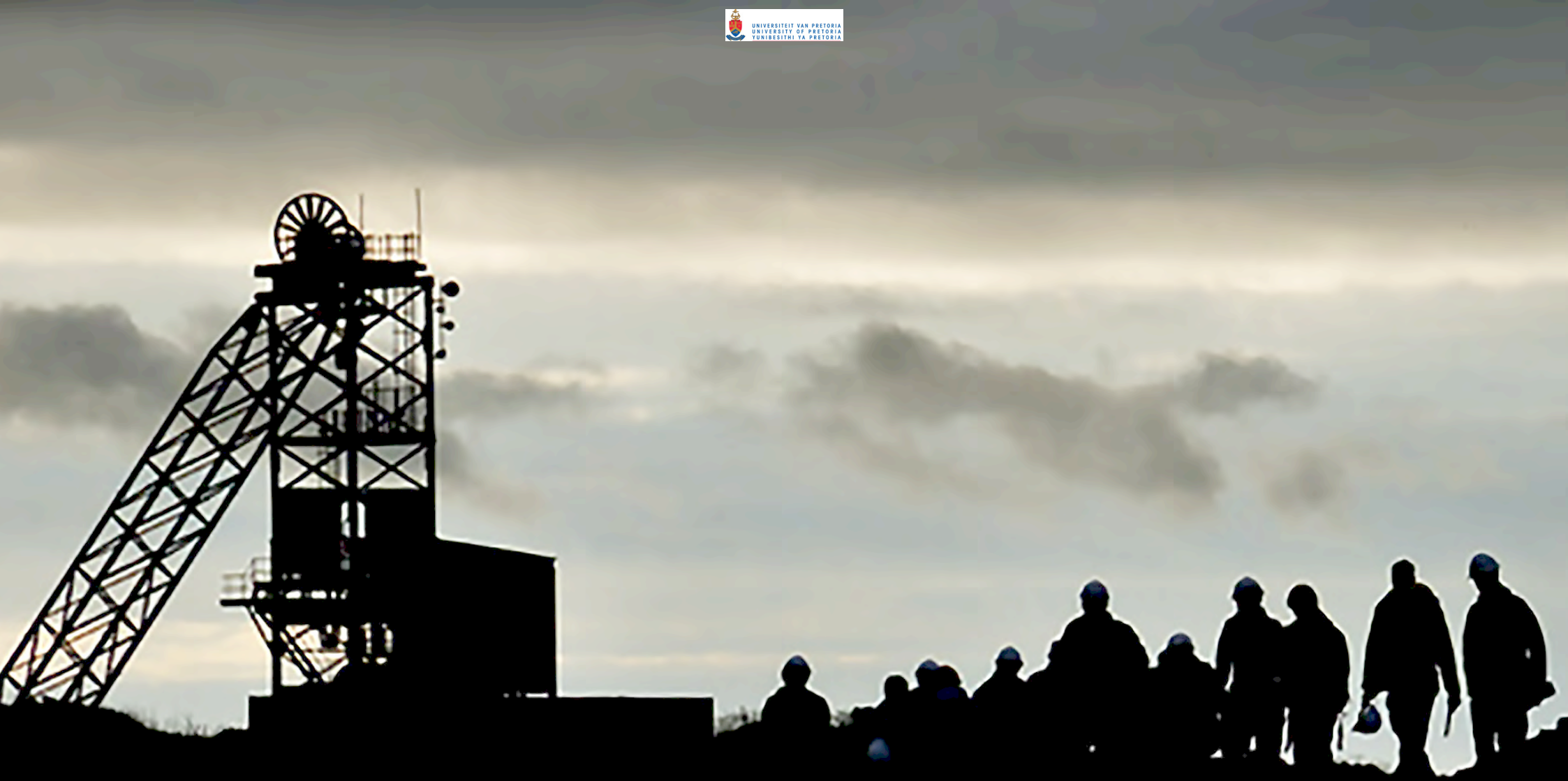

ACTIVE REGENERATION

RE-ACTIVATING JOHANNESBURG'S MINING BELT THROUGH A CONTEXTUAL REGENERATIVE THEORY

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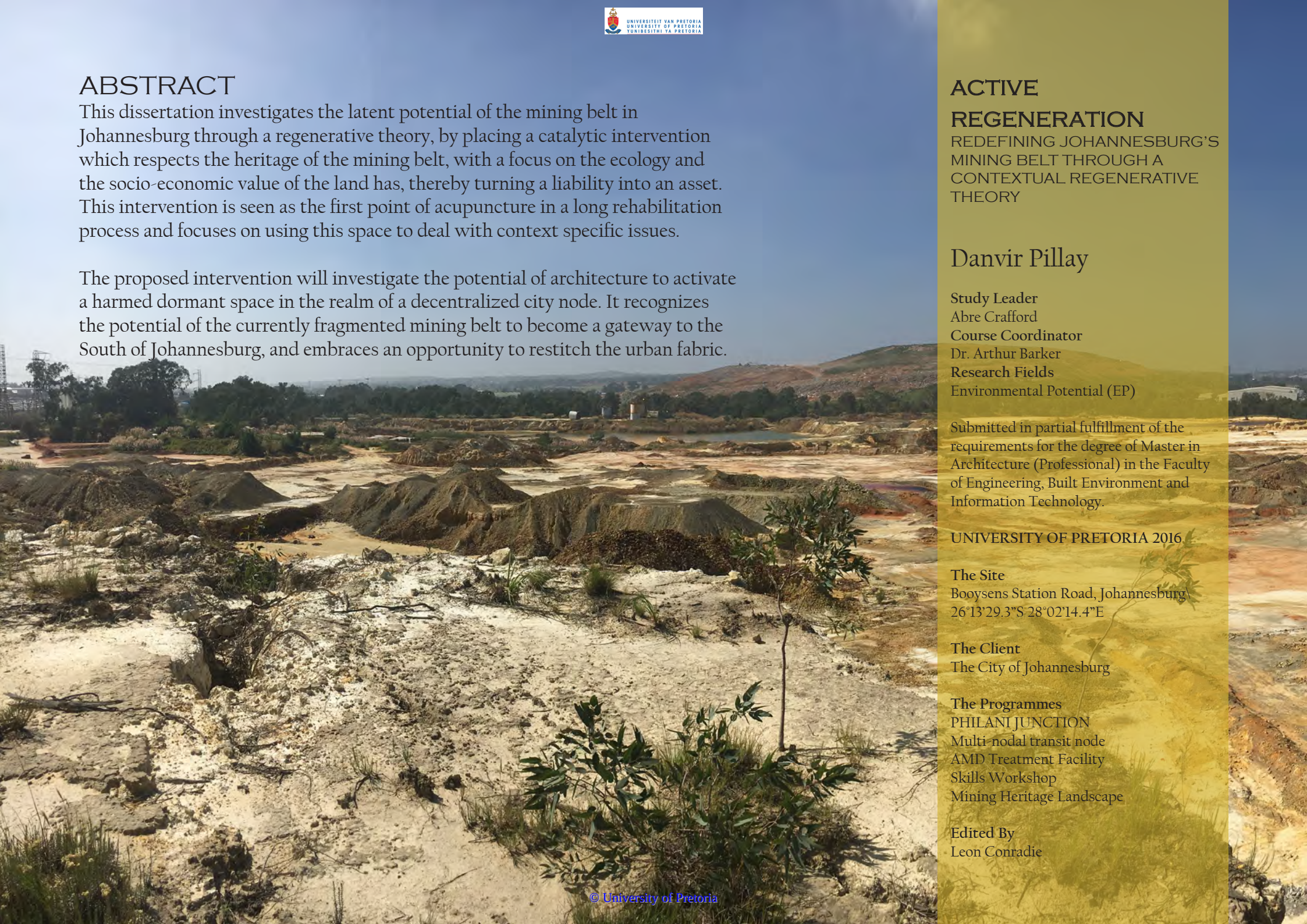
ABSTRACT

This dissertation investigates the latent potential of the mining belt in Johannesburg through a regenerative theory, by placing a catalytic intervention which respects the heritage of the mining belt, with a focus on the ecology and the socio-economic value of the land has, thereby turning a liability into an asset. This intervention is seen as the first point of acupuncture in a long rehabilitation process and focuses on using this space to deal with context specific issues.

The proposed intervention will investigate the potential of architecture to activate a harmed dormant space in the realm of a decentralized city node. It recognizes the potential of the currently fragmented mining belt to become a gateway to the South of Johannesburg, and embraces an opportunity to restitch the urban fabric.



ACTIVE REGENERATION

REDEFINING JOHANNESBURG'S MINING BELT THROUGH A CONTEXTUAL REGENERATIVE THEORY

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Research Fields
Environmental Potential (EP)

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The Site
Booysens Station Road, Johannesburg
26°13'29.3"S 28°02'14.4"E

The Client
The City of Johannesburg

The Programmes
PHILANI JUNCTION
Multi-nodal transit node
AMD Treatment Facility
Skills Workshop
Mining Heritage Landscape

Edited By
Leon Conradie

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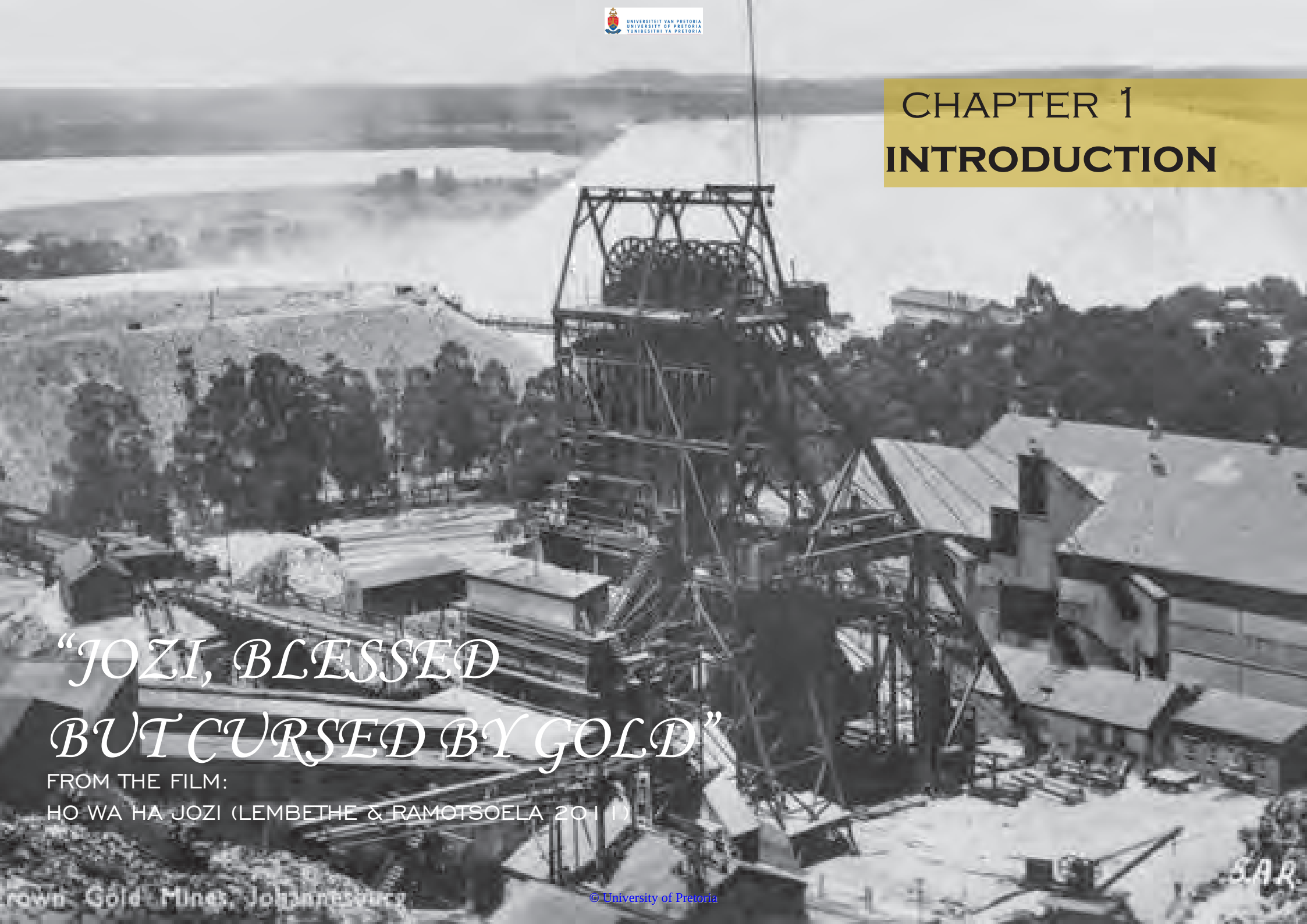
INTRODUCTION



"JOZI, BLESSED BUT CURSED BY GOLD"

FROM THE FILM:
HO WA HA JOZI (LEMBETHE & RAMOTSOELA 2011)

1.1 MINING LEGACY

Mining is the historic and invasive process of acquiring raw materials from the earth often in the cheapest way possible. This process has left toxic socio-ecological scars on landscapes across the world, but has ironically formed the strong foundation of those economies and is a vital part of their resulting heritage.

There is no more emblematic example of this than the city of Johannesburg, which sits atop a labyrinth of tunnels, a subterranean museum which has given way to its successor above. This process has formed the strong foundation of economies and is an important aspect of their resulting heritage. What sets the Witwatersrand apart from other mining regions is that, "most mining belts of this scale are peripheral, whereas this mining belt is located [in] the centre of the city" (Toffa 2015).

Although almost all mining in the Gauteng City-Region has ceased, the region, along a 50km stretch is littered, with mine dumps, tailings and slime dams. These towering mounds welcome occupants to Johannesburg.
"The mine dumps of the Witwatersrand are beautiful. We think of them with nostalgia when we are away, and we return to them with joy." (Schuman 1974: 17-24). Visually they are somewhat like Johannesburg's equivalent to Cape Town's "mountains" and Durban's "beaches" (Toffa 2015). Their presence is thus oxymoronic both as a cultural asset and an ecological problem.

Due to policy or rather lack thereof and stakeholder complexity, the impact of extraction on the post mining landscape of Johannesburg has not been effectively dealt with. This corridor of dead space runs through key socio-economic nodes such as Johannesburg's CBD, and remains as a scar that is not integrated in the 2016 version of the JHB SDF for 2040. Although the mining belt is zoned as a mixed-use area, it have yet to form a significant part of Johannesburg's 2040 SDF[1], only transport nodes around it have been targeted rather than the actual site itself.

"Present day Johannesburg, with the economic structure and growth performance of a successful post-primary post-industrial city, is far removed from its mining origins. However, Johannesburg remains deeply connected to its mining past." (Harrison&Zack, 2012, p564)

FIG 1 : *The mining belt and city condition (Trangos & Bobbins, 2015)*

FIG 2 : *State Mines, in Brakpan (Johnson, 2017)*

FIG 3 : *Children playing in toxic AMD water (Crowley, 2016)*

FIG 4 : *Collage of existing heritage museums gold reef city [left] and the workers museum [right] (Trangos & Bobbins, 2015)*

1.2 THE RESEARCH PROBLEMS

This landscape hosts a complex set of issues with a deep rooted socio-economic heritage. "Mining on the [Witwaters]Rand not only extracted significant wealth from the ground but also instilled deep socio-economic and class divides" (Trangos G & Bobbins K, 2015). Furthermore, the post-mining landscape of Johannesburg divides the city whereby some hazardous zones remain, uninhabitable. These hazardous sites "present challenges for future development and spatial integration of the city-region." (Trangos G & Bobbins K, 2015) This problem is amplified by the existence of informal settlements which are products of the spatially disadvantaged in satellite townships. The mining belt, so close to the urban core, has become, not only a lost space, but a negative one (Trangos G & Bobbins K, 2015). The belt thus lies as a dormant gateway to the spatially disadvantaged Southern region of Johannesburg. In addition it also has the potential to strengthen the metropolitan core of Johannesburg leading to a more resilient city. This could be achieved through high quality linkages and spatially just interventions. This scared landscape, which was the core economic driver of the region through its gold production, has the potential to become an economic and ecological hub.

The most pressing concern resulting from mining activity is the ecological threat of toxic residues, both in the form of airborne dust, and Acid Mine Drainage(AMD[2]). Acid Mine Drainage is when Pyrites and Sulphides infect water on mining dumps and slime dams as well as percolating into the old mines forming an acidic by-product that is hazardous. This harmful product "threatens vegetation, water courses and human health" as well as building foundations.(Kidd 2011) Several authors Naicker, Cukrwosja, McCarthy have argued that this problem needs immediate attention. The city has undertaken certain initiatives with private institutions to decant the AMD from the mines, store and partially treat the water as well as rehabilitating the mining landscape however this has only largely happened in the west rand and mining land.

Another less tangible concern is that is that lost mining heritage which is poorly acknowledged. Stefan Berger noted at the International Mining History Congress that "mining and its heritage have been crucial to forms of identity construction in regions of heavy industry across the world, not just south Africa." Where South Africa differs from other countries is in the lack of celebration, documentation and acknowledgment of its mining heritage, and the potential for this to form part of its national heritage. Johannesburg is the quintessential example of a mining city. Dubbed the City of gold it nevertheless has no official museum dedicated to mining or industrial heritage celebration apart from two sites, one of celebration and one of remembrance (Davenport J, 2012). One is the themed scenography of Gold Reef City and the other a narrative history of migrant labour at the workers museum.

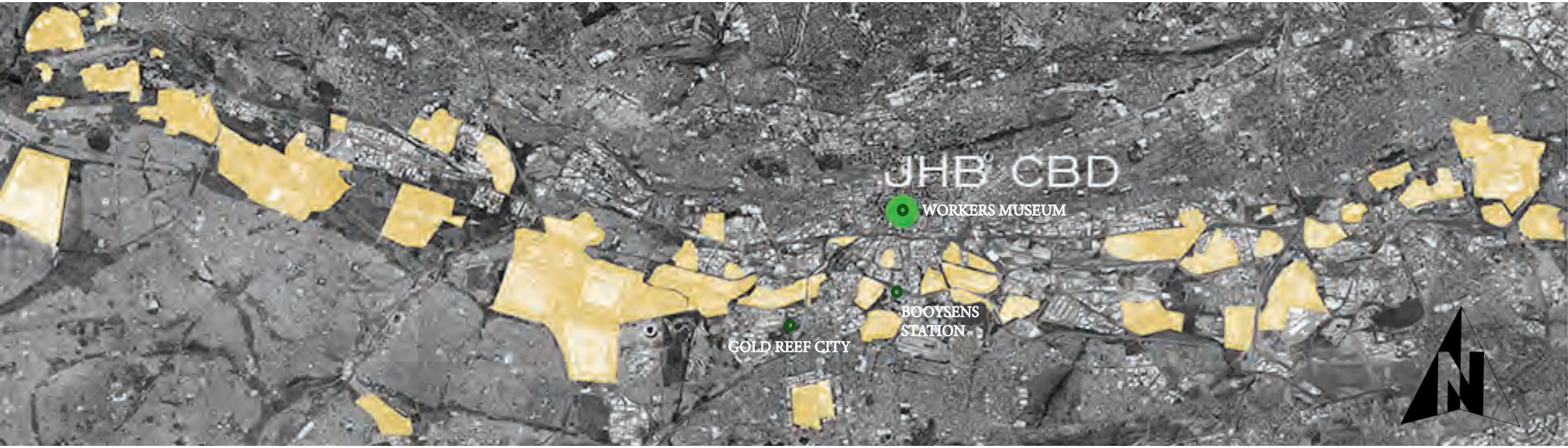


FIG 5 : *Orthophoto showing mining belt and sites of interest (Author, 2017)*

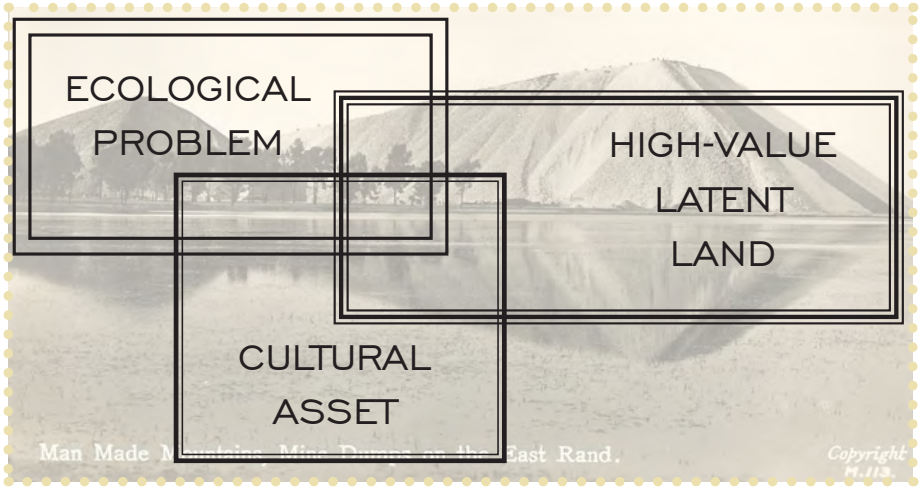


***FIG 6** : Diagram showing the main issues and assets of the mining belt (Author, 2017)*

This belt has the potential to positively impact the spatial and socio-economic strength of the city but If left uninvestigated then not only does it pose a health risk to the city and its inhabitants but it will remain lost space which lies latent as a rich historic landscape.

The Johannesburg SDF for 2040 has been used as a framework to drive this intervention. it is a point of departure for a contextual response and will be explored further in the urban and site analysis components of this document. Specifically, a preliminary urban analysis has highlighted Booysens Station[3] earmarked for a multi-modal upgrade. This provides the perfect driver for this intervention as it provides a loose framework to facilitate a contextual response. Therefore it will become a point of departure for this investigation. This driver will be explored more in the urban and site analysis.

Thus, the question becomes

1.3 THE RESEARCH QUESTION

How can a contextual regenerative theory be utilized to re-imagine Booysens station as a precinct that brings a new legibility to the lost space of Johannesburg's mining belt, addressing socio-economic concerns and ecological damage while acknowledging the mining heritage of the Witwatersrand?

1.4 THE RESEARCH INTENTIONS, ASSUMPTIONS AND DELINEATIONS

In this landscape a web of concerns and informants call for:

1) a socio-economic investigation into the climate of Johannesburg reference to the mining belt, that will lead to a site activation strategy that positively impacts the surrounding communities. Skills development, spatial empowerment and intra-city linkages and connections are focus areas. The intent is to utilize this high value land so close to the CBD through successful activation.
2) An investigation of the infected landscape, specifically AMD to effectively raise awareness of the subterranean problem and begin the process of site rehabilitation. This intervention could be replicated across the 50km stretch of landscape. The intention is to provide a plan to resolve the ecological problem post-mining land has caused
3) Acknowledgment, documentation and exhibition of the history of the mining belt as explored through a heritage landscape. This comprehensive account of the extraction history of the Witwatersrand will include the presentation of documents, photographs, narratives, physical infrastructure and machinery. The intention is to retain the cultural asset of the post-mining landscape.

This investigation sets out to define an initial point of acupuncture within the mining belt that will form part of a greater urban scheme. It deals with the variety of mining belt problems from a holistic perspective, but isolates the three "focus areas" of socio-economic value, ecology and heritage. The intention is for these to generate a complex yet balanced dialogue that responds to and regenerates the site. The study is contextual and targets existing conditions. Thus it does not deal with every issue and is not a generic solution for all post-mining landscapes but rather a very specific response through the aforementioned "focus areas" or lenses.

1.5 RESEARCH METHODOLOGY

In order to address the Research Intentions the following method and format will be utilized in order to generate an architectural solution.

Context
A historical and contextual analysis will be conducted using old book, journals, articles, photograph and web pages to gather information on the mining belt specifically related to the three lenses of ecology, heritage and socio-economic value

Urban Analysis And Site Analysis
An Urban Analysis will be conducted by examining Reports such as The Johannesburg Spatial Development Framework 2040, the Gauteng Mobility Report 2016 and the Corridors of Freedom Proposals. These Frameworks along with urban mapping and contextual analysis will assist in selecting an urban site and developing an Urban Plan to deal with the relevant mining sites rehabilitation

From there a Site will be chosen within the Urban Plan Area and a subsequent Analysis will be carried out through mapping techniques specific to the 3 mentioned lenses. The site will also be documented through photographs after specific site visits. The surrounding community will be engaged to assist in the development of a context-driven response.

Regenerative Theory
3 Charters will be used to establish a regenerative response, that being "The Burra Charter", Kenneth Frampton's "10 Points on an architecture of regionalism," and Nabeel Hamdi's "The spacemakers guide to big change," These 3 charters will be examined to develop a regenerative theory that will have a focus on ecology, heritage and socio-economic effect. The intention of this theory is to provide a guideline to develop an architecture that will heal and activate this post-mining landscape. This theory will be used to formulate and inform the design conceptually.

Precedents
A series of case studies will be examined to support the formal, contextual and technical responses. Specific Precedents will focus on Multi-modal transit hubs, post-mining landscapes and critically regionalistic design, heritage relevant examples like mining stamps of Johannesburg.

Design Methodology
The Design will spatially be inspired from precedents, specifically Bernard Tschumi's Parc de la Villette as well as the developed regenerative theory. A study into context, site, topography, heritage and historical influences, forms, materials and construction will be conducted to form a complete architectural language.