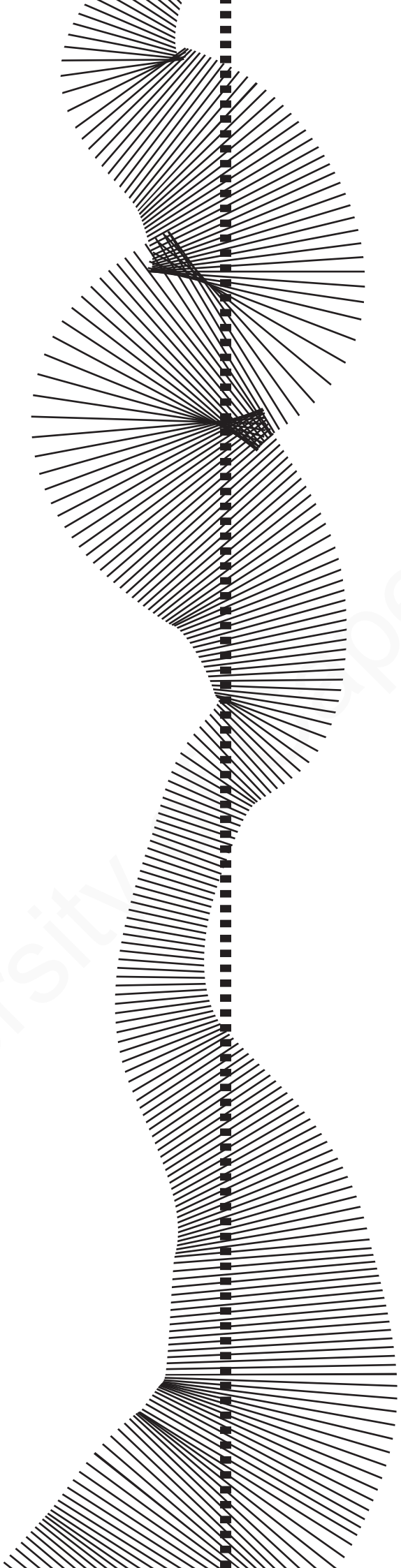

TRANSURBANCE: a walk about the river
Matthew Mills

Transurbance: a walk about the river

Matthew Mills

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

October 2015

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ABSTRACT

This dissertation aims to address the particular social, economic and environmental issues that exist within our industrial landscape. The cities in which we live are designed to be technically enhanced but consist of functionally isolated systems that bear no relevance to the living environment. These infrastructural systems fragment our cities with linear barriers, where only functionality is measured; rivers are canalised, transport systems such as highways and railway lines separate the city from the ocean, and large industrial buildings bear no relationship to their surroundings, whilst polluting their context. The results are social and environmental disjunctions within our city.

Paarden Eiland is an area that exemplifies a disconnected and disjointed environment. The particular focus of this dissertation is on a portion of the Salt River, which runs through Paarden Eiland and reaches its mouth surrounded by industrial factories. The solution that emerged consists of a long linear path that moves over and under transport barriers such as highways and railway lines, utilising the often dead residual spaces to provide a pedestrian connection to the shore. The path is continuous and unbroken but through its use of organic folds, it creates moments in which observation, interaction, play and discovery can take place. This constructed path forms a weir in the river, bringing floating debris to a recycling centre, where it can be re-purposed into usable components that restore the river.

Through a close reading of existing site conditions, the architecture attempts to merge landscape, building and infrastructure into one, in order to create a new architecture that is intricately connected to its site and its users. This architecture plays with the definitions of the man-made and the natural, creating a design that can rehabilitate the environment, and illustrate the destruction man has wrought on nature. It is my belief that the design will be able to shift its users' understanding of the environment, to one where technology and nature can exist not only harmoniously but also symbiotically.

CONTENTS

INTRODUCTION

The world in which we live is shaped by the pressures of industry, where man's attempt to increase profitability and prioritise output, results in bridges, highways, railways lines, canalised rivers and enormous factories that create linear barriers, which divide up our landscape. These barriers result in uninhabitable and isolated spaces where industry is prioritised at the expense of people's connection to their environment and one another.

Paarden Eiland is an example of an industrialised landscape that emphasizes industry and disregards the human and natural elements. The Salt River, which runs through the area, is canalised, heavily polluted and pedestrians are unable to reach its mouth at the Atlantic Ocean. The Zoarvlei wetland that used to connect to the river, now lies isolated and pollution is affecting its biodiversity. Roads and bridges for vehicles as well as industrial factories take centre stage in Paarden Eiland, resulting in minimal pedestrian activity.

This dissertation attempts to address these challenges that Paarden Eiland poses. We cannot remove the existing industrial landscape but architecture can endeavour to repair the disjuncture created by industria. Therefore the design itself makes the problem evident and follows the path of the river to the ocean, its rib like structure and intricate folding systems emphasizing an organic movement with the environment. Reconnection is pivotal, with the reconnection of Zoarvlei and Salt River as the starting point of the project. Connected to this, is the emphasis on pedestrian usage and allowing pedestrian access to the water's edge.

Central to the dissertation is the rehabilitation of the natural environment, therefore the architecture focuses on the channeling of the waste from the river to a central recycling centre where it can be reused and repurposed into components that restore the river. Imperative to this process is the human element, whereby the users of the space are made explicitly aware of the process through constant visual connections of the waste collecting and recycling. This channeling process is facilitated by the linear path of the architecture, forming a weir along the river. Paths are integral to the project, in particular paths for pedestrian usage. The act of walking through an industrial landscape is emphasized by the formation of paths that not only connect users to the building and environment but also attempt to provide spaces for play, discovery and relaxation.

This dissertation attempts to create an architecture that merges landscape, building and infrastructure, in order to create a new architecture that is intricately connected to its site and its users.

fig 1. Photo montage of Transurbance.

Transurbance

"Transurbance is a mode of critical walking. It is like an erratic journey, a sort of pre-architecture of the contemporary landscape. In the transurbance, walking is both a mode of expression and a useful instrument for learning about the on-going social and morphological transformations in cities. It is the interpretation of the present city from the point of view of roaming seeing inside the wrinkles of the city." (Wiley, 2008; Careri, 1966)

Transurbance was developed by a group of urban activists called 'Stalker' in 1995. Stalker are a group of architects and researchers connected to the Roma Tre University, who engaging in actions to create self-organised spaces and situations.

Never before has the impact of man on this earth been so important.

INDUSTRY

Industrial Revolution

The Industrial Revolution took place over the 18th and 19th centuries and was an era that marked an important transition in technological developments. The concept behind the Industrial Revolution was that an efficient, functional city could be designed that would revolutionise all cities (Kirkwood, 2001:126). However, it also altered the human relationship with the earth, whereby the desire for 'progress' was emphasised and technology was always seen as the answer (Kirkwood, 2001:126). It led to the notion that the earth was a reservoir ripe for extraction and could absorb all of humankind's waste (Kirkwood, 2001:126). Part of this destruction was the building of costly projects that required nature to adjust for the benefit of man (CCT, 2011). As industry displaced agriculture, so too did the mechanistic view of the universe begin to displace the idea of nature as organic (Kirkwood, 2001:126). Land was viewed as only a commodity and therefore environmental degradation began to escalate, with the sky and water becoming visibly polluted.

Modernist city

Following in the footsteps of the Industrial Revolution was the concept of modernist planning. It was shaped by an increase in the world of industry, and innovations in transportation systems. One of the foundations of modernist planning was the idea that a city needs to be planned with purely functionality in mind. This mentality resulted in a loss of connection between man and nature, contributing to Stanford Anderson's belief that, "Functionalism is a weak concept. It has dulled our understanding of theories and practices in modern architecture," (Anderson, 1987:19). Thus the Industrial Revolution and modernist planning did not only impact on the environment but also on society.

fig. 2. Photo montage of the industrial revolution.

Social Disconnection

One of the most influential effects from the constantly evolving manufactured environment is the increase in social disconnection. The slow shift from an industrial to a semi post-industrial era has caused both economic and social changes, and resulted in our cities becoming more service based (Hamnett, 2003:211). The Industrial Revolution saw an increase in the overall labour market, thus also increasing manual jobs (Hamnett, 2003:211). The post-industrial era has conversely led to a decrease in the labour market, thus manual jobs are also decreasing (Hamnett, 2003:211). This has a direct effect on poorer communities for whom manual work is often the only option for employment as to be employed in more skilled labour would require a qualification from a tertiary institution, which is prohibitively expensive and securing a place in a college or university is difficult especially for people who have problematic home and schooling environments (Hamnett, 2003:211).

South Africa is an incredibly diverse country whose past has been marred by both oppression and discrimination under the legacy of Apartheid. This system led to the exclusion of black, coloured and Indian people, meaning that they were treated as inferior to white people. One of the outcomes of Apartheid was the forced removals of many communities to less desirable areas on the outskirts of cities. This created social stratification, emphasising the gap between the rich and the poor. These socio-economic divides formed a hierarchy whereby the poor were relegated to particular areas and the wealthier, to others. In Cape Town, this social stratification was overwhelmingly obvious with the wealthier white areas concentrated around the famed Table Mountain and along the picturesque coastline where amenities were taken for granted. Whilst the mostly poorer black, coloured and Indian population were made to live on the outskirts of the city in what were often terrible conditions. This social stratification is no longer government policy but the after effects can still be felt due to the fact that poorer citizens are still very much relegated to the less desirable outskirts of the city.

In today's society all citizens should have the right to live in aesthetically pleasant and functional landscapes (Hamnett, 2003:211). But when the environment around a certain community deteriorates, very often the community does as well. For example, if harmful chemicals and toxic wastes are discarded into the environment, the area becomes polluted and uncontrolled. This can significantly reduce the public interest as well as care towards the area, and cause severe health problems to its occupants (Loures & Burley, 2012).

fig. 3. Photo montage of social disconnection.

People's interest and care towards a certain area depends mainly on two factors, firstly the way in which a certain landscape fulfills their needs and desires, and secondly the way in which people experience and use the landscape (Loures, & Burley, 2012:224). Subsequently, environmental degradation creates an undesirable landscape that can, in turn, produce a downward spiral effect that results in health, social and economic problems for the community living in the area (Hamnett, 2003).

Another issue related to social disconnection is the often conflicted relationship between private and public. The industrial landscape comprises of mostly large buildings that bear no relationship to their surrounds; they are built purely with functionality and performance in mind. While this outlook prioritises economic performance, it very often neglects the social and environmental impact that the building may have on the community and the environment in which it is constructed.

fig. 4. Photo montage of private vs public.

NATURE

Environmental Degradation

The development of the industrial city has had a direct effect on the environment. Industry is dramatically polluting vast areas of the globe. Industrial buildings show no connection between outside and inside spaces. Large boundary walls separate man from nature. Natural systems such as rivers are deemed less important and often ignored, merely becoming the backyard spaces (CCT, 2013). Furthermore, factories pollute the environment with their harmful chemicals and toxic waste that are disposed into natural bodies of water. Here, it is evident that nature is viewed as insignificant when placed up against humankind's needs.

Infrastructure

We have many needs, and infrastructure is one of the most important. Infrastructure provides services such as transportation that give order and functionality to a city. Infrastructure also addresses some of the most basic requirements of man, such as running water, a reliable supply of electricity, adequate plumbing and transport services. However, infrastructure has a distinct series of barriers and boundaries that it creates, which influence both society and the environment (Benosky & O'Rourke, 2012). It has the power to divide our city into discontinuities and fragmentations, prohibiting movement and access, which in turn contributes to spatial separation.

We design infrastructure and machines of production that connect us with elaborate forms of concrete and steel, but we disregard the urban waters that we contaminate and submerge into storm water networks to eliminate their seemingly problematic presence (Weiss, 2014:131). Our industrial society produces vast quantities of wasteful products that end up polluting natural water networks. This can be a result of isolated engineering systems that are made to perform a singular task, at maximum structural efficiency, and do not relate to the city's context as a whole.

Infrastructure has its importance and functionality, but it divides the world into natural and artificial, healthy and unhealthy, beautiful and ugly (Latz, 2014). The result is a strong disconnect between people and place, as well as man and nature.

fig. 5. Photo montage of infrastructure.

1. Paarden Eiland
2. Zoarvlei
3. Brooklyn
4. Rugby
5. Marine Drive
6. Railway line
7. Beach
8. Koeberg road
9. Salt River

SITE

From my initial interest into the effects that our industrial city has on its lived environment, I became interested in exploring the industrial areas that border the outskirts of Cape Town's Central District. This led me to focus on the Table Bay district, in particular Paarden Eiland and Milnerton South, which is a diverse and often disregarded area that boasts much hidden potential. This hidden potential includes a large stretch of open coastline, railway lines, bicycling paths, a new MyCiti bus route, spectacular views of Table Mountain, numerous sporting activities, and a diverse system of rivers and wetlands, meaning that it could make the ideal destination for regeneration. However, the area is currently facing huge issues of social, economic and environmental degradation that are particularly evident around the industrial zone of Paarden Eiland. The area is in dire need of an architectural invention that reconnects and revitalises the relationship between people and place.

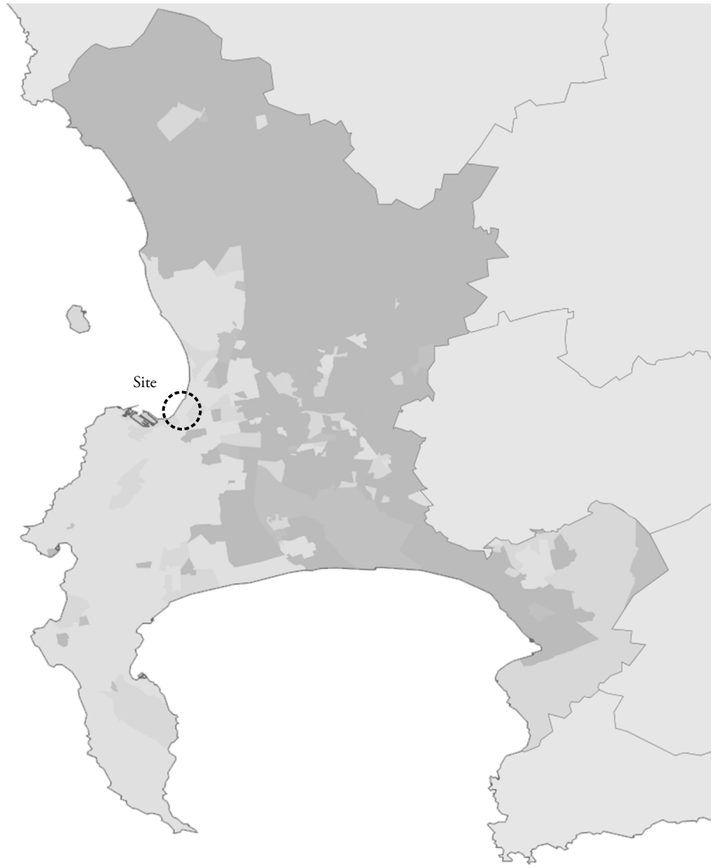


fig. 6. Up. Map of Cape Town identifying Paarden Eiland.
fig. 7. Left. Map of Paarden Eiland.

fig. 8. Klein Zoar, the historic cottage on the edge of the vlei, built in 1710 and reputedly the home of folk hero Wolraad Woltemade. It was originally separated from Paarden Eiland by a wide stretch of water, where fish were caught on a daily basis.

fig. 9. Aerial photograph shows the development of the old Marine Drive highway, and the adjacent approaching coastline.

History of Paarden Eiland

Before the evolution of the industrial zone of Paarden Eiland, the site was historically a flourishing wetland wilderness. Paarden Eiland was once recognised as a secluded island separated from the mainland by a tributary from Salt River (Baker, 2010). The site hosted a diverse range of wildlife including hippopotamus that roamed the river, and it was during Jan van Riebeek's time, around the 17th century, that there are frequent references in his dairies of the site being used as a hunting ground (PECID, 2015). Hence the name Paarden Eiland meaning 'island of horses' dates back to the days when the Dutch East India Company owned the land (Baker, 2010).

Nevertheless, due to the raging Cape's Northwest storms in winter, the area quickly became regarded as a dangerous and hazardous region, and became the graveyard of between 80 and 100 sailing ships (PECID, 2015).

From initially being a wilderness region, it soon gave way to agricultural land (Paarden Eiland). Maps from around 1785 show well-defined farms, which were home to horses, cattle and sheep, with crops located on the higher ground (PECID, 2015). The river was used regularly by fisherman and smugglers found it as a good route for the trafficking of illegal cargo of contraband brandy. According to the inhabitants at the time, the water in the river was so clear you could see the bottom (Baker, 2010).

The important shift from agriculture to industry came about through the discovery of blue muscle shells that were washed up on the beach and contained lime. Some of the first lime kilns were then built, using scraps of washed up timber from shipwrecks as fueling agents, thereby demonstrating an early exercise in recycling. This generated the beginnings of an industry that saw the expansion of wheat milling, drying fish and salt production (PECID, 2015).

In 1916 the construction of Marine Drive highway began, in order to provide a gateway connection to and from Cape Town's harbour and up the West Coast. Due to the area being a wetland, it was not uncommon to see sand and seaweed lying on the road caused by flooding from the sea (PECID, 2015).

Paarden Eiland was only actively proclaimed as an industrial area in 1935, which would act as a support business zone for the adjacent port industry. Land was originally sold for as little as 4 ½ pence per square foot, and later around 1968, it was traded at R1.50 (PECID, 2015). After World War II, larger industrial areas such as Epping and Bellville opened up. Due to Paarden Eiland's strategic location close to the sea, land values were three times higher than other industrial land such as Epping and Bellville, which inevitably attracted the larger enterprises away from Paarden Eiland (CCT, 2013). This then resulted in an expansion of smaller production enterprises within

fig. 10. Old locomotive steam trains at Paarden Eiland in 1976.

fig. 11. Dredging for the canalisation of the Black River.

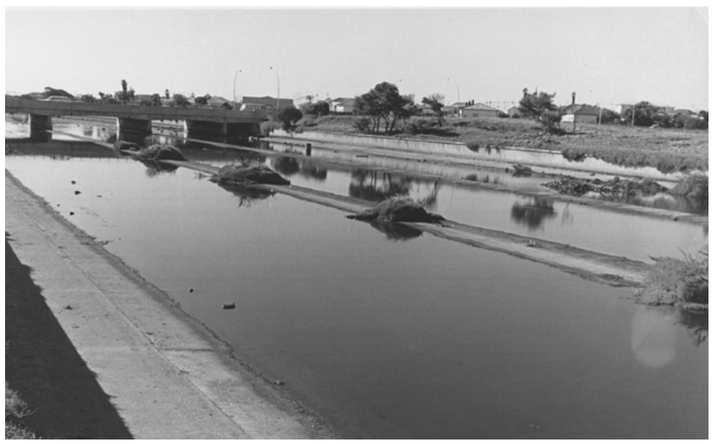


fig. 12. The canalised Black River.

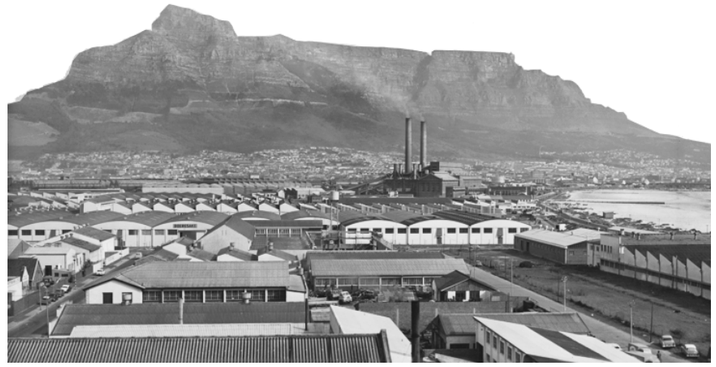


fig. 13. The industrial zone of Paarden Eiland with Table Mountain in the background.

Paarden Eiland that had little or no connection to the port. This has since promoted both commercial and retail industries; some of which are under sectional title ownership. Today, a variety of businesses are thriving, from car manufacturing, steel engineering, textile production, foundries, bakeries, hides/skin wool stores, to retail shops selling goods such as new and used furniture, cold meat storage, liquor, plumbing and bathroom fittings (PECID, 2015). Professional services of banks, attorneys, doctors and estate agents are also offered in Paarden Eiland. Now the next shift means progressing towards the entertainment sectors where even restaurants, pubs, takeaways, modeling and nightclubs are starting to develop from underutilised and abandoned warehouses and factories.

It is clear that Paarden Eiland has served the economic needs of the population around Cape Town for many years. However, through this progress from wild veld, to agriculture, to industry, to commercial, to retail and now entertainment, it has always been the human desire to 'progress' that has been prioritised, which has resulted in a loss of connection between man and nature.

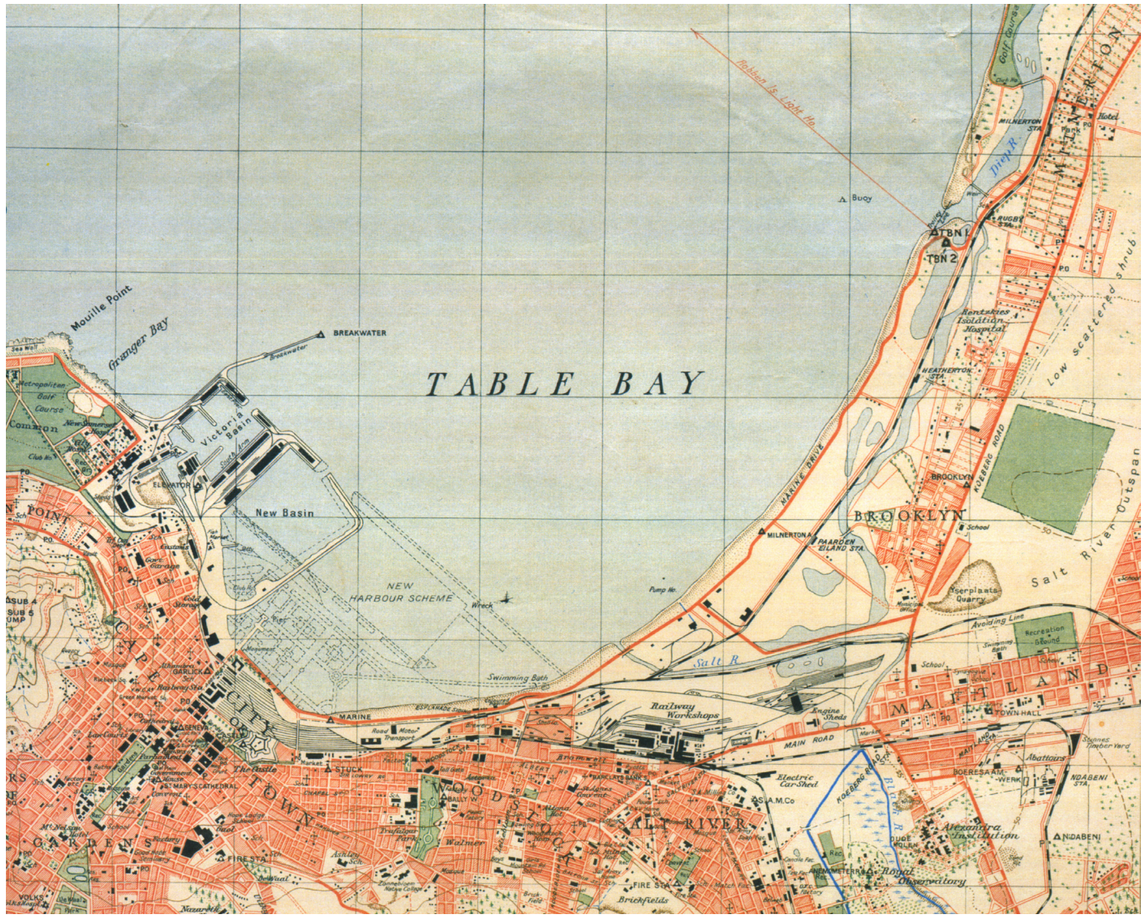


fig. 14. Map of Table Bay, showing the river and wetland system before the canalisation of the Black River, 1939.

fig. 15. Map showing the once connected Zoarvlei and the Black River, 1968.

"*The Black River is currently a detriment to the region when it could be an asset.*" —The City of Cape Town (CCT, 2011:4)

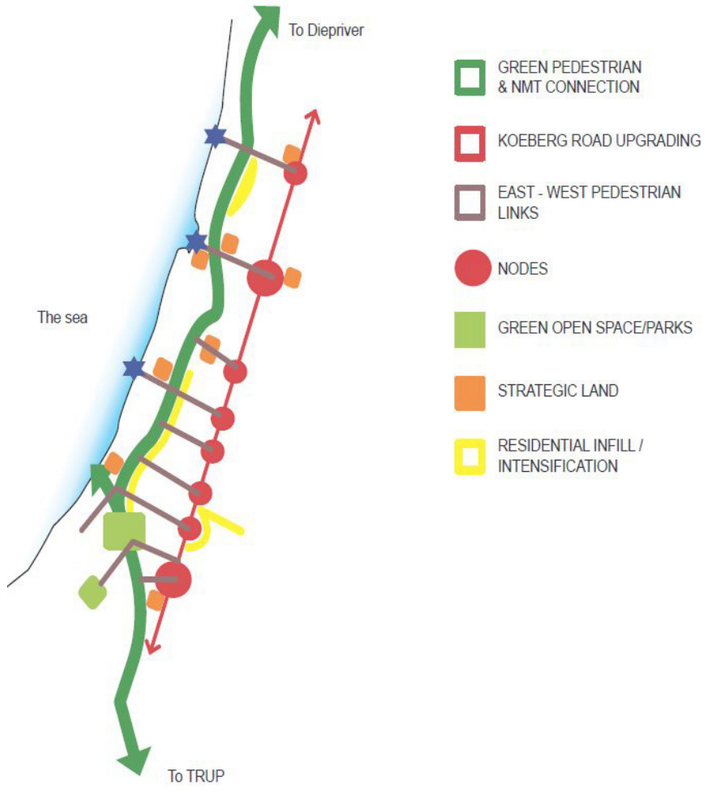


fig. 16. Diagram of the Milnerton South – Paarden Eiland Local Area Spatial Development Framework plan.

Government development plans

The report *Milnerton South – Paarden Eiland Local Area Spatial Development Framework* complied by the City of Cape Town, became a key source in identifying some of the current environmental problems that exist in Paarden Eiland. The report proposes a future framework plan that highlights key concepts for possible future plans along Zoarvlei and Salt River such as the regeneration of the wetland system and the creation of an urban park, the strengthening of Koeberg Road by upgrading nodes along its length and the improvement of land use intensification through rezoning and capital investment (CCT, 2013).

Other proposals such as the *Black River Corridor: Visions for Restoration and Recreational Use*, suggest a corridor network of pathways, parks, and recreational spaces that extend along the Black River corridor to improve the ecological and socioeconomic potentials of the river (CCT, 2011). The plan starts at the Hazendale Rail Station, extending all the way through Rondebosch Golf Course, the Interchange Park, Maitland Garden Village, Oude Molen Eco Village, Valkenberg Hospital and Raapenberg Bird Sanctuary, and finally ends at Berkley Park. However this destination stops before the heavily industrialised area and private land of Paarden Eiland. It also shies away from the complications caused by crossing several multiple-line rail bridges at the Salt River mouth.

I therefore decided to focus my attention on the Salt River mouth area; the one that was least explored, and has the most difficulties. I regarded my design as an extension of both urban proposals. In particular the 'regeneration of the wetland' system sparked my initial design interest in the reconnection of Zoar Vlei with the Black River system. The proposal to create a pathway network that would go subtly over and under transport systems to connect people to the water's edge also became part of my proposal for my design dissertation.

fig. 17. Plan of the Salt River Mouth.

fig. 18. Map of the Salt River system connected to the Black River.

The Salt River is a river located in the Western Cape province of South Africa, and flows into the Table Bay at the Salt River mouth. The river is a confluence after the Elsieskraal River and the Liesbeek River join the Black River, thus the Salt River forms part of the Black River corridor.

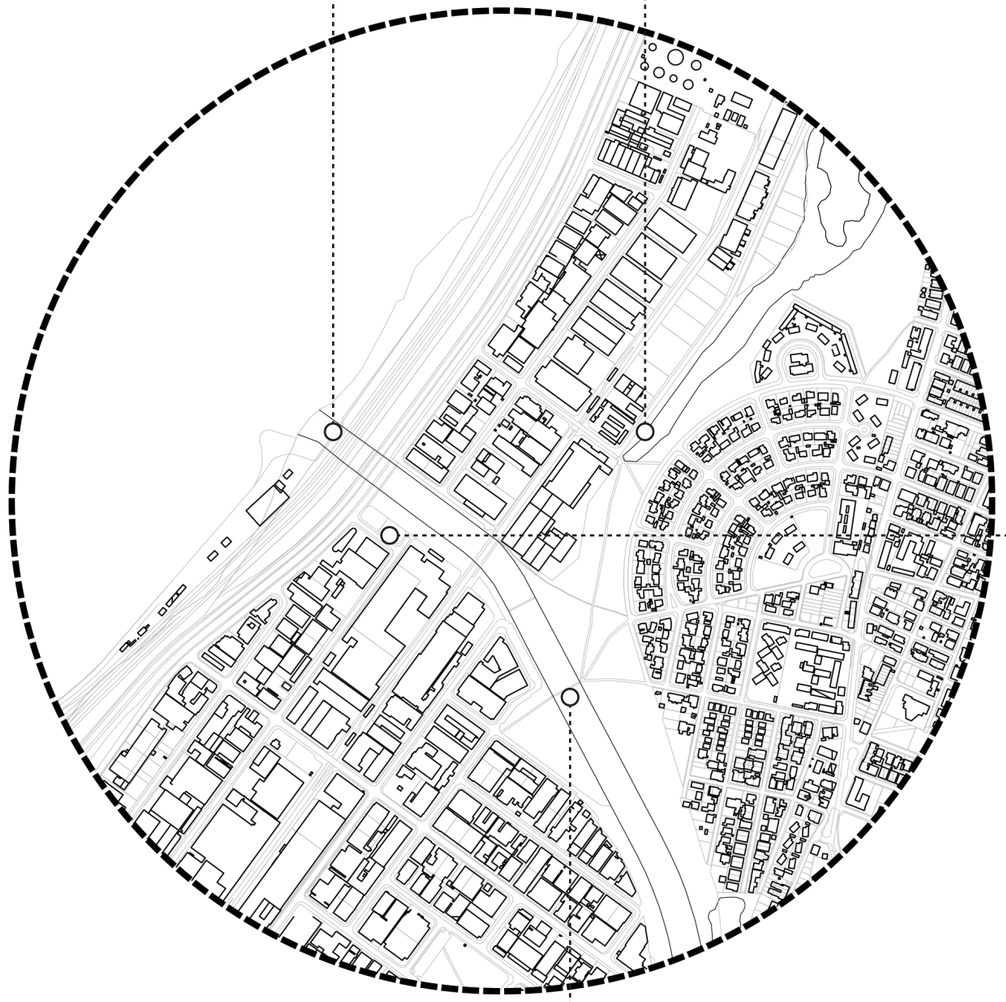


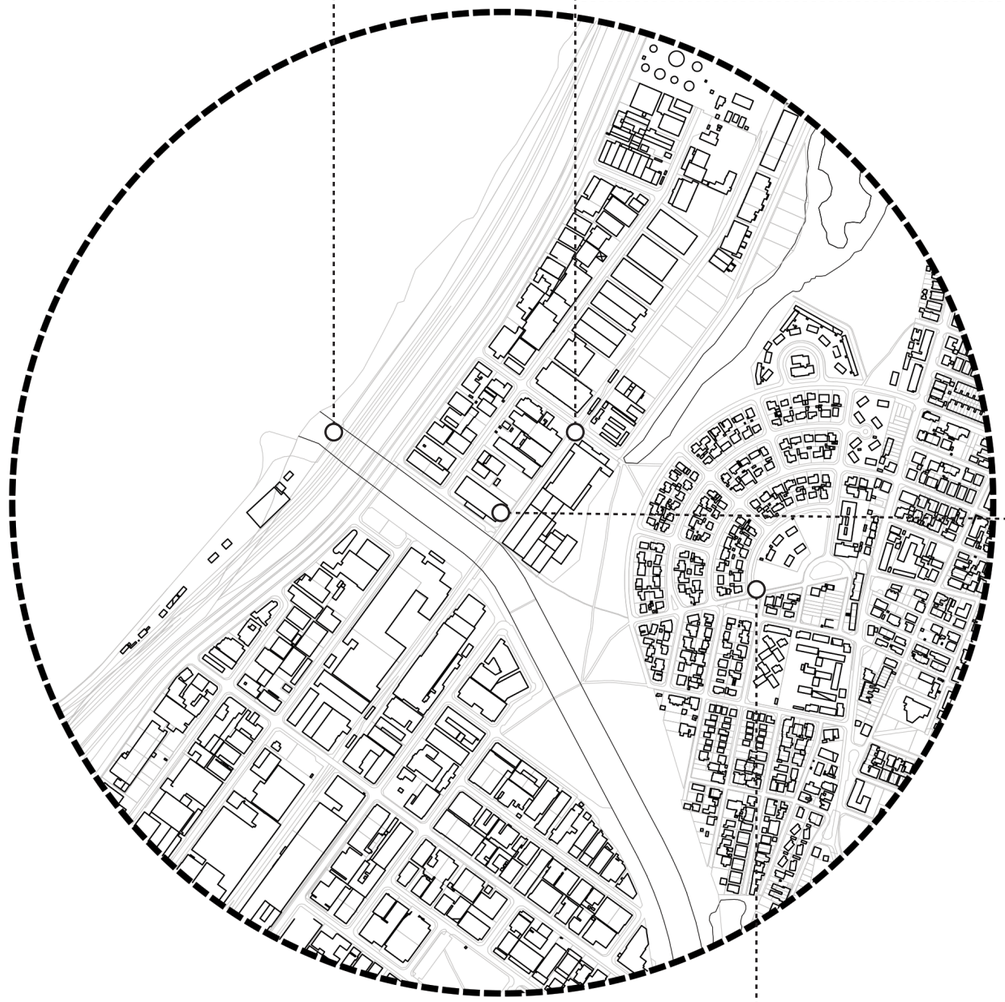
fig. 19. Site plan showing location of adjacent photos.

BEACH

ZOARVLEI

TRUCKYARD

BRIDGES



RAILWAY LINE

MYCITI BUS ROUTE

FACTORIES

BROOKLYN

fig. 20. Site plan showing location of adjacent photos.

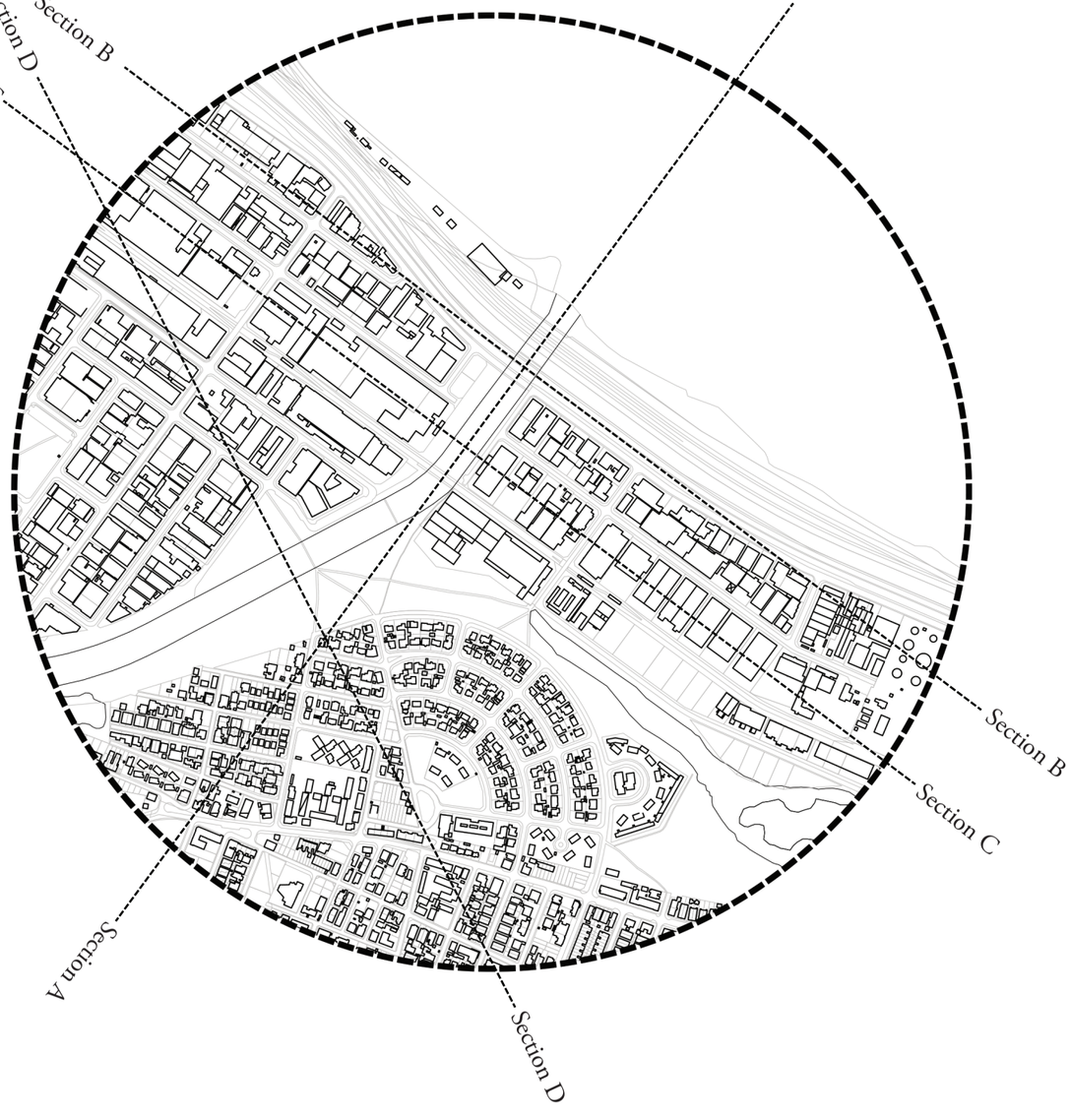
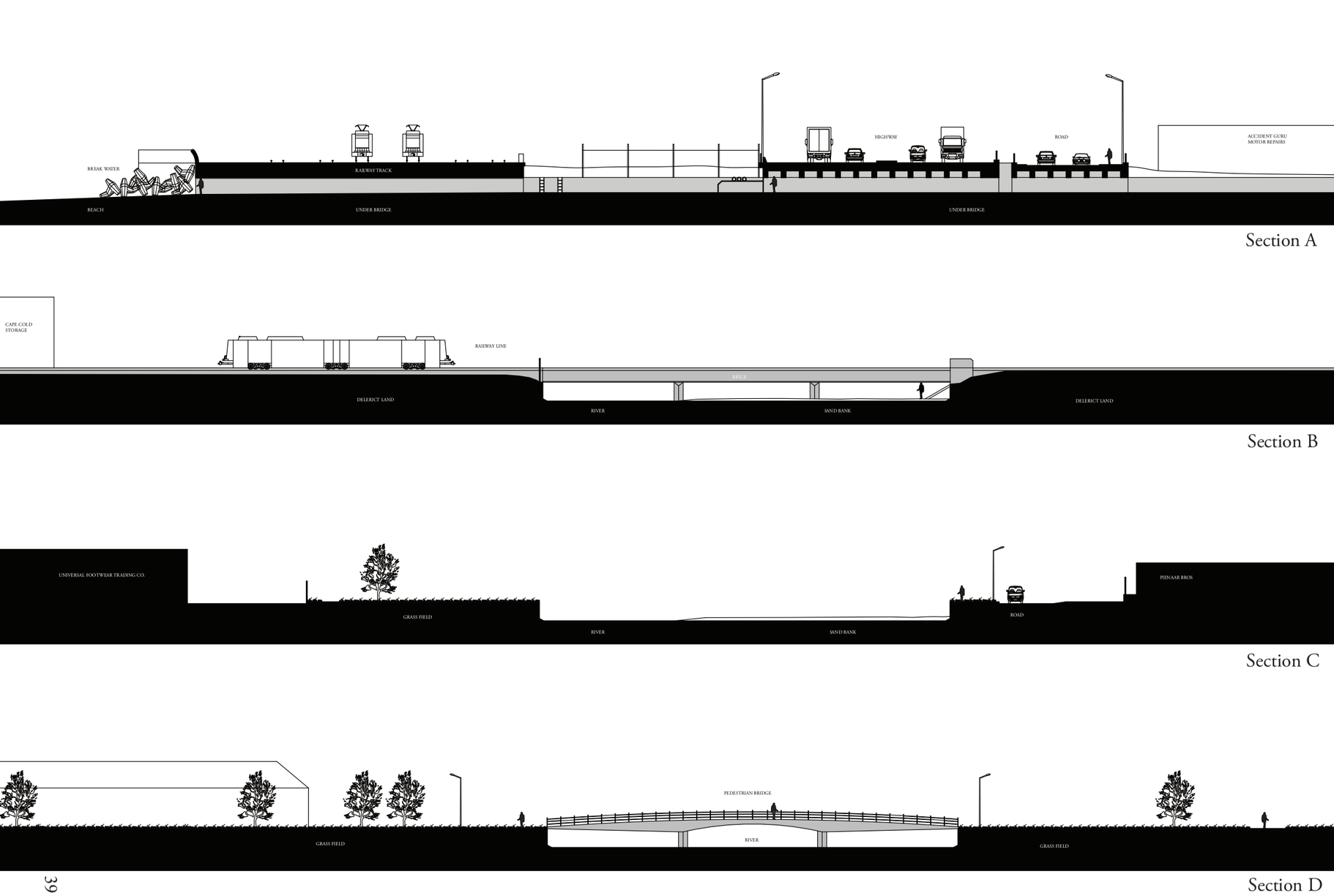
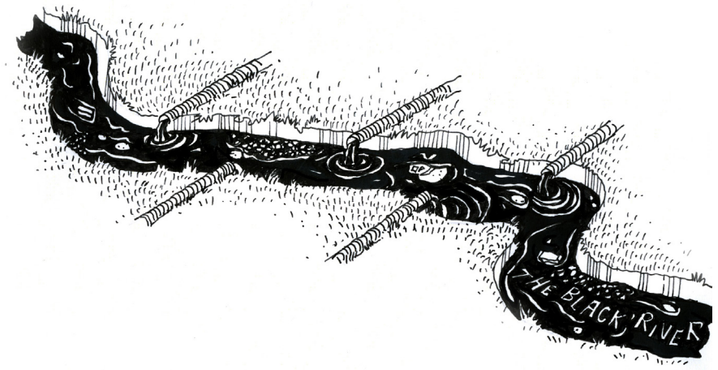


fig. 21. Above. Site plan showing location of adjacent sections.
fig. 22. Right. Site sections through the existing canalised Salt River.





Site issues

Pollution

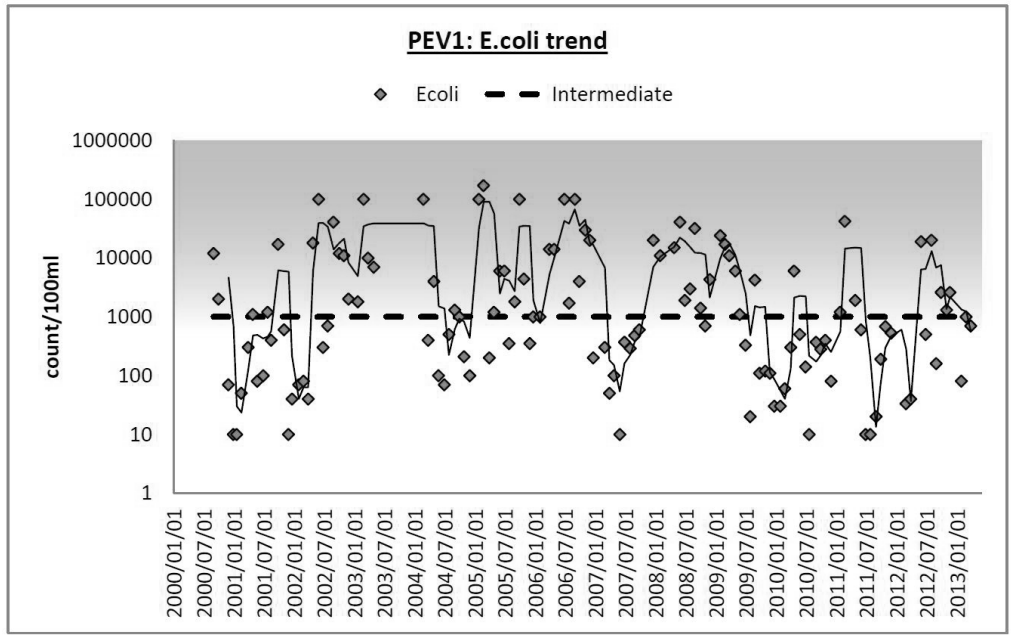
One of biggest environmental impacts of waste disposal on water is pollution. Pollution causes rivers and bodies of water to turn into "a dirty soup from which many cities draw their drinking water" through the loading of sewage, sediment, garbage, and poisonous chemicals into the water (Spirn, 1947). Pollution can come in two forms, the first one being physical pollution, which is the discarding of physical materials into the natural environment such as plastic bags, and water bottles – often called litter (Lim, 2014). The other form is chemical pollution, which is the discarding of chemicals into water or the earth, often from surrounding industrial areas (Lim, 2014).

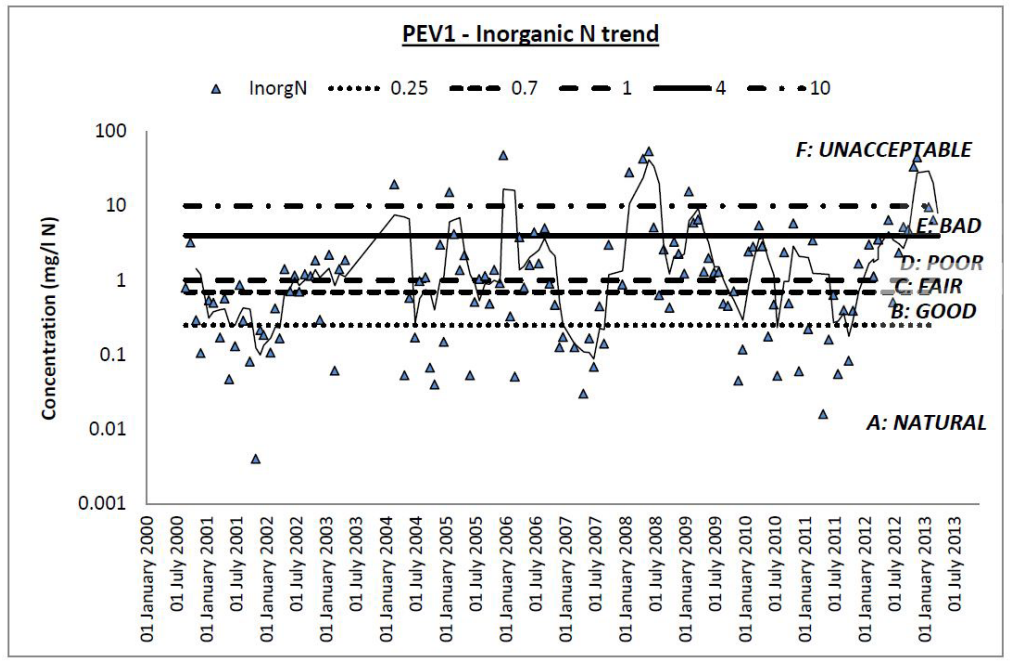
In its current state, Salt River is afflicted by both forms of pollution. The water in the river is therefore very toxic and can cause serious health problems for humans (CCT, 2013). There are vast amounts of physical debris and litter scattered all along the banks of the river. Litter gets deposited through illegal dumping, and blown into the canal by strong winds (CCT, 2011). Clusters of litter become a tangled mess all along the sides of the river (CCT, 2011). The water is so contaminated with hazardous matter such as faecal coliform and E.coli, that their chemical substances are visible to the naked eye (CCT, 2013). In its current state, the water in the Salt River is so toxic that it is not suitable for human contact. Local fisherman cannot eat the fish straight out of the river; instead they need to put them into a tank of fresh water, changing the water every day for a week before they are edible, and even then the toxicity of the fish is questionable (CCT, 2011).

Approximately 55% of the Black River (which includes the Salt River) is canalised (CCT, 2005). The concrete prevents plant growth, which in turn affects the food supply for the entire ecosystem along the canalised river. The devastation to the environment and its ecosystem is beyond comprehensible, eliminating fish and causing birds to migrate elsewhere (CCT, 2011).

As Ian McHarg puts it in his influential book, *Design with Nature*, "Nature is a single interacting system and any changes to any part will affect the operation of the whole," (McHarg, 1971).

fig. 23. Above. Sketch of pollution in Black River.
fig. 24. Left. Pollution scattered along the banks of the Salt River.





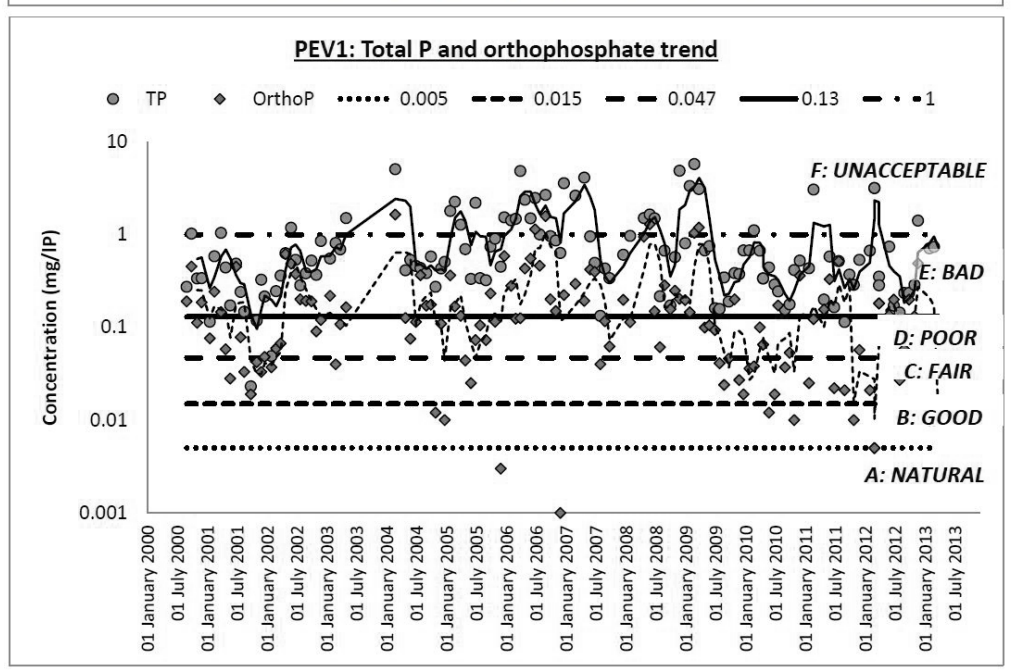


Fig. 25. Graphs indicating the different amounts of bacteria in Zoarvlei.

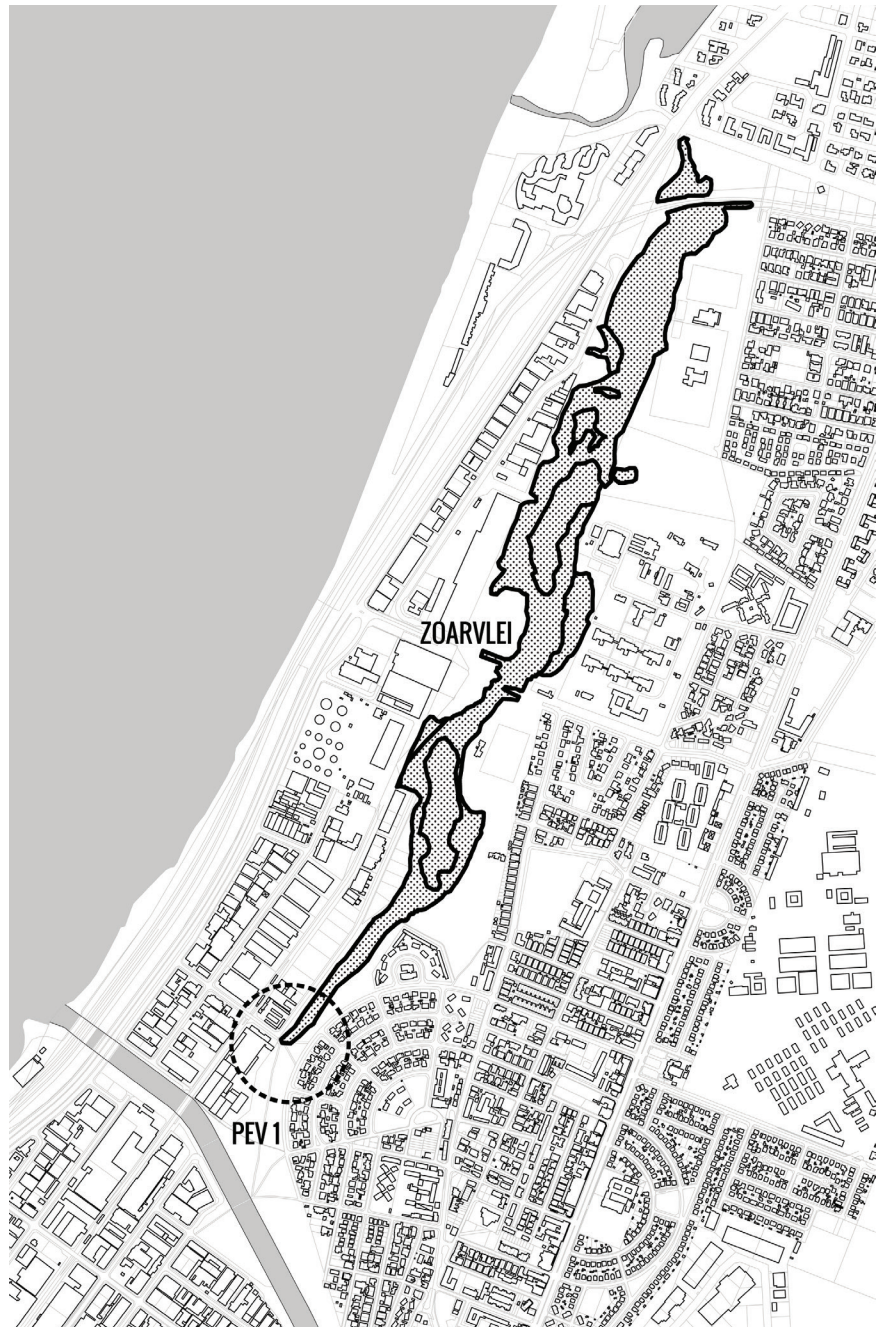


Fig. 26. Map showing Zoarvlei, with PEV1 as the area thats been monitored.

The City of Cape Town completed an extensive 'Water Quality Report' in 2013 on Zoarvlei, which involved monthly monitoring and research since 2000. Results show that the Southern portion of Zoarvlei, near the Black River, which is the proposed site, is the most affected area (CCT, 2013). Its poor quality is shown by the extreme amounts of inorganic nitrogen present within the water (CCT, 2013). There is also a relatively high presence of the nutrient phosphorus, which creates a poor environment for plant growth due to the fact that plants only need a very small amounts of phosphorus in order to grow correctly (CCT, 2013). Studies also show that there is a decline in the chlorophyll level, which provides an indication of the amount of microscopic algae produced in the vlei (CCT, 2013). Therefore the quality of the water is dramatically declining, which is in turn affecting the surrounding biodiversity of the river (CCT, 2013). There needs to be a serious change in attitude towards this problematic river.

Efforts are being made to try and clean up the polluted environment. Surrounding schools such as Ysterplaat Primary, located in the suburb of Rugby, occasionally come in groups to clean up the vlei and river. They believe that this is important for the environment, and they regard themselves as the *vleipaddas* (vlei frogs). Below are letters in the *Vlei Time*, written by two children, Yusuf Galant and Thando Janda (Baker, 2010:6).

My time at the zoar vlei by Yusuf Galant

"I love cleaning up at the vlei. I know for a fact the
animals loves us even bird, mole, lizzards, fish
because we helped them clean ther and our environment.
I had a loverly experianc cleaning up the zoar
vlei. I made some new friends and we court fish under
the bridg and in the river. And we met a loverly
old man called uncle frank but this is not our uncle
we just say uncle to show some respect to him.
I also met the best lady in the world. I can't get
to her name but she's old and weres round glasses
I love her cause she helps me through thick and
thine. I know she cheats some times she gives me
the best prize. And then there's aunt renal hou I also
love a lot caus without her the would be no cleang"

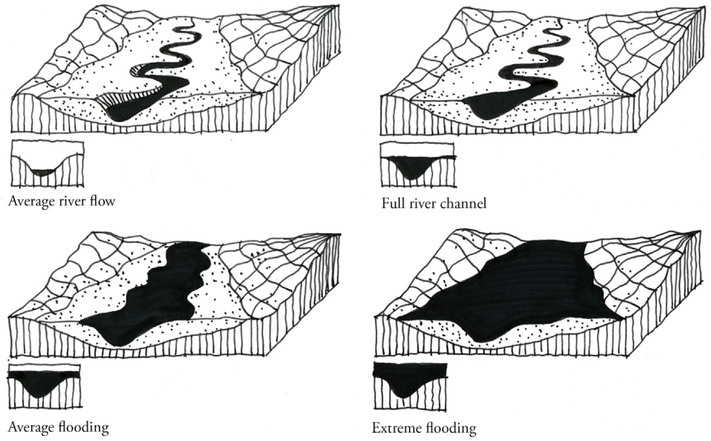
How it feels like to work at the wetlands by Thando Janda

"Working at the wetlands feels I am do my part
for my community. Every second week we
go cleaning up. We have a group that we call the
vlei paddas.
Cliening up at the vlei makes you feel sceared
and happy. Once we walk past we got to see plants
that we don't know about. Every second week we
come again to clean but everything is just worser
than last week. It feels uslas to work there but we
try to tell people not to letter.
The most mess comes from the people who live
next to the vlei. The paper and plastic get stuck
against the plants and it makes them suferceat.
Cleaning at the vlei mean that I preventing plants
from die and making my community a
cleaner place. That's what it feel like and
mean to clean at the wetland or vlei"

Fig. 27 . Photo montage of environmental degradation.

fig. 28. River users wearing pollution masks to protect themselves from the contaminated river water in the Black River.

fig. 29. Access to the beach is blocked by the Marine Drive highway and railway line, Kayakers have to crawl through fences to get to the shoreline.



Flooding

Water shapes our earth. It is the most important natural resource for all forms of life. The natural river systems of water play many vital roles – that of an orientation point around which urban infrastructure is organised, a source for human activities, and an element of natural identity within the landscape. Water is essential for all socio-economic development and for maintaining healthy ecosystems (Pedersen, 73:2012). However, water can also cause flooding, which adversely affects these two components. Flooding is also becoming a more common occurrence due to climate change, which can cause rising sea levels and harsher storms (Bergdoll, 2011). During a flood, a city can be completely transformed, with all forms of infrastructure being affected – destroying homes, businesses, roads and even lives. Most of our cities are not properly designed to accommodate a massive influx of water due to our hard surfaces and when it does flood, the water creates radical planar reconfigurations (Spirn, 1947; Nordenson & Seavitt, 2011). The problem of climate change means that water levels are indeed rising and this will change both the contours of the landscape and the population patterns of heavily populated areas (Bergdoll, 2011).

In the case of Paarden Eiland, the constant effects of 'freshwater' flooding from Salt River can be seen due to the heavier rainstorms that the area is experiencing (Jackson, 2015). Due to the canalisation of the Salt River in 1943 it has destroyed almost all forms of ecological life along the river that would otherwise create softer edges to collect some of the vital depository of nutrients into the soil, encouraging the growth of vegetation and wildlife. However, the harsh concrete edges of the river don't allow much flexibility or absorbency, meaning that water is forced to overflow into surrounding infrastructure and buildings. Another side effects of the canalisation of the river is the fact that during summer the water body is extremely low (30cm in height), and in winter it is prone to severe flooding (CCT, 2011). This causes a radical fluctuation in water level all year round, which limits the ability of people to traverse the Salt River (CCT, 2011).

fig. 30. Above. Drawinf of a typical flood plain.
fig. 31. Left. Plan of 50 year flood plain, Salt River mouth.

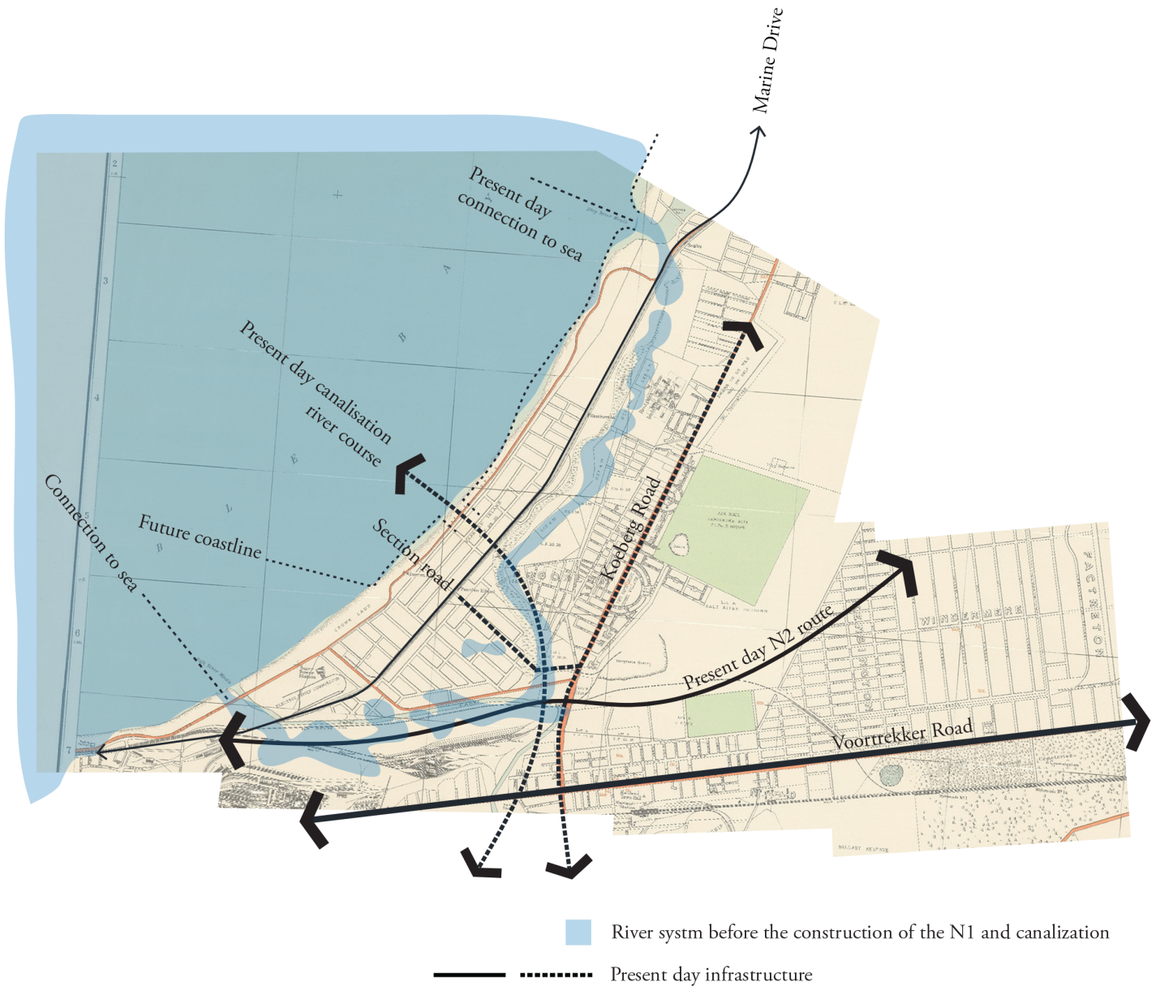


fig. 32. Present day situation overlaid on a 1939 map.

Fragmented landscape

Within the world of industry and infrastructure each system is engineered to perform a single task at maximum structural and functional efficiency, it is a business of production, yet its function does not stretch past the walls which define it. It is an isolated element amongst other isolated elements, within a world of infrastructure. These systems create divides within the landscape where only functionality is measured, the result are discontinuities and disjunctions both socially and environmentally.

In Paarden Eiland it is clear that the transport services are deemed as the most important, rivers are canalised and transport systems such as highways and railway lines separate the city from the ocean. However the priority should shift towards a area of more pedestrian importance. To the left is a drawing illustrating the fragmented landscape of Paarden Eiland, showing the changes that occurred over time, with the present day 'infrastructural site conditions' overlaid on the 'natural site conditions' of a 1939 map.

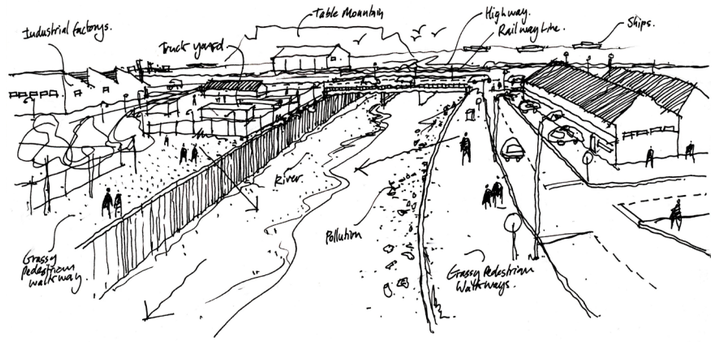


fig. 33. Early sketch of the site.

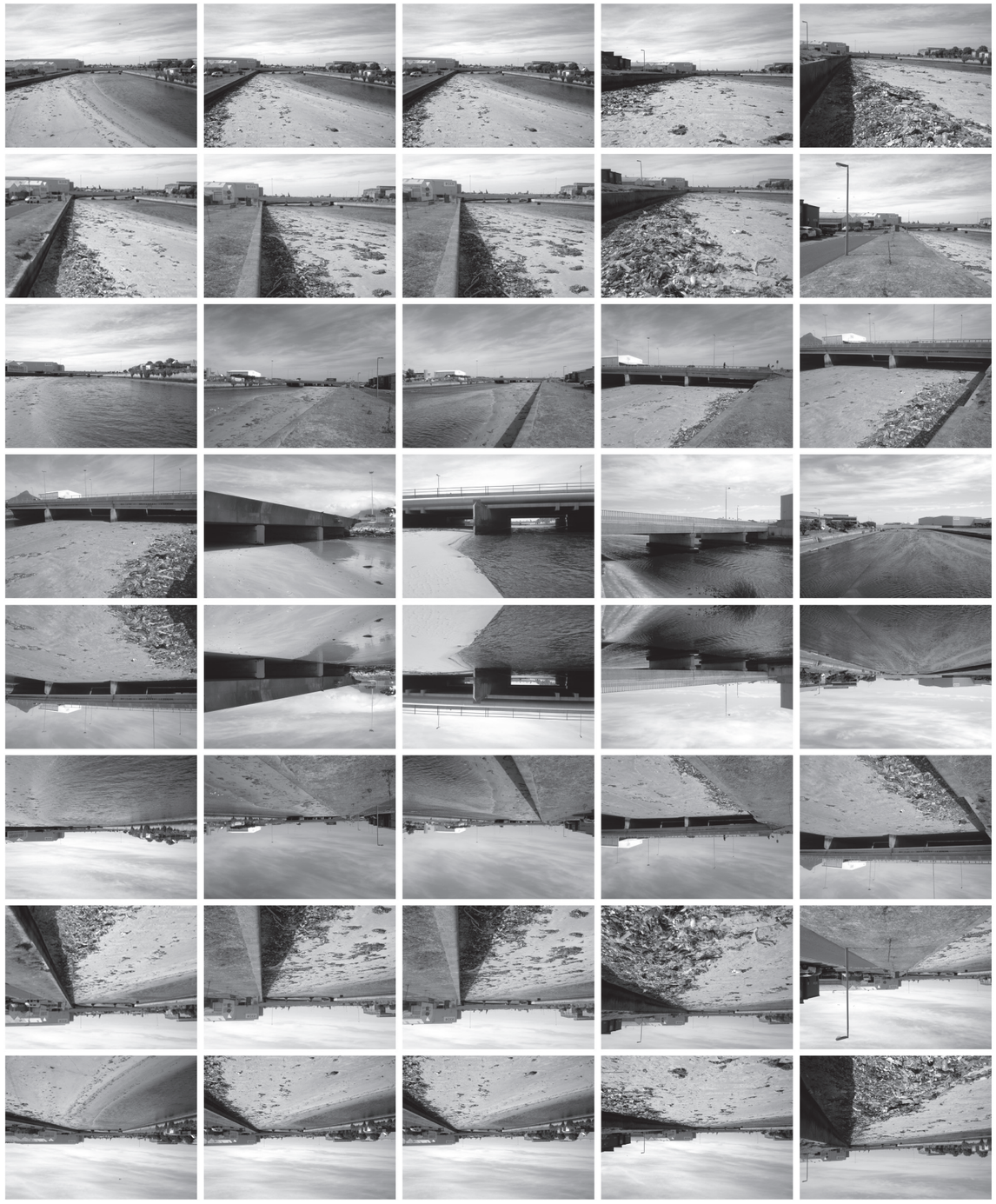


fig. 34. Landscape sequences of the canalised Salt River.

When infrastructure is placed between the city and the ocean as seen in the case of Paarden Eiland, it cuts visual corridors, disorders a community, and creates social unrest. It tends to produce large, unattractive and often unusable spaces, which threaten the urban life around it. This division of a city also formulates residual spaces that become lost. These spaces are normally underutilised slivers of awkward junctions that sit between buildings and transport services, occupying edge conditions, and are not large enough to warrant many forms of traditional use (Marika, 2010). Paarden Eiland has many residual spaces that are evident between the highway, railway line, and along the Black River. The result is a strong disconnect between people and place, as well as man and nature.

In Richard Forman's article *Infrastructure and Nature: Reciprocal Effects and Patterns for our Future* he addresses the relationship between infrastructure and nature from the belief that nature affects infrastructure, and infrastructure affects nature (Forman, 2012). Forman asks: How do we affect nature? He simplifies the discussion down to the following twelve points: We simplify, we linearise and geometricise, we attempt to control, we reduce variability and thus adaptability, we multiply and sprawl, we pollute and contaminate, we eliminate and impoverish, we degrade patterns, we disrupt processes, we perforate and dissect, we fragment and shrink, and we consume and over-consume (Forman, 2012).

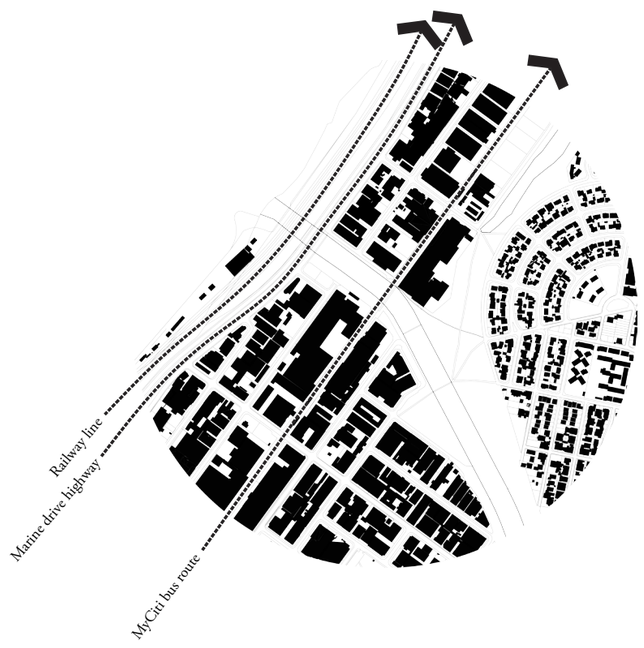
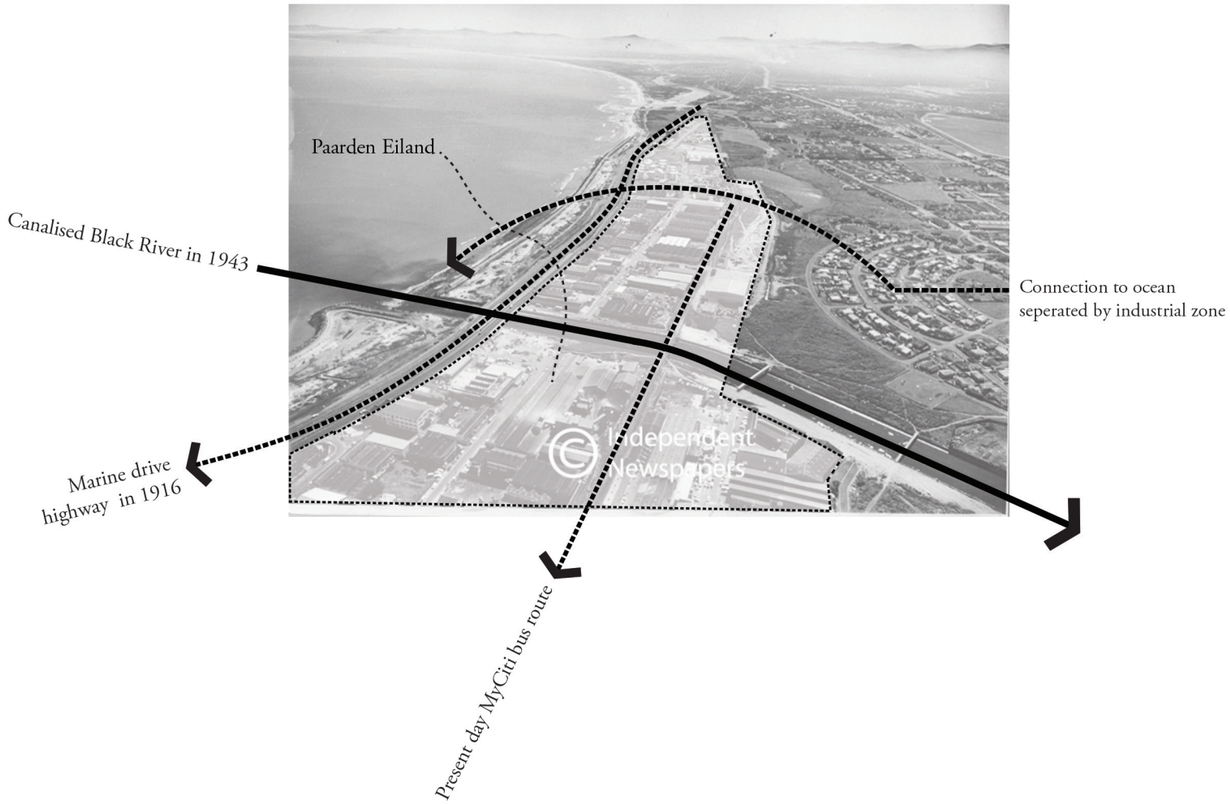


fig. 35. Figure ground plan showing transport barriers.

fig. 36. An old aerial photograph of Paarden Eiland, overlaid with changes that occurred over time.



In the case of Paarden Eiland's infrastructure, these points appear regularly, for example in the development of Marine Drive highway. This highway was strategically built to provide simple access and transportation of goods and services between the city and areas up the West Coast, such as Saldanha Bay. This is indicative of man's need to simplify, linearise and geometricise the landscape.

Another example is the canalisation of the Black River, which shows man's attempt to control and eradicate the problem of flooding. This means that the river's ecosystem is destroyed. Adding to this destruction are the industrial zones in Paarden Eiland that pollute and contaminate the river, further eliminating and impoverishing its contiguous ecosystem.

The result is that poorer residents living in Brooklyn and Rugby have no connection or access to the ocean as they are separated by layers of roads, highways, and railway lines. Whereas further up towards Diep River mouth, where the more middle class suburbs begin, there is access straight onto the beach front, with apartments and large homes looking out towards the ocean.

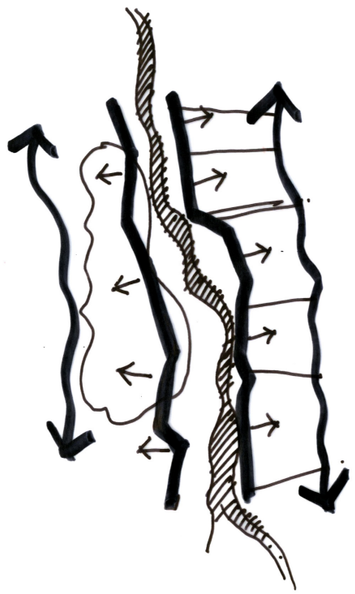


fig. 37. Existing movement structure creates an alienated landscape of backyards. Forming a barrier and contributing to a fragmented landscape.

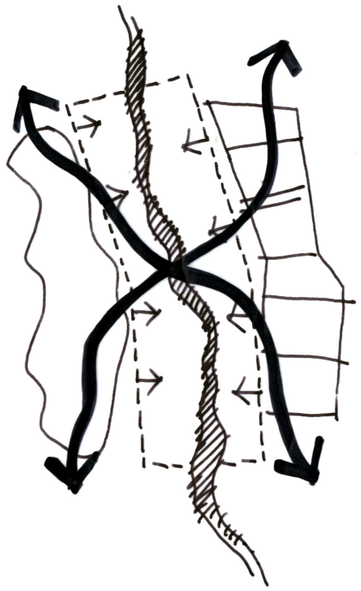


fig. 38. Proposed movement with active frontag onto the river, creating a connected landscape.

Alienated Landscape

The surrounding neighbourhoods that were developed before Paarden Eiland's establishment, such as Brooklyn and Rugby, are completely separated from the ocean by the privatised industrial zone that is Paarden Eiland. The industrial zone is strategically located close to the harbour. However, today only 40% of the businesses are linked to the port (CCT, 2013.) The placement of factories and distribution centres so close to the city, means that large areas of valuable land are not available for private residents; instead factories are placed on this prime land.

The only people that use the buildings are the staff, and at night these large factories become vacant and unused spaces. No community input is encouraged, particularly amongst the local residents (CCT, 2001). The factories in the industrial area are also surrounded by large walls and security fences that block connections to the street and river (CCT, 2013). This alienates its surrounding context, and forms barriers that contribute to a fragmented landscape. These barriers turn their backs on the surrounding neighbourhood and environment, resulting in unsafe areas with surveillance that is only aimed at protecting the businesses' interests, something that would not be the case if the factories were replaced with homes or recreational facilities.

fig. 39. Example of the large CCS logistics cold storage factory that is located right along the edge of the Salt River. Its large blank walls show no connection to the outside, and the river merely becomes the backyard space in the environment.

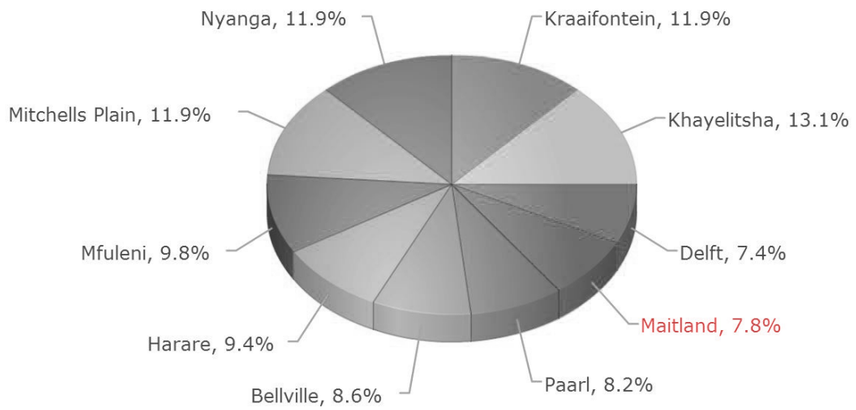


fig. 40. Graph showing worst ten precincts for culpable homicide in 2014.

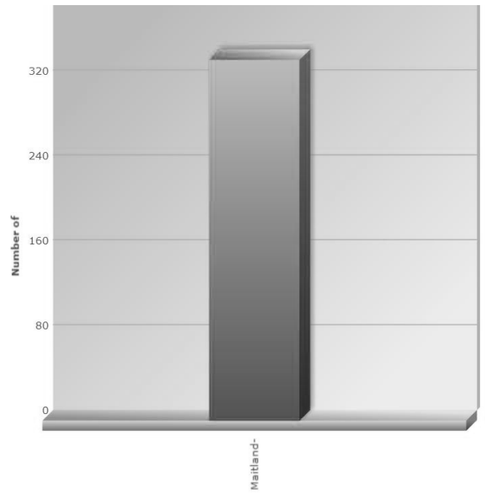


fig. 41. Drug related crimes.

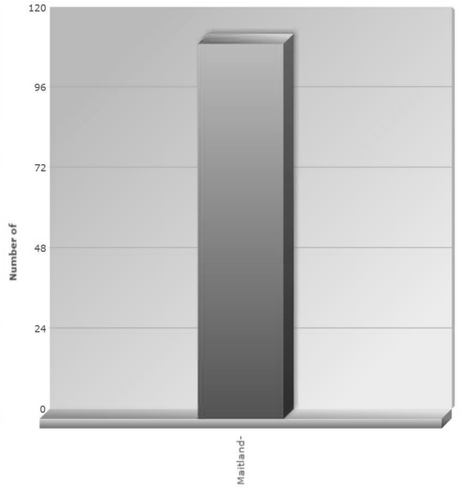


fig. 42. Common assault.

Crime

People's interest and care towards a certain area depends mainly on two factors: Firstly, the way in which a certain landscape fulfills their needs and desires, and secondly, the way in which people experience and use the landscape (Loures, & Burley, 224:2012). Subsequently, environmental degradation creates an undesirable landscape that can in turn produce a downward spiral effect, which results in health, social and economic problems for the community living in the area (Hamnett, 2003). This is particularly apparent within Paarden Eiland's deteriorating surrounding neighbourhoods, such as Brooklyn and Rugby, (which fall under the region of Maitland) where crime rates are high and public spaces are littered with waste (CCT, 2001).

An extensive report called, *Brooklyn* on the neighbourhood has been produced using an investigative interviewing process, where the aim was to uncover the main social issues within the community (CCT, 2001). It was noted that the area is rife with crime, specifically drug and gang related (CCT, 2001). In Statistics South Africa, under the small region of Maitland (that both the suburbs of Paarden Eiland and Brooklyn fall under), in 2014 there where a total of 2456 crimes committed within the area (Crime Stats SA, 2015). Other surrounding regions such as Milnerton, Table View and Athlone also show staggering amount of crimes reaching over 8000 (Crime Stats SA, 2015).

Residents normally have a good idea who the drug lords are, as one participant said, "You know who you can swear at and who you can't," (CCT, 2001). Muggings and break-in are also a common occurrence in the area. Several interviewees also mentioned "how it was no longer safe to walk after dark in the area and that there was a period when it was not even safe to walk around during the day," (CCT, 2001). This is as a result of the lack of surveillance, however if the area is activated with more people it will increase surveillance and security, thus counteracting crime. It was also noted that many of the younger residents felt as if there were no activities in which to partake within the area – no cinemas, malls or decent restaurants.

This lack of alternatives to keep young people entertained can lead to the development of negative social interactions. In the report a local church leader suggests that the simple act of greening the pavements and verges could go a long way in aesthetically improving the environment, and local school children could be put to work through environmental education programmes that clean the neighbourhood in order to teach them about the importance of the environment (CCT, 2001). The report also points out the relatively high unemployment rate of 18%, with a high number of residents being dependent on grants and charity, compared to that of a bigger region like Milnerton, where the unemployment rate sits at only 4.62% (City Statistics, 2011).

Therefore, a fundamental approach to the design would be to create an architectural intervention that incorporated entertainment facilities, provided an urban attraction that could draw people into what are often dead spaces, teach the community about the importance of the environment, and provide employment opportunities. This project then became a site driven architecture that looked for ways to deal with the above issues.

"One of the best things about water is the look and feel of it… It is not right to put water before people and then keep them away from it." –William H. Whyte

fig. 43. A beautiful isolated beach, where the river mouth encounters the ocean. An important connection to nature that is completely isolated by the Marine Drive highway, and the railway line.

The term "path" indicates the act of crossing a route that directs the action of walking from one point to the other (Careri, F). A path can become an architectural object, which can become a narrative about the crossing of space. It can also provide a bridge that reconnects architecture to landscape through human scale.

In the book *Walkscapes* by Francesco Careri, he talks about 'transurbance', which are walks in the leftover spaces in and around the contemporary metropolis (Careri, F). These spaces are under-utilised, large urban voids of barren and wasted lands that are marked by the city's infrastructural needs. Transurbance becomes the process of critical walking through these spaces that uncovers the city's empty and forgotten land (Careri, F). Walking is then signified as a mode of expression that begins to uncover the on-going social and environmental problems that exist in a city (Careri, F). The walking along a path can then become a useful tool of critical assessment, and a unique way of mapping the spatial and social conditions of the city through the act of walking (Careri, F). This leads to the need for a design that will bring about new portions of order, which will reconnect and re-compose the fragmentations that exist within our evolving cities.

In 1967 the artist Richard Long explored the simplest way for art to intervene with nature; not as an object but as an experience. He produced *A Line Made by Walking*, a line drawn by physically stepping on the grass in a field (Careri, F). The idea was that the only thing man needed was the experience of nature, and the only thing man should leave behind are footprints (Careri, F).

This image of the *Line Made by Walking* sparked my initial urban move to mark a straight line across Paarden Eiland's industrial landscape that would break all the infrastructural barriers to provide the shortest and most effective connection from the segregated residential community of Brooklyn, to the beautiful empty shore line.

fig. 44. Line Made by Walking, Richard Long, 1967.

fig. 45. Initial model of the site at 1:1000 showing the urban scheme of the straight line connection to the shore.

The line of the design would become a point that regenerates the edges of the monotonous and structured modernist city planning, in order to create an intersecting dimension that can reconnect people to place. It would act as an architectural intervention that forms a linkage to a disconnected environment.

By providing a pedestrian pathway through the site it will encourage people to appreciate the river and see its potential. The path will provide a network to areas that may once have seemed inaccessible. This activation of the area will also allow people to pursue daily activities that were not previously plausible, without hindrance or fear of safety. In turn it also provides an outlet for recreation as well as a course for movement. The path then acts as a 'transurbance', which begins to illustrate the problem of the site, through the experience of an individual moving in a mode of critical walking along the path.

The straight line will not only achieve an important connection to the water's edge but will also create a weir in the river, separating it into two parts where dirty river pollution can be isolated from the clean river water (which will be explained further under 'Environment').

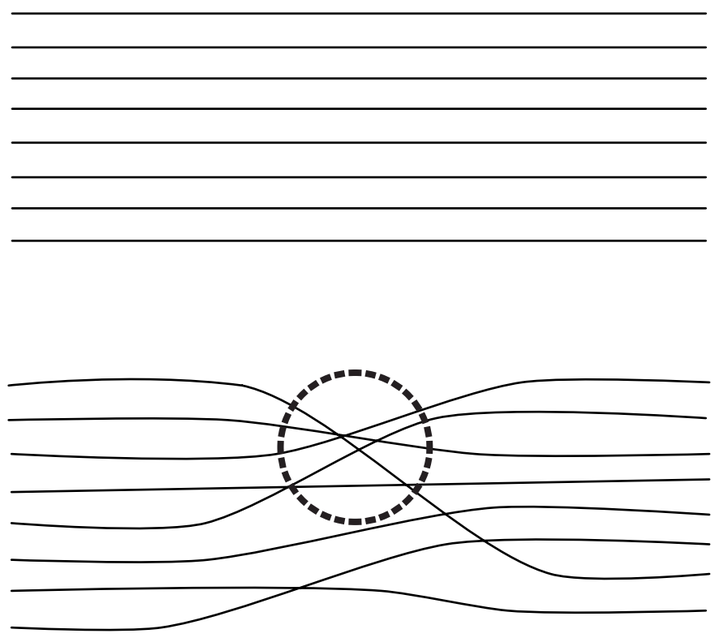
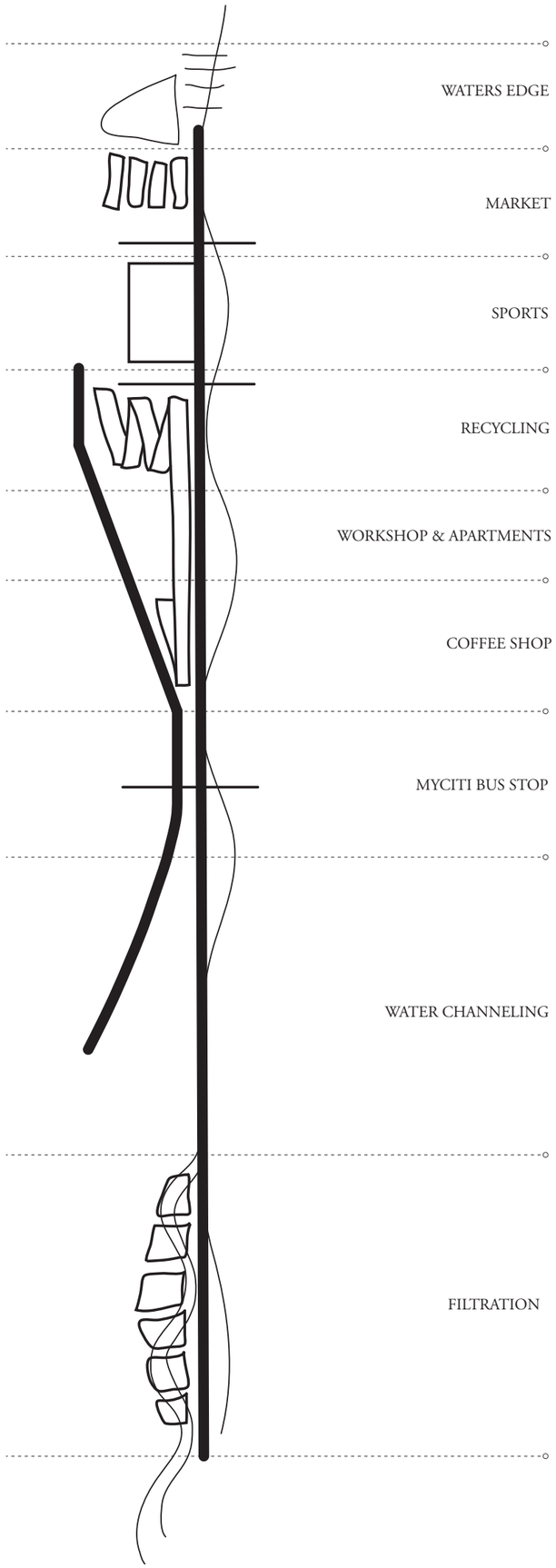


fig. 46. Diagram on the top showing the monotonous and structured modernist city planning as a series of barriers, and below an intervention that provides a linkage to the network.

fig. 47. Collage illustrating pedestrian importance within Paarden Eilands infrastructural landscape. The path provides a pedestrain connection to the empty shoreline.



Programme

The linking of a series of networks along a path that provides opportunities such as trade, employment and recreation, creates a strong incentive for people to use a path, which subsequently increases the safety of the path. A pathway's usage and its safety are directly correlated (CCT, 2011). By creating a safe pathway for people to move along a river, the surrounding communities will have their attention drawn to the pollution problem, and will therefore be motivated to bring about a change (CCT, 2011).

Therefore in order to provide an architectural solution that counteracts the above mentioned site issues, a combination of various programmes will stretch along the path of the design to activate its usage. These programmes are aimed at achieving the following:

- Rehabilitate the environment
- Activate and clean the river
- Increase employment
- Create community participation
- Promote recycling
- Promote sport and recreation in a natural environment
- Activate underutilised areas between transport systems
- Provide accommodation
- Increase surveillance
- Provide a reconnection to the shoreline
- Encourage entrepreneurship
- Attract tourism

An architectural invention, as a living, breathing connection for the vlei and community.

fig. 48. Diagram of urban scheme showing the network of programmes along the path.

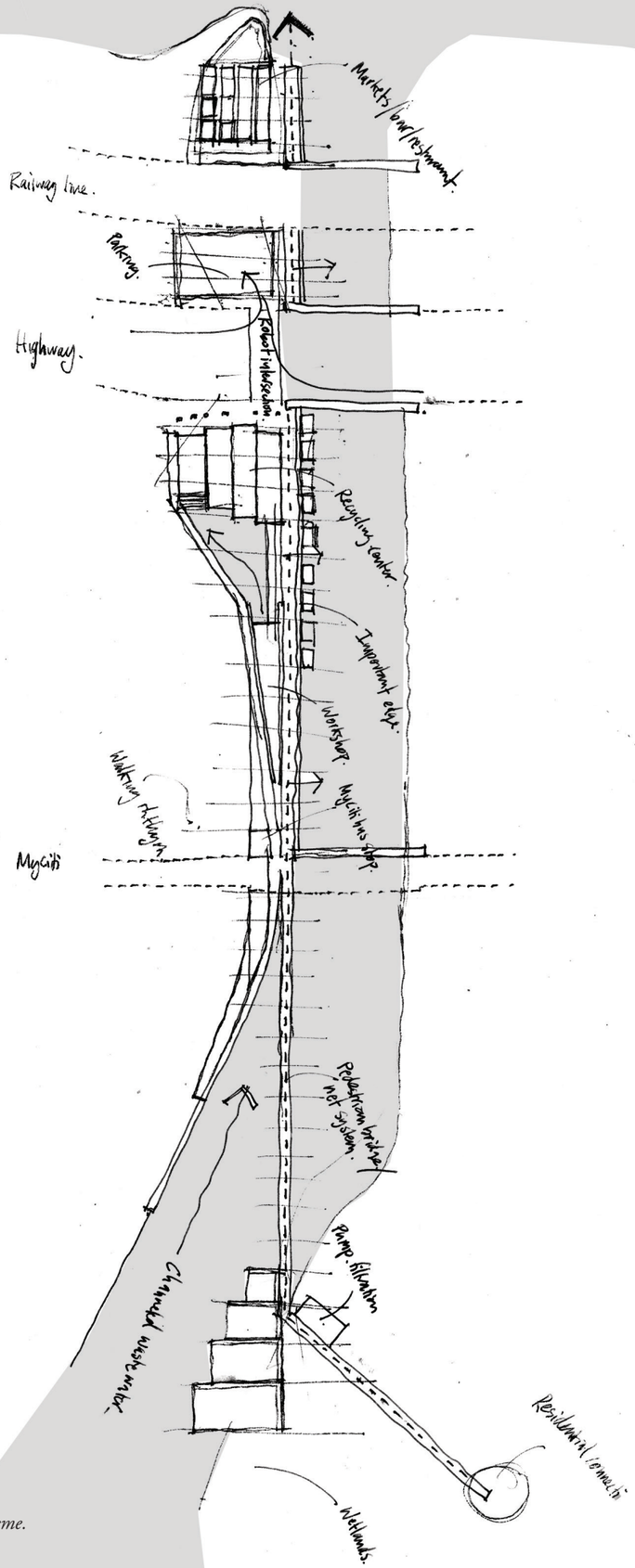


fig. 49. Early sketch of urban scheme.

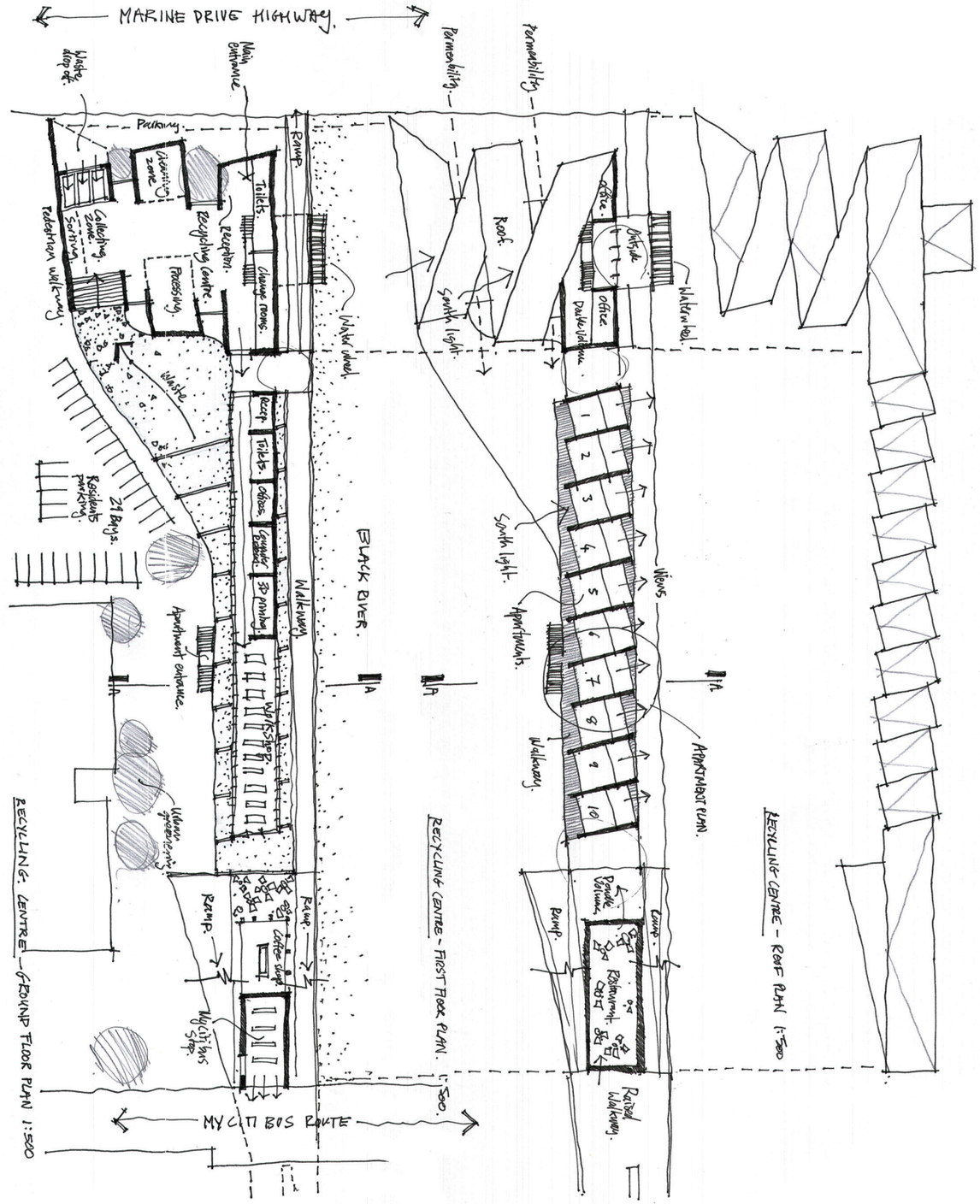
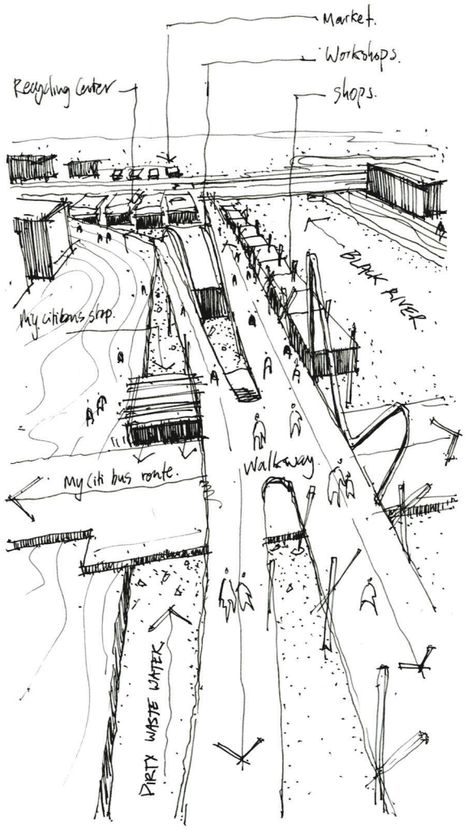
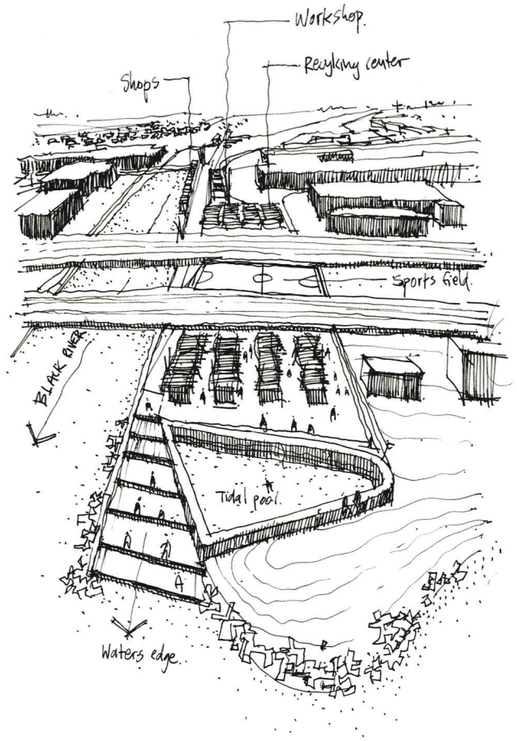


fig. 50. Early sketch of recycling centre plan.





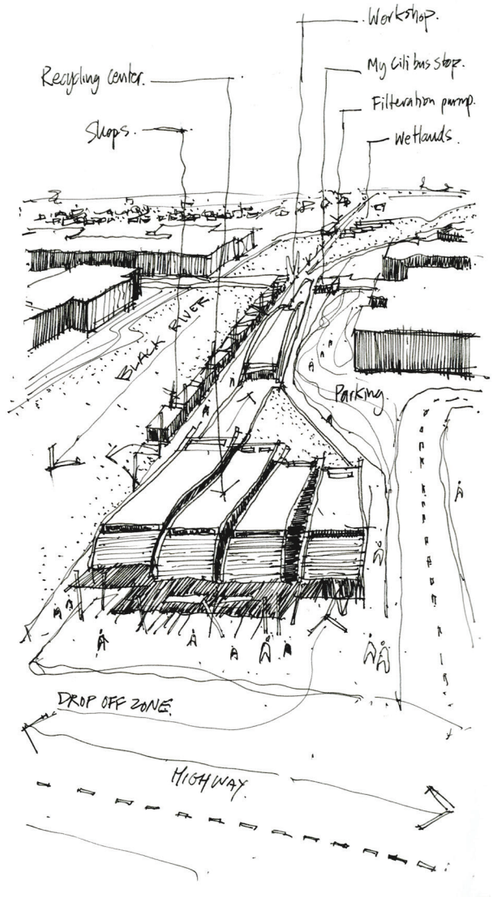


fig. 51. Early 3D massing sketches.

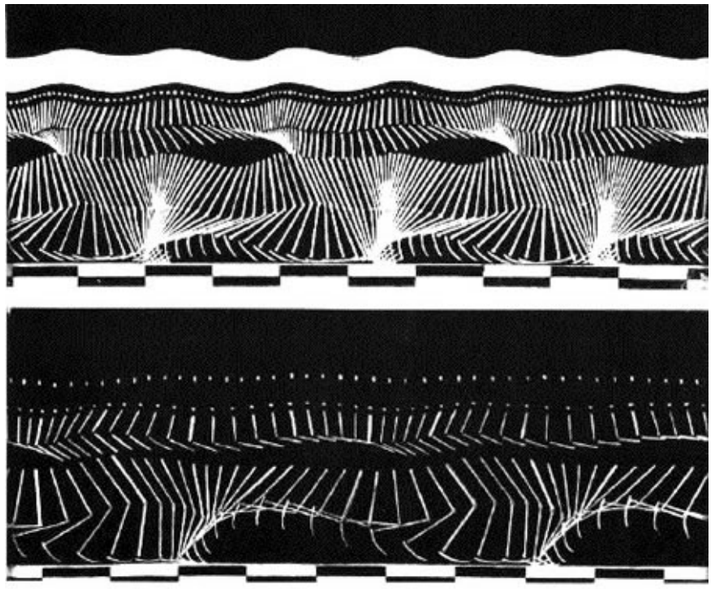


fig. 52. Chronophotograph locomotion study of a man walking, 1870, by Etienne-Jules.

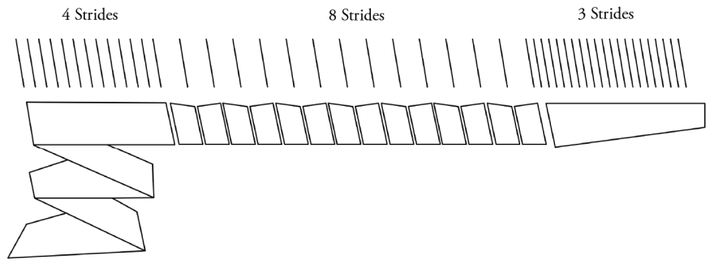


fig. 53. Diagram illustrating the structural rhythm of the bays that relates to the walking stride of a person.

Rhythm

"A line is a long, stretched note. Everything can happen there, from the initiation of a gaze to the echo of a shadow or a sound. When the line is located in a specific place all is registered in its volume, in its density: Objects and happenings are marked with its presence." – Adrian Luchini (Luchini, 1999)

The importance of rhythm in architecture is based upon architecture's relationship to natural human rhythms (Laseau, 1937). Walking then becomes the connection to the architecture. Just as music presents audio rhythms, the architecture needs to display visual rhythms (Laseau, 1937). In architecture the principle meaning of achieving visual rhythm is the spacing of structure, and in walking, the principle meaning of achieving rhythm is through the length of a human stride.

The average walking stride of a human is around 780mm, and this then began to determine the structural grid that defined the building itself. The long linear route is then divided up into a series of repeated rhythms that relate to the length of a foot stride, in order to provide a human connection to the architecture. The route can then be broken up into different moments along the journey, creating a system of 'forest like paths' that draw you into different spaces. The placement of spaces become an important marking along the journey, and the play between walking and structure can also start to relate to one another as a coherent interconnected system.

The number of strides along the building then corresponded to the interior spatial conditions. For example the decision to make the apartments a three bedroom double volume flat, then helped to determine the most comfortable standard width of a three bedroom apartment. This was worked out to be around six metres, which translated into eight human walking strides, therefore defining the apartment dimension width as 6240mm. This process was used to define the structural rhythm along the path, relating to all the spaces including the walkway, the recycling centre and the MyCiti bus stop.

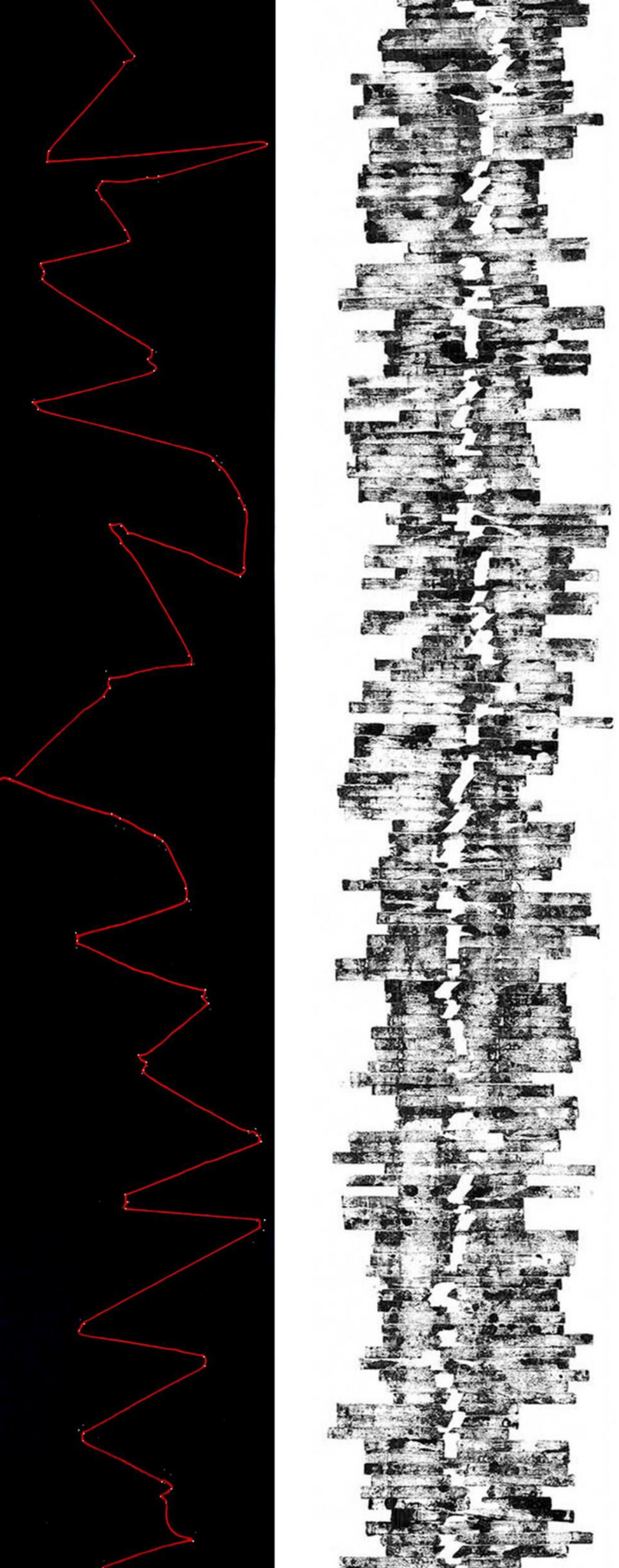


fig. 54. First task, left 'invisible space', right 'invisible line'.

The idea of line with a series of rhythms also connected to the artefact I created at the beginning of the year. The artefact developed from my original interest in structure and the making of things. It utilised pieces from a wooden dowel, in an attempt to try and connect all the elements together at one single junction without the use of any glue or fixing. The process progressed by cutting and carving away at the wood at various angles, to create an abstract object that could be dismantled and reassembled.

After creating the artefact, the first task required me to, "Expand all the lines of your artefact until they become spaces themselves." This made me ask, what is a line? Initially my first thought was to extend all the corners of my artefact, or repeat the object's patterns to create a space. I realised that I was interpreting the task in a very literal manner, and I then started to look at more abstract ways of exploring the lines and spaces that the object makes. These are the invisible spaces and forms that any object can create. The first experiment of the 'invisible line', involved the rolling of the assembled artefact along a blank page, marking the various points where it touched the surface. These points were then connected in order of sequence, to create the 'invisible line'. The second experiment the 'invisible space' used each singular disassembled element as a painting tool, which was pressed along a page. This repetition then started to create a pattern of the 'in-between space' formed by the joints in the wood.

These initial tasks at the beginning of the year helped develop my ideas of the path as a long linear route that is then divided up into a series of rhythms.

fig. 55. Initial artefact.

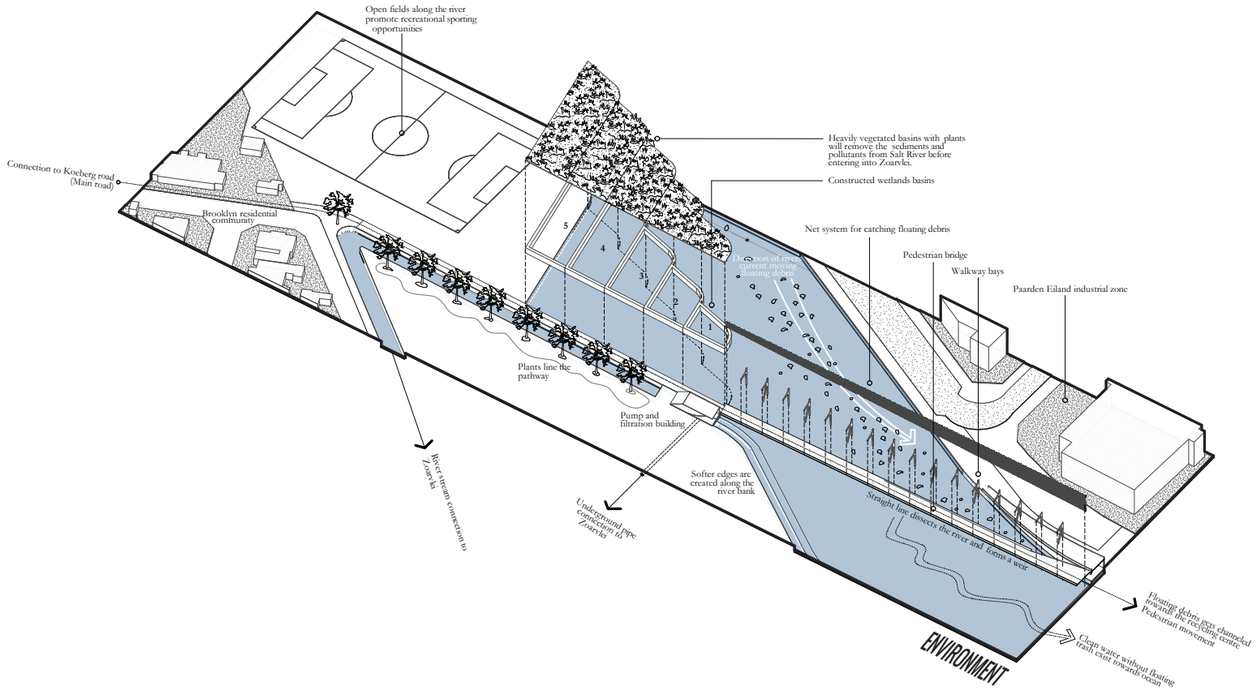


fig. 56. Exploded axonometric drawing of 'The Environment'.

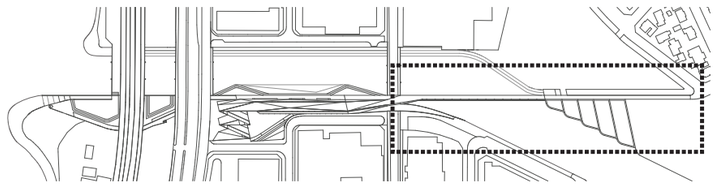


fig. 57. Plan showing the location of 'The Environment'.

Urban scheme

Through a close reading of the site the problems of flooding, pollution, fragmentation, isolation, crime, and unemployment emerged. Subsequently the project then attempts to provide a solution to these issues, as a series of programmatic conditions that would be placed along the path. The design is broken up into three urban schemes: the environment, the everyday, and the play.

The environment

The environment portion consists of the revitalisation of the urban river. A proposed reconnection of both the Zoarvlei and Salt River system, through the means of a pump and river stream channel, will provide an inlet and outlet of water that will eliminate flooding during winter and drought during summer. This will ensure a constant river water level all year round. Zoarvlei will act as an overflow water catchment outlet for the river. However, due to the chemically contaminated water in Salt River, there needs to be a primary treatment process before the water enters the vlei. Therefore the constructed wetlands will line the river banks to filtrate the polluted water and act as a 'green' landscaping element that also softens the edges of the river. The cleaning up of the environment will in turn increase the desirability of the area, where the large open fields along the river banks can be used for sports and recreational uses.

In turn, the extension of the straight line bridge will divide the river into two portions through which a net system can be released to channel floating debris such as litter and floating plastic bottles that would otherwise be carried out to sea or collected along the river towards the 'Everyday' portion. This system diverges the pollution to the one side of the river by forming a weir and creates a cleaner river's edge on the other.

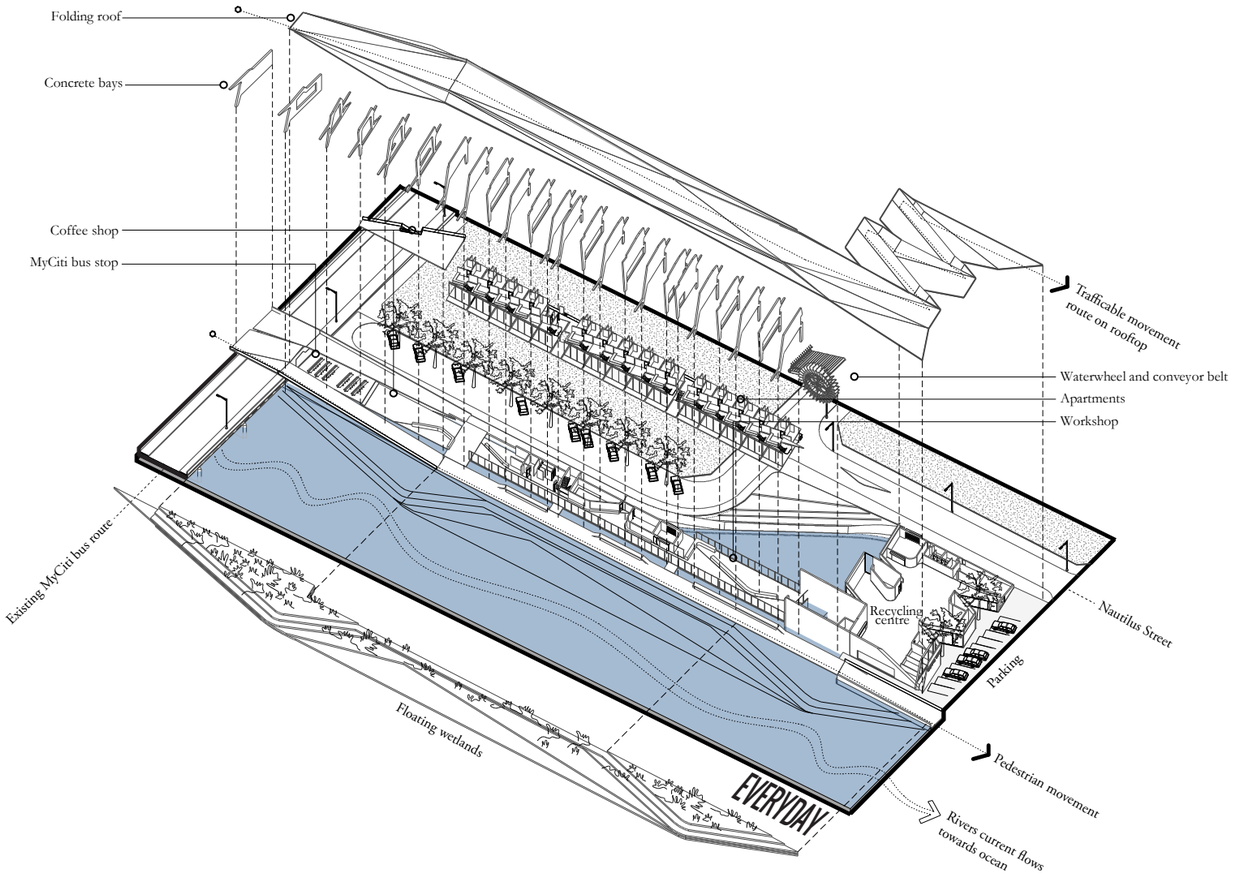


fig. 58. Exploded axonometric drawing of 'The Everyday'.

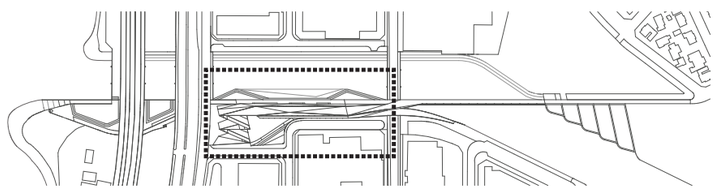


fig. 59. Plan showing the location of 'The Everyday'.

The everyday

The everyday portion is situated in the industrial zone; it is the life blood to the design. This is the area that will become most active throughout the day as it becomes the common place where people work and live, mixing both conditions of public and private.

After the floating river waste is channeled, it is shifted towards the head of the design that consists of a small scale recycling facility that collects the waste from the river. The plastic waste is then taken through its necessary recycling stages from sorting, cleaning, processing, to the final recyclable product. After this, the recyclable product is transferred to a small scale community workshop to provide a place for artisans, community members, children and unemployed people in surrounding areas to make and build things using the recycled waste from site. With the use of the advanced technology of 3D printing, the workshop can 3D print elements from the recyclable plastic product into components for either the design (such as floating wetlands) or goods to be sold at an outdoor market for a profit in the 'Play' portion of the design. The manufactured elements of the floating wetlands will line the edges of the path to filtrate and clean the chemically contaminated river and provide a landscaping element for public enjoyment.

Both the recycling centre and the workshop are aimed at increasing public participation and employment within the community, and can be run by NGOs and local authorities. Situated above the recycling centre and workshop are double storey residential apartments located along the river's edge to generate income for the project. Access to 'the everyday' is provided through an existing MyCiti bus route that runs through the site, and will become the 'nodal' entry point to the design, and serve as a public access point for the path.

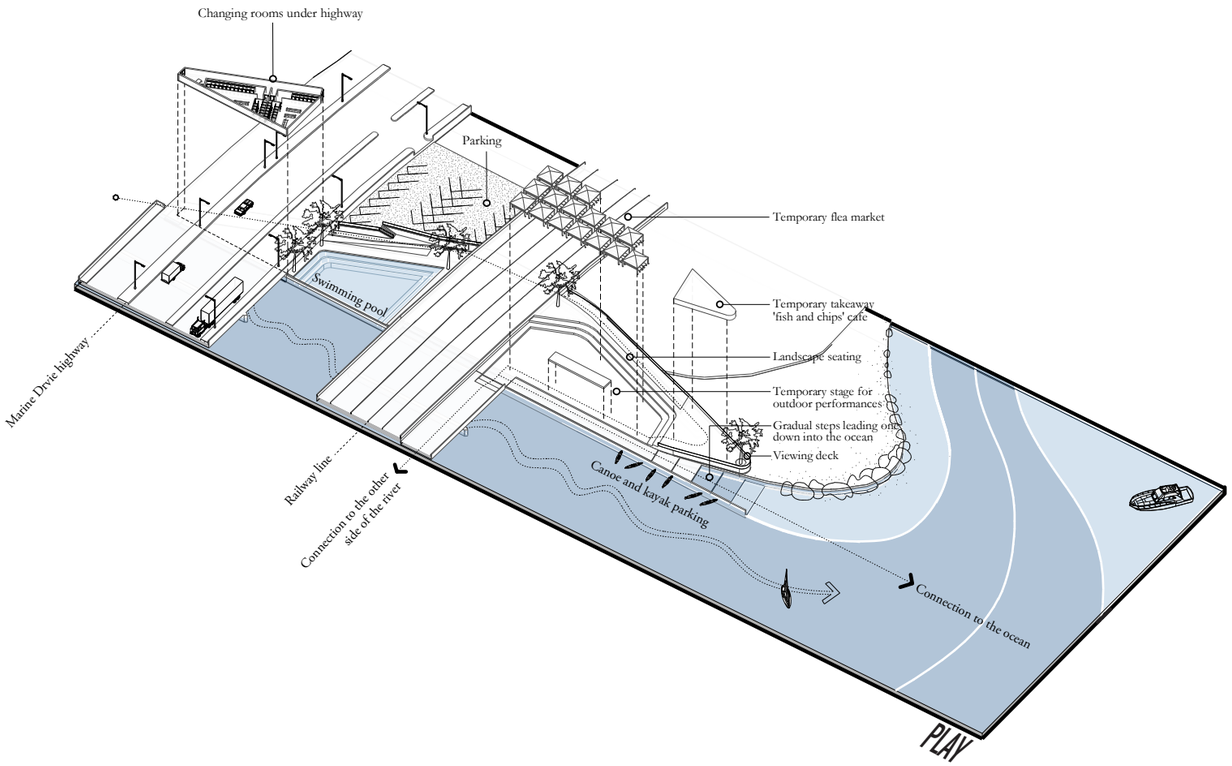


fig. 60. Exploded axonometric drawing of 'The Play'.

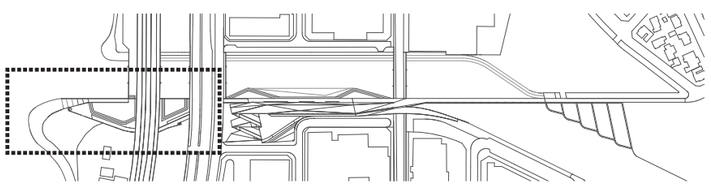


fig. 61. Plan showing the location of 'The Play'.

The play

Located towards the end of the design are the play spaces. These become destination areas that draw people along the path and provide a reconnection to the water's edge. The programmes occupy the underutilised junctions of awkward spaces that are formed between the two transport systems, such as the Marine Drive highway and the railway line. The movement along the pathway will subtly weave under the transport systems, verses bridging over and become domineering. Numerous entertainment activities have been placed in this space, creating a sense of enjoyment, and utilising the urban river.

One of these entertainment spaces is a large swimming pool that is wedged between the highway and railway line. It floats above the river to provide panoramic views of the city. This space is purely for enjoyment, relaxing and soaking up the sun, whilst enjoying the benefits of the clean river. Under the highway sits the change rooms for the swimming pool, which also activate the dead space under the highway. Lights along the path and under the highway will ensure safety during the night.

Towards the end of the design is a viewing deck looking out towards the ocean, which provides a tranquil setting as an end point to the journey. Steps then carry one down to a large open platform that can be adapted to provide a market space, a place to eat and picnic or an amphitheater for small plays and concerts. The usage of these numerous activities will vary, and can be organised by the community. The existing railway line bridge will also provide access to the other side of the river.

The final stage of the design consists of gradual steps that lead one down onto the sea water's edge, and support recreational opportunities allowing one to tow a kayak, canoe or surfboard down into the ocean.

IMAGINATION

Imagination is a one of the most powerful human abilities. It uses the creative power of the mind to form images that are not present to the common senses. Architecture is a form of imagination, which is brought to life. Hence design techniques that push the boundary of what is imaginable can lead to new possibilities.

In understanding the programmatic response of the site, the architecture needed to become a hybrid – a multi-functional design approach that merges landscape, building and infrastructure into one. The landscape being the medium through which to formulate and articulate solutions for the pressing environmental issues faced within Paarden Eiland. The infrastructure being the basic physical and organisational structure of the path that provides a pedestrian connection, and the building being the spaces that support a variety of programmatic conditions. It became an attempt to engage with all three conditions in order to achieve a dynamic structure that begins to push architecture in new ways.

This led me to explore some of the pre-existing infrastructural conditions on site, such as the typology of the precast concrete bridge. Here, the system is designed to perform a single task, both functional and economical. Precast concrete elements are normally assembled on site, which consists of a post and beam construction. The system can repeat itself along its course, and offers a very high speed mode of construction. Concrete is used for robustness, with flanged edges to stream line the columns against the constant battering of the water current. It works well as a linear engineered system that can be repeated; however it is limited to only a horizontal and vertical system. Instead I was seeking an architecture that would combine the idea of landscape, building and infrastructure, a dynamic structure that provided a continuous surface, merging wall, floor, and roof into one, to provide a network to areas that once may have been inaccessible.

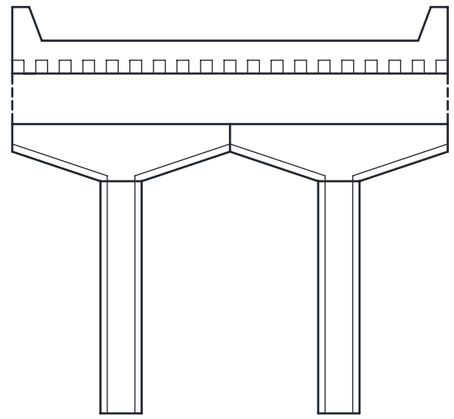
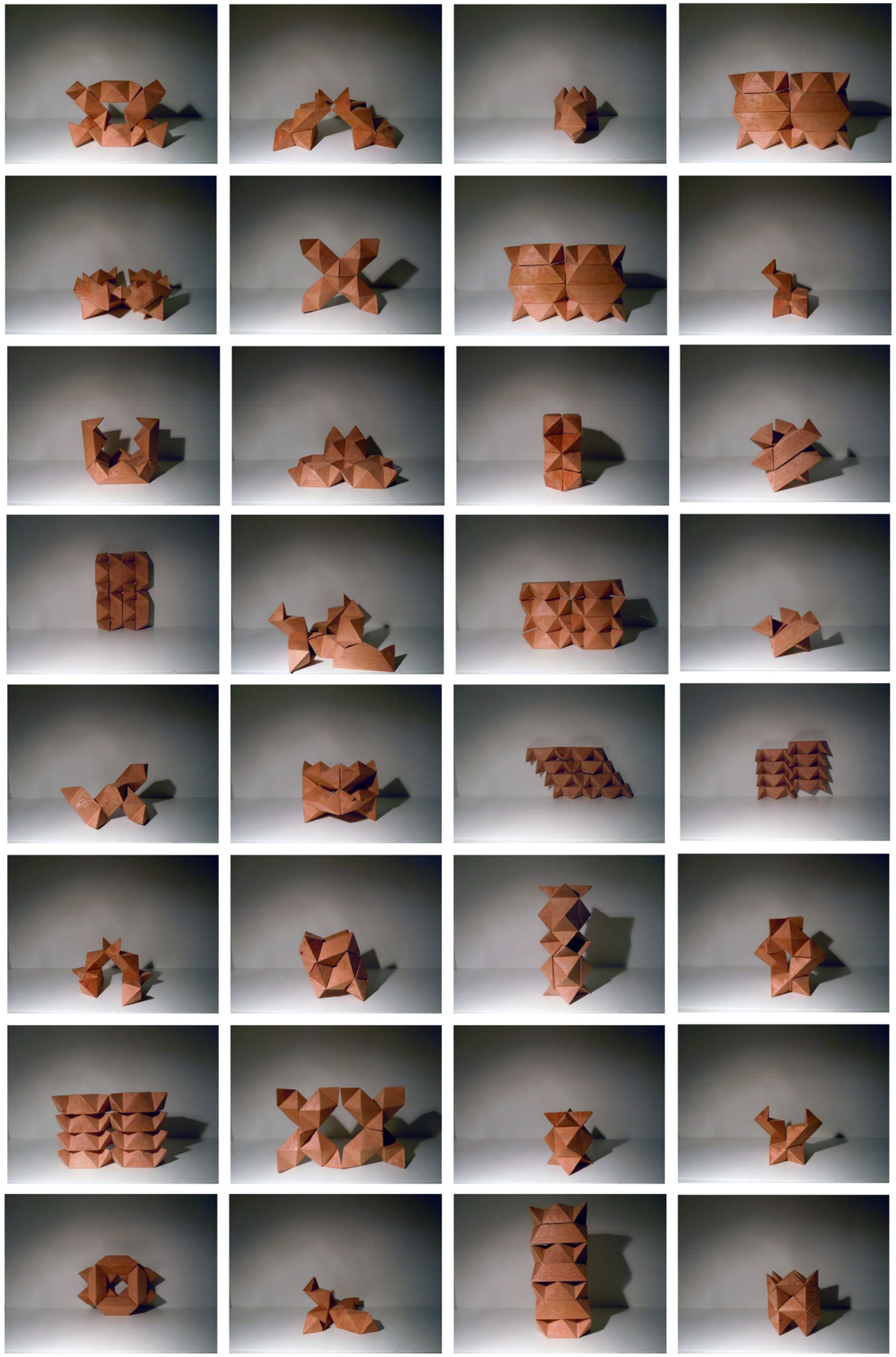


fig. 62. Above. Standard precast concrete bridge system. Using a 'post and beam' construction, it is limited to only a horizontal and vertical direction.

fig. 63. Left. Experience of light under the Marine Drive highway.



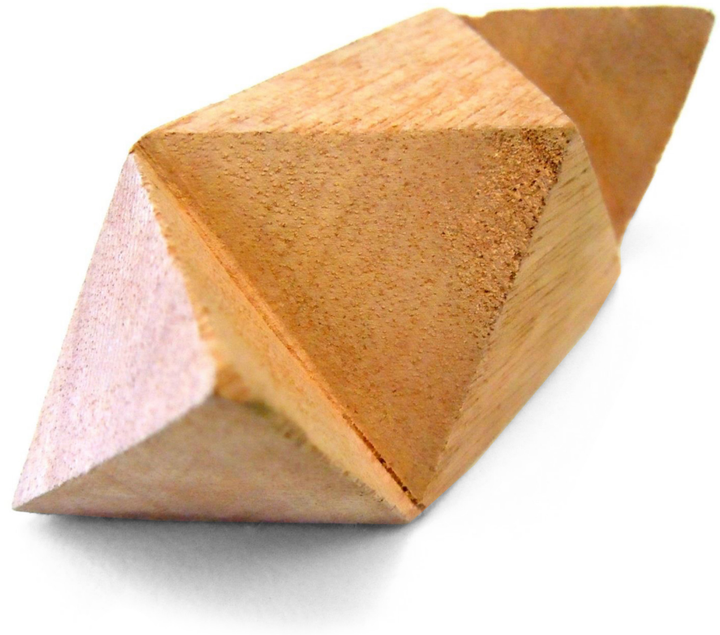


fig. 64. 'Simplicity vs complexity' object.

Experiments at the beginning of the year led me to explore the notion of 'simplicity vs complexity'. The object itself being a piece of wood cut at 45 degree angles that becomes the positive space into which other identical objects can fit. These experiments opened up my imagination to different types of interesting orthogonal shapes, which would be created through the repetition of this singular object. The same idea of experimentation with form led me to explore the construction of folding form as a system that would be used along the path of the design.

fig. 65. 'Simplicity vs complexity' pattern studies.

Folding

In keeping with the existing material site condition of concrete, I was led to explore the technology of a folded plate system where steel-reinforced concrete can be used. Folded plate structures are flat plates or slabs inclined in different directions to form a three-dimensional structure that distributes loads along the surface and between its folds and seams (Aroni, 1964). Some advantages of the folded plate system are that rigidity and strength is provided through its form. Construction costs are usually low, due to relatively simple form work, which can be repeated. It can also create aesthetically pleasing structures, through a variety of different shapes and forms. It can provide a key solution to my inquiry into a continuous surface where wall, floor and roof become one – an architecture that delivers a variety of programmatic conditions but still reads as one element.

Folding requires no addition or subtraction of elements (Terzidis, 1962). A two-dimensional plane can be inverted or reverted to reveal a multitude of three-dimensional surfaces. This hidden trans-dimensional property is also relevant in nature (Terzidis, 1962). “Proteins fold and intertwine to form larger structures. Snakes and fish fold and unfold to slide,” (Terzidis, 1962). In the human body almost any motion is a form of folding. This connects back to the motion of walking along the path, now as a series of folding and unfolding of limbs. Each human ligament is designed to be at a certain location to allow particular elaborate folding motion for maximum handling, touching, movement, rotating and feeling (Terzidis, 1962). In the same way architecture can fold and unfold to accommodate certain spaces.

The idea is that by opening a fold in a surface one can create spaces that become volumes in our minds, pushing the imagination. Therefore the technique of folding can reevaluate each step, and each step is laden with potential (Vyzoviti, 2003). Through the act of bending and experimenting with folds, the designer can be liberated, by removing any preconceptions that occur during the design thought process. Folding can allow for accidental and unknown outcomes, which can push the design towards different paths that were previously inconceivable. This opens up the imagination, in order to find alternative solutions to problems.

Finding form through folding has been an exploratory process that allowed me to engage with a particular problem through understanding and confronting it in all its relationships (Vyzoviti, 2003). It became a generative process, a challenge that delivered great individual possibilities. It led me down a path of experimentation, which was not only an important aspect of the design but also an important individual learning process.

The next design development phase, focused on the ‘everyday’ portion. This was the most important and challenging space that had to fuse a variety of different programmatic conditions. Set design parameters were defined where the building needed to span over the water, channeling waste underneath it, providing a visual link down into the channeled waste, and extending a walkway facing the clean side of the river. This needs to be done while spatially incorporating a combination of public programmes, such as the recycling centre, workshop, and MyCiti bus stop, with private residential apartments above that having north facing views opening out towards the river. Therefore the following folding exercises helped in finding a solution that adapted with the above requirements.

fig 66. Initial folding exercise using thin paper strips.

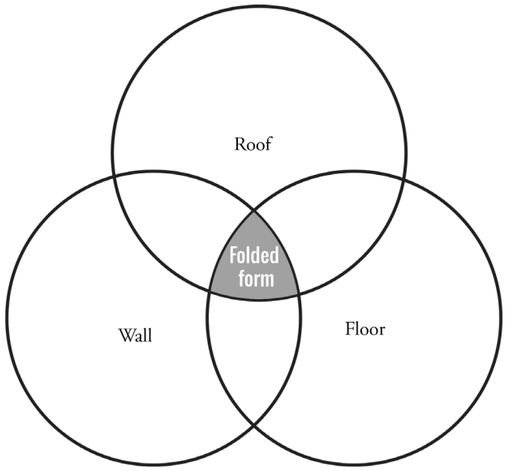


fig. 67. Continous surface, diagram showing folding as a useful tool to merge roof, walls, and floors together.

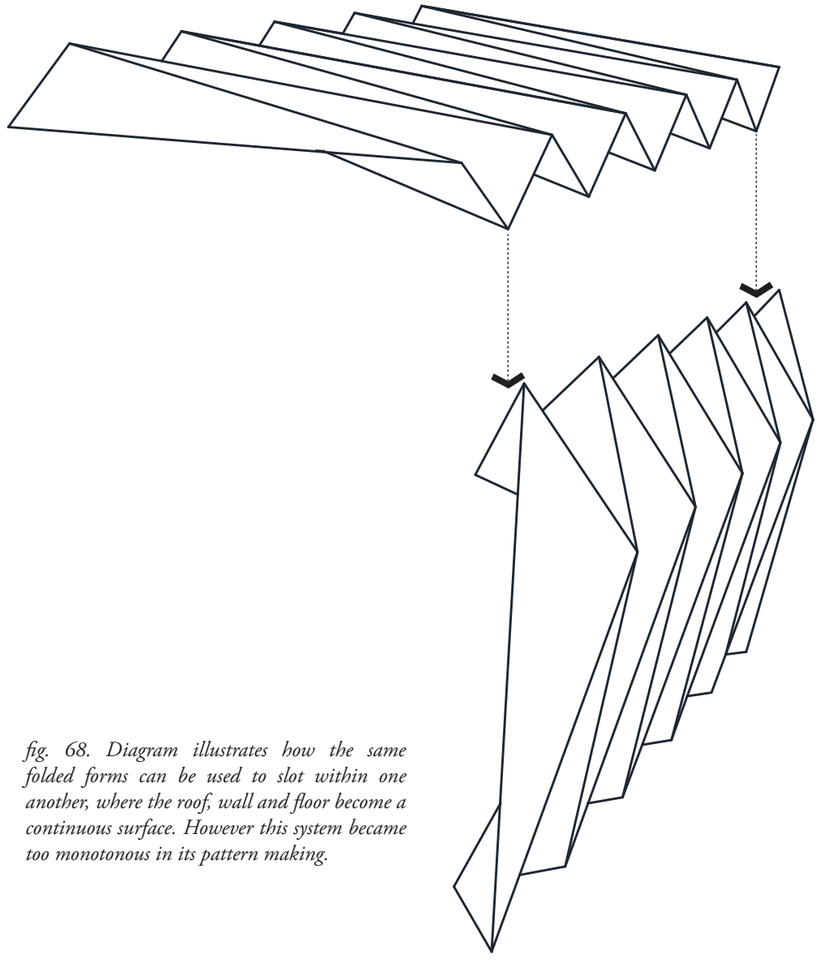


fig. 68. Diagram illustrates how the same folded forms can be used to slot within one another, where the roof, wall and floor become a continuous surface. However this system became too monotonous in its pattern making.

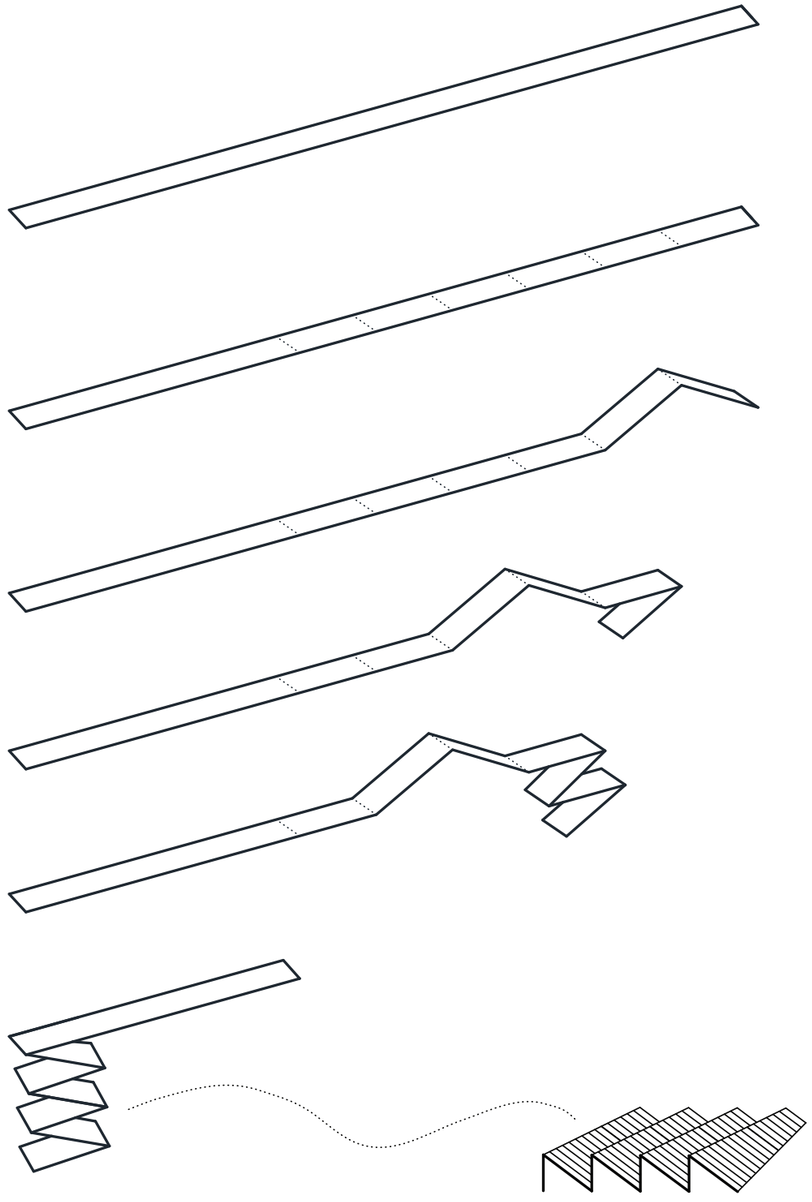


fig. 69. Diagram illustrating the folding of the recycling centre's roof. It mimics the surrounding typology of the traditional saw-tooth roof factories. The 'zig-zagging' of the fold allows the filtration of South light and provides a stepping down for roof top movement.

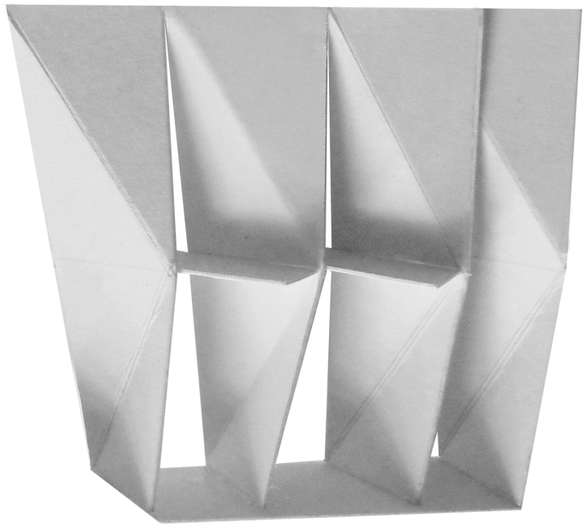


fig. 70. Model experiment of 'twisting column' folding system.

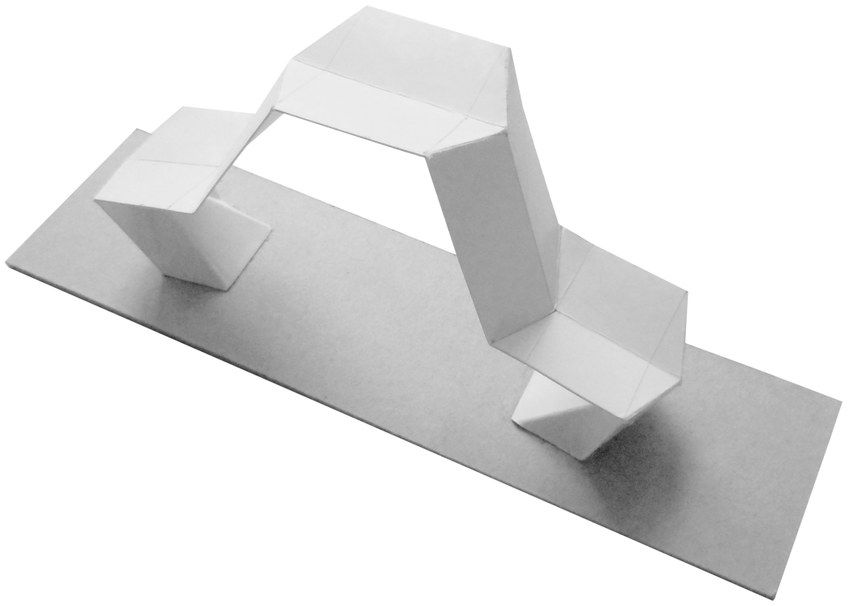


fig. 71. Model experiment of strength through folded form.

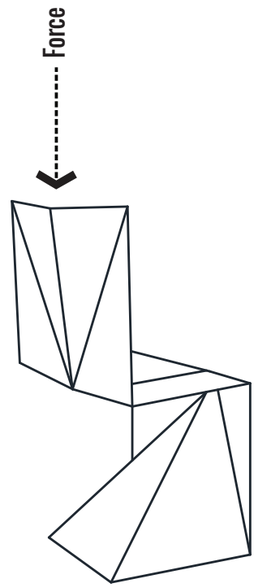


fig. 72. Strength in cantilevered form.

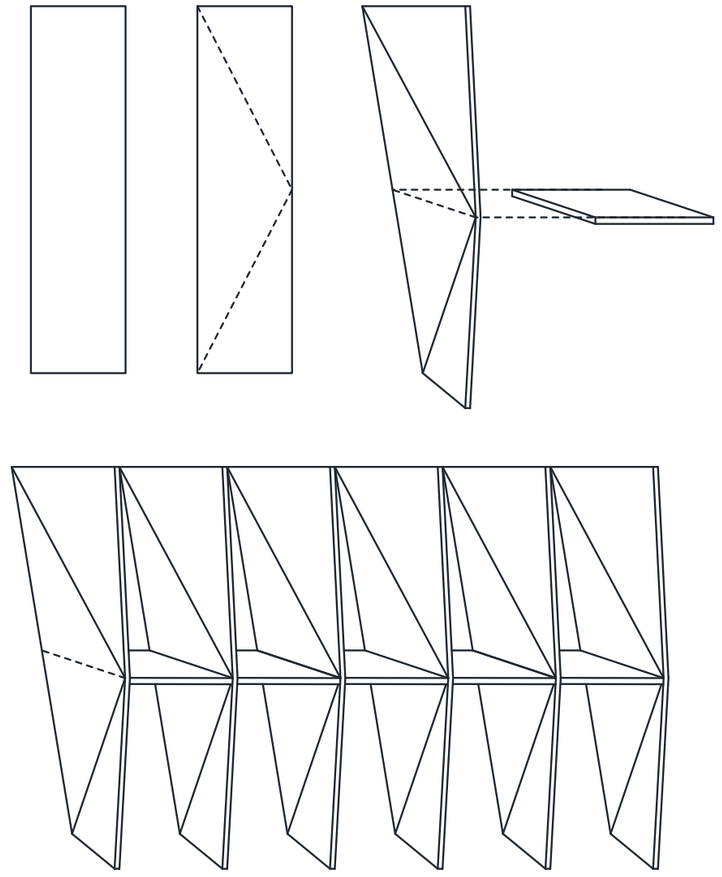


fig. 73. Diagrams illustrating a folding system where a rectangle can be folded and twisted at an angle to make a column that allows for floor slabs to slot in-between. The system can be repeated; nevertheless a challenge arose in trying to create continuity between the folded column and the folding roof above. The system also became to monotonous in its pattern making.

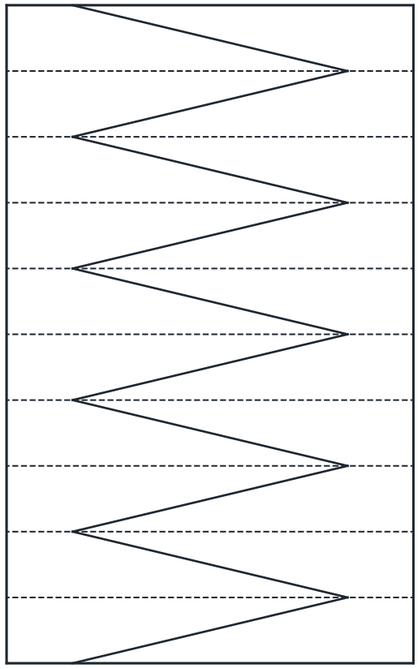


fig. 74. Plan of folded form that opens and closes.

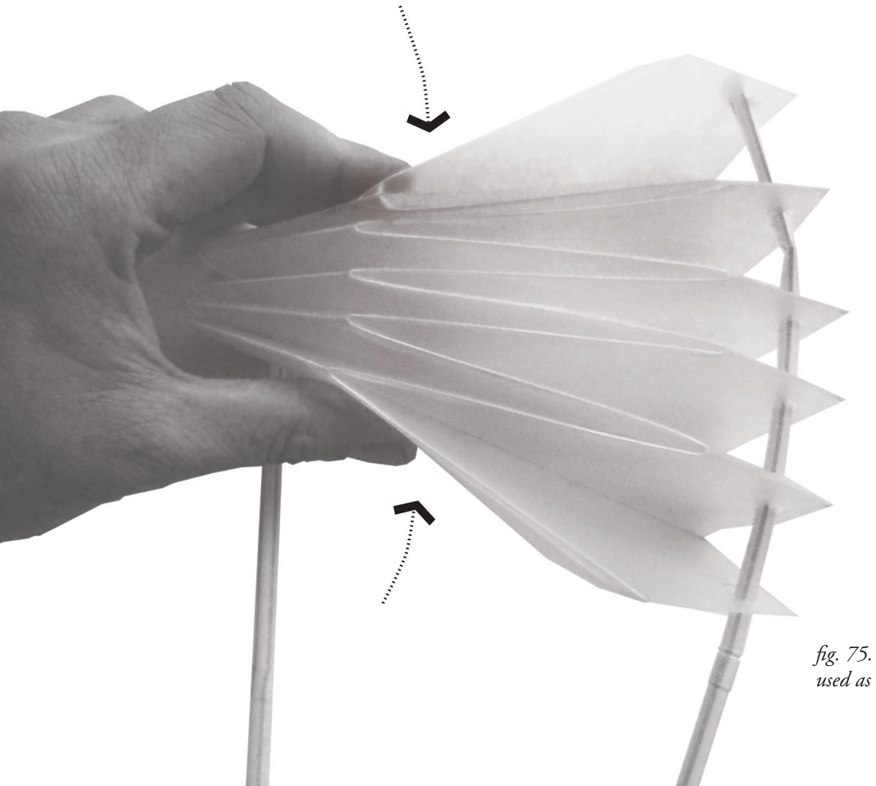


fig. 75. Exploring folds that close, potentially to be used as a façade screen along the building.

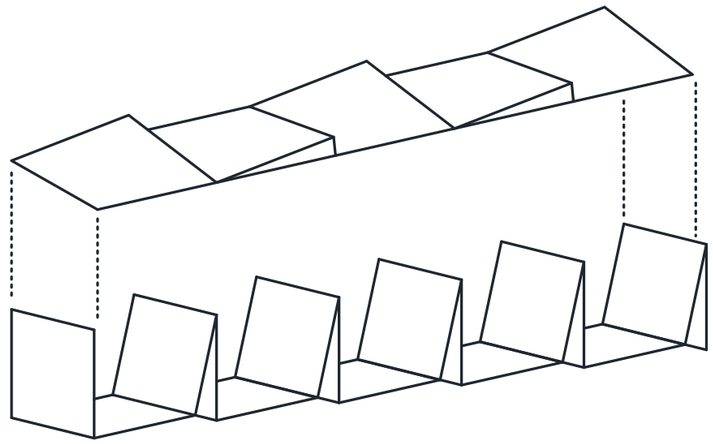


fig. 76. Exploring folded form of apartments with roof and the walls and floor as separate structures.

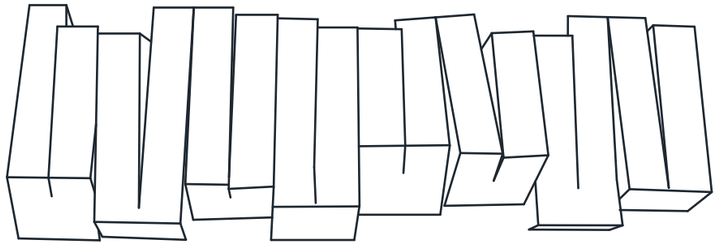


fig. 77. Exploring folded form of apartments as organic irregular cut outs.

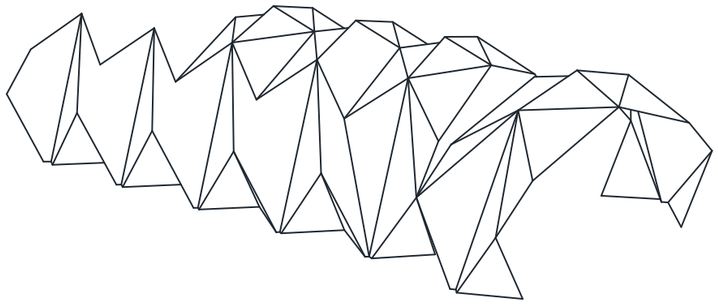
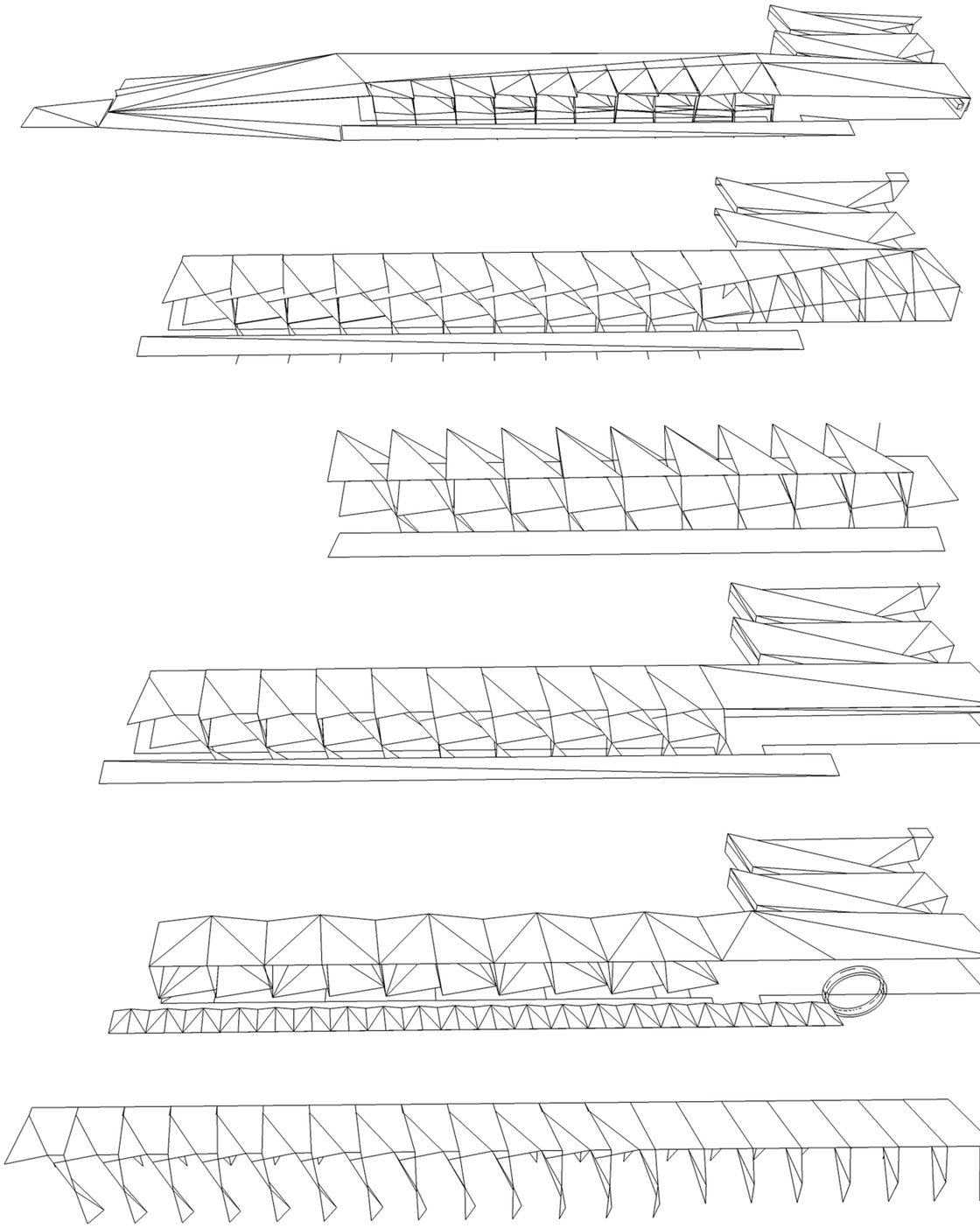
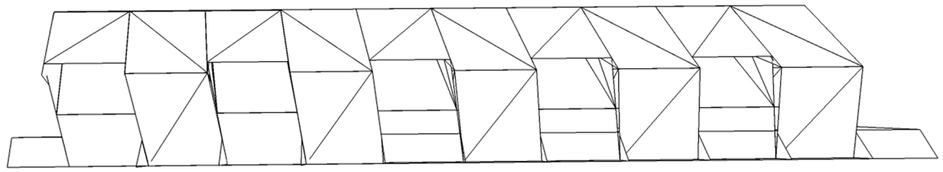
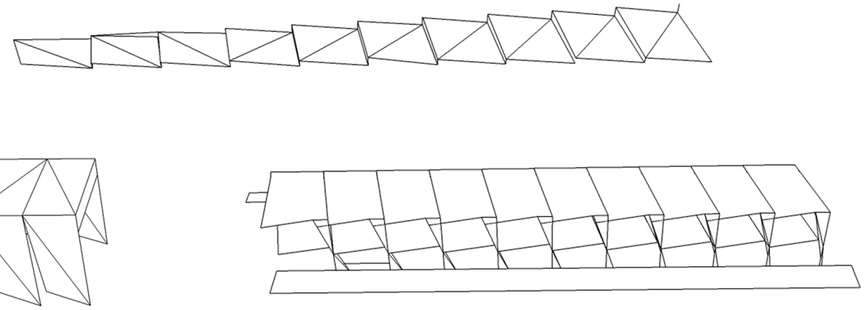
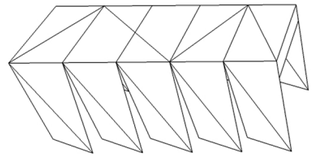


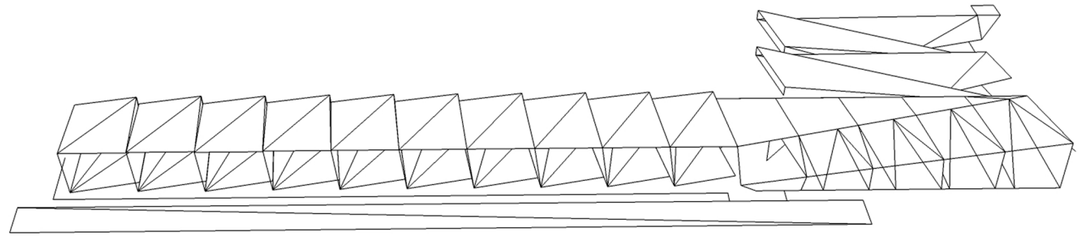
fig. 78. Exploring folded form of apartment's as an organic outer shell system.

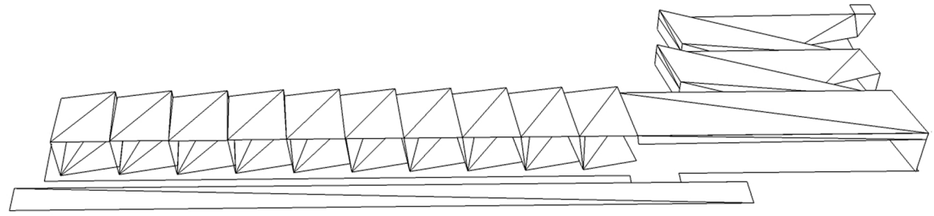












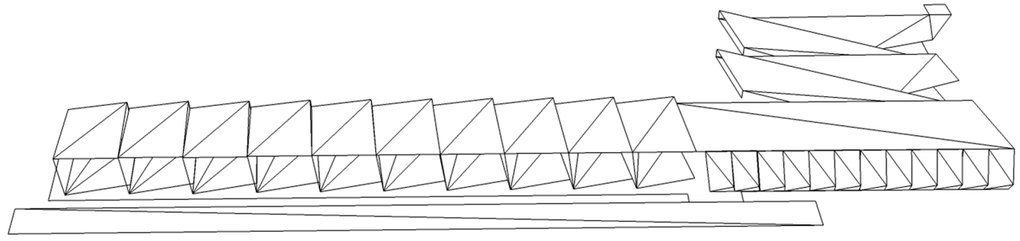


fig. 79. Recycling center and apartment, digital folding explorations.

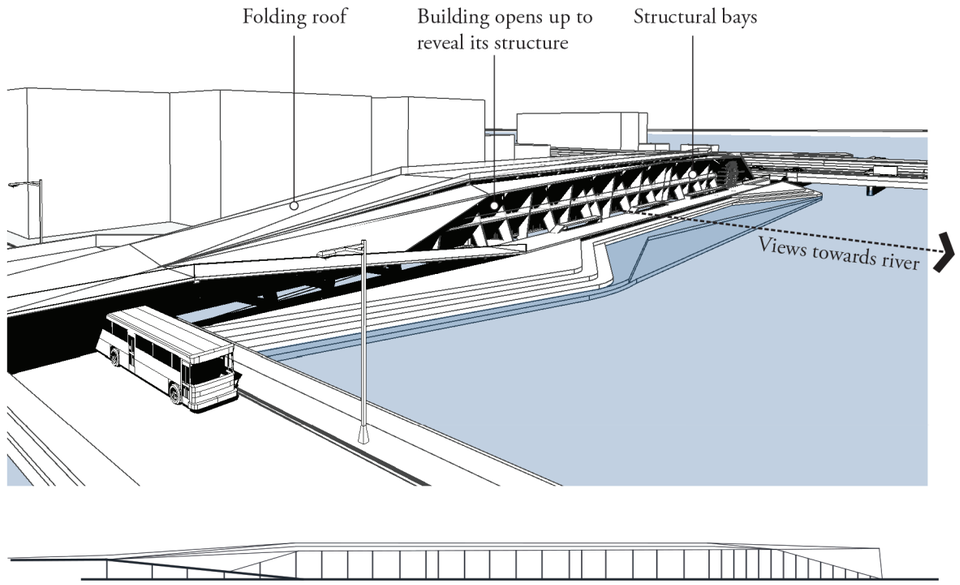


fig. 80. Building opens out to views of the river.

The challenge that quickly presented itself during these explorations was the repetitive geometric structure that the apartments formed, due to the recurring nature of it as side by side spaces. Tying together the two separate buildings of the recycling centre and apartments proved both a structural and formalist challenge. The folded form had a coherent organic nature in its longitudinal direction, acting as a roof that allowed light in and views towards the river. However, difficulty arose once the same element was folded in the vertical direction; it began to express a different language in elevation, due to its need to accommodate the different spaces within the building, in particular the apartments. Both the roof and walls became expressed as different folded forms—the roof being organic and the walls being repetitive, which stretched far from the idea to create a dynamic form that mimicked the typology of the landscape.

I was not interested in creating a monotonous system, instead I wanted the architecture to naturally adapt itself to the given site, where the form and its use mutually benefit one another. Therefore the decision was taken to make the roof a separate free-form, organic folding system with the structure lying underneath it. This made sense in terms of dealing with the way in which the architecture connected down into the river's water. If a folded form was used it would become problematic in both functional and structural terms, because its foundations lie below the water level.

The chosen design then translates into a building that can be read as if the landscape was being peeled away, and underneath this, lies its structure, 'the bays'.

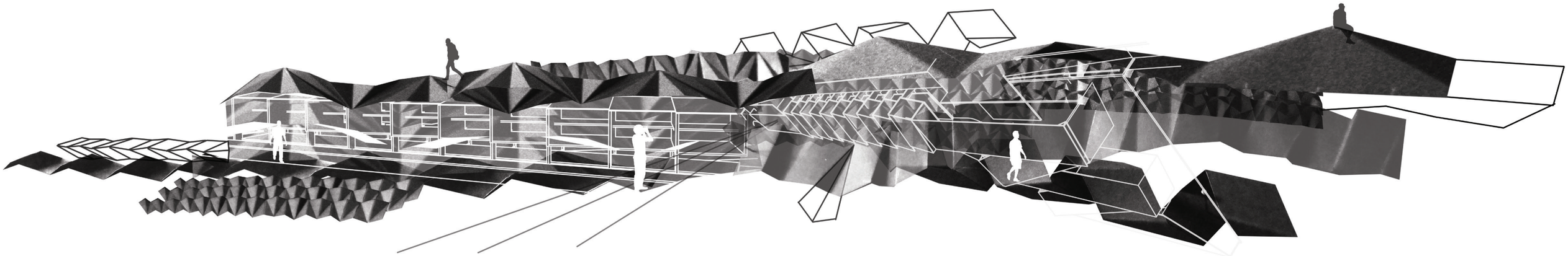
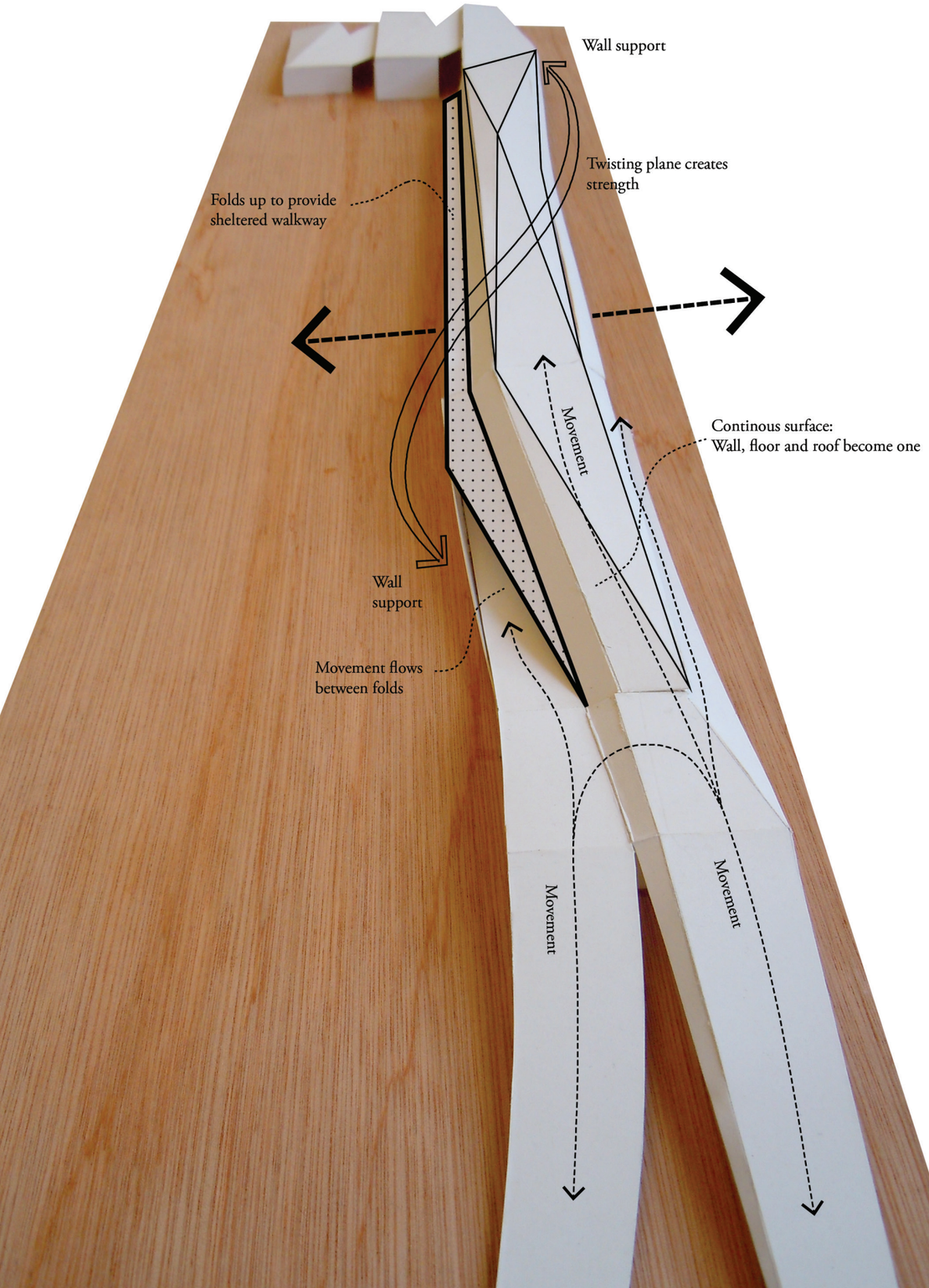
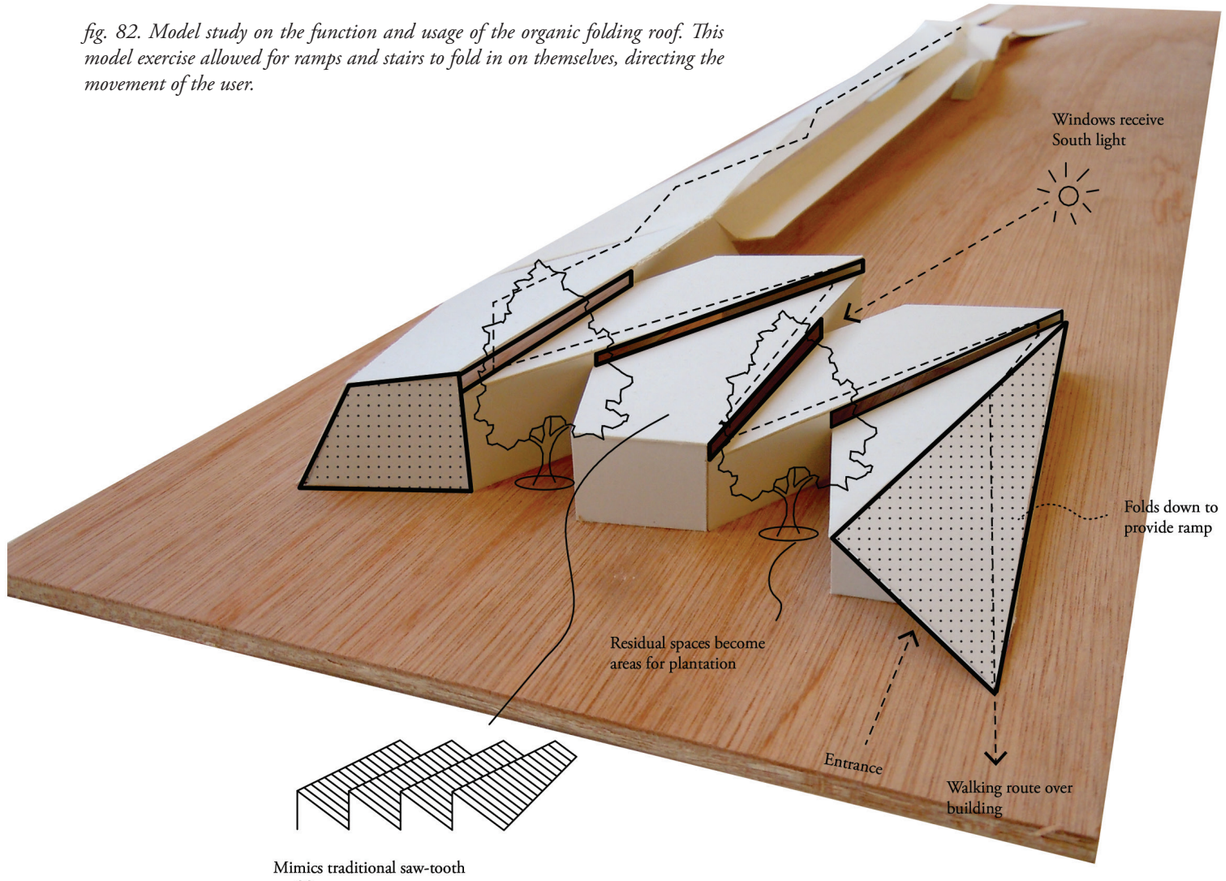
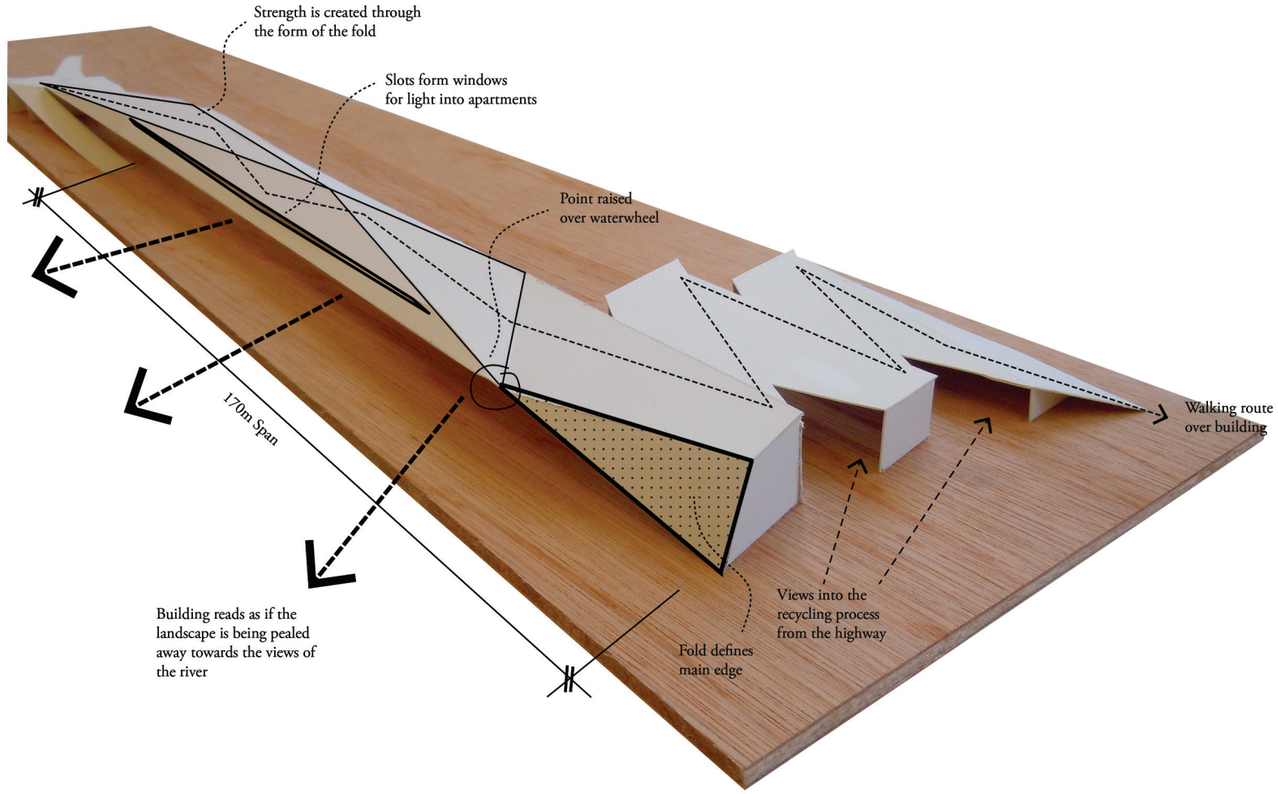


fig. 81. This conceptual collage using my initial models formed an important breakthrough in terms of loosening up the folded forms. It also helped to reassure my design's spatial intentions.

fig. 82. Model study on the function and usage of the organic folding roof. This model exercise allowed for ramps and stairs to fold in on themselves, directing the movement of the user.







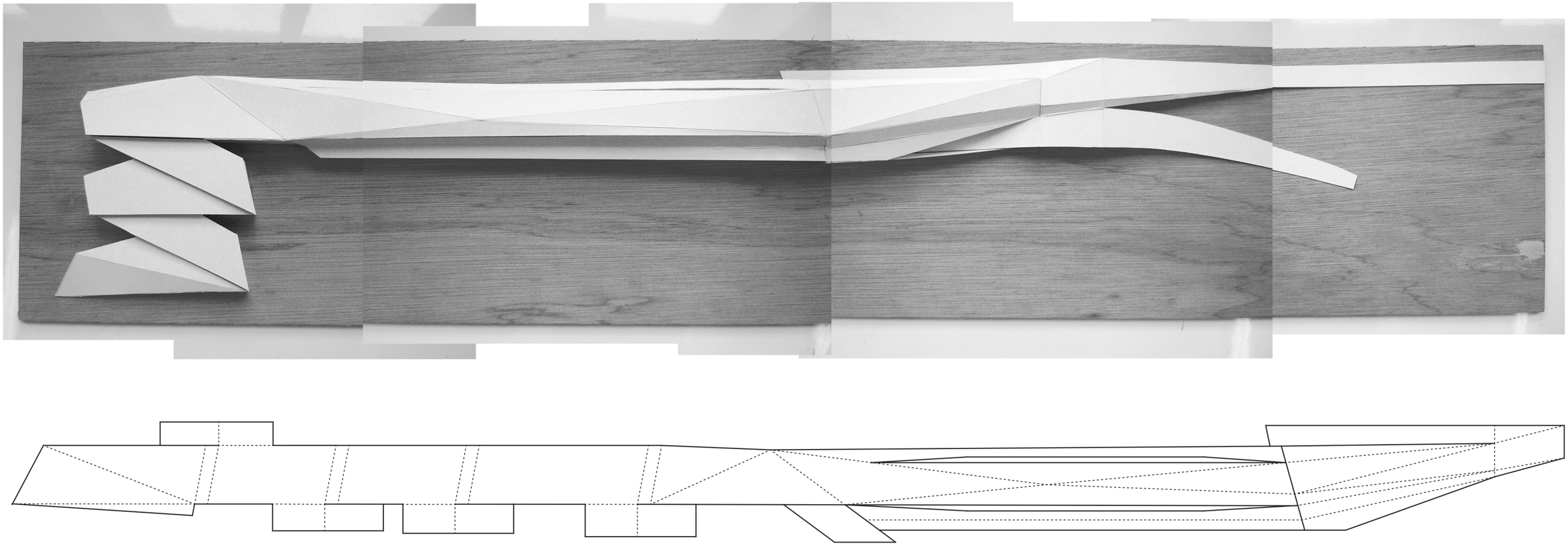


fig. 83. Basic illustration of the building made out of one piece of card, that can be folded into its three dimensional form.

fig. 84. The famous 1855 painting by George Inness of the Lackwanna valley, representing the unification of the pastoral and mechanised landscapes.

MACHINE

The definition of a machine is that which has "several parts, each with a definite function, which when put together perform a particular task" (OED, 2015). The architecture of the design can then be referred to as a complex machine that uses a combination of simple systems, reiterating the idea of small parts forming a whole. This next chapter deals with the technical investigation of the design.

Machine in the Garden

The influential 1964 book by Leo Marx *The Machine in the Garden* addresses the relationship between technology and nature in the American landscape. The book examines the clash "between the pastoral idea of harmonious accommodation to nature and the progressive quest for power and wealth that continues to fuel many of today's environmental conflicts", (Marx, 1964). What is interesting about Marx's view is that the machine becomes a clear object in the landscape; and it is the contact between the engineered object and the earth that creates complete opposites. Like any machine, its use is purely functional and mostly for the benefit of man. Nonetheless, a machine whose purpose is used for the benefit of nature, can begin to uncover positive relations between machine and nature. Man has always been in awe of the large-scale application of technological prowess since the days of the industrial revolution. It is the continuing appeal of the 'technical sublime', which is the beauty that lies in the grand and dangerous (De Mul, 2011).

Therefore I regard my design as an architecture of the technical sublime, which uses technology to draw attention to a particular problem in order to ultimately benefit nature. It becomes an 'architecture of the obvious', a tool of demonstration, which tries to make the problem evident, by bringing into play the definition of both the man-made, and the natural. My belief is that the design will be able to shift people's thinking towards the environment into a new light through the use of technology in the context of nature. The machine and the garden should not be viewed as two separate things, but rather as mutually beneficial with one another.

The following sub-sections are elements in the design that support this idea of the 'machine in the garden'.

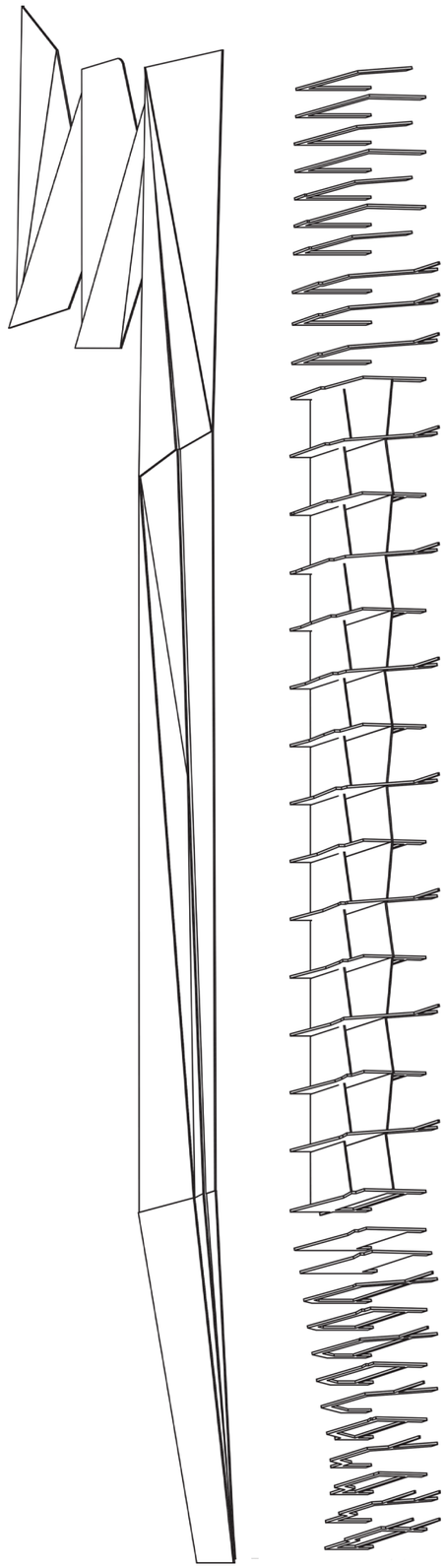


fig. 85. Initial exploration of the 'Everyday portions' folding roof with bays.

Skin and Ribs

In the human form, the ribs act as an enclosure and protection for many of the vital organs, which rest behind them. It is the structure that defines the human form, and is made up of a series of parts, the bones. The skin then becomes the outer layer for which to strengthen and encase the ribs. Together, both the skin and the ribs become vital parts that contribute to the functioning of the human body. Using this concept, the architecture of the folding roof becomes the skin and underneath it lies the structural bays, 'the ribs'. They can be viewed as two separate systems that are interconnected to one another, in the same way the ribs and skin work in the human body so too can the architecture. The architecture then reveals itself and stands out amongst its surroundings, in order to attract and draw the public's attention, so that it can make the problem of the polluted river evident.

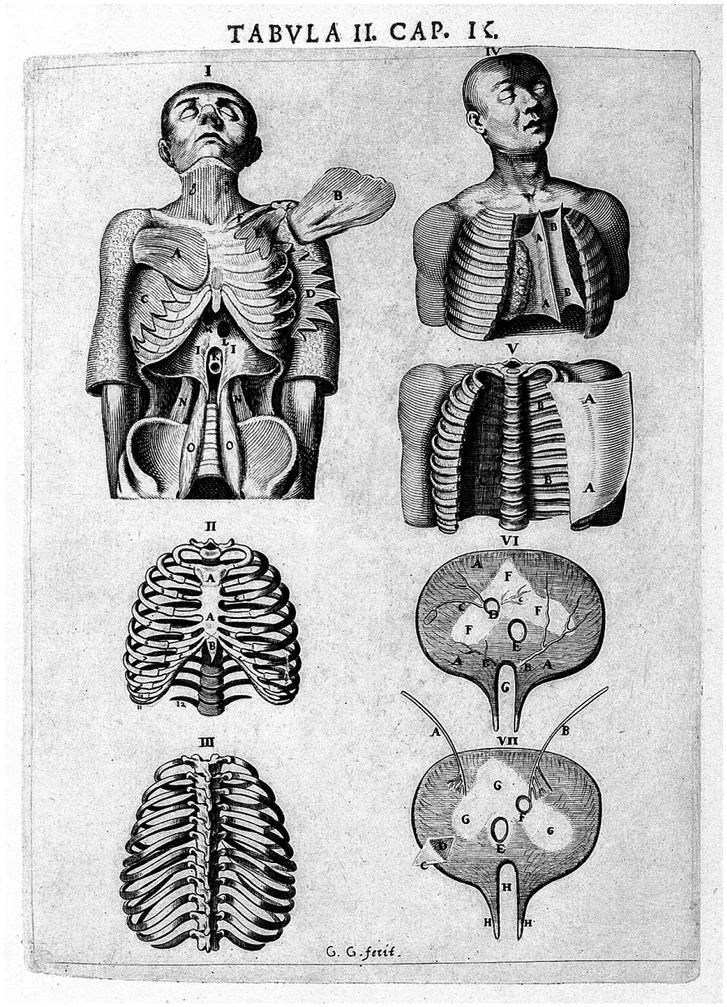


fig. 86. Illustration of the skin and ribs in a human body, Vesling 'Syntagma', 1647.

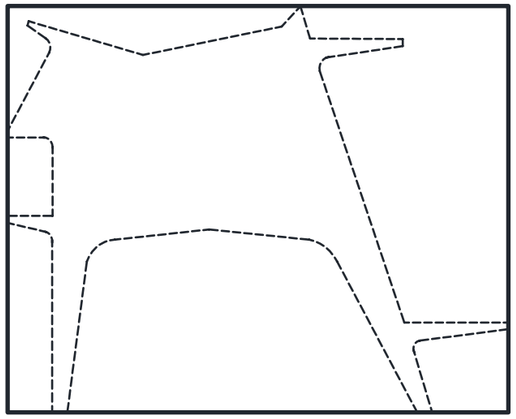


fig. 87. Exploring the notion of a system that can change its repetition along a path. Solid bays are cut out to create positive and negatives space that vary for each section.

Bays

The existing site construction of the 'post and beam' concrete precast bridges can then be explored through a new lens. The notion is that the bays in section are solid elements, which can then be cut out to form positive and negative spaces. The positive spaces become the support structure, such as the walls and columns, and the negative spaces become inhabited areas and areas of movement. The system can then change and repeat itself along the path, accommodating its various programmatic requirements, and acting as a support structure for the folding roof above. It becomes a process of molding the architecture to produce a complex shape that can be changed throughout its path—'the act of repeating'.

This then starts to express an architecture that naturally adapts itself to a given site, and formally challenges the notions of the conventional relationship between infrastructure and building. The 'cut-out' bays in section start to become sculptural elements, exploring not only the structural but the sculpture conditions of which concrete can produce. The architecture of the bays then become a series of variations along the path.

Several architects have had a significant influence on me during the design process, due to their explorations of space. The work of the late Spanish architect Enric Miralles has been a great inspiration. His architecture engages with its users by creating a spatial playground, where the subjects sense the experience of surroundings and self simultaneously. In the creation of his designs he considers the layers of a building and how they form a harmonious vision in space (Cohen. 2005:105). There are clear reflections of physical movements as well as visual connections within his designs.

Miralles worked with numerous models and sections to understand the spatial relationships of the human form within the space. His influential project of the Igualada cemetery in Barcelona, clearly expresses the idea of a section that repeats itself along a path. Many of his works express the notion of a simple element as a series of variations, to produce a complex form.

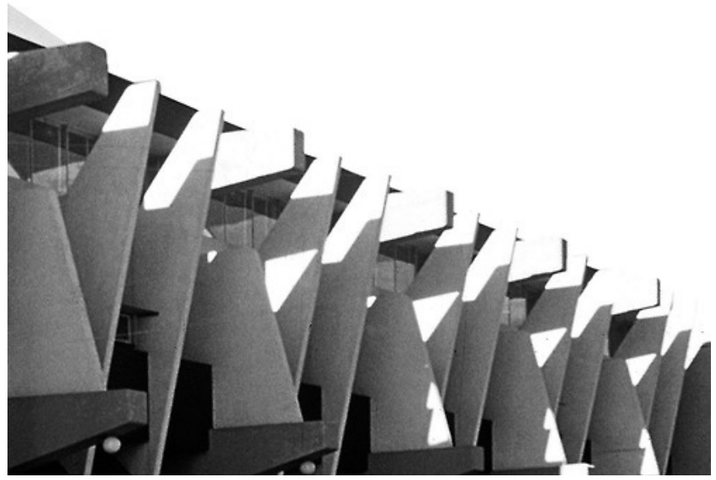


fig. 88. Otto Barbosa office building, 1953 Maputo, Pancho Guedes.

The way in which he worked became an important design influence. In exploring the spatial intentions of the folded form, I found working through digital medium as a very limiting design tool. So I then began to explore the relationship between the folds and the bays through hand drawings, sections, and building models, similar to the process in which Miralles worked. This then opened up many more spatial possibilities.

Another influential architect for me was Pancho Guedes. His expertise as a sculptor and painter allows his architecture to play with the use of concrete as a sculptural material, creating organic shapes that become expressive free-form elements in the landscape (Artefacts, 2015). The Otto Barbosa office building is an example that illustrates the use of concrete bays as a system that can create a sequence of rhythms that alternates irregular and angular forms to become dramatic elements in space that entangle the mind of the viewer.

"*Architecture exists in the imagination, and grows in its reality and is influenced through drawings, photographs, models and reproduction.*"— Pancho Guedes (Green, 2006)

Therefore the bays became an important element within the design, and their forms began to play with the idea of walking as a rhythm along the path. Experiments looked at how the bays could start to shift and generate alternating rhythms that mimic the motion of walking. These bays are also curved on the edges to signify the moment of bending right before the fold.

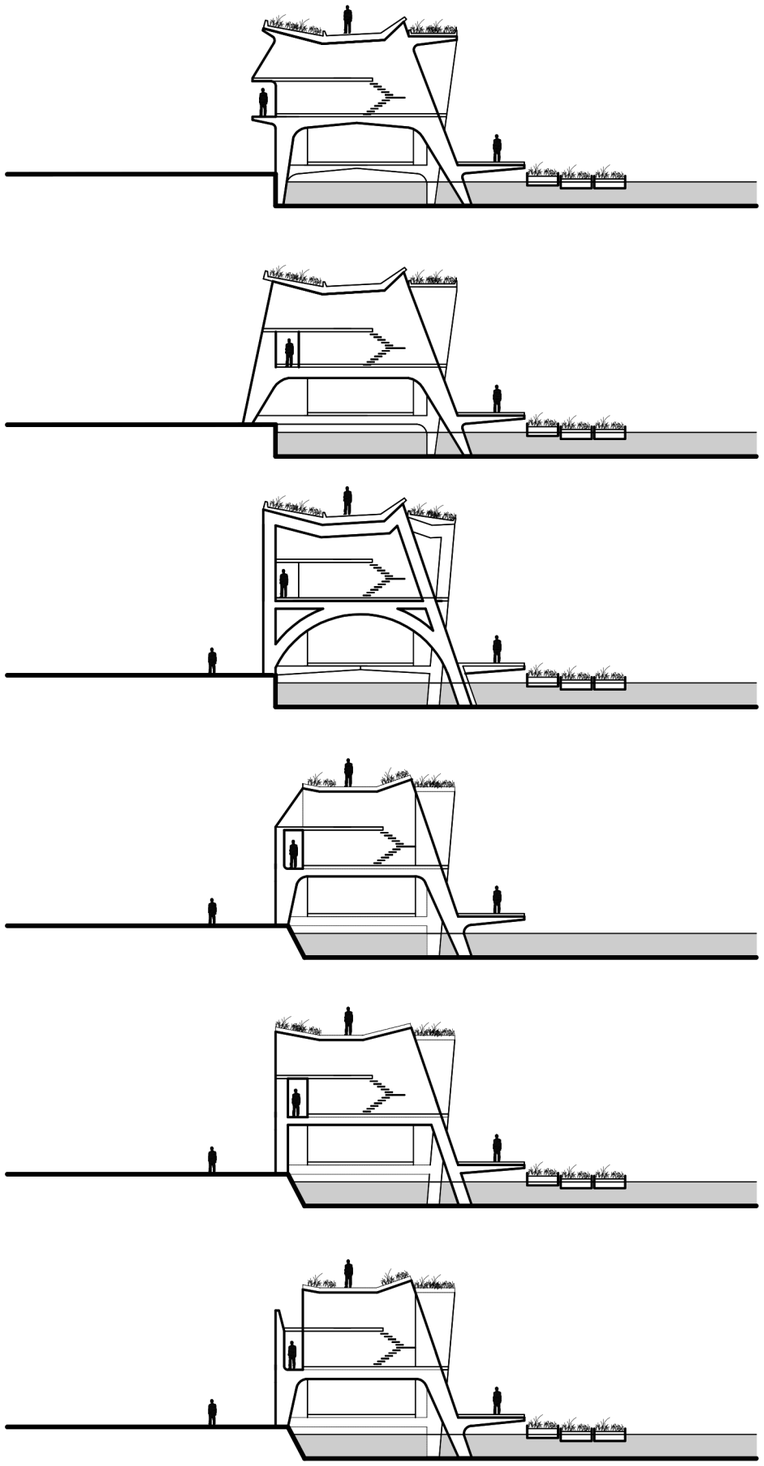


fig. 89. Sections exploring different bay type options.

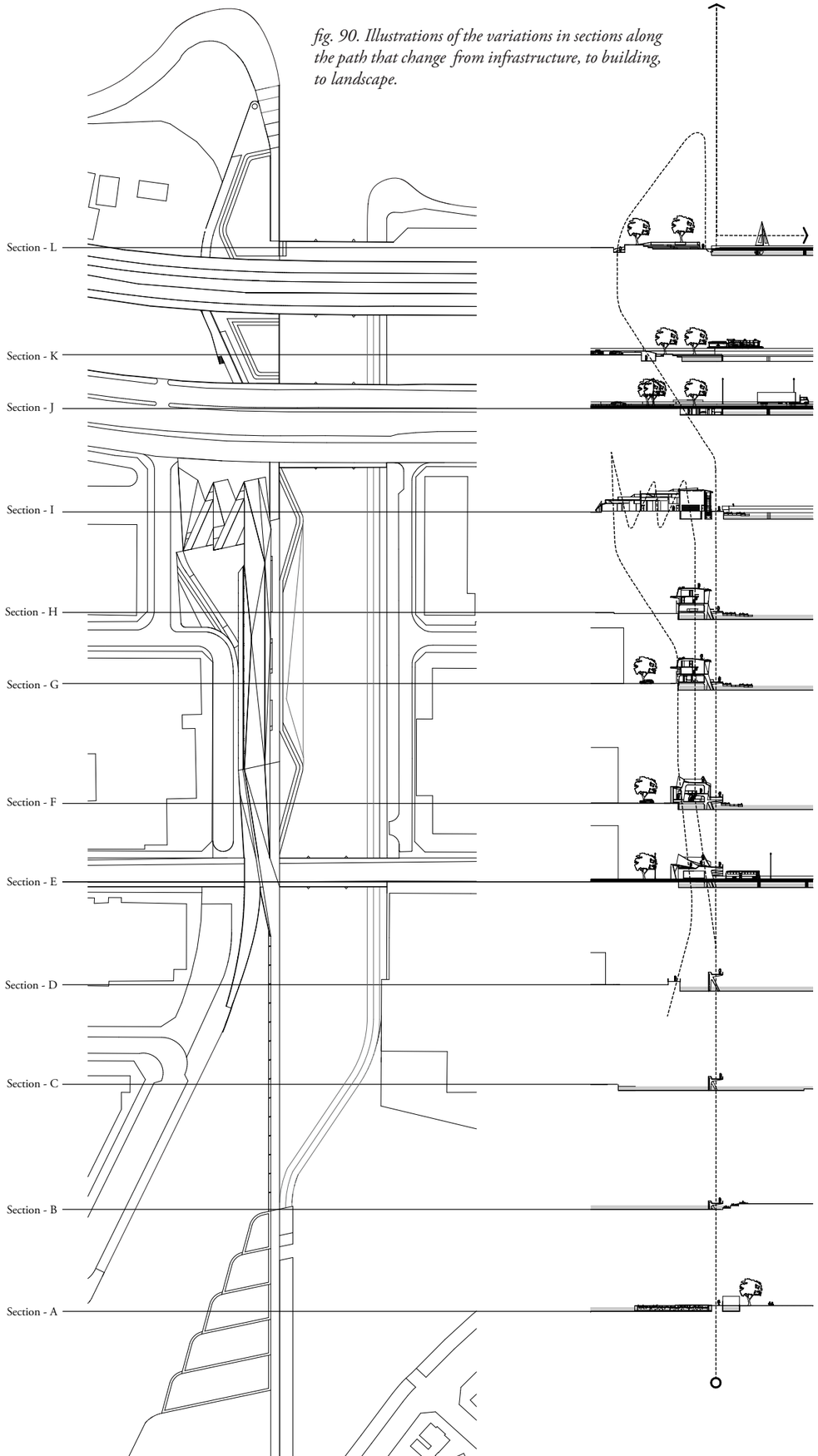


fig. 90. Illustrations of the variations in sections along the path that change from infrastructure, to building, to landscape.

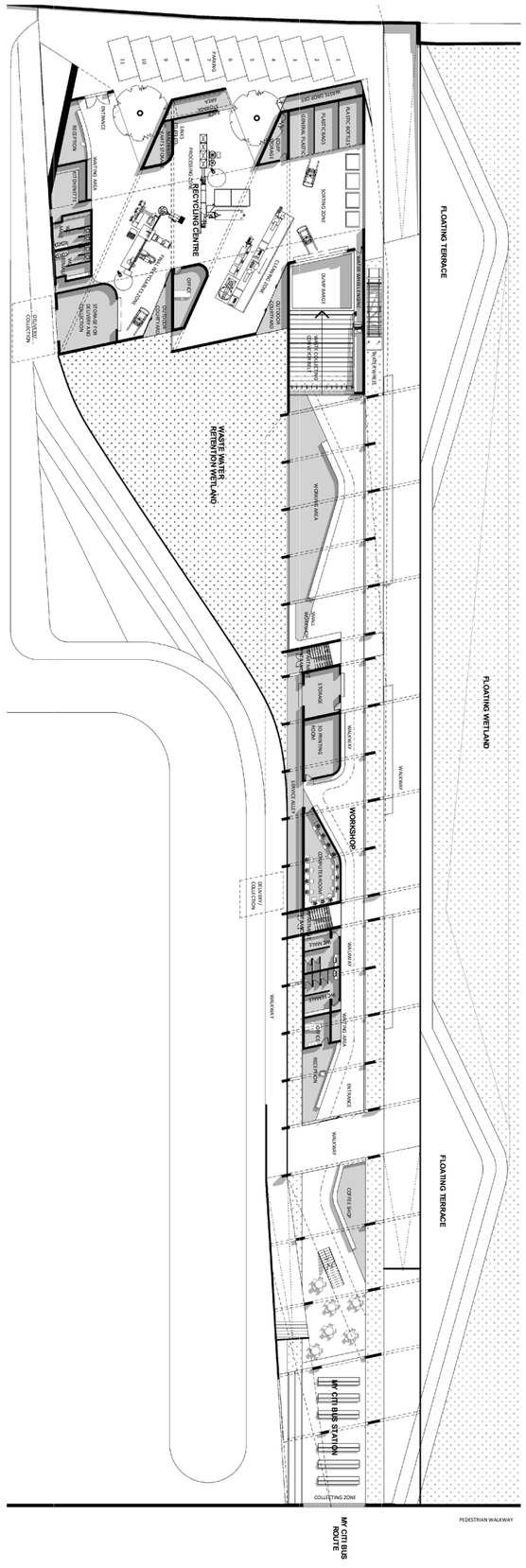


fig. 91. Plan of recycling centre and workshop illustrating the interior space as separate systems to the structure.

Breaking the rhythm

The regularity of the bays gave a structural order to the plan. However the interior walls can start to break away from the structural grid system of the bays. These walls can be separated from the main structure and become more organic, free form partitions constructed out of light drywalls. This will create a more dynamic experiential quality while walking through the building and generate a system of 'forest like paths' that draws you into different spaces to provide areas for discovery.

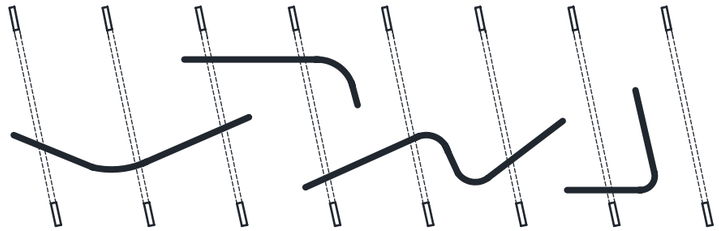


fig. 92. Interior walls start to break away from the structural grid system of the bays.

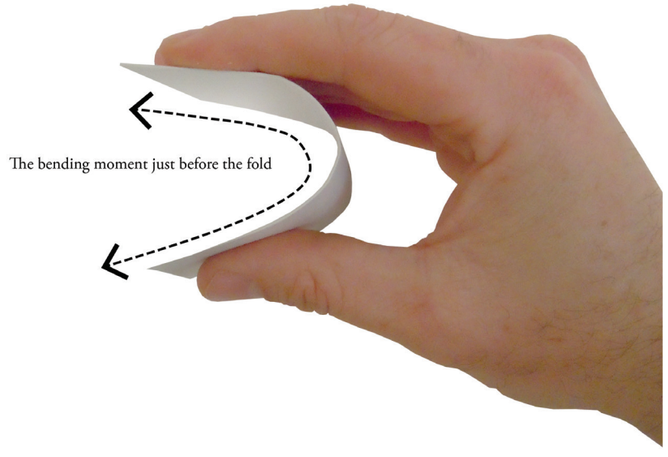


fig. 93. The curved form signifies the bending moment just before the fold.

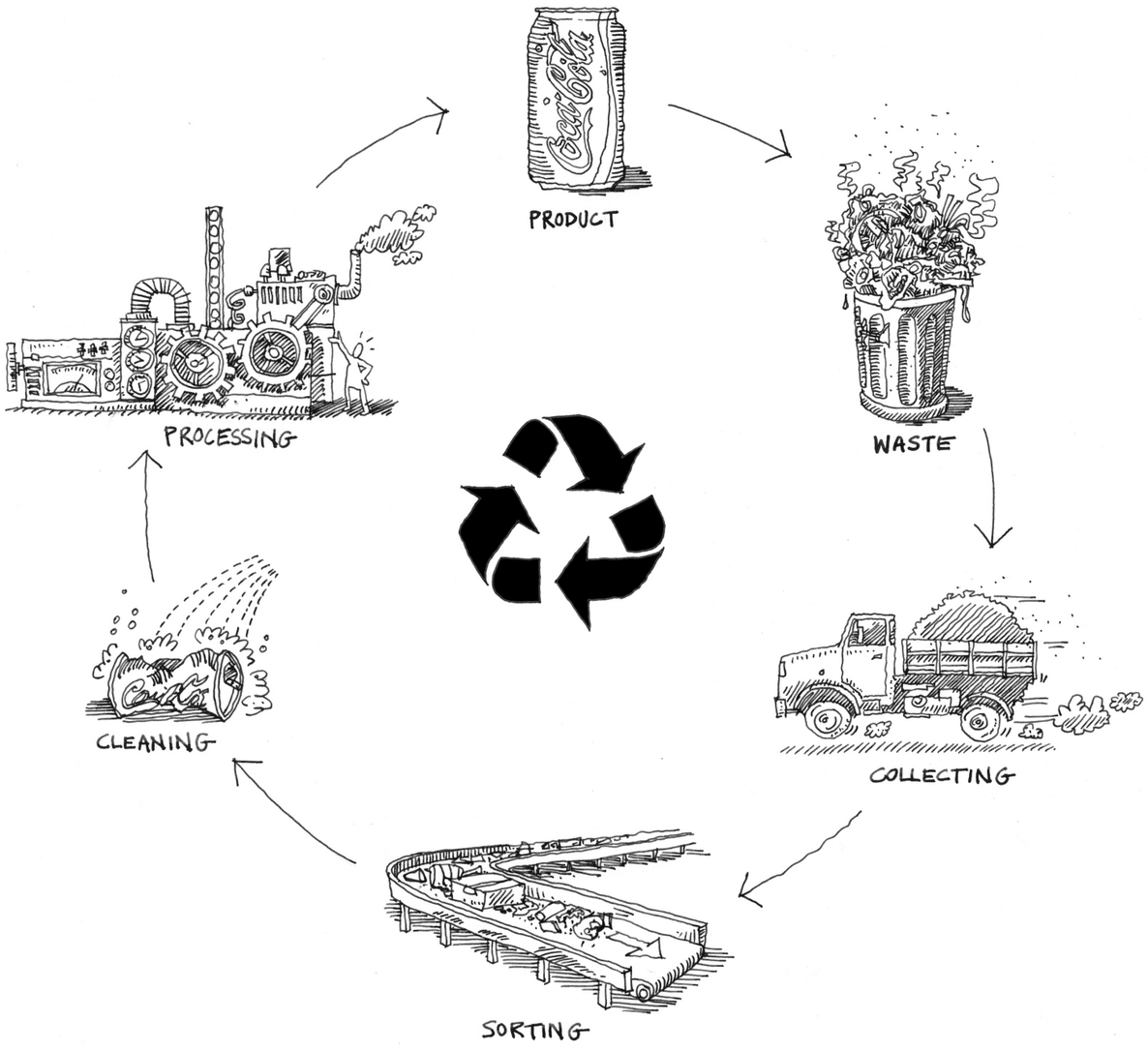


fig. 94. Recycling process.

The following sub-chapters explore the recycling process and shows how machines and technology can be used to benefit nature.

Recycling

It can be said with certainty that the disposal of waste into the Salt River system has subsequently had a negative effect on the quality of its water and surroundings. In order to counteract the 'solid' waste effects on the river, there needs to be a process of collecting, recycling and reusing of the waste.

Recycling is the process of collecting, separating, and cleaning-up of waste materials to produce a final product (William, 2005). It is beneficial to the environment because it reuses old materials; saves energy in the production process of producing virgin materials and reduces carbon emissions that generate both air pollution and water pollution (William, 2005).

It is important to recognise that recycling solid waste materials has a positive effect on our water system, since it finds alternative ways to reuse waste that would very often be discarded into our river systems or dumped in a landfill. There are also ways in which the recycling of waste can be combined with architecture to form a beneficial relationship.

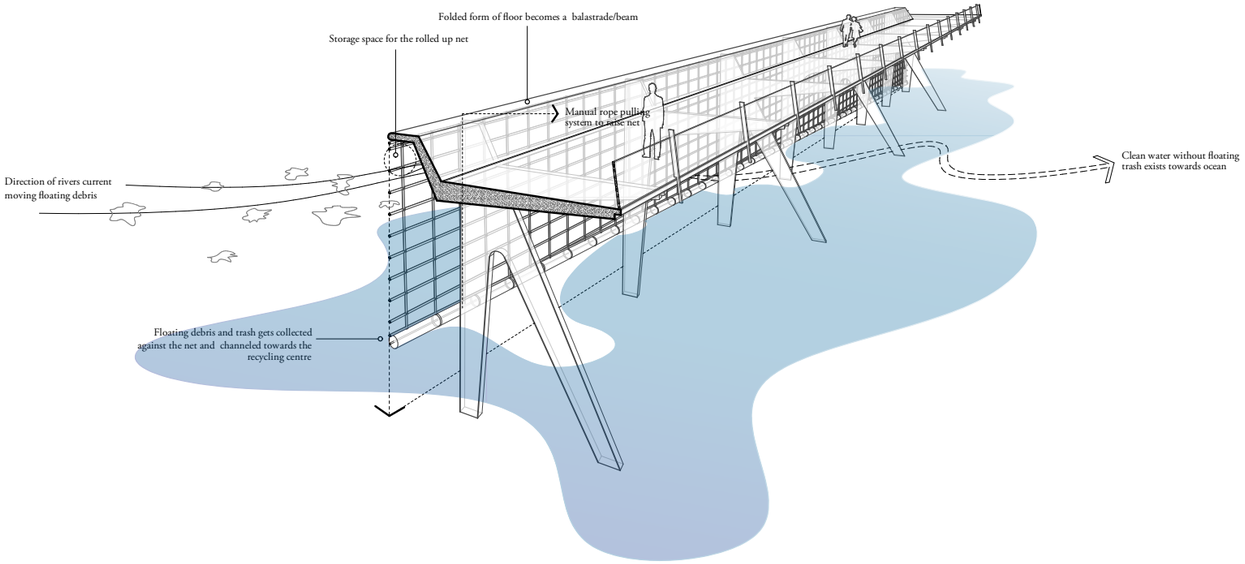


fig. 95. Waste catching process

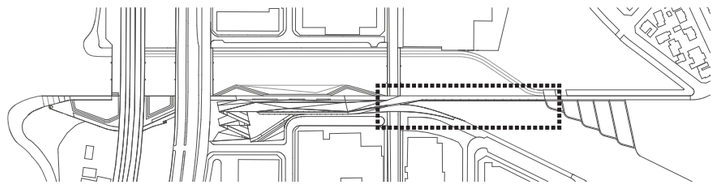


fig. 96. Plan showing the location of the waste channeling bridge.

Waste channeling

Water constantly moves and adapts to the physical boundaries that contain it, but one consistent characteristic of water, is that it always seeks its lowest level, resulting in the flow of current, which can be used to a great effect. The Salt River system is connected to the ocean at the river's mouth, which forms an estuary. This is an important transitional point where the river meets the ocean, from freshwater to saltwater. Subsequently, the river's flow is affected by tides from the ocean, and fresh rain water coming down from Table Mountain. The most powerful current is that of water flowing out towards the ocean.

As previously mentioned, the formation of the linear path forms a bridge over the river dividing it into two portions. The bridge provides a catchment area that collects floating debris and trash that would otherwise be carried out to sea; instead it is channeled towards the recycling centre.

In order to catch the floating waste a net system can be released or pulled up manually from the walkway. Floating plastic buoys are attached at the bottom of the net allowing the net to be above the water's surface, therefore only catching floating debris such as plastic bottles, bags and polythene. This in turn still allows for marine life to swim past underneath.

The construction of the bridge is supported by bays that act as stilts in the water, which also mimics the motion of walking. The floor of the bridge is then folded up on one side so as to act as both a balustrade and a beam, as well as to provide a hidden storage area for the raised net system.

The bridge becomes a essential system to the rehabilitation of the environment, by collecting all the floating debris and generating a cleaner river's edge on the side where the water is uncontaminated, so as to facilitate enjoyment.

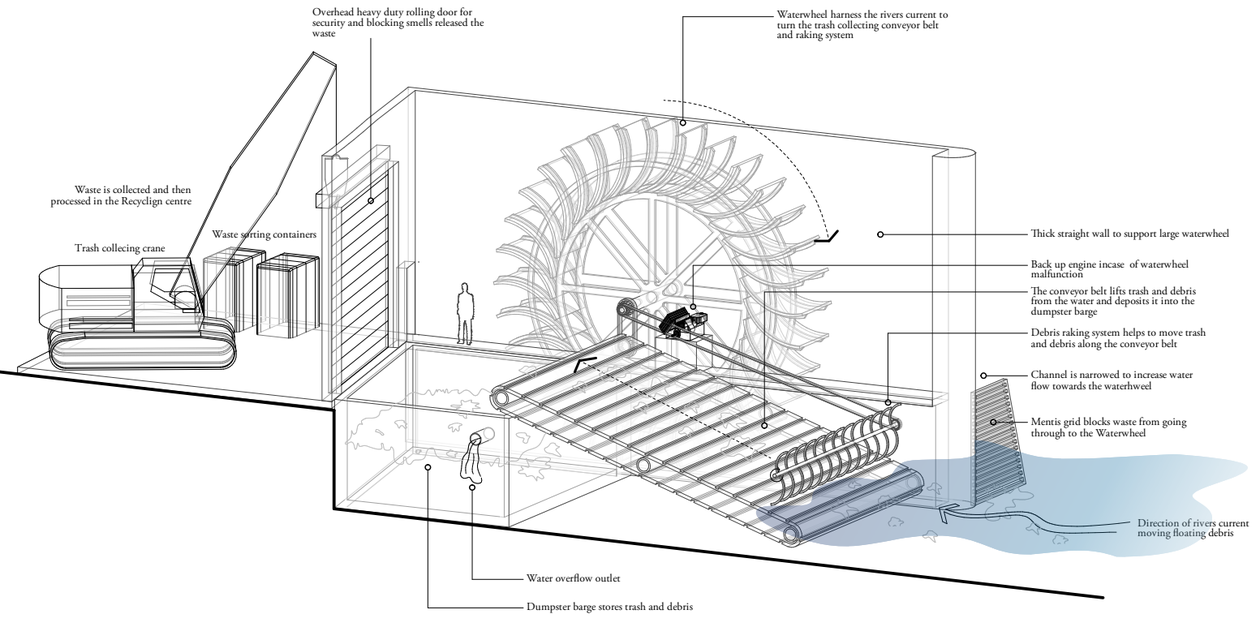


fig. 97. Waste collecting process.

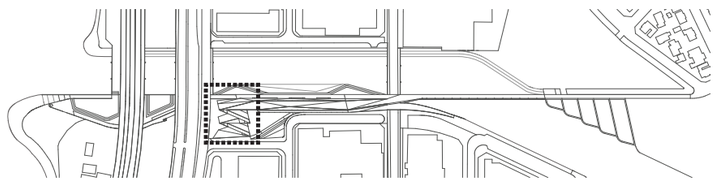


fig. 98. Plan showing the location of the recycling centre.

Recycling Centre

After the waste has been channeled it is then carried underneath the building towards the recycling centre, where it is collected by a 'ladder type' conveyor that lifts the debris from the water's surface and feeds it into a dumpster barge. This conveyor belt is powered by a water wheel that uses the power of the river's current. The width of the entrance where the river's current enters, is much wider than the exit near the waterwheel. This increases the velocity of the water's current, which in turn increases the rotation of the waterwheel. A debris raking system (powered by the waterwheel) helps to move trash and debris along the conveyor belt. A mentis grid then stops waste from traveling towards the waterwheel. A backup engine can be used in case of waterwheel malfunctioning. The collection of waste is an important procedure because without a reliable system for collecting waste it can halt the entire recycling process.

This machinery uses a combination of old and new technologies that refurnish the environment, demonstrating that the use of man-made technologies can benefit nature. An example of a similar successful water waste collecting system is the 'Baltimore Water Wheel', invented by Clearwater Mills, where up to 3600kg of waste can be collected in an hour (Valosik, 2014).

Once the waste is dropped into the barge it is then collected by crane and sorted into its various material categories. Most of the waste found within the river is a form of plastic; consequently the design of the recycling centre focuses its attention towards the recycling of only plastic waste. Other waste that is not plastic will be separated and transferred to other nearby recycling plants. Incorporated into the design is also a waste 'drop off' zone, where the community can contribute towards the recycling process by discarding their household plastic waste at the head of the design that is situated next to the highway, therefore creating a sense of community involvement and participation.

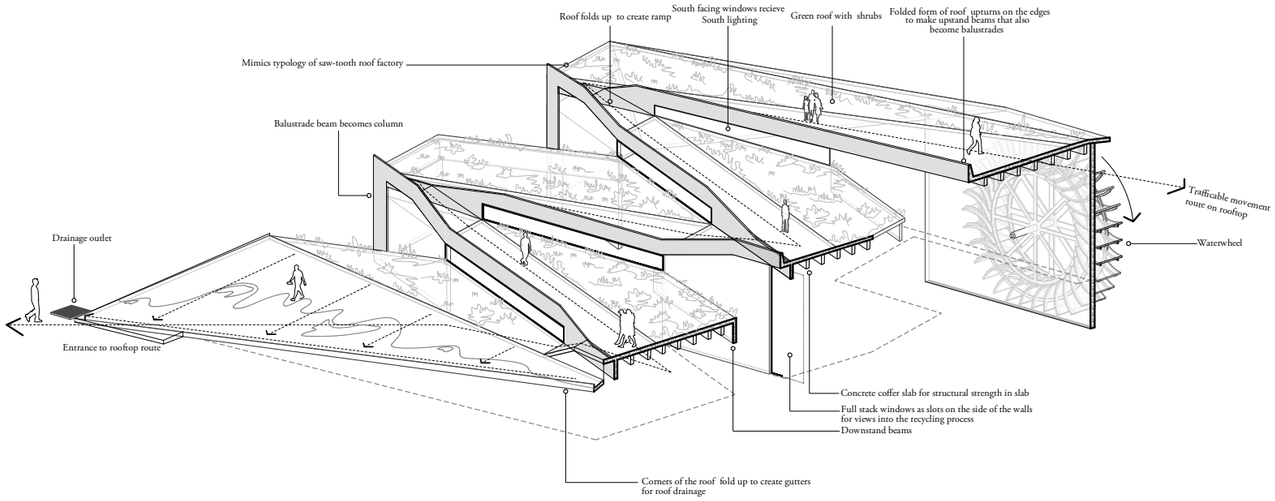


fig. 99. Recycling centre .

The design of the 'zig-zag' recycling centre is shaped so that each stage of the recycling process, namely the collecting, sorting, cleaning and processing of waste, follows a continuous line of production from one phase to the next, as well as to mimic the form of the folding roof above. The form of the folding roof becomes a multi-functional structure. Through its use of organic folds it provides a gradual pedestrian route up onto the roof that provides views out over the industrial landscape and the river. The ends of each roof fold up to create a ramp to allow people easy access onto the main roof. The stepping down layering of the roof also allows for natural light to filter down into the recycling centre, as well as to mimic the typology of the existing surrounding industrial saw-tooth roof factories. The folded form of the roof turns up on the edges to form up-stand beams that also act as balustrades. These large beams also connect down to columns hidden in the walls at the ends, opening up the interior spaces of the recycling centre below. Sloped roofs on the ends have folded up corners that create gutters for roof drainage. Hence through the roof's uses of folds it is able to achieve a dynamic construction that performs a multitude of tasks.

Inside the recycling centre, the use of machines becomes important; firstly the waste is spread out on conveyor belts for larger objects to first be removed by hand, with machines then separating the materials by weight (Lim, 2014). Once sorted, the materials are cleaned and dried, ready for the last method of 'processing', in which they are melted or liquefied, in order to be broken down into their basic elements. They are then extruded into final raw recyclable materials, which can be used to manufacture new products and components that can be incorporated into the design (Lim, 2014).

The next stage of the design transfers the recyclable product to a small scale community workshop, as mentioned earlier it provides a place for artisans, community members, children and unemployed people in surrounding areas to make and build things using the recycled waste collected from the site.

South Africa has always had a rich tradition in craft making and producing local products. An example, of one designer who turns waste materials into desirable products is that of Heath Nash. He finds alternative ways of turning discarded plastic waste into elegant products, such as lamps, bowls, pillow cases, and various types of furniture (Nash, 2015). His creative use of plastics can be used as a good example of the variety of goods that can be made in the workshop to sell at the market for profit. Nevertheless, the plastic waste can also be used to make components that help rehabilitate the environment through the technology of 3D printing.

3D printing

It is important to recognise that recycling solid waste materials has a positive effect on our water system, since it finds alternative ways to reuse waste that would very often be discarded into our river systems or dumped in a landfill. There are also ways in which the recycling of waste can be combined with architecture to form a beneficial relationship.

One of the most innovative ways of using plastic waste is through the use of 3D printing technology. This involves the process of a 3D printing machine that constructs a three dimensional solid object from a digital file. It is an additive process where the product is created by layering down successful layers of plastic materials until the entire object is created. This technology means that almost any form can be created with accurate results.

Hence the workshop will be equipment with a computer room where the designing of the product will take place. Linked to this will be the 3D printing room where the designed products can be printed into three dimensional forms out of the recycled waste. The creative opportunities are endless as well as sustainable. However this inventive way in which waste can be reused can also be seen as a possible model to address the issues of rising water levels, and pollution faced along the Salt River. One example which has been explored is that of making plastic floating wetland units.

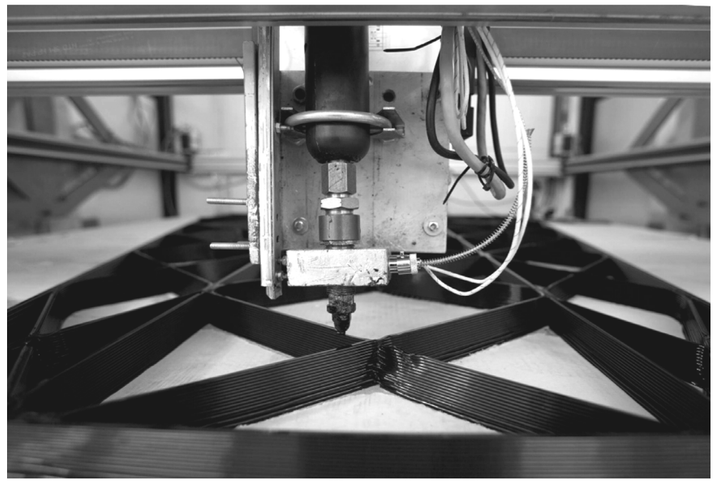


fig. 100. 3D Printing.

Floating wetlands

Wetlands are a significant part of the natural water management system, which contributes to the removal of chemical pollutants and as well as the creation of storm water outlets (Landphair & Klatt, 1999).

Floating wetlands are a relatively new technology that has emerged for the re-purposing of waste in water systems. An example of this is the 'Recycled Park' by WHIM Architects, which proposes to capture and recycle waste flowing along the Nieuwe Maas River in the Netherlands to create a recycled island, which could provide a system of sustainable flood proof habitats and recreational spaces (Brooks, 2014).

Using the advanced technology of 3D printing in the workshop, the recycled plastic materials from the recycling centre site can be made into floating wetland components. These components would be built into triangular shaped building units that can be pinned together to construct a floating landscape that sits subtlety on top of the water along the path of the design. The triangular shape of the units can produce almost any desired form that follows the flow of the architecture. The plastic 'building blocks' are roughly around 1500mm in width, 900mm in length, and 600mm in depth. However, the blocks can vary in depth, generating a soft flowing landscape, that provides a gradual gradient down to the water's edge, as well as areas for seating. A variety of flora can grow on top of these blocks, from moss to large trees. Beneath the water's surface the recycled blocks also have a rough texture onto which aquatic marine life can attach and lay their eggs (Leigh, 2014). This will serve to advance the ecosystem within the river.

What once remained litter scattered along the river can be made into clean materials that further clean the environment. The floating wetlands will not only improve the water quality and plastic bottle recycling, but would provide a series of piers and walkways that could be easily accessible for public interest and educational uses (Streb, 2013). It further serves to create a new sustainable flood-proof island that will help counteract issues of global rising water levels, and pollution.

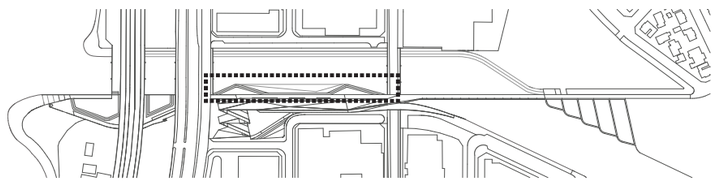


fig. 101. Plan showing the location of the floating wetlands.

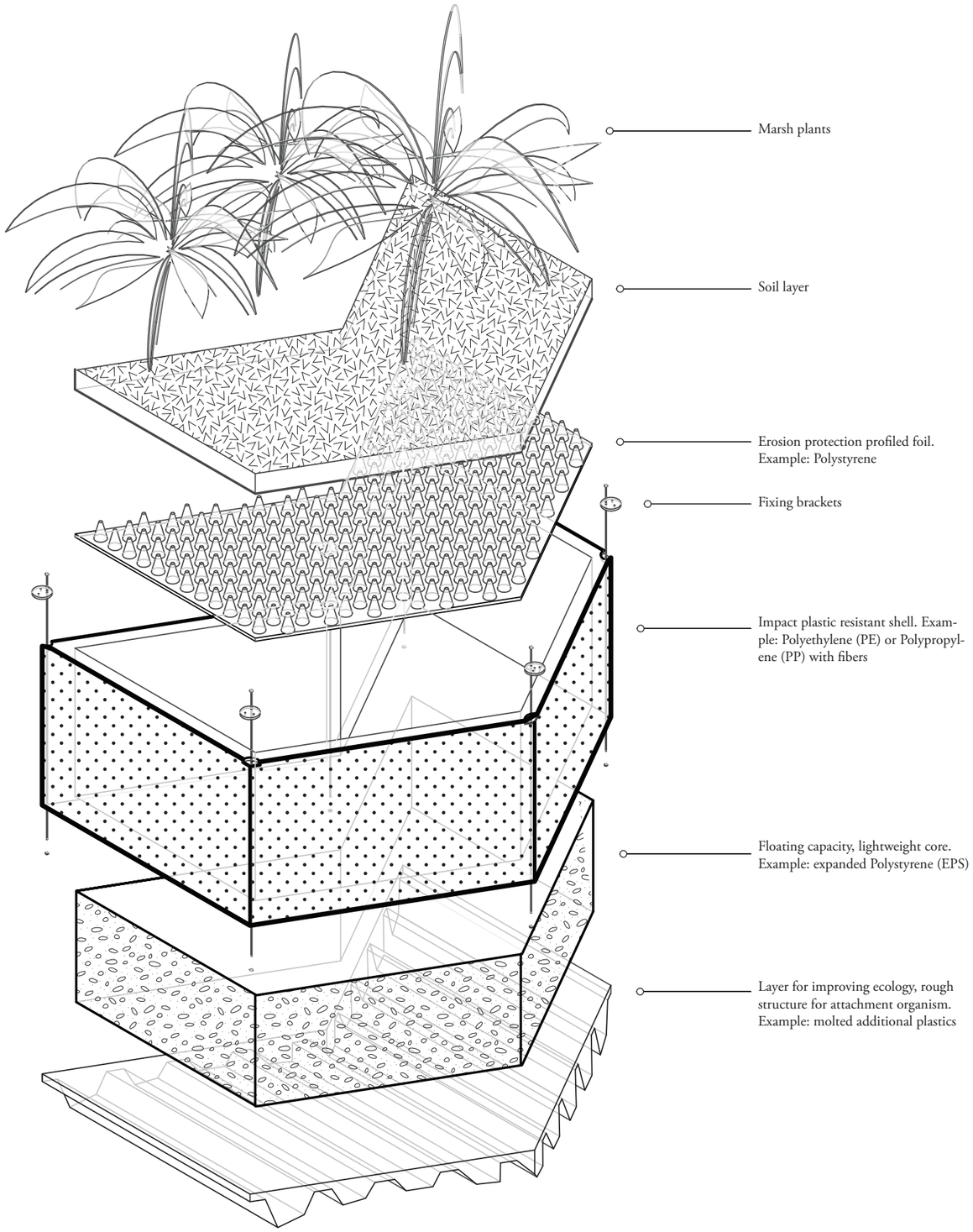


fig. 102. Exploded axonometric of plastic floating wetland unit.

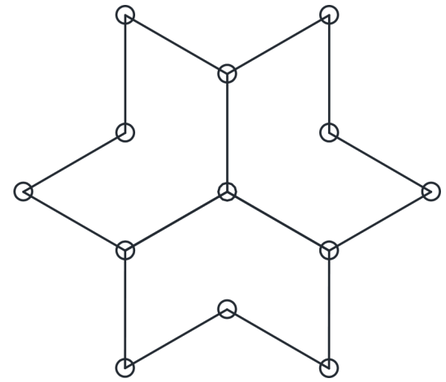


fig. 103. Wetland connection joints.

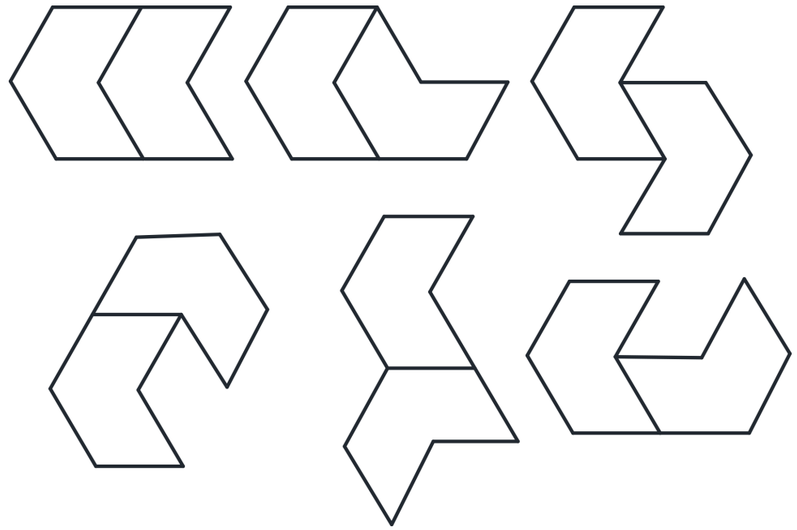


fig. 104. Wetland pattern options.

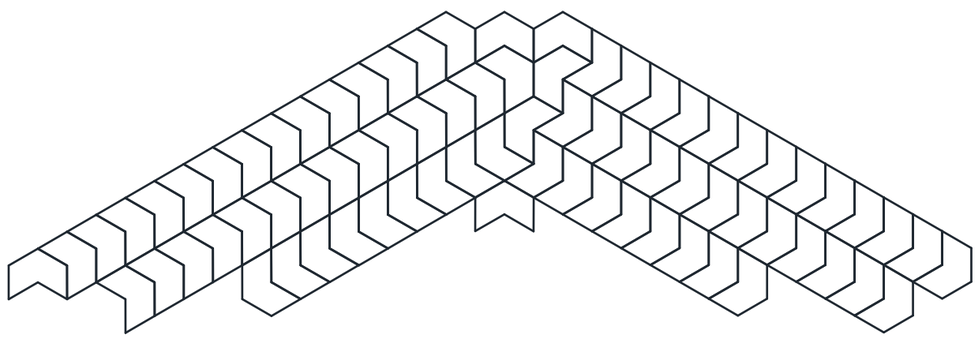


fig. 105. Example of desired shape for wetland landscaping.

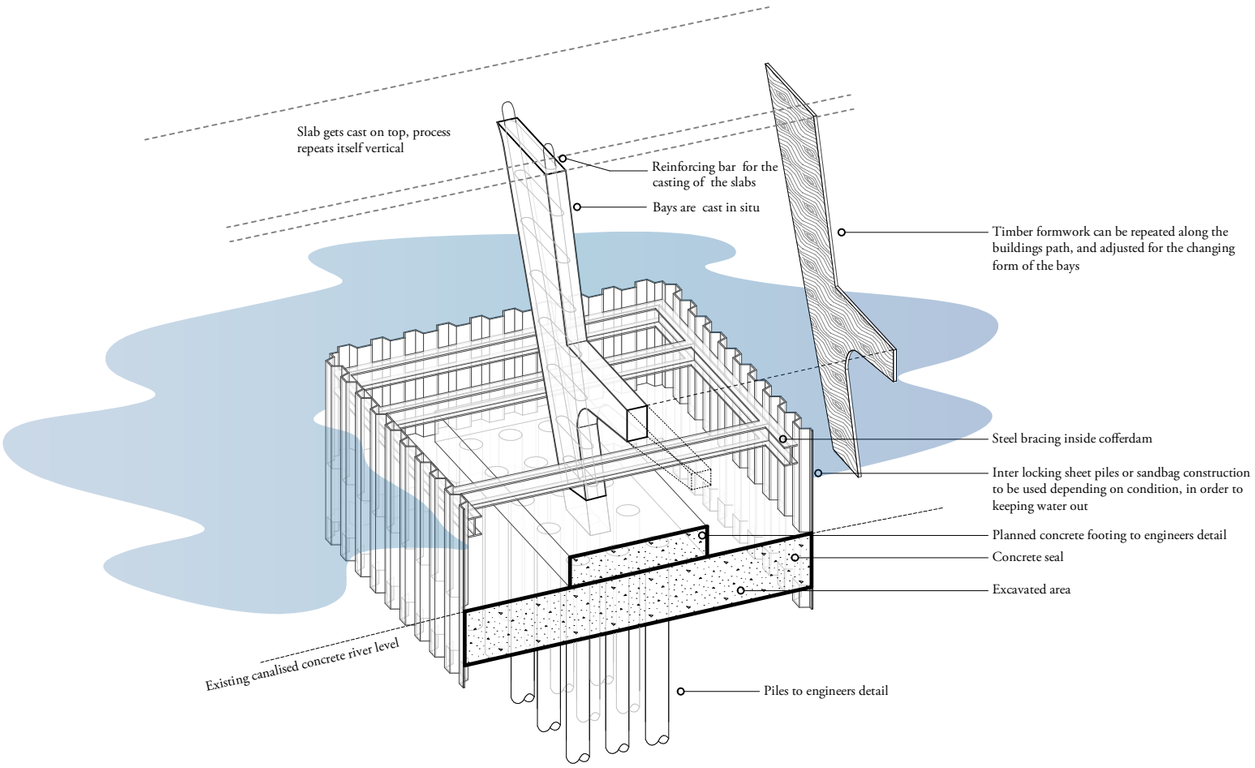


fig. 106. Cofferdam construction.

Construction

The construction of the project is an important procedure as the building needs to rest in the existing river's water body. Subsequently, draining the entire river will prove to be a difficult and costly challenge. Therefore the method of a cofferdam temporary built enclosure system can be used to lay the foundations. Sheet piles or a sandbag construction can be used to create the enclosure around the foundations. Water is then pumped out to create a dry working area for casting to proceed. After foundations are laid; the bays are cast in situ up to the level of the first floor slab. Once dry the floor slab is cast on top of the bays column, the process repeats itself upwards in the direction of the roof. This entire process can be repeated along the path of the design, and the timber framework used for casting the bays can be adjusted for the each change in the bays' form.

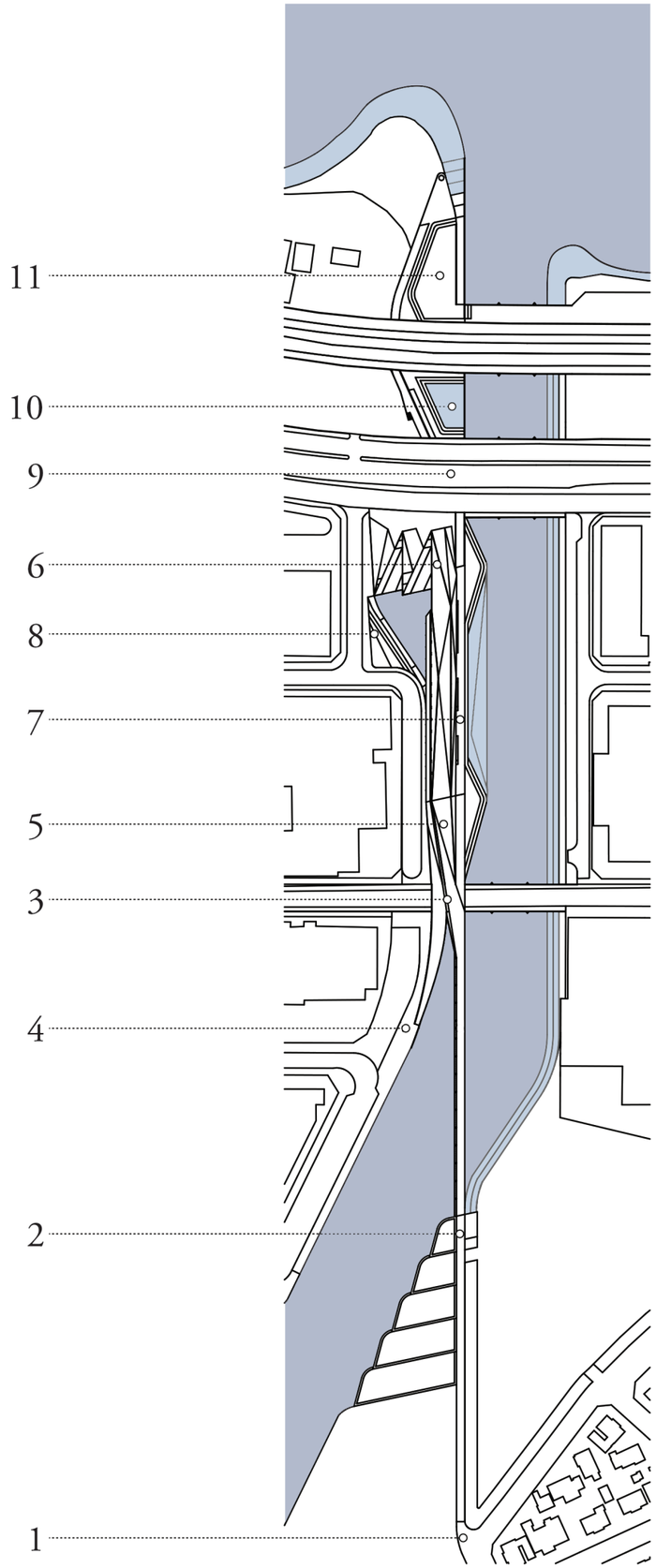


fig. 107. Diagrammatic plan showing journey points along the design.

The experiential walk along the design becomes a useful instrument in understanding the journey of an individual as they move through the space. Physically walking along the path then becomes a mode of transurbance that begins to uncover the neglected landscape. The following chapter will detail the envisioned experiential walk along the design.

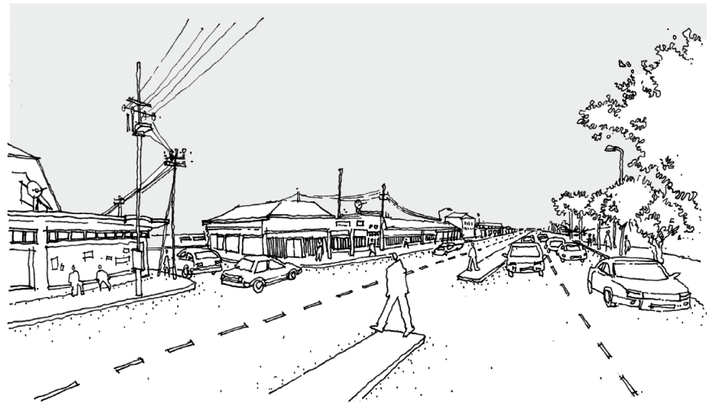


fig. 108. Sketch of Koeberg road.

1. The project begins by the hustle and bustle of Koeberg road. Here a small coloured pedestrian walkway will distinguish itself from the rest and lead one along Church and River Street through the residential suburb of Brookyln, to arrive at a corner junction with seating benches and a small water fountain shaded by a large tree. Before you lies a long straight bridge lined with trees, and beneath it is a flowing river that forks out and runs along Justin Street towards Zoarvlei. Surrounding you are grassy fields where children are playing soccer, factory workmen are enjoying their lunch breaks, people are walking their dogs, and families and couples are picnicking along the river bank.

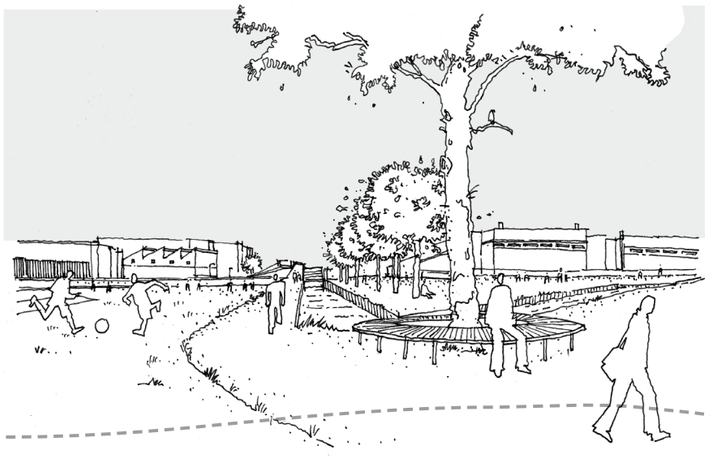


fig. 109. Sketch of 1.

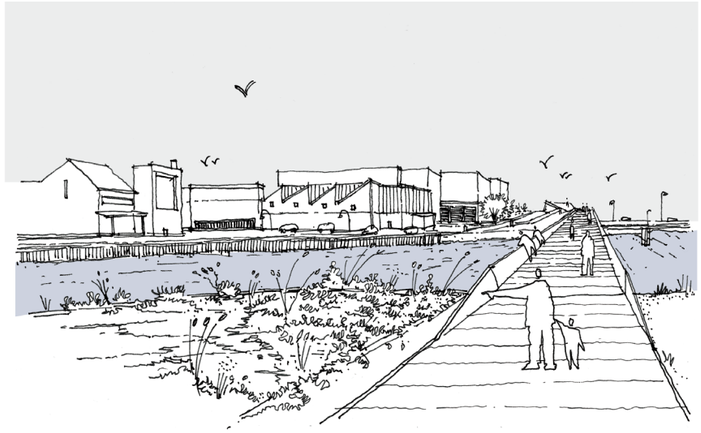


fig. 110. Sketch of 2.

2. If you proceed down the path you will reach the gradually inclined bridge that will lead you over the river. The surface of the concrete bridge folds up on the left at an inclined angle that beckons you to lean over and observe floating plastic bottles getting caught up against the net and being channeled down into the distance. While the adjacent side has a light glass balustrade the opens out and invites you to look out onto views of a river free of floating debris.

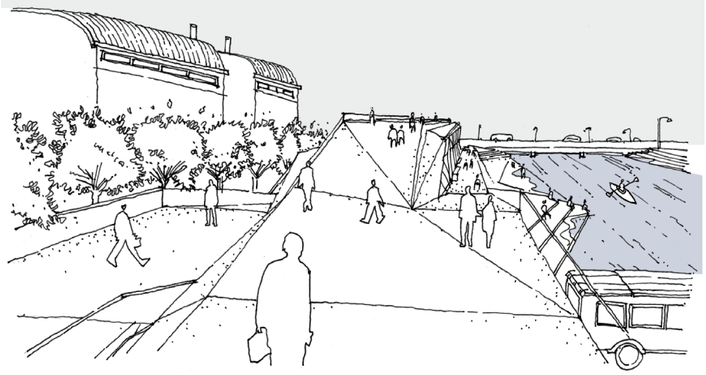


fig. 111. Sketch of 3.

3. The journey along the bridge then leads you up over a MyCiti bus route, where buses below are constantly moving from station to station. Here you encounter a twisting folding landscape that weaves into four different routes.

4. One leads you around back down towards Carlisle Street into the heart of the industrial zone.

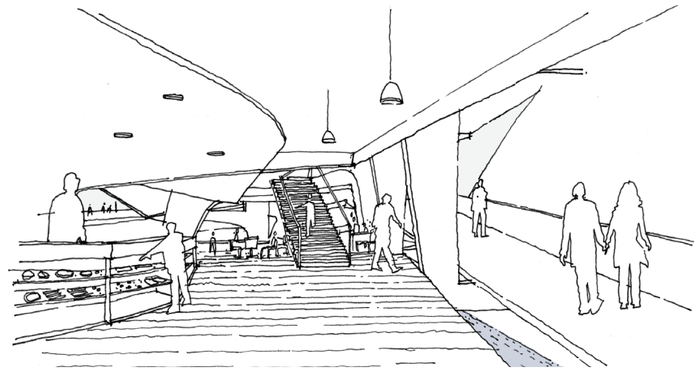


fig. 112. Sketch of 5.

5. The next route leads you underneath the folding roof towards a MyCiti bus station that is the central access point to the design. The station is full of tourists, workmen, school children and residents who are either arriving or departing. Adjacent to the station is a coffee shop that provides a quick place to grab a coffee while waiting for the next bus.

6. Another route leads you up and onto the roof, where views open out to reveal the entire industrial landscape, river, and ocean. The surface of the roof is undulating due to its folding form, emphasising the sensation of walking on a natural landscape. Along the roof, benches fold up to provide places for relaxation and enjoyment. The edges of the roof are filled with small local indigenous shrubs and plants that green the environment and retain people from the edges. Towards the end of the roof you are directed in a meandering manner down a series of folding roofs that provide brief views into the recycling centre and its process.

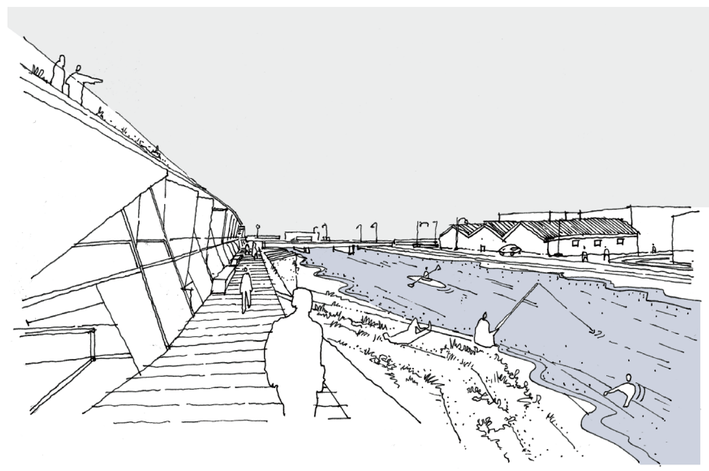


fig. 113. Sketch of 7.

7. The final route directs you straight down a ramp with views of a long building hovering across the river. The building's folding roof opens out to display a row of irregularly alternating bays that mimic the motion of walking legs. These bays act as stilts that ground into the river and support the roof above. Tucked away and resting behind these bays are the interior spaces that are shaded from the direct North sun light.

The walkway sits just enough above the water level to enable you to dip your feet into the water. On your right a fluctuating floating landscape of seating areas and plants can also gradually lead you down to the water. Here, fishermen, swimmers, and kayakers are seen utilising the river.

Proceeding along the path, you get glimpses down into the divided portion of the river where the collected floating waste is being channeled by the river's current towards the recycling centre. Suspended above the river is the workshop, where one can see people inside making and building things out of the recycled plastic waste that is floating below them. Above the workshop are the apartments that are raised just above eye-level to create privacy.

Near the end of the walkway one encounters a large waterwheel that captivates you due to its technically sublime presence, with its large wheel gracefully rotating along with the river's current. Views are exposed into the recycling centre, where workmen are collecting and processing the same waste you saw previously floating down the river.

fig. 114. Sketch of 7.

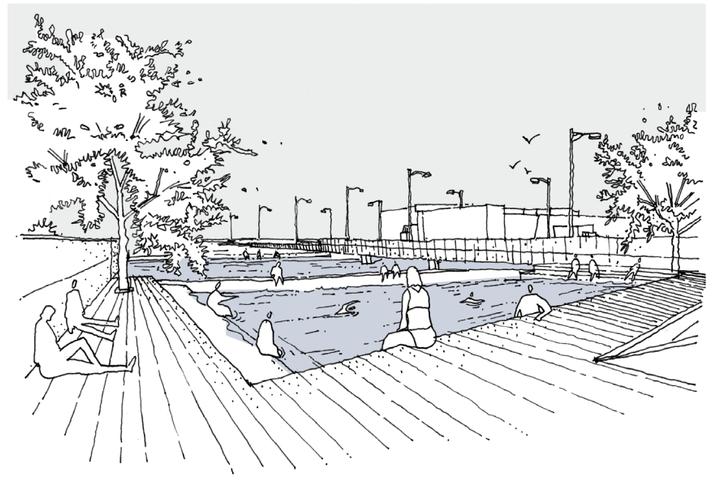


fig. 115. Sketch of 10.

8. Behind the building, on the other side of the river, is a small park that overlooks a waste water retention wetland, and provides a place for local factory workers to enjoy their lunch breaks. A small outdoor exercise gym also offers a place for the public to keep fit.

9. Ahead, lies the busy motor highway of the Marine Drive, where large trucks, delivery vans and motor vehicles flash by on their way to their destinations. The path then extents down underneath the highway, to where you can access the swimming pool and its changing rooms. A parking area is also located just off the highway for access to visitors driving along Marine Drive highway.

10. After passing through the changing rooms, a ramp leads you up onto a timber decking, where you are captivated by a large public swimming pool that floats above the river to provide panoramic views of both the river and the ocean. Both the railway line and highway become unimportant, as trees line the edges of the pool to provide privacy and shade. Everyone from young children to elderly people, lie tanning and soaking up the sun, jumping in and out of the pool and as well into the river.

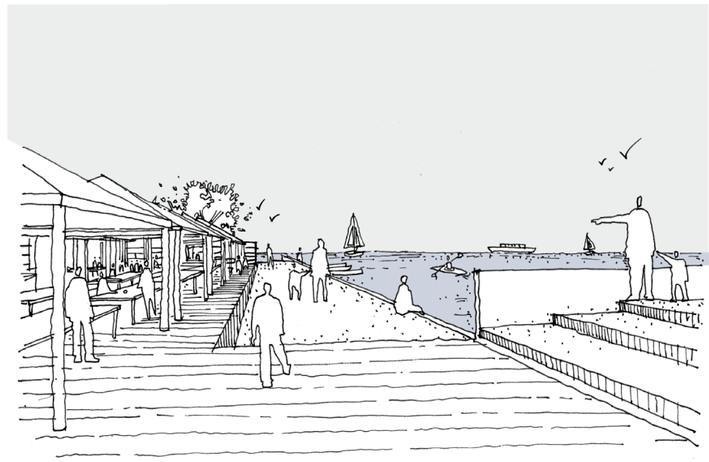


fig. 116. Sketch of 11.

11. The final stages of the path lead you under the railway line, and up to a viewing deck that provides a tranquil view out over the ocean. Steps then lead one down into the market area where plastic handmade goods are for sale, or you can find a place to sit and eat local fish and chips while enjoying a performance from a live band. Towards the right, the sounds of an old locomotive train full of cargo is passing by on its way up the coast. Steps ahead then lead you along the railway line towards the other side of the river. Straight ahead in the distance sights of surfers, windsurfers, canoers and kayakers are all enjoying the ocean. Below gradual steps provide a slipway down to the sea water's edge, enticing you to experience the beauty of the ocean for yourself.

CONCLUSION

At the beginning of the year I set out with a broad interest in the way in which our cities have been shaped by industry and infrastructure. I wanted to uncover and address the particular social, economic and environmental issues that exist within our industrial landscape and its surrounding neighbourhoods. Through this, I hoped to explore the relationship between people and place, attempting to find an architectural solution that emphasised a reciprocal relationship. The discovery of the disconnected environment consisting of the industrial area of Paarden Eiland, the polluted Salt River that runs through it, and the isolated residential area of Brooklyn, established the ideal site for regeneration.

By forming a linear path that breaks through all forms of infrastructural barriers, the design provides a framework solution in which to experiment with the relationship between 'path' and 'architecture'. The path provides a direct pedestrian reconnection to the shore, and a network to areas that may once have seemed inaccessible, emphasising pedestrian importance within the environment. Furthermore, it allows for the channeling and separating of floating debris from the water's surface in order to rehabilitate the river.

Through the act of the building's intricate folding systems, it is able to create an organic movement with the environment, and merges the typology of landscape, building and infrastructure into one. The structural division along the route provides a series of rhythms that can relate to the motion of walking, forming a human connection to the architecture. The placement of different programmatic conditions along the path, namely the environment, the everyday, and the play, allows for a synthesis between formal and informal, public and private, wealthy and poor, recreation and occupation, natural and man-made. This is in the hope that the design will counteract the issues of social disconnection and environmental degradation.

The act of walking, not just on this continuous path, but the act of walking through a disconnected city, allows for moments of critical observation, interaction, play and discovery—ultimately transurbance, and this is what lies at the core of the project.

The project attempts to bring into play the definitions of both the man-made and the natural. To simultaneously engage in finding an architecture that can address the needs of both people and nature and to improve the socioeconomic potential of the river while generating an architecture that is intrinsically constructed through its site. As every site differs, this project should not be viewed as a solution to the general problem, but rather as a locus from which to begin further exploration in other sites facing similar issues. This dissertation serves to add to the creation of new knowledge, that will aid in the restoring of our existing infrastructural cities. It is a project that attempts to uncover the fundamental detachment that the urban city creates between its residents and its natural environment. This is in the hope that the project will start to shift our thinking towards the environment, to one where technology and nature can exist not only harmoniously, but also symbiotically.

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