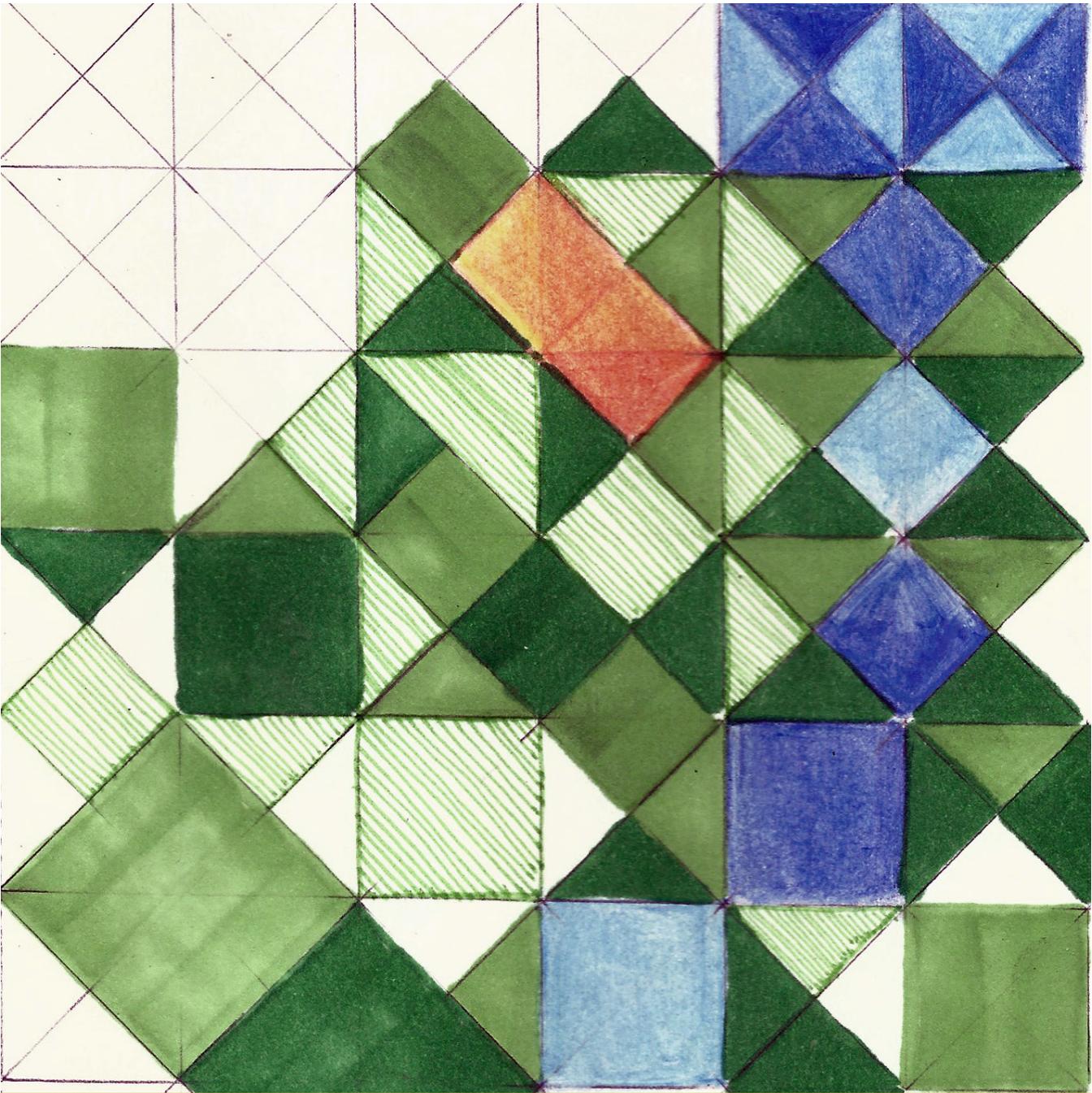


LANDSCAPE ARCHITECTURE FOR A MINING SOLUTION: AN EXPLORATION OF PATTERN

HS Jansen van Vuuren
2017



Exploration of urban grid over the landscape (Author 2017)

ACKNOWLEDGMENTS

Thank you to my family, and especially my mother for reading every word. For friends like Hazel that helped me with the sneaky 'is' and 'are'. To my salsa family for understanding my absence from my teaching responsibilities, Jonas for waking me with a phone call every morning so I could get a head start and to Smita for housing and feeding me. The support through this difficult year did not go unnoticed.

ABSTRACT

Mining has a lasting effect on our communities and urban environments and is especially visible in the City of Johannesburg. The industrial processes that formed the gold mine tailings sites and the natural processes that effect these sites create enchanting port industrial sites. The current remediation includes either unaccessible engineered solutions or a site is left derelict and unsafe. Exploring these processes on the project site, the study investigated how pattern making, derived form residual patterns, can inform the landscape for a recreation space. The combination of natural processes and proposed new processes to form the basis of a recreational landscape is explored.

Robinson Deep Mine tailings 81-IR
Robinson Deep 81-IR, Erf 21, Booysen Road, Ophirton
Johannesburg
E'28o 2'5.14" S 26o13'39.34"

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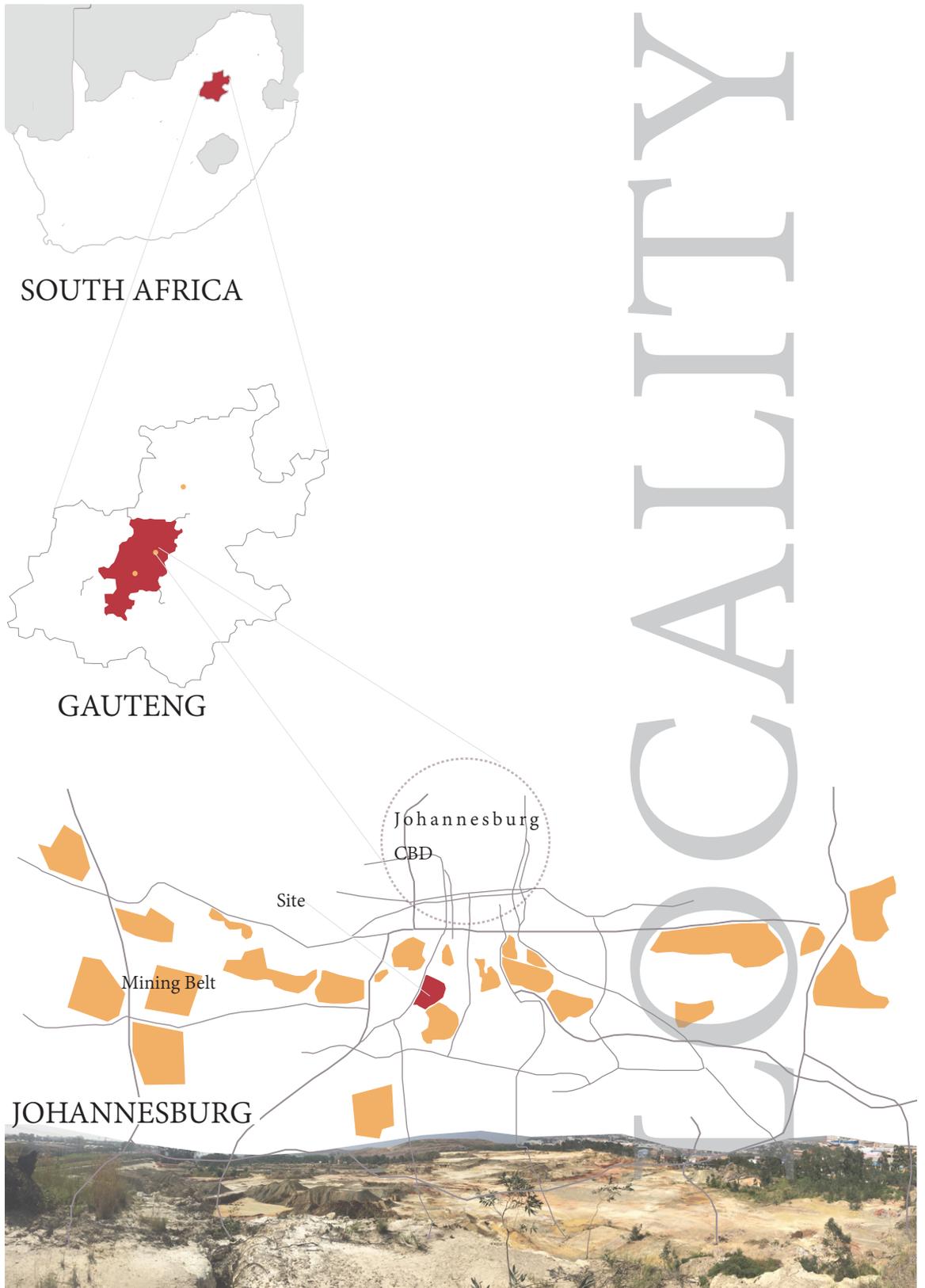


Figure 1.1 Locality of site in the mining belt context (Author 2017)

CHAPTER ONE

Introduction

1.1 Introduction to gold mining in Johannesburg

Johannesburg is the primary example of South Africa's dependence on mining as a source of wealth (Swart 2003). The remnants of mining activities are still evident in the urban fabric, with derelict tailings and poorly protected mine portal sites. These sites pose a risk to the people and surrounding environment (Lieverink 2017). To extract gold from the ore, a process of gold cyanidation is used. The application of cyanide to isolate gold particles before it is melted to form gold bars is the most effective method of extraction and the one most commonly used in the South African gold industry since 1889. This method of cyanidation was introduced after it was found that the pyrite gold ores in Johannesburg were difficult to extract gold from (Wise Uranium Project 2017). This and other dangerous substances such as uranium, magnesium, cobalt and other heavy metals, are present in the silt at 380 mine tailings sites and slime dams in and around Johannesburg which are polluting groundwater and water streams (Wise Uranium Project 2017).

After the gold is extracted the silt is pumped to silt dams in tailing sites and, over time, these sites have added to Johannesburg's iconic landscape (Walker 2015). The Johannesburg landscape has been depicted in various art forms over the 130 years of mining history (Thurman 2010).

The reprocessing of tailings sites started in 1977, which transformed these landmark landscape features in Johannesburg into a flattened-out sterile landscape (Walker 2015). After reprocessing, the silts are either pumped into pits, old mining shafts or into mega tailing sites on the outskirts of urban areas (Wise Uranium Project 2017).

1.2 The profession of landscape architecture and mining issues in Johannesburg

The subject of mining in the landscape architecture profession is not as common as one would think given South Africa's rich mining history. In the 'Identification of Work for Landscape Architects' document, as supplied by the South African Council for the Landscape Architectural Profession (2011), possible projects that professional landscape architects can participate in, include: projects in environmental management, derelict and contaminated sites, landfill sites and mining operations. Further stated within the scope of work for landscape architects, the document refers to preparing and auditing of environmental management plans (South African Landscape Architecture Profession 2011). Environmental management planning is what Swart (2003) had identified as the basis for any mine closure.

Currently, in the landscape architecture profession in South Africa, as investigated by the author, minimal brown-field and no mining-related projects have received an award in the past four years which are merited by the Institute for Landscape Architects in South Africa (VdW & Co 2017). This leads to the conclusion that landscape architects are not deeply involved in the rehabilitation or reclamation of old mining sites, despite having the opportunity to be involved as set out in the Identification of Works document referred to above.

The issues with mining and the perceived lack of involvement in the landscape architecture profession have led to this study of the possibility to redevelop a mine tailings site.



Figure 1.2 Panoramic view of site looking towards Booyens street (Author 2017)

1.3 The site location and client

The site refers to a 34-hectare, municipal-owned land in the south of Johannesburg marked in red as seen in Figure 2.1. The site is bordered by a railway line and the Booyens train station to the north, the police academy and the Pikitup waste site to the east, a City Power depot to the south and commercial and light industrial developments to the west. This site was previously the Robinson Deep mine tailings site.

In Figure 2.2, the site's seemingly vast landscape stands in contrast to the surrounding industries with the Johannesburg skyline in the background. The important Booyens Road connector, located on the western edge of the site, is used by the community travelling to the central business district (CBD) and was noticeable on the first site visit. This road connects to other communities like Soweto and Lenasia with many inhabitants regularly travelling to and through the area.

The responsibility of the local government and previous mining companies to rehabilitate the mine site is also covered under legislation such as the National Environmental Management Act (Lieverink 2017). The investment opportunity for the redevelopment of the site is enhanced by the high potential of the existing infrastructure surrounding the site. Thus, it is foreseen that the client would be a property developer.

1.4 Problem statement

Mining sites in Johannesburg are an issue for the urban environment as they lead to long-lasting negative effects on the environment and its users. These are usually dealt with, if at all, in a highly engineered realm that cater for nothing more than a functional requirement; mostly limited to treating the symptoms such as acid mine drainage (AMD). The Robinson Deep site is currently a hazardous site, forgotten and neglected but highly valuable in terms of its locality within the urban fabric.

1.5 Hypothesis

Solutions for the problems caused by mining sites can be optimised by applying the holistic approach of landscape architects. This approach will not only cater for solution-driven interventions but also considers both the users and the surrounding spaces. The systematic requirements may best be achieved through pattern making as a driver to facilitate form making, there by enhancing the user experience. The rich history of the mining industry that essentially formed the city of Johannesburg can not be erased but should rather be celebrated, by retaining a mining identity for the site.



1.6 Research Questions

Can landscape systems be expressed through pattern making?

Can the use of pattern for a systems design enhance the landscape and make it more relatable to its users?

How can picturesque ideals cater for a mining identity?

1.7 Methodology

Evaluation always includes a process by which one measures one aspect with another to determine its relevance and success (Deming 2011). This thesis will aim to find a solution to the real-world problems through the study of theory and precedent. After an analysis of the site, problems and opportunities are identified. Solutions will be synthesised to unlock the site potential. The solutions will then be tested against the theories and site analysis to ensure an optimum solution is achieved.

1.8 Aims of study

The development of a park space that will house the systematic requirements as required by the 'real-world' problem as well as serving as a recreational space for the users of the site.

To explore ways in which to not only rehabilitate a site but also celebrate the site. The crude beauty that is inherent in the site and its past would be incorporated.

To facilitate the expression of system through pattern and process.

1.9 Delimitation and assumptions

Financially, the project will be supported by the mining company and other responsible stakeholders.

The toxicity of site will be solved by the proposed systems as the chemical composition of site is out of the authors body of knowledge.

The future developments will progress to include multi-functional developments as outlined by the urban vision and supported by the Johannesburg Spatial Framework.

The site as documented will experience no further human interference in the form of dumping of rock or waste products.