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UPCOMING ISSUES
The Return of Narrative, Eco-Logics

PRAXIS 13 **ECOLOGICS**

Ecologics

Ashley Schafer and Amanda Reeser Lawrence

Hermaphroditic polar bears, melting ice caps, water shortages, rising sea levels, crop failures, and catastrophic storms: these are just a few of the consequences and predicted effects of global warming. Scientists cite buildings as the source of between □□□ and □□□ of greenhouse gas emissions annually, a fact which places architects at the center of the problem, but also mandates a disciplinary response.

Most of the current debate surrounding sustainability relies on negative rhetoric (scare tactics) that incentivise immediate, realizable, pragmatic responses (LEED), rather than more radical and visionary solutions.

Current discourse on sustainability is lacking. This issue aims to come at the question from a different angle. But how exactly? What is lacking in the contemporary discussion?

Seems that much of current green architecture focuses on a sustainable aesthetic, with little or no consideration for performance or truly radical questionings of current building practice. Too often an overlay of allegedly sustainable item (green wall best example) which has no real impact on the architecture or, more importantly in our minds, which doesn't emerge in any integral way as a part of the design process.

This issue then was meant to highlight firms, projects, ideas in which ecology—in other words how architecture relates to a larger system/its environment and can itself embody ecological ideas—was paramount in the design process and which generated a genuinely innovative architecture as a result.

This has a resulted in a green architecture issue with no green buildings. No green walls, no green roofs. And yet all of these projects address the question of ecology. Each considers a 'logic'—an approach to ecological thinking, embedded in the work, not applied retroactively.

How does a project impact its environment? And vice versa? At what scale? All of the projects we've decided to feature emerge from a consideration of ho

Talk about number of objects—not necessarily an important measure in and of itself, but begins to get at different notions of networks vs. field conditions. Also an interesting inverse where the smaller objects often impact a greater area. Architects thinking at multiple scales at the same time. So even if the object is small (ie bat house or stack haus) the architects are considering how they impact and are impacted by larger environments (the bat migratory patterns or the transportation network for materials). And vice versa—when architects thinking urbanistically or even globally, it often comes down to the very small scale where the impact is made—nicholas's wpa project where the leftover spaces of the city are captured to create a larger network, or utt where an urban network is activated through smaller scale projects such as gyms or funiculars.

Importance of repurcussions—the impact a project has on its environment.

What bout disciplinarity? Are architects treading into territory where they shouldn't go? Talk about Walter's piece (we hope!) – the idea that architects are comfortable wearing many hats. But does this dilute our credibility? Are we just trying to jump on the bandwagon with the Landscape Urbanists, to try and propose more universal solutions? I would say that the projects here avoid that trap in most cases because they capitalize on the specific tools and strengths of the architect—this is where the interest of praxis and our focus is important, because we are featuring architectural responses to this problem, in other words responses that propose solutions in the form of designed projects--even if they're not built. Not just diagrams or renderings but developed designs. Xero house or

Talk about why we included all of WPA—why do we think this is important? Our general commitment to competitions is one aspect (fresh kills, dead malls) but more importantly...what? Seems to mark a moment where architects are taking on these larger environmental questions in a new way. Not lanscape urbanism. Why not, exactly? I think it does have something to do with the specificity and the architecturalness of the responses.

Also talk about the radicality and visionary quality of many of the proposals. We didn't' start out looking for those, but again perhaps this marks a disciplinary shift, a moment where architects are projecting forward as they sense a sea change in the profession. Projects like smog machine or weightless city or even xero house. Do these harken back to the □□s, to lydia's work? How are they similar? Different?

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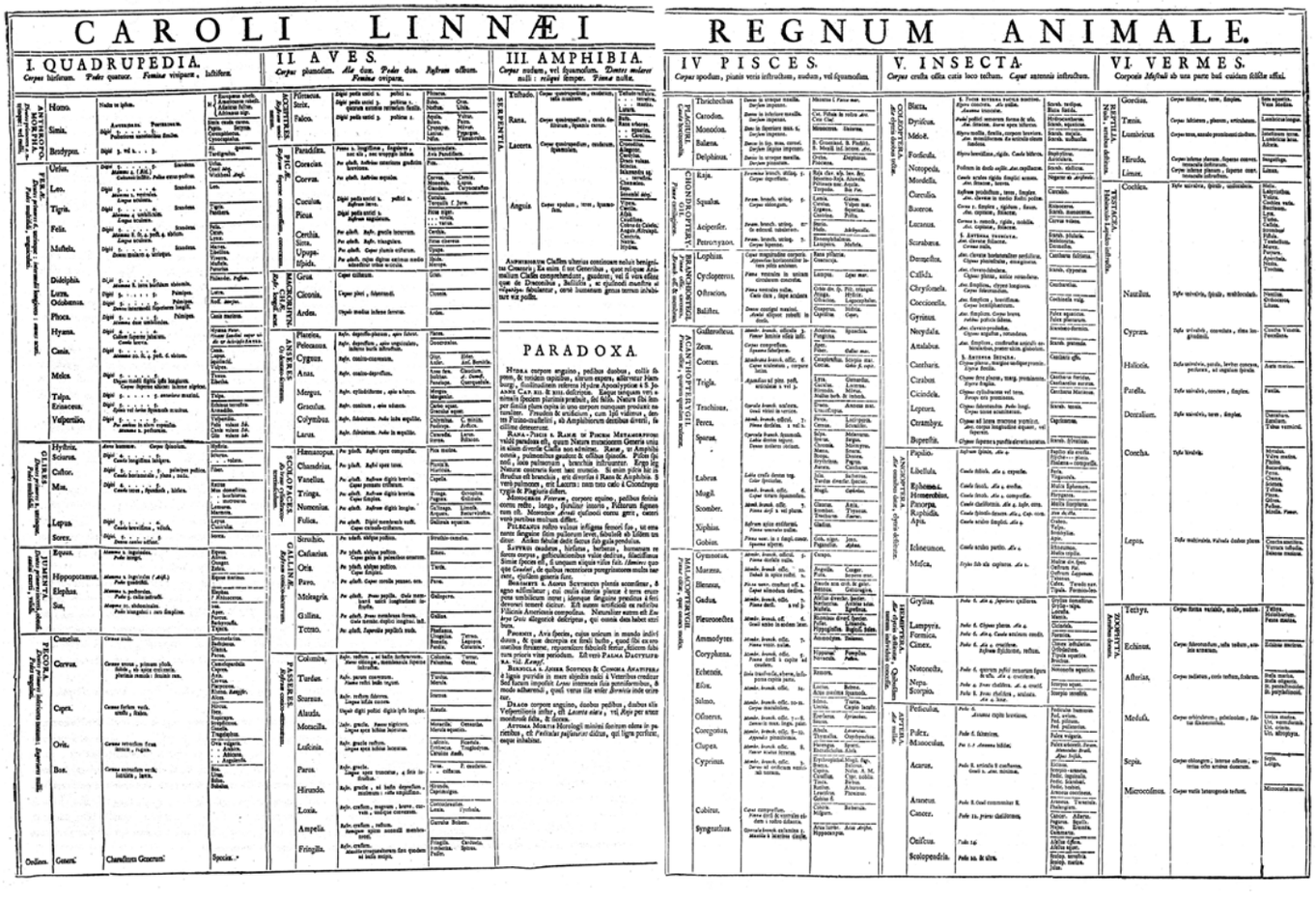
ECO-REDUX:
LYDIA KALLIPOLITI

FROM “OBJECT” TO “SYSTEM” AND THEN TO “CLOUD”


CAROLI LINNÆI

REGNUM ANIMALE.

I. QUADRUPEDIA. II. AVES. III. AMPHIBIA.

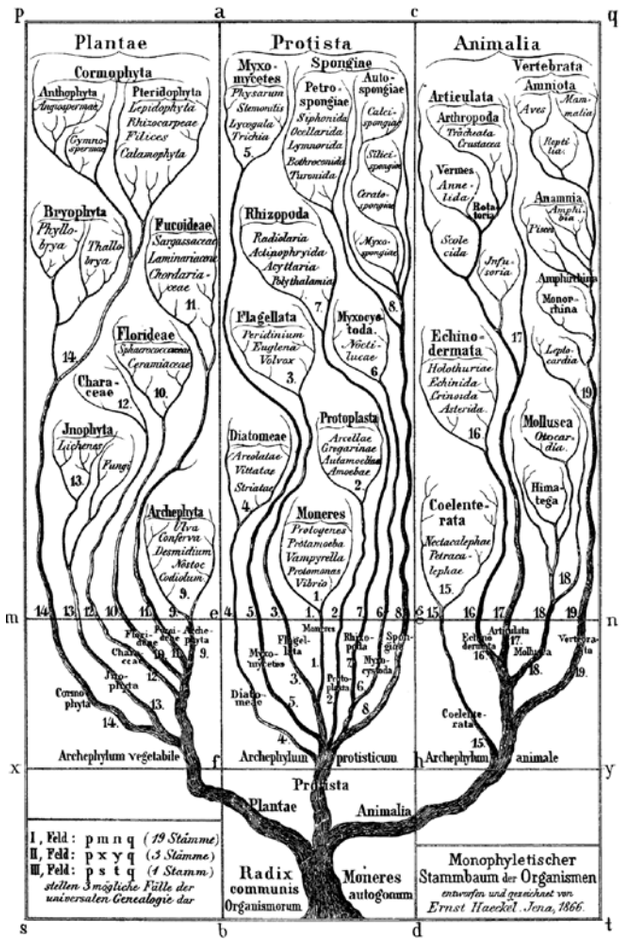
IV PISCES. V. INSECTA. VI. VERMES.

PARADOXA.

The way we classify things bears a profound impact on disciplinary structurIn the history of ideas, discourses get recycled. Concepts emerge as allegedly new, though ideas undergo long journeys of migration from one epistemological field to another. Like Ulysses’ drift in the Odyssey strayed by the winds, ideas travel in space and time across different branches of knowledge. The kinship between present-day design debates and the period of □□□□s-□□□□s is quite striking, to such an extent that we can speak of uncanny resemblances, something eerie, already seen and experienced like a déjà-vu. Concepts, forms and approaches retrieved from this recent past have been described by a number of critics as a pervasive phenomenon of media archeology.

But, what lies behind this dramatic recovery of the □□□□s? Is this déjà-vu a psychopathological symptom in the progression of ideas? And if so, how could this regression be used generatively to reconstruct future courses? The only way history survives as a relevant discourse is through revivalism of the oblivious past. Looking backwards to the postwar period is more than a quest to identify historical antecedents. It could be quite the opposite: that the present helps us understand this recent past; and of course, vice versa.

Leftover histories—environmental experiments with organic matter, synthetic growth and other alternative technologies that were once esteemed as marginal and deviant—are now of core significance to architectural discourse. Displaced from the periphery to the center of deliberations, these counter-histories may account for the multiplicity and diversity of current ecological anxieties in architecture. At present, on a planet that has no more square inches of untouched environments, the new wave of ecological architecture cannot be explicitly directed to the ethics of the world’s salvation and the rhetoric of confinement. It rather upraises as a psycho-spatial or mental position, fuelling a reality of change, action and disciplinary crossbreeding.



In this light, an online archive was created to document and explore significant disciplinary transformations in the postwar period. Coined as Eco-Redux, the archive refers to the return of ecological awareness as a phenomenon of resurgence from the □□□□s and □□□□s and assembles a database of ecological material experiments as well as their ramifications in architectural design. The EcoRedux archive indexes experiments that are offsprings of a local inventory, an inventory by which the material selection and the technique of its deployment are fused semantically to produce the effect of unique and variable solutions. In this sense, the intention is to track an unexplored genealogy of design experimentation that underground architectural groups conducted during this period, as a prehistory of a rising biotechnological imagery and a new social and planetary vision throughout different design disciplines. In this context, revisiting the term 'ecological', rather than 'sustainable' and 'green', is of essence and may potentially contribute to a reassessment of contemporary debates. It may be in this epistemological fusion that we can ask more of architecture.

None of the experiments in the archive address the totality of the planet managed and harnessed as a whole ecosystem. Rather, all imaginable provisional structures and small-scale strategies–pneumatics from used parachutes, hand-made domes from discarded materials, electronic-lawn carpets, pills, capsules and self-sufficient systems, garbage houses, foam shelters—become part of new equation in reflection of the intense socio-political concerns of the time and the collective fantasizing about new technologies as remedial tools. The collection of these experiments, perceived as partial adhoc ecological strategies, form a counterpart trajectory to the canonic environmental discourse of the postwar period, focused on the decryption of the planet as a whole ecosystem, consisted of subsystems. Buckminster Fuller, John McHale, and Ian McHarg played a seminal role in developing this system-based organization of the earth by distinguishing parallels between the earth and human processes. A physiological diagnosis of planetary resources was precisely the agenda of Fuller's "World Design Science Decade," which took cognitive analytical form in McHale's The Ecological Context. However, the experiments registered in the EcoRedux archive comprise only zoomed-in fragments in defiance of a larger scheme for global harmony; like a peep-show of the world, or a selective perspective that reconstructs the globe out of little pieces.

These experiments suggest an alternate model for urbanism that presupposes a new form of description irreverent to the master plan; a form that needs to integrate the parameters of variable micro environments that are constantly changing. Although the improvisatory techniques registered in the archive only provide us with rudimentary shelters, they suggest a new method of approach, in contrast to prior geometric configurations, allowing for the integration of constantly changing environmental parameters within the design and construction process. Furthermore, we witness a germinal connection between the macro-urban scale and the micro-material scale, leaving the medium scale,—building—out of the equation. Peter Cook recalls how, at the end of the □□□□s, "it was fashionable to introduce a project as 'anti-building,' or a conglomeration of environmental elements." By looking back at this time, it is not proposed to forgo the discipline's core, which is the building as the main edifice of architectural practice and education. But instead, it is suggested to interrogate the extremity of scale—the focus in the micro and macro—and to inquire this "out of focus" moment as a reflection of intense socio political upheaval.

Nevertheless, in present-day design debates, the extensive recovery of ecological concerns broadcasts mainstream values and stands as a defense mechanism for late capitalism. At the formative stages of the green movement in the □□□□s and □□□□s, ecological design debates were of a very different political and ideological orientation. Ecology not only embodied an alternative route to mainstream political action, but also an inspirational model for design creativity; it embodied an evolutionary design process in several stages and lifecycles through material experiments as analog computation tools. Looking back on this period, offers an alternative "elastic" understanding of term "ecology," at a time when the term addressed not only a new kind of "naturalism" and techno-scientific standards, but also systems theory: a recirculatory understanding of the world and its resources.

Overall, EcoRedux documents a larger disciplinary transformation and an experimental mindset in the finale of the □□□□s with the aim to map a history of architectural imagination, rather than a history of technological development. Through this documentation, the hope was to question mainstream current perceptions of sustainability and the LEED program, as a technical classification tool that empowers capitalist production, creating a new revenue source veiled by the ethics of environmentalism. The archive is also an educational open-source online resource—www.ecoredux.com—with a dual function: first as a tool to explore the history of the period, but also as a pedagogical tool for design. Given, the open source nature of the project, architects and designers are able to actively participate in the expansion of the website by submitting for upload their own interpretations of ecological experiments that are documented in the database. The scope is to foster the reuse and recycling of the information documented in the historical archive in order to explore innovative ecological strategies in contemporary architectural practice. It is implicitly argued here that the permission to reproduce, translate or even "misuse" information, to observe and transform existing material and ideological structures, endows architecture with its creative potential.

EXPERIMENTS WITHOUT HYPOTHESES

The experiments documented in the EcoRedux archive, beyond being historically informative, narrate stories, wonders, obsessions, blemishes and personal values that haunted their authors. In many cases, the projects were very crude in form, leaving their authors unsatisfied or in anxious search of the materialization of their visions that could somehow not be pinned down at that moment. Many experiments were based on erratic material interactions and therefore defied established definitions of representation; there was little tectonic control over their formation. This realm of impossibility, the moment when representation fails to be descriptive of the form of objects is both magical and terrifying. And as such, these architects were prisoners of their visions, openly willing to fail at all fronts.

As compared to the scientific definition of experiment, this type of open-ended exploration was obscure in its directions and purposes. The scientific terminology holds that an experiment is conducted in order to either verify or falsify a hypothesis, or in order to research a causal relationship between phenomena. Moreover, an experiment should be able of replication, under certain predefined canonical conditions and in a particular number of steps /phases. On the other hand, the fuzzy, non-linear nature of design processes makes it unfeasible for a design experiment to align to this universal clarity. One could argue that design experiments seem "hypothesisless," while the value of contingency, as this is mediated by the interaction of materials and their deployment tactics in varied circumstances, constituted a key feature of design experimentation. Peter Cook, in his influential book Experimental Architecture, rightfully admits the elusive nature of design experiments when he writes:

It is difficult to define 'experiment' in the architectural sense. One is now forced to admit that design has so far been tantalizingly imprecise as a science. While there are bodies of knowledge, such as structural theory, weather protection and fabrication, these are a mere technical backup and have limits as a support as a theory of architecture.

While Cook acknowledges that "a practical problem could lead to a piece of pure inventiveness" and praises technological innovation for the detouring architecture from the fetishism of buildings, he continues to deny technical innovation as purely experimental and classifies this kind of expertise to the traditions of the problem solver and the "boffin" designer. The experiment consequently surfaces as a transgression of the techno-rational and functional tradition and as an immersion to unfamiliar territories that will potentially yield unpredictable results for the discipline of architecture.

The model of "direct action," that the EcoRedux projects proposed , stimulated major design debates, the echoes of which are still vibrant in contemporary practice. This emerging framework of thinking critically undermined the imperial significance of formalism as the distiller of value, in favor of open-ended potential in procedural design. As an effect of this discourse, alternate means of production were recovered, disengaging design from the conventions and limitations of drawings, which have for the most part governed design practice throughout the century.

Foremost, several projects documented in the EcoRedux archive do not necessarily target environmental improvement as a planetary strategy. The archived experiments are partial, small-scale, adhoc and opportunistic, unclassified under a larger plan. In this sense, the archive documents a counter-history of ecological anxiousness. The projects are not performative agents of amelioration; rather they are, in themselves, their own ecologies, producing new worlds.

CLOUD HISTORIES

In □□□□ Ramnath Chellappa coined the term "cloud computing" to describe information storage in networked online clusters, as distinct from localized storage in physical data centers. Chris Anderson, editor in chief of Wired magazine, argues that information is no longer about the archive, the library and even the organization of complex three dimensional classification systems, but instead it renders an order of "dimensionally agnostic statistics." The cloud necessitates an entirely different way of understanding the world, "one that requires us to lose the tether of data as something that can be visualized in its totality." Growing out of Google's model of detecting correlations through applied mathematics and not through context, the cloud ranks fractional connections above holistic perceptions of phenomena. An embodiment and representation of change and self-organization, the temporal space of the cloud grows, crystallizes and dissolves. What is essential about the cloud is the absorption and collection of data that crystallizes in a region, rather than the overall contextual interpretation of the data. In a world where complexity can no longer be decoded systematically, the cloud is a byproduct of incidental data accretion; it defies any precise definition of form and representation.

In many respects, the EcoRedux archive is like a cloud. It swarms together in a blurry mass seemingly unrelated characters, projects and environments that phenomenally do not have much in common. Even though they never worked together, these architects are the protagonists of a profound transformation to amplify the main disciplinary focus from object to environment, system and situation. This archive is not a marginal history of non-architects that needs to be written because it is left untold. It is assembled to uncover spatial and architectural concerns and ideas that surface now, though they originate from a historical moment when the discipline underwent a fundamental disappropriation of its normative tools.

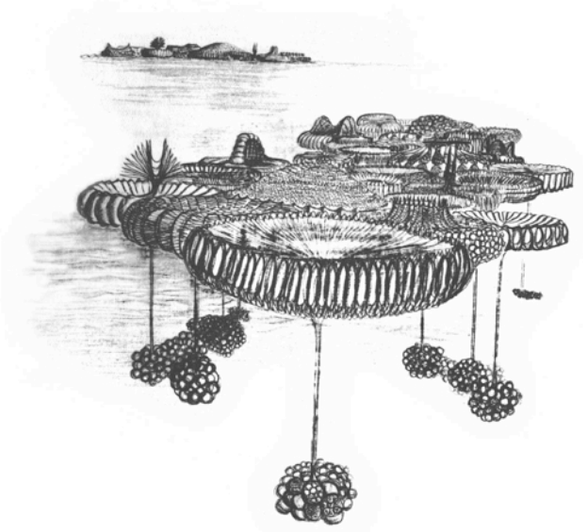
Concluding, we may distinguish the stories outlined in EcoRedux archive as side effects in the history of ideas, rather in alliance with the normative course of what we premeditate as of core historical significance. The experiments register retroactive moments, incomplete bubbles of events. At times, such unexpected offspring stories that germinate as derailed paths from the central line of inquiry truly speak of today's ideological diffusion, despite the fact that they are not cognitively claimed as central. They constitute a marginal practice that informs the core in an almost subconscious way, feeding history through its dross, These stories, incidental side effects produced as a discipline undergoes a transformation, may suggest an alternative reading of architectural history: not by offering actual objects and a new paradigm, but by suggesting new tools and new modes of practice. The objects may be fictional, impossible, or in the best-case scenario ephemeral, but architecture is mostly a project on imagination. The objects can be ephemeral, but the tools and modalities of design creativity that they produce are still vibrant in contemporary practice. Foremost, this emerging framework of thinking critically undermined the imperial significance of formalism as the distiller of value, in favor of open-ended potential in procedural design. As an effect of this discourse, alternate means of production were recovered, disengaging design from the conventions and limitations of drawings, which have for the most part governed design practice throughout the century.

In many cases exhibited, especially those interrelated with transformation techniques such as sculpting and moulding, the results were less than formally promising. As could be expected, initial attempts to explore the nature of new materials and techniques could not be other than coarse, given the lack of proficiency in their manipulation. Formal finesse is intimately bound to the accumulative knowledge embedded in the adeptness of established means of representation, implicitly acquired and passed from one generation to the other and regularly succeeding initial stages of experimentation. However, the majority of critics of the time were less than sympathetic to this juncture of open-ended exploration, disparaging such efforts for their formal vulgarity.

Material experimentation has often occasioned denigrating critiques by its evaluation on the basis of subjective aesthetic criteria beyond the scope of the authors' agendas. However, despite the misinterpreted reception of such projects, formalism's temporal displacement entailed a short-lived subversion of the belief in representation as an exclusive mode of spatial production, putting forward an agenda of 'direct making' before one is in command of formal intent. Latent in the punctuated lineage of this experimental trajectory, is the disciplinary necessity for ongoing, unceasing production; a production so brutally wallowing that it might 'devour' the heroic architect, and remind the discipline of the fragility of precious concepts before one indulges in action.

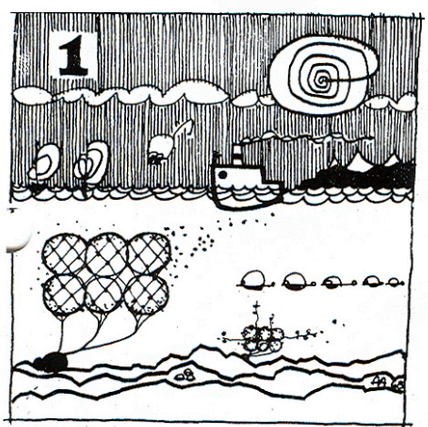
SOFT 1.1—
GROWTH AND LIVING SYSTEMS

Investigates the integration of organic matter and biological substances as evolutionary building elements in space. In this category, the term 'construction' is replaced by the term 'growth' as built artifacts are understood in several stages of formation and take shape in time through chemical reactions and growth processes. The end product is partially controlled and partially emergent from unpredictable transformations of the living systems.

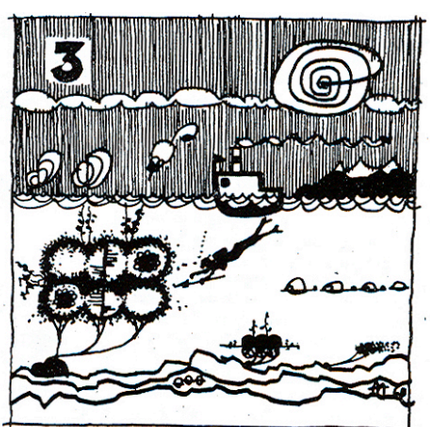


1.1.1 CHEMICAL ARCHITECTURE BY WILLIAM KATAVOLOS (1960)

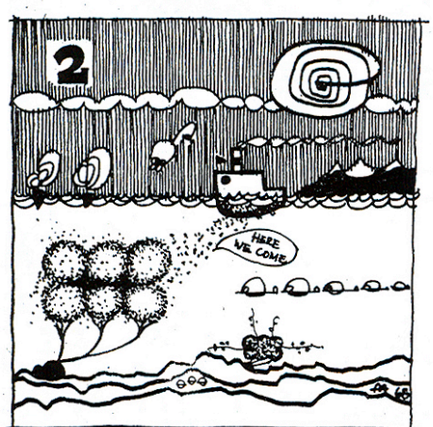
The Museum of Modern Art in New York organized an architectural exhibition entitled "Visionary Architecture." In the exhibition statement, the curator of the show Arthur Drexler, wrote that the buildings included were a collection of unbuilt projects, either because they were technically infeasible at the time they were designed, or society could find neither the justification nor the money for their construction. Among Frederic Kiesler, Buckminster Fuller, Paolo Soleri, Kiyonori Kikutake and many other, William Katavolos presented his project "Chemical Architecture" which was later canonized as the "Organics Manifesto" in Ulrich Conrad's collection of twentieth century modern manifestos. In the description of his project, Katavolos envisioned the design of cities through the microscopic manipulation of materials and imagined a city that would grow softly, rather than be designed as an end product. His manifesto identified the soft, biological, chemical potential of design as a democratic and sustainable outlet to deterministic design. He wrote: A new architecture is possible through the matrix of chemistry. Man must stop making and manipulating, and instead allow architecture to happen... We are rapidly gaining the necessary knowledge of the molecular structure of chemicals, which will have a specific program of behavior built into them in a sub-microscopic stage. Accordingly, it will be possible to take minute quantities of powder and make them expand into predetermined shapes, such as spheres, tubes and toruses. Visualize the new city grow molded on the sea, of great circles in which plastics pour to form a network of strips and discs that expand into spheres, and further perforate for many purposes.



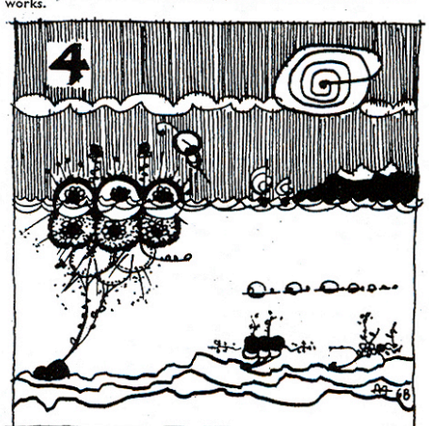
Take net and cables to hold pneumatic bubbles below surface of sea. Maritime micro-organisms colonize everything: Bubble system and captain Smoky's boat.



A tourist arrives to conquer this selfgrowing submarine shell—he perforates some of the Plastic bubbles as he has learned, when he left his mother or when he deflorates. Soon he has bigger inner spaces in INNER SPACE: living-room, bedroom and the whole works.



While captain Smoky's boat slows down and loses speed because of algae crust, the bubble matrix grows a live space frame of optimal loadbearing capacity—huge macro bone. Oysters and shells climb to this surmarine Bio and nibble from it, not knowing yet that [illegible]r they get nibbled themselves.



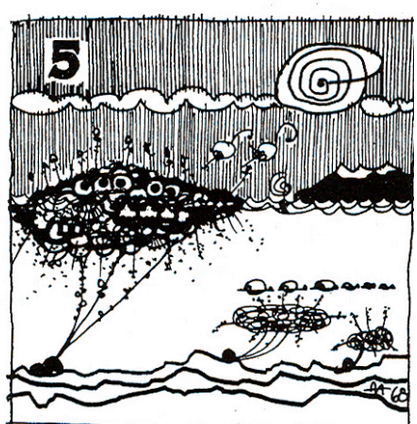
The bubble - over - perforator - deflator - deflorator loosens some of these cables to let his house mate with the sun in summer, when the sea keeps quiet. He also re-uses some bubbles to grow more space for bubbling companions. Among them his friend Delphine, who hauls in breakfast every morning and some fabulous sea lettuce too.

Provolution

R + D (or Rudolph Doernach)

Interdisciplinary micro-macro-game

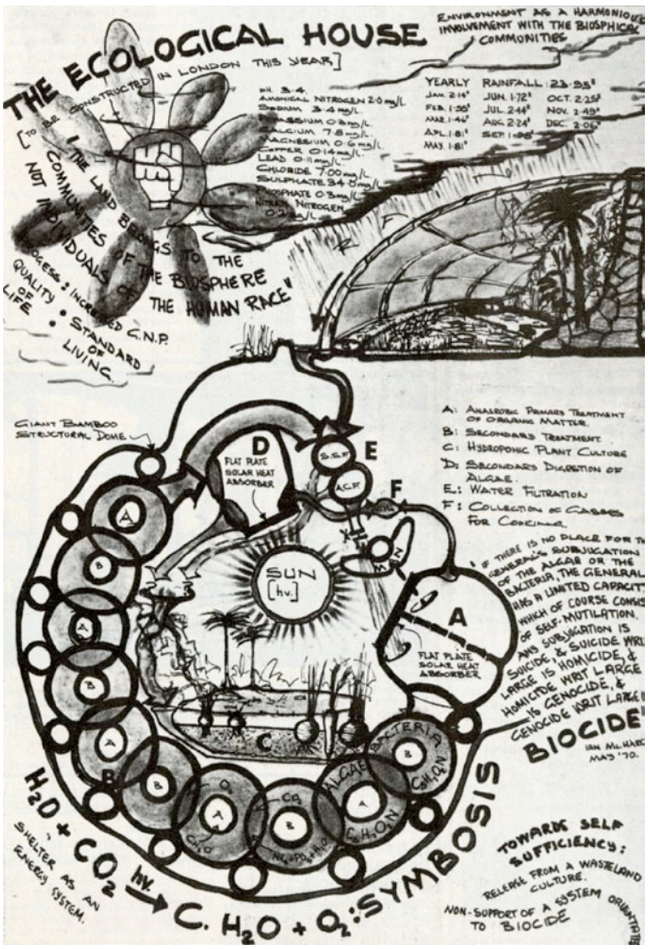
How to grow a maritime city?
How to grow a fur for society?
How to grow Biocity edible city?
How to regain PARADISE?

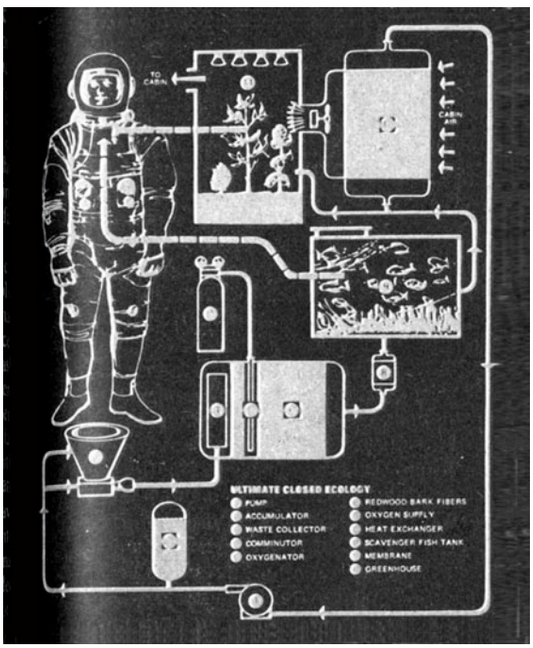


Edible City keeps growing because one tourist found out how t use fluid plastics and fibrous plastics to reinforce Edible City's liv space frame. Another started to fool around with a perforated hos simply because he likes to play with all round-long things; this wa he discovered how to feed the big sea bubbles with all kinds goodies from EDY Chemical Co. At the same time he used th invisible plastic hose to cool his HAPPYTAINER. One day a bottl of whisky caught fire; the cooling system acted as a fire patro One day Rudolf—called R + D—brought a little atomic breede for Edible City. You should have seen all these animals going-nut growing-huts in the warm sea.

SOFT 1.2— RECYCLING

Recycling investigates space as a physiological feedback mechanism that receives input from the environment—in the form of sunlight, rainwater capturing, air flow—or from human occupation—excrements, greywater etc.—and returns it to useful output, the production of energy that is consequently fed back again into the function of the inhabitable unit. Space is viewed as a cybernetic machine of cyclical operations converting waste into useful products. Recycling provides an ecological model as a circular cause of reasoning, constantly searching for causal mechanisms.





1.2.1 BIOLOGICAL WAST TREATMENTS SYSTEM BY EDWARD BURTON (1960S)

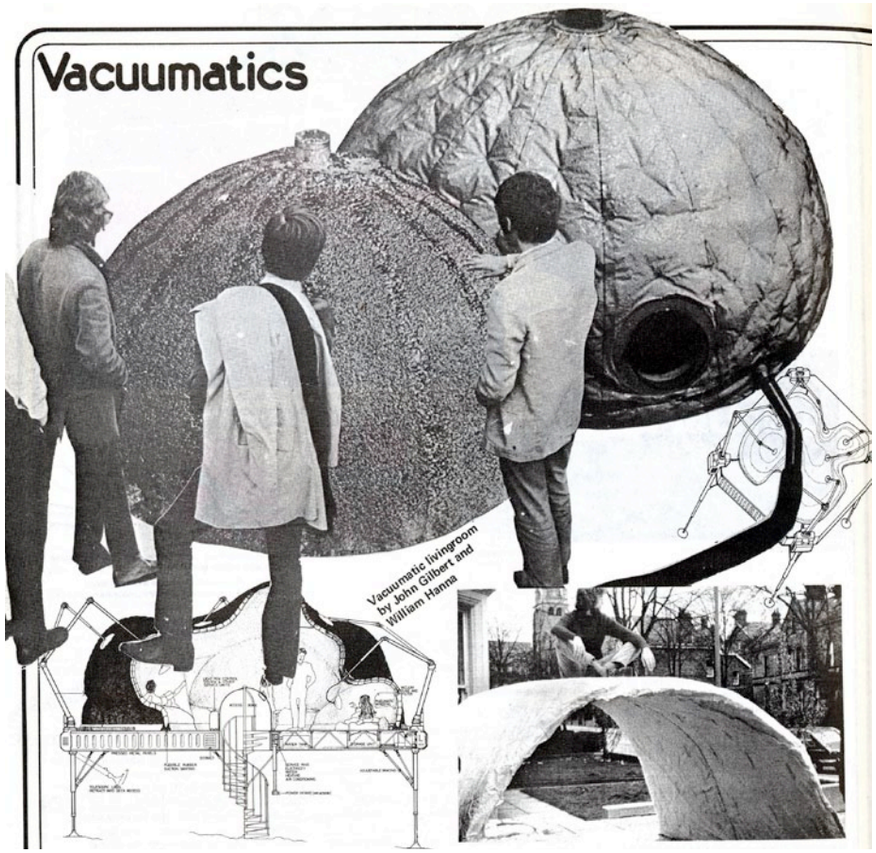
Under the pseudonym Ruppert Spade, Martin Pawley, wrote in □□□□ the article "Trick Recyclist," describing the experiments of Mr. Edward Burton, who between □□□□ and □□□□ had taken out several patents relating to a Biological Waste Treatments System (BWTS), with a view to adapting his waste recycling system for use undersea or in space. To develop his inventions, Burton was in touch with the Grumann Corporation, in the early □□□□s, and offset the industry's smart technologies to home-made reprocessing systems, managing to nourish a duck, fifteen goldfish, an apple tree sapling, an apricot tree plantlet and a small rhododendron plant, singularly and adequately from household effluent. With a number of conversions, oxidizing and permeation devices, Burton's system became commercially available in the US in the early □□□□s, promising to clear off effluents and then grow tomatoes.

1.2.2 THE ECO-HOUSE BY GRAHAME CAINE (1972)

The Eco-House or Street Farmhouse in Eltham, South London, was one of the earliest ecological houses, built in □□□□ as a laboratory and a living experiment by Graham Caine, a member of the anarchist group Street Farmers. The Eco-House was not only a fully functioning integrated system that converted human waste to methane for cooking, but was also built by its architect, who used himself and his family as guinea pigs. Caine was the steward of this house; he alone knew how to feed the house with the right nutrients—how to chop wood, water the plants in the greenhouse, feed the engines, water the greenhouse and experimented with his waste, his cooking habits, his use of water, monitoring closely every activity of daily practice until the day the day the house was demolished in □□□□. Caine was an indispensable part of the house he built and portrayed himself as a combustion device for generating electricity, connected to the house in a diagram where excretion becomes part of the system's sustenance. One can argue that in many respects, the house was more grown than constructed. It needed care from its caretaker and without human presence its living biotechnical systems would degenerate and die. Describing his house as a life-support system, Caine satirically argued that the architect, now being involved with the house's biological cycles, may now relate to his own shit.

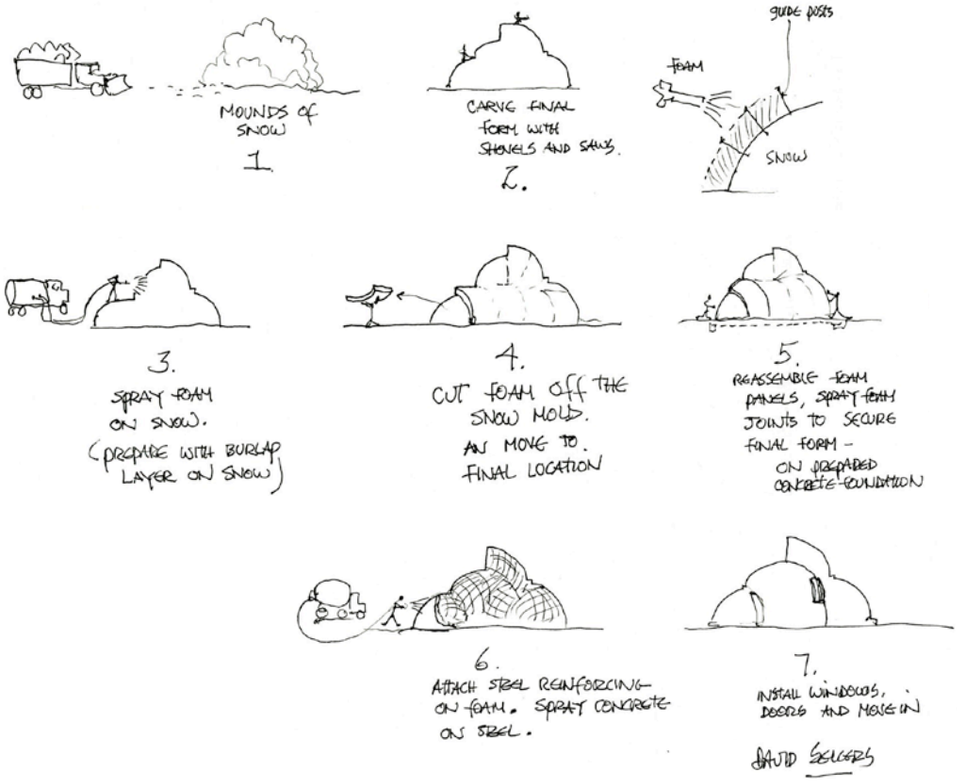
SOFT 1.3—
FLEXIBLE MOULDS: AIR, PNEUMATIC AND ICE MOULDS

Flexible (Air and Ice) Molds redefines the process molding in form-finding processes, through the use of "flexible" elements or environmental forces as molds. Rather than a static formwork, like a wooden frame, that returns an end product as an inversion of its shape, the final product of flexible molding process is derived from the interaction between the mold and the cast. The final object is not a self-defined entity. Flexible moulding signals an open formation process: one that allows the object under formation to be affected by environmental parameters, such as local winds, temperatures and other meteorological phenomena. In this sense, a more expanded definition of moulding is suggested; one in which the 'mold' becomes an accumulator of physiological contingencies that play an active role in the construction process.



1.3.1 VACCUMATICS BY JOHN GILBERT AND WILLIAM HANNA (1971)

The 'Vacuumatics' project' investigated an interactive molding process with polystyrene beads inserted in a flexible plastic membrane. Air was vacuumed out of the membrane and then the beads, under certain conditions of pressure and temperature, bonded and provided a benchmark-mold for the membrane to set. 'Vacuumatics' exploited the mechanical material properties of expanded polystyrene beads that were capable of softening and fusing with the aid of the proper catalyzing agents, along the guidelines of an article published in AD earlier that year, entitled "The expanding world of polystyrene foam." The method of pumping air out of the flexible envelope provided overall stability to the structure, despite the fact that the beads, on their own, were small-scale feeble particles. The article featured small prototype domes which were erected at the Department of Architecture of the Queen's University in Belfast, using the 'vacuumatic' principle, sucking air out of the mold in a reverse pumping process



1.3.2 SNOW MOULDING BY DAVID SELLERS (1973)

In the early □□□□s, David Sellers used snow, abundantly available in his place of residence in Vermont, to produce cheap but variable moulding forms for free-form polyurethane shelters. Sellers built up the snow to the required shape and covered it with hessian; then the mound was sprayed with low temperature foam to create a shell of a thickness of between two and eight inches, depending on the structural requirements. Seller's 'snow moulding' project had an immediate predecessor: "Ice City", the product of a workshop held by the Symbiotic Process Laboratory of Texas University that took place in Fargo, Minnesota, at the beginning of □□□□. The scope of the workshop was to experiment with ice as a building material for temporary shelter, emphasizing the numerous free-form possibilities derived from ice's inherent material properties. The case of 'snow moulding' however, was methodologically different. As explained by Sellers, snow was used as a mould, onto which low-temperature foam was sprayed, so that the occurring shelters resulted from the synergistic effect of two materials—one as the mould and the other as the cast. Although one of the two objects is unseen and essentially comprises a phantom, the final product of the molding process is derivative from the interaction between the mold and the cast. It is not a self-defined entity.

SOFT 1.4—
ACCRETION AND SPRAYING

Accretion cannot be defined by a particular technique alone. As a process it exists in matter itself: from the macro-scale cosmic collisions in the formation of galaxies, to the micro-scale in the sedimentation of matter and the development of molecular bonds. Accretion investigates bottom up techniques of organizing particles of matter around a reinforcement matrix, which becomes a source of attraction. Techniques like spraying and the sedimentation process of celluloid foam plastics constitute examples of accretion.

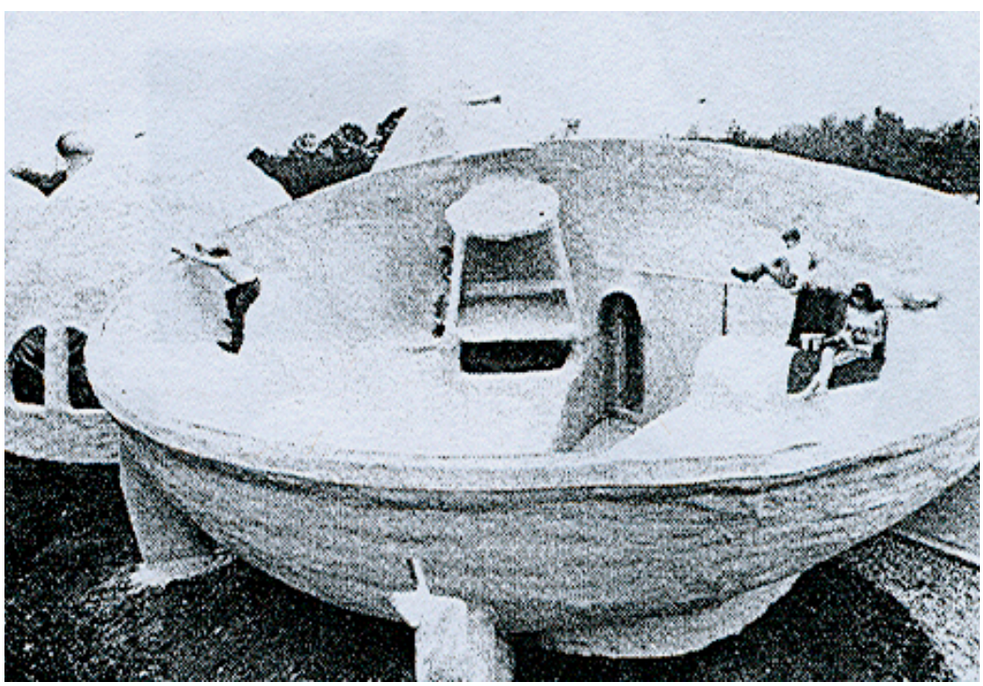
1.4.1 TAO EARTH HOUSE BY CHARLES HARKER (1972)

Charles Harker, founder of the Tao Design Group in Austin, Texas, juxtaposed Le Corbusier's machine for living in the early □□th century with a new concept for habitation that he coined as the "soft machine." The Tao Design Group, an experimental group of architects, sculptors and artists associated with the University of Texas at Austin, explored the application of new plastic materials in architecture and published their molded shelters as environmental paradigms for a "soft future" in Architectural Design and Domebook □. As Harker wrote: We are in the midst of a Socio-Psychological, Cybernetic, Mass-media and Space Age revolution. The architect must respond to these influences and must discover the path to a "soft machine". We should create a softer, more fluid and exciting physical environment, understanding form as the articulation of a set of interacting forces.

In his manifesto for the "Soft Machine," Harker outlined an alternative definition of matter as patterns of energy that come to be solidified in time; he spoke of matter that can be remodeled in numerous ways; and materials that could be composed morphogenetically rather than morphologically. For the Tao Design Group, it was key to dispose firm tectonic divisions, like structure, envelope and roof, in order to envision an environmentally—friendly, as they called, soft future. The term "soft" was therefore used both literally, though the use of plastic materials, and conceptually, projecting an elastic understanding of tectonic conventions.

1.4.2 FOAM HOUSE BY FELIX DRURY (1970)

Architect Felix Drury designed a corporate guest house for the West Point Pepperell headquarters at Langdale, Alabama. The house was explicitly shot from a spray gun and according to Drury, it represented just the beginning technology for the use of foamed plastics, urethane foam to be precise, as structural materials in housing. The forms were inflated after being stapled to the formwork of concrete floor slabs. They were then sprayed from the outside with"cold weather" urethane foam of about □lib density. After the house was completed Drury evaluated the result as "entirely unsatisfactory." It seems that the heat of the chemical interaction during foaming determined the layers of polypropylene fiber, leaving a partially loose interior surface. Even though Drury was highly frustrated with the result he mentioned when interviewed that "this technology is only a crude start. It is not the magical material, but it can do things no other material can do, such as to freely work with curved surfaces. As drastic changes occur in man's use and sense of time, scale and place, foam allows the architect to experiment with conditions which might accommodate these changes."



SOFT 1.5—
PHASE CHANGE AND MATERIAL EXPANSION

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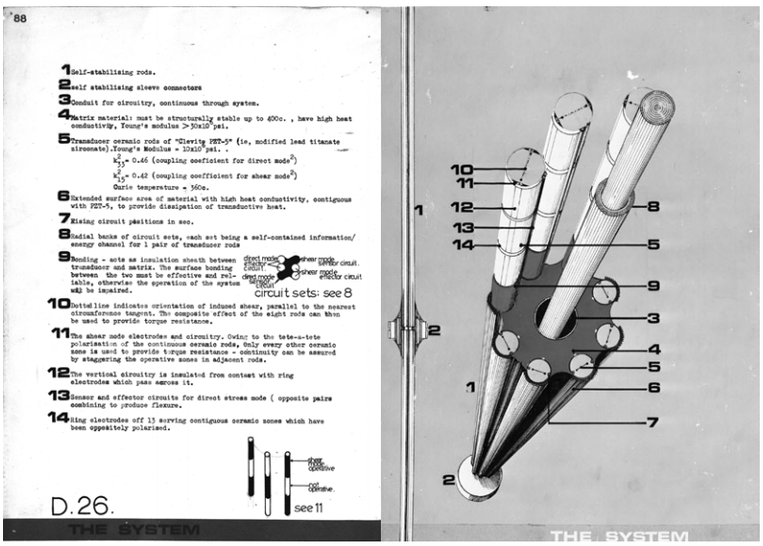
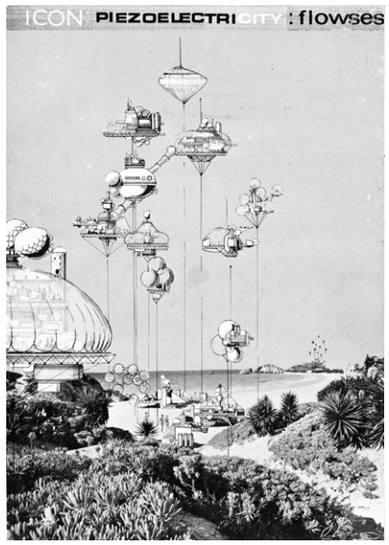
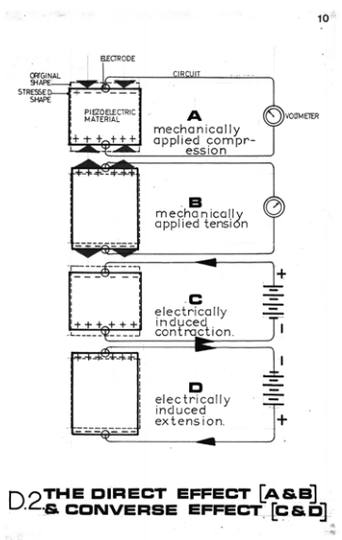
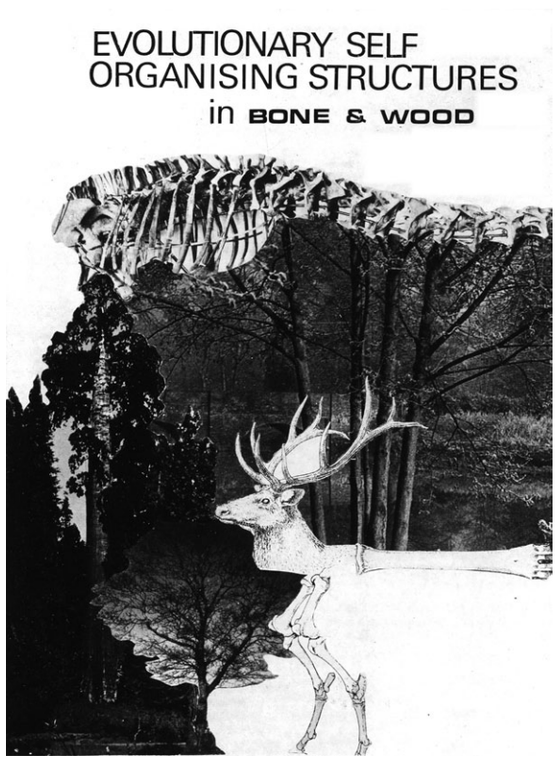


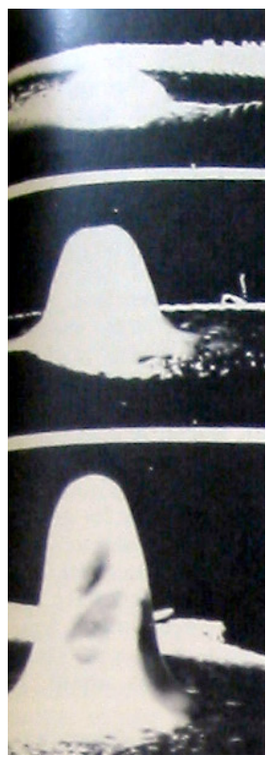




1.5.1 PIEZOELECTRICS BY ROBIN EVANS (1969)

Piezoelectrics was the thesis project of eminent architectural theorist Robin Evans for his graduation at the Architectural Association in London. The thesis was inspired by technological advancements in the micro realm materials and proposed macro solutions for cities made of piezoelectric elements that are set in position and then made rigid by the passing through of an electrical current. The properties of piezoelectric materials that can be electrically charged when subjected to a certain amount of stress provided a platform for Robins to envision the future city. Evans thought of piezoelectric materials as an emerging type of naturally interactive system and outlined their potential use in the design of a series of interactive structures.





1.5.2 PROJECT TITLE BY SOMEONE (1969)

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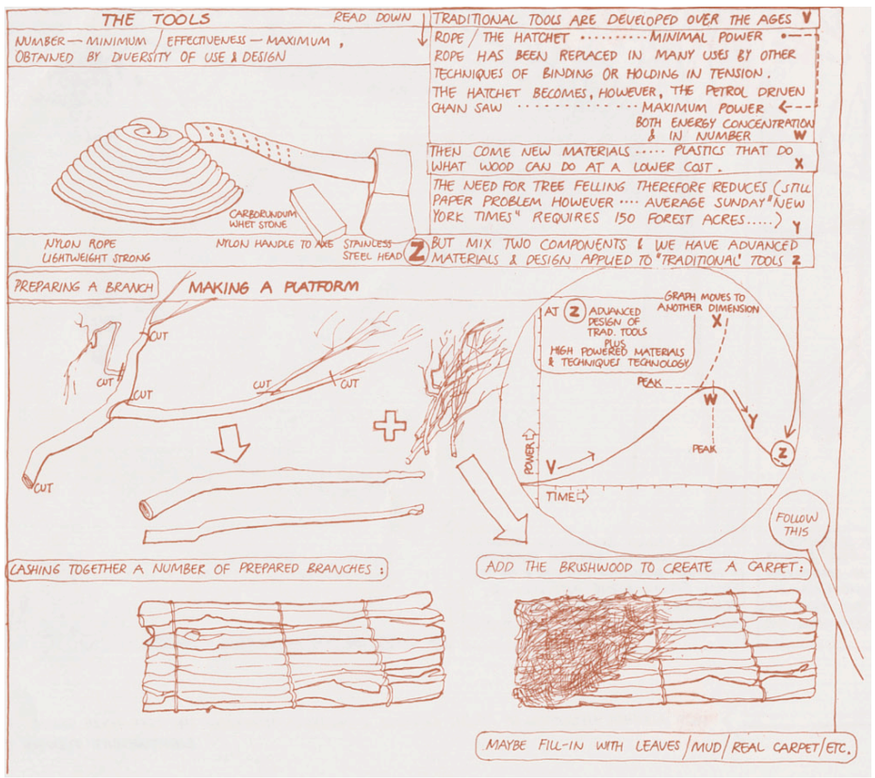
HARD 2.1—
FOLDING AND KNOTTING

I nvestigates the use of weak materials, not normally used for structural purposes, which strengthen locally through the application of repetitive techniques. This category explored an economy of means by means of geometries and patterns that attribute new mechanical properties to material performance.



2.1.1 PROJECT TITLE BY SOMEONE (1969)

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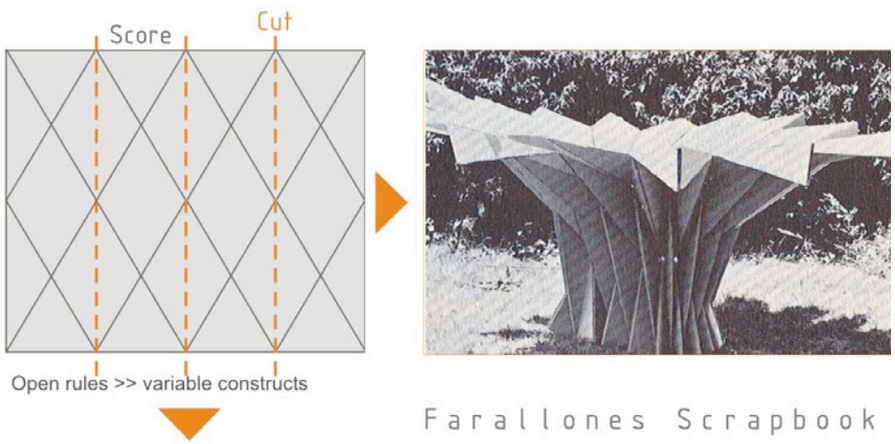

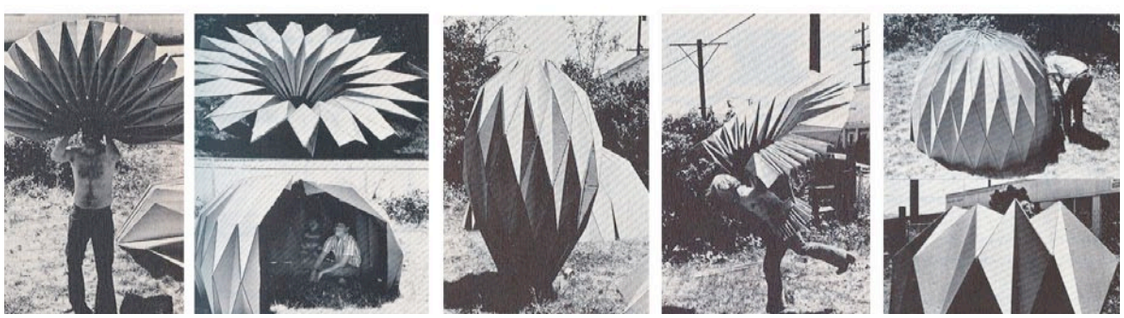

HARD 2.2—
ASSEMBLY AND MODULES

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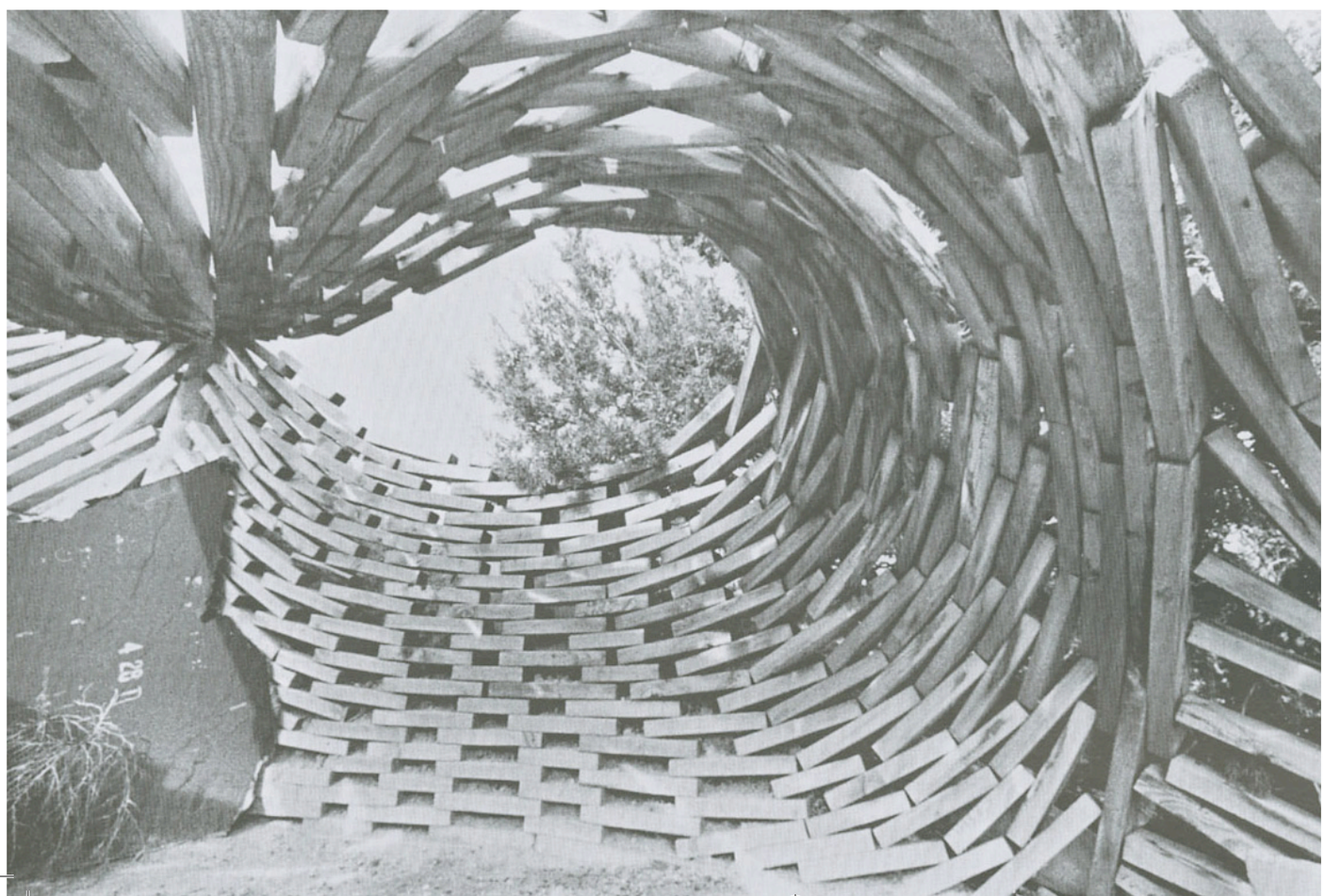

HARD 2..3—
RECOVERY AND REUSE OF PARTS

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2.3.1 PROJECT TITLE BY SOMEONE (1969)

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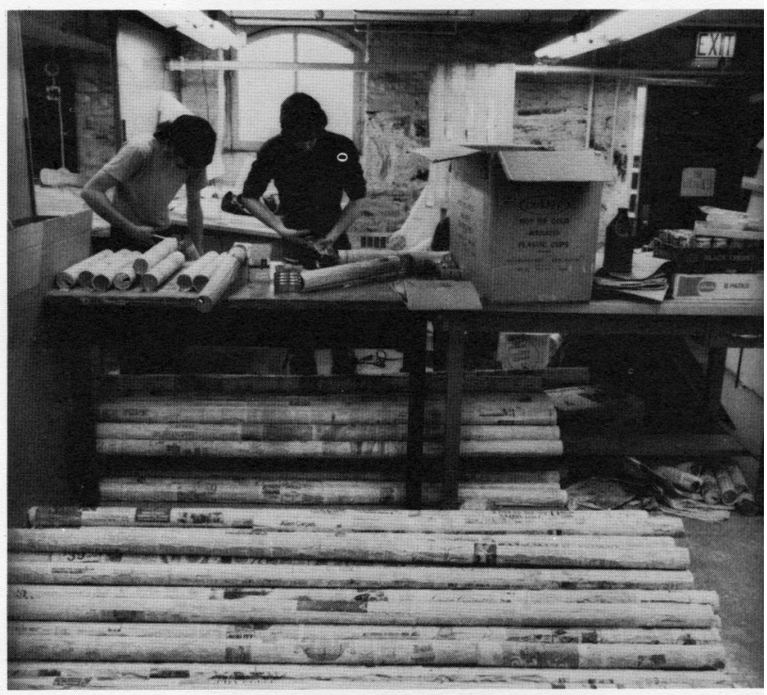
The Cornell project. Using data supplied by the Chilean government, the author with twelve final year students from the department of architecture, completed two experimental housing shells using unmodified waste materials chiefly cardboard packaging. The two sketch designs (61, 62 previous page) were built as full-size structures twelve weeks later (63, 64). Though hurriedly constructed and lacking in durability the two completed shells contained some interesting features, such as the structural *papier maché* studs rolled around soft drink and beer cans (65) used for the icosahedral house (63), and the barrel vaults (66) constructed using similar cans as voussoirs. The multidirectional metal joint fabricated from steel can walls (67) by Patrick Paul, and the upturned bottle flooring system by Eddie Woo (68) showed some ingenuity, as did the cycle wheel rooflight (69).



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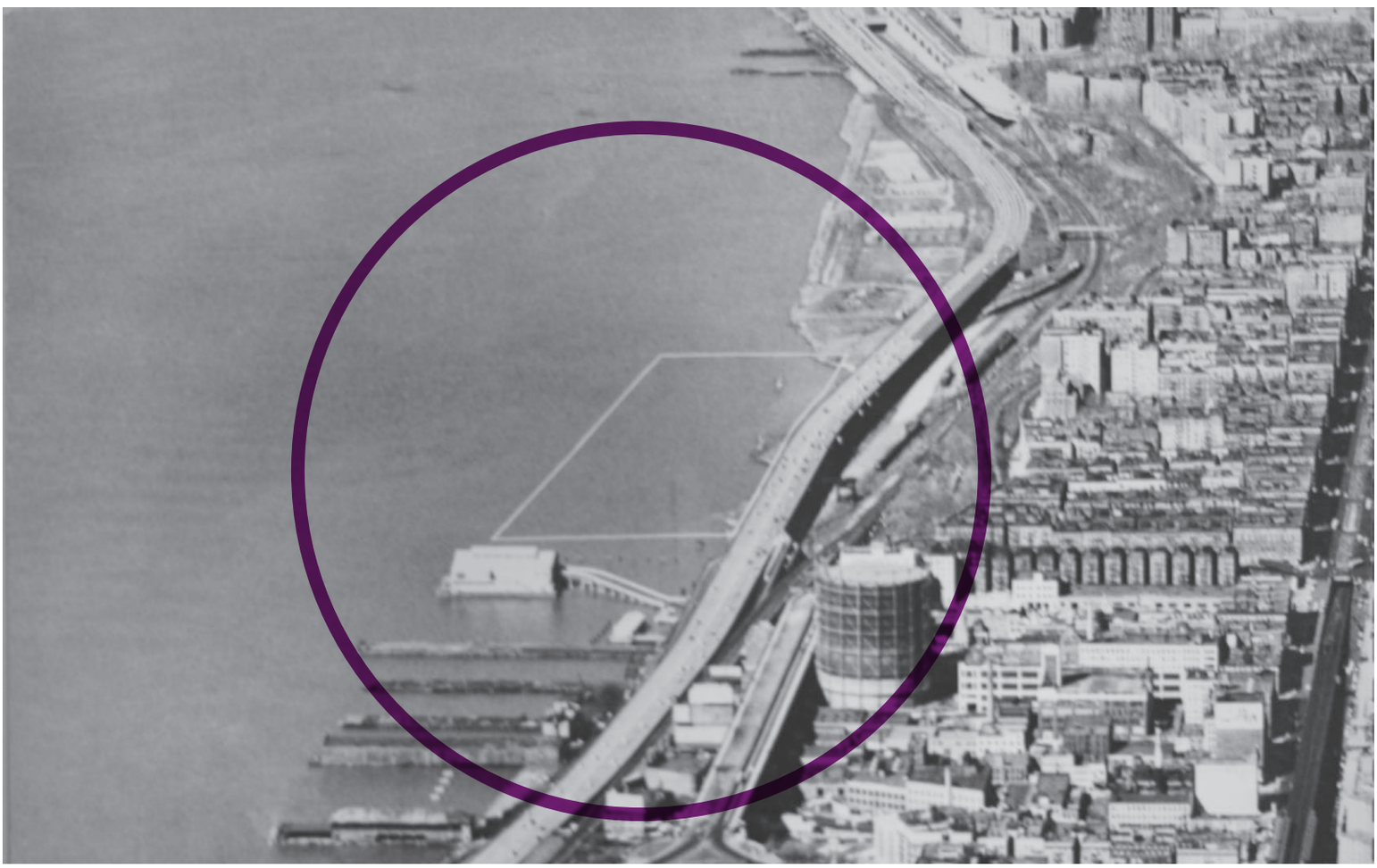
THE ARCHITECTURE OF REMEDIATION: RIVERBANK PARK

MARIANA MOGILEVICH



In a growing number of cities where "sustainability" ostensibly guides plans for future development, the social implications of the term are often ignored. To intervene in the urban environment today implies dealing with stormwater, street trees, and wayward coyotes. Where human needs fit in is less clear. Today, most designers tend to approach sustainability as an abstraction of checklists and vague scientificity, rarely asking who benefits and who loses. Yet contemporary scholars of political ecology make clear that "processes of socio-environmental change are never socially or ecologically neutral"; when the sustainability of one social group or place is enhanced, that of another will be undermined.

Waste landscapes, which flourish today as cities enlist designers to reclaim landfill for recreation, are more complex problems than dumps requiring alchemical conversion to playing fields. Advocates celebrate such sites as automatic urban amelioration without much critical attention to the processes that shaped them or the specific groups who live with them. Focusing on technical solutions, architects often ignore the social and political implications of the urban environment, and with that an opportunity to mediate an urban ecology that better serves all enmeshed in it. Similarly, numerous designers and municipalities have attempted to convert functional infrastructures into valuable amenities and therefore productively engage in processes of urban environmental change. Rather than mediating the conflicts necessarily entailed by the management of urban ecologies, they see the social and "natural" aspects of urban environments as either separate spheres or entirely in sync. This is rarely the case, as the long saga of the planning and design of New York City's North River Waste Water Treatment Plant, and the Riverbank Park ultimately built on its roof, has been demonstrating for almost fifty years. Its story presents a lesson in the complexity and possibility of designing urban ecologies that include people as well as plants and animals.

1: PLANT AS PROBLEM

In □□□□, faced with a Hudson River suitable for "fish survival only" and increasing pressure to clean it up, New York City's Department of Public Works hired a consortium of architects and engineers to design a sewage treatment plant for the West Side of Manhattan. The North River Waste Water Treatment Plant, a gargantuan affair to be decked over □□ acres of waterfront, would treat half of Manhattan's wastewater. Functional above all, the plant's design was dictated by the biological treatment process it housed in a series of tanks where sewage would be aerated and digested by bacteria, separating sludge from treated effluent that the plant would discharge into the river. Like the city's eleven other waste water treatment plants, North River would be a critical but unremarkable component of New York's environmental infrastructure.

Plans for the plant had been in the works for decades, but there was a new urgency to its construction given the growing sense that the city, like so many others, found itself in a "crisis" of deteriorating environmental quality. The city's polluted air and water were major, if intangible, causes for concern. The perceived epicenter of New York's environmental crisis was the inner-city slum, with its substandard housing and deteriorating neighborhoods, where the city's low income and minority residents were concentrated. The North River plant had been sited literally in the backyard of such a neighborhood, at the western edge of Harlem. While North River would doubtless help all New Yorkers—plus the bass and the bluefish—in contributing to a cleaner river, it also directly threatened the quality of Harlem's environment in particular.

When plans for the plant publicized in □□□□, reactions were overwhelmingly negative. The Regional Plan Association criticized the plant for directly contravening the goal of restoring the deindustrializing waterfront to people-friendly uses like parks and housing, and the plant's neighbors opposed the corruption of their river views. But more fundamentally, the site directly abutted a neighborhood that was more than sixty percent Black and Hispanic and "in transition," and the plant seemed disgusting and possibly dangerous. The attempt to protect universal rights to a "decent" or "unpolluted" environment found itself squarely at odds with the right of all citizens to live in a decent neighborhood. In this period, Matthew Gandy has argued that "the elision between the social and technical dimensions of urban space was no longer politically credible." The plant could not claim to perform its environmental function without addressing its place in the city's social ecology. The subsequent story of North River testifies to the rapidly evolving conception of the social dimensions of the urban environment and architecture's role in mediating this conflict.

2: MONUMENTS AND ORNAMENT

New Yorkers in □□□□ had elected a new Mayor, John V. Lindsay, who promised both better municipal design and greater sensitivity to the city's minority populations. Shortly after his inauguration, Lindsay ordered an independent review of the North River project. In March □□□□, the consulting engineers concluded that the plant would not produce odorous or noxious fumes—it could stay where it was. But the "outstanding architectural consultant" contracted by the city—Philip Johnson—concluded that the plant required "a bold new approach to the exterior aspect," and the city hired him to design one.

Johnson's brief was not to conceal the eight-block-long facility, but to convert it to "an aesthetic asset to the community." He proposed covering the plant's roof with ornamental pools and a system of fountains shooting water jets almost twenty stories into the air. Johnson designed a proscenium on the Hudson, "a major aesthetic monument on the waterfront." The necessary digester and thickener tanks at the north end of the site lost their utilitarian appearance, transformed into elegant geometric volumes. Johnson roofed over the central aeration tanks with a reflecting pool containing three elementary forms, a cone, a cylinder, and a trapezoidal volume within. These housed various functional requirements, but were assembled to "make a gigantic sculpture garden" not unlike Isamu Noguchi's recent *Sunken Garden* at Yale (□□□□). The bulk of the plant area—□□ acres which had been open water tanks—became a vast confection, with four water jets shooting high in the air over a shimmering, frothy pool. "The changing effect of such a display lighted at night and blown about in the wind during the day," the architect suggested, "can be one of the great attractions of the New York scene."

The aquatic mise-en-scène may have owed its inspiration to Johnson's recent success with waterworks further downtown. Johnson's Revson Fountain was the centerpiece of Lincoln Center, a particular irony, as the North River Plant had been intentionally relocated from a site just west of the cultural complex to Harlem so as not to mar that refined environment with its scatological functions. Location aside, while the Revson Fountain would prove a lively and popular attraction on an otherwise austere campus, the North River waterworks could only be viewed as a spectacle from afar. This "great fountain" would only be experienced from New Jersey, or from Riverside Drive, beyond the uncrossable and visually disorganized moat of the elevated Henry Hudson Parkway and the tracks of the New York Central Railroad. Such views would also include the boats which would inevitably transport the sludge the plant produced, and the marine transfer station located just south of the plant at □□□th Street, neither of which appeared in Johnson's renderings.

No doubt aware of the shortcomings of his solution, Johnson—playing the role of socially responsible architect—presented the city with a "bonus" proposal. By lowering the highway to grade and covering it and the railroad tracks with a platform, he made room for a badly-needed new □□-acre park and playground. This was to be a "gentle green slope" extending down from Riverside Drive, with fields for baseball and football and some half-hearted and vaguely picturesque paths denoting a park. But the plant, separated from park-goers by a strong barrier of trees, remained a phenomenon apart from the neighborhood. While providing that great amenity of "open space," the park would serve primarily as a viewing platform enticing a captive audience for Johnson's great show.

The New York *Daily News* opined in an editorial entitled "The Sewage Plant Beautiful" that "the Johnson job would be a thing so beautiful that few uninformed outsiders would suspect what was going on inside," and Mayor Lindsay vaunted the plant's "architectural distinction," which would add to the neighborhood's "value and attractiveness."[□] But while the mayor had promised to confer with neighborhood leaders who had opposed the plant and seek their approval of the Johnson proposal, in October *Progressive Architecture* reported that the city was sitting on Johnson's proposal to "mask" the plant: "Apparently, residents of the area from □□□th Street to □□□th Street are not satisfied with ornament."[□]

Aesthetic objections met environmental ones as critics voiced concern about the release of toxic amounts of ozone and asked exactly what water was going to be shot two hundred feet into the air. When the Board of Estimate, which had to approve the selection of the plant's site, met in April □□□□, representatives of a newly galvanized and growing opposition to the plant accused the city of racial discrimination and a lack of respect for Harlem residents. Threats of violence and rioting were raised, followed by protests against "the toilet in our living room."[□□] As groups began to connect environmental issues like open space and dirty streets to civil rights, the environment and its problems—waste water, air pollution, and material refuse—were becoming increasingly politicized. "Garbage riots" would in fact become a reality in East Harlem the following summer, among the many "civil disturbances" which were taking place in cities across the United States since □□□□. In this context, North River was neither a technical nor even an aesthetic problem, but a social and political one, which would require a very different design solution.

3: PURIFICATION AND DISTRACTION

Community members and the Regional Plan Association had long advocated a park on the plant's roof, inspired by recent events in Tokyo. There, the Bureau of Sewage had recently inaugurated the Ochiai Water Treatment Center, which was surrounded, like North River, by dense residential districts. Ochiai's tanks had been roofed over to form a park—the first of its kind. This clever solution kept the plant's smell from fouling the air and also created more than □□,□□□ square meters of open space—room for a track, playground, and grounds for baseball, soccer, and tennis—where urban parks were sorely needed.[□□] Ochiai clearly demonstrated that North River could be put to good use.

In □□□□, the city abandoned plans for the fountain and joined forces with a new commission to create state parks within city limits to plan a park on the roof of the North River plant. Gruzen and Partners were hired to complete an exploratory design study for what would now be called Riverbank Park. The architects, who completed numerous city projects under Mayor Lindsay, excelled at making the best of a bad thing, boasting specialties like humane prison design. Plant beautification was no longer the priority. After investigating alternative sites and programs, including housing on or around the plant, the architects ultimately endorsed building an "activities park" directly atop North River.

In extreme contrast to Johnson's stunningly passive monument, and responding to survey and community input demanding recreation facilities, Riverbank was to be all program. It was carpeted in activity, from handball and checkers to ice skating and basketball, such that park-goers wouldn't have the time to figure out they were on top of a sewage plant. The park's integration with its surroundings—a central platform bridged over to Riverside Drive, and Riverbank sloped down to meet surrounding parkland to the north and south—also distracted users from the existence of the plant below.

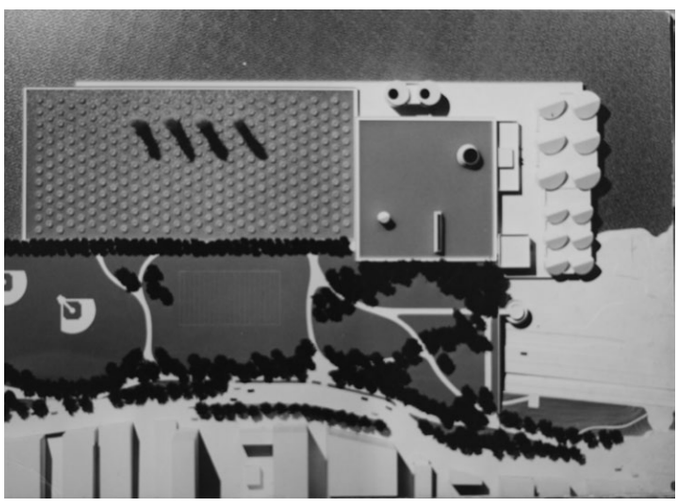
This "useful facility," as the architects described the park, would match the utility of the "much-needed" plant below.[□□] In the long tradition of urban parks as antidotes for social unrest, Riverbank mimicked the North River Plant in orchestrating a purification process where people, rather than water, would be treated through access to nature and wholesome activity. At this precise moment, Henri Lefebvre criticized what he described as the rise of a new "pseudo-right" to nature, where spaces for recreation and leisure presented city dwellers with a false respite from their environment at the expense of its actual transformation. "'Nature', or what passes for it, and survives of it," he wrote, "becomes the ghetto of leisure pursuits, the separate place of pleasure and the retreat of 'creativity.'"[□□] Lefebvre argued that the "functionality" of urban parks and open spaces created by urbanists to substitute for nature was "reduced to an absence of 'real' functions, to a function of passive observation." In the same way that the sewage plant would negatively impact the environment of Harlemites, a park could distract from the larger physical and social problems at hand, disenfranchising residents while offering them a new amenity. To accept Riverbank Park as an escape valve from Harlem implied abandoning an insistence on the

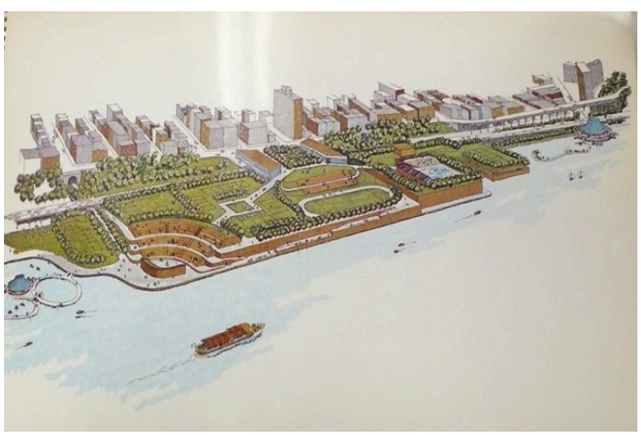
Top: A team of engineers and architects submitted drawings for the North River Pollution Control Project in □□□□. Decked over □□ acres of waterfront, it would treat the wastewater produced by □□□,□□□ residents, plus commuters and tourists, on the West Side of Manhattan. Though the plant was no different from others in operation or under construction in New York at the time, it would garner tremendous opposition.

Center: In □□□□ New York City hired Philip Johnson to "beautify" North River. His proposal for a monumental fountain was popular with the local press but incensed neighbors of the proposed plant.

Bottom Left: An alternative proposal by Johnson created a new park that would span from Riverside Drive to the new fountain, but did not permit access to the plant's roof.

Bottom Right: Though the City was unwilling to relocate the North River Plant to another site, intense resistance compelled it to turn the plant into a community asset. Gruzen and Partners prepared an exploratory design study for a Hudson-Riverside Park Development for the State Park Commission for the City of New York in Cooperation with the City of New York in □□□□. Their proposal for "Riverbank" carpeted the roof of the North River Plant with recreation





improvement of the neighborhood itself.

4: AN URBAN ECOLOGY

Although the pacifying function of the park was evident, the *Amsterdam News* argued in an editorial that "while the poor still wallow in their filth," this project presented Harlem with "its greatest opportunity for depollution of people."[□□] This statement, all the more evocative in its obscurity, suggested an expanded conception of "environmental protection" and enthusiasm for the social and physical benefits that combined open space and waste water treatment could provide. In his State of the Union Address that year, President Nixon spoke of an unpolluted environment as "the birthright of every American." A growing emphasis on the "natural" environment in this year of the first Earth Day was in fact the harbinger of a retreat from the more concrete problems of the urban environment.

Yet for the moment there was still a strong conception of a socially produced and experienced urban environment. A □□□□ EPA report focused on the environment of the urban poor, arguing that if there was "one environment" it was "unequally shared," and the conclusions of the □□□□ United Nations Conference on the Human Environment similarly envisioned a synthesis of environmental protection and human development, where "both aspects of man's environment, the natural and the man-made, are essential to his well-being and to the enjoyment of his basic human rights." It was in this context that Bond Ryder & Associates were hired to develop the master plan for Riverbank Park in □□□□, as a series of sewage interceptors were completed and construction of the plant commenced. The Harlem-based architects initiated a process that would see the development of the park as part of the development of the neighborhood that surrounded it. They began the park planning process with extensive community consultation and outreach that resulted in a plan focused on the quality of the urban built environment.

Emphasizing access to the park, the architects sited two bridges at either end, connecting the park to the subway and more densely populated areas. These roads joined together to create a space frame megastructure along the park's eastern edge, which made room for additional open space above it and classrooms and indoor sports below. Rather than cover the plant like a blanket, this multi-level park incorporated additional functional layers to the site. Instead of attempting to distract parkgoers from the constructed nature of the site, Riverbank recognized the particular nature of its urban ecology and proposed to augment it, extending technology for the improvement of the urban environment to the park above. Air structures, for instance, would enable flexible year-round use of a windy, exposed site.

Bond Ryder's explicit allusion to megastructure was not a frivolous one. On the one hand, the project was "mega" in very concrete ways. When construction began on the concrete and steel platform for the plant, the North River complex was to be the most expensive building project in New York City history.[□□] But Bond Ryder and Associates also envisioned Riverbank as a self-enclosed complex—a "total park environment" that incorporated the best of the era's technological conceits.[□□] The park's space frames, inflatable coverings, even a geodesic dome, were essential components of what Reyner Banham would call "the Megastructure look."[□□] The future, not nature, was at the center of this park, which posited a sort of para-environment of possibility. Riverbank shared the megastructural ambitions of the "city as a single building," in this case a city which resonated with what Lefebvre called the right to urban life, one which would not need manufactured nature as an escape valve, and where pleasure, creative activity, and self-actualization would replace alienation.[□□]

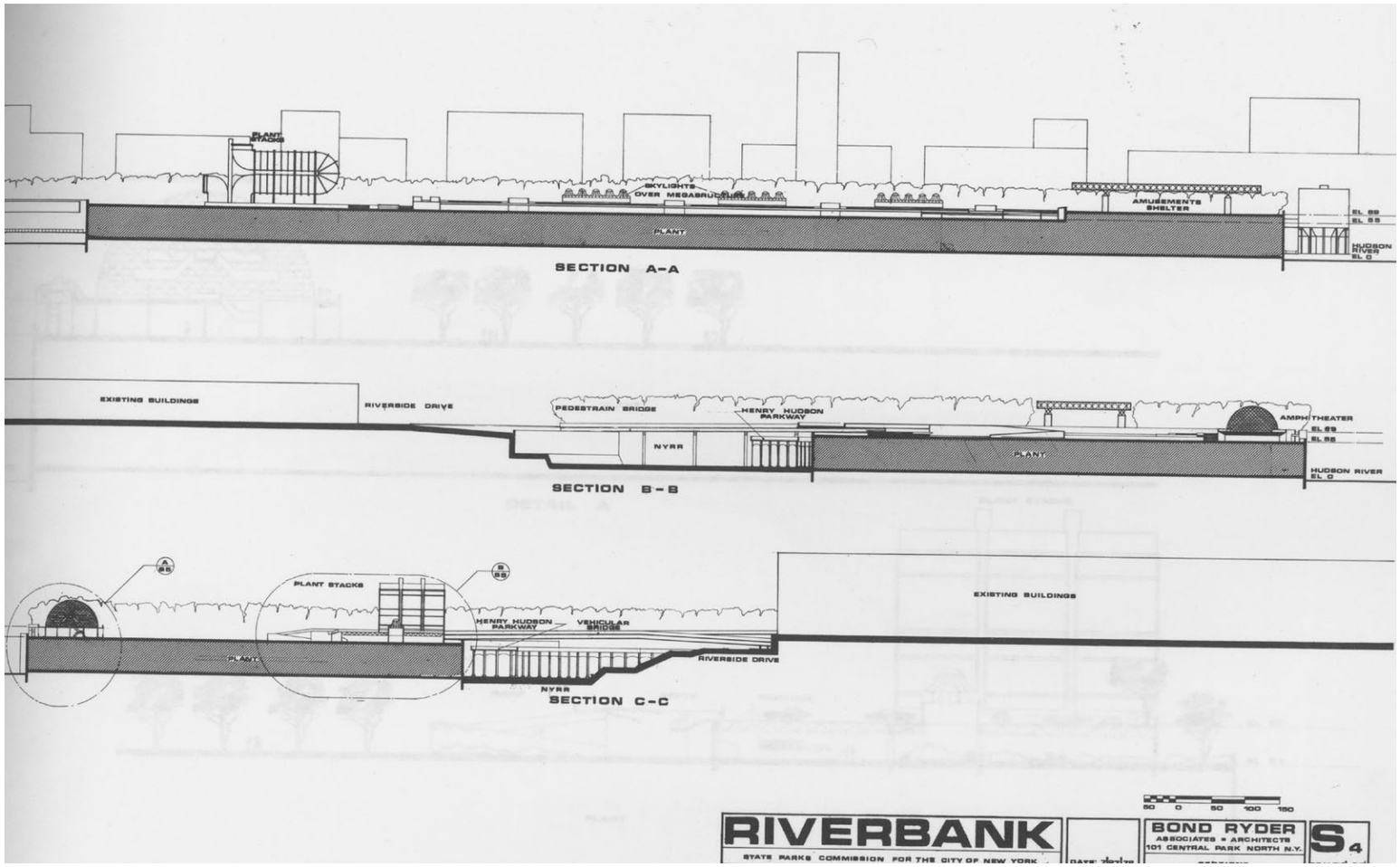
Bond Ryder brought in the firm of Lawrence Halprin to complete the final site design. They further developed Riverbank into a "lively urban place," resolving the ecological conflict so the park and plant would serve as a model for the city beyond. Halprin saw the park as "a significant extension of the urban environment" that incorporated the plant's functional elements.[□□] The large, sculptural Cor-Ten steel ventilation stacks at the plant's center, for instance, rather than an unwanted incursion from below, could be embraced as industrial sculpture and "a challenge to any mural painter." The smokestack as canvas set the tone for a city where inhabitants had a role in its production and where the practical could be beautiful. As a dense setting for urban life, incorporating strolling, shopping, and people-watching, the park also featured a canopied "bazaar cluster" with brightly colored stalls for vendors and refreshments running along one side of a "main street."

Riverbank's "main street" led from the real □□□th Street toward the water—to both a riverfront promenade and a large fountain which then descended down to a □□,□□□-square-foot pool. Water, so off-key in Philip Johnson's fountain, reappeared as an essential feature, with environmental, social, and aesthetic properties. Though Riverbank's fountain would never progress beyond the hazy sketch, Halprin's Portland Fountain, completed in □□□□ and which came up in design discussions for Riverbank, or the fountains at Freeway Park in Seattle, under construction at the time, suggest where Halprin's design was headed. In one place, water could be clean and dirty; for processing, for contemplating, and for swimming. Jokingly describing North River as "a plant without even one leaf," Halprin integrated plants and the plant in the same urban ecology.[□□]

5: ENVIRONMENT FOR WHOSE SAKE?

Unfortunately, Riverbank's triumph of reconciliation, accounting for New Yorkers' social and environmental needs in one place, coincided with the city's dramatic fiscal unravelling in □□□□. Not only was funding for the project in doubt, the social project that made the park possible was decisively abandoned. Riverbank stalled for years. By the time the North River plant was nearing completion, the old designs for what now seemed a "superpark" on its roof were hopelessly out of reach.[□□]

In □□□□ the State Park Commission hired a new architect, Richard Dattner, to address the prosaic but no less difficult task of redesigning Riverbank once more, conserving the park's major elements and some degree of delight within the constraints of multiple rounds of value engineering. The park, inaugurated in □□□□, was more modest than once envisioned, the *beau idéal* of ecological reconciliation replaced by a stricter utilitarianism. The plant was built because it was federally mandated and the legal



Riverbank Park

This is a preliminary sketch of Riverbank Park, planned for the Hudson River bank atop the 137th-145th St. sewage plant. Community reaction to the concept is being sought by the designers, Bond, Ryder Associates, 101 Central Park North.

Seek Harlemites advice on Riverbank project

By SIMON ANEKWE

Bond, Ryder Associates, Black architectural firm of 101 Central Park North, is inviting residents and organizations of Harlem to advise on the recreational and cultural plans for the planned Riverbank

moved to an uptown site after whites rejected earlier plans to locate it in their neighborhood downtown.

The architectural firm was endorsed by Community Planning Board Nine and selected by the State Parks Commission to

als, according to Bond, Ryder urban planner Robert Catlin.

The main part of the park would run from Henry Hudson Parkway into the river, atop the sewage plant. A smaller section would lie between the parkway

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By MEL TAP

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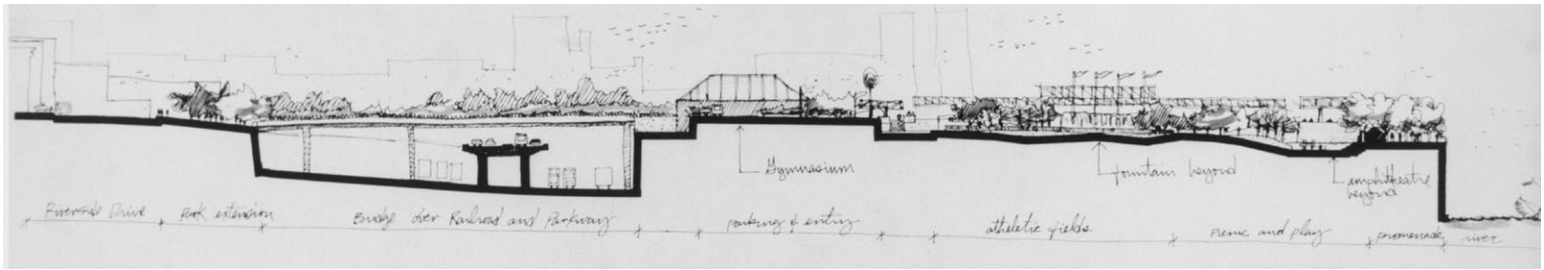
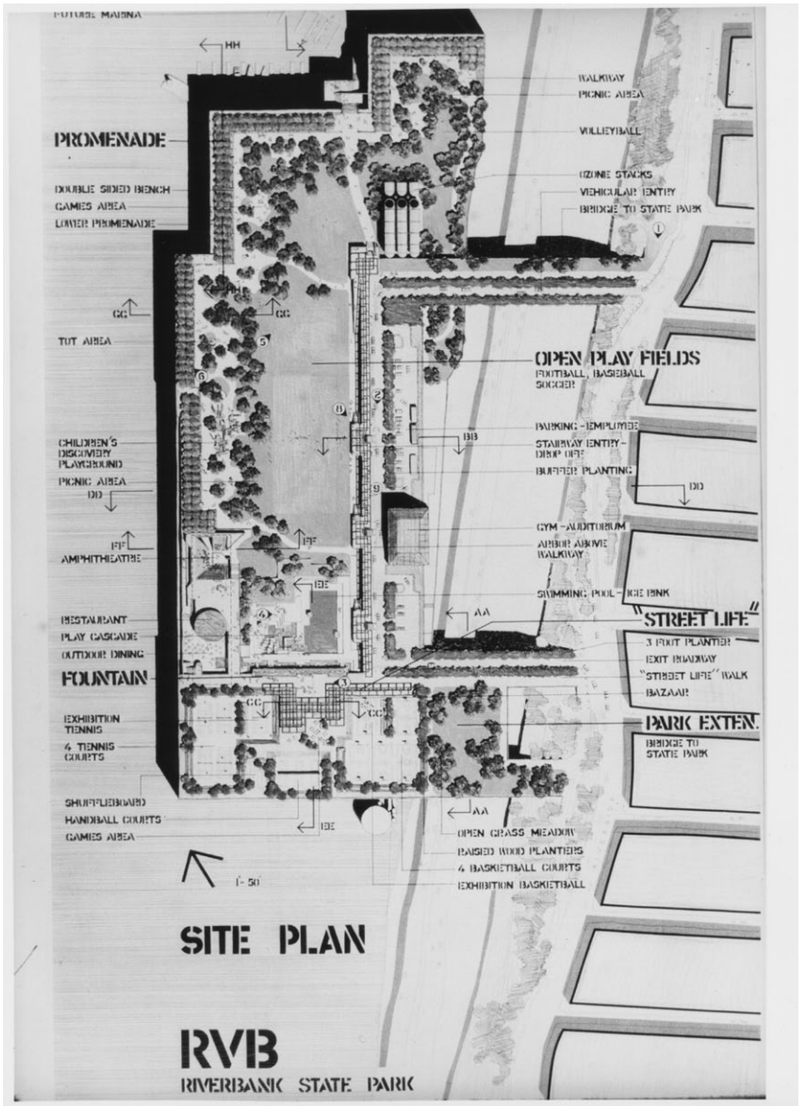
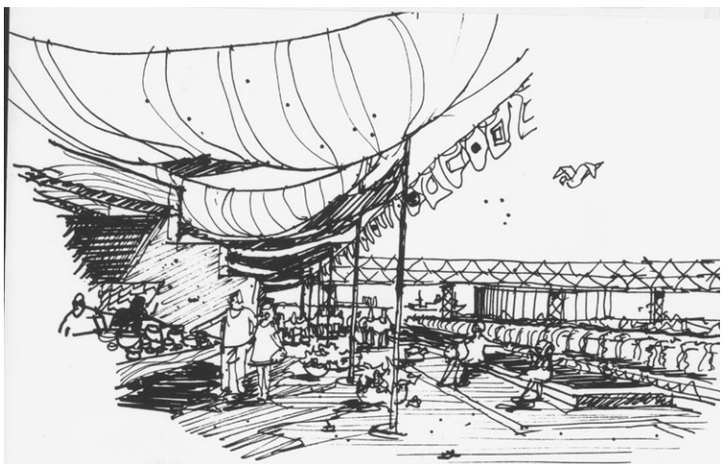
Top: Bond Ryder and Associates, based in Harlem, preliminary plan for Riverbank in □□□□ brought an array of technological conceits—space frames, geodesic domes and inflatable coverings—creating a leisure infrastructure atop the plant on the scale of the water treatment mechanisms below.

Bottom: Bond Ryder reached out to incorporate a range of voices into the planning of Riverbank Park, including community organizations, churches, and politicians, and published a preliminary sketch in the May □□, □□□□ edition of the New York Amsterdam News with a call for community reaction.







Top: Riverbank was conceived as an extension of the city beyond. Creating connections from West Harlem to the Hudson River, it brought parkgoers to the water and created a model city. Incoroporating natural features and biological treatment processes with the pleasures of urban life, Riverbank proposed an environment where residents were active participants in the shaping and use of space.

Left: Lawrence Halprin and Associates collaborated with Bond Ryder on the site design for Riverbank State Park as construction progressed on the plant's platform, □□□□.

Right Center: Parkgoers would be participants in a city conceived as theater. A large fountain bordering an extensive pool would serve as a stage for urban life. Water was central to the park's design. Rather than simply watch it passively or forget that it was neing processed in the plant below, people could also wade and splash in the water and participate in a complex urban ecology.

Right Below: Riverbank State Park, finally constructed as redesigned by Richard Dattner and inaugurated in □□□□.

commitment to the park also had to be honored, but the logic of the park's design was "architectural triage," or "the greatest good for the greatest number."□□

New Yorkers—more than four million a year—ultimately skate in the park's roller rink, swim in its three pools, attend concerts at the riverside amphitheater, or garden small plots on the roof's □□.□ acres. The plant below processes the waste of a million Manhattanites and the Hudson River's water quality has improved dramatically. The community gardens, plantings, and playing fields make the park a green roof avant la lettre and suggest, if not enact, a more recent emphasis on architecture's ecological performance.□□ Yet design and construction flaws led to North River producing terrible smells after it began operation in □□□□. Renewed action in West Harlem for redress made the plant into one of the early battlefields of the environmental justice movement.□□ Activists in Harlem and their counterparts elsewhere argued strongly that "people are an integral part of what should be understood as the environment."□□ The continuing problems at the plant beg the question: what, today, would be an architecture of environmental justice?

One answer would be no architecture at all—that is to say, the plant should never have been built at that site. But North River, like all our infrastructure for the calibration of a complex urban environment, had to go somewhere, and at every site, specific issues will arise. Riverbank demonstrates the potential agency for architecture in mediating among conflicting components of the urban environment. That social and environmental concerns in the city are not only inextricably linked but one and the same ecology is as true today as it was forty years ago, with implications for how architecture claims to be, and has the potential to be, ecological.

NOTES

1–Erik Swyngedouw, Maria Kaika and Esteban Castro, "Urban Water: A Political-Ecology Perspective," *Built Environment* 28:2 (2002), 125.

2–Elizabeth K. Meyer has argued that large parks on disturbed sites in particular should be more didactic and demonstrate to users their role in the creation of disturbed environments. Envisioning a universal waste-producing consumer-citizen, however, she does not take into account the uneven distribution of responsibility for environmental disturbance. See "Uncertain Parks: Disturbed Sites, Citizens, and Risk Society" in Julia Czerniak and George Hargreaves, eds. *Large Parks* (New York: Princeton Architectural Press, 2007.)

3–Gandy, Matthew. *Concrete and Clay: Reworking Nature in New York City* (Cambridge, Mass.: MIT Press, 2002(, 15.

4–Letter, Meyer F. Wiles to Mayor Lindsay, March 211967, Mayor Lindsay Papers, NYC Municipal Archives, Subject Files 80:1506 North River.

5–Ibid.

6–Presentation Booklet "North River Water Pollution Control Project" Philip Johnson Papers, V. Box 16 (Oversize II.42). The Museum of Modern Art Archives, New York.

7–Ibid.

8–"The Sewage Plant Beautiful" *Daily News* (New York) August 18, 1967, p 37; Press release, Oct 9, 1967, Text of an Address by John V. Lindsay, Mayor of the City of New York Before the Water Pollution Control Federation's 40th Annual Congress. John Vliet Lindsay Papers (MS 592). Manuscripts and Archives, Yale University Library. Box 351 folder 267.

9–"Fountains to Mask NYC Public Works Plant on the River" *Progressive Architecture* October 1967, p52.

10–"Motorcade to Show Sewer Opposition" *New York Amsterdam News*, 20 April 1968.

11–See Atelier Bow Wow's *Made in Tokyo* (Tokyo: Kajima Institute Publishing Co., 2001) for the little material published in English on this plant. Tokyo now has thirteen wastewater treatment plants with roof parks mixing active and passive recreation.

12–Gruzen & Partners. "Riverbank: Hudson-Riverside Park Development: Exploratory Design Study Prepared for the State Park Commission for the City of New York in cooperation with the City of New York" March 1969.

13–Lefebvre, Henri, "The Right to the City" [1968] *Writings on Cities* (Oxford: Blackwell Publishers, 1996), 158.

14–Lefebvre, Henri. *The Urban Revolution* [1970] (Minneapolis: University of Minnesota Press, 2003), 27.

15–"The Environment" *New York Amsterdam News*, 14 February 1970.
Stern, Robert A. M., Thomas Mellins, and David Fishman. *New York 1960: Architecture and Urbanism Between the Second World War and the Bicentennial* (New York, NY: Monacelli Press, 1995), 1041.

16–Riverbank—Interim Report—Phase II. January 1973. Prepared by Bond Ryder Associates for the State Park Commission of the City of New York, 014.I.A.6235, Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania.

17–Banham, Reyner. *Megastructure: Urban Futures of the Recent Past*. 1st U.S. ed (New York: Harper and Row, 1976), 179.

18–Ibid, 32. Although Banham suggests that the megastructure, despite pretensions to provide space for play and self-determination for its users, was designed for the "mobile, leisure-seeking citizens" of a "swinging affluent society," (83) in the Bond Ryder project an issue of justice was at play, in making these spaces, however consumerist, accessible to residents of Harlem, as they might be to people elsewhere.

19–Lawrence Halprin and Associates, Untitled report on Riverbank State Park, 1975. 014.I.A.5561, Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania.

20–Ibid.

21–Scott Aiges "An $80-Million Park Planned Atop Treatment Plant" *New York Times*, 4 August 1985.

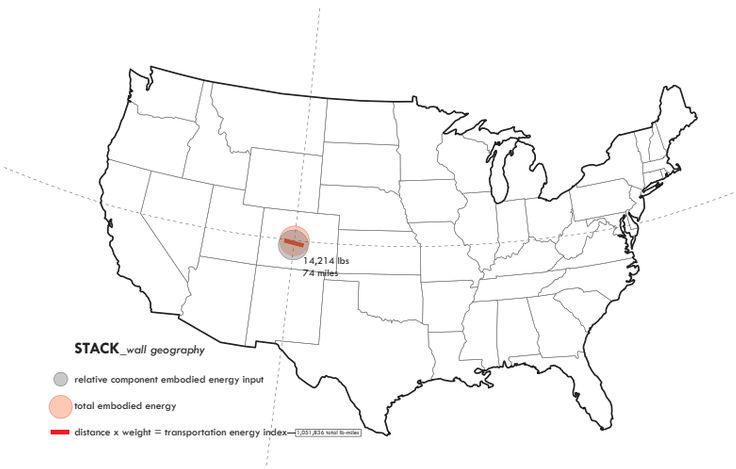
22–Richard Dattner, quoted in Susanna Sirefman, *New York: A Guide to Recent Architecture* (London: Ellipsis, 2001), 13-16.

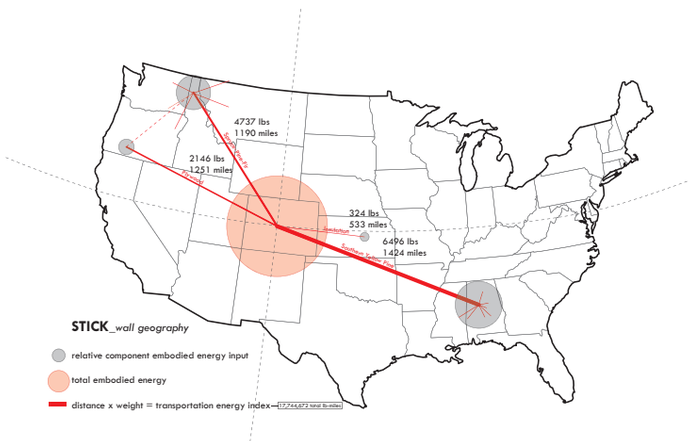
23–Much of Riverbank's ecologically performing, energy efficient building design was eliminated before construction for budget reasons. The park's storm-water drains to the Hudson River, while its sewage goes directly to the plant.

24–See Chapter 2, Julie Sze. *Noxious New York: the racial politics of urban health and environmental justice* (Cambridge, Mass.: MIT Press, 2007.) And Vernice D. Miller, "Planning, Power and Politics: A Case Study of the Land Use and Siting History of the North River Water Pollution Control Plant." *Fordham Urban Law Journal* 21 Fordham Urb. L.J. 707, no. Spring (1994).

25–Giovanna Di Chiro "Nature as Community: The Convergence of Environment and Social Justice" in William Cronon, ed. *Uncommon Ground: Rethinking the Human Place in Nature* (New York: W.W. Norton, 1996), 301.

STACK
KIEL MOE





Among contemporary residential construction techniques, the layered wall assembly typically remains unquestioned—an allegedly efficient system which can be deployed to different architectural ends and effects, but which is itself more or less inviolable. As a challenge to this assumption, Kiel Moe's StackHaus near Granite, Colorado rethinks the layered wall assembly and proposes in its place a single, monolithic wall, comprised of stacked □x□ spruce timbers. These timbers comprise the structure, enclosure, finish material and insulation of the building.

The material choice is possible in part because of the modesty of the project—a □□□ square foot multipurpose space, essentially a single room. There is neither plumbing nor HVAC, and the building has no energy input other than the sun and the wind. One of eight buildings constructed by Moe on the rural site which sits at the base of the Collegiate peaks and overlooks the Arkansas river, the building functions as a yoga and painting studio, a performance space, and a kind of mini theater for recitals, plays and readings.

But the seemingly inefficient use of solid wood construction is also a deliberate response to the site. The spruce is harvested, dried and milled in the same valley as the project, yielding a surprisingly small transportation footprint. Moe compares this with the thousands of miles from which the materials in a typical "stick" construction assembly—framing, plywood, insulation, etc.—are trucked to the site. The building's straightforward construction also exceeds its apparent simplicity, using lower technology to yield higher performance. Although it has much more mass then a layered construction, its embodied energy is dramatically lower. The thermal conductivity of spruce is used to regulate temperatures in both summer and winter. Wood is also the only material that sequesters carbon, so this solid wood building ultimately yields a carbon surplus, sequestering twice as much carbon as it took to produce the building itself. And there is even a resultant "gain" in design time as a result of the simplified construction technique.

This modest building, then, proposes a larger ecological argument; the project tackles what Moe terms "eco-logistics"—the practices and systems which are outside the domain of the object itself, but which have a meaningful impact on the architecture. In other words, how architecture impacts landscapes, economies, climate, etc. and vice versa. These "extensive" architectural logics are often ignored or elided in the pursuit of "design" as the ultimate end. For Moe, however, they become primary considerations in the work and are themselves integrated into the design thinking.

--Amanda Reeser Lawrence

Above: Stack's minimal transportation footprint as compared with typical "stick" construction adds agency to its architecture by directing more budget and resources into the building itself rather than externalities.

Facing Page: Two parallel, □□.□' tall solid wood beams provide the primary structure, enclosure, finish materials, and thermal strategy for Stack. From the structural to the thermal, the cellular solid characteristics of wood yield a range of performances.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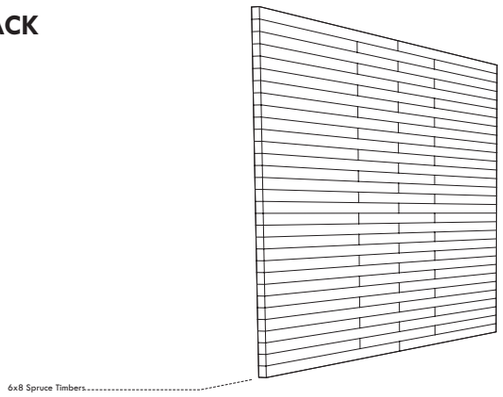
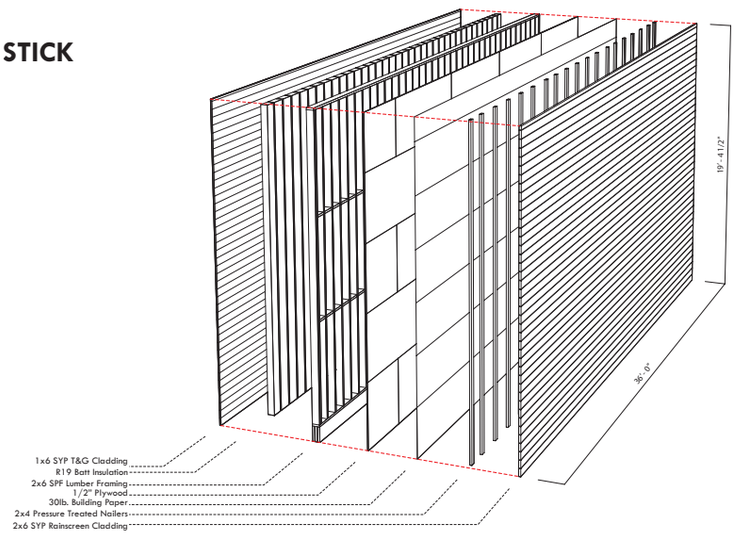


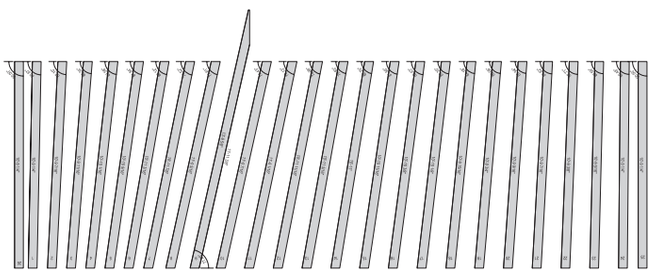
Facing Page: □x□ Spruce timbers support the ruled surface roof. Once a timber is installed, it is largely complete. The spruce walls will shrink about □" as they dry. A series of tunable threaded rods compress the timbers as the material shrinks around slotted connections to the steel moment frames and window boxes.

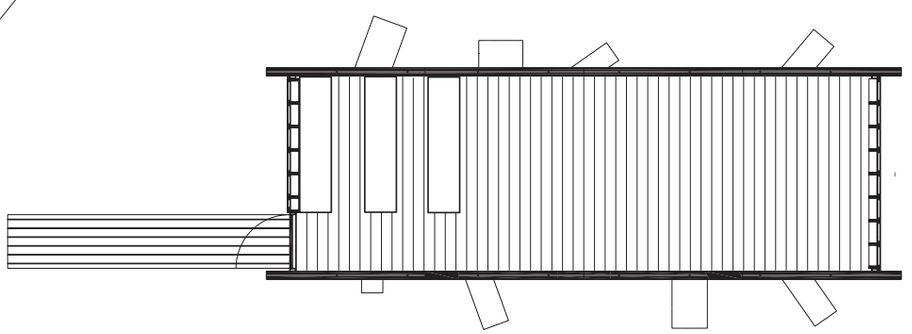
Left: Stack questions the efficacy of the unwarranted complicatedness and excessively additive logic of contemporary architecture from ecological, economic, and architectural points of view.

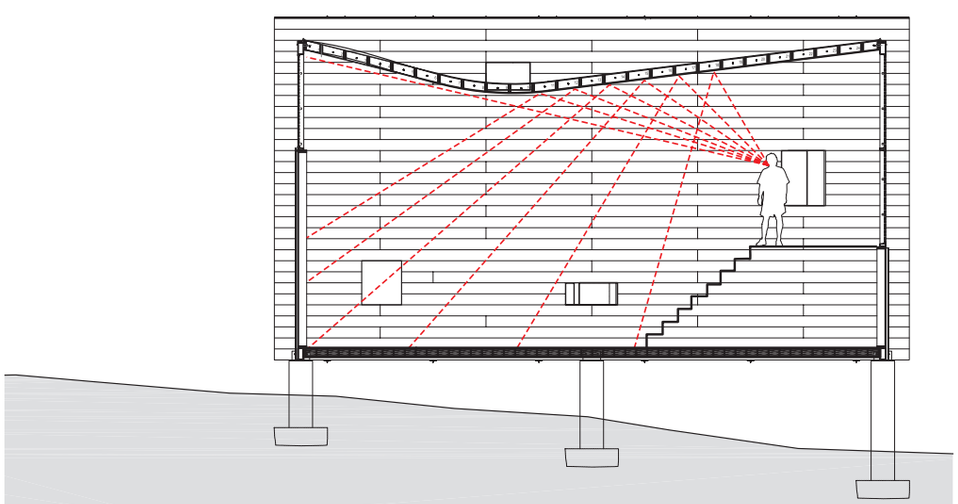
Below: Roof framing, plan, and section. The asymmetrical belly of the ruled surface roof distributes light and sound in the interior while draining rain and snow from the roof above.

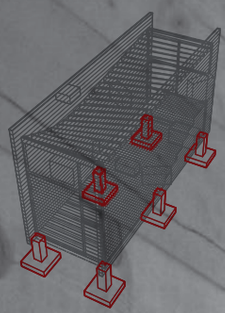
STICK



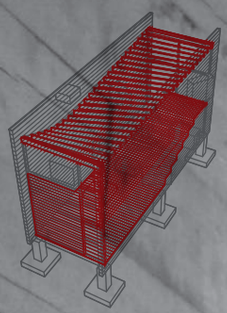




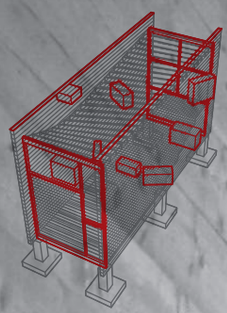




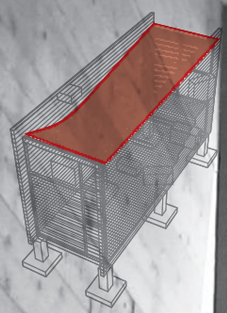
CONCRETE 869 kgCO2



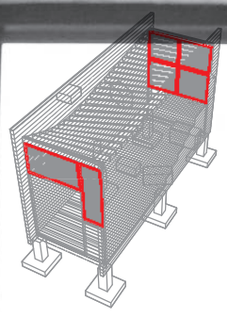
OTHER WOOD 1,052kgCO2



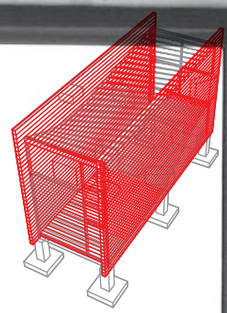
STEEL 4,134 kgCO2



BITUMEN 80 kgCO2



GLAZING 409 kgCO2



TIMBER 2,454 kgCO2

Carbon and Energy Sink

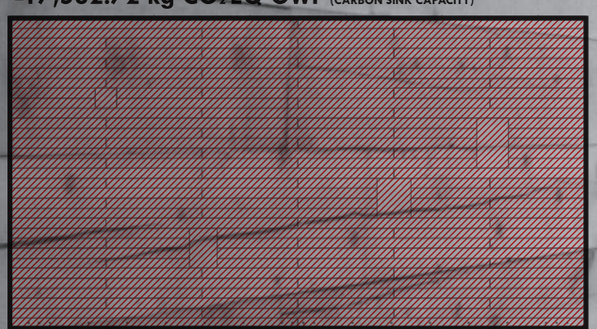
Material[1]		ft³	pounds	meters³	kg	EE (MJ)	EC (kgCO2)
Timber		784.00	18,032.00	22.20	8,179.18	16,358.36	2,453.75
Lumber		99.52	2,817.93	2.82	1,278.19	9,458.62	575.19
Plywood		45.06	1,592.36	1.28	722.28	7,484.08	476.49
Steel		47.00	5,148.64	1.33	2,335.39	31,761.24	4,133.63
Concrete		99.00	14,850.00	2.80	6,735.85	6,399.05	868.92
Glazing		7.38	1,062.00	0.21	481.72	7,225.73	409.46
Other materials		6.62	238.92	0.19	157.36	2,346.99	79.68
	totals	**1,088.57**	**43,741.85**	**30.82**	**19,889.96**	**81,034.06**	**8,997.13**
timber %				72.02%	41.12%	20.19%	27.27%

Timber Global Equivalent Carbon Sequestration[2] -792 kgCo2eq./m³ **-17582.72** kgCO2 eq.

NET CARBON SEQUESTRATION **-8585.59** kgCO2 eq.

1. Geoff Hammond and Craig Jones. *Inventory of Carbon and Energy (ICE)* . Version 1.6a. 2008
2. Hegger, Manfred, Matthias Fuchs, Thomas Stark, and Martin Zeumer. *Energy Manual: Sustainable Architecture* . Birkhauser, 2008. Table B5.53 p. 161

-17,582.72 kg·CO_2 EQ GWP (CARBON SINK CAPACITY)



8,997.13 kg·CO_2

-8,585.59 kg·CO2 EQ. GWP *SURPLUS*

Table (Top): The carbon equivalent sequestered by the timber walls and floor is about twice as much as the carbon inherent in all the materials combined yielding a surplus of sequestered carbon.

Table (Facing Page Top): Embodied energy comparison of a stack wall and a stick wall. The energy inherent in the stick approach is inextricable from the building yet little value to the architecture or to the larger collective.

Table (Facing Page Bottom): The thermal diffusivity of Spruce is why the owner of this building can occupy it a t-shirt and shorts in -°F weather with no energy other than the sun. Thermal Diffusivity plays an important, but often overlooked, role in the thermal performance of more massive approaches to architecture.

Embodied Energy of Stick and Stack

STICK

	qty	length	linear feet	volume per	feet^3	meters^3	EE (MJ per unit)	Total EE (MJ)
Wall Framing: 2x6 stud	39	18.2	710	0.06	40.66	1.15		
Wall Framing: 2x6 plate	2	36	72	0.06	4.12	0.12		
Wall Framing: blocking	76	0.875	67	0.06	3.81	0.11		
Wall Framing: 2x12 beam	3	36	108	0.11	12.37	0.35		
Wall Framing: total					60.97	1.73	4692	**8101**
Plywood: 1/2"	23			1.33	30.66	0.87	9440	**8195**
Batt Insulation: R-19 x 12"	36	18	648		162.00	73.50	150	**11025**
Interior Finish: 1x6 SYP #1	39	36	1404	0.02	26.80	0.76	4692	**3561**
Rain Screen: 2x4 nailer	19	19.2	365	0.03	10.45	0.30		
Rain Screen: 2x6 cladding	39	36	1404	0.06	80.44	2.28		
Rain Screen: total						2.57	4692	**12075**
							Stick Total Embodied Energy	**42958**

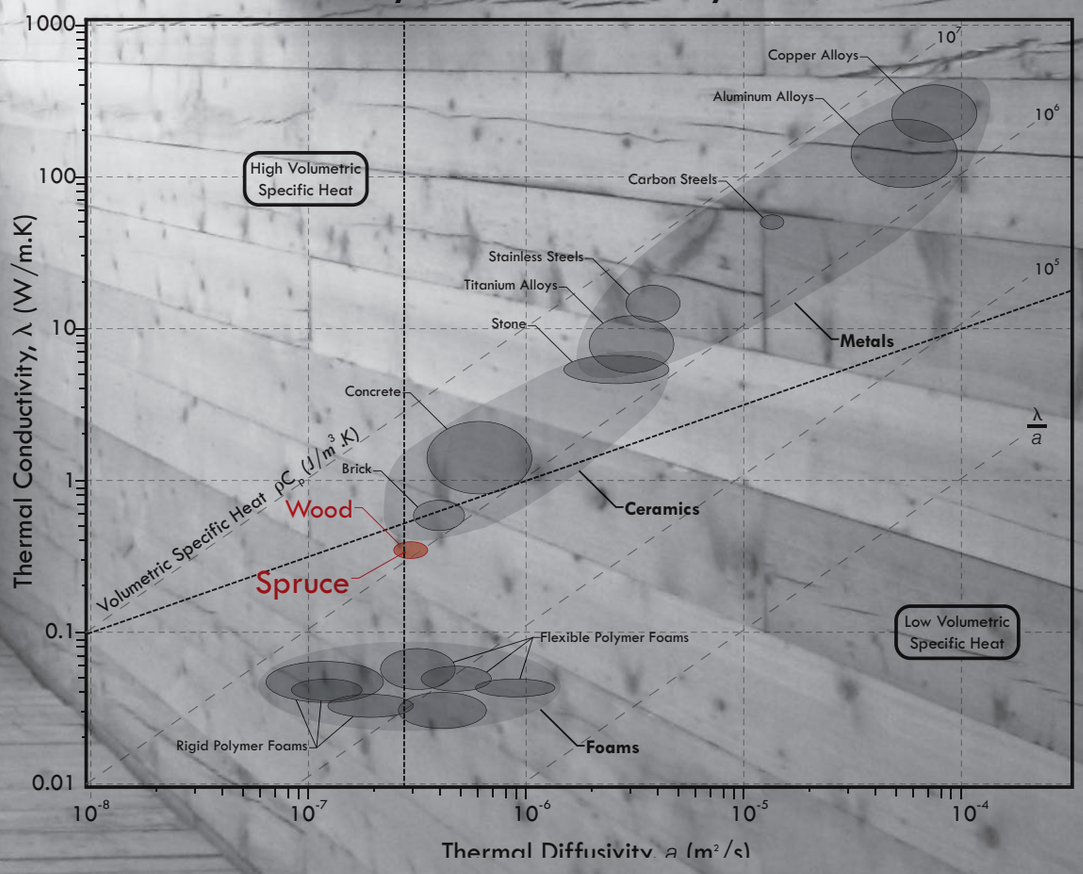
STACK

	rows	length	linear feet	volume per	cu feet	cu meter	MJ per unit	MJ
6x8 timber	31	36	1116	0.28	309.03	8.75	848	**7421**
							Stick Total Embodied Energy	**7421**

Project Credits

Stack
Location: The Georgia Bar, near Granite, Colorado
2008
Design: Kiel Moe with and for Ron Mason
Engineer: Chuck Keyes, P.E. of Martin and Martin, Lakewood, CO
Construction: Kiel Moe with Jacob Mans and Amit Oza

Thermal Conductivity - Thermal Diffusivity *(room temperature)*



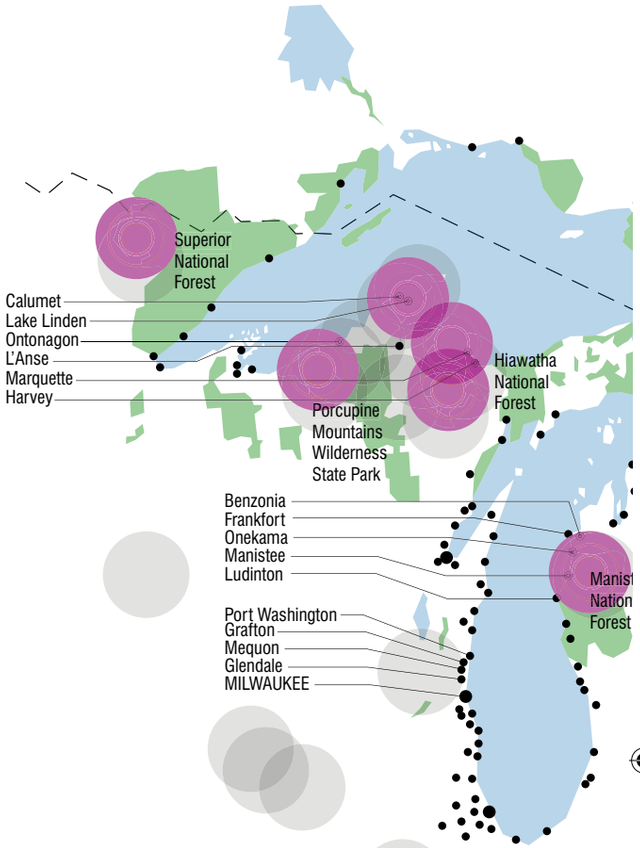
BAT TOWER

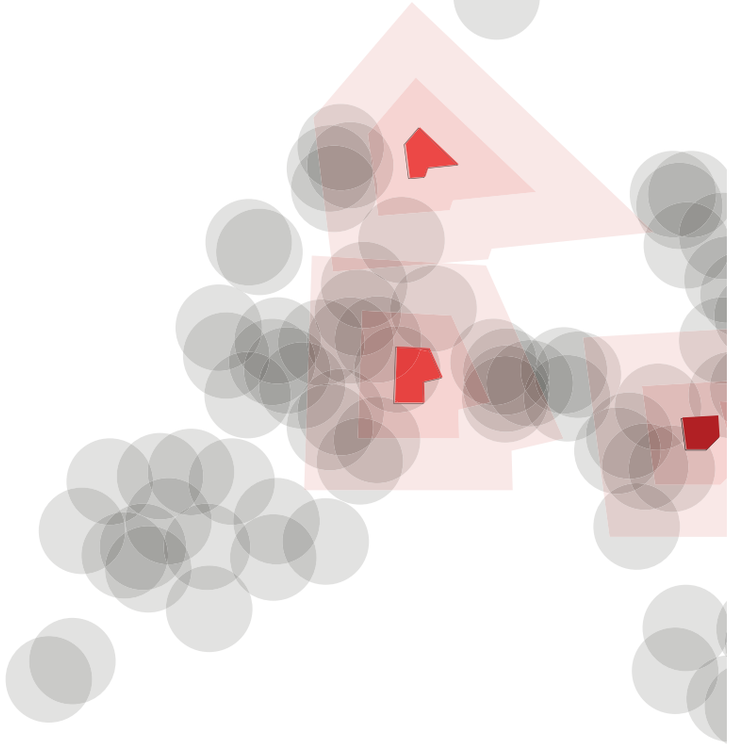
JOYCE HWANG ANTS OF THE PRAIRIE

BAT TOWER is the second in a series of bat house prototypes which explore strategies for increasing public awareness of bats as a critical component of our ecosystem. Bats are effective as natural pesticides, pollinators, and mosquito abatement. Yet they are often considered as a kind of urban pest, and are frequently exterminated by human-run 'pest control' services. Their very survival is also being challenged by White Nose Syndrome, a disease which has inexplicably been wiping out large bat populations in northeastern United States.

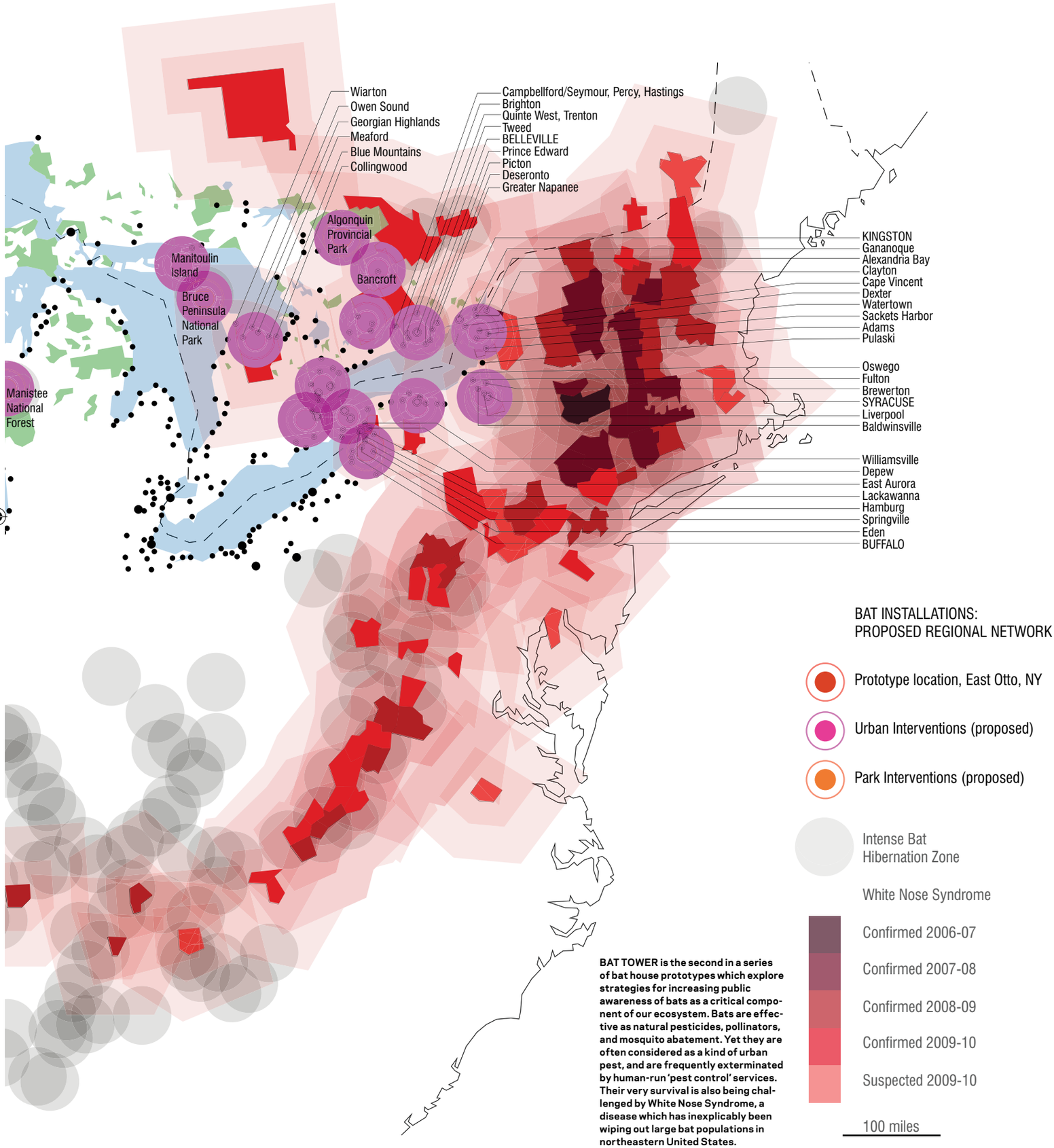
In order to bring visibility to bats, BAT TOWER challenges notions of the typical off-the-shelf bat house. Rather than innocuously fading into the background, the tower stands as a prominently visible outdoor sculpture. Drawing from the idea of a vertical cave, the installation has a heavy and intense presence, contrasting the lightness and invisibility associated with do-it-yourself bat house constructions.

BAT TOWER is sited and designed to attract and facilitate bat inhabitation. Located adjacent to a pond, the site boasts an abundance of mosquitoes and other bat-attracting insects. Chives, oregano and other bat-attracting herbs are planted within the base of the tower. To help facilitate entry, the project's ribbed construction includes a series of 'landing pads' near the top of the tower. A pattern of grooves on both vertical and horizontal surfaces allows bats to more easily climb into the tower and cling to its 'ceilings.' To provide a suitably warm interior for bat roosting, dark wood panels cover the tower's inhabitation zone in order to absorb sunlight.





Project Director: Joyce Hwang, *Ants of the Prairie*
Design Collaborators: Thomas Giannino, Michael Pudlewski, Laura Schmitz, Nicole Marple, Mark Nowaczyk
Construction Collaborators: Michael Pudlewski, Laura Schmitz, Nicole Marple, Mark Nowaczyk, Dan Dimillo, Matt Salzer, Jake West
Installation Collaborators: Matt Bain, Albert Chao, Joshua Gardner, Shawn Lewis, Sergio López-Piñeiro, Nellie Niespodzinski, Mark Nowaczyk, Michael Pudlewski, Joey Swerdlin, Angela Wu
Consultants: Katharina Dittmar, Mark Bajorek
Installation Photographers: Albert Chao, Nellie Niespodzinski, Angela Wu



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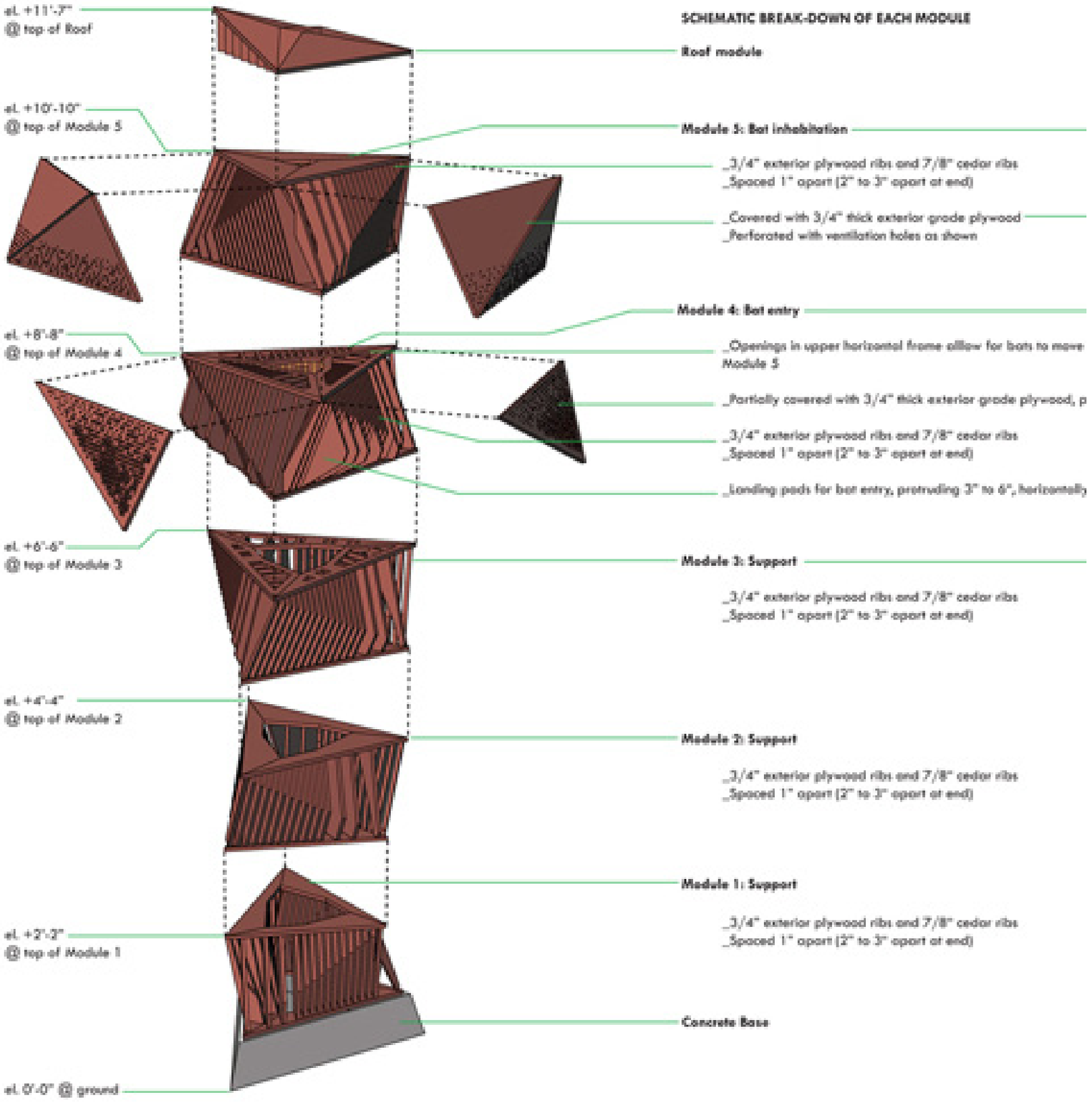

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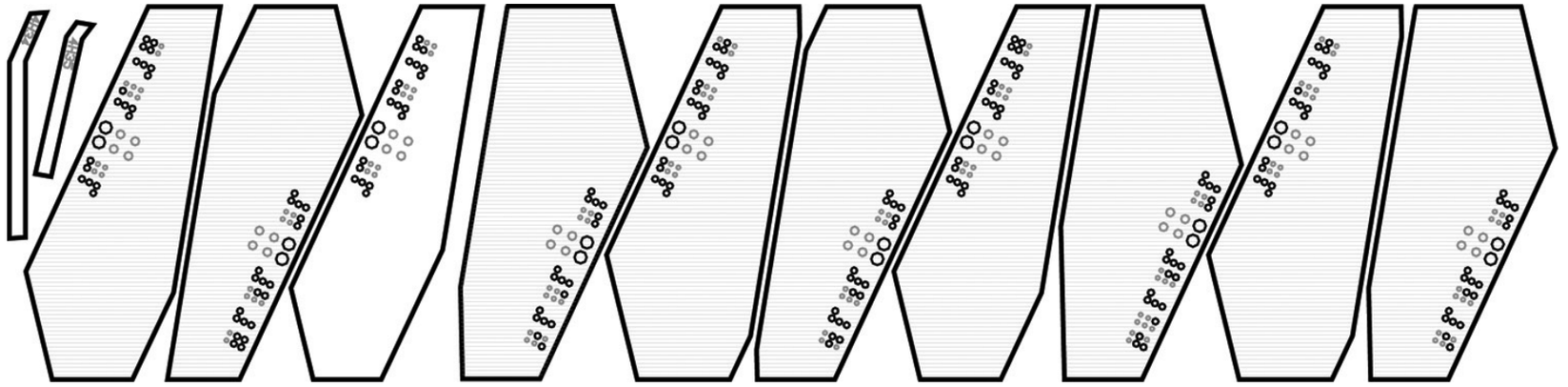


NUMBER

A1 B2 C3 D4 E5 F6 G7 H8 I9 JO K L M N O P Q R S T U V W X Y Z

#4 C #1 #11

#4 C #1 #11

#1 C #1 #5

#3 C #1 #13

#3 C #1 #1

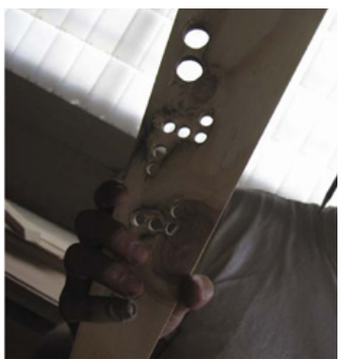
#3 C #2 #18

#3 C #1 #1

#3 H #1 #T

#3 H #2 #T

#3 H #3 #T



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XEROHOUSE
FUTURE CITIES LAB

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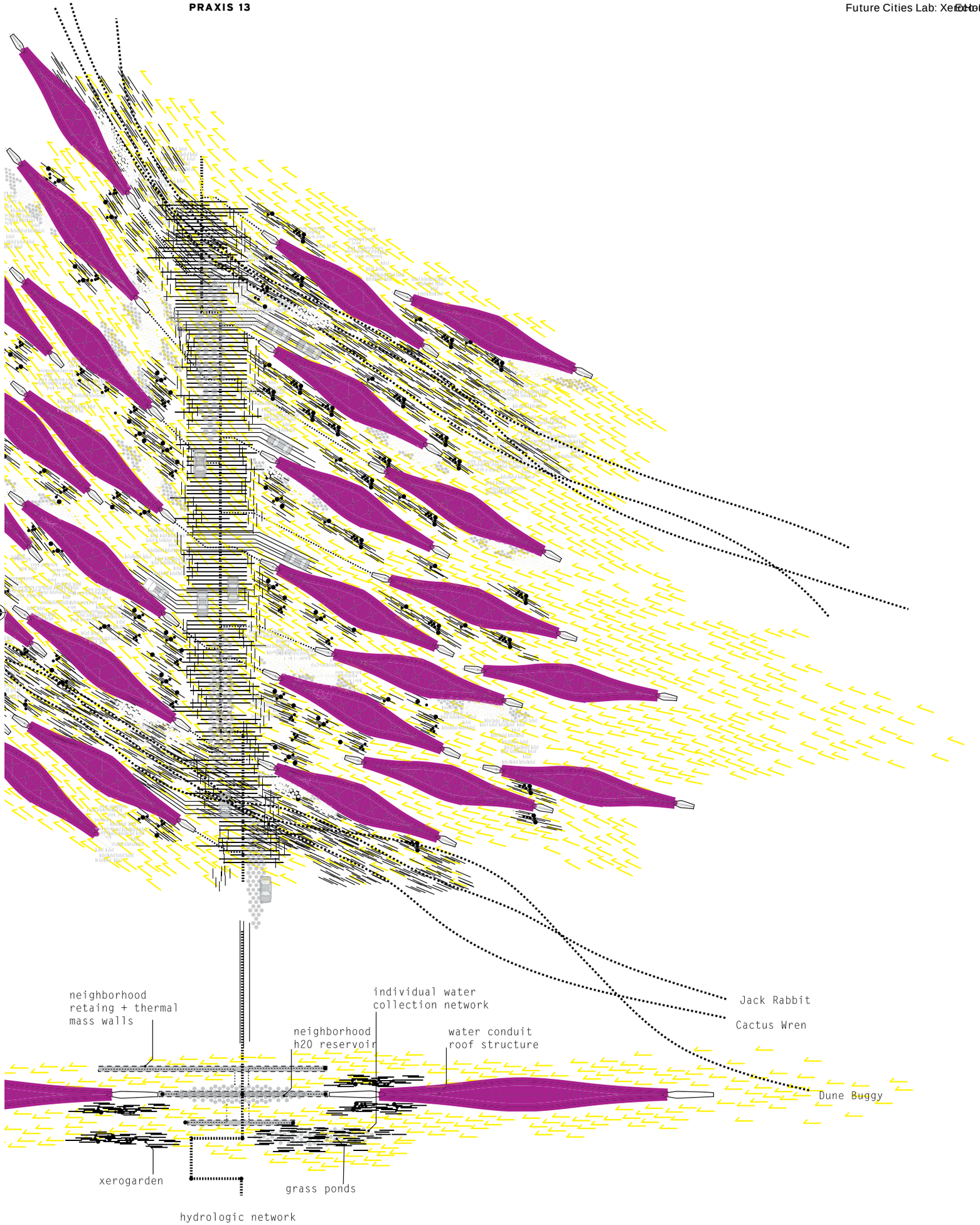
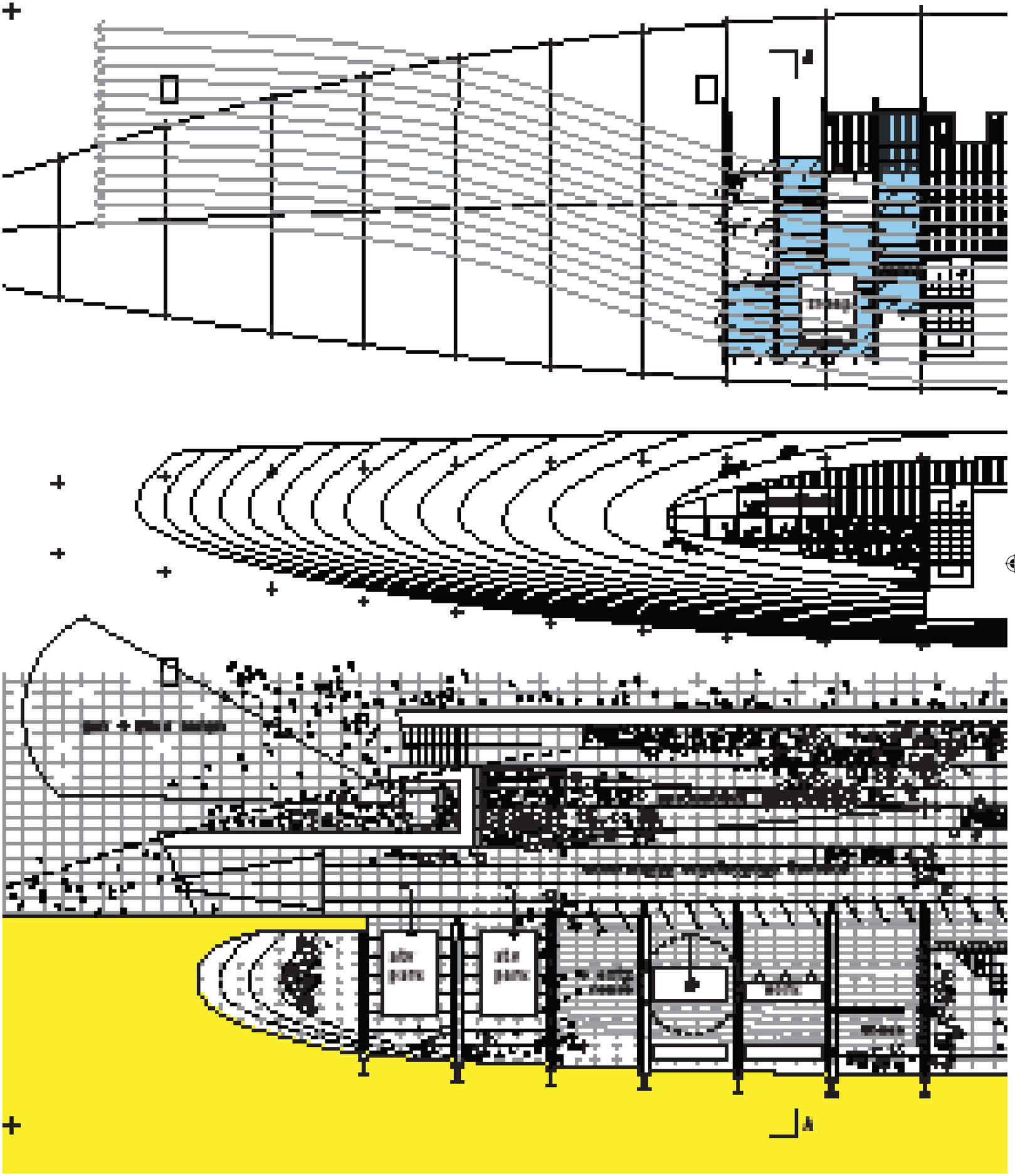
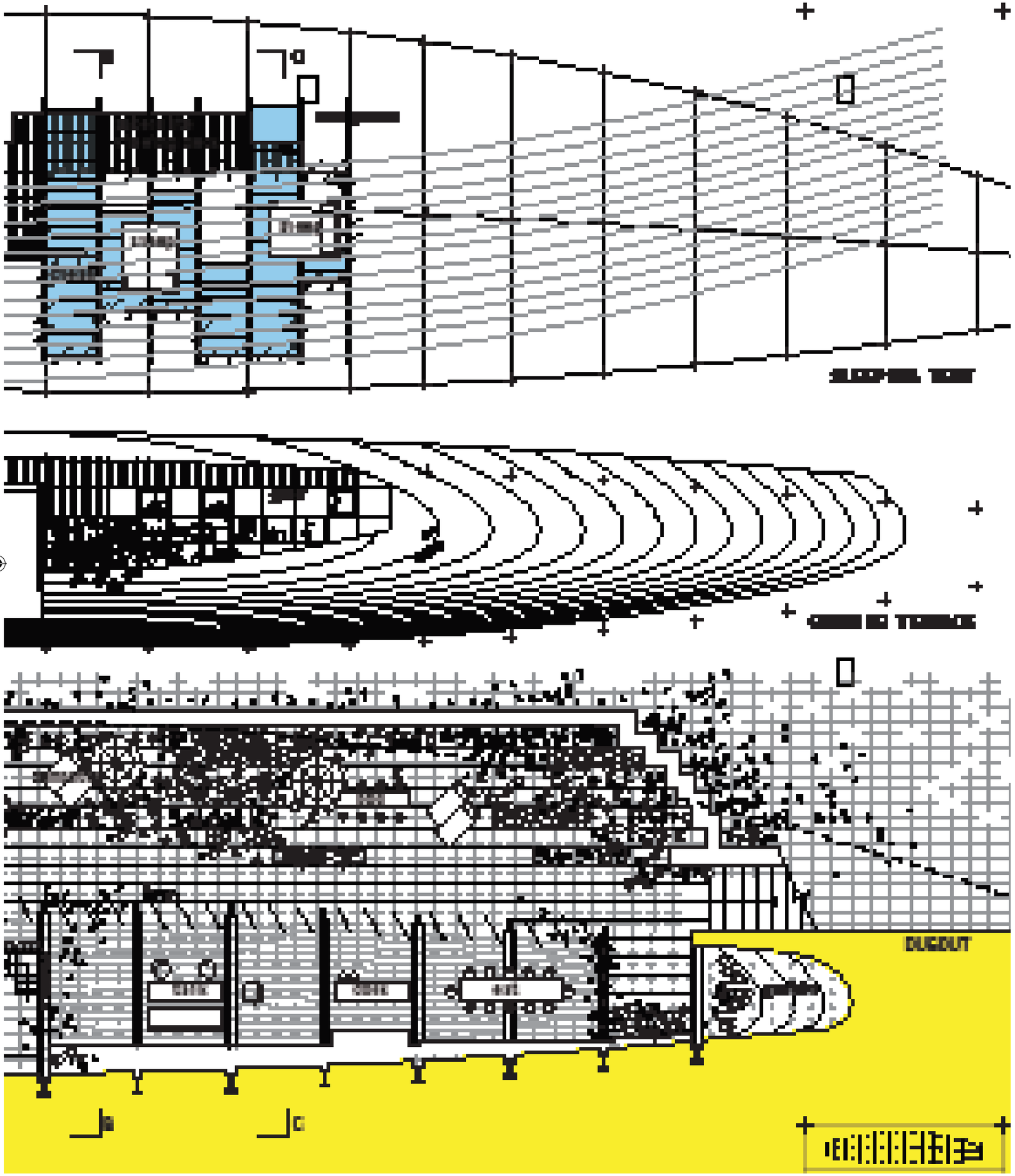
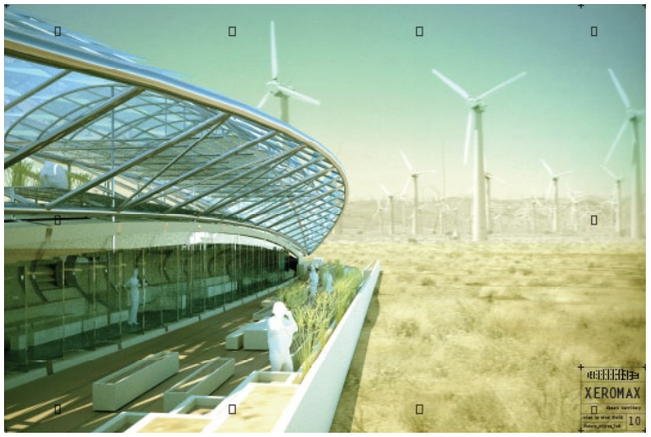
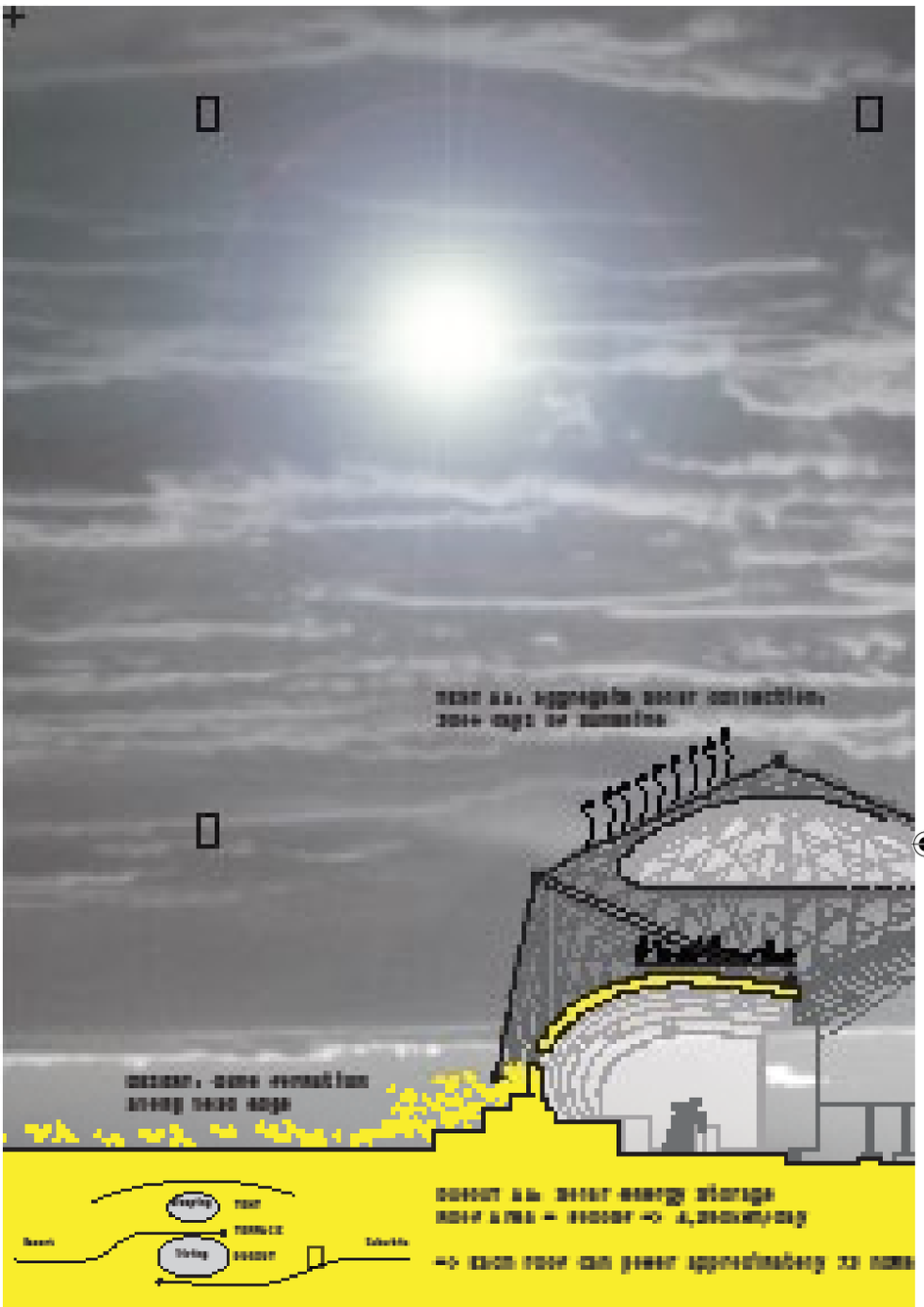

neighborhood
retaing + thermal
mass walls
individual water
collection network
neighborhood
h2O reservoir
water conduit
roof structure
Jack Rabbit
Cactus Wren
Dune Buggy
xerogarden
grass ponds
hydrologic network




DUGOUT

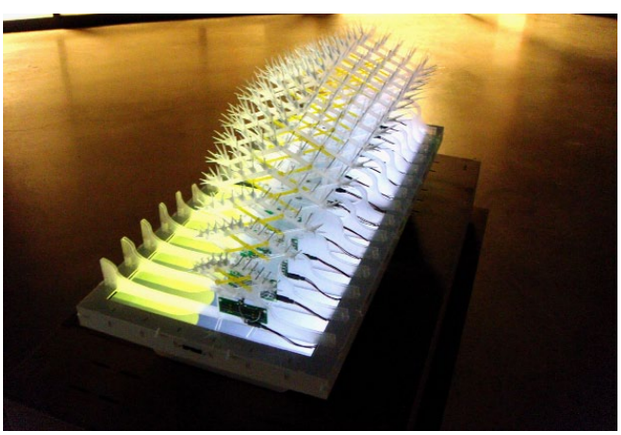


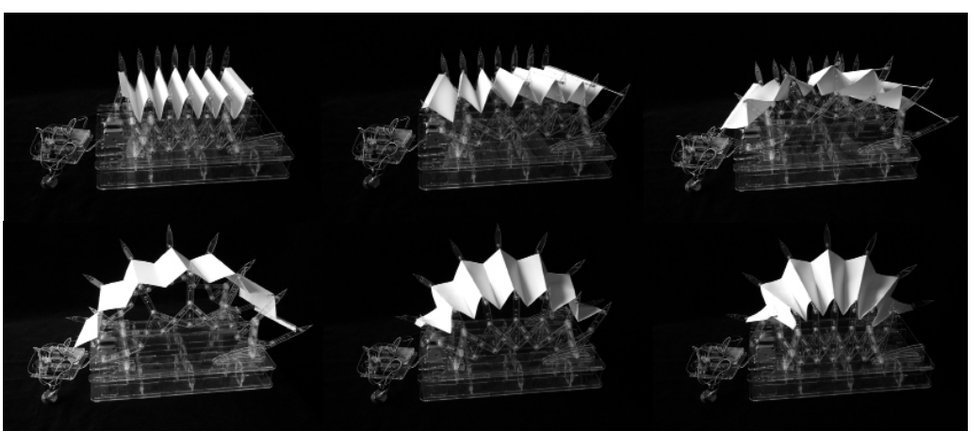


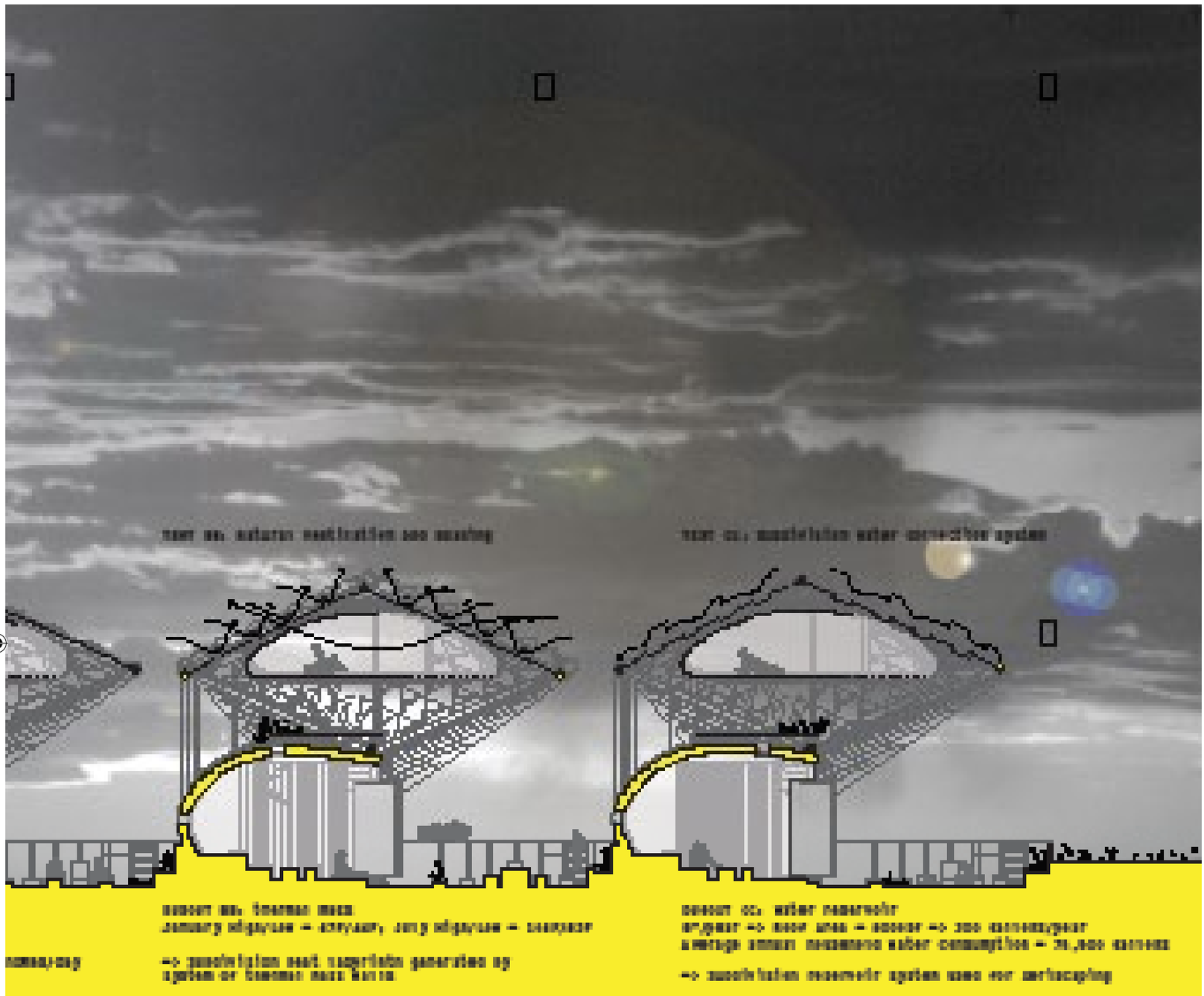
The Xerohouse project illustrated here, experiments with the design of architectural frameworks that operate at multiple scales and investigate the relationship between energy and form. It explores the blurring of boundaries between building and environment through the development of an experimental multi-scalar desert ecology. Xerohouse is calibrated, tuned and responsive to its desert habitat; adaptable, mutable and variable to the desert ecology. Contrary to current trends in desert suburban development, it is a porous, permeable and evolving habitat in synchronicity with its surroundings; hyper situated, indigenous and local, yet responsive to larger weather and climate patterns. Xerohouse responds to the DNA of the desert: wind direction, solar orientation, temperature and sand, while attempting to reconcile two antithetical and disparate conditions that define modern desert living: extreme climate and extreme sprawl. How could the intense heat, aridity, and blistering sunshine of the desert be reconciled with the vast expanses of single-family homes cooled by central air, surrounded by golf courses, and bordered by artificial lakes? Could the synthetic recombination of these extreme conditions spawn productive new hybrids for desert living; alternative desert aggregates and energy formations?

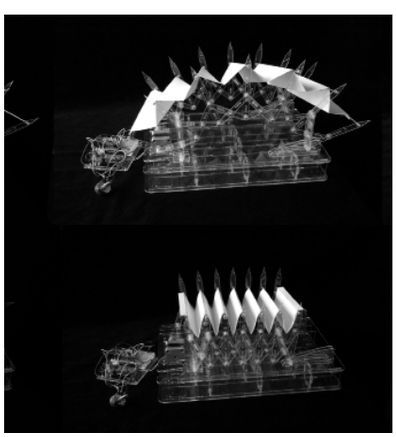
Xerohouse is a combination of two archetypal desert typologies: the dugout and the tent. The dugout is stable; burrowed into the ground, taking advantage of passive thermal mass and encapsulating the daytime living programs that require daytime cooling. The tent is flexible; suspended above, holding the sleeping quarters and a complex roof system adjustable to cool or heat the house as needed. Between the two is an interstitial zone which allows for maximum air flow, accommodates the growing of food and provides a shaded exterior space for leisure. The Xerohouse roof is designed to adjust to the prevailing seasonal solar orientation. It opens to allow breezes to course through it and shuts down during the warmest parts of the day to protect the spaces within . The faceted roof channels and distributes seasonal rains towards the communal underground storage tanks beneath the street. Arrays of small spiky panels (similar to desert microphyllous leaves) avoid overheating and promote self-shading through their size and overlap.

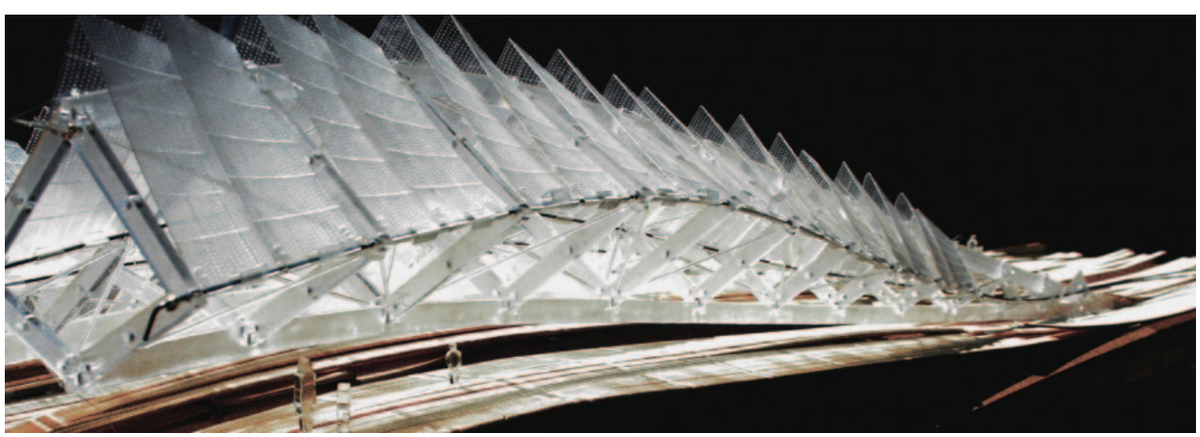
BELOW: Live Models series.











Live Models

Nataly Gattegno + Jason Kelly Johnson

Ecosystems are defined by networks of agents that self organize into complex hierarchies of patterns and processes. The 'system' in ecosystem implies the importance of interaction between the parts . The 'ecology' of ecosystem studies the structure and function of an entire system of agents – whether they are microbes, plants, animals, or emerging species of artificially intelligent beings - in relation to their environment . Distinctly different from the evaluative term 'environmental', ecosystem ecology describes the behavioral logics of the system; the inputs and triggers versus the outputs and effects. Ecosystems are constantly confronted with a range of environmental fluctuations that vary transiently in magnitude and force. Under these terms, conventional notions of scale are of negligible importance and are subservient to the interaction between all the parts.

The Aurora Borealis is an example of this ascalar interaction of components both local and distant. The Northern Lights are a representation of the collision of highly charged solar particles with the Earth's magnetosphere . In this process, a very distant and vast, phenomenon is represented in a temporal, flickering and changing show of lights on Earth's atmosphere. The phenomenon spans scales and defies conventional interpretation of scalar relationships. The ascalar nature of ecological dynamics can therefore operate as a closed system with respect to local site variables, while at the same time remaining open with regard to broader systemic influences. Ecosystems and by extension ecology describe multi-scalar systems that span scales and are able to address hyper local and global realms through their behavioral logics and interactions.

These ecosystemic logics can be productive vehicles for design. Within this methodology, "... building gives way to ecosystem, to a built organization that operates at the level of vivisystems – dynamic and complex systems that learn, adapt, evolve and mutate in response to the feedback of environmental conditions" . These environmental feedback loops enable the development of design frameworks that are not characterized by figure, but by the relationship between energy and form. These live models require the use of a promiscuous mixture of design tactics from the fields of interactive design, robotics, biology, material sciences and advanced fabrication to name but a few.

Live models are dynamic material and sensorial formations that register and continuously adapt to shifting atmospheric, microclimatic conditions. These models can be used as analytical engines to understand the patterns around us, and in some cases, as conceptual frameworks for architecture. The most compelling of these models do not merely depict the appearance of things, but seek to reveal the irreducible nature and behavior of processes in transition. Interestingly, the word 'model' is an auto-antonym, containing two antithetical and opposing definitions. 'Model' simultaneously defines a fake and an ideal; it describes the representation of a given condition and an exemplar, prototypical order. This representational fluctuation is core to live models in the way they operate, by simultaneously representing both existing and ideal conditions. Live models are triggered by existing forces and energies that are dimensionally far and near. They represent those energies and strive to articulate their unpredictable and sometimes surprising consequences. Not only are they capable of calculating the underlying logic of these processes, they also reveal emerging organizations of energy, form and flow in visually discernible patterns. These frameworks are highly integrated with the ecosystems within which they are located and are constantly recalibrating themselves relative to them. They behave and evolve over time, are nimble and dynamic, temporal and multi-scalar. These frameworks are regulated by processes of energy exchange, with extensions that generate, consume and distribute energy. They are "complex organizations defined to manage energy through their formal characteristics, technical devices and material definition – all of which evolve over time."

The Xerohouse proposes an alternative vision of desert inhabitation by exploring issues of temporality, seasonality, change and performance, and experimenting with the development of interconnected, complex, looped and ecosystemic frameworks for design. The methodology explored in Xerohouse frames an extremely contextual, highly responsive and indigenous approach to design. "Looped into ecosystems, architecture becomes ecosystemic itself." Extreme environments such as the desert are ideal situations in which to test live models – to experiment with extreme modulations of interaction – from minimum to maximum. These landscapes are ones we are further colonizing at an alarming rate. Far from relying on conventional notions of design, extreme environments require risk and present themselves as design opportunities. "In a landscape where nothing officially exists, absolutely anything becomes thinkable, and may consequently happen ..." Extremes prompt us to critically rethink our environments and harness their inherent logics through design.

Ferenc Jordán and István Scheuring, Network Ecology: Topological Constraints on Ecosystem Dynamics, Physics of Life Reviews, □, □□□□, pp.□□□–□□□.

Kevin Kelly, Out of Control: The New Biology of Machines, Social Systems, & the Economic World, Addison Wesley, □□□□, pp.□□-□□.

Levin, S. A., The Problem of Pattern and Scale in Ecology: the Robert H. MacArthur Award Lecture, Ecology, □□ (□), pp.□□□□–□□.

http://en.wikipedia.org/wiki/Aurora_(astronomy)

Helene Furjan, Eco-logics, in Softspace: From a Representation of Form to a Simulation of Space, eds. Sean Lally and Jessica Young, Routledge, □□□□, p.□□□.

For more on our description of live models: Nataly Gattegno and Jason Kelly Johnson, Live Models, in ACSA □□□□ Conference Proceedings: Flip your Field, Chicago, p.xx.

Cristina Diaz Moreno and Efrén Garcia Grinda, Energy Forms, in Energies: New Material Boundaries: Architectural Design, ed. Sean Lally, Wiley, London, □□□□, p.□□.

Project Credits: Future Cities Lab, Design Principals - Nataly Gattegno and Jason Kelly Johnson. Design Assistant: Joy Wang. Project Support: David Malda, Brad DeVries, Michael Hopkins, Jae Oh, Richard Tursky, Natalie Wiersma, the Taubman College of Architecture and Urban Planning and Tom Buresh. For full project credits visit: www.future-cities-lab.net

The Sonoran desert routinely experiences diurnal temperature fluctuations of □□□ F (□□□ C). For more on desert temperature fluctuations see Steven J. Phillips and Patricia Wentworth Comus [eds.], A Natural History of the Sonoran Desert, University of California Press/ASDM Press, p.□□□.

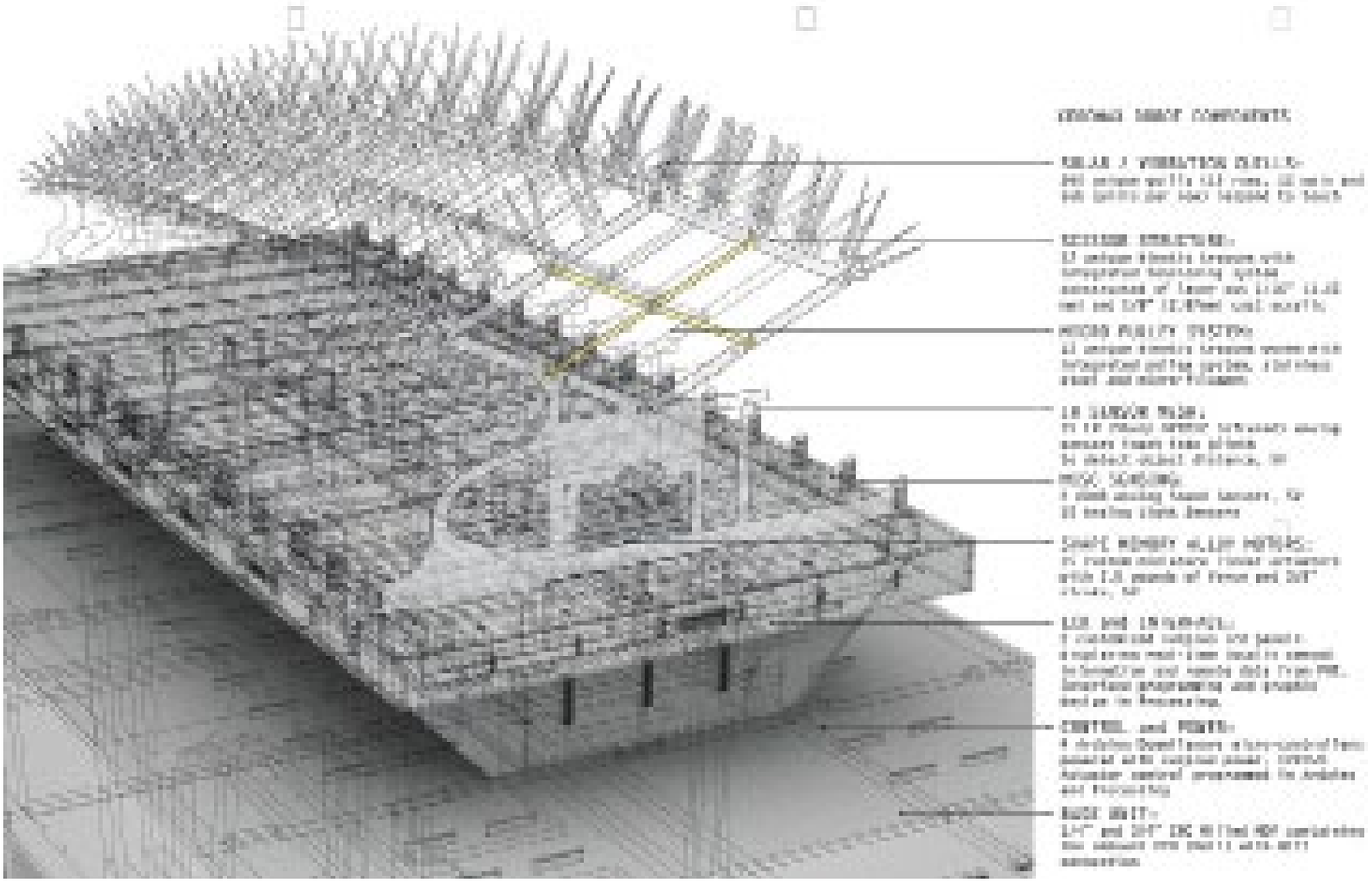
Ibid, p.□□□.

Ibid, pp. □□□-□□□.

Mark.C.Taylor, The Moment of Complexity: Emerging Network Culture, University Of Chicago Press, □□□□, p.□□□

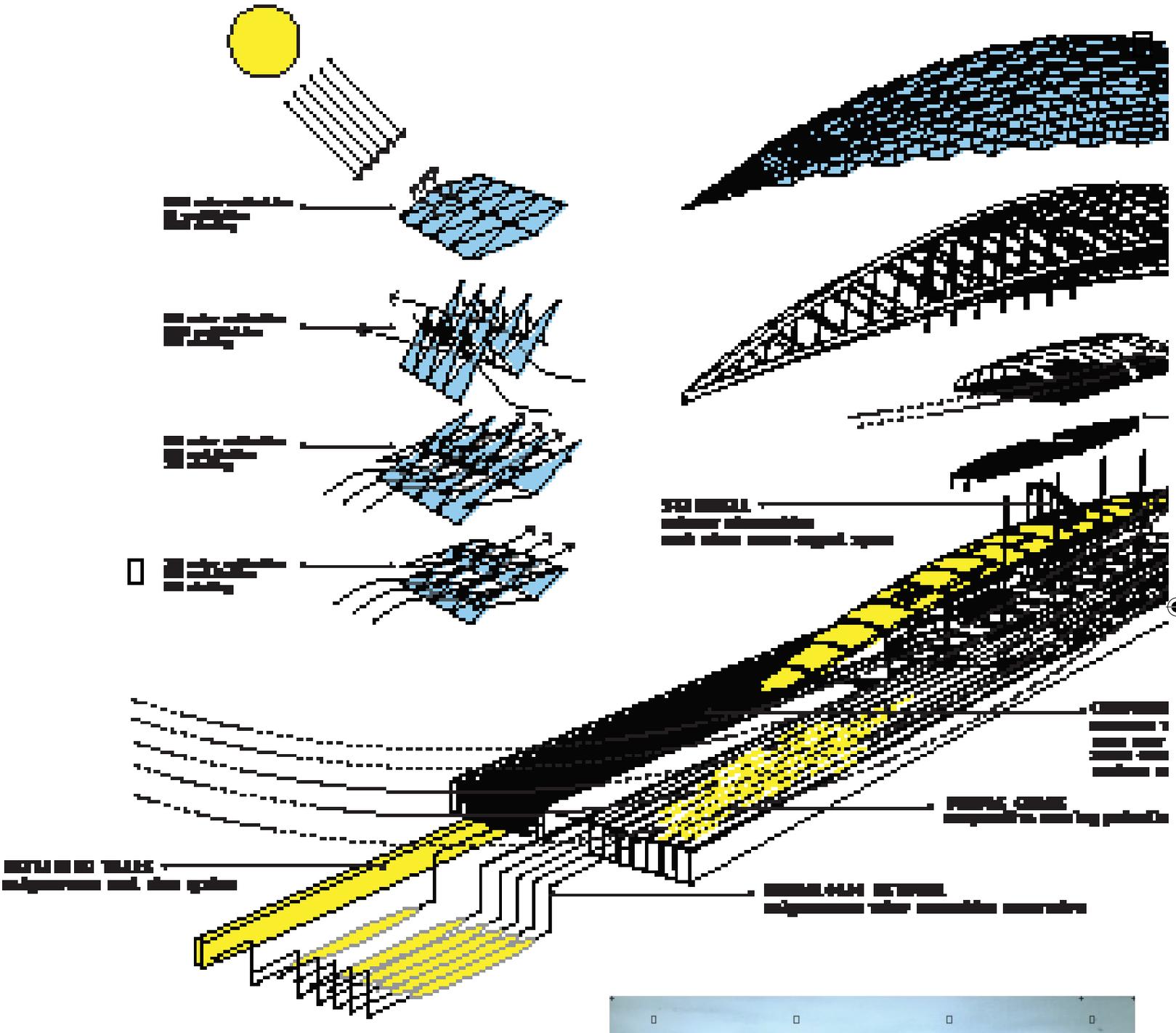
Helene Furjan, Eco-logics, in Softspace: From a Representation of Form to a Simulation of Space, eds. Sean Lally and Jessica Young, Routledge, □□□□, p.□□□.

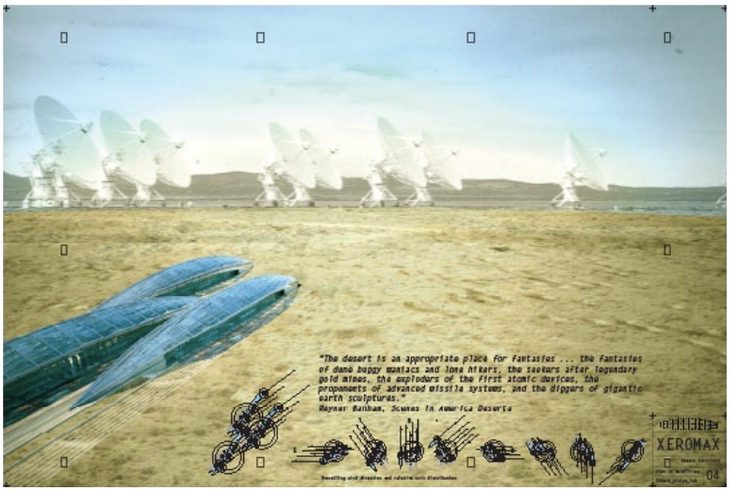
Reyner Banham, Scenes in America Deserta, MIT Press, □□□□, p.xx.

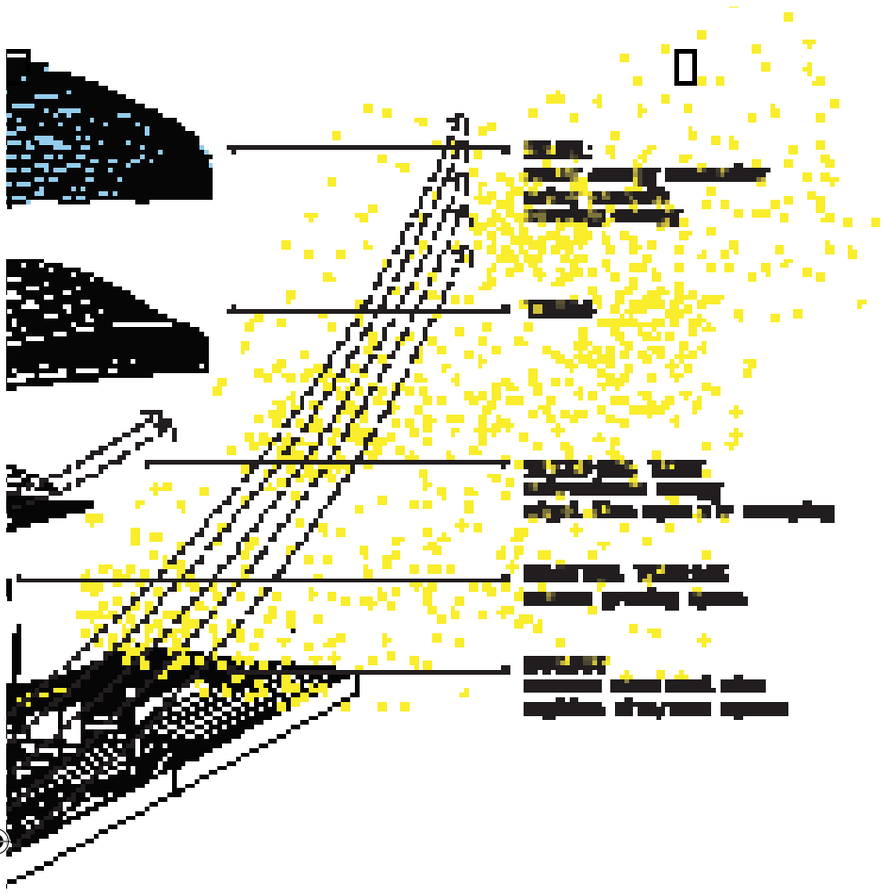


An experimental robotic model was fabricated to explore how this system might slowly change shape and adapt to the varying conditions of the site. The model investigates how a responsive assembly might be in constant negotiation with the shifting energy cycles of its site for the harvesting of sun, wind and water. The model serves as the testing ground for exploring how Xerohouse's behavior might gain intelligence, complexity and richness over time. The Xerohouse robot model is a live model, dynamically registering and shifting relative to the fluctuating energies and forces that surround it. It consists of a series of actuated scissor-trusses with integrated motors. The model weaves ultra thin shape-memory alloy activated truss modules, arrays of light and proximity sensors, with a customized interactive graphic display that registers the fluctuating energy inputs. Part robotic structure, part experimental interface, and part analytical instrument it is capable of registering energy cycles and interactions over time.

The model responds in a material and an indexical manner. The roof trusses are designed to collapse and inflate depending on the signal sent by the perimeter IR sensors. The presence and proximity of an object to a sensor is representative of temperature and solar orientation. Once triggered the roof structure collapses, reduces its exposure to the harsh elements and maximizes its self-shading capacity through the overlap of the roof 'thorns'. Once the trigger is removed, the roof inflates and allows for cooling breezes to permeate through the porous lattice. Corollary to the tectonic manifestation of the energy cycles

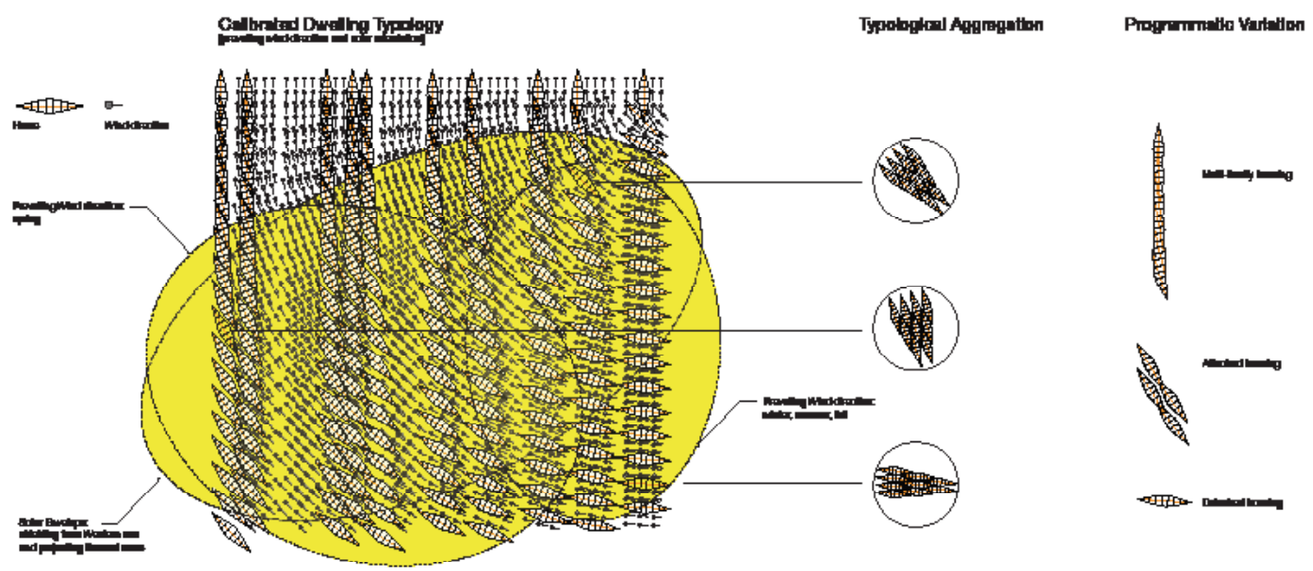



"The desert is an appropriate place for fantasies ... the fantasies of dune buggy maniacs and lone hikers, the seekers after legendary gold mines, the explodars of the first atomic devices, the proponents of advanced missile systems, and the diggers of gigantic earth sculptures."
Reyner Banham, Scenes in America Deserta
XEROMAX



Xerohouse is a single mutable residential unit that aggregates to make up an entire colony of desert dwellings. The primary orientation of the subdivision is guided by the prevailing wind direction. This aggregation is oriented in line with the prevailing winds to cool the subdivision, protect it from sand storms and allow for the desert landscape to intermesh with hardscape, roads and connected infrastructure. The built environment is therefore embedded and subsumed into the desert landscape allowing corridors and pathways of movement for people, sand and desert creatures to still be maintained throughout the landscape. Self shading, programmatic adjacency and solar insolence further calibrate the aggregation logic of the suburban ecology. The gated, subdivided, suburban community that Xerohouse generates is highly interconnected and infrastructural. Each house uses its roof to collect water and dew, channeling it through to the retaining walls and into the water infrastructure laced beneath the streets with water reservoirs and filtration systems . The water is subsequently used to tend to the xeroscape courtyards between lots. Though each Xerohouse acts independently in terms of programmatic occupation, multiple Xerohouses collaborate to collect shared resources [water, solar energy], distribute them at the suburban scale and protect themselves from desert elements, such as sand storms.

"For complex systems to maintain themselves they must remain open to their environment and change when conditions require it. Complex adaptive systems therefore inevitably evolve, or, more accurately co-evolve." In its prototypical form, Xerohouse suggests an alternative vision for the design of suburban habitat. The scale of a suburban cluster is calibrated and tuned to available resources; its infrastructure determined relative to local resource potential and suburban building adjusted accordingly. This suggests a temporal and ever-changing suburban landscape that has a maximum and a minimum capacity: it grows as large as its resources allow it to and ceases to sprawl after that. An alternative interpretation of suburban design and growth emerges. Growth is a strategically adaptive process of co-evolution in tandem with available resources; a mutable suburban framework capable of yielding synthetic spaces of inhabitation, with civic repercussions. Suburbia no longer functions as an isolated and independent entity, but is transformed into a highly interconnected and interdependent energy landscape where neighbors share more than a parti wall or picket fence. The logics of the desert and the feedback loops between building and landscape yield complex, ecosystemic frameworks for occupation.



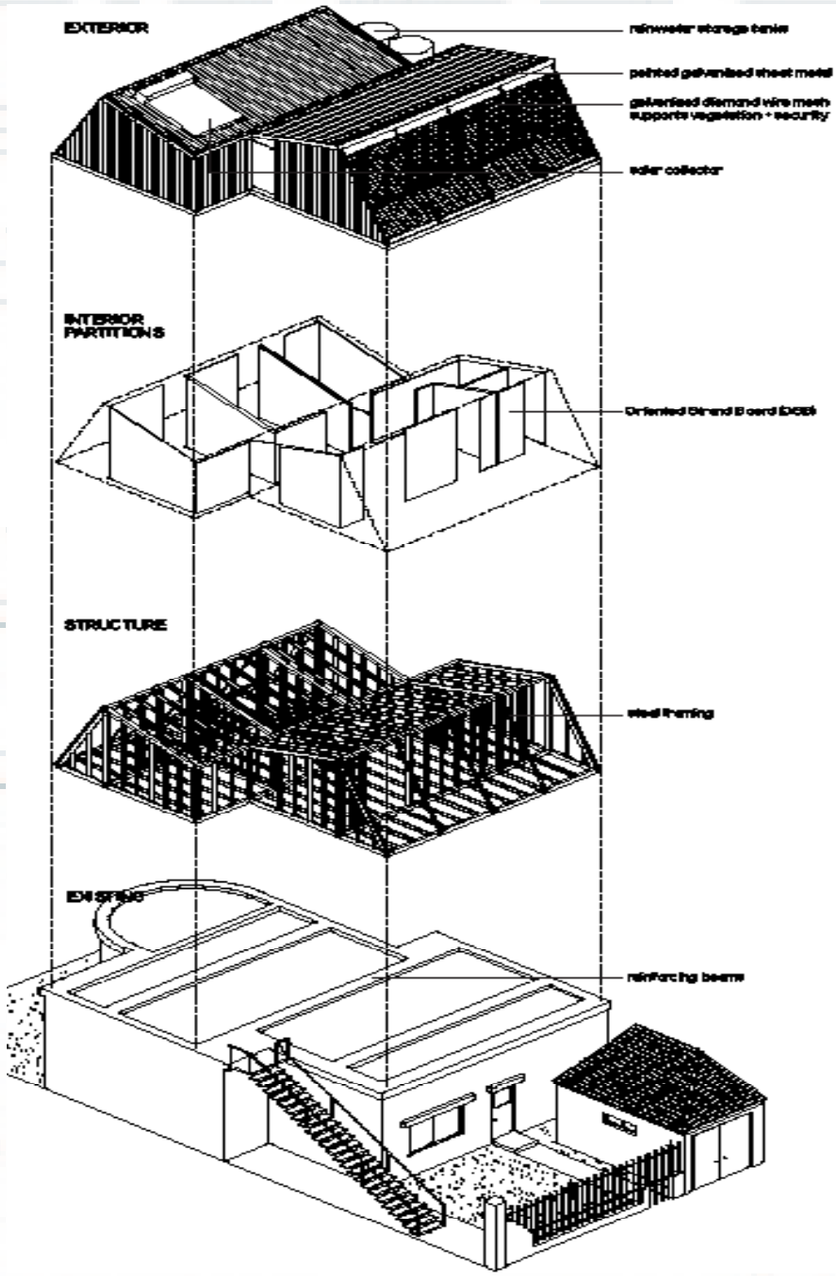
MURERE
ADAMO-FAIDEN

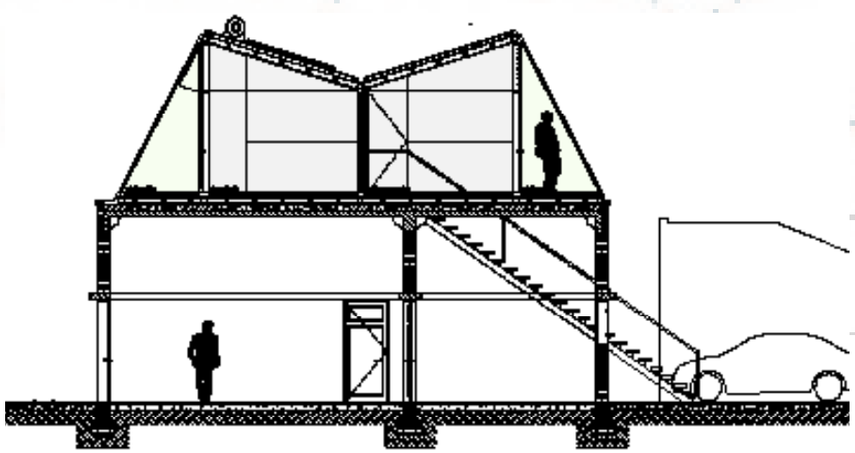
Adamo-Faiden's proposal for a new solution to social housing in the suburban neighborhoods of Buenos Aires Argentina aims to reverse the commonly held perceptions that social housing is (1) Parasitic; drawing resources from its host without offering anything in return (2) an Outcast; beginning in a state of crisis without the supporting infrastructure necessary for its survival and (3) a force of Depreciation; decreasing the value of its surroundings. In contrast, MuReRe houses offer a new covenant between social housing and its context. Embracing Mutualism, Regeneration and densified Residential infrastructure as their basis for design, MuReRe houses are simultaneously a new model for social hous-

ing and a strategy for increasing the quality of existing neighborhoods by reactivating the latent potential of the Buenos Aires suburbs.

Rejecting the empty lot or virgin ground as their site, MuReRe houses are constructed on the top of existing buildings, effectively doubling the density of the lot where they are inserted and increasing the programmatic diversity of the neighborhood. By dispersing the MuReRe houses throughout the existing suburban fabric, gentrification is avoided. A MuReRe house is built by the owners of the host building with the financial help and general assistance of the family social services organization AMPF. The MuReRe house and respective residents receive a site within an existing and well serviced neighborhood, immediate utility connections and a welcoming downstairs neighbor. In return for offering their roof as a foundation, the host building, and its owner, receive rent from the MuReRe resident and benefit from lower energy bills as a consequence of increased roof insulation. Additionally, a MuReRe house supplements the site's infrastructure through a double peaked roof that is angled to best capture the sun for solar collectors that provide hot water for domestic use or hydronic heating, and functions to catch rainwater for the grey water storage tanks that can be used for watering the garden, washing cars or flushing toilets.

Individually, MuReRe houses thrive on a unique social and economic equation created specifically by and for the host building/family and the newly inserted building/family. At the urban scale, MuReRe houses activate a positive transformation of an outdated urban fabric and simultaneously provide a supply of social service for low-income housing without straining the existing infrastructure .





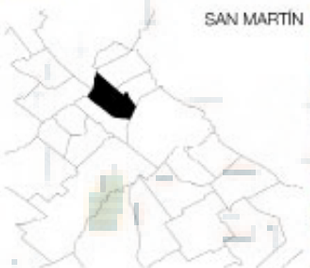
Hasta ahora no había casas para nosotras dos, me ofrecían ir a fundaciones con otras mamás pero yo no quería eso para Lucía. La asistente me explicaba que se estaban haciendo casas pero para que vivan familias con un papá y más hijos. Al final apareció esta casa que es hermosa, es toda de madera y además me pude quedar en el barrio, cerca de mis tíos.

Ahora cuando llegamos del cole le avisamos a papá y subimos a comer. A la tarde mamá se va trabajar pero no nos quedamos solos, papá está abajo trabajando en la gomería de Don Antonio. Si pasa algo o María llora le avisamos. Cuando llega mamá riega las plantas y después prepara la comida.

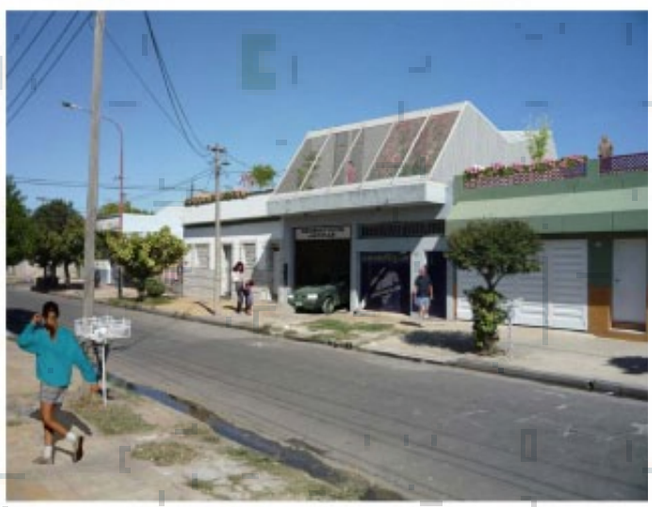
Con Mabel llevamos tres años de casados y decidimos que era un buen momento para tener nuestro primer hijo. La idea de que ella tenga que dejar su trabajo hasta que el bebé crezca nos dejaba un poco intranquilos. En mi cumpleaños decidimos aprovechar la terraza de la casa para entrar al plan MuReRe. Dos meses después conocimos a Alicia y a su hijita, tres meses más tarde ya éramos vecinos.

Ricky trabaja conmigo desde pibe. Hace cuatro años se casó con Ángela y se fueron a vivir a una casita en Merlo. Imaginate, viajar más de 2 horas todas las mañanas para venir a laburar… El año pasado llegamos a un acuerdo y construimos una MuReRe arriba. Ahora de rebote tengo vigilancia por las noches y hasta el día de hoy que no me volvieron a robar. Jorge de la bulonería me dijo que va hacer lo mismo.

SAN MARTÍN



TRES DE FEBRERO



Dirección: Árzana 3100
Superficie: 31m²

1. Expansión 1,70x8,55m
2. Estar comedor 3,20x3,80m
3. Baño 1,75x1,80m
4. Dormitorio 3,20x2,65m
5. Cocina 1,35x1,80m

Dirección: Elizalde 1600
Superficie: 70m²

1. Expansión 1,70x9,70m
2. Estar comedor 3,20x6,70m
3. Baño 1,75x1,80m
4. Lavadero - dep. 1,35x1,80m
5. Dormitorio 3,20x2,00m
6. Dormitorio 3,20x2,50m
7. Dormitorio 3,20x2,75m

WPA □.□: Working Public Architecuture

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Ecology as Infrastructure

Walter Hood

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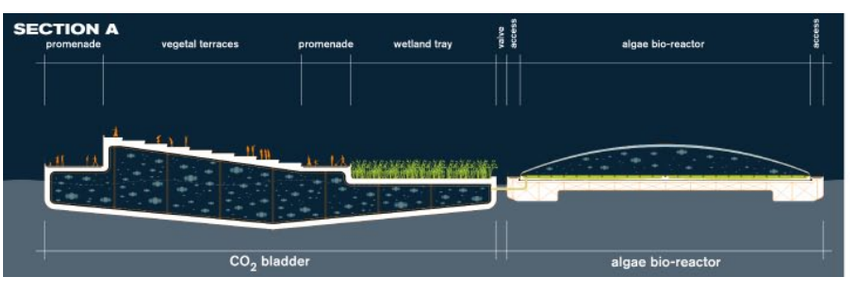
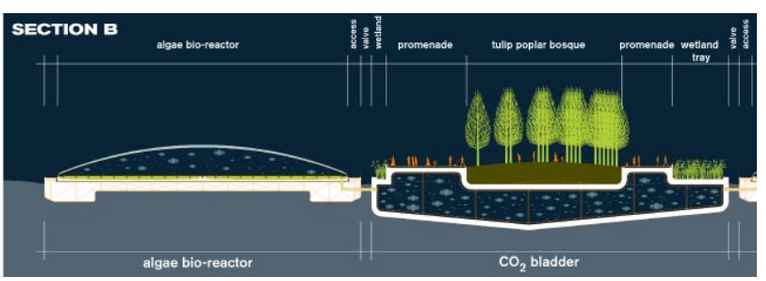
MANHATTAN
The fixed Battery pier is connected to the landside ventilation shaft and is able to function independently from the other two pier elements.
The rotating pier departs on the half hour for the Brooklyn Waterfront.
total travel duration: approximately 20 min.
arc length: 5,280 ft (1mi)
The rotating pier is driven by an integrated cycloidal drive propeller system located at its free end. This system of locomotion is highly maneuverable, allowing for near instantaneous change of thrust direction.
line of brooklyn-battery tunnel below
Like the Battery pier, the fixed Brooklyn pier is able to function independently as a storage and delivery system. It is also home to the processing facility for the entire NYC industrial algae complex.
The rotating pier departs on the hour for the Battery in Manhattan.
The rotating Governors Island pier connects to the existing Brooklyn-Battery tunnel ventilation system via a matrix of flexible ducting that links to the shaft's 53 existing fans and motors.
The floating pier follows a scheduled pivoting sequence connecting to Brooklyn and Manhattan each once every hour.
GOVERNORS ISLAND
1 The Battery Landing
2 The Hive
3 Entry Bosque
4 Recreation Pool
5 Algae Bioreactor (typ.)
6 Wetland Tray (typ.)
7 The Promenade
8 Gov. Island Overlook
9 The Point
10 Vertical Botanic Gardens
11 Recreation Pool
12 Vegetal Terrace
13 Algae Bioreactor (typ.)
14 Tulip Poplar Grove
15 Event Plaza
16 Vegetal Terrace
17 Wetland Tray (typ.)
18 The Hive
19 BBT Ventilation Tower
20 Gov. Island Landing
21 Brooklyn Landing
22 Wetland Tray (typ.)
23 Algae Bioreactor (typ.)
24 Event Plaza
25 Collection Area
26 Processing Plant
27 Entry Bosque


SECTION A
promenade
vegetal terraces
promenade
wetland tray
valve access
algae bio-reactor
access
CO_2 bladder
algae bio-reactor


SECTION B
algae bio-reactor
access valve wetland
promenade
tulip poplar bosque
promenade
wetland tray
valve access
algae bio-reactor
CO_2 bladder

Carbon T.A.P (Tunnel Algae Park)

PORT Architecture + Urbanism, Winner

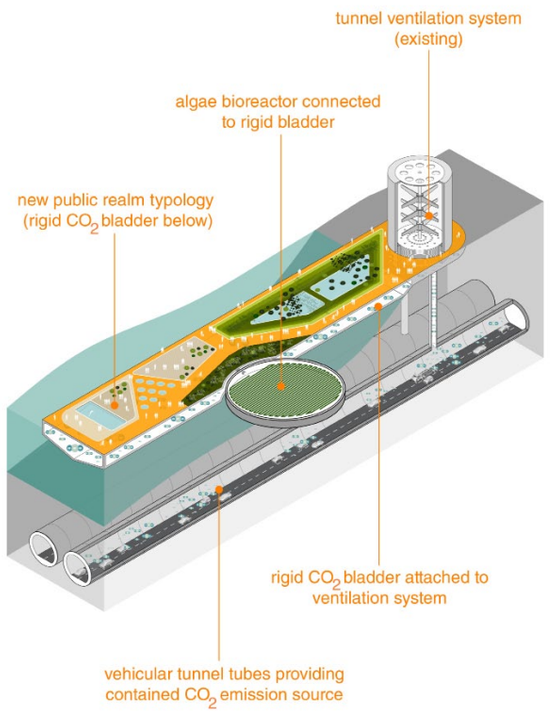
As Federal, state and local governments undertake consideration of large-scale investments in the renovation and replacement of urban infrastructures, we see a unique opportunity to reconsider the role of these systemic networks and their effect on our contemporary urban landscapes.

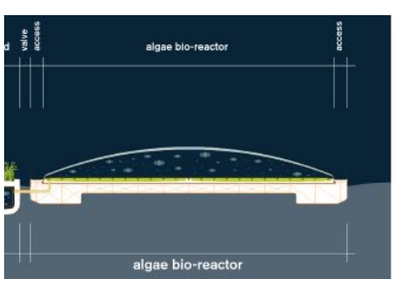
In the scenario outlined herein, a new type of green infrastructure is deployed at urban locations comprising concentrated sources of CO□ production. This new infrastructure utilizes a proprietary system of industrial scale algal agriculture to sequester and consume green-house gas emissions (in particular CO□) in order to limit their introduction into the atmosphere, while simultaneously creating a new economic resource through the production of oxygen, biofuels, bio-plastics, nutraceuticals and/or agricultural feeds. In the scenario shown, this new infrastructure manifests itself as a series of pier-like armatures linked to the ventilation system for the Brooklyn-Battery tunnel.

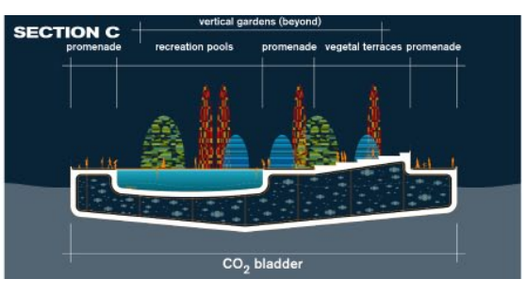
What is unique about this proposition is not just the introduction of large-scale green infrastructure in the context of a city, but rather the use of this infrastructure to create an exceptional public realm amenity for the city. Rather than considering urban infrastructures as a necessary evil only to be hidden or mitigated, we view the renovation and re-imagination of these systems as opportunities to create new forms of civic and social domain that have the capacity to positively transform the American urban landscape.

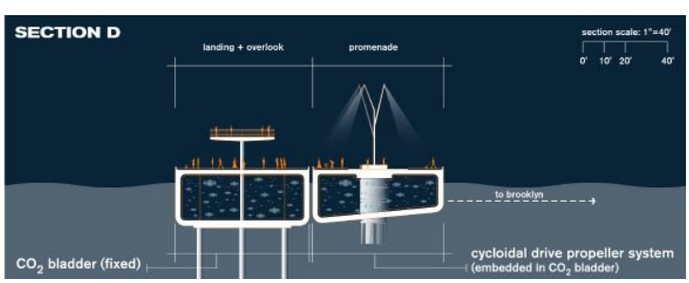
Our proposal for a new infrastructural typology that is one part climate action; one part agricultural production; one part ecological preserve; one part public realm; and one part economic catalyst represents what should be the aspiration for all newly deployed urban infrastructures – the ability to fundamentally improve the economic and social quality of a city, as well as the associated lives of its current and future residents.

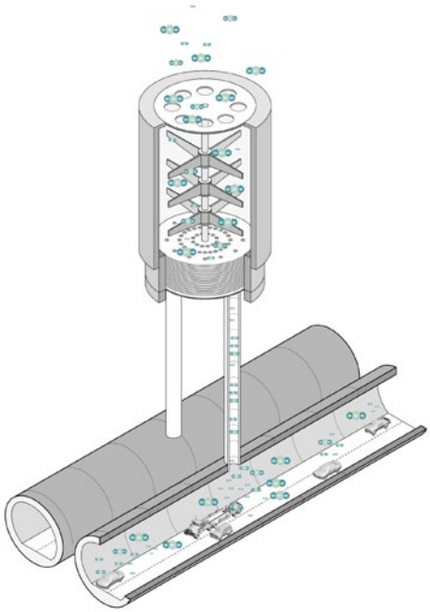
Andrew Moddrell, Christopher Marcinkoski

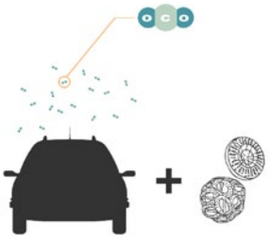


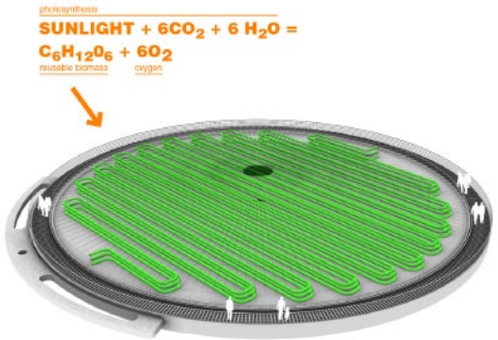











photosynthesis
SUNLIGHT + 6CO2 + 6 H2O =
C6H12O6 + 6O2
reusable biomass
oxygen


4:30pm DEPARTING BROOKLYN PIER
BROOKLYN-BATTERY TUNNEL VEHICLE TRIPS/DAY (NYSDOT) 51,064
AVG. CO2 EMISSIONS/TRIP (FPA) 1.4 lbs
BROOKLYN-BATTERY TUNNEL CO2 EMISSIONS/YEAR 26,000,000 lbs
GOVERNORS ISLAND EXHAUST STRUCTURE


4:53pm APPROACHING THE BATTERY
BROOKLYN-BATTERY TUNNEL CO2 EMISSIONS/YEAR 26,000,000 lbs
CO2 CONSUMED BY ONE SQUARE FOOT OF ALGAE/YEAR 9.7 lbs
AREA OF ALGAE TO CONSUME 45% OF BBT CO2 EMISSIONS 28 acres
= 1.0 acre of algae


4:56pm COMPLETING THE PIVOT
KNOCK NEVIS (world's largest supertanker)
BURJ DUBAI (world's tallest building)
BROOKLYN-BATTERY CARBON TAJP
TOTAL VOLUME OF BROOKLYN-BATTERY PIER CO2 BLADDER 7,400,000 ft3

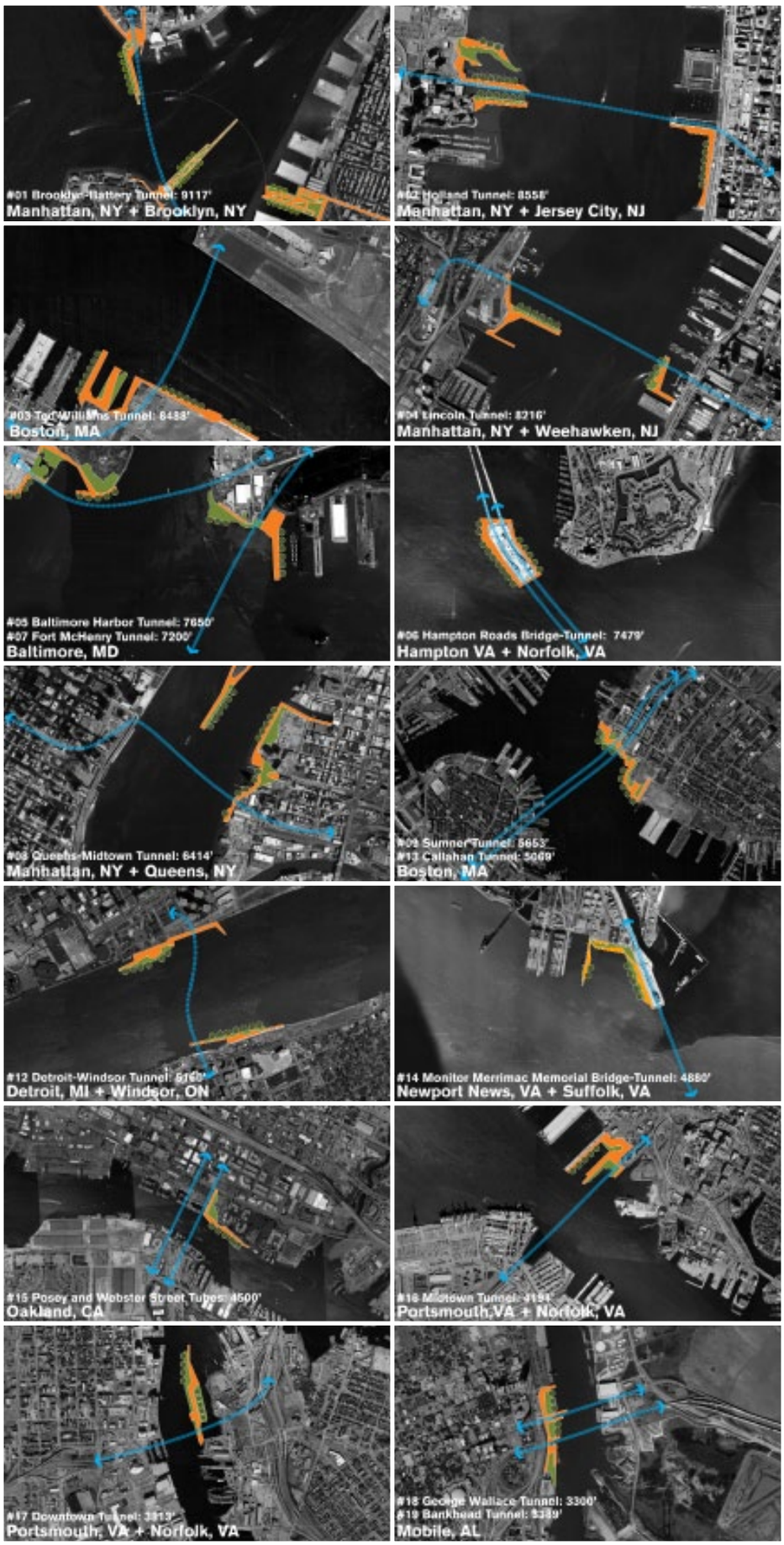

5:00pm DISEMBARK AT THE BATTERY
In 1936 Robert Moses proposed to build a bridge from Red Hook, Brooklyn to the Battery in Lower Manhattan.
It was never built.
Moses' bridge was the product of the automobile century. Though it traverses a similar route, our proposed Brooklyn-Battery bridge is a product of the ecological century, representing a new infrastructural paradigm.
Replete with CO2 consuming algae bioreactors, structured wetlands, aquatic habitat and public realm amenities like swimming pools and fishing piers, this bridge represents a new ambition for contemporary infrastructure; providing necessary public services while creating economic, ecological and social value through the introduction of spectacular and compelling urban form.

RIGHT: Site plans from a selection of the 19 vehicular tunnels throughout the U.S. more than 2,000 feet in length where the Carbon T.A.P. system could be adapted to generate energy while reviatlizing the local urban environment. Not shown are the Thimble Shoals and Chesapeake Navigation Channels (5,280' feet each) that connect Virgina Beach and Cape Charles, Virigina.

TOP LEFT: Existing Brookyn-Battery Tunnel exhaust structure located on Governors Island. Each of the □□,□□□ daily trips through the tunnel (NYSDOT) generates *□.□ cubic pounds of CO2 emissions* (EPA), totalling *□□ million cubic pounds of CO2 each year.*

FAR RIGHT: Each square foot of algae consumes 9.7 cubic pounds of CO2 per year. At this rate, 28 bioreactor pods (1 acre of algae per pod) would consume 4□□ of the tunnel's yearly emissions.

BOTTOM LEFT: Public experience traveling from the Brooklyn Pier to the Battery during the course of a single pivot.



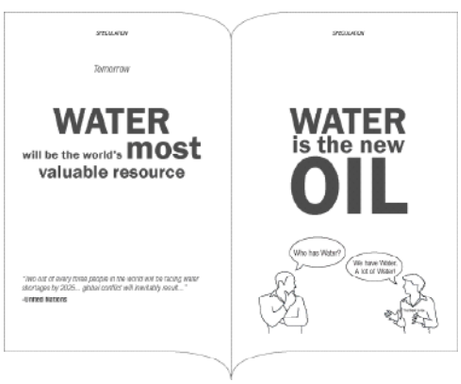
FWD:Free Water District

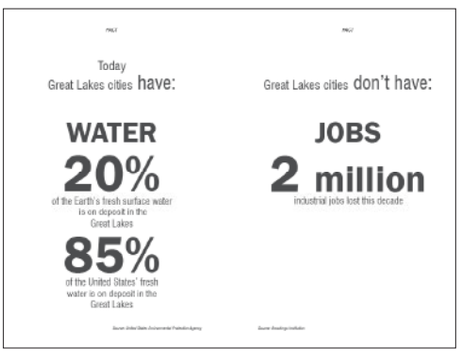
Urban Lab, Finalist

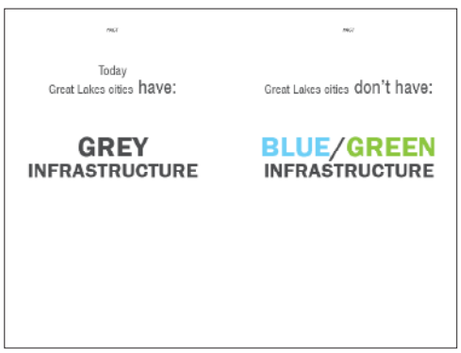
Combining the Rust Belts' loss of population with its abundance of fresh water, this proposal outlines a strategy for re-densification of underutilized post-industrial landscapes. Free Water is used as a catalyst for attracting water intensive industries to relocate from areas such as the Sun Belt— where water is scarce— to the water endowed Great Lakes region. Today, water intensive businesses representing millions of jobs are scrambling to secure long-term water resources as global supplies become more and more contested. In exchange for free water, industries will recycle "waste" water from their operations through a series of constructed wetlands in order to slowly remediate adjacent post-industrial landscapes. Wetlands will be designed as ecological treatment systems that make use of natural bioremediation processes to remove contaminants from wastewater sources. Once treated, water will be carried through blue/green infrastructure (bio-streets and wetlands) to recharge the lake. Ultimately, a network of Free Water Districts connected by the Great Lakes will grow.

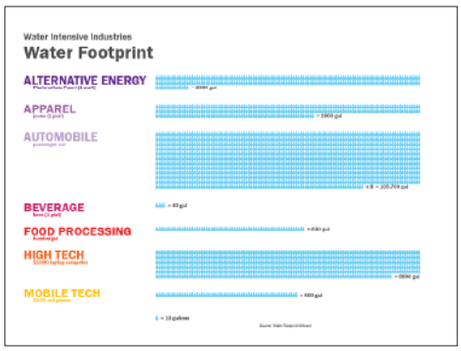
*Note: Some images included here represent continued project development beyond the initial WPA □.□ submission.

PROJECT TEAM: Sarah Dunn, Martin Felsen, Katherine Eberly, Lee Greenberg, Jeff Macias





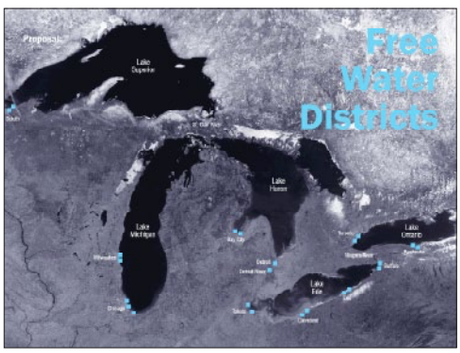



Water Intensive Industries
Water Footprint
ALTERNATIVE ENERGY
APPAREL
AUTOMOBILE
BEVERAGE
FOOD PROCESSING
HIGH TECH
MOBILE TECH

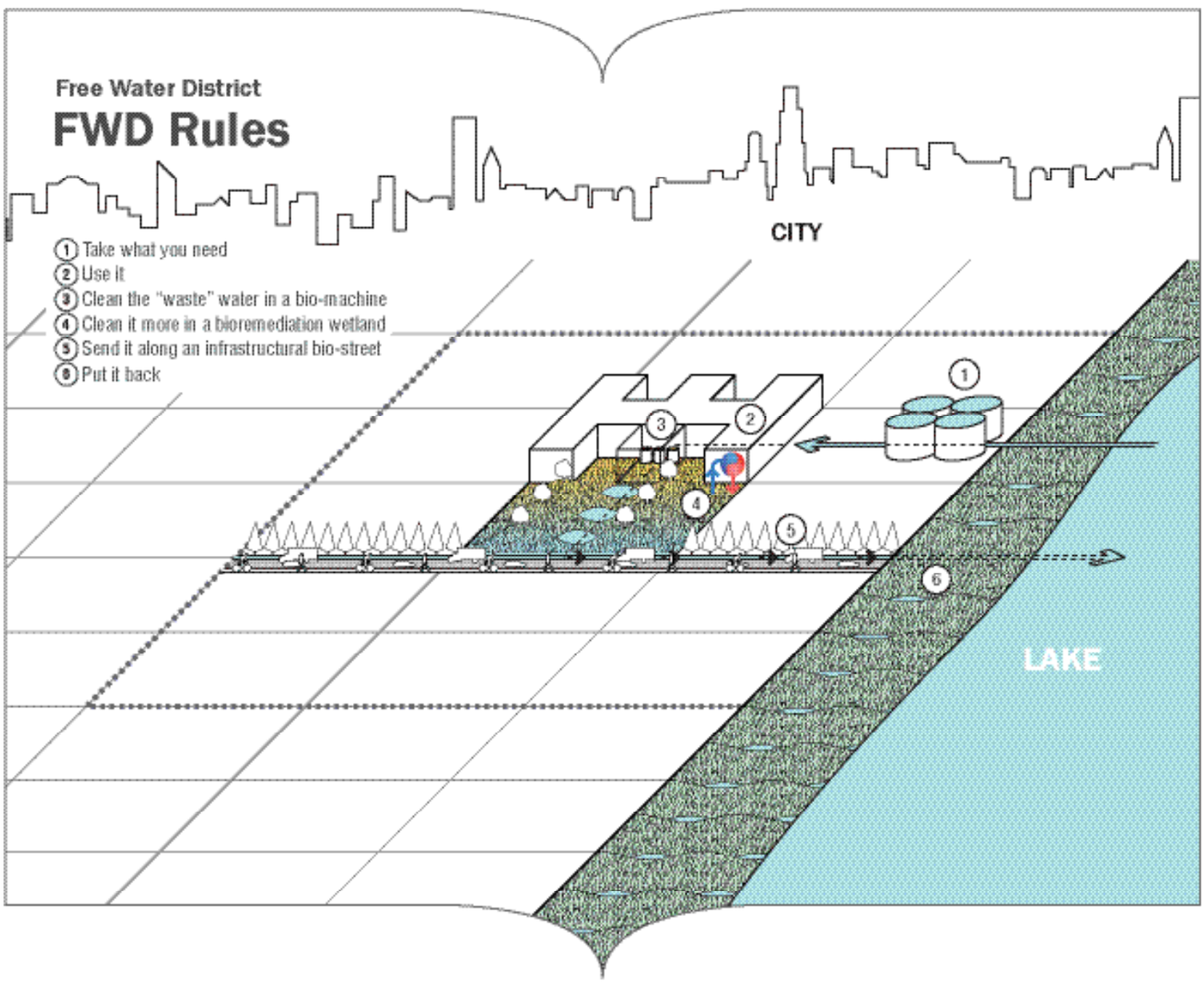

Attract How?
Free Water


Free X District Case Study
Free Energy in Iceland
Steam Water


Free X District Case Study
Free Labor in Vancouver

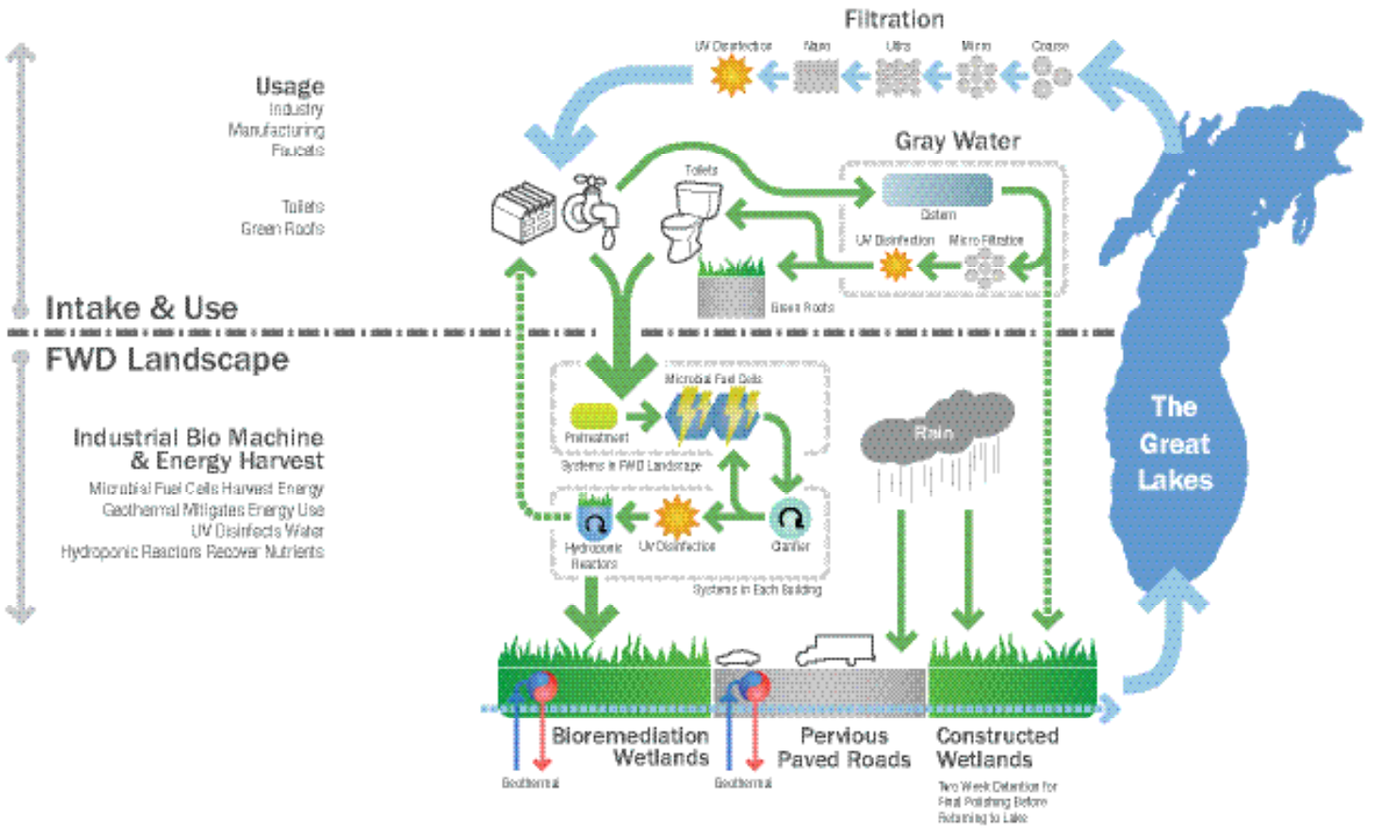

Proposal
Free Water Districts
Lake Superior
Lake Huron
Lake Michigan
Lake Ontario
Lake Erie

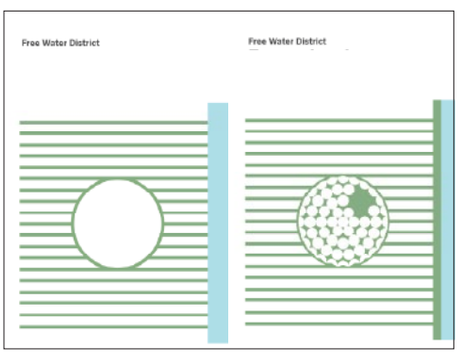

In every Great Lakes city, a
Free Water District
FWD

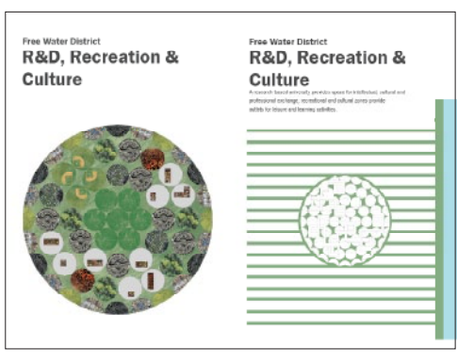

Free Water District
FWD Rules
CITY
1 Take what you need
2 Use it
3 Clean the "waste" water in a bio-machine
4 Clean it more in a bioremediation wetland
5 Send it along an infrastructural bio-street
6 Put it back
LAKE

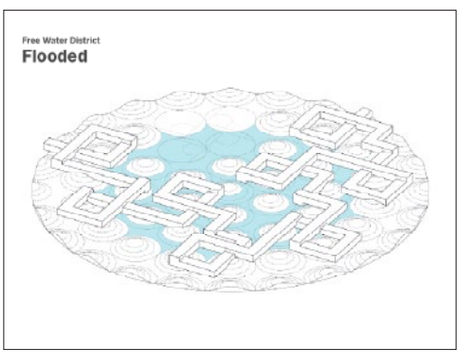
Free Water District

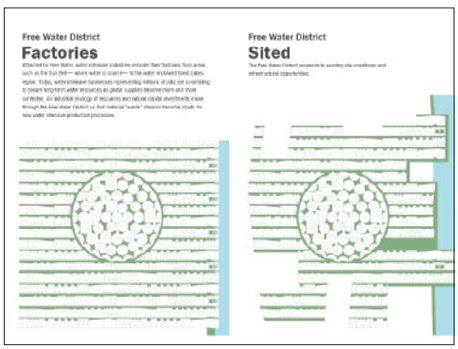
FWD Rules: Expanded

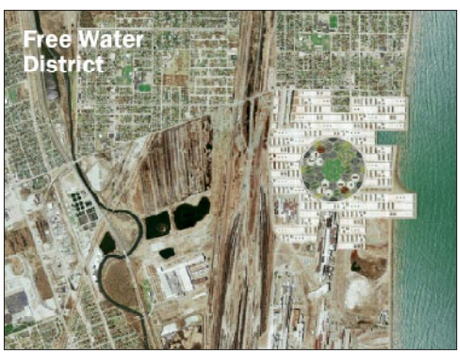


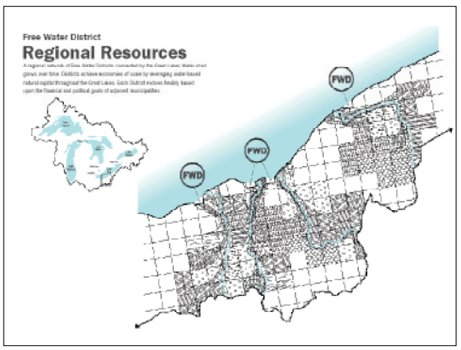


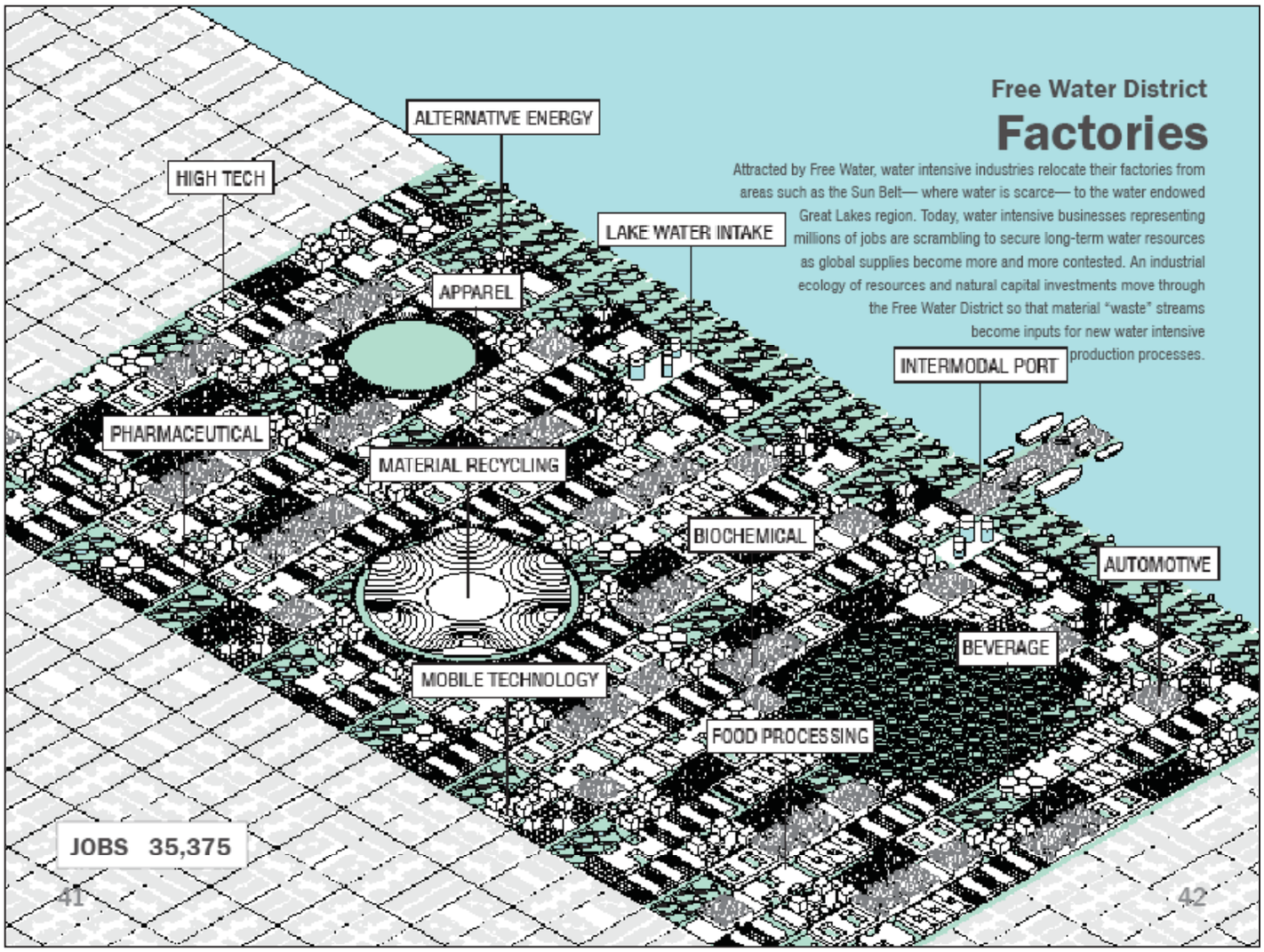




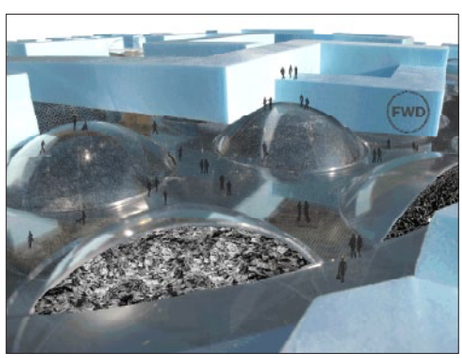


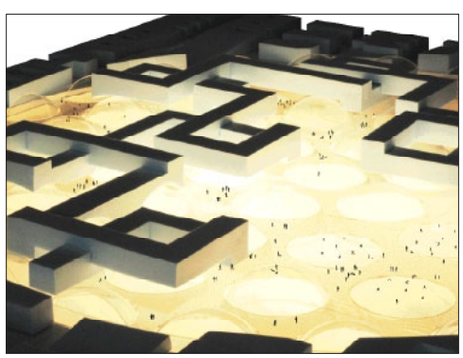


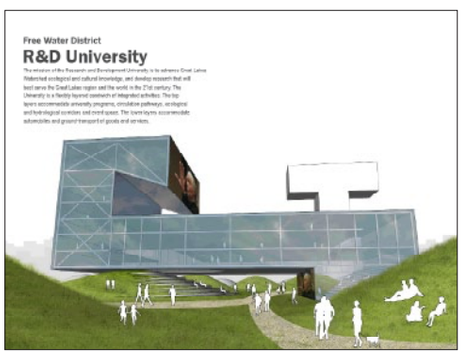



Free Water District
Factories
Attracted by Free Water, water intensive industries relocate their factories from areas such as the Sun Belt— where water is scarce— to the water endowed Great Lakes region. Today, water intensive businesses representing millions of jobs are scrambling to secure long-term water resources as global supplies become more and more contested. An industrial ecology of resources and natural capital investments move through the Free Water District so that material "waste" streams become inputs for new water intensive production processes.
ALTERNATIVE ENERGY
HIGH TECH
LAKE WATER INTAKE
APPAREL
INTERMODAL PORT
PHARMACEUTICAL
MATERIAL RECYCLING
BIOCHEMICAL
AUTOMOTIVE
BEVERAGE
MOBILE TECHNOLOGY
FOOD PROCESSING
JOBS 35,375
41
42


Free Water District
Recycle Center


FWD




Free Water District
R&D University

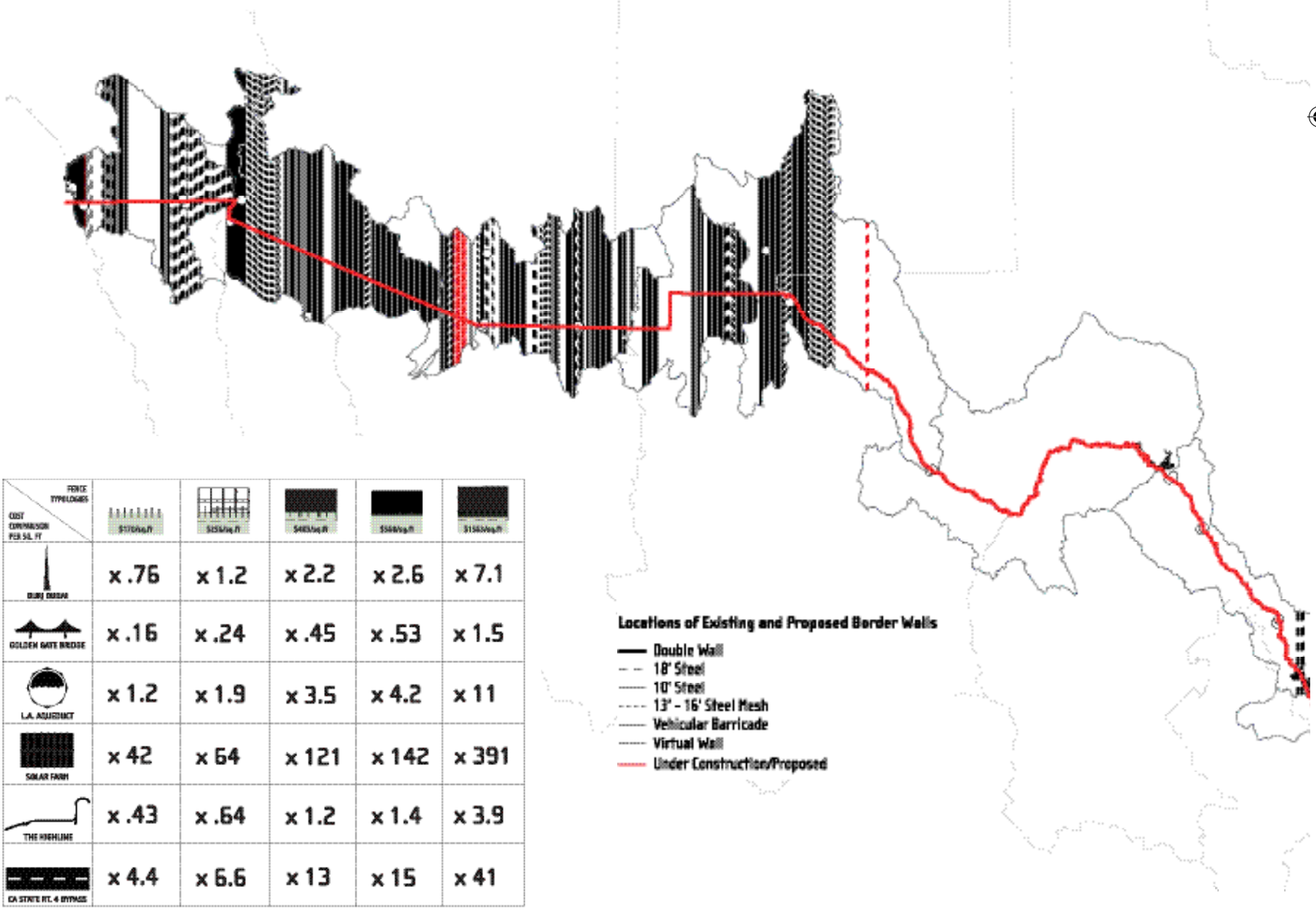
Border Wall as Infrastructure

Rael San Fratello Architects, Finalist

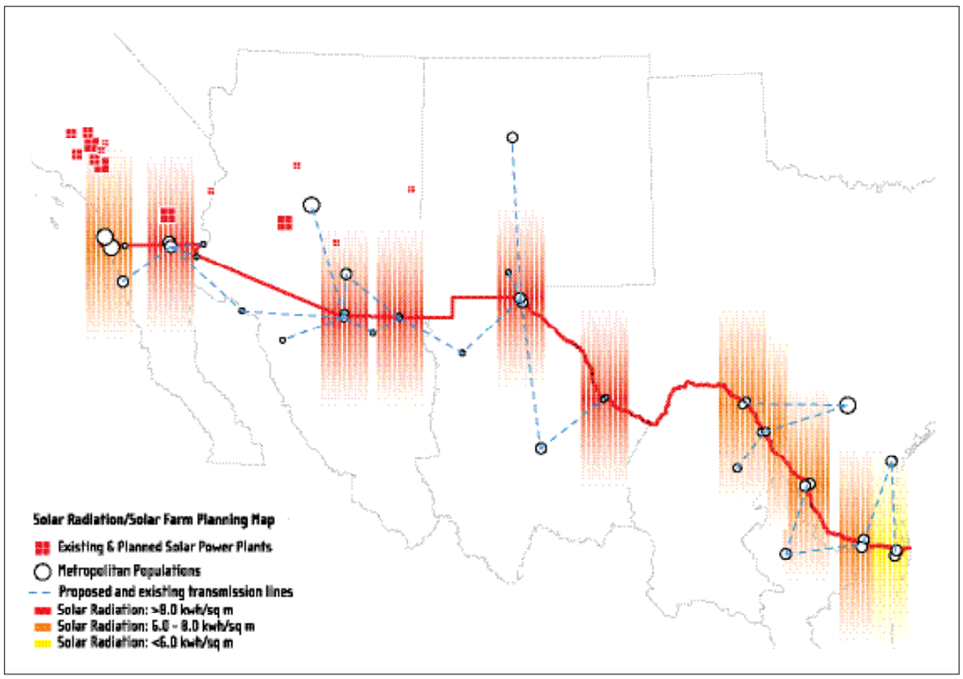
By some measures, the U.S. Secure Fence Act of □□□□ funded the single largest and most expensive building project in the United States of the □□st Century. It finances □□□ miles of fortification dividing the U.S. from Mexico at the average cost of □□ million dollars per mile. □□□ miles of barriers have been constructed since □□□□, at the cost of □□.□ billion. Additionally, the new wall has been breached over □□□□ times, incurring □□.□ milllion in repairs. The construction and maintenance costs are estimated to exceed □□□ billion over the next twenty five years–and there are several hundred more miles of wall construction recently proposed.

This wall, at such prices, should and could be thought of not only as security, but also as productive infrastructure–as the very backbone of a borderland economy. Indeed, coupling the wall with viable infrastructure–and this proposal focuses on water, renewable energy, and urban social infrastructure–is a pathway to security and safety in border communities and the nation beyond them.

PROJECT TEAM: Ronald Rael, Virginia San Fratello, Brian Grieb, Nicholas Karklins,Emily Licht, Plamena Milusheva, Colleen Paz, Molly Reichert



FENCE TYPOLOGIES / COST COMPARISON PER SQ. FT					
BURJ DUBAI	x .76	x 1.2	x 2.2	x 2.6	x 7.1
GOLDEN GATE BRIDGE	x .16	x .24	x .45	x .53	x 1.5
L.A. AQUEDUCT	x 1.2	x 1.9	x 3.5	x 4.2	x 11
SOLAR FARM	x 42	x 64	x 121	x 142	x 391
THE HIGHLINE	x .43	x .64	x 1.2	x 1.4	x 3.9
CA STATE RT. 4 BYPASS	x 4.4	x 6.6	x 13	x 15	x 41



SOLAR SECURITY

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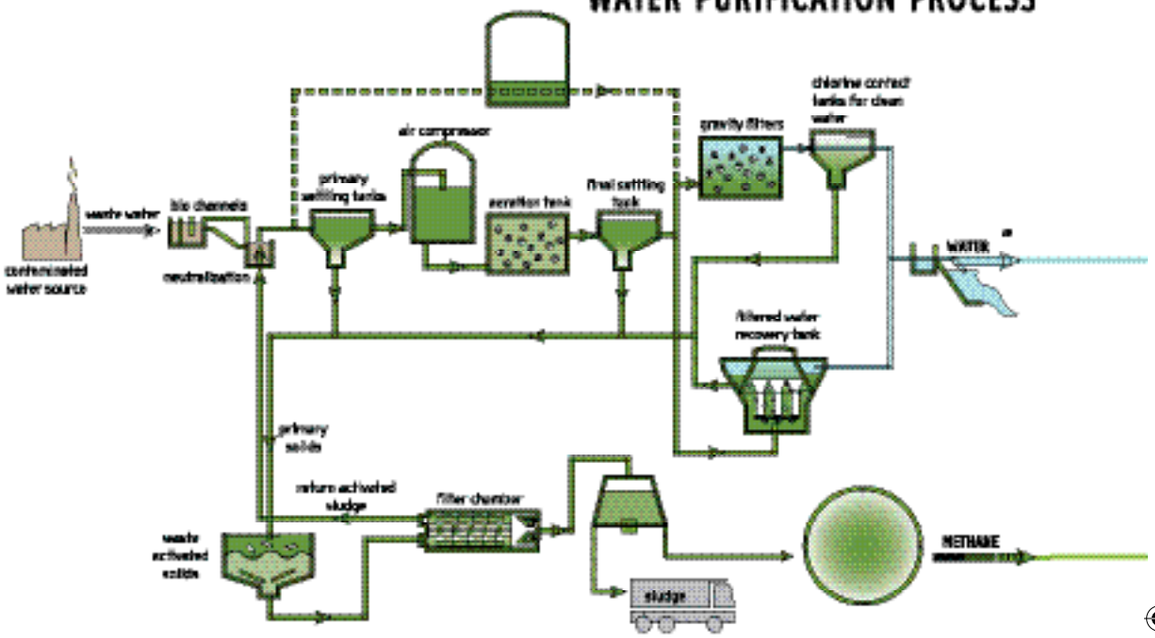
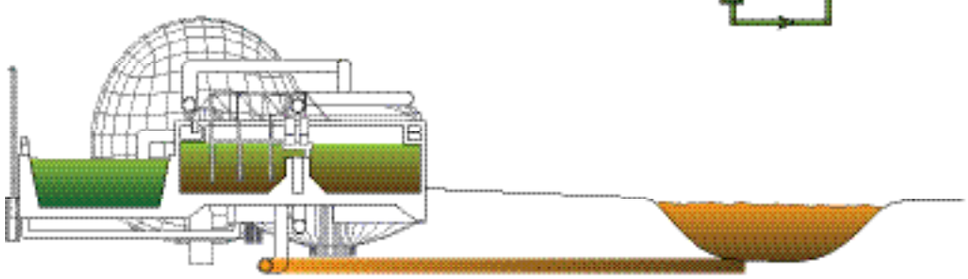
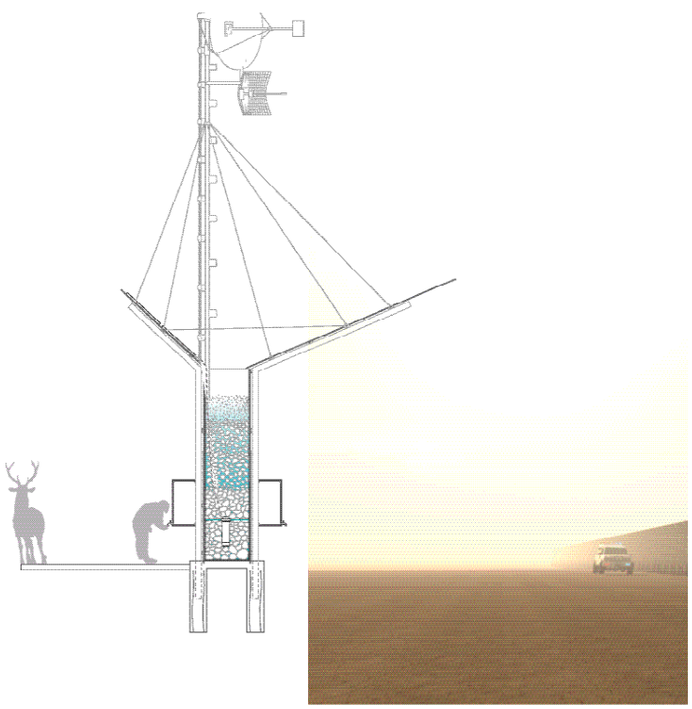
WATER PURIFICATION PROCESS



WASTEWATER TREATMENT

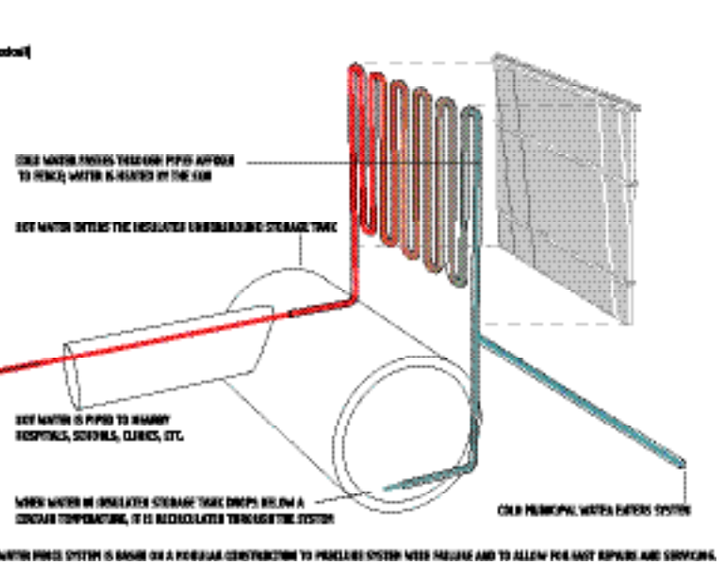


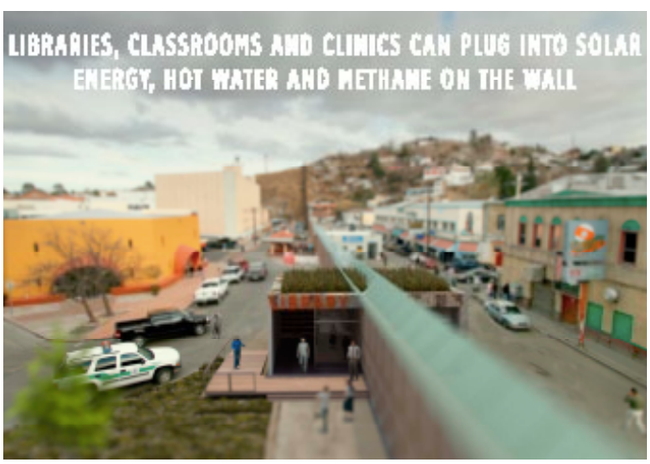
Section through wastewater treatment facility and The New River in Caleico/Mexicali



LINEAR PARK THROUGH CALEXICO/MEXICALI

SOLAR HOT WATER GENERATION





SOCIAL INFRASTRUCTURE

Velisi el ex etuerat. Duis adiamconulla consenisit luptatue ver ing eugait prat. Ibh eu feugait, quis ad exeraestie ea coreet prate commy nis el ut illum zzrilit il dionsequi enisl iusto consequisi.

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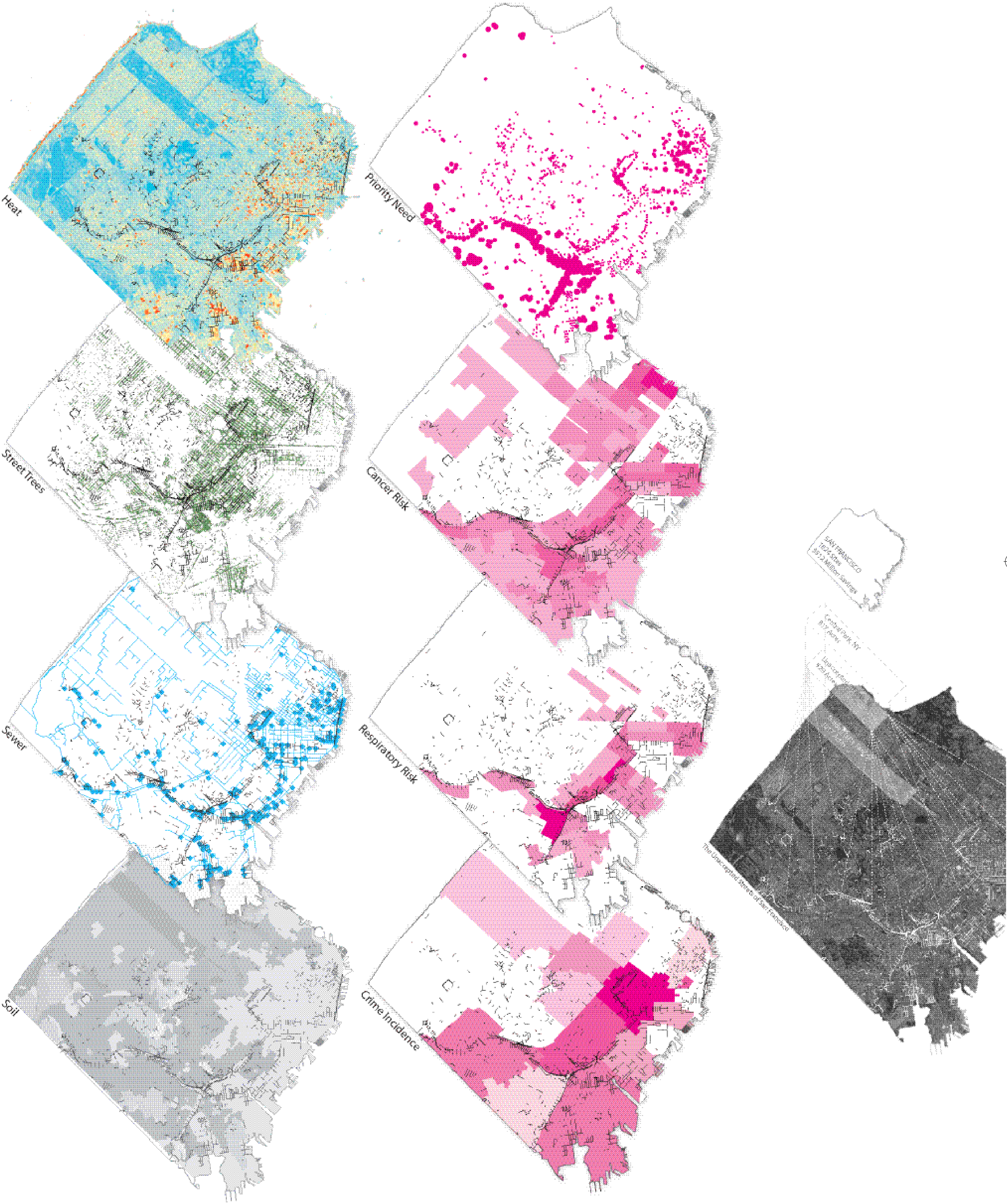

Heat
Priority Need
Street Trees
Cancer Risk
Sewer
Respiratory Risk
Soil
Crime Incidence
SAN FRANCISCO
Central Park, NY
817 Acres
The Unaccepted Streets of San Francisco

Local Code:Real Estates

Nicholas de Monchaux, Finalist

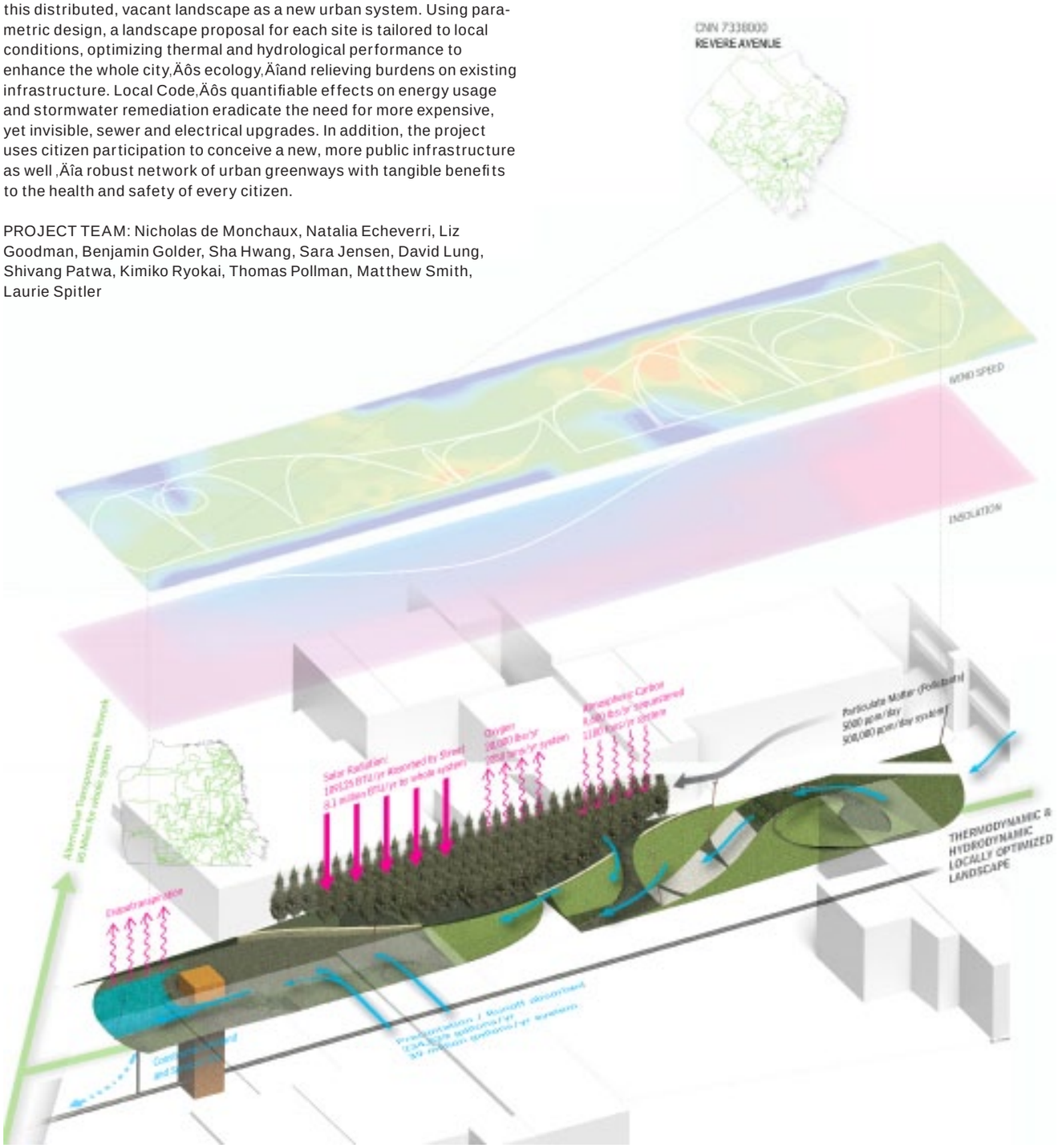
Proposal Location : Major US Cities with city-owned abandoned lots, including New York, Los Angeles, Chicago and Washington DC. Case study developed for San Francisco.

Local Code : Real Estates uses geospatial analysis to identify thousands of publicly owned abandoned sites in major US cities, imagining this distributed, vacant landscape as a new urban system. Using parametric design, a landscape proposal for each site is tailored to local conditions, optimizing thermal and hydrological performance to enhance the whole city,Äôs ecology,Äîand relieving burdens on existing infrastructure. Local Code,Äôs quantifiable effects on energy usage and stormwater remediation eradicate the need for more expensive, yet invisible, sewer and electrical upgrades. In addition, the project uses citizen participation to conceive a new, more public infrastructure as well ,Äîa robust network of urban greenways with tangible benefits to the health and safety of every citizen.

PROJECT TEAM: Nicholas de Monchaux, Natalia Echeverri, Liz Goodman, Benjamin Golder, Sha Hwang, Sara Jensen, David Lung, Shivang Patwa, Kimiko Ryokai, Thomas Pollman, Matthew Smith, Laurie Spitler

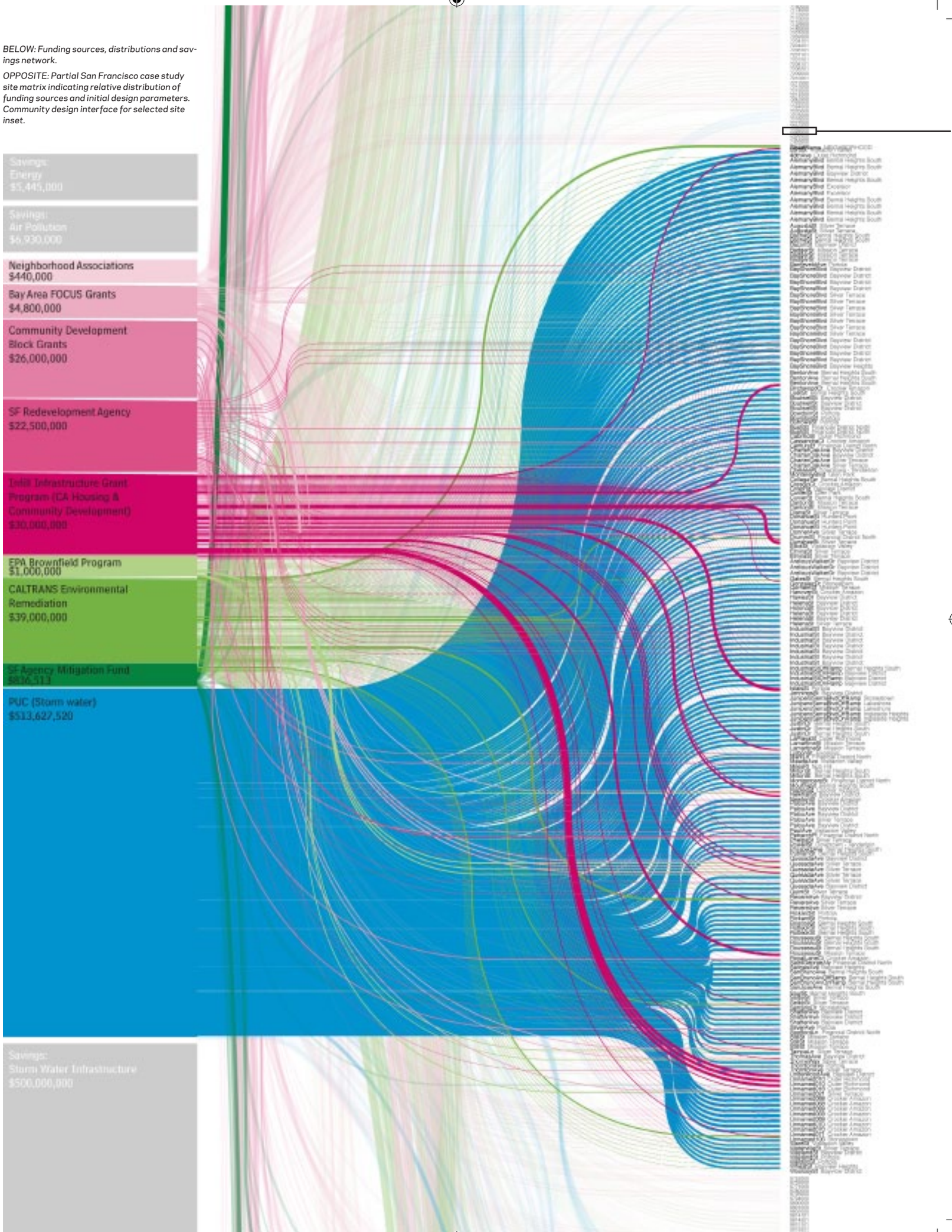
OPPOSITE: San Francisco case study city-wide geospatial analysis of select urban parameters and collective site map.

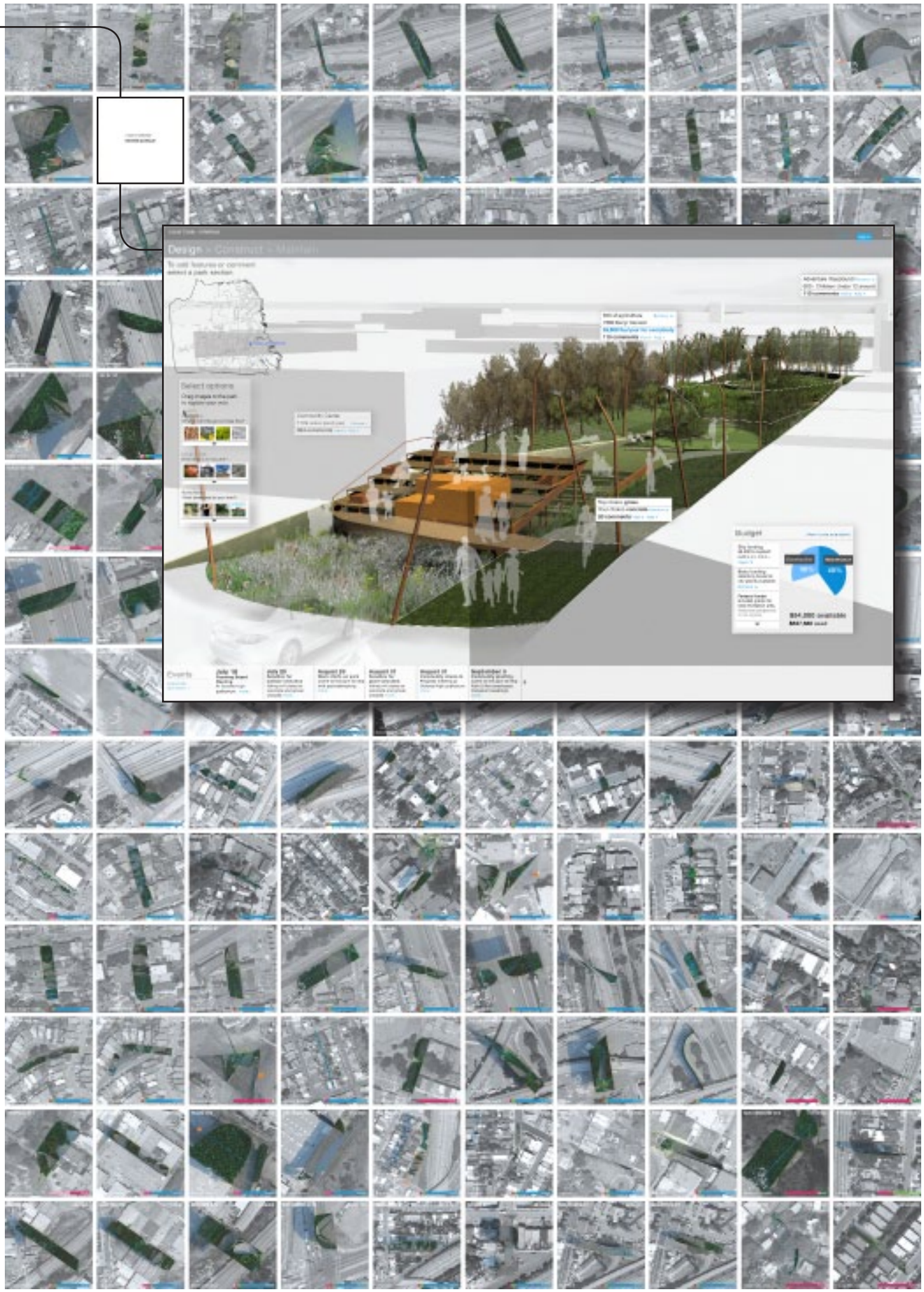
BELOW: Enviornmental design performance and geospatial analysis for site 7338000, Rever Avenue.



BELOW: Funding sources, distributions and savings network.

OPPOSITE: Partial San Francisco case study site matrix indicating relative distribution of funding sources and initial design parameters. Community design interface for selected site inset.




Design > Construct > Maintain

Hydro-Genic City, □□□□

Aershop, Finalist

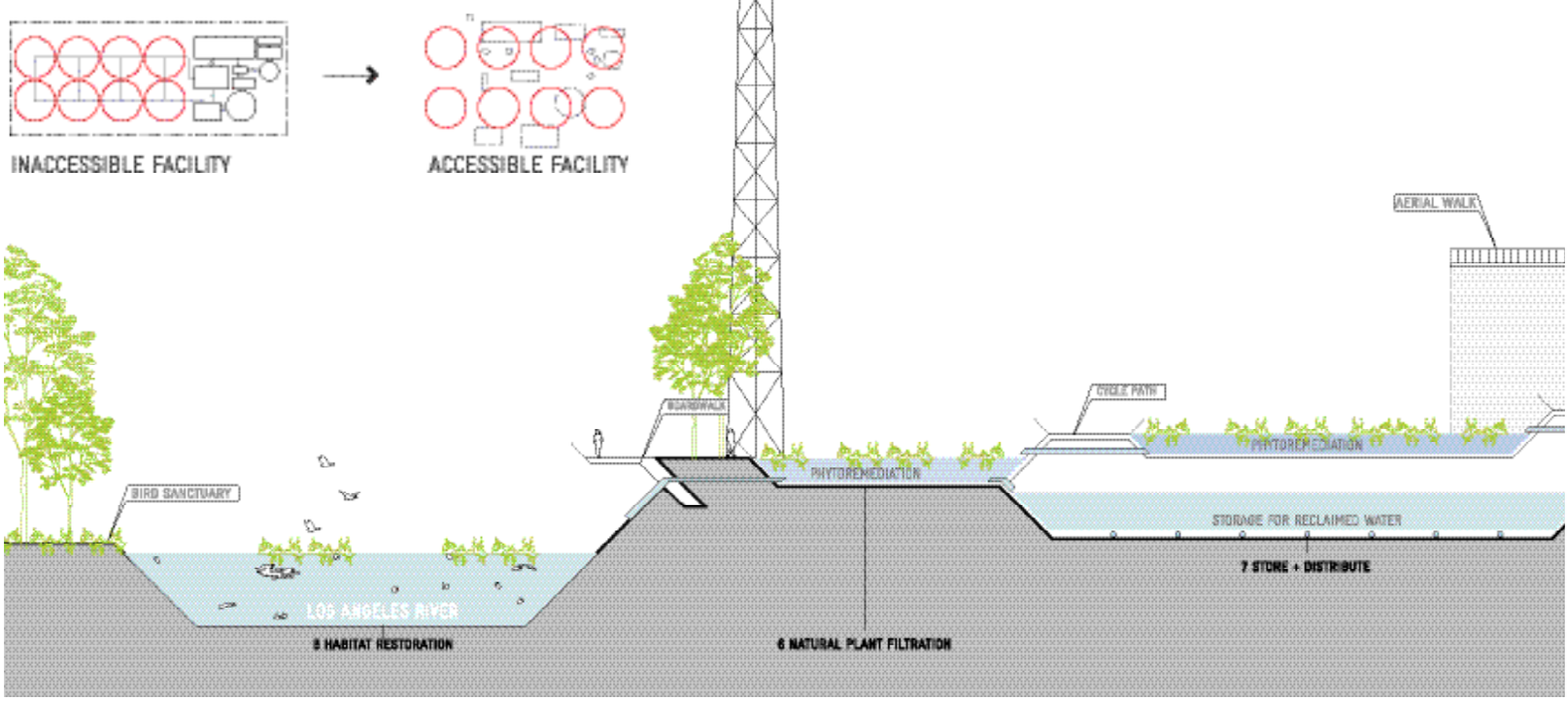
There is an urgency to find integrated and intelligent solutions for supplanting and diversifying water sources. Climate change disrupts the annual water flow cycle while population growth and economic development impose growing demands on a shrinking water supply. Worldwide, water shortages and the need to control water resources remain a source of political tensions and health concerns.

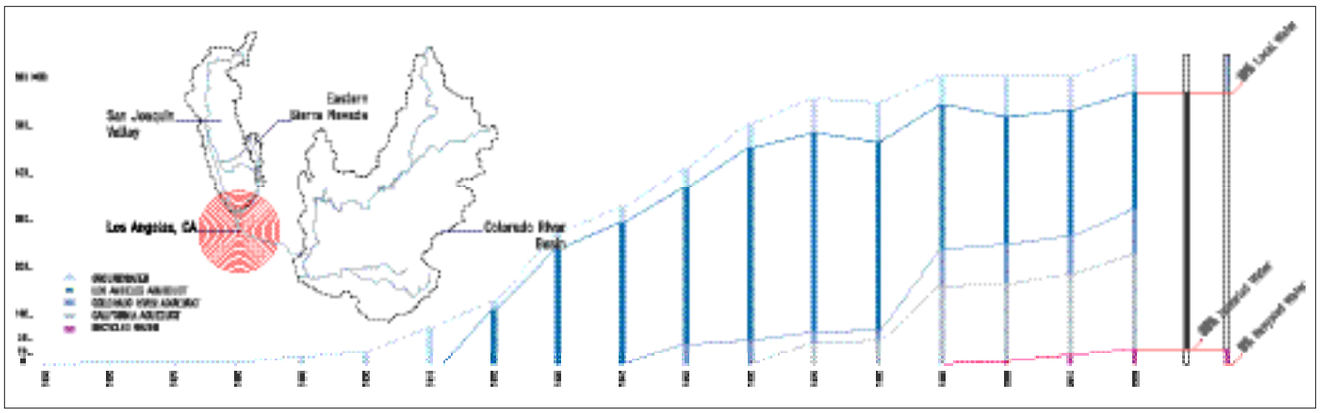
In the United States the majority of fastest growing cities are located in the arid Southwest and the existing supplies from the Sierra Nevada and Colorado River basin are vulnerable to loss from warming. The city of Los Angeles imports as much as □□□ of its water from these basins and was chosen as pilot location.

This project envisions a decentralized network of environmentally friendly and aesthetically compelling wastewater reclamation centers. The process of water treatment acts as the connective tissue through an environment that provokes a renewed relationship to water. As water flows into passive treatment, it becomes an interactive element in the form of remediation wetlands, shallow channels, and swimming pools. Finally, reclaimed water is re-distributed to a variety of direct uses.

Each reclamation center provides a sustainable water source to the city. The mechanistic infrastructure of waterworks is transformed into an interactive and sensory series of public nodes. As mist platforms, solar-encased water tanks, urban beaches, aquatic parking lots, reflecting pools and channels, water-based landscapes become organizational moments for community building.

Project Credits: Darina Zlateva, Takuma Ono, Helen Han, Ryan Leidner, Matt Storus

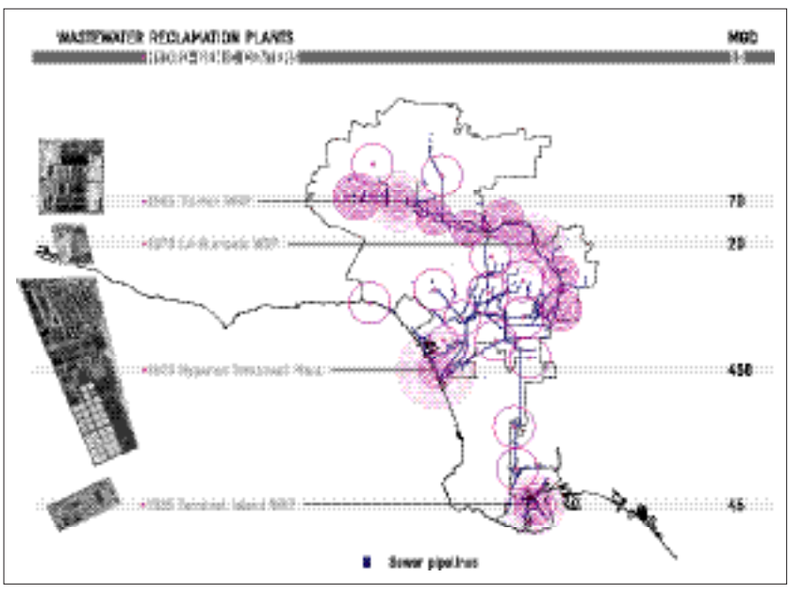


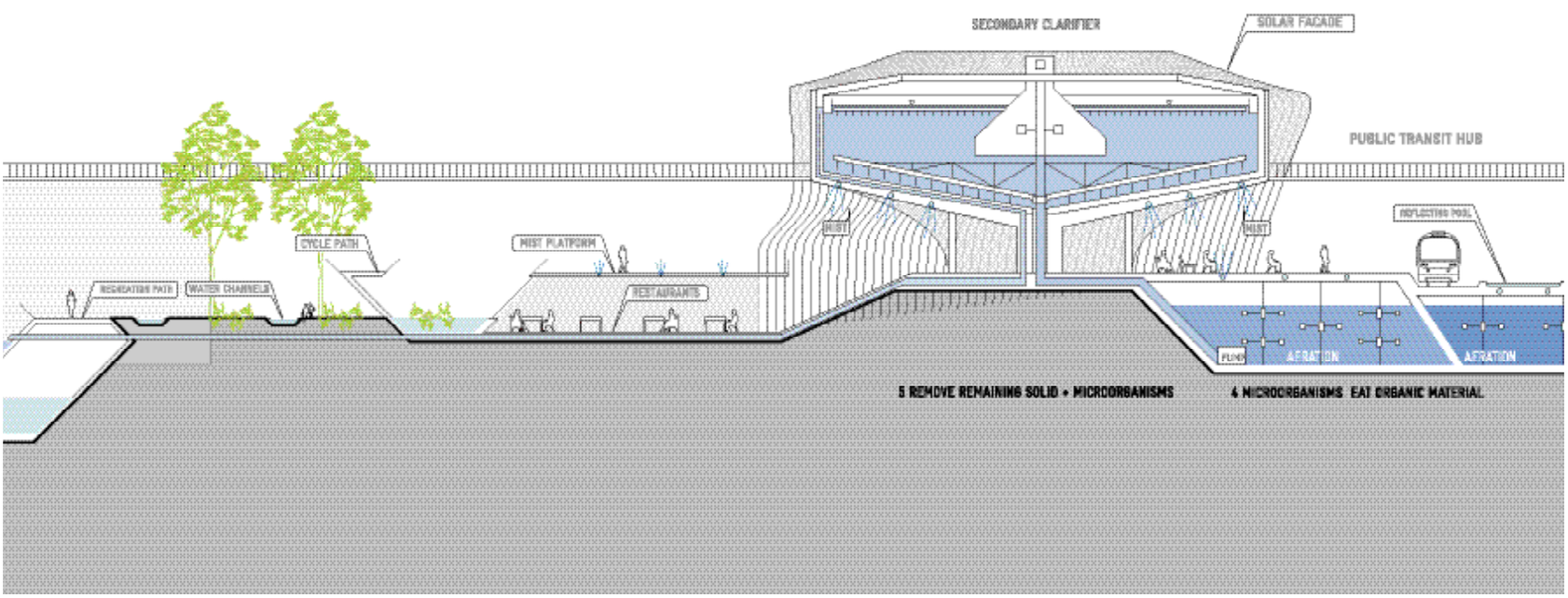


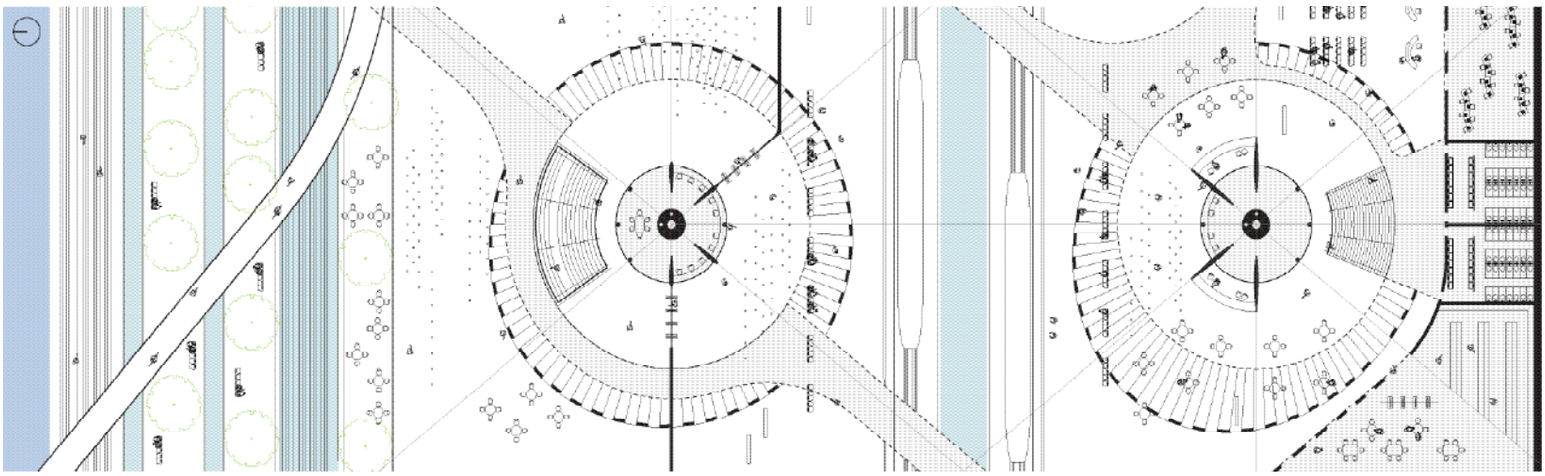
ABOVE: Historical and projected water source volume for Los Angeles, California. To hedge against seasonal variability, LA relies on five sources of water and imports as much as 85% from these basins. Since the Los Angeles Aqueduct is gravity-driven, water from the eastern Sierra Nevada Mountains has been the primary source for nearly a century, 41% of which is at risk of being lost by 2020 due to reduced snow pack from a warming climate.

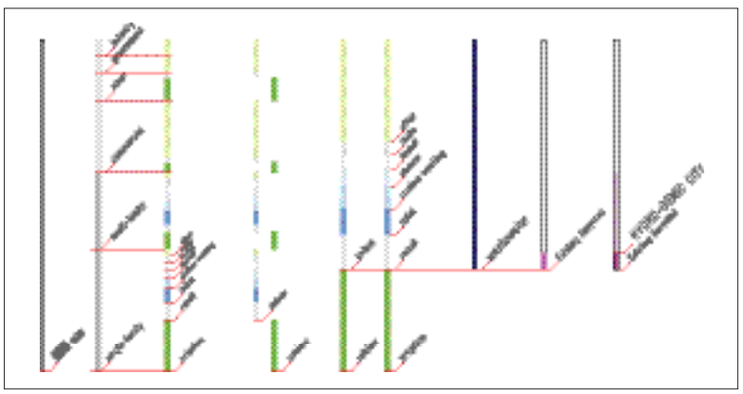
RIGHT: Decentralized network of wastewater reclamation sites and potential Hydro-genic City community nodes througout greater Los Angeles.

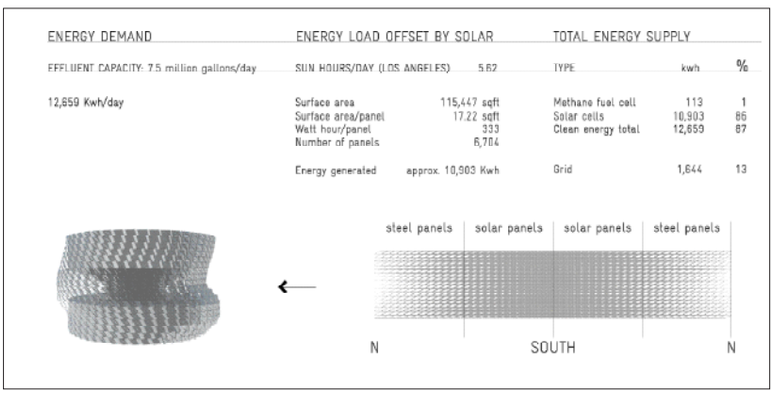
BELOW: Typical section through Hydro-genic city node.







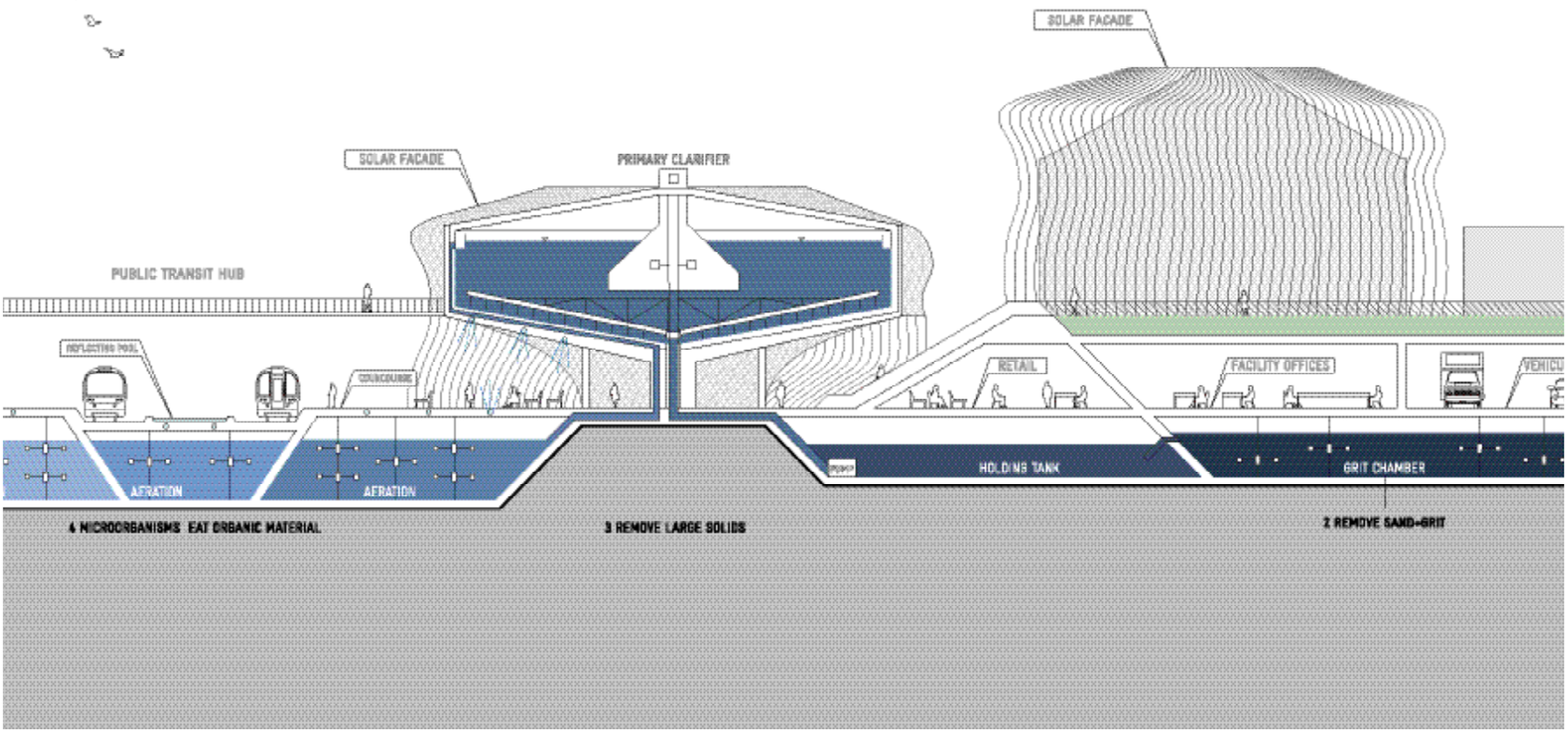


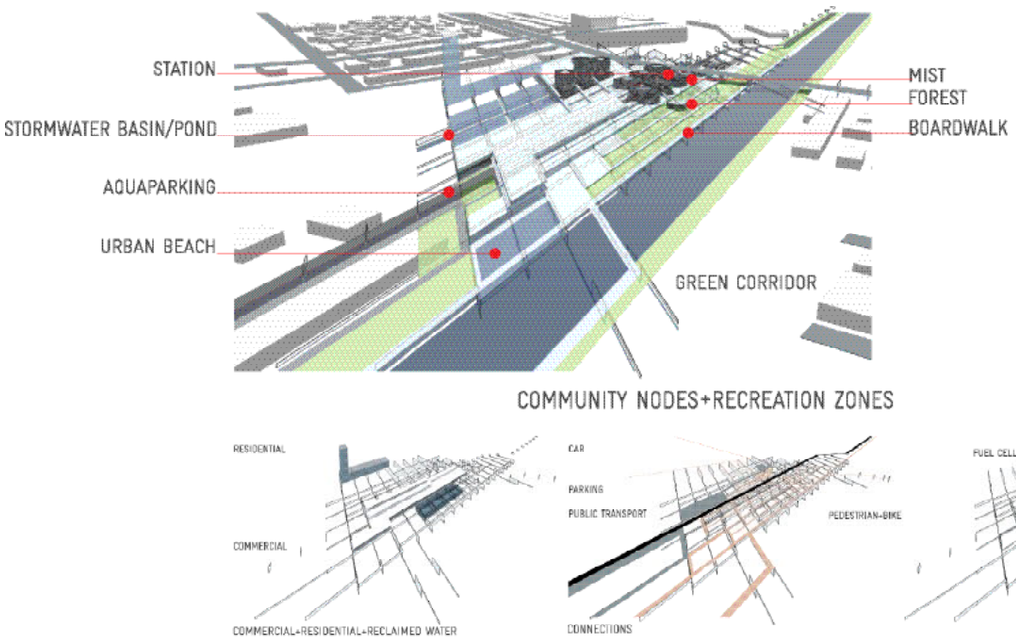


TOP: Typical plan of Hydro-genic city node.

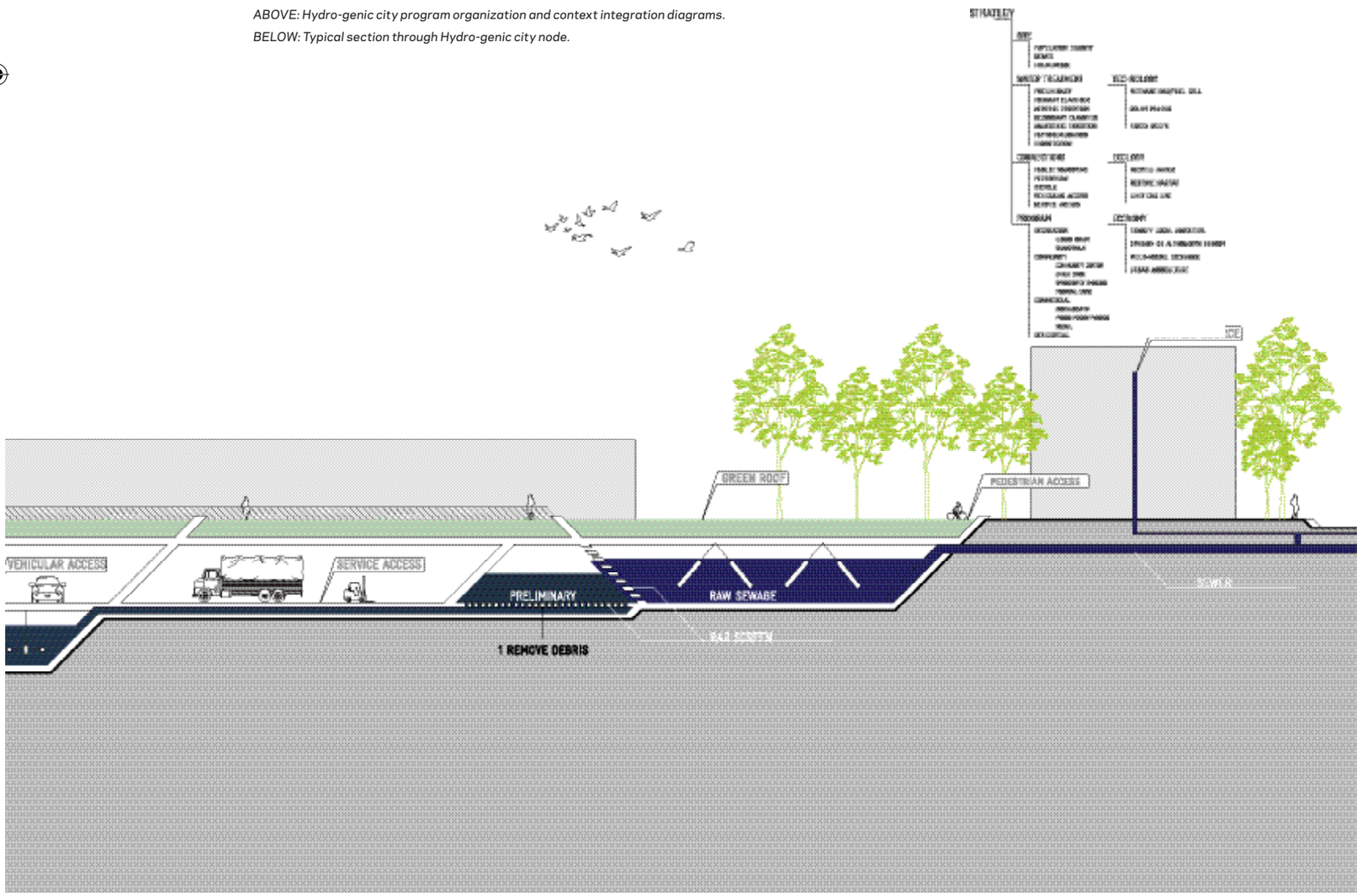
ABOVE LEFT: Water usage in Los Angeles by 2020 is expected to top 650 million gallons per day (MGD). Hydro-genic city recycles wastewater to greatly reduce demand on imported water.

ABOVE RIGHT: Localized energy generation from patterned water tank photovoltaic cladding system.





ABOVE: Hydro-genic city program organization and context integration diagrams.
BELOW: Typical section through Hydro-genic city node.



Coupling Infrastructures: Water Economies/Ecologies

Lateral Office / InfraNet Lab, Finalist

The American Southwest is the site of one of the nation's most unusual contradictions. It is both the driest region and home to the most rapidly increasing populations. More specifically, the Colorado River Water Basin remains a site for some of the country's most ambitious □□th Century infrastructure interventions including dams, aqueducts, water banks, and canals. This region, once again, is the site of intense debate on how to address an increasingly fragile ecology, and a complex economy of agriculture and tourism that relies upon this ecology. There are plans in place to manage the Imperial Valley and terminal Salton Sea, but these plans miss an infrastructural opportunity. We see this opportunity as a chance to introduce an infrastructure that is incremental and allows for a coupling of production systems, vibrant cultures, and threatened ecosystems. The Salton offers an ideal case study for America to demonstrate the potential of working public architecture □.□.

Our proposal aims to create working public architecture that operates at a very large regional scale, though it employs micro-scale, incremental soft infrastructure. The Salton Sea edge is populated by three primary new marina cities that center on the site as productive, recreational, and wild. Within the sea itself, are deployable buoyant pools that maintain different levels of salinity to encourage a range of applications from recreation to harvest. Among other attributes, the pools are equipped to passively separate water and salt, generating a regional water (and salt) economy. Our vision is for a WPA □.□, unlike WPA □.□, that allows for infrastructure to behave as an ecosystem; it can grow, shrink, change priorities, feed, protect, and cultivate new species.

*Note: Some images included here represent continued project development beyond the initial WPA □.□ submission.

PROJECT TEAM: Mason White, Lola Sheppard, Daniel Rabin, Fei-ling Tseng

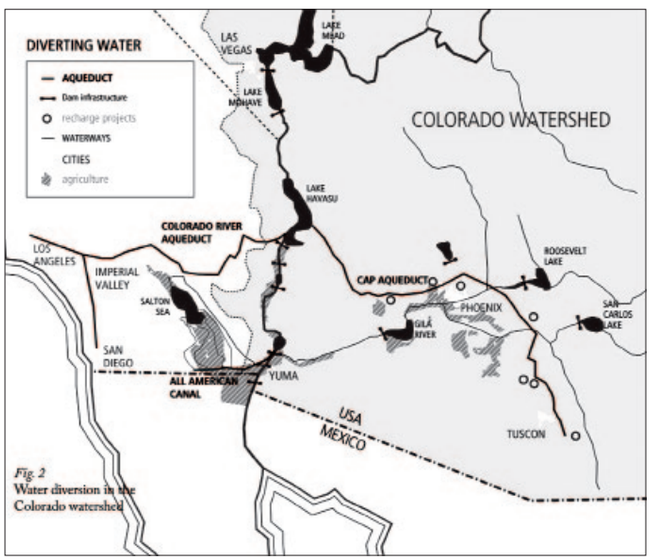
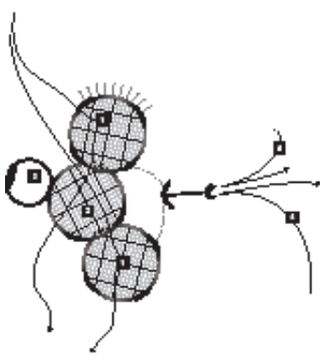
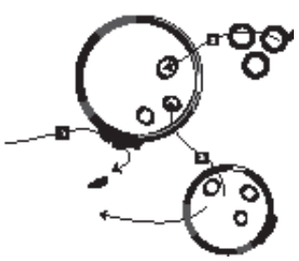
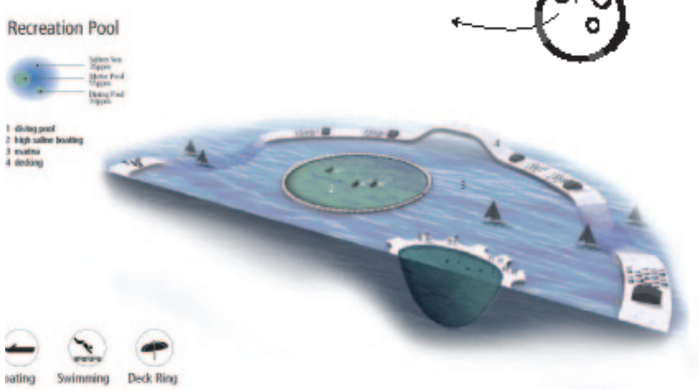
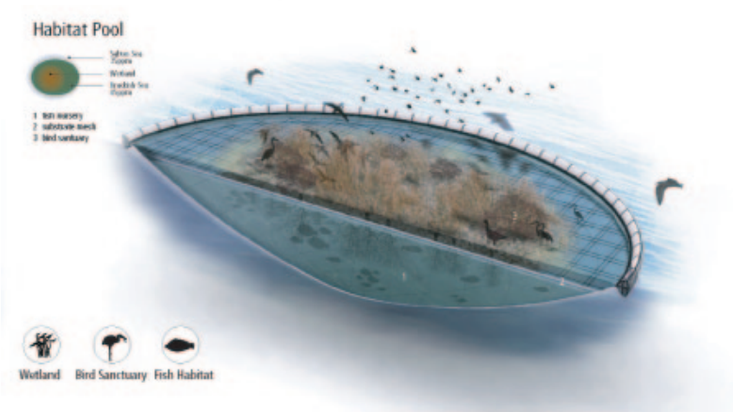


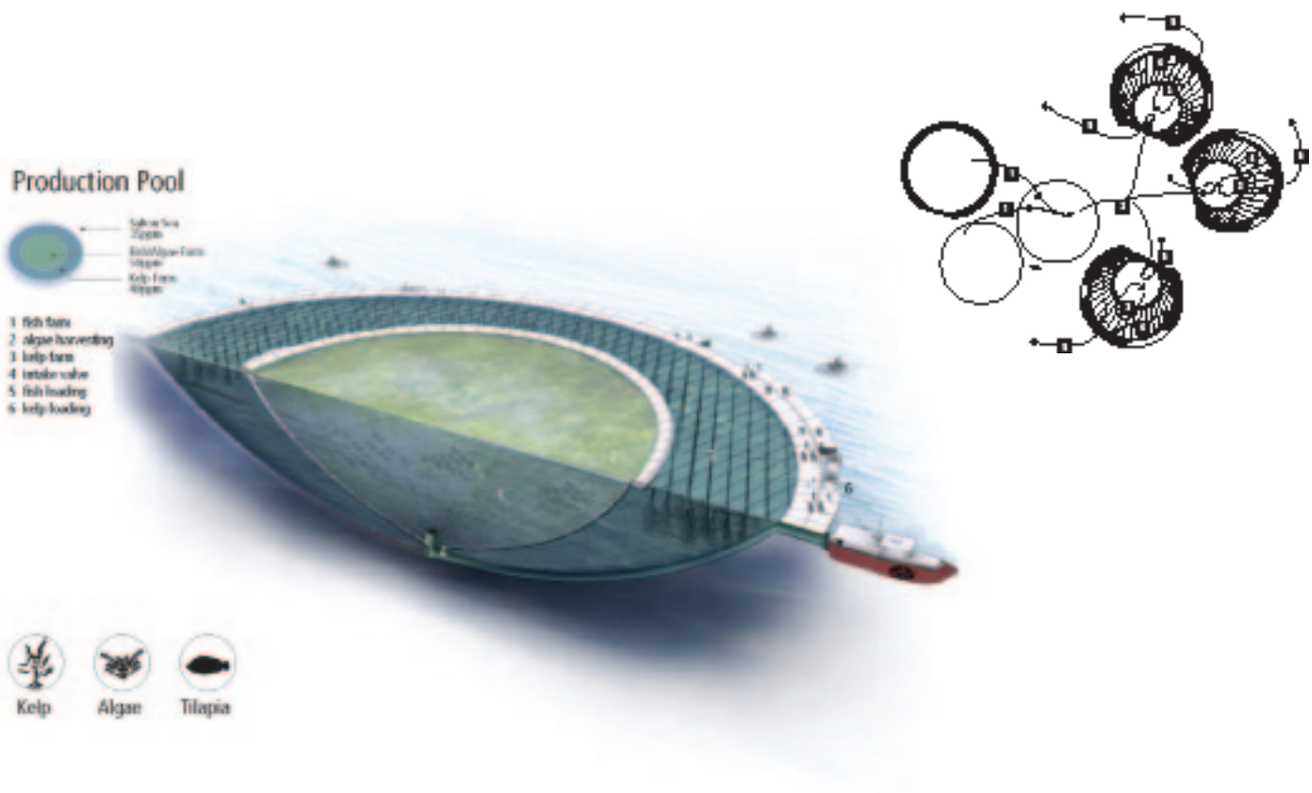
Fig. 2
Water diversion in the Colorado watershed

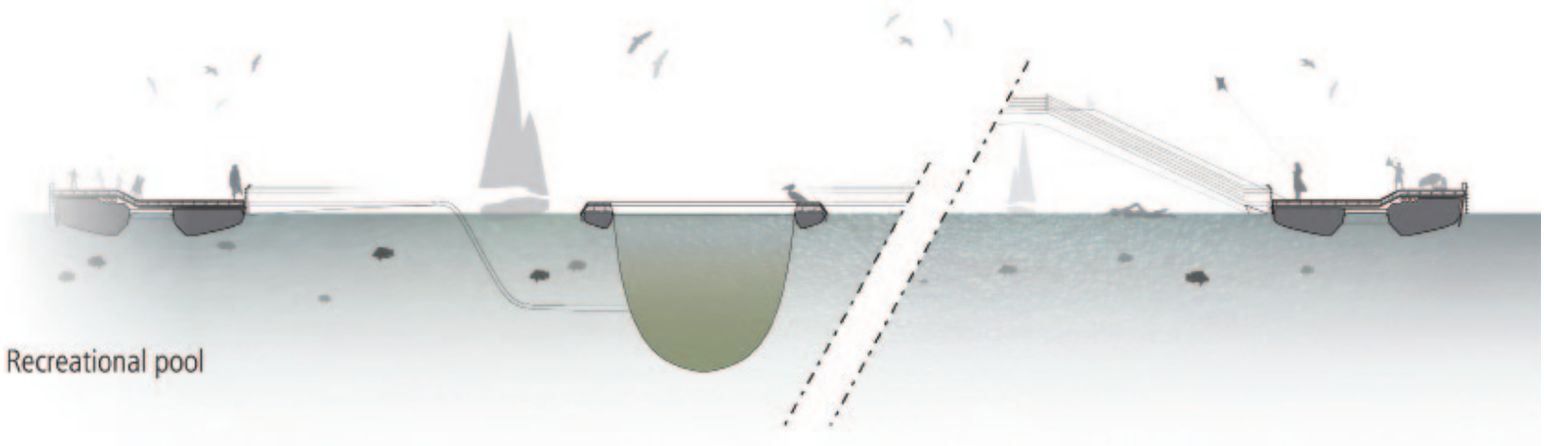


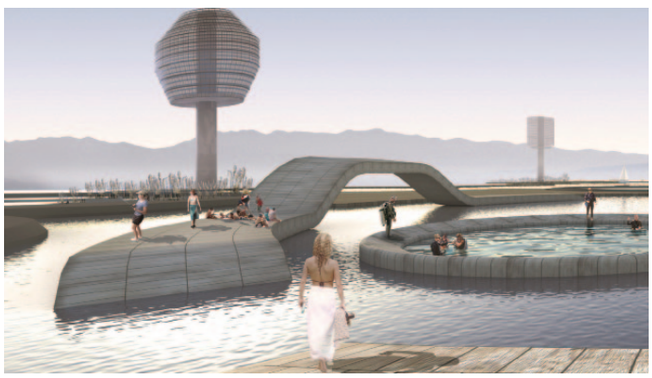






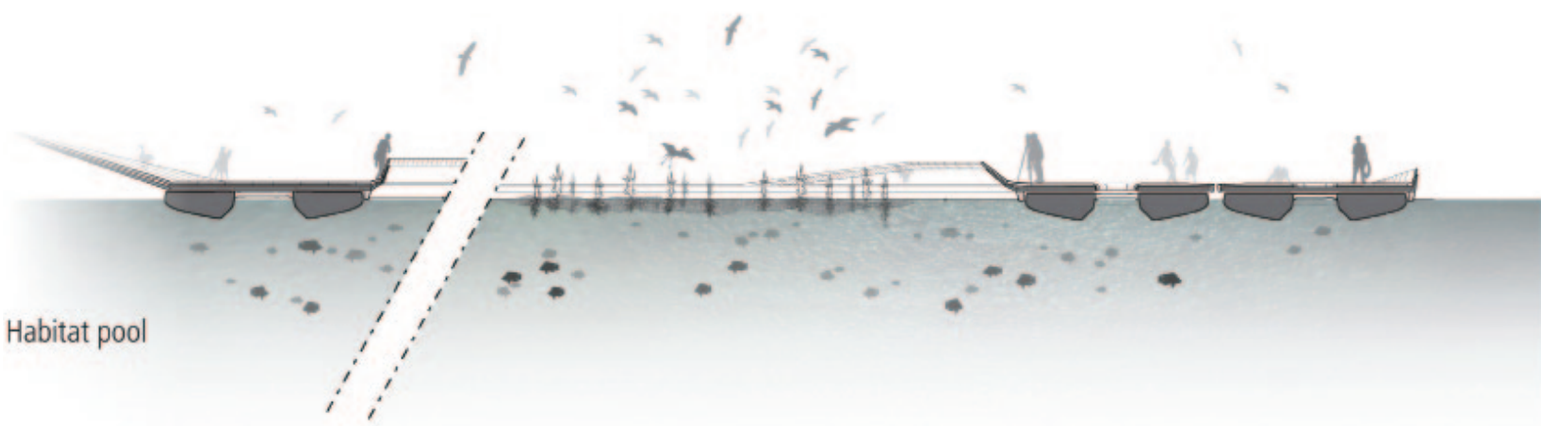

Production Pool
1 fish farm
2 algae harvesting
3 kelp farm
4 intake valve
5 fish loading
6 kelp loading
Kelp
Algae
Tilapia

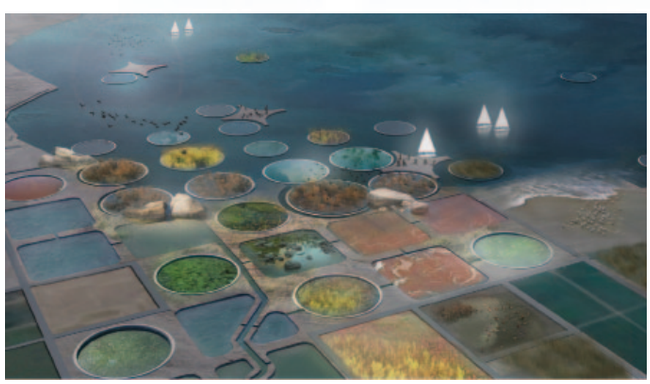




ABOVE: Typical section at recreation pool.

LEFT: View of recreation pool along the shoreline of Salton City.

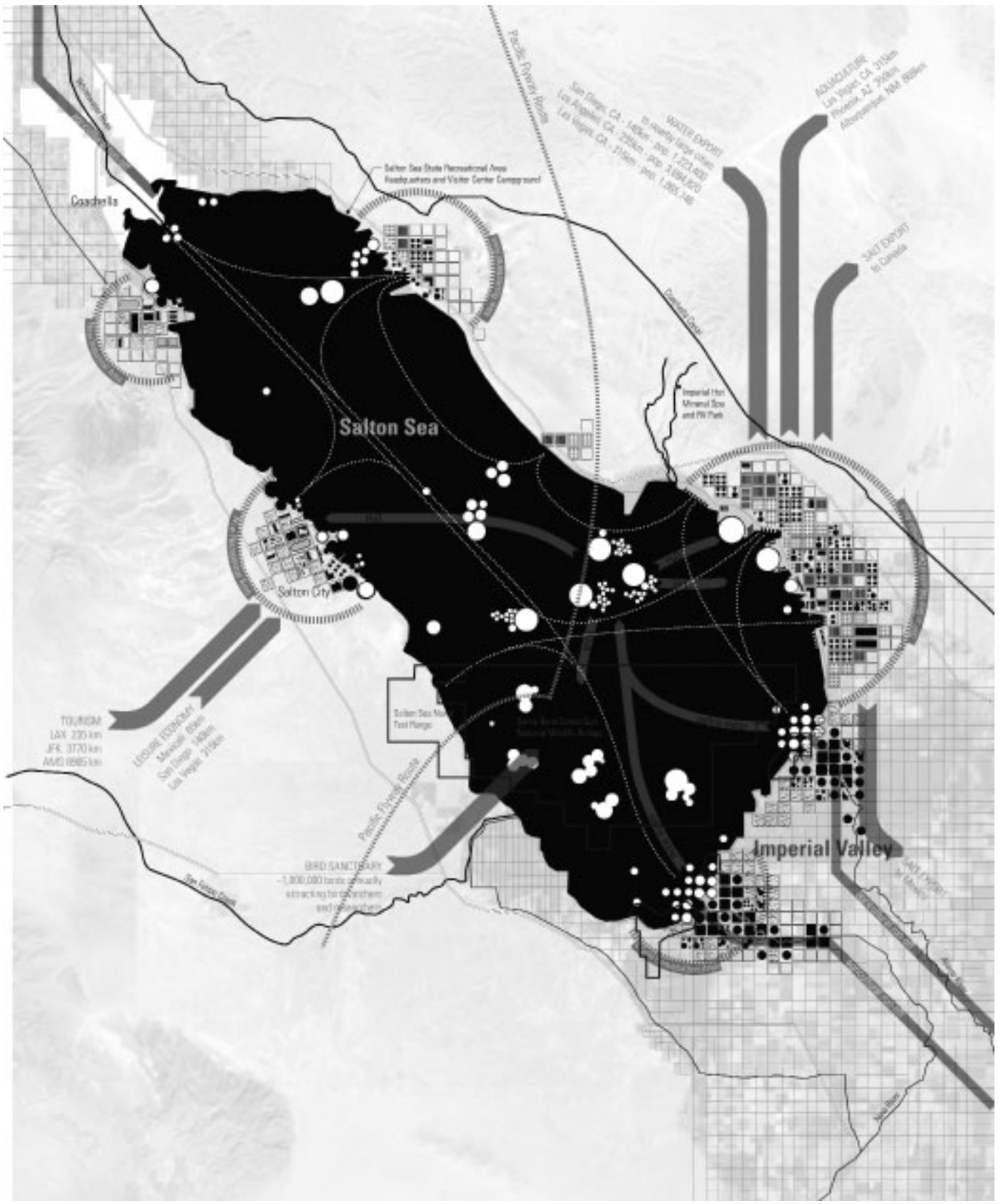




ABOVE: Typical section at habitat pool.

LEFT: View of ecology delta, with remediating wetlands treating the agricultural runoff of the Imperial Valley before entering the Salton Sea.


SALTON SEA WATER
NEW SHORELINE INTERFACE
INFRASTRUCTURAL PONDS
NEW LAND-BASED PROGRAM


Salton Sea
Coachella
Salton City
Imperial Valley
Pacific Flyway Route
Coachella Canal
AQUACULTURE
WATER Export
SALT EXPORT
TOURISM
LAX 235 km
JFK 3720 km
AMS 8885 km
BIRD SANCTUARY


THIN
THICK
OFFSET
WOBBLE
WAVY
STAGING
OBSERVING
LOADING
LOUNGING
EVENT

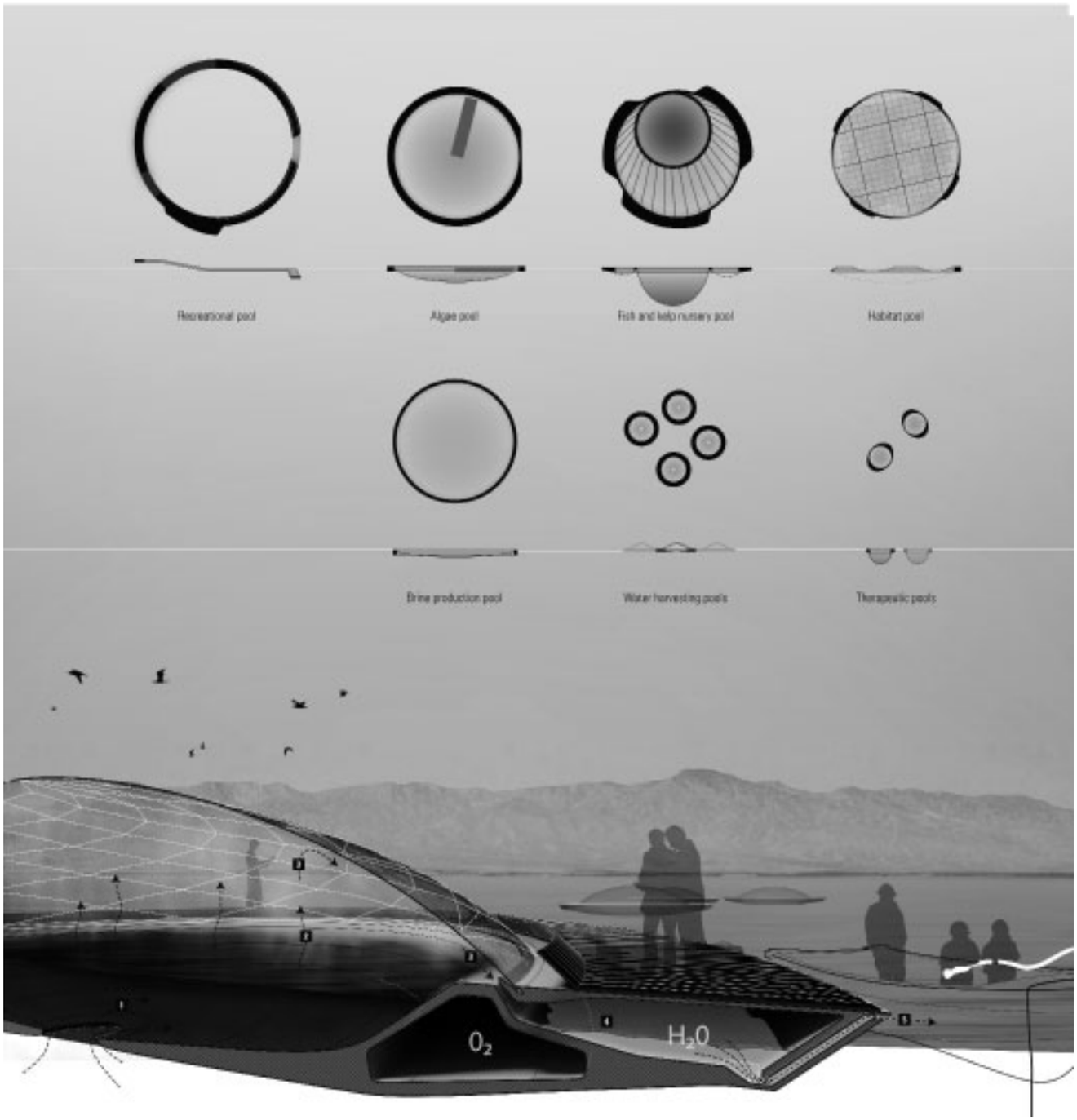

fresh water is harvested from water harvesting pools
sedimentation tanks
water filtration
water processed in settling tanks
fresh water stored in tanks or underground water pools
water exported to cities or agriculture
hyper saline water is harvested from salt pools and allowed to evaporate in salt flats
brine pools
salt is mined or sent on trucks for export
saline agricultural water is intercepted and collected
water flows into naturally remediating wetland marshes
remediated water is sent back into agricultural loop
saline water naturally evaporated to create brine marshes
salt + brine water sent to habitat and recreation pools
processing tank/ coagulant
sedimentation ponds
aeration/ filtration basins
settling tanks
water tower
underground water storage
greenhouses
agri. wetland
salt flats
brine pools
drying beds - salt, sludge
salt storage

OPPOSITE, ABOVE: Pool ring variants.

OPPOSITE, BELOW: An interactive waterfront emerges on the shore, completing water- and salt-harvesting cycles. New wetlands treat incoming agricultural runoff before it enters the sea.

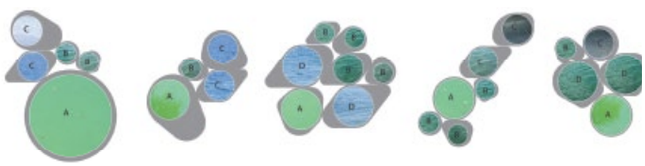
LEFT: Pool ring aggregation.

BELOW: Pool typologies indicating variation in width and depth to address a range of uses and environments.

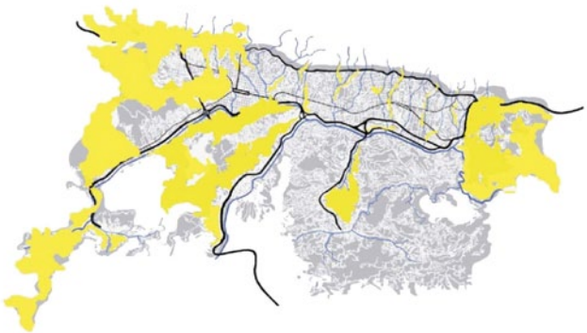


ABOVE: Section of desalination pool. The pool takes in water roughly filtered by a mesh (1), which then gets heated up and evaporates (2). The evaporated water gets collected (3) into a storage cell (4) where it is available for vaious uses (5).

RIGHT: Pool types encourage aggregation into islands, forming localized ecologies that can be assembled and reconfigured as needed. (A) Recreation. (B) Agriculture. (C) Ecology Habitat. (D) Entertainment.



INTERVENTIONS
URBAN-THINK TANK



Final text needed: Among the first systems thinker to decisively challenge this conservative image was Donella Meadows, a student of the systems pioneer, Jay Forrester. Directing her statements at the failed policies of NAFTA, GATT and the WTO on global problems, Meadows called what U-TT and others have referred to as acupuncture-like interventions, “leverage points”; that is, “places within a living system (a corporation, an economy, a living body, a city, an ecosystem) where a small shift in one thing can produce big changes in everything.” Leverage points are like fault lines where converging energies have a mutual amplifier effect, and although they can wreak havoc to a system, they can also effect change in a positive direction.

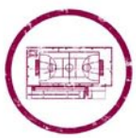
Finding these leverage points, Meadows further warned, was not simply intuitive, but baffl ingly counter-intuitive, and in her essay f¬¬¬¬or Whole Earth, “Places to Intervene in a System” (□□□□), she not only gave a definition of the unpredictable nature of systems, she also identified ten different categories of leverage points, two of which are directly related to the work of U-TT. Like Meadows, U-TT is cognizant of the fact that large-scale rehabilitation plans in the slums of Caracas, where □□□ of the urban population resides, have more often failed than succeeded, and they have therefore countered with a two-prong approach to the problems that plague the barrios: namely, the lack of essential services, such as schools, hospitals, parks, water supply, sewage and trash removal.

La Ceiba Station

- Typical Hill Station. The MetroCable System not only provides critical access to San Agustín, but it also serves as an essential connective tissue between the Formal and Informal City, integrated with existing public transportation infrastructure.

Parque Central Station

- Typical Bottom/End Station



Vertical Gym

- The Gimnasio Vertical was generated from the need to provide adequate sports facilities and play space within the density of the Informal City.

Music Factory

- This new music factory is a vital catalyst in this area, expanding music programs into the barrio while beginning to form a new network that serves the youth from all levels of society.

Growing House

- The Growing House is a social project that combines housing, public space, community services, and commercial zones into a comprehensive system of living. It is a spatial system that can be plugged into, added to, transformed, and adapted through use.

Pocket Parks

- These parks revitalize marginalized zones of neglect, underuse, and high risk (erosion, runoff) through public infill. Made of mixed materials and serving multiple functions, they create open spaces for public gathering and introduce play space.

Urban Agriculture

- Community agriculture generates the opportunity to transform the vacant and marginalized zones of the Informal City into productive zones that are catalysts for education and growth. The terraced landscape stabilizes the precarious ground; eliminates erosion; and encourages diverse community participation.

Community Center

- Derived from the needs of the surrounding inhabitants, the center can provide space for community meetings, after-school education, auxiliary education for adults, library exchange, medical facilities, and community exhibition/gallery space.

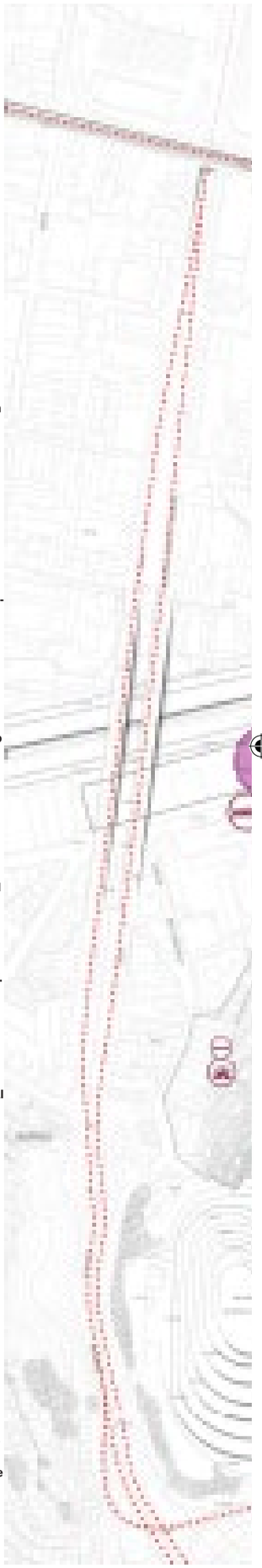
Dry Toilet

- Expected amenities become luxury items in the barrios that are severed from formalized services. The Dry Toilet reduces the demand on the inadequate water resources of the Barrio. Sewage and sanitation issues are avoided, aug-

Urban Furniture

- Taking multiple forms and fulfilling varied needs, these elements are essential for connecting a fragmented community, providing much needed accessibility, and giving a sense of security to residents.

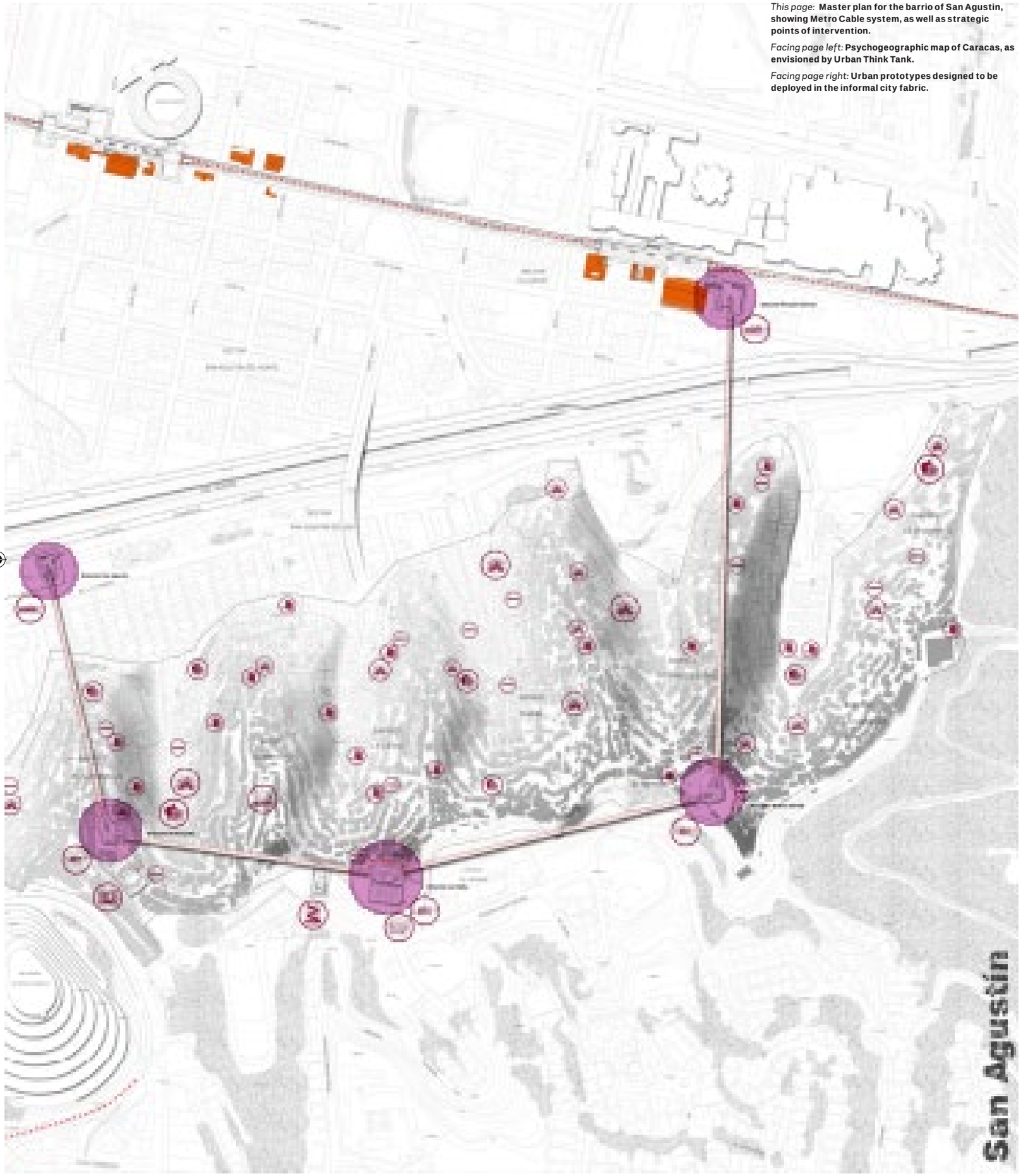
- Urban Furniture includes: Pathways, Benches, Garbage Cans, Light Posts, Signage, Landscaping, Shade, Rock Wall, Workout Benches, Chalkboards, Amphitheater, Playground equipment, Art, MetroChivo, Solar Roofs, Dry Toilets.



This page: **Master plan for the barrio of San Agustin, showing Metro Cable system, as well as strategic points of intervention.**

Facing page left: **Psychogeographic map of Caracas, as envisioned by Urban Think Tank.**

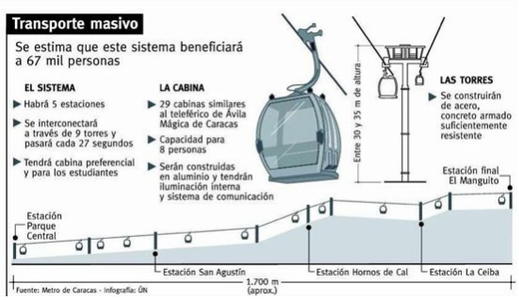
Facing page right: **Urban prototypes designed to be deployed in the informal city fabric.**

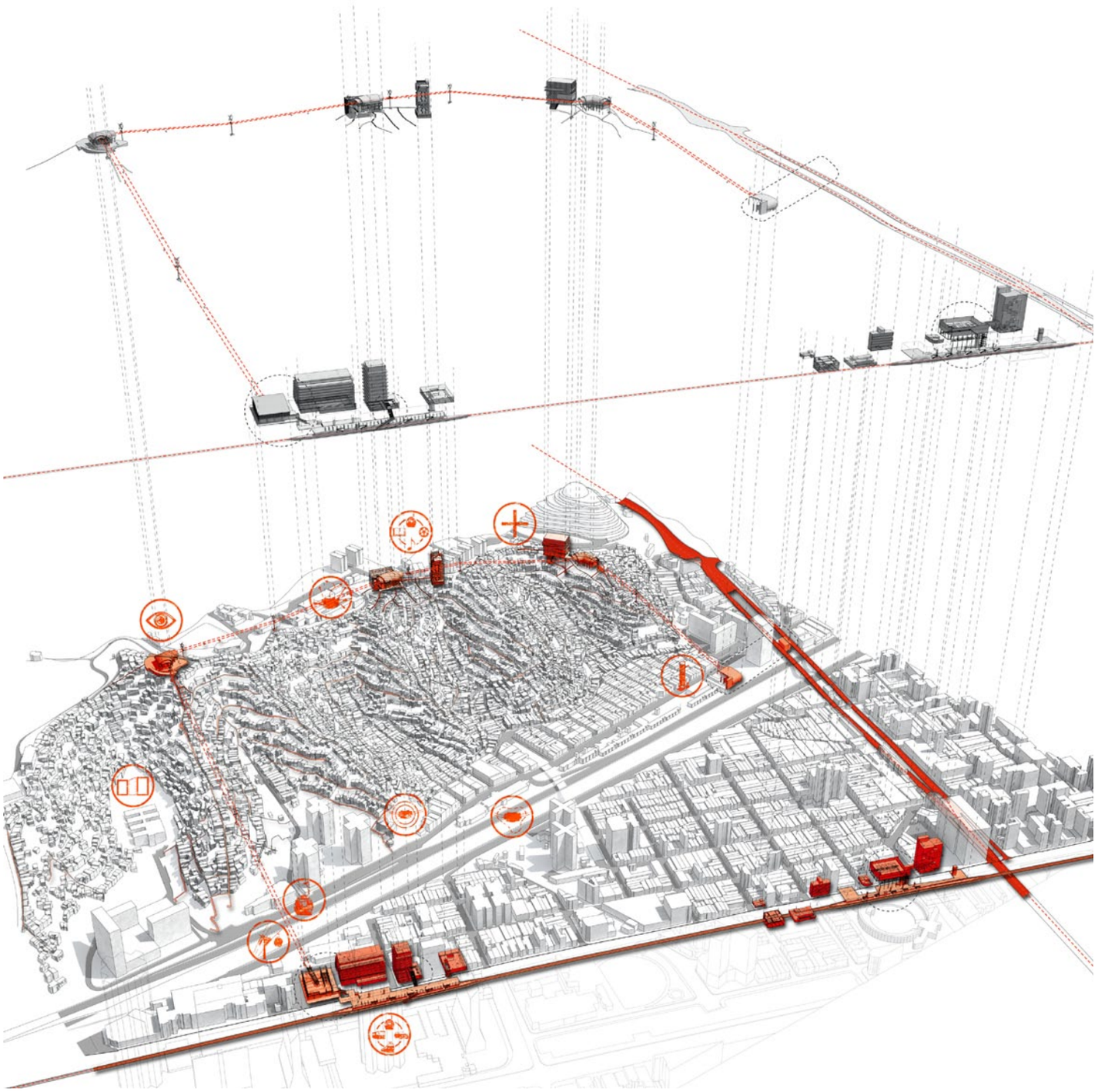


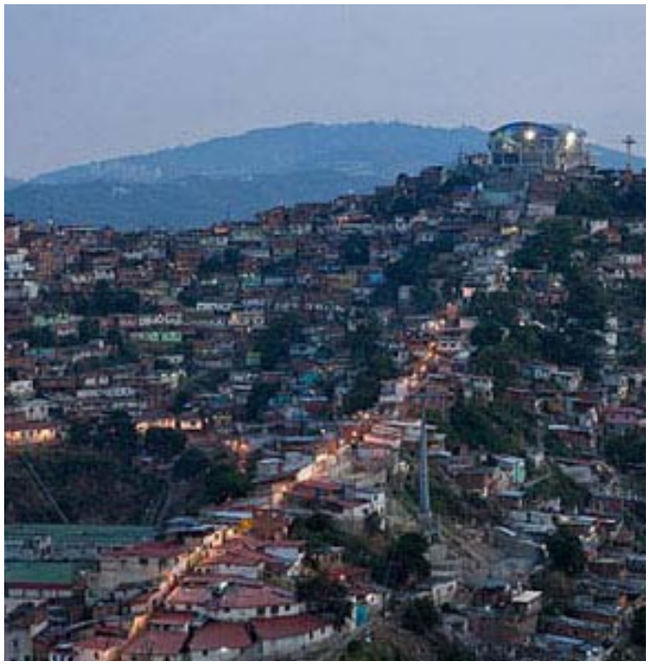
Cable Car System

The cable car system, which is integrated with the Metro System of Caracas, is □.□ km in length and employs gondolas holding □ passengers each. Metro Cable's capacity allows for the movement of □,□□□ people per hour in each direction. Two stations will be to be in the valley and connect directly to the Caracas public transportation system. Three additional stations are located along the mountain ridge, on sites that meet the demands of community access, established pedestrian circulation patterns, and also spatial availability for construction, ensuring minimal demolition of existing housing.

The five stations' designs share a basic set of components in common; platform levels, ramps for access, circulation patterns, materials, and structural elements. However, each station differs in configuration and additional functions, and the separate stations include cultural, social and system administrative functions; replacement of demolished residences with more homes, as well as public spaces; a gym, supermarket, and daycare center; and a link between the cable car system and the municipal bus circuit.







Top, middle left and middle right: **Views of Metro cable system and stations above the informal settlements on the hills of Caracas.**

Middle left: **View of Metro Cable system seen from below.**

Bottom left: **Detail view of cable car.**

Left: **System of urban catalysts. These catalysts include: accessibility; provide mobility; redefine mobility; integrate transportation infrastructure; add auxiliary program; activate street; create node; increase zone of influence.**

Facing page top: **Metro Cable diagram.**

Facing page bottom: **Aerial view showing Metro Cable network and stations, as well as points where urban catalysts are conceived.**

Hill-side station

The cable car system, which is integrated with the Metro System of Caracas, is □.□ km in length and employs gondolas holding □ passengers each. Metro Cable's capacity allows for the movement of □,□□□ people per hour in each direction. Two stations will be to be in the valley and connect directly to the Caracas public transportation system. Three additional stations are located along the mountain ridge, on sites that meet the demands of community access, established pedestrian circulation patterns, and also spatial availability for construction, ensuring minimal demolition of existing housing.

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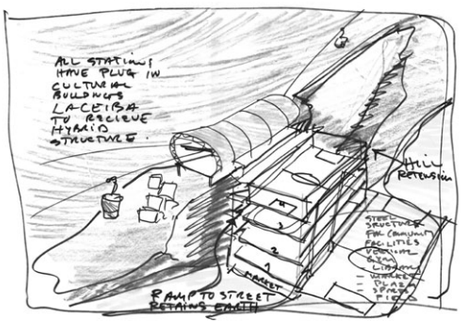
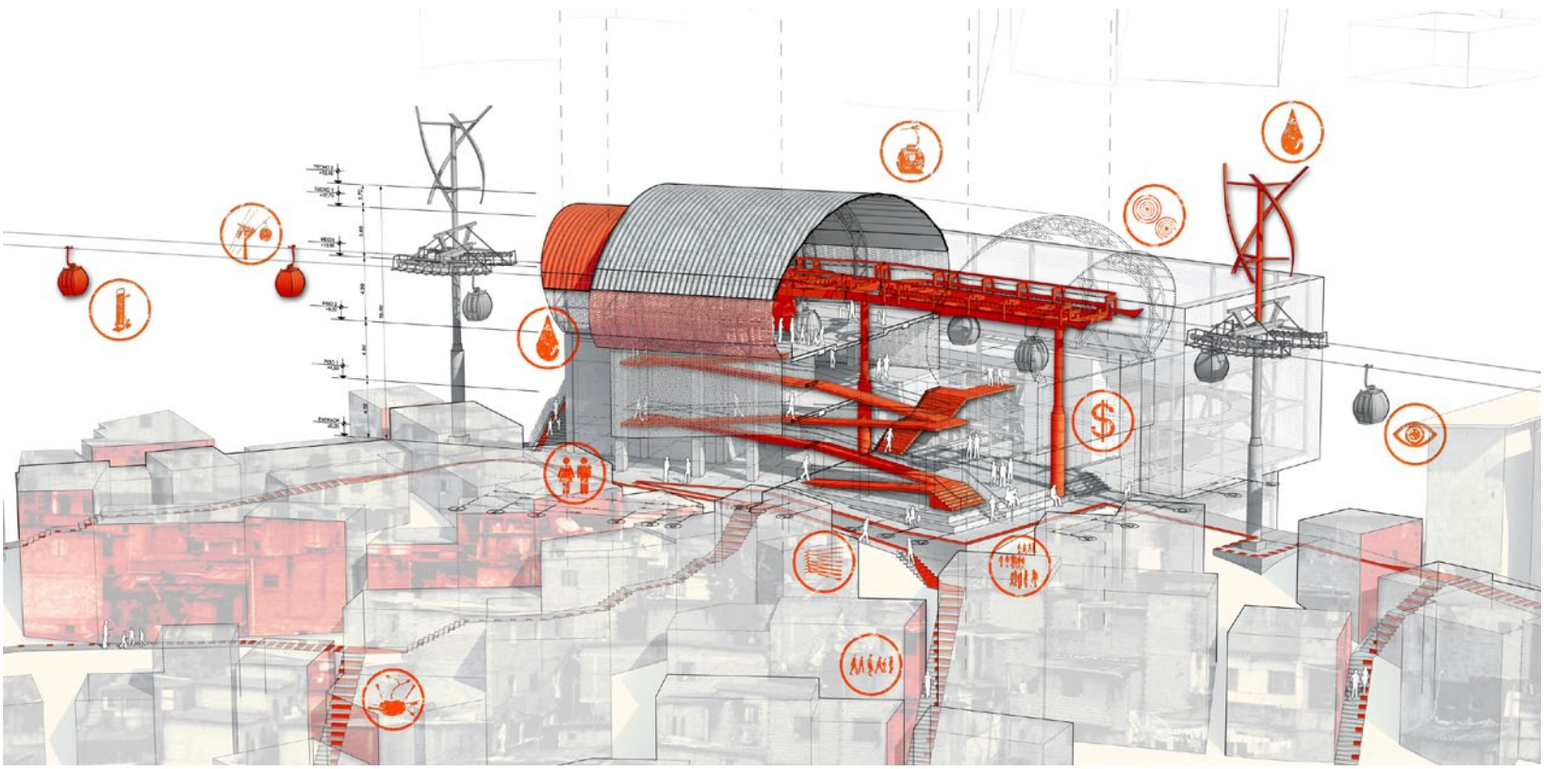
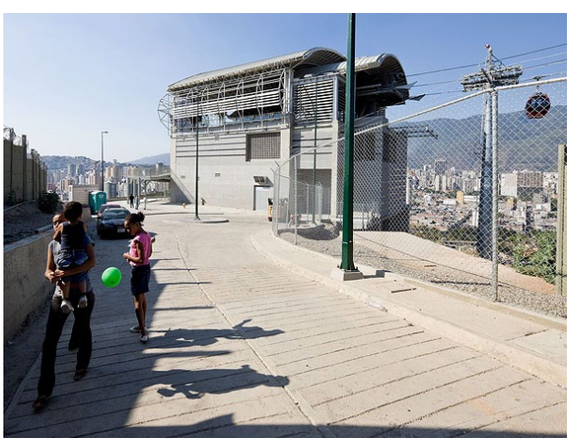
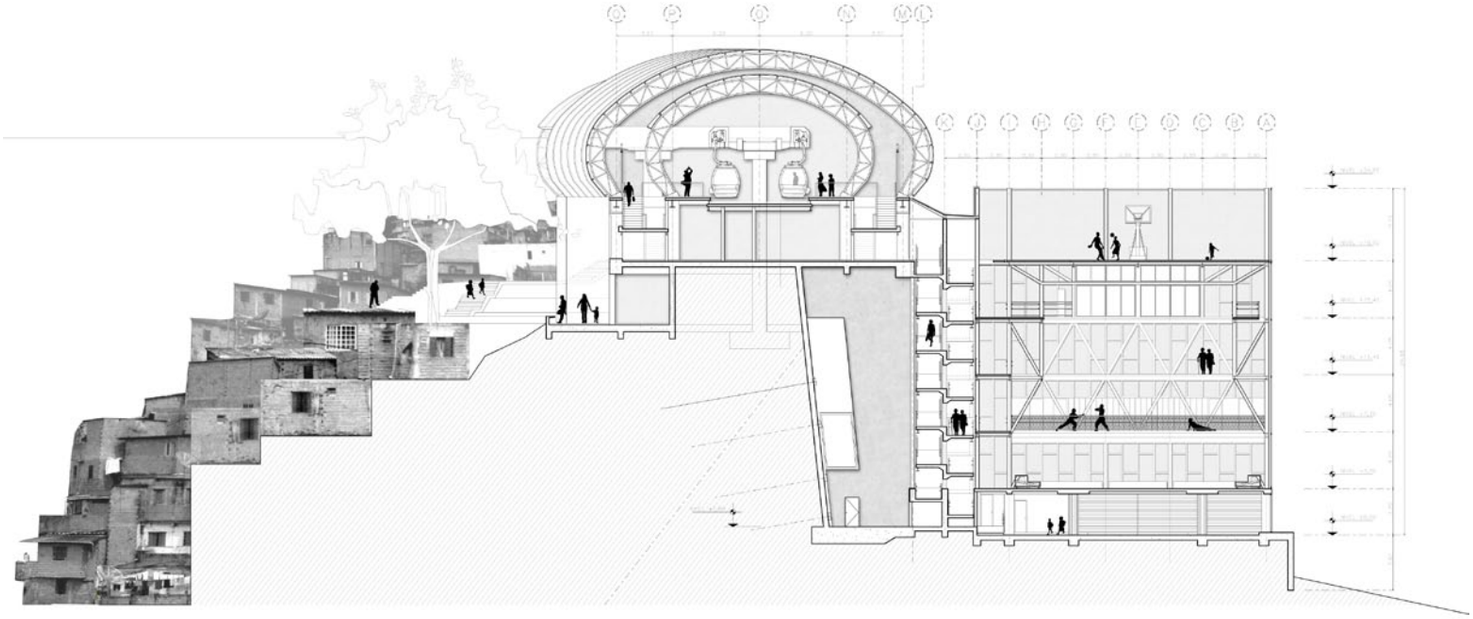
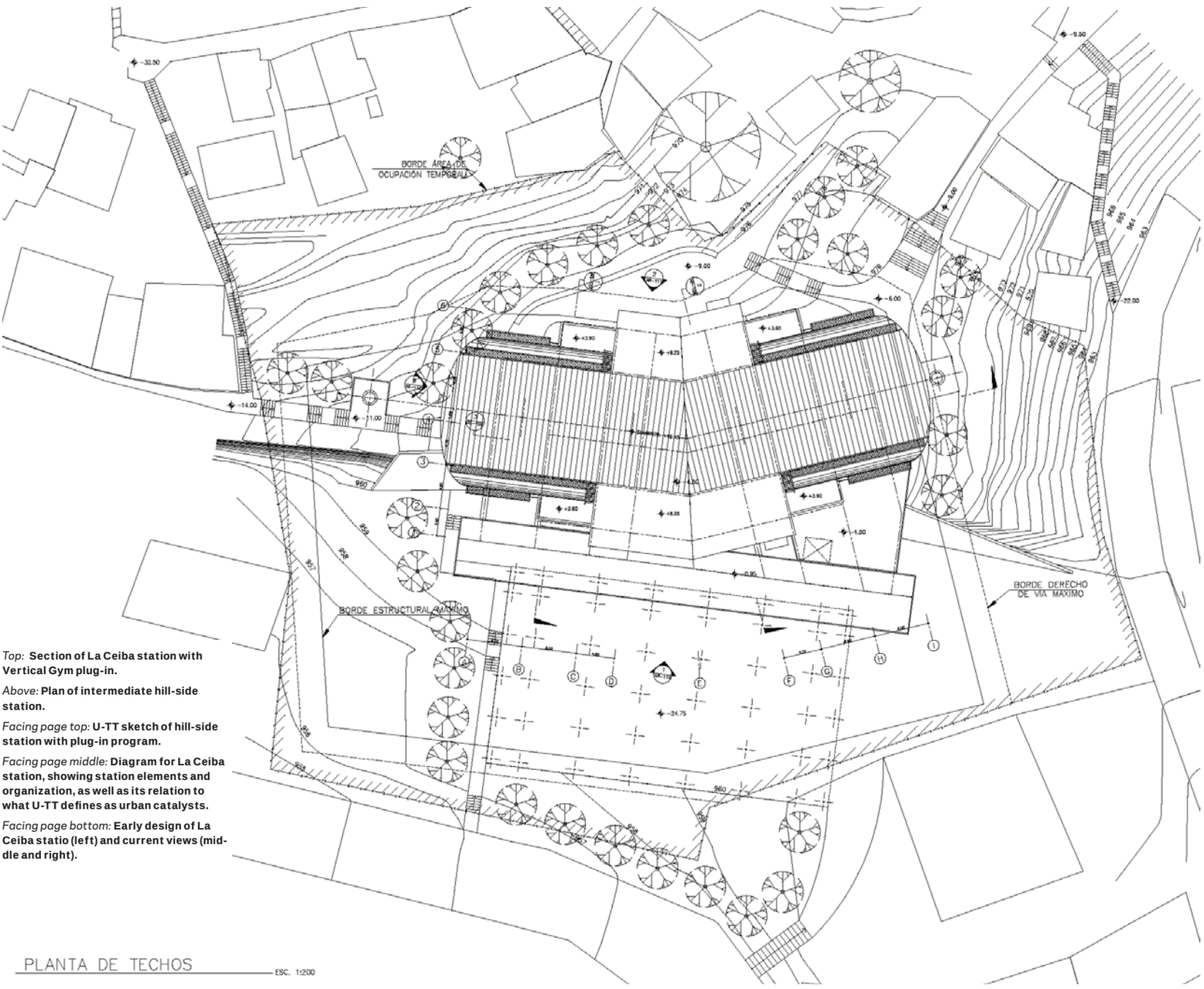










Top: **Section of La Ceiba station with Vertical Gym plug-in.**

Above: **Plan of intermediate hill-side station.**

Facing page top: **U-TT sketch of hill-side station with plug-in program.**

Facing page middle: **Diagram for La Ceiba station, showing station elements and organization, as well as its relation to what U-TT defines as urban catalysts.**

Facing page bottom: **Early design of La Ceiba statio (left) and current views (middle and right).**

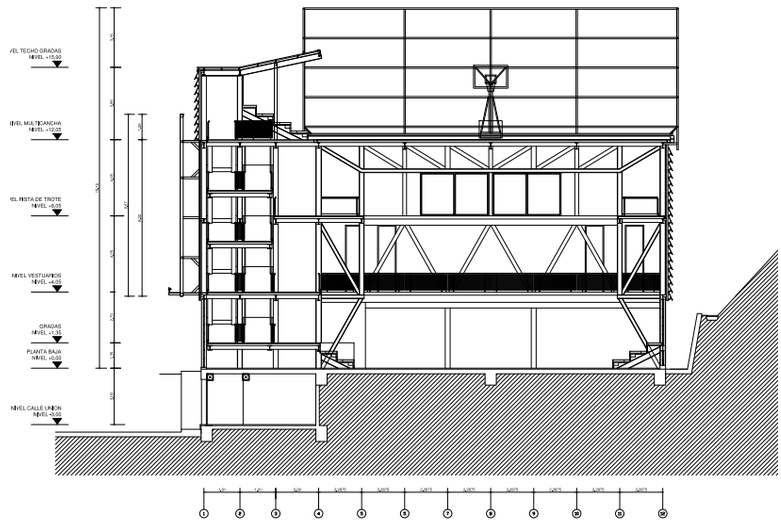
Vertical Gym

The Vertical Gymnasium (GIMNASIO VERTICAL™) is a prefabricated construction system installed on the site of a run down, existing inner-city sport field. The design explores a modular and vertical arrangement of facilities for various sports (Volleyball, Martial Arts, Running Track, Weight lifting area, Basketball, etc.). The vertical dimension of the gym structure compensates for □□ ha of lacking sports fields in the slum-areas of the city. The inner city is an area where little open land is available, crime rates and violence are skyrocketing and population densities up to □□□ per/ha are common. We believe that practicing sports should not be for a privileged few. Sports and physical activity should be a right of all citizens in the city, no matter what their social and economic background is. With the Vertical Gymnasium we want to create the physical and broad political platform where such activity can happen. There is one Vertical Gymnasium built in Barrio La Cruz and four under construction in Baruta, Los Teques, Miranda and San Agustin, respectively.

The Vertical Gymnasium at Barrio La Cruz (Bello Campo) in the Municipality of Chacao, constructed in □□□□ at over □,□□□ m□, transforms the site of a former, makeshift soccer field into a fitness complex with basketball courts, a dance studio, weights, a running track, a rock-climbing wall and an open-air soccer field. Indeed, this is an integral leisure facility for this densely populated sector of the city.

The former training ground was located at street level, and due to the densely built surroundings, it could not expand outwards. The solution was to build upwards.

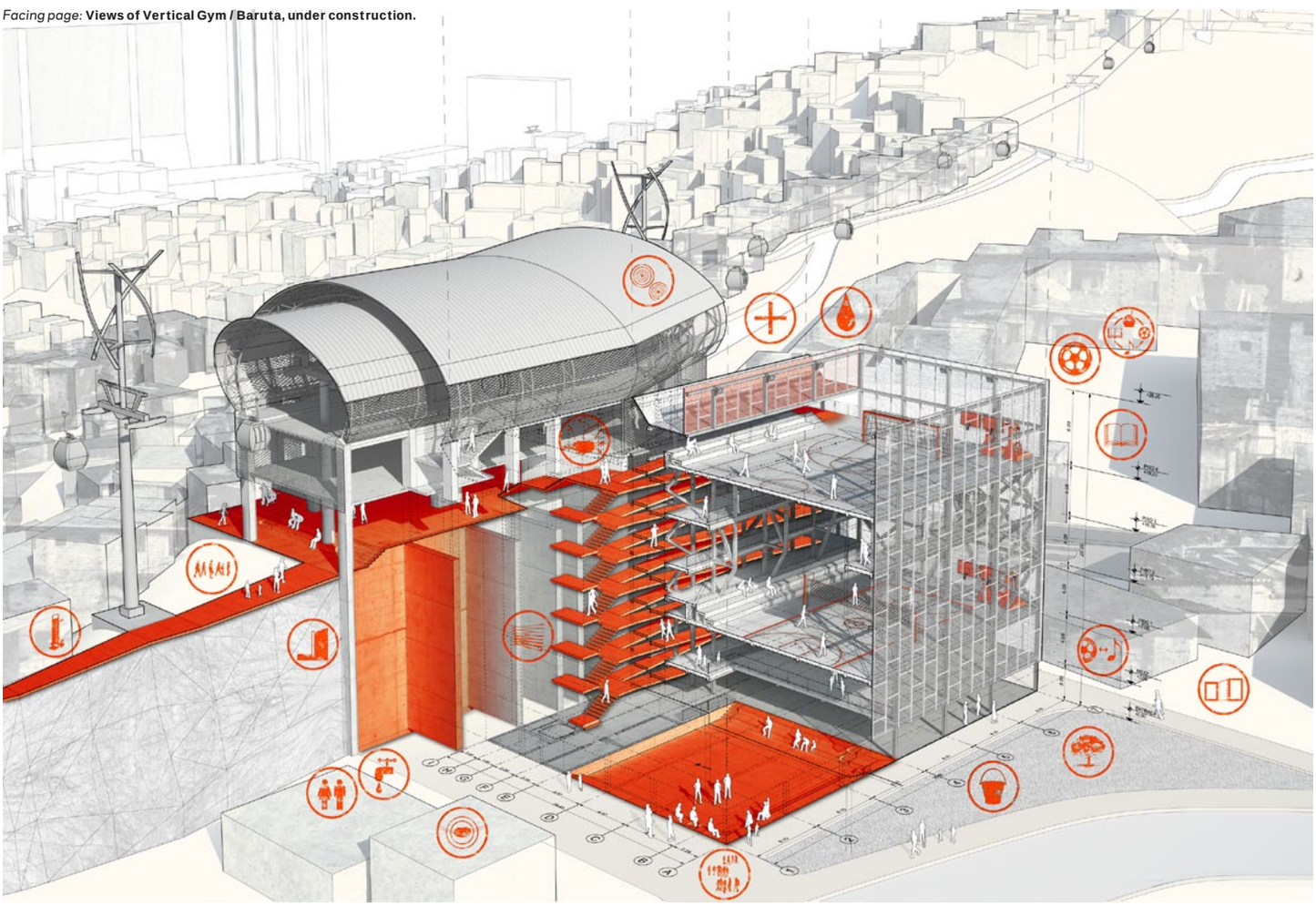
The first of its kind, this Vertical Gymnasium bustles with activity day and night, and welcomes an average of □□,□□□ visitors per month. Crucially, it has helped lower the crime rate in this barrio by more than □□ percent since its inauguration, according to local community leaders. The challenge for the new Vertical Gymnasium in □□□□ was to introduce the design together with engineer Guy Battle from Battle McCarthy environmental engineers in London as a best practices example that can receive international carbon credit funding to promote sustainable technologies. The new gym now incorporates the use of recyclable materials, wind towers solar panels, and rain water collection as part of the design initiative to make the prototype a responsive design object that complies with the Kyoto protocol.

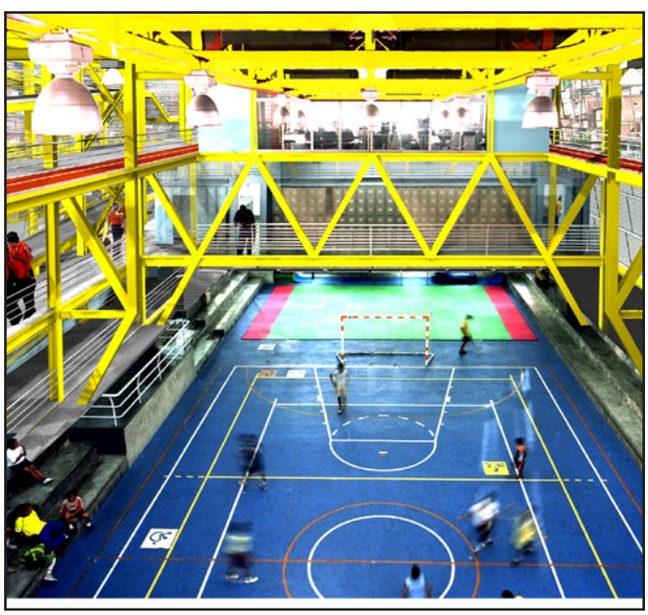


Top: **Section of Vertical Gym / Baruta.**

Above: **Cut-away view showing prototype of Vertical Gym plug-in, alongside a Metro Cable hill-side station.**

Facing page: **Views of Vertical Gym / Baruta, under construction.**





Vertical Gym Prototype (Registered TM) 2004-2011 Credits
Architects: Urban-Think Tank - Alfredo Brillembourg and Hubert Klumpner
Project Consultants: Felix Caraballo (community outreach); Integral Ruedi Baur & Associes: Ruedi Baur (graphic design), Sustainability / Thomas Auer - Transsolar; Prefabricated Bolted Channel Steel system
Consultants: Ing. Andres Steiner (Structure); Ing. Freddy Ferro (Electrical services); Ing. Robert Nino (Sanitary services); Ing. Miguel Sureda (Fire protection); Jose Miguel Perez (Sport coordinator); Ing. Luis Torres (Construction Management); Ing. Guy Battle, Battle McCarthy (Sustainability)
Materials: Kits of Prefabricated modular structural steel system
Photography:

URBAN ACUPUNCTURE AND THE LOGIC OF SYSTEMS

SARAH DEYONG

Urban Acupuncture refers to the idea that carefully considered, small-scale interventions in architecture have the potential to bring about positive change to the larger urban field. The term has its origins in the writings of Manuel de Solà-Morales on his reparative interventions to Barcelona and has subsequently been adopted by other notable architects such as Teddy Cruz, Urban Think Tank and the architect-mayor Jaime Lerner. While its meaning clearly derives from the ancient Chinese medical procedure, where small pressures at well-defined points on the skin, say on the ear, can effect change elsewhere in the body, the lung or the knee, it also corresponds with the systems idea of leverage points, an idea expounded by systems thinker and environmentalist, Donella Meadows.

Although there is no direct influence of systems thinking on urban acupuncture, conceptually, there is a correlation, so long as we define systems as radically different from that of the □□□□s and □□s, when architecture broached an ecological view of the city informed by cybernetics. Back then the dominant image of a living system came from the cybernetic model of a homeostatic mechanism seeking a state of equilibrium through negative feedback (figure □). But while this conservative image still underpins the life-cycle approach to sustainability, it is somewhat obsolete, since complex systems, as we now know, do not always seek a "natural" state of equilibrium, where one thing is recycled into another in a perfect and endless chain of cycles, but instead give way to moments of disturbance and morphogenesis.

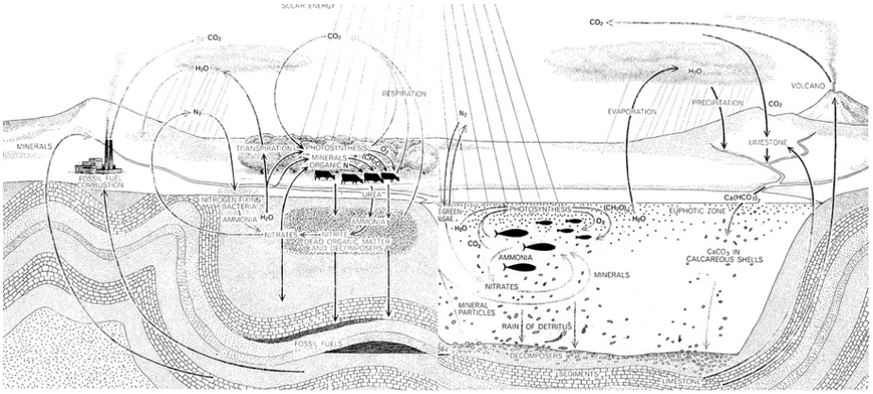
Deleuze and Guattari famously recognized the positive and creative necessity of destabilizing moments in a system with their definition of a rhizome, and Deleuze himself has said that the rhizome was "precisely one example of an open [complex] system." But among systems thinkers themselves, it was the aforementioned Meadows who decisively challenged prior assumptions, offering something far more interesting in its place. A student of Jay Forrester and one of the authors of Limits to Growth (□□□□) – the book that sounded the alarm on the limits of the earth's resources and in so doing forwarded the environmental cause -- Meadows later repudiated the book's pretense of prediction and control. "People who are raised in the industrial world and who get enthused about systems thinking are likely to make a terrible mistake," she candidly wrote in □□□□. Instead of a system that could be understood, maintained and controlled, she underscored the unpredictable nature of complex systems, saw these as counterintuitive, and coined the term "leverage points" to designate "places within a complex system (a corporation, an economy, a living body, a city, an ecosystem) where a small shift in one thing can produce big changes in everything." For Meadows, leverage points were like fault lines where converging energies have a mutual amplifier effect, and although they can wreak havoc to a system, they can also effect change in a positive direction. In her essay "Places to Intervene in a System," published in Whole Earth in □□□□, she warned against generalizing systems (they are "way too complicated and dynamically complex to figure out easily") and instead identified tactical places to intervene in a system, ranging from the prosaic--such as parameters, rules and constraints--to the revolutionary, casting off paradigms.

Meadows's notion of leveraging change relates to urban acupuncture as the latter has been defined by Kenneth Frampton as a concept referring "to the reparative potential of compact, urban interventions ... capable of spontaneously restructuring their immediate surroundings." But it also underscores the fact that urban acupuncture need not be regarded as simply remedial or reparative of the built environment, but potentially transformative in a broader social sense. By virtue of the interconnected and rhizomatic nature of a complex system, it points to an "ecologic" based not on a conservative, homeostatic model but on what Jean-François Lyotard once called the paradoxical logic, or "paralogic," of systems. A case in point is the urban acupuncture of Urban Think Tank in the barrios of Caracas, where □□□ of the urban population resides, and where poverty and a lack of essential services, including schools, hospitals, parks, water supply, sewage and trash removal, plague these communities. Specifically, two of Meadows's leverage points, outlined in her "Places to Intervene in a System," can be seen to resonate with U-TT's own strategy to leverage change in the barrios. The first of these levers is what Meadows has referred to as "material stocks and flow," that is, the physical arrangement of things, such as urban infrastructure (Meadows cites road systems) and public services. U-TT's Vertical Gymnasiums constitute one such leverage in the sense that they are focal points within the urban fabric that have substantially changed some dimension of the social field.

Stacking basketball courts, soccer fields and volleyball courts on top of each other, these gyms fulfill a need for recreational facilities in neighborhoods rife with gang-related violence. Since its inauguration in □□□□, however, U-TT's first vertical gym in the barrio La Cruz has received an average of □□,□□□ visitors per month and is one reason why crime rate in the area has dropped by an impressive □□ percent. Located on the site of an old makeshift soccer field, the building displaces very little of the existing urban fabric and is strategically located to maximize accessibility. Though the facility is not the first recreational center to have been built in the barrios, it has been successful where others have not, in part, because the architects addressed the problem of finding an embedded site without displacing the homes that are already there. U-TT note, for example, how one center, isolated and unused, quickly became a place to scavenge building

[i] *For their use of the term, see the following texts: Manuel de Solà-Morales, "Progettare città/Designing Cities," Lotus Quaderni Documents 23, ed. Mirko Zardini (Milan: Electa, 1999); Teddy Cruz, "Urban Acupuncture," Residential Architect (January-February 2005); Alfredo Brillembourg, Kristin Feireiss and Hubert Klumpner, eds., Informal City: Caracas Case (Munich: Prestel Verlag, 2005), 107; and Jaime Lerner, Urban Acupuncture (2008).*

[ii] *As Deleuze explained in an interview with Christian Descamps in the late 1980s: "It's become a commonplace these days to talk about the breakdown of systems, the impossibility of constructing a system now that knowledge has become so fragmented.... [But] there are two problems with this idea: people can't imagine doing any serious work except on very restricted and specific little series; worse still, any broader approach is left to the spurious work of visionaries, with anyone saying whatever comes into their head. Systems have in fact lost absolutely none of their power. All the groundwork for a theory of so-called open systems is in place in current science and logic, systems based on interactions, rejecting only linear forms of causality, and transforming the notion of time.... What I and Guattari call a rhizome is precisely one example of an open system." Gilles Deleuze, Negotiations (New York: Columbia University Press, 1990), p. 32.*



material. In contrast, U-TT's vertical gym in La Cruz … [describe the site in detail, what surrounds it and how one gets there. Also briefly describe where the other gyms are located].

Another project that leverages change at the level of a city's physical organization is U-TT's Metro Cable in the Barrio San Agustin. The barrios have an intricate interstitial network of pedestrian routes that is prone to flooding during the wet season, and for the elderly and young children who live at the top of the hills, it is especially difficult to traverse the terrain. Since any proposal for a road system would be too invasive (according to Alfredo Brillembourg and Hubert Klumpner, "to place a road network could displace up to one-third of the residents"), U-TT came up with the idea of an elevated cable car system that touched the ground minimally. Subsidized by the government and completed in January □□□□, the Metro Cable bridges the river and six-lane highway that geographically divides the barrio from the city proper, connecting the three peaks of the barrio with two stations along the public transportation route in the commercial area of Caracas. Consequently, commuting time to the formal city has been reduced in some cases from □ ½ hours by foot to □□ minutes by cable car. This reduction in travel time potentially reverses the existing economic condition, where the cost of goods sold in stores located higher up in the barrio are more expensive than those below due to the additional time and effort it takes to climb the barrio by foot. One of the stations, moreover, integrates a library and gym (though it originally included a more comprehensive program drawn up by the citizens' council of San Agustin, consisting of a social center, stores, offices and a garden as well), thus serving as another means of bringing into the barrio the public amenities of the city.

Urban infrastructure functions at what Meadows calls a lower-ranking leverage point, mainly because it is difficult to change once it is built: "Physical structure is crucial in a system, but the leverage point is in proper design in the first place. That is why it is so important to get the infrastructure right the first time [sic]." Still, U-TT has managed to transform the socio-urban field through innovation, layering and microsurgery, capitalizing on the forces that already exist rather than wiping them away. In working with real-world, social problems, they have had to reinvent the ways things are typically done out of necessity, like a bricoleur who resourcefully juxtaposes previously unrelated elements (a cable car and a mountain of houses or a "vertical" gym) in a poetic yet real attempt to create a new possibility.

The second of Meadows's leverage points (places to intervene in a system) that relates to U-TT's urban acupuncture is self-organization, a bottom-up strategy of adaptation, or in Meadows's words, of "surviving change through change," and a concept for which U-TT have adopted the term "informal." U-TT sees the unregulated urbanization of the barrios not as urban blight but as morphologies with their own internal logic. "These settlements," they note, "are both illegal … and extra-legal, since existing zoning codes have no jurisdiction over building sites that lack any title of ownership. But the squatter cities are not without their own codes, following unwritten rules of self-organization." To be sure, this informal logic is not without its limitations (houses are built on unstable ground and are subject to mudslides), but it has also fostered vital cooperatives, where families acquire property collectively in the interests of the community as a whole, for example.

In working with the community, U-TT has capitalized on the fault line between the urban poor and an unstable dictatorship, and has found an opening there. After ten years of research in the barrios, they know how essential it is to harness the collective intelligence of self-organization, and many of their best design decisions in regard to program and site were strategically informed by it (for example, the site of the Mama Margarita Orphanage, an abandoned municipal space under a highway bridge in Petare, was the insight of a local priest). Other projects, such as the dry toilets and water collection units in the Barrio La Vega, a sustainable alternative to costly and invasive upgrades to infrastructure, relied heavily on individual initiative for construction, maintenance and use, and ultimately, for the project's success.

U-TT makes no reference that I am aware of to systems in their work, but their style of thought is rhizomatic, which itself is connected to the paradoxical logic of systems. Their strategy for an urban acupuncture entails not only a deep understanding of the social, political and economic forces at play in a given field, but more importantly, a tactical knowledge of the dynamics of this ecology in order to construct new maps, networks of relations and lines of flight. Their work mediates between multiple agents and has led to innovative design solutions that have changed the dynamics of the socio-ecological field in which they are embedded. Theirs is a strategy that begins with mapping the existing forces at play in order to identify potential sites that can act as catalysts for change, and is therefore not unlike the psychogeographic strategies of Guy Debord, in which Paris was re-imagined by forging new relationships (détournements). U-TT has mapped the phenomena of everyday life in the barrios; they have made physical connections with infrastructure linking disparate points in a field, as well as interventions that tactically reverse the existing socio-economic condition; and they see informal settlements as urban laboratories of the future, because they necessitate new kinds of off-grid prototypes for the city that even the so-called Developed World can learn from.

[iii] *Donella Meadows, "Places to Intervene in a System," Whole Earth Review (Winter 1997).*

[iv] *Kenneth Frampton, Labour, Work and Architecture (London: Phaidon, 2002), 16.*

[v] *Lyotard, The Postmodern Condition: A Report on Knowledge (1979; Minneapolis: University of Minnesota Press, 1993), 61-63.*

[vi] *Information on all of the projects discussed in this paper has been drawn from my exchanges with Alfredo Brillembourg and Hubert Klumpner, as well as from the following essays: Alfredo Brillembourg and Hubert Klumpner, "Urban Acupuncture in Caracas," Topos 64 (2008): 24-29; Stefano Casciani, "Fly Me to My Barrio," Domus 935 (April 2010): 58-69; and Andres Lepik, "Building on Society," Small Scale Big Change, ed. Barry Bergdoll (New York: MoMA, 2010), 20-21.*

[vii] *This point is made by Brillembourg and Klumpner in the film by Rob Schröder, "Caracas, The Informal City" (Rotterdam: VPRO, 2007).*

[viii] *Meadows, "Places to Intervene."*

[ix] *Brillembourg, Feireiss and Klumpner, Informal, 74.*

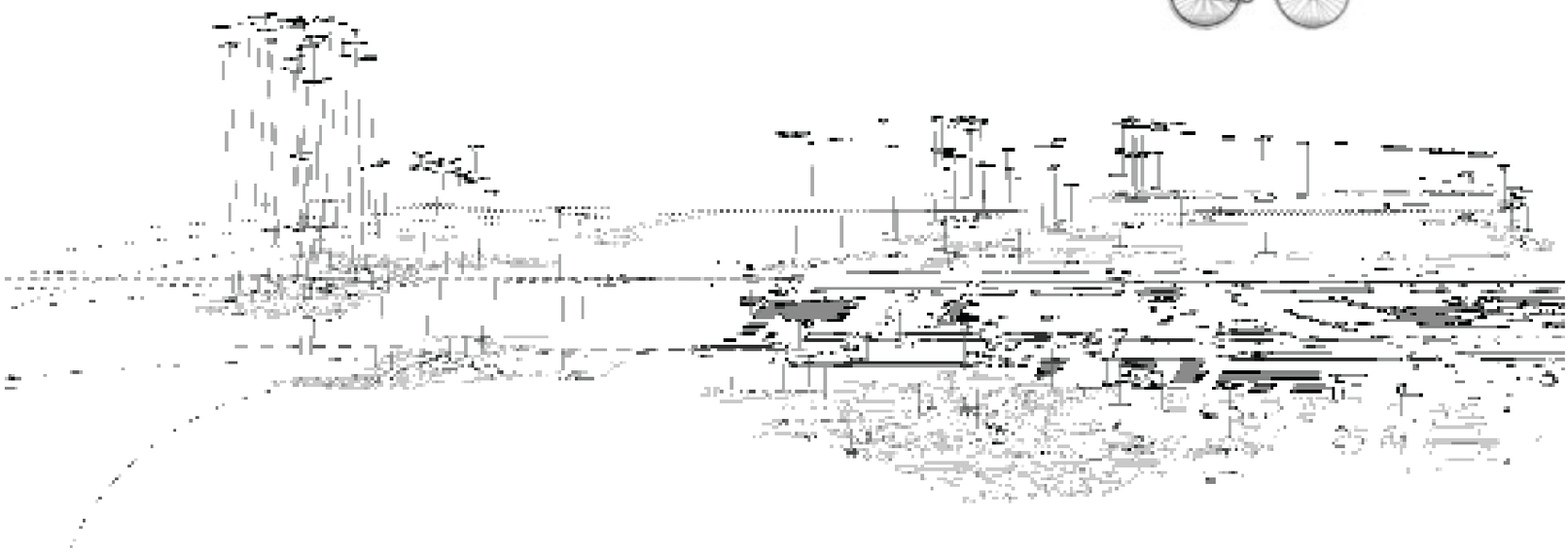
[x] *Spurred by the publication of Simon Sadler's book The Situationist City (1999), U-TT produced their own psychogeographic maps of Caracas. Brillembourg in conversation with the author, 12 December 2010.*

[xi] *For an example of their "phenomena mapping," see Brillembourg, Feireiss and Klumpner, 110.*

An earlier version of this paper was presented at the ACSA Regional Conference "Flip Your Field," at UIC in October 2010, in the session on systems organized by Dawn Finley. My research on systems is part of a larger project on the Megastructure supported by the Graham Foundation. My thanks to Amanda Reeser Lawrence and Irina Verona for their editorial guidance.

Weightless City
Paisajes Emergentes

Adamo-Faiden's proposal for a new solution to social housing in the suburban neighborhoods of Buenos Aires Argentina aims to reverse the commonly held perceptions that social housing is (1) Parasitic; drawing resources from its host without offering anything in return (2) an Outcast; beginning in a state of crisis without the supporting infrastructure necessary for its survival and (3) a force of Depreciation; decreasing the value of its surroundings. In contrast, MuReRe houses offer a new covenant between social housing and its context. Embracing **Mu**tualism, **Re**generation and densified **Re**sidential infrastructure as their basis for design, MuReRe houses are simultaneously a new model for social housing and a strategy for increasing the quality of existing neighborhoods by reactivating the latent potential of the Buenos Aires suburbs.



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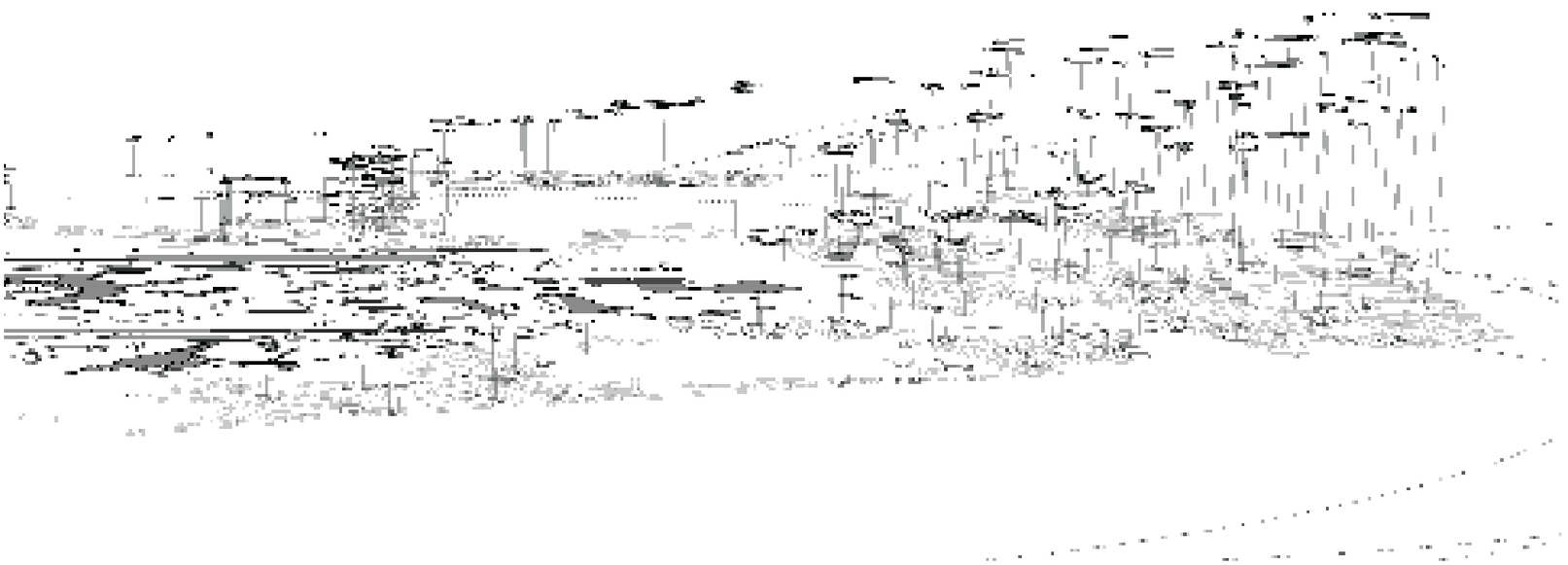
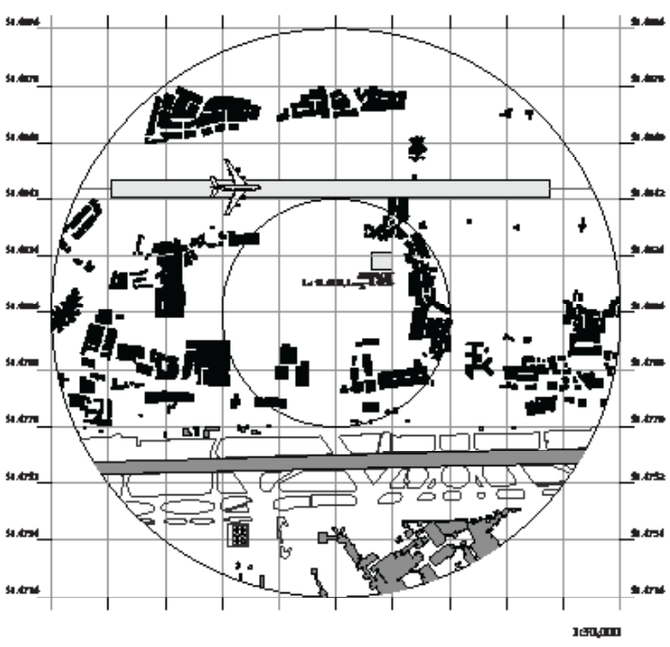
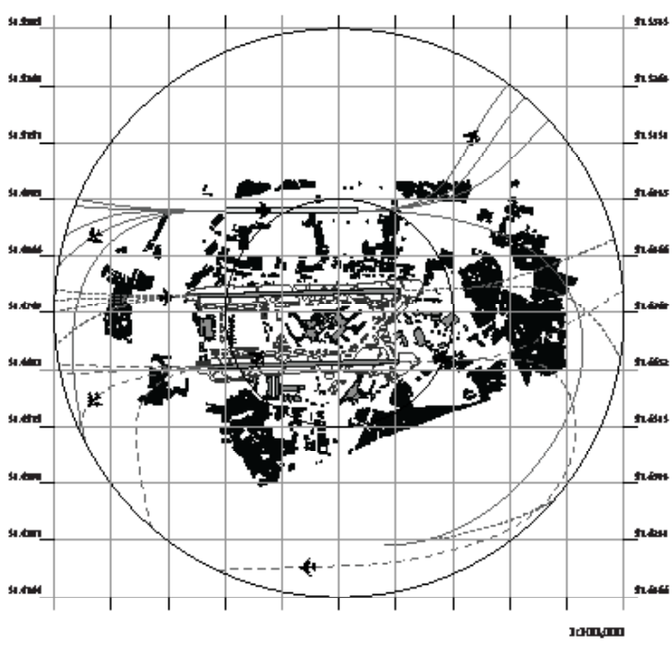






Meterological Typologies: Philippe Rahm

In a letter to Pope Leo X in □□□□, the painter Raphael distinguishes the architect's representational techniques from those of the painter, declaring the plan as the essential tool of f the architect, in the same way that the perspective was the essential representation for the painter: "The drawn plan, belonging within the realm of the architect, is different from the painter's drawing." Raphael adopts Leon Battista Albertis'distinction between architecture and painting, which claimed the drawn plan as the exclusive territory of the architect and reserving perspective drawingsolely for the painter. We propose returning to this fundamental distinction, to the plan and its creation, as the essential starting point of our work, preceding all other types of representation.. While our representational tools may be traditional, the elements with which we compose are not. They shift from the visible to the invisible, from the solid to the climatic. Our plans are becoming meteorological.

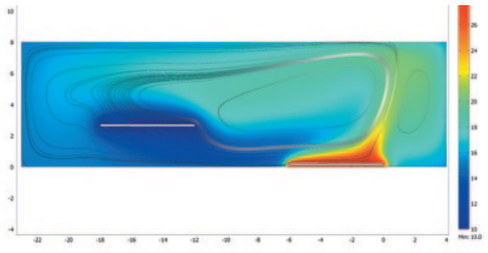
Historically, typological classifications of Architecture, from Vitruvius to J.N.L. Durand toJulien Guadet , define categories into elements and compositional strategies: "elements of architecture" are for example walls, vaults, roof, column, windows, etc and the compositional strategies areare for example: symmetry, addition, inclusion, superposition, juxtaposition, etc.

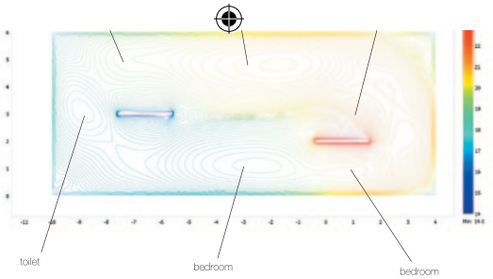
We propose to maintain a traditional classification of the language of architecture as a structure, but to replace the classical elements with those from the field of climate and meteorology. In lieu of walls, ceilings, floors, doors or windows, our essential elements are heat, moisture, light, inertia, and albedo.. and Instead of thinking in terms of compositional techniques of asymmetry, division or subtraction as elements of compositions, we propose to use "convection, conduction, radiation, pressure to design a meteorological architecture.

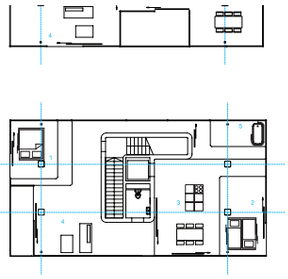
Buildings produce nearly □□□ of the world's greenhouse gas emissions due to the burning of fossil fuels to heat and cool them. While the building industry has come (late) to address some of these problems through remediative tactics: insulation, life cycle analysis and the use of renewable energies, what else might be done beyond socially responsible and ecological objectives to reduce CO□ emissions? Might we be able to thing of climate as a new architectural language, a language for architecture with meteorology in mind? Might it be possible to imagine climatic phenomena such as convection, conduction or evaporation for example as new tools for architectural composition? Could vapour, heat or light become the new bricks of contemporary construction?

As the addressing climate change becomes part of the mandate of the architect, it is also possible that climate becomes one of his or her resources and tools? > The vocabulary used to describe atmospheric phenomena (convection, pressure, depressions, temperature, heat, relative humidity, reverberation, for example) thus becomes an architectural language. We seek to integrate the climatic mission of architecture not only as purpose but also as process. Architecture as meteorology opens other spatial dimensions and definitions. : At a large scale, it explores the atmospheric qualities of the space (temperature, air pressure, water, vapor, light, etc) as physical and chemical phenomenon of new climatic techniques like ventilation, heating, air conditioning, insulation, radiation. At the microscopic scale, it explores new fields of reception (cutaneous, olfactive, hormonal, digestible, breathable), as biological and chemical perceptions of invisible environmental qualities such as air, ions, electromagnetic waves, light or radiations.

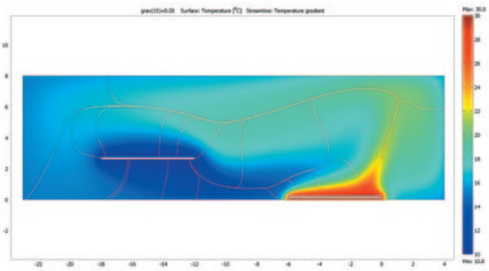
A meteorological architecture affords us the opportunity to shift from a purely visual and functional approach towards one that is more sensitive and, more attentive to the invisible, climate-related aspects of space. Slipping (Moving?) from solid to void, from visible to invisible, from metric composition to thermal composition, architecture as meteorology opens sensual, variable dimensions in which limits fade away and solids evaporate (this is a bit unclear/undocumented or unspecific—how do limits fade and solids evaporate). The architect's task is no longer to build images and functions but to orchestrate climates and interpretations. At the large scale, meteorological architecture explores the atmospheric and poetic potential of new construction techniques for ventilation, heating, dual-flow air renewal and insulation. At the microscopic level, it plumbs novel domains of perception through skin contact, smell and hormones. Between the infinitely small of the physiological and the infinitely vast of the meteorological, architecture must build sensual exchanges between body and space and invent new aesthetic philosophical approaches capable of making long-term changes to the form

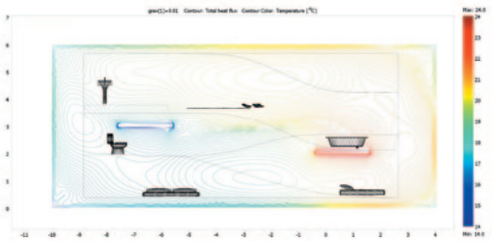


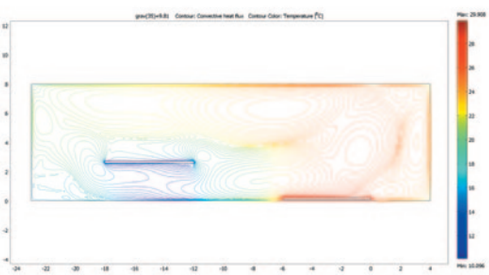


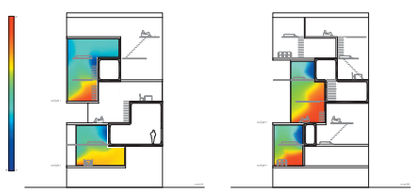


public air

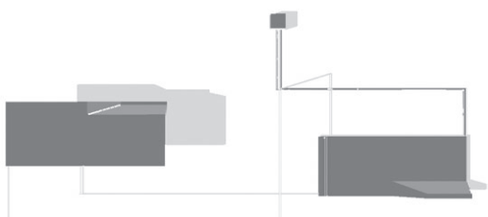


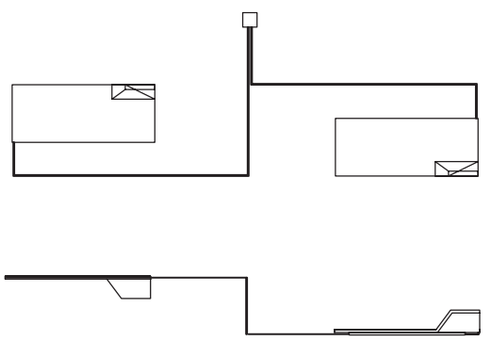




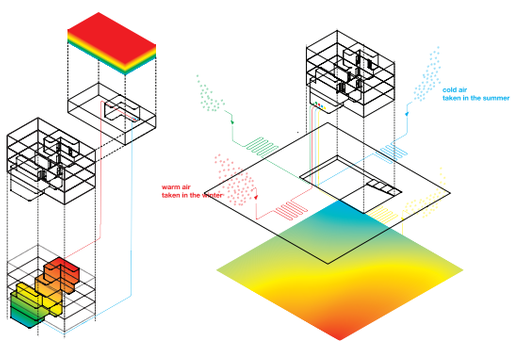


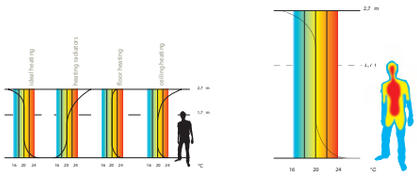
convective condominium

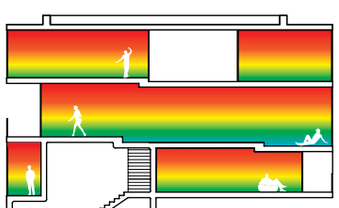


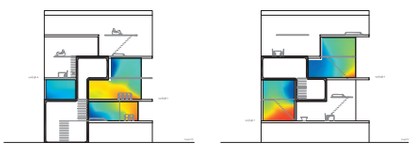


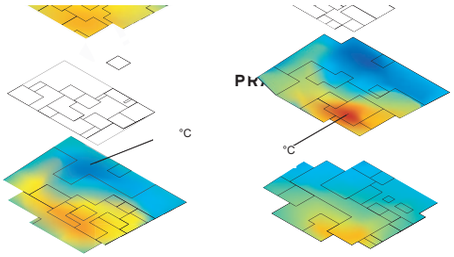
interior gulf stream

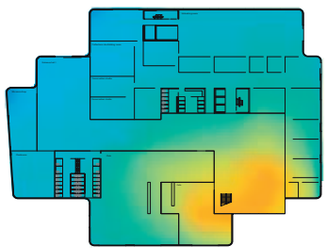


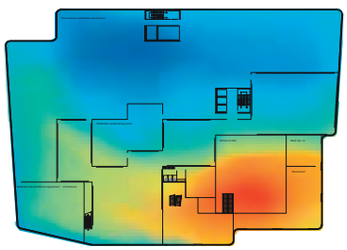


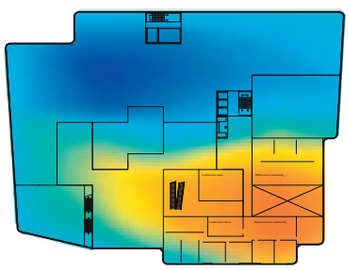


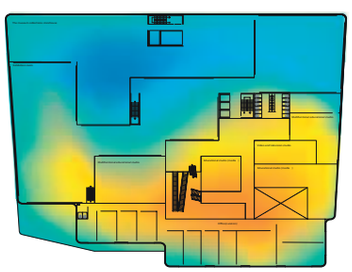


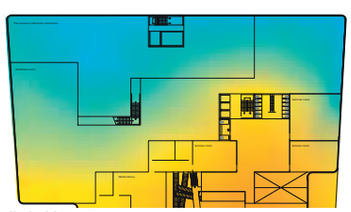












Climatic Typologies AEach apartment has a unique spatial quality achieved with different heights, different depths. The layout of the apartments is made according to calculations of temperature change depending on the input of fresh air in the apartment at the sheath. In a thermographic physical study, we manage the various functions in relationship with the movement of interior temperatures linked to the recommendations of the standard SIA 384 / 2 by placing the functions that require the cooler temperatures near the sheath (rooms, wc, kitchen) and those that require

higher temperatures higher, under the law of Archimedes, following the upward movement of heat

Convection. Design based on water vapor gives form and arrangement to spaces according to relative humidity. The architecture takes shape as the real and physical immersion of the inhabitants' bodies in the humid and variable body of the space. A sleeping person emits around 40 grams of water vapor per hour (bedroom) and up to 150 grams per hour when active (living room). A bathroom gives off up to 800 grams of water vapor in 20 minutes and a kitchen, 1500 grams per hour.

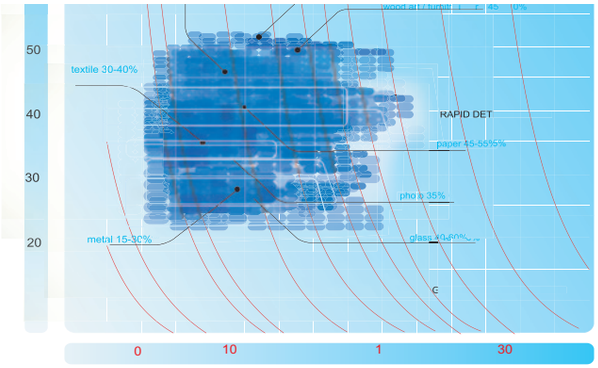
Interior Gulf Stream. Modernist architectural principles particularly, the free plan tended to require that interior spaces maintainuniform temperatures around 21 degrees. The aim in this work is to restore a diversity of temperatures within the house. to allow for seasonal changes in occupation, migrations from downstairs to upstairs, from cold to warm, winter andsummer, dressed and undressed. e In order to meet the demand for energy conservation, we attempt within each building, and each room, to provide a precisely calculated thermal capacity in order to use the minimum amount of energy to maintain thermal comfort.

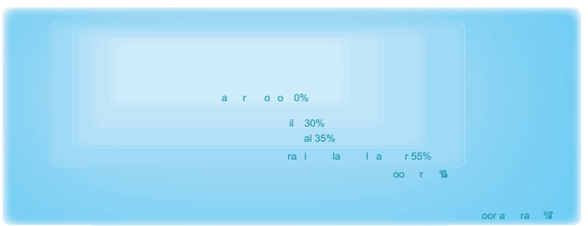
The Swiss construction code SIA 3842 gives the following values for ambient temperature: Bathroom:

22°C, Living room: 20°C, Kitchen: 18°C, Bedroom: 16°C. Instead of warming all spaces equally at

Digestible Gulf Stream. An architectural that works between the neurologic and th atmospheric to producea landscape that i simultaneously gastronomic and thermal than building spaces this architecture cr temperatures and atmospheres. Here, we horizontal metal planes at different heigh lower plane is heated to 28°C, the upper o to 12°C. Their spatial offset and temperat difference creates a convection current, l minature Gulf Stream The rising hot air c

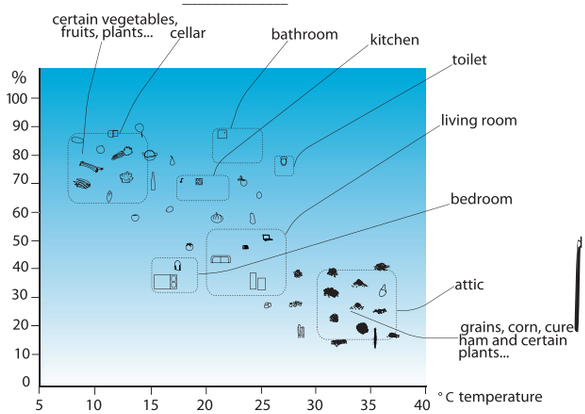
Evaporation. Design based on water vapor gives form and arrangement to spaces according to relative humidity. The architecture takes shape as the real and physical impression of the inhabitants' bodies in the humid and variable body of the space. A person breathes in air at 45% humidity and releases air at 90%, which means that a sleeping person emits around 40 grams of water vapor per hour (bedroom) and up to 150 grams per hour when active (living room), so that air breathed in . A





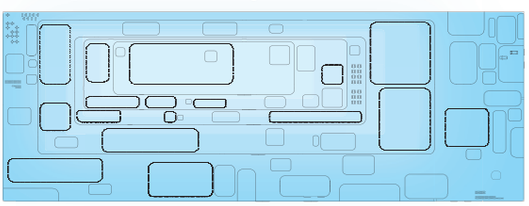
o r la i i for ario a rial o r a i

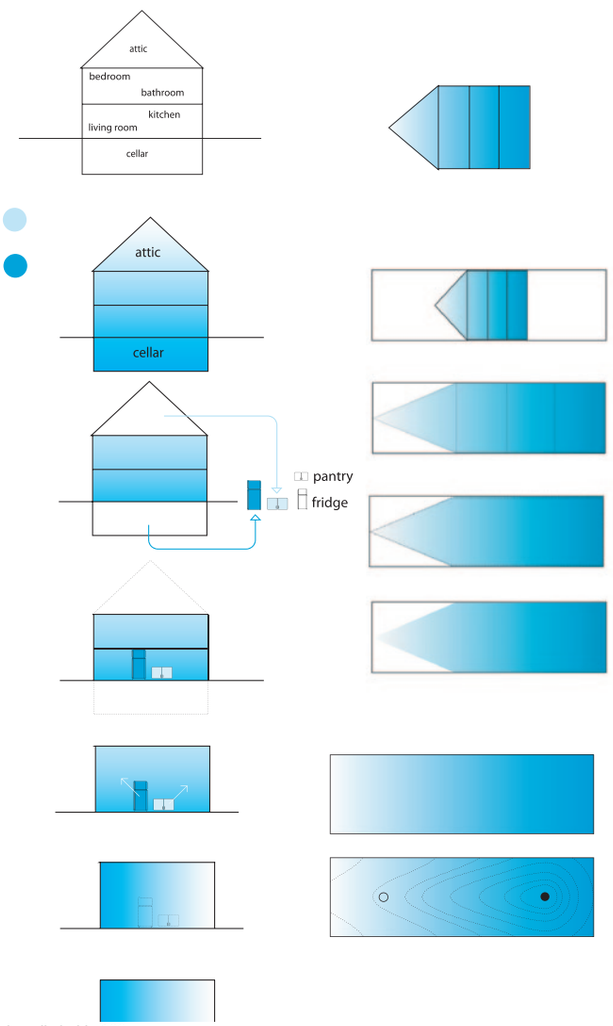
relocated barn

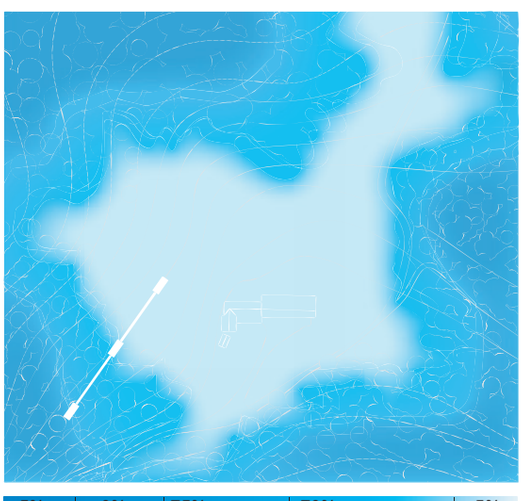


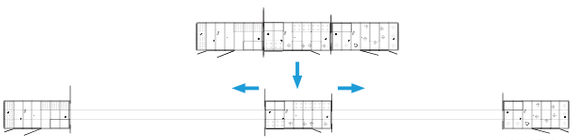
Dialated House By dispersing the program of a house to the whole of the site, in order to match specific spaces with their appropriate climates. The house is no longer a compact and closed object but spread over the site, multiplying views, situations, atmospheres and climates. By disseminated the house throughout the landscape, rooms can be occupied in various places, according to

dilated house



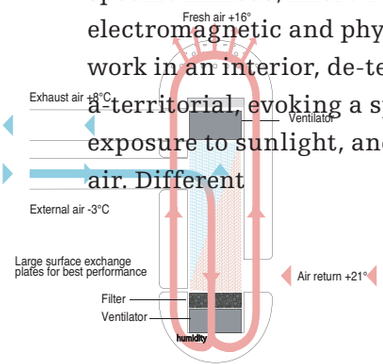




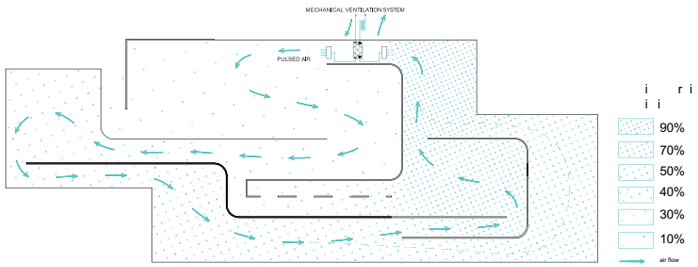


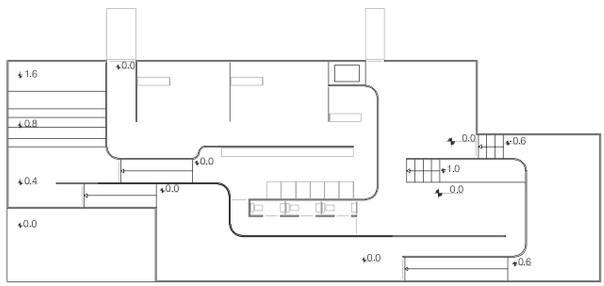
Deterritorialising Terriors. The project aims to recreate a specific milieu in an interior, using construction techniques, control of air and air-flow with extraction of heat, heating and ventilation. Like specific milieus, micro-regions with chemical, electromagnetic and physical properties are set to work in an interior, de-territorialised or a-territorial, evoking a specific type of soil, climate, exposure to sunlight, and scents and tangs in the air. Different

deterritorialized terroirs

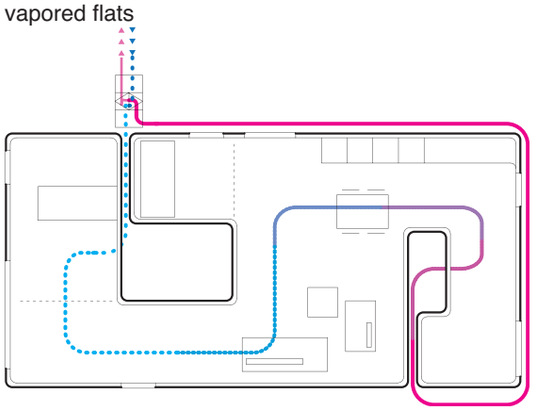


vaporscape

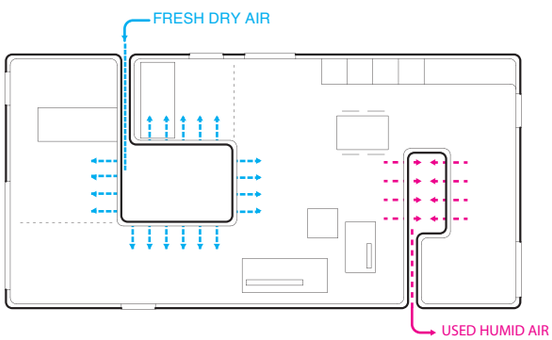




vapored flats



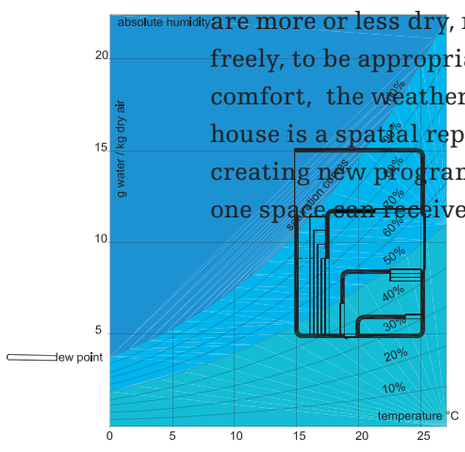
floor plan_apartment
air-flow related to the double flux air-renewal with heat-exchanger



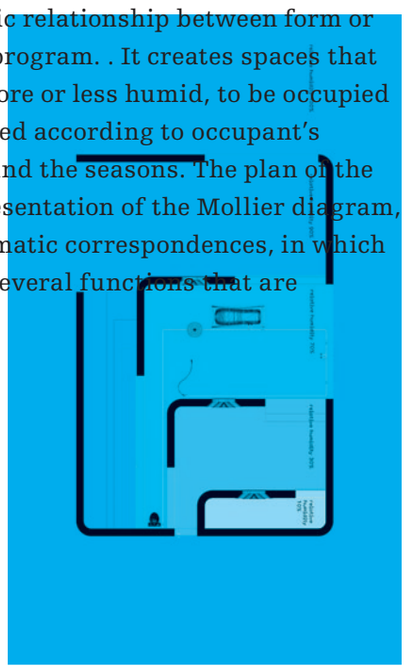
floor plan_apartment
air-flow related to the double flux air-renewal with heat-exchanger

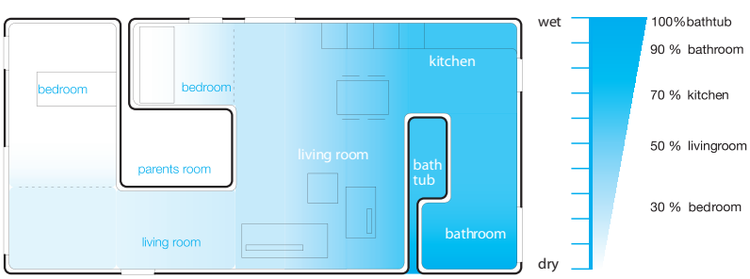
Mollier House. Our project establishes a stratification of the levels of humidity within the space. The living areas are arranged according to the route of fresh air through the house, from the driest and freshest to the most humid, from the bedroom to the bathroom while refusing a deterministic relationship between form or space and function or program. . It creates spaces that are more or less dry, more or less humid, to be occupied freely, to be appropriated according to occupant's comfort, the weather and the seasons. The plan of the house is a spatial representation of the Mollier diagram, creating new programmatic correspondences, in which one space can receive several functions that are

mollie's houses



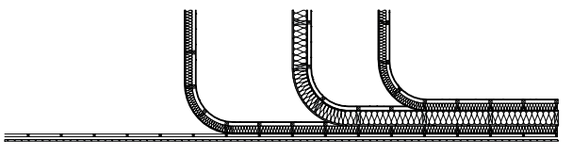
Mollier's graph



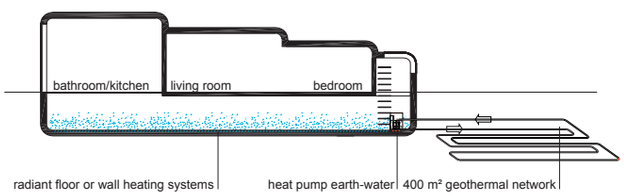


floor plan_apartment
functions related to humidity
horizontal stratifiication of humidity

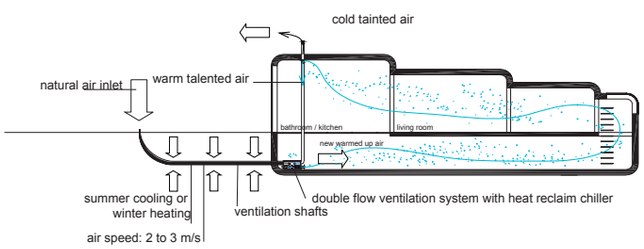
Three Thermal Bubbles. Our building consists of having some “bubbles”,bubbles that joins thermal and programmatic conflicts.Those bubbles are nested within each other, overlapping the most thermally sensible in the interior,and the most thermally resistant in the outside.Every bubble consists of a bearing wall, each one have 16 cm of thickness.As we move from the outside to the inside of the building,from one bubble to the other, we are adding more and more layers of isolation.So we say, first we have just 16cm of thickness, in the second bubble, 32 cm, and in the third one, 48cm.isky vault



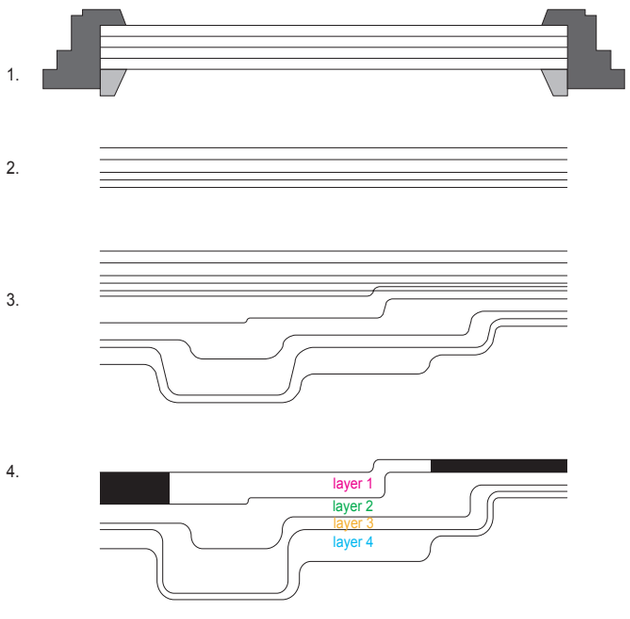
programmatic stratification related to the thermal transmission coefficient

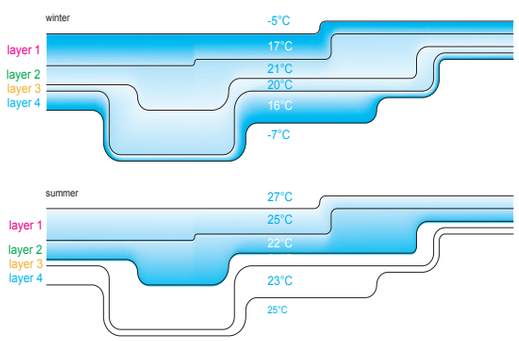


heating system diagram

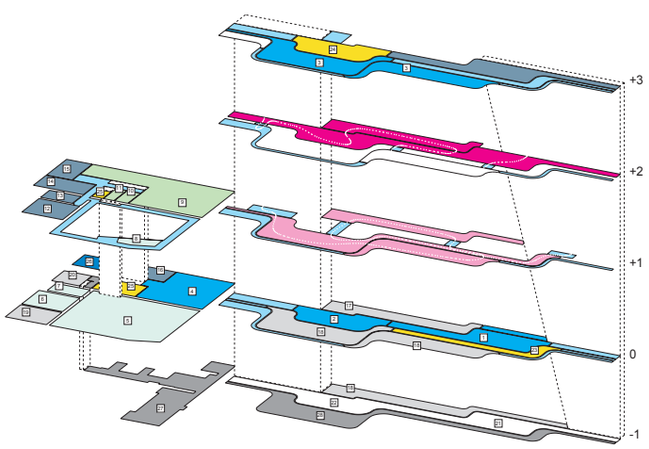


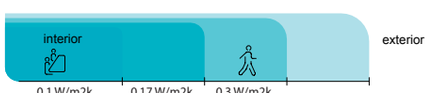
Insterstitial Living This project for a museum in Poland is literally an increase of the thickness of the small spacing of some millimetres between the glass panes of a window with double or triple glazing, until it becomes a liveable space of some meters. Precisely like the construction manner of the contemporary windows which adds several panes of glass (single, double and triple pane) to improve the insulation by decreasing the coefficient of the thermal transmission K (W/m2.K) (single pane: K =5,6, double: K = 3, triple: K = 2), our project adds layers to improve the thermal coefficient gradually, one layer after another, offering a variety of temperatures and luminosities. Against the homogeneity of the modern climate, we propose a diversity of atmospheres, light and temperatures open to transhumancefunctions that are assumed to be separated.



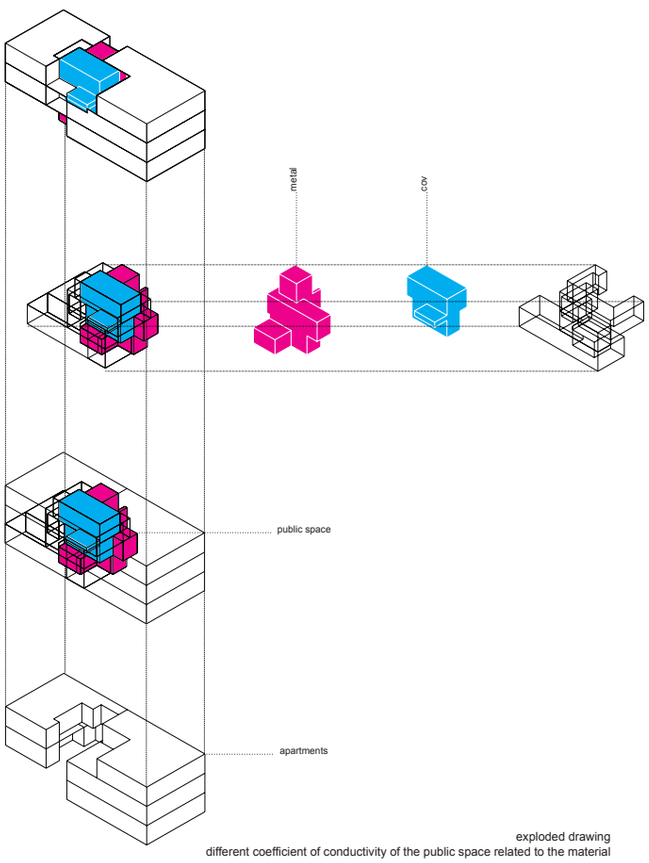


variation of temperature of the layers depending on the season





Conductive building. The design of this building is based on the thermal conductivity. The main materials of the building have a very low thermal conductivity coefficient (under 1 W/m.K wood and hollow fill fibre insulation) except a few rooms, some made of concrete and some others made of steel. These two different materials, with different thermal conductivity coefficients will bring the heat of the coldness of the outside environment brought by the radiation of the sun or the light dark vault through the insulated glass of the facade.In physics, thermal conductivity, k, is the property of a material that indicates its ability to conduct heat. It appears primarily in Fourier's Law for heat conduction, the

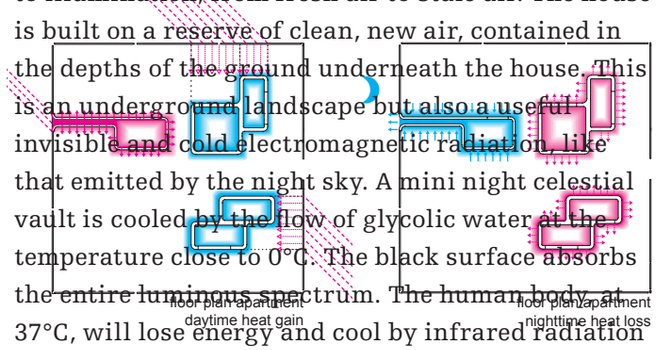


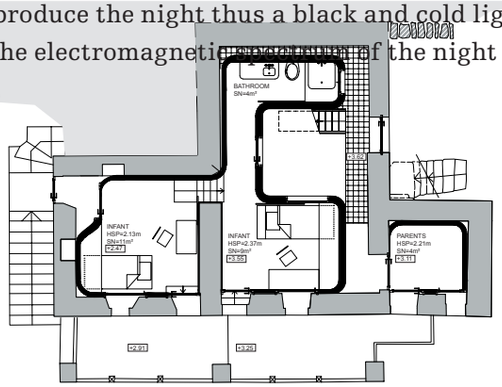
exploded drawing
different coefficient of conductivity of the public space related to the material

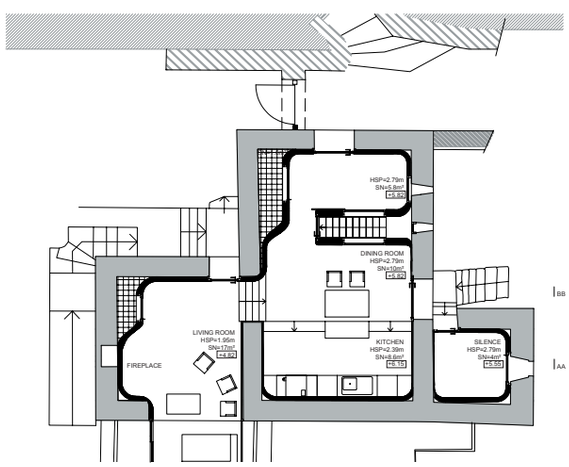
transfer of thermal energy between neighboring molecules in a substance due to a temperature gradient. Thermal conductance is the quantity of heat that passes in unit time through a plate of particular area and thickness when its opposite

Underground Houses. Both heating and cooling are generated underground using the unique properties of the Vassivière soil – baked with geothermal energy and air-cooled within the cold darkness of the ground. A certain quality of air is therefore sought above anything else. Extracted from the inert soil underground, the air gives the interiors of these houses an earthy taste, a slightly brownish tone, a thermal quality from the heat that has been drawn out.

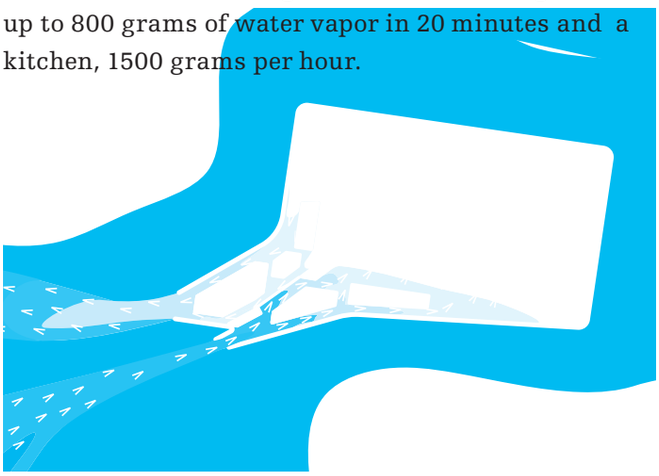
In this way, the project is developed in the flatness of the earth and in the succession of air movements, from the deepest to the most elevated, from darkness to illumination, from fresh air to stale air. The house is built on a reserve of clean, new air, contained in the depths of the ground underneath the house. This is an underground landscape but also a useful, invisible and cold electromagnetic radiation, like that emitted by the night sky. A mini night celestial vault is cooled by the flow of glycolic water at the temperature close to 0°C. The black surface absorbs the entire luminous spectrum. The human body, at 37°C, will lose energy and cool by infrared radiation towards this cold object. A hot body always loses heat to the profit of a cold body. Our outdoor lamps will produce the night thus a black and cold light like the electromagnetic characteristics of the night sky vault



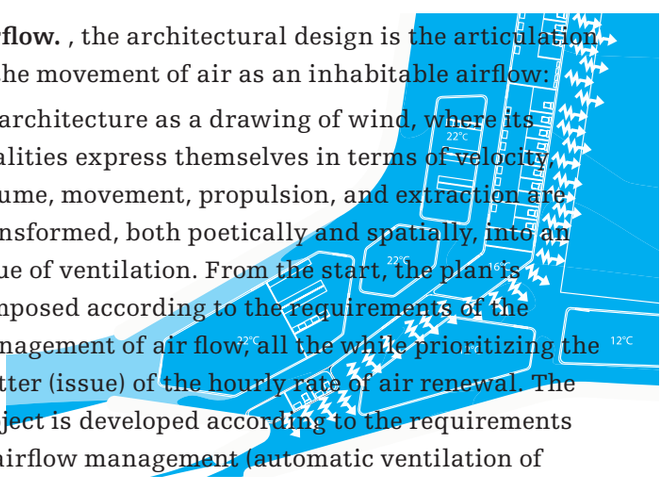


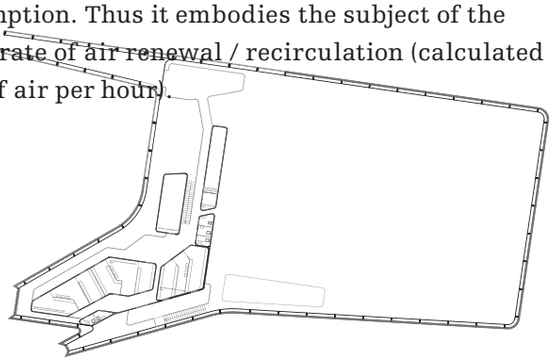


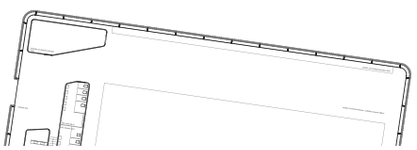
Low Pressure. Design based on water vapor gives form and arrangement to spaces according to relative humidity. The architecture takes shape as the real and physical immersion of the inhabitants' bodies in the humid and variable body of the space. A sleeping person emits around 40 grams of water vapor per hour (bedroom) and up to 150 grams per hour when active (living room). A bathroom gives off up to 800 grams of water vapor in 20 minutes and a kitchen, 1500 grams per hour.

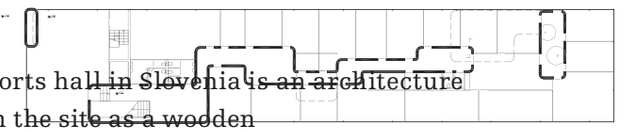


Airflow. , the architectural design is the articulation of the movement of air as an inhabitable airflow: an architecture as a drawing of wind, where its qualities express themselves in terms of velocity volume, movement, propulsion, and extraction are transformed, both poetically and spatially, into an issue of ventilation. From the start, the plan is composed according to the requirements of the management of air flow, all the while prioritizing the matter (issue) of the hourly rate of air renewal. The project is developed according to the requirements of airflow management (automatic ventilation of fresh air with heat recovery / Minergie, Switzerland) so as to reduce, by a factor of 8, the building's energy consumption. Thus it embodies the subject of the hourly rate of air renewal / recirculation (calculated in m³ of air per hour).

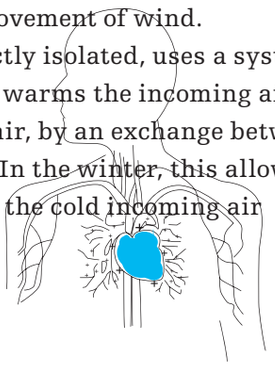




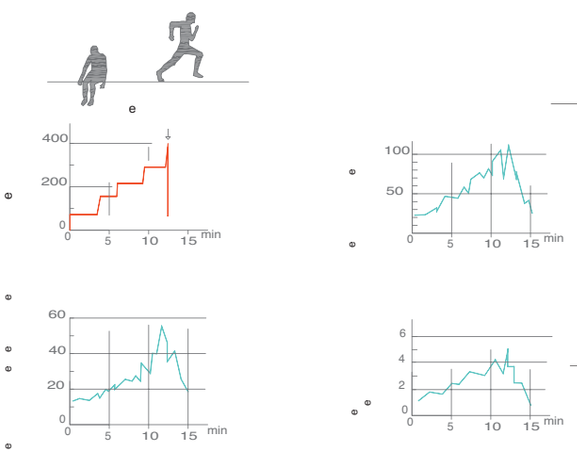


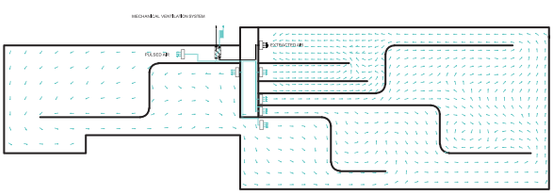


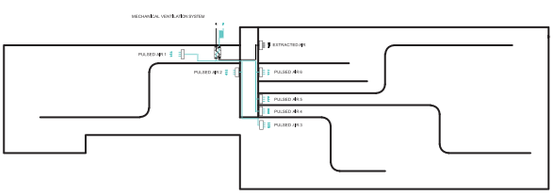
Windtrap. ia new sports hall in Slovenia is an architecture as weather, placed in the site as a wooden object slipped in the course of the wind. It captures the warm scent from the south and rejects the stale air to the north, after removing its heat. The sports hall emerges as a slight inflection in the natural movement of wind. Technically, this building, perfectly isolated, uses a system of double flow ventilation, which warms the incoming air with the warmth of the exhaust air, by an exchange between large conductive metal surfaces. In the winter, this allows the exhaust air to give its heat to the cold incoming air

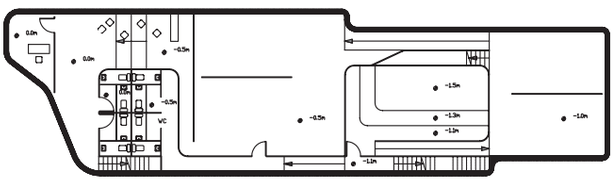


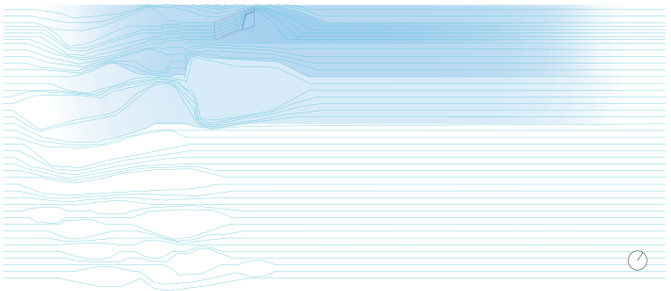
Augmentation of the heart beat rate depending on the sport activity

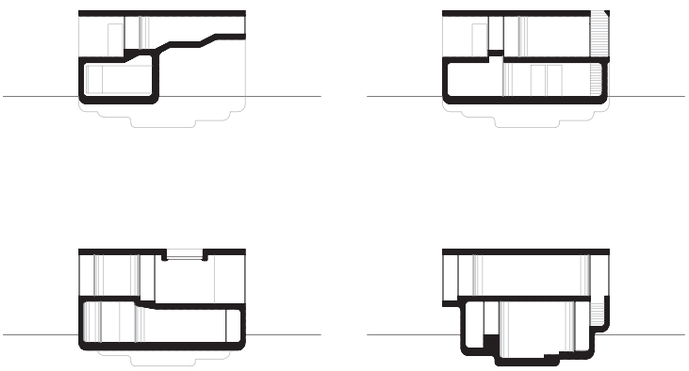


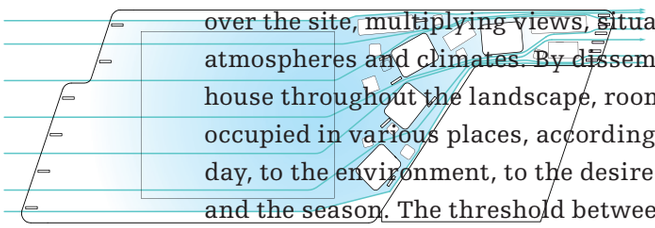




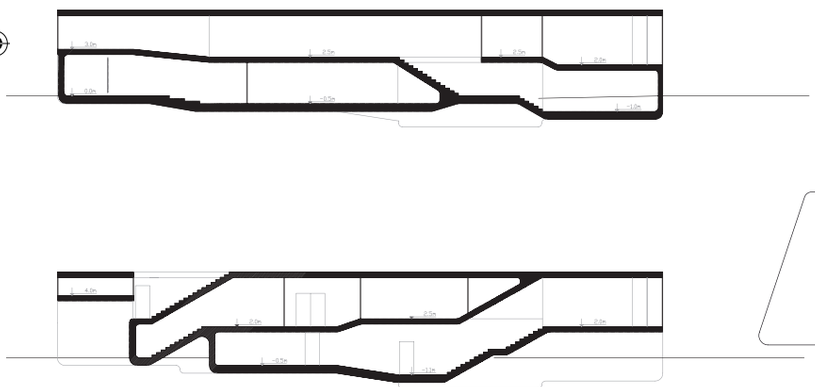


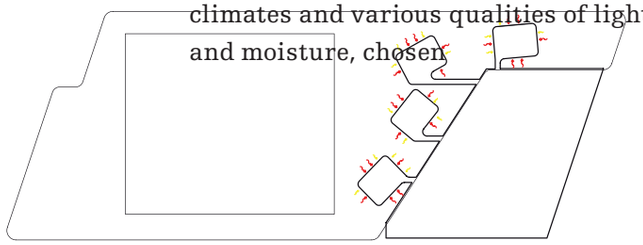






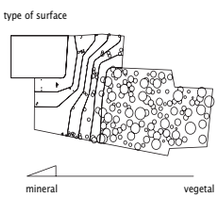
Indoor Wind By dispersing the program of a house to the whole of the site, in order to match specific spaces with their appropriate climates. The house is no longer a compact and closed object but spread over the site, multiplying views, situations, atmospheres and climates. By disseminated the house throughout the landscape, rooms can be occupied in various places, according to hours of the day, to the environment, to the desires of the moment and the season. The threshold between two rooms, normally a doorway of a few centimeters thick, dilates over hundreds of meters. The apartment does not measure any more 50 square meters, but one square kilometers. And the inhabitant lives in this dilated space on a landscape scale. Our project for Grizedale works on the whole of the site. It dilates the functions through various places, various climates and various qualities of light, temperature and moisture, chosen

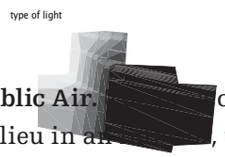




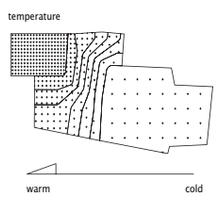
e e

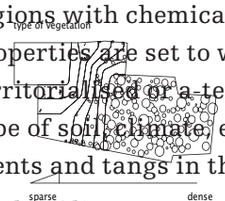
public air

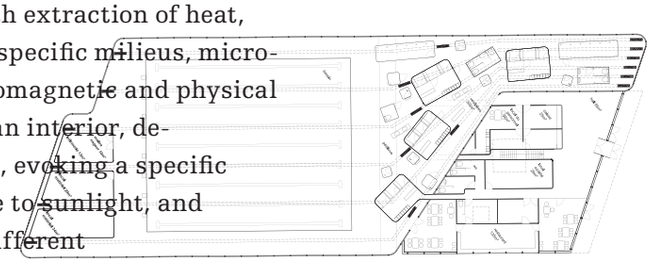




Public Air. ct aims to recreate a specific milieu in air , using construction techniques, control of air and air-flow with extraction of heat, heating and ventilation. Like specific milieus, micro-regions with chemical, electromagnetic and physical properties are set to work in an interior, de-territorialised or a-territorial, evoking a specific type of soil, climate, exposure to sunlight, and scents and tangs in the air. Different kinds of limestone, quarried in the Parisian basin,







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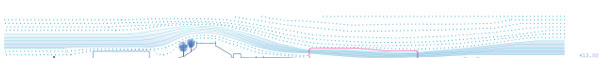


system of air renewal of the apartments / winter situation

system of air renewal of the apartments / summer situation

Instructions for the Reconstitution of Historical Smog
International House of Architecture
Marcos Sánchez and Mark Wasiuta with Adam Bandler

ATMOSPHERIC REPORT FOR WEDNESDAY, SEPTEMBER □□, □□□□
HIGH: □□°F
OZONE PEAK: .□□ PARTS PER MILLION (PPM)
INVERSION LID AT □□□□ FEET
FIRST STAGE SMOG ALERT

The instruction diagram describes stages and procedures for the reconstitution or construction of historical smog. This process appropriates archival records compiled by several air quality agencies beginning in the late □□□□s. Incorporating years of air monitoring measurements, these archives form a vast databank of atmospheric signals that demonstrate a peculiar reversibility. Interpreted not as test results or output but rather as detailed lists of materials and measurements, the archives provide specific ingredients for smog recovery. Guided by this reversibility, the instruction diagram is divided into two categories: Record, in which the air is sampled and its contents analyzed, and Replay, in which an atmospheric chamber is used to reconstruct photochemical smog from this analysis.

Following these instructions we reproduce air sampled by the Los Angeles Air Pollution Control District (APCD) Central Station in downtown Los Angeles on September □□, □□□□. Record, the first sequence of steps, depicts APCD sampling equipment (ca. □□□□) and the pollutant information this technology delivered. A first key component of smog, microscopic dust suspended in the air, was measured by rooftop devices that trapped these particulates against a rotating filter; a second component, the day's combination of pollutant gases, was captured for later analysis in the APCD laboratory, where the agency's personnel recorded levels of ozone, carbon monoxide, nitrogen oxides, sulphur dioxide and hydrocarbons. As the APCD expanded in the years after the Second World War it multiplied sampling locations into a regional network of fixed and mobile air testing stations. The agency's ongoing measurements resulted in a data record of pollutants whose combination was specific to the date, season, and meteorological conditions of a precise location within the city.

Replay, the diagram's second category, shows particulates and gases being constructed and injected into an atmospheric "reactor" alongside a stream of purified air. The chamber and ancillary equipment follow a common design of atmospheric modeling facilities built for the study of aerosol pollutants and photochemical reactions. The primary purpose of the reactor is to hold this mixture aloft while it is lit by an array of fluorescent black lights. In this final phase of smog construction, the chamber's contents are irradiated with ultraviolet light of approximately the same spectrum as sunlight, replicating photochemical reactions that occurred on the day the pollutants were originally recorded. Once the black lights complete their irradiation cycle, the net product of this sequence is □,□□□ cubic feet of historical smog.

Remarks on Molecular History

Photochemical smog forms a fluctuating and indistinct body of volatile ingredients that varies by toxicity and visual intensity as well as by composition. Reconstituting Los Angeles smog from its historical components, we discover that the proportions and volumes of aerosol chemicals depend on the specific particulates and gas mixtures injected into the air, as well as on sunlight exposure, wind currents and other weather conditions. As a projection of meteorological and industrial activity, smog emerges as an articulate medium of historical and location-specific atmospheric expression: not only is the city's smog different from that found in Cairo or Mexico City, the smog produced in L.A. in □□□□ bears a different chemical signature from that produced five, ten, or fifteen years afterward.

The difference among these smogs is linked to technological, economic, and political conditions in the city below. APCD sampling stations, for example, captured numerous species of particulate material flung into the air during the city's explosive postwar expansion: dust from San Gabriel Valley farming, fluctuations in carbon levels from shipping at the city's port, ash from backyard garbage incinerators, rubber from nylon-belted tires, and concrete dust from freeway construction. Via the records produced by the APCD air monitoring network, Los Angeles smog delivers a material history of the city at the molecular level.

Remarks on Air Agency

While the archival record of L.A. smog traces the molecular detritus and material emanation from the city below, it is also evidence of smog's transformative effects. Photochemical smog is both an aerial recipient of surface matter and a reactive force that produces ever more particulates as it attacks rubber, nylon and other ubiquitous materials. In this dynamic interaction with the material of the city, photochemical smog differs from □□th-century aerial accumulations of soot or dust. Through its internal chemical reactions it becomes a potent manifestation of a distinct postwar air ecology. The molecular history of smog records an atmosphere saturated by supplements and pollutants that in turn became an active protoganist in the city.

This atmospheric feedback cycle enveloped the L.A. Basin's administrative apparatus. Newly established and increasingly powerful agencies such as the APCD marked a novel involvement between regional administration and city air. Bronchial irritation and chest pain, increasingly described as "smog syndrome," combined with persistent low-visibility conditions and crop damage to cause an escalating atmospheric anxiety. September □□, □□□□, our reconstruction date, demarcates one of the initial large-scale encounters between a sudden increase in photochemical smog and the city's new air bureaucracy. With its observation codes, lab analysis procedures, and growing archive of air measurements, the administration of polluted air in Los Angeles expanded older notions of the pathogenic city by positioning municipal government between the population and techniques of atmospheric management. Through the governmental action it compelled, smog, which was initially produced by the city, now participated in the regulation of city life.

Consonant with having been a recent center of war production, the initial engagements between the city administration and smog reprised a theme of militarized airspace; Los Angeles was accustomed to similar wartime deployments of city authority through the civil defense apparatus. "Air emergency" procedures and the terminology of "smog attacks" helped compel the inflation of an ever-differentiating air sampling network that attempted to track an inscrutable enemy. These airborne threats ultimately became the basis for a new formulation of the city environment that required correspondingly novel forms of information, administration, and defense.

Remarks on Smog Threat and Preservation

The reconstitution of historical smog extends preservation to include the corrosive air that infiltrated postwar architecture as well as the toxins, chemicals, ingredients and supplements that have conditioned the spatial and environmental ecology of postwar Los Angeles. It is precisely this caustic agent that would be excluded from any preservation project that would seek to isolate, secure, and rescue architectural objects from L.A.'s smog effects. Yet, L.A.'s spaces, populations, and forms of perception have been colored and historically altered by their relation to this constant backdrop of iridescent or murky toxicity. L.A.'s atmosphere is not only a protean body of polluted air that hovers in the distance; it is a cultural artifact that also permeates the city, its population, and its architecture. Smog's gases and particulates were produced by the same manufacturing practices that made building materials available; its ingredients were produced and aerosolized by suburban construction and by the widespread car ownership that fostered suburban life. Smog became not only the by-product of urban expansion in Southern California but also its inseparable complement.

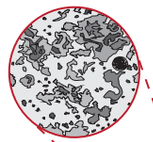
UNESCO's photochemical smog studies in Europe have consistently focused on the deleterious effects of smog measured through acid rain and the surface degradation of historical monuments. In contrast, Los Angeles is a city largely free of both rain and stone monuments. The city seals itself from smog in conditioned interiors of automobiles and architecture, both of which incorporate their own defensive air systems. The most invasive corrosion associated with L.A. smog is not on architectural surfaces but within the filtering apparatuses, sealants, gaskets, and other barriers and technologies of atmospheric isolation. The architecture and filtered environments of Los Angeles are under threat at their edges, seams, and hinges.

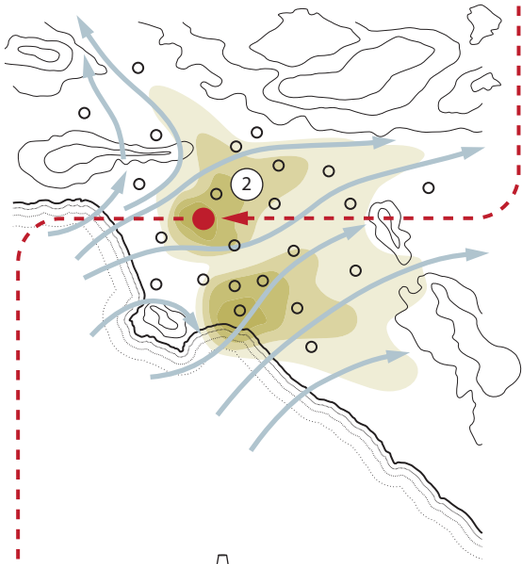
Remarks on Smog Visibility

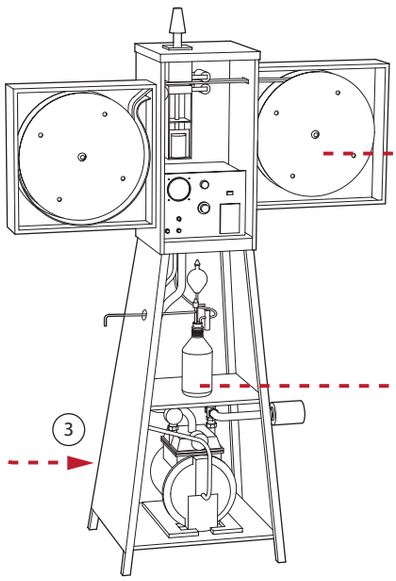
While demonstrating the corrosive potency of photochemical smog, the resulting volume of reconstituted historical air does not exhibit the characteristic hydrocarbonate color range associated with the vistas of late Los Angeles summer. Although pollutant concentrations in the air chamber equal those found in archival smog data, aerial refraction does not successfully scale or compress. The dominant visual effect in the atmospheric laboratory, outside of the short-lived violet glow of the black lights, is what Reyner Banham called the "environmental provisions," the equipment that constructs and supplies the pollutant-air mixture.

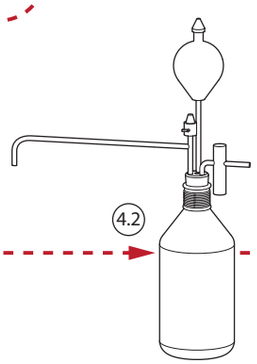
The relative visibility or invisibility of smog pervades the project of historical reconstitution. Although historical patterns of toxic intensity and visual density correspond only approximately, visual perception is critical to smog's urban identity. Despite its potential visual imperceptibility, the secondary attributes of haze and color are generally L.A. smog's most obvious phenomena.

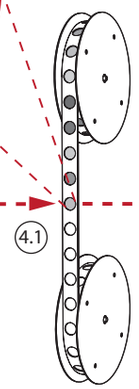
Where the instruction diagram uses color-coding as a graphic surrogate for the absent smog chroma, the assembly compensates for the elusive visual features with the attached smog helmet. While the bag's contents are not visible from outside the reactor, they are immediately perceptible from within the breathing apparatus. By exposing the naked eye to the chemical contents, the reconstructed smog's visual evasion is arrested, irradiated, and exposed into an acute optical condition, triggering a form of historic vision. Immersed in smog, the subject registers the aerosol mixture through respiratory distress, chest pain, ocular discharge, and tears, symptoms of the "smog syndrome" first described in the □□□□s. Less optical illusion than occlusion, the apparatus ultimately induces the perception of blurs, hazes, and the indistinct boundaries of the smog horizon.

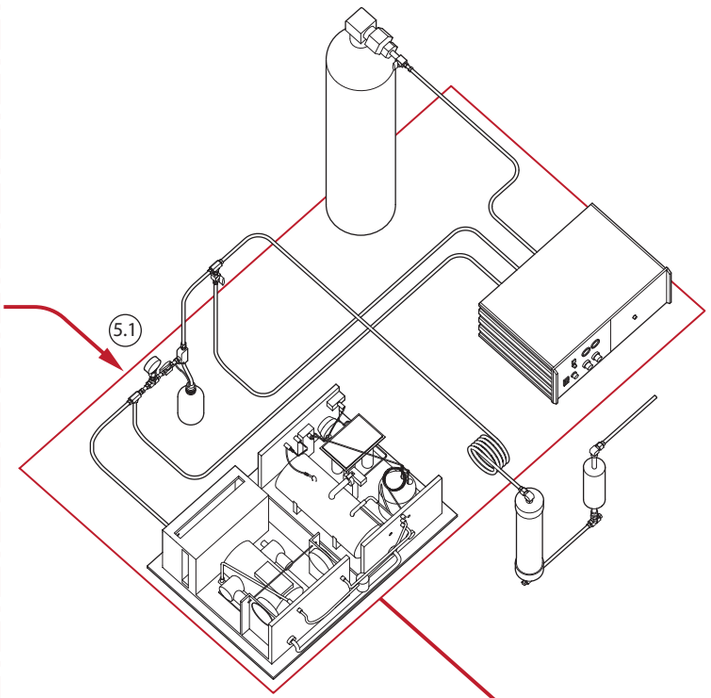


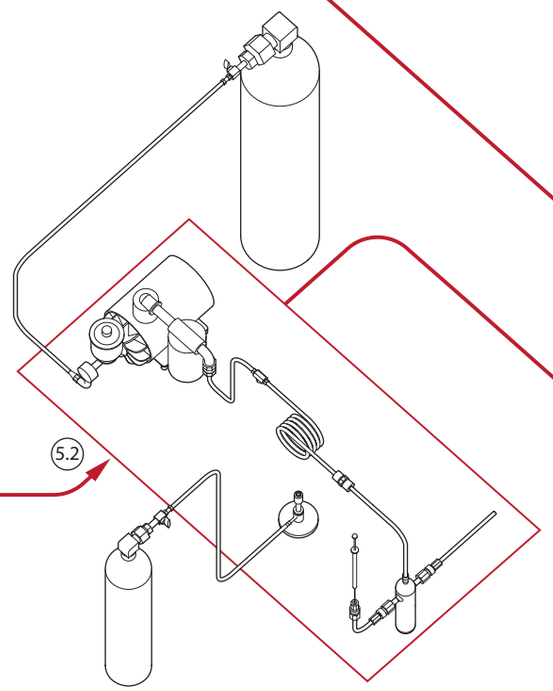












1. AIR CONDITION
Photograph from September 14, 1955. Image shows air conditions during a smog alert in downtown Los
Angeles near Air Pollution Control District Station 1. Temperature high of 93 degrees Fahrenheit, inversion lid at 1,000 feet.

2. AIR NETWORK
Map of the Los Angeles Basin showing typical onshore air movement. By 1955, the APCD network included dozens of sampling
stations distributed throughout the basin measuring contaminants, eye irritation, and plant damage. Map indicates APCD Station 1 and other main sampling locations.

3. AIR SAMPLING STATION
APCD air sampler used until the early 1960s to collect particulate matter. Over one hour air was drawn through 2 inch filter disks mounted in a "reel-to-reel" belt. At the end of the hour, the belt would advance and the cycle would repeat to produce a continuous material recording. Motors and other equipment were housed within the base of the station, where ambient air samples were drawn into a glass and metal canister for later lab analysis.

4.1. PARTICULATE SAMPLING
After the filtration phase the disks carried data on pollutant ratios and particulate density, measured in micrograms per cubic meter.

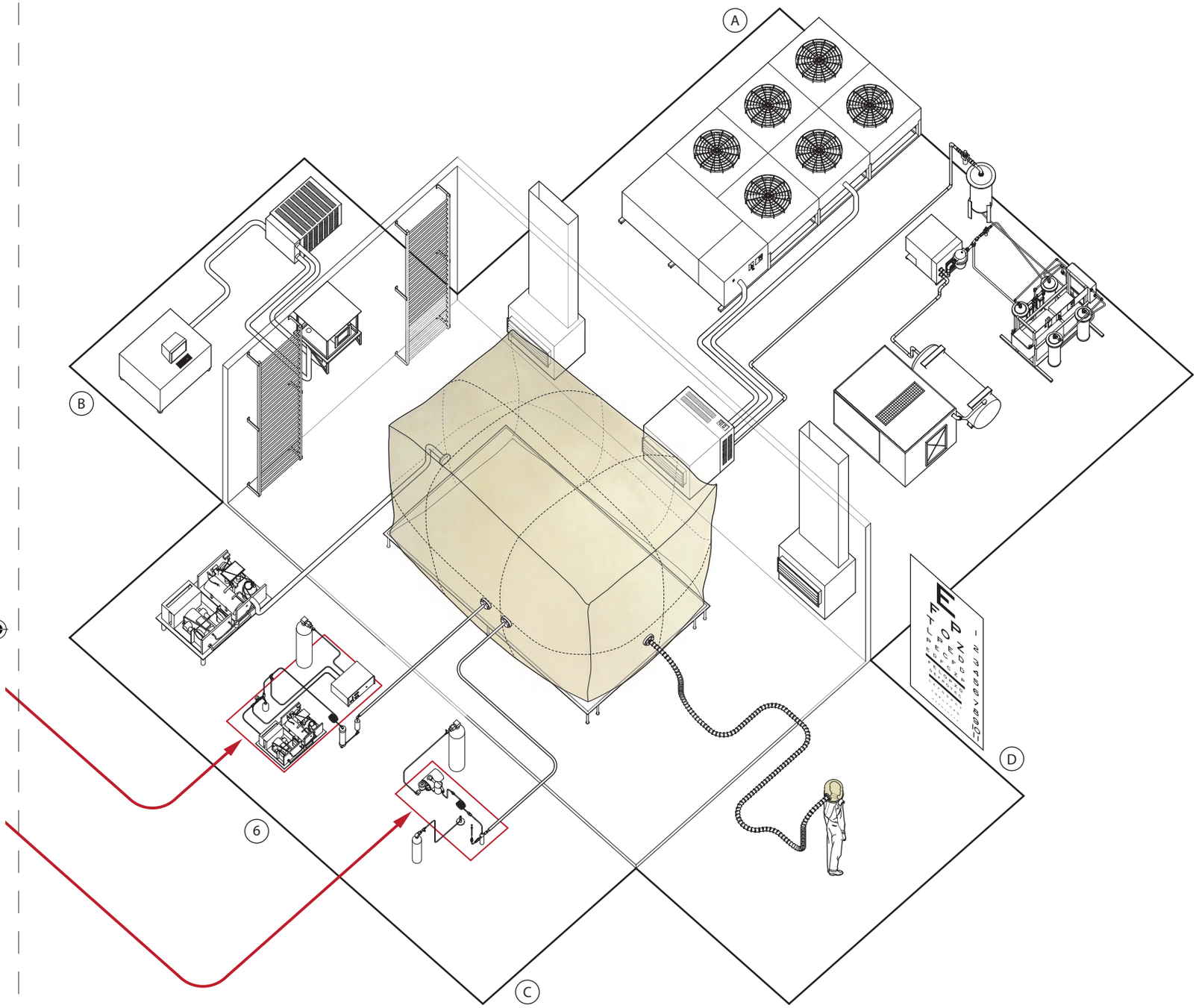
4.2. HYDROCARBON SAMPLING
Air samples collected at network stations were analyzed using gas chromatographs; this equipment measured hydrocarbons in units of parts per million (PPM).

5.1. PARTICULATE INJECTION
A graphite aerosol generator is used to produce carbon particles, which are mixed with purified air and injected into the reactor bag. The resulting suspended particulate density follows the 1955 measurements .

5.2 HYDROCARBON INJECTION
Xylene, a hydrocarbon present in solvents and fuels, was registered across the Los Angeles basin from the 1950s onward. Here, it is vaporized into a stream of molecular nitrogen (N2). The resulting vapor is then injected into the reactor bag. A similar apparatus used for each hydrocarbon results in hydrocarbon concentrations equal to those of the target date.

6. CHAMBER SYSTEM DIAGRAM
(A) Components for supplying a continuous flow of purified air to the enclosure around the reactor bag. This prevents outside pollutants from migrating into the bag.
(B) Equipment used to supply UV radiation to the bag. The two banks of black lights match the emission spectrum of sunlight between 300 and 450 nm.
(C) Components used to inflate the reactor bag with purified air, and later, to inject a flow of pollutants into the bag. A separate system (not shown) samples the bag contents to achieve and maintain the required balance of ingredients.
(D) Wearing a sealed transparent helmet, a subject is exposed to the bag contents. Viewing a Snellen eye chart, the retinal irritation and obscuring of vision associated with the 1955 smog syndrome are manifest.

7. SMOG CONSTRUCTION SEQUENCE
A clean air generator fills the FEP-Teflon reactor bag with purified air; pollutants are then injected through the bag's side ports. Black light arrays irradiate the bag's aerosol contents with UV light, producing controlled and specific photochemical reactions. After irradiation, the reactor's contents match air samples taken on September 14, 1955, resulting in a volume of historical air.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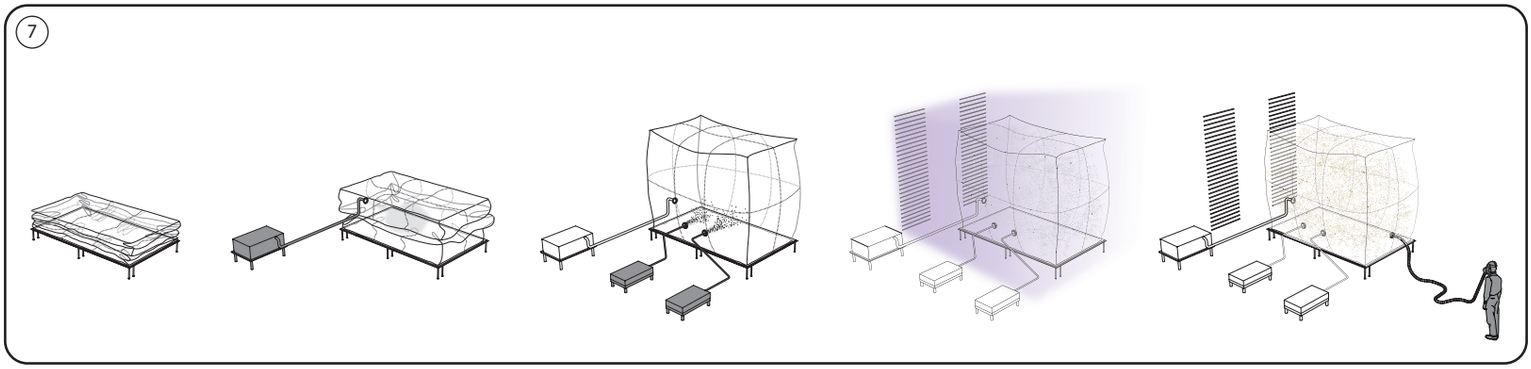
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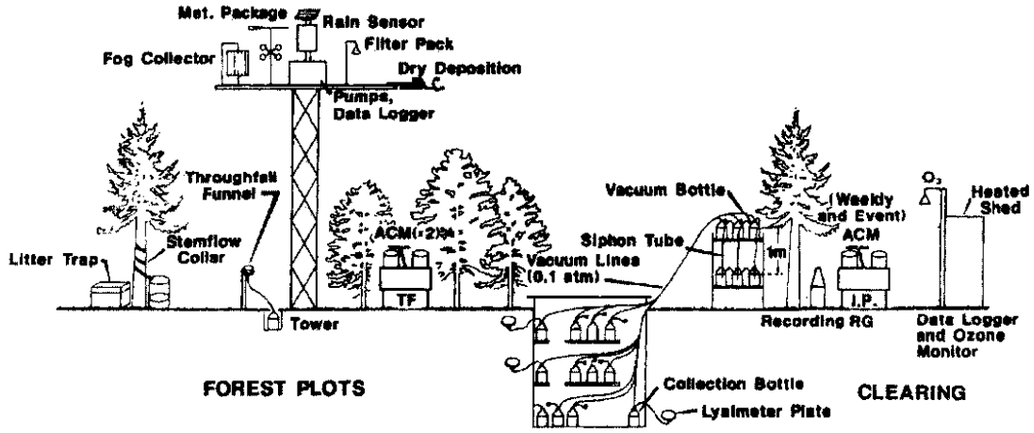
Logic of the Managerial Surface

John May

We have in recent years become rather suddenly astonished and fascinated by a series of basic realities that, in truth, we ought to have already known. We've discovered that global urbanization has barely just begun; that the extraction, production and consumption of our so-called 'natural resources' is accelerating, not diminishing; that infrastructures have played a central role in deploying and nourishing a specific model of modernity; that the developing world, if we continue to force-feed it our own practices, will soon eclipse and dwarf our irreparable mistakes. Most recently we've realized that design, no matter how marginal its agency, is inextricably bound up in all these conditions.

We catalog these conditions and express requisite dismay, but seem incapable of initiating an internal historical-philosophical project worthy of their severity.

Instead, the visceral emptiness that attends these circumstances has widened a rift within architectural practice previously demarcated by the two halves of its premillennial self. On one side, a camp that long prided itself on its engagement with architecture's outside is now seemingly so paralyzed that it cannot but revert to the same ironic affectation that has tyrannized it for a generation ("…and make no mistake: irony tyrannizes us"). Exhausted, enriched and institutionally entrenched: thus does a river of ambivalent reportage, masquerading as research, continue to flow from a weightless, wry smile.



Architects Hayley Eber and Frank Gesualdi of EFGH describe their entry for the Van Alen Institute Gateway competition as follows: "H□grOw is a conceptual systems design project that draws on techniques of floater hydroponics, exploring the possibilities of using water as a resource for planting, transportation, energy harnessing, food production and recreation. A fleet of mobile Hydro Pods, measuring □□' x □□□', is deployed across Gateway's network of islands and peninsulas. Each pod is a hydroponic eco-system grown completely without soil. This new landscape is supported primarily on a pontoon ring struc

Across the chasm, balancing the equation, sits a second faction. Their backs are turned to the first group. Wanting only to extend their mentors' quest for autonomy, they have surrendered themselves ever more fully to automatism, hoping to remain forever amused and mesmerized by their toys, as though nothing has happened; as though 'innovation' or 'fabrication' were uncontroversial terms; as though tools do not also break the worlds they make. Thus does rote technical acumen now pass for architectural theory.

Strung apsidally across the widening void between these two positions (which in fact are no longer really positions at all, but merely postures) are the New Mandarins, a disconnected cacophony of 'ecological practices:' landscape urbanists, infrastructuralists, technophilic urban organicists, and even a curiously atavistic retrenchment of the regional human sciences. All wanting to assert superiority over the crass dilletantism of "green design," but lacking any specific agreement, the only shared characteristic among this step-family of alternatives appears to be their tacit allegiance to a collection of clouded ambitions: that we ought preserve, or 'sustain' something called the 'natural environment;' that we need to design more 'energy efficient' objects in order to minimize our 'environmental impact;' that design, particularly at the scale of urban landscapes, ought to be approached as a form of aestheticized 'environmental management;' that "to bring the knowledge of scientists and engineers to bear on a question is to necessarily resort to the unquestionable laws of nature;" and that the key to all these objectives seemingly lies in coupling biophysical knowledge outlined by the ecological sciences with the eventual perfectibility (or at least gradual improvement) of urban and architectural technologies.

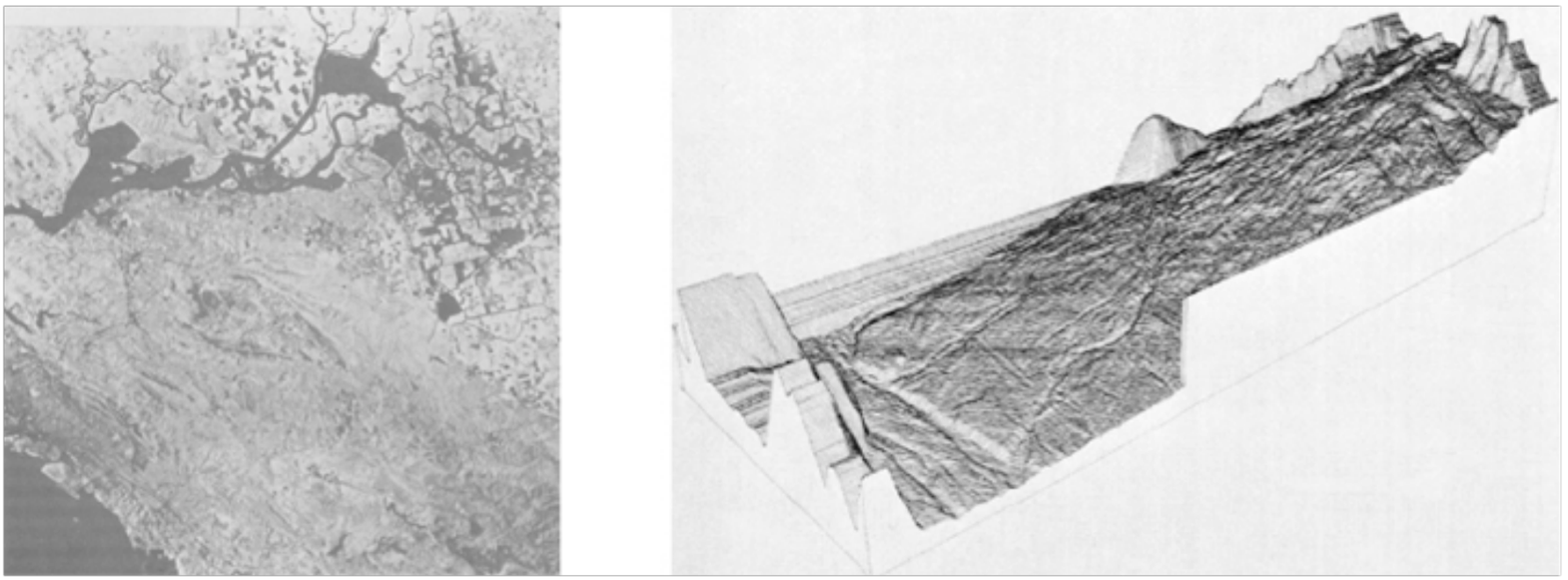
That we so readily gravitate towards these principles proves our anachronistic devotion to the dogmas of modernity, which have imploded under the weight of their own objective past; socioecological nightmares that easily disprove the simple truths by which the modern psyche motivated itself just a half-century ago: growth, progress, productivity, efficiency, society, development, innovation, MORE? etc. "Coins which have lost their pictures and now matter only as metal."

Amidst the false clarity of those depreciated ideas we face two exhausting questions, one layered beneath the other: First: what does it mean to conceive of architecture, landscape, and urbanism as forms of environmental management? Not: "how might our prescribed managerial tasks best be carried out?" Nor: "what are the most effective and efficient methods and techniques?" Those are questions far too easily answered, with bravado and certainty. Rather, what does it mean today, in this moment—after the bankruptcy of progressive modernity—for the design fields to self-consciously situate themselves along the precarious seam between environmental-scientific knowledge and neoliberal bureaucratic practices?

This first difficulty approaches impossibility when we admit to a second, more concealed question: what happens when the language and concepts we've used throughout modernity to distinguish between kinds of environments—specifically between those we've called 'natural' and others we've called 'artificial'—loses its metaphysical bearings? When we are forced, in other words, to admit that the modern conception of nature—the stable, objective, naturalized nature of modern science; "that originary, absolute, essential reference, about which people dream" — has epistemically evaporated, having all along been a concept-technique for eclipsing an older, less predictable, less manageable metaphysics; a brilliant compensatory strategy for preserving theoretical purity in the face of practical inconsistencies. Refracted across ever-more complex entanglements of politics and hardware, the entire category of 'the natural' has revealed itself as always-already suffused with the assumptions and rationality of scientific civilization, which conceals and governs without mercy the volatile space of representation from which its objects emerge.

Consequences spread outwards from that refraction. No longer able to take up its position as an immutable datum, as the counter-referent by which other theories measure their own fitness—theories of "sustainability," of "performativity," or "biomimesis" (notions which have never been more than elliptical self-negations; birth-defects of primary scientization)—the epistemic collapse of naturalized nature takes with it an entire lexicon of terminology that, for want of its precious anchor, has been rendered so vague as to be theoretically useless: "All techniques are artificial; this banality, however, does not imply that techniques are metaphysically distinct from or opposed to [naturalized] nature in any ontological way."

"It is not without penalty that the word 'ecology' is so ambivalent that everything from back-to-the-land sentiments to hypertechnologism can find a place and rank in it." Our penalty is non-



sense. Our penalty is a circular and frail theoretical armature that lags badly behind, and scarcely understands, the very techniques it advocates. Our penalty is to have become either self-disillusioned or self-distracted parodies of ourselves. Our language sows disenchantment within us, and mocks itself behind our backs.

This condition will persist so long as we demand that the modern concept of nature serve as the irreducible denominator beneath our reasoning, where it can do nothing more than sow an obstinate emptiness beneath its derivative tautologisms: most obviously environment and ecology, but also the whole domain of the supposedly unnatural: the social, artificial, built, constructed, and synthetic, as well as precious distinctions such as inside and outside, landscape and urban, (both of which prop up public and private)... The list recedes far to the horizon, until a sad cycle of dissolution bursts forth, revealing at once the hollow thickness of our confident but self-referential language.

In the twilight of those idols "there is only one thing to do, and that is to go even deeper;" towards the recreation of a "philosophical language within language," in which the imposing cosmology of modern-nature is rotated on its axis and reversed—made to run backwards, as it were—through a kind of inverted (or anti-) phenomenology that paces patiently through our instrumental worlds so as to discover both what lies beneath our reasoning and what kinds of beings we are becoming.

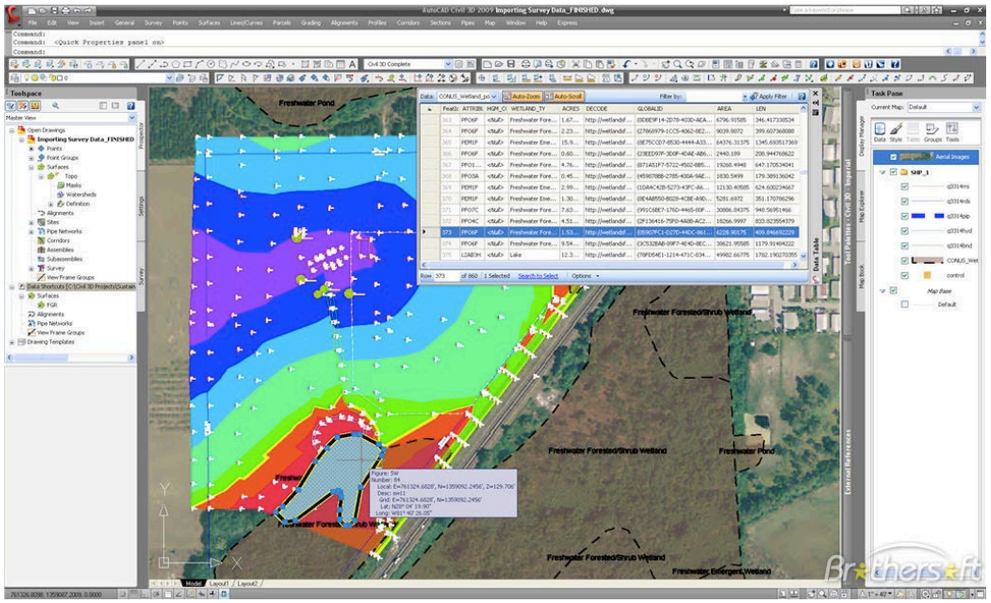
The Birth of the Managerial Surface

These two figures will serve to expose . The figure on the left was published in late □□□□, in an essay on the "Satellite Detection of Urban Heat Islands." Produced using a high resolution satellite radiometer, it portrays thermal fields across the Eastern United States in shades of gray ranging from black (warmest) to white (coldest). There is nothing remarkable about this particular figure; it merely stands as an early example of a form of representation—'imaging' (by which we mean the conversion of the continuous visual field of lived experience into a statistical field comprised of discrete electrical charges)—that has not only come to dominate our conceptions of nature and ecology, but has also reoriented and restructured the entire scientific-bureaucratic apparatus that today takes 'environment' as its object of concern.

The second figure, on the right, also dates to the late □□□□'s, to an obscure technical report on "Production Mapping with Orthophoto Digital Terrain Models." It marks an early expression of certain instrumental arrangements crucial to the emergence of a fully automated electronic surface: "a statistical representation of the continuous surface of the ground, by a large number of selected points with known xyz coordinates." Noting that a convenient representation of the surface of the earth is a common requirement for engineering, scientific, and military problems, the report contends that such problems could be most efficiently handled by producing "terrain data in a form which the electronic computer understands."

These figures shared no specific relationship in their time, belonging instead to wholly distinct technological projects. Despite their crudeness to our eyes today, we can today detect in their features the faint signs of a nascent collision, or fusing, between two distinct genealogies—electronic imaging and electronic modeling—that has become during the past two decades an explicit instrumental program within both the ecological sciences and the practices of environmental management.

It is a coalescing that has given birth to a managerial surface: an expanding repertoire of techniques and instruments that together form an utterly novel space—simultaneously real and theoretical—halfway between conceptualization and materiality; a kind of statistical-electrical control space, in which an 'environment' is defined exclusively as that which can be represented as information in the form of discrete electrical signals ('data') that serve as the raw armature around which our conceptions of ecology are fashioned. In it the long history of perspectival depth—itself a geometrical-mechanical simulation of ocular space—is replaced with the concept of resolution, a statistical-electrical



Land machines, a precursor of entrepreneurial environmentalism's ecologically-based but consumer-oriented productivity.

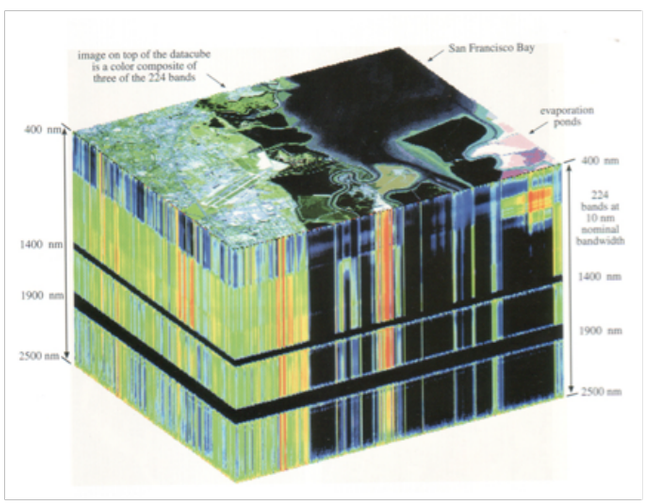
left: Hebron State fish hatchery in Ohio; right: Al Khufrah Oasis in southeastern Libya, as seen from the International Space Station.

In response to satellite imagery of the oasis, pruned.blogspot asks, "What will Google Earth tourists see when they point their vigilant eyes towards an electrified North Africa? Will they come upon vast plantations of coronal fields, perfect geometries arrayed in similarly perfect arrangement, irrespective of terrain but nevertheless finely attuned to the sky? And what about the people on the ground? Where once was desert, might they now enjoy newly sprouted oases, which are fed with water from solar-powered desalination plants? An Emerald Necklace of Olmstedian design inscribed in the Saharan landscape?"

simulation of pure visual continuity, in which "mathematical analysis and natural phenomena do not so much correspond as they merge indistinguishably." The world is rendered at once ideally dimensionless and infinitely thick: a "varying two-dimensional Gaussian surface superimposed on a planar...background."

Neither an object nor an idea, the managerial surface is a reciprocity, an electrical exchange among ideality, visuality and materiality, incessantly sewing connections between scientific knowledge and bureaucratic desire; between our statistical view of nature and an insatiable modern compulsion towards the "explication" of space; between truth and power. Because it has so completely altered the field of intelligibility within which our fantasies of management and control are played out and simulated, the managerial surface has engendered an entirely new mode of environmental intervention, which at present is not so much erasing our former methods as swallowing them whole.

We have recently passed a kind of pivot point, or schism, in the history of both the formation of environments and in their ongoing regulation and maintenance, which is inseparable from the emergence of a new form of environmental representation. On one side lies a logic of environmentalism whose principal method of intervention was infrastructural—viz., linear, material, mechanical, essentialist, and deductive—and which corresponded to a progressive phase of modernity that has now drawn to a close for all but the most devout engineer-priests. Marked by a relentless "geometrical organization of the shortest route," modern infrastructuralism relies on an implicit strategy of externalization, during a period when it was still possible to believe in the existence of something like an 'outside' to the world.



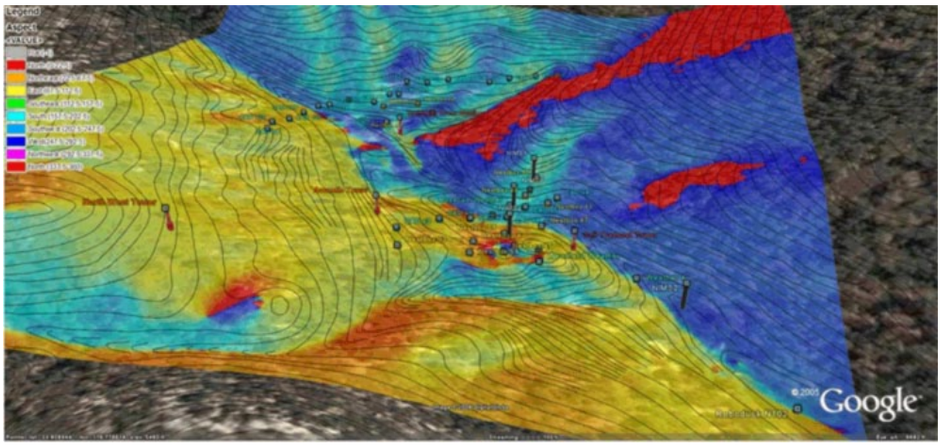
On the other side of that schism is a different interventionist approach—electrical, populationist, and surficial (though not at all superficial)—tethered to a radically different space of statistical representation, opened up by a coordinated electronic signalization of the perceptual and material fields.

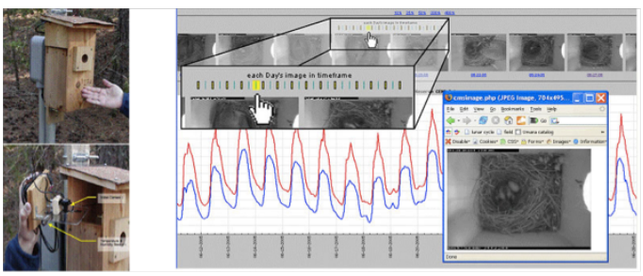
Signalization Takes Command

Stark distinctions between the mechanical-infrastructural and the electrical-surficial appear against the background of two definitions: First, a simple explanation of statistics, from an introductory manual on the topic: "statistics is the technology of extracting meaning from data...of handling uncertainty and making inferences about the unknown." Statistics is a technology for deploying modernity, for marshaling the efficacy of probabilistic reasoning wherever pure determinism proves insufficient.

Next: a specific definition of 'life'—one both familiar and disquieting to our sensibilities. Despite the nearly comical metaphysical reductivisim it requires, let us provisionally agree with much of contemporary science that life is neither more nor less than "a property of the organization of matter."

Consider first the case of the "James Reserve," an experimental ecological research center southeast of Los Angeles, where a technique known as "embedded network sensing" is being explored with unusual rigor and intensity. Whole populations of sensitive automata—devices that through some manner of their design are coupled with, and responsive to, changes in their surroundings—have been deployed and linked together in one of the





top: Extroverted, consensual, and plural: West □'s □□□□ winning scheme for one portion of the Toronto Waterfront fuses social elements such as pedestrian routes, transit hubs, and recreation staging with ecological components, including massive, floating maple leafs that house phytoremediating plant materials. Toward the upper right of the image, the mouth of the Don River exaggerates the urban/environmental interface to capture the public's attention for this "repository for undesirables" as a palpable metropolitan matter.

above: Super-Realist imagery by the Scottish landscape practice GROSS.MAX. In urban, landscape, and architectural design, Super-Realism's compositional methods of sampling, collage, and amplified texture create candid-driven content of high-detail and densely juxtaposed activity. Super-Real imagery creates an expectation of similarly intensified levels of actual performance and experience, condensed into a single frame or moment. When we envision the exponentially-programmed city, what will determine our ability to participate in this lifestyle promised by the super-real? A likely answer: by taking on the behavioral and organizational characteristics of both ecological and informational systems, such as: assimilation, surveillance, and migration.

left: Location, information, sensation: Irishtown Bend competition, park proposal by Elizabeth Lagedroste.

most comprehensive regional monitoring networks yet constructed. All elements "communicate with one another telemetrically," transmitting "real-time information to a centralized data model," through which it is automatically crossed with larger geospatial information. Within the space of the model, events and objects are correlated with one another, probabilities and causal hypotheses are formulated, etc.:

Twenty-four hours a day, year-in, year-out, they could measure every conceivable variable of an ecosystem or a human body, at whatever scale might be appropriate, from the nanometric to the continental... They would act in concert, sharing the data that each of them gathers so as to process them into meaningful digital representations of the world. Even when the scientists were busy elsewhere, the webs would go on analyzing events autonomously, modifying their behavior to suit their changing experience of the world.

In the language of scientific ecstasy are concealed two essential characteristics of the managerial surface. First, electronic control has little concern for the concept of scale. The geometrical infrastructures of Modernity were organized specifically to compensate for the friction of distance. Scale posed a special class of problems that assumed a position of priority within their deployment. But scale is of no special concern within the managerial surface; it no longer dictates the parameters of intervention.

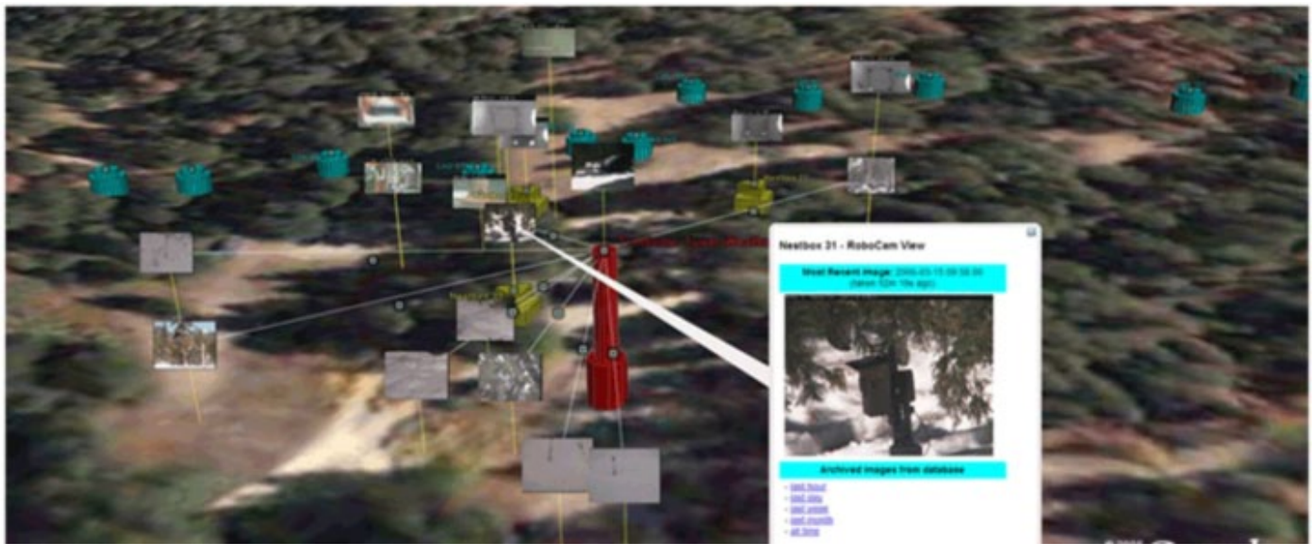
As soon as the mode of communication among parts was, through electronic transmission, made commensurate with the rate at which events themselves seemingly unfolded—that is, as soon as the principle of 'real time' was technically resolved—scale ceased to demand any special consideration. It does not disappear as a consideration altogether, but rather within this logic all of the traditional contents of the concept of scale—distance, magnitude, proportionality, momentum, mass, etc.—are subsumed within the more indiscriminate numeracy, adrift amidst a growing tide of figures and possible correlations with biological, climatological, and economic metrics, each demanding causal reassurance from the others.

A second general feature is also directly related to the telemetric "communication among the parts." It concerns the mode of regulation specific to the managerial surface. Infrastructural interventions dealt with uncertainty by designing for maximum and minimum thresholds (as with, say, river channelization, which involves establishing the periodicity and range of a known flood corridor). The managerial surface aims to tailor its responses to uncertain events on a drastically reduced time scale: again, ideally instantly, in "real time," which is always first and foremost the time of the series.

In this sense, and in stark contrast to modern infrastructuralism, the managerial surface is probabilistic rather than deterministic, statistical rather than geometrical, inductive rather than deductive. And it is for want of this 'instantaneous'—viz., statistically-significant—response rate that the principle of automation ceases to require justification and achieves the status of a truth within the moral register of the managerial surface, which relies on the coordination of sensitive automata for its very existence as a possible interventionist strategy.

For an even more fully realized example of the managerial surface, look to the example of Fresh Kills landfill on Staten Island. More precisely, consider the ongoing project of 'rehabilitating' Fresh Kills landfill as an 'urban landscape.' What mode of environmentalism—described in the official project literature as a process of "in situ management over time"—now governs Fresh Kills? That is, divorced from the questions surrounding the real efficacy of this restoration project, how are its imagined goals being pursued?

What we find at a place like Fresh Kills, residing just beneath its



grassy slopes and bird sanctuaries, is a telemetric monitoring apparatus so dense that there is in fact no location within the project that escapes the possibility of being cataloged, supervised and regulated. "Highly engineered," shot through with "sophisticated systems in place to collect and treat…byproducts and to protect both public health and the environment," it is a surface that escapes the ocularcentric history of landscapes and joins instead a contemporary psychopathology of postindustrial oneirism:

It is anticipated that it will take a minimum of thirty years before gas production and settlement associated with decomposition cease and leachate fully drains from the site. As these processes occur, there will be a continuing need for regular maintenance, monitoring and evaluation of the site and systems that have been put into place—primarily the final cover, landfill gas (LFG) and leachate systems, and the extensive network of monitoring wells. It is essential that access to these systems be preserved during this time for inspection, maintenance and repair.

Managerial discourse of this kind—which revolves around the adiaphoric vagaries of 'mitigation strategies' and actuarial risk assessments—secretly and unintentionally discloses the fact that Fresh Kills, like the rest of life (Fresh Kills is merely the opening wedge of more generalized tendencies in our professions) now sits both within and once-removed from modernity. It no longer feigns at managing or solving the initial pressures of modernity confronted by the nineteenth century city (demographic, juridical, epidemiological, etc.), but rather is oriented around the sudden need to now manage the most substantial consequences of our prior methods of 'successful' management—all the negative externalities of the modern managerial posture—waste, toxicity, byproducts, pollution—which are being continually expelled by modern infrastructures, and which have in truth always outpaced our strategies of confinement and concealment.

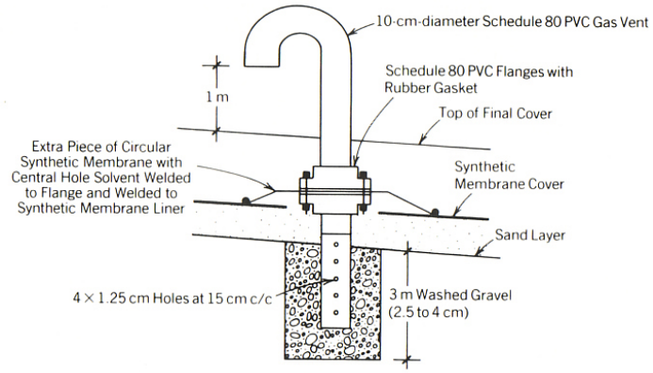
This (recent) conceptual change in what it means to 'manage an environment'—which corresponds to the increasingly reflexive character of modernity more generally —constitutes the third and perhaps most fundamental general feature of the managerial surface: that the environments produced through its logic are quite well aware of modernity's catastrophic tendencies, precisely because it is their prescribed task to somehow compensate for those failures. Their charge, by design, is to somehow extend, under any circumstance, the limitless expansion of so-called civilization. They must somehow be made to dream in the language of solutions while remaining wide-awake to the historical absurdity of that very discourse. Deployed under the banners of remediation and restoration, the inevitability of failure underlies their carefully planned births, and adds to their joyous inauguration an actively repressed sense of disappointment and dread.

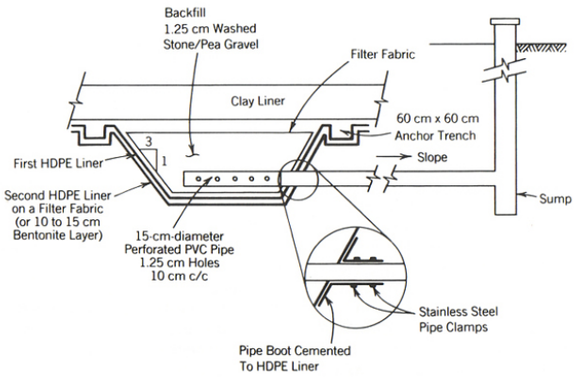
A continual telemetric exchange between emergent techniques of electronic representation and networks of electronic intervention, aimed at harnessing and marshaling ever greater material-mechanical control beneath the alibi of statistical reasoning: this is the managerial surface; this is what it means today manage an environment. Can we now grasp the extent to which all of modern environmental logic has in fact become a kind of autoenvironmentalism?

The New Environmentalism

But what is this logic? What does it want? In the first place it is a novel compulsion towards synthesizing a kind of universal format into which the continuity of lived experience might be forever divided into discrete, measureable, manageable units. It asks that we seek out the interstices between as-yet disparate control surfaces—some raster, some vector, some in situ—that we might fashion statistical-electrical sutures across them. This "platforming" process involves first finding, in statistical-representational space ('code'), the seams in various kinds of data sets and file formats, and then developing algorithms to ultimately automate as far as possible the translation of those discrepancies into a single model, or at least into ever-fewer models.

At the same time, it is a logic that involves fabricating ways of life complicit with this idealized model. Through an ever-quickening movement between statistical operations that coordinate the redistribution of matter in real time, populations and topographies are massaged towards the perfection of their own simula-





tions at an exponential rate. Far more than simply a species of "logistics," the managerial surface is a conditioning of possibilities that preauthorizes logistical reasoning by naturalizing its facticity, by arranging—in advance of any logistical intervention—whole families of historical a priori that will come to constitute the field within which those processes take place. Smoothing the pathways between life-as-organized-matter and its malleable potentials, it does not seek to establish the (epistemological) legitimacy of our contemporary "statistical view of nature" —on this point it is more or less agnostic—but simply aims instead to discover avenues by which that form of reasoning can be made factual; avenues along which life can be opened up, rearranged, and made to conform to certain kinds of goals.

Within this vision, the techniques of environmental management are designed not around the limitations of life, but rather precisely the opposite: life itself is opened up, made operational—the managerial surface is an operational theater—and brought in line with other kinds of demands; quality control, local epidemiology, just-in-time delivery, labor overhead and refrigerated shipping costs. Unlike the geometrical infrastructures of the nineteenth and twentieth centuries, which were tasked with "regulating the naturalness of [a] species within an artificial milieu," today our managerial posture demands that all of life be displaced to a condition beyond the natural and the artificial, to an ontological plane where such distinctions no longer make sense, and can no longer interfere with the choreographing of matter.

In this way, it seems that one goal of the managerial surface, if only implicitly (if only automatically) is to drive that regularity and predictability down below the population, into the processes of individuation, by refashioning (according to a drastically reduced timeframe) the beings of which it is comprised. For this reason we can point to a certain disappearance of management as it moves from the older, geometrical forms into a domain of ascalar surfaces.

The sublimation of managerial tasks, their imbrication within the fabric of life itself, involves a movement away from geometrical methods in two directions simultaneously. Management has become at once infinitesimally small and imperceptibly large, molecular and global; a twin disappearance into being and nothingness, one and zero. Through its reciprocal deportment it now resides simultaneously in the species and in its milieu, comprising through this double movement a new, universally formatted habitat for the living.

For proof, one can look to contemporary agribusiness, where the geodesic and the genomic are actively merged with astonishing efficacy. Precision farming (the aim of which is to "optimize plant growth and farm profitability by adjusting treatments to suit the variable biophysical conditions that occur within the agricultural field") brings an entire suite of technologies and data stacks—GPS satellite positioning and automatic guidance sensors, geospatial information data, yield-monitoring and variable-rate sensing equipment—to bear upon "the field," transforming that object into a metastatic tableau that resists primary ocular comprehension.

Within this absurdly regulated terrain, we find the very real effects of our exponentially heightened representational prowess. The egg-to-death time of the common poultry chicken has now, through genetic modification and breeding strategies, been reduced to roughly six weeks, down from the more than twelve weeks previously conferred by its 'naturalness.' Each individual is electronically marked at birth so that its growth, health and eventual position in the supply chain might be closely supervised. In the technique referred to as "robotic weed control," we encounter an even more purified set of control loops. Sensorimechanical field hands, able to differentiate among various species according to their spectral signature, dispense variable doses of toxins in discrete locations, eliminating not only weeds but in some cases serving to 'purify' the stock species by selecting out only the most genetically-desirable individuals.

Genetic identification and georeferenced location, brought side-by-side as nodes within a surface of logistical supply and demand; close electronic coordination among genetic experimentation, atmospheric regulation, and biotic monitoring; localized managerial intensities, fit with increasing perfection within their scalar opposite: the regional, the territorial, the global.

It would of course be supremely naïve to assume that these methods will somehow remain ethically constrained, and in fact some resolution of the problem of animality may well arise not from the political extension of so-called "human rights" to nonhuman lives, but rather through the technological extension of agricultural management practices to human collectives.

The managerial surface carries with it a metaphysics all its own, which fantasizes of the moment in which that old, soon forgotten, premodern conception of nature—inexplicit, uncomprehended, willful, wild, impulsive, "primordial nature" —is finally effaced, refracted into the tranquility of regulated discontinuity.

Continuously forming and reforming new ways of being-in-the-world, ontologies that will by definition confirm our probabilistic conjectures and subsequent measurements, the managerial surface does not so much cause as engender these ways of life, inseminating them, arranging their preconditions, and then supporting them on all sides, bringing certain ways of life to the foreground while pushing others to the disposable periphery of modernity.

If our lives appear ever more amenable to statistical modeling, it may be due in part to the fact that the world is being quite literally modeled by statistical processes. "We are being remodeled..." Or, more specifically, being is being remodeled—inwardly and outwardly—through processes that expose the confidence of our engineering prowess to an unsettling proposition, whispered in the minor philosophies of 'skeptical fools' since the beginning: that "perhaps science and technology have always had far more to do with exploiting potentials than revealing essences."

Family Ties

Design today knows all too well the tremendous capabilities of the managerial surface, precisely because it is genealogically related to the mode of representation that reigns sovereign in our daily practices. Despite its triumphal disciplinary pervasiveness, the electronic control surface does not in any way belong to architecture. Precisely the opposite: contemporary "digital design"—no matter its stylistic or ideological pronouncements—belongs to it. The architectural control surface is an infinitesimal slice of an enormous and expanding panorama of feedbacks, all aimed at reconfiguring the practices and demands of management and control around a probabilistic worldview.

From the first moment of contact there has been a curious comingling of scalar experimentation, wherein architectural production has become decidedly 'topological' in character, while the landscape itself has been increasingly treated as an object that can be 'tooled' and 'scripted' uniformly. (The collapsing of scale within design methodology being merely a symptom of the technical disdain with which that concept is treated within the processes of the managerial surface more generally.)

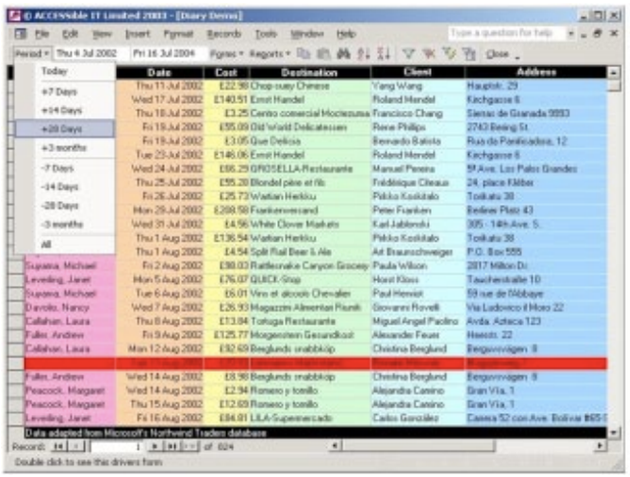
What this rough genealogy reveals is that the seemingly disparate approaches to architectural production mentioned at the outset—including the two most dominant schools of thought within current practice, which have in fact sparred over the past four decades regarding the proper role of architectural practice with respect to larger, external conditions—are of course today unified at a most fundamental level: within the very composition of their disciplinary subjectivity, which rotates around and is more or less constituted through an intense experimentation with the electronic control surface.

Statistical-electrical control perforates and invests (both theoretically and materially)—it is a process of investment—and it has invested our discipline and our practices so thoroughly, and so neatly, and in so many quiet places, that we neither see it nor see past it, but rather see with it.

Tooling, scripting, performativity: the passive neutrality of such language conceals anxieties surrounding the fact that just as design has had to acknowledge its complicity in the aesthetics of warfare, it must now come to terms with an aesthetics of management, whose archive—which constitutes the very essence of modern environmentalism—is no less beautiful or brutal. This task has nothing at all to do with the refutation of false advertising or cynical public relations campaign, dispensing, ad nauseam, the dull ecstasy of 'green consumption:' unadorned common sense can guide that activity. Rather it consists in examining the intimate historical relation of modern managerial-scientific representation to that which is silently posited in it: the principle that life itself is best conceived not so much as the fragility of being, or the enigma of desire, or the rich mystery of existence, but instead simply as a function of the organization of matter.

It involves uncovering, in the spatial politics of neoliberalism, an ongoing transposition of the pathological underside of bureaucratic desire into the concepts of environmental management, whereby all space becomes a theater of war; whereby the desire for speed, efficiency and control exist as unquestioned values; whereby "the Earth became the common enemy." Specific to our own recent disciplinary history, it involves discerning the points of contact between the concepts of autonomy and automation.

Urbanists, automatists, and professed-environmentalists: partners in a politics of aesthetics that once animated architectural theory, but which has now been electrochemically value-engineered into an abyss of reflexive anachronism. Today they remain, playing a discursive shell game, concealing a fact that erases their shared language: that the potentiality of the mana-



gerial surface—the sum of its telemetric possibilities—has become the silent epistemological backdrop for all design practice. Its genealogy now reigns sovereign, entwining and binding design reasoning down beneath perception, within the mundane details of disciplinary subjectivity. Claims to difference are summarily upended by their implication in an instrumental lineage that has engulfed them, 'guilty by association' with a family of technologies that are today only regarded unhistorically and apolitically.

Through our association with the genealogy of the managerial surface, we're all monitors, and regulators, and controllers... we're all managers. And so these are the new denominators: concepts that have from the outset circumvented the vagaries of modern naturalistic reasoning—by design—in order to compensate for the practical inadequacies of that epistemic dream.

Language and Life

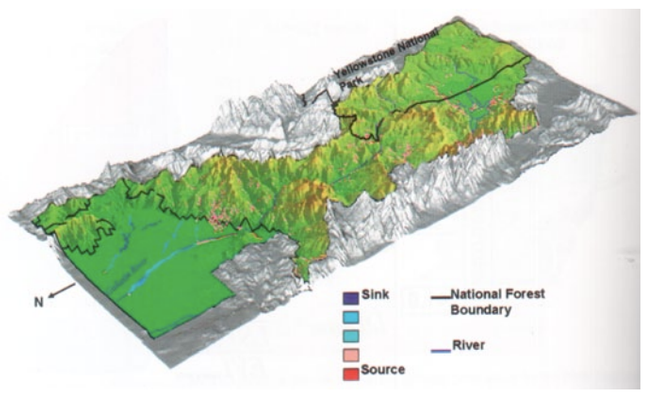
Nature—or more specifically, the question of what is natural?—has always been first and foremost a matter of representation. Our techniques have reconfigured the space of representation beneath our reasoning, and our mode of intervention in the world has undergone a fundamental change. We can no longer assume any distance or delay between life and its representation. Nor can we be confident, however, that the reduction of that gap, or the grand project of finally eliminating it once and for all, is moving us at all closer to the dreams of Progressive Modernism.

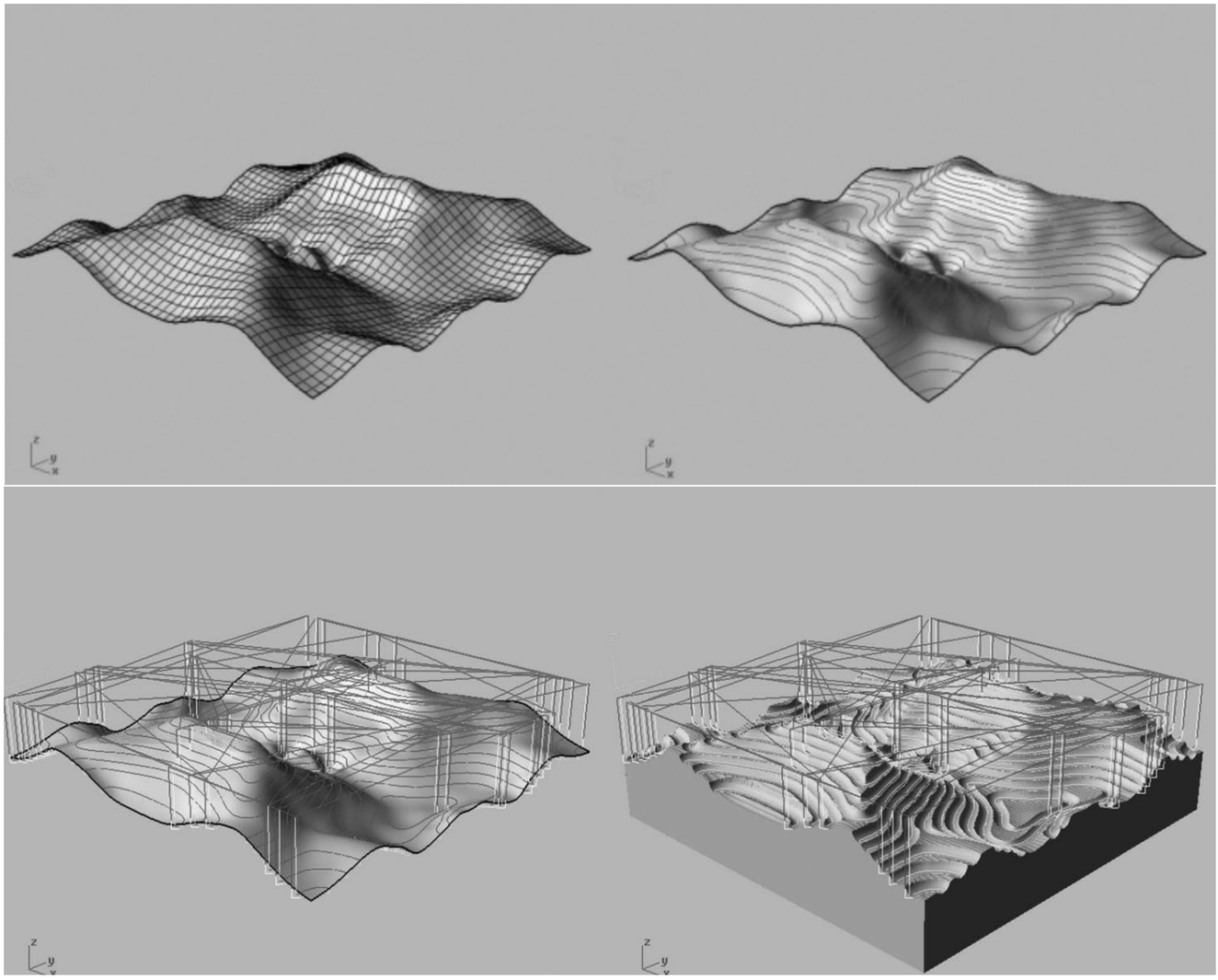
Still, we continue to rehearse a worn-out equation, in which modern infrastructures and bureaucracies enthymematically 'manage the environmental impact of the built environment,' and where statistical reasoning merely enables us to "see through the mists and confusion of the world" —a nostalgic formula that, ironically, we still posit as a solution, as though it were somehow our last, best hope for collective survival.

An entirely new political field is now laced silently throughout this modern environmental mythos; an electrical feudalism of ontology and existence in which our present theories and methods are, for their naïveté and myopia, potentially dangerous confidants. The dictatorship of lucidity established by the modern technosciences is collapsing, but we must continue to somehow live within it, by resisting the rote scientization of all ecological sensibilities. The great promise of something like ecological design rests not in its ability to fashion terminal and partial palliatives for sustaining our degenerate modes of civilized existence, but in its capacity "to create concepts that are always new;" to foment a disposition towards existence that does not materially undermine itself; to stimulate competition among various conceptions of life, rather than among individuals locked in straightjackets of spatial noopolitics.

Isn't this where the work now lies? In fashioning a platform for rumination, a way of seeing, an orienting schema—or at least a primitive compass—for moving about purposively within these new frameworks? In finding, and capturing within our language and thought, another order of agency, another degree of freedom within a milieu that by design aims to organize, govern, administer, monitor, record, and securitize that freedom?

Absent that effort we remain in frigid freefall, our language and thought always-already returned to us, simultaneously lucid and incoherent, confident and vacuous, a glittering and hollow doubling of all that it claims to explain.





NOTES

□. For a full discussion of the contested relationship of progress and protectionism relative to cultural views of nature in the U.S. see Leo Marx "American Ideology of Space: the Primitive, Pastoral and Progressive" in *Denatured Visions,* ed.William Howard Adams and Stewart Wrede (New York, NY: Museum of Modern Art, □□□□), □□-□□.

□. Darcy Frey, "Crowded House," *New York Times* =, June □, □□□□. Frey describes MVRDV's MetaCity/Datatown project as "a serious investigation: by translating the chaos of the contemporary city into pure information…MVRDV set out to reveal how our collective choices and behaviors come to mold our constructed environments."

□. See http:www.vanalen.org/gateway

□. See http:www.toronto.ca/waterfront

□. See Liat Margolis and Alexander Robinson, *Living Systems: Innovative Materials and Technologies for Landscape Architecture*. (Basel: Birkhauser, □□□□).

□. GIS = geographic information systems; GPS = global positioning system; BIM = building information modeling. BIM tools have been used primarily for architectural projects but are increasingly applicable to landscape and urban projects. BIM technology models embedded cost, material, implementation, environmental, and demographic factors throughout a project's life cycle, and can be integrated with GPS, GIS, and in situ information systems that provide live data on moisture, light, wind, temperature, traffic, events, etc.

□. http://www. grossmax.com.

□. Paul Shepheard, "Sensational Landscapes," *TOPOS Journal*. □□ (□□□□): □□.

□. Gilles Deleuze and Felix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, trans. Brian Massumi (London, New York: Continuum International Publishing Group, □□□□).

□□. For alternate verbiage, see the incisive Landscape Urbanism Bullshit

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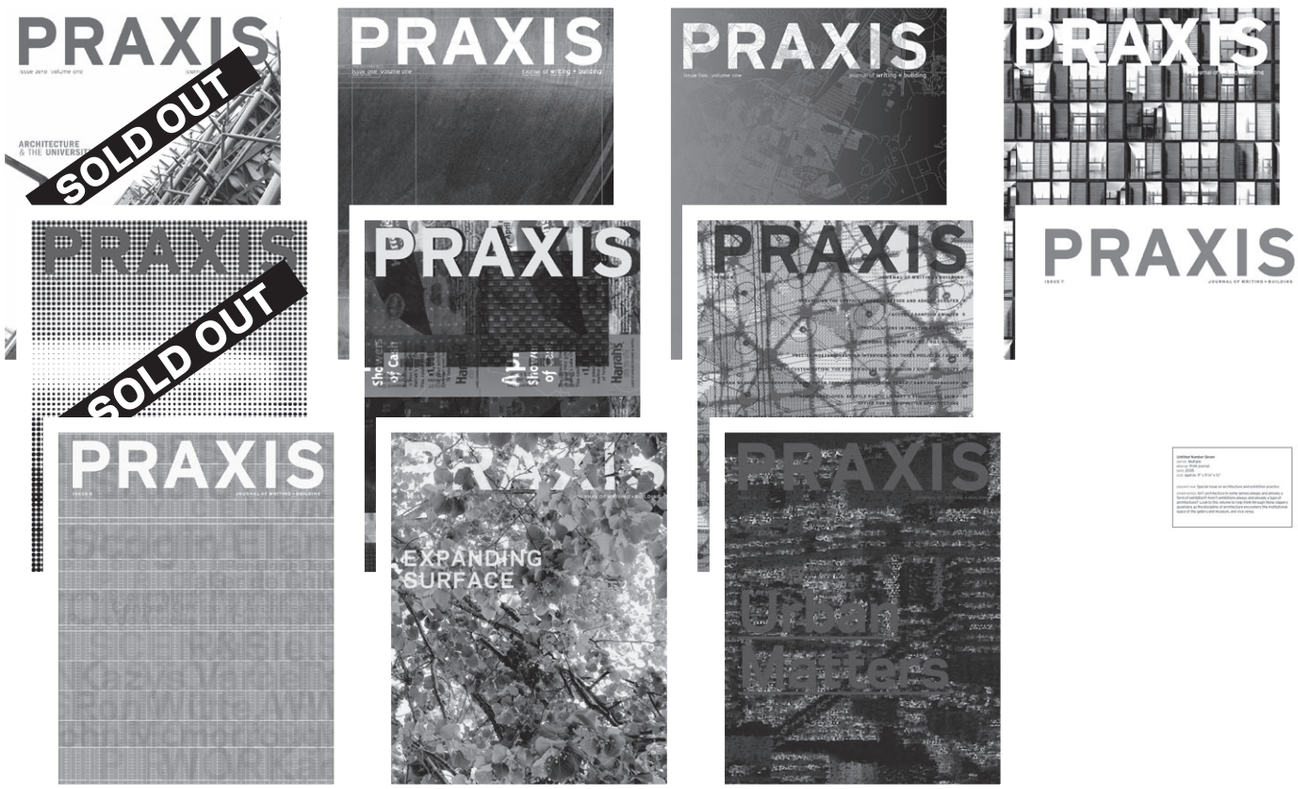

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Michael Meredith is an Associate Professor at Harvard University, Graduate School of Design. Hilary Sample is an Associate Professor at Yale University School of Architecture. They are the principals of MOS. MOS's built projects include PS□/MoMA Afterparty, the Floating House, and an artist studio for Terry Winters. In □□□□, they received an Academy Award from the American Academy of Arts and Letters.

PATTERNS Interview MOS
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Project Editor: Ashley Schafer
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Alejandro Aravena, received his architecture degree from the Universidad Católica de Chile in □□□□. Executive director of Elemental, partner of UC and COPEC (Chilean Oil Company). International Fellow of the Royal Institute of British Architects since □□□□. Member of the Pritzker Prize Jury since □□□□. Winner of Silver Lion of the □□□□ Venice Biennale and Marcus Prize □□□□. He has been Visiting Professor at Harvard University GSD from □□□□ until □□□□ and holds the Elemental-Copec Chair at Universidad Católica since □□□□.

nARCHITECTS was founded in New York City in □□□□ and is led by partners Eric Bunge and Mimi Hoang. The studio's work, recognized internationally with awards, exhibitions and publications, includes a wide range of scales from buildings and interiors to ephemeral structures and public space design. Hoang and Bunge have also taught extensively, most recently as the Kahn Visiting Assistant Professors of Architectural Design at Yale University.

Alejandro Aravena Interviews n_ARCHITECTS
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nARCHITECTS interviews PRODUCTORA
Project Editor: Fred Tang
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PRODUCTORA is a Mexico City–based office founded in □□□□ by Abel Perles, Carlos Bedoya, Victor Jaime and Wonne Ickx. The office is realizing a variety of projects in Mexico, Asia and South America ranging from single family dwellings to larger scale office and public buildings. Productora's work has been published and exhibited internationally. They were winners of the Architectural League of New York's Young Architect's Form in □□□□.

WORK Architecture Company (WORKac) was founded in □□□□ by Amale Andraos and Dan Wood. Based in New York, WORKac strives to develop architectural and urban projects that engage culture and consciousness, nature and artificiality, surrealism and pragmatism. In □□□□, WORKac was honored at the White House as Finalist for a National Design Award. In □□□□, the firm was identified by Icon Magazine as one of the □□ most-influential new architecture firms in the world, winning numerous awards, including several AIA Merit Awards, three "Best of" awards, and a MASterwork Award from the Municipal Arts Society.

PRODUCTORA interviews WORKac
Project Editor: Filip Tejchman
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p □□ lower right: Elizabeth Felicella

WORKac interviews FAR
Project Editor:
Alayna Fraser
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FAR frohn&rojas is a networked architectural design and research practice located in Cologne , Santiago de Chile and Los Angeles . With its distributed setup the office seeks to appropriate corporate models of global presence and distribution as its own effective means of production. FAR takes these models as a means of establishing a more diversified type of architectural production in which both the inherent contradictions between geographies, as well as the stretching of disciplinary boundaries will let formerly undeterminable links thrive. The separate locations work as hubs linking the office to a variety of local specialists both from within architecture as well as other disciplines, trades, companies, cultural institutions and educational/research facilities.

Aranda\Lasch is a New York-based architectural studio dedicated to experimental research and innovative building. Established in □□□□ by Benjamin Aranda and Chris Lasch, the studio designs buildings, installations and objects through a deep investigation of materials and structure. Their approach can be described as intuitive computing which is not about problem-solving but rather opening up new opportunities in design. Winners of the United States Artists Award and Young Architects Award in □□□□, their early architectural projects are the subject of the book, Pamphlet Architecture □□□: Tooling. In □□□□ they collaborated with artist Matthew Ritchie on a pavilion-sized work, "The Morning Line," for the □□□□ Venice Biennial and the Seville Biennial. In addition to commercial and residential projects in New York, they completed a □□,□□□ square foot temporary structure for Design Miami in □□□□ & □□□□. Aranda\Lasch continually develops experimental furniture products that explore new concepts in fabrication and assembly and are represented by Johnson Trading Gallery in New York. Aranda\Lasch will be featured in the upcoming □□□□ Venice Architecture Biennial.

FAR interviews Aranda/Lasch
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Aranda/Lasch Interviews Ciro Najle
Project Editor: Ben Gilmartin
All images courtesy of the architect

An architect practicing in Buenos Aires and Design Critic at Harvard GSD, Ciro Najle is the former Director of the Landscape Urbanism Graduate Design Program and Diploma Unit Master at the AA in London. Najle received the Young Architect of the Year Second Prize in London in □□□□, and his work has been exhibited in various cultural venues including the Prague Biennale of Art and the Beijing Biennale of Architecture, where he was the curator of the London Pavilion. His work has been published in *Quaderns, After the Sprawl, Oris, Architectural World, Egg Magazine, Esquire, Summa, UR* and *2G* Monographs on FOA and MGM. He is the co-editor of the 'Tokyo Bay Experiment,' and of the 'Landscape Urbanism: A Manual for the Machinic Landscape,' and is currently working on the upcoming book 'Material Discipline.' www.generaldesignbureau.com; www.machiniclaboratory.com

The Living was created in □□□□ by David Benjamin and Soo-in Yang. The firm emphasizes open-source research and design and collaborates both within and outside the field of architecture. The team's work has been awarded, exhibited, and published internationally and was recently featured in C□ Magazine, Environment Monthly and on CNN. Benjamin and Yang currently teach at Pratt Institute and at the Columbia Graduate School of Architecture where they are co-directors of the Living Architecture Lab.

Ciro Najle Interviews The Living
Project Editor: Andrew Colopy
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The Living Interviews H+Y Architects
Project Editor: Elizabeth Stoel
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p □□□: Andy Ryan

Höweler + Yoon Architecture, the Boston-based practice of Eric Höweler and J. Meejin Yoon , is a research-driven, multi-disciplinary practice that focuses on the integration of the body, technology, and space, engaging these issues at a wide range of scales. Prior to co-founding HY Architecture with Höweler in □□□□, Yoon was the principal of MY Studio, the laboratory-like studio she founded in □□□□ and continues to maintain to explore clientless projects from books to clothing to installations. HY Architecture/ MY Studio published a monograph, Expanded Practice, in □□□□. Höweler is a Design Critic in Architecture at Harvard Design School. Yoon is an Associate Professor in the Department of Architecture at the Massachusetts Institute of Technology.

Directed by Marcelo Spina and Georgina Huljich, PATTERNS is a design research architectural practice based in Los Angeles. Their projects include Prism Gallery in Los Angeles, FyF Residence in Rosario Argentina, and Jujuy Redux, a ten-storey housing project in Argentina. PATTERNS' work has received numerous prizes and awards and has been exhibited at the Venice, Shenzhen and Beijing Biennales, SF MOMA, MAK Vienna, Chicago Art Institute, Artists Space New York and Gyeonggi Foundation in Korea. Their first book "Embedded" is forthcoming by the Beijing-based AADCU. Marcelo Spina has been a member of the design faculty at SCI-Arc since □□□□ and Georgina Huljich has been a Lecturer at the Department of Architecture at UCLA since □□□□.

HY Architecture interviews PATTERNS
Project Editor: Amanda Reeser Lawrence
All images courtesy of the architects except:
p □□□, top: Andrea Ostera
p □□□, top: Gustavo Frittegotto
p □□□, bottom: Josh White
p □□□, glass renderings: courtesy of □-Form
p □□□, photos: Josh White
p □□□, line drawings: courtesy of □-Form
p □□□, photos: Josh White
p □□□, top left: Natalia Vinuela
p □□□, middle: Bradley Wheeler

Timothy Hyde and Lucia Allais
Project Editors: Ashley Schafer and Amanda Reeser Lawrence

Timothy Hyde is Assistant Professor of Architecture at the Harvard Graduate School of Design. He is an historian of □□th century architecture and architectural theory.
Lucia Allais is Behrman-Cotsen Postdoctoral Fellow in the Society of Fellows, and Lecturer in the School of Architecture, at Princeton University. She has published a number of essays, (most recently "The Real and the Theoretical, □□□□," in Perspecta □□) and is working on a book about architecture and international politics in the mid-□□th Century.

14 Testing

Architects are always testing the limits--of structure, of materiality of form and of the discipline itself.In the □□□□s, a faltering economy propelled architects such as Bernard Tschumi, Daniel Libeskind, Thom Mayne, Rem Koolhaas and Peter Eisenman to challenge disciplinary boundaries and explore their work through alternative means of drawing as a means to establish new criticality.

More recently the question of testing has taken on renewed urgency among many young architectural firms. But testing now means much more than a self-reflexive criticality, and the production of fabricated testings has led to a somewhat surprising outcome: installation has become a generational and operational mandate.

On the one hand testing applies to a kind of extreme or improbable materiality; projects doing extraordinary things with experimental materials and processes. However, testing also takes on a more philosophical or conceptual approach as architects are unafraid to explore options, more interested in this “process” versus “product,” and able to grasp multiple scenarios as possible outcomes. Much of this, of course, is enabled by increasing computational power and the notion of testing is deeply embedded within digital processes and outcomes.

Our aim in this show is to explore the material, structural, conceptual and intellectual possibilities of “testing” as a new architectural paradigm, and its ramifications as these tests as firms work at a larger architectural scale. This issue would offer particularly exciting capacity to publish architectural installations full-scale as well as their translation into realms outside the space of the gallery..