# Campus: Flexible Methods for a City in Decline

by

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for the degree of Master of Architecture

at

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**DALHOUSIE UNIVERSITY**

**SCHOOL OF ARCHITECTURE**

The undersigned hereby certify that they have read and recommend to the Faculty of Graduate Studies for acceptance a thesis entitled "Campus: Flexible Methods for a City in Decline" by Yusef Ali Dennis in partial fulfilment of the requirements for the degree of Master of Architecture.

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# DALHOUSIE UNIVERSITY

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# DEDICATION

For Asia Dennis

# CONTENTS

# ABSTRACT

Buffalo, New York was once among the wealthiest cities in the United States, today it is one of the poorest, with a poverty rate of 30%. The economic-infrastructural shift following the opening of the St Lawrence Seaway ended the region's reliance on the Erie Canal, leading to years of economic and population decline. The resulting urban voids left from acres of abandoned worker's homes, industrial land and commercial strips provide opportunities for an innovative approach to negotiating Buffalo's urban issues. This thesis proposes the university campus as a pilot project to address settlement and building in this shrinking context by way of a new urban paradigm incorporating ecology, urbanism and architecture.

# ACKNOWLEDGEMENTS

# INTRODUCTION

Buffalo, New York was once among the wealthiest cities in the United States. Today it is one of the poorest, with a poverty rate of 30%, one of the highest in the US. The economic-infrastructural shift following the opening of the St Lawrence Seaway ended the region's reliance on the Erie Canal, leading to years of economic and population decline. The resulting urban voids left from acres of abandoned workers' homes, industrial land and commercial strips provided opportunities for an innovative approach to negotiating Buffalo's urban issues. This thesis proposes the University campus as a pilot project to address settlement and building in this shrinking context by way of a new urban paradigm, which incorporates ecology, urbanism and architecture. The proposed campus combines manipulated landscape with a kit of architectural typologies that are capable of responding to temporal change, transformation, adaptation and succession. This process allows for incremental growth, as the elements are applied and hybridized over time, based on planning strategies. The shrinking city provides an opportunity to imagine a new urban model -- one that takes into consideration ecology, infrastructure, landscape and architecture.

## QUESTION

How can a synthesis of landscape, urbanism and campus architecture remediate a shrinking city?

## SHRINKING

### BUFFALO

The first great wave of industrialization in Buffalo was brought on by the construction of the Erie Canal in 1825, which opened the Eastern markets of the United States to the products of the Midwest. Another artificial waterway, built 130 years later, spelled disaster for the port of Buffalo. The St. Lawrence Seaway opened in 1959 and effectively ended the city's growth.

Buffalo's rapid expansion and decompression owe a great deal to the modern grain elevator which was developed by Joseph Dart in Buffalo in 1842[1]. Originally constructed out of wood, the terminal elevators were later changed to brick and finally to reinforced concrete because of it's resistance to fires caused by grain dust. The resulting elevators were heroic in scale; huge, monolithic, curvilinear, technological wonders. Early modernists Erich Mendelsohn, Walter Gropius and Le Corbusier were energized by the avenue of skyscrapers that line the Buffalo River and were greatly inspired by the confidence, rationality, and efficiency of these new structures. As Le Corbusier wrote in his *Vers un Architectrue*,

> "Thus we have the American grain elevators and factories, the magnificent first fruits of a new age. The American engineers overwhelm with their calculations our expiring architecture[2]."

These hugely influential structures, some of the largest in the world, still stand today and are a constant reminder of the city's industrial heritage. Buffalo's dependence on marine infrastructure

1. Reyner Banham, *A Concrete Atlantis: U.S. Industrial Building and European Modern Architecture 1900-1925.* (Cambridge: The MIT Press, 1989)
2. *Ibid.*

has had a lasting impact, allowing it to retain a gritty and appealing industrial character in a time when North American cities are largely becoming increasingly homogenous, chain dominated and auto dependant.

Despite recent hardships, Buffalo remains optimistic. The city has inherited a legacy of cultural institutions and a rich design heritage. For the city's modest size, it is well known as a historic innovator in architecture and urban design with extensive work from Fredrick Law Olmsted, Frank Lloyd Wright, Louis Sullivan, Daniel Burnham, Eliel Saarinen and H. H. Richardson.

The recent mortgage crisis in the United States is only one of many that Buffalonians are facing. The economic-infrastructural shift as a result of the opening of the seaway has led to years of decline[3]. The infrastructural, architectural and human sediment of its industrial past overburdens the city. Abandonment, the suburbanization of the middle class, globalization and racial segregation are all problems that the city has to deal with. Given the decompression facing American and international postindustrial cities like Buffalo, a question arises of what to do about the abandoned factories and acres of vacant workers housing, with redundant commercial strips.



Buffalo billboard petitions president for "a freakin' job". From Yahoo News.

3. *Ibid.*

**SITE**

      The thesis site is located along the Buffalo River in a postindustrial neighborhood of South Buffalo. The site has complex adjacencies, with streets of worker's homes to the East, Buffalo River and Lake Erie to the South and the downtown towards the North East. Originally Seneca Indian seasonal hunting and fishing grounds, the site has seen rapid development and decompression after the Buffalo Creek Treaty of 1826[4]. At the turn of the century it started its transformation into a warehouse district for the industrialized river. A large turning basin for ships once covered most of the site. Nature is often the first to recolonize these spaces; large swaths of postindustrial land in South Buffalo has already been returned to nature. The largest urban wildlife preserve in the country, the Tift Preserve, exists to the South East of the site, on the grounds of a transshipment center, primarily for coal and iron ore and later a city dump. Today it has seen the reemergence of numerous plant and animal species. The site is largely abandoned and the resulting urban void provides the opportunity for ambitious urban innovation.



South Buffalo site images and local context.

4. "Buffalo Creek Treaty, 1838," *A Place for Haudenosaunee to Meet*, 2 Dec. 2010 <http://tuscaroras.com/jtwigle/pages/treatyof1838.shtml>.
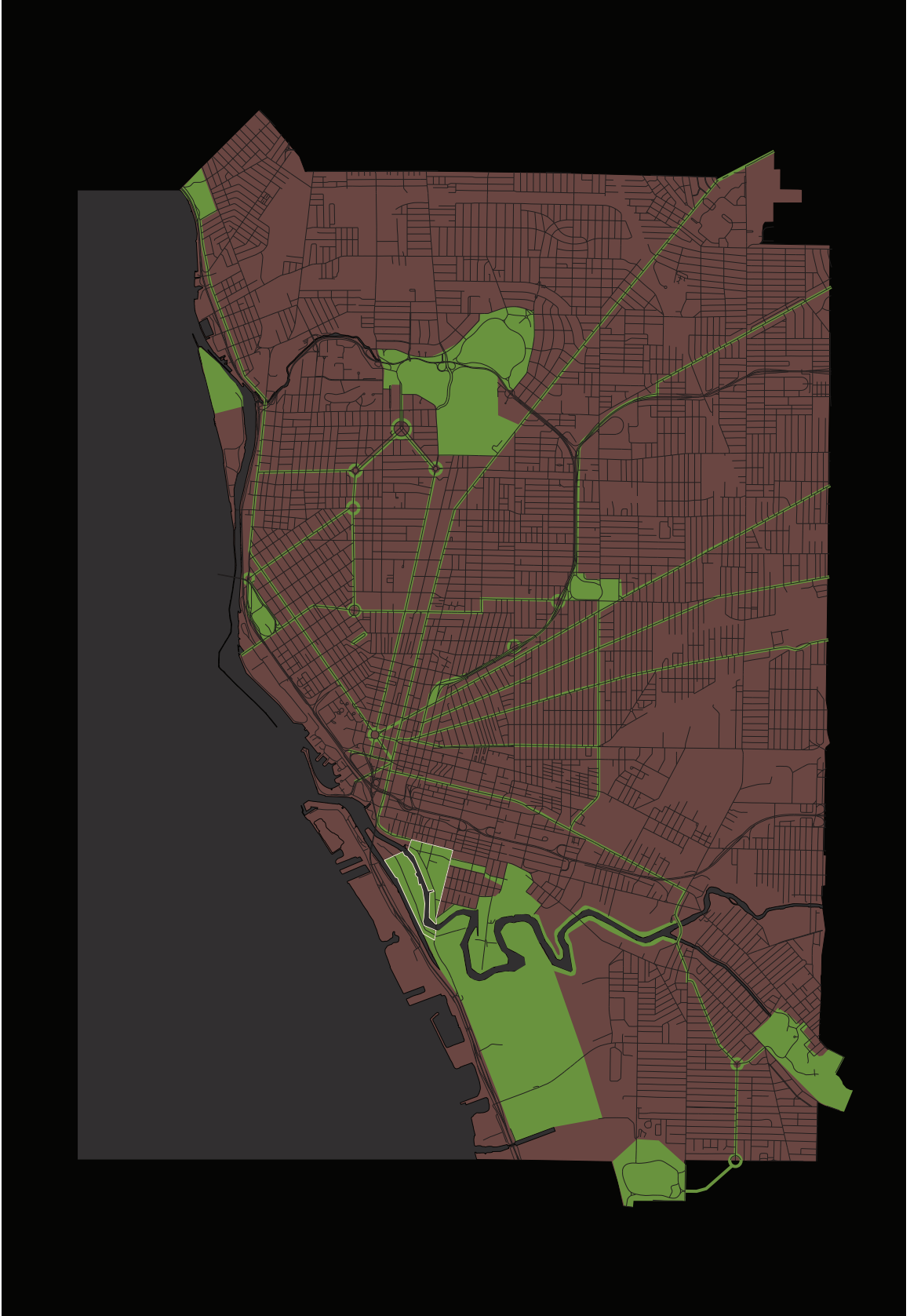
Plan of Buffalo. Highlited are the cities plan to extend Olmstead's park and parkway network and the thesis site.

## HYBRID LANDSCAPES

In the context of decreasing density and rapid decentralization, the use of landscape as a model for urbanism has been recognized as an effective tool to activate space and produce urban effects without the 'weighty apparatus' of traditional place making.[5] Most infrastructure decreases in value over time while landscape increases. Traditional urban design's reliance on building alone proves slow, inflexible and costly in relation to the changing conditions and urban culture of places like Buffalo.[6]

OMA and Bernard Tchumi's entries for the Park de La Villete competition marked a departure from traditional urban design practices in favour of a strategic, layered and flexible approach focused on landscape. Rem Koolhaus writes, "the underlying principle of programmatic indeterminacy as a basis of the formal concept allows any shift, modification, replacement or substitution to occur without sacrificing the initial hypothesis.[7]"



(Top) *Reclamation*, 2003. Earth as a medium for mineral landscapes. From Robert and Shana ParkeHarrison. (Bottom) *Terra Nova*, Korean DMZ. Hybrid landcapes. From Lebbeus Woods.

5. James Corner, "Eidetic Operations an New Landscapes." *Recovering Landscape: Essays In Contemporary Landscape Architecture*, ed. James Corner (New York: Princeton Architectural Press, 1999), 153.
6. *Ibid*, 39.
7. Grahme Shane, "The Emergence of Landscape Urbanism," *Landscape Urbanism Reader*, ed. Charles Waldhiem (New York: Princeton Architectural Press, 2006), 218-239.

Several international competitions serve as precedents for dealing with large-scale post-industrial sites. Toronto's Downsview Park competition and the Fresh Kills competition on the world's largest landfill in Staten Island are two notable examples. Stan Allen's Field Operations entry for Fresh Kills and OMA's entry for Downsview both outline ideas of phasing, succession planting, habitat as well as programmatic and planning regimes. The projects demonstrate a complex interweaving of ecology with social, cultural and infrastructural layers of the city.

Central to ideas of landscape urbanism is a challenging of the pastoral idea of landscape and nature that is deeply ingrained in site and society. There is a conviction that nature is a stable, holistic community held in perfect balance if humans can avoid disturbing it[8]. This thesis challenges this relationship between man and nature in search of a new relationship.

Buffalo's tattered fabric requires reordering of the relationship between ecology, infrastructure and building. Landscape is a proven medium capable of addressing change with enough flexibility that it can to respond to temporal change, transformation, adaptation and succession.
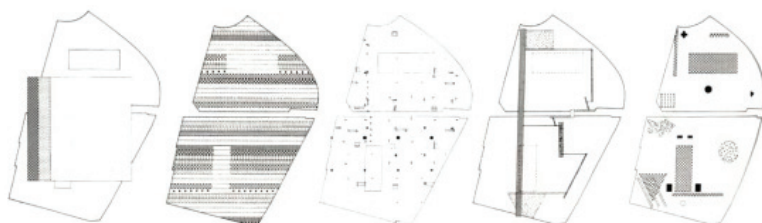


Park de La Villette. From The Office of Metropolitan Architecture, Park de La Villette competition.

8. William Cronon, *Uncommon Ground: Rethinking the Human Place in Nature.* New York; W.W Norton & Company Inc, 1995

# LANDSCAPE AND CAMPUS

## A BRIEF HISTORY OF CAMPUSES

### THE CLOISTER AND QUADRANGLE

The term *academy* --an institution of higher learning and research-- is rooted in landscape. Academy comes from the Greek *akademia*, which referred to the sacred groove of olive trees outside of Athens where Plato would instruct students[9]. The term *campus* itself was derived from the Greek terminology for a "green" or open landscaped area[10]. Thus, landscape was fundamental to the campus long before buildings were built for academic pursuit.

However, while one may trace the origins of the university to the monastic cloister, medieval colleges were not as thoroughly patterned on monastic models as once supposed. The influence was strong, and in a number of cases colleges were founded on (and later took over) monastic structures. It was the programmatic similarities between monasticism and academic life -- housing unmarried men and boys with spaces for eating, sleeping, receiving instruction and religious services -- that remained unchanged as universities began forming throughout Europe. The quadrangle became the recognizable form of medieval campus planning and was the central landscape typology. The quadrangle remains perhaps the most recognizable urban form of campus architecture today.

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9. Paul Venable Turner, *Campus: An American Planning Tradition* (Cambridge: The MIT Press, 1985)
10. *Ibid, 12*

Campus figure ground study. A collection of drawings from universities visited as part of the Rosetti Scholarship.(Left)Dalhousie Sexton Campus, Halifax . University of Virgina, Virgina. Christ's Church College, Oxford. (Right)Alma Mater Studiorum Di Bologna, Bologna. Carl Bo Town Campus, Urbino. Carl Bo Greenfield Campus, Urbino.

*THE COLONIAL COLLEGE*

The next great leap in campus planning came with the American colonial college. The American college had a unique character and tendency to be located on the frontier rather than in cities. Two factors contributed to this: a distrust of cities, which were viewed as centers of irreligion and discord, and an attraction to the beauty of nature. The American college saw the development of the college green or lawn typology. Initially modeled on an open quadrangle, the lawn was a unique expression of North American educational ideals. Most notable is the great lawn at the University of Virginia designed by Thomas Jefferson. At the head of the lawn was a library, as opposed to a church, which had previously been the standard focal point for universities. The library was designed to represent the "authority of nature and power of reason" and was modeled on the pantheon in Rome[11]. The campus plan embodied ideals of democracy and a new separation between education and religion.

It was not long before these early American institutions began taking on some of the urban character they had once strived to escape. The cities expanded around them, but their landscape character remained. Universities of the past one hundred years tended to be characterized by dramatic growth. As these universities evolved, becoming larger and increasingly complex, they began to lose an important ideal of the colligate experience: a community of scholars. In some contemporary campus plans, the desire to return to nature and escape civilization to persue academia has been implemented. Numerous examples can be found throughout North America and internationally and vary greatly in their expression. Giancarlo de Carlo's Greenfield campus

11. David Neuman, *Building Type Basics for College and University Facilities* (New York: Wiley & Sons, 2003) 30

at Urbino demonstrated a particular sensitivity to the landscape while creating an overall coherent campus.
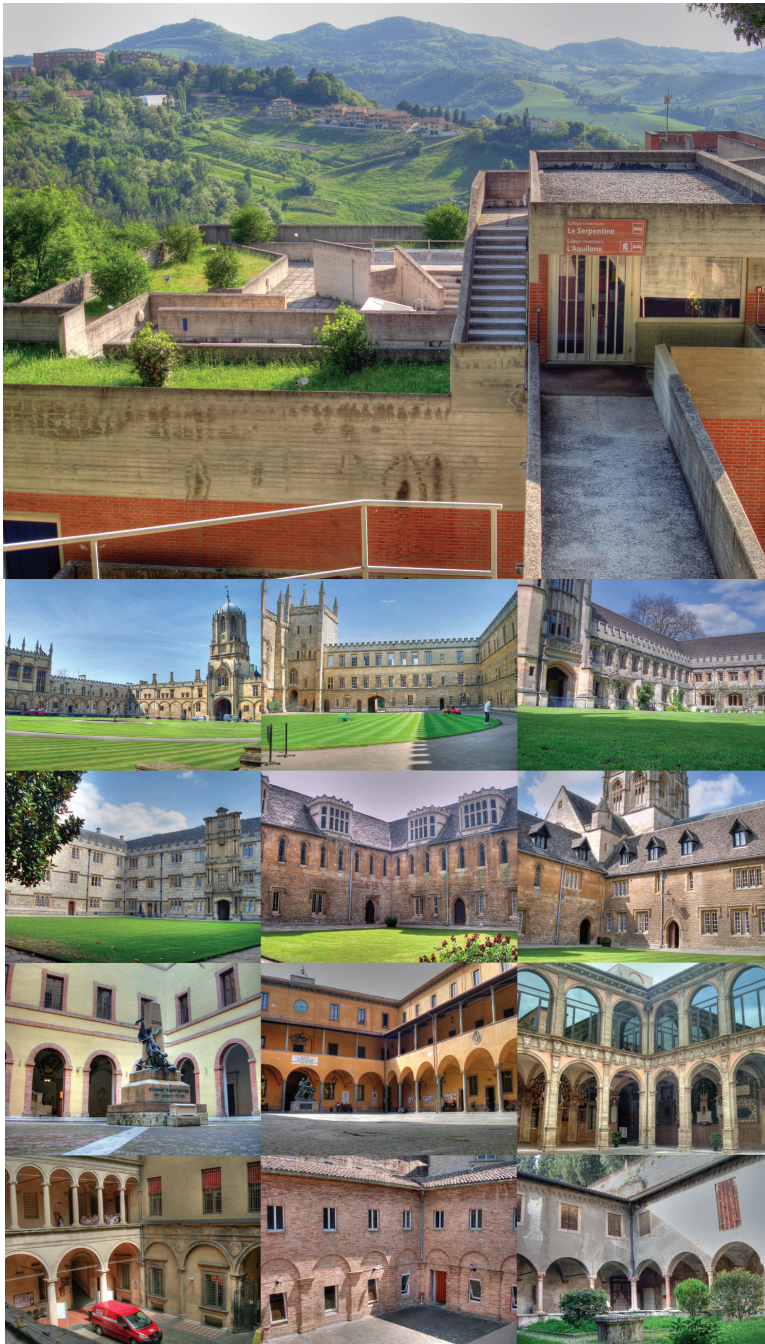


(Top) Giancarlo deCarlo's greenfield campus at Urbino, intigrating landscape and campus architecture. (Bottom) Medievil campus quad study. Quads from Oxford, Bologna, Pisa, Urbino and Sienna.

## CAMPUS LANDSCAPE | CAMPUS LANDMARK

Throughout history the campus appears to be defined just as much by its landscape character of quads, lawns, meadows sports fields, etc., as it does by its built typologies. Campuses therefore become an interesting example in the examination of relationships between landscape, infrastructure and building.

Universities tend to be organic; they grow and change over hundreds of years. Commercial and industrial buildings, however, usually cycle more-or-less every 50 years. The university campus model has proved resilient in a variety of conditions largely because of its adaptability.

The overall university character can be viewed as a simple result of growth and change, but a well functioning campus can only emerge when carefully planned and keenly managed. To achieve this, it is necessary acknowledge certain requirements: an enduring planning framework, a compelling landscape character, controlled perimeter treatments and carefully managed encounters[12]. If these general principles are applied rigorously over time, it will contribute positively to the campus's intelligibility and overall aesthetic. A successful campus plan should unite two-dimensional adjacencies in plan with the three-dimensional realities of topography, landscape, and building massing to bring about a well functioning campus. The campus plan is not a "master" plan, because it must respond to change and be adaptive to new generations. The district or precinct plan becomes a more detailed vision of a particular area; it interprets the campus plan at the level of the neighborhood. The university campus can be viewed as a microcosm of the city, which is fitting for the study settlement in a city in decline on a reasonable scale. In the context

12. *Ibid, 12*

of South Buffalo, there exists the opportunity to investigate a new relationship between town and gown, and the university and nature. The voids left from acres of vacant industrial land allow for idyllic landscape setting, while maintaining close proximity to the city and transit.



(Left) Urban voids. The mineral landscape along the Buffalo creek that is slowly returning to nature. (Right) Hybrid landscape precident. Cappadocia, Turkey.

## DESIGN

### FLEXIBLE METHODS

Some projects offer limitless possibilities and require self-imposed operations to generate form. A kit of parts and a set of operating rules impose a rigor on an otherwise unencumbered circumstance.[13] Instead of a single system able to accommodate a totalizing program, the campus can be viewed as an urban field made up of various layers, each with their own rules. A campus can grow over hundreds of years and in the context of a shrinking city the flexibility of this approach is critical to success. An architectural and landscape kit of parts, which accommodate a variety of programmatic demands, can provide this. The process allows for incremental growth as new typologies are utilized. The result is a net or field where elements cross, mix, overlap and intersect. Relationships between elements and their intersections are stressed over the continuous development of a single form.

In Kevin Lynch's *The Image of the City,* he outlines how users understand their surroundings in consistent and predictable ways, forming mental maps with five elements: paths, edges, districts, nodes and landmarks. Campus typologies can be understood as fitting into these elements. The basic building typologies that make up campuses include: residence buildings, dining halls, academic buildings, libraries and recreational facilities. The landscape typologies include: lawns, avenues, quads, sports fields and meadows.

Flexibility is a critical component of any campus plan. As needs and desires change, the various landscape and building

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13. Thom Mayne, *Urban Book* (New York: Rizzoli, Forthcoming, Draft 2009) ,15.

typologies that accommodate particular functions can be selected, proliferated and hybridized based on general planning strategies. It is especially important within the context of shrinkage that a methodology for organic growth is taken into account.

## PLANOMETRIC | TOPOGRAPHIC

The campus is conceived to exist within the landscape, instead of dominating it. Large pieces of program are slipped under a layer of ground with the intention of creating a more balanced relationship between building and landscape. Lebbeus Woods describes a new attitude emerging towards architecture, "one that plays down a heroic conquest of nature and looks for modes of coexistence with it. As in all cases of coexistence, neither presence is sacrificed at the expense of the other; rather, each impacts the other in creating—hopefully—a balance, even a new form of harmony."[14]The program is organized topographically as opposed to the typical plano-metric view of the city. This layering increases the utility of the site without sacrificing open space. Through the articulation of ground conditions, spaces become activated and microclimates are created. This integrative shaping of built form and landscape establishes a series of varied environments that accommodate the development's mixed-use program: a center for culture, education, and recreation.

14. Lebbeus Woods, "Building Landscapes," 12 Nov. 2010 <http://lebbeus-woods.wordpress.com/2010/09/13/building-landscapes/>

## INTERSECTION | OVERLAP

The layering and intersection of the different architectural and landscape typologies creates new relationships between parts. In nature, areas of intersection between different landscape types are areas of great biodiversity. The complexity that emerges when two systems overlap creates a zone of increased diversity. The richness and complexity that occurs in nature within the ecosystem can be applied to architecture. When different elements of the kit of parts collide, gathering spaces and lobbies are formed. In these spaces, members of the university and community collide with one another and engage in conversation; trading ideas, inspiration and information. These spaces promote increased cross-disciplinary interaction and communication. The overlapping architectural typologies create a heightened sense of space because of the complexity generated from intersecting forms, which creates an environment for exchange and interaction.
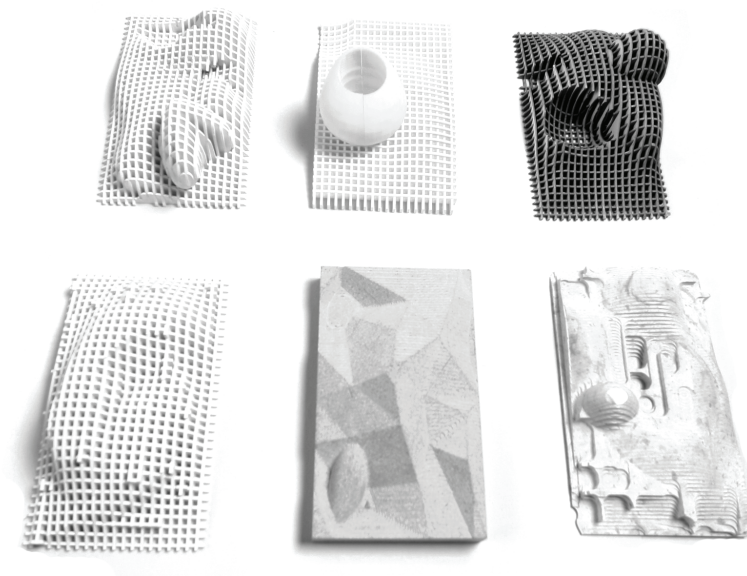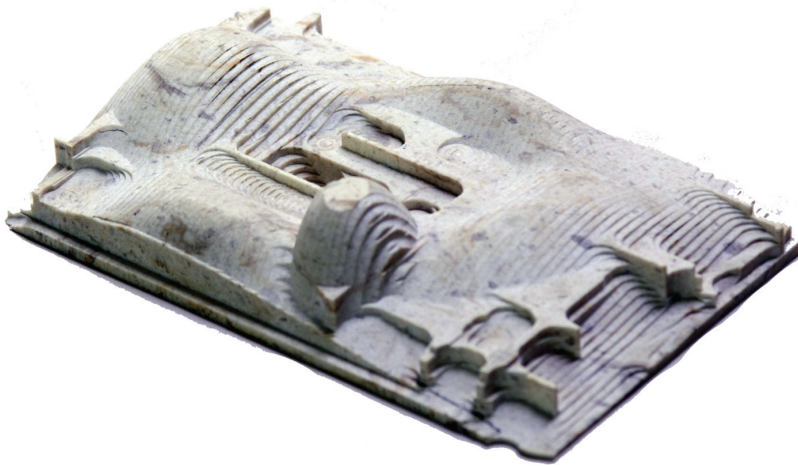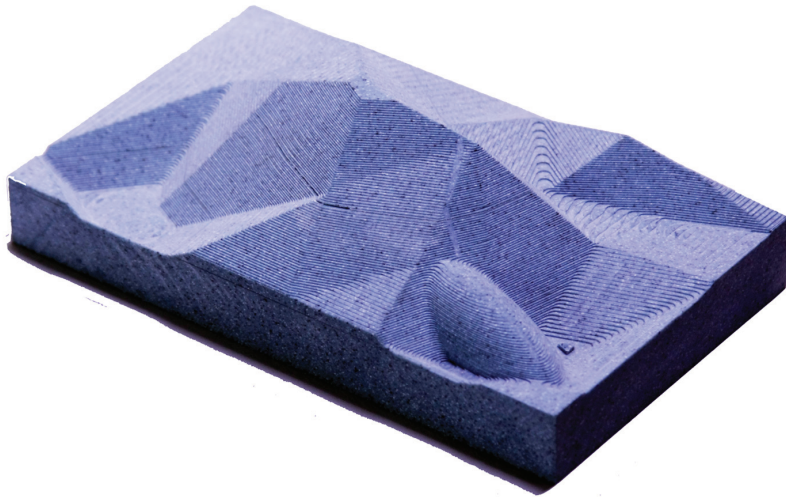
Study models: laser cut acrylic and card, CNC Corian, 3d print.
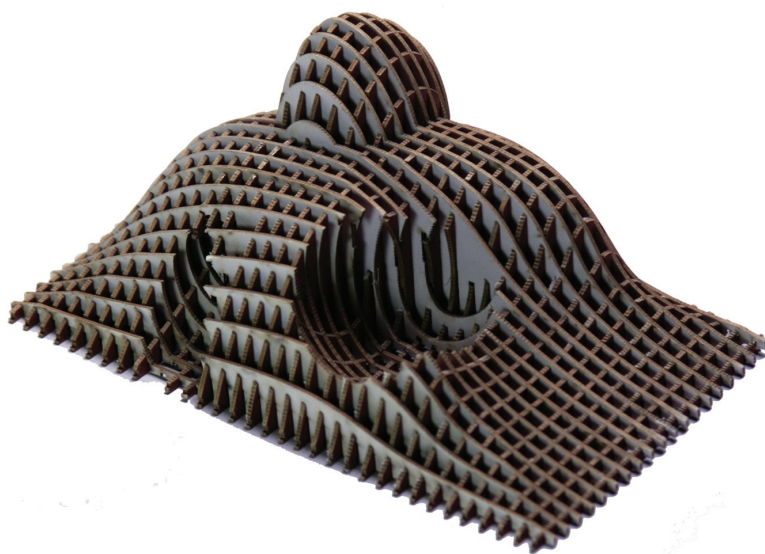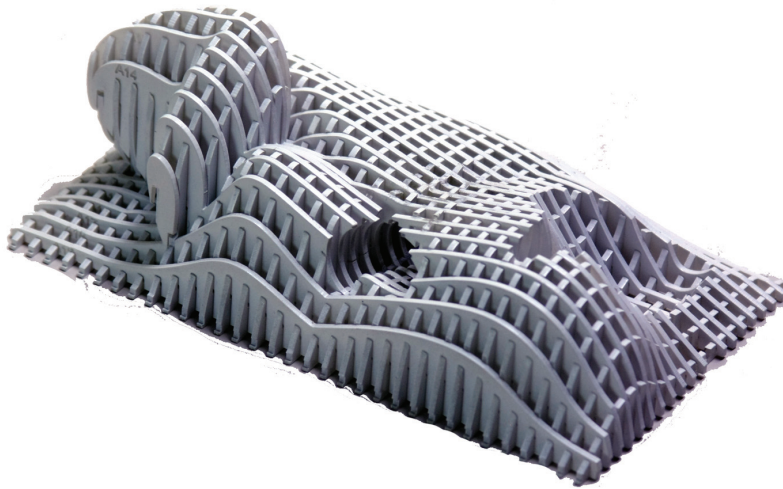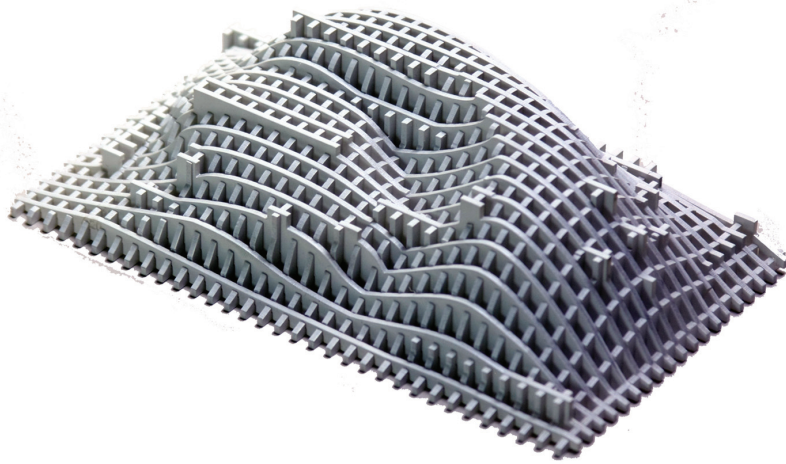
Abstract laser cut study models explore ideas of collage and intersection. The relationship between morphological land and typological building are blurred.

CNC Corian study models explore ideas of collage and intersection. The relationship between morphological land and typological building are blurred, as it is difficult to determine where one ends and another begins.

**ANYLYTICAL TOOLS**

In order to approach design at the scale of the site with a degree of control and rigor, a set of tools were developed that utilize parametric capabilities. Ideally, this process would be able to adapt to increasing amounts of information and complexity.

*TOPOGRAPHY AND LANDSCAPE GENERATOR*

The first tool was a landscape and topography generator. Because of the site's industrial past, large volumes of earth require remediation. As opposed to having it dealt with offsite, the scheme proposes to deal with all the remediation onsite through a more long-term process of Phytoremdiation. This process has the capacity to fix toxins, absorbing them into their biomass, rendering them environmentally innocuous. The earth and building waste that is being remediated would become the medium through which the landscape can be designed. Over time, the site could start to absorb construction waste from other demolished buildings in the city. The tool uses color-coding to indicate various heights and the planting types that would be associated with them. A grasshopper script generates a continuous surface that can change over time. A similar process could be used to indicate areas of higher soil toxicity, which would generate the surface. The landscape elements will be planted incrementally over time as funding permits, gradually building up the site's mass into a flexible patchwork of planted zones separated by open undesignated areas. The landscaping can be staged in long term phasing, starting with site and soil preparation and pathway construction. Ultimately the tool allows for the design of an articulation of the ground condition with flexibility and control.
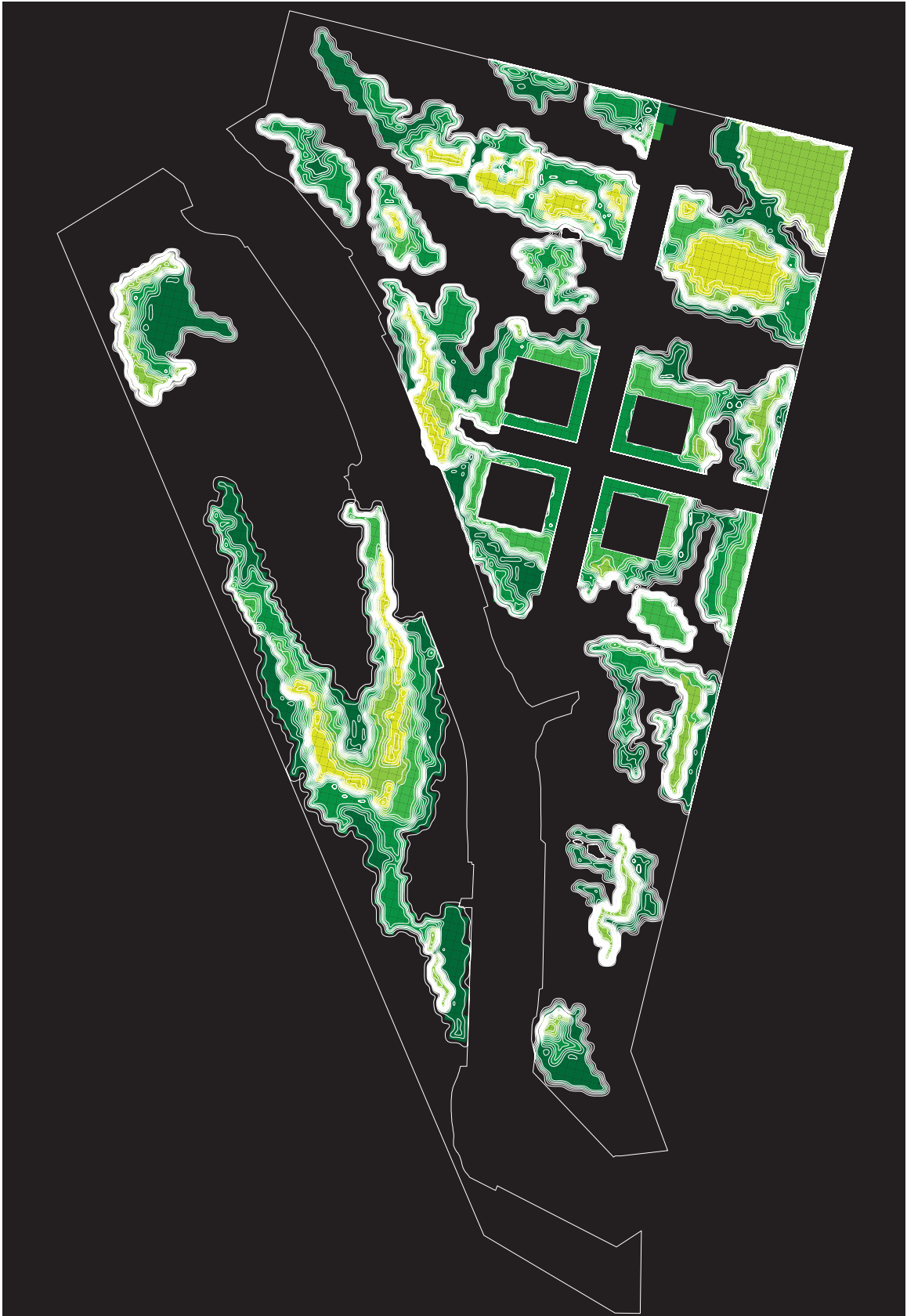
Topography generator diagram.

The scheme is built around pathway connections across the site. I used the adjacent neighborhood streets and blocks context - in particular the incoming lines of circulation and shortcuts across the site as an important input for the generation of the urban geometry. A parametric dynamic relaxation tool achieved a parametrically tuned bundling of the incoming paths into larger paths, enclosing larger sites. The resultant lateral path system exhibits the basic properties of Frei Otto's minimizing detour network[15]. Wool-thread models are able to compute a network solution between given points that optimize the relationship of total network length and the average detour factor imposed. This technique has been used in recent Zaha Hadid master plan projects. Patrick Shumaker describes the principles:

> "for each set of points, and for each adopted sur-length over the theoretical direct path, an optimizing solution is produced. Although no unique optimal solution exists, and each computation is different, characteristic patterns emerge in different regions of the parametric space."[16]
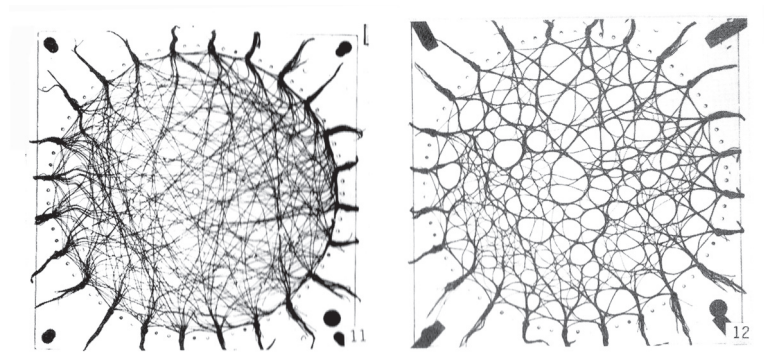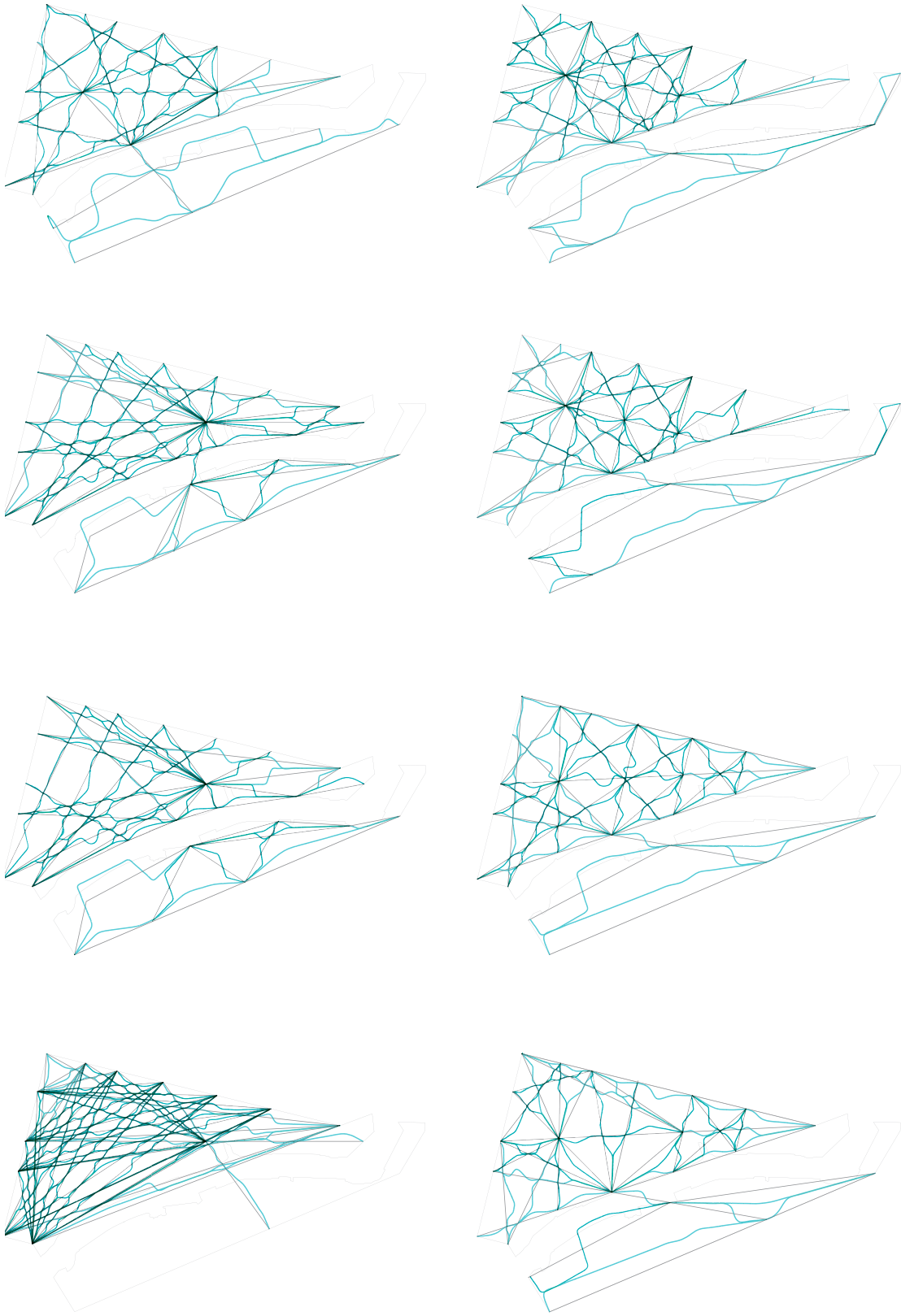


Marek Kolodziejczyk, wool-thread model to compute optimised detour path networks. From Frei Otto's Institute for Lightweight Structures (ILEK), Stuttgart, 1991. The system creates an efficient network - through the relaxation of threads - thus reducing the amount of path with the minimal amout of detour.

15. Patrcik Shummaker, & Christian Rogner, "After Ford." *Stalking Detroit*, ed. Georgia Daskalakis, Charles Waldheim, Jason Young (Barcalona: Actar, 2002)
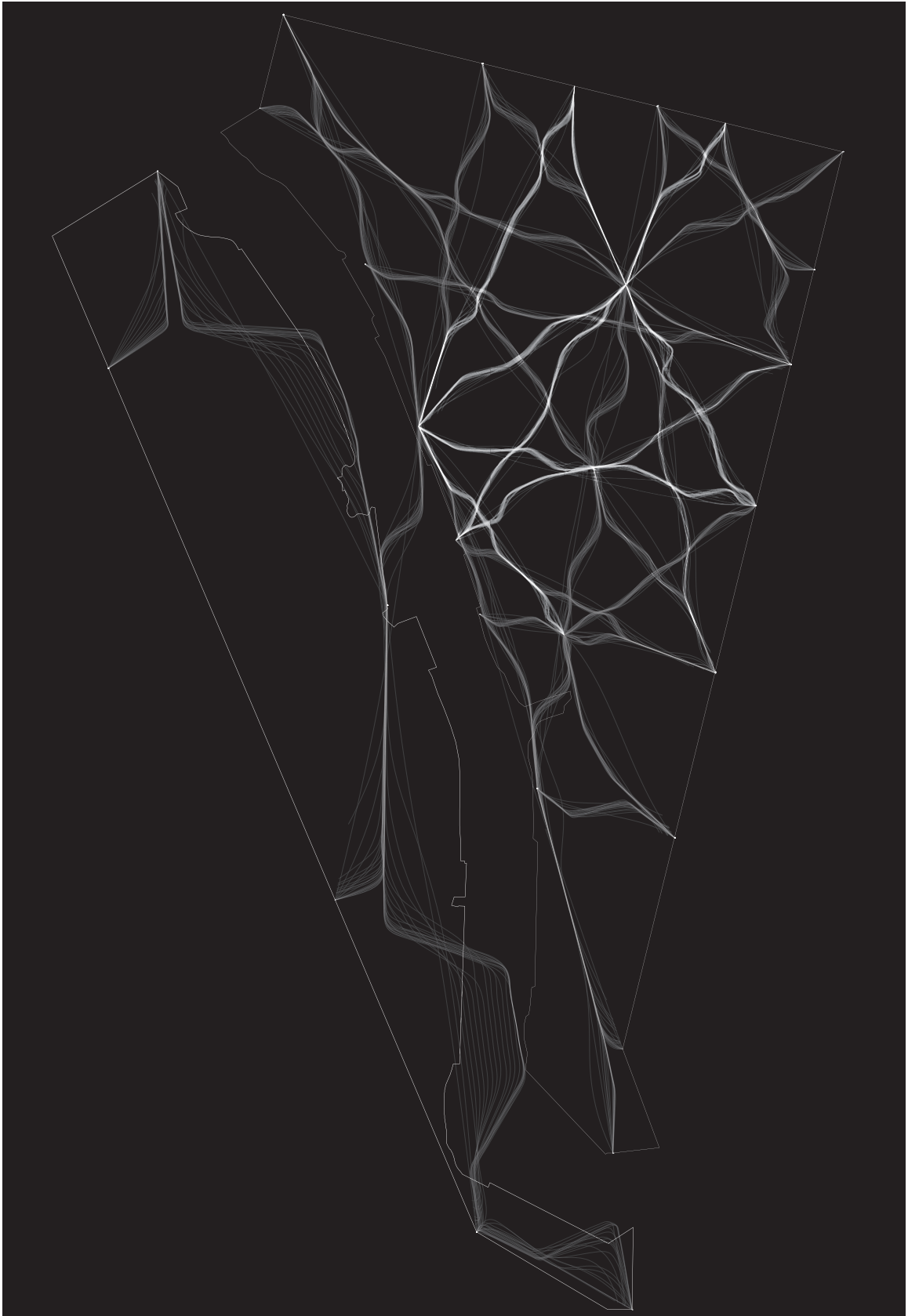16. Patrik Schumacher, "Parametricism - A New Global Style for Architecture and Urban Design", *AD Architectural Design - Digital Cities*, 1 Aug. 2010.

Longitudinal and horizontal axis were imposed via two primary arteries. The result was is a hybrid between minimizing detour network and deformed grid. This system negotiates the underlying grid of the city that extends into the site. Paths of circulation act as mixers, connectors and activators of different landscape and program elements. Two main pedestrian malls bisect the site and define a variety of spaces. Together, the scheme fully integrates city and nature whereby their division is indistinguishable.
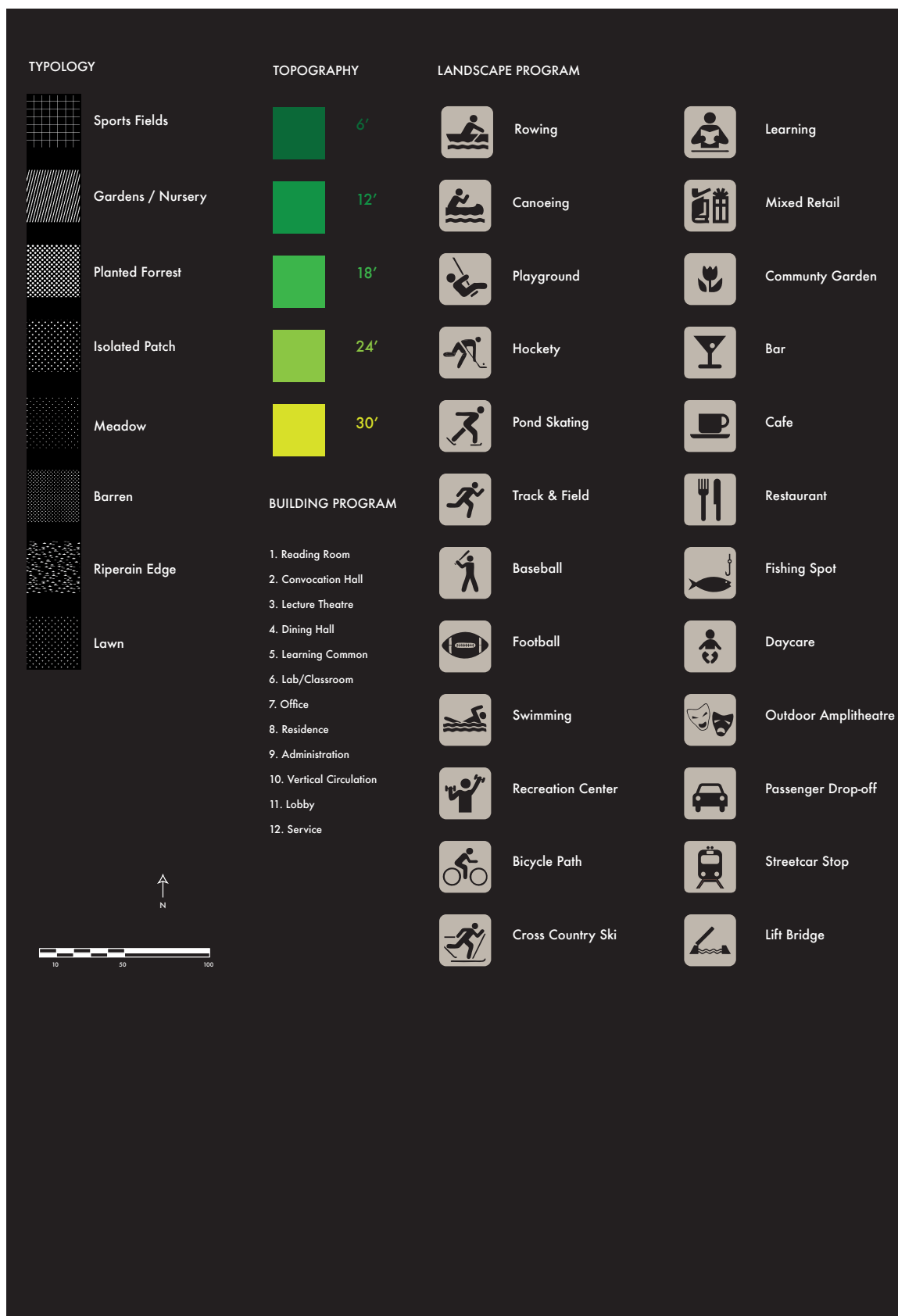
Path option study.

Wet wool path network diagram.

**TYPOLOGY**

Sports Fields

Gardens / Nursery

Planted Forrest

Isolated Patch

Meadow

Barren

Riperain Edge

Lawn

**TOPOGRAPHY**

6'

12'

18'

24'

30'

**BUILDING PROGRAM**

1. Reading Room
2. Convocation Hall
3. Lecture Theatre
4. Dining Hall
5. Learning Common
6. Lab/Classroom
7. Office
8. Residence
9. Administration
10. Vertical Circulation
11. Lobby
12. Service

N

10        50        100

**LANDSCAPE PROGRAM**

Rowing

Canoeing

Playground

Hockety

Pond Skating

Track & Field

Baseball

Football

Swimming

Recreation Center

Bicycle Path

Cross Country Ski

Learning

Mixed Retail

Communty Garden

Bar

Cafe

Restaurant

Fishing Spot

Daycare

Outdoor Amplitheatre

Passenger Drop-off

Streetcar Stop

Lift Bridge

Drawing key. (Left to Right) Landscape typologies, topography diagram building program, site plan.

**TYPOLOGY | KIT OF PARTS**

The scheme attempts to integrate movement, program, infrastructure and ecology into a single flexible system. The campus proposes an architectural kit of parts that consists of: ribbons - elevated residence and administrative buildings, pods - library and lecture theatres that act as attractors, plinths - large academic and lab spaces that are absorbed by the landscape, teeth - recreational facilities and mixed use community spaces that deal with adjacencies with surrounding context. The scheme also incorporates multiple landscape types: malls—large, democratic spaces which function as connective tissue, quads—more intimate, defined spaces enclosed by perimeter plinth buildings, meadows, planted forest, recreational fields, community gardens, playgrounds, barrens and wetlands. Layers of infrastructure: energy production - geothermal and wind power, circulation - bike paths, pedestrian paths, streetcar and vehicular. The superimposition and layering produce a multilayered surface that integrates campus housing and educational buildings with recreational, cultural, infrastructure and community oriented program elements. Ultimately, the scheme delivers a flexible tool, rather than a fixed, 'designed' form.

Landscape typology diagram.

**Typology:**
## Isolated Patch

Location:
**Intermediate Mounds**

Spatial Function/Program:
**Scale contrast, Increased views**

Ecological Benefit:
**Minimum soil modification, Biodiversity, Habitat for small animals**

Typ. Plant & Animals Species:
**Dogwood, Red Cedar, Bay berry, Snake, Birds, Butterflies**



**Typology:**
## Barren/Existing Berms

Location:
**Upper Mounds**

Spatial Function/Program:
**Corridor formation, Path definition**

Ecological Benefit:
**Early successional diversity, minimum soil modification**

Typ. Plant & Animals Species:
**Blueberry, Red maple, Snake, Groundhog**



**Typology:**
## Public Gardens/ Nursery

Location:
**Proximity to Community**

Spatial Function/Program:
**Food Production, Colour, Visibility from distance, Site identification**

Ecological Benefit:
**Seed production, local food source, trial planting blocks**

Typ. Plant & Animals Species:
**Urbanized genotypes, native herbs, non commercial plants, Species for learning and experimentation**

Kit of a parts 1: isolated patch, barren, public gardens.

Typology:
## Riparian Zone/ Wetland

Location:
**River Edge**

Spatial Function/Program:
**Habitat boundary definition, Emphasis on proximity to water**

Ecological Benefit:
**Mitigation, Adaptation, Surface water cleanup, Flood management, Wastewater/Runoff management,Biodiversity, Nutrient Sink, Water column nutrient supply, Bird habitat**

Typ. Plant & Animals Species:
**Heron, Duck, Turtle, Wetland grasses , Blueberry, Red maple, Frogs, Fish, Muskrat, Mink Beech, American Holly, Yellow Birch...**

Typology:
## Meadow

Location:
**Upper Mounds**

Spatial Function/Program:
**Mound form maintenance and emphasis, Visibility form distance, Increased views**

Ecological Benefit:
**Soil remediation, Population persistence, grazing**

Typ. Plant & Animals Species:
**Various grasses, remideating plants, deer, fox, birds, butterflies**

Typology:
## Planted Forrest

Location:
**Lower Mounds**

Spatial Function/Program:
**Forrest densification, Open space definition**

Ecological Benefit:
**Understory growth, Accumulation of organic matter, Resistance to invasives by minimizing edges**

Typ. Plant & Animals Species:
**Yellow poplar, Black oak, Gray birch, Black cherry, Sassafras, Raccoon, Fox, Rabbit, Birds**

Kit of parts 2: wetland, meadow, planted forrest.

Typology:
**Lawn**

Location:
At Grade

Form:
Open, Linear, Axial

Spatial Function/Program:
Recreation, Connective Tissue, Reflection, Democratic Space, Infinite

Typology:
**Quad**

Location:
At Grade

Form:
Food Production, Colour, Visibility from distance, Site identification

Spatial Function/Program:
Recreation, Connective Tissue, Reflection, Daylighting, Academical Village

Typology:
**Sportsfields/Play grounds**

Location:
Proximity to Community, East Bank of Riverbed

Spatial Function/Program:
Football, Ice Skating, Playgrounds, Hockey, Baseball

Typ. Plant & Animals Species:
Local Grasses, Mulch, Permeable Ground Cover
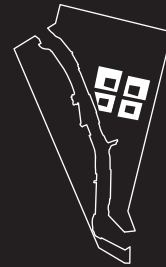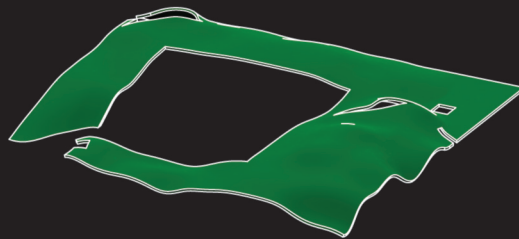
Kit of parts 3: lawn, quad, field.

Typology:
**Path**

Location:
At Grade

Form:
Vectors

Spatial Function/Program:
Connective Tissue,
Pedestrian Circulation,
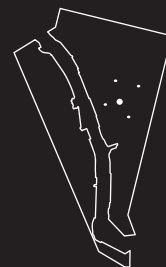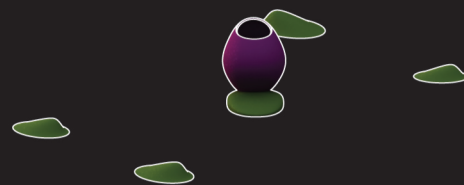Vehicular Traffic,
Streetcar line, Bike Lanes

Typology:
**Plinth**

Location:
Subterranean

Form:
Large Plinth Structure

Spatial Function/Program:
Small Classrooms/Labs
(7,476m²)
Large Classrooms/Labs
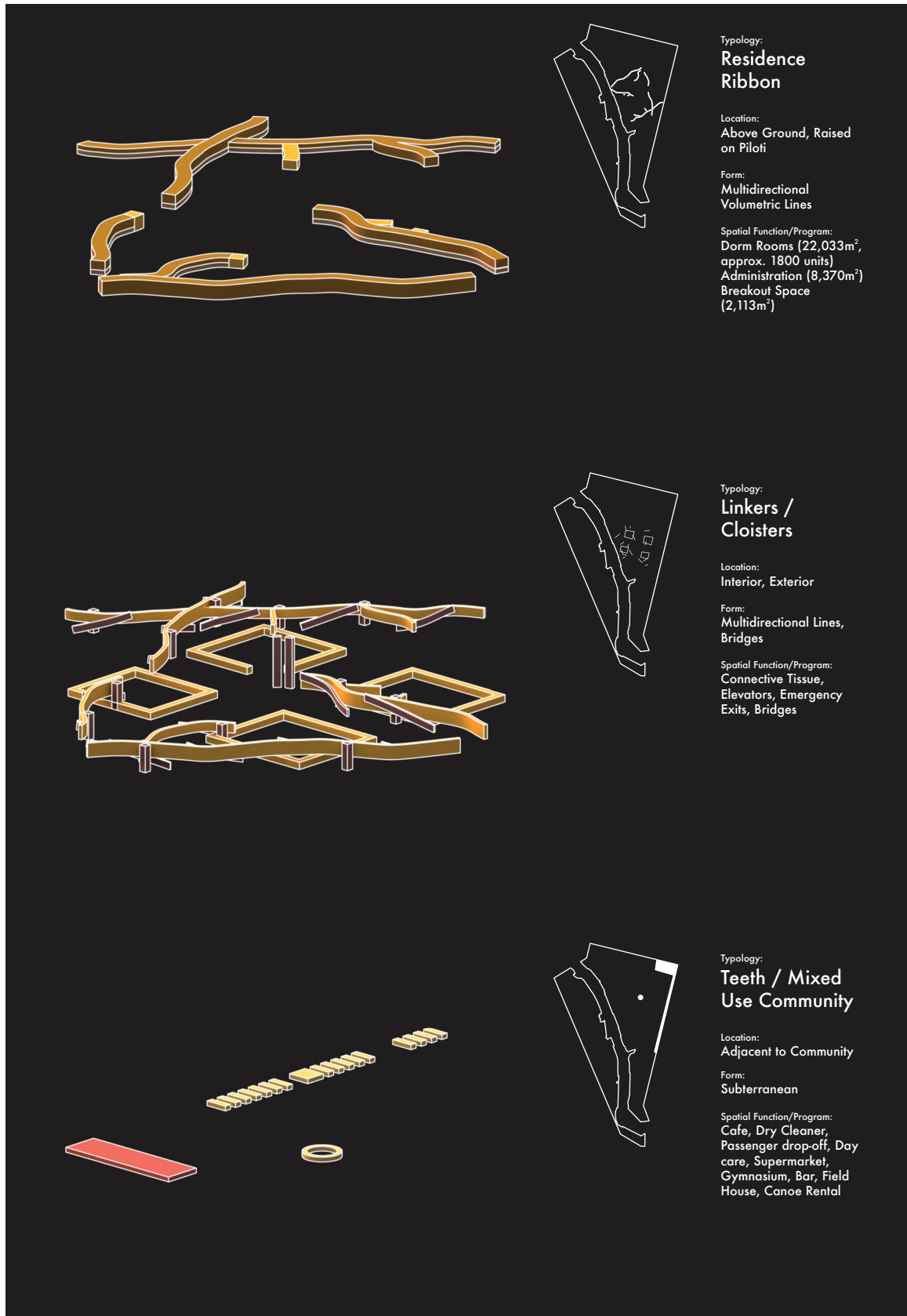(8,943m²)
Learning Common
(2,926m²)
Dining Hall (5,225m²)

Typology:
**Pods**

Location:
Central

Form:
Unique Form, Attractor

Spatial Function/Program:
Convocation Hall
(872m², 600 cap.)
Lecture Theatre
(600-900m², 300-800
cap.)
Library/Reading Room

Kit of parts 4: lines, plinths, pods.

Kit of parts 5: ribbon, linker, teeth.

*RIBBONS*

Living quarters are raised above the landscape on *piloti*. The elevated ribbon-like buildings follow the meandering site paths, which connect important axis on campus. Ribbons have a clear and flexible plan, the rooms are located along a single loaded corridor, with common spaces occurring at points of intersection and overlap.

*PLINTHS*

Plinths absorb the large program elements of the site without sacrificing open space. Classrooms, labs, cafeterias, recreation centers and other large elements are housed in simple adaptable structures where the earth is draped over to create a continuous landscape. The landscape can be pierced, lifted or peeled away to allow daylight into the spaces.

*PODS*

Pods include lecture theatres and a central library building. These elements are objects within the landscape and act as attractors on the campus. The campus has one main pod, which acts as the library. Inspired by the campus tradition of circular reading rooms, the library holds a prominent place on the campus. The library intentionally shares similar proportions to the Radcliffe Camera at Oxford and The Rotunda at the University of Virginia. The voluptuous and plastic forms of the nearby grain elevators also provided inspiration for the shapely pods. The core of the library pod is thought of as a book silo, the verticality of the space is understood as a reference to the adjacent decommissioned grain silos.
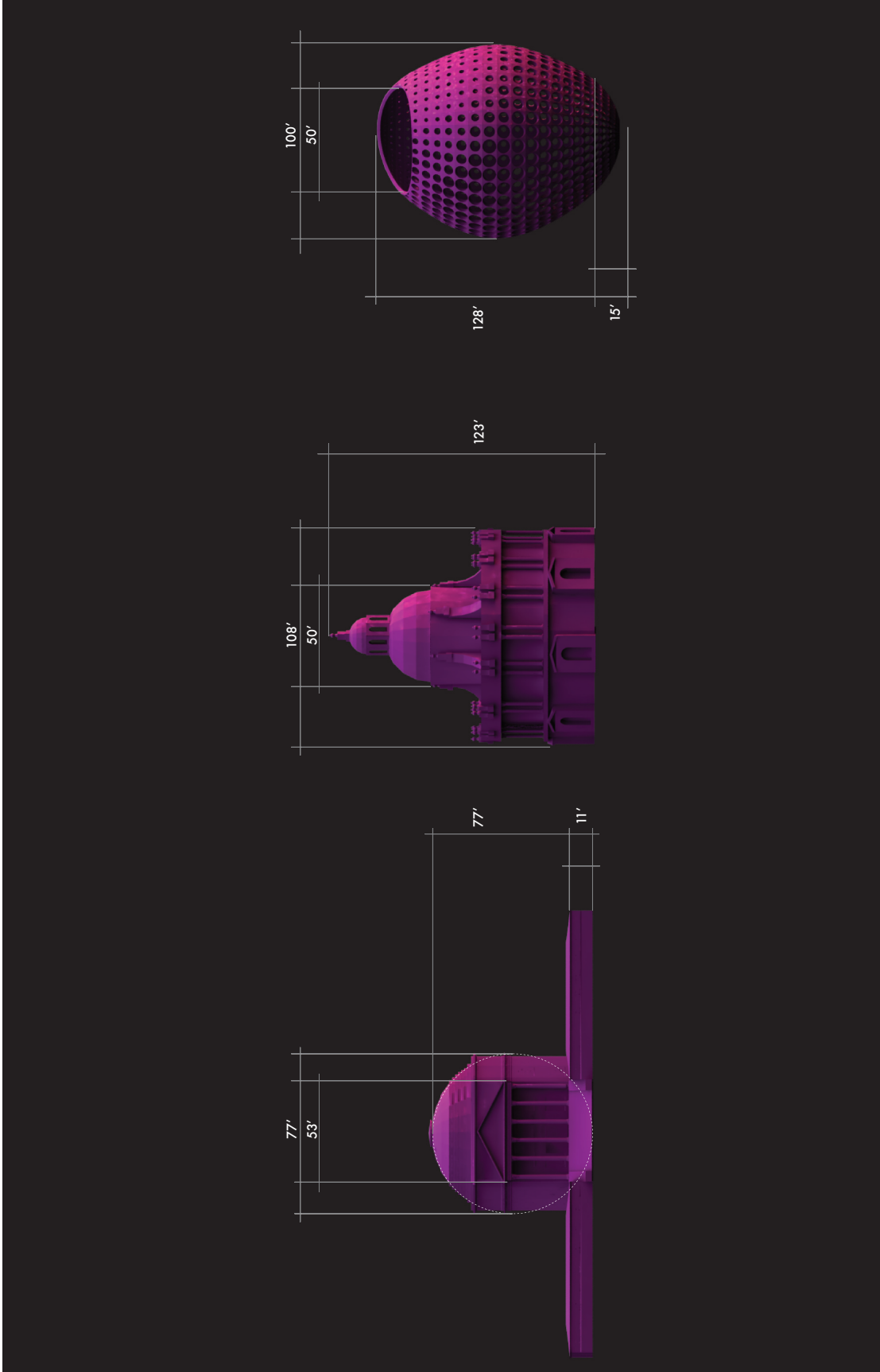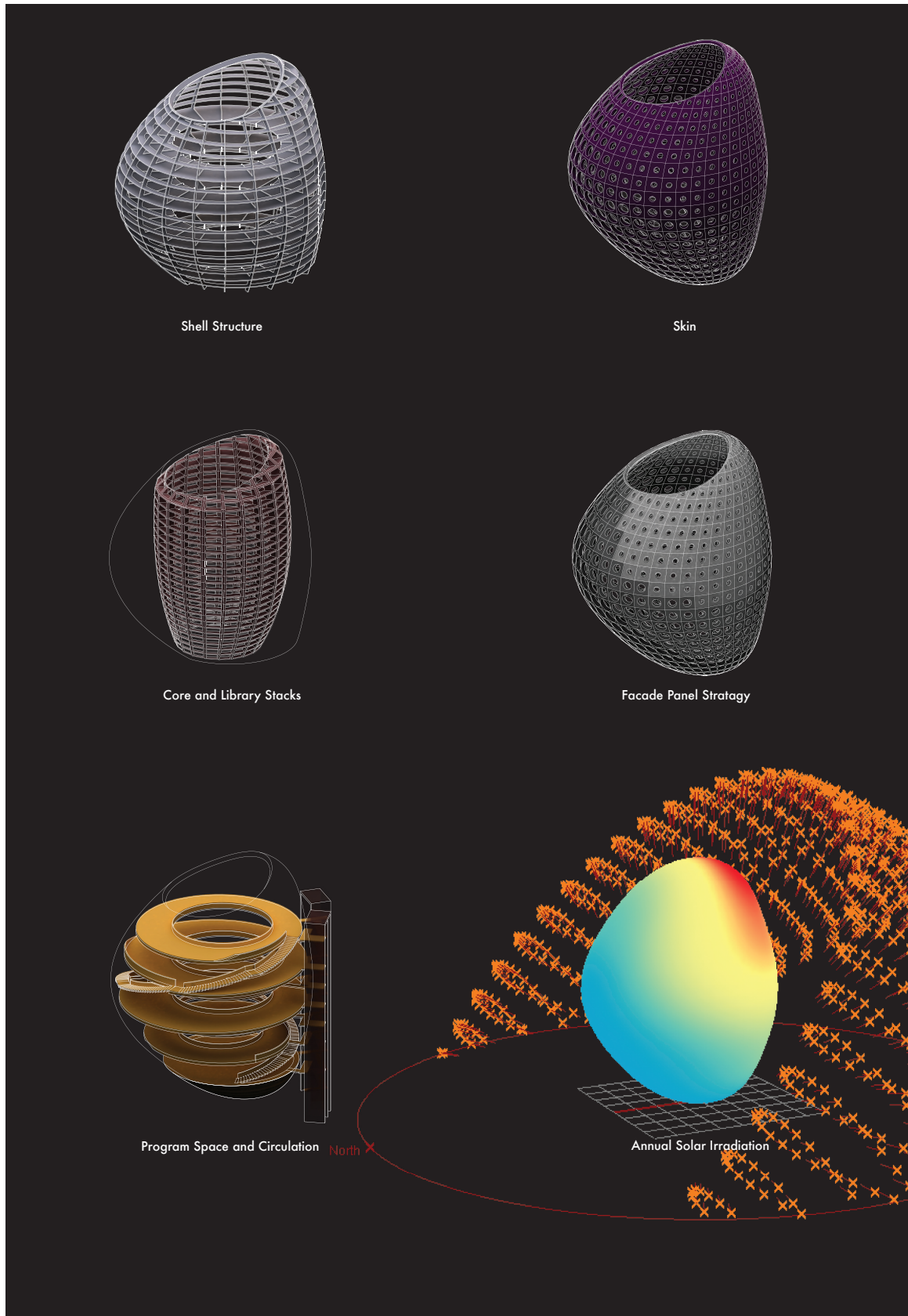
Precidents and insperation. (Left to Right) The Rotunda at The University of Virgina, Radcliff Camera at Oxford and the Library Pod.

Sectional library pod model.

Shell Structure

Skin

Core and Library Stacks

Facade Panel Stratagy

Program Space and Circulation    North

Annual Solar Irradiation

Central reading room / library pod.

*TEETH*

Teeth building house mixed use community elements and are located on the periphery of the site. They hold functions used by community members as well as students. These buildings address the surrounding context.

*LAWN*

The lawn acts as the connective tissue for the campus and symbolizes open democratic space. It defines the grounds for future growth.

*QUAD*

The quad is a more intimate, defined spaces enclosed by perimeter plinth buildings. It also serves as connective tissue for the individual colleges. Each quad is its own precinct within the larger campus.

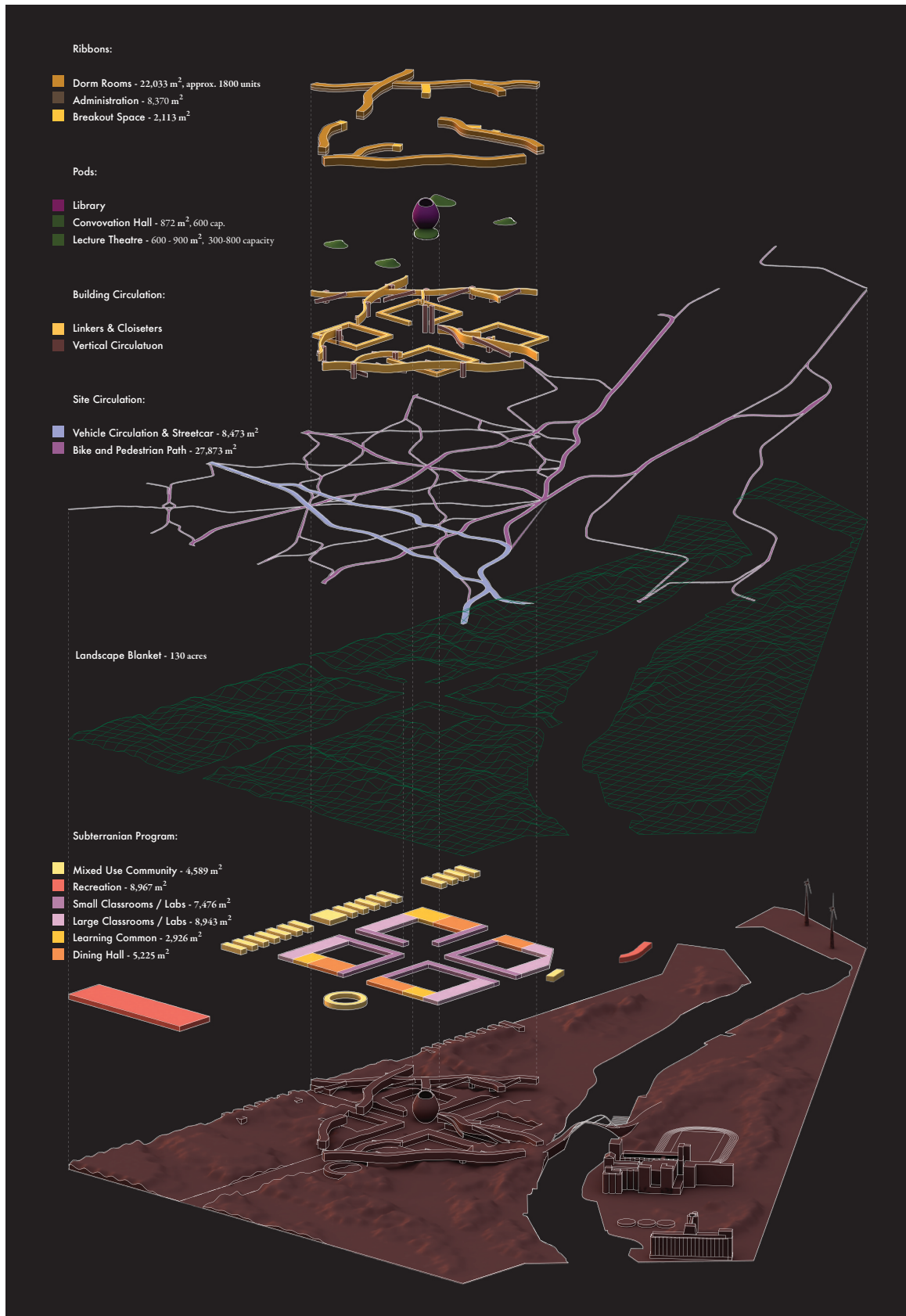Quad with cloister at Magdalen College, Oxford.

*LINES*

A network of paths weaves the city through the campus. The paths are superimposed on the landscape and provide full permeability across the site. A new streetcar line is created, extending from the nearby streetcar barns. A single road also cuts across the site. A station is created for streetcar and passenger dropoff.

*LINKERS*

Linkers also act as a connective tissue for the campus. They allow for circulation vertically and horizontally. Each college's circulation is centered on the quad, taking inspiration from the medieval cloister, which has a strong tradition in campus planning. Entrances into campus buildings occur when linkers and lines intersect. Inspired by the marine legs attached to nearby grain elevators, vertical linkers are tacked onto the outside of ribbons or pods, preserving the clarity and adaptability of their plans.
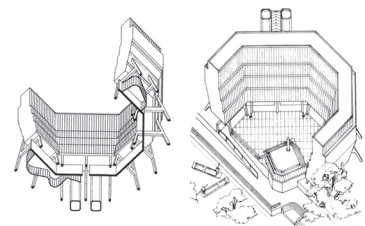
Precedents: (Top) James Stirling, Florey Hall, 1971. The Residence frames a quad. Services and circulation are attached to the form. From Seier Plus Seier. (Bottom) Marine legs attached to the side of Concrete Central grain terminal, Buffalo.
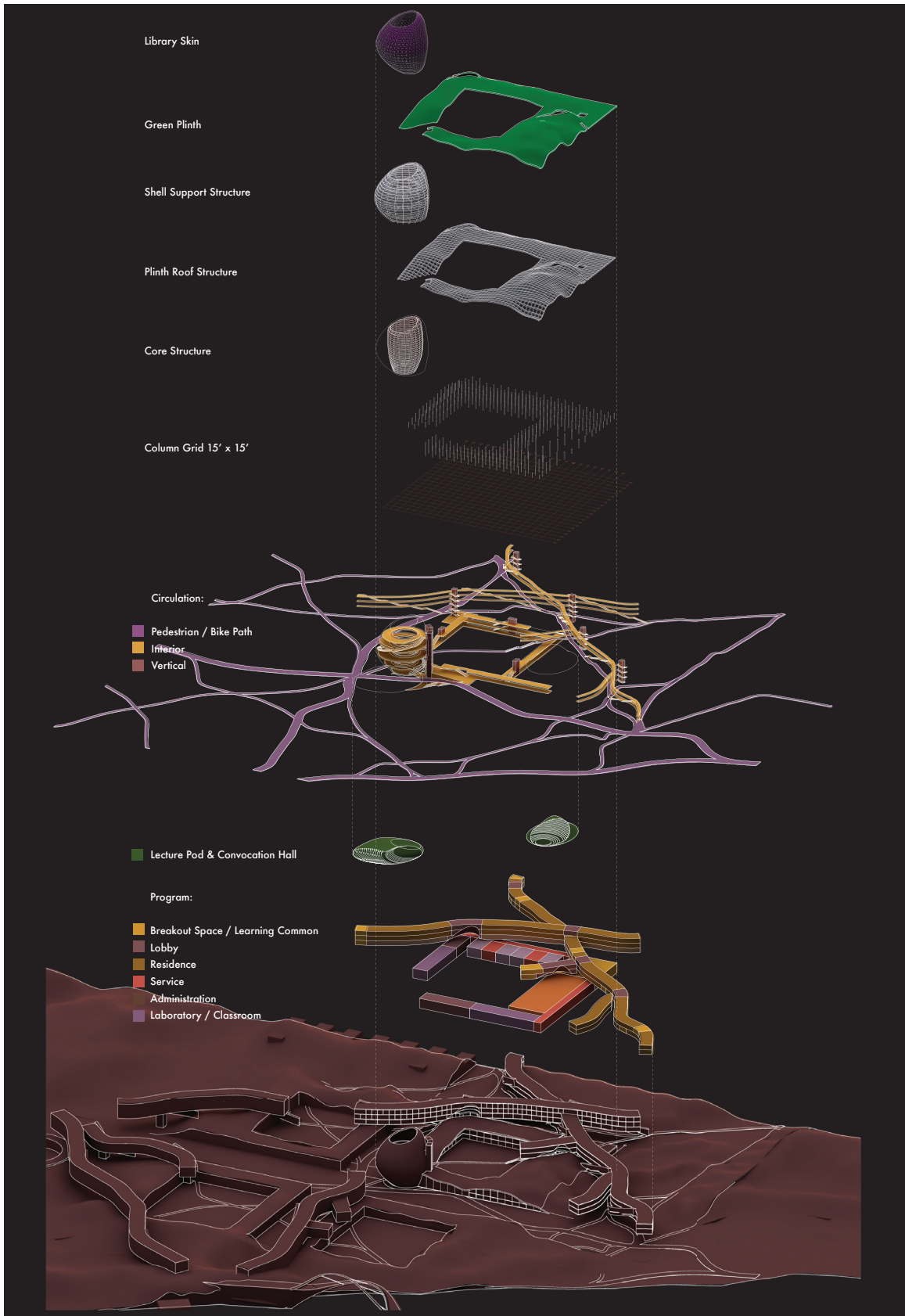
Ribbons:

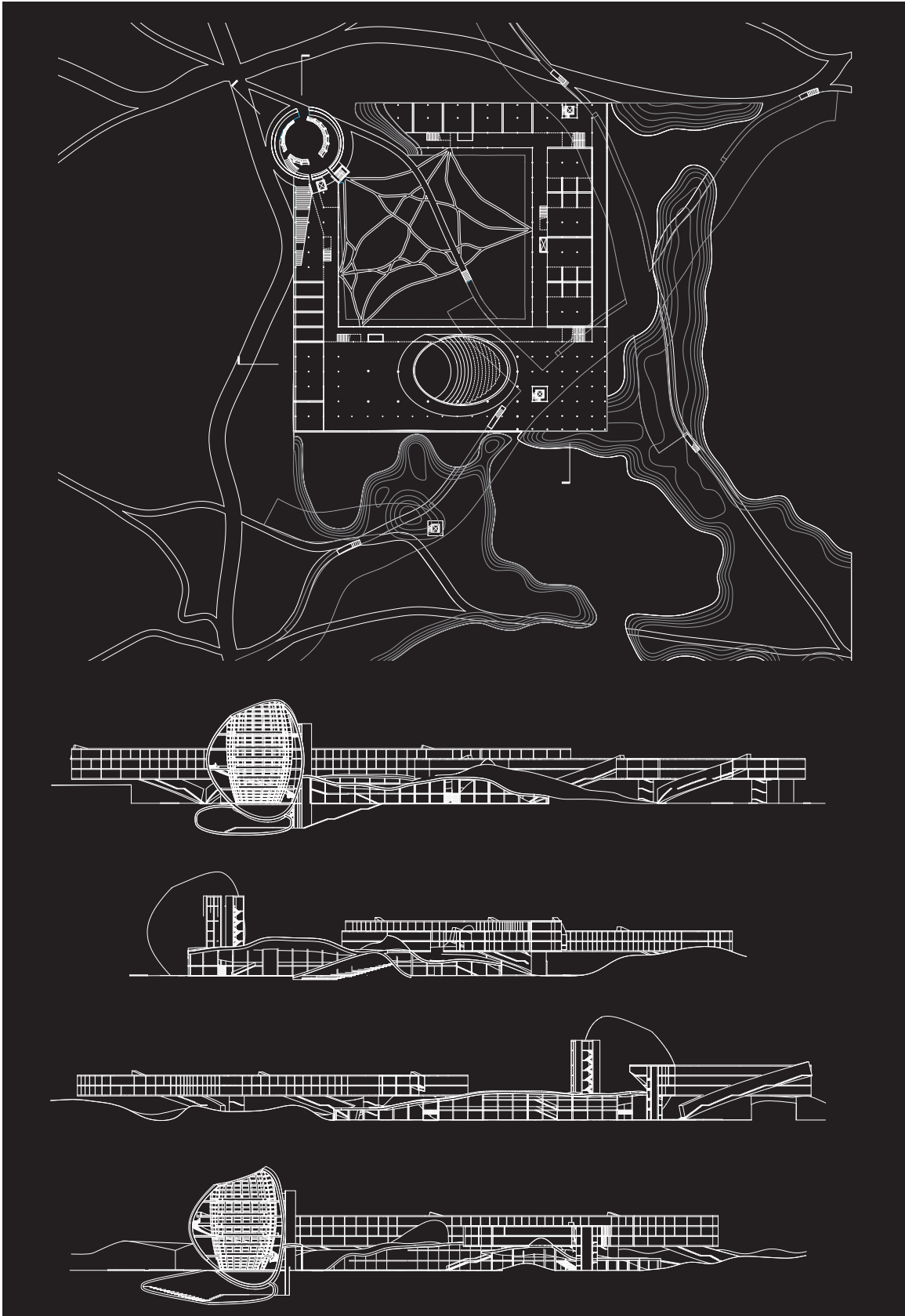Dorm Rooms - 22,033 m$^2$, approx. 1800 units
Administration - 8,370 m$^2$
Breakout Space - 2,113 m$^2$

Pods:

Library
Convovation Hall - 872 m$^2$, 600 cap.
Lecture Theatre - 600 - 900 m$^2$, 300-800 capacity

Building Circulation:

Linkers & Cloiseters
Vertical Circulatuon

Site Circulation:

Vehicle Circulation & Streetcar - 8,473 m$^2$
Bike and Pedestrian Path - 27,873 m$^2$

Landscape Blanket - 130 acres

Subterranian Program:

Mixed Use Community - 4,589 m$^2$
Recreation - 8,967 m$^2$
Small Classrooms / Labs - 7,476 m$^2$
Large Classrooms / Labs - 8,943 m$^2$
Learning Common - 2,926 m$^2$
Dining Hall - 5,225 m$^2$

Site axonometric.

Site plan with local context.

Library Skin

Green Plinth

Shell Support Structure

Plinth Roof Structure

Core Structure

Column Grid 15' x 15'

Circulation:

Pedestrian / Bike Path
Interior
Vertical

Lecture Pod & Convocation Hall

Program:

Breakout Space / Learning Common
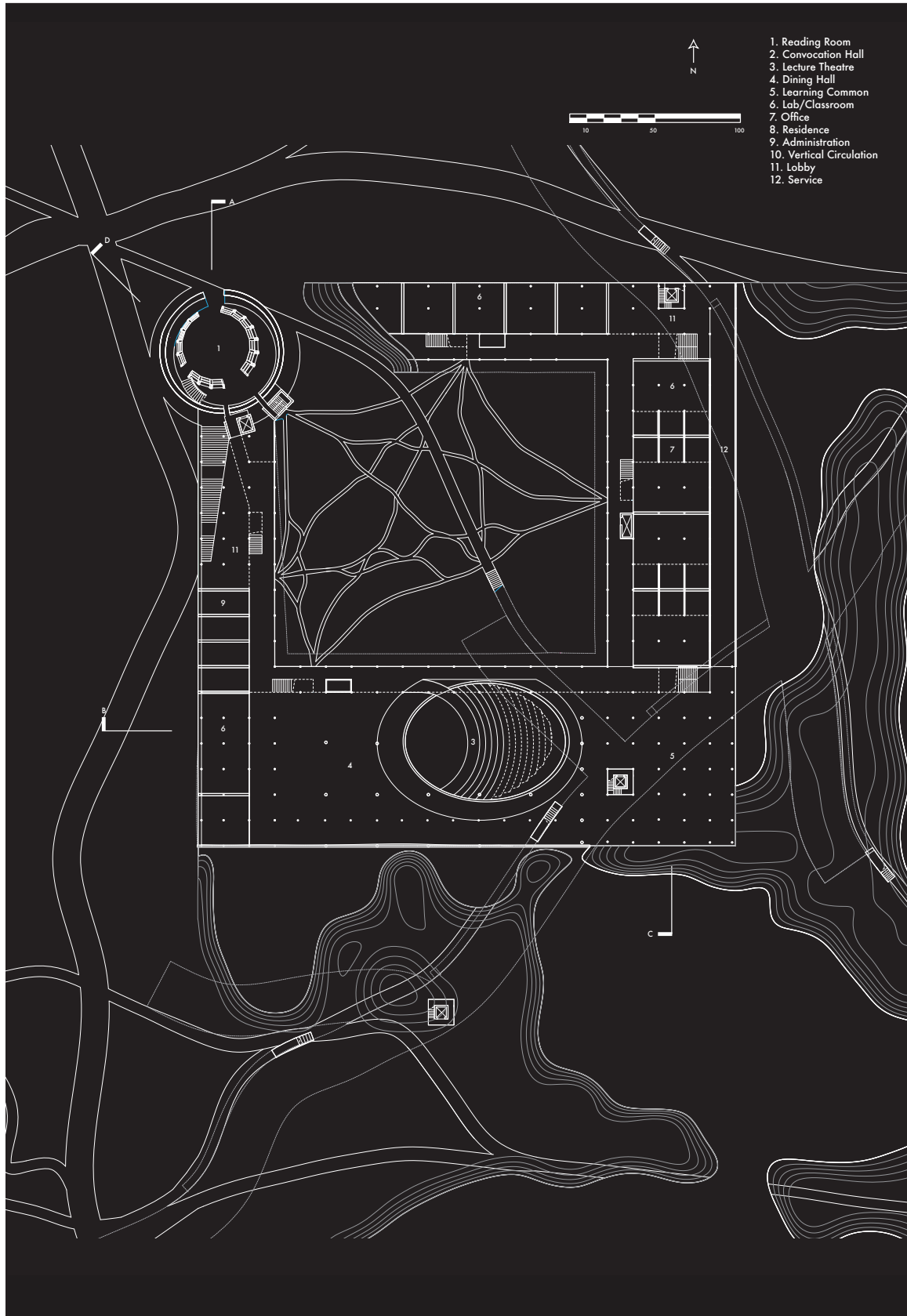Lobby
Residence
Service
Administration
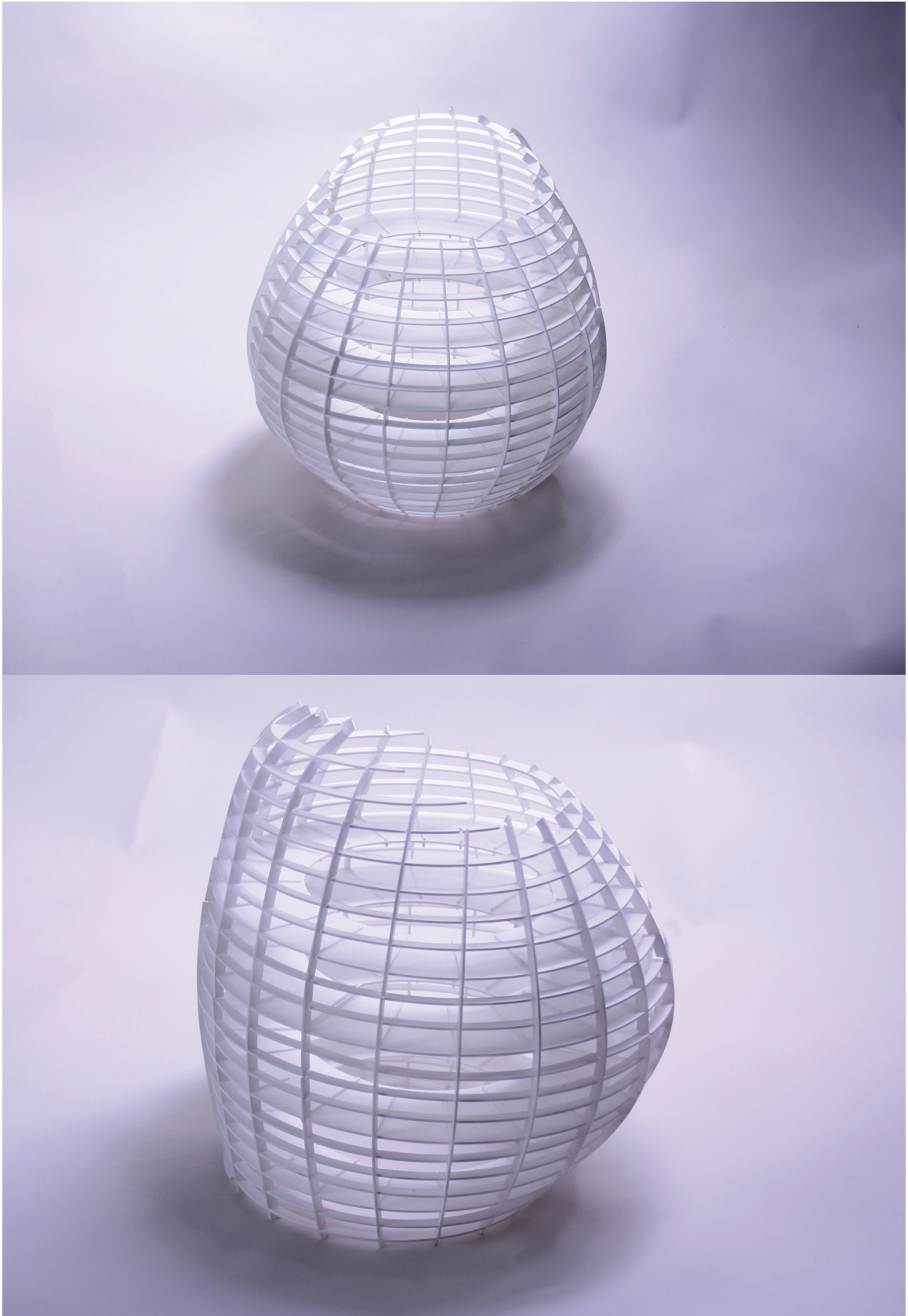Laboratory / Classroom

Precinct / quad axonometric.

Quad plan with four sections.

1. Reading Room
2. Convocation Hall
3. Lecture Theatre
4. Dining Hall
5. Learning Common
6. Lab/Classroom
7. Office
8. Residence
9. Administration
10. Vertical Circulation
11. Lobby
12. Service

Ground floor quad plan.

1. Reading Room
2. Convocation Hall
3. Lecture Theatre
4. Dining Hall
5. Learning Common
6. Lab/Classroom
7. Office
8. Residence
9. Administration
10. Vertical Circulation
11. Lobby
12. Service
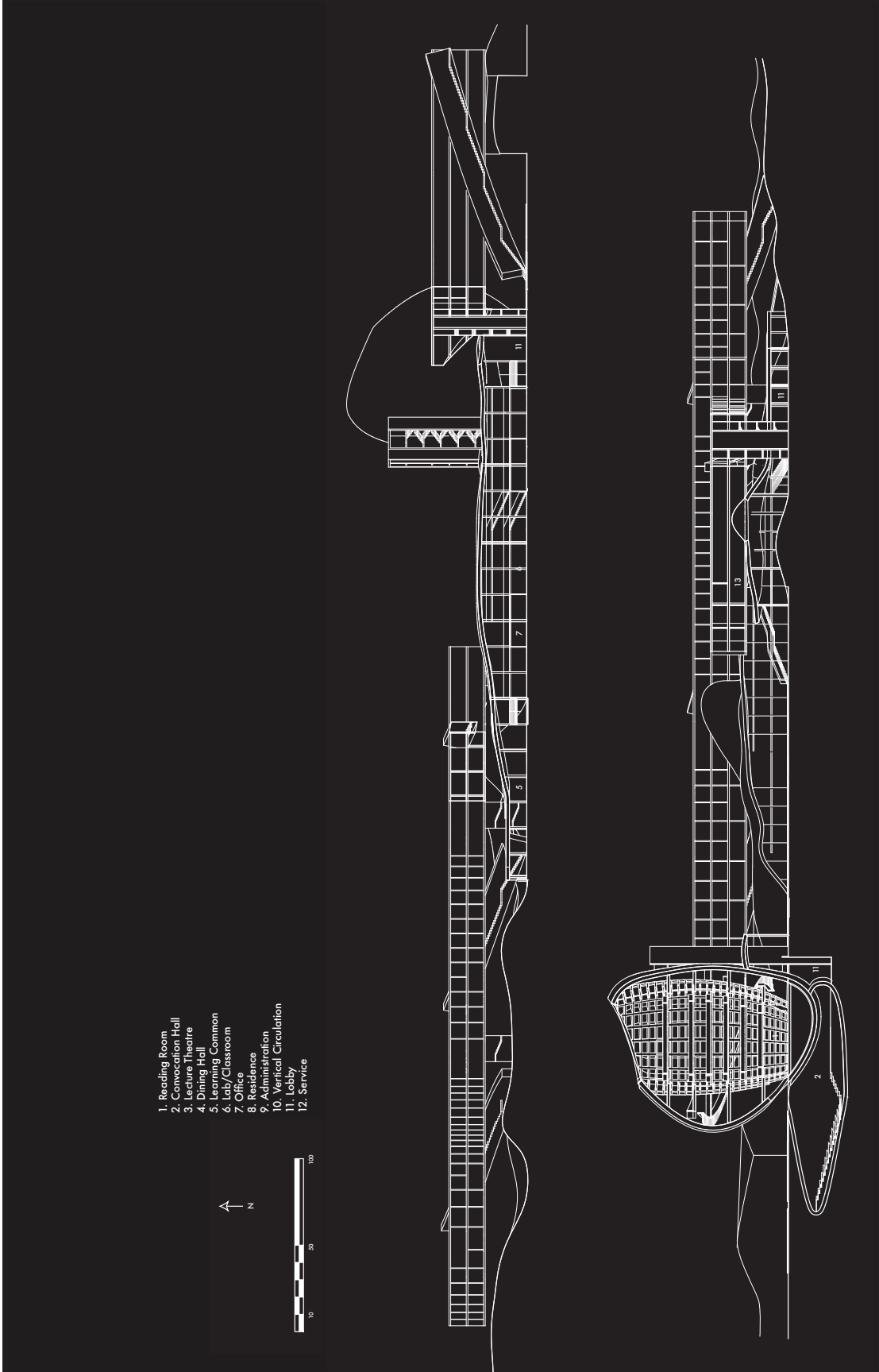
(Top) Section A. (Bottom) Section B.

1. Reading Room
2. Convocation Hall
3. Lecture Theatre
4. Dining Hall
5. Learning Common
6. Lab/Classroom
7. Office
8. Residence
9. Administration
10. Vertical Circulation
11. Lobby
12. Service

N

10    50    100
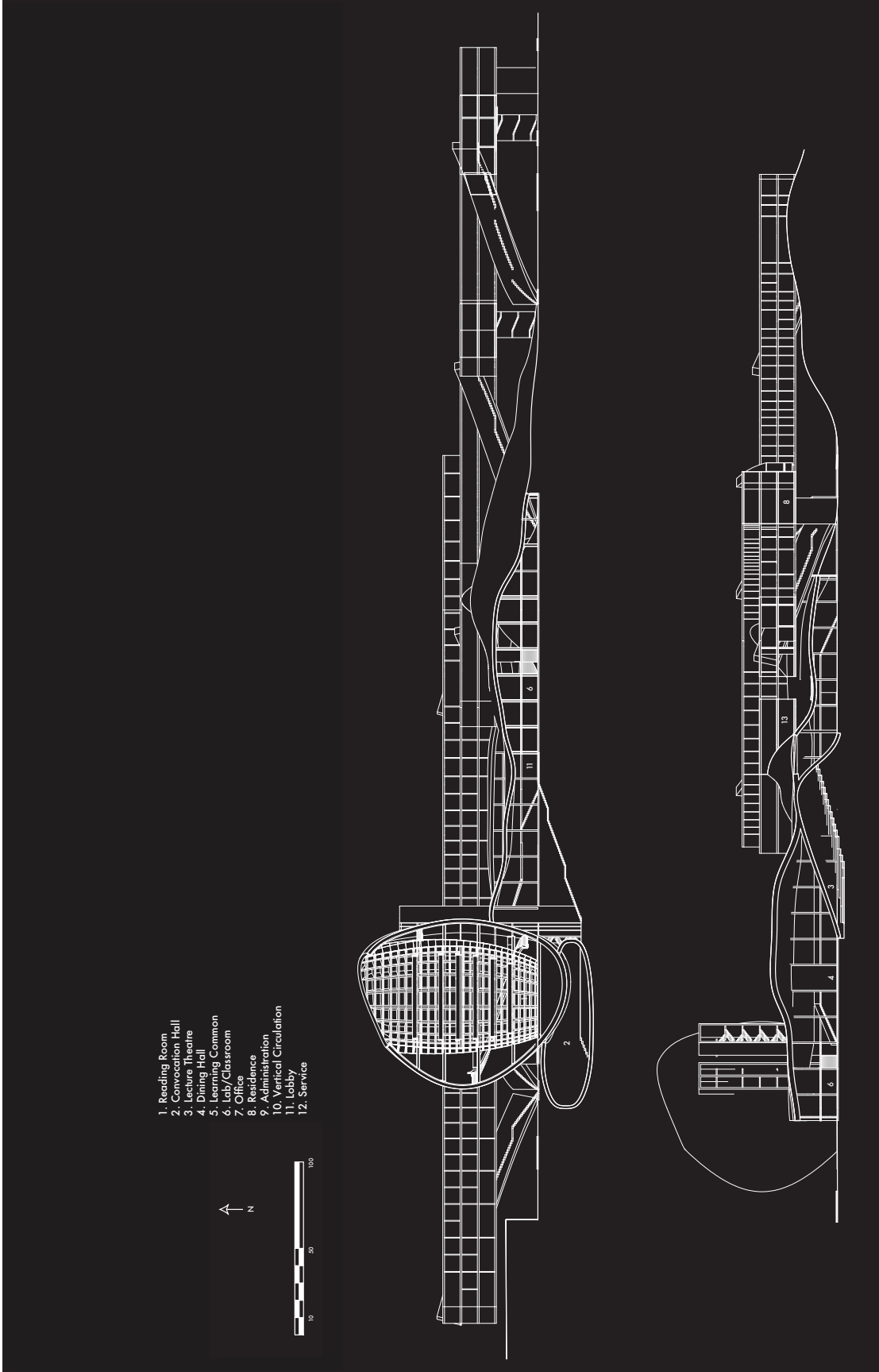


(Top) Section C. (Bottom) Section D.

Library pod, shell structure model.

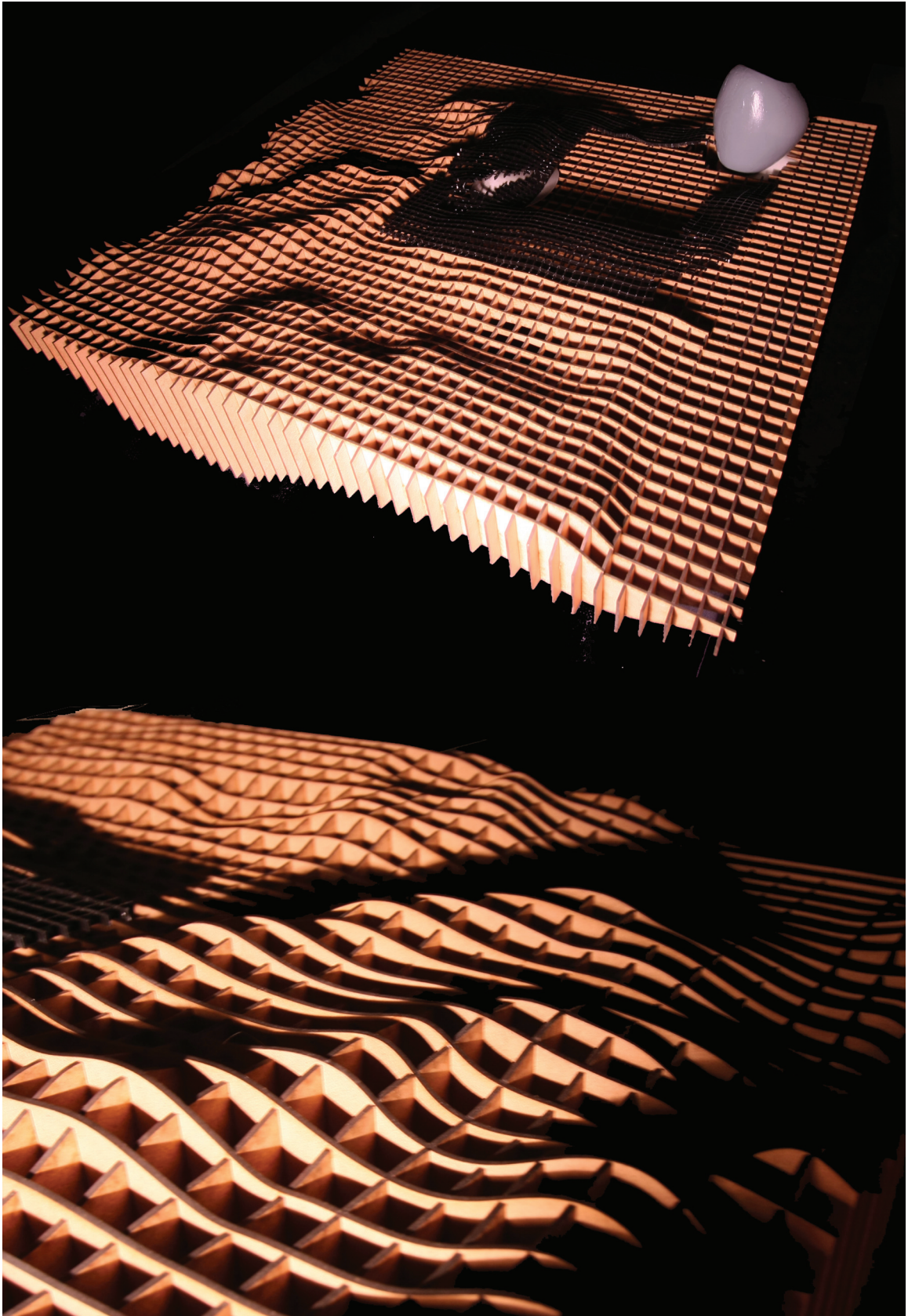(Left to Right) Library pod, residence ribbon, complete quad.

(Left to Right) Quad with lecture pods, plinth roof.
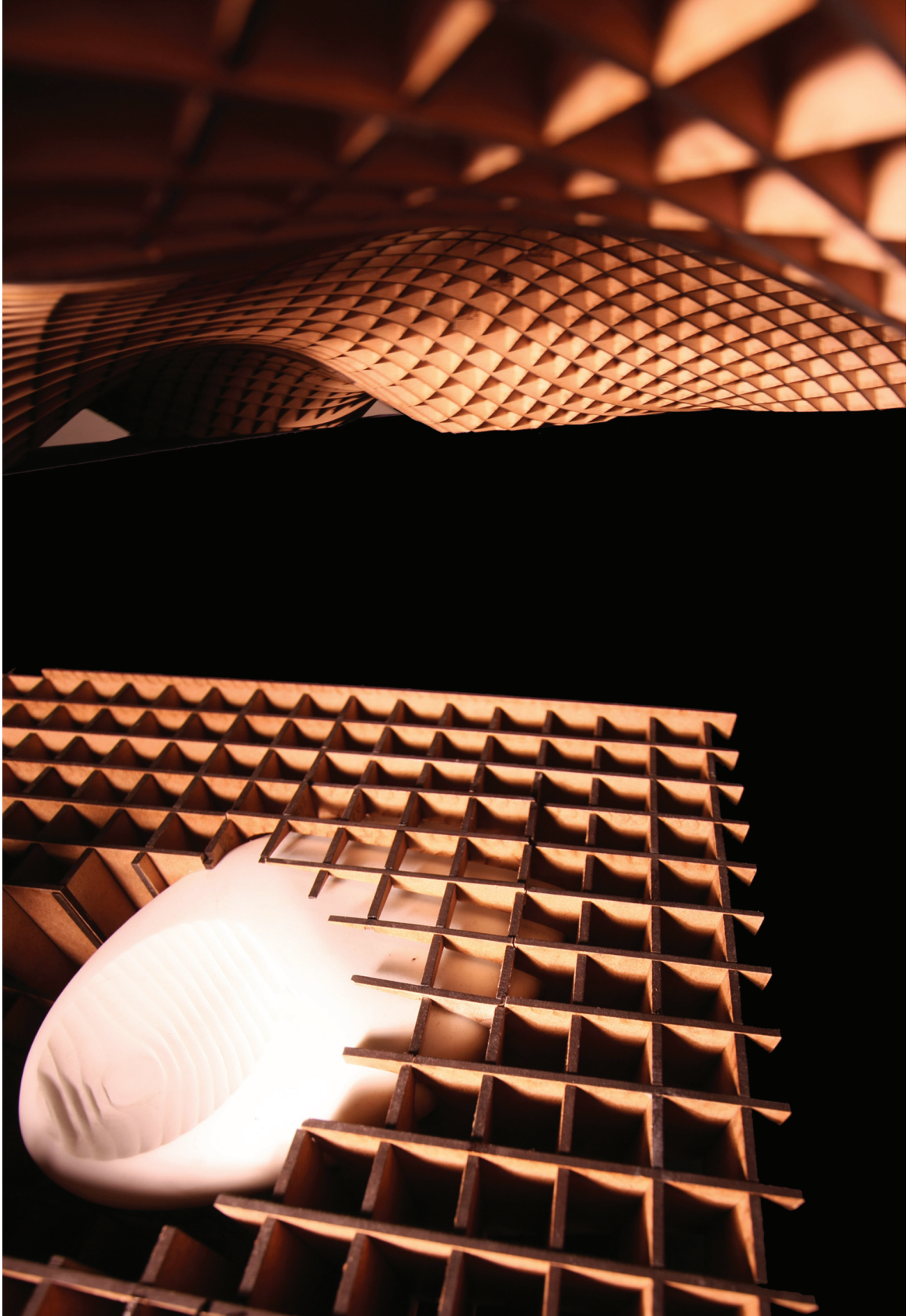
(Top) Detail under model base, represents the interior roofscape at smaller scale. (Bottom) Lecture pod detail.

(Top) New landscape and roof structure. (Bottom) Detail of constructed landscape.

**ENERGY**

The campus takes advantage of South Buffalo's existing infrastructure, but also seeks to expand it. The site is on Lake Erie and can take advantage of the consistent winds that come off the lake. For the universities heating and cooling loads, a geothermal system can be laid underneath the campus lawn.

*GEOTHERMAL*

A geothermal heating system uses the earth as a heat source when in heating mode and as a heat sink when in cooling mode. Borehole fields along the campus lawn draw heat from the ground or return heat to the ground. The campus energy station will transfer or exchange the heat with heat pump chillers that will be connected to the two loops that run through the campus. A cold-water loop 5C and a hot water loop 66C deliver heating and cooling needs to the users underneath the efficient pedestrian path network.

*WIND*

Buffalo has an average annual wind speed of 19 kmph, which comes directly off Lake Erie to the west of the site. The winds are strong and consistent throughout the year. Wind turbines placed to the South West of the site could provide for the campuses energy needs in conjunction with the geothermal system.
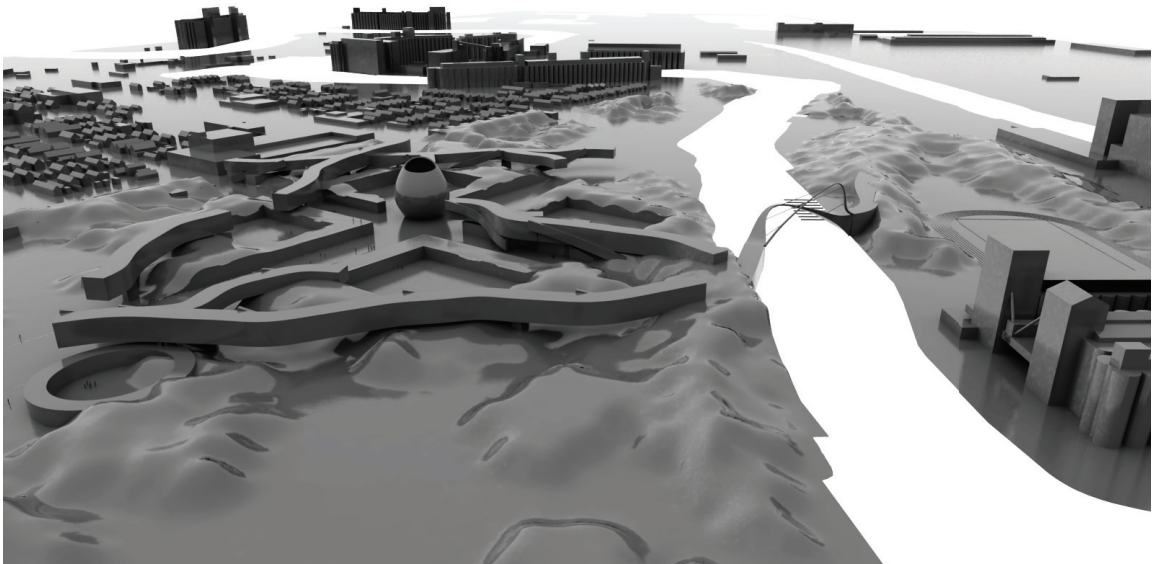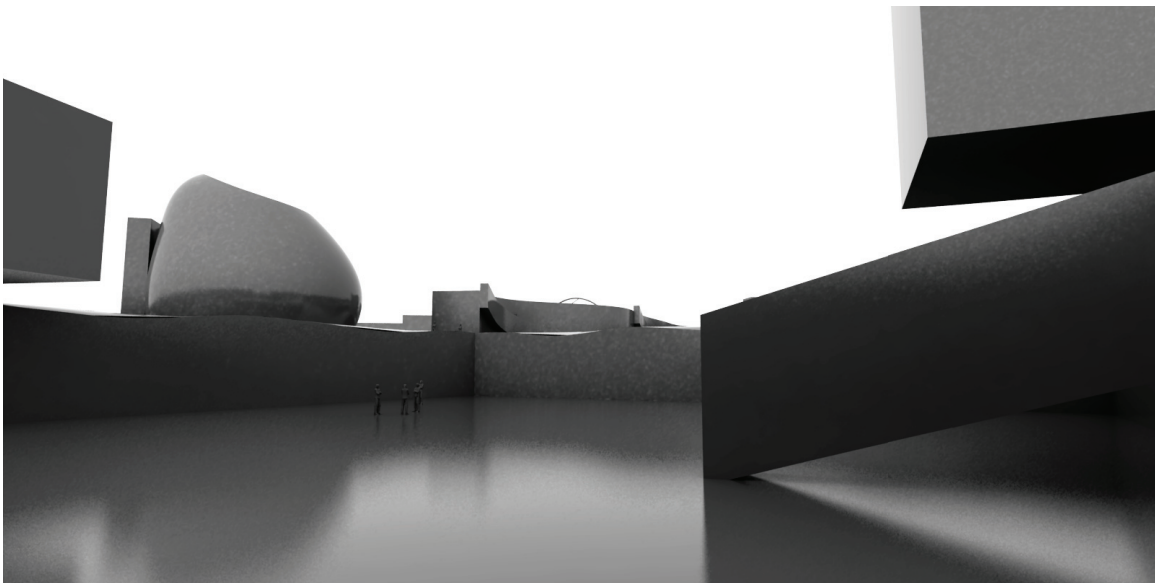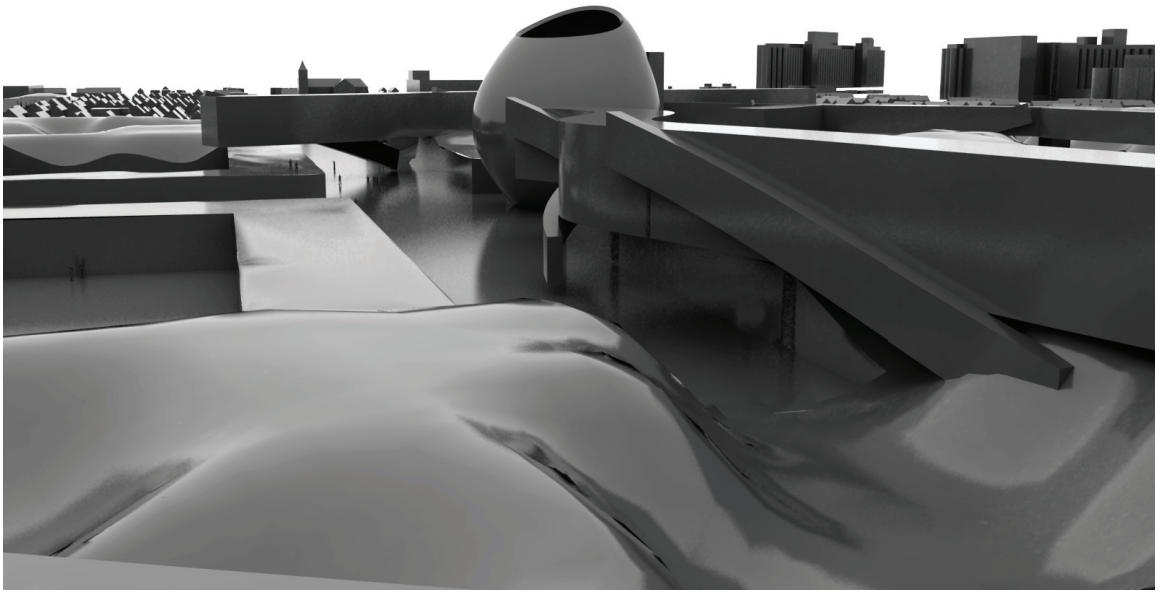
(Top) Site redering showing surrouding context. (Bottom)View from the West looking down the Buffalo Creek with Lake Erie in the distance.
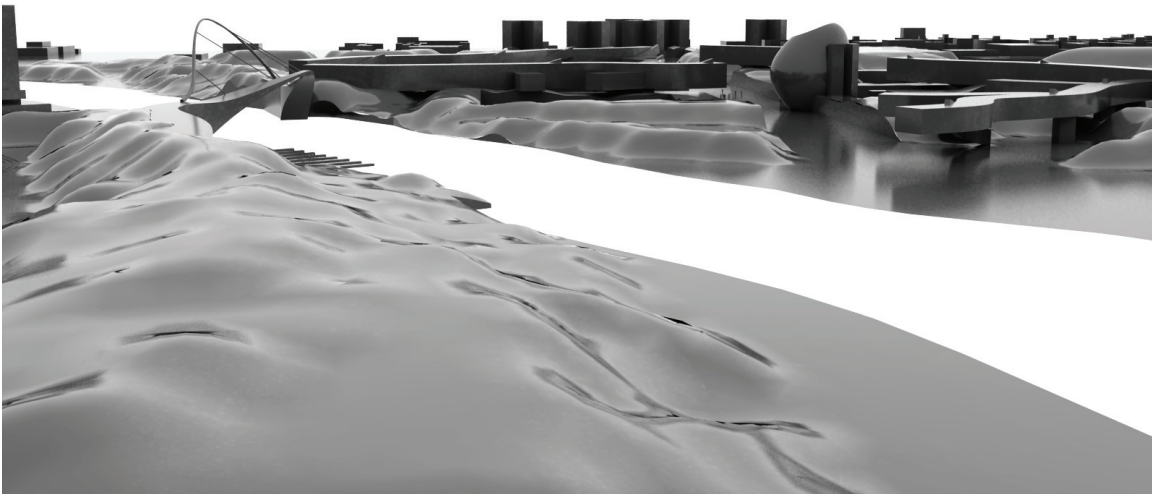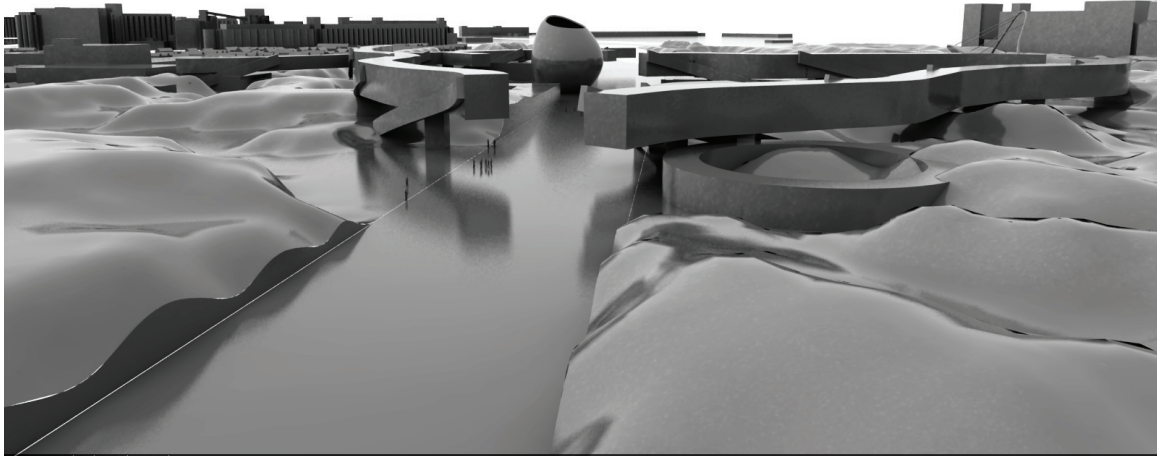
(Top) Rendering looking down the main campus lawn towards the reading room. (Bottom)View from across the South bank of the Buffalo Creek showing the proposed pedestrian bridge.

(Top) Secondary lawn with residence ribbon building foarming a gateway into the campus.(Bottom) View from within one of the quads.

Rendering from within the cafeteria looking towards the lecture pod. and quad.

## SUMMARY

The thesis focused on methods that can help to remediate a city in decline. A hybridized landscape and a kit of architectural typologies prove capable of responding to temporal change, transformation, adaptation and succession within the context of shrinkage. Furthermore, a campus offers employment and education, two routes out of poverty. Buffalo was central to the investigation, however one can imagine the process and methodology being applied to another city in similar circumstances. Potential for further study exists, how could cities such as Detroit, Cincinnati, Leeds, Manchester or Newark, adapt this hybrid of education, urbanism, architecture and landscape. Buffalo offered a suitable test case, but ultimately, the scheme delivers a flexible tool, rather than a fixed, 'designed' form. The thesis aimed to create a methodology and architecture capable of dealing with indeterminacy and flux, which is critical when designing for a city in decline.

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