

# Other Than Infrastructure: Leaving Room for the Fantastical in the Resilient Project

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*ABSTRACT - The manuscript reflects on the delightful and absurd qualities that might be harbored in routine infrastructures. Through a series of contemporary and historical examples the paper highlights how experience, material quality, narrative, and civic engagement can unlock new potentials in the mundane, and often intangible systems, which are intended to protect and serve those in flood prone territories. Understanding first that resilient water-management infrastructures exist along a spectrum of defense, and second that they each participate in their own extensive system of flows and processes, generates a set of opportunities for designers to interject and draw out new possibilities. Locating projects within these systems calls for two approaches: 1. identifying the “objecthood” of infrastructure; and 2. techniques for “unblackboxing” or bringing parts of now hidden systems to the foreground of the civic realm. The paper suggests that these two approaches aid in locating the whimsical within systems and offer calculated ways to confront flood mitigation methods that all too often privilege what is deemed as efficient over what is enjoyable.*

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The resilient project often assigns the architect to the role of problem-solver. Given what is at stake, this is understandable. Denizens of coastal cities and towns and their respective governmental institutions, faced with increased accounts of sea level rise, ballooning insurance rates, and routine flood events, have often allayed their fears through stop-gap or

technocratic procedures. Frequently, these techniques are both radical and conventional (such as the construction of stilted housing or massive sea walls), reinforce deterministic attitudes toward city-making, and ignore softer solutions which embrace ecological and landscape strategies that contemporary designers have developed over the past decade. This leaves designers in a compromising position in which they are caught between panicked-urgency and financial constraint in which they are subsequently forced to err toward delivering “real-world” solutions. The problem with solving problems, however, is that it often positions pragmatism against other concerns central to the discipline of architecture like aesthetics, ecology, social practice, and material and experiential effects. Instead, it is possible to conceive of a project that is both infrastructural in nature and that also overlays additional and alternative intentions to produce unconventional juxtapositions between its purpose - the achievement of pragmatic concerns - and a broader agenda attuned to the above architectural values. In its current approach, pairings of program and infrastructure might be regarded as sufficient—think of seawalls deployed as boardwalks, but an investment in tactics that go beyond these measures is required to encourage greater fidelity between architectural pursuits and resiliency. A set of case studies ensures that such a legacy of unexpected, absurd, and fantastical outcroppings not only exists, but assists in advocating a *modus operandi* for a new type of resilient project: one that bypasses deterministic approaches in favor of productive realignments with the discipline of architecture.

To this end, the mechanisms and strategies of resilient water-management infrastructures deserve a closer reading. One might begin with a conceptual structure that is typological in its sorting of various resilient infrastructures according to their primary functional traits: for instance, devices that create defensive boundaries at one extreme compared against assemblages that mitigate and manage flows. These definitions are helpful, of course, but are only a gateway to another set of observed qualities that can be redeployed as tools for conjuring the fantastical. First, in assessing infrastructures in terms of their formal and material characteristics, as opposed to only judging their adequacy as functional devices, they are moved into the realm of “objecthood.” Doing so considers infrastructure not as a device or utilitarian machine, but as an object or set of objects with formal and material qualities consistent with architecture and loaded with greater agency. Second, by exposing the inner workings of infrastructures and redistributing them, infrastructural projects expand their role. If infrastructure is typically thought of as objects and systems that do not engage directly with the inhabitants of the city yet are fundamental to the city’s functioning, then they are limited to a set of predisposed functional outcomes. In other words, in shifting from the understanding of infrastructure purely as a “city-making” device toward an expectation that it do more, its agenda focuses on additional, specific intentions. The means by which such an expanded role may be achieved could be described as “unblackboxing,” or the

unfolding of material flows, processes, and temporalities of infrastructure such that infrastructure is foregrounded in everyday experience. The examples included below describe unblackboxing strategies that reveal intentional gaps in infrastructural mechanisms and narrative approaches that produce unexpected, even fantastical results.

Framing resiliency through tactics that produce whimsy and wonder implicitly suggests strategies that are inefficient when compared against their traditional brethren. Rather than view this as a deficit “inefficiency” might instead be embraced as a means by which productive intentions are embedded into infrastructure that cause it to engage with the city in new and unforeseen ways. Here, the qualities of objecthood and unblackboxing are useful because they articulate precise tactics of eliciting surprising solutions to problems that are typically resolved through banal responses. In leveraging these strategies toward the creation of alternative visions for the resilient project a framework is established by which the mundane and transcendental are hybridized.

## INFRASTRUCTURE AND PERFORMANCE

Water management systems in today’s American cities resemble the deployment of other existing infrastructures (such as mobility and telecommunications networks) that make cities “work”; that is, they are primarily functionalist in disposition and unrelenting in their pursuit of efficiency. If the transportation networks of a city consist of conduits focused on the efficient movement of vehicles and goods, flood control systems are largely comprised of barriers designed to keep water out or sequestered to a defined domain. The result is particularly hard edged. As with the voided lines drawn for freeways’ passage through urban fabric, the definitive lines between land and water are also clearly drawn out. In the case of transportation networks, infrastructures of mobility were used to operationalize large regions. The successful distribution of goods and people rang paramount over concerns of aesthetics and experience and functioned as a device for controlling the heterogeneous and dynamic urban environment. The consideration of freeways foremost as conduits, and not as objects with material qualities, reflects a historical transformation in urban thinking on the American city.

Just over a century ago, the City Beautiful movement served as a guiding pursuit for urban designers in which aesthetics and the urban experience were privileged. With architects and artists engaged in the planning of cities, concerns of efficiency were subservient to populating the city with monuments, public spaces, and architecture. Included in the restructuring of cities with beauty in mind were architects’ and artists’ involvement in the design of roads. In favoring aesthetics over the functional, however, the City Beautiful movement eventually was surpassed by a systematic approach that favored the city’s demand for increased speed and mobility

to control flows and accommodate its growing scale. The move of the American Planning Association from beautification toward a technocratic approach was reflected in the adoption of the “comprehensive plan” in which the designer was replaced by the engineer and policy maker.<sup>1</sup> These shifts resulted in modernist approaches to city-making and deterministic architecture. Urban design was subjected to readings of infrastructure as objective: either it worked or it did not and could be measured through quantifiable criteria. Performance, in this regard, had been shaped and defined to evaluate and measure “the calibration of efficiency, optimization, or endurance.”<sup>2</sup> The possibility exists, though, for infrastructural logics to embrace alternative definitions of performance that are not based on quantitative results but instead are described as performative, or, rather, can be evaluated by “subjective judgement” of “qualitative aspects.”<sup>3</sup>

The point here registers a disciplinary shift in infrastructural thinking and one that has been embraced by architects, landscape architects, and designers over the course of the last decade, particularly as it relates to the resilient project. In place of the deterministic and hard infrastructures, indeterminate and soft, but robust, infrastructural systems have surmounted in design competitions, exhibitions, and progressive thinking on resilience. During 2009-10, and following Hurricane Katrina, the Museum of Modern Art hosted a series of workshops and an exhibition under the title *Rising Currents* that envisioned a series of resilient interventions in the New York City area. The consensus of the resulting projects leaned into so-called “soft infrastructural”<sup>4</sup> strategies and called for the rethinking of “reworked, crenellated, and softened” waterfront edges, roads with spongy underbellies, and islands capable of attenuating wave energy.<sup>5</sup> Of these projects, *Oyster-tecture* by the firm SCAPE (Kate Orff and Elena Brescia partners) already begins to suggest the possibility of a fantastical infrastructure in its alignment with ecological attributes over the typical material realities of infrastructure (Fig. 1). The proposed system is a simple field of piles and linked nets for oyster propagation, which when placed in low lying shores around New York City grows into a robust strategy to protect the shoreline. Tapping into an oyster based history and culture that for many was long gone, SCAPE uses the oyster for all its infrastructural possibilities (oysters foster reef creation, which help attenuate the waves, which help stabilize the shore) but perhaps more importantly convinces the public that their history with water, and industry, and pleasure is again a possibility.

If the modernist infrastructural project consisted of projects subsumed by infrastructure as a totalizing device,<sup>6</sup> SCAPE’s project has projected a format wherein ecology becomes the organizing principle. Here, infrastructure is conceived not as concrete barrier walls, but in the form (species) of oysters. With the complexities of the project admittedly omitted, resiliency in the realm of soft infrastructural tactics engages a cultural history as well as a relationship and breeding with ecology in

ways that might serve both a richness of coastal habitat and achieve the necessary stabilization of the coast to reduce erosion, thereby becoming “infrastructure.” Following its debut in *Rising Currents*, SCAPE’s *Oyster-tecture* served as the progenitor for its inception as a winning entry in the *Rebuild By Design* competition as *Living Breakwaters* following Superstorm Sandy’s impact on New York City; effectively fulfilling the *Rising Currents*’ foreshadowing of catastrophe to come just two years after the exhibition’s conclusion.<sup>7</sup>

### UNPACKING THE BLACKBOX

The systems that support the modern city are all around us but hidden either below ground, within the walls, floors, and ceilings of buildings, or are rendered invisible to us by virtue of their commonplace-ness. Their outputs are engaged with routinely, for instance through transportation and communications networks, yet their physical presence is often unconsidered. Lewis Mumford’s often cited articulation of the “Invisible City” describes these systems as those that “have now been transposed into forms capable of swift transportation, mechanical unfolding, electronic transmission, worldwide distribution.”<sup>8</sup> The space where these networks

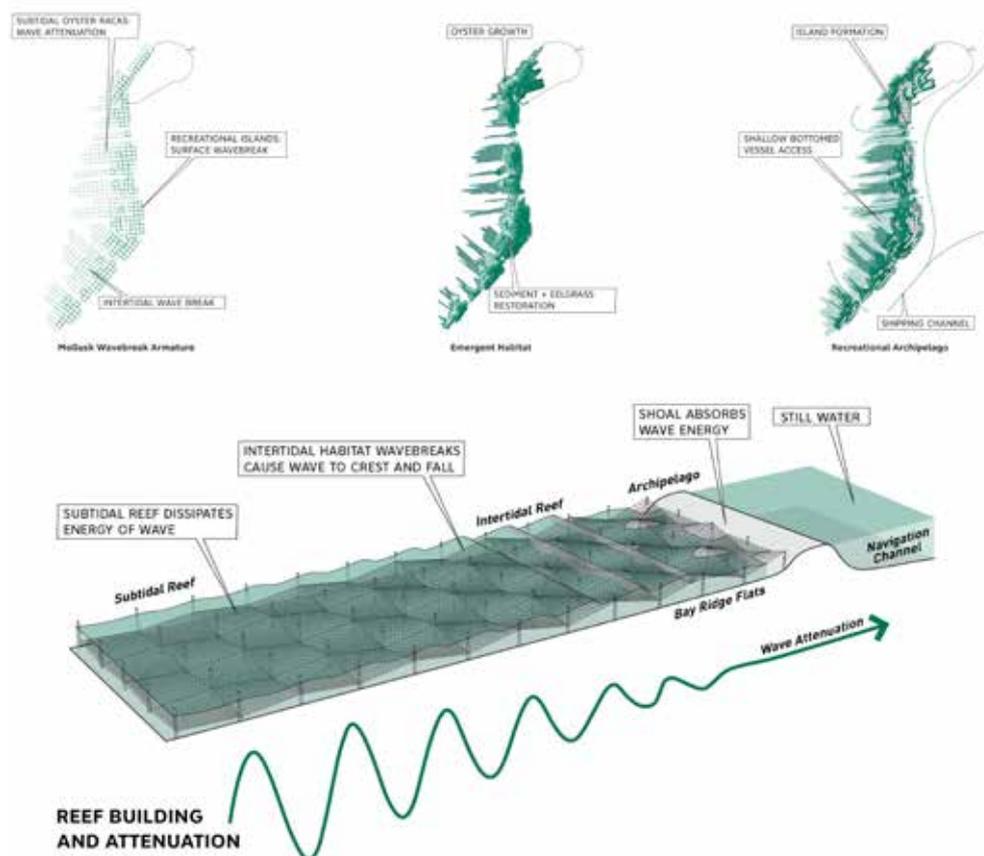


Figure 1. SCAPE Landscape Architecture, *Oyster-tecture*, diagram showing wave attenuating potential of infrastructural systems composed of oysters.

overlap is where their vast scales are reduced to that of the human and emerge as the visible city.<sup>9</sup> Their disappearance from the foreground of experience veils infrastructure until the moment in which it breaks down and then reappears. Otherwise taken for granted, it is only in the absence of their proper functioning that they become noticed.

The removal of infrastructure from the visible landscape corresponds with the technocratic nature of infrastructure over the past century. The modernists, in particular the CIAM (Congrès Internationaux d'Architecture Moderne), emphasized rationalization and standardization, prompting infrastructure to be absorbed primarily into the engineering discipline without the input of architects. The engineered result is what produces the blackbox, or those systems that effectively have been removed from visibility and which the mechanisms and flows contained within have been rendered incomprehensible from outside the veil.

Water management, flood control, and storm barrier infrastructures exhibit the qualities described above, through culverts, sewers, sluices that are hidden below grade or levees and seawalls that have been habituated. And, whereas other infrastructures and networks simply become noticeable by their absence (communications networks, for instance), the failure of flood control mechanisms is profound: the breakdown of the aforementioned deterministic lines drawn between land and water result in catastrophic transformations to the physical environment.

#### UNBLACKBOXING: OR MERGING THE FANTASTICAL AND THE BANAL

If blackboxing concerns the hiding (or disappearing) of vast arrays of technical and material infrastructure, then “un-blackboxing” is the revealing of these instruments. Yet the act of unblackboxing reaches deeper than the noticing of the equipment and mechanisms used to operate the contemporary city - if it were only this, than the revealing of infrastructure through its breaking down would suffice. Rather, to unblackbox in the terms discussed here enjoys the productive outputs of infrastructure while doubling up on features of an infrastructure that otherwise would not be expressed. In other words, the processes of unblackboxing are those means through which infrastructure begins to attain the unexpected and wondrous properties only possible through its grafting of other disciplinary (and cross-disciplinary) interests. This concept is not nearly new, but has a pronounced history. In recent memory, for instance, the Works Progress Administration created by FDR's New Deal built a wide range of projects from dams to hospitals to airports, many of which were vital infrastructures. These projects, like the City Beautiful movement in the decades before, included artists and architects who addressed the artifice of a project, not only its utility.<sup>10</sup> The example of the WPA touches on the ways in which banal mechanisms could acquire greater value with the addition of architects' agency, but there are projects in the lineage that

move the needle further; both in drawing out infrastructure's role in forming and celebrating civic landmarks and in anticipating ways in which future unblackboxing might occur.

### *Historical Unblackboxing*

The groundwork for today's unblackboxing is perhaps best laid by retrieving examples of this legacy that point to the historical confluence of utilitarian production and flows of material with form, ornamentation, and celebratory effects. Two examples, the Trevi Fountain and the ornamental gardens of L.E. Audot leverage mechanisms and practices that in contemporary cities have been banalized, removed from our consciousness as everyday debris, or hidden from view.<sup>11</sup>

#### Trevi Fountain

The Aqua Virgo, completed in 19 BC by Marcus Agrippa, was built to supply the thermal baths of Campus Martius, and extended a distance of 21 km [13 mi.]. The accomplishment was considered of such great cultural and civic value that the infrastructure received its own monument celebrating its end point in the form of the Trevi Fountain. Perhaps as a result of the fountain's iconic value, the Aqua Virgo is the only aqueduct still functioning in Rome. And, because of its fame, today the fountain stands on its own as a destination of great importance. As such, it is easy to overlook its historical relevance as a monument to infrastructural achievement. Stepping back and understanding the relationship between the Aqua Virgo and Trevi Fountain, however, yields some important readings. The aqueduct as a conduit, first and foremost, provides for the flow of goods (water) into the city, yet is still banal in its capacity as infrastructure. Water, as the material being transmitted, however, is leveraged within the correlative typology of the fountain. The fountain, then, deployed as artistry or memorial, becomes a medium by which water is no longer ordinary but celebrated as a civic achievement. In the case of the Aqua Virgo and Trevi Fountain, then, the lessons learned are two-fold. First, that the monuments and memorials of the city (and their capacity to impart cultural value) have historically, at times, also served as the markers of infrastructure, wherein the infrastructure's prodigious achievement is commemorated. Second, that the material transported by infrastructure - water in this case - is shared between the aqueduct and fountain. In this instance, the material serves as a linking device between two typologies with varying types of cultural value: the output of the water in the fountain transforms it from the routine to the wondrous, iconic, and beautiful. It is by virtue of artistry and architecture that this transformation occurs.

#### The Ornamental Gardens of L.E. Audot

Standard agricultural production today typically depends on factors of logistics with its spatialization occurring long distances from its destination

and rendered inaccessible to the public. Through his design of ornamental gardens, the visions of Louis-Eustache Audot in the nineteenth century offer alternative practices from those that are common today. As opposed to developing agricultural landscapes banal in expression, Audot created designs that he called by more enticing names such as an *Ornate Hamlet*, or by names that might disingenuously belie its sophistication - for instance, a *Fruit and Vegetable Garden* imbued with the trappings of a traditional French garden (Fig. 2). The combination of the agricultural landscape with typologies of English and French gardens resulted in the hybridization of productive and social space. Merged together, not only were spaces of productivity made beautiful, but they imbued these spaces with new cultural value. Once again, the medium of production - fruits and vegetables - were transformed from a neutral status as “food” and instead served as ornamentation. Though the practices of the ornamental garden defy standards for efficiency, they produce gains in leveraging the re-spatialization of productive landscapes as civic entities and in converting the product of typical gardens into pleasurable features.<sup>12</sup>

The above historical examples of unblackboxing reveal tactics for re-envisioning infrastructure as ripe for cultural use. One strategy underlines the possibilities available when products or material flows contained within infrastructural systems are transferred between typologies (from conduit to fountain) or become the artifice by which productive landscapes become beautiful (fruits and vegetables applied as the ornamentation of gardens in place of flowering plants). More importantly, these case studies do not make the infrastructures better by technocratic standards such as efficiency, but instead develop models by which banal understandings of infrastructure might be combined with ecological, social, and even ornamented desires. This new type of infrastructure (the unblackboxed), registers absurd readings of superimposed types that flicker back and forth between the utilitarian and the pleasurable.

#### The Fantastical, the Absurd, and the Mechanism: Hero of Alexandria

To be sure, the above historical examples of unblackboxing uncover principles useful for the design of future infrastructures. However, the introduction of an additional character is required to elucidate the radical reframing of the banal as wondrous: Hero of Alexandria.<sup>13</sup> Working in the first century CE, Hero worked as an imaginative and ingenious, if quixotic, inventor whose machines delighted in their narrative constructions that combined physics and mechanics with the poetic. His creations would come with enticing and curious titles such as *A Jet of Steam Supporting a Sphere* or *An Altar Organ Blown by the Agency of a Wind-Mill*. As noted by Sabine Müller and Andreas Quednau: “There is no obvious link between flowing water and birdsong, nor is there an apparent mechanical relationship implied by a fire and the opening of a door. The success of the design depends entirely on a story, a story that links together diverse

subjects without forcing them into an overly logical relationship.”<sup>14</sup> Again, Müller and Quednau:

Contemporary thinking charges Hero’s narrative hybridity, regardless of its ability to link separate spheres, with being too inefficient. Worse, even, is the tendency for Hero’s narratives to have no higher purpose than the aesthetic: a mock bird whistles, a bronze sphere spins, a miniature stage play unfolds. And yet, it is precisely the “purposelessness” contained within this inefficiency that is fascinating. Hero’s work stands for the potential of urban design and architecture to push beyond questions of quantification, optimization, and efficiency. Instead, Hero-strategies represent trust in the irrational, the bizarre, the playful, and the absurd.<sup>15</sup>

In Hero and his machines we see the potential for the wondrous to become an asset even while denying the benefits of efficiency and predictability offered by deterministic and technocratic infrastructures. By dismissing the “overly logical,” the mundane is able to merge with other characteristics that cause an architecture or infrastructure to become transcendent. These attributes, such as the aesthetic celebration of the Trevi Fountain, the ecological pairing of SCAPE’s *Oyster-ecture*, or the social utility offered

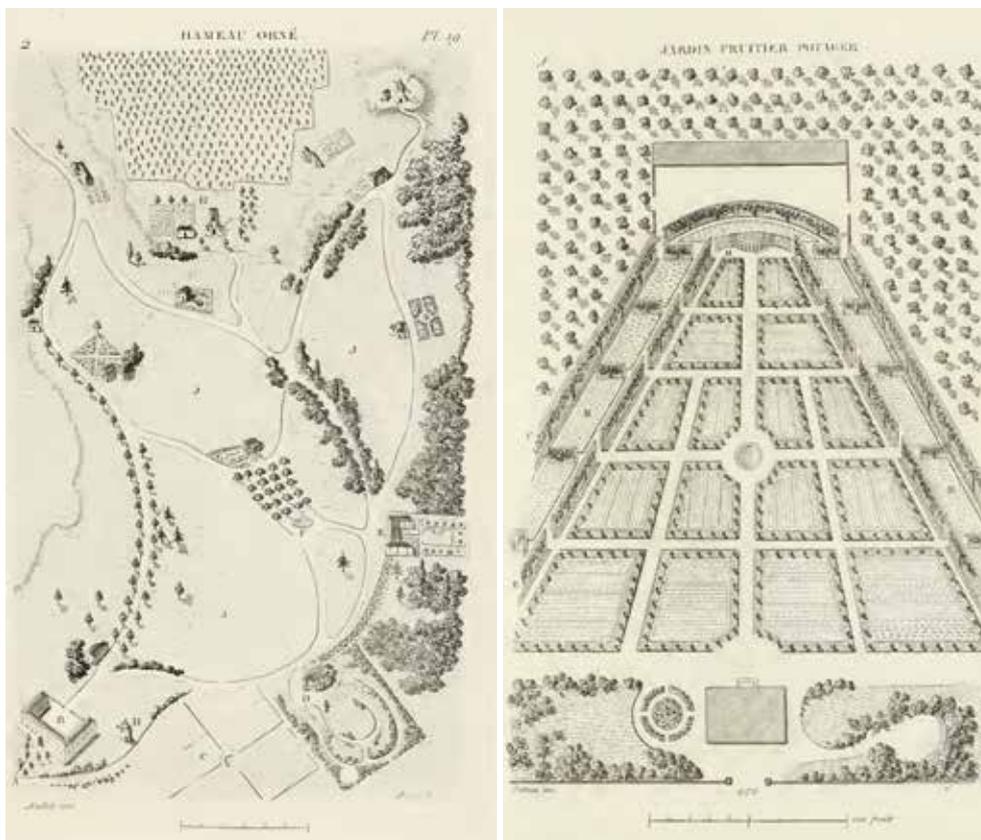


Figure 2. Louis-Eustache Audot (1839), *Ornate Hamlet* (left) and *Fruit and Vegetable Garden* (right).

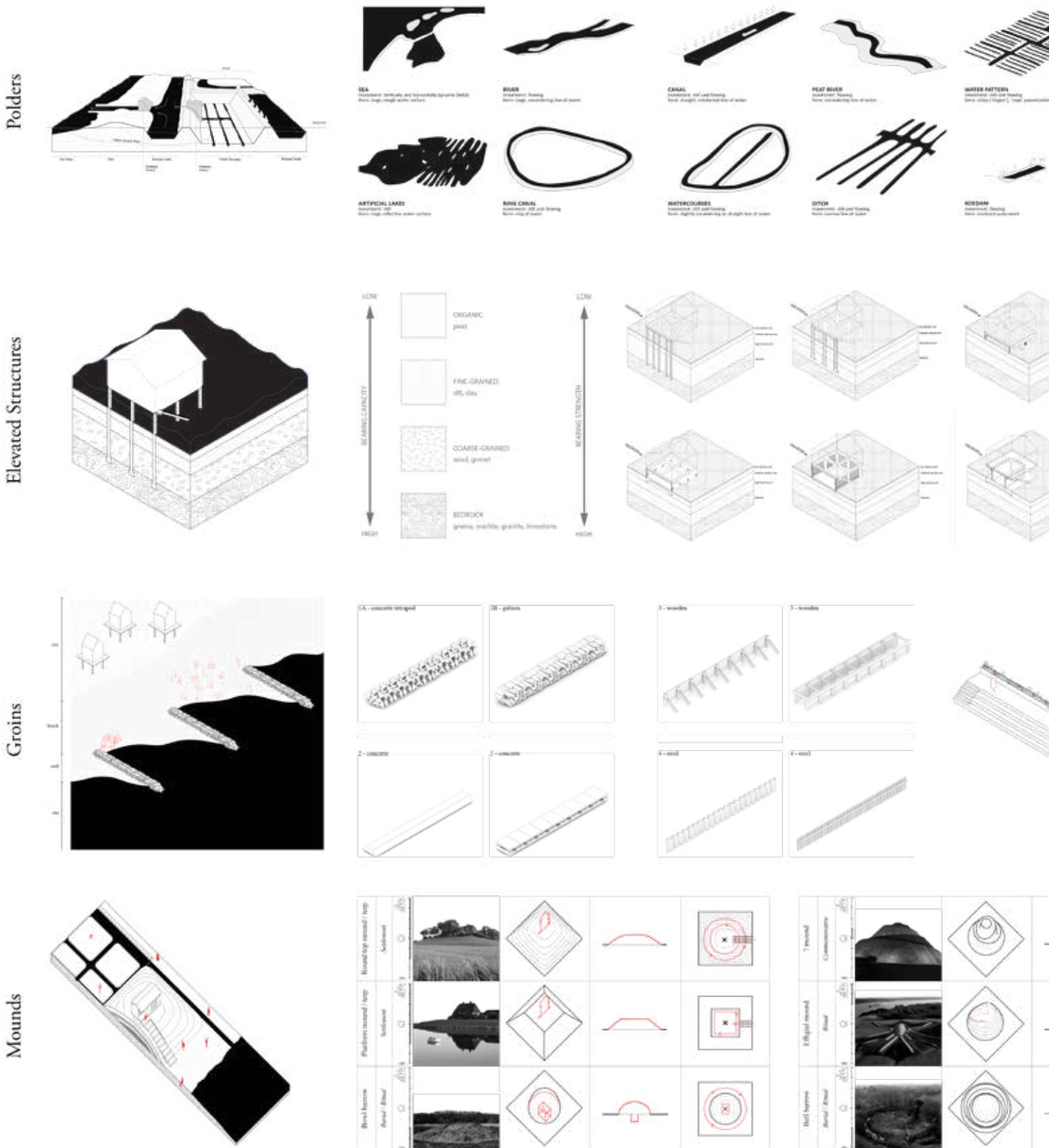
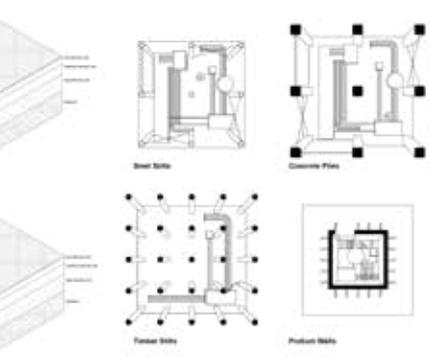
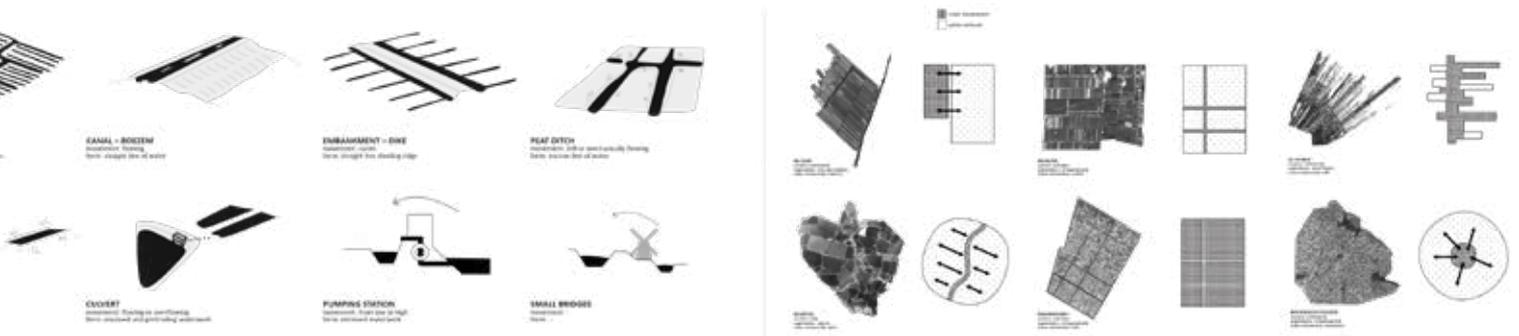
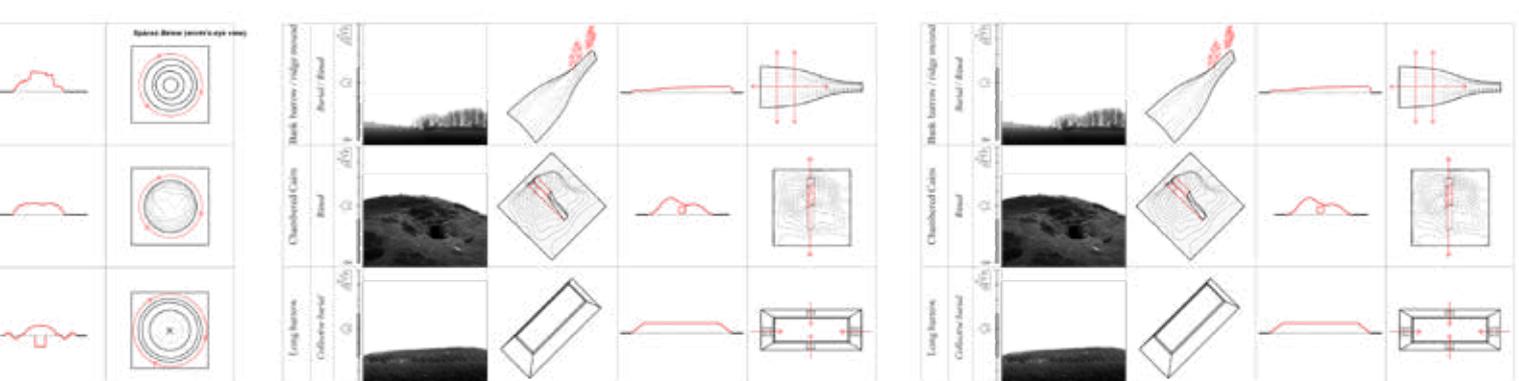
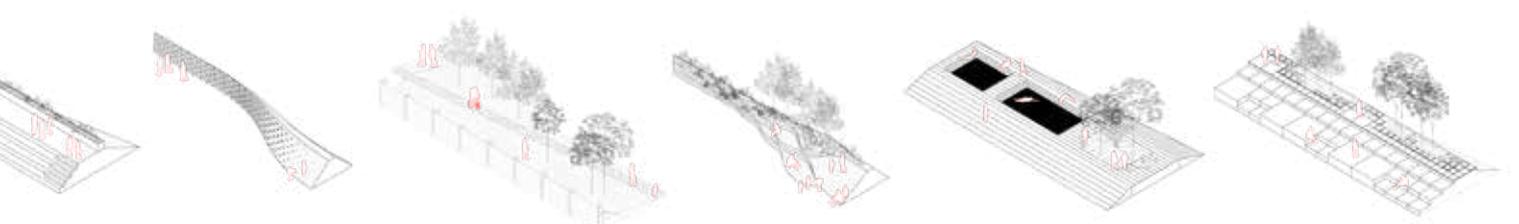
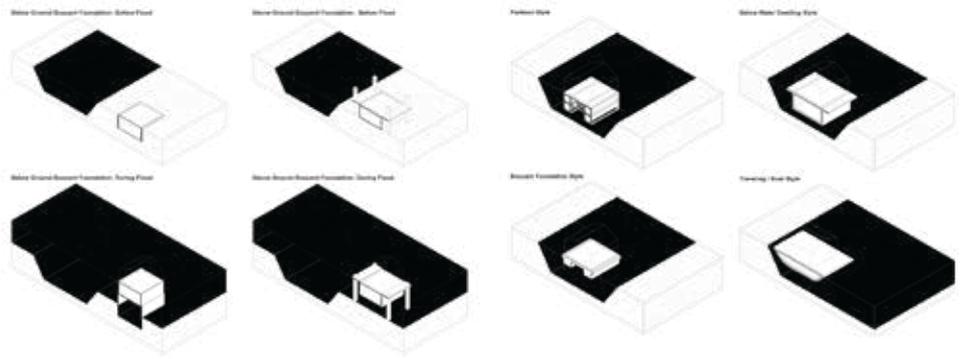


Figure 3. Catalog of typologies of flood resiliency infrastructures (from top to bottom: polder, elevated house, groin, mound). Vertical Option Studio, Cornell University, 2016



Floating Systems



by the re-spatialization of productive landscapes in Audot's *Ornamental Gardens*, make a compelling case for sacrificing maximum efficiency for the absurd.

## NEW RESILIENCY

Much of the discussion to this point has considered "infrastructure" abstractly, relating to transportation and telecommunication networks, productive landscapes as well as the instruments of water management. Let us now place our focus on flood resilience infrastructures entirely by providing examples that harness and craft the wondrous and absurd. These projects build from research that catalogs the various mechanisms of water management and flood control, from which clear delineations form. On one hand, there exist self-preservation strategies: namely, the introduction of stilts and pilings to coastal houses. Their detachment from the ground fosters a paradoxical typological readjustment of the typical house: by elevating, the house protects itself by adapting to an inevitable future flooded context while also removing itself of any bias or relationship to its current un-flooded context; thus, both protecting and removing itself from its surroundings. It can best be filed under "flee" as its strategy. Another type in the flee category would be mounding, for instance, in which habitation is placed on top of man-made solid structures (Fig. 3).

At the other extreme there exist seawalls, levees, and dykes with the intent foremost focused on keeping water out. These structures are best affiliated with deterministic measures that seek to control nature in diminishing its dynamic qualities through the creation of hard edged devices. Other mechanisms fall between these extremes along a spectrum of subcategories in which water flows are managed or mitigated such as sluices, dams, and weirs, or those that absorb runoff such as swales and infiltration basins. The projects below begin with an assessment of these typologies and develop strategies that hybridize resilient infrastructures with formal invention, programmatic superimposition, and ecology in order to propagate unexpected strategies.<sup>16</sup>

### *Gaming Nature*

Working with the same narrative conceits of Hero of Alexandria, Clayton Witt's *Gaming Nature* (2017) establishes a series of paradoxes that work between natural and man-made conditions, incorporate ecology in radical scenarios, and unite unlikely programmatic companions. With the weir serving as the typology of choice, the project begins by unpacking its formal and ecological qualities.<sup>17</sup> Although submerged below the surface, the weir is capable of altering river flow such that silt and soil deposition begin to form habitats for wildlife and contribute to water flows that diminish flood impacts. But this effect is magnified with the addition of riverboats that settle above the subsurface weirs. Sited along the Mississippi River,

the riverboat takes on a more nefarious resonance with the addition of a program endemic to the banks of the Mississippi: the casino.

Cast to the water's edge by state policies that prohibit gambling on dry land, the riverboat casino thrives in its riverine habitat. On its face, vice (prompted by the presence of gambling) contrasts with the vulnerability of wildlife habitats. Yet in their confluence unanticipated opportunities arise. A fleet of riverboats are crossbred with eco-tourist functions and are plugged into habitats to form nuanced affiliations in which ship-decks are merged

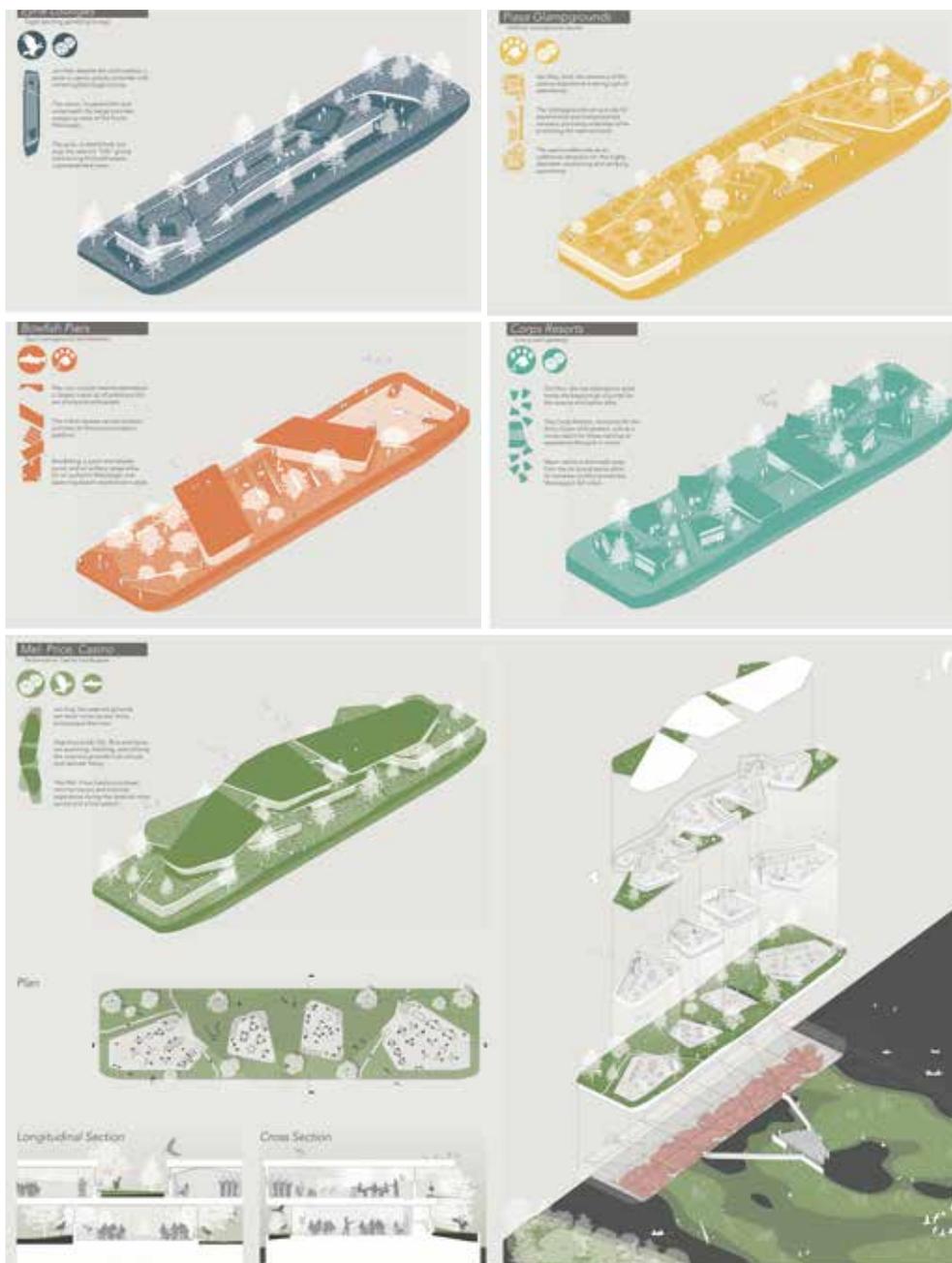


Figure 4. Clayton Witt, "Gaming Nature," (2017), types of ecological-riverboat casinos.

with natural landscapes or absurd juxtapositions are encouraged in which nature serves as the wallpaper of casino life (Fig. 4). To further amplify these scenarios various configurations are employed corresponding to temporal logistics corresponding to casino tourism logistics, breeding and spawning of wildlife, and periods of peak rainfall and flooding (Fig. 5). The union of these characteristics recalls the confluences stimulated by Hero’s machines. Here, design arrives at the intersection of infrastructure and ecology, and choreographs a sophisticated interplay between contradictory programs, resulting in the production of novel effects. With the entanglement of resilient mechanisms with an improbable cast of characters, unimaginable architectures and landscapes are produced.

*Neo-Coastal Order*

Predicated on the reinforcement of dunes (both natural and man-made) as storm surge attenuating devices, Frank Gibase’s *Neo-Coastal Order* (2017) appropriates techniques belonging to coastal areas that employ fields of piles and other debris as strengthening measures. In a more direct fashion than has been seen to this point, these devices are directly correlated with fundamental elements of architecture: columns. Yet like Witt’s *Gaming Nature* and Hero’s inventions, the narrative mythmaking entailed produces links between the infrastructural and the architectural.

Envisioned at a time that sea level rise has peaked and consequently has decimated Washington DC, the project declares a new coastline that coincidentally intersects with the United States Naval Observatory.<sup>18</sup> With the remainder of the city submerged, the project calls for a series of monuments to remember the lost monuments of Washington. The column, recalling the formal tendencies of its infrastructural brethren, is conjured here as a totem of the monuments of Washington that are in Gibase’s estimate best characterized by the prevalence of Neo-Classical columns. Doubling down on the column as a device of infrastructure and memory,

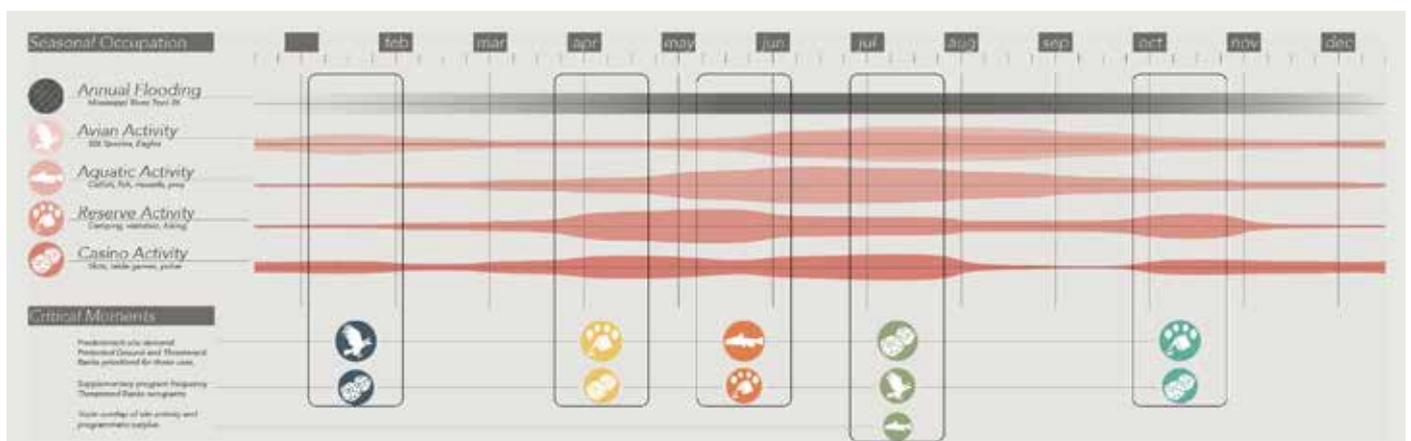


Figure 5. Clayton Witt, “Gaming Nature,” (2017), season cycles of wildlife compared against casino tourism.



Figure 6. Frank Gibase, “Neo-Coastal Order,” (2017), site plan showing reconfigured monuments along the new coastline of the U.S. and within the site of the U.S. Naval Observatory.

their arrangements are guided by the plans of the lost monuments and scattered within the flooded portion of Naval Observatory so as to complete its figure by packing it with the debris of history while (literally) shoring up its future (Fig. 6). The columns, in their aggregation serve to resist erosion and gather sediment, forming islands that mark the plans of their predecessors, while, accumulated together they resemble a catastrophic Campo Marzio. As individual elements, the columns begin to swell and stretch to take on new infrastructural capabilities (Fig. 7). Through its appropriation of resilient infrastructural strategies and the extrapolation of formal characteristics, the project achieves the invention of a new type of infrastructure, one that serves as both monument by virtue of its formal characteristics and landscape mitigation via its flood attenuating qualities. However, it is through its imagining of a radical future scenario that the project surpasses the believable and becomes something else: equal parts whimsical and outlandish.

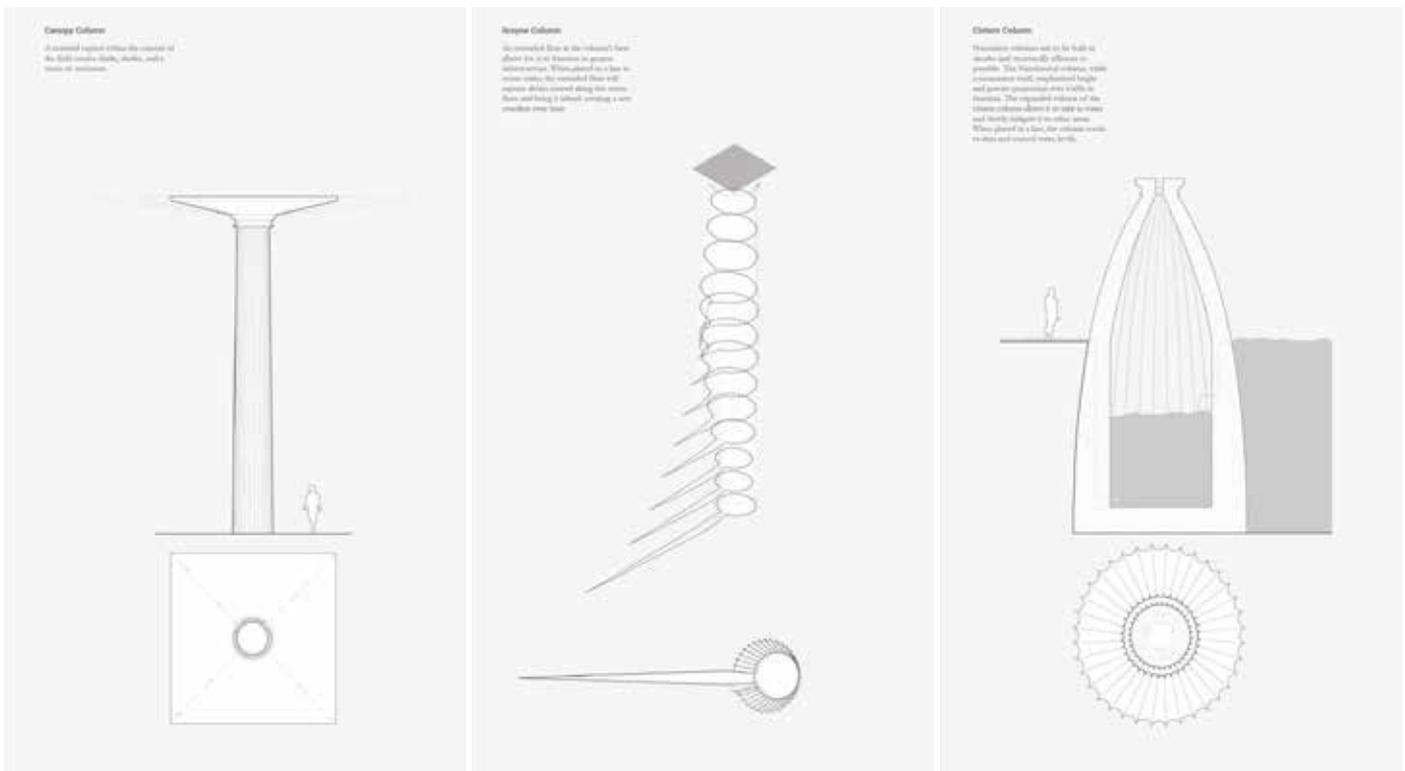


Figure 7. Frank Gibase, “Neo-Coastal Order,” (2017), infrastructural column types.

## AESTHETIC-ECOLOGICAL-SOCIAL INFRASTRUCTURES

It is clear that the infrastructural tactics deployed today in the face of rising seas are no longer sufficient, either because increased flooding has rendered them insufficient or their increased robustness would come with a financial burden and diminished quality of the urban edge. And while a call for reduced efficiency seems, on one hand, to disrupt attempts to create working and dependable resilient infrastructures, on the other, the strategies outline above might in fact be necessary to enable richer paths forward. Dana Cuff notes that the current economic and political environment favors private development of infrastructures, or suggests that public funds are insufficient for the necessary development of infrastructures. In doing so, Cuff issues imperatives for the future of infrastructural practice that consist of working “double duty” and indexing infrastructure’s form.<sup>19</sup> The double duty approach is evidenced in Witt’s *Gaming Nature* and Gibase’s *Neo-Coastal Order* in which programmatic situations are laid on top of infrastructural functions to generate new social space for its citizens. *Neo-Coastal Order*, in particular, is successful at indexing infrastructure through radical means by leveraging the form of infrastructure toward other formal agendas, and in doing so collapsing formal pursuits with infrastructural agendas. More precisely, these projects, and many of those discussed above, employ hybridization to achieve an unblackboxed result.

Whether through the superimposition of program or unions between aesthetics and the banal, the result is often the birth of new types of infrastructure capable of rethinking models of efficiency and optimization in favor of the radical and fantastical. As our coastal environments show signs of degradation, architects, designers, and landscape architects continue to value indeterminate, dynamic, soft infrastructural tactics. Those strategies that engage these qualities will offer unimaginable, if peculiar, new infrastructural-social spaces. The imaginative potential of these new aesthetic-ecological-social infrastructural types have become capable of more than rethinking the resilient project, but, rather, in reshaping the nature of coastal inhabitation.

## Notes

1. Alexander D'Hooghe, "The Objectification of Infrastructure: The Cultural Project of Suburban Architecture," *Projections 10: Designing for Growth and Change* 10 (Spring 2011), 85-94, [https://dusp.mit.edu/sites/dusp.mit.edu/files/attachments/project/projections\\_10\\_a.pdf](https://dusp.mit.edu/sites/dusp.mit.edu/files/attachments/project/projections_10_a.pdf).
2. Neeraj Bhatia, "The Subjects of Performance," *ARPA Journal* no. 3 "Performance" (July 2015).
3. Ibid.
4. The term "soft infrastructure" in the context of flood and storm resilience is invented and defined in: Guy Nordenson, Catherine Seavitt and Adam Yarinski, *On the Water: Palisade Bay* (Ostfildern, Ger: Hatje Cantz, 2010).
5. Barry Bergdoll, *Rising Currents: Projects for New York's Waterfront* (New York: Museum of Modern Art, 2011).
6. D'Hooghe, "The Objectification of Infrastructure," 85-94.
7. These discussions are surely to be resurrected following the events of Hurricane Harvey in Houston and southeastern Texas. At the time of this writing, Harvey's effects are still being uncovered, yet already explicit in the discussion of the causes that may have exacerbated the catastrophe are Houston's inability to tame flows of water and the contribution of the built fabric comprised of impervious surfaces that magnified inundation.
8. Lewis Mumford, "The City in History," *Washington University Law Quarterly* 1962, no. 3 (June 1962), 285-330.
9. Ibid.
10. Dana Cuff, "Architecture as Public Work" in *Infrastructure As Architecture Designing Composite Networks*, eds. Katrina Stoll and Scott Lloyd (Berlin: Jovis, 2010), 18-25.
11. Many of the historical precedents discussed were introduced to the author by Sabine Müller from the firm SMAQ, Berlin. This paper is indebted to the many conversations that framed these topics and served as the basis for the notions of unblackboxing that grew into the exploration featured herein.
12. Contemporary projects also re-deploy this tactic of re-spatialization. Van Bergen Kolpa Architects' Park Supermarket extrapolates the grocery store and its contents as an agricultural field. Conceptually, this functions not as a didactic device only meant to connect one with the earth from which one's food arrives, but, rather, redeploys productive landscapes as social space much as Audot's gardens.
13. Hero of Alexandria is presented as a fundamental inspiration behind the work of SMAQ. The discussion of Hero in this paper owes to their research and writings on his inventions. Sabine Müller and Andreas Quednau, eds., *Giraffes, Telegraphs, and Hero of Alexandria: Urban Design by Narration: SMAQ* (Berlin: Ruby Press, 2016), 382.
14. Ibid., 31.
15. Ibid., 31.
16. Frank Gibase's *Neo-Coastal Order* and Clayton Witt's *Gaming Nature* were conducted as part of the Housing Infrastructure Thesis Studio at the University of Michigan, 2017. Our thanks go to the administration and faculty of the Taubman College of Architecture for their support.

17. A “weir” is described as a barrier across the horizontal width of a river that alters the flow characteristics of the water with the effect of altering the height of the river level.
18. Based on Gibase’s research, peak projected coastal flooding would result in a modified coastline that would shift inland such that it intersects, by coincidence, with the location of the United States Naval Observatory.
19. Cuff, “Architecture as Public Work.”

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## Credits

- Figure 1: SCAPE Landscape Architecture, *Oyster-tecture*.
- Figure 2: Louis-Eustache. Audot, *Ornamental Gardens* (or. ed. *Traité de la composition de l’ornaments des jardins*, Paris: 1839).
- Figure 3: Research from Vertical Option Studio, “Lo-Res: Architectural Strategies for Localized Resilience,” Cornell University, 2016.
- Figures 4 and 5: Clayton Witt, “Gaming Nature,” (MArch thesis, University of Michigan, Spring 2017).
- Figures 6 and 7: Frank Gibase, “Neo-Coastal Order,” (MArch thesis, University of Michigan, Spring 2017).

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