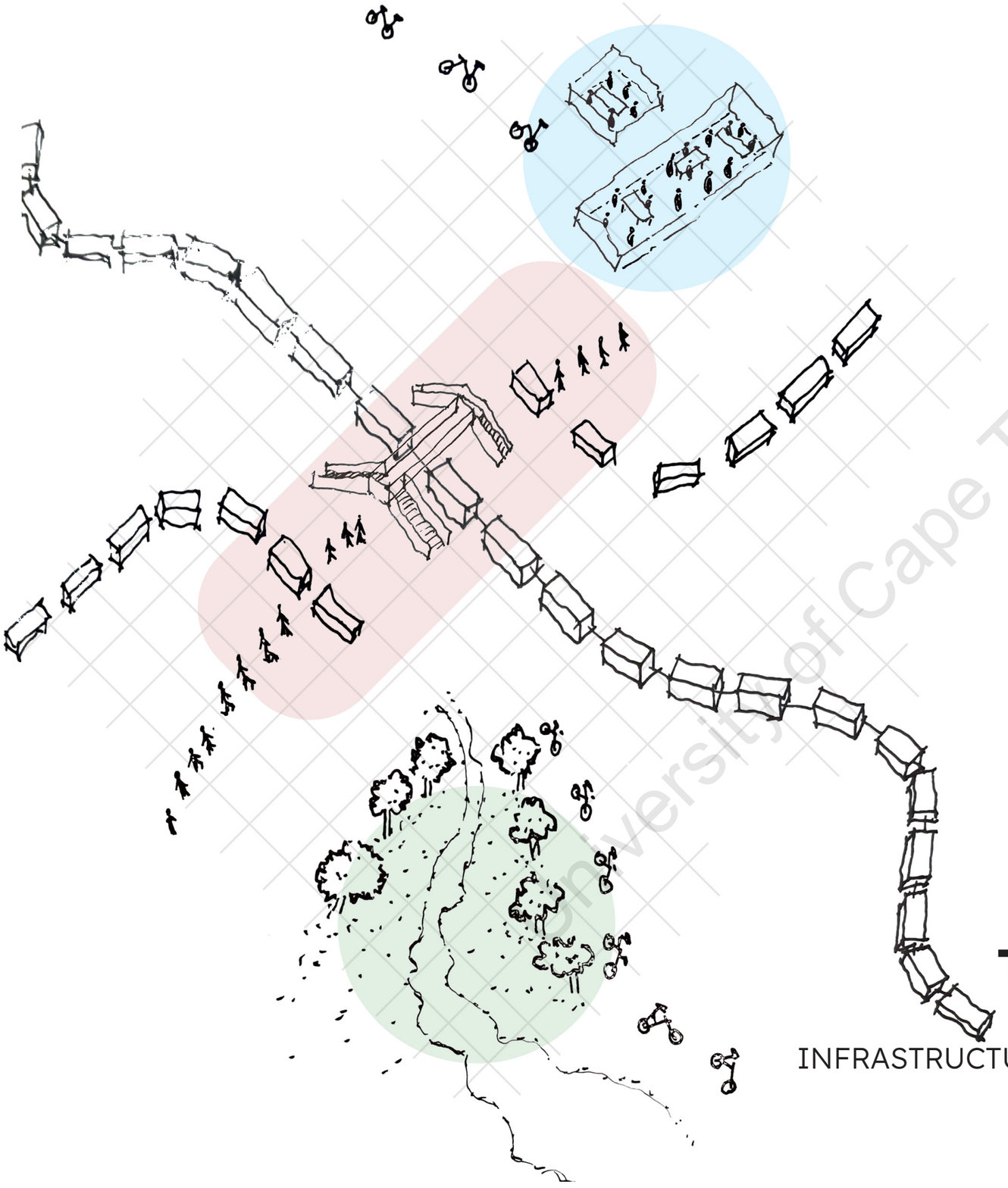

THREADS OF CONNECTIVITY

PLACEMAKING AS A CATALYST FOR BRIDGING THE INFRASTRUCTURE DIVIDE ALONG THE VOORTREKKER CORRIDOR

2023
Xenophen Masipa [mspxen001]

DECLARATION

Design Dissertation APG5079W
Dissertation Title: Threads of Connectivity
Student Name: Xenophen Lloyd Masipa
Supervisor Name: Alta Steenkamp

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

Date: 26 October 2023

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ACKNOWLEDGMENTS

Firstly, I would like to dedicate this design dissertation to my family, who have been extremely supportive during my studies.

Secondly, I would like to thank the OMT (Oppenheimer Memorial Trust) and the University of Cape Town for financially supporting my Master’s studies. A special mention to Alta Steenkamp, my supervisor, who has shown great support and provided a good foundation for grounding my work.

Lastly, I would like to thank my teachers and mentors, who have guided me throughout my architectural scholar journey.

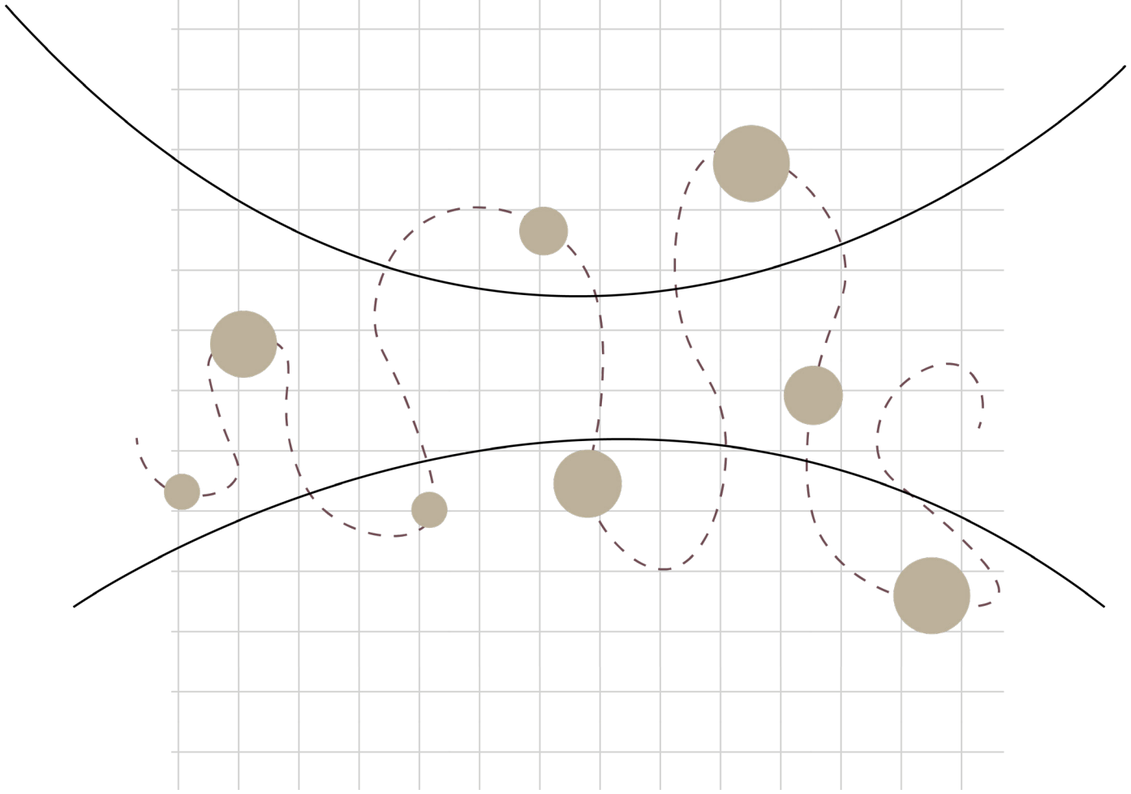

Figure 01: Crossing the great divide

PROLOGUE

Growing up in the Northern suburbs of Cape Town, I often found myself navigating Voortrekker Road to reach my desired destination. With many friends and family staying in the Northern suburbs, Voortrekker was the road that linked suburbs such as Elsiesriver, Goodwood, Parow and Bellville and provided easy access to these neighbourhoods. As a youth, my friends and I would often find myself exploring the neighbouring suburbs, either by foot, bicycle or taxi.. Whenever we came across a railway line, we'd find an existing pedestrian path across the station and follow it. Voortrekker Road allowed me to explore my city relatively easily; it can be seen as a gateway that unlocked experiences.

During my undergraduate studies at the Cape Peninsula University of Technology, I was fortunate enough to receive an opportunity to study in Belgium at the University of Hasselt. Our design studio project was located in Brussels-North and focused on how urban architecture could revitalise and diversify the area. The project was led by Belgian practice 51N4E in partnership with the Brussels Bouwmeesters office. This experience allowed me to understand the social value of architecture and how architecture functions as part of the system that is the city.

Working with 51N4E gave me a newfound perspective on urban architecture, mainly its value in shaping the built fabric and how this fabric creates an opportunity for social relations to develop. Similarly, how the Northern suburb communities have shaped me, I would take this opportunity to plant seeds that might benefit the area in the future.

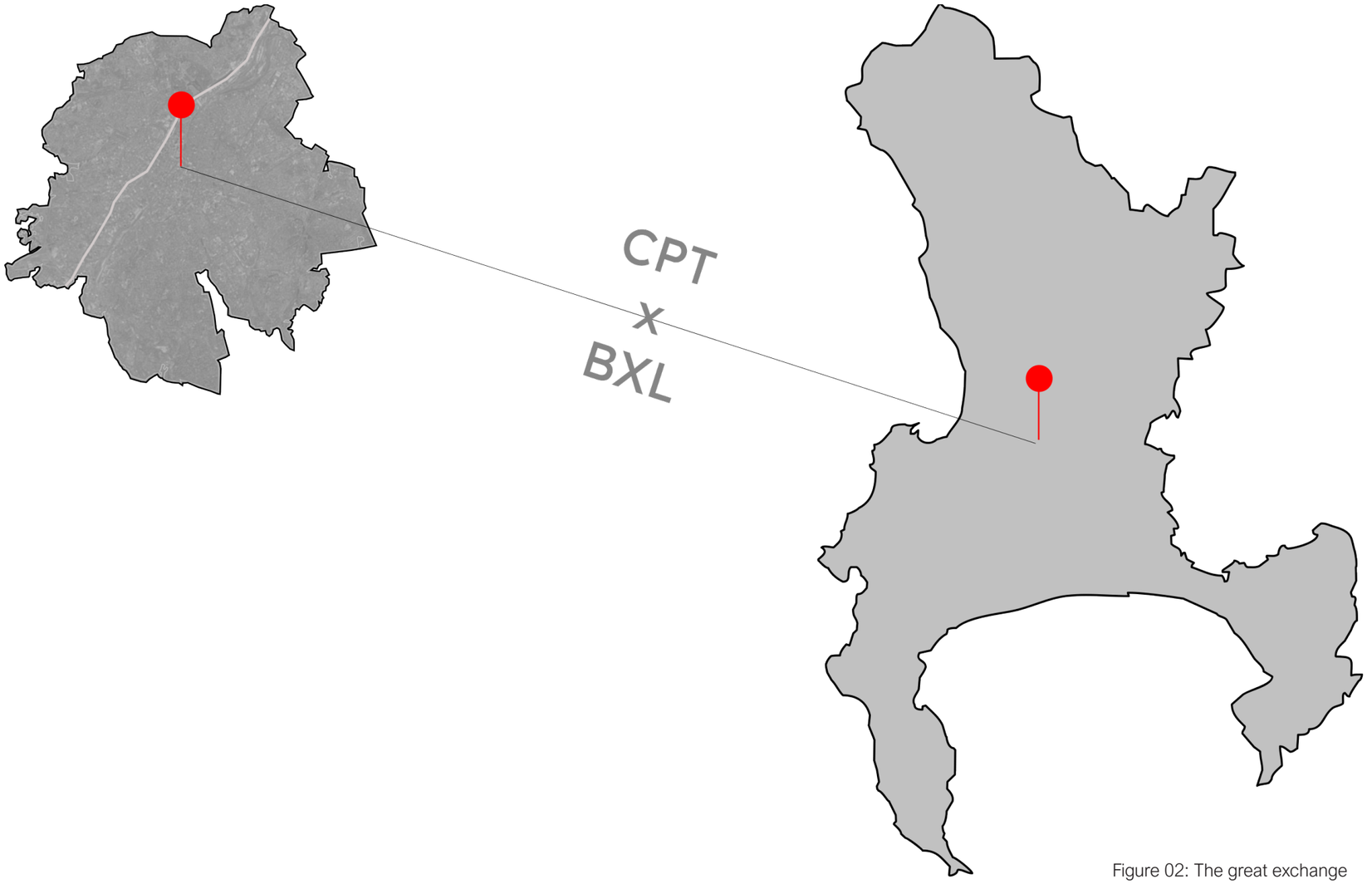

Figure 02: The great exchange

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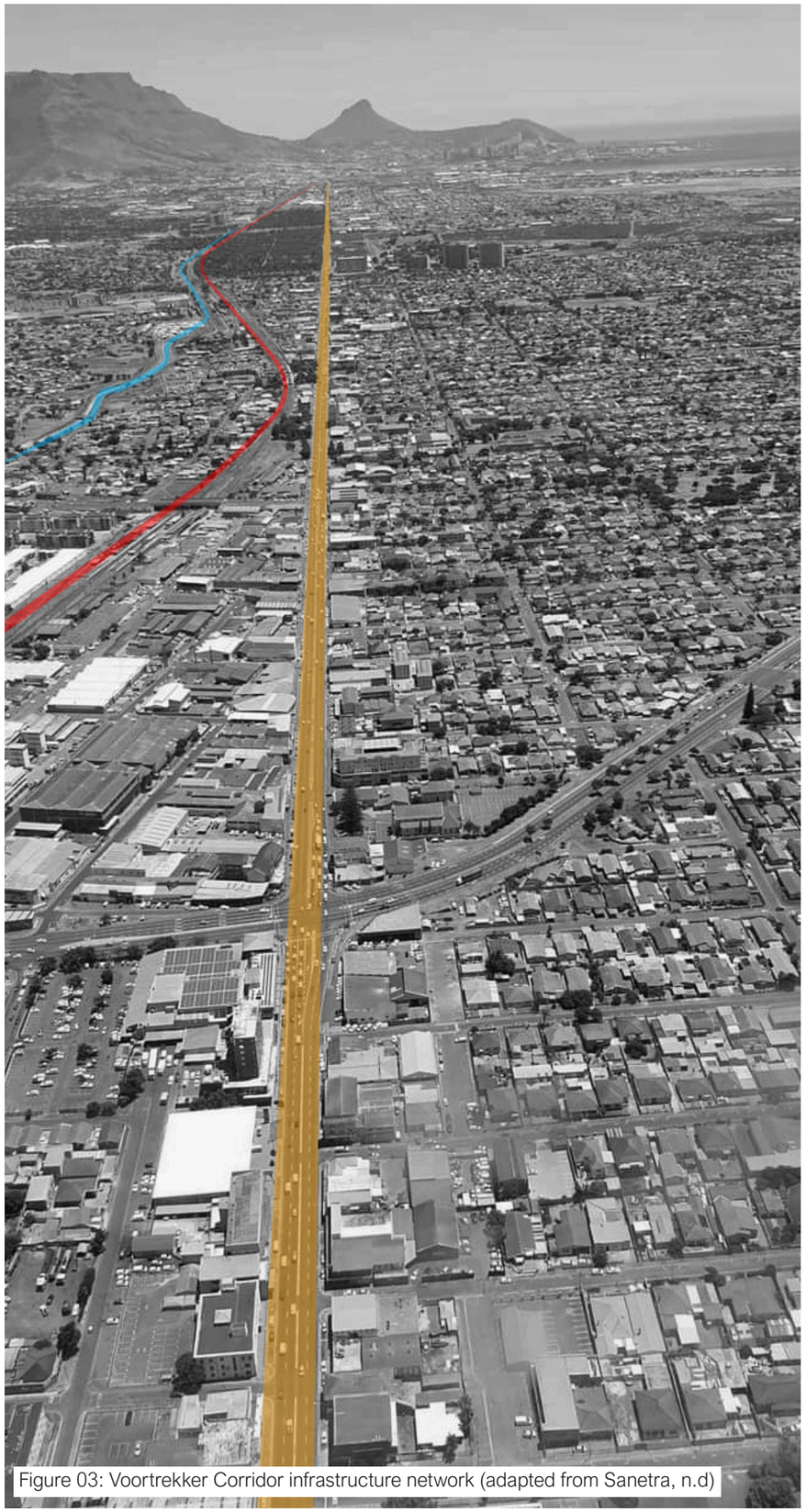


Figure 03: Voortrekker Corridor infrastructure network (adapted from Sanetra, n.d)

01. SETTING THE SCENE

INTRODUCTION

Architecture is a craft which requires that the architect constantly and intricately create and negotiate relationships between elements. How do buildings interact with their context? What is the relationship between inside and outside? What is the relationship between materials?

Infrastructure systems play a vital role in cities, distributing resources throughout the city to ensure its functionality and continuous development. In the book *Points + Lines*, Stan Allen describes urban infrastructure as artificial ecologies which manage the flow of energy and resources within the city (Allen, 1999). For artificial ecologies to function sustainably, the systems must be interconnected across different infrastructure silos and embedded within the context. However, infrastructure does not just refer to physical infrastructure but also social infrastructure, so it becomes vital to how these systems are connected.

Spatial planning was vital in shaping South Africa's spatial environment and was used by the apartheid regime as connectors and dividers. Today, large segments of the City of Cape Town are still subject to the implications of apartheid spatial planning. Communities were divided into cells reinforced with infrastructure buffers (Watson, 2001); this spatial arrangement promoted vehicular movement, which few could afford, thereby restricting access. Although the Voortrekker Road corridor has an established diverse fabric, the railway infrastructure along the corridor also restricts access for some communities. However, this has led to the development of a network of desire lines in and around the railway corridor. The lack of integration by infrastructure with its immediate context creates an opportunity for architecture to connect the city's divided components.

The research is focused on the Voortrekker Road Corridor infrastructure network. The paper seeks to understand how infrastructure networks can become integrated with the use of placemaking to serve surrounding communities better. To do this, the paper will focus on unpacking the spatial structure around infrastructure networks and the components of a sustainable city and the importance of public space.

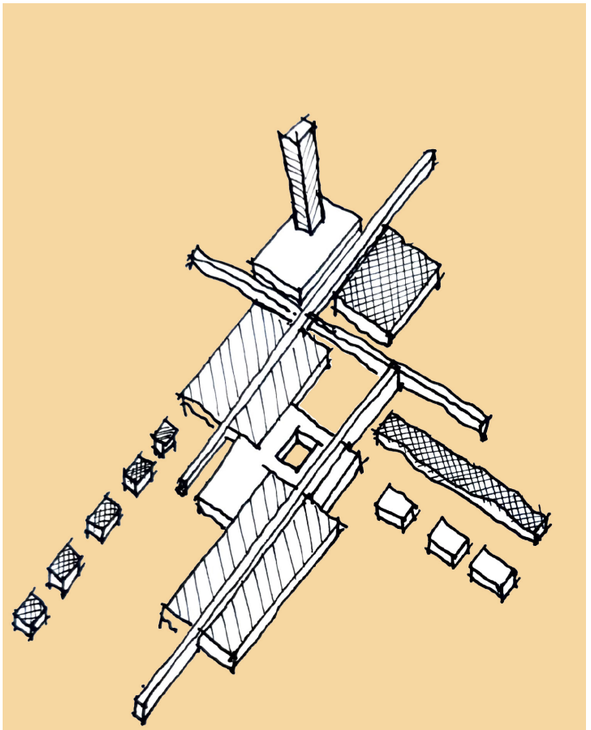


Figure 04: Connecting across boundaries

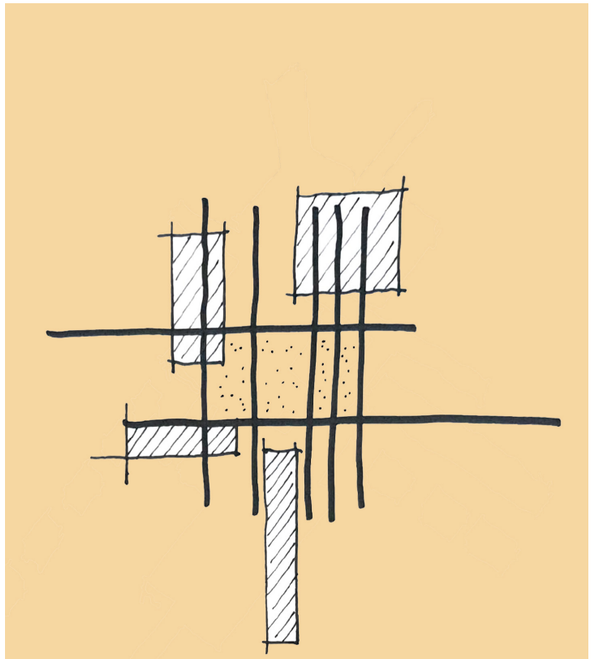


Figure 05: Constructing integration

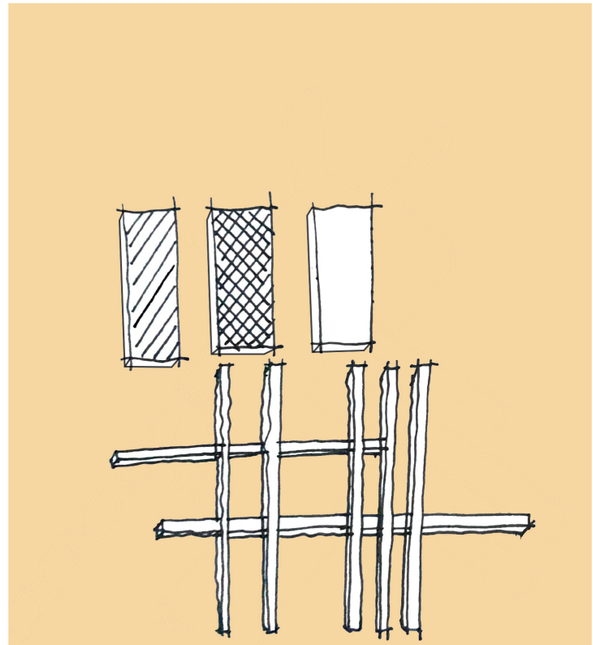


Figure 06: Elements of connectivity

This design dissertation paper is divided into eight sections with subsections; the first section discusses the key concepts of connectivity and disconnectivity. The following section unpacks the structure of Cape Town by analysing the past and future trajectories and proposals by various academics and practitioners on how the city can be improved. The third section analyses the structure of the Voortrekker Road Corridor. Urban Framework and Architectural intent follow this. Section five unpacks two key technological case studies. The following section analyses the urban challenges and proposes an urban strategy for the area. Section six establishes the client and the programmatic plugins for the architectural intervention. The different layers of the design development are unpacked in the following section. The final section focuses on the closing and way forward for the project.

Infrastructure systems are crucial to sustainable city development; therefore, connecting with surrounding communities becomes crucial. However, where infrastructure falls short, architecture is used to bridge that divide. The project aims to create architecture that promotes connectivity between the fragments around infrastructure.

Figure 07: Elsieskraal River before canalisation (Watkyns, n.d)

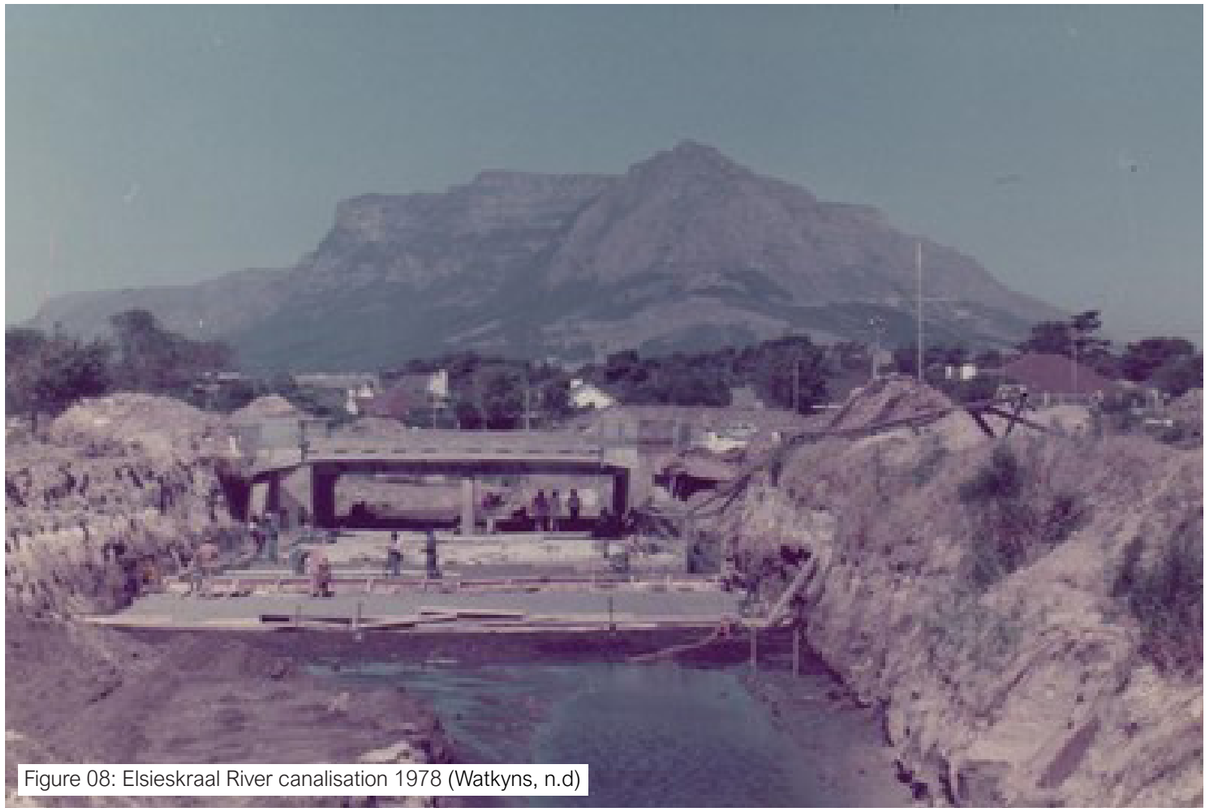


Figure 08: Elsieskraal River canalisation 1978 (Watkyns, n.d)

THE VOORTREKKER ROAD

Curious about what lies beyond Table Bay Harbour, Dutch settlers set out in their first major expedition in 1657 to explore and survey Cape Town. They set out and travelled along the Elsieskraal River and ended up at Tygerberg Hills; this dusty road later became known as Voortrekker Road, forming the main connection between Cape Town and the Northern suburbs (Du Plessis, 1998). Later in 1860, a railway line was built between Voortrekker Road and the Elsieskraal River; this new railway network would later become key in the city's structuring under apartheid and is yet again key in creating a city that's inclusive and accessible for all. The Elsieskraal was vital in establishing the farms along the area, yet; it also had problematic winter floods that would wreak havoc in the surrounding neighbourhoods in later years, leading to the canalisation of the river in 1978 (Watkyns, n.d). With this canalisation plan, the river lost all its biodiversity and has been replaced by grass planes in some areas. The images above show the Elsieskraal River before and after canalisation. Prior to the establishment of Voortrekker road, the Elsieskraal River was frequented by indigenous groups for their watering needs (Walters, 2019).

As Voortrekker Road evolved over the years, so did its cultural identity; it has been home to the Afrikaner and Coloured community and has most recently become home to a thriving East-African community (Unknown, 2016). Over time Voortrekker has become a dense, vibrant road, housing a variety of functions; mixed-use buildings with ground floor business and multi-residential above, office blocks, car dealerships, industrial facilities, schools, clinics, sports fields and police stations. Voortrekker Road Corridor offers a wide variety of opportunities, something for all and is crucial to the development of an integrated and diverse

Figure 09: The Voortrekker Road collage past and present

city, which is what spurred on the GTP initiative by the city. In its research, the GTP has identified the lack of co-working space in the northern suburbs (Greater Tygerberg Partnership, 2020), which means young innovators and entrepreneurs are heading to other areas for these facilities. The collage above (Figure 09) showcases the past developed Voortrekker Road, contrasted with the current state of the Voortrekker Road with all the varying entrepreneurs above. This highlights the ability of the Voortrekker Road to constantly adapt and support entrepreneurs, which adds to the diversity of the area This is a key finding because a large part of the Voortrekker Road's identity was rooted in being an attractive location for entrepreneurs and businesses.

The diversity of services along the Voortrekker Road Corridor attracts people from neighbourhoods all along the corridor. The residents of these neighbourhoods can easily access the corridor by foot and then catch a taxi to their desired destination; however, as pedestrians' movements through spaces constantly change, so do the taxi drivers' routes. The flexibility of taxis is their greatest strength and their greatest flaw, as their flexibility has led to complaints from residents and clamping down by traffic officials. The existing Northern railway line, the canalised Elsieskraal River and the flexible taxi network create an opportunity to develop an integrated infrastructure that serves the surrounding neighbourhoods. Understanding the structure currently operates and where it falls short, presents an opportunity to develop a architectural framework that will improve the relationship between the different systems.

CONNECTIVE DIVISIONS

The key conceptual terms for this thesis exploration are **connection & division**, which have been explored in the models on the right.
The built landscape in the city of Cape Town still finds itself divided into an array of monotonic neighbourhoods. Urban infrastructure was vital in producing space and holding control over that space; the infrastructure reinforced the fragmented cellular structure of neighbours within the city while maintaining the ability to remain inaccessible to the people of those neighbourhoods. This project seeks to develop strategies to connect the fragmented urban infrastructure within the surrounding urban fabric to improve accessibility and diversity within neighbourhoods.

What does it mean to be connected? And what does connectivity entail? The word connect stems from the Latin word 'connectere', which means to join, bind or fasten together. In 1881 France, the word connexer was superseded by connecter, which means to establish a relationship. Division stems from the Latin word 'dividere', which means to force apart, distribute. The terms connection and division will have a dialectical relationship, which will be translated across architectural scales.

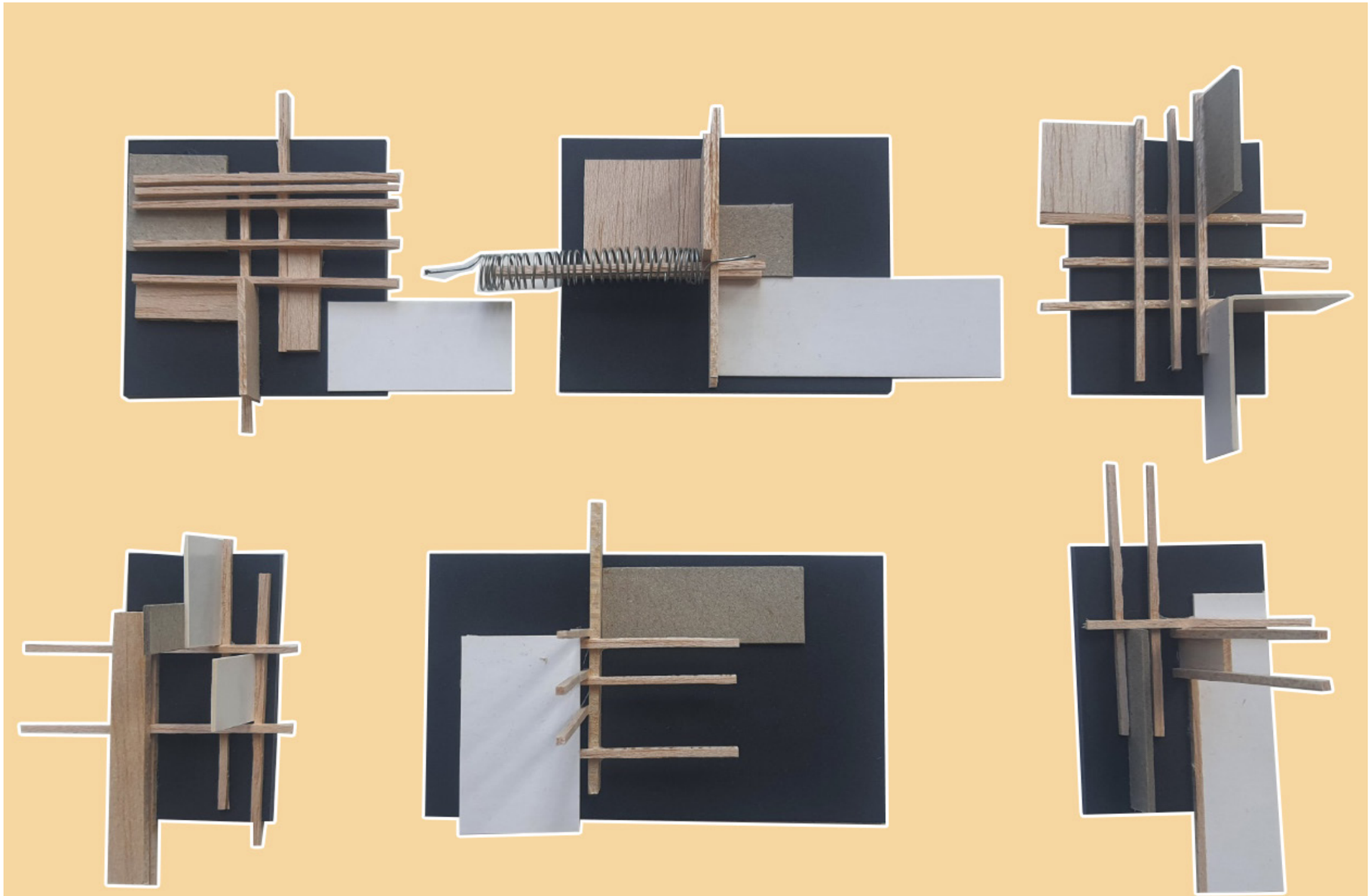


Figure 10: Constructing connection models

"The components of spatial form are no longer complete, isolated addends but fractions of a pre-existing whole. The space does not consist of many units; it is one unit divided into parts or fractions. The parts are incapable of independent existence. They are fractional interior forms suspended or floating within the total space. The clarity of the bounding surfaces of these fragmentary spatial parts is also diminished."

-Paul Frankl, 1914:57, 60

When connecting elements, the first thing that comes to mind is the continuous line; this line creates a relationship between point A and point B. Whenever a line is made, a story is told, a relationship is created, and new divisions are established. As Valentin Mudimbe states, "... a line, real or imaginary, signifies a path, a continuous point, a moving mark" In the case of infrastructure systems, the lines create a network of connectivity which allow resources to be dispersed throughout the city. However, this line of connectivity created a division within the surrounding areas. Over time these divisions have been neglected, and the project will aim to create a relationship between the existing divisions.

Parc de la Villette by Bernard Tschumi is an example of how the superimposed grid of points and lines was used to establish a dialectical relationship through division and connection. In the instance of Cape Town, the division was utilised to inhibit movement, but this inhibited movement will be used to thread together an interconnected architecture.

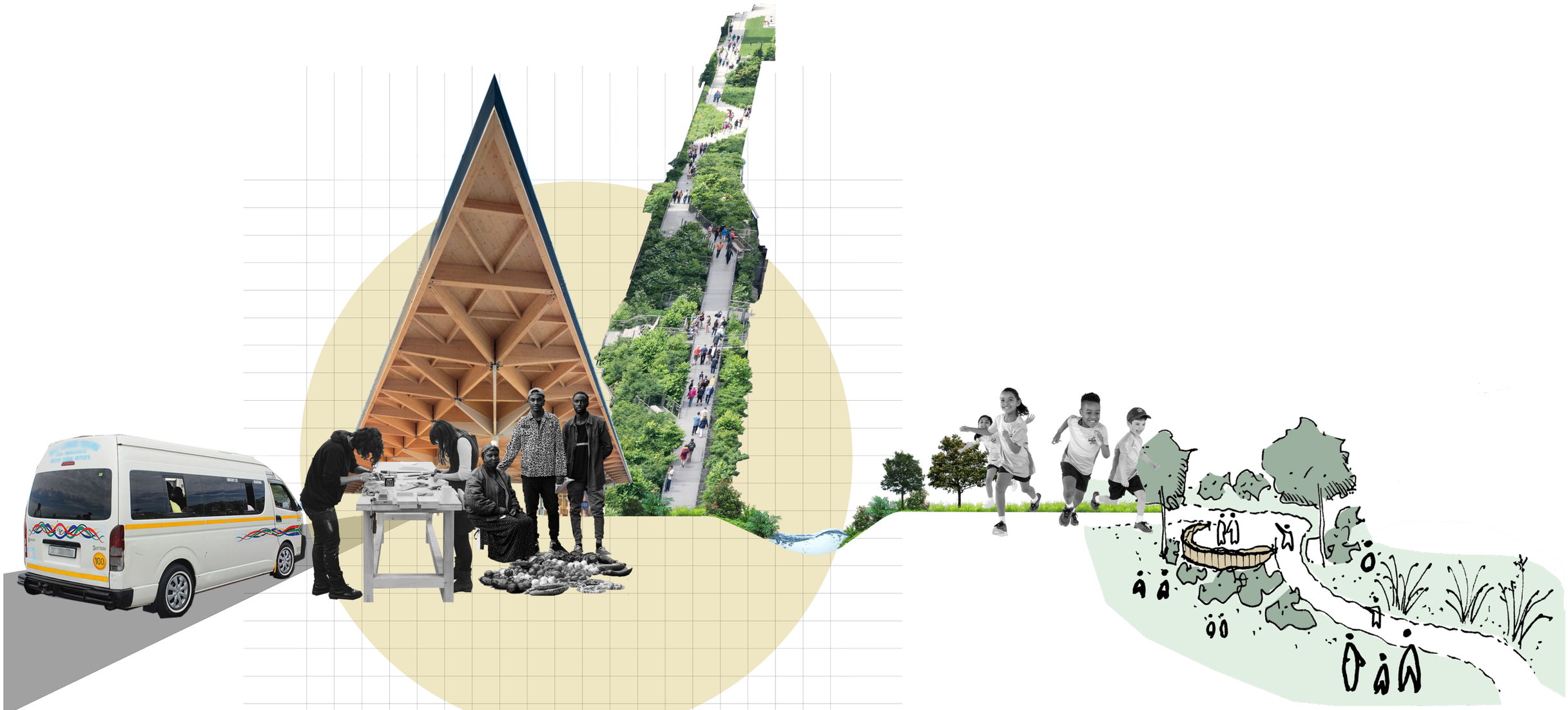


Figure 11: Crafting spatial connections

AN ARCHITECTURE THAT CRAFTS CONNECTIONS

Architecture is a craft which requires that the architect constantly and intricately create and negotiate relationships between elements. These relationships are not just between materials but can be applied across scales. How do buildings interact with their context? What is the relationship between inside and outside? What is the relationship between different spaces? What is the relationship between materials?

In the context of Cape Town, the relationship between infrastructure and contextual environments remain unarticulated. Infrastructure is a line that connects, but creating that connection creates disconnection. The space between the railway and the context is often undefined, creating a disconnect between infrastructure and the context. Infrastructure systems are limited in their function. In this project, the in-between space is viewed as an 'unarticulated joint' which requires architecture to articulate the space. Due to the unrefined nature of the transition between the different spaces around the railway station, the architecture intends to create a smooth connection between all the existing elements in and around the site, allowing users to move between spaces seamlessly. The temporal nature of the railway station means that it is only active during certain times; the design aims to create a sense of permanence by establishing a sense of place that will allow community members to engage with the space in multiple ways.

In summary, the design aims to promote connectivity, create a sense of place and improve transparency. Promoting connectivity amongst people on either side of the railway, between the different transport modes and functions around the site. Establishing a sense of place by building on the existing characteristics of the contextual environment and rejuvenating the existing canalised river to serve the community. The design should be transparent because it invites users and promotes visual access.

Movement is a powerful design tool, and this proposal intends to employ it to develop an architecture that crafts connections and stimulates the flow of people. People shape space, and in turn, those spaces shape people. Therefore it becomes crucial to shape these spaces into positive environments.

02. PAST, PRESENT AND FUTURE

STRUCTURE OF THE CITY

Under the Apartheid regime, ethnic groups were segregated according to their racial classification using spatial planning principles, resulting in spatial mismatches. Apartheid ended in 1994, but its spatial legacy continues reverberating throughout the city and resulting in various socio-economic issues. With one Central Business District and suburban sprawl throughout the city, the spatial layout followed Modernist planning principles by implementing a separation of function. Modernism planning moved away from millennia of settlement-making patterns by shifting away from values of urbanity in exchange for suburbia (Dewar & Todeschini, 2004). Infrastructure systems were key to implementing suburbia ideals and spatial segregation; communities were divided into cellular structures, with infrastructure buffers between them (Watson, 2001) as seen in the cellular structure diagram to the right. These planning principles were, however, in line with international planning principles at the time, where planned neighbourhoods were divided by green infrastructure belts (Wilkinson, 1996). The areas could be described as low-density and monofunctional, meaning people had to travel long distances for work or to recreational areas. In the book South African Cities: A Manifesto for Change by Roelof Uytenbogaardt and Dawid Dewar, the authors call for a change in spatial planning that will improve the lives of all South Africans.

“A compact, intensive and convenient city which operates as an integrated system, which works well at the level of the lowest common denominator (people on foot), which makes maximum use of limited resources, and which is respectful of its beautiful natural settings.”

-Dewar & Uytenbogaardt 1991

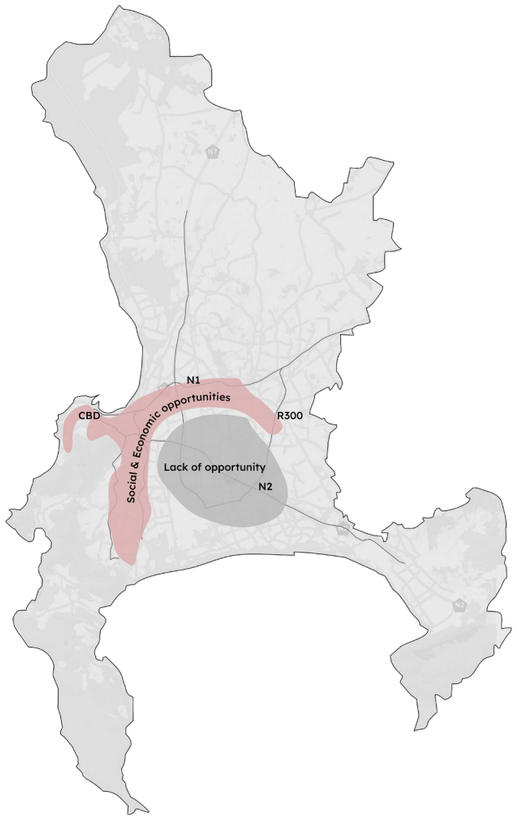


Figure 12: Past Spatial structure based on 1996 Technical Report by CoCT

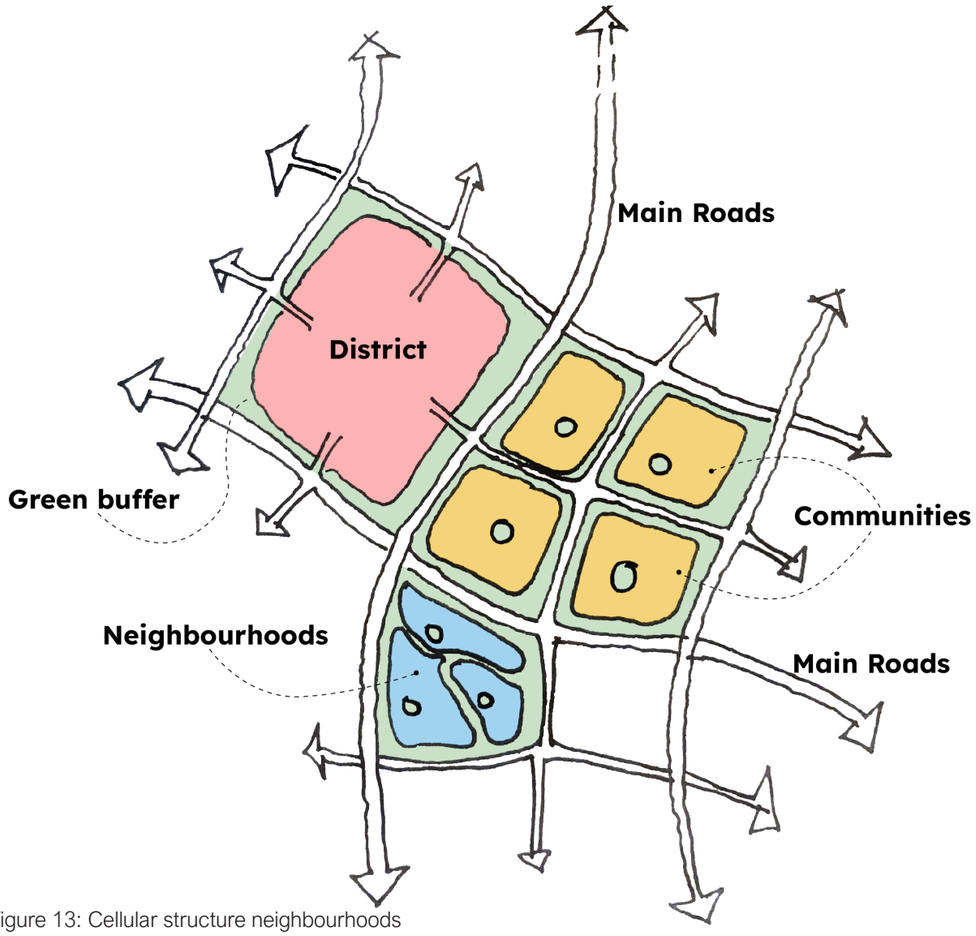


Figure 13: Cellular structure neighbourhoods

Vanessa Watson later repeated these sentiments, that Cape Town should become a Compact and Integrated city. Many argued that Cape Town was too large for a dense and compact city. However, in its current capacity, this system has not proven fruitful to the City of Cape Town and has instead reinforced socio-economic inequalities. The inadequacy of the existing spatial structure requires the internal spatial restructuring of the city to achieve a compact, dense and integrated city as outlined by Dewar and Uytenbogaardt (Watson, 2001). Therefore, understanding the fundamental components of Dewar and Uytenbogaardt’s manifesto becomes crucial to improving the city. The approach of Dewar and Uyenbogaardt’s manifesto was rooted in humanist needs, meaning that urban structure and form should be an enabler of this.

“The methodological sequence that underpins all physical design decisions: need; programme; ideas and context is the basis for a coherent approach to urban development.”

-Dewar & Uytenbogaardt 1991

When analysing the layer of needs, there are four layers of needs crucial to managing the growth: *urban generation, access, promotion of collective activities and contact, and individual needs.* Authors, Dewar and Uytenbogaardt, highlight that some of these principles stem from the **raison d’etre** of cities. The need of Urban generation refers to the economic, social, cultural and recreational opportunities cities can generate through their population density. By having this density, cities can generate an urban experience for all who come to cities. The need of Access refers to the ease of access to the opportunities

Figure 14: Progressive development around Interchange points on based on Andrew sketch, 2002

in the city; creating opportunities and facilities without adequate accessibility is counterproductive and would not aid the urban development of any city. The need of Promotion of collective activities and contact, which creates opportunities for social contact and interaction, is crucial to urban development. Intensifying and diversifying the city allows it to meet a wide array of needs, thereby increasing urban liveliness. The final need is Individual needs, which refers to fundamental needs such as physical needs, social needs, psychological needs and sensory needs, obtaining these needs requires freedom of decision-making. Looking at these needs, it's important to understand the relationship between the people and the built environment; the above needs show that built environments can become enablers that create the opportunity for human life to flourish, whilst neglecting these needs can harm the development of the urban form and those inhabiting those spaces. When looking at the principles developed by Dewar and Uytenbogaardt, one can easily draw relationships with the Production of Space theory by Henri Lefebvre, who notes how that its important to understand how produced space influences the lives of those experiencing it.

Shaping Cape Town to become an integrated and inclusive city is essential to ensure the city's sustainable development. The complexity of a city does not allow it to be easily changed and requires a long-term strategy with consistent implementation. The book Integration Syndicate by Edgar Pieterse acknowledges the challenges of spatial segregation, inequality and the gentrification process, which emerge once private developers enter the conversation. Contributing authors propose five provocations in the book; embracing the evolved minibus taxi, living differently by placing a moratorium on sprawl, weaving cultural narratives among the youth, placemaking through public works and digitally-enabled social power. When overlaying these provocations with the writings of Watson, Dewar and Uytenbogaardt, overlapping principles appear; there's a clear position on limiting urban sprawl by utilising density and creating a diverse urban fabric that fulfils a variety of needs that an integrated transport network would support. The Progressive Interchange sketch above shows how interchange points in the city can become dense and diverse. This progressive development around interchange points maximises transit infrastructure systems and improves accessibility for neighbouring communities. The ideas highlighted in the writings of Uytenbogaardt, Dewar and Pieterse could be implemented broadly across an area. However, the progressive interchange idea allows all those ideas to be condensed into one area that develops over time, which can also be interconnected to similar areas through the infrastructure network.

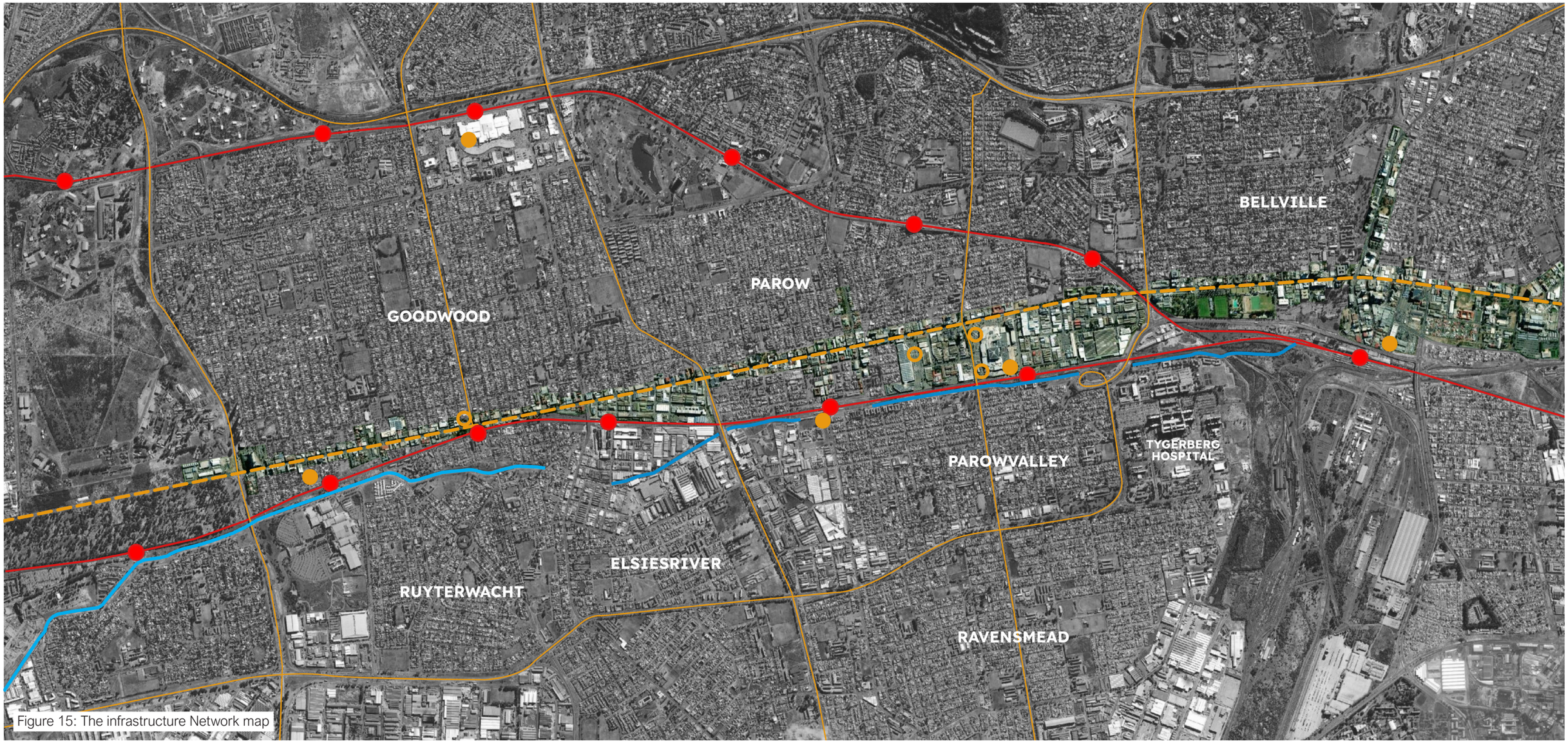


Figure 15: The infrastructure Network map

INFRASTRUCTURE NETWORK

The Infrastructure Network map above shows various infrastructure networks operating in and around the VRC. However, there are various networks, each operating within its own silo. The road networks provide access to areas, but these road networks and the railway line create cellular neighbourhoods with limited access. The railway line acts as a space separator and limits access for communities below the railway line, while above is the ease of access to the VRC. Although the taxis operate near the railway line, there is a lack of taxi ranks around many of the stations, leading to informal taxi ranks development. Residents have complained about this, which has led to taxis being clamped down by traffic officials. The Elsieskraal River, which runs below the railway line, was a water source for the indigenous people of the area, but due to canalisation, the river is not frequented anymore. Creating a connection between the disconnected taxi, rail and river infrastructure is an opportunity to diffuse the disconnect caused by the railway line and the buffer elements on either side.

The fluctuating VRC band has become a well-established corridor with its unique character and traits, and the infrastructure network around it supported its growth and development. The following sections unpack the character of the VRC and what draws people to it.

CHARACTER MAP

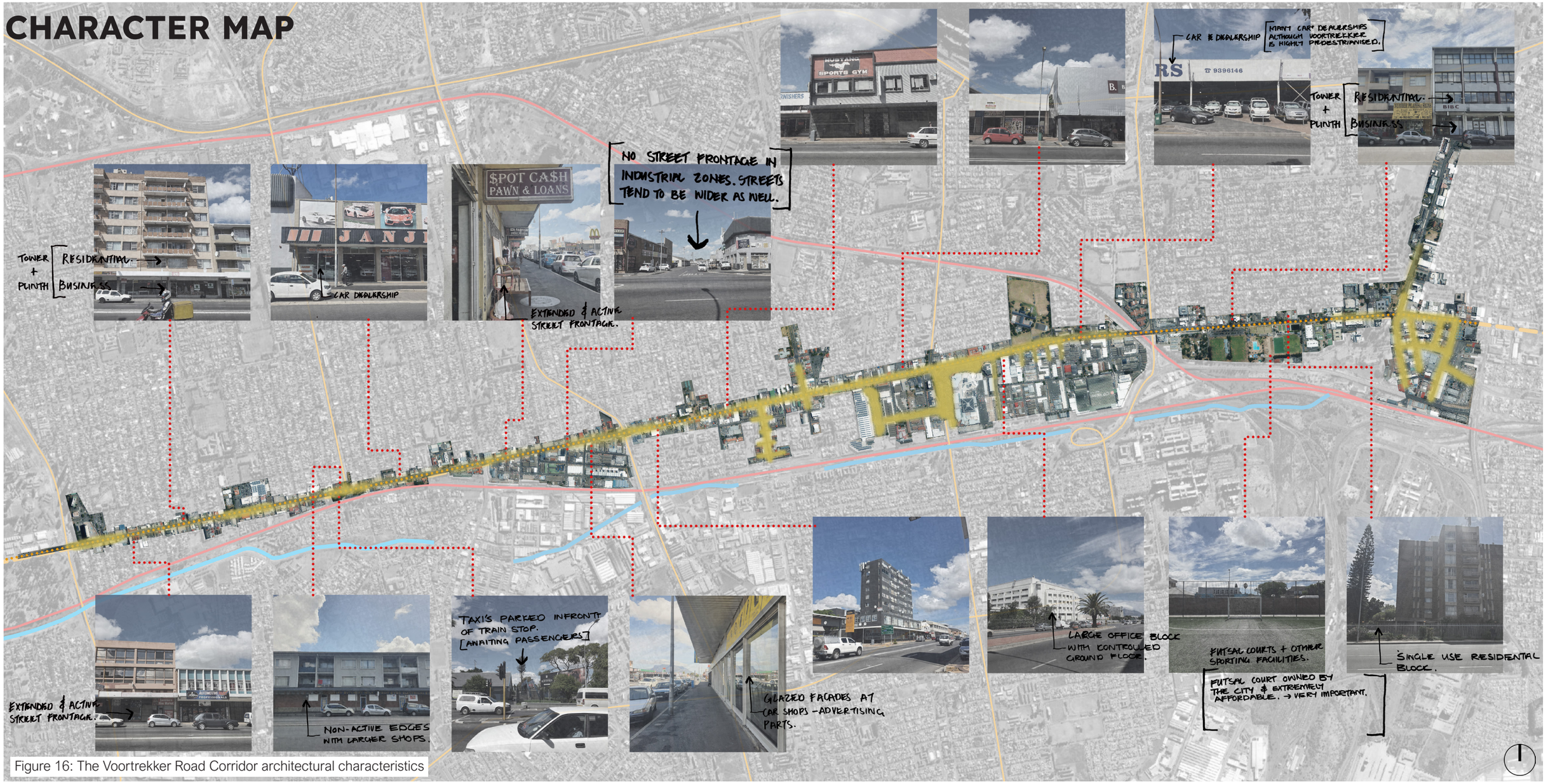


Figure 16: The Voortrekker Road Corridor architectural characteristics

The Character Map above showcased the diversity of functions along the VRC between Goodwood and Parow. As previously mentioned, the VRC is a dense, vibrant road, housing a variety of functions; mixed-use buildings with ground floor business and multi-residential above, office blocks, car dealerships, industrial facilities, schools, clinics, sports fields and police stations. When walking down the VRC, it becomes quite noticeable that some areas tend to be more residential, business or industrial zones; this impacts how the street frontage has been treated. Whilst walking down the VRC, vibrancy and pedestrian activity was recorded, this is shown in faded yellow on the map above and the building function and treatment of the street frontage influence activity along this corridor. The business areas tend to have a covered street frontage, allowing businesses to extend into the street, and another key feature is that glazing is frequently used to make it more inviting to pedestrians. In the industrial areas, things are different, streets tend to be slightly wider to accommodate freight vehicles and street parking for employees. The facades of these buildings are not as inviting and often just have one main opening with no windows, and these areas tend to have less pedestrian foot traffic, except during peak hours when pedestrians commute home. The diverse function of the VRC has also resulted in diverse foot traffic. The strength of the VRC is its density and diversity; however, this density and diversity can increase to create access for more people and businesses, allowing the VRC to remain functional for longer hours.

The character map does not reflect the different zoning categories around the VRC and mainly focuses on highlighting the different building variations and their impact on pedestrian activity. The following focuses on unpacking the zoning along the VRC.

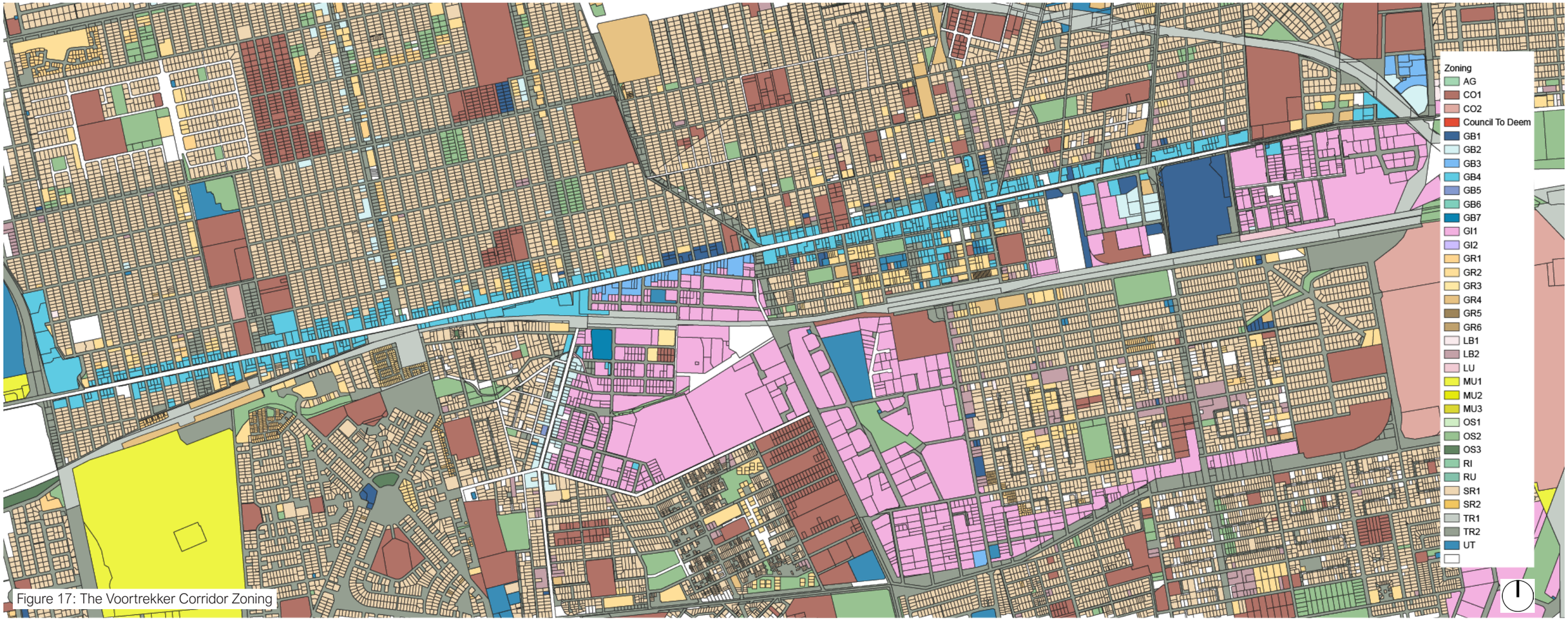


Figure 17: The Voortrekker Corridor Zoning

ZONING MAP

The Zoning map above focuses on the VRC and surrounding neighbourhoods. Looking at the map, it becomes clear that density and diversity mainly occur along Voortrekker Road. Due to the fluctuating nature of the railway line, it allows the dense and diverse character to increase in some areas along the road. The make-up of this area is a dense and diverse fabric consisting of general business (shades of blue), general residential (shades of brown) industrial (Pink) zoned areas. As it moves away from Voortrekker Road, the density and diversity dissipate, and the suburbs are mainly zoned as single residential, meaning one plot, one house. The lack of diversity in the suburbs draws residents to the VRC because it caters for many of their needs. This diversity of the VRC does not only offer services but job opportunities as well, and this was part of the key principles during the establishment of Parow, which will be discussed later.

With the VRC being a well-established, dense and diverse corridor, the City of Cape Town aims to utilise this to improve accessibility and create new opportunities for communities beyond the city. The VRC is a key component in the city's long-term plans and will be unpacked in the following section.

FUTURE TRAJECTORY

The City of Cape Town's 2018 Municipal Spatial Development Framework (City of Cape Town, 2018) clearly outlines the city's spatial vision and development goal to develop a reconstructed and inclusive spatial environment. To ensure that the city's urban structure can grow sustainably over the long term, it has developed a strategy around; well located nodes, reinforcing transit-oriented corridors and coupling existing and new nodes through infrastructure. The spatial development framework intends to grow Cape Town into an intense, diverse and integrated city that is easily accessible for all whilst protecting and maintaining the city's environmental assets. To achieve these goals, the city intends to partner with public and private sector role players; however, what often happens when private sector role players are involved in development is that public spaces become privatized and controlled. The process whereby networked public infrastructure becomes privatized is known as splintering urbanism; when this comes about it begins to restrict and limit access to people from certain backgrounds. Splintering urbanism is defined as an urban development process in which infrastructural networks become progressively unbundled and differentiated, establishing a patchwork of "premium networked spaces" and

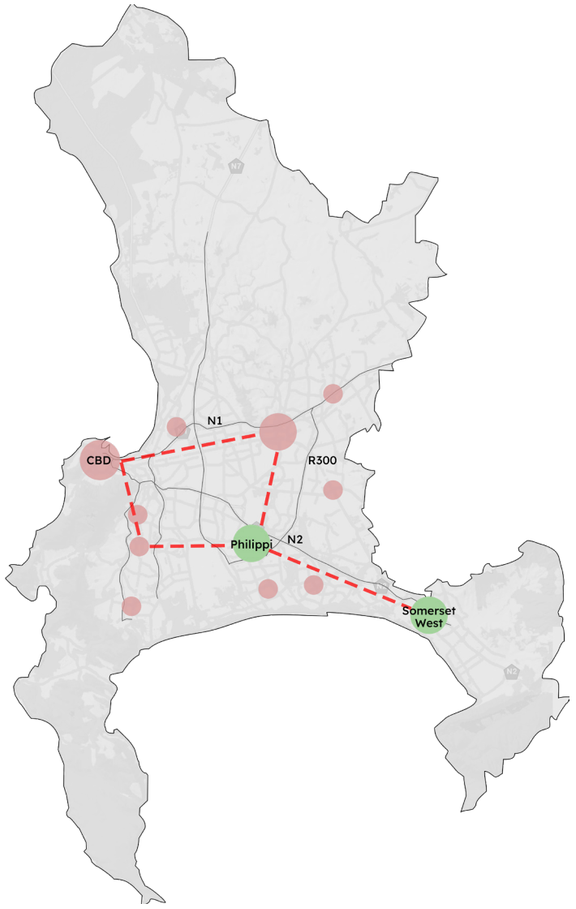


Figure 18: Multi-nodal city

The City of Cape Town aims to develop a multi-nodal city to ensure the sustainable development of the city.

"residual spaces" (Graham et al., 2001). Transit Oriented Development requires the city to develop an integrated transit system encompassing rail, motorised and non-motorised transit networks, allowing commuters to access transport modes easily. A critical component in establishing Transit Oriented Development in Cape Town is the development corridors and the nodes; there are two existing established development corridors, firstly the Voortrekker Corridor, which connects to the Northern suburbs and the Main road corridor, which connects to the Southern suburbs.

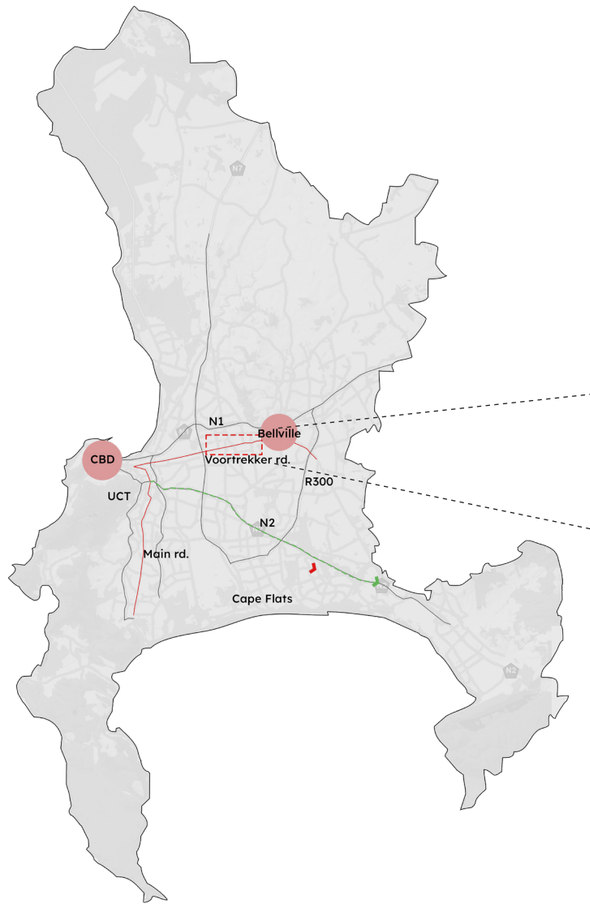


Figure 19: Development Corridors

The existing transit corridors - Main road & Voortrekker road which are key to the development of the multi-nodal city

Development corridors will allow the city to improve access to needs and utilise transit infrastructure networks to their full potential. These corridors are high-intensity urban routes centred around an integrated hierarchical transport system. Together with the transit nodes, areas within 500m walking distance will be referred to as **Transit-Accessible Precincts** (TAPS), with these Precincts acting as generators and attractors for pedestrians' activity. The MSDF defines TAPs as zones around Transit Orientated Development (TOD) which are part of the city's long-term transport development strategy

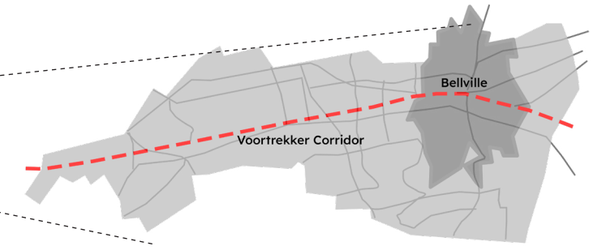


Figure 20: The Voortrekker corridor

Voortrekker road stretches 17km and acts as a key link between Cape Town CBD and Bellville CBD

(City of Cape Town, 2018). All these components - development corridors, nodes and transport infrastructure- are necessary for the growth of a multi-nodal city, shifting away from the current model. The multi-nodal spatial layout aims to improve accessibility for all members of society, thereby alleviating socio-economic challenges.

Figure 21: Economic Development
Support for informal traders at transit stations (GTP, 2023)

Figure 23: Urban Regeneration
Cleaning up of Elizabeth Park (GTP. 2023)

THE GREATER TYGERBERG PARTNERSHIP

Figure 22: Social Development
Local urban food garden to support the homeless & jobless adults (GTP, 2021)

Figure 24: Safety & Security
The City of Cape Town aims to develop a multi-nodal city to ensure the sustainable development of the city. (GTP, 2022)

Anchored by the Cape Town CBD on one end and Bellville CBD on the other, the Voortrekker corridor is crucial in establishing Bellville as the city's second CBD. The Voortrekker Corridor currently has a mix of ground-level business with apartments above and industrial portions; the areas away from the corridor lack diversity and are currently only single-plot residential units. There are opportunities along Voortrekker Road Corridor where density, diversity and access can be increased, reinforcing Voortrekker Road Corridor as a key feeder route for Bellville CBD.
The Greater Tygerberg Partnership (GTP) public-private partnership aims to create a prosperous, inclusive and sustainable city through the means of urban regeneration and new investment opportunities for businesses. Regeneration efforts will focus on the public realm, social, economic, utility and mobility infrastructure while also aiming to address high crime activities. Investments opportunities will focus on education, manufacturing, healthcare and commercial opportunities.
The various projects which the GTP has undertaken include;

Economic development: Providing access to funding, mentorship, and networking opportunities for businesses in the area.

Urban regeneration: Renovation and upliftment of existing infrastructure, public spaces, and the arts.

Transport and mobility: Providing more public transport options and adding bicycle and pedestrian mobility infrastructure.

Social development: Providing support to social upliftment programmes such as programmes that improve the lives of residents and provide access to education, healthcare, and social services.

Safety and security: Improving safety and security for local residents, businesses and visitors to the area
In establishing Bellville as the second CBD in Cape Town, Voortrekker Road Corridor will also need to improve. To do this, understanding the background of Voortrekker Corridor is crucial.

As previously mentioned, the VRC is crucial in establishing Bellville as the city's second CBD, but to achieve this, its important to understand the structure of the VRC. The aim of understanding the structure of the VRC is to understand where the VRC can be improved so that it can become more accessible and provide opportunities for more people, this will reinforce the VRC as the key feeder route to Bellville CBD—using Bill Hillier's Space Syntax methodological framework and other methods to understand the place's character, which the Space Syntax toolkit does not do. The intention is not to highlight which structural elements of the city need to be discarded but to highlight which elements can be adapted to improve the city.

03. STRUCTURAL ANALYSIS

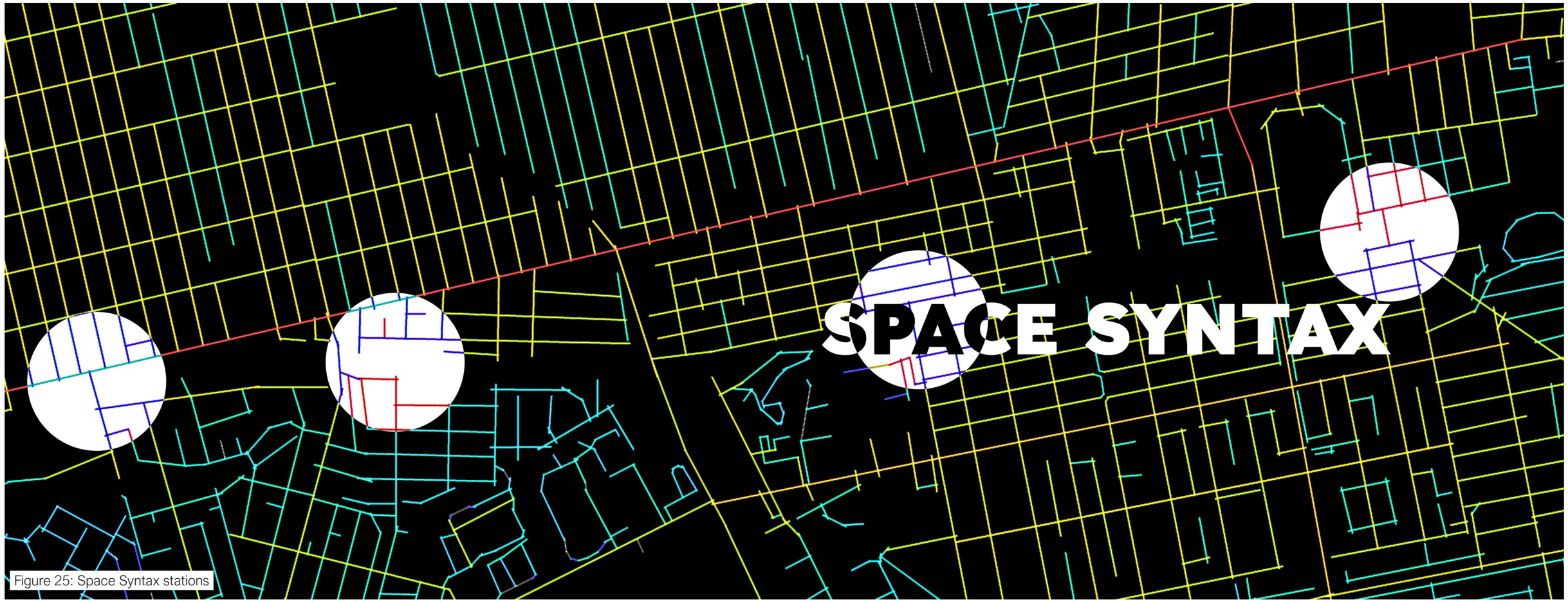


Figure 25: Space Syntax stations

SPACE SYNTAX

Cities are complex structures, especially the composition of the VRC; although the corridor offers many opportunities, it also has its challenges. The Space Syntax framework will be key in understanding the structure of the corridor, which assist in identifying strategic intervention points.

During the 1970s, while at UCL in London, Bill Hillier and Julienne Hanson developed Space Syntax. Space syntax is a theoretical and methodological framework for analysing spatial relationships at various scales (Hillier et al., 1976). The Space Syntax toolkit consists of multiple techniques which can be applied individually or in combinations, depending on the research goals; the techniques are also scale-specific, ranging from the broad city scale down to the spatial relationships within a building. The toolkit consists of principles from architecture, urban planning, sociology and computer science, which allows the researcher to understand how the organisation of buildings influence social relations.
The toolkit allows researchers and designers to measure how spatial networks relate to functional patterns such as pedestrian and vehicular movement, land use, crime and social well-being. The various techniques allow it to be applied to office furniture layouts to improve collaboration interactions and analyse urban systems (van Nes & Yamu, 2021). Similarly, it can also be used to compare before and after conditions in spatial environments.
Space syntax is classified as an Urban Network analysis; because of this, it cannot measure identity, character and the spatial order of a place; however, this shortcoming allows it to be used in combination with the urban morphology and place phenomenology theories. It is also key to note that Space syntax analyses spatial structures, not spatial patterns (van Nes & Yamu, 2021).

The key principles of space syntax include;

Spatial configuration analysis: How the spatial configuration of an area shapes and influences movement and social relations within an area
Integration and connectivity analysis: How spaces integrate and connect within an area
Topological analysis: Connectivity between spaces
Global and local analysis: To understand the relationship between elements in relation to their local and global context.

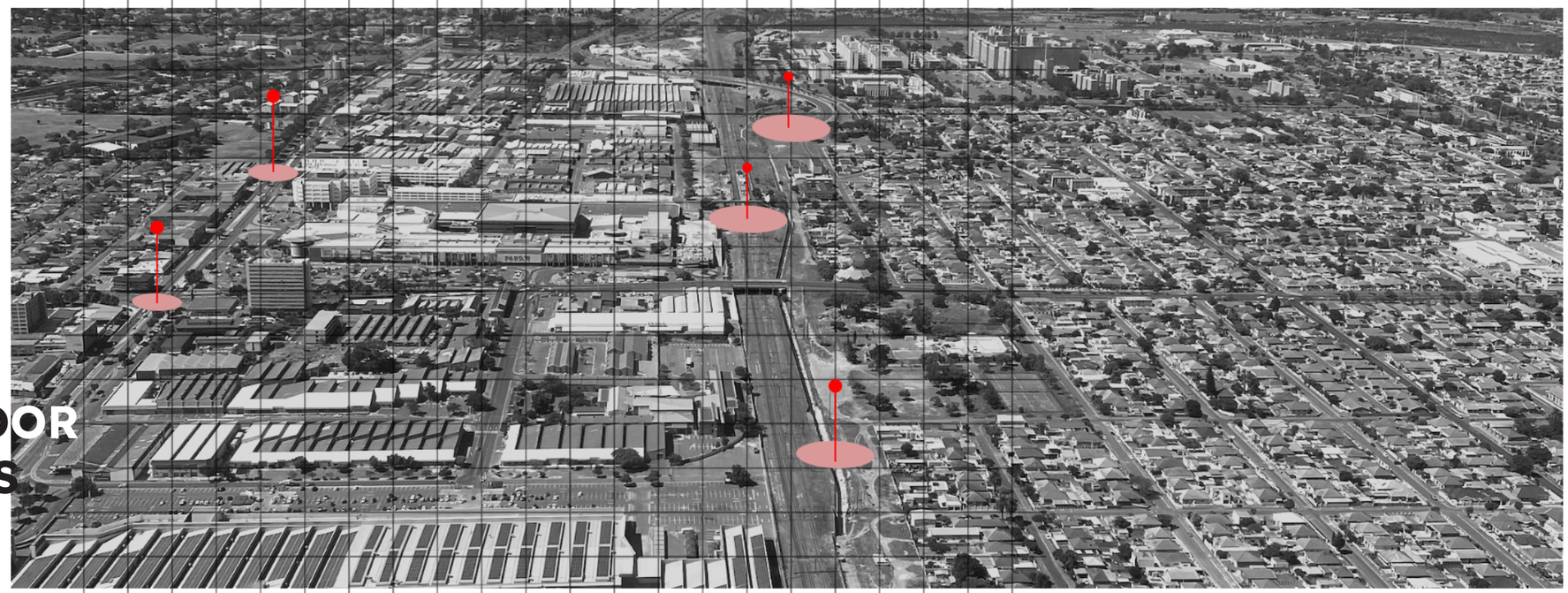


Figure 26: The Voortrekker Road Corridor strategic structural connections (Adapted from, Our Future Cities, n.d)

VOORTREKKER CORRIDOR SYNTACTICAL ANALYSIS

The intent of the syntactical analysis is to understand the spatial structure of the Voortrekker Road Corridor and identify possible areas of intervention. Because Space Syntax does not map the area's character, Voortrekker's character will be mapped using photography and sketches. due to this being an Architecture Thesis, the analysis will not go into the mathematical and statistics analytics of the methodology. The analysis methods have been listed below, and this will be done with the assistance of the Space Syntax software Depthmap.

METHODS OF ANALYSIS:

Linear mapping:

Use the three-step method to understand the accessibility levels of the street network in and around Voortrekker. Doing this will give an understanding of the network structure of the neighbourhoods parallel to Voortrekker Road. This method can be applied at a local and global scale.

Orientation and wayfinding:

This analysis will use isovist mapping and photography of routes leading to points of intersection (railway station or taxi interchange) to understand what pedestrians experience. The data will contrast the wayfinding paths between the two opposing areas.

Natural surveillance & urban liveliness -micro-scale analysis:

Mapping the entrance density in and around the acupuncture points will give an understanding of the treatment of the existing fabric that has influenced the pedestrian movement.

Measuring the constitutedness and unconstitutedness of buildings around public space to compare this pedestrian movement

Other:

Mapping the character of the place through photography and sketching.

CORRIDOR INTEGRATION

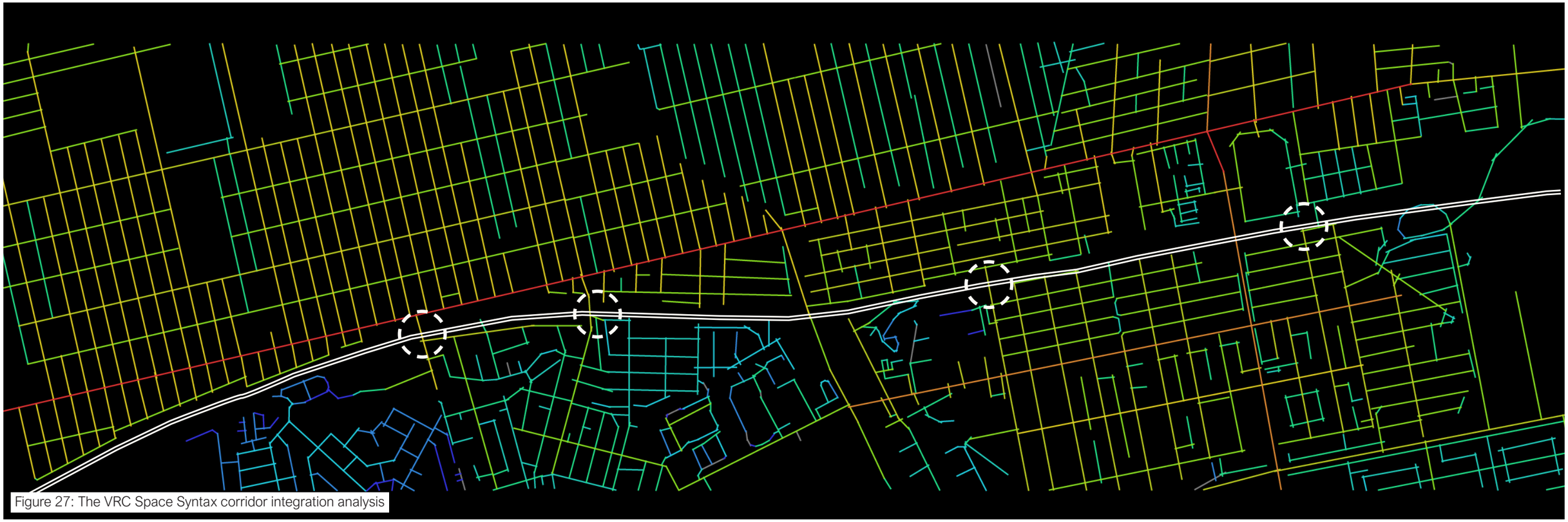


Figure 27: The VRC Space Syntax corridor integration analysis

The map above analyses the street network integration, intending to understand accessibility. The degree of integration differs for the neighbourhoods parallel to Voortrekker Road. The neighbourhoods above Voortrekker, namely Goodwood and Parow, have a high degree of accessibility, mostly in orange and dark green. The areas below Voortrekker Road, Ruyterwacht, Elsiesriver and Parow Valley all show a lower level of connectivity. This limited connectivity is due to the railway line flowing seamlessly beside the corridor. The railway acts as a space bridge, however, where there are space bridges, there should be a high degree of accessibility and density which supports the accessibility (Dewar & Todeschini, 2004). The railway stations are key points of access for neighbourhoods below the railway. The railway stations are also where illegal taxi ranks are formed in response to pedestrian movement between the modes of transport. However, the stations only function temporally, meaning there is only movement and activity during certain times at set intervals. Accessibility to these railway stations also influences pedestrian usage, this requires an analysis of the structural layouts of the surrounding suburbs.

Orthogonal grid layout

Organic grid layout

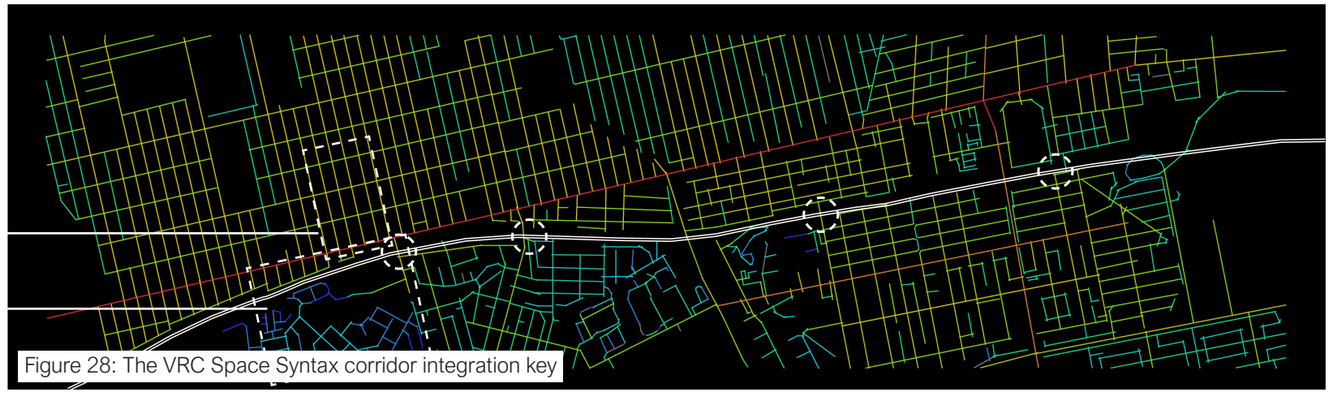


Figure 28: The VRC Space Syntax corridor integration key

Figure 29: Wayfinding aerial ortho grid layout

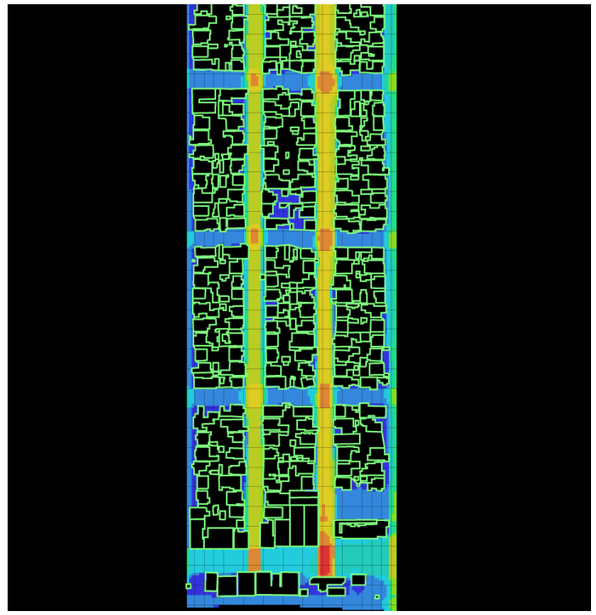


Figure 30: Wayfinding analysis ortho grid layout

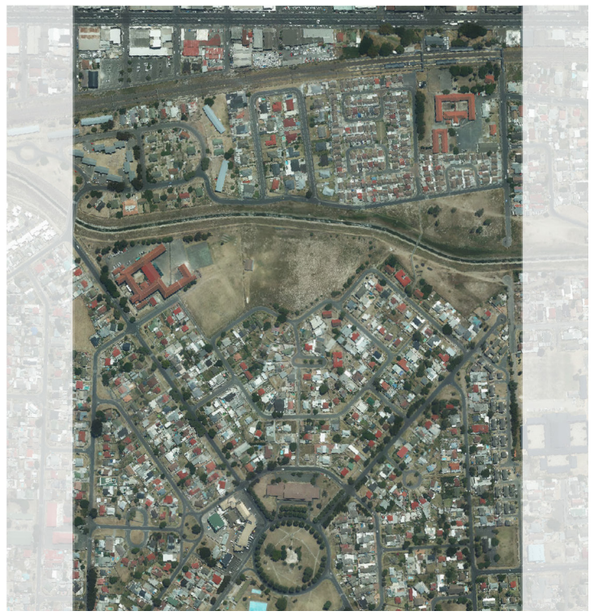


Figure 31: Wayfinding aerial organic grid layout

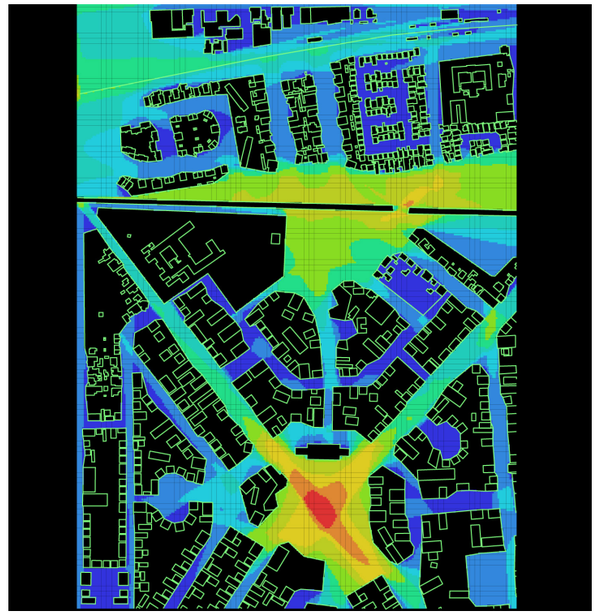


Figure 32: Wayfinding analysis organic grid layout

WAYFINDING ANALYSIS

The wayfinding analysis maps above are focused on analysing the structure of the neighbourhood grids, which influences how people navigate through spaces, spaces which are easy to navigate tend to attract more pedestrians than places which are challenging to navigate. The structural layout of the neighbourhoods is also different; most areas use an orthogonal grid layout, whereas Ruyterwacht, Elsiesriver uses an organic grid. This impacts wayfinding in areas. In the orientation and wayfinding maps for the two different grids, wayfinding for pedestrians is way easier where the orthogonal grid has been implemented and much more complicated where the organic grid has been employed. The maps have been contrasted with an aerial overview, which does not highlight this, but the wayfinding maps extract that information based on the structure. With the orthogonal grid, these routes play a vital role in attracting pedestrians to places and should be utilised with this in mind. In the case of the organic grid, it becomes important to understand how pedestrians move through space and how urban architectural interventions can improve wayfinding in areas which might be difficult to navigate.

These grids are key in creating connectivity across the infrastructure space bridges. expanding the function and possibility of infrastructure will allow it to integrate the surrounding neighbourhoods; to implement this, possible areas of intervention need to be carefully considered and identified.

04. TRANSIT ACCESSIBLE PRECINCTS

Figure 33: The VRC Transit Precincts

TRANSIT ACCESSIBLE PRECINCTS

Vasco Station, Parow Station & Tygerberg Station are three identified interchange points with a range of diversity and density around them. However, they remained disconnected from the nearby infrastructure: the informal taxi ranks, the neglected Elsieskraal River and the surrounding communities. These interchange points become points of opportunity simply because of the mixture of movement around them; the railway attracts pedestrians, the taxis transport commuters to and from and the train, which has pulsating flow bringing and taking commuters at set intervals. These infrastructures operate individually, creating an opportunity to craft urban architecture that connects the different layers of infrastructure whilst stimulating the flow of people. The three stations, in combination with the existing infrastructure, can become compact, intense and integrated TAPS which weaves together the community urban fabric which the railway line has segregated. Although these three TAPS have similar features, there are grounded conditions which make them distinct from each other, the next section will unpack the grounded conditions.

These three TAPS offer an opportunity to improve access and diversity but also need to respond to the area's specific conditions to improve the urban fabric's continuity.

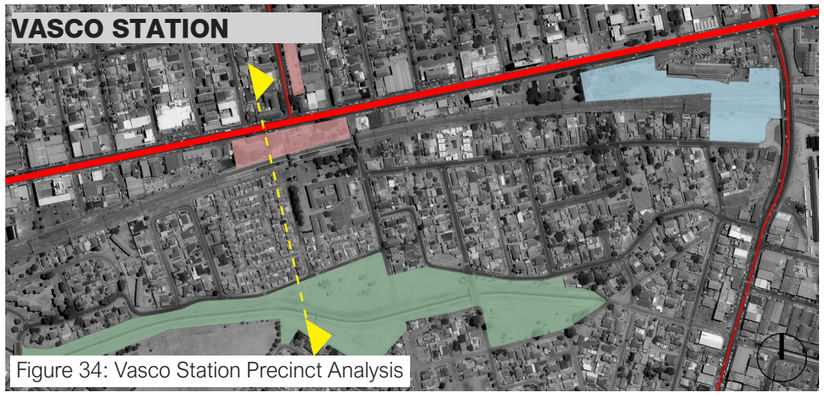


Figure 34: Vasco Station Precinct Analysis

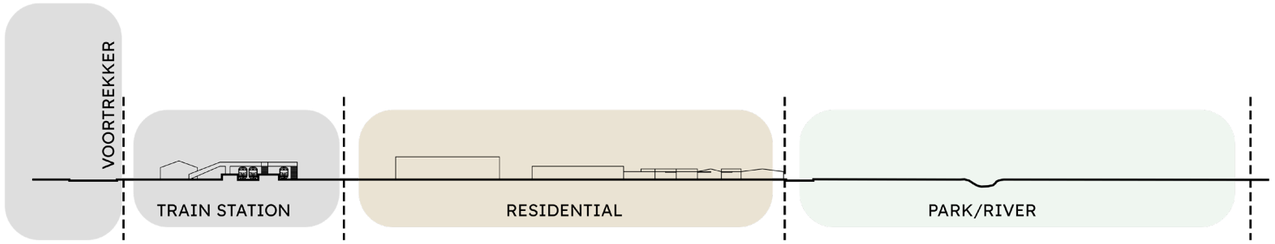


Figure 35: Vasco Station Precinct Site Section

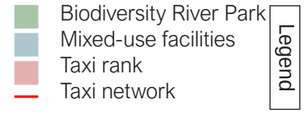



Figure 36: Vasco Station Entrance (Google Maps, 2023)


Figure 37: Vasco Boulevard (Google Maps, 2023)


Figure 38: Elsieskraal River (Google Maps, 2023)

PRECINCT 01 - VASCO STATION

Unlike the other stations, Vasco station is situated right on the doorstep of Voortrekker Road, where it intersects with Vasco Boulevard. The station is flanked by two large spacious gardens allowing commuters to move freely in and around the building. The taxis have claimed two areas on Voortrekker Road and Vasco Boulevard, where they park and wait for passengers. The buildings on Voortrekker Road and Vasco Boulevard are mainly mixed-use, comprising ground-floor businesses and residential apartments above. Due to the pedestrian and transit activity at this intersection, the stores along this intersection experience good foot traffic - all of this creates a high level of urban liveliness for the area. The opposing side of the railway station paints a different picture, it is a residential area with a school in close proximity to the station. For residents the station, becomes an important point of access to Voortrekker Road with all its services. Suburb sprawl and other safety factors has led to the development of pedestrians desire lines across the railway lines and open parcels of land around the railway line. A portion of the Elsieskraal River situated close to the railway station is currently used as grass covered park with limited access across the canalised river, so this does not allow visitors to safely interact with the river for any recreational uses. The main opportunity within this precinct lies in the connecting the garden of the station to the Elsieskraal River and back into the neighbourhood to create a green network. The other opportunity is the vacant sites along the railway line between industrial buildings and the taxi parking areas.

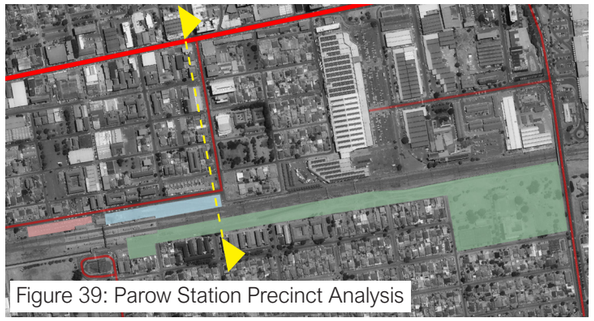


Figure 39: Parow Station Precinct Analysis

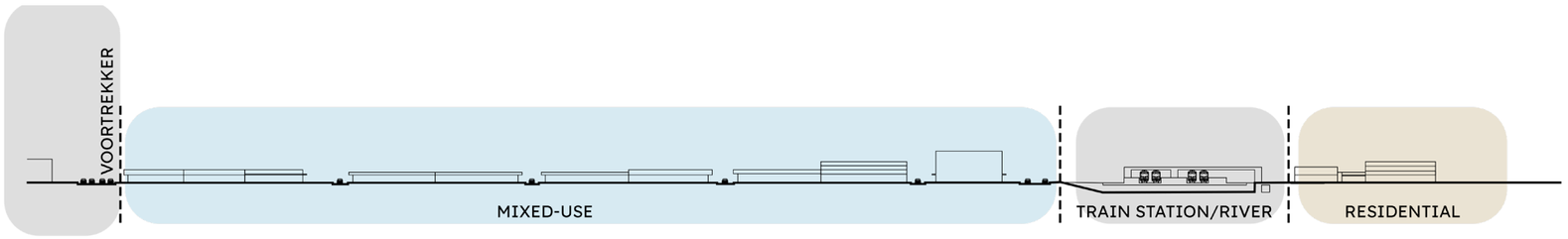


Figure 40: Parow Station Precinct site section

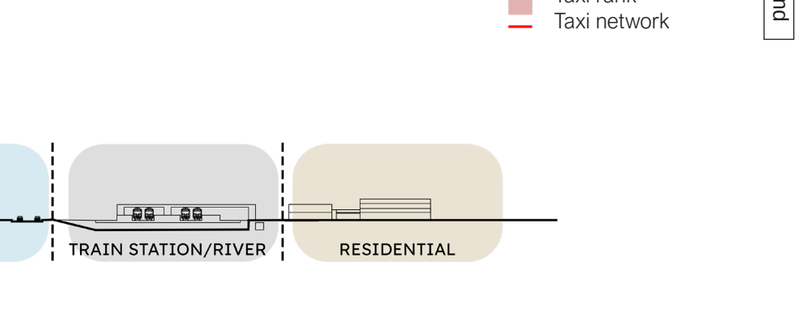


Figure 41: Elsieskraal River (Google Maps, 2023)

Figure 42: Parow Station Entrance (Google Maps, 2023)

Figure 43: Station road shopping street (Google Maps, 2023)

PRECINCT 02 - PAROW STATION

Situated off Voortrekker Road, the historic Parow station is a bustling and busy stop, in recent years parts of the station building has been fenced up. The station has an overpass bridge, along with an underground tunnel, allowing commuters access to the platforms, the other allows pedestrians to pass through the station without getting mixed up with the commuters. Connecting Parow Station to Voortrekker road, is the pedestrianised Station Arcade street, this street has is flanked on either end by mixed-use buildings with ground floor business which open directly onto the road and with additional demarcated space where informal traders can setup shop, this vibrant street is directly fed by train and taxi commuters. The pedestrian movement around this station has similarly resulted in the development of an informal taxi rank on the open parcels of land next to the station. This makes it accessible for the commuters to navigate between transport modes, whilst also supporting the local businesses in this corridor. This well-established trading corridor, offers a great opportunity for small businesses and traders because there is a constant flow of people through the corridor even though it happens in set intervals. Connecting to the station on the other end is Connaught road which is comprised of industrial building which attracts a lot of foot traffic due to the amount of people it employs. Right next to the station is the Elsieskraal River, which is directed underground next to the station and is later revealed again. With portions of high density apartments next to the river, it presents an opportunity to improve the river so that it serves the community and that it does not become a privatized asset. Similarly as what was found at Vasco Station, is the presence of the desire lines which run around and across the railway line. The established economic corridors leading to the station has led to a great amount of urban liveliness in the area and would greatly support an architectural invention in and around the existing train station.

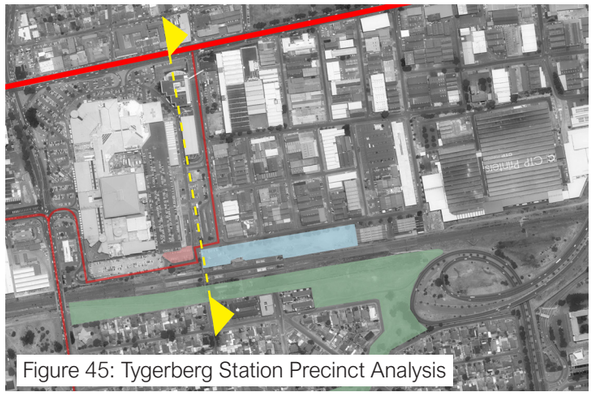


Figure 45: Tygerberg Station Precinct Analysis

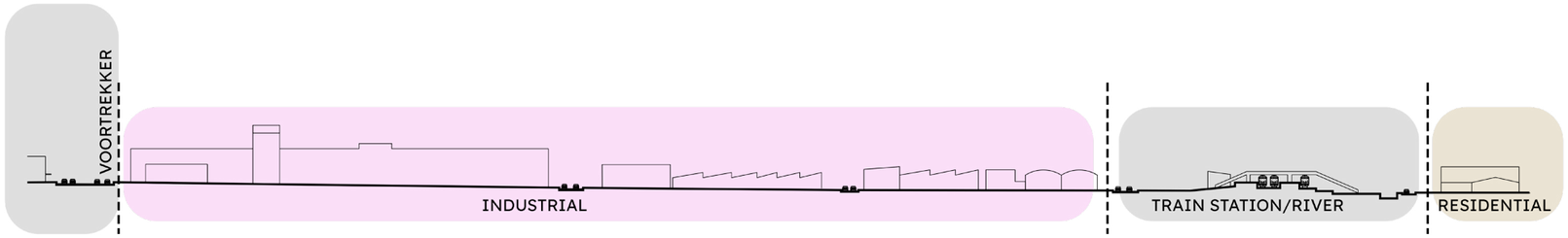


Figure 46: Tygerberg Station Precinct site section

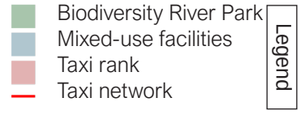


Figure 47: Tygerberg Station entrance (Google Maps, 2023)

Figure 48: Canalised Elsieskraal River (Google Maps, 2023)

Figure 49: West Street connecting to Voortrekker Road (Google Maps, 2023)

PRECINCT 03 - TYGERBERG STATION

The composition of the Tygerberg is similar to Parow Precinct in the way that the station is offset from Voortrekker Road, but unique in the sense that the area between Voortrekker Road and the station consists of of industrial buildings, along with Parow centre shopping centre which draws people from all the nearby neighbourhoods. The industrial nature of the area means that there's a low level urban liveliness, this has resulted in less pedestrian traffic outside of working hours. Because of all the businesses nearby this results in a high amount of commuter railway activity, there's a bus stop next to the station and taxi rank next to the station. On the opposing side, the Elsieskraal river is present again but the river is uncovered , with an overpass bridge providing access to the train station. The nearby facilities business and school facilities presents an opportunity to increase diversity and integration between all the existing infrastructures in and around the train station, this would all be in the aim of increasing the urban liveliness of the area so that it can function beyond its current operating hours.

CONCLUSION - URBAN THREADS

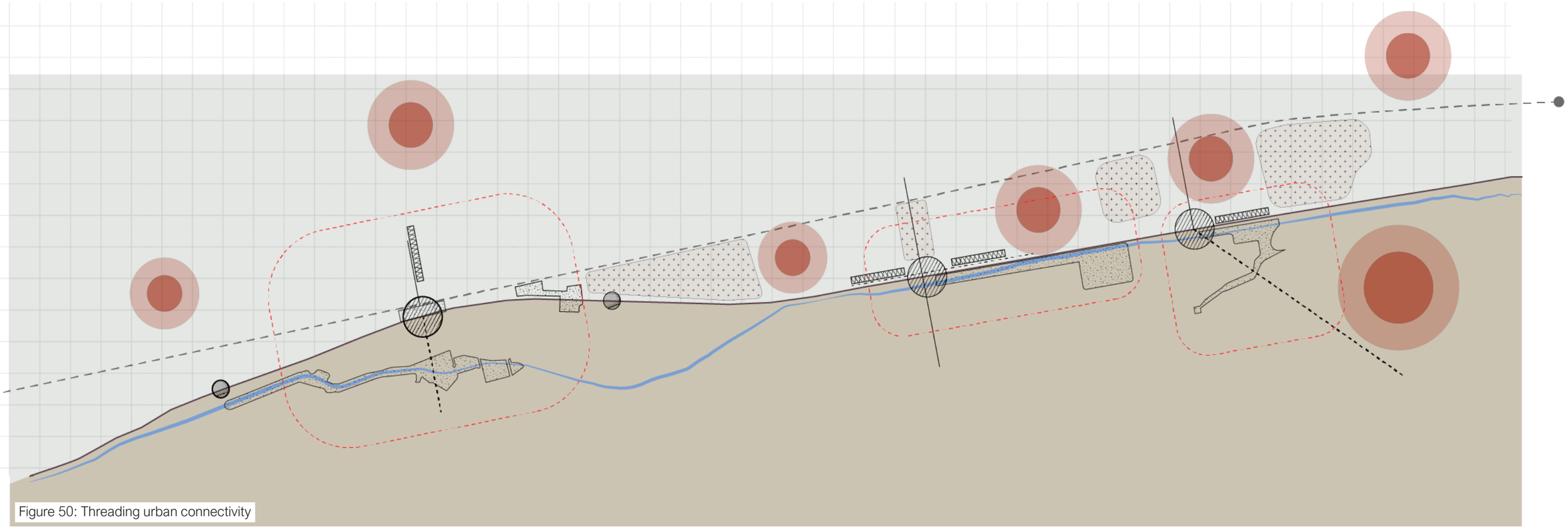


Figure 50: Threading urban connectivity

The urban liveliness of the precincts varies due to the different zoning conditions within and beyond these areas. The general business-zoned areas along Voortrekker Road experience higher density, pedestrian foot traffic and urban liveliness compared to the residential-zoned areas on the opposing side of the railway. Areas that also experience lower levels of urban liveliness are the industrial-zoned areas. The analysis of these three precincts highlights the similarity and differences between them, this requires the urban framework to be flexible to be applied globally, yet it should also respond to the ground conditions present in each precinct. The urban framework would allow the urban architecture of the precincts to stitch together the urban fabric of the communities on either side of Voortrekker, making these precincts catalysts for interconnectivity. The precinct interventions should aim to enhance the sense of place around the railway station, which contrasts to past spatial planning principles; the neglected spaces offer an opportunity to rejuvenate these crucial points of intersection.

The three identified precincts show the urban fabric can be threaded together in order to promote social cohesion amongst the neighbouring communities. Promoting social cohesion amongst the communities can be achieved by intensifying place around the railway stations. The design proposal will focus on Parow Precinct due to the existing diversity in the area, this will allow the proposal to build on the current functions and add new ones that can benefit the surrounding communities.

05. ARCHITECTURAL PROPOSAL

URBAN FRAMEWORK

The framework aims to establish a strong sense of place within the Precincts. The idea behind the urban framework is that it can be applied globally at railway stations where certain conditions are met. The first condition is that there's a diversity of functions. Secondly, there is a high level of pedestrian movement and a lack of integration between existing infrastructure and surrounding communities.

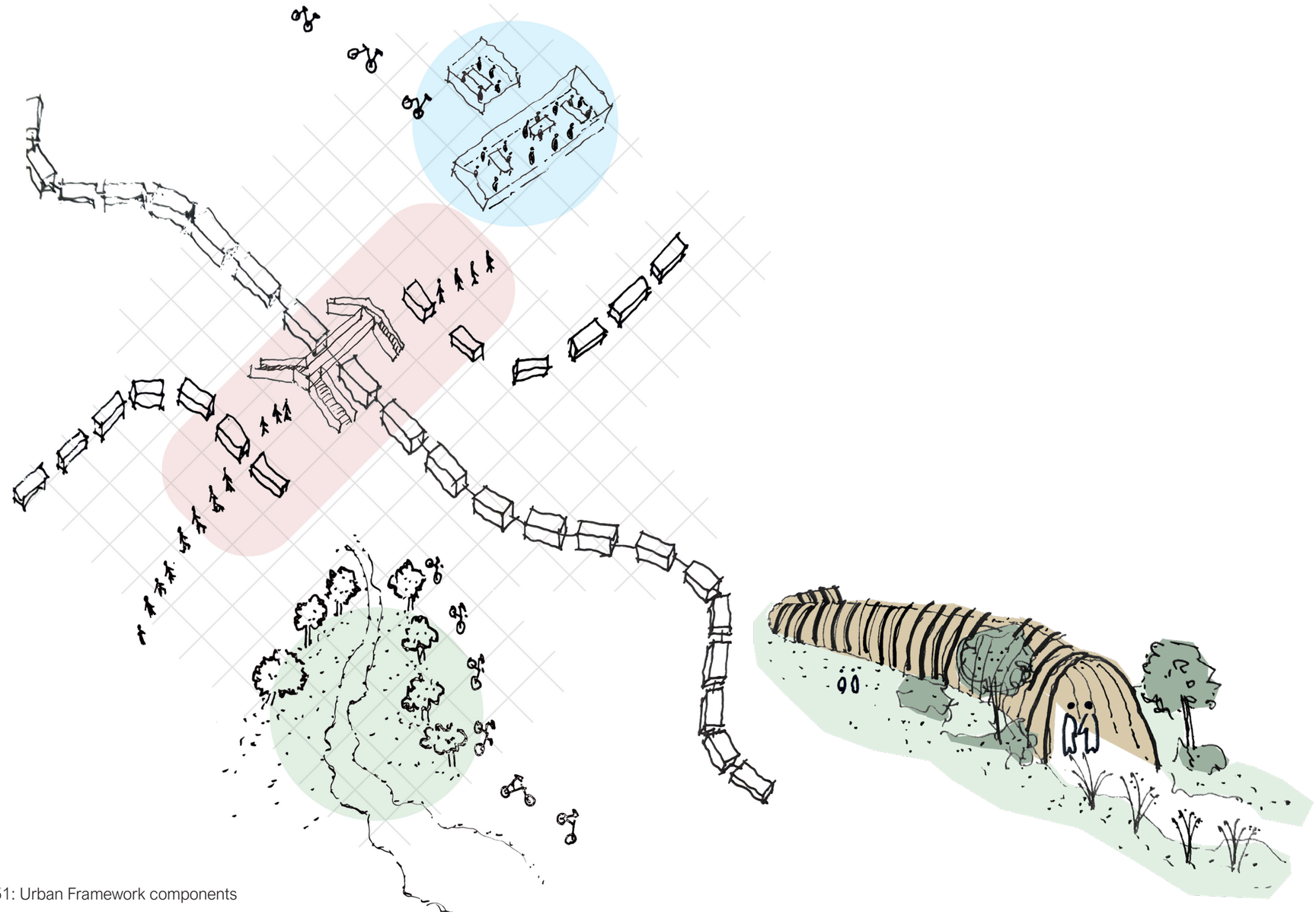


Figure 51: Urban Framework components

The urban framework is comprised of three infrastructure components; transit infrastructure, social infrastructure and recreational infrastructure. Transit infrastructure refers to railway services, taxi services and non-motorised means of transport. The framework aims to establish a relationship between these three existing modes of transport to improve accessibility for commuters and surrounding neighbourhoods. Social infrastructure is a layer consisting of two things: economic trade and housing infrastructure. Economic trade refers to providing co-working spaces for entrepreneurs and innovators because these spaces are lacking in the Voortrekker area. Housing refers to providing mixed-income housing to densify around the railway station. Recreational infrastructure is focused on retaining public space to serve the community. This is mainly focused on rejuvenating the Elsieskraal River, which has been canalised and does not serve the community.

When analysing the specific station, it becomes important to understand what is available and lacking and develop an appropriate response to these ground conditions. These components are not intended to function independently but in an integrated manner because the weakest part will reflect the whole, so establishing relationships is crucial. Because the movement was previously so restricted, it is a crucial component that requires careful articulation.

These layers are intended to improve access to opportunities and diversify and intensify activities around transit stations. In Rethinking Transport after Modernism in South Africa, the authors highlight the importance of developing interchange points which becomes a high-activity urban centre that becomes special place environmentally and socially. This is what the framework aims to establish, creating activity centres around interchanges which were previously used to disconnect people. The core of the interchanges will be the railway station which becomes an interconnected hub of activity that reaches beyond the immediate railway infrastructure.

The architectural intervention will be located at Parow Station Precinct due to the diversity within the area and the close personal relationship with the area. Although the intent is that the framework can be applied globally, it is important for the architectural intervention to be located in a specific place, but understanding the place's identity is key. In this instance, the place is Parow.

BRIEF BACKGROUND OF PAROW

Focusing on the suburb of Parow, where the Parow Station Precinct is located. Like many other suburbs along the Voortrekker Road, Parow started as a farm, later becoming a residential neighbourhood in 1903. Today, the portion of Parow along the Voortrekker Corridor is a highly diverse and dense fabric.

In the book *Parow quo vadis?* by Dr Nico Walters, the author gives a detailed historical account of Parow. The author highlights how historians referred to Parow as the town created by developers, and these early visions of the founders have become the backbone of Parow and Voortrekker today. The founders saw Parow as an area with great potential and persuaded many factories and businesses to establish their operations in Parow, from 48 factories in 1961; by the late 1990s, Parow boasted over 300 factories (2019, Walters). This was due to the Voortrekker Road being a highly active route and the establishment of Parow's railway station in 1918. Today, these factories and businesses are the backbone of Parow and have room for much growth.

Before the Group Areas Act, Parow was community of mixed races . However, after the segregation act was passed, families of colour were relocated to areas beyond the railway line, such as Ravensmead, Elsiesriver, Bellville South and Athlone. With Voortrekker Road still providing work to people of colour, accessibility to the VRC is essential because it can be viewed as the industrial heartland for surrounding communities.

Transforming the railway stations into an interconnected hub of activity is key to improving accessibility. The Parow station is located in an area founded on providing services to people while improving the area's economy. The station architecture must reflect that and become a catalyst that facilitates movement and fosters a sense of connection, community and place.

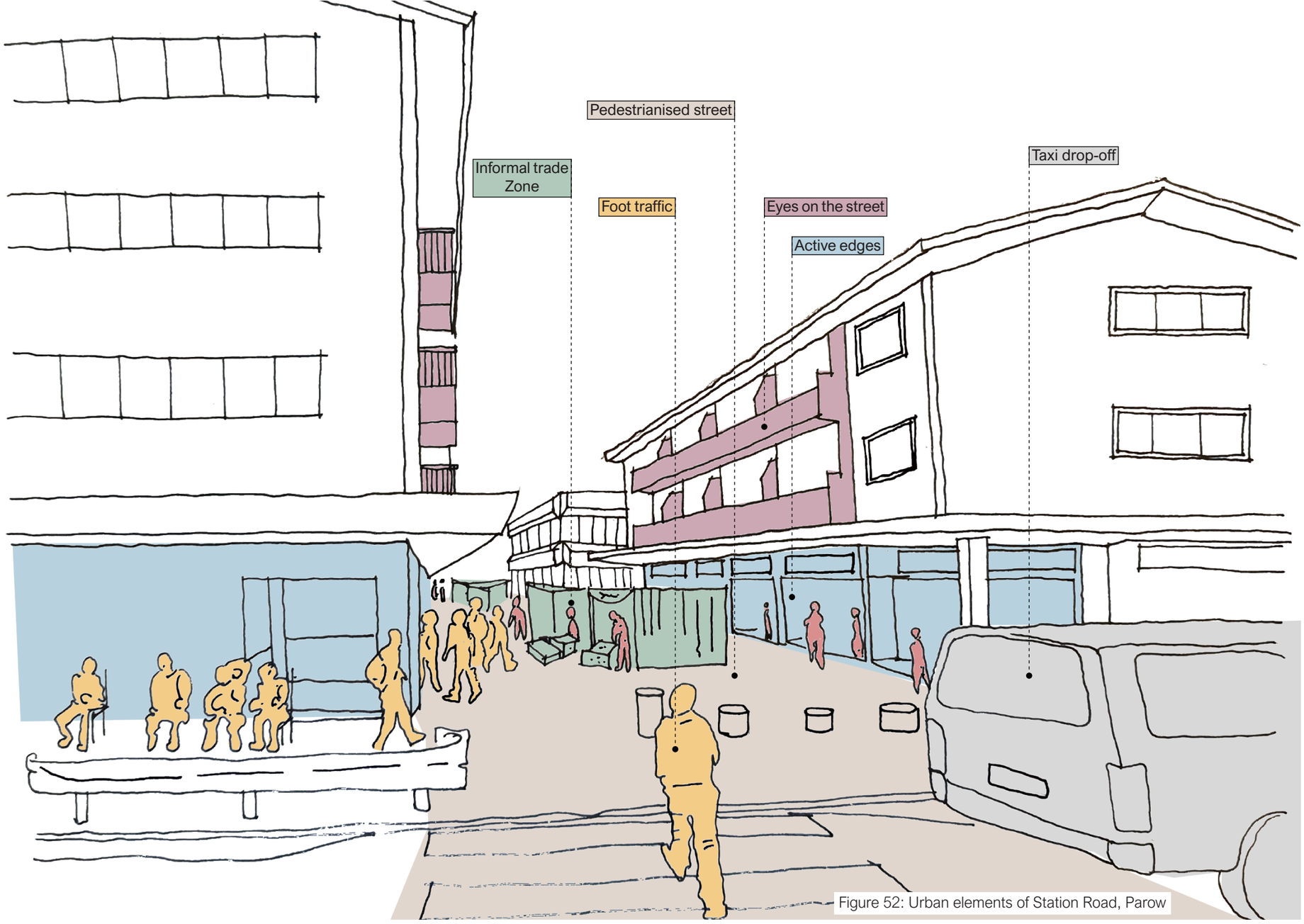


Figure 52: Urban elements of Station Road, Parow

One key historical street, Stasieweg, is a key focal point for good urban principles. The well-established pedestrian street constantly hums with pedestrian activity at frequent intervals. The street employs various urban architectural principles that ensure urban liveliness. Because the train station serves a public function, the building will promote pedestrian activity by using the urban architectural elements identified above: pedestrian-friendly streets, active edges, eyes on the street and a place for informal traders along the street frontage. Given the public function of the railway station, these urban elements will further promote pedestrian activity, stimulating movement and connectivity throughout the area.

In essence, Stasieweg is a short yet dense and diverse street that contains historic value but also offers lessons for good urban strategies. By building upon the good urban principles showcased by Stasieweg, the Parow Station Precinct can become a thriving and connected hub for the communities.

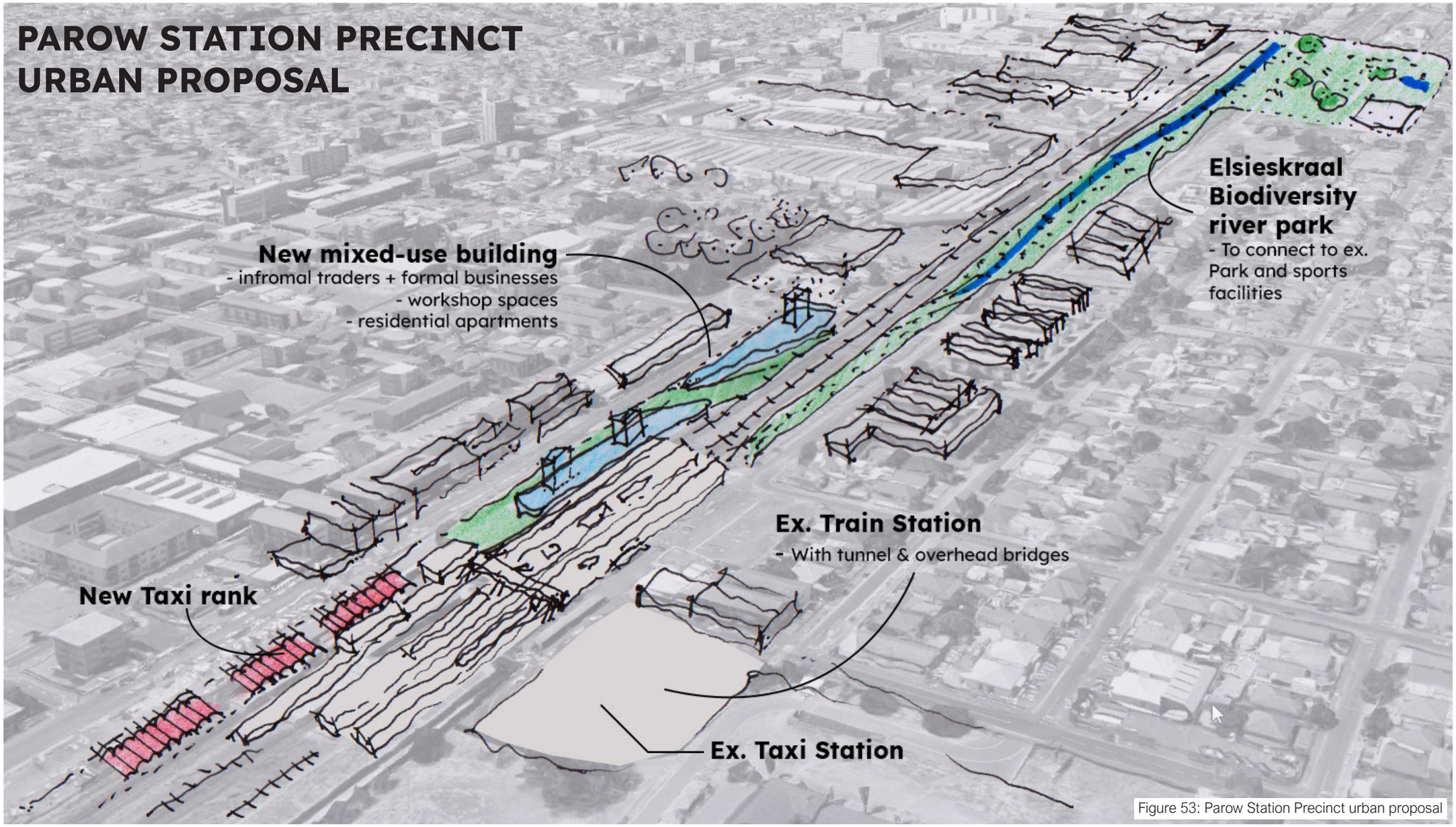


Figure 53: Parow Station Precinct urban proposal

The urban proposal to the right proposes various ideas on either side of the railway to transform the railway station into a hive of activity. The proposal explores how connections can be crafted in the physical landscape to create social and economic connections. The next step would be to explore how this connection can be made, both above and below ground. The main ideas centre accommodating taxis that frequent the station, business trading spaces for formal and informal traders, and the Elsieskraal River's rejuvenation. The desired result is to create a scheme that crafts connections and promotes the flow of people.

The unmaintained and empty parcels of land around the train station offer an opportunity to craft the desired connections across the railway divide. Introducing a taxi rank allows the Precinct to become intermodal; this allows commuters to easily switch between transport options. Station Street is a well-defined business street consisting of formal and informal businesses; the precinct scheme aims to extend the existing economic character, stimulating pedestrian foot traffic. The extension also aims to promote entrepreneurship by providing co-working workspaces for young entrepreneurs and businesses in the area. Rejuvenating the Elsieskraal River into a biodiversity park would also serve as a recreational park for the nearby neighbourhoods. These three interventions allow the Parow Station Precinct to become an interactive hub of diversity.

Improving the linkage between transport systems and improving pedestrian routes around the station improves accessibility for neighbouring communities, By creating a diversity of use around the railway station, allowing the station to stay active beyond its current operating hours. The precinct intends to act as an urban generator that allows a variety of activities to take place in and around the station. However, for the Station Precinct to become a successful urban generator, the architecture of the precinct needs to promote that desired urban connectivity. It requires an architecture that is interactive and inviting.

Crafting a sense of place across barriers

Infrastructure is a line that connects, but in creating that connection it creates disconnection. The Space Syntax analysis revealed how the railway line disconnects but the railway stations offer an opportunity to re-connect. In analysing the structure of infrastructure networks, it becomes obvious that infrastructure networks have mainly focused solely on executing their function. Hints of what the architecture can be emerges in desires lines along the railway lines which represent a yearning for, these lines represent the space between the engineered and the lived (Murray et al., 2007).

The design intervention focuses on the Parow Precinct, allowing the proposal to build on the area's existing qualities and improve others. The design proposal consists out of three components which are intricately woven together to blur the boundary of the railway line. The initial design intent explores how movement can be integrated into the design that would allow connectivity to public areas. The design intends to create overlapping spaces that blur boundaries between inside and outside, above and below. This is rooted in the concept of connectivity and divisions.

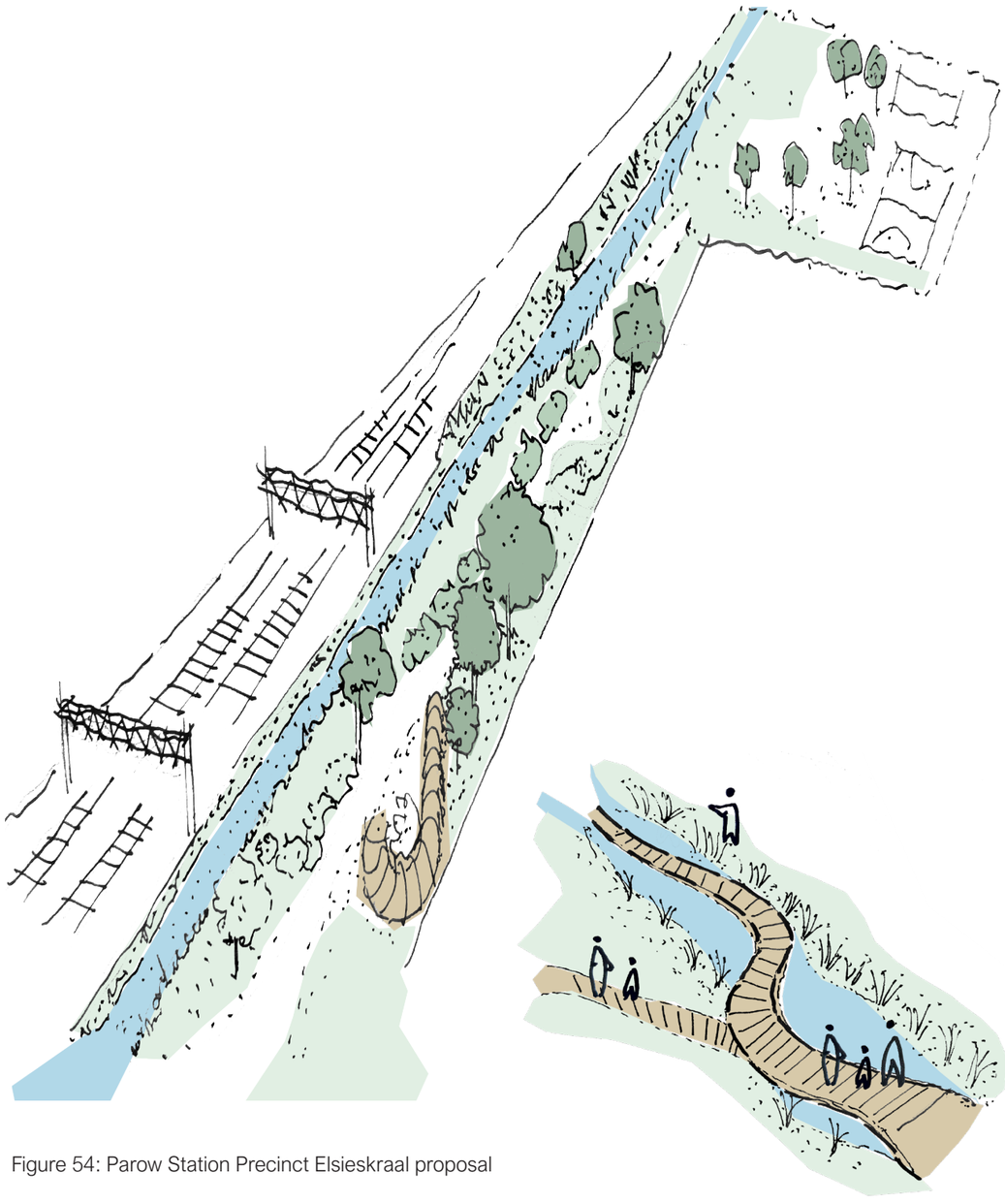


Figure 54: Parow Station Precinct Elsieskraal proposal

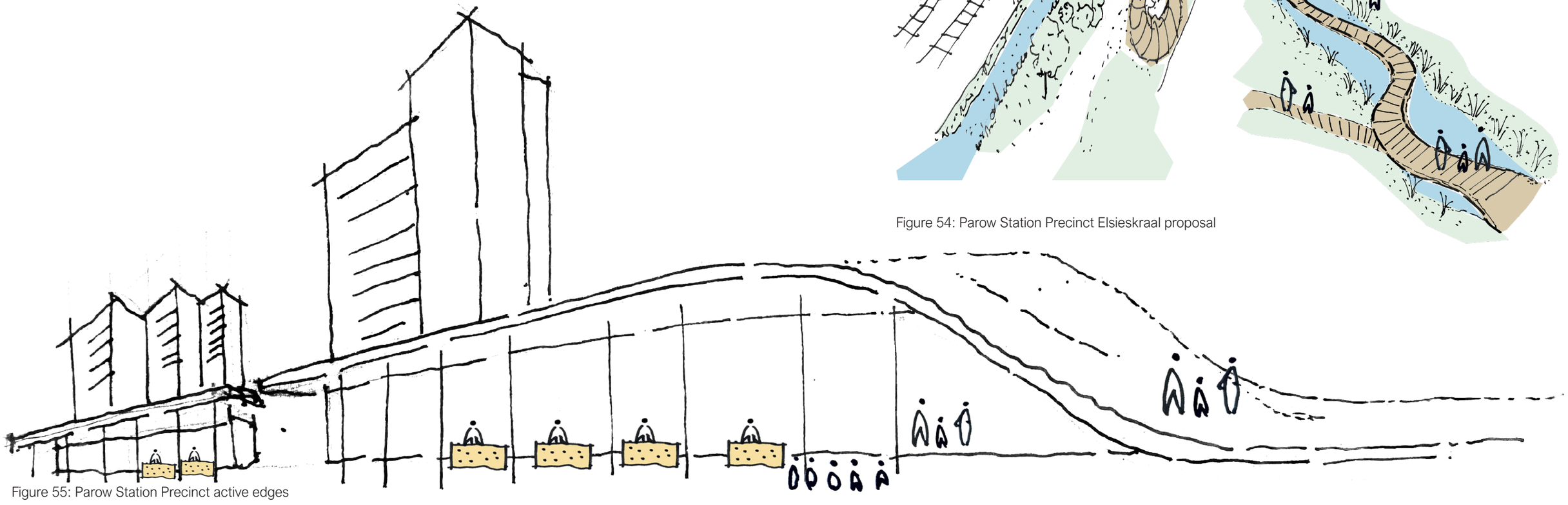


Figure 55: Parow Station Precinct active edges

06. TECHNOLOGICAL ANALYSIS

TECHNOLOGICAL CONNECTIONS

The technology studies aim to analyse case studies with similar desired spatial qualities and that utilise similarly intended material palettes. The design intends to create architecture that interconnects various elements through movement paths, establishes a sense of place and improves transparency. To create a sense of permanence, the design will aim to utilise **stereotomic** materials, which are more grounded and to achieve a lightness that is associated with transparency it will look into **tectonic**, high-tech materials and how these contrasting elements can be employed in a complementary approach to achieve the desired spatial results. The design will comprise a heavy, grounded ground-level structure and an overheard, lightweight, thin structure. This paper explores three materials: humble brick as stereotomic material, industrious steel as a tectonic material and wood as a tectonic material. Individual bricks are layered together to create sound structures that withstand the test of time, however, the individuality of brick allows it to be assembled to create complex structures (Yglesias, 2014). With **face brick** being a prevalent material on either side of the train station, employing the material will allow the design to develop continuity through the landscape. **Steel**, a more modern material, is associated with industrialization.

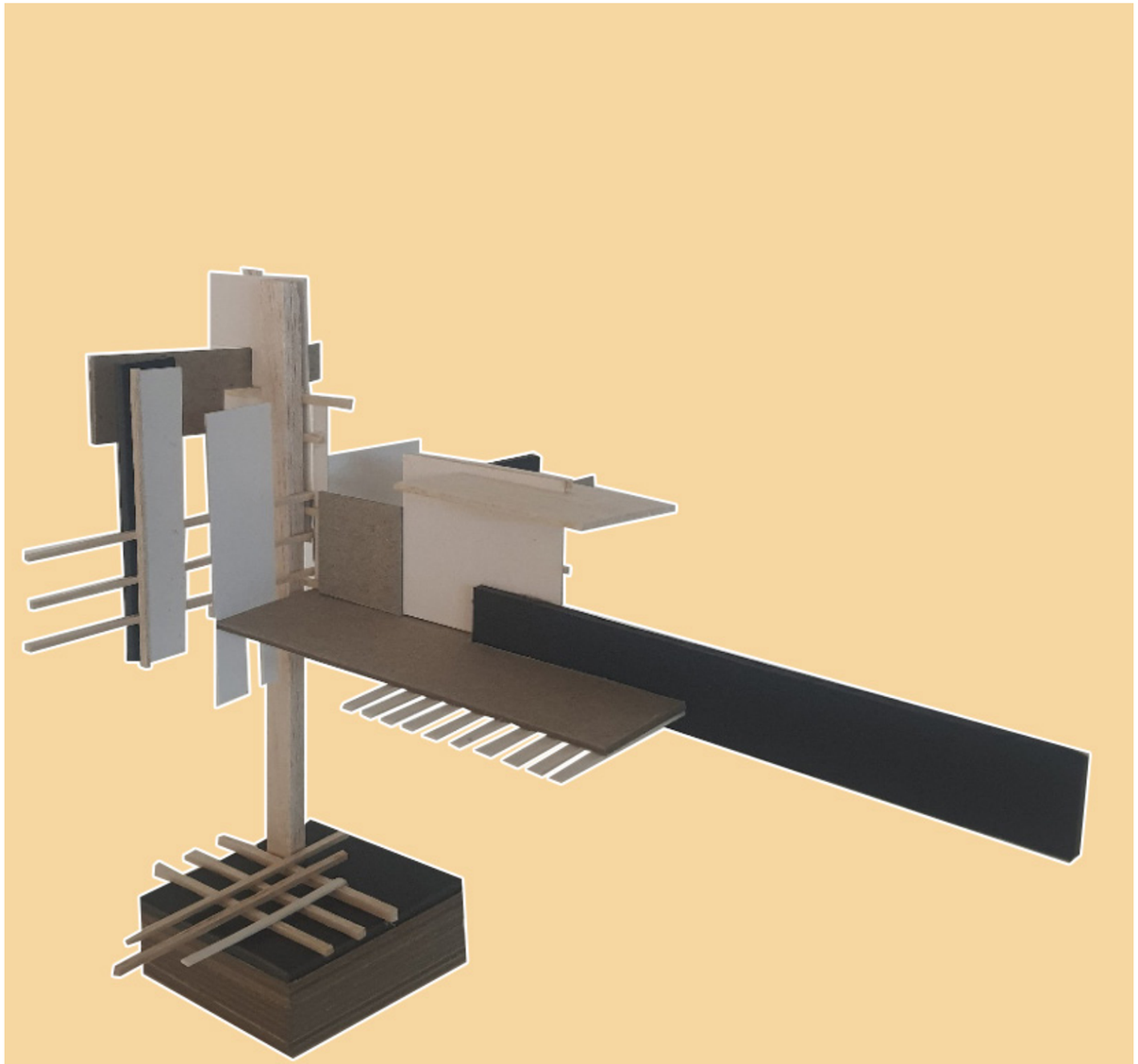


Figure 56: Crafting connections

The material is known for its hardness and strength-to-weight ratio; its this ratio that gives it a thinness and elegance which many modern architects appreciate. Steel's elegance and strength-to-weight ratio is why it was used in the construction of railways and is also prevalent on-site. A material that has re-emerged in recent time is the warm and **sustainable wood**. The material is tied to the metaphor of rootedness (Yglesias, 2014), in the case of this project, that relates strongly with the Elsieskraal River that has been neglected and its natural fauna that has been removed. Understanding how wood can be employed to create warm and more inviting environments becomes important.

Understanding how relationships between the three identified materials can be developed is crucial in understanding how the technical composition can complement the spatial arrangement and desired atmosphere. The technical study will focus on two projects, Assen Station and Terminal Breda, both located in the Netherlands; both projects aim to overcome the structural divide yet employ different methods to achieve it.

Figure 57: Assen station exterior (van Damme, 2020)

ASSEN STATION

A large timber canopy sits above the new Assen train station, with overhangs reaching beyond the station in an attempt to connect the railway and the city. The new Assen Station was completed in Assen, Netherlands, in 2020 by Powerhouse Company in collaboration with De Zwarte Hond. The architects intended to create a connective, transparent and sustainable station while managing to remove the railway tracks barrier through design. The triangular roof structure connects with the urban context and organises the program.

To create a pedestrian-friendly plaza area above ground, the architects placed the vehicular parking and bicycle garage storage below ground, which freed up ground space for pedestrian movement. To overcome the railway track barrier, a pedestrian tunnel was placed below ground; this connects the city's Eastern and Western sides and commuters to the platforms. The plaza is topped with a triangular-shaped timber canopy; the glazing in the centre of the canopy filters natural light onto the railway platforms. The buildings below the structure house commercial and station functions. The new green landscaping and roof gardens above the brick buildings complement the timber canopy roof structure in an aim to create a more sustainable and inviting environment.

The careful composition of the station allowed the architects to blur the divide of the railway line. By fragmenting the building and floating a canopy overhead, the architects can extend the room of the building. This careful combination of these two decisions creates a point of connectivity between the two neighbourhoods, thereby blurring the bond between the two areas. Figure 59 depicts how the building is split, connected through the underground tunnel, depicted in Figure 60 below. Although the buildings are split, portions are enclosed to create a controlled environment from the colder seasons. The underground pedestrian tunnels further improve the connectivity between the two areas, acting as a bicycle tunnel for cyclists. The tunnel runs straight underneath the railway and between the buildings, which controls the flow of people across the railway line. Although the buildings are scattered across the railway line, the large overhead canopy unites the space and filters light into the station. In this instance, the overhead canopy functions like a tree, providing a space for urban activities.

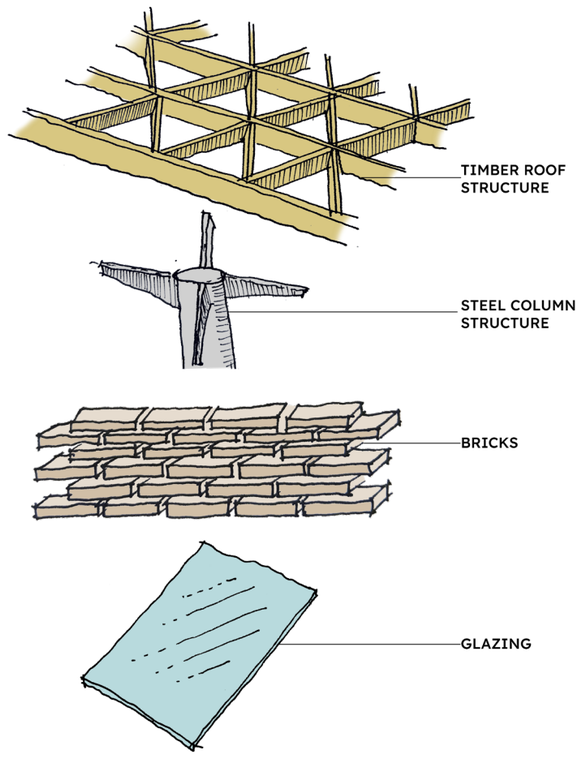


Figure 58: Station materials

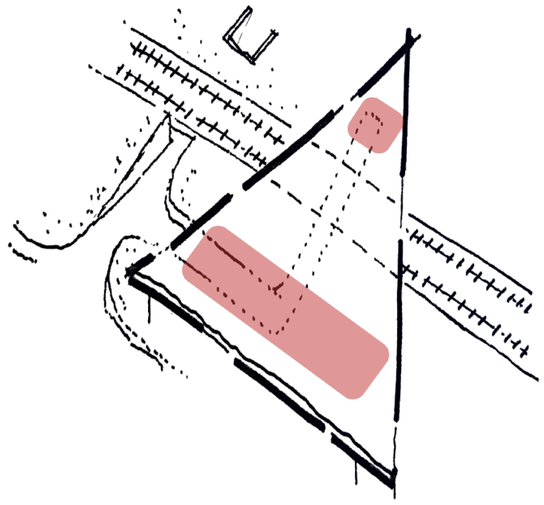


Figure 59: Station building footprint

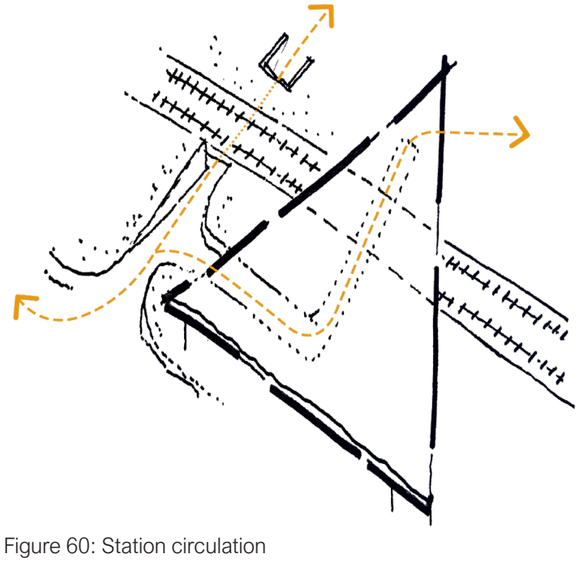


Figure 60: Station circulation

Figure 61: Assen station basement parking entrance (van Damme, 2020)

Figure 62: Assen station canopy platform (van Damme, 2020)

The material pallet used includes brick, timber, steel and glass, as shown in figure 58. The brick is used extensively on the paving and where there is landscaping. As the landscaped floor sweeps into the underground tunnel, it seamlessly morphs into layers of curved brick walls topped off by these green planting beds. The brick retaining walls transforms again into the curved brick walls of the buildings and is topped off with a roof garden. The brick used is a thin, elongated brick placing more influence on horizontality. The large canopy roof structure is supported by large round steel columns, which branch out to provide structural support in multiple directions. A six-star bracket holds together the timber truss. Moving to the centre of the roof structure, a steel truss is used to offset the glass roof from the timber truss. The combination of these materials has created a warm and inviting architecture, which is visible in Figure 63, which depicts the warmth of these materials. Painting the steel columns softens the cold feeling often associated with steel. The glass panels above the canopy filter sunlight into the space between them and enhances the warmth created by the brick.

Although the project is a small-scale project, it highlights how the careful composition of the buildings, movement and materials can create an inviting railway station that blurs the boundary of the railway station. The canopy serves an important function as it allows the buildings to be scattered, thereby allowing the building to become an urban generator as it overlaps with the plaza. The floating canopy, scattered buildings and underground movement network are elements which would be explored in the design of the Precinct.

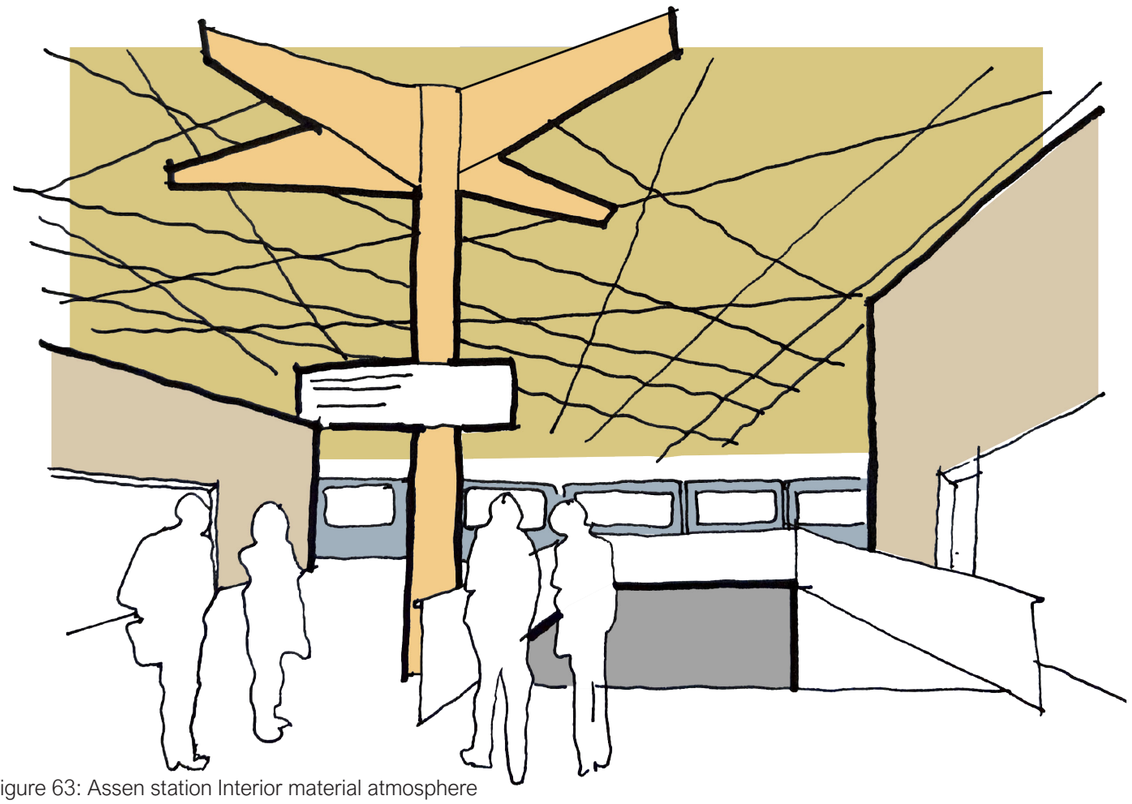


Figure 63: Assen station Interior material atmosphere

TERMINAL BREDA

Figure 64: Terminal Breda covered main entrance (de Wit, 2016)

Terminal Breda is located in the Dutch city of Breda, it was completed in 2016 by Koen van Velsen Architecten. The building contains various functions such as; a train station, bus station, apartments, offices, retail, car parking on the roof, bicycle parking and two new public squares. The architects highlight that the building is not a multi-functional building containing a train station but a station that contains a complex program, thereby expanding the train station typology into something more complex. By including various other programmes in the station, it becomes more than just a means to travel, it becomes a node with a sense of place; Figure 66 on the right highlights what diversity has brought to the train station. The building is a large monolithic complex with multiple functions and forms part of a large urban scheme of former railway yard property. The architects link the two city fragments by placing two large courtyards on either side of the railway line, which draws people in and connects to the existing urban fabric. The courtyards link the old city and act as an entry to the city of Breda. Due to the large scale of the building, the architects employ brick to produce a nuanced and human-scaled facade, which blends in with the contextual environment.

By spanning the large monolithic structure across the railway lines, it unifies the station into one building and uses the roof deck as parking for the building visitors and residents. This large monolithic structure is clad in various bricks to match the surrounding context but is also used to symbolize change and create a dynamic facade. Looking at the building brick facade in Figure 63 above, the architects employed bricks which vary in size, pattern, colour and finishes to create a more dynamic facade, creating a collage-like effect on the facade.

Figure 65: Terminal Breda facade showing brick variations (de Wit, 2016)

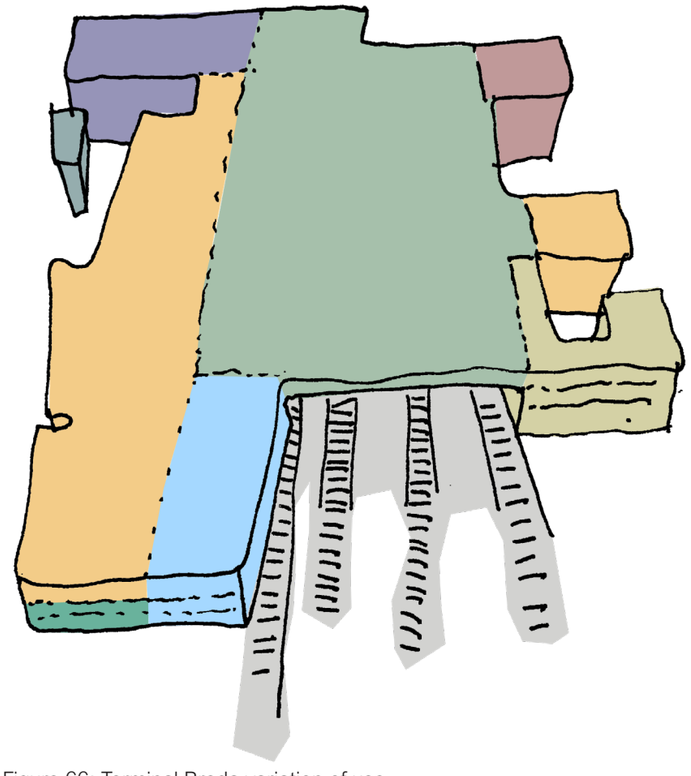


Figure 66: Terminal Breda variation of use

Figure 67: Terminal Breda interior with light wells (de Wit, 2016)

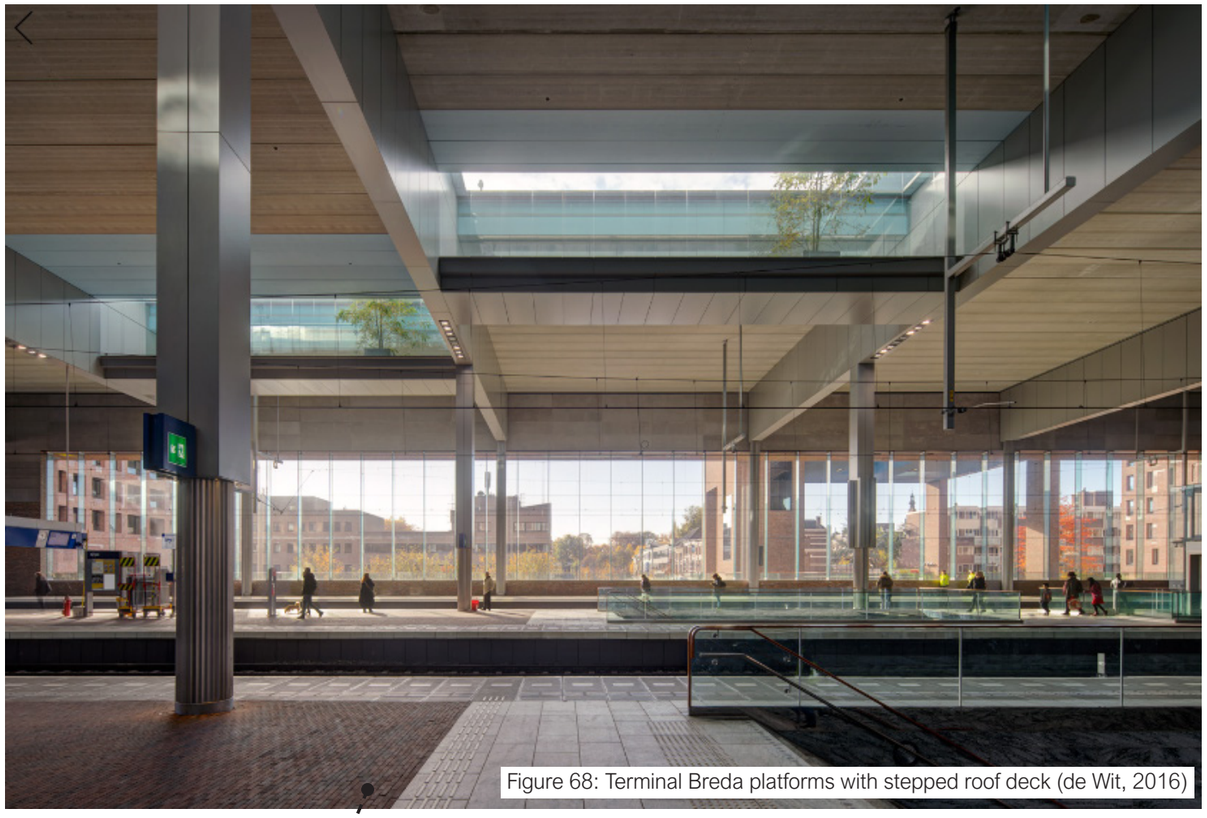


Figure 68: Terminal Breda platforms with stepped roof deck (de Wit, 2016)

This case study showcases how a train station can be transformed beyond the standard typology which mainly functions as transit infrastructure. With Terminal Breda, the station becomes a crucial node in the city, that goes beyond the usual temporal nature of the train station and becomes a destination as well.

Although the building is a large monolithic structure, the architects carefully carved out volumes which filter light into the interior spaces, as seen in Figures 67 and 66 above. The building was treated as a large mass, from which volumes were carved out to filter natural light into the interior of the large mass and in some instances, these carved-out volumes became interior courtyards as well. When looking at Figure 68 to the right, it shows in yellow where the light wells occur. As seen in the sketch, there are two approaches taken to filter light into the building; first is focused on the facade and the second is focused on the roof. Firstly when looking at the street-facing facade, these have been broken up and stepped back in some instances, which allows light to penetrate deeper into the building and the introduction of courtyards where these steps occur and this is used in Figure 64 to create an entrance plaza. The second method focuses on of light wells punctures in the roof, this creates spatial volumes which overlap to filter in light as seen in Figure 70; where the roof deck steps down to filter light in but also serves as a mini courtyard with the planting and benches above. These courtyards are crucial in the design as they generate pause spaces within a building where people constantly go from one destination to the next.

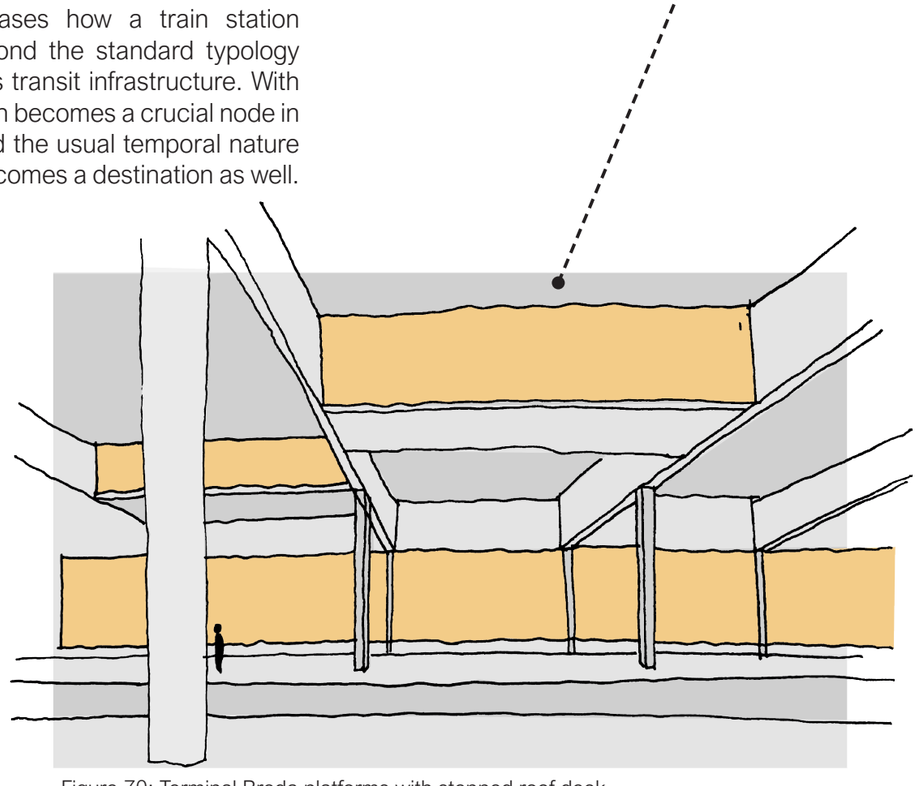


Figure 70: Terminal Breda platforms with stepped roof deck

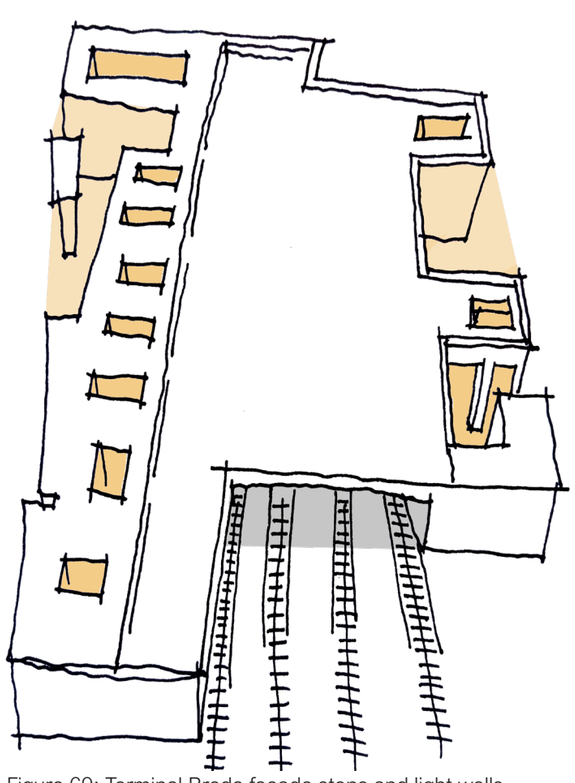


Figure 69: Terminal Breda facade steps and light wells

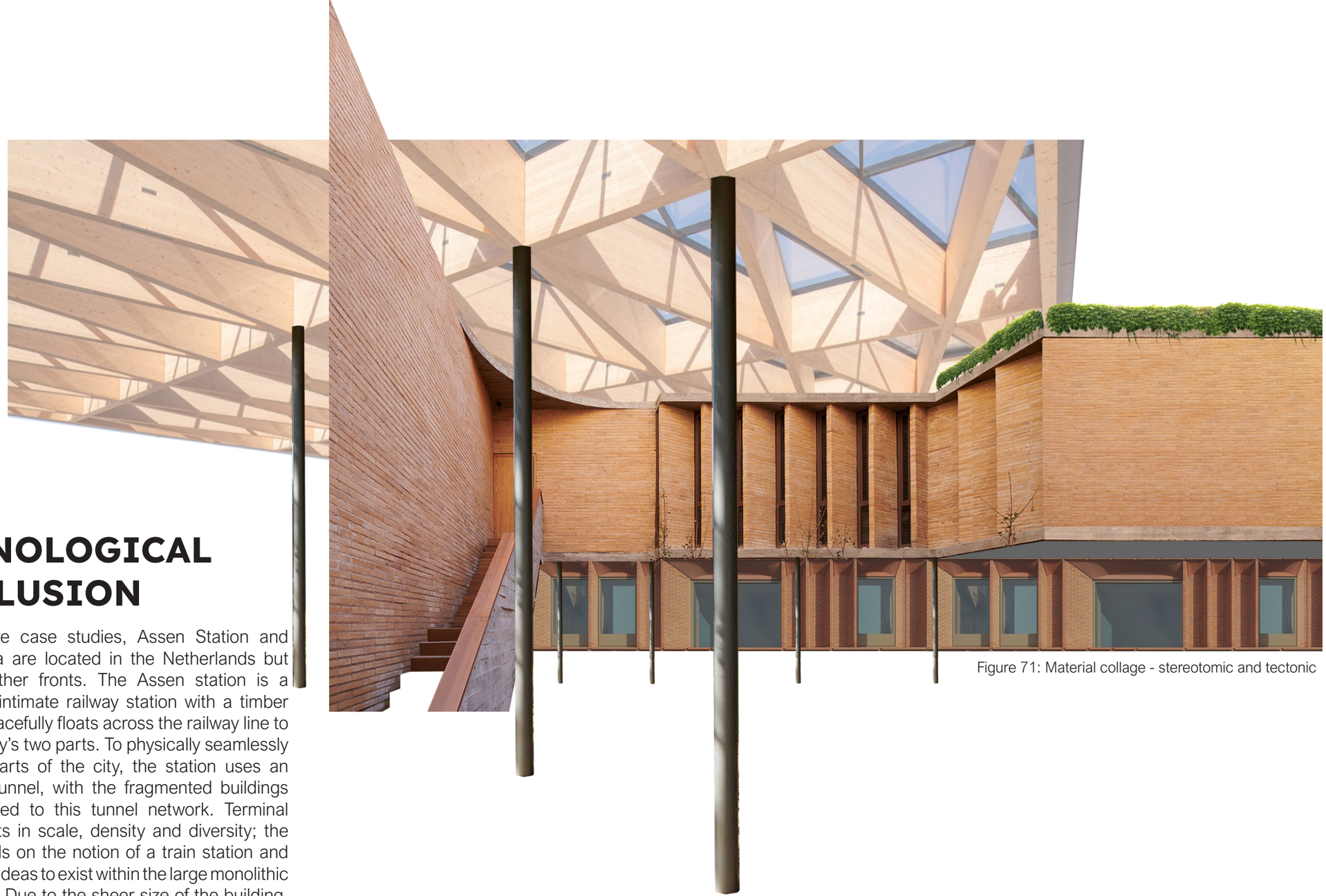


Figure 71: Material collage - stereotomic and tectonic

TECHNOLOGICAL CONCLUSION

The two above case studies, Assen Station and Terminal Breda are located in the Netherlands but contrast on other fronts. The Assen station is a smaller, more intimate railway station with a timber canopy that gracefully floats across the railway line to connect the city's two parts. To physically seamlessly connect the parts of the city, the station uses an underground tunnel, with the fragmented buildings being connected to this tunnel network. Terminal Breda contrasts in scale, density and diversity; the project expands on the notion of a train station and allows multiple ideas to exist within the large monolithic railway station. Due to the sheer size of the building, the architects step and carve out volumes to use light as a key material in the design of the railway station. Although the two railway stations differ in scale and program, they aim to connect neighbourhoods where the railway line has disconnected. Assen station attempts this by creating a seamless transition across the railway line, and Terminal Breda attempts this by making the railway station a node in the urban landscape.

When looking at the material pallet of the two stations, Assen station overall has a warmer palette reflected on the exterior and interior of the building. Terminal Breda employs colder stone on the interior, which creates a commercial atmosphere. The materials employed in the Assen Station would be further explored as it is warmer and more inviting. A key component of Terminal Breda that would be explored in design is how the train station was transformed into a node with varying functions and how the mass of the building was carefully sculpted. Both projects employed stereotomic materials in response to the context, creating material continuity in the existing environments. Assen station has shown the importance of tectonic structures in railway architecture as it improves transparency and creates an inviting and dynamic architecture.

These projects aim to craft connections within the urban context; unlike the usual railway station, which only serves the passengers, these stations aim to integrate into the surrounding communities. They both employ a public plaza, which serves as a key entry and gathering point, crucial elements to create urban continuity in existing urban fabrics. Although different, both case studies

07. CLOSING & WAY FORWARD

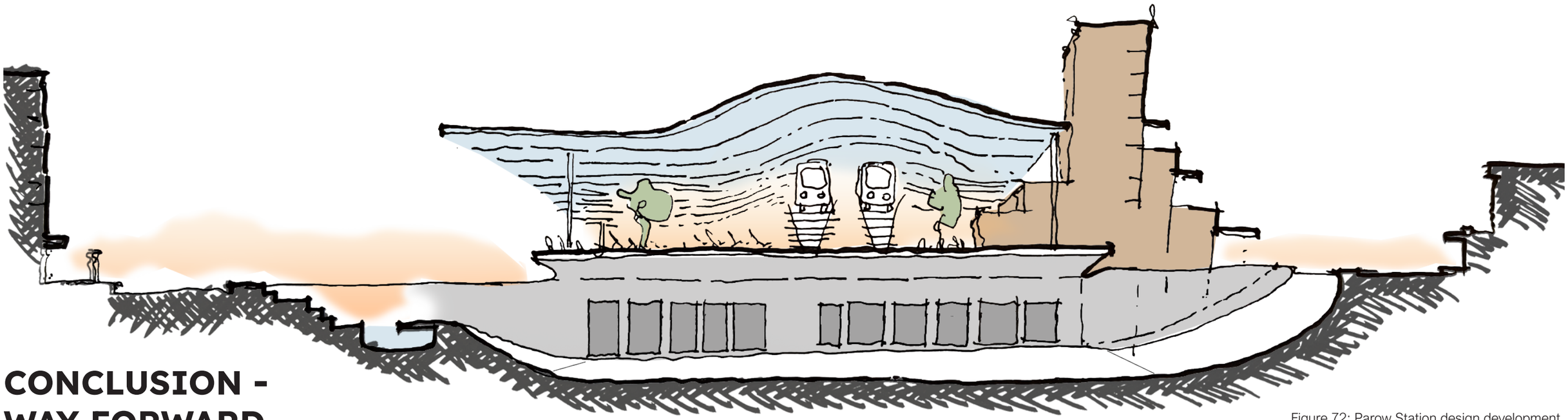


Figure 72: Parow Station design development with stereotomic and tectonic elements

CONCLUSION - WAY FORWARD

In unpacking the structure of Cape Town, it became clear that the structural divides of the past still impact the contemporary city and inhibit the city's growth. Infrastructure was key in creating the disconnect in the city; however, infrastructure also offers an opportunity to reconnect the fragments of the city. The VRC is a well-established corridor with a rich sense of character and place.

The development of the VRC saw the growth of the surrounding neighbourhoods, however, the Space Syntax analysis highlighted the disconnect caused by the railway line as it acts as a space bridge because it creates limited access opportunities. But the Space Syntax analysis also highlighted that the railway stations are special places of opportunity along the railway network. The three identified railway stations had desire lines around the station, highlighting the desire to cross the barrier; taxis created informal taxi ranks at these stations because there was constant foot traffic and there was always some form of economic activity around the stations. Each station had a unique identity, representing a sense of place, with the Parow Station being selected as the TAP for this research proposal. Parow has attracted many entrepreneurs and manufacturing companies over the years, which is why so many businesses still exist in the area, from small informal vendors to family businesses to large manufacturing companies; all of them found a home a Parow.

The Urban Framework aims to establish a strong sense of place by building upon the existing characteristics and genius loci of the place. Building upon the existing characteristics of the place allows a continuation of the urban fabric, allowing the TAP to seamlessly integrate with the existing communities. Moving forward, the paper will establish placemaking principles throughout the scheme to achieve urban continuity and for the station to become an urban generator. This will be followed by developing a detailed urban scheme highlighting the key components of the scheme. The framework also promotes density and diversity at the railway station, meaning it becomes more than just a railway station but a destination and intermodal hub of activity. Assen station and Terminal Breda are two railway stations which operate at different scales, yet both attempt to connect the fragments of the city. Assen station does this through its material use and focuses on creating barrier-free movement routes; Terminal Breda transforms the idea of a train station by adding other uses to the railway station to create a complex and dense railway station. Various design principles from these two case studies and additional case studies will be tested to understand which suits the Parow Station Precinct.

The key thing that will be focused on during this next phase will be ensuring that urban principles are carried through and that architectural objectives are met. The Parow Station Precinct aims to catalyse progressive development around infrastructure interchanges that bind together disconnected urban fabric to improve accessibility, density and diversity within suburbia.

08. URBAN CHALLENGES & STRATEGY

PRECINCT CHALLENGES

To develop an appropriate urban and architectural solution for the Parow Station Precinct, it is important to understand the ground conditions of the area. The maps on the right unpack the grounded conditions in three layers, namely, urban liveliness, surface texture and lastly, vacant and neglected properties around the site.

The urban liveliness shows the peak energy in yellow and the off-peak energy in red; the purple highlights areas which were quiet and lacked the urban liveliness seen elsewhere—a lot of this energy is contained in Stasieweg Street. Cloete Street, which sits perpendicular to the Stasieweg, holds a sea of taxis, which have created an informal taxi rank on the vacant station property. Taxi drivers park in Cloete Street during off-peak hours in anticipation of the peak hour rush, with small car wash and taxi repair businesses operating opposite the rank. Due to the amount of taxis, it has also meant less active street edges and less pedestrian activity along this road.

When mapping the surface texture of the site, it became evident that the area mostly contains hard non-pour surfaces, and there was a clear lack of greenery. Across the railway line, along the canalised Elsieskraal river, there's grass along the street. However, this is unmaintained and contains gravel, making it undesirable for recreational uses.

Around the site, there are various underutilised parking lots which were meant to serve the surrounding buildings but are underutilised. On the far right is the sports facilities, which consist of a swimming pool, park, and tennis courts. However, this piece of infrastructure is dilapidated and is crucial for the surrounding community.

The map above combines all these layers and shows the complexity of the precinct, but within this set of complex challenges also lies an opportunity to improve relationships between these fragmented components.

Figure 73: Activity zones

The map above highlights the areas which are most lively and active during peak hours in yellow-red and the quiet areas during these hours in purple.

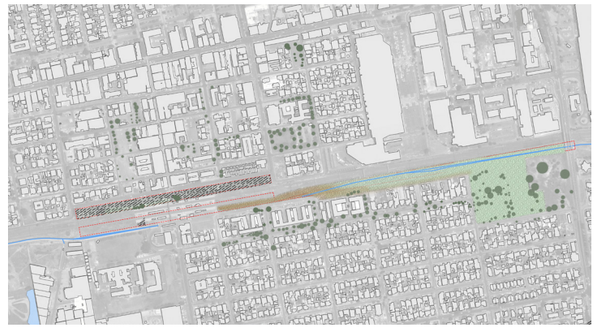


Figure 74: Surface texture and greenery

The map aboves highlights the lack of greenery in the area and hard gravel surfaces.

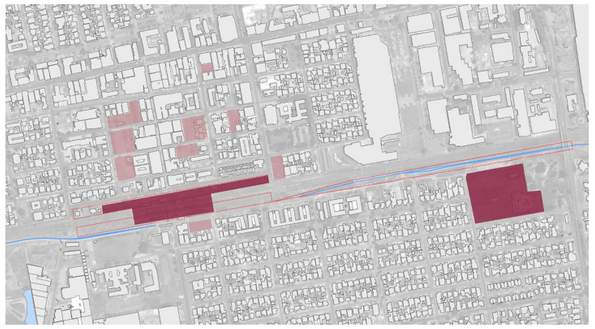


Figure 75: Vacant & neglected erfs

The map aboves highlights the underutilized parking lots and sites which have been neglected.

Figure 76: Precinct Challenges Overlay

Figure 77: Street names

KEY STREETS

Three streets have been identified as being crucial to the precinct scheme.

Firstly Stasieweg Street is a pedestrianised street which links VRC to Parow station as previously stated, the street contains desirable characteristics, namely; its pedestrian nature, the balance between the formal and informal traders, which is a beneficial relationship relationship and the eyes on the street which is possible through the facade design of the apartments above. These listed traits are key to developing active street edges and building on the nature of the street. The second street is Cloete Street, which is perpendicular to Stasieweg, which is filled with taxi and the vacant station site, which has been fenced off. Although the site has been fenced off pedestrians still cross it. Introducing a rank would provide the street with many more possibilities. The final street is De Kock Street which is on the opposite side of the railway with a dense residential edge; the buildings along this street vary in density from two to five storeys. The Elsieskraal River has a pattern of being concealed and revealed along this street.

These three streets offer key informants for points of intervention, the characteristics of Stasieweg can be built on and applied elsewhere along the scheme, and the taxis can be contained along Cloete Street and the Elsieskraal River can be revealed along the De Kock Street.

Figure 78: Pedestrianised Stasieweg Street

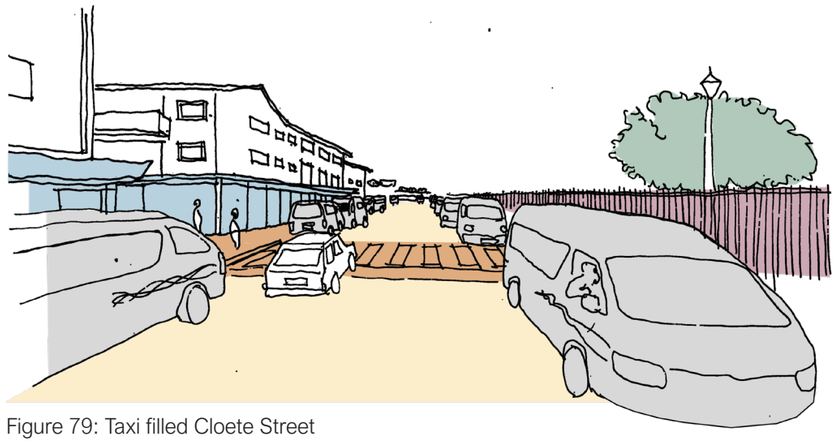
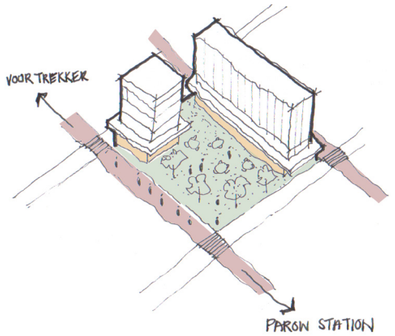


Figure 79: Taxi filled Cloete Street

Figure 80: High Res De KockStreet

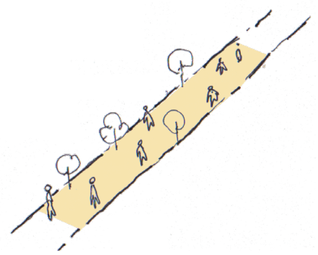
URBAN CONCEPTUAL COMPONENTS

The urban conceptual components are built on the challenges and opportunities identified during the urban analysis to integrate the urban fabric using continuity and discontinuity. Continuity is used through key routes connecting pedestrians from one point to another; discontinuity is employed by creating special places along these key routes to bring people together. Therefore, The station strip becomes a discontinuity element that acts as a key collector and distributor of people.



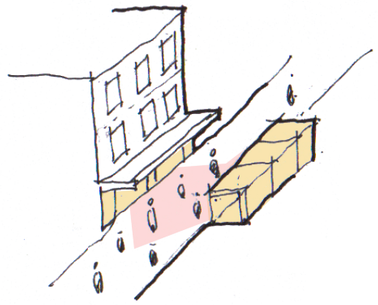
ACTIVATING BLOCKS

The previously identified vacant parking lot blocks have been identified as blocks which need to be activated, with new mixed-use development and ground floor courtyards which interact with the street.



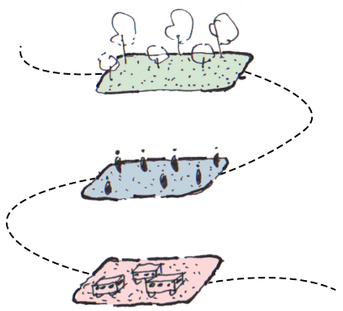
PEDESTRIAN ROUTES

The scheme proposes pedestrianising two streets based on the pedestrian structure of Stasieweg street.



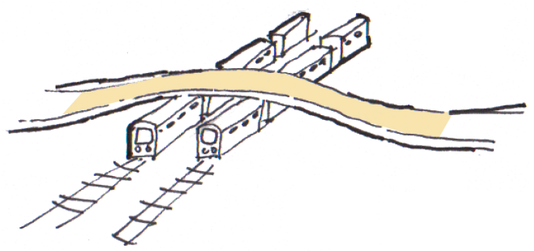
ACTIVE EDGES

Similar to Stasieweg Street, creating active edges by having stores that store that spill out onto the street and create places for informal traders to set up shop. Creating a symbiotic relationship between formal and informal business.



STATION COURTYARDS

The station courtyards break the strip's continuity, creating pause spaces with the recreational courtyard, station forecourt and the taxi courtyard where taxis can park and be washed.



CONNECTING ACROSS THE RAIL

In response to the desire of pedestrians to cross the railway at informal points, the scheme introduces a pedestrian bridge which follows the desire lines on site, connecting users to the Elsieskraal River.

GREATER URBAN STRATEGY

The greater urban strategy is developed around the previously mentioned precinct challenges, feeder routes which provide access to the station and how these integrate with the surrounding communities. The Space syntax gave insight into the importance of connectivity between streets; this has led to key pedestrian and transport routes being identified to reinforce these routes by identifying sites of opportunity along these routes that become a destination.

Three types of sites were identified; the vacant sites in purple, low-density mixed-use buildings in red and recreational spaces in green. The vacant sites would be developed for mixed-use purposes, linking Voortrekker and Cloete Street with pedestrianised streets, similar to Stasieweg. The low-density sites will have increased density with activated street edges which would create pedestrian engagement connected with public transport routes. The recreational sites would be upgraded and improved, connected with green linkages, which means routes.

It is of utmost importance that the Precinct Scheme connects to elements within the surrounding communities to forge and strengthen connections between the community and infrastructure. The intent is that this proposal will be implemented and maintained by the Greater Tygerberg Partnership, the City of Cape Town and local businesses and residents of the surrounding areas. It is important that these areas remain in the ownership of locals to prevent privatisation of these spaces, yet also requires assistance from the city and GTP so that the scheme can reach its full potential.

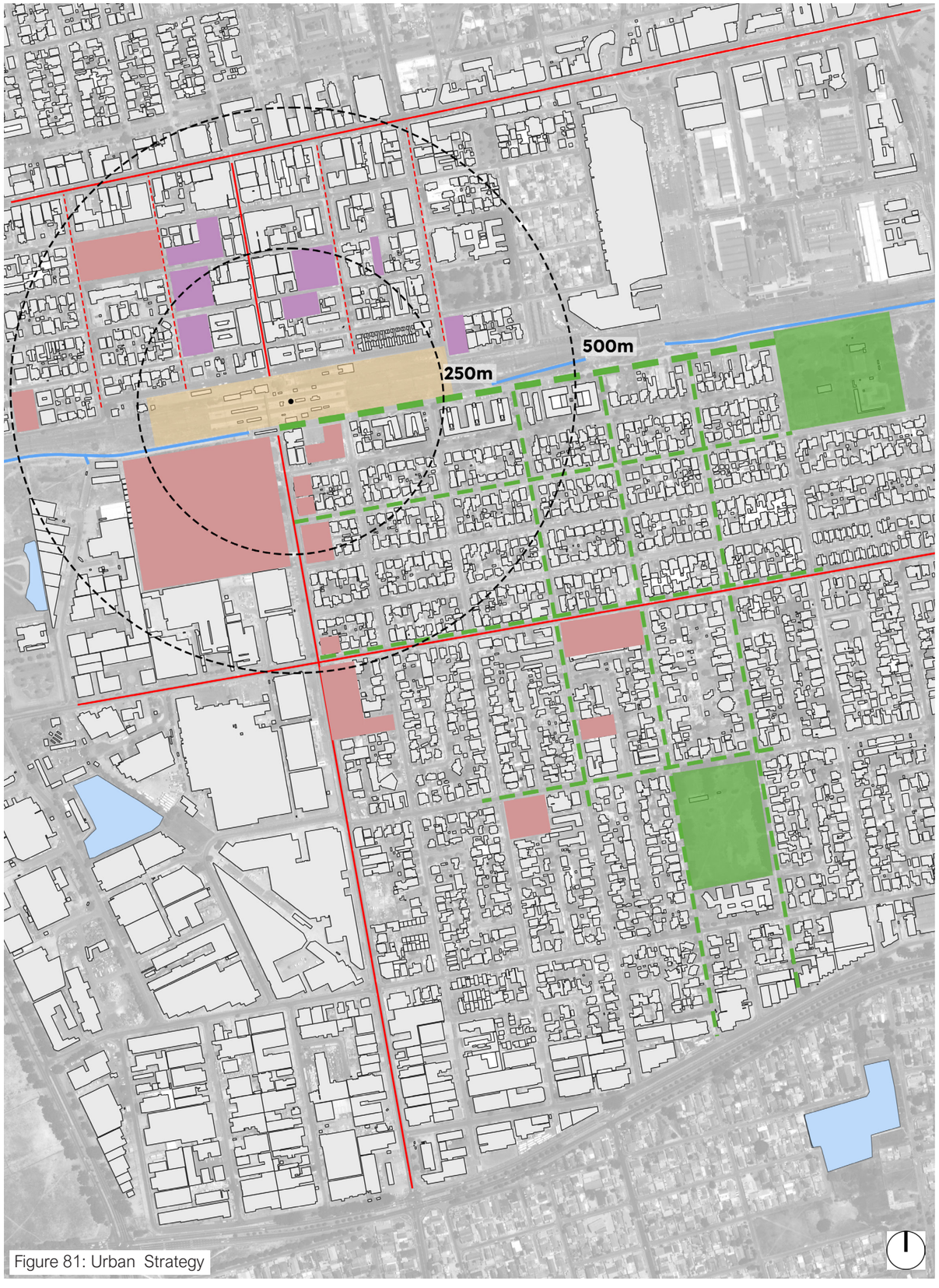


Figure 81: Urban Strategy

PRECINCT STRATEGY

The precinct strategy utilises routes and places to connect the railway and infrastructure. Developing identified sites with active edges along specific routes will improve the relationship between the communities and infrastructure systems.

The vacant parking lot sites will be developed as mixed-use buildings with activated ground-floor courtyards, as seen in the sketch to the right (figure 82). To activate the streets parallel to Stasieweg, the scheme proposes that these streets be pedestrianised with active ground edges, with the intent of facilitating the movement of the VRC and the Parow Station, which will serve as a mixed-use destination. Parow Station will facilitate a connection across the railway line to the Elsieskraal River and recreational park. The section on the right depicts the intent to activate Cloete Road by creating active building edges and how the Elsieskraal River can be adapted to serve a recreational function and support natural habitat.

Figure 82: Activated blocks

Figure 83: Precinct opportunities

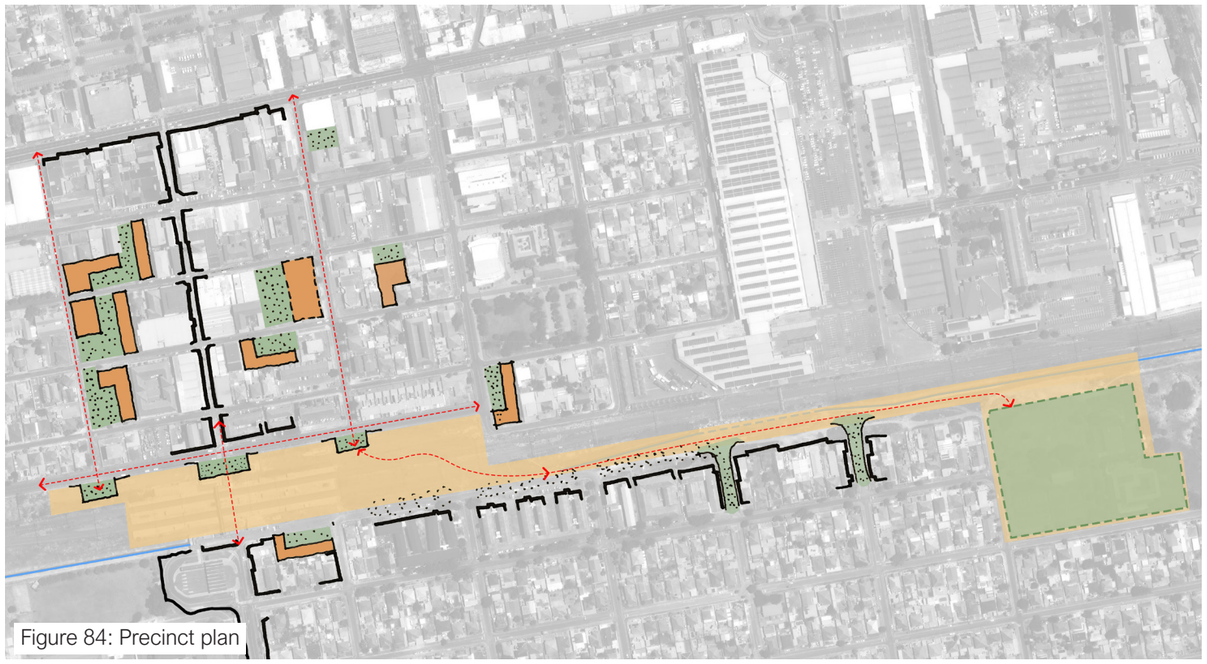


Figure 84: Precinct plan

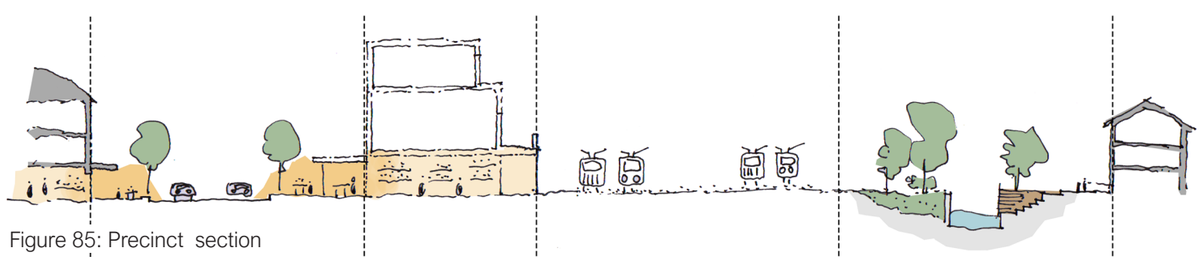


Figure 85: Precinct section

PRECINCT STRATEGY AXO

This axonometric drawing depicts how the components of precinct strategy come together to bind the urban fabric. The station strip becomes key in this scheme because it becomes a destination with a sense of place.

Figure 86: Precinct axonometric

09. CLIENT + PROGRAMME

COMMUNITY PLUGINS

The project proposal is a mixed-use train station located on PRASA (The Passenger Rail Agency of South Africa) owned land; this means that PRASA is the client for the project. With the scheme focusing on urban integration and regeneration, it will also connect to the broader GTP scheme, which is focused on urban regeneration, as previously mentioned.

As previously highlighted, Parow was known as an area where various entrepreneurs of all scales could set up their businesses and the schemes intended to build on that identity. The area consists of various small shops owned by community members, and these shops thrive off the long-established entrepreneurial spirit of the place. These community shops are often found along streets with plenty of pedestrian activity; on Stasieweg Street, they co-exist and thrive with informal traders. Building on this dynamic, the scheme will include ground-floor community shops, which range from recreational, small businesses, food and grocery-related businesses and transport businesses. The diagram on the right depicts the various community businesses. The inclusion of recreational spaces is so that kids and adults can have places to play and exercise, this would also give life to the area beyond the standard week workdays.

SPORTS & LEARNING

Futsal courts

Reading Centre

Outdoor & Indoor gym

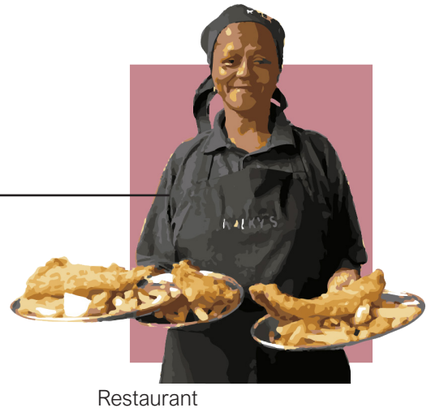
SMALL BUSINESSES

Hair salon

Barbershop

Laundromat

FOOD & GROCERY

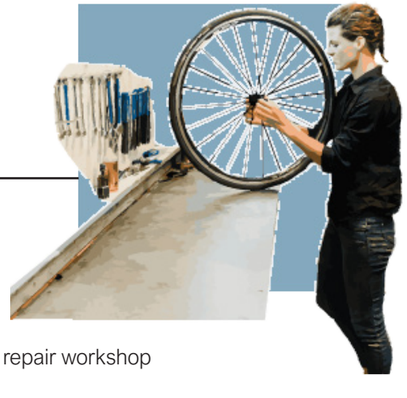


Restaurant

Local convenience store/Spaza shop

Bakery

TRANSPORT



Bicycle repair workshop

Car and taxi wash

ENTREPRENEURIAL PLUGINS

The project proposes a mixed-use station, with various programmatic plugins. As previously highlighted, the GTP research revealed that there is a lack of co-working spaces and places for young innovators and entrepreneurs to work, resulting in them travelling to other areas to find these facilities. In response to this need, the GTP has created the Bellvile Innovation and Development Centre for Bellville. Similarly, the new Parow Station Precinct will accommodate these entrepreneurs, along with the informal traders and makerspaces where small-scale making and prototyping can occur. The precinct will also include a community and reading centre where demonstrations and skills development training can be held, allowing businesses to give back to the local community.

To provide eyes on the street as seen throughout the VRC is the residential component. The mix of these functions will allow the train station to attract and hold various types of energies, allowing it to become a type of hybrid architecture which forges connections, within and beyond.

Figure 87: GTP Bellville innovation and development centre (GTP, 2020)

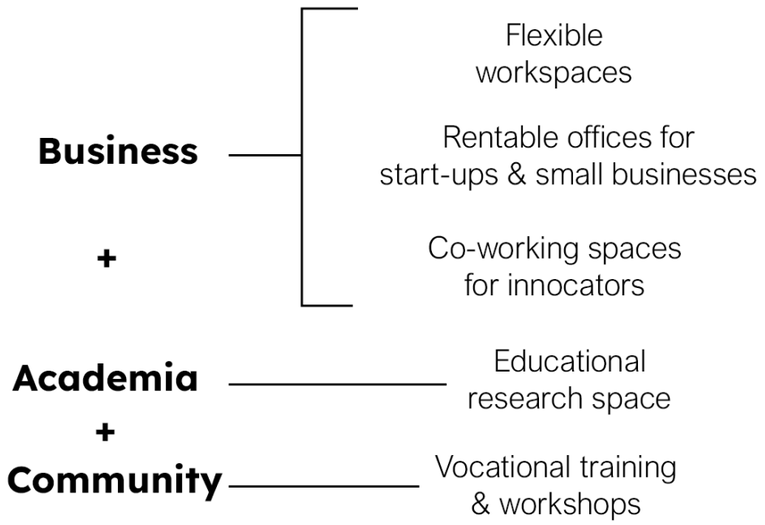


Figure 88: Building user group

10. DESIGN DEVELOPMENT

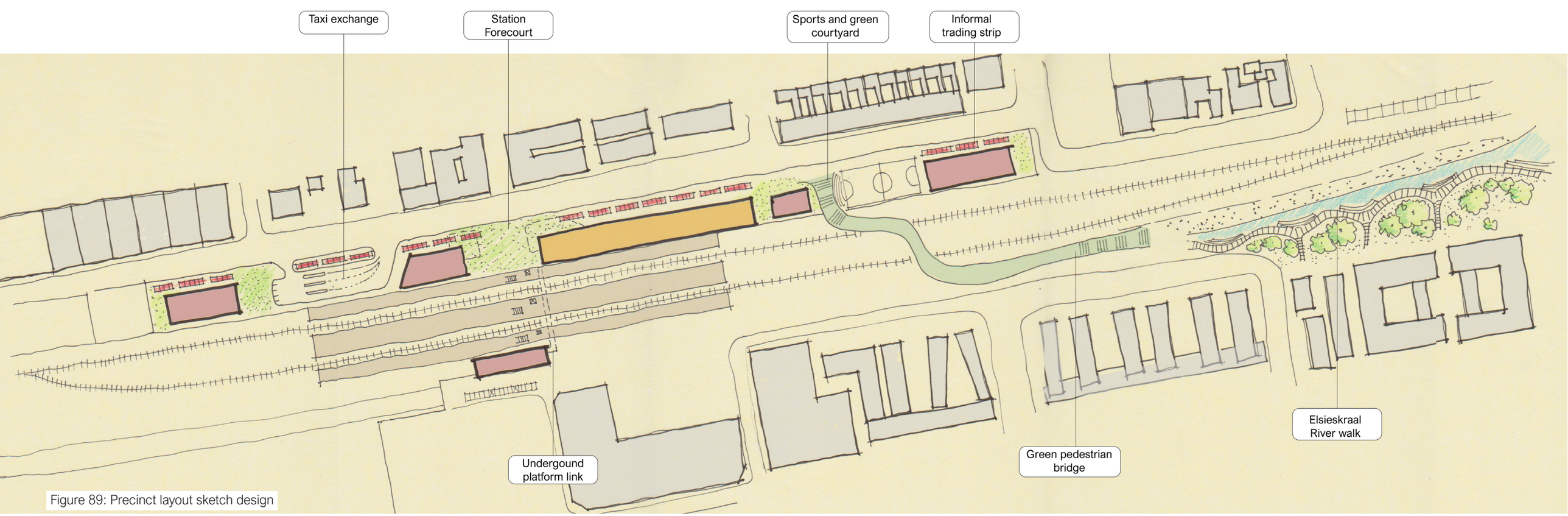


Figure 89: Precinct layout sketch design

PRECINCT LAYOUT

The Parow Station Precinct builds on the urban scheme, which has informed the layout of the Precinct scheme. By activating the streets parallel to Stasieweg, three distinct courtyards have been introduced to receive pedestrians. The courtyard on the far right is a sports and recreation courtyard, followed by the station forecourt, which meets pedestrians from Stasieweg and lastly, the taxi courtyard, where a new taxi rank has been introduced. The strip along the pavement edge of Cloete Street has been reserved for informal traders to set up shop. Between these courtyards are mixed-use buildings, which will accommodate the community shops, entrepreneurs and residents; functions will be distributed differently across these buildings. Creating a link to the Elsieskraal River Walk is a new pedestrian bridge which follows the existing desire lines on site and runs over the railway line. The Precinct layout similarly follows the strategy of combining movement routes and pause spaces along the route, and the same applies to the bridge; the pause spaces create an interaction between the pedestrian and the site.

Looking at the axonometric drawing on the right shows the desired volumes of the buildings; this is to create density and diversity along this strip but also in line with the context. All of the buildings have a covered ground floor; this is intended to make the building more inviting and is a typical trait of buildings along the VRC. The focus of this project will be the building in yellow which houses the train station buildings.

The pedestrian bridge snakes across to the Elsieskraal Riverwalk, and the drawing on the bottom right shows the first design iteration, which focused on including greenery along the bridge with the intent of bringing it across the rail divide. However, this design requires more activity and a place for informal trading. The Elsieskraal Riverwalk shows how the edge can be reimagined to allow access to the river; the flowing nature of the edge also allows it to act as a flood control method.

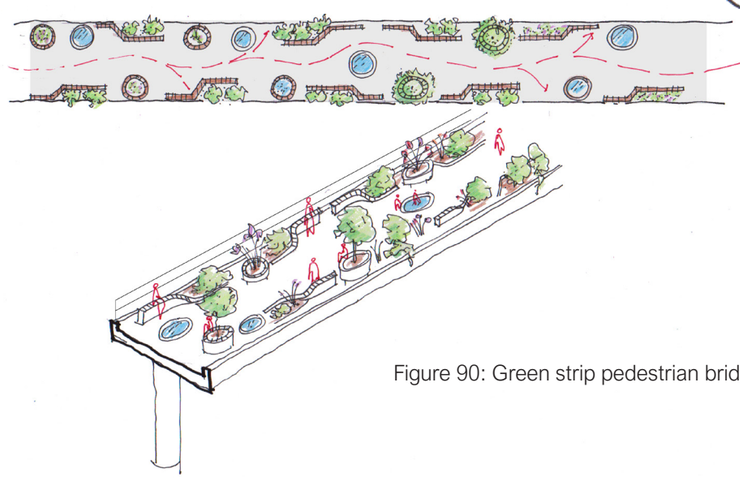


Figure 90: Green strip pedestrian bridge

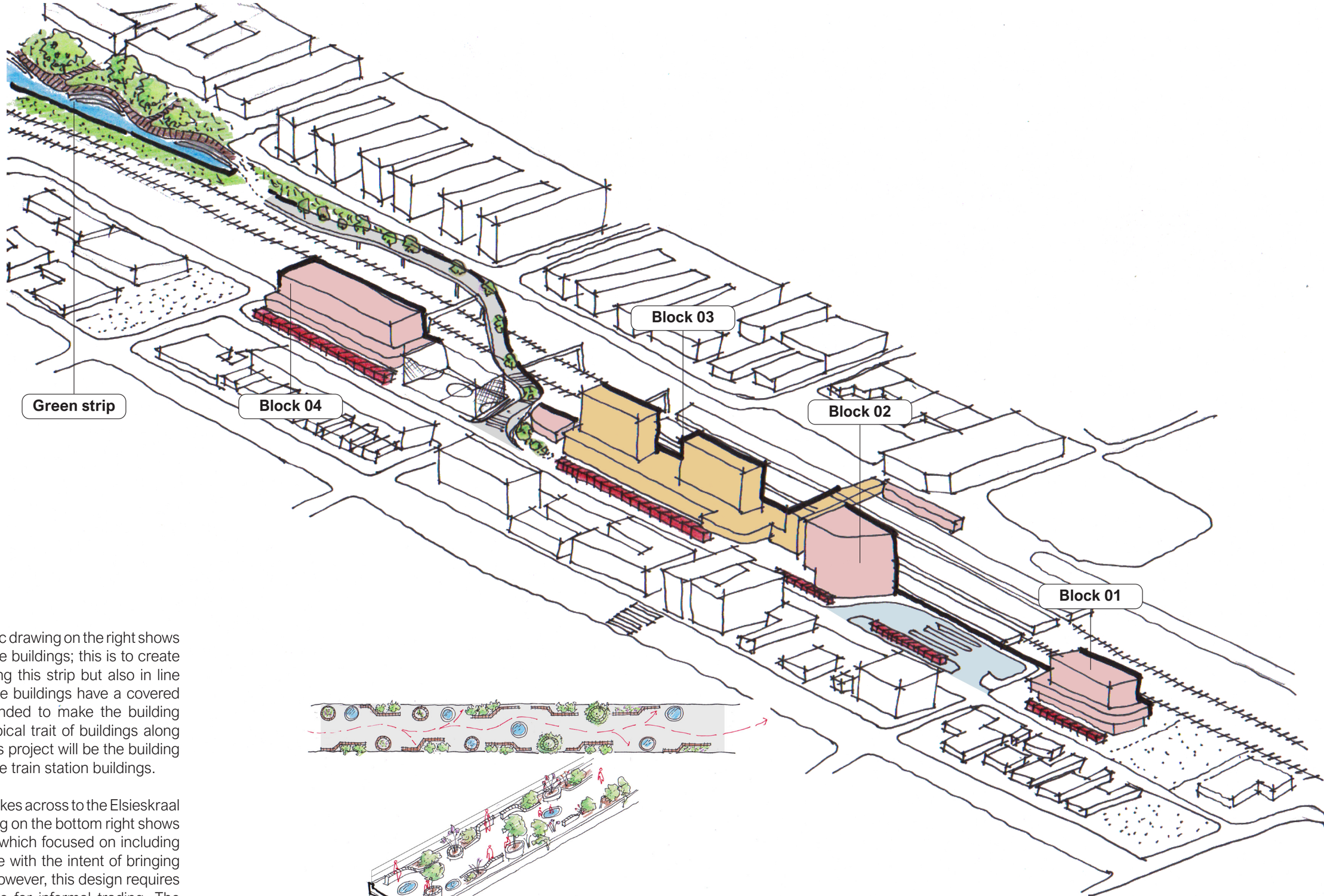


Figure 91: Station strip axonometric

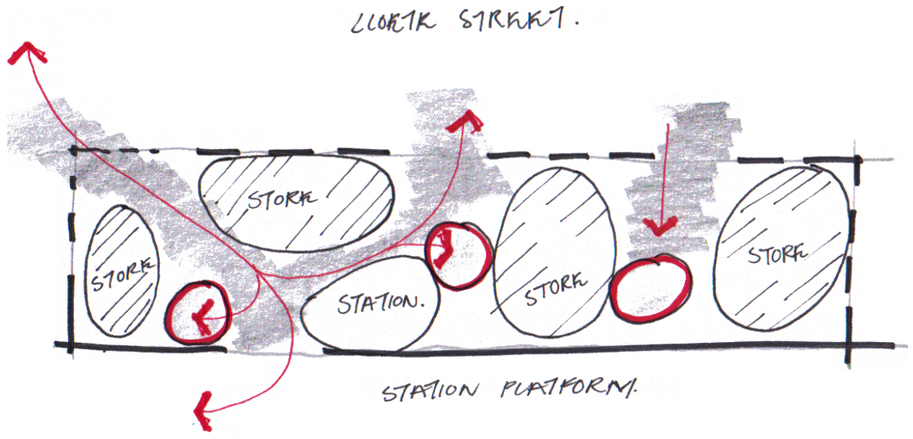


Figure 92: Ground floor bubble diagram

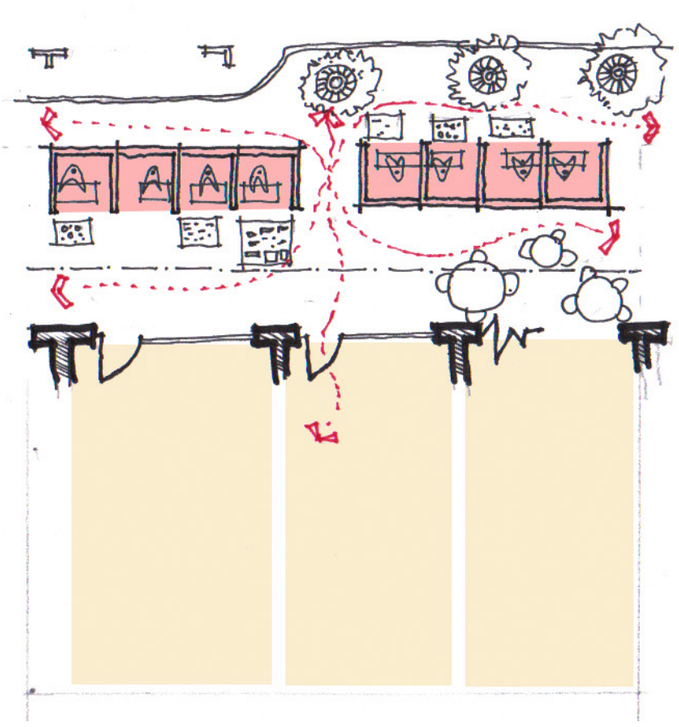


Figure 93: Street Edge activation

Street edge activation for informal traders
Creating a relationship between informal and formal businesses

GROUND FLOOR EXPLORATION

The first attempt at developing the ground floor was focused on how different commuters would move through the building when arriving on site but also how the informal traders interact with the formal community shops. The space between the informal traders and the building facade also allows the community shops to open up and expand their business onto the pavement, and similarly, for the informal traders, this is depicted on the diagram on the top right. The building also required two cores for the two tower blocks above. The community line shops in yellow were available in various depths for different shop types; the challenge with this layout is that it mainly focused on the Cloete Street facade, creating a hard, uninviting edge along the railway.

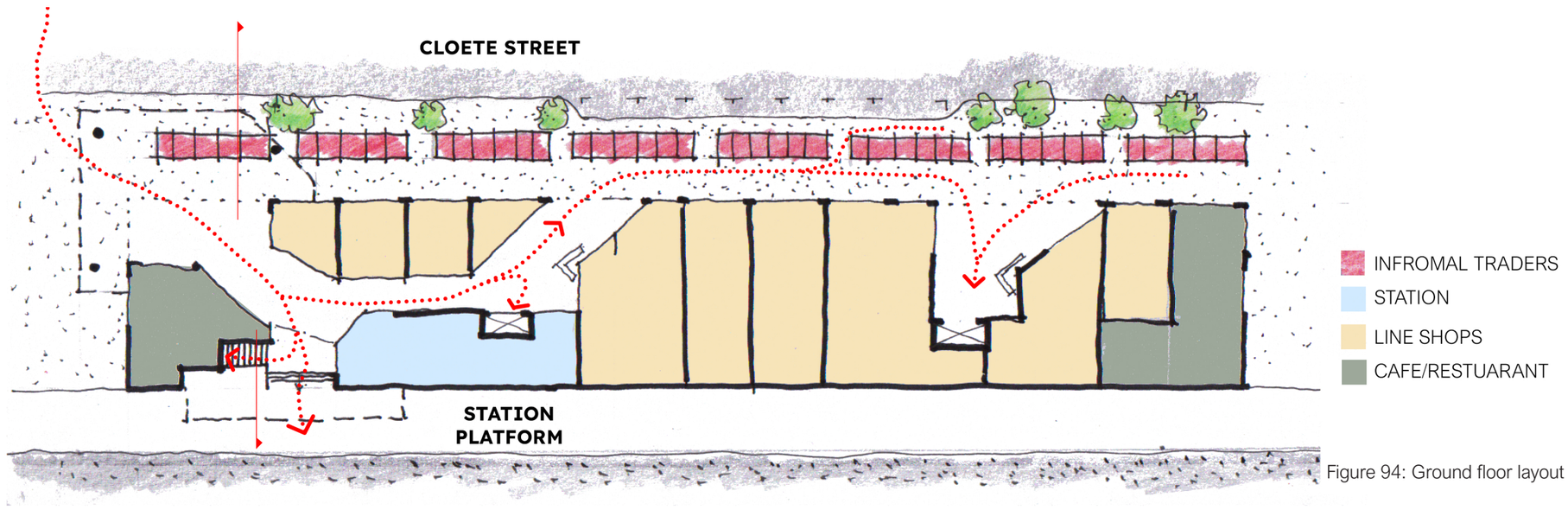


Figure 94: Ground floor layout

FLOOR LAYOUT EXPLORATION

The second-floor plan exploration looked at multiple floors, mainly the ground floor, co-working/ makerspace floor and the residential units above. In this iteration of the ground floor layout the community shops were reduced in size and a co-working space was inserted behind it to create a visual link with passing-by commuters. The co-working space would also include a coffee shop, where commuters can wait and work while they wait for their train, or they can grab a coffee on the go to their destination.

The lifts will take visitors up to the co-working and makerspace floor above but access to this would be allowed by security, as the lift also connects to the residential apartments above. To access the different space key tags will be assigned. The co-working space consists of various working space options, firstly, a bookable conference room, large working spaces for small groups between one to five people, then single individual cubicles and lastly, informal work spaces. These spaces could be reserved at the reception area. There are publicly accessible courtyards on the podium floor as well but these have to be reconsidered.

Floors second to sixth contain varying residential apartments ranging from studio to two-bedroom units. Due to the narrow nature of the plan, the apartments will be north-facing, and circulation occur on the South end. It is important that these apartments have balconies on the facade because this will create eyes on the street; however, these will be explored later in the sectional axonometric drawing.

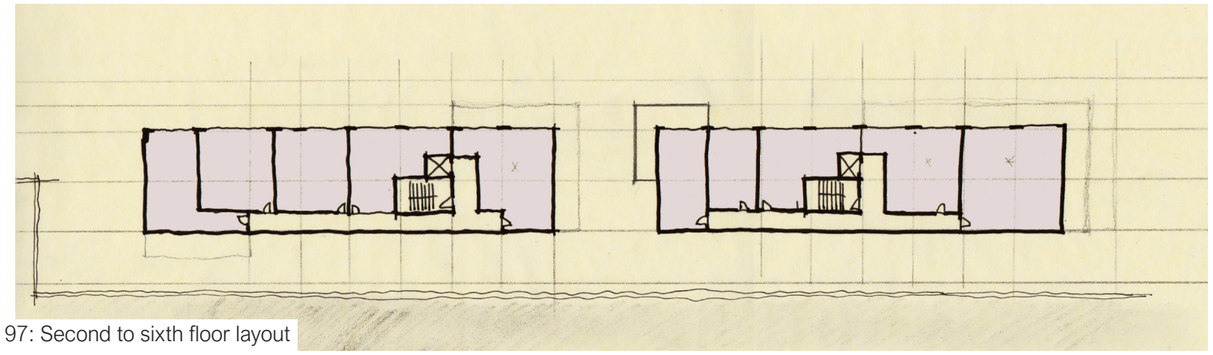


Figure 97: Second to sixth floor layout

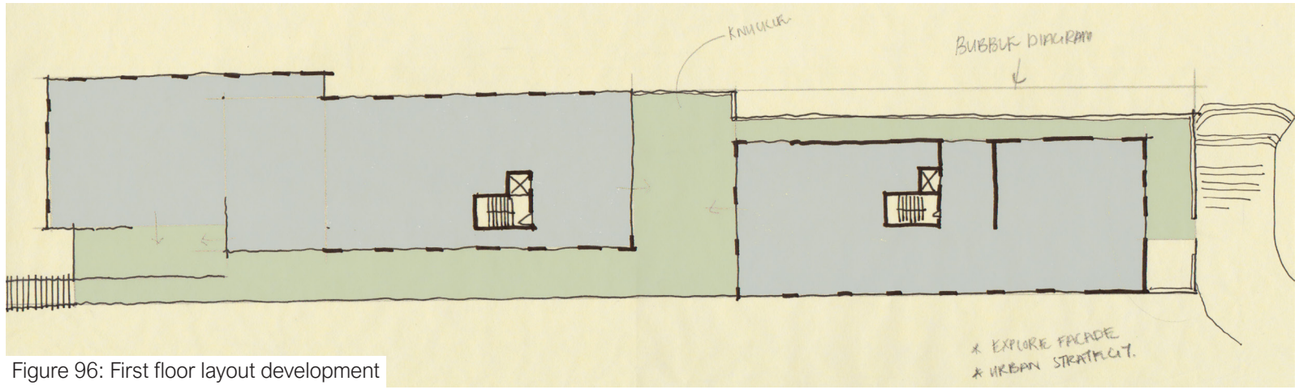


Figure 96: First floor layout development

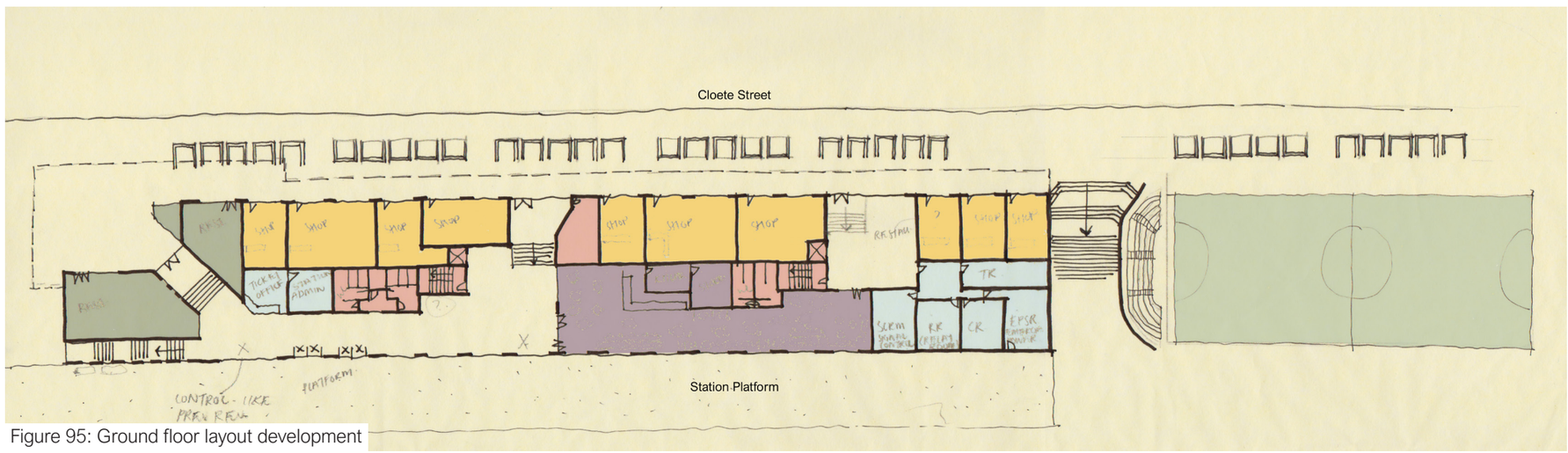


Figure 95: Ground floor layout development

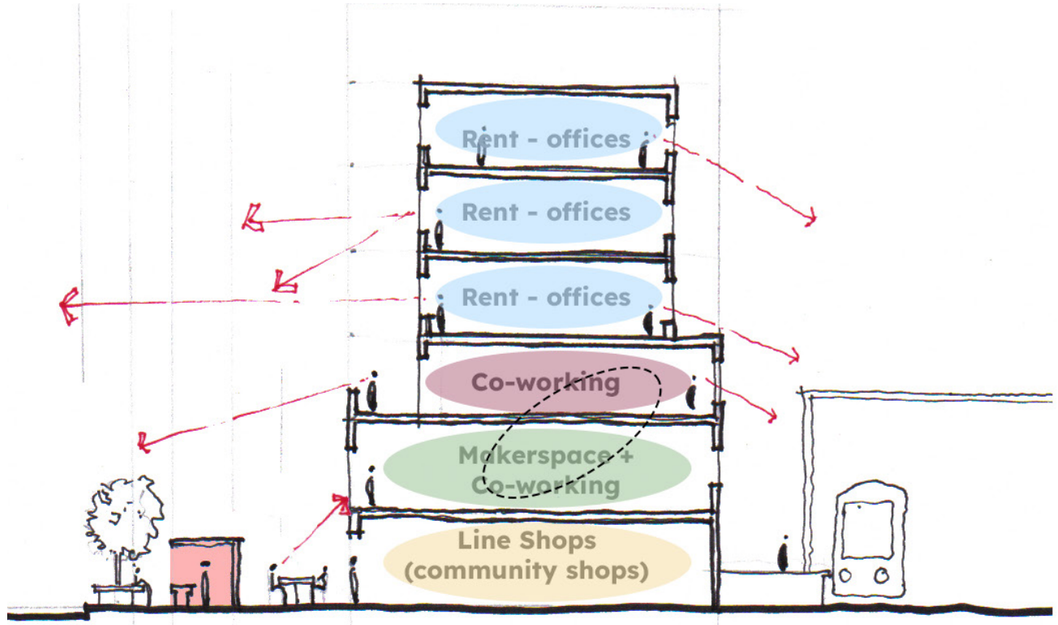


Figure 98: Programmatic section

SECTIONAL EXPLORATION

The first sectional exploration looked at how the various entrepreneurial functions can be located within the building to create a gradient of informal to formal. It was also important to have a visual connection between the inside and outside so that pedestrians could see the inner workings of the building but in return, this would also allow eyes on the street. The section also looked at how the building can connect commuters from the street to the station platform, with the view that the building acts as a conductor of urban liveliness. This exploration also looked at the removal of the overhead crossing and just using the underground tunnel as a means to access the platform; access to this space would be controlled, as it can only be accessed through the station buildings on either end.

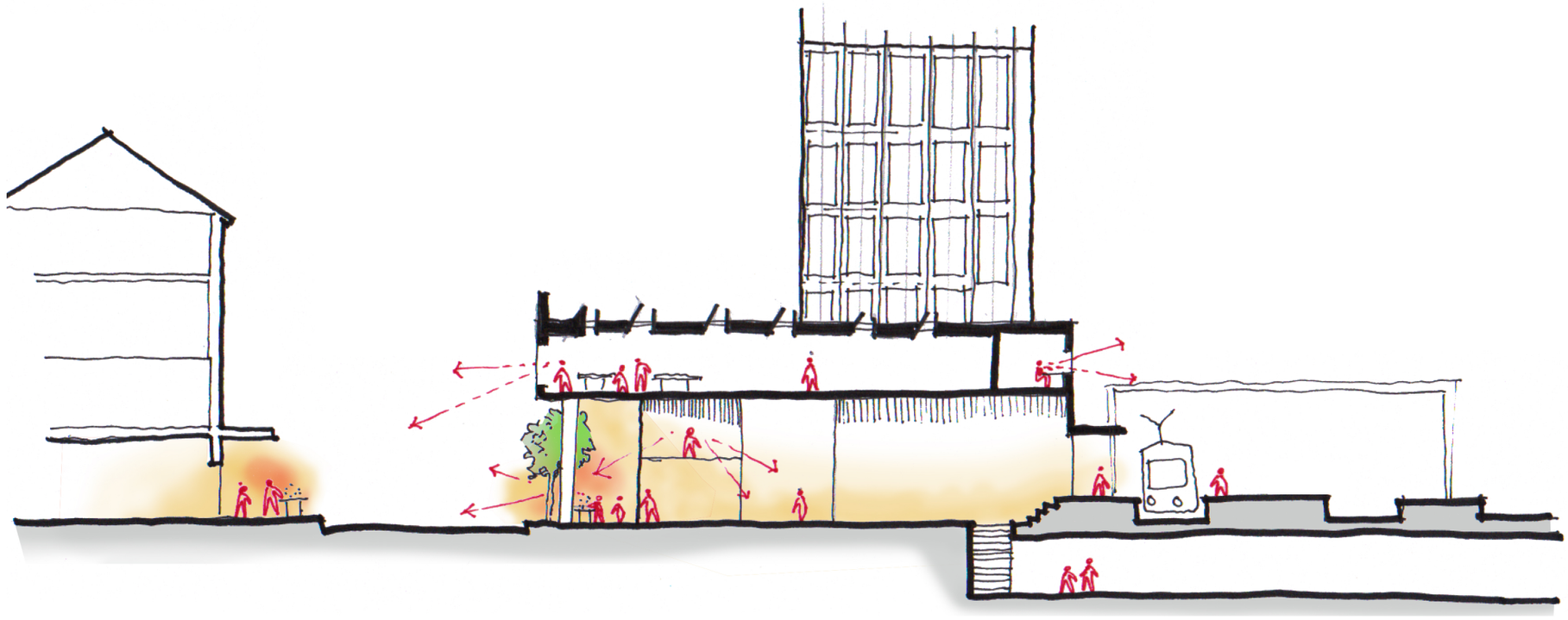


Figure 99: Schematic section

VOORTREKKER MIXED-USE TYPOLOGY

The diagrams on the right explore how mixed-use buildings along the VRC dealt with building and facade composition. The first building on top created a horizontal layered facade using strip windows and shading devices, and similarly, this building was also north-facing. The second building created a vertical facade, and this was done by pushing and pulling the facade; a large horizontal strip separated the apartments and shops below. With the last building, the architect similarly implemented the horizontal strategy but the horizontal elements were broken down into different components depending on where it was.

A key feature of the buildings along the VRC is that they all mostly employed face-brick and plaster in the facade composition. In some instances, it's just white plaster bands and in others, it's colourful but brick remains the common material except in industrial spaces.

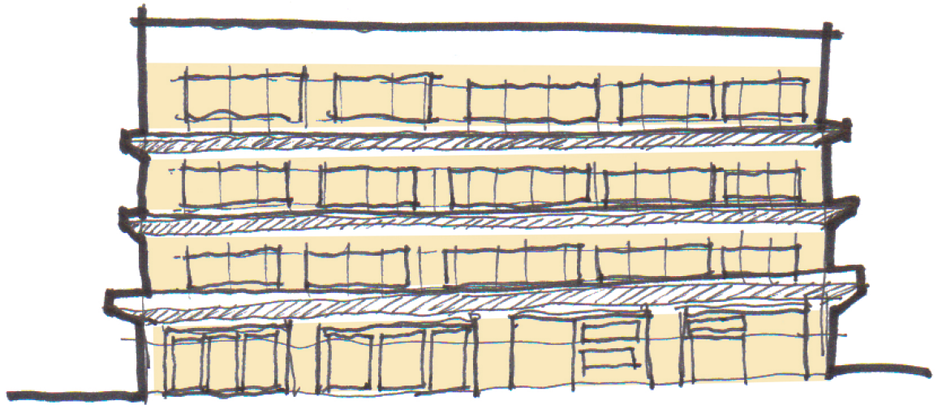


Figure 100: VRC horizontal facade

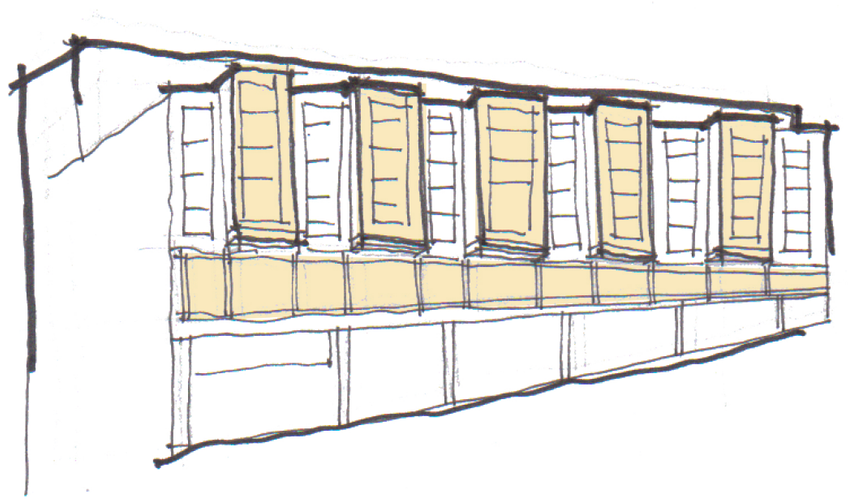


Figure 101: VRC Vertical facade

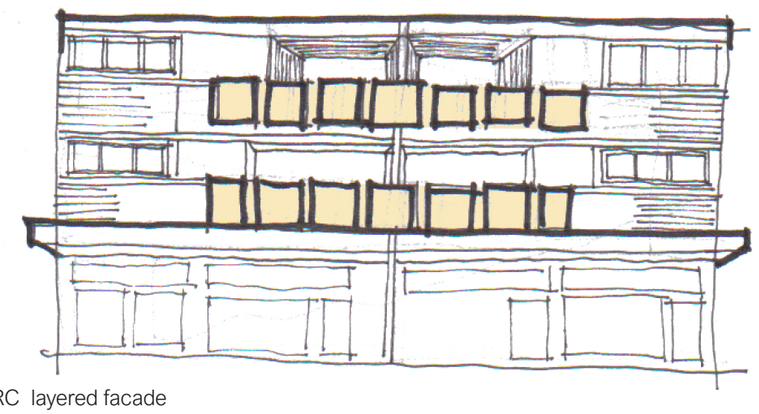


Figure 102: VRC layered facade

FACADE & SECTIONAL EXPLORATION

The intent of the axonometric sectional exploration was not only to look like the facade but also to create different types of balconies, this would also impact the sizes of the apartments, meaning that the apartment layouts have to be reconfigured. Various balconies have been introduced on the facade but act as shading devices for the apartments below. The design intends to create a vertical rhythm on the facade, following how the shop facade is broken up on the ground floor. In the earlier technological studies, three materials were identified: brick, steel and timber; however, it seems that the building will mainly employ a face-brick facade with varying brick patterns to create another layer within the facade.

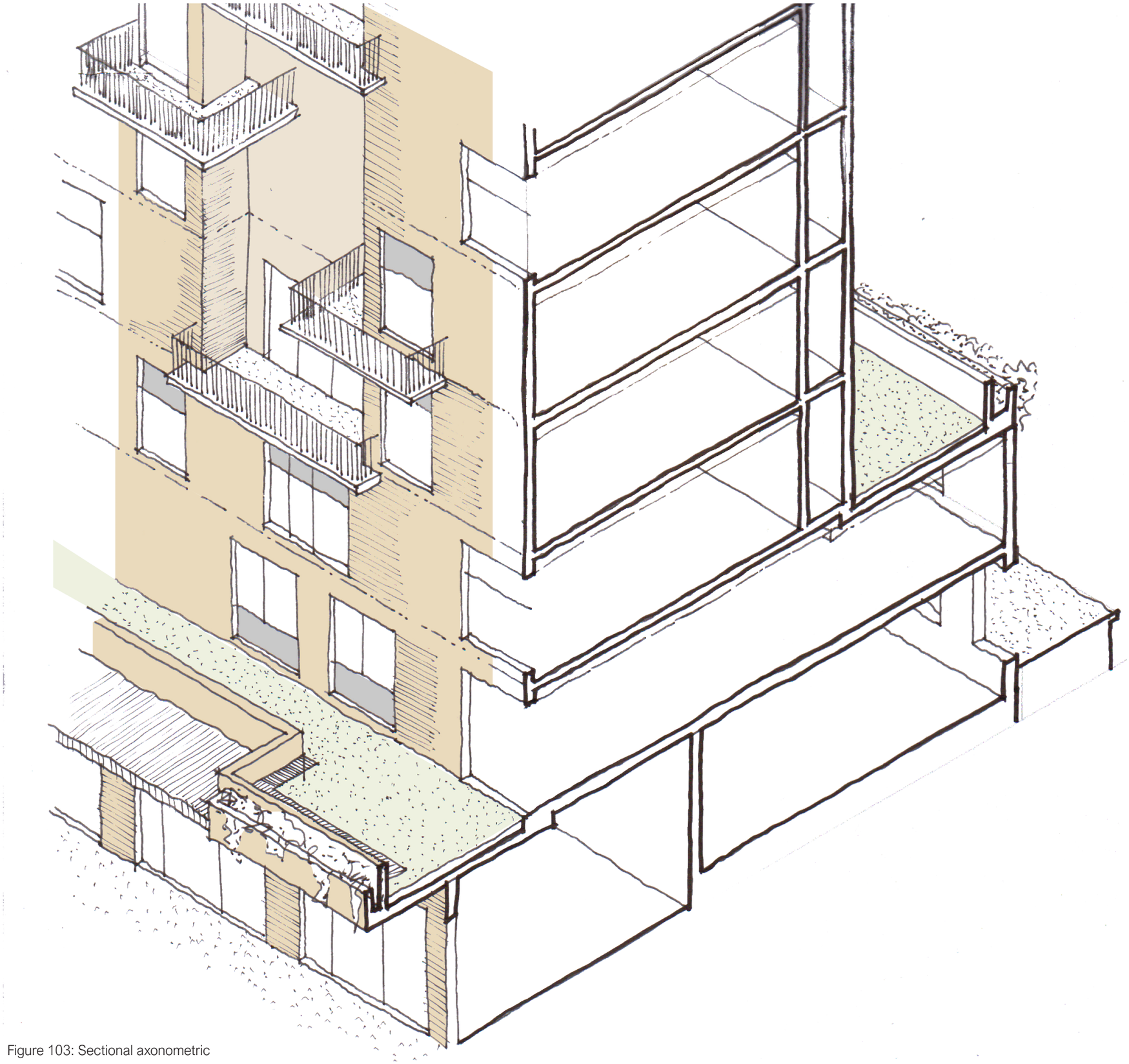


Figure 103: Sectional axonometric

FACADE & SECTIONAL DEVELOPMENT

In the second iteration of the design, the intent was to improve the interactive nature of the facade to create a facade that interacts with the streets and between the balconies themselves; this is done by stepping and staggering the balconies instead of stacking them above each other. Brick is still employed as the main material to create a robust facade, however, a darker brick is used along the ground floor, signifying a change in function. The exposed concrete slab edges reinforce the horizontality of the brick. They are the main structural material, freeing up the brickwork to be employed more aesthetically when required.

This iteration explored the idea of having a mixed-use building that houses commercial shops, workspaces and residential businesses above, however, this composition of functions means that the building will have a degree of high privacy on the levels above. Because of the location of the building in the overall scheme, a more public programme is required, meaning that the residential component will be removed from this building moving forward. The building will be an entrepreneurial incubator hub that houses the station components.

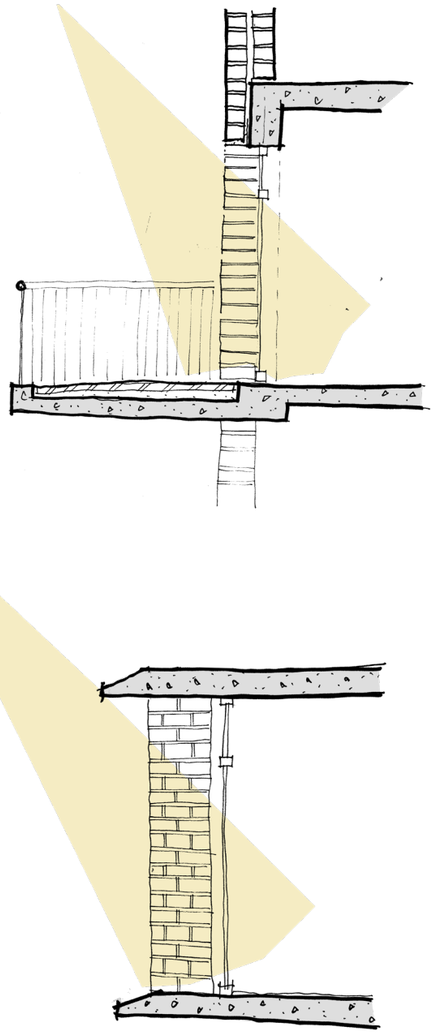


Figure 105: Facade sections

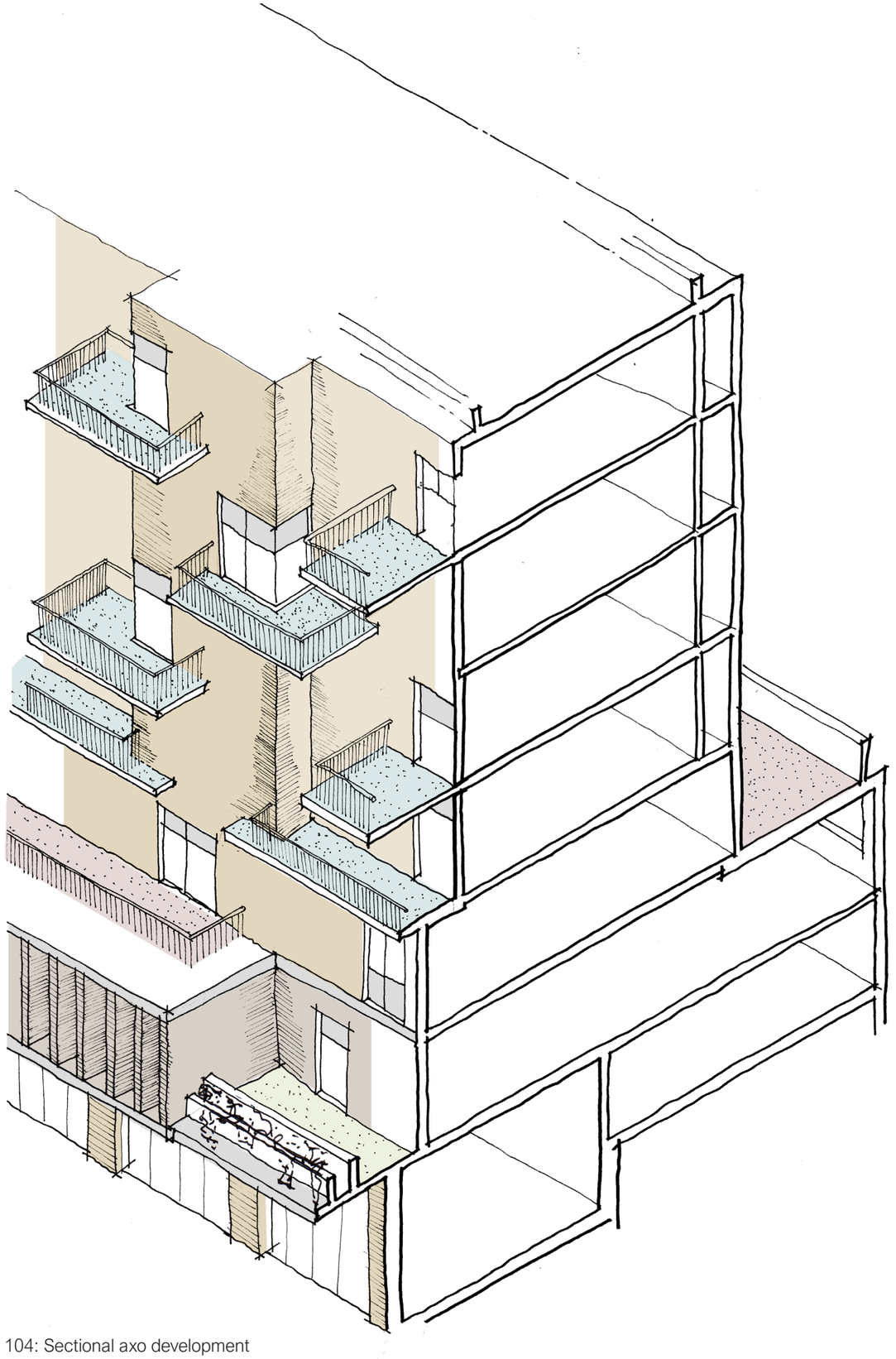


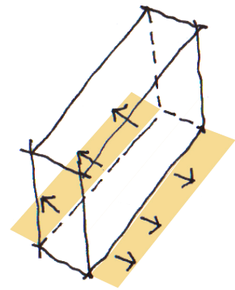
Figure 104: Sectional axo development

ARCHITECTURAL CONCEPT

Building on the intent to create a dense, diverse and interconnected urban environment - the architectural intent takes those principles forward in the architecture so that the architecture can contribute to its contextual surroundings and create an interactive building allowing relationships to develop between programs. Five methods are used to achieve this: edges, massing, cores, facade workspaces and threaded vertical urbanity.

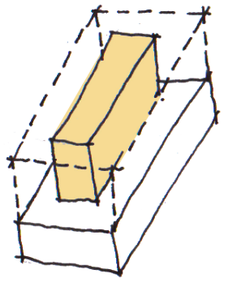
ACTIVE GROUND EDGES

This refers to how the building interacts with its surroundings, namely Cloete Street on the front facade and the railway platform edge. The intent is to create interactive edges on both fronts to pull people into the building. Community shops are located along the Cloete Street edge, and a coffee shop is on the railway platform edge.



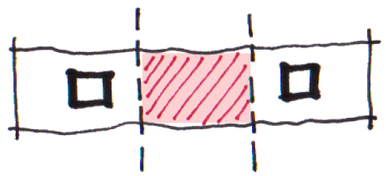
REDUCTION OF MASS

Above the first floor, the building reduces its mass by stepping back, creating balcony spaces for users to spill onto, allowing eyes on the street.



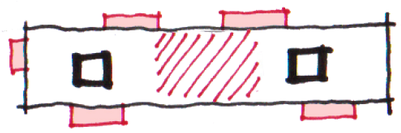
THREE CORES

The building is split into three cores; the two end cores are dedicated to service cores and fixed working spaces. The central core functions as an urban stair with flexible working spaces, which also services a social function as it becomes a place where people interact and network with others.



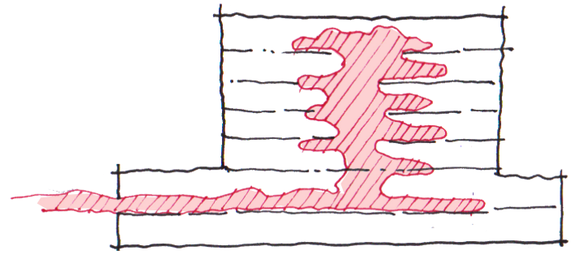
FACADE WORKSPACES

Due to the narrow nature of the plan, space is lost to circulation; however, extending these outwards creates bookable workspaces along the facade. Allowing the street to look into the life of the building.



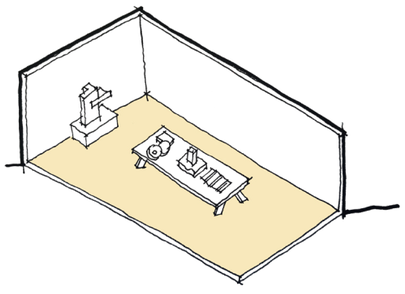
THREADED VERTICAL URBANITY

The thread of vertical urbanity pulls in users on the first floor and pulls them up throughout the building through this light-filled atrium space which is an extension of the street. The stairs doubles up as social and work spaces as users ascend the stairs.



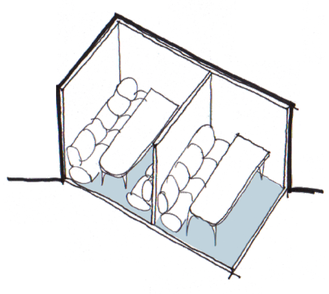
WORKING SPACES

The working spaces are divided into makerspaces, working cubicles, meeting pods and office spaces. The spaces within the building are available for short-term and medium-term rentals. These working spaces provide space for young businesses and fabricators who previously travelled beyond the northern suburbs for office space. The building becomes an incubator hub for young entrepreneurs in the area, which builds on the entrepreneurial spirit of the place, which was key in establishing Parow.



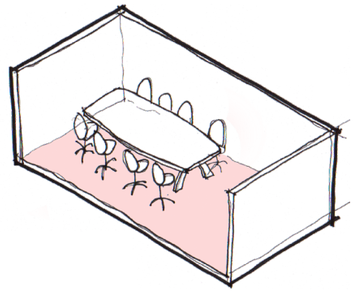
MAKERSPACE

A makerspace is defined as a collaborative workspace for making, exploring and learning through the use of high and low-tech tools. These tools include 3D printers, laser cutters, CNC machines and other fabrication tools. This space serves as a space where prototyping and learning can take place. Entrepreneurs can utilise the facilities to prototype new designs, and school kids can use them to learn new making skills.



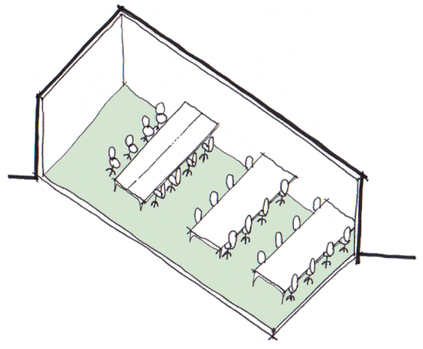
WORKING CUBICLES

The small working cubicles are suitable for individual and small group working spaces. They are strategically located along corridors and provide a view inside the building.



MEETING PODS

The meeting pods are bookable and located on each floor and are also located along the facade, allowing light to filter into the space and natural ventilation to occur. The meeting pods also have variants from small to larger pods for larger groups.



OFFICES

The rentable offices are bookable for medium to long-term periods and are also located along the facade. These spaces would be ideal for small start-up businesses that require office space within the area.

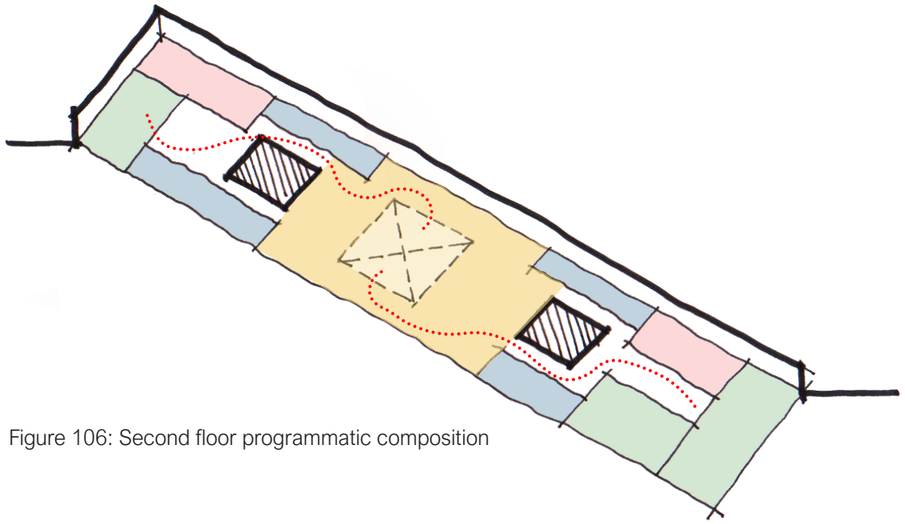


Figure 106: Second floor programmatic composition

PLAN LAYOUT

The ground floor layout follows the initial design of community shops along Cloete Street, the coffee shop faces the railway platform, and the station ticket office and railway services are within the building as well. Commuters have direct access to the railway platform from within the building and can access the other platforms through the platform bridge from within the building.

The first floor holds the makerspace, which hovers over the main entrance, with large street-facing windows that allow pedestrians to see the activity within. The remainder of the floor contains a cafe and small restaurant for building occupants and flexible work spaces in the centre.

Users can access the first floor through the central threaded urbanity stair; this atrium space pulls visitors up vertically and connects with the two anchor cores where the workspaces are located, as seen in the diagram above. The space is intentionally organised in this way, intending to pull users to the central pause space where interactions take place, yet, this space also contains flexible work spaces.

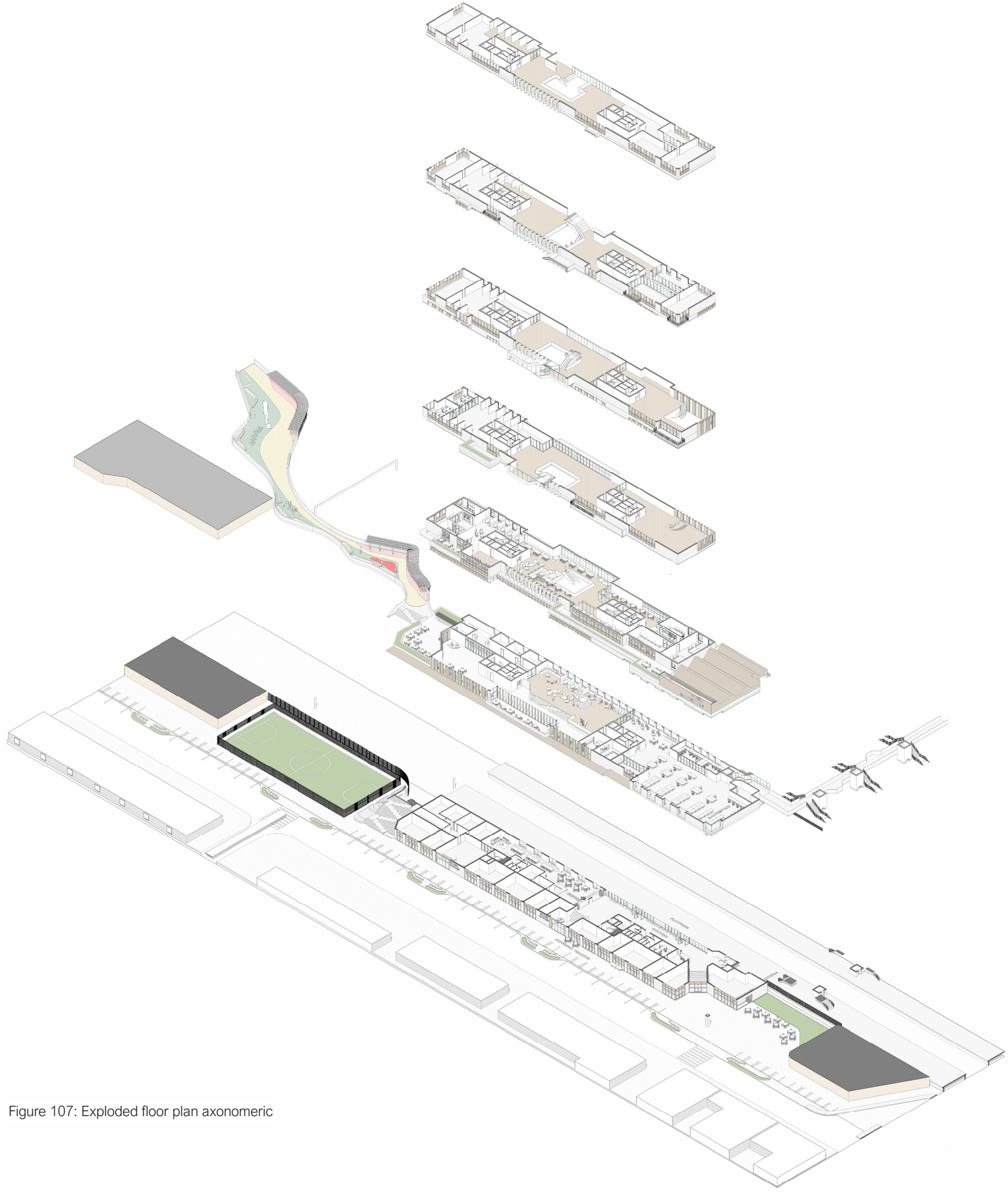


Figure 107: Exploded floor plan axonomeric

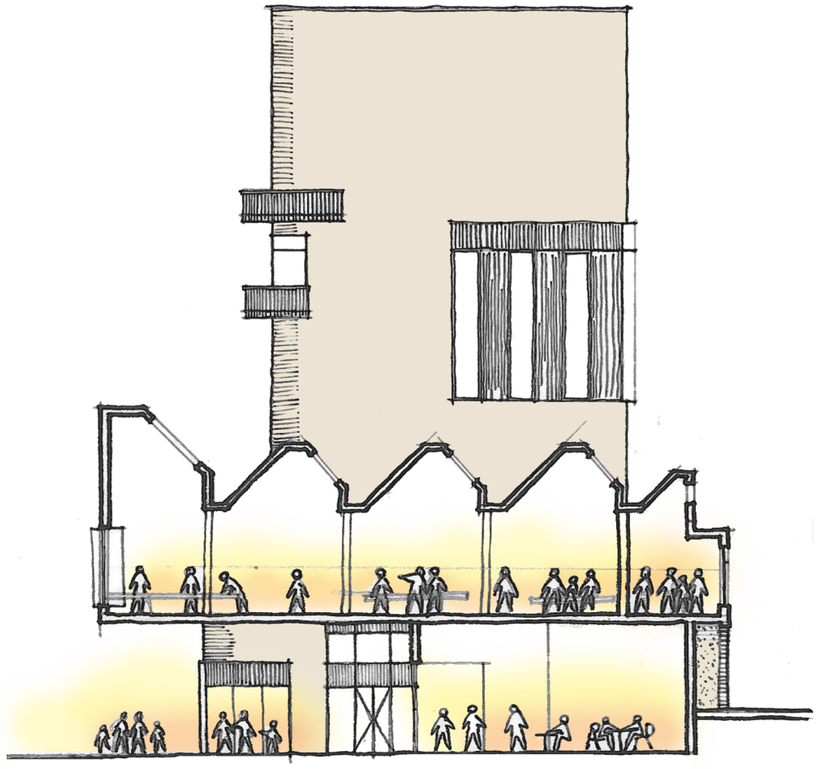


Figure 108: Section A - Through Makerspace

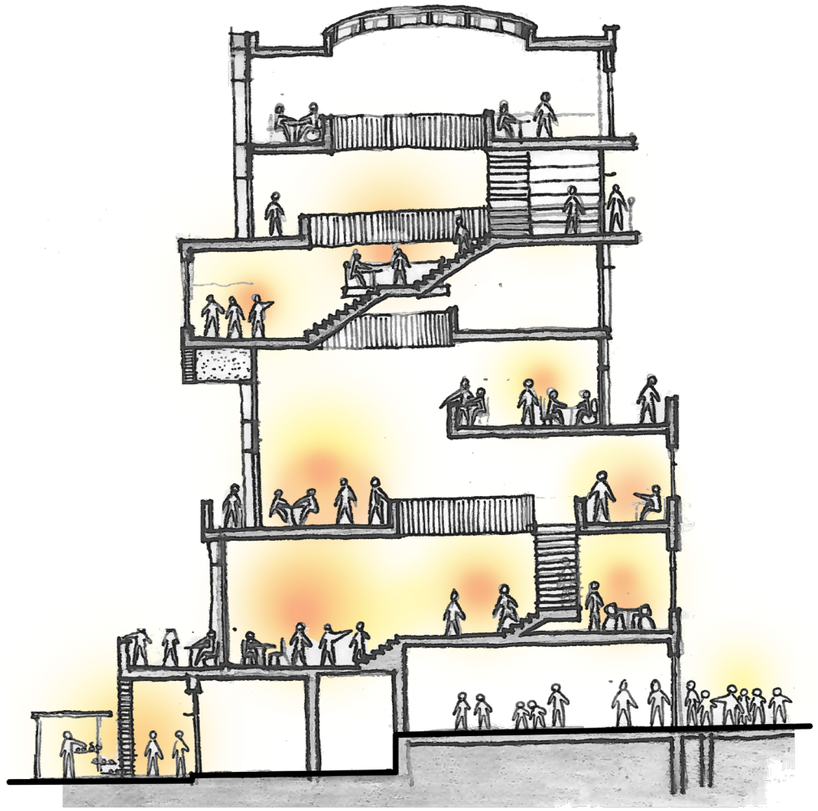


Figure 109: Section B - Through Threaded Vertical Urbanity

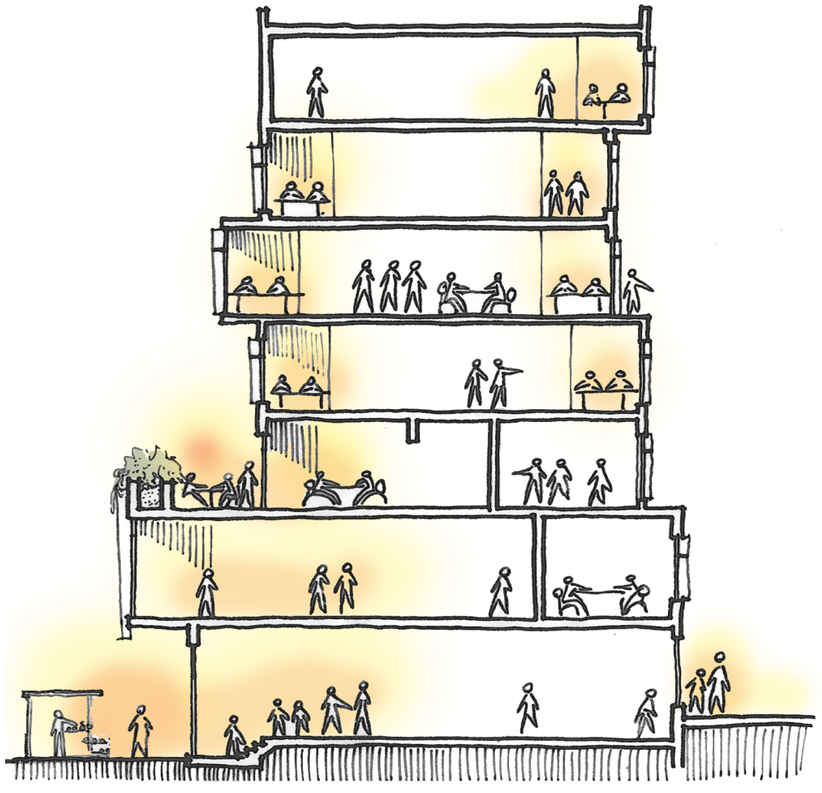


Figure 110: Section C - Through work spaces

SECTIONAL COMPOSITION

The sections above explored the different natures of the building; section A explored the makerspace and south light filters into the space and the life beneath the makerspace. The makerspace hovers over the new station forecourt, and the makerspace creates a threshold space as commuters move in and out of the building.

Section B explores the thread of vertical urbanity atrium, showcasing the floors step back and forth, creating overlapping spaces that become dynamic and interactive. This is also reflected on the facade as it creates exterior balconies.

Section C was taken through static spaces, which show the facade working spaces on the building perimeter and the ground floor linkage between Cloete Street and the railway platform.

FACADE MATERIALITY

The facade materiality consists of three materials; brick, aluminium and glass. The intent of the project is to unite and strengthen the culture of entrepreneurship in Parow and across the railway divide; it is about crafting connections. Brick allows for the crafting of relationships between elements. This is combined with glazed and aluminium facade systems to break the heaviness of the brickwork and filter light into the space.

Figure 111: Materiality collage

ARTIST IMPRESSION - MAIN ENTRANCE

The artist's impression of the Main entrance to the left depicts how the makerspace floats over the entrance and how the restaurant space spills onto the station forecourt. The brick facade creates a grounded building but also represents the strength and unity of the community, however, there remains an opportunity to experiment with the brick bonds on the facade to express the desired diversity and connectivity further.

Figure 112: Cloete Street Main Entrance

ARTIST IMPRESSION - RECREATIONAL COURTYARD INTERFACE

This impression shows how the building connects with its surroundings; the train is running below in the corner, with commuters viewing the futsal court. Pedestrians using the bridge can easily flow into the building on the first floor or descend to the ground floor streetscape. The community shops are Strung along the ground floor streetscape; these are covered, allowing shops to spill out onto the street and interact with the informal traders when they set up shop.

Figure 113: Cloete Street Facade

11. WAY FORWARD

Figure 114: Cloete Street storefront perspective

Figure 115: Ground floor platform coffee shop perspective

Figure 116: Threaded Vertical Urbanity atrium perspective

CONCLUSION - WAY FORWARD

Although the design has developed considerably, various elements must be resolved. The plans require refinement, specifically the threaded vertical urbanity core; it is an important design component and requires a detailed resolution as it also greatly impacts the facade. The facade needs a layer of making and refinement, along with the roof, which needs to be developed. Although brickwork has been employed quite generally, it requires that the different bonds are carefully crafted in crafting the facade.

Crafting the interior spaces is important because it will also show how users experience the spaces, not just the interior but the exterior. The structure requires resolution to get a basic understanding of the structure.

Looking at the urban scale, the project also requires drawings which depict the experience of some urban spaces - namely the Elsieskraal Riverwalk, recreational courtyard and station forecourt.

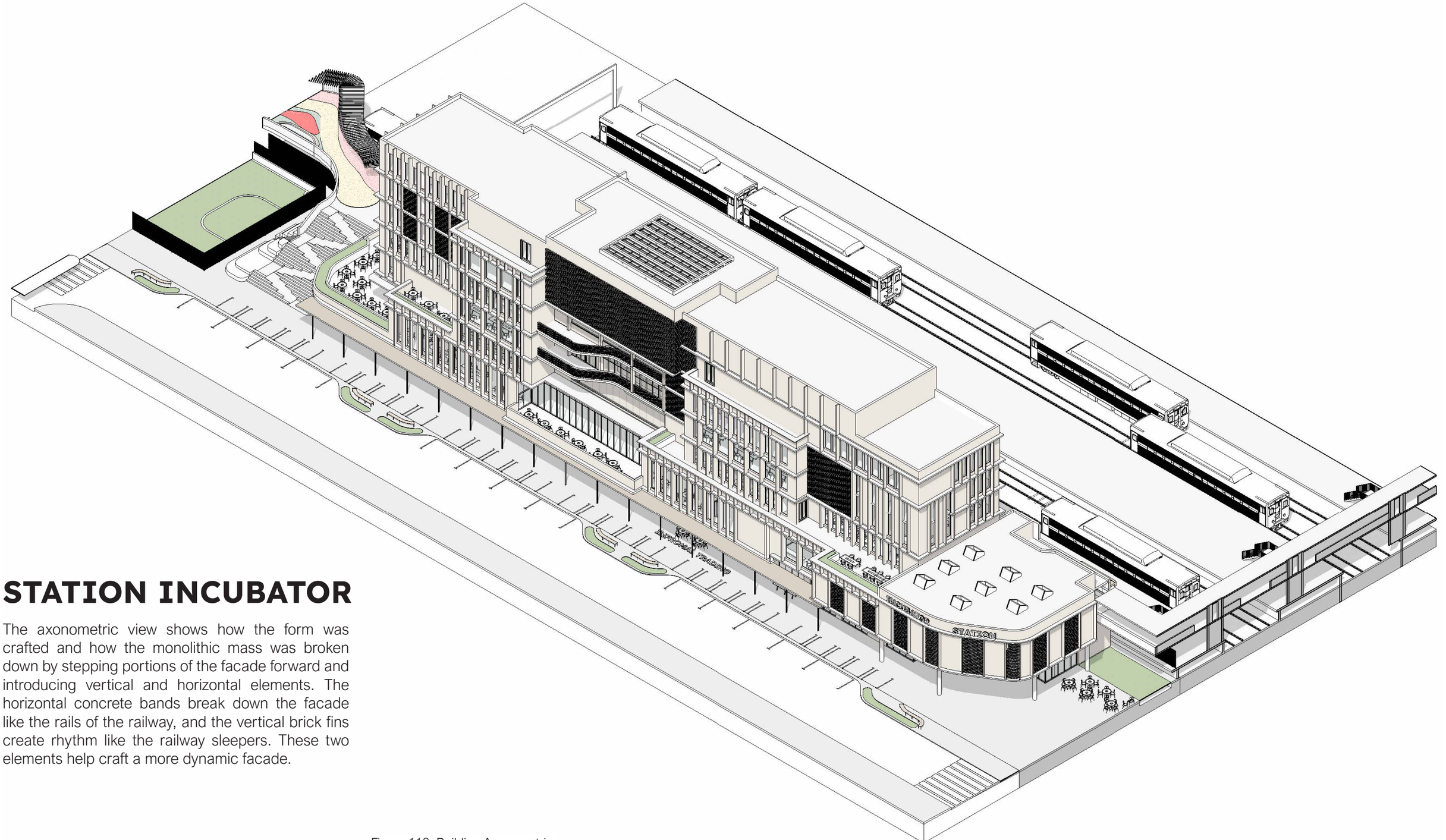
The project should fully represent an architecture that is carefully crafted and stimulates the flow of people at the greater urban scale and the intimate architectural scale.

12. THE INCUBATOR STATION

PRECINCT LAYOUT

The Precinct layout on the right shows how all the scheme's components are connected by activating routes and spaces along these routes. The Incubator station acts as a catalyst that facilitates movement across the railway line and, similarly, the pedestrian bridge.

Figure 117: Precinct Axonometric



STATION INCUBATOR

The axonometric view shows how the form was crafted and how the monolithic mass was broken down by stepping portions of the facade forward and introducing vertical and horizontal elements. The horizontal concrete bands break down the facade like the rails of the railway, and the vertical brick fins create rhythm like the railway sleepers. These two elements help craft a more dynamic facade.

Figure 118: Building Axonometric

LAYOUTS

Community shops located along the ground floor can benefit from the pedestrian traffic during peak hours and allow builds on the pedestrian traffic of Stasieweg Street – thereby creating urban continuity with Stasieweg being the main commuter route. The station forecourt is located at the intersection between Stasieweg and Cloete Street. The Makerspace above hovers over the main entrance creating a large covered entrance for commuters. The corner restaurants can spill out on the forecourt as well. The varying office spaces are stacked above from the second floor to the sixth, connected by the thread of urbanity.

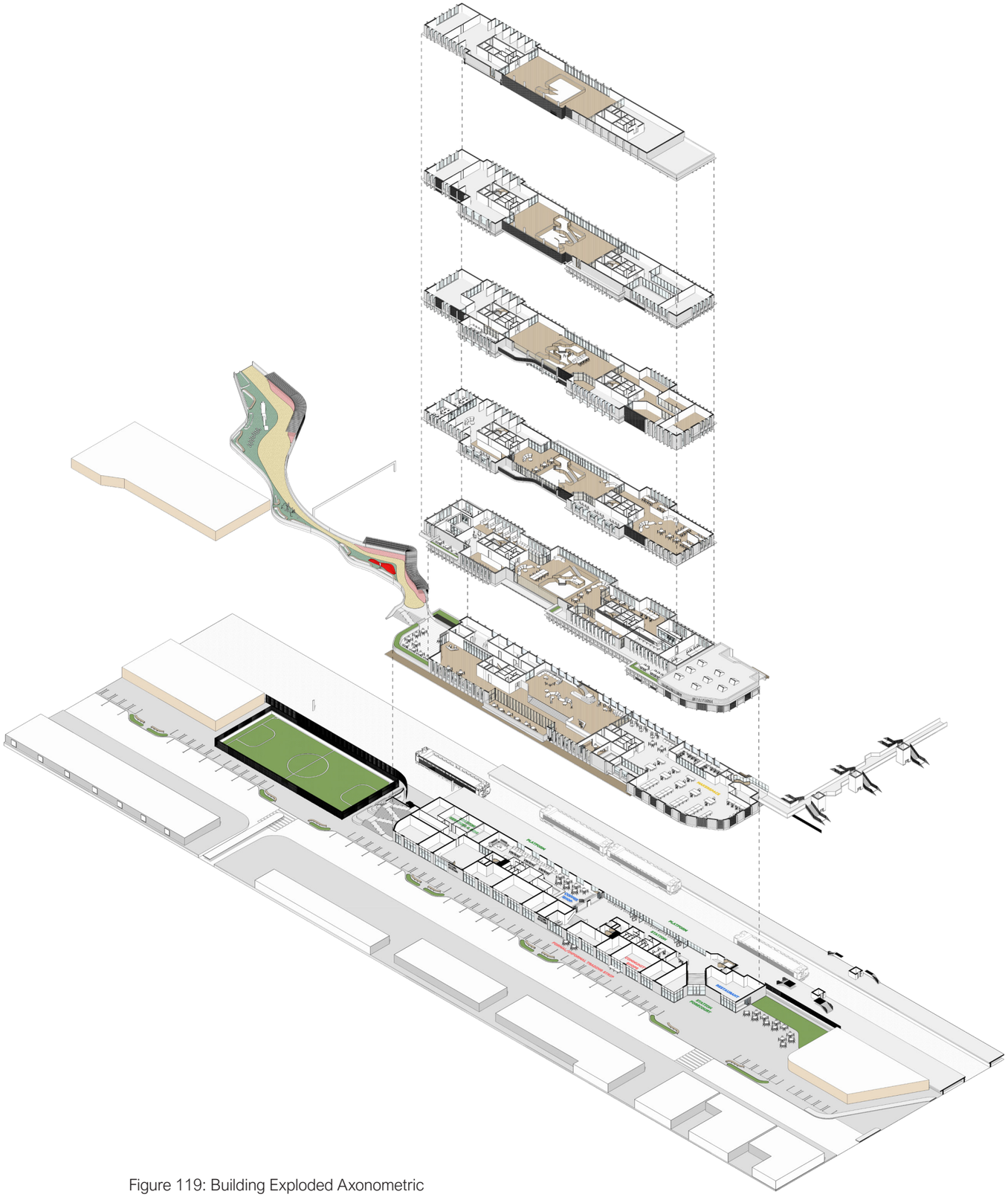


Figure 119: Building Exploded Axonometric

SECTIONAL & ELEVATION CRAFT

Long Section A depicts how the building is intended to sit within its context. It cuts through the Makerspace with the coffer slab with light wells to filter south light into the Makerspace. The light is ideal for the Makerspace because of the workshop activities.

The North elevation shows the dynamic nature of the crafted facade and how it interacts with the courtyards on either flank. Two brick bonds have also been introduced on the facade to change the nature of the facade throughout the day. The horizontal and vertical elements also introduce a layer of depth to the facade.

Figure 120: Section A

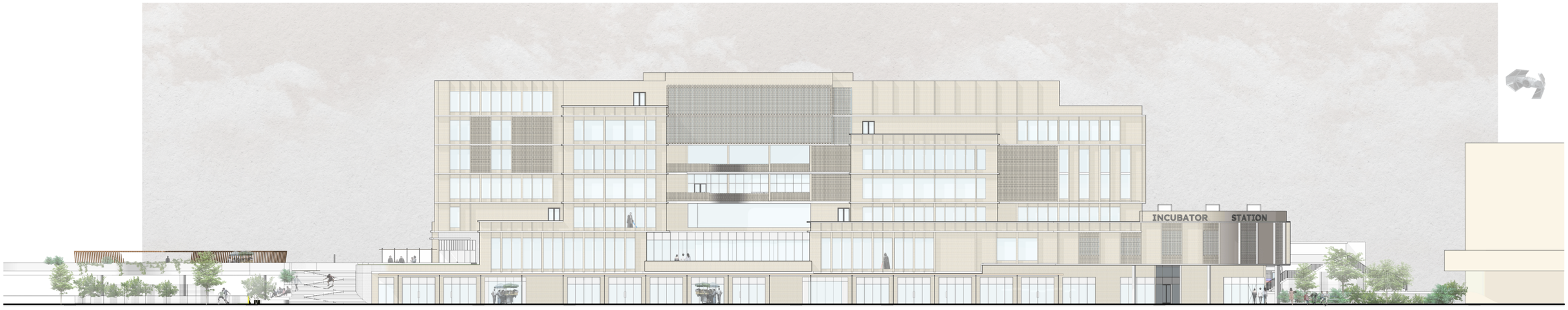


Figure 121: North Elevation

FACADE DISCONTINUITY

The exterior render depicts the discontinuity created in the facade where the Thread of Urbanity is located, which can ideally be seen as the heart of the building. The extruded fins create a new layer of depth in the facade that constantly evolves throughout the day. The activity on the ground floor is due to the relationship between the community shops and informal traders. This threads urban continuity, which runs from Stasieweg Street and stretches over the new pedestrian bridge.

Figure 122: Facade discontinuity render

THREAD OF URBANITY

The atrium stair flows from the first floor, through to the sixth floor.

The first-floor stair extends and becomes a seating area for workers and allows the first-floor atrium space to double up as an amphitheatre space which allows presentations to take place on the first floor.

An important characteristic of the stairs is how it unwinds as you progress up the stairs. It consists out of two threads; one is the continuation of the stair and the second is an extended landing which acts as an additional work space.

The stair is clad in vertical timber slats continuing the rhythm created on the facade. The timber cladding also acts as a sound absorber for the loud and bustling thread of urbanity.

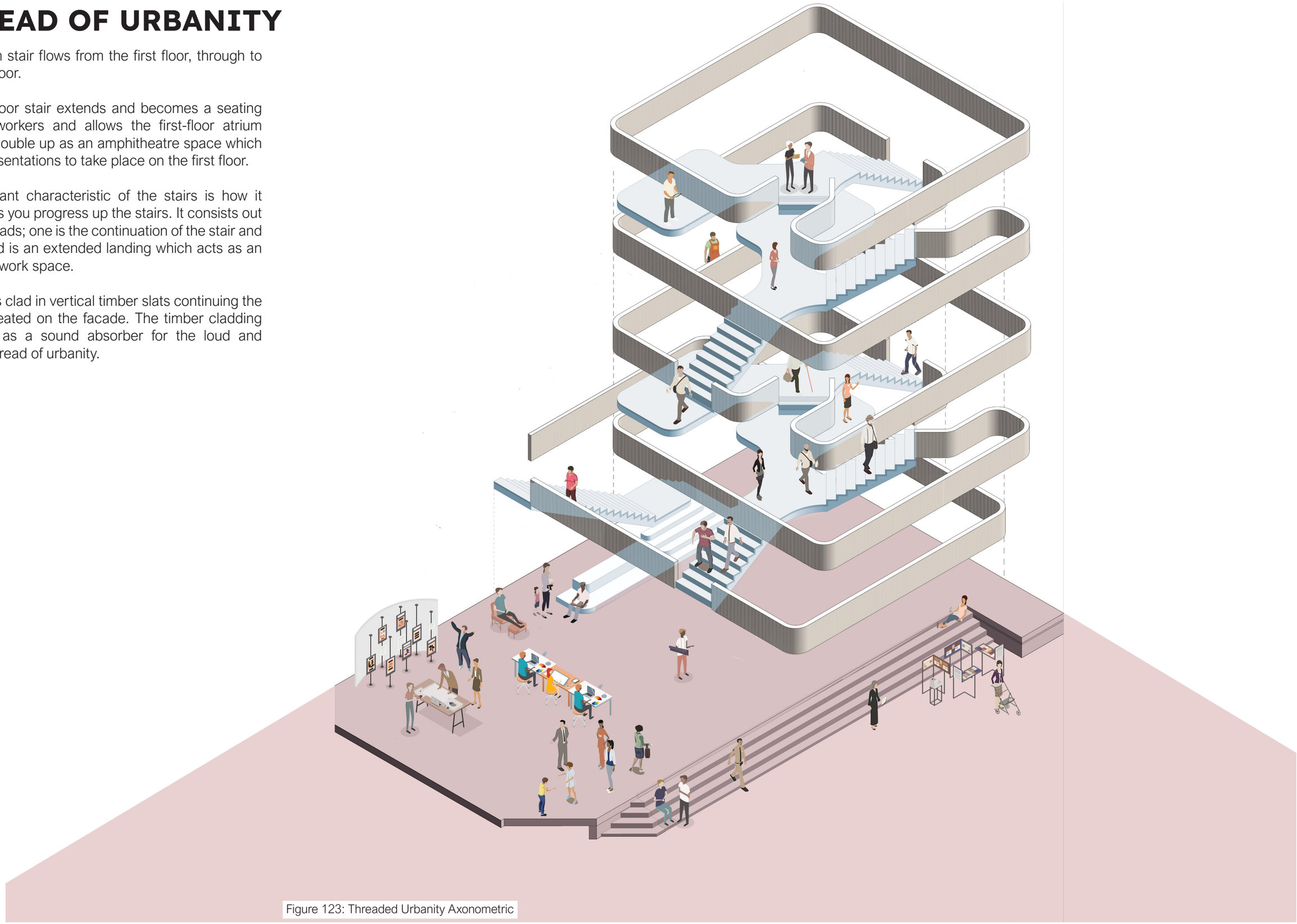


Figure 123: Threaded Urbanity Axonometric

CONTEXTUALIZING THE THREAD

The atrium stair overlooks the activity of Cloete Street and the intermittent life of the railway line. The Thread facade is clad in varying brick bonds, namely the protruding Flemish brick bond on the balconies and the Hit-and-Miss brick on the fifth and sixth floors. The Hit-and-Miss brick controls how light is filtered into the space and similarly, the vertical concrete light wells filter the south light into the space.

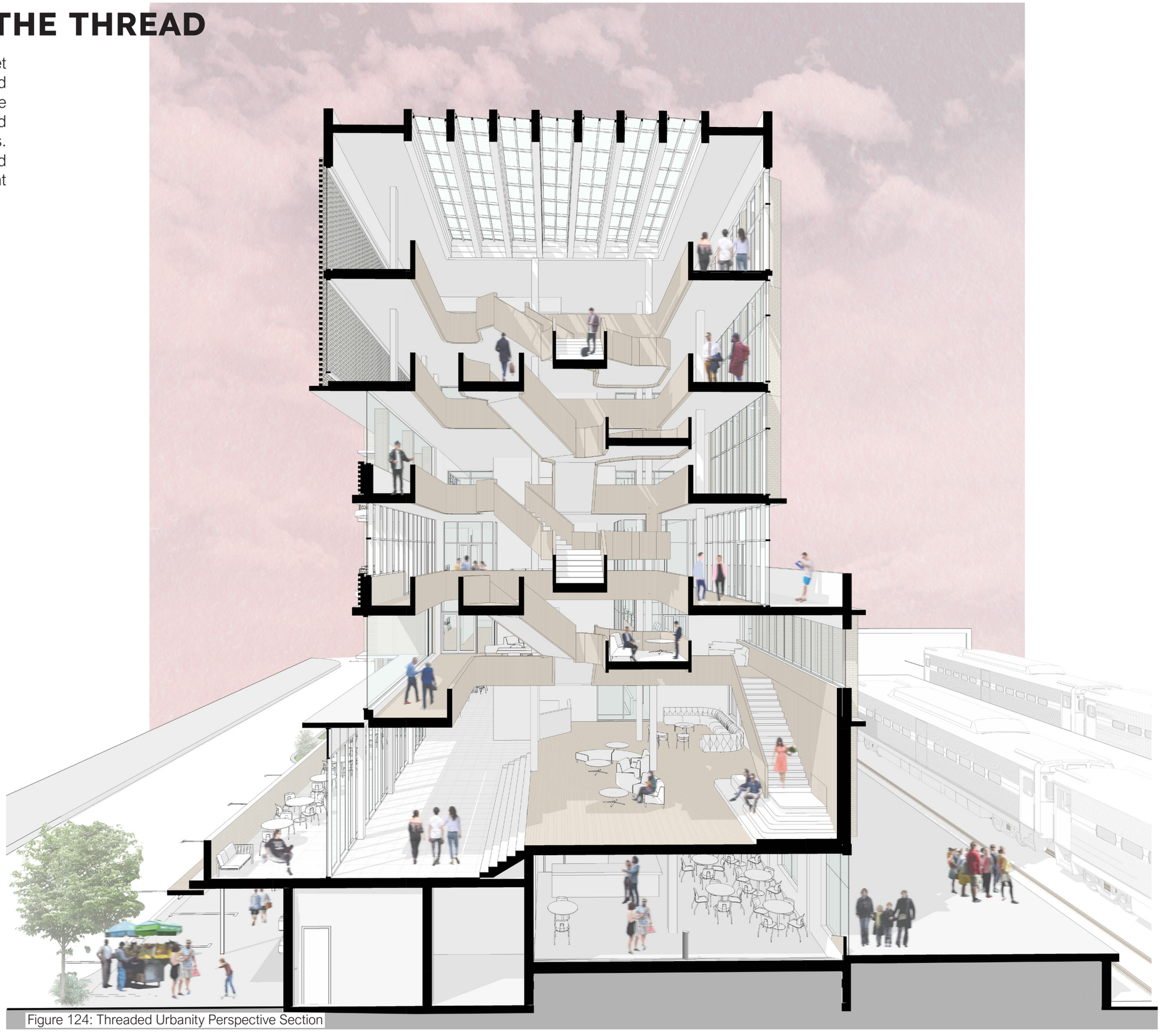


Figure 124: Threaded Urbanity Perspective Section

ANGLED ENTRANCE

The Makerspace which hovers over the main ground floor entrance is angled to face Stasieweg Street where the main pedestrian commuters navigate from. It hovers over the planted station forecourt which allows for restaurants to spill out onto the court. There is various seating underneath trees around the court and also within the garden space on the edge of the station platform.

The incubator station docks itself at the station ready to absorb the urban life in and around the building.

Figure 125: Incubator Entrance Render

MOVEMENT INTERSECTION

The render below depicts the intersection between the ground plane, the building's first floor and the pedestrian bridge.
This intersection is key to providing a seamless link to the building for varying pedestrians passing by the building, however, this space also allows the building life to spill out onto this entrance space and similarly the recreational courtyard.

Figure 126: Movement Intersection Render

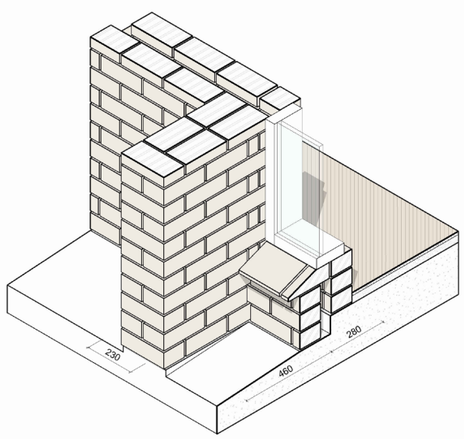
THREADING MATERIALITY

The strip section unpacks how the brick façade is woven together, due to the building being face brick, levels had to be carefully laid out in brick dimensions and similarly the slab thicknesses. This meant that wherever the slab extended to the façade no bricks would have to be cut. The ground floor employed a basic stretcher bond, however, these facades are mainly glazed because they are shop fronts.

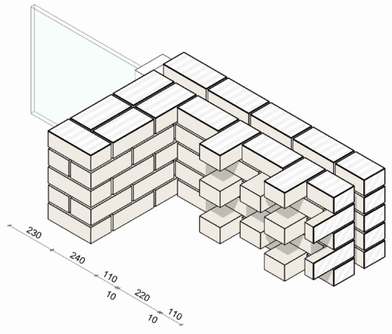
Moving up we see the brick fin which extends out 460mm and similarly the slab, this extension adds a layer of depth to the façade but also changes how north light enters the building through the course of the day.

Where the Hit-and-Miss brick bond is employed, vertical steel rods are used to add structural stability to the single-skin brick wall. The rods are fixed to steel angles which are tied back to the concrete structure. These supports are placed at the slab levels below and at the downstand beam level above. The glazing is set back and performs a non-structural function. In other instances, fritted glass is used along the northern façade.

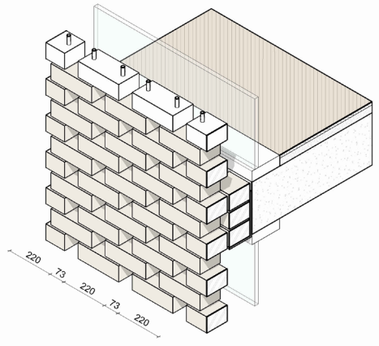
The flat roof is topped off with a stone ballast along the edges of the roof lights.



01 3D Detail 01_Brick Fin Detail

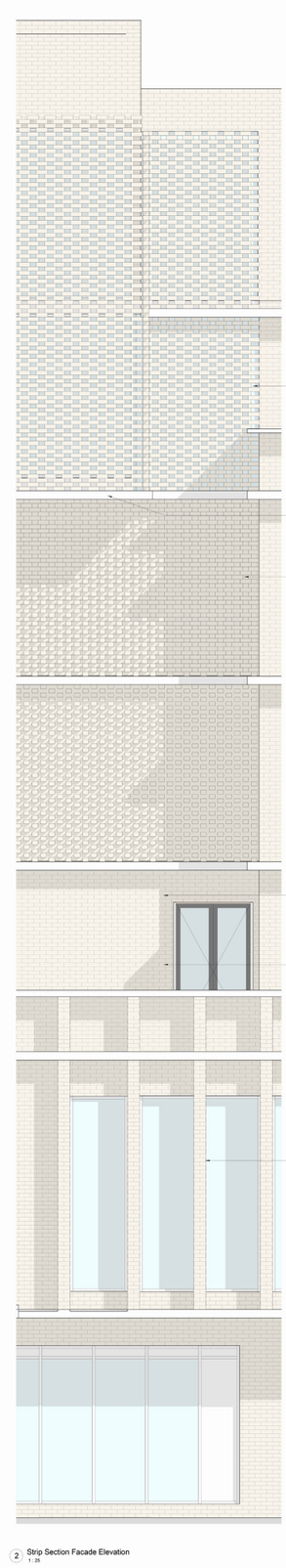


02 3D Detail 02_Protruding Flemish Brick Bond



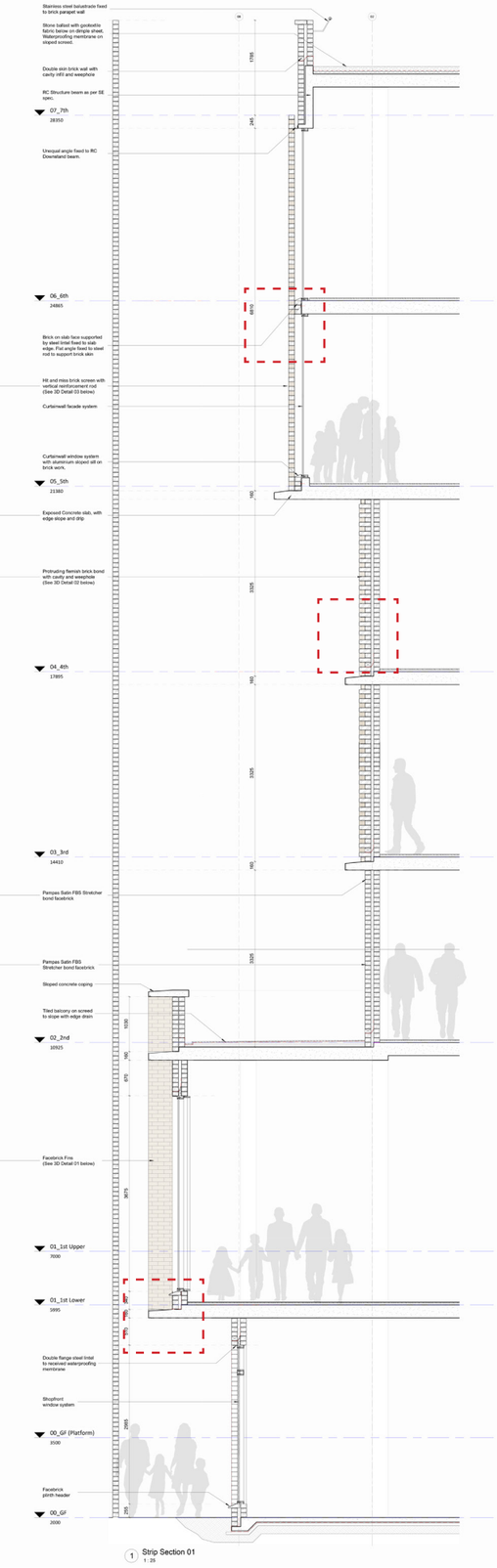
03 3D Detail 03_Hit & Miss Brickwork

Figure 127: Brick Bond details



2 Strip Section Facade Elevation
1 : 25

Figure 128: Detail Elevation



1 Strip Section 01
1 : 25

Figure 129: Detail Strip Section

OVERALL MODEL AERIAL OVERVIEW

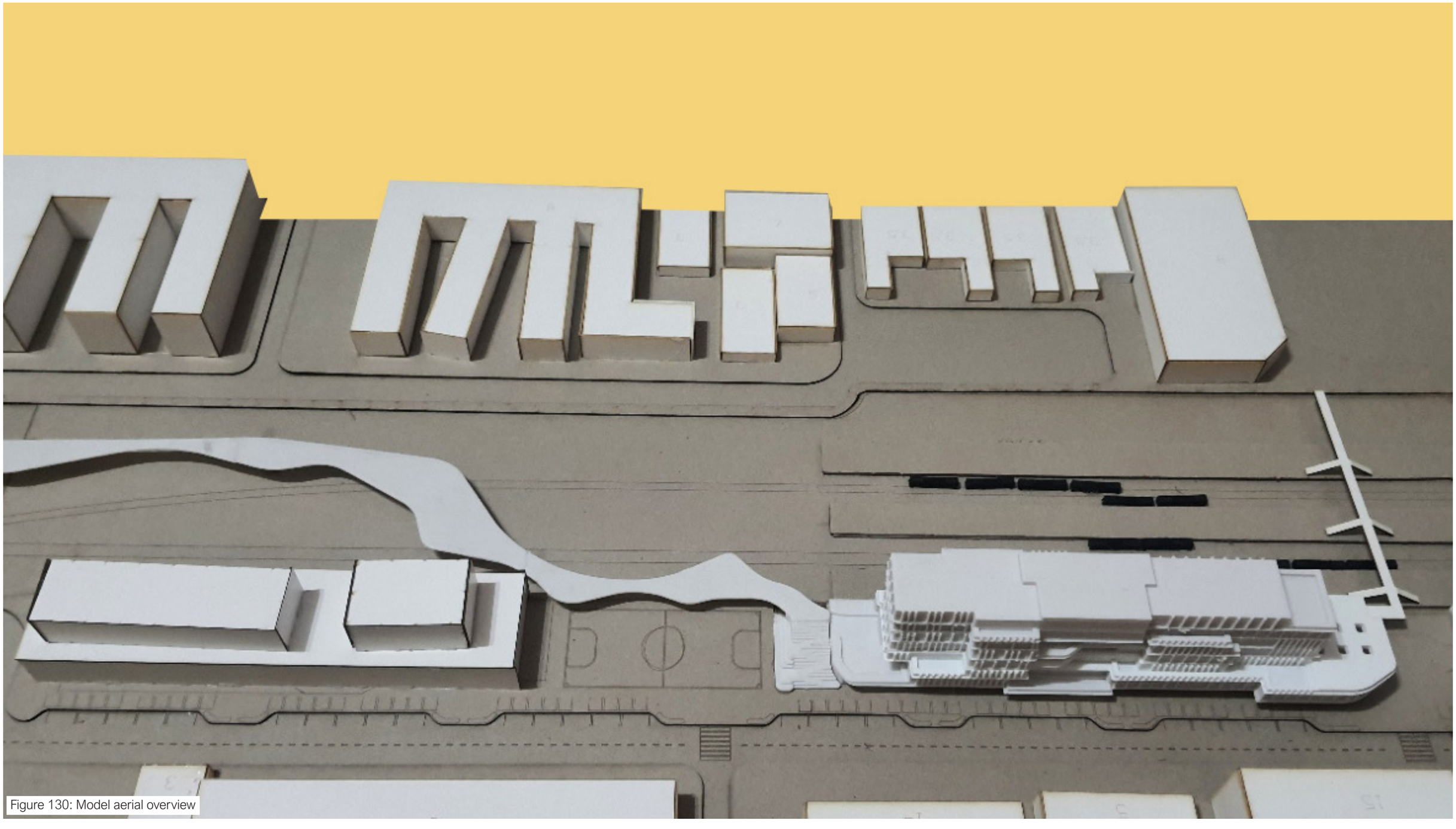


Figure 130: Model aerial overview

BIRDS EYE VIEW ENTRANCE OVERVIEW

Figure 131: Cloete Street entrance birds eye view

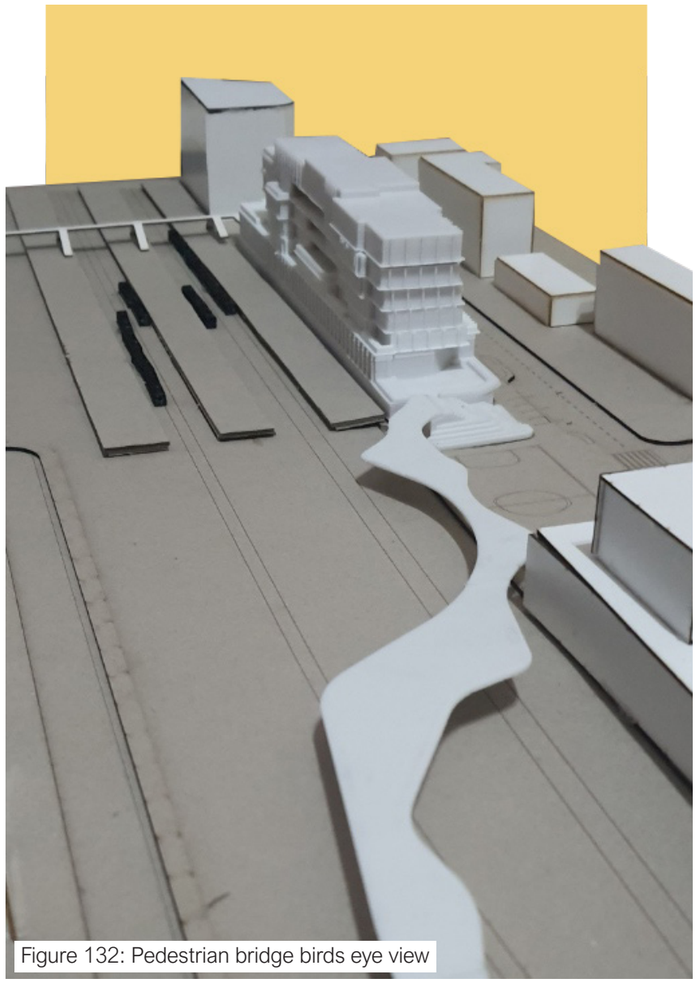


Figure 132: Pedestrian bridge birds eye view

CLOETE STREET PERSPECTIVES

Figure 133: Makerspace Entrance view

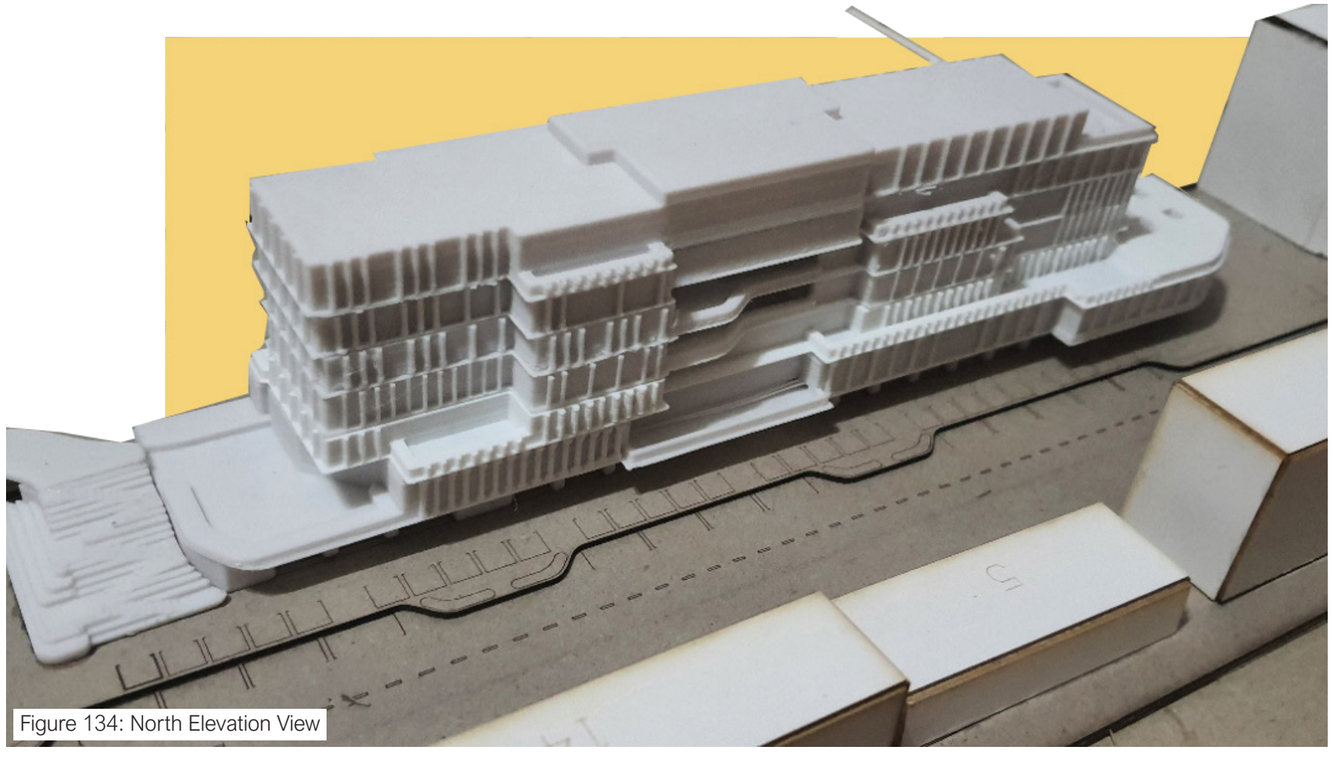


Figure 134: North Elevation View

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LIST OF FIGURES