

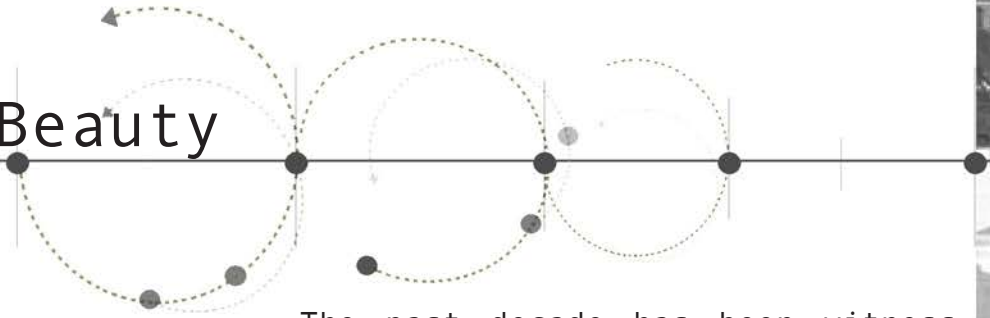


A Paradox of Poisonous Beauty

Water desalination plant and urban wetland on Main Reef Road Johannesburg

A Paradox of Poisonous Beauty

Abstract



The past decade has been witness to a resurgence of interest in ecologically sustainable thinking about the design and management of reclaimed, post-industrial landscapes.

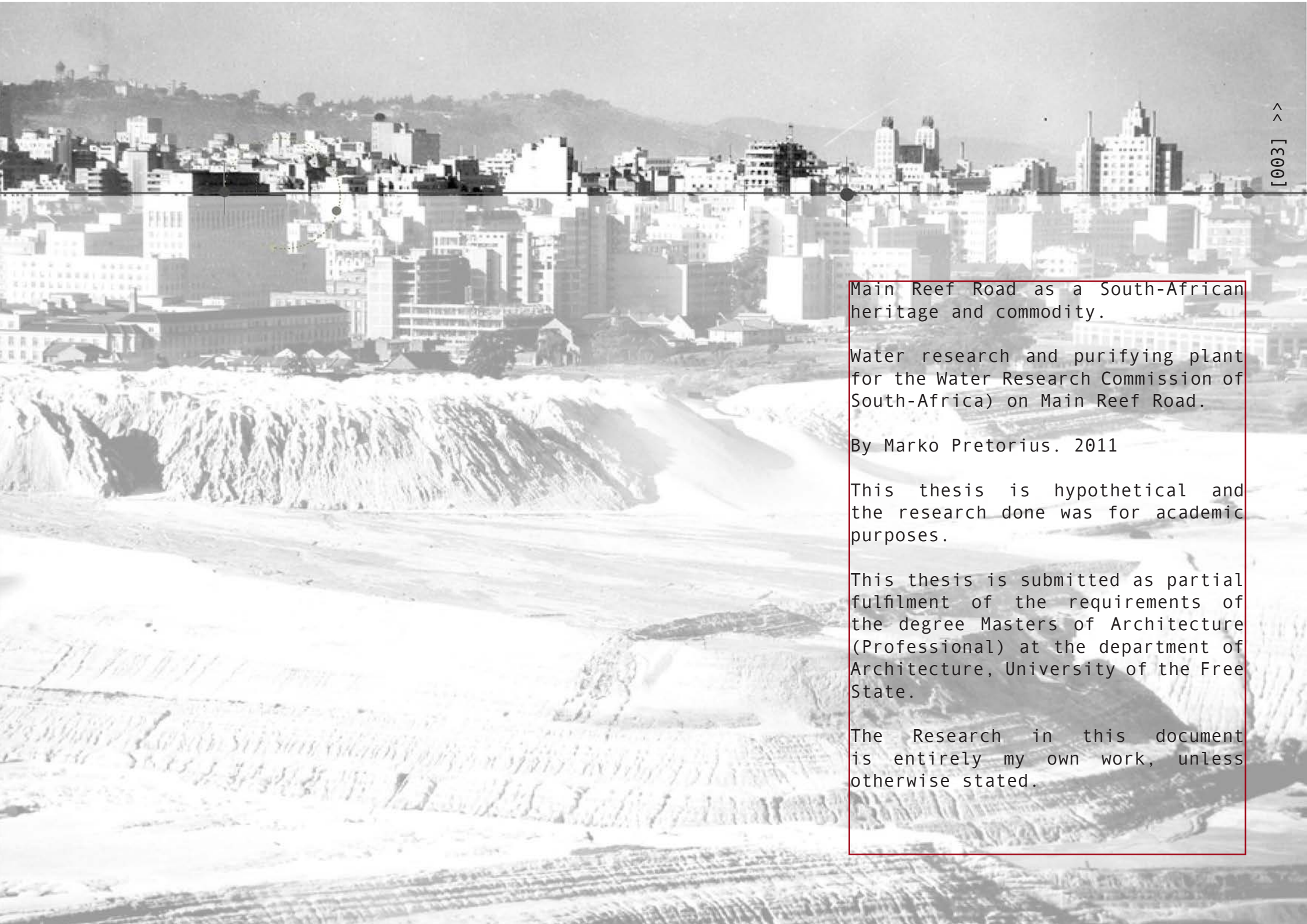
As a result, landscapes that were not previously considered fit for habitation, are now being rehabilitated and redeveloped for new uses.

This project engages in a discourse about thoughts on landscape, and investigates techniques to the task of transforming out dated and disused post-extraction landscapes through design.

Illustration 1.1 (Front Page): Mining Headgear. [Jeanette Unite, 2010:Online]

Illustration 1.2: Historic image of Johannesburg CBD and Mine dumps. [Flickr, n.d:Online]





Main Reef Road as a South-African heritage and commodity.

Water research and purifying plant for the Water Research Commission of South-Africa) on Main Reef Road.

By Marko Pretorius. 2011

This thesis is hypothetical and the research done was for academic purposes.

This thesis is submitted as partial fulfilment of the requirements of the degree Masters of Architecture (Professional) at the department of Architecture, University of the Free State.

The Research in this document is entirely my own work, unless otherwise stated.

Contents



Illustration 1.3: Mining Headgear. [Jeanette Unite, 2010:Online]

>> [004]

>>	Title Page	
>>	Abstract	
>>	Content	
[01]	CHAPTER ONE- INTRODUCTION	[008]
[1.1]	Introduction	[008]
[1.2]	Aims of study	[011]
[1.3]	Research Methodologies	[011]
[1.4]	Design Influences	[012]
[02]	CHAPTER TWO- CONTEXTUAL INVESTIGATION	[014]
[2.1]	Orientation	[017]
[2.1.1]	Johannesburg	[018]
[2.1.2]	The Reef	[026]
[2.1.3]	Acid Mine Drainage	[030]
[2.2]	Micro Context Claim 19	[032]
[2.2.1]	Introduction to claim 19	[032]
[2.2.2]	Claim 19 on Main Reef Road	[034]
[2.2.3]	Geology of claim 19	[036]

[2.3]	Micro Context Top Star Drive Inn	[040]
[2.3.1]	Introduction of Top Star	[041]
[2.3.2]	Contextual study	[042]
[2.3.3]	Geology of Top Star	[046]

[03]	CHAPTER THREE- THEORETICAL PREMISE	[048]
[3.1]	Introduction	[050]
[3.2]	Part One: Intervention	[052]
[3.3]	Part Two: Essence of the site - landscape of extraction	[058]
[3.4]	Part Three: Conclusion	[068]

[04]	CHAPTER FOUR- PRECEDENT STUDIES	[070]
[4.1]	AMD & ART Project in Vintondale, Pennsylvania	[070]
[4.2]	Blur Building [Exposition Pavilion: Swiss Expo]	[074]
[4.3]	Lingotto Fiat Factory Conversion	[076]
[4.4]	Yad Vashem's Holocaust Museum	[078]
[4.5]	Inspirational Projects	[080]

[05]	CHAPTER FIVE- BRIEF AND ACCOMMODATION	[086]
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[06] CHAPTER SIX- DESIGN CONCLUSION

[090]

[6.1] Introduction

[091]

[6.1.1] Main Reef Road

[091]

[6.1.2] Sites investigated

[092]

[6.2] Touchstone

[094]

[6.3] Acid Mine Water Reclamation

[096]

[6.3.1] Introduction

[096]

[6.3.2] Active Treatment

[098]

[6.3.3] Passive Treatment

[100]

[6.4] Claim 19: Water desalination plant

[102]

[6.4.1] Choice of Site

[102]

[6.4.2] Form giving elements

[103]

[6.4.3] Materials

[114]

[6.4.4] Design conclusion

[116]

[6.5] Top Star temporary Cinema

[138]

[6.5.1] Design Conclusion

[138]

[07] CHAPTER SEVEN- TECHNICAL REPORT

[144]

>> BIBLIOGRAPHY

Illustration 1.4: Mining Headgear.
[Jeanette Unite,2010:Online]



[1.1] Introduction

This year celebrates the 125th anniversary of gold discovery in Johannesburg. Johannesburg would not have existed if not for the gold mines, the headgear, the mines hafts and the mine dumps. These post-mining sites are man-made and iconic... Main Reef Road- south of the Johannesburg CBD- and its surrounding mining sites are remnants of a changing and disappearing heritage. Main Reef Road defines this post-industrial edge, which for the past century served the mining activities along the gold reef. Today it is strewn with apocalyptic sights that have become an important part of our South African heritage. To celebrate it would be to celebrate its essence, as a space of wonder and exploitation. There is a certain magic to be in the presence of these sites. One can be mesmerized by the scale, the void and the alien of the various mine dumps, mines hafts and post industrial ruins. Most recently Main Reef Road has become known for the acid mine drainage crisis as acid water rises up through drainage points, spewing toxic filth

to the surface. The underground void left by ages of excavation is filling up drastically and water carrying sulphuric acid and any number of toxins, are spilling out and could compromise our city, our environment, our reputation and, arguably, our future.

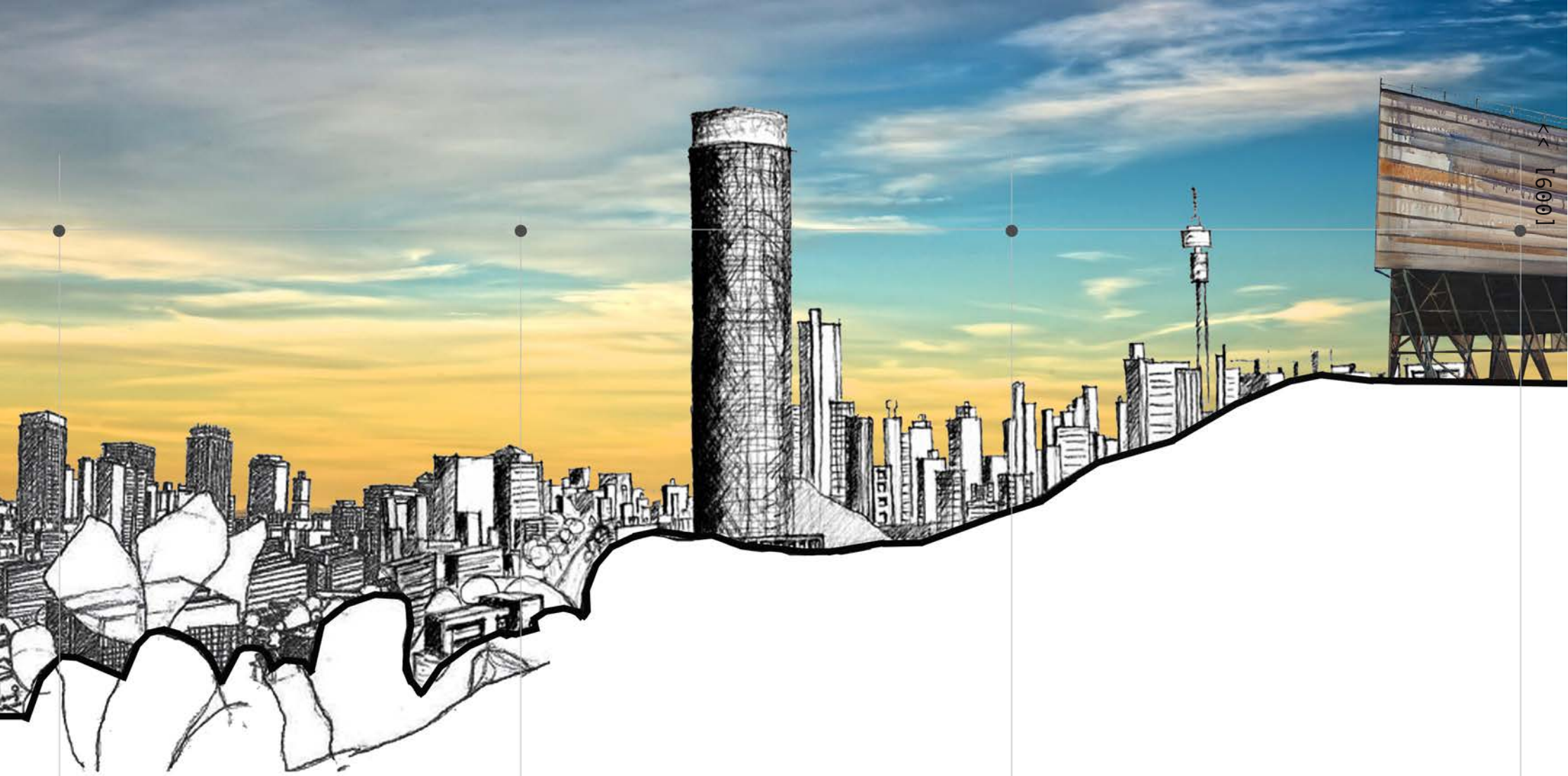
This project is an effort to confront this dilemma, while honouring a past of significant accomplishment and broadening participation and deeper engagement. It will also be argued that reclaiming any environmentally damaged area in which communities have a stake, needs more than a technical solution. Sustainable reclamation demands more than a scientific intervention. Lasting solutions to the problems of environmental reclamation should firstly be environmental but should also be cultural. A Truly collaborative, multidisciplinary approach that engages the arts and the sciences has the power both to rehabilitate the landscape and involve the community in a healing process that continues long

after the proposed intervention.

The project aims at:

- Celebrating Main Reef Road as a heritage site and valuable commodity.
- Engaging with the site on the premise that architecture and human life is not intended to oppose or cower away from these post-industrial sites, but rather to draw it into an intimate association in order to find union with it.
- Designing a catalyst building and public place that directly addresses the problems associated with acid mine drainage.

Illustration 1.5: Joburg skyline [Cabral, n.d: Online and Niebuhr, 2011: Online]



10001

[1.2] Aims of study



The project aims at:

- Celebrating Main Reef Road as a heritage site and valuable commodity;
- Engaging with the site on the premise that architecture and human life is not intended to oppose or cower away from these post-industrial sites, but rather draw it into an intimate association in order to find union with it.
- Designing a catalyst building and public place that directly addresses the problems associated with acid mine drainage.

[Perspective rendering of entrance to water desalination plant on claim 19]

[1.3] Research Methodologies

The research done for this thesis will entail a number of different methodologies. The theoretical argument will be based on the temporary continuum and explores process and time as material. Architecture is explored not as form, but as atmosphere or effect in discovering the architecture which the site itself is seeking. The focus will be on branding Main Reef Road as an international heritage and mining icon. The result of this methodology in the building will be a stretched out sequence of events, designed to expose the body to the various surreal experiences found on Main Reef Road, enhancing the experience through the constant reminder of passing time.

Personal interviews will be conducted:

1. Regarding site conditions; Prof. Barker (Geology Department, university of the Free-State)
2. Regarding Project Theme: Prof. Bremner.
3. Regarding AMD and water purification: Dr. Vermeulen (Ground Water Department, University of the Free-State).
4. Regarding Active and Passive water purification techniques: Prof. Rose (Biotechnology Research Unit, Rhodes University).

Journals and newspaper articles will be consulted.

Books will be consulted.

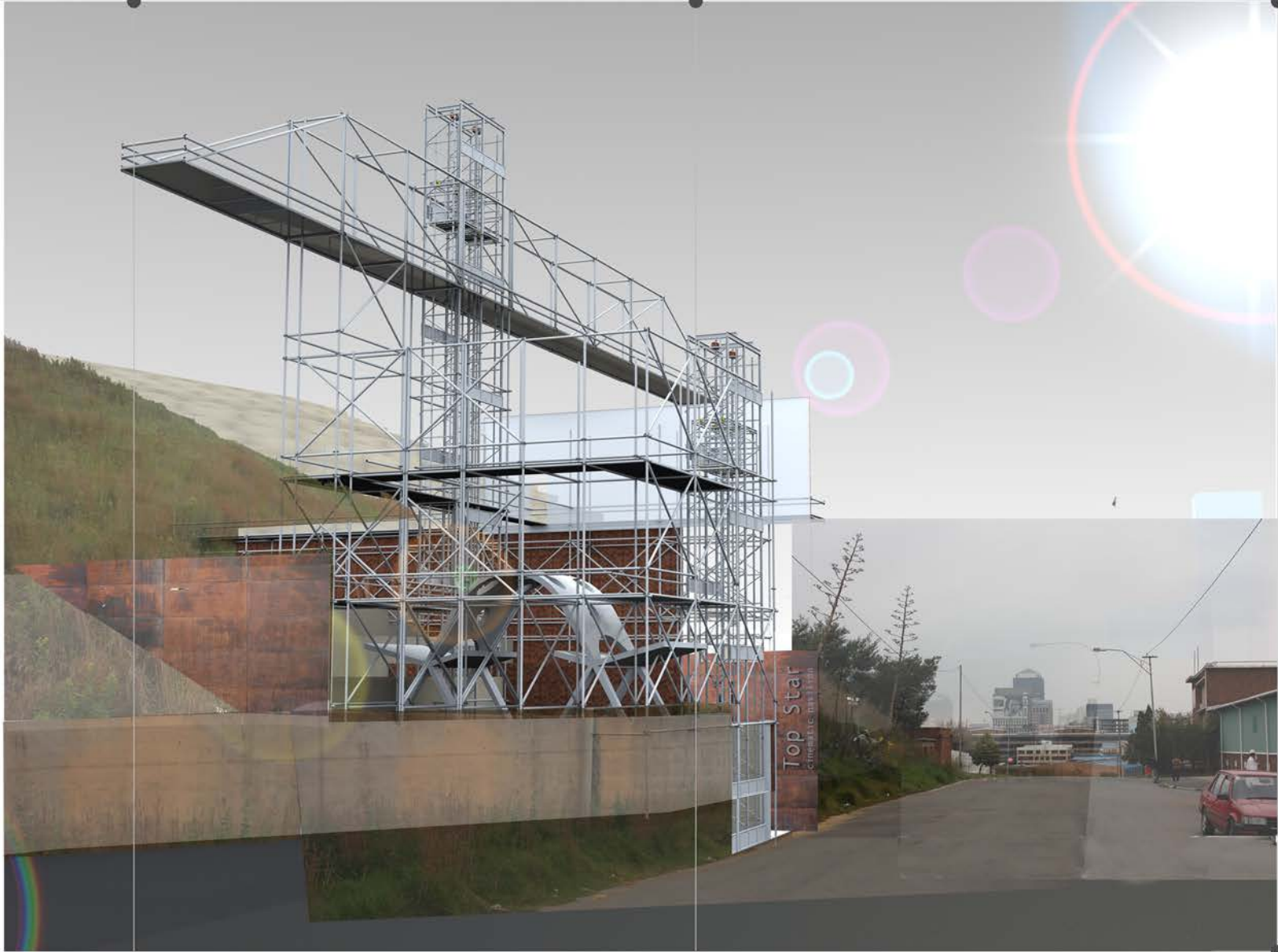
A site analysis will be done.

Precedent studies will be done.

[1.4] Design Influences

- The Edge
- Existing Mining Grid
- Land Forming
- Circulation
- Tectonic Structures

[Perspective rendering of temporary cinema
on Ferreira mine dump]



[02] Contextual Investigation

[2.1] Orientation

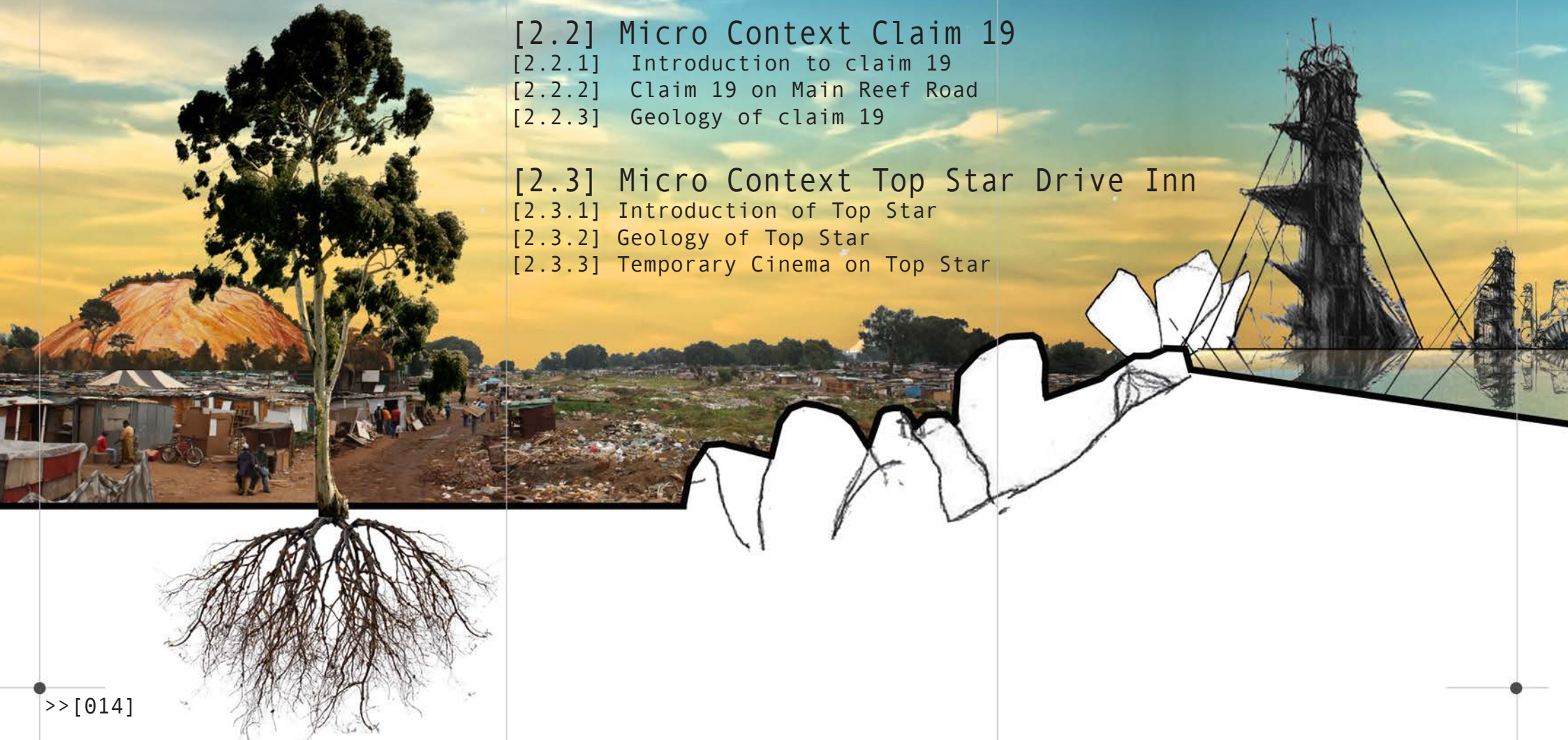
- [2.1.1] Johannesburg
- [2.1.2] The Reef
- [2.1.3] Acid Mine Drainage

[2.2] Micro Context Claim 19

- [2.2.1] Introduction to claim 19
- [2.2.2] Claim 19 on Main Reef Road
- [2.2.3] Geology of claim 19

[2.3] Micro Context Top Star Drive Inn

- [2.3.1] Introduction of Top Star
- [2.3.2] Geology of Top Star
- [2.3.3] Temporary Cinema on Top Star





“All roads lead to Johannesburg. If you are white or if you are black they lead to Johannesburg. If the crops fail, there is work in Johannesburg. If there are taxes to be paid, there is work in Johannesburg. If the farm is too small to be divided further, some must go to Johannesburg. If there is a child to be born that must be delivered in secret, it can be delivered in Johannesburg.”

[Paton, 1948:65]

Illustration 2.1: Johannesburg Sky-line, edited by Author. [Niebuhr & Cabral, 2011:Online]



Illustration 2.2: Historic image Johannesburg CBD and Mine Dumps [Flickr,n.d:Online]



Illustration 2.3: Constitution Hill [Flickr,n.d:Online]



Illustration 2.4: Hector Peterson Memorial [Flickr,n.d:Online]



Illustration 2.5: Apartheids Museum
[Flickr,n.d;Online]



Illustration 2.6: Gold Reef
City

[2.1.1] Johannesburg.

Jo'burg. Jozi. iGoli. The City of Gold. The name refers to Johannesburg's beginnings as a 19th century gold rush town and today it is the commercial centre of our country. Economic strength, energy, a beautiful climate and a commercial edge make Johannesburg a fascinating city.



Illustration 2.7: Map of South Africa,
showing Gauteng.

Johannesburg Zoning

[Mine Dumps]

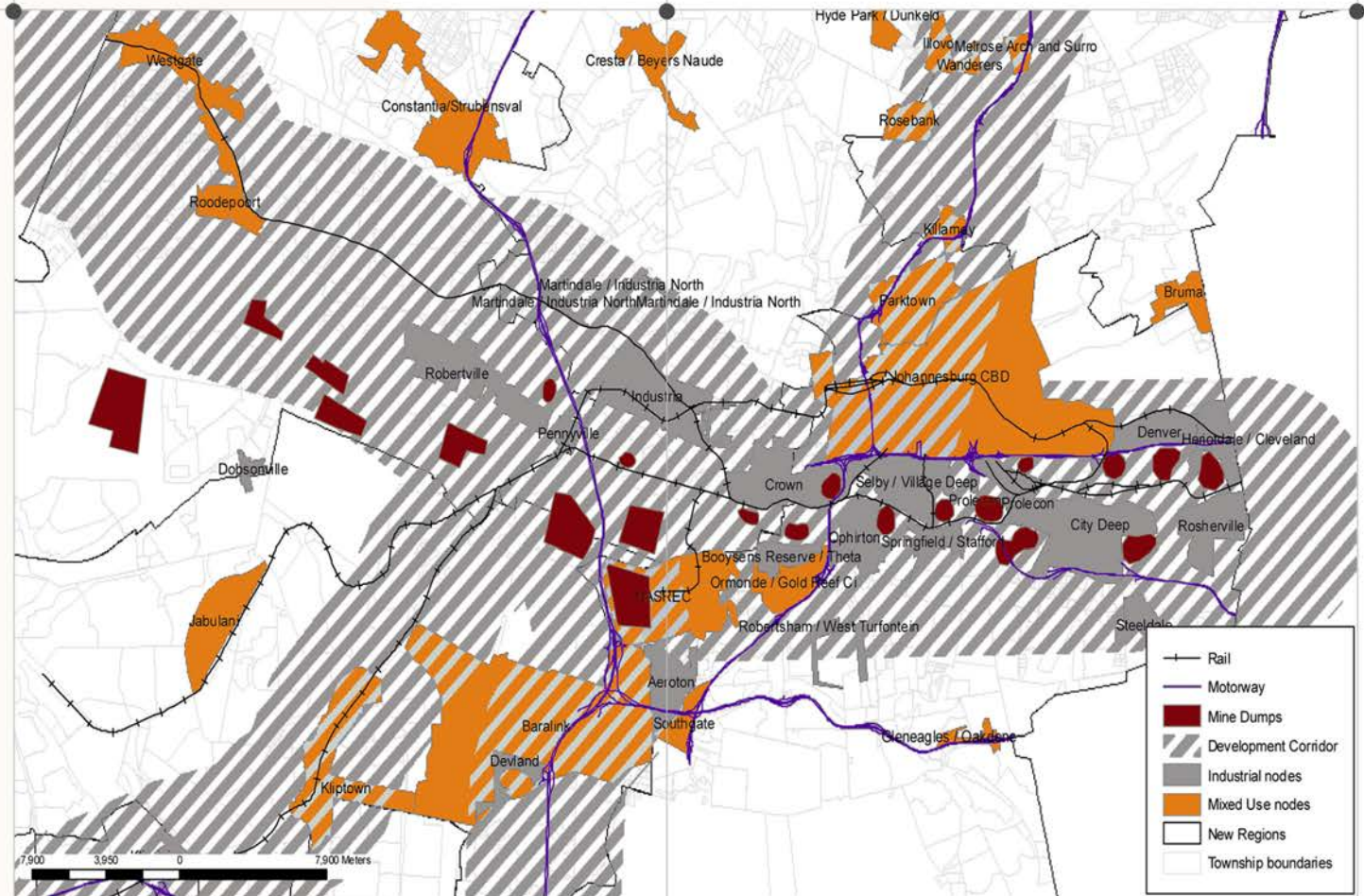


Illustration 2.8: Johannesburg Zoning of Mine Dumps. [Joburg,2011:Online]

[Gold Mines]

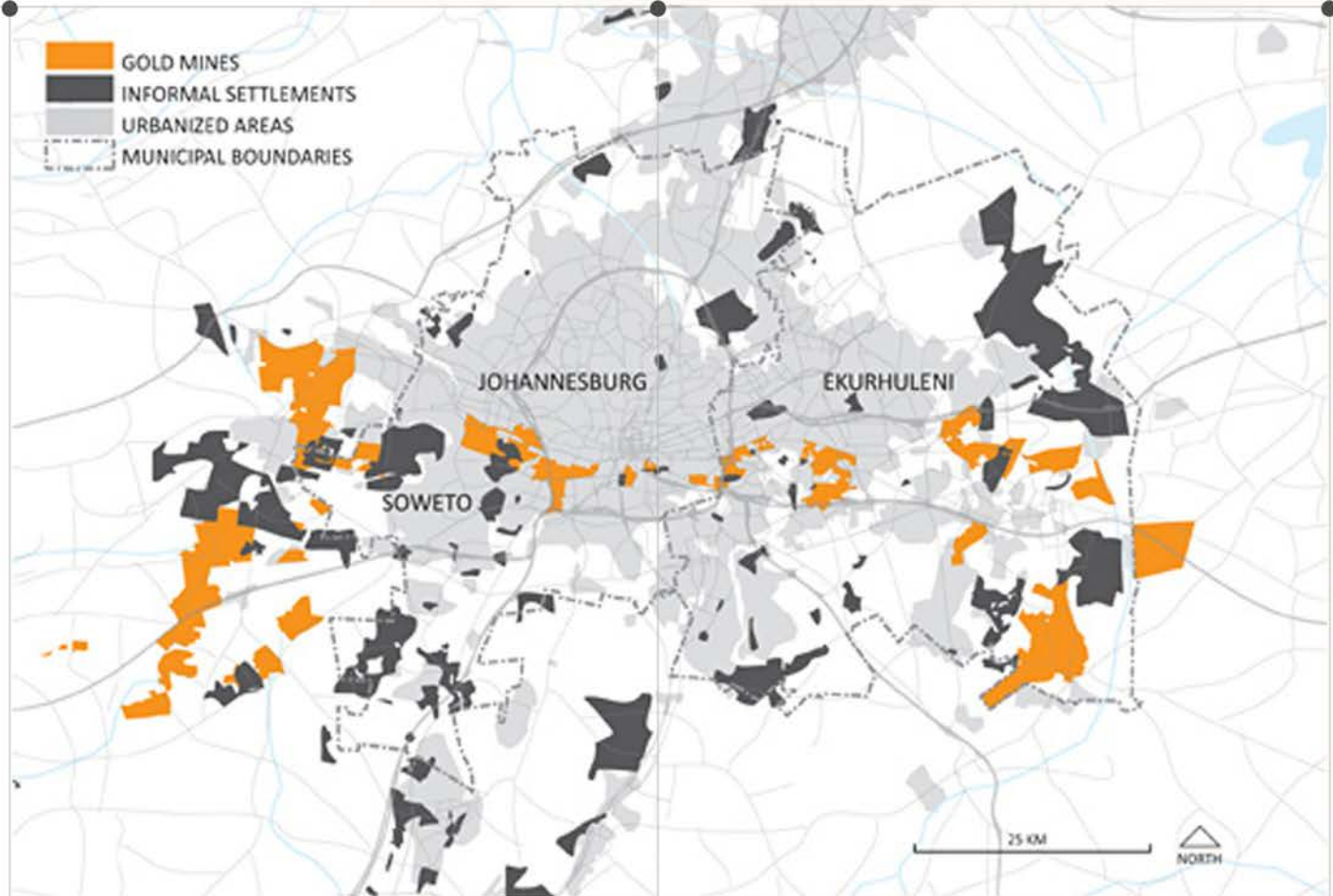


Illustration 2.9: Johannesburg Zoning of Gold Mines. [Joburg,2011:Online]

[2] Contextual Investigation
[2.1.1] Johannesburg

1886:
12 April, George Walker and George Harrison obtain permission to prospect for gold on the farm Langlaagte, owned by Gert C. Oosthuizen.

1888:
Piped water delivery to homes is turned on for the first time.

1894:
8 February, A by-law is passed prohibiting 'Natives' from using the Johannesburg city's pavements

1897:
The first train from Cape reach Johannesburg.

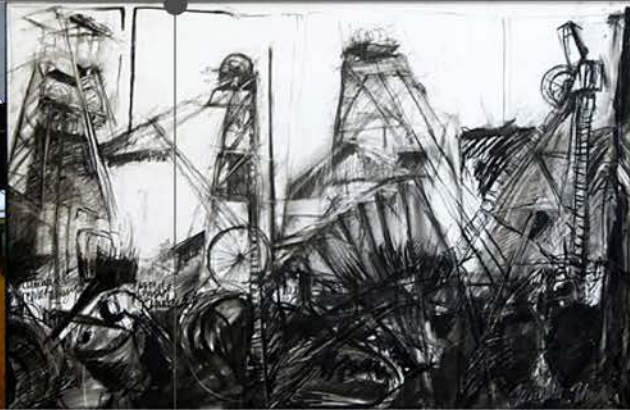
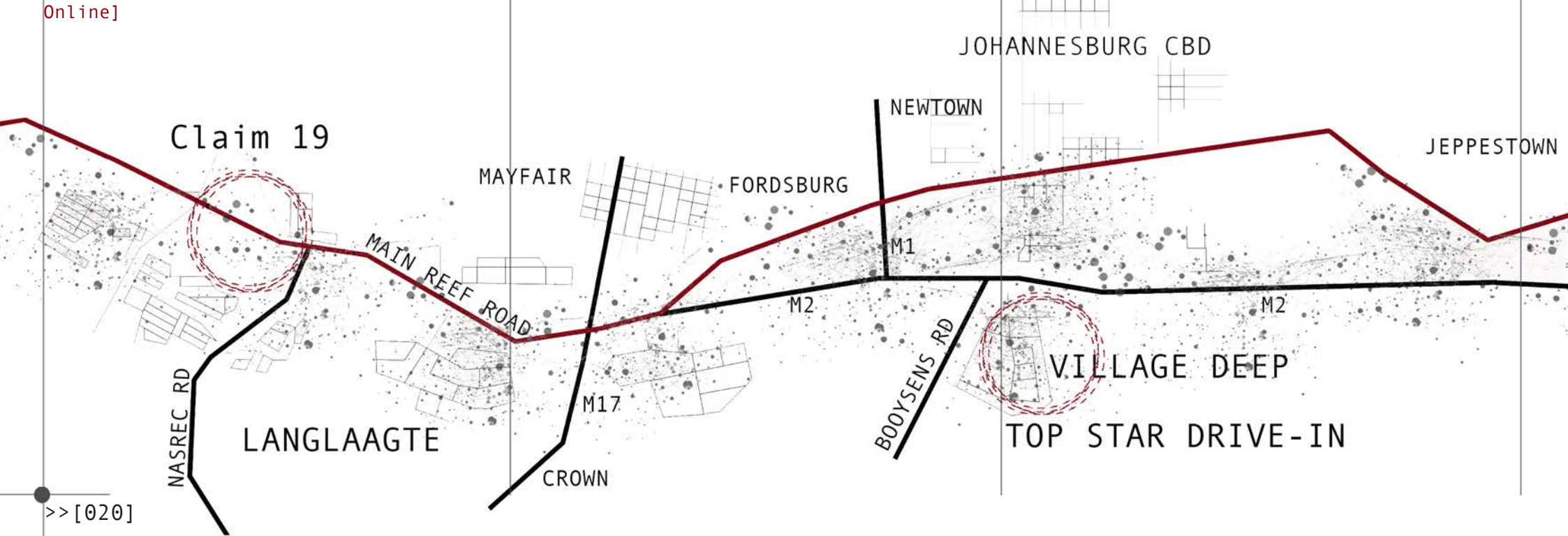


Illustration 2.10: Views along Main Reef Road. [Flicker, 2011: Online]

Illustration 2.11: Mining Headgear. [Jeanette Unite, 2011: Online]

Illustration 2.12: Views along Main Reef Road. [Flicker, 2011: Online]

Illustration 2.13: Views along Reef Road. [Flicker, 2011: Online]



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1899:
11 October, there is an outbreak of hostilities between Britain and the ZAR

1901:
The first Town Council nominated under the interim British Military Administration takes office

1902:
November, Elections are held for Johannesburg's first elected Municipal Council. The Johannesburg Insanitary Area Improvement Scheme Commission tables its report, which leads to the expropriation of the area now known as Newtown. The area of Johannesburg increases to 81.5 square miles

1909:
The Johannesburg Municipal Commission urges that surveyed land be made available to "natives and other non-Europeans"

1914:
5 August, World War I breaks out

Brief History

Johannesburg was built along the natural feature of the main reef outcrop which extends over 45km in an east west direction, underneath the city.

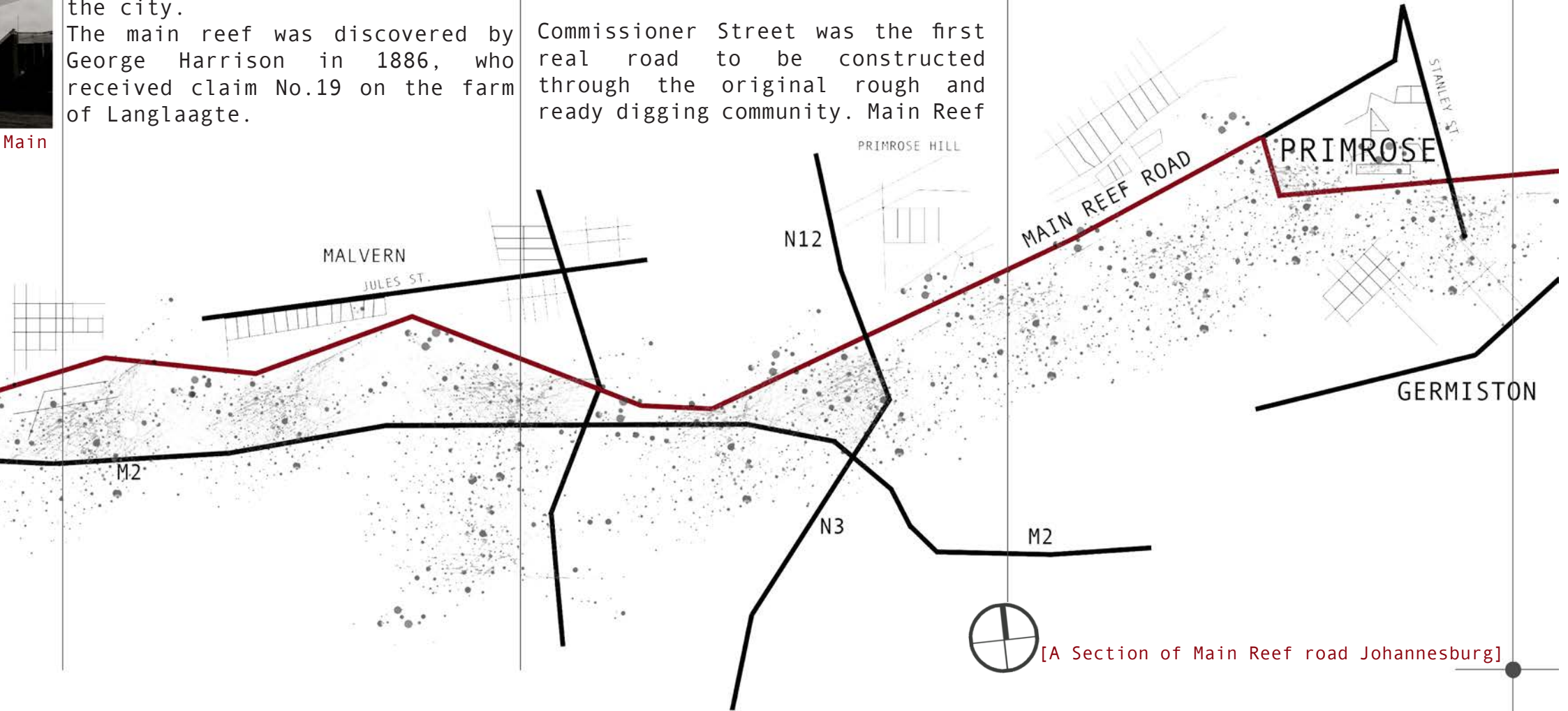
The main reef was discovered by George Harrison in 1886, who received claim No.19 on the farm of Langlaagte.

In the past, it was theoretically possible to walk underground all the way from Roodepoort to Boksburg, because adjacent mines generally interconnected their workings.

Commissioner Street was the first real road to be constructed through the original rough and ready digging community. Main Reef

Road extends out from either end, to the east and west. An artery through the city, it follows the jagged spine of the gold reef.

Main



[A Section of Main Reef road Johannesburg]

[021] >>

[2] Contextual Investigation
[2.1.1] Johannesburg



Crown Mines Reclamation Plant,
Main Reef Road West.



Primrose Informal Settlement on Main Reef Road.



A typical post-mining landscape along Main Reef Road.



Typical Hostels found along Main Reef Road.



Industrial ruins on Main Reef Road.



Typical view found on Main Reef Road.



Typical view found on Main Reef Road.



Largest in-land shipping yard on M2.

[2] Contextual Investigation
[2.1.1] Johannesburg



China Mall on Main Reef Road.



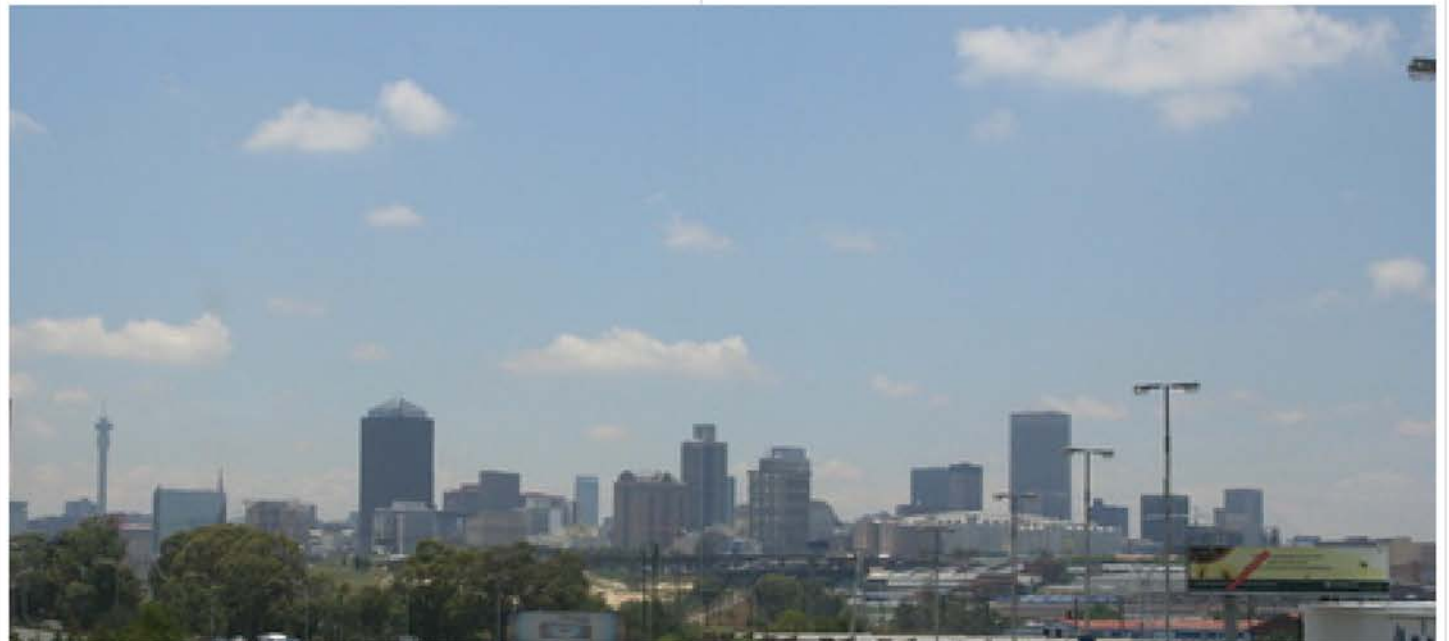
Johannesburg CBD.



Johannesburg CBD.



George Harrison Memorial on Main Reef Road.



Johannesburg CBD from the M2.



A Historic view of Top Star Cinema on Ferreira Mine dump. [Flickr,n.d:Online]



FNB Soccer stadium, Soweto.



City Deep informal settlement on Main Reef Road.



Typical view found on Main Reef Road.

[2] Contextual Investigation
[2.1.2] The Reef



What cropped up on Langlaagte Farm was one of a crescent of gold reefs around the whole Witwatersrand Basin. These reefs plunge at an angle of 25 degrees or more, sloping inwards towards the centre, to depths of at least 5,000 metres. The reef horizons run several kilometres underground, extending from 65 kilometres east of Johannesburg to 145 kilometres west of the city, forming a crescent around the Witwatersrand basin. (Niebuhr. 2011. Online)

Illustration 2.10: Original Mining Head Gear on the George Harrison Claim, Langlaagte. [Flickr,n.d:Online]

Cross-section through a typical Witwatersrand mine illustrating the manner in which reefs were accessed from the vertical shafts. Shafts and the reef layers were extensively inter-connected underground.

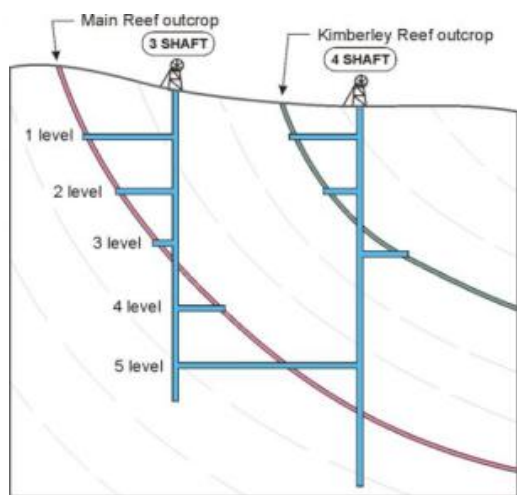


Illustration 2.11: Cross-section through a typical Witwatersrand mine. [McCarthy,2010:9]

Mining methods used in the early days of gold mining on the Witwatersrand. A shaft was sunk down on the gold-bearing reef layer and at intervals (called levels) horizontal tunnels were dug laterally on the reef. From these tunnels (called raises) were dug up to the level above. These raises were then widened sideways on the reef to create stopes. The broken reef rock was fed down to the level below and taken to surface where the gold was extracted.

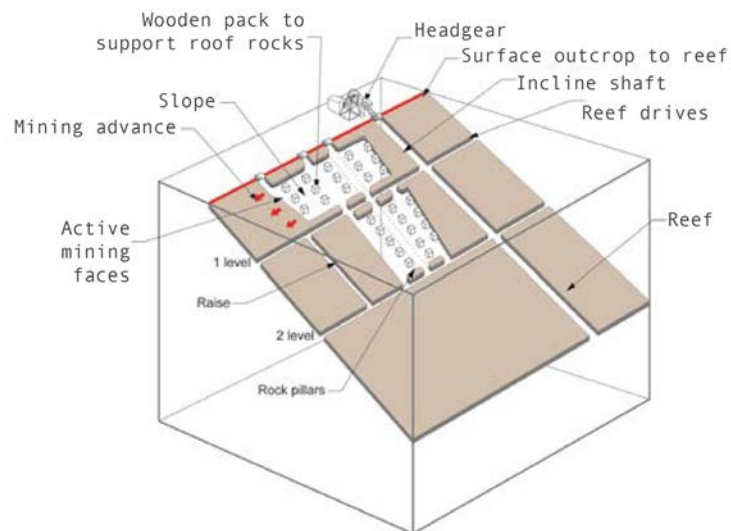


Illustration 2.12: Example of early mining methods used on the Witwatersrand. [McCarthy,2010:8]

As mining progressed to deeper levels, vertical shafts replaced incline shafts. The layers of gold-bearing reef rock (shown in red and green) were extracted in the process, leaving behind open space which is known as the mine void.

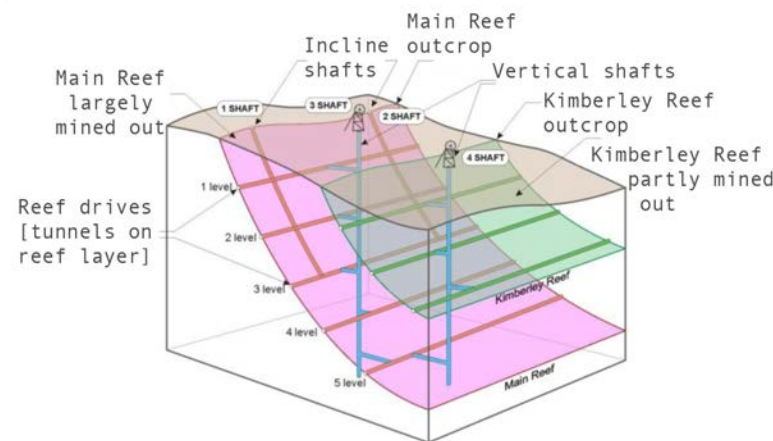


Illustration 2.13: As mining progressed to deeper levels. [McCarthy,2010:9]

[2] Contextual Investigation
[2.1.2] The Reef



Illustration 2.13: Mine dump on Main Reef Road, Johannesburg. [Flickr,n.d:Online]

Mine dumps

Over the life span of the Central Rand Mines, a total of 1 300 million tones of rock was brought to surface from underground, and from this rock, 12 220 710kg of gold was extracted. The volume of rock mined amounts to a cube 800m x 800m by 800m. In crushed and processed form the rock volume becomes even larger, which explain why there are so many large dumps of mine waste along the Witwatersrand.

Advances in modern extraction processes mean that mine dumps are considered viable for reclamation when 0,4 grams of gold can be obtained per ton - some have yielded as high as 0,65 grams per ton. As long as the gold price remains above R80 000 a kilogram, the city's mine dumps will continue to be reclaimed; and with this, the face of Johannesburg will forever be altered.

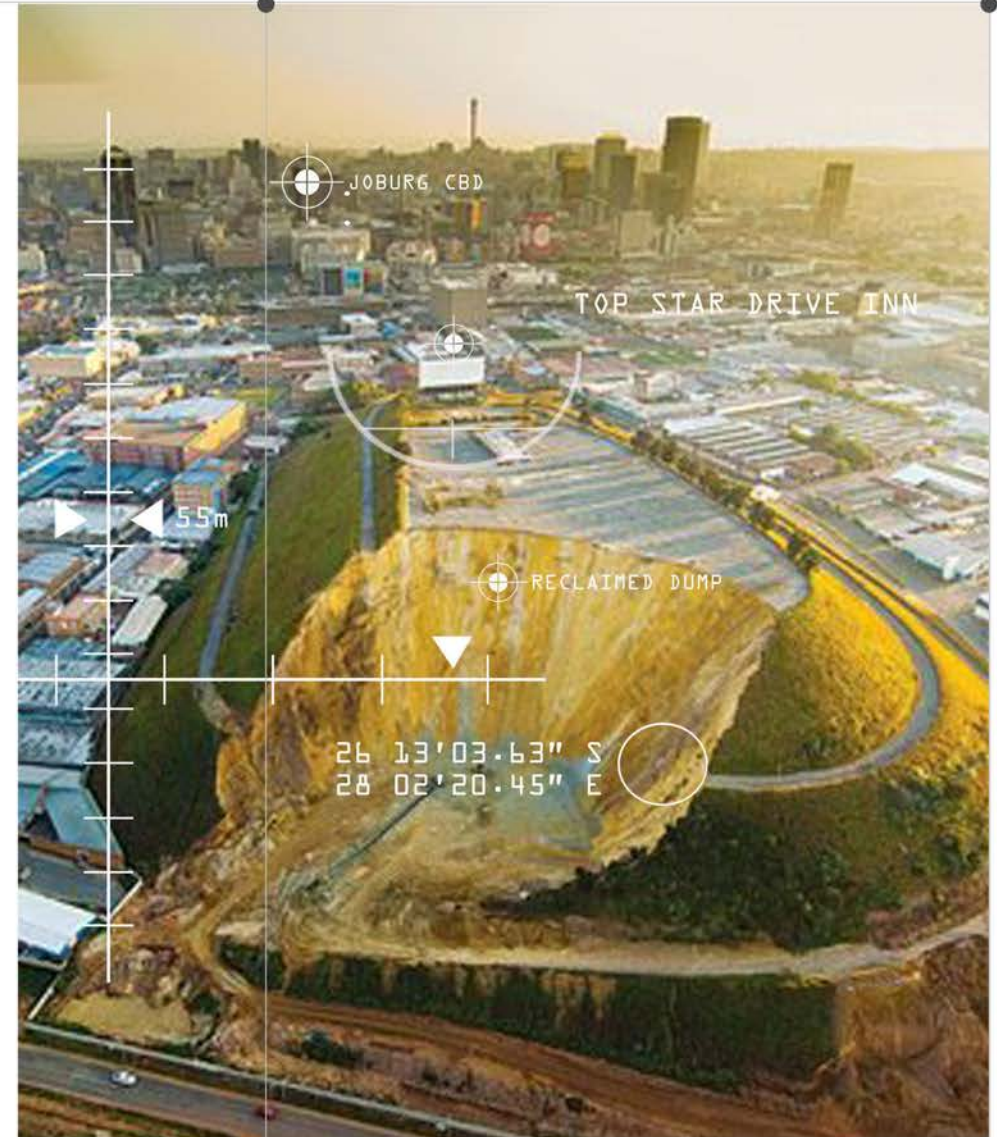


Illustration 2.14: The reclaimed Ferreira dump.
[Flickr,n.d:Online]

[2] Contextual Investigation

[2.1.3] Acid Mine Drainage

Beneath the surroundings of Main Reef Road, extending into the greater Johannesburg, lies a void of hundreds of abandoned mining tunnels equaling five times the volume of Lake Cariba. Acid Mine Drainage, or AMD, has resulted from the flooding of these abandoned voids with ground water.

When iron pyrite or 'fools gold' which can be found in the mined rock is exposed to oxygenated water, it

forms sulphuric acid. In the acidic water, other minerals also break down and their metals dissolve into the water. This water is toxic and corrosive.

"We don't know exactly where the leakages are going to be. But Main Reef Road is a danger zone," says Professor Terence McCarthy of the Wits Geoscience Department. According to Prof Terrance McCarthy acid mine drainage will seep up through

the main shaft at Gold Reef City as early as 2012. At the same time, Boksburg could see AMD rising up through drainage points, spewing toxic filth into the town.

[McCarthy,2010:16]

During mining, water entering the mine void is channelled towards the shaft and pumped to surface to prevent flooding of the workings, if pumping were to stop, the void will slowly fill with water.

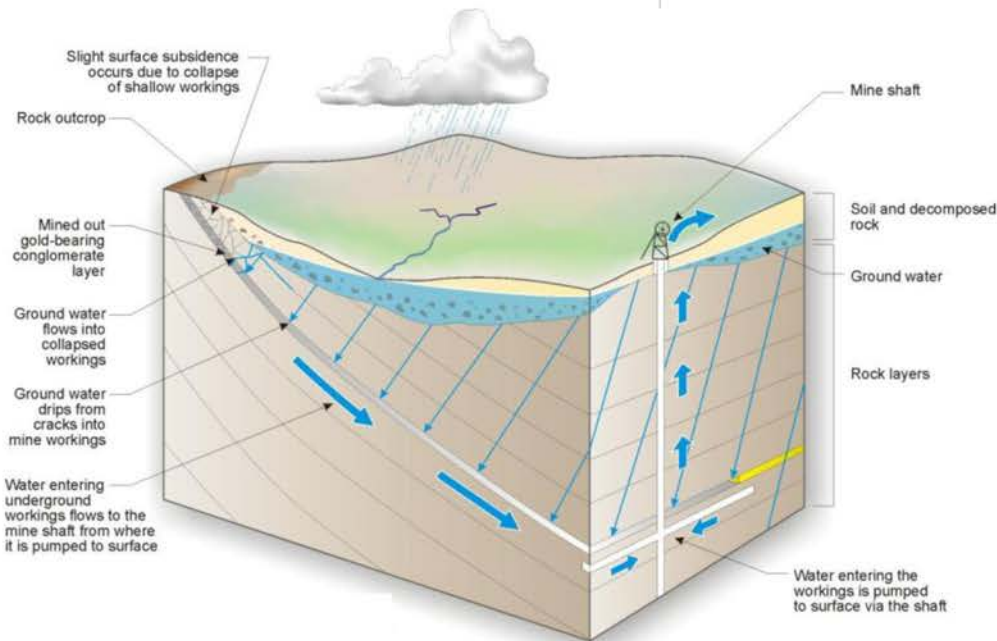


Illustration 2.15: During Mining. [McCarthy,2010:16]

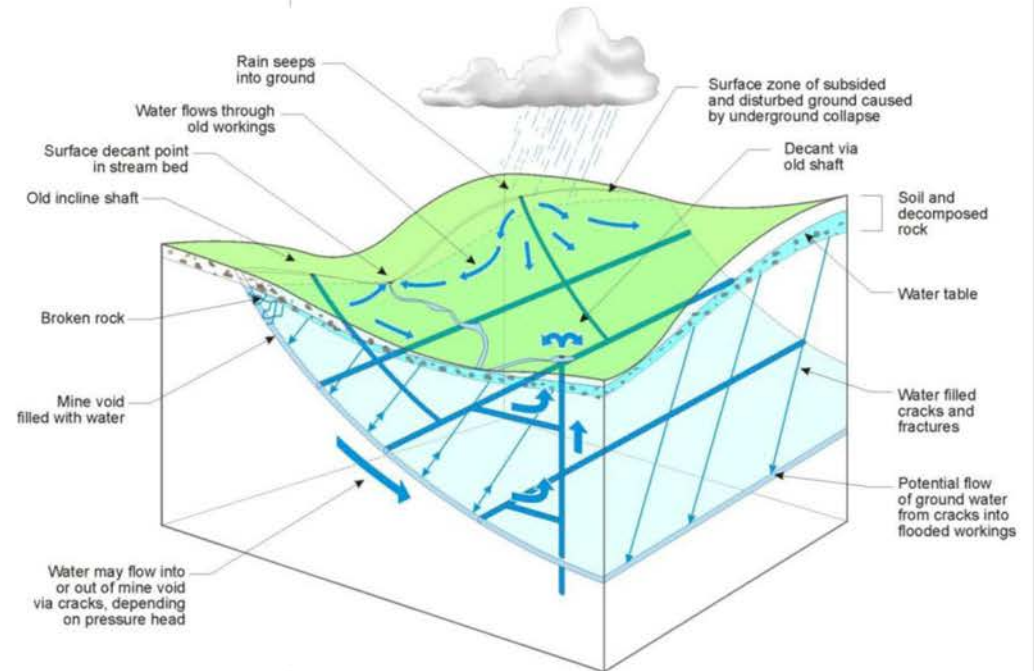


Illustration 2.16: After Mining. [McCarthy,2010:18]



Illustration 2.17: Acid Mine Water on mine dump. [Photo Stock,n.d:Online]

Illustration 2.18: Decanting Acid Mine Water, with the Joburg skyline in the background. [Flickr,n.d:Online]

Illustration 2.19: Decanting Acid Mine Water. [Flickr,n.d:Online]

Illustration 2.20: Decanting Acid Mine Water.[Flickr,n.d:Online]

Illustration 2.21: Areal view of Acid Mine Water drainage dams. [Flickr,n.d:Online]



[2] Contextual Investigation

[2.2] Micro Context Claim 19

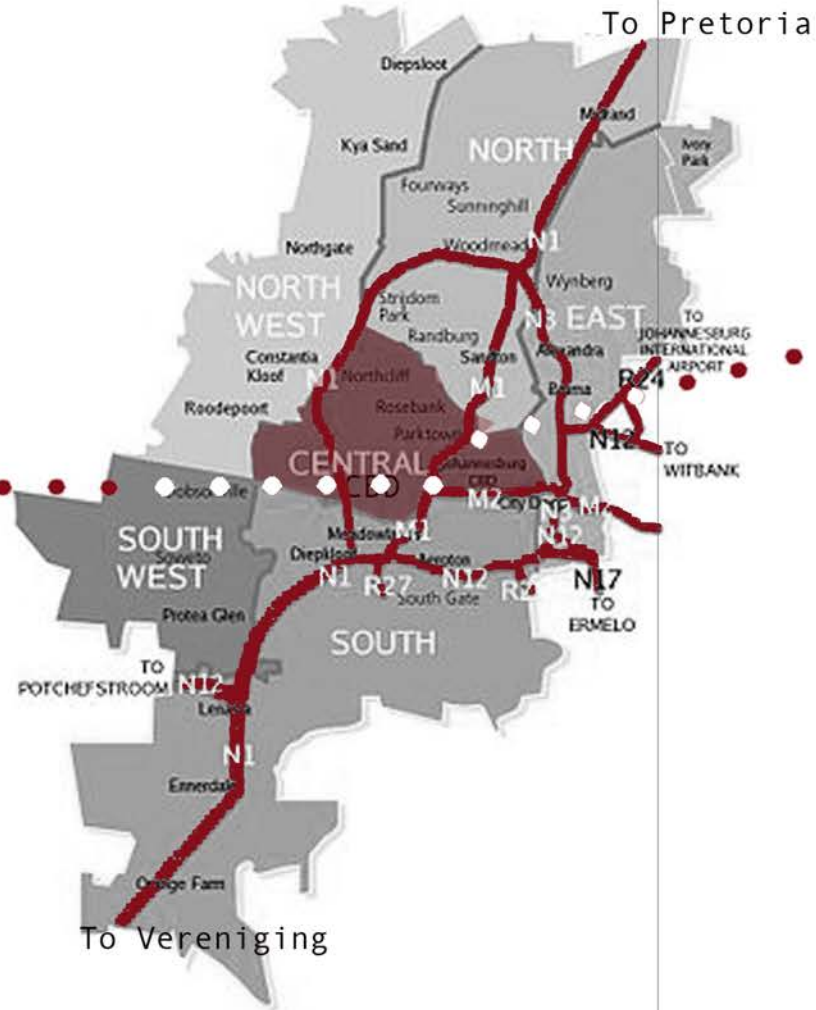


Illustration 2.21: Map of main roads leading into Johannesburg. [Joburg,n.d:Online]

>> [032]

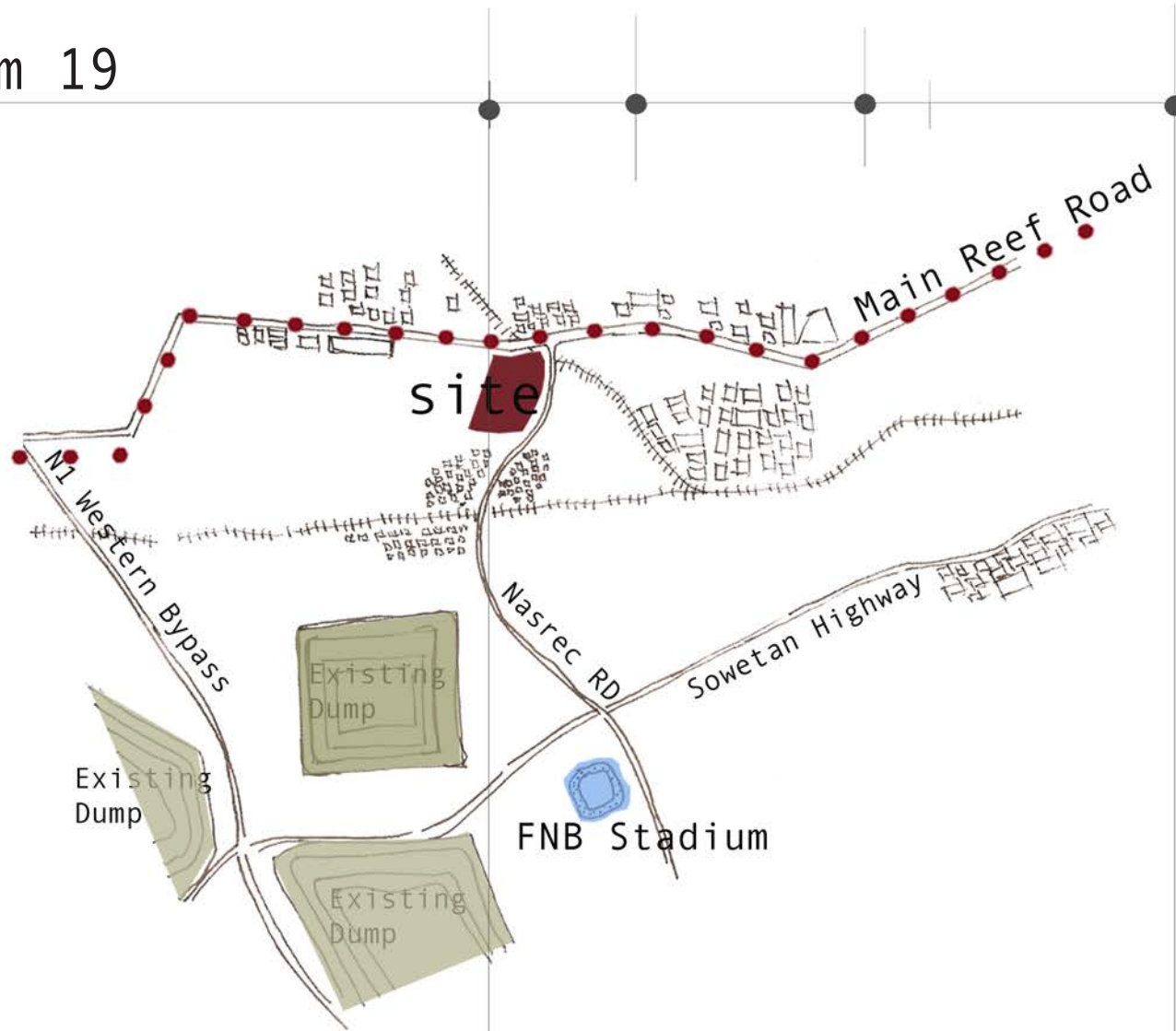
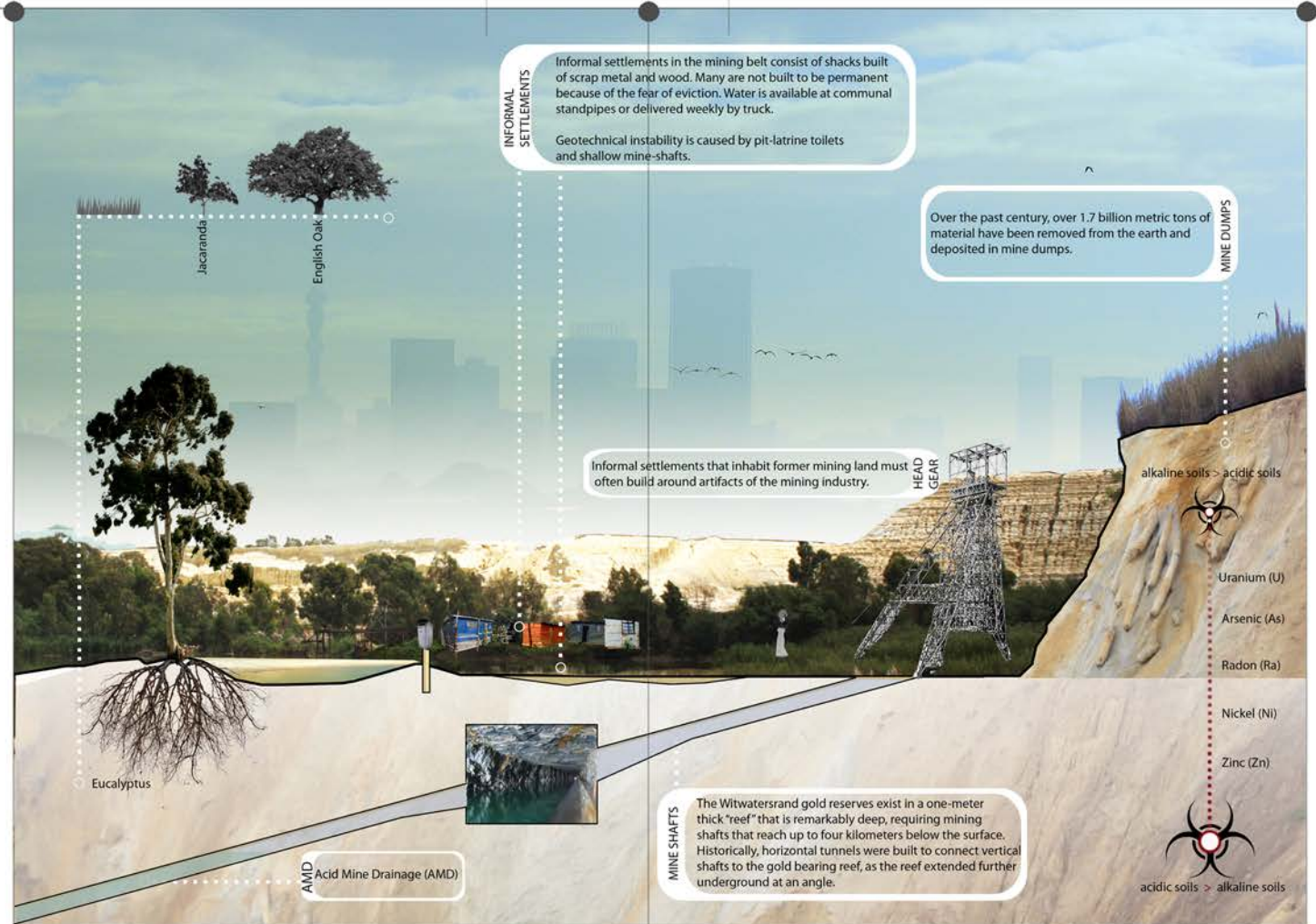
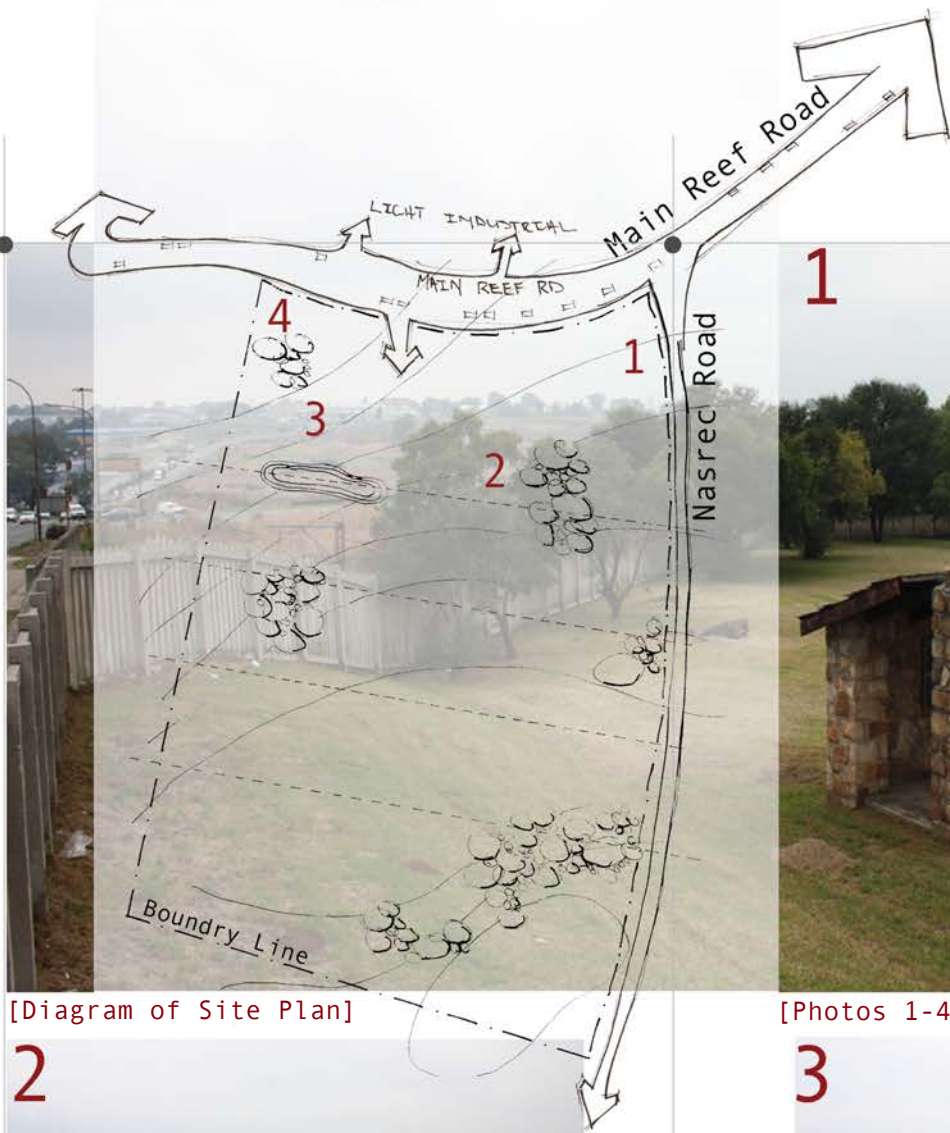


Illustration 2.22: Map illustrating site and context. [Joburg,n.d:Online]

[2.2.1] Introduction

Claim 19 was discovered by an Australian miner by the name of George Harrison went out walking on a Sunday in March 1886 and discovered an outcrop of a main gold bearing reef on the farm Langlaagte. He staked his claim with the Government of the time which was the Zuid Afrikaanse Republiek and the area was declared open. It is believed that Harrison sold his claim for 10 pounds and was forced to leave. He was never heard of again and it is speculated that he was killed on his journey home. [Carew, 2010:Online]





[Diagram of Site Plan]



[Photos 1-4: Entrance to Claim 19 from Main Reef Road]

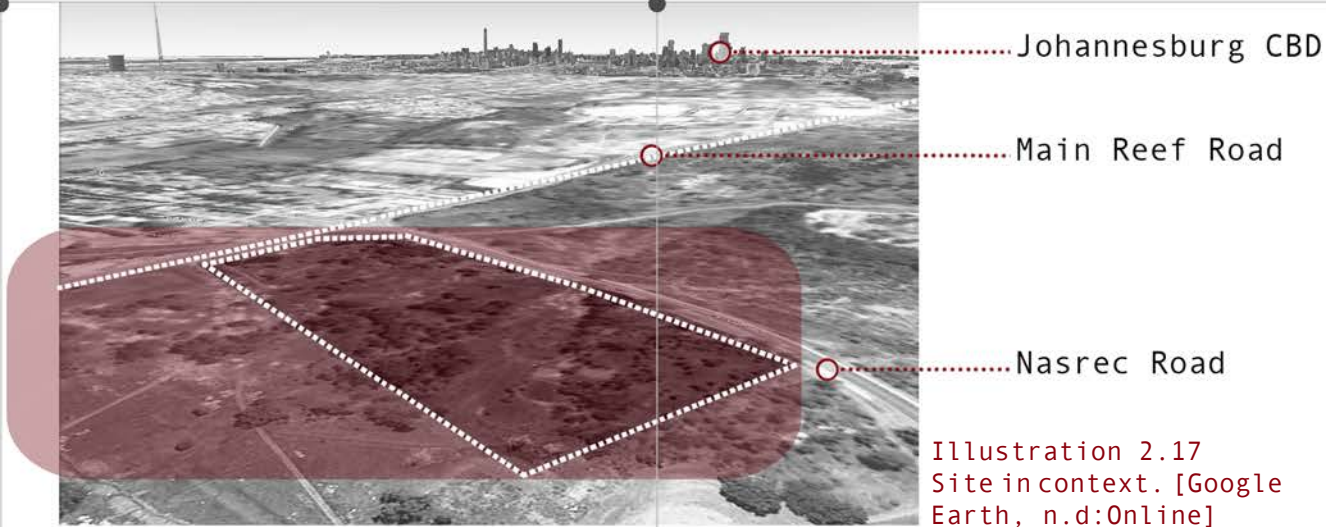


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[2] Contextual Investigation

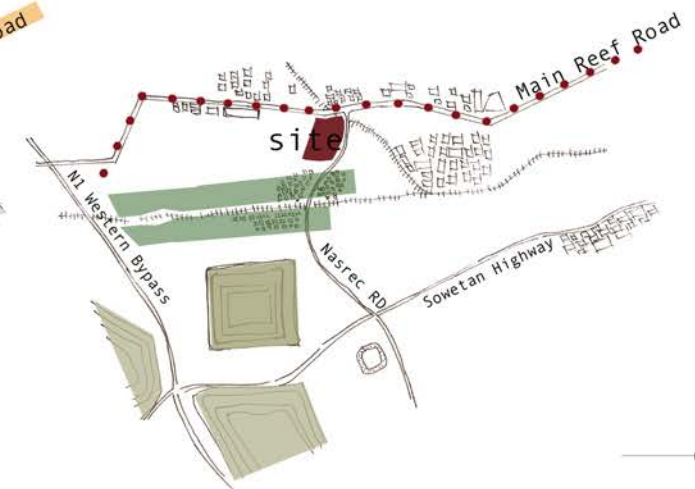
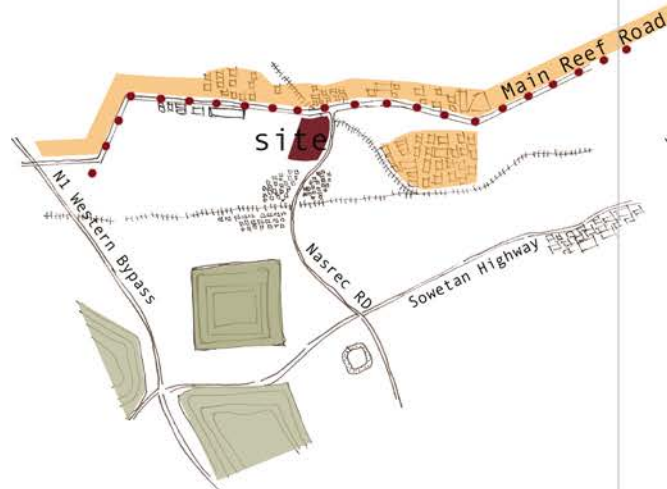
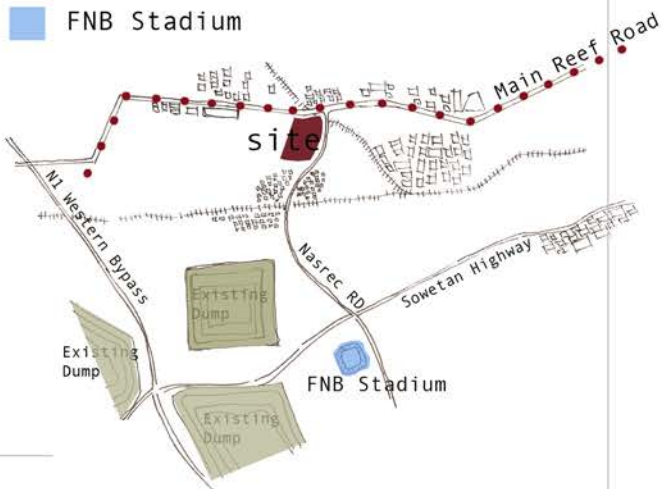
[2.2.2] Claim 19 on Main Reef Road



This discovery has been honoured by the erection of a monument and a park named after Harrison.

This inevitably led to a major Gold Rush and within 10 years Johannesburg had already grown from a small-tented town to the largest city in South Africa, outstripping the 200 year-old Cape Town. [Carew, 2010:Online]

- Site
- Residential development
- Industrial and Commercial development
- Existing Mine Dumps
- FNB Stadium





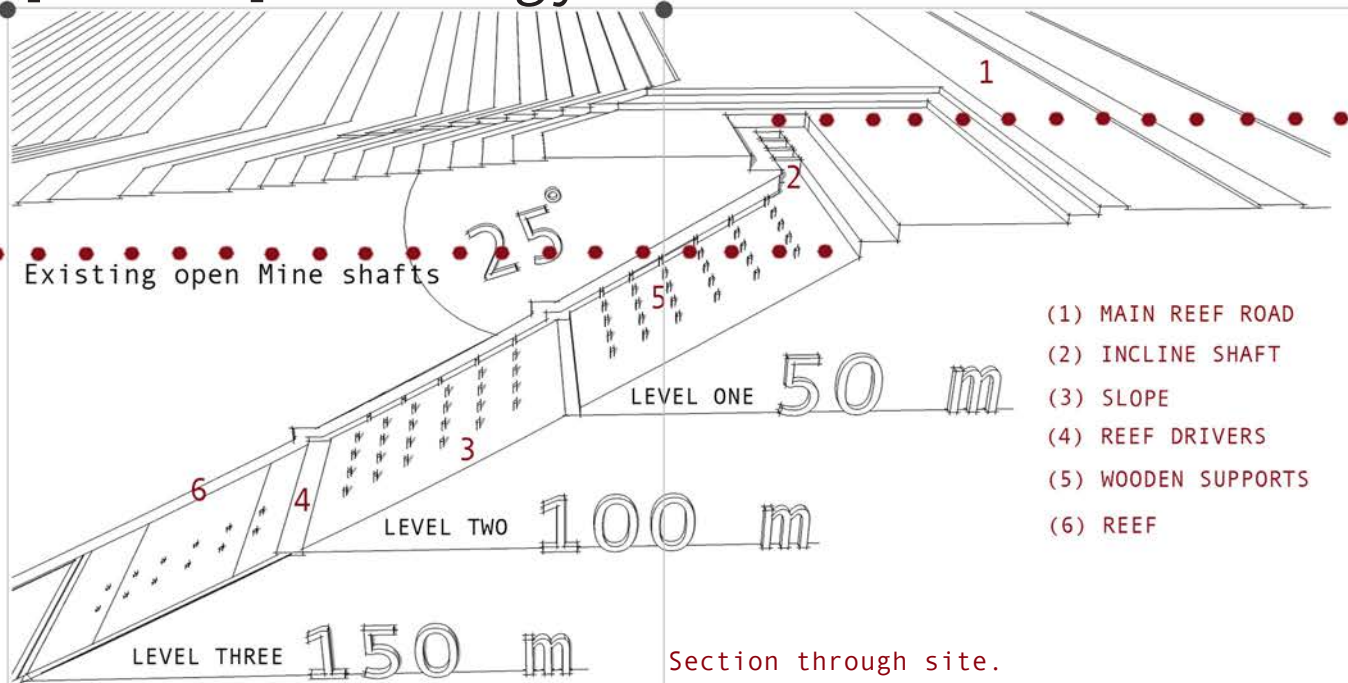
[Diagram of Site Plan]



[Photos 1-3: Existing Mine Shafts on Claim 19 from Main Reef Road]

[2] Contextual Investigation

[2.2.3] Geology of claim 19



Section through site.

Mining methods used in the early days of gold mining on the Witwatersrand. A shaft was sunk down on the gold-bearing reef layer and at intervals (called levels) horizontal tunnels were dug laterally on the reef. From these tunnels (called raises) were dug up to the level above. These raises were then widened sideways on the reef to create stopes. The broken reef rock was fed down to the level below and taken to surface where the gold was extracted. [McCarthy,2010:8]

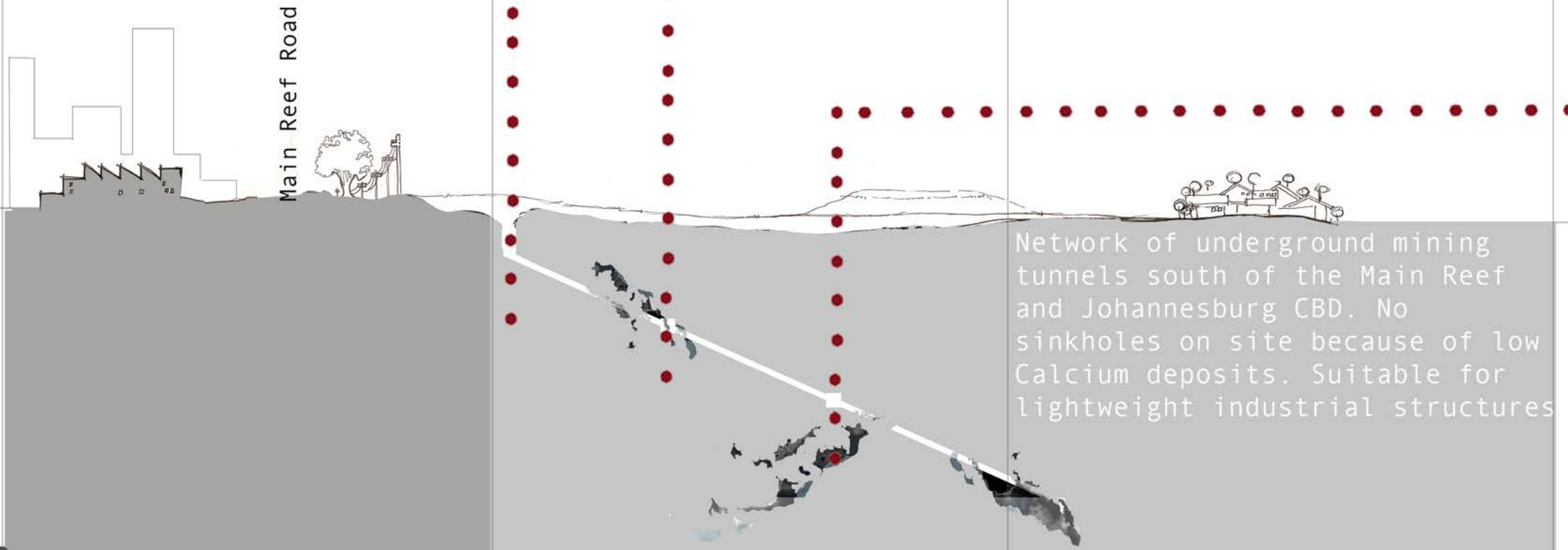


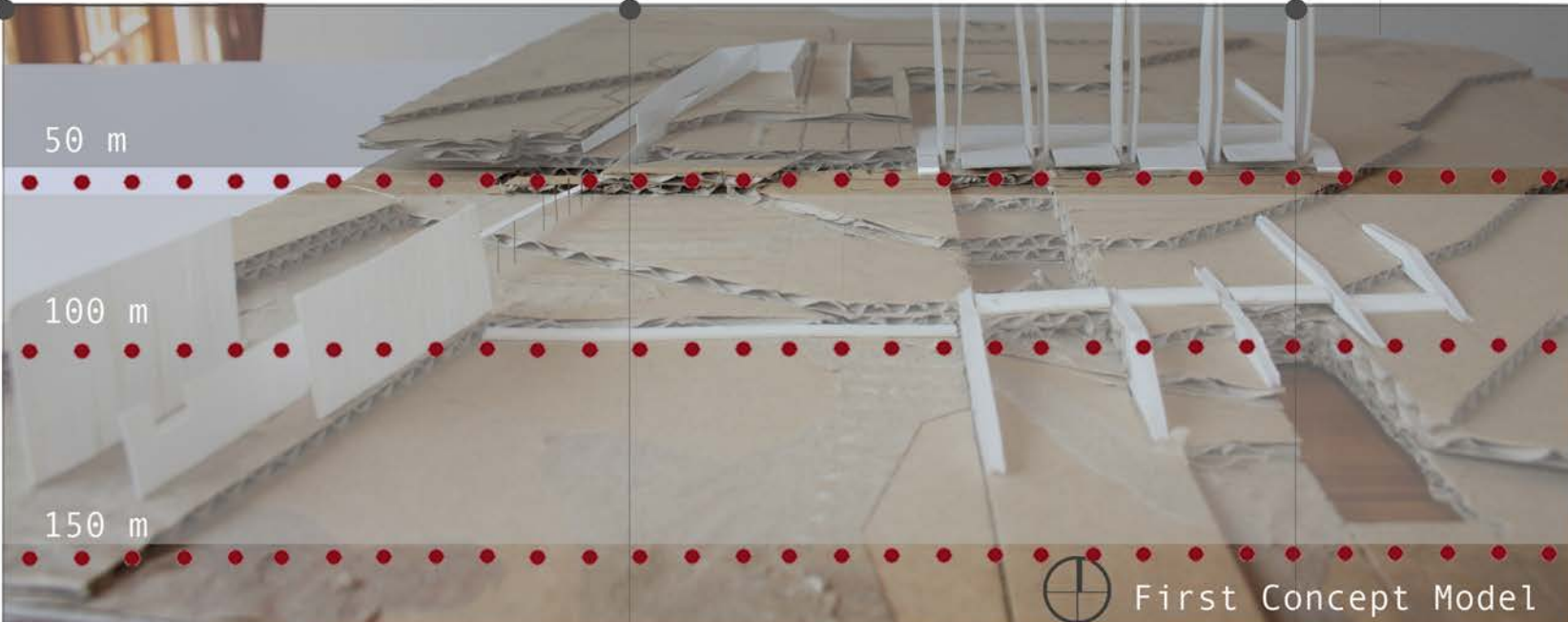
[Existing Mine Shafts on Claim 19 from Main Reef Road]

[2] Contextual Investigation

[2.2.3] Geological features of claim 19

The concept model is an investigation into the existing mining grid found on the George Harrison site. The site consists of seismic columns north of the gold reef and a network of mining tunnels south of Main Reef Road.



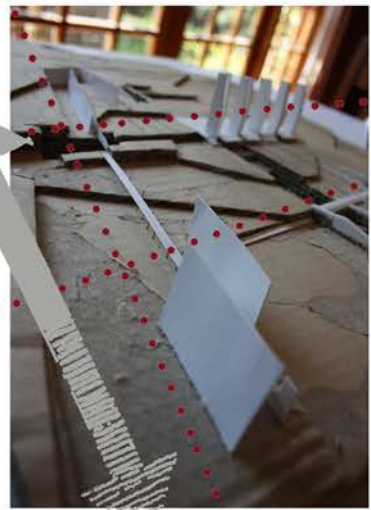
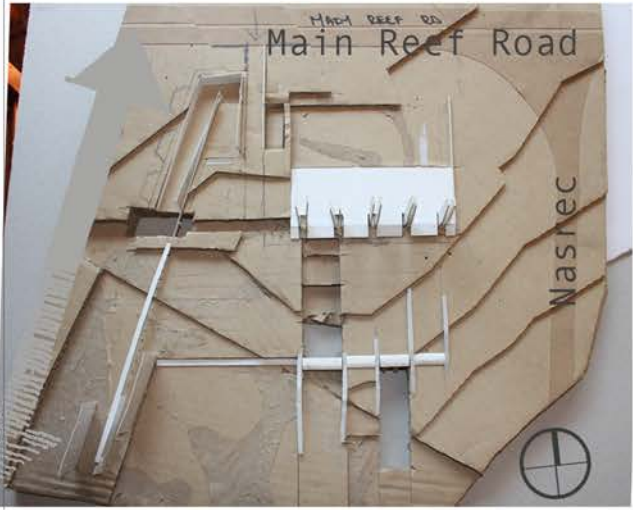


Seismic underground columns

Network of underground mining tunnels:

Light weight structures.

⊕ First Concept Model



Claim 19



Illustration 2.18: Existing Top-Star entrance on dump road. [Google Earth, n.d:Online]

[2] Contextual Investigation

[2.3] Micro Context Top Star Drive Inn

[2.3.1] Introduction

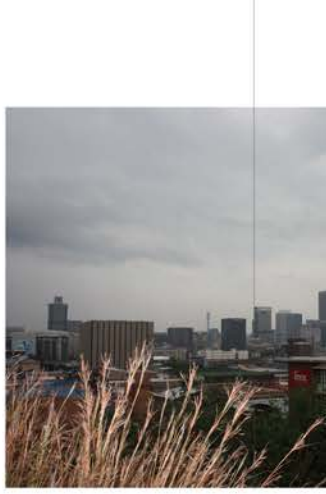
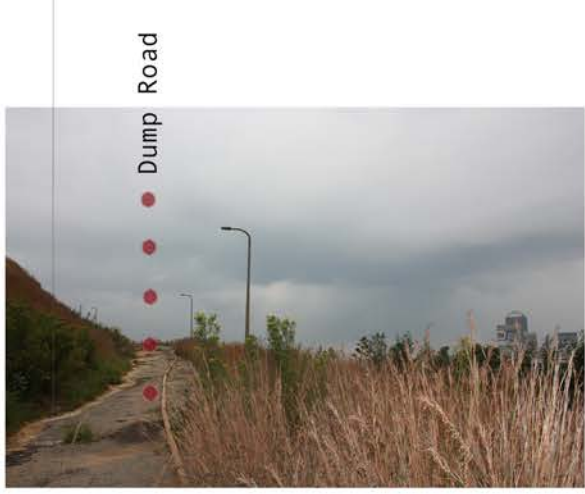
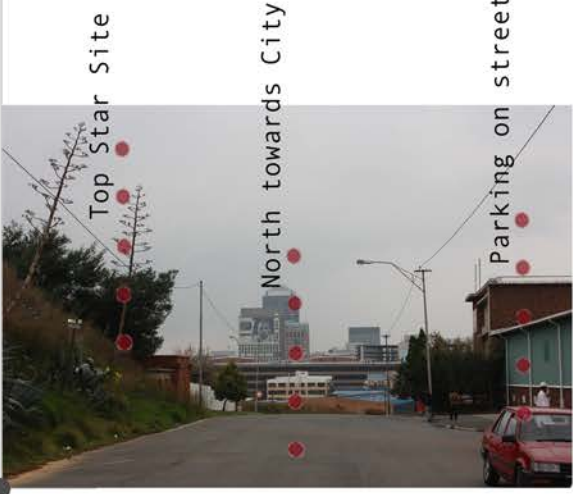
The names of the mines are largely forgotten: Langlaagte Estate, Crown Mines, Robinson Deep, Village Main Reef, City Deep, Geldenhuis Deep, Ferreira Deep. Left behind were the silhouettes of mining headgears; the Crown Mines village; a labyrinth of abandoned mines shafts crisscrossing the city centre and the mine dumps - some of them 50 metres high. The most iconic of these is the Top Star, built in the early 1960's as a European drive-in movie theatre on top of the old Ferreira's Dump. Despite attempts by heritage agencies to protect the site, the Top Star is rapidly being demolished by reclamation company DRDGold, its bulldozers eviscerating the landmark. [Niebuhr,n.d:Online]

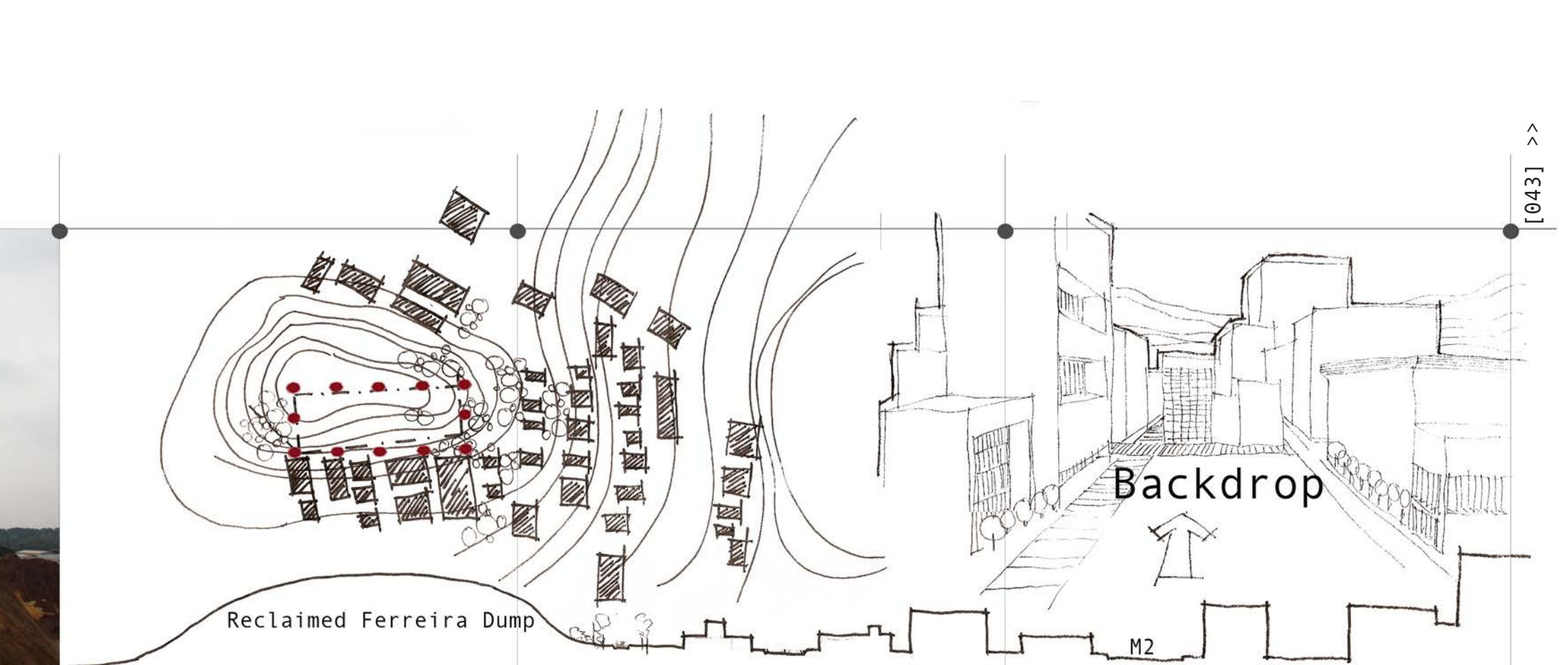
[2] Contextual Investigation

[2.3.2] Contextual study of Top Star Drive Inn



[Illustrations: Top Star context]





Reclaimed Ferreira Dump

Backdrop

M2



[Illustrations: Site in context]

View from Dump Road



Top Star Entrance



[2] Contextual Investigation

[2.3.2] Contextual study of Top Star Drive Inn

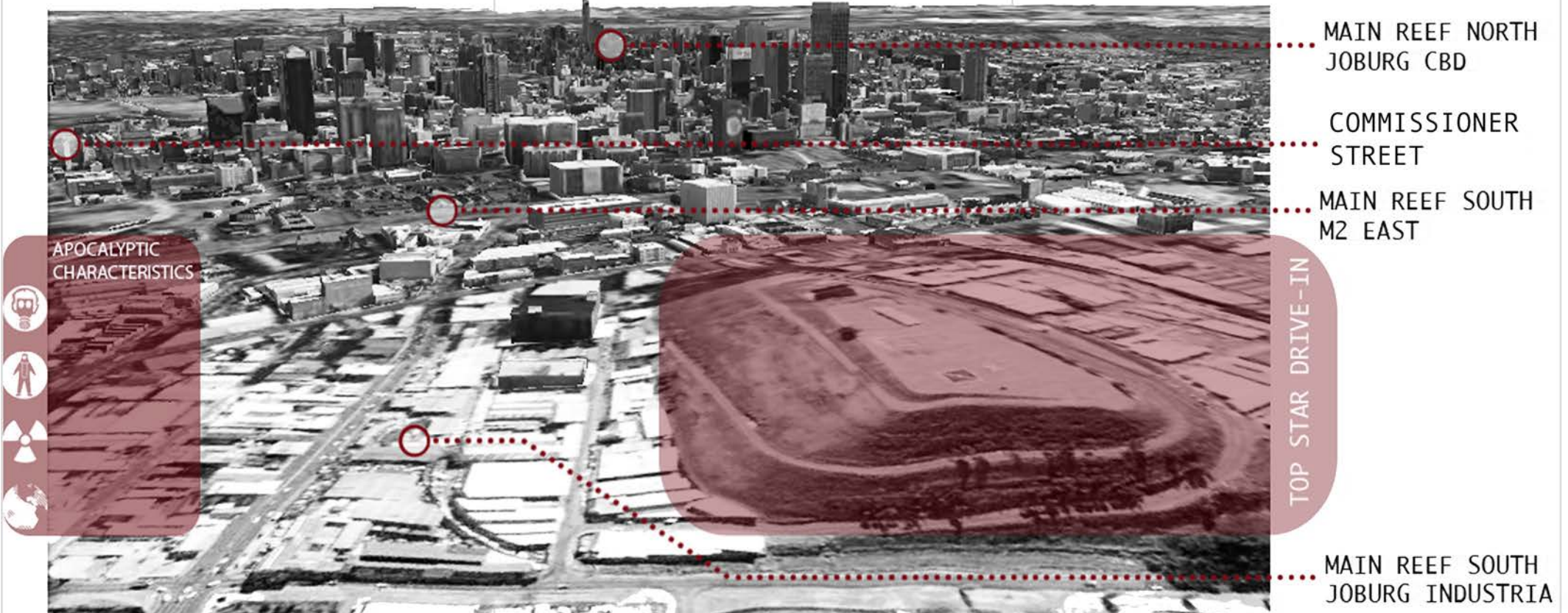


Illustration 2.19: Aerial view of Ferreira dump and Joburg CBD [Google Earth, n.d.:Online]

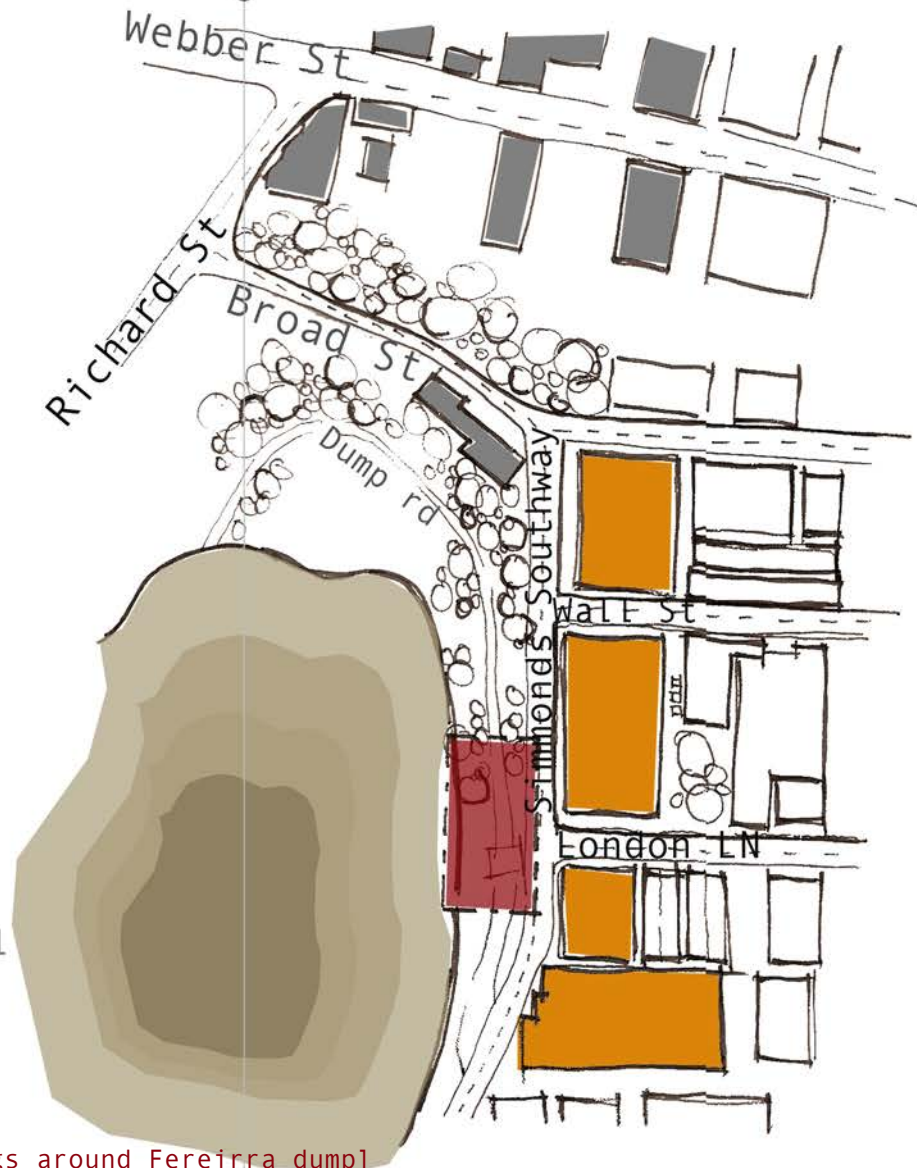


Illustration 2.20- 2.23: Top Star Drive-In before the reclamation of Ferreira dump. [Flickr, 2002:Online]

Lightweight industrial buildings.

Top Star Drive-in entrance

Small commercial and office buildings



[Illustration of buildings around Ferreira dump]

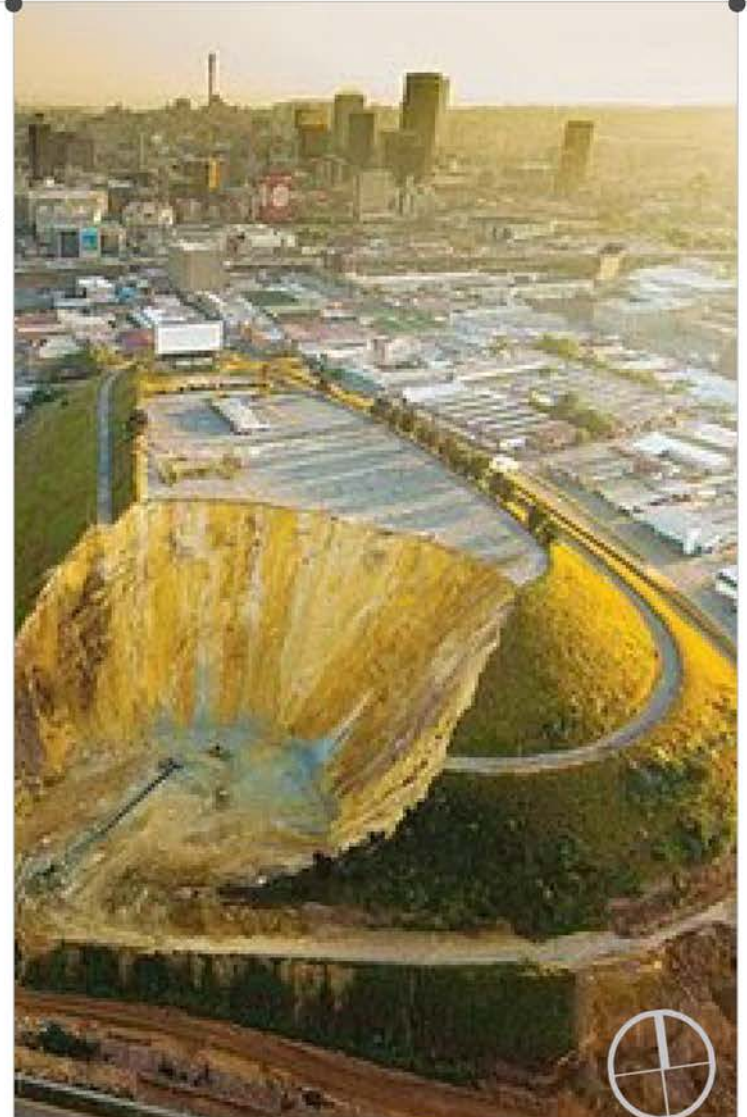
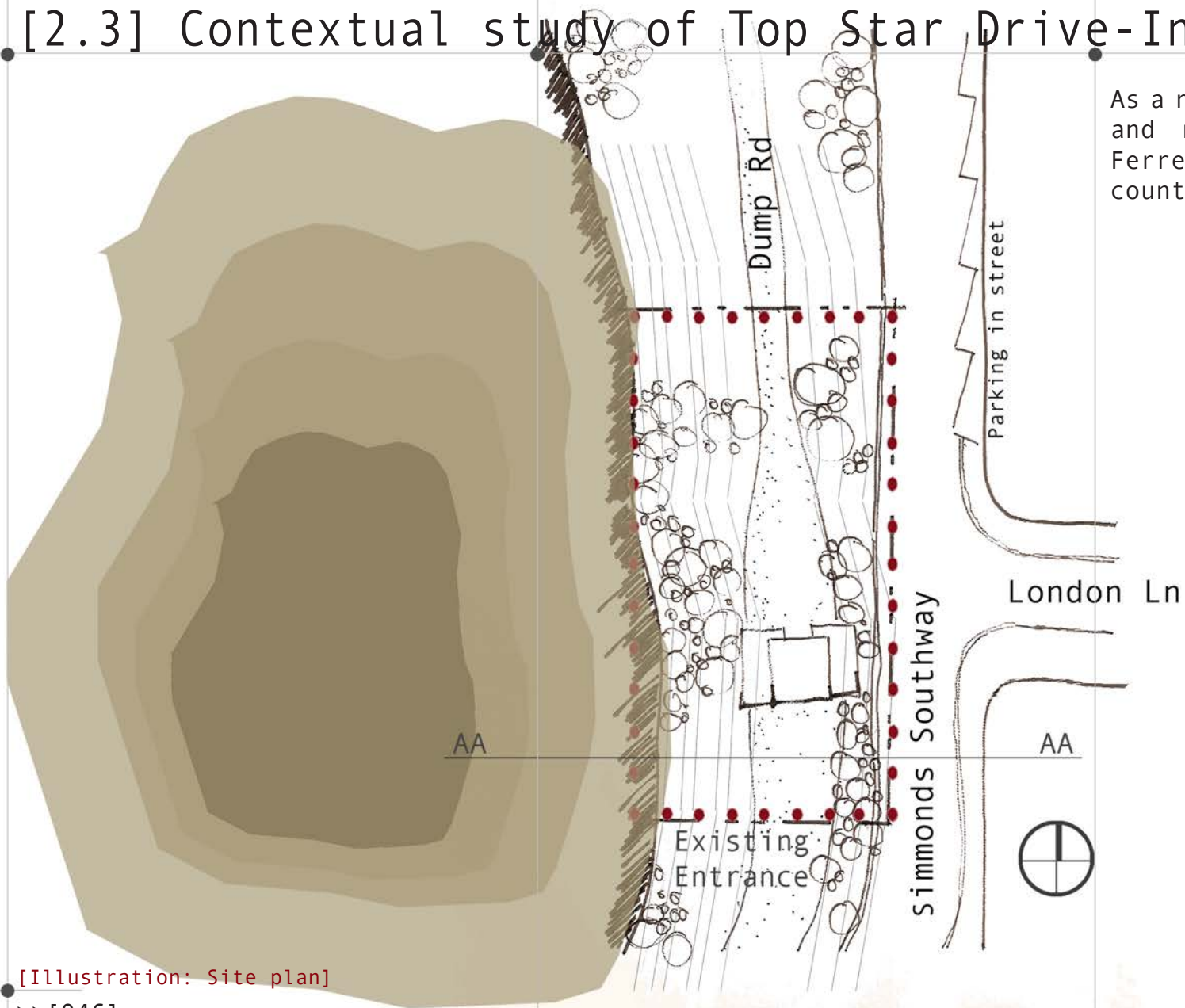


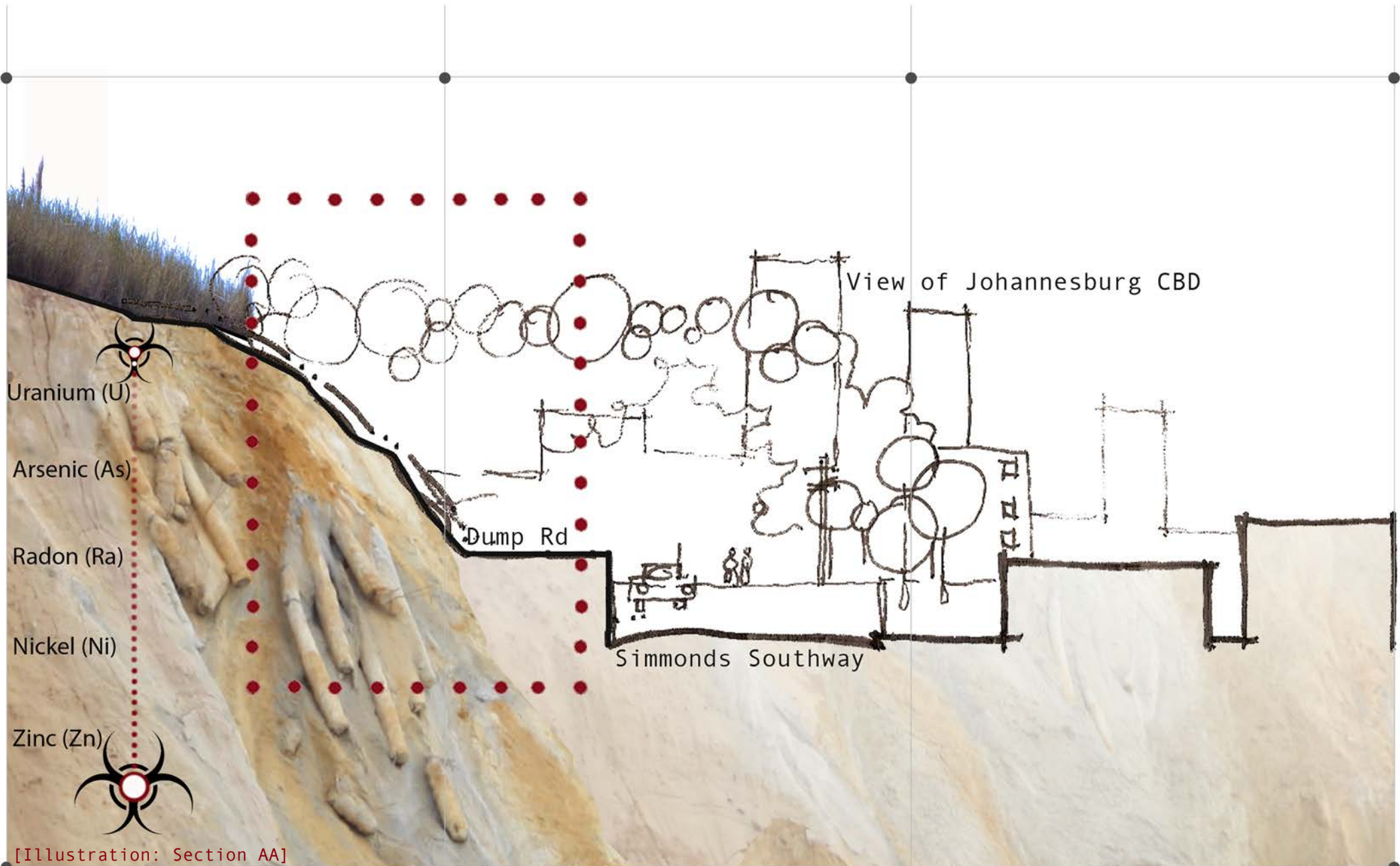
Illustration 2.24: Reclaimed Ferreira dump [Joburg, n.d: online]

[2] Contextual Investigation

[2.3] Contextual study of Top Star Drive-In



As a result of the escalating gold price and more efficient mine technology, Ferreira dump, as others around the country, is being reclaimed.





[03] Theoretical Premise

[3.1] Introduction

[3.2] Part One: Intervention

[3.3] Part Two: Identifying the
Physical and Psychological essence
of the landscape

[3.4] Part Three: Conclusion



Illustration 3.1 Mining Headgear [Jeanette Unite, 2010: online]

[03] Theoretical Premise

[3.1] Introduction

This chapter outlines the theoretical premise adopted for the reclamation of landscapes, radically altered by gold mining. The purpose of the chapter is to demonstrate that modest alterations of disturbed terrain can expose the rich theoretical seams that weave through the concepts of extraction, ruination and waste.

Main Reef Road is a remarkable historical setting. To celebrate it, would entail celebrating its essence as a space of wonder and exploitation. There is a certain magic to these sites. One tends to be mesmerized by the scale, the void and the sense of alienation of the various mine dumps, mine shafts and post industrial ruins.

The aim is to identify the physical and psychological essence of an extraction landscape and explaining how to engage with it.



Illustration 3.1.1: Unique Body Landscape Art: Physical interaction with landscape. [Rafael,2010:Online]



Illustration 3.1.2: Unique Body Landscape
Landscape. [Rafael,2010:Online]

Art: Physical interaction with



Illustration3.1.3: Psychological interaction
with landscape. [Flickr,n.d:Online]

[03] Theoretical Premise

[3.2] Intervention

“Intervention” by Raimund Abraham
(Salzmann. 2008:32)

“Borne into the landscape. To touch it, to smell it, to let the eyes gaze over it, to let the eyes dig into it, to scratch signs into the earth, to excavate cavities, to pile up mounds, to bury the entire body in the earth, to measure with groping steps, to feel space, to draw scales and to engrave them eternally into stone. To sharpen the eyes like a sword, not only to caress the Landscape but to dissect it, to measure beyond the body, to measure between the heavens and the earth, to create horizons. To let lines vanish into points, immaterial but with greater precision than any known tactile or visual reality before. Torn from the power of gravity. Torn from the terror of the endless landscape. Memory and desire: That is architecture. Built or unbuilt. A collision of irreconcilable thoughts and interventions.

>> [052]



Illustration 3.2.1: Unique Body Landscape
Art: Physical interaction with landscape.
[Rafael, 2010:Online]



Illustration 3.2.2: Unique Body Landscape
Art: Physical interaction with landscape.
“Man between trees” [Rafael,2010:Online]



Illustration 3.2.3: Unique Body Landscape
Art: Physical interaction with landscape.
[Rafael,2010:Online]

[03] Theoretical Premise

[3.2] Intervention

Intervention is inevitable when humans excavate or build. Tadao Ando and Raimund Abraham present two opposing views. Both authors are concerned with the relationship of architecture to nature and the site.

The above poem explains the human need to excavate. Abraham defines the process of architecture as either digging into the earth, or reaching for the sky. His poem

highlights human desire to measure the world with their bodies as point of reference, to create new horizons, to overcome knowledge and reason. But most important, to understand that when one excavates and measures; one scars the earth.

Abraham (Nesbitt, 1995: 465) states that the origin of his own work is that of intervention and decomposition and that architects primarily transform the topographical

nature of the site. The process of design is the secondary act with a purpose to reconcile and harmonize the consequences of the initial intervention, collision and negation. Abraham sees the design process as reconciliator of the site. He believes there is continuous confrontation between the ideal and matter. Architecture is essentially a monument to the eternal and the temporal.

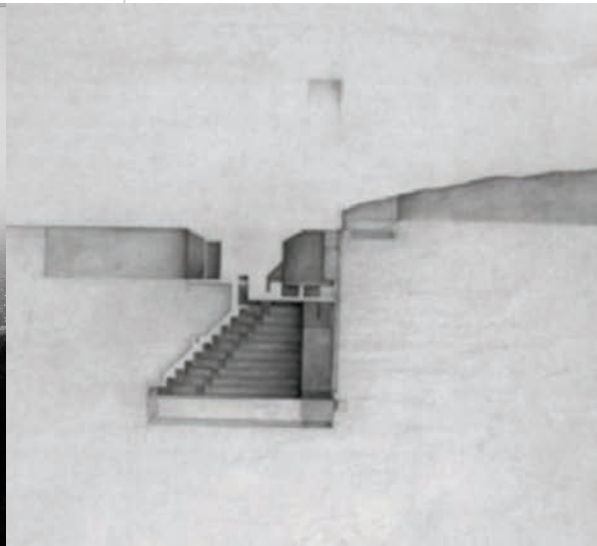


Illustration 3.2.1 Between heaven and earth. [Deviant art, n.d: online]

Illustration 3.2.2 Sketch by Raimund Abraham. [Shift, n.d: online]

Illustration 3.2.3 Sketch by Raimund Abraham. [Shift, n.d: online]

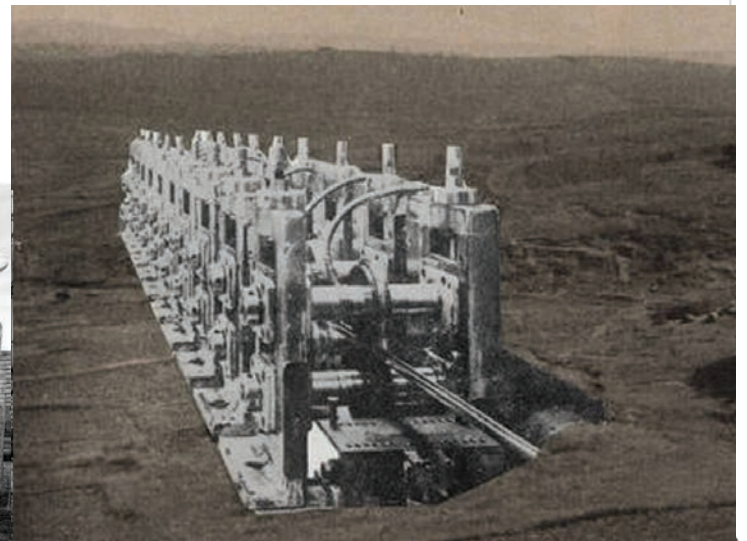
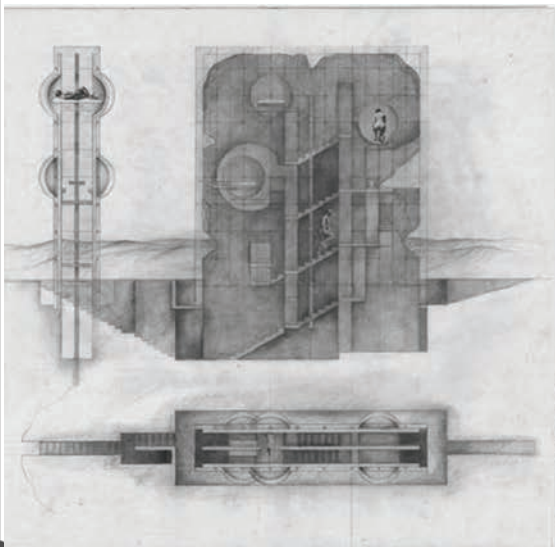
Illustration 3.2.4 Sketch by Raimund Abraham. [Shift, n.d: online]

Illustration 3.2.5 Time Square Tower. [MOMA, 1984: online]

Illustration 3.2.6 House without rooms. [MOMA, 1974: online]

Illustration 2.3.7 Raimund Abraham Musikstudio, Rakenstation Hombroirch [djibnet, 2008: online]

Illustration 2.3.8 Transplantation. [MOMA, 1964: online]



[03] Theoretical Premise

[3.2] Intervention

Ando, however believes in a union between man and nature through an architecture that differs from Abraham's "conquest of the site".

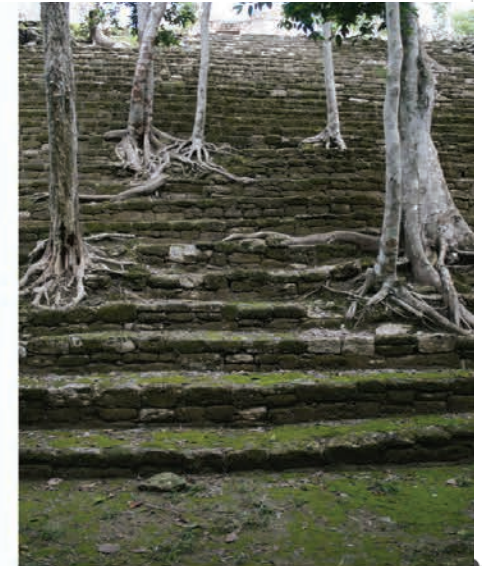
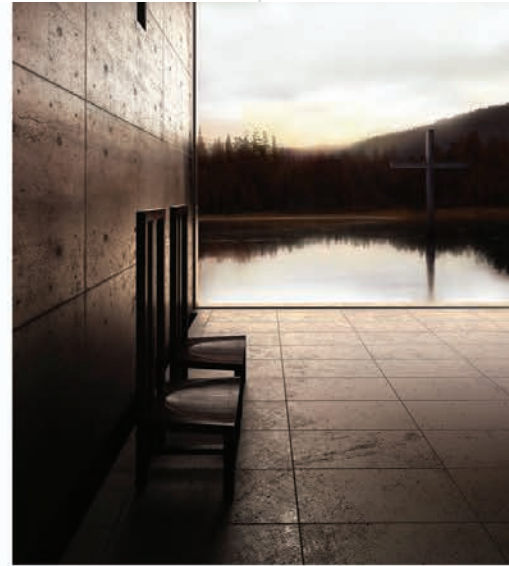
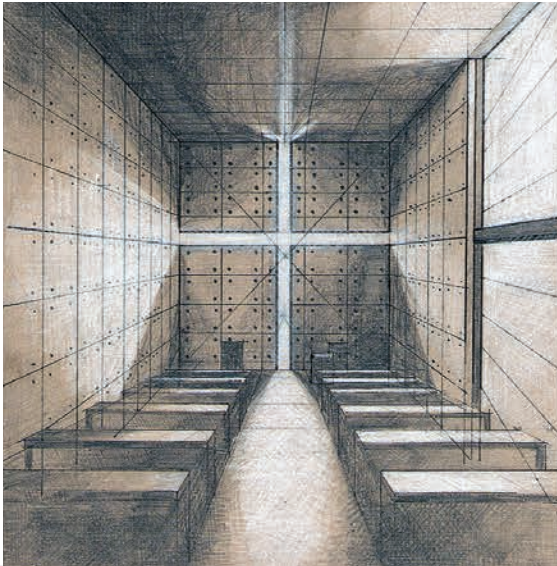
According to Ando (Nesbitt, 1995:460) "the elements of nature-water, wind, light, and sky-bring architecture derived from ideological thought down to the ground level of reality and awaken man-made life within it. Human life is not intended to oppose nature and endeavour to control it, but

rather to draw nature into an intimate association in order to find union with it." This approach de-emphasises the physical boundary between residence and surrounding nature and establishes instead a spiritual threshold. Architecture becomes a platform for confrontation between man and nature. The aim is to draw nature and the site to the inside.

Main Reef Road, and its traces of a post-industrial mining landscape,

is often regarded as a site of urban disorder of which the decaying features should be erased from the urban backdrop ,

By contrast this project proposes a different view and aims to celebrate its awe inspiring landscape as that of accomplishment and exploitation, by reclaiming it both physically and psychologically.



Both Ando and Abraham aspire to create tension through architecture which overcomes reason and inspires the sublime experience, either through a union with the site and a disappearing threshold, or as a conquest of the site and a recognition of our ontological limits. To create this tension, or sense of intensity, one must understand the essence of the site and engage with it through an intervention to a certain level of abstraction.

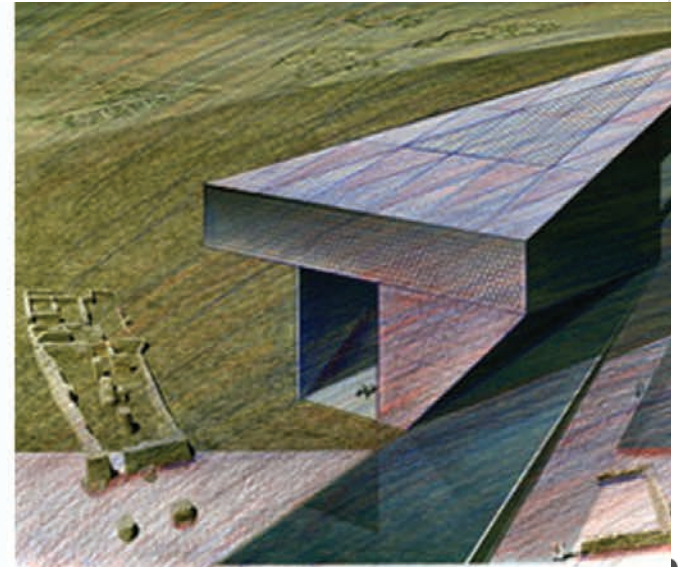



Illustration 3.2.9 Tadao Ando: Church of Light. [Martin Majer, n.d: online]
Illustration 3.2.10 Ruination. [Deveantart, n.d: online]
Illustration 3.2.11 Tadao Ando: Church on the Water. [Martin Majer, 1988: online]
Illustration 3.2.12 Sketch by Raimund Abraham. [Shift, n.d: online]
Illustration 3.2.13 Architecture vs Nature. [Deveantart, 1984: online]
Illustration 3.2.14 Tadao Ando: Light & Water. [Deveantart, n.d: online]
Illustration 3.2.15 Kolmanskop (ghost town). [Flickr, n.d: online]
Illustration 3.2.16 Tadao Ando: Bahrain Archaeological Museum. [Design boom, n.d: online]

A black and white photograph showing a coastal city built on a hillside. In the foreground, there is a large, eroded cliffside with visible horizontal layers of rock or soil. The city buildings are densely packed on the hillside behind the cliff. The sky is clear and bright.

“If it could speak what would it say? What would it sound like? Would it be worth listening to?”

(Ne1, 2009:35)



[03] Theoretical Premise

[3.3] Essence of site [Landscape of Extraction]

>> [059]

To find an architectural solution is to research the essence of site. Main Reef Road is a landscape of extraction and post industrial traces.

During the existence of the Central Rand Mines, a total of 1 300 million tones of rock was brought to surface from underground, and from this rock, 12 220 710kg of gold was extracted (McArthy. 2010:11)

According to Gavin Bridge (Bridge, 2008:45) author of “Scales and spaces of extraction” extraction is the primal pursuit of converting raw materials from pits, wells and mines, into energy and money.

Bridge (Bridge, 2008:45) describes such landscapes as portals between two worlds in which time and space work differently. Under ground lies a world of natural production. The deep-time processes beyond human control. Above ground and freed from geological fixity, energy is thrown into a tumultuous world of social production. A surface world of mobility and change where the quality of space, as well as that of time, is reduced to zero, “The annihilation of space by time”.

Illustration 3.3.1: Historic image of Johannesburg CBD and Mine dumps. [Flickr,n.d:Online]

[03] Theoretical Premise

[3.3] Essence of site [Landscape of Extraction]

THRESHOLD



The transition of time and space from a slow compacted space to a concentrated, fast space - and finally a dispersed or dissolved state is immensely intriguing. The existing intervention acts as a time-machine, bridging different millennia. Exposing our temporary existence in relation to the deep time cycles of the earth.

Deep time vs. Abolished time

Once extracted and dispersed across the planet via trade, concentrated stocks of energy, that were assembled below ground over millions of years, are shattered into highly distributed, low-order forms of energy and use.

The hole is both a space of ecological appropriation in which those with social power lay claim to naturally produced materials and a conduit through which these materials are employed in the transformation of space and nature (Bridge, 2008:45).



Illustration 3.3.2: Johannesburg CBD can be experience as an invert of the mining void.

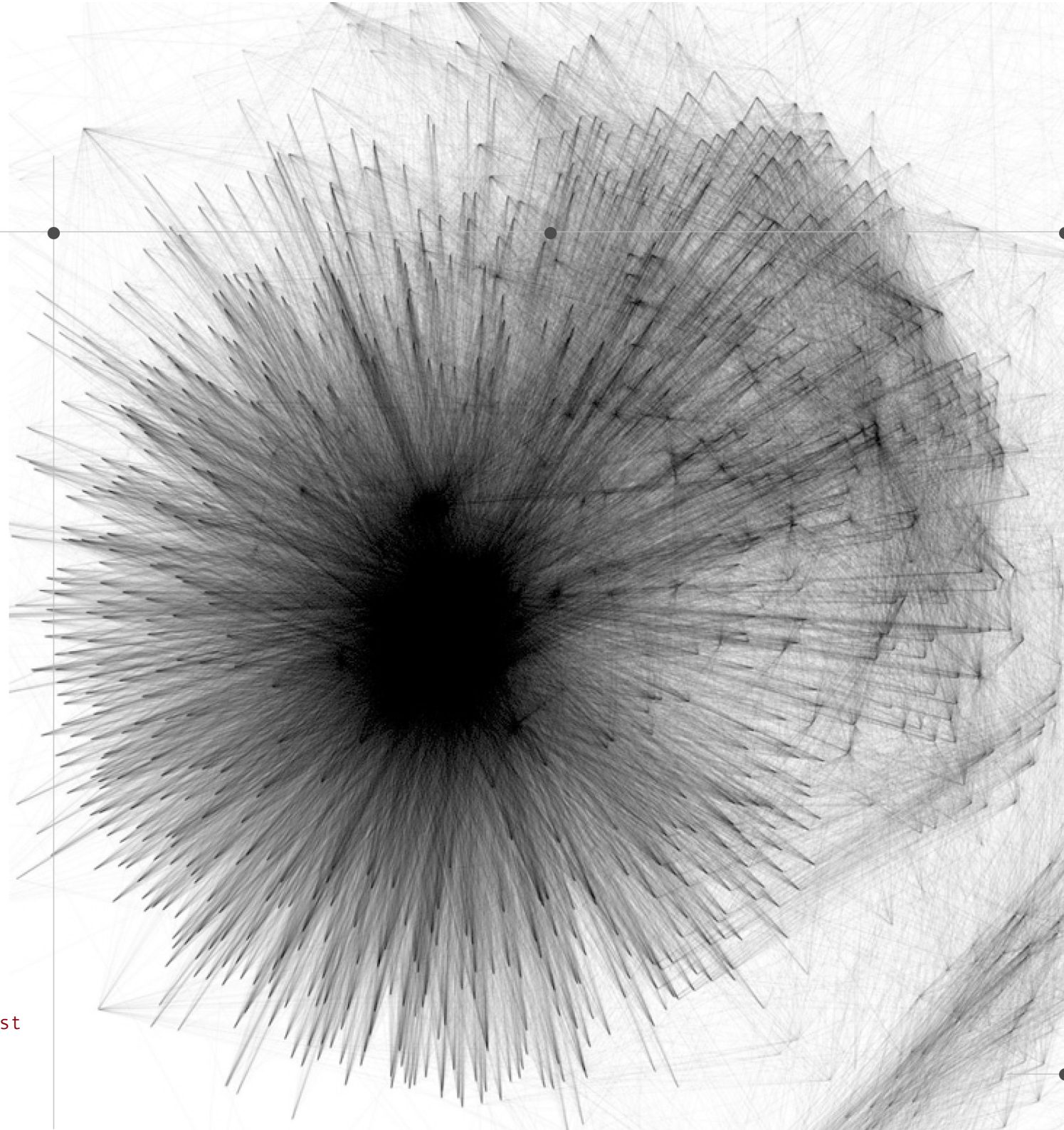


Illustration 3.3.3: Transition from stereotomic deep time to tectonic fast time. [Deveantart, n.d:online]

[03] Theoretical Premise

[3.3] Essence of site [Landscape of Extraction]

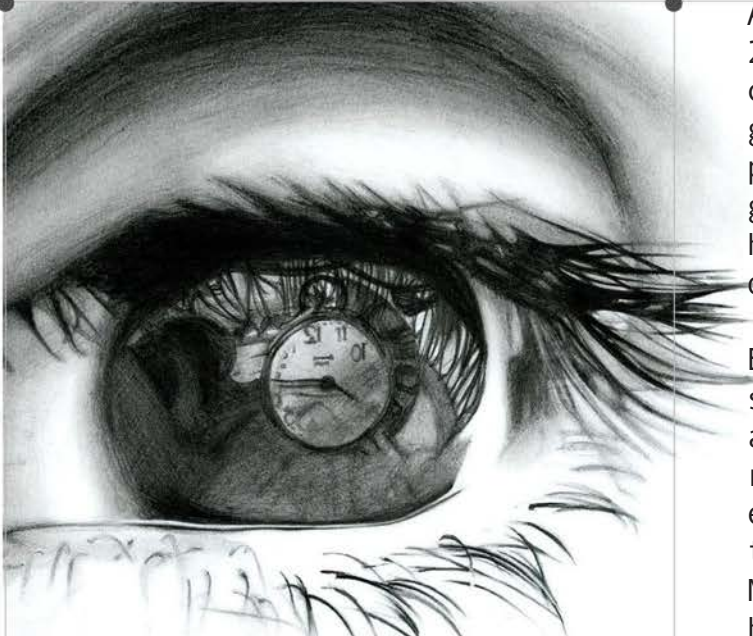


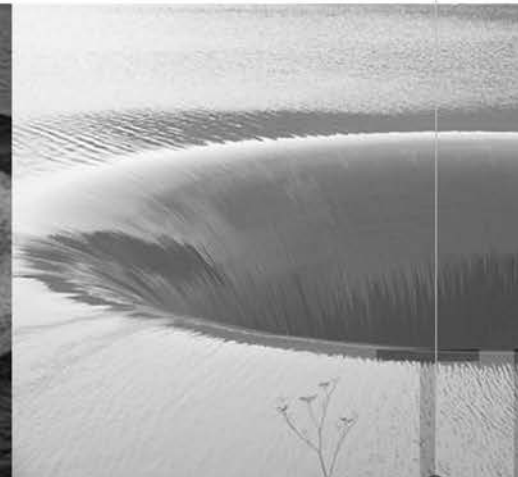
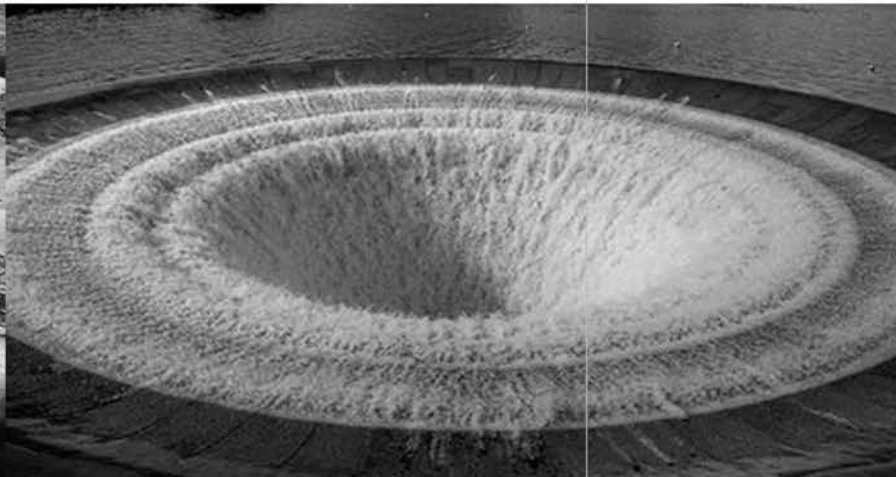
Illustration 3.3.4: Terror of Time.
[Deveantart, n.d: Online]

According to Bridge (Bridge, 2008:45) these immensely concentrated flows represent geological subsidies to the present day. A transfer of geological space and time that has underpinned the compression of time and space in modernity

Bridge (Bridge, 2008:45) quotes social critic, Lewis Mumford, and his captivation of the radically different environments experienced on crossing the threshold to the underground. Mumford describes the mine, or hole, as an archetypal space of modernity: “mine, blast, dump,

crush, extract, exhaust, as the “syntax of modernity”.

According to Bridge one can expand on Mumford’s analysis by thinking about the ways in which spaces of extraction inform urbanization “technologies of surveying, lifting, and construction pioneered in mining become imported into the city; the rationalities of ecological simplification and radical abstraction that underpin geological science become a hallmark of urban design characterize the experience of urban life” (Bridge, 2008:45).



According to Gary Brown (Brown, 2003:10), author of "Freedom and Transience of Space", modernist architecture preferred materials and surfaces that seek the effect of flatness, immaterial abstractness and timelessness. "Architecture has become a master of the 'fast image' accelerating experiential space and condensing spatial experience as a singular surface sensation".

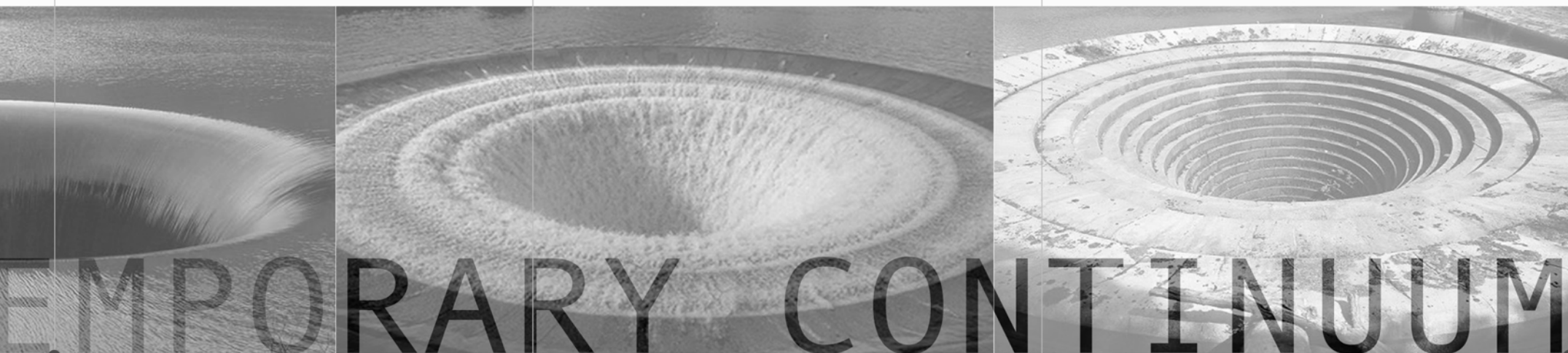
Likewise Juhani Pallasmaa (Pallasmaa. 1999:1) believes that many aspects of the pathology of today's architecture can also be understood through a critique of the visual prejudice of our

culture. "As a consequence of the power of the eye over the other sensory realms, architecture has turned into an art form of instant visual image. Instead of creating existential microcosms, embodied representations of the world, architecture projects retinal images for the purpose of immediate persuasion. Flatness of surfaces and materials, uniformity of illumination, as well as the elimination of micro-climatic differences, further reinforces the tiresome and soporific uniformity of experience. All in all, the tendency of technological culture to standardize environmental

conditions and make the environment entirely predictable, is causing a serious sensory impoverishment. Our buildings have lost their opacity and depth, sensory invitation and discovery, mystery and shadow"

The extractive landscape confronts us with the temporal continuum and suggests that the depth, discovery, sensory invitation and mystery that we are longing for may be found in time and process as matter rather than the immaterial abstractness of the "fast image".

Illustration 3.3.5: Temporary Continuum. [Seri Grapher, 2007: Online]



[03] Theoretical Premise

[3.3] Essence of site [The Aesthetic significance of ruination]

Embracing a different sensibility towards toxic post-industrial landscapes, the author studied the work of various artists and academics in an attempt to understand the aesthetic and psychological significance of the site.

Illustration 3.3.6 Shows the work of artist Herman Niebuhr, Johannesburg based artist. His works titled "Mine" is an attempt to document a disappearing heritage.

Illustration 3.3.7 shows Jeannette Unite an independent visual artist based in Cape Town, South Africa. For the past decade she has been exploring Africa's industrial landscape. Unite gathers minerals, mine dump waste and site specific sands integral to her process of making her own pastels and paint. The title "Remembering the Future" of selected works published in this dissertation refers to the selected cultural memory that is created

through the information that is stored and that which is not.

Illustration 3.3.8 Illustrates the aesthetic significance of ruination. This installation, at The Sans Souci in Soweto, invites the audience to consider and imagine the function and power of aesthetic spectacle in a setting of ruination and urban decay (Stephen Hobbs. 2009:online).

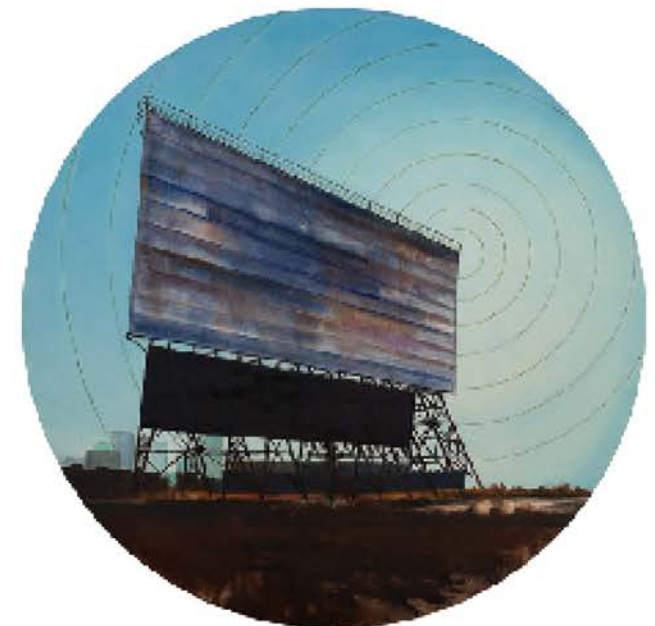


Illustration 3.3.6: Artist Herman Niebuhr and his work titled "mine". [Niebuhr, 2009: Online]

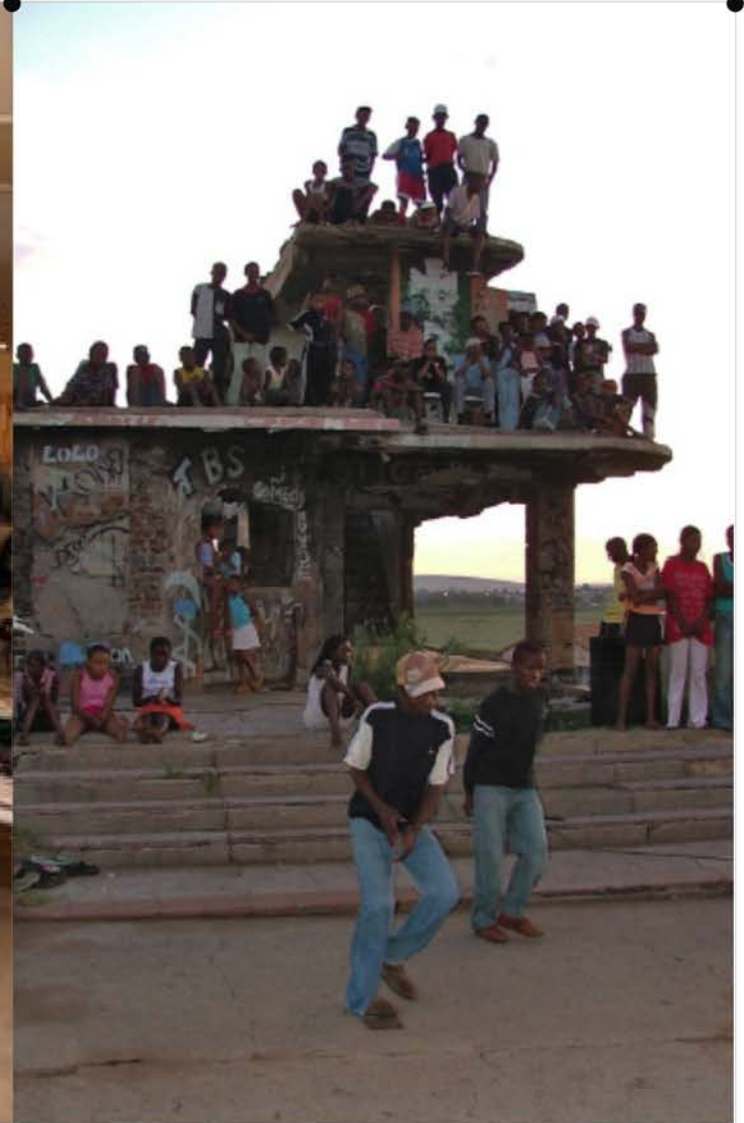


Illustration 3.3.7: Artist Jeanette Unite and her interpretation of Mining Headgear. [Unite, 2009: Online]

Illustration 3.3.8: The Sans Souci in Soweto. [Joburg, 2009: Online]

[03] Theoretical Premise

3.3 Essence of site [The Aesthetic significance of ruination]

According to Dr. Armstrong the sense of time, dereliction and beauty reveal itself nowhere more powerfully than in vast industrial wastelands of ruins. "It is ironic that through dereliction we can again experience the concept of the Sublime, so recently lost to us through the taming and commodification of wilderness.

Ellen (Ellen, 1978: 97) believes ruins make it so difficult for the imagination to estimate them

aesthetically according to sensible standards, that imagination tries to turn elsewhere for its standards" Settings of ruination and urban decay suggest a conflict between reason and imagination". This conflict, or tension, provides an opportunity for the sublime experience.

According to Kant's theory on the sublime, objects are not sublime per se, but can give rise to a sublime experience. For Kant, the conflict

between what can be sensuously given and the ideas of reason, is not played out in the aesthetic object, but in the subject. The aesthetic object may suggest the conflict, but is not in itself the source, or the arena, of the conflict.

Ellen describes passions, raised from the sublime experience, as enthusiastic passions and lists six enthusiastic passions: Terror, admiration, horror, joy, sadness, and desire (Ellen, 1978: 97).



Dr. Armstrong (Armstrong. 2006:117) defines three ways of engaging with these landscapes psychologically.

- Uncanny,
- Reflection on the “terror of time”,
- The slow time of vast derelict and abandoned post-industrial sites.

Dr. Tim Edensor (Edensor. 2005:53-125) describes post-industrial ruins as part of excess, impossible to totally erase, which contains rich potential for reinterpretation and reuse because it is under-



determined. “Through processes of decay and nonhuman intervention, objects in ruins gradually transform their character and lose their discreteness, they become charged with alternative aesthetic properties, they impose their materiality upon the sensory experience of visitors”(Edensor. 2005:53-125).

Dr. Edensor (Edensor. 2005: 125) identified the following six architectural manifestations of Ruination. Juxtapositions, traces,



stages, textures, nature and order.

Illustration 3.3.9 Between heaven and earth. [Deveant art, n.d: online]

Illustration 3.3.10 What lurks beneath? [Deveantart, n.d: Online]

Illustration 3.3.11 Top Star [Flickr,n.d: online]

Illustration 3.3.12 Mining Headgear, on Main Reef Road.

Illustration 3.3.13 Historic image of Johannesburg CBD and Mine dumps. [Flickr,n.d:Online]

Illustration 3.3.14 What lurks beneath? [Deveantart, n.d: online]

Illustration 3.3.15 Mine shaft on Claim 19.



[03] Theoretical Premise

[3.4] Conclusion: Constructing the essence

The voids, wastelands and derelict spaces in our cities are not merely contemptuous places of blight, heavy with memories of human exploitation and environmental negligence they are also places of great beauty, rich in opportunities for time to reflect on our recent past, the present and also future landscapes



[04] PRECEDENT STUDIES

[4.1] AMD & ART Project in Vintondale, Pennsylvania

Acid mine drainage [AMD] is the most widespread water quality problem, as well as a significant economic and social constraint. Seeping or surging from an abandoned coal mine, "The old Vinton Colliery Company Mine No.3", this project aims to treat and re-habilitate the post mining landscape of Vintondale.

[AMD&ART, 1994: Online]

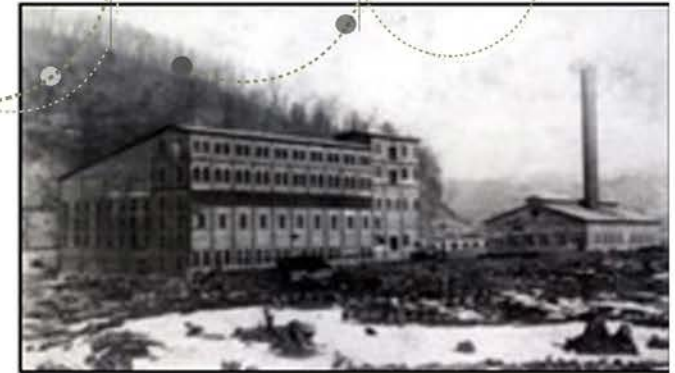


Illustration 4.1 The collage to the right depicts the Vinton Colliery Washery & Power House in 1906 (top), an overlay of the old colliery on the reclaimed land (middle) and the colliery site today (bottom). [AMD&ART, 1994: Online]

SCIENCE

AMD is the metals-laden water, often acidic, that coats stream beds with orange sediment, killing the bottom of the food chain. The AMD Treatment System: This is a passive treatment system, relying on natural processes to raise the pH and remove the metals. The "Litmus Garden" contains groves of native trees, The garden's fall foliage color reflects the cleansing of the water in the ponds and is a metaphor for this process. In fall, as you walk from the beginning of the system, you may see brilliant red leaves, changing to orange, then yellow, and then a clean blue-green at the end of the treatment system.

[AMD&ART, 1994: Online]

Illustration 4.2 Litmus Garden

[AMD&ART, 1994: Online]



HUMANITY

The AMD&ART Park is about more than just treating water; it's also about treating the community, preserving the past and building towards the future. Our Great Map Project, a large mosaic of the Vinton Colliery, is located across from the former entrance to the Mine No.6 Portal. Standing upon the map, visitors can locate and compare the present landscape and buildings to those of the mining times. [AMD&ART, 1994: Online]

Illustration 4.3 Portal 6 entrance

[AMD&ART, 1994: Online]



ART

The treatment system, indeed the entire design of the site, can be looked at as a piece of art! Two large slabs of Pennsylvania Slate have become "a literal and physical clean slate" on which visitors can gather and reflect on the processes they witness in the park. One piece of slate is situated in a limestone channel allowing the clean water returning to Blacklick Creek to flow over it. The other piece serves as a viewing platform. [AMD&ART, 1994: Online]

Illustration 4.4 Clean Slate.

[AMD&ART, 1994: Online]



[04] PRECEDENT STUDIES

[4.1] AMD & ART Project in Vintondale, Pennsylvania

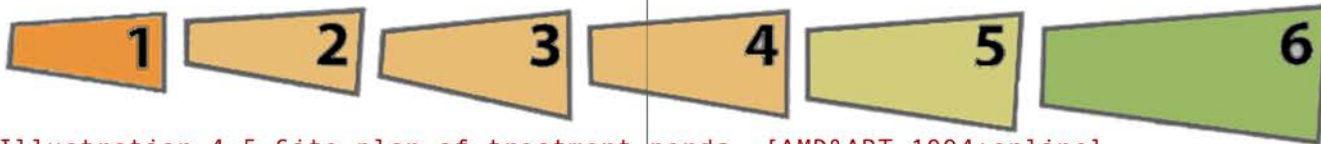


Illustration 4.5 Site plan of treatment ponds. [AMD&ART,1994:online]

1] Acid Pool
This is the beginning, the discharge flowing from the pipes has high levels of iron & aluminum ↓



Illustration 4.6 Picture of different stages of the treatment system. [AMD&ART,1994:online]



Passive Acid Mine Drainage Treatment System

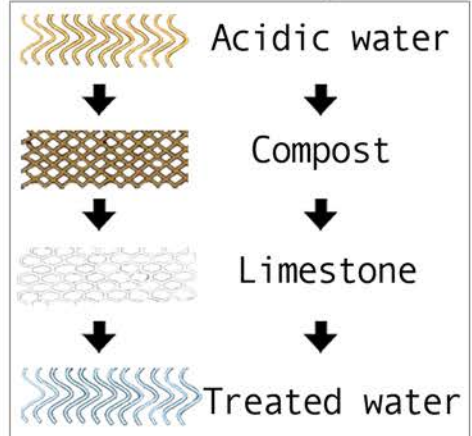
2-4] Wetland Treatment Ponds

These 3 ponds are wetland treatment cells. The plants and compost in the ponds slow the water and promote biological activity, making the water less acidic, allowing the metals to settle out ↓



5] Vertical Flow Pond

In Pond five oxygen is removed from the water by decaying organic material. The water then seeps through a thick bed of limestone that neutralizes the acidity. The vertical flow process prevents the iron from coating the limestone, making the AMD treatment system more efficient ↓



6] Final Settling Pond

The water mixes with air as it enters the Pond 6. The added oxygen creates iron oxide (rust) that settles to the bottom of the pond. The water exiting the treatment system is cleansed of metals ↓



7] Wetlands

↓ Wetlands are excellent water purifiers



[04] Precedent Studies

[4.2] Blur Building. Exposition Pavilion: Swiss Expo, Yverdon-Es-Bains

Architects
Diller&Scofidio

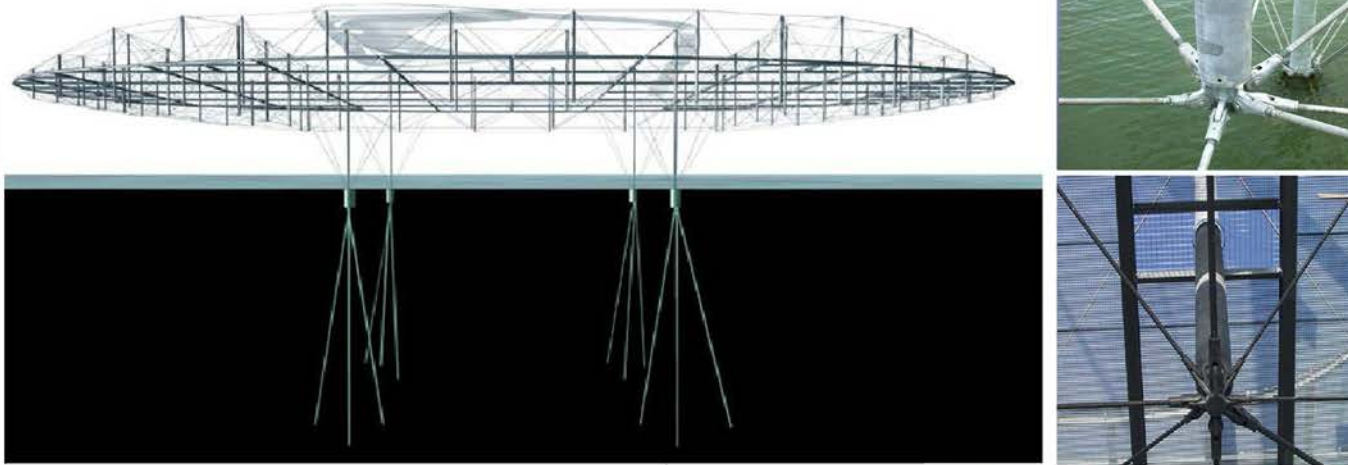


Illustration 4.7 Section + Detail of the Steel Structure. [diller&scofidio, n.d.:online]

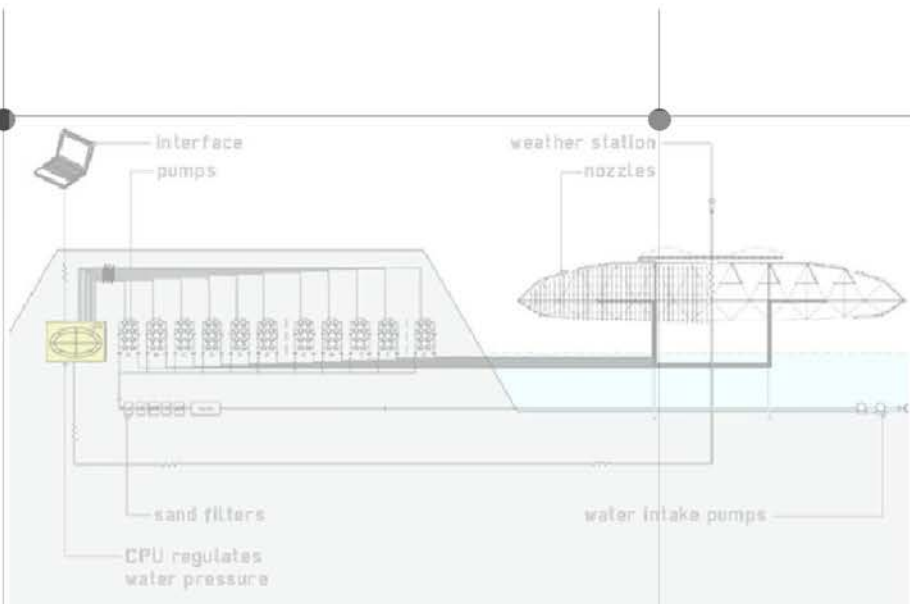


“Upon entering Blur, visual and acoustic references are erased. There is only an optical “white-out” and the “white-noise” of pulsing nozzles. Contrary to immersive environments that strive for visual fidelity in high-definition with ever-greater technical virtuosity, Blur is decidedly low-definition. In this exposition pavilion there is nothing to see but our dependence on vision itself. Is an experiment in de-emphasis on an environmental scale. Movement within is unregulated.”

[diller&scofidio, n.d.:online]



Illustrations 4.7, 4.8, 4.9. Blur Building on Lake Neuchatel. [diller&scofidio, n.d.:online]



“The Blur Building is an architecture of atmosphere > fog mass resulting from natural and manmade forces. Water is pumped from Lake Neuchatel, filtered, and shot as a fine mist through 35,000 high-pressure nozzles. A smart weather system reads the shifting climatic conditions of temperature, humidity, wind speed and direction and regulates water pressure at a variety of zones. Water is not only the site and primary material of the building it is also a culinary pleasure. The public can drink the building.”
 [diller&scofidio, n.d.:online]

Illustration 4.10. Architecture of Atmosphere. [diller&scofidio, n.d.:online]



Illustrations 4.11, 4.12 ,4.13. Water > the site and primary material of the building and a culinary Pleasure.
 [diller&scofidio, n.d.:online]

[04] Precedent Studies

[4.3] Lingotto Fiat Factory Conversion. Torino, Italy.



Illustration 4.13 Hotel and helicopter pad.
[RPBW, n.d.:Online]

Inspiration:

Material and structure inspired by an industrial landscape.

Reclamation of a post-industrial structure.

Structure that cantilevers.

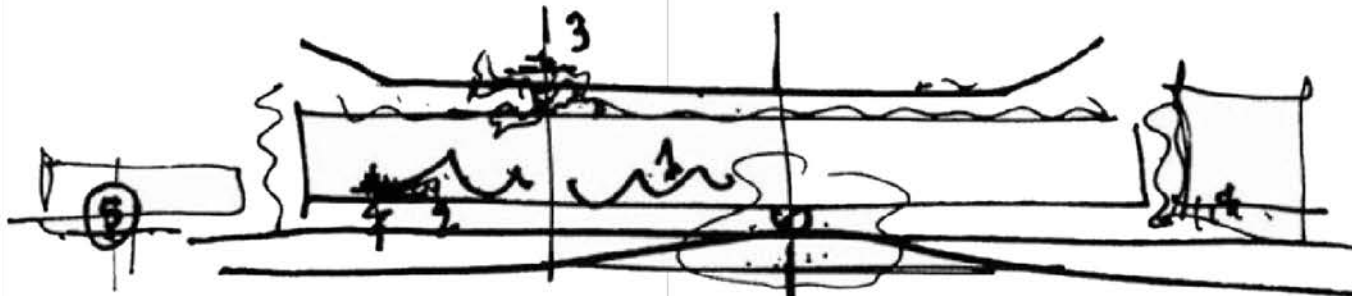


Illustration 4.15 Concept sketch of the Lingotto Factory Conversion. [RPBW, n.d.:Online]

>> [076]

Architect
Renzo Piano

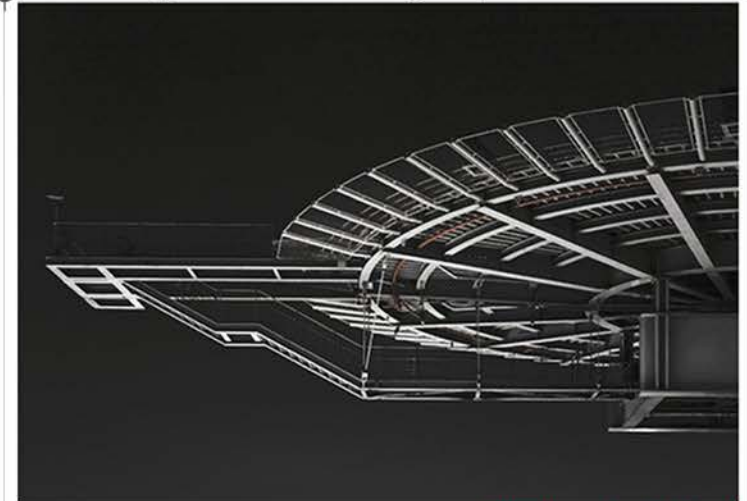


Illustration 4.16 Helicopter Pad. [RPBW, n.d.:Online]



Illustration 4.17 Glass-and-Steel Dome.
[RPBW, n.d.:Online]

Piano's steel-and-glass gallery atop Turin's Fiat factory is a bold venue for a world-class art collection. This 400-ton steel box over-looking the factory's former rooftop racetrack, seems to float above the building.

The daring structure houses 25 masterpieces from the private collection of the Agnelli family, Fiat's founders, including works by Renoir, Matisse and Picasso



Illustration 4.18 "Treasure Box" [RPBW, n.d.:Online]



Illustration 4.19 Old Rooftop Test Track. [RPBW, n.d.:Online]

Built in 1916 the design, by architect Mattè Trucco, was unusual in that it had five floors, with raw materials going in at the ground floor, and cars built on a line that went up through the building. Finished cars emerged at rooftop level, where there was a rooftop test track.

The Lingotto building was avantgarde, influential and impressive – Le Corbusier called it "one of the most impressive sights in the industry". 80 different models of cars were produced there in its lifetime, including the famous Fiat Topolino of 1936.

The factory became outmoded in the 1970s and the decision was made to finally close it in 1982

Renzo Piano was the architect who envisioned an exciting public space for the city. The old factory was rebuilt into a modern complex with concert halls theatre, a convention centre, shopping arcades and a prestigious hotel. The work was completed in 1989. [RPBW, n.d.:Online]

[04] Precedent Studies

[4.4] Yad Vashem's Holocaust Museum. Jerusalem, Israel.

Architect
Moshe Safdie

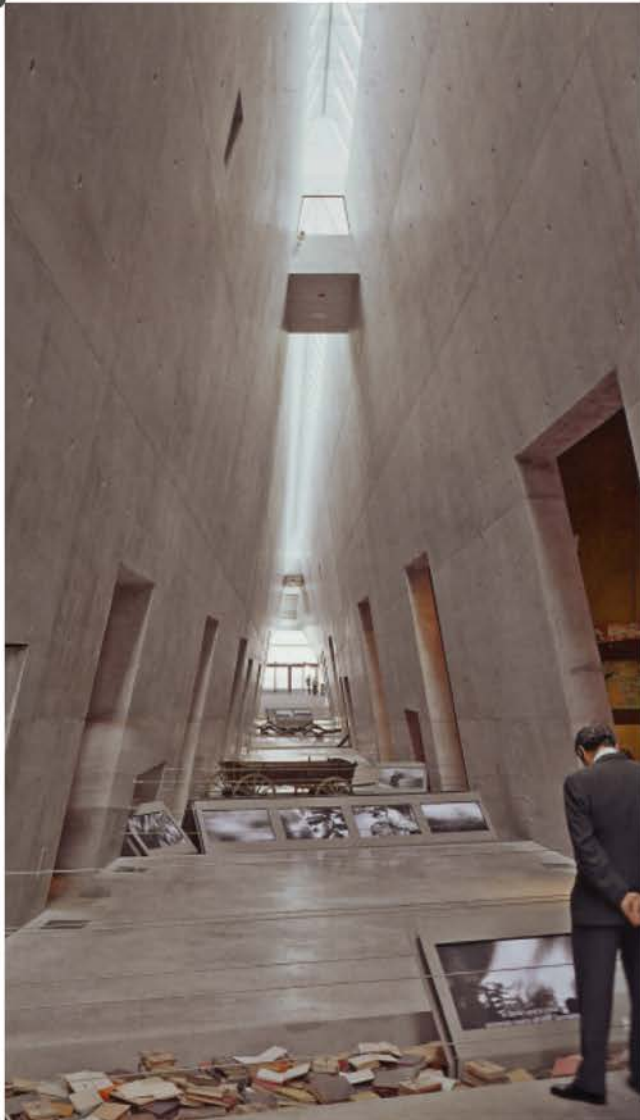


Illustration 4.20 Museum, Main Gallery.
[Yad Vashem, n.d.:Online]

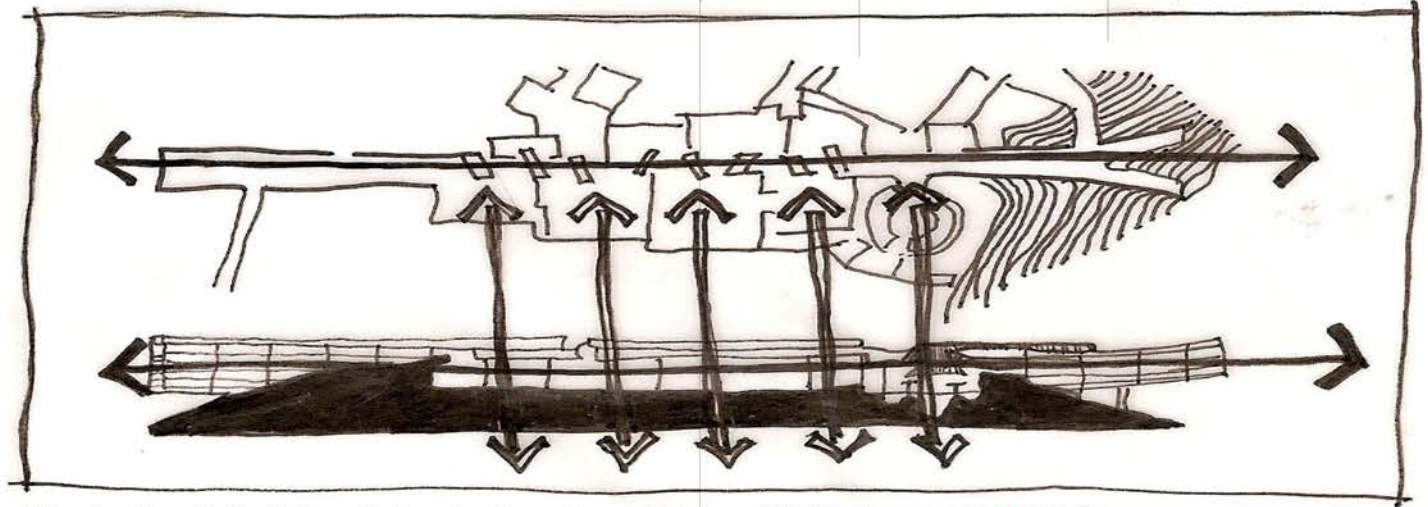


Illustration 4.21 Rythm of the plan/ section relation. [Yad Vashem, n.d.:Online]

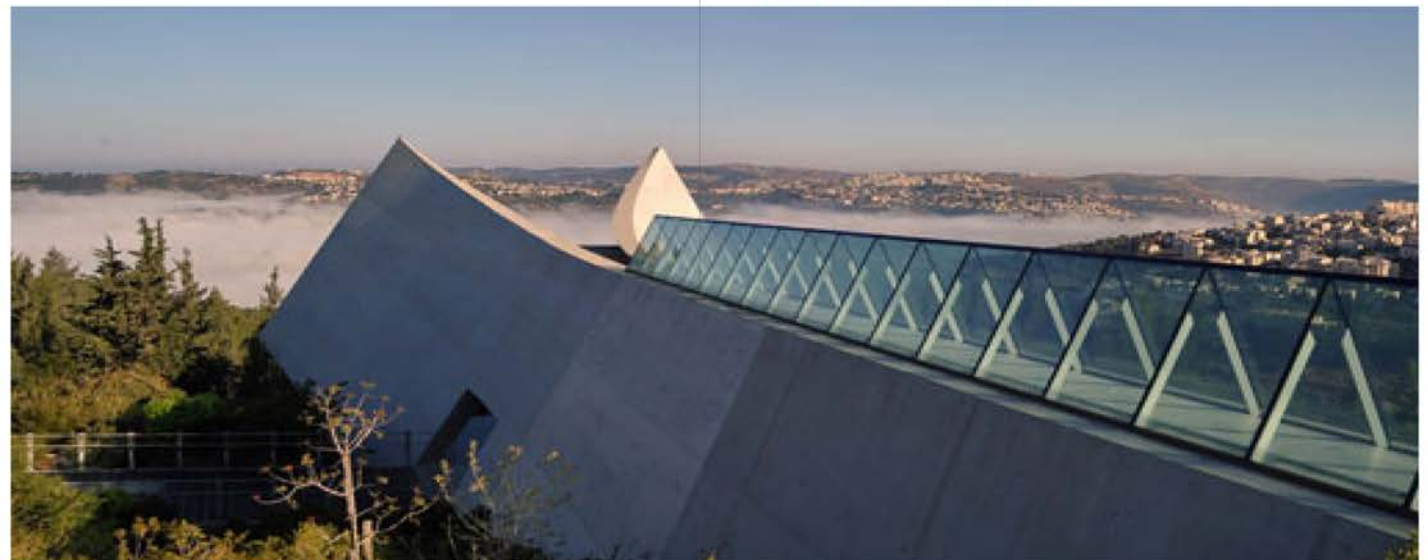


Illustration 4.22 Main Gallery and Viewing Terrace over the New Jerusalem. [Yad Vashem, n.d.:Online]

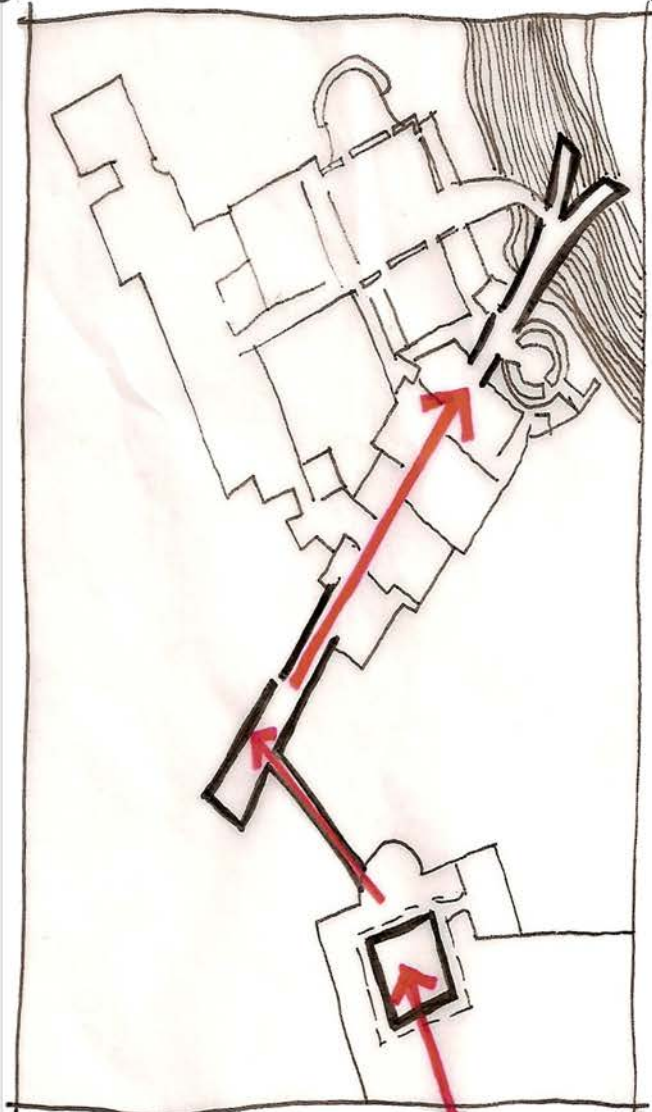


Illustration 4.23 Entry Pavilion and Bridge to Museum.



Illustration 4.24 Entry Pavilion. [Yad Vashem, n.d.:Online]



Illustration 4.25 The structure penetrates the mountain from one side to the other, with both ends dramatically cantilevering into the open air. [Yad Vashem, n.d.:Online]



Illustration 4.26 Entry Pavilion [Yad Vashem, n.d.:Online]

[04] Precedent Studies [Inspirational Projects]
[A] Sans Souci cinema in Kliptown, South Africa.

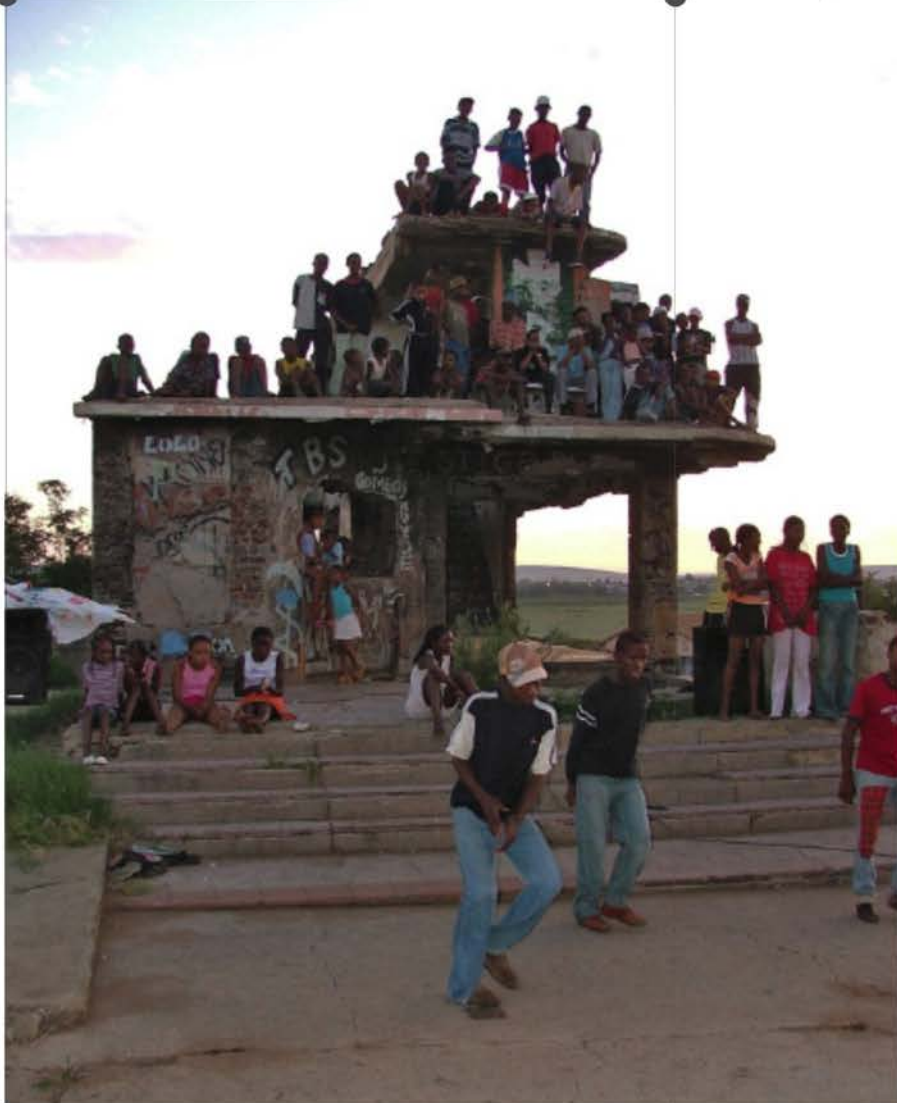


Illustration 4.26 Sans Souci – 300 pounds of hammer.
[Stephen Hobbs, April 5, 2009: Online]

>> [080]

“Imagine the power of an aesthetic spectacle in a setting of ruination.”
[Author.2011]



Illustration 4.27 The Vuyani dancers rehearsing in the ruin.
[26'10 South Architects,n.d:Online]

"An innovative architectural project for the old Sans Souci cinema in Kiptown will see the building evolve along with the community's needs and commitment. Architect Thorsten Deckler of 26'10 South Architects, calls the building a "beautiful ruin".

Although now just chunks of concrete, from the remains of its

first floor level it offers a view of the historic suburb of Kiptown, a collection of untidy, ramshackle houses and shacks.

The project is unusual in that it does not start with the building, but instead, according to the architects, "it develops and gives the 'idea' of [the] cinema new meaning over time, through a

number of events and incremental architectural interventions that reconstruct the memory of the Sans Souci and project it into the future".

[Lucille Davie, August 24, 2006: Online]



Illustration 4.29 Sans Souci - 300 pounds of hammer.
[Stephen Hobbs, April 5, 2009: Online]



Illustration 4.28 Sans Souci cinema in its heyday.
[26'10 South Architects, n.d: Online]

[04] Precedent Studies [Inspirational Projects-Lightweight Scaffolding Structures]

[B] Southwark Lido, London.

[EXYZT and Sara Muzio]



Illustration 4.30 Temporary Steel Structure. [Agnese Sanvito, 18 Julie 2008: Online]



Illustration 5.31 Temporary Installment - Spa. [Agnese Sanvito, 18 Julie 2008: Online]

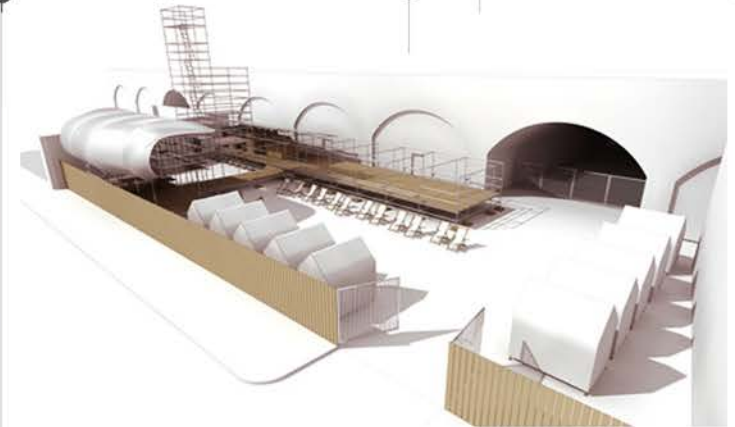


Illustration 4.32 Rendering of The Southwark Lido. [EXYZT, 2008: Online]



Illustration 4.33 & 5.34 The temporary scaffolding structure included a sauna, paddling pool, spray deck, viewing platform and changing rooms. [Agnese Sanvito., 18 Julie 2008: Online]



[C] Croation Floating Pavilion, The Venice Biennale.



Illustration 4.35 Interior Prespective.
[Pavilion, 2010: Online]



Illustration 4.36 The Floating Pavilion.
[Pavilion, 2010: Online]



Illustration 4.37 The Floating Pavilion at Rijeka's waterfront.
[Pavilion, 2010: Online]



Illustration 4.38 The Floating Pavilion at Rijeka's waterfront.
[Pavilion, 2010: Online]



Illustration 4.39 Interior Perspective.
[Pavilion, 2010: Online]

[Leading Croation Architects]

[04] Precedent Studies

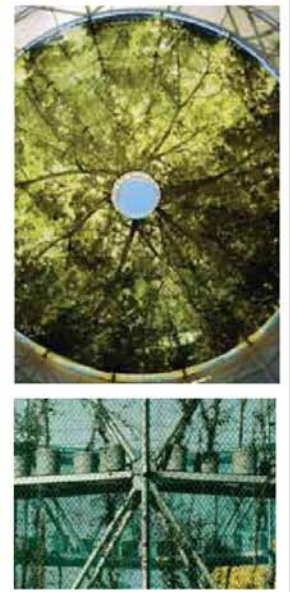
[Inspirational Projects - temporary tower pavilions]

[E] Ecosistema Urbano. Eco-Boulevard, Vallecas, Madrid.

[R.Rutkowski & L.Wojciechowski]



Illustration 4.40 Ludic Tree Pavilion. Night view of the pavilion which has an artificial lighting system. [Emilio P Doiztua,2009:Online]



Illustrations 4.31 - 4.35 Pavilion Air Tree. [Ecosistema Urbano,2009:Online]



Illustration 4.36 Media Tree Pavilion. Organised rock concerts during summer months. [Emilio P Doiztua,2009:Online]



Illustration 4.37 Air Tree Pavilion. The outer skin is made from high-density, multilayer polyethylene films and aluminium. [Emilio P Doiztua,2009:Online]

“The simple yet impressive composition of 3 tower pavilions can be quickly dismantled and moved to another site, reflecting the changeability, temporality and dynamics of the contemporary world. They challenge potentials of technology and nature in order to trigger some very basic and natural effects: simple social activities are stimulated not by programme/function of the architecture or by any special occasions, but by climatic conditions: temperature, humidity, shadowing and so on. This is a new type of space that is delineated by intangible micro-weather ingredients.”

[Anna Baldini, 2009: Online]

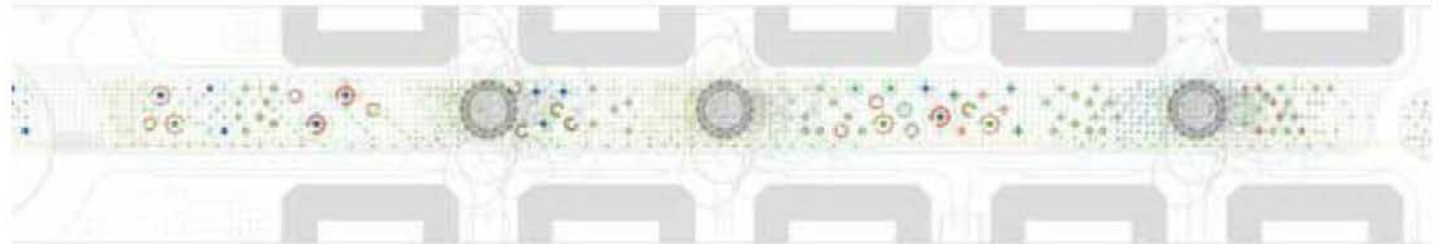


Illustration 4.38 Eco-Boulevard, Vallecas, Madrid [Ecosistema Urbano,2009:Online]

[05] Brief & Accomodation

Client:

South African Water Research Commission.

“Supporting sustainable development through research, funding, knowledge creation and dissemination”.

In the future (short- to long-term), it is envisaged that South Africa’s water problems may intensify. Issues such as water for all, quality of life, and a sustainable environment are an essential part of the country’s national priorities and require considerable attention. In addition, implementation of the National Water Act of 1998 and the related national water strategy places considerable demand on water management and calls for research support.

The WRC recognises that adapting and responding to a changing, dynamic environment and providing South Africa with value for the money invested in water R&D, is an immense challenge. The strategy which has been developed and is continuously being refined by the WRC seeks to ensure that the organisation remains proactive in addressing society’s current and future needs for water-related problem-solving initiatives.

In summary, the strategic direction of the WRC is focused on:

An integrated approach to meeting South Africa’s societal and water-sector R&D needs

Provision of integrated solutions to invariably complex, inter-disciplinary problems

Ongoing strategic identification of needs (short, medium and long-term needs, both explicit and implicit)

Investment in knowledge creation, transfer and dissemination in a set of 5 Key Strategic Areas (KSAs).

Investment in infrastructure creation, in adressing South Africa’s water problem’s.

Client brief:

On a micro scale:

Firstly, the development should address the current acid mine drainage problem found on the gold reef.

Secondly, create a platform for research and education, that celebrates this changing and dynamic environment.

Thirdly, the development should provide a new functioning space and importantly an unique identity.

It is important to note that the claim 19 development does not aim to replace WRC's current headquarters but provide for the various functions and conferences held annually.

It aims to provide the company with a permanent location and platform from which to strengthen its brand and influence.

The Water Research Commission provides the capital for the development owns the infrastructure but will invite tenders for the operation and maintenance of the desalination plant.

On a macro scale :

The building should embrace its setting, work with the surroundings and serve users of all types. It should act as a vertical and horizontal threshold, linking different types of users, a stitching together of industrial activity and public activity.

Most importantly, the intervention should communicate the WRC's mission of knowledge creation and water reclamation.

[05] Brief & Accomodation

Claim 19- Educational platform and water desalination plant.

Front of house Physical Area

First Floor:

Foyer/ event space	340 sqm
Auditorium	160 sqm
Reception	14 sqm
Public restrooms	30 sqm

Basement:

Machine exhibition	80 sqm
--------------------	--------

Back of house

Firstfloor:

Staff Lockers	100 sqm
Staff cafeteria	65 sqm
Staff recreation	65 sqm
Project rooms	25 sqm
Deck outside	60 qm
Board room	50 sqm
Informal workspace	45 sqm
Staff restrooms	26 sqm

Second Floor:

Work stations	100 sqm
Monitoring labs	150 sqm
Staff restrooms	53 sqm
informal workspace	45 sqm
Deck outside	60 sqm
Cafeteria	60 sqm
Workshop	100 sqm
Storage	60 sqm

Basement

Staff/ service entrance

Parking

Desalination plant:

Control rooms

Pump Rooms

Deep water pumps

Store room

Primary clarifiers

Primary filters

Mine water storage

Reservoir

Physical Area

70 sqm

1500 sqm

180 sqm

100 sqm

300 sqm

25 sqm

240 sqm

510 sqm

900 sqm

2000 sqm

65 sqm

Claim 19- educational and research platform.

Front of House

Entrance bridge and access to wetland

Research exhibition 1- 3

1000 sqm

180 sqm

Back of house

Laboratory one to three

Entrance/ reception

Project room

Work stations

Clean room

Staff lounge

Document storage

Outside storage

Store room

Staff rest rooms

20 sqm

20 sqm

40 sqm

40 sqm

30 sqm

20 sqm

12.25 sqm

12.25 sqm

30 sqm

[06] Design Conclusion

- [6.1] Introduction
 - [6.1.1] Main Reef Road
 - [6.1.2] Sites investigated
- [6.2] Touchstone
- [6.3] Acid Mine Water Reclamation
 - [6.3.1] Introduction
 - [6.3.2] Active Treatment
 - [6.3.3] Passive Treatment
- [6.4] Claim 19: Water purification plant
 - [6.4.1] Choice of Site
 - [6.4.2] Form giving elements
 - [6.4.3] Materials
 - [6.4.4] Design conclusion
- [6.5] Top Star temporary Cinema
 - [6.5.1] Choice of Site
 - [6.5.2] Form giving elements
 - [6.5.3] Design conclusion

[06] Introduction

[6.1.1] Main Reef Road



Main Reef Road represents the character of Johannesburg. It was decided that the city and its industrial edge should meet in a transitional space where the activity would appreciate that you are in a city but at the edge of this amazing phenomena. Mixed use development is proposed on the periphery of Main Reef Road. The proposed interventions or future development should stabilize the post-mining sites south of Main Reef. Main Reef Road would become a destination where local and tourists alike could appreciate the scale and wonder of South-Africa's gold mining heritage.

Illustration 6.1.1 Perspective rendering of proposed Water Desalination Plant and headquarters for the Water Research Commission, on Claim 19.

[06] Design Conclusion
 [6.1.2] Sites Investigated

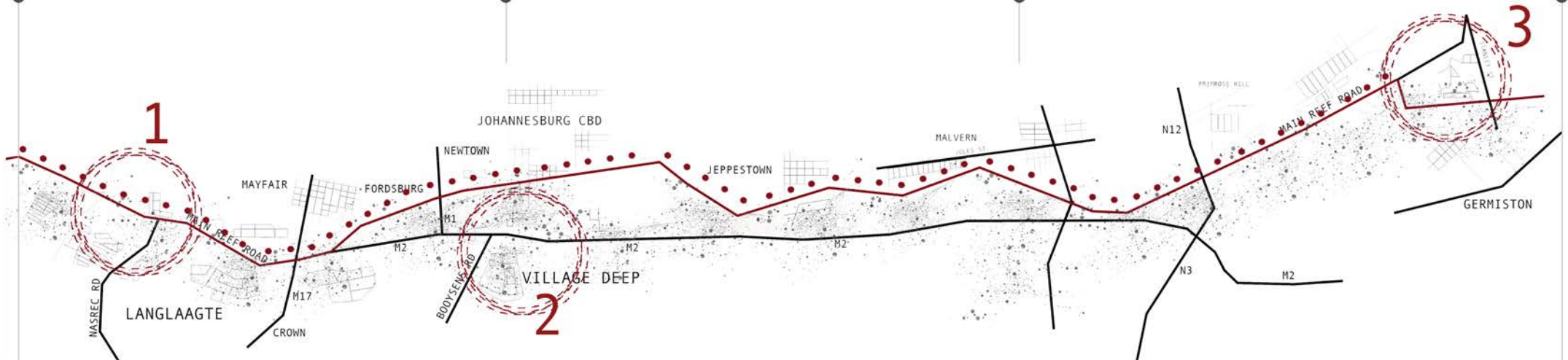
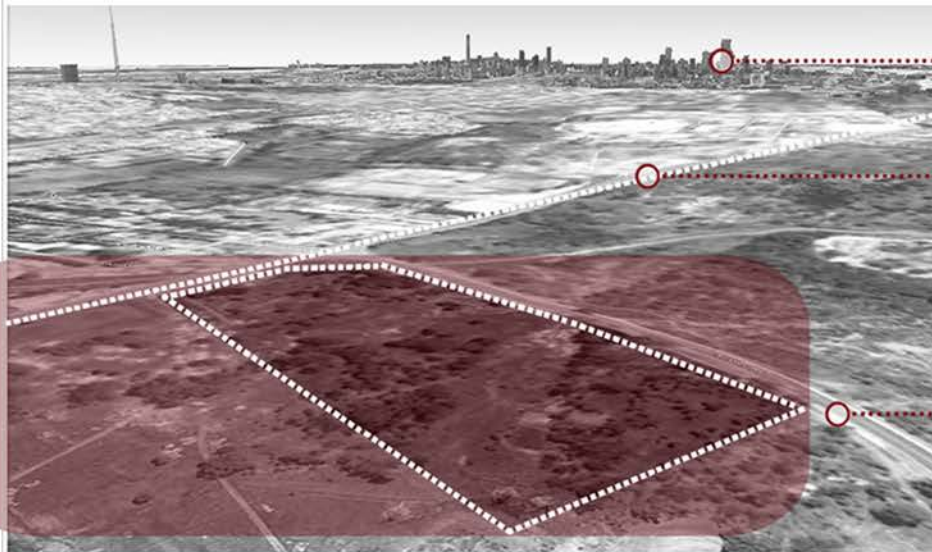


Illustration 6.1. Portion of Main Reef Road.

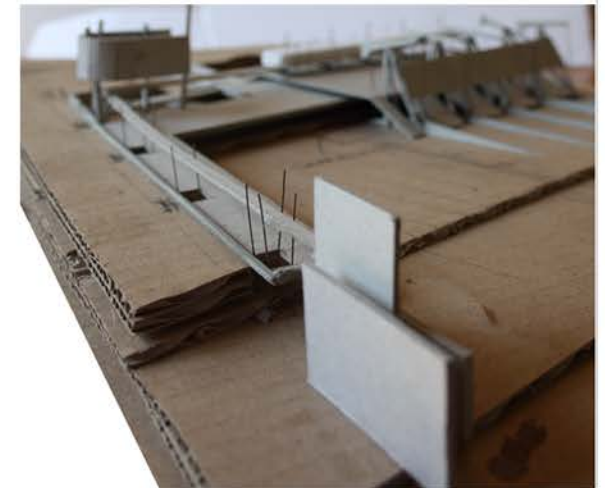


Johannesburg CBD

Main Reef Road

Nasrec Road

1



[1] Claim 19 on Main Reef Road, Addressing Acid Mine Drainage.

Illustration 6.2 George Harrison Memorial on Main Reef Road.
 [Google Earth, 2010:Online]

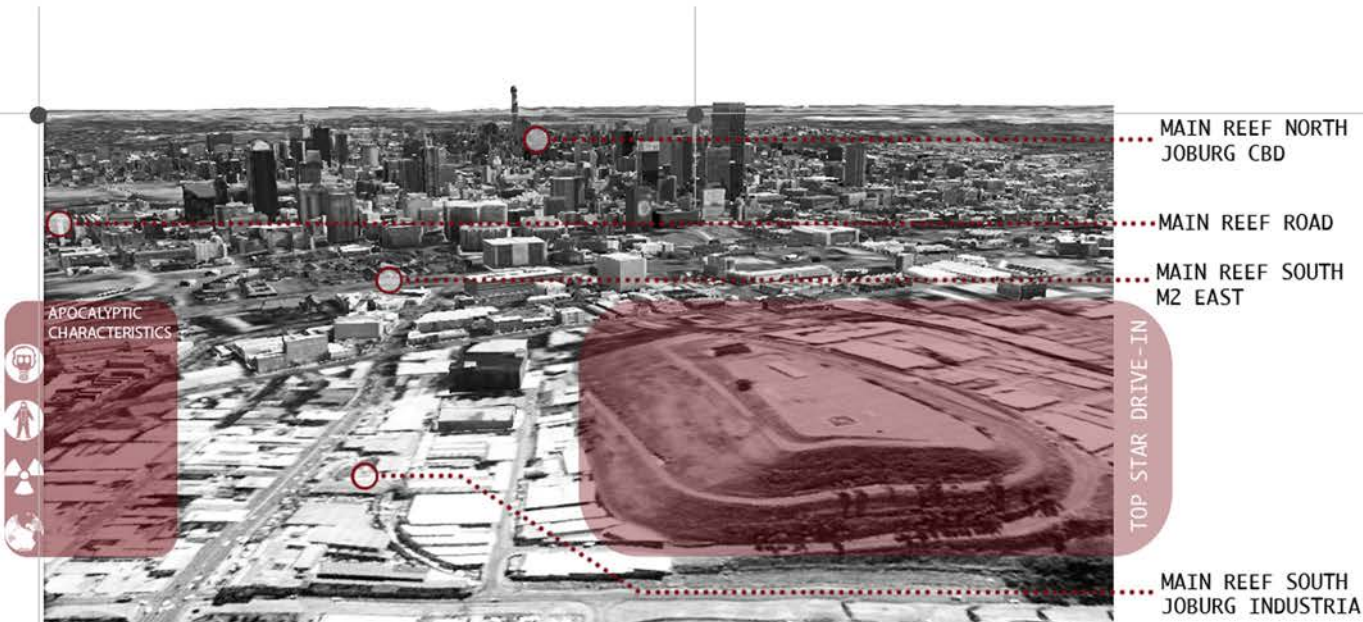


Illustration 6.3 Reclaimed Top Star Drive-In. [Google Earth, 2010:Online]

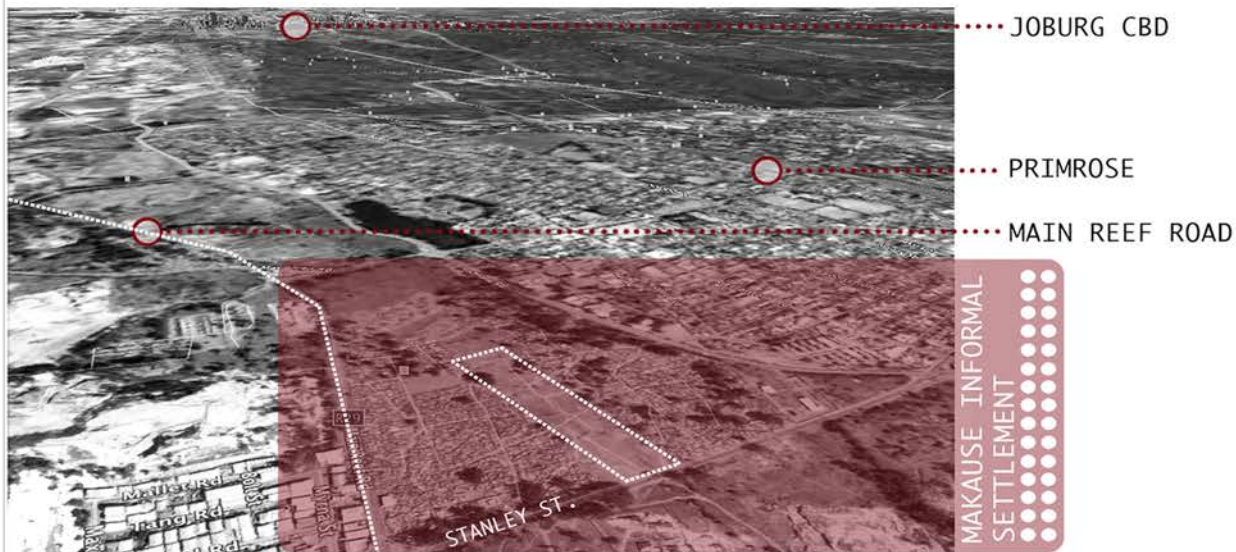
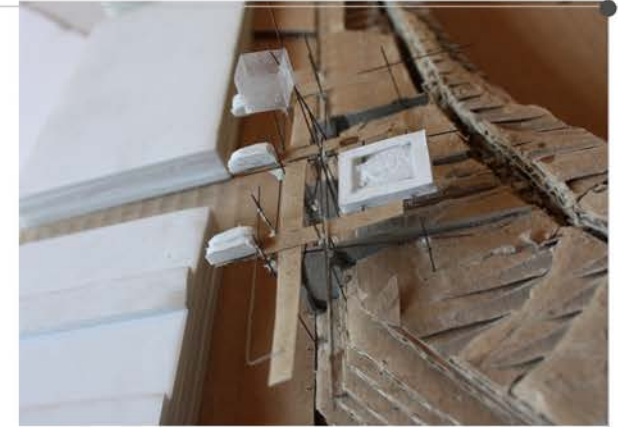


Illustration 6.4 Primrose Informal settlement on Main Reef Road. [Google Earth, 2010:Online]

2



[2] Top Star Drive-in on the reclaimed Ferreira's dump, addressing the disappearing heritage of Main Reef.

3



[3] Primrose informal settlement, addressing dangerous sinkholes west of Johannesburg.

[6.2] Touchstone

[6.2.1] The Fantastic in the Mundane

The touchstone is an artistic expression of my site. My first introduction to Main Reef Road was at the 2010 master class re-imagining the mining-belt. I was intrigued and stimulated by the surrealistic views found along this post-mining landscape.

District 9, a 2009 South African science fiction thriller directed by Neill Blomkamp and filmed in Johannesburg inspired my investigation

District 9 is a successful juxtaposition of the fantastic in the mundane. In many settings the camera would focus on chickens or rubbish with a space ship or aliens in the background making it more realistic.

My experience of Main Reef Road is that of the fantastic in the mundane. The mining landscape and its monuments is accepted as part of Johannesburgs skyline , but exposed and experienced individually with the city as backdrop it is fantastic.



Illustration 6.5 Body suit, 5 mm rubber mat pierced with sharpened 12mm galvanized nails.



Illustration 6.6 The fantastic in the mundane one.



Illustration 6.7 The fantastic in the mundane two.

[6.3] Acid Mine Water and Reclamation.

[6.3.1] Introduction

The solution:

According to Prof McCarthy (McCarthy, 2010:10) long-term, integrated solutions are required. "The problem will not respond to once-off band-aids, however expensive they happen to be".

An integrated range of measures would include active water treatment, passive water treatment systems, and controlled placement of acid-generating mine waste, amongst others.

According Prof. McCarthy (McCarthy, 2010) the problem could be solved by:

- Establishing pump stations at a shallow depth on the mining belt keeping the acid mine water at a safe depth of 300m below the surface.

- Old mine shafts could be refurbished to access the water.

- The water treatment required has been carried out at Grootvlei, ERPM, and at the Randfontein for

many years and it is well tried and tested.

- Two or more pump stations are required to keep the water at a depth of 300m.

Prof. Barker from the Geology Department at university of the Free-State suggests a passive treatment solution that purifies the groundwater found on site to a depth of 50 meters ensuring that the development is not compromised by decanting mine water.

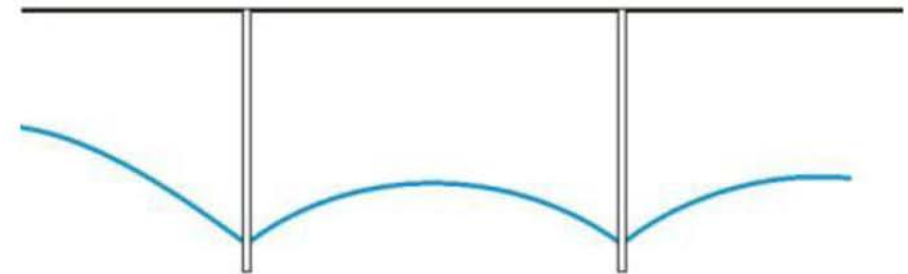
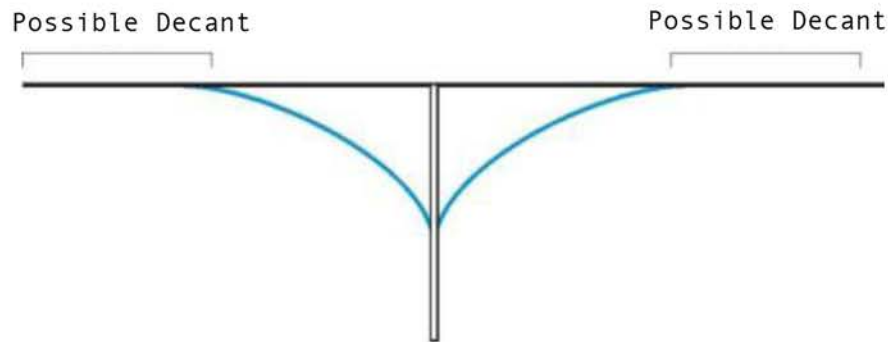


Illustration 6.8 Illustrates the necessity of two or more pump stations along Main Reef Road [McCarthy,2010: 10]

Examples of active treatment of contaminated mine water include chemical or biological processes such as the following:

- pH adjustment
- Metal precipitation
- Membrane processes
- Adsorption treatments
- Electrochemical treatment technologies

A selection of mine water treatment technologies for the Emalahleni water reclamation project proposed by Peter Guther were considered for Claim 19 desalination plant.

Examples of passive treatment of contaminated mine water include chemical or biological

processes such as the following:

- pH adjustment (anoxic limestone drains)
- metals removal (Wetlands)
- sulphate removal (Wetlands)

The AMD & ART passive water reclamation development in Vintondale, Pennsylvania, USA was used as precedent of a successful passive treatment insinulative.



Illustration 6.9 Reverse Osmosis tanks. [Photo stock,n.d:online]



Illustration 6.10 AMD and ART passive water treatment gravitation dams. [AMD&ART,1994:online]

[6.3] Acid Mine Water and Reclamation.

[6.3.2] Active Treatment System

The Active treatment technology proposed for the development of Claim 19 was adopted from the Emalaheni Water Reclamation Project based in Witbank as documented by Peter Gunther (Gunther&Mey,2005:2)

The proposed desalination plant will produce 20Ml/day potable water a day and pass the water onto the local municipality in a sustainable public-private partnership project.

Operation and Maintenance:

This dissertation proposes that the Water Research Commission provide the capital input and own the plant but the operation and maintenance is to be done by the water treatment technology supplier.

Peter Gunther (Gunther, 2005: 10) proposed the treatment proses developed by Keyplan (PTY) Ltd. based on:

- their treatment residue policy and
- and closed desalination proses making the plant for safe urban and public development.

Illustration 6.11 Section BB through Active treatment process.

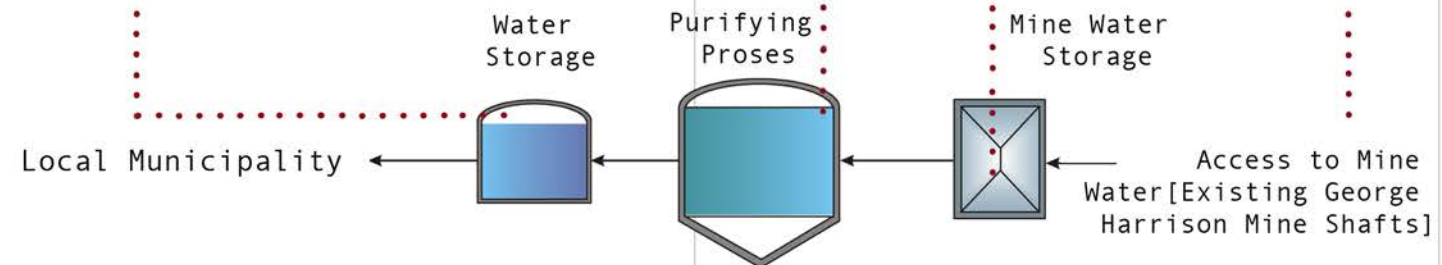
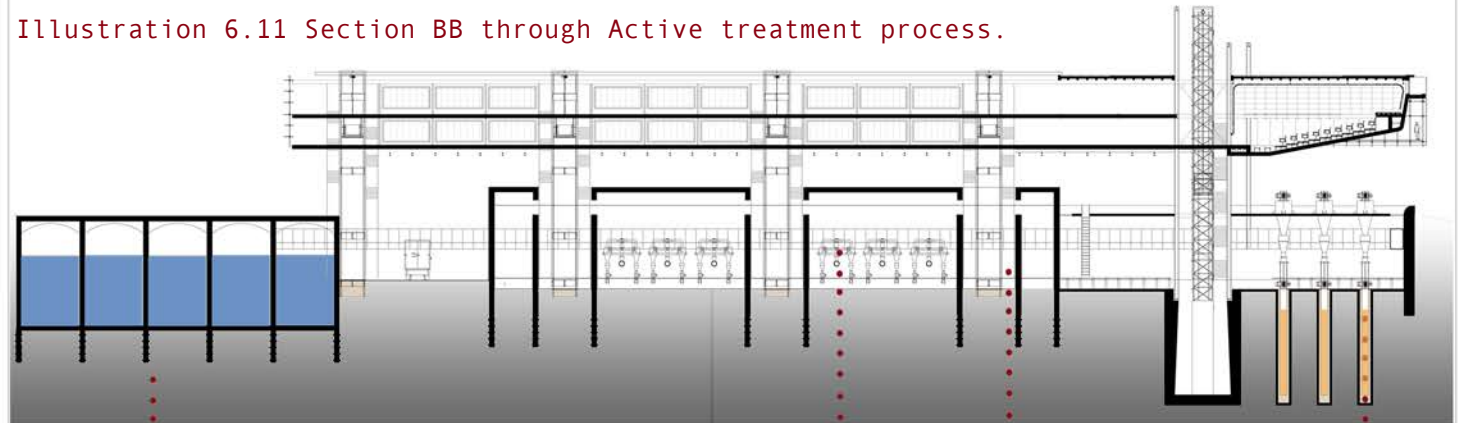


Illustration 6.12 Schematic of main components of the project. [Gunther&Mey,2005:6]

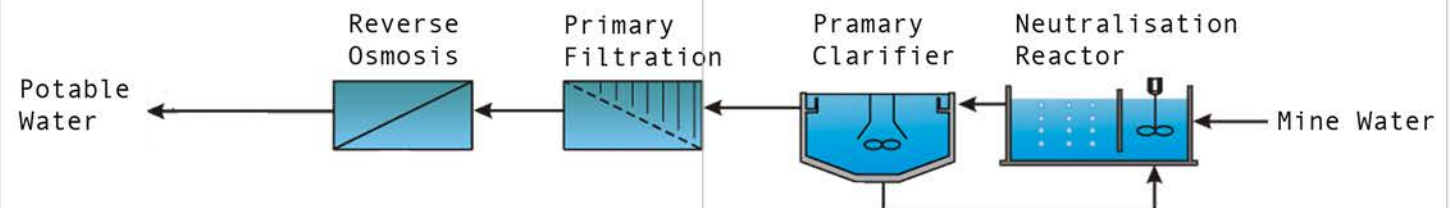


Illustration 6.13 KeyPlan (Pty) Ltd- Simplified Process Flow Diagram [Gunther&Mey,2005:6]

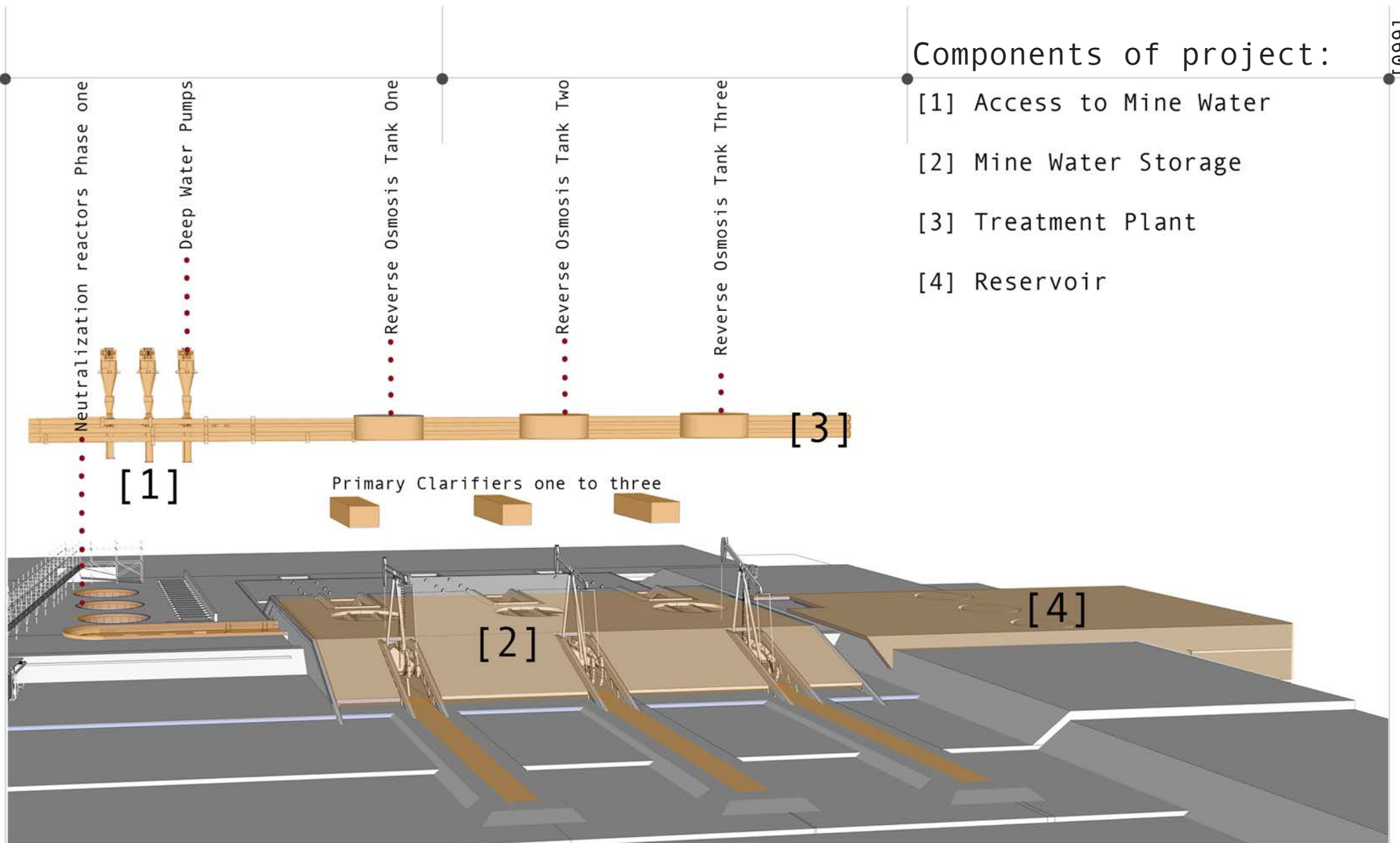


Illustration 6.14 Illustration of the components of an active mine desalination component.

[6.3] Acid Mine Water and Reclamation.

[6.3.3] Passive Treatment Wetland

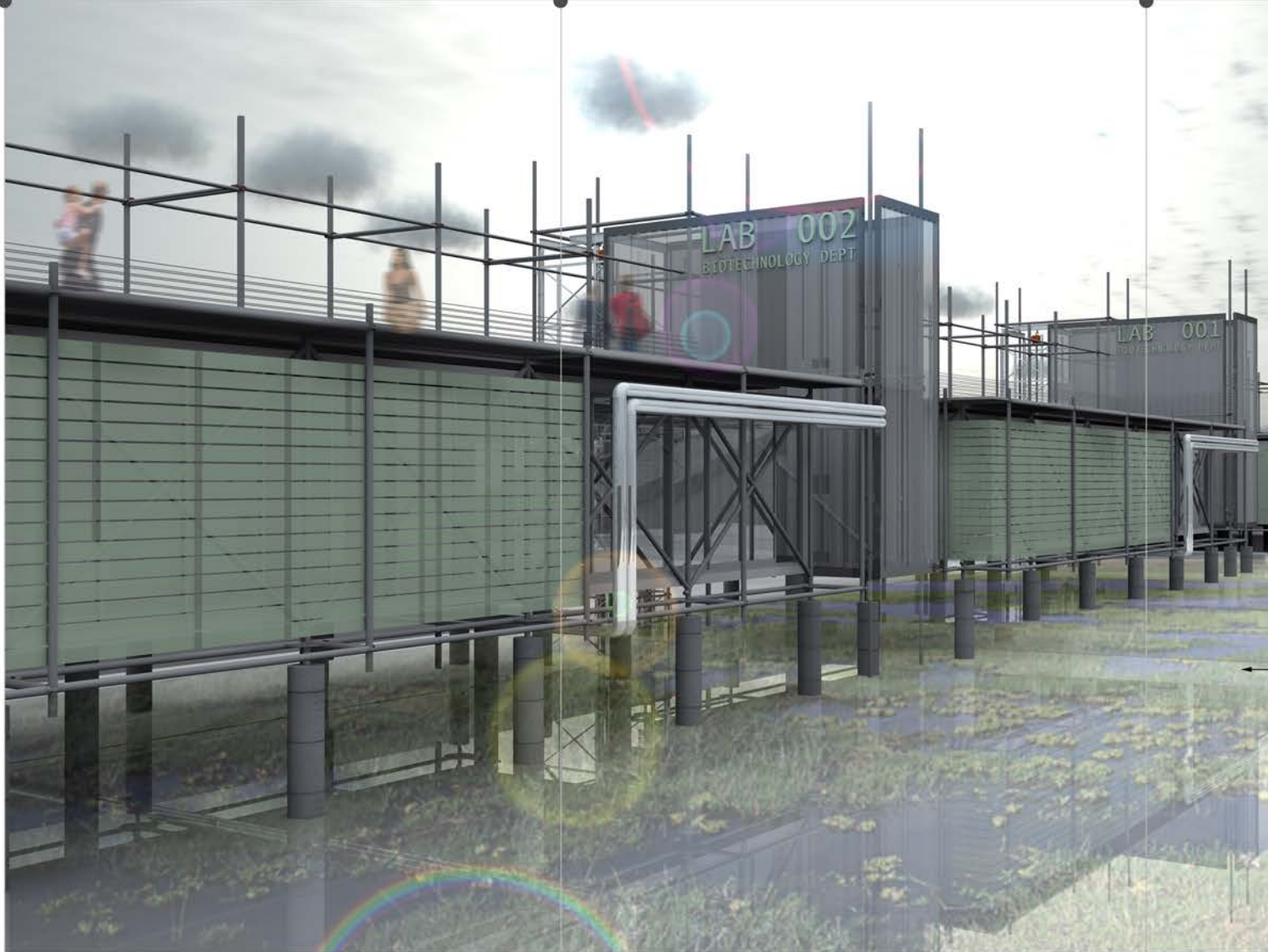


Illustration 6.15 Rendering of wetlands and research laboratories.

>> [100]

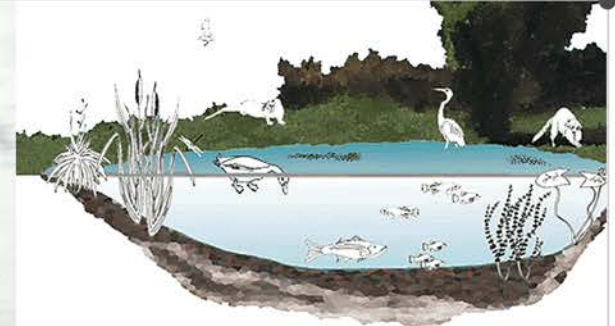


Illustration 6.16 Micro-habitat of a typical wetland. [WRC, n.d:Online]

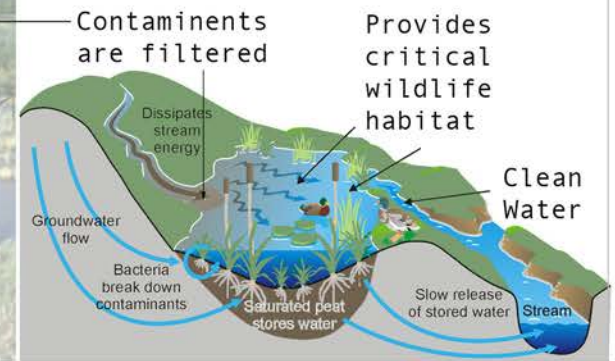


Illustration 6.17 Section through wetland. [WRC, n.d:Online]

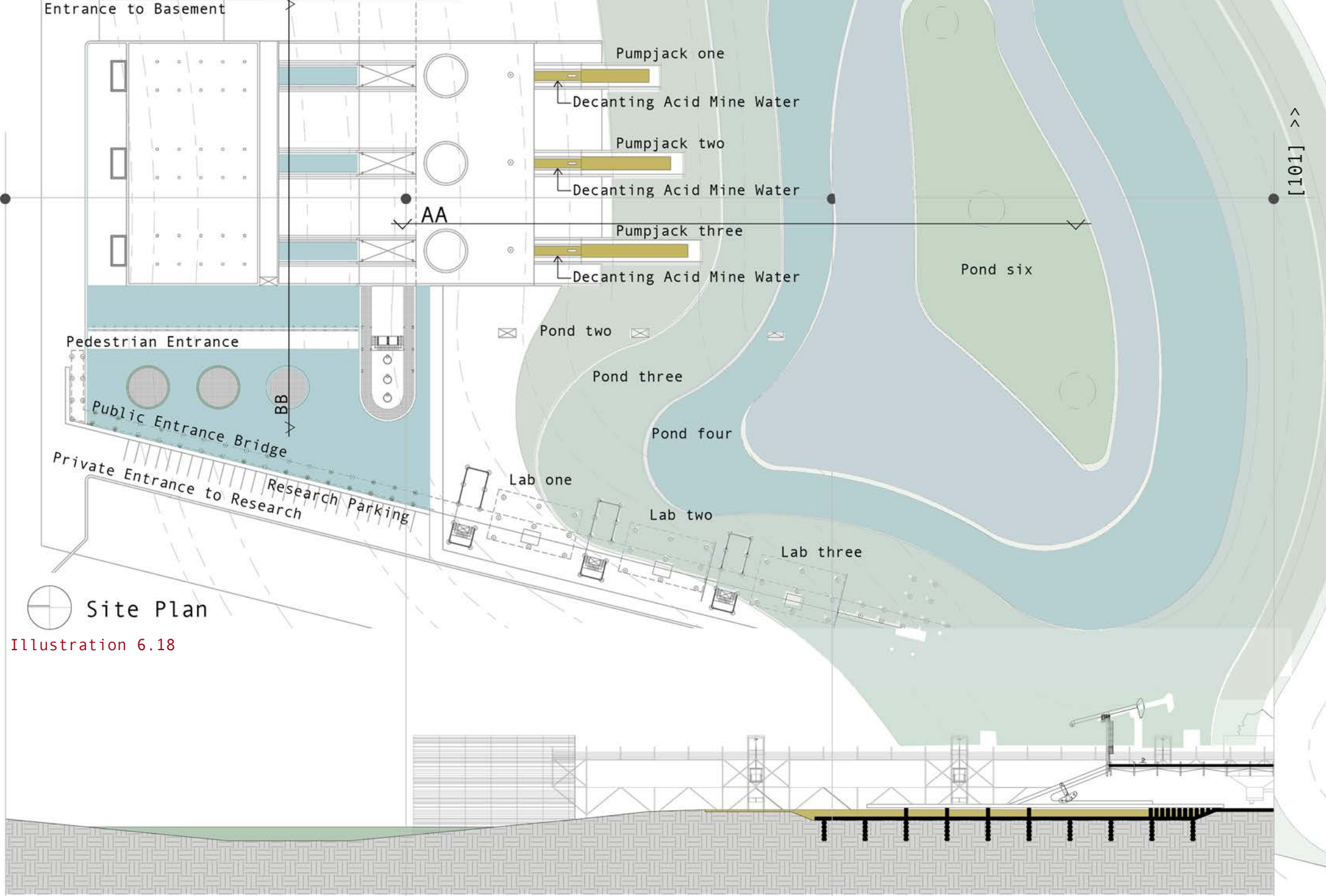


Illustration 6.18

Illustration 6.19 Section AA

[6.4] Claim 19 [George Harrison Memorial] - Water desalination plant]

[6.4.1] Choice of site

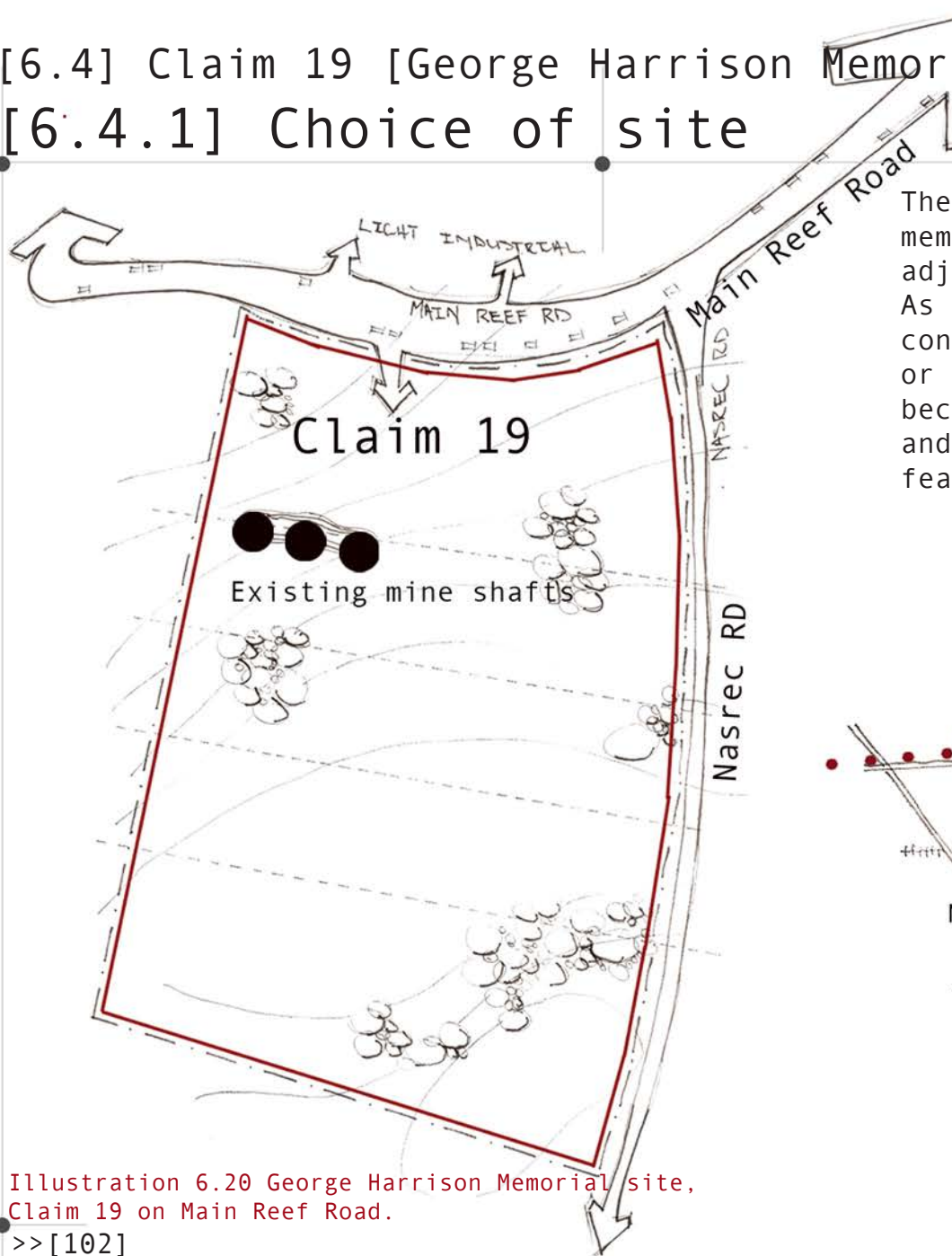


Illustration 6.20 George Harrison Memorial site, Claim 19 on Main Reef Road.

>> [102]

The existing George Harrison memorial site is an urban void. As of yet it has not been considered for commercial or residential development because of its unstable and challenging geological features.

Two key features:

- Its existing mine shafts allows access to acid mine water.
- Its heritage celebrates the memory of this historically significant mining landscape.

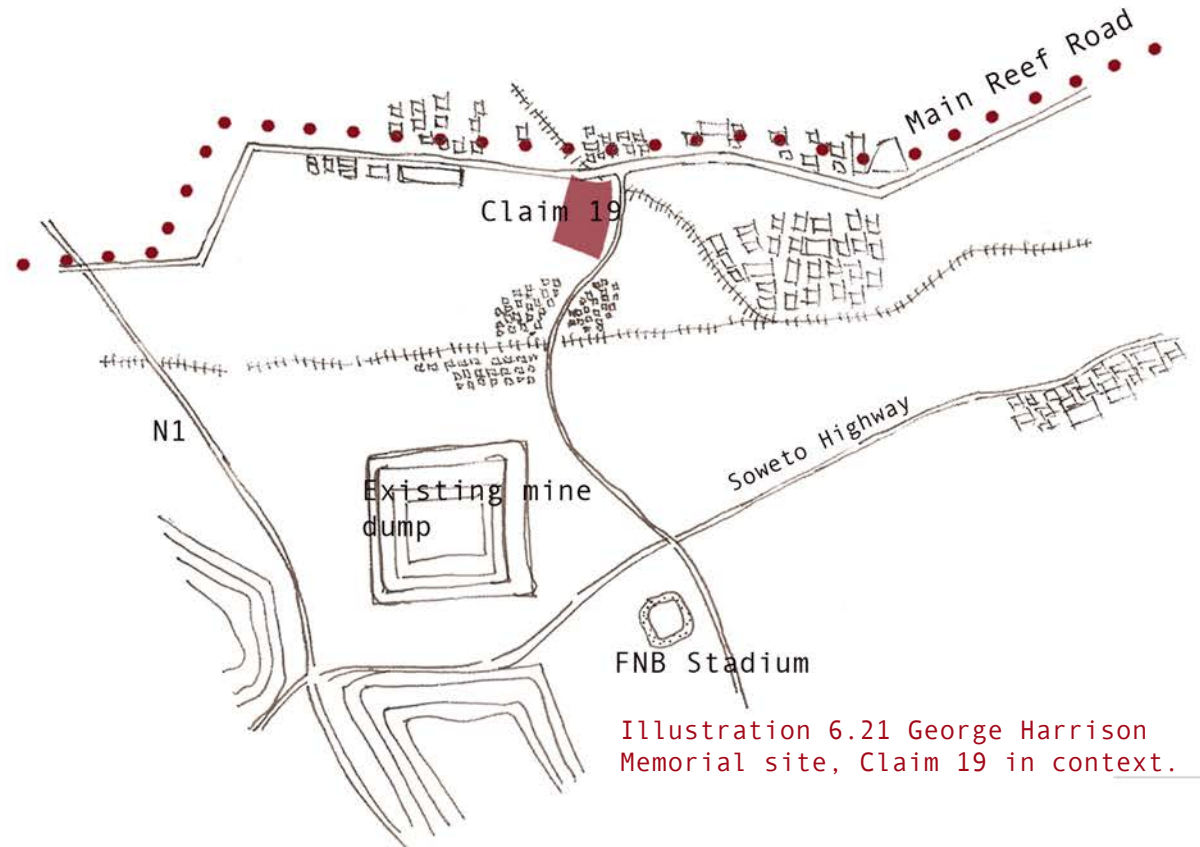


Illustration 6.21 George Harrison Memorial site, Claim 19 in context.

[6.4] Claim 19 [George Harrison Memorial]- Water desalination plant.

[6.4.2] Form giving elements

The form giving elements are the six main elements which the design has explored in generating into a building.

[1] The Edge

Main Reef Road defines three different edges:

- An Urban- Industrial edge
- a Geographical edge and
- the Northern edge of the Main Gold Reef.

Design Application:

The design is set on a transitional site, at the edge of the city and industrial activities and the beginning of an residential area. The building aims to respond to both these elements, by stabilizing the edge of the site and giving way to passive water purification ponds and a natural park.

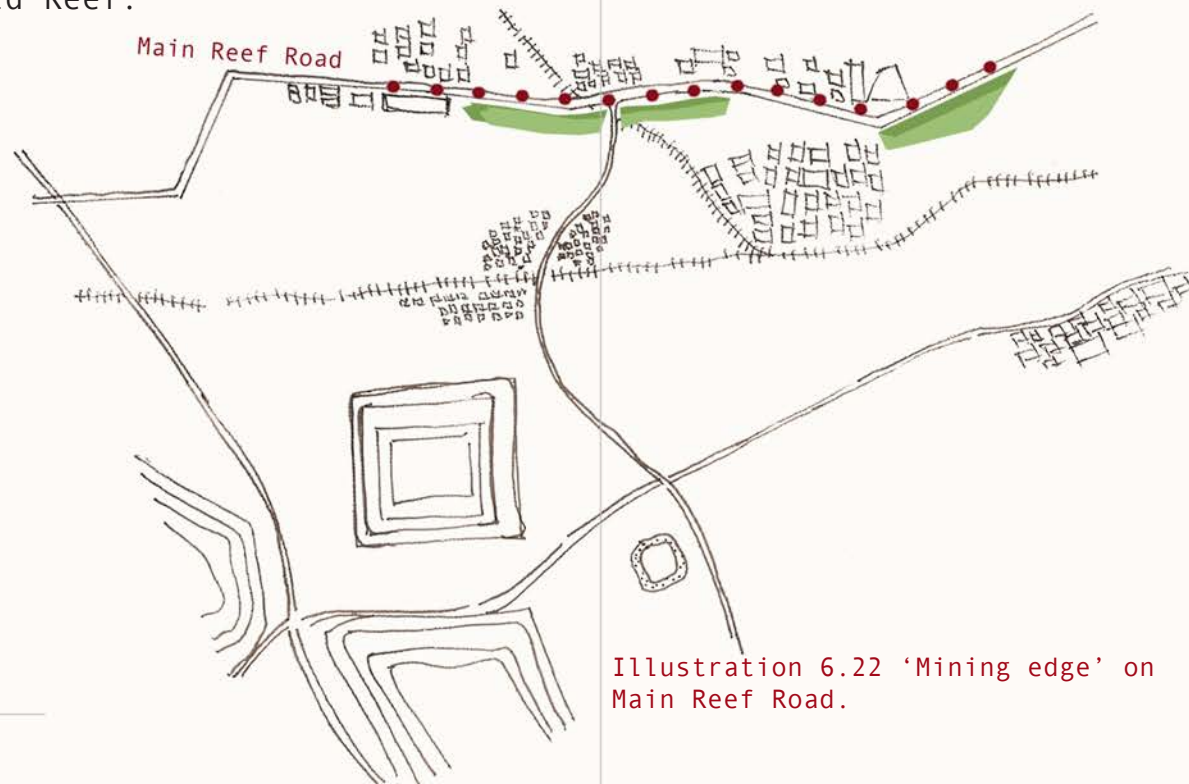


Illustration 6.22 'Mining edge' on Main Reef Road.

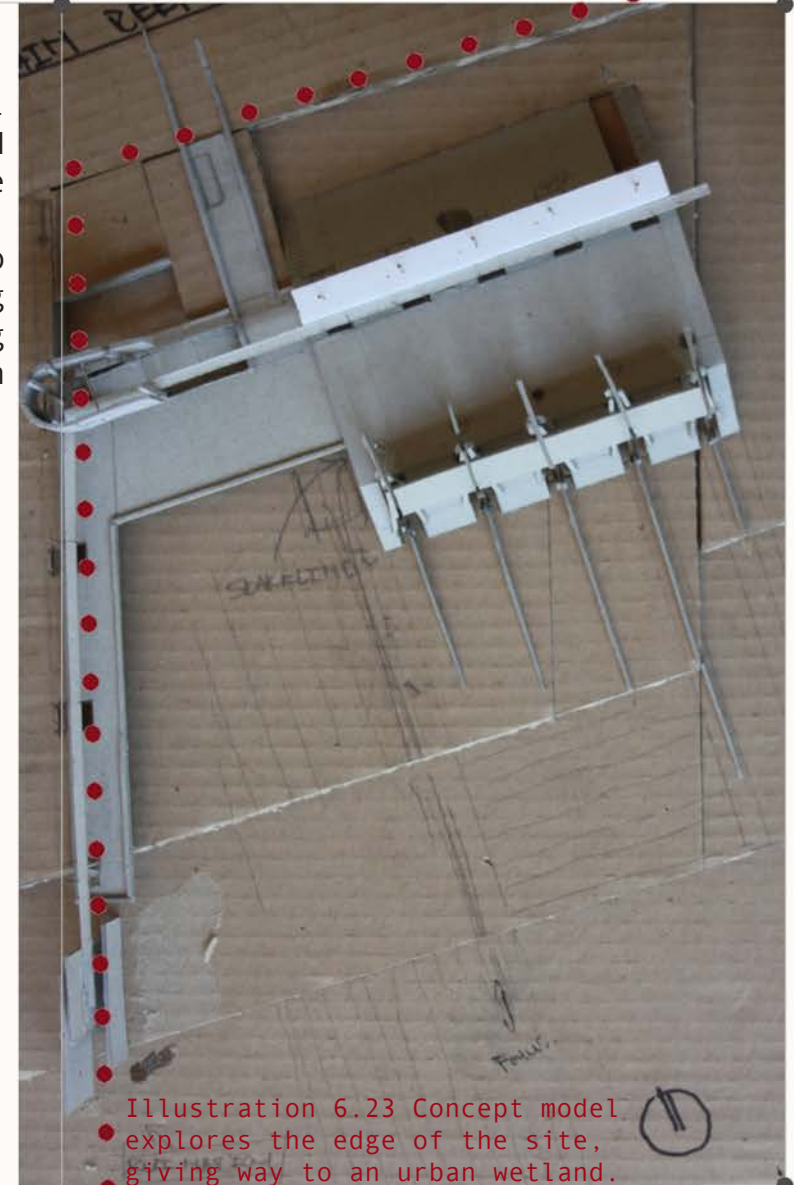


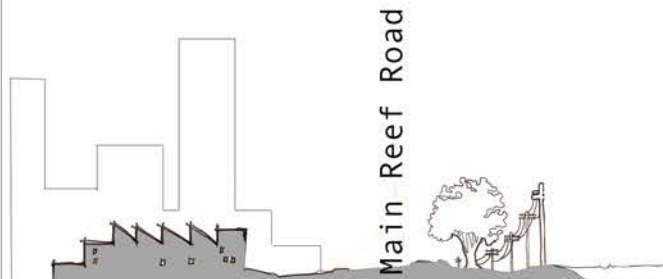
Illustration 6.23 Concept model explores the edge of the site, giving way to an urban wetland.

[6.4] Claim 19 [George Harrison Memorial]- Water desalination plant.

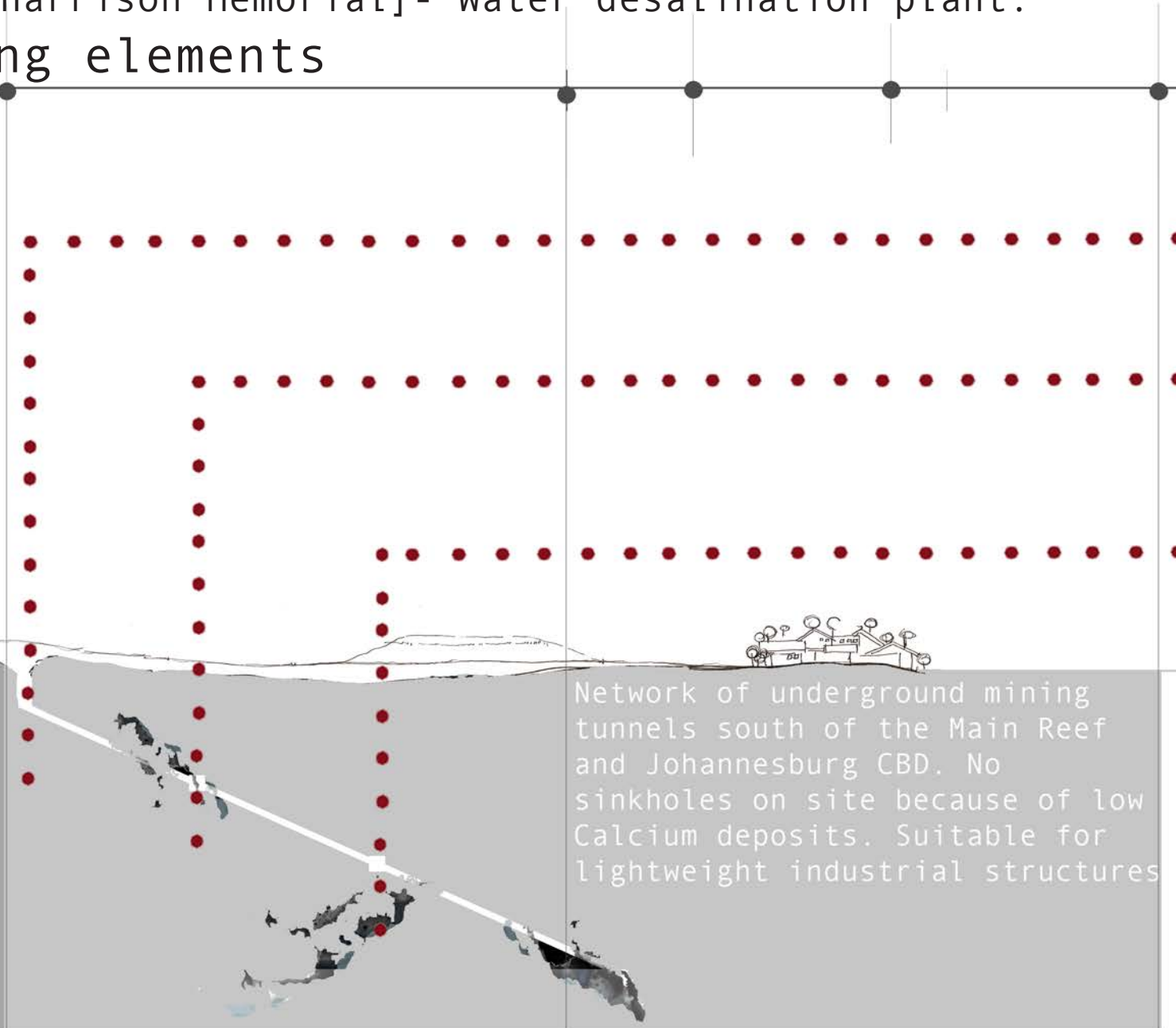
[6.4.2] Form giving elements

[2] Existing Grid

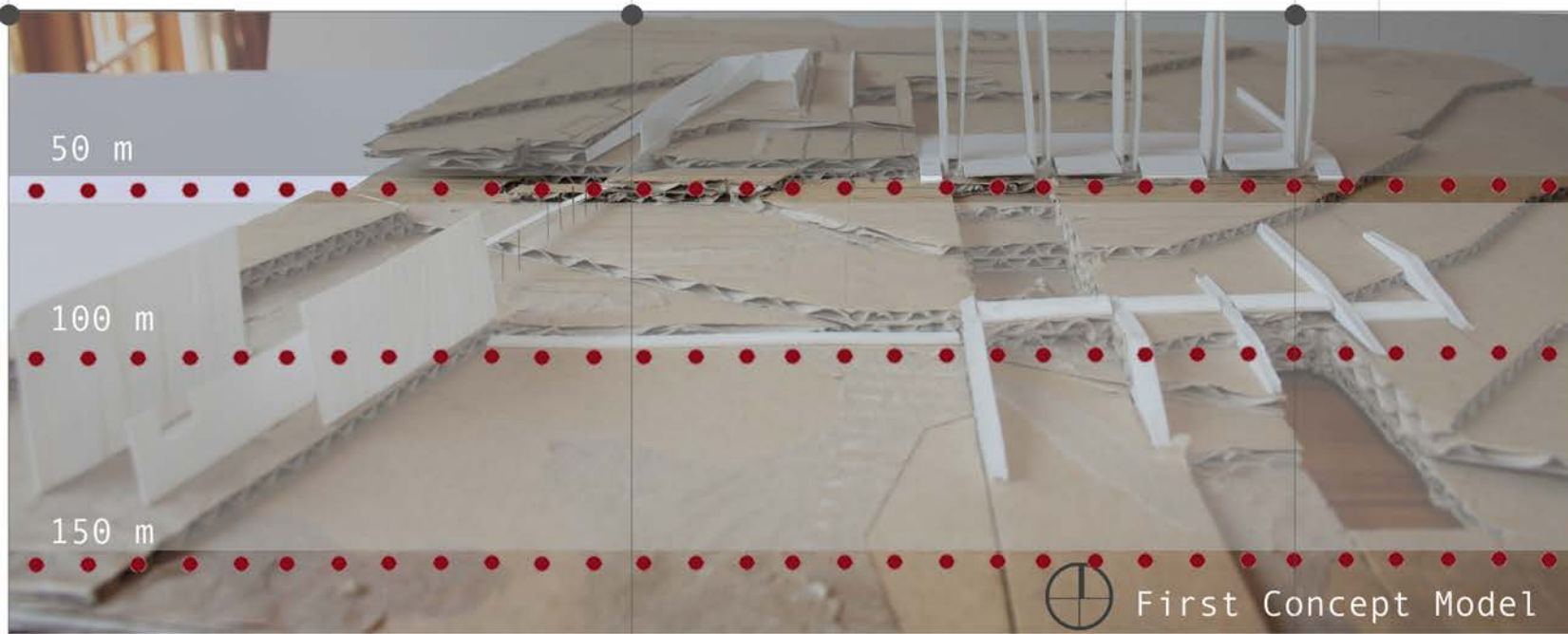
The concept model is an investigation into the existing mining grid found on the George Harrison site. The site consists of seismic columns north of the gold reef and a network of mining tunnels south of Main Reef Road.



Application: The concept model illustrates the transition from heavy stereotomic structures to lighter tectonic structures from the north to the south.



Network of underground mining tunnels south of the Main Reef and Johannesburg CBD. No sinkholes on site because of low Calcium deposits. Suitable for lightweight industrial structures

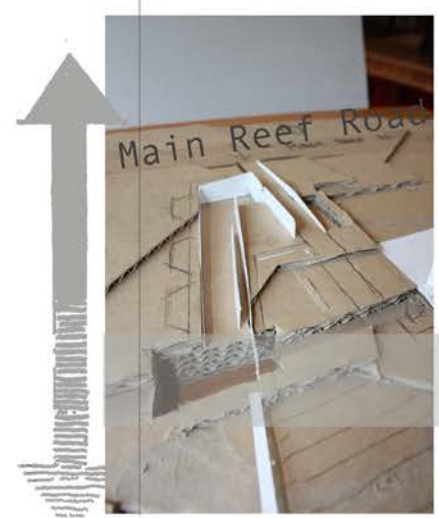
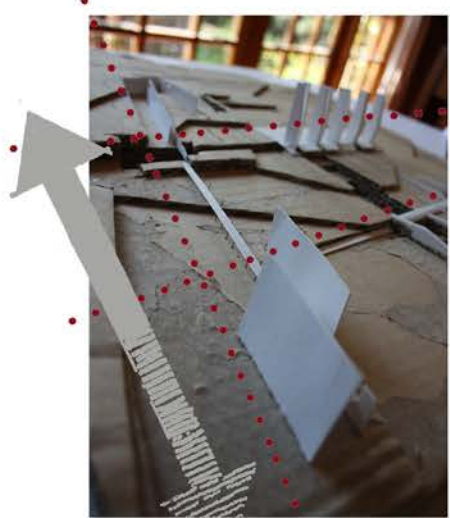
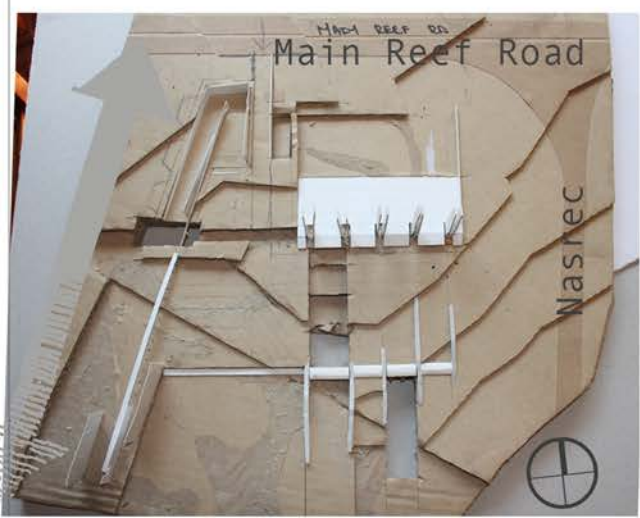


Seismic underground columns

Network of underground mining tunnels:

Leight weight structures.

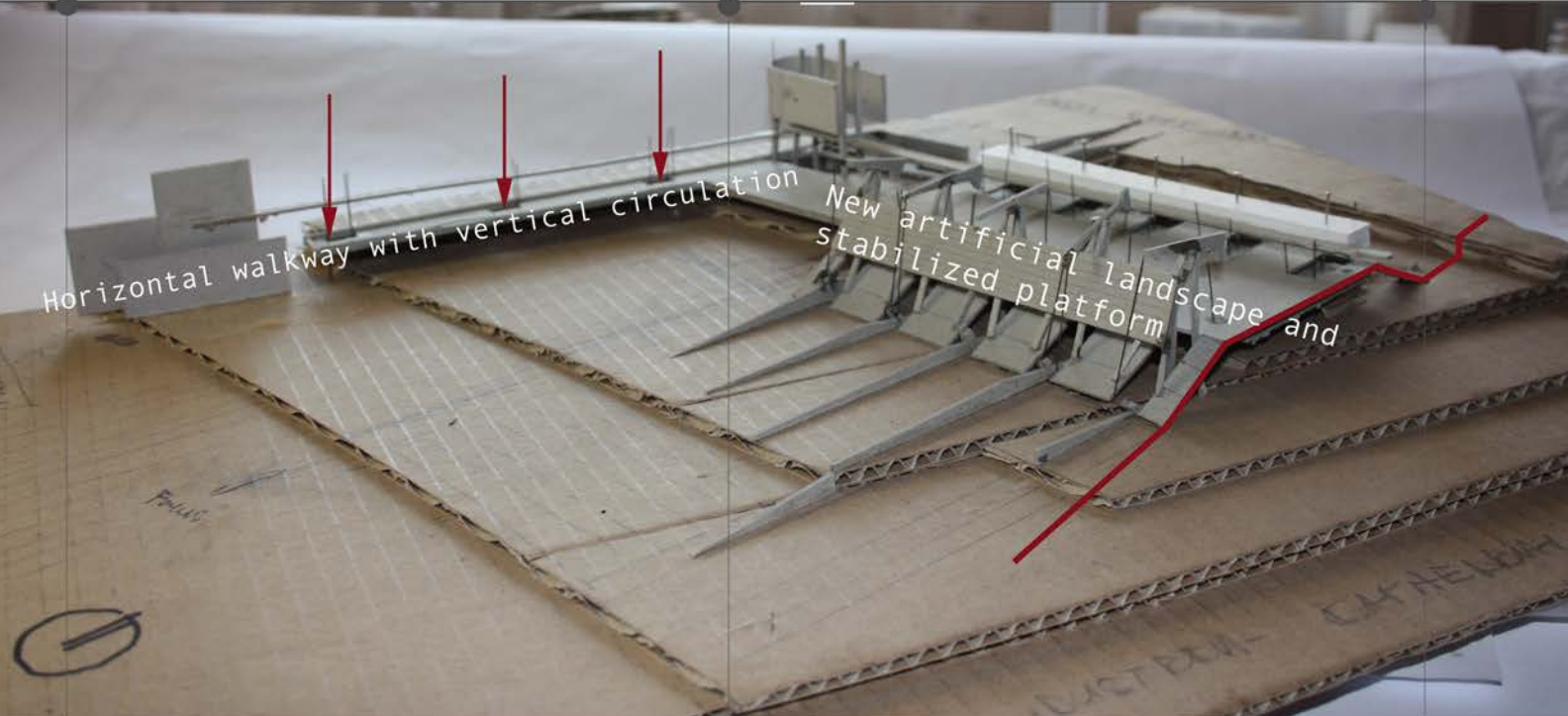
⊕ First Concept Model



Claim 19

[6.4] Claim 19 [George Harrison Memorial]- Water desalination plant.

[6.4.2] Form giving elements



[3] Land Forming

The association with land forming comes forward in Johannesburg's landscape. The gold mining have recreated Johannesburg's immediate landscape. The displaced landscape formed by the mines are evident as hills from outside of Johannesburg.

Application:

The intervention represents a hill and occupies the edge of the site giving way to an urban wetland and park which can be enjoyed by the public.

Illustration 6.24 Concept model explores land forming.

Illustration 6.25 The following images illustrates the effects of Land Forming along Main Reef Road.



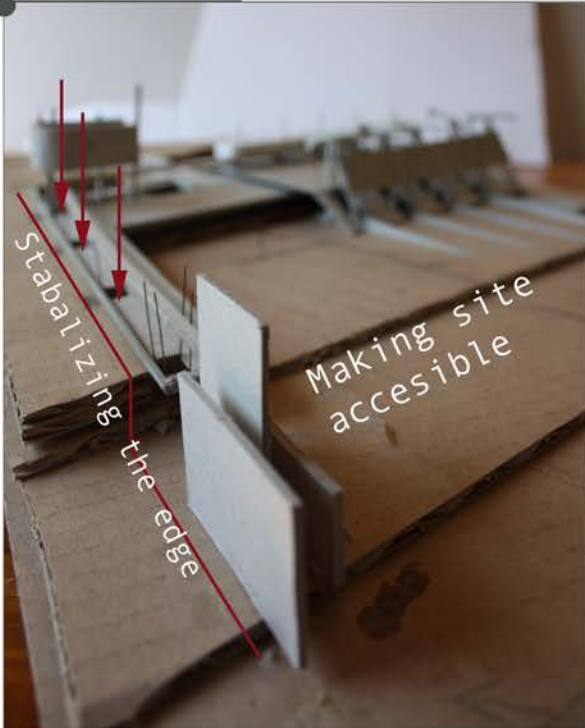


Illustration 6.26 Concept model explores land forming.



Illustration 6.27 Concept model explores land forming.



[6.4] Claim 19 [George Harrison Memorial] - Water desalination plant.

[6.4.2] Form giving elements

[4] Circulation

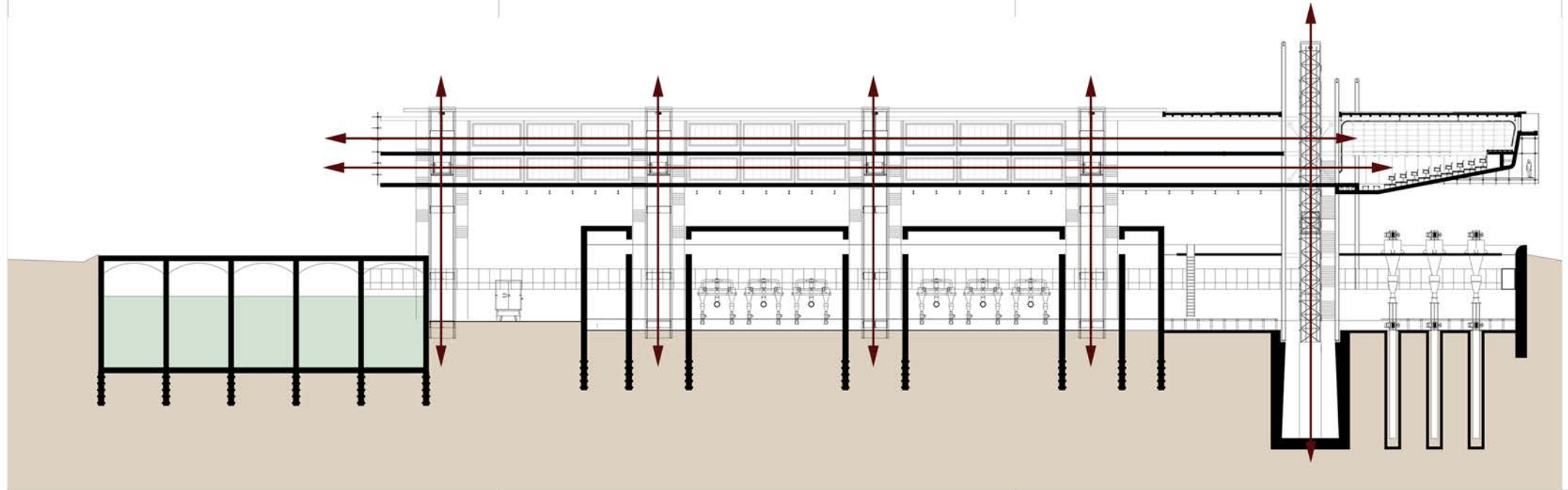


Illustration 6.28 Section BB - illustrates the vertical and horizontal circulation.



Illustration 6.29; 6.30, 6.31 Mine Shafts. [Flickr,n.d: Online]



Illustration 6.32 Reverse osmosis tank.[Flickr,n.d:online]



Illustration 6.33 Mining headgear. [Flickr,n.d:online]

[5] Tectonic Structures



Illustration 6.34 Rendering of the water desalination plant illustrating the tectonic structure.

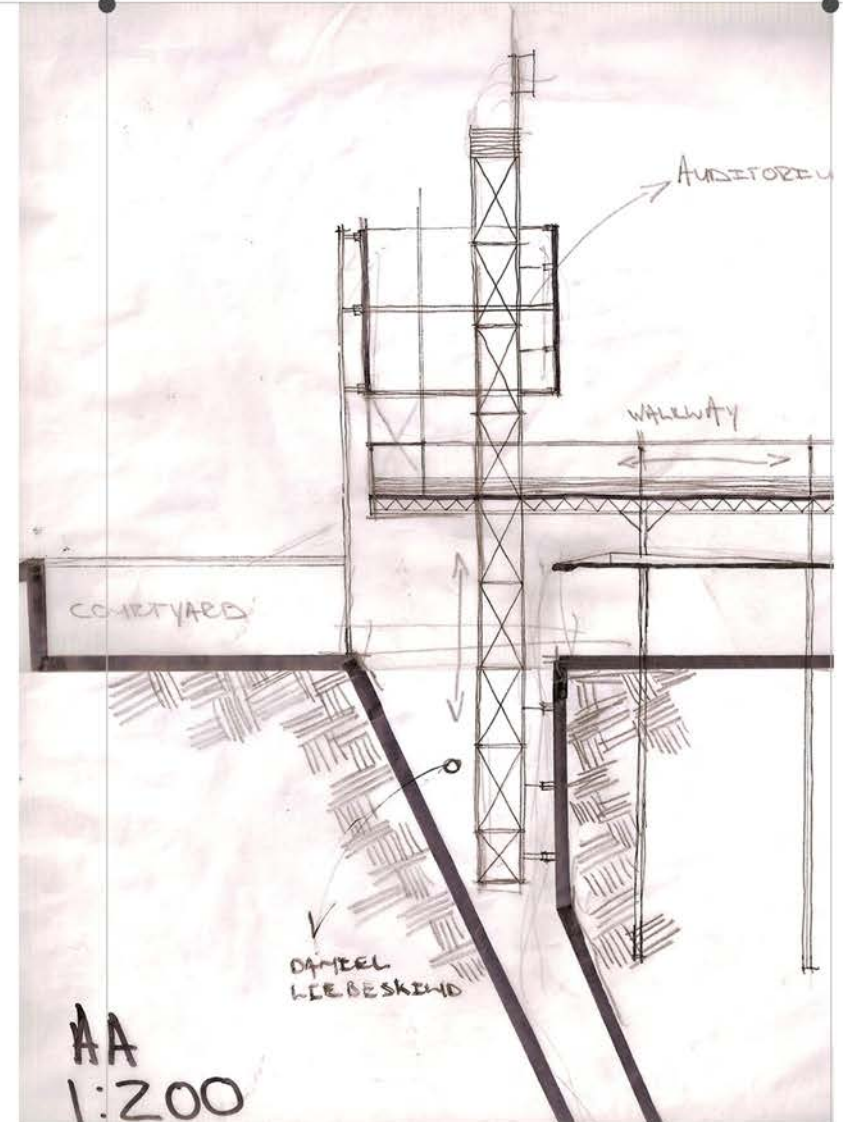
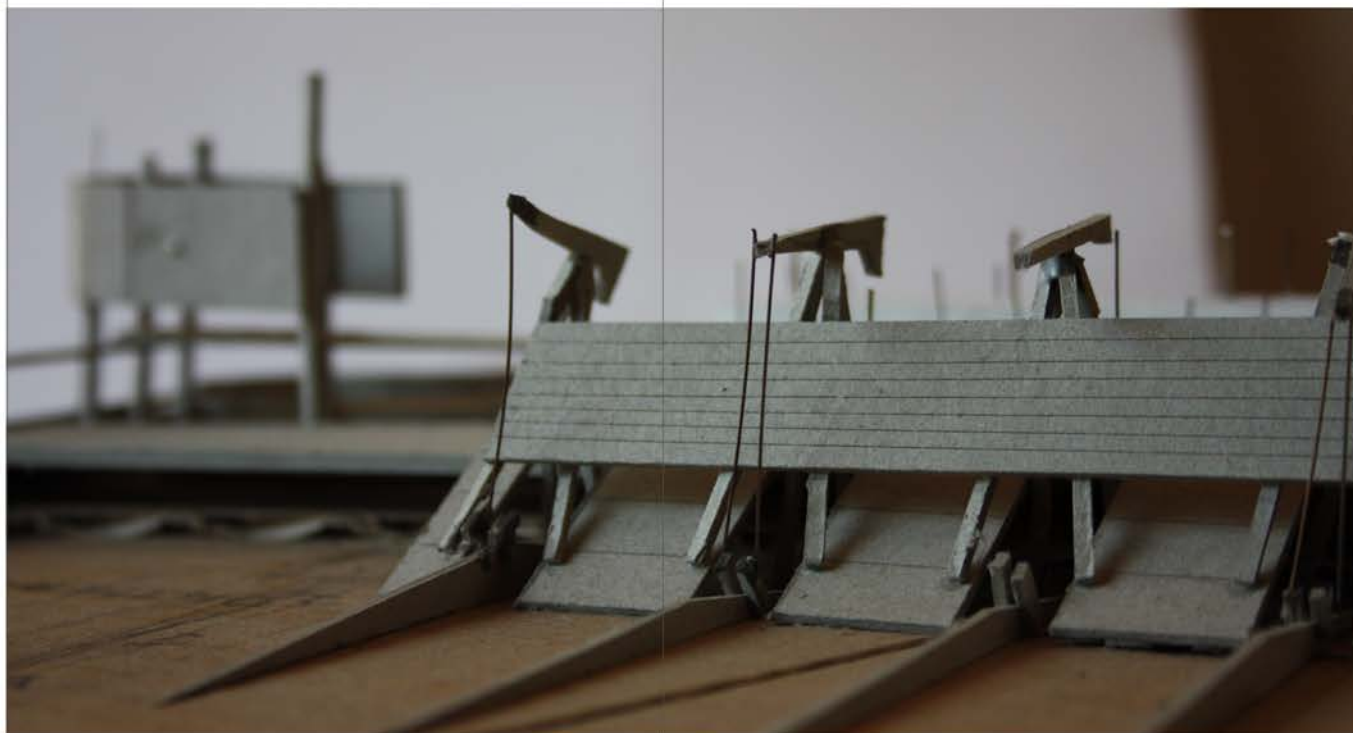


Illustration 6.35 Concept sketch of the auditorium and existing mine shaft.

[6.4] Claim 19 [George Harrison Memorial]- Water desalination plant.
[6.4.2] Form giving elements





[5] Tectonic Structures

Prominent tectonic structures are found on the edge of the mines. These mast structures are purely functional. Their physical appearance is very robust and their inherent nature is that of a structure which penetrates the earth with elements that move in and out of the mine along the vertical shafts.

Illustration 6.36 Concept models exploring tectonic structures.

[6.4] Claim 19 [George Harrison Memorial] - Water desalination plant.

[6.4.2] Form giving elements

[5] Tectonic Structures

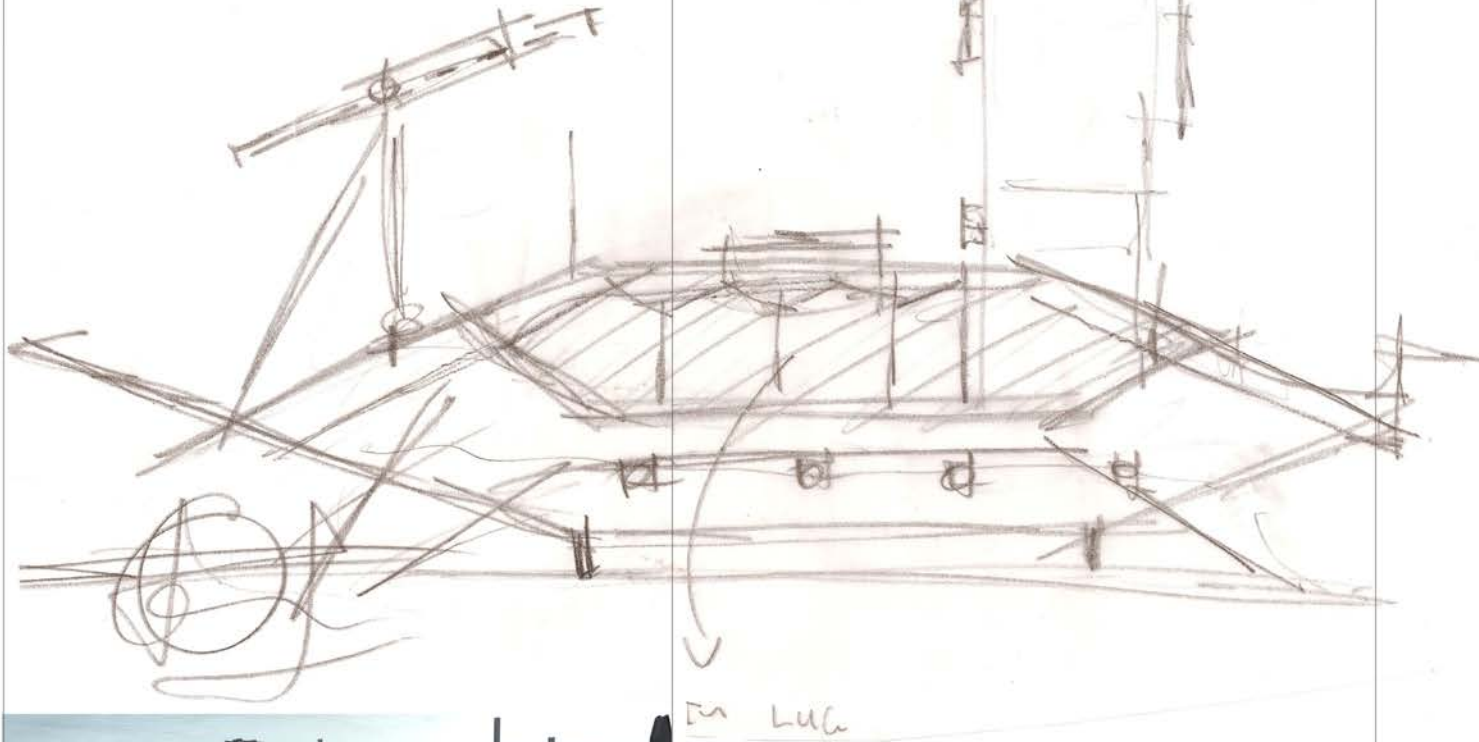


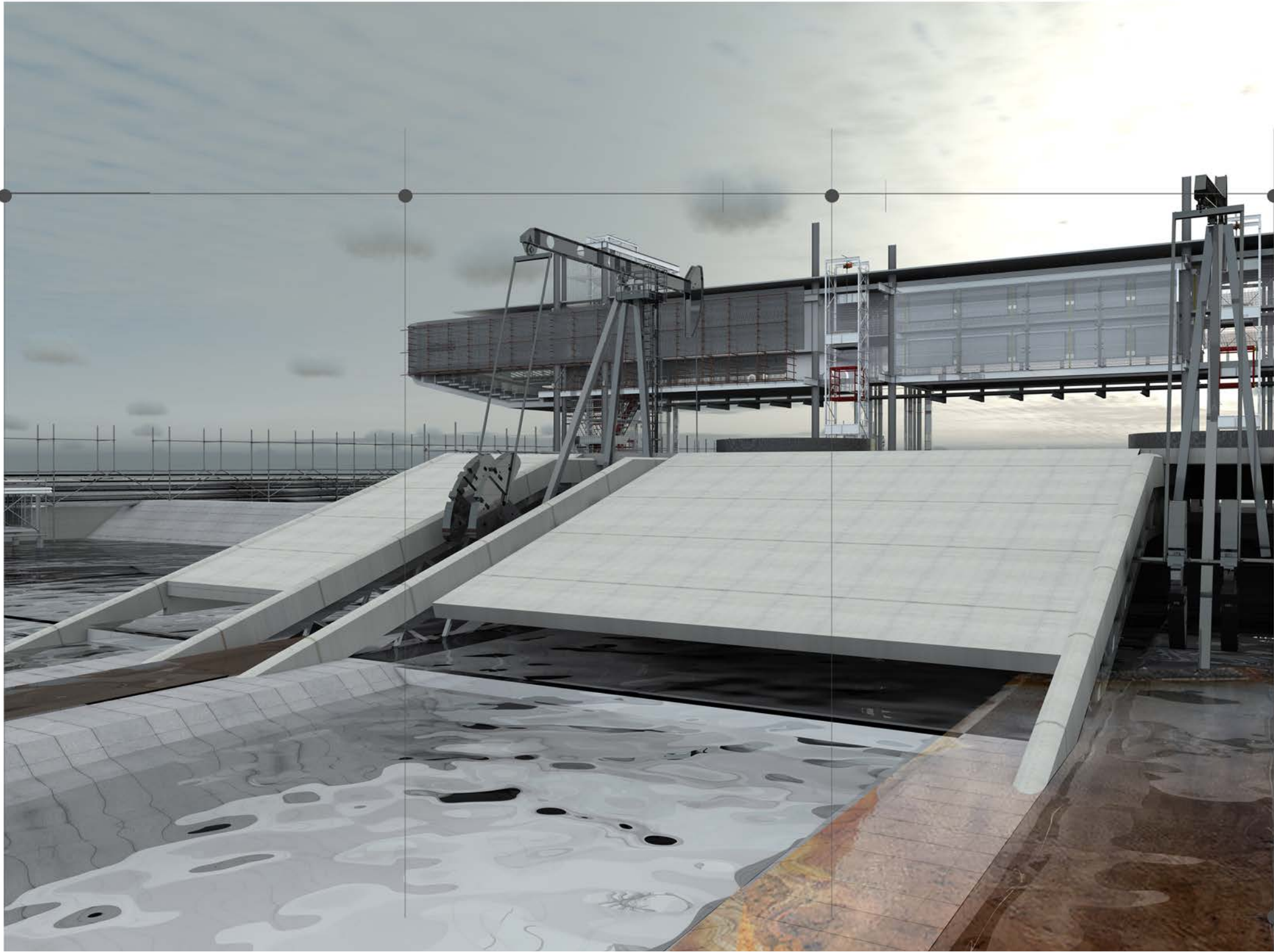
Illustration 6.37 Early concept sketch of the machine.

Illustration 6.38 Pump jacks

Illustration 6.39 Rendering of pump jacks.

Illustration 6.40 Rendering of pump jacks and decanting acid mine water.





[6.4] Claim 19 [George Harrison Memorial] - Water desalination plant.

[6.4.3] Materials



Illustration 6.41 An illustration of a copper plate that has reacted to acid mine water. [Flickr,n.d:Online]

Illustration 6.42 The texture of clay ponds . [Flickr,n.d:Online]

Illustration 6.43 An aerial view of the different colours of water in acid mine drainage ponds.[Stock photo,n.d: online]

Illustration 6.44 A rendering access to the wetlands. Materials: Reused Cor-ten steel panels from Top Star; Water is also used as a material in the project.

Illustration 6.45 Off-shutter smooth concrete. [Flickr, n.d:Online]



Illustration 6.46 Translucent textile membrane: the grey coloured fabric composed of glass fibre with silicone spread across two sides, is a transition and filter between the large 5 meter high foyer with its steel structure and the outside.

[6.4] Claim 19 [George Harrison Memorial] - Water desalination plant.

[6.4.4] Design Conclusion



..... Auditorium

..... Deep water pumps

..... Main entrance

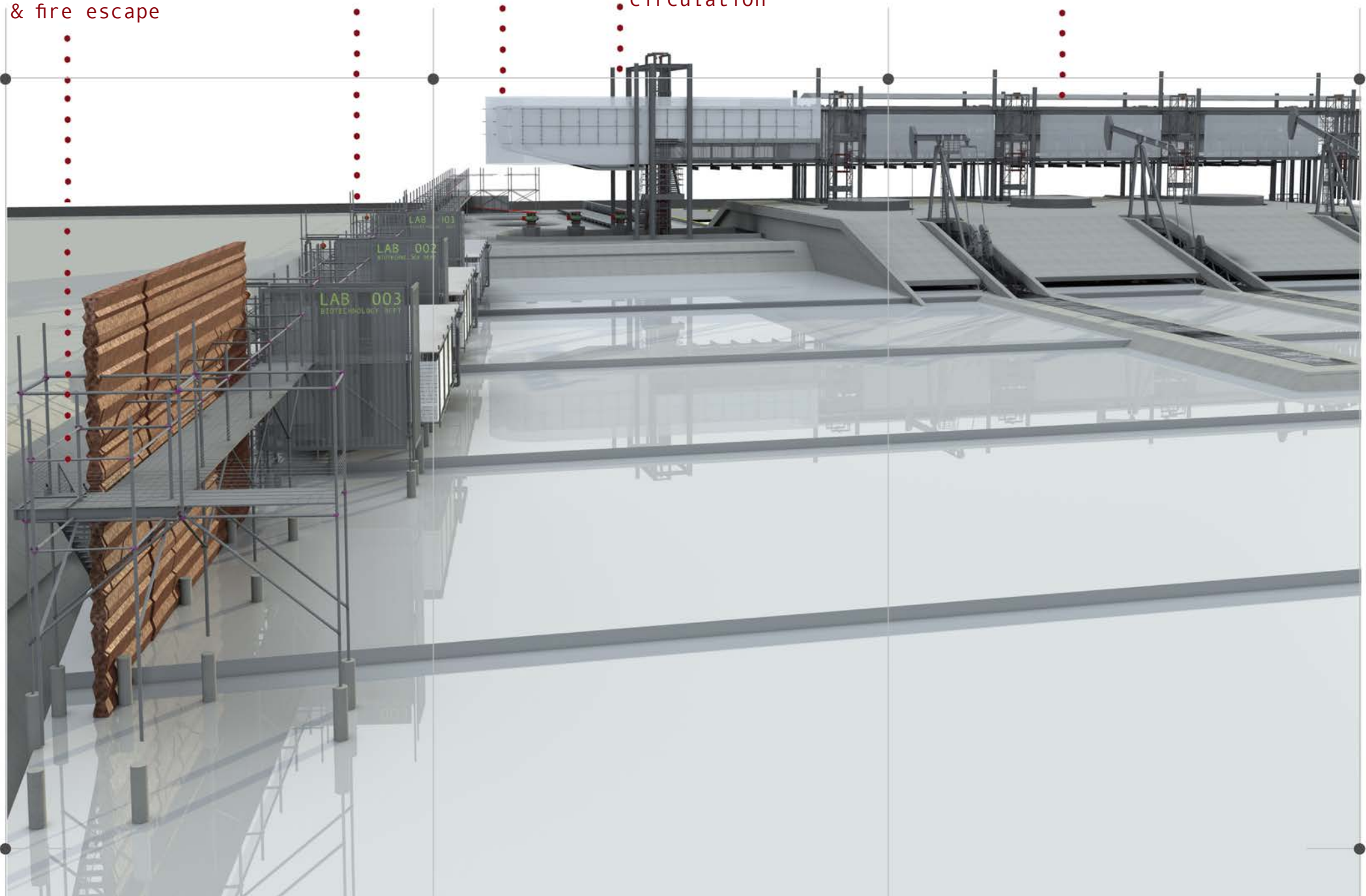
Access to wetlands
& fire escape

Laboratories

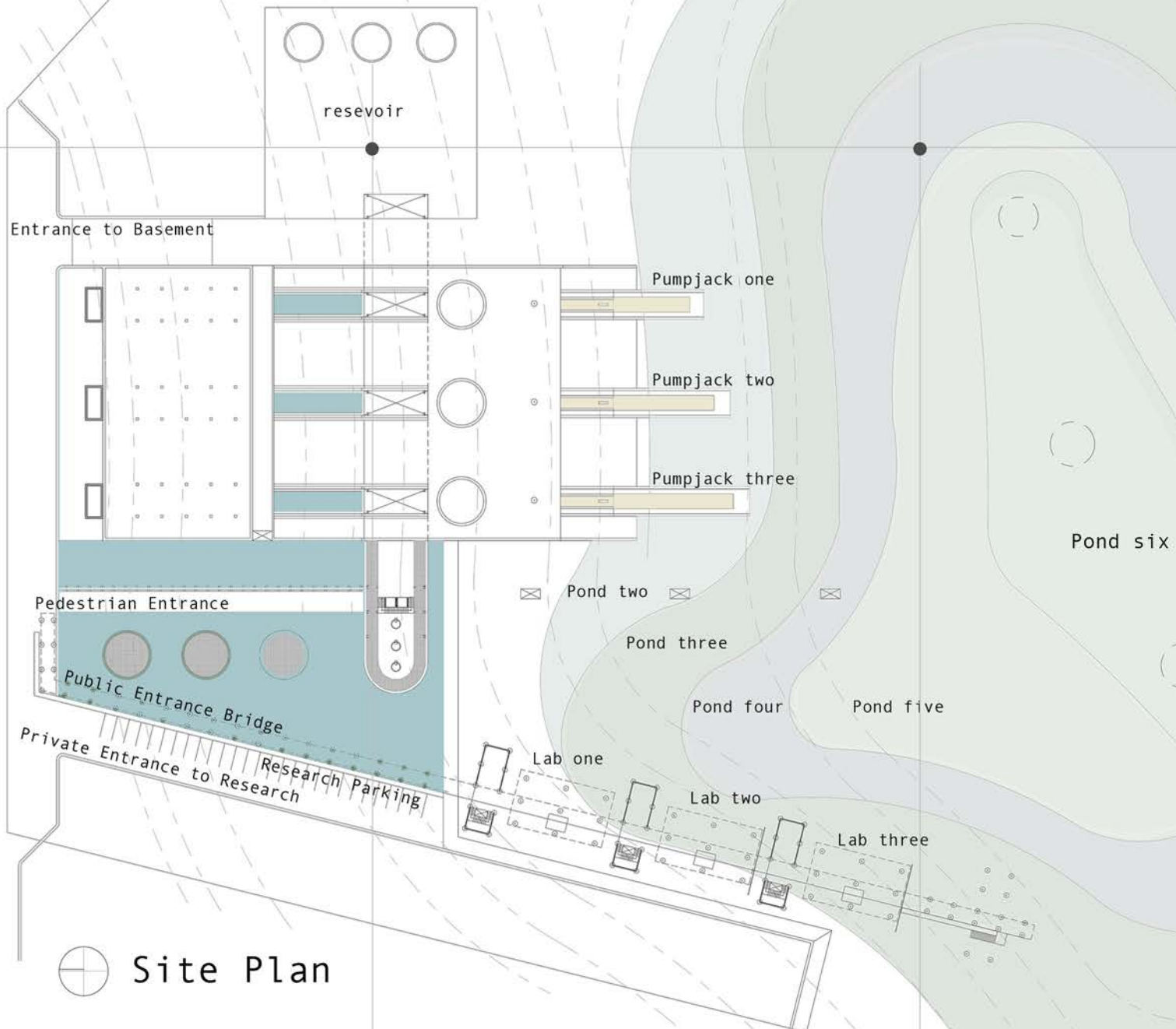
Auditorium

Main entrance &
circulation

WRC Headquarters

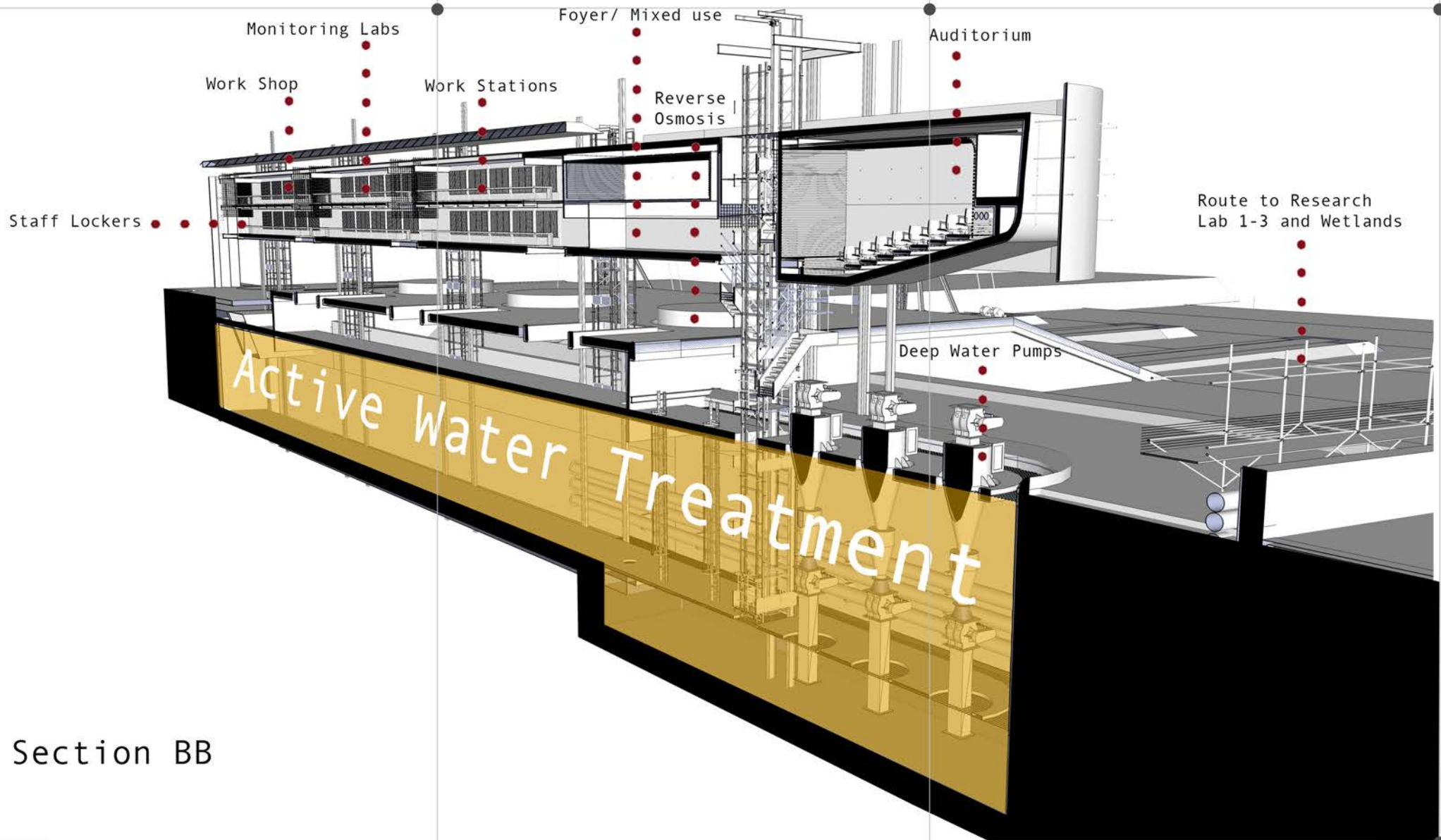


Main Reef Road



Site Plan

[6.4] Claim 19 [George Harrison Memorial] - Water desalination plant.
[6.4.4] Design Conclusion



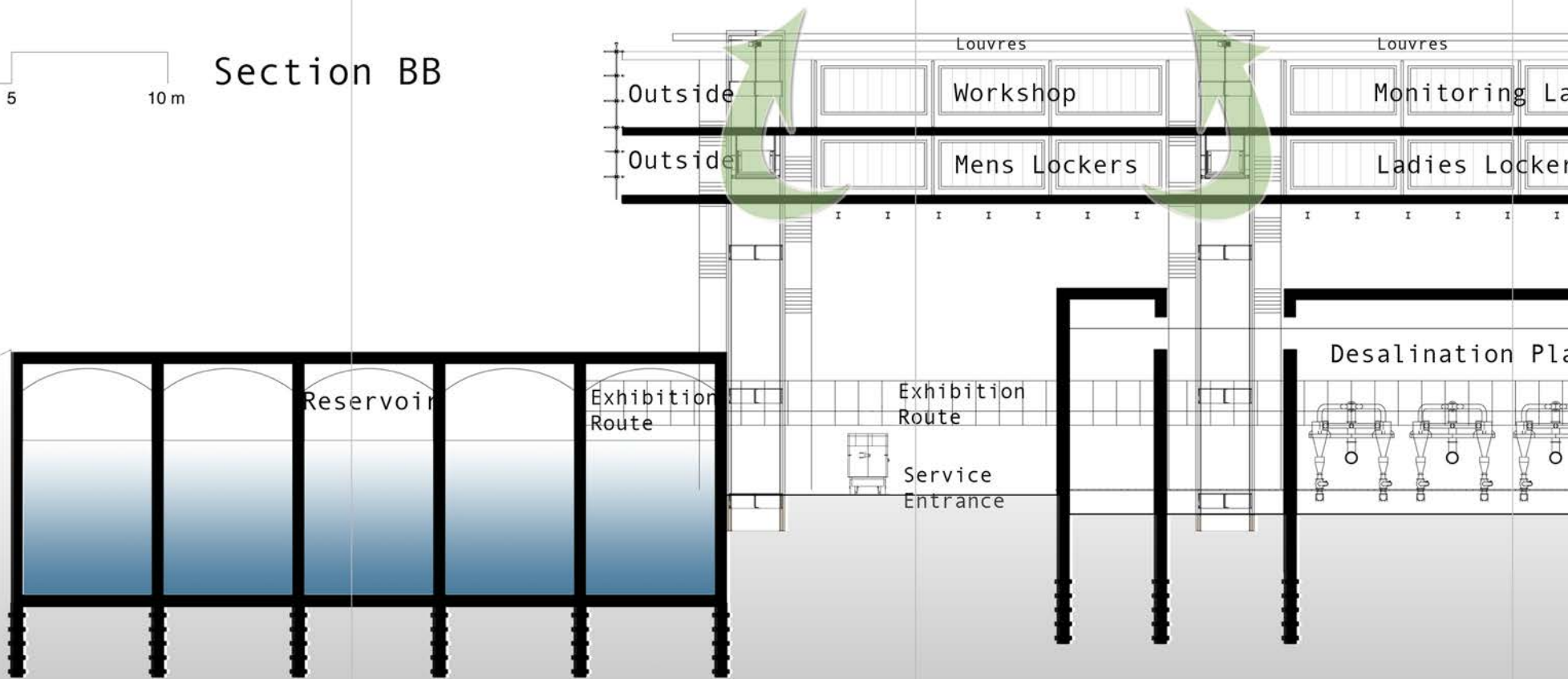
Section BB

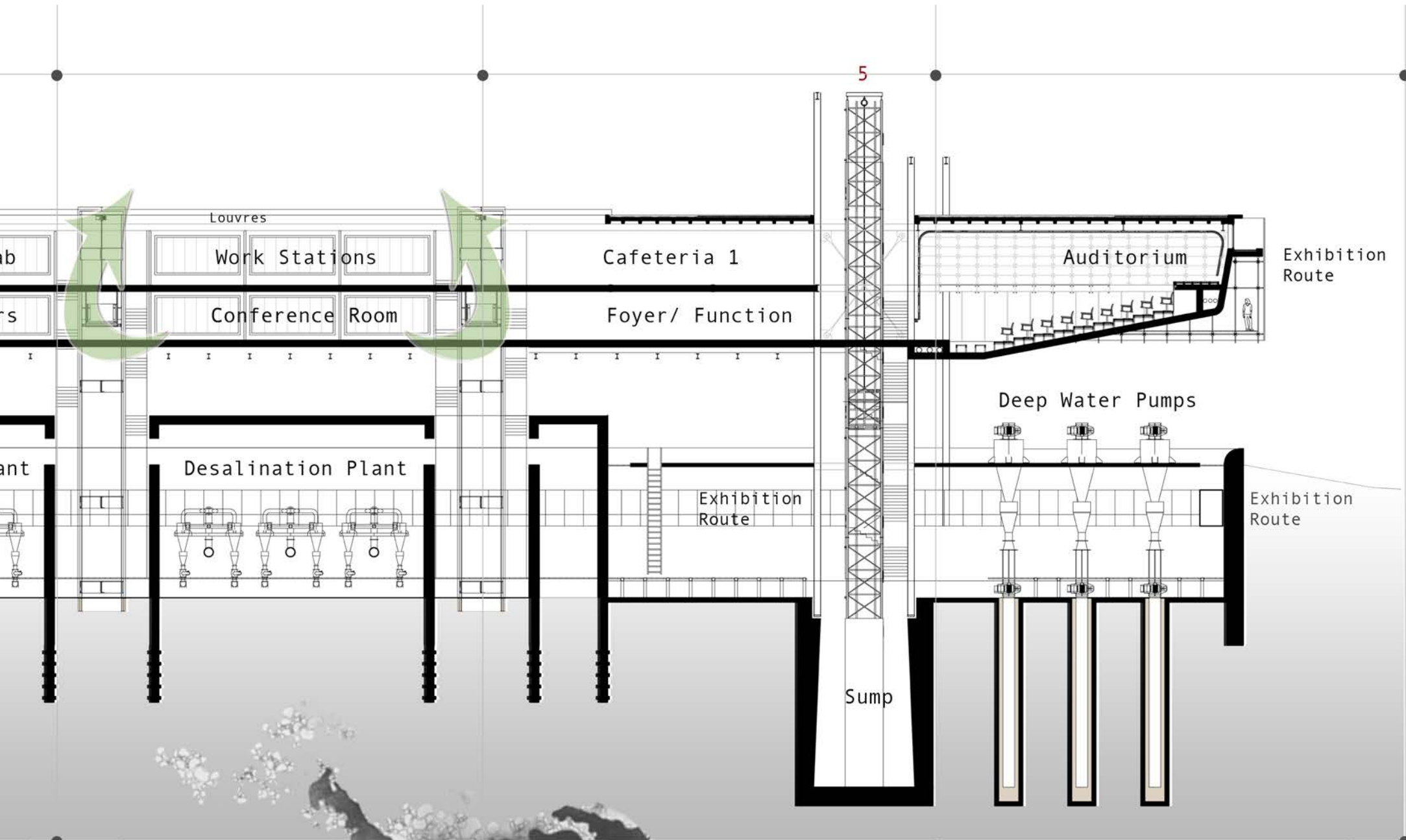
[6.4] Claim 19 [George Harrison Memorial] - Water desalination plant.

[6.4.4] Design Conclusion

0 5 10 m

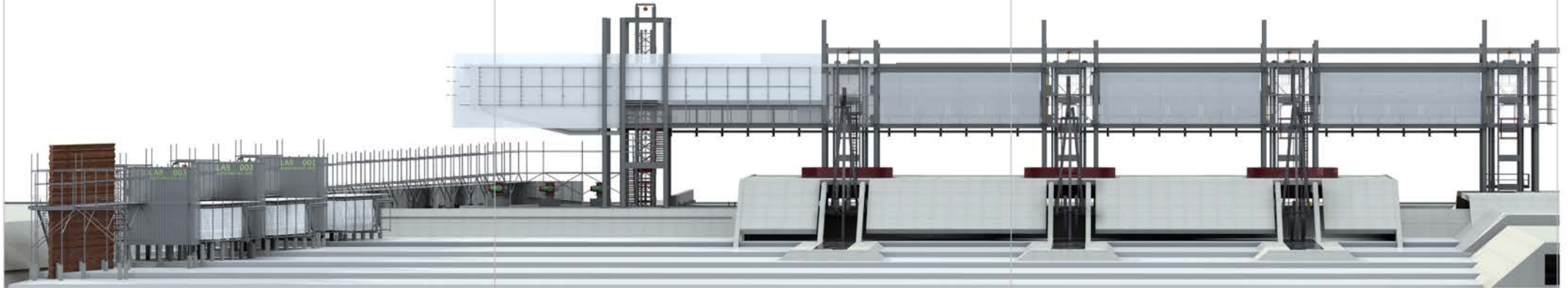
Section BB





[6.4] Claim 19 [George Harrison Memorial] - Water desalination plant.

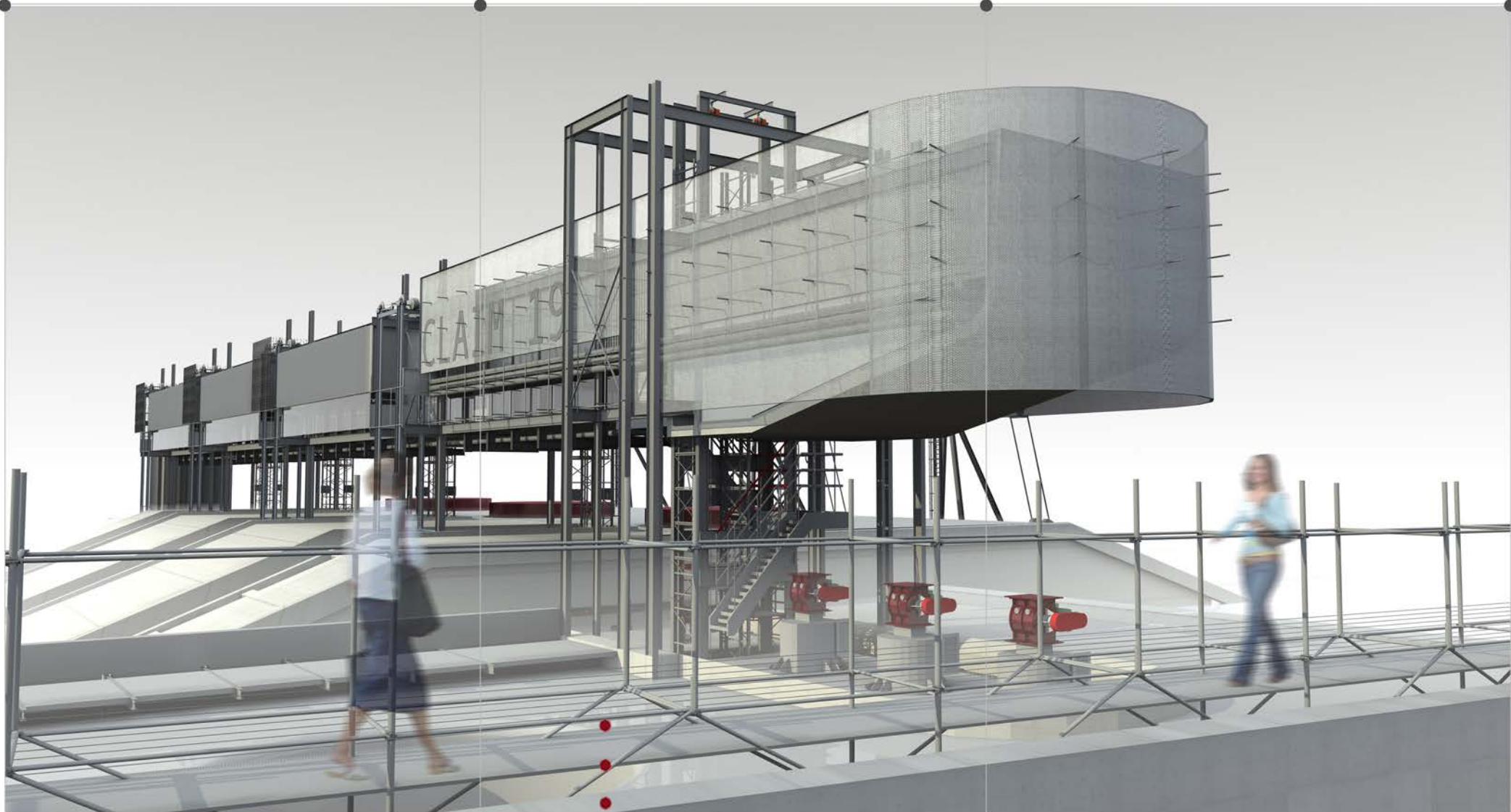
[6.4.4] Design Conclusion



Elevation South



Elevation North



Western perspective.

- Access to wetlands and laboratories



Auditorium

Exhibition

Multifunctional Foyer

Main Circulation Shaft

Exhibition

Unisex Toilets

Service Lift Two

Conference One

Reception/Service counter

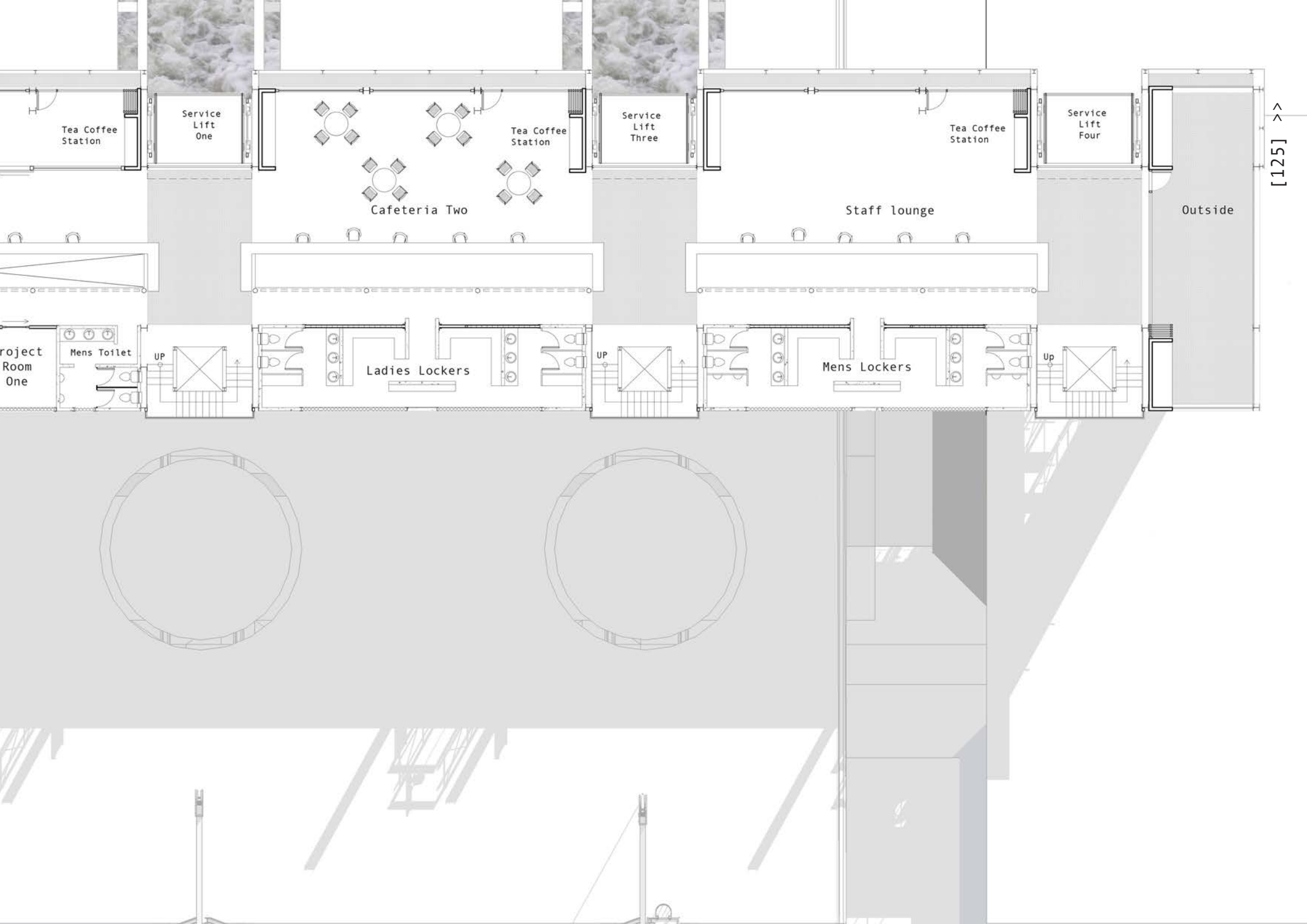
Brandslang

Disabled Toilet

Ladies Toilet

Project Room Two

⊕ First Floor Plan



Tea Coffee Station

Service Lift One



Tea Coffee Station

Service Lift Three



Tea Coffee Station

Service Lift Four

Cafeteria Two

Staff lounge

Outside

Project Room One

Mens Toilet

UP

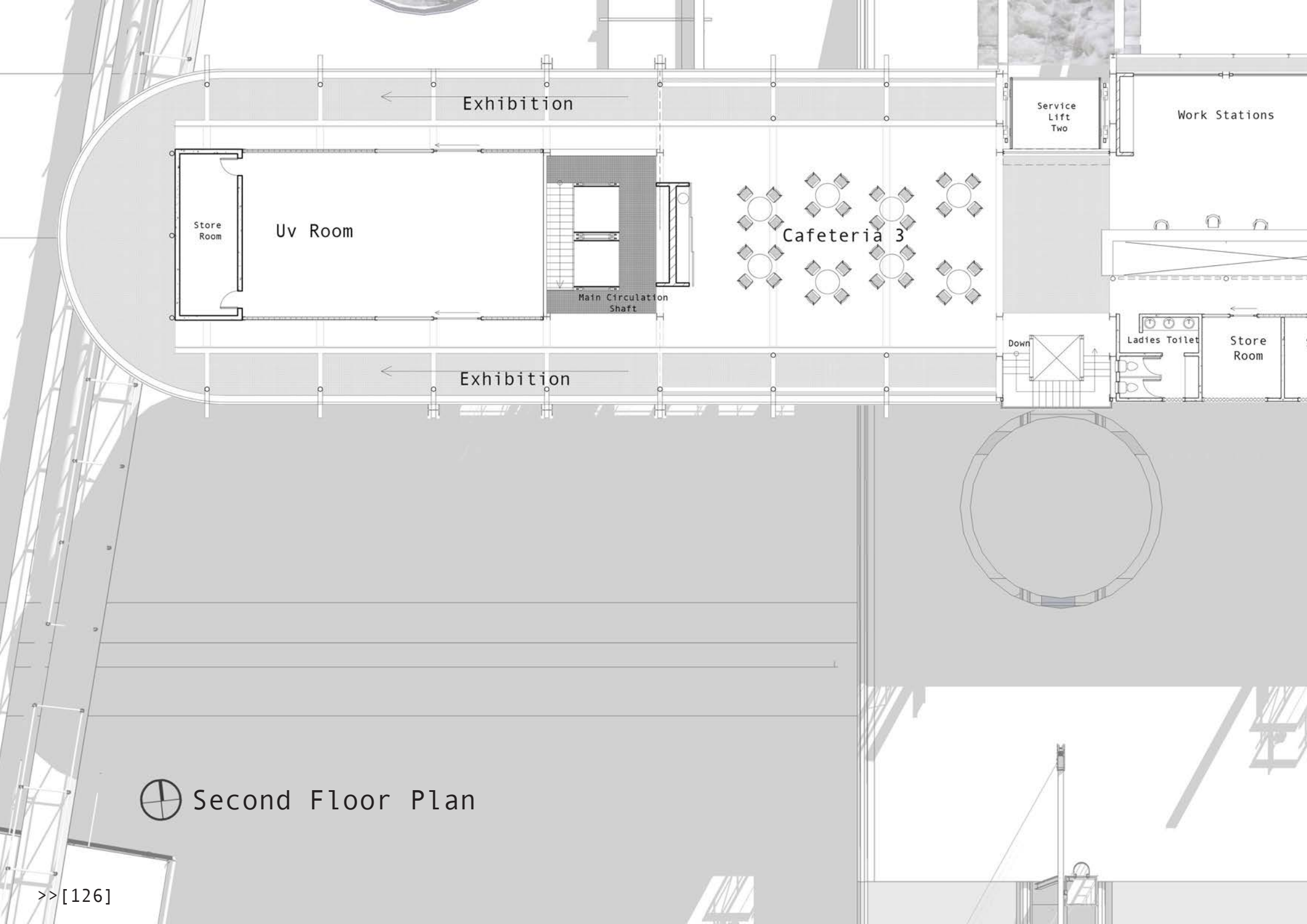
Ladies Lockers

UP

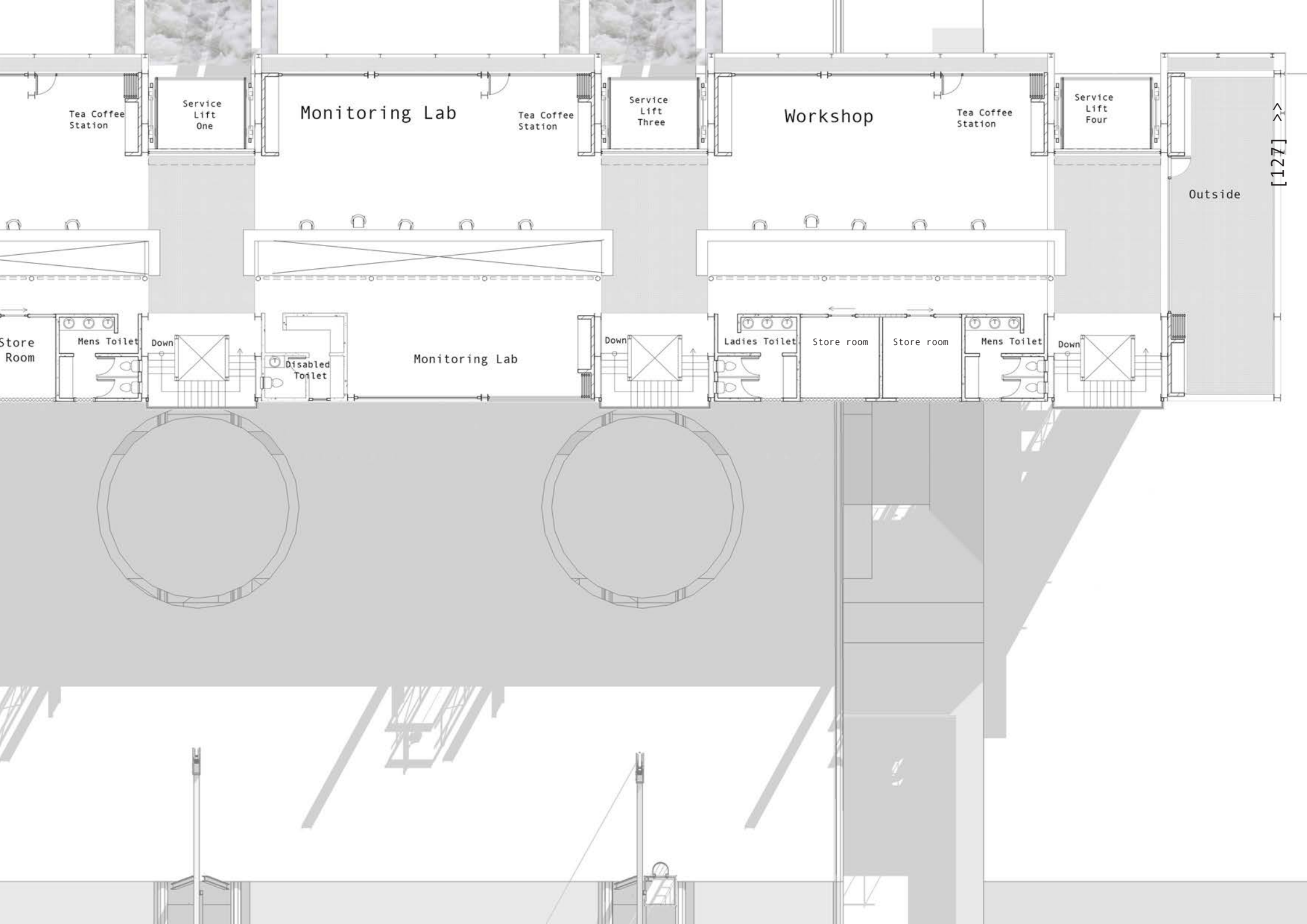
Mens Lockers

Up

[125] >>

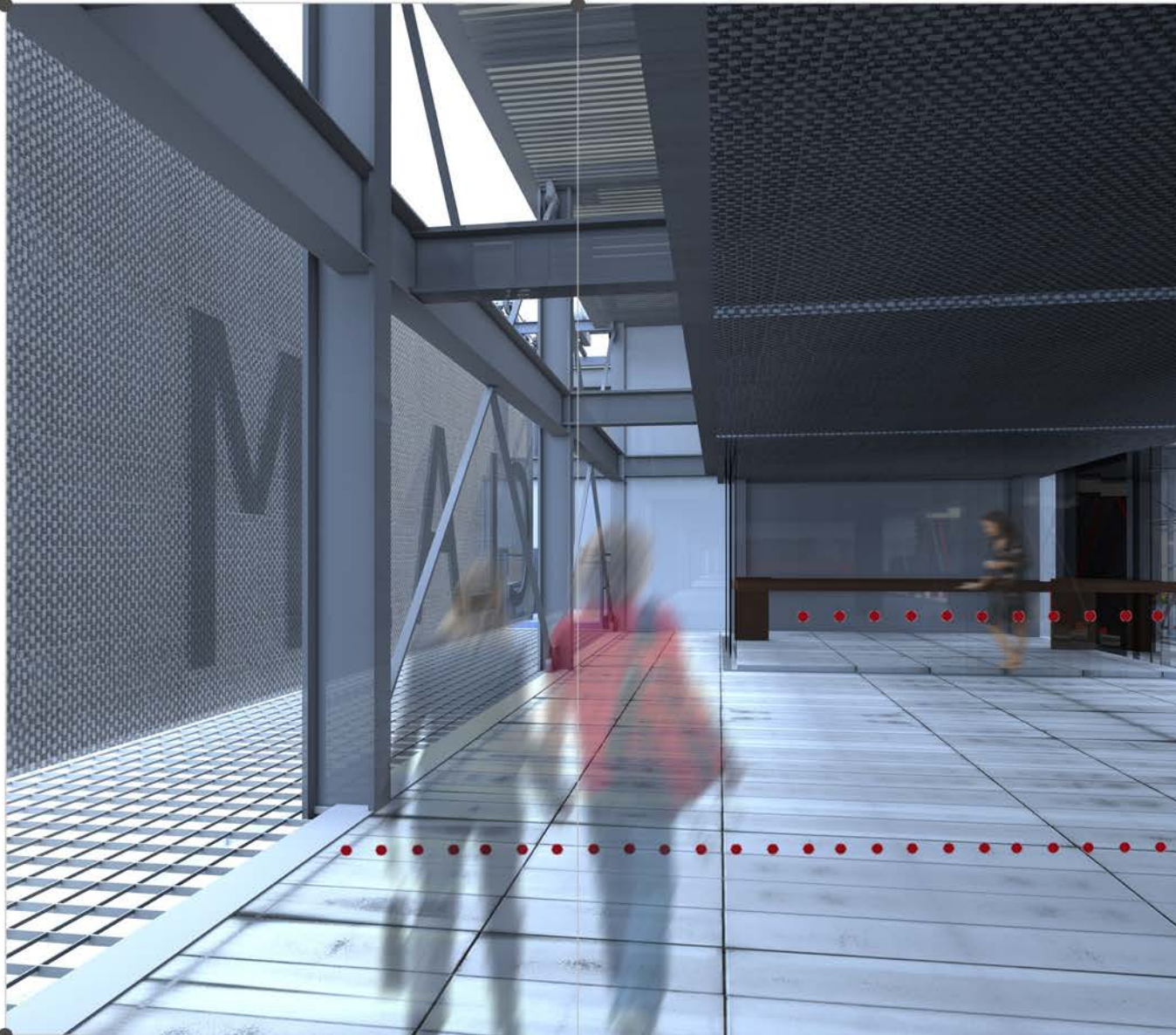


⊕ Second Floor Plan



[6.4] Claim 19 [George Harrison Memorial] - Water desalination plant.
[6.4.4] Design Conclusion





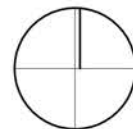
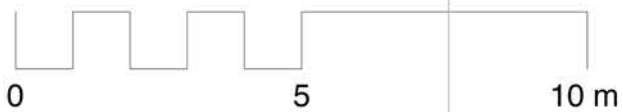
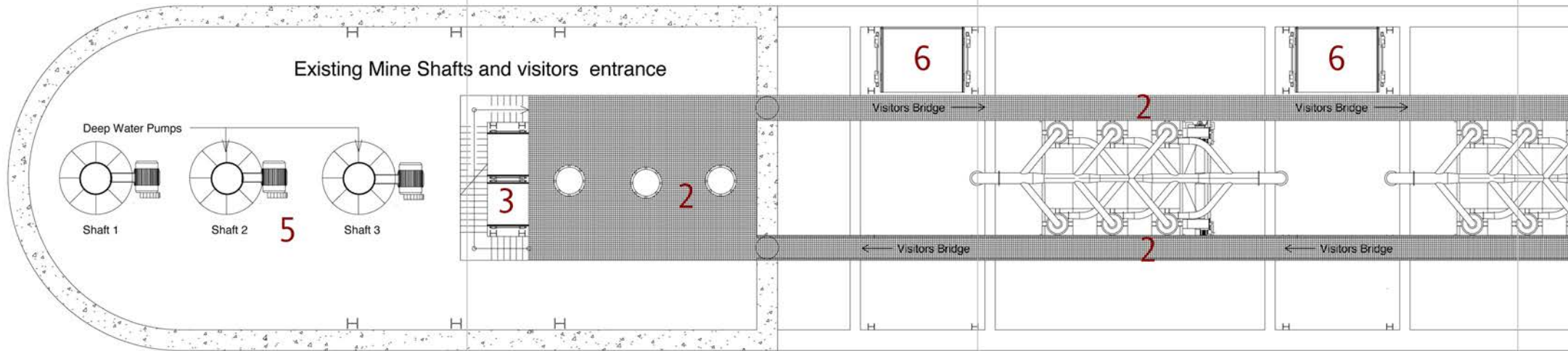
A large, covered, public space offers the flexibility required for this kind of program. Enclosed by a transparent skin the new interior public space is connected to the exterior public space.

..... Reception

..... Exhibition space & Venue for events



Illustration 6.47. Perspective rendering of purified water reservoir.

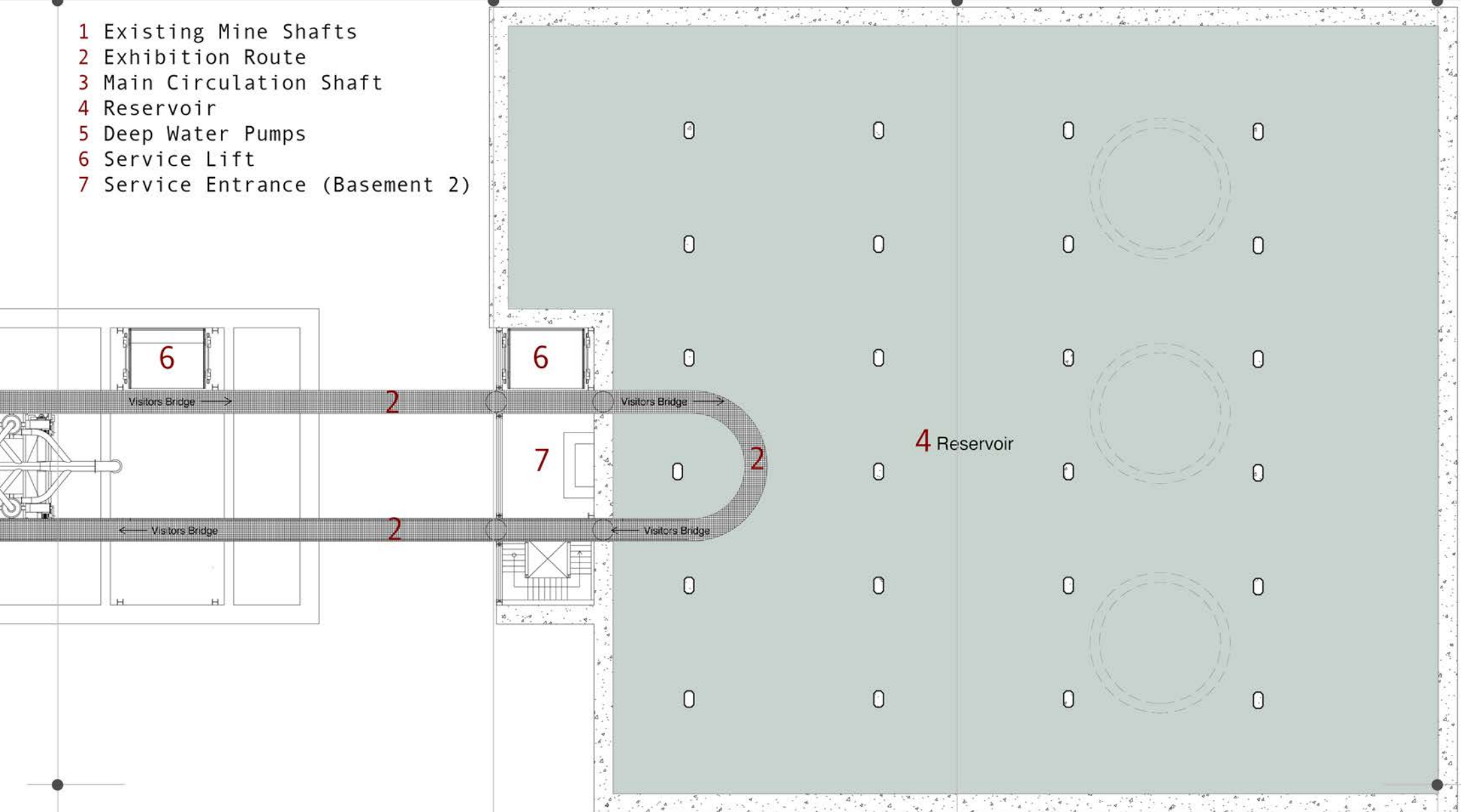


Visitors Route

[6.4] Claim 19 [George Harrison Memorial] - Water desalination plant.

[6.4.4] Design Conclusion [Exhibition Route]

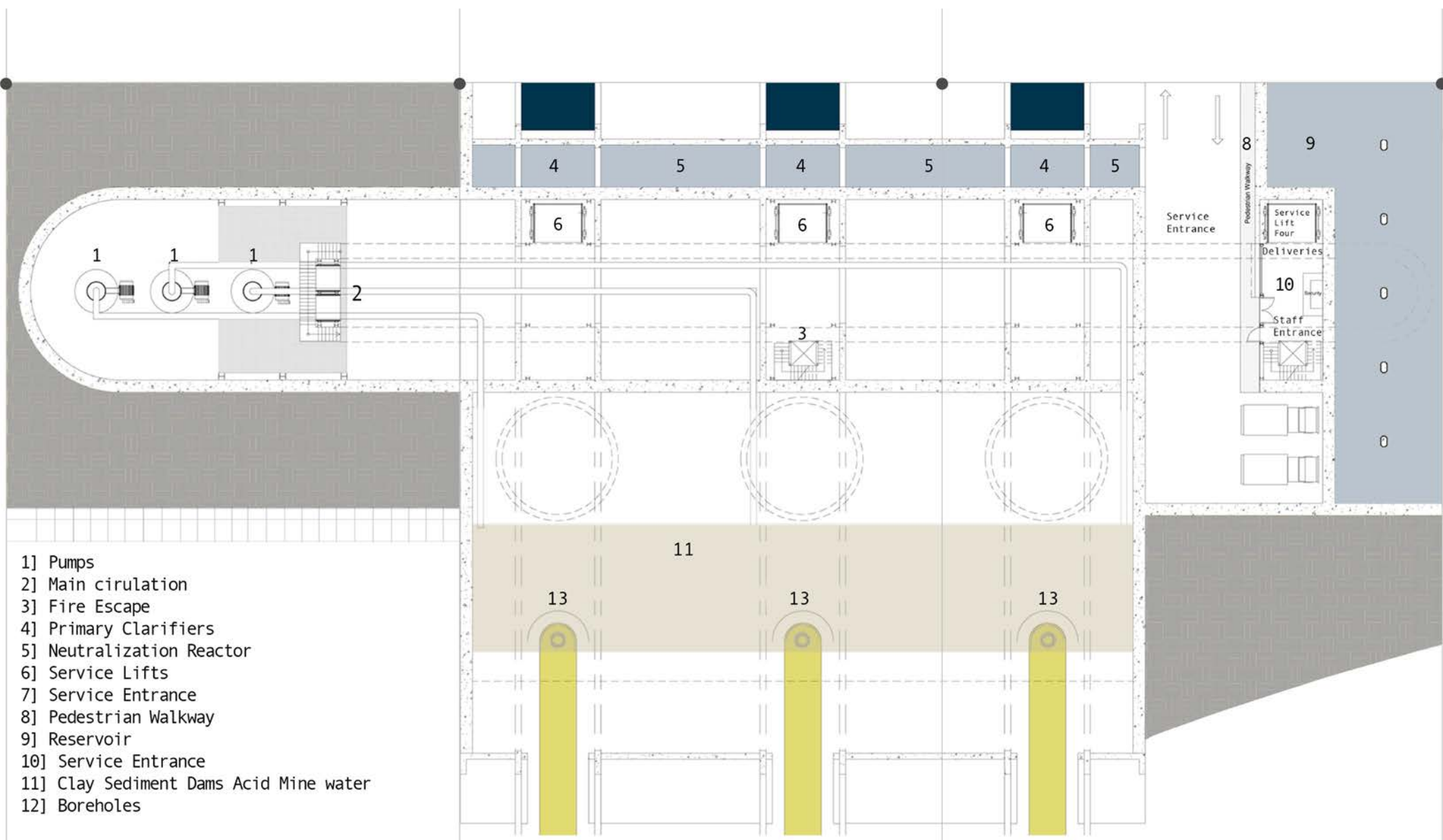
- 1 Existing Mine Shafts
- 2 Exhibition Route
- 3 Main Circulation Shaft
- 4 Reservoir
- 5 Deep Water Pumps
- 6 Service Lift
- 7 Service Entrance (Basement 2)



[6.4] Claim 19 [George Harrison Memorial] - Water desalination plant.
[6.4.4] Design Conclusion



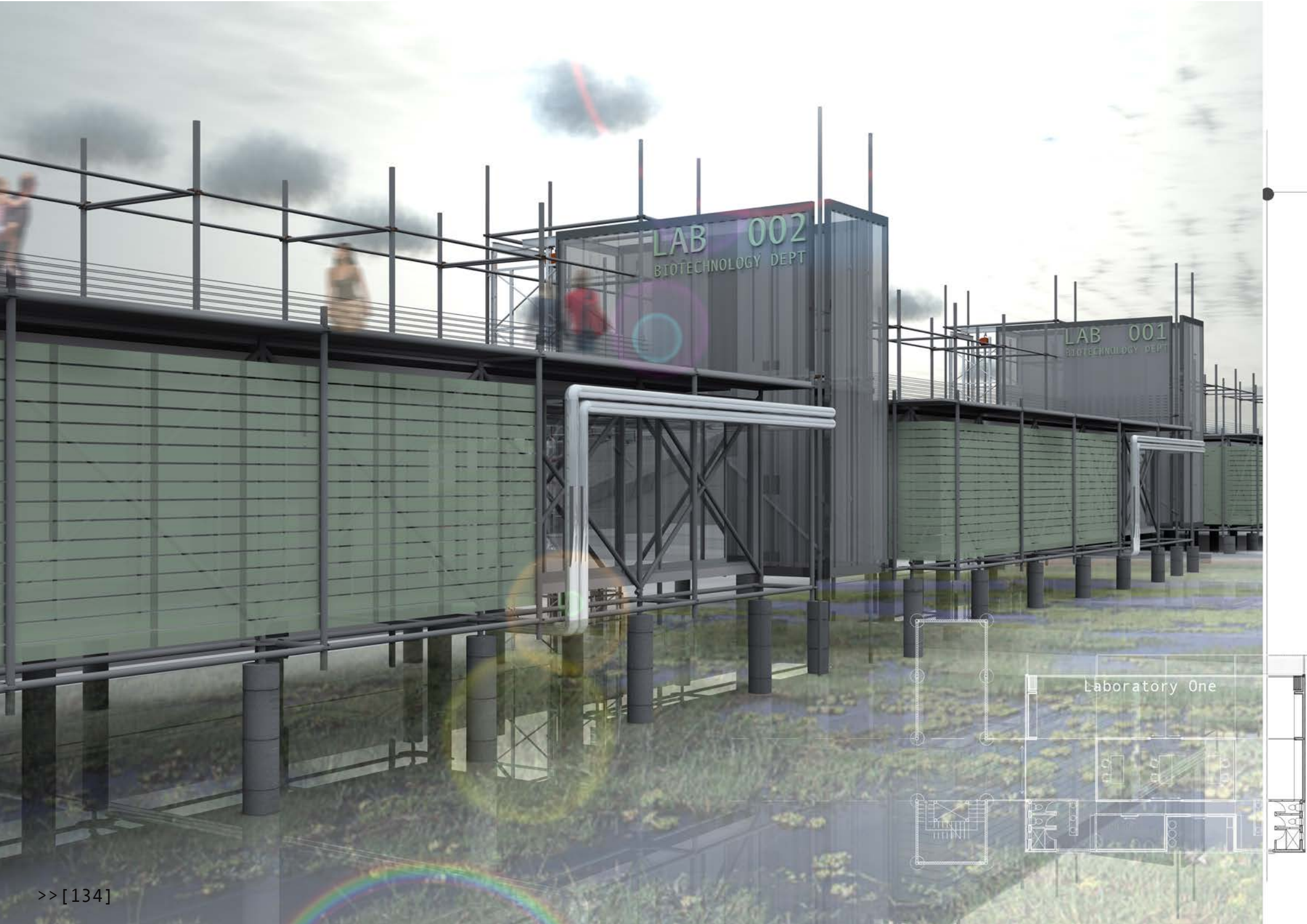
Illustration 6.48. Deep water pumps in existing mine shafts.



- 1] Pumps
- 2] Main circulation
- 3] Fire Escape
- 4] Primary Clarifiers
- 5] Neutralization Reactor
- 6] Service Lifts
- 7] Service Entrance
- 8] Pedestrian Walkway
- 9] Reservoir
- 10] Service Entrance
- 11] Clay Sediment Dams Acid Mine water
- 12] Boreholes

Basement 1



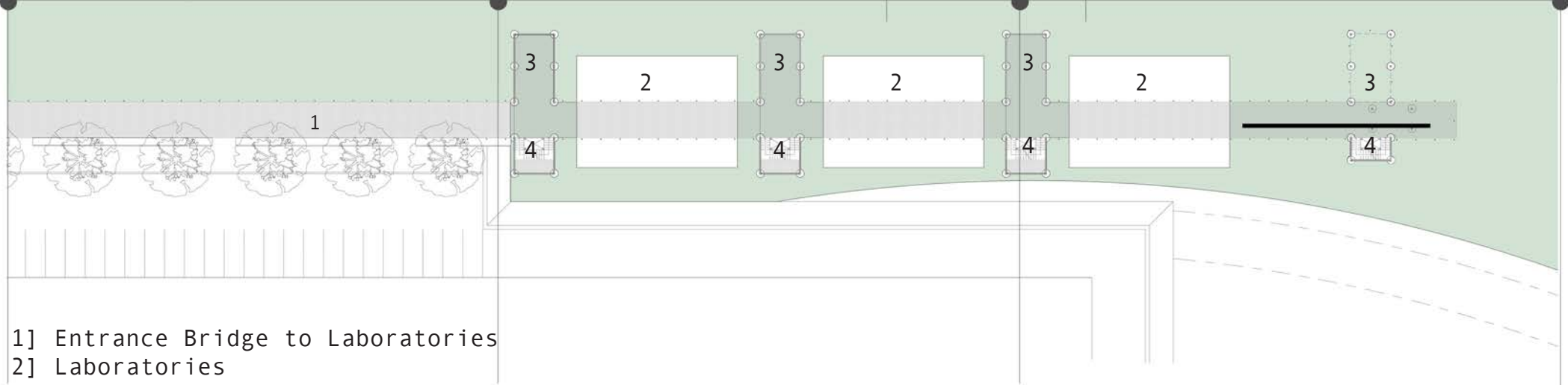


LAB 002
BIOTECHNOLOGY DEPT

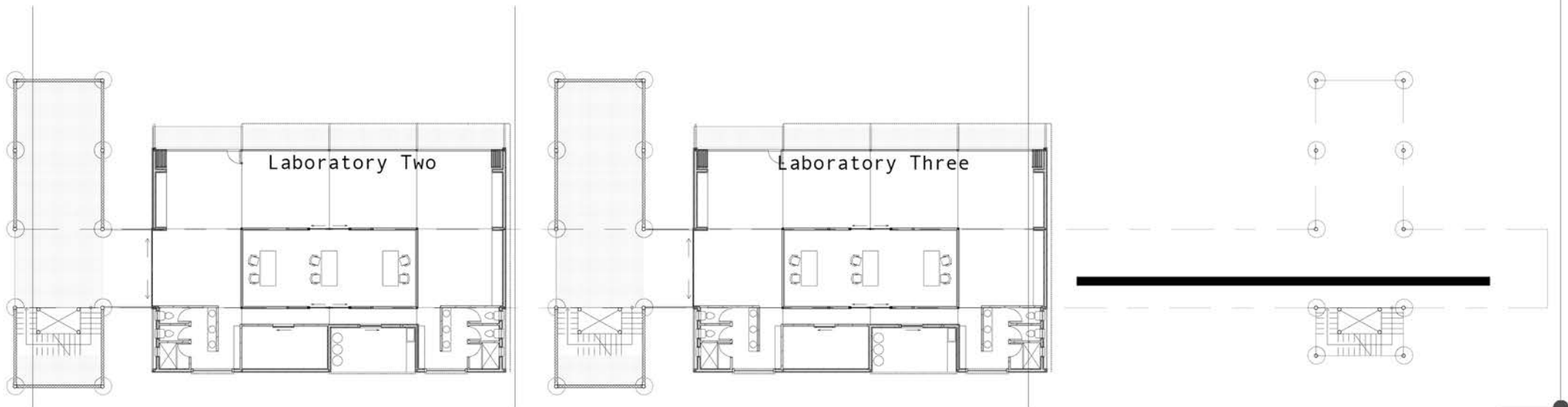
LAB 001
BIOTECHNOLOGY DEPT

Laboratory One

[6.4] Claim 19 [George Harrison Memorial] - Water desalination plant.
[6.4.4] Design Conclusion [Biotechnology Laboratories]



- 1] Entrance Bridge to Laboratories
- 2] Laboratories
- 3] Research Exhibitions
- 4] Access to Wetlands



[6.4] Claim 19 [George Harrison Memorial] - Water desalination plant.
[6.4.4] Design Conclusion [Biotechnology Laboratories]



Illustration 6.49. Decanting acid mine water released into wetland.
[Flicker,n.d:online]

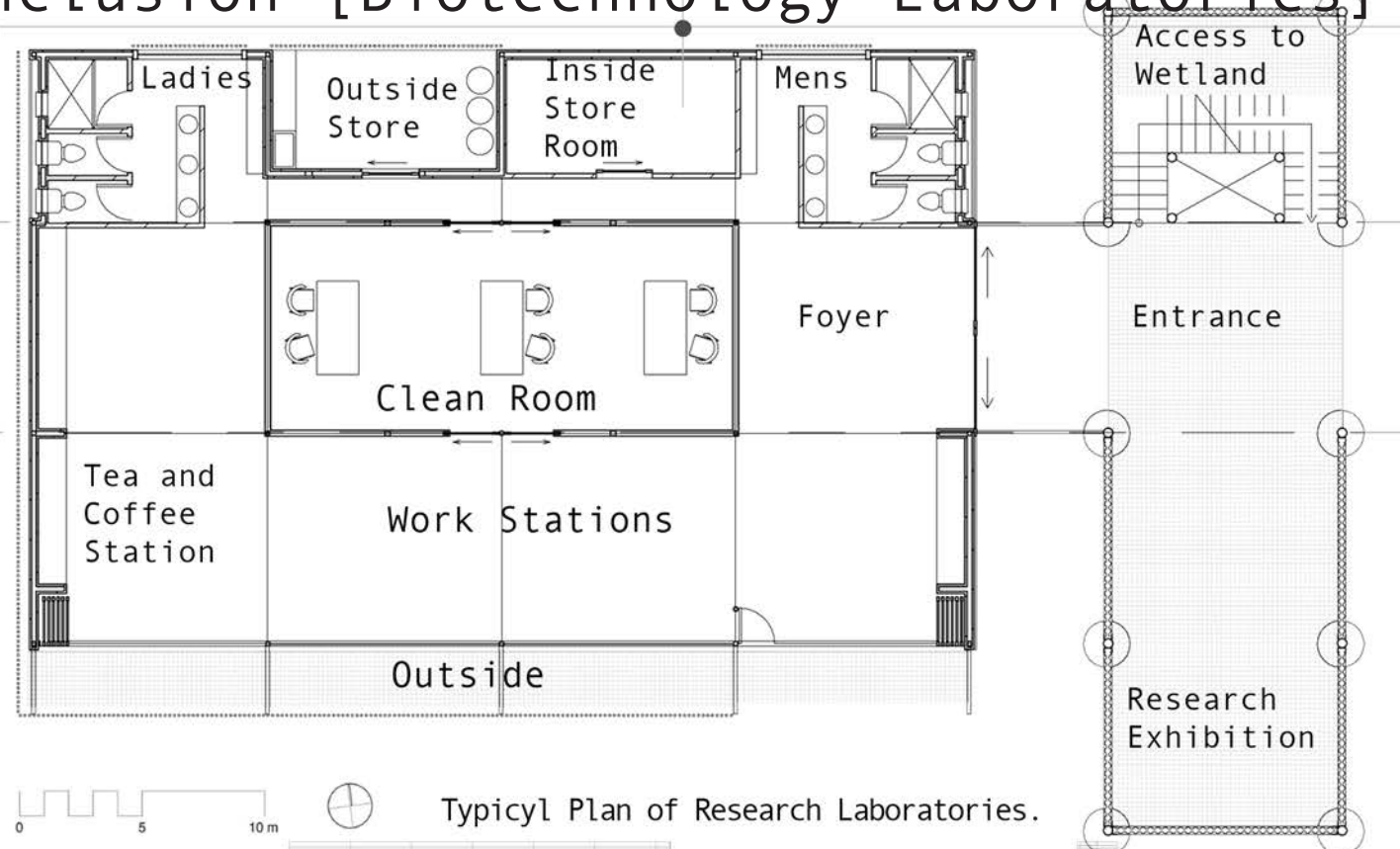




Illustration 6.50. Biotechnology Laboratories.

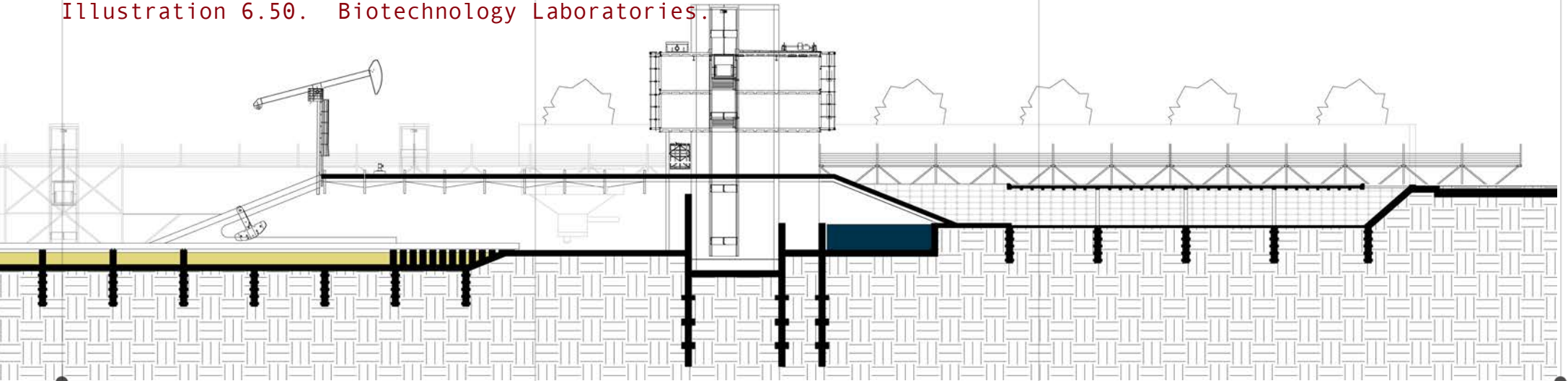
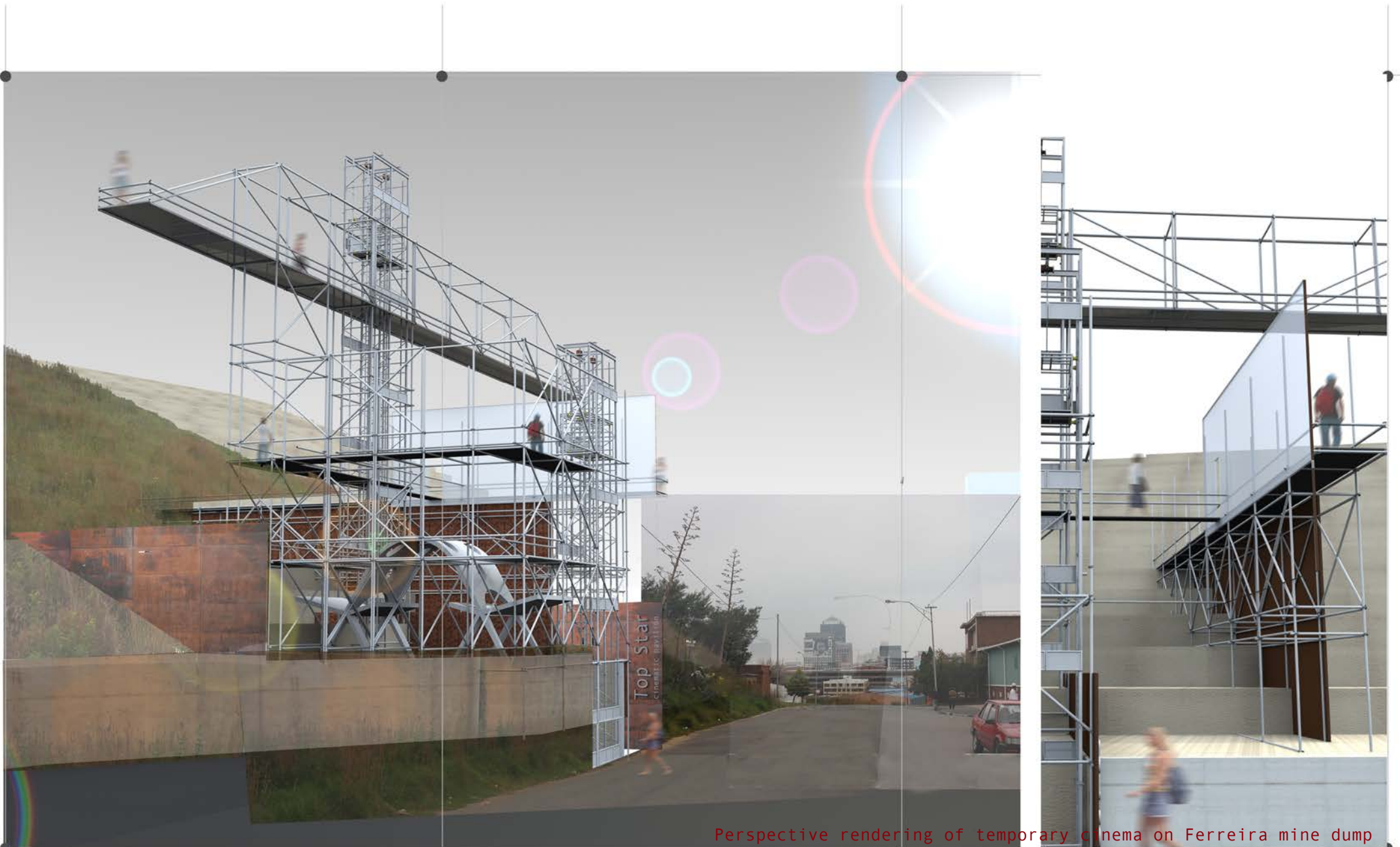


Illustration 6.51. Section AA.



Perspective rendering of temporary cinema on Ferreira mine dump

[6.5] Ferreira dump [Top Star Drive Inn] - Temporary cinema.

[6.5.1] Design Conclusion



Illustration 6.52 Section AA [Section through a part of Ferreira dump, Dump Road & Simmonds Southway]

[6.5] Ferreira dump [Top Star Drive Inn] - Temporary cinema.

[6.5.1] Design Conclusion



Look-out over the Joburg CBD.

New temporary cinema on the part of Ferreira dump still existing.

Existing Ferreira dump.

Corten steel plates buried in mine dump.

Existing structure on Ferreira dump [Dump drive]. It was the entrance to the old drive-in.

Perspective renderings of temporary cinema on Ferreira mine dump and tectonic structure allowing access to the unstable site.



