Adapting at Multiple Scales

Towards a contextualised adaptive reuse of disused commercial infrastructure in secondary South African cities.

Bongane Madolo
M.Arch (Prof)
2017,

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Project Title		Secondary cities, coming back home with different needs

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Bongane Madolo
M.Arch (Prof)
2017,

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This dissertation is presented as part fulfillment of
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The School of Architecture, Planning and Geomatics, University of Cape Town
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Terms

CBD – Central Business District

Primary city – South African city with more than 1 million residents

Secondary city – South African city with between 300- under 1 million residents.

The difference between a primary and secondary city -There is not definitive description of what a primary or secondary city is because different factors have to be taken in to account, including economic activity, the population, the concentration of services and other factors(John, 2012). But a general measure is the change in the population numbers, a city's contribution to the economy. This was the measure that was used in this paper to distinguish between the different types of cities.

Affordable housing – housing for people who typically earn between R3 500 and R15 000 per month, which is too little to enable them to participate in the private property market, yet too much to qualify for a traditional state assistance (South African Government, n.d.).

Land Redistribution -Meeting the need for land amongst the poor in both rural and urban areas, not based on land claims but on addressing a racial imbalance in land ownership and access (Nxesi, 2015).

Adapt

"To make (something) suitable for a new use or purpose; modify."

Introduction

In the early 1990s about 50 000 m² of office space was developed in the Central Business District (CBD) of Nelspruit for the Mpumalanga Provincial Government. The office space was spread out in a number of office buildings around the CBD. Between 2003-and 2005 the Provincial Government moved out of these office buildings to an office complex on the outskirts of the CBD, as a result a portion of the CBD was left vacant. The commercial sector has not really recovered since then and the CBD is beginning to experience urban decay.

With this as background the dissertation, explores regeneration of a CBD and the opportunities that lie in large scale disused concrete frame buildings in Nelspruit, a secondary South African city.

Affordable housing plays an important role in the development of the project, not only because it addresses a practical need for housing in the city, but also because it starts to speak to transformation of a city that largely remains anti-poor.

The exploration in-to timber construction plays an equally important role in addressing questions of making buildings differently, looking at regional industry and craft, and the use of more sustainable building material. Research in to this topic was primarily aided by a 4-week research trip to Mezimbite Forest Centre in Beira, Mozambique.

The objective is not to create a blueprint on which all the buildings are to be adapted because each existing building by virtue of its context alone, is unique and has challenges that are specific to it that need to be addressed. The objective is to develop a different way of adapting large scale buildings. One that breaks the monolith, makes connections and through its material is rooted in its broader context. Ideas that are tested in 32 Bell Street, a nine-storey building in the CBD of Nelspruit.

Johannesburg's regeneration is looked at as an example of regeneration because it is the best example of a South African city that has used the decline of its commercial office sector to bring about transformation to a CBD, with housing being an important part of that transformation. Johannesburg also offers some of the clues on what needs to evolve in the way office buildings are being adapted.

Part 1 - Theory

Part 1 focusses on the theoretical underpinning of the project. The research started with a look at the regeneration of Johannesburg's CBD, and the role of housing in that regeneration. It also looks at the work of Lacaton & Vassal's work in response to the emergent poor quality of housing in Johannesburg. Lastly there is a focus on timber construction as this is the main model of construction that is employed in the project.

Adapting Johannesburg

The current model of affordable housing provision in the CBD of Johannesburg which primarily uses old office buildings for housing has gone a long way in achieving the land redistribution Thulas Nxesi talks about in “Socio-economic impact of land restitution in the Enhlanzeni district, Mpumalanga”. This includes housing provision and changing apartheid spatial planning policies which were in many ways anti-urban in the way we have come to accept urban living as, which is a dense, integrated environment where different activities can happen in the same part of the city. This regeneration gives clues to how cities that are experiencing a similar fate can use decay as a model for regenerating in a more inclusive manner.

Having said that there are some concerns that emerge from the development of Johannesburg’s inner city that ought to be addressed in an adaptation of the model, the one is the quality of the housing which remains poor and the other is provision of public space and other resources at a more urban/city scale (Bethlehem, 2013).

Decay

The inner city of Johannesburg experienced the bulk of its decay in the late 1980s, one of the main reasons was a mass exodus of businesses and residents in the surrounding areas. This mass exodus was caused by a variety of factors including; cheaper land, tax and rates outside the CBD (Larsen, 2005). There were also problems relating to laws passed in the 1970s prohibiting the construction of parking basements, which led to a lack of parking and traffic congestion in the city centre (Bethlehem, 2013). The decline of the CBD peaked at a very politically volatile time in the country causing uncertainty in businesses, sending the last few businesses packing.

On the one hand, this mass exodus saw tens of thousands of black people who were previously not allowed to live in the city, move in to well-located housing in the city bounds (Bethlehem, 2013). On the other hand many buildings were abandoned by landlords and hijacked by criminals and conditions soon deteriorated. With large parts of the inner city becoming slums, in a way robbing the new residents of the luxury that came with living in the city.

Urban Regeneration, at the Urban Scale

The regeneration at the urban level started around 2000. It was in part state-led initiatives like the provincial government moving a number of its offices to the CBD that got the process going (Broll Property Group, 2011). The state also used city agencies like Johannesburg Development Agency (JDA) to build large infrastructure projects like the Mandela bridge and the Mary Fitzgerald Square to indicate a sustained investment in the CBD which is needed to get private investment in to come back to an unfavourable part of the city (Bethlehem, 2013). There was also a lot of investment in transportation infrastructure that addressed the problem of traffic and cemented the CBD as a transportation hub within the large metro (City of Johannesburg, April, 2009).

Housing

"All of this would probably not have been possible without the key driver of investment in the CBD over the last 15 years – the conversion of office stock to residential units"

Lael Bethlehem, A new dynamic - urban regeneration in the Joburg CBD

Affordable rental housing was another important part of the regeneration of the CBD. Its introduction mainly through adapting office buildings for housing, decreased the amount of vacant buildings in the CBD, it also brought a "vibrant and lively hive of urban activity" to the CBD that did not exist before for a lot of the new residents (Low, 2003). The adapting of office buildings meant a quick and cheap way to providing a lot of units, about 40 000 by 2012 and growing (Bethlehem, 2013).

Beyond providing housing for a demographic that was not allowed to live in the city before the fall of apartheid, it has also fostered a change in apartheid planning practice of low density, urban sprawl, fragmentation and strict zoning that promoted segregation in all forms (Muthambi, 2014).

The introduction of housing means that the CBD now has a 24 hour life, from retail and commerce during the day, to housing and night life in the evening. The introduction of housing has also fostered further diversification of the inner city with an increase in schools, parks and other facilities related to people living in the city increasing since the introduction of housing.

Financing

The biggest problem that housing companies like Modulamoho Housing and Johannesburg Housing Company (JHC) faced in the beginning was accessing funding and this remains an important challenge to deal with in the conversation about adapting disused office buildings for affordable housing. What initially made affordable housing viable were all the measures in place that decreased the capital injection needed to get a project off the ground. Measures like; the depreciated values of the properties and the robust concrete frame structures that needed little to no change for the introduction of housing, (Bethlehem, 2013), the clearing of any arrears owed to the city through the Better Building Programme [BBP] for buildings that were being redeveloped for social and affordable housing (The Housing Development Agency, 2013). For properties developed after 2003, a further financial break came from the Urban Development Zones [UDZ] tax allowance (The Housing Development Agency, 2013). Which gives property owners developing properties in the City of Johannesburg's UDZ's 100% of the total cost of property in taxes back (Broll Property Group, 2011).

The Trust for Urban Housing Finance (TUHF), established in 2003 by National Housing Finance Corporation was the first institution to fund housing in the inner city at a time when traditional lending institutions were not willing to risk being tied up in what was a very volatile environment. Since then the Restructuring Capital Grant [RCG] subsidies were introduced, a grant that is linked to the Institutional Subsidy, and provides 2/3 of the capital needed for a project. These projects need to be in Urban Development Zones (UDZ) and funding is given to Social Housing Institutions because they normally are the ones who carry out the construction of the affordable housing units, the value of this is about R130 000.00 per unit (The Housing Development Agency, 2013). Between 2006 and 2011 these grants were used to fund the construction of about 2'000 units in the city of Johannesburg (The Housing Development Agency, 2013). This is a nationwide subsidy and can be used in the CBD of Nelspruit because it is a UDZ. All of the tax breaks that come with developing property for affordable housing are also available in the CBD of Nelspruit.

Private developers have also entered the market, tending to use the savings on costs and tax breaks rather than applying for grants to get projects off the ground. Their introduction into the market is the most encouraging sign that suggests that the redevelopment of the CBD is self-sustaining. This provides the government the opportunity to focus on other projects such as schools, clinics and parks which as afore mentioned are lacking in the city of Johannesburg (Bethlehem, 2013).

The availability of funds from private developers also provides the opportunity for both private and public investment to be used in providing higher quality housing. Housing that is bigger, with better light and air quality and housing that speaks to more than just an apartment. The availability of funds from private developers also provides the opportunity for both private and public investment to be used in providing higher quality housing. Housing that is bigger, with better light and air quality and housing that speaks to more than just an apartment.

Challenges

The main challenge that remains is the provision of quality housing. Another challenge is the provision of public space and other public amenities such as schools and clinics (Bethlehem, 2013). The problem of hi-jacked buildings has recently been revived by the new Mayor of Johannesburg Herman Mashaba, and whether one agrees with his tactics or not, it is an issue that needs to be addressed (Bulger, 2017).

Figure 1: CBD of Johannesburg, an adapted landscape.

Lacaton & Vassal Architects

The work of Lacaton & Vassal Architects was looked at specifically in response to the problem of the quality of the housing, noted as one of the challenges in the housing being provided in Johannesburg. They are also looked at because of their extensive work in adapting French post-war high-rise housing, with the specific task of improving the quality of the housing units.

Their approach to adapting is “never demolish, never remove or replace, always add and reuse.” This was both a slogan and a strategy for dealing with housing in their publication Plus (Huber, 2016). They have since had the opportunity to bring these ideas, that were developed in the publication, to life in a series of built works around France in redeveloping existing high-rise social housing buildings and estates.

It is through the built works that principles for improving the quality of housing emerge. These include: adding space, using inexpensive materials, using the winter gardens as temperature moderating devices, providing usable outdoor space, freedom of use, daylight, diversifying the apartment types, improving the aesthetic of the building and placing value in the input of the residents; these are discussed further below. Through post-occupancy evaluations, since they began in 2004, it is evident that their approach is largely a success. These principles which have also been used in new projects as they speak to more than just existing buildings.

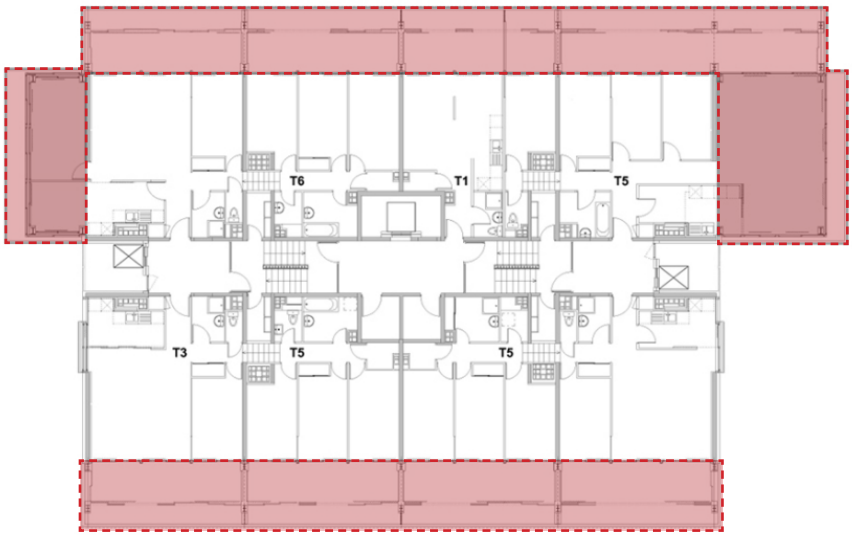


Figure 2: Typical floor plan with extended balcony highlighted ,Tower Bois le Prêtre.

Most of these principles of design are manifested in the addition of a 4-metre-deep space that can be opened up to act as a balcony or closed up in the winter to be a room/ winter garden (El Croquis, 2015). These speak to the first principle of additional space, which is something that the residents of these towers had complained about during their site visits (Harvard GSD, 2015). This idea of adding space and generosity can be traced back to their first commission, Maison Latapie in 1993 where they doubled the size of the original commission without increasing the budget of the project (El Croquis, 2015). Initially, it was a decision that was just about size but it has increasingly become about freedom of use that comes with generosity in space. In a way moving away from existenz-minimum to existenz-maximum.

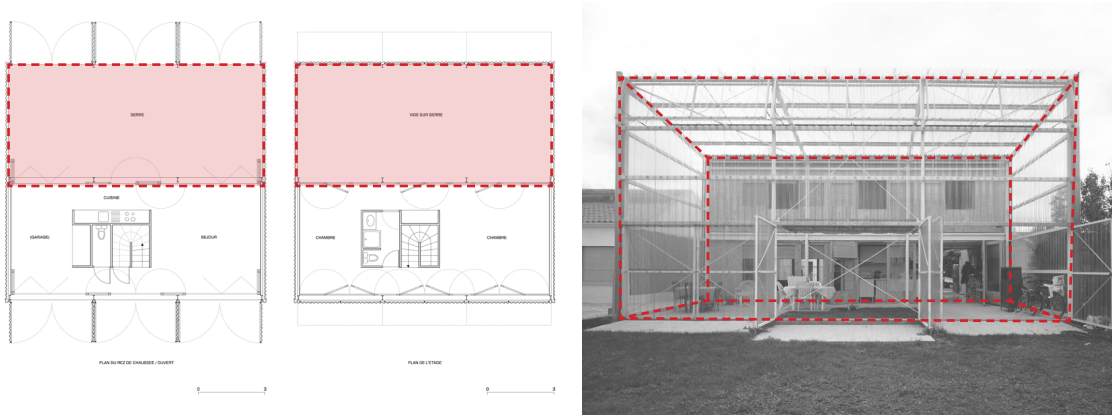


Figure 3: Ground and First floor plan, with added ambiguous space highlighted, Maison Latapie.

Figure 4: Agricultural green house construction highlighted.

Maison Latapie was also where the principle of using inexpensive materials was first tested, in that building agricultural greenhouse construction was used. In the high-rise housing additions, the focus has shifted to the use of prefabricated concrete structures because they allow for faster construction and thus reduce construction costs (see figure 5). This construction system allows for less disruptions for the residents during construction, who in most cases stay in their apartments. An important note about the exploration in to inexpensive materials and ways of building is that, it is not about using the cheapest material.

Figure 5: Prefabricated concrete and steel construction system, that was installed while residents lived in the building, Tower Bois le Prêtre

Functionally these balconies/winter gardens also act as temperature moderating devices, another principle. The fully operable and fully glazed double façade means in summer, when open, they act as balconies, while in winter, when fully closed, they act as winter gardens that store heat see figure.

The balconies do not have a program, the residents have full control to do as they wish with the space, and this relates to the principle of freedom of use, where a space is left ambiguous enough that inhabitants can still change it to suit their needs. In an interview in El Croquis they talk about the possessions of the inhabitants defining space not walls (El Croquis, 2015). A similar idea emerges in the dissertation of Xongile Muthambi, who was also grappling with the question of housing in the CBD of Johannesburg (Muthambi, 2014).

Figure 6 : Winter Garden/ Balcony, enclosed in winter, freedom in the use of the space
Tower Bois le Prêtre

The balconies introduce usable outdoor space. To connect to this outdoor space, fully glazed operable curtain walls replace the old box window facades. The curtain wall also improves the light quality by bringing in more natural daylight in to the existing apartments. This inevitably improves the spatial quality of the apartments . In her lecture at the VELUX Daylight Symposium Anne Lacaton talked about the importance of daylight in their design and its overall importance to the wellbeing of residents (The VELUX Group, 2017).

Figure 7: **Natural lit living room with expansive views of the city.**
Tower Bois le Prêtre, Paris.

To diversify the apartment types, some of the smaller apartments were combined to make bigger units, while some units were divided in to two. As a result, there are now 7 apartment types with rooms ranging from 1 to 7 (Ayers, 2011). In addition, the number of apartments has gone up (Ayers, 2011). The objective of this principle is to make the buildings more appealing to a broader demographic, a strategy that has in most of the buildings worked (El Croquis, 2015). The majority of apartments interiors were left untouched and this is explained as valuing the additions that residents had made over time to the apartment.

Figure 8 Existing apartment that was not changed in the adaptation of Tower Bois le Prêtre, Paris.

Because the addition is made on the face of the building, there is quite a radical transformation to the façade. Although this was not the primary goal of the work, Jean-Philippe Vassal talks about the importance of transformation being visible especially because a lot of these buildings are prominent in the skyline of their neighbourhoods (Ruby, 2007). Anne Lacaton also talks about the importance of people being reflected in the place they live as sign of their presence in the space, this is in reference to the transparency of the Façade (Harvard GSD, 2015).

Figure 9 : Before adaptation, 1990s refurbished facade with box windows
Tower Bois le Prêtre, Paris.

Figure 10: After adaptation, translucent facade that reveals its occupation to the descretion of the residents
Tower Bois le Prêtre, Paris.

Timber Construction

To expand on the material research that is evident in the work of Lacaton & Vassal architects, there was a decision made earlier on in the design process to investigate timber construction as the primary means of adapting the existing building. This is primarily because the Lowveld region and Mpumalanga, the province in which the project is located, is the number 1 producer of timber in the South Africa. In addition to this, globally, there has been a renewed and sustained focus on timber construction, mainly because of its environmental qualities when compared to other materials such as concrete, brick or steel.

The objective of the research was a broader investigation to gain a better understanding of the growing industry and the different construction products that are available in the industry. What also emerged as an important point of the research was looking at making buildings differently, a way that responds to context, regional industry and craft, and using more sustainable material. There is also a focus, especially in the sub section on Mezimbite Forest Centre, on how timber construction could be adapted to the context of South Africa, instead of the current European model, where timber is only thought of materially. There was the question of what should a South African timber construction industry look like. Most of these questions were addressed in a month-long research trip to Mezimbite Forest Centre in Beira, Mozambique over the July/August break.

Mezimbite Forest Centre

The initial interest in the centre was based on their strong emphasis on the ideas of “seed to building” and the potential it presents to timber construction to be a more socially and environmentally conscious way of building.
The centre is run by architect Allan Schwartz with the 3 primary functions of the centre being; reforestation, building construction and high value timber product design and manufacturing. The centre, which is located in Mozambique within the Great Sofala Province, is on a 200 hectare site and was established in 1994.

The idea of “seed to building” basically means the centre is involved in every part of the process from planting trees, designing the timber components for a building, making the components and constructing the buildings. Being involved in the entire process also means that it can be adjusted to address local needs.

The multi species forest being planted in the centre consists only of indigenous plants and is extended every year. Beyond reforestation the 5 nurseries on the site, that also assist in community based reforestation efforts in Sofala province and beyond.

Figure 11: Expansion of the indigenous forest using an agro-forestry model. The vegetables grown here are sold to sustain the expansion of the forest and feed the 100 employees,
Mezimbete Forest Centre.

Timber Sourcing

Since the centre is only 24 years old, they have not started harvesting the wood from the planted area. Instead they depend on wood from a number of sources, namely; indigenous forest, a coconut plantation and discarded hardwood from Chinese exporters. Discussed below is the reciprocity with which timber is sourced, both with communities and the rnvironment.

The indigenous forest timber is purchased from communities around the centre. This is because in Mozambique the resources of an area belong to the community. As part of a sustainable timber sourcing model, every tree that is removed from the forest is replaced, either in the same location or one where the survival chances are greater. They are primarily used for doors, windows and furniture and expressive structural elements. An example of this are the doors, windows, furniture and the tree columns in Gorongosa National Park's community centre. They are also used in outdoor applications because they respond better to being exposed to the elements.

Figure 11: A dining hall where all three sources are used. The ceiling is plantation timber, the collumns, trusses and curtain wall are indigenous forest hard woods, and the furniture is mainly recycled wood from exporters that discard the. This project is an example of how sources, trades and construction systems can be employed in one project, all using timber.
Gorongosa National Park by Mezimbite forest centre.

The coconut plantation timber is a replacement fruit tree timber from a 150 year old plantation 60km south of the centre. Coconut timber is extensively used at the centre and research in to its application is being done both academically with Universities and on site. Its use at the centre stems from a continuous search for new applications for the timber resources that are available in the area. Its applications range from walls, ceilings, trusses and other non construction products like vases see.

**Figure 12: Coconut timber structure the author worked on. Its application is in the columns, the panels and the trusses. All the elements are prefabricated at the forest centre and assembled on site.
Fish Farm, Beira.**

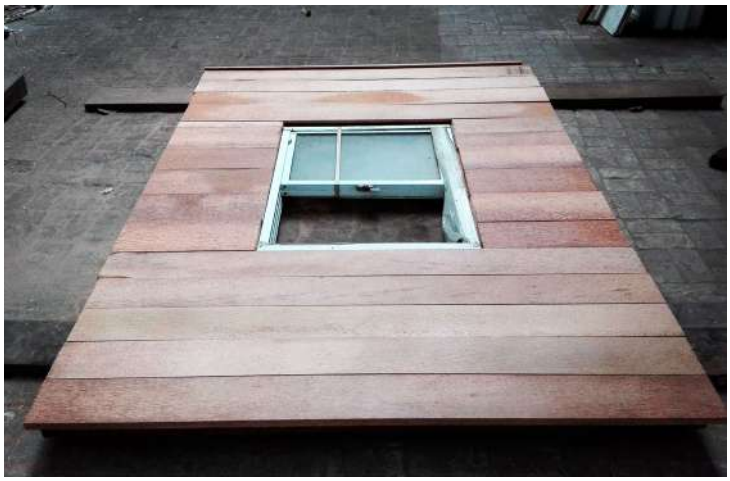


**Figure 13: Coconut timber panel for fish farm the author built.
Mezimbite Forest Centre.**

Figure 14: Base of coconut tree is used to make vases by traditional craftspersons

The discarded hardwoods come mainly from the left-over wood from Chinese exporters. This wood is not suitable for construction but is nonetheless useful. It is mainly used for furniture and other smaller crafted pieces. Incidentally these have become the most expensive items that are sold from the centre because of the unique nature of each piece due to the technique that has been developed to repair the wood. In most projects a lot of the material luxury that is gained from the saving in using plantation timber is used in furnishing the house.

Figure 15: Señor Mario, head craftsman repairing a piece of discarded wood, for a table top at Mezimbite forest Centre

In many of the projects these different sources are combined and the decision on the type of wood used is based on the best application for that wood. The cheaper wood is also used to offset the price of the more expensive elements like the doors and screens. In the context of Mozambique where timber is relatively cheap it does not have too much of a financial impact but in a different context, like Nelspruit, the material trade-off could be used to introduce more expensive timber to otherwise low budget projects.

The mix of timber also allows for a mix in the trades that are used in the construction process as each requires a different way of working the timber. As a result, buildings have a richer tectonic and exploit the different properties that these types have to offer.

Socio economic benefits

The one benefit to the local community, with Mezimbite being located in the rural area where the forest is, is that the value add is done in the area, and profits stay in the community. Whether it be by the whole community through the sale of a log or employment of a member of the community.

The biggest benefit however is the skills that many residents have gained in the last 23 years of the forest centre's existence. The importance of this cannot be overstated enough because Mozambique does not have a functioning vocational training system. There is an apprenticeship program for all the jobs and most of these end up in permanent employment. By providing employment the centre has curbed the percentage of rural to urban migration in the area, limiting a lot of the social ills that come from economic based.

This is an issue that plagues a lot of developing nations, which this type of rural development seems to be combating.

The skill set gained also means that if tradespeople do move to the city, they have skills that will help them better integrate into whatever city they find themselves in. Some of the jobs at Mezimbete include ; nurseryman, gardeners, apiculturist, oil pressers, lumber jacks, construction workers, carpenters, carvers, craftspeople, wood turners, marquetry men, chefs and a number of management staffers.

The role of an Architect

The most interesting thing about the centre was understanding the role of the architect through learning from and observing architect Allan Schwartz. As the only professional running the forest centre, the list of hats he wears is endless. He is; the farmer, the forester, the designer, the architect, lecturer, construction manager, the head of fabrication, the accountant, and whole lot of other things. He has had to do a lot of these because of a skills shortage in the area and broadly in Mozambique. But in so doing it shows the capacity architects have to broaden the work they do.

Because he wears so many hats, has had to relinquish some of the design work to the makers. This means, in part, the training has evolved over time, as the carpenter or the carver has to be empowered with the skill to design. In a way, this starts to talk about true empowerment of the artisans and real collaboration not just an architect giving orders. This is most evident in carved pieces, where most of them are conceived and made as a dialogue between the artisan and the architect. Through this dialogue there has been a contextualising and rooting in place that is not evident in contemporary architecture, in particular contemporary timber architecture, which for the most par remains a material only architecture.

What was also evident was the more in depth relationship the architect had in the design and building process. A design process that included designing most of the components, because timber construction is mainly a prefabricated way of building. This does however call for architects working in timber to be more knowledgeable about the material.

Figure 16: First day, with Dr Allan Schwartz showing author and scholars from The University of Sheffield around Mezimbite Forest. This part of the forest is about 15 years old

Figure 17: Señor Fransisco in the main work shop area

Figure 18: Last day, with All the craftspersons, contractors that taught me how to make with wood, Entrance of Mezimbite Forest Centre.

Sources of timber in Mpumalanga and their uses

There was then an exploration in to the different sources of timber that are available in Nelspruit and their possible application. There are 4 main sources of timber in Mpumalanga, namely; Plantation timber, sustainably sourced indigenous forest timber, invasive species timber and timber from replaced fruit trees.

Plantation timber

Plantation timber are the most common and accounts for the majority of the current exports of timber from the province. The three most prominent species in the province and region are Pine [softwood], wattle/ acacia [hardwood], Eucalyptus [hardwood] and more than 3000 hectares of other hardwood plantations (Godsmark, 2013).

Because there is a mix of both soft and hard woods, their application in construction is virtually endless. They can be used for; dimensional timber, veneers, plywoods, flooring, walls, ceilings, engineered timber products (glue-laminated beams, cross laminated timber panels) and other components with application, indoors and outdoors. There are a few manufacturers in the Lowveld region that already produce most of these. VeneerCRAFT for instance makes veneers and plywood from pine and eucalyptus (VeneerCRAFT, n.d.). White River Saw Mills produces graded structural timber, clear grade timber, laminated beams, flooring, ceiling and furniture grade timber. Looking at the way Mezimbite Forest Centre is using plantation timber, it is evident there is opportunity for different kinds of companies to enter this growing market, particularly one that addresses the social economic issues evident at Mezimbite forest Centre.

Invasive Species

The two main invasive species in the region are Jacaranda and Syringa. (Schwartz D. A., 2017). They pose a threat to water security and the country's biological biodiversity (Department of Environmental Affairs, n.d.). Harvesting these species for construction could be a way of supplying the market with quality hardwoods, while assisting in efforts to remove them in environments like the Kruger National Park where they pose a threat to the woodlands and some animal species (Beer, 1991). This model of removing invasive species was adopted by the Department of Environmental Affairs through the Value-Added Industries and wetlands projects in 1998 and expanded in 2002 (Department of Environmental Affairs, n.d.)The problem has been in finding sustainable projects where it can be applied.

Their application is best suited for non-structural application because they are knotty or lack the mechanical properties needed for structural timber. Their durable nature however, makes them suitable for external use in screens and other timber products where durability is important (Schwartz D. A., 2017).

Timber from replaced fruit trees

Replacement fruit tree timber comes from fruit trees that are replaced with new trees when they become unproductive. The most suitable are citrus fruit trees and macadamia trees, and both begin to be unproductive between the ages of 15-20 years old, at which point the timber has matured enough for application (Schwartz D. A., 2017). There are an estimated 2 700 000 replacement macadamia trees that come from the region every 15- 20 years, speaking to the scale of the resources that exist in the area (Department of Agriculture Forestry and Fisheries, 2013).
The most common application currently is furniture or firewood, but there is potential for application in wood fibre products like insulation and flooring (Steico, n.d.). The sheer volume of timber makes an industry that only uses this type of timber plausible.

Sustainably sourced Indigenous forest timber

A large part of the Lowveld is covered by a combination of woodland and forest, with many timber species that are suitable for construction use. It is a resource that is not used currently but the model Mezimbite uses can be adopted to source and preserve a fast disappearing resource

Some of the timber species that are available for construction in the Lowveld region are indigenous species like; Mobola Plum, Monkey Thorn, Hook Thorn, Kiaat, Marula wood, Tamboti, Lebombo Ironwood, Karee, Bush Willow, Matumi tree, Pink Ivory. There is also White Stinkwood, Faurea Saligna, Albizia, Knob Thorn, Burkea Africana (Wild Seringa), Weeping Boer-bean, Tamarind, Sjambok pod (Numanyama), Raintree, Red Mahogany, , Sneeze wood, Brown Ivory, Lead wood/ Hardekoo, Silver cluster wood, Sand Yellowwood/ umsonti, Jackal berry tree, Sausage Tree, Mingerhout and M'ghonha. The sourcing of these trees needs to be in line with the protected and endangered species list published by the Department of Agriculture Forestry and Fisheries and research into their application has to be increased but the potential is there(National department of Agriculture (RSA), 2014).

Their application in construction lies in more high value products like flooring, doors, screens, windows, immovable furniture and other such applications. There also exists the opportunity to integrate traditional knowledge of Swati and Tsonga artisans in to modern construction as these are the timbers that are used in traditional crafts (Schwartz D. A., 2017). This is the most exciting potential that a lot of these sources of timber have as they are located in Rural areas.

Conclusion

There are a number of takeaways from the research that are taken forward into the design.

From Johannesburg, it is that the local government in Nelspruit will have to play an active role in the redevelopment of the CBD through the funding of infrastructure projects that address the problems of the larger urban site and to demonstrate sustained investment in the CBD. Housing is an important tool to take forward as a means of addressing the problem of vacancy and a means of addressing the spatial legacy of apartheid. A combination of state and private funding is adopted as the primary funding model in the housing portion of the building. The challenges to the Johannesburg regeneration model is the unilateral conversion of office buildings to housing which robs these buildings potential to be active participants in city life beyond housing.

From Lacaton & Vassal, the principles of improving the quality of apartments are built on in the design development of the housing, specifically at the unit level.

From Mezimbite, it's the exploration of collaborative design that emerges from the way architect Allan Schwartz works. There is also the exploration into using different sources of timber that are in the province as both a way to ground the project in its context and to open the possibilities for different kinds of builders within the timber industry. Part of the objective is to make a way for a Mezimbite Forest Centre to join the growing timber industry, thus changing the way we build. This is also done to address the socio-economic challenges that the areas these resources are located are facing, in addition to curbing migration with providing opportunities for employment.

Part 2 - Locating the Project

The first part of this section will focus mainly on the location of the project in Nelspruit and its potential role in changing apartheid era migratory patterns. The second part of this section will focus on the CBD of Nelspruit where the larger project is located. The last part of this section will then be a micro study of the existing building.

Secondary cities: Challenging Apartheid era migration patterns

The decision to locate the project in Nelspruit is a deliberate one, made to challenge the current migratory patterns that privilege primary cities in South Africa. A model that is peculiar because it is entrenched in apartheid era patterns of migration (Steyn, 2013).

It is to be noted that the shift of the population in developing nations from being mainly rural to urban is a global phenomenon, one similar to the shift that Europe experienced in the turn of the century (Correa, 1989). What is unique about South Africa's context is concentration of the urban population in primary cities. This trend is contrary to the rest of the world, where most of the urban population lives in secondary cities, where there is a huge effort to support the growth of these cities (John, 2012). There are a number of reasons for the focus on secondary cities in developing nations, these include their potential to; disperse growth across the country, help in the development of their surrounds [most cases rural areas] and the potential they have in relieving some of the pressure on the primary cites (John, 2012).

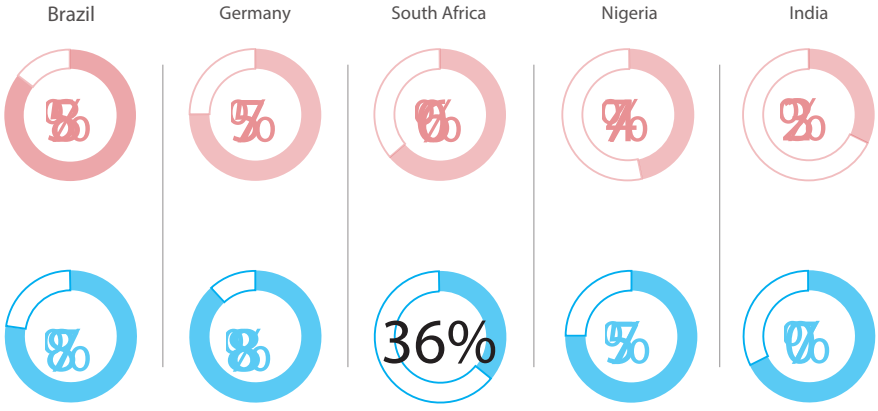


Figure 19
Rural/ Urban divide (Developing nations + 1 developed country), South Africa like many other developing nations has a growing urban population

Figure 20:
Urban population living in secondary cities, South Africa having the lowest percentage

In South Africa this pressure is evident in the backlog of services that all of the primary cities have. Johannesburg and Cape Town for example, each face a housing delivery backlog of 600 000 (NGCOBO, 2017) and 400 000 (Mongwe, 2016) respectively, which represents 50% of the housing backlog in the whole country (ENCA, 2016). These figures do not account for the 5.5 million South Africans that are expected to move to urban areas in the next 10-15 years (Lehohla, 2011). Most of who will move to these primary cities.

But perhaps the most compelling reason for a shift toward secondary cities as a means to addressing a growing urban population, is their close proximity to rural areas . The shift would mean a drastic cut to the distances that most are migrating currently when moving to primary cities. In many ways addressing both the physical and the social ills that have been the products of the migration patterns which include the proliferation of HIV, broken families, as well as undue financial strain on the poorest of households (Steyn, 2013).

A study conducted earlier in the year shows that if the rural population of Mpumalanga, South Africa migrated to the six secondary cities in the province, the majority would move to within a 50km radius of their current homes and the rest would move to within a 100km radius (See figure 22). This would also account for retaining a connection to ancestral homes, something of great importance to a majority of rural migrants (Steyn, 2013).

It is then, in part, for these reasons above that Nelspruit was chosen as the location for the testing this model of adapting disused office buildings.

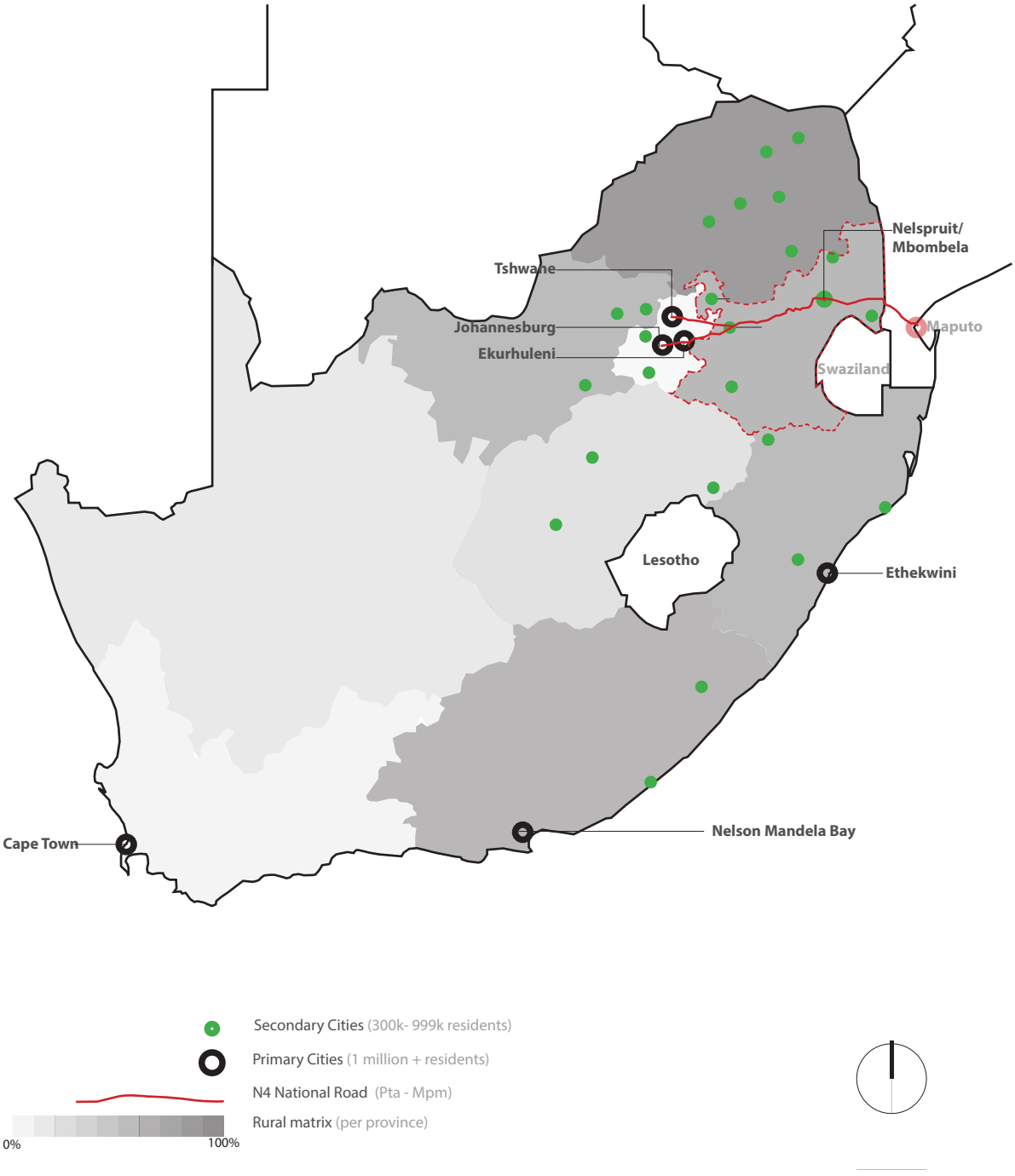


Figure 21:
South African Map indicating the 30 biggest cities(6 primary cities and 24 secondary cities). To be noted is that the majority of the secondary cities are in the more rural provinces of South Africa.

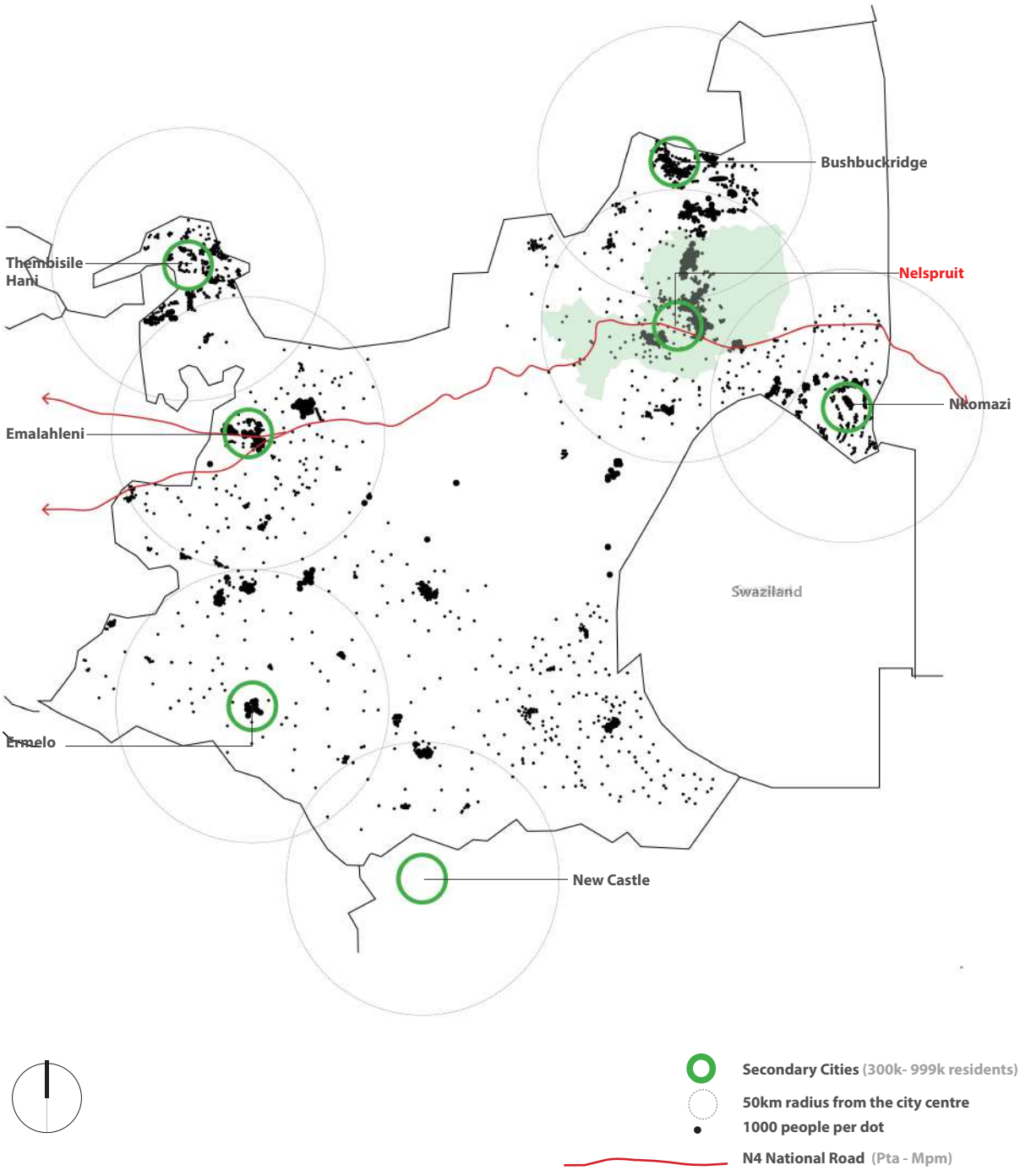


Figure 22:
Mpumalanga Map with the 6 secondary cities in the province and the population distribution of the province. There are 50km circles around each city.

Nelspruit

Nelspruit's Town

The 58 000 population of Nelspruit's town accounts for only 10% of the greater city's 588 000 population (Statistics South Africa, 2011). The majority of the population lives in the city's Townships set up by the apartheid regime in the 1970's (SAhistory, 2011). Although the city's town has had a population explosion in the last 20 years, that growth has been mostly in middle to high income families. This is evident in housing prices, with the average home in town costing more than R 1.1 million rands (Property 24, 2017). The limited access to the city for middle to low income families is reinforced by the fact that the city has not built any affordable or social housing projects in town.

This class segregation and its racial implications because of South Africa's past means that the city is frozen in the realisation of apartheid spatial policies. Which suggests that, if there is to be a shift to secondary cities like Nelspruit, one of the aspects that need to be addressed, is access to the city for middle and low income residents of those cities. This dissertation addresses this as a primary prerequisite for the regeneration of the CBD, through the focus on the provision of affordable housing.

The CBD

As afore mentioned, the reason the Central Business District [CBD] of Nelspruit was chosen as an appropriate site for the investigation is because it is exhibiting a lot of the characteristics that made affordable housing feasible in Johannesburg, including; a depreciation in land value and high vacancies in a majority of the large-scale office buildings in the CBD (Winston, 2017).

The high vacancies are mostly related to the provincial government moving out of about 50 000m² of office space, mostly located in these buildings, to a new office park in Riverside Complex between 2003- and 2005. The move saw a lot of smaller businesses move out of the bigger buildings and the general area highlighted in figure , to smaller buildings, (mostly converted houses) south of the CBD.

The retail dominant North and the small scale commercial dominant South of the CBD have remained relatively active but the centre of the CBD highlighted in figure has not. The negative effect on the broader CBD has been a lack of lack of financial investment in infrastructure.

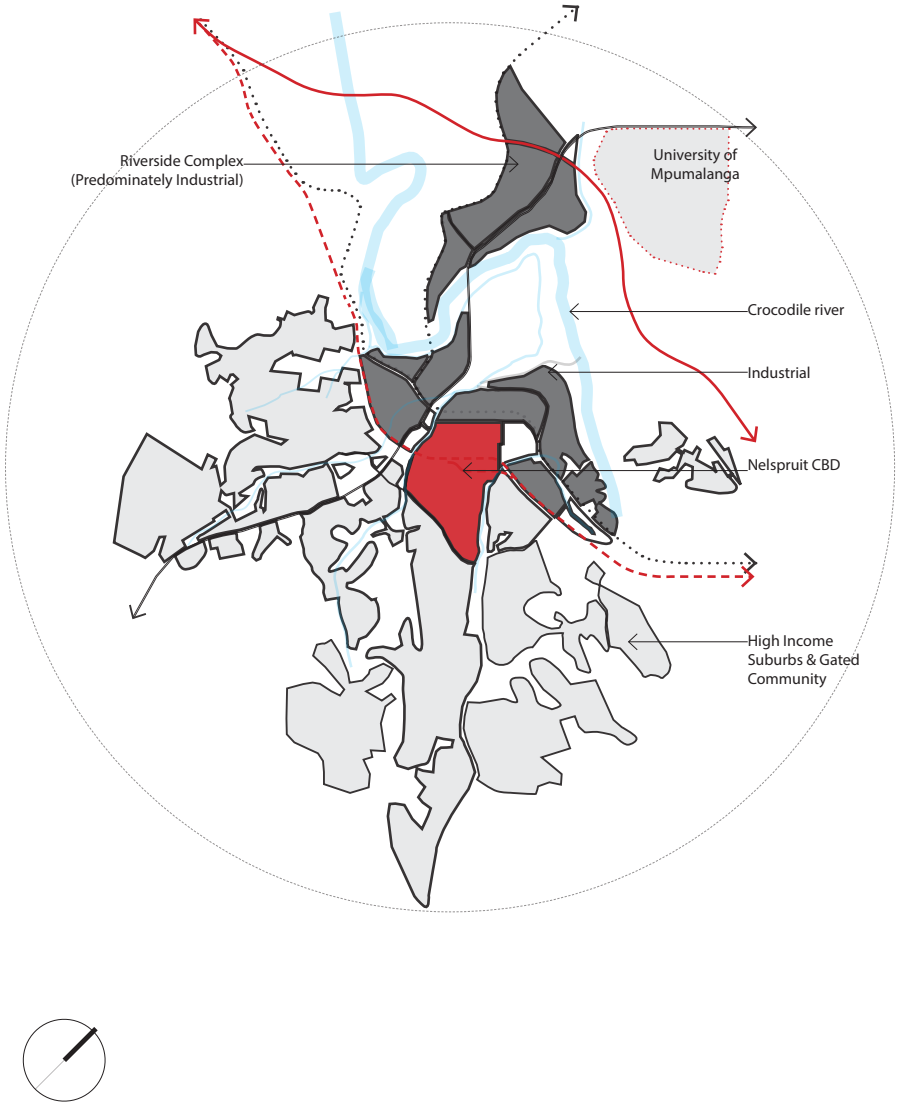


Figure 23:
Map of Nelspruit, with the centrally located CBD highlighted.

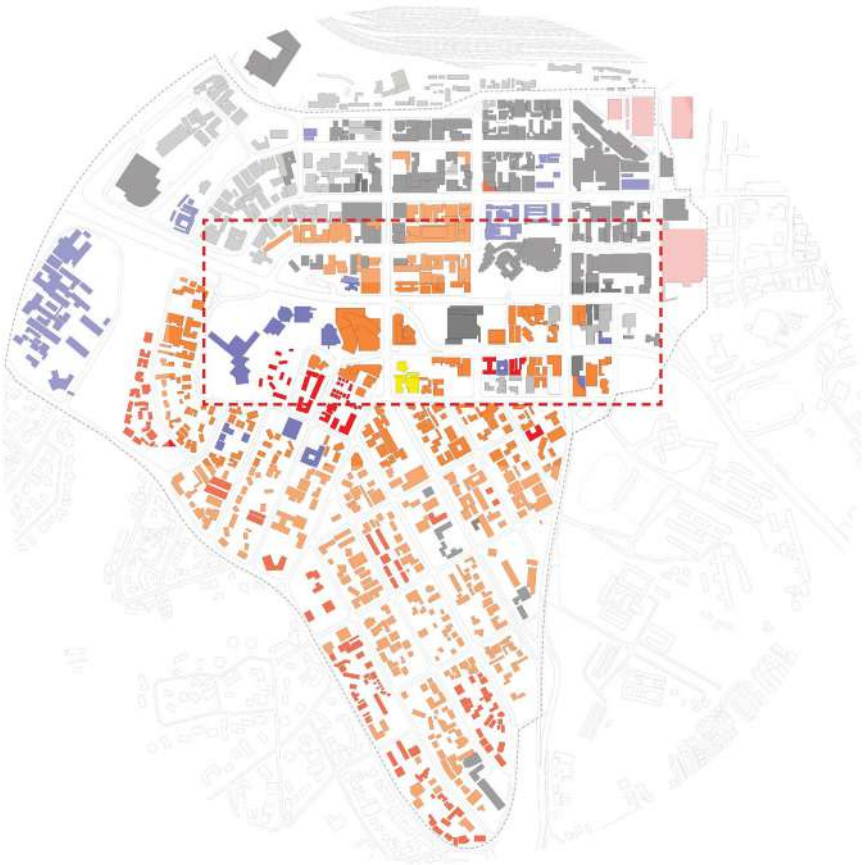


Figure 24:
Land Use diagram of Nelspruit's CBD.

Figure 25:
Aerial photo of Nelspruit, with larger site highlighted.

The larger site

The larger site is the middle portion of the CBD which is characterised by a number of vacant buildings, disused on grade parking lots and the old N4 highway that has been rerouted around town.

The disused nature of these large infrastructure elements allow for a broader transformation of this part of the CBD, one that extends beyond the building scale and address some of the precinct scale challenges that emerge in the transformation of Johannesburg.

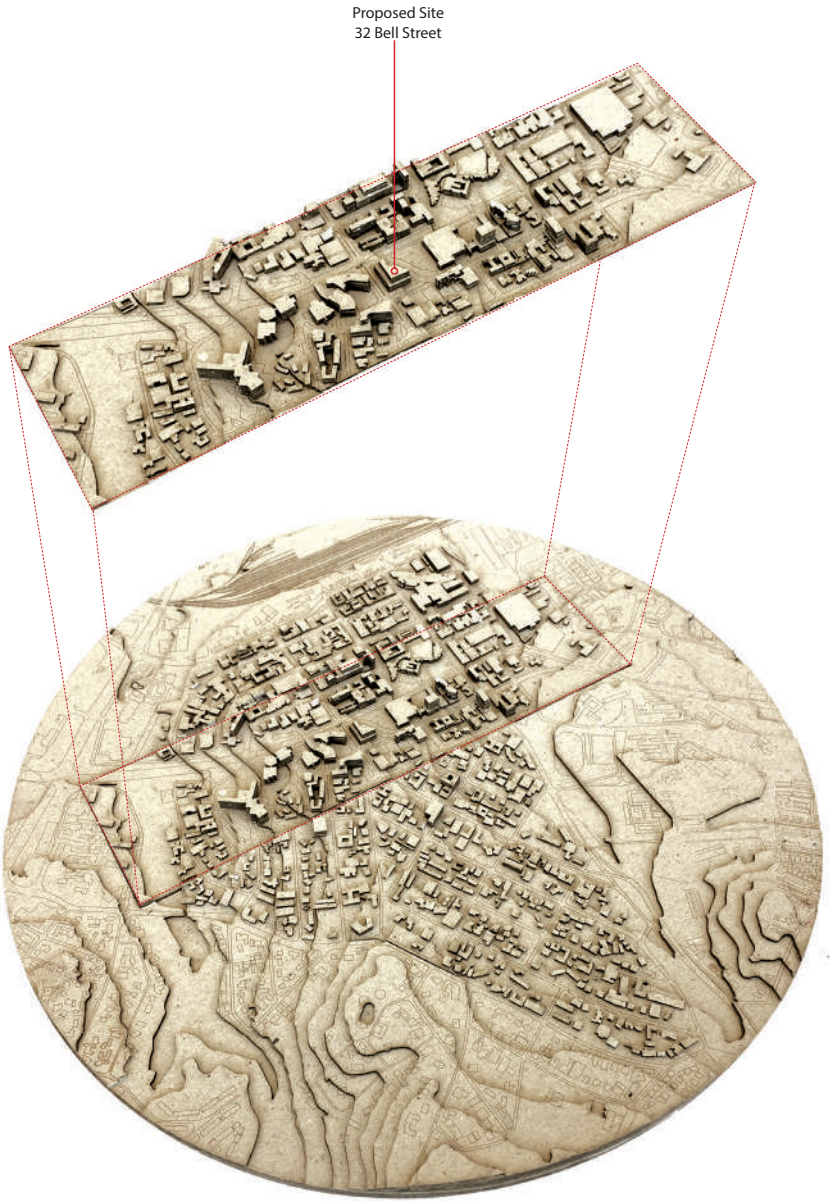
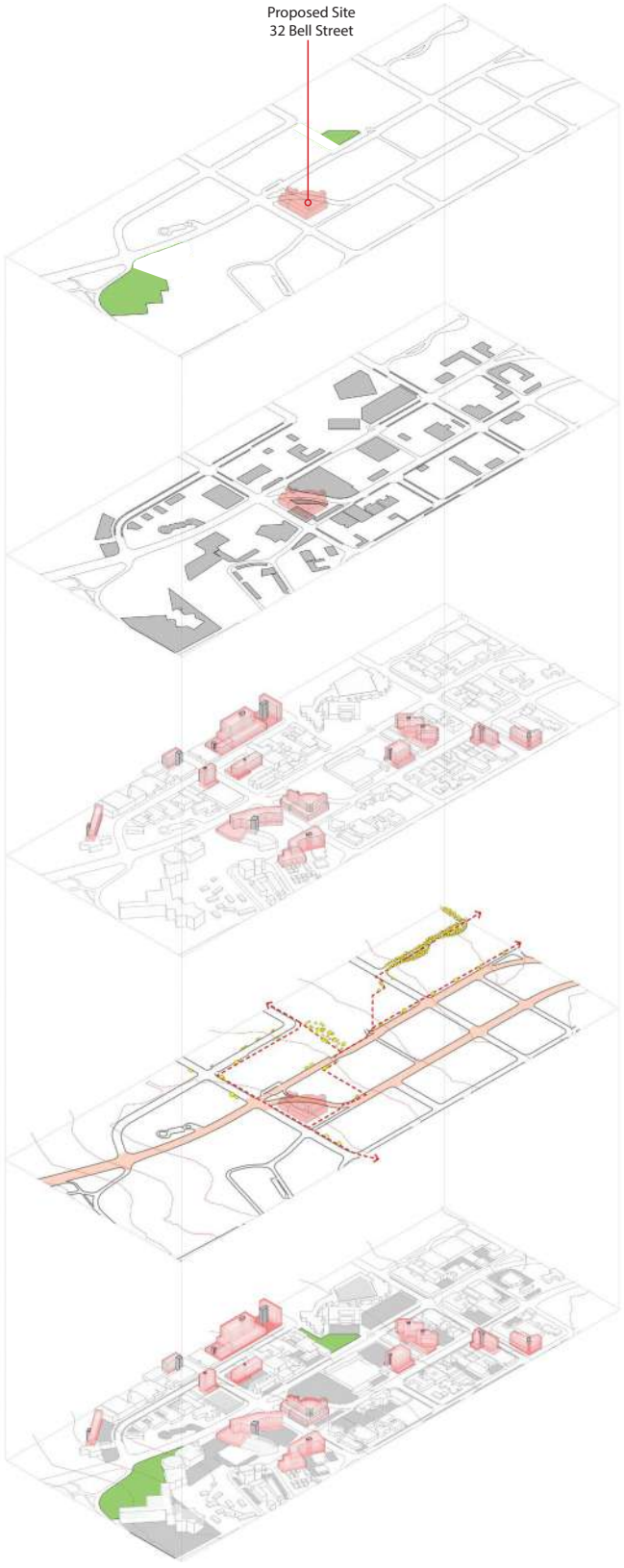


Figure 26:
Model of Nelspruit's CBD, Showing the scale of building and topography of the CBD.



Little public space that exists in the city.

Parking lots in the CBD, including street parking.

The fifteen large scale concrete frame office buildings and the low-rise retail and office buildings around them.

Old N4 highway cutting through town and the main pedestrian routes in relation to the proposed site.

Figure 27:
3D exploration of of the charateristic of the N4 precinct.

32 Bell Street (Caltex building)

The proposed site is located within this context and the initial decision to choose 32 bell Street was that the building is located at the meeting point of the three factors that have come to characterise of this area, namely; an empty office building, the disused N4 and a parking lot. The closing down of two petrol stations on Bell street and the N4 west bound also means that, of all the office buildings in the area it has the most visible signs of both decay and emptiness.

The building is a nine-storey concrete frame structure that was completed in 1996. It has a cement brick façade with steel ribbon windows. It is located on an island site that was the result of the extension of the now disused highway.

Between 1996 and 2010, the primary tenants were the Mpumalanga Provincial Government and Caltex, which had 2 petrol station in the building. The provincial Government moved out of the building in 2003, following the completion of their offices in Riverside. The 2 petrol stations were closed after the completion of the rerouting of the N4 in 2010, which took most of the traffic around town, making the 2 petrol stations redundant.

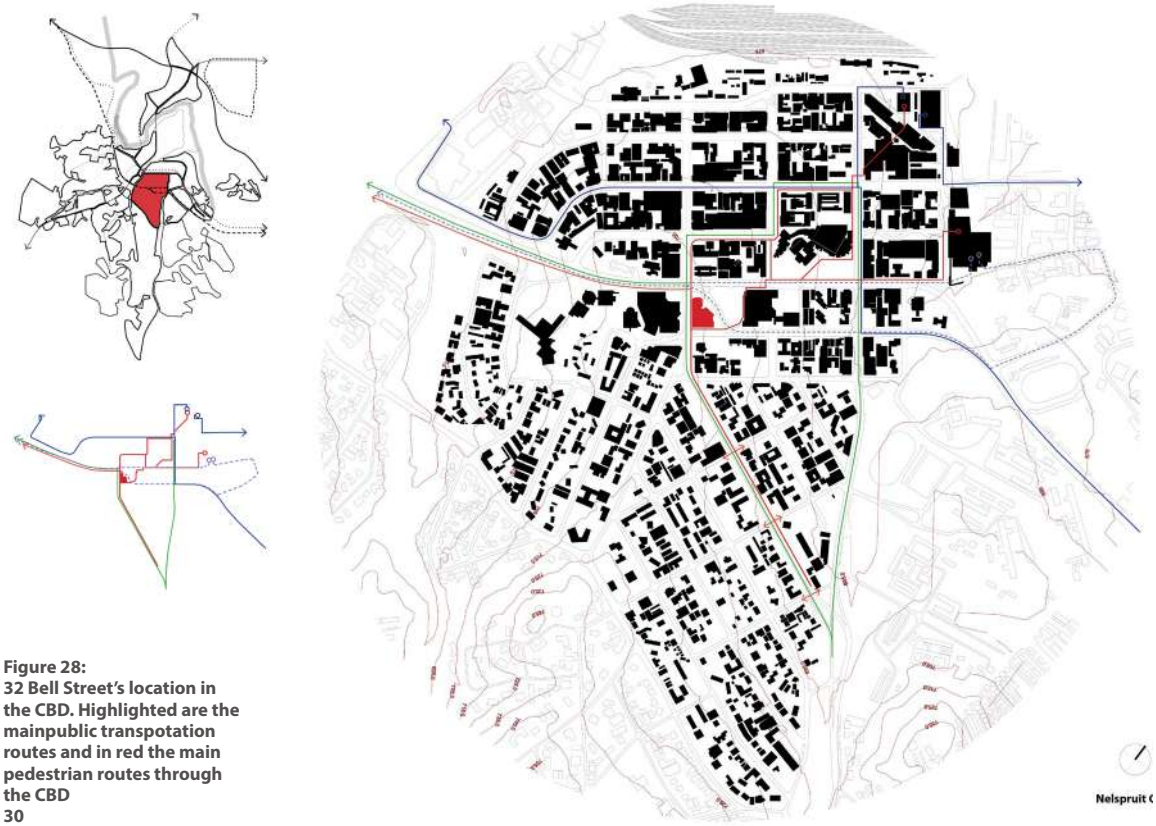


Figure 28:
32 Bell Street's location in the CBD. Highlighted are the mainpublic transpotation routes and in red the main pedestrian routes through the CBD
30

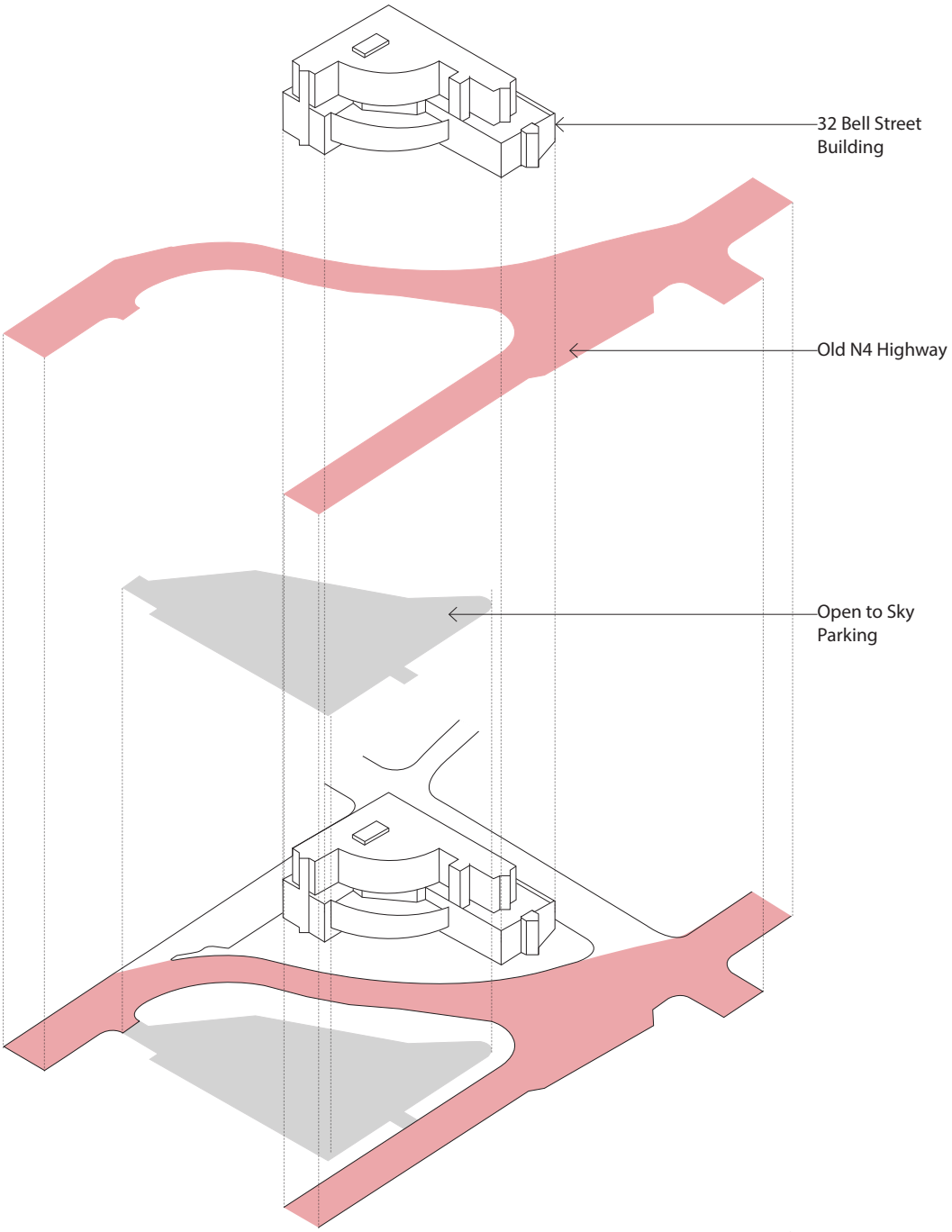


Figure 29:
Analysis of 32 Bell Street,. The meeting point the parking lots, the disused highway and the vacant buildings.

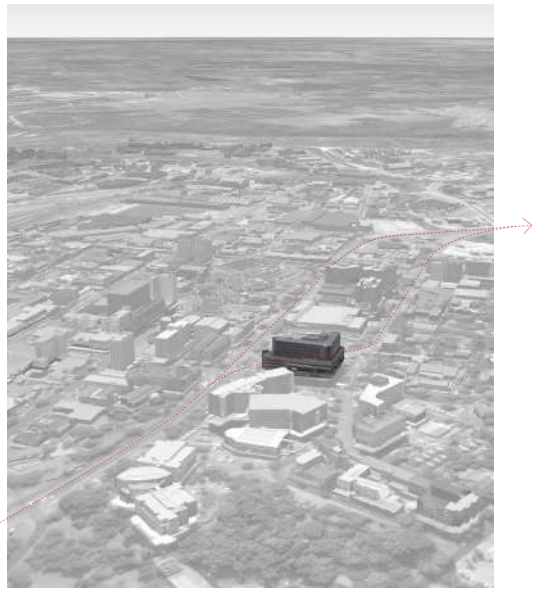


Figure 30:
South aerial perspective, looking toward the distant mountans to the north of 32 Bell Street

Figure 31:
South-East aerial

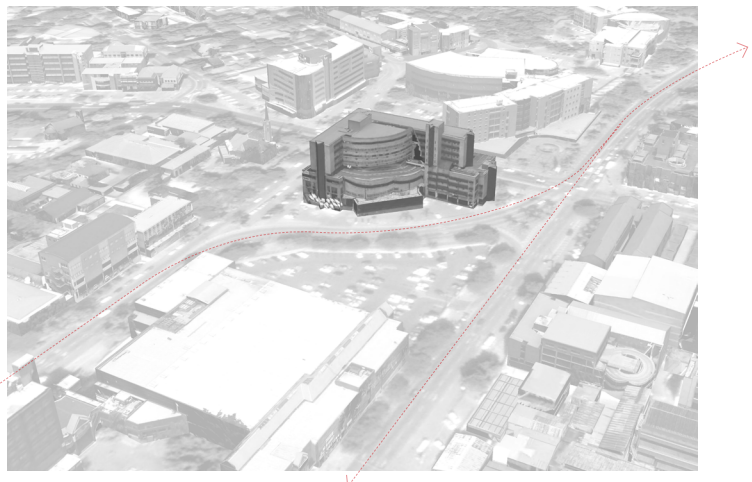
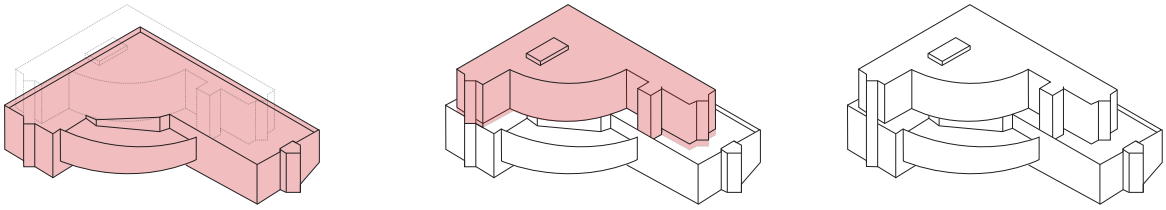


Figure 32:
North aerial perspective,

The nine-storey building can separated in two portions, a car orientated podium and a commercial office upper level. What helps in understating the program is understanding the way this building was built. The first part which has the 2 petrol stations, a car service station and a parking level was completed first in 1994, as a response to increased activity on the highway. The office addition was completed in 1996, comprising of an additional parking level and 8000m² of office space over four floors. The office space was developed for the Provincial Government.



1994 **1996** **2017**

Figure 33:
Tracking the developmet of 32 Bell Street from 1996 to present day.

The Future

The future of the building is uncertain because for the last 10 years it has been mostly vacant. There have been times when the National Government had different offices in the building, but as more higher-grade office space becomes available on the southern edge of the CBD, the national government is moving to those offices, making the prospect of them being a long-term tenant unlikely.

These building has however become a way in-to the city for a lot of small businesses that were operating from home. There are currently a number of small businesses in the building and these are to be retained in the design proposal.

Challenges and opportunity

One of the problems with the current car oriented nature of the lower ground floor that it impedes the building from connecting to the broader CBD. Being on an island surrounded by a highway adds to this problem. The vacancy has made this worse with the ground floor now being turned in to a parking lot.

Another problem is the nature of the floor plate, which at parts is so deep it does not allow for natural light or natural ventilation. This part of the floor plate also has a randomised column layout around the rotunda, that makes it difficult to design a more regularised layout. This is evident in the awkward office layout proposed by the original architects.

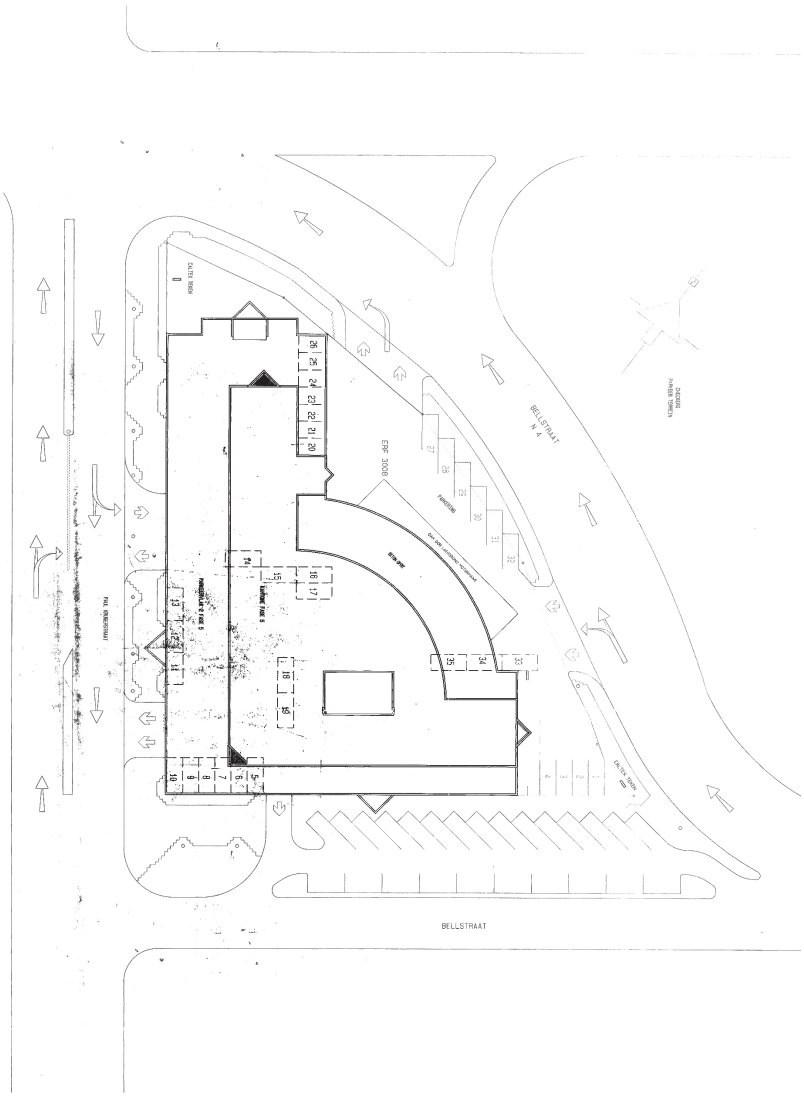


Figure 34:
Site plan, showing the building on an island site, that was the left over piece from the development of the highway. Note the number of access ways for vehicles

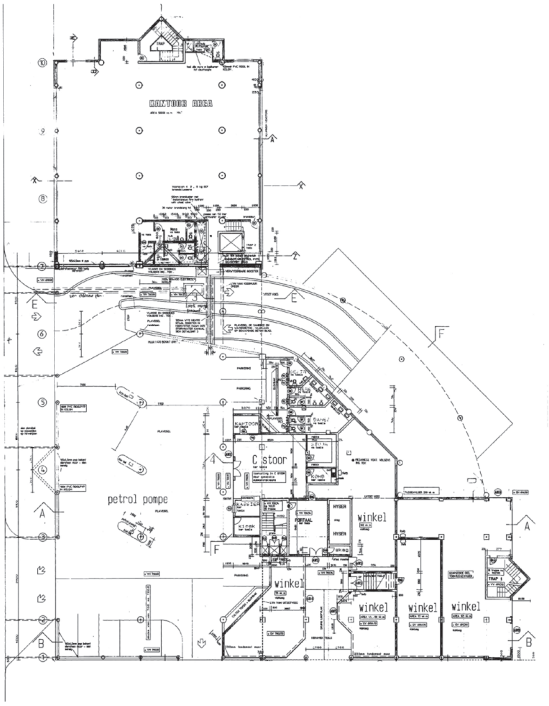


Figure 35:
Upper ground floor, where one of the 2 vacant petrol stations are.

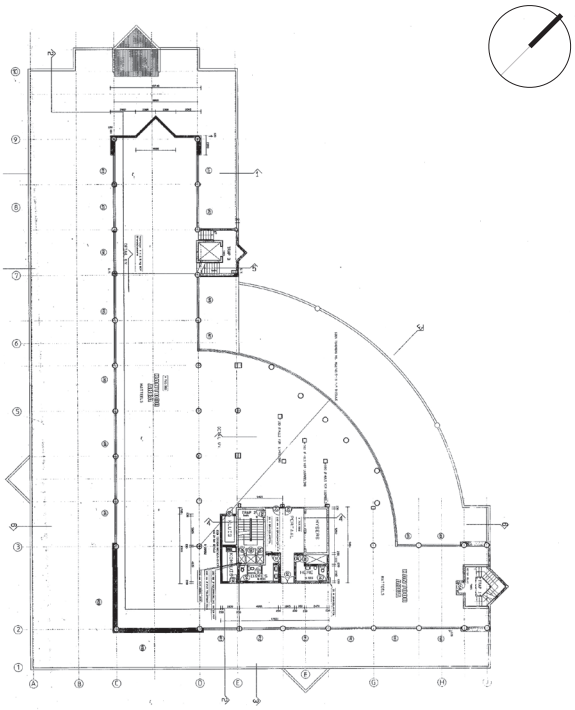


Figure 36:
Typical floor plan for level 4-7, with the rotunda .

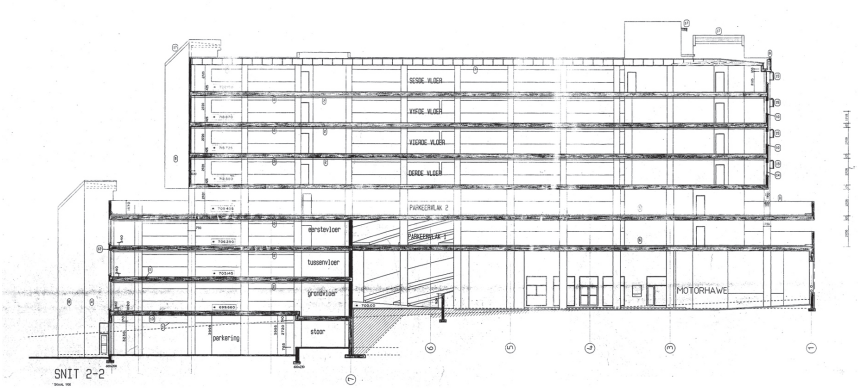


Figure 37:
Section though the petrol station on the upper ground floor and the car service station on the lower ground floor

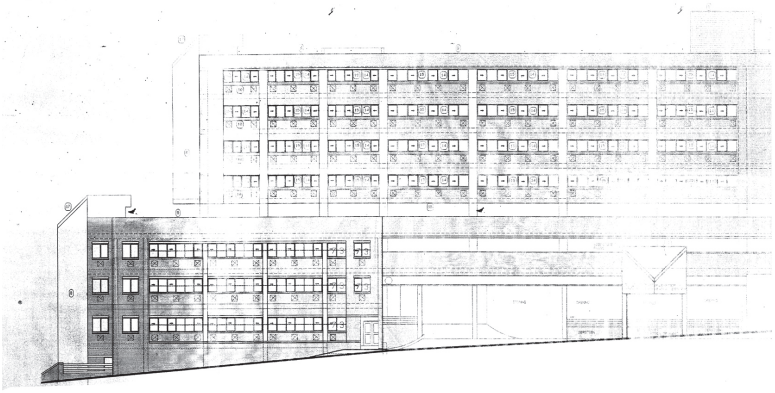


Figure 38:
South West elevation

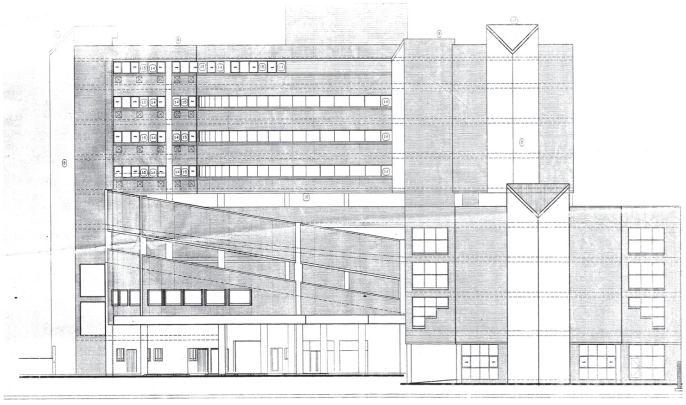


Figure 39:
South West elevation

Figure 40:
View from Corner Bell Street and the old n$ highway

Figure 41:
View from top of Bell Street (South view)

Figure 42:
View from the parking lot in front of the building (North view)

Figure 43:
View from the second floor of 32 Bell Street (North-West view)

Figure 44:
View from the second floor of 32 Bell Street (South view)

Figure 45:
View from the second floor of 32 Bell Street (North view)

What is Valued

Throughout the year, there has been a focus in to the existing, understanding not only the building but its context too. In this evaluation of the existing, one of the most important questions have been about what about the building should be valued. In existing buildings this is never a straight forward answer because buildings mean different things to different individuals. The prolonged conversation around the Werdmuller Centre in Cape Town is one such an example where there is no consensus on what to do with the building. The 60-year preservation rule puts forth age as a value because of the link to heritage, but for a building like Caltex Building, which is only 22 years old, the discretion is mostly with the owner on what to do (Zimmermann, 2015). This is a very dangerous precident and the number of demolished buildings in the CBD of Cape Town in the last 10 years stand as testament to that. Along with these building, is a layer of the city's history and earlier on an opportunity for transformation that is lost forever.

The probability of 32 Bell Street being demolished is low because of the lack of interest in the CBD currently, this however does not mean that this will last forever.

So rather than looking at the building only for its age, this dissertation proposes that existing buildings be looked at according to what they have to offer for the changing needs of a city and it is obvious from the research on Johannesburg that these large concrete frame structure buildings lend themselves to being good bases for adaptation in to affordable housing. Beyond the generic there also needs to be a more in-depth look in what individual buildings offer at a material and urban level.

Location

Its location in the CBD close to places of employment, schools, hospitals and other services integral to everyday life is valued. It is also located along a pedestrian route that connects the commercial part of the CBD in the South to the Retail and transportation Hub north of the CBD. Its location also offers 360° views of the mountains in its surrounds.

The Concrete frame

The most valued parts of the building is the concrete frame, which at just over 20 years has not reached the half way point of its 50 year life span. A life span that can be extended without much effort (Zimmermann, 2015). The frame is the most dominant part of the building and holds the most amount of embodied energy, and considered in relation to the structure as a whole it would cost most to demolish and has the highest replacement value.

In Embodied Relevance Sophie Zimmerman discusses at length the reasons a concrete frame structure should be valued in large scale buildings. Some of these include; a service life of up 100 years, and a high thermal mass which can substantially decrease the energy loads on buildings (Zimmermann, 2015). Exposed concrete building surfaces also absorb heat in hot environments, which is important in Nelspruit because the city experiences very hot summers (Zimmermann, 2015).

Building Services

Most Part of the Services of the Building, one of the elevator core and all the fire escapes are also retained. The one lift core that is not has been redundant since the extension of the building upward. There is also a solar power system that could provide as much as 50% of the buildings energy needs.

The outdoor spaces

Covered outdoor space accounts for a large part of the building and its retention and possible extension has the potential to bring down the cost of adapting the building, as the cost of bringing buildings up to code in terms of heat gain, airtightness, ventilation and others drive up the cost of adapting buildings to a point where it becomes unfeasible to do this.

The idea of retaining the outdoor nature of a building and only enclosing what is necessary so to save on cost when adapting a building is a strategy that is used by Wolff Architects in workshop 17 with great success.

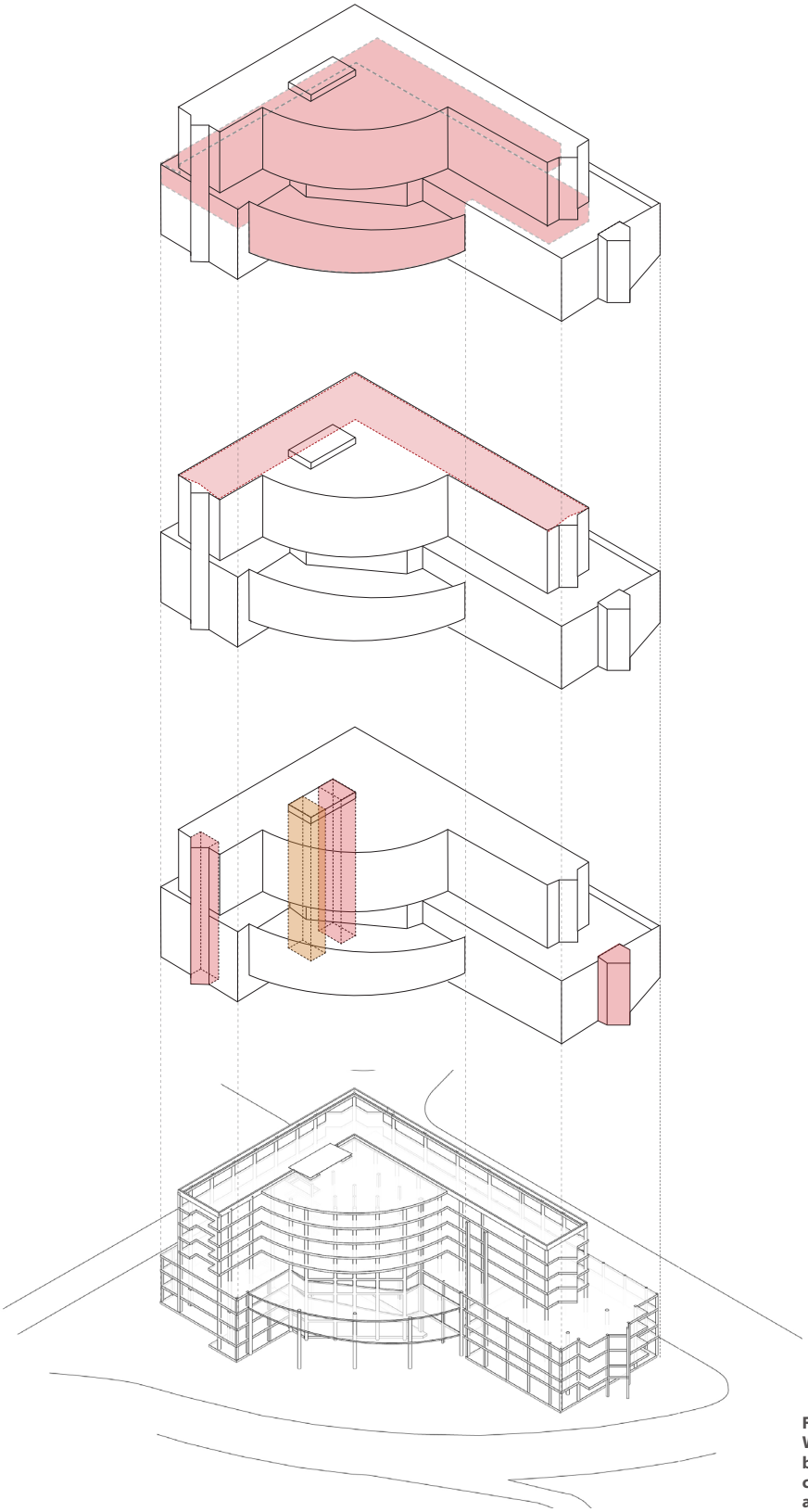


Figure 46:
What is valued in the building, concrete frame, circulation cores,solar roof and outdoor space

Part 3 - Design Proposal

The research into Johannesburg, Lacaton Vassal Architects and timber construction serves as the basis for the design proposal, with the focus being on adapting the different disused infrastructural elements to regenerate and transform the CBD of Nelspruit.

This adaption happens at multiple scales, going from the precinct scale to building scale. At the precinct level there is an adaption of the disused highway and the open to sky parking lots, turning them into infrastructure that connects the city rather than disconnect. At the building level, there is an adaption of 32 Bell Street, into a mix-use building with affordable housing as the primary program. The Adaptation of 32 Bell Street, looks to integrate it back in to the life of the CBD.

The following subsections expand on these design interventions, particularly at the building level.

Urban design Proposal

The urban proposal considers two of the disused infrastructural elements in the CBD, namely; the old highway and the disused parking lots. Both major contributors to the lack of pedestrian activity in what is otherwise a very pedestrian orientated CBD.

The size of the highway is reduced and the number of streets that cross from the northern edge of the CBD to the southern edge are increased. This changes the average length of the city block in this precinct from being 500 meters long to on average 150 meters long, bringing this precinct closer to the scale of the rest of the city. The size of the highway is also reduced, which assist in slowing down traffic in the area, making it more pedestrian orientated. The change in the road network also unlocks pieces if property that are currently stuck as traffic islands or buffer zones. From the municipalities perspective the sale of these can be used to increase funding for these infrastructural adaptations.

The on-grade parking lots are converted to public spaces to addresses the challenge of the lack in public space that has emerged in the regeneration of Johannesburg. This change also reinforces the idea of this part of the city being pedestrian orientated. These public spaces are conceived as meeting points for all the city's residents with facilities that are at the precinct and city scale. The projection is that land around these parks will become more desirable and small-scale buildings will be added on, increasing the density around these public spaces.

Figure 47:
Pittsburgh Market Square, an example of good public space that has driven investment in its immediate context

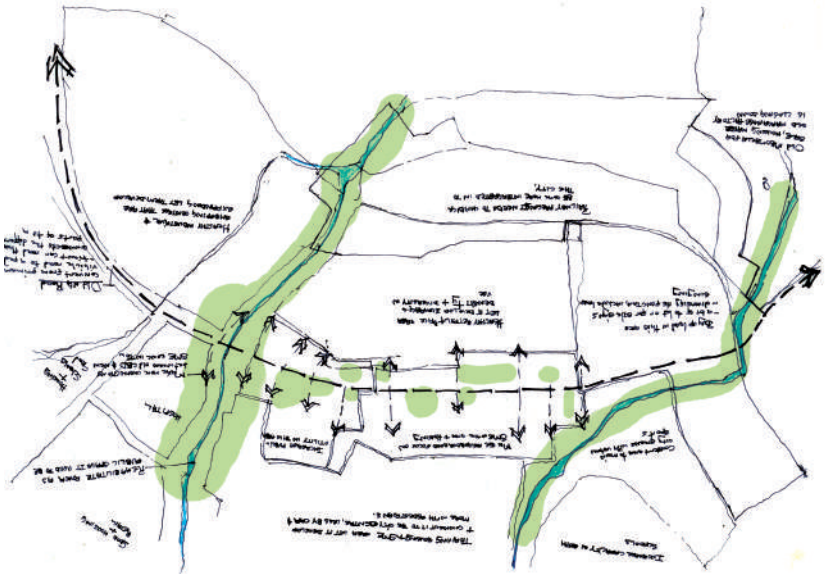


Figure 48:
Early drawing of the idea of stitching the two parts of the CBD, with green spaces connecting two rivers that run on either side of the CBD.

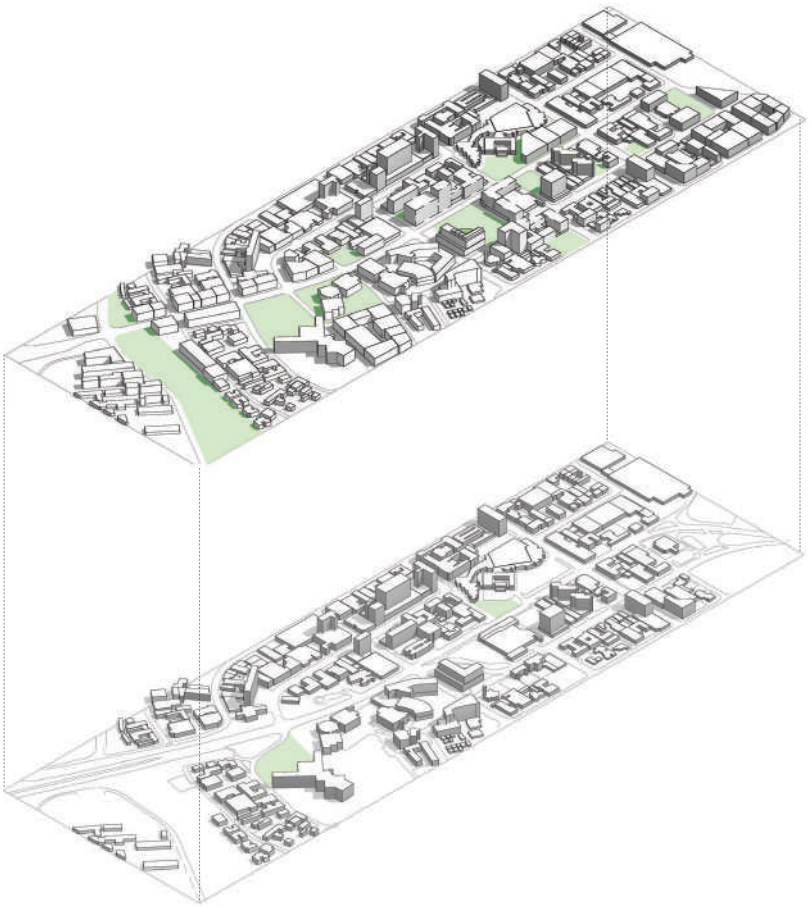
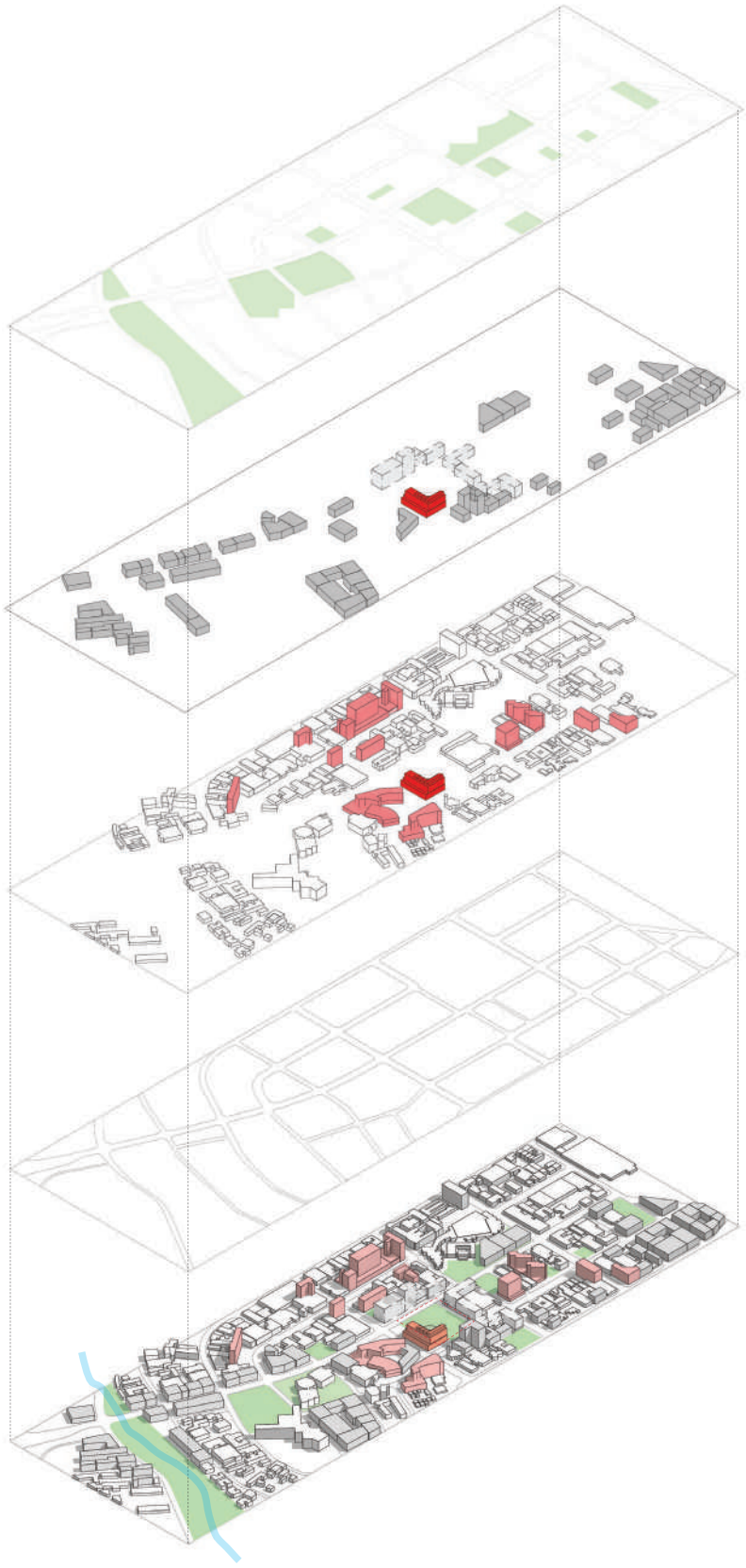


Figure 49:
Top, Urban design proposal with adapted highway, green space and denser fabric. Bottom existing urban fabric.



New public spaces.

New buildings, mostly as a result of realigning the grid

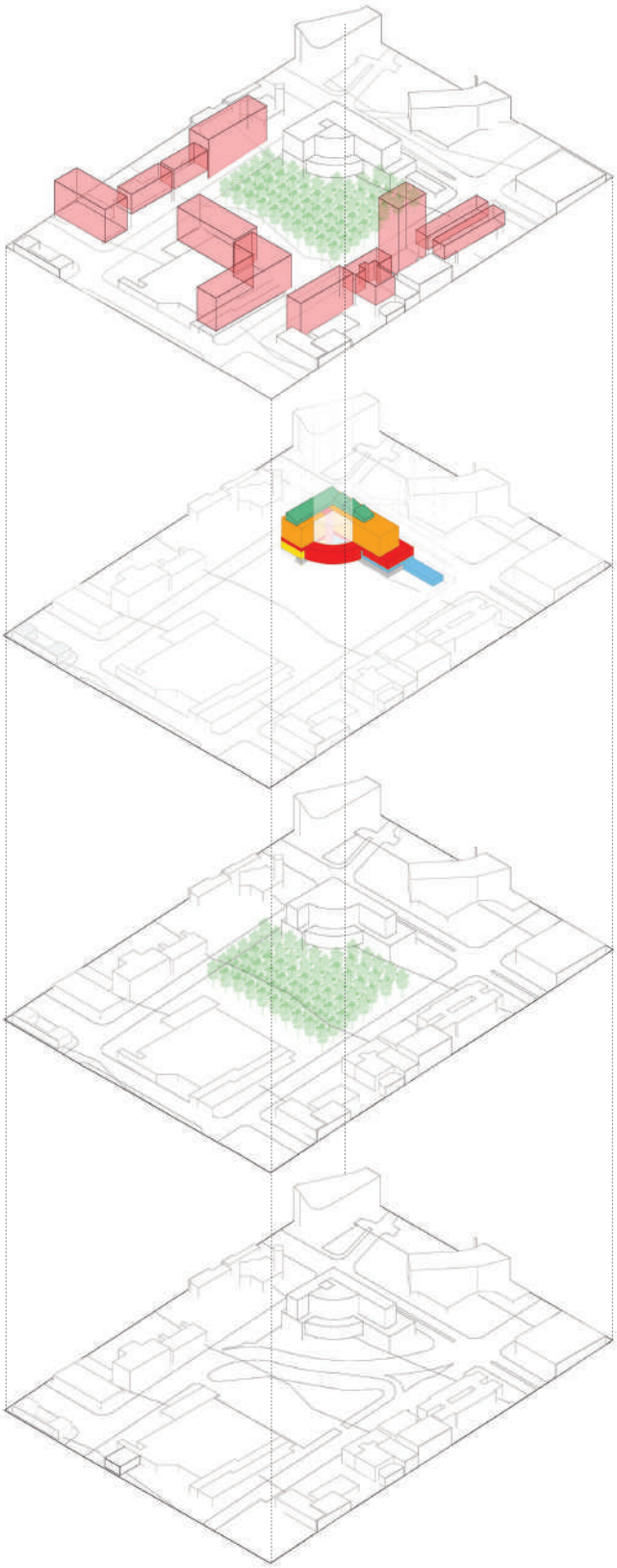
Existing urban fabric and vacant large scale concrete frame buildings

The new urban grid.

Figure 50:
The urban proposal

Site development strategy

The site development strategy of the immediate context of 32 Bell Street expands of the ideas of the urban design proposal. With the highway being removed and the parking lot in front of the building being converted to public space. There is the adaptation of the building which brings it in to a positive cycle and responds to this new context. Then last stage of the site development strategy imagines the area densifying as a result of the investment in the area and those sites being sought after locations.



Extra bulk on the adjacent sites

Adapted building.

New park and road network

Existing

Figure 51:
Site development strategy.

Program

At the building scale the program became an important part of the design development of the building. Although housing was adopted as the primary program quite early on with the research that was done in Johannesburg. The wholesale programmatic change of office buildings to residential was identified as a problem in Johannesburg because it has the potential of turning the city in to a high-rise housing neighbourhood instead of a multi-faceted vibrant city centre.

Instead of this mono function adaptation, the project proposes a diversifying of program, one that sees the building having a 24-hour life and a number of city actors being present in the building.

The initial program was commercial in the podium and housing above. This was done to give the lower portion of the building back to the city, so it could participate in the everyday working of the city. There was also the practical implication of the building having small businesses as tenants. The broadening of the program built on the idea of breaking the monolith. The monolithic nature of the building being one of the reasons it has failed to adapt, as noted by the building manager of 32 Bell Street Brent Winston (Winston, 2017).

The program then broadened to a timber vocational training school at the lower ground floor level, a market on ground level, taking advantage of the 6m high ceiling height of the old petrol station. The 1st and 2nd level are shared office space, geared toward small businesses in the building. The 3rd- 7th floor is housing. The roof is given over back to the public realm in a garden centre that sells only indigenous plants, a restaurant and viewing deck.

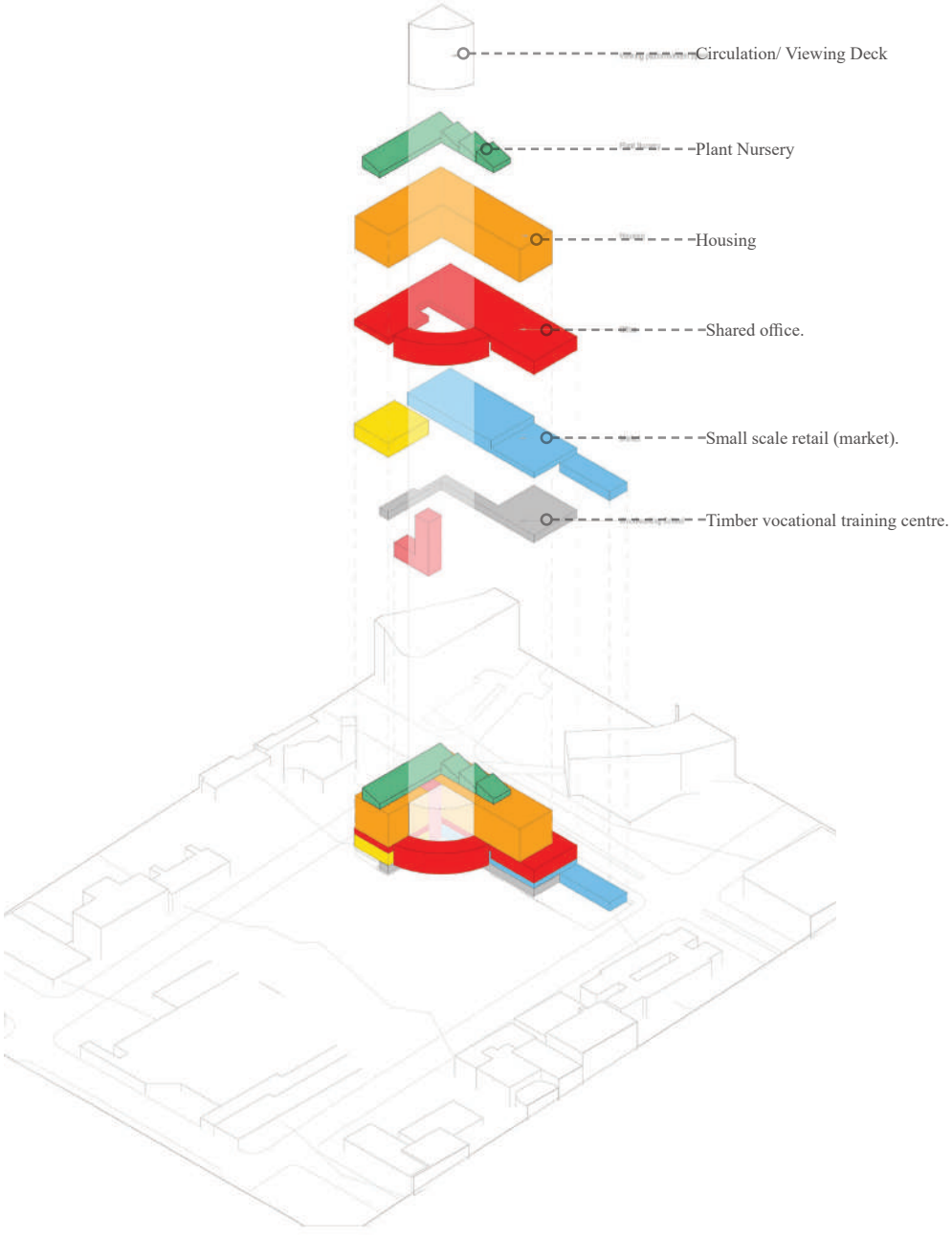


Figure 52:
Proposed program.

Deep Plate

One of the problems identified during the design process was the deep plate, which does not allow for any strategies for natural lighting or natural ventilation. There was an investigation done to find the most suitable way to address this problem.

The option chosen is one where the frame structure is retained while the floor plate is removed. This was done at the time with the idea. that something would be developed in the frame. The other reason for retaining the frame was to ensure the retention of what was value in the building, the concrete frame.

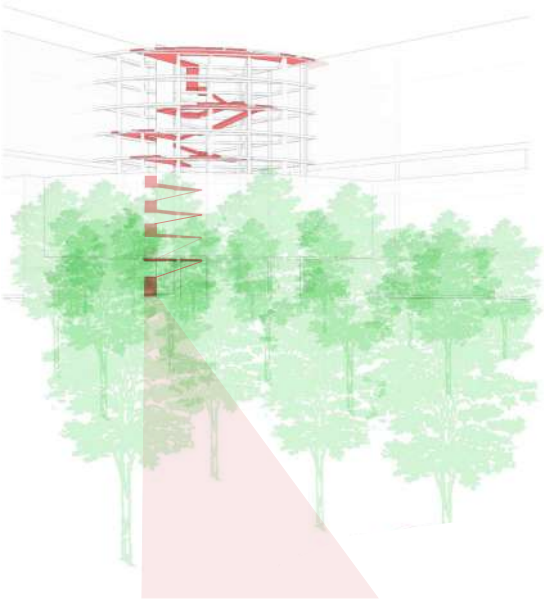


Figure 53:
Perspective view of the new circulation connecting the ground plane to the public roof space.

Circulation

The frame allowed for a narrower plate, making natural ventilation and lighting possible. It also became an opportunity for a new circulation system that connects the park to the roof space, and the other levels, while exposing one to views of the park below and the distant views to the north. (insert picture of the veiws). On the 4th, 6th, and 8th floors the landings are generous spaces.

At a conceptual level the stair goes from being a service in the core, to a meeting point for the different city actors that inhabit the building. The new viewing deck also deals with an aesthetic problem that was because of the rotunda.

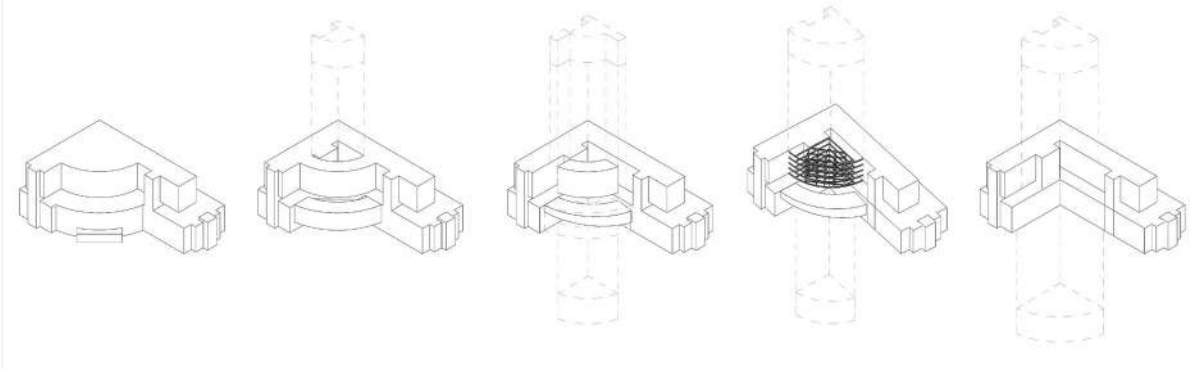
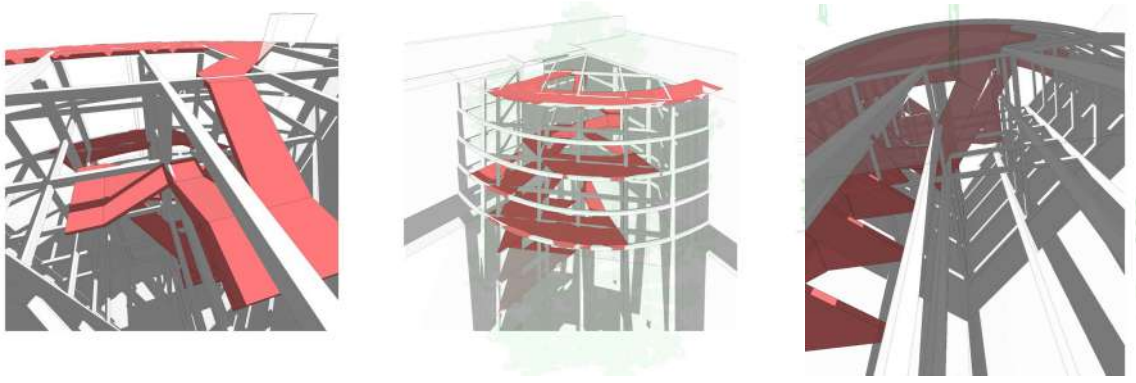


Figure 54:
Exploring the cut,
3D exploration on the how to
get light in to the floor plate.

Figure 55:
Sketch design of the circulation
System.
Left; 8th floor view back to
the city
Centre; generous landing,
turning the circulation system
to being a viewing deck,
freedom of use.
right; view from below



Housing

Being that the housing was an important part of the building there was a lot of focus spent on developing an appropriate model. The investigation in to housing started with comparing three different models of housing. A single bank, double bank and cluster typology.

The cluster typology was chosen as the most appropriate model for mainly three reasons. The first was that it accommodated more apartments than the other two models. Second was that it broke the scale of the building by separating the 125 apartments in the building to clusters of about 20 apartments. Most importantly was that the central stair could adapted to communal spaces for each cluster extending the life of resident to beyond their apartment.

This cluster typology was also observed in 1-room apartment developments in the townships around Nelspruit, where the central spaces were used as relief space from the hot and mostly small 1-room apartments.

The circulation space was developed to being generous communal spaces where a number of communal activities could happen.

At the apartment level the Lacaton & Vassal apartment model was adopted, and the balcony was adopted as a measure to get additional space without compromising on the number of units. The other benefits of these balconies of introduction of outdoor space, the transformation of the façade and others were also great additions that went further in improving the quality of the apartments.

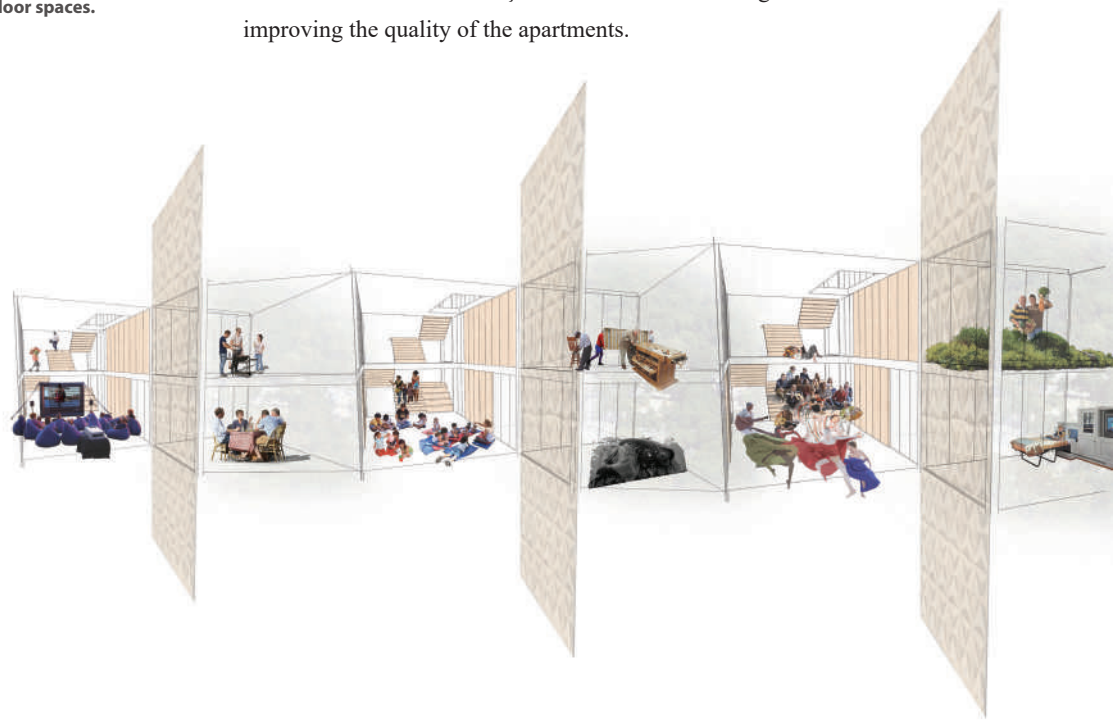


Figure 56:
Collage of the public and private outdoor spaces in the housing levels. Freedom of use is expressed in the communal outdoor spaces.

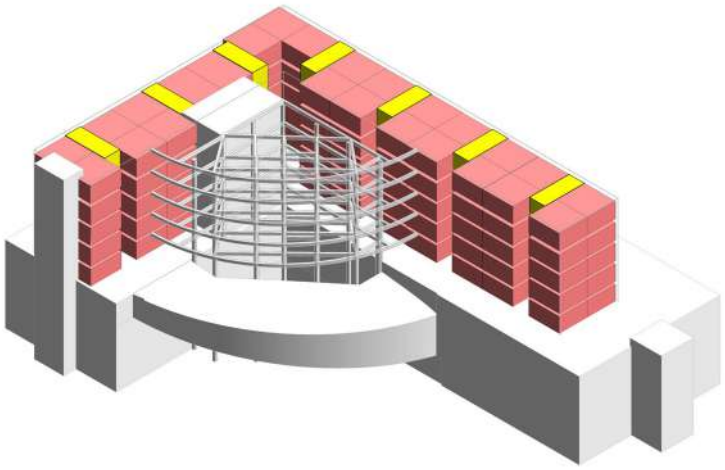


Figure 57:
Cluster Typology with central communal stair shared by 20 units, A break of the monolith. 125 units over 5 floors.

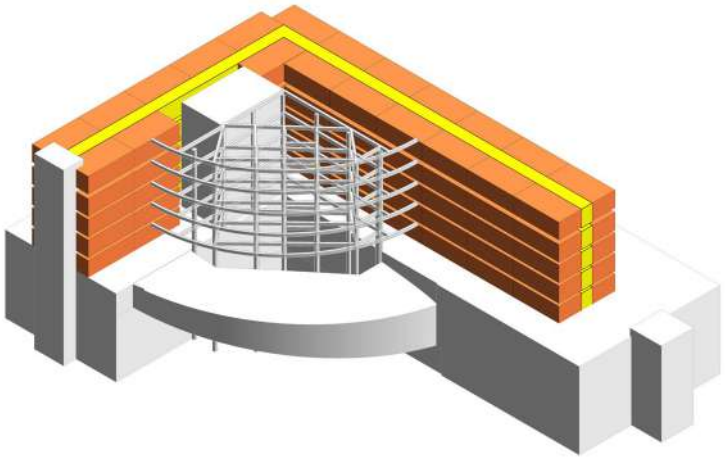


Figure58:
Double bank Typology with interior corridor and not cross ventilation,
105 units over 5 floors.

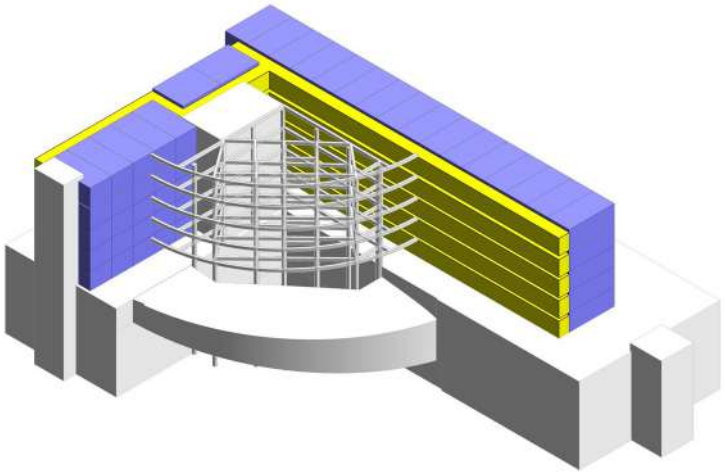
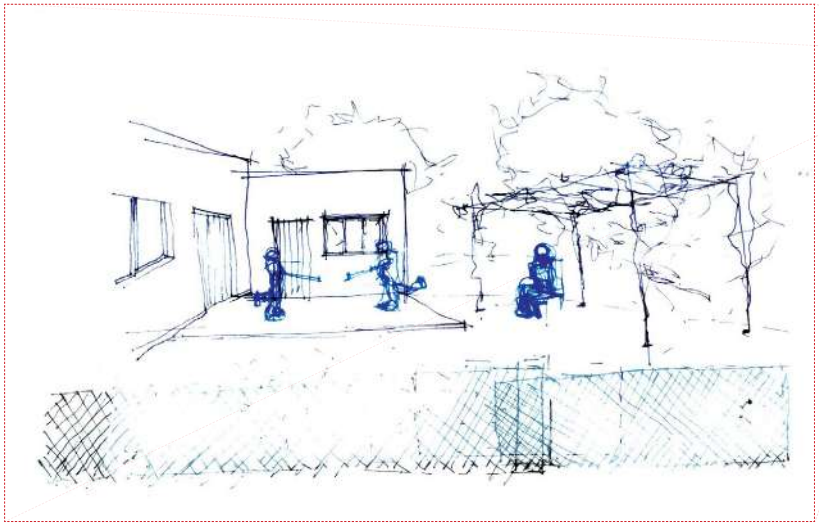


Figure 59:
Single bank Typology with the narrowest and deepest apartment of the three, meaning natural lighting and ventilation will be a problem. Also on one of the sides the views to the city can not be fully exploited by residents. 115 units over 5 floors.

Figure60 :
Design development sketch of the nature of the space, capturing the essence of the space.



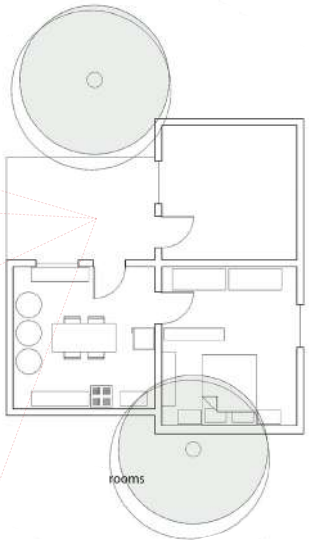
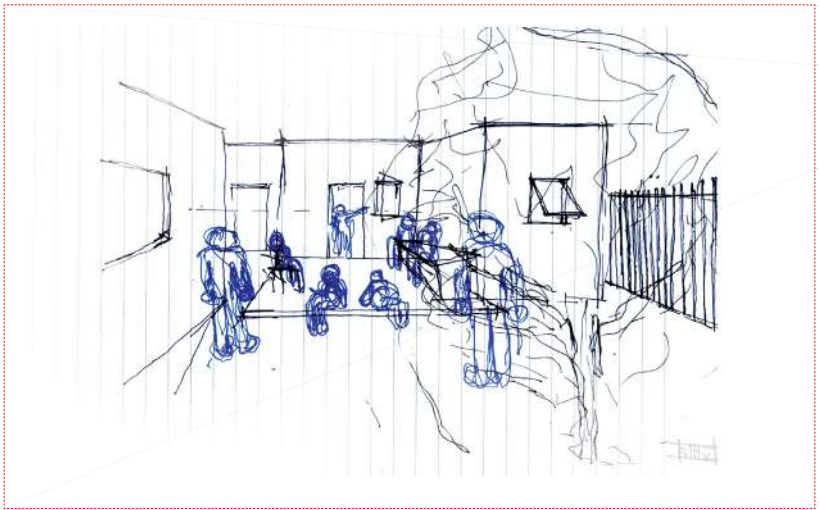


Figure 61:
Typical 1/2 room apartment in the township for New residents in Nelspruit. According to most owners their main residents are civil servants and students.

Figure 62:
Sketch of communal space. Mother sitting under a grape vine watching children play. Pienaar, 40km from Nelspruit



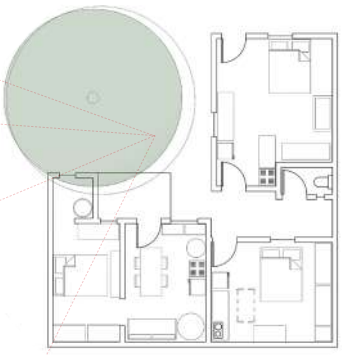


Figure63:
Floor plan of one of four clusters in a 17 one-room apartment development. Note: the cooking areas are at the entrance closest to the outdoor space.

Figure 64:
A sketch of the communal space, with a tree, a platform and washing station. The space is most active in the afternoon. All the residents get water from the communal tap, as no one has running water in their apartment.
Kanyamazane 30km from Nelspruit

Commercial and retail Space.

The commercial and retail space, which are located in the old petrol station and the parking levels on the podium level, expand the idea of outdoor space that is developed in the housing communal spaces and the new circulation viewing deck in the rotunda. It's development adopts the model explored by Wolff architects in Workshop 17, where most of the building is a protected outdoor space with a few fully enclosed spaces that accommodate offices and auditoriums.

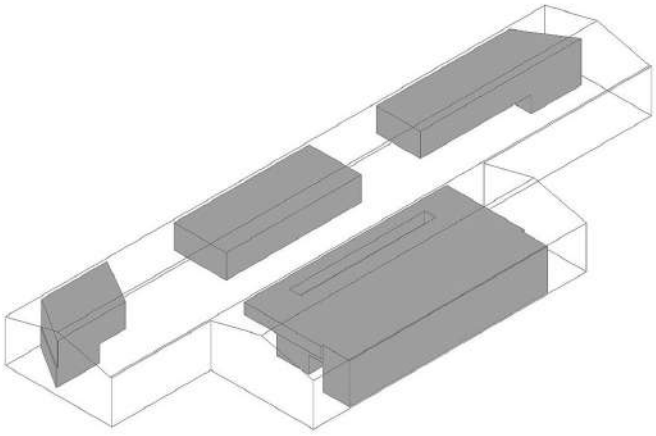


Figure 65:
Workshop 17 by Wolff Architects, showing the enclosed spaces in the building.

Figure 66:
Interior of proposal, 32 Bell Street

Materiality

As afore mentioned the primary material used in the adaptation of the building is timber. There are a number of reasons for this decision, including Mpumalanga being the primary producer of timber in the country and the research into Mezimbite Forest Centre in part 1, that highlights the potential that exists in the industry to address things such as unemployment, skill upgrading, reducing economic driven migration and the incorporation of traditional craft into contemporary construction amongst others.

The primary architectural investigation here was exploring a different way of making, one that is rooted in its context both materially and with the craft that is used to make the building. There was also a deliberate decision to use all the sources of timber available in the region so to encourage the Mezimbite of Nelspruit to emerge and to help the small-scale producer of glue-laminated products in the area to grow. In so doing taking an anonymous concrete frame building and embedding it in it's context.

The decision to use all four sources also encourage the innovation in to what is a very young industry, rather than fall into what the rest of the world is doing. Mezimbite Forest Centre is a great example of what that innovation at all levels looks like.

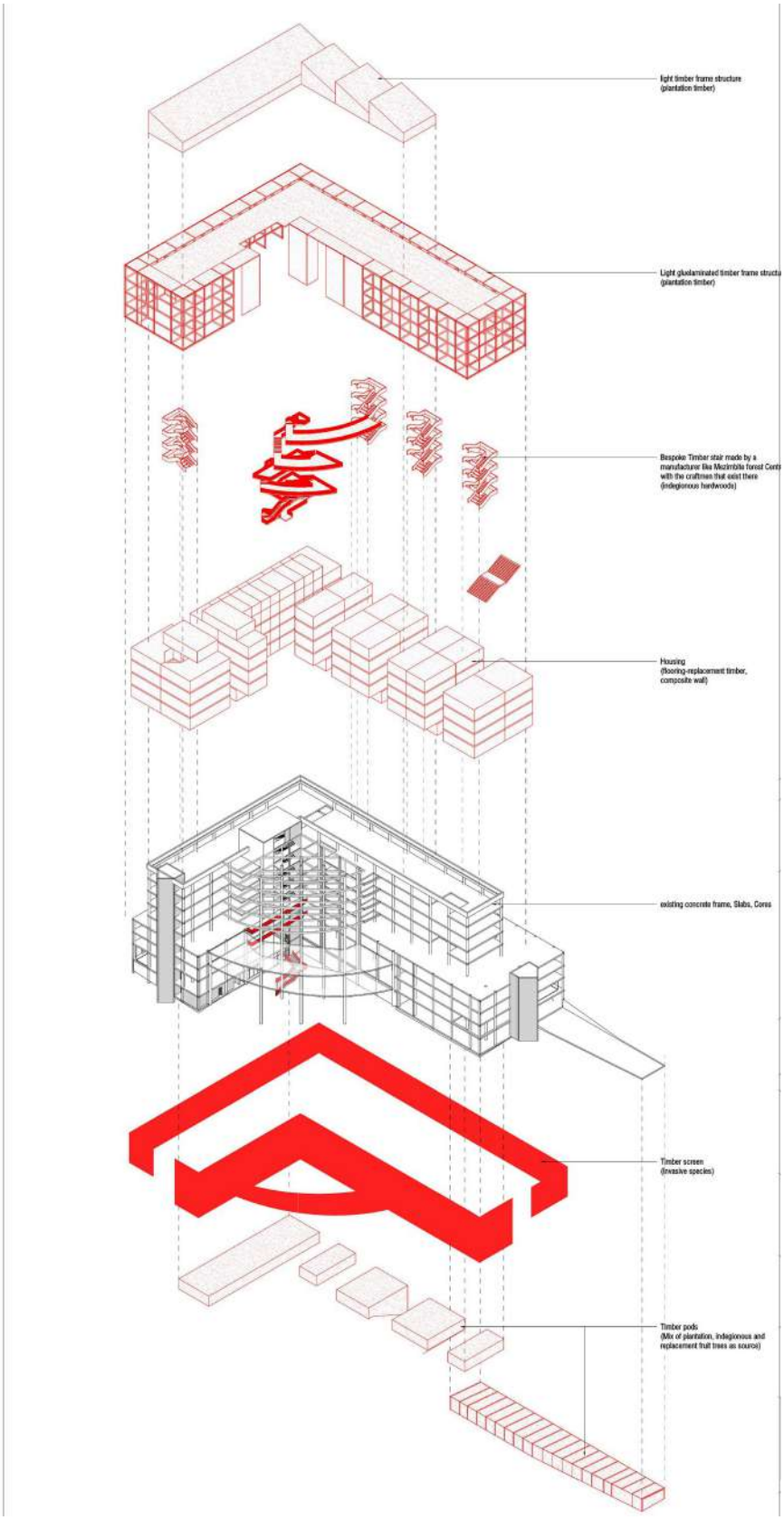
Architecturally there is also the opportunity to express the dynamic and varied nature of timber construction, which ranges from a very mechanical process with glue-laminated elements to a very manual process when dealing with carving and turning wood.

In the building these varied sources are used in different parts of the building dependent on their availability, mechanical and aesthetic properties.
The plantation timber is the most widely used and its application include; the timber frame structure for the balcony addition, the interior and exterior prefabricated walls, the frame structure for the inserted boxes on the lower level and the light frame structure for the green house on the roof.

The sustainably sourced indigenous hardwood timber is used in the public spaces, mainly in the bespoke stair/viewing deck in the rotunda and the communal stairs in the housing clusters.

The invasive species timbers are used in a screen that wraps the entire lower portion of the building and the sun shading screens for the apartments. Effectively becoming the façade of the building.

The replacement fruit trees are used for flooring and the prefabricated wall components. Aesthetically the existing concrete structure, which is exposed as the layers of brick, suspended ceiling and floor tiles are stripped of, will form the base palette on which the light and varied timber with a number of sources and trades will play on.


light timber frame structure
(plantation timber)
Light glulaminated timber frame structu
(plantation timber)
Bespoke Timber stair made by a
manufacturer like Mezimbite forest Centr
with the craftman that exist there
(indegionous hardwoods)
Housing
(flooring-replacement timber,
composite wall)
existing concrete frame, Slabs, Cores
Timber screen
(Invasive species)
Timber pods
(Mix of plantation, indegionous and
replacement fruit trees as source)

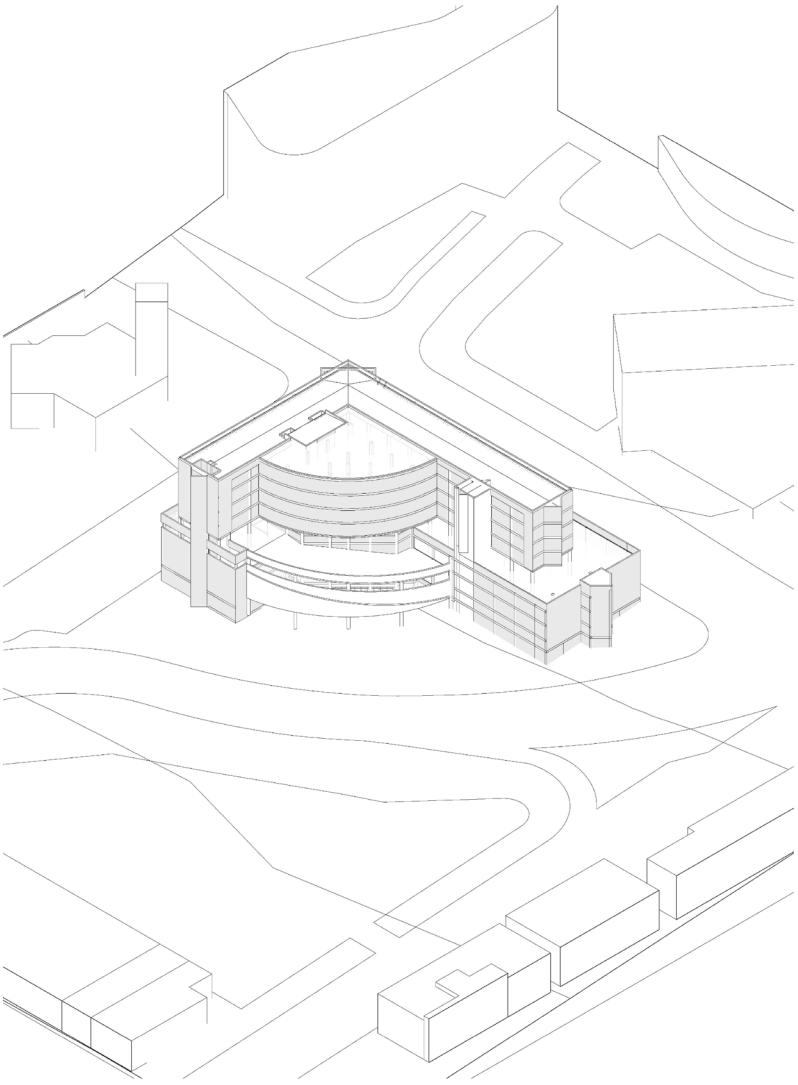


Figure 68:
Existing

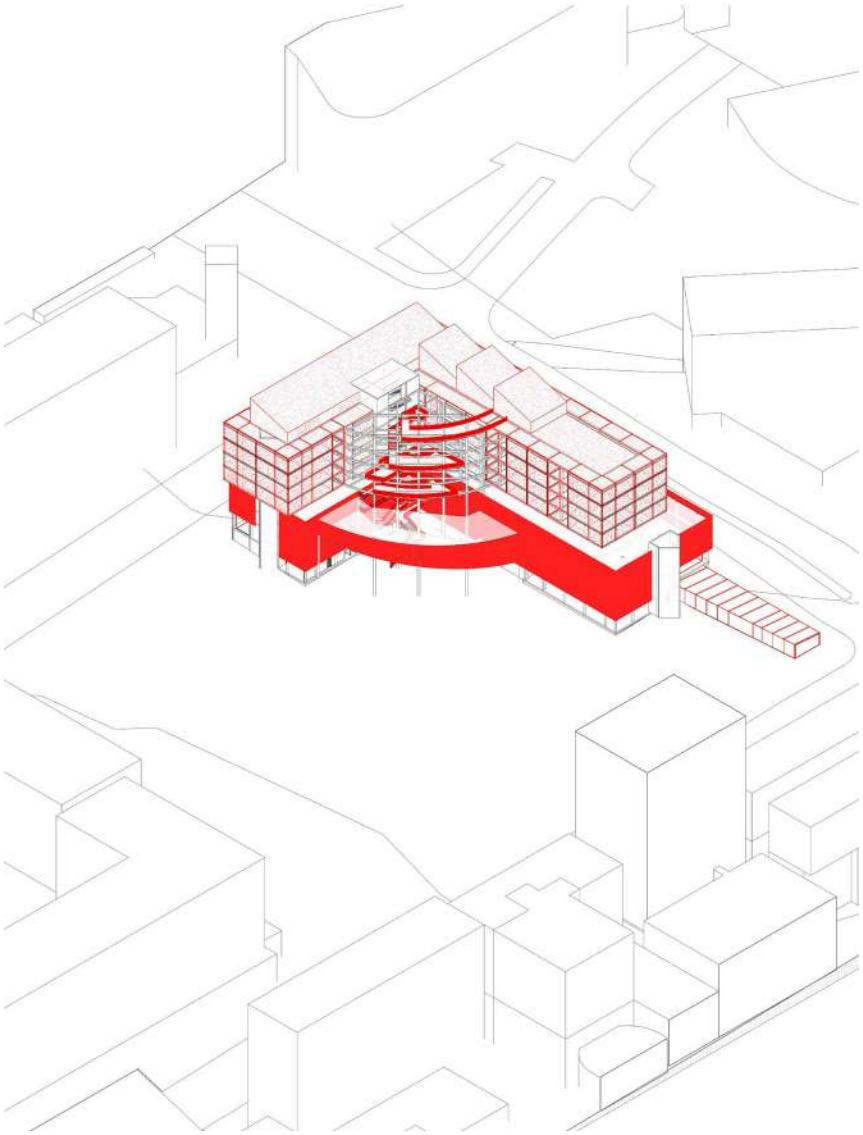


Figure 68:
Proposal.

Concluding Remarks

The opportunities that lie is disused large-scale concrete frame buildings is immense and the CBD of Johannesburg stands as testament to this. It also stands as an example for other cities that experience a similar decline, to use the it as an opportunity for transformation. In addition to this, the regeneration of the CBD of Johannesburg teaches us lessons about the challenges that exist in regeneration both at an urban and building level and the importance of working at both scales.

The proposal takes the model that has been developed in Johannesburg over the last 20 years and addresses the challenges that have emerged over this period. Challenges such as the lack of public space at the urban level, quality of the housing and the wholesale conversion to housing at the building level are confronted throughout the design process.

In addition, to this there is a contextualising of this model both at the urban and building level that looks to take advantage of opportunities that exist in the CBD of Nelspruit. The adaptation of the old highway to a type of high street that stiches a series of public spaces is one such example of embedding the model in its context. The program, which responds to the needs of the city and the development of the housing, which takes ques from how housing is happening in the large metro expand on this idea. But it perhaps through its materiality and the way it is made that the building is truly imbedded in its context. A way of making that interests itself in innovation, it’s context and it’s broader reaching implications such as challenging apartheid migratory patterns by bringing jobs to rural communities.

Figure 69: A way of making. This is a photo album box made in collaboration with a carver at Mezimbite forest centre and the exploration was trying to make in a new. A way of making that used making as the only tool. There were no drawings used to make this box.

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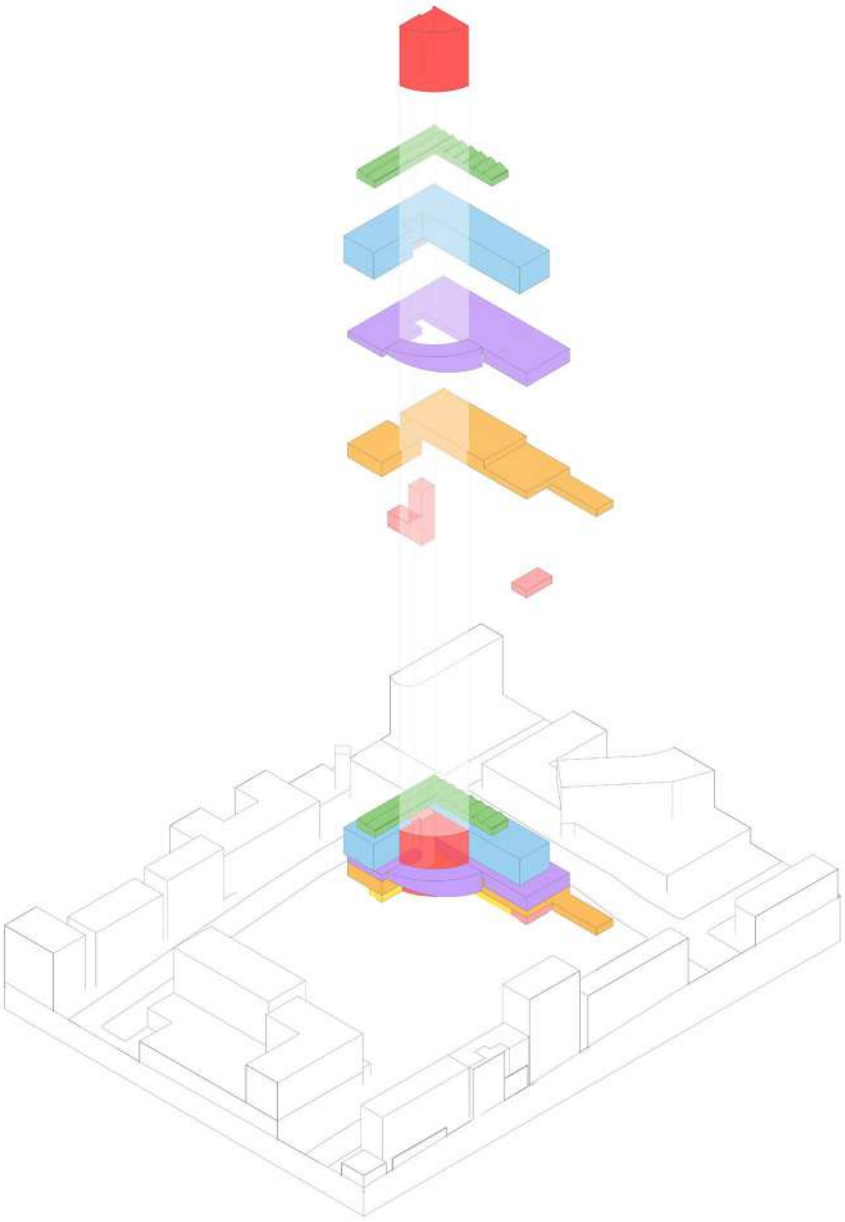
Part 4 - Final Drawings

Site plan
with the trees used on the park.
NTS

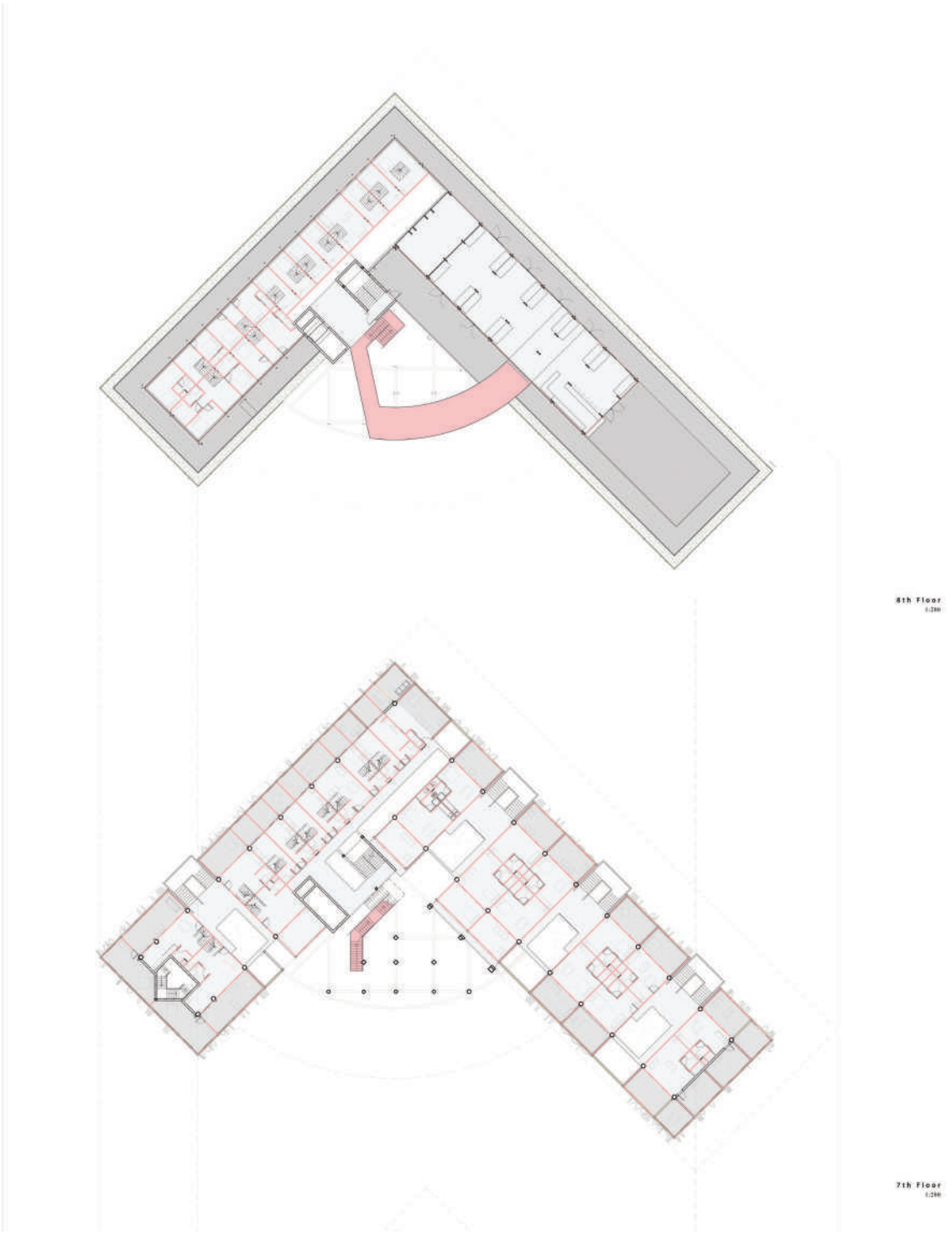


Building Program
NTS

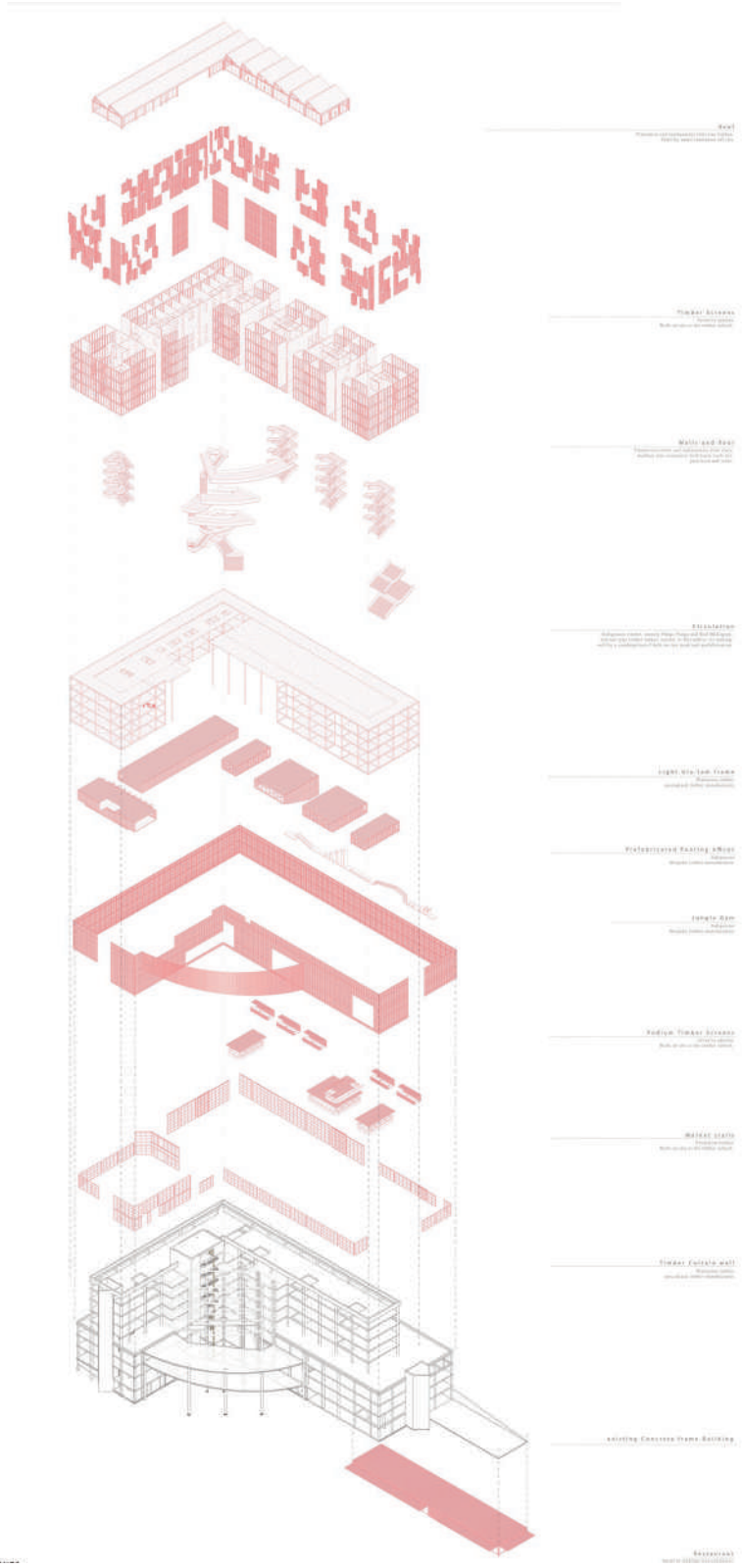
Floor Plans - (Lower Gorund and Upper ground)
NTS

Floor Plans - (1st and second Floor)
NTS

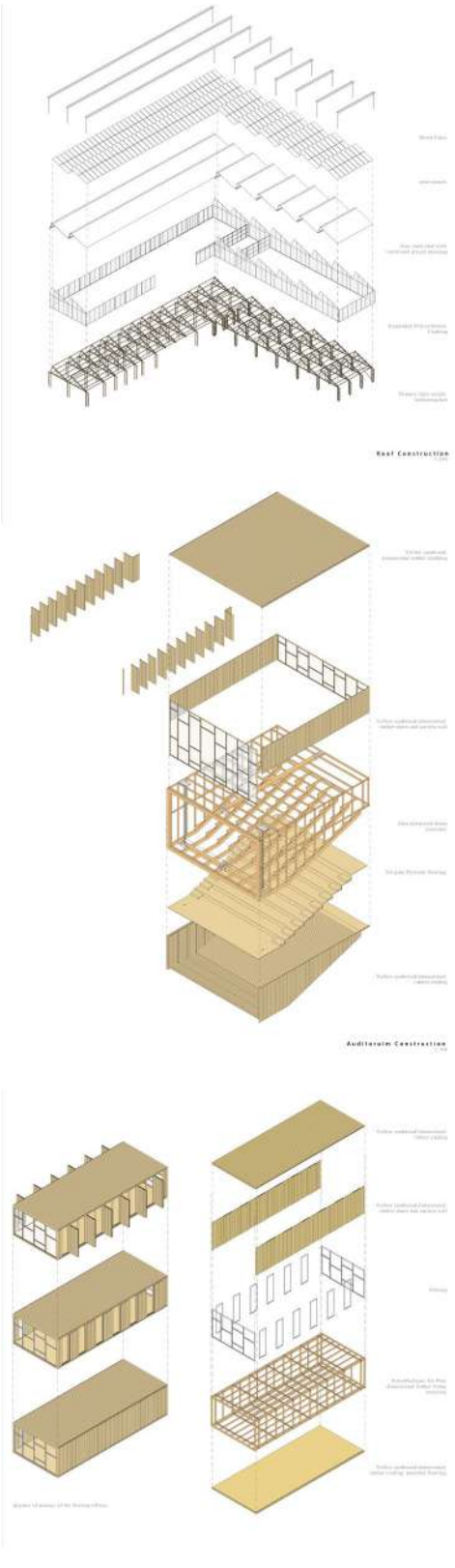
Floor Plans -
(Typical housing levels)



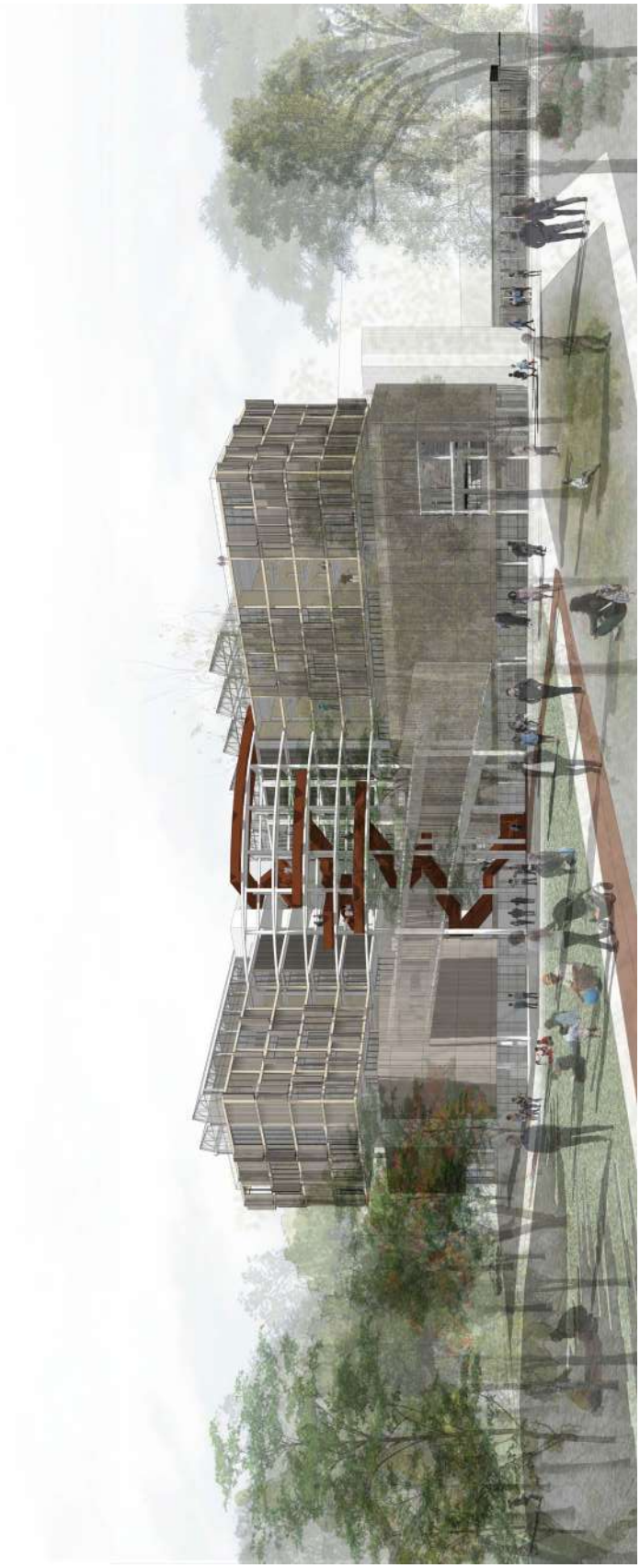
Floor Plans - (7th & 8th floor)



Exploded Axonmetric
- Material sourcing and manufacture



Exploded Axonmetric - Building Elements



Perspective from the park

Perspective from Bell Street.

Section through the outdoor shared spaces in the building

Section through the interior spaces in the building.

Perspective through public market space on upper ground floor.

Perspective of housing communal space.

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