# CREATING WATER SENSITIVE PLACES

## IN HANGBERG

MARI SMITH

URBAN DESIGN RESEARCH PROJECT | MASTER OF URBAN DESIGN | UNIVERSITY OF CAPE TOWN | 2021

SUPERVISOR: DR KATHRYN EWING

# CREATING WATER SENSITIVE PLACES
## IN HANGBERG

MARI SMITH

BTHMAR033

January 2021

Submitted in partial fulfillment of the Master of Urban Design Degree at the University of Cape Town

60 credits

# ABSTRACT

The neighbourhood of Hangberg has had a long and intimate relationship with water, the neighbourhood is located around the Hout Bay harbour where the fishing industry provides the main source of employment and residents depend on clean water for their daily needs. This relationship has however been put under strain as urban development has affected the natural and urban water cycle resulting in flooding, soil erosion, pollution and water shortages. Urban spaces and residents have become detached from water as infrastructure tends to be hidden underground and water is seen as a nuisance rather than an asset. Even though we depend on water resources, it is often not a priority in the design and development of our urban spaces. We need to relook at the relationship between water and urban space to provide a solution that integrates the urban water cycle with good qualities of urban design to create a liveable neighbourhood.

# HANGBERG

Hangberg is located on the slopes of the Sentinel above the Hout Bay harbour. The area is characterised by council flats, row houses and informal structures.

On a sunny Wednesday afternoon children from Hangberg race down the streets to the harbour on homemade go-carts, forcing some strolling tourists to jump out of the way.

Yachts that can only be afforded by the wealthy float through the Marina while workers walk to the operational part of the harbour. Fisherman and dock workers from Hangberg get on with their work as everyone else has to step out of the way.

A crayfish fisherman struggles to access the sea, having to walk over sharp rocks at the edge of the harbour. But the struggle is worth it as he can sell some of the crayfish at the end of the day to be able to afford some groceries. Many families lost their livelihoods when the fishing quota was introduced in 2005.

A group of women stand chatting outside of a spaza shop while children are playing in the streets in front of a block of flats. The lack of trees and seating makes it uncomfortable to stand in the scorching sun.

The streets now seem amicable with little indication of the violent protests that took place in 2010 when residents tried to stop the Municipality's anti-land invasion unit and the police from demolishing shacks on the Sentinel's fire break. Authorities responded with force and many people were injured.

As the clouds start to roll in over the Sentinel the weather turns and the rain starts to fall. Many residents living in informal structures have to prepare for the unpreventable flooding, as a result of the poor infrastructure, which damages their homes and makes it tough to walk in the area.

The day comes to an end, many families huddle in their homes trying to stay dry and safe. The lack of proper water and sanitation services makes it difficult to complete normal daily tasks but somehow they find a way to cope.

And so ends another day in Hangberg, a place of such beauty and strong community, plagued by its apartheid legacy, yet possessing immense potential.

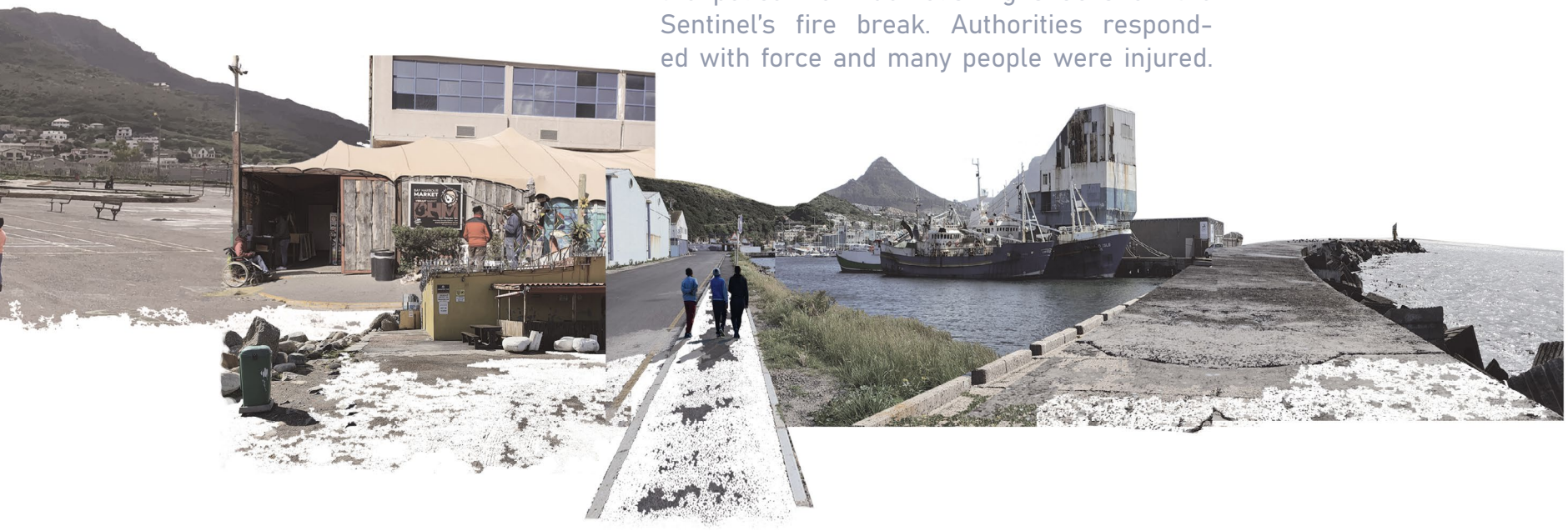



Figure 1: View of Hangberg from the Harbour (Source: author)

# CONTENTS PAGE

# CHAPTER 1
# INTRODUCTION

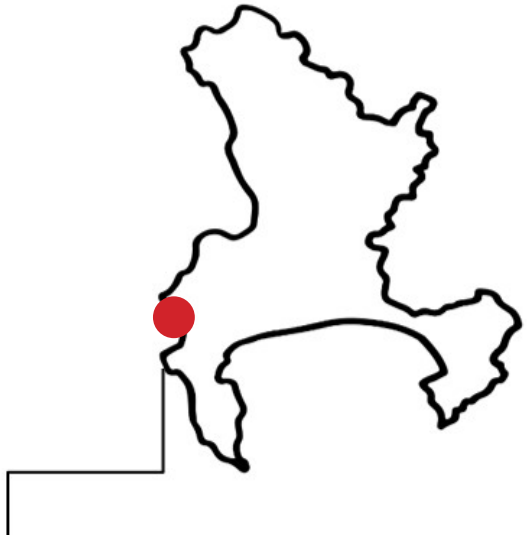
# 1. INTRODUCTION

## 1.1. INTRODUCTION

South Africa is a water scarce country and in the past few years the country has experience its worst drought to date. This has resulted in water shortages resulting in water restrictions in urban areas. Along with the increasingly growing gap between water supply and demand, the country is still facing challenges of providing basic water services to the majority of the population. This is particularly challenging in growing urban areas such as Cape Town, where the municipality is struggling to provide communities with basic services while simultaneously ensuring environmental sustainability. The pollution and littering of Cape Town's freshwater systems and stormwater poses a threat to the biodiversity as well as human health. Proper stormwater management is vital for protecting citizens from localised and widespread flooding, however informal settlements face the brunt of localised flooding whilst having the least means to prepare and recover from such events. This however provides an opportunity for the capture and reuse of stormwater for productive use. Cape Town's water ecosystems, such as rivers and wetlands, are generally not suitable for recreation activities and are undesirable public gathering spaces. These spaces are also regarded as unsafe as criminal activities tend to occur in these spaces. These systems are largely ignored while they are in fact rich with possibility. It is clear that an alternative approach is required to plan sustainable urban water systems in our cities. This research project intends to explore how we can relook at the relationship between water and urban space in Hangberg to provide a design solution that integrates the urban water cycle with good qualities of urban design to create liveable neighbourhoods. By testing out various approaches, an urban design framework will be developed for Hangberg which could guide future water-sensitive urban design initiatives.

## 1.2. LOCATING THE STUDY AREA

Hangberg is located in Hout Bay, Cape Town. Hout Bay is a predominantly residential neighbourhood that is situated in the south-west of Cape Town and is located 22km away from the CBD. The neighbourhood has had a long and intimate relationship with water as it was originally a farming and fishing community. Hout Bay harbour's fishing industry still provides the primary source of employment for residents in Hangberg.




## 1.3. STRUCTURE OF DOCUMENT

CHAPTER 1: INTRODUCTION
This chapter provides a brief overview of the objective of the research project as well as the research methodology and design methods used.

CHAPTER 2: LOCATING THE PROBLEM
This chapter analyses the dominant spatial and development trends that have informed the growth of Hangberg and the physical urban patterns that have resulted from these.

CHAPTER 3: CONCEPTUAL FRAMEWORK
This chapter outlines a brief philosophical position about the values and ethics that the researcher used in the compiling of this research project as well as the various concepts and theories that were used in formulating the design proposals.

CHAPTER 4: CONTEXTUAL ANALYSIS
This chapter includes context analysis of Hout Bay and Hangberg and identifies opportunities and constraints for the site.

CHAPTER 5: DESIGN FRAMEWORK
This chapter develops an urban design framework for Hangberg that provides planning guidelines for the site and identifies a precinct within the site.

## 1.4. RESEARCH TEAM

I form part of the Liveable Neighbourhood Research Project (LNRP) at UCT that is funded by the Water Research Commission (WRC). The LNRP is a transdisciplinary team investigating water sensitive design in Hangberg, Hout Bay. The team worked jointly to integrate the perspectives from different disciplines and to provide a platform for knowledge production and to learn from one another. The research team conducted baseline investigations and various site evaluations within the Hout Bay Catchment area to identify the focus area for the LNRP. A transect analysis was done where 5 key sections through the Hout Bay Catchment was selected. The following areas were researched:

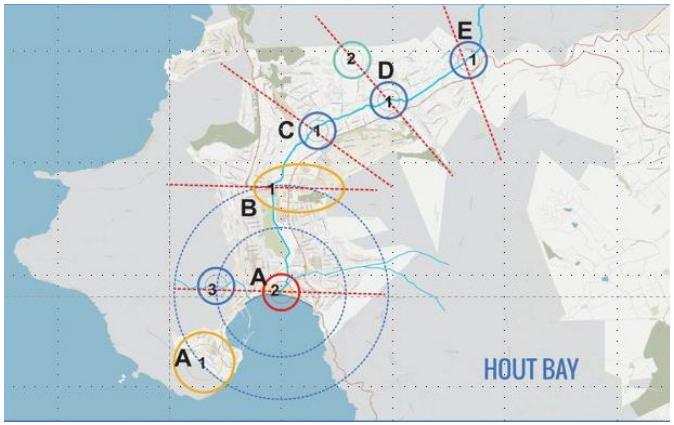



Figure 1.1: Transect analysis of Hout Bay catchment

Hangberg was chosen as the focus area based on the sites current conditions relating to the environment and how people live with water and associated access to resource such as housing, adequate infrastructure and services.

| | |
|---|---|
| Faith Gara | Social Science |
| Donna Shefer | City + Regional Planning |
| Mari Smith | Urban Design |
| Chisomo Piri | Architecture |
| Lina Lukusa | Information Systems |

Figure 1.2: LNRP student research team

The funding required the Urban Design researcher to produce an urban design framework and precinct plan for Hangberg that has a focus on water sensitive design. The researcher is also required to provide monthly updates on study progress, attend meetings and co-author an academic paper. Other commitments that I attended was an online course on Water-Sensitive Urban Design and Planning which was jointly organised by the Centre for Science and Environment in India and the Water Research Commission in South Africa. During the period August to October 2020 I also did several site visits to Hangberg and the surrounding area. Two of the site visits to Hangberg were accompanied by a local community member who took me through the study area. In September 2020 I attended a workshop on benchmarking the City of Cape Town as a water sensitive city and in November 2020 I did a presentation at the future water seminar on the progress of my work.

## 1.5. RESEARCH METHODOLOGY

### 1.5.1 Research Question

What solutions can a Water Sensitive Urban Design (WSUD) approach provide that will help address key challenges in Hangberg?

### 1.5.2 RESEARCH OBJECTIVES

To relook at the relationship between water and urban space in Hangberg to provide a solution that integrates the urban water cycle with good qualities of urban design to create a liveable neighbourhood.

### 1.5.3 POSITIONALITY

My research approach is influenced by the skills as well as the knowledge that I have gained through my studies and work experience over the past few years. During my studies at the sustainability institute the concepts of systems thinking and sustainability resonated with me and I felt very passionate about being in a profession where I could contribute towards creating better urban places for all. I became very interested in the planning profession where I got to further engage with many different issues such as environmental degradation, inequality, poverty and urbanization while I was studying my Masters in City and Regional Planning at UCT. In my work environment I have worked in

multi-disciplinary teams which has given me an understand of the value and the knowledge that you gain by engaging with different stakeholders. I believe in the importance of meaningful participation and respecting everyone's options and ideas, it is all about compromise and ensuring that everyone's voices and opinions are met to come up with a combined and integrated solution. This reiterated the importance of involving communities from the beginning of the design processes to harness local knowledge and design with communities instead of for communities.

## 1.5.4 METHODOLOGY

For this research project I positioned myself within the following methodology:

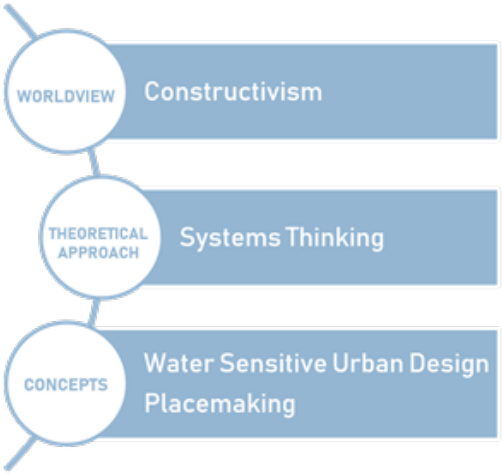



Figure 1.3: Methodology (Source: Author)

My approach to my research combined constructivism with a systems thinking approach. I understands that knowledge is produced through personal experiences and observations, although I was not able to hold engagements with local community members I do believe that researchers should aim to engage with the local community in order to have a holistic understanding of the complex problems that they are facing. This approach focuses on cyclical relationships and looks at the interrelated connections between ecological, economic, social and spatial elements within Hangberg. I used a water sensitive urban design approach to provide spatial proposals that could provide some solutions to some of the key problems that Hangberg is facing.

## 1.5.5 METHODS

Figure 1.4 lists the qualitative research tools that was used to implement the methodology.

| METHOD | DESCRIPTION | Able to do due to COVID-19 |
|---|---|---|
| **Desktop study** | GIS mapping<br>Document analysis<br>Literature review<br>Case Studies<br>Mapping | Yes |
| **Observations** | Site visits | Yes (but limited) |
| **Interviews** | Semi-structured with some specific questions | Yes (but limited) |
| **Participatory action research** | Focus groups<br>Co-design workshops | No |

Figure 1.4: Methods (Source: Author)

## 1.5.6 LIMITATIONS

Due to COVID-19 South Africa went into a national lockdown which meant that I was not able to have face-to-face interactions with community members. This was a significant challenge as research methods such interviews and workshops with community members could not take place. As commuity members didn't have access to the amount of data that is required for online session is was not possible to hold zoom interview. Faith Gara from the LNRP research team has already established a relationship with some of the Hangberg community members, she assist with putting me in contact with a community member that guided two site visits to Hangberg. Due to these limitations it was important for the various LNRP researcher's to work closely together, we held regular meetings to share information and resources to assist each other and to collaborate.

## 1.6. DESIGN METHOD

This section provides an overview of the design method, process and approach which is developed in this research project. I followed a cyclical design process that has the following four main stages:

Concept:
The concept is concerned with understanding the nature of the problem as well as how things ought to be.

Context:
The concept requries a detailed understanding of the various factors that impact the site. The product of this phase is a composite opportunities and constraints map that shows all of the relevant information needed to inform design decisions.

Design Formulation:
The design formation involves the bringing together of the concepts and contextual analysis at a range of scales.

Implementation:
The implementation plan identifies some of the key elements that are required to implement the design proposals. It also deals with phasing which identifies a series of necessary actions.

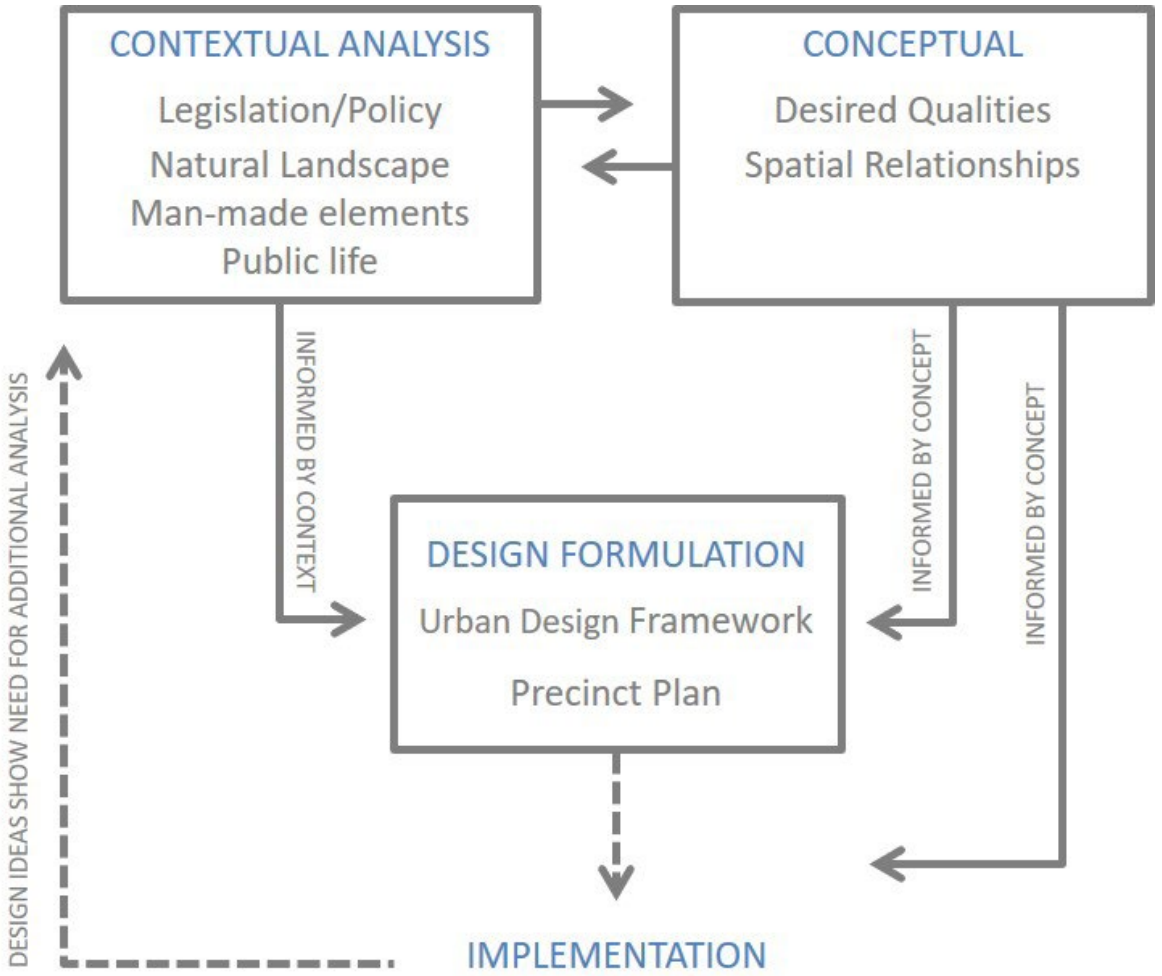



Figure 1.5: Research process (Source: Author)

# CHAPTER 2
# LOCATING THE PROBLEM

# 2. LOCATING THE PROBLEM

## 2.1. GLOBAL CONTEXT

In recent years we have seen a rising conflict between urban growth and environmental protection. Even though people have interacted with the biophysical environment since the beginning of history, the intensity of these human interactions has increased dramatically resulting in unsustainable development. The magnitude and acceleration of urbanization is reshaping land use in a way that requires us to re-look at the interrelations among the natural and human activities as human survival is dependent on the conditions and resources available in the natural environment.

### 2.1.1. CLIMATE CHANGE

The effects of climate change are largely attributable to human activities that are increasing the amount of greenhouse gasses released into the atmosphere. The largest contribution comes from the burning of fossil fuels. The world's cities occupy just 3 per cent of the Earth's land, but account for 60-80 per cent of energy consumption and 75 per cent of carbon emissions (United Nations, 2020). Climate change has led to the following realisations:

- harmful emissions need to be reduced and the best way to achieve this is for cities to reduce urban residents' dependence on motor cars.
- We need to conserve nature, cities footprint are expanding rapidly and usually into environmentally sensitive areas. Therefore urban compaction should be promoted to reduce the footprint of cities.
- Rising sea levels are going to affect many coastal cities and planners need to ensure that no further development occurs in flood lines.

### 2.1.2. URBANISATION

According to the ODI In 2018, an estimated 55% of the world's population lived in urban settlements. By 2030, urban areas are projected to house 60% of people with 6.5 billion people living in urban areas which is two thirds of the world's population. Urban environments provide any benefits such as job opportunities, higher incomes and opportunities and facilities (ODI, 2020). Some of the impacts on urbanisation include the following:

- The number of urban poor is increasing as there is limited access to land and the cost of transport, education, healthcare and housing is high
- There is liited access to basic services such as water and sanitation
- increasing populations and urban sprawl exacerbates congestion in cities
- governments in poor countries are under resourced

### 2.1.3. RESOURCE DEPLETION

Since the industrial revolution our demand for raw materials have significantly increased. Humans are using natural resources faster than it can replenish itseld, the planet can't keep up with our ever increasing demands (The world counts, 2020).

Some of the causes of resource depletion include the following:

- Overpopulation
- Overconsumption casued by excessive and unnecessary use of resources
- Deforestation and the Destruction of Ecosystems leading to loss of biodiversity
- Pollution and Contamination of resources

WATER SCARCITY

Eventhough the earth is 70% water, only 2.5% of that is fresh water which is suitable for human consumption. The United Nations predict that by 2025, 1.8 billion people will have no water to drink (The world counts, 2020).

### 2.1.4. FOOD INSECURITY

Food insecurity is where households have a lack of access to adequate food due to several factos such as employment, race/ethnicity and disability. This can cause a variety of health problems. Climate change also adversly affect aspect of food security such as the availability of food due to changes in rainfall patterns and temperature changes. Climagte change also increases the frequency of extreme weather consitions such as droughts and floods. The best way to ensure food security in cities is to promote local food production through urban agriculture and to protect valuable agricultural land. Local food production can also encourage local economic development and provide jobs.

## 2.2. HANGBERG, HOUT BAY

### 2.2.1 HOUT BAY RIVER CATCHMENT

A river catchment is an area of land where water collects when it rains, the water flows over the landscape, into streams and eventually feeding the river. Some of this water remains underground and continuously feeds the river during dry times. Catchments are complex systems; water, soil, plants and animals are all linked together within a catchment. What happens in one part of a catchment has a big impact on other parts. Urban development has led to poor river catchment health resulting in the natural system not being able to filter, clean and store water ("What is a catchment?", 2020). The total area of the Hout Bay River catchment is 33.8 km2. The Hout Bay River originates on Table Mountain where it splits into two streams (Disa and original DIsa streams) and joins the Orange Kloof river which runs the length of the valley through farmlands and residential areas to the sea. There are five dams that control the headwaters of these two streams which supply potable water to Cape Town (Grindley, 1988).

### 2.2.2 HISTORIC GROWTH

In the 1600's Hout Bay was identified as a safe landing place for ships, the Disa River provided plenty of fresh water while the forest provided plenty of timber for buildings and the repair of ships. Three was a great demand for vegetables to supply the ships that came to the harbor and the sheltered position of Hout Bay made it an ideal location for agricultural opportunities. By 1958 the banks of virtually the entire length of the river was cultivated. Farmers removed the natural vegetation along the river to increase the area of their fields, this resulted in significant erosion of the river banks (Grindley, 1988; "The Modern History of the Hout Bay River", 2020). Hout Bay was a fishing centre for many years, after the harbor was developing in 1937 and the fishing industry boomed, the area received an influx of people looking for work. The advent of the motor vehicle and roads turned Hout Bay into a suburb in Cape Town, with many affluent resident making their home in the bay (Grindley, 1988).

### 2.2.3 RESOURCE DEPLETION

In the mid-1800's the natural resources of the river catchment were exploited, the forests were destroyed to meet the needs of Cape Town's rapid urbanization and water demand outstripped water supply. Five dams were constructed to collect water which flowed through Hout Bay's valley which supplied areas like Wynberg and Constantia. During heavy winter rains when the dam's reached their capacity, the city opened the sluices of the dam to prevent overflow damage to the dam walls.
This resulted in a 'tidal wave' following the river's course to the sea. In 1984 an extreme flood washed away the crops at the Kronendal farm, in 1995 the farm ceased production, resulting in the closing down of the country's oldest working farm. This ultimately resulted in the demise of commercial agriculture activity in Hout Bay ("The Modern History of the Hout Bay River", 2020)

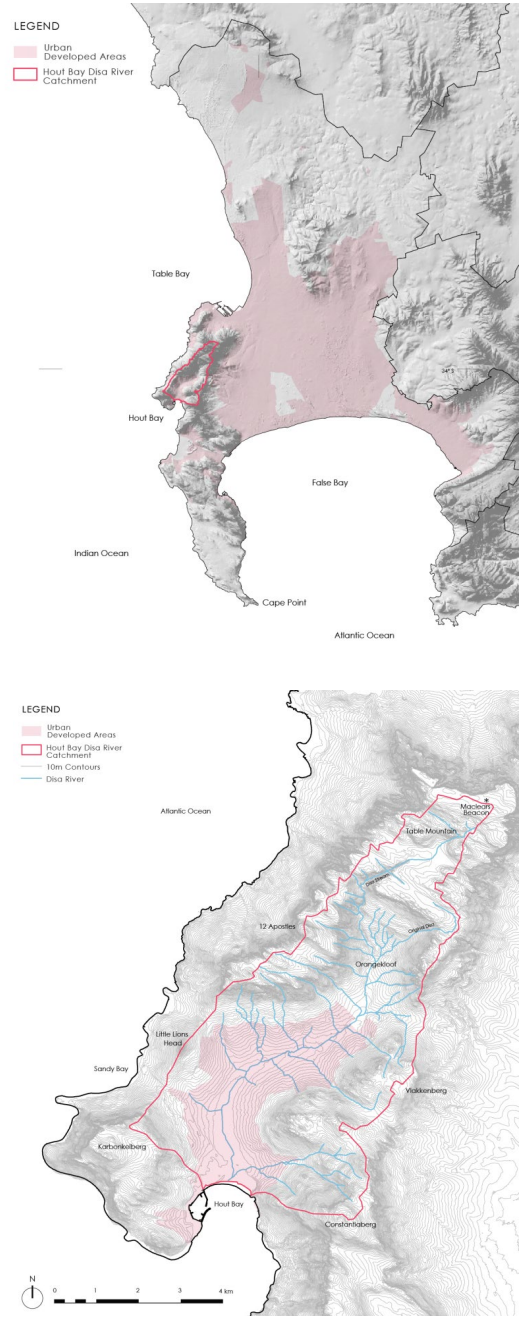



Figure 2.1: Hout Bay River Catchment Location (Vaughan, 2017).

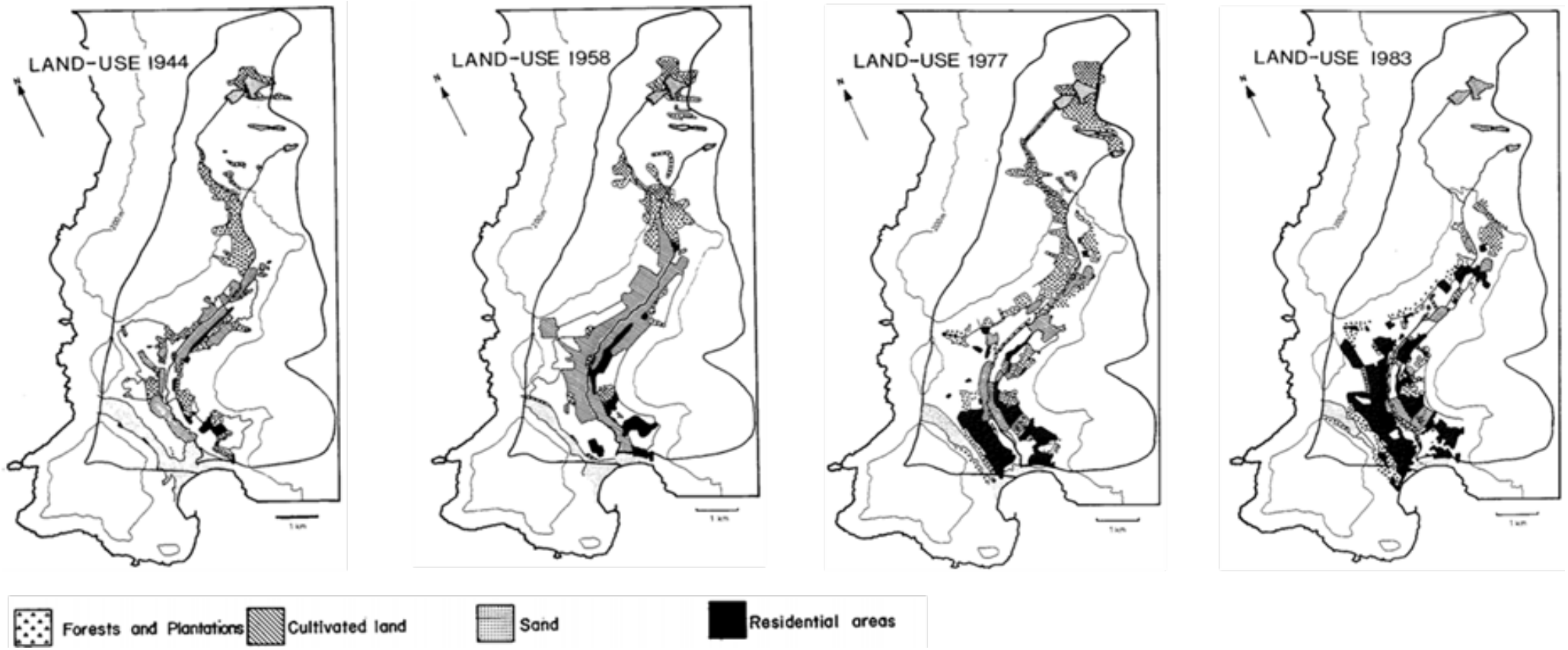



Figure 2.2: Land use patterns in Hout Bay from 1944 – 1983 (Grindley, 1988).

## 2.2.4 SPATIAL DEVELOPMENT

During apartheid life radically changed for Hout Bay's residents, the neighbourhood was designated as a 'white' area while the township of Hangberg was designated as a 'coloured' area. Originally the South African government wanted to reolate the coloured people from Hout Bay to the Cape Flats but the fishing companies needed the labour and put pressure on the politicians to keep them in Hout Bay. As a result the Group Areas Act forced the removal of 'coloured' families from their homes in the centre of the bay into small council houses and flats for those working in the fishing industries in the Hout Bay harbour. Most hostels were built in the 1970s and most council flats were built in the 1980s (Gara, 2020).

After Apartheid ended, residents started to build informally, initially building shacks behind the existing hostels, but as space became limited residents started to build higher up the mountain into the nature reserve's fire break, this informal settlement is known an 'die sloot'. This land is owned by South African National Parks (SANParks) who received a court interdict against further settlement on this land. ("Hangberg, Hout Bay", 2020). Residents risked arrest and eviction in order to remain in their 'ancestral home' in Hangberg (Knoetze, 2014).

In 2006 Hangberg was chosen as one of the few settlements to be upgraded through the municipality's Informal Settlement Improvement Plan. Together with DAG, a local NGO, the community negotiated an agreement with the municipality to upgrade the settlement and gradually securing tenure rights for existing residents. A part of the agreement was to prevent further encroachment on the firebreak (Gara, 2020). The upgrading process was slow and the community and municipality accused each other of breaching the agreement. According to the municipality the community had allowed new residents to erect structure on the firebreak and that some members of the community engage in illegal activities such as drugs and abalone or crayfish poaching. The community alleged that the city was demolishing shacks and evicting residents as well as arresting suspected poachers. Hangberg;s coloured community felt neglected as they believed that the black community of Imizamo Yethu was given preferential treatment. This mutual distrust led to many riots over the years (Gara, 2020).

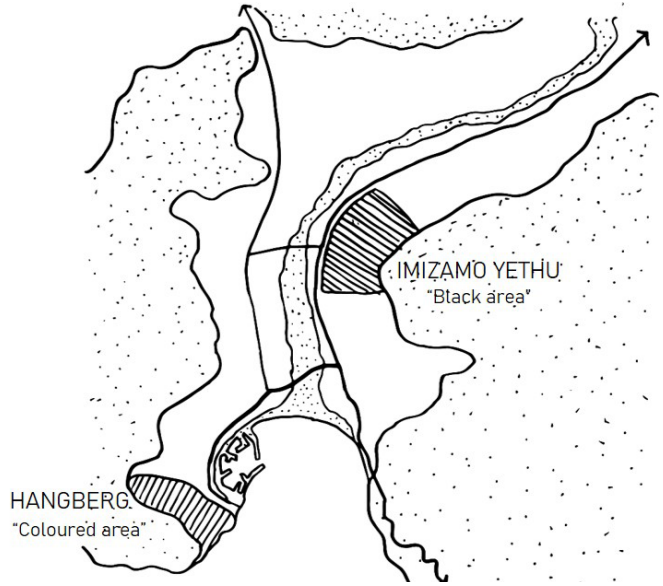



Figure 2.2: Apartheid consequences in Hout Bay (Source: Author)


Figure 2.3: Current Layout of Hangberg (Source: Google Earth, https://adrian.frith.dev/historical-maps-of-ct/

## 2.2.5 KEY EVENTS IN HANGBERG

2010
There was a large uprising against the eviction of thirty houses, residents fought for the land that they believe belongs to them (Knoetze, 2014). Knoetze (2014) conducted an interview with a Hangberg resident who stated that "the riots represented the climax of a systematic breakdown of relations between the community and local and provincial government." (Knoetze, 2014)

2013
The municipality gained a court interdict to evict 20 families living in an area that was situated on land allocated for new housing. The evicted residents were put in temporary housing (Gara, 2020).

2014
A violent riot erupted as a result of residents being evicted from the informal area known as 'die sloot' (Gara, 2020).

2017
Another violent riot broke out when the Hangberg community found out that about R100 million was spent on the black community of Imizamo Yethu (Gara, 2020).

2018
An anti-poaching unit allegedly killed a fisherman sparking violent riots as well as the allocation of fishing rights (Gara, 2020).

2019
Hundreds of people joined a protest in Hangberg to show their solidarity with the community and the families who's illegally built structures were broken down by the City of Cape Town.

2020
Violent protests erupted following an anti-land invasion operation by the City of Cape Town on 11 June. The police tear gassed the school and fired rounds of rubber bullets (Palm, 2020).


Figure 2.4: 2020 protest in Hangberg (Source: "Protest in Hangberg after homes broken down by City of Cape Town", 2020)

## 2.2.6 SPATIAL CONSEQUENCES

The spatial development of Hout Bay has had a devastating impact on Hout Bay and Hangberg. Some of these spatial consequences are listed below:

NATURAL DISASTERS

There is a significant lack of emergency services in the neighbourhood. During the rainy seasong water runs down from the mountain, resulting in a stream that flows through the informal settlement and causes flooding which damages or even destroys homes. Fire outbreaks are also frequent in the area which destroys property as well as livelihoods. Other weather related challenges includes storms and winds that blow away roofs.

Figure 2.5: Fire outbreak in Hangberg (Source: https://www.iol.co.za/capeargus/news/hangberg-fire-kills-2-leaves-many-homeless-17555453)

ENVIRONMENTAL DEGRADATION

The sprawling informal settlement of 'die sloot' has encroached onto environmentally sensitive and conservation areas. The lack of basic services, overcrowding and poor waste management also negatively affects the natural environment.

Figure 2.6: Pollution build up in 'die sloot' (Source: author)

POOR QUALITY PUBLIC SPACES

The quality of the public spaces in Hangberg is poor despite the fact that most of the people in the community spend a considerable amount of time in these spaces. Because the neighbourhood is so overcrowded these public spaces become places where people socialise and 'escape' from their daily struggles. Most of the buildings located around these spaces fail to define these public spaces and creates unattractive and unsafe spaces. There is very little attention given to these public spaces.

Figure 2.7: Central public space in Hangberg (Source: author)

ECONOMIC INEFFICIENCY

As unemployment in South Africa increases, more people are forced to generate their own livelihoods. The neighbourhood does not accomodate locations for local markets, therefore informal trading occurs in unregulated locations that create access, health and safety problems.

Figure 2.8: informal traders in Hangberg (Source: author)

INADEQUATE HOUSING

As the municipality has not provided affordable housing options, residents have taken it upon themselves to build infromal structures. This has led to people building in areas that are dangerous

Figure 2.9: informal structures (Source: author)

INADEQUATE PROVISION OF SERVICES

The unplanned growth of informal structures has resulted in the inadequate provision of basic services in the neighbourhood. Many informal structures has illegally connected to the sewage and water infrastructure putting additional pressure on the ageing infrastructure and resulting in frequent burst sewage and water pipes. Many residents are of the opinion that the water and sanitation issues can only be addressed when residents have formal housing that comes with toilets and taps.

Figure 2.10: Illegal sewage connections (Source: author)

INCREASING INEQUALITY

The historic patterns of development in the neighbourhood has significantly exacerbated key social problems of poverty and inequality. Many residents are forced to spend large proportions of their income on using public transport to access economic oportunities and social facilities within the city, this results in many residents being unable to travel to pursue oportunities within the city.

Figure 2.11: Hangberg spatially segregated (Source: https://c.mi.com/thread-2251096-1-0.html)

## 2.3. NEED FOR A NEW APPROACH

Cities in South Africa have been experiencing high growth rates, traditional urban planning systems have been unable to adequately deal with the demand for key resources such as water. This existing challenge with supplying water is exacerbated by an increase in droughts and extreme weather conditions. On top of this urban areas, such as cape town, is characterized by socio-economic and spatial inequalities with the poorer neighbourhoods being subject to greater water stress than higher income neighbourhoods (Water Sensitive Design, 2020). Historically water has been treated in a linear approach that is technology driven, resource intensive and removes citizens from the approach. This has resulted in fragmentation of the management of the urban water cycle (Armitage et al, 2014). These complex challenges of water and rapid urbanization require innovative solutions in order to develop efficient, resilient and flexible urban water systems while simultaneously creating a liveable neighbouthoods (Water Sensitive Design, 2020)

# CHAPTER 3
# THEORETICAL FRAMEWORK

3.1 VISION

3,.2 VALUES

3.3 ETHICS

3.4 PERFORMANCE QUALITIES

3.5 APPROACH

3.6 STRUCTURING ELEMENTS

3.7 CONCEPTS AND THEORIES

# 3. THEORETICAL FRAME-WORK

This chapter provides an overview of the vision, values, ethics, approach and principles, theories and concepts that will be used in the formulation of the design proposals for Hangberg.

## 3.1. VISION

The vision for Hangberg is to create a liveable neighbourhood that:

- Meets social, environmental and economic needs
- Addresses community values and preferences for amenities, wellbeing and sense of place
- Is resilient and respond to shocks and long term change
- Consider needs of future generations

## 3.2. VALUES

The objective of the design proposals is to promote sustainable urban development in Hangberg. The design proposals makes use of the sustainable urban development model developed in the work of the scholar Adrian Allen who acknowledges that urban development will only be acceptable and in the public interest if it is economically viable, ecologically justifiable, socially equitable, physically integrated and politically sustainable (Allen, 2009). Allen's conceptof sustainable urban development is illustrated in Figure 3.1. To assess whether any development, policy or design is moving towards sustainable urban development or against it, it is necessary to consider the relationship amongst the five dimensions that are shown in Figure 3.1 below. The outer circle represents the ecological capacity of an urban region and acts as a measure to assess whether interventions in each of the five dimension are moving towards sustainable development. The corners of the square within the circle represent the economic, social, ecological and built environment dimensions while the political dimension articulates them. The political dimension is seen as the regulating mechanism to ensure that all other dimensions remain within the boundary of sustainability.

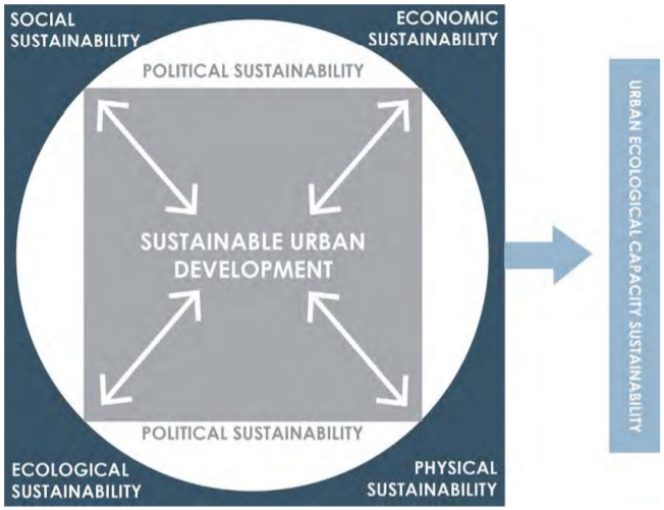



Figure 3.1: Five Dimensions of Sustainable Urban Development (Source: author; Allen, 2009)

### 3.2.1 FIVE DIMENSIONS OF URBAN SUSTAINABILITY

**Economic sustainability**
the ability of the local economy to sustain itself without causing irreversible damage to natural resources and without increasing the city's ecological footprint (Allen, 2009).

**Social sustainability**
a set of actions and policies aimed to improve the quality of life but also committed to fair access and distribution of rights to use the natural and built environment (Allen, 2009).

**Ecological sustainability**
the impact of urban production and consumption on the health of cities and the global carrying capacity (Allen,2009).

**Physical sustainability**
the capacity and ability of the built environment to support human life and productive activities (Allen, 2009). Institutional sustainability: the quality of governance systems guiding the relationship and actions of different actors among the four dimensions. It involves the participation of civil society in all areas of decision making (Allen,2009).

### 3.2.2 SUSTAINABILITY AND WSUD

The overarching theme of WSUD is ecologically sustainable development which can be achieved by considering all aspects of the water cycle and their interaction with urban design. It aims to be the way through which sustainable development can achieve water sensitive placeS (Armitage et al, 2014). For the Water Sensitive Urban Design (WSUD) approach to be sustainable it needs to take into account context specific elements of social and institutional issues such as poverty alleviation and strengthening democracy, economic growth that is targeted towards the needs of the poor as well as being sensitive to the needs of the environment. In order for the WSUD approach to become a recognised approach by politicians social and economic benefits needs to be clearly shown (Armitage et al, 2014)

## 3.3. ETHICS

Dewar and Uytenbogaardt (1991) identify two ethical pillars in which urban design needs to be rooted, namely humanism and environmentalism.

### 3.3.1 HUMANISM

According to Dewar & Louw (n.d) the first pillar is humanism which recognises that the basic function of settlements is to improve the lives of people and to meet human needs. Humans have two different kinds of needs:

Individual needs have to be met to enrich the lives of people. This can be done by creating spaces that give people freedom to improve their own circumstances (Dewar & Louw, n.d).

Group needs arise when people live in communities, these collective sets of concerns also need to be met (Dewar & Louw, n.d).

In order to meet these human needs the starting point is people with disabilities, people that move on foot and people that do not have access to resources. If these conditions are not met then settlements will perform poorly and it is usually the most marginalised who will be affected the most (Dewar & Louw, n.d).

### 3.3.2 ENVIRONMENTALISM

According to Dewar & Louw (n.d) the second pillar relates to nature which provides resources that human life depends on. In this case conservation does not simply mean to 'preserve' or to 'prevent change', it rather incorporates the following three principles:

Balance: There is a need for balance between human activities and natural resources that are affected by these human activities. Any human action needs to take these natural resources into consideration and respect them (Dewar & Uytenbogaardt, 1991).

Place-Making: The importance of the creation and protection of the qualities of a place. The values of people are influenced by the places in which they live. All different landscapes are mportant and therefore design needs to retain and work appropriately within these different landscapes which make up a place (Dewar & Louw, n.d).

Resources: There is a recognition that nature provides resources which should be used to improve human life. These resources are important and thereforebneed to be utilised in a sustainable way. Wherever possible, the use of renewable resources should be promoted (Dewar & Louw, n.d).

The conclusion from these ethics is that urban design needs to be creative and that it is the role of the urban designer to show possibilities and opportunities that can genuinly enrich society.

## 3.4. PERFORMANCE QUALITIES

This section looks at various performance qualities that contributes towards the vision of a liveable neighbourhood and which have given direction to the work done in this research project. Many of these qualities were taken from the work of Dewar & Uytenbogaardt (1991) and Dewar et al (2012). Although these performance qualities can be seen as 'general', the principles of Water Sensitive Urban Design can be concurrent with each one of the six qualities.

## EQUITY

An equitable urban environment enhances and promotes urban activities through its structure and form, thereby allowing residents to have easy access to these opportunities (Dewar & Uytenbogaardt, 1991). Equity primarily relates to the equity of access to opportunities within cities and implies that all people should be able to conduct their daily activities easily and inexpensively (Dewar et al, 2012).

## BALANCE

There are two types of balance. Firstly, there is balance between nature and settlement. Everyone should have access to nature and actions on the ground need to be compatible with the natural conditions that are associated with the site. Secondly, is balance between urban and opportunities where all people have easy access to a range of activities and opportunities that make up urban life (Dewar & Uytenbogaardt, 1995).

## INTEGRATION

The concept of continuity is central to integration: three types are important. The first is the continuity of movement. Continuous movement lines should tie different local areas together to break down fragmentation. Secondly, is continuity of green spaces as they are important for biodiversity and natural regeneration. It is also important that people have access to nature. Thirdly, is the continuity of the urban fabric which refers to the need to move away from urban forms that are a collection of fragmented parts towards an urban form that is a coherent system (Dewar & Louw, n.d).

## SENSE OF PLACE

There are several factors that contribute towards the creation of a sense of place. Firstly, is the appropriateness of city form to the characteristic of the landscape. Secondly, is the quality and consistency of public spaces. Thirdly, is the legibility of the urban environment and the clear definition between public and private spaces. Finally, is the creation of 'special places' where people can escape the struggle of daily life and be treated with respect and dignity (Dewar et al, 2012).

## SAFETY + SECURITY

Safety and security include security of tenure, food security, safety from hazards and natural disasters, safety from attack and security in terms of crime prevention. Emphasis should be placed on surveillance , exposure and permeability to promote safety. Designs should consider access to emergency services, and people should be able to access emergency services by foot (Dewar et al, 2012).

## EFFICIENCY

Firstly, a compromise must be achieved between the conflicting requirements of mobility (road movement) and accessibility (dominance of NMT and public transport). Secondly, is the promotion of the compaction of urban forms to reduce sprawl and aggregate movement, to reduce the investment in infrastructure and to increase densities. Thirdly, is the promotion of mixed-use development and encouraging walking which will increase convenience (Dewar et al, 2012).

## 3.5. APPROACH

This section will look at how to achieve the performance qualities as mentioned in the previous section. In this research project the non-programmatic approach has been used.

### 3.5.1 NON-PROGRAMMATIC APPROACH

The non-programmatic approach focuses on the following points:

- Firstly, this approach is concerned with the performance of a settlement as a whole.
- Secondly, plans are created by an integrated and interdisciplinary team as opposed to separate multi-disciplinary processes.
- Thirdly, the approach is not focused on land use but rather on accommodating human activities in space.
- Fourthly, the plan does not attempt to determine the spatial distribution of human activities through top-down decision-making that relates to land use zoning but rather manipulates the logic of access to which human activities respond to create broadly predictable outcomes.
- Lastly, the approach concentrates on creating choice instead of attempting to define the good urban life that applies to all people. In this way the plan is enabling rather than prescribing a way of life.

The concepts of structure, space and minimalism are central to the non-programmatic approach (Dewar, 2011).

STRUCTURE

Structure is used in designing settlements to order the landscape. The elements of public structure such as green spaces, movement, social facilities and public open space are manipulated and co-ordinated to create a logic to which all activities (whether large or small, private or public, formal or informal) can respond (Dewar, 2011). The structural system establishes a logic of publicness and privacy to which all urban activities can respond. Through this process, choices are offered without imposing a certain form of lifestyle for everyone. (Dewar, 2011).

SPACE

In the non-programmatic approach all public spaces can be seen as social space. Public spaces are multi-functional and can significantly enhance the urban environment. The hierarchy of public spaces creates a logic for where public facilities should be located. Facilities that are used by all urban inhabitants are located in the most prominent locations while more community based facilities are positioned closer to their space (Dewar, 2011; Dewar & Louw, n.d). Non-programmatic approaches therefore integrate the hierarchy of access and the hierarchy of spaces into a framework that creates a logical structure of publicness and privacy where all activities can be located in terms of their own requirements for accessibility (see Figure x). The quality of the framework contributes directly to the quality of the urban environment (Dewar, 2011).

MINIMALISM

A trademark of positive urban environments is that they are complex. This complexity, however, cannot be designed and is a results from process. When the design process is dominated by the ingenuity and creativity of only a few people, sterility and monotony are inevitable consequences. At each scale, spatial plans should only depict the minimum-actions that are necessary to give direction in order to allow for the ingenuity and creativity of all designs and decision-makers to enrich the urban environment. The approach is therefore concerned with process and allows a range of actors to be incorporated into the process (Dewar, 2011).

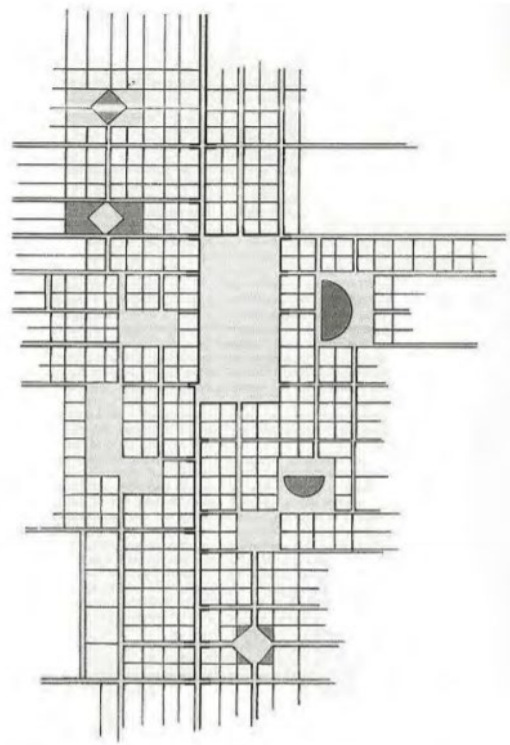


Figure 3.2: A synthesis of spatial hierarchies (Source: Dewar, 2011)

## 3.6. STRUCTURING ELEMENTS

Generally two types of corridors can be proposed namely urban and ecological corridors. It is argued here that multi functional corridors provides an opportunity to integrate the benefits of both the urban and ecological corridors to promote more compact, equitable, resilient and integrated settlements.

### 3.6.1 THE NATURE OF CORRIDORS

The introverted neighbourhood cells that have been created by modernist planning have resulted in the formation of space bridges throughout South African cities. These space bridges are limited access routes that connect only a few points along their route. They create barriers between communities and result in nodes that are limited to a small number of locations. They essentially divide a city into 'boxes' (Dewar, 2011).

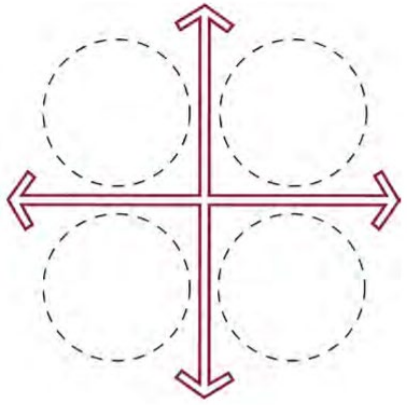


Figure 3.3: Space Bridges (Source: Author)

Continuous routes that tie several areas together through which they pass can be seen as space integrators and can break down these space bridges. Space integrators are stopstart routes along which intense activities occur. These routes also bring several local communities together through the provision of shared facilities and amenities (Dewar, 2011)

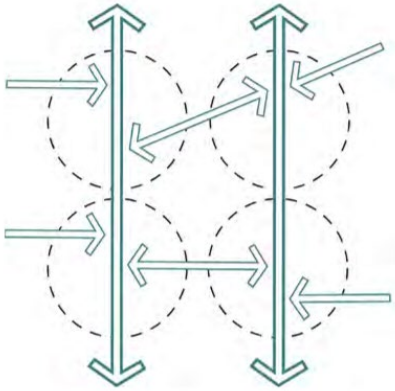


Figure 3.4: Space integrators (Source: Author)

### 3.6.2 URBAN CORRIDORS

According to Dewar (2011) urban corridors seek-to promote intensity, to encourage non-motorized and public transportation, to stimulate a mix of activity, to promote small business, to pursue urban integration vigorously and to improve equity and convenience.

Intensive activities do not normally occur evenly along the corridor: they tend to cluster at points of high accessibility along the corridor. This creates hierarchies of nodes that correspond with the hierarchies of movement. The pattern that then tends to emerge is that of 'beads on a string' with nodes of different activities occurring along the corridor (Dewar, 2011).

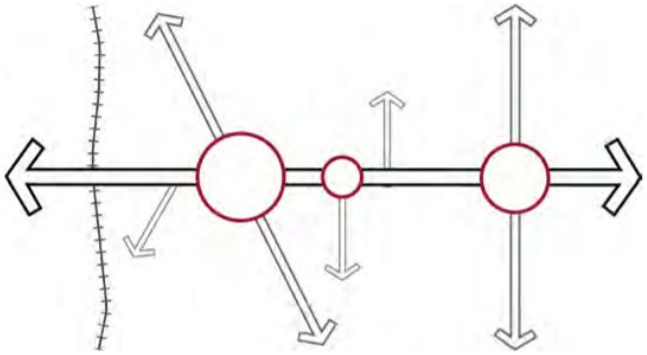


Figure 3.5: Hierarchy of access and nodes (Source: Author)

Corridors are also made up of a hierarchy of larger and smaller corridors. The smaller corridors align with less significant continuous routes that intersect with the main spine and respond to Non-Motorised-Transport (NMT) traffic flows. It therefore makes sense to place NMT-generating facilities, such as schools and other social services, along these smaller corridors (Dewar, 2011).

High residential densities are usually a prerequisite for urban corridors as they are needed to support public transport, commercial and retail activities. The highest residential densities should occur around the primary activity routes and gradually become less dense further away (Dewar & Louw, n.d).

### 3.6.3 ECOLOGICAL CORRIDORS

Ecological corridors are usually strips of land that is used to link natural areas to ensure ecological connectivity for species and ecological processes. These corridors usually have buffer zones that protect the areas from disruptive development while allowing low impact activities to take place. The corridors also deliver a range of other social and environmental benefits that includes the enhancement of the local landscape, better opportunities for public access and recreational use. They cover natural landscapes such as rivers, floodplains and mountains, as well as "corridors" of unsealed land. Ecological corridors should be created to support natural systems where all areas of natural value is included into a biodiversity network to ensure the conservation of biodiversity (Nilsson et al, 2013).

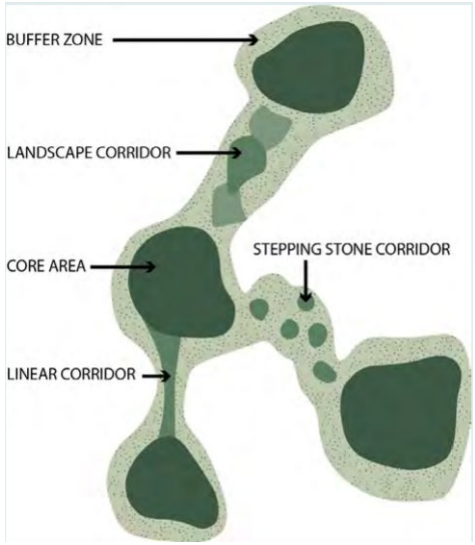



Figure 3.6: Diagram of an ecological corridor (Source: author)

### 3.6.4 ACHIEVING BALANCE

Urban corridorsare usually focused around transit-orientated development and high density residential development with commercial nodes in an effort to make settlements more compact and sustainable. Open spaces are generally strongly anthropocentric with features such as landscaping to create a sense of place or parks that can be isolated in the urban context. This approach can therefore neglect issues of urban biodiversity. Ecological corridors can be compatible with urban corridors and offers a number of ecosyste benefits to urban residents (Austin, 2012). This approach could promote more compact, equitable, resilient and integrated settlements.

## 3.7. CONCEPTS AND THEORIES

This section briefly explains and evaluates the theories and concepts that supports the theoretical framework and also explains how this research project will fit in which can be seen in figure 3.10.

### 3.7.1 WATER SENSITIVE URBAN DESIGN

> "...mitigating water scarcity, improving water quality, thereby protecting ecosystems, through the development of water sensitive urban areas (for all) that are sustainable, resilient and adaptable to change, while simultaneously being a place where people want to live...." (Armitage et al, 2014, p.vi).

According to Armitage et al (2014) Water Sensitive Urban Design (WSUD) is defined as bringing the conepts of 'water sensitivity' and 'urban design' together to ensure that urban design is undertaken in a water sensitive manner to facilitate change in urban areas to water sensitive places. WSUD also incorporates water sensitive urban management (WSUM) that deals with the post construction management of infrastructure to support the urban water cycle in a manner that is sensitive to the ecosystem and also the needs of the affected individuals (Armitage et al, 2014).

What makes the Water Sensitive Urban Design (WSUD) approach different to conventional urban planning practices is that it "has the potential to mitigate the negative effects of water scarcity; manage and reverse water pollution; develop social and intergenerational equity; increase sustainability; and develop resilience within water systems in South Africa." (Armitage et al, 2014, p. ii).

The transformation of settlements into water sensitive places requires a shift in the way that the urban water cycle is managed. Conventional water management systems were designed to used a linear approach of source, treat, transport, distribute, collect, treat and dispose. This approach is removed from the people that is servces (See figure 3.7). Unlike conventional approachs, the WSUD approach largely focuses on keeping water in the city by implementing the following principles: (Armitage et al, 2014)

## WATER SENSITIVE URBAN DESIGN PRINCIPLES

**Protect natural systems:** Protect and enhance natural water systems.

**Protect water quality:** Improve the quality of water draining from the urban area.

**Integrate stormwater treatment with the landscape:** Use stormwater treatment systems in the landscape for multiple uses and with multiple benefits, such as water quality treatment, wildlife habitat, public open space as well as recreational and visual amenity.

**Reduce runoff and peak flows:** Reduce peak flows through on-site temporary storage measures (with potential for reuse) and minimise impervious areas.

**Add value while minimising development costs:** Minimise the drainage infrastructure cost of development.

**Reduce potable water demand:** Use stormwater as a resource by capturing and reusing it for non-potable purposes (toilet flushing, garden irrigation, laundry, etc.).

(Source: City of Cape Town, 2019).

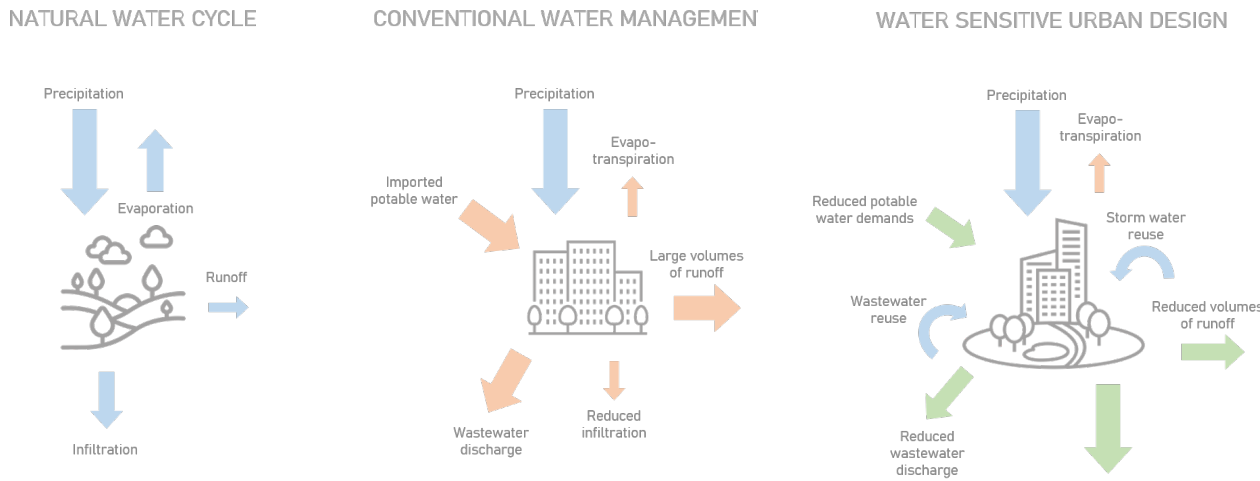



Figure 3.7: The impact of water sensitive urban design on the urban water cycle (Source: Author; Armitage et al, 2014)

**WSUD ACTIVITIES**

The two main components of WSUD is urban water infrastructure and design & planning, these are shown in more detail in Figure 3.8.

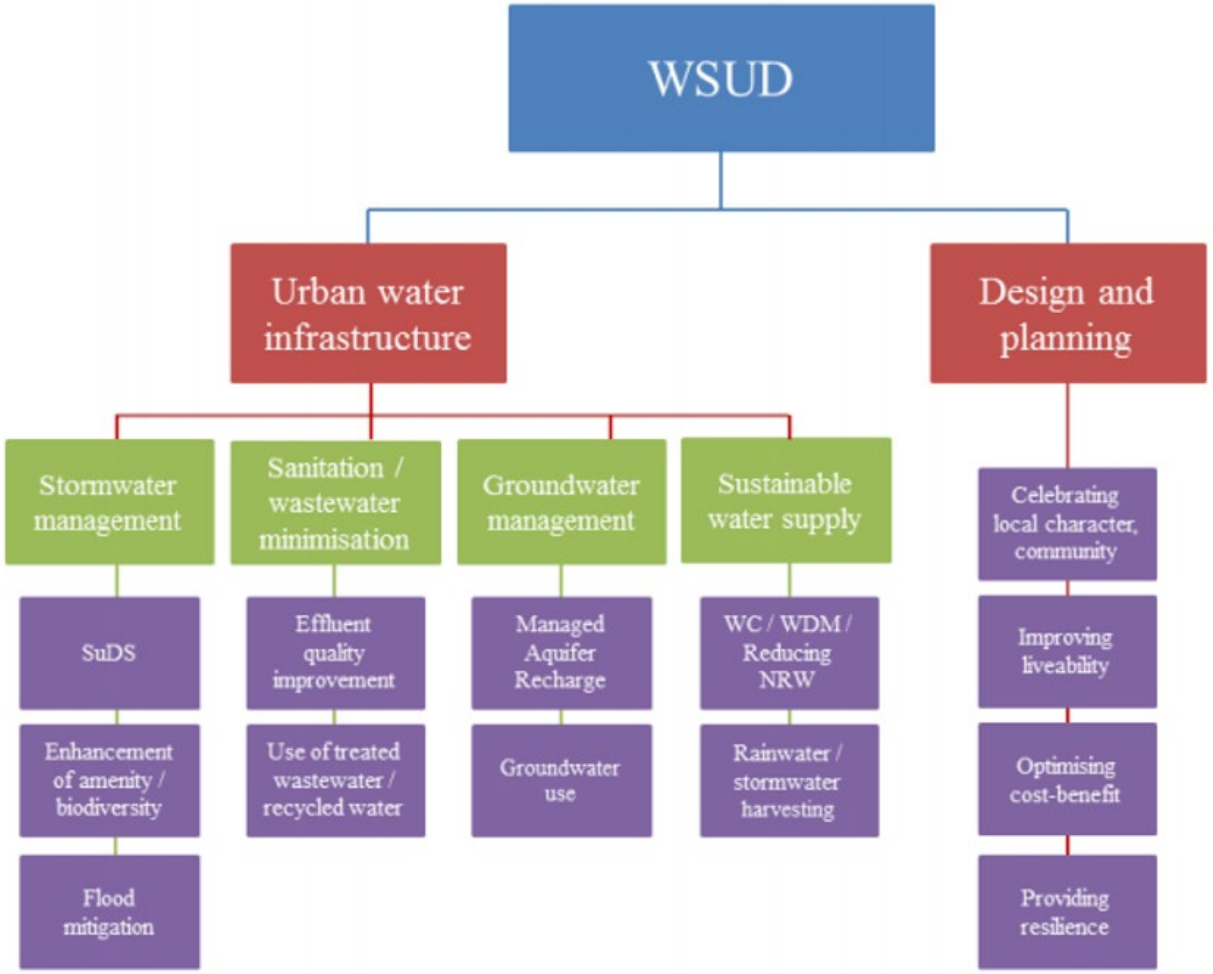



Figure 3.8: Framework for water sensitive settlements in South Africa (Source: Armitage et al, 2014)

## FRAMEWORK FOR WSUD

The legacy of apartheid also needs to be taken into account which resulted in significant backlogs in infrastructure which the current government is still attempting to address. This has resulted in a large numbers of poorly-served informal settlements and although the government is committeed to upgrading these settlements, current services are generally implemented as a response to civil unrest and natural disasters (Armitage et al, 2014). The transition to water sensitive settlements in South Africa wil need to consider formal settlements as well as informal settlements with high densities and limited infrastructure (Armitage et al, 2014). Figure x provides a vision of how it could be possible to transition both formal and infromal areas. The diagram emphasises that "enhancing water sensitivity in settlements has the potential to not only address issues of resource availability and environmental damage, but also to address related problems of social exclusion, equity and equality." (Armitage et al, 2014, p.26).

### BROWNFIELD AREAS

These area should attempt to transition to water sensitive settlements through retrofitting redeveloping brownfield sites in a water sensitive manner (Armitage et al, 2014).

### INFORMAL AREAS

Any development in informal areas should negate the need for retrofit at a later stage by using water sensitive technologies that also have secondary benefits for communities (Armitage et al, 2014).

### GREENFIELD AREAS

Greenfield developments should be done in a water sensitive manner, especially for private developments where the municipality can use the development planning approval process to ensure that water sensitvity is incorporated into the development (Armitage et al, 2014).

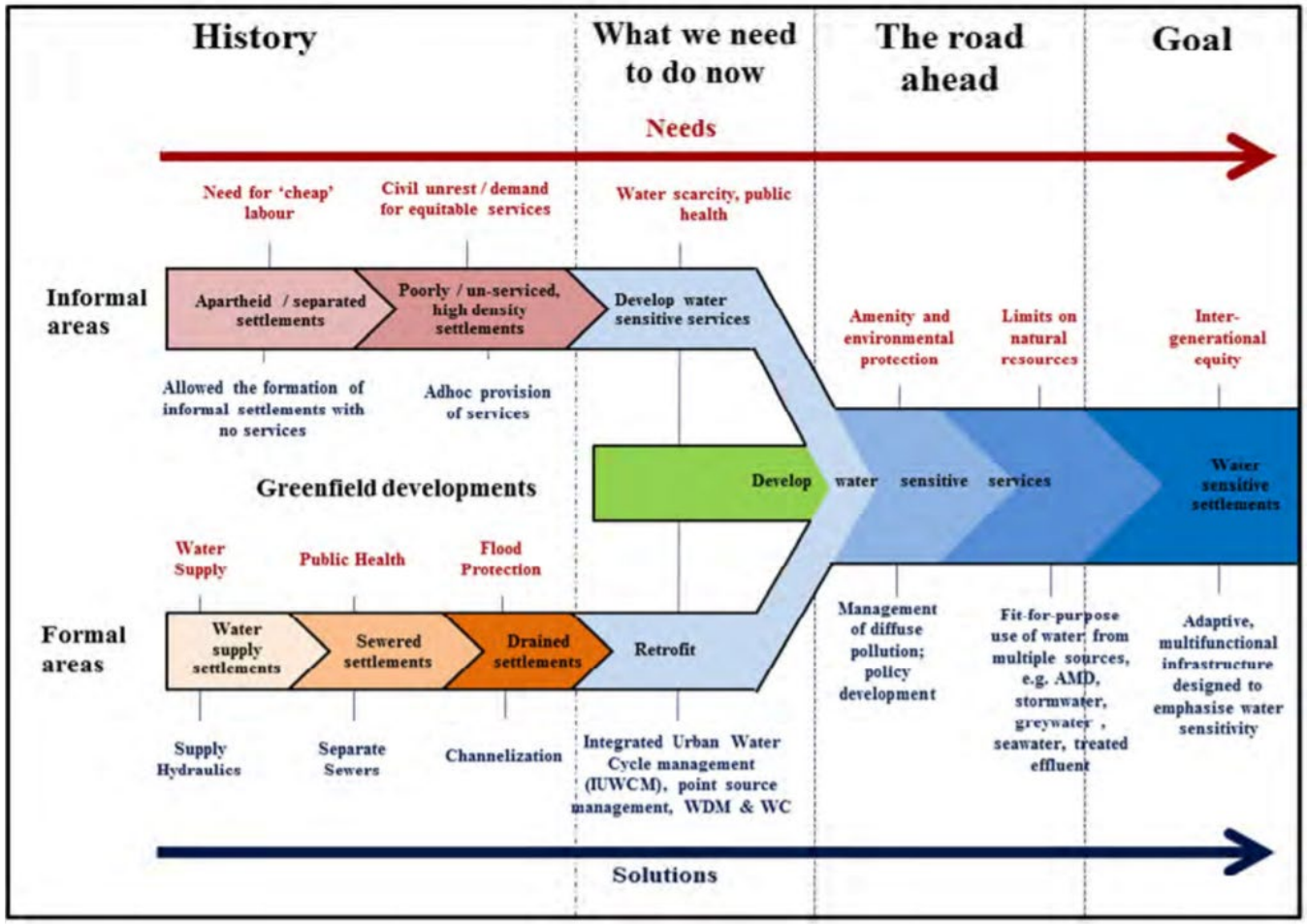



Figure 3.9: Framework for water sensitive settlements in South Africa (Source: Armitage et al, 2014)

### 3.7.2 PLACEMAKING

Placemaking is an approach to the planning, design and management of public spaces that makes use of urban design principles to incorporate local community's assets, culture, memory and potential with the intentions to create spaces that promotes communities well-being and happiness. In Gehl's (2010) book "Cities for People" he states that "The street, the footpath, the square and the park are the grammar of the city; they provide the structure that enables cities to come to life, and to encourage and accommodate diverse activities" (Gehl, 2010, p.ix). The book provides five design principles that can be used to improve the design of public spaces and thereby the quality of life for its residents (Gehl, 2010). In Kevin Lynch's (1960) book "The image of the city" and Dewar and Uytenbogaardt's (1991) book "South African cities: A manifesto for change" they explore various urban structuring elements as well as sensory elements which influence how people perceive, move around and inhabit the urban landscape. The authors all touch on the concept that placemaking is not just about building places, it is also about building communities.

### 3.7.3 PARTICIPATORY PLANNING

Jane Jacobs (2010) was the first strong voice to advocated for a shift in the way that we build cities. In her 1961 book named "The death and life of the great American cities" she discusses the failures of modernist cities and argued for a new place-based and community centered approach to urban planning so that we can design cities for people and not for malls or vehicles (Jacobs, 1961). This influential book spurred numerous literature on participatory planning. In the book "The placemakers' guide to building community" Hamdi (2010) argues that for urban interventions to be successful a place needs to be thoroughly understood by engaging with local communities through a participatory planning approach. This is essential as local knowledge and skills can be harnessed during community engagements and can cultivate a sense of belonging and ownership within a community (Hamdi, 2010). He further advocates that this meaningful community participation is a shift from simply providing for the poor towards enabling them to provide for themselves (Hamdi, 2010). The book provides examples of practical implementation of this approach and also highlights challenges that are faced by urban planners and designers. The work of Jane Jacobs and Hamdi have had a significant influence on urban planning and design practices and remain relevant today.

### 3.7.4 URBAN ACCUPUNCTURE

Urban accupuncture is a design tool that advocates for a move away from large scale urban renewal projects towards a more localized and community based approach (Lerner, 2016). In Lerner's (2016) book called "Urban Acupuncture" he brings to light that by doing smaller scale but catalytic interventions it can ultimately transform the larger urban space. The scale of the projects can however range from small intervention such as installing lighting to larger interventions such as implementing a Bus Rapid Transport (BRT) system. In light of the current context of constraint budgets and limited resources in South Africa, this approach can develop more cost effective and democratic projects.

### 3.7.5 DRAWING CONNECTIONS

Literature on the Water Sensitive Urban Design (WSUD) concept illustrates a technical approach by providing guidelines for the provision of various urban water system infrastructure to facilitate change in urban areas to water sensitive places. Although literature on WSUD stresses the importance of utilizing this approach to enhance the amenity of a place, it does not explore how principles of urban design can be utilized to create places that are designed for water and also designed for people. There seems to be a need for a contextually relevant exploration that integrates WSUD insights with detailed urban design principles of placemaking. This research project aims to achieve this by explore various ways of combining WSUD and placemaking approaches at a neighbourhood and precinct scale to discover insights, benefits and lessons for applying this combined approach to Hangberg and in an informal settlement context. A participatory planning approach will be essential to propose any interventions in Hangberg as the community already has a strained relationship with the local and provincial government. Hamdi (2010) states that this is an essential and challenging endeavor which is needed to ensure the success and sustainability of any projects. This theoretical framework's combined approach could have the potential to address some of the key challenge that Hangberg is facing and to transform the neighbourhood into a water sensitive place.

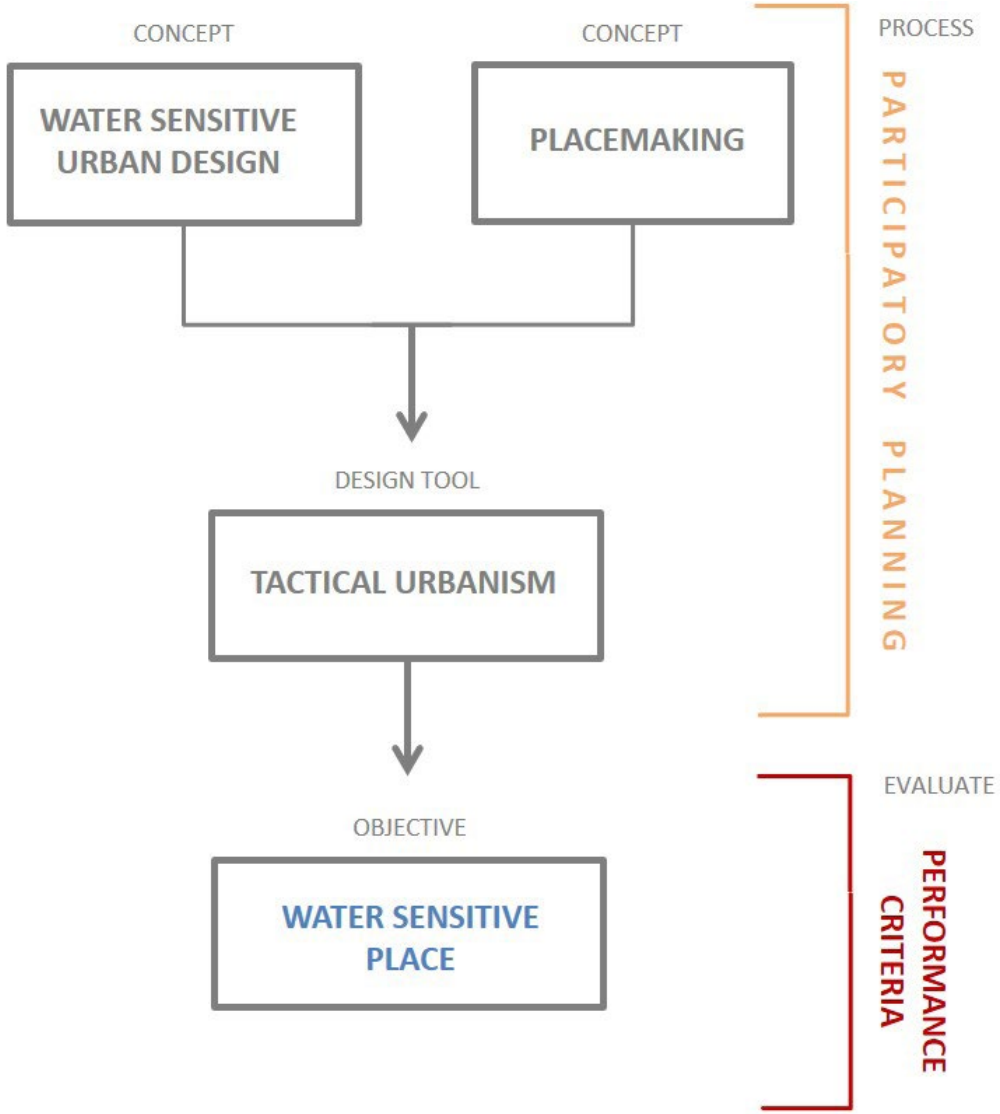



Figure 3.9: Theories and Concepts framework (Source: Author)

## 3.8. PRECEDENTS

### 3.8.1 MEDELLIN'S SOCIAL URBANISM

In the 1990s, Medellin was widely known as one of the most violent cities in the world. In 2004, under the leadership of mayor Sergio Fajardo, the government decided to implement a public policy that focused on reducing inequality and violence in the city by investing in infrastructure in the poorer neighbourhoods. The city's turnaround strategy emphasised a developmental approach, rather than a welfare focus on social grants. This developmental approach is based on investing in people, places and jobs, through first-class public facilities and infrastructure (Turok, 2014). Mayor Sergio Fajardo promoted the idea of social urbanism during his administration by declaring that: "Our most beautiful buildings must be in our poorest areas." The result was the development of a series of integrated urban projects that formed part of a comprehensive plan to strengthen the fabric, dignity and quality of life for the marginalised communities (Turok, 2014). The city was dedicated to neighbourhood revitalisation and liveability and invested in attractive public spaces, impressive schools, libraries and health facilities. Efficient public transportation was crucial to the agenda and the government invested in innovative rail, bus, cable carts and escalators that were engineered to fit into the challenging topography of the city. New housing projects wer built around transport stations to increase densities and accessibility (Turok, 2014). Extensive engagement with various stakeholders and the local community during all stages of the design and implementation of projects helped to build trust and respect between and within local communities (Turok, 2014). For example, so-called 'library parks' were built that serve as meeting and recreation points for the communities and the new 'Metro Cable' transport system connects the remote marginalized communities with the city centre (Aguinaga, 2015)

Figure x: Espana library in the Santo Domingo Savio neighbourhood (Source: https://creativecitysouth.org/blog-1/2018/3/29/medellin-a-creative-city )

Figure x: Escalators assisting those living up the hills in Medellin to have easy access to the city centre (Source: https://www.saferspaces.org.za/blog/entry/learning-from-medellin-a-success-story-of-holistic-violence-prevention )

Figure 3.10: EL Mirador Park in Medellin (Source: https://issuu.com/dannyandresosoriogaviria/docs/the_northeastern_urban_integration_ )

## 3.8.2 CHEONGGYECHEON RIVER

The Cheonggyecheon river project is an example of how a green corridor introduced nature-filled public spaces and dramatically transformed the area. In the 1940s the river was paved over with concrete and an elevated freeway was built over the channelized river, the areas under the freeway becasue derelict lost spaces. Between 2002 and 2005 the freeway was torn down and replaced with a 6km restored river that provided a multifunctional linear park. The benefits of the project included an increase in biodiversity, improved quality of life and great economic development in the surrounding area. The park is integrated into the urban fabric and is equipped with food market stands, craft vendors and hosts many events (Wang, 2020). The project is an example of a successful water sensitive urban design intervention.

Figure 3.11: Cheonggyecheon river (Source: Wang, 2020).

3.8.2 CHEONGGYECHEON RIVER

## 3.8.3 WEILIE WETLAND PARK

Weilie Wetland Park is located in Xianyang, China. Urbanisation in the city resulted in the degradation of the riverside landscape which also contributed to the loss of a sense of beloning for residents that lived in the area for many generations. The Wetland park provided a piece of green infrastructure in the city that aimed to restore and reconstruct the local riparian ecosystem. Startegies included biodiversity restoration, stormwater management, adaptive flood control, waste water reuse and water quality improvement (World Landscape Architecture, 2019).

### CREATING RESILIENT, FLOOD ADAPTIVE SPACES

The design was based on the existing topography, the lowest areas were designed to be flooded and areas that were lower flood risks were used for constructed wetlands, recreational spaces were constructed on the highest areas. The design made use of gabions and grassed slopes that were used to restore biodiversity and protect against flooding (World Landscape Architecture, 2019).

Figure 3.12: Walkways  in Weilie Wetland Park (Source: World Landscape Architecture, 2019)

### PURIFYING WASTE WATER FOR REUSE

Polluted water was directed to a wastewater treatment plant where the outlet water was treated by constructed wetlands that recycled the water to be used for irrigation and for the water playpark and the finally directed to th replenish the riparian wetlands (World Landscape Architecture, 2019).

### SENSE OF BELONGING

Recreation facilities such as a public square, outdoor gym and water playpark was provided for the community to enjoy and experience the restored riparian area (World Landscape Architecture, 2019).

Figure 3.13: Water playpark in Weilie Wetland Park (Source: World Landscape Architecture, 2019)

Figure 3.14:  Weilie Wetland Park (Source: World Landscape Architecture, 2019)

## 3.8.4 GENIUS OF SPACE

The Genius of Space project in Langrug, Franschhoek focuses on building innovative water and waste treatment solutions in the informal settlement of Langrug. ("Genius of SPACE - Langrug", 2020). The following problems and solutions were identified in the area:

PROBLEMS
- Safety issues
- Dirty water
- Health challenges
- Difficult waste disposal

SOLUTIONS
- Dirty water disposal points
- Underground waste water pipe
- Tree/food garden

LANGRUG: BEFORE

LANGRUG: AFTER

Figure 3.15: Langrug: Before and after (Source: "Genius of SPACE - Langrug", 2020)

The project focused on the following thre components:
1. Demonstrate using an Eco-machine for treating grey water flows from an informal settlement
2. Establish a system for collection, processing, recycling and upcycling solid waste
3. Implement a pilot grey water management system for informal settlement
grug", 2020). The following problems and solutions were identified during the course of the project:

DESIGN PROCESS
- Converting open drains into ecological treatment channels
- Disposal points, greywater biofilter drains with separate stormwater swale, tree wells and micro wetlands
- Disposal points, piped greywater, in roadway stormwater, Tree wells

LESSONS LEARNT
- Needs to run concurrent with solid waste management programme.
- Requires regular 'local' maintenance.
- Sustained and meaningful community engagement is essential.
- Streets free from greywater flow
- Challenge with night soil disposal in absence of local sanitation services
- Some plants and trees not suited to greywater flow
- Limited impact on water quality (other than
- solid removal)

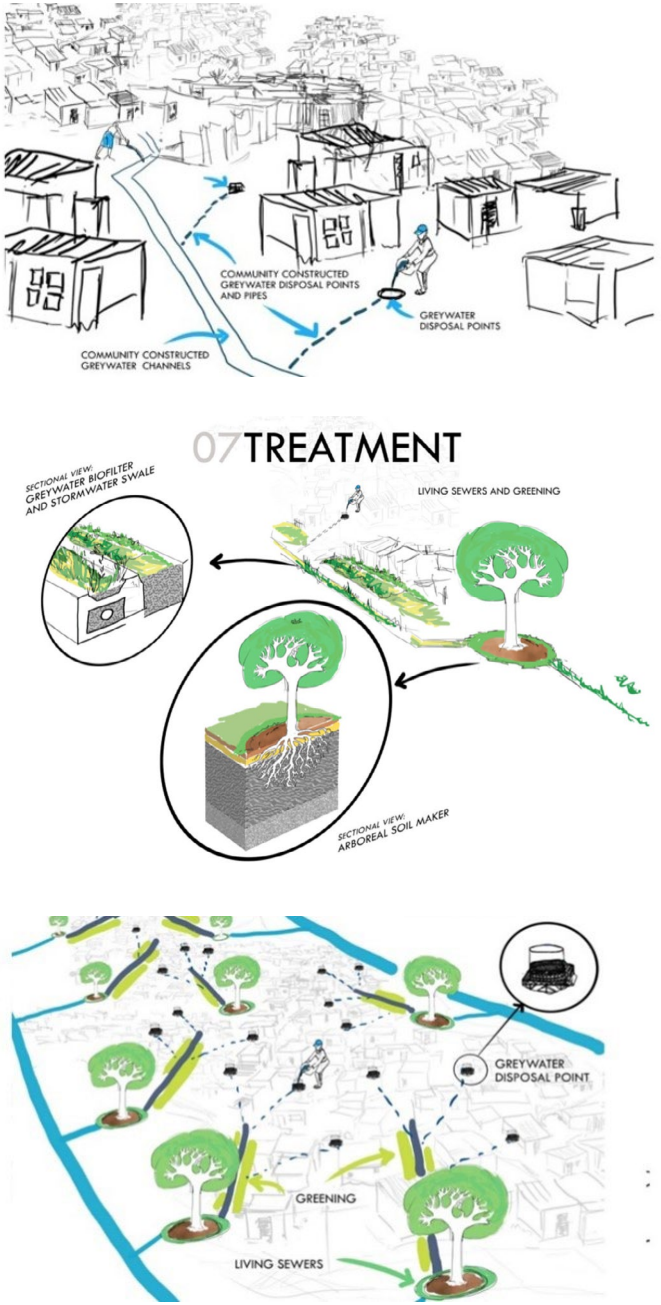



Figure 3.16: Elments of the plan (Source: "Genius of SPACE - Langrug", 2020)

# CHAPTER 4
# CONTEXTUAL ANALYSIS

# 4. CONTEXTUAL ANALYSIS

This chapter includes context analysis of Hout Bay and Hangberg and identifies opportunities and constraints for the chosen sites.

## 4.1. LEGISLATION AND POLICY CONTEXT

In this section the most relevant legislation and policies are briefly reviewed to provide a better understanding of the context of the research project. The following legislation and policies have been reviewed:

### 4.1.1 SDGS

The Sustainable Development Goals (SDGs) are comprosed of 17 global goals that are intended to achieve a more sustainable future for all. The Goals are intended to be achieved by 2030. Goal 11 is sustainable cities and communities. This goals is focused on making human settlements inclusive, safe, resilient and sustainable (United Nations, 2020). In South Africa the United Nations has provided support to raise awareness about the SDGs to government officials, the private sector and civil society.


Figure 4.1: SDGs (Source: United Nations, 2020)

### 4.1.2 SPLUMA

The Spatial Planning and Land Use Management Act 2013 (SPLUMA) aims to direct spatial planning in South Africa. Chapter 2 sets out the development principles that should be used as a guide in the preparation of spatial plans (National Government of South Africa, 2013). These principles are shown in Figure x below.

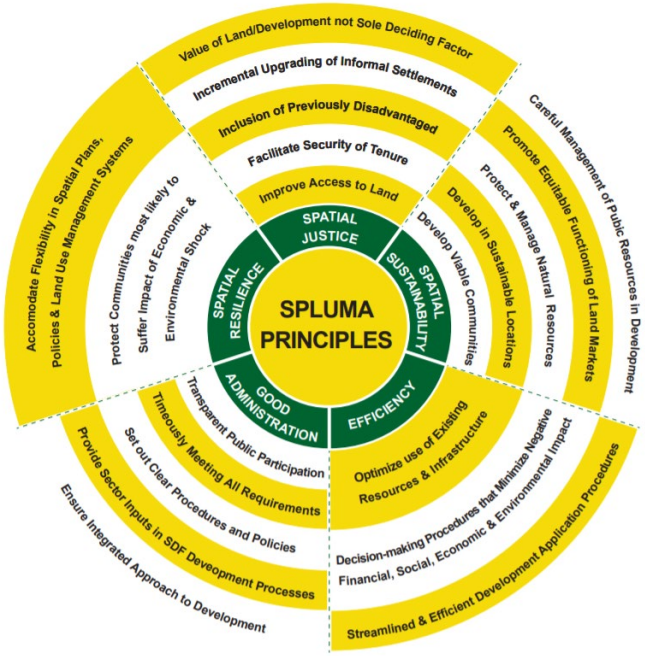



Figure 4.2: Key elements of SPLUMA principles (Source: National Government of South Africa, 2013)

### 4.1.3 CAPE TOWN WATER STRATEGY

Cape Town's water strategy provide a set of principles which is centred on five core commitments made by the City to the citizens of Cape Town. The commitments include (1)Safe access to water and

sanitation, (2) wise use, (3) sufficient, reliable water from diverse resources, (4) shared benefits from regional water sources, (5) a water sensitive city. Commitment 5 is further described below:

5: A WATER SENSITIVE CITY: The City will actively facilitate the transition of Cape Town into a water-sensitive city with diverse water resources, diversified infrastructure and one that makes optimal use of stormwater and urban waterways for flood control, aquifer recharge, water reuse and recreation, and is based on sound ecological principles (City of Cape Town, 2019).

### 4.1.4 SOUTHERN DISTRICT PLAN

The Southern District Plan seeks to translate Cape Towns Spatial Development Framework at a sub-metropolitan scale. It is a 10 year plan and aims to guide spatial plans (City of Cape Town, 2012). A few key points from the document is summarised below:

- Promote the multi-layer movement network
- Provide new civic facilities within walking distance of settlements
- Protect and enhance river corridors, wetlands, estuaries and fynbos corridors which provide habitat protection and recreational opportunities and link various conservation areas.
- Develop appropriate access points to the coast that can accommodate large numbers of people and associated recreational and economic activities.

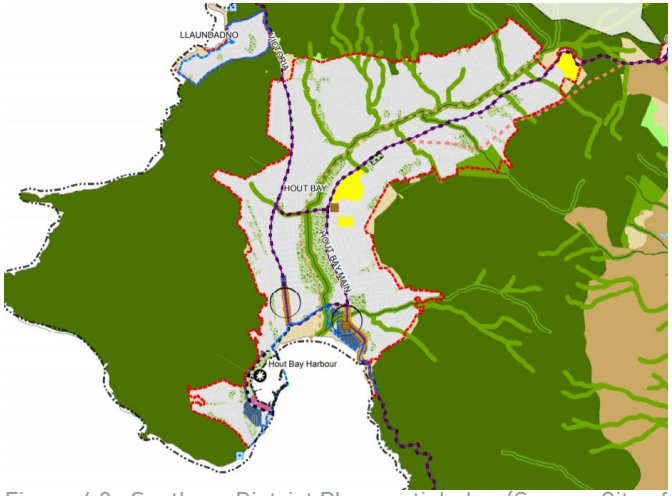


Figure 4.3: Southern District Plan spatial plan (Source: City of Cape Town, 2012)

### 4.1.5 COCT URBAN DESIGN POLICY

The city of Cape Town's urban design policy intends tointroduce urban design thinking into the preparation of spatial plans and development proposals. The document provides a framework of urban design principles and objectives which proposals should comply with. The policy focuses on the public environment and the interface between public and private (City of Cape Town, 2013). The following objectives are listed in the policy:

OBJECTIVE 1: ensure that development contributes positively to the urban structure of the city to create integrated and legible places and neighbourhoods.

OBJECTIVE 2: Ensure that development contributes to improved quality of the public realm and public spaces.

OBJECTIVE 3: Ensure that development contributes to the creation of safe and secure communities.

OBJECTIVE 4: Ensure opportunities and amenities are accessible and that people can move about easily and efficiently.

OBJECTIVE 5: Promote development intensity, diversity and adaptability

OBJECTIVE 6: Ensure enclosed and positive interfaces onto the public realm

OBJECTIVE 7: Development should recognise and respond appropriately to informality.

OBJECTIVE 8: Development should protect, value and enhance the natural environment through sustainable design

OBJECTIVE 9: Development should respect and enhance the heritage, character adn unique identity of the city and its neighbourhoods.

## 4.2. HOUT BAY CONTEXT ANALYSIS

In this section Hout Bay has been analysed to gain an understanding of the green systems, public facilities and connections of the area surrounding Hangberg. This will inform design proposals for Hout Bay which in turn will lead into an urban design framework for Hangberg by dropping down in scale.

### 4.2.1 HOUT BAY: GREEN SYSTEMS ANALYSIS

Hout Bay has a unique and valuable natural environment that is made up on coastlines, mountains and biodiversity. The high productive agricultural areas within Hout Bay should be utilised to provide urban agriculture in the area. The green system is responsible for the attractiveness of the area and is recognised for the essential services that they provide recreationally, socially, educationally, economically and in maintaining healthy environments. The biodiversity of the area must be conserved as part of the urban fabric and should be integrated into design proposals.

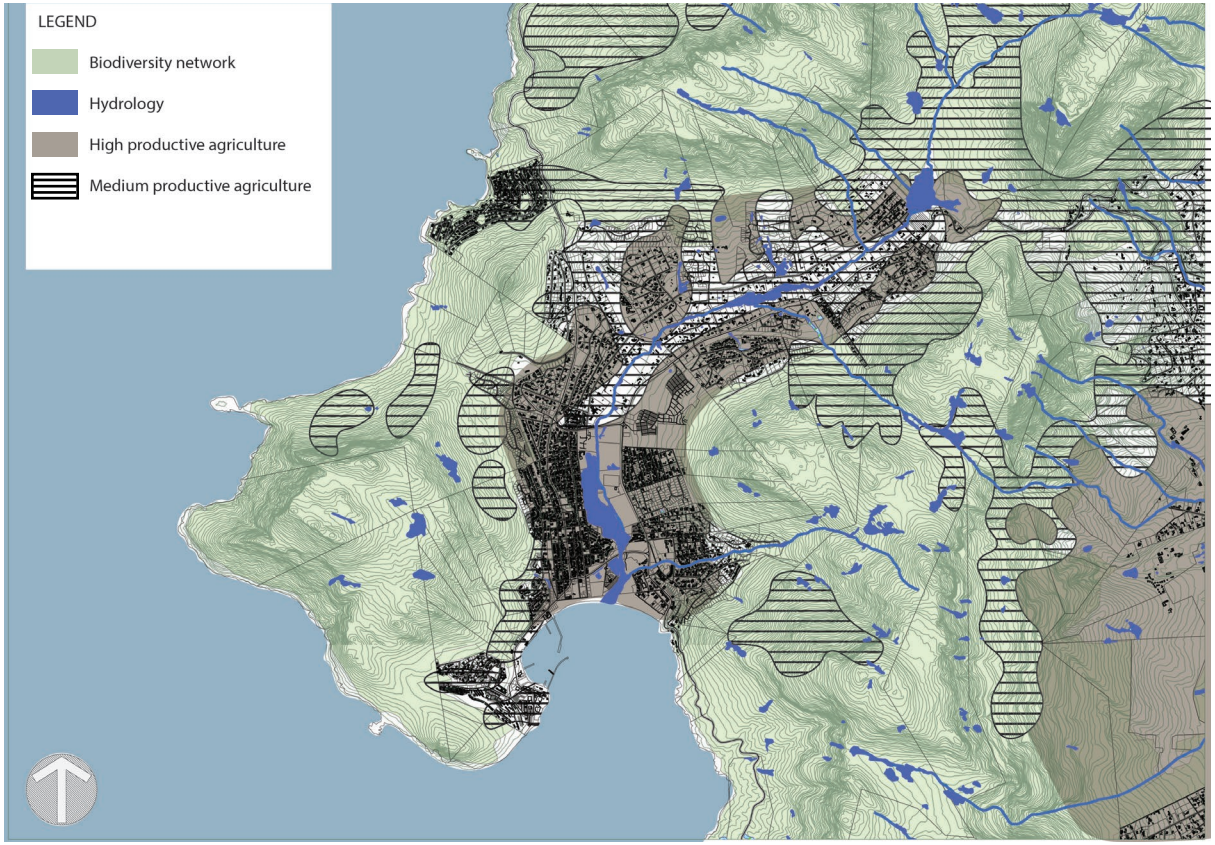



Figure4.4: Hout Bay green system analysis (Source: author)

## 4.2.2 HOUT BAY: PUBLIC FACILITIES

There are two nodes where public facilities are clustered in the area namely around the intersection by Izama Yethu and a node within Hangberg. This depicts that the lower income areas in Hout Bay are serviced with what seems to be sufficient public facilities, however this does not speak to the quality of these public facilities. The public open spaces network is located parralel to the river that runs through Hout Bay, however the quality of these spaces is poor as the urban environment does not possitively contribute towards these spaces.

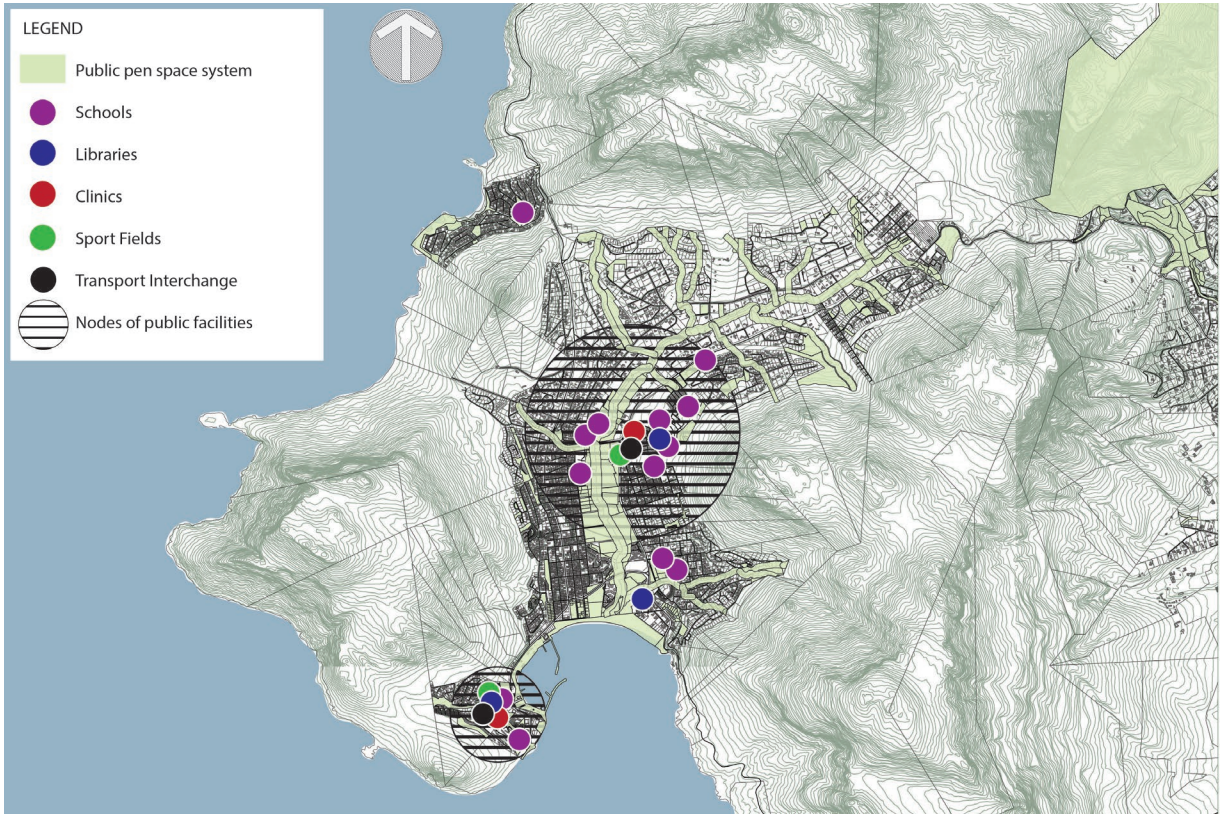



Figure 4.5: Hout Bay Public facilities analysis (Source: au-

## 4.2.3 HOUT BAY: CONNECTIONS

The movement network in Hout Bay consists of two main elements, which is the roads and the puclic transport network which is made up on taxis and buses. There is inadequate NMT facilities in Hout Bay which poses a problem as many residents living in the lower income areas access opportunities and facilities by foot. No distinctive corridors are running through the area but there are three types of nodes in Hout Bay namely:

- CBD nodes where many businesses are located
- Tourism node located at the harbour
- Public facilities nodes in Imizama Yethu and Hangberg

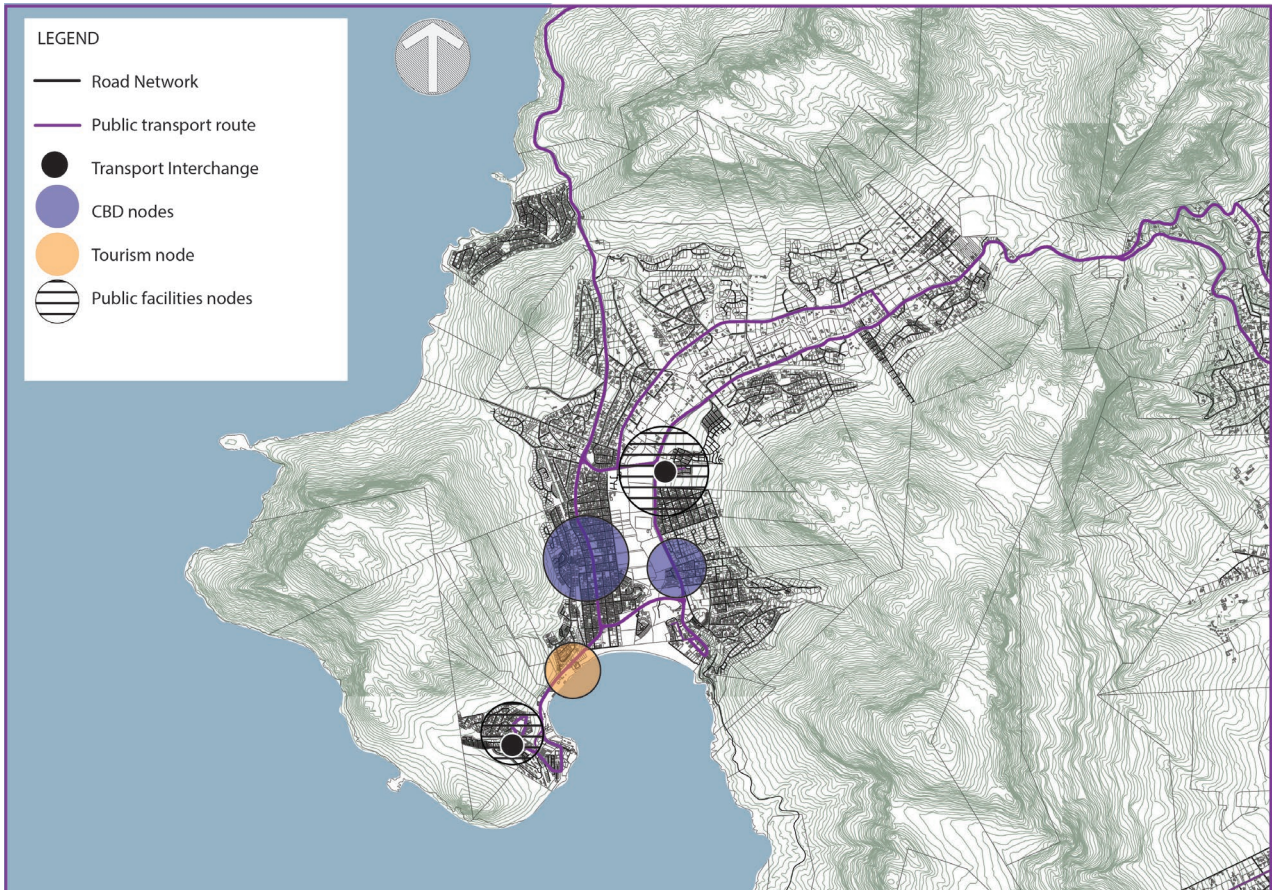



Figure 4.6: Hout Bay Connections analysis (Source: author)

## 4.3. HANGBERG CONTEXT ANALYSIS

In this section Hangberg has been analysed to gain an understanding of the water systems, urban morphology and connections in the neighbourhood. This will inform design proposals for Hangberg- which in turn will lead into the identification of a precinct by dropping down in scale.

### 4.3.1 HANGBERG: WATER SYSTEM

The water system in Hangberg consists of formal and informal systems. The formal areas in the neighbourhood is serviced by conventional water and sewage systems. The primary stormwater pipe channels the water coming down from the mountain, running underneath Oude Skip Road , into the ocean. Informal structures have illegally connected to the water and sewage systems which has resulted in additional pressure on the existing ageing infrastructure, causing frequent burst pipes. Many residents have implemented their own interventions to combat frequent flooding and stormwater challenges by building on stilts, using tyres to build retaining walls and building small bridges or placing boards on walkways to be able to walk between buildings.

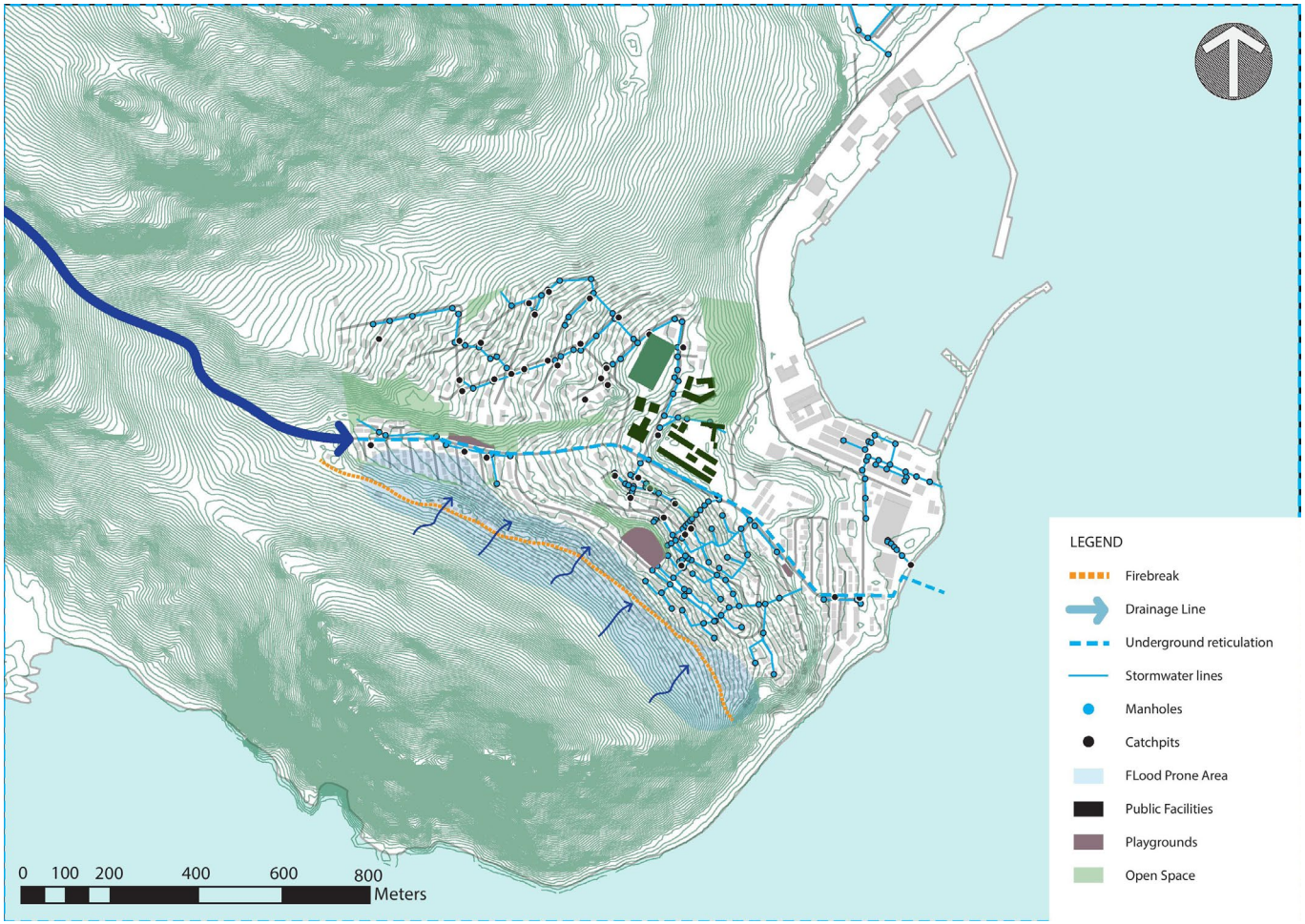



Figure 4.7: Hangberg water system analysis (Source: author)

Figure 4.8: Water systems in Hangberg (Source: author)

## 4.3.2 HANGBERG: URBAN MORPHOLOGY

Hangberg is characterised by row houses, council flats, backyard shacks and small informal settlements with a small area of freestanding homes, mostly white-owned, known as The Heights. As the municipality has not provided affordable housing options, residents have taken it upon themselves to build infromal structures. This has led to people building in areas that are dangerous such as residents that are living in the fire break known as 'die sloot'

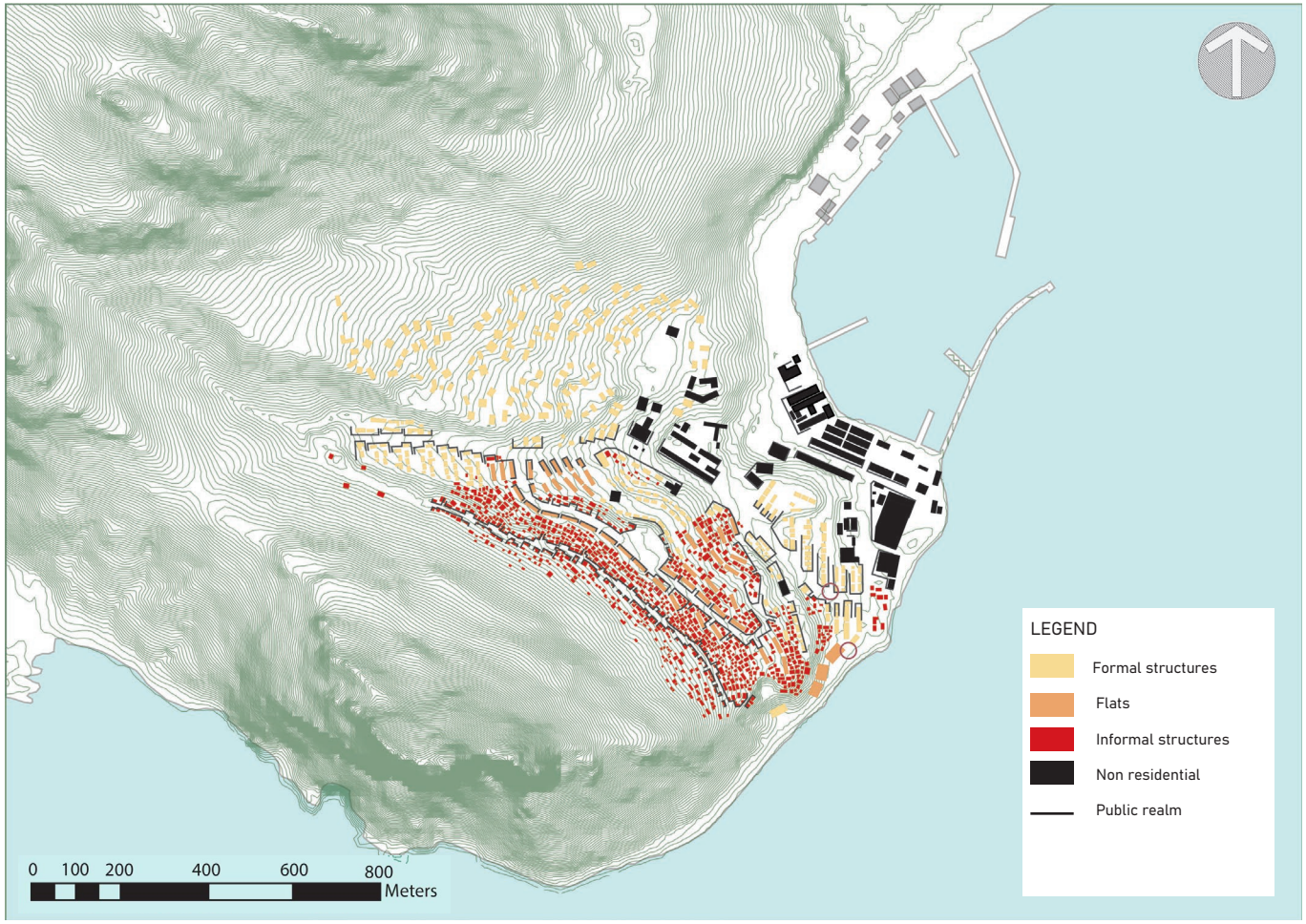



Figure 4.9: Hangberg Urban morphology analysis (Source: author)

Figure 4.10: Urban Morphology in Hangberg (Source: author)

## 4.3.3 HANGBERG: CONNECTIONS

Hangberg has a strong central node where many social facilities are located such as the schools and sport field. Taxis and the MyCiti Bus do have a route that goes through the area but it only services the residents living close to the harbour or by the social facilities node. The majority of residents living in Hangberg travel by foot and have to struggle with walking between structures that have no formal walkways or lighting to access facilities. There are no areas that accomodate local markets which has resulted in informal traders setting up adjacent to the two main roads in the area. The harbour is another node that attracts tourists and fisherman.

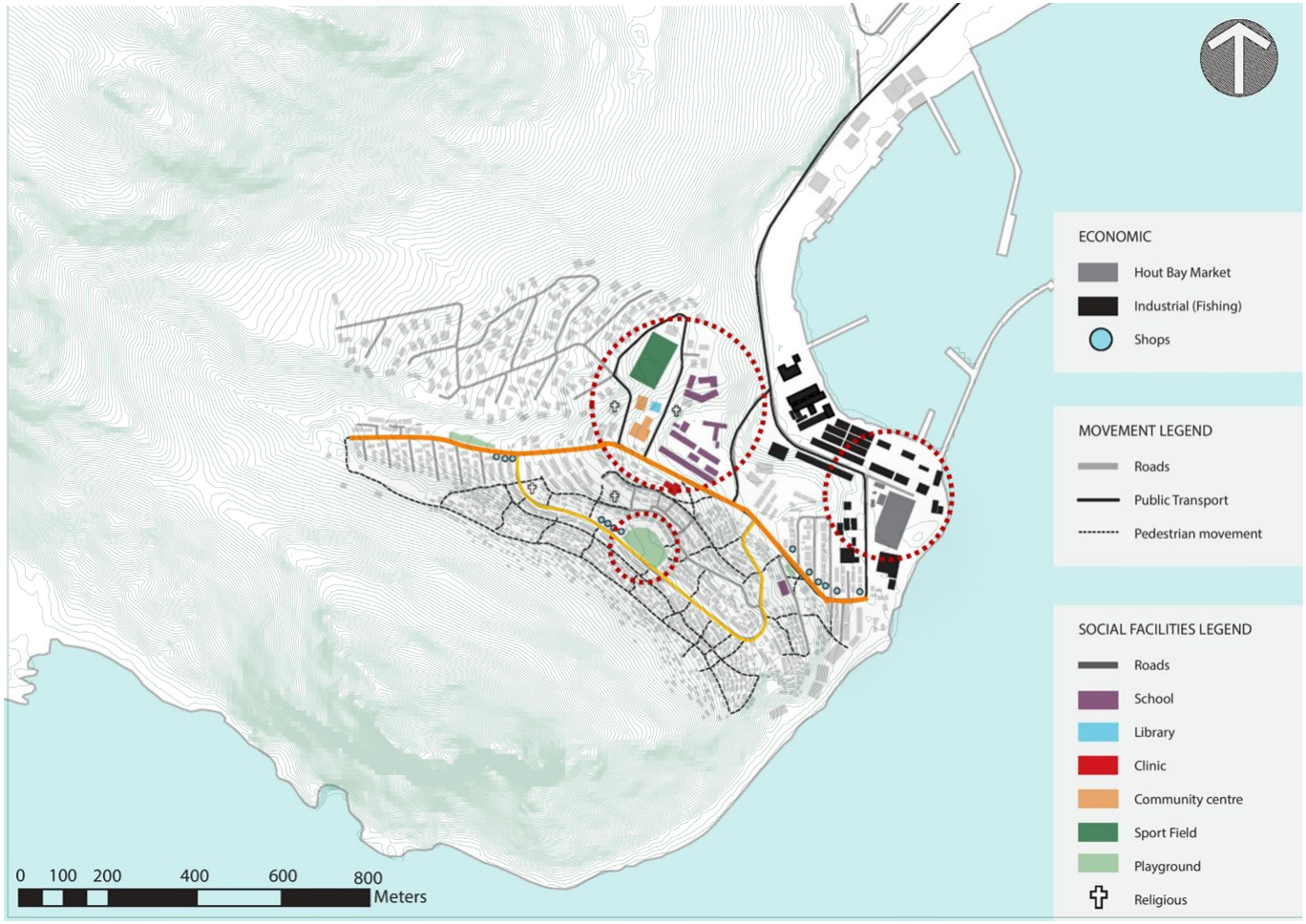



Figure 4.11: Hangberg connections analysis (Source: author)

Figure 4.12: Urban Morphology in Hangberg (Source: author)

## 4.4. HANGBERG BIOPHYSICAL ANALYSIS

The section the biophysical analysis in order to understand the natural landscape and to determine where development should and should not go. The analysis includes geology, soil, landforms, climate, hydrology and biodiversity. Below are the definitions used for the various restrictions:

No-Go: Sensitive environmental areas and areas of high significance for social and economic systems. The loss or degradation of these resources should be avoided.

Tread Lightly: Sensitive environment areas where low-impact development could be considered.

| CATEGORY | INDICATOR | RESTRICTIONS |
|---|---|---|
| Landform | • Steep slopes<br>• Ridge lines | • Tread lightly<br>• No-Go |
| Soil | • Stability | |
| Hydrology | • Minor river<br>• Aquifer<br>• Ground water | • No-Go<br>• No-Go<br>• Tread lightly |
| Biodiversity | • Protected area<br>• Threatened ecosystems | • No-Go<br>• No-Go |
| Agriculture | • Medium Productive potential<br>• High Productive potential | • Tread lightly<br>• No-Go |

Figure 4.12: Criteria table (Source: author)

### LANDFORM

The steep mountain which is adjacent to Hangberg has a shear cliff dropping towards the sea. This is a significant barrier to development in the neighbourhood.


Figure 4.13: Landform in Hangberg (Source: author)

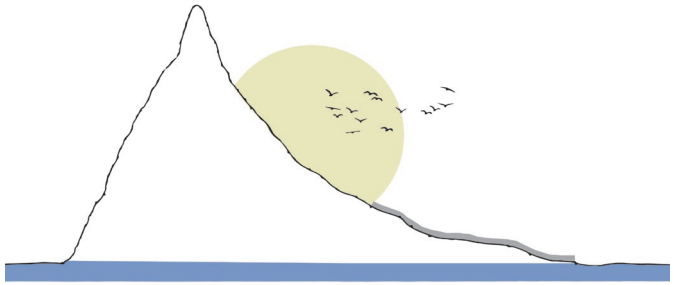


Figure 4.14: Section through Hangberg showing the shear cliff and height of the mountain (Source: author)

### HYDROLOGY

There is one river running down the mountain. The topography of the site and drainage lines cause problems with flooding.

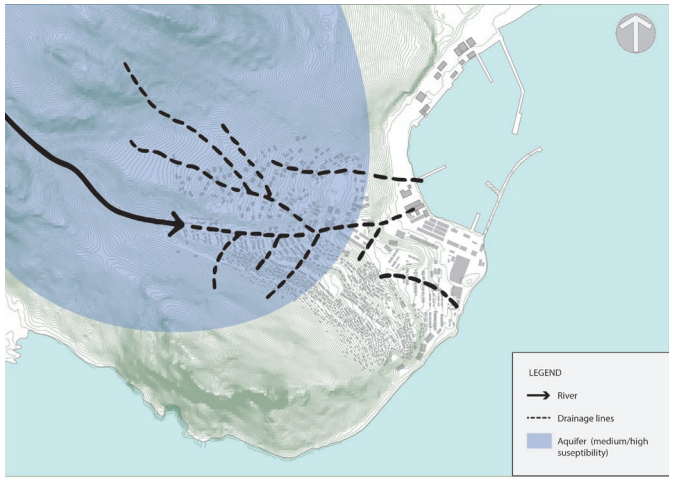



Figure 4.15: Hydrology in Hangberg (Source: author)

### SOIL

The soil condition is rock with limited or no soil which can cause barriers for development.


Figure 4.16: Soil in Hangberg (Source: author)

## BIODIVERSITY

The significant conservation and critical biodiversity areas is a significant barrier to development in the neighbourhood.


Figure 4.17: Biodiversity in Hangberg (Source: author)

## AGRICULTURE

Although there are is high agricultural potential, there are areas with medium agricultural potential where urban agriculture can be introduced.

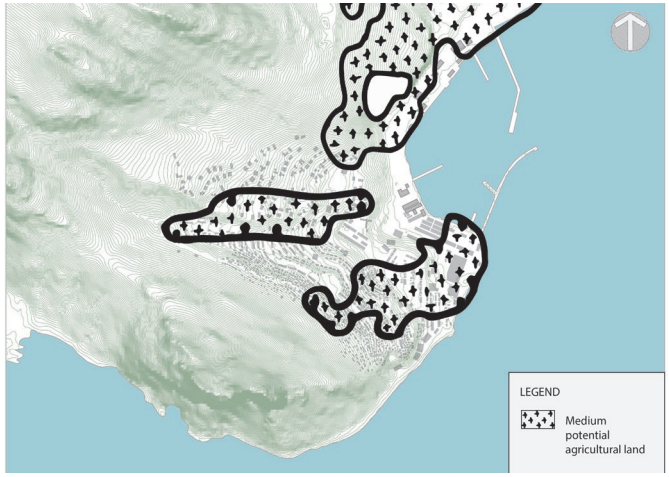



Figure 4.18: Agriculture in Hangberg (Source: author)

## COMPOSITE BIO-PHYSICALANALYSIS

Figure x below show the composite biophysical informants map which shows where development should and should not go in Hangberg. The map includes 'No-Go' and 'Tread Lightly' areas.


Figure 4.19: Composite biophysical informants (Source: author)

## 4.5. PROGRAMME

The section the number of social facilities required for Hangberg is calculated based off of the thresholds published by the CSIR (2012).

### 4.5.1 SOCIAL FACILITIES

ESTIMATED POPULATION: 6 500

ESTIMATED HOUSEHOLDS: 1515

Not all citizens can enjoy the same level of access to all services. Establishing a hierarchy of social facilities assists in allocating facilities of various types to their most appropriate locations based on the facility threshold and number of people within catchment distance (CSIR, 2012).

From Figure 4.17 it is clear that the most needed facilities for Hangberg is Education, with two ECD's and one Primary Schools required, and two public open spaces requried. Although the population of Hangberg does not warrent the need for a fire or police station, the neighbourhood required these facilities as the neighbourhood is segregated from the rest of Hout Bay and regularly has fire outbreaks and struggles with crime.

| FACILITY TYPE | Threshold Population | | REQUIRED | | PROVIDED | | SHORTFALL | |
|---|---|---|---|---|---|---|---|---|
| | Lower Limit | Upper Limit | Lower Limit | Upper Limit | Hangberg | TOTAL | Lower Limit | Upper Limit |
| Early Childhood Development Centres | 2400 | 3600 | 3 | 2 | 1 | **1** | 2 | 1 |
| Primary Schools | 3000 | 4000 | 2 | 2 | 1 | **1** | 1 | 1 |
| Secondary Schools | 6000 | 10000 | 1 | 1 | 1 | **1** | 0 | 0 |
| Community Sports Field | 5000 | 60000 | 1 | 1 | 1 | **1** | 0 | 0 |
| Local Library | 10000 | 70000 | 1 | 0 | 1 | **1** | 0 | -1 |
| Community Health Care Centre | 20000 | 120000 | 0 | 0 | 1 | **1** | -1 | -1.0 |
| District Hospital | 300000 | 900000 | 0 | 0 | 0 | **0** | 0 | 0 |
| Children's Homes | 42000 | 60000 | 0 | 0 | 0 | **0** | 0 | 0 |
| Homes for the Aged | 65000 | 65000 | 0 | 0 | 0 | **0** | 0 | 0 |
| Community Halls / Centres | 10000 | 25000 | 1 | 0 | 1 | **1** | 0 | -1 |
| Municipal Offices | 50000 | 50000 | 0 | 0 | 0 | **0** | 0 | 0 |
| Firestations | 60000 | 60000 | 0 | 0 | 0 | **0** | 0 | 0 |
| Public Open Space (Community Parks) | 2000 | 10000 | 3 | 1 | 1 | **1** | 2 | 0 |
| Cemetries | 5000 | 100000 | 1 | 0 | 0 | **0** | 1 | 0 |
| Police Stations | 25000 | 60000 | 0 | 0 | 0 | **0** | 0 | 0 |

Figure 4.17: Social Facilities required for Hangberg (Source: CSIR, 2012)

## 4.6. MAIN INFORMANTS

### 4.6.1 OPPORTUNITIES AND CONSTRAINTS

To summarise the contextual analysis of Hout Bay and Hangberg the following points reflect the most important informants that will be addresed in the urban design framework. Map x shows a spatial representation of the opportunities and constraints that exist within the study area.

| PRINCIPLES | CONSTRAINTS |
|---|---|
| EQUITY | **Spatial segregation:** Hangberg is spatially segregated from the larger Hout Bay area. This means that it is difficult for residents to access opportunities and facilities in the Hout Bay CBD as there is inadequate NMT and public transport facilities. Many residents are also employed as domestic workers or gardeners for residents in Hout Bay which makes access to jobs difficult. |
| BALANCE | **Pressure on Environmental Sensitive Areas -** The sprawling informal settlement is encroaching into the conservation areas and on critical biodiversity areas. There is also a lack of developable land in the neighbourhood.<br>**Inadequate water management:** The neighbourhood has inadequate water infrastructure but the river that is flowing down the mountain is being channeled into the ocean which presents a lost opportunity. |
| INTEGRATION | **Urban fragmentation:** There is poor integration between the residential areas and the harbour area as well as the ocean.<br>**Fragmented green spaces:** Urbanisation has resulted in the fragmentation of the green system which negatively effects the biodiversity of the area. |
| SENSE OF PLACE | **Inadequate public spaces:** There is a lack of adequare public spaces in the neighbourhood, the existing public spaces are neglected and some have become lost spaces.<br>**Poor definition of the public realm:** Public spaces are poorly defined with dwellings either turning their backs on these spaces or there being a lack buildings that front onto these spaces.<br>**Lack of special places:** There are very few special places such as landmarks, viewpoints or high quality public spaces that the community can enjoy. |
| SAFETY + SECURITY | **Disasters:** There are no emergency services in Hangberg, it is a safety risk for residents as flooding and shack fires commonly occur in the area,<br>**Security of Tenure:** As there is a court interdict agains the erection of structures on SANPARKS land, residents are at risk of being evicted.<br>**Safety:** Safety is a concern in the area, particularly in open spaces where there is a lack of activities and passive surveilanc |
| EFFICIENCY | **Monofunctional:** the neighbourhood is largely residential with a lack of mixed-use development<br>**Lack of NMT facilities:** There are very few formalised NMT routes in the neighbourhood, this is a challenge as most residents rely on walking to access opportunities and facilities.<br>**Sprawl:** the settlement is sprawling up the mountain, this makes providing adequate housing and infrastructure a challenge. |

| PRINCIPLES | OPPORTUNITIES |
|---|---|
| EQUITY | **NMT routes:** There is an opportunity to provide adequate NMT facilities which can provide better access within Hangberg and to connect the neighbourhood with Hout Bay.<br>**Clustering of Facilities:** Facilities can be clustered around nodes and corridors that have good access to public transport, this will help to reduce travelling distances. |
| BALANCE | **Fire Break:** The firebreak can be better defined to create a buffer between the urban and natural landscape which could prevent the encroachment of the settlements into the conservation area.<br>**Blue/green infrastructure:** There is opportunities for blue/green infrastructure to capture and reuse water resources, control flooring and to mitigate the effects of climate change and improve biodiversity |
| INTEGRATION | **Green Corridors:** The creation of continous green corridors throughout the neighbourhood can colsolifatie and define ecological areas and open spaces to enhance biodiversity and access to these spaces. |
| SENSE OF PLACE | **Network of public spaces:** The creation of a network of public spaces can integrate these spaces and provide adequate and equitable provision of public spaces within the neighbourgood.<br>**Define the public realm:** Elements such as continous building frontages can create defensible spaces and clear spatial definition of public spaces.<br>**High quality spaces:** The design of high quality spaces can encourage people to engage positively with the spaces and encourage collective ownership which will decrease vandalism. |
| SAFETY + SECURITY | **Co-locate public facilities and open spaces:** The integration of different types of public facilities with open spaces such as sport fields, parks and the river can improve the safety in these areas.<br>**Food security: t**he introduction of urban agriculture on the productive agricultural sites can promote lcoal production and distribution of health food in the neighbouthoodl. |
| EFFICIENCY | **Mixed-use development:** the encouragement of mixed use activities and development in the neighbourhood can improve urban compaction and provide additional facilities and opportunities in the neighbouthoof for the community to access<br>**Higher density development:** The encouragement of higher density residential developments and different tenure options can provide additional housing opportunities in the area.<br>Informal settlement upgrading: Different types of informal settlement upgrading such as re-blocking can improve housing conditions in the neighbourhood. |

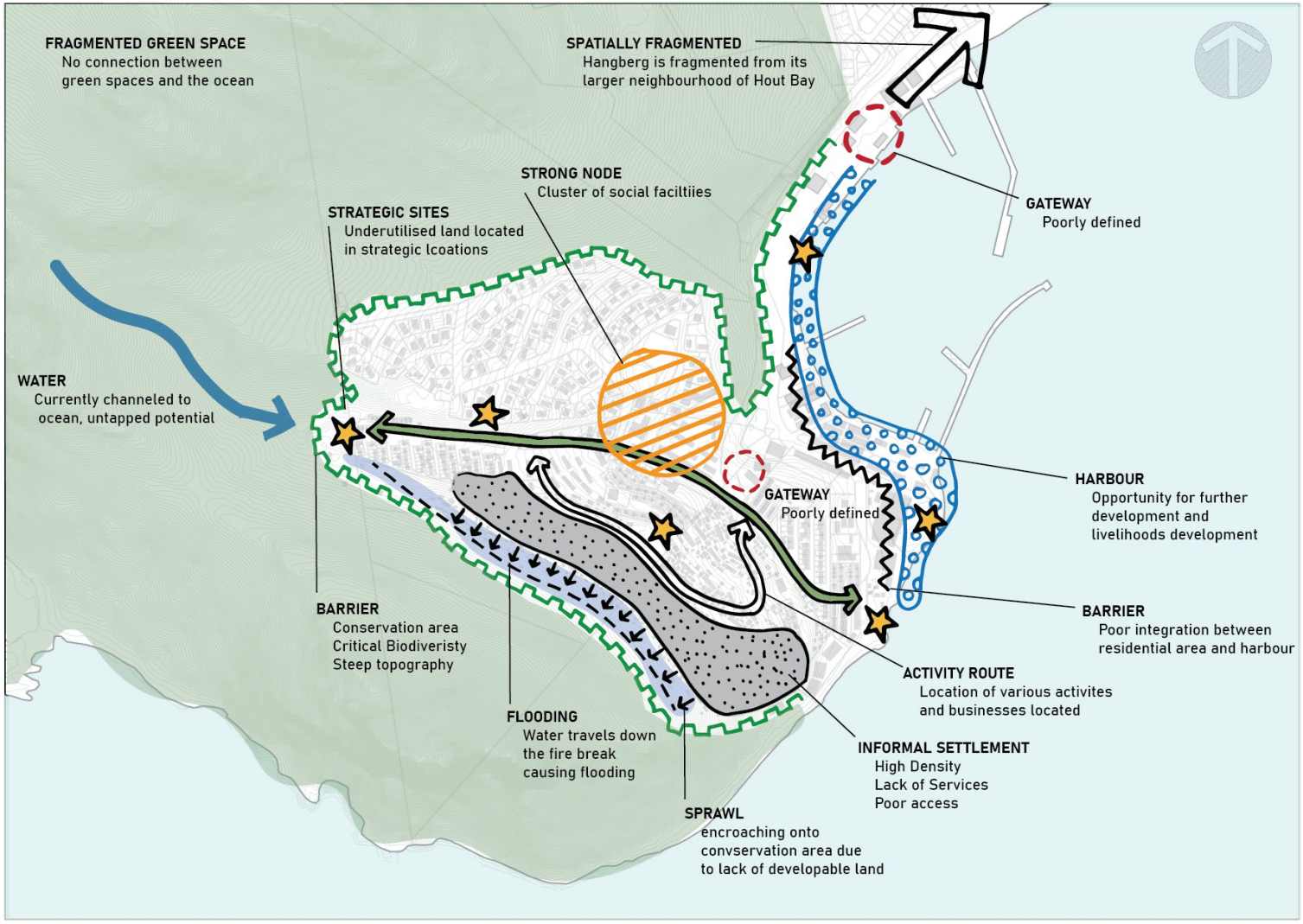



Figure 4.18: Informants in Hangberg (Source: author)

# CHAPTER 5
# DESIGN FRAMEWORK

# 5. DESIGN FRAMEWORK

This chapter sets up the design framework to develop a spatial concept for Hout Bay and an urban design framework for Hangberg which also identifies a precinct plan within the neighbourhood,

## 5.1. STRUCTURE OF DESIGN FRAMEWORK

The design framework aims to achieve the vision of a liveable neighbourhood through the delivery of key interventions that can be grouped into three strategies namely connections, place and resilience. These interlinked strategies will provide a structure for decision making and identifying priority interventions. Figure 5.1 shows a diagram of the design framework

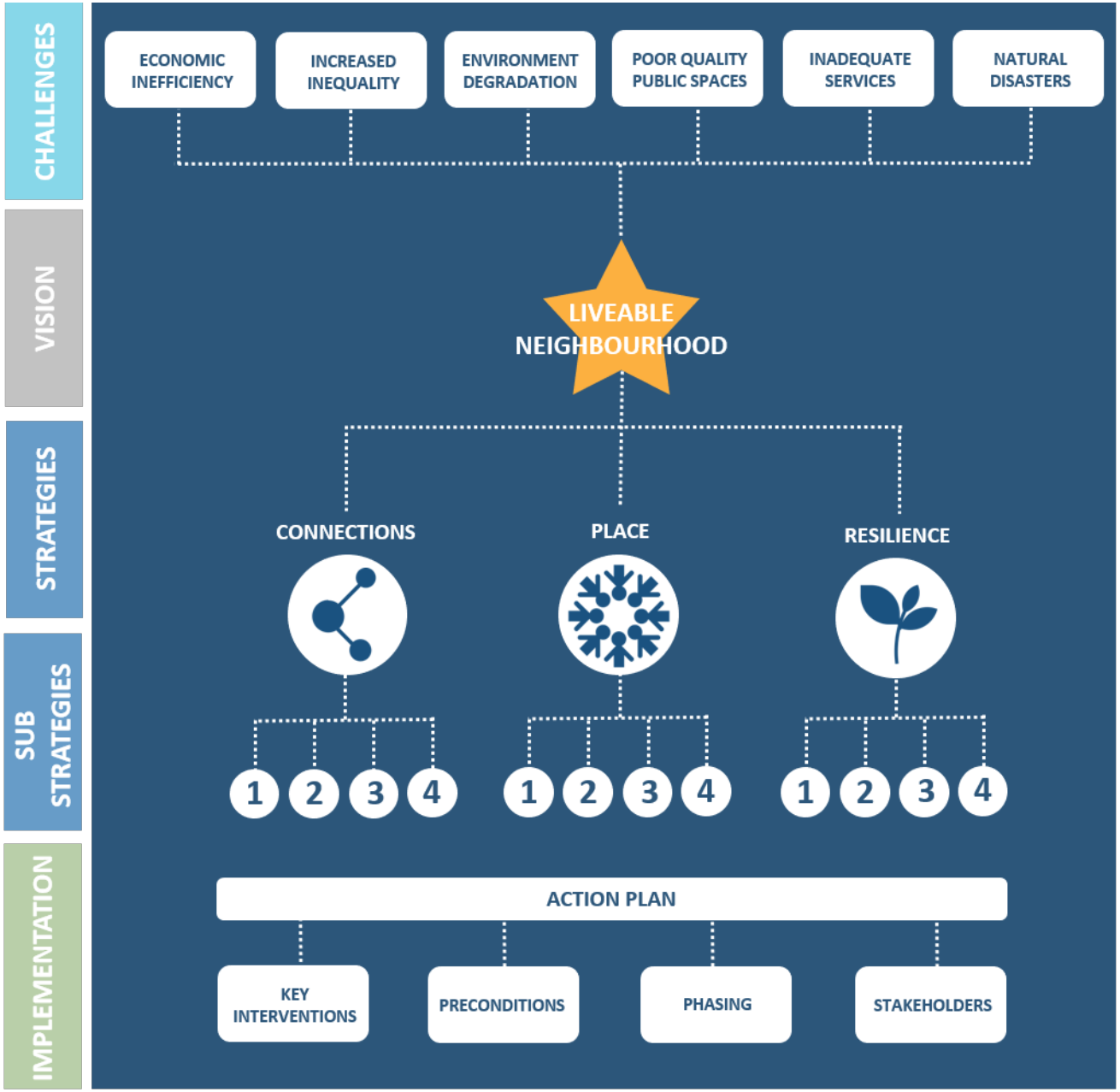



Figure 5.1: Diagram of the Design Framework (Source: Author)

## 5.2. STRATEGIES

The design framework aims to achieve the vision of a liveable neighbourhood through the delivery of key interventions that can be grouped into three strategies namely connections, place and resilience. These interlinked strategies will provide a structure for decision making and identifying priority interventions. The strategies and their inter-relationship with the performance criteria are set out in section 4.4.

### 5.2.1 STRATEGY 1: CONNECTIONS

| CONNECTIONS | | | |
|---|---|---|---|
| SUB-STRATEGY | OBJECTIVE | GUIDELINES | MONITORING |
| Create hierarchy of corridors and nodes | Provide structuring elements to integrate the urban fabric | Identify existing as well as potential new nodes and corridors within the urban fabric | The average distance residents travel to access economic, social and recreation facilities<br><br>Backlog for social facilities and housing<br><br>Efficient use of land and infrastructure<br><br>Diverse range of housing typologies and tenure options |
| Promote economic activities, densification and mixed use development | Create multifunctional spaces where people can live, work and play | Promote development intensity, diversity and adaptability | |
| Clustering of facilities | Ensure the equitable provision of services and facilities | New facilities should be clustered at central locations | |
| Integrated movement and public transport network | Ensure that people can move about efficiently and safely | Movement routes, especially NMT routes, to be aligned with water systems | |

## 5.2.2 STRATEGY 2: PLACE

| PLACE | | | |
|---|---|---|---|
| SUB-STRATEGY | OBJECTIVE | GUIDELINES | MONITORING |
| Maintain unique sense of place | Celebrate the memory, cultural heritage and diversity of the area and community | Involve the local community in the design process to harness local knowledge of the area | The average distance residents have to travel to access public spaces<br><br>New and existing developments adhere to the urban design guidelines<br><br>Provision of multi-functional public spaces<br><br>Water elements are incorporated into the public realm |
| Create network of public spaces | Connect public open spaces to create easy accessible, integrated and legible places | Ensure public spaces are accessible and legible so that people can move about easily and efficiently. | |
| Development contributes to quality of public realm | Create vibrant public spaces where people feel safe and can interact, socialise and participate in recreational activities. | Ensure enclosed and positive interfaces onto the public realm | |
| Integrate water in public spaces | Public spaces should value and enhance the natural environment | Promote multi functional public spaces that incorporates ecological services | |

## 5.2.3 STRATEGY 3: RESILIENCE

| RESILIENCE | | | |
|---|---|---|---|
| SUB-STRATEGY | OBJECTIVE | GUIDELINES | MONITORING |
| Conserve functional ecosystems | Improve the connectivity between ecosystems to counter fragmentation | Create multi functional green corridors that support healthy ecosystems | Hectares of natural assets protected<br><br>Quality of freshwater sources<br><br>Reduced fragmentation of natural assets with corridor connections<br><br>Decreased development on ecologically sensitive or productive land<br><br>No. of local jobs opportunities created and supported |
| Manage development impacts | Development should minimise its negative impact on the environment | Promote development in appropriate locations and ensure buildings make use of renewable energy and sustainable elements | |
| Metabolic restructuring | Promote the sustainable use of resource | Make use of blue/green infrastructure and the capture and resue of water | |
| Livelihoods | Reduce poverty and improve living conditions and food security | Enhance community livelihoods such as small scale fisheries and urban agriculture | |

## 5.2.4 ALIGNMENT

Figure 5.3 below depicts how the three strategies on connections, place and resilience, that were discussed in section 4.3, aligns with the performance criteria that was discussed in section 2.4. The strategies do integrate the various performance criteria, thereby contributing towards achieving a liveable neighbourhood.

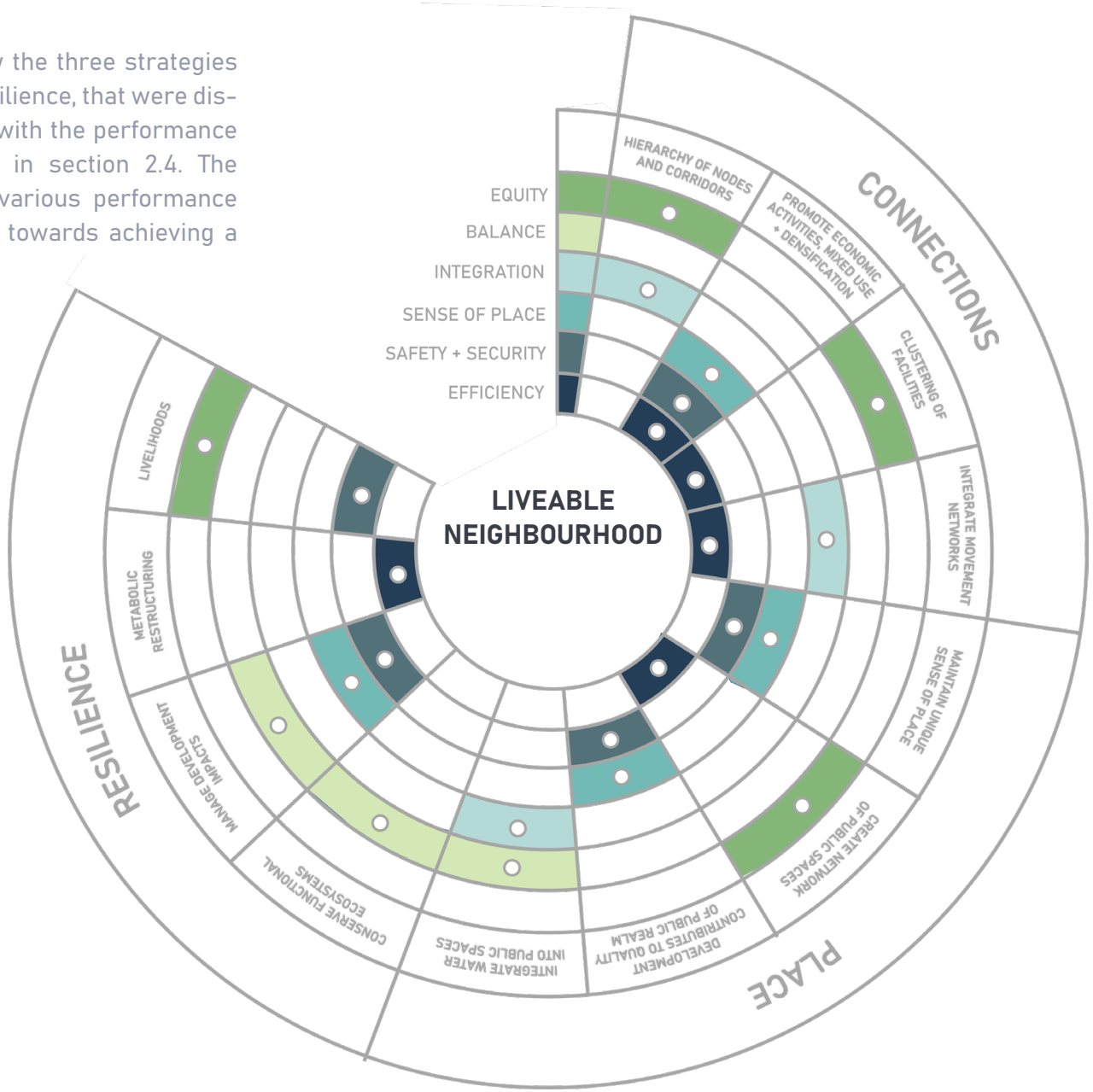



Figure 5.2: Alignment of principles and strategies (Source: Author)

## 5.2.5 SCALES

The design framework will focus on three different scales as discussed below:

HOUT BAY: The Hout Bay Spatial Framework focuses on the application of the three principles to the larger study area and also focuses on the integration of Hangberg and its surrounding areas.

HANGBERG: An Urban Design Framework will be developed for Hangberg and will be consistent with the Hout Bay Spatial concept. The framework will lay down general urban design principles for the three strategies that form part of the design framework.

PRECINCT: The precinct plan will provide a more detailed design intervention that responds to the strategies in the design framework. The precinct plan is accompanied by a set of urban design guidelines.

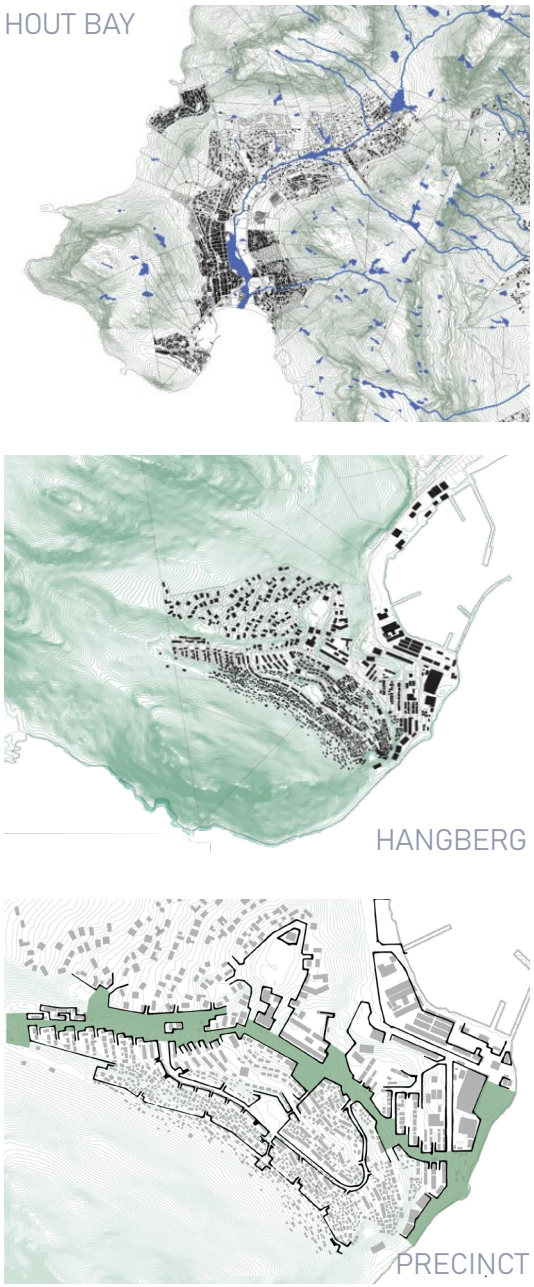



Figure 5.3: Scales used in the Design Framework (Source: Author)

## 5.4. APPLICATION

The three strategies of Connections, Place and resilience were tested at the three different scales of Hout Bay, Hangberg and the Precinct. The strategies can be applied at each scale and it shows that there is also consistency between the three scales. The stratergies are further discussed in the next section

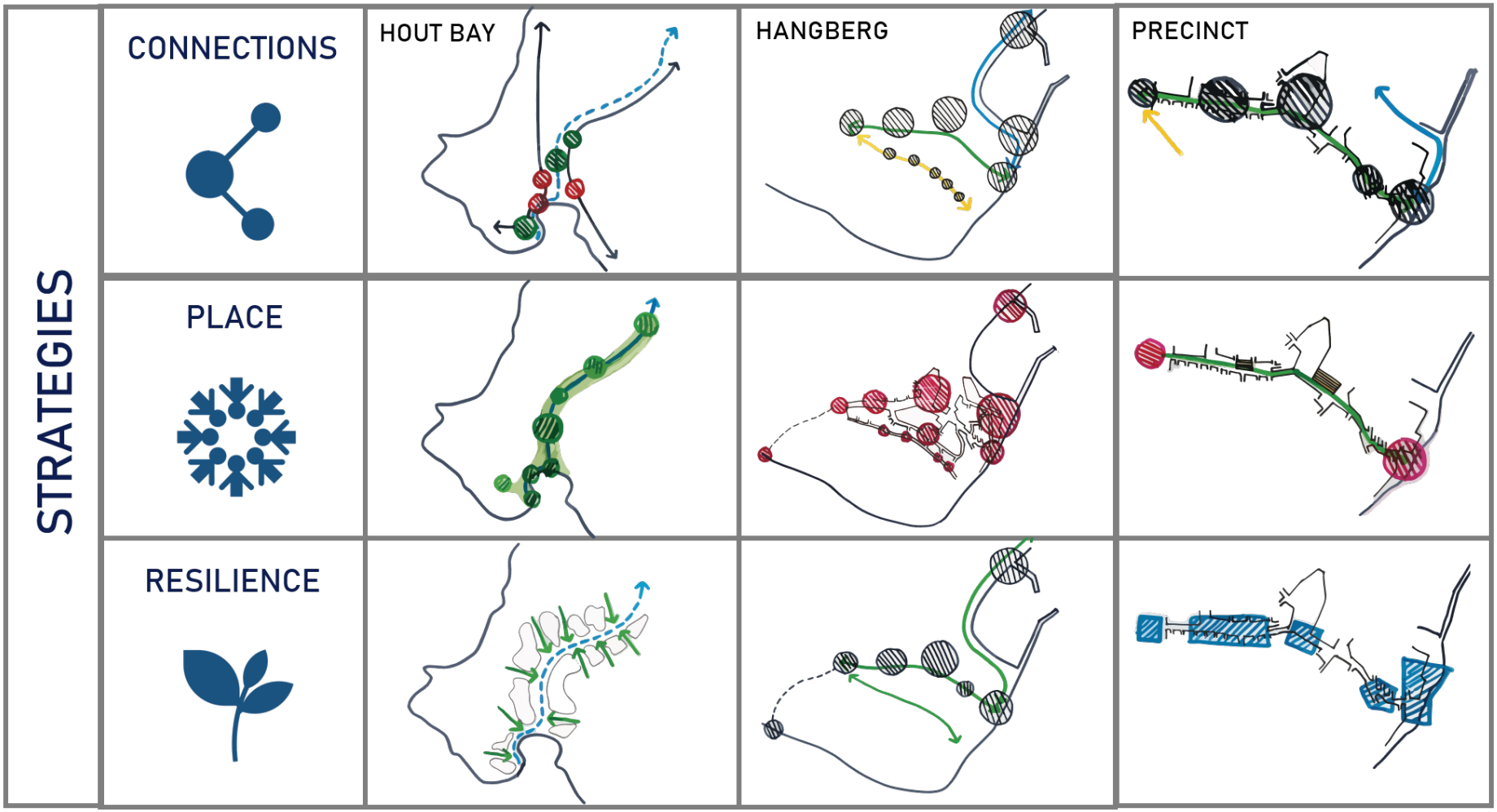



Figure 5.4: Diagramatic application of the strategies to Hout Bay, Hangberg and the Precinct (Source: Author)

## 5.5. HOUT BAY SPATIAL FRAMEWORK

The Spatial Framework for Hout Bay aims to set up various structures within the focus area that are linked with the three strategies of connections, place and resilience and identify priority interventions. These strategies are further explored in this section.

### 5.5.1 CONNECTIONS

Key elements include integrating the movement system and linking these with key destinations. This is shown as proposed activity corridors and nodes. Another key element is connecting Hangberg within Hout Bay by a continues access route along the river and harbour.

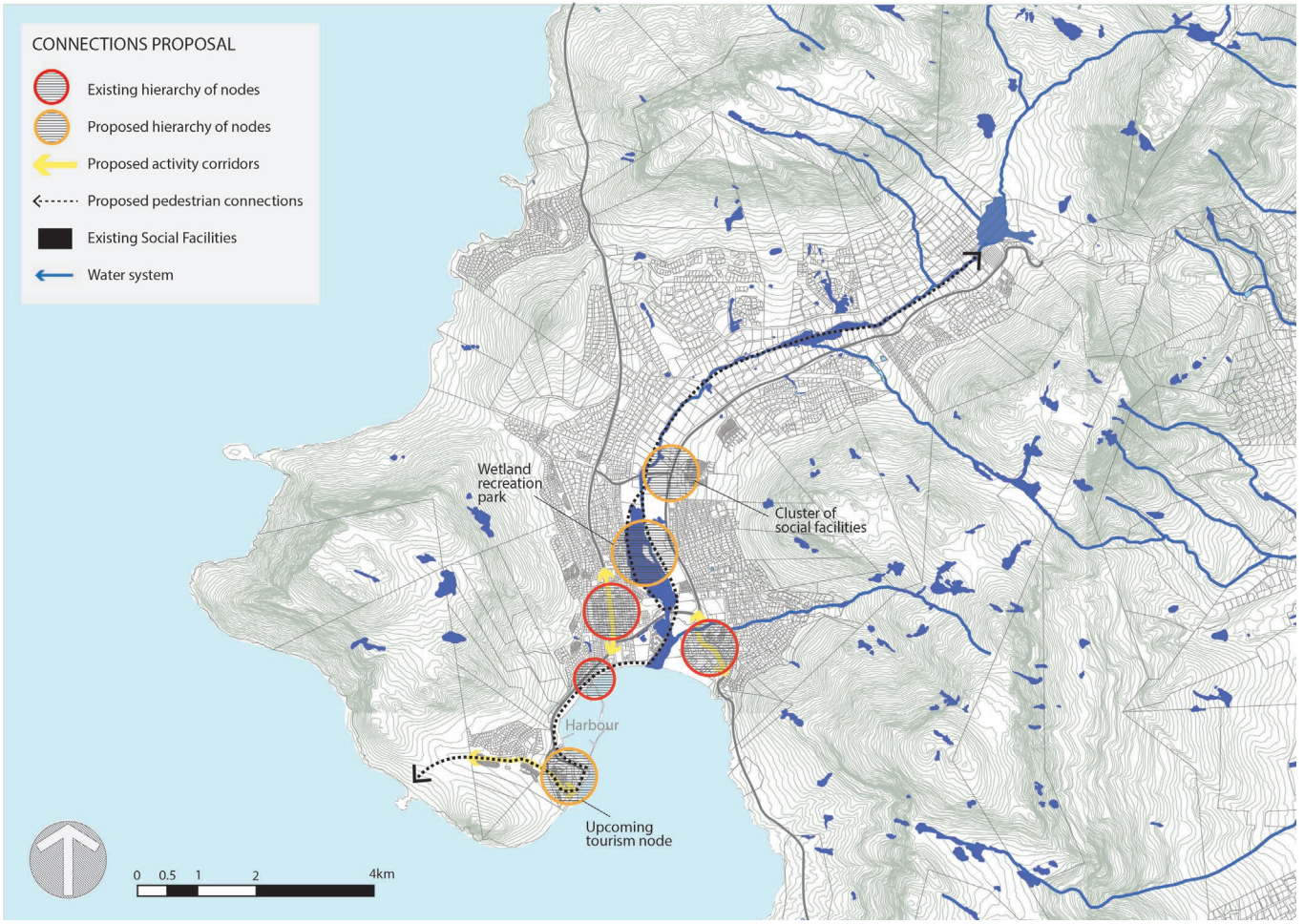



Figure 5.5: Hout Bay Connections (Source: Author)

## 5.5.2 PLACE

Key elements include creating places that are linked with the river, ocean and harbour and maintaining the unique sense of place that Hout Bay has to offer. A hierarchy of nodes is proposed along the water system where various activities are promoted.

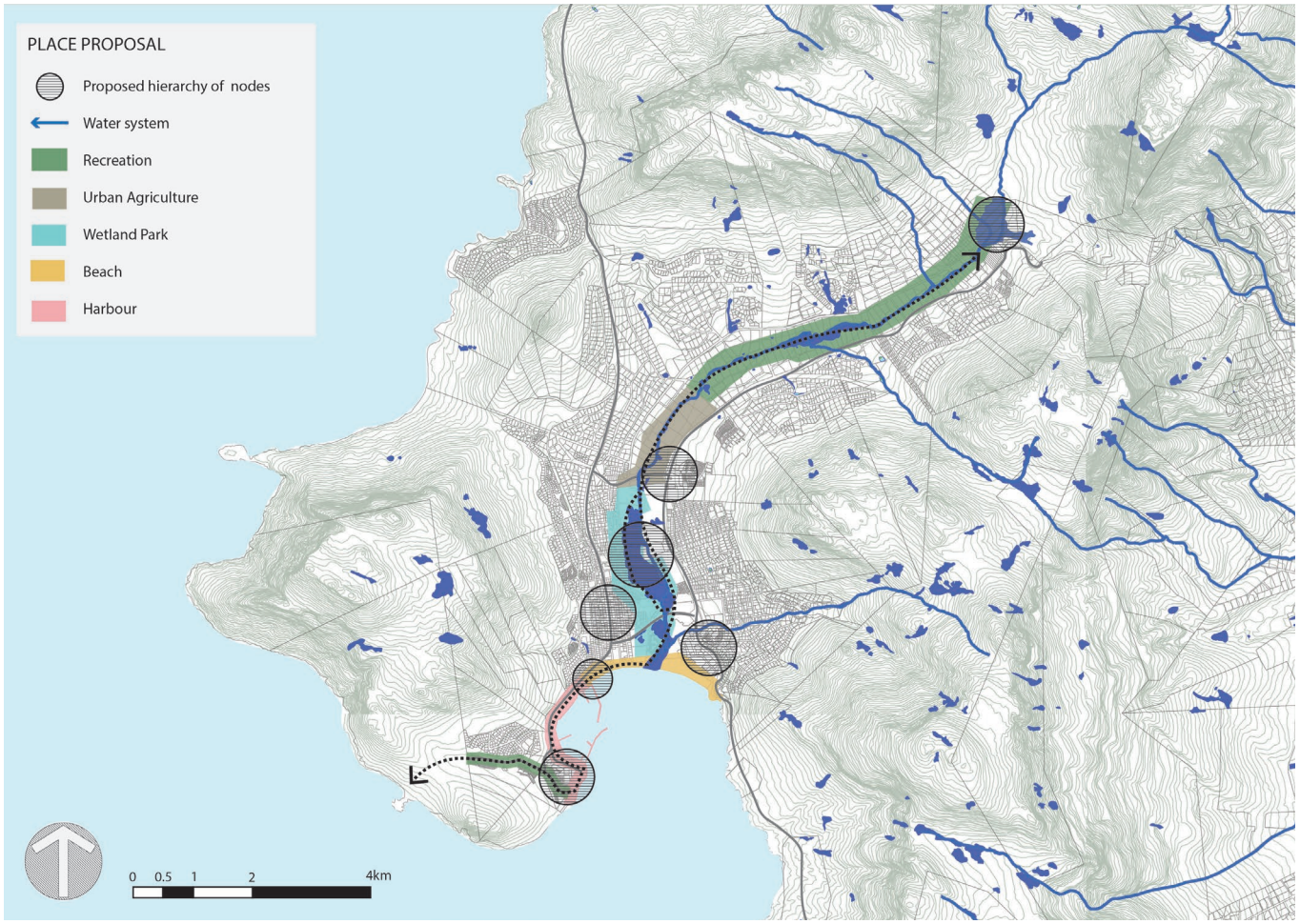



Figure 5.6: Hout Bay Place (Source: Author)

## 5.5.3 RESILIENCE

Key elements include preventing sprawl, integrating the natural and built environment and conserving valuable ecosystems. A system of proposed green corridors that link up with the river and harbour can assist with improving the connectivity between ecosystems.

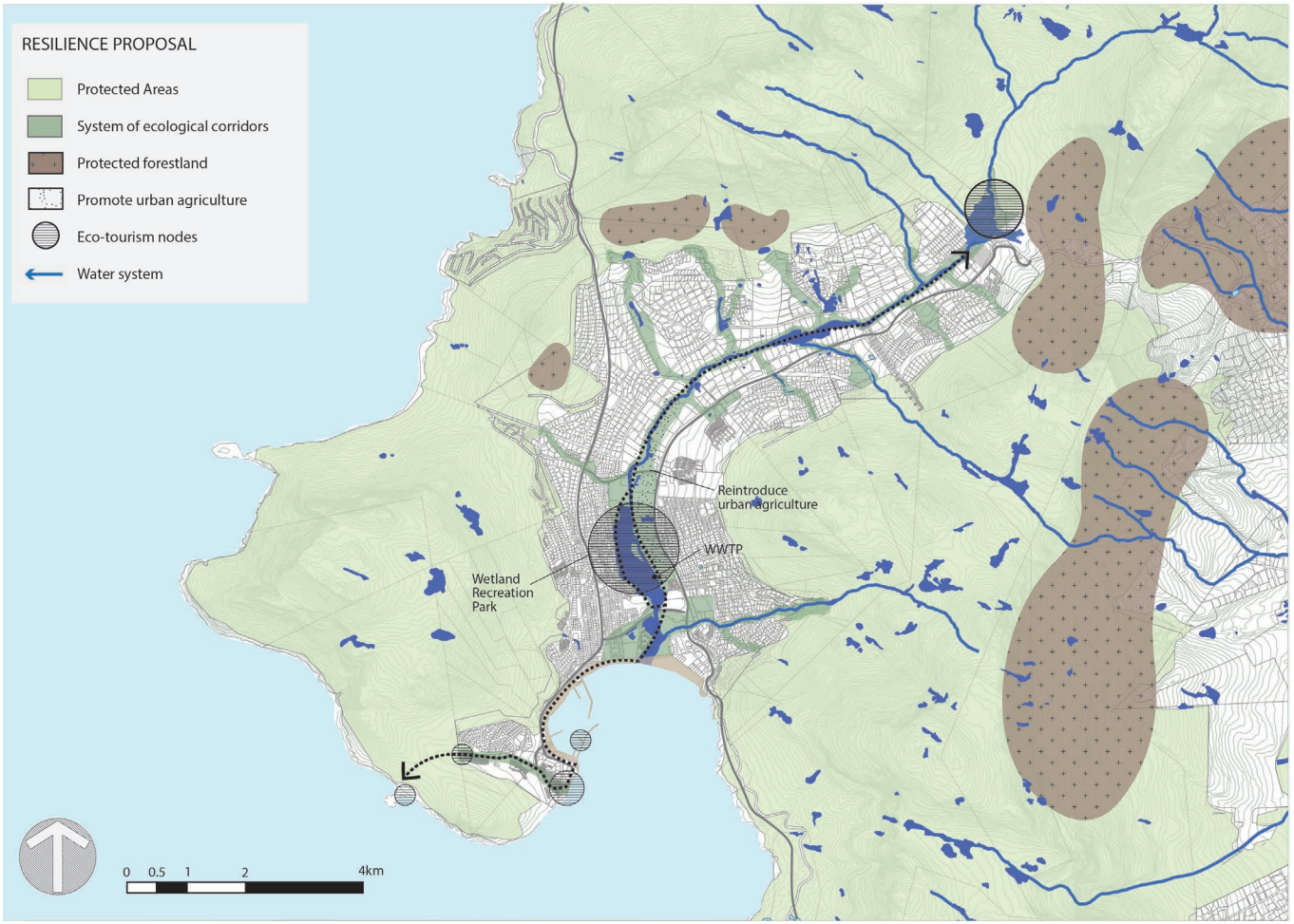



Figure 5.7: Hout Bay Resilience (Source: Author)

## 5.6. HANGBERG URBAN DESIGN FRAMEWORK

The Urban Design framework for Hangberg aims to lay down general urban design principles for the three strategies of connections, place and resilience that form part of the design framework. These three strategies are further explored in this section.

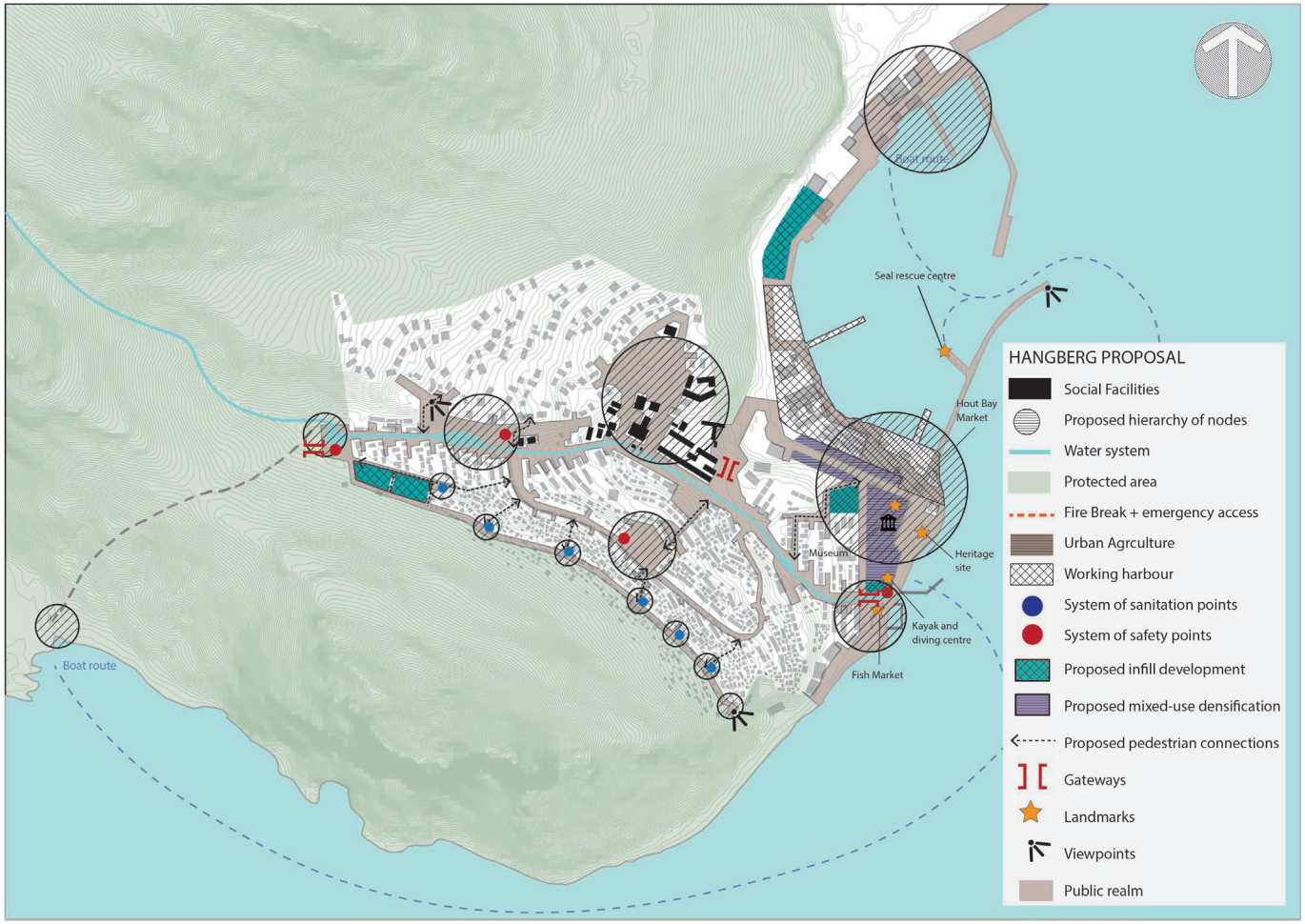



Figure 5.8: Hangberg Urban Design Framework (Source: Author)

## 5.6.1 CONNECTIONS

A key focus is connecting Hangberg with Hout Bay through a continuous NMT route leading from the river in Hout Bay  to the harbour in Hangberg. Activity corridors are proposed throughout Hangberg that links up with a system of proposed nodes to provide equal access to opportunities for residents.

Areas are also identified where infill development and densification can occur along these activity corridors

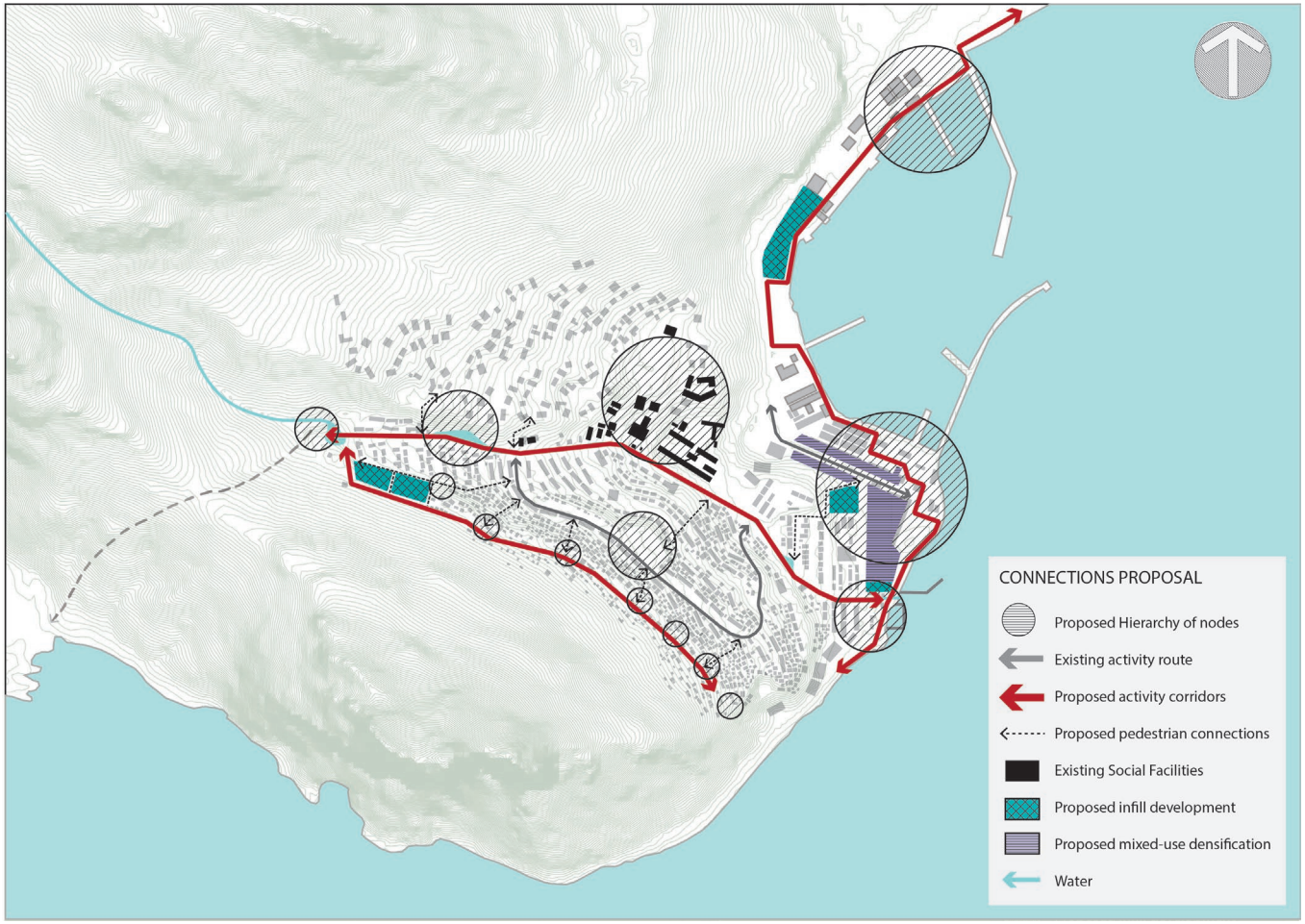



Figure 5.9: Hangberg Connections (Source: Author)

## 5.6.2 PLACE

A key element of place is to create a network of public spaces throughout the neighbourhood to improving access to public spaces for all residents. These spaces should be integrated with the water system. A system of safety points is proposed in areas that are currently vacant or underutilized and are prone to crime. A system of sanitation points is also proposed along the fire break where there is a lack of services. These safety and sanitation points will be integrated with the public space network. Elements such as landmarks, viewpoints and gateways add to the legibility of these spaces.

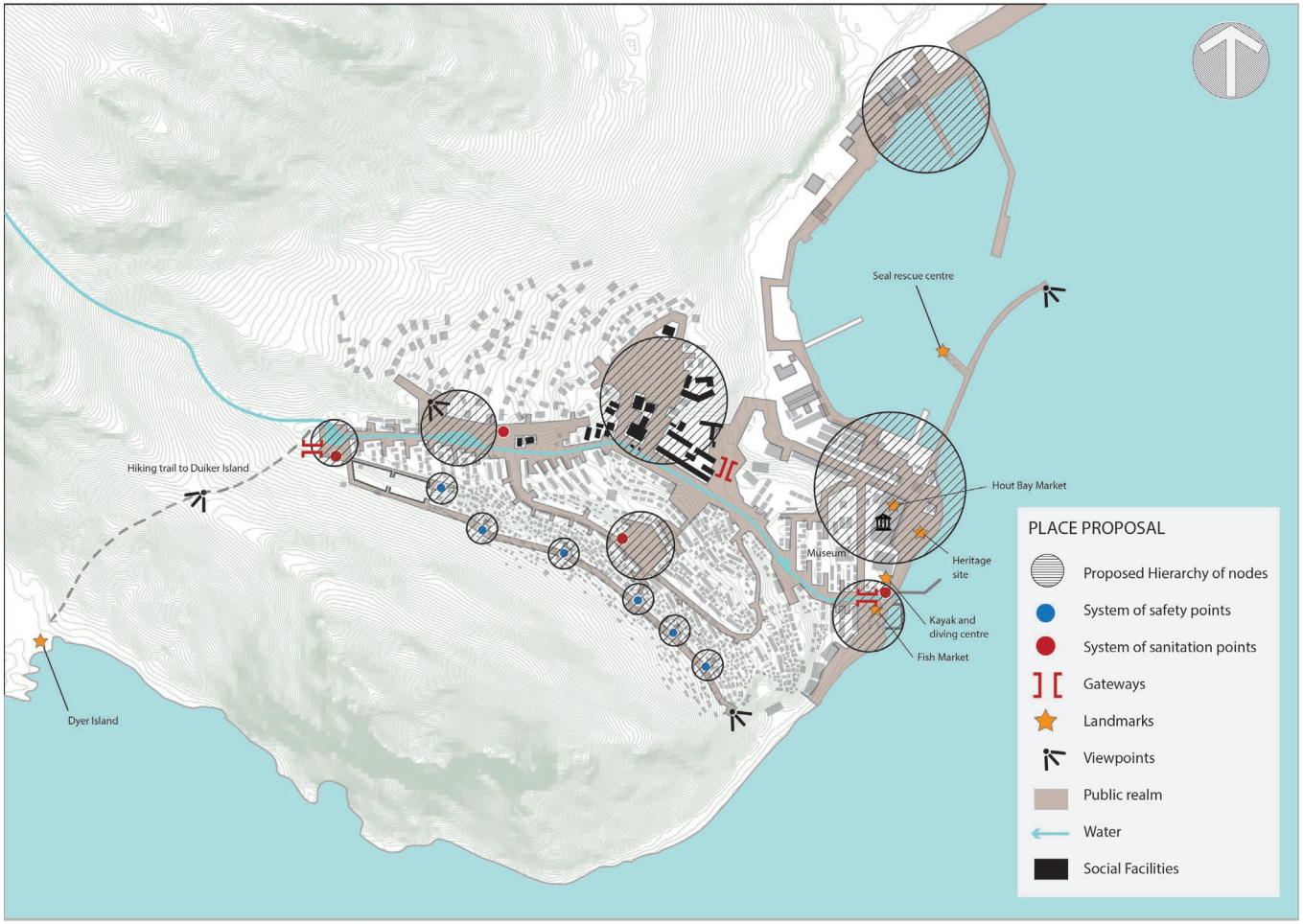



Figure 5.10: Hangberg Place (Source: Author)

## 5.6.3 RESILIENCE

A key element of resilience is to protect the natural systems. This is done by creating ecological corridors that are linked with the water system. Protecting and enhancing livelihoods is another essential element of resilience, this can be done by providing opportunities for economic growth such as the introduction of urban agriculture and the building of a central market place for fisherman and farmers. Eco-tourism is also ontroduced into the neighbourhood such as a hiking trail to Dyker island and a kayak and diving centre.

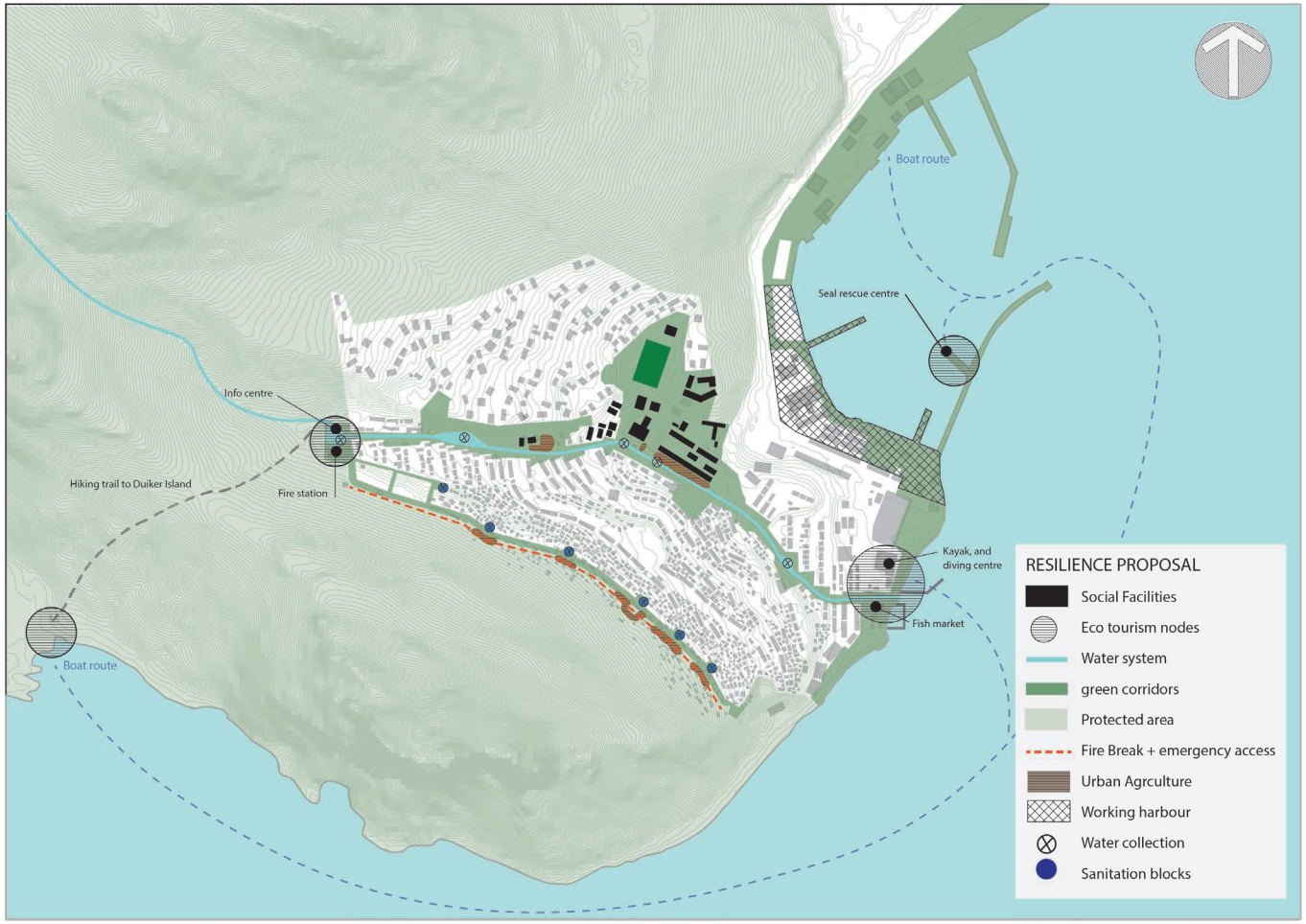



Figure 5.11: Hangberg Resilience(Source: Author)

## 5.7. KEY STRUCTURING ELEMENTS

After applying the strategies of Connections, Place and Resilience at the Hout Bay and Hangberg scale, a system of multi-functional corridors emerged that are focused along water and have different hierarchies and functions. The three corridors are the (1) Harbour Corridor (2) Green Corridor, and (3) Fire Break Corridor. The visions and concepts for these three corridors are discussed in this section.

HOUT BAY SCALE

HANGBERG SCALE

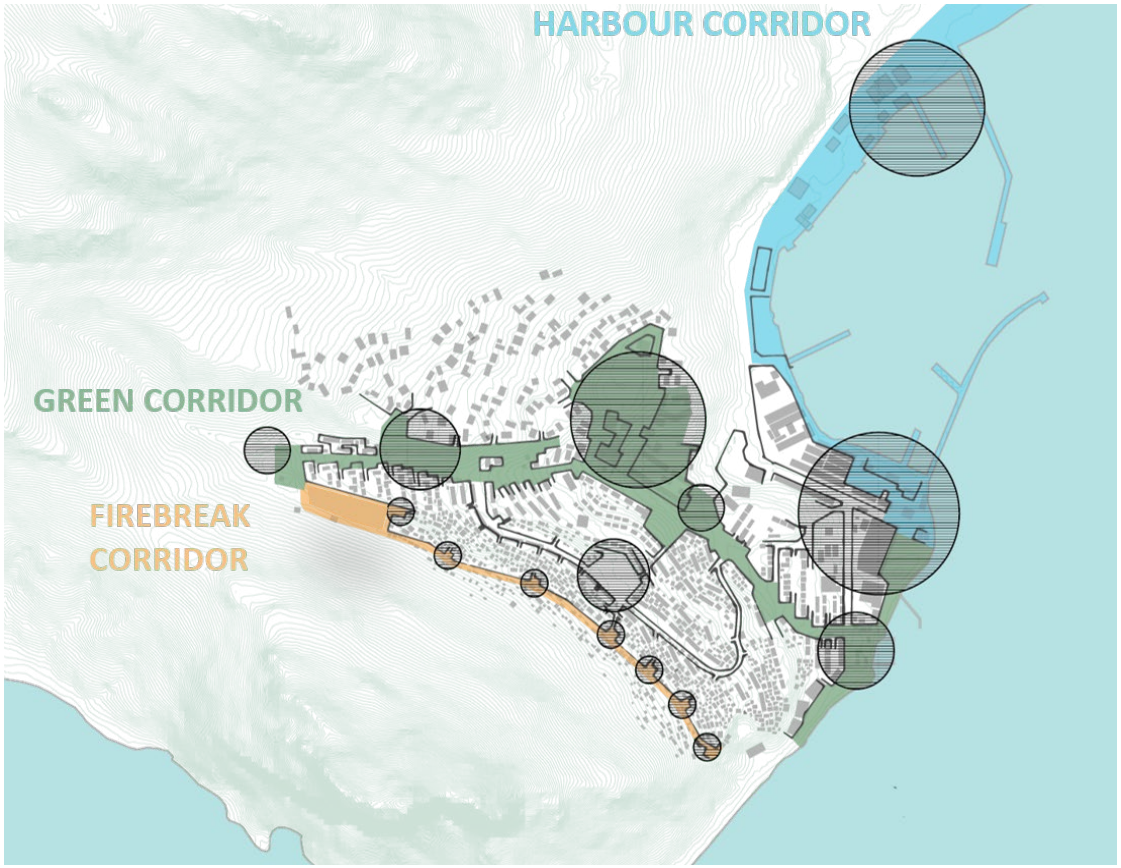




Figure 5.12: Kay structuring elements (Source: Author)

## 5.7.1 HARBOUR CORRIDOR

This is a higher-order corridor and serves the larger neighbourhood of Hout Bay. The corridor aims to connect Hang Berg with Hout Bay by creating a continuous route along the harbour and river and promotes tourism that is linked with the harbour.

### VISION

- CONTINOUS PUBLIC SPACE ALONG HARBOUR
- FOCUS ON NMT AND ACCESS TO LARGER NEIGHBOURHOOD
- PROMOTE TOURISM AROUND HARBOUR
- MIXED USE INTENSIFICATION


Figure 5.13: Harbour Corridor concept (Source: Author)

## 5.7.2 GREEN CORRIDOR

This medium order corridor serves the neighbourhood of Hangberg. The corridor follows the water running down the mountain and underneath the main road. The corridor aims to resurface the water running underneath the main road and to connect ecosystems from the mountain with the ocean.

### VISION

- CONTINOUS GREEN PUBLIC SPACE THAT CONNECTS ECOSYSTEMS + ENCOURAGES BIODIVERSITY
- FOCUS ON INTEGRATING WATER INTO PUBLIC SPACES
- CLUSTER OF FACILITIES AROUND NODES
- POSITIVE PUBLIC INTERFACE
- SAFE ACCESS AND MOVEMENT

Figure 5.14: Green Corridor concept (Source: Author)

## 5.7.2 FIRE BREAK CORRIDOR

This lower order corridor serves the local community that is residing along the fire break. The corridor runs along the fire break where development is encroaching onto the nature reserve and which also acts as a stormwater channel. The corridor aims to control urban sprawl and manage stormwater while improving livelihoods. The corridor also provides emergency services into the area.

### VISION

- CONTROL URBAN SPRAWL
- MANAGE STORMWATER
- COMMUNITY SPACES
- SANITATION BLOCKS
- URBAN AGRICULTURE
- FORMALISE HOUSING ALONG PUBLIC EDGE

Figure 5.15: Fire Break Corridor concept (Source: Author)

## 5.8. PRECINCT PLAN

The Green Corridor was chosen to be the focus of the precinct plan because it is currently where water is being channeled underneath the settlement into the ocean and where. This green corridor provides an opportunity to resurface the water and link public spaces to the water system. The three strategies of Connect, Place and Resilience applied to the precinct area is further explored in this section.

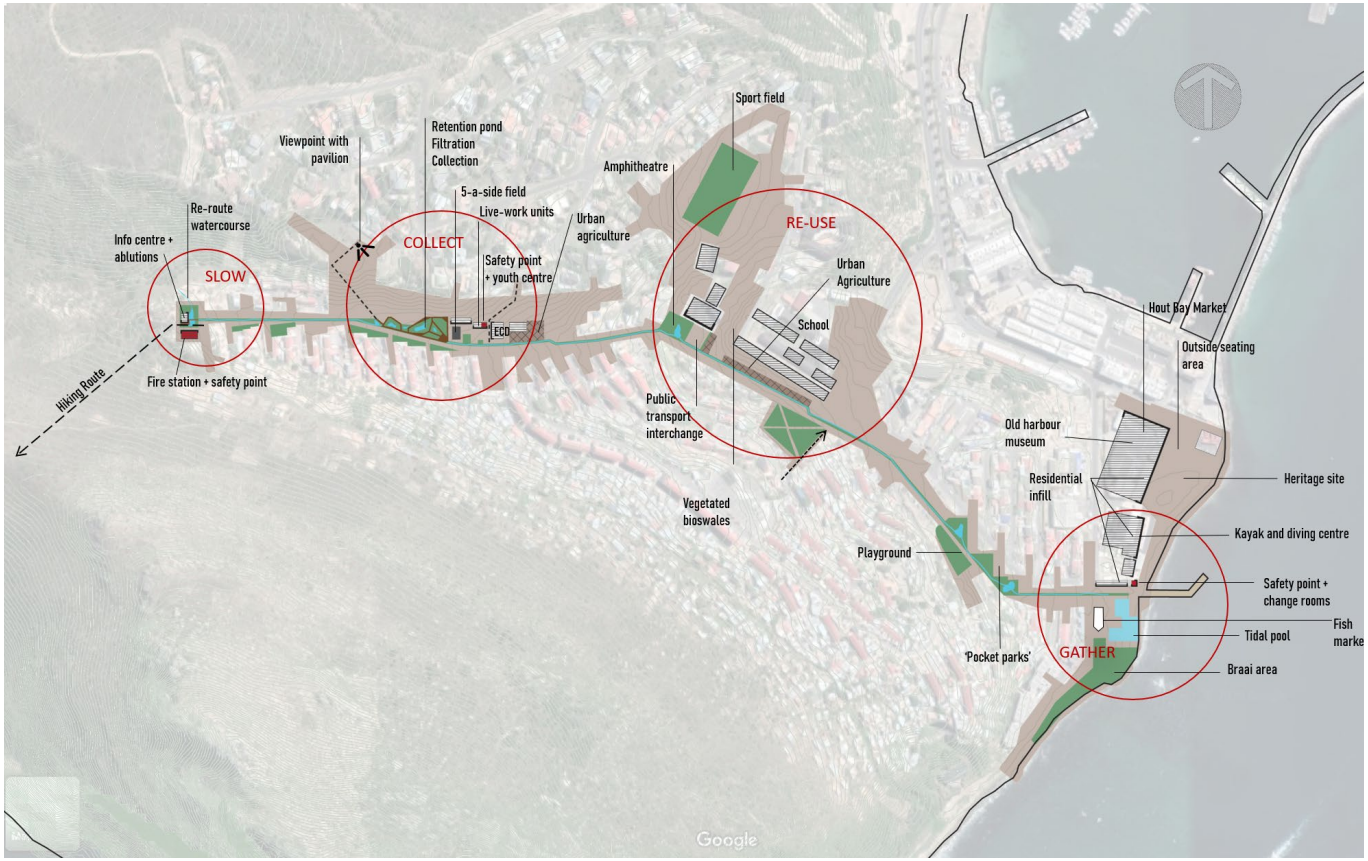



Figure 5.16: Precinct Plan (Source: Author)

## 5.8.1 PRECINCT CONNECTIONS

The corridor is proposed to be the primary activity route through Hangberg. Important pedestrian links coming off of the corridor. There are four proposed multi functional nodes along the route. Development intensity, diversity and adaptability is encouraged along this system of corridors and nodes.

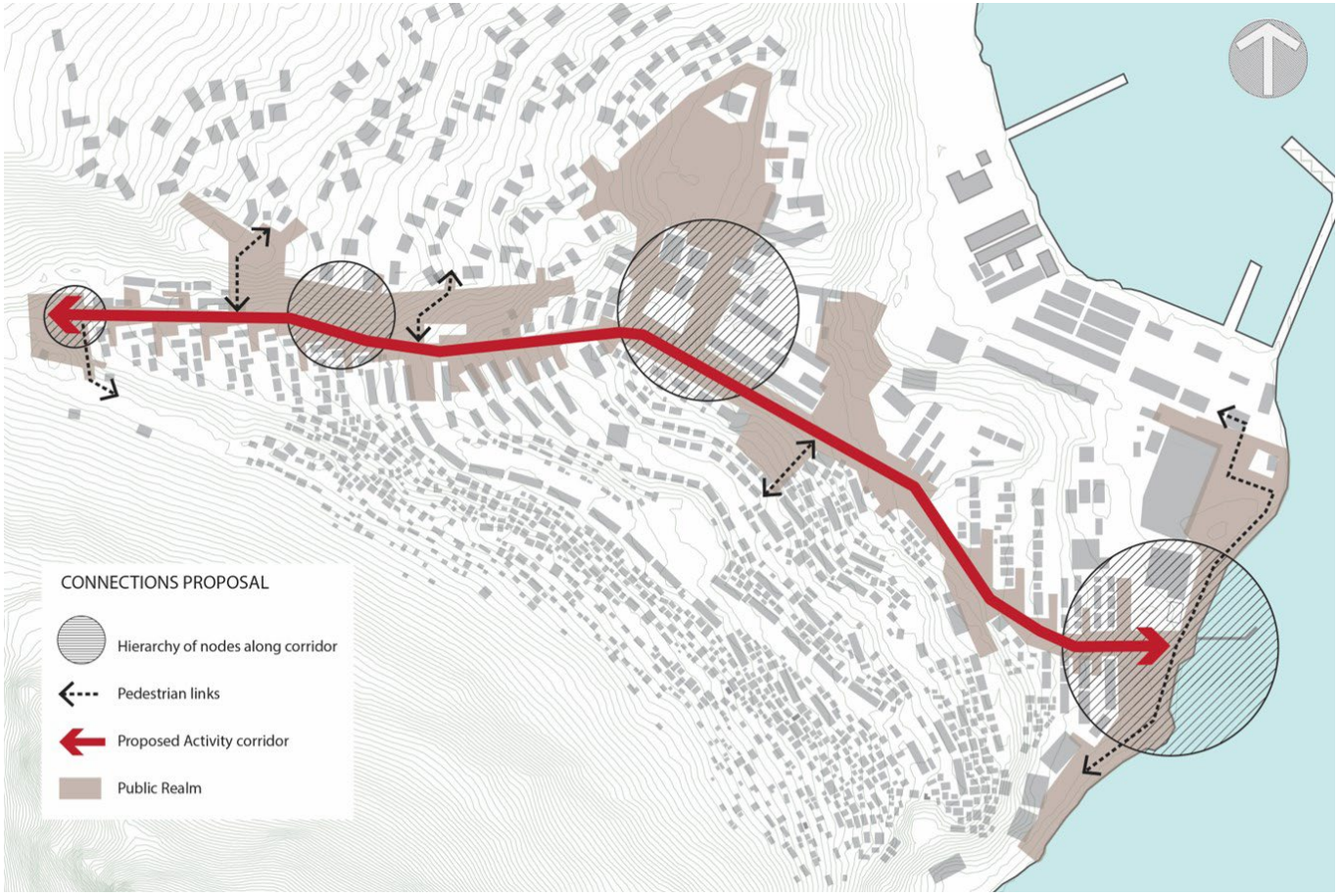



Figure 5.17: Precinct Connections (Source: Author)

## 5.8.2 PRECINCT PLACE

A network of public spaces should be created to provide adequate and equitable provision of public spaces within the corridor. These spaces should be multi-functional and be incorporated with the water system. The gateways into and out of the corridor become special places of celebration where the green corridor connects up with the harbour and fire break corridor. Landmarks and viewpoints also contribute to the legibility of these public spaces so that people can move about easily and efficiently.

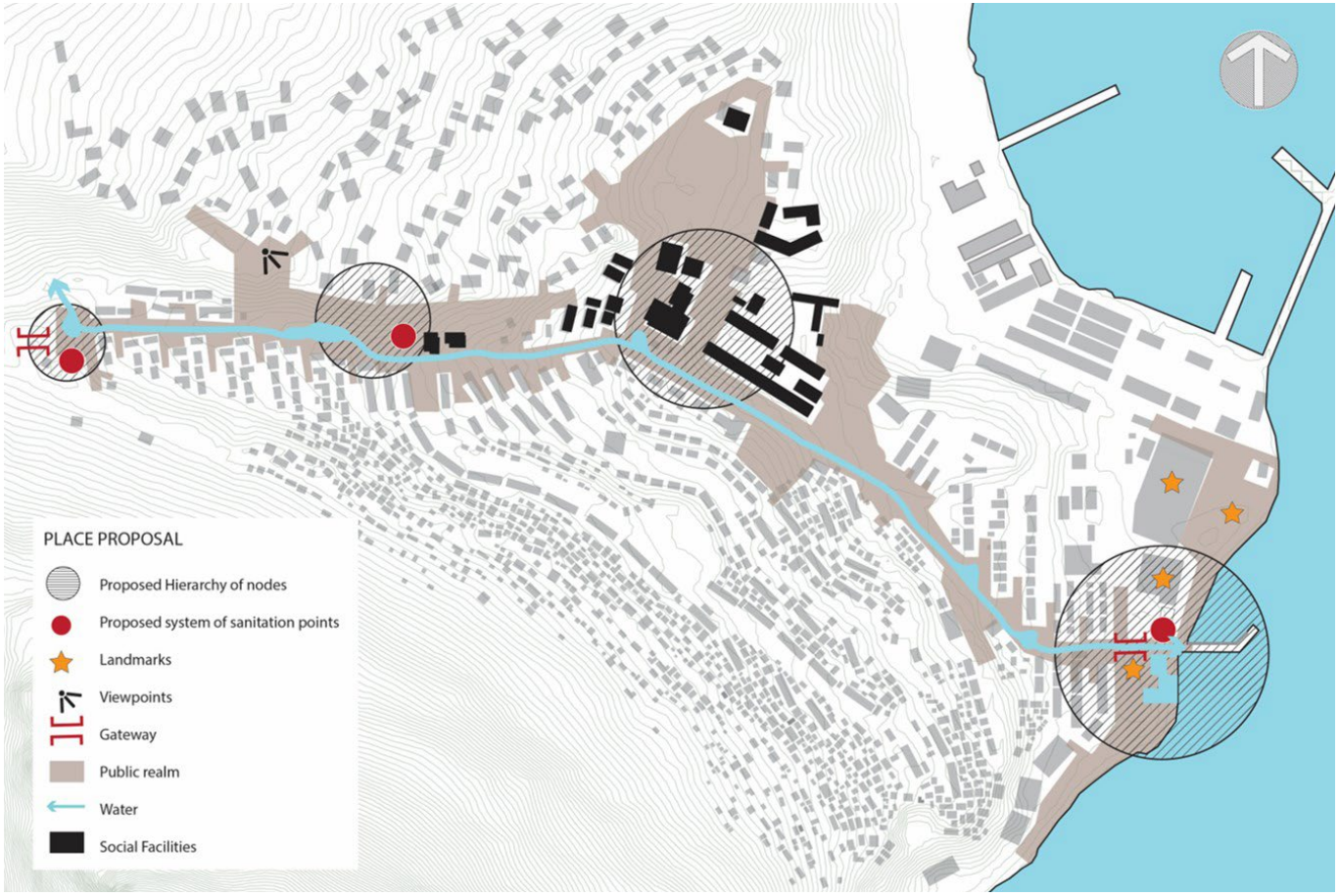



Figure 5.18: Precinct Place (Source: Author)

## 5.8.3 PRECINCT RESILIENCE

The green corridor aims to connect various ecosystems and water systems. Bioswale with planted trees and vegetation becomes a continuous feature down the corridor to the ocean that transports the water. There are points along the corridor where water is slowed down, collected and reused, this can be achieved by making use of blue/green infrastructure in these spaces. Urban agriculture is introduced at education facilities such as the existing ECD and school. Training facilities, a jetty to access the ocean and a market space also help to support the livelihoods of the local residents.


Figure 5.19: Precinct Resilience (Source: Author)

## 5.8.4 PRECINCT PLAN FOCUS AREAS

There are four identified nodes along the green corridor, namely:

SLOW node
Where different water sources coming from the mountain meet, are slowed down.

COLLECT node
To treat and collect the water entering the node to be re-used and utilised elsewhere.

REUSE node
To make use of various collected water sources for uses such as the irrigation of the proposed urban agriculture and existing sports field.

GATHER node
Focused on connection between the neighbourhood and the ocean and to provide space for recreation and enhancing livelihoods.

This section will further explore ideas and concepts for these four focus areas.

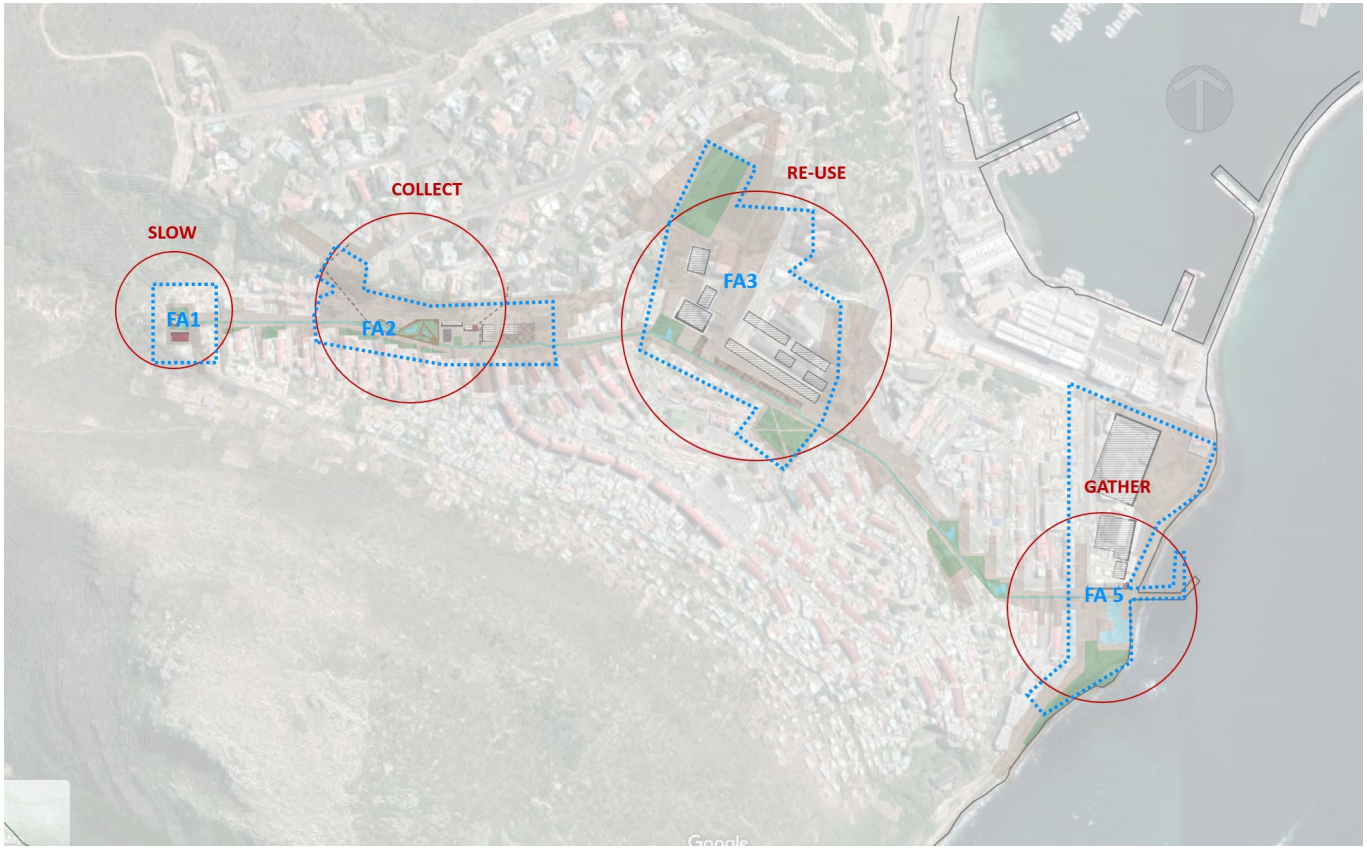



Figure 5.20: Precinct Focus Areas (Source: Author)

## 5.8.5 SLOW NODE

The watercourse running down the mountain should be re-routed so that it can run through the green corridor. The flat topography provides an opportunity to collect the different sources of water from the mountain and slowly release the water from the mountain so that it can travel down the corridor through a system of bioswales. The proposed satellite fire station will collect groundwater, which can be stored in a water tower, to be used for emergencies.

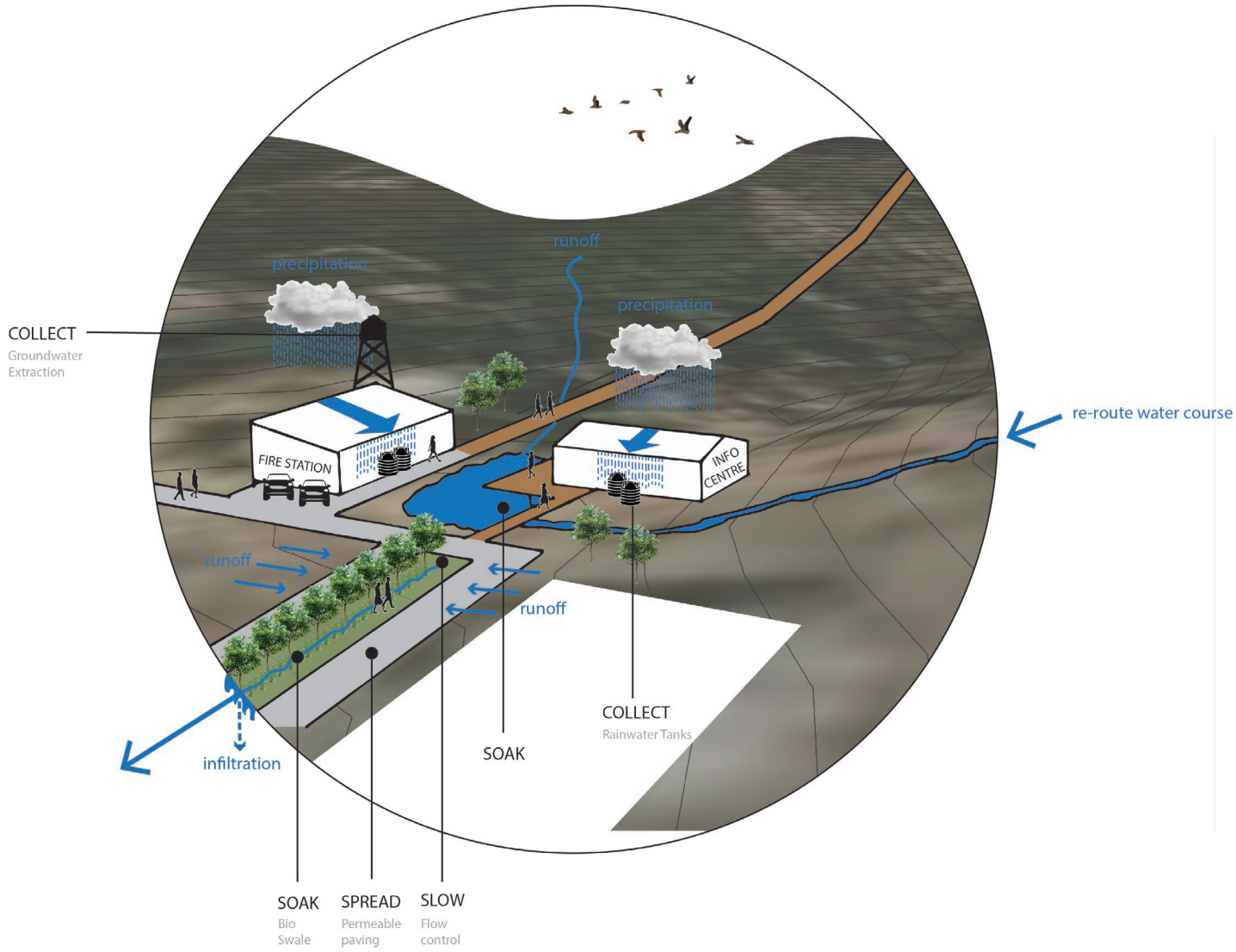



Figure 5.21: Slow node water concept diagram (Source: Author)


Figure 5.22: Slow node collage concept (Source: Author)

## 5.8.6 COLLECT NODE

Water comes into the node from the bioswale, this water is then collected and treated through a series of retention ponds which also acts as a recreation space. Water is collected in underground tanks and also at buildings such as the water tower for re-use at the proposed urban agriculture at the ECD and further down at the re-use node. Water continues to move down the corridor with bioswales.

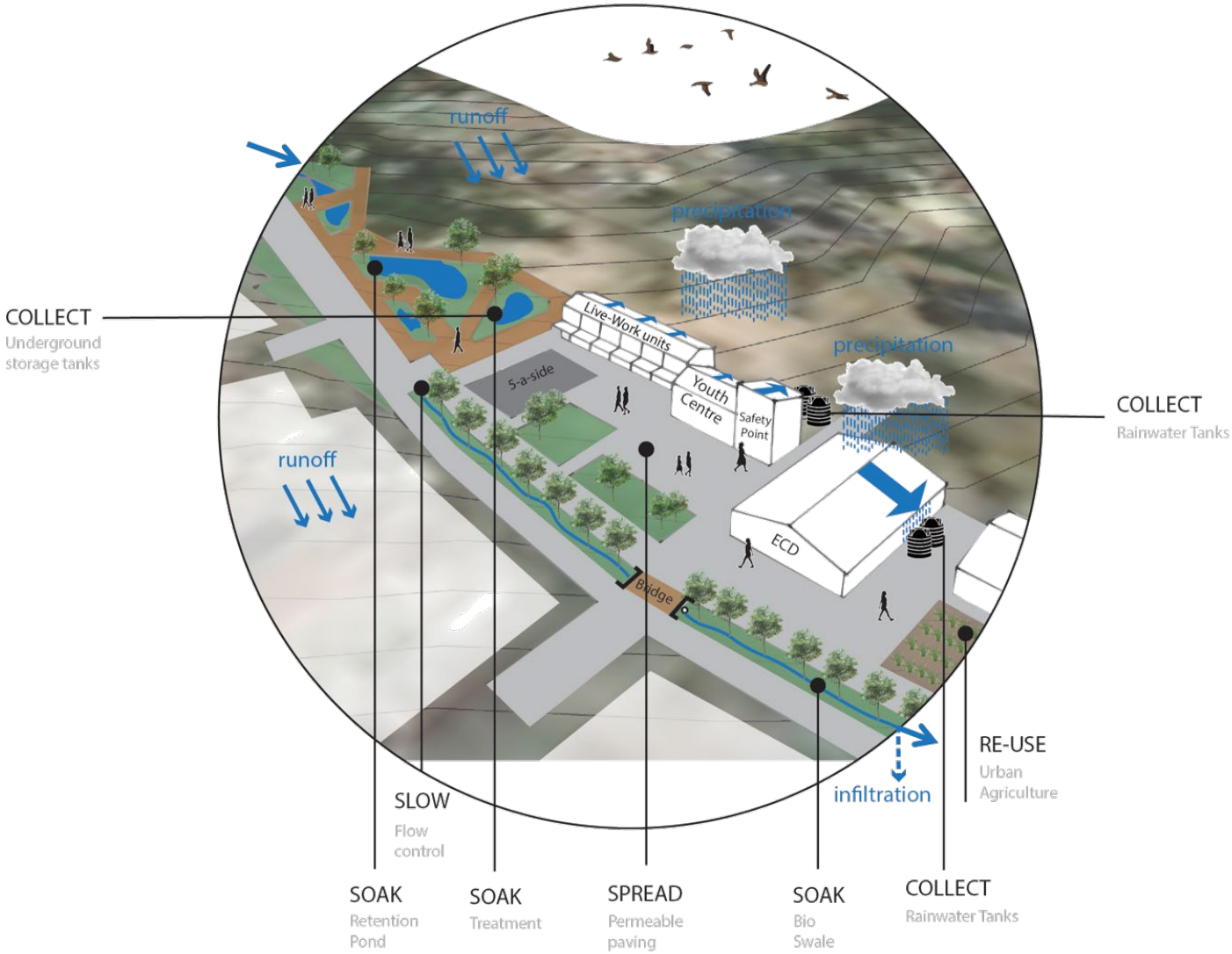



Figure 5.23: Collect node water concept diagram (Source: Author)

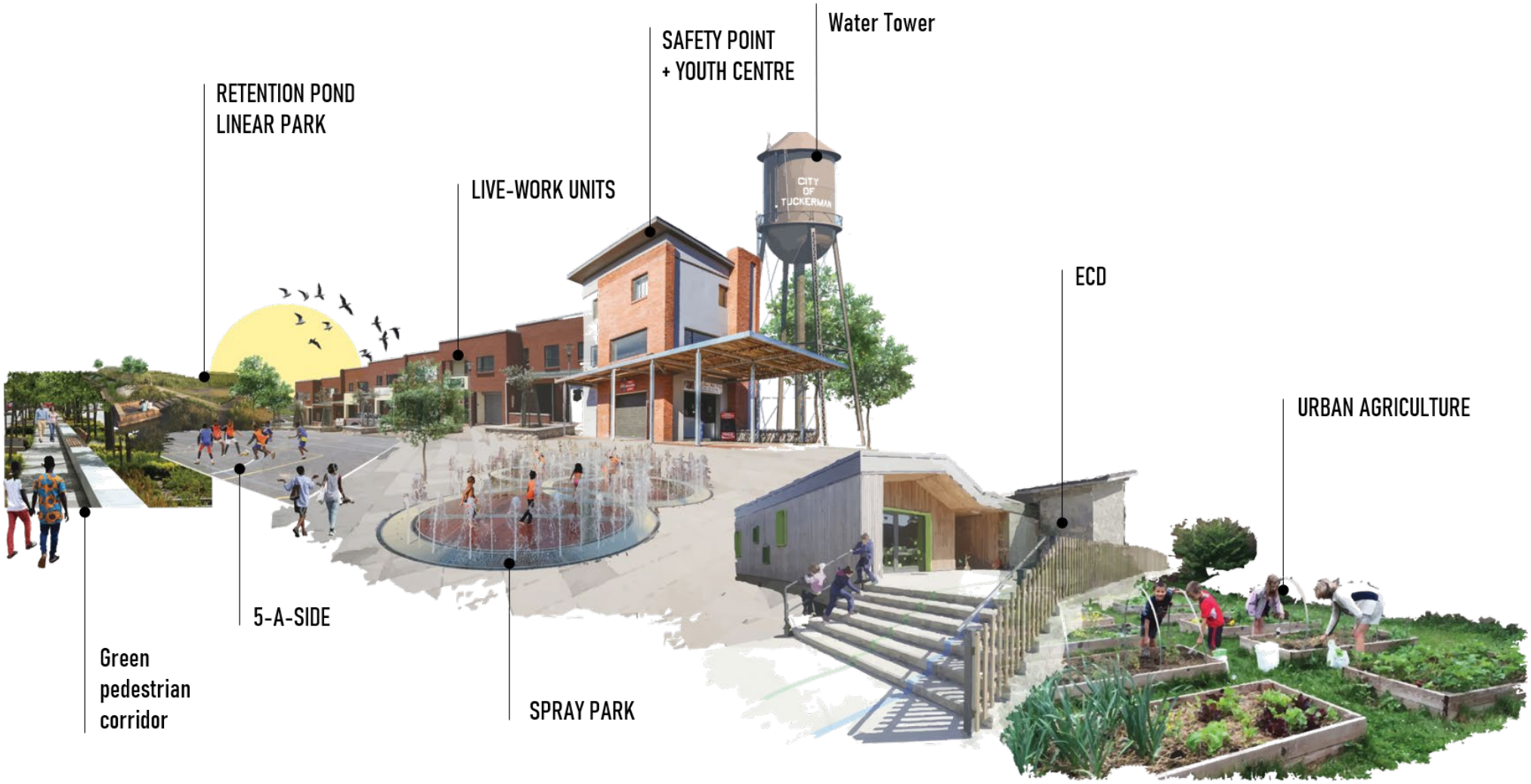



Figure 5.24:Collect node collage concept (Source: Author)

## 5.8.7 RE-USE NODE

Water comes into the node from the bioswale. Water is then directed to a detention pond to slow down and become a feature space for the amphitheatre. Water that has been collected along the corridor is reused in this node for different uses such as the irrigation of urban agriculture at the school and existing sports field. Water then continues to move down the corridor with bioswales.

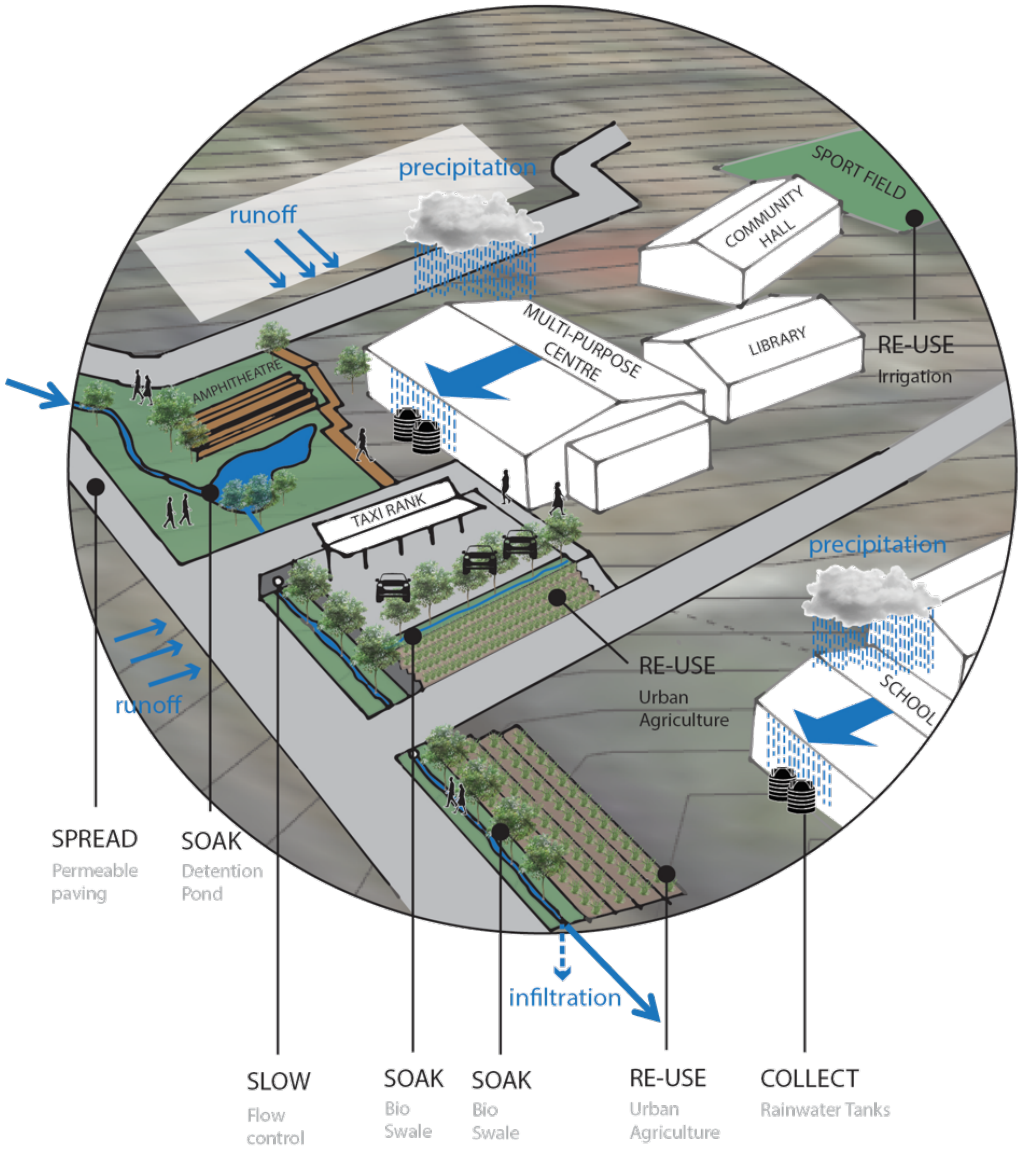



Figure 5.25: Re-Use node water concept diagram (Source: Author)

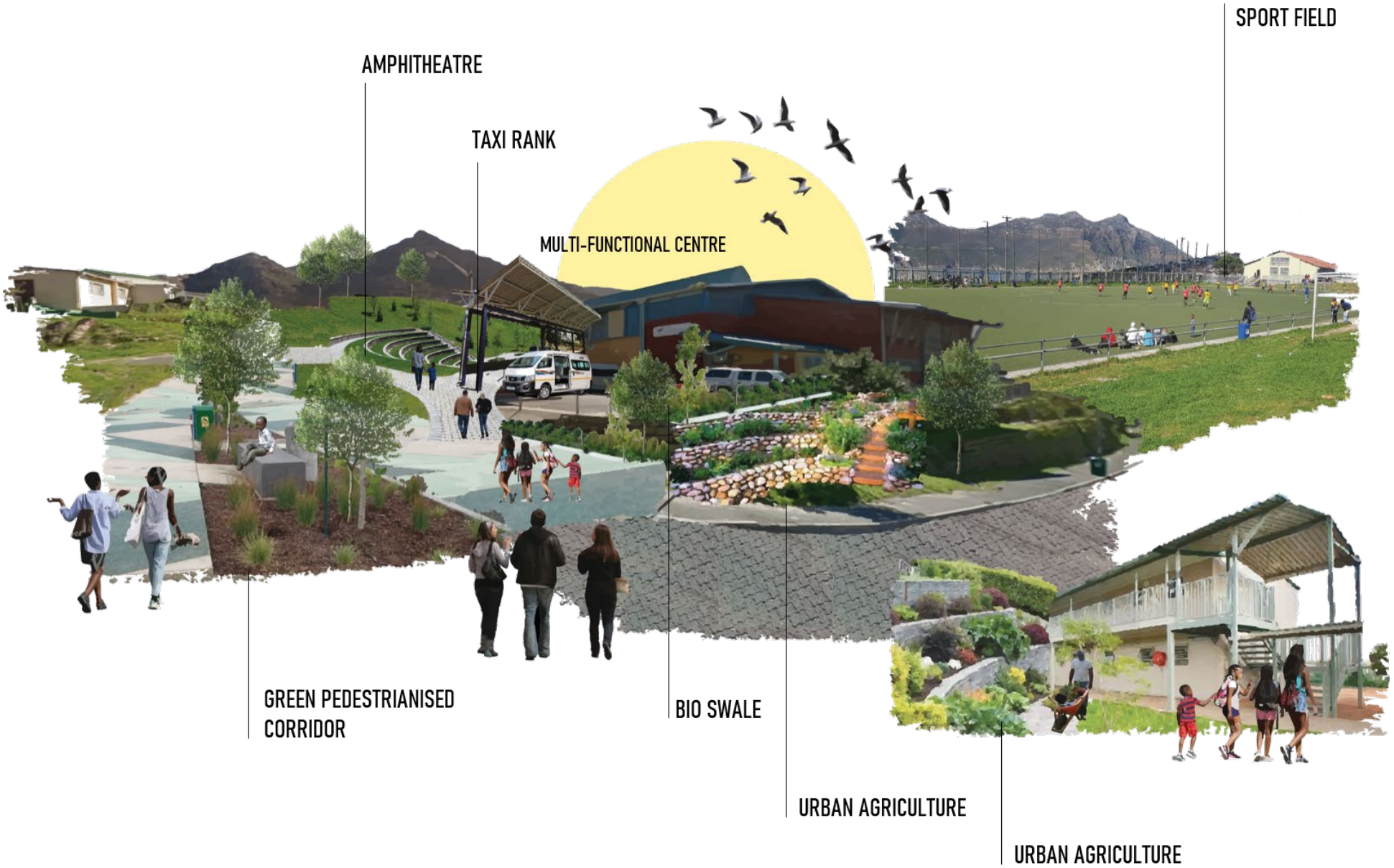



Figure 5.26: Re-use node collage concept (Source: Author)

## 5.8.8 GATHER NODE

Water comes into the node through the bioswales. The idea is that most of the water would have already be collected and reused by the time it reaches the ocean. The bioswale with planted trees and vegetation becomes a continuous feature running down the corridor and into the gather node. It is extended by a pier which provides access to the ocean for fisherman and tourists. There are recreation activities linked with the water such as a tidal pool, braai facilities and a kayak and diving centre. There is a jetty that local fisherman can use to access the ocean. The fish market provides a space where the local fishermen can sell their products and also where local farmers from urban agriculture can sell their fresh produce. It is proposed that the existing Hout Bay market should be extended out into the heritage site and also be linked with an old harbour museum at the top of the building to tell the story of Hangberg. A safety point with changing facilities should be linked with live-work units that provide additional residential and economic opportunities.

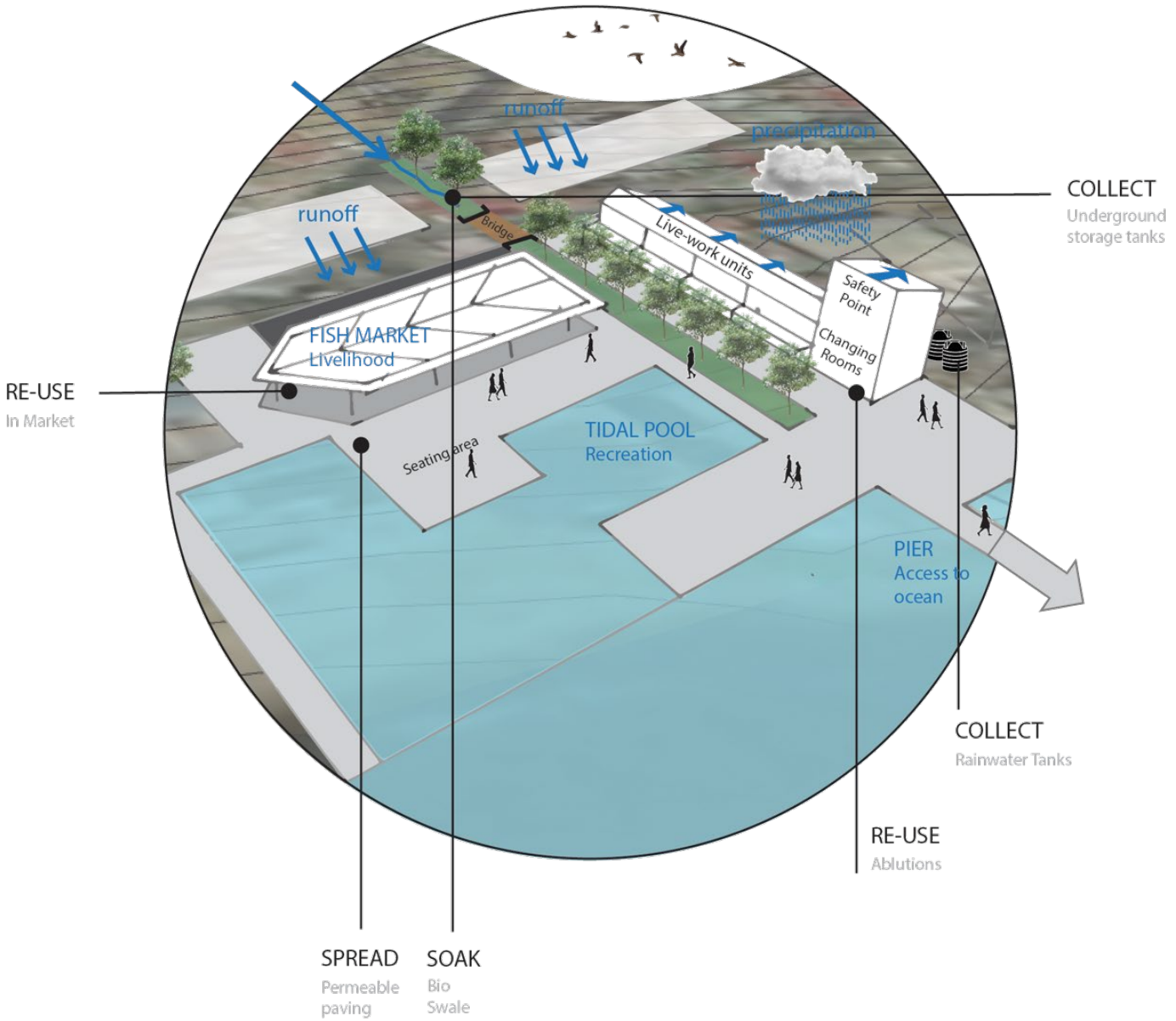



Figure 5.27: Gather node water concept diagram (Source: Author)

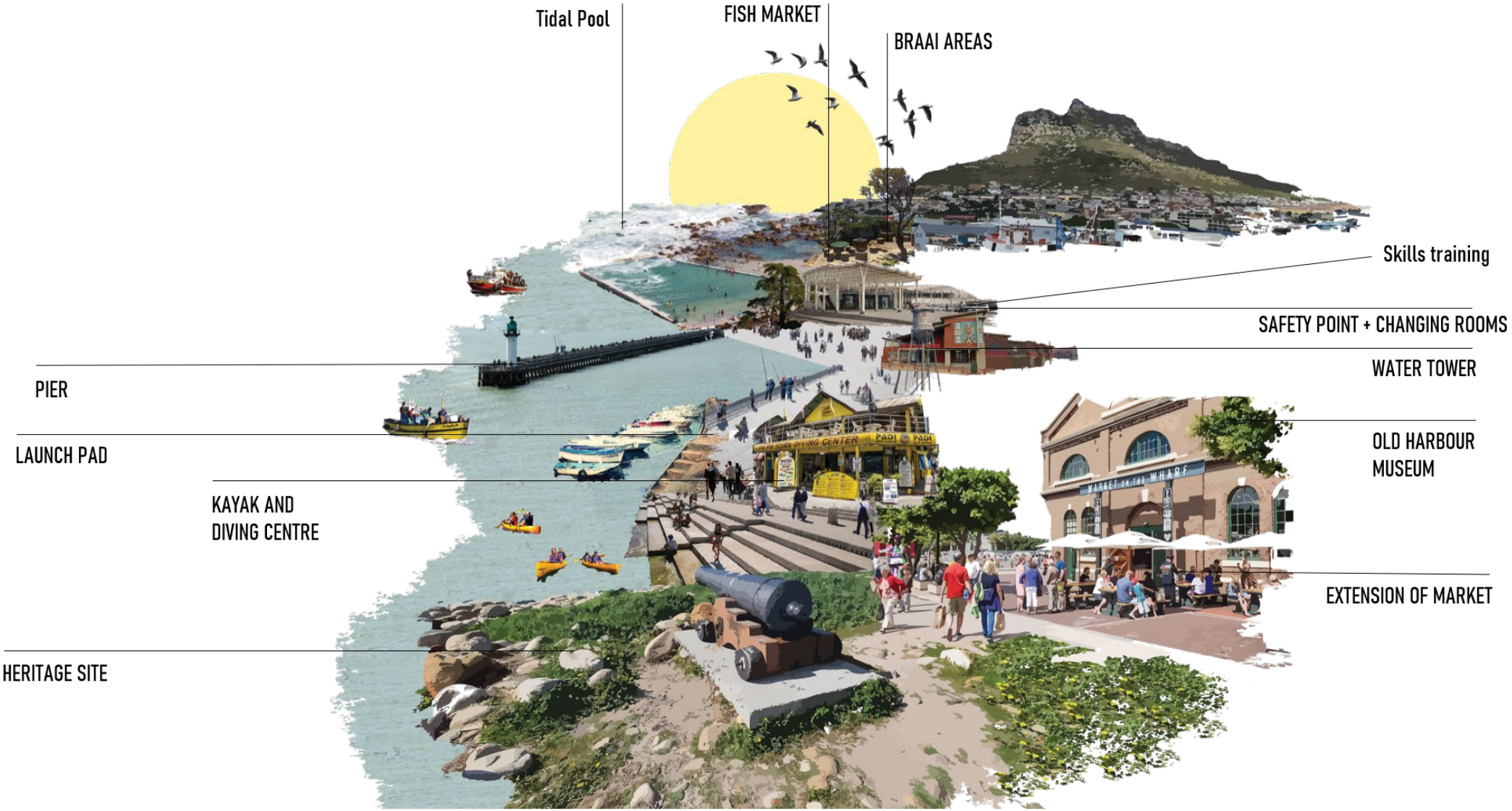



Figure 5.28: Gather node collage concept (Source: Author)

# 5.9. URBAN DESIGN GUIDELINES

## BUILT FORM

| | | |
|---|---|---|
| SAFETY POINTS | Strategically located system of safety points that act as safety beacons. The building should be 3 or 4 storey's high and have day and night occupancy for passive surveilance. |  |
| BUILDING INTERFACE ON PUBLIC REALM | Promote mixed use buildings with economic activities on the ground floor and residential above. Buildings should have balconies on the upper floors to provide passive surveilance and should positively relate to the street with doors and windows facing onto the street. Low boundary walls allowed to facilitate street surveillance and interaction. |  |
| INCREMENTAL HOUSING | Formalising housing in a phased approach where owners can improve their home as funding, time or materials become available. |  |

## LANDSCAPE ELEMENTS

| | | |
|---|---|---|
| SOFT LANDSCAPING | Use large shade trees that are suitable for the region with minimal maintenance and watering requirements. Tree cages can be used to support and protect trees against climatic conditions and vandalism. Trees to be planted as screens to protect from prevailing winds. |  |
| HARD LANDSCAPING | Use permeable paving where possible to enable infiltration of storm water and rainwater runoff to the soil. This will increase groundwater recharge, improve stormwater quality and reduce high water flows entering the water system and urban areas. eg. Pervious concrete, porous asphalt, paving stones. |  |
| PUBLIC SPACE COMPONENTS | Lighting:<br>Provide Adequate Lighting along movement routes and in public squares and sanitation blocks that are resilient to vandalism.<br><br>Bins:<br>Bins located along prominent pedestrian routes and in public spaces to avoid littering and pollution<br><br>Street furniture:<br>Location of furnishing should correspond to framework and stimulate social encounters. Make use of materials that are resilient to vandalism |  <br>  |
| FIRE BREAK | Firebreaks should be positioned and prepared in such a way as to cause the least disturbance to soil and biodiversity. These spaces should also be multi-functional and include NMT and emergency access. |  |

## WATER ELEMENTS

### SANITATION BLOCKS

Provide water and wash points and sanitation facilities. Design to have male sanitation facilities on top floor. Female, children and disabled sanitation facilities on ground floor. Caretaker on site to ensure 24hr surveillance and maintenance. Make use of rainwater tanks

### WASTE COLLECTION POINTS

Designated waste disposal points for general waste and different forms of recycling. To be located in closse proximity to sanitation block

### WATER HARVEST

Make use of water harvesting to improve water security and resileince to climate change

Rainwater harvesting
Capture and store rainwater runoff from rooftops to be reused for domestic use and rrigation.

Stormwater harvesting
Capture, store and treat water runoff from urban areas such as streets to be used as recycled water for irrugation. Make use of retention and detention ponds.

Greywater harvesting
Capture, store and treat water from sinks, dishwashers, showers etc. to be used for flushing toilets and irrigation.

### STORMWATER SYSTEM

Make use of blue/green infrastructure to create an integrated storm water system to enable the collection and filtration of water to reduce flooding, improve managed aquifer recharge (MAR) and reuse water.

Bio swales:
Make use of bioswales instead of pipes to convey and treat stormwater and to add to the aesthetic character of an area. Bio swales should be integrated with landscape features in parks and street.

Ponds:
Make use ponds for flood control, MAR and stormwater runoff treatment. Design these to be functional spaces so that when the ponds are empty they can become dynamic recreation spaces

Use retention ponds to permanently hold water from percipitation and runoff from surrounding areas. Generally retention ponds require more area than detention ponds.

Use detention ponds to hold stormwater for a short periof of time such as 24 hours. These ponds are generally only used for flood control measures and reduce runoff rates that are associated with storms and decrease flood damage.

### URBAN AGRICULTURE

Urban agriculture should include the cu;tivating, processing and the distribution of food in and around the urban area. Where the topography is steep terraced urban agriculture can be created.

## 5.10. IMPLEMENTATION PLAN

Thissection is comprised of the implementation plan for the design proposals in the precinct plan which includes the identification of catalytic projects, phasing and the various institutinal arrangements that are required to implement the design proposals.

| ACTION PLAN | 1. WATER | 2. URBAN AGRICULTURE | 3. SAFETY POINTS | 4. PUBLIC SPACES | 5. RESIDENTIAL /MIXED USE |
|---|---|---|---|---|---|
| PROJECT DESCRIPTION | Incorporate water system into corridor | Introducing urban agriculture on school grounds | Development of safety points | Create primary public spaces that can act as a multi-purpose space | Medium density residential development around public square |
| PRECONDITIONS | Rehabilitation of waterways<br><br>Introduction of blue/green infrastructure<br><br>Points of Water collection + reuse<br><br>Hosting educational events | Engagement with Schools, NGOs and interested parties<br><br>Hosting educational events<br><br>Linking produce with selling at fish market | Engagement with community<br><br>Establish management body For maintenance and upkeep<br><br>MOU between residents and CoCT | Engagement with community regarding reconfiguration or relocation of existing homes<br><br>Activation of space through various community programmes | Engagement with developers and interested parties<br><br>Engagement with WCG human settlements<br><br>Land use applications (subdivision, rezoning) |
| FOCUS AREA | FA1 – re-route water courses<br><br>FA2 – collect water<br><br>FA3 - re use water<br><br>FA4 – livelihood and recreation | FA2 – Urban agriculture integrated with ECD<br><br>FA3 – Urban agriculture integrated with School | FA1 – Safety point (linked with fire station) adjacent to info centre<br><br>FA2 – Safety point adjacent to ECD, live-work units and public square<br><br>FA4 – Safety point adjacent to Fish market and live-work units | FA1 – public space around info centre<br><br>FA2 – public space adjacent to retention pond linear park<br><br>FA3 – amphitheatre public space adjacent to transport interchange<br><br>FA4 – public space along harbour and shoreline | FA2 – 2 storey residential and live-work units<br><br>FA4 – 2 storey residential and live-work units<br>- residential above Hout Bay Market |
| PROJECT OWNER | City of Cape Town + NGO + community + Academic | Schools, NGOs, interested parties | City of Cape Town + community watch + community | City of Cape Town + community | City of Cape Town + Developers |
| IMPLEMENTING AGENT | City of Cape Town | City of Cape Town + schools | City of Cape Town | City of Cape Town | CoCT, WCG human settlements, Developers, interested parties |
| TIMEFRAME |  | | | | |

# 6. CONCLUSION

This research project intended to relook at the relationship between water and urban spaces in Hangberg to provide a solution that integrates the urban water cycle with good qualities of urban design to create a liveable neighbourhood. The research identified key challenges that residents in Hangberg are facing namely economic inefficiency, increased inequality, poor quality public spaces, inadequate services, natural disasters and environmental degradation. These challenges provided an opportunity to explore how spatial interventions, that are focused around water, could create a more liveable neighbourhood. The three strategies of connections, place and resilience that is identified in this research project aims to provide structure for decision making and identifying priority interventions. The ideas and concepts that I've presented for the Hout Bay, Hangberg and Precinct scale in this research project looks at integrating the urban water cycle, such as water supply and stormwater management with elements of placemaking to create public spaces where social interactions can take place, economic exchanges can occur and where celebrations of diversity and memory can be held.

# 7. REFERENCE LIST


Allen, A. (2009). Sustainable cities or sustainable urbanisation?. Palette UCL's Journal of Sustainable Cities, 1: 2

Austin, G. (2012). Multi-Functional Ecological Corridors in Urban Development. Spaces And Flows: An International Journal Of Urban And Extraurban Studies, 2(3), 211-228. https://doi.org/10.18848/2154-8676/cgp/v02i03/53662

Aguinaga, G. (2015). Learning from Medellin: a success story of holistic violence prevention. Retrieved from https://www.saferspaces.org.za/blog/entry/learning-from-medellin-a-success-story-of-holistic-violence-prevention

Armitage, N., Fisher-Jeffes, L., Carden, K., Winter, K., Naidoo, V., & Spiegel, A. et al. (2014). Water Sensitive Urban Design (WSUD) for South Africa: Framework and guidelines.
Ballard, R. (2014). Geographies of development III. Progress in Human Geography, 39(2), pp.214-224.

Behrens, R & Watson, V. (1996). Making urban places: Principles and guidelines for layout planning. Urban Problems Research Unit, University of Cape Town.

City of Cape Town. (2012). Southern District Plan.

City of Cape Town. (2013). Urban Design Policy.

City of Cape Town. (2019). Cape Town's Water Strategy.

CIRIA. (2013). Water sensitive urban design in the UK. London: CIRIA. Retrieved from https://www.susdrain.org/files/resources/ciria_guidance/wsud_ideas_book.pdf

CSIR. (2012). CSRI Guidelines for the Provision of Social Facilities in South African Settlements.

Dewar, D & Uytenbogaardt, R. S. (1991). South African cities: A manifesto for change. Urban Problems Research Unit, University of Cape Town.

Dewar, D & Louw, P. (n.d). Seeking qualities of urbanity through design. Unpublished manuscript.

Dewar, D. (2011). The relationship between spatial planning and transportation planning in Southern Africa and its consequences for human settlement. World Academy of Science, Engineering and Technology, 5(20): 811 - 816.

Dewar, D. Louw, P & Povall M. (2012). Spatial development framework training Materials (Module 2); constructing a terms of reference for a spatial development framework. matis. Cogta

Ehebrecht, D. (2014). The challenge of informal settlement upgrading: Breaking New Ground in Hangberg, Cape Town?. Potsdam: Universitätsverlag Potsdam.

Fisher-Jeffes, L., Carden, K., & Armitage, N. (2017). A water sensitive urban design framework for South Africa. Town And Regional Planning, 71(1). doi: 10.18820/2415-0495/trp71i1.1

Gara, F. (2020) (Forthcoming). UCT Master's Dissertation

Genius of SPACE - Langrug. FLOW - For Love Of Water. (2020). Retrieved 22 May 2020, from https://www.flow.org.za/all-causes/genius-of-space-langrug/.

Gehl, J. (2010). Cities for People. Island Press.
Genius of SPACE - Langrug. FLOW - For Love Of Water. (2020). Retrieved 22 May 2020, from https://www.flow.org.za/all-causes/genius-of-space-langrug/.

Grindley, S. (1988). Estuaries of the Cape: Synopses of available information on individual systems. Stellenbosch. Retrieved from http://file:///C:/Users/C0910208/Downloads/Estuaries%20of%20the%20Cape_29.pdf

Hangberg, Hout Bay. South African History Online. (2020). Retrieved 16 May 2020, from https://www.sahistory.org.za/place/hangberg-hout-bay.

Hamdi, N. (2010). The placemakers' guide to building community. London: Earthscan.
Jacobs, J. (1961). The death and life of the great American cities. Vintage; Reissue edition.
K
noetze, D. (2014). Hangberg: 'A view too good for poor people'. The Mail & Guardian. Retrieved 12 May 2020, from https://mg.co.za/article/2014-10-08-hangberg-on-a-knife-edge/.
Lerner, J. (2016). Urban Acupuncture. Island Press.

Jabareen, Y. (2006). Sustainable urban forms their typologies, models, and concepts. Journal of Planning Education and Research, 26(1), pp.38--52.

Lynch, K. (1960). The image of the city. The MIT press.
Payne, S. (2020). Hangberg residents protest for better living conditions. GroundUp. Retrieved 15

June 2020, from https://www.groundup.org.za/article/hangberg-residents-protest-better-living-conditions.

Resilient City. (2015). ResilientCity | Resilience. [online] Available at: http://www.resilientcity.org/index.cfm?id=11449.

Roads & Kingdoms. (2020). Hangberg Hout Bay [Image]. Retrieved 26 July 2020, from https://roadsandkingdoms.com/2016/the-abalone-poacher/hangberg-hout-bay-low-dh-8228/.

Sanya, T., Phiri, C., & Gara, F. (2019). Deliverable 3: Site Evaluation and Baseline Evaluation.

Soja, E, W. (2009). The City and Spatial Justice. Department of Georgraphy, University of California, los Angeles.

Struggle for dignity in Cape Town's informal settlements: the facts. Ismaps.org.za. (2020). Retrieved 14 June 2020, from http://ismaps.org.za/desktop.html.

The Modern History of the Hout Bay River. Houtbayheritage.org.za. (2020). Retrieved 24 May 2020, from http://www.houtbayheritage.org.za/page28.html

The World Counts. The needs of 7 billion people. (2020). from https://www.theworldcounts.com/stories/depletion-of-natural-resources.

United Nations. (2020). Sustainable Development Goals. Retrieved from https://sdgs.un.org/goals.

National Government of South Africa. (2013). Spatial Planning and Land Use Management Act. Cape Town: Government Gazette.

Nilsson, K. Pauleit, S. Bell, S. Aalbers, C & Nielsen, T. (2013). Peri-urban futures: Scenarios and models for land use change in Europe. London: Springer

Oberholzer, B. (2011). Reading the landscape: 125 notebook. Cape Town: Creda Communications.

ODI. 10 things to know about the impacts of urbanisation. (2020). Retrieved 2 November 2020, from https://www.odi.org/publications/11218-10-things-know-about-impacts-urbanisation.

Palm, K. (2020). Violent protests erupt in Hangberg after anti-land invasion operation by CoCT. Ewn.co.za. Retrieved 1 November 2020, from https://ewn.co.za/2020/09/23/violent-protests-erupt-in-hangberg-after-anti-land-invasion-operation-by-coct.

Protest in Hangberg after homes broken down by City of Cape Town. Iol. (2020). Retrieved 26 July 2020, from https://www.iol.co.za/capeargus/news/protest-in-hangberg-after-homes-broken-down-by-city-of-cape-town-50101665.

Turok, I. (2014). Medellín's 'social urbanism' a model for city transformation. Retrieved from https://mg.co.za/article/2014-05-15-citys-social-urbanism-offers-a-model/

United Nations, Department of Economic and Social Affairs. (2014). World Urbanization Prospects: The 2014 Revision, Highlights. New York: United Nations.

United Nations. United Nations Sustainable Development. (2020)., from https://www.un.org/sustainabledevelopment/cities/.

Water Sensitive Design. Future Water. (2020). Retrieved 14 June 2020, from http://www.futurewater.uct.ac.za/FW-wsd.

Wang, L. (2020). How the Cheonggyecheon River Urban Design Restored the Green Heart of Seoul. Inhabitat. from https://inhabitat.com/how-the-cheonggyecheon-river-urban-design-restored-the-green-heart-of-seoul/.

What is a catchment?. Georges Riverkeeper. (2020). Retrieved 22 May 2020, from https://georgesriver.org.au/learn-about-the-river/what-catchment.

World Landscape Architecture. (2019). Weiliu Wetland Park | Xianyang, China | Yifang Ecoscape. [online] Available at: <https://worldlandscapearchitect.com/weiliu-wetland-park-xianyang-china-yifang-ecoscape/#.X3hwWWgzZPY>.

Vaughan, S. (2017). Towards the Management of Territorial Forces in Hout Bay [Image]. Retrieved 20 May 2020, from https://sashavaughan.wordpress.com/2017/06/07/towards-the-management-of-territorial-forces-in-hout-bay/.

# APPENDIX 1: PLAGARISM DECLARATION

UNIVERSITY OF CAPE TOWN • FACULTY OF EBE • SCHOOL OF ARCHITECTURE PLANNING + GEOMATICS

## *PLAGIARISM DECLARATION*

I, Mari Smith, student number BTHMAR033, hereby acknowledge that;

1. Plagiarism is wrong. Plagiarism is to use another's work and pretend that it is one's own.
2. I have used the APA style convention for citation and referencing.
3. Each contribution to and quotation in, this research project from the work(s) of other people has been attributed, and has been cited and referenced.
4. This research project is my own work.
5. I have not allowed, and will not allow, anyone to copy my work.

Signature: 

Date: 8-01-2021

# APPENDIX 2: ETHICS APPROVAL



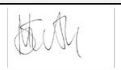
## ETHICS APPLICATION FORM

**Please Note:**
Any person planning to undertake research in the Faculty of Engineering and the Built Environment (EBE) at the University of Cape Town is required to complete this form **before** collecting or analysing data. The objective of submitting this application *prior* to embarking on research is to ensure that the highest ethical standards in research, conducted under the auspices of the EBE Faculty, are met. Please ensure that you have read, and understood the **EBE Ethics in Research Handbook** (available from the UCT EBE, Research Ethics website) prior to completing this application form: http://www.ebe.uct.ac.za/ebe/research/ethics1

| **APPLICANT'S DETAILS** | | |
|---|---|---|
| Name of principal researcher, student or external applicant | | Mari Smith (BTHMAR033) |
| Department | | EBE |
| Preferred email address of applicant: | | bthmar033@myuct.ac.za |
| If Student | Your Degree: e.g., MSc, PhD, etc. | Masters in Urban Design (MUD) |
| | Credit Value of Research: e.g., 60/120/180/360 etc. | 60 |
| | Name of Supervisor (if supervised): | Kathryn Ewing |
| If this is a researchcontract, indicate the source of funding/sponsorship | | Funding from Water Research Commission |
| Project Title | | Creating water sensitive places: Using a water sensitive urban design approach to transform Hangberg into a liveable neighbourhood |

**I hereby undertake to carry out my research in such a way that:**

- there is no apparent legal objection to the nature or the method of research; and
- the research will not compromise staff or students or the other responsibilities of the University;
- the stated objective will be achieved, and the findings will have a high degree of validity;
- limitations and alternative interpretations will be considered;
- the findings could be subject to peer review and publicly available; and
- I will comply with the conventions of copyright and avoid any practice that would constitute plagiarism.

| **APPLICATION BY** | Full name | Signature | Date |
|---|---|---|---|
| **Principal Researcher/ Student/External applicant** | Mari Smith |  | 19/05/2020 |
| **SUPPORTED BY** | Full name | Signature | Date |
| **Supervisor (where applicable)** | Kathryn Ewing |  | 25/05/2020 |

| **APPROVED BY** | Full name | Signature | Date |
|---|---|---|---|
| **HOD (or delegated nominee)** Final authority for all applicants who have answered NO to all questions in Section 1; and for all Undergraduate research (Including Honours). | p.tumubweinee |  | 19 July 2020 |
| **Chair: Faculty EIR Committee** For applicants other than undergraduate students who have answered YES to any of the questions in Section 1. | | | |

# APPENDIX 3: INTERVIEW CONSENT FORM

**UCT School of Architecture, Planning & Geomatics**
**Postgraduate Masters of Urban Design (MUD)**

**CONSENT FOR A PARTICIPANT TO BE INTERVIEWED FOR THE PURPOSE OF RESEARCH**

Research project title:

Creating water sensitive places: Using a water sensitive urban design approach to transform Hangberg into a liveable neighbourhood

Purpose of research project:

To relook at the relationship between water and urban space in Hangberg to provide a solution that integrates the urban water cycle with good qualities of urban design to create a liveable neighbourhood.

Hello, my name is Mari Smith and I am studying the neighbourhood of Hangberg as part of my Masters of Urban Design at the University of Cape Town. Thank you for agreeing to be interviewed as part of the above research project. This consent form is necessary for me to ensure that you understand the purpose of your involvement and that you agree to the conditions of your participation.

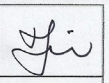
By signing this form you agree that:

1. You are voluntarily taking part in this research. You understand that you don't have to take part and that the interview can be stopped at any time;
2. You agree to this interview being recorded;
3. The questions that are asked are for education and research purpose and do not benefit you or your community;
4. The information which is gathered will be used for a research project and may be published in academic journals or exhibitions;
5. The research data will be stored safely for future use;
6. A copy of this form can be requested.

**Permission:**

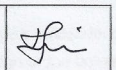
1. Do you agree to be interviewed, to contribute to this research?

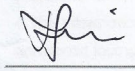
*Please initial next to the statement that you agree with:*

| | |
|---|---|
| Yes I do |  |
| No I do not | |

2. Do you give permission for your name to be used as a source of information in this research?

*Please initial next to the statement that you agree with:*

| | |
|---|---|
| Yes I do |  |
| No I do not | |

| **Participant** | **Student** |
|---|---|
| TONI THONGO | |
| Name | Name |
|  | |
| Signature | Signature |
| 30-08-2020 | |
| Date | Date |

Contact Information

If you have any further questions or concerns about this interview, please contact:

Name of student: Mari Smith
Cell: 079 5296 085
E-mail: bthmar033@myuct.ac.za