

REGENERATION THROUGH DECAY.

Architectural prosthetic within the damaged
coastline of the South African West Coast.

Flavio Coetzee

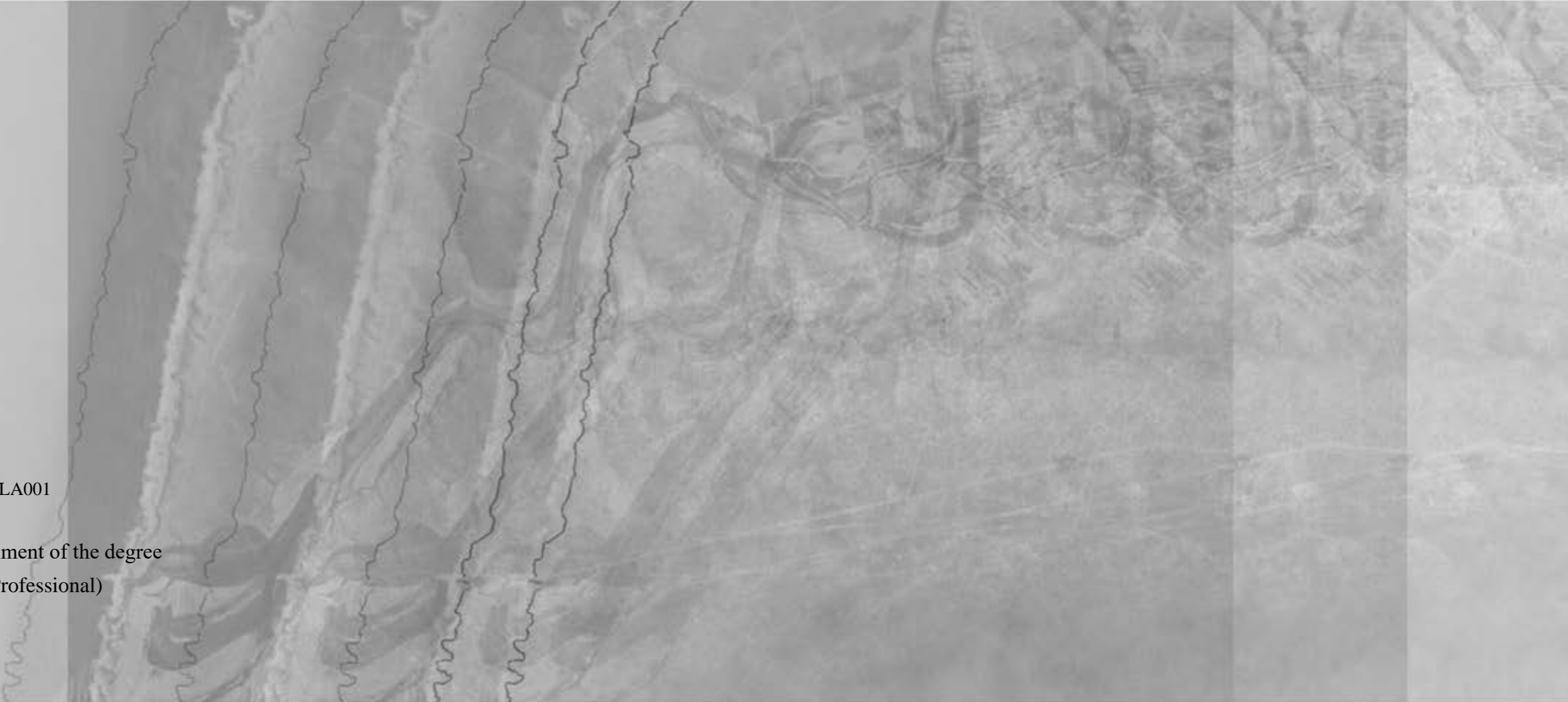
STUDENT NUMBER: CTZFLA001

DESIGN REPORT

Submitted in partial fulfillment of the degree

Master Of Architecture (Professional)

University of Cape Town,
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TITLE OF PROJECT

Dissertation project title: Regeneration through decay. An architectural prosthetic within the damaged coastline of the South African West Coast.

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This dissertation is presented as art fulfillment of the degree of Master of Architecture (Professional) in the School of Architecture, Planning and Geomatics (APG) at the University of Cape Town.

Date: 13 September 2022

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Before entering this dissertation, I would like to extend my deepest gratitude to the following people. My supervisor Michael Louw, for guiding me throughout my architectural process, allowing me to push myself further within the space, while simultaneously being able to provide me with a sense of calmness and security in the different stages of the journey.

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My fellow architecture friends made throughout this journey, making the studio a place of joy, comfort, and stability.



ABSTRACT

The relationship between decay and regeneration acts as a theoretical foundation from which this dissertation suggests a new method of approaching architecture that allows for a perspectival shift within the realm of regenerative architecture. Large-scale sand mining industries along the West Coast of South Africa result in collapsed dunes and natural systems impacting small, dependent communities. Approved mining permits south of the Olifants River Estuary risk a complete collapse of the ecological equilibrium, accompanied by irreversible damage to the livelihood of the residents. An analysis and damage simulation lead to the discovery of the most crucial (pinch point) site, which acts as the last portion and is paramount to regulate the balance of the salt pan. This landscape demands an architectural insertion acting as a tool to stabilise the pinch point, rehabilitate the natural ecology, support local communities, and serve as resistance to any future exploitation. Using the Japanese practice of Kintsugi, the project tests whether architecture can act as an adhesive that elevates the importance of the site by boldly restoring the scars that speak to the scale of resistance against environmental exploitation. Model-making is a primary method of the design process that merges the intuitive and analytical. By testing conceptual ideas of permanence and impermanence, a meticulous design is created, which is nestled within the impacts of time—stretching the potential of architecture to become an extension of the landscape itself while partially dissolving as if it never existed, where the architecture becomes a form of physical and symbolic resistance. Acting with and against the forces of nature beyond the site boundaries, the architecture is set in a constant state of transmutation.


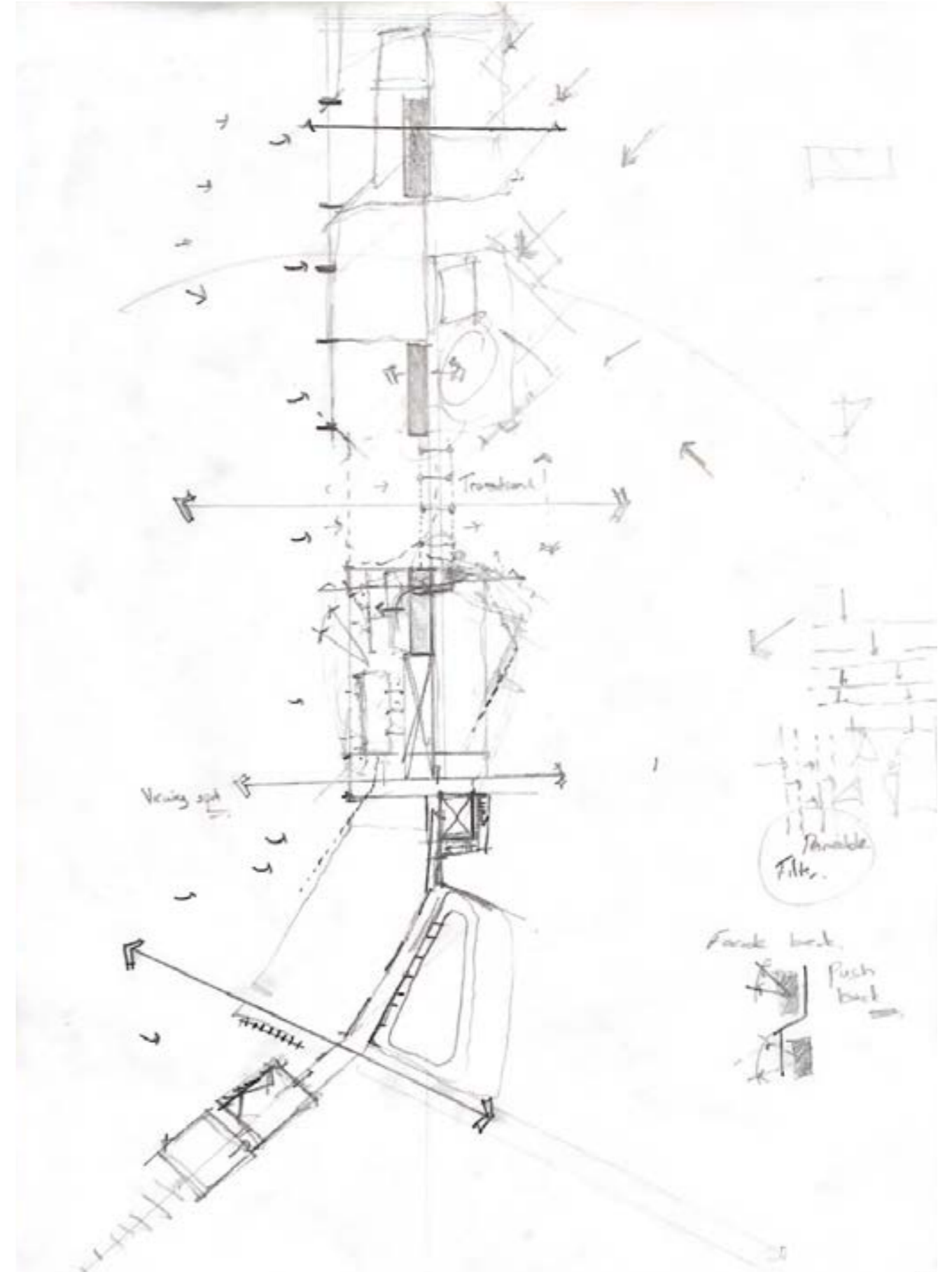


Fig. 01. Elevating the broken, documenting the cracks

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GLOSSARY OF TERMS

The following terms and definitions are intended as a quick-reference that supports supplementary texts. Concepts and authors are fully referenced in the text of this paper.

Anthropomorphic: The attribution of human traits, emotions or intentions by non-human systems or entities.

Decay: To undergo a destructive dissolution, usually a slow change from a state of perfection or soundness.

Entropy: A measure of disorder, chance and randomness of and within a system.

Estuary: A very sensitive partially enclosed, body of coastal water where fresh inland water mixes with salt water, a place of transition from land to sea.

Fait accompli: A state of an object or thing which is has already been decided or happened before those who are affected find out about it.

Kintsugi (金継ぎ): The Japanese practice of mending broken items with the use of precious metal glue.

Kintsukuroi (金繕い): “gold mending”. The mending of broken items with gold as glue.

Lieu de mémoire: A site of memory. A place of remembrance and archive for the human memory.

Mono no aware (物の哀れ): The “Pathos of things”, a sensitivity to the ephemera and awareness of impermanence.

Transmutation: The constant change of state. In this paper, this term is used to describe the changes a building and space goes throughout time.

Phenomenology: A philosophy of perception that posits that one’s reality is a subjective account of events. Through experiences that are created within the mind evoked through the senses. In this paper, the term is used to capture and describe an architectural approach that emphasizes the sensorial aspects of habitable space and materials.

Pilgrimage: A specific journey or search of moral or spiritual significance, typically a journey towards a religious shrine, temple or totem which is of importance to a person’s belief.

Program: Described what an architectural space, or structure is understood and used.

Prosthetics: An artificial part, or extension of a body part specifically designed to repair, replace or heal a missing or broken part of the body to improve the body’s function. In this paper, the term is used to describe an architectural approach or tool to assist within the design process that assists healing and rehabilitation.

Rehabilitation: The action of restoring something that has been damaged.

Spinal fusion: A spinal fusion is a permanent surgery that involves techniques designed to mimic the normal healing process of broken bones, where rods and screw plates permanently connect vertebrae’s to the spine. In this paper, the term is used to describe a design tool and approach towards **permanently** mechanism to assist with the regeneration of the dune and strandveld.

Splint: A splint is a rigid support made from metal, plaster, or plastic. It’s used to protect, support or immobilize an injured or inflamed, or broken part of a body. In this paper, the term is used to describe a design tool and approach towards a **temporary** mechanism to assist with regeneration.

Strandveld (beach shrub): Refers to vegetation that grows along the coast, it covers and stabilises sand dunes on the beaches. Flowers in the spring season. and supports high biomass of browsing animals.

Wabi Sabi (侘寂): A Japanese world view centered on the acknowledgment and acceptance of Imperfections.

Weathering: A process whereby natural forces act upon a surface, altering the look and character through addition or subtraction.

White body: The Euro-centric Modernist belief that a clean slate without any marks is a pure and desired body which is always to be pursued.

INTRODUCTION.

A pilgrimage away from the city towards nothingness for a moment of fresh air kickstarted my interest in the South African West Coast. I saw a previously untouched sacred landscape being aggressively destroyed. All along the coast, sea banks and coastal cliffs collapsed, leaving scars across the landscape. The ecological balance, which took millions of years to act in equilibrium, is decaying rapidly due to human's demystification and exploitation of the Earth's natural resources.

Resources gathered and used for man's personal vision of dominance over nature (Barrie and Bermudez, 2016). On the second (2nd) of November 2021, the South African government released a media statement announcing South Africa signing an international partnership that will aggressively accelerate the transition towards the decarbonization of its economy. However, the consequence of man's disregard for nature is what forces us now to act desperately to stop potentially irreversible damage.

Industries will be forced to close earlier than planned without the necessary time to create and implement a framework that allows for a sustainable exit strategy and regeneration plan to rectify the ecological damage done. As a result, we are left with scarred landscapes that have failed to be rehabilitated, wholly ignored, or further exploited.

Within the transition, some industries will still be operational, and those industries will run the risk of being sold to less responsible actors resulting in a worse social, economic, and ecological outcome. I have always been interested in the transition from carbonization to decarbonization, but my interest lies in the architectural role within the previously mentioned transition. Furthermore, the architectural part concerns regenerating previously exploited social, environmental, and economic landscapes.

This project is situated 300km North of Cape Town, South Africa, between the mid-Atlantic Ocean and the sensitive Olifant's River Estuary along the West Coast. Currently, the site is an untouched landscape facing the imminent threat of being destroyed by mining operations, as mining permits have already been approved. I position this project where the operations have already damaged the site. This decision is made to align with my theoretical interest in regeneration through a process of decay which will be explored within the report, leaving the pinch point site in an unstable state.

The coastal mines are damaging the ecological stability of the environment and changing the continent's physical footprint by thousands of square meters each year. With each disturbance to the sensitive ecology, nature will attempt to find a new equilibrium.

Ecological damage of this scale asks for more than just the typical attempted regeneration programs with a backward-looking approach. Finding stability in a constantly exploited space is where we find ourselves now.

I am left in a liminal space where architecture has the potential to heal but also the further ability to damage the already broken context. I aim to test whether architecture can act as an adhesive that restores social, ecological, and psychological scars. With the same urgency that we face on a daily, I enter this project. I am on a journey to test and create a sensitive yet alarming architecture acting as a prosthetic which does not separate it from nature but allows nature to rule over the architecture through its many lives.

This design dissertation paper documents the project in four (4) parts. This decision is made to provide a comprehensive report and representation of my personal process and development of the project ranging from the inception and the theoretical investigations to the architectural insertion.

The development of my theoretical ideas reinforcing my design was developed through identifying and investigating two concepts, decay and regeneration. There is a disconnect within the realm of architecture, it does not allow for an adequate and deep understanding of the role of time in spatial experiences. Analyzing the perspectives towards decay found within the Euro-centric position and contrasting it with the Japanese practice of Kintsugi. Applying the theoretical understanding within a technical study allows for a stable foundation from which to embark on the architectural journey.

My personal aim is to merge my intuitive design language with a particular set of design drivers developed from understanding decay and regeneration. A method of constant controlled experimentation led to unexpected design opportunities being revealed, resulting in concepts that are discussed within the theoretical interest and are, therefore, directly developed in an architectural design. This study reestablishes the relationship between time-person-architecture while promoting a perspective shift.



Fig. 02. The result of the carbonized economy.

This initial portion of the report investigates the current epoch that we find ourselves in. The attempts to create a successful model for ecological regeneration will never be successful unless a new position is taken. This position will only come once a complete shift in perspective is made whereby it changes our current view and understanding of the relationship between us and nature. Only when viewing all landscapes as sacred landscapes, can an attempt to regenerate it be made. By understanding what constitutes to the sacredness of a landscape, it can assist us with the regeneration thereof. I believe that through understanding our relationship with nature, it gives insight on how a shift can be made. Following the understanding of our view towards nature, this portion then addresses the current ecological crisis occurring along the West Coast of South Africa as the physical manifestation of our attitude. The aim of this section is to outline the ecological and societal risks we are currently facing due to the disconnect between us and nature. By understanding the product of our position, it generates opportunity to renew our theories of regeneration followed by the current problematic manner regeneration is approached within architecture.

SACRED LANDSCAPES

The Western Euro-centric view of the Earth and its systems creates a disconnect between the Earth and us. Therefore, an unsympathetic perspective is manifested within society. It sees the Earth as a body of resources that is there for our own benefit and use.

Our exploitation of natural resources disregards its environmental impacts. It has thus led us into a space that attempts to better the future but does not allow for the rectification of previous damage done. I believe that a net-positive outcome can only be achieved once an attitude that addresses both past and future impacts have been taken—resulting in a societal development that will change the architectural approach toward the regenerative possibilities within the built environment. I argue that our backs have been turned against the importance of an ethical stance where architecture should be beneficial to all the living fabric it impacts.

We have separated ourselves from nature, resulting in the demystification and desanctification of nature (Barrie and Mermudez, 2016). The pursuit of a decarbonized economy while still viewing us and nature as separate entities will, I believe, result in a lack of knowledge and understanding of the complex systems at play within nature. How does one regenerate a damaged system if one does not understand the system? Any regenerating attempt will remain ineffective if a perspectival shift isn't taken. Brio and Smith (2012, p.10) state that we live in a relatively new epoch called the "Anthropocene," where humans dominate all the Earth-system processes, including the living fabric that makes up the ecosystem. According to the Oxford English Dictionary, Anthropocene is defined as

"relating to the current age, viewed as the period during which human activity has had the greatest influence on the environment and climate change."

I posit that only once a conscious step is taken to renew our worldview and break our belief of superiority towards nature then it allows for a better chance of success. I will attempt to undergo such a perspectival shift towards architectural design. Phillip Roos (2021) also argues that a global behavioral change needs to occur where the sensitivity of the human psyche needs to dwell in the sacredness of nature to reconnect in the present moment.

Carl Jung (1959), in his book *Archetypes and the Collective Unconscious*, describes the sacred as an "ethereal quality" where such quality is not found through any form of religious association but embedded within the spirit of space. The human psyche is independent of any form or shape, but the spiritual qualities within the psyche are found

throughout the world of form that acts as a medium. In other words, physical space (architecture), or lack thereof, serves as the medium through which spiritual qualities are evoked within the human psyche. Marc Treib (2009) posits that sacred landscapes constitute the most influential externalization of our memory. The evolution of nature, specifically natural landscapes before human manipulation, creates the purest form of physical space (Barrie and Mermudez, 2016). The demystification of our sacred landscapes results in rich histories being damaged or lost.

One should not view sacred landscapes as *fait accompli* but rather as a system that flows in a continuous state of dynamic equilibrium resulting from constant external and internal forces experienced over time. Gueze (1994) points out the similarities between the human spirit and landscapes, where natural landscapes are so profound through how it decides to reveal their chaotic history to us that we cannot comprehend on a conscious level but rather elevates our sensitivity within the spiritual qualities of our psyche.

The clock cannot rewind back; thus, the probability that one can restore nature to its original state before destruction is nearly impossible. If the balance of a landscape is disrupted but hypothetically regenerated through the intervention of humans precisely to the condition it was before the disturbance, is that landscape back to its original state? Näsman & Odgaard (2002) answers this question by stating that we cannot recreate the sans-human form by which the original product was created, and as we know, we cannot turn back the clock; thus, even if we do regenerate the space precisely as per pre-disturbance, that transformation is a new transformation, each equilibrium is a new equilibrium.

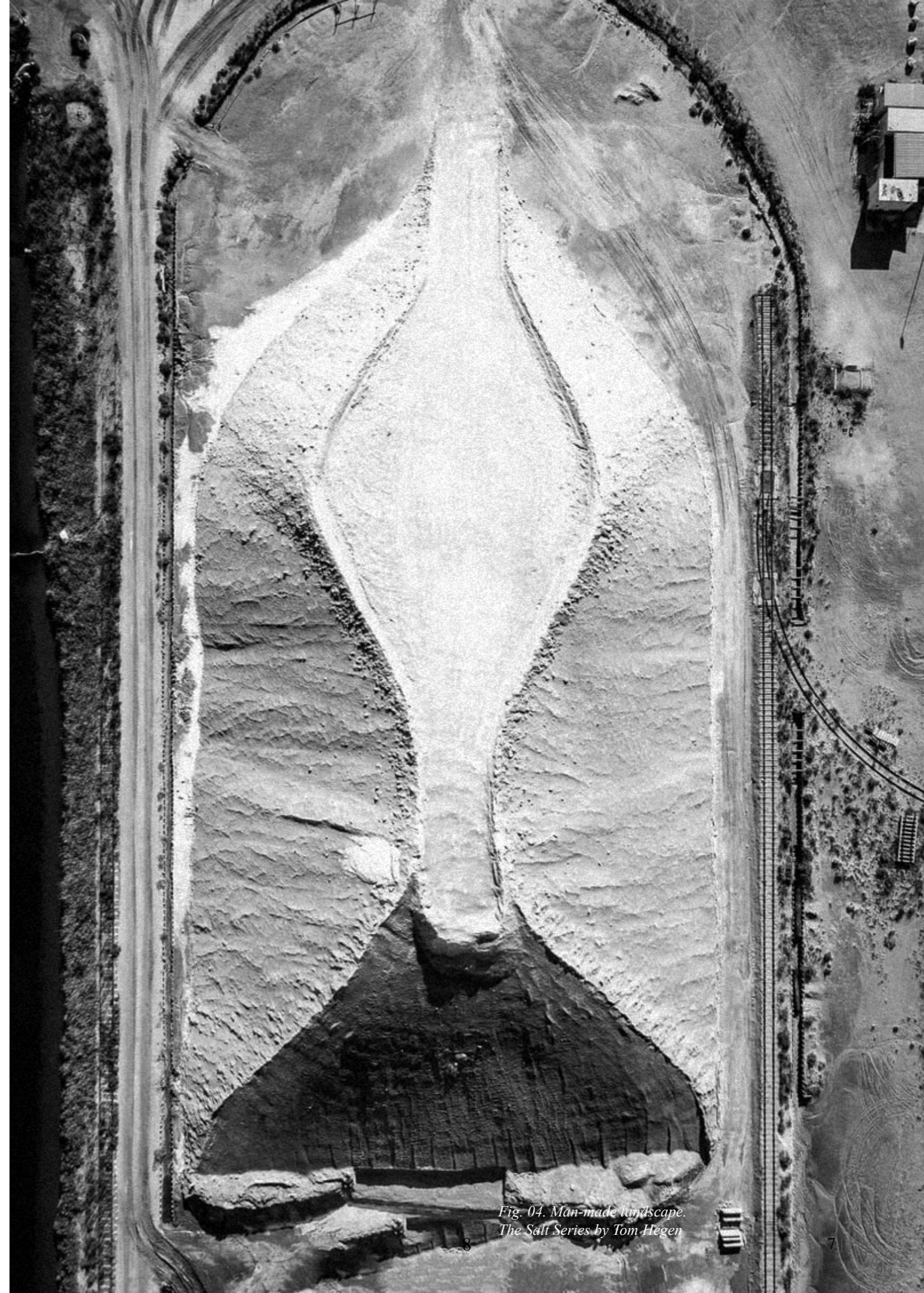


Fig. 04. Man-made landscape.
The Salt Series by Tom Heggen

THE DESTRUCTION OF SACRED LANDSCAPES

It is my belief that we are not opposite nor separate from nature. Natural landscapes are alive and create a robust and deep resonance that we feel within us. The mystery of its many narratives echoes deep in time, mysteries that influence lead to the most practiced world religions. In other words, landscapes do not hold a singular true story but instead a network of similar tales which we attempt to uncover and understand. It is fundamental for us that we should not only learn and preserve the tales of the landscapes but also approach them with an understanding that would elevate their significance.

I look towards the West Coast as the context of interest. Mining companies are currently sweeping along South Africa's hauntingly beautiful coastline. Most of these operations are based on the beaches and near-shore zones excavating sand to extract heavy metals and natural minerals. Operations in such a sensitive region disrupt the natural equilibrium. They plan to destroy further hundreds of kilometers of sensitive, pristine coastal environments manipulating the biodiverse ecology, disrupting local communities, and decaying the physical footprint of South Africa.

Not only does it change the footprint, but it disregards our relationship with nature. The West Coast is part of the Cape Floristic Region within the Fynbos biome, therefore home to thousands of unique vegetation like succulent plants and strandveld. UNESCO has therefore deemed it a Protected Areas World heritage site. The area has also been a historical landscape and home for the Khoisan, marking it as a sacred landscape. However, descendants of first nations still live in small communities alongside the coast. Meaning that the tales and layered history the landscape has been a part of is being wiped away without any attempts to preserve them. This action indicates man's pursuit of power and dominance over the importance of time and nature. I, therefore, frame the destruction of the West Coast as the destruction of sacred landscapes.

REGENERATING THE SACRED

For regeneration to occur, something must first be in a state of decay. Regeneration and decay are thus never separate, directly or indirectly proportionate to each other, but rather in a complex state of flux. Can the sacredness of a destroyed landscape be regenerated through architectural interventions? When attempting to restore the sacred, it is crucial to understand the complexities of each specific situation and understand how we can be an agent for evolution rather than degeneration. Charlotte and Charlotte and Bøe (2016) question in their book *Raw: Architectural Engagement with Nature* whether regenerating the landscape is the same as setting it free.

We are thus at a nick point; we need to learn how to be a part of nature rather than apart from nature. Unfortunately, regeneration projects are usually not as successful as what they are planned to be, and I would argue that the majority's view regarding a regenerative design follows the problem-solving attitude, which is a resulting view that is born out of a "fear-based narrative" (Dominique and Du Plessis, 2015). A fear-based narrative looks towards the most negative possible outcome to generate fear, driving the need for change. Tied to fear or a problem ends up creating polarization.

The principal and co-founding member of the architecture firm Regenesi, Ben Haggard believes that if a problem-solving view is adopted, then the orientation of work is always towards the past, limiting one's field of view where the best outcome of regeneration is to merely solve the problem created in the past (Regenerative Development from Regenesi, 2017, 00:40).

I also understand that if the most negative outcomes are used to drive a project, it creates the opportunity for accountability to be shifted away onto the people next in line who would be directly influenced by it. Furthermore, if the most damaging outcome of a problem is not as urgent or less harmful than another, it will not be addressed until that becomes the most pressing problem to solve. This is evident within the context of the West Coast. Mining operations are not attempting to rehabilitate the ecology after completion, therefore shifting the accountability away from them resulting in a series of large-scale unrehabilitated sites.

Phillip Roos argues in the book *Regenerative-adaptive Design for Sustainable Development* (2021) that a mass behavioral change needs to occur where we need to acknowledge the sensitivity and sacredness of the human species to reconnect with nature within the present. He continues to state that the current aim of architectural regeneration attempts is not to have a net positive outcome but a "neutral" outcome. If the most beneficial outcome is considered neutral, then it limits the potential of a regenerative one.

How can we reprogramme our formal and technical approaches and our ethical perspective towards regeneration? Thomas Moore (1996) suggests and defines a new morally potent and ethical way of viewing ecology as "sacred ecology." He describes a sacred ecology as

"...an ethical concern for all living creatures and the earth as a living system".

In other words, this definition reframes the way we view and understand our natural environment as purely sacred.



Fig. 05. Mining operation on the coast. (PTWC, 2021).

Shifting our perspective towards the appreciation of imperfection.

This portion challenges the manner we consider imperfection, especially decay. A comparison is made between the Euro-centric obsession over aesthetic purity and the Eastern philosophy of Wabi-Sabi. By attempting to understand the relationship between decay and regeneration, a reflection on some of the problems both currently hold can be challenged. This allows me to seek a better stance toward an architectural understanding of a regenerative perspective. The importance of imperfection then leads to further theoretical explorations of weathering as a method to indicate imperfection and record time. It further investigates the psychology of permanence and impermanence concerning our understanding of time.

Everything has a tendency towards its own death from the exact moment of birth. Within the desire to understand and therefore conquer all elements of life and spirituality, time is yet to be conquered. The obsession with achieving aesthetic purity and perfection has always been present within the Western, primarily Euro-centric movements, which still manifests in our current paradigm. This belief is rooted in the Western world's obsession with perfection, symmetry, and ideal proportions. The idea is that any creation should strive to be a "beautiful white body," therefore viewing any physical alteration such as stains, dirt, cracks, or natural weathering as a spiritually and morally unsound occurrence. This intention is both our conscious and subconscious attempts to position ourselves as more influential to our actual fragility in the presence of time and nature.

Architecture does not only act as a witness in time, but I argue that architecture is a product of time by revealing signs of past lives allowing the qualities that provoke memory to be experienced.

"A building may live on though it may be slashed to pieces, recycled or transformed, for it can continue to live in fragmented form and acts as intermediary onto which people can project their own memories" (Edensor, 2005).

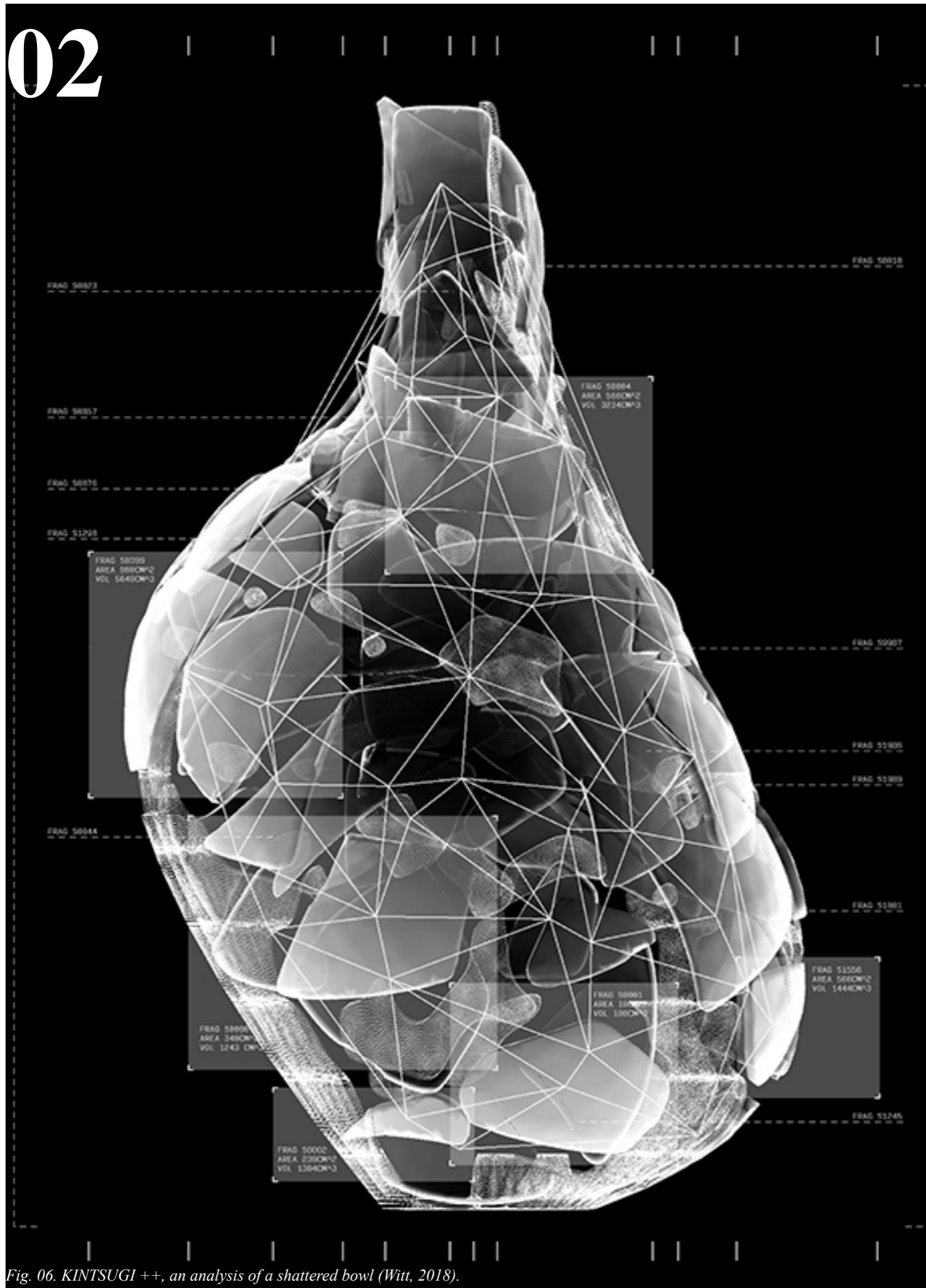


Fig. 06. KINTSUGI ++, an analysis of a shattered bowl (Witt, 2018).

THE WHITE BODY.

The belief is that if time is conquered, all forces linked to time will be redundant such as aging, decay, entropy, and death. Mohsen Mostafavi (1993) further explains this belief by stating that imperfection changes not only the physical appearance but also its spiritual significance, where man's creation is second to time. The western intention to create the desired white body is not to capture what time has to offer, nor intend to age with time, but instead aims to act as a singular still-shot moment. When faced with the white body, the interaction removes us from our current space and time and propels us to its desired space and time. This approach creates an a-cultural exchange. Resulting in a void-like manner of dwelling in space.

The life cycle of any object is never static; from the moment it is made, regardless of its intent, its death is inevitable in time. A way we attempt to conquer time is through designing "permanent" buildings, even though that is not possible with the forces of time and nature acting upon it. We ignore the reality of a building's end. Over time, external natural forces constantly interact with the building, as these natural elements and the surface (usually the shell/exterior) of the building interact, the surface will begin to show signs of its interaction with nature through physical surface modifications.

In nature, decay is equally destructive as it is constructive, a non-linear dynamic cycle; this generates a balance in nature within a permanent state of restlessness. A biological view of decay is where the death of one living matter becomes the source of life for another issue, thus acting as a dependent non-linear closed cycle. In other words, the end of something is the origin of another. This prompts the question of when is the origin of a building? Does a building begin the day of construction, practical completion, or when the opportunity for a project is created? The same could be asked about the end of buildings. Does a building end when nobody occupies it or when nature has decayed the structure to such an extent that it is an integrated part of that exact nature?

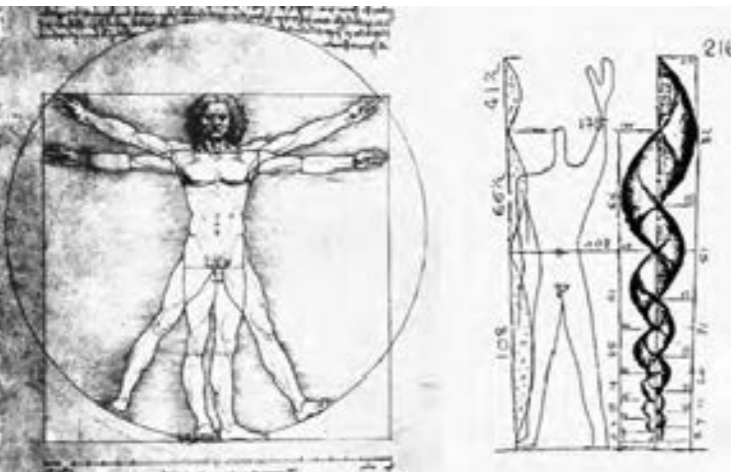


Fig. 07. Vitruvian man by Leonardo da Vinci alongside the Modulor man by Le Corbusier

Villa Savoye.

Le Corbusier's Villa Savoye, built between 1928 and 1931, captures the idolization of architecture. A project and product which attempts to gesture no signs of aging therefore transcending time. Artist Xavier Delory (2014) explains that Villa Savoye has become a mark of "impeccable whiteness." Where it was once the perfect icon of utilitarianism and function, it is now treated as an idolized object (Artemel, 2014).

The building has been through many phases of regeneration and preservation to attempt to relive the still-shot image of the Western ideal of perfection and beauty.

We have become accustomed to abandoning post-programmatic buildings for centuries. This is not only a reflection of our impatience, but also our lack of acknowledgment of post-programmatic use. These abandoned spaces embody the spirit and time of the building's past life. As elements begin to decay, a transaction occurs between nature and man-made.

The Oxford English Dictionary defines rehabilitation as the process under which a building or area goes through where it is returned to its previous good condition. This process is often done to historically significant buildings or artefacts for preservation. This act prolongs the life cycle of the building. The duality of making something new to extend its age ultimately.

Reoccupation is an inevitable process that creates opportunities for new life. For a building to be labeled as "reoccupied", it must be partially or fully abandoned, where the after, other life takes ownership over the abandoned space to make it their own. This relationship between death and life of the building is usually not planned for, but if one life reoccupies space of a previous life, then nature can also reoccupy space thus, plants and animals can reoccupy abandoned space.

These lives are all connected to the passage of time and the inhabitation of life. It shows that the death of a building is a blurry line since the death of each life is the birth of the next, thus showing the impermanence of the intended matter. With every cycle, a portion of the building's original spirit becomes layered with the next, this then prompts the question - what can decay - what must decay?

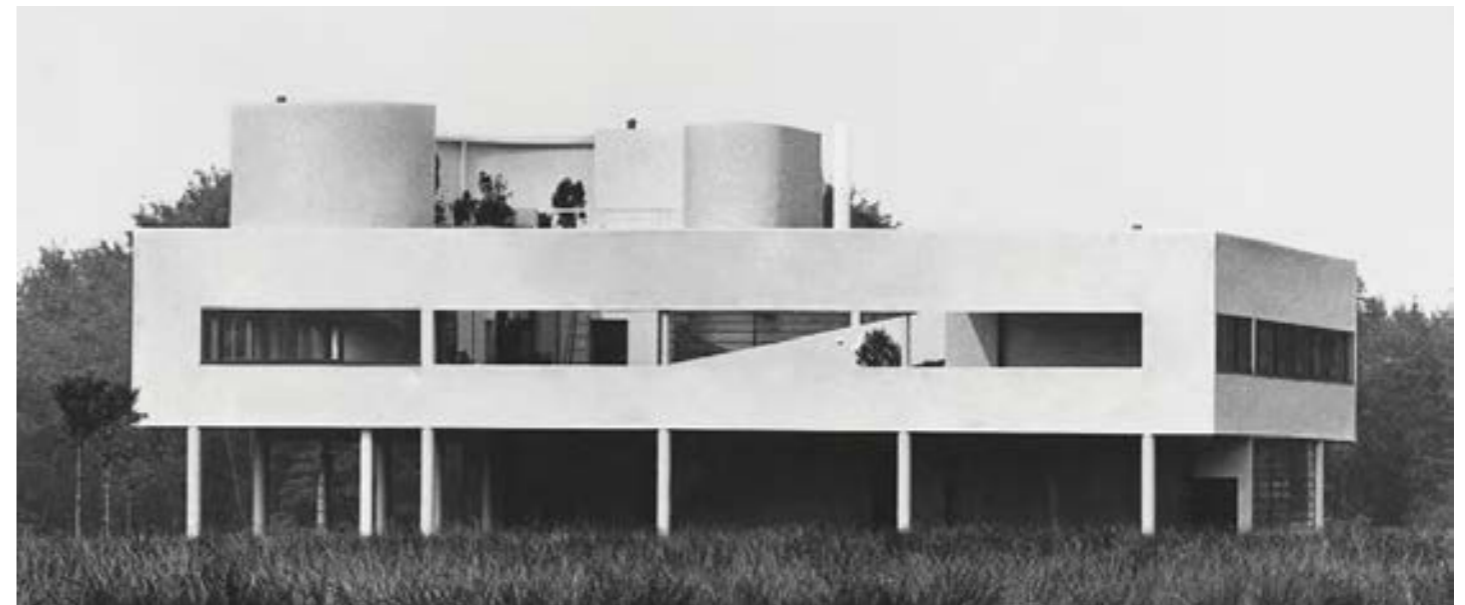


Fig. 08. Le Corbusier: Villa Savoye (1928-1931). Restoration 1984



Fig. 09. Le Corbusier: The decay of Villa Savoye during World War 2.



Fig. 10. Xavier Delory: Digitally fabricated vandalism and decay of Villa Savoye (2014)

BREAKING THE WHITE BODY

In contrast to the belief of the White body, where any other state other than the intended one of an object, surface, or space is seen as lesser, the appreciation of the impermanence through imperfections is evident in the Eastern philosophy of belief Wabi-Sabi. Wabi-Sabi is the philosophy and belief that finds beauty and importance in imperfections.

It therefore commands a worldview towards all the elements inside life with an attitude of acceptance when an imperfection occurs. It's removed from the Western ideology and believes that imperfection and faults are to be valued. I bring forth the practice of Kintsugi or also known as Kintsukuroi, as a practical way to understand the philosophical approach of Wabi-Sabi.

KINTSUGI / KINTSUKUROI

Kintsugi, is a process of “refinement”; it treats the moment of breakage or scarring of an object (usually ceramics) as an intimate life-altering moment captured in its history of it (ANON, 2018). This simple shift of accepting the inevitable event of imperfection results in that event not trying to be covered up but rather acknowledging it as a crucial moment, consequently creating an opportunity for innovation that allows the object to surpass its original state and prolong its life span.

I believe the common reaction after breakage is usually to discard the object and replace it with a “perfect” new one since a broken piece’s functionality can be limited or removed from any potential use. This exemplifies our current position towards imperfection. The practice of kintsugi restores mundane (usually ceramic) broken objects by mending back all the broken parts with an adhesive made from precious powdered metals, traditionally gold (Fig11). The glue usually used to put pieces together is lacquer produced from the sap of an indigenous tree in Japan. Extracting the lacquer results at the end of the tree’s life because the tree will be cut off after the sap is extracted, creating an intimate relationship between the person and nature. This makes sense of gratitude towards nature where the man-made and natural and random chance were united in the perfect expression of beauty and wisdom.

Through using such a precious metal, it demands immediate attention to those cracks, instead of hiding them. The piece’s materialistic value is elevated hence signifying that the restoration of the object does not attempt to break even, but its value surpasses its own past. The fractured part where Kintsugi is applied becomes a new landscape in itself.

This process is repeated with every chip and break,

where the gold becomes more prominent throughout the object, ultimately taking over completely. I posit that a direct correlation is made between breakage (decay) and gold mending (regeneration).

Mono No Aware, a Japanese philosophy delegates the awareness of impermanence or transience of things where the flow of nature and time is evident (Yurt, 202, p.682). A sense of beauty is therefore created in the impermanent state of life since the state of decay represents its ever-flawed nature. An awareness and sensitivity with time is generated in all objects of life—a greater satisfaction in the humbler and imperfect moments.

The decay of the ceramic creates the opportunity for its significance and value to increase. I then ask how architecture can use this concept to use the opportunities given within damaged spaces? Where the regeneration of those spaces exceeds the value of what it was previously. I aim to test how architecture can act as this golden adhesive within the scars.

I believe that an architectural approach that takes the decay and damage of it or the landscape as a beneficial element, then it can begin to create the shift in perspective needed to reshape our Western attempts for dominance over time.

According to Zach Fein (2011), by understanding decay as regeneration, a new prescription for an architectural perspective can be formed, which leads to a new architectural approach. If we decay nature, can we then regenerate or facilitate the process of regeneration through decay as a tool? Decay does not conform to a prescribed scale since everything has “death as a birthright” (Mostafavi, 1993). This relates back to the balance of permanence and impermanence. I believe one must know the relationship of decay within a space of regeneration, as well as how regeneration can be facilitated through a process of decay.



Fig. 11. Golden joinery of Kintsugi.

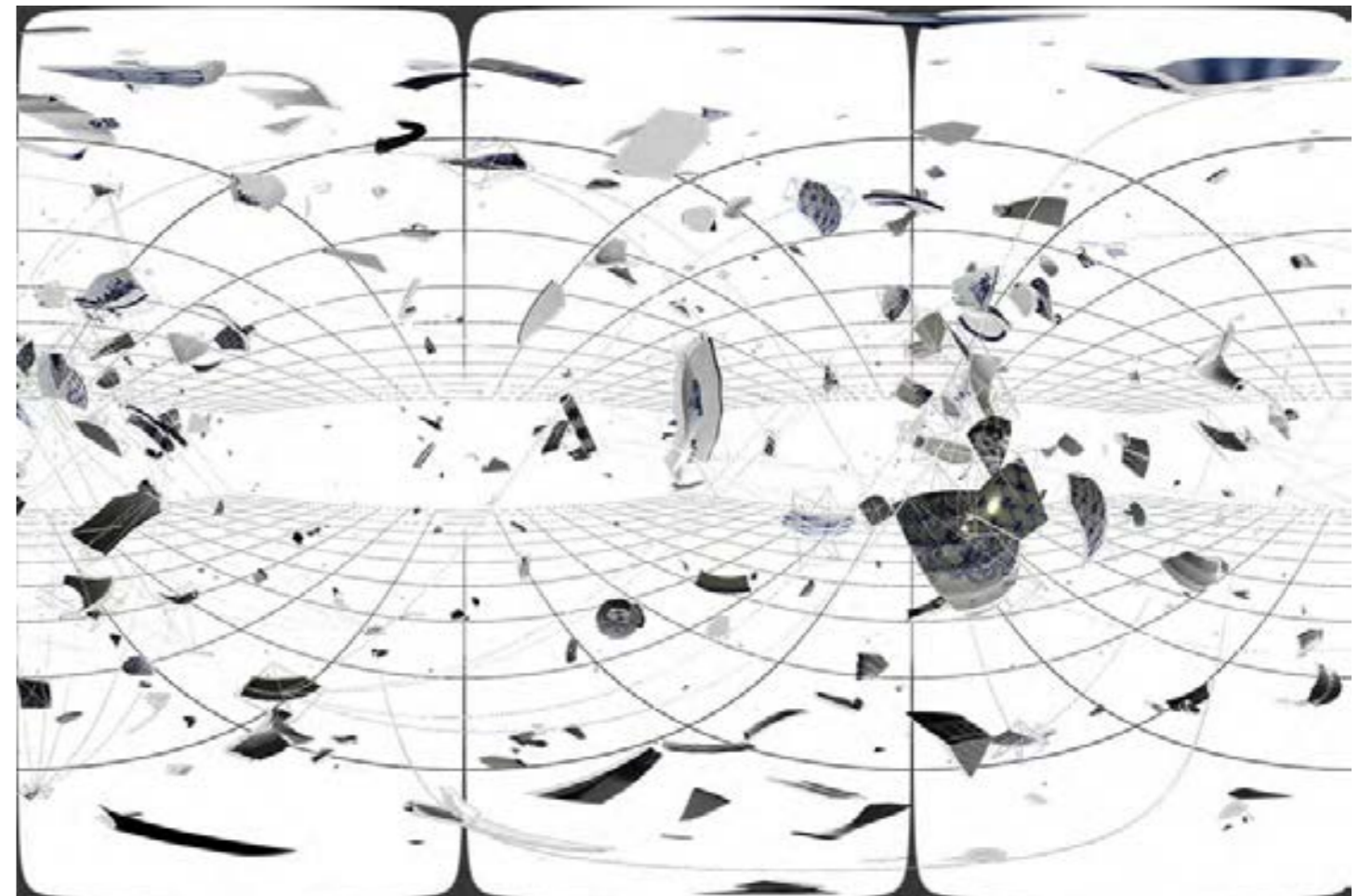


Fig. 12. KINTSUGI ++, Digital analysis of a shattered bowl (Witt, 2018).

DOCUMENTING DECAY THROUGH MAKING

I tested elements of the theory of decay by making a conceptual model. The intention of this model was to create an object that allows external forces to act upon it, encouraging the natural process of decay. The material choice in creating the model was crucial for the documentation and understanding of how different materials operate within the same time period. Each material reacts differently to time, therefore allowing for unforeseen interactions between other materials. The relationship between mass (plaster of Paris), brass pens which conceptually act as the structure and the balsa wood representing the possible envelope.

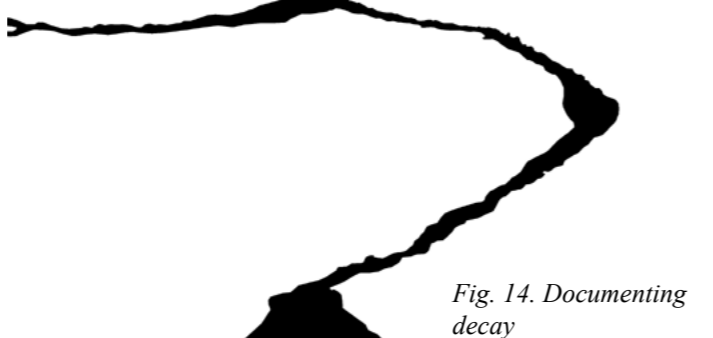
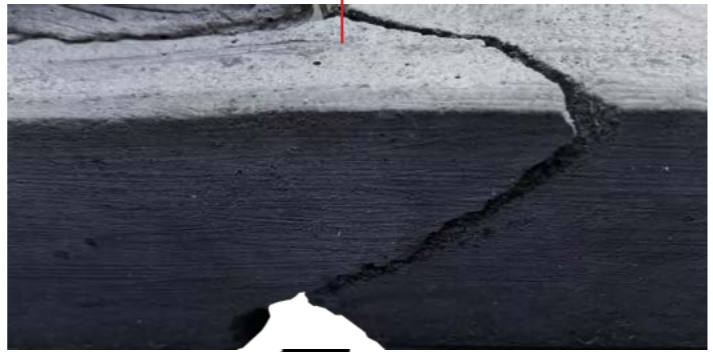
No external adhesive such as glue was used to bind all the pieces together, therefore allowing the envelope to be removed, resulting in the model being in a constant state of transmutation. As the plaster of Paris mass begins to settle, cracks start to form at the weakest points within the model.

These cracks were documented over time, ultimately resulting in the solid mass being broken up into multiple smaller pieces. I view these cracks and imperfections as the model's life-altering moment. The knock-on effects from the cracks forming within the plaster of Paris dynamically shifted the stability of the brass pens.

These cracks are not hidden away but rather celebrated through the documentation of all the cracks and breaks. Removing human interaction up to a certain point allows me to document further smaller changes, approaching each moment through sensitivity and appreciation. Through documenting the cracks and celebrating them, I argue that it is another way to increase the sentimental value and spiritual essence of the model.



Fig. 13. Top view of model



Digitally documentation of the crack formed before mending it back together



Fig. 15. Restoring the crack of model A

Digitally simulating the regeneration of the crack through Kintsugi

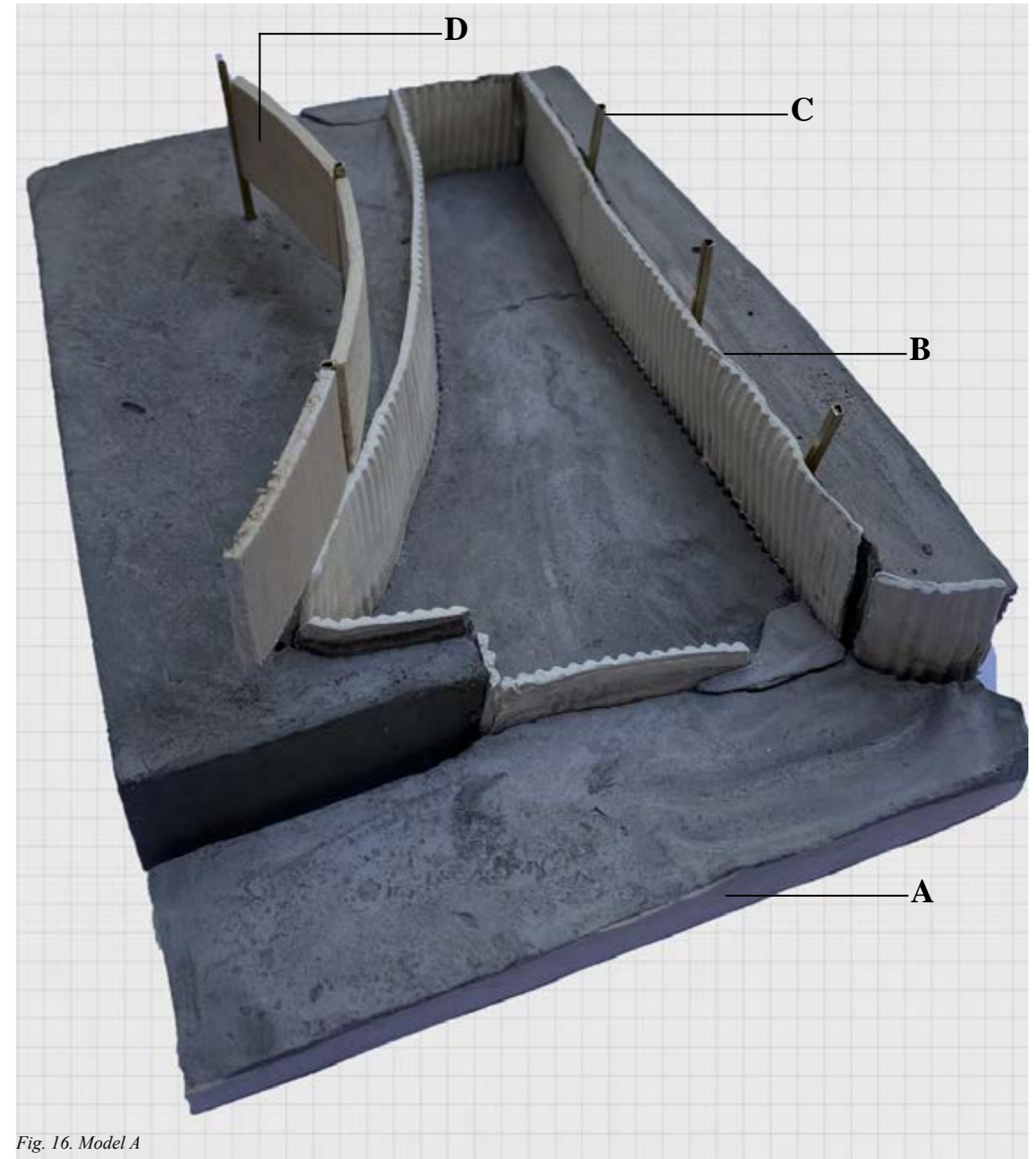


Fig. 16. Model A

A - Dyed plaster of Paris base.

B - Textured air dry clay

C - Cut brass pens fixed inside plaster of Paris

D - Curved 2mm balsa wood slotted in between brass pens

**Twyfelfontein Visitor's Interpretive Rock Centre
(2005-2007) Nina Maritz Architects**

Marc Treib (2019) explains that the built environment and human construction can preserve the past, enabling us to exist in a spatial and materialistic reality, which further transcends us to dwell in a deeply configured cultural reality too.

Architect Nina Maritz's Visitors' Interpretive Rock Art Centre, located at Twyfelfontein, North-West of Namibia, which was completed in 2006, exemplifies architecture's inhabitation in time. It is situated in a highly cultural and archaeologically sensitive site surrounded by rock engravings made by the San's ancestors.

The building acts as a metaphor, where its role is to "prepare the visitor for an otherworldly experience with the esoteric nature of the rock engravings" (Maritz, 2016). I will be focusing on the making of the building to better understand the process of decay-regeneration at different scales.

Material regeneration.

Nearby found and repurposed materials drive the building's technical construction and material choice, thereby regenerating the life of those materials through using them in the construction, reassigning their purpose resulting in the value of those objects to increase. The building acknowledges its potential death by preparing an exit plan; therefore, it becomes a "reversible building" where it can be removed entirely and reused. The screens and roof act as the envelope of the building, where the roof is made from "quartered two-hundred-liter oil drums" (Louw, 2019) while the screen was made from the lids. These recycled materials already had signs of rust, but these weathering marks are further emphasized after the material goes through a sandblasting process. Sandblasting the metal used in the roofs and screens allows for an even faster process of rust (decay). Although the materials are not designed to dissolve within the landscape, designing the making and material use, allows for the building to act with the forces of nature within its context, rather than attempting to be of more importance.

The gabion walls create micro-spaces for small creatures to create smaller ecosystems within the man-made. As time begins to remove layers from the stone further, it brings a new layer of material in communication with the different forces of nature, therefore constantly changing. It allows us not only to dwell in the building's time. But transcends us to the context's time and spiritual significance, therefore using the relationship between decay and regeneration to the advantage of both the human experience and the natural ecology.



Fig. 17. Decayed oil drums regenerated to a facade
Nina Maritz. Twyfelfontein Visitor's centre (2005 - 2007).



Fig. 18. Decayed materials that have been regenerated
Nina Maritz. Twyfelfontein Visitor's centre (2005 - 2007).

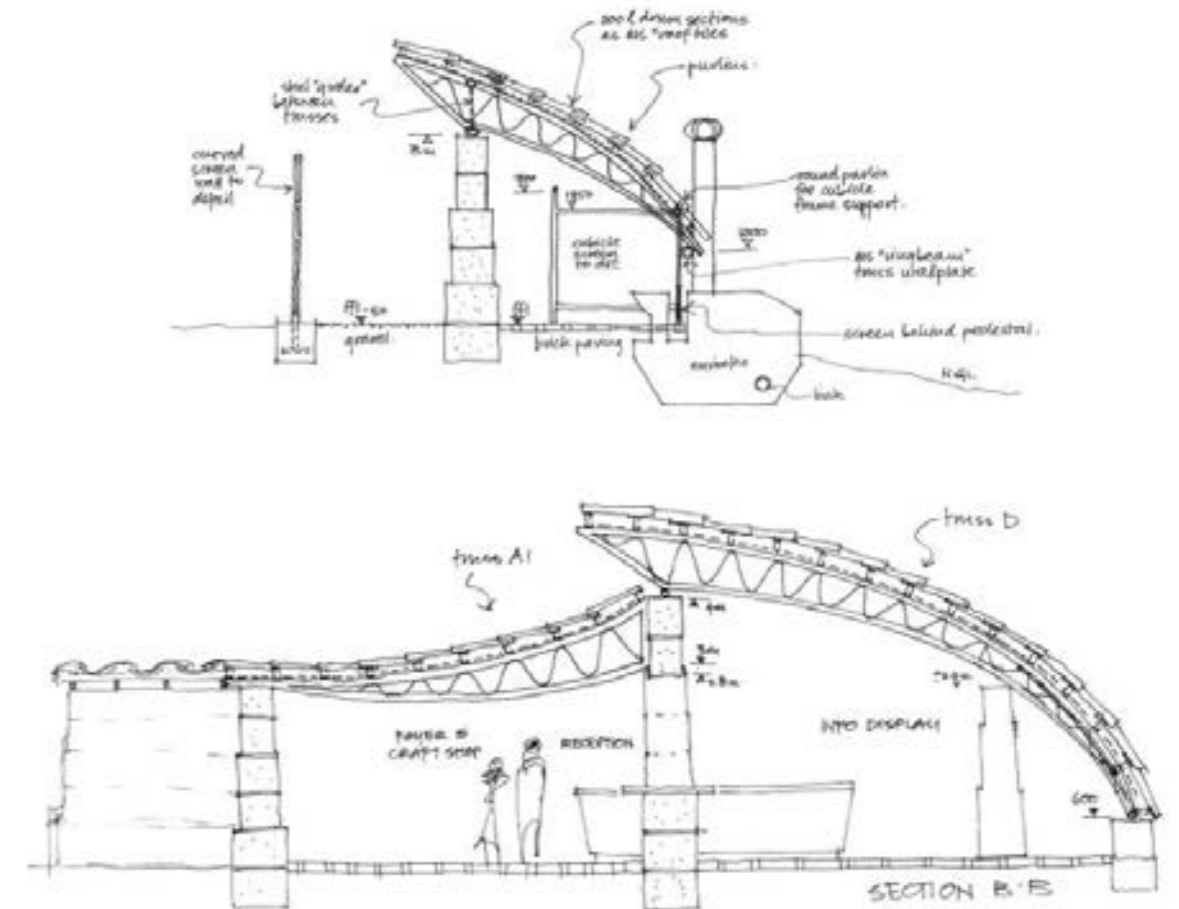


Fig. 19. Sectional sketch of gabion wall and roof connection
Nina Maritz. Twyfelfontein Visitor's centre (2005 - 2007).

Recognizing the importance of time allows for a renewed valuing of experiences in time and space. Paul Virilio (1994) expresses his belief that we now experience time as fragments that individually pass us and immediately vanish instead of dwelling in time. Thus, finish architect Juhani Pallasmaa (2015) states that architecture's role is to force the slowness of time onto those who interact with the architecture. Time is slowed when time is experienced. In the case of architectural aesthetics, a method to capture time is through aesthetic deterioration. Aesthetic deterioration is the visual decay of a building, surface, or visible space. In the construction process, the final stage of construction is usually the application of the finishes and with this completion of the construction process, the life of the building and its inhabitants starts, but so does the process of its death and deterioration. If the passage of time is expressed through aesthetic deterioration (decay), and we inhabit that space, then ultimately, we inhabit both our own time, and the building's time.

"Finishing ends construction, weathering constructs finishes" Mohsen Mostafavi

The technical aspects of decay and regeneration

As previously mentioned, we attempt to conquer time by designing "permanent" structures. If the death of a structure is not an option, then one does not need to design for the death of it. Weathering is the systematic "destruction" of an object or building over time as a product of natural forces and time acting on it. I will use weathering as a medium to further investigate the concept of decay. Mathematically, weathering can be seen as the subtraction or addition of matter or mass of an object's original state, or the addition of external matter onto an object's original state (Mostafavi, 1993).

Subtraction

I frame subtraction as the physical removal of a building's surface, revealing the layer below. This is the result of continuous natural forces over time. A building does not exist in a vacuum where these forces cannot be neglectable. This places it in direct relation with time and nature, where the impacts can be made tangible through weather marks causing subtraction. A present form is produced from the building's past. Layers of matter begin to be removed, allowing a new portion of the building to be in direct contact with time. This concrete piece, found at a metal scrap yard adjacent to the Cape Town Harbor, shows its interaction with time and nature.

Subtraction can aid regeneration. This is present in the relationship between plants and metals. For example, Ferric oxide is a very important chemical that is present in soil. This product is formed when iron undergoes an oxidation process (rust). Ferric oxide is beneficial



Fig. 20. Documenting weathered concrete found near the harbor

to plant life since the iron it releases is absorbed by the soil and vegetation which assists the plants in circulating oxygen throughout the system (Baley, 2021).

Addition

In addition to subtraction, addition is the building up or layering of new material on a surface over time. It is seen as a form of decay in gathering residual matter that does not form part of the intended desired surface. An example of such an addition is the patina created on metals such as copper and bronze. Patina is a layer that is formed on the surface of copper that is produced by oxidation. I am aware that a patina is at times desired, but not in the context of the White Body.

I posit that a patina indicates nature's rightful claim over it. The addition is not only the layer-up of matter, but I argue that addition can be the layer up of new life. The subtracted concrete piece creates an opportunity for the addition of new life within it. Ironically, both addition and subtraction add unique character to the material, bringing it to life and in conversation with time. Therefore, I argue that both states could add value. Zach Fein (2011) explains that by understanding decay and regeneration, a new perspective can be formed which therefore leads to a new architectural understanding and approach.



Fig. 21. Patina and rust of salvaged metal piece



Fig. 22. Patina and rust of salvaged metal piece 2



Fig. 23. Patina and rust of salvaged metal piece 3

Proposing a new architectural approach through understanding the ecological and social impacts of the mines.

It is evident that a new approach towards regeneration is needed. By changing the perspective towards decay from the Western attitude to the Japanese philosophy opens new possible paths towards the regeneration of the broken. Decay and regeneration are as previously discussed not separate, but rather act in a constant state of flux. Therefore, I enter the design development portion intending to create an architectural response situated within a damaged sacred landscape. This portion analyses the destruction of the mining operations within the West Coast, I believe that through understanding the larger context, it allows for a holistic understanding of the more significant consequences. Uncovering current and future approved mining sites allowed for the discovery and investigation of the most crucial portion within the planned damage, where I would ultimately situate the architectural prosthetic.

Fig. 24. The decay of the shoreline due to mining

UNDERSTANDING CONTEXT

Coastal mining along South Africa’s West Coast is rapidly expanding. However, mining companies and political representatives have always said that the mining operations would never move south of the Olifant river’s mouth (Fig.25). North of the mouth is primarily uninhabited natural landscapes that many people rarely visit due to the lack of infrastructure. The most infrastructure on the West Coast is small fishing communities that live off the ocean, agriculture, and livestock.

Data gathered and compiled by the Department of Environmental Geographical Science from the University of Cape Town in January 2022 (Fig.26) indicates that prospecting and mining rights south of the mouth were granted by the Department of Minerals and Energy (DMRE) with minimal intention to allow for a collaborative decision to be made through meeting with representatives from the communities that will be impacted.

Critical biodiverse areas such as agricultural land, pristine beaches, fishing areas for small-scale and commercial-scale fisheries, and areas of cultural and historical importance. The ecological and social damage done asks for more than just rehabilitation. I combined drone footage captured by

a Non-Profit Organization called “Protect the West Coast” to show the scale of destruction. They are attempting to raise mass awareness towards the insidious nature of the complete planned destruction of the West Coast.



<https://vimeo.com/745169463>

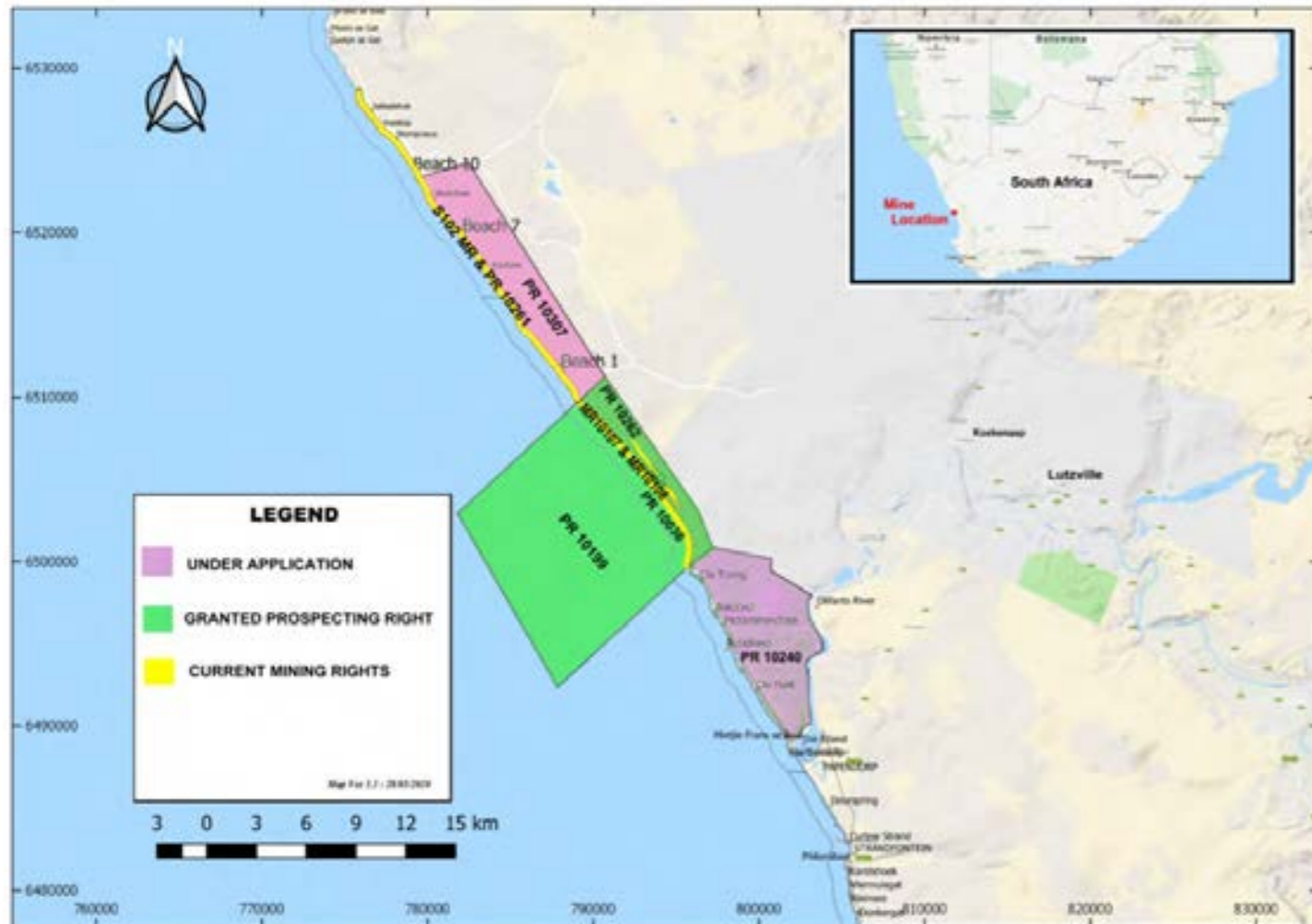


Fig. 25. Initial map of approved mining and prospecting rights

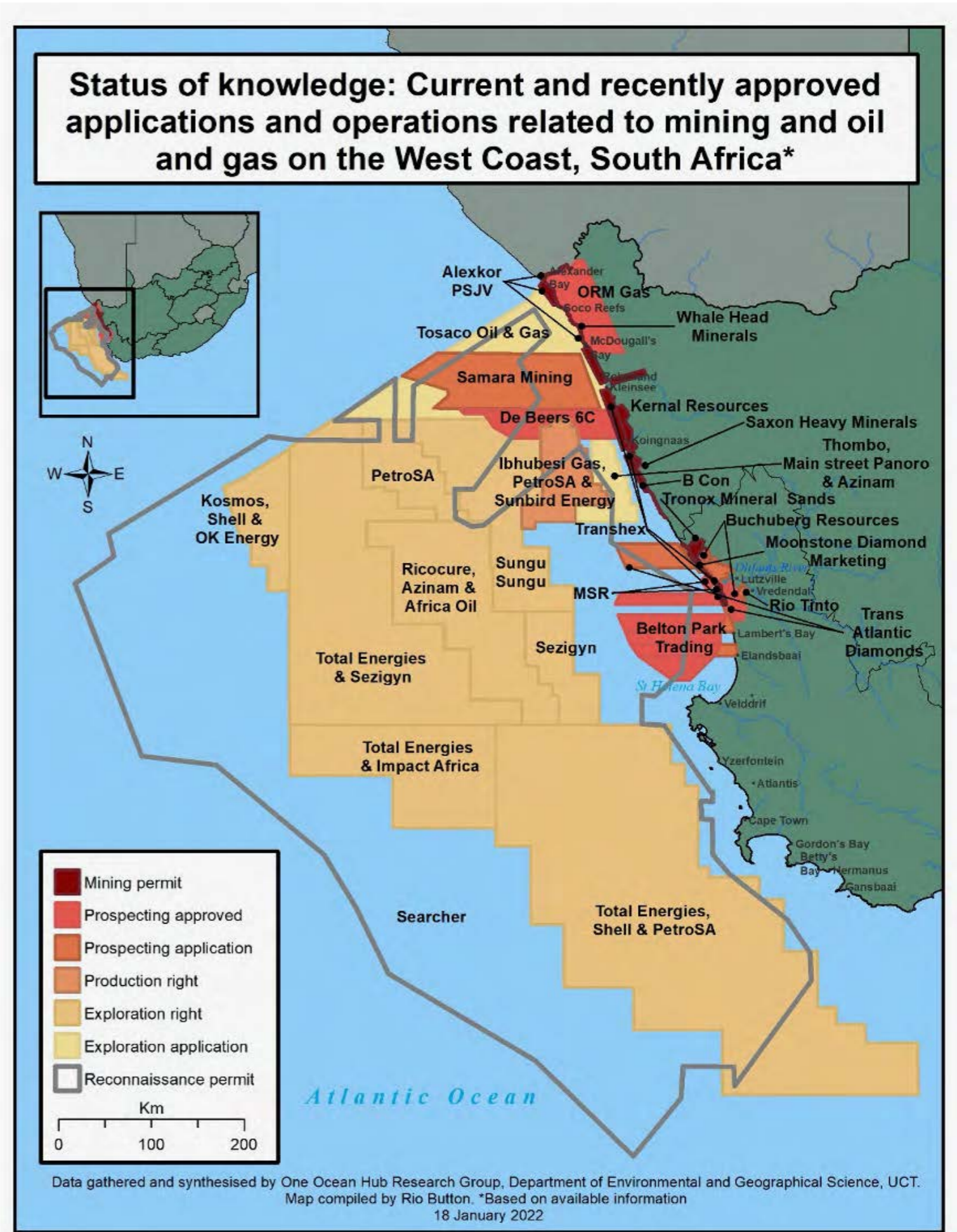


Fig. 26. Current and recently approved mining and prospecting rights

CURRENT INDUSTRIES ALONG THE WEST COAST

After further investigating (Fig.29) I separated and categorized each current and future operating industry along the West Coast. I discovered that the majority of the most impactful damage dealt within the West Coast was the result of Heavy minerals and sand mining (indicated in red). It also became clear that the majority of these operations are located north of the mouth (shown in the red circle).



Fig. 27. Mining machinery on mining site



Fig. 28. Excavating beach sand

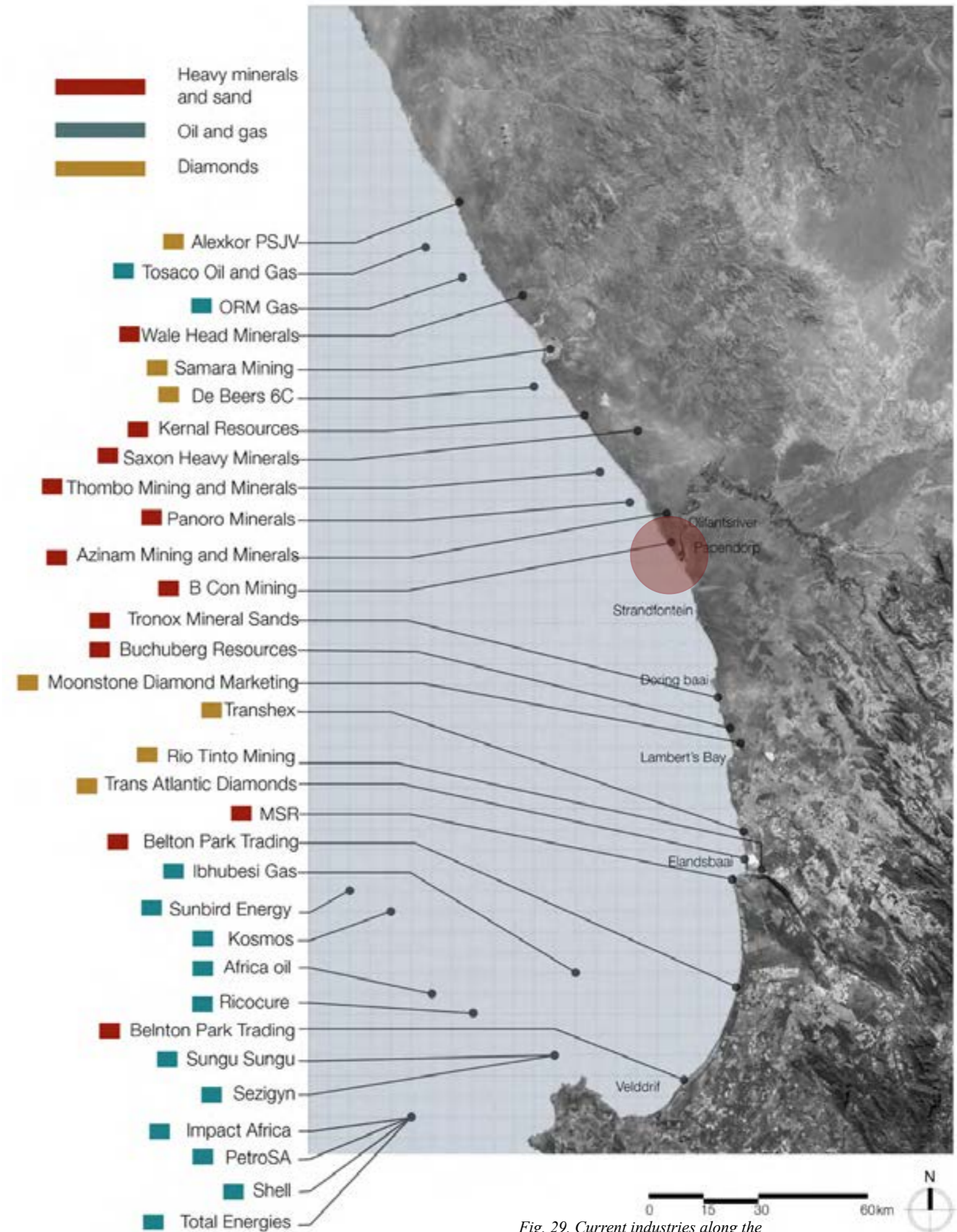


Fig. 29. Current industries along the West Coast

SCALE OF CURRENT AND FUTURE DAMAGE

Through mapping the degree of damage of heavy mineral and sand mines at different scales over a five (5) to ten (10) year period of the current and future damage, I aimed to uncover the possible severity of the damage south of the Olifants river. Stretching from Papendorp, a small community living next to the mouth, down towards more significant settlements such as Strandfontein, Lambert's Bay and Velddrif.

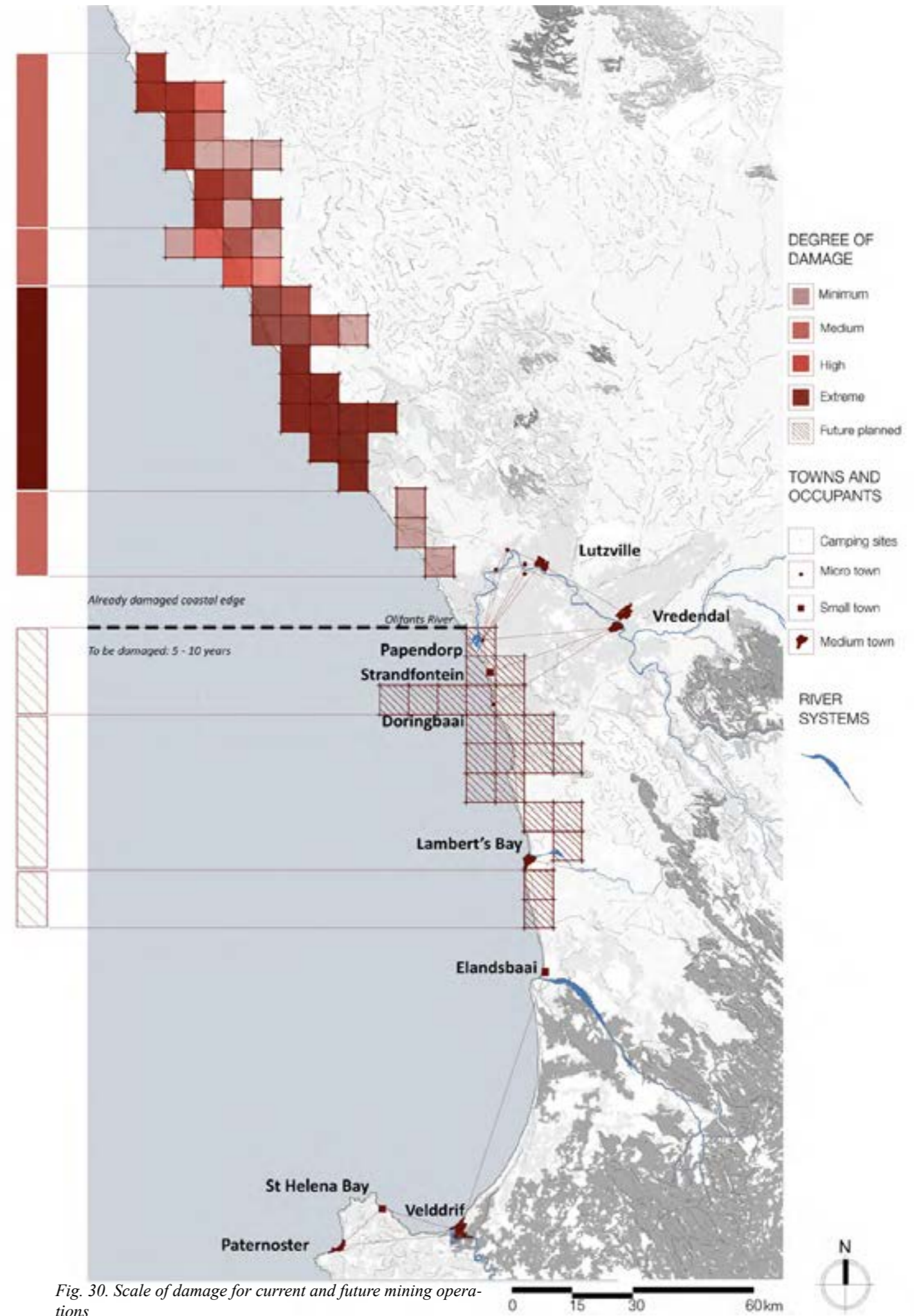


Fig. 30. Scale of damage for current and future mining operations

THE OLIFANT RIVER ESTUARY

The mouth of the Olifants river is what currently separates the mined-up landscape (north) and the pristine untouched landscape (South). It splits these two landscapes where the river's freshwater meets the Mid-Atlantic saltwater, therefore, creating an active estuary system.

This Estuary is one of only three (3) permanent open estuaries located on the West Coast. It is also the third most important in terms of conservation importance within South Africa (Adam, Bornman and Bate, 2008). The dominant vegetation which covers 85% of the total vegetation of the Estuary is salt marsh. In an article released by Nelson Mandela University (2008) it was noted that the scale of this large inter-tidal salt marsh of the Olifants River is extremely rare due to only 18% of all inter-tidal salt marshes being permanently open. The article further discusses how the Olifants Estuary is also the largest super-tidal/floodplain in South Africa.

In certain parts of the flood plain sensitive vegetation called Strandveld is present, with a diverse range of terrestrial species. This is quite rare since the soil had a much higher salinity content, making it more difficult to grow vegetation (Bornman et al., 2004). It is an incredibly sensitive and biodiverse natural ecosystem where the balance of all systems across multiple scales is required for the efficient and balanced ecosystem to continue. Global warming, and especially the rising sea levels pose a big natural risk to this sensitive landscape. Residents of Papendorp use the Salt Pan to traditionally hand-harvest salt. This will be explored later in the report when discussing the societal risks and damage.

With the mining industries planning on mining the shoreline, it currently poses the biggest human threat, and arguably the biggest overall threat to the sensitive Olifant River Estuary system. The beach sits between the Salt Pan within the Estuary and the Mid-Atlantic Ocean.

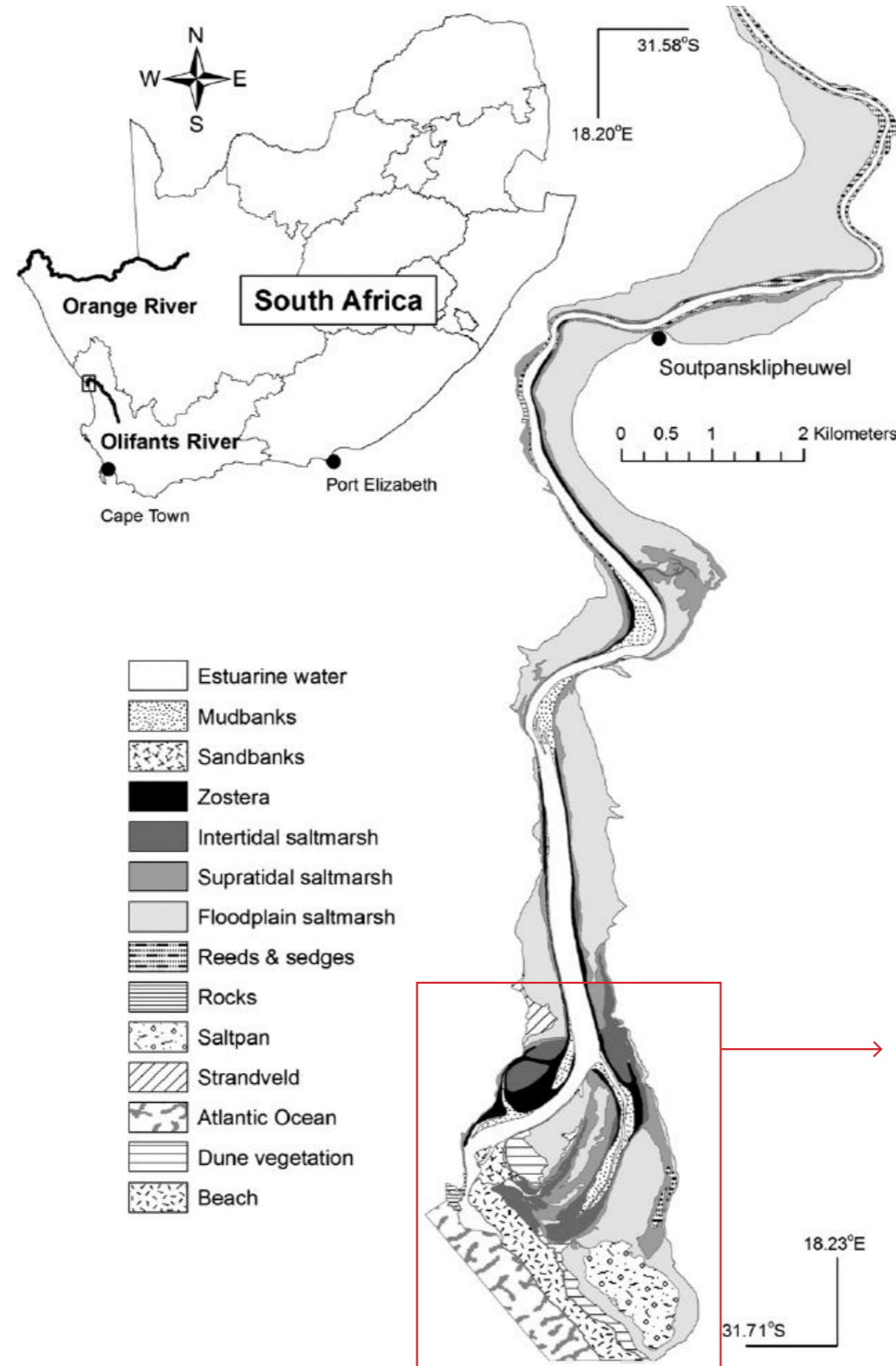


Fig. 31. Contextual diagram of the Olifants Estuary

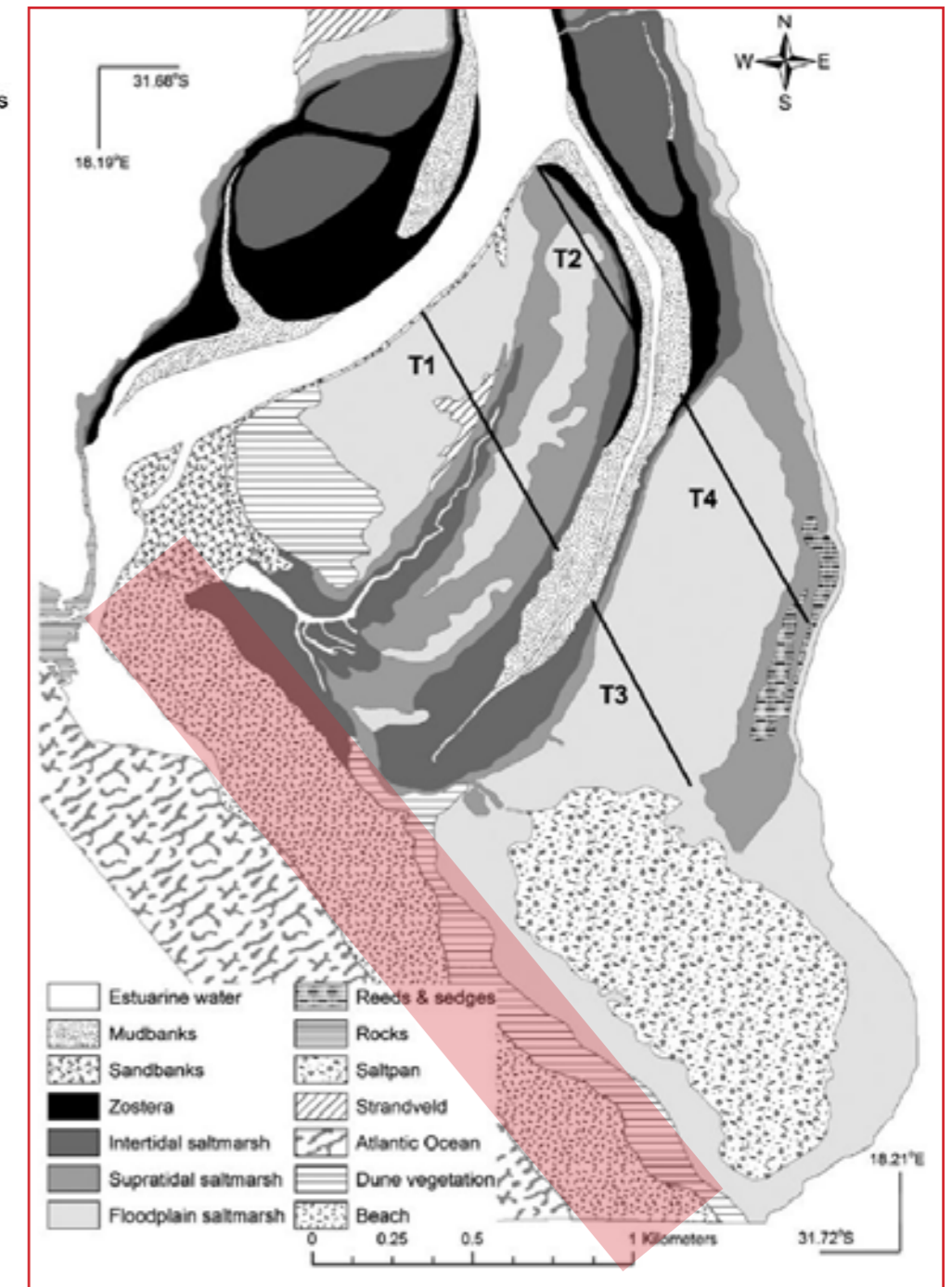


Fig. 32. Contextual diagram of the Estuary at the mouth

The planned shoreline which is to be mined separating the Olifants Estuary and the Mid-Atlantic Ocean

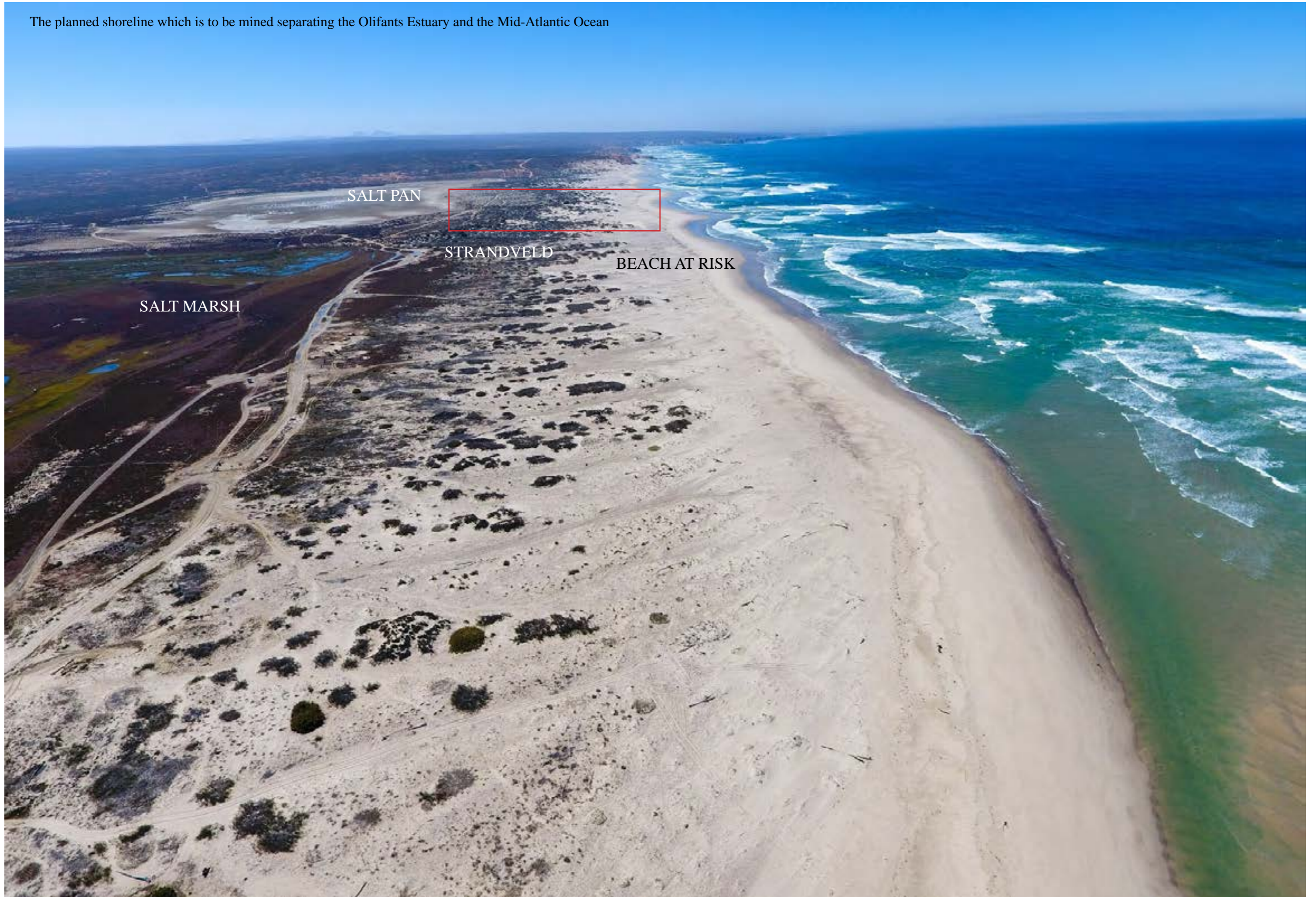


Fig. 33. Scale of damage for current and future mining operations

THE POSITIONING OF THE PROJECT

With the mining and prospecting rights already approved alongside and South of the Estuary. I view the damage of these mining operations as an inevitable occurrence. Hence, I situate this project in the context where the heavy minerals and sand mining companies have already mined up the nearby southern portion of the Estuary. In other words, this project is placed in the timeline where the damage has already been done, meaning in the space where mining operations have already been executed and completed. This results in the state of the area to be where the damage has already been done to the immediate surroundings, and the mining operations have packed up and left the site in an unstable and damaged condition. This analyzed decision is made in line with my previously discussed theoretical interest in regenerating and elevating a broken landscape through architecture.

To understand the damage to be caused on the South of the mouth, the decision is made to first analyze the damage caused by the MSR Tormin mine north of the mouth before, during, and after operations. I believe that such an analysis allows me to simulate well-informed, educated scenario.

1) UNTOUCHED LANDSCAPE 2006

The first satellite image (Fig. 34.) Accompanied by the diagram (Fig. 35.) shows the untouched landscape recorded back in 2006 just before mining operations took place.

2) COLLAPSED COASTAL CLIFF 2008

The second satellite image (Fig. 36.) with its relevant diagram (Fig. 37.) was taken in 2008 indicates the initial collapse of a portion of the coastal cliffs. This is due to increased vibrations, disruptions, and displacement from the mining operations. These vibrations jeopardized the stability of the cliffs.

3) THE 800m CLIFF COLLAPSE OF 2019

Lastly, the most recent satellite image (Fig. 38.) and its relevant diagram (Fig. 39.) shows the total collapse of an 800m coastal cliff, resulting in roughly 192 000m³ (cubic meters), or 300 tons of displaced Earth. This calculation was done using the conversion of 1m³ (cubic meter) of beach sand = 1.5kg of beach sand.

The result is an unstable, damaged landscape where the equilibrium between the ocean and beach, beach and dune, and dune and strandveld vegetation is destroyed.

UNTOUCHED LANDSCAPE 2006

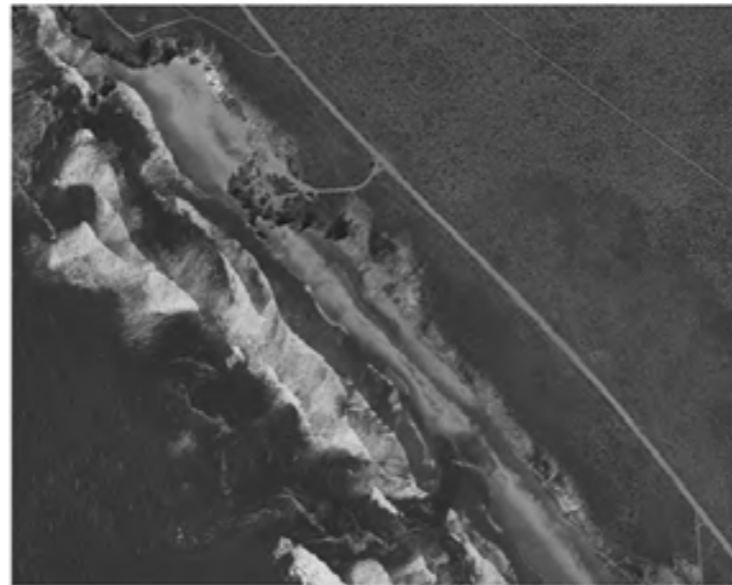


Fig. 34. Untouched landscape

COLLAPSED COASTAL CLIFF 2008

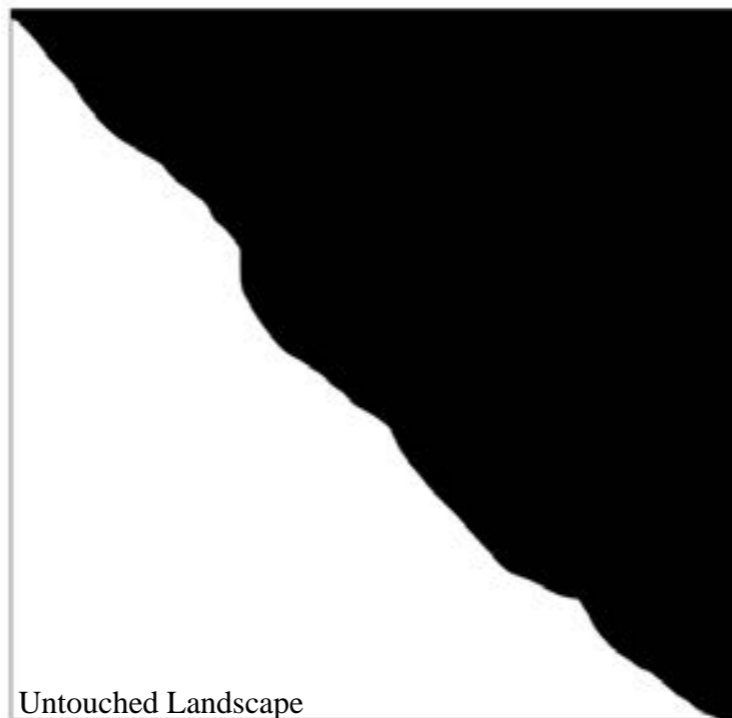


Fig. 36. Collapsed cliff

THE 800m CLIFF COLLAPSE OF 2019

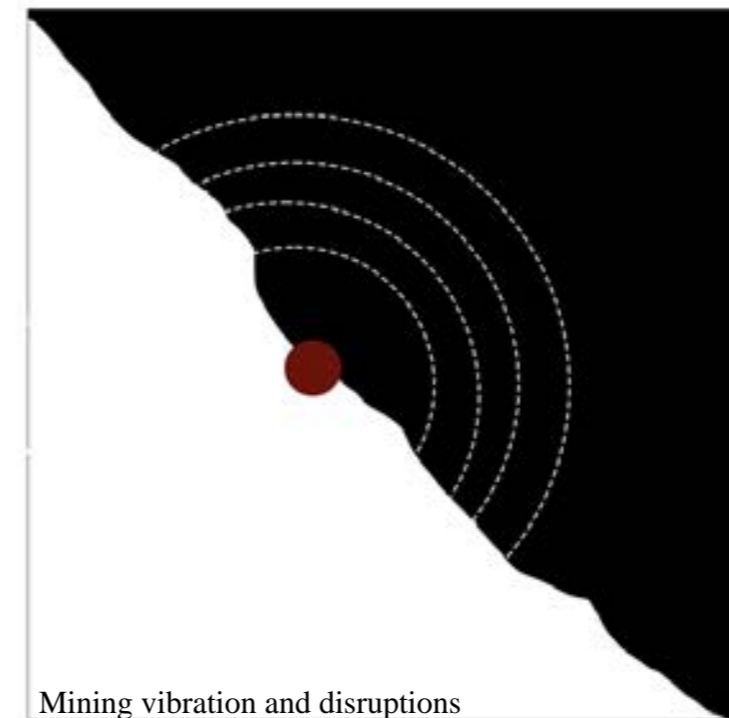


Fig. 38. 800m Collapse



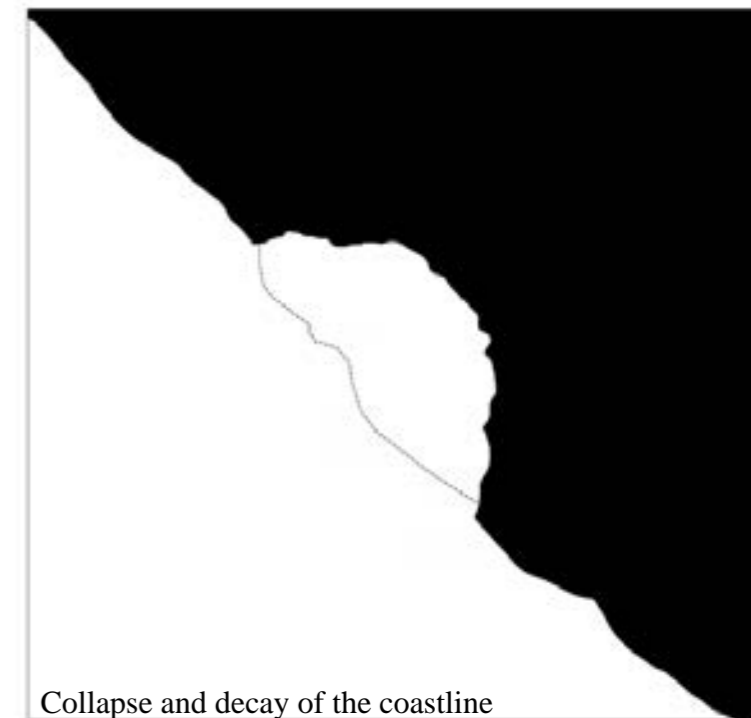
Untouched Landscape

Fig. 35.



Mining vibration and disruptions

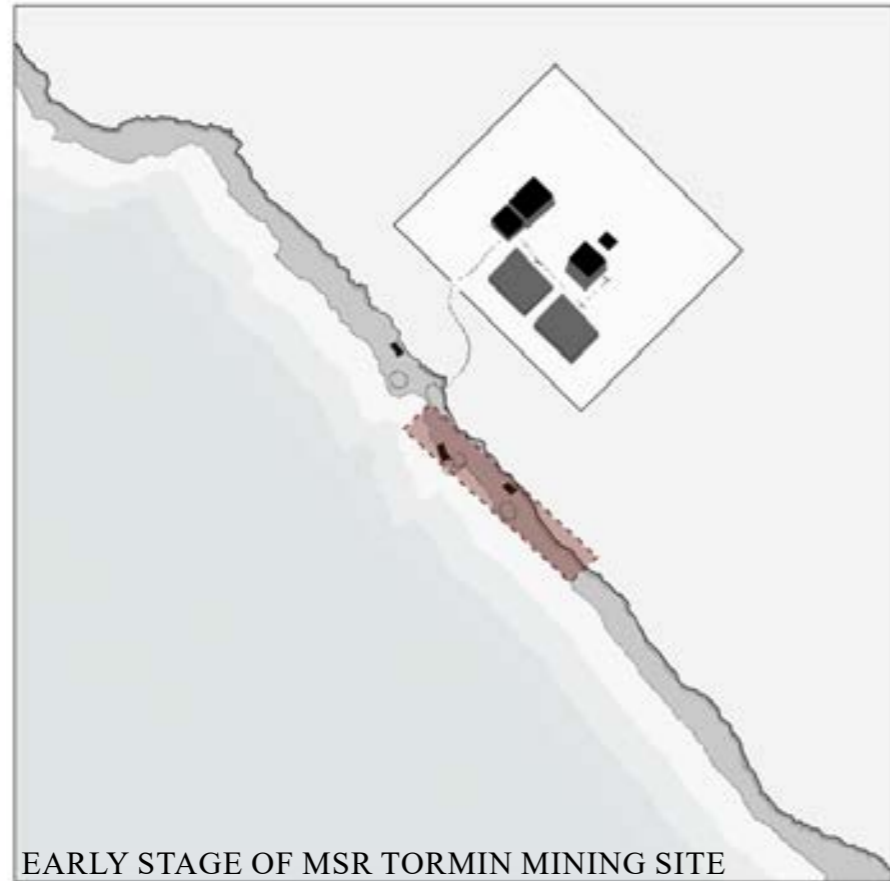
Fig. 37.



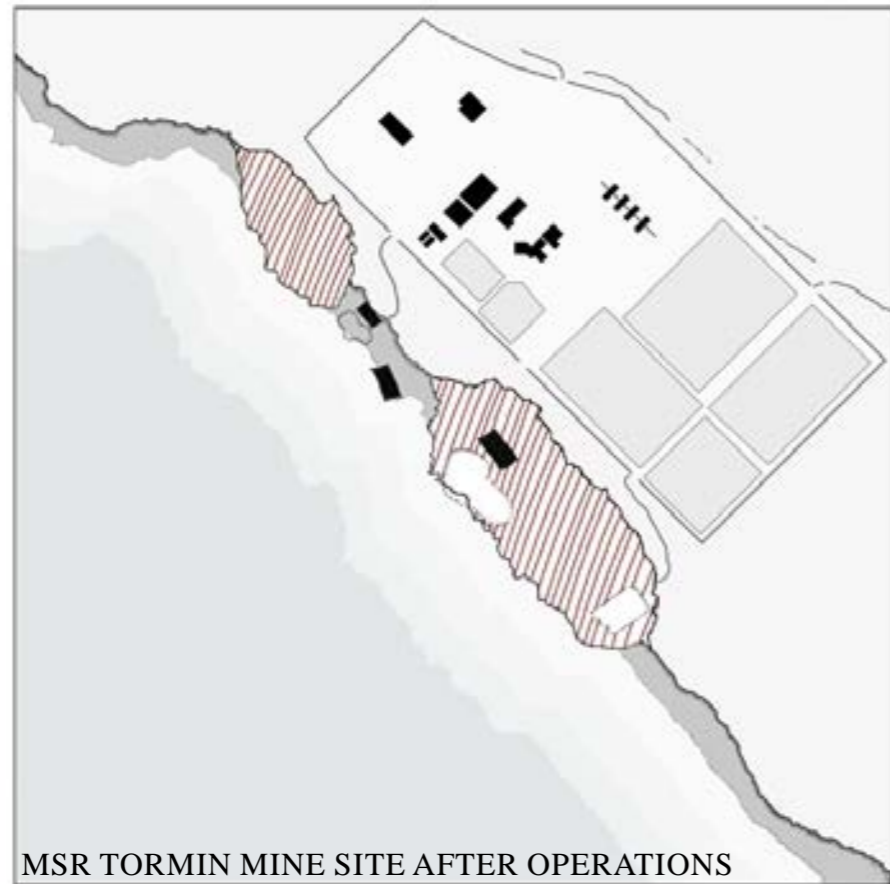
Collapse and decay of the coastline

Fig. 39.

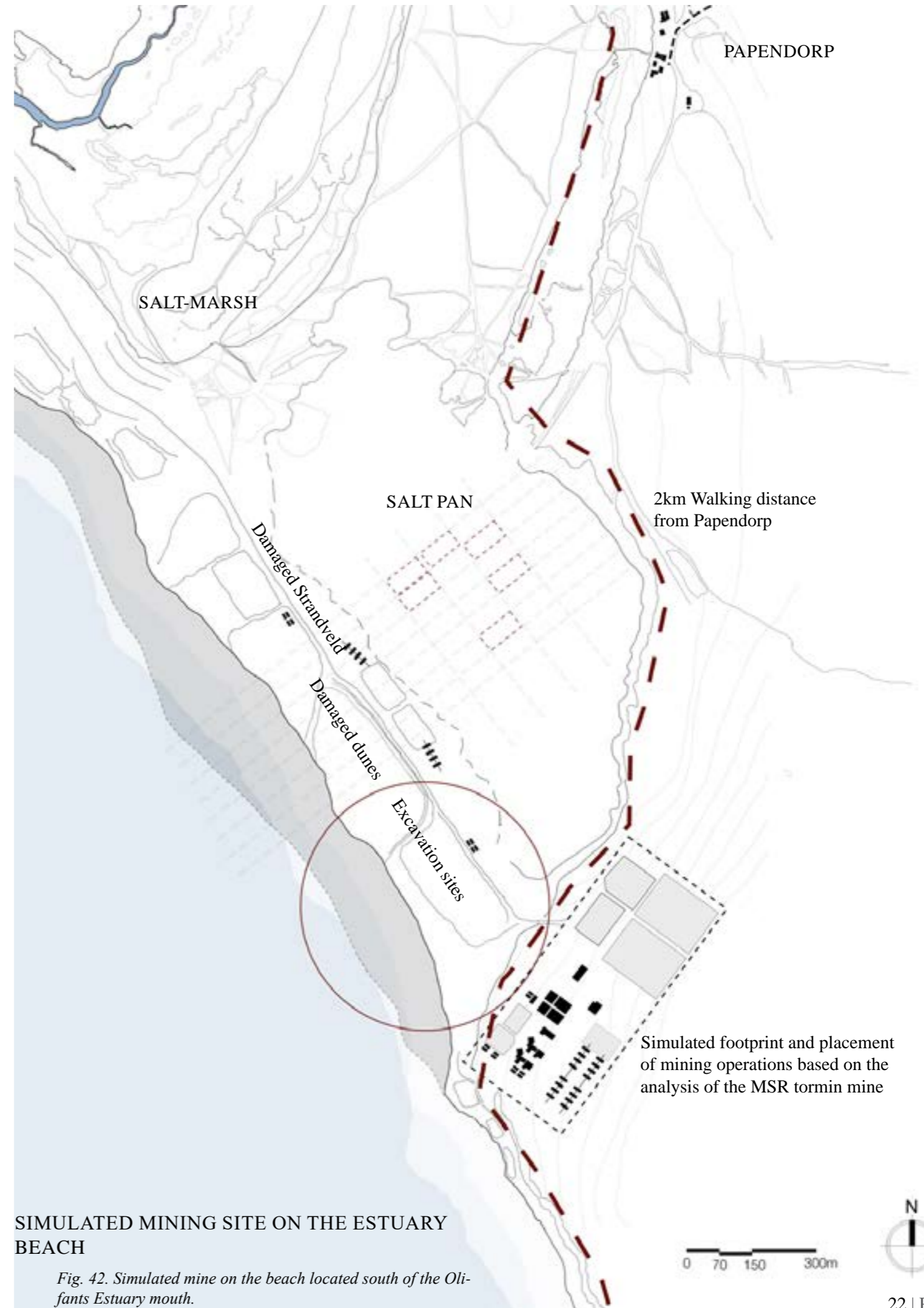
SIMULATING POTENTIAL DAMAGE BASED ON ANALYSIS.



EARLY STAGE OF MSR TORMIN MINING SITE
 Fig. 40. MSR Tormin initial mining zone



MSR TORMIN MINE SITE AFTER OPERATIONS
 Fig. 41. MSR Tormin destruction of the coastline and sea cliff.



SIMULATED MINING SITE ON THE ESTUARY BEACH
 Fig. 42. Simulated mine on the beach located south of the Olifants Estuary mouth.

SITE SELECTION

After investigating the MSR Tormin mine and placing the project in a position where the damage has already been done, I identified what I call the pinch point. The pinch point is the most crucial portion where the mining industry will have the biggest ecological, social and economic impact and destruction. After investigating the Estuary, it is also evident that the pinch point is located where the Salt Pan and the Mid-Atlantic Ocean is the nearest to each other.

Therefore, the destruction of the pinch point will lead to the complete collapse of the sensitive balance of the Salt Pan. The pinch point is located 2km from the small settlement of Papendorp, which overlooks the Olifants Estuary and approximately 6km from a bigger settlement of Strandfontein.

From the pinch point, the beach (A) will be completely mined and destroyed. The pinch point is situated in such a position where smaller mining operations could pop up along the coast (B).

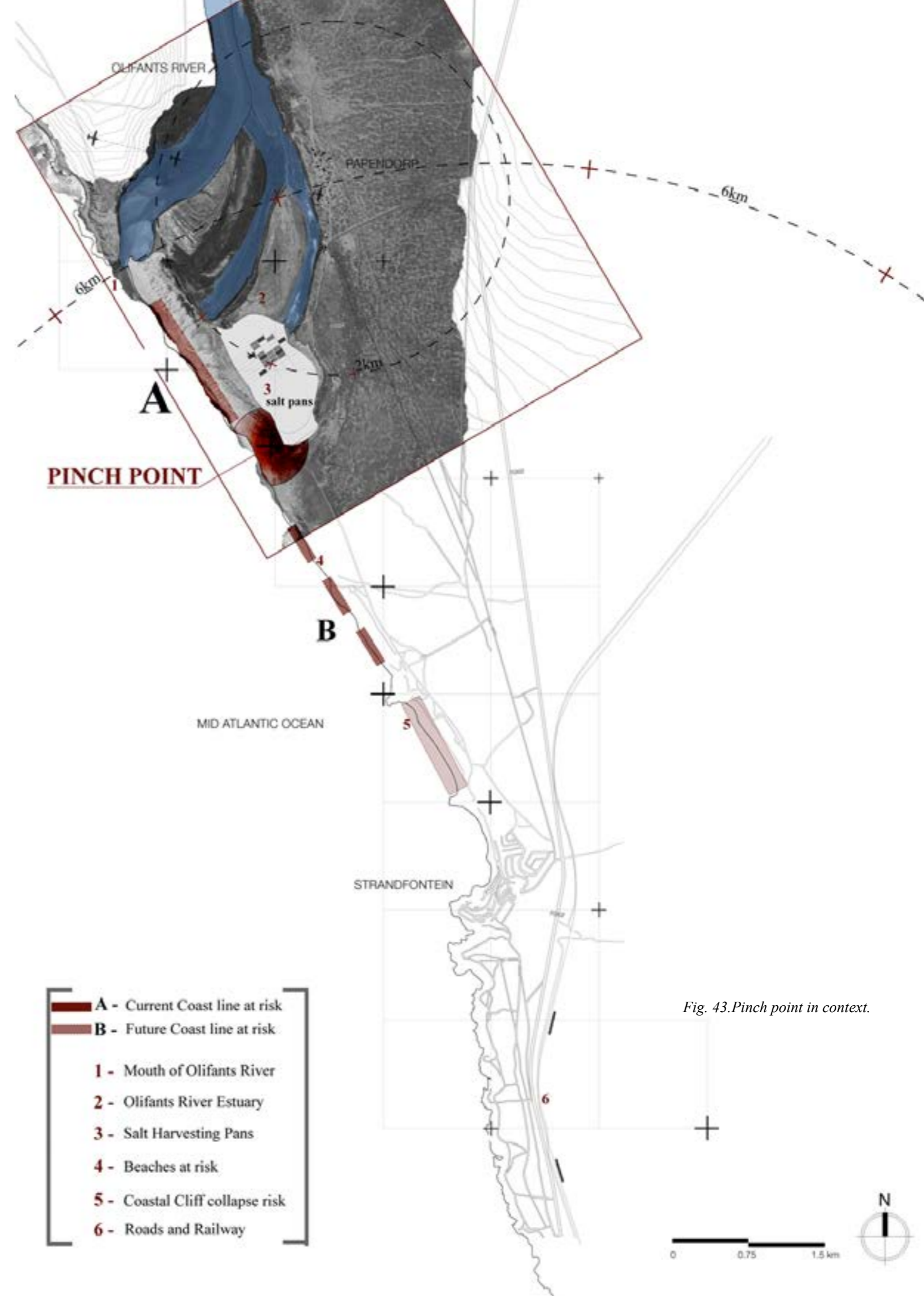
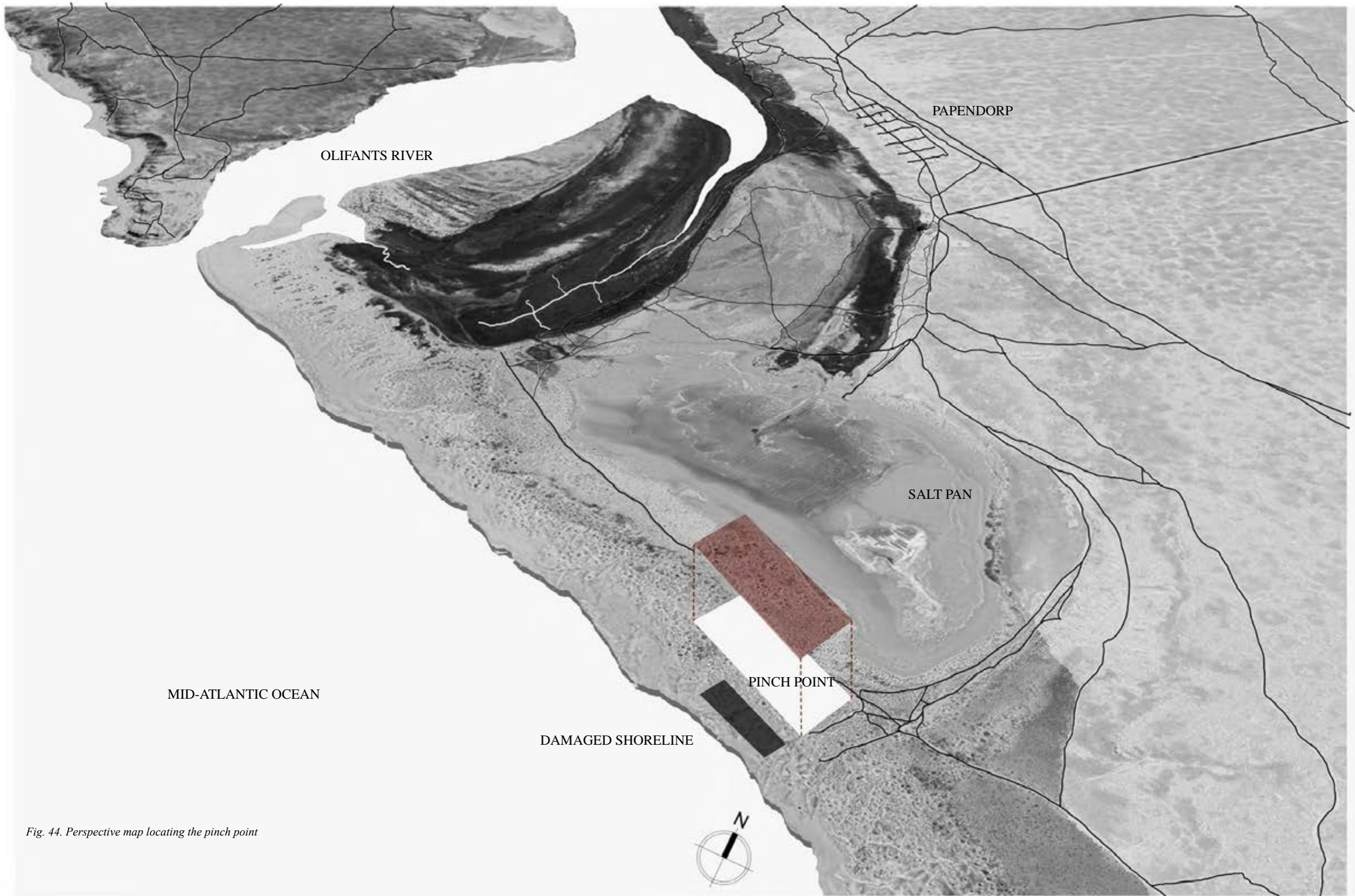


Fig. 43. Pinch point in context.



OLIFANTS RIVER

PAPENDORP

SALT PAN

MID-ATLANTIC OCEAN

PINCH POINT

DAMAGED SHORELINE

Fig. 44. Perspective map locating the pinch point

MINING OPERATIONS

After analyzing how the MSR Tormin mine is operated, I simulated the operation process on the southern portion of the Estuary. The base of operations would be of a similar scale, and the placement of base is situated just south of the Salt Pan, this is to allow for easy mining vehicles and equipment to access the beach. To understand and attempt regeneration, one must first know what is lost. I categorize the impacts the mine would bring South of the mouth into three categories:

- 1. Ecological damage focuses on the destruction of the ecology and natural landscapes.
- 2. The societal damage the mining operation would bring to the small communities affected by the operation.
- 3. The economic impacts the mining operations would bring.

Beaches:

The natural profile of the beach is destroyed due to the digging up and displacement of the beach sand. In addition, the operation's vibrations will destabilize natural dunes (1), which will drastically shift the regulation of the ocean's tide.

Vegetation:

With the profile of the beach destroyed and collapsed dune. It will directly impact the vegetation. The strandveld situated at the edge of the dune will therefore be destroyed. This first layer of strandveld acts as a filter by protecting the more sensitive vegetation from harsh wind conditions and alkaline sea mist. However, this means that the more sensitive strandveld will be exposed to the full force of the wind and sea mist, risking the complete collapse of the sensitive strandveld region.

Salt pan:

The salt pan is protected from the high tides of the ocean (B) by the dunes and vegetation. With flattened dunes and damaged vegetation belt, it will therefore result in the potential risk that with the steady rise of the sea level, approximately 0.51cm per year as per calculation (Lindsey, 2022) that the salt pan is highly at risk of flooding. If the salt pan floods, then the damage done will not be reversible.

Shoreline

Mining operations mine up to the beach's edge, changing how the ocean and beach meet and interact with each other. This holds a great risk to the natural equilibrium of the nearby marine life.

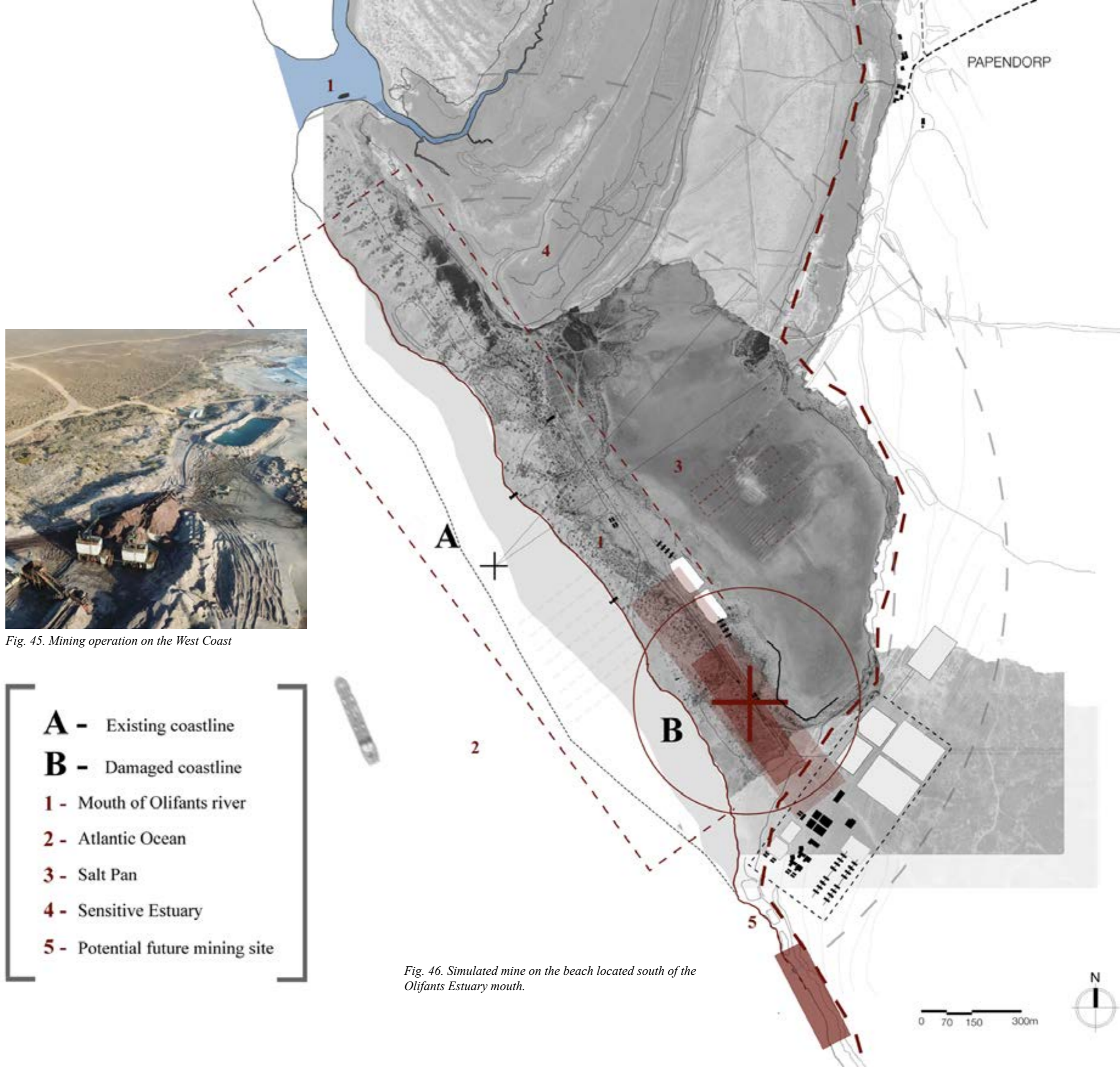


Fig. 45. Mining operation on the West Coast

Fig. 46. Simulated mine on the beach located south of the Olifants Estuary mouth.

SECTION THROUGH THE PINCH POINT

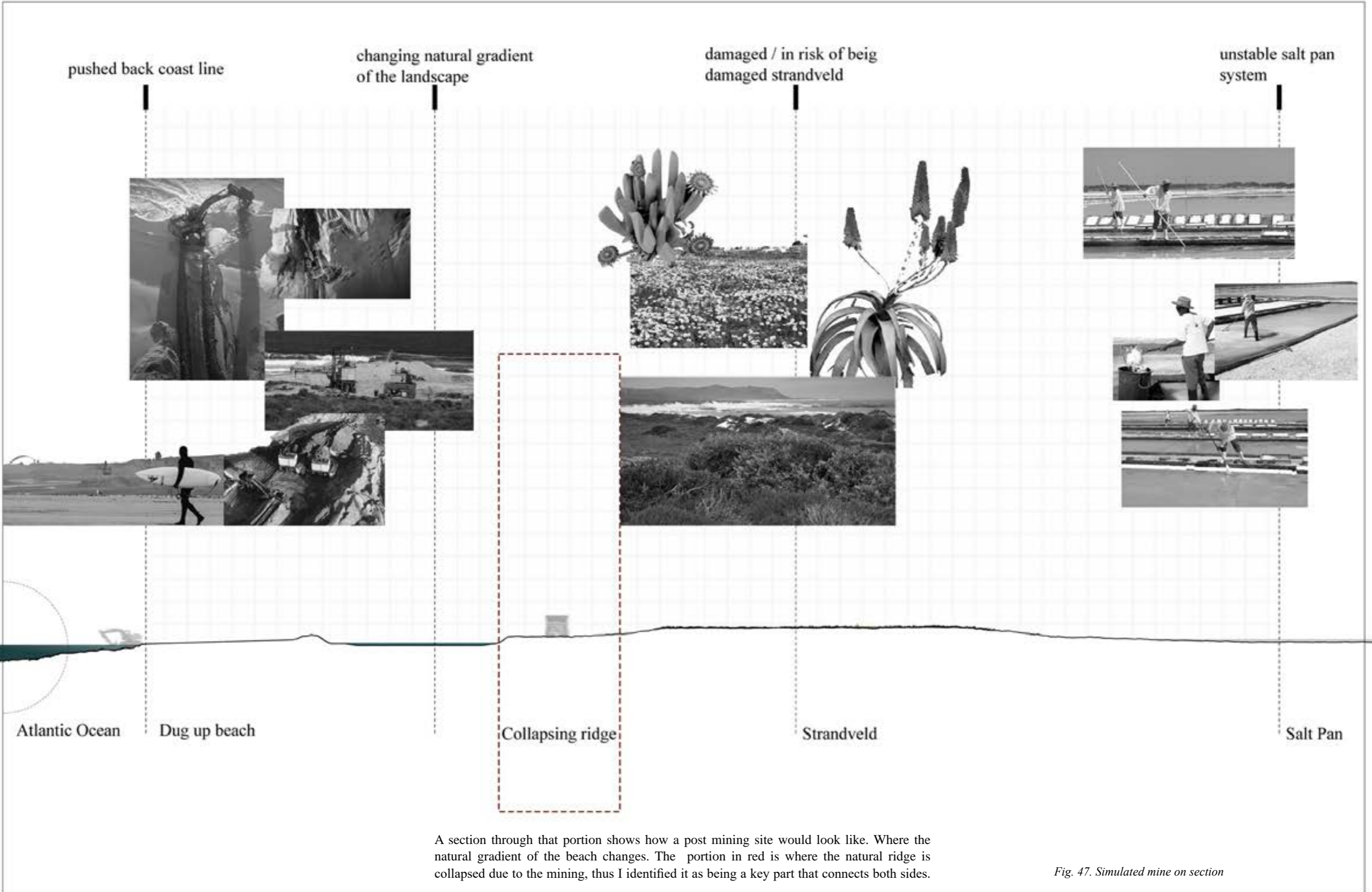


Fig. 47. Simulated mine on section

SOCIETAL AND ECONOMIC IMPACTS

The livelihoods of the small surrounding communities such as the residents of Papendorp and Strandfontein will be greatly affected since the majority of the people living in these settlements are dependent on the landscape.

Understanding the societal and economic impacts and risks will lead to more informants within the architectural design process. I aim to treat the destruction of the social and economic landscape as important as the destruction of the natural landscape.

Mining industries approach small communities with the promise that the mining companies will create multiple job opportunities for the residents, resulting in the belief that the mine will become a secure source of income. These promises give false hope to the residents that are only trying to improve their living quality. The reality of the mines are that once they are done with the operation in the location, they move to another location leaving the residents without any framework to fall back onto and leaving their ecology which they were previously dependent on in a damaged state.

The livelihoods of the residents living in Papendorp and Strandfontein are affected from the mines since most of the residents work in and around the estuary. The local fishing industry will be damaged due to the impact the mine has on the estuary. The balance of the salt pan is also disrupted, therefore damaging the passed down traditional practice of hand harvesting salt. Furthermore, this damage will have a generational impact on these small communities and risks a further loss of indigenous heritage sites.

The waves and beaches near the salt pan is a known hotspot by professional international surfers and caravanners that would travel and camp alongside the beach. Meaning that this recreational tourist activity will suffer greatly alongside the seasonal economic injection brought by tourists that come to experience the flower season in the area will be lost due to the damaged ecology.



Fig. 49. Fisherman in Papendorp



Fig. 51. Salt Pan worker harvesting salt



Fig. 48. PTWC protest on the COAST



Fig. 50. Mining operation near surfing zone

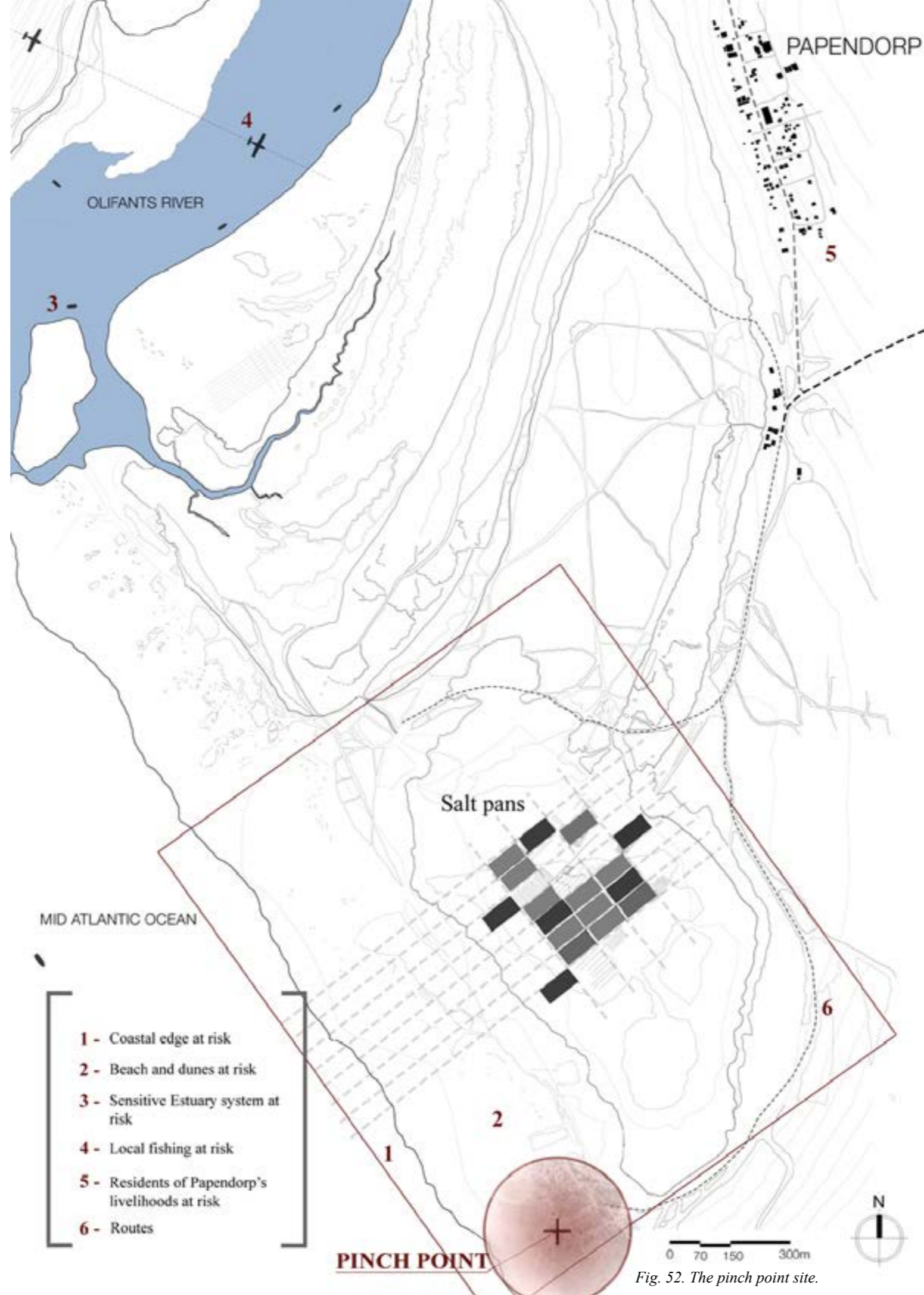


Fig. 52. The pinch point site.



Fig. 53. Community elders from Papendorp.



Fig. 54. Traditionally hand harvesting salt.



Fig. 55. Pattern on salt pan

Recreational



Many beaches along the West Coast are internationally known by professional surfers, thus making it a destination place.



International multi-day trail marathons are regularly held along the coast.

Local



Papendorp and Strandfontein has a very active fishing community. The majority of the livelihoods of the residents come from the fishing industry. This is at risk due to the mining industry which can affect the sensitive ecosystem.



Traditional hand-harvested salt plays a major role in the micro-economy of the residents of Papendorp. This is at risk due to the international mining industry.

Resistance



San tribe / first nations are still very present in the West Coast. Meetings with elders are held on a regular basis regarding the risk of mining.



Protect The West Coast is an active and big NGO dedicated to stop the approved prospect and mining along the West Coast - especially South of the Olifants River.

FINDING PROGRAMME WITHIN THE DAMAGED LANDSCAPE

Architectural intention

The architectural intention is to create an architecture that allows for the natural and social regeneration within a damaged landscape through understanding and designing specifically for decay. By not ignoring the forces of time and nature, it allows for the sacredness of the landscape to be regenerated through a symbiotic relationship between the man-made and nature, ultimately where the architectural insertion becomes part of nature rather than being a separate machine.

Programme

I categorized three core topics I'd address within the development of the architectural design:

1. The recreational would cater and re-inject tourism in the area, specifically focusing on active tourism such as surfing and multi-day running races.
2. The local, where the architecture seeks to regenerate and secure the livelihoods of those affected by the mining industry through an architectural insertion that would stabilise the salt pans system and provide temporary jobs accompanied by skills development.
3. The resistance, where the architectural insertion becomes the growth point for the communities and organizations to stand up against any future mining operations and allow the organization to test, analyze, and improve methods of regeneration and the post-programmatic life of the architecture will act as a barrier for any possible operations on site.

DESIGN PRINCIPLES

With the earlier mentioned theoretic interest of a new perspective towards regenerative architecture through decay. I have set out a series of design principles to work from. An architecture that acts as a regenerative insertion in the landscape, assisting with regenerating the surrounding ecology. Improving the livelihoods of the surrounding communities. Emphasizing the tension between man-made and nature.

Emphasizing the relationship where the architecture meets the Earth and incorporating the contrasting principles of permanence and impermanence. Next, I place the site as an open wound, and lastly, an architecture whereby the architecture itself becomes a prosthetic that would assist the regeneration.

Explorative model testing how the architecture meets the ground and exploring a skeletal structural system

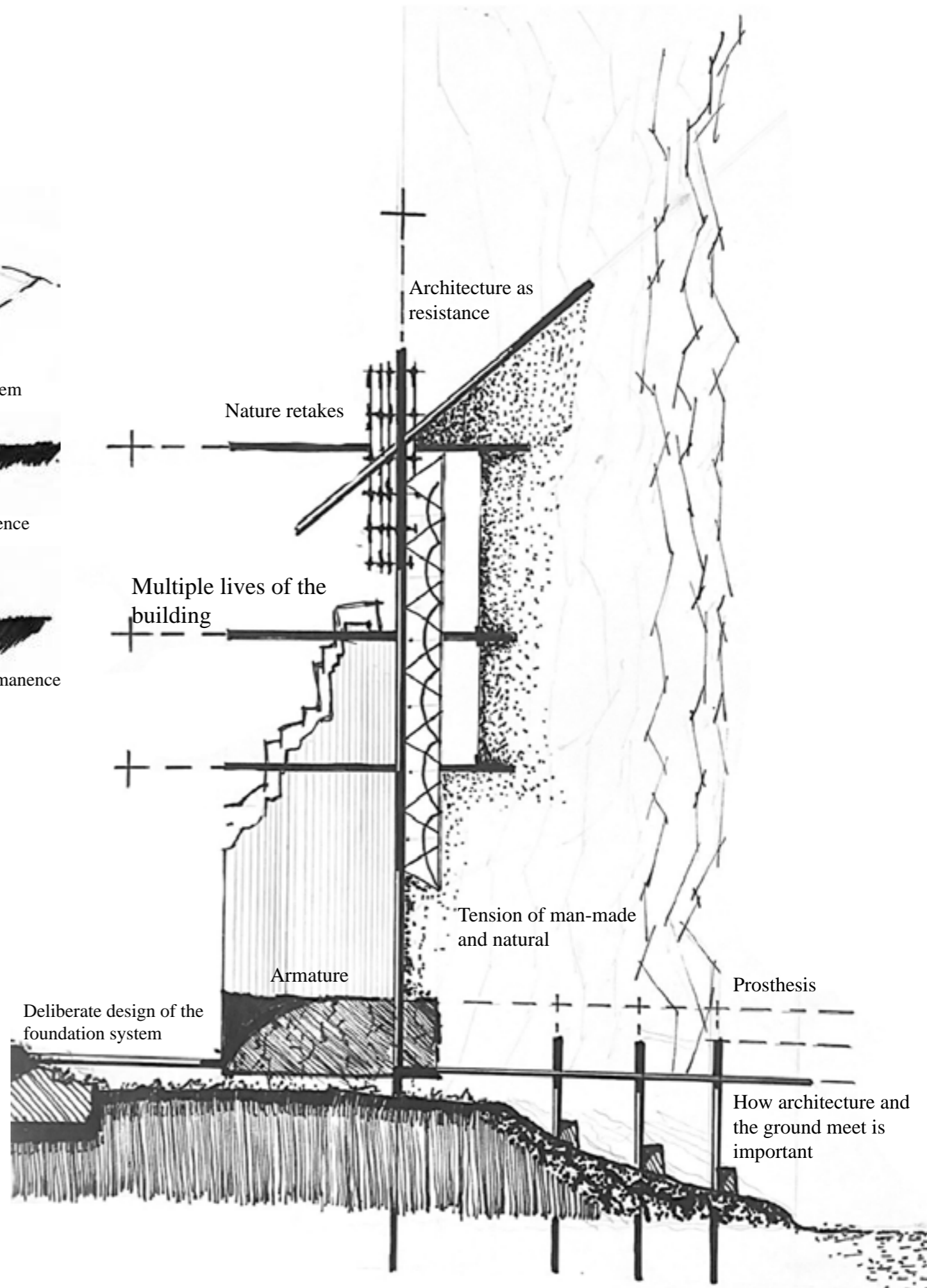
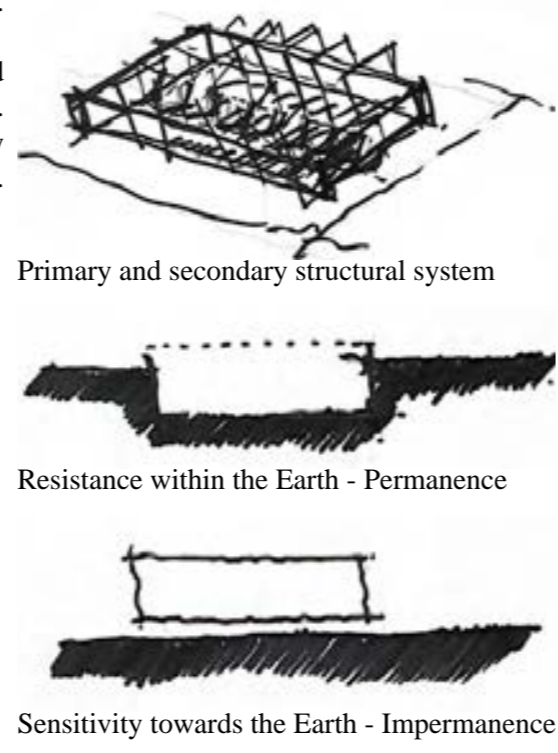


Fig. 56. Exploration model.

PROSTHETICS

As previously mentioned, an architectural prosthetic, I view the mentioned architectural prosthetic as an insertion within the landscape that would allow for natural regeneration. This investigation splits into temporary and permanent prosthetics as a conceptual tool and design drivers. Prosthetic is defined as

“An artificial body part designed to repair or replace a missing one whereby it allows that part of the body to function in a better manner than previous as a means of healing and healing (regeneration)”.

Intending to find a design tool that would relate to both permanence and impermanence, I identified two categories of prosthetics, namely temporary prosthetics and permanent prosthetics.

The Temporary Prosthetic

Researching temporary tools for the healing/regeneration of the human body led me to investigate the technology and applications of the leg splint as a temporary prosthetic. A splint is a temporary medical device used to stabilize injuries by limiting movement while providing support in the injured area, allowing the body to naturally begin the healing process. Shaping the splint to the natural curves of the human leg results in a highly sculptural yet purely functional device that becomes an extension of the body once it is applied. This is evident throughout the evolution of the leg splint, such as Charles Eames' lightweight wooden leg splint designed for World War 2 and the current state-of-the-art KAFO 3d printed brace.

Architectural application

- 1) Shaping and placement of the architecture to the natural curves of the landscapes.
- 2) Being an impermanent architectural element, which would be able to decay, or be removed through the impacts of time
- 3) The natural materiality of the Eames splint informs the possible use of natural materials such as wood to be used in the temporary architectural spaces.
- 4) Become the envelope of the architectural insertion which can be removed and repurposed or reused in another manner. Therefore, allowing the decay of the envelope to become regenerated by allowing for an exit strategy.



Fig. 57. Charles Eames's leg splint.



Fig. 58. KAFO 3D printed leg brace.

The Permanent Prosthetic

In contrast to the temporary leg splint, I investigated the technology and applications of spinal fusion as a permanent prosthetic. Spinal fusion is a serious permanent medical operation usually made from titanium surgical screws, rods and metal plates that are used to hold or replace damaged vertebrae. This procedure is only done if the vertebrae cannot function as intended, in other words, where the body is not capable of healing itself due to the severity of the damage.

Thus, it is a purely functional man-made extension that allows the host to return to a state before the damage occurs.

It was specifically designed and engineered to act as a permanent insertion within the body. As a result, the spine becomes dependent on the effectivity of the spinal fusion. Ultimately creating an intense relationship between it and the person (the man-made and natural), where the host cannot operate at all without such a prosthetic insertion.

Architectural application

1) Become the permanent insertion within the landscape. Foundations and specifically placed structural elements will allow for the protection of the environment from any exploitation.

2) Indicate a possible structural system and logic

3) Placed within the damaged landscape, therefore binding the landscape back together.

4) Materials such as steel can therefore rust and decay over time, allowing for the architecture to stay in conversation with the effects of time

THE SCAR (page 33)

Returning towards the pinch point, I simulate the destruction of the mine in the specific area. Again, breaking each phase up into three parts.

1) Existing strandveld vegetation before mine

The vegetation and natural ecology before the mining operations

2) Damaged strandveld and dune caused by the mining site

Simulating the damage onto the site. The dune that separates the beach and the vegetation strip collapses, and the vegetation is damaged.

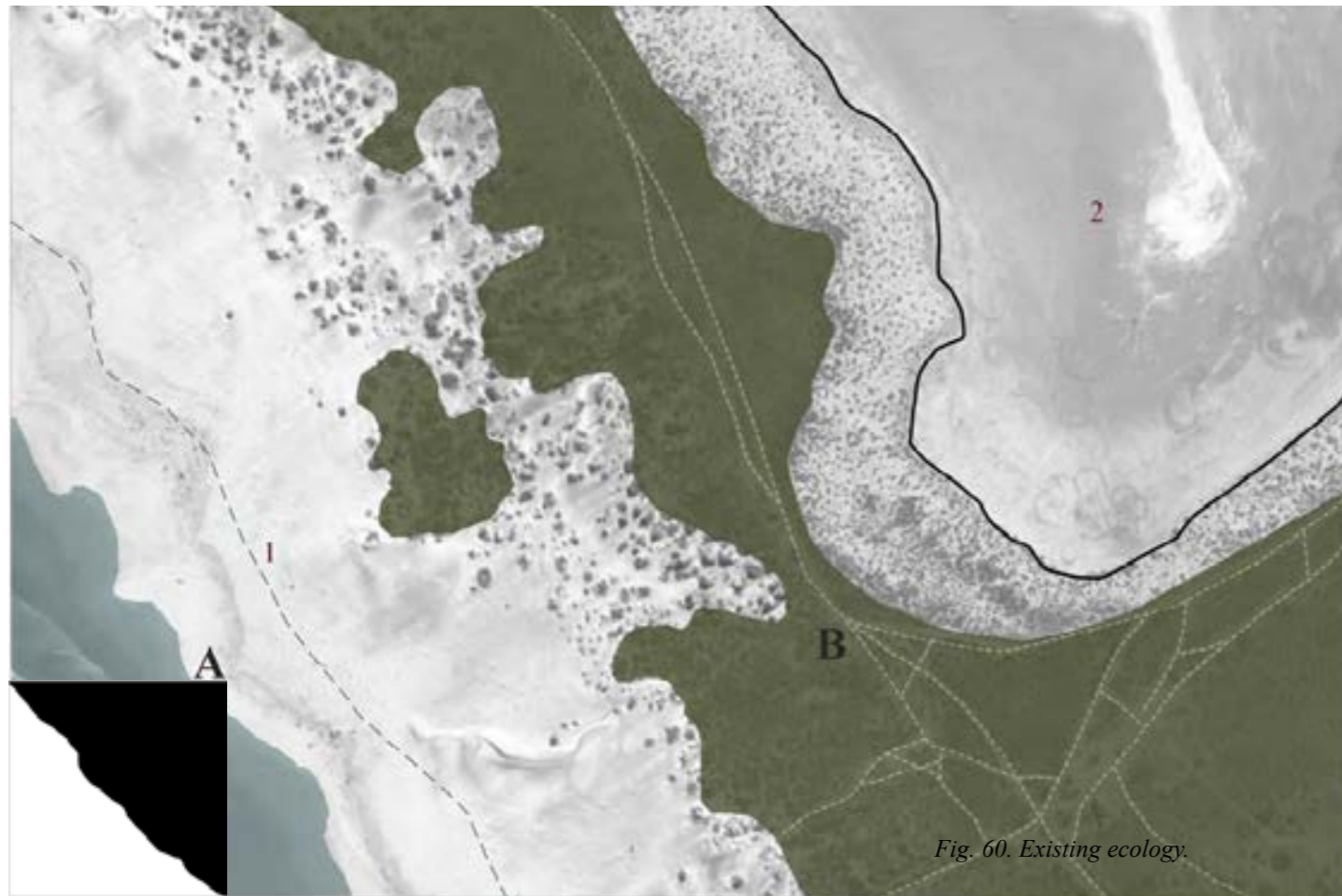
3) Worst possible outcome if no architectural insertion is made

With the simulation, I posit that this outcome is the worst possible outcome (an outcome where no intervention is made). Taking everything into account and the effects of global warming and the steady rise of sea level, all strandveld will be lost, and the disruption to the sensitive salt pan system will be completely irreversible.

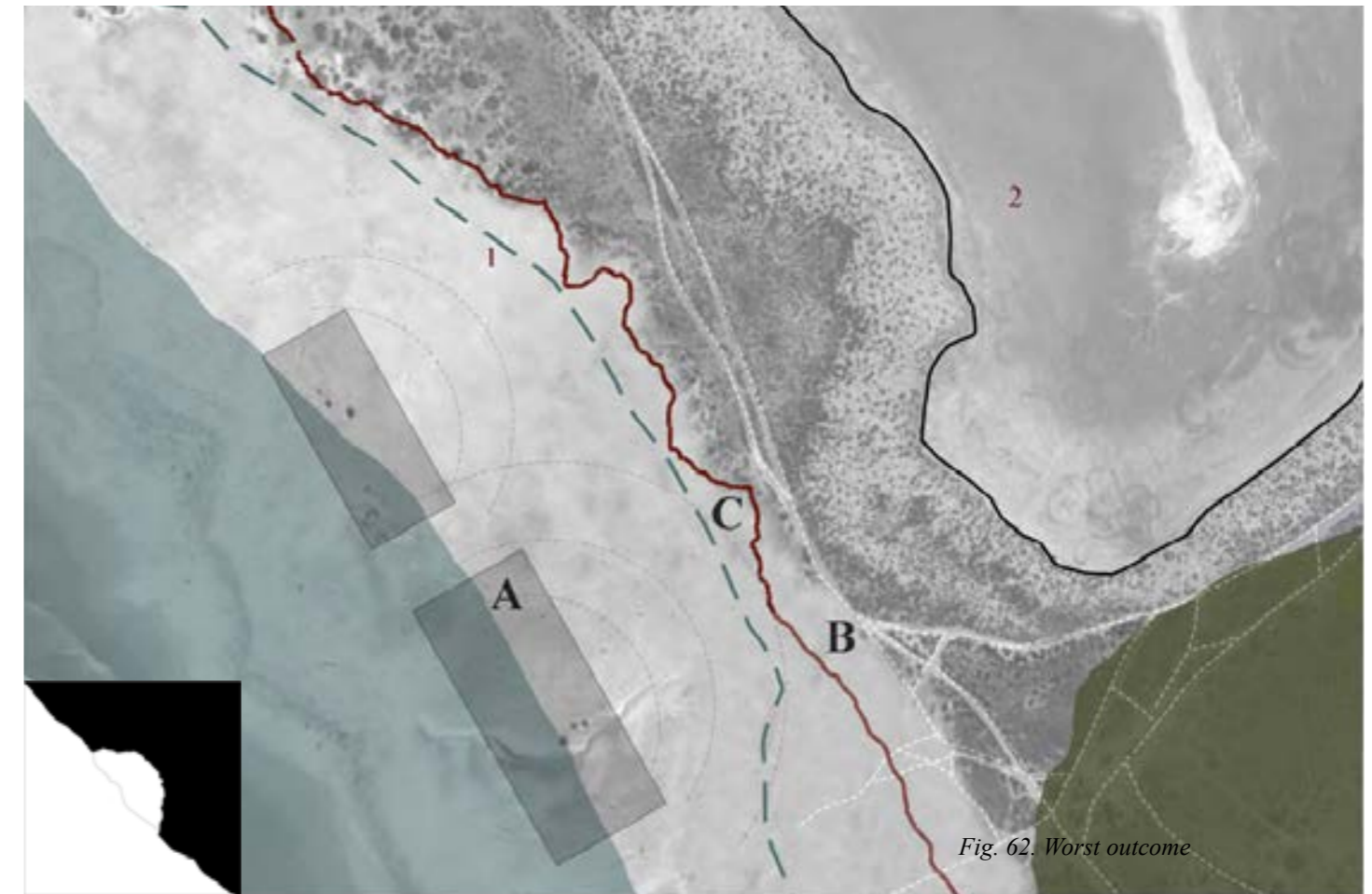


Fig. 59. Spinal neck fusion X-rays.

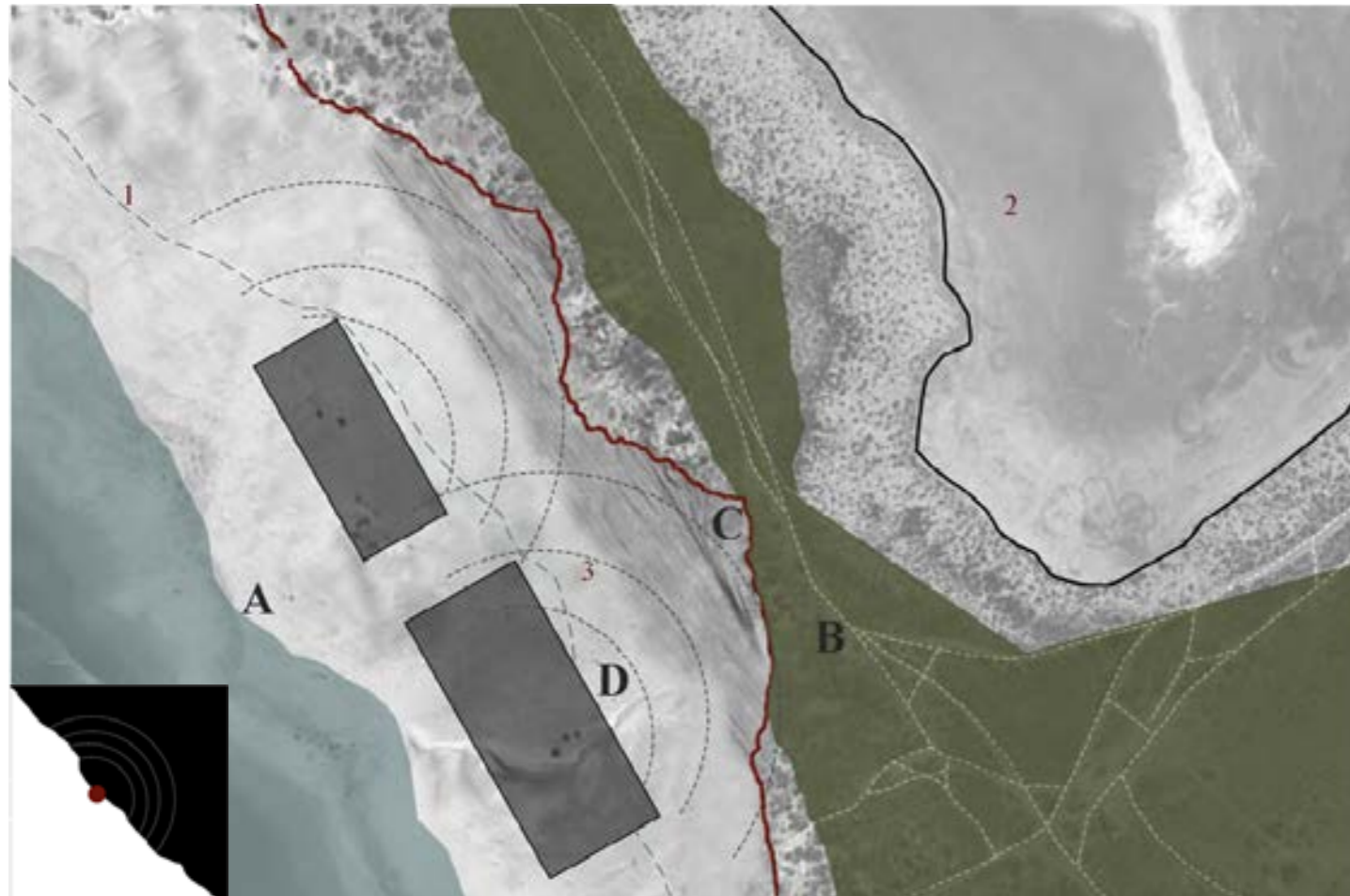
1) Existing strandveld vegetation before mine



3) Worst possible outcome if no architectural insertion is made



2) Damaged strandveld and dunes caused by the mining site



4) Destroyed natural landscape and landscape before mining operations



THE REGENERATION SPINE

To prevent the worst-case scenario, I propose a 50m wide prevention spine site that is situated at the most crucial point between the ocean, mining site, strandveld and the salt pan. This spine runs along the beach edge, acting as the interface between the vegetation and the beach. It also doubles up as the proposed site boundary that will hold the architecture and the landscape together. Similar to a scar being closed back together.

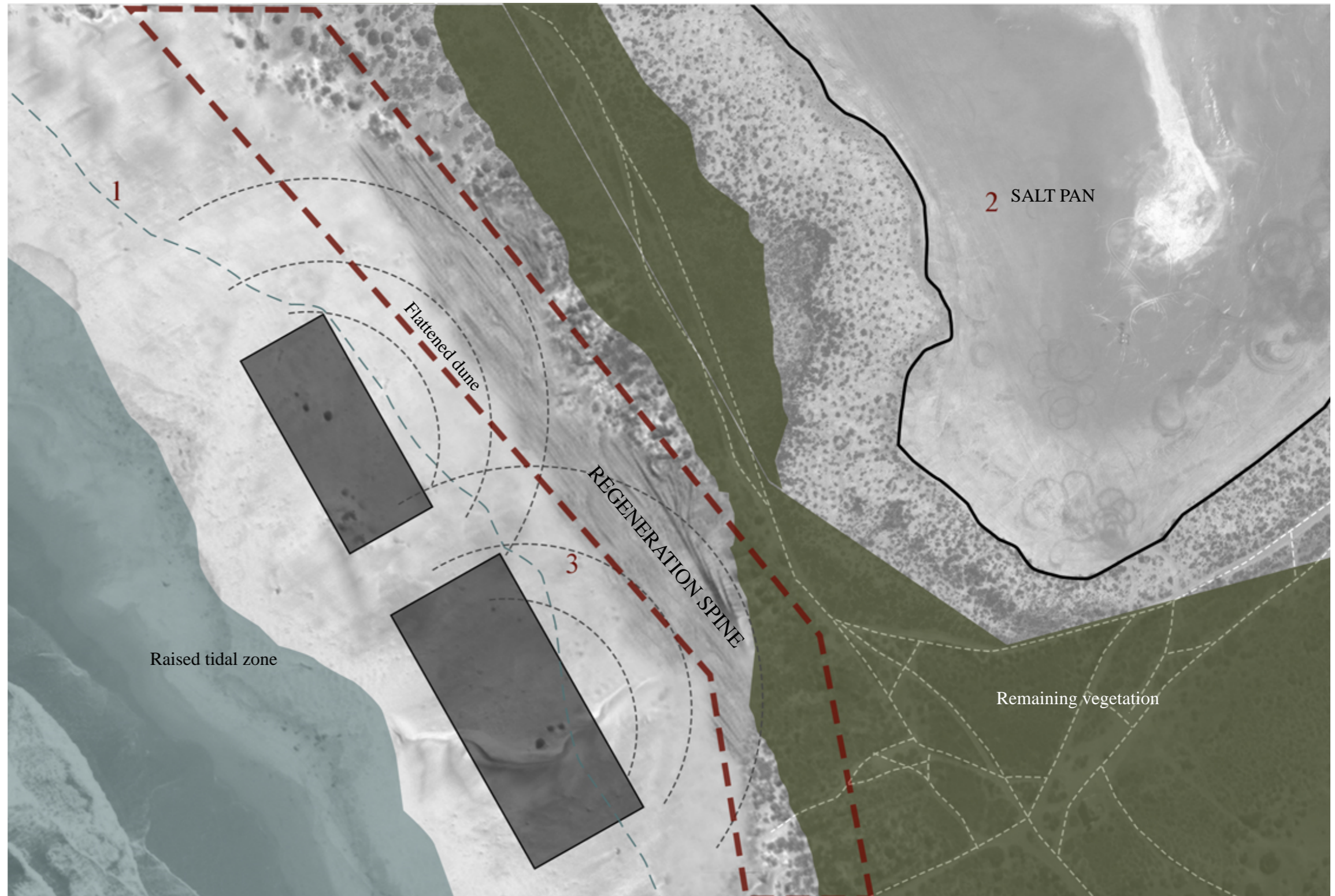


Fig. 64. Regeneration spine.

THE PERMANENT: CONCEPTUAL INSERTION AND STRUCTURAL LOGIC

THE CONCEPTUAL INTENTION

A conceptual system and form were designed using the permanent prosthetic as a design driver. The structural form represents the initial intention to design and place structural members within the landscape. The placement of these structural members, such as foundations, is informed by the natural flow of the site. Its placement of the structure becomes the contested edge. By mimicking the natural patterns and topography of the land, it replaces conventional methods of foundations, therefore already beginning to speak towards a new method and perspective for a new approach towards regenerative architecture. The permanent structure is seen as the adhesive used within the practice of Kintsugi.

THE ARCHITECTURAL INTENTION

- 1) Stabilise the collapsed dune system.
- 2) Act as the structural core for the habitable space.
- 3) Act as the structural interface between the damaged dune (West) and the sensitive strandveld (East).
- 4) Act as the resistance within the landscape long after the death of the building.
- 5) Becoming a man-made sea wall in collaboration with the regenerated dune, securing and regulating the nearest salt pan portion from the rise of the seawater due to global warming.
- 6) The material for the permanent structure relates to the concept of regeneration through decay by using repurposed concrete.

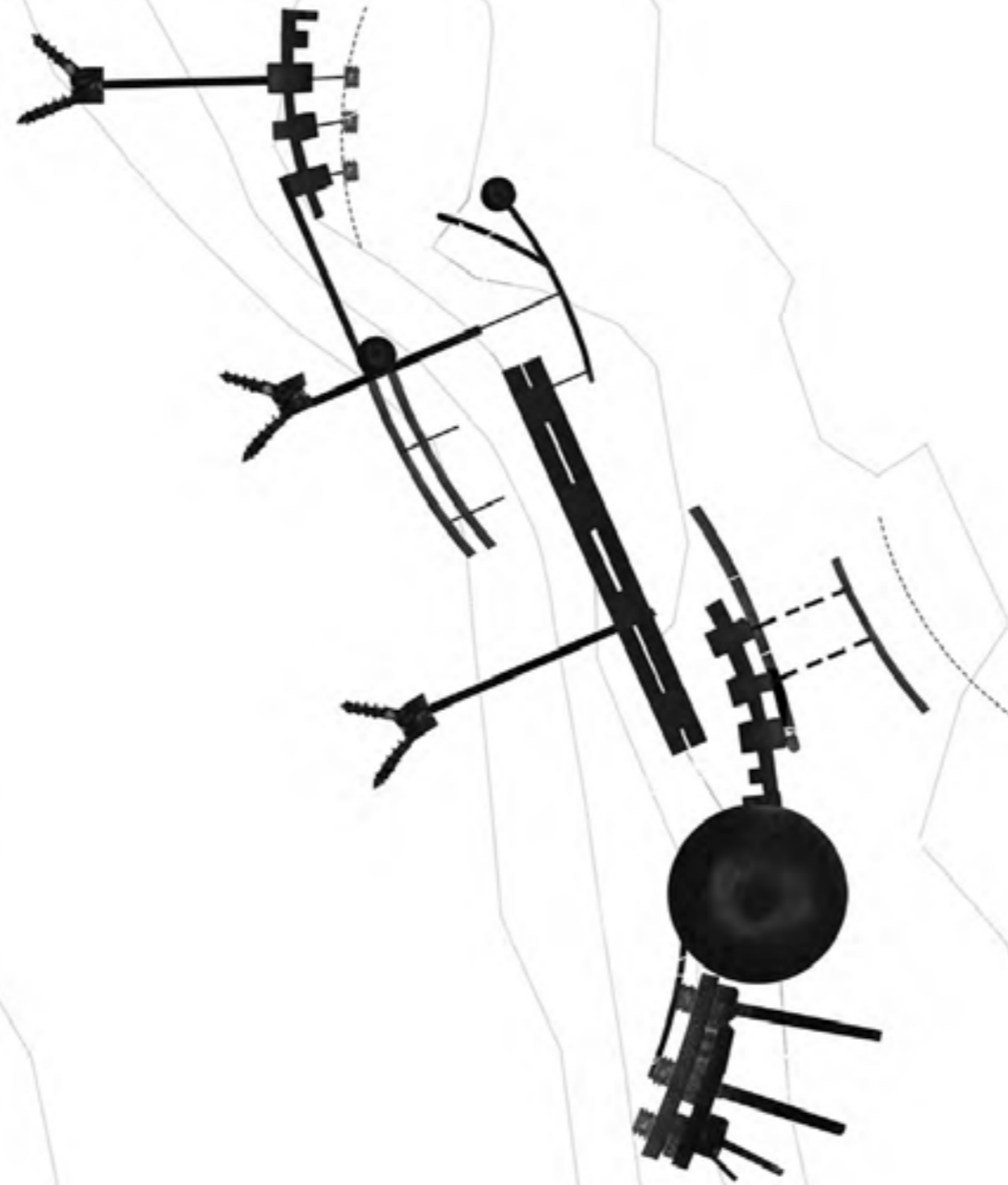
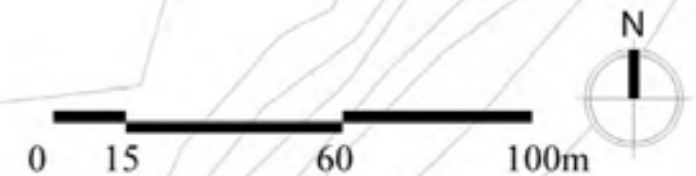


Fig. 65. Permanent insertion



THE TEMPORARY: CONCEPTUAL HABITABLE SPACE AND ENVELOPE

THE CONCEPTUAL INTENTION

After using the map of the damaged: previously existing vegetation and placing the structural spine within the natural flow of the land, the structure allows for the interstutuary portions to be filled with habitable space. This space also follows the natural flow of the site while being carefully placed on a grid-like structure which was informed by the grid-like pattern of the salt pan. The infill, or in other words, the habitable space which caters for people will therefore act as the societal regenerative element.

THE ARCHITECTURAL INTENTION

- 1) To act as a permeable wall that would soften the blow of the wind damaging the sensitive strandveld until the first layer of strandveld is regenerated back.
- 2) Act as the habitable space.
- 3) Being the least permanent architectural element, through using materials such as sand-blasted steel and wood. Allowing the envelope to decay, resulting in the insertion being weathered by the natural elements.
- 4) Act as the resistance within the landscape long after the death of the building.



Fig. 66. Temporary envelope

THE PROSTHETIC WITHIN THE LANDSCAPE

THE CONCEPTUAL INTENTION

Combining both the permanent and the temporary prosthetic within the regeneration spine, a conceptual form begins to address the intention to create a regenerative architectural design that allows and celebrates decay.

Ultimately a prosthetic architectural insertion is held within the body of the damaged landscape, returning to the term kintsugi, where the insertion becomes the adhesive that mends and regenerates the broken. With the relationship of decay and regeneration, the structure intends to allow for a post-programmatic lifespan, where the machine still operates as a regeneration tool long after human occupancy. Thus, becoming a form of structural resistance within the landscape.



Fig. 67. Conceptual prosthetic insertion

PORTION A - THE RESISTANCE (CONCEPTUAL)

The placement of the programmes are also informed by the prosthetic. A hall or court space, intended for the local municipalities and communities to meet, discuss and protest stand up against future mining.

Atlantic Ocean

Salt Pan

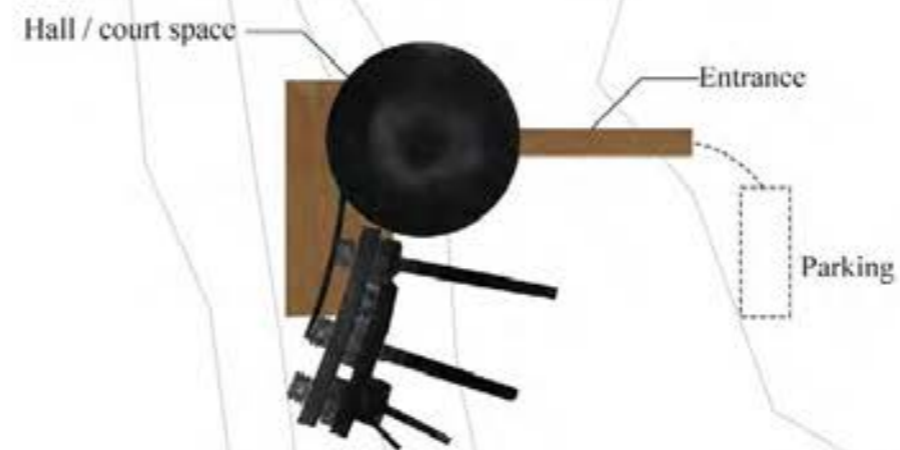
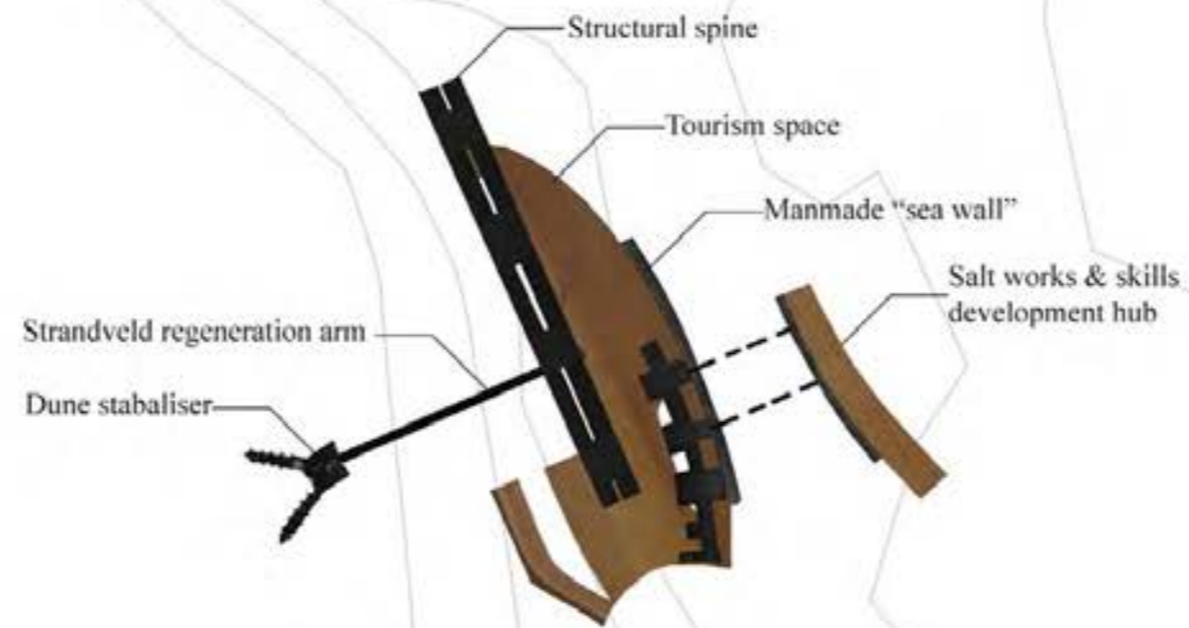


Fig. 68. Programme A.

PORTION B - THE EDUCATIONAL (CONCEPTUAL)

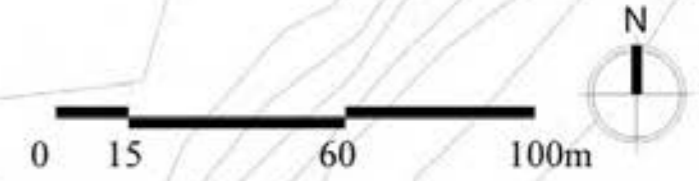
The educational and recreational portion, which caters for recreational visitors, tourists and communities that want to explore or learn about the local ecology, the salt pans and projects to regenerate a damaged landscape.

Salt Pan



Atlantic Ocean

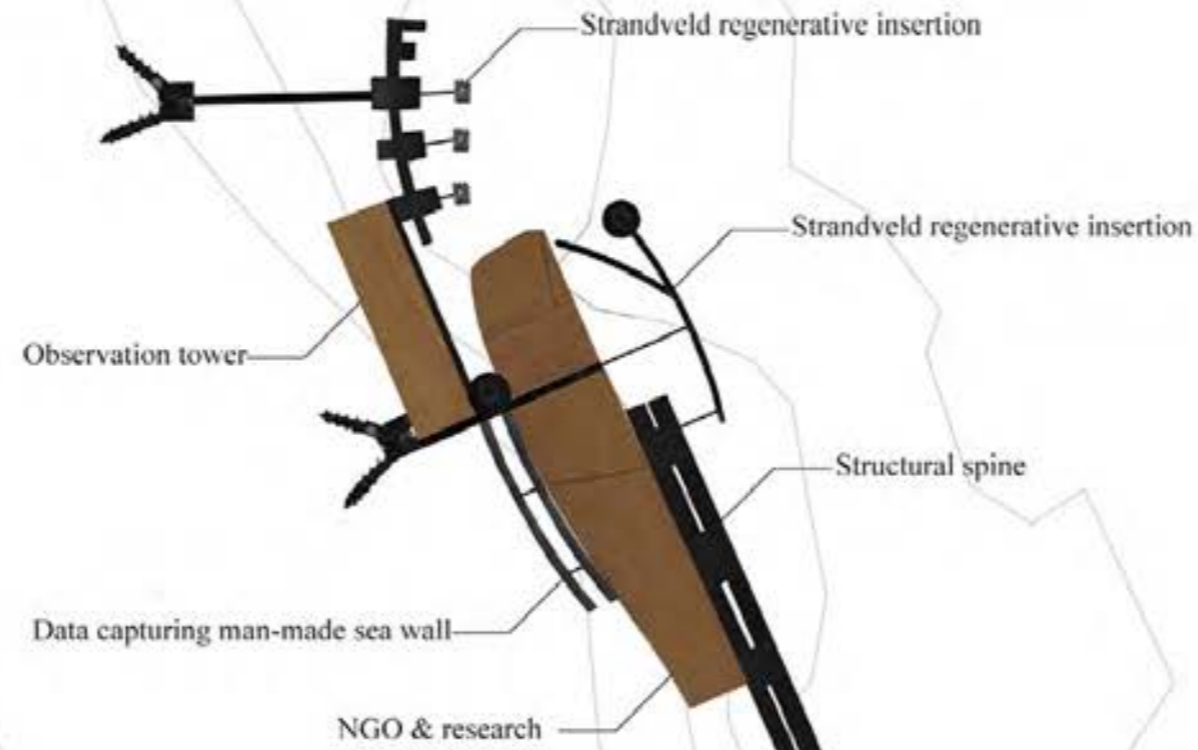
Fig. 69. Programme B



PORTION C - THE OBSERVATION (CONCEPTUAL)

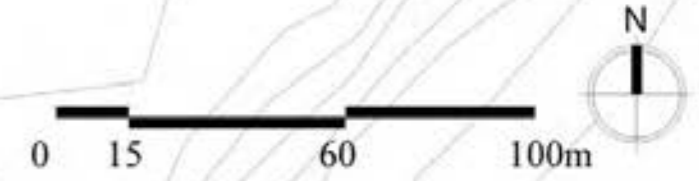
The research resistance and observation portion, which caters for the NGO's such as protect the west coast, researchers who deal with the regeneration of coastal damage and lastly an observation tower which becomes a beacon in the landscape where people can look over a damaged, but yet regenerating landscape. This beacon also acts as a landmark or destination point.

Salt Pan



Atlantic Ocean

Fig. 70. Programme C.



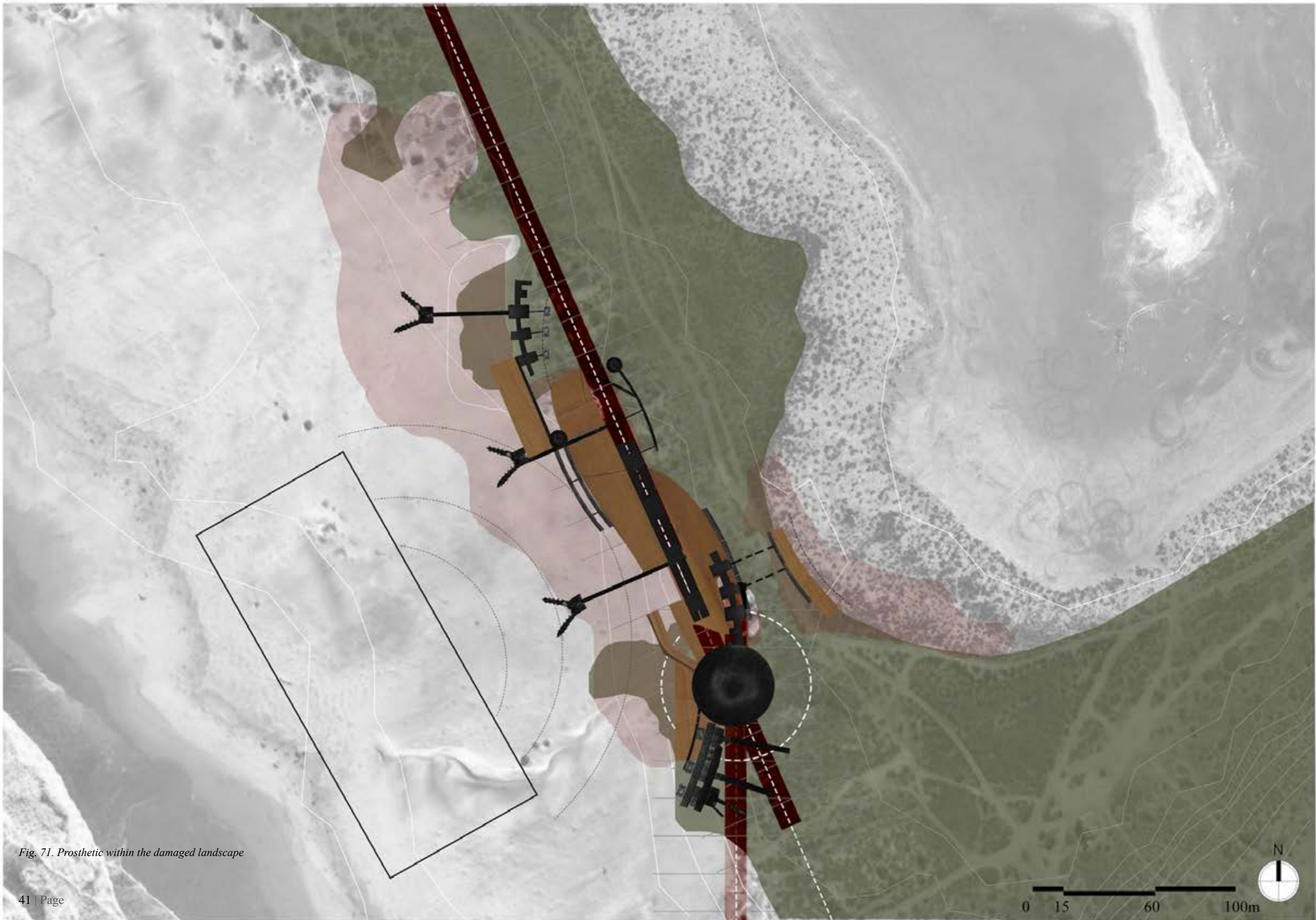


Fig. 71. Prosthetic within the damaged landscape

04 ARCHITECTURAL INTERVENTION.

Allowing for architecture to be found through making

After the analysis of the natural forces on site, understanding exactly what the impacts of the mining operations on site hold, hence giving insight into what should be regenerated and ultimately viewing the social and economic landscapes as equally important to the regeneration and security of the ecological landscape. The architectural and spatial development of the project is predominantly driven through physical model making as the tool to generate structural logos accompanied by the programmatic execution on the site.

I approach the making of these models similar to the earlier mentioned investigation between the relationship of decay and regeneration by constantly using both as a tool to drive the spatial and architectural form. Furthermore, I attempt to test this new approach toward regeneration throughout the process.

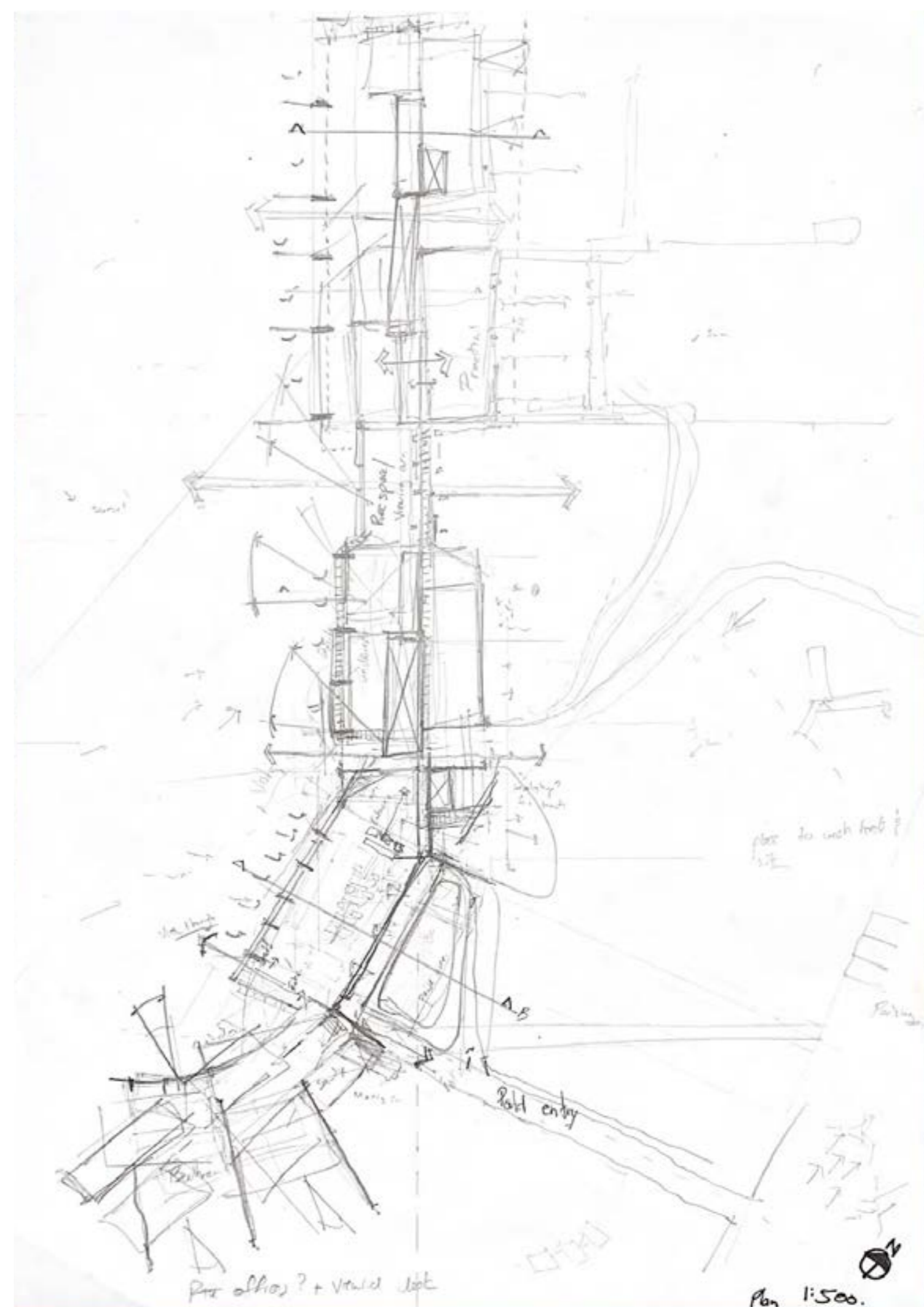


Fig. 72. Rough sketch of the ground floor plan

By placing the architectural intervention in the transitional space between the collapsed dune and the vegetation, it becomes the interface that divides these two systems. Furthermore, placing it onto the collapsed dune, it assists with the regeneration of the collapsed dune. This is done by placing structural members within the dune, followed by the envelope or facade that acts as the layer that shields the vegetation from the wind.

The South-Westerly facade experiences the full power of the natural forces acting upon it such as the strong wind, the sea breeze, and sand blowing against it.

As the architectural prosthetic lives in time, certain elements will begin to decay at a faster rate than others. This allows for the constant transmutation of the structure within the landscape. As the insertion decays, it allows nature to take over it, therefore taking a post-programmatic life span of not only the architecture but the ecology into consideration.

I posit that the site and the architecture are never a permanent snapshot of the intention, thus breaking the perception and goal to create a “white body” architecture. The site is constantly experiencing the impacts of time, nature, and memory as forces that act beyond the boundaries of the site influence the aesthetic.

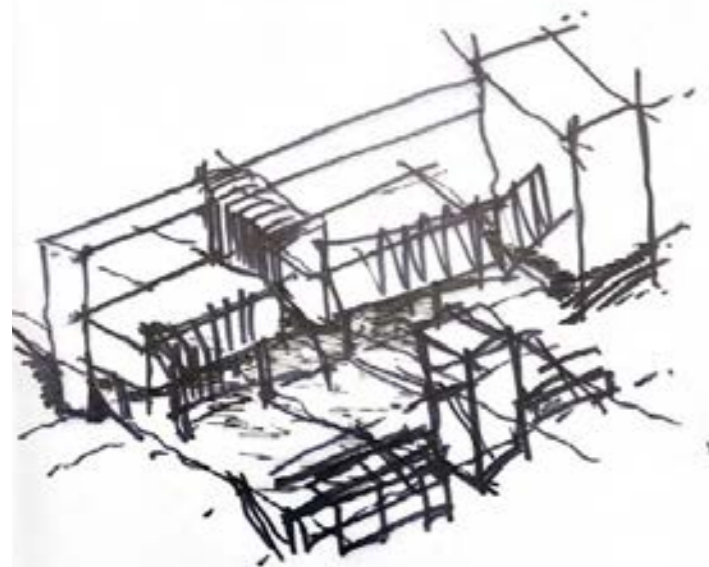


Fig. 73. Initial massing sketch

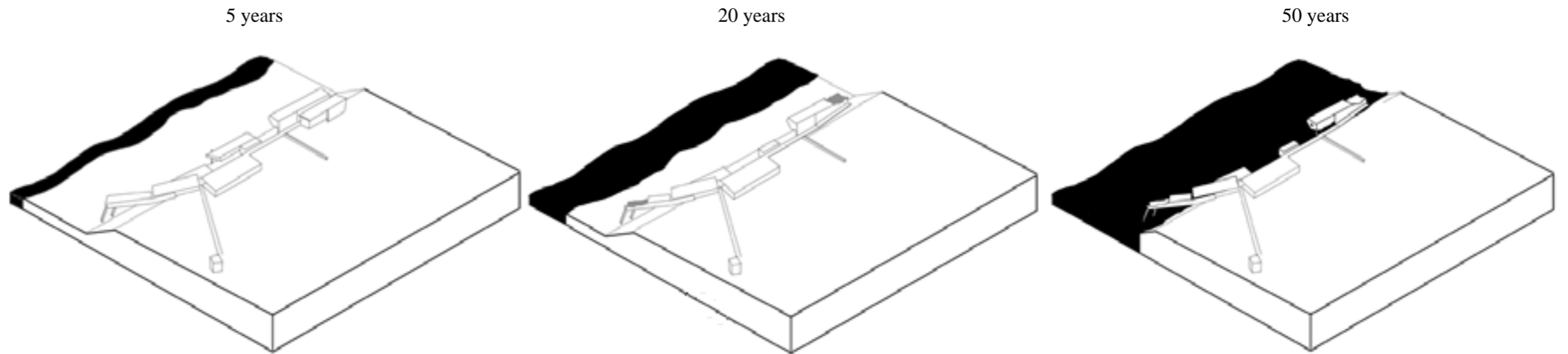


Fig. 75. The partial decay of the structure over time

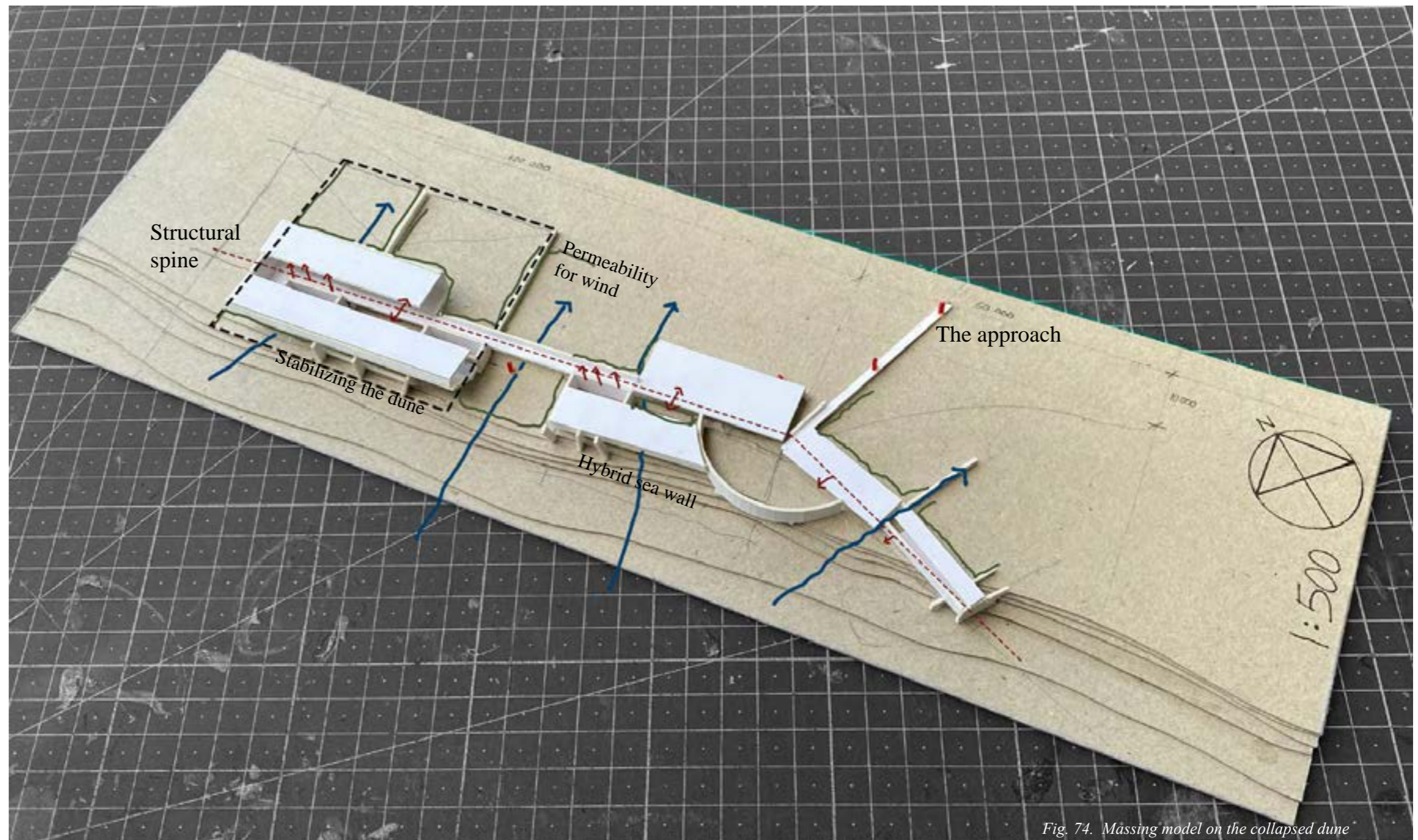


Fig. 74. Massing model on the collapsed dune

Regenerating the dune through permanent insertions. The intention is for the structure of the edge of the building to act as the stabilizers which regenerate, in other words, the adhesive that allows for the regeneration.

As sand begins to pile up against the facade, a natural, steeper dune slope begins to form.

Using re-appropriated weathered concrete sourced from the nearby Saldanha bay harbor and steel sources from the Saldanha steel plant, these materials, which were in a state of decay, become regenerated. By reusing the materials, it becomes clear that the elevation of value is linked to the appreciation of imperfection, which prolongs their lifespan, like the practice of Kintsugi mentioned earlier.

The structural elements will have a 50–100-year life span, thus acting as resistance in the landscape while allowing nature to completely take over, whereas the envelope and portions designed to be decayed earlier will only have a 10-25year life span.

Symbiotic sea wall

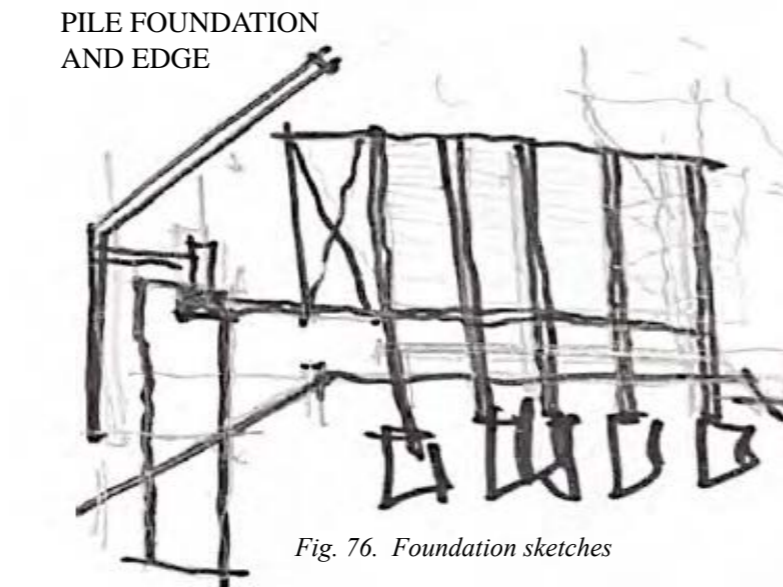
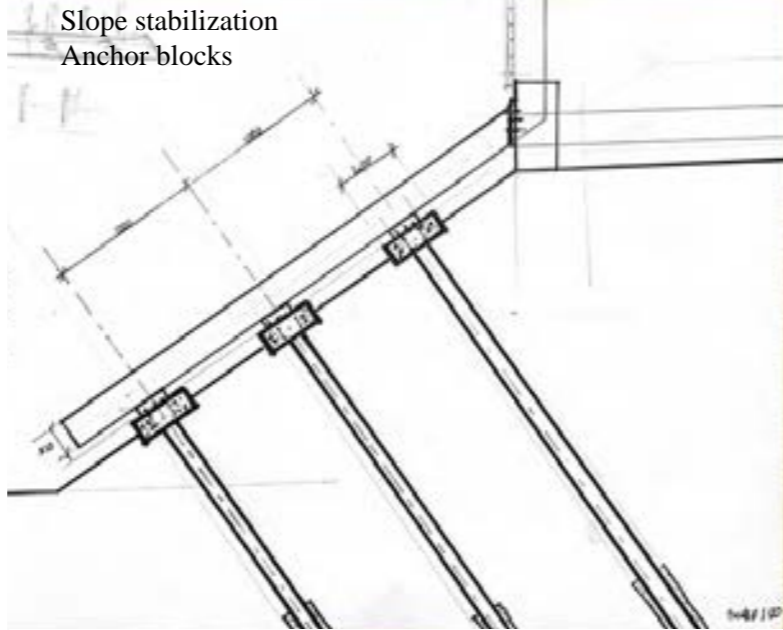
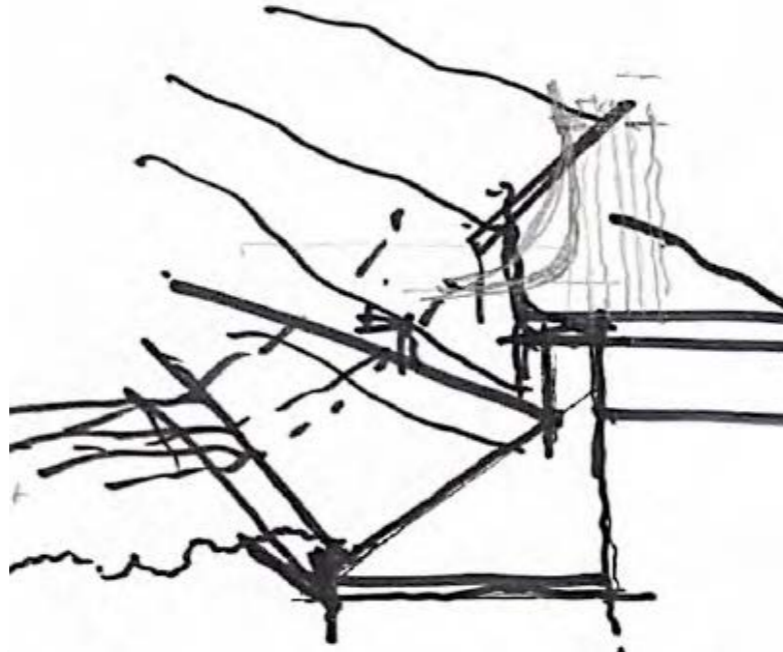


Fig. 76. Foundation sketches

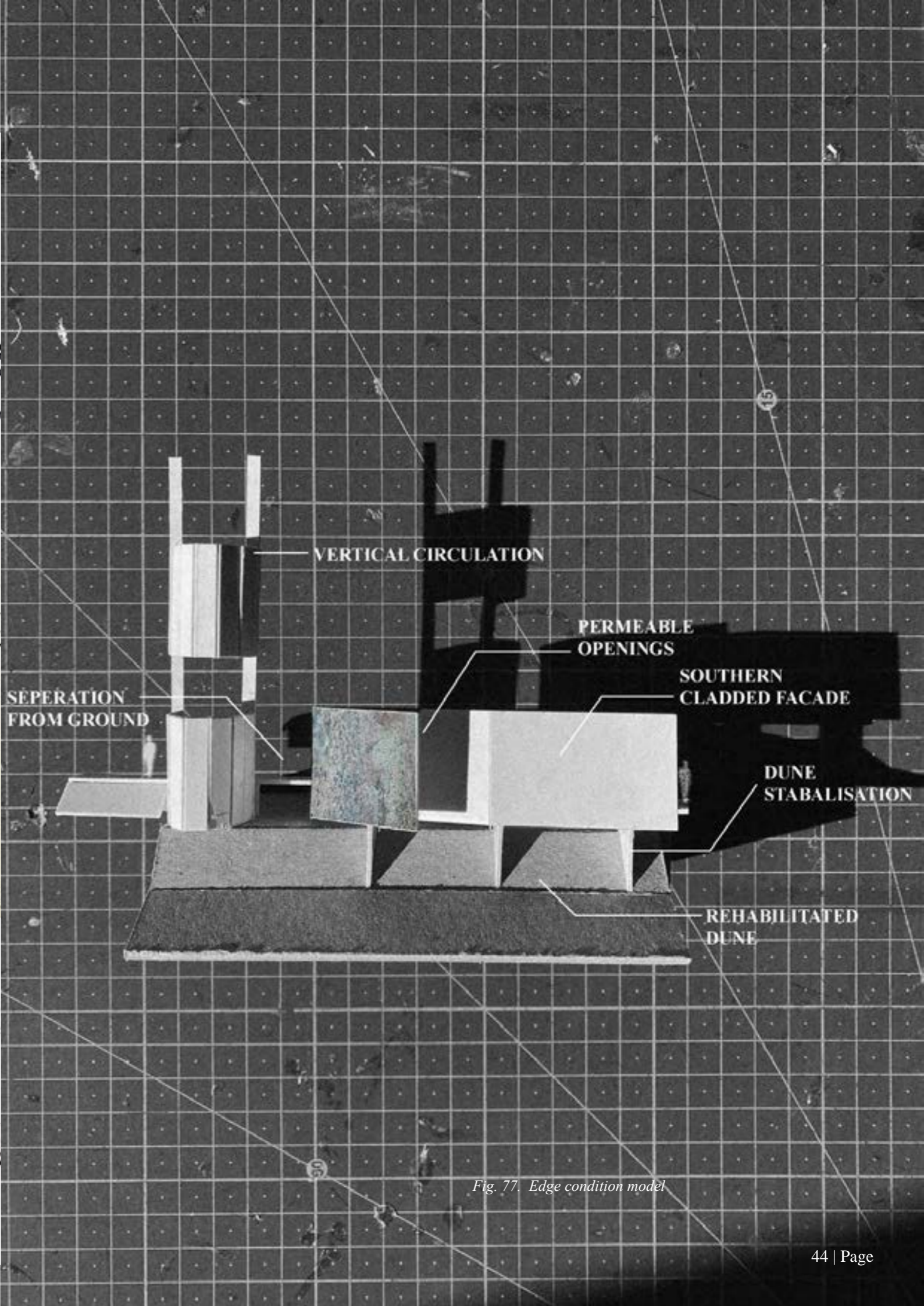


Fig. 77. Edge condition model

A façade exploration model shows how a possible dune stabilization structure can double up as an element on which the envelope rests. It was important to not close off the façade completely to the elements but rather allow the wind and ocean mist to enter the inner parts of the building too. A 10m height limit allows the strong winds to flow easily over the envelope. The architectural intention is to allow the habitable space to float above the natural landscape, allowing for the regeneration of the ground through active regenerating attempts by researchers and volunteers.

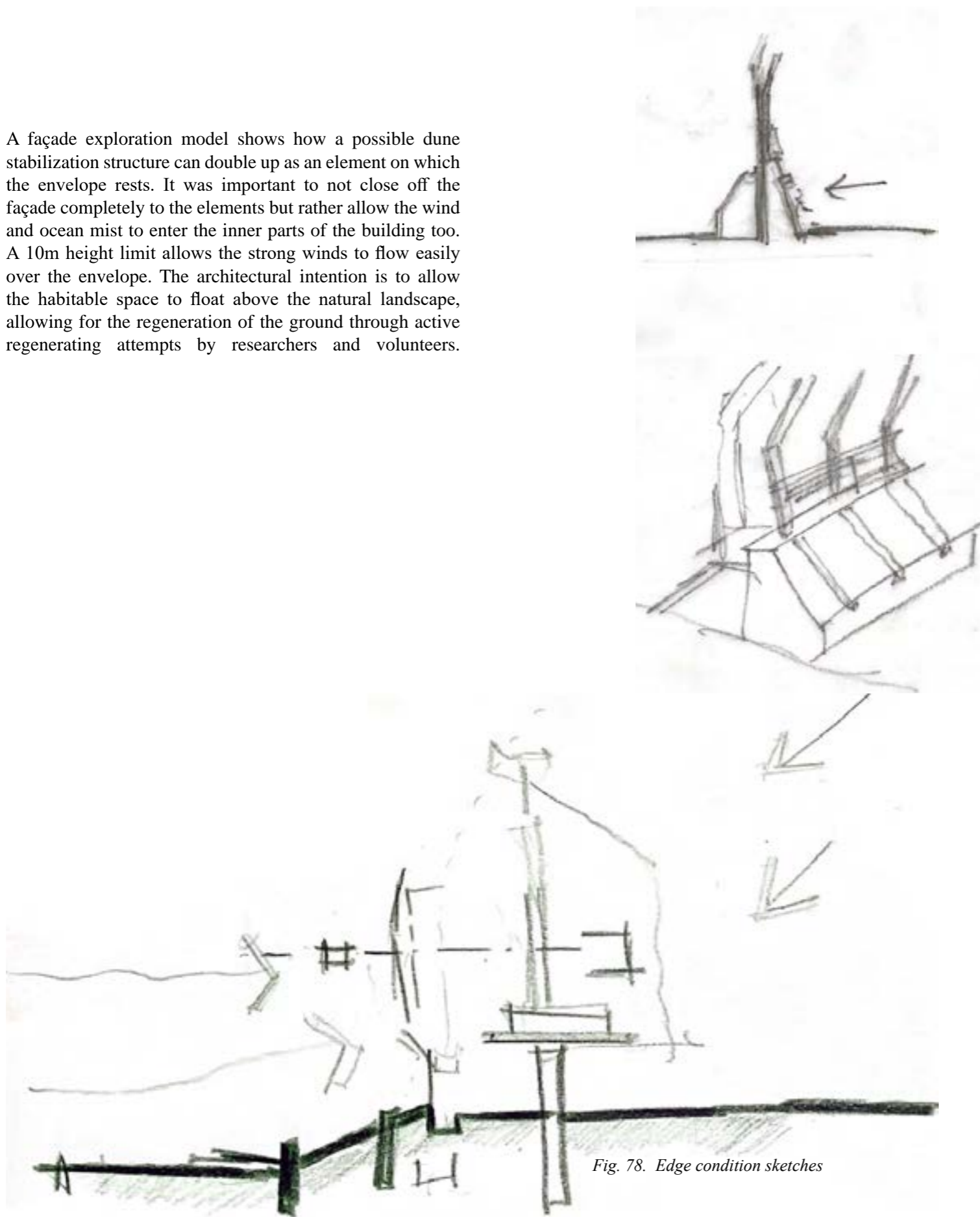


Fig. 78. Edge condition sketches

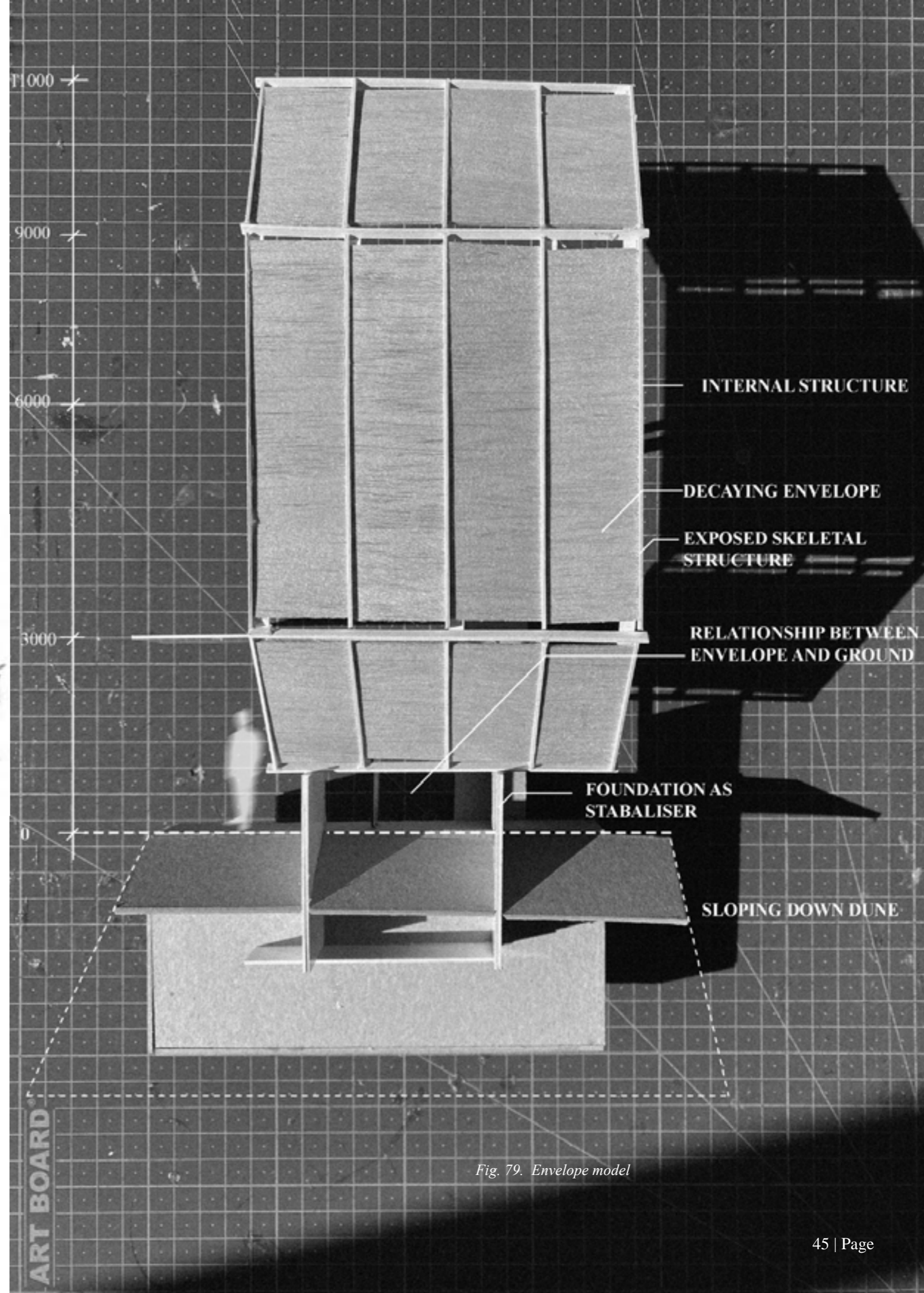


Fig. 79. Envelope model

Exploring a permeable façade, which allows for a dynamic shift in spatial quality, being able to close off, filter, or completely allow the natural forces such as the sea spray, the rain, and wind to enter the skeletal structure of the building.

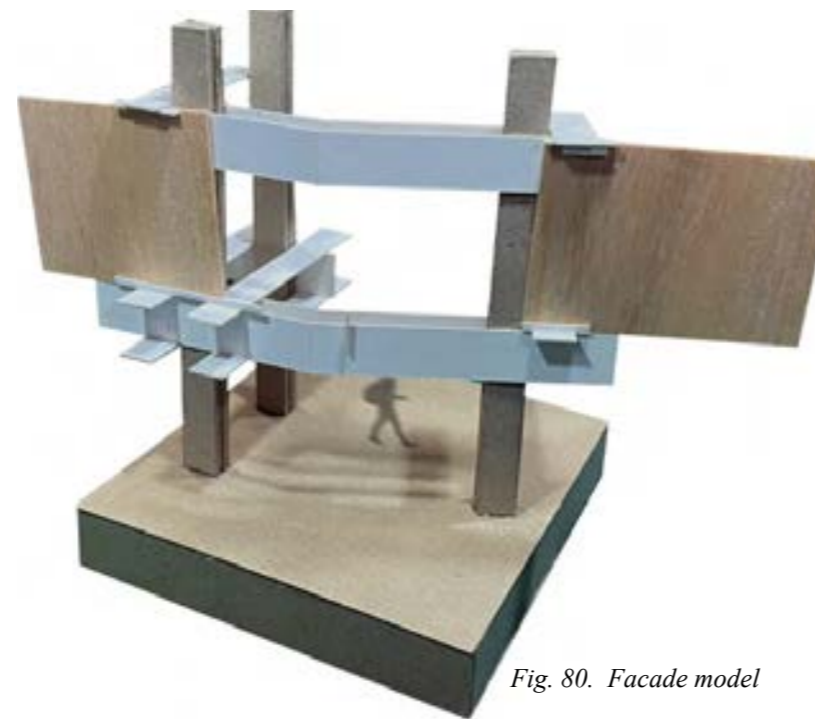
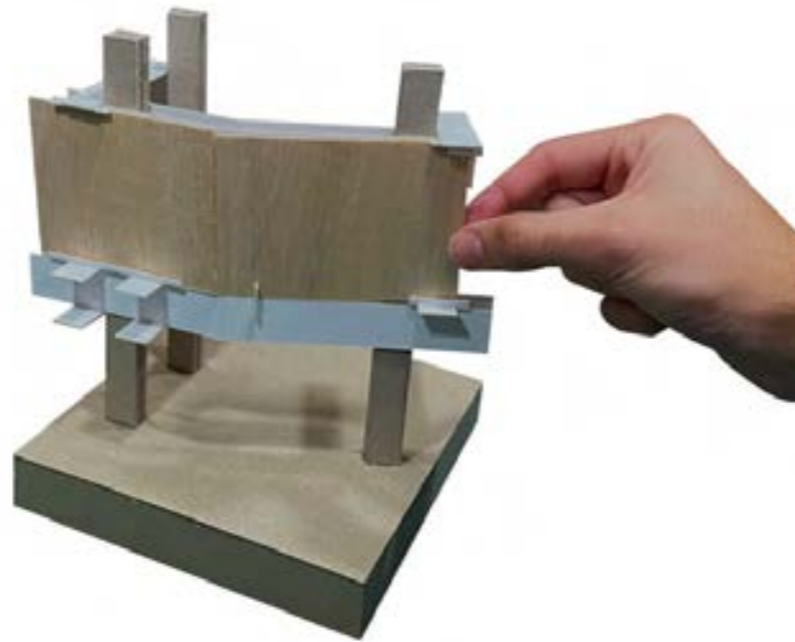


Fig. 80. Facade model

Looking at how pathways between programmes can be defined through their separation off the ground.

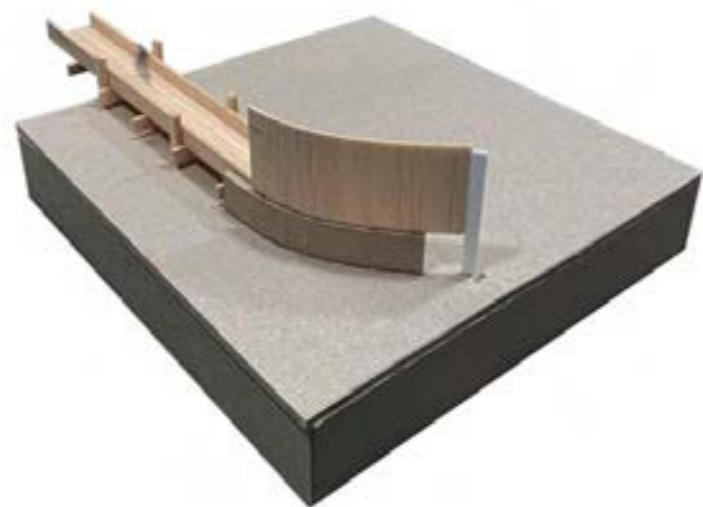


Fig. 81. Walkway model

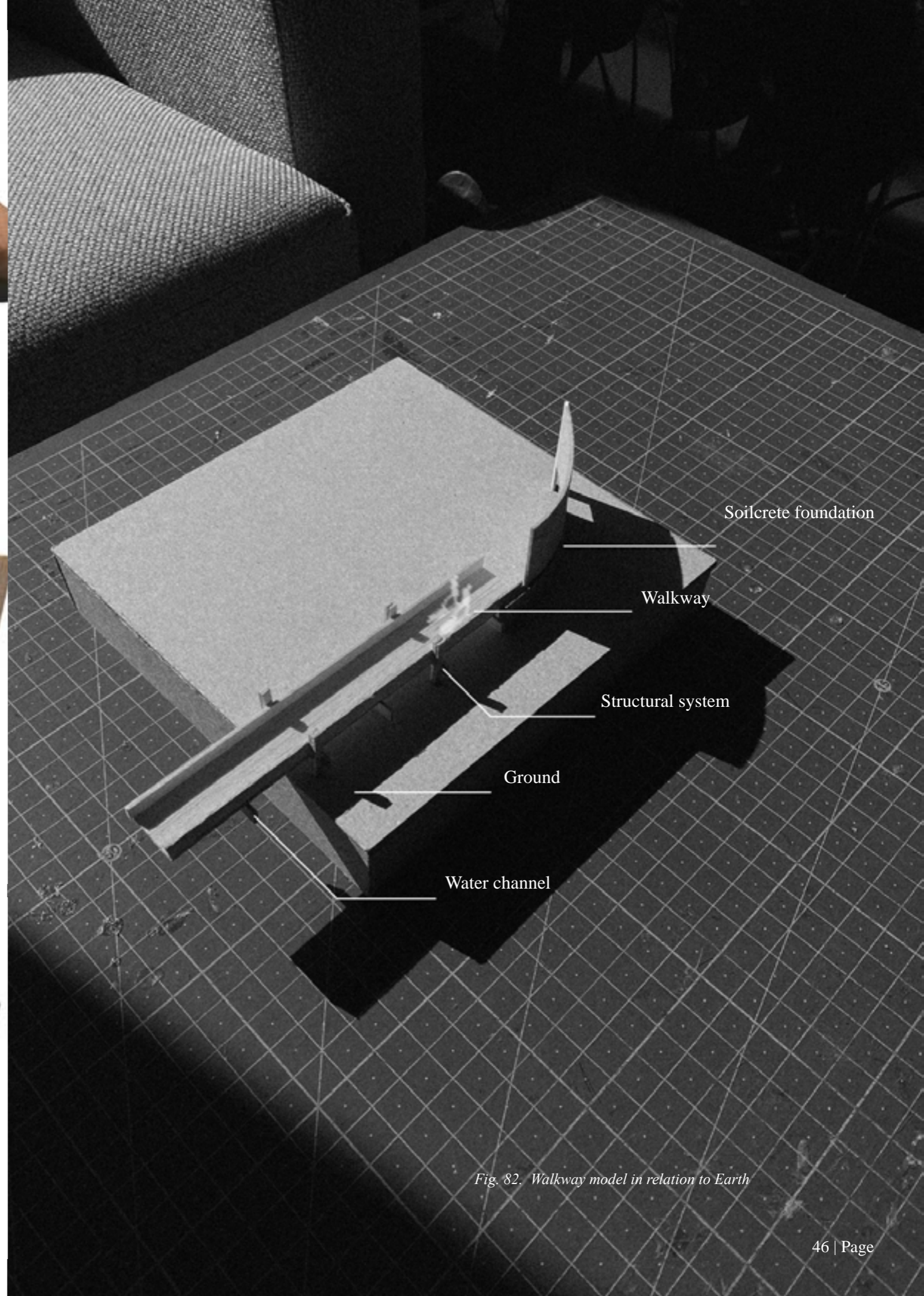


Fig. 82. Walkway model in relation to Earth

GROUND FLOOR PLAN

The current ground floor plan is placed within the previously demarcated prevention spine. The three portions are marked as follows – green is the local space which houses the protest chambers and the administrative offices, the red is the research and rehabilitation core of the space, which is an active ground floor space used to test, and rehabilitate the vegetation, and the blue is the visitor's wing which is situated at the far end to let visitors wander through an active regeneration space thus giving them a direct conversation with the ongoing process. In addition, a series of heavier soilcrete and repurposed concrete foundations are placed on a similar grid inspired by the salt pan harvesting grid.

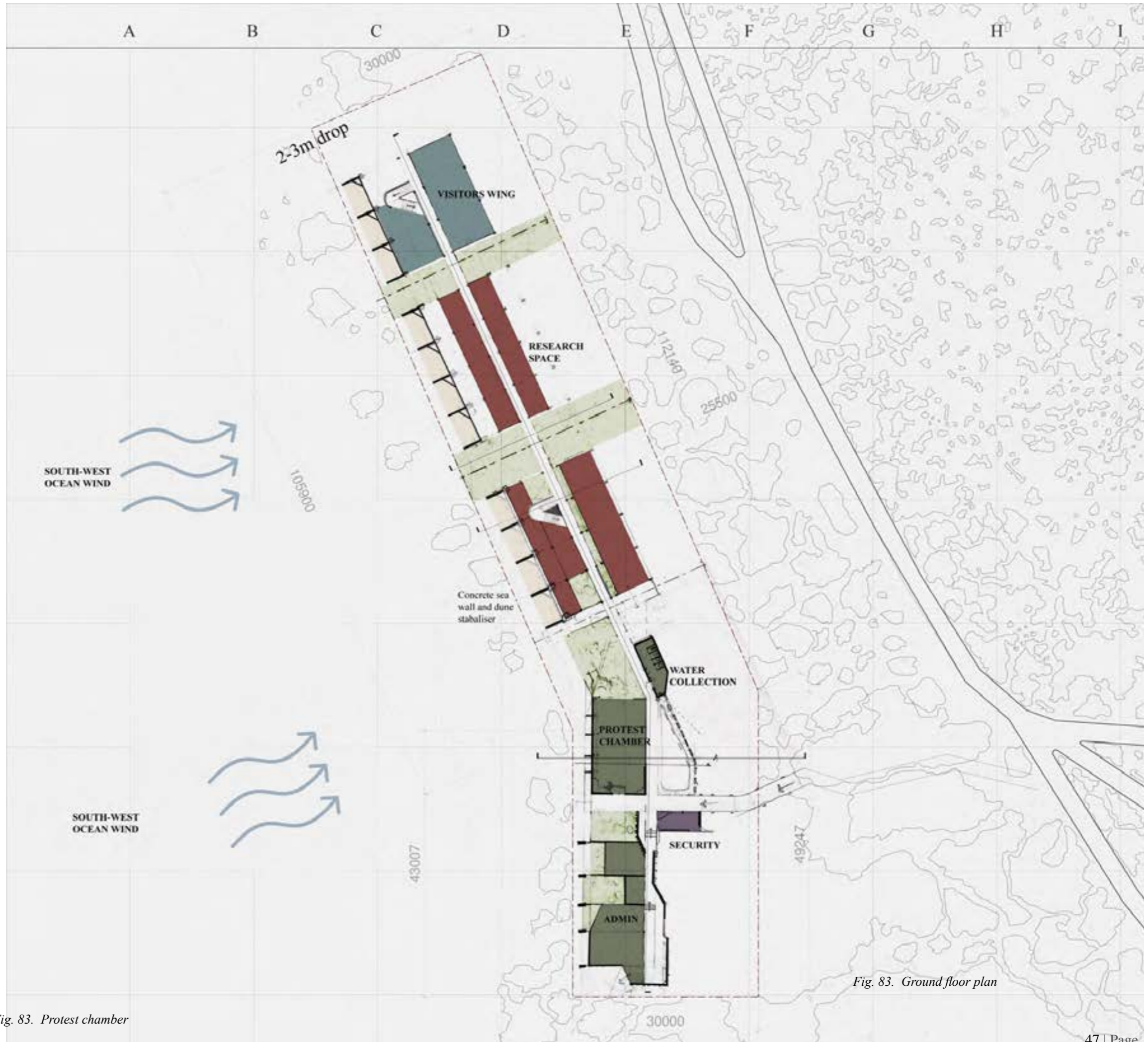


Fig. 83. Ground floor plan

PROTEST CHAMBERS

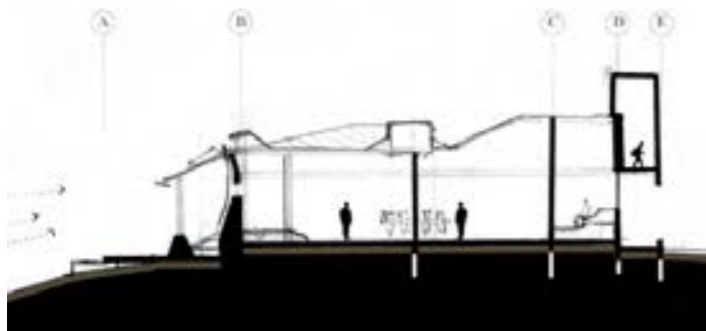


Fig. 83. Protest chamber

FIRST FLOOR PLAN

The current first-floor plan only accommodates the observation space on the far northern end, and then further research space for researchers, geologists, and accommodation for more permanent staff.

CONNECTING BRIDGE

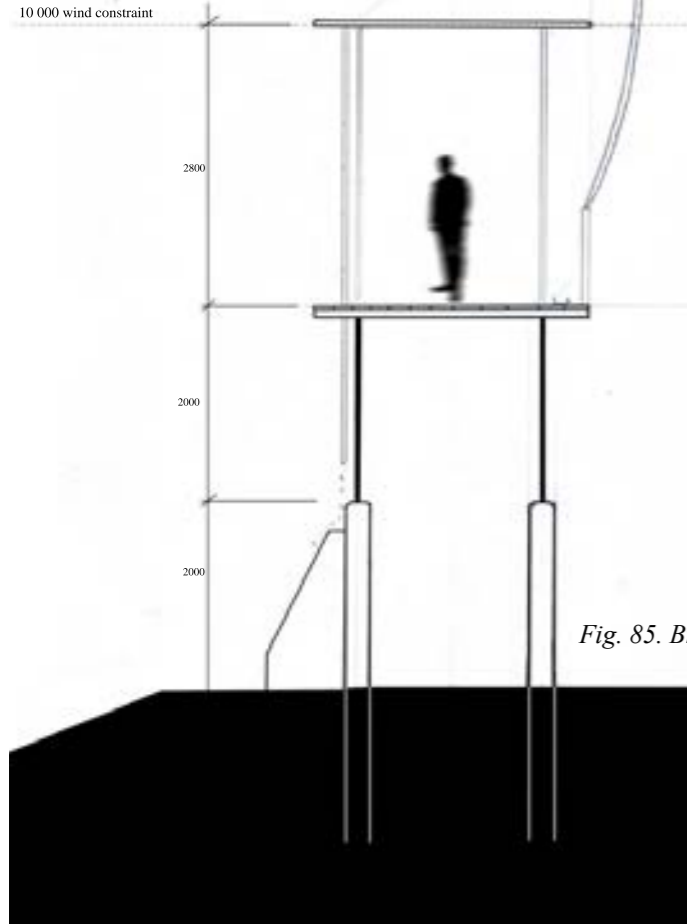


Fig. 85. Bridge



Fig. 86. First floor plan

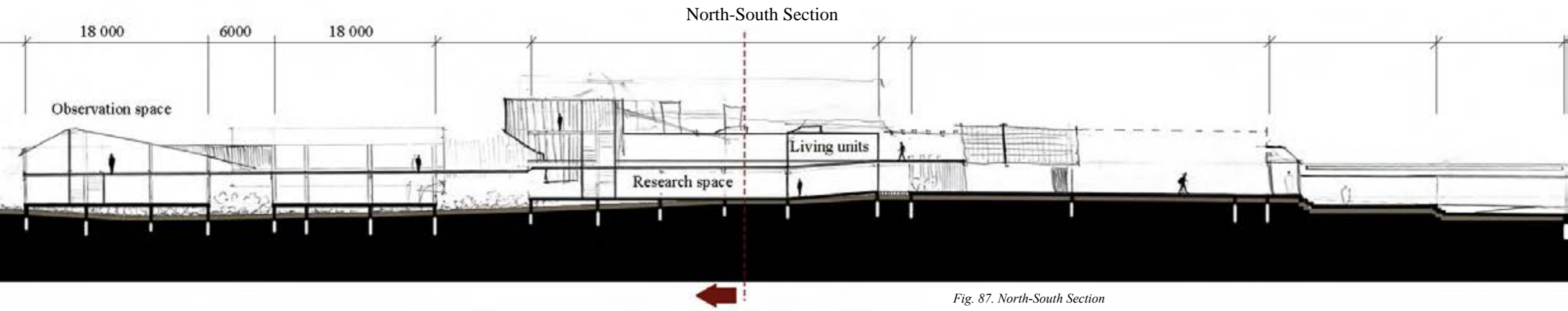


Fig. 87. North-South Section

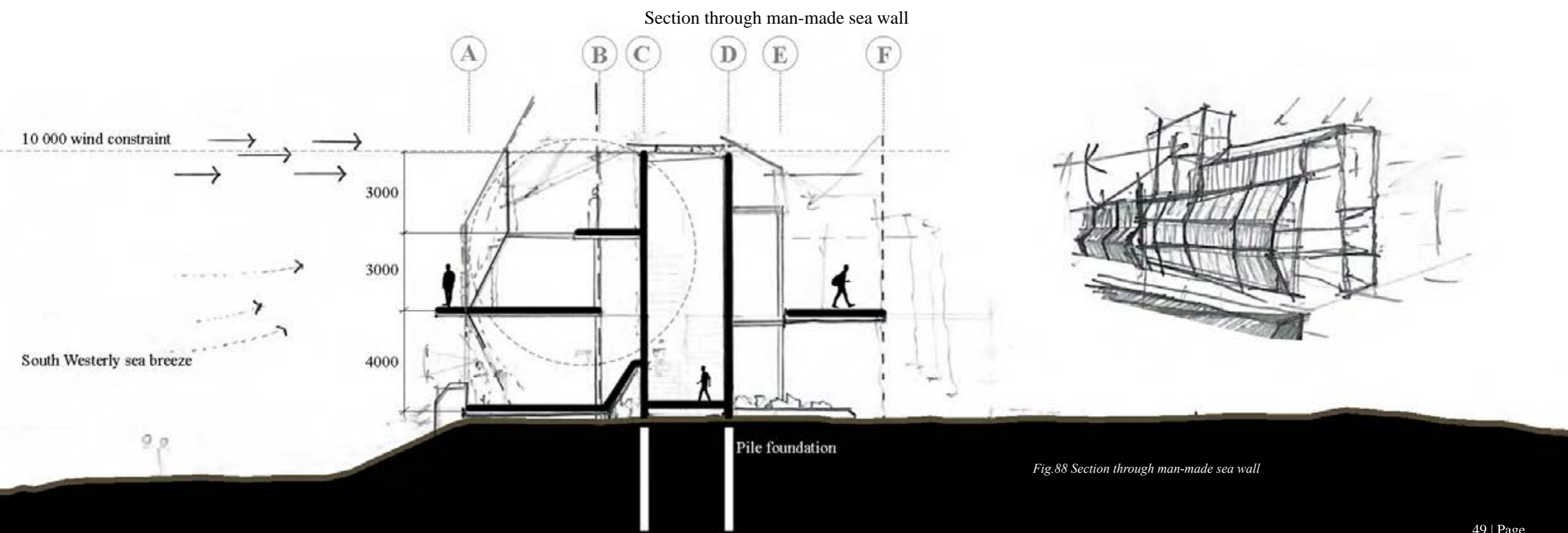


Fig.88 Section through man-made sea wall

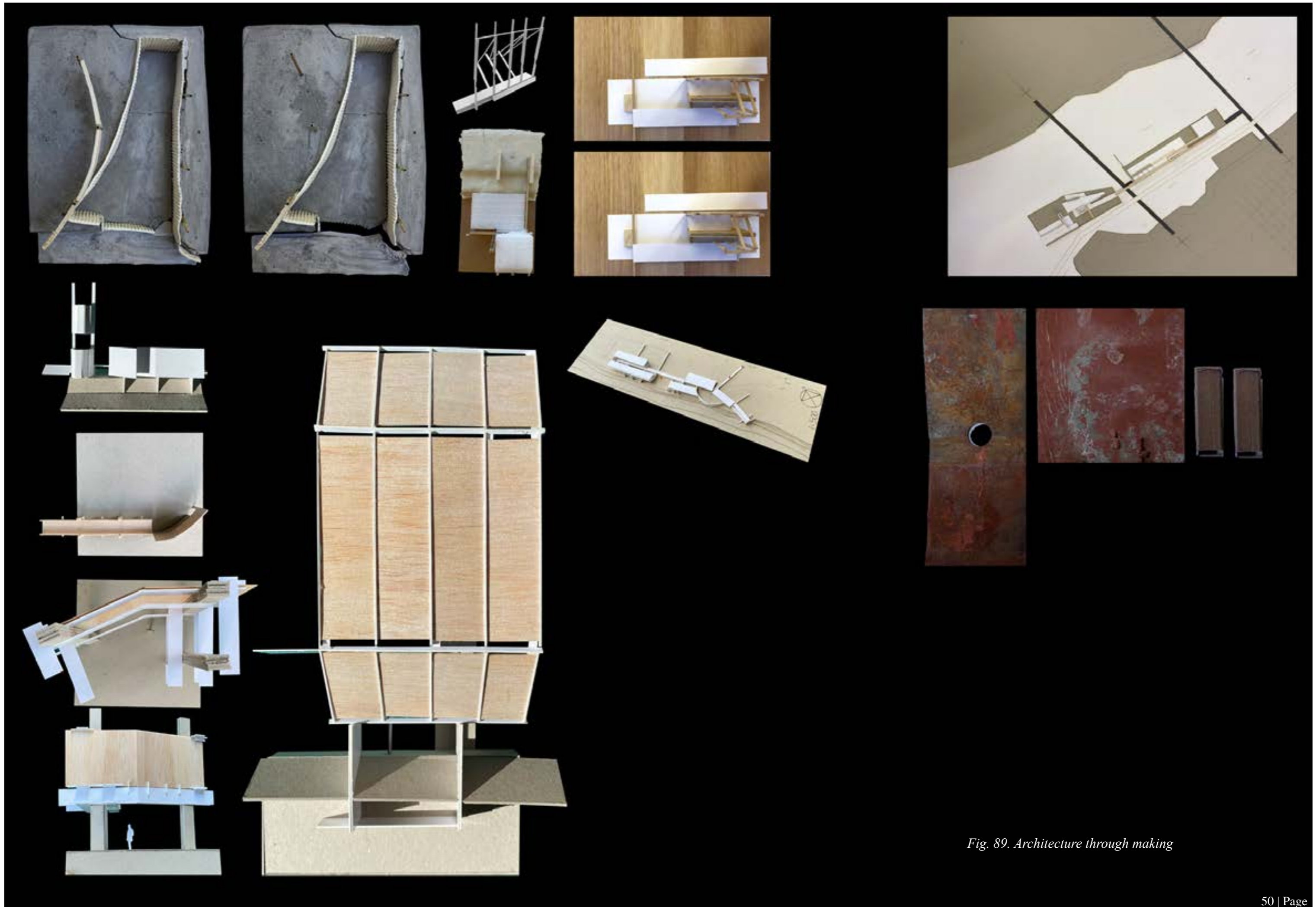


Fig. 89. Architecture through making

CONCLUSION AND CLOSING REMARKS

My interest in a new architectural approach towards regeneration within a damaged space was an attempt to uncover new methods of viewing the quality of decay and imperfection as a tool that critiques the view towards the perfect white body. I am convinced that an architecture that allows for the imperfect and impermanent to be captured through reacting towards the natural force of time and memory generates the foundation for the needed shift towards a new regeneration method. Through understanding our impacts and position within the perspective of all landscapes as sacred landscapes, experience and an architectural response may be designed by rethinking the relationship between decay and regeneration. The recontextualization of decayed and previously seen damaged materials as a tool for design led to uncovering of architecture's relationship over time.

Models were assembled to emphasize and show each design and architectural intention. Assessing each material's possible life span it prompted a technical resolution within each iteration, model, and sketch. The process of contextual analysis and understanding the ability to allow architecture not just to regenerate, but to further elevate the value within the ecological, social, and economic landscapes, defined the programme set out for the architectural prosthetic within the damaged landscape.

In essence, my dissertation used a shift in perspective and appreciation of impermanence and time as an instrument to confront, better understand and implement a better relationship between man-made and nature, allowing for practical implementation of Kintsugi to be applied within a practical yet theoretical inquiry within the architectural realm.

These investigations, experiments, and future experimentation which were conducted during this process, in addition to a rigorous series of layered intuitive approaches, allowed for the project to not be separate from nature, therefore allowing the architecture to be held within the regenerative space.

Thus, accompanied by a topic that I am very passionate about, the essence of decay and regeneration resides deep within me. I believe that reshaping

my method of thinking, it embodies exactly that which is needed to generate the momentum to create a new epoch, away from the Anthropocene.

I view the appreciation for sacred landscapes that acknowledges the fact that spatial form is played out in time as the core within this project. Allowing architecture to transmute and act as the machine that allows time to generate as a positive force beyond the possible control that humans attempt to seek over the sacred.

Thus, this project acts as the adhesive within the context that allows for constant regeneration at all scales through using the decay of the physical as the tool. The life of architecture is in constant flux. In this sense, it may be possible to capture an architecture that allows interaction to break the Western desire to conquer time and control the sacred to an architecture that values the sacred and imperfection in a transitional space seeking regeneration.



Fig. 90. Shipwreck prosthetic on the coast

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PRE-SCREENING QUESTIONNAIRE OUTCOME LETTER

STU-EBE-2022-PSQ000005

2022/07/17

Dear Flavio Coetzee,

Your Ethics pre-screening questionnaire (PSQ) has been evaluated by your departmental ethics representative. Based on the information supplied in your PSQ, it has been determined that you do not need to make a full ethics application for the research project in question.

You may proceed with your research project titled:

Regeneration through decay. An architectural prosthetic.

Please note that should aspect(s) of your current project change, you should submit a new PSQ in order to determine whether the changed aspects increase the ethical risks of your project. It may be the case that project changes could require a full ethics application and review process.

Regards,

Faculty Research Ethics Committee