

WEATHERING THE EDGE

RESCRIPTING THE INDUSTRIAL ARTEFACTS OF THE VREDEHOEK TIN MINE.

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TITLE PAGE

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This dissertation is presented as part fulfilment of the degree of Master of Architecture (Professional) in the School of Architecture, Planning and Geomatics, University of Cape Town.

05 November 2017

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EPIGRAPH

“[B]efore placing stone on stone, man placed the stone on the ground to recognize a site in the midst of an unknown universe: in order to take account of it and modify it.”

ABSTRACT

Cape Town's iconic geographical phenomena and the relentless urban expansion have resulted in the isolation and expulsion of nature to the urban edge, marking the protected boundaries of Table Mountain National park. It is within these borders that a forgotten landscape remains as a marker of a time and its processes. This artefact serves as the point of departure for my dissertation, grounded in an interest in the relationship between man and nature. This interest manifests in an architectural response; rescripting of the Vredehoek Tin Mine, opposing the very destructive nature of its establishment through the addition of ecological programming. This reprogrammed site-specific architecture serves as a host to a legacy of landscape urbanism, utilising the existing infrastructure in order to reconnect the man-made urban environment to the natural landscape of Table Mountain. This is achieved through the establishment of an urban ecological park, composing of smaller interventions along its route that surface man-made and natural interactions.

CONTENTS

Introduction		2
Part One: On Method	Reading Site	8
	Poetic Research	10
Part Two: The Disruption of Nature	The Artifact	16
	The Shaft	22
	Dams and Wiers	24
	Working Platforms	26
	The Machine	28
	Erosive Flumes	30
	Storm Water	32
Part Three: Programming Water	Matter and Place	42
	Cycles	44
	Flora	48
	Parks	52
	Route	56
Part Four: The Natural Machine	Ecological corridor	62
	The Seed Vault	68
	Germination Pods	74
	Water Machines	76
	Route and Bridge	78
	The Ecological Legacy	86
Conclusion		98
Figure References		100
Bibliography		104
Appendix : Final Drawings		111

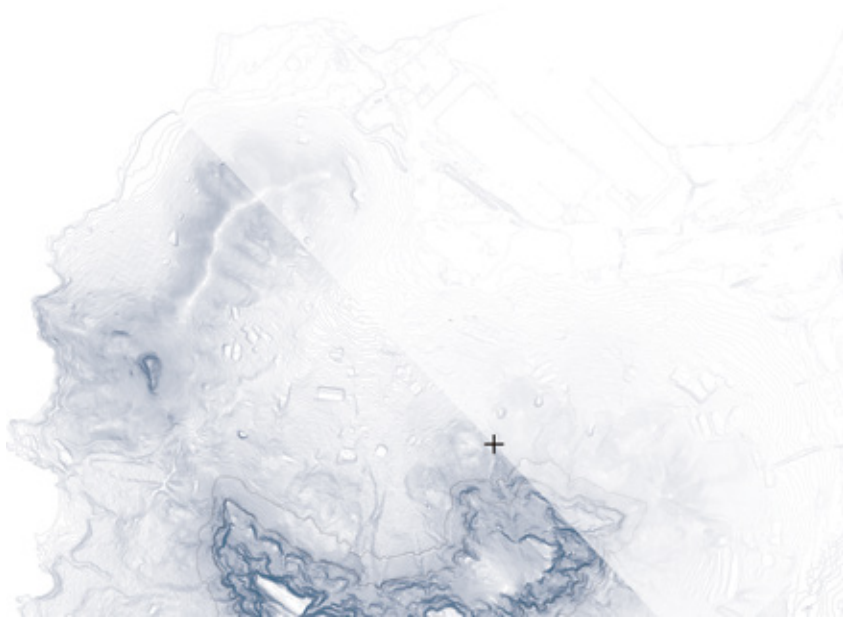


Fig X. The section line.

INTRODUCTION

This dissertation manifests a design project ground within the aim of ensuring the continuation of the endemic flora of the Cape: fynbos. The project takes form as an urban ecological path, reconnecting the reprogrammed artefacts of the Vredehoek Tin Mine, along the forgotten subterranean network of historic waterways to the previous shorelines of Cape Town, marked by the fortified form of the Castle of Good Hope.

This dissertation's origin lies within a single stroke of graphite. A decisive stroke forever marked within the planar face of the freshly torn sheet of trace paper. This conscious act manifests as a metaphorical line of incision, parting the landscape of Cape Town's City Bowl in two. Unfolding from the apex of Devil's Peak to the ridge of Signal Hill, the resultant profile exposes the strata of its formation over time, both natural and man-made. This sectional profile, viewed through the theoretical lens of Patrick Geddes' Valley Section of Civilisation, serves as the point of departure for this year's Landscape of the Cape Masters in Architecture Studio.

The theoretical imposition of the Valley Section of Civilisation applies a shift in perspective, altering the perception of the built environment of today. Emphasising the relationship of people, culture and place, the theoretical section draws parallels between man's cultural origins and the natural physicality of place. Through the prescribed title of 'Miner', the section line's expansive length alters to locate suitable geological conditions, contracting its spatial parameters towards the north-western slopes of Devil's Peak. Here, the juxtaposed materiality and spatiality of the natural and man-made landscapes are as clear as the stroke of graphite on the page. It is at this interface between man and nature that acts as the initial point of inquiry.



Fig X. Severed City- The relationship of man and nature.

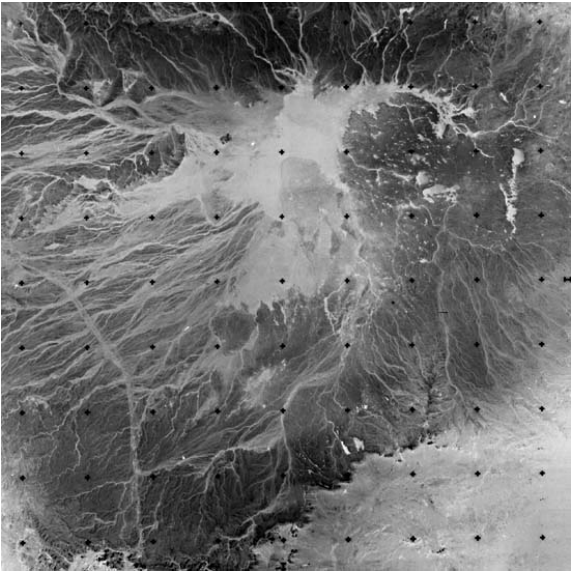
This dissertation begins to question the disparity between landscapes, focusing on the effects of man in nature, and subsequently, the effects of nature on man, over time. This relationship shares an underlying commonality: place. Therefore, the inquiry focuses on surfacing an architecture of place, restitching the contrasting landscapes through common experiential nuances.

The inquiry into surfacing a phenomenological architecture is grounded in method. Rather than a premeditated architectural response, an embedded architecture of place is drawn through a rigorous reading of site; surfacing ghosted networks, restrictive parameters, historical narratives and existing systems that manifest across various time frames. It is through this explorative process that a 'pre-existing place can be found, disturbed, awakened and brought to presence.'¹ This episodic discovery of architectural triggers manifests in an intermittent design process, reflected in the following document.

This document's structure unfolds chronologically in four parts. Part One departs with understanding the importance of method, particularly the aspect of reading site through poetic research. Part Two focuses on applying the previously stated methodology in order to uncover site-bound architectural triggers that may manifest within the project as prominent themes or strands of thinking. Part Three focuses its attention toward gathering programme from these triggers; whilst Part Four synthesises these triggers in a proposed built form, producing an architectural response rooted in place that weathers the boundary between man and nature.

1. Descombes, G 'Shifting Sites; The Swiss Way, Geneva' in Corner, J *Recovering Landscape: Essays in Contemporary Landscape Architecture* (1999).

Part One: Method



A centripetal drainage system.

POETIC METHOD

This dissertation adapts a non-conventional, 'rhizomatic'² model of research known as poetic research. This model of research aims to challenge the linearity of conventional methodologies; a research channelled along an envisaged linear path from the offset, constrained by a centrally aligned research problem.

*The poetic can be considered as a dynamic process in which the imaginative course of practice can be developed as research. It starts not in the simple but in the complex. Drawing out from a number of sources simultaneously.*³

Within the essay, 'The Reservoir: Towards a Poetic Model of Research in Design', Rosenberg describes the employment of the imagination as a means of action, surfacing a 'technicity'⁴ or 'method'.⁵ Due to the centripetal nature of this poetic research model, its origins may initially lay as multiple disparate points, yet as more research surfaces it has the ability to converge to a central focal territory, producing a stabilised, rich, layered and complex series of non-linear connections.

Rosenberg's model for poetic research forms the overarching chosen methodology within this dissertation, surfacing a plethora of site-specific particularities; drawing parallels from multiple points in an aim to establish a truly site-cultured architecture.

2. Rosenberg, T 'The Reservoir: Towards a Poetic Model of Research in Design' Working Papers in Art and Design (2000), available at <http://sitem.herts.ac.uk/artdes_research/papers/wpades/vol1/rosenberg_2.html>. 6.

3. Ibid at 5.

4. Ibid at 5.

5. Ibid at 5.

*I try to give people a different way of looking at their surroundings.
That's art to me.*

Maya Lin.

READING SITE

Within the essay, 'Shifting Sites: The Swiss Way, Geneva,' George Descombes describes that in order to produce an architectural extension of place, an embedded knowledge of site is required. This knowledge is gained through understanding landscape's composing matter and in turn its material memory. Acting as a vessel of time-based imprints, '[l]andscape is never finished or completed, like a can of preserves; it is an accumulation of events and stories, a continually unfolding inheritance'.⁶

This material memory of matter therefore implies that in order to gain knowledge of place, it is critical to surface the particularities of the embedded 'traces'⁷ within its surface. Descombes elaborates on the presence of such traces within specific contexts of matter, in which natural traces are more evident within the shifting natural landscape, as opposed to the static nature of the man-made. These natural traces manifest as dynamic natural forces of place, altering its physical formation and dictating its transformation over time, ultimately impacting the experiential qualities of place.

The resurfacing of hidden traces aims to clarify moments, marking the presence of unrealised spatial features within the existing landscapes. This is achieved by providing a 'shift in complexity through minimum means'.⁸

6. Descombes, G 'Shifting Sites; The Swiss Way, Geneva' in Corner, J *Recovering Landscape: Essays in Contemporary Landscape Architecture* (1999). 81.

7. *Ibid* at 5.

8. *Ibid* at 5.



Wire Landscape (Everest).

This momentary shift in perspective is marked by the presence of architecture, and is described by Descombes as follows:

I aim for precision of disposition, articulation, arrangement - architecture - so that a pre-existing place can be found, disturbed, awakened, and brought to presence. I try to achieve an architecture of place, a construction that jolts its context, scrapes the ordinariness of a situation, and imposes a shift on what seems the most obvious.⁹

This momentary jolting of context acknowledges future potentials of site, amplifying its previously ghosted presence within the landscape. Due to the complex systematic composition of landscapes, smaller architectural interventions are preferred, implemented through an acupuncture approach. This approach in turn has the ability to manifest across large landscapes with minimal means, limiting the disturbance to the existing natural systems whilst still amplifying the landscapes legibility through an embedded architectural response.

When paralleled with the rationale of the miner, the surfacing of embedded traces of place provides a highly imaginative research method. This methodology, carried out by 'walking again and again around the site'¹⁰ serves as the manner of inquiry.

9. Ibid at 79.

10. Ibid at 82.

Part Two: The Disruption of Nature

Cape Argus, 10 June 1910

TIN NEAR CAPE TOWN.

REPORTED DISCOVERY.

AT FOOT OF DEVIL'S PEAK.

We are informed that an area believed to carry some rich tin ore has been discovered on the land lying between the foot of Devil's Peak and Upper Buitenkant-street, and including portions of the properties of Messrs. Mellish, Jurgens, Walsh, and the Cape Town Municipality. Our informant, who states that he saw the samples carrying splendid crystals of cassiterite, advises that the discovery was actually made some months ago by Mr. Ross, well known as the prospector to the No. 7 Syndicate.

It is stated that Mr. Ross came upon the find by accident, when sheltering under a boulder during a heavy rain storm.

It is interesting to recall that the Jurgens portion of the area was sold recently at a nominal figure by public auction on the Grand Parade.

THE ARTEFACT

The Vredehoek Tin Mine sits within the foothold of Devil's Peak, formerly known as Prospectors' Hill. The discovery, accredited to Mr Ross, 'well known as the prospector to the No.7 Syndicate',¹¹ is reported to have stumbled upon the discovery by accident, whilst sheltering beneath a bolder from the rains.¹² In 1910, exploration into the area began in which an area 'opened up over a distance of 500 feet on a more or less horizontal line about 30 to 50 feet above the water stream'.¹³ At the end of March 1911, the newspapers announced the prospectus of the Vredehoek Tin Mining Syndicate, whose directors were well-known Capetonians – Senator Sir Miering Beck, Mr Ludwig Wiener and Senator AG Viljoen, with a capital of £30 000.¹⁴

At the height of its production in 1912, the Cape Argus reported that approximately 100 men all together were engaged in the mine.¹⁵ The 55m deep mine extracted the cassiterite (SnO₂) or tin oxide found within granite and quartzite formations.¹⁶ This extraction produced a yield of 2.5%, of which 70% of its total body is pure tin.¹⁷

11. The Argus Tin Near Cape Town (1910) in Spargo, P *The History, Preservation and Restoration of Vredehoek Tin Mine, Devils Peak, Cape Town* (1999).

12. Spargo, P *The History, Preservation and Restoration of Vredehoek Tin Mine, Devils Peak, Cape Town* (1999).

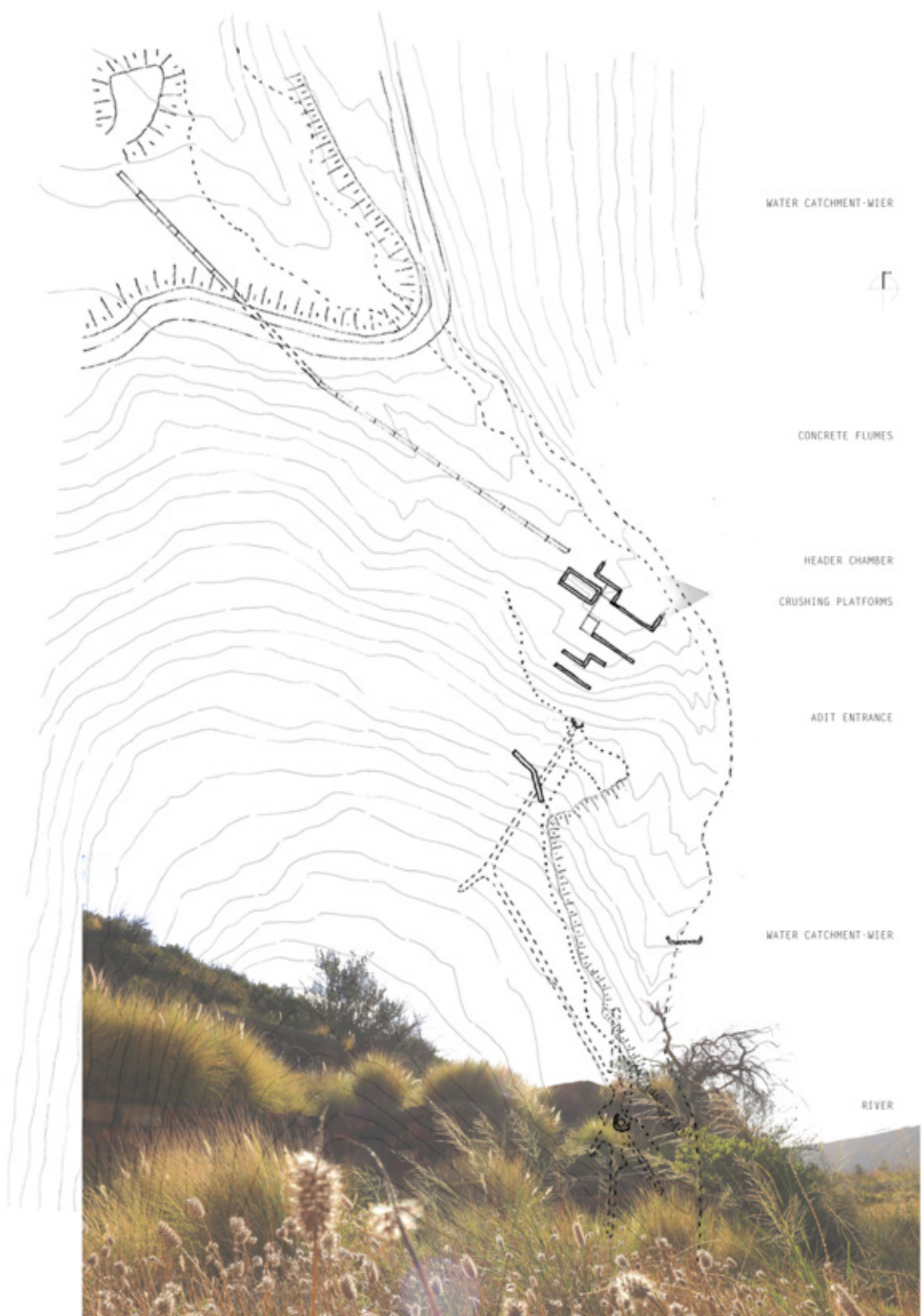
13. Spargo, P 'The Vredehoek Tin Mine Cape Town' (1999) 54 *Quarterly Bulletin of the National Library of South Africa*.

14. Ibid.

15. Spargo, P (Note 13 above).

16. Cairncross, B *Rocks and Minerals of Southern Africa* (2004).

17. Ibid.



Although closing in 1914 due to a presumed reduction in yield, the remembrance of the Tin Mine's industrial processes still remain; preserved within the protected boundaries of the Table Mountain National Park. This imaginary boundary, established in 1910, follows the 500ft contour line, and is marked today by a physical built edge.¹⁸ Due to the mines fragmented spatial nature, its components lay juxtaposed to its surrounding natural landscape, as artefacts of a forgotten industry. These artefacts, each with their own specific purpose and position, unfold along the river course. These include the mine shaft and its weathered entrance, the embedded concrete working platforms and their sandstone retaining walls, a network of stone dam walls, a string of fractured concrete flumes, the header dam and the traces of industrial machinery.

18. Hey, D *The Mountain: An Authoritative Guide to the Table Mountain Chain* (1994).

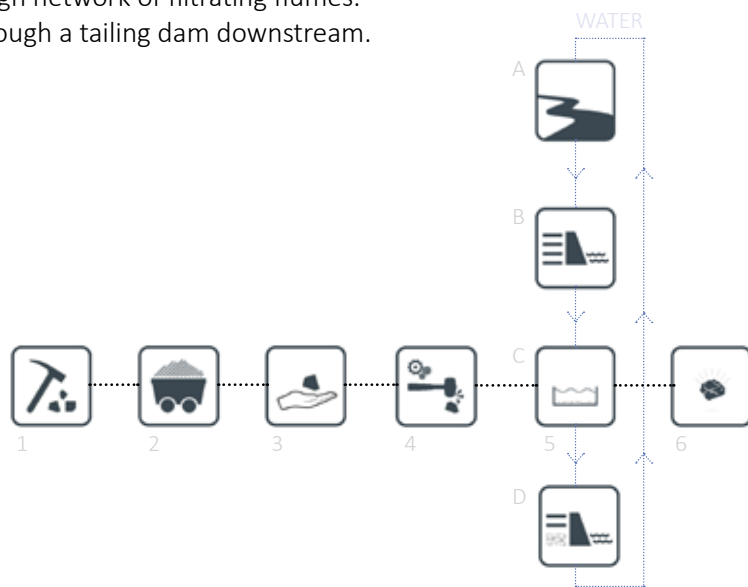


Process on Site

- 1- Excavation through mining shafts.
- 2- Transportation to processing platforms.
- 3- Hand sorting on platforms.
- 4- Crushing via the 5 Stamp Mill.
- 5- Suspension of ore via the network of flumes.
- 6- Extraction of the raw material: tin ore.

Water Articulation

- A- Water harnessed from river.
- B- Primary dam upstream to feed header dam.
- C- Water flowed through network of filtrating flumes.
- D- Recycling water through a tailing dam downstream.





The removal of excess matter form the horizontal service audit.

THE SHAFT

At the height of its production in 1912, the industrial landscape was marked with a vertical void, extending 55m into the earth's surface. The burrowed vertical nature of the shaft is due to the presence of a vertical hydrothermal vein within the geological granite structure.¹⁹ At the base of the shaft, a hollowing sprawl occurred, signifying the discovery of a mineral deposit. The hollowing continued horizontally in various randomised directions, prompted by the momentary surfacing of flat-laying quartz veins.²⁰ These momentary discoveries also manifest within the sectional profile of these shafts, representing the uncertainty of the prospecting, unearthing material in the hope of surfacing riches that may lie beneath.

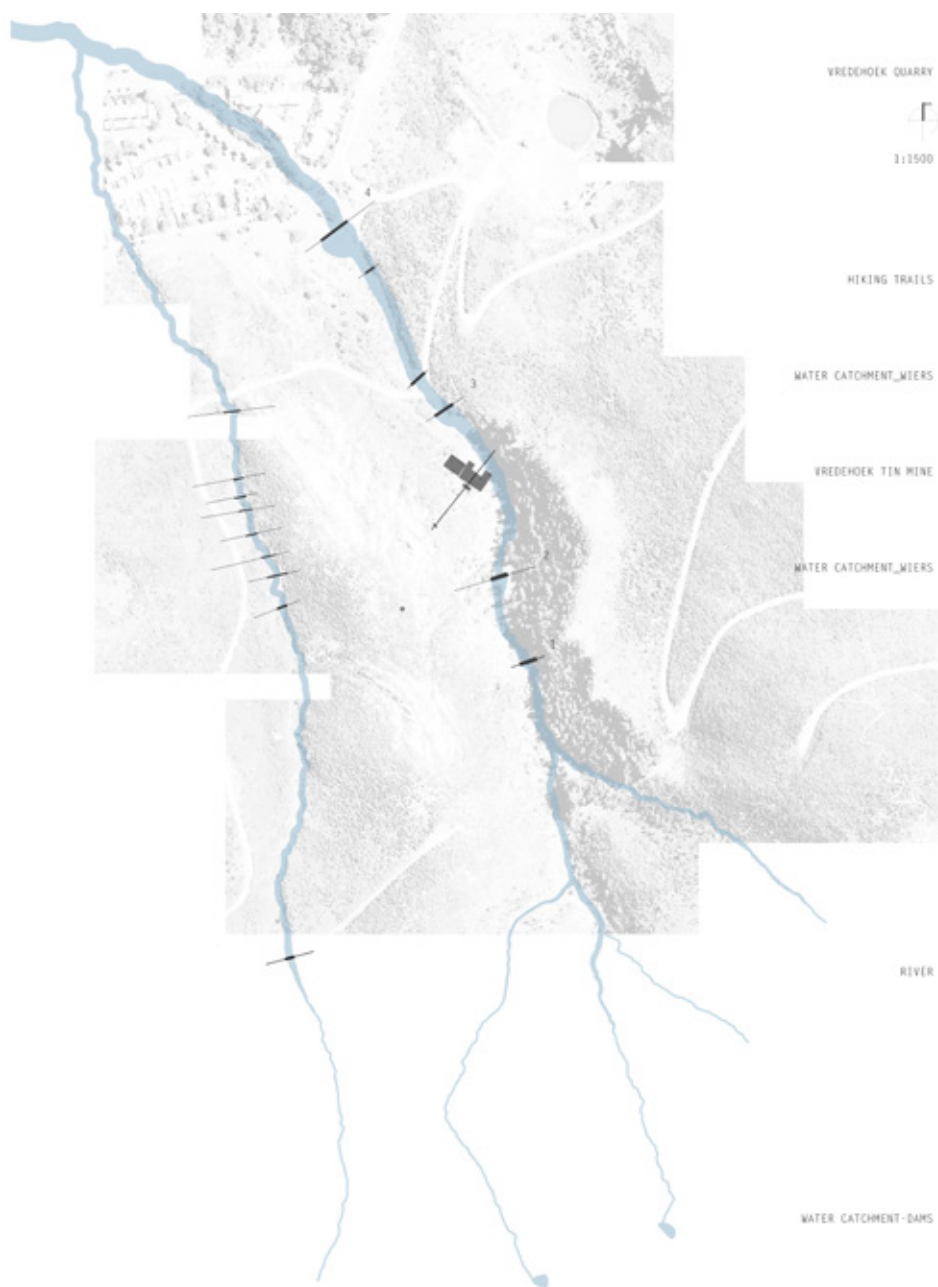
Although the exact process of excavating the multiple mine shafts is unknown, it can be presumed that a relevant technology would be applied in achieving a level of expected efficiency. The likely source points to a concoction of gelatine and dynamite; hand bored into the rock face and loaded by 'machine men'.²¹ The ratio of powder utilised would ultimately be due to the geological rock typology and the most economical manner in which extraction could be achieved. Once again in the pursuit of efficiency, an audit shaft was subsequently added for ease of material removal and working access.²² In turn, this service audit burrowed horizontally, announcing itself on the upper north-eastern slopes of the ravine. Its presence remains visible today, as a scar within the natural surface of the landscape. As being the designated path of removal, the transported mineral laden matter would require processing. Utilising water as the primary agent within the refining process, the ability to dictate its available volume and flow was achieved through the imposition of obstacles: dams and weirs.

19. Cairncross, B (Note 16 above).

20. Spargo, P (Note 13 above).

21. Munroe, *CE Explosives In Metal Mining And Quarry Operations* (2003).

22. Spargo, P (Note 13 above).



DAMS AND WEIRS

The Tin Mine's heavy reliance on water and its inherent ability to break down matter is echoed through the frequency of the water capturing devices along the river course. The imposed engineering aimed to control the water, articulating its path and focusing its flow through a network of pipes, unlocking its embodied potential energy. The water's journey begins at the first major obstacle: the main dam. Situated at the highest point within the system, it utilised gravity to draw the water's flow toward the working platforms, before descending further into the filtration matrix and settling at the tailing dam below.

This critical management of water and its volume stems from the region's Mediterranean climate and its seasonal rainfall patterns. Due to the lack of summer rainfall, the implementations of such devices are needed in order to maintain water security. In addition to these systems in place, a water reticulation system was introduced. As water exited the processing matrix it would be channelled into a catchment area known as the tailing dam. Here, the 'pulp (the sandy remains from the separation process)'²³ would subside, therefore allowing the distilled water at the surface to be pumped back into the header dam for reuse.²⁴

The frequency of these imposed obstacles further ingrains the relationship of man to the natural environment as an exploitative one; imposing obstacles in the hydrological networks meant fundamentally altering the characteristic and ecological systems that naturally unfold along its presence downstream.²⁵

23. Blackburn, CL 'Waste/Mine Reinterpreting Mans' Connection to the Landscape Through the Conservation of a Tin Mine on Devil's Peak' (2014, MArch dissertation, University of Cape Town).

24. Ibid.

25. McCully, P *Silenced Rivers: The Ecology and Politics of Large Dams* (2001)..



The active mine, nestled into the slopes of Prospect Hill. (1911)



The existing remnants of the Vredehoek Tin Mine. (2017)

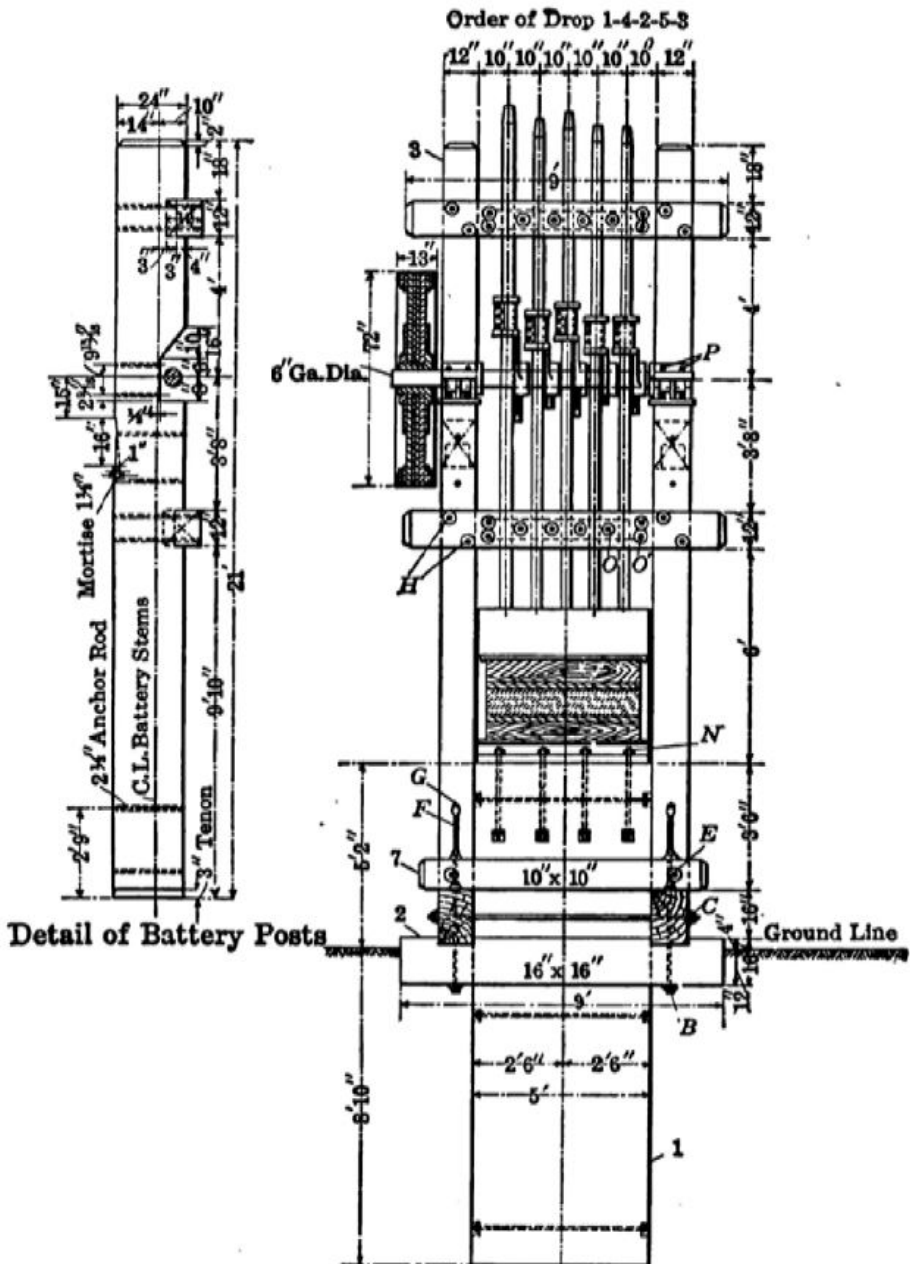
WORKING PLATFORMS

The ruin's presence is emphasised through the large vertical planes of its sandstone retaining walls. Capped with a tactile concrete slab; its textural face bearing testament to its exposure to the elements. As the seemingly embedded platforms protrude from the overgrown grass, their staggered relationship to the landscape becomes a point of interest.

Upon further inspection, the mine's careful response to siting is evident through the subtle vertical articulation of its working platforms and its imposed water infrastructure. The rationale governing its spatial layout lies rooted in the mannerisms of water, and its constant downward flow. In turn, the relevant processes cascade along the face of the ravine, unfolding as large open working spaces.

Fundamentally, the platforms acted as a purely functional space: a place for sorting and crushing. The larger concrete slab, spanning over two levels, lays approximately 5m in width by 10m in length. Whilst the first tier sits 1.1m above natural ground level; the second tier lifts another 2.3m above its position. Their position, close in proximity to the horizontal service audit, provides an efficient route for the deposition of matter. Here, upon its large open surface, the labour intensive task of sorting the matter by hand occurred.²⁶ This matter would then move towards the smaller triple tiered crushing platform and its machine: the 5 stamp mill.

26. Spargo, P (Note 13 above).



An example of a 5 Stamp Mill

THE MACHINE

The Tin Mine, although initially operated by manual labour, implemented the processing power of machinery, crediting its extraction of 430 tonnes of ore in November 1911,²⁷ greatly increasing the efficiency of the previously labour-intensive crushing process. Areas where machinery would operate are evident, notably that of a hopper, to hold and deposit the excavated ore, prior to entering the destructive mechanics of the 5 stamp mill, where the raw material would then be crushed into a finer aggregate before its filtration through suspension.²⁸

The position of the industrial mechanics can be traced due to their placement within the gravitational process, as well as by their remnant exposed fixings. The locations of these embedded threaded rods are announced through the weathered surface of the concrete, with a rusted metallic lustre.

The machine symbolises the relationship of man's use of technology in the dictation and manipulation of nature.

27. Spargo, P (Note 13 above).

28. Blackburn, CL (Note 23 above).

FOR TO END YET AGAIN

SAMUEL BECKETT

THE WATER HOLLOWED THE STONE,
THE WIND DISPERSED THE WATER,
THE STONE STOPPED THE WIND.
WATER AND WIND AND STONE.

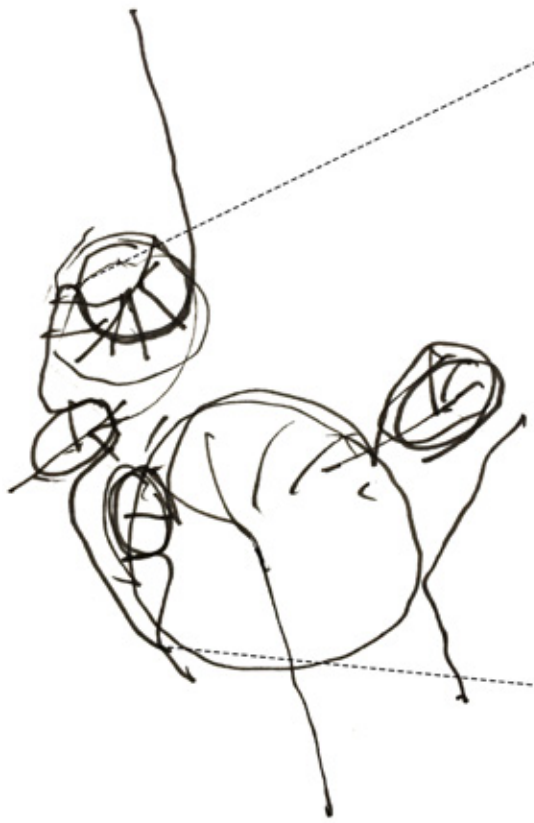
OCTAVIO PAZ, *A DRAFT OF SHADOWS*

EROSIVE FLUMES

The linear filtrating matrix of concrete flumes is still partially visible within the landscape, momentarily surfacing portions of their weathered and battered rectilinear form from the dense carpet of renosterveld that sprawls across the land. Each flume module at the time consisted of two drainage tanks boasting a capacity of approximately 300L and measuring approximately 1.2m x 0.6m x 0.45m in size. Although these historic artefacts are still physically present, their effective functionalism is highly sceptical. Their forms, exposed to the continuous process of weathering, have resulted in some flume modules being structurally compromised, therefore lacking the ability to retain water, whilst others lay entirely buried, or destroyed.

Originally, modules staggered to suit the existing gradient, ensuring the processional flow of the water towards the tailing dam. The flumes, harnessing waters weathering force, channelled the water along its cascading matrix, breaking down and separating the tin from the rock through alluvial suspension.

The weathering water, critical in the processing, was diverted from the nearby stream, which originated from the surface runoff of Devil's Peak itself. This stream, articulated through an engineered water system of weirs, dams and flumes upon exiting the mining systems entered momentarily back into the natural landscape, before being channelled into the darkness of a subterranean storm water system, originally imposed as canals under British occupation.



STORM WATER

Once named Camissa, or the Place of Sweet Waters, by the indigenous Khoi San community,²⁹ Cape Town became the ideal resting point for foreign sailors on their arduous commute around the tip of Africa towards India. Although once historically known for its abundant supply of fresh water, Cape Town's hydrological system no longer appears present within the urbanised water catchment of the city bowl, or so it seems.

Colonised by the Dutch in 1652, Jan van Riebeeck settled on the shores of the Cape with the intention of establishing a resting point on behalf of the Dutch East India Shipping Company (VOC) due to its abundance of water from its multiple escarpements and catchment areas. This initially unfolded through the establishment of water security, altering and securing the existing water courses to ensure hydration and crop production. The altered river course fed the central expansive form of company gardens with its arable soil.

In 1653, the protective form of the Fort de Goede Hoop announced its presence on the shoreline, the present day Grand Parade.³⁰ Its form, an extrusion of the clay laden earth, stood as a symbol of power, protected by the surrounding moat fed by the Varshe River.³¹ The four bastion clay fort was superseded by the Casteel de Goede Hoop (Castle of Good Hope) in 1679, in which its five positioned bastions focused towards a central natural water point.³² The manipulation of hydrological systems continued in the artificial dictation of an existing river course; wrapping its form around the fortified edge, ensuring an isolated protected central space.³³

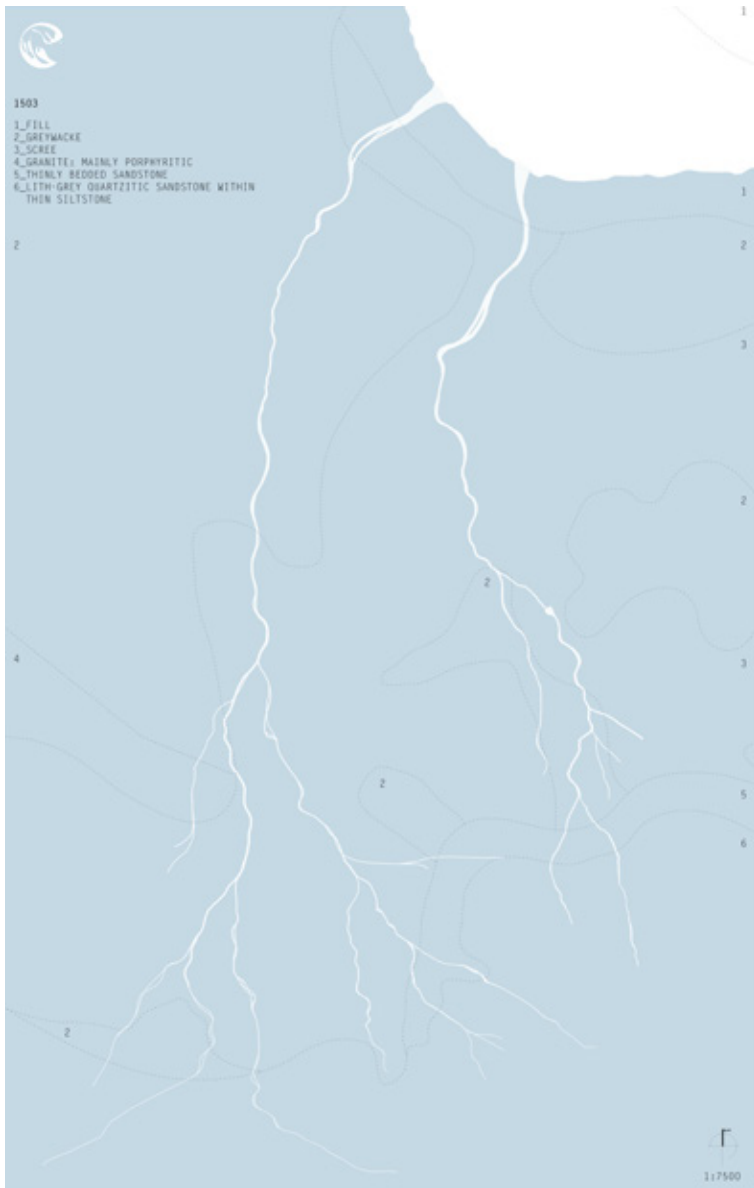
29. Camissa People 'Reclaim Camissa – The Struggle to Save our Water Heritage – Beware of the Greedy Tjommie Brigade' (2017) available at <<https://camissapeople.wordpress.com>>.

30. Castle of Good Hope 'A Short History of the Castle of Good Hope' (2015) available at <<http://www.castleofgoodhope.co.za/a-short-history-of-the-castle-of-good-hope/>>.

31. Ibid.

32. Castle of Good Hope (Note 30 above).

33. South Africa History Online 'The Castle of Good Hope, Oldest Surviving Colonial Building in South Africa, is Completed' (2017) available at <<http://www.sahistory.org.za>>.



The natural dendritic pattern, of the river pre-colonialisation. The water velocity, volume of runoff and river pattern are shaped by the underlying rock structure.

This articulation and dictation of water sources continued through Dutch occupation in which 'the town got its water from runnels and furrows connected to this stream and various mountain springs'. However, due to the pollution, water was piped through imported Burmese Teak pipes, roughly 10–15cm in diameter, directly from its source to the reservoir. With the rapid population spike around the 18th century, the implementation of public water points had been erected, at which slaves would collect water for their masters.

Until the British occupation in 1806, the dated Dutch-implemented water systems continued to feed the growing population which had reached 17 000 strong. Due to over consumption and lack of infrastructure, the existing system began to strain, which echoed in the quality of water produced, causing illness to both the town's inhabitants and armed forces. This prompted the arrival of Royal water engineer John Rennie, who began replacing the dated lead-lined wooden pipes with cast iron duplicates along Hof, Long and Strand Streets. This created an infrastructural line in which lead-lined pipes carried water to individual residences. (Although, due to low water levels at the time, a small covered reservoir positioned off Hof Street Gardens was supplied by neighbouring springs: the Kotze and Waterhof Springs). It was this accessibility that fundamentally shifted the labour-intensive daily task of water collection from a centrally positioned public fountain within town squares, to a mechanised 'Swaai Pump' (swing pump) operated system fed directly into one's home. This change in technology altered the built fabric of the city, forcing the exposed water reticulation systems below ground level, clearing way for the next infrastructural network: roads.

34. Timoney, TW 'Cape Town's Early Water Supply' (1993) *CABO*.

35. *Ibid.*

36. *Ibid.*

37. *Ibid.*

38. *Ibid.*

39. *Ibid.*

1660

Naar de Kaart No. 824, aanwezig in het Alg. Rijksarchief



The initial canalisation of water ways in 1660 (right of the four bastion castle), as well as utilised as an element of fortification: the moat.



Heerengracht

Buitengracht

The clear canalisation of Buitengracht and Heerengracht (present day Adderly Street)



A Historic sketch showing Buitengracht being channeled towards the shoreline.

1_ (1696) Post
Colonisation



2_ (1790) Establishment
of Castle of Good Hope



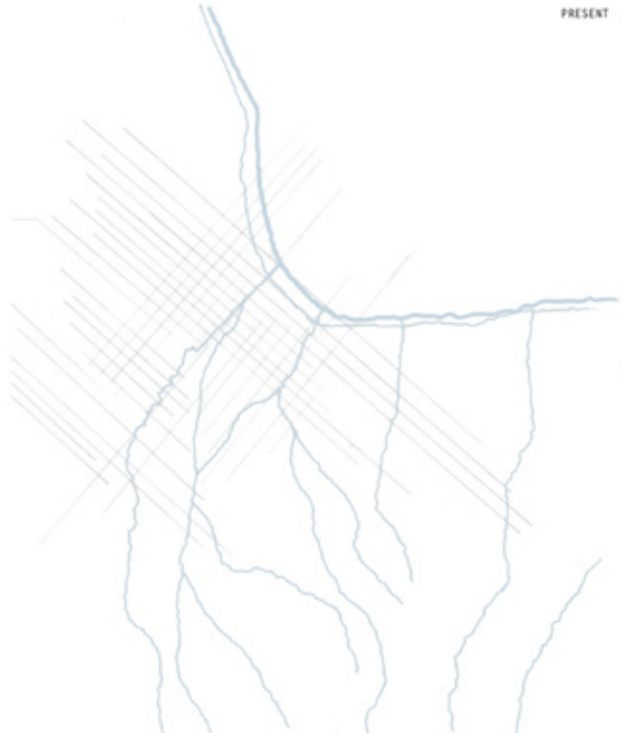
3_ (1862) Formalisation
of Harbour



4_ (1897) Adaption
Shoreline

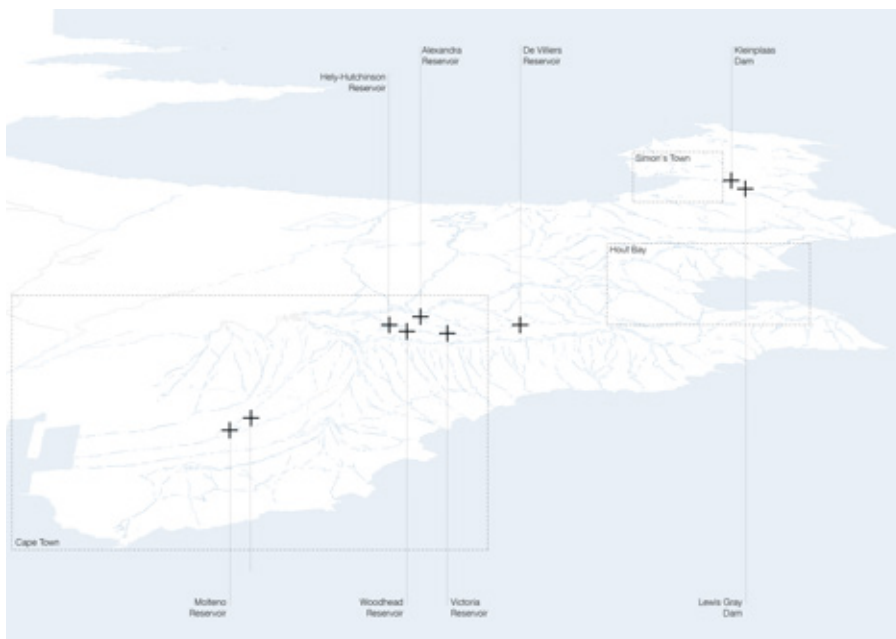


5_ (1992) Current Storm
Water Layout



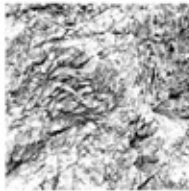
The contrasting geometries of the orthogonal city grid and the initial organic dendritic river patterns.

Two hundred years on and the presence of man’s dictation of nature for self-use can be represented through the shifting orthogonal forms of Cape Town’s hydrological system, culminating in the present establishment of six dams; providing water security for the constantly expanding population of the ‘Mother City’. Yet, although two decades have passed and the landscape has dramatically evolved, the ghosted, sub-surface water system’s presence can still be felt through the spatial layout of the city, in which its carved voids have been dictated by the initial capturing, transportation and distribution of this vital natural resource. Therefore, one may say Cape Town’s very being revolves around the simple presence of this life-giving resource: water.



The above graphic depicts the water storage infrastructure within the localised area of the Cape Peninsula.

Part Three: Programming Water



2_GREYWACKE

LOWER STAGE: Poorly sorted angular grains of quartz, feldspar, and small rock or lithic fragments compacted in a clay-fine matrix.



3_SCREE

LOWER STAGE: A loose collection of rock fragments that sit at the base of mountains, crags, cliffs and volcanoes that have periodically occurred over time.



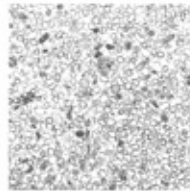
4 GRANITE :
MAINLY PORPHYRITIC

UPPER STAGE: Granite is a felsic intrusive igneous rock structure. Porphyritic rocks have large crystals or phenocrysts floating in a fine-grained groundmass of non-visible crystals.



5_SANDSTONE:
THINLY BEDDED

MIDDLE STAGE: Sandstone is a clastic sedimentary rock composed mainly of sand-sized minerals or rock grains. Most sandstone is composed of quartz or feldspar, the most common minerals in the Earth's crust.



6_SANDSTONE:
LITH-GREY QUARTZITIC

MIDDLE STAGE: Another sedimentary rock layer, however contains large grey visible flecks of quartzite.



CAPE TOWN FLOOD CYCLE: 3-4 YEARS
CYCLES OF RIVER EROSION

YOUTH



MATURITY



OLD AGE



REJUVENATION



MATTER AND PLACE

Place is defined by the composition of matter, sculpted by the particular magnitude of its elements: earth, air, fire and water. In order to create a phenomenological architecture – an extension of place⁴⁰ – it is imperative to understand the relationship of matter, and its effects on people through experience.

Cape Town's unique geographic form stems from the primary relationship between earth, water and fire. Its iconic forms of Table Mountain, Signal Hill and Devil's Peak are the result of the African Superswell; a 'large, buoyant plume of hot mantle rock'⁴¹ which surfaced a hardened sandstone area of horizontal strata. This superheated sandstone, being more resistant to the effects of weathering and erosion, resulted in the unmistakable natural formations of today.⁴²

In isolating water as the significant shaper of both the natural and urban spatial fabric, the watershed of Table Mountain surfaces its physical properties in a reddish hue. The water's unique colouration is caused by an altered relationship between water and earth in the presence of Tannin.⁴³ Commonly found within bodies of surface water, its earthy tone is a by-product of the natural decay of the area's localised plant matter: fynbos.⁴⁴ In studying the sacrificial nature of fynbos and fire, the reddish phenomena may be linked to the percolation of water through the soil containing its charred, decaying matter.

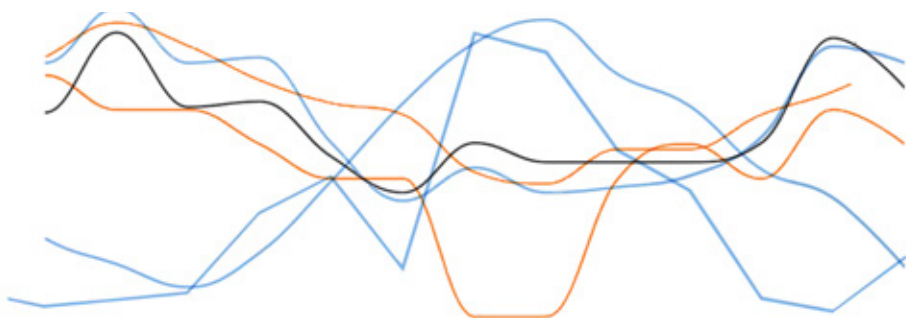
40. Norberg-Schulz, C *Genius Loci: Towards a Phenomenology of Architecture* (2007).

41. Compton, JS *The Rocks and Mountains of Cape Town* (2004).

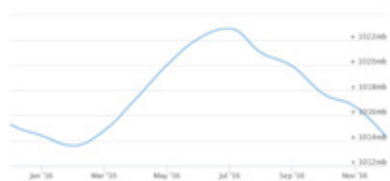
42. Ibid.

43. Rim of Africa Multimedia Trail Journal 'Tannins in Red Water of the Fynbos' (2012) available at <<http://tboltkid.com/trailjournal/tannins-in-red-water-fynbos/>>.

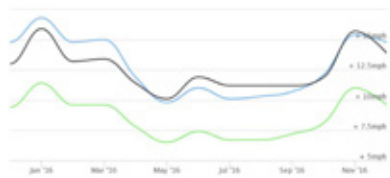
44. Water Quality Association 'Common Perceptible Water Quality Issues' (2017) available at <<https://www.wqa.org/learn-about-water/perceptible-issues>>.



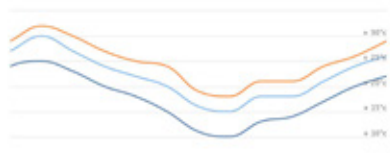
PRESSURE



WIND



RAIN



CYCLES

*No man ever steps in the same river twice, for it's not the same river and he's not the same man.*⁴⁵

Rivers are systems of time. Their nature, perennial or non-perennial, highlights the altering character of their form and physicality, dictated by the cyclical climatic patterns of a particular place.

Whilst rivers may oscillate in their volume seasonally, a river's system is inherently in a state of flux, with the erosion and deposition of material widening and constricting its critical path. In turn, the way we inhabit river environments must also be seasonal, adapting to the rhythmic transformation of the physical and experiential constructs of the riverscape.

Whilst the hydrological systems of Cape Town may shift in appearance, altering the vegetated hue across the landscape, its absence ignites the seemingly destructive cyclical phenomena of the Cape – the veld fires. Scaring the landscape as a blackened void of life, these small fires sprawl across the dry, windswept landscape aided by the 'dry, hot sunny conditions and onshore south easterly winds'⁴⁶ of summer.

Although the frequency of the fire outbreaks may appear sporadic at first, the underlying binary matrix between fire and landscape revolve around the existence of a specific category of species: fynbos. These fire-prone species have been identified as Peninsula Shale Renosterveld (5%) and Peninsula Sandstone Fynbos (92%), making up a large percentage of ground cover across the nutrient poor soil of the Cape Peninsula (figures taken from Crowling's Mapping of 1996).⁴⁷ The flames are incited by the presence of alien vegetation which have been able to establish themselves due to man's presence.⁴⁸

45. Attributed to Heraclitus.

46. Pooley, *S Burning Table Mountain: An Environmental History of Fire on the Cape Peninsula* (2014).

47. Ibid.

This relationship of flora and fire is systemic within the indigenous 'pyrophylic' or fire-loving species as they utilise this natural force in the act of germination, ensuring a minimised landscape of competition for newly fledged growth within a revitalised, nutrient rich soil. Due to this necessary relationship, the frequencies of natural fires can be mapped in accordance to the germination of the plant species. If the frequency of fires is too short, the species may not have ample time to mature, therefore not producing substantial seed banks to ensure the survival of the species, and thus reducing the biodiversity. On the other hand, if the fire frequencies are too long, this 'may result in senescence (reduced vigour and reproductive capacity) of some fynbos species, notably the endemic silver trees'.

Therefore, the Kruger's rule of thumb indicates that the minimum interval between the frequency of fires should be 'based on how long it takes the slowest maturing species in any fire management compartment to mature to the point where 50 percent of individuals had flowered 3 times or more,' establishing the general period of 10-12 years, although Cape Town National Park burns roughly 11.4 percent of its fynbos every 6 years since 1990, raising concerns for their longevity.

48. Comaroff, JL 'Naturing the Nation: Aliens, Apocalypse and the Postcolonial State' (2001) 27(3) *Journal of Southern African Studies* 627–651.

49. Kogelberg Biosphere Reserve 'The Relationship between Fynbos and Fire' (2016) available at <<http://www.kbrc.org.za/news/fynbos-and-fire/>>.

50. Ibid.

51. Pooley, S (Note 46 above).

52. Ibid.



FYNBOS REJUVENATION CYCLE: 10 - 14 YEARS

LEUCADENDRON ARGENTEUM _ SILVER TREE

BRACHYSIPHON FUCATUS

EUCALYPTUS GLOBULUS _ BLUE GUM TREE

PROTEA CYNAROIDES _ KING PROTEA

ERICA ABIETINA SUBSP. DIABOLIS

BRACHYSIPHON FUCATUS _ AUTUMN PAINTED LILY

PROTEA NITIDA _ WABOOM

EUCALYPTUS GLOBULUS _ BLUE GUM TREE

Selected species of fynbos present within the locality of the Vredehoek Tin Mine.

Flora

Listed as a UNESCO World Heritage Site for Biodiversity, the 78 555 square kilometre area of the Cape Floristic Region engulfs the relatively small proximity of the Table Mountain National Park.⁵³ Its encompassing area boasts the highest density of species in the world with more than 9600 species of vascular plants, of which 69% are endemic to this area.⁵⁴ One of these endemic species is the national flower of South Africa – the *Protea Cynaroides* – otherwise known as the King Protea.⁵⁵

Due to the specificity of its growth and the manner in which it dramatically germinates, the large fynbos landscapes of the Cape Peninsula have become a focal point of tourism. The pyrophylic manner of its germination is particularly interesting, utilising the presence of fire and its cleansing, tabula rasa effect on the landscape to ensure the removal of other competitive species.⁵⁶

The floral species are grouped into two categories based on their germination technique; *Minetes Speledidus* and the *Seretonous Protea*. The first species harnesses the wind as a means of germination, storing its seed within the upper most part of its being, its canopy. Here the seeds will be lifted by the heat of the flames and deposited elsewhere. The latter relies on fire to neutralise and enrich the landscape, sacrificing its own life in the continuation of its seedlings, stored in the depths of its woody root stack. Both these germination techniques require the act of fire as a catalyst, triggered by the presence of heat and smoke.⁵⁷

53. Notes from a Cape Town Botanist 'Fynbos' (2017) available at <<http://www.capetownbotanist.com/fynbos/>>.

54. Rim of Africa Multimedia Trail Journal 'Tannins in Red Water of the Fynbos' (2012) available at <<http://tboltkid.com/trailjournal/tannins-in-red-water-fynbos/>>.

55. Ibid.

56. Manning, J *Field Guide to Fynbos* (2008).

57. Saunders, R 'Does Fynbos Need to Burn?' (2010) *Veld & Flora* 76.



The ultimate fate of fynbos in the sacrificial act of fertilising the earth and in turn ensuring the continuation of their species.

As fynbos is a fire-dependant system, it relies on the characteristics of a fire (the smoke and heat) in order to catalyse its germination process. Although these triggers are critical, the element of fire is not. This is due to these triggers still being achieved through smoke or ash infused water, or direct sunlight heating the soil to the required heat.⁵⁸

Due to its exclusivity and unique sacrificial germination technique, this pyrophylic vegetation type is highly threatened, with 'more than 2000 species listed'⁵⁹ on the ICUN list for threatened species. The largest threat to its existence is the loss or degradation of habitat, by both man and the competitive invasive alien species they bring with them.⁶⁰ With man's constant encroachment into their habitat, these endangered species are at threat of extinction.

Due to the importance of ensuring this biodiversity and environmental stability, man has established a 'back-up' system for the worlds vegetation, located in over a thousand secured facilities across the world, known as seed banks.⁶¹ Whilst securing the ability to reproduce and ensuring the continuation of a specific species, many of the seed banks contain species of flora due to their potential to provide food security, thus only ensuring the reservation of consumable species. Due to this primary safeguarding of potential crop species, the continuity of the Cape Floristic Region and its world renowned fynbos biome comes into question.

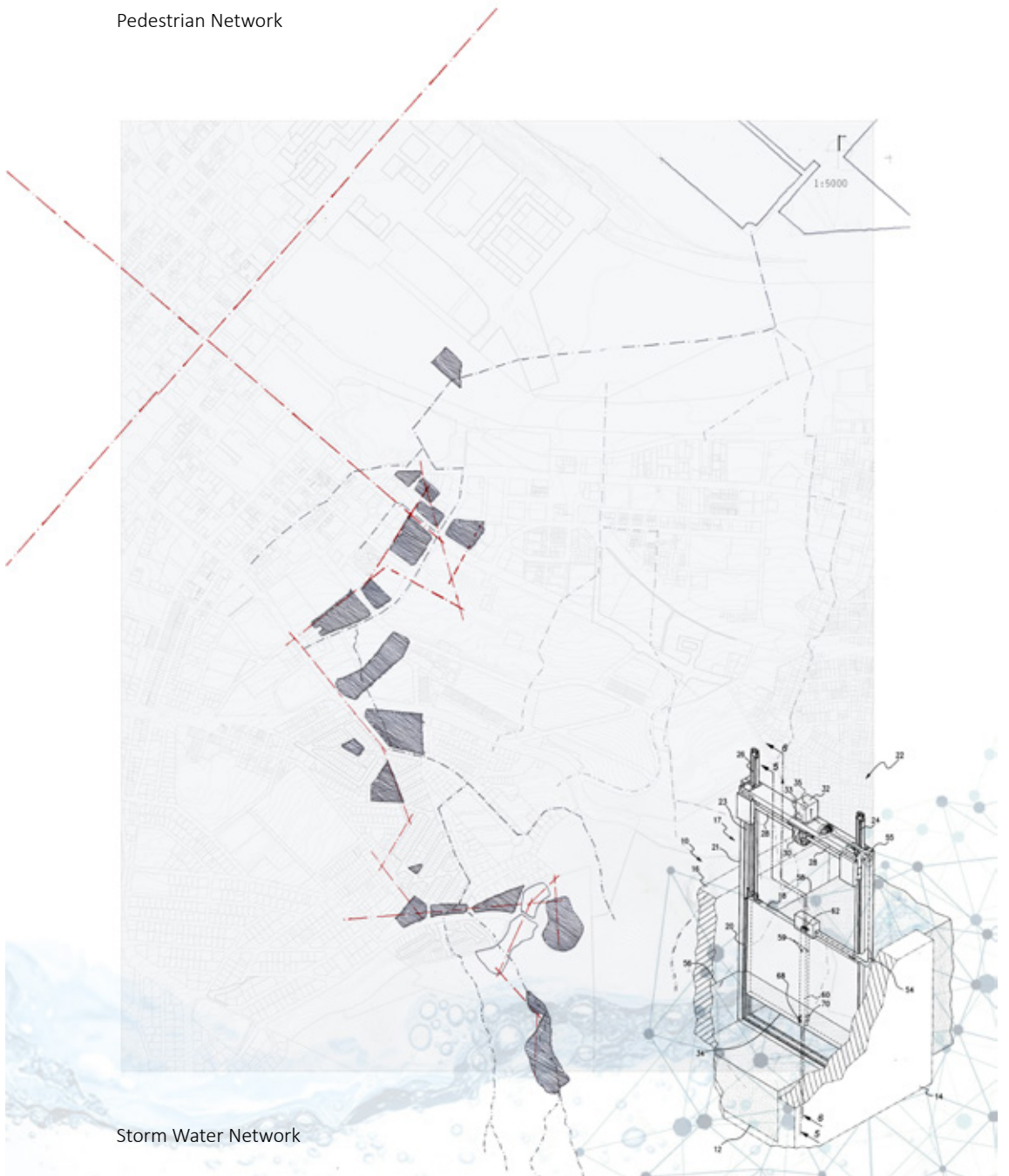
58. Notes from a Cape Town Botanist 'Fynbos' (2017) available at <<http://www.capetownbotanist.com/fynbos/>>.

59. Fynbos Hub 'What is Fynbos?' (2017) available at <<http://www.fynboshub.co.za/fynbos-conservation/>>.

60. SANBI 'Statistics: Red List of South African Plants (version 2017.1)' available at <Redlist.sanbi.org>.

61. Ronca, D Seed Banks Around the World (2017) available at <<http://science.howstuffworks.com/environmental/green-science/seed-bank4.htm>>.

Pedestrian Network



Storm Water Network

PARKS

The existence of the sub-surface, canalised water courses are marked by a series of open spaces that carve through the built environment. These areas remain unbuildable, scared by the possible fracturing of its envelope, rupturing its historic flow and compromising the system's effectiveness. These spaces in turn have been attributed with a relevant zoning overlay, generally associated towards transport routes, utility, local community and public open space (POS). Whilst the transportation promotes an open expansive use of its surface, the latter spaces lie as unprogrammed expanses, therefore unutilised, dormant or forgotten; falling into misuse by the lack of a constant human presence.

Initially proposed as areas of community interaction (local community or POS), these underutilised areas contradict their initial intended purpose and zoning. Rather, their physical presence is expansive, uninviting, monotonous and predominantly void of the objects that promote human engagement, such as public facilities, furniture, lighting etc. These unarticulated landscapes of POS are based on the modernist interpretation of landscape, limited to a reduced presence of nature through a formalised horizontal grassed surface and a vertical plane of sculpted trees.⁶²

Its vegetated monoculture negates the diverse ecologies that are endemic to the area, promoting a monotonous planar surface, captured through a minimised, singular experience of the landscape. These expansive surfaces similarly juxtapose the natural systems present, requiring larger quantities of water and regular maintenance schedules; their existence promoting excess surface runoff, already aggravated by the continually expanding artificial surfaces of the city.⁶³

62. Waldheim, C *The Landscape Urbanism Reader* (2006).

63. Belanger, P *Landscape as Infrastructure: A Base Primer* (2017).

In turn, these surfaces are directed towards the subterranean storm water system that already expels 20 million litres a day of fresh water into the harbours salt water system.⁶⁴

Alternatively these isolated pockets of undeveloped, unutilised land may be hydrated by surfacing the ghosted waterways that sit directly beneath its surface, negating the need for alternative hydration. The surfacing of this water system would also in turn re-stitch the landscape, acting as a spatial ribbon of undulating POS, projecting off the critical path of the resurfaced river. This route, for both man and nature, may in turn be activated through the implementation of relevant objects and activities, carving an alternative route of motion into the existing urban landscape; flowing from its source to its destination. Through the resurfacing of this system, the boundaries of the isolated fragments may be traversed, enticing the movements of nature and thus increasing the biodiversity of these parks. In doing so the monoculture of vegetation may be altered, providing a natural extension of the Table Mountain National Park through the gradual migration and germination of its endemic species of flora and fauna.

64. Head, T 'Watch: Cape Town's Underwater Canals Produce 20m Litres of Fresh Water a Day. Why Aren't They Being Used?' [video] (2017) available at <<https://www.thesouthafrican.com/watch-cape-towns-underwater-canals-produce-20m-litres-of-fresh-water-a-day-why-arent-they-being-used-video/>>.



Reimagining the river as it floods through the existing geometry of the city.

ROUTE

In archotyping the element of water, its characteristics focus around its relation to slope; ingraining routes and constructing edges through its movement over time, whilst inherently providing the ability to gather at its moment of rest.

Water's ability to inscribe a line within the earth provides a navigational point of reference within a landscape, suggesting the directional slope of the topography and its relation to the movement of water. This inscribed pathway embodies a conflicting character, acting as a dividing element along the horizontal surface on which it flows, whilst simultaneously acting as a connective element, stitching areas of varying elevation through its visual and material presence.

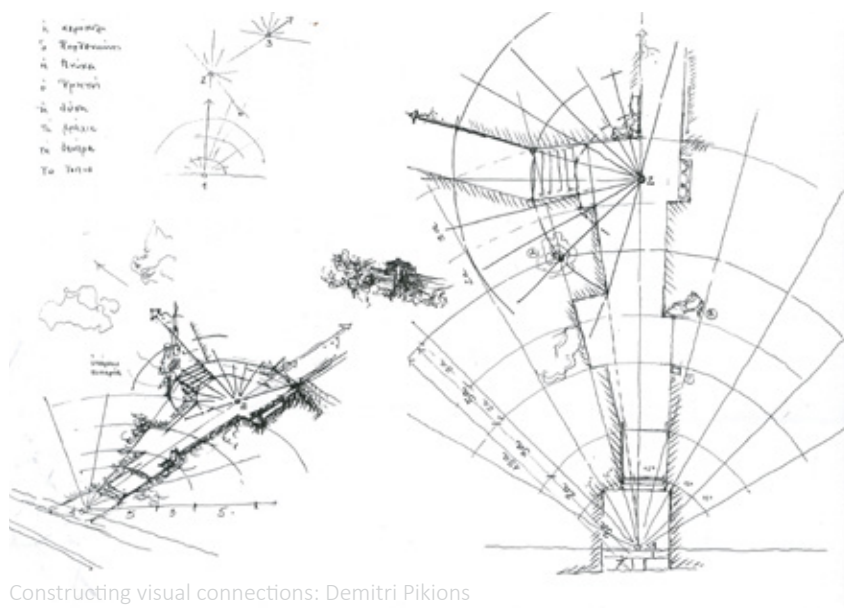
Its position as a natural obstacle surfaces the manner in which you engage with its edges; traversed and undermined or followed and emphasised, depending on the direction of your preferred movement. The velocity of the water and its relation to gravity are also mimicked in the manner in which people move through the land; steeper gradients lean to more transitional spaces whilst areas of rest lead to spaces of gathering

This understanding in behaviour and gradient unfolds within the work of Dimitri Pikionis' pathway to the Acropolis; an urban carpet that unravels its form in relation to the visual and experiential understanding of place, highlighting the users position within the landscape through framed vistas, vantage points and platforms of rest. These positional moments were connected by a geometrically generated, sinuous network of pathways, emphasising the construction of the visual landscape through the experience of man. Its physical construction, spanning between 1954 and 1957, grounded itself within localised materials and construction techniques, highlighting the nuances of place through accentuating the momentary topographical undulations and its particular lighting qualities.⁶⁵

65. Pikiōnēs, D *Dimitris Pikionis, Architect 1887-1968* (1989) Architectural Association.

“Man is the measure of all things,
of the existence of the things that are and the nonexistence if things that are not.”¹

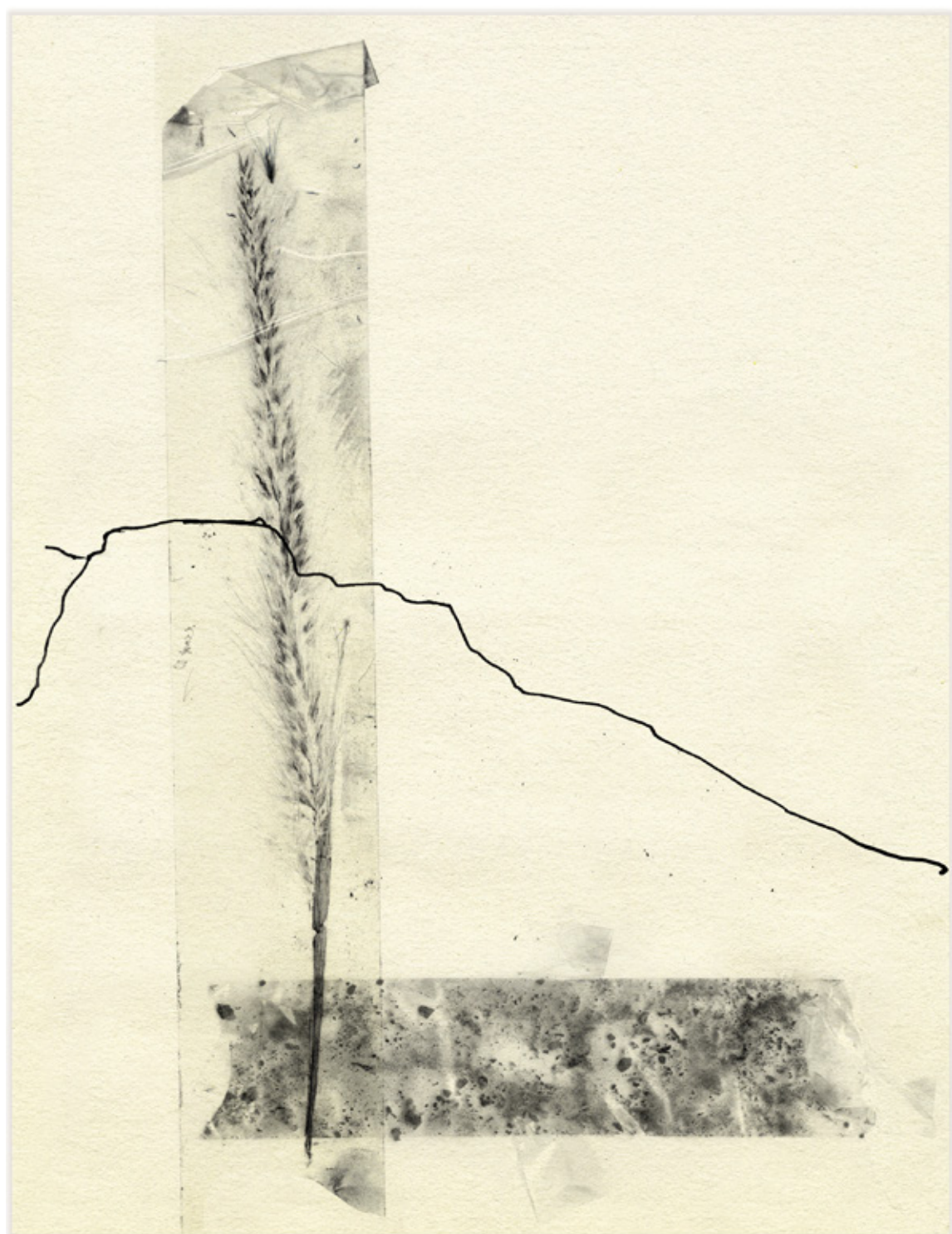
Protagoras, quoted in Plato Theaetetus 152A



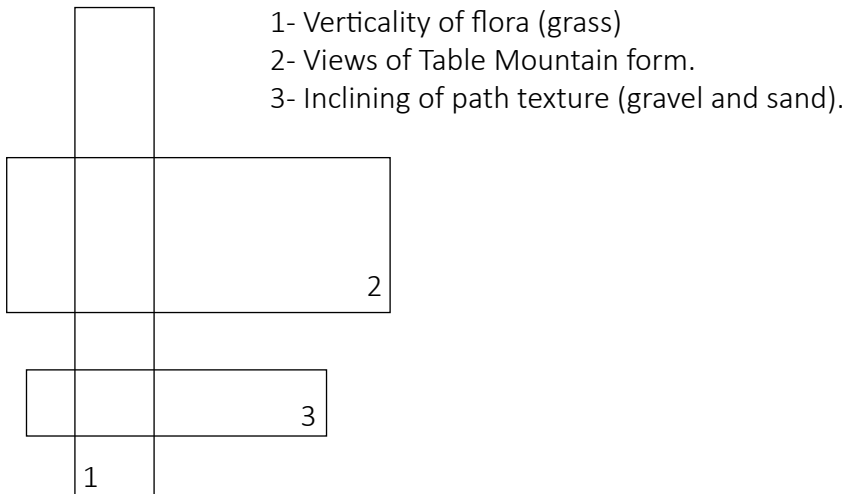
Constructing visual connections: Demetri Pikions



View along a minor path framing the acropolis and the Parthenon.



Through the analysis of the Acropolis intervention by Demitri Pikionis's, the aspect of materiality is utilised in the suggested perception and navigation of a terrain. The mappings refer utilise ash as a means of translating the experiential moments and atmospheres of one of the intended parks along the route.



Part Four: The Natural Machine



THE ECOLOGICAL CORRIDIOR

*When we come across a mound in the wood, six feet long and three feet wide, raised in a pyramidal form by means of a spade, we become serious and something in us says: some-body lies buried here. This is architecture.*⁶⁵

In using Adolf Loos's definition of architecture, the project manifests as a series of previously subdued experiences, emphasised through the presence of matter and bound by a connective route.

The project ultimately manifests as a singular entity, formulated by the processes of the individual elements within its composition. This singular entity is translated into a form: an ecological corridor, composed of a series of subtle gestures that, when combined have the ability to alter an entire landscape.

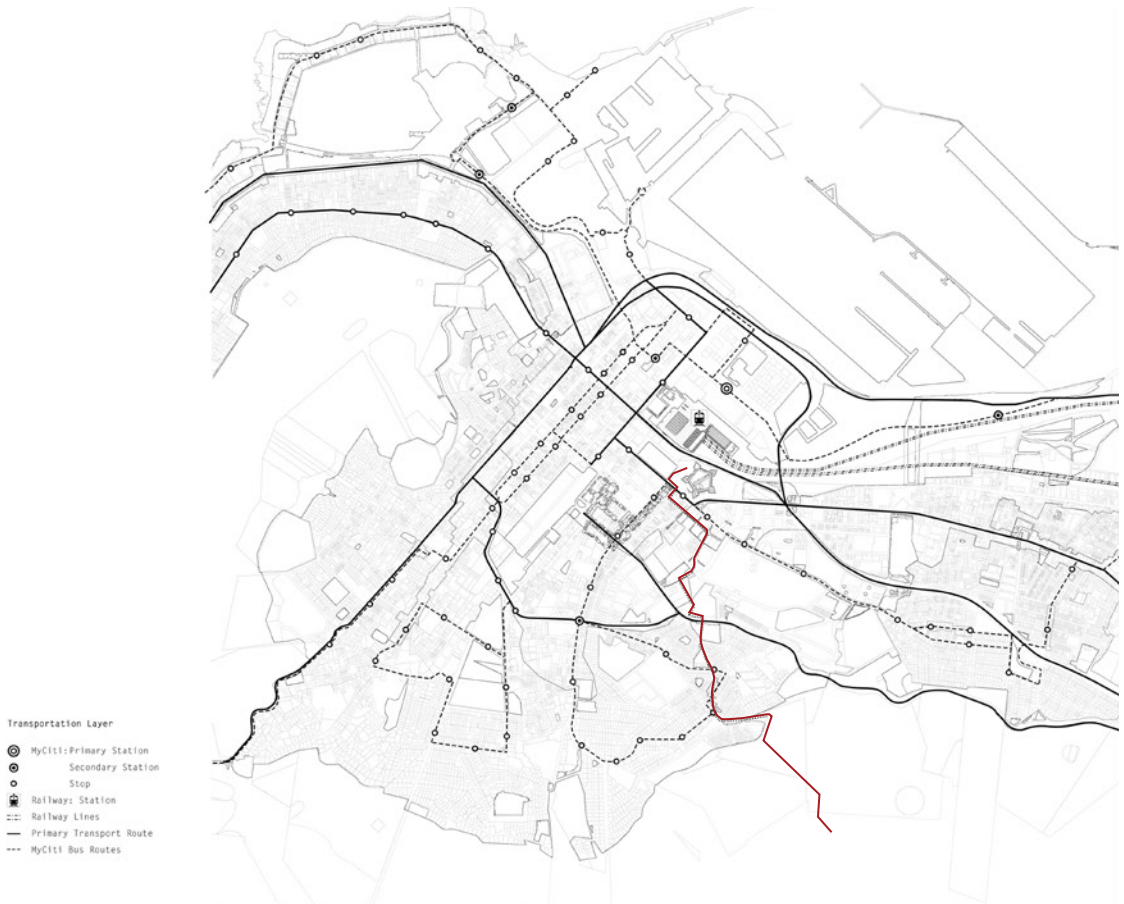
These small rescripted interventions position themselves accordingly, unfolding along a ghosted subsurface waterway. The project unfolds along a resurfaced natural waterway, marked by its visible presence within the landscape. As does water, its form gathers at moments along its journey, pausing within the environment momentarily before continuing along its route. These moments of pause are marked by formations of natural landscape; public open spaces designed to harbour social interaction between people as well as between man and its natural environment. These park landscapes are formed through visual construction, connection and articulation of its surface matter, both natural and manmade. These landscapes unravel as momentary, highly specific experiences, accentuated by the localised particularities of its context.

65. Loos, A Architektur first published in Der Sturm (1910). The translation quoted here is from The Architecture of Adolf Loos: An Arts Council Exhibition (London, The Arts Council, 1985).

- Zoning Layer
- Business
 - Industrial
 - Residential
 - Mixed Use
 - Transport
 - Public / Utility
 - Green Spaces



Understanding context through zoning.



Understanding systems and public place.

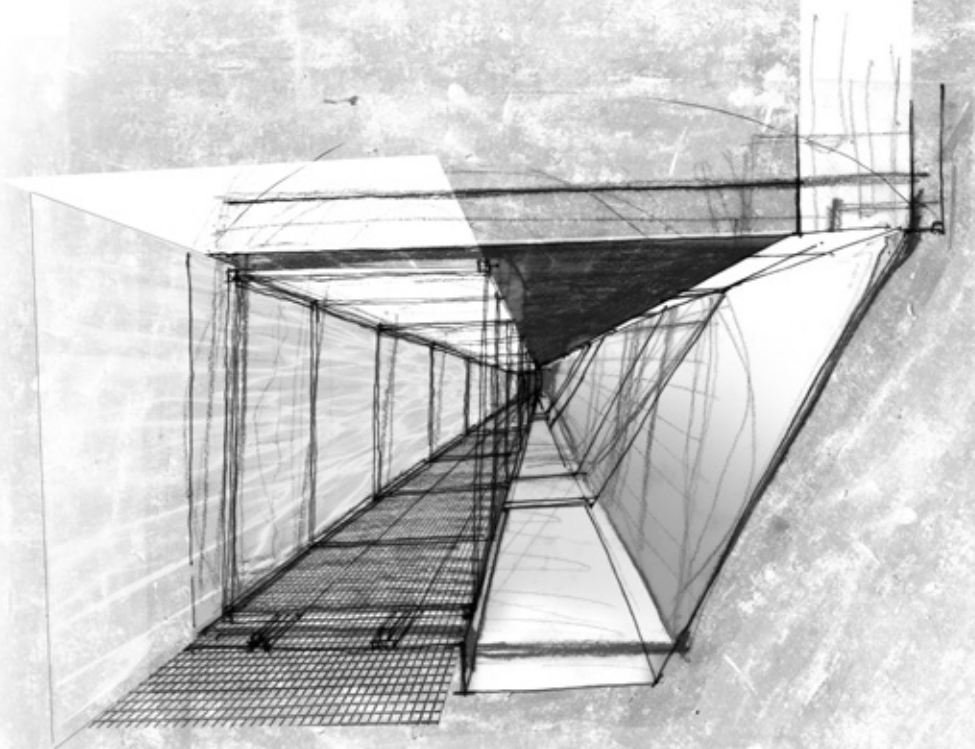
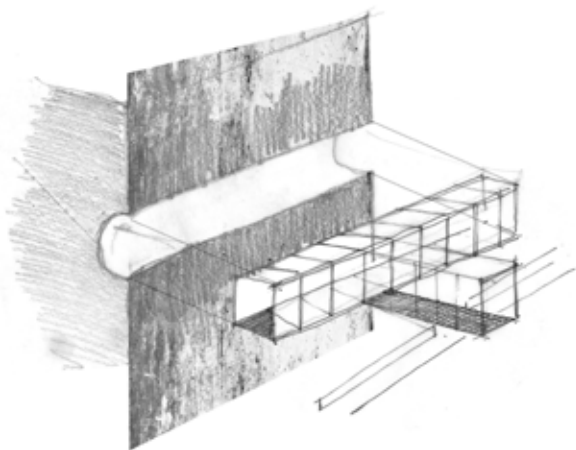
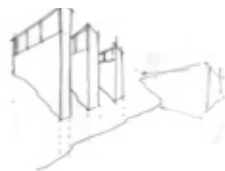
Natural (Landscape)

Man (Built)



Orientated around the continuation of the endemic floral species of fynbos, the landscapes programming reflects the momentary stages of the floras germination process. This process is subsequently overlaid with the life cycle of a river, manifesting in a symbiotic narrative of water and vegetation.

The origin of the water; the mountain marks the position of the first intervention: the seed vault. This manifests as the reimagined shaft of the Vredehoek Tin Mine. The second intervention; the germination pods act as momentary public nodes within the landscape. They simultaneously act as vessels of germination, education and orientation. The third intervention is marked by the presence and reprogramming of the mines water infrastructure, repurposed to store and release large bodies of water in a cyclical process. The fourth intervention manifests as an extension of path; an infrastructural bridge, ensuring the continual flow of both people and water along the route. The final intervention; the ecological corridor, manifests as a series of interconnected public open spaces along a route. Yet, its continued success only manifests as a result of a healthy symbiotic relationship of its initial seemingly individual interventions, therefore the urban landscape that is the ecological corridor is the first, last and essentially the only intervention.

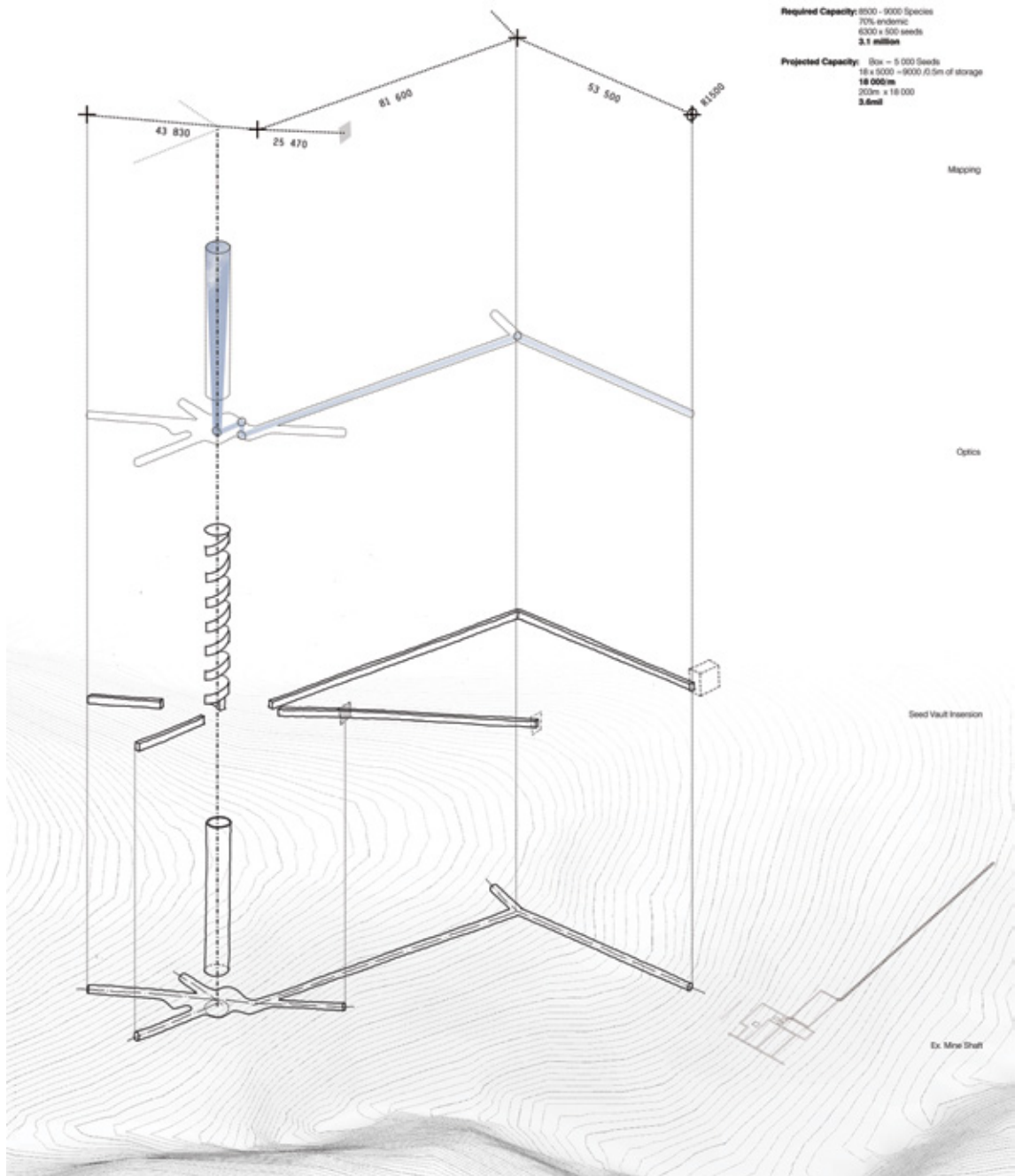


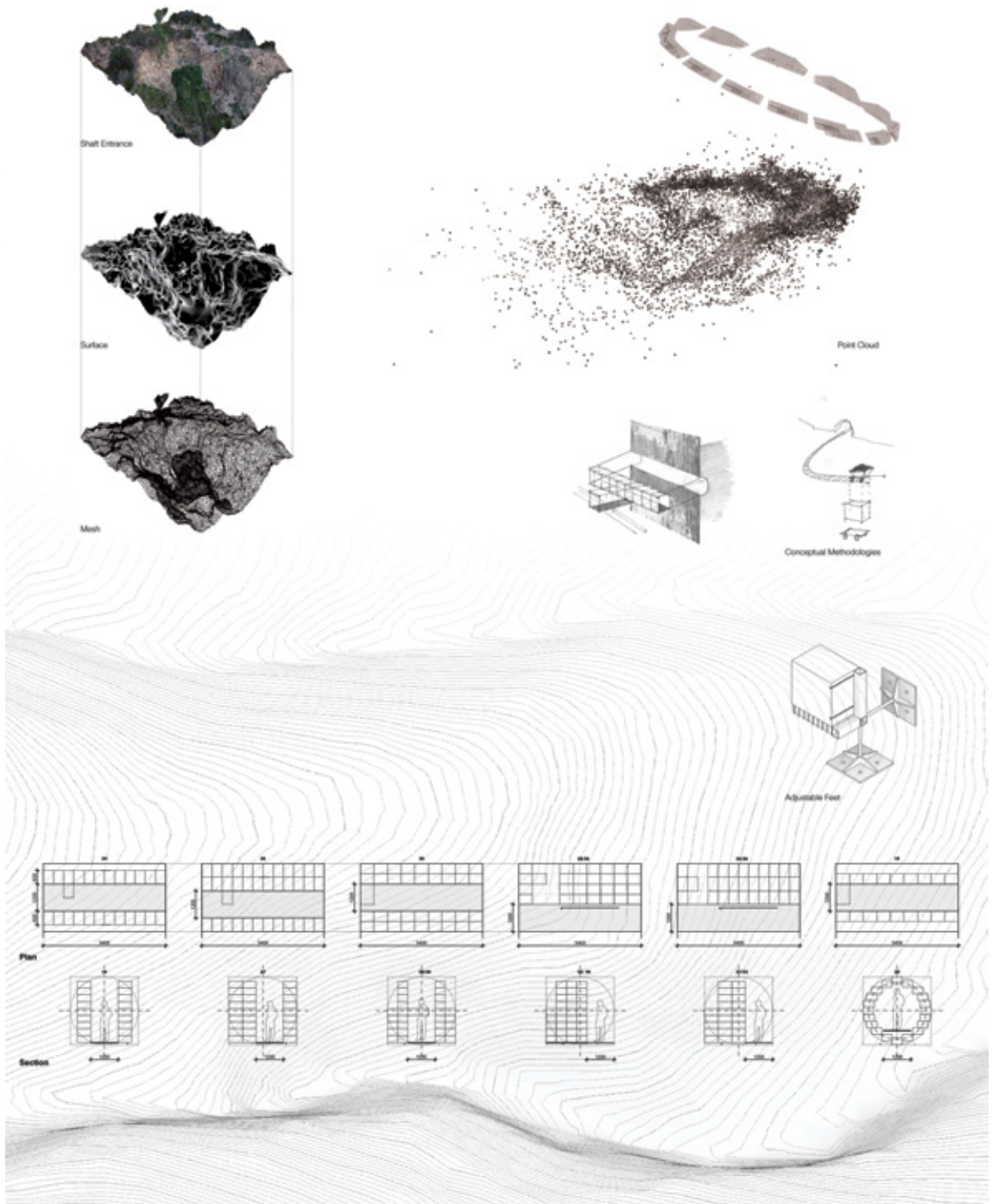
THE SEED VAULT

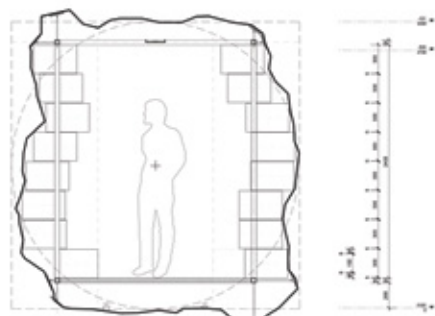
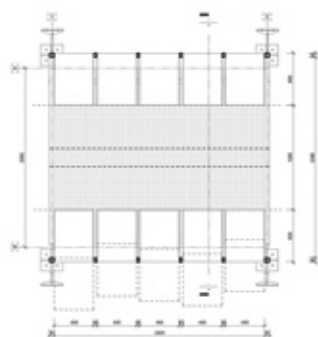
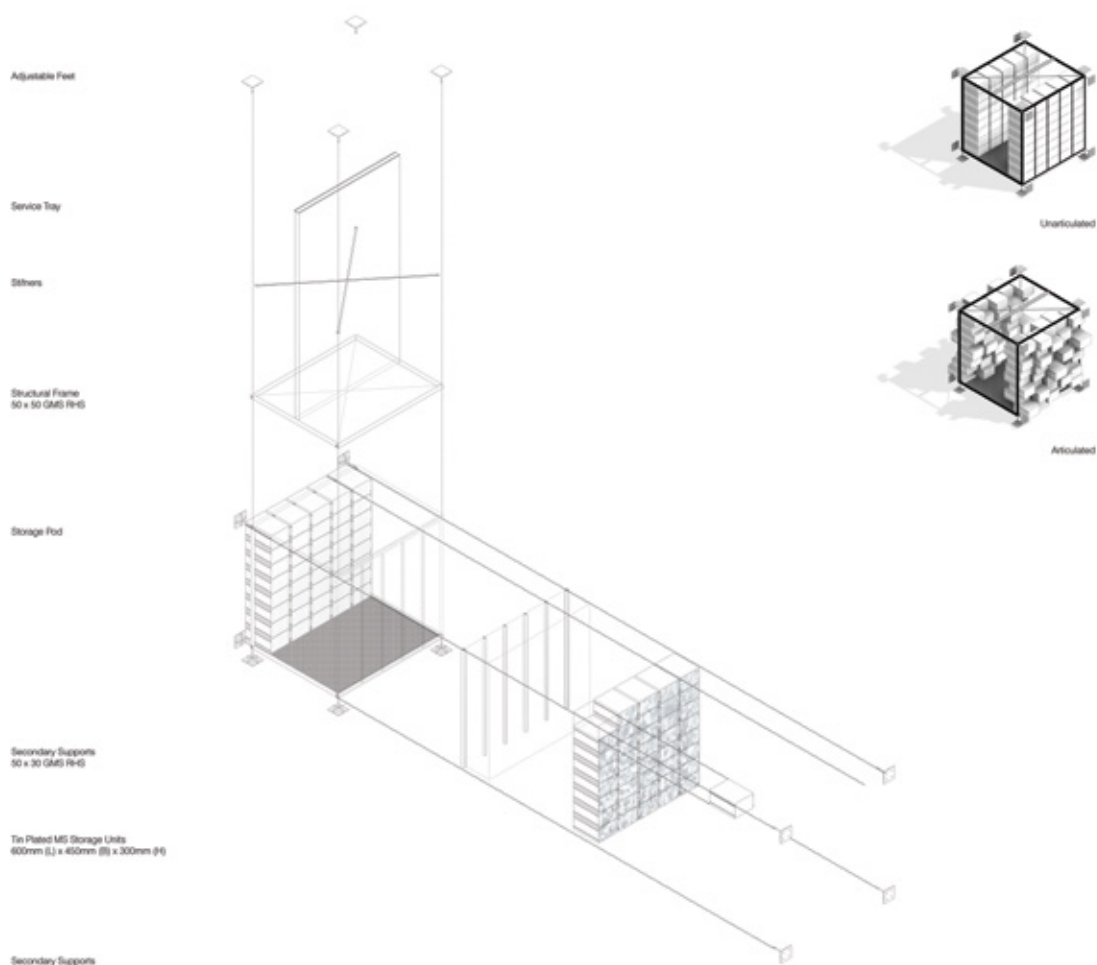
The existing shaft sits as a physical manifestation of contradicting characteristics; solid and void, light and dark, vertical and horizontal, expansive and contractive. These characteristics and their juxtaposed nature surfaced in the thinking behind the repurposing of its hollowed void. Its scarred form within the landscape, when reimagined as a seed bank, contrasts its initial existence, acting as the 'backup' to the future rehabilitation of an extinct landscape.

In order to gain an insight into the workings of a seed storage bank, specifically the manner in which seeds are packed and store, the precedent of an existing facility was examined: the Svalbard Seed Bank. Upon inspecting the process; 500 seeds of the same origin are heat sealed within a 4 ply heat sealed envelope, deposited with similar envelopes within a plastic storage container, which are then stacked in an air sealed environment, raised off the ground to protect them from possible water damage. This process was in turn initially applied to the conception of the mine shaft.

Due to the violent creation of the 3m diameter voids within the mountain, the project took a more sensitive approach, repurposing the existing parameters of its internal volume with the insertion of a repetitive, self-contained storage unit and a reflective connective network of light. This pod like design enabled the vault to incrementally expand in relative volume, whilst simultaneously adjusting to the conditions at hand. Utilising the mass of Table Mountain as a protective enclosure, the repurposing of the shafts depths provided the opportunity of lowered temperature levels and the ability to seal its enclosure. The visual tension of the solid and void acted as a catalyst, manifesting in a light weight tubular steel insertion that exposed the inner faces of the shaft, whilst simultaneously created a skeletal aesthetic which combatted the heavy attribution of both the mountain and the perception of a vault as seen on the left.







Due to the erratic nature of prospecting, the shafts geometry can be expectedly complex, creating moments of contraction and expansion. This spatial undulation required the spatial parameters of the pod to be adjustable in both its form and the manner in which it mounts itself within the space. Utilising a series of telescopic probing feet anchored to the surrounding surfaces, the pod has the ability to level and brace itself independently, even when within a series.

In order to maximise the storage potential of the void, the most economical design layout was interrogated, resulting in a central walkway with parallel flanking storage. These flanking walls, in order to respond to the undulating conditions, are fragmented into their individual forms, allowing them to be mounted on a track system. The storage boxes, bent from mild steel and coated with tin, ensure longevity from corrosion, whilst simultaneously resurfacing parallels to the original inception of the scarred landscape. Due the crafted rigidity of the selected material, these individual boxes may slide at increments, translating the internal undulating, faceted, damp rock face into the central metallic walkway of the parasitic storage unit.

Whilst moving through a tunnel, the absence and reappearance of light is inseparable from the transcending experience of entering into the solidity of the earth's mass. This experience is abstracted through a series of reflective mirrors, connecting the matter of earth and sky whilst inverting the direction towards the surface.

Due to the space essentially acting as an archive of combustible material, the aspect of fire prevention rather than detection is paramount. This is addressed through the surety of its enclosure, creating an airtight storage chamber and the implementation of a hypoxic fire prevention system, regulating the levels of oxygen to a stable level to ensure the inability of combustion.

GERMINATION PODS

Similarly to 'a mound within the wood' the presence of the germination pods act as a marker of orientation, suggesting a momentary pause within the landscape. The monolithic nature of its form and its inherent voids projects the observer's attention to the nuances of their immediate environment, its views, sounds and atmospheres, in the aim of re-establishing a connection between man and nature.

The formations also act as educational enclosures, in which their steel-lined internals depict the relationship of the mine and the landscape, marking its original and rescripted presence within the landscape.

As these forms endure the elements of time, they begin to alter in presence, shedding areas of adobe, exposing their embedded load of seeds. Whilst they remain in the landscape, their monolithic form continually deteriorates by the processes of weathering and erosion, surfacing an orthogonal matrix of steel tubing, initially acting as the adobes rebar. As time passes, the corten steel envelope begins to alter as well, changing in hue and texture. As the cyclical forces of wind, fire and rain continue at its surface, its mass shifts, changing in perception as the seeds begin to germinate, as time passes these forms alter from a skeletal void to a vegetated mass, fluctuating in density and bloom depending on the season and species.

Material Study



1) Mild Steel Elemental Assembly



2) Formation of Grid



3) Formation of Steel Substructure



4) Shutter board fixed to Substructure



5) Earth infilled



6) Addition of Steel Structure



7) Shutter board raised



8) Earth Wall



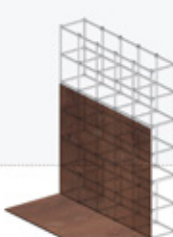
9) Steel Plate Fixed to Substructure



10) Weathering of earth mass

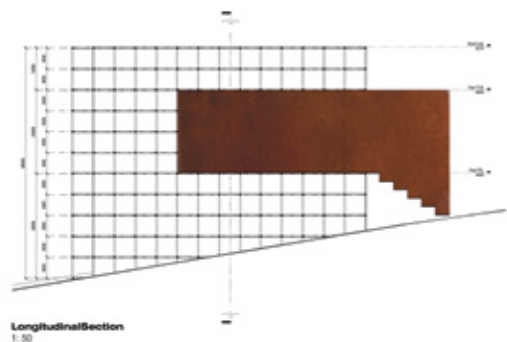
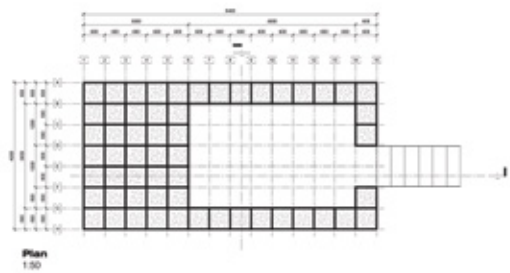
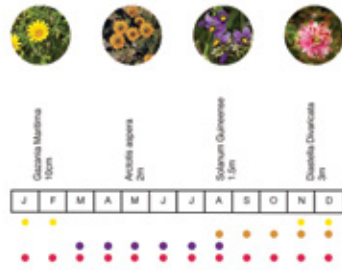
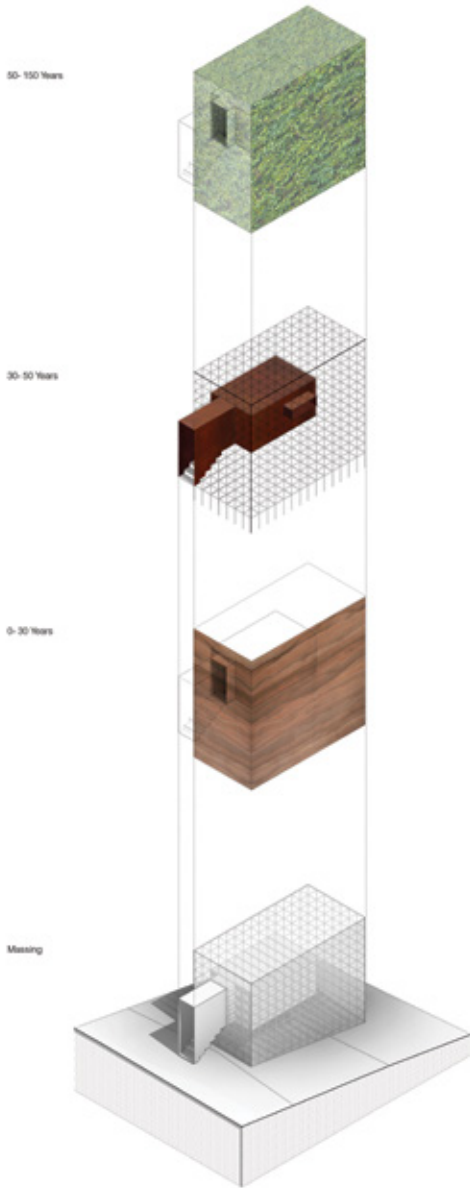


11) Exposed skeletal structure

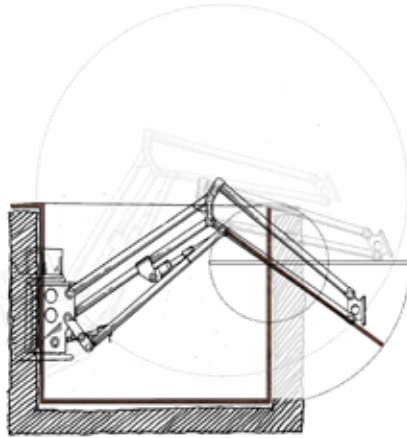


12) Vegetated weathared mass

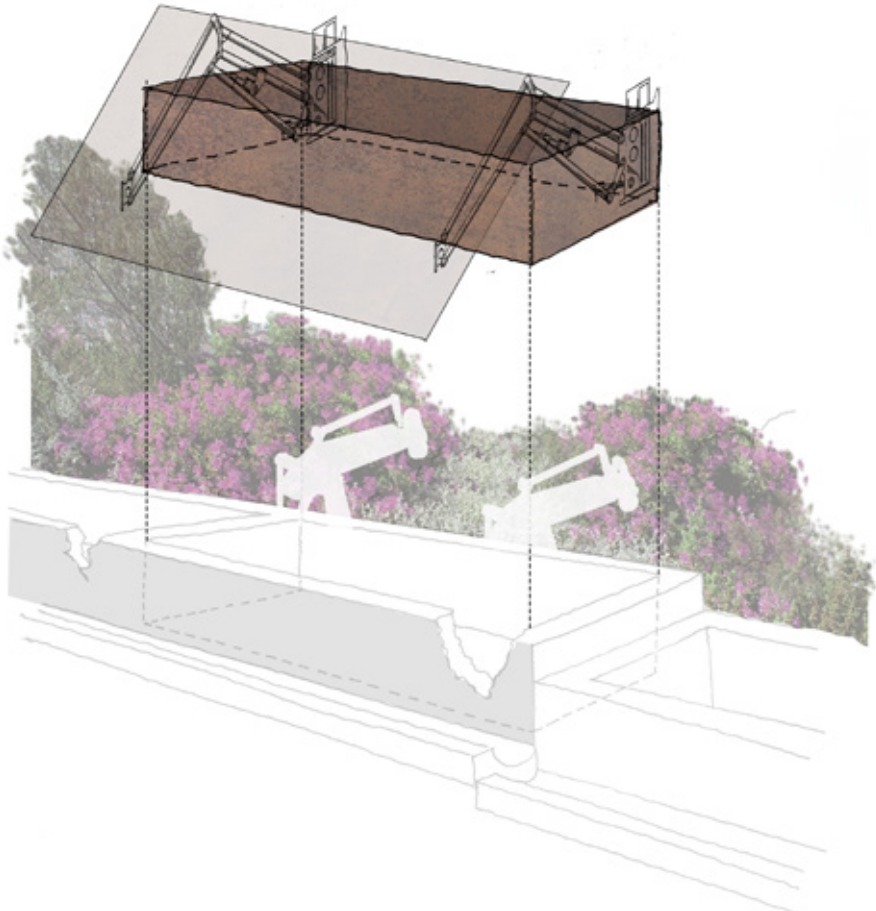




Mechanised Release



Bent Steel Trough



WATER MACHINES

Although the existing infrastructures of the mine are compromised, their physicality still remains as objects within the landscape, therefore implying their ability to be adapted and repurposed in the required storage and release of water periodically. This adaptability occurs through resurfacing the presence of the machine aesthetic, utilising its presence to alter the flow through the release of water.

The aim in re-scripting the mines water infrastructure stems from the cyclical nature of fires, and the resultant by product of ash. It is within this ash that lays the catalyst for the germination of many fynbos species. With the ability to control the release of water across the landscape, comes the ability to wash its surface, instilling the water with the essence of the earth's smoky, charred remains and instigating the growth of the fynbos.



Crossing: Sir Lowry Road and Darling Street

ROUTE AND BRIDGE

Following the presence of the water, the route navigates the landscape accordingly, marked by respected anchored points: its origin within the mountain and its destination, the castle. This physical route is created by the presence of this water and water's inherent directive characteristics. Although the route has an origin and a destination, there is no preferred direction or manner in which to traverse its length, rather its manifestation acts as a simple way-finding tool, acting as an alternative means of experiencing the city, guiding its users along a secure path, transitioning through the undulations of the land and its complex characters and zones. The approach used in its formation manifests in three typologies: the route, reflecting the motion of the water; the platform, marking the natural formation of usable topography; and the mass, the limited imposition of an architectural object as a means of gathering through programme, activating spaces along its informed pathway. The application of these typologies can be seen in the design of the route, and in turn the ecological corridor with its connected parks.

As the route unfolds, its continuity is questioned by obstacles, providing a point of architectural infrastructural insertion. One of these points of insertion occurs in close proximity to the historical marker of the Castle of Good Hope, at the joining of two major roads: Sir Lowry Road and Darling Street. Another occurs along Philip Kgosane Drive (De Waal Drive). Both these points along the route require the ability to traverse a high traffic zone. As in the manner in which a person crosses a river by means of a bridge, so too can water be channelled across these traffic zones via an aqueduct. Since both man and water are required to cross these obstacles (roads), the infrastructure used will require duality of purpose. Hence, the aqueduct acts as a bridge for both man and water. These insertions of infrastructure act as a means of continuity, marking these primary routes of circulation as gateways into the city through the announcement of its historical spatial informer, water.

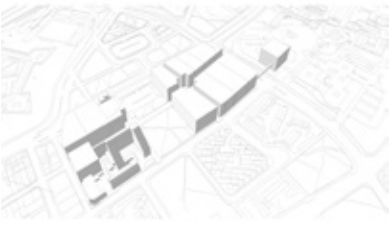
Existing



Ex. Zoning



Ex. Zoning- Max Mass



Re-Zoning



Re-Zoning: Max Mass



Articulated: Summer



Articulated: Winter

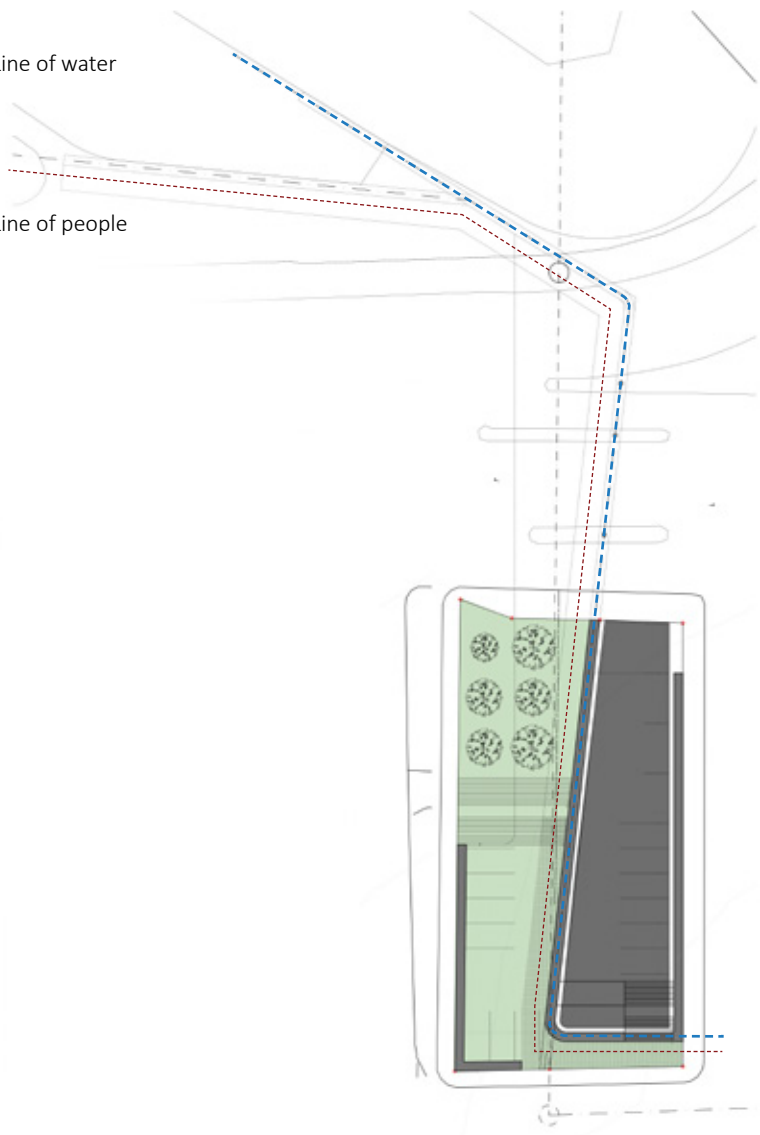


Due to the presence of an existing footpath spanning the divides of Philip Kgosane Drive, my focus shifts towards the construction of an integrated node of programme at the joining of Sir Lowry Road and Darling Street. Suggested by its designated, current usage and zoning requirements, its programmatic response is focused around the creation of an urban marker of public open space, parking and an extension of the Cape Peninsula University of Technology's (CPUT) Agricultural Department. The current disjunction between the site and the technicon has also been acknowledged; by utilising the research carried out by Guy Briggs entitled 'The Fringe', it is suggested that zoning be orientated towards a densified mixed use 'Design Park'. This park will include areas of public open space (green), commerce (blue), education (red), governmental and residential programmes (orange).

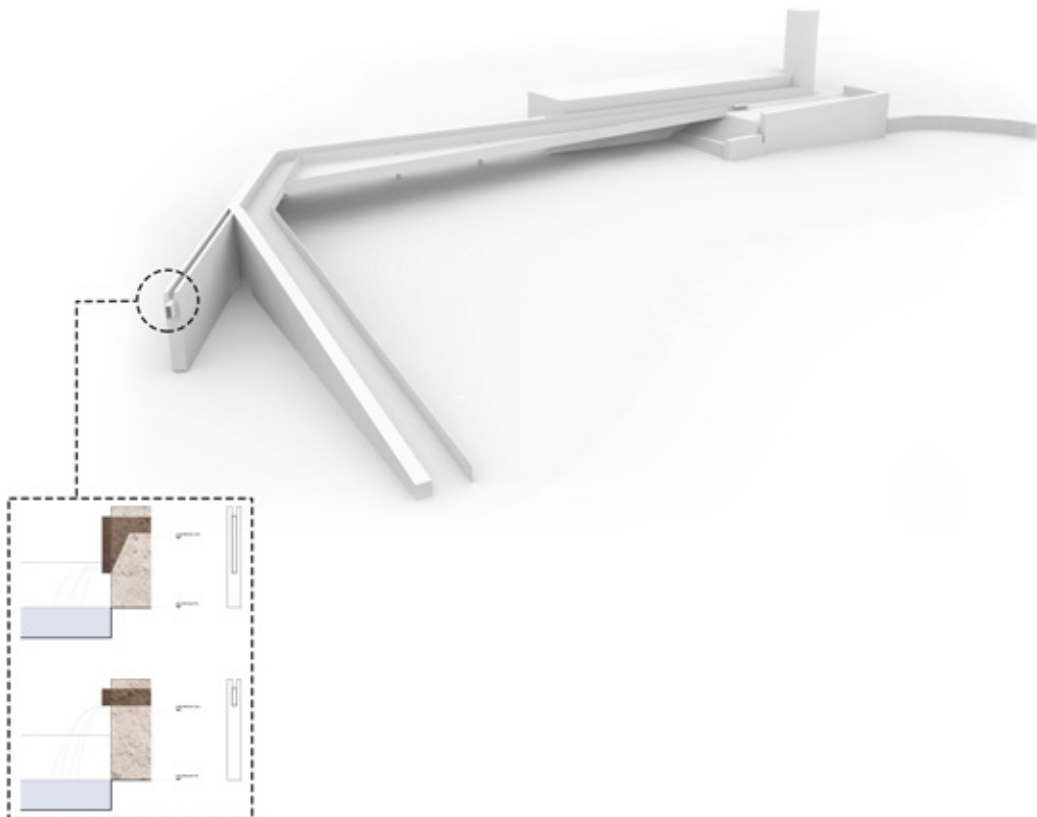
Due to the site's position upon a circumnavigated route between the transportation nodes of Cape Town's Train Station and the educational facility of CPUT (dotted yellow), the surrounding public open spaces will be highly utilised through a steady flow of pedestrian movement, both now and in the future years of its envisaged development. Through designing the path and its surrounding space, a series of suggested parameters were reached in order to gain a suitable threshold between developmental targets of usable floor area, and the experiential quality of the public open space.

Line of water

Line of people

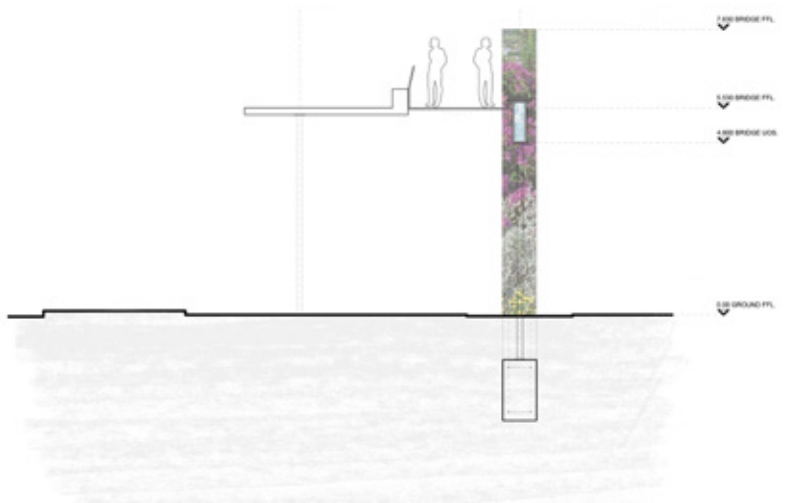
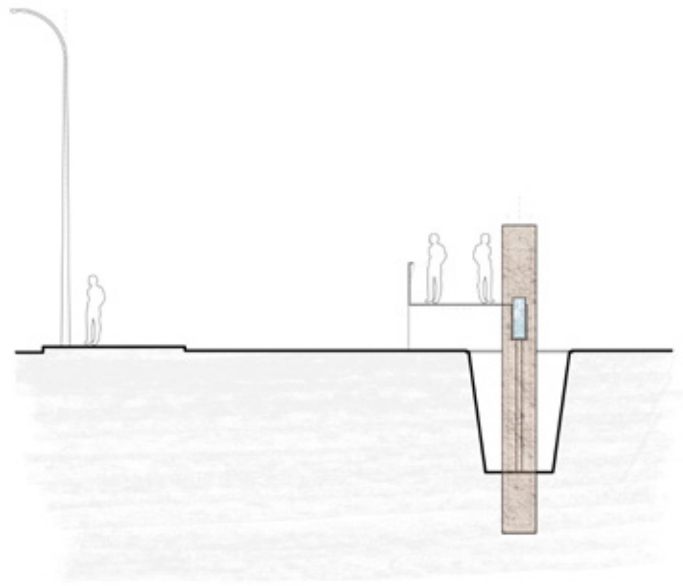


The projected formation of the walkway or aqueduct utilises its sharp topographic relief and proximity to the intersection to act as a bridge, seamlessly allowing the water to flow above the stream of vehicles below. Its presence marks the threshold of the CBD, announced by its exposed steel channels and the dramatic water feature emptying its capacity into the historic waterways of the Castle of Good Hope and the origins of the shoreline.





Material Palette

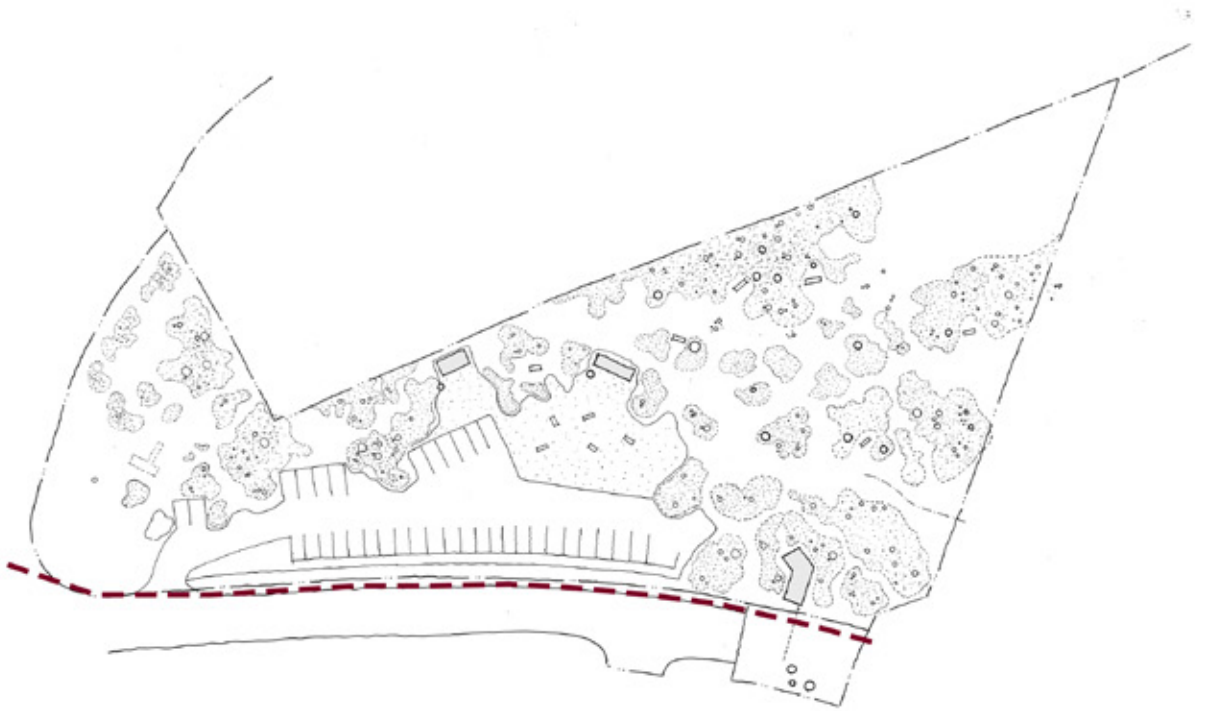


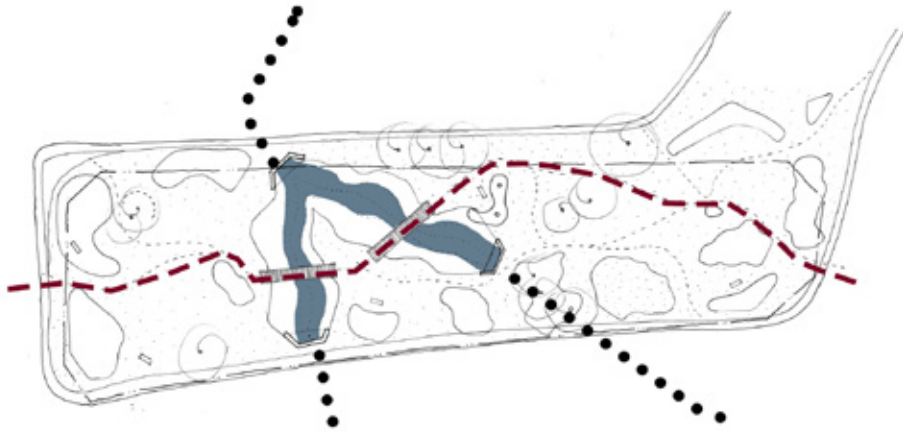
This construction methodology used in the formation of this bridge, for both people and water, follows the particular design language that is engrained in this dissertation, focusing on the contrasting aspects of solid and void, the manner in which weathering is capable of achieving this over time and this therefore acting as a marker of time. Therefore, the material palette and aesthetic utilised mimics that of the germination pods: the fragmentation of its large thermal wall over time, subsequently growing vegetation past its skeletal form, acting as an ever-changing, weathered element within the monotonous forms of the urban landscape.

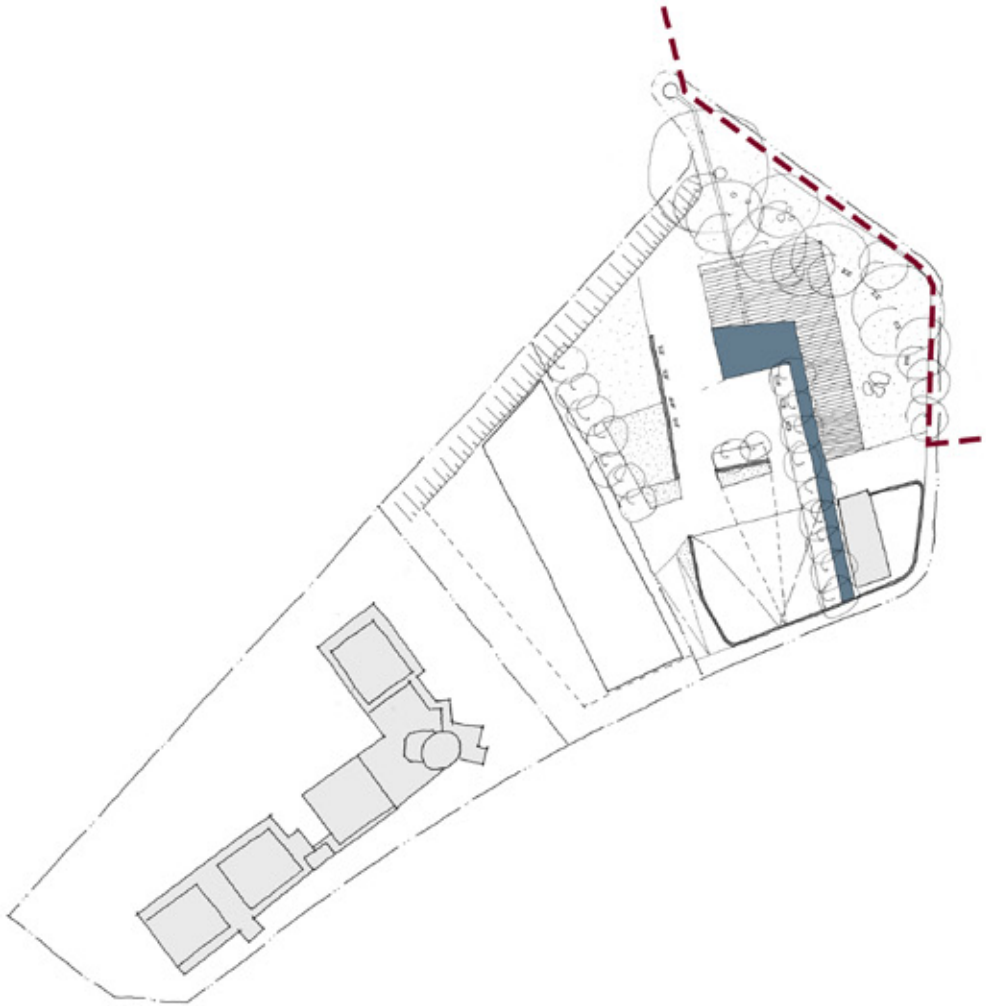


THE ECOLOGICAL LEGACY

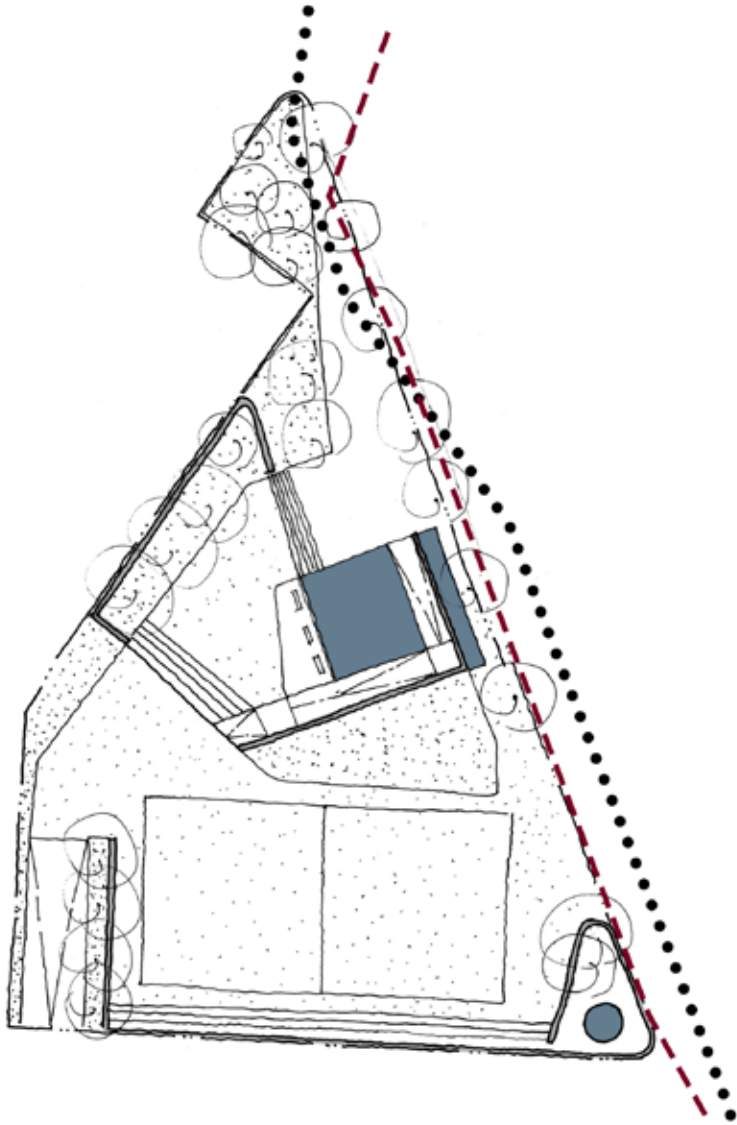
As previously stated, the interventions listed above culminate in the formation of an ecological corridor, through the connection and re-juvenation of its existing spatial parameters. These reimagined areas of public open space, utilising the typologies of route (Red), platform: marked by its retaining walls (Dark Grey), and mass (Light Grey) are depicted to the left. Due to the large scale in which this corridor traverses, they are represented momentarily in isolation, as they unfold along the river's critical path.

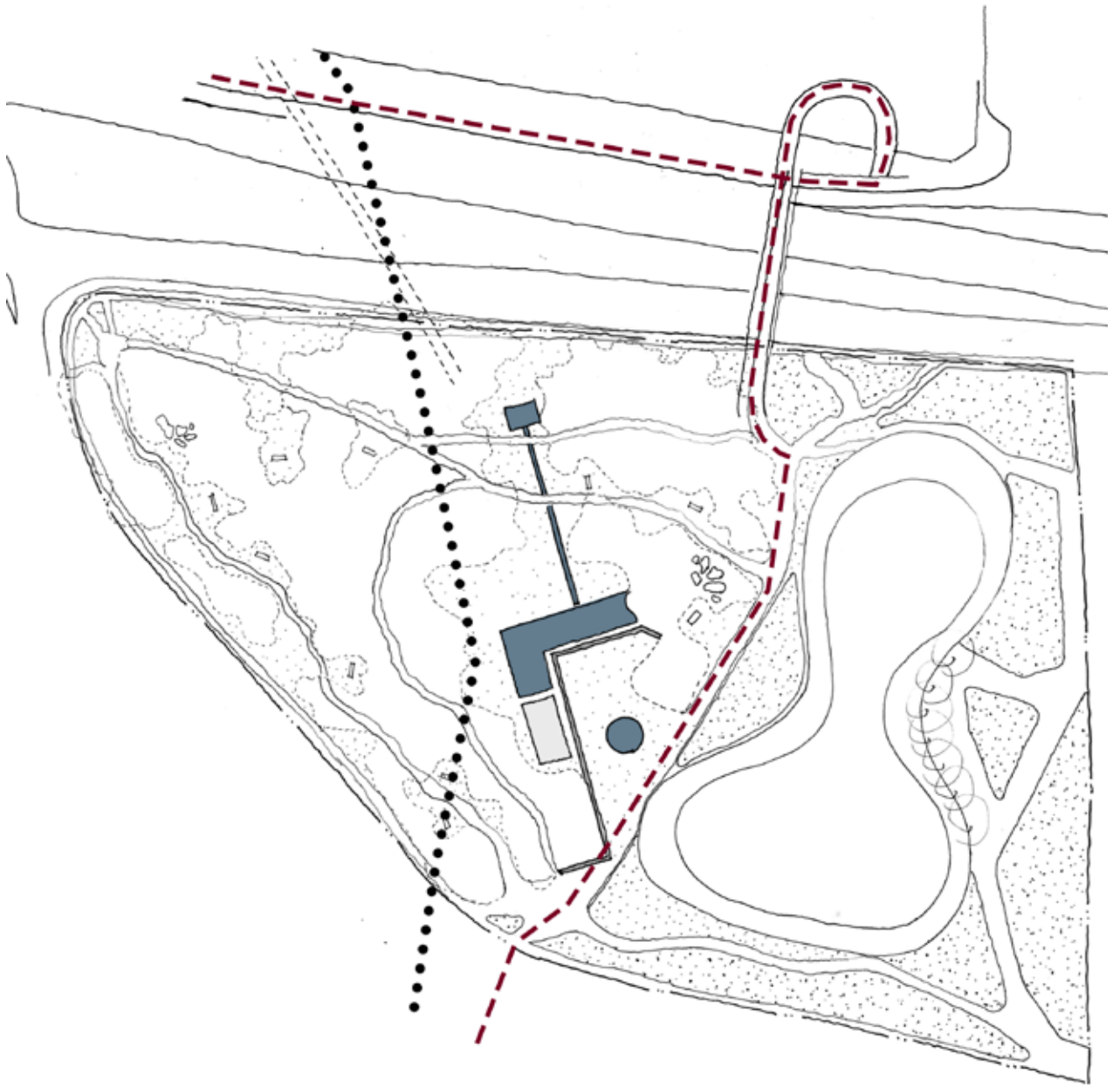


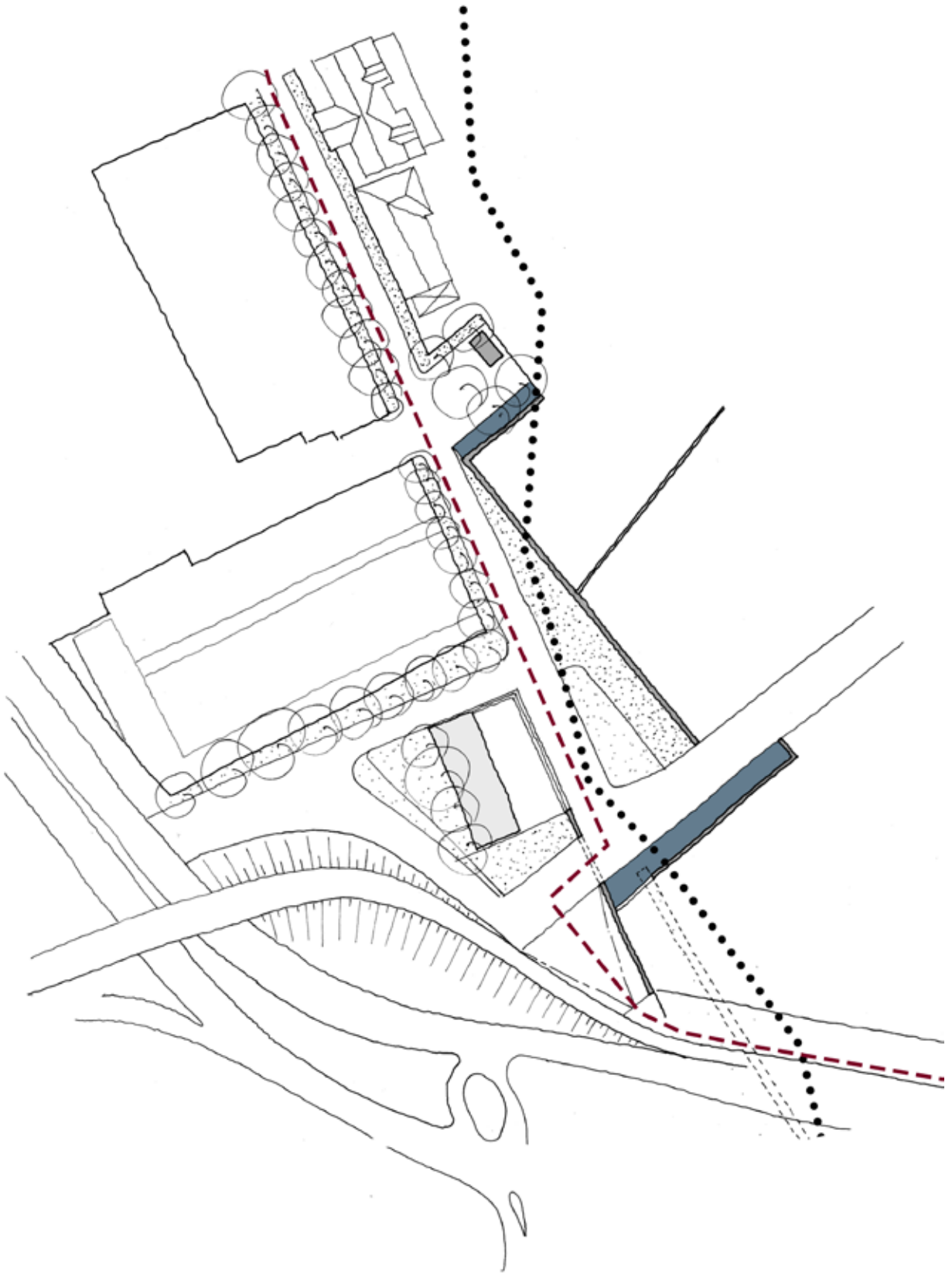




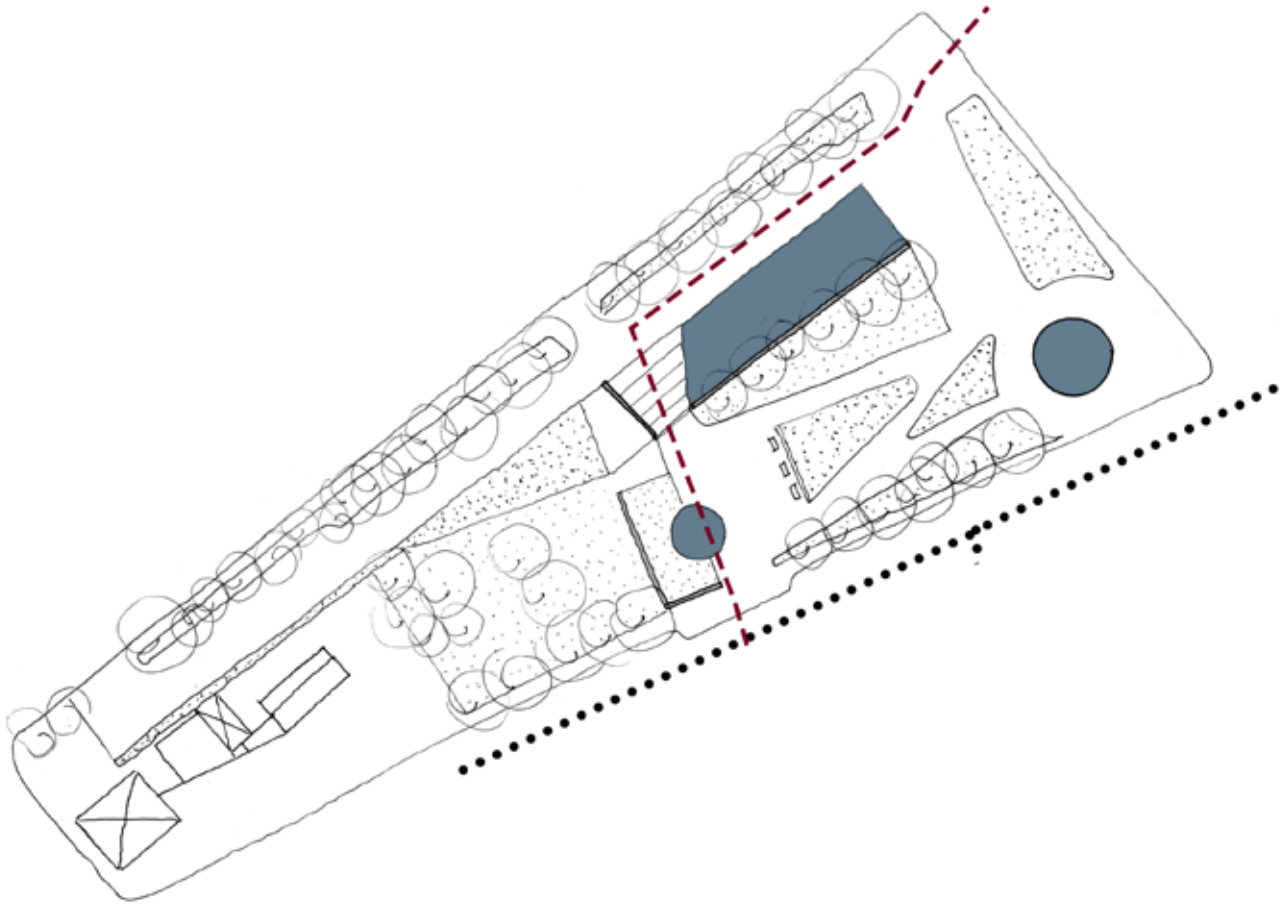


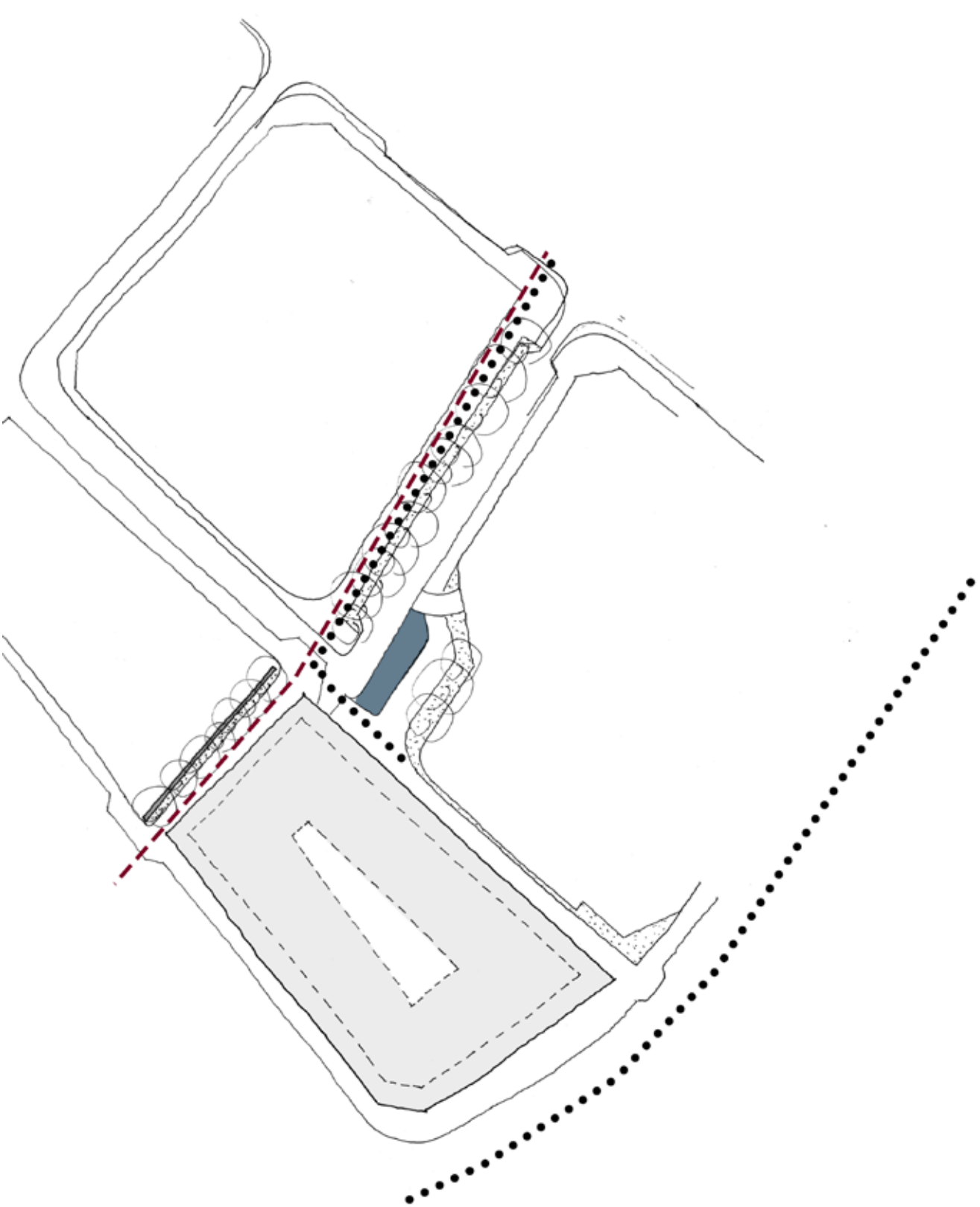


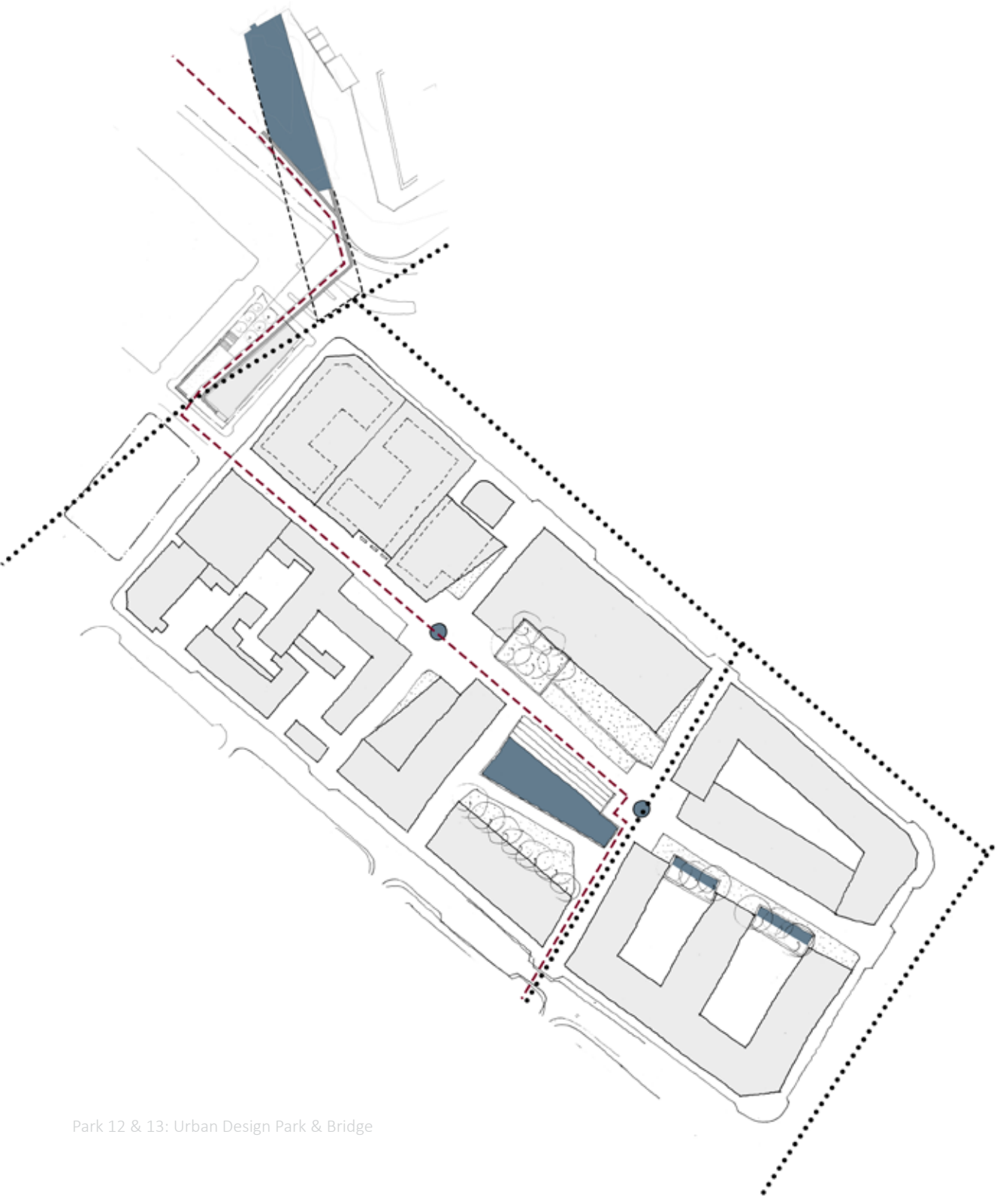




Park 10: Cross Roads







CONCLUSION

This dissertation began with an interest in the contrasting interface between man and nature. The Tin Mine, acting as an embodied marker of this tension, surfaced the juxtaposition of natural and man-made landscapes through poetic research. This was continued through the inspection of the mine where it became apparent that this interface, like the physicality of the man-made components left within the landscape, can be weathered by the natural elements over time. This was reinforced by surfacing the historic filtration process of the mine's ore, utilising the presence of water as a means of breaking down matter and their edges. This idea was therefore applied to the physical interface between man and nature, the constructed boundary of Table Mountain National Park, and the surrounding residential suburbs of Vredehoek. In turn, the natural erosive characteristic of water was resurfaced through the historic waterways. These were resurfaced in order to blur the existing boundary by allowing the natural migration of fauna and endemic flora – fynbos – into the city through an ecological corridor. This corridor manifests as a series of public open spaces and acupuncture architectural interventions, bound by a route.

FIGURE REFERENCES

- Page 7 : Unknown, (1978), Figure F-4.1 [ONLINE]. Available at: http://geoinfo.amu.edu.pl/wpk/geos/GEO_4/GEO_PLATE_F-4.HTML [Accessed 4 November 2017].
- Page 11: Unknown, (2014), Wire Landscape (Everest) [ONLINE]. Available at: <https://www.metalocus.es/en/news/maya-lin-rivers-and-mountains> [Accessed 4 November 2017].
- Page 15: The Argus Tin Near Cape Town (1910) Spargo, P The History, Preservation and Restoration of Vredehoek Tin Mine, Devils Peak, Cape Town (1999).
- Page 21: Entrance to No.2 Adit. 15 Nov 1911. Cape Times weekly. Developing a local mine. Cape Times. Retrieved National Library
- Page 25: General view of battery site shewing machine being erected for 5 stamp battery ect. 15 Nov 1911. Cape Times weekly. Developing a local mine. Cape Times. Retrieved National Library
- Page 27: 31-Wooden mortar block five stamp. Mar, A. D. 1912. Stamp Milling: a treatise on practical stamp milling and stamp mill construction. New York: Mcgraw-Hill book company. pg 81
- Page 29: Mostafavi, M & Leatherbarrow, D, 2005. On Weathering: The Life of Buildings in Time. 4th ed. Massachusetts: Massachusetts Institute of Technology.1
- Page 35: Rijksarchief, (1660), ' Fort de Goede Hoop, huizen en tuinen van vrij luiden, etc. Naar de Kaart No. 824, aanwezig in het Alg. Rijksarchief (now Nationaal Archief). [ONLINE]. Available at: http://www.tanap.net/content/activities/documents/Orphan_Chamber-Cape_of_Good_Hope/ [Accessed 19 July 2017].

FIGURE REFERENCES continued

- Page 36 : Unknown, (1785), A map of Cape Town in 1785 indicating the blocks/erven as well as the family name of the owners (with the courtesy of the Nasionaal Archief in The Hague, where a large collection of maps of the Cape of Good Hope is kept). [ONLINE]. Available at: http://www.tanap.net/content/activities/documents/Orphan_Chamber-Cape_of_Good_Hope/ [Accessed 19 July 2017].
- Page 36 : Unknown, (18th Century), Map of Cabo de Goede Hoop in the 18th century (4.AANW 1420, Nasionaal Archief) [ONLINE]. Available at: http://www.tanap.net/content/activities/documents/Orphan_Chamber-Cape_of_Good_Hope/ [Accessed 19 July 2017]
- Page 57: Binet, H & , 1989. Dimitris Pikionis, Architect, 1887-1968: A Sentimental Topography (Megas). 1st ed. London: Architectural Association Publications.
- Page 58: Hélène Binet, (1989), Landscaping of the acropolis surrounding-area [ONLINE]. Available at: <https://divisare.com/projects/313234-dimitris-pikionis-helene-binet-landscaping-of-the-acropolis-surrounding-area> [Accessed 3 August 2017].

BIBLIOGRAPHY

Belanger, P Landscape as Infrastructure: A Base Primer (2017).

Blackburn, CL 'Waste/Mine Reinterpreting Mans' Connection to the Landscape Through the Conservation of a Tin Mine on Devil's Peak' (2014, MArch dissertation, University of Cape Town).

Cairncross, B Rocks and Minerals of Southern Africa (2004).

Camissa People 'Reclaim Camissa – The Struggle to Save our Water Heritage – Beware of the Greedy Tjommie Brigade' (2017) available at <<https://camissapeople.wordpress.com>>.

Castle of Good Hope 'A Short History of the Castle of Good Hope' (2015) available at <<http://www.castleofgoodhope.co.za/a-short-history-of-the-castle-of-good-hope/>>.

Comaroff, JL 'Naturing the Nation: Aliens, Apocalypse and the Postcolonial State' (2001) 27(3) Journal of Southern African Studies 627.

Descombes, G 'Shifting Sites; The Swiss Way, Geneva' in Corner, J Recovering Landscape: Essays in Contemporary Landscape Architecture (1999).

Fynbos Hub 'What is Fynbos?' (2017) available at <<http://www.fynboshub.co.za/fynbos-conservation/>>.

Head, T 'Watch: Cape Town's Underwater Canals Produce 20m Litres of Fresh Water a Day. Why Aren't They Being Used?' [video] (2017) available at <<https://www.thesouthafrican.com/watch-cape-towns-underwater-canals-produce-20m-litres-of-fresh-water-a-day-why-arent-they-being-used-video/>>.

Hey, D The Mountain: An Authoritative Guide to the Table Mountain Chain (1994).

Kogelberg Biosphere Reserve 'The Relationship between Fynbos and Fire' (2016) available at <<http://www.kbrc.org.za/news/fynbos-and-fire/>>.

BIBLIOGRAPHY continued

Loos, A Architektur first published in Der Sturm (1910).

Manning, J Field Guide to Fynbos (2008).

McCully, P Silenced Rivers: The Ecology and Politics of Large Dams (2001).

Munroe, CE Explosives In Metal Mining And Quarry Operations (2003).

Norberg-Schulz, C Genius Loci: Towards a Phenomenology of Architecture (2007) Compton, JS

The Rocks and Mountains of Cape Town (2004).

Notes from a Cape Town Botanist 'Fynbos' (2017) available at <<http://www.capetownbotanist.com/fynbos/>>.

Notes from a Cape Town Botanist 'Fynbos' (2017) available at <<http://www.capetownbotanist.com/fynbos/>>.

Pikiōnēs, D., 1989. Dimitris Pikionis, Architect 1887-1968. Architectural Association.

Pooley, S Burning Table Mountain: An Environmental History of Fire on the Cape Peninsula (2014).

Rim of Africa Multimedia Trail Journal 'Tannins in Red Water of the Fynbos' (2012) available at <<http://tboltkid.com/trailjournal/tannins-in-red-water-fynbos/>>.

Ronca, D Seed Banks Around the World (2017) available at <<http://science.howstuffworks.com/environmental/green-science/seed-bank4.htm>>.

Rosenberg, T 'The Reservoir: Towards a Poetic Model of Research in Design' Working Papers in Art and Design (2000), available at <http://sitem.herts.ac.uk/artdes_research/papers/wpades/vol1/rosenberg_2.html>.

BIBLIOGRAPHY continued

SANBI 'Statistics: Red List of South African Plants (version 2017.1)' available at <Redlist.sanbi.org>.

Saunders, R 'Does Fynbos Need to Burn?' (2010) *Veld & Flora* 76.

South Africa History Online 'The Castle of Good Hope, Oldest Surviving Colonial Building in South Africa, is Completed' (2017) available at <<http://www.sahistory.org.za>>.

Spargo, P 'The Vredehoek Tin Mine Cape Town' (1999) 54 *Quarterly Bulletin of the National Library of South Africa*.

Spargo, P *The History, Preservation and Restoration of Vredehoek Tin Mine, Devils Peak, Cape Town* (1999).

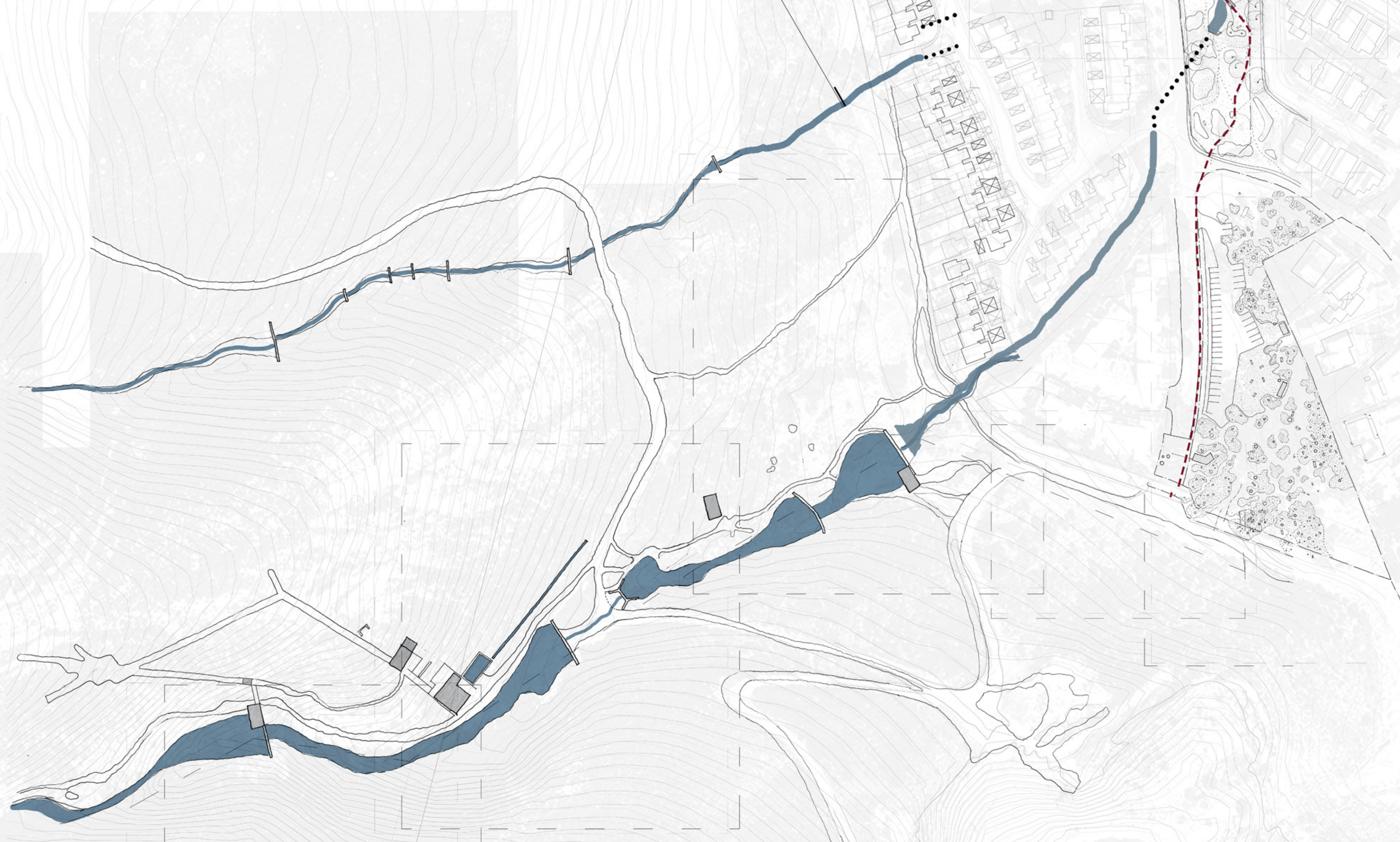
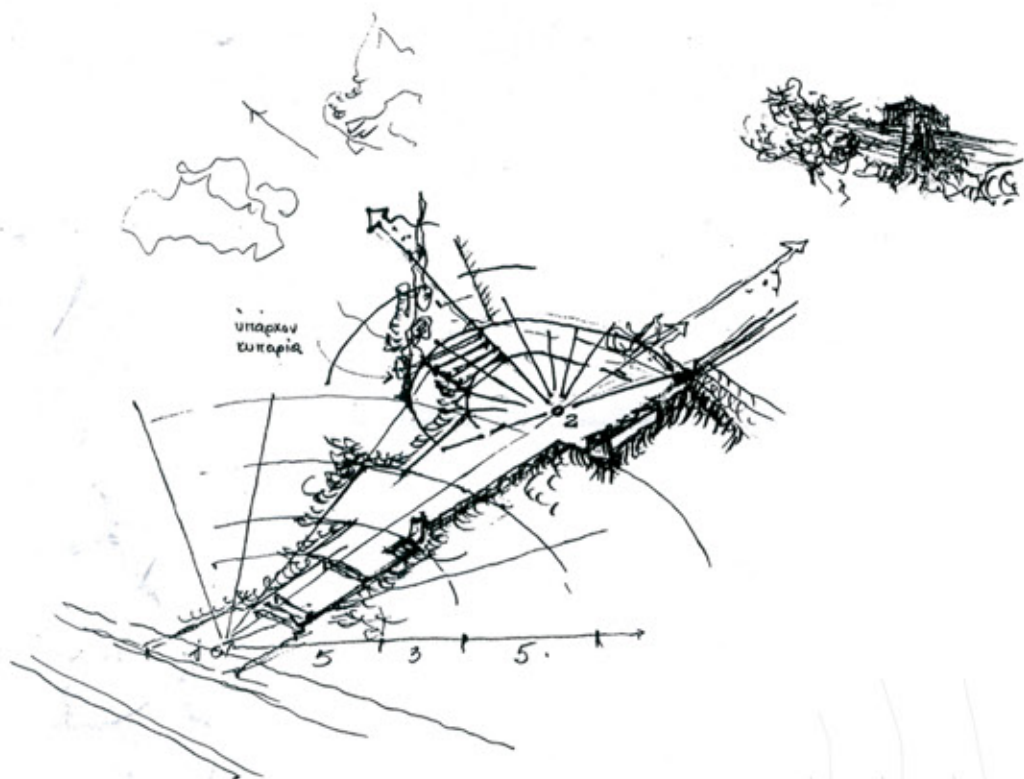
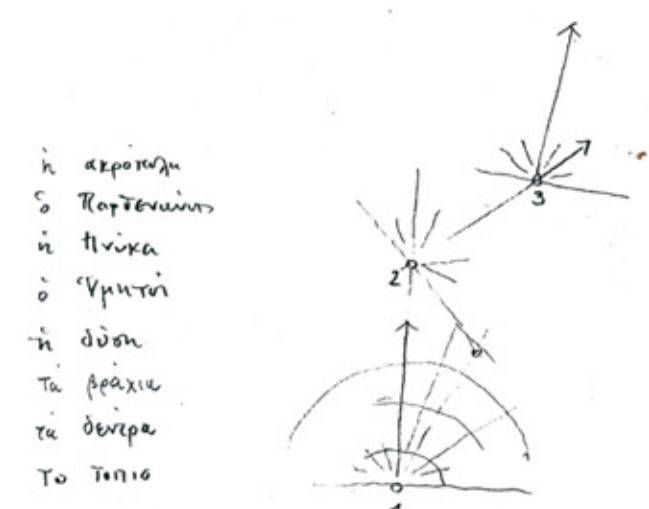
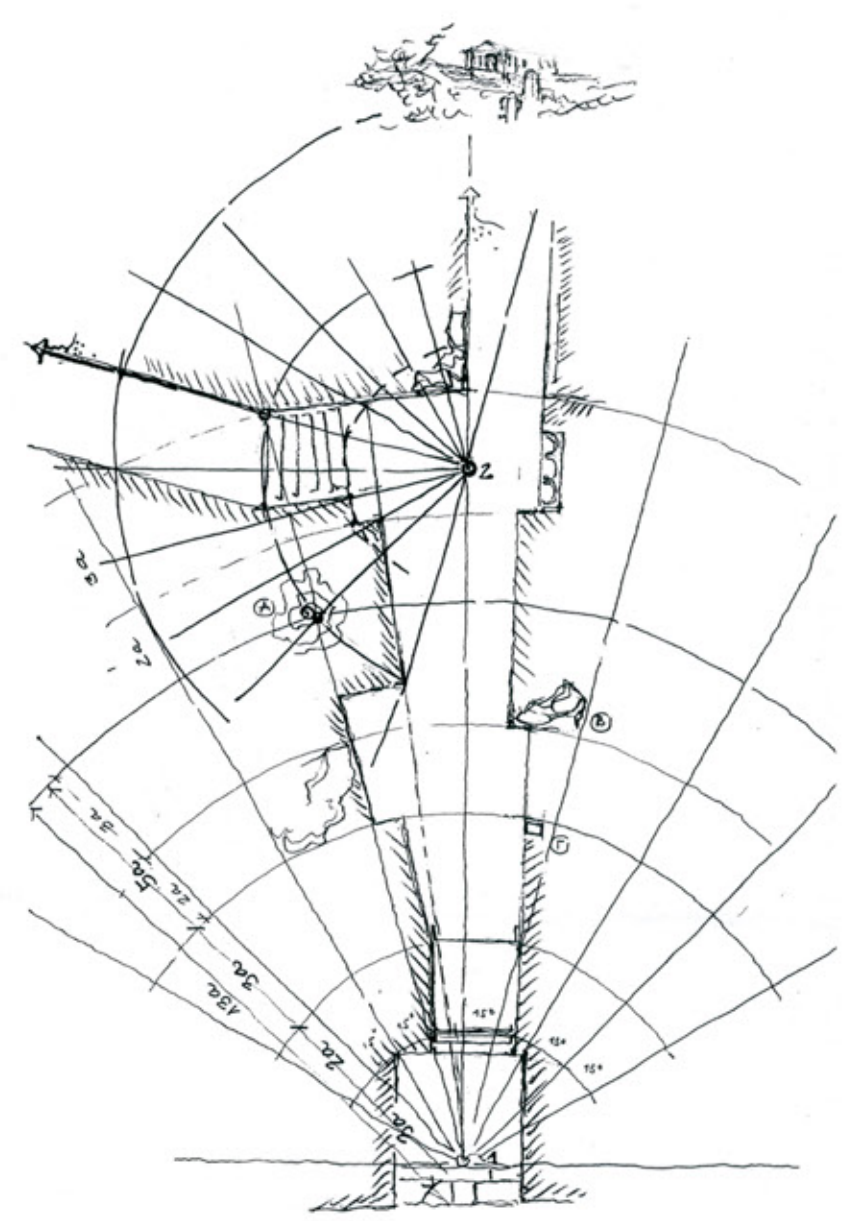
The Argus Tin Near Cape Town (1910) in Spargo, P *The History, Preservation and Restoration of Vredehoek Tin Mine, Devils Peak, Cape Town* (1999).

Timoney, TW 'Cape Town's Early Water Supply' (1993) CABO.

Waldheim, C *The Landscape Urbanism Reader* (2006).

Water Quality Association 'Common Perceptible Water Quality Issues' (2017) available at <<https://www.wqa.org/learn-about-water/perceptible-issues>>.

Appendix : Final Drawings





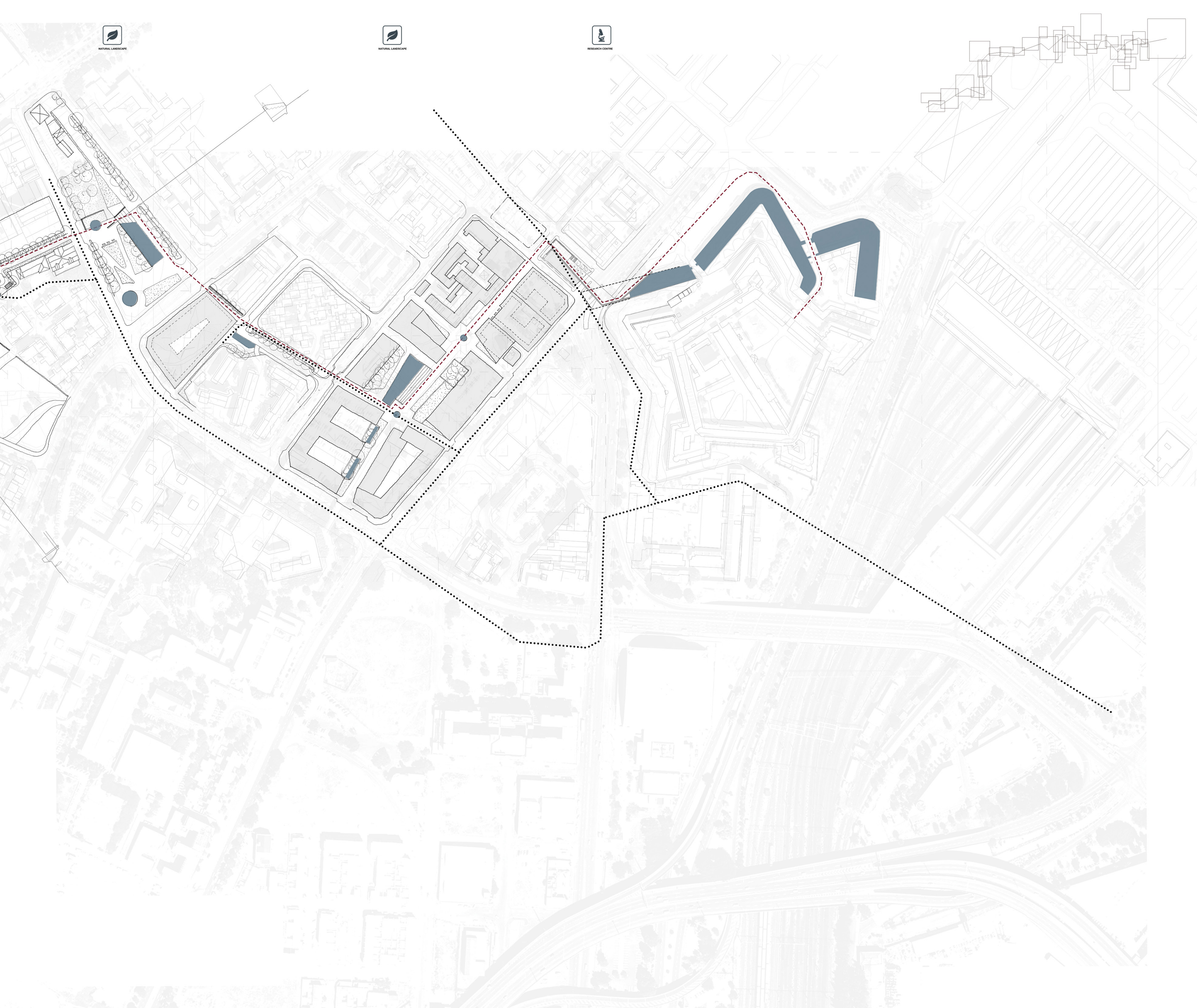
NATURAL LANDSCAPE



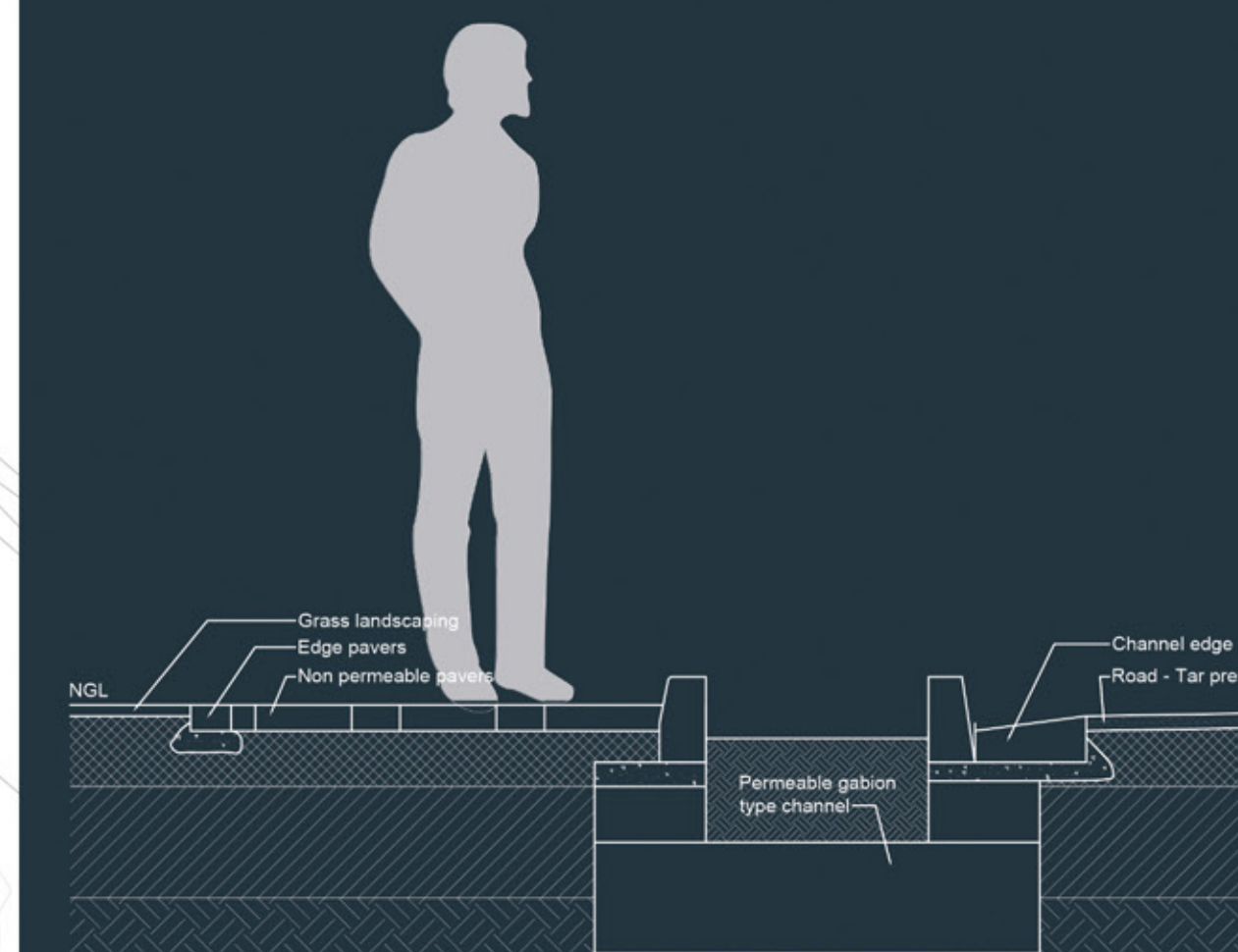
NATURAL LANDSCAPE



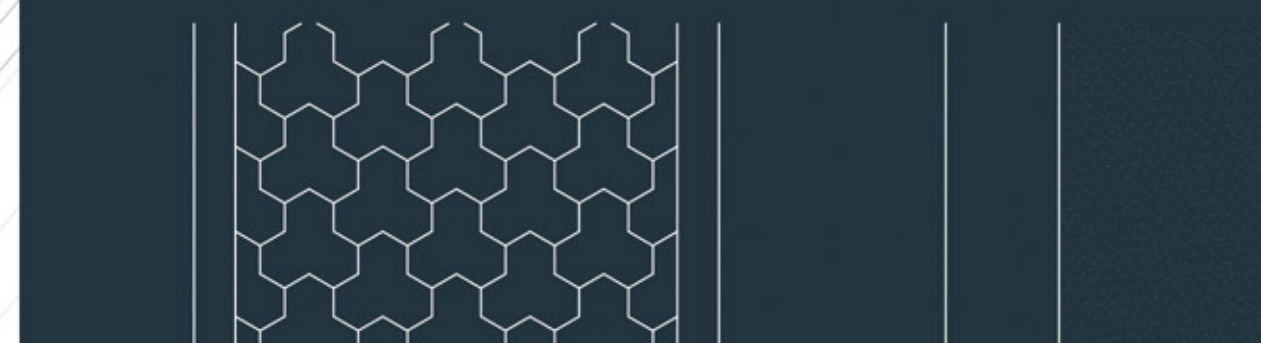
RESEARCH CENTRE



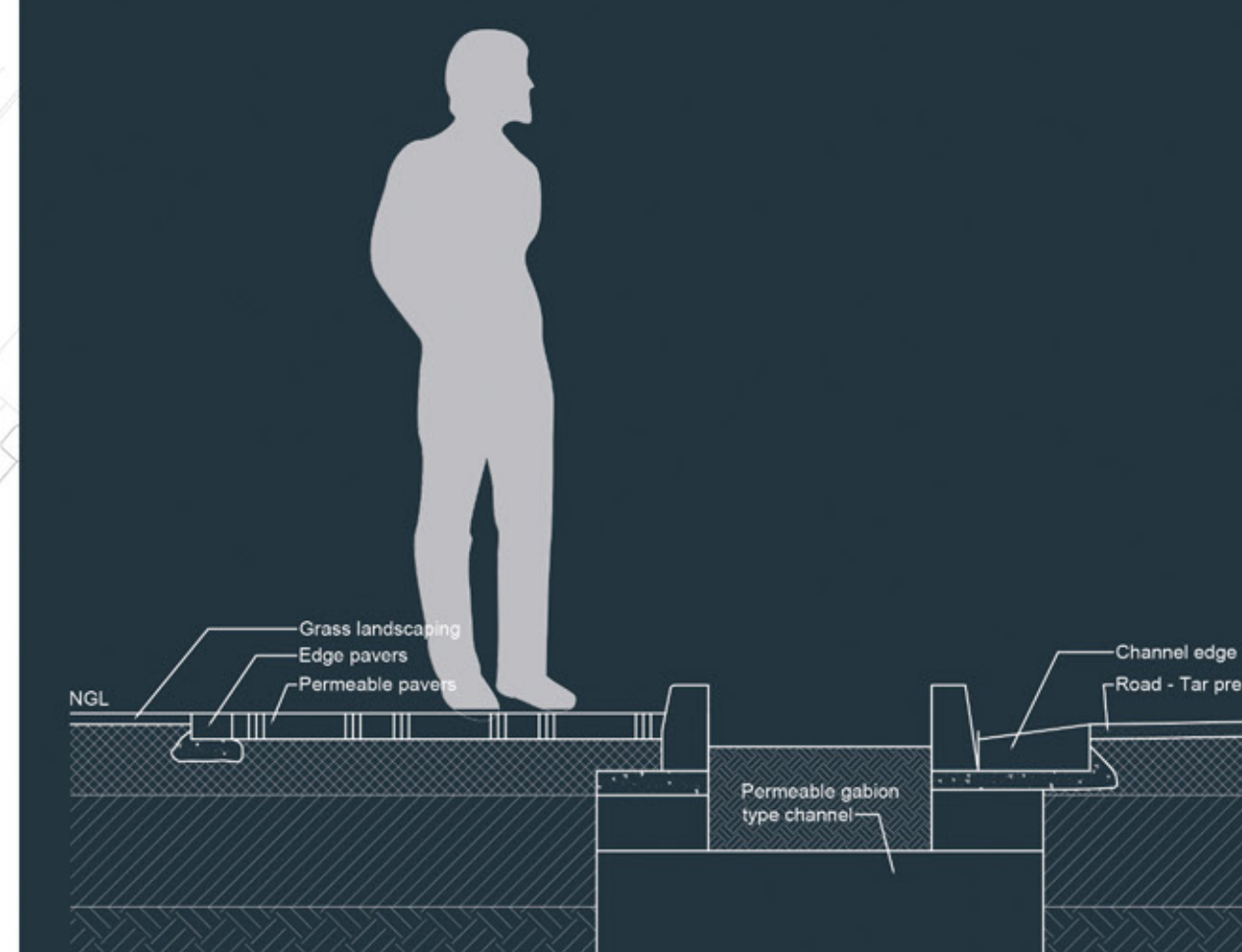
SURFACE TREATMENT
IMPERMEABLE TO PERMEABLE



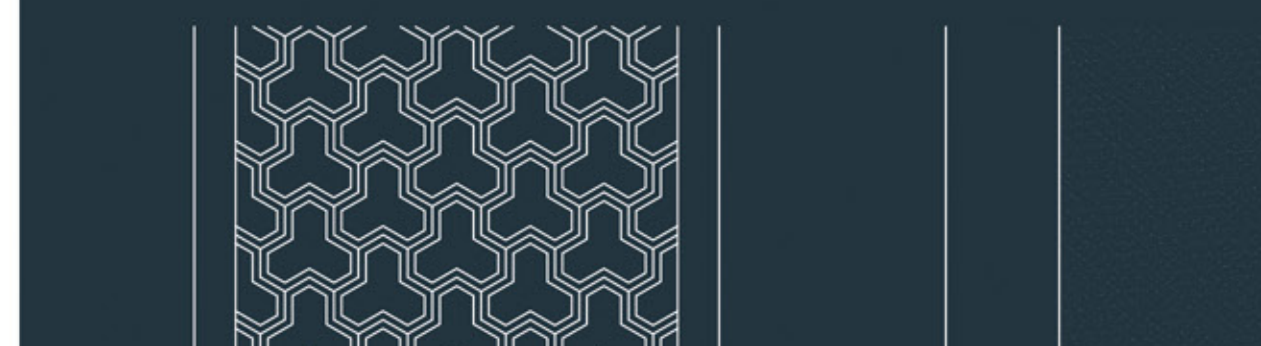
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Scale 1:20



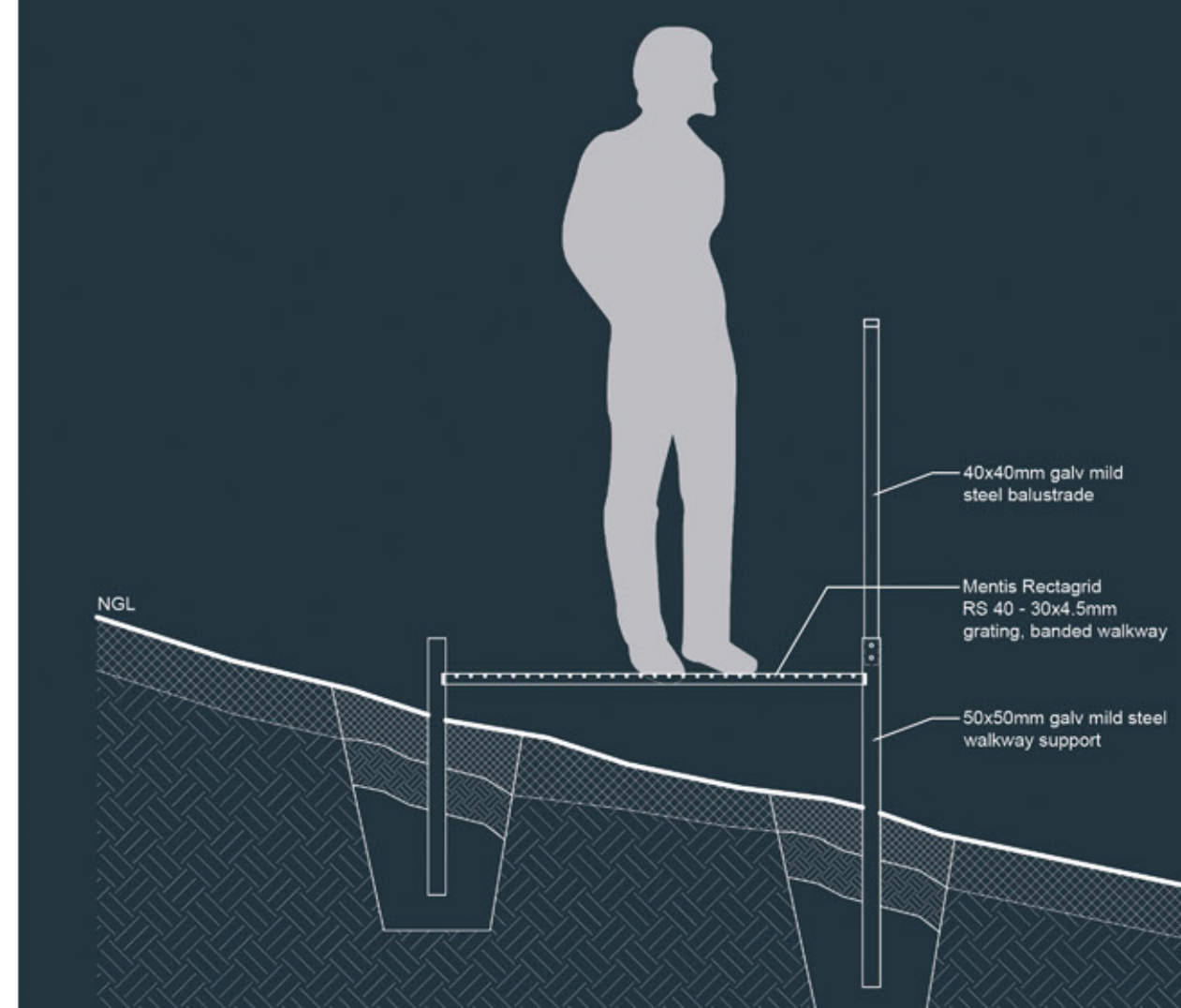
Plan - Non Permeable Pavers
Scale 1:20



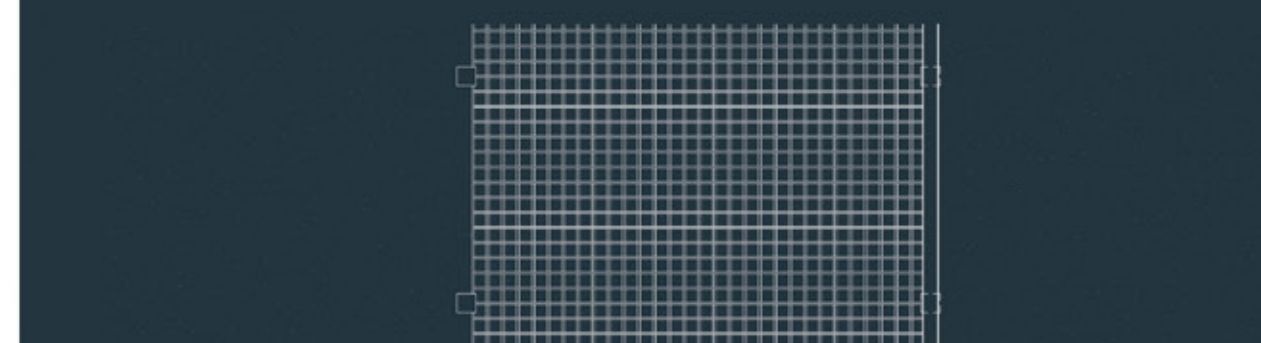
Section - Permeable Pavers
Scale 1:20



Plan - Permeable Pavers
Scale 1:20



Section - Steel Walkway
Scale 1:20



Plan - Steel Walkway
Scale 1:20



WEATHERING THE EDGE_VREDEHOEK
MINE SHAFT



Key

Adjustable Feet

Service Tray

Stifners

Structural Frame
50 x 50 GMS RHS

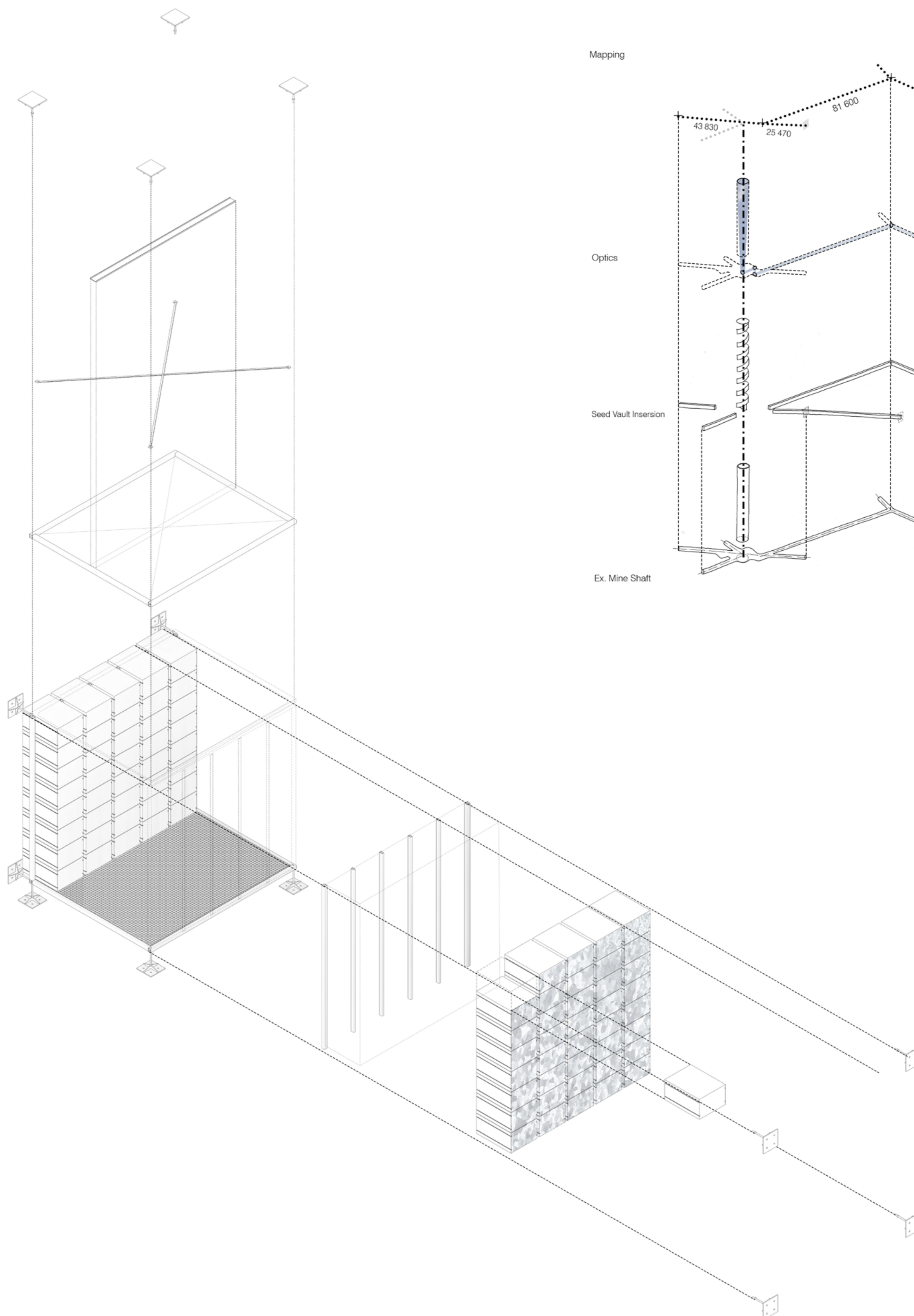
Storage Pod

Mentis Rectagrid
RS 40 - 30x4.5mm

Secondary Supports
50 x 40 GMS RHS

Tin Plated MS Storage Units
600mm (L) x 450mm (B) x 300mm (H)

Secondary Supports

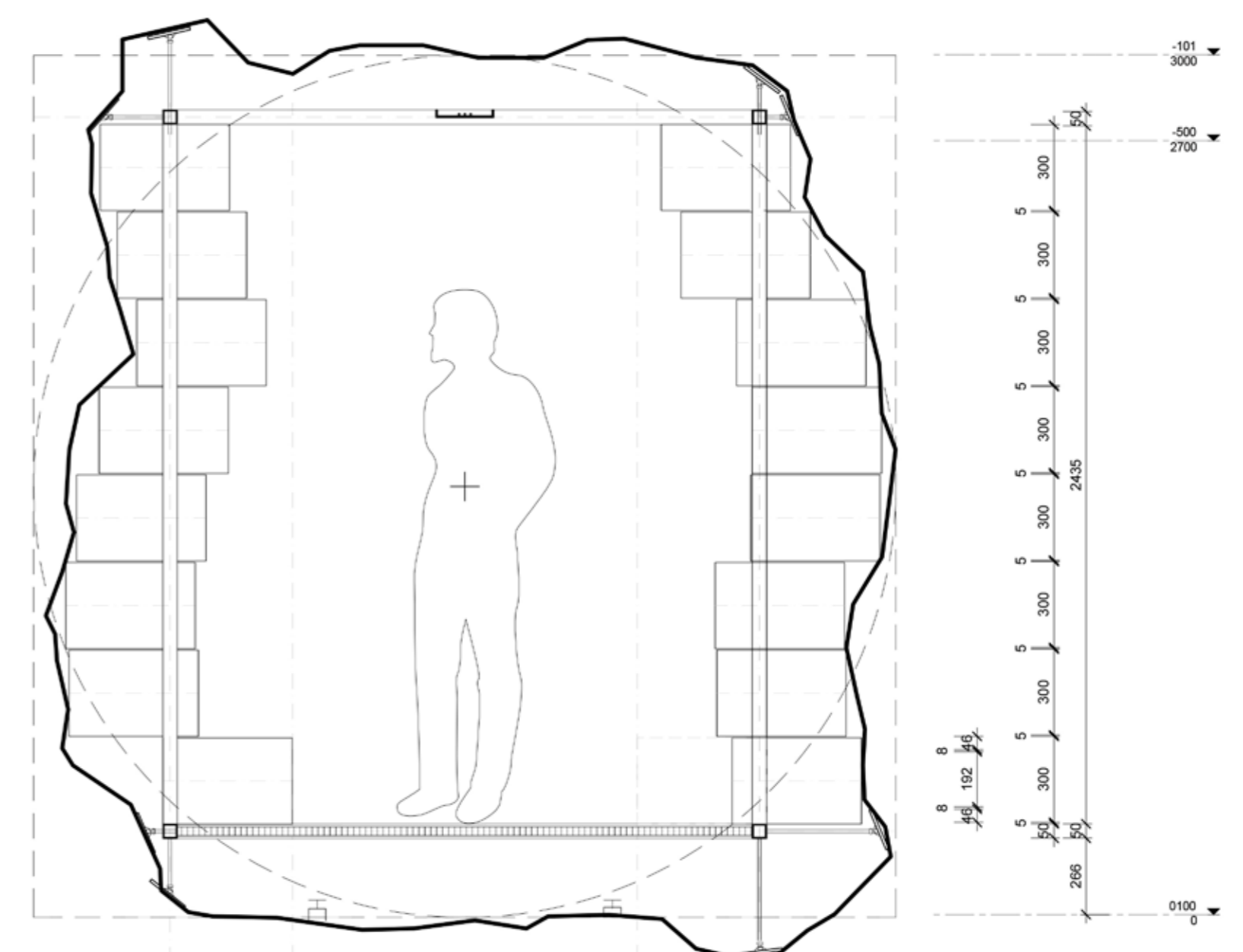
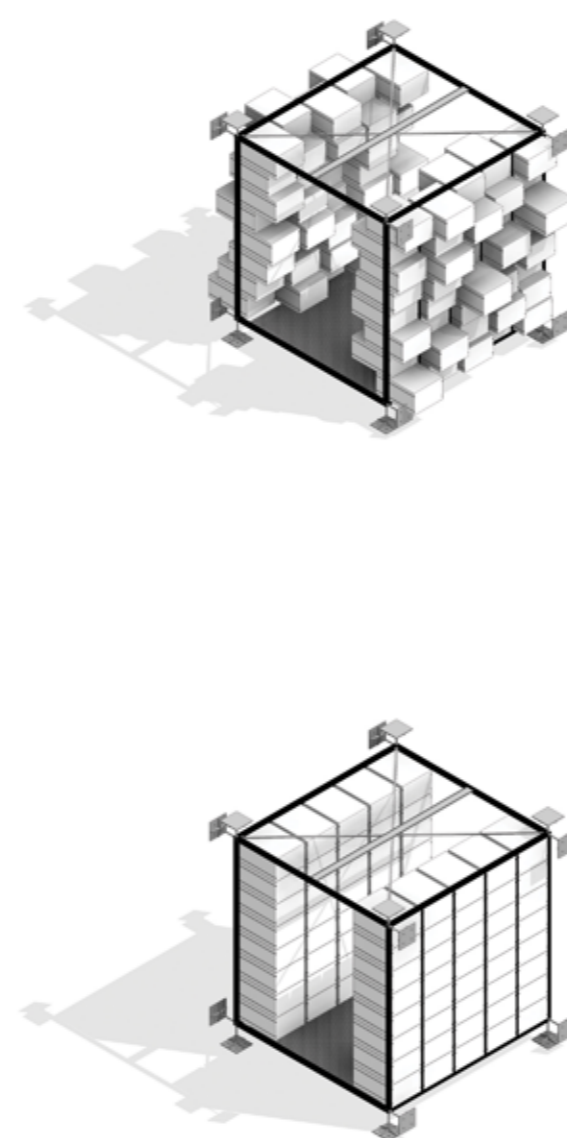
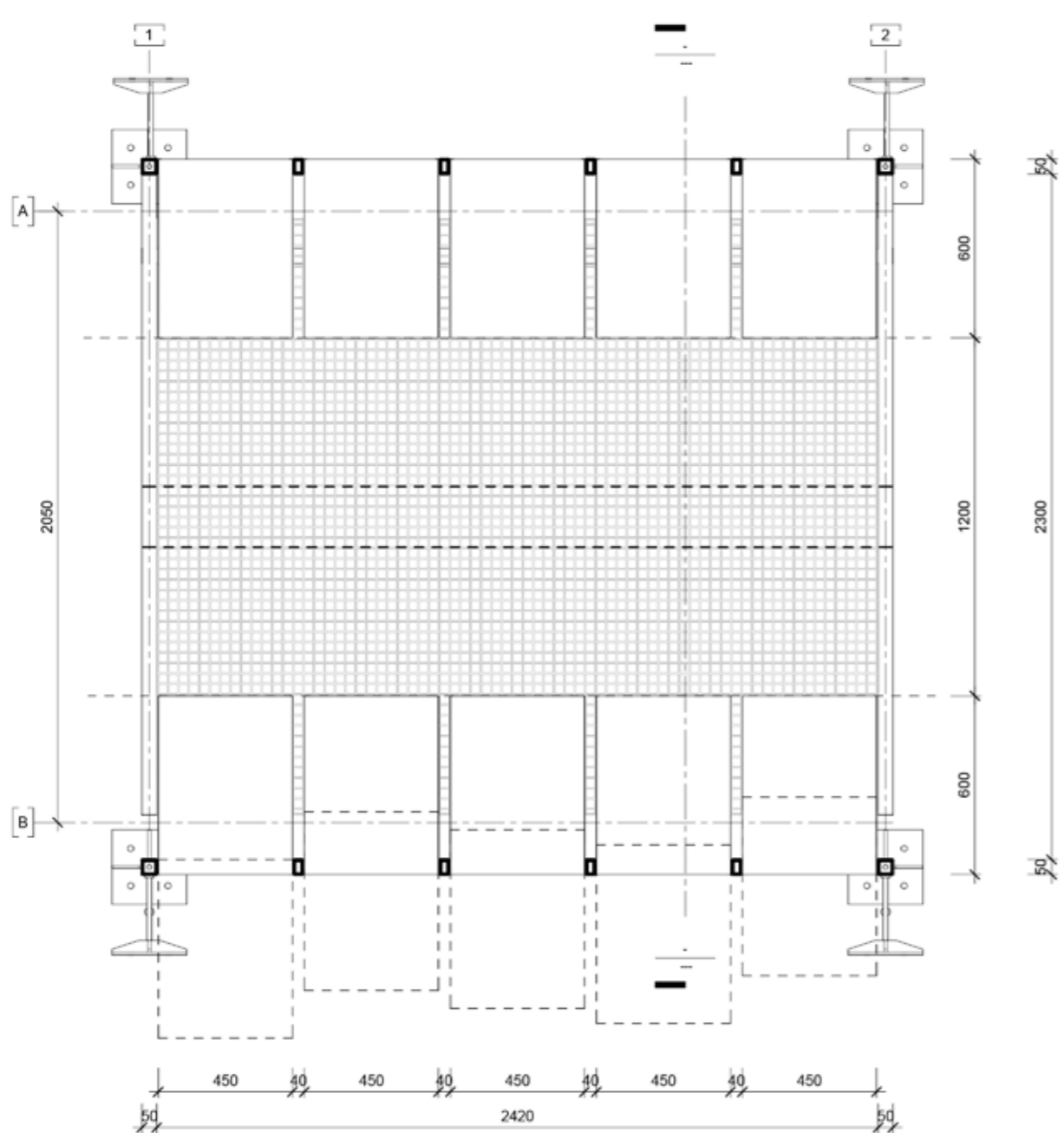
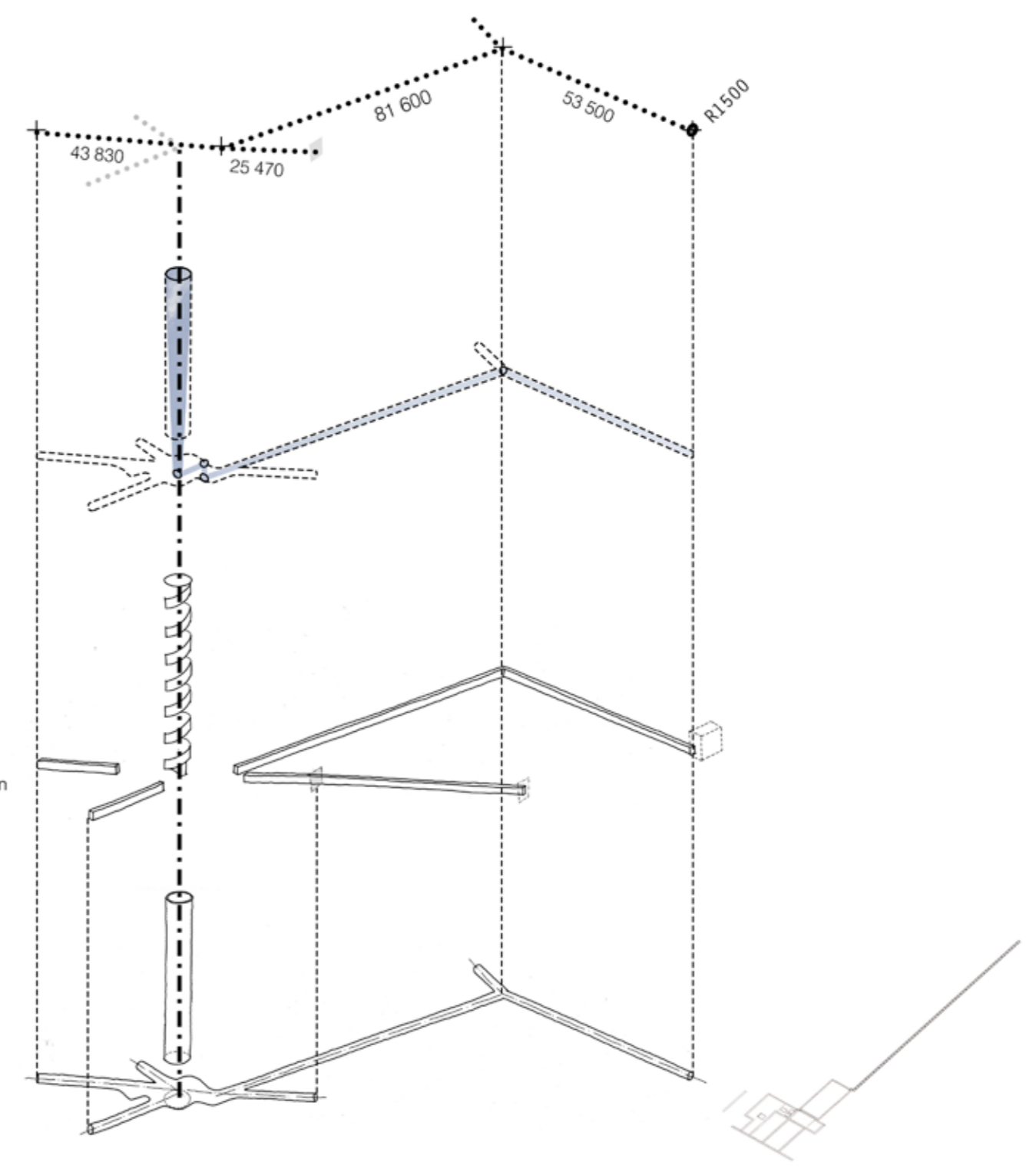


Mapping

Optics

Seed Vault Inersion

Ex. Mine Shaft



Plan
1:20

Transverse Section
1:20



WEATHERING THE EDGE_VREDEHOEK
MINE PLATFORMS



Key

Locality
1:1000

Secured Vault Entrance

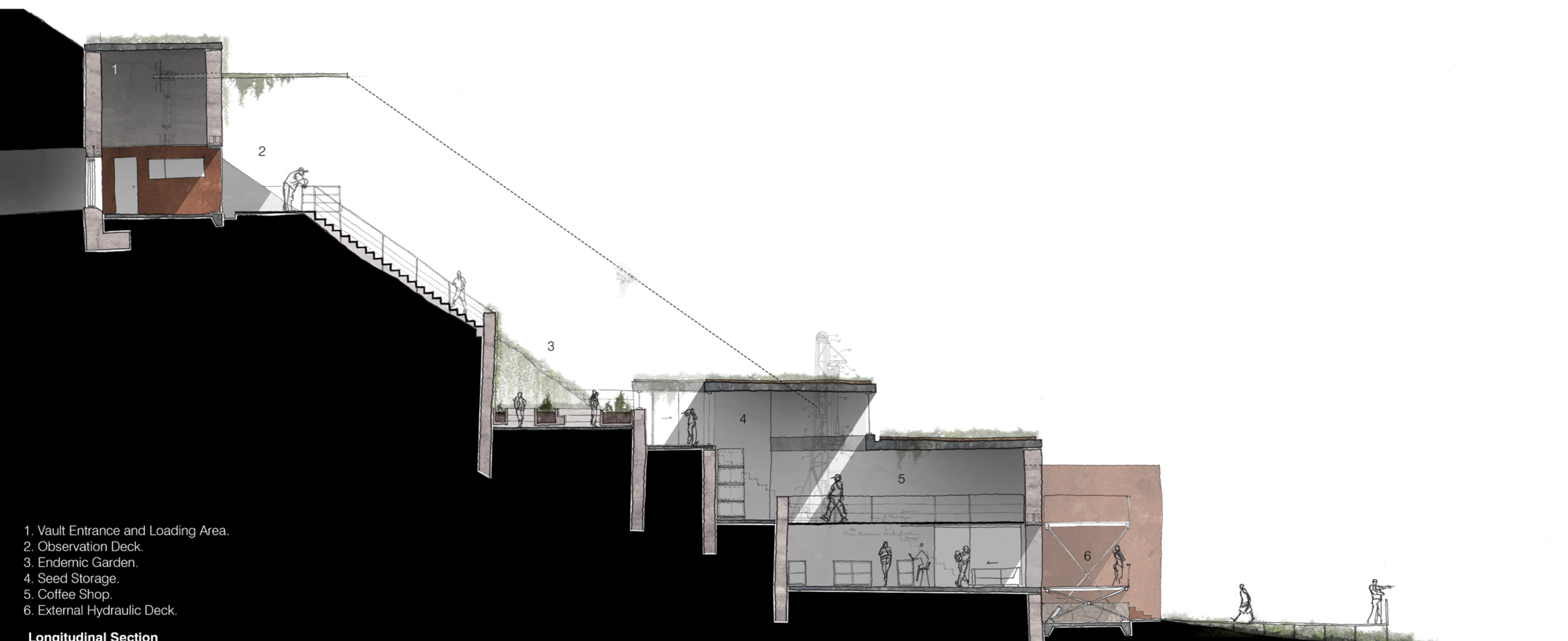
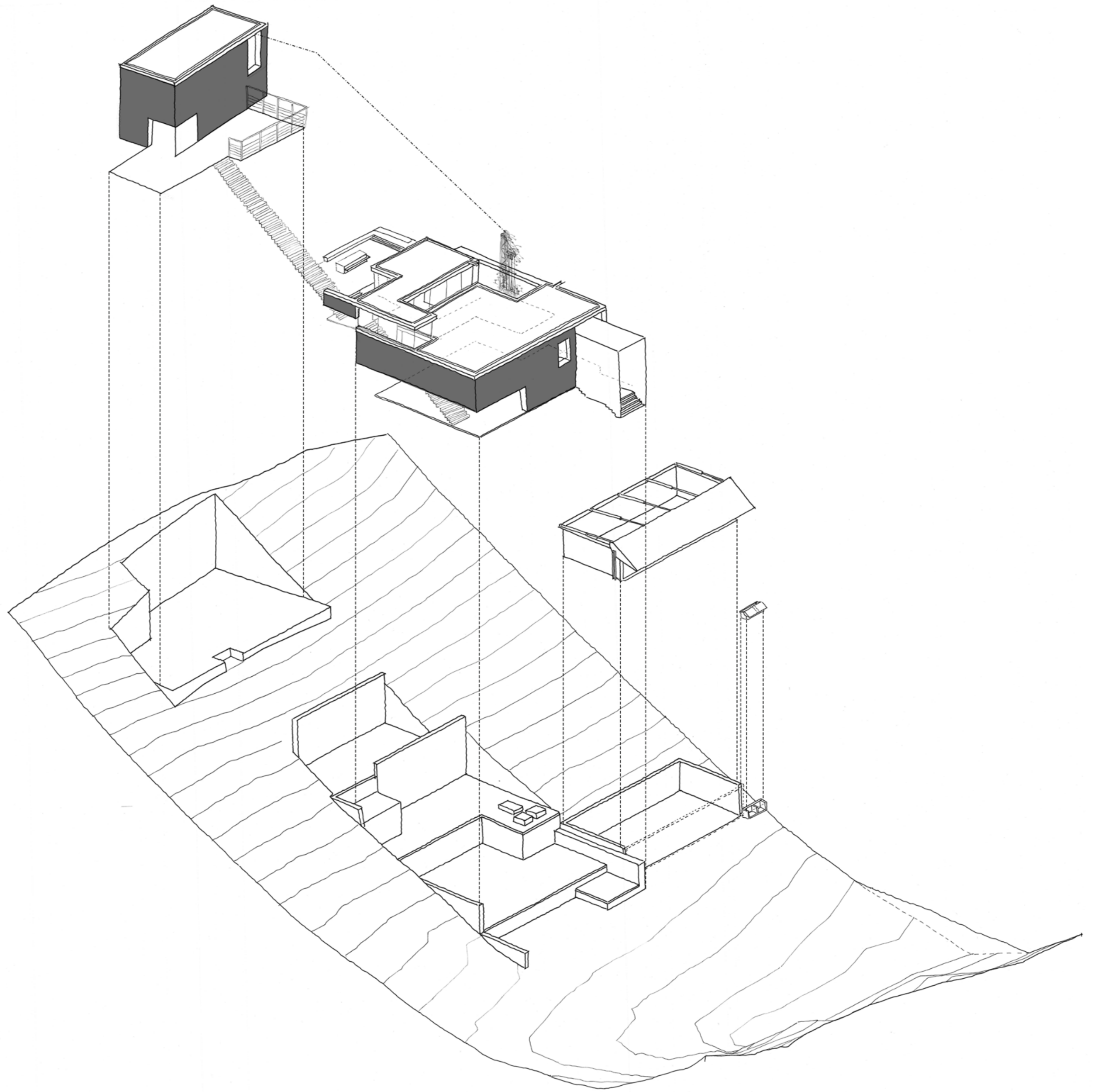
Public Interface + Mechanical Hoist

Rescripted Existing Water Infrastructure:
Header Dam

New Platforms

Existing Platforms

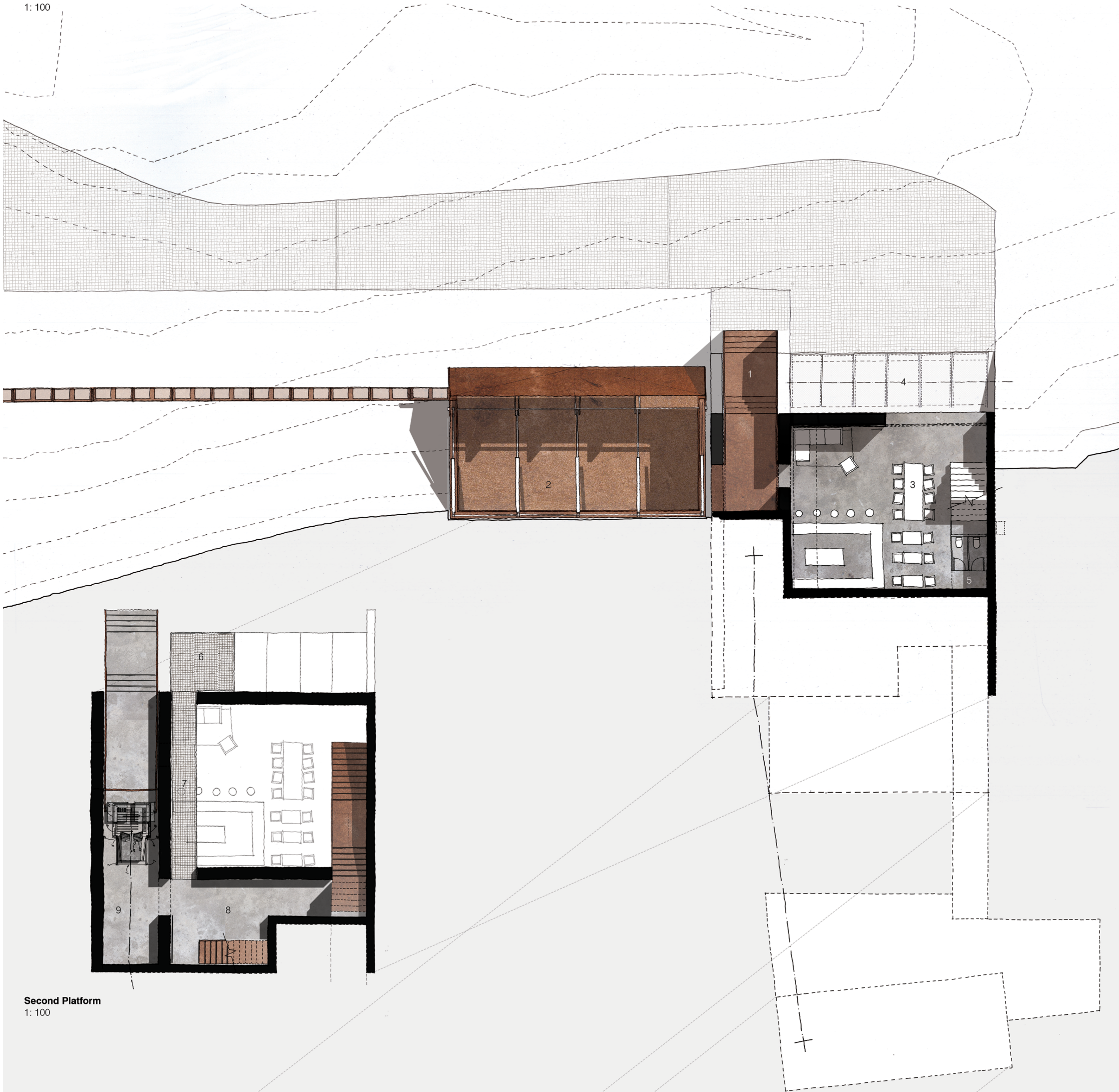
Siting Isometric



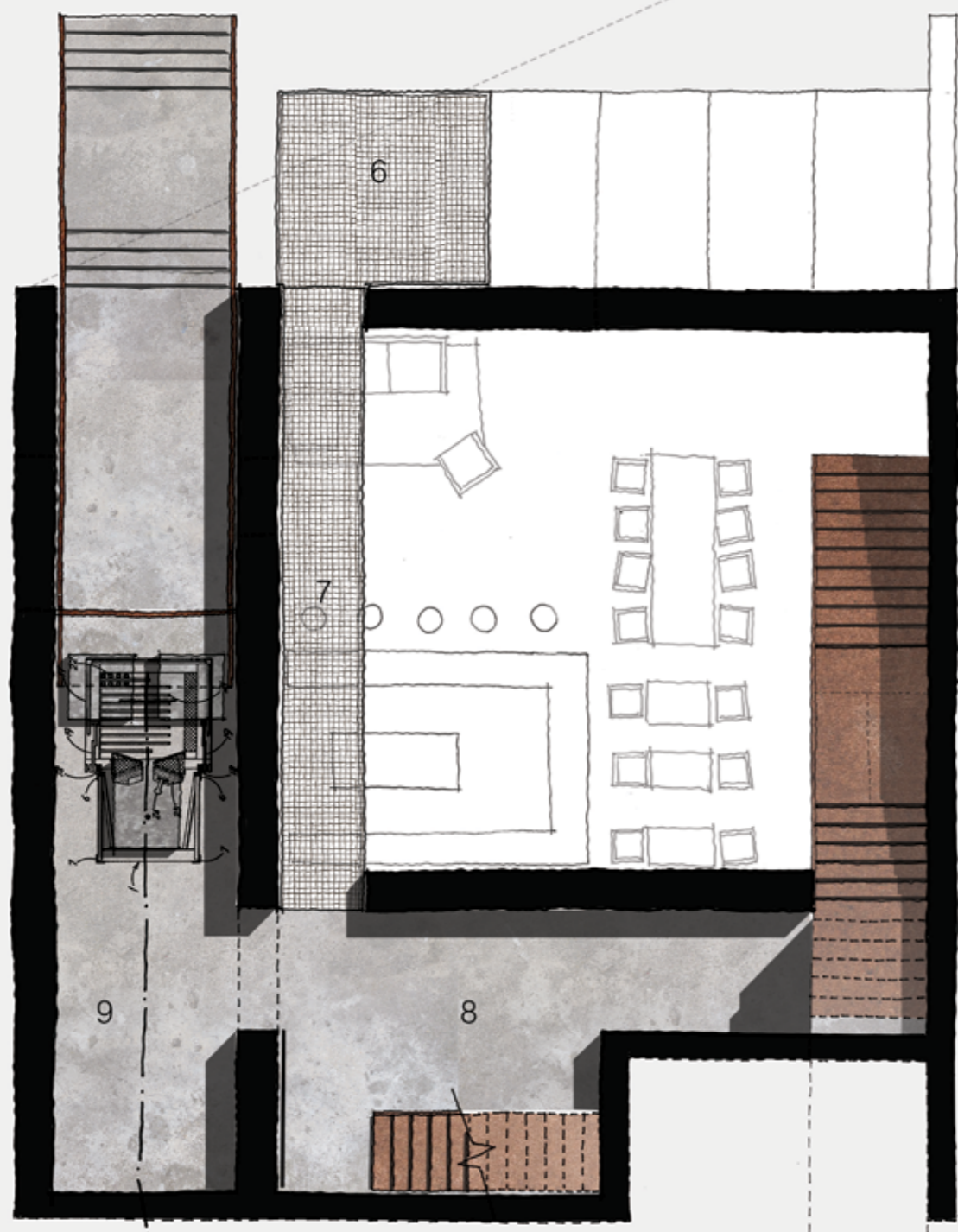
- 1. Vault Entrance and Loading Area.
- 2. Observation Deck.
- 3. Endemic Garden.
- 4. Seed Storage.
- 5. Coffee Shop.
- 6. External Hydraulic Deck.

Longitudinal Section
1: 100

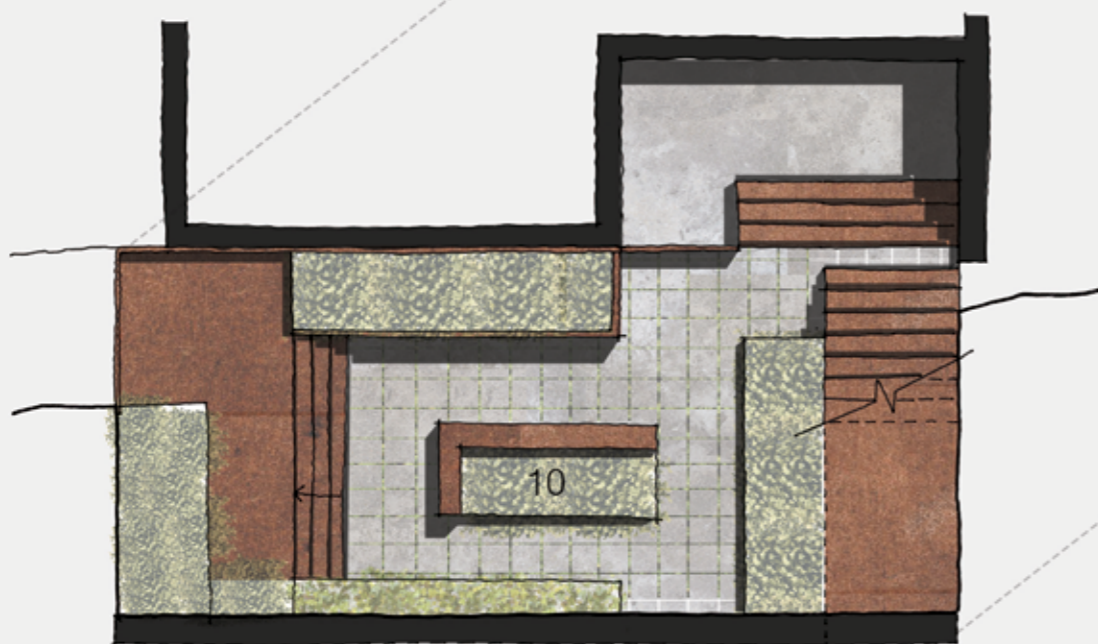
First Platform
1: 100



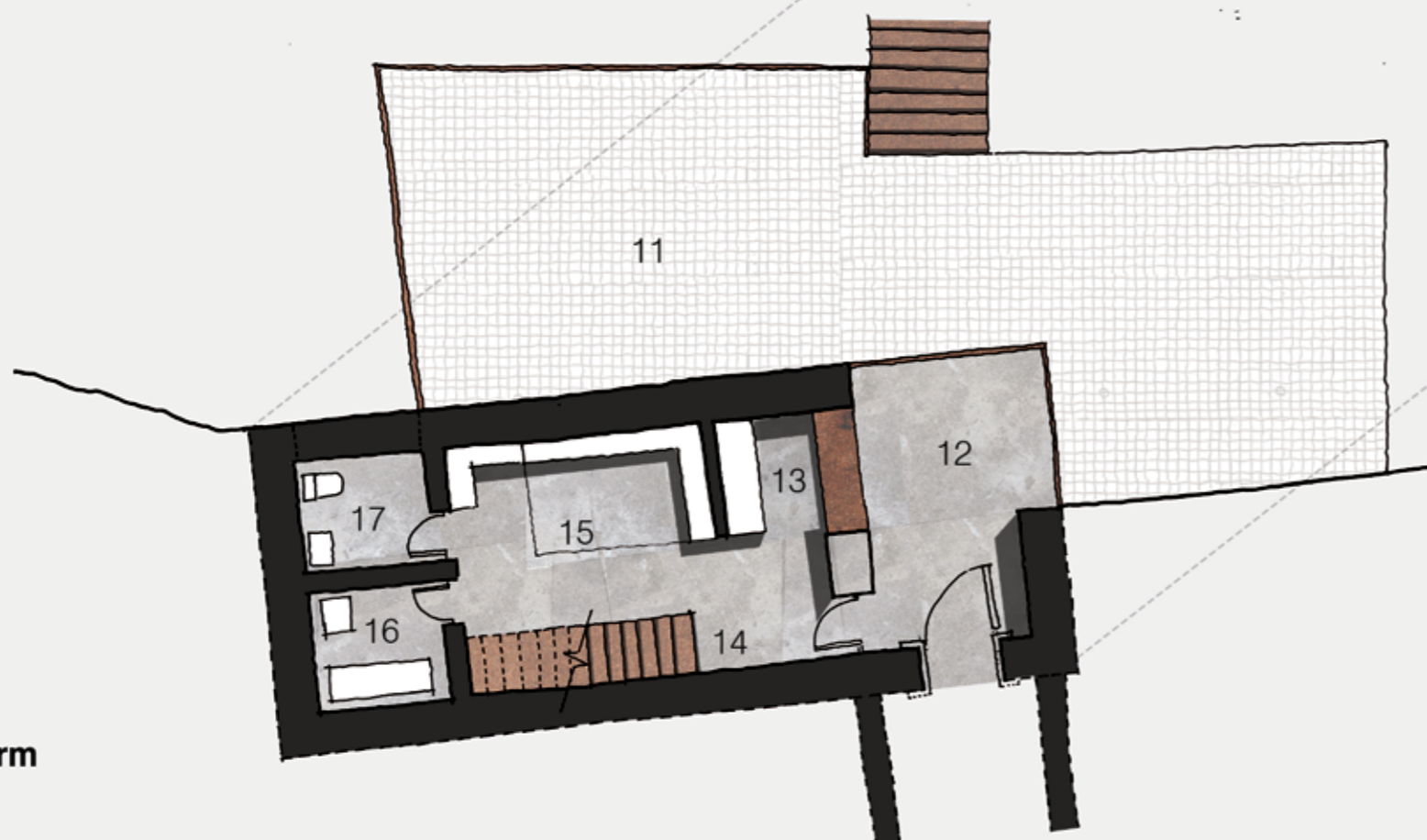
Second Platform
1: 100



Third Platform
1: 100



Fourth Platform
1: 100



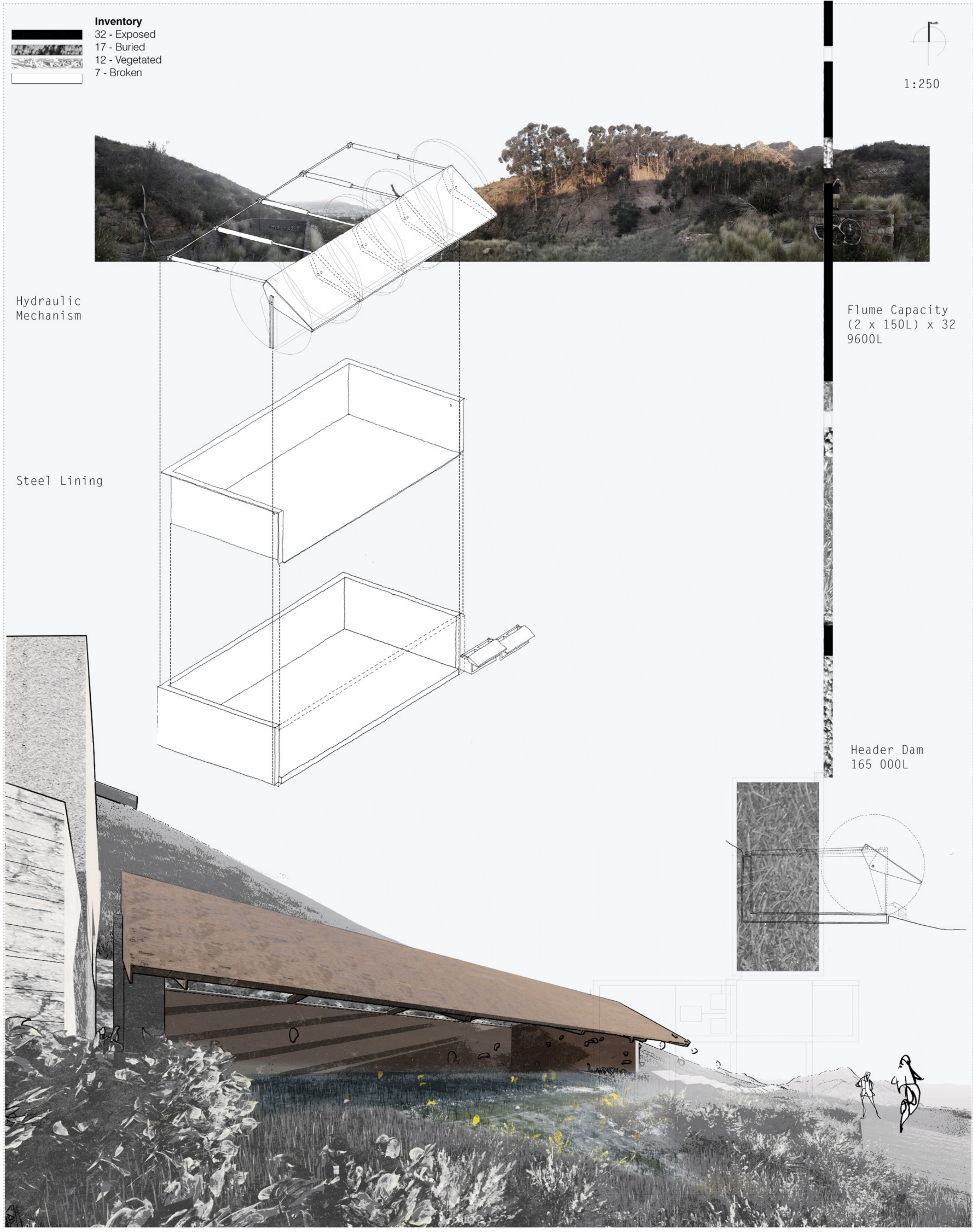
- First Platform (Existing)**
1. Entrance Portico
 2. Rescripted Existing Header
 3. Coffee Shop
 4. External Hydraulic Deck
 5. Ablutions

- Second Platform (Existing)**
6. Hydraulic Loading Platform
 7. Gantry Walkway
 8. Seed Storage
 9. Hoist Loading Area

- Third Platform (Existing)**
10. Endemic Garden

- Fourth Platform (New)**
11. Observational Point
 12. Hydraulic Patio
 13. Security Check Point
 14. To Mechanical Hoist Above
 15. Seed Storage Area
 16. Xray Room
 17. Ablutions

WEATHERING THE EDGE_VREDEHOEK
NATURAL MACHINE



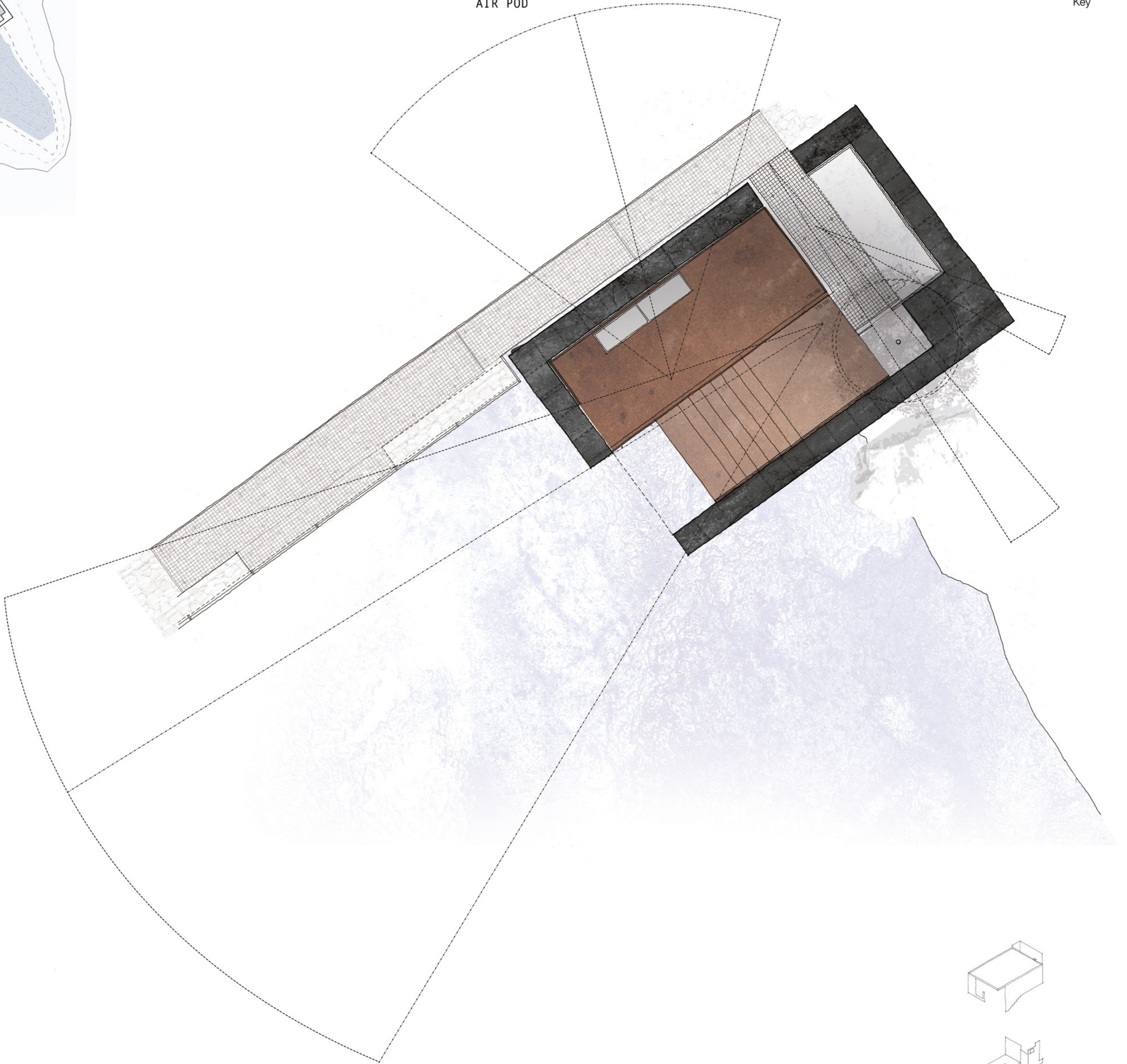


WEATHERING THE EDGE_VREDEHOEK
AIR POD

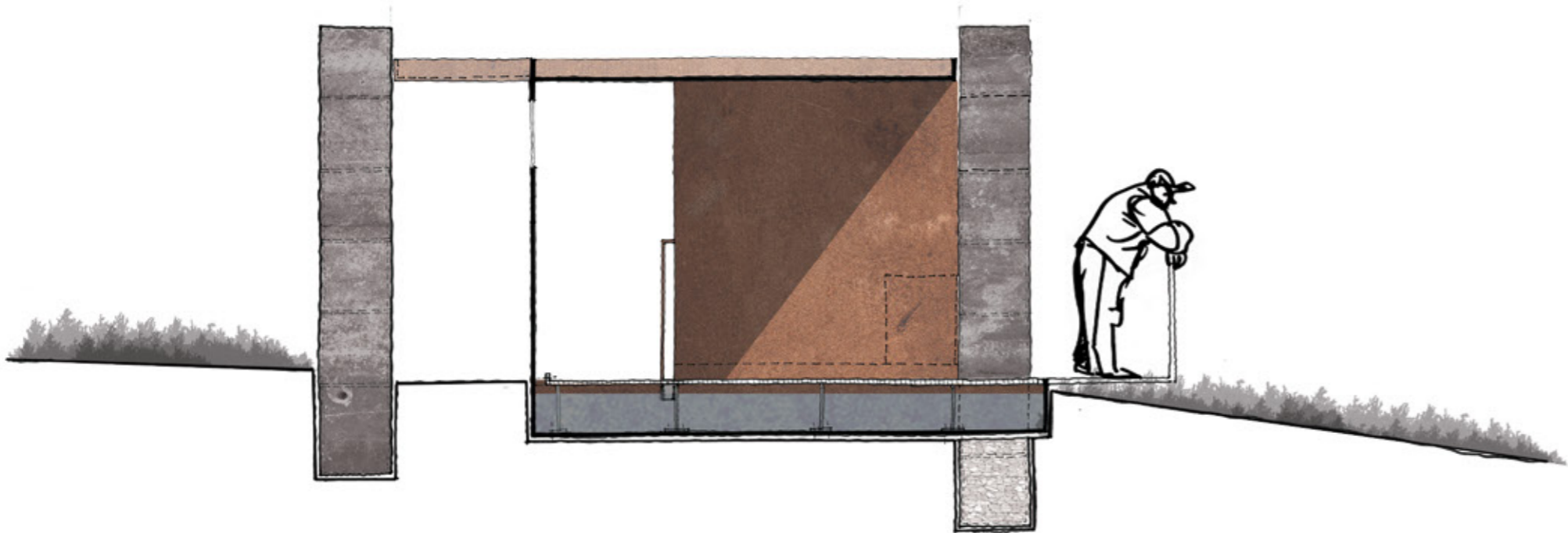


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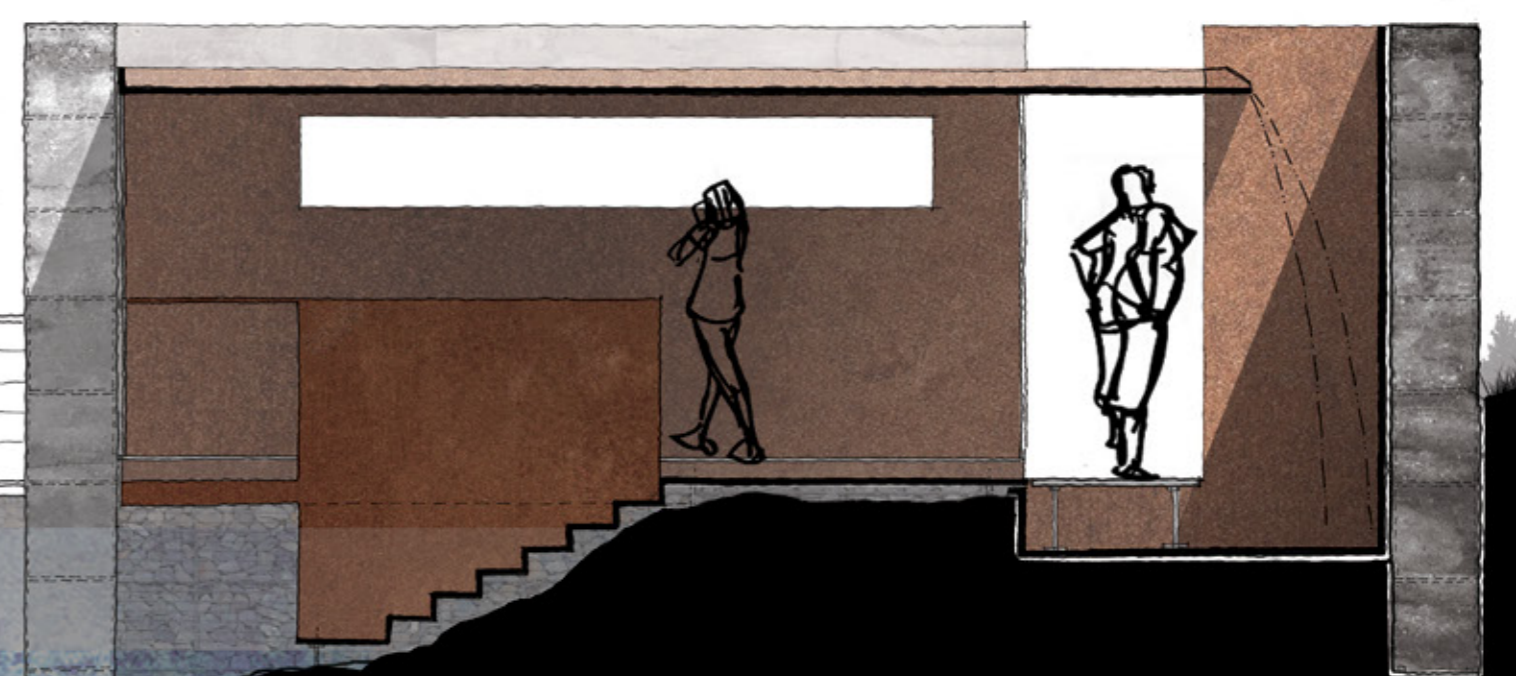
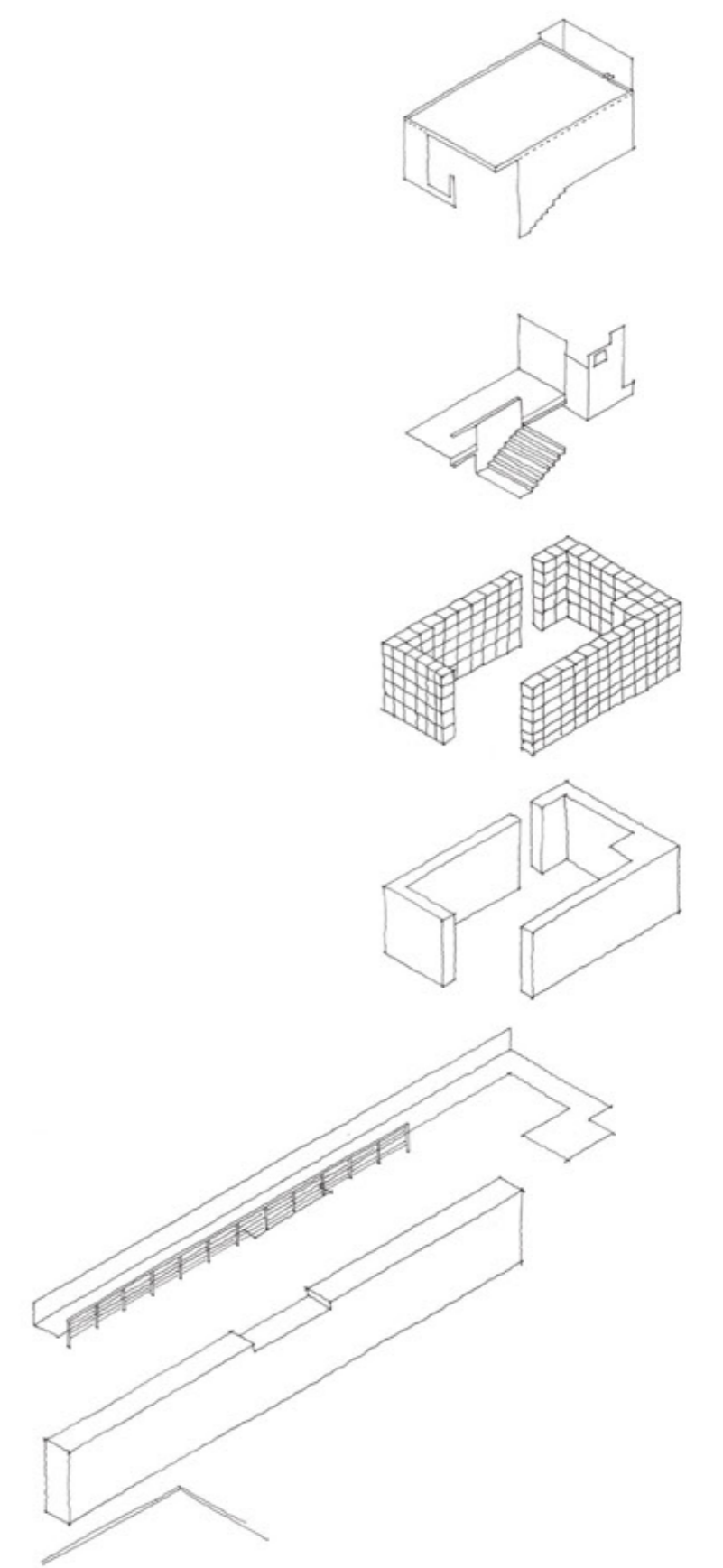
Locality
1 : 1500



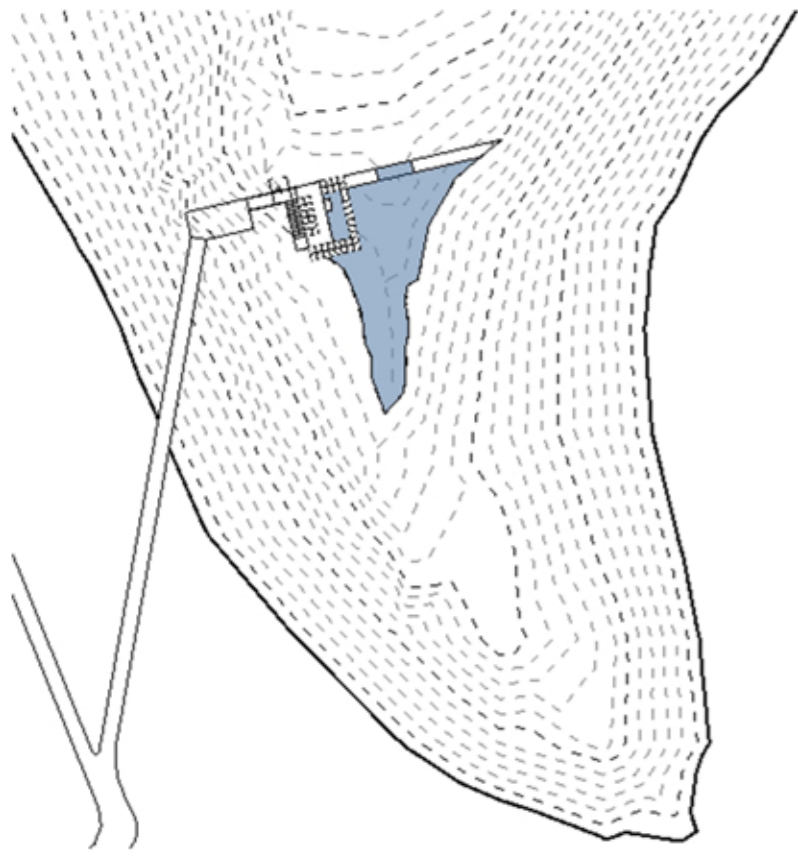
Floor Plan
1 : 50



Traverse Section
1 : 50



Longitudinal Section
1 : 50

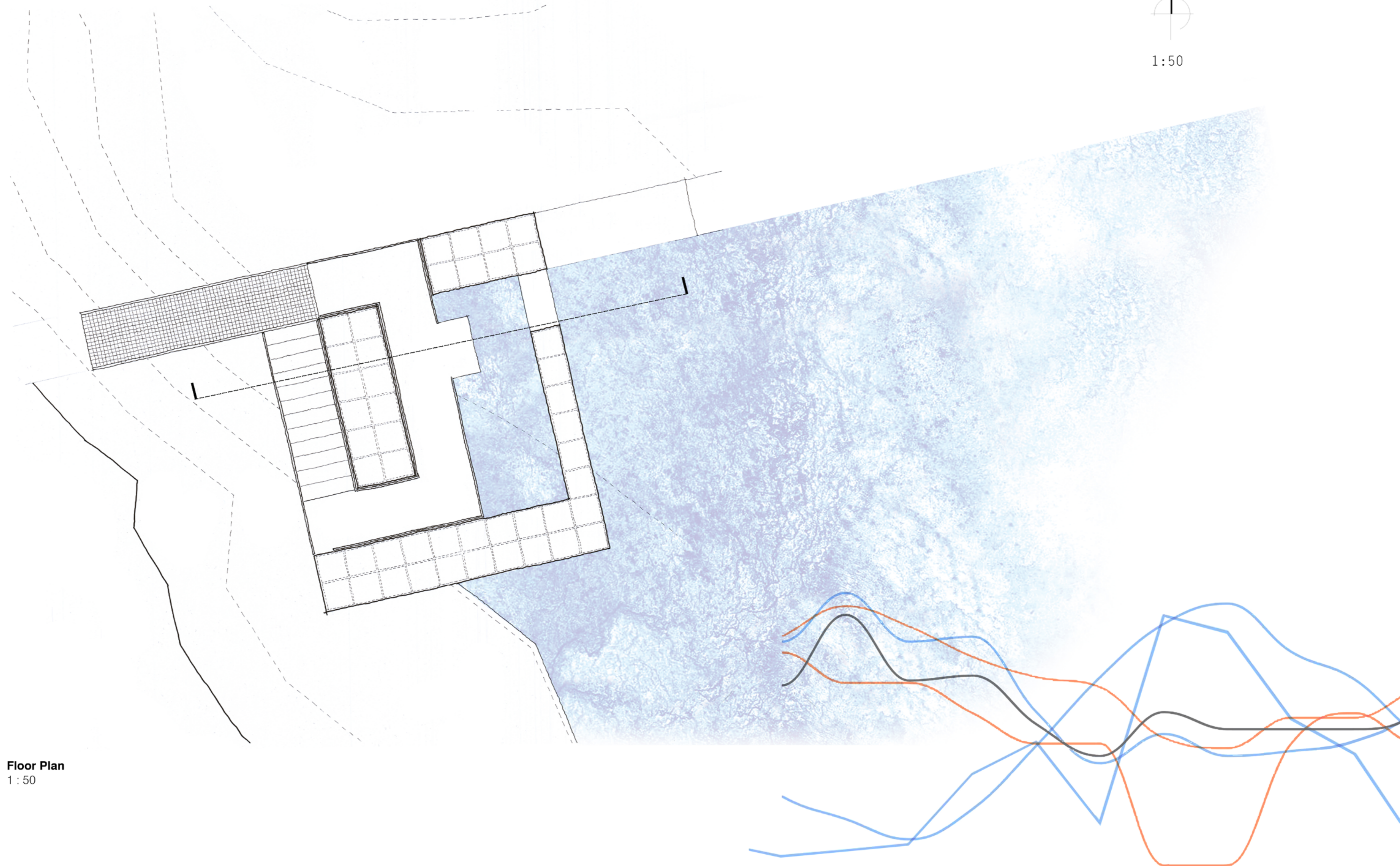


WEATHERING THE EDGE_VREDEHOEK
AIR POD

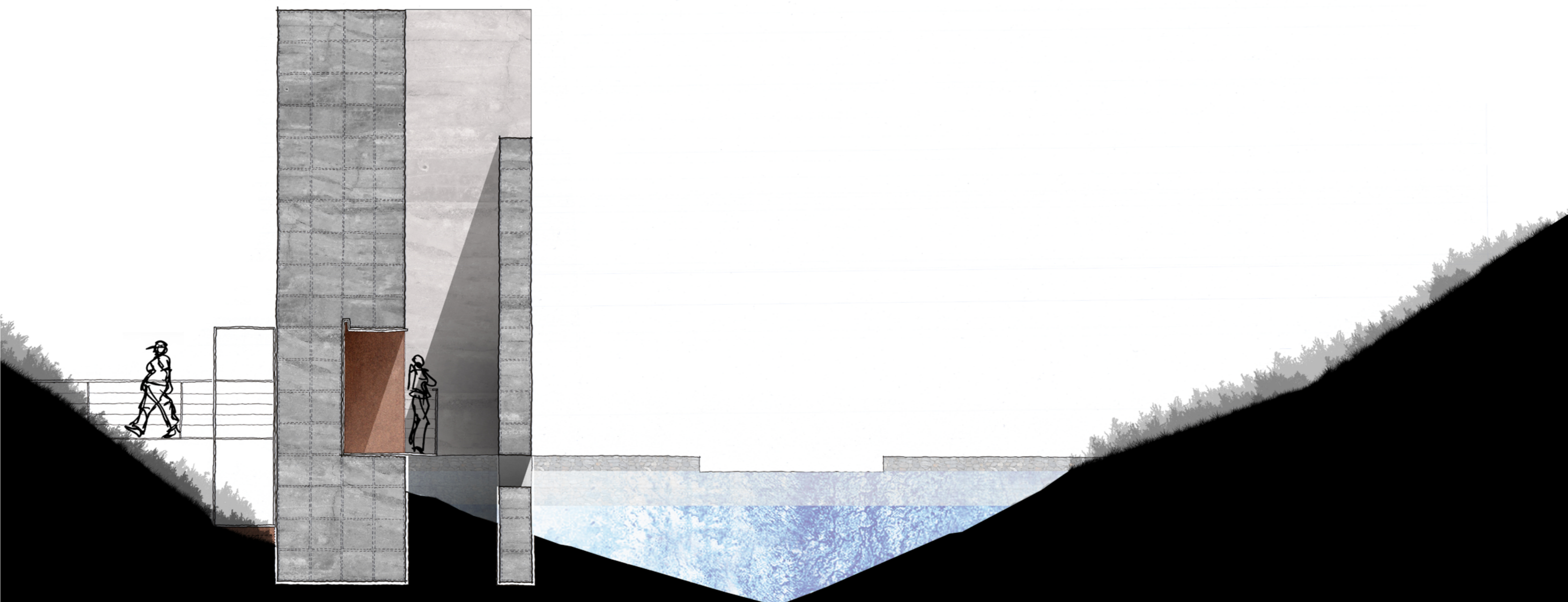


Key

Locality
1:1500



Floor Plan
1:50



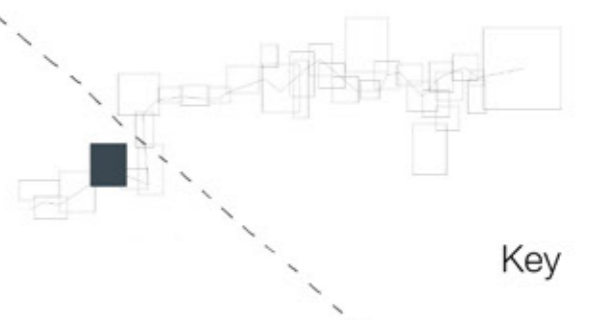
LongitudinalSection
1:50



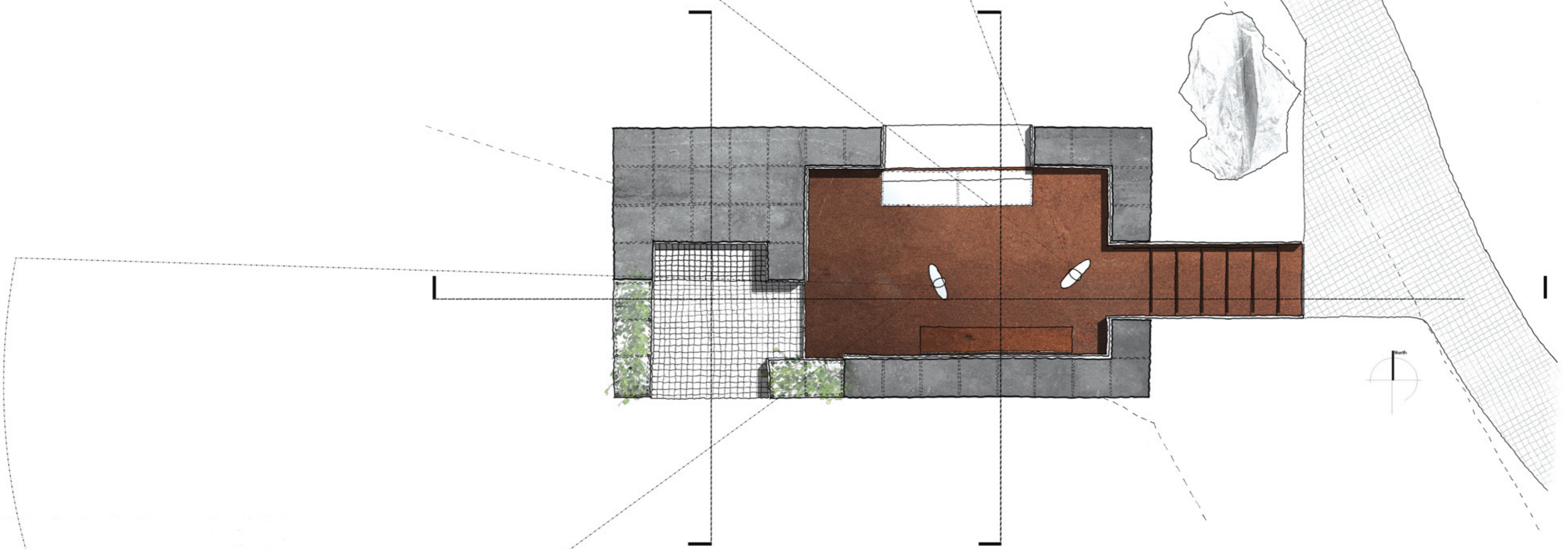
Locality
1: 1500



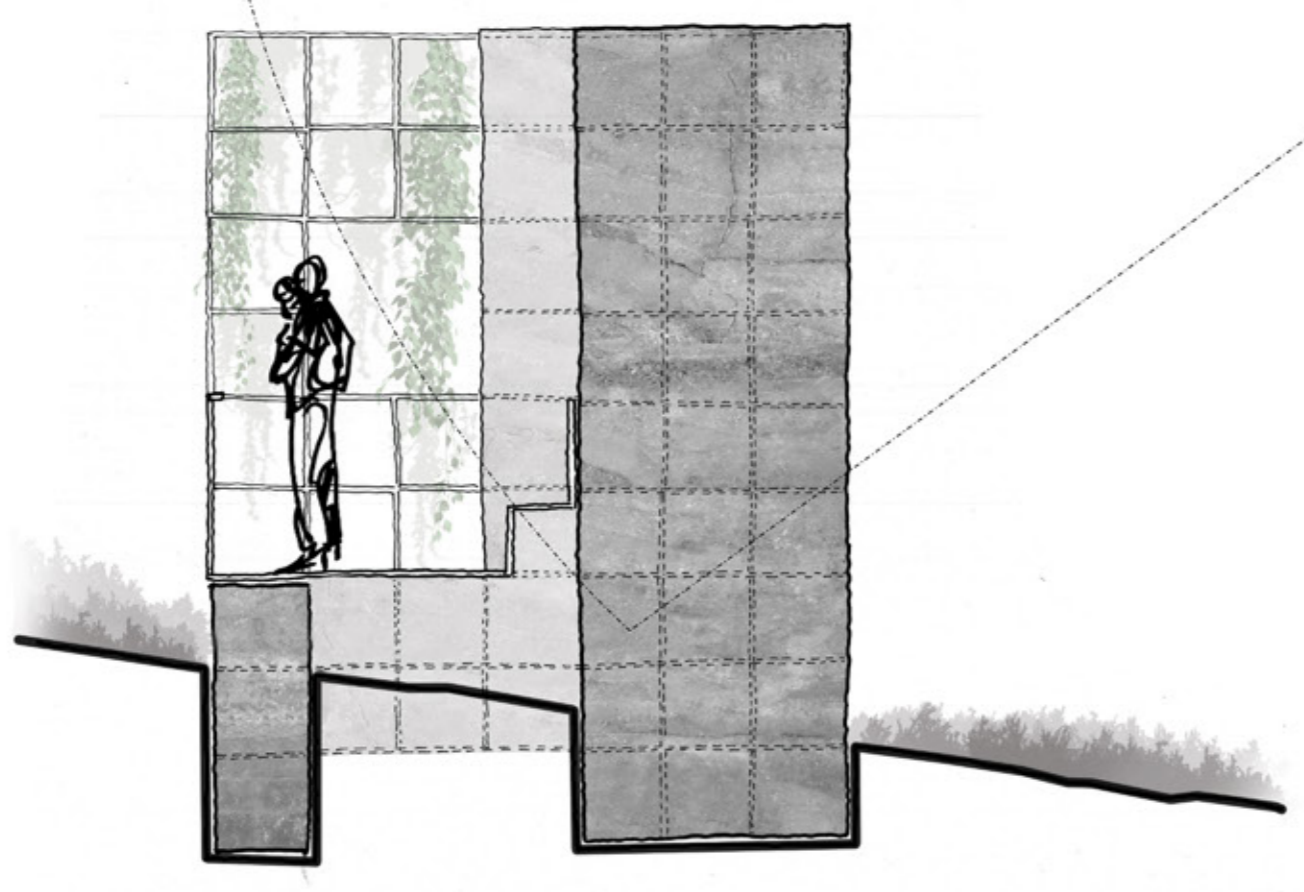
WEATHERING THE EDGE_VREDEHOEK
FIRE POD



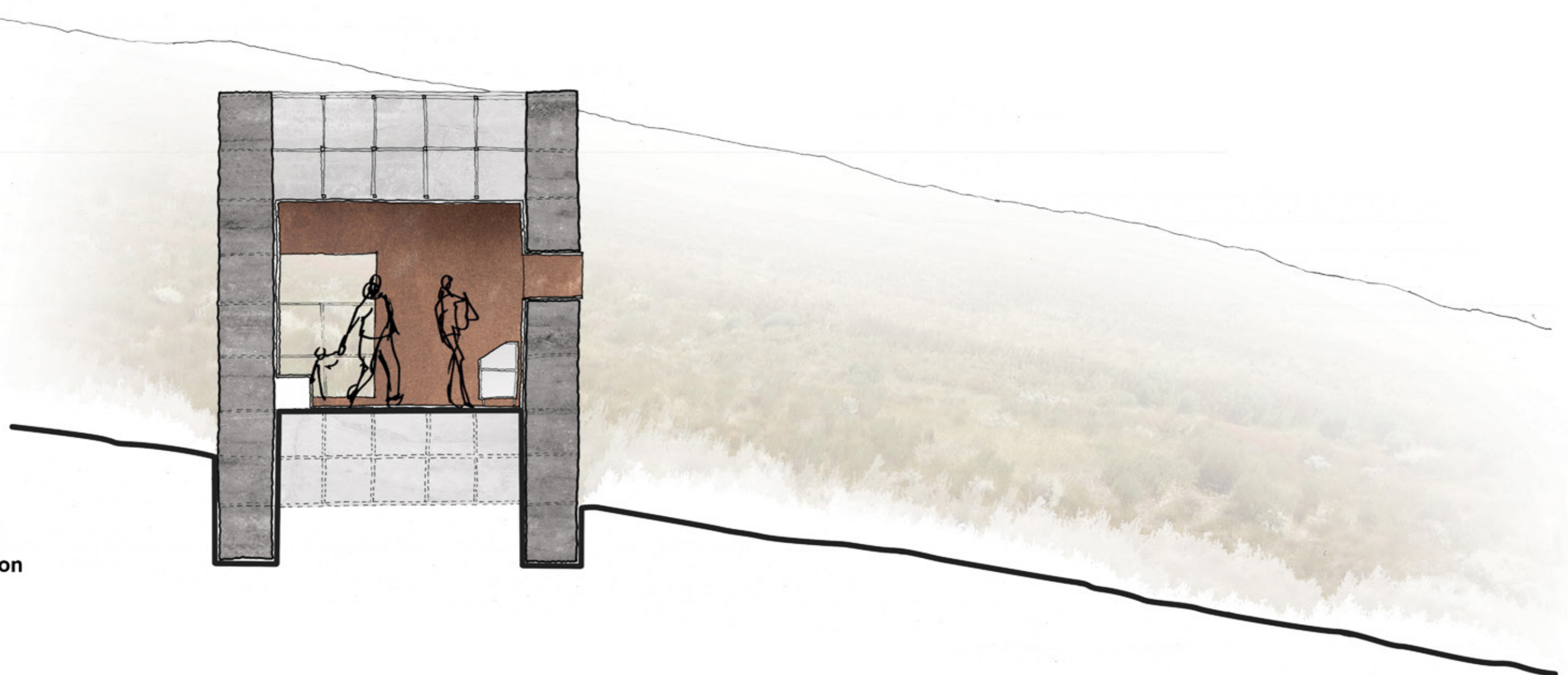
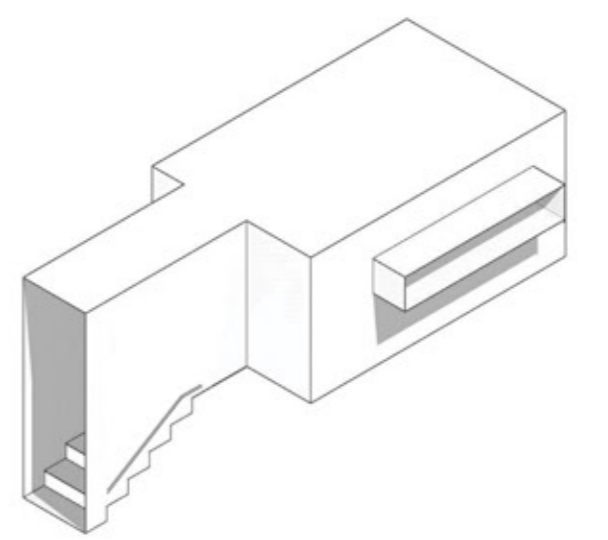
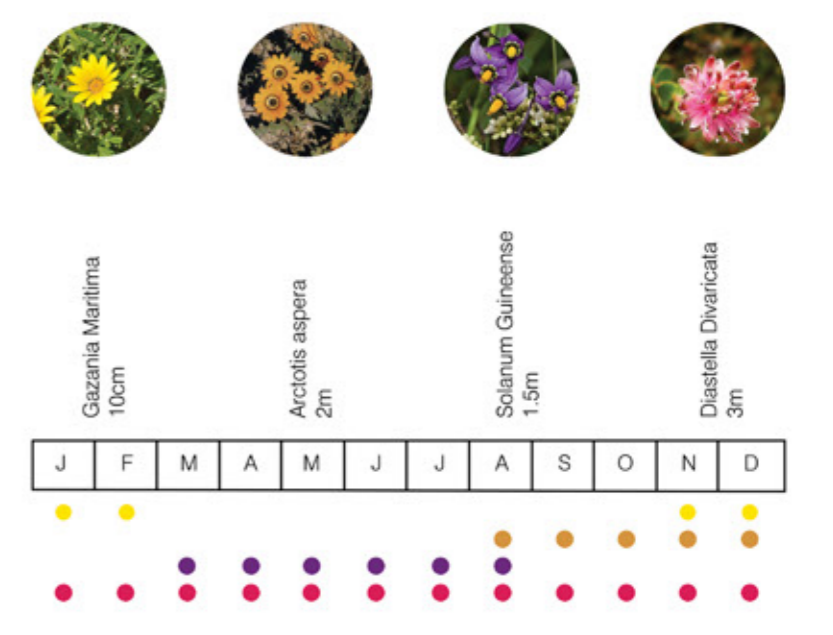
Key



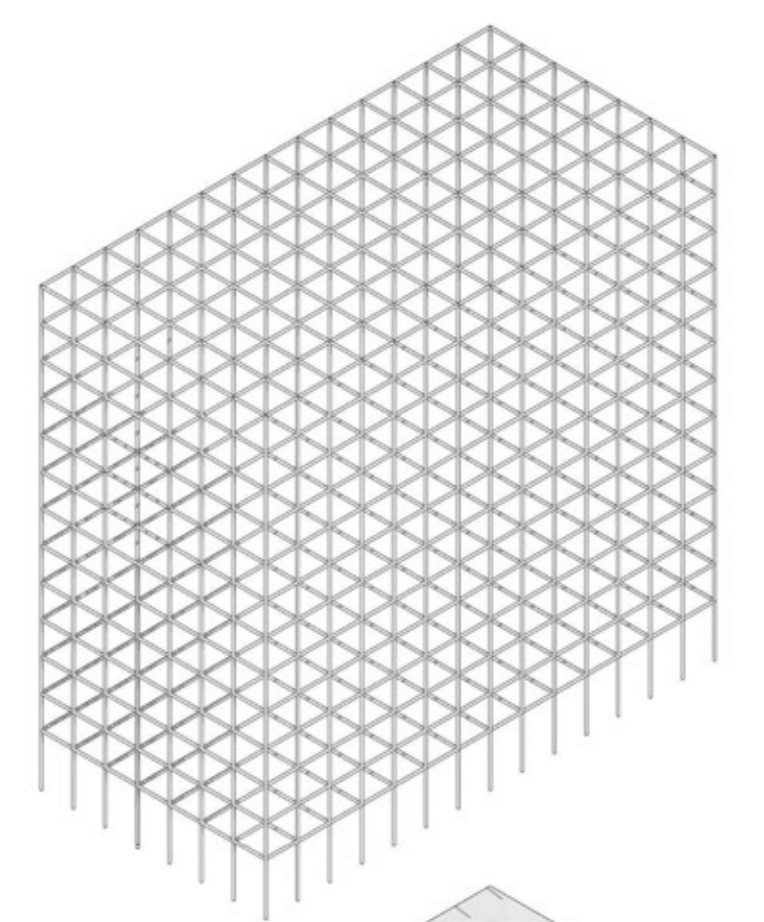
Floor Plan
1: 50



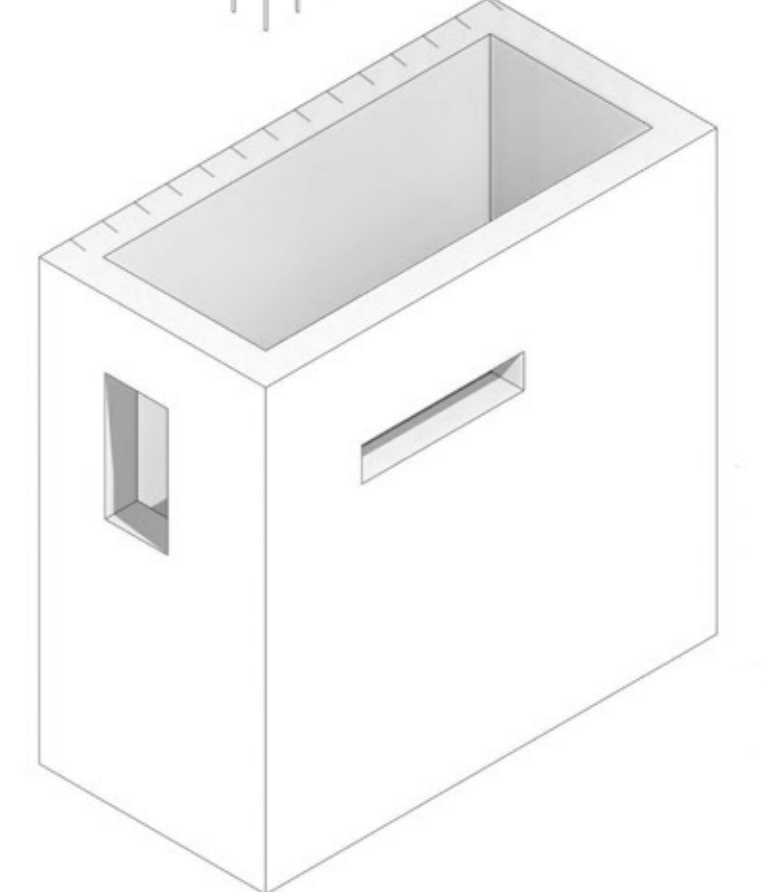
Traverse Section
1: 50

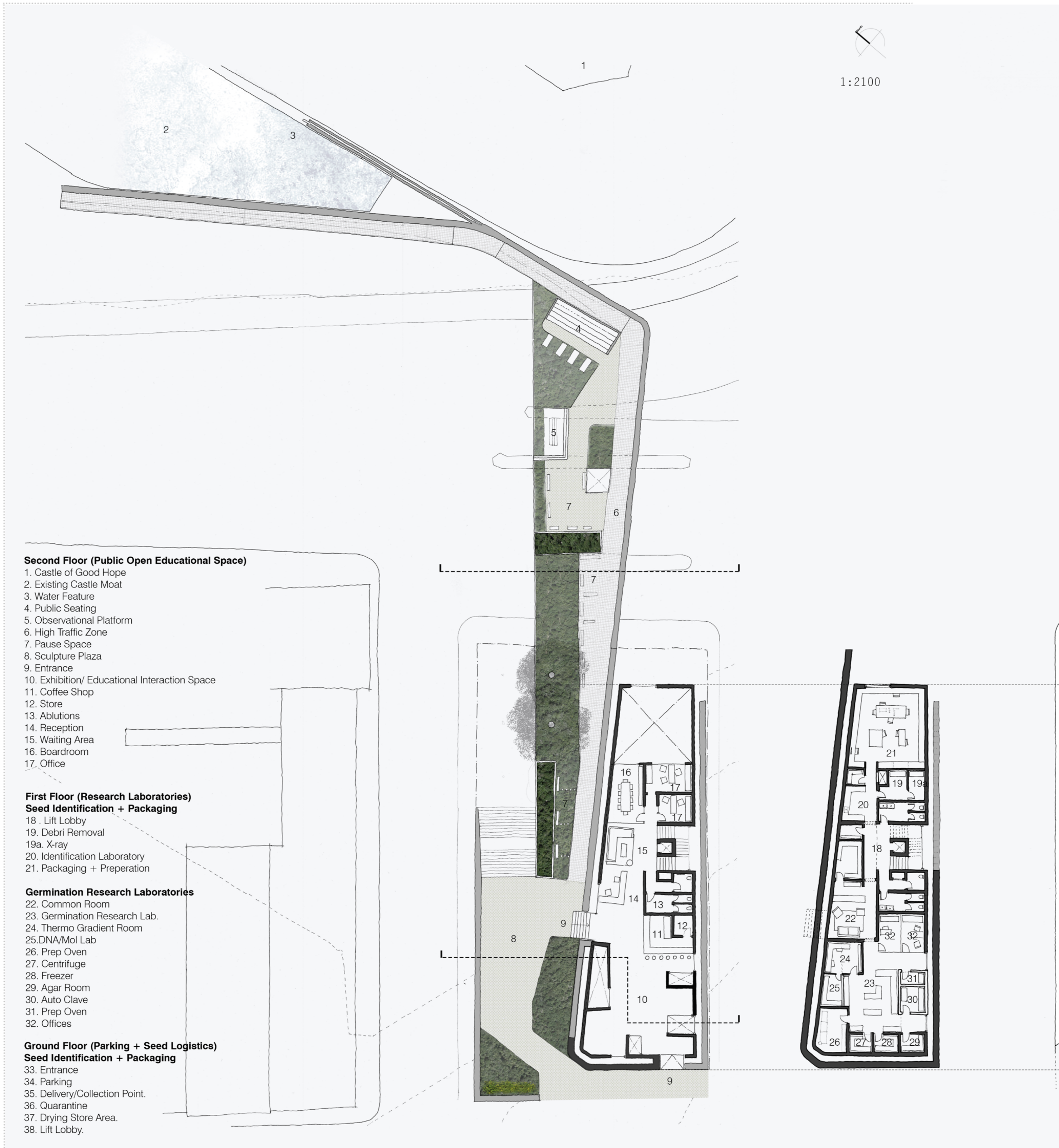


Traverse Section
1: 50



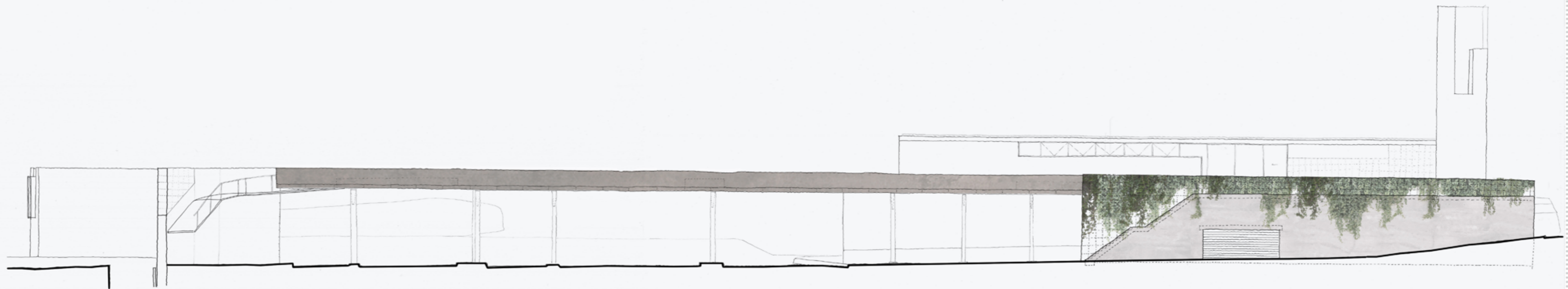
Longitudinal Section
1: 50



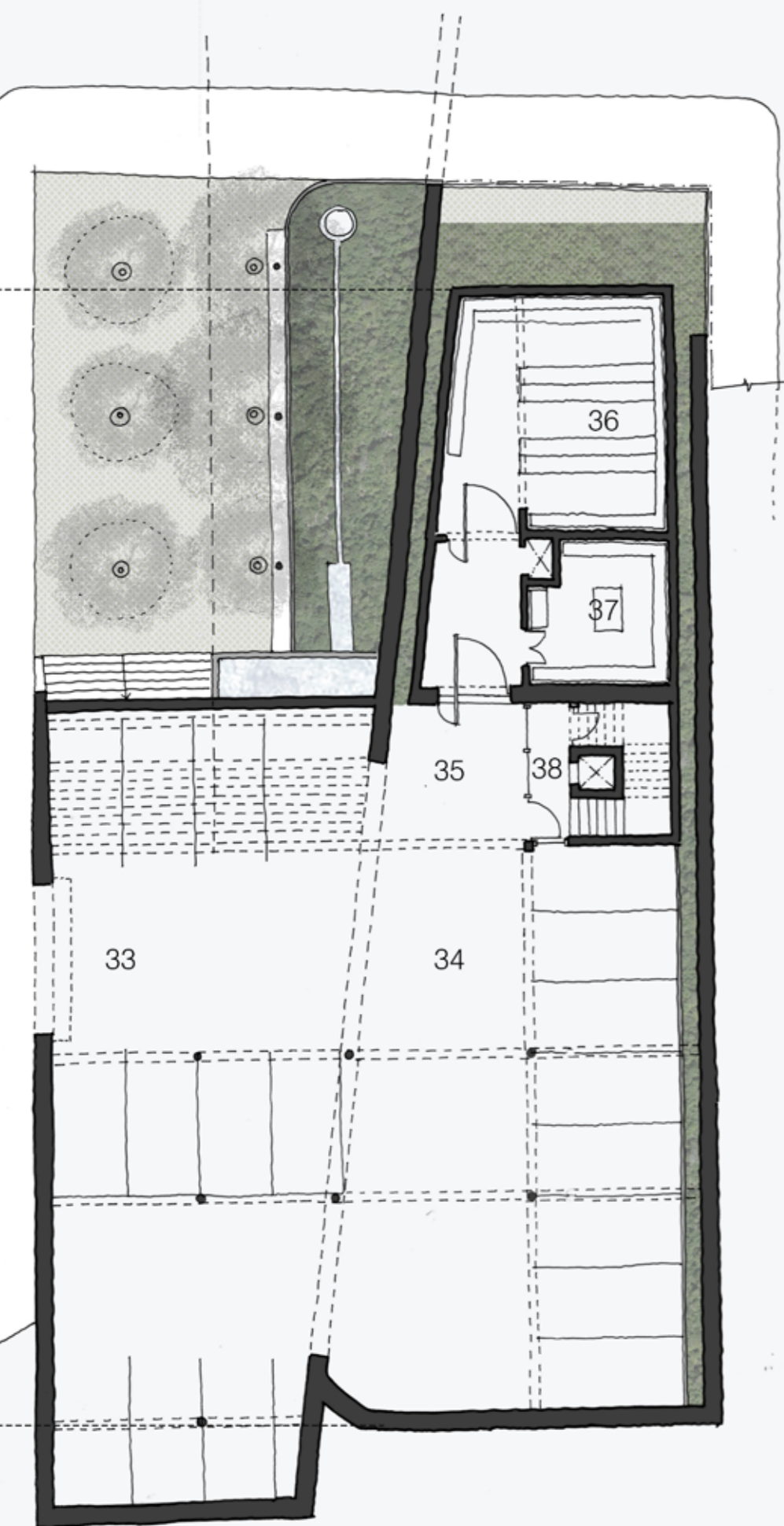


Second Floor Plan
1: 200

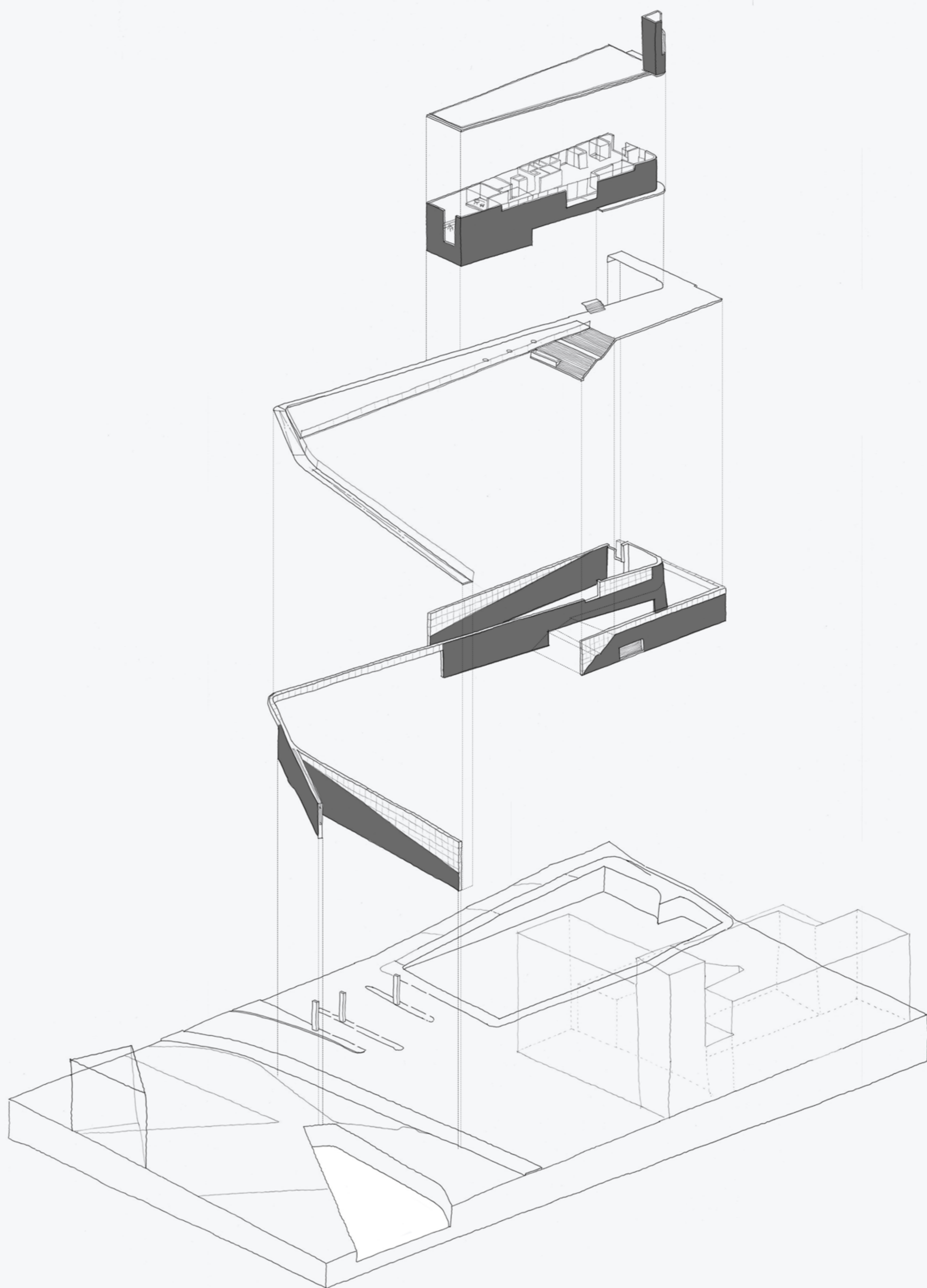
First Floor Plan
1: 200



North Elevation
1 : 200



Ground Floor Plan
1 : 200



Mass

Route

Platform

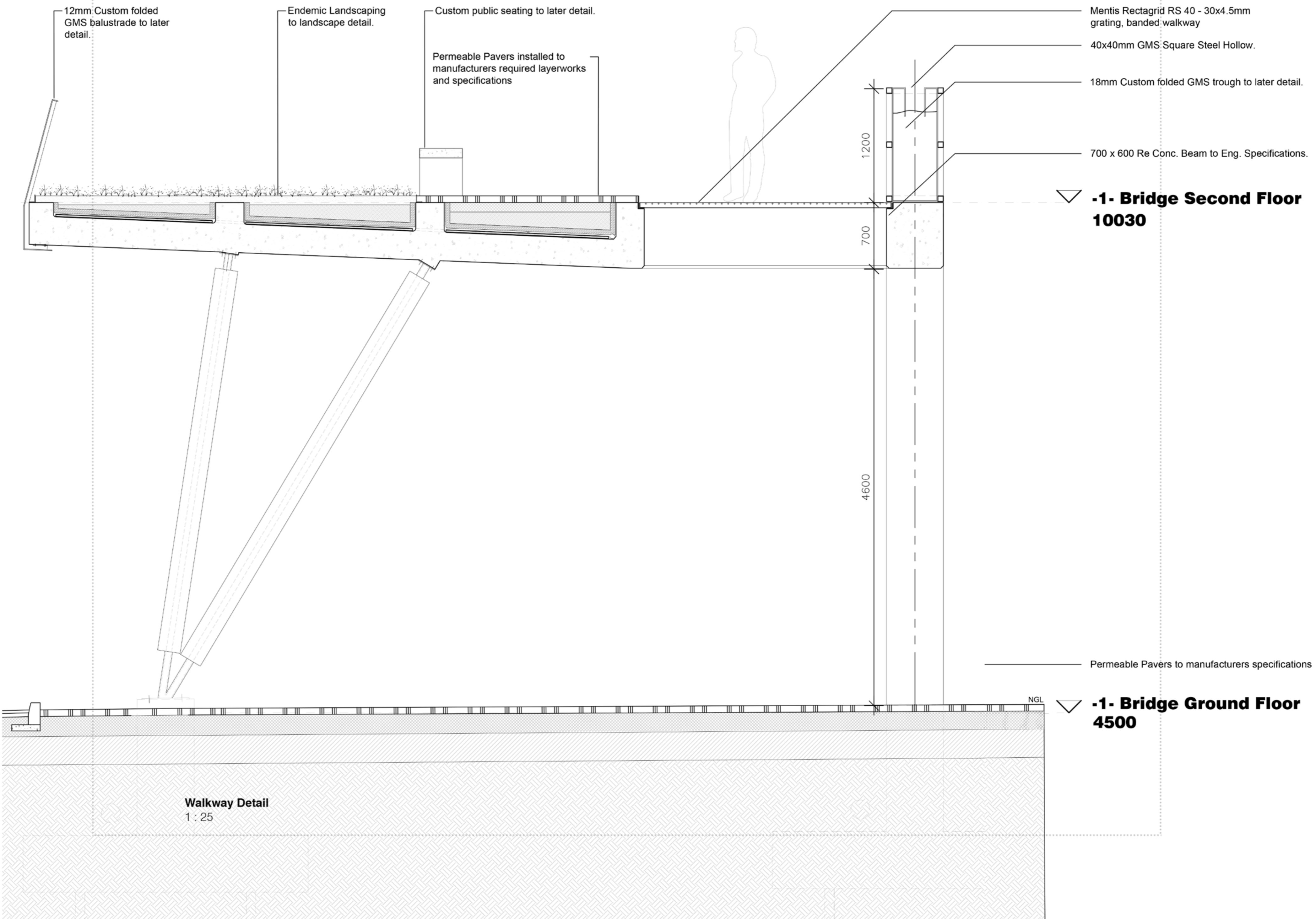
Isometric

Isometric

WEATHERING THE EDGE_VREDEHOEK
BRIDGE SECTION



Traverse Section
1 : 200



APPLICATION FORM

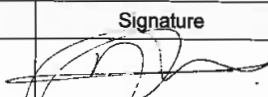
Please Note:


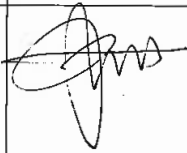
Any person planning to undertake research in the Faculty of Engineering and the Built Environment (EBE) at the University of Cape Town is required to complete this form **before** collecting or analysing data. The objective of submitting this application *prior* to embarking on research is to ensure that the highest ethical standards in research, conducted under the auspices of the EBE Faculty, are met. Please ensure that you have read, and understood the **EBE Ethics in Research Handbook** (available from the UCT EBE, Research Ethics website) prior to completing this application form: <http://www.ebe.uct.ac.za/usr/ebe/research/ethics.pdf>

APPLICANT'S DETAILS		
Name of principal researcher, student or external applicant		YASEEN DEEN NOON
Department		ARCHITECTURE, PLANNING & GEOMATICS
Preferred email address of applicant:		
If a Student	Your Degree: e.g., MSc, PhD, etc.,	M. ARCH (PROF)
	Name of Supervisor (if supervised):	Supervisor : NIC COETZER Co-Supervisor : KEVIN FELLINGHAM
If this is a research contract, indicate the source of funding/sponsorship		
Project Title		WEATHERED LANDSCAPES : THE MEMORY OF TECTONIC CULTURE

I hereby undertake to carry out my research in such a way that:

- there is no apparent legal objection to the nature or the method of research; and
- the research will not compromise staff or students or the other responsibilities of the University;
- the stated objective will be achieved, and the findings will have a high degree of validity;
- limitations and alternative interpretations will be considered;
- the findings could be subject to peer review and publicly available; and
- I will comply with the conventions of copyright and avoid any practice that would constitute plagiarism.

SIGNED BY	Full name	Signature	Date
Principal Researcher/ Student/External applicant	YASEEN DEEN NOON		27/07/17

APPLICATION APPROVED BY	Full name	Signature	Date
Supervisor (where applicable)	N. COETZER		
HOD (or delegated nominee) Final authority for all applicants who have answered NO to all questions in Section 1, and for all Undergraduate research (Including Honours)	Prof T. BERLANDA		
Chair : Faculty EIR Committee For applicants other than undergraduate students who have answered YES to any of the above questions.			

