Hazeldean

Regenerating a Neglected Landscape

A revived Identity and a new purpose

HAZELDEAN

Regenerating a Neglected Landscape

A revived identity and a new purpose.

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ABSTRACT

Tshwane is a city that is expanding eastwards. In the process, valuable cultural and ecological landscapes are being neglected. These unique landscapes, which contain critical environmental assets, could be made attractive to the general public and thus should be protected wherever possible. The expansion of the city is inevitable. While cities need to accommodate more people, they should also provide socially and culturally enriching outdoor spaces.

This study uses landscape architecture and regenerative theory to suggest ways of making post-industrial sites productive again. The Hazeldean dairy; a site of cultural significance, environmental assets and physical charm, is in danger of becoming a deteriorating and forgotten landscape. The hypothesis argues that that by adapting to current social, economic and sustainable requirements, a new and living landscape can be created. This would prevent Hazeldean from becoming a characterless buffer between surrounding property developments.

The design interventions proposed for the Hazeldean farm should enhance its historical and ecological value and attract visitors to the property for many different reasons, throughout the year. Ultimately, Hazeldean should endure as a physical and socially valuable asset within the rapidly expanding city of Tshwane.

ACKNOWLEDGEMENTS

Mom and dad, for your endless support.

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01 Introduction

1.1 PROLOGUE

“Look deep into nature and then you will understand everything better.”
Albert Einstein

The spreading city encroaches upon us, continually reminding us of an urban environment that we seek to escape, yet are forced to come to terms with. . We spend much of our lives in the city, deprived of the tranquillity and solace that nature provides. When the opportunity arises, we find ourselves travelling into the countryside to reconnect and revitalise our spirits. As civilization progresses, populations grow and cities become ever bigger, economic growth takes precedence over considerations of beauty and natural balance in the planning of the cities.

Hazeldean is one of these naturally beautiful places which has the potential to become a beacon of tranquillity in Tshwane’s’ busy urban landscape.

1.2 PROBLEM IN CONTEXT

Urbanization is defined as the movement of people from rural areas to the city (Delta Enviro, n.d.). This is happening in cities such as Pretoria. . The UN predicts that 60% of the world will be living in cities by 2030, and 70% by 2050 (WHO 2010).This progression suggests that cities like Pretoria may be hard-pressed to cope with the pressures that increasing urbanization will impose on its infrastructure.

Urbanization is the primary reason for urban sprawl and the uncontrollable encroachment of the city into what were once rural areas, resulting in degradation of natural spaces and ecosystems. Urban sprawl results from cities not having enough space to accommodate the large influx of people settling in an already overcrowded environment. (Delta Enviro, n.d.). Natural resources become strained as a result of poor planning schemes in response to population pressures regarding services and settlement space.

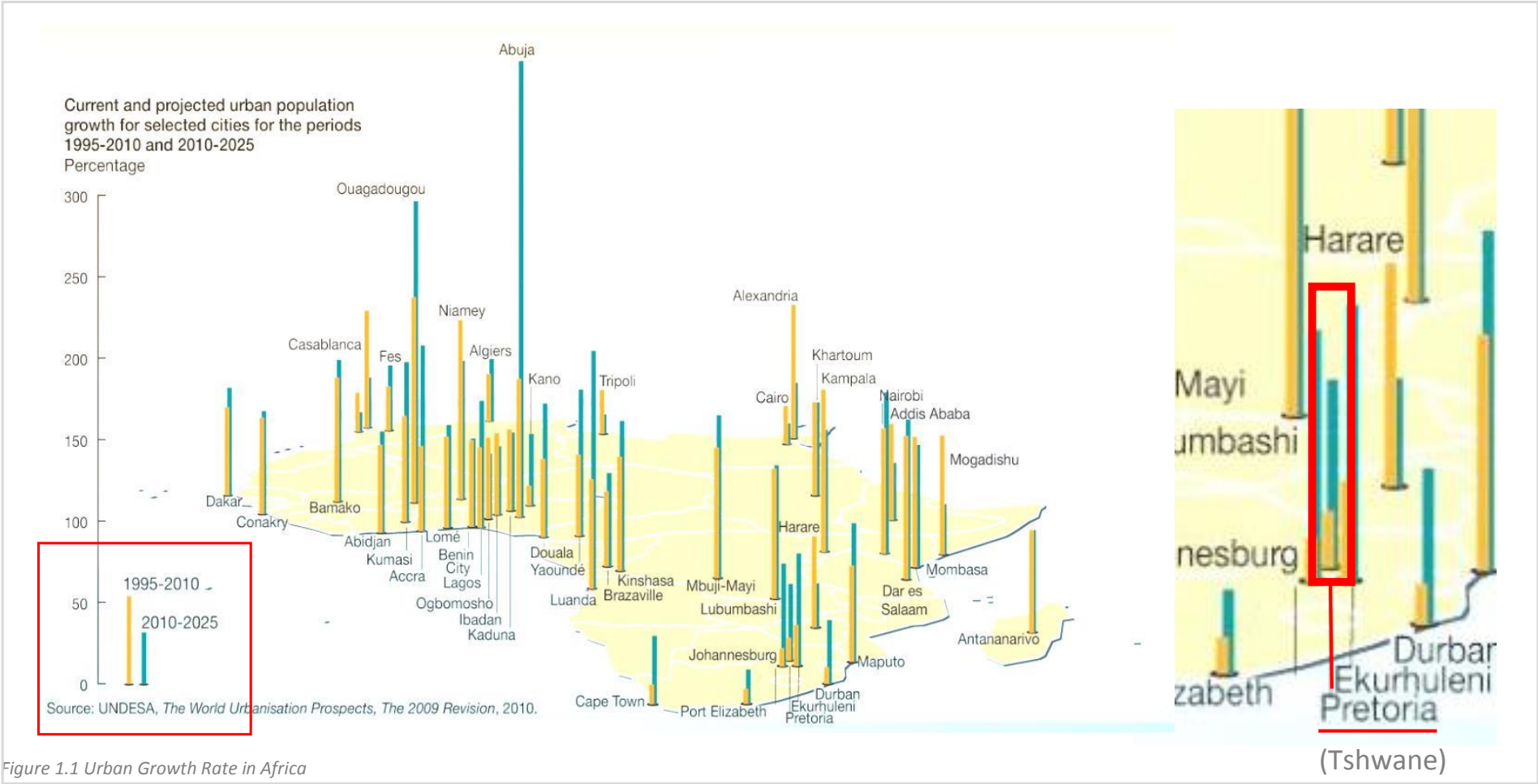


Figure 1.1 Urban Growth Rate in Africa

Figure. 1.1 indicates the growth of African cities and highlights their expansion from 2010 to 2025 in blue, whilst Figure 1.2 demonstrates Tshwanes' (Pretoria) previous growth from 1900 to 1999.

The predicted growth increase for Tshwane is more than double the growth experienced prior to 2010. This means that Pretoria may experience increased pressure on its natural spaces and ecological systems, assuming design and planning remain inadequate to deal with these issues. Natural space, endemic vegetation and the benefits given to us by these natural systems are irreplaceable once they have been destroyed. However, if these natural systems are protected and left intact, their function in providing energy, shelter, food, water and waste treatment can continue. Mimicking these assets by means of engineered processes are monetarily and environmentally costly and leads our cities further down the road of degeneration and resource exhaustion (Lyle 1994,38).

In a city where improvement is focused on income- increasing development, natural and designed landscapes are subverted because their potential to the city is not realised. The World Health Organisation argues that we should put "health at the heart of urban policy" (WHO 2010), while the United Nations Children Fund believes that "governments should put children at the heart of urban planning" (UNICEF 2012). If the integration of functional and recreational green space is placed at the heart of urban development, then the needs of both health and children will become priorities.

> "Urban green space not only improves the ecological and psychological environment of urban population but also uplifts economic conditions of the community. Green is the colour most restful for our eyes, presumably because we evolved in a predominantly green environment. Green spaces bring back certain harmony to the urban environment and therefore, play a vital social role in ceasing urban tensions" (Ahmed &Hassan 2003:¶2).

Nature is experienced by many people as an escape and place of recovery from the daily stresses of life. Stress is a common symptom faced by humankind and thus the need for recreational and relaxation spaces within the city is ever growing. However, urban sprawl and a decline in the quantity and quality of open space makes this form of relaxation harder to find. (Maas et al, 2006).

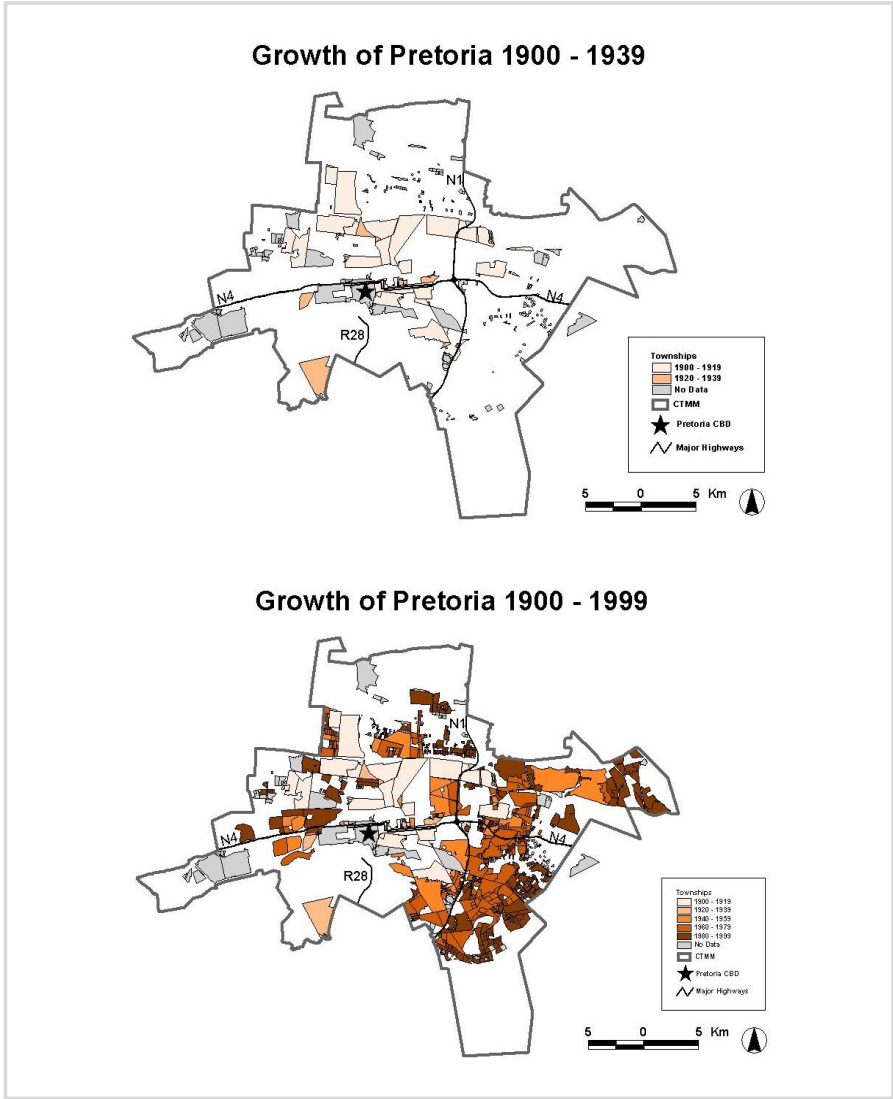


Figure 1.2 Urban Growth of Pretoria from 1900 to 1999

1.3 STUDY AREA

This study is focused on the Hazeldean precinct in Zwartkoppies, located to the east of the Tshwane CBD. Referring to Figure 1.3. The area highlighted in red demarcates the focus of this study while the larger outlined area indicates the whole expanse of the Hazeldean farm precinct.

The study area is related to Tshwane's contextual problem, which was discussed above. Hazeldean is situated on the periphery of extensive residential development and farmlands. This site is in danger of becoming a redundant and identity-less space between these two contrasting zones. Currently, the site is part of a large holding with no immediate surrounds; however there are plans to develop the areas surrounding the property which may result in the farm being suffocated by urban and suburban development .Hazeldean was specifically chosen as the area of study because of the threat posed by encroaching developments and the opportunity provided to recommend solutions that would uphold the cultural and ecological significance of the site.

Hazeldean is a historic dairy farm established in 1945 by Charles Malleson. The Hazeldean Dairy and the Sammy Marks Dairy both operated at the same time and were positioned on opposite sides of the Pienaarsrivier. These light industrial businesses are typical of many that exist on the eastern side of Tshwane. Rural towns like Zwartkoppies and Rayton, on the outskirts of Tshwane, were known for their agrarian holdings, dairy farms and cattle farms, which once supported the city with their produce. These commercial farmlands, created a buffer between farmland and city, however those boundaries are now blurring due to the urban sprawl, and the decline of the city's dependence on small farmers. Many, once large farms, are now being subdivided and converted into lodges and game parks. If urban sprawl continues, threshold spaces are required if rural, urban and suburban zones are to intersect harmoniously.

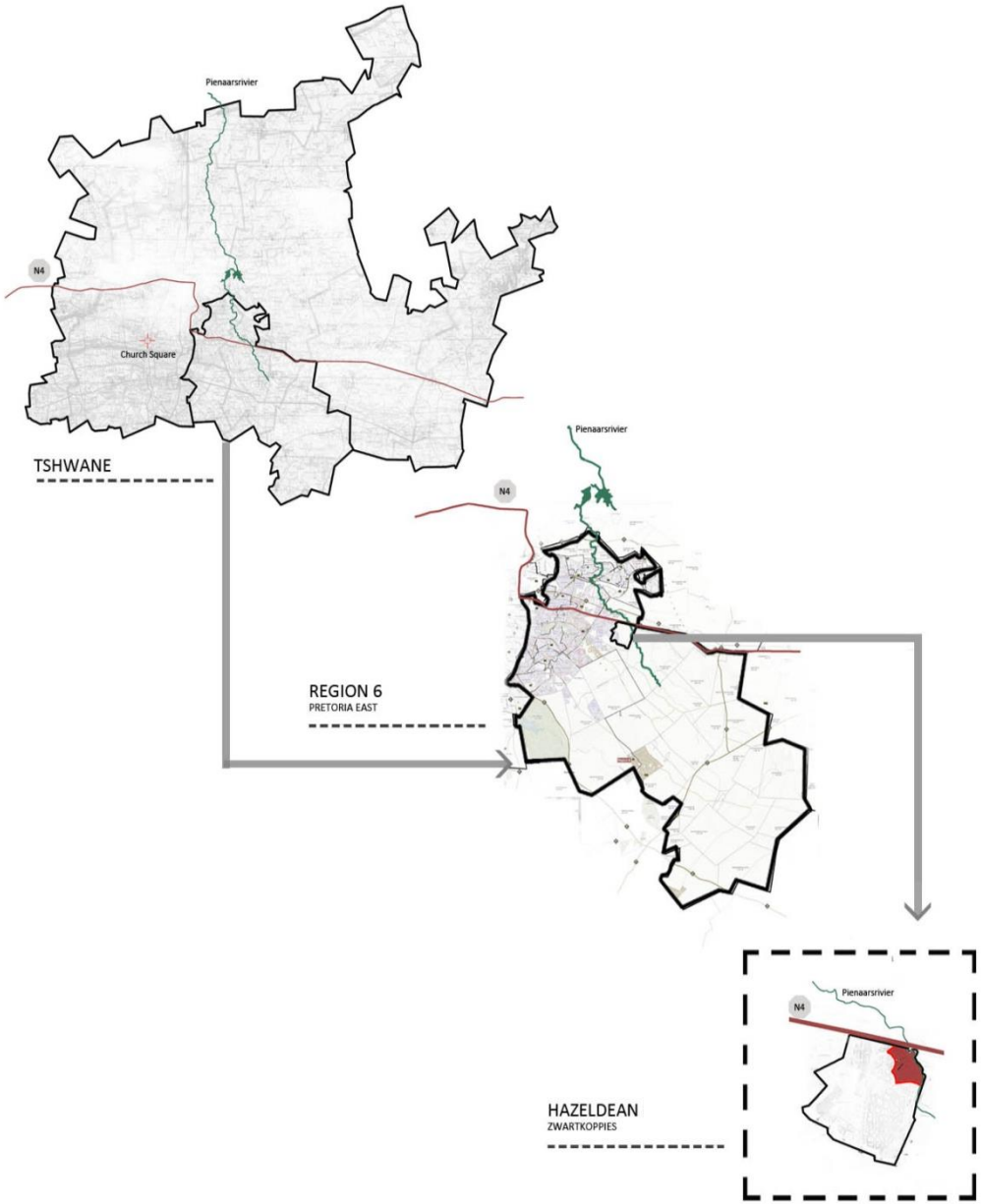


Figure 1.3 Site Location within Tshwane

Hazeldean, currently known as Nkunzi Milkyway, functions today as a milk processing factory only, because of surrounding developments, however, it will cease to operate in the near future. The site, with its inherent cultural heritage, charming character and environmental opportunities, will become a wasteland, without any economically productive use or distinction. The opportunity thus arises to propose a landscape- design solution that will revive and enhance the social potential of this place.

1.4 CLIENT

The Malleson family are considered as the client in this study. They are the land and dairy factory owners as well as the direct descendants of the farm's founder, Charles Malleson. Mindful of the site's history, the client has an interest in preserving its historic character. The family wishes to preserve its interest in the farm for future generations and would like to develop the site into a function venue that might generate income on the one hand and allow the public to experience the magical charm of Hazeldean, on the other.

1.5 PROBLEM STATEMENT

In the past, development in Tshwane has been insensitive to the potential for integrating natural landscapes into the city's layout. Promising landscapes have been displaced to the edges of developments and labeled as "open space" or "green buffers". These buffer landscapes usually hold little value for the public and are seen as redundant. Along with this phenomenon, there is a general disregard for designed landscapes to provide unique cultural places that are responsive to issues such as heritage, environment and the creation of engaging recreational space. There are only a few loved and designed landscapes in Tshwane, thus adding to the city's reputation of being unfriendly and somewhat unattractive in terms of its contrived outdoor spaces. Included among the city's stagnant landscapes are potentially attractive post-industrial sites which are being neglected and ignored, left to deteriorate and further degrade the environment. These sites come with stories and layers of meaning which can be creatively interpreted in order to design exciting new places. These places may then have the potential to become socially significant attractions.

1.6 HYPOTHESIS

By using landscape architecture as the departure point for the regeneration of post-industrial sites; edifying, healthy and living environments can be designed and created. This especially on sites which have heritage and environmental significance. This regeneration will contribute to a new and better landscape that is economically productive, environmentally sound and socially sustainable ensuring the sites' potential has been maximised and thus stops it from being consumed in the ever expanding city sprawl scenario.

1.7 RESEARCH QUESTONS

1. What condition is landscape left in as a result of urban sprawl in Pretoria?

2. What is the role of landscape architecture in dealing with the revival of significant post-industrial sites?

3. What are the current developmental threats and opportunities to the site?

4. What do regenerative- , living landscape- and green infrastructure theories propose for redesigning post-industrial sites so that they become attractive public places?

5. What do precedents suggest about preserving heritage, reviving post-industrial sites and creating enriching spaces?

1.8 SIGNIFICANCE OF STUDY

The issue of reviving and restoring neglected but potentially valuable landscapes is relevant to our enjoyment of living in our ever-expanding city. This tangible problem is not being dealt with efficiently in current planning proposals and as a result, the ecosystem is being degraded and perceptions of the city are being damaged. Uncontrolled expansion is disregarding the importance of carefully- designed green space in the city. By not integrating green spaces into urban developmental planning, these spaces are left open to vegetate in a way that brings no benefit to the public. If designed green space is to be made central to development, it will result in the city becoming more livable and thus more internationally competitive. (Mulcahey,2011). If natural systems are accommodated into city planning, not only will the environment remain sustainable and healthy, but we will all benefit socially and economically.

1.9 METHODOLOGY

As per Figure 1.4, this dissertation addresses the issue of regenerating post-industrial sites and landscapes that have stagnated as a result of poor planning and design strategies. The urban sprawl scenario, will be quantitatively researched by means of online data, graphs and articles. A review of the theoretical literature will help to frame the parameters within which landscape architecture can be used to provide design solutions to this problem.

Regular visits to the site will be made to analyse and record conditions there. Information will be gathered from interviews with parties who have knowledge of the physical workings of the site, from available documents, and from aerial photographs that will give clues to physical changes that the site has undergone through the years. A site analysis will indicate both the opportunities and constraints of the site. The heritage components of the site will be identified through interviews and documents sourced from the Malleson family. The National Heritage Act and relevant Charters will be reviewed to highlight regulations and guidelines associated with a site with cultural significance.

A review of regenerative theory, green infrastructure theory, and living landscape theory regarding the approach to post-industrial sites will be researched. These theories will be reviewed to support the design concept and design decisions.

Precedent studies of urban design, form, detail design and heritage response will be used to propose innovative design possibilities for the new Hazeldean landscape.

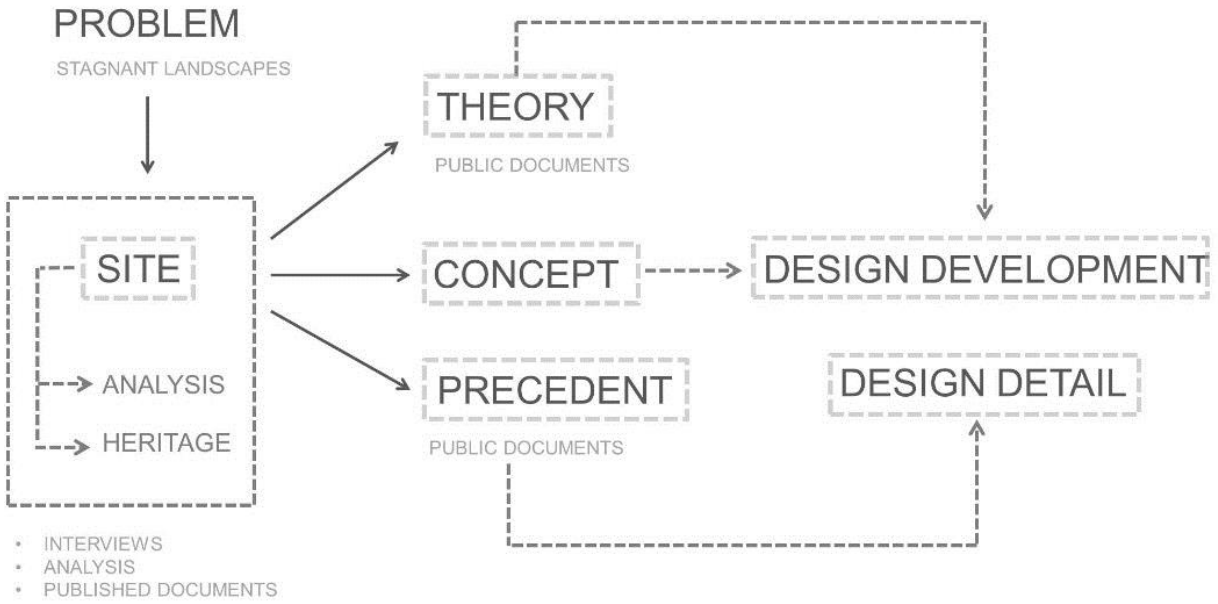


Figure 1.4 Methodology diagram

1.10 ASSUMPTIONS

In order for the design proposal to be suitable, the study relies on the assumption that the Hazeldean precinct will be developed. The study will question the development framework already proposed and then make suggestions as to how that framework can be integrated into a new design scheme for the area. Redevelopment has not yet begun and thus the assumption is that the current version of the master plan issued will not dramatically change, also that it will be implemented in the near future The likelihood of the surrounding development being constructed is high as the allocated section of Hazeldean has already been sold to developers who wish to capitalize on the economic potential of the area.

1.11 OUTLINE OF STUDY

Chapter 1- Introduction

Chapter 2- Site

Chapter 3- Theory

Chapter 4- Programme

Chapter 5- Precedent Studies

Chapter 6- Design development

Chapter 7- Detail Design

Chapter 8- Appendices

Chapter 9- References

1.12 DEFINITION OF TERMS

Natural landscape

The natural landscape and nature refer to places in a biological setting which contain limited disturbance by man. Natural landscape is dominated by vegetation that is not formally arranged and is not uncharacteristic of its context. In a natural setting or site dominated by nature, living systems are active and the site functions as it would naturally or as close to naturally as possible (Ferdinands, 1970).

Cultural significance

Cultural Significance refers to important historical, environmental, aesthetic, scientific, or spiritual attributes that are inherently linked to specific places. These attributes are deemed significant if they add value and insights for current and future generations. In this dissertation, the term refers to a site's historical, aesthetic and environmental attributes. (Australia ICOMOS Burra Charter, 1999:2).

Environmental significance

A place with environmental potential that contains natural vegetation as well as eco-systems and resources (such as water) that are crucial to the functioning of a landscape. These natural features usually have an effect on other systems, such as wildlife or natural regulation. These sites are environmentally significant and need to be looked after and improved upon to allow them to be revived and regenerated.

(Designed)Green space

These are pieces of land that have varying functions and usually consist of a large portion of vegetation in their ratio of soft to hard space. Green space allows for public access and offers a relief from the urban environment. . Green space provides recreational facilities to the public and helps to improve the quality of neighbourhoods, by enhancing the quality of life for its inhabitants (EPA, 2012).

02
Site

2.1 INTRODUCTION

In this chapter, a contextual description of the sprawl in the eastern extensions of Pretoria will be given. A biophysical site and heritage analysis of Hazeldean with its attributes will be presented, as well as a discussion of the proposed framework. The synthesis of the analysis will reveal the constraints of and opportunities for the site.

2.2 URBAN EXPANSION IN PRETORIA

The industrial era, rise of the automotive industry and the post WW II economic boom were the initial drivers of urbanization globally. Many people relocated to cities attracted by the promise of jobs, riches, opportunities and services that rural areas failed to provide. In South Africa, particularly after the end of the apartheid era ,black South Africans were granted the opportunity to move into cities freely, for the same reasons given above (Internet Geography, 2008) .This era also resulted in an increased dependency on the automobile and other forms of motorized transport. These advances lead to more roads and development took place along routes easily accessible for motor vehicles. This trend holds true even today: transport corridors are catalysts for developmental growth. This may be the reason why Tshwane and other South African cities are vehicle-orientated with little regard for pedestrians and their outdoor experience. The lack of concern for the interests of pedestrians is closely related to the neglect of urban green space and the quality of its design. Those who gain most from the cities remain those travelling in motorized transport, furthermore, the increase of vehicle numbers in the city leads to more road infrastructure which makes it necessary for towns and cities to expand.. This growing trend, the result of short sighted planning, is the reason for the many environmental issues faced by urban landscape. The escalating development of the city spills over into rural areas, farm lands and open spaces found on the peripheries of the city. These newly occupied areas cause damage to vegetation and hydrological systems which result in pollution and soil degradation .Figure 2.1 illustrates the valuable open space lost to development. Ideally these places should have been protected.

It is well known that urban green space plays an important role in the social and natural sustainability of a city. Nevertheless countless of green spaces have been lost to the process of urban sprawl (Zain, n.d.). Green field sites are being depleted in order to make room for residential and commercial development, resulting in a shortage of the valuable green space that alleviates conditions in our often-harsh urban environments. The supply of adequate urban green space materially improves the quality of life of city dwellers and also provides positive environmental effects in the form of air cleansing, cooling, biodiversity and natural world experiences (Groenewegen et al, 2006). Urban sprawl is a predicament faced by many South African cities, and provides abundant opportunity for change and improvement. This means that cities such as Pretoria could heighten the urban experience by designing green spaces- that makes up for the deprivations by city operations.

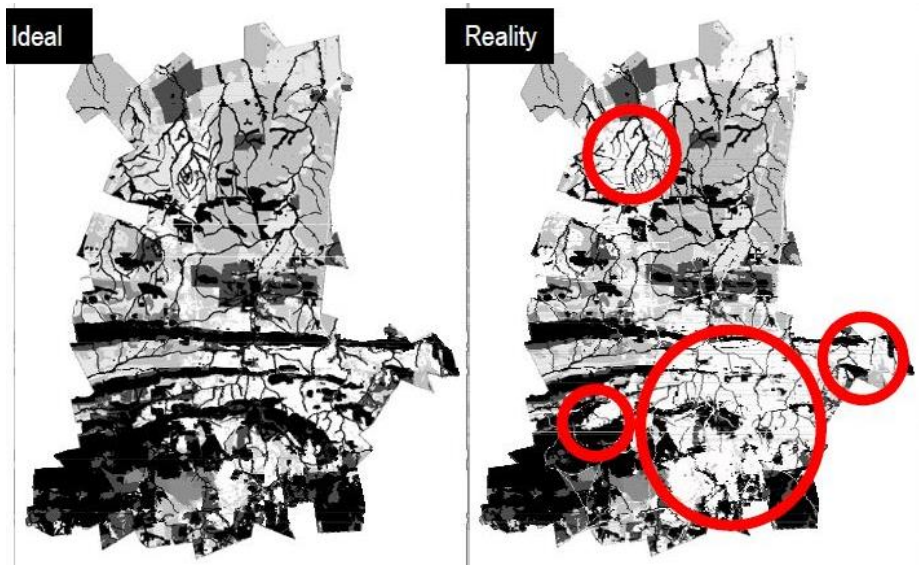
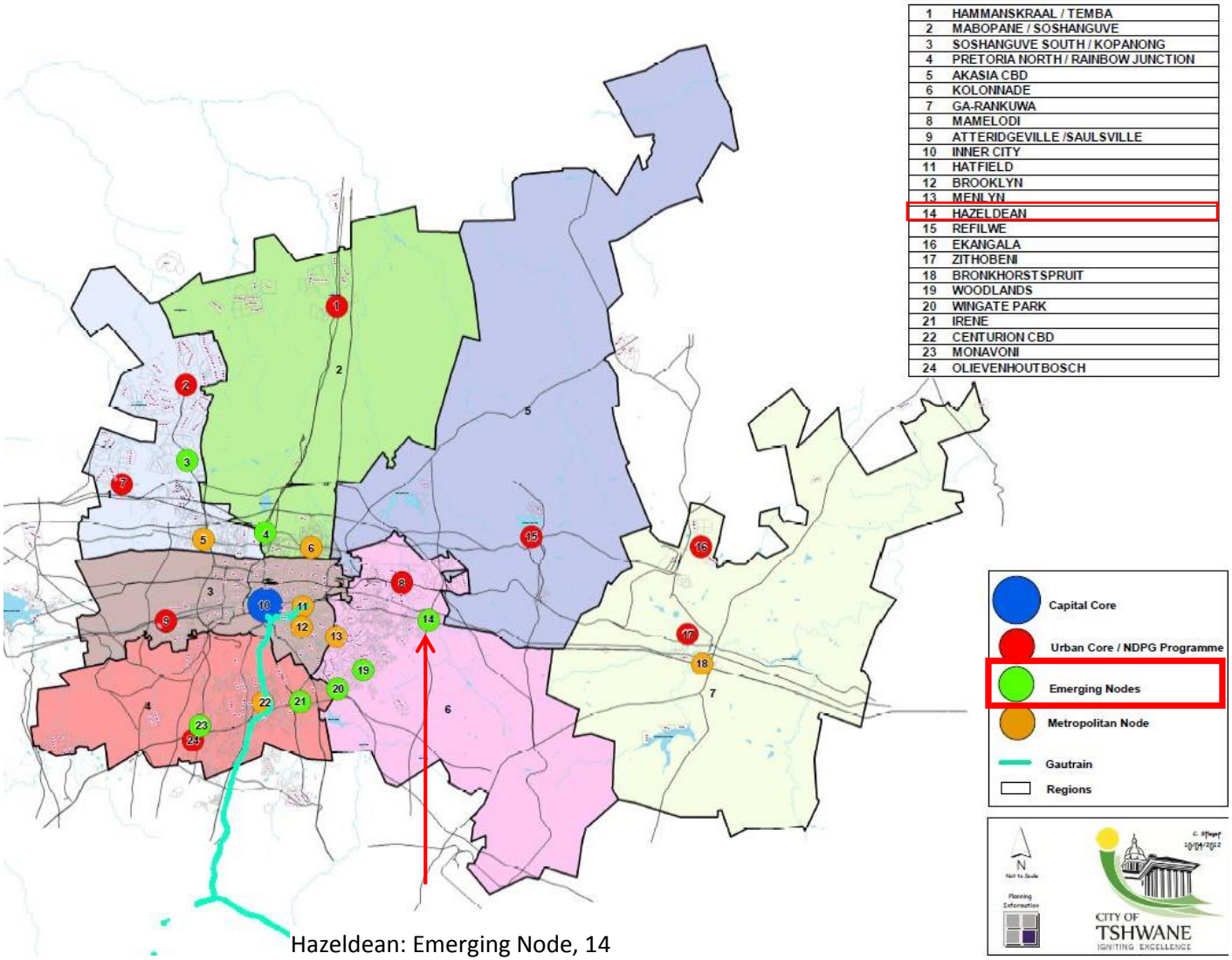


Figure 2.1 Loss of Valuable Open Space to Urban Development

2.3 SITE AND CONTEXT

2.3.1 Context

Referring to Figure 2.2, it can be observed that Hazeldean is located in Tshwane region 6, to the east of the capital core. Figure 2.2 indicates that Hazeldean, node 14, is an emerging node with developmental plans for its near future. Figure 2.3 illustrates that the site is on the periphery of urban and suburban development to its west, and a large expanse of farmland and plots to its east. The Tshwane regional spatial development framework for region 6, indicates that Hazeldean and the adjacent plots are on the border of the urban edge and zoned for mixed use. This mixed use zone is neighboured by nature reserves and open space on its eastern side, inviting the question of what the transitional node between these two contrasting zones will be. Figure 2.4 stipulates the programmatic requirements and zoning parameters acceptable for the Hazeldean framework development and has thus guided the appointed development company to model a suitable framework in accordance with the Tshwane Regional Spatial Development Framework. The zones stipulated in the government documents are important to adhere to as non-compliance leads to non- development. The outlined area of Hazeldean farm, seen in Figure 2.6, will become the research site where the design intervention will be proposed at a later stage in the study.



Hazeldean: Emerging Node, 14

Figure 2 2 Tshwane Nodes Map

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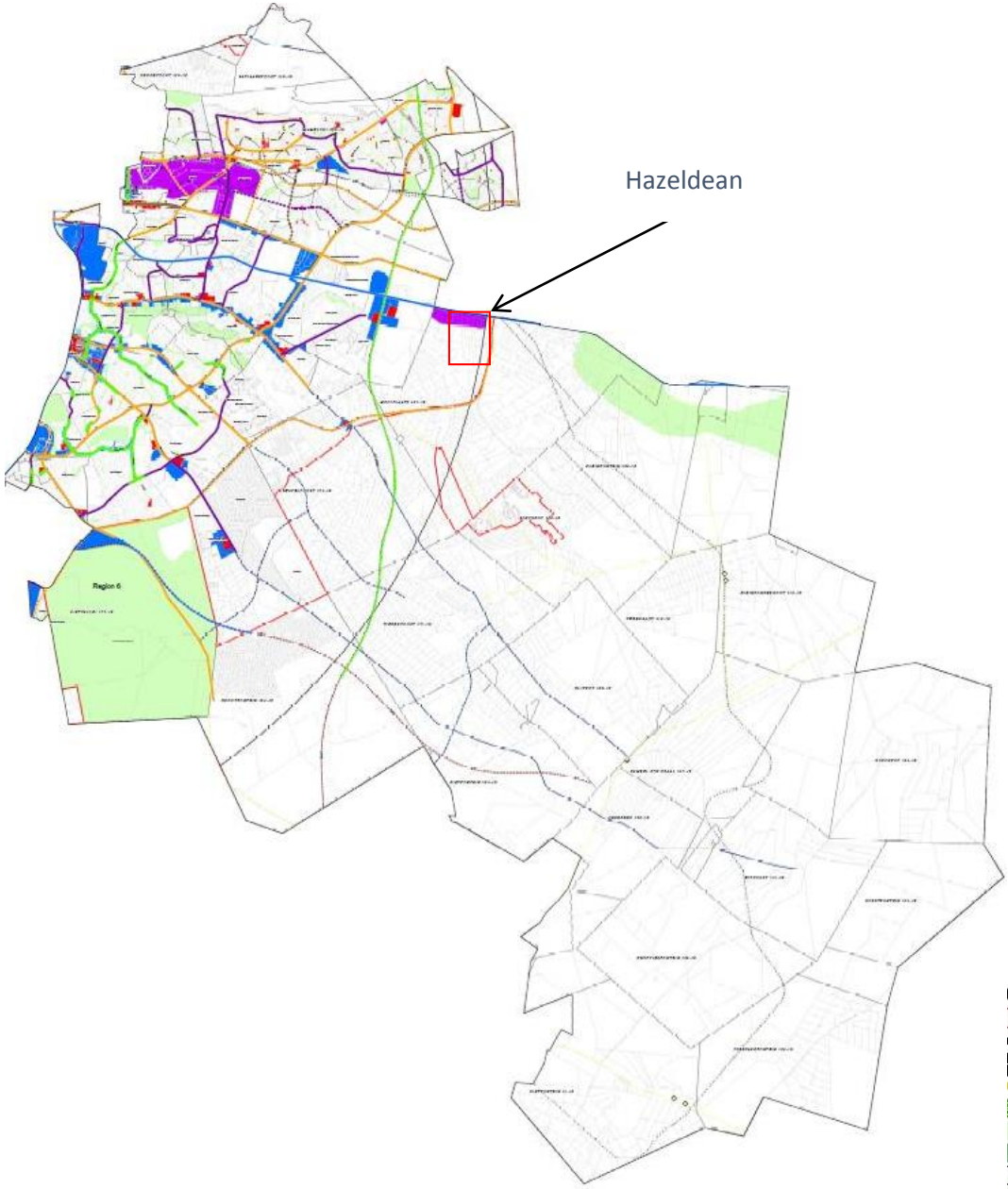


Figure 2 3 Hazeldean on the Edge between Urban and Rural.

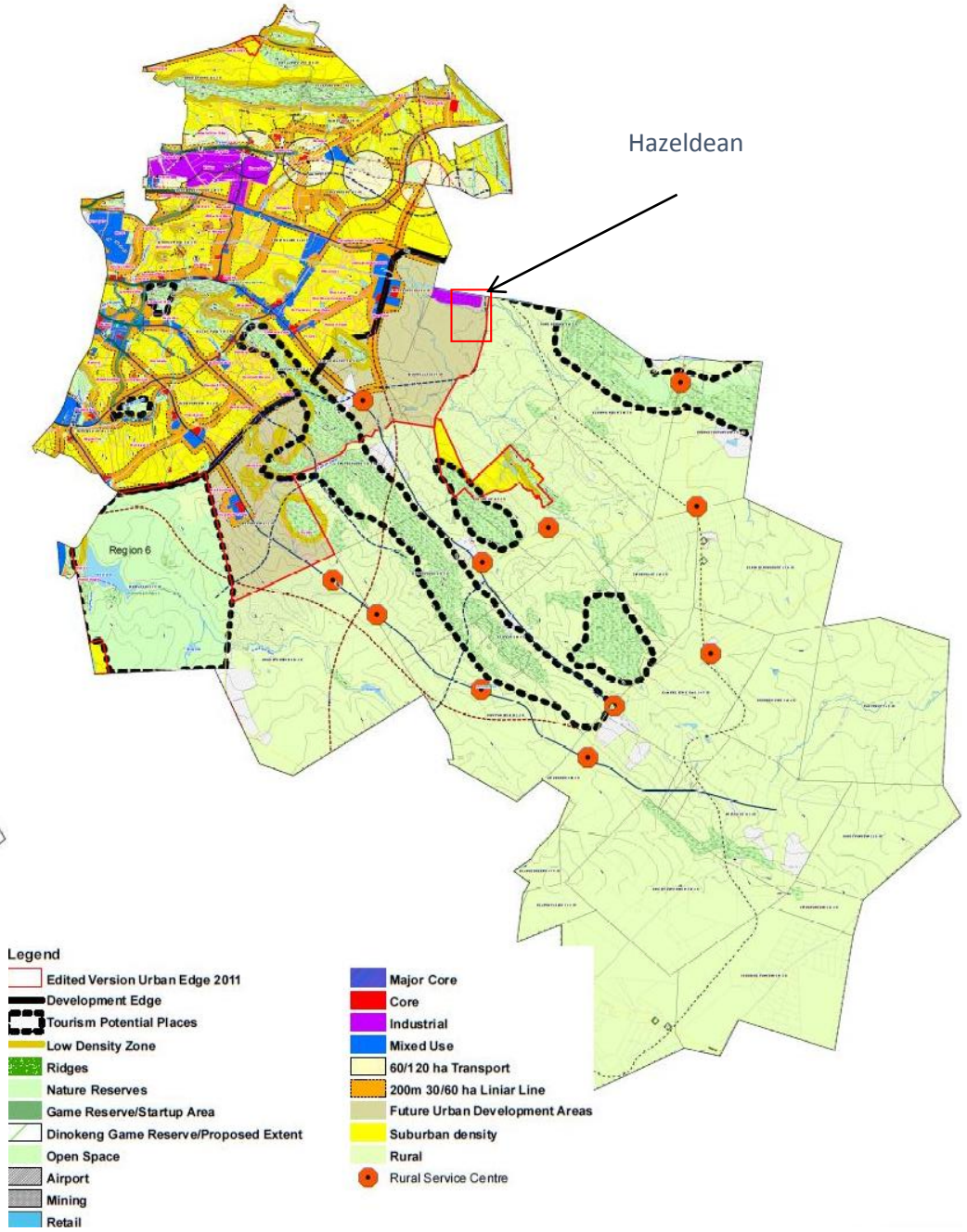


Figure 2 4 Hazeldean- Future Urban Development Zone

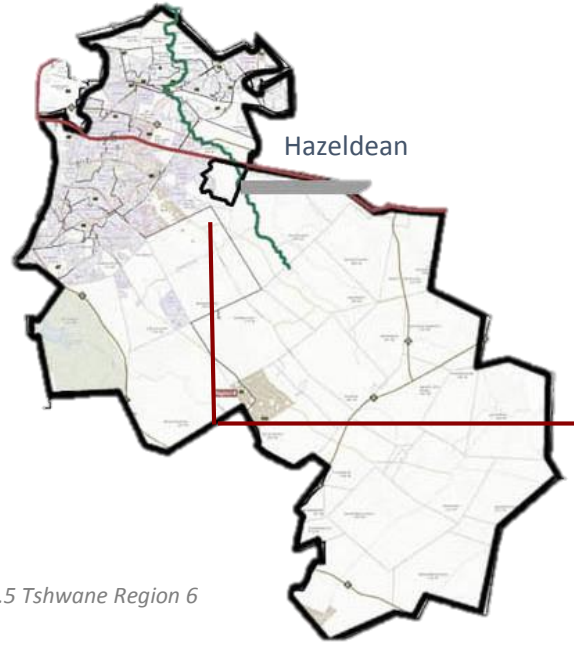


Figure 2.5 Tshwane Region 6

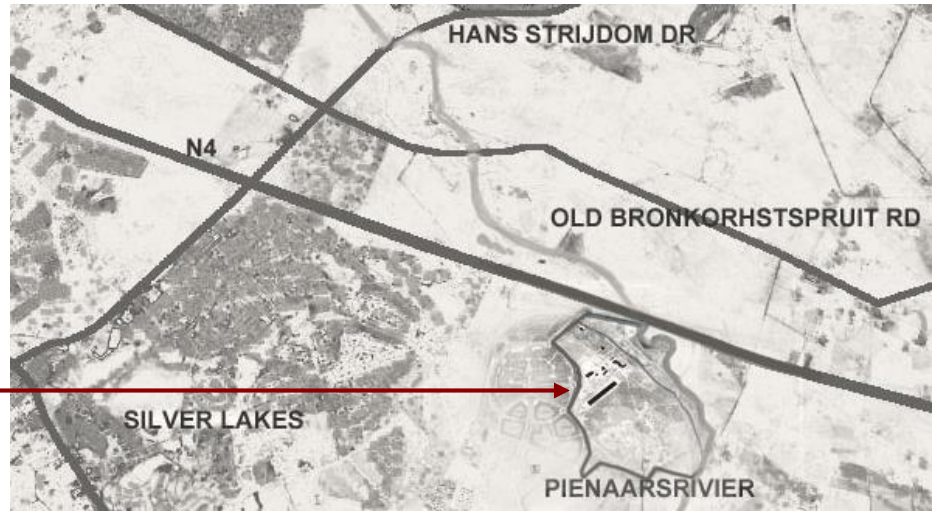


Figure 2 6 Site in Context

Figure 2 7 Future Buildings on Site when the factory shuts down

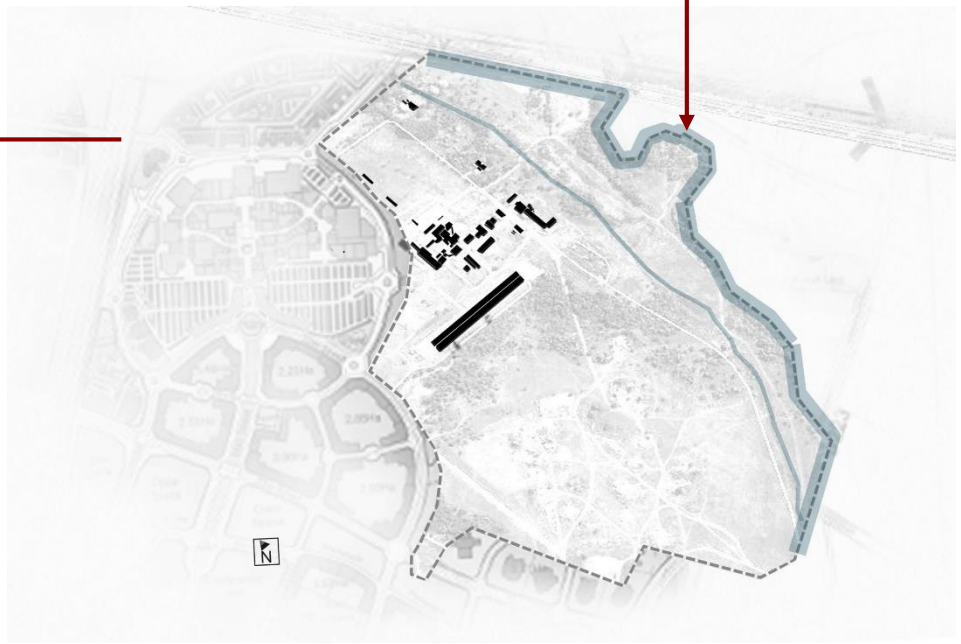


Figure 2 8 Current Buildings on Site

2.4 DEVELOPMENT THREATS TO THE SITE

Because of urban expansion in Tshwane, the chosen site is directly impacted by urban sprawl and its negative environmental and social implications. The future plan is for Hazeldean to be converted into a suburban “city”, within the larger city. The development titled “Full Circle Living” by the Sable and Abland developers, is to include medium to high income residential development, schools, colleges, a hospital, shopping mall, business parks, hotels, churches, community centres and mixed use zones for commercial purposes and warehousing (Figure 2.11). There is also a planned PWV 17 Highway that is to run through the precinct which will provide direct access to the site. The ‘Full Circle Living’ development will only begin once the PWV 17 highway has been constructed (Figure 2.10). As previously mentioned, developments along main transport corridors initiates urban sprawl. The series of highways planned around Tshwane will encourage further sprawl because of the investment opportunities that these motorways provide. The development boundary is generally not overly strict, thus allowing urban development to gradually spread without forceful constraint. The ‘Full Circle Living’ development will be referred to as FCL.1 in order to distinguish between the existing proposal and the modifications to the plan that will be made later in the study .The FCL.1 framework allows Hazeldean to be partitioned by vehicular roads, making the area a miniature duplicate of the city and the issues which come with urbanisation. This development, like many others, might have negative environmental effects including; runoff, ground compaction, air pollution, traffic and loss of biodiversity.

The area shaded in black on Figure 2.9, illustrates the perimeter of the Hazeldean historic farmstead which will not be sold off to development, but will remain in the ownership of the Malleson-family. This is the area where the historical dairy farm buildings, current operating factory and Pienaarsrivier are located. There is at present, no differentiation between this portion of the farm (study site) and the rest of the Hazeldean farm however, when the development is completed, the study site will become a left over space with deteriorating buildings and no public energy. This historic farmstead is in danger of becoming a fenced- off private area, which will prevent people from experience the charm of this place with its cultural heritage. The planning of the FCL.1 development will not necessarily demolish the old dairy buildings or rid the area of all that makes it appealing. The threat, rather, is that the site’s potential within the context of the city will not be optimized if it is not to be integrated with the new development in some way. What becomes important, is that the site is cohesive with its adjacencies, but still remains unique and true to its historical character.

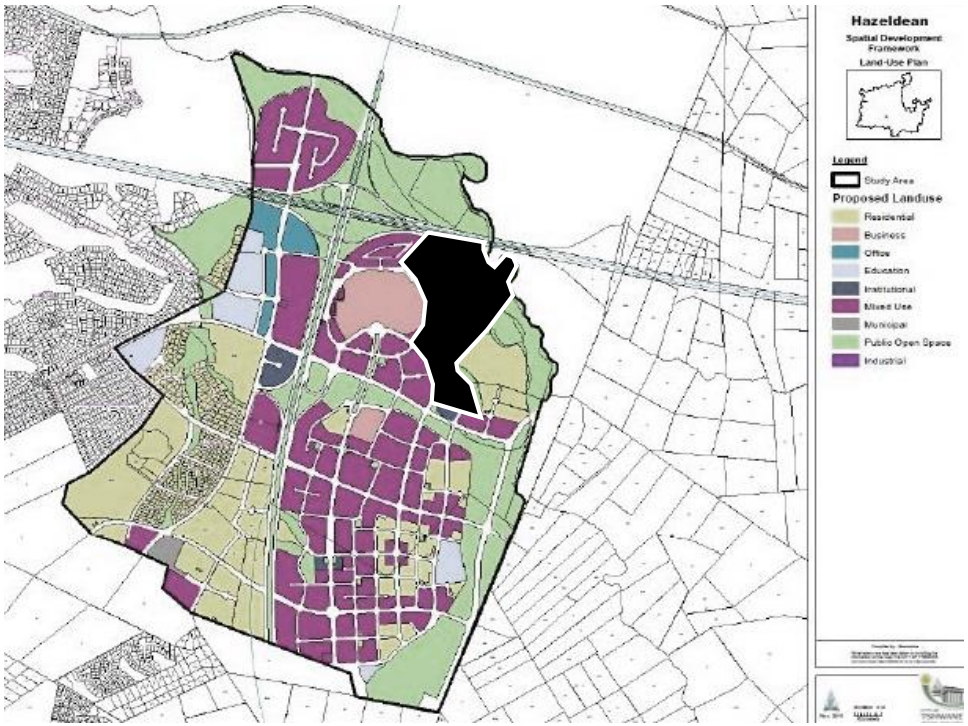


Figure 2 9 Hazeldean Nodal Development

The framework proposal issued by Sable Homes and co., is based on the Tshwane Spatial Development Framework and is thus in accordance with the governmental requirements for the precinct (Figure 2.10 and 2.11). According to the Hazeldean development website (www.hazeldeandevelopment.co.za), the developers envision the 900 hectare nodal development as a park-like and eco-friendly environment for the young and old. It is aimed at being a “self-sufficient live, learn, grow, work and play precinct” that offers residents all they need to live on their doorsteps, without the hassle of daily commuting to these places.

According to the Tshwane Spatial development Framework for the Hazeldean node, the framework plan should have taken special note of the design of public and private open space, environmentally sensitive areas, agricultural and commercial farming operations, spatial flow and a sense of place. Both the vision and the requirements of Tshwane offer optimism that this new development, will be inclined towards sustainability, good place making characteristics and a general sense of responsibly designed landscape.

Figure 2 10 Position of PWV17 Highway

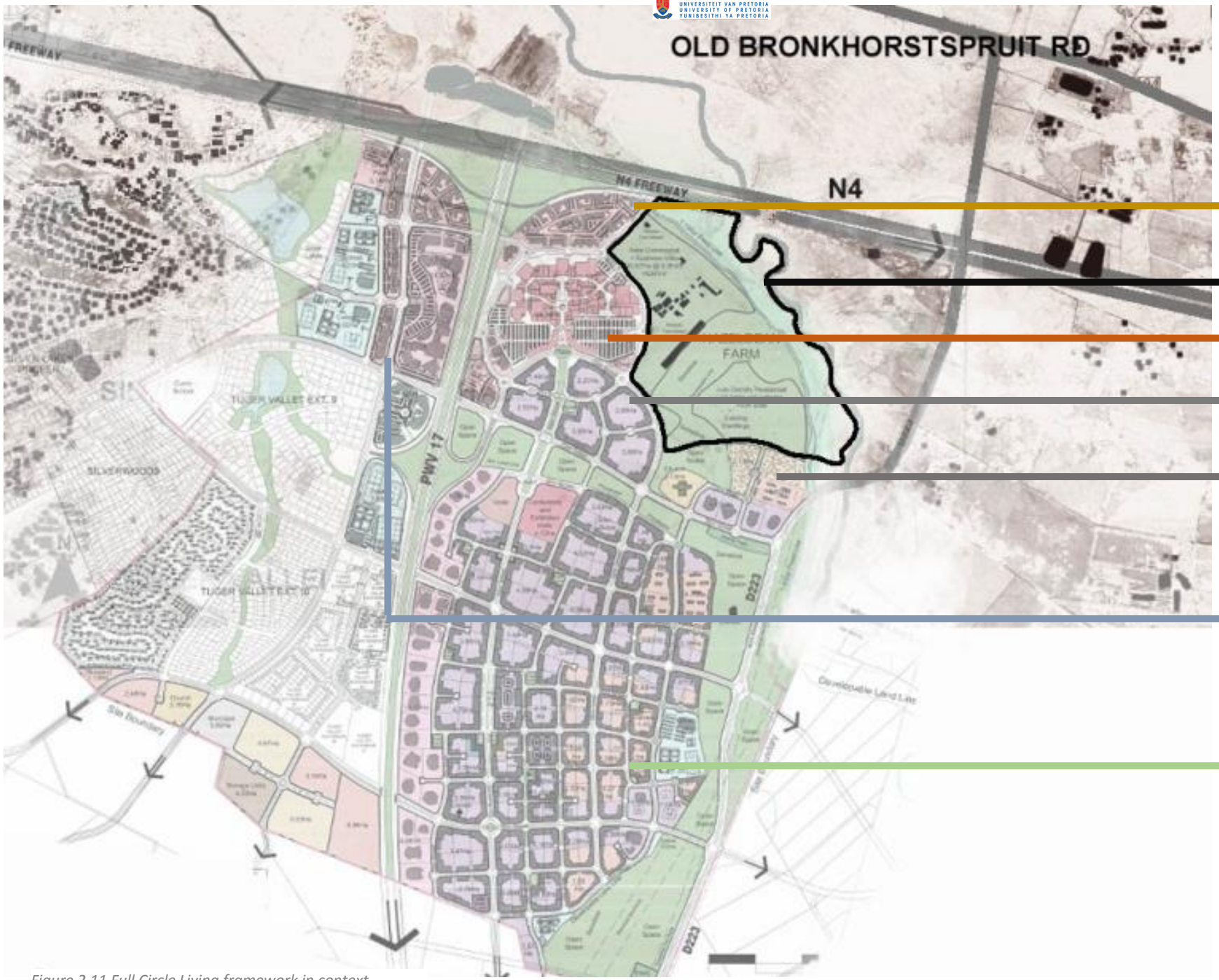


Figure 2 11 Full Circle Living framework in context

2.5 FRAMEWORK

2.5.1 Framework critique

Green space

> "Research shows that the percentage of green space in people's living environment has a positive association with the perceived general health of residents. Green space seems to be more than just a luxury and consequently the development of green space should be allocated a more central position in spatial planning policy" (Groenewegen et al, 2006:¶4).

The FCL.1 plan could possibly be adapted more to this thinking in order to make green space functionally central and with a purpose greater than that of simply allowing for it in good ethos during planning. It is assumed that the green space allocated will serve as an inactive buffer on the edge of the development as the plan gives no indication as to what the character of the spaces might be. This allocation of green space is superficial and meaningless. On a more positive note, the framework does provide for a reasonable amount of green space and considers environmentally sensitive areas. Refer to Figures. 2.12 and 2.13.

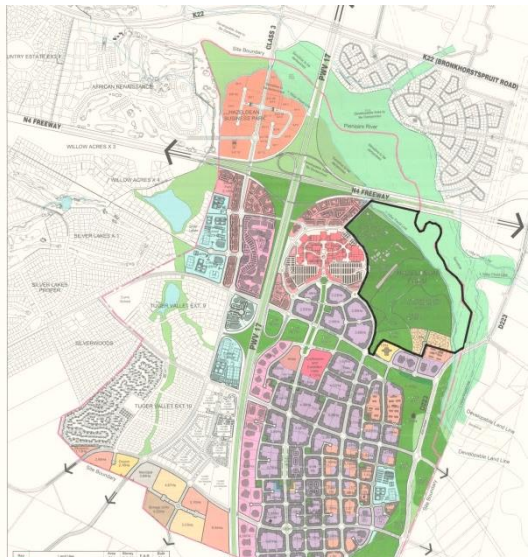


Figure 2.12 Open Space Buffer

Figure 2.13 Sensitive undevelopable areas

Pedestrian environment and place making

In figure 2.14, the confines of the framework allow for a pedestrian to walk from one end to the other within 15 minutes. This allows opportunities in the pedestrian environment of the precinct, so that the users might enjoy a pleasant outdoor experience. According to the principles of New Urbanism, walkability is a crucial part of contemporary development and there should thus be a strong focus on walkability within the proposal. If there is a lack of well-designed pedestrian routes, this development will become nothing more than a miniature of the unpleasant city environment we are already faced with.

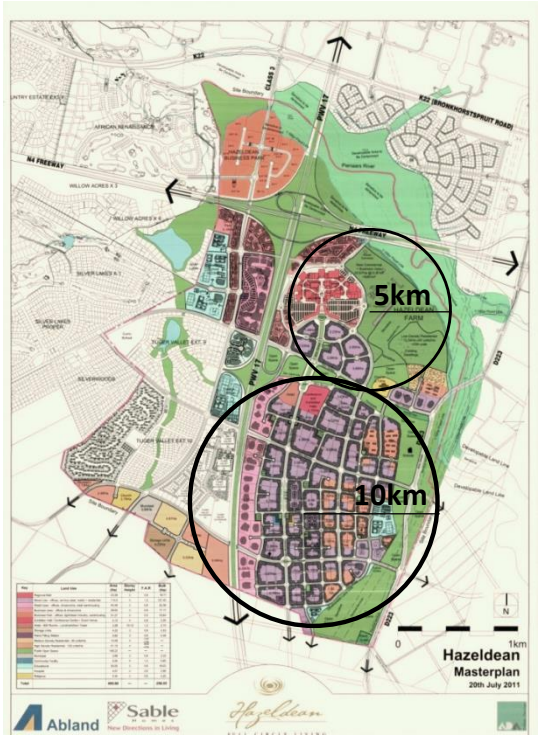


Figure 2.14 Walkability Plan

Building and space arrangement

It is apparent that the buildings are arranged around courtyard spaces which have the potential to become semi-private green spaces in the centre of each block. As can be seen in Figure 2.15, demarcations have been made on the edges of some blocks for public squares. This provision is a step in the right direction however, there are areas in the framework where linear parks are simultaneously labelled as parking ports. This seems to indicate the true nature of these green spaces. There is a vast amount of allocated open space in the development, but there is no indication that these spaces will be properly designed to exploit the valuable qualities of the site. If these spaces are not intended to add any real value or identity to the precinct, then what is the purpose of their existence in the design?

Figure 2 .15 Building Arrangement

Diverse land uses

The FCL.1 framework comprises many diverse activities, which allow the site to become a complete living environment -as the vision states. Referring to Figure 2.16 however, one notes that the building facades are not positioned to look onto the site, thus the site becomes an ostracised edge piece. The study site is large and has the potential to become integrated with the adjacent mall, icon hotel, residential plots and mixed use holdings in a significant way. The dairy is the heart of the Hazeldean precinct, and is the only feature which makes it unique. It should therefore be distinguished as such and developed into an asset for the whole precinct.

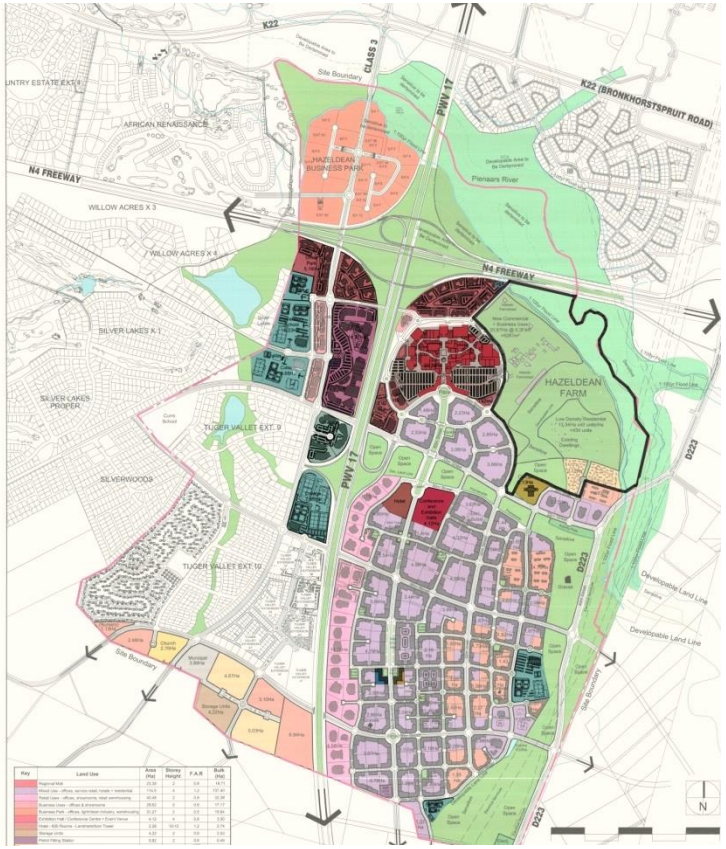


Figure 2.16 Buildings backs toward of the site

2.5.2 Framework Synthesis

A “self-sufficient live, learn, grow, work and play precinct” is a healthy enough vision when read together with the Tshwane development framework plan, which requires that consideration be given to well-designed spaces and sustainability, among other things. The vision imagery alongside, reinforces that impression in certain spaces within the development. The aesthetic seems natural-like and soft, although the framework doesn’t give any clues as to where spaces like this would occur. If these vision images are a true reflection of what is to come, then there is potential for this development to be an attractive and unique one, even more so if dairy is developed to become the central distinguishing element of the precinct.

As with most designs there is always room for improvement. The development covers an area of 900 hectares and thus the storm water expected in the area is immense. The topography of the land directs large volumes of water toward the study site, and onwards downslope toward the Pienaarsrivier. There needs thus to be a storm water management strategy, where water is slowed and detained to control the flow. This permits a green-blue landscape as is hinted in Figures 2.17 and 2.18. Taking this into account, the allocated green space is placed superficially and could be shifted to a central position in the development to perform the dual function of storm water management and social recreational space. Park spaces could be centralised and create a legible progression of movement through the suburban development. By placing these green spaces centrally within the development, the issue of irrelevant edge buffers is eliminated.

There is an opportunity for the surrounding buildings to open up onto it so as to ensure the spaces form part of the same whole. The mall encourages diverse users, while the icon hotel will bring in tourists. The mixed use zone allows for private residences owners to enjoy a possible public park-like environment on the threshold to the site. The dairy and heritage buildings create an appeal to Hazeldean; therefore it is important that the farmstead remains the soul of the precinct. It should not be ignored as it is in the FCL.1 plan.

Figure 2.17.1 Full Circle Living Vision 1

Figure 2.17.1 Full Circle Living Vision 2

2.6 HERITAGE

2.6.1 Dairy History

For many young people, the notion of fresh milk delivered to one's doorstep in the morning seems an archaic but fascinating practice from the distant past. Yet it wasn't that long ago that bottles of milk delivered by the milkman was the norm across South Africa. In the late 19th century, milk was "routinely scooped directly from the farmer's churn into jugs that customers would leave on their doorsteps" (Collective weekly, n.d.:¶1). Later, dairy farmers imprinted their logos on glass bottles which were delivered to customers' doors steps before the empty bottle was returned for another delivery trip the following day. The embossed glass bottles made it easy for the milkmen colleting empty bottles to identify the dairy where the milk was produced (Collective weekly, n.d). Though the days of glass bottle delivery are over, South Africa's dairy industry today is losing milk producers because of the sector's reduced viability: small dairy farms are becoming a distant memory. These producers are no longer able to cover their costs, resulting in a 33% decrease in farms over the last 4 years. (Singh, 2013)

Hazeldean dairy is one of the small producers which has lived through the era of glass milk bottles, doorstep delivery by milkmen; milk produced for sale in waxed paper cartons and more recently, delivery to bulk milk processors who deliver plastic bottles of milk to supermarkets. This is a legacy that should be preserved and supported so that the memory of small dairy farming is not be forgotten.

In all of Tshwane, there are only two well-known and regularly- visited dairies that have been transformed into cultural heritage landscapes in order to preserve the past - Irene Farm Dairy and the Sammy Marks Dairy, both of which have unique characteristics which remind us of the small dairy farm legacy. Hazeldean, with its singular character, should also be preserved and celebrated so that it becomes an iconic landmark on the local scene and an asset to the collection of South African sites with heritage around the area (Figure 2.25)

Figure 2.19, 2.20 and 2.21 illustrate the character of the buildings on the three small dairies farms in Tshwane mentioned above.

Figure 2.18 Delivered Milk

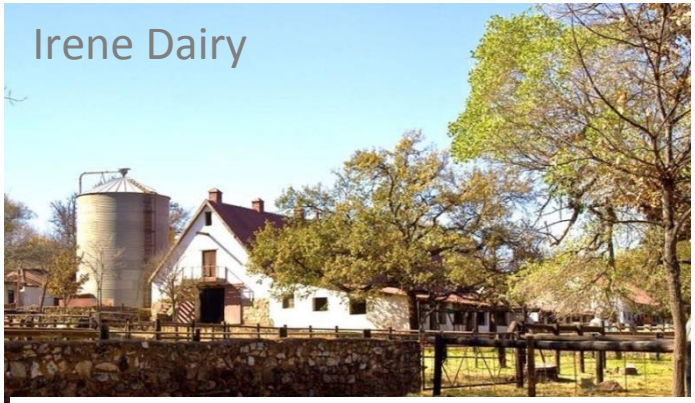


Figure 2.19 a

Figure 2.19 b

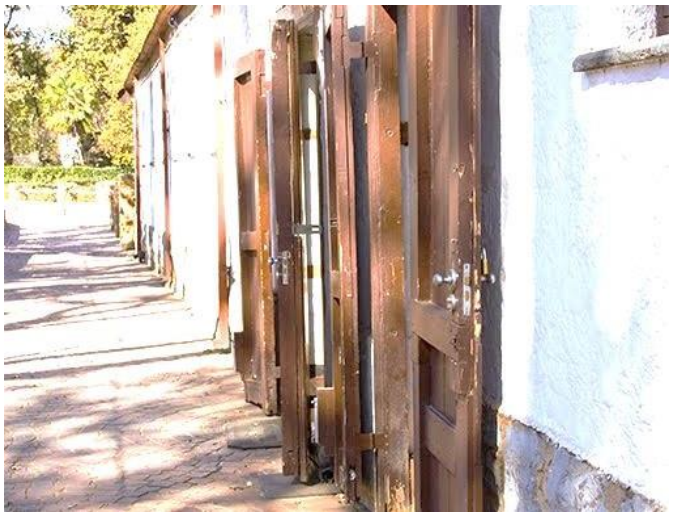


Figure 2.19 c

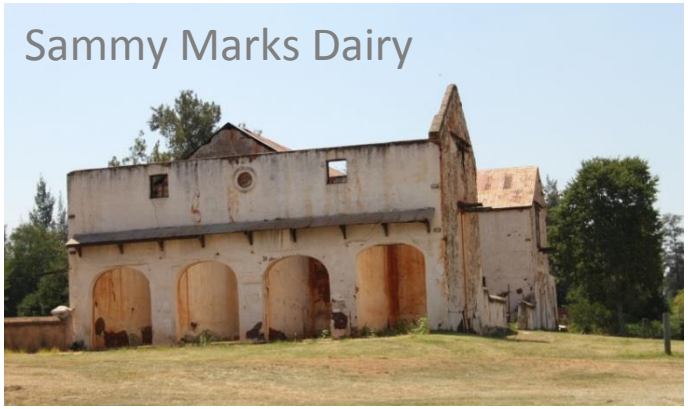


Figure 2.20 a

Figure 2.20 b

Figure 2.20 c

Figure 2.21 a

Figure 2.21 b

Figure2.21 c

2.6.2 STATEMENT OF HERITAGE SIGNIFICANCE

Hazeldean is an aged dairy farm of historic relevance in Tshwane's. The site is located in an area previously dominated by farmlands of similar significance: Sammy Marks' farm and Willem Prinsloo`s Karlfontein farm are iconic in this area. Hazeldean comprises a manor house, an old Transvaal- style house, a barn, silos, a calf rearing shed, a show stable, and several workshops as well as additions that include a steel frame barn and a milk processing factory. The latter were essential to the operations of a successful dairy farm from 1945 onwards. The only elements of the farm that are still operational are the factory and Transvaal- style house; all other areas are used as storage space. The exact origin date of the Transvaal- style house is unknown, but is thought to have been constructed around 1890. The historic farmstead and Cape Dutch- style manor house were built in 1945. These buildings are now protected under section 34 of the National Heritage Act because of their significant ages (Figure 2.24). The architects and builders of these heritage sites are unknown. The buildings were constructed by unskilled labourers, using second hand materials because of the post WWII depression. The farmstead buildings were built out of large boulders mixed with lime, cured in corrugated iron shuttering whose ribbed imprints are still visible. The manor house building is 3 brick widths on exterior walls and 2 bricks-width on internal walls, the thickness being a stability safeguard against the unskilled construction techniques. The landscape which surrounded the establishment was a productive, agrarian landscape which grew feed for the dairy's Ayrshire cows. A furrow system stemming from the Pienaarsrivier, as well as three catchment dams built to irrigate the site still exist. Both the furrow and the catchment dams are of historical importance as they were also constructed in 1945 and are still in use today. The hydrological functions and cattle camp boundaries on the site are still intact; however, many other elements of the agrarian landscape have been lost, though the farmstead buildings continue to exert a strong presence over the landscape and

Figure 2 22. Manor House Oil Paining

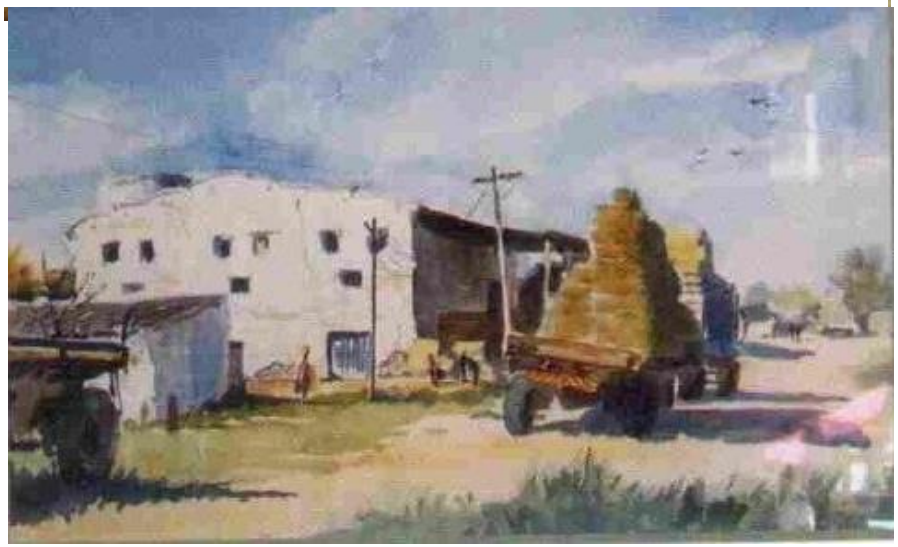


Figure 2 23 Old Barn Oil Painting.

The Images above are oil paintings of the Manor House and Old barn, located in the Malleson Household as a reminder of the Hazeldean charm. The date and artist are unknown.

are a reminder of the farming activities once located on the site. The rarity aspect of this site is that it is still owned by the original founding family and thus its heritage has been preserved to an acceptable extent. The site forms part of a collection of historic sites and museums in the area. (Figure 2.25). The farmstead should therefore be developed to its maximum potential and become a much-visited place that will remind us of the contribution that small dairy farms such as Hazeldean made to South Africa's industrial history.

Figure 2 24 Heritage Buildings

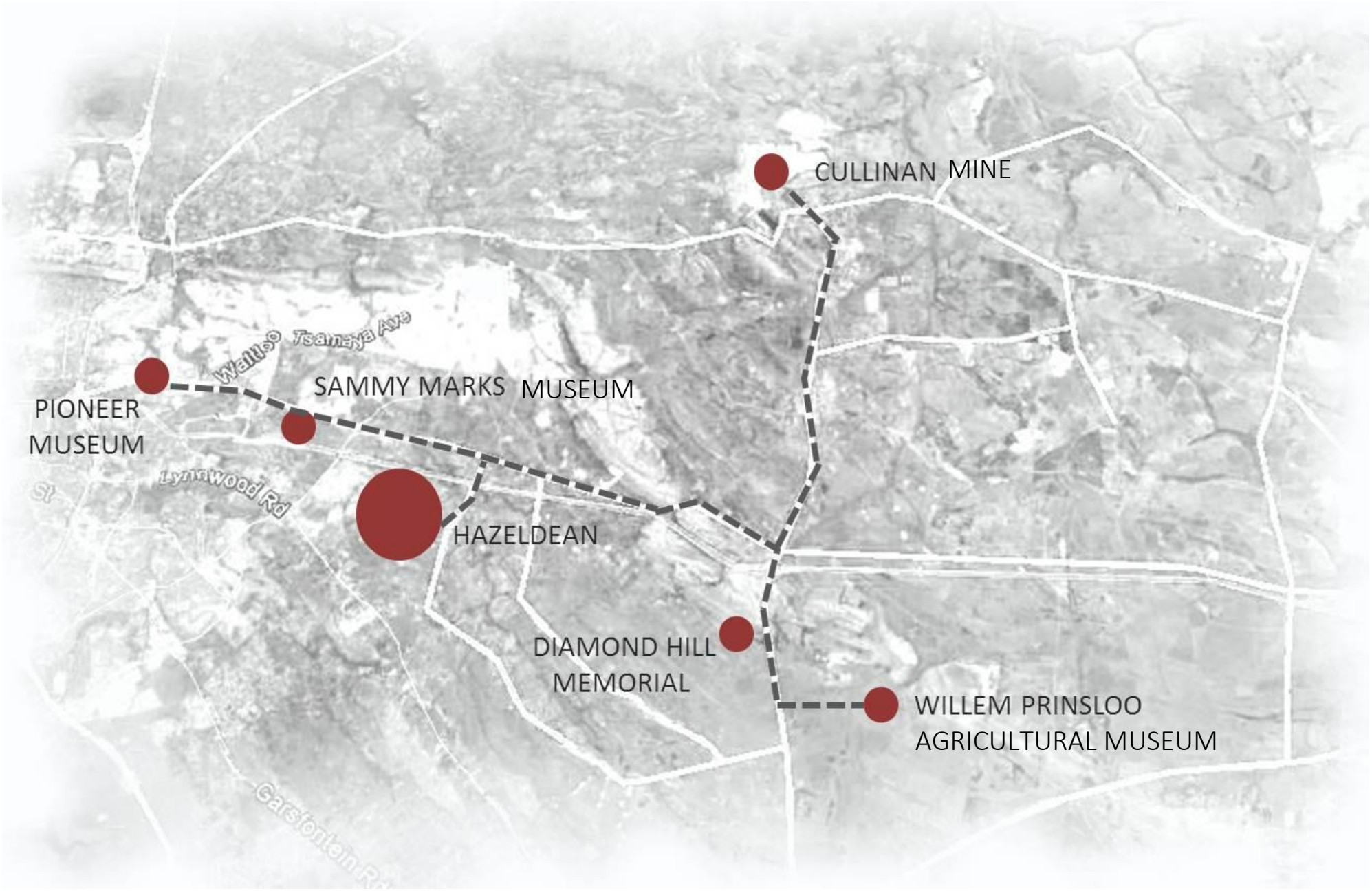


Figure 2 25 Sites with Heritage Significance near Hazeldean

2.6.3 The Burra Charter

> "Places of cultural significance enrich people's lives, often providing a deep and inspirational sense of connection to community and landscape, to the past and to lived experiences. They are irreplaceable and precious." (Australia ICOMOS Burra Charter, 1999)

The Charter is a guide for the treatment of places of historical cultural significance and lays out for the designer, accepted practices within such treatment. Cultural significance is described by the Charter as "aesthetic, historic, scientific, social or spiritual value for past, present or future generations". The Burra Charter will be consulted during the design process to guide the design strategy for Hazeldean, to comply with relevant guidelines.

The subsequent articles in the charter are those most appropriate to the treatment of a post-industrial dairy farm:

ARTICLE 7: USE

> "Use means the functions of a place, as well as the activities and practices that may occur there. Where the use of a place is of cultural significance, it should be retained" (Burra Charter).

ARTICLE 8: SETTING

> "Conservation requires the retention of an appropriate visual setting and other relationships that contribute to the cultural significance of the place" (Burra Charter).

ARTICLE 21: ADAPTATION

> "21.1 Adaptation is acceptable only where the adaptation has minimal impact on the cultural significance of the place: Adaptation may involve the introduction of new services, or a new use, or changes to safeguard the place. Adaptation means modifying a place to suit the existing use or a proposed use."(Burra Charter).

ARTICLE 23 CONSERVING USE

> "Continuing, modifying or reinstating a significant *use* may be appropriate and preferred forms of conservation."(Burra Charter).

ARTICLE 25: INTERPRETATION

> "The cultural significance of many places is not readily apparent, and should be explained by interpretation. Interpretation should enhance understanding and enjoyment, and be culturally appropriate" (Burra Charter).

In summary, the productivity and light industrial nature of the dairy, as it once was, is one of the aspects that make the place significant. Therefore the reintroduction of new productive practices suited to the surrounding context would be most appropriate in this case. The introduction of a new use to the site refers to Article 21: Adaption. The visual setting of the place adds to its charm and an understanding that should be upheld. As this site remains a cultural heritage landscape, the interpretation and communication of important site characteristics remains imperative.

2.6.4 Preserving Genius Loci

As previously mentioned, the spirit of Hazeldean is one of the most valuable qualities the site possesses. Genius locus refers to the spirit and atmosphere of a place, the qualities that make the site unique. A genius locus is about the way a place is distinguished and not necessarily by its physical make up. The spirit of a place may be preserved by reinforcing those elements of the landscape that contribute to the atmosphere of the place most strongly. Once these elements have been distinguished, they can be built upon and strengthened in order to enhance the spirit of the place. As suggested by Article 8 of the Burra Charter (referring to setting), the new landscape needs to mirror the existing spirit of the place and also incorporate the site components which make the place distinct. The atmosphere around the site speaks loudest and thus enhancing this asset should be the first step in designing a new landscape. The views from the site as well as the its vegetated surroundings are elements that define the site. Low walls, permeable boundaries, picturesque scenery, roaming cattle, an honest water system and savannah bushveld vegetation are typical attributes of Hazeldean. (Figure 2.26).

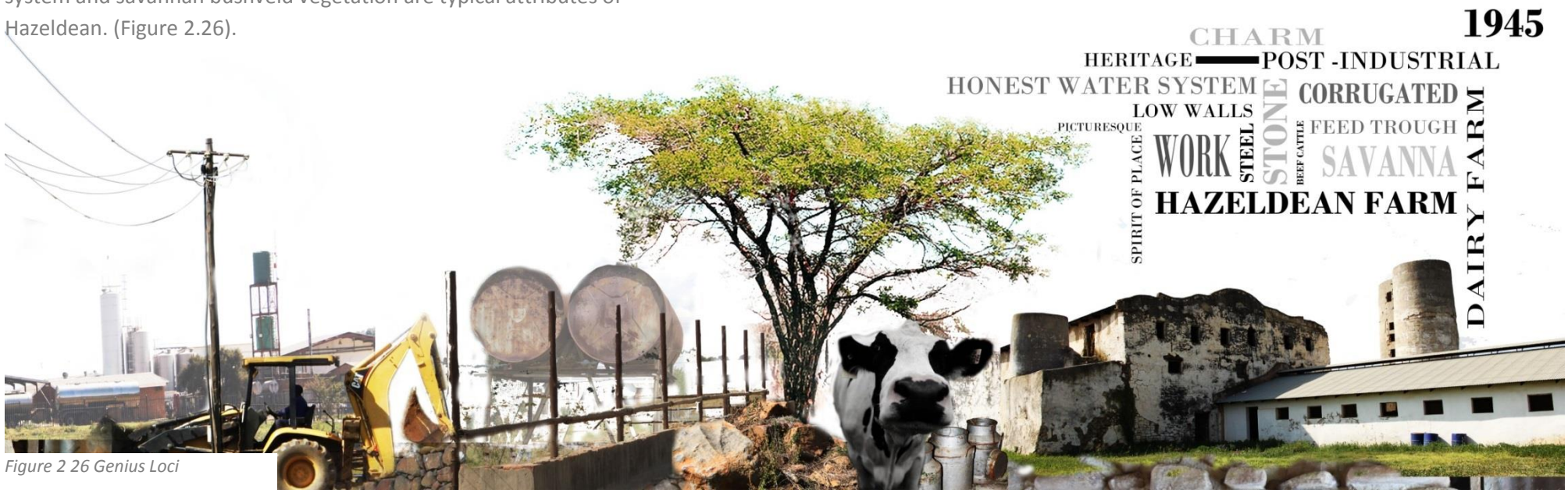


Figure 2 26 Genius Loci

2.7 SITE ANALYSIS

The next series of diagrams illustrate the conditions of the site and its contextual surrounds. The diagrams illustrate graphically the features of this historic farmstead. The aim of the site analysis is to realise the opportunities and constraints present on the site in order to determine design parameters.

2.7.1 Site Context

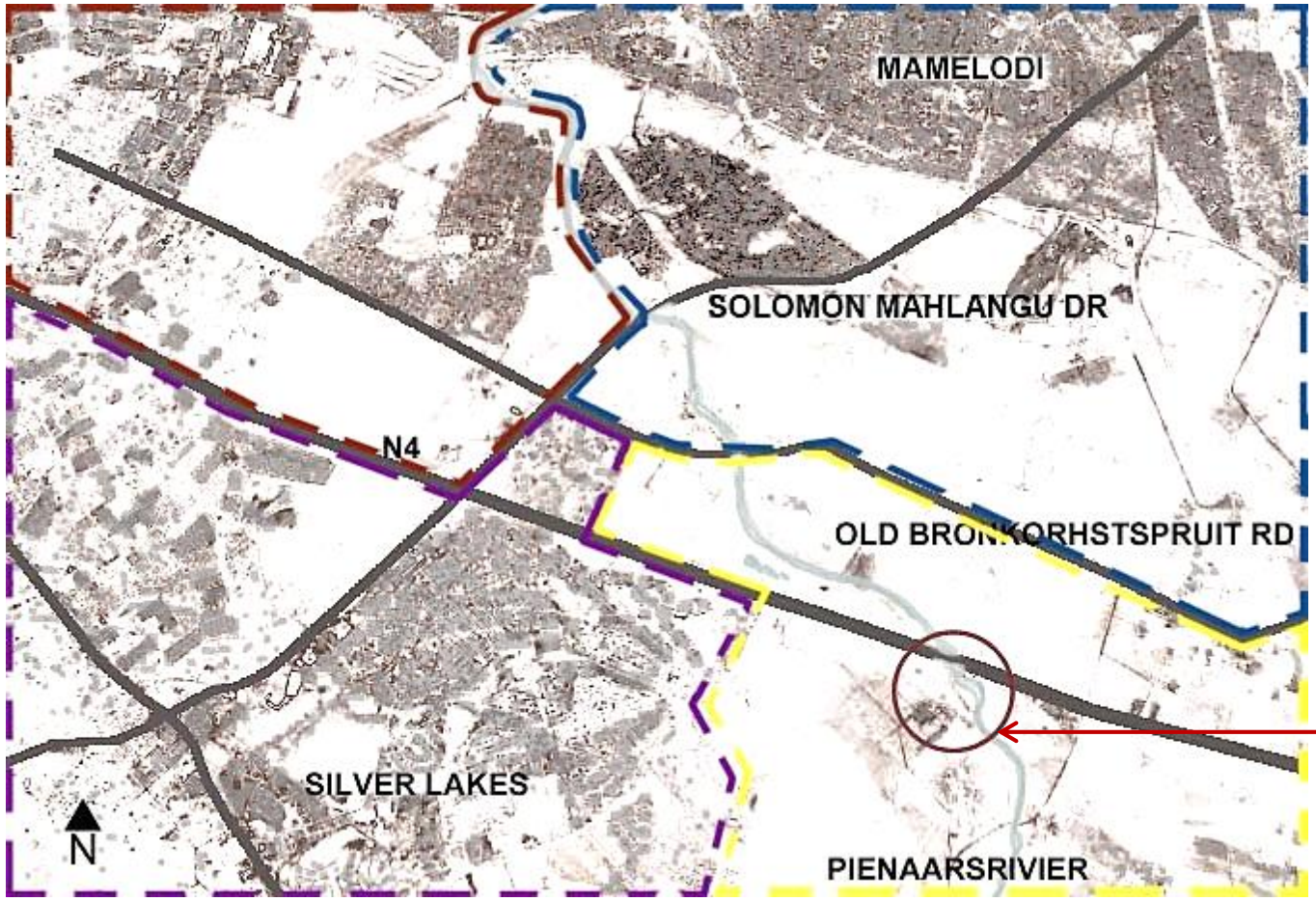


Figure 2 27 Site Context

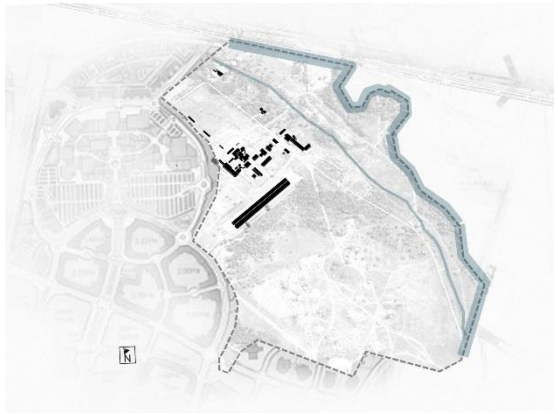


Figure 2 28 Current Factory Composition

Figure 2 29 Future Factory Composition

Referring to Figure 2.27: Mamelodi and the area above Old Bronkhorstspruit Road consist mainly of informal settlements. The region on the north-western side of the map is largely an industrial area. The area south of the N4 highway is predominantly a middle to high end residential area, which includes shopping malls and business parks. The eastern and south-eastern region shown on the map (including the site), are farmlands subdivided into large plots. Figure 2.28 and 2.29 illustrate the current building composition on the Hazeldean study site, as well as its future building composition in light of the factory shutdown.

2.7.2 Surrounding Land Uses

Figure 2 28 Surrounding Land Uses

2.7.3 ACCESS

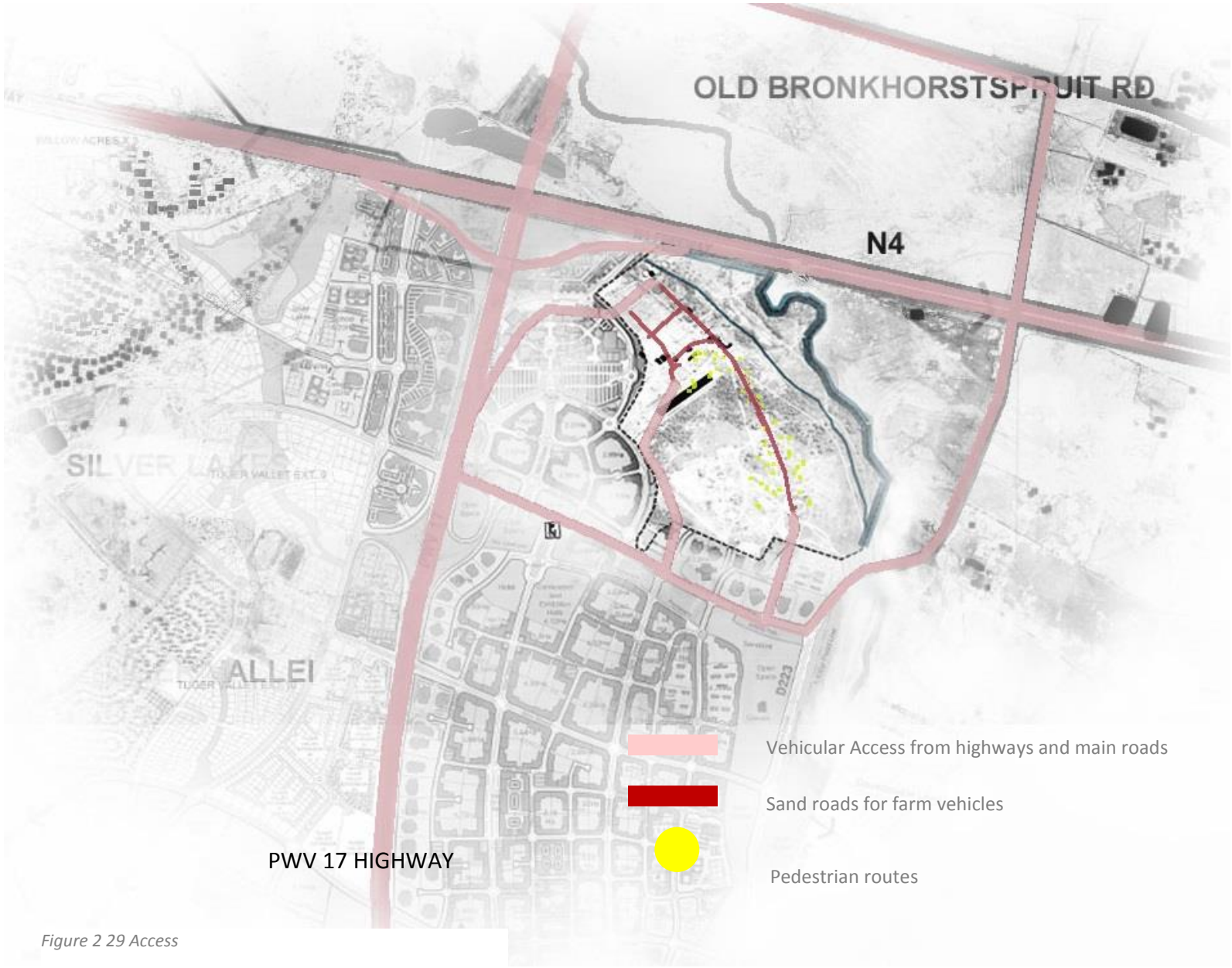


Figure 2 29 Access

Acces to Hazeldean presents a challenge. Access is currently only available via the Old Bronkhorstspruit Road, or from the N4 highway via a weigh bridge.

The PWV 17 highway will allow for much easier access to the study site once the road has been constrructed.Figure 2.29 illustrates highway and main road access in pink whilst existing farm roads are shown in red.

The farm roads are currently sand roads which service dairy trucks and tractors. In the near future there will be no need for the current sand roads as the dairy will no longer be in operation.

2.7.4 TOPOGRAPHY

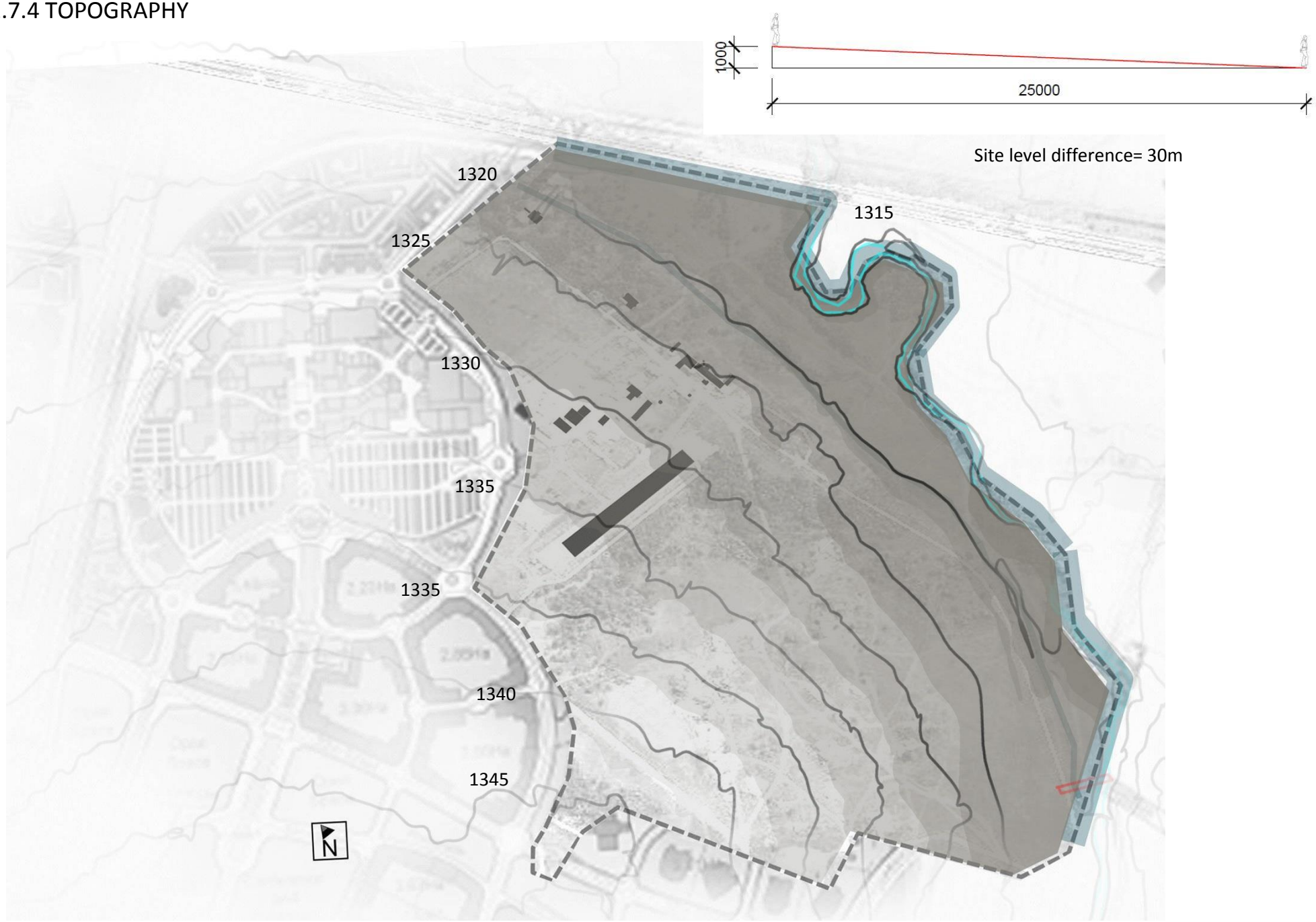


Figure 2.30 Topography

2.7.5 HYDROL0GY

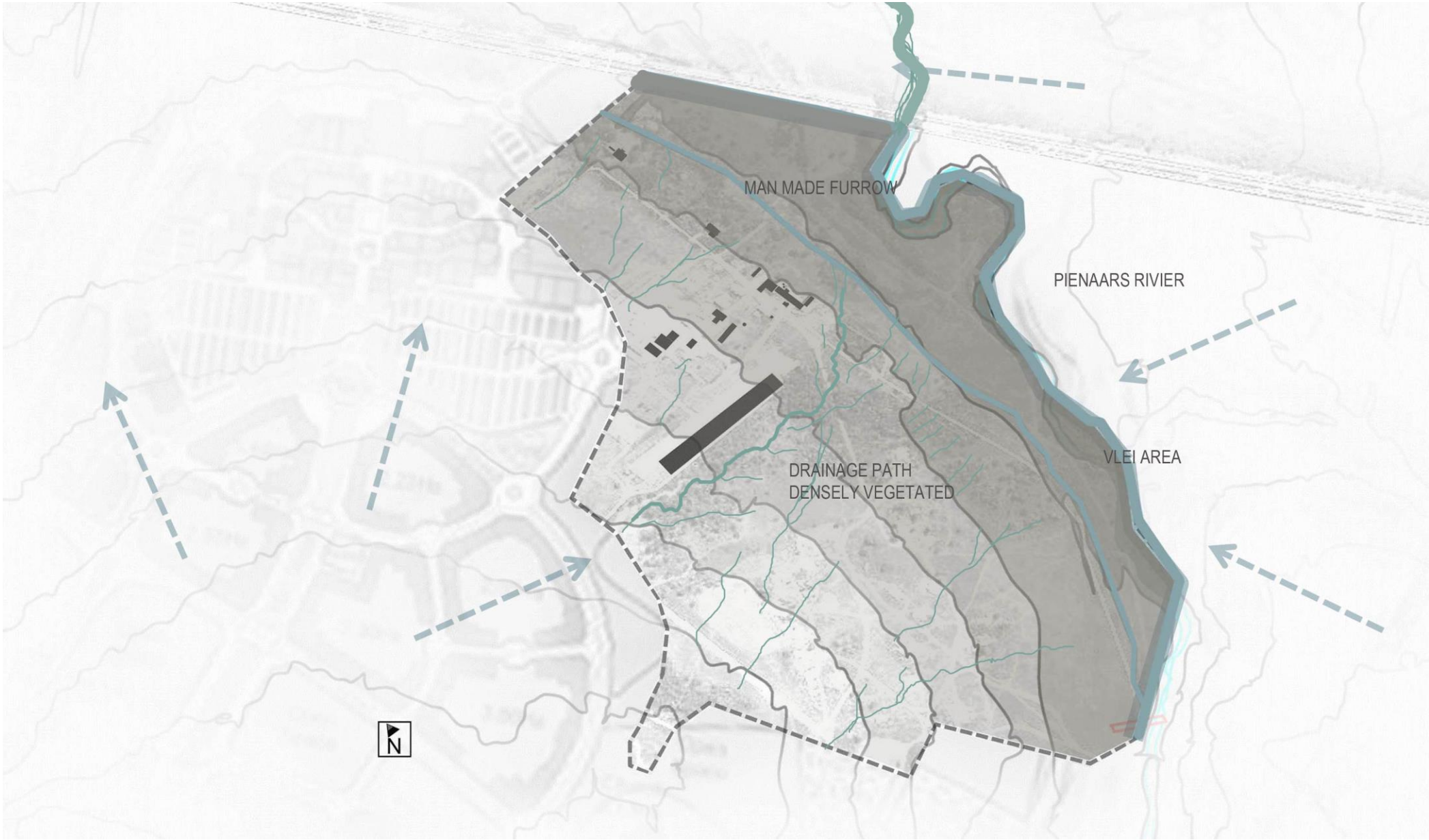


Figure 2 21 Storm Water Drainage

Figure 2 .32 Pienaarsrivier on Site

Figure 2 33 Furrow

The shape of the land directs storm water downhill toward the Pienaarsrivier, as indicated in Figure 2.31. This means that all the runoff from the new development collects at the study site.

Figure 2.34 demonstrates the current storm water and irrigation system. The main storm water management system on site is the man- made furrow, as indicated on Figure 2.33 and 2.34. Two- thirds of the river's water is channelled into the furrow to prevent flooding as well as to direct and store water in three large storage dams on the northern side of the N4 freeway. This stored water was used to irrigate crops which were grown to feed dairy cattle.

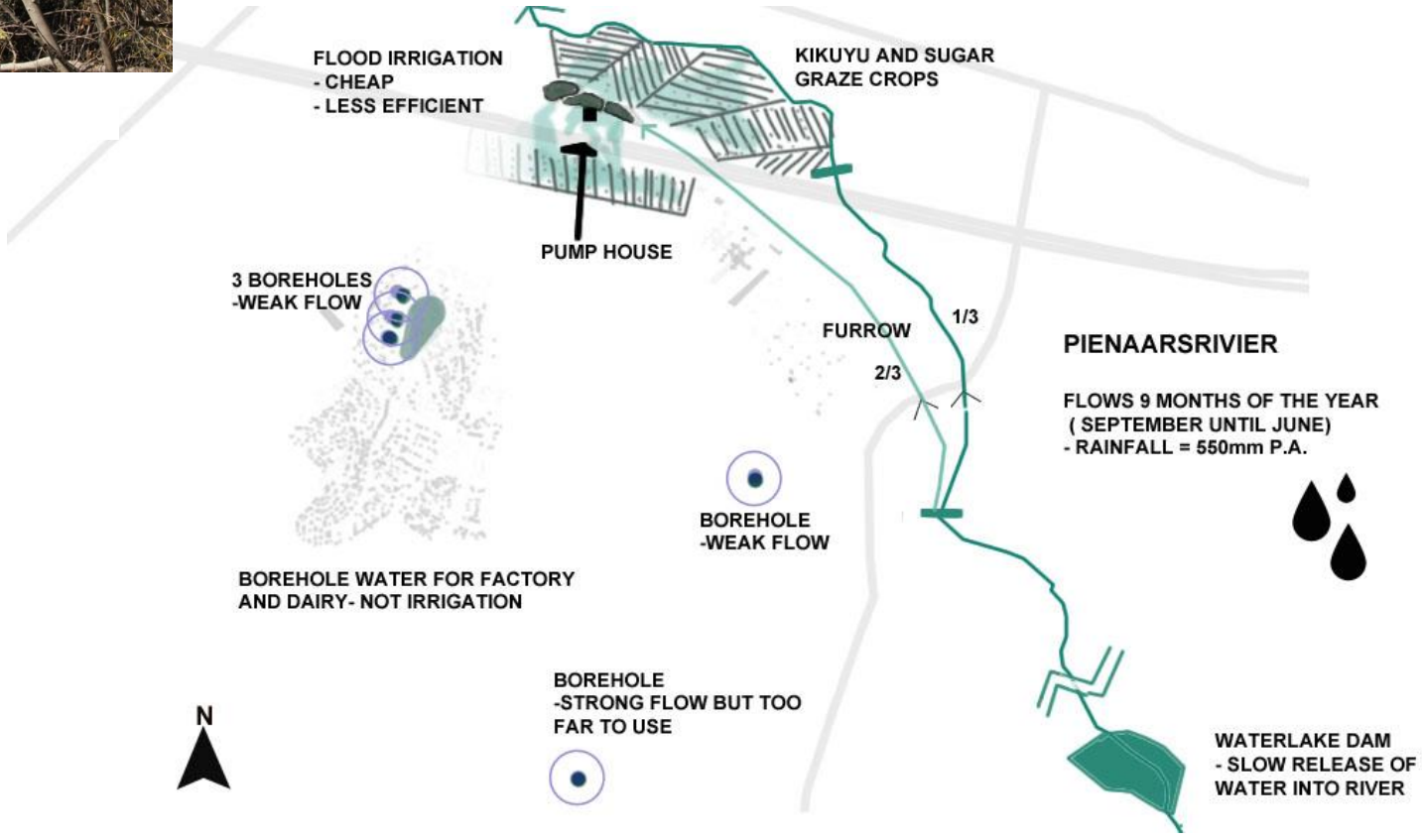


Figure 2.34 Site hydrology system

2.7.6 VEGETATION

Figure 2.35 Vegetation

Figure 2.36 Vlei

Vlei

This seasonal vlei area which is characteristically marshy contributes to the natural assets on the site. It is a breeding ground for frog species and birds and is thus considered to be sensitive

Figure 2.37 Forest

Forest and Riverine

The presence of forest like spaces and large trees along water courses and more fertile areas add to the variety found on Hazeldean.

Figure 2.38 Disturbed

Disturbed Area

This area is dominated by low growing weeds. There is only a few scattered trees in this area and the vegetation and soil is disturbed due to cattle roaming and eating extensively from the land.

Figure 2.39 Rock mounds

Figure 2.40 Grassy vegetation

Dominant vegetation

The vegetation that occurs throughout most of site consists of grassy species, rock mounds and scattered trees. The site consists of vegetation from both the Grassland biome and Savannah Bushveld biome.

2.7.7 GEOLOGY

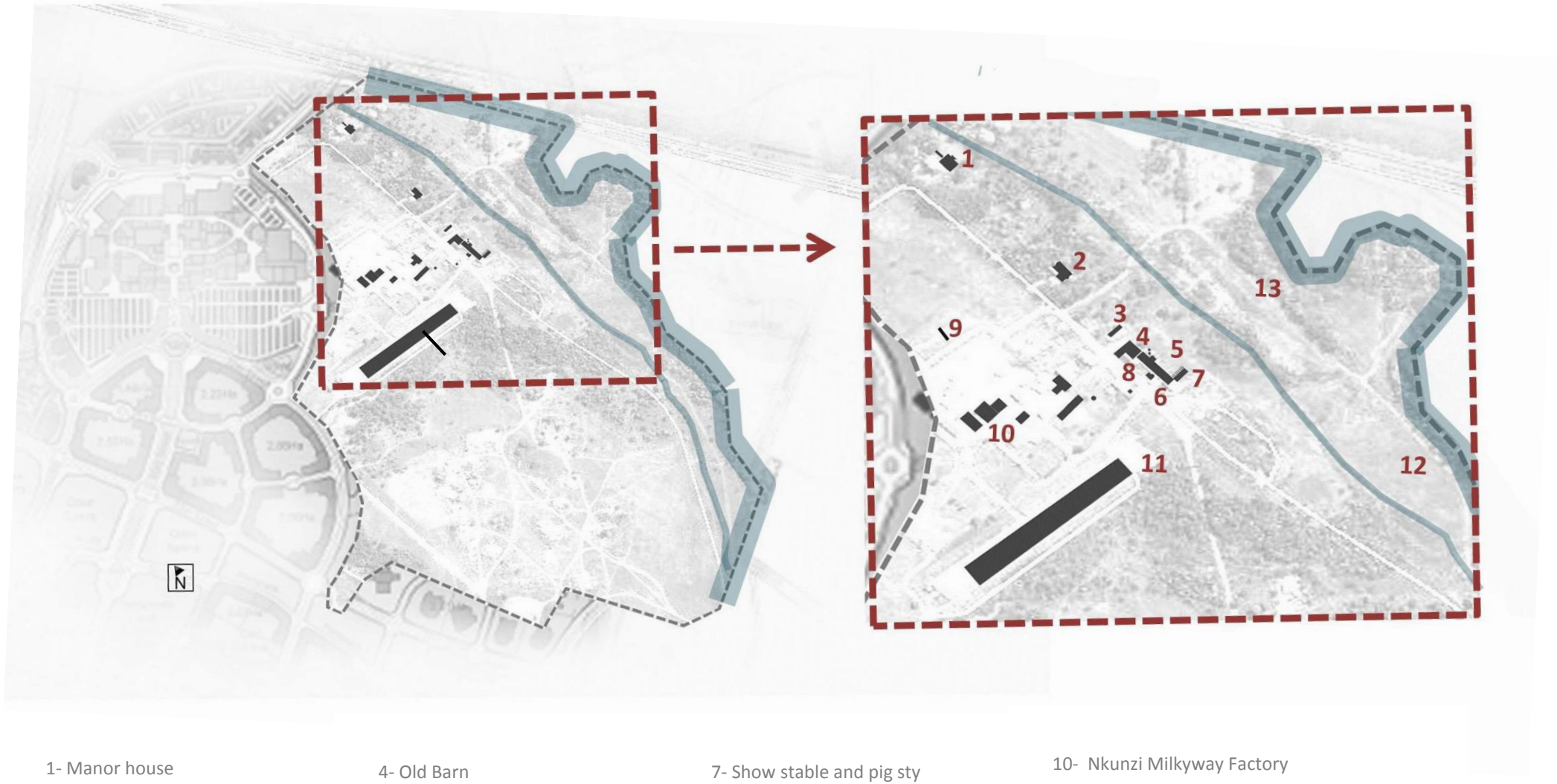
1. Fertile and deeper soil along water courses, although still clayey.

2. Deeper soil corresponding with densely vegetated forest areas.

3. The dominant soil type on the site is rocky and shallow and has poor crop growing capabilities. This poor soil quality is the reason why the dairy cattle were moved to another farm where silage could be bountifully grown and thus reduce the farmer's costs.

Figure 2.41 Geology

2.7.8 SITE ATTRIBUTES



1- Manor house

2- Transvaal- style house

3- Work sheds

4- Old Barn

5- Silos

6- Calf Rearing Shed

7- Show stable and pig sty

8- Old horse stable

9- Feed troughs

10- Nkunzi Milkyway Factory

11- Steel frame barn

12- Sensitive vlei area

13- A view of the Furrow and Pienaarsrivier

Figure 2.42 Site attributes

Figure 2.43 Site attributes 1

Figure 2.44 Site attributes 2

2.9 SUMMARY

2.9.1 Site issues

Site issues sometimes dictate design constraints; often however, they can be transformed into design opportunities. The site issues listed below are deduced from the analysis and are as follows:

IDENTITY- Once the dairy factory ceases to operate, the site will have no defining characteristic. A site identity is usually formed by the functional character of the place, and its activities.

FUNCTION- In the near future, Hazeldean will no longer be a functioning dairy and as a result there will be no functional purpose for the site to exist. Productivity will thus need to be reintroduced in a way that is responsive to heritage requirements as well as the adjacent development which is about to be built.

ACCESS AND CONNECTION - The FCL.1 framework makes no attempt to incorporate the study site into the development, because the farmstead is to l remain in the ownership of the Malleson family. However that does not mean the site should be excluded from important access points. The perception of the role of the site needs to be changed in order for its relationship with the surrounding development to be improved upon.

BUILDING AND LANDSCAPE RELATIONSHIP- The buildings are currently situated in the midst of abandoned landscape. There is no relationship between the two, which thus reduces the presence of both. Buildings in a farm setting become objects on the landscape as do those on post -industrial sites. The heritage buildings on this landscape should remain as sculptural elements which help to convey the sense of place.

SOIL CONDITIONS – As indicated on the site analysis, the soil type is clearly not suitable for plant growth. The soil is shallow, rocky and clayey and only in decent condition along the river bank. This calls for an intervention so that crops can be grown in a position nearer to the main activities on site.

2.9.2 Site opportunities

The Hazeldean farm is not a site lacking in character or charm. Maximising these s appealing attributes is the first step toward creating a desirable destination. The site opportunities are discussed below:

LOCATION – Alongside the threat that the surrounding development brings to the site, lies the opportunities. The development will focus attention and awareness on the Hazeldean farm, which was not the case previously. The adjacent mall and hotel have the potential to draw energy onto the site, if the latter is designed sympathetically. . The N4 highway also allows a visual gateway to the site where it can be seen by passers-by.

EXISTING INFRASTRUCTURE - The existence of buildings on the site allow for these buildings to be adapted to new uses; thus the need to construct new buildings for activities does not exist. . The current buildings are large, open plan rooms with few partitions, making them simpler to retrofit.

WATER DRAINAGE- As mentioned, storm water naturally drains toward the study site. The opportunity thus exists to implement a storm water management- and harvesting system so that water can be controlled, made a feature of the landscape and reused. If the site becomes a productive landscape, it will most likely require water as its most important resource.

ROCK KOPPIES - The rocky landscape adds to the visual appeal of the site and indicates what the proposed vegetation character should be. If the new landscape is sensitive to important existing elements on the site, the spirit of place can be sustained and enhanced.

POST INDUSTRIAL INTRIGUE - The possibilities in renewing post- industrial sites often require innovative solutions that breathe new life into ageing landscapes. The opportunity exists at Hazeldean to create a layered

landscape that reminds us of the past and present, and preserves both t for future generations to experience.

HERITAGE RESPONSIVE - The site calls for a new landscape that is mindful of its heritage. This requires landscape design concept derived from what exists on the site. Heritage landscapes are made authentic if meaning is generated from elements already embedded in the existing landscape. This eliminates the possibility of superficial meaning being layered onto the design in a forced manner.

PRODUCTIVE LANDSCAPE - The main requirement of heritage is to restore productivity to the site in a way that is sensitive both to the needs of both the public and the industry on site. The merging of these two contrasting requirements creates many design opportunities.

RIVERINE AND VLEI AREA - The sensitive vlei area and riverine system can be preserved and maintained in order to become of significant value for the site and its users. There should be controlled access to these spaces, with minimal disturbance to what exists on the site.

03 Theory

3.1INTRODUCTION

The thesis hypothesis stated that theory relating to landscape architecture would be researched in order to suggest how healthy and exciting environments could be created. This chapter discusses regenerative theory, green infrastructure, post-industrial sites and living landscapes. The aim is to offer researched thinking in support of the design approach and subsequent decisions within the design process.

3.2 THE ROLE OF LANDSCAPE ARCHITECTURE IN DEALING WITH THE SUBVERTED VIEW OF LANDSCAPES

As mentioned in previous chapters, the subverted view of landscape and the lack of consideration for natural assets within the city by planners, has allowed urban sprawl to accelerate insensitively. Inflexible planning results in the hardening of attitudes towards urban space and deters people from the city. First world cities are often looked to as alternatives once their functionality, atmosphere and vigour have been experienced by those accustomed to rigid urban environments like Tshwane. These cities become desirable because their systems incorporate mindful exterior spaces and offer pedestrians an attractive urban experience (Figure 3.1 and 3.2). It is the role of landscape architects to take leadership roles when urban frameworks are being planned. Landscape architects are trained to have an overall understanding of the workings of the environment, and they also have the skills to create desirable spaces, their input regarding the use of green space in planning is therefore of vital importance. . The influx of people into the city and using up natural space for urban development means these spaces are becoming rarer; therefore living close to these natural spaces is becoming more desirable. The city contains few designed spaces that allow people to experience nature; thus the role of landscape architecture is also to design places that produce, by now, uncommon natural experiences (Vancouver Courier, 2008).Landscape architects ensure that allowances are made for important natural conservancy areas and designed green spaces in urban planning so that these areas become physically and functionally part of the surrounding urban environment.

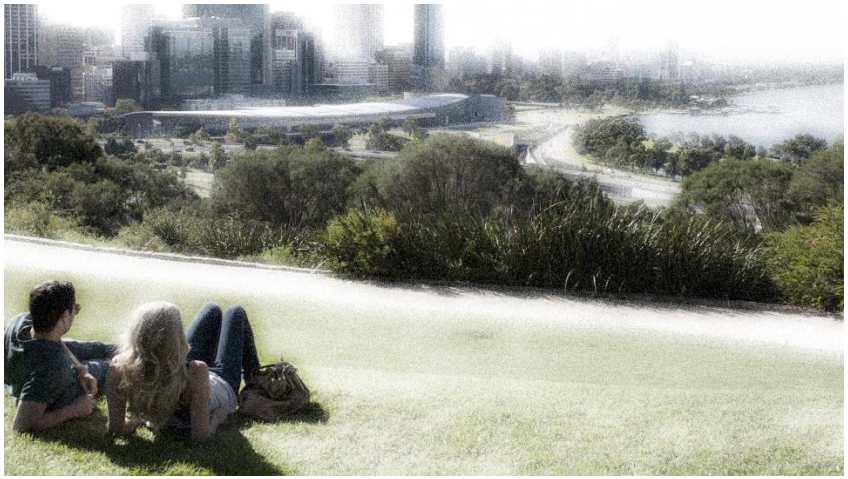


Figure 3.1 Perth

Figure 3.2 Central Park, New York

This will ensure that green spaces become more than redundant "buffers" between surrounding development. Green space in an urban landscape should contribute to the revival of natural environments, be socially uplifting and enhance heritage where appropriate. Landscape architecture is the profession with the skills to amalgamate these requirements harmoniously and elevate the role of landscape in urban areas.

3.3 RESPONDING TO HERITAGE

The role of the landscape in retaining the heritage of Hazeldean is primarily to preserve the presence of the heritage buildings contained in the designed landscape. These buildings are central to Hazeldean's unique and intriguing spirit of place. The heritage buildings (manor house, old dairy and Transvaal style house) should remain central features of the landscape so that their importance can be understood. As previously mentioned, they can be seen as functional sculptures on the landscape.

The strongest way in which the new landscape can incorporate heritage elements is by material use, productive landscape practices and by reinterpreting the existing landscape attributes in a new way (low walls, rock koppies, an honest water system etc.). Fundamentally, the site is a farm, and the character of the new landscape should reflect this, however the site can still be made contemporary and elegant. Essentially, the landscape should invite users to make use of the available spaces so that the Hazeldean story can live on. While the landscape design should intrigue and excite, it needs to remain sensitive to the heritage and other unique qualities of the site (Littlepage, 2011).

The industrious use of the old farmstead has been lost, and so the productive energy and labor intensiveness that was once central to Hazeldean no longer exists. The farm buildings are still typical of a dairy farm, even though they are no longer productive. Ultimately, the landscape has lost its vigor. The catchment dams, furrow and Pienaarsrivier are all still present, however; it is the connections the buildings and surrounding landscape have to these elements are no longer visible. The connection of buildings through landscape is gone, as well as the evidence of cultivation practices. Lastly, there is nothing happening at the old farmstead and thus the energy and bustle that was once apparent, no longer exists. The role of the landscape design is thus to revive the charismatic appeal of the farmstead according to heritage parameters, and make it a desirable destination for visitors. The new additions to the Hazeldean landscape should be clearly identifiable. The aim in preserving its heritage is not to replicate what once existed, but rather to bring a new dimension to the site which responds back to the essence of the dairy.

3.4 REGENERATIVE SYSTEMS AND DESIGN

Regeneration theory has been selected for research as it relates to the renewal of the environment while also implementing systems that ensure continuous functioning over time .This theory is based on a systems- thinking foundation which allows varying systems to integrate and renew inputs and outputs to benefit other systems simultaneously. This mimics nature. (Fig. 3.4). The focus is on replenishment and renewal, zero wastage and a process that touches lightly on the environment in order to conserve and work symbiotically with it. Regenerative design is the implementation of cyclical flows of energy, whereby the energy is constantly being replenished and spent in a way that does not degrade the landscape on which this production flow exists. A regenerative landscape is one that follows the principle of symbiosis through the functioning, social activity and environment that is part of the site (Lyle 1994). Landscape processes that abide by regeneration are complex and strive to take all these intermingling systems and merge them into one working whole that is dependent upon its parts (Lyle 1994, 38).

This theory will be used as a point of departure to resolve the system strategies required in a practical design proposal. The focus of these systems

will be zero waste and nutrient cycling between systems which are related. This will ensure that the strategies proposed are sustainable and sensitive. Hazeldean has a strong natural character which should be maintained while creating a new landscape. Regenerative systems and design theory work to create natural spaces as well as to produce sustainable solutions in a paradigm where sustainability is central to all new developments.

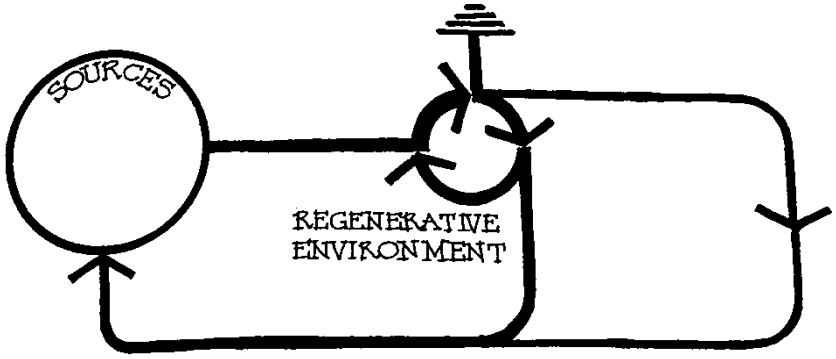


Figure 3.3 Regenerative systems

3.5 GREEN INFRASTRUCTURE

Having established the role of landscape architecture in urban planning, the approach taken by the green infrastructure theory to guide frameworks is applicable. The green infrastructure approach is based on creating a wide range of benefits for people and wildlife by ensuring that natural areas and green spaces are interconnected in a living network within the city. This arrangement of green space ensures that the functions and values of the natural ecosystem are conserved and continued in order to manage and sustain clean air and water systems for us (Benedict & McMahon 2006). The theory does not contest land development and man-made infrastructure but rather acknowledges the practical need for it, as long as it is in accordance with conservation of the environment. In this way the land use can be optimized in a manner that is harmonious to people and nature. In understanding these practical requirements for a working city, the green infrastructure approach provides a framework for conservation and development that recognizes the need for providing people with places to live, eat, work, shop and enjoy nature.

> "Green infrastructure is a life support system and comprises an interconnected network of waterways, wetlands, woodlands, wildlife habitats; and other natural areas, it includes greenways, parks, working farms; and wilderness that support native species. These networks also include areas that sustain natural ecology and contribute to sustaining air and water resources as well as the general health of humans" (Benedict & McMahon 2006:281-2)

Green infrastructure, unlike open space, is something we need, not something that is pleasant to have. Guarding and restoring our natural life support system is not only a nice-to-have, but a critical necessity. (Benedict & McMahon 2006)The integration of waterways and central recreational spaces in the design scheme is crucial when trying to deal with the runoff and buffered green space issue, which has been discussed previously. This theory offers an approach to dealing with both of these requirements in a way that will ensure that the scheme is truly beneficial to the development - socially, environmentally and functionally.

3.6 POST-INDUSTRIAL LANDSCAPES

The need for specific industries in a changing economy is always in flux, which leads to the abandonment and lack of demand for some of them. As in the case of Hazeldean, dairies are still needed: however, the process by which the milk is produced and processed is always adapting and progressing. These changes often cannot be afforded and thus dairies which are not able to adapt are left behind and forced to shut down. The afterlife of post- industrial sites is contentious, depending on their situation in cities. These sites are not always appropriate for single function recreational parks, so the designer should use context to decide which function is best suited to the site. This consideration is often the first step in establishing function in

most situations. Reprogramming a post-industrial site for a new and more profitable use is usually preferable to demolishing and flattening the area. There is always potential in a brownfield site and thus turning problems into opportunities always makes for more interesting design. Reprogramming and redesigning allows for cost reduction in site clearing and also offers the opportunity of retaining and developing the site's special characteristics. Adaptive reuse is a strategy that is useful in keeping sites from further decay and destruction (Wu 2011)

The typical course of events in a post- industrial scenario can be seen as a cycle. The site begins in a natural state and through development, abandonment and deterioration, it reverts to its original l state in order to reach an ecological equilibrium. Figure 3.5 illustrates the above cycle and provides an approach to dealing with the aesthetic of a reclaimed post-industrial site. The new landscape becomes a product of ecological design and decaying buildings. The buildings become objects in the landscape like capsules in time set in a physically contrasting natural environment. The buildings become sculpturally intriguing, attracting curiosity.

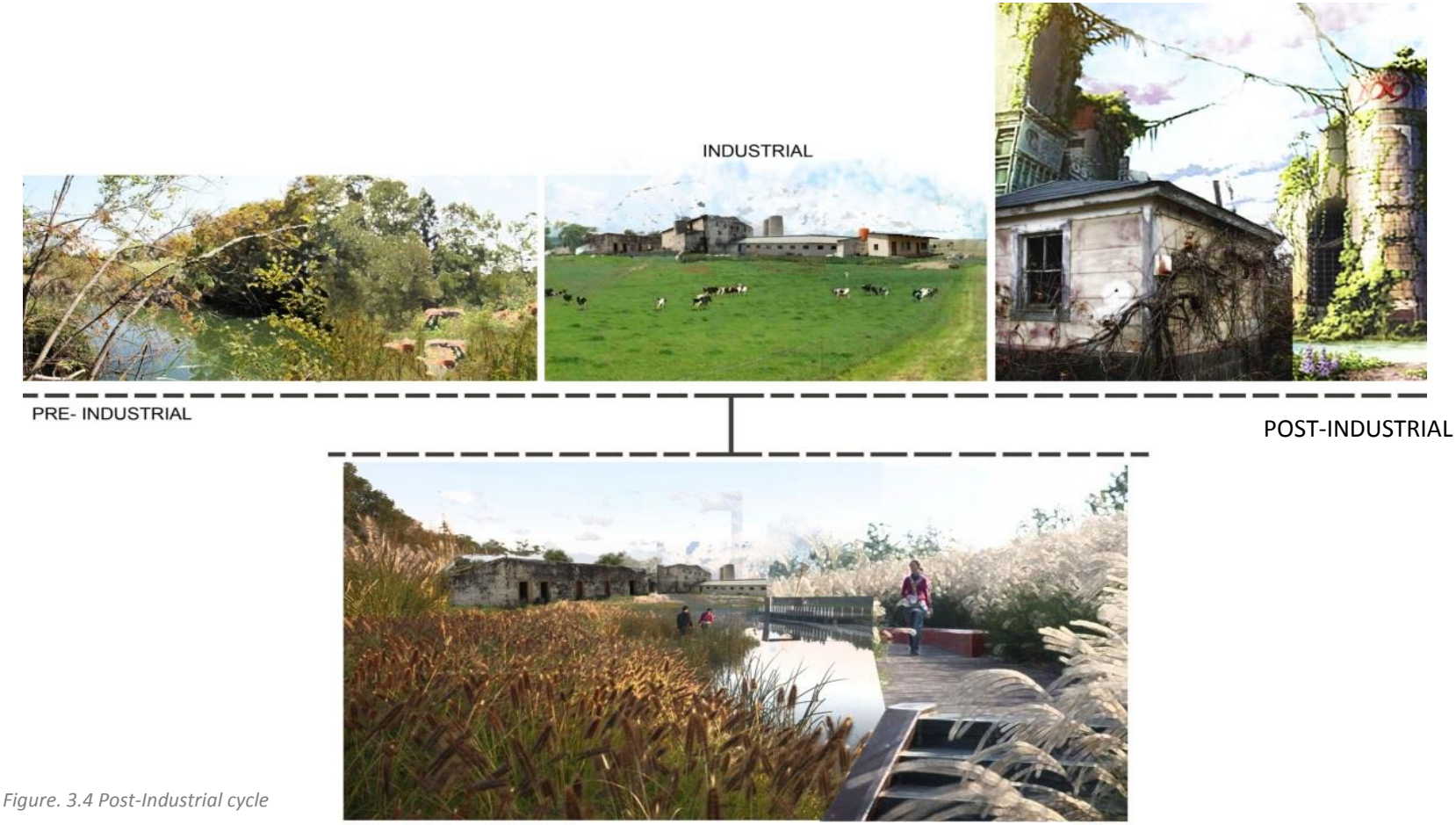


Figure. 3.4 Post-Industrial cycle

3.7 LIVING LANDSCAPE

Landscapes are usually understood as being living entities, however, although living elements are employed into the landscape, some landscapes remain static. Plants as a main medium in designing landscape are already living thus it is the other tools available that require manipulation to represent them as being alive. Landscapes are constructed and morphed by materials. Materials form the core of a landscape whereby components are then created by these materials. These materials thus need to be dynamic and in flux in order to represent living and changing qualities.

According to the text tilted Living Systems by Margolis and Robinson, 2007, principles are given to understand materiality so that they can be used, manipulated and placed to ensure they contribute to a landscape that is alive. Landscape is to be viewed as a:

> "motion picture view rather than a static framed image: landscape material technologies are not considered technologies but rather processes that occur at varying scales, time intervals, from day to night and from drought to flood" (Margolis & Robinson, 2007:10)

The approach also states that as living systems are in a constant state of change, so should their material components be. These material systems should not be used as a means of cladding, but should rather be integral to the design intent and physical structuring of the landscape. Materials and components should take on living attributes such as decay, conversion, growth and adaptation. An important notion is that landscape is a constructed system, whether it is man-made or natural, and therefore special attention should be paid to the relationship between landscape and construction through materials. (Margolis & Robinson, 2007)

3.8 SUMMARY

The design interventions in Hazeldean will be based on the above mentioned theories by using their principles and approaches to inform design decisions. Regenerative theory informs water systems, while Green infrastructure informs the framework proposal and water systems in the larger context. The post- industrial landscape refers to form, feel and aesthetic while the living landscape approach deals with detail design and material application.

The regenerative theory which speaks of sustainability is a theory that should be applied throughout the design scheme, more specifically, it will be most closely adhered to when dealing with the hydrological system on site. The intention to create feedback loops, nutrient cycling and system intermingling through the hydrology system will be based on the regenerative principles that have been researched.

The Green Infrastructure theory will be consulted in proposing an improvement to the Full Circle Living Framework put forward by the developers of the Hazeldean property. This theory supports the notion of placing green and blue (green space and water ways) infrastructure at the centre of development. By doing this, the theory suggests, the environment and animal species who depend on the environment, as well as people who desire more green space where they live will both benefit. The placement of green infrastructure in developments also relates to sustainable practices and creates more interesting and ecologically sensitive designs.

The approach of reprogramming post-industrial sites is applicable to Hazeldean because of its location and non- dangerous state. The approach relates to the general treatment of sites with abandoned use and offers a means of creating the character and aesthetic of the site by means of what already exists on the site.

The living landscape strategy will influence the way in which materials are used on the site. The aim is that the study site becomes a predominantly

naturalised landscape with a post- industrial intrigue. The environment and plants are all living and changing and the landscape should personify that. The living landscape approach gives suggestions as to how this may be achieved. Material components should be designed to accommodate plants, water systems and wind movement in a visible way. Figure 3.5 summarises how each theory will influence the design.

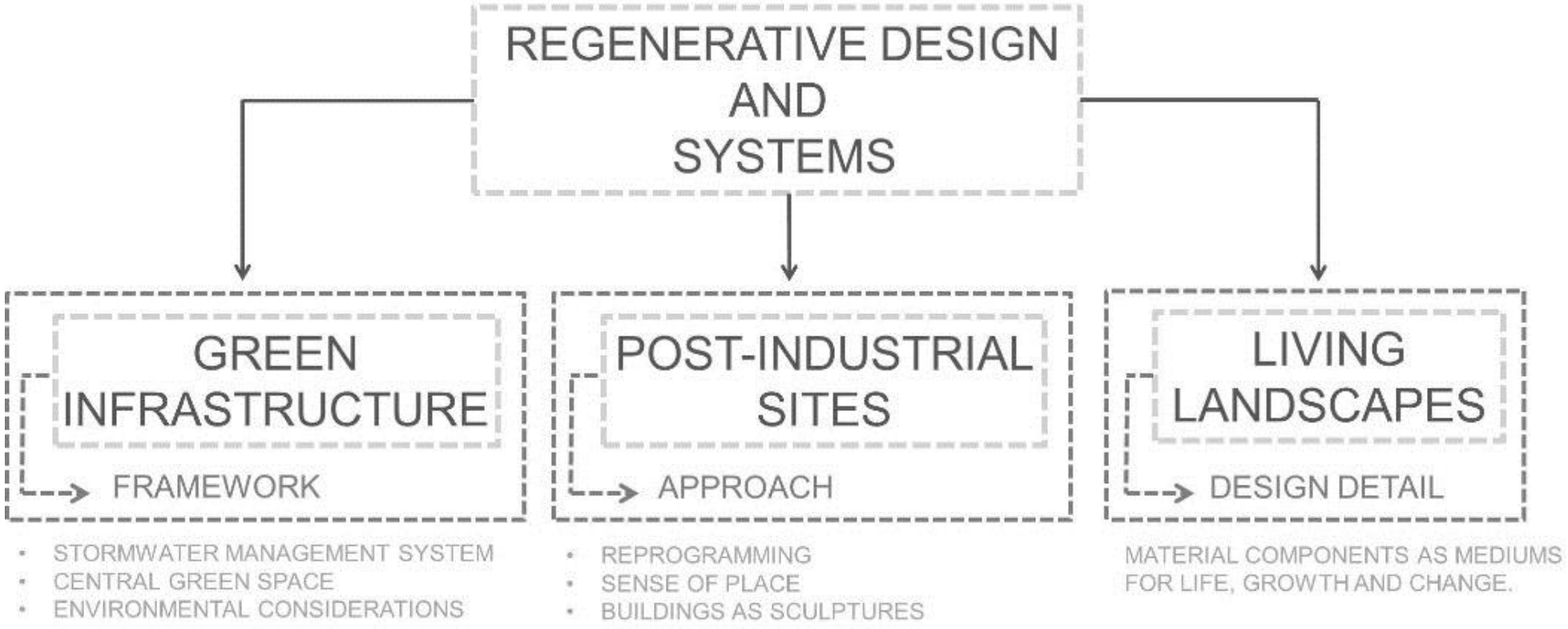


Figure 3 5 Theory Diagram

Design Intent
Programme
Spatial relationships diagram
Site Components
Interfaces, threshold and connection
Vision imagery

04 Programme

4.1 INTRODUCTION

This chapter will recap the design intents and then introduce the site program and concept which will inform the design proposal. The programmatic requirements, spatial relationships between programmes and the vision for the site will also be described.

4.2 DESIGN INTENT

The need for a design intervention within Hazeldean came as a response to the threat of the site becoming an identity-less, leftover space with no useful function. The primary intent of the design is thus to supply this special place with a new identity, one which will attract people and cause it to become a desirable destination. In order for heritage to be cared for, people need to experience it at first hand. The site should therefore become a people-friendly place. As for conserving its use, the site's functioning could be modified to produce a landscape which reminds us of the cultivation practices once housed on the site. The site is to contain multiple thresholds between contrasting zones, such as, recreation meets working farm and farm meets regional mall. The design scheme should be heritage- responsive and ecologically- inclined, providing further contrasts. Ultimately, the design should be guided by theories researched in order to create a new landscape which is socially exciting, sustainably sound and economically feasible. This will ensure that the memory of Hazeldean dairy remains alive in spite of the insensitive development which threatens to disregard it.

4.3 PROGRAMME

The formulation of the site program is a direct response to the issues identified in previous chapters. Each programme will be listed, alongside, the requirement to which it responds, and the details of each of its operations will then be discussed.

To recap, the site issues were identified as: Identity, function, access and connection, building to landscape relationship and soil conditions.

CUT FLOWER FARM

4.3.1.1 Response to Issue

The proposal of a cut flower farm was a primary response to the requirement to introduce a new productive function into the Hazeldean site. This form of agrarian production will make it possible for the site to become a working entity once more, as the opportunity exists to accommodate the whole cut flower process, from growth to retail. The visual appeal of an open- field cut flower farm permits the renewal of Hazeldean as a farm. The structure and order in the cut flower crops have the potential to add visual interest to the site as this will be a unique activity in the eastern extension of Tshwane.

4.3.1.2 Programme Details

The flower farm was chosen as it is a labour- intensive industry that doesn't require heavy machinery or dangerous processes. It would be therefore acceptable to incorporate public access into the working farm. The cut flower farm is aimed at growing indigenous flowers and plants for retail. Flower crops in indoor tunnels will need to be grown in some places to ensure that flowers are available for sale all year round, regardless of weather conditions.

4.3.2 Aquaponics

4.3.2.1 Response to Issue

The introduction of crops requires healthy soil and water as basic requirements for growth; however the poor quality of the soil on site was

identified as an issue to be addressed. . An Aquaponics- based irrigation system was proposed, as such a system requires no soil. This way crops could be grown without the need to import soil or employ costly measures to enrich it. As mentioned previously, there will be a large excess of storm water runoff from the adjacent development (FCL.1) and thus access to enough water will not be a concern.

4.3.2.2 Programme Details

Aquaphonics is based on a constantly circulating water system whereby the nutrients and air in the water are recycled to benefit plants and fish simultaneously. The fish excrement is allowed to flow along with the water to the crops, where the nutrients from the waste are taken up. In turn, the plants filter the water for the fish to live in. As the water returns to the fish pond, it becomes aerated. This system strategy is influenced by the regenerative theory discussed in previous chapters. It allows one system to support and feed off the other while sustaining itself.

4.3.3 Storm water harvesting system

4.3.3.1 Response to Issue

Water harvesting is a necessary requirement when dealing with a productive landscape that relies on plant growth. The water strategy will require storm water mitigation as there is a flood risk on the site. This is due to the immense volume of runoff from the neighbouring development which will be densely built up.

4.2.3.2 Programme Details

If runoff is to be harvested for use in aquaculture dams and retention feature dams, the water will need to be filtered and cleansed of any harmful substances that could be detrimental to the fish or unsightly to visitors. The most biologically acceptable way of treating water lies in a constructed wetland which will have to be designed to deal with run off pollutants. The opportunity also arises to design this purification system as a dual feature of the landscape, that being, a visual and functional feature.

4.3.4 Nursery

4.3.4.1 Response to Issue

Young plants need to be propagated before they can be planted in outdoor fields for growth and harvesting, thus there is a need for a nursery.

4.3.4.2 Programme Details

A nursery could produce further income by being open to customers, thereby adding to the diversity of activities on the site and its attractions for visitors.

4.3.5 Worm Farm and Recycling point

4.3.5.1 Response to Issue

The compost and tee produced by worms is extremely fertile for growing plants. Compost is required to establish seedlings and small plants before they are transplanted to the fields for subsequent growth and harvesting. The soil on the Hazeldean site is not conducive to plant growth and thus a worm farm would be a better means of producing nutrient rich- soil.

4.2.5.2 Programme Details

The worm farm can be sheltered from the rain and kept in the dark in one of the existing structures. What it produces can then be sold in the nursery to consumers for a profit. The creating of compost results in organic waste and

thus a recycling point needs to be provided. This system of nutrient cycling also relates to the regenerative systems theory which was researched earlier.

4.3.6 Market area

4.3.6.1 Response to Issue

The addition of a market area contributes to the identity and proposed functioning of the landscape and provides a link between landscape and buildings. The market place is crucial in creating connections with the adjacent mall development.

4.3.6.2 Programme Details

The market is to function as a people- attracting point in the flower production cycle. An outdoor market produces a pleasantly nostalgic shopping experience different from that of a mall. The nostalgia comes from the memory of the old dairy delivery system operated by dairies close to the city. Outdoor markets bring uniqueness and warmth to retail activities. The site's varied activities call for a robust landscape.

4.3.7 Recreational space and pedestrian access

4.3.7.1 Response to Issue

Most, if not all landscapes are designed for people, and thus pedestrian access, gathering spaces, seating spaces and the like are all obvious considerations .

4.3.7.2 Programme Details

The programme for recreational space should include walkways, comfortable seating areas, shade, gathering places, spaces that evoke natural world experiences, children's play areas and multifunctional open spaces to house events. The landscape should offer zones with fluctuating degrees of activity so that variety is offered to the users.

4.3.8 Venue and Restaurant

4.3.8.1 Response to Issue

A venue and restaurant space should be provided in the old barn, as requested by the client. This would introduce a new function into the old barn which would allow for a pragmatic relationship between the landscape and buildings used for multifunctional purposes.

4.3.8.2 Programme Details

A restaurant and wedding venue will allow the site to be used at different times of the day and year for many different purposes

4.3.9 Parking and entrances

4.3.9.1 Response to Issue

An arrival and access point for visitors using vehicular transport is essential. Entrance and access nodes are crucial in defining thresholds and creating connections between spaces. Entrances announce spaces and allow the user to understand hierarchy and the transition through spaces.

4.3.9.2 Programme Details

The parking area is crucial for access as well as practicality. Market traders and nursery customers will require transport to load and drop off merchandise. Entrance signage should be placed at main access points to the site, such as the mall and parking lot.

4.3.10 Protecting and reprogramming heritage buildings

4.3.10.1 Response to Issue

The reprogramming of significant buildings allows the interface between building and landscape to be re- designed according to specific activities in each building. The preservation of the facades of buildings is also a crucial element in reprogramming and adaptive reuse.

4.3.10.2 Programme Details

As previously stated, the old barn will be adapted and changed to house a restaurant and functions venue. The remaining factory buildings are not of heritage value; however their relationship to the landscape cannot be neglected. These buildings should thus be adapted for use on the cut flower farm.

4.3.11 Vlei and Riverine protection

4.3.11.1 Response to Issue

The protection of these natural assets in the landscape should be done to enhance the existing natural environment. Protecting and maintaining these systems will ensure that their quality does not decline, and that they will be l in good condition for visitors to experience. These natural assets add to the identity of the precinct.

4.3.11.2 Programme Details

These natural systems are to remain protected by controlling access allowed by the public to these places. The provision for access has to be as undamaging and sensitive as possible to these delicateness areas.

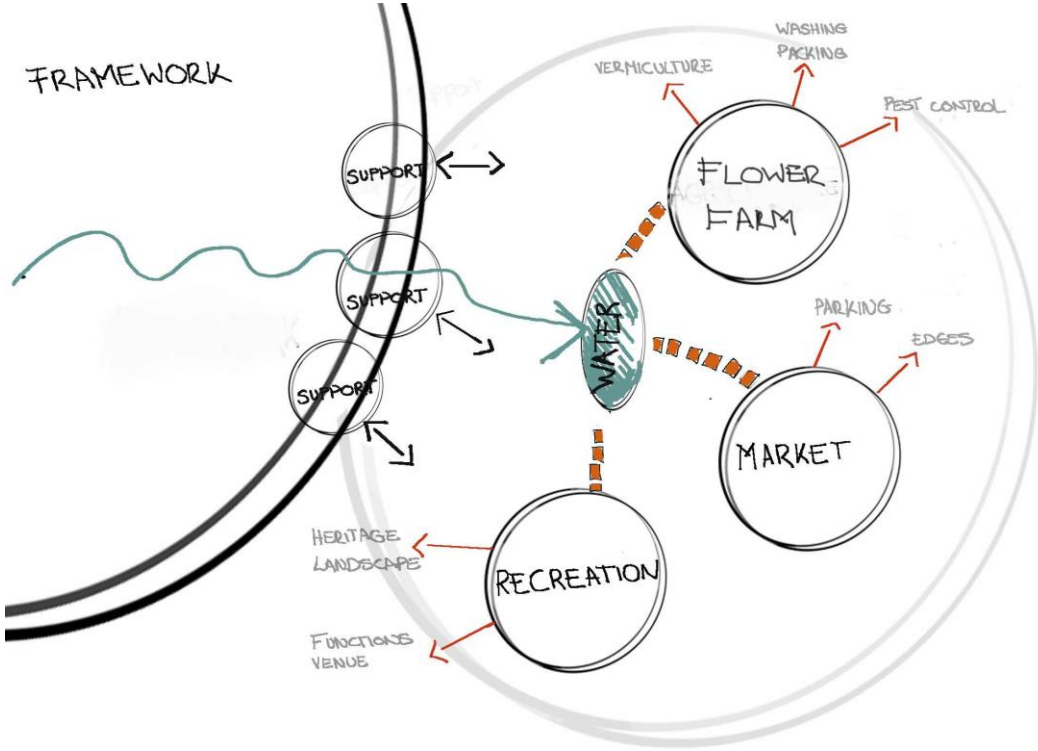


Figure. 4.1 Site Programme

Figure 4.1 summaries the programme: The central system in the landscape is the hydrological system. It joins the surrounding development and the site visually and functionally. This water harvested is critical for the site operations on site and also provides visual amenities in the landscape.

The diagram illustrates that the site programme should relate to the adjacent land uses. These are the points at which entrances and threshold spaces

become important. In the diagram it can be seen that heritage concerns should inform the design throughout.

4.4 SPATAL RELATIONSHIPS DIAGRAM

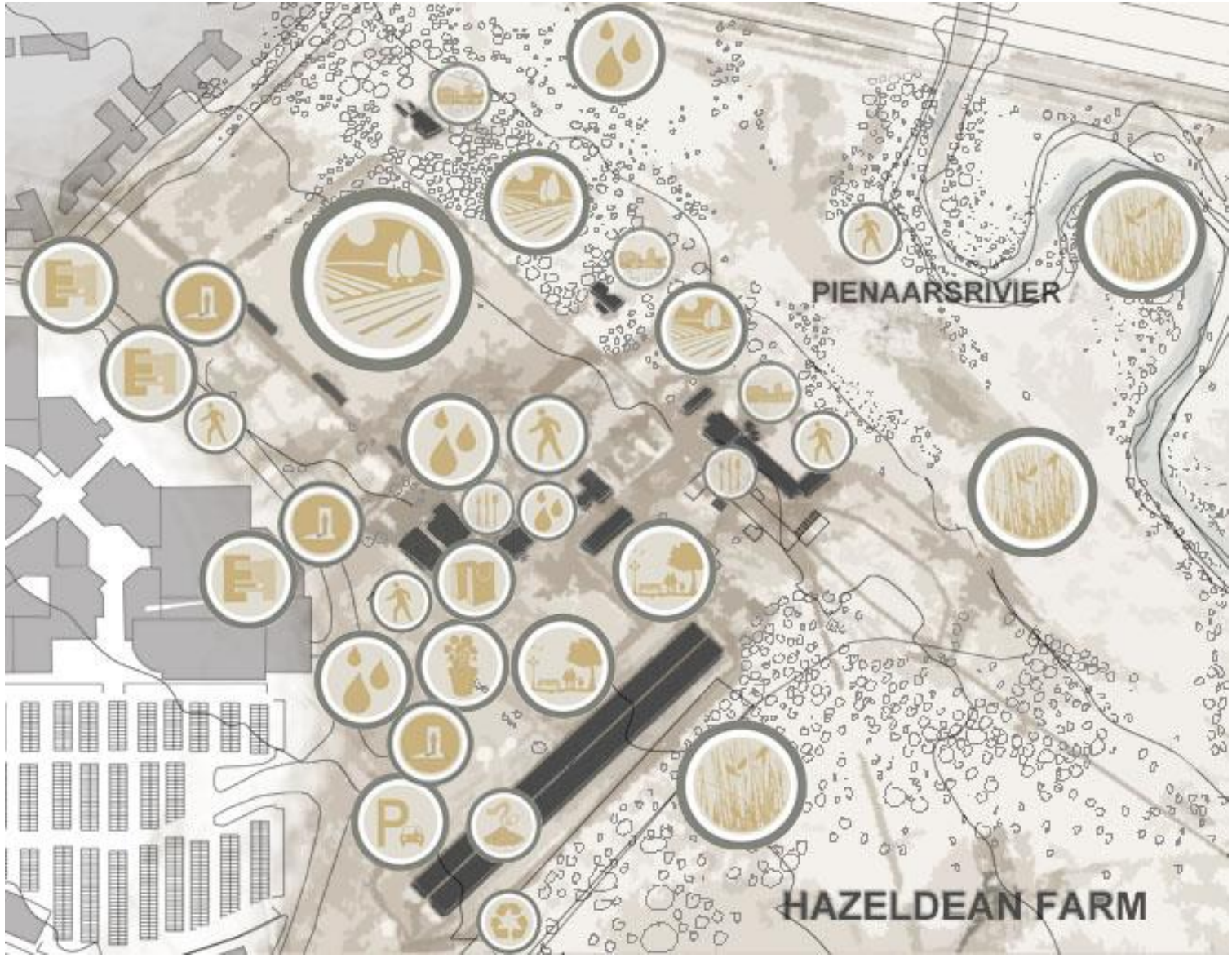


Figure. 4.2 Spatial relationships

The diagram alongside attempts to place the programmatic requirements onto the site so as to form the basis of a functional diagram.

4.5 CONCEPT DEVELOPMENT

4.5.1 Broad Concept

Regeneration is the broad concept under which the design proposal falls. Hazeldean requires regeneration in terms of identity, function and design. The regenerative theory is also linked to this idea as it suggests sustainable, practical and ecological means of regeneration. Ultimately, this place requires restoration, redesign and reclamation so that it can remain relevant in its setting.

4.5.2Landscape Components

The existing landscape components are illustrated in Figure 4.3.The heritage and spirit of place are fundamental site attributes. The existing site components were recorded in order to distinguish the character of the existing landscape. The approach to maintaining genius loci is to reinterpret the existing landscape components in a contemporary way that is responsive to heritage in terms of material use.

HONEST WATER SYSTEM

The first attribute noted was an open and honest water system. In a dairy, water is an essential resource for crop watering, animal feeding and milk processing. In a farm setting, the layout of working systems is not aimed at visual effect; rather they are positioned in the most practical and effective way. The water system on site can be physically traced to the furrow, catchment dams, boreholes, water tanks and towers scattered over the site. These water connection points perform the dual purpose of creating unintended sculptural features as well as supplying water to the landscape. As discussed, water also becomes a crucial element on a cut flower farm. The existing water system should therefore be re- established in the new landscape, this time with an aesthetically designed focus. The water system should become the spine of the landscape - physically and functionally.

MONO PITCHED ROOFS

The second distinguishing element relating to form was the angled roofs of most of the buildings on site, heritage significant and not. The angled roof structures throughout create a building dialogue that allows the buildings to speak a similar language, even though their styles and materials use are completely contrasting. The new landscape will require new buildings and structures, thus the existing building dialogue can be added to by using it as the form driver in the new landscape structures .This will allow the landscape elements to look similar despite all their materials and construction techniques being different.

LOW WALLS

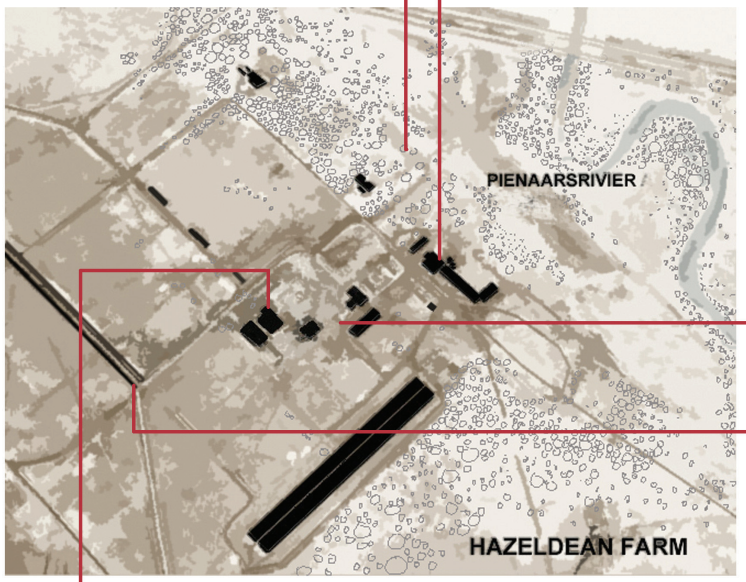
The low wall aesthetic in the landscape stems from the cattle feed troughs scattered throughout the site. These low walls are a reminder of the old landscape but they could also become useful tools to create space.

MATERIAL PALETTE

A crucial aesthetic, historical and construction quality of the landscape is the materials used in the old farmstead buildings - the old barn, workshops, silos and show stable. The materials consist of rock, concrete- cured with a ribbed finish, and steel. They add significantly to the interest of the old buildings and can be used in a contemporary way to celebrate the landscape. The material usage gives clues to the construction techniques evident in making them.

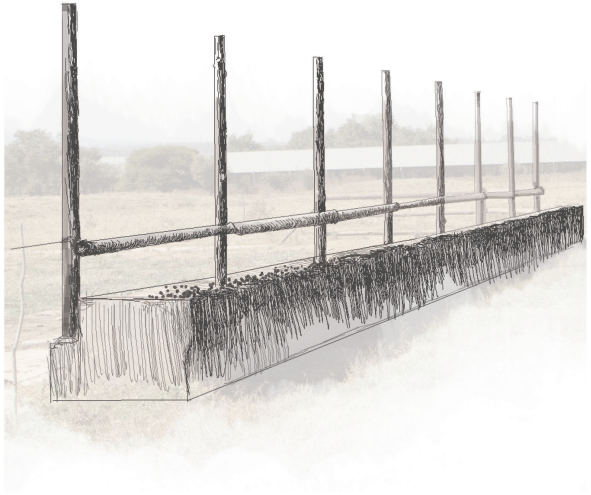
ROCK MOUNDS

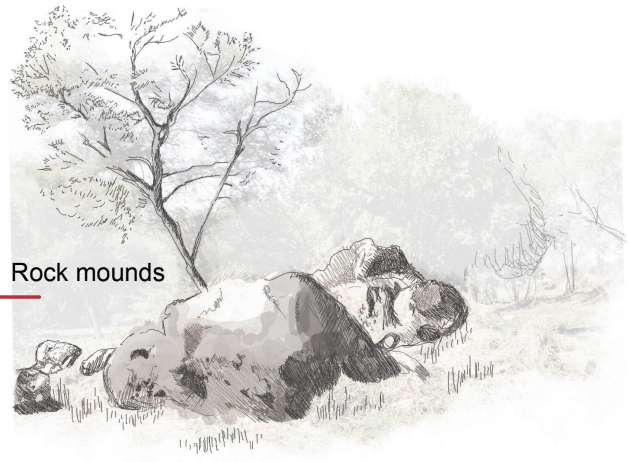
The scattered rock mounds in the landscape contribute to the plant palette and give the landscape its unique aesthetic.



Honest materials

Low walls (feed troughs)





Mono pitched rooves

Figure. 4.3 Landscape components.

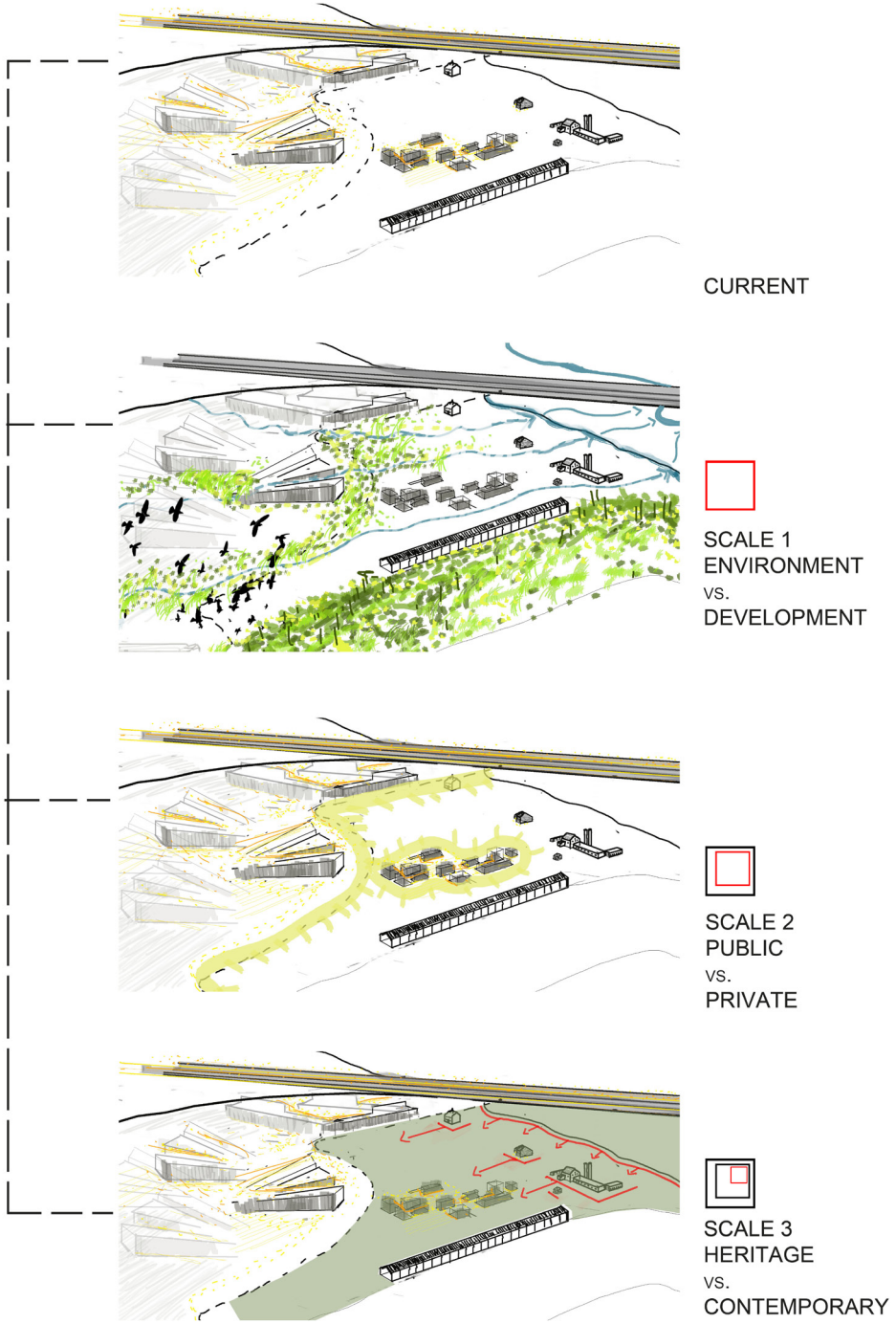
4.5.3 Interfaces, Thresholds and Connections

The positioning of the site within its larger context reveals many thresholds that are shared with diverse activities adjacent to, and within the site. This three scale approach to the landscape design, illustrated in Figure 4.4 is one that views the landscape as being multi-layered, and with many thresholds that occur at three varying scales of precinct intervention; that is framework, site design and detail design.

The first interface occurs at a framework scale between the natural environment and the surrounding development. See Figure 4.4. This relationship between the two needs to be altered so that it may become mutually beneficial to both the occupants and the environment in terms of its ecological systems. This proposal should aim to create a recreational spine, a storm water management system, plant biodiversity and a strong sense of place and identity in the development. This will make the precinct attractive for investors and residents.

Referring to figure 4.4, the second integration happens at a master plan level, between public and private access areas. These interfaces occur between areas that should become productive. The threshold approach aims to allow for subtle variations between private and public spaces that almost merge the two, but still keep them separate.
The third and most detailed merging of two entities happens at the sketch plan stage, where heritage concerns and contemporary design meet. See Figure 4.4. The aim is to reuse and reincorporate existing elements into the new landscape in a contemporary way that allows the two to be differentiated, all the while keeping the landscape character as it was only displaying it in a new way.

Figure. 4.4 3 scale approach.



4.5.4 Vision

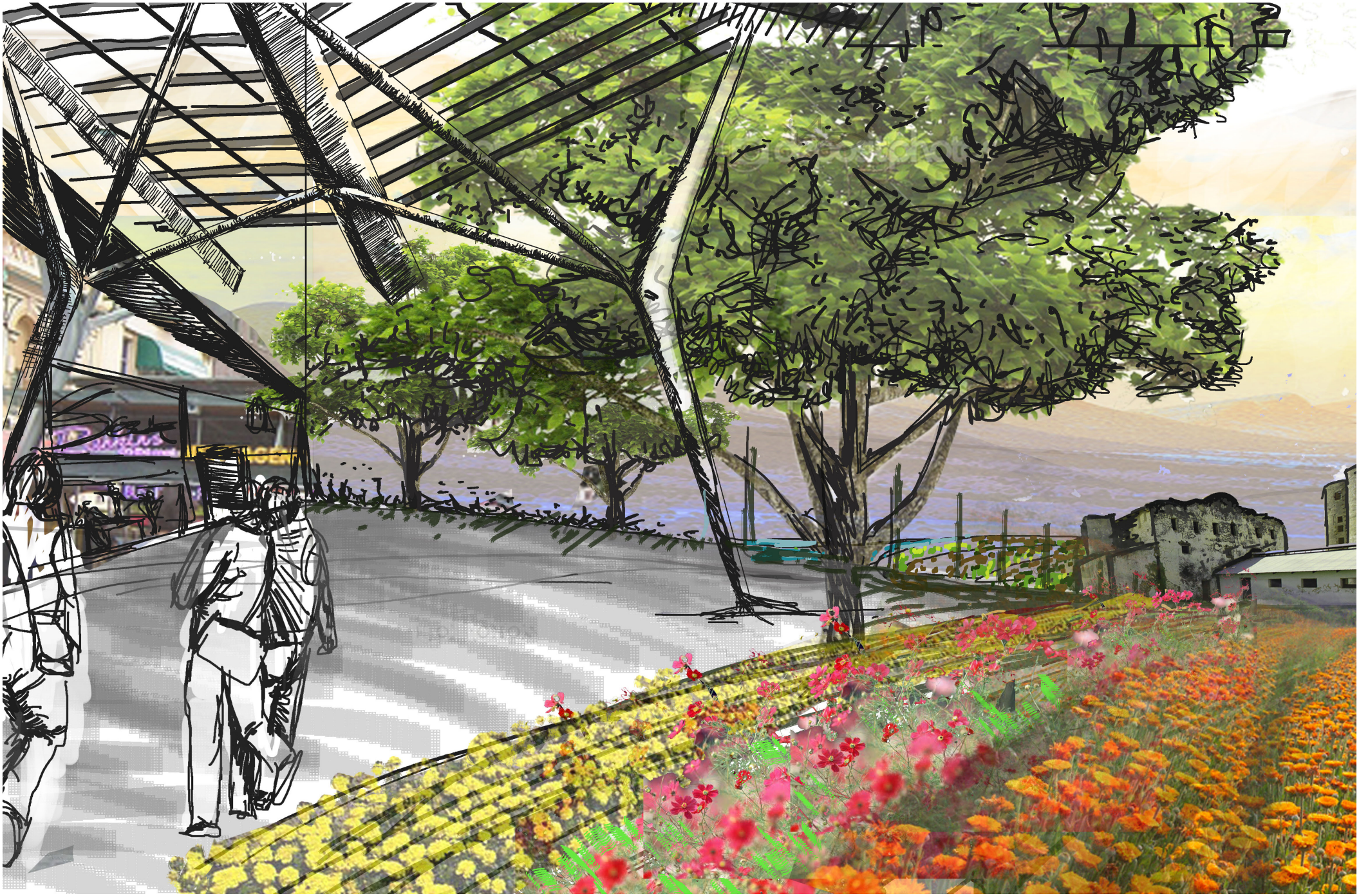


Figure. 4.5 Mall and Farm Threshold

Figure. 4.6 Cut Flower Farm and Old Barn Threshold

Mo Kio Park
Landschaftpark
Zhongshan Shipyard Park
The High Line

05
Precedent

Figure. 5.1 Blue Green system

Figure. 5.2 Blue Green system meets recreation

5.1 BISHAN-ANG, MO KIO PARK, SINGAPORE

Green Infrastructure

What was once an ugly fenced canal used to divert torrents of water from tropical storms has now been transformed into a functional river with both integrated water resources and aesthetically attractive recreational facilities. Water creates a naturally beautiful and peaceful environment that attracts people and encourages outdoor activities. The system is functional in that it provides a flood plane for tropical storms and relieves the pressure on municipal systems within the centre of the urban development by recycling and harvesting the storm water for use by the local community. This park has brought together the economy, ecology and social aspects of water use within the city (Dreiseitl,2012).

Influence on Design

- The allocation of functional green space within an urban environment is one that relates directly to the FCL.1 development plan. This case study serves to illustrate the opportunities that exist when blue and green infrastructure is placed at the functional and aesthetical centre of a development.
- The opportunity exists to use a bio-swale system along with weirs and naturally integrated detention dams as methods to manage storm water flow.
- Providing recreational and activity spaces associated with these environmental infrastructures is crucial. This approach to planning can transform the identity and atmosphere of a development such as FLC .1 dramatically.
-

Figure. 5.3 Water sculpture

Figure. 5.4 Main plaza

5.2 LANDSCHAFTSPARK, DUISBURG NORD

Post-industrial

This old hard and rugged industrial region was re-interpreted into functional landscape that aimed to restore natural water processes, transform environmentally contaminated spaces into flourishing meadows, and convert old industrial structures into a fantasy playground offering panoramic views. This abandoned industrial smelter was converted into a picturesque park which attracts the community to a place filled with adventure and old memories. . This case study illustrates how to transform post-industrial sites into ones with vigour and benefits to the surrounding community. (Landezine,2011)

Influence on Design

Figure. 5.5 Controlled overgrowth

By adapting the spirit of place and incorporating old and new landscape features into an exciting aesthetic, an intriguing atmosphere can emerge. The character of the Hazeldean factory should remain, despite all the new interventions.

-Ultimately the project's ability to turn problems into opportunities could create new and exciting spaces. On Hazeldean farm, the issues mentioned can be drivers for innovative design.

Figure. 5.6 Pathway to natural spaces

Figure. 5.7 Grassy aesthetic

Figure. 5.8 Waters edge

5.3 ZHONGSHAN SHIPYARD PARK, BEIJING, TURENSCAPE

Merging living and social systems

This adaptation of a once operational shipyard converts the industrial shipyard structures into recreational facilities which have a historical meaning within a new landscape. This park takes three approaches in order to dramatize, artistically and ecologically, the spirit of the site using the following elements: its unique history and vegetation, soil and natural habitats; modification of old forms and structures for educational and functional purposes; and new forms that illustrate the character of the site in an artistic way. The fundamental part of this design is the objective of allowing people to experience this place because of its heritage, ecological systems and appealing spaces. (Landezine,2012)

Influence on design

- The pedestrian access system seems to float on and touch the landscape and its ecological systems lightly. The two systems thus work together harmoniously.
- The adaption of this industrial site, not initially considered to be valuable in terms of recreational space, is converted from an undesirable and dead space into a desirable destination.
- The display of ecological systems showcases the opportunities there are in using various plants and planting systems to characterize and create a strong identity in different parts of the landscape. Hazeldean has similar attributes to those in this case study. It is a post-industrial site currently unvisited and unnoticed by people, it has historical meaning, various vegetation and different types of water systems. All these attributes can be added to, to create a peoples' place that depicts meaning and uniqueness. .

Figure. 5.9 Merging of soft and hard elements

Figure. 5.10 Surface material geometry

Figure. 5.11 contrasting contemporary planting

5.4 THE HIGH LINE, NEW YORK, FIELD OPERATIONS

Details and material arrangement

The High Line was designed to keep pedestrians and traffic at a distance, enabling city dwellers to escape by taking long walks on formerly abandoned, but now transformed railway tracks. The design maintains linear consistency while maximizing the performing functions of a public space. The multi-functional planking system integrates planting, irrigation, walking surfaces, and seating on a suspended rail structure and reinforces linearity by working with the rail tracks and creating a sense of eternity. Integration of the planks and planting areas create a sense of merging materials and contrasting textures between vegetation and pre-cast concrete planks (Margolis et al.,2007).

Influence on Design

- The pedestrian dominance advocated by the design concept makes this a good precedent to observe, whilst designing circulation for a pedestrian environment consisting of busy walkways and quiet spaces.
- The merging of soft and hard materials is a direct response to the general aesthetic of clean lines and the geometry found in the design. The contrast of cold materials such as steel and concrete with the softness and warmth of informal contemporary planting creates an appealing space. This technique could be adapted to the many contrasting soft to hard spaces that will be necessary in the Hazeldean landscape.

Design Objective
Framework
Design Development

06
Design Development

6.1 INTRODUCTION

This chapter serves to explore a landscape design solution. The design resolution will be in response to issues, opportunities, theories and concepts outlined in previous chapters. The initial site exploration and ideas leading up to the proposed framework and final design solution will be discussed here.

6.2 DESIGN OBJECTIVE

As stated in the hypothesis, the objective is to create for Hazeldean an enriching, healthy and living environment through landscape design that will regenerate and renew this post-industrial dairy farm. The site has heritage significance and environmental assets which should be optimized to ensure that the new landscape is economically productive, environmentally sound and socially sustainable. The objective of creating a new landscape lies in the probability that the site's potential can be realised and subsequently embraced in a new development context.

The design proposal aims to resolve issues such as site identity, use, access, connections, building and landscape relationship, as well as soil conditions. Alternatively, opportunities that exist and could be built upon are site topography, existing infrastructure, energy from surrounding amenities, productive capabilities, heritage significance, the spirit of place as well as the natural features of the site which contribute to its rarity.

Ultimately, the design objective endeavours to draw previously non-existent attention to this charming site in order to transform a property special to one family into a public landscape cherished by its community.

Figure. 6.1 Hazeldean Dairy farm buildings

6.3 FRAMEWORK PROPOSAL: "FULL CIRCLE LIVING .2"

The FCL.1 framework critique found weaknesses that needed to be addressed. The theory of Green Infrastructure suggested ways of integrating natural systems into urban and suburban scenarios, which could be applied to modifying the FCL.1 framework. The first issue to be addressed was the positioning and quality of green space. In Figure 6.2, the Full Circle Living.2 framework (FCL.2) proposes that the green space allocated in the framework be moved to a more central position in the development. This is to ensure that green space is not left redundant on the edge of development, with no purpose other than being a buffer space. These central recreational spaces are to function both as storm water swales and detention ponds which manage and direct the flow of water gently to the study site.

The second adaptation to the FCL.1 plan comes in response to the allocation for the movement and experience of pedestrians within the development. It is crucial that the FCL.2 proposal should resolve this issue, as there is a disregard for the pedestrian experience in many built up places in Tshwane. As this is a suburban development, the need to cater for pedestrians is even greater, seeing that the precinct aims to satisfy every human need within its boundaries. Referring to Figure 6.2, the proposed pedestrian routes form part of the green space spine, therefore reinforcing these avenues as pedestrian-centred zones.

Another pertinent issue which the FCL.2 framework aims to resolve, concerns the orientation and character of the mall adjacent to the study site. The FCL.2 plan suggests that the mall be allowed to spill out onto the site and become an open air mall. The character of such an open air mall lends itself to the mall becoming an extension to the pathways proposed on the study site. This mall arrangement also allows for a gentle transition from the mall space onto the site.

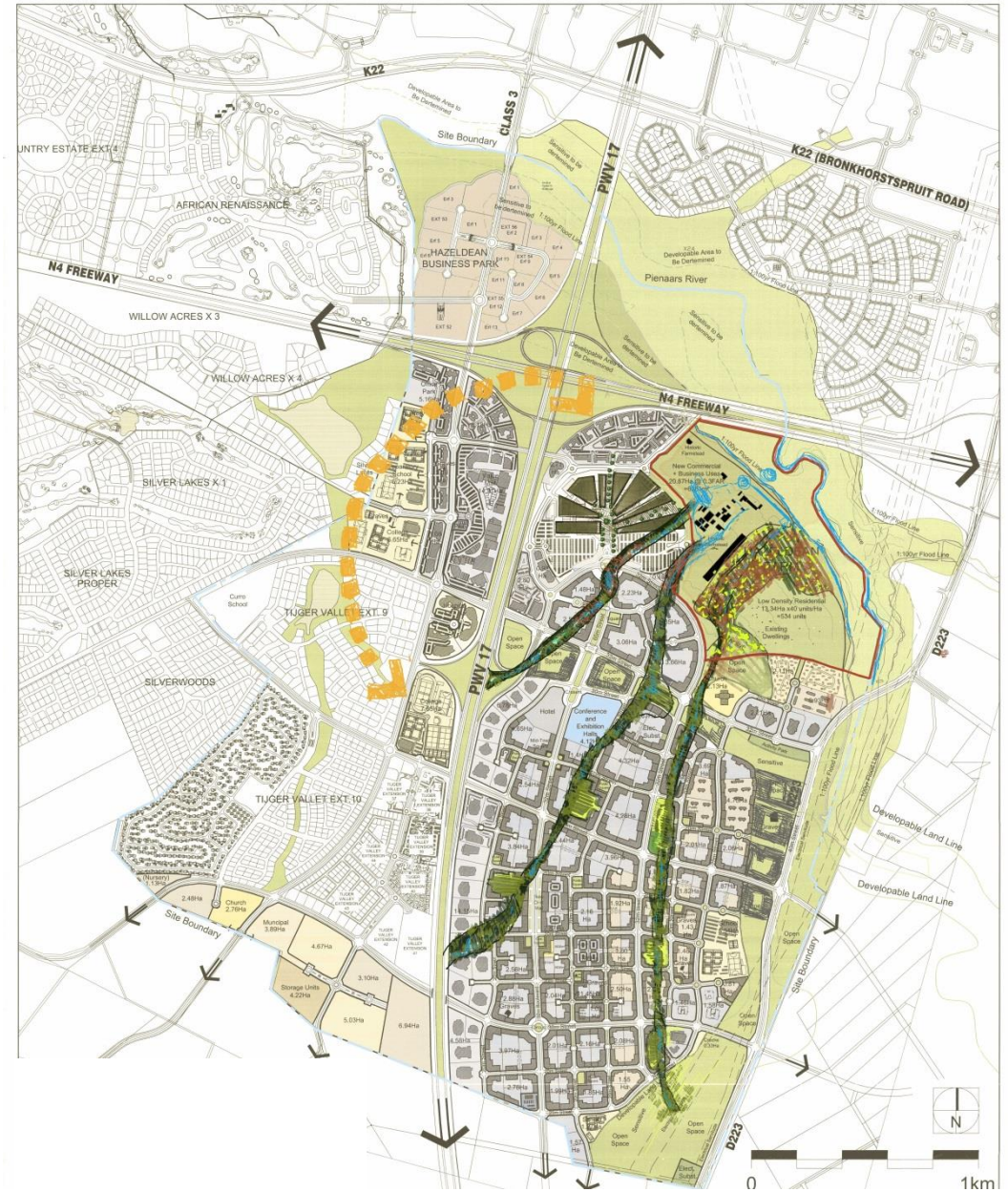


Figure. 6.2 Diagrammatical FCL.2 Framework proposal

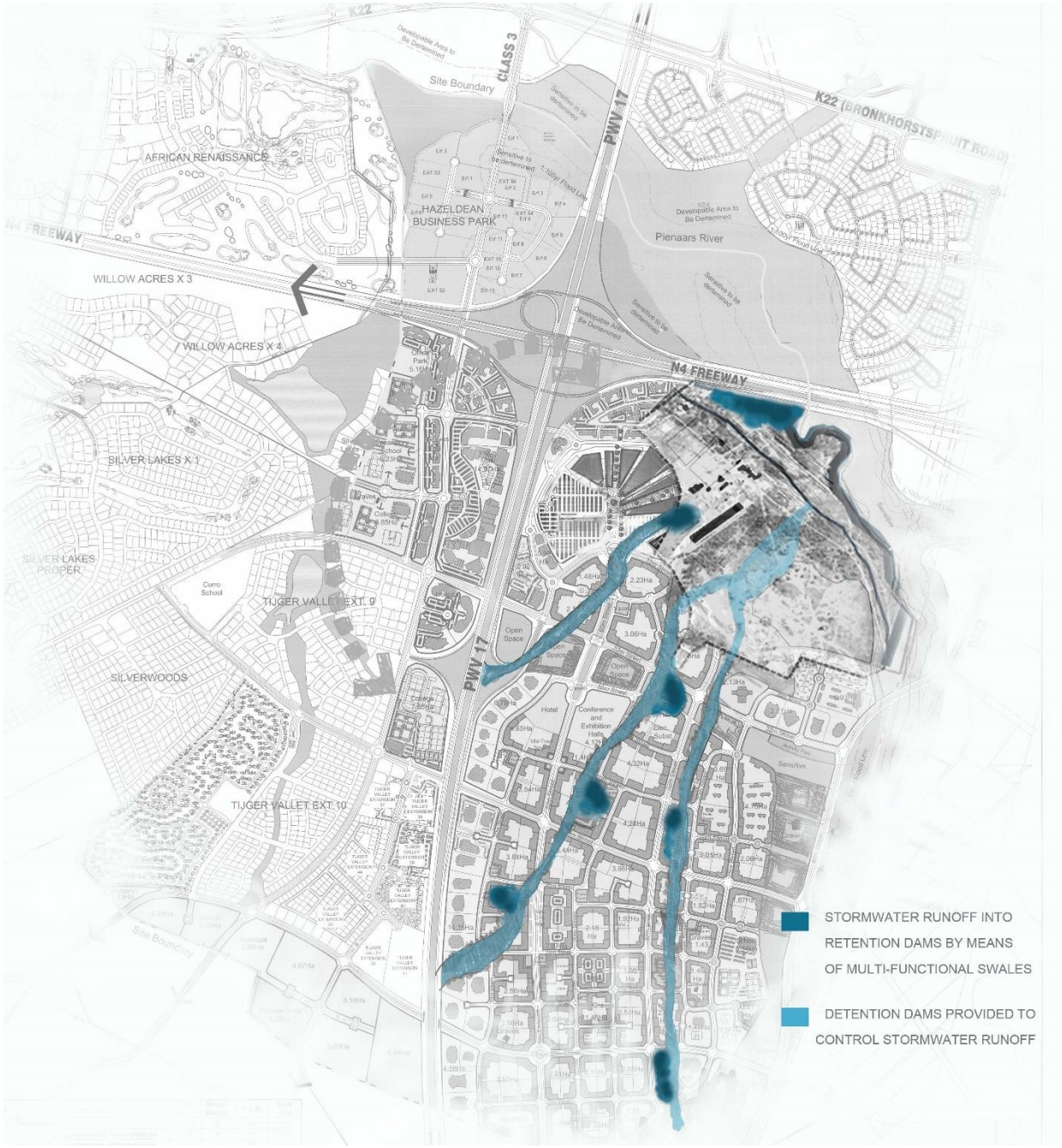


Figure 6.3 Storm water strategy FCL.2

The FCL.2 framework aims to use swales as a natural means of water diversion, thereby making place for waterways to become central features in the development. Detention dams will be constructed along the swale paths to control the speed of runoff water. The appearance of the central green spaces will thus be ever changing according to weather patterns and seasonal rain showers.

6.4 DESIGN DEVELOPMENT

6.4.1 Zoning and edges

The first step in designing was to prepare a rough zoning diagram for the allocation of activities proposed for the site, this was a response to the spatial relationships diagram prepared in chapter 4. These zones included main access routes to important places, parking, flower crops, water storage dams, open- event space and hard space demarcated for the market area (Figure.6.4). This diagrammatic stage also highlighted the important transition zones requiring attention, that is, the mall to site edge, the factory buildings to hardscape edges, and the entrance to parking edge. Discussed in previous chapters were the thresholds and interfaces between spaces and activities that were crucial to understanding the role of the site in its context and thus developing the site concept. The first design response, seen in Figure 6.5, aimed to separate the factory buildings from the rest of the site by means of a mote .This proved to be short sighted as the demise of the factory in the near future was probable and the design had to respond to the vacant buildings that would be left over after the factory's end. The approach to designing the site with the factories end in mind was deemed more sensible as, by the time the factory shut down, the FCL.2 development would be established and the issue of the site being abandoned would have arisen. Through the process of assigning activities to the landscape, many of these changed position. The placement of the market space and nursery were changed more than once as the space- making capabilities of these structures were tested through the process. The extent of the flower crops and open event space were also changed continually in order improve on the spatial quality that these activities were contributing. The Pienaarsriver flood line also became a consideration when determining the magnitude of the flower crops.

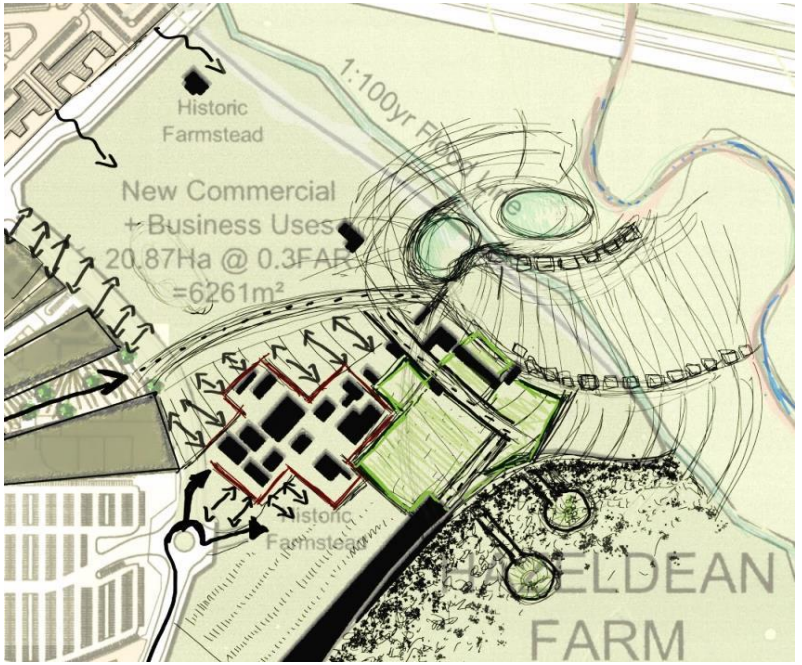


Figure 6.4 Zoning and Edges.1

Figure 6.5 Mote approach

6.4.2 Access and hierarchy

The second stage of design planning began with the organization and arrangement of access and circulation paths to direct pedestrians toward the main activity nodes in the landscape, as illustrated in Figure 6.6. It was presumed that the activities that would draw people to the site would be the market facility and the functions hall at the old barn. The areas allocated to these two activities already contain the tallest structures in the landscape which serve as landmarks to identify these important destinations. The market area contains an existing water tower and milk silo, while the old barn contains two grain silos (Figure. 6.7). Adjacent to these primary nodes are the secondary, spill over, recreational spaces which consist of quieter and more intimate spaces which encourage relaxation and calmness. This is in in contrast to the bustling atmosphere of the market space. The secondary spill over spaces will be adjacent to the market area and placed next to water in order to encourage tranquillity, refer to Figure 6.8. The open green space and multifunctional events space could also be considered as a secondary space because of the relief it provides from the adjacent hardscape market area.

The tertiary activity spaces are considered to be places of exploration and are situated away from the main activities in the landscape. Paths and pause spaces amongst the cut flower farm as well as forest paths to the Pienaarsrivers and vlei area will be considered as tertiary zones .These places aim to evoke natural world experiences and provide settings unusual to otherwise harsh urban areas.

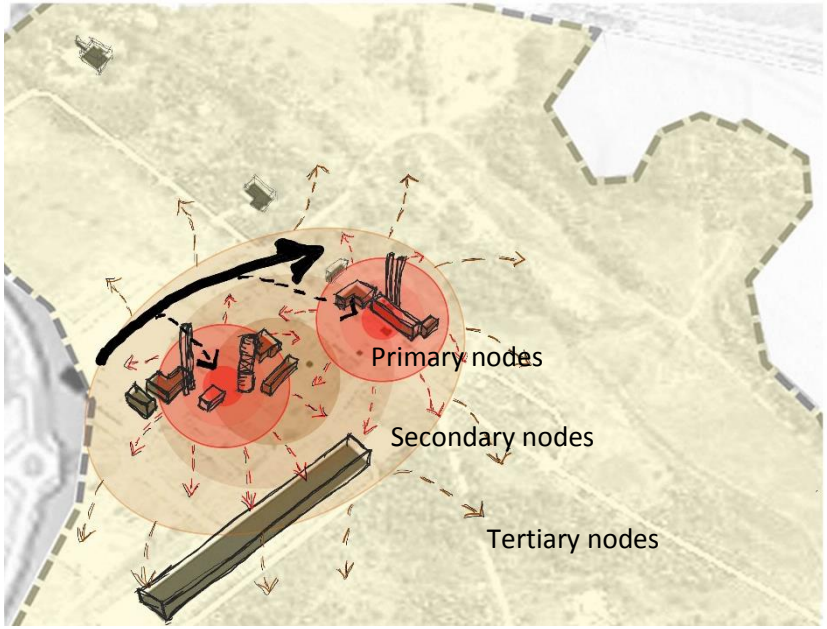


Figure. 6.6 Main Activity nodes

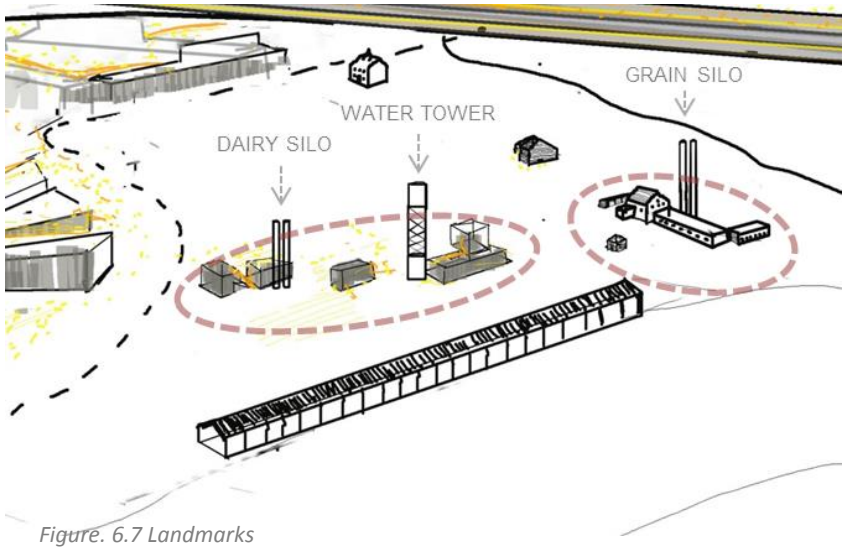


Figure. 6.7 Landmarks

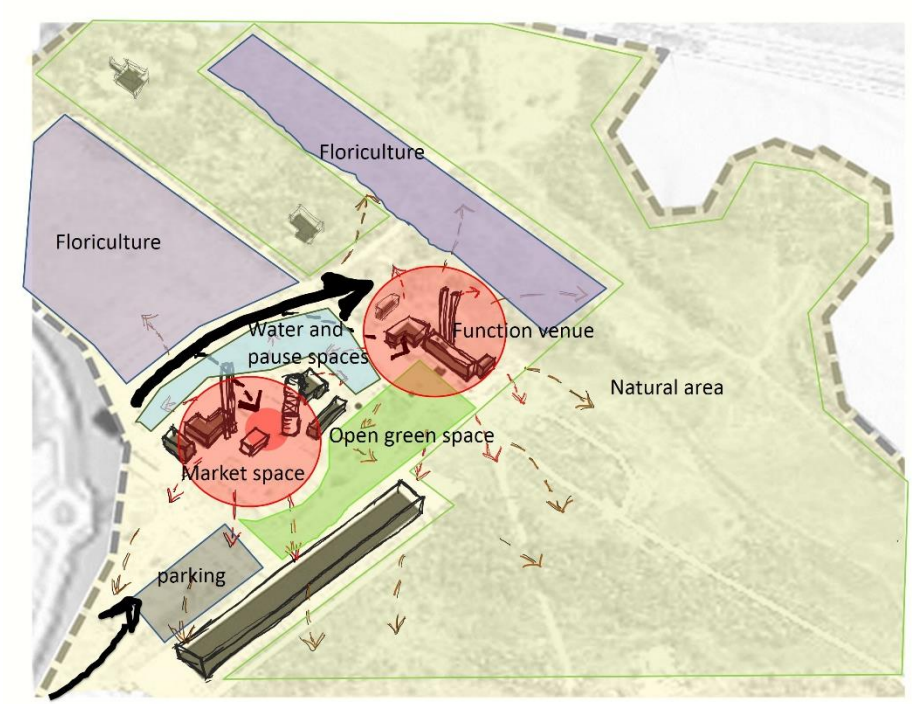


Figure. 6.8 Zoning

6.4.3 WATER

6.4.3.1 Storm water management system

The storm water management system is crucial to the functional working of the proposed landscape. There is a flood risk at the study site if the water is not controlled and slowed down. The storm water control strategy is proposed to slow down the water by using swales, weirs and detention dams as part of the FCL.2 development proposal. The water strategy aims to slow and delay the peak flow while simultaneously creating seasonal features in the suburban development. The storm water calculations which demonstrate the volume of water expected and can be seen in Appendix A. Figures 6.9 and 6.10 further explain the storm water management system as it appears in the FCL.2 framework. The water captured will then be purified in a large wetland system to ensure harmful substances are removed in order for the fish to survive. The wetland will become the main functional and aesthetical spine in the landscape.

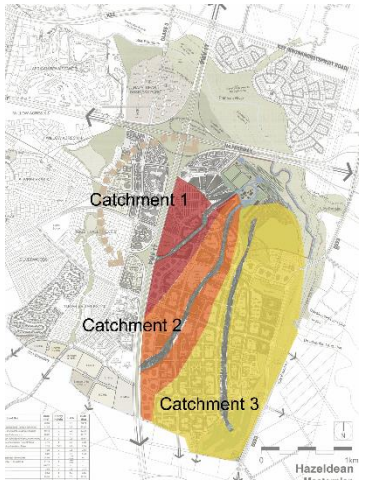


Figure. 6.9 Swale routes

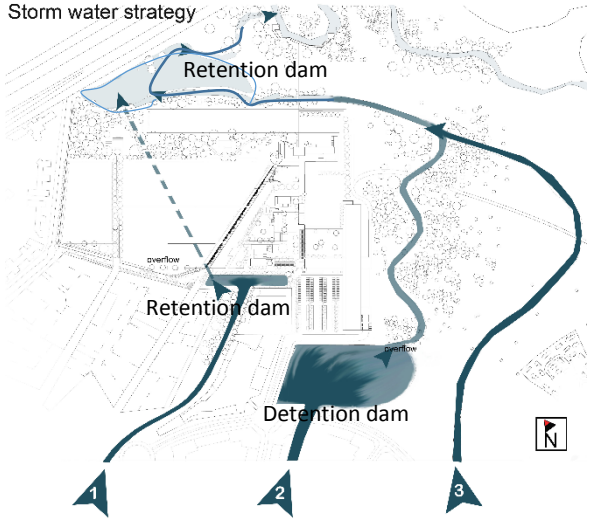
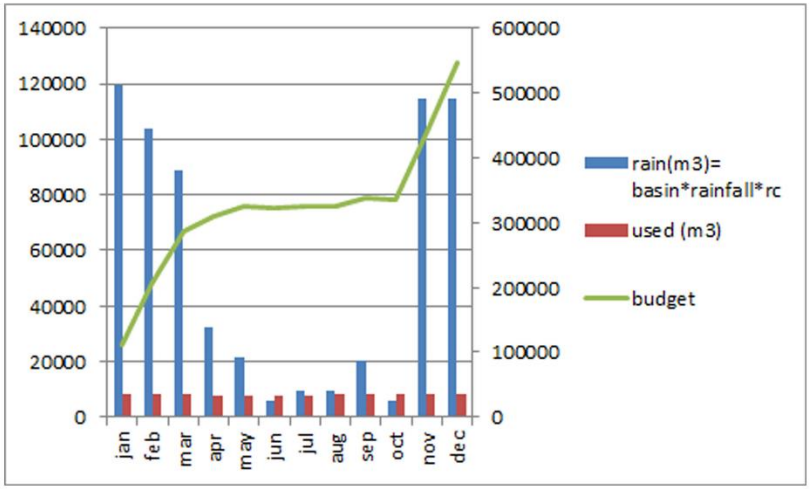


Figure. 6.10 Water diversion on site

6.4.3.2 Site storm water

The storm water flow directed toward the site is a valuable resource that can be used in the landscape, especially as an abundant amount of water is needed to sustain the cut flower farm. . The Aquaphonics- based method of irrigating also requires large amounts of water to start the system off. Fortunately the volume of water expected far greatly exceeds the amount that will be used in this system, refer to Figure 6.11.

Most of the proposed designed landscape is vegetated space and thus runoff from this area will not be as worrying as the runoff from the dense FCL.2 development adjacent to the site. The hardscape market area on the site



WATER USED INCLUDES:

Flower crop irrigation
evaporation losses
Root absorption losses
Tree, lawn and general landscape irrigation
Water for cut flower preservation, nursery and market.

Figure. 6.11 Water budget

however lends itself to a water collection system for use in the surrounding market buildings and cut flower trade buildings. There is an existing water tower in this space and thus the infrastructure exists in which to plan this collecting system. The design of this system is outlined in Figure .6.12. Permeable paving with a large underground cavity to store water was an initial option : however, upon investigation a secondary option was proposed by which designed storm water grates, which contributed to the aesthetic of the market place, could be allocated to direct water underground to one large underground storage cavity at the lowest point of the hardscape market area. This water could then be pumped through to the tower by means of an interactive water feature. As the water flowed down the tower from the storage tank, it could be filtered to supply clean water to flower retailers, who require buckets of water to preserve their flowers. The nursery and industrial buildings could also have their own allocated towers where water is stored. These towers would have the potential to create sculptural elements in the new landscape, as they did in the old. These towers could add distinction to the landscape especially if they are placed in the market area, which is the main activity hub.

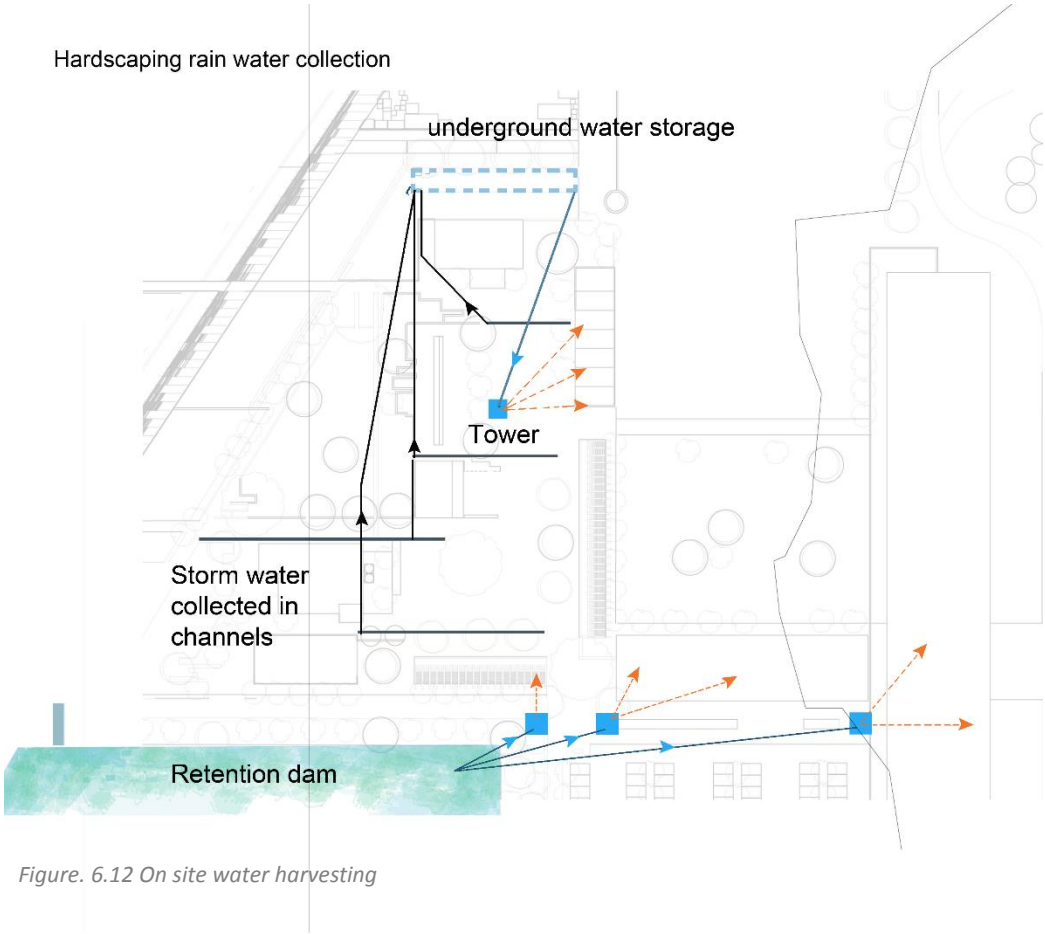


Figure. 6.12 On site water harvesting

6.4.3.3 Floriculture and Aquphonics irrigation

As previously stated, the reason for investigating the Aquaponics irrigation system was the bad soil conditions on site. The closed loop water circulation system and exchange of nutrients in this system ties in closely with the theory of regeneration. The structure of the systems supporting the Aquaphonics and water purification wetlands allow for the theory of a living landscape to be applied more strongly. The attached subsystems also create an opportunity to respond to living systems and their attributes, namely, growth, wind, light and change.

The irrigation system is to work as follows: after the storm water has been cleared of impurities and pollutants through the constructed wetland, the water will flow to large fish breeding dams. The water, rich in nutrients (fish excrement), will then be conveyed to the specially designed cut flower irrigation pipes where plants can slowly absorb the water. Figure 6.13 illustrates the Aquaponics system strategy while Figure 6.14 illustrates the custom designed water conveying and plant holding pipe.

The site has a sufficiently gradual slope for water to flow slowly and gravitationally toward a low point where the filtered water can be collected and pumped back up to the fish dam. This will allow the water to be aerated and returned to the fish in a condition suitable for them to live in. This cycle will continue and water will only need to be topped up when it is lost to evaporation and plant root uptake.

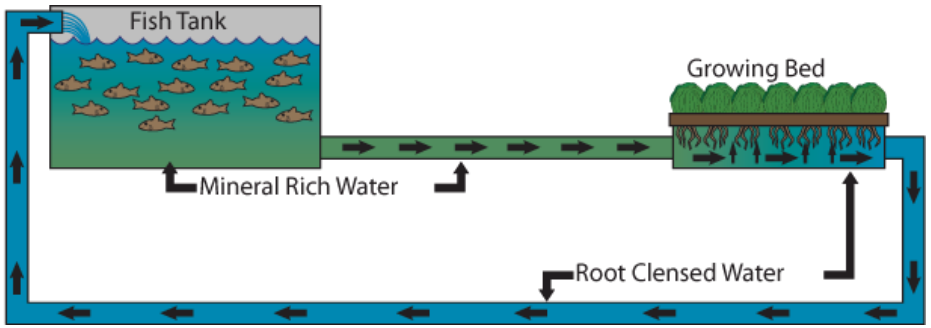


Figure. 6.13 Aquaphonics system strategy

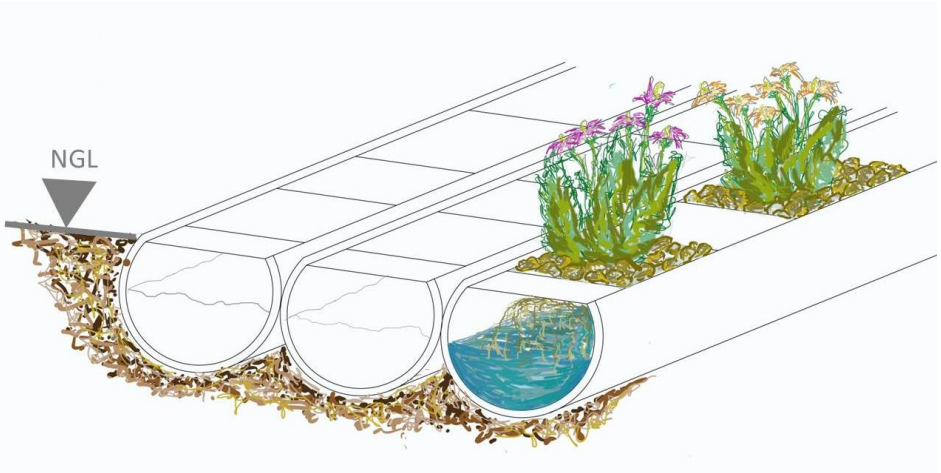


Figure. 6.14 Aquaponics pipe

6.4.4 PLACES OF INTEREST/ PEOPLE SYSTEM

Besides making the new Hazeldean landscape a productive one; it is imperative to incorporate social activities into the working farm. Designed landscapes are primarily people places. The driver behind the design of the people spaces in the landscape aimed to enable the pedestrian to observe and enjoy the site's natural assets. As the design character emphasises natural features and systems, the objective is to place pedestrians on viewing platforms to witness the beauty of an environment dominated by intricate systems. The structural approach to pedestrian places should aim to touch lightly on the landscape.

The main pedestrian zones are within the market space and the pause spaces along the wetland edges, flower crop look- out points and other natural assets on the site, including the Pienaarsrivier, vlei area and forest near the manor house. People love to engage with water and thus all the water amenities on site have varying characteristics, so that different emotions are evoked by all of them. The design aims to allow pedestrians to experience a range of places in the landscape which all evoke a different feel. The pedestrian spaces range from hard and busy to completely soft and tranquil, all of them having completely different characteristics.

Material palette
Plant palette
Master plan
Sketch plan
Sections and Details
Perspectives
Conclusion

07
Detail Design

7.1 INTRODUCTION

This chapter aims to illustrate the technical considerations of the design proposal in terms of detail design, construction and materiality. The technical resolution will make reference to heritage response through materiality and in response to the living
landscape philosophy.

7.2 MATERIAL PALETTE

The approach to the material palette selection is based on heritage factors. The use of material in the heritage buildings is the key characteristic which makes Hazeldean dairy unique from Sammy Marks Dairy and Irene dairy. This distinguishing attribute should thus be carried through into the new landscape, where historically used materials will be used in a contemporary way.

1a. the old barn is constructed with a concrete and lime mixture, cured in corrugated steel shuttering. This ribbed finish on the concrete makes clear the construction process used in 1945.
1b. Concrete with an off shutter- timber grain finish, will be used in the new landscape wherever cast in situ concrete is specified. This finish will reveal visual evidence of the construction method employed. This material specification will be used in retaining walls and low walls constructed in the landscape.

2a. locally found stone was used as a reinforcement to strengthen the walls. With age, these stones are starting to reveal themselves. The material palette has become honest, even if it might have not been before.
2b. Gabion baskets will be used as a contemporary material response to using stone in the landscape. Gabions are used as soil stabilization on the banks of the constructed wetland and retention dams. Large boulders cast in concrete are also used for slope stabilization.

3a. Mild steel in the form of corrugated sheeting for roofs is used throughout Hazeldean. I-beams and channel profiles are used as supporting members in some instances.
3b.Mild steel is used in many ways in the new landscape, especially for overhead

Existing materials

Figure. 7.1 corrugated concrete

Figure. 7.3 Stone and Steel

Figure. 7. 5 Steel supports

New materials

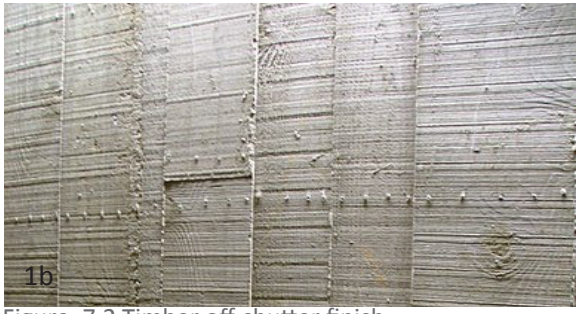


Figure. 7.2 Timber off-shutter finish

Figure. 7.4 Gabion

Figure. 7. 6 Steel sections

Figure. 7. 7 *Eucalyptus* Timber

structures, connections and handrail systems. The steel is galvanized in places where it is in contact with soil or water.

4b. Timber is used in seating details only. This is most comfortable to sit on compared to the others materials chosen for the palette. There are man sitting areas and pause spaces in the landscape and therefore providing comfortable seating is essential. The timber specified is Eucalyptus harvested on site.

5b. Mentis grating is used on the raised walkway above the wetland. This indicates the pause spaces on the walkway and is thus situated away from the high traffic zone.

6b. Echo slabs are used as a precast method of constructing the raised walkway. These slabs have interlocking edges and thus they do not need to be joined with mortar or screed.

7b. Pre-cast concrete slabs are used as the main paving material along access routes. This method of paving emphasizes linearity along these routes.

8b. Cobble stone pavers are used in the market are to differentiate this gathering and retail space from access and movement paths.

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8b. Cobble stone pavers are used in the market are to differentiate this gathering and retail space from access and movement paths.

Figure. 7. 8 Steel grating

Figure. 7. 9 Echo-Slab concrete

Figure. 7.10 cast in-situ concrete

Figure. 7.11 Cobblestone paving

7.3 PLANT PALETTE

All planting species are to be endemic to the grassland biome. The planting strategy for Hazeldean is to be conducted in a naturalised manner in order to emulate the pre-industrial spirit of the landscape.

Alien Vegetation:
All exotic species are to be eradicated from the site before planting of Indigenous plants can commence.

Raised walkway planting:
The use of a single specimen on the walkway structure is based upon the concept of creating distinctive landmarks on Hazeldean. The *Clematis brachiata* creeper is selected not only for its physiological characteristics, but also for its sensorial and aesthetic qualities.

Wetland:
The plants are specifically chosen to purify any pollutants that pass through the storm water system. The different cells within the wetland permits a variety of habitats for both fauna and flora .

Planters:
Planters near the buildings should be vegetated with palatable and indigenous grasses. This stategy forms part of heritage considerations, as the previous landscape would have been filled with palatable grasses for the cattle, thus reintroducing this vegetation will contribute to the memory of the agrarian landscape which existed.

Cut flower:
Due to the aquaponics irrigation system, plants with bulbous or tuberous root systems are not suitable in this palette. In addition to their root systems, strong contrasts in colour, texture and size become critical features in plant selection due to the requirements of the cut flower industry. Using plants flowering through different seasons and which are sun loving, would be ideal

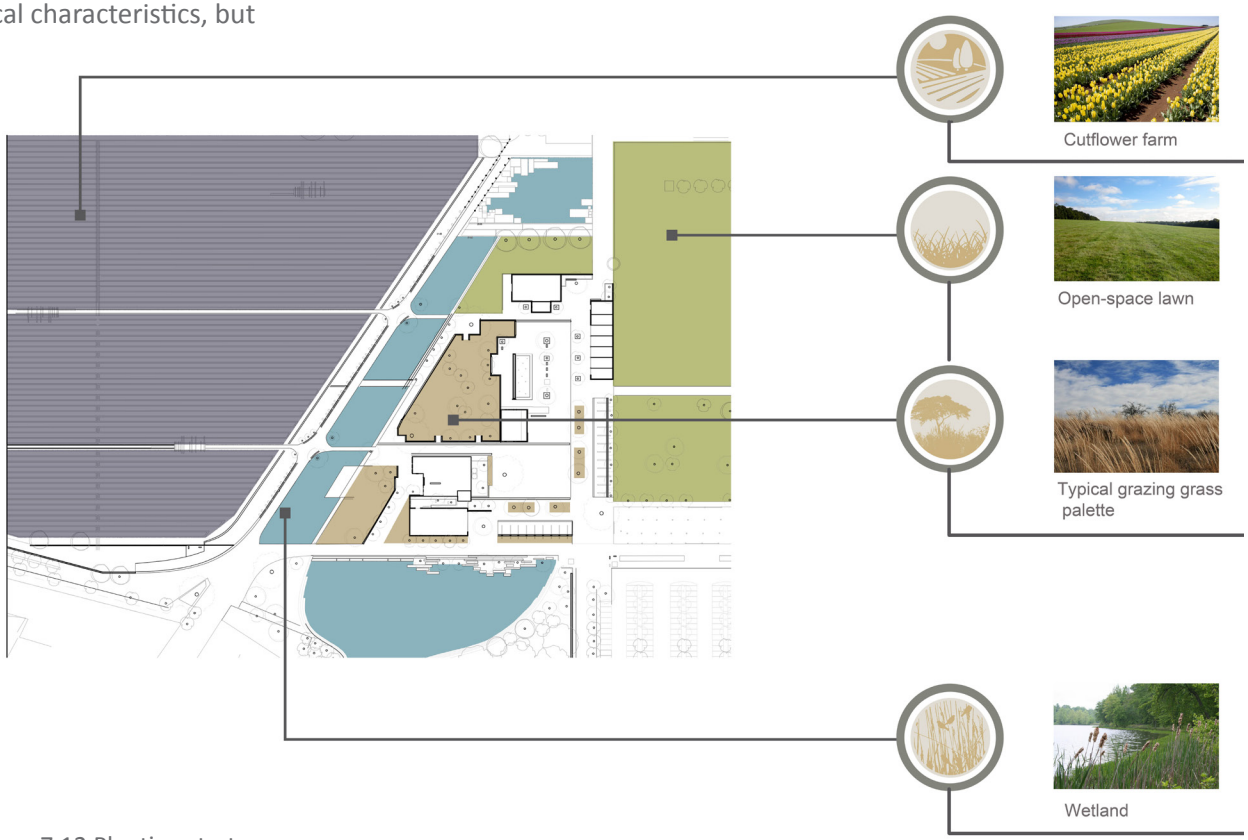


Figure. 7.12 Planting strategy

WETLAND:

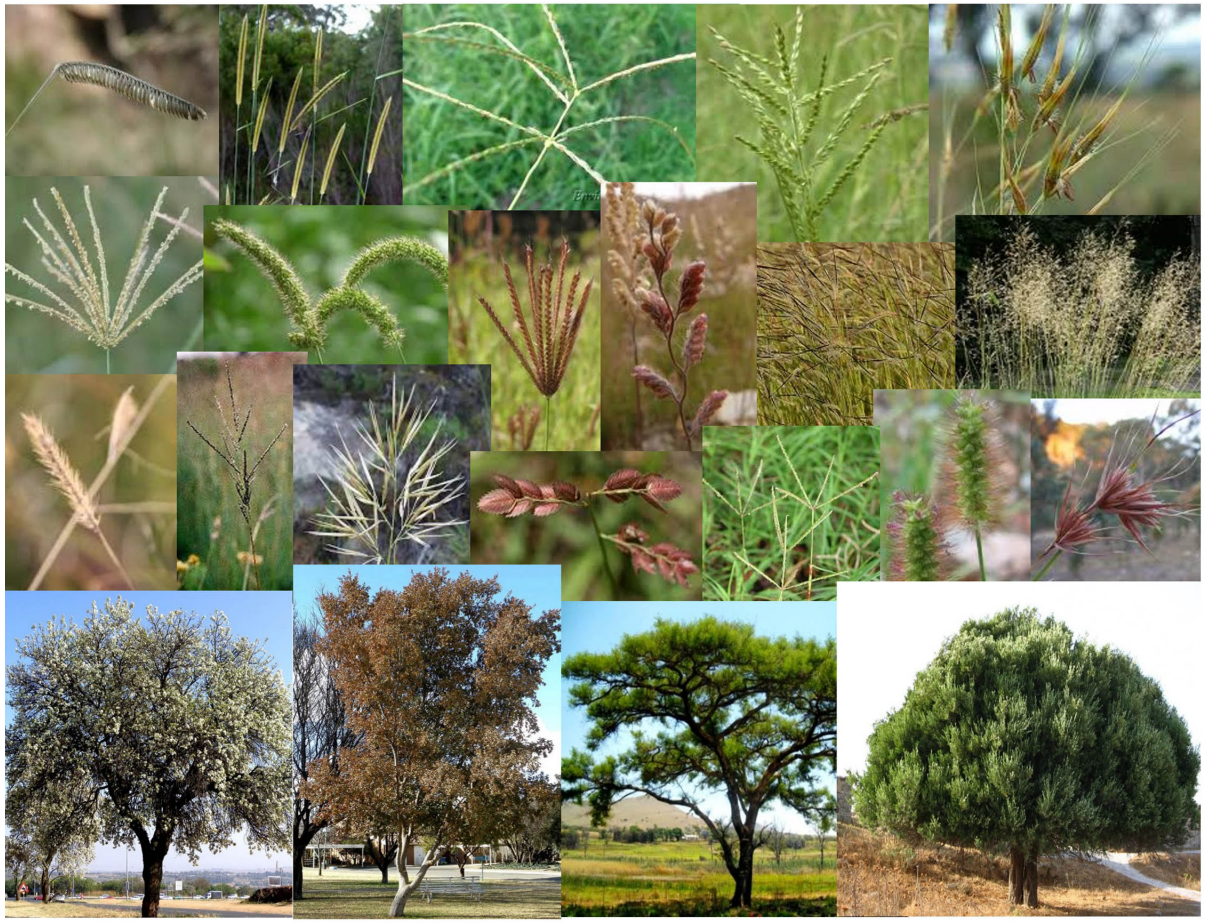
Marsilea schelpiana
Nymphae nouchali
Nymphoides indica
Nymphoides thunbergiana
Schoenoplectus corymbosus
Berula erecta
Cypherus marginatus
Cyrtanthus breviflorus
Eleocharis dregeana
Hesperantha coccinea
Juncus glaucus
Kniphofia ensifolia
Mentha aquatic
Commelina Africana
Crinum bulbispermum
Cyrtanthus breviflorus
Equisetum ramosissimum
Eucomis autumnalis
Falkia oblongata
Gomphostigma virgatum
Gunnera perpensa
Lippia javanica
Melinis nerviglumis
Andropogon eucomis
Blechnum tabulare
Carex austo subsp. Africana

Figure. 7.13 Cut flower plants

Figure. 7.14 Aquatic plants

CUTFLOWERS:

Zantedeschia rehmanii
Gladiolus crassifolius
Gladiolus elliotii
Gladiolus dalenii
Urginea multisetosa
Phyllanthus parvulus
Melinis repens
Hilliardiella hirsute
Berkheya speciosa
Eulophia ovalis subsp. Ovalis
Dicoma zeyheri
Kylinga alba
Bulbine angustifolia
Hermbstaedtia odorata
Asclepias adscendens
Erica woodii
Indigofera sordida



PLANT LIST:

TREES:
Dombeya rotundifolia
Combretum erythrophyllum
Acacia sieberiana
Olea europaea subsp. Africana

PALATABLE GRASSES:
Highly palatable

Harpochla falx
Setaria sphacelata
Digitaria eriantha
Urochloa mosambicensis
Tristachya leucothrix
Chloris gayana
Setaria verticillata

Palatable Perennials
Heteropogon contortus
Setaria nigrirostris
Brachiaria serrate
Chloris virgate
Digitaria diagonalis
Themeda triandra
Chrysopogon semulatus
Tristachya biseriata
Eragrostis superba
Setaria pallide-fusca

Figure. 7.15 Master plan

7.4 MASTER PLAN

The master plan was primarily designed around the water system and the flower crops which relate directly to it.The main pathway of this new landscape is seen as an extension of the open air mall and this was the second consideration concerning form ,hierarchy and circulation.

The central water system creates many opportunities and it is multifunctional in its arrangement. The water bodies are necessary functionally, and are placed logically in the landscape to maximise gravitational flow. These water bodies with varying characters create opportunity for social engagement as well as aesthetical appeal. Water as the functional and aesthetical back-bone of the new landscape relates to the historical arrangement of the dairy farm with its honest and visible water system throughout. The constructed wetland system and aquaponics system also allow for new plant and animal ecosystems to occur.

The main raised walkway stemming from the mall and extending over the wetland, direct visitors to either of the two main attractions on the site, that being, the functions venue at the old barn, or the market space amongst the factory buildings. The main pathway allows secondary and tertiary pathway systems to dissect it and lead the visitors to activities with varying degrees of intensities. The entrance,market and venue nodes act as central points where paths to less intense activities stem off from.

The secondary, less- busy activity zones are pause and relaxation spaces which are situated close to water bodies and densely planted areas . These occur on all four sides adjacent, but separate to the bustling market space. These being the seating edges alongside the wetland, the lawn areas around the market as well as the concrete slabs which overlook the retention dam.

The tertiary spaces are those which allow visitors to experience places in the landscape dominated by vegetation and the naturally occurring environmental amenities on site. These areas include pathways into the flower crops with varying functional follies, a pathway and viewing deck over the Pienaarsrivier, as well as a meandering pathway through the existing forest near the Manor house.

The master plan aims to provide access to diverse activities within the landscape which evoke various experiences for visitors, whether commercial and natural.

Figure. 7.16 Sketch plan

7.5 SKETCH PLAN

The sketch plan area is focused on the market area enclosed by the existing face brick, factory buildings. These buildings and the existing water tower and steel dairy silos give this space its typical post-industrial character.

The plan presents the entrances to the farm from the open air mall, and the parking lot, both spaces are celebrated as entrances and provide an open space for visitors to pause and then decide upon a direction in which to go. Both entrances create strong links to the two main activity zones (venue and market)

The aquaponics storage building, refrigerated cut flower storage building, proposed outdoor market structures, the proposed nursery greenhouse, admin building, flower paraphernalia building and coffee shop, as well as the information desk, all enclose the main market space. This space is designed as a public square like space, where a change in material demarcates the selling, buying and waiting spaces typical to the functioning of a market environment. The zero depth water feature is especially designed to invite children to interact with it. The water feature forms part of the circulatory water system part of this zone, and creates a transition between the busy market and the pause spaces to the left.

As previously mentioned, these pause spaces occur within the grassland vegetated mound, and seating retaining walls which support it. The wetland edge is different all along its edge, this as to encourage various experiences and views. Around the market space, visitors can experience water differently, in some instances they can be in contact with the water and other times only viewing it from a distance. The retention dam is shaped to allow concrete slabs to “float” in the very shallow water so that visitors may walk into the water with getting wet or being in danger.

Multifunctional lawn spaces are provided to the right of the market space, this to accommodate events and a park like environment, depending on the circumstance. This threshold space also provides a link between the production cycle and retail cycle where a dual service and pedestrian path link the two activities.

The market space becomes a central point whereby other activities on the farm stem off from it in descending degrees of public energy.

7.6 SECTIONS AND DETAILS

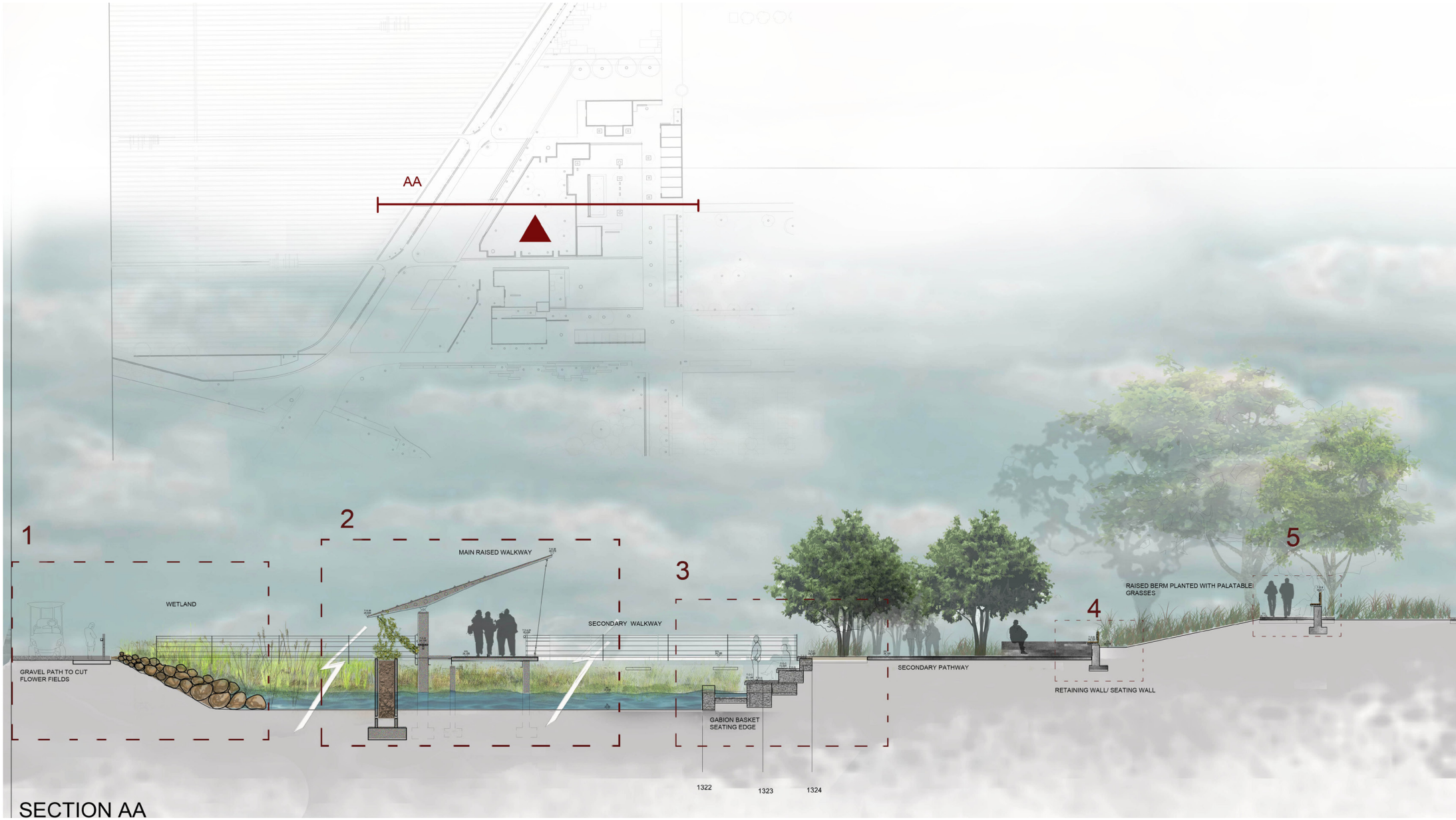
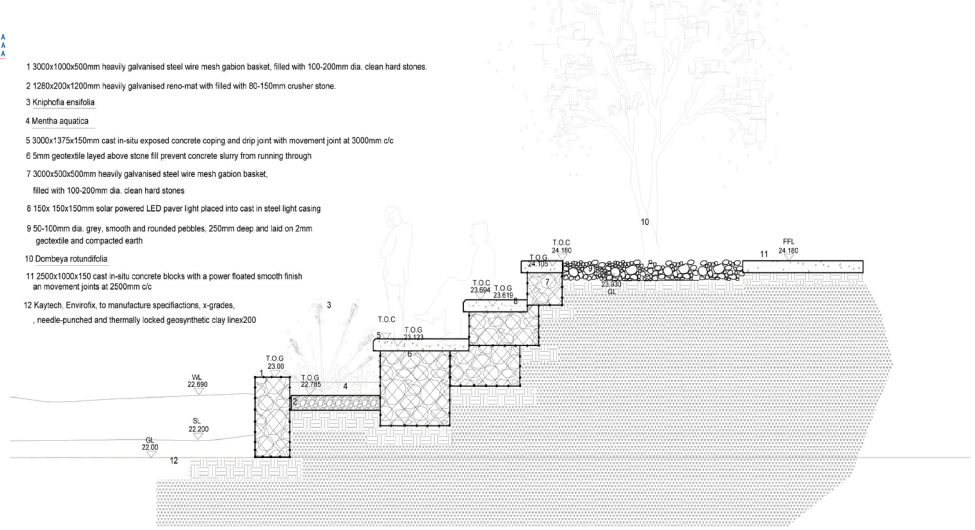


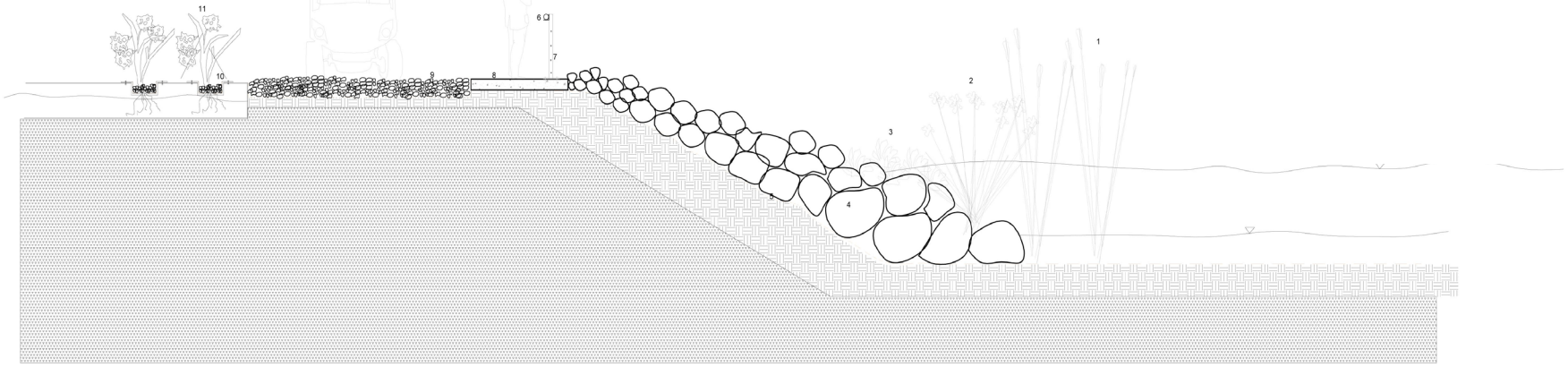
Figure. 7.17 Section AA- Through Wetland and Market area

1 3000x1000x500mm heavily galvanised steel wire mesh gabion basket, filled with 100-200mm dia. clean hard stones.
2 1280x200x1200mm heavily galvanised reno-mat with filled with 80-150mm crusher stone.
3 Kniphofia ensifolia
4 Mentha aquatica
5 3000x1375x150mm cast in-situ exposed concrete coping and drip joint with movement joint at 3000mm c/c
6 5mm geotextile layed above stone fill prevent concrete slurry from running through
7 3000x500x500mm heavily galvanised steel wire mesh gabion basket, filled with 100-200mm dia. clean hard stones
8 150x 150x150mm solar powered LED paver light placed into cast in steel light casing
9 50-100mm dia. grey, smooth and rounded pebbles, 250mm deep and laid on 2mm gectextile and compacted earth
10 Dombeya rotundifolia
11 2500x1000x150 cast in-situ concrete blocks with a power floated smooth finish an movement joints at 2500mm c/c
12 Kaytech. Envirofix, to manufacture specifiactions, x-grades, , needle-punched and thermally locked geosynthetic clay linex200

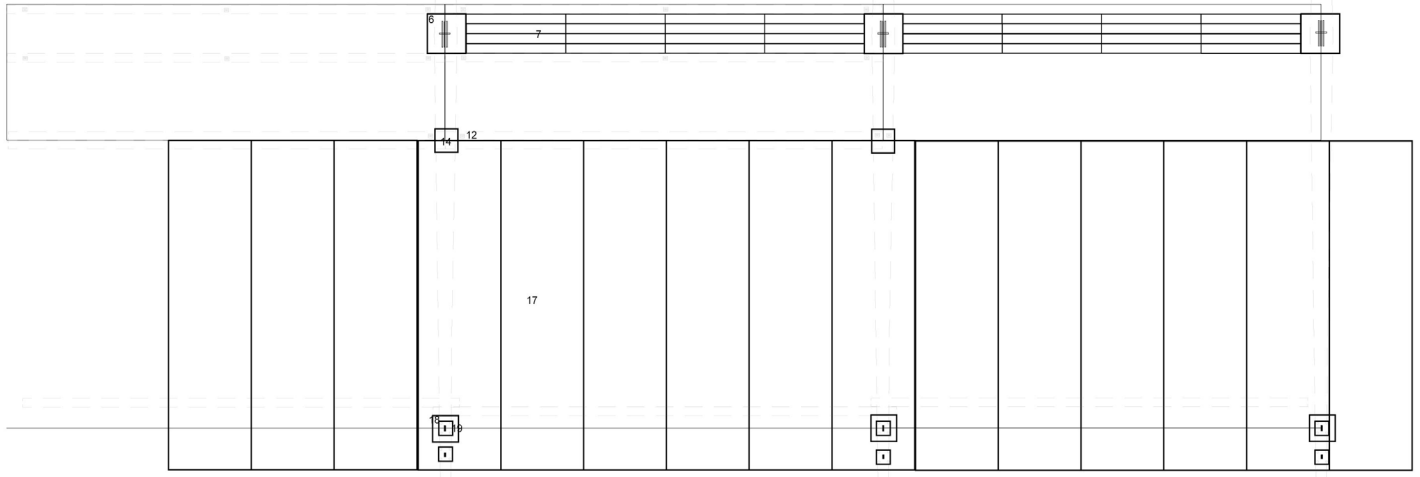


DETAIL 3
GABION BASKET SEATING EDGE
SCALE 1:50
Figure. 7.19 Detail 3

1 Pennisetum thunbargii
2 Hesperantha coccinea
3 Juncus lomatophyllus
4 from 500-600mm dia. to 100-200mm dia boulders dry stacked on a geotextile and compacted earth.
5 Kaytech, Envirofix, to manufacture specifiactions, x-grades, , needle-punched and thermally locked geosynthetic clay linex200
6 75mm dia. clear painted steel, round tube, welded to a 85x85x2mm steel galvanised and pre-welded angle
7 900x50x5mm galvanised steel flat bar fixed to 150x150x5mm base plate and M8 expansion bolts and nuts,at 4760mm c/c
8 1500x500x150 cast in-situ concrete blocks with a power floated smooth finish an movement joints at 2500mm c/c
9 19mm dia. grey gravel, 250mm deep and laid on 2mm geotextile and compacted earth
10 15mm grey gravel on a 0.5mm geotextile laid in a PVC perforated tray, fixed to a 500mm dia. PVC pipe, at 1000mm c/c
11 Gladiolus crassifolius



DETAIL 1
WETLAND EDGE AND CUT FLOWER FARM IRRIGATION SYSTEM
SCALE 1:50
Figure. 7.18 Detail 1



1 7885,perforated and tapered galvanised steel I-beam

2 30mm dia., 40mm long galvanised steel eyelet and nut, at 600mm c/c ,fixed to I-beam flange

3 Clematis brachiata

4 270x 160x 10mm clear painted steel hinges with a 15mm central axel, welded to 5mm base plate.

5 420x420x5mm galvanised steel baseplate at 4760mm c/c ,fixed to M18 cast in-situ U bolts and M18 nuts

6 420x 420x 4695mm cast in-situ exposed concrete column with concrete footing to engineer specification

7 1080x 100x 50mm PAR Eucallyptus timber, fixed with self tapping screws to steel PFC and treated with Woodoc 35 exterior polywax sealer

8 50x 20x 2mm clear painted PFC steel section, at 1080mm c/c, welded to 126x60x4mm clear painted PFC steel section at 4760mm c/c

9 M12 cast in U bolt fixed with M12 nuts to a 200x200x2mm clear painted base plate, welded to at 50mm dia eyelet at 4760mm c/c

10 1960x 16mm dia. internally threaded galvanised steel rod,fixed with reverse threaded hook bent bolts, to welded eyelets, at 4760mm c/c

11 30 mm dia. galvanised steel eyelets pre-welded to 16mm dia. galvanised steel rod, at 400mm c/c

12 4760 x1440 x 50mm unbanded RS80 Mentis GRIPWELD galvanised steel grating,continuously placed and fixed with M saddle clamps, at 2204mm c/c, to steel PFC sections

13 260x90x9mm PFC, galvanised steel section, fixed to M18 cast in U bolt with M18 nuts, at 4760mm c/c

14 2572x 200x 200mm cast in-situ exposed concrete column with concrete footing to engineer specification

15 120x120x2mm galvanised steel angle, pre-welded to a 600x 2mm cast in galvanised steel lug at 4760mm c/c

16 260x90x9mm PFC, galvanised steel section,pre-welded to a 600x 2mm cast in galvanised steel lug at 4760mm c/c

17 3500x 900x150mm interlocking concrete unscreeded "Echo-slab",placed continually

18 2808x 280x 280mm cast in-situ exposed concrete column with concrete footing to engineer specification

19 900x50x5mm galvanised steel flat bar fixed to 150x150x5mm base plate and M8 expansion bolts and nuts,at 4760mm c/c

20 75mm dia. clear painted steel, round tube, welded to a 85x85x2mm steel galvanised and pre-welded angle

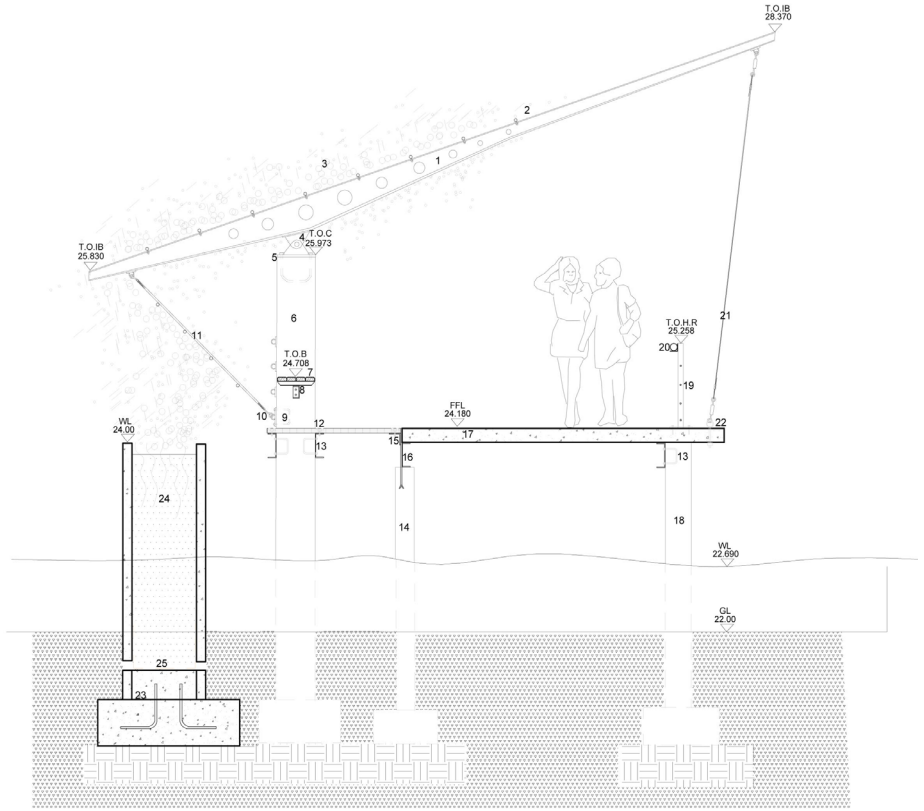
21 3920x10mm dia. galvanised steel cable clamped and fixed with bent hook bolts to welded eyelets, at 4760mm c/c

22 M18 80mm dia. galvanised eyelet fixed to the Echo-slab with M18 nut

23 2680x 900mm dia. concrete pipe with drainage perforation, cast into a concrete foundation anchored with galvanised J bolts, to engineer specification

24 growing medium

25 5mm geotextile



DETAIL 2

RAISED WALKWAY STRUCTURE

SCALE 1:50

Figure. 7.20 Detail 2

1 Melinis repens

2 Eragrostis capensis

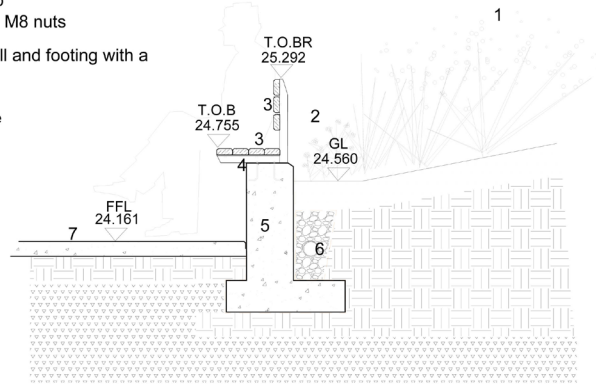
3 1200x 100x 50mm PAR Eucalyptus timber,fixed with self tapping screws to steel PFC and treated with Woodoc 35 exterior polywax sealer

4 400x50x35mm galvanised steel PFC fixed to M8 galvanised steel cast in J bolts fixed with M8 nuts

5 45000x750x 300mm cast in-situ concrete wall and footing with a timber grain off shutter finish

6 19mm dia. gravel wrapped in 5mm geotextile with a 100mm dia. Geopipe

7 2500x1000x150 cast in-situ concrete with a smooth finish, with movement joints at 2500mmc/c



DETAIL 4
RETAINING WALL/SEATING WALL WITH BACK REST
SCALE 1:20

Figure. 7.21 Detail 4

1 Eragrostis racemosa

2 Eragrostis capensis

3 2500x1000x150 cast in-situ concrete blocks with a broom finish placed at 150mm spacing

4 1200x 300x 860mm cast in-situ exposed concrete wall with a concrete footing

5 1200x 100x 50mm PAR Eucalyptus timber, fixed with self tapping screws to 400x 50x35mm galvanised steel PFC and treated with Woodoc 35 exterior polywax sealer

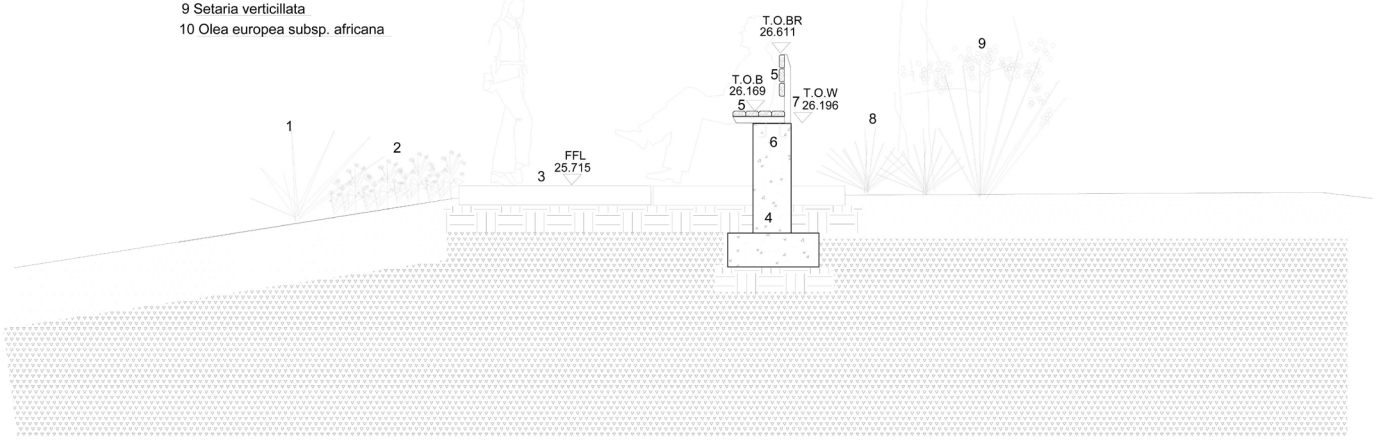
6 M8 galvanised steel cast in J bolts fixed with M8 nuts to PFC

7 530x50x35mm backrest PFC galvanised and pre-welded to seat PFC

8 Hyparrhenia hirta

9 Setaria verticillata

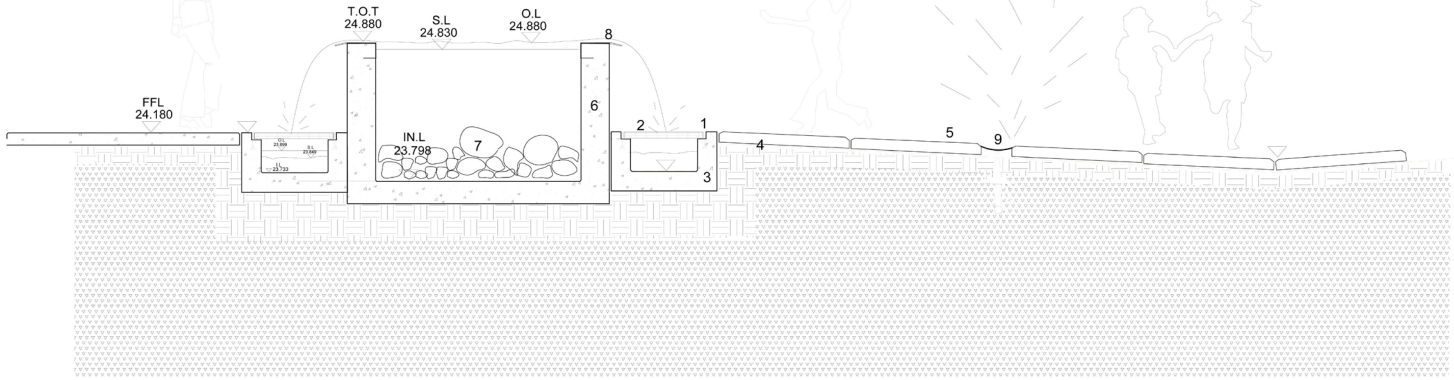
10 Olea europea subsp. africana



DETAIL 5
BENCH AND RAISED PLANTED BERM
SCALE 1:20

Figure. 7.22 Detail 5

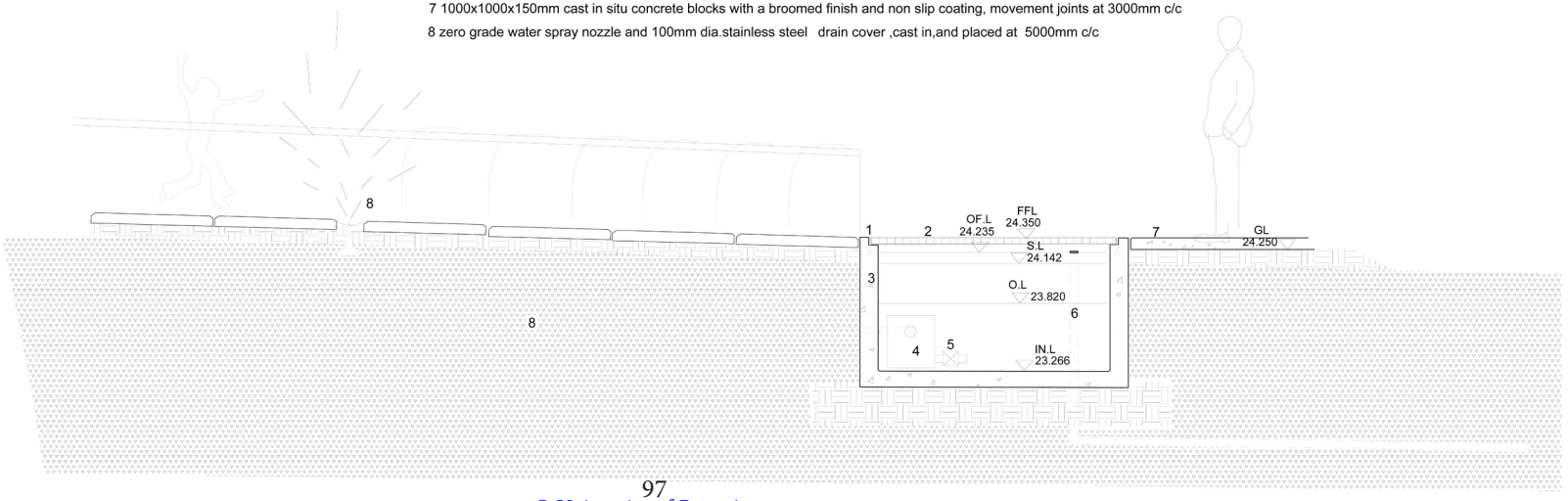
1 100x10x2mm cast in galvanised steel lug pre-welded to a 50x50x5mm galvanised mild steel angle, at 1440mm c/c
2 1440x 700x 50mm unbanded RS80 Mentis GRIPWELD galvanised steel grating at 1440mm c/c
3 21000x800 x150mm cast in-situ concrete channel with a 5mm Derbigum torched on waterproofing membrane
4 0.25 polypropylene damp proof membrane on compacted earth
5 1000x1000x150mm cast in situ concrete blocks with a broomed finish and non slip coating, movement joints at 3000mm c/c
6 21000x 210 x1252mm cast in-situ concrete trough with a 5mm Derbigum torched on waterproofing membrane
7 50-80mm dia. smooth and rounded stones dry stacked
8 1000x2mm bent and galvanised steel plate cast in concrete
9 zero grade water spray nozzle and 100mm dia.stainless steel drain cover ,cast in,and placed at 5000mm c/c



DETAIL 7.1
WATER FEATURE - TRANSVERSE SECTION
SCALE 1:20

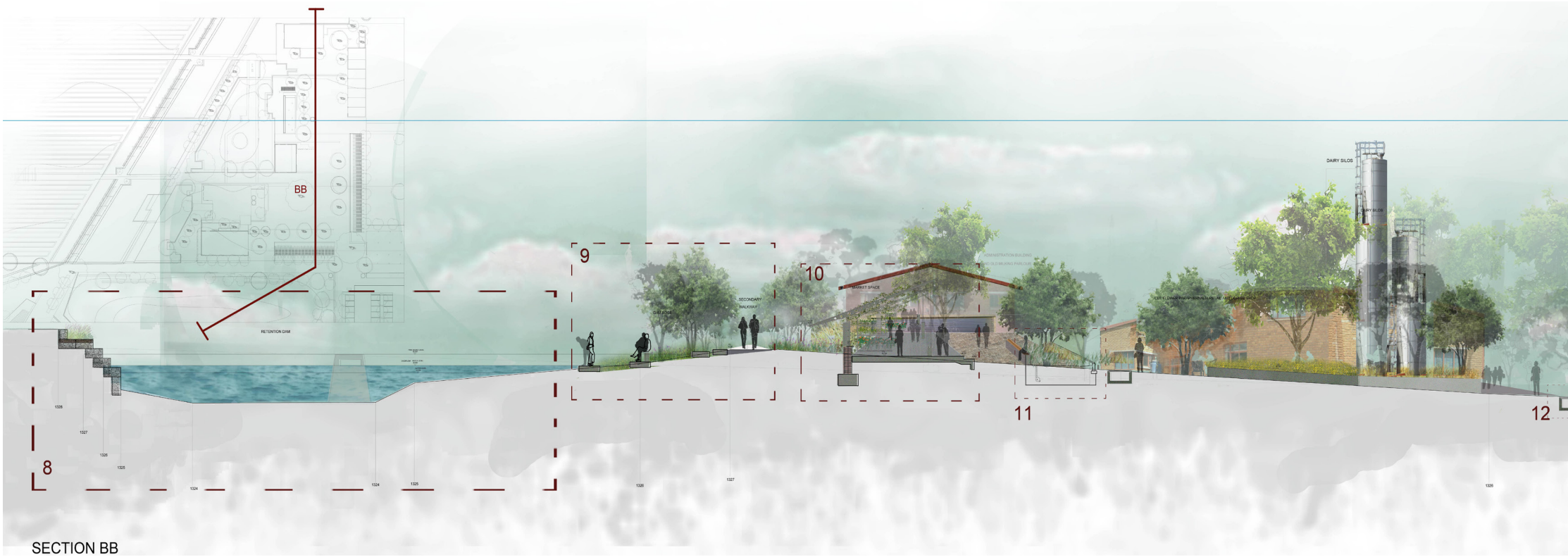
Figure. 7.23 Detail 7.1

1 100x10x2mm cast in galvanised steel lug pre-welded to a 50x50x5mm galvanised mild steel angle, at 1440mm c/c
2 1440x 2000x 50mm unbanded RS80 Mentis GRIPWELD galvanised steel grating at 1440mm c/c
3 9390x 150x 1220mm cast in-situ concrete channel with a 5mm Derbigum torched on waterproofing membrane
4 submersible pump and UV filtration system
5 control valve
6 50 mm dia. PVC overflow pipe
7 1000x1000x150mm cast in situ concrete blocks with a broomed finish and non slip coating, movement joints at 3000mm c/c
8 zero grade water spray nozzle and 100mm dia.stainless steel drain cover ,cast in,and placed at 5000mm c/c



DETAIL 7.2
WATER FEATURE - LONGITUDINAL SECTION
SCALE 1:20

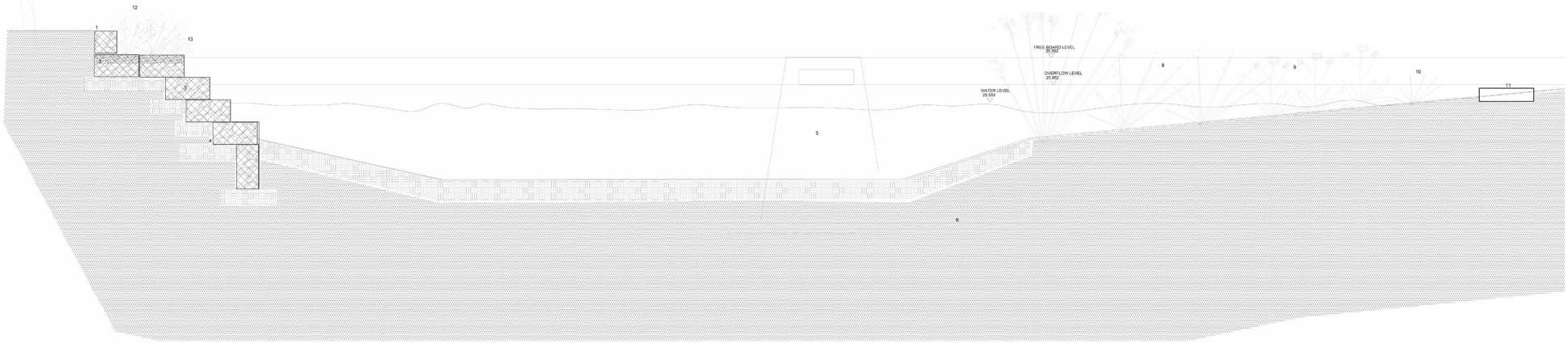
Figure. 7.24 Detail 7.2



SECTION BB

Figure. 7.25 Section BB- through retention dam and market area

1 2000x500x500mm heavily galvanised steel wire mesh gabion basket, filled with 100-200mm dia. clean hard stones.
2 2000x1000x500mm heavily galvanised steel wire mesh gabion basket, filled with 100-200mm dia. clean hard stones and topped with growing medium wrapped in a geotextile for plant growth
3 Kaytech, Envirofix, to manufacture specifiactions, x-grades,
, needle-punched and thermally locked geosynthetic clay linex200
5 storm water control ,cast in-situ sump with a concrete foundation
6 500mm dia. PVC storm water outlet pipe
7 Kniphofia ensifolia
8 Cyperus marginatus
9 Berula erecta
10 Eleocharis dregeana
11 7450x1200x150mm cast in-situ concrete slabs with a rough broom finish and non slip coating.
with movement joints at 3000mm c/c
12 Melinis repens
13 Gunnera perpensa



DETAIL 8
RETENTION DAM EDGE
SCALE 1:50

Figure. 7.26 Detail 8

DETAIL 9
CONCRETE SLABS
SCALE 1:20

1 Cyrtanthus breviflorus
2 3300x 1000x 300mm cast in-situ concrete slab with a broom finish and non-slip coating.
3 Melinis nerviglumis
4 100mm dia. smoothed and rounded riverbed stone on a 1mm geotextile to a depth of 250mm
5 7450x 1200x 300mm cast in-situ concrete slab with a broom finish and non-slip coating
6 1200x 450x 300 mm cast in-situ concrete wall with concrete footing
7 timber seat with backrest
8 Crinum bulbispermum
9 Gomphostigma virgatum
10 Berula erecta
11 24760 x 800x 300mm cast in-situ concrete slab with a broom finish and non-slip ciating, with movement joints at 3000mm c/c
12 7870 x 800x 300mm cast in-situ concrete slab with a broom finish, non-slip coating and movement joints at 3000mm c/c
13 2500x1000x150 cast in-situ concrete blocks with a smooth finish

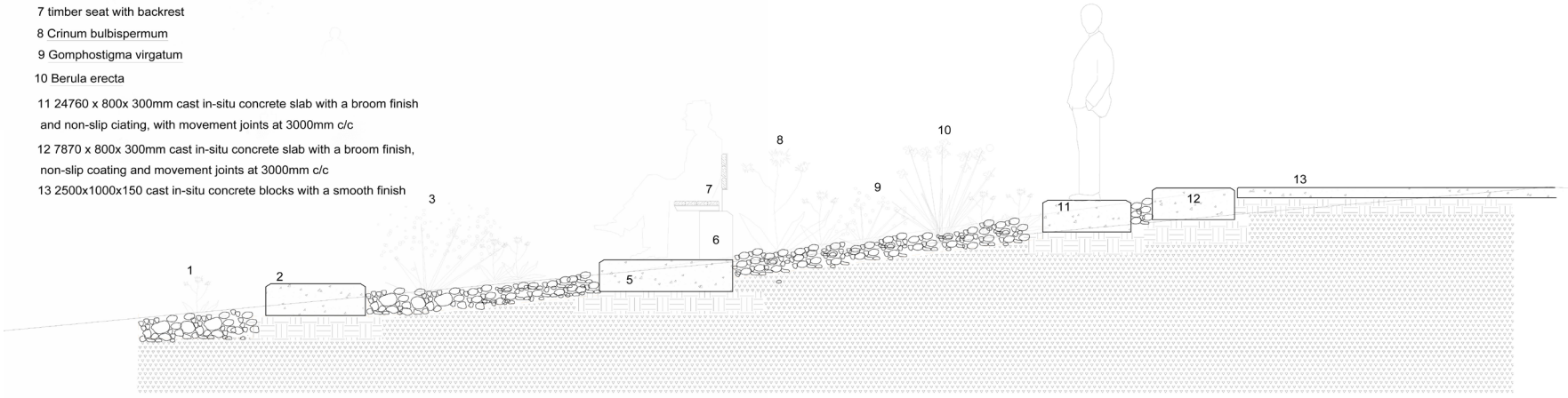


Figure. 7.27 Detail 9

1 7885,perforated and tapered galvanised steel I-beam

2 30mm dia., 40mm long galvanised steel eyelet and nut, at 600mm c/c ,fixed to I-beam flange

3 270x 160x 10mm clear painted steel hinges with a 15mm central axel, welded to 5mm base plate.

4 420x420x5mm galvanised steel baseplate at 4760mm c/c ,fixed to M18 cast in-situ U bolts and M18 nuts

5 3740x10mm thick galvanised mild steel cable connected to eyelit and flat plate

6 420x 420x2770 mm cast in-situ exposed concrete column with concrete footing to engineer specification

7 1080x 100x 50mm PAR Eucalyptus timber, fixed with self tapping screws to steel PFC and treated with Woodoc 35 exterior polywax sealer

8 50x 20x 2mm clear painted PFC steel section, at 1080mm c/c, welded to 126x60x4mm clear painted PFC steel section at 4760mm c/c

9 3475x 450x1472 mm brick seating wall on a concrete foundation with a smooth plaster finish, at 3590mm c/c

10 1960x 16mm dia. internally threaded galvanised steel rod,fixed with reverse threaded hook bent bolts, to welded eyelets, at 4760mm c/c

11 30 mm dia. galvanised steel eyelets pre-welded to 16mm dia. galvanised steel rod, at 400mm c/c

12 270x270x1010mm cast in-situ concrete column with a concrete footing

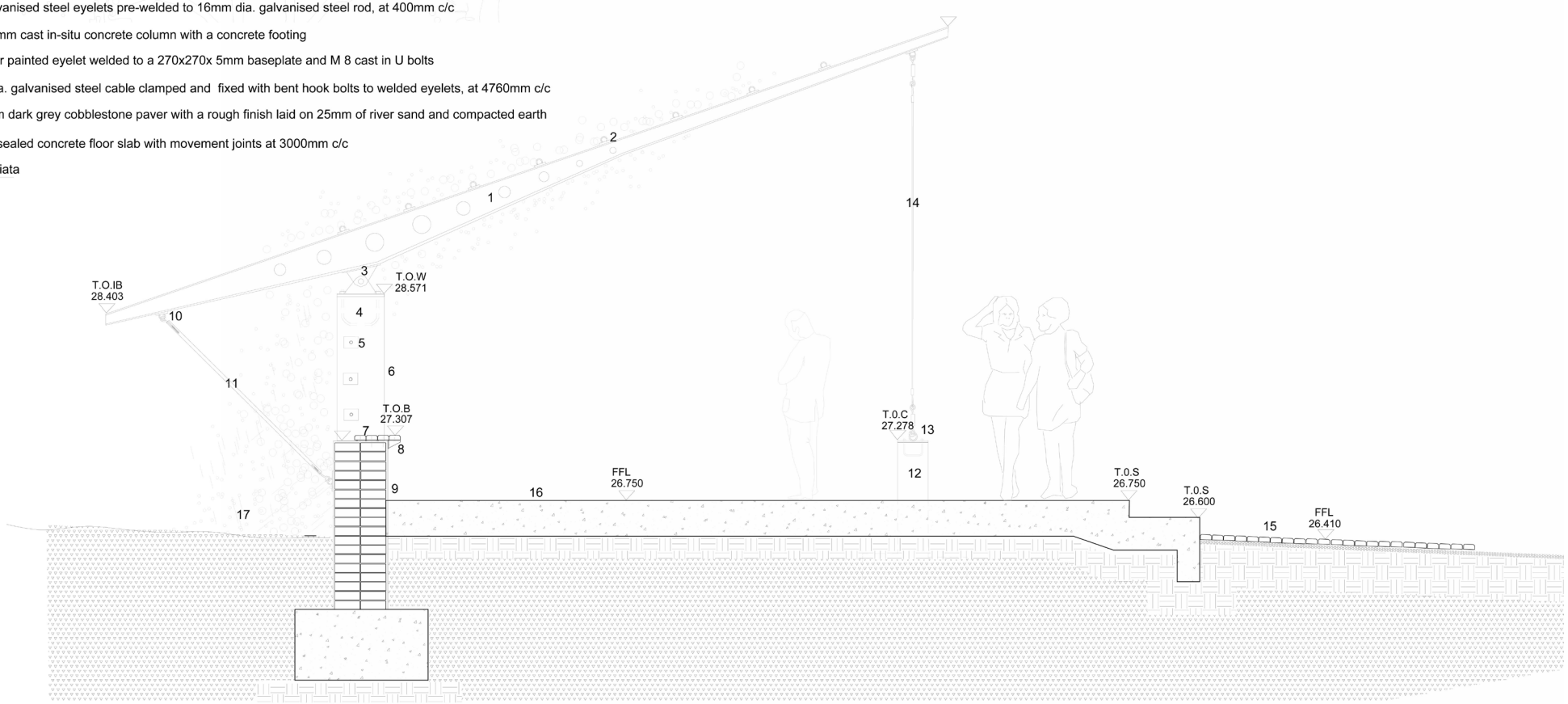
13 50mm dia. clear painted eyelet welded to a 270x270x 5mm baseplate and M 8 cast in U bolts

14 3920x10mm dia. galvanised steel cable clamped and fixed with bent hook bolts to welded eyelets, at 4760mm c/c

15 100x100x50mm dark grey cobblestone paver with a rough finish laid on 25mm of river sand and compacted earth

16 smooth and unsealed concrete floor slab with movement joints at 3000mm c/c

17 Clematis brachiata



DETAIL 10
MARKET STALL STRUCTURE
SCALE 1:20

Figure. 7.28 Detail 10

1 2000x 400x 50mm timber seat on cast in-situ concrete wall

2 100x100x50mm dark grey cobblestone paver with a rough finish laid on 25mm of river sand and compacted earth

3 500x 200x150mm concrete footing cast with mortar to the cobble stones at 2000mm c/c

4 200mm Geopipe and Kaytech Flownet wrapped in a 5mm continuous needle punched nonwoven polyester geotextile closed with a staple of wire binding.

5 1000mm deep growing medium

6 70mm dia. PVC overflow pipe

7 6780x150x390mm cast in-situ concrete edge restraint with concrete footing

DETAIL 11

SELF IRRIGATING PLANTER
SCALE 1:20

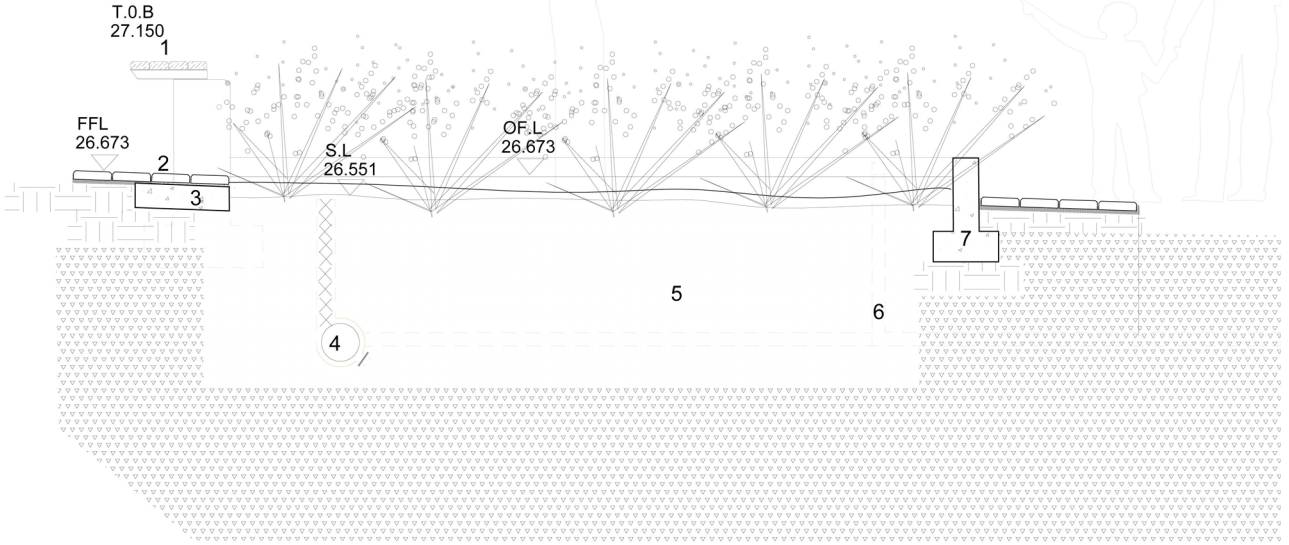
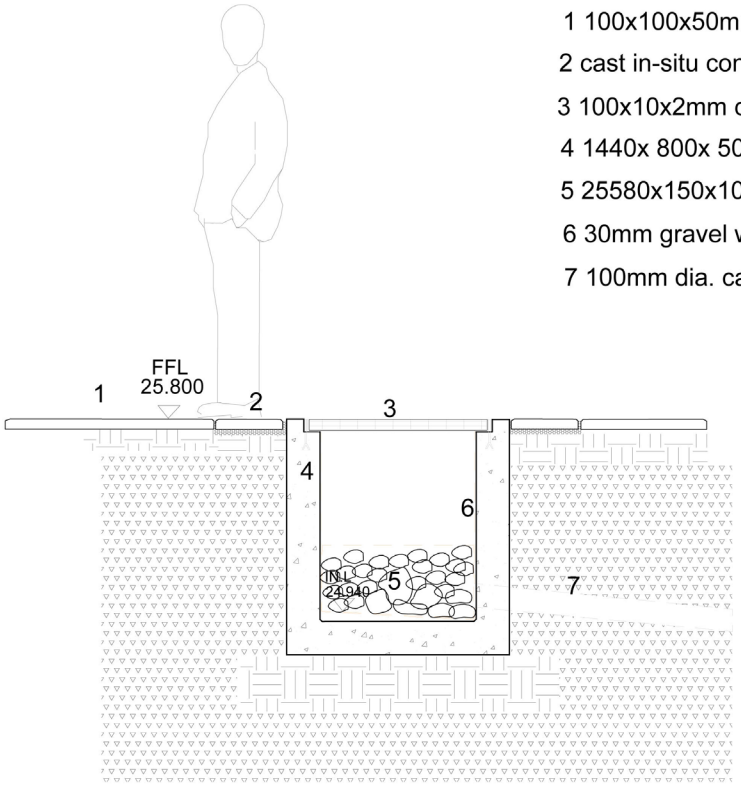


Figure. 7.29 Detail 11



1 100x100x50mm dark grey cobblestone paver with a rough finish laid on 25mm of river sand and compacted earth

2 cast in-situ concrete slab with a smooth finish and movement joints at 3000 c/c

3 100x10x2mm cast in galvanised steel lug pre-welded to a 50x50x5mm galvanised mild steel angle, at 1440mm c/c

4 1440x 800x 50mm unbanded RS80 Mentis GRIPWELD galvanised steel grating,continuously placed

5 25580x150x1060mm cast in-situ concrete channel with a 5mm Derbigum torched on waterproofing membrane and screeded to fall

6 30mm gravel wrapped in a geotextile

7 100mm dia. cast in PVC water outlet pipe

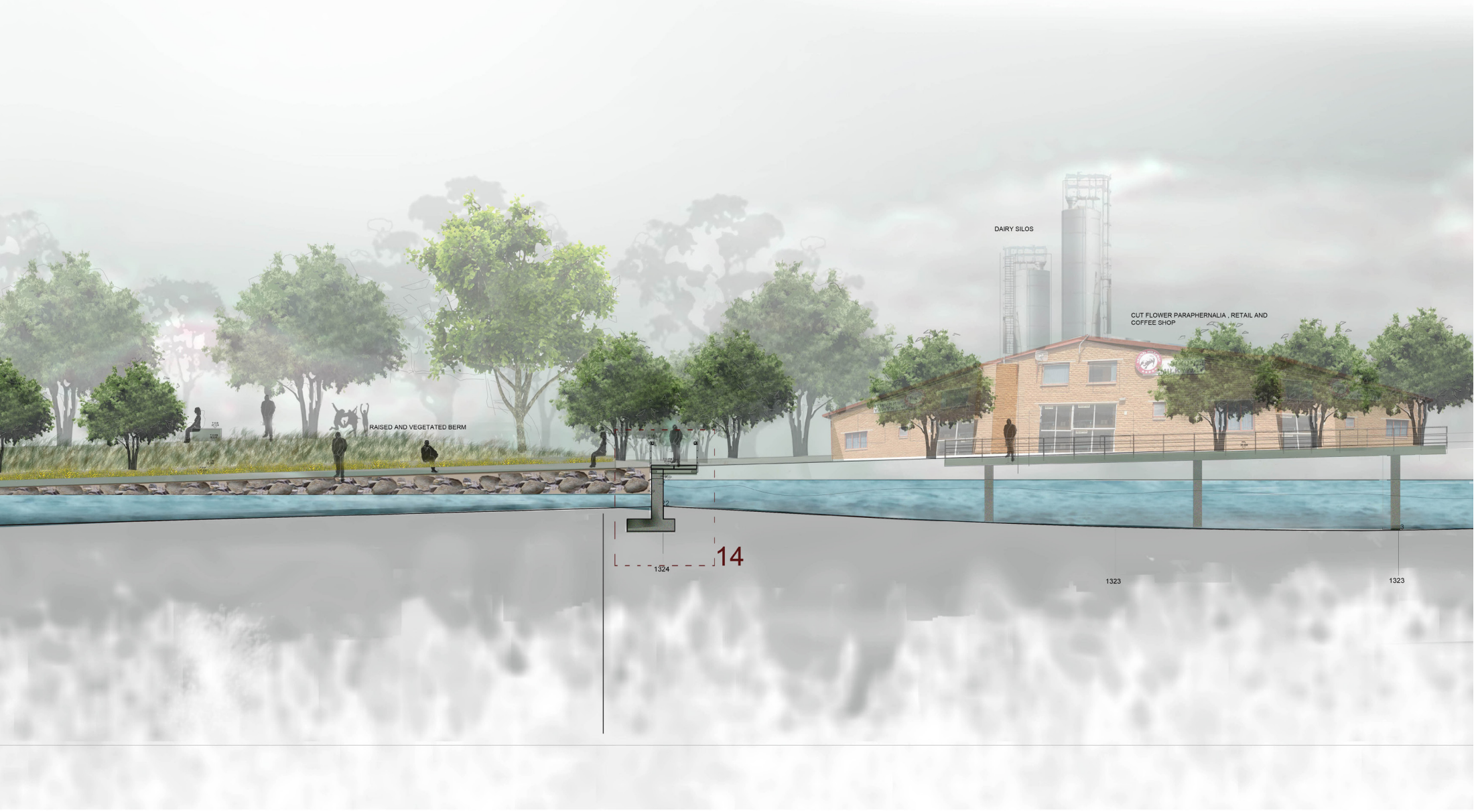
DETAIL 12

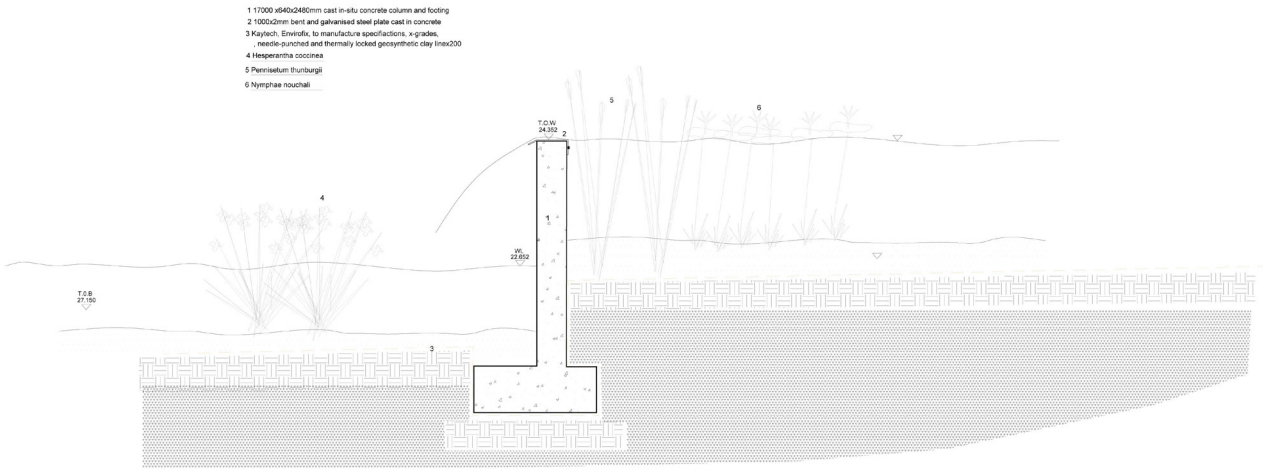
STORM WATER GRATE AND CHANNEL
SCALE 1:20

Figure. 7.30 Detail 12

SECTION CC

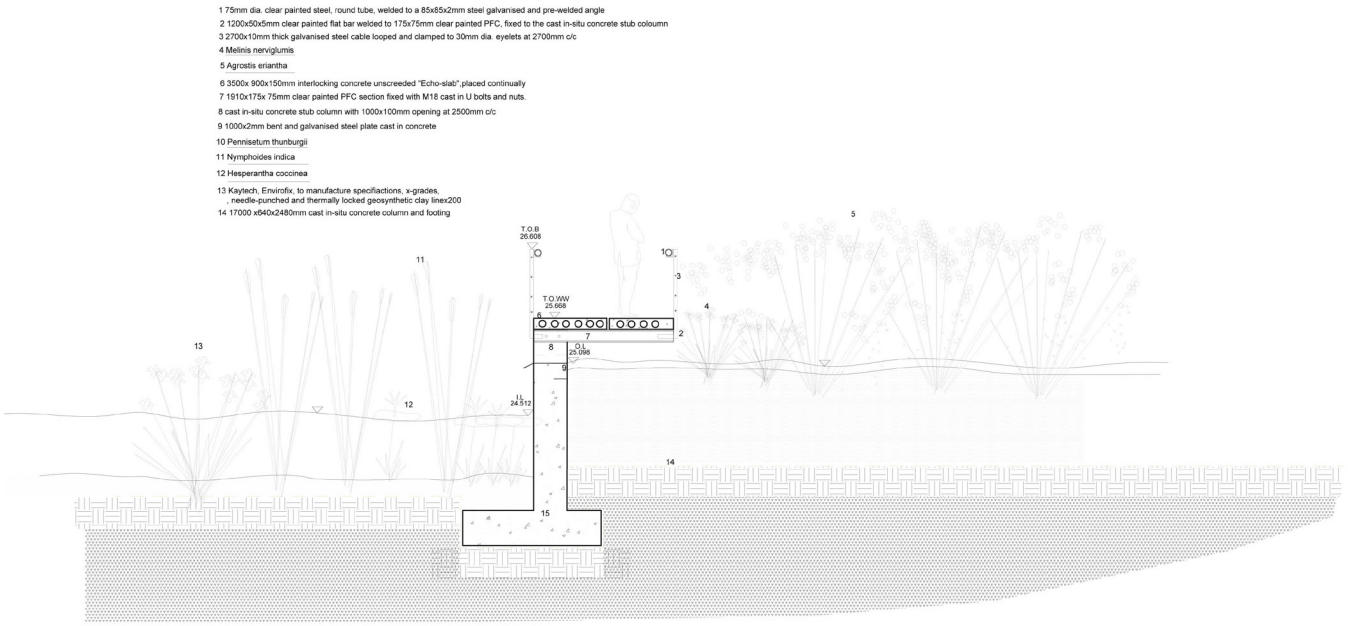
Figure. 7.31 Section CC- through wetland





DETAIL 13
WETLAND WEIR
SCALE 1:50

Figure. 7.32 Detail 13



DETAIL 14
WETLAND WEIR AND WALKWAY
SCALE 1:50

Figure. 7.33 Detail 14

7.7 PERSPECTIVES

Figure. 7.34 Wetland and pause spaces

Figure. 7.35 Market space ,existing buildings and water tower

Figure. 7.36 Retention dam, market space structure and existing admin building

Figure. 7.37 Admin building walkway

7.8 CONCLUSION

Hazeldean has the potential to become an exciting destination in Tshwane. This landscape proposal aims to promote rest and solace so as to become an escape from the bustling city that surrounds it. If it is designed to integrate better with the new development it can become a point of attraction for all of the public. By making Hazeldean a desirable destination, the legacy of Hazeldean dairy and the environmental assets existing in the site will be appreciated and recognized. This place will thus no longer be classified as a neglected landscape but rather a thriving and regenerated one.

Appendix A
Summarised water calculations
Appendix B
Design presentation

08 Appendices

APPENDIX A SUMMARISED WATER CALCULATIONS

Site Stormwater Calculations

Incoming Stormwater

catchement size/drainage area (m²)	1303700
Runoff co-efficient (C -value)	0.75

Rainfall x Catchemnt size x C = incoming stormwater to be expected

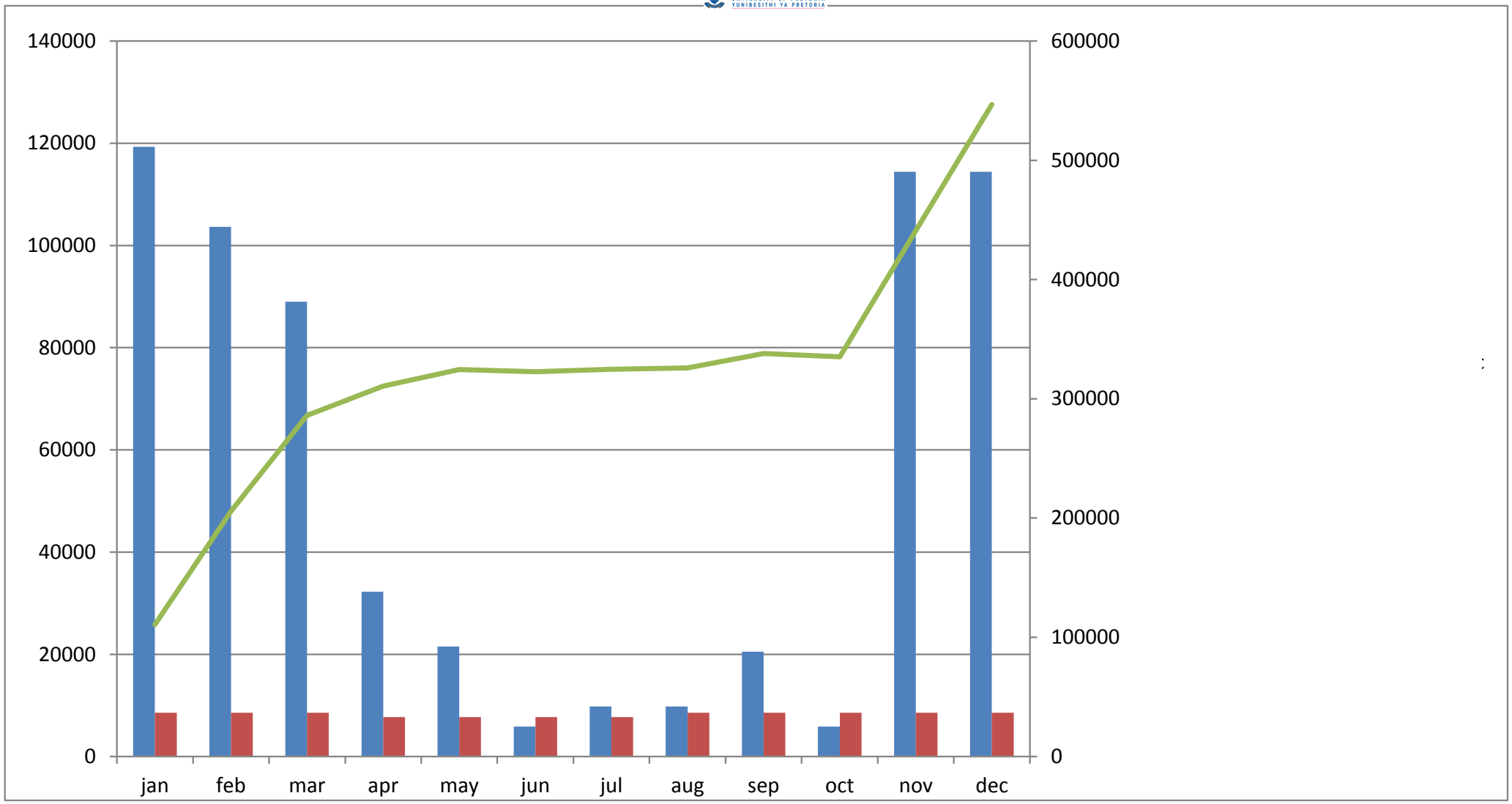
Month	Rainfall (m)	Catchment (m²)	C-value	Incoming stormwater (m³)
January	0.122	1303700.0	0.75	119288.6
February	0.106	1303700.0	0.75	103644.2
March	0.091	1303700.0	0.75	88977.5
April	0.033	1303700.0	0.75	32266.6
May	0.022	1303700.0	0.75	21511.1
June	0.006	1303700.0	0.75	5866.7
July	0.01	1303700.0	0.75	9777.8
August	0.01	1303700.0	0.75	9777.8
September	0.021	1303700.0	0.75	20533.3
October	0.006	1303700.0	0.75	5866.7
November	0.117	1303700.0	0.75	114399.7
December	0.117	1303700.0	0.75	114399.7

Landscape Water Usage:

	summer	winter
Aquaponics irrigation system for cut flowers (monthly),includes: water for irrigation, plant uptake, and 5% for precaution)	3567.41m³	2311.89m³
Evaporation from the constructed wetland system and fish dams (monthly)	9795.2m³	4897.6m³
irrigation of landscape(monthly), includes:		
General planting, lawn and trees	1180.61m³	296.77m³
All water used from water towers for nursery and market operations (monthly) dependent upon tank size capacity	187.23m³	156.12m³
Total	11198.45	7662.389

Water budget

Month	Available water m³	Water required m³	Balance m³
January	119288.6	11198.45	108090.1
February	103644.2	11198.45	200535.8
March	88977.5	11198.45	278314.9
April	32266.6	11198.45	299383.0
May	21511.1	7662.3889	313231.7
June	5866.7	7662.3889	311435.9
July	9777.8	7662.3889	313551.3
August	9777.8	7662.3889	315666.6
September	20533.3	7662.3889	328537.5
October	5866.7	7662.3889	326741.8
November	114399.7	11198.45	429943.0
December	114399.7	11198.45	533144.2



As can be seen in the graph above,the water available far exceeds the water required. This is because most of the water systems are circulatory and closed to a large extent. It is also clear that if all water is to be stored, the amount of water is immense and will probably take up more space than is available. As a result of this water budget investigation, it was dcided that the only water that should be stored is enough to supply the landscape, the remaining storm water will thus be bipasses and slowed down via a storm water control system that only controls the speed and flow of the water so that minimal damage occurs.

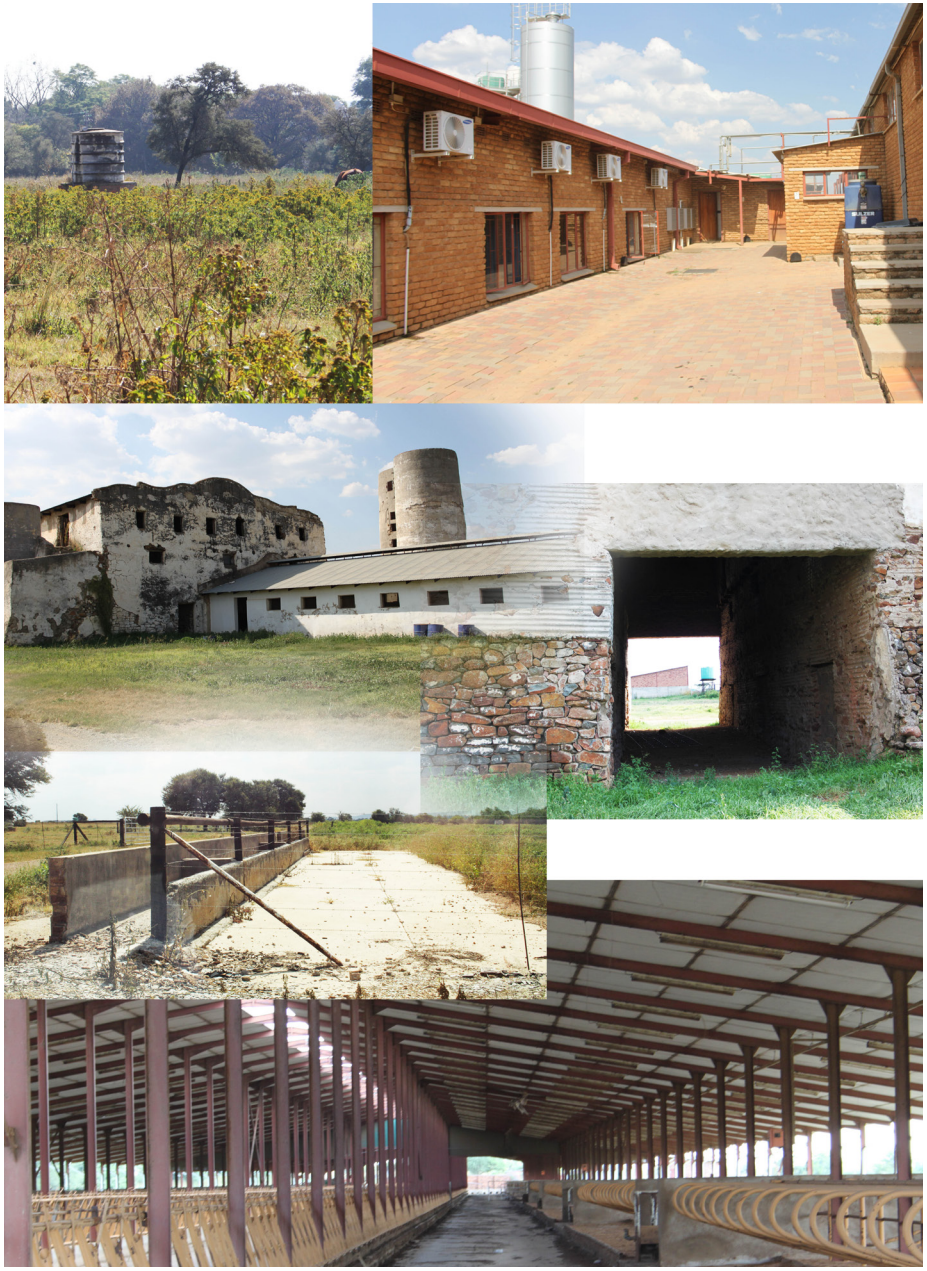
APPENDIX B DESIGN PRESENTATION

PROBLEM STATEMENT

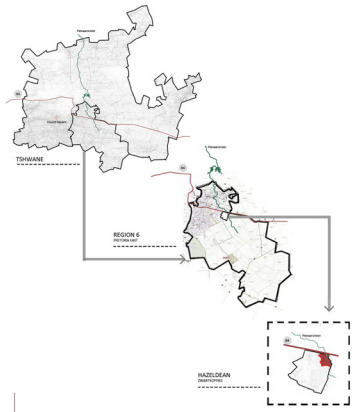
In the past, development in Tshwane has been insensitive to the potential for integrating natural landscapes into the city's layout. Promising landscapes have been displaced to the edges of developments and labeled as "open space" or "green buffers". These buffer landscapes usually hold little value for the public and are seen as redundant. Along with this phenomenon, there is a general disregard for designed landscapes to provide unique cultural places that are responsive to issues such as heritage, environment and the creation of engaging recreational space. There are only a few loved and designed landscapes in Tshwane, thus adding to the city's reputation of being unfriendly and somewhat unattractive in terms of its contrived outdoor spaces. Included among the city's stagnant landscapes are potentially attractive post-industrial sites which are being neglected and ignored, left to deteriorate and further degrade the environment. These sites come with stories and layers of meaning which can be creatively interpreted in order to design exciting new places. These places may then have the potential to become socially significant attractions.

HYPOTHESIS

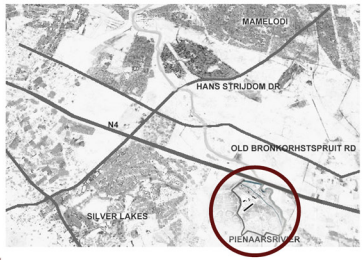
By using landscape architecture as the departure point for the regeneration of post-industrial sites; edifying, healthy and living environments can be designed and created. This especially on sites which have heritage and environmental significance. This regeneration will contribute to a new and better landscape that is economically productive, environmentally sound and socially sustainable ensuring the sites' potential has been maximised and thus stops it from being consumed in the ever expanding city sprawl scenario.



REGIONAL LOCATION



CONTEXTUAL LOCATION



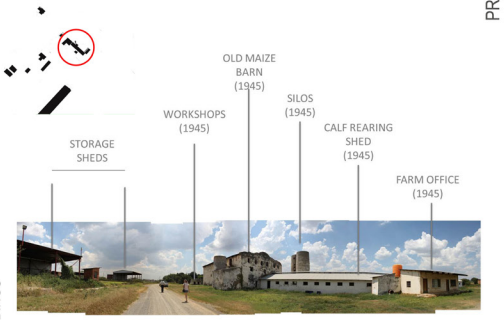
STUDY FOCUS
CURRENT COMPOSITION

STUDY FOCUS
CURRENT COMPOSITION

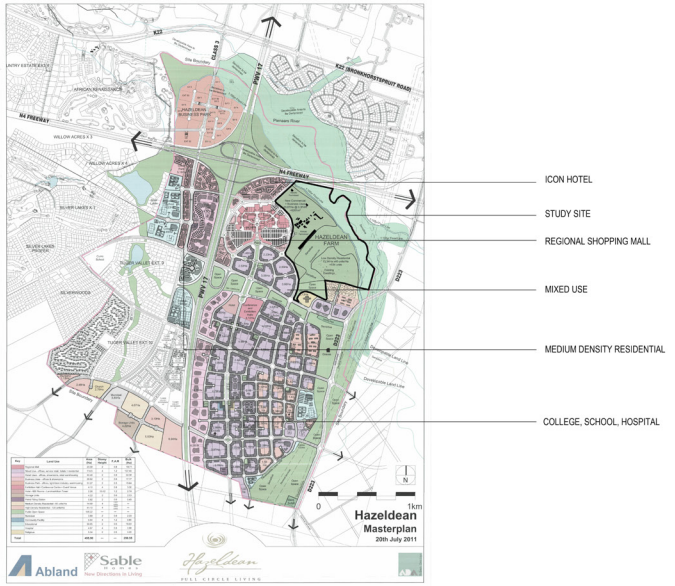
LANDSCAPE

DAIRY FACTORY

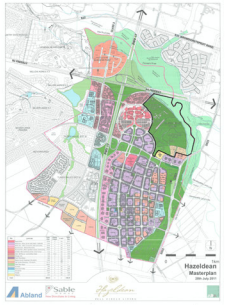
HERITAGE BUILDINGS



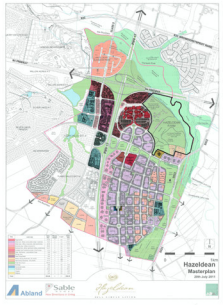
PROPOSED FRAMEWORK DEVELOPMENT : FULL CIRCLE LIVING



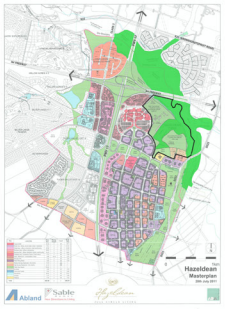
FACTORS TO CONSIDER



POSITION OF GREEN SPACE

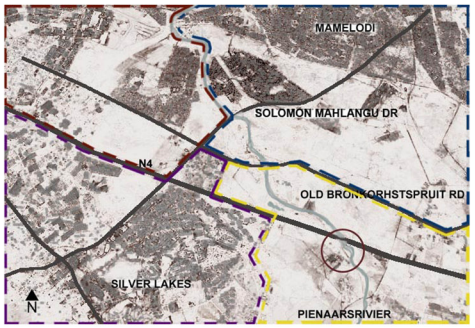


SURROUNDING ACTIVITIES



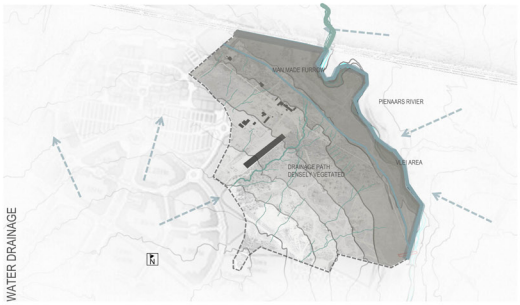
ECOLOGICAL SENSITIVITY

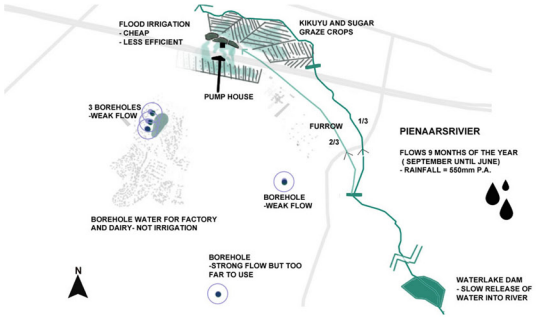
HAZELDEAN N



Mamelodi and the area above Old Bronkhorstspruit Road consist mainly of informal settlements. The region on the north-western side of the map is largely an industrial area. The area south of the N4 highway is predominantly a middle to high end residential area, that includes shopping malls and business parks. The eastern and south-eastern region shown on the map (including the site), are farmlands subdivided into large plots.

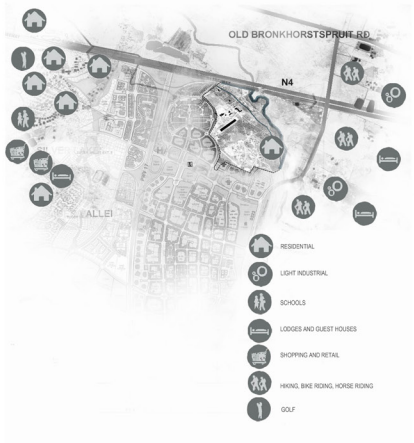
WATER DRAINAGE





VEGETATION ZONES

SURROUNDING LAND USES



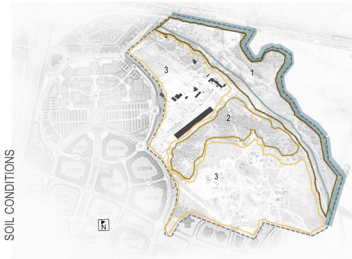
TOPOGRAPHY

ACCESS

Access to Hazeldean presents a challenge. Access is currently only available via the Old Bronkhorstspruit Road, or from the N4 highway via a weigh bridge.
The PWV 17 highway will allow for much easier access to the study site once the road has been constructed.

The farm roads are currently sand roads which service dairy trucks and tractors. In the near future there will be no need for the current sand roads as the dairy will no longer be in operation.

SOIL CONDITIONS



1. Fertile and deeper soil along water courses, although still clayey.

2. Deeper soil corresponding with densely vegetated forest areas.

3. The dominant soil type on the site is rocky and shallow and has poor crop growing capabilities. This poor soil quality is the reason why the dairy cattle were moved to another farm where silage could be bountifully grown and thus reduce the farmer's costs.

SITE ISSUES

IDENTITY-
Once the dairy factory ceases to operate, the site will have no defining characteristic. A site identity is usually formed by the functional character of the place, and its activities.

FUNCTION-
In the near future, Hazeldean will no longer be a functioning dairy and as a result there will be no functional purpose for the site to exist. Productivity will thus need to be reintroduced in a way that is responsive to heritage requirements as well as the adjacent development which is about to be built.

ACCESS AND CONNECTION -
The FCL 1 framework makes no attempt to incorporate the study site into the development, because the farmstead is to l remain in the ownership of the Malleson family. However that does not mean the site should be excluded from important access points. The perception of the role of the site needs to be changed in order for its relationship with the surrounding development to be improved upon.

BUILDING AND LANDSCAPE RELATIONSHIP-
The buildings are currently situated in the midst of abandoned landscape. There is no relationship between the two, which thus reduces the presence of both. Buildings in a farm setting become objects on the landscape as do those on post -industrial sites. The heritage buildings on this landscape should remain as sculptural elements which help to convey the sense of place.

SOIL CONDITIONS –
As indicated on the site analysis, the soil type is clearly not suitable for plant growth. The soil is shallow, rocky and clayey and only in decent condition along the river bank. This calls for an intervention so that crops can be grown in a position nearer to the main activities on site.

SITE OPPORTUNITIES

LOCATION –
Alongside the threat that the surrounding development brings to the site, lies the opportunities. The development will focus attention and awareness on the Hazeldean farm, which was not the case previously. The adjacent mall and hotel have the potential to draw energy onto the site, if the latter is designed sympathetically. . The N4 highway also allows a visual gateway to the site where it can be seen by passers-by.

EXISTING INFRASTRUCTURE -
The existence of buildings on the site allow for these buildings to be adapted to new uses; thus the need to construct new buildings for activities does not exist. . The current buildings are large, open plan rooms with few partitions, making them simpler to retrofit.

WATER DRAINAGE-
As mentioned, storm water naturally drains toward the study site. The opportunity thus exists to implement a storm water management- and harvesting system so that water can be controlled, made a feature of the landscape and reused. If the site becomes a productive landscape, it will most likely require water as its most important resource.

ROCK KOPPIES -
The rocky landscape adds to the visual appeal of the site and indicates what the proposed vegetation character should be. If the new landscape is sensitive to to important existing elements on the site, the spirit of place can be sustained and enhanced.

POST INDUSTRIAL INTRIGUE -
The possibilities in renewing post- industrial sites often require innovative solutions that breathe new life into ageing landscapes. The opportunity exists at Hazeldean to create a layered landscape that reminds us of the past and present, and preserves both t for future generations to experience.

HERITAGE RESPONSIVE -
The site calls for a new landscape that is mindful of its heritage. This requires landscape design concept derived from what exists on the site. Heritage landscapes are made authentic if meaning is generated from elements already embedded in the existing landscape. This eliminates the possibility of superficial meaning being layered onto the design in a forced manner.

PRODUCTIVE LANDSCAPE -
The main requirement of heritage is to restore productivity to the site in a way that is sensitive both to the needs of both the public and the industry on site. The merging of these two contrasting requirements creates many design opportunities.

RIVERINE AND VLEI AREA -
The sensitive vlei area and riverine system can be preserved and maintained in order to become of significant value for the site and its users. There should be controlled access to these spaces, with minimal disturbance to what exists on the site.

SITE ANALYSIS

The Burra Charter

"Places of cultural significance enrich people's lives, often providing a deep and inspirational sense of connection to community and landscape, to the past and to lived experiences. They are irreplaceable and precious." (Australia ICOMOS Burra Charter, 1999)

The Charter is a guide for the treatment of places of historical cultural significance and lays out for the designer, accepted practices within such treatment. Cultural significance is described by the Charter as "aesthetic, historic, scientific, social or spiritual value for past, present or future generations". The Burra Charter will be consulted during the design process to guide the design strategy for Hazeldean, to comply with relevant guidelines.

The subsequent articles in the charter are those most appropriate to the treatment of this post-industrial dairy farm:

ARTICLE 7: USE
"Use means the functions of a place, as well as the activities and practices that may occur there. Where the use of a place is of cultural significance, it should be retained" (Burra Charter).

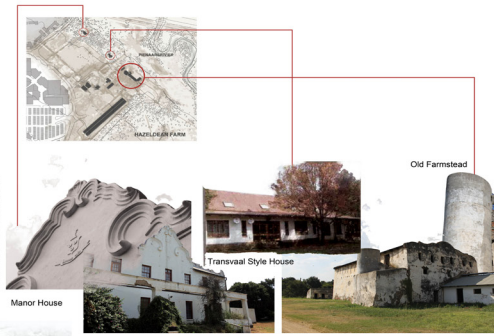
ARTICLE 8: SETTING
"Conservation requires the retention of an appropriate visual setting and other relationships that contribute to the cultural significance of the place" (Burra Charter).

ARTICLE 21: ADAPTATION
"21.1 Adaptation is acceptable only where the adaptation has minimal impact on the cultural significance of the place: Adaptation may involve the introduction of new services, or a new use, or changes to safeguard the place. Adaptation means modifying a place to suit the existing use or a proposed use."(Burra Charter).

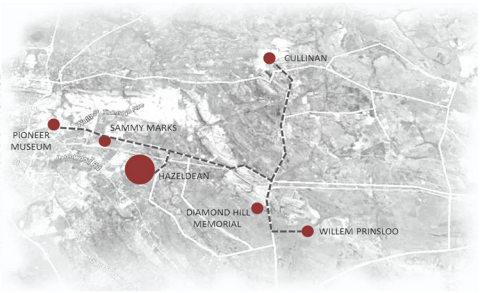
ARTICLE 23 CONSERVING USE
"Continuing, modifying or reinstating a significant use may be appropriate and preferred forms of conservation."(Burra Charter).

ARTICLE 25: INTERPRETATION
"The cultural significance of many places is not readily apparent, and should be explained by interpretation. Interpretation should enhance understanding and enjoyment, and be culturally appropriate" (Burra Charter).

HERITAGE BUILDINGS



SITES WITH HERITAGE SIGNIFICANCE



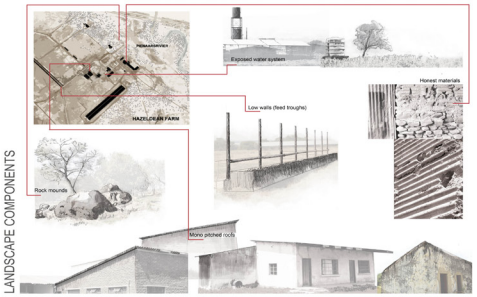
STATEMENT OF HERITAGE SIGNIFICANCE

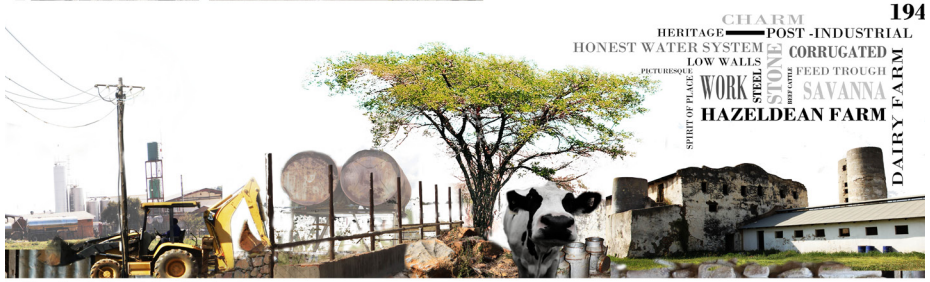
Hazeldean is an aged dairy farm of historic relevance in Tshwane. The site is located in an area previously dominated by farmlands of similar significance: Sammy Marks' farm and Willem Prinsloo's Karfontein farm are iconic this area. Hazeldean comprises a manor house, an old Transvaal- style house, a barn, silos, a calf rearing shed, a show stable, and several workshops as well as additions that include a steel frame barn and a milk processing factory. The latter were essential to the operations of a successful dairy farm from 1945 onwards.

The only elements of the farm that are still operational are the factory and Transvaal style house; all other areas are used as storage space. The exact origin date of the Transvaal- style house is unknown, but is thought to have been constructed around 1890. The historic farmstead and Cape Dutch- style manor house were built in 194 These buildings are now protected under section 34 of the National Heritage Act be cause of their significant ages . The architects and builders of these heritage buildings are unknown. The buildings were constructed by unskilled labourers, usin second hand materials because of the post WWII depression. The farmstead buildings were built out of large boulders mixed with lime, cured in corrugated iron shuttering whose ribbed imprints are still visible. The manor house building is 3 bric widths on exterior walls and 2 bricks-width on internal walls, the thickness being a stability safeguard against the unskilled construction techniques.

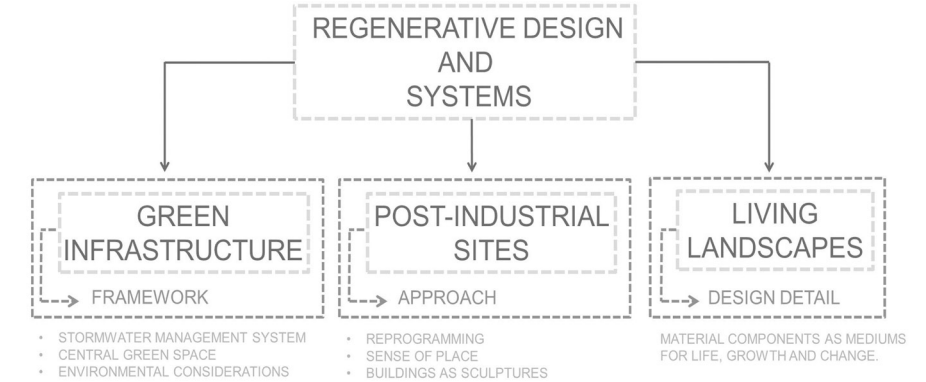
The landscape which surrounded the establishment was a productive, agrarian lan scape which grew feed for the dairy's Ayrshire cows. A furrow system stemming from the Pienaarsrivier, as well as three catchment dams built to irrigate the site stil exist. Both the furrow and the catchment dams are of historical importance as they were also constructed in 1945 and are still in use today. The hydrological functions and cattle camp boundaries on the site are still intact; however, many other elemen of the agrarian landscape have been lost, though the farmstead buildings continue to exert a strong presence over the landscape and are a reminder of the farming activities once located on the site. The rarity aspect of this site is that it is still owne by the original founding family and thus its heritage has been preserved to an acce able extent. The site forms part of a collection of historic sites and museums in the area. The farmstead should therefore be developed to its maximum potential in ord for its cultural heritage to be experienced.

LANDSCAPE COMPONENTS





HERITAGE



THEORY


Bishan-Ang Mo Kio Park Singapore

- Green, Blue and social infrastructu
- Relieve pressure on municipal syst
- Green at the centre of urban development- not on the edge
- Integrated green network
- Parks and recreational space

GREEN INFRASTRUCTURE

Landschaftspark Duisburg Nord

POST-INDUSTRIAL

- Re- interpreted and transformed
- Existing developed into a new landscape
- Unused parts become sculptural elements
- "Governed by rules of ecology and maintained by technology"
- Natural and artificial





Zhongshan Shipyard Par Beijing

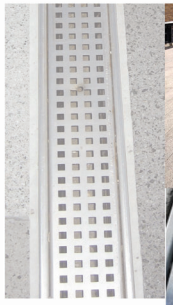
- Urban renovation
- Historical meanings
- Protecting trees and managing water
- "Ecologically dramatize the spirit of the site using exist machinery elements: preservation, modification old forms and creation of n forms"
- Environmental responsibili

MERGING LIVING AND SOCIAL SYSTEMS

High Line New York

DETAIL AND AESTHETIC

- Pedestrian orientated
- Contrasting textures
- Clean lines
- Merging materials



PRECEDENTS

Design objective

As stated in the hypothesis, the objective is to create for Hazeldean an enriching, healthy and living environment through landscape design that will regenerate and renew this post-industrial dairy farm. The site has heritage significance and environmental assets which should be optimized to ensure that the new landscape is economically productive, environmentally sound and socially sustainable. The objective of creating a new landscape lies in the probability that the site's potential can be realised and subsequently embraced in a new development context.

The design proposal aims to resolve issues such as site identity, use, access, connections, building and landscape relationship, as well as soil conditions. Alternatively, opportunities that exist and could be built upon are site topography, existing infrastructure, energy from surrounding amenities, productive capabilities, heritage significance, the spirit of place as well as the natural features of the site which contribute to its rarity.
Ultimately, the design objective endeavours to draw previously non-existent attention to this charming site in order to transform a property special to one family into a public landscape cherished by its community.

Programmatic requirements

FLORICULTURE	A cut flower farm with a focus on feedback systems. The layout of the crops should be visually appealing and add to the ambience of the farm.
AQUACULTURE	Fish breeding ponds to contribute to an aquaponics based irrigation system for the cut flowers. Hardy and indigenous fish species are used.
STORM WATER CATCHMENET SYSTEM	a system focused on directing, capturing and storing reinwater runoff to be used for the irrigation of crops and the landscape, rinsing of produce and use in the vermiculture system.
VERMICULTURE	organic composting soil, where tee can be sold and used to enhance growth and health of produce. The organic matter is obtained from willing contributors from the adjacent restaurants and other willing parties.
RECYCLING POINT	a public recycling point accessible to cars and pedestrians. It will include 2 sections of waste, namely, paper and organic waste. Paper will be traded for paper bags at a reduced cost and organic waste for the vermiculture.
NURSERY	a facility to protect, store and grow young plants to be transplanted into the farm. Plants are grown for farm usage as well as to be sold
RECREATIONAL SPACE	responsive to heritage elements and inclusive of seating areas, shade, and abstract interpretation of historical features. This includes a multifunctional space for the purpose of functions
MARKET AREA	The main attraction area where flowers, plants, crafts and other items are sold in a semi covered market area.
VENUE AND RESTAURANT	located in old farm buildings with limited physical impact on the building structure and integrity. Physical connection with agrarian landscape and recreational space is imperative. The building façade should not be obstructed.
VLEI AND RIVERINE PROTECTION	preserve natural flei area but allow controlled access into the area for experiential purposes. Preserving the area excludes development in the area and includes protecting and increasing current bird and animal life.
MAINTENANCE OF BUILDINGS WITH HERITAGE SIGNIFICANCE	buildings should be in use but the use should not impact on the structure physically oralter the building character.
DIRECT INTEGRATION WITH SITE SURROUNDS	the site is to integrate physically and functionally with directly surrounding uses, namely the open air mall and hotel
PARKING	parking area for 50 cars and close to the market space, nursery and entrance.
ENTRANCES	entrances to be located at nodal interfaces between the shopping centre and farm, the entrance pathway and historic buildings as well as vehicular entrances.
PEDESTRIAN ACCESS	the farm precinct should be pedestrian orientated and thus access is imperative. Legibility and hierarchy can be highlighted by pedestrian routes

IDENTITY

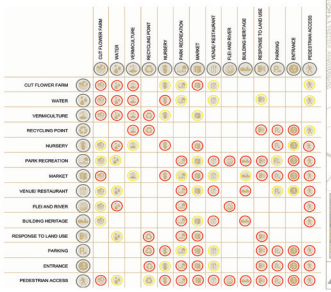
PRODUCTIVITY

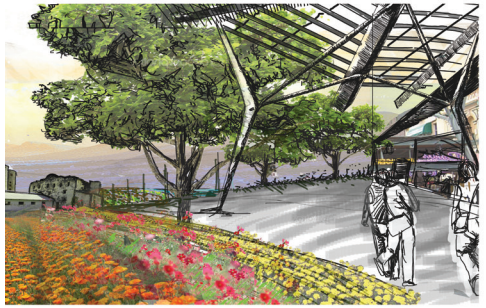
Genius Loci

Thresholds + Connections

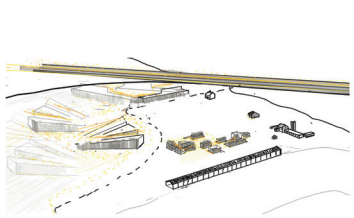
Post Indisutrial cycle

Regenerative






PROGRAMME

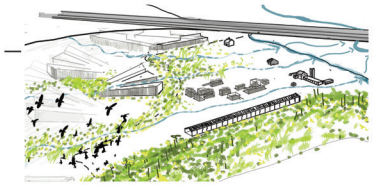


SCALE 1:
FRAMEWORK /ZONING

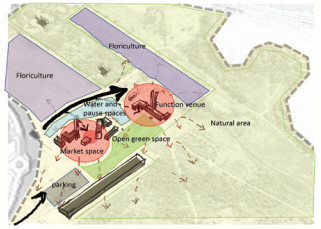
SCALE 2:
MASTER PLAN

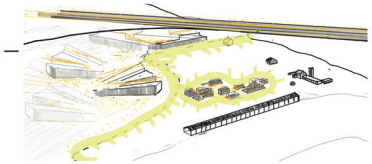
SCALE 3:
SKETCH PLAN

CURRENT

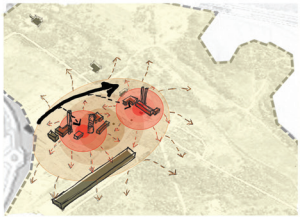


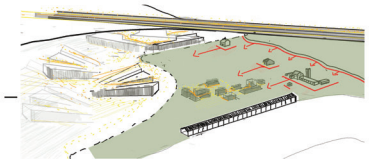
SCALE 1
ENVIRONMENT
vs.
DEVELOPMENT



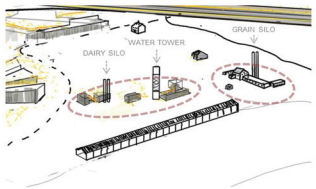


SCALE 2
PUBLIC
vs.
PRIVATE

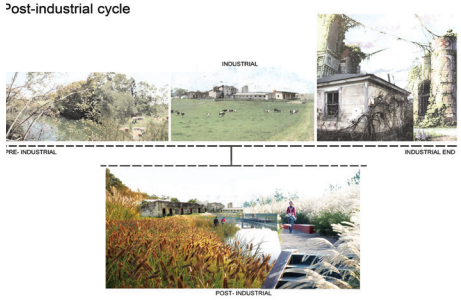




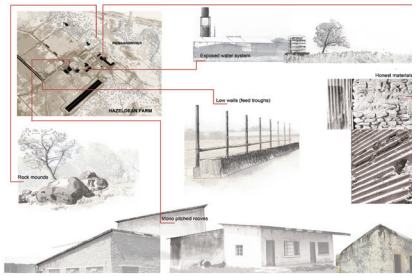
SCALE 3
HERITAGE
vs.
CONTEMPORARY



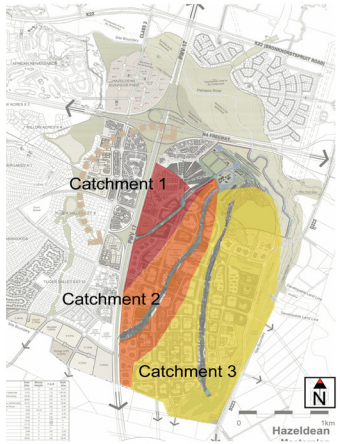
Post-industrial cycle



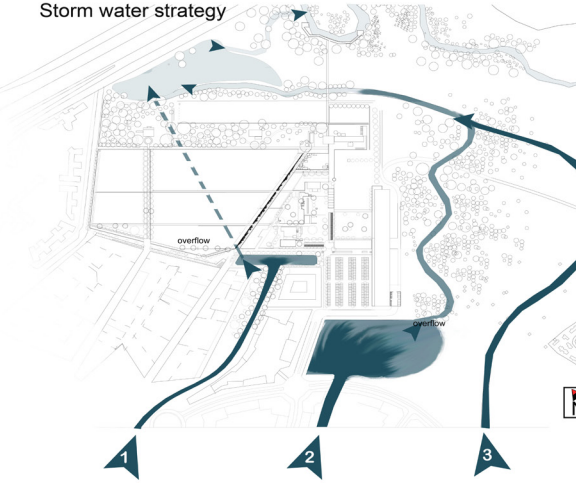
Existing landscape elements



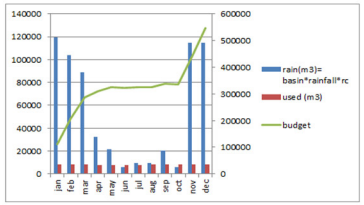
CONCEPT DEVELOPMENT



Storm water strategy



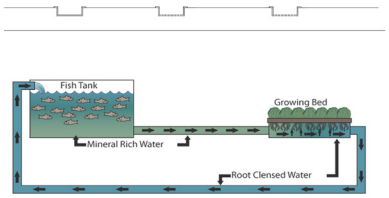
Water Budget



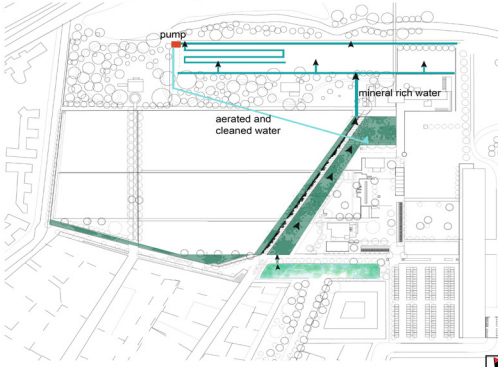
WATER USED INCLUDES:

Flower crop irrigation
evaporation losses
Root absorption losses
Tree, lawn and general landscape irrigation
Water for cut flower preservation, nursery and market.

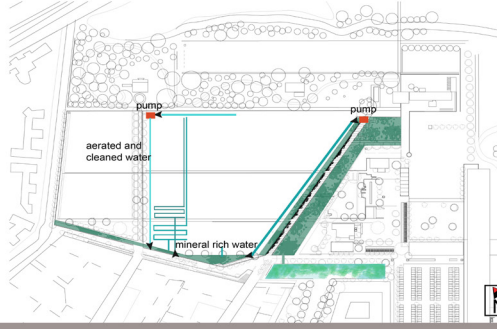
Aquaponics derived system



Northern field irrigation system

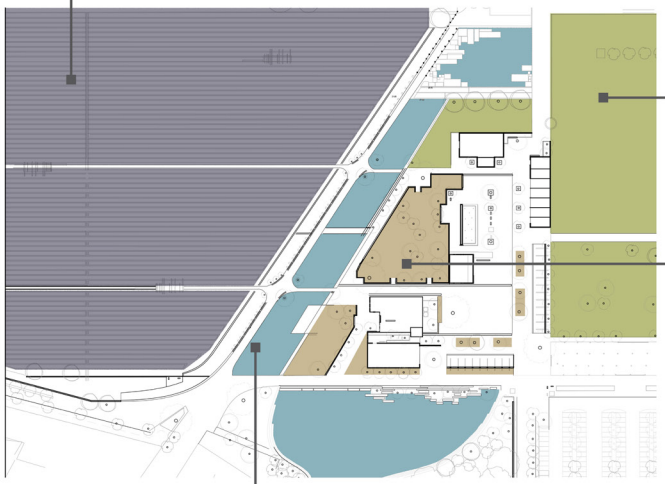


Western field irrigation system



Water Strategy

DESIGN AND TECHNICAL



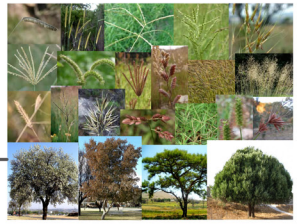
Cutflower farm

Heritage related material

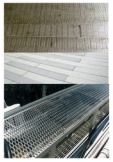
Open-space lawn

Natural materials

Typical grazing grass palette



Wetland



Manufactured materials

An abstract expression of four ecologies on Hazeldean, the planting palette is well integrated into the surrounding landscape, and its design focuses on how the plants interact in their native environments.

TREE PALETTE
Dombeya rotundifolia
Combretum erythrophyllum
Acaccia sieberiana
Olea europaea susp. africana

GRAMINOID PALETTE
Highly palatable:
Harpochloa falx
Setaria sphacelata
Digitaria eriantha
Urochloa mosambicensis
Tristachya leucothrix
Chloris gayana
Setaria verticillata
Palatable perennials:
Heteropogon contortus
Setaria nigirostris
Brachiaria serrate
Chloris virgate
Digitaria diagonalis
Themeda triandra
Chrysopogon serrulatus
Tristachya biseriata
Eragrostis superba
Setaria pallide-fusca

WETLAND PALETTE
Marsilea schelpiana
Nymphae nouchali
Nymphoides indica
Nymphoides thunbergiana
Schoenoplectus corymbosus
Berula erecta
Cypherus marginatus
Cyrtanthus breviflorus
Eleocharis dregeana
Hesperantha coccinea
Juncus glaucus
Kniphofia ensifolia
Mentha aquatic
Blechnum tabulare
Carex austo subsp. africana
Commelina africana
Crinum bulbispermum
Equisetum ramosissimum
Eucomis autumnalis
Falkia oblongata
Gomphostigma virgatum
Gunnera perpensa
Lippia javanica
Melinis nerviglumis
Andropogen eucomis

CUTFLOWER PALETTE
Zantedeschia rehmanii
Gladiolus crassifolius
Gladiolus elliotii
Gladiolus dalenii
Urginea multisetosa
Phyllanthus parvulus
Melinis repens
Hilliardiella hirsute
Berkheya speciosa
Eulophia ovalis subsp. ovalis
Dicoma zeyheri
Kylinga alba
Bulbine angustifolia
Hermbstaedtia odorata
Asclepias adscendens
Erica woodii
Indigofera sordida

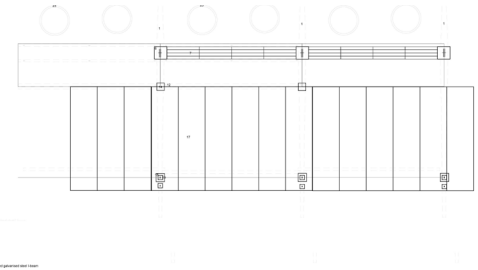
MATERIAL PALETTE

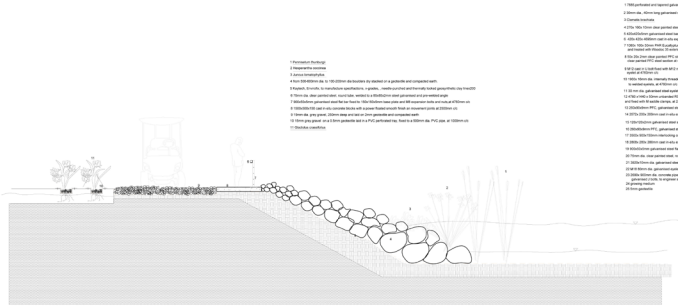
Heritage related:
Concrete and lime mixture
Corrugated steel off-shutter finish
Locally found stone

Natural:
Gabion baskets
Timber
Cobblestone pavers
Smooth stone

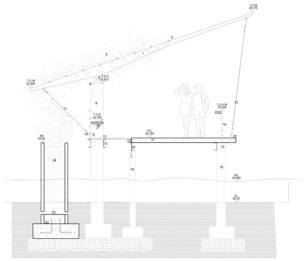
Manufactured:
Mild steel
Mentis grating
Echo slabs
Concrete with an off-shutter timber grain finish

PLANT AND MATERIAL PALETTE

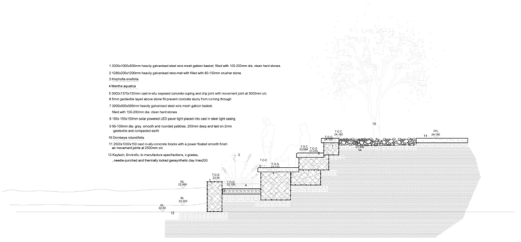




DETAIL 1
WETLAND EDGE AND CUT FLOWER FARM IRRIGATION SYSTEM
SCALE 1:50



DETAIL 2
RAISED WALKWAY STRUCTURE
SCALE 1:50



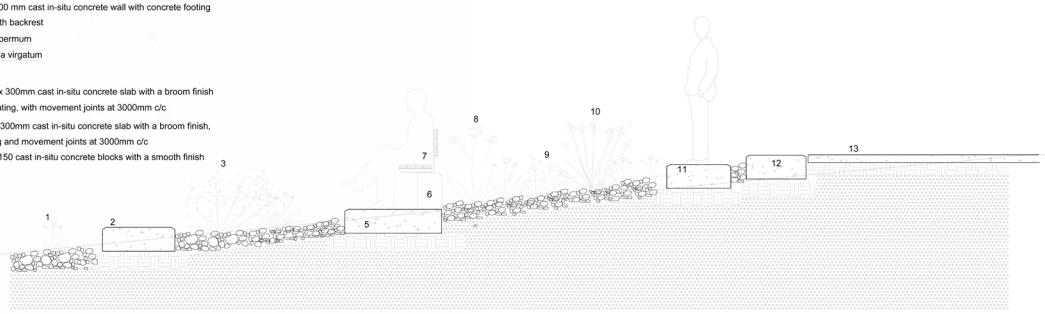
DETAIL 3
GABION BASKET SEATING EDGE
SCALE 1:50

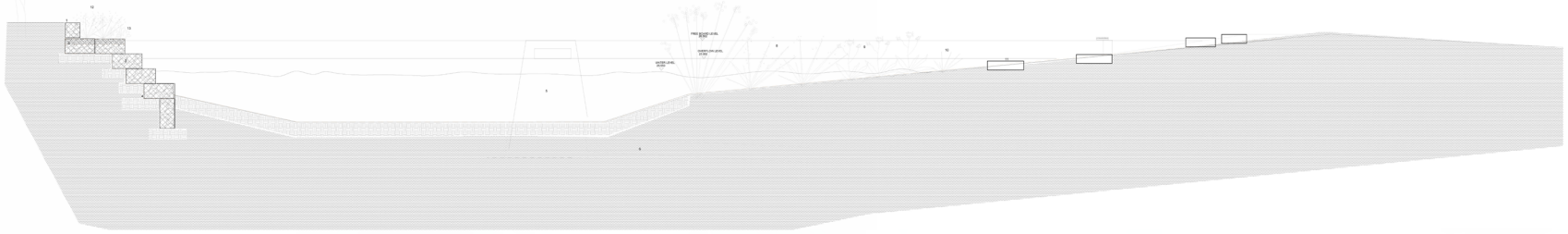
SECTION AA
SCALE 1:100

DESIGN AND TECHNICAL

DETAIL 9
CONCRETE SLABS
SCALE 1:20

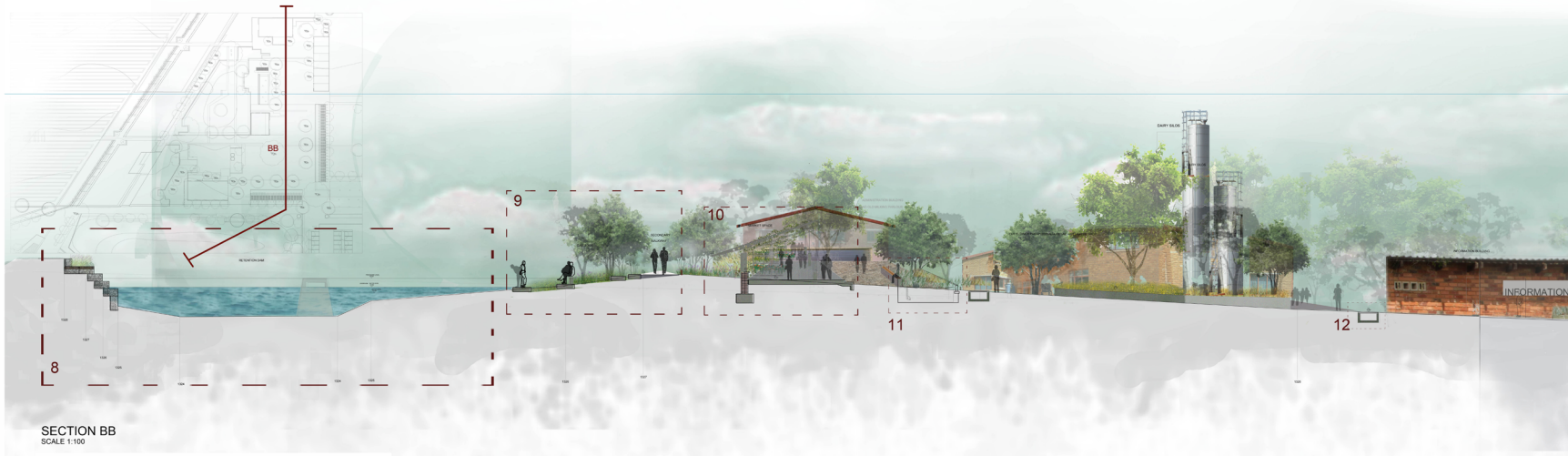
1 Cyrtanthus breviflorus
2 3300x 1000x 300mm cast in-situ concrete slab with a broom finish and non-slip coating.
3 Melinis nerviglumis
4 100mm dia. smoothed and rounded riverbed stone on a 1mm geotextile to a depth of 250mm
5 7450x 1200x 300mm cast in-situ concrete slab with a broom finish and non-slip coating
6 1200x 450x 300 mm cast in-situ concrete wall with concrete footing
7 timber seat with backrest
8 Crinum bulbispermum
9 Gomphostigma virgatum
10 Berula erecta
11 24760 x 800x 300mm cast in-situ concrete slab with a broom finish and non-slip ciating, with movement joints at 3000mm c/c
12 7870 x 800x 300mm cast in-situ concrete slab with a broom finish, non-slip coating and movement joints at 3000mm c/c
13 2500x1000x150 cast in-situ concrete blocks with a smooth finish





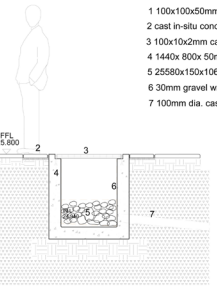
1 2000x 400x 50
2 100x100x50m
3 500x 200x150
4 200mm Geop
closed with a s
5 1000mm deep
6 70mm dia. PV
7 6780x150x39

DETAIL 8
RETENTION DAM EDGE
SCALE 1:50



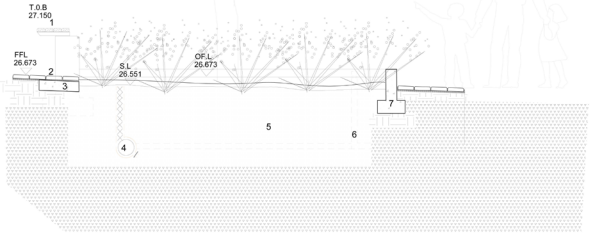
SECTION BB
SCALE 1:100

1 100x100x50mm dark grey cobblestone paver with a rough finish laid on 25mm of river sand and compacted earth
2 cast in-situ concrete slab with a smooth finish and movement joints at 3000 c/c
3 100x10x2mm cast in galvanised steel lug pre-welded to a 50x50x5mm galvanised mild steel angle, at 1440mm c/c
4 1440x 800x 50mm unbanded RS80 Mentis GRIPWELD galvanised steel grating,continuously placed
5 25580x150x1060mm cast in-situ concrete channel with a 5mm Derbigum torched on waterproofing membrane and screeded to fall
6 30mm gravel wrapped in a geotextile
7 100mm dia. cast in PVC water outlet pipe



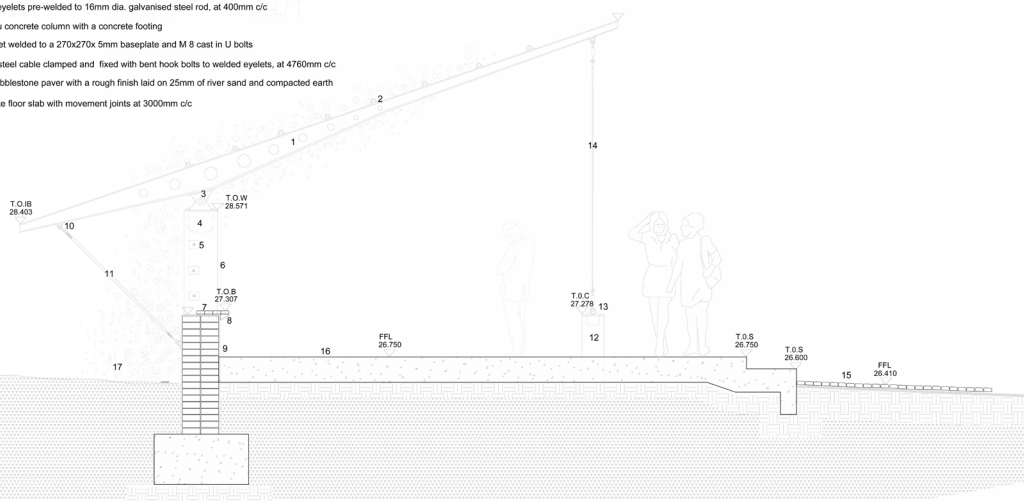
DETAIL 12
STORM WATER GRATE AND CHANNEL
SCALE 1:20

0mm timber seat on cast in-situ concrete wall
m dark grey cobblestone paver with a rough finish laid on 25mm of river sand and compacted earth
0mm concrete footing cast with mortar to the cobble stones at 2000mm c/c
ipe and Kaytech Flownet wrapped in a 5mm continuous needle punched nonwoven polyester geotextile
taple of wire binding.
growing medium
'C overflow pipe
0mm cast in-situ concrete edge restraint with concrete footing

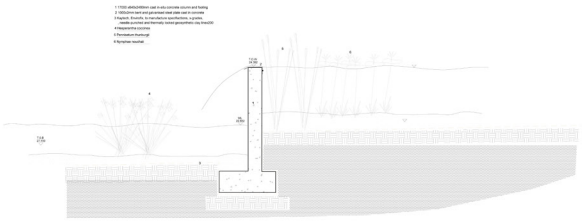


DETAIL 11
SELF IFFIAGATING PLANTER
SCALE 1:20

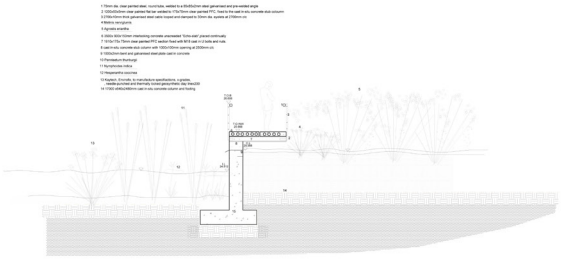
1 7885,perforated and tapered galvanised steel I-beam
2 30mm dia., 40mm long galvanised steel eyelet and nut, at 600mm c/c ,fixed to I-beam flange
3 270x 160x 10mm clear painted steel hinges with a 15mm central axel, welded to 5mm base plate.
4 420x420x5mm galvanised steel baseplate at 4760mm c/c ,fixed to M18 cast in-situ U bolts and M18 nuts
5 3740x10mm thick galvanised mild steel cable connected to eyelit and flat plate
6 420x 420x2770 mm cast in-situ exposed concrete column with concrete footing to engineer specification
7 1080x 100x 50mm PAR Eucalyptus timber, fixed with self tapping screws to steel PFC and treated with Woodoc 35 exterior polywax sealer
8 50x 20x 2mm clear painted PFC steel section, at 1080mm c/c, welded to 126x60x4mm clear painted PFC steel section at 4760mm c/c
9 3475x 450x1472 mm brick seating wall on a concrete foundation with a smooth plaster finish, at 3590mm c/c
10 1960x 16mm dia. internally threaded galvanised steel rod,fixed with reverse threaded hook bent bolts, to welded eyelets, at 4760mm c/c
11 30 mm dia. galvanised steel eyelets pre-welded to 16mm dia. galvanised steel rod, at 400mm c/c
12 270x270x1010mm cast in-situ concrete column with a concrete footing
13 50mm dia. clear painted eyelet welded to a 270x270x 5mm baseplate and M 8 cast in U bolts
14 3920x10mm dia. galvanised steel cable clamped and fixed with bent hook bolts to welded eyelets, at 4760mm c/c
15 100x100x50mm dark grey cobblestone paver with a rough finish laid on 25mm of river sand and compacted earth
16 smooth and unsealed concrete floor slab with movement joints at 3000mm c/c
17 Clematis brachiata



DETAIL 10
MARKET STALL STRUCTURE
SCALE 1:20



DETAIL 13
WETLAND WEIR
SCALE 1:50



DETAIL 14
WETLAND WEIR AND WALKWAY
SCALE 1:50

SECTION CC
SCALE 1:100

WETLAND AND MAIN WALKWAY

PUBLIC MARKET SPACE

PERSPECTIVES

PLANTING AND PATHWAYS NEAR THE ADMIN BUILDING

BIRDS EYE VIEW OF THE MARKET SPACE AND RETENTION DAM

PERSPECTIVES

Sources in text

List of Figures

09 References

9.1 SOURCES IN TEXT

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9.2 LIST OF FIGURES

FRONT

CHAPTER 01

CHAPTER 02

CHAPTER 03

CHAPTER 04

CHAPTER 05

CHAPTER 06

CHAPTER 07

In accordance with regulation 4[e] of the General Regulations [G.57] for Dissertations and Theses, I Declare that this Dissertation which I hereby submit for the Degree of ML (Prof) at the University of Pretoria is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution.

I further state that no part of my Dissertation has already been, or is currently being, submitted for any such degree, diploma or other qualification.

I further declare that this dissertation is substantially my own work. Where reference is made to the works of others, the extent to which the work has been used is indicated and fully acknowledged in the text and list of references.

Kiana Martins

2013