Landscapes of Repulsion: Hidden in Plain Site

A Thesis Submitted to the Department of Landscape Architecture, Harvard University Graduate School of Design

by

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In Partial Fulfillment of the Requirements for the Degree of

MASTER IN LANDSCAPE ARCHITECTURE

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Sergio Lopez-Pineiro

Colleen Sloan

Landscapes of Repulsion: Hidden in Plain Site

Colleen Sloan Advised by: Sergio Lopez-Pineiro

This thesis interrogates landscape architecture's participation in the cleaning and concealing of repugnant sites of industry through the creation of fabricated mountains constructed from the wastes of Iowa's booming commercial hog industry. The constructed mountains, dubbed the De Sotos, are proposed to be located just north of the town of Manson in northwest Iowa. These constructed megaforms are in constant negotiation between industry and nature, always changing and never complete, to reimagine the landscape's relationship to active industry.

The De Sotos are constructed over time as waste material is collected, processed, shaped, and, in some cases, planted. The mountain range is both a force of its own, shaped by the byproducts of its natural and artificial processes, as well as being a product of consumption and construction. The mountains make visible the repulsions of this industry as an immeasurable force altering the land of Iowa and its value as a site of production.



The Thesis

This thesis interrogates landscape architecture's participation in the **cleaning** and **concealing of the repugnant sites of industry**.

The thesis contributes to current discourse regarding, as Richard Weller states, postmodern landscape architecture's "**boom trade in cleaning up after modern infrastructure**".

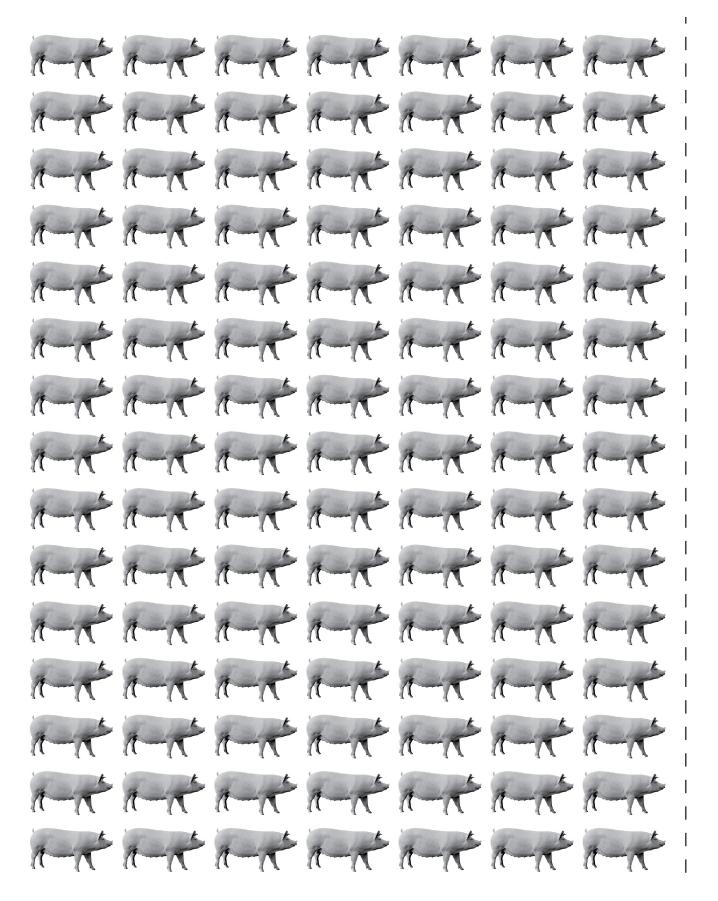
-Richard Weller, "An Art of Instrumentality: Thinking Through Landscape Urbansim." Landscape Urbanism Reader. New York: Princeton Architectural Press: 69-85. 2006.

Iowa's Industrial Pork Problem

This thesis reveals the repulsions of industrial pork production in the State of Iowa, through the creation of a man-made waste mountain range in Manson, Iowa.

Dubbed the De Sotos, named after the grandfather of the pork industry, the mountains are in constant tension between industry and pristine nature, always changing and never complete.



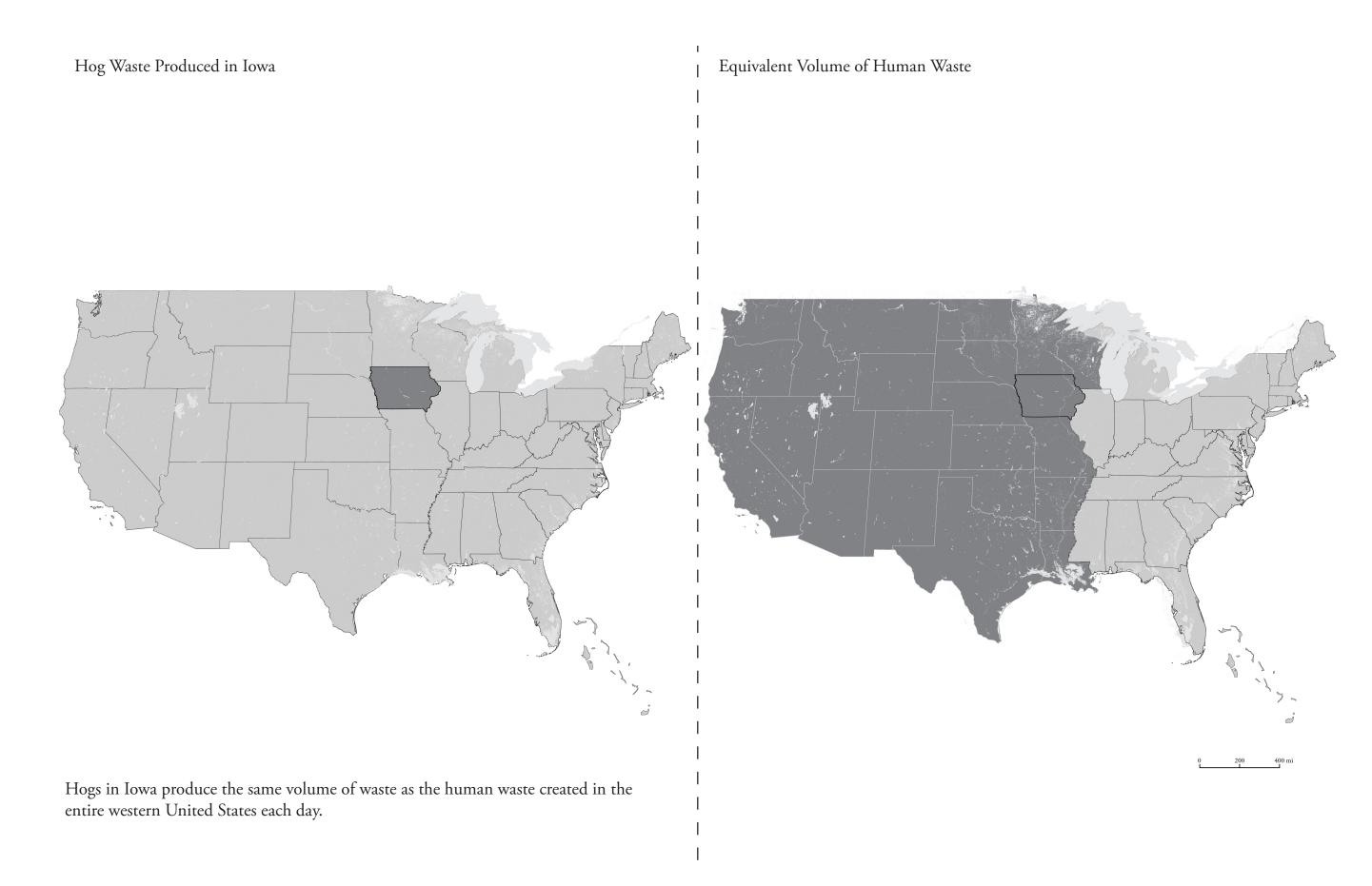




As the top pork producing state in the United States, Iowa's pig population outnumbers people at a ratio of 7:1.



Hog Waste Production in the State of Iowa



Big Pig's Industrial Concentrated Animal Feeding Operations (CAFO)

Most hogs in Iowa are raised in the industrialised concentrated feeding operations of Big Pork called CAFOs, where the animals are packed in as tightly as possible to maximize value.



Image source: Capital Journal

Industrial Hog Repulsions

The tons of waste produced by the hogs falls through the slatted floors of the CAFO. Due to this process of waste collection, the site faces risks such as the production of toxic foam shown below, or even explosions onsite from the build up of methane.







Industrial Hog Repulsions

Waste is often pumped out from under the CAFO building into external storage tanks, or open manure lagoons such as this one.



Image source: Dairy Herd website

Material Textures of Repulsions

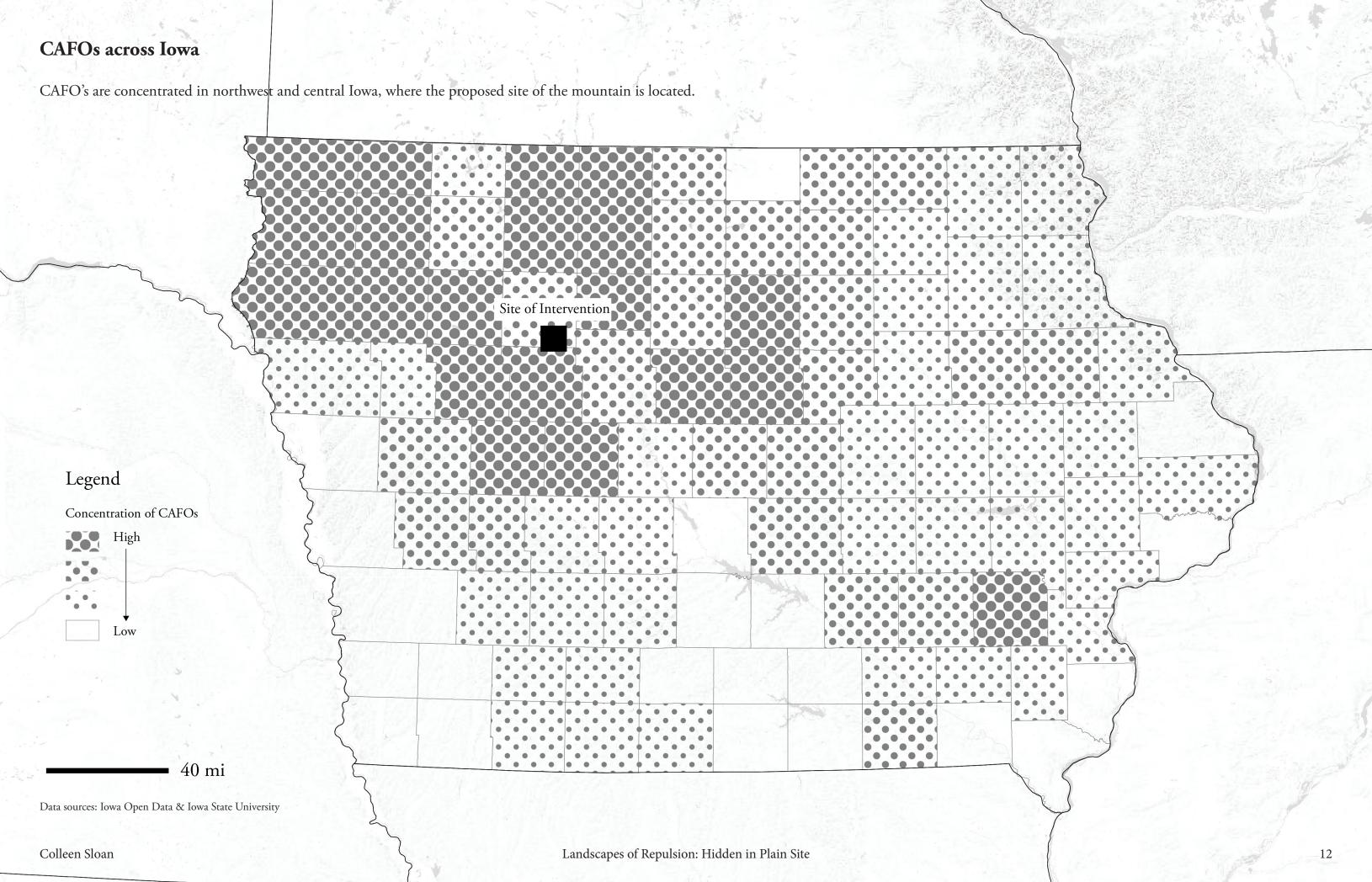


Material Textures of Repulsions

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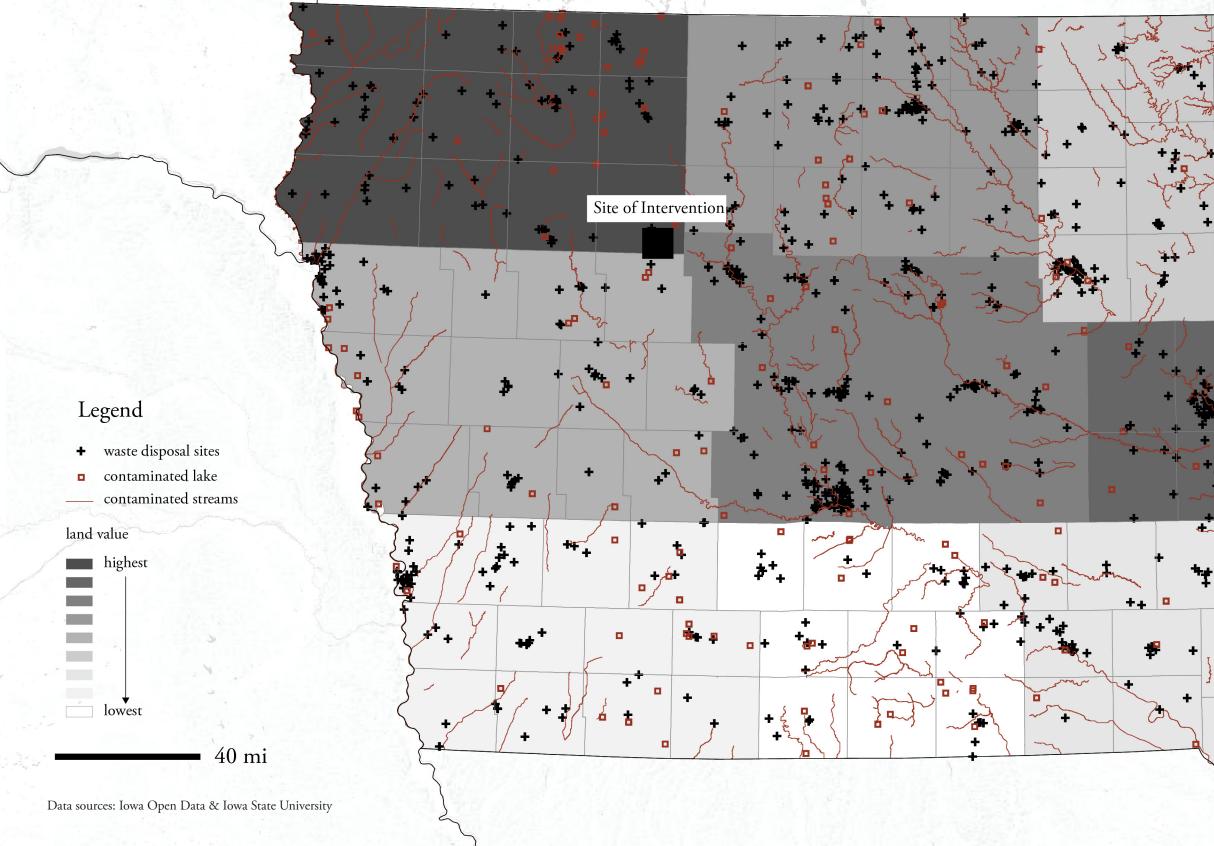


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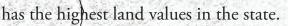
CAFO Effects Across the State

The industry is known to pollute many of Iowa's waterways. Due to the direct link between production and land value, the CAFO concentrated northwest also has the highest land values in the state.



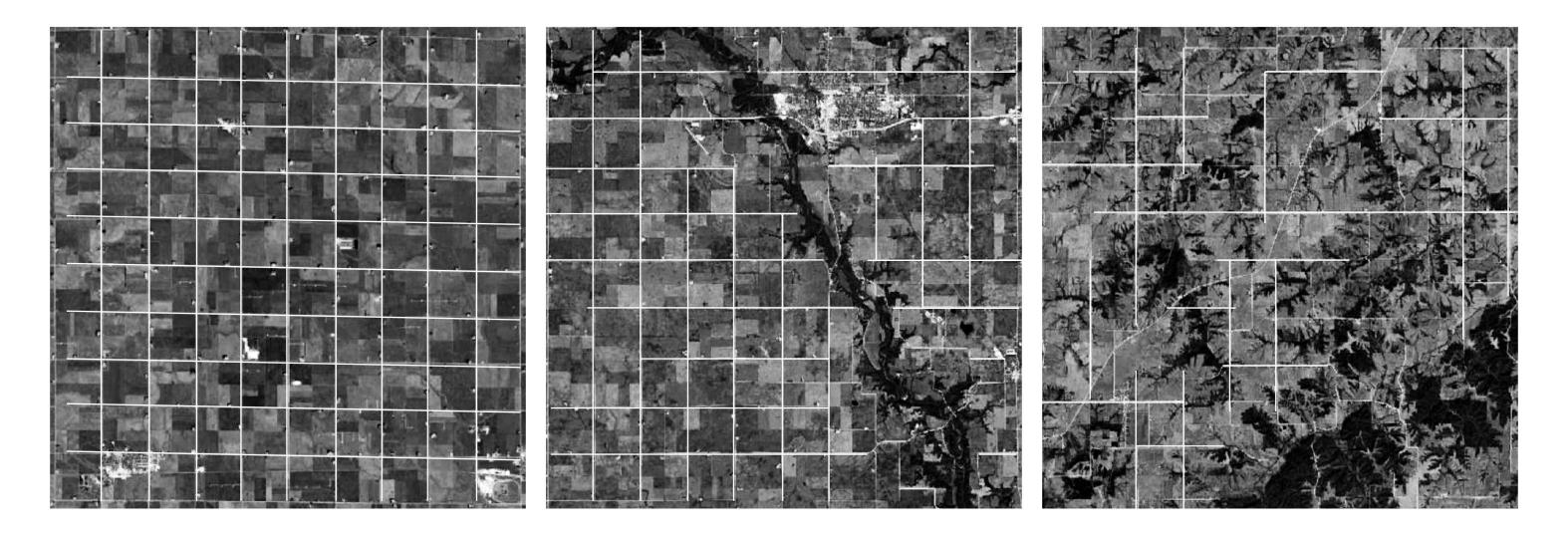
Colleen Sloan

Landscapes of Repulsion: Hidden in Plain Site



The Jefferson Grid and Land Value

The northwest region with its high land values, shown here on the left, is uniformly gridded and flat where industry and production fit neatly within square boundaries and their outputs are easily measured. Moving south, to the right, the grid becomes increasingly disrupted by hydrology and topographical features until it is nearly unrecognizable.



Northwest Iowa

Image source: Google Earth

Highest value _____ → Lowest value

→ South Central Iowa

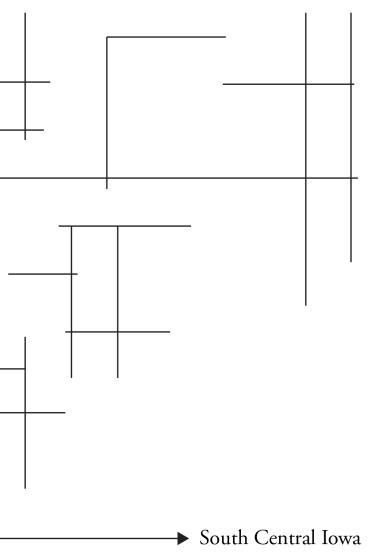
The Jefferson Grid and Land Value

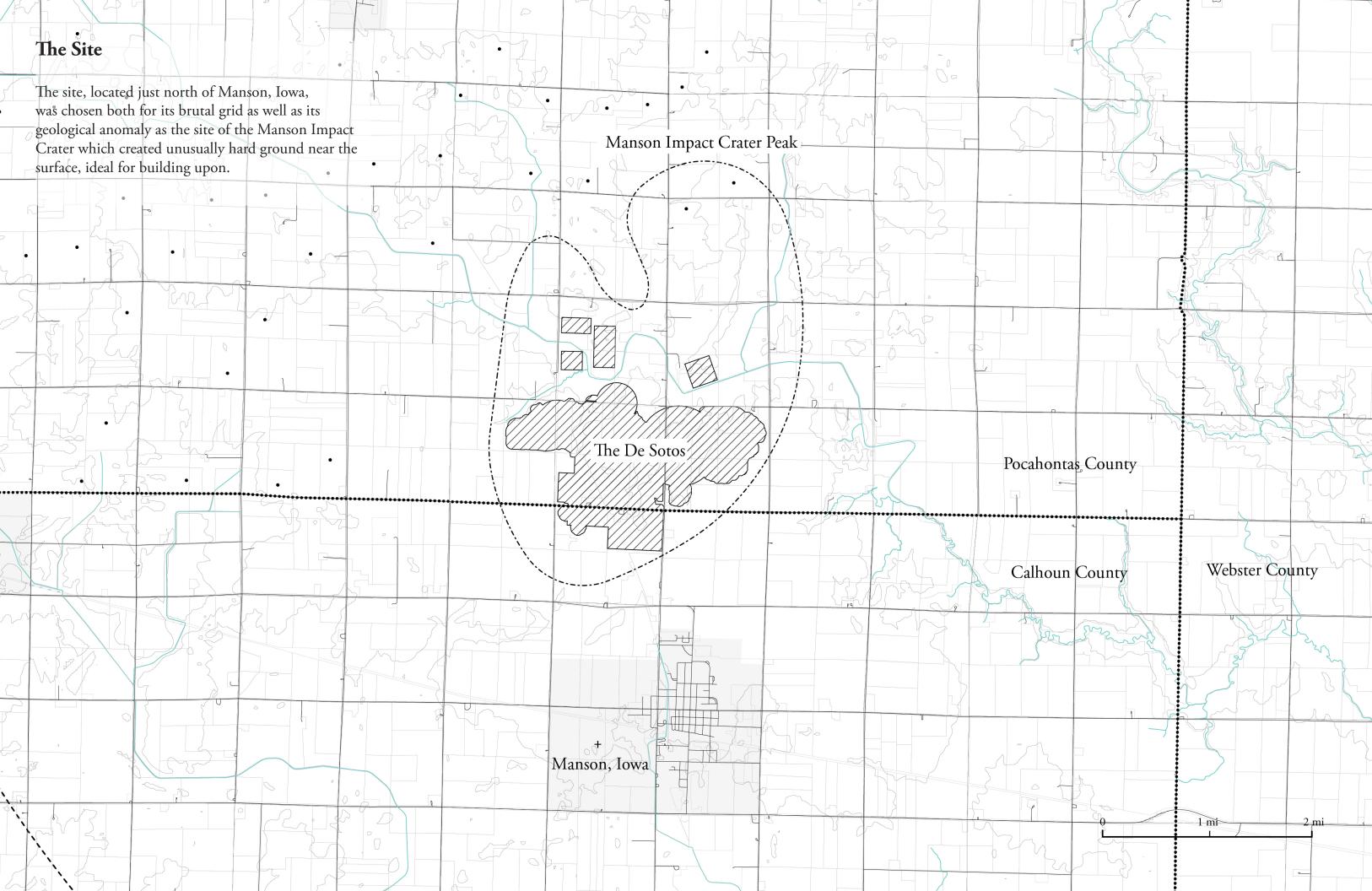
This breaking of the grid is associated with land being unproductive, less measurable and less valuable.

Highest value _____

Northwest Iowa

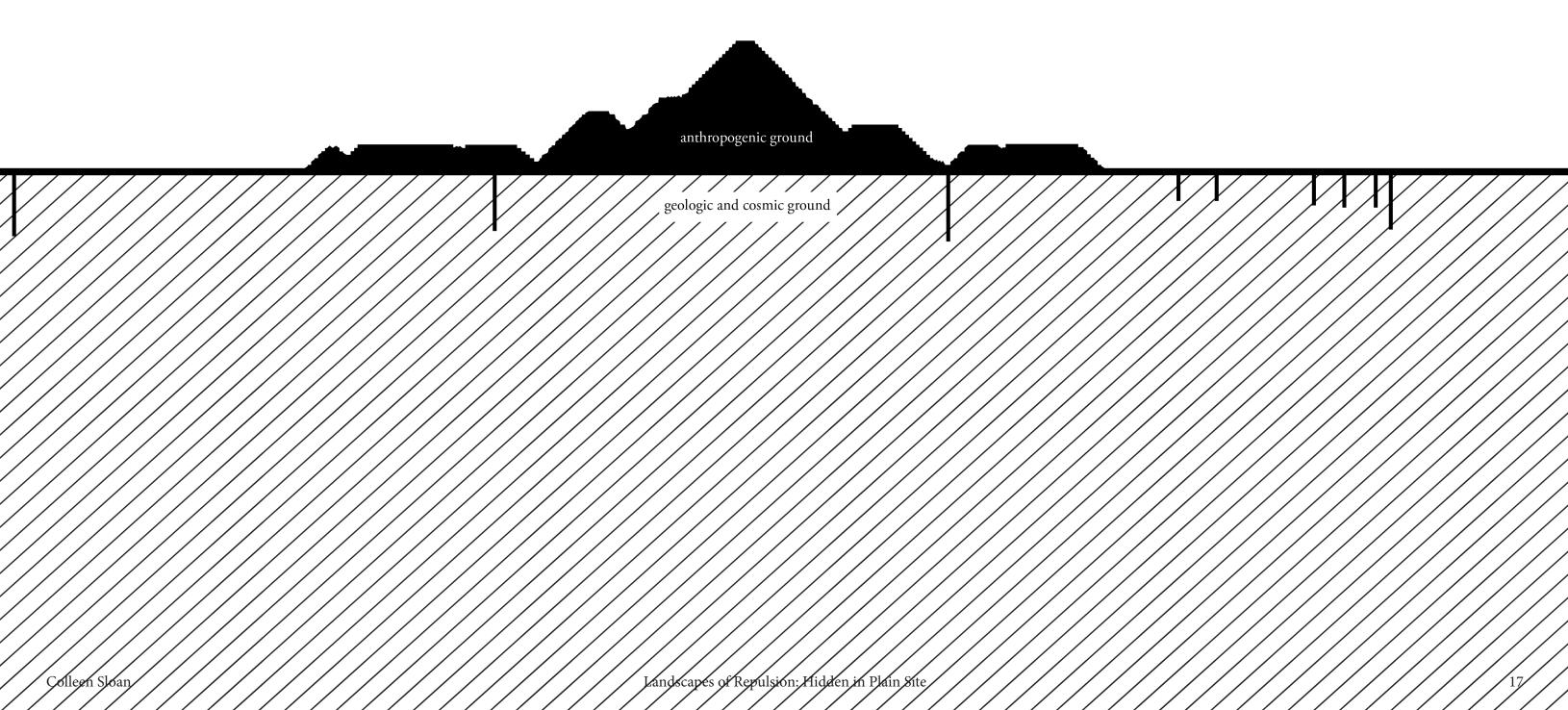






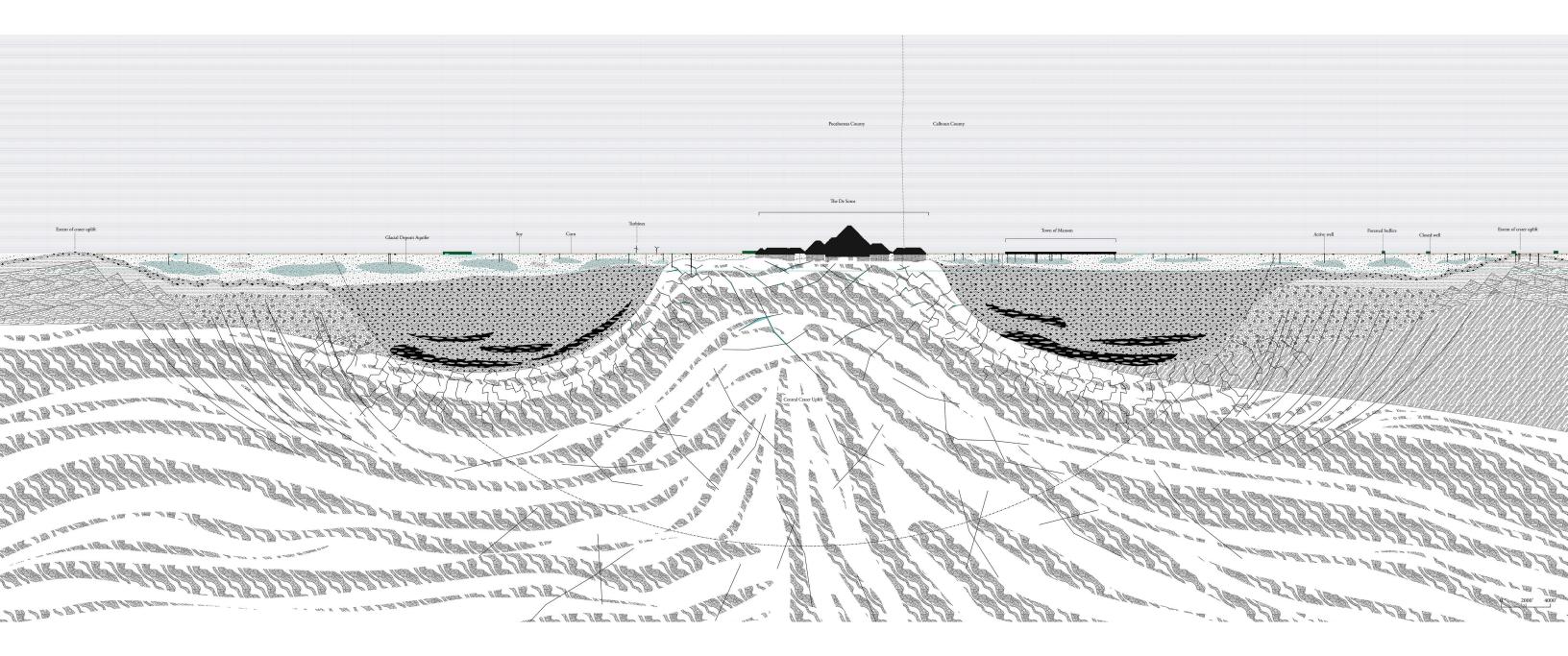
Perceived Geology

The De Sotos are a new layer on the anthropogenic ground, in contrast to the unique geological and cosmic ground beneath.



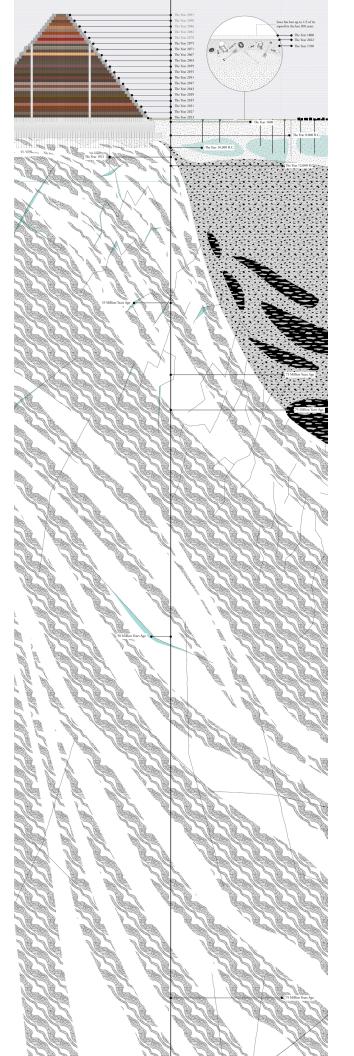
Site Geology

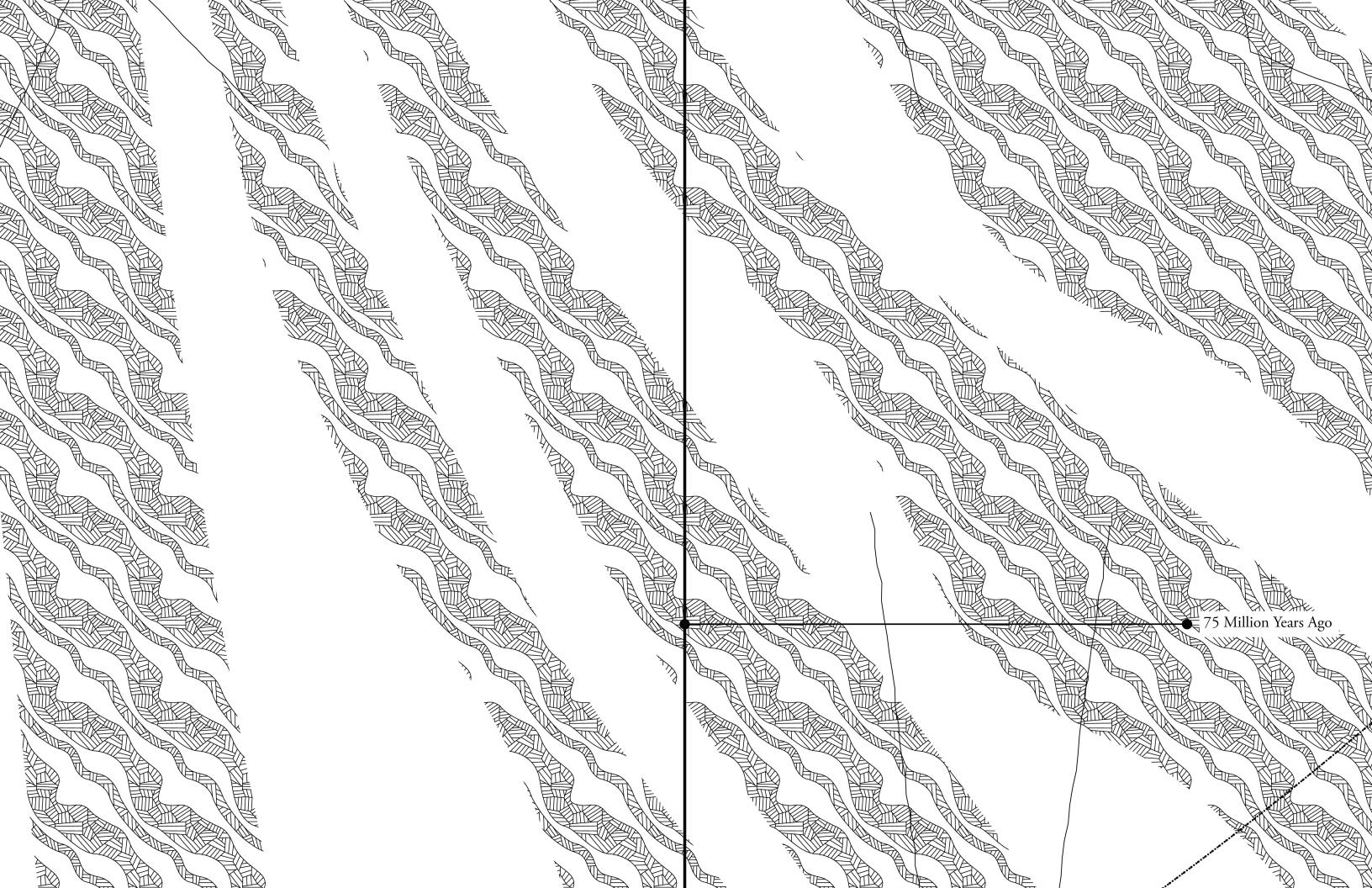
The peaks are seen as extruding up from the crater's hard granite peak in section, surrounded by existing flat cropland and deep wells attempting to reach pockets of water where no aquifers exist.

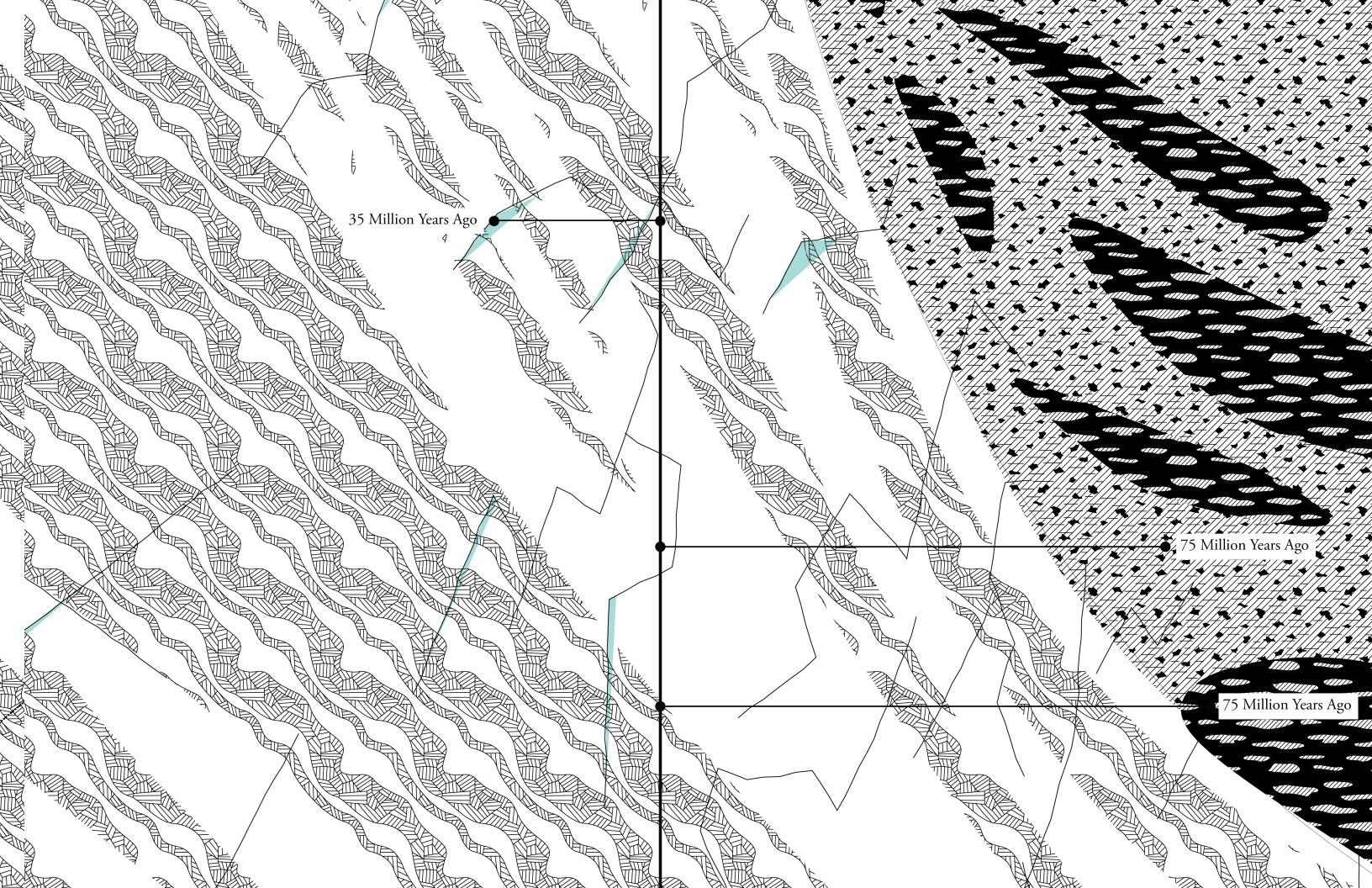


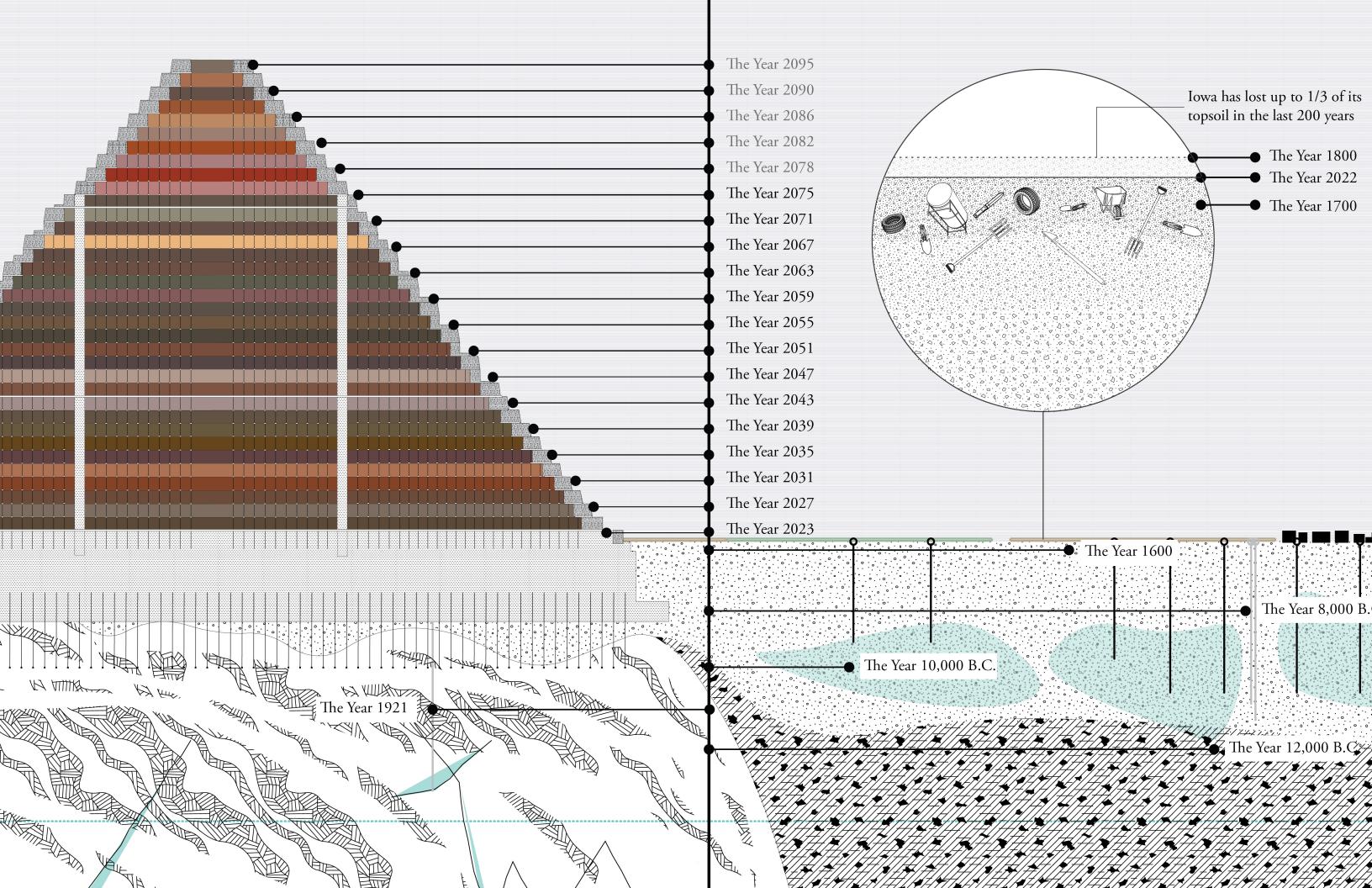
Deep Section of Site

The deep section of the site spans in time from 75 million year old rock, to hidden crevices containing an estimated 35 million year old water, to glacial till, and then the anthropogenic waste of the mountain created layer by layer, which would reach its highest point in the year 2095.





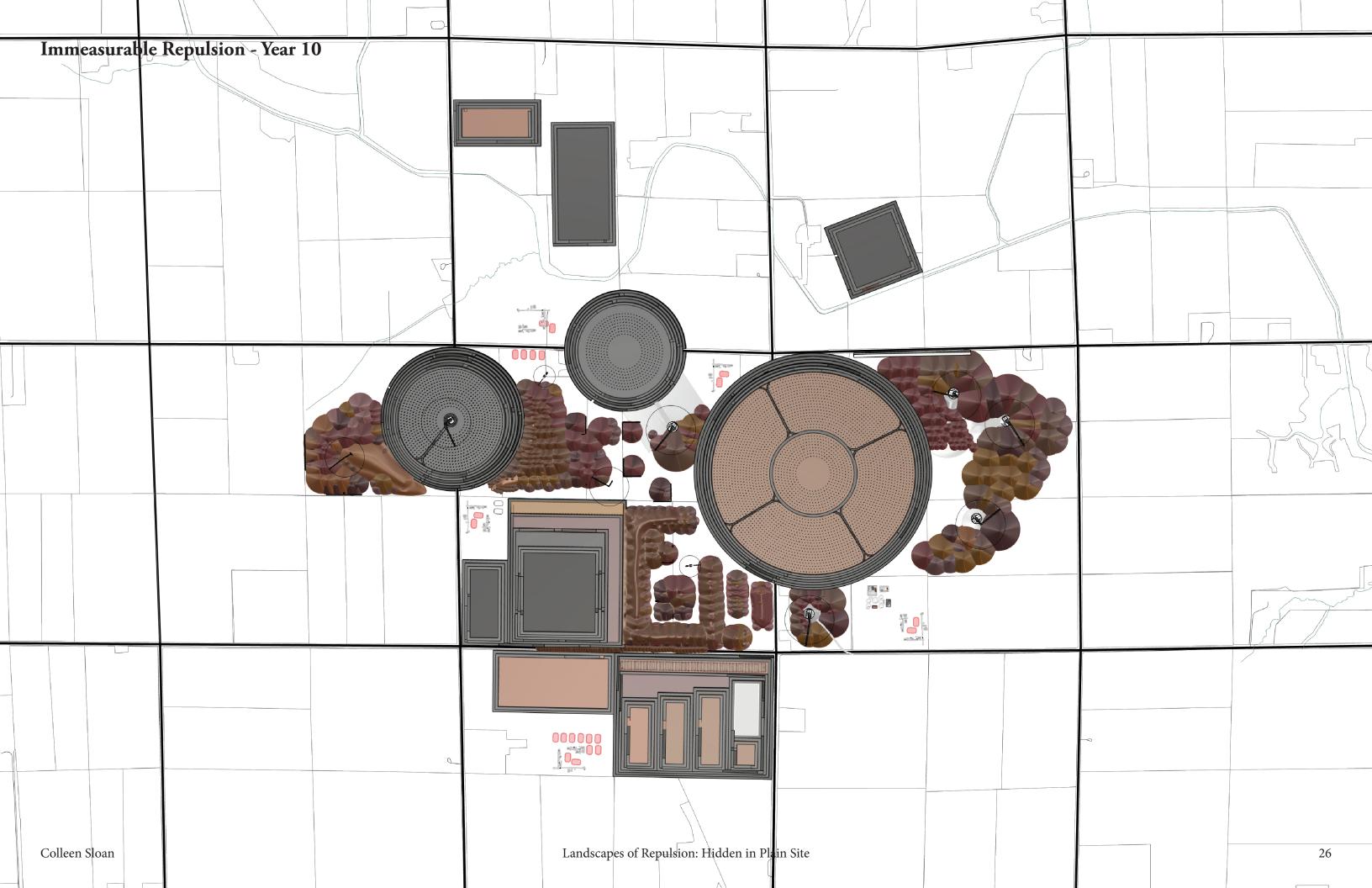


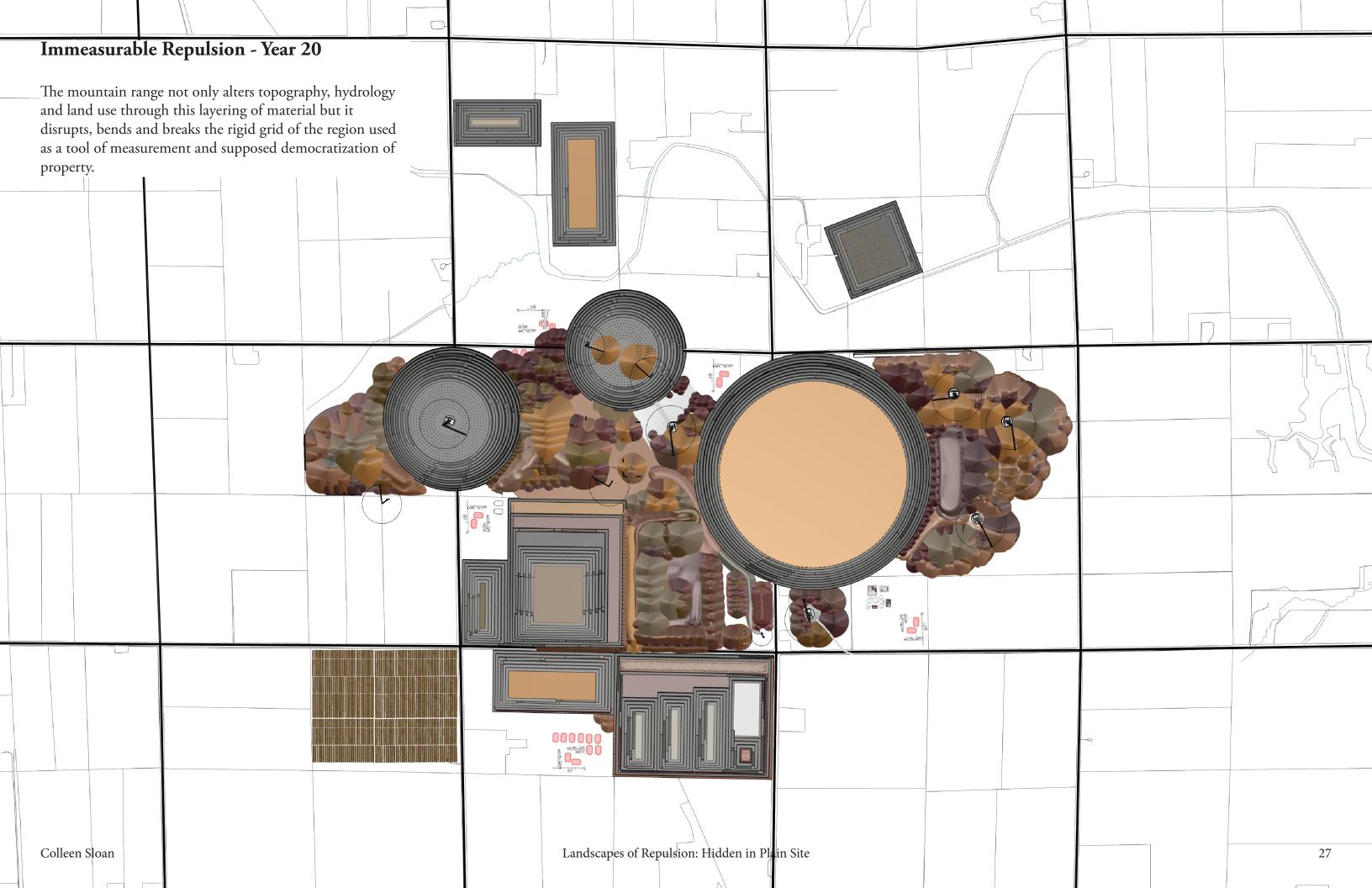


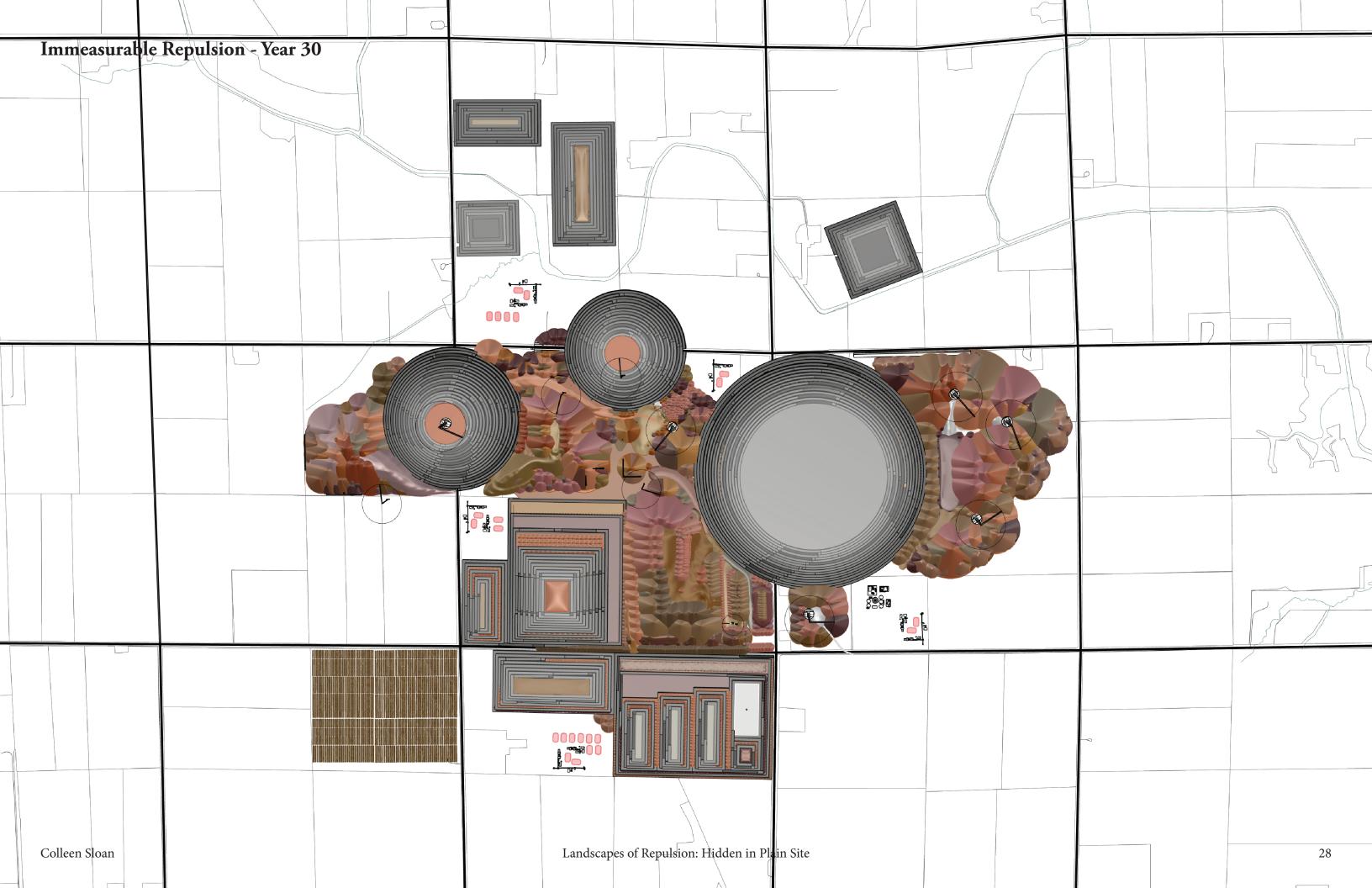
Immeasurable Repulsion - The Grid Year 0				
Colleen Sloan		Landscapes of Repulsion: Hidden in Pl	ain Site	23

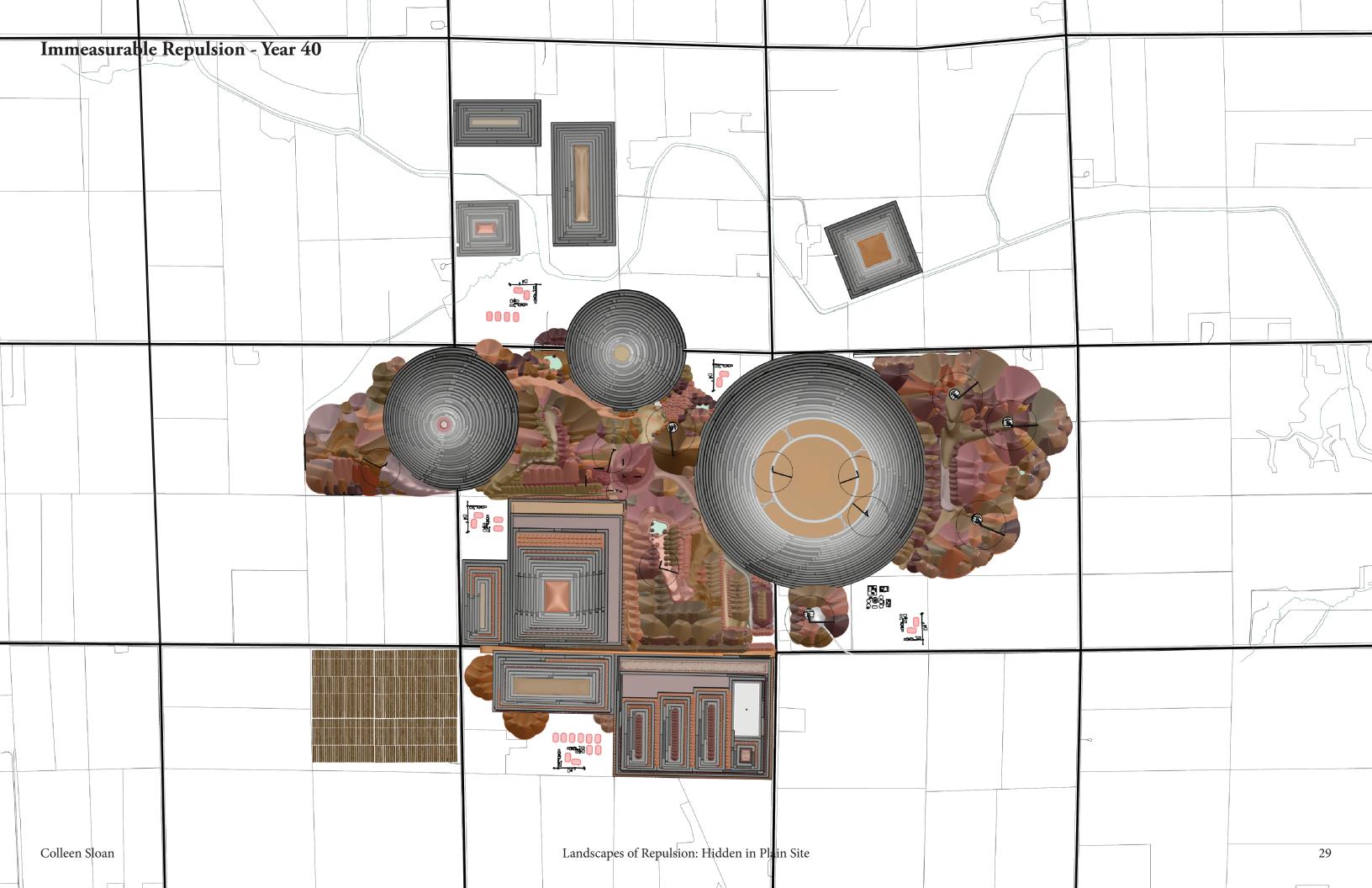


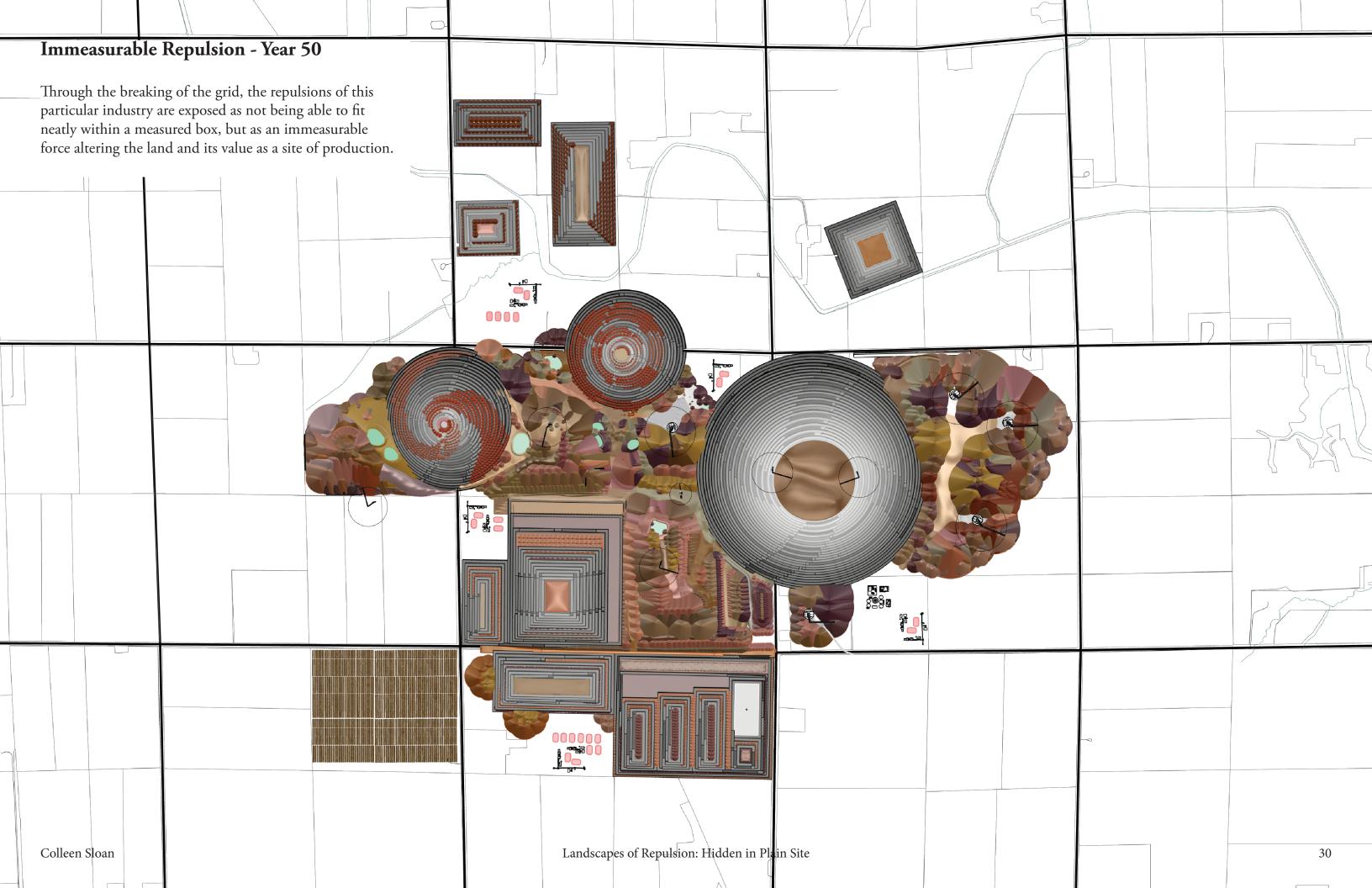


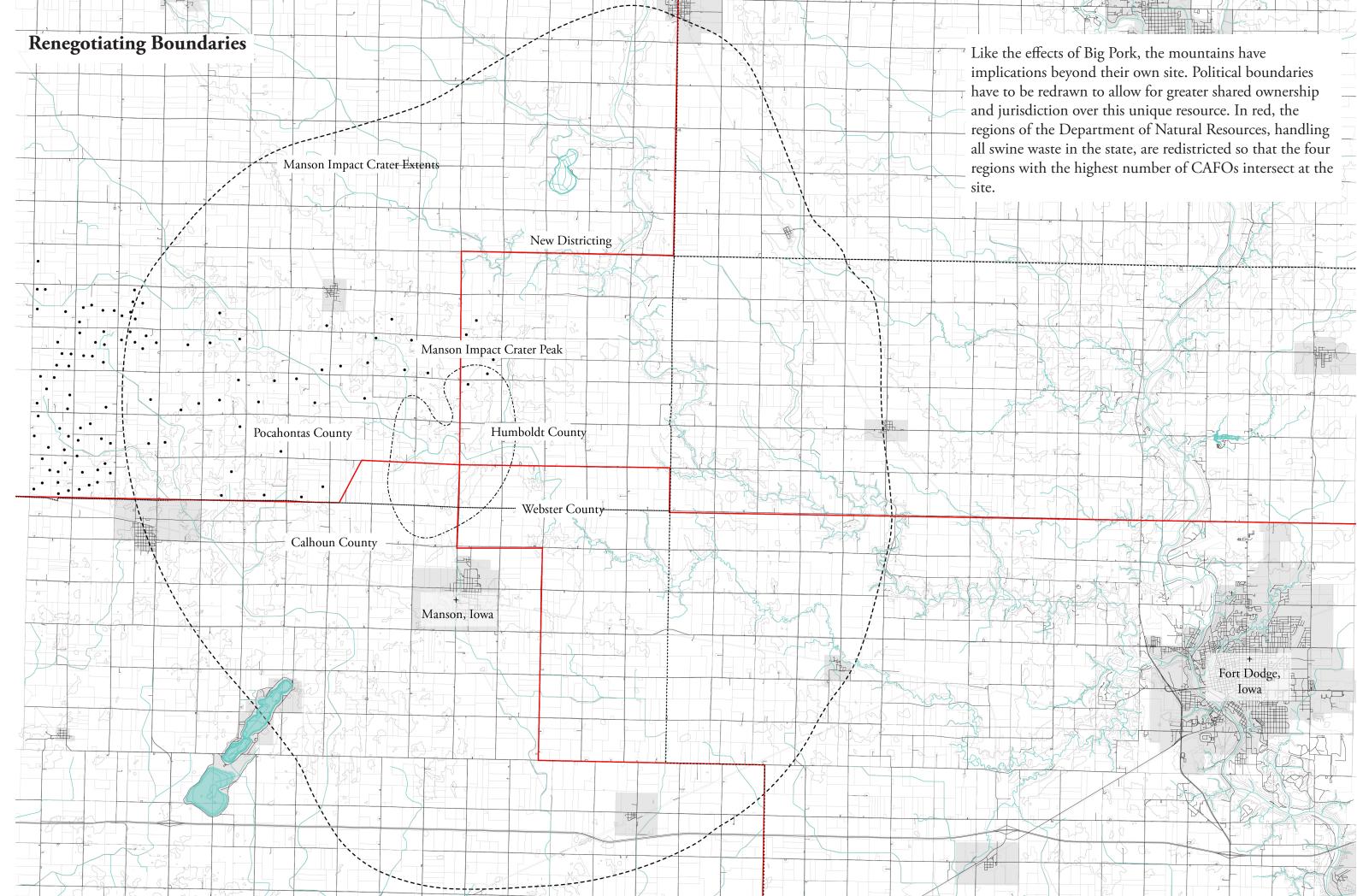


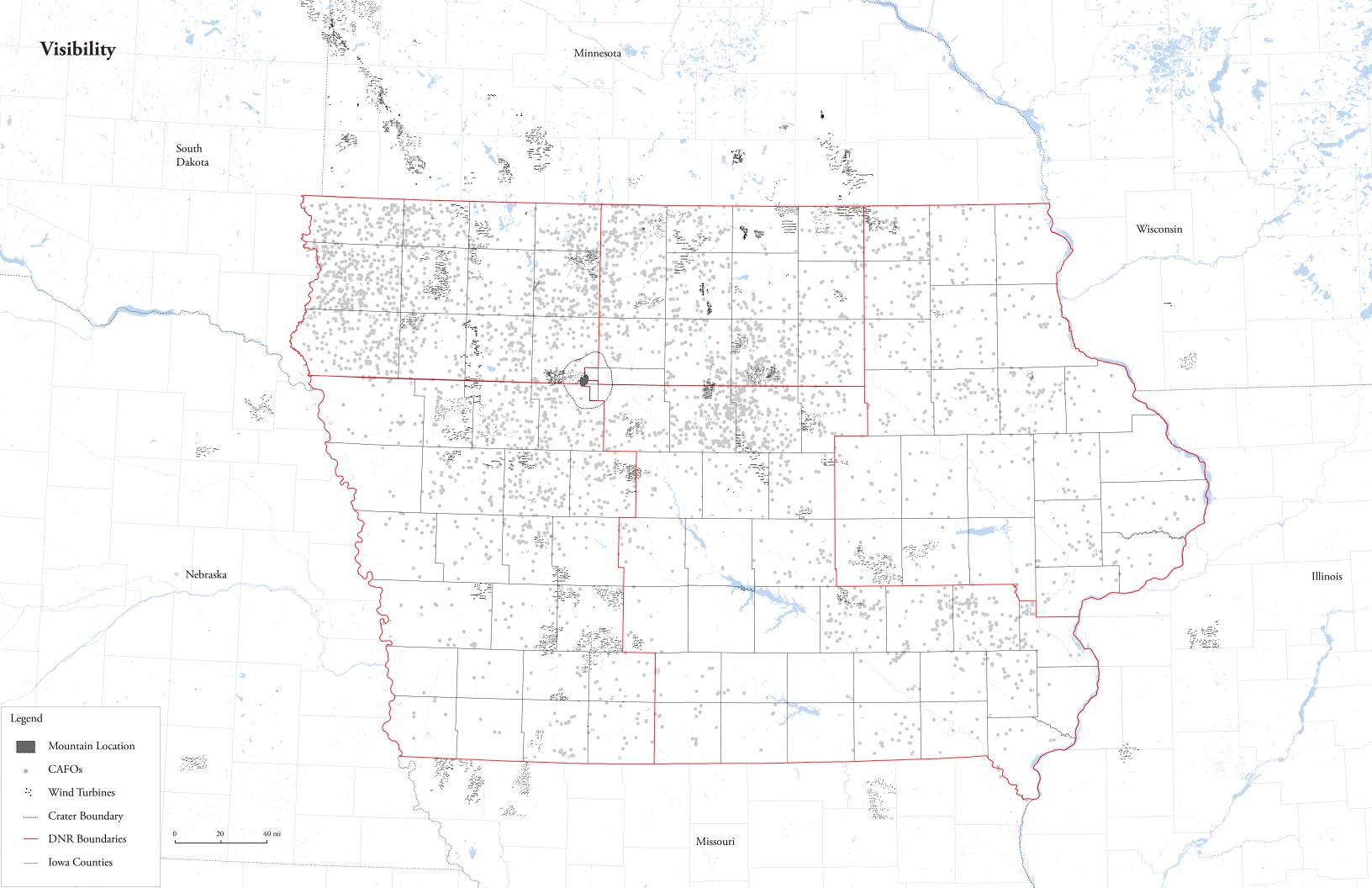


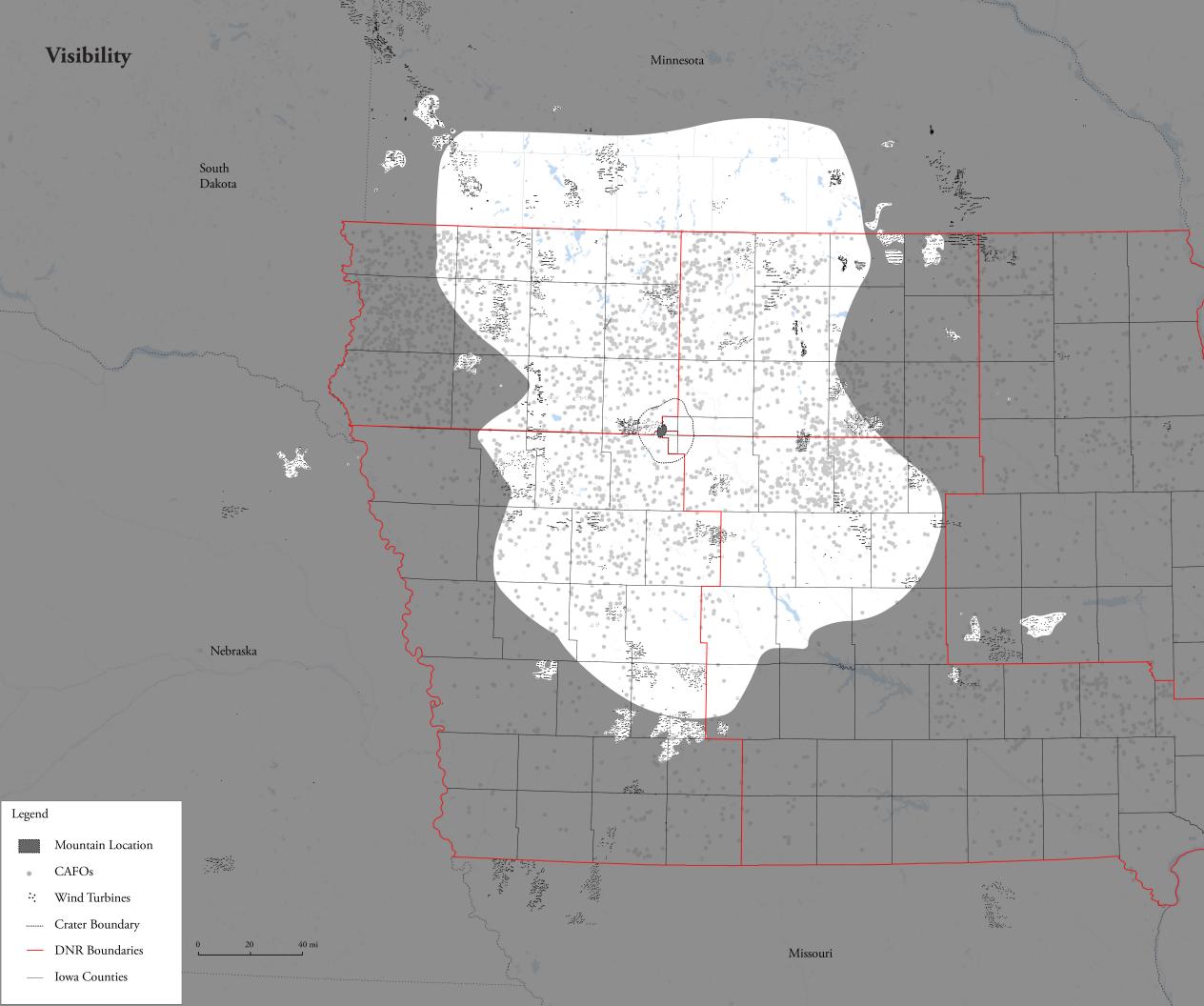












On a clear day the mountain can be spotted across a large portion of Iowa, and even parts of Minnesota and Nebraska.

Wisconsin

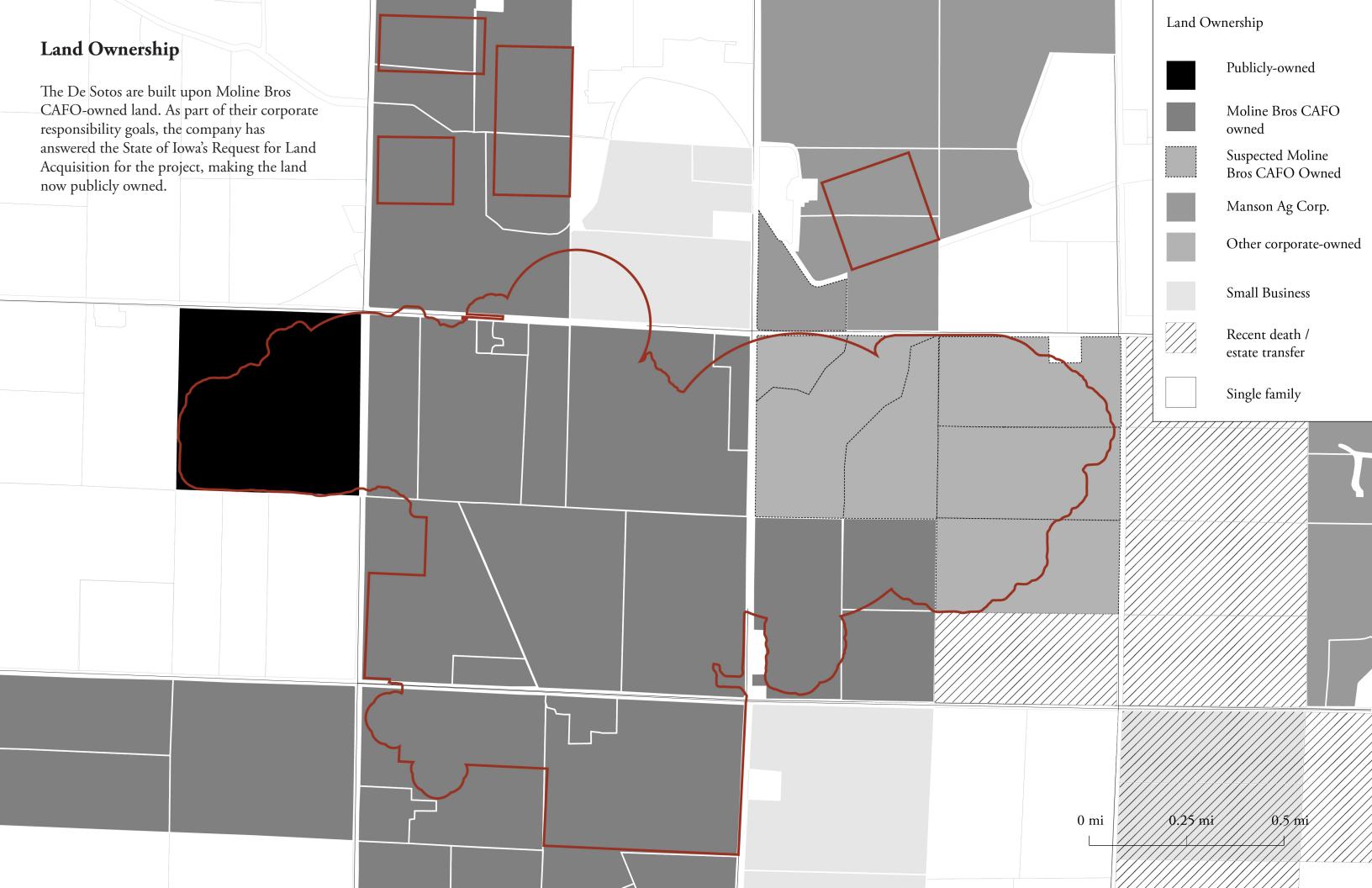
Illinois

View from Fort Dodge



View from Des Moines

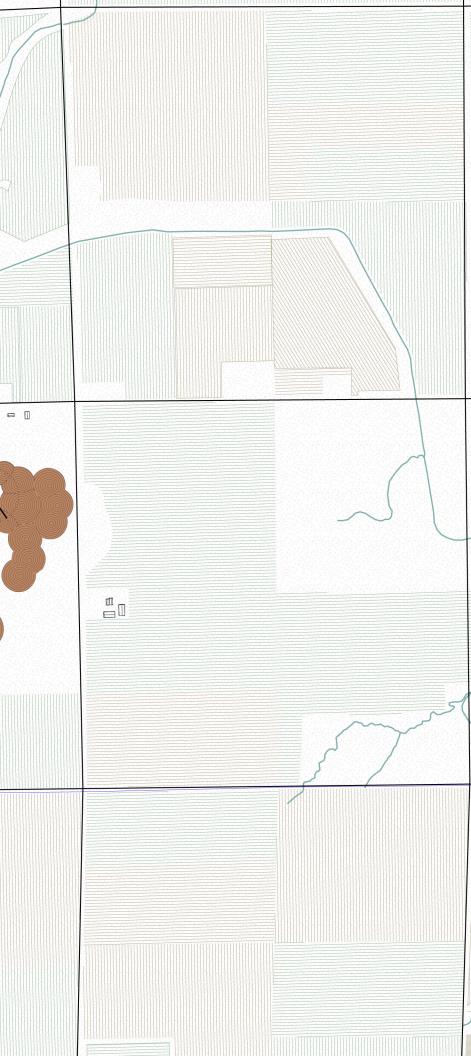
From locals to policymakers in Des Moines, the public will see this mega landform of repulsion extruding out of the ground.



Construction Logic - Year 3

The logic of the mountain's construction is determined based on the radius of cranes, linear movement of conveyers and industrial composters, the construction of gabion walls, and access roads used to deliver the waste material onsite. The site grows each year according to the volume of hog waste that is produced annually.

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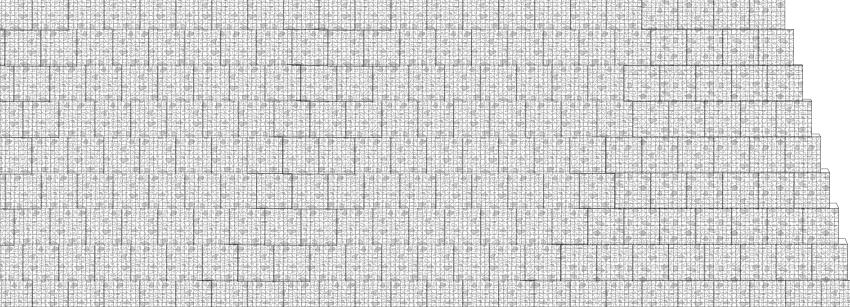
Gabion Wall Constructed Form

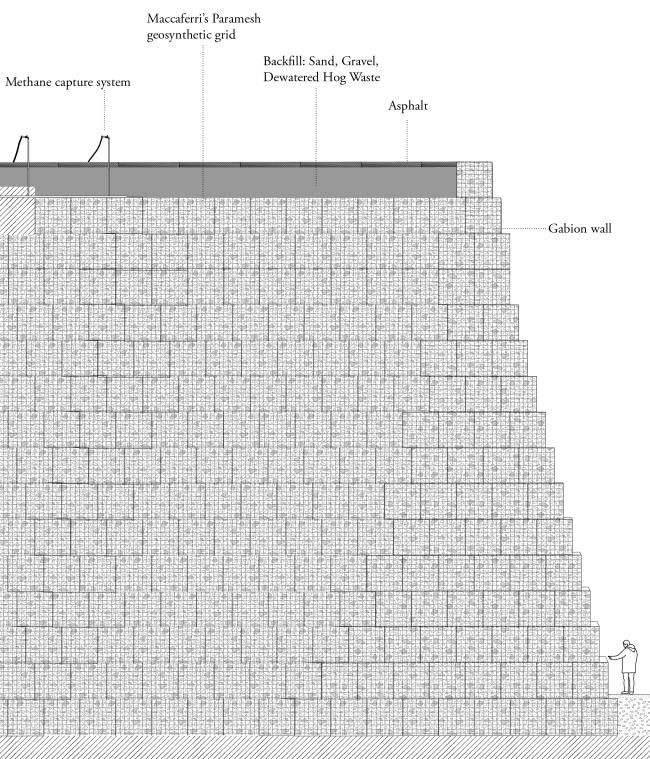
The constructed gabion wall system allows for high peaks and road tracks constructed along the walls for continual access during construction and beyond.

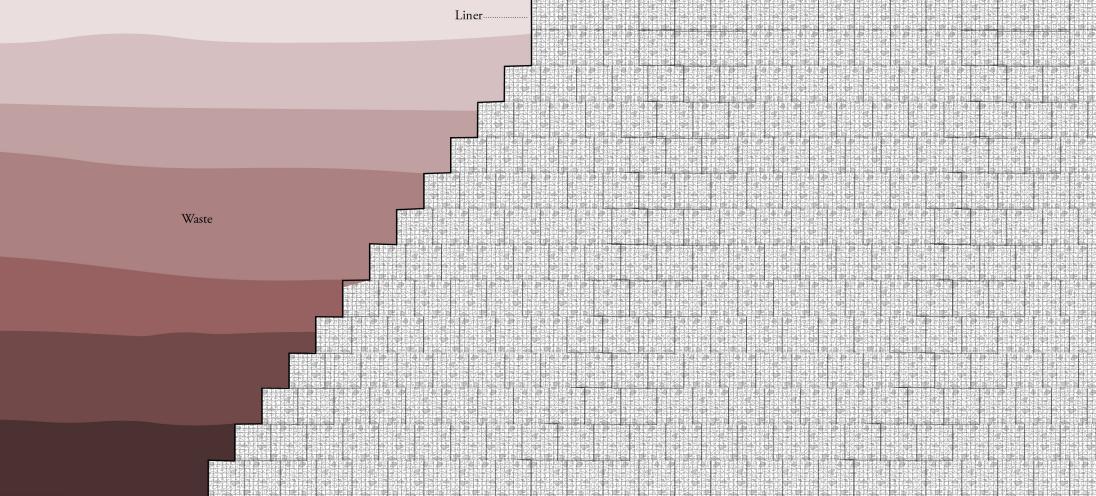


Section of Construction

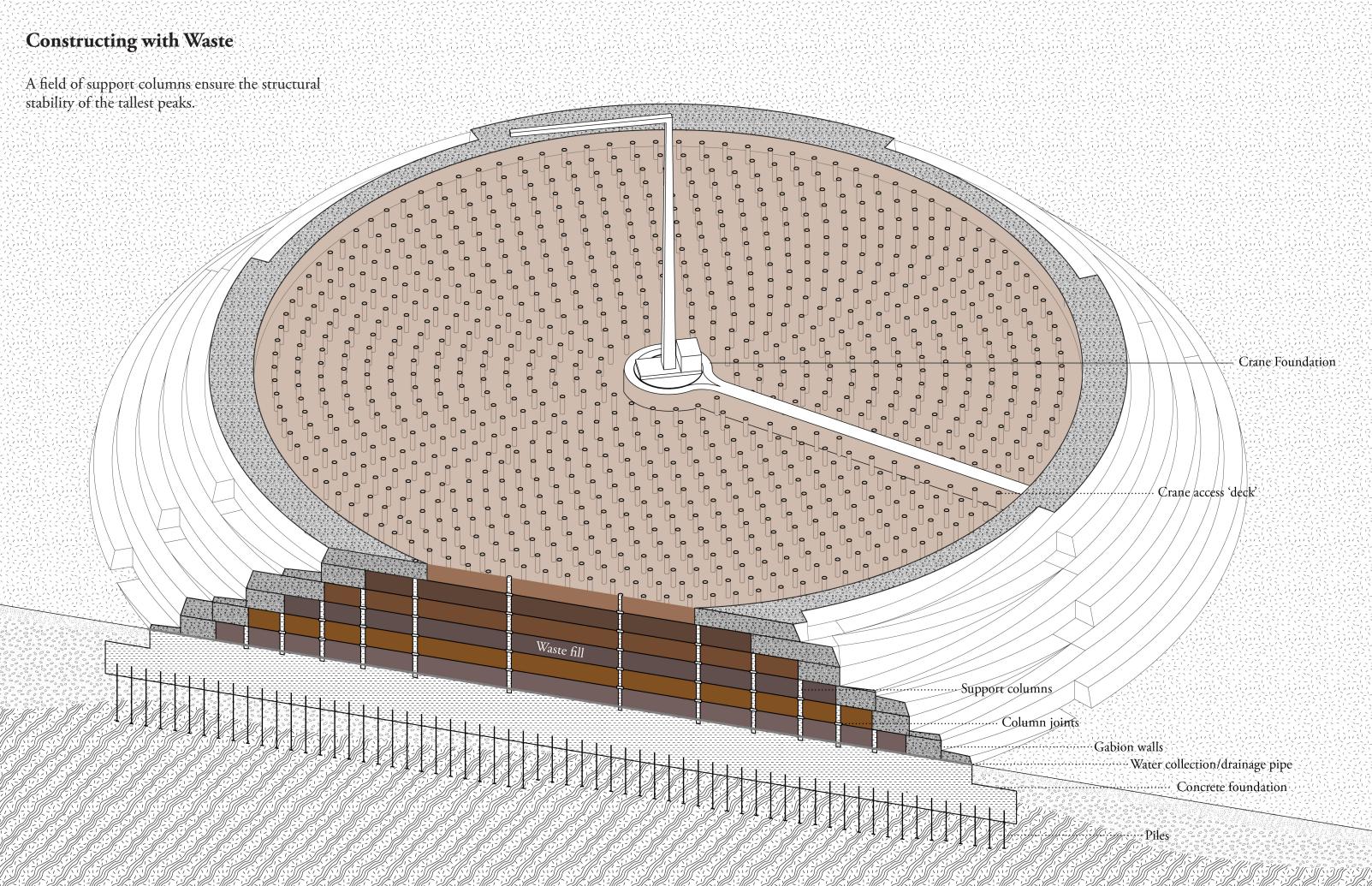


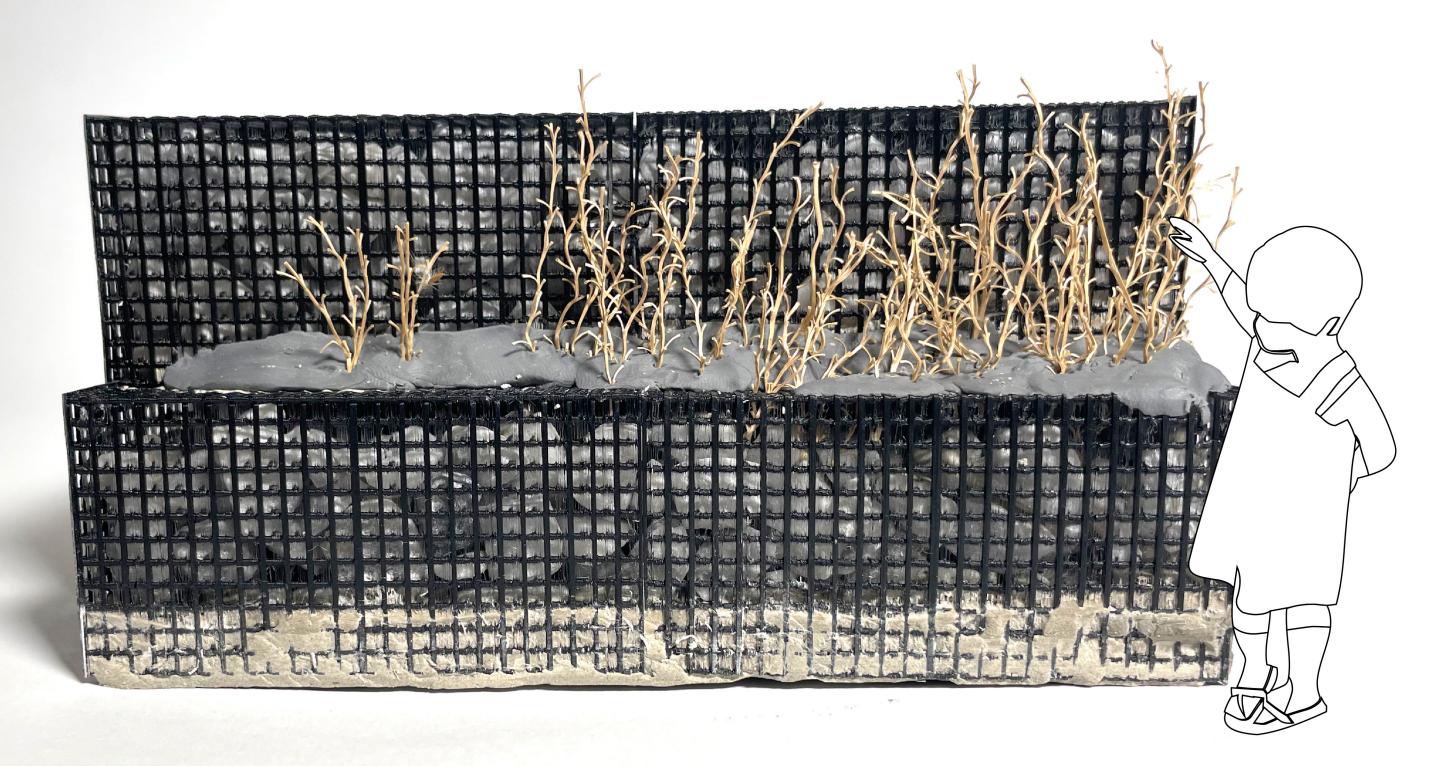






The gabion walls allow for greater containment and capping of less processed material with a slightly higher water content and toxicity.



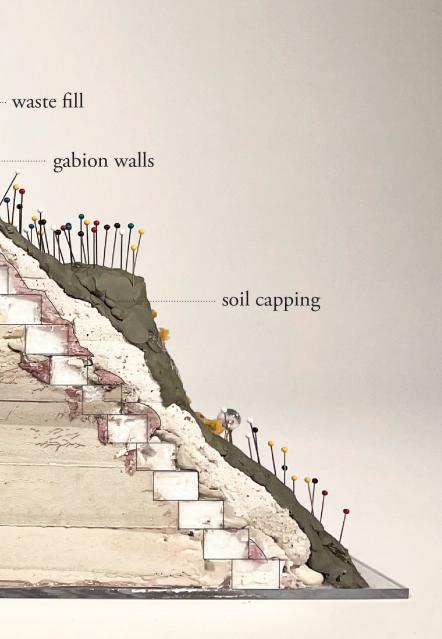


Early Model Iteration Testing Layering and Construction

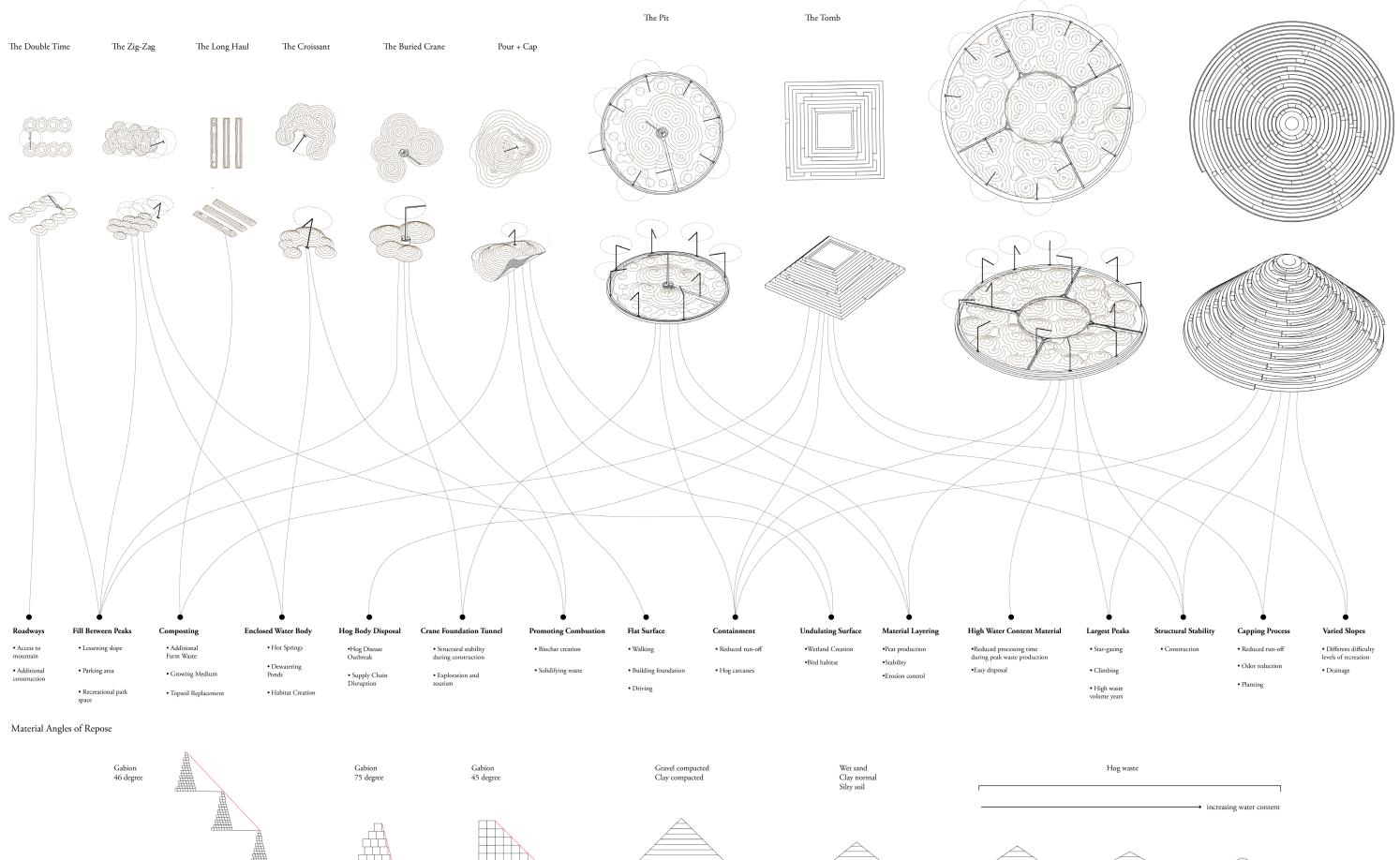
In the construction of the peak first to be completed, material is layered year by year, while the foundations of the crane in the center creates a vertical tunnel where stairwells and an elevator shaft can be added in order for the public to venture through the section of the mountain.

crane foundation tunnel

P1. 1.1. + 6.2



Landform Typologies of Big Pig and Their Anthropogenic Uses















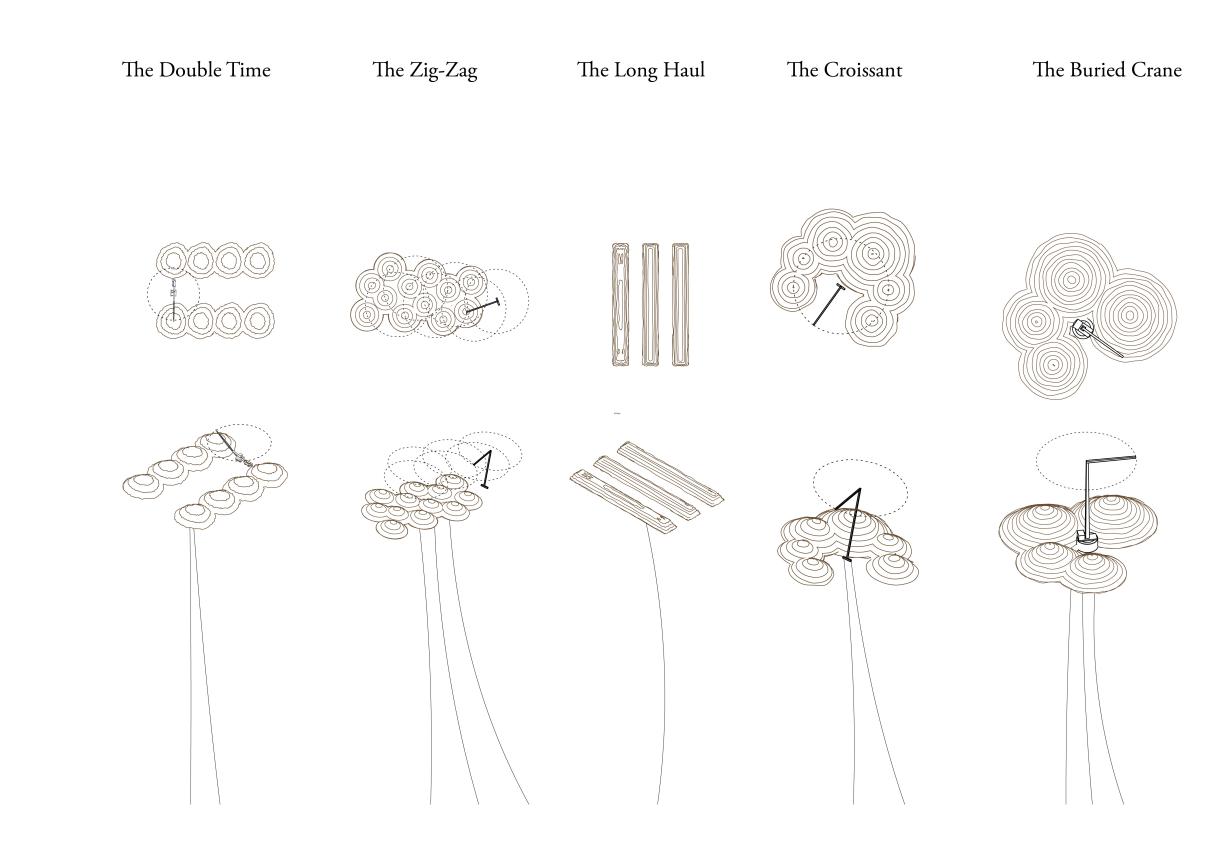


The Sectional

The Cone

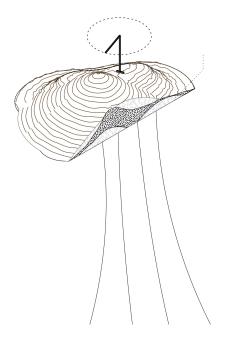
Landform Typologies of Big Pig

Typologies such as The Double Time and The Zig-Zag aid in the creation of low-lying mounds and a slow, even buildup of material. The long haul is a traditional composting landform creating elongated rows of decomposition. The Croissant, The Buried Crane, and The Pour + Cap are about material layering, achieving height with larger cranes.



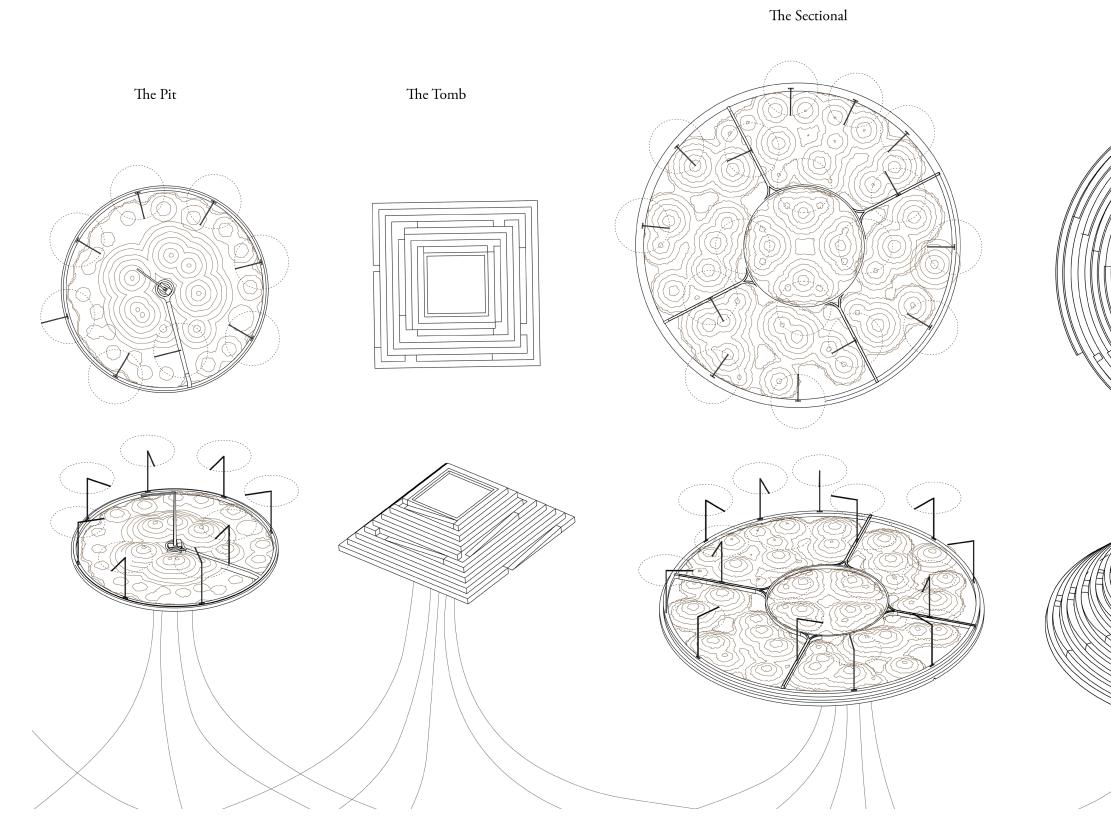
Pour + Cap



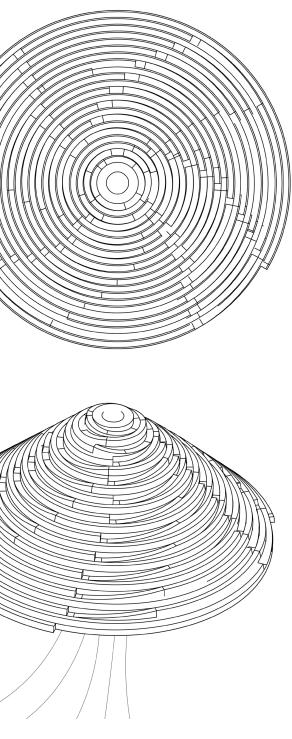


Landform Typologies of Big Pig

The constructed forms aid in the creation of the tallest peaks, contributing to the visibility of the De Sotos. The Tomb, used in the case of supply chain disruption for emergency mass hog burial, remains lower and added to at a more sporadic rate. The largest peak at 2,000', utilizes The Sectional to allow cranes to reach the entire surface area.

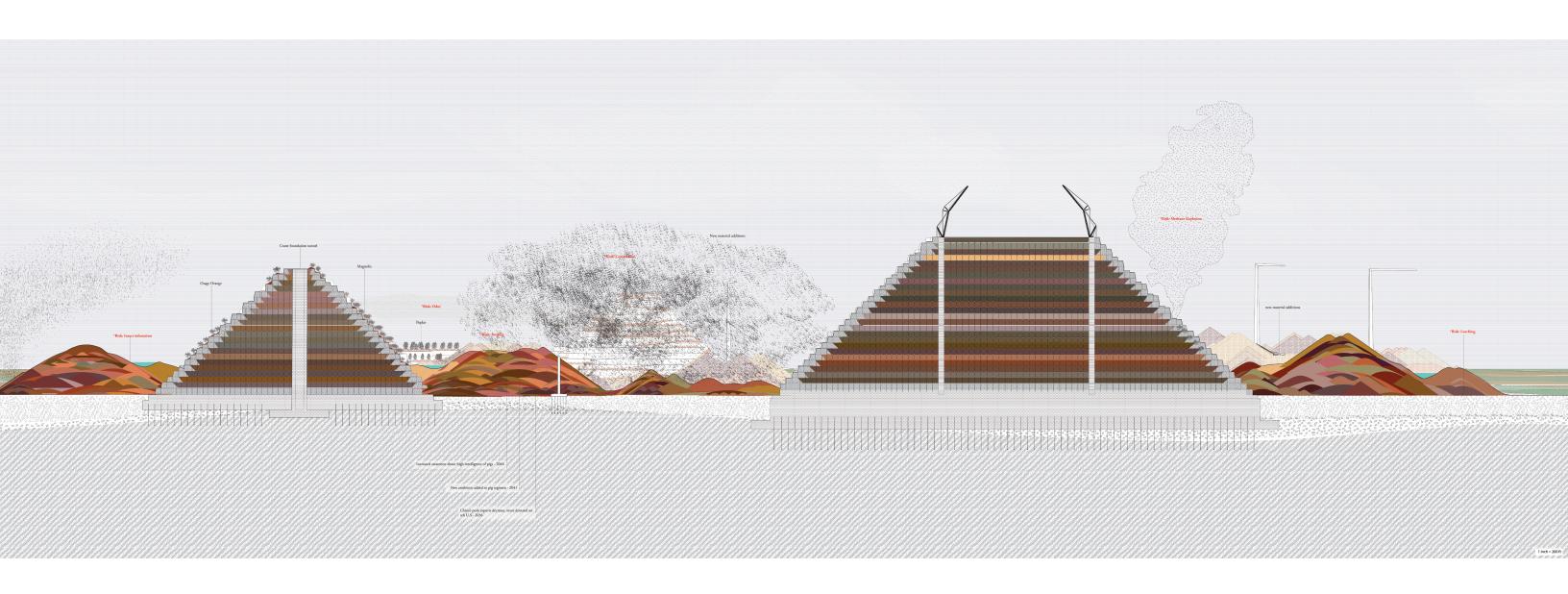


The Cone



From Typologies to Site

The modes of construction and various typologies lend themselves to a variety of landforms across the site, from lower-lying mounds of layered material to tall peaks.



From Typologies to Site



"The term [post-industrial] itself creates more problems than solutions because it **narrowly isolates and objectifies the landscape as the byproduct of very specific processes no longer operating upon a given site** (residual pollution aside). This outlook reifies the site as essentially static and defines it in terms of the past **rather than as part of ongoing industrial processes** that form other parts of the city..."

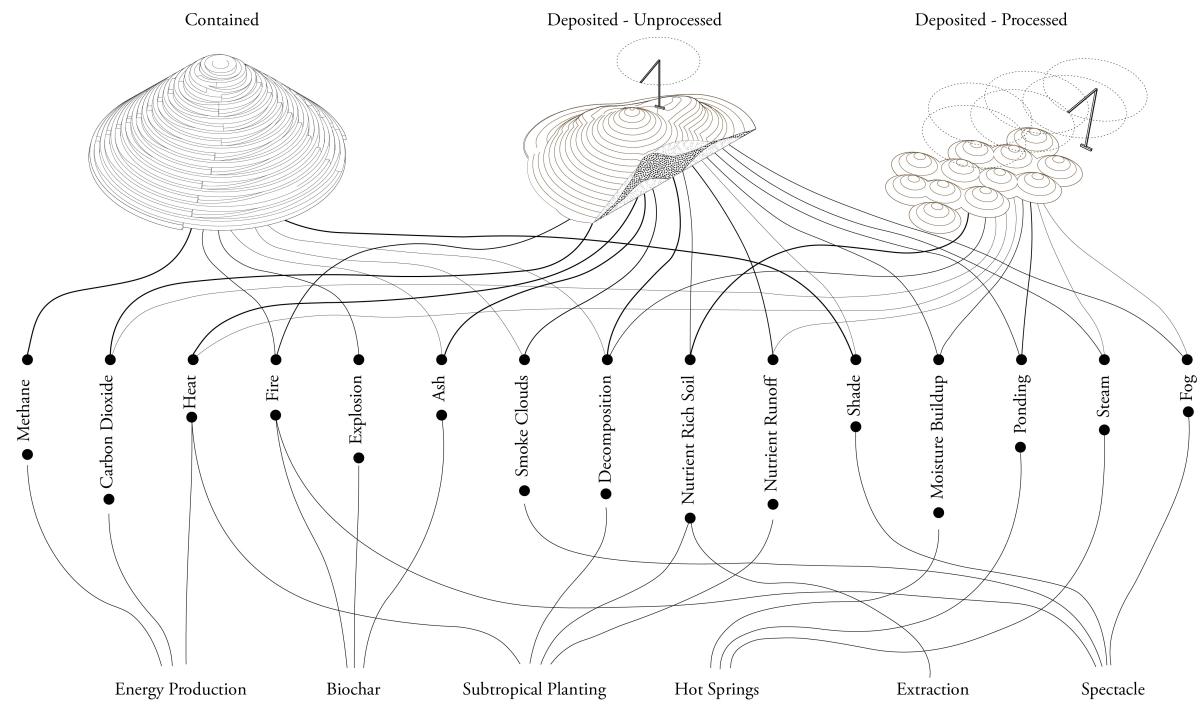
-Alan Berger, "Drosscape." Landscape Urbanism Reader. New York: Princeton Architectural Press: 69-85. 2006.

As an active site of industry, the De Sotos push back on landscape architecture's fascination with and overuse of the term "post-industrial" landscape which as Alan Berger states above "isolates and objectifies the landscape" as a by-product of processes no longer operating on the site.

The De Sotos embrace the artificial and natural processes of industry as an ongoing condition.

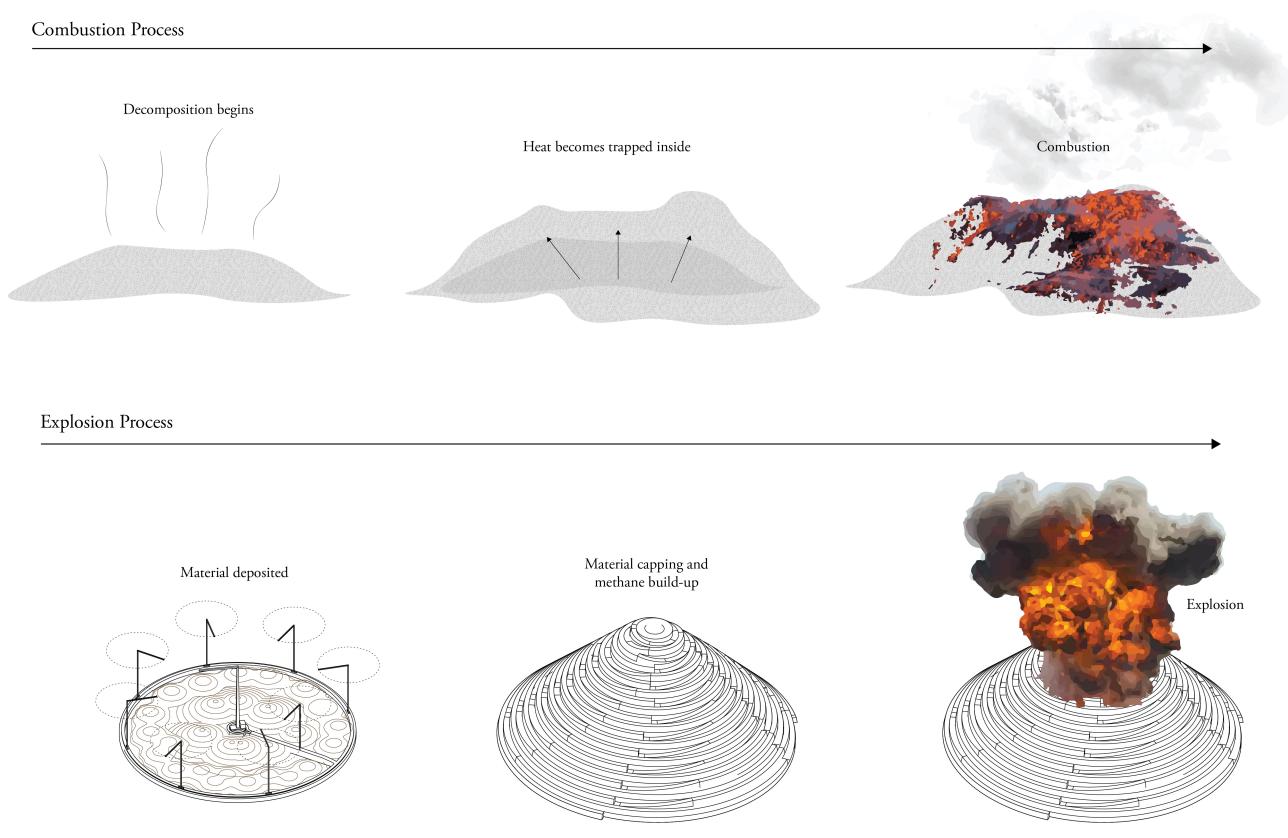
The Risks and By-Products of Industrial Nature

The site is understood as not a by-product in and of itself, but a landscape that produces its own by-products and risks. The processes of the site are dependent on the multipeaked form of the site which emphasizes the tension between natural and artificial.



Understanding the Risks of the Site

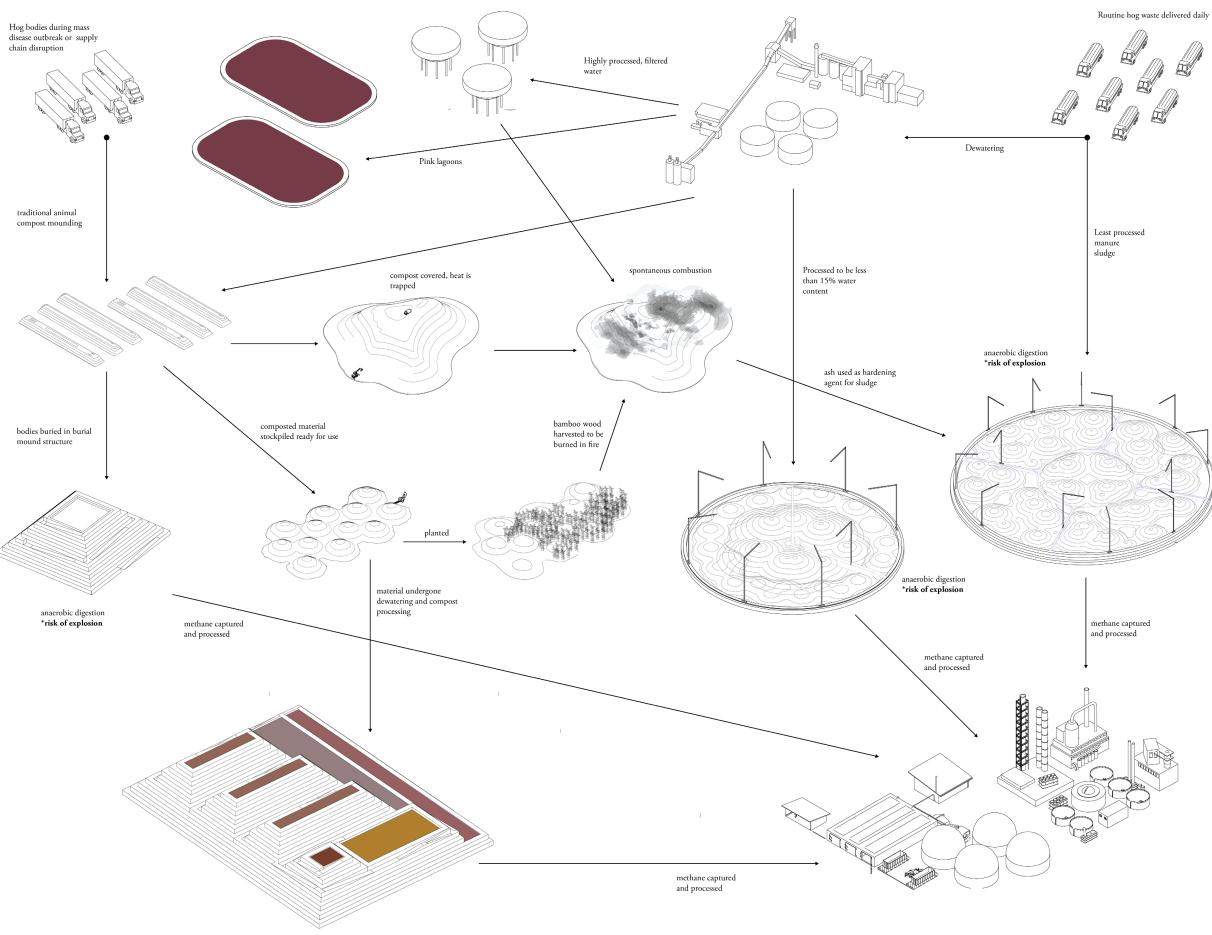
Risks of the site such as combustion or possible explosion are monitored and utilized in the creation of nutrient rich soil, construction, and biogas energy production.



Landscapes of Repulsion: Hidden in Plain Site

Artificial and Natural Processes and Material Flow

In the ongoing functioning and material flows of the site, by-products such as the ash from combustion can be used to stabilize and cement the waste sludge with a higher water content to speed up the construction of the next ring of walls.



Combining of Site Systems and Processes

THE MANY

Medium Water Content Waste Containment

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Combustion Zones

Birt george

Radias Antornation Istala Antonia (San Added to secon concern

Hot Springs

Dewatering Facility and Material Processing

Low Water Content

New Material Additions

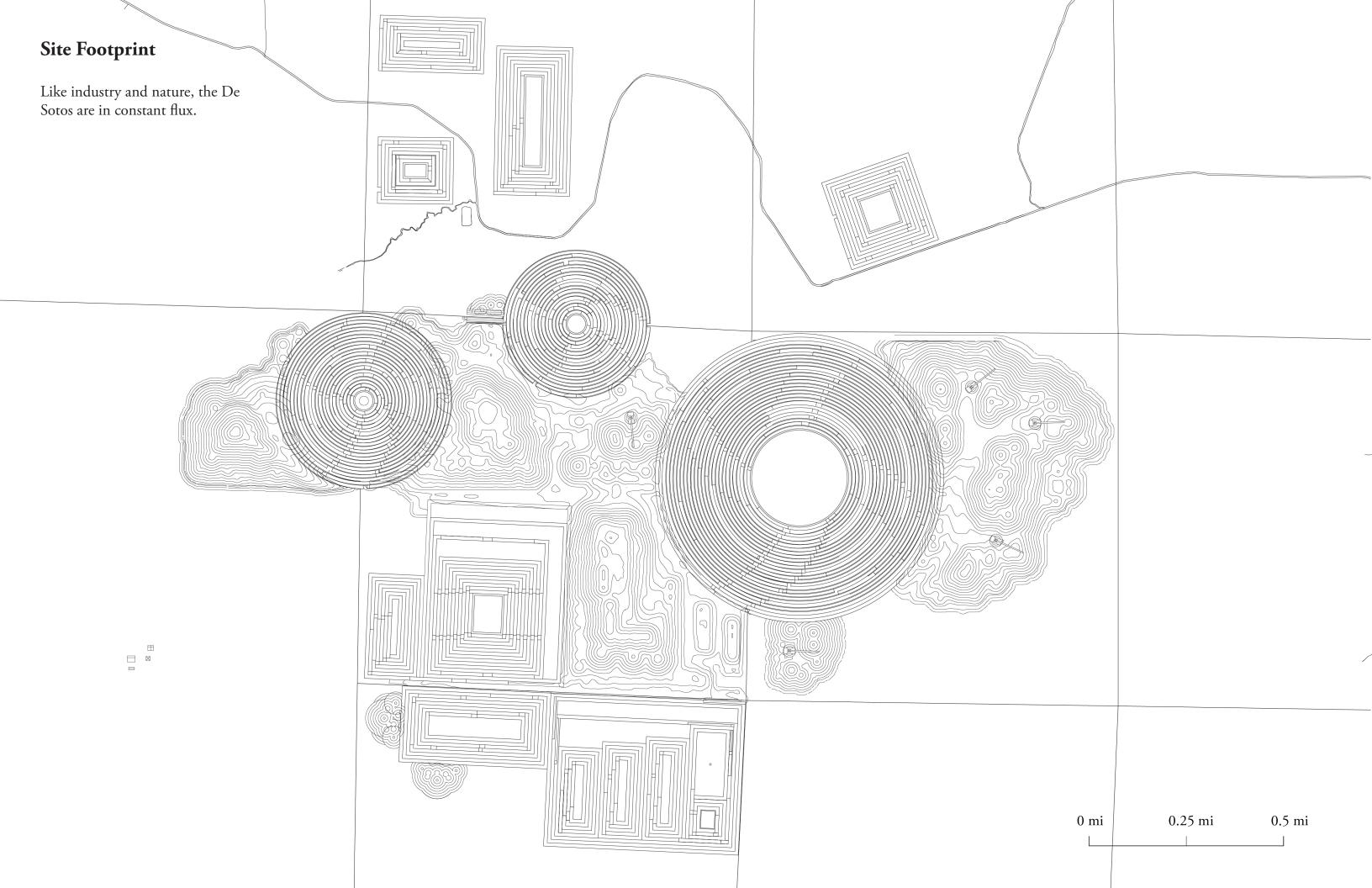
Waste and Compost

High Water Content Waste Containment

Bamboo

HINH

THE / F T I SHOT



Hydrological Studies

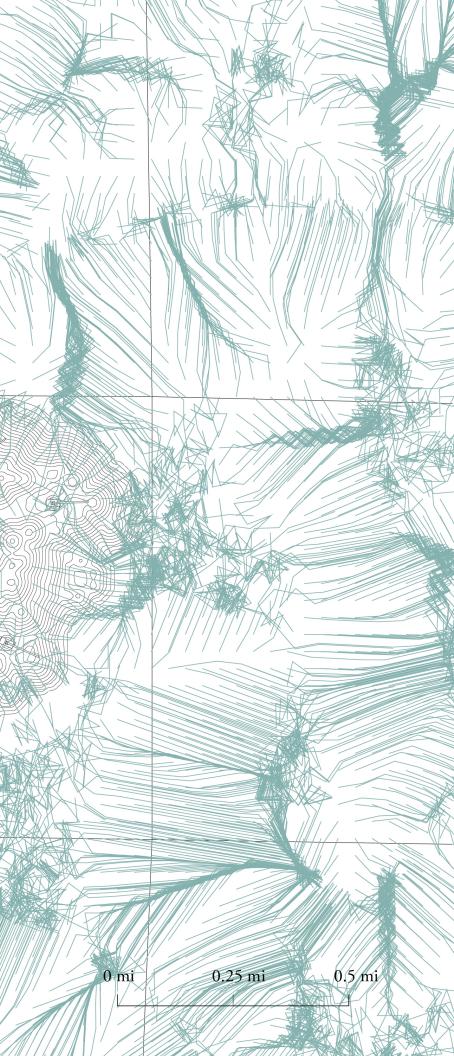
Altered topography lends itself to new hydrologic systems over time.

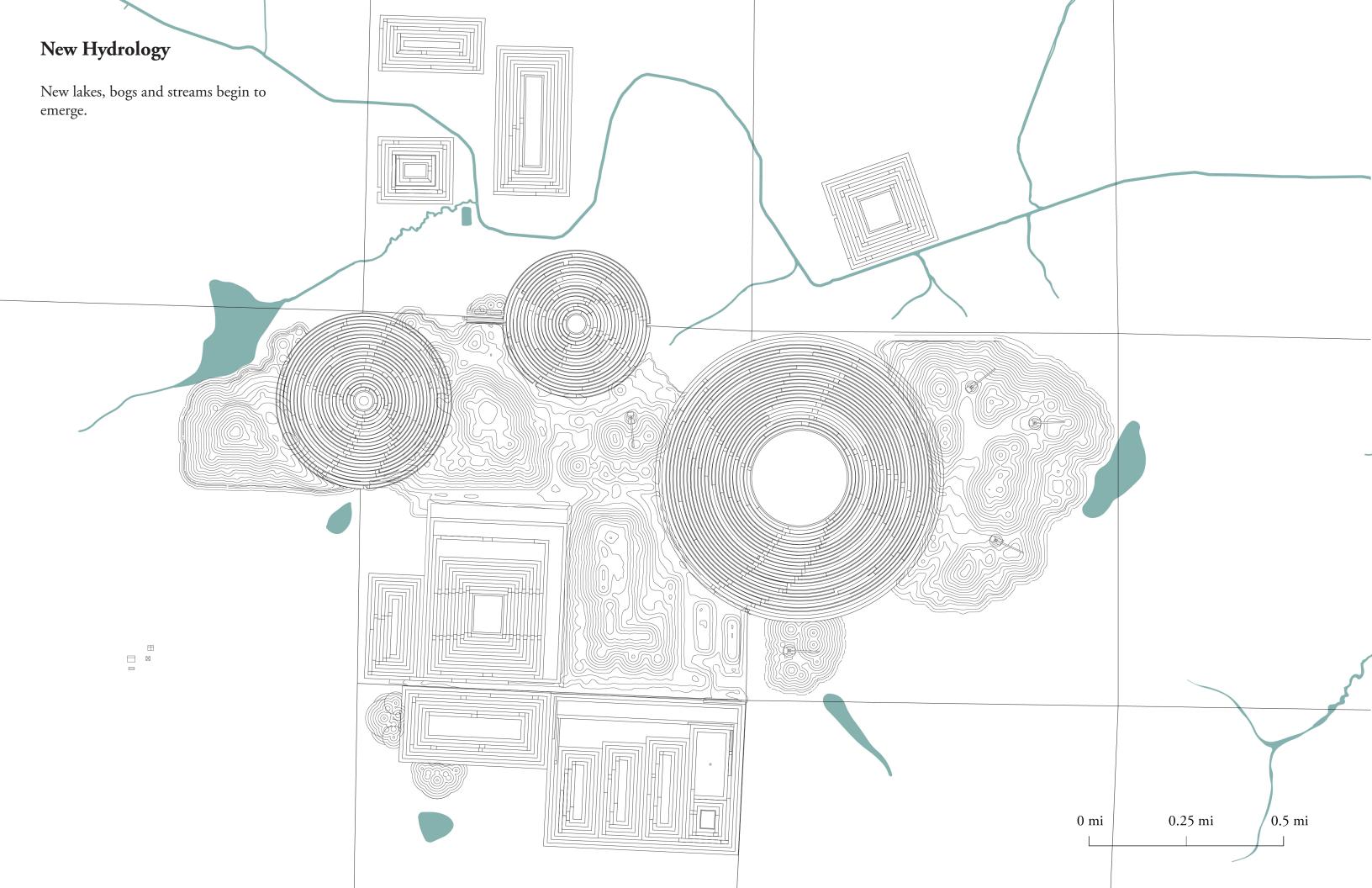
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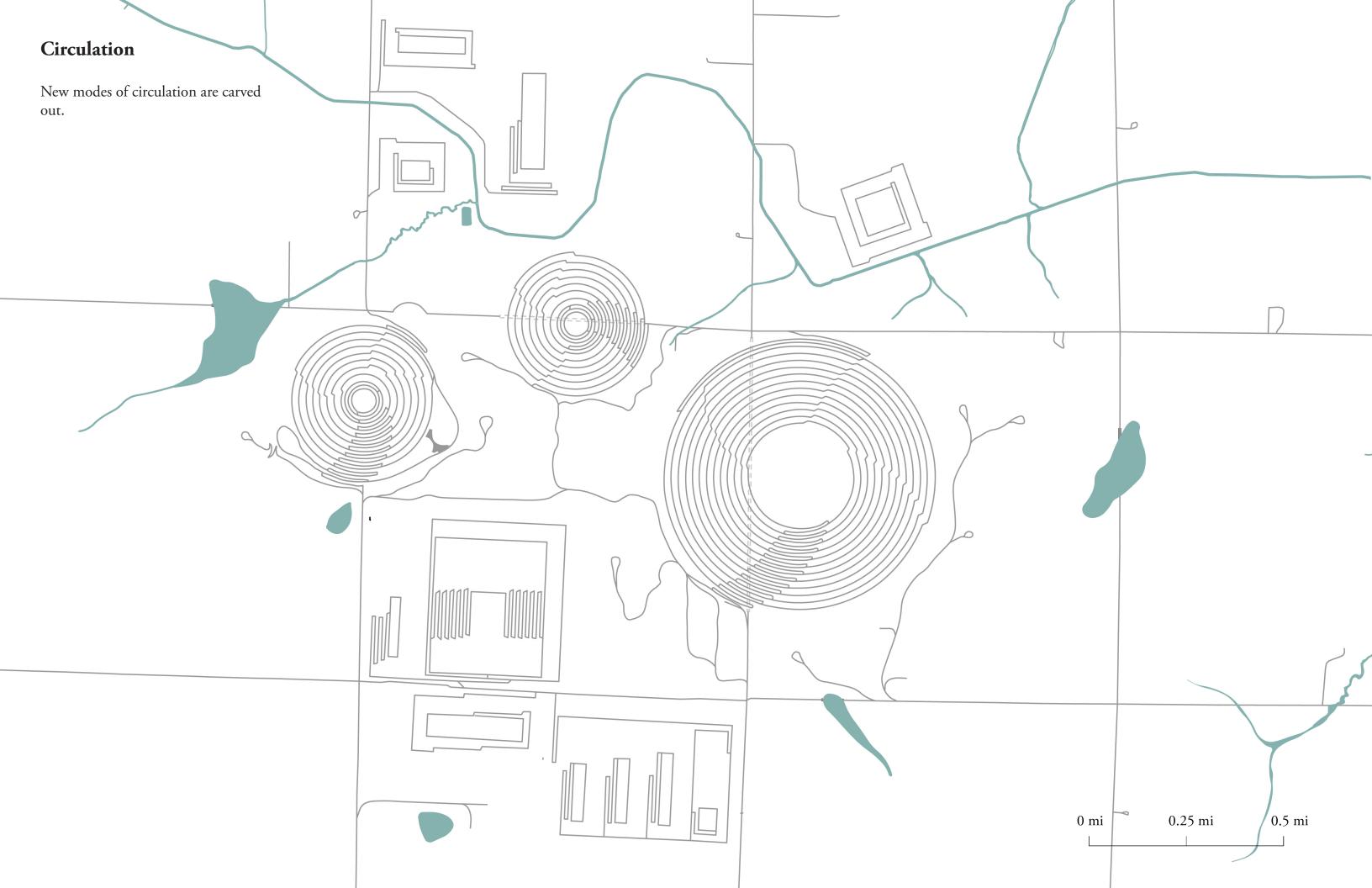
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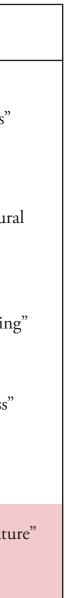
Nature of the Fourth Kind version 2.0

The project joins the call in landscape architecture discourse of figures such as Anita Bakshi and Frank Gallagher for a rethinking of the "fourth nature" that goes beyond "wildlands and spontaneous plants" to utilize the active processes of industry both natural and artificial for a more intentional plant design.

- Bakshi, Anita and Frank Gallagher. "Design with Fourth Nature." Journal of Landscape Architecture, 15:2, 24-35. 2020.

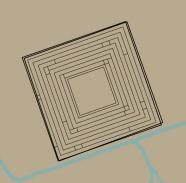
Types of Forests	Types of Ecosystem	Types of "Nature"
Remnants of pristine nature	Pristine ecosystems	Nature 1: "old wilderness"
Forests characterised by human management	Ecosystems shaped by agriculture and agroforestry	Nature 2: "traditional cultur landscape"
Parks, planned gardens	Ecosystems established by planned design	Nature 3: "finctional greening
Successive planting on urban post-industrial and abandoned sites	Ecosystems that evolved naturally on urban industrial sites	Nature 4: "new wilderness"
Intentional designed planting that takes into account "natural" processes of active industry	Unexpected ecosystems that are intentionally designed with active industry	Nature 4, 2.0: "industrial natu

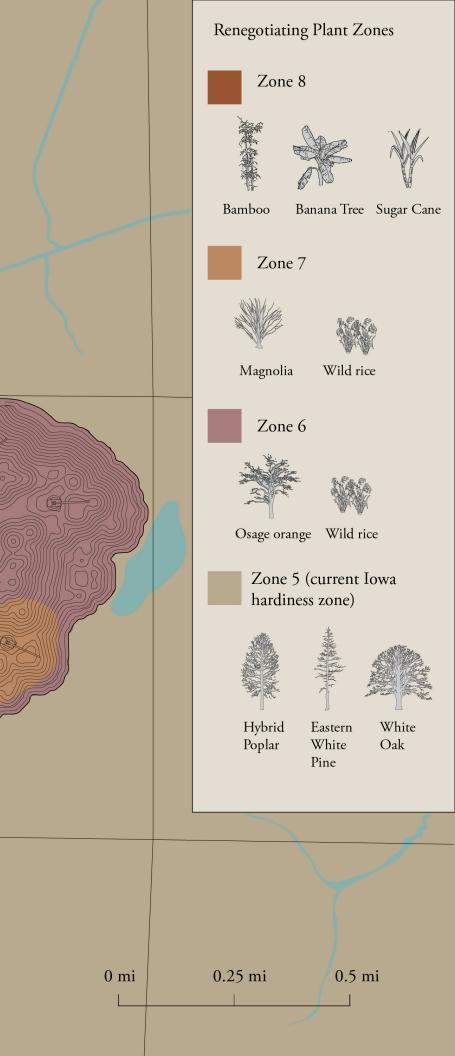
Adapted from the work of Dr. Ingo Kowarik



Planting Zones

At the De Sotos, the Fourth Nature 2.0 leverages by-products such as heat, combustion and nutrient dense soil to reimagine planting zones. The lower, hotter areas of the site become subtropical planting districts transitioning to temperate zones of planting at higher elevations and outer extents of the site.





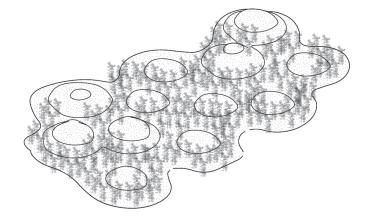
Temporality of Planting

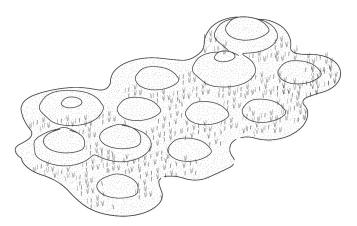
Bamboo, an uncommon sight in Iowa, is planted to become commonplace at this site and used in the process of combustion and production of wood ash.

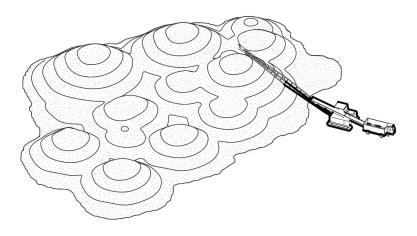
Bamboo planted low-landforms

Bamboo cut for burn pile

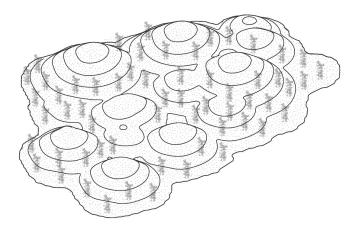
New material added on top





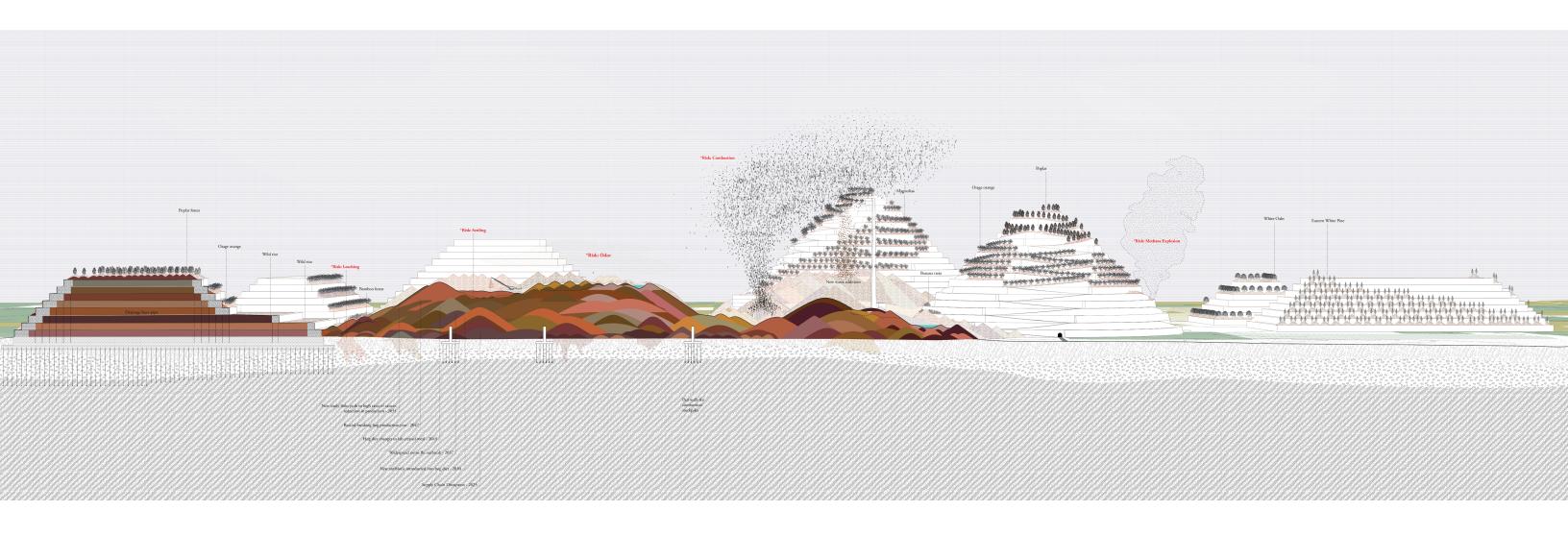


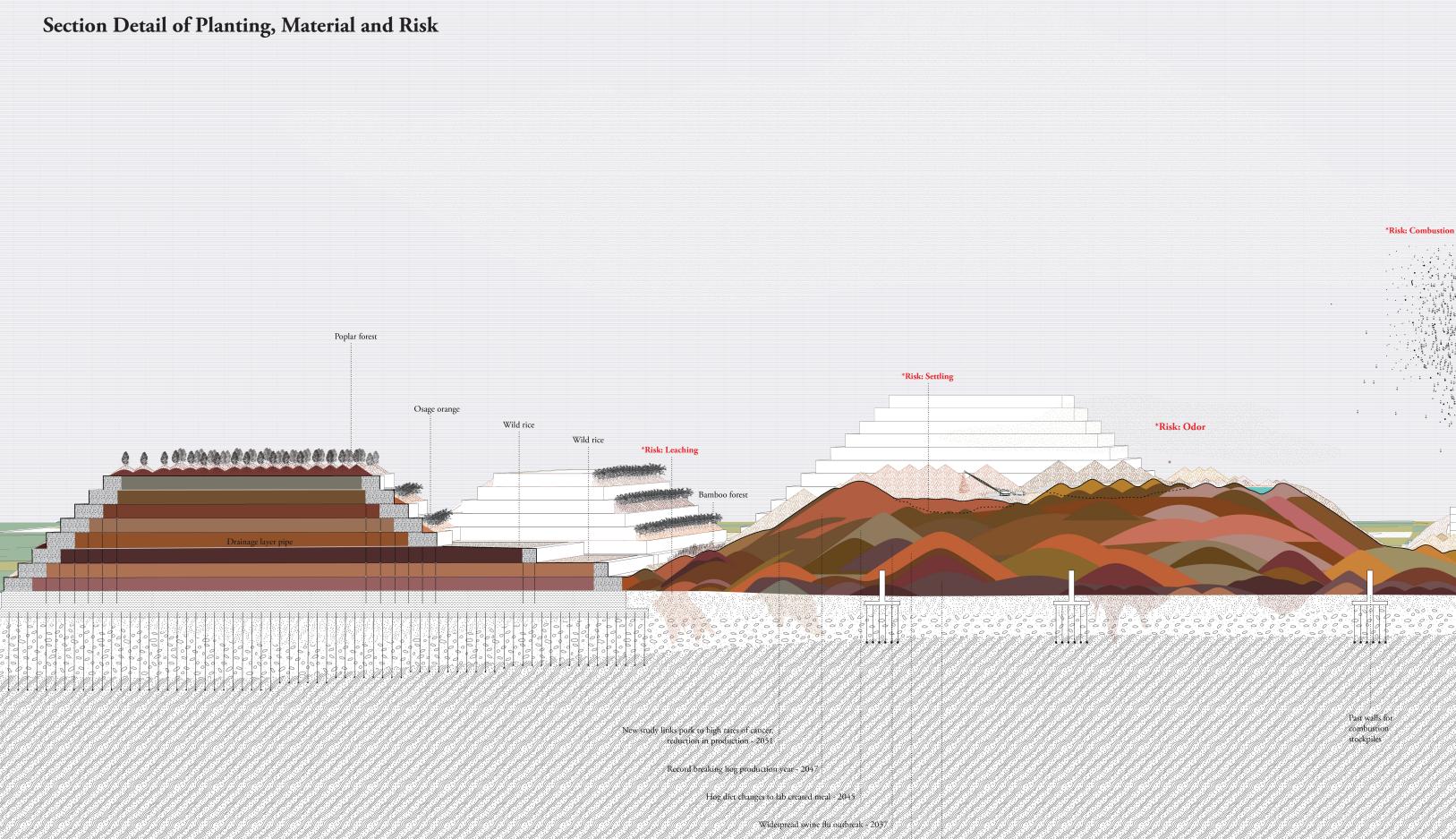
New planting



Planting Zones in Section

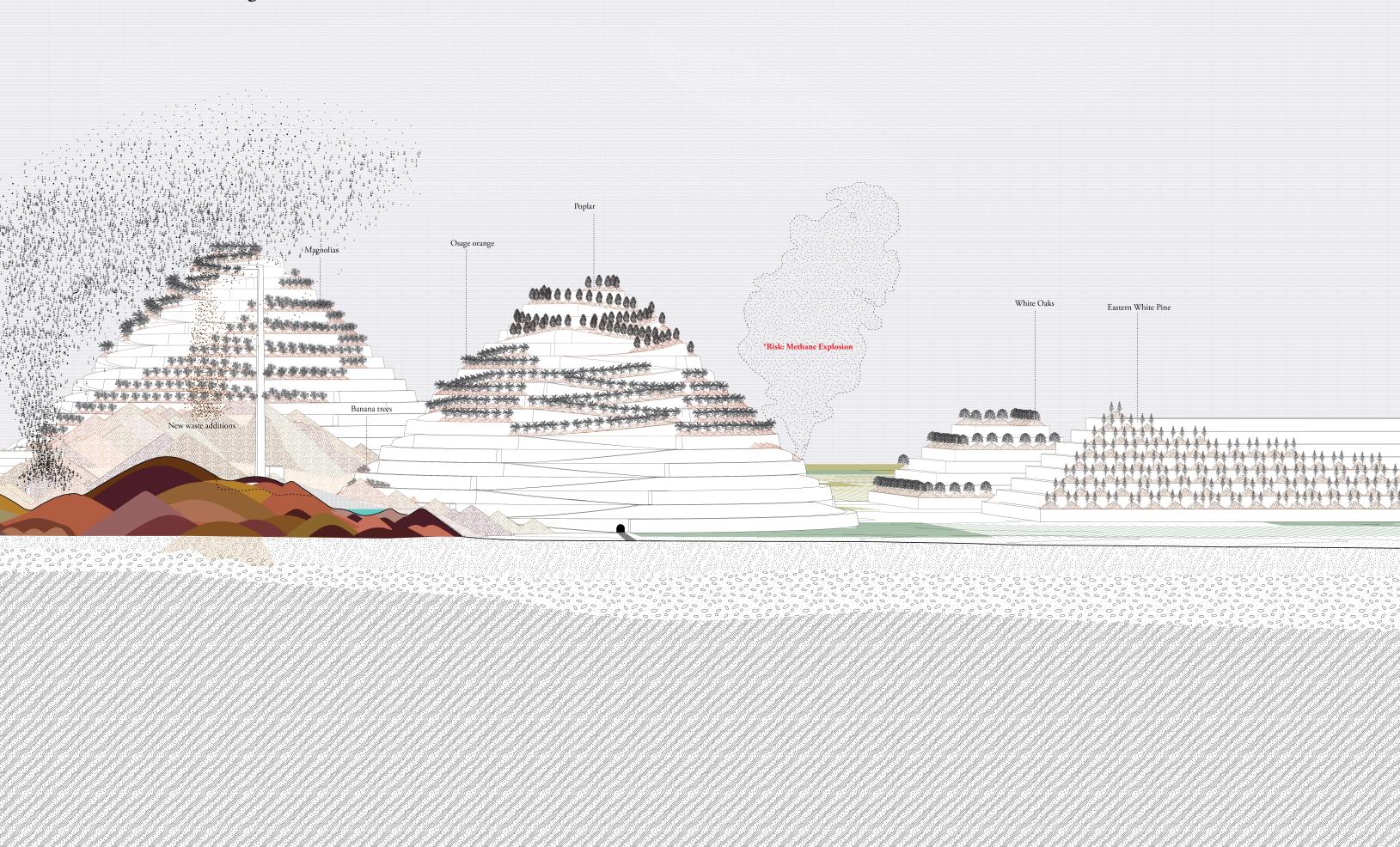
At the De Sotos, one may be able stand in a Poplar forest and see dense Bamboo stands and Banana plants growing below, or escape the odor of freshly added waste under a Magnolia tree atop a peak.





New antibiotic introducted into hog diet - 2030

Section Detail of Planting, Material and Risk



Modelling Planting Zones

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Temperate Planting

Subtropical Planting

1. Martin

Level Etc.

Temperate Planting

Subtropical Planting



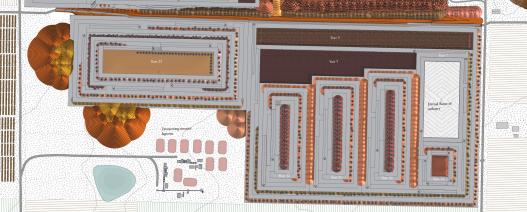
Year 2075

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As a product of consumption subject to a shift in societal or political winds, the mountain is only projected for 50 years worth of construction, weighing in at about 2 billion tons. The mountain is comprised of the addition and subtraction of material over time.

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Necture results

Materiality of Repulsion

The colors of the site plan are a representation of the many different colors and textures of the repulsive material the landscape is made of.



Year 2075

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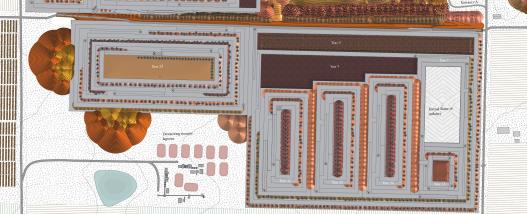
In her work on post-industrial landscapes, Anna Storm writes that post-industrial sites can be considered "a scar, part of a heritage or nostalgia for an industrial past."

-Anna Storm, *Post-Industrial Landscape Scars*. New York: Palgrave Macmillan. 2014.

As a site of active industry, The De Sotos are a landscape of temporary memory.

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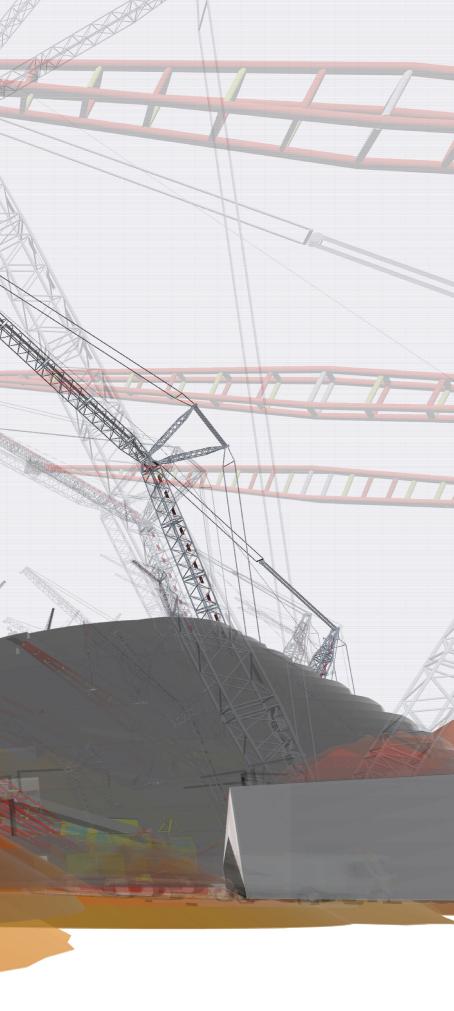


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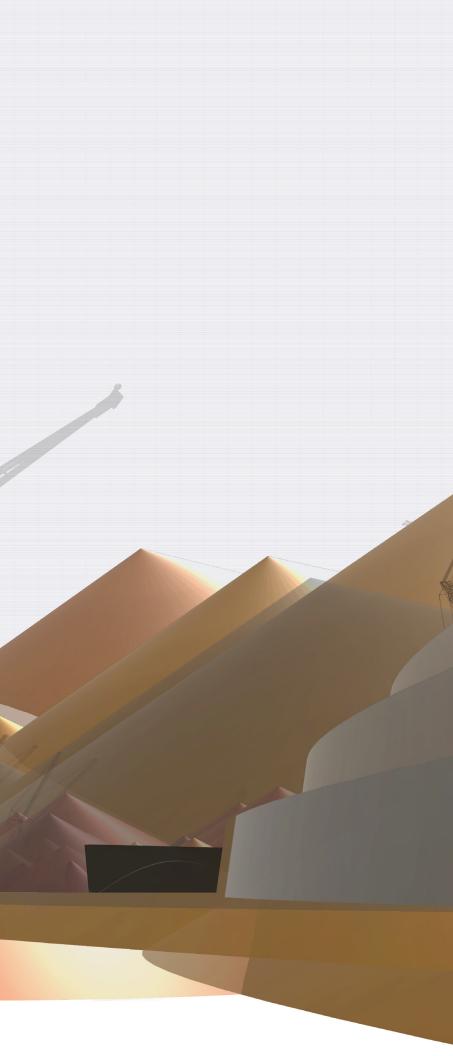


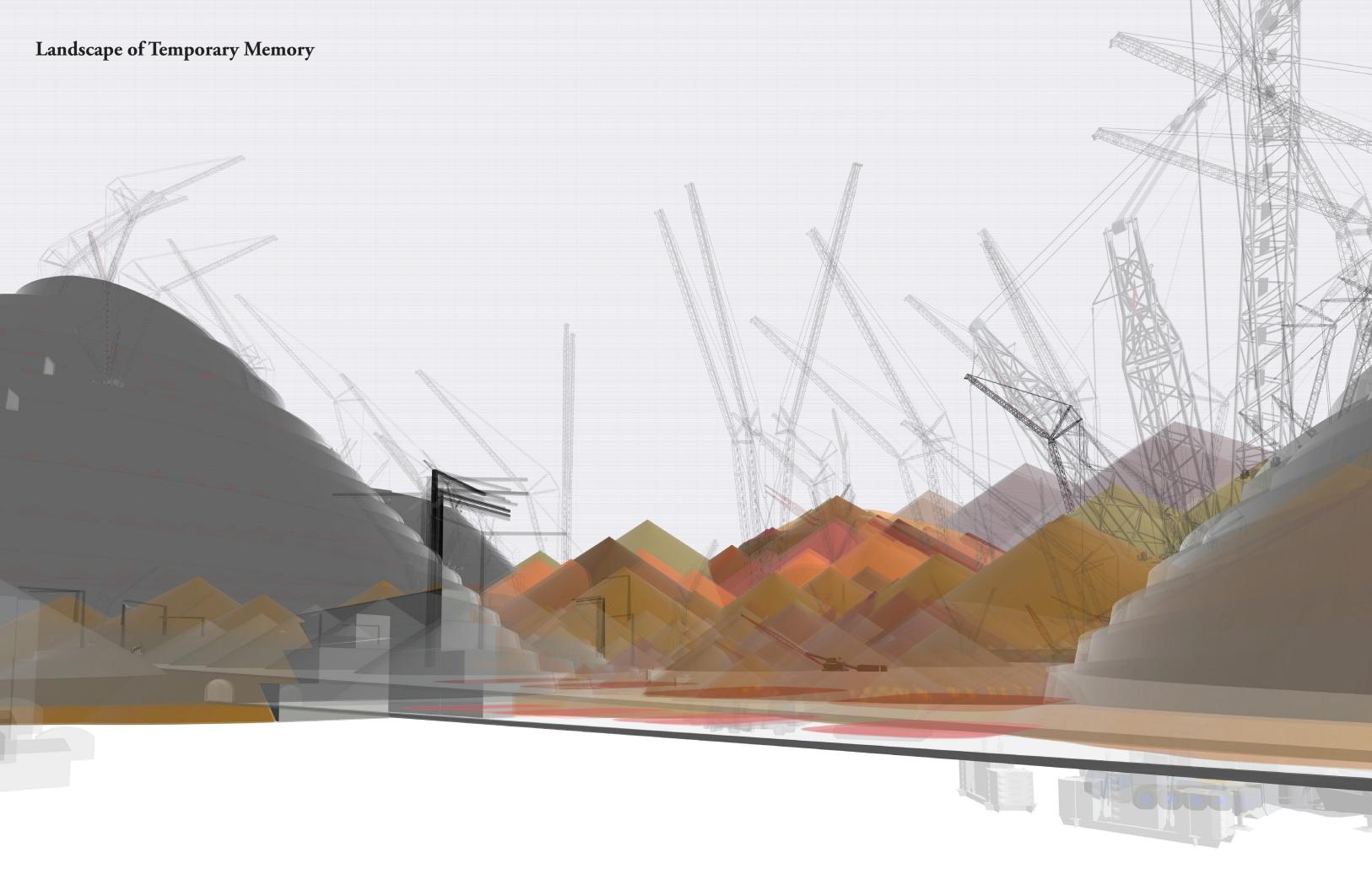
Landscape of Temporary Memory

The layering, burning and extracting of material over time means that a given vantage point may never look the same more than once in a person's lifetime as cranes and trucks come and go, and memories are buried.







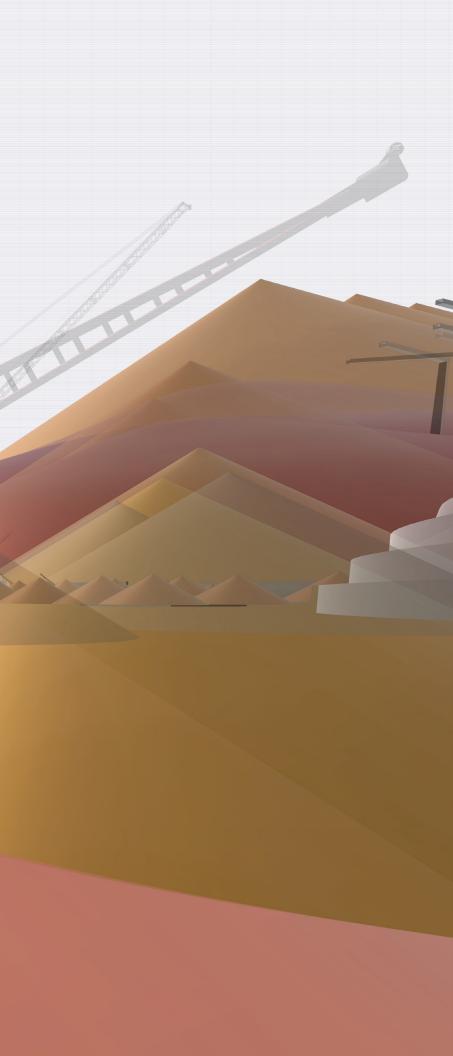


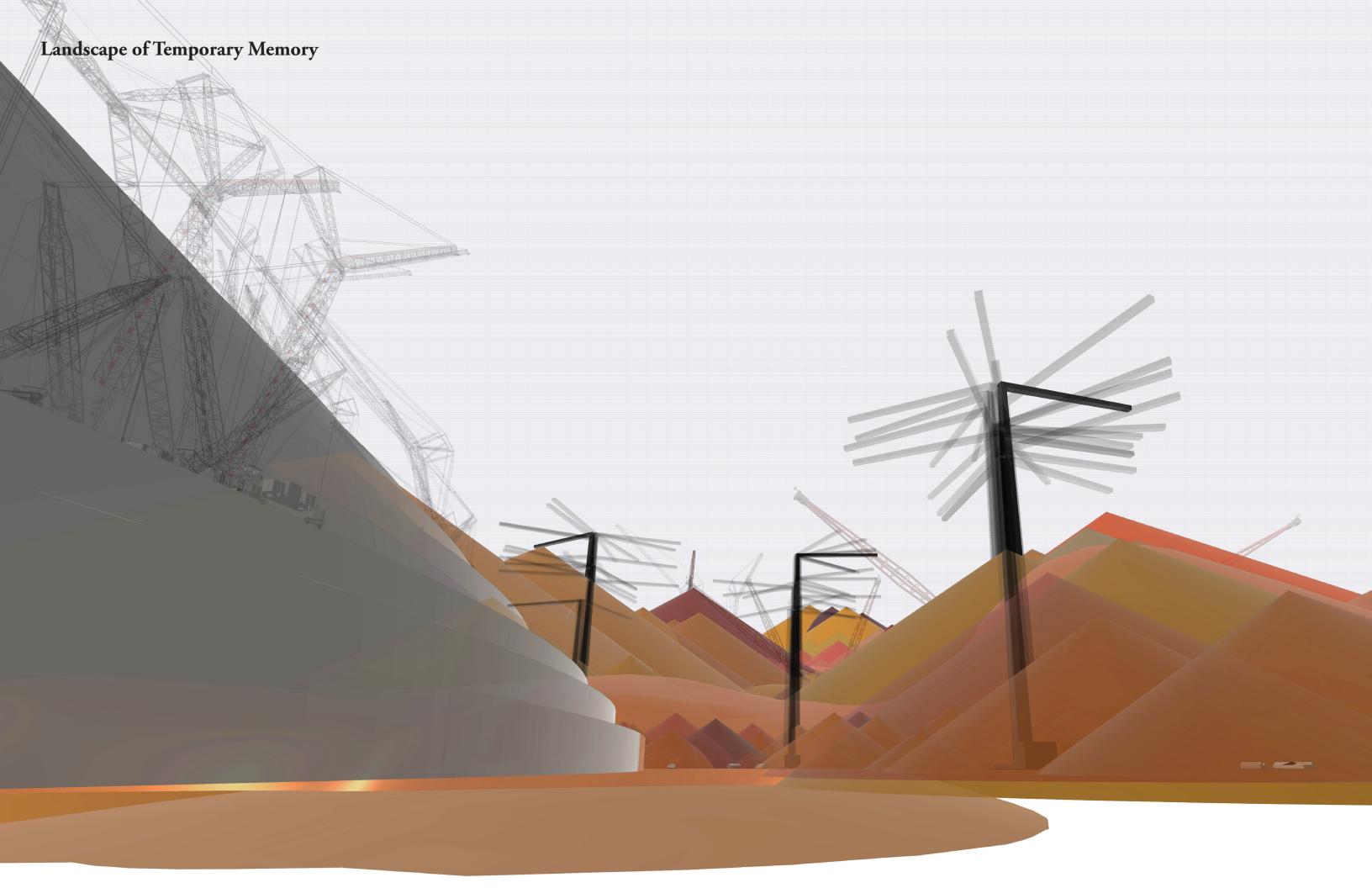
Landscape of Temporary Memory

s-biller sil



Landscape of Temporary Memory





Permanent Fields, Impermanent Peaks

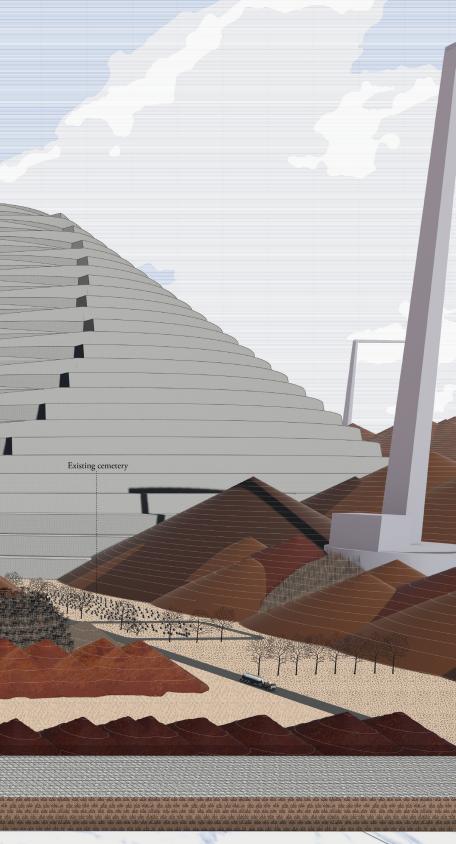
A mountain usually remains unchanged, as the backdrop against a changing world. In this case, the cornfield that the Peters have been growing on for 50 years may be there another 50, but future generations of farmers will watch as mountain peaks grow in front of them.



Political Stage with a View

Ash cloud for co

Certain spaces on the site are planned to remain unchanged as datums against the growing megaform, such as this public platform for social and political gathering where the Iowa Caucuses can be held.



Year 51

Dense bamboo forests for timbe

Sugar Cane Cultivation

Permanent Public Plaza

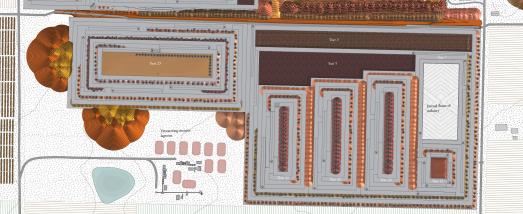
After The Year 2075

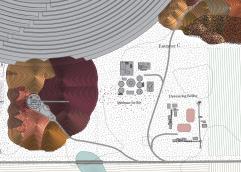
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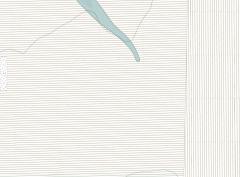
The fate of the mountain indefinitely will depend on the cultural acceptance or rejection of this industry as a force that is shaping the landscape in immeasurable ways.

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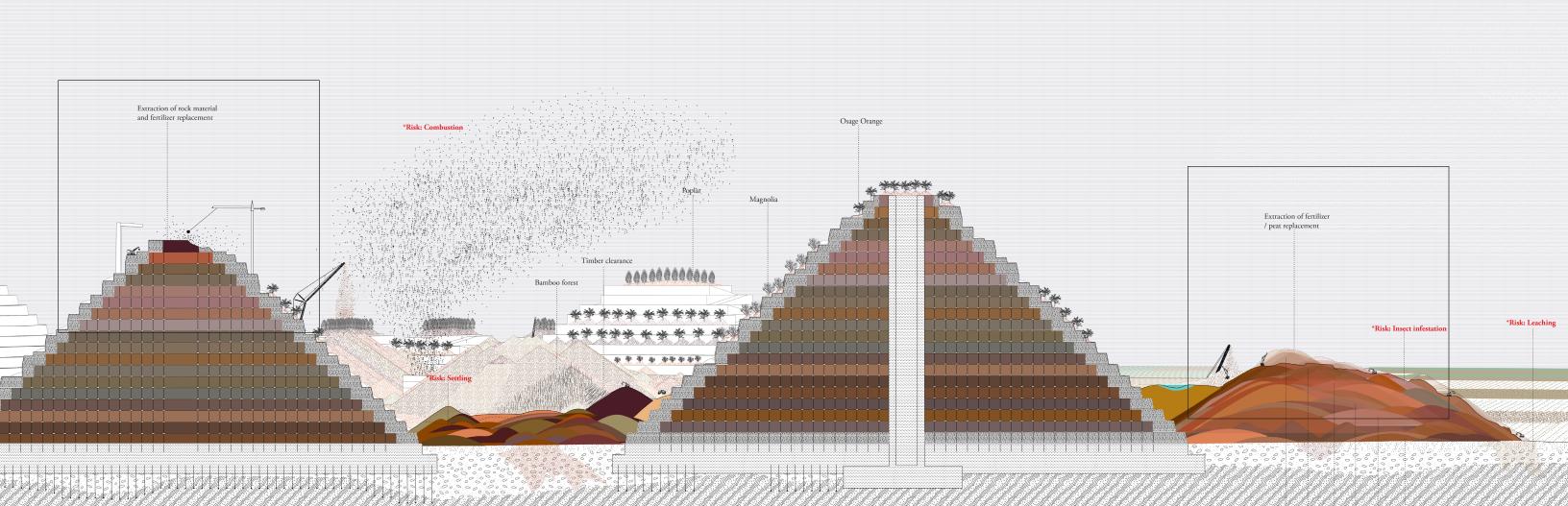






Extraction Outpacing Growth

In one possible future, the exposure of the hog industry and technological advances in artificial meat have lessened demand. The processes of extraction for the site's nutrient dense fertilizer replacement continue at a rate faster than material is added.



New study links pork to high rates of cancel.

Record breaking hog production year - 204

Hog det thanges to lab overed meat /2045

Widespread swine the outbreak 2037

New antibiotic introducted into hog diet - 2030

Supply Chain Disruption - 2025

Possible Future Scenario 1

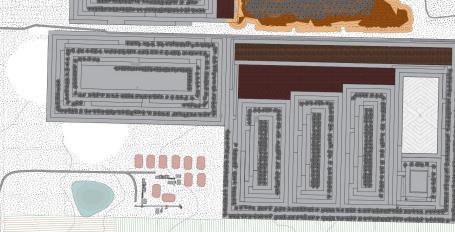
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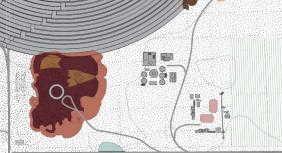
In this future, new construction ceases and old structures are decommissioned for their construction material and fertilizer replacement. The processes that contributed to the warm environment that supported tropical growth lessen, and White Oak and Pine forests are planted in place of Bamboo. -----

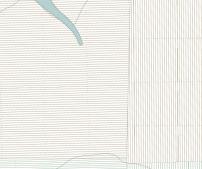
Decommissionin of structures for

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Less habitat for bamboo









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Crane foundation remnants

White Oak and Eastern White Pine Forests

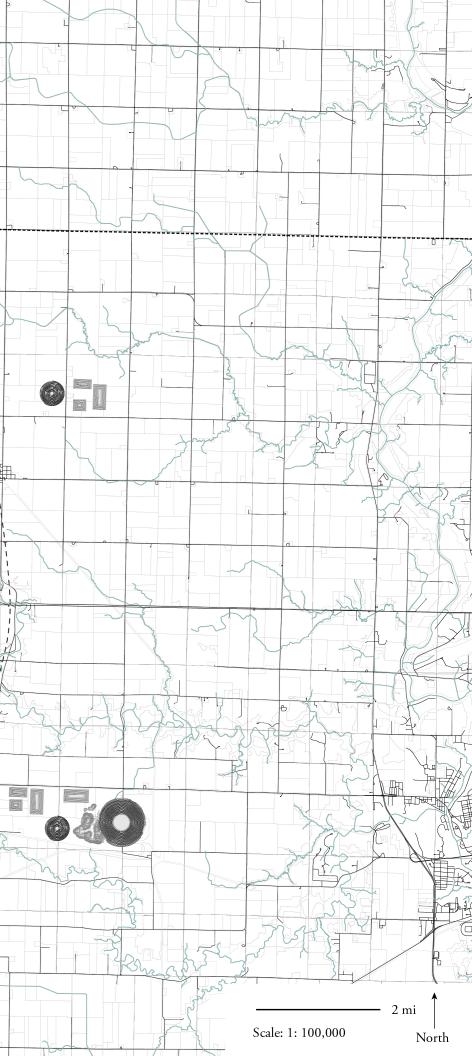
THE DE SOTO RANGE

SCALE: 1:2000

NORTH

Possible Future Scenario 2

Alternatively, The De Sotos will be seen as a triumph of capitalism and will lead to the expansion of a range of mountains across the landscape as industrial pork operations prevail.



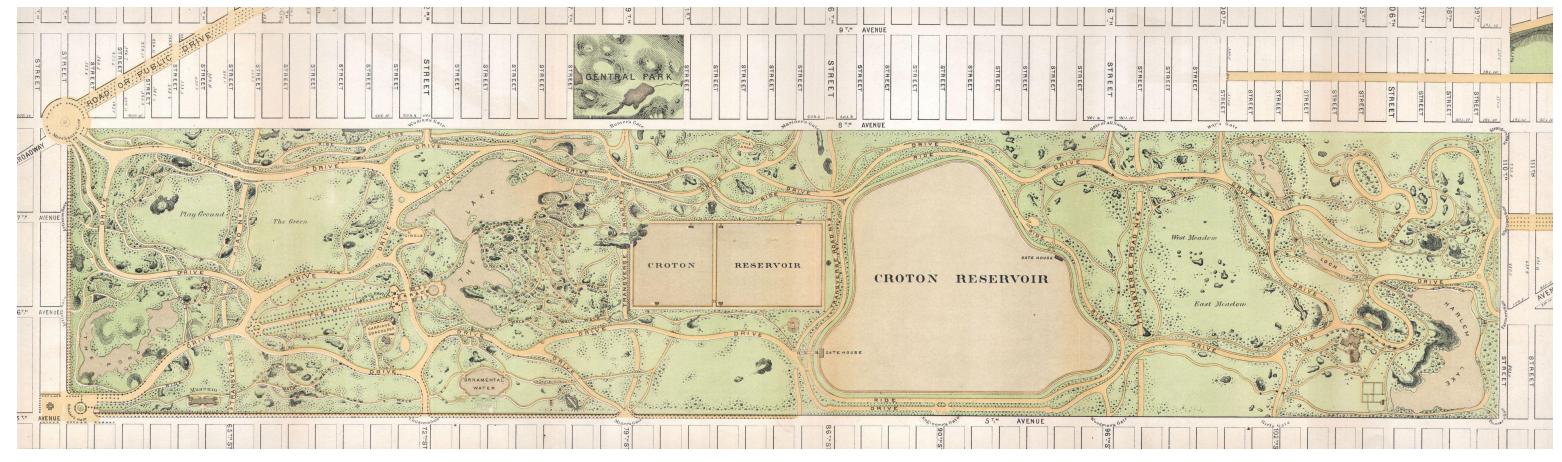
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Landscape Architecture's Legacy of Seperating Industry and Enjoyment

Historically, projects such as Olmsted and Vaux's Central Park have been seen as an escape from the realities and repulsions of industrial life. As Olmsted called it, parks are "the lungs of the city" that separate our places of pleasure from our places of industry or disgust.



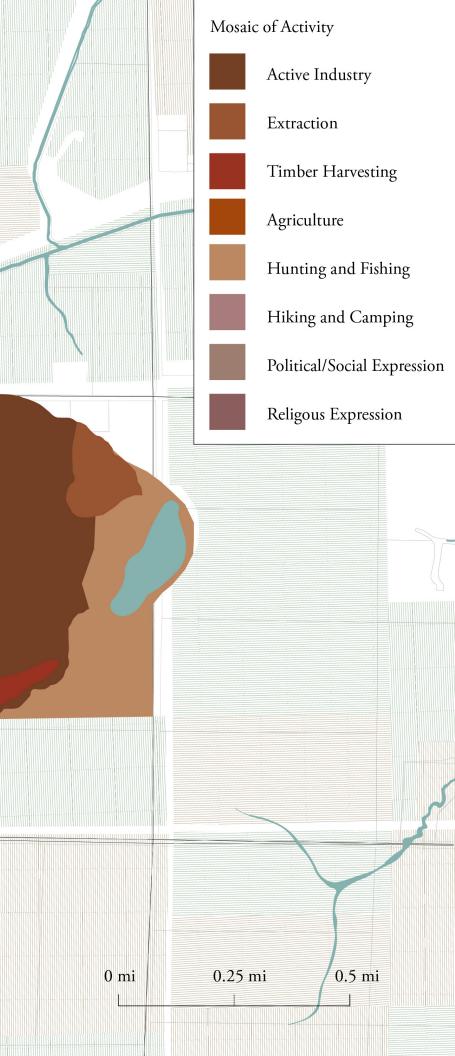
Drawn by Frederick Law Olmsted and Calvert Vaux

The Melting Pot

This thesis argues for the revealing of industry's repulsions through the collapsing in space of enjoyment and repulsion.

In doing so, the site becomes a public battleground of differing political and social ideologies, motives, and backgrounds connected by a common reality.

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Go Tell It on the Mountain

Vear /

The De Sotos are a spectacle of disgust, a working landscape, a public park, and a political and social tool of expression demanding to be seen.

Ash cloud

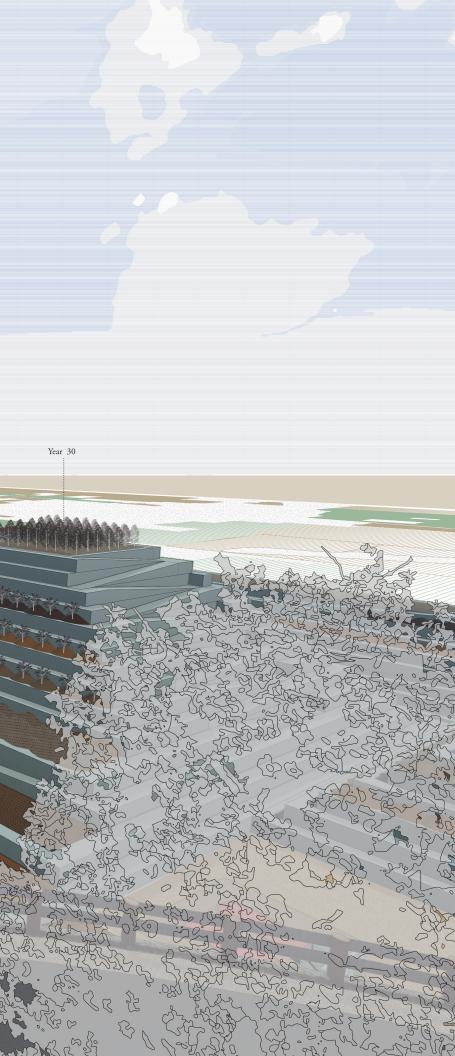
Public plaza

Year 51

CAEO

SIERRA CLUB

Smithfield,



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Colleen Sloan

Landscapes of Repulsion: Hidden in Plain Site

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