

Other Landscapes
Shifting Grounds : Active Network of Field Mechanics

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Pallas Hoffmann

Candidate for Bachelor of Architecture
and Renée Crown University Honors
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Thesis Advisor: _____

Molly Hunker
Associate Professor
School of Architecture

Thesis Reader: _____

Shayan Mirzabeigi
Assistant Professor
Department of Sustainable Resources Management

Abstract

This thesis investigates how landscapes are constructed and continually reshaped through overlapping environmental and industrial processes. Initial research focuses on the Sossusvlei dunes within the Namib Sand Sea, where wind, fog, rainfall, and evaporation interact to produce cyclical transformations of sand and clay surfaces. Through representational analysis, the dunes reveal a landscape defined not by permanence but by continuous redistribution of material: sand migrates with prevailing winds, clay swells and cracks with changing moisture conditions, and vegetation appears only briefly during periods of rainfall. These processes demonstrate how ground conditions are constantly reorganized through natural cycles of accumulation, erosion, and evaporation. The project extends this understanding of dynamic landscapes to the Kern River Oil Field near Bakersfield, where similar forms of instability occur through industrial systems rather than climatic forces. Here, networks of wells, pipelines, service roads, and pump jacks penetrate and reorganize the terrain, producing a mechanical landscape shaped by continuous extraction, maintenance, and environmental change. By comparing these two sites where one is driven by natural forces and the other by human-made infrastructures, the research reveals how landscapes operate as active fields where materials, energy, and systems constantly interact.

Building on this analysis, the design proposal *Shifting Grounds: Active Networks of Field Mechanics* reimagines the oil field as a post-extraction landscape that embraces instability rather than resisting it. Instead of treating the site solely as a resource for oil production, the project positions the landscape itself as the primary resource, supporting educational, ecological, and recreational programs. Through a network of distributed architectural interventions across multiple scales, the project transforms the oil field into an evolving landscape that reveals its industrial history while enabling new forms of environmental awareness and public engagement. *Shifting Grounds* aims to re-evaluate a post-extractive landscape from one used for individual economic gain by oil corporations to one for public recreational and educational gain through a constellation of individual interventions that form an overall network.

Executive Summary

Landscapes are often perceived as neutral backgrounds to architectural intervention; however, they function as active systems that continuously shape the environments they occupy. Aligned with the research presented in *Other Landscapes*, an exhibition led by Professor Molly Hunker, this thesis investigates how architecture can both represent and construct landscapes by engaging the processes that produce them. Rather than treating landscape as a passive setting for buildings, the project positions it as a primary generator of design ideas and spatial strategies.

The research begins with a detailed analysis of the Sossusvlei dune corridor located within the Namib Sand Sea. These dunes demonstrate how environmental forces such as wind, fog, rainfall, and evaporation interact to produce shifting landforms and cyclical transformations of the ground surface. Through representational drawings and analytical diagrams, the first section of the thesis investigates how these natural processes redistribute material across the landscape over time. This portion of the research is organized into four analytical lenses: landform, systems and infrastructure, construction and deconstruction, and texture as representation. Together, these studies reveal the dunes as a landscape defined by instability, where sand, clay, moisture, and vegetation continually reorganize the terrain.

Insights from this environmental analysis establish the conceptual framework for the second portion of the thesis, which shifts focus to the Kern River Oil Field near Bakersfield. While the Sossusvlei dunes are shaped by climatic forces, the oil field represents a landscape constructed through industrial systems. Networks of wells, pipelines, and mechanical pump jacks puncture and reorganize the ground surface, creating a dense mechanical field driven by energy production and infrastructural maintenance. By comparing these two sites, the research

reveals how both natural and industrial landscapes operate through cycles of movement, accumulation, and transformation.

Building on this analysis, the design proposal *Shifting Grounds: Active Networks of Field Mechanics* reimagines the oil field as a post-extraction landscape that embraces instability rather than resisting it. Instead of focusing on the economic value of the oil beneath the surface, the project reframes the landscape itself as a valuable resource capable of supporting educational, ecological, and recreational programs. The proposal operates across three interconnected scales: territorial master planning, site-scale intervention, and architectural construction. Through these scales, the project explores how design can engage the shifting ground conditions produced by both environmental processes and industrial history.

As an outcome, this thesis situates the project within broader architectural discourse surrounding landscape urbanism, post-industrial transformation, and field-based design strategies. By examining how landscapes evolve through both natural and constructed systems, this project argues for architectural approaches that work with dynamic ground conditions rather than attempting to impose typical static forms upon them.

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Preface

This essay is complimentary to a larger research project with the School of Architecture at Syracuse University titled *Other Landscapes*. This research draws from both my experience as an architecture student as well as my knowledge of construction management that I have acquired through my minor.

Part 1 - Grounds

Analysis of Landforms

Sossusvlei Dunes

Situated deep within the Namib Sand Sea lies the Sossusvlei Dune Corridor. This 55 million year old coastal desert contains a wide variety of large shifting dunes. Due to its active geological, ecological, and wind-driven processes, sand accumulates in ways that create distinct patterns along the ground's surface.¹ In the Sossusvlei Valley, however, it is the combination of wind, water, or lack thereof that causes a unique barchanoid dune type to form and repeat itself along the 66km endorheic (closed) salt/ clay pan.² This pan was created by the Tsauchab River, which rarely flows after rainfall and terminates at Sossusvlei or Deadvlei. It is the occasional presence of water within this corridor that causes sand to accumulate into these parabolic shapes and reach up to 300m in height.³ Ultimately, these quartz sand dunes have been forming an almost invisible-like border between the dunes and the pan, accumulating over millions of years. Drawn to these mountain-like landforms, the Sossusvlei dunes have attracted people from all over the world, while also remaining mostly untouched by human infrastructure. Inhabitable weather paired with shifting sands makes it difficult to build and the corridor has also been sectioned off as a national park. While the terminal is marked as a UNESCO heritage site, there are no built structures, only a few signs and gravel lots scattered throughout the valley.

¹ UNESCO World Heritage. "Namib Sand Sea." UNESCO World Heritage Centre.

² MAT, Mahmut. "Sossusvlei, Namibia: A Geologic Marvel in the Namib Desert." *Geology Science*, October 22, 2024.

³ "Namib Sand Sea." *IUGS*, n.d.

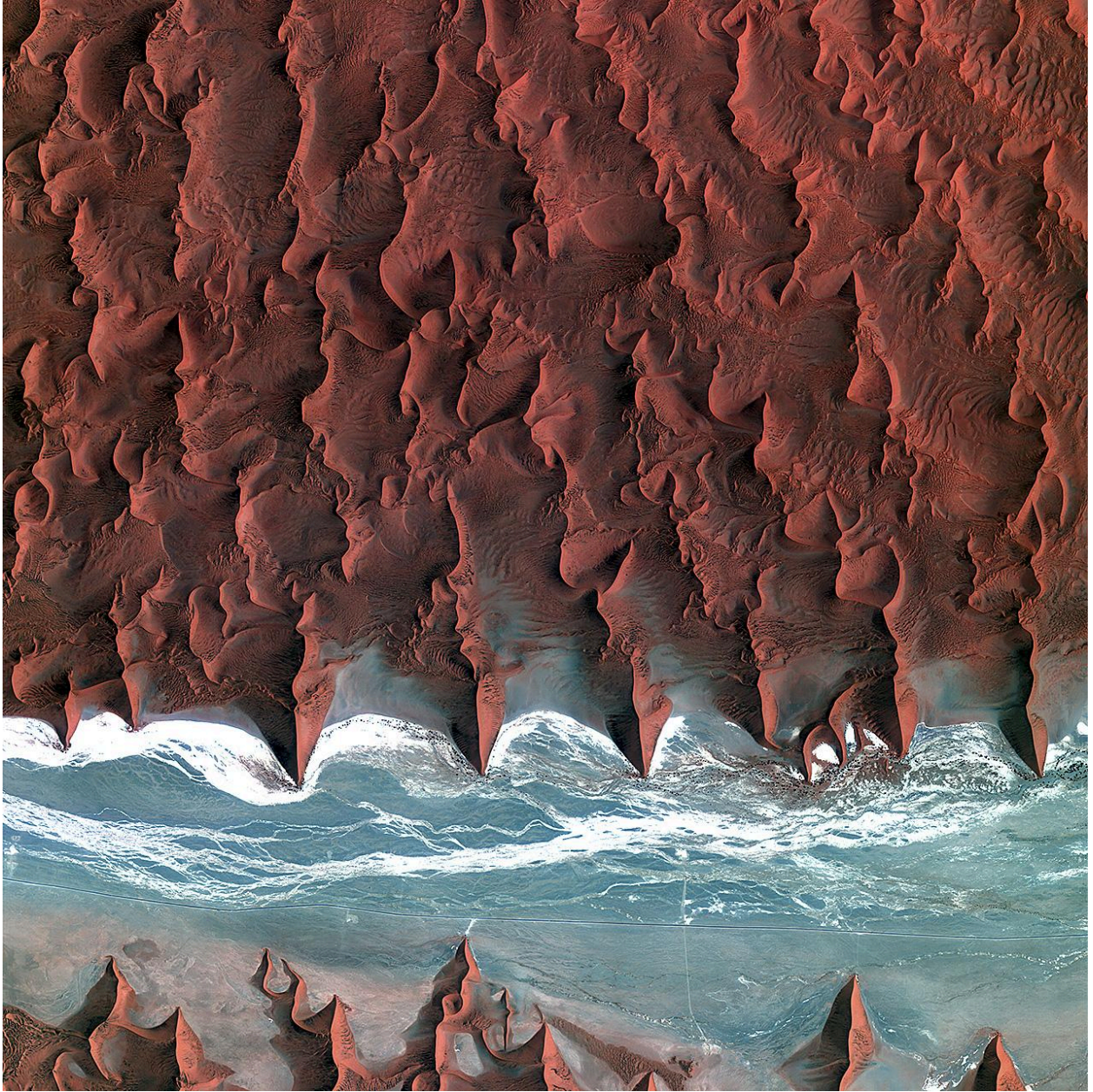


Fig. 1 - European Space Agency, "Namib Desert," ESA Multimedia – Images, April 24, 2020

Kern River Oil Field

About 180km north of Los Angeles lies Bakersfield, a city that is home to one of the largest oil fields in the nation: Kern River Oil Field. It occupies about 25 square miles and contains terraces around the San Joaquin Valley area. Since 1899, the field has produced billions of petroleum barrels and remains one of California's most productive oil sites. Unlike the dune sands, which were shaped primarily by geological/ climatic conditions, this terrain has been organized through more than a century of industrial extraction. Thousands of wells, pump jacks, service roads, pipelines, and maintenance facilities repeat, creating a dense mechanical field that follows the underlying oil reservoir distribution system.⁴ Rig spacing, access roads, and collection systems produce a recognizable pattern across the hillsides, where human-designed structures rather than natural processes determine how the land is divided and occupied. Drilling operations have reshaped the surface by carving pads into the hillside and have established a network of circulation routes that support the extraction of oil. Today, the landscape operates as a sort of farm system where mechanical movement, energy transfer, and material flow control the environment. It is surprising to consider that the field exists so close to the city of Bakersfield, including several residential neighborhoods and agricultural plots of land. While the oil field may be highly valued from an economic standpoint, it is also a contested landscape because of growing environmental concerns and regional growth impact on the surrounding urban areas.

⁴ Swartz, J., et al. "Kern River Field: Framework and Future of an Old Giant." AAPG Pacific Section, 2008.



Fig. 2 - Henner, Mishka, "Kern River Oil Field", Kern County, California, 2013.

Systems

Sossusvlei Dunes

The cyclical presence of moisture is what causes ground conditions such as the cracking of the clay, shifting of sand, and existence of vegetation. Arid conditions cause the initial movement of sand across the dunes, with little water allowing particles to travel towards the southeast because of ocean wind currents. Fog from the Atlantic Ocean that is about 55km away travels over the desert, also controlled by the wind; moisture from the fog acts as a sort of blanket and seals sand in place while. On the rare occasion that it begins to rain, small droplets begin to infiltrate both the sand and clay surfaces allowing for the germination of several desert plant species. In the unlikely event that rain continues, clay begins to swell along

with rapid vegetative growth throughout the pan region of the valley. At the threshold between the dunes and pans is where erosion occurs, redrawing the border between landforms. It is only when rainfall ceases that the clay begins to form cracks as it compresses after the swelling.⁵ Evapotranspiration occurs and causes water to move upwards, pulling sand particles along with it, thus contributing to the overall shape of the dune. Along with dry weather comes sand mobility once again and so the long cycle restarts. The dunes within the Sossusvlei corridor are formed when systems of wind, sand supply, fog, flooding, and evaporation intersect with each other.

Bakersfield Oil Rigs

The Kern River Oil Field is also shaped in a cyclical manner where industrial, environmental and infrastructural systems all intersect to reorganize the ground's surface. Unlike the dune systems, which were created only through climatic forces, the oil field terrain is structured by repeated extraction of oil from the reservoirs underneath Bakersfield. Oil wells puncture the ground in dense arrays while mechanical pump jacks draw oil to the surface. Once above ground, the oil is then transferred through a network of pipes, storage tanks, and service roads.⁶ This extraction process requires constant maintenance and circulation. For example, access roads must be graded, drilling pads need to always be leveled, and occasionally machinery must be expanded or discarded as production conditions shift across the field. It is also important to note the environmental systems at play, as they alter the surface of the landscape. Seasonal rainfall and erosion work to reshape Bakersfield's hillside, while sparse vegetation grows in areas not disturbed by oil rigs. Over time, these overlapping

⁵ Gruslin, Hennebaut, Tirone, et al. "How to Ensure Better Consideration and Mitigation of the Shrinkage–Swelling Risk of Clays?" *Eurogeologists*, n.d.

⁶ Swartz, J., et al. 2008

processes produce a layered terrain where industrial patterns and natural processes can coexist. As production fluctuates and machines age, the field becomes a dynamic territory in which surface conditions are being constantly reorganized through interactions of energy production, environmental changes, and human intervention. Similar to the Sossusvlei dunes, the Kern River Oil Field operates not as a static industrial site, but also as an ever-changing landscape shaped by the interactions between extraction networks and gradual ecological transformation.

Construction

Sossusvlei Dunes

Winds are the primary cause of the sand and dune shapes, originating from erosion of rivers in southern Africa, they carried material from the Orange River to the coast (present-day desert).⁷ As described previously, the combination of water and wind contributes to dunes throughout the corridor. There are several different components that make up a dune and can be analyzed through section. Topset beds move in coordination with wind direction, topset sides cover more ground area and tend to be more compact due to the accumulation of sands and wind constantly pushing against the surface. The slip face lies on the opposite side, facing away from the wind. It tends to be much shorter in distance while also have a steep angle, or angle of repose.⁸ Slip faces contain loose sand particles and are considered to be the “gentle”

⁷ MAT, Mahmut. “Sossusvlei, Namibia: A Geologic Marvel in the Namib Desert.” *Geology Science*, October 22, 2024.

⁸ Goldfinger, Chris, Christopher Romsos, and Bran Black. Survey and Analysis of the Surficial Geology and Geophysics in the Pacific Marine Energy Center – South Energy Test Site Area and Associated Cable Routes in the Vicinity of Seal Rock, Oregon. 2014.

face; because of the slipping and falling of sand as it is blown over the topset bed, sand has the highest chance of movement. At the bottom of the slip face lies forest beds, which are formed as material accumulates down the slip face until it becomes too steep, causing it to avalanche downwards and create a dipping (foreset) layer.⁹ This continuous sliding and piling of sand causes the dune to slowly migrate in the direction of the wind, creating that asymmetrical shape.

The movement of water – whether it is evaporation, precipitation, etc, is what causes the overall shape of dunes. The ground water path is what pulls the saturated sand/silt layers down toward the water table while evaporation pulls the sand up, resulting in the height that dunes are able to achieve. Since the dunes consist of wind-blown sands that accumulated on top of impermeable estuarine or glacial clays, they can form the base of the dune system and provide a distinct hydraulic barrier to the underlying bedrock. This underground layer can both hold and transmit groundwater.

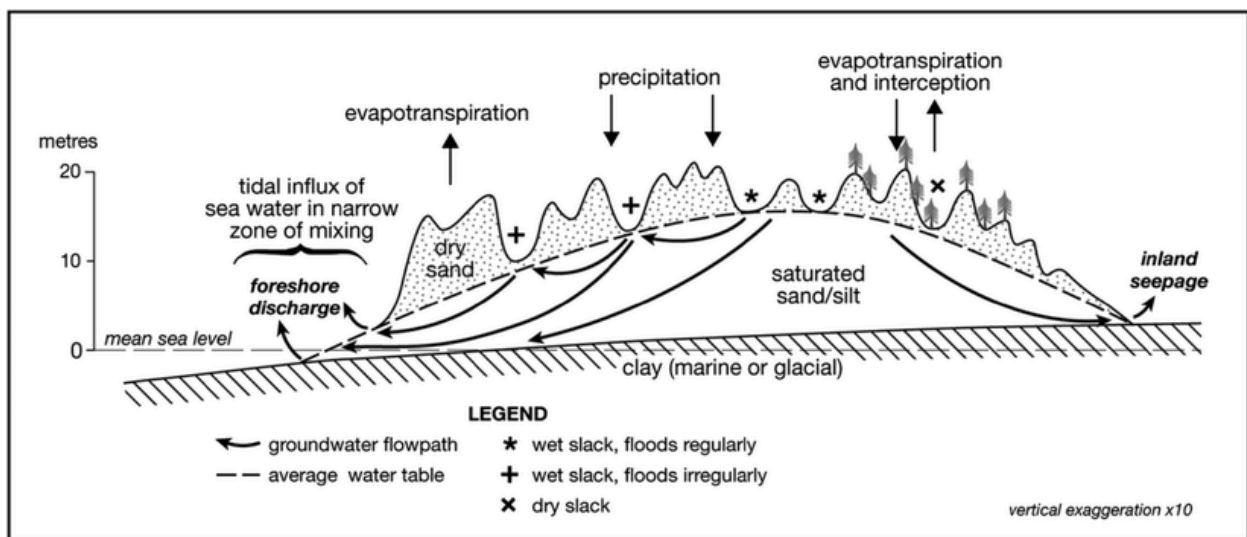


Fig. 3 - Generic cross section through a dune system showing main groundwater and surface water features (Stratford et al. 2013)

⁹ “Glossary: Sedimentary Structures.” Geological Digressions, May 13, 2021.

Bakersfield Oil Rigs

Construction within the Kern River Oil Field begins with the identification of subsurface petroleum reservoirs underneath the Bakersfield hills. Through geological surveys and seismic analysis, locations to drill can be identified and cleared for grading. Grading is necessary to support heavy equipment and storage tanks that are needed for the rigs. Access roads must be built to allow drilling rigs, water trucks, and maintenance personnel to reach each site. The drilling rig is assembled on a large pad and typically consists of a steel derrick structure that can support the systems. A rotary drill bit attached to a long drill string penetrates the ground, cutting through layers of soil and sedimentary rock until the oil-bearing formation is reached.¹⁰ During drilling, mud is sent down the well to cool the bit, remove rock cuttings, and stabilize the borehole walls. As the hole deepens, steel casing pipes are inserted and cemented into place to reinforce the well and isolate surrounding groundwater layers. Once the well reaches the reservoir, production equipment replaces the drilling apparatus.¹¹ In the Kern River field, pump jacks are installed to mechanically lift the viscous heavy crude oil toward the surface. Additional infrastructure attaches to the well pad to facilitate long-term production.¹² Over time, thousands of these wells are repeated across the landscape in a grid-like pattern, with service roads and pipelines linking individual rigs into a larger network of extraction infrastructure. Through this repetitive process of drilling, casing, pumping, and maintenance, the oil field becomes a constructed mechanical landscape shaped by the continuous assembly and operation of extraction systems.

¹⁰ Swartz et al. 2008

¹¹ Harish. "How Deep Oil Drilling Really Works? Deep Oil Extraction Explained" LifeAda, YouTube video, 17:52. July 11, 2025.

¹² Hart Energy. "Steamflooding Keeps California Field Producing 117 Years Later."

Textures - Representation Exercise

Sossusvlei Dunes

Rich with natural processes, the Namib desert contains a variety of textures. From the cracking of clay to accumulation of sand, each moisture stage yields different ground and surface conditions. Through the lens of a representational exercise, I was able to experiment with several different types of hatches, colors, lineweights, and patterns to break down while also re-imagining the Sossusvlei dune landscapes. Moving past descriptive map exercises, fig. 4 breaks down the dune corridor into six different phases aligned with the moisture and wind process previously discussed. Each stage of the cyclical dune construction process shows the ongoing environmental operations, both visible and invisible to the human eye.

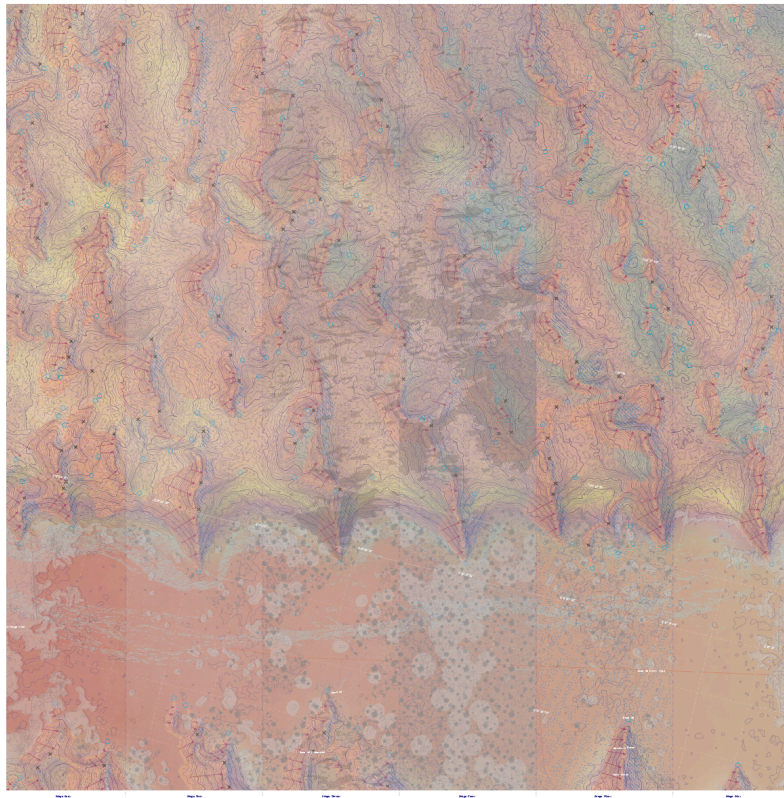


Fig. 4 - How Landscape Operations Change Ground Conditions 6' x 6'

Analytical Stages

Arid

The typical state of the desert, this stage's dry climate allows for sands to be mobile and winds to carry material across the dunes. Without the weight of moisture, movement of sand dunes is constantly shifting as the winds ebb and flow. Looking at the clay pan region towards the bottom of the drawing, cracks form along the clays and salt deposits due to how thin these layers have become over time. With no water, vegetation is sparse and only those with deep roots can survive.

Fog

Fog occurs more often than rain, bringing moisture from the ocean across the dunes. The introduction of moisture from fog causes a thin layer of "moisture film" to develop just below the surface of the dunes.¹³ The presence of moisture weighs down sand, preventing mobility as during the arid stage. Minimal swelling can be seen in clay, allowing for less crack formations to occur. With little moisture in the air, there is no large-scale increase in plant growth, however the fog can help bring relief to existing organisms.

Light Rain

Initial rain quickly infiltrates the top surface layers of both the dune and clay regions causing sand to consolidate due to high porosity. Clay begins to absorb water which causes some swelling and softens the surface. Presence of water allows for the germination of annual

¹³ Wiggs, G. F. S., A. J. Baird, and R. J. Atherton. "The Dynamic Effects of Moisture on the Entrainment and Transport of Sand by Wind." *Geomorphology, Aeolian Research: processes, instrumentation, landforms and palaeoenvironments*, vol. 59, no. 1 (2004): 13–30.

plants within the pan region, especially along the Tschau River. The overall expansion of ground conditions is represented by the introduction of darker hatches to indicate downpour and also the increase in vegetation within the pan region.

Heavy Rain

After infiltrating the surface, heavy rain is what causes erosion along the border between dunes and clay to form along with pools of water forming, especially during floods. While it is rare, these floods can re-activate the Tschau River, which draws its curved path along the dunes until it terminates at the end of the Sossusvlei corridor. Clay pan swelling increases as the water table rises and fine sediment depositions, such as salt, occur. Rapid growth along the pan can be seen during this stage, which has been shown as the darkest out of all six phases.

Evaporation

As the surface begins to dry again, sand mobility gradually returns. Water that was absorbed by clay evaporates and clay shrinks. Cracks form as a result and salt migrates upward, becoming visible throughout the pan region as it follows the path of the Tschau River. Overall, there is a decrease in vegetation as moisture slips away and the ground layers of clay experience contraction along with fracturing.

Return to Arid

Just as it was in the first phase, dune mobility has been fully re-established and cracks along the clay surface are fixed until the next exposure to moisture comes along. The average duration of this cycle can be anywhere from yearly to once a decade, if there is a drought.

Sossusvlei Dunes - Emerging Architectural Concepts:

- Shifting Surface Conditions
- Elements reinforcing themselves
- Cyclical Nature of the Surface
- A Surface that exposes Material/ produces Things
- Designing for Instability
- Understanding the landscape as a surface that is particulate and that is distributed and redistributed over time

Bakersfield Oil Rigs

Rich with valuable resources, the Kern River Oil Fields have been heavily influenced by infrastructure and human intervention. From road erosion to emerging landscapes, each analysis identifies different operations that take place on site. Through the lens of a representational exercise, Maria experimented with several different types of hatches, colors, lineweights, and patterns to break down the complex systems that compose the Kern River Oil Fields. Fig. 2 is a composite drawing that combines all the moving parts within the landscape, visible and invisible, and represents them across time. While the dunes in Sossusvlei also endure changes, the Kern River Oil Fields undergo environmental transformations through the intervention of humans and machinery. In her drawing, Maria documented and performed an analysis on the site's infrastructure, through which she was able to visualize the field's conditions and develop an overall logic for the site.

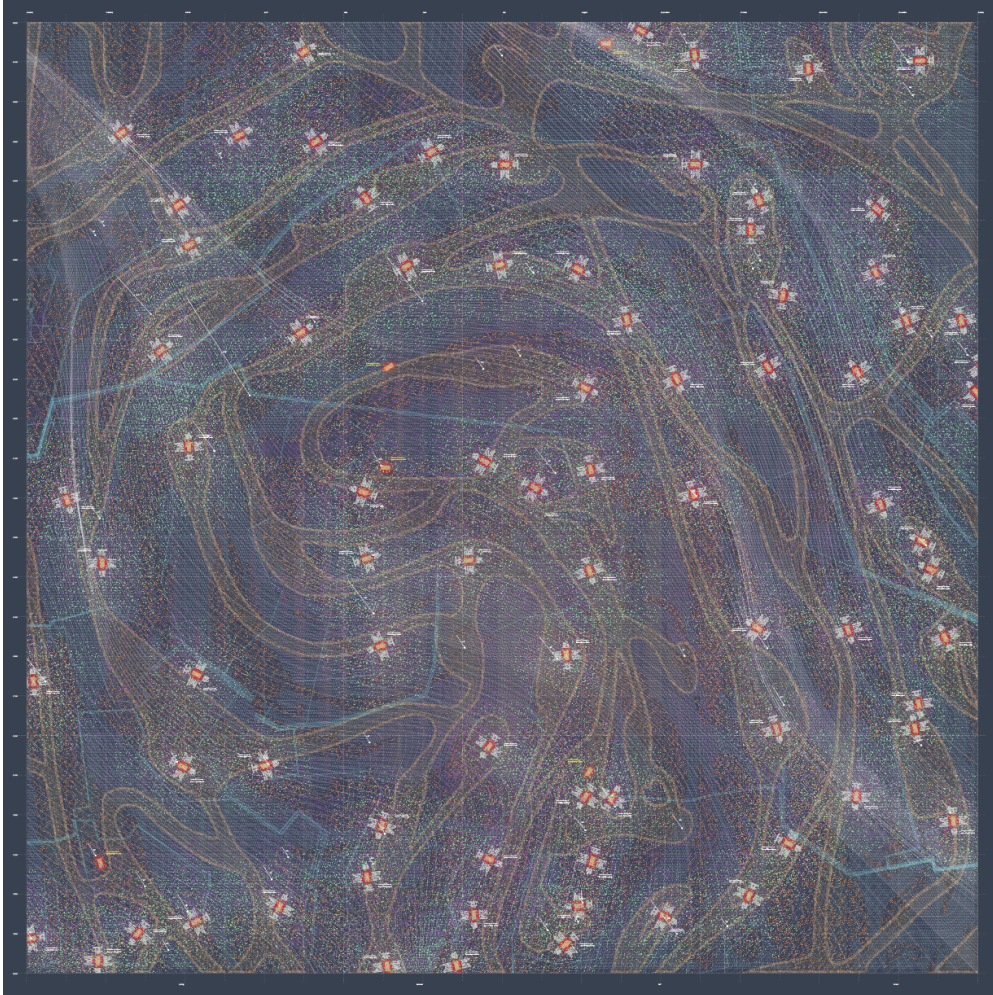


Fig. 5 - Maria Vazquez Serra's Composite Drawing 6' x 6'

Bakersfield Oil Rigs - Emerging Architectural Concepts:

- Timescale
- Material Afterlife
- Relocation of Material
- Active Network - Interactions
- Defining System Operations
- Exploitation through Economies
- Exploitation as different Values
- Systems of Interventions

After five weeks of representational landscape research and analysis, it became clear that the design approach for this project would focus on cyclical processes and shifting surface conditions. The purpose is to design to accommodate for instability rather than attempting to resist it. The Kern River Oil Fields near Bakersfield present a landscape where similar forms of instability occur, though they are produced through different forces. In the Sossusvlei, wind and intermittent water shape the dunes through the continual movement of sand across the desert floor. Within the oil field, however, instability is generated through industrial systems. Networks of wells, pipelines, and service roads penetrate and reorganize the ground, redistributing material and altering surface conditions over time. While the dunes demonstrate how environmental forces produce shifting landscapes, the oil field reveals how human-built systems can generate comparable cycles of transformation. Both landscapes operate through processes of movement, accumulation, and change, making the oil field an appropriate site to further explore architecture that engages dynamic and evolving ground conditions.

While these two sites exist in vastly different contexts where one is shaped by environmental forces and the other is by industrial extraction, they are connected through processes of movement and transformation. In the Sossusvlei dunes, wind, moisture, and sediment continuously redistribute material across the landscape, while in the Kern River Oil Field, mechanical systems, extraction networks, and infrastructural maintenance reorganize the ground through human intervention. Despite their differences, both landscapes operate as dynamic fields where surface conditions are never fixed, but instead evolve over time through cycles of accumulation, displacement, and change.

Drawing on Junya Ishigami's concept of an expanded scale of architecture, where the boundary between the built environment and nature becomes blurred, this thesis proposes a

design approach that occupies the space between these two conditions. Rather than treating the oil field as an industrial site or a restored natural landscape, the project positions the landscape as a hybrid terrain shaped by both existing infrastructure and emerging environment processes.

Shifting Grounds: Active Networks of Field Mechanics reinterprets the systems that structure the oil field and transforms them from methods of extraction into frameworks for human occupation. In doing so, the project asks: how can a decommissioned oil field become accessible and inhabitable for the public, and what new forms of landscape might emerge as industrial systems are revalued rather than erased?

Part 2 - Shifting

Design Proposal

The landscape of the Kern River Oil Field has long been shaped by the value of the resources hidden beneath its surface. For more than a century, the site has been extensively exploited for the oil stored underground, its terrain organized around wells, pipelines, and infrastructure designed to extract and transport this valuable commodity. The economic value of petroleum has dictated how the land is used, transforming the landscape into a productive field where the primary goal has been the extraction of oil and the generation of revenue.

Shifting Grounds: Active Networks of Field Mechanics reimagines that same logic of value through a future-oriented lens. Rather than locating value in the oil beneath the ground, the proposal positions the landscape itself as the resource, one rich with educational, ecological, and recreational opportunities. In this reinterpretation, the site is no longer exploited for what lies below but engaged for what can be experienced above: a terrain that supports learning, exploration, and interaction with a recovering, changing landscape. This proposal explores how design can respond and be part of changing surface conditions caused by natural processes, while redefining local tourism by transforming a post-extraction landscape into a destination for environmental education and recreational activities.

There are three interconnected scales used for this project: the master plan, the site, and the building. At the territorial scale, a master plan of the Kern River Oil Field (which spans approximately 25 square miles) identifies key moments within the landscape and examines how the field relates to its broader regional context around Bakersfield. At a medium scale, the project focuses on a specific portion of the oil field where the proposed program is located,

analyzing the spatial, ecological, and infrastructural conditions that shape the intervention. Finally, at the smaller scale, the design focuses on the primary building and its relationship to the ground and surface conditions, exploring how architecture can engage directly with the shifting landscape.

In terms of programmatic layering, existing extraction infrastructure becomes the framework for new historical and environmental programs. The project's educational, recreational, and ecological functions are layered across the site, acting as a sort of platform for several different activities and experiences. Surface conditions, pathways, structures, and interpretive elements form a constructed landscape assemblage.

Architectural Context

Behavioral Landscapes

This project treats the oil field not as a background but as a primary generator of the design. This idea reflects Corner's argument about landscape as a system that can organize social and spatial systems throughout the campus.¹⁴ This is where the "mechanics" part of the Shifting Grounds project comes into play. By analyzing the behavior of the landscape, this project will focus on moving parts that come together to create a cohesive whole. The site's ground is viewed as a constructed condition that may not be natural but one that has been produced through a series of industrial operations over a long period of time. In *Cartographic Grounds*, Desimini's idea of exploration of the ground as a designed and contested surface

¹⁴ Corner, James. *The Landscape Imagination : Collected Essays of James Corner, 1990-2010*. First edition. Edited by Alison Bick Hirsch. Princeton Architectural Press, 2015.

plays an important role in the design approach.¹⁵ While the overall design of the oil rigs was created purely for economic value, the site remains contested within the context of Bakersfield and its urban population. The question remained, how can the behavior of the landscape change to not only create economic benefits, but also cultural ones as well.

Throughout the site, visitors can move through and interact with the oil field terrain; this program juxtaposes your typical outdoor recreational experience in nature by submerging the viewer in a barren and scarred field. This kind of program aligns with Bow-Wow's emphasis on observing everyday spatial behaviors.¹⁶ Distributed interventions, because our program does not operate as a single building, rather a system of structures, the Kern River Oil Field becomes spatial grounds for environmental process, infrastructures, and programs rather than a single architectural object. In Stan Allen's field conditions, he discusses the idea that form can emerge from relationships across a field and can operate through patterns, networks, and repeated elements.¹⁷ Revisiting the idea of designing for instability, Junya Ishigami argues for architecture that works with the terrain and environmental processes rather than imposing a dominant form.¹⁸ These interventions are subtle within the vast landscape of the oil fields, in an attempt to amplify environmental conditions.

¹⁵ Desimini, Jill, and Charles Waldheim. "Cartographic Grounds : Projecting the Landscape Imaginary." 1st ed. Princeton Architectural Press, 2016.

¹⁶ Bow-Wow, Atelier, and Sunil Bald. "Atelier Bow-Wow." *Bomb (New York, N.Y.)*, October 1, 2019.

¹⁷ Allen, Stan. From Object to Field: Field Conditions in Architecture and Urbanism. n.d.

¹⁸ Ishigami, Jun'ya, Chinatsu Kuma, and Toyota-shi Bijutsukan. *Kenchiku no atarashii okisa = Another scale of architecture*. Fourth edition. Seigensha. 2015.

Post-Industrial Transformation

This project proposes a long-term design solution that works from the harmful aftereffects of extraction to post-industrial recovery. These ideas align with Corner's emphasis on landscape as a process that unfolds over time.¹⁹ While he may also be referring to natural processes over time, his idea can be viewed through the lens of creating a new landscape that can adapt over time to accommodate ever-changing geological conditions. To design for instability, this project works with degraded landscapes. Rather than erasing its industrial past, the design engages residual conditions of extraction. This relates to Gissen's ideas in *Subnature*, where architecture should embrace "subnatural" environments, meaning the design must consider all aspects of its surroundings.²⁰ Existing oil infrastructure is not erased, rather it is reassembled into new uses. To achieve the goal of post-industrial transformation, the project examines the territorial consequences of fossil fuel extraction. Similar to Neyran Turan in *Nine Islands*, the project aims to respond to planetary and environmental conditions that revolve around energy systems.²¹ From a planetary perspective, the transformation of Kern's Oil Field situates the project within broader discussions of post-carbon futures and climate responsibility. From extraction to ecological awareness, this site transforms into a space where visitors are confronted with environmental implications of energy systems.

¹⁹ Corner, *The Landscape Imagination*, 198.

²⁰ Gissen, David. *Subnature : Architecture's Other Environments : Atmospheres, Matter, Life*. 1st ed. Princeton Architectural Press, 2009.

²¹ Turan, Neyran. "Nine Islands: Matters Around Architecture," 2016.

Case Studies

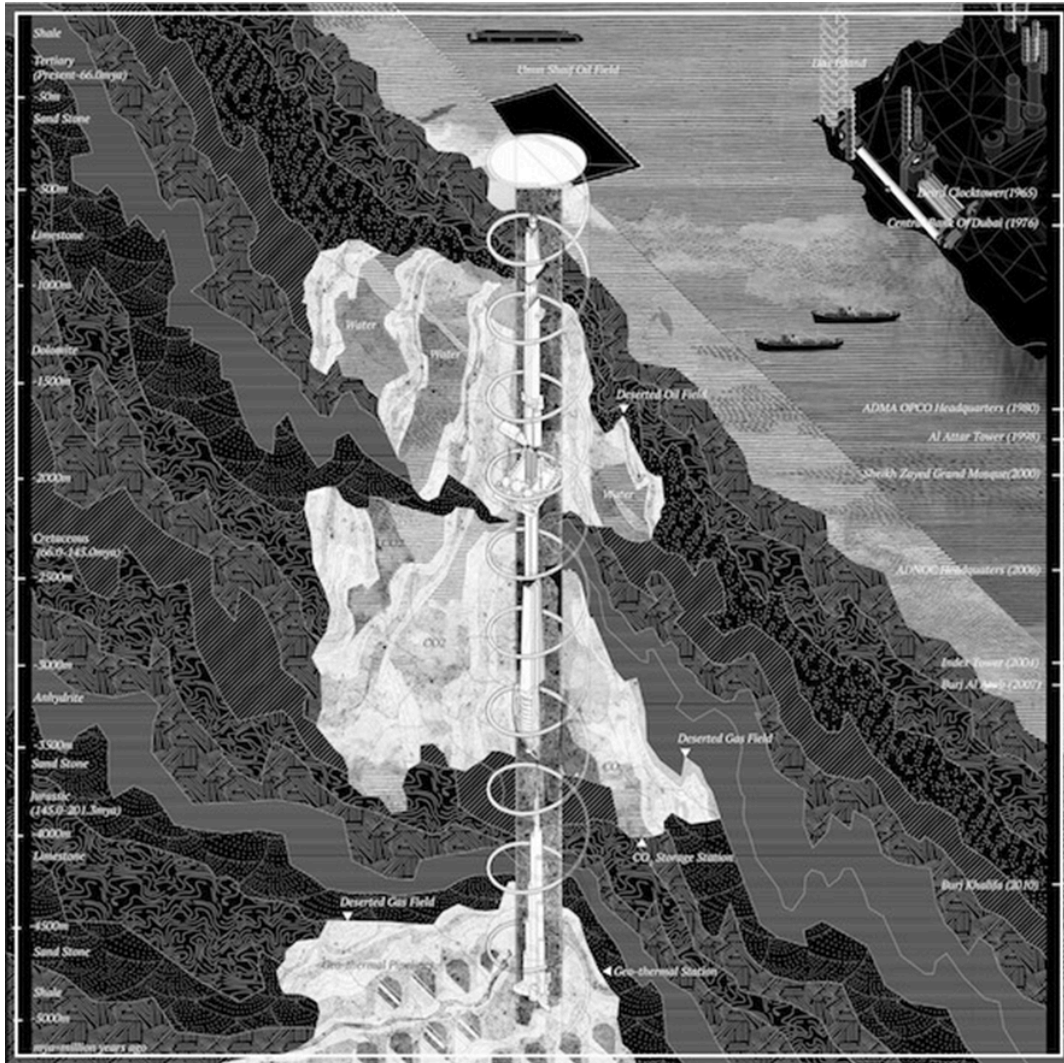


Fig. 6 - After Oil
Kuwait Pavilion at the Venice Biennale



Fig. 7 - Groundscrapers
Harvard GSD

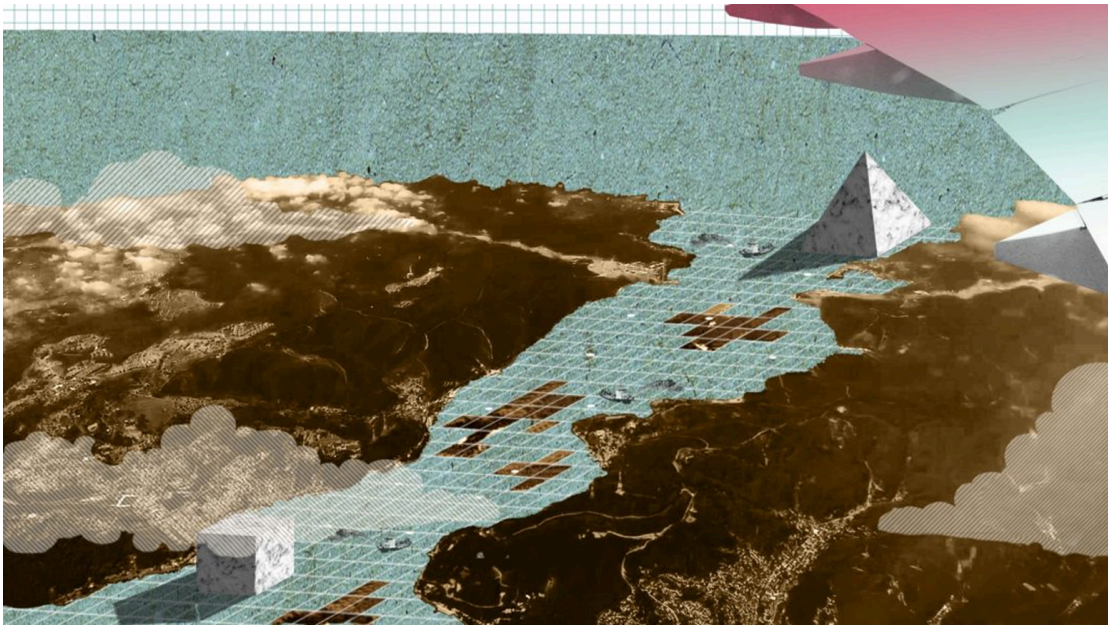


Fig 8. - Strait: A Geofiction
2015



Fig. 9 - Grace Farms
Sanaa



Fig. 10 - Moving Terrace
Robert Konieczny's Quadrant House

Project Description

This project aims to treat the Kern River Oil Field as an operational landscape field, in that its architecture no longer extracts resources from the ground, rather it reassembles environmental, infrastructural, and social systems into creating new value for the land. By mapping out existing materials throughout the site, this project identifies a catalog of materials that can be repurposed to not only provide economic value for corporations but to provide a different kind of recreational and experiential value oriented towards people. In the same way that the Sossusvlei dunes create opportunities for people to interact with nature, this project offers an opportunity to not only learn more about oil fields, but experience a previously restricted area. Instead of pursuing the revival of the land, this project accepts the damage done by humans, but repurposes excess materials found on site such as pipes, steel, and concrete to serve people instead of large oil companies.

Covering about 64 acres, Shifting Grounds acts as a park with a campus of different activities and opportunities for community events. The site is divided into three zones ranging from minimal to heavy intervention strategies, establishing an overall hierarchy that determines the location and intensity of these interventions.

Zone 1 - Bike Trails + Hiking

This area is the most severely affected by oil drilling, therefore it is the area with the least amount of building intervention. Scrapes of material and remaining pipe networks are scattered throughout the trails, which have a wide range in slope for the user to determine their

desired path for hiking, biking, or running. Towards the upper northwest region lies an outlook tower, or a repurposed 80 ft tall oil well tower, which provides clear view of the site and mountain ranges close by.

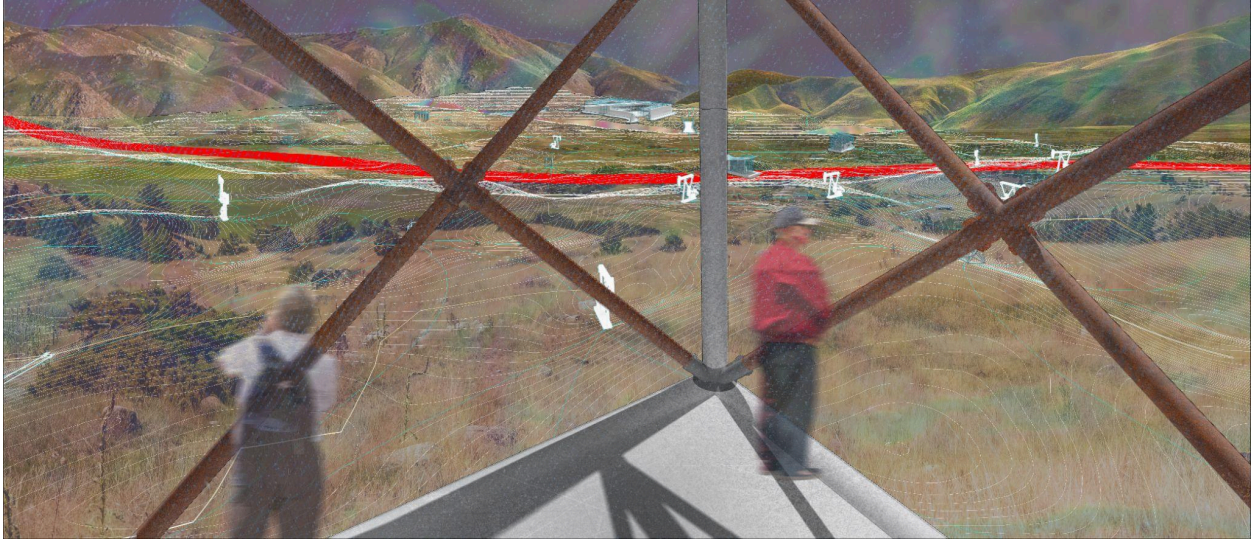


Fig. 11 - Outlook Tower
Interior View

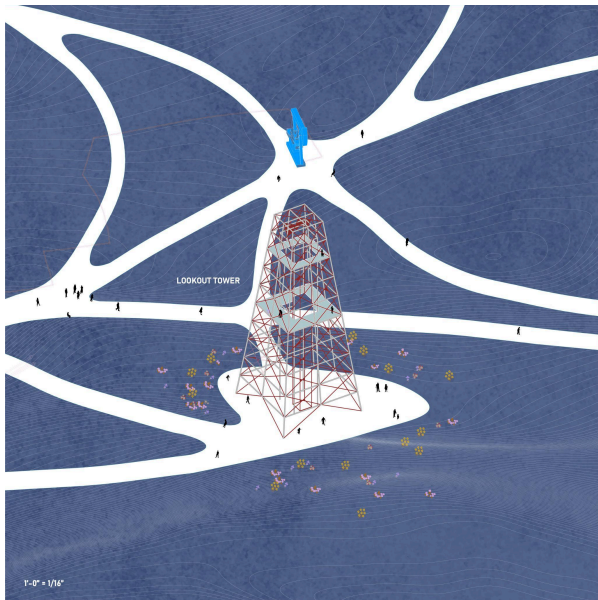


Fig. 12 - Outlook Tower
Isometric View

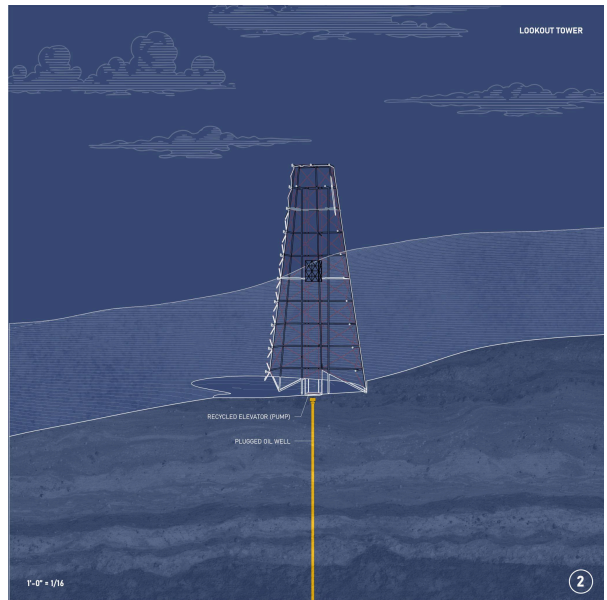


Fig. 13 - Outlook Tower
Section View

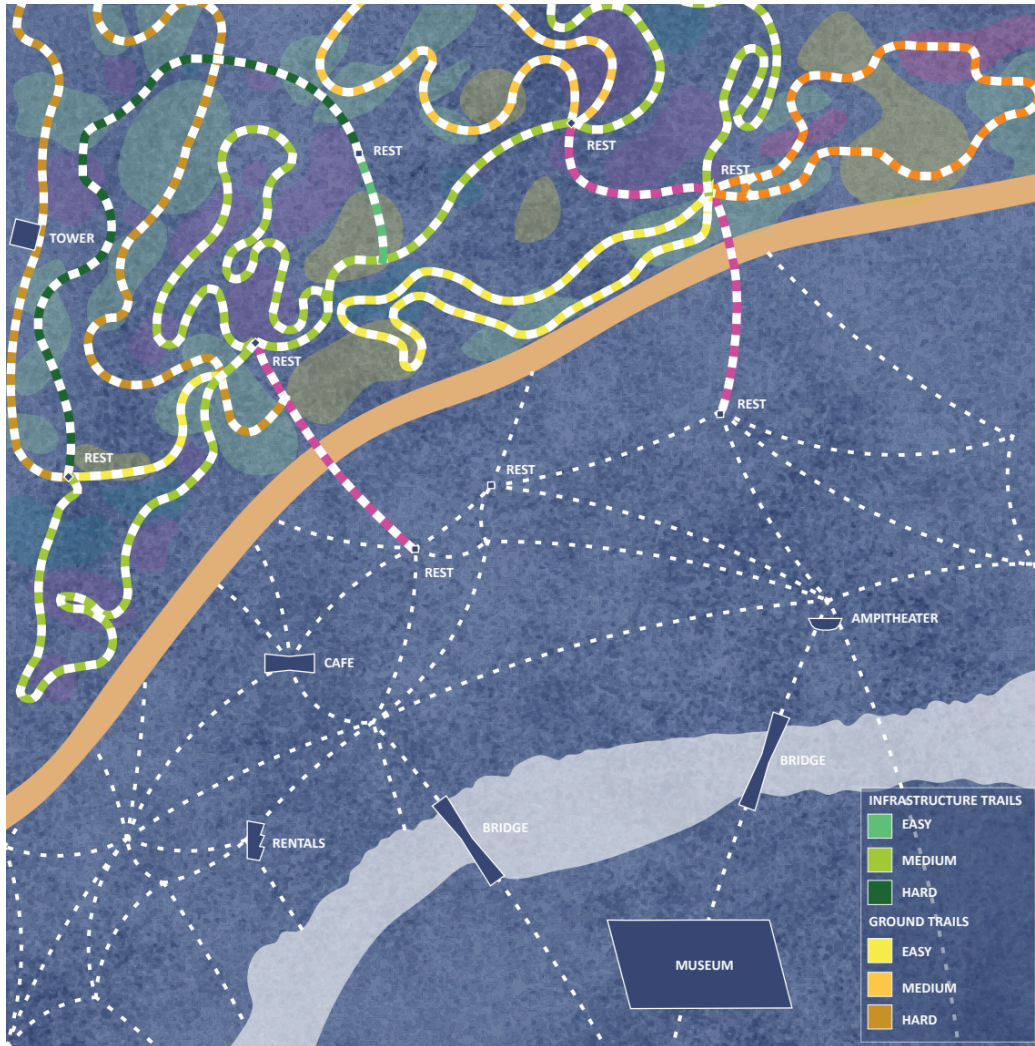


Fig. 14 - Site Trails
Map Plan

Zone 2 - Main Campus

Although many activities have been introduced throughout this area, Zone 2 has a medium-level of intervention out of all the zones. It is the entry point for the site, featuring bike rental offices, rest stops, storage, a cafe, outdoor event space, and parking. These structures have been created using existing site materials such as steel pipes and recycled fiberglass panels. These programs are all relatively small and connected with outdoor activities, encouraging the visitor to explore the surrounding area.

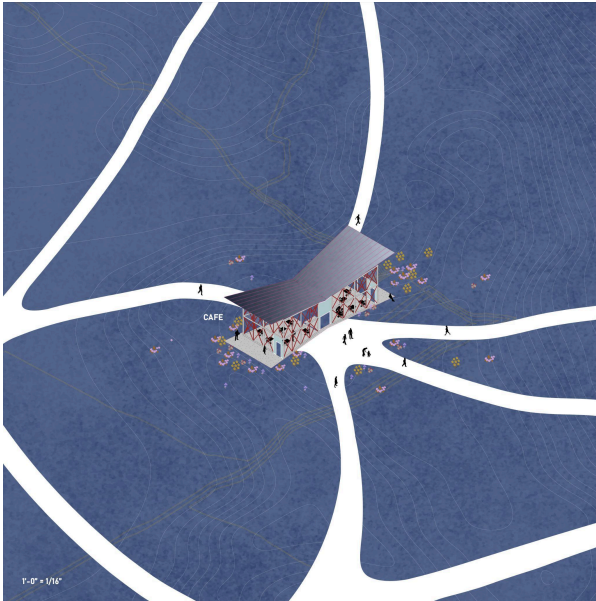


Fig. 15 - Cafe
Isometric View



Fig. 16 - Cafe
Section View

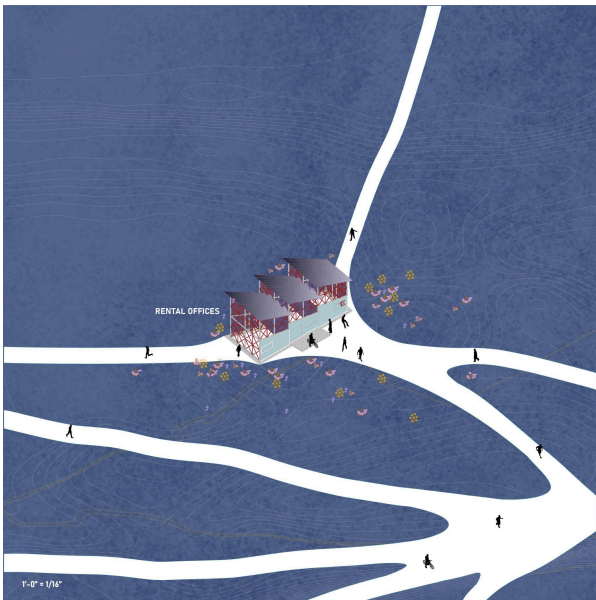


Fig. 17 - Rental Offices
Isometric View

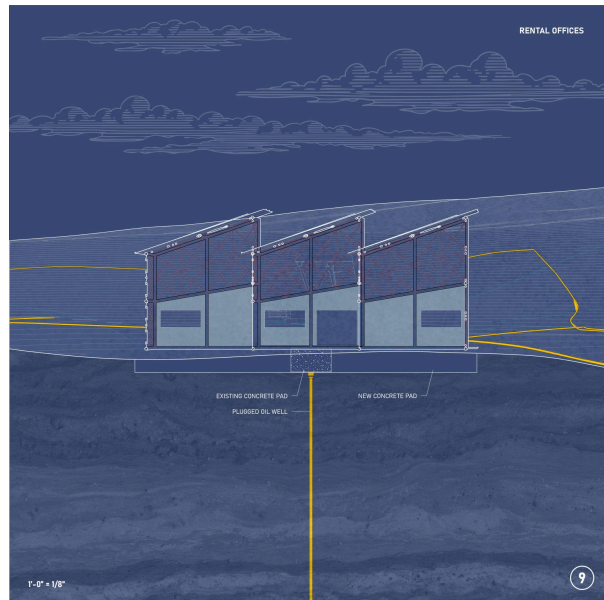


Fig. 18 - Rental Offices
Section View

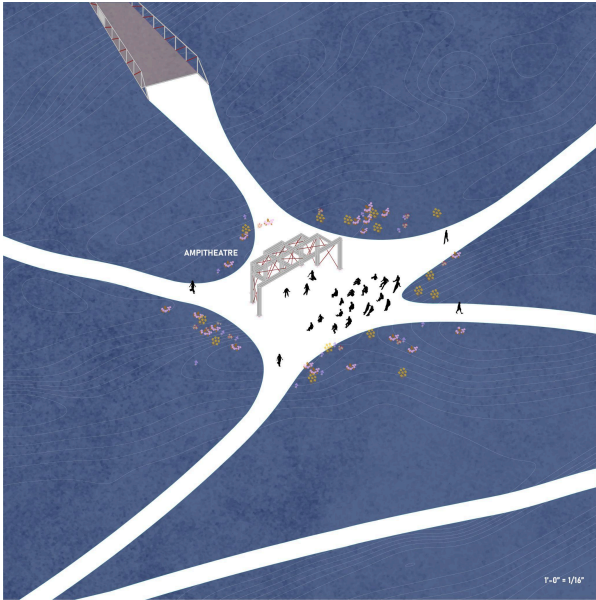


Fig. 19 - Amphitheatre
Isometric View



Fig. 20 - Amphitheatre
Section View



Fig. 21 - Lockers
Isometric View



Fig. 22 - Lockers
Section View

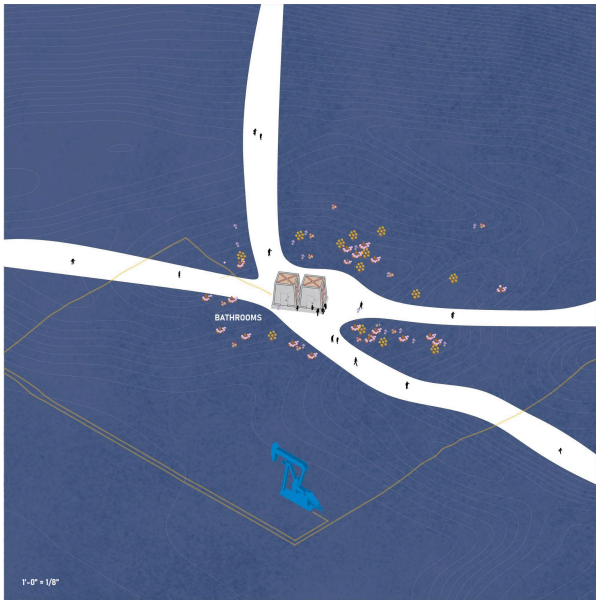


Fig. 23 - Restrooms
Isometric View

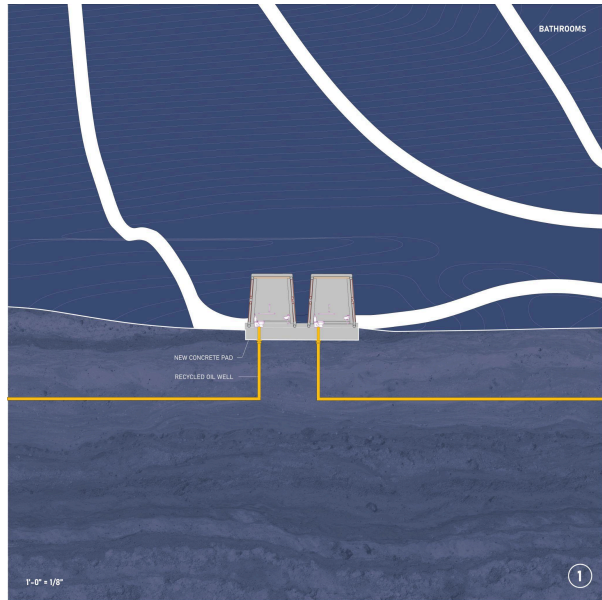


Fig. 24 - Restrooms
Section View

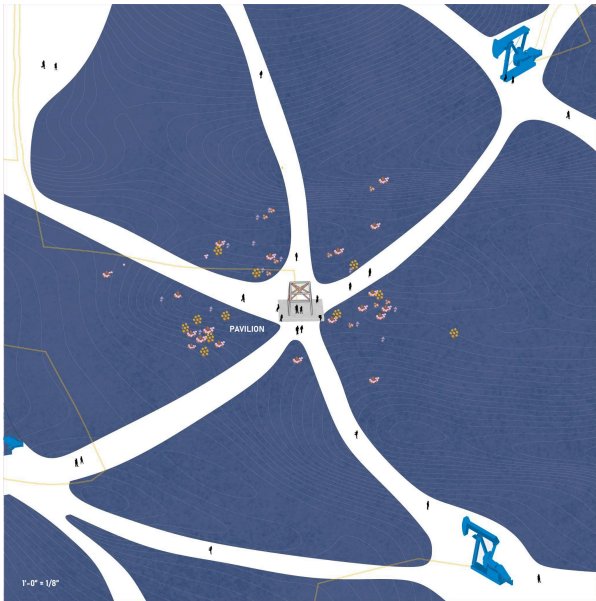


Fig. 25 - Pavilion
Isometric View

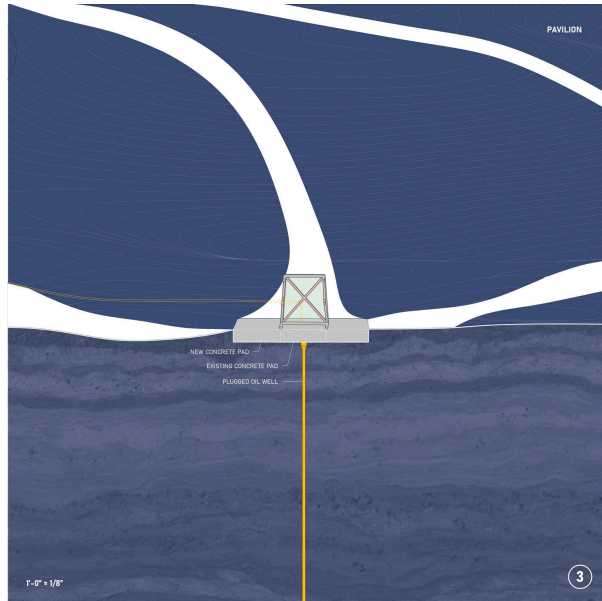


Fig. 26 - Pavilion
Section View

Zone 3 - Museum + Bridge

With the highest level of intervention for both ground and structure, Zone 3 introduces a large museum dedicated to education about the Kern Oil Field and repurposing industrial materials. A bridge spans across the Kern River that connects to Main Campus and allows for seamless transportation of materials and people between zones. The museum is embedded within the ground in a similar manner to existing crude-oil and gathering pipelines, but acts as a carrier for people rather than extracting resources.



Fig. 27 - Museum
Interior View

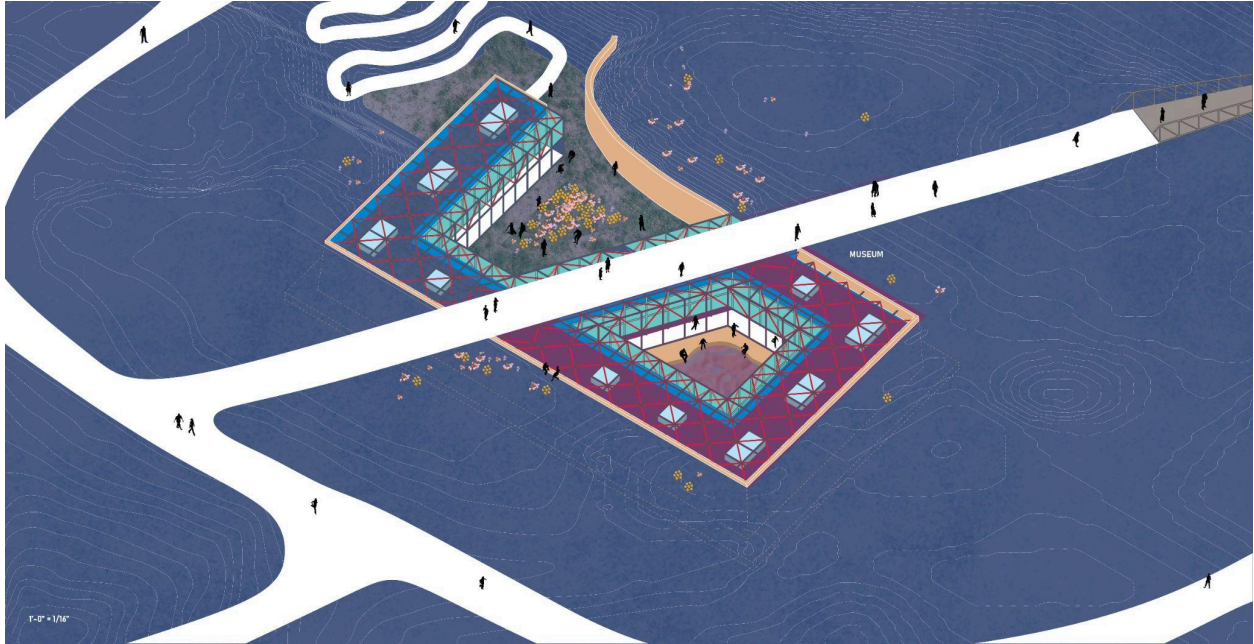


Fig. 30 - Museum
Isometric View



Fig. 31 - Museum
Section View

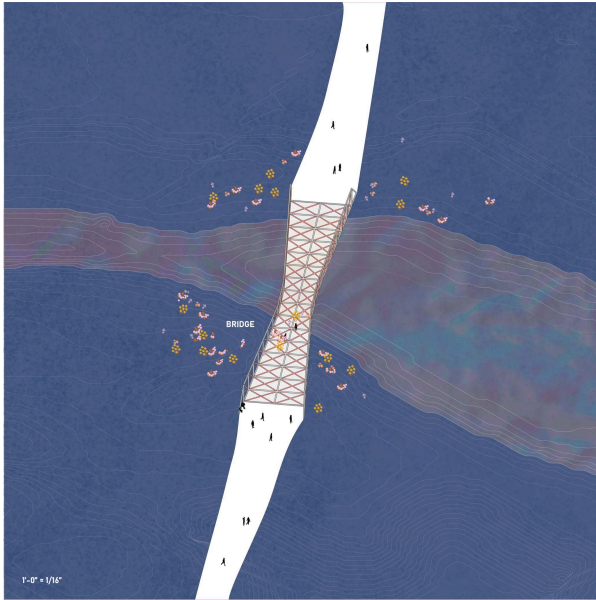


Fig. 28 - Bridge
Isometric View

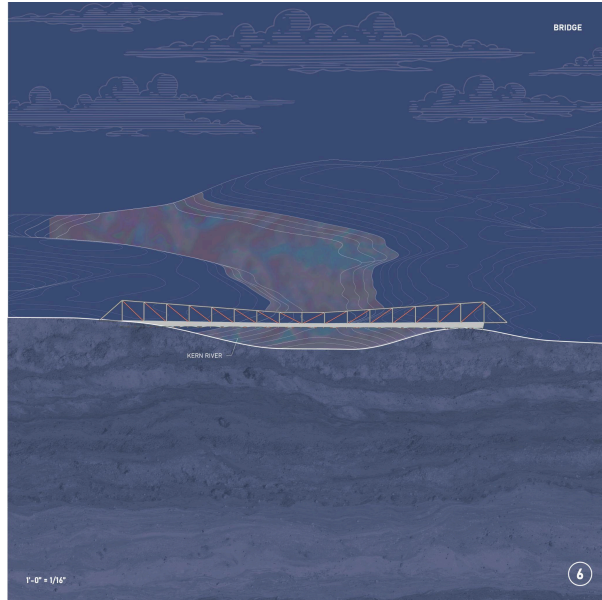


Fig. 29 - Bridge
Section View

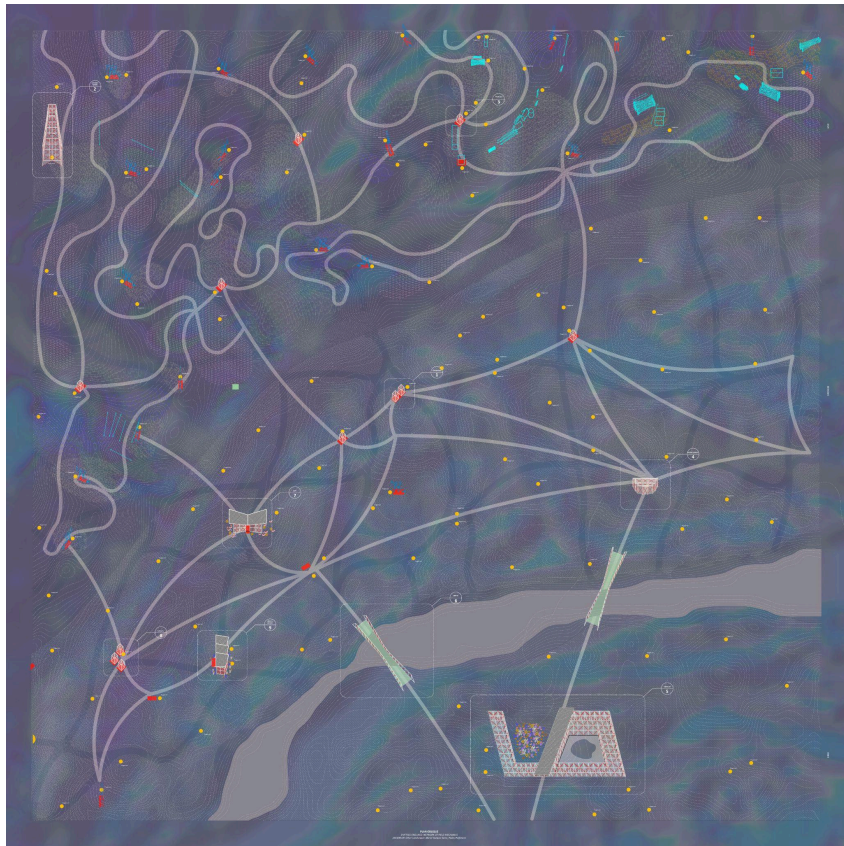


Fig. 32 - Composite Site Drawing 6' x 6'
Plan Oblique View

Conclusion

This thesis demonstrates that landscapes are not just static grounds where architecture can be placed, rather they are active systems that are continuously constructed through processes of movement, accumulation, and transformation. Through the analysis of the Sossusvlei dunes, it is evident that environmental forces such as wind, moisture, and evaporation operate cyclically to reshape the ground, producing a landscape that is defined by instability rather than permanence. When this idea is extended to the Kern River Oil Field, a parallel condition emerges where industrial systems similarly reorganize the surface through extraction, maintenance, and infrastructural networks. Although driven by different forces, both landscapes reveal that ground is not fixed, but continuously remade.

Shifting Grounds: Active Networks of Field Mechanics builds upon this realization by proposing an alternative approach to post-industrial sites. Rather than erasing the remnants of extraction or restoring the landscape to a pre-industrial state, the design utilizes existing systems as a framework for new forms of occupation by people. By reassembling materials, infrastructures, and spatial patterns, the project transforms mechanisms of extraction into platforms for education, recreation, and ecological awareness. In doing so, it challenges conventional notions of value, and shifts the focus from what can be removed from the ground to what can be experienced on it.

Ultimately, this thesis argues for an architectural approach that embraces instability within its design. By working with dynamic surface processes, both natural and industrial, architecture can move beyond static forms and instead operate as part of an evolving field. The Kern River Oil Field is thus reimagined not as a depleted resource, but as an active landscape

capable of generating new cultural and environmental value. In this way, the project positions architecture as a mediator between past extraction and future transformation, where design participates in, rather than resists, the continual reshaping of the ground.

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