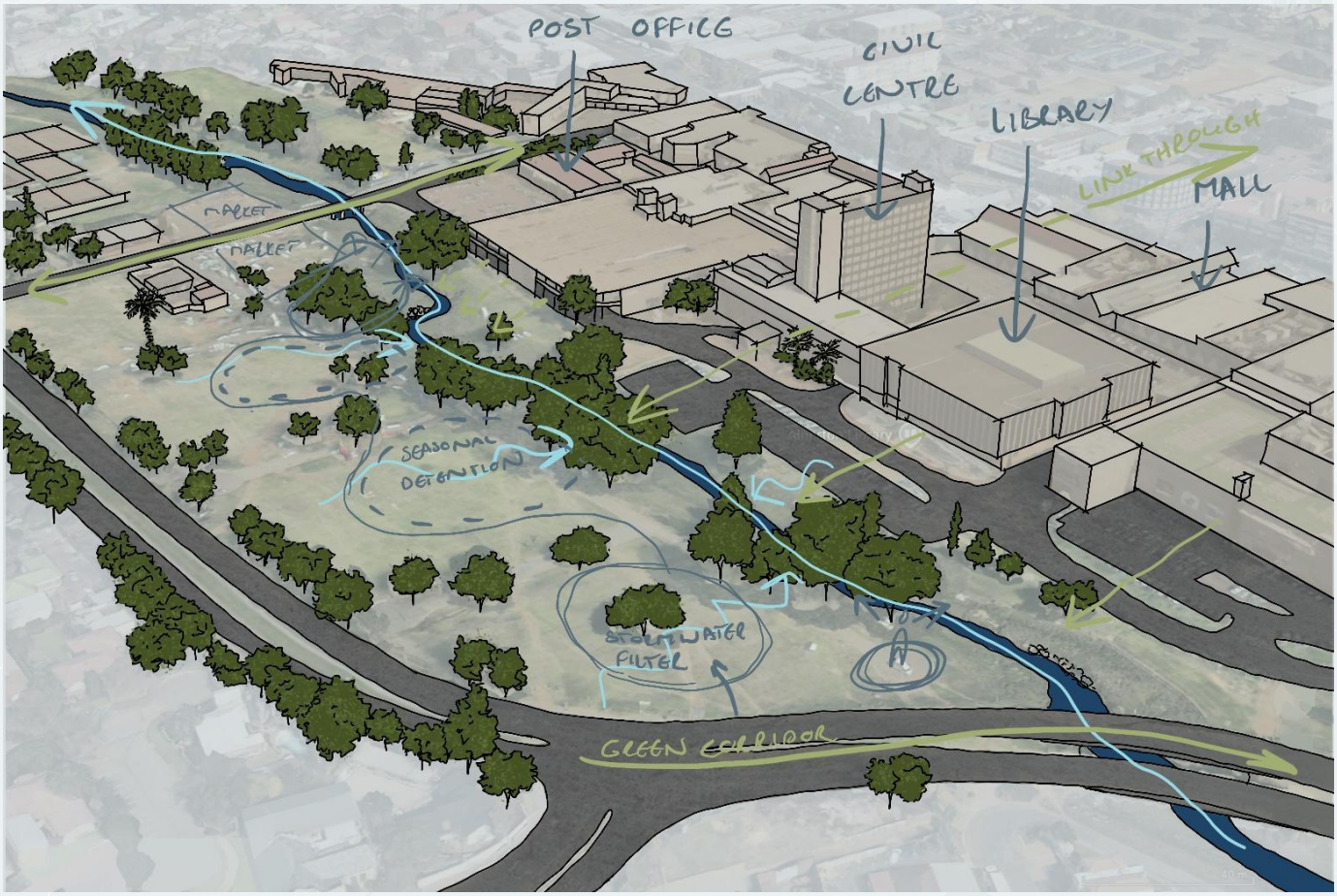
WATERS OF PLACE

Re-imagining sense of place in Alberton

through water-led landscapes



DANIELLE NIGRINI 20537442

Professional Masters in Landscape Architecture | Supervisor: Dr. Dayle Shand | Discipline Coordinator: Prof. Ida Breed

Module: Design Project and Discourse 802

2025

ABSTRACT

As cities expand and urbanisation increases, historical areas within cities tend to degenerate and develop a sense of placelessness. This is described by Relph as the loss of connectivity to the geographical context, a lack of distinctiveness and the effect of avoidant human-nature relationships. This project aims to illustrate the value of applying eco-hydrology and sustainable urban drainage principles to urban precincts as a means to enhance both the ecological functioning of the precinct as well as the socio-cultural value through urban place-making.

Placelessness is experienced keenly in smaller urban centres such as Alberton. The City of Alberton was established as a residential centre for the mining population working in Johannesburg and its extensive mining network. As the city developed over time the need for urban expansion grew considerably. The result of these urban development tendencies is that various green and blue spaces within the CBD have lost their ecological functioning and social importance, as evidenced by the degradation of natural features such as the Natal Spruit. The historic central business district (CBD) is slowly decaying in favour of a newer commercial and retail core towards the South of the old city centre where areas are more prone to development. The resulting urban and environmental degradation has resulted in a sense of placelessness within the historic centre of Alberton.

Focussing on the Natal spruit as the main green corridor, an urban framework was developed. The framework is accompanied by a detailed site design of an important urban node that will act as a case study to showcase how the various principles of eco-hydrology and sustainable urban drainage systems can be used to create an ecologically and socially sound urban landscape. By improving the ecological condition and functioning of the site through a lense of ecohydrology, once neglected green spaces can become vibrant water sensitive urban green “places”.

Stakeholders in this project includes public and private partnerships with a focus on the Alberton Civic Centre and library and the Alberton City Mall. The project aims to serve the community of, and visitors to, Alberton.

KEYWORDS

Eco hydrology; Place and Placelessness, Rivers, Sustainable Urban Drainage, Urban degeneration

PROJECT DETAILS

TITLE – Waters of Place – Re-imagining sense of place in Alberton through water-led landscapes.

PROGRAMME – A water-led urban park.

ADDRESS – Green open site across form Alberton City Mall, surrounded by the Ring Road East, Du Plessis Road and Alwyn Taljaard Avenue.

GPS COORDINATES - 26°15'53.5"S 28°07'28.9"E

CLIENTS – Alberton City Mall, Alberton Civic Centre and Alberton Library

TABLE OF CONTENTS

1. PROJECT BRIEF

PROJECT INTRODUCTION

RIVERS THROUGHOUT HISTORY

Throughout history, rivers have played an essential role in the cities and lives of humans. Many cities have been established based on the presence of great rivers such as the Nile. Rivers are often incorporated into religions such as the Egyptians who regarded the river Nile as the giver of life (Medium, 2023). Throughout history, humans' reliance on and reverence for rivers have shifted and changed.

In the past rivers were often seen as destroyers, the river was wild and uncontrolled, moving where it wanted. Over time, humans learned how to harness the flooding of rivers and utilise the water contained in the river, essentially taming the wild river. From here, humans found ways to travel on rivers and built bridges to cross over rivers. The industrial revolution saw the river become a dumping ground used to convey toxic chemicals and sewerage away from cities, essentially poisoned and forgotten (Pinto & Kondolf, 2015). Today our rivers are hidden concrete channels lying in wait.

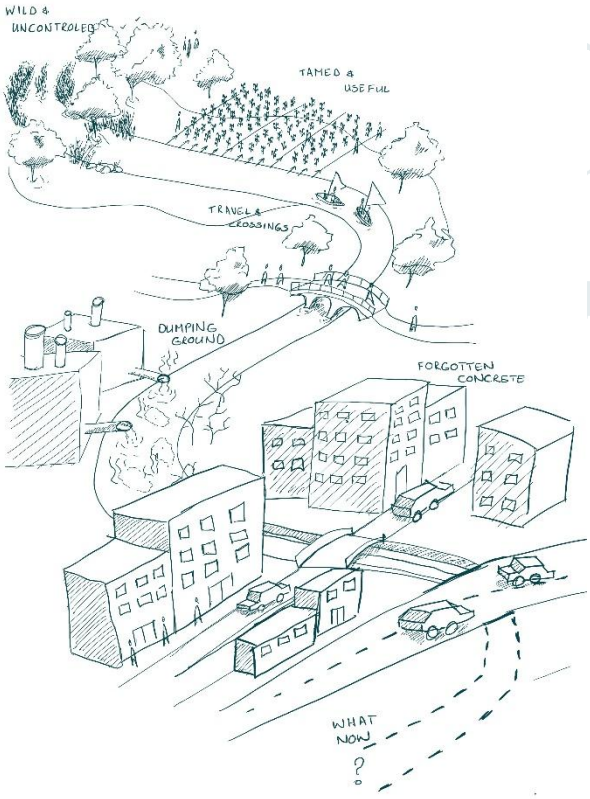


Figure 1: River timeline (Author, 2025)

CHALLENGES OF URBANISATION AND RIVER DEGRADATION

Urban environments consist of a series of intertwined systems (including stormwater, rivers and social systems) that affect each other in a variety of ways (Shahady, 2021). Similarly, rivers function in direct relation to their catchment. Water from the catchment is filtered through the landscape and moved towards the river. Historically, the catchment used to be entirely vegetated, allowing for groundwater recharge and consisting of large floodplain areas where rivers could flood safely. Over time as the catchment urbanised and became impervious, the river was forced to change (Shahady, 2021), becoming polluted and artificially modified.

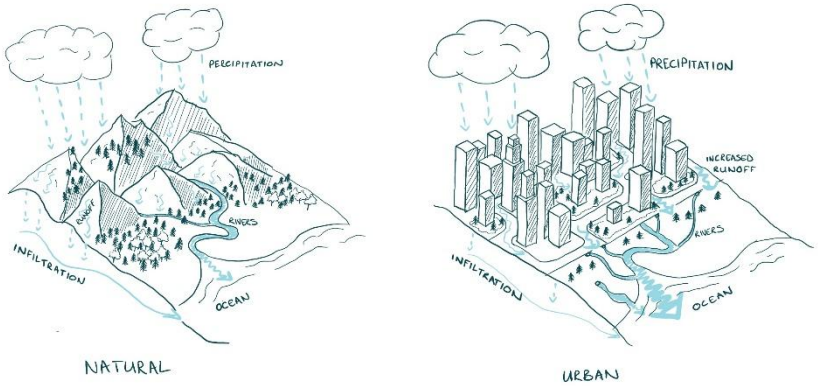


Figure 2: Natural vs Urban river catchment conditions (Author, 2025)

The ever-changing nature and fluctuation of the water level within a river result in a mosaic of habitats that support a range of complex ecosystems (Rivers are life, 2023). Furthermore, rivers provide an abundance of resources (water, nutrients and food) that support diverse plant and animal communities (Rivers are life, 2023). The urbanisation of river corridors has led to the loss of these diverse functions within the river system.

The most prominent challenges faced by rivers in and urban area includes pollution and changes in morphology. Increased runoff from impervious surfaces and the concentration of stormwater from city infrastructure (Shahady, 2021) has led to the overall transformation of natural river systems into the concrete structures that we know today.

POTENTIAL OF GREEN-BLUE INFRASTRUCTURE & GREEN CORRIDORS

Green infrastructure in the urban context is understood as a strategic planning approach that aims to develop networks of green (vegetation) and blue (water) spaces that are designed and managed to deliver a wide range of ecosystem services (Pauleit et al., 2017). By utilising principles such as connectivity, multi-functionality, and green-grey integration (Pauleit et al., 2017), it offers an ecologically sensitive approach to infrastructure planning.

Green corridors are portions of land that connect fragmented natural areas and offer multiple ecological, social and cultural uses and benefits (Iberdrola, 2025). These spaces form the homes of multiple species and often coincide with river corridors. By focussing on river corridors and working with green corridors to connect separate and fragmented green spaces within the urban environment, a healthy, connected urban ecosystem can be established.

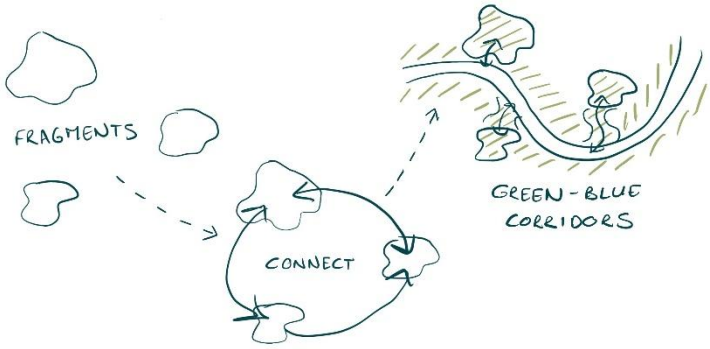


Figure 3: Green Infrastructure principles used in line with reiver corridors (Author, 2025)

DESIGN STATEMENT

This project thus asks:

> Can improved eco-hydrology be utilised as a form of place making?

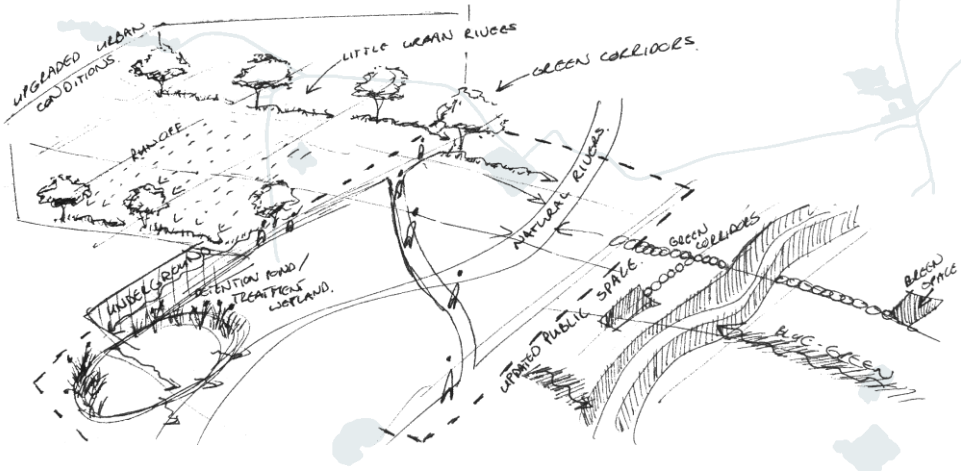


Figure 4: Design intent.

CONTEXT

ALBERTON

Located towards the South of Johannesburg, the City of Alberton was originally established due to the need for a suburban residential settlement for mineworkers. Although various ecologically beneficial elements (such as the Klipriviersberg and the Natal Spruit) were also present.

The origins of the Natal Spruit can be found just West of the Meyers Farm and North into Johannesburg. The Natal Spruit passes through various highly urbanised spaces resulting in the channelisation and bridging of the river. This caused the river to lose many of its natural functions. Recent investigations into the Natal Spruit have revealed drastic loss fauna and flora due to recurring sewer spills (Limba, 2025:1). The ecological state of the river is further reduced due to

acid spills from the mines in the surrounding areas. Thus, an intervention along this river corridor is essential.

FOCUS SITE

The focus area was chosen due to its intimate relationship with the heart of the Alberton CBD and the potential that it holds to breathe new life into the city. Opposite the Alberton Civic Centre, Alberton Library and Alberton City Mall lies a green open space showcasing a semi-naturalized stretch of the Natal Spruit. The site is hugged on one side by the Ring Road East, a main throughfare that brings a lot of vehicular traffic to the area. Across from the site there is a bustling taxi rank with local vendors that ensures constant pedestrian flow throughout the day.

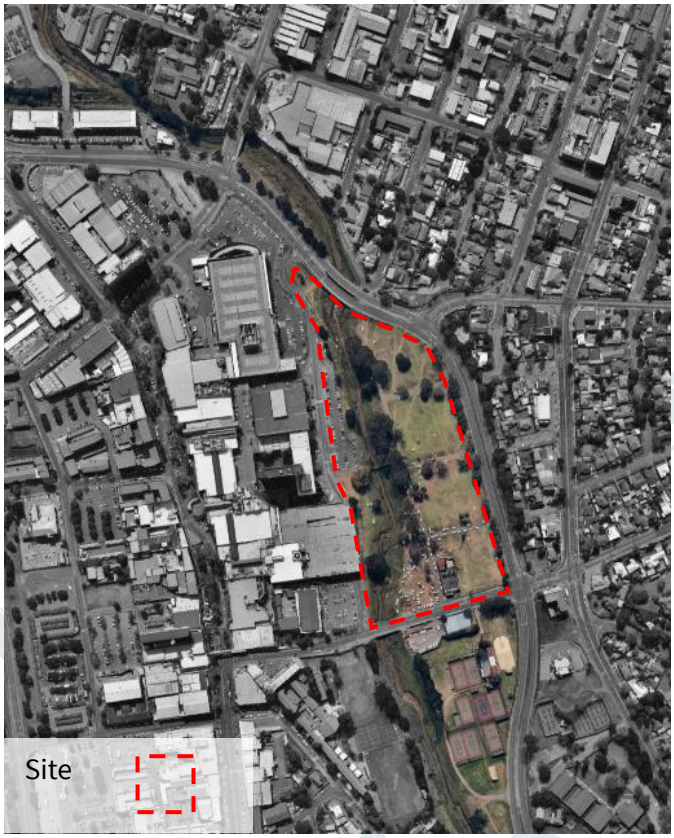


Figure 5: Focus area for design project (Author, 2025)

Challenges faced on site are the disconnect between the urban elements and the natural site as well as the flood lines that cover the entire site. However, these challenges highlight the potential that this site must become a link between the urban and the natural environment while showcasing the important functions that the river has. Furthermore, the site can act as an urban anchor that other green spaces can be linked to through the introduction of green corridors, strengthening the ecological value of the city and the river corridor.

CLIENT

The client and stakeholders of this project include a variety of public and private institutions. As the site is owned by the Ekurhuleni municipality, they are the primary stakeholders along with the Alberton Civic Centre and Alberton Library. Private investment is possible through the inclusion of the Alberton City Mall and the taxi rank across from the site.

PROJECT OBJECTIVES

RIVER CORRIDOR

The objectives for the river corridor are to 1. Connect isolated green spaces to the river through green corridors, 2. Implement sustainable urban drainage principles to lower flood risks, and 3. Create spaces for human-water interactions.

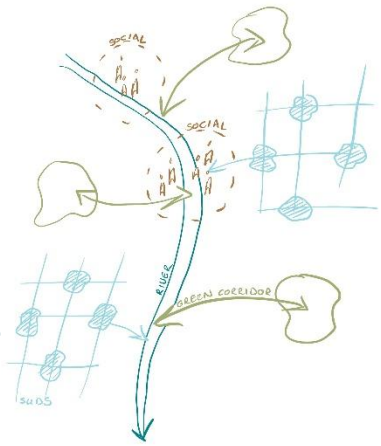


Figure 6: Main objectives for the river corridor framework (Author, 2025).

FOCUS SITE

The main objectives for the focus site are 1. Revitalize the river by restoring river functioning and re-introducing native fauna and flora, 2. Cleanse stormwater on site to ensure better water quality within the river while showcasing the systems to the public, and 3. Empower the community through a market space and by connecting to the Civic Center and Library.

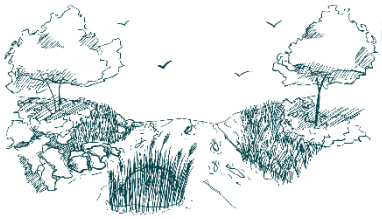


Figure 9: Site objective 1 - Revitalize the river corridor through introduction of native flora and fauna (Author, 2025).

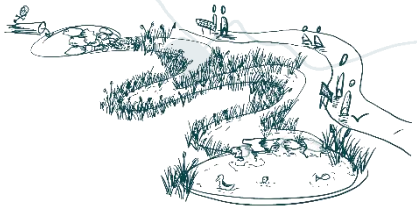


Figure 8: Site objective 2 - Cleanse stormwater and showcase functioning to the public (Author, 2025)

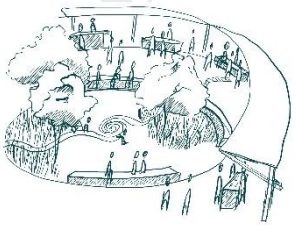


Figure 7: Site objective 3 - Empower the community through social spaces (Author, 2025)

The program on site includes stormwater treatment terraces, a nature walk, and an informal event space linked to the Civic Center. Further the site allows for different levels of flooding which in turn allows various forms of human-water interactions throughout the year.

CONCEPT

Creating a sense of place through water-led landscapes was the inspiration for the project. The concept for the project stems from this inspiration. By exploring rivers and their meaning as well as their functioning the concept of a water-first approach was born. The project aims to firstly make the water systems on site (Natal Spruit and stormwater) work and then see where additional programs can fit into that system.

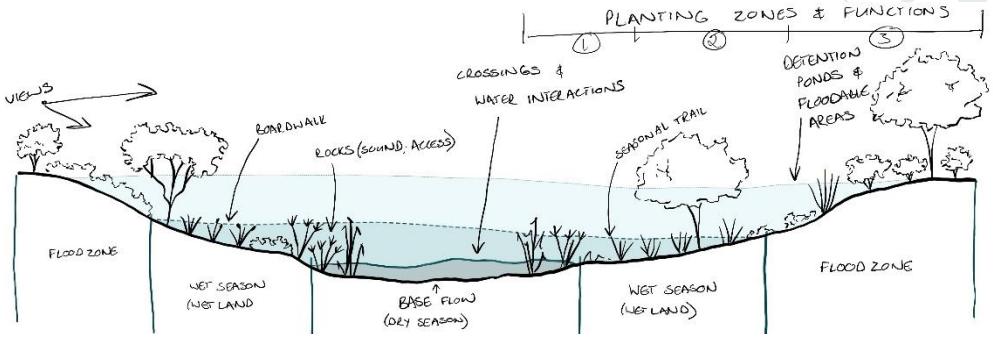


Figure 13: Typical river cross section explaining planting zones and design opportunities (Author, 2025).

The design draws inspiration from the various shapes and movements of rivers and how water is allowed to shape a landscape over time. By studying the route that the Natal Spruit takes from origin to the ocean various forms and layers were identified that inspired the forms within the landscape. Further explorations were done with water and food coloring which showcased how water moves over a blank canvas and the refractile patterns that it creates. These experiments were further studied in terms of how it can inform place making and patterns within a landscape.

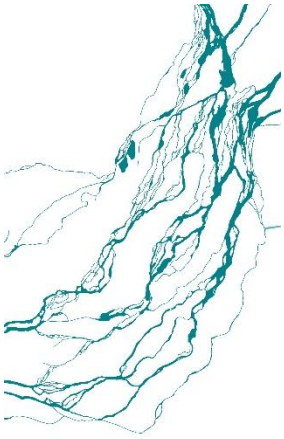


Figure 12: Section of the Orange River (part of the Natal Spruit river system) form inspiration (Author, 2025).

Figure 11: Water explorations led to refractile patterns (Author, 2025).

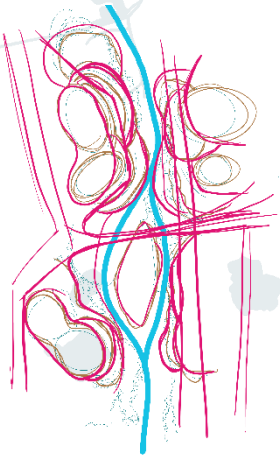


Figure 10: Form extracted from water explorations (Author, 2025)

By bringing these two investigations together the design aims to create a landscape that moves as one with the river and showcases the amazing lifeforce that water can be.

THEORETICAL CONTEXT

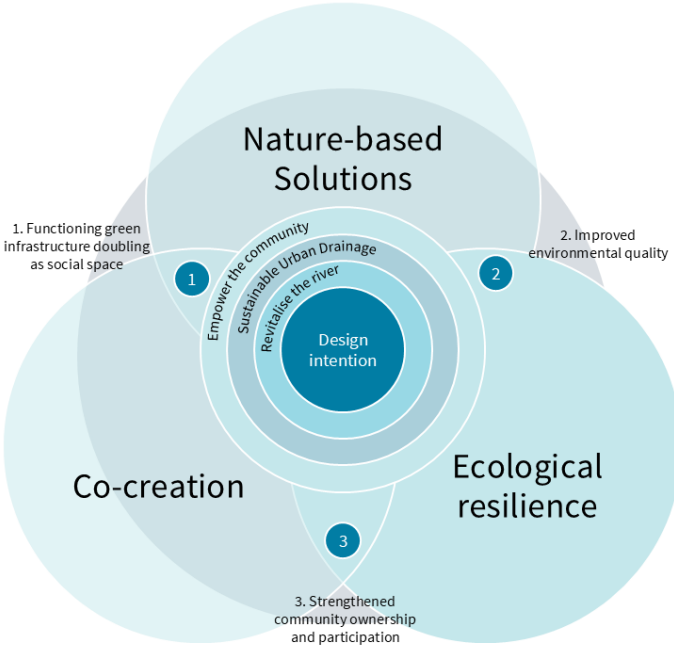
DIT AND DPD INTEGRATION

The research study carried out in the first semester of this year investigated the benefits and disadvantages of engaging in a community driven co-creation process to develop nature-based

prototypes. The co-creation of nature-based solutions has recently been advocated for to better include communities in the development of infrastructure and public spaces. It is argued that this approach allows community members to develop a better sense of ownership over green spaces and allows them to participate in the long-term maintenance and care of these spaces. Through a series of co-creative skills development workshops, the research team worked with the community to develop nature-based prototypes that were eventually built with assistance from the community. The study found that the participation of the community in the project from start to end allowed them to better understand the project intent as well as inform the eventual built structures. Further the importance of natural systems and interaction therewith was highlighted by the community members as an unexpected benefit from the research project.

Throughout the research project various workshops were held regarding environmental awareness, propagation, composting and nature-based stormwater management. The community highlighted the benefit that these workshops had regarding the acquisition of new skills and education. It was confirmed at the end of the study that the participation of the community in both the co-creation and the skills development workshops allowed a greater sense of ownership over the built prototypes but also encouraged the community driven expansion and duplication of the prototypes throughout the community. The research project spans over 4 years and thus replicating the co-creation process in its totality for the design project would be impossible, rather the design project drew inspiration from the research project and its findings and implemented certain aspects at a smaller scale.

The design project drew inspiration from the research process and the importance of a nature-based approach to the design elements. Further it acknowledged the important impact that community members have on the eventual design. As such the designer engaged in various conversations with visitors to the project site to determine specific issues to address and how to do this. These conversations informed the objectives of the project but also revealed where potential lied to include community members in the



construction and maintenance of the project. As such the project proposes that the construction of certain elements and the maintenance of the project be done by disadvantaged members from the community such as homeless persons who can then take these skills further. Community members raised their concerns regarding the quality of the river water and the danger that the flooding of the river caused to people using the site as well as buildings around the site. Further the need for a more formalized market space near the taxi rank was highlighted and the general lack of community spaces in nature was also raised. The project aims were formulated around these concerns with a focus on integrating these concerns with natural systems occurring on site.

The focus on natural systems is evident in the design concept which focuses on the river system and its functioning as well as the intent to allow various forms of interaction and experiences with the different states of the river throughout the year. The landscaping on site is informed by a typical river section and the planting “zones” that it consists of. Further the water experiences and interactions with the river and other water elements drew inspiration from the various elements within a river corridor such as a waterfall or a meandering bend. Water elements on site aim to firstly be functional (natural cleansing of water, groundwater recharge, flood control) and aesthetic and secondly allow human interaction. Various forms of sustainable urban drainage systems (permeable pavement, swales, etc.) are used in the landscape along with treatment terraces. These terraces are dispersed throughout the landscape which allows for the filtering of stormwater before it enters the river corridor, while also acting as educational elements highlighting the value of sustainable drainage systems in an urban environment. Designed as a floodable landscape the park helps to control flooding in the surrounding area by widening the floodplain of the river and allows unique nature interactions throughout the various seasons as the water level fluctuates.

DESIGN DEVELOPMENT AND TECHNOLOGY INVESTIGATION

DESIGN DEVELOPMENT

INITIAL VISION

The initial vision for the design project saw the development of a river corridor framework that identified a set of principles for interventions along a river system. Further three sites for intervention were identified to possibly resolve as a showcase of how to address the urban river. However, to fully address the urban river condition, one site was chosen and developed further as

a site-specific example of how natural and semi-natural water systems could enhance sense of place.

NATAL SPRUIT FRAMEWORK

The project began by investigating how urban rivers were addressed and planned for. Precedents such as the Los Angeles River Revitalization Master Plan (Wenk Associates, 2017) and the Cape Town Livable Urban Waterways Program (McDonald, 2020) informed a set of principles to consider when developing a river framework. Areas around the river corridor were considered in terms of their potential to act as detention spaces, filtering areas, permeable spaces and the possibility for the occurrence of public-water interfaces. This allowed the development of a river framework that identified possible intervention points where most of the principles overlap.

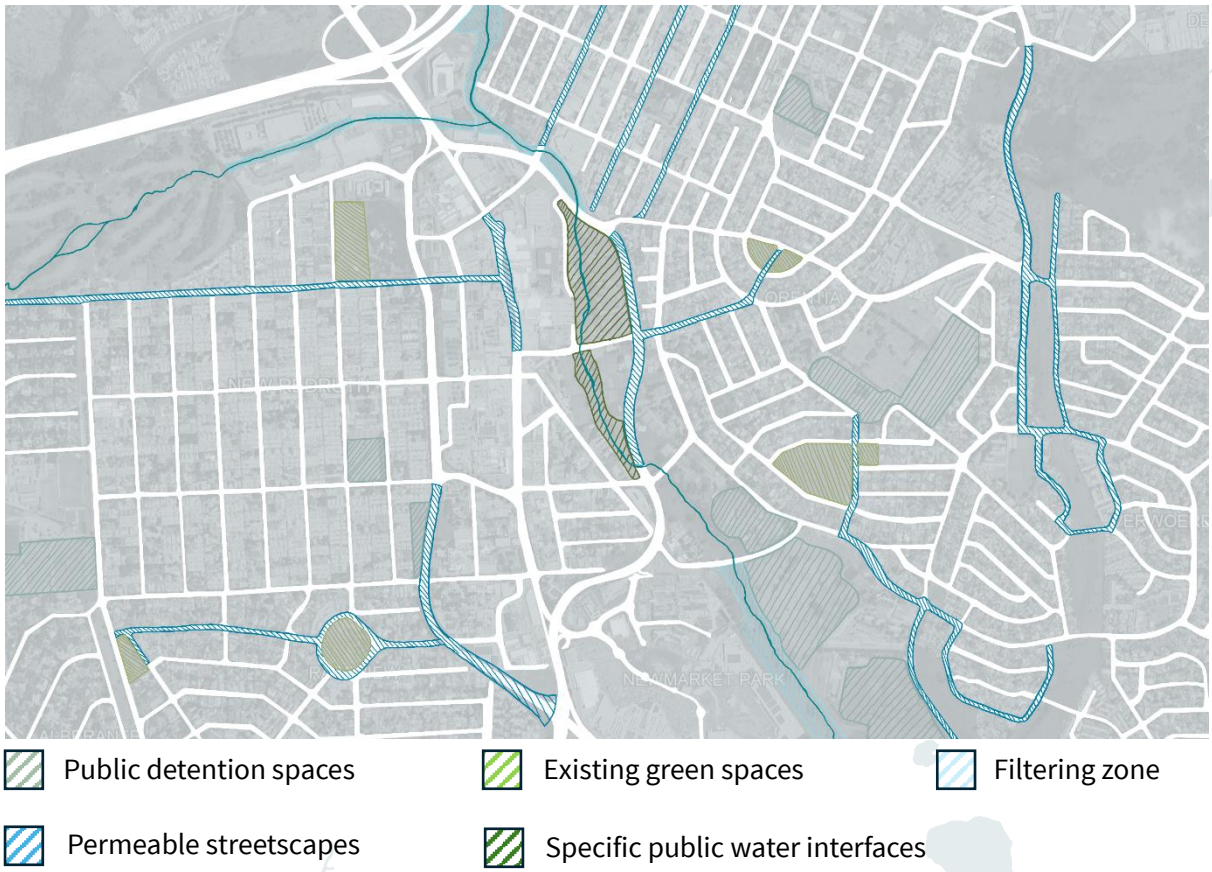


Figure 14: Natal Spruit framework (Author, 2025).

FOCUS AREA

The design then focused on the green open space across from the Civic Centre and Library. Initial iterations of the design worked with the river as a static element, focusing on the treatment and showcasing of stormwater. However, the focus was shifted towards working with the river and allowing it to shape the space as the giver of form and life to the site. Further emphasis was put on the link between the Civic Center and Library to the site by creating outdoor rooms along the river

space. This emphasizes how water shapes a landscape and how it can facilitate various nature interactions.

SITE ORGANIZATION AND LINKAGES

For site zoning and program placement the linkages between the site and existing programs (Civic Centre, Library, Mall, Taxi Rank) were investigated giving the design an anchoring point. Further linkages to green spaces within a 5 – 10 minute walking distance (400m – 800m) were also investigated allowing for the establishment of green corridors between these spaces. The main circulation routes through the site were kept as direct linkages and throughfares while narrower meandering routes were introduced to allow a more intimate interaction with nature and water elements. The existing road creating a boundary between the Civic Centre and the site is narrowed to become a single lane road with streetside parking. Drawing inspiration from the Johannesburg Complete Streets Guide the pedestrian interface is enlarged encouraging better pedestrian access and flow from the Civic Centre, Library and Mall towards the landscaped site.

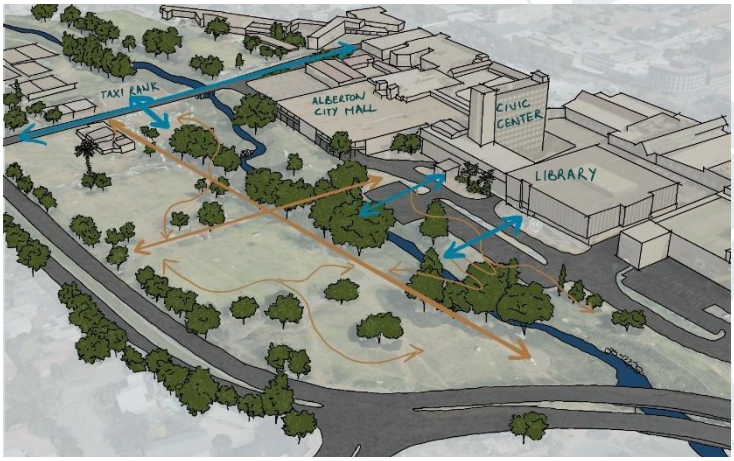


Figure 15: Proposed linkages to site (Author, 2025).

The creation of a formalized market space and the formalization of the Taxi rank system create a nuanced vivid node at the Southern entrance to the site drawing visitors in. Three bridges span the river at different points allowing safe crossing of the river and vistas over the site. Stormwater treatment terraces form the North-Eastern boundary of the site buffering the children's playscape from the busy Ring Road and produces cleaned non-potable water for an interactive water play element. The multifunctional lawn area allows for the continuation of sports activities such as soccer on site but also invites the community to participate in informal activities such as picnicking.

ADDRESSING DESIGN OBJECTIVES

The sketch plan area of the design aims to showcase the extension of the Civic Centre and Public Library into the landscape. The creation of an urban plaza with different planting areas and seating spaces invites visitors in from the Civic Centre and down into a terraced seating area which leads to a constructed island within the main channel of the river. From here visitors can engage with the flowing river while viewing and interacting with a smaller scale treatment system that showcases the planting zones of a riverbank. These terraces overflow into one another through different spouts and overflows which draw inspiration from a river's journey from origin to ocean. Furthermore, this space allows for informal performances to happen in association with the Civic Centre. Across from the library a small coffee shop spills into a shaded landscaped area creating space for visitors to enjoy their books. Wide steps lead down to a raised platform overlooking the area which allows visitors a view over the river and its floodplain. A meandering nature walk entices visitors to experience the different planting zones and allows for an alternative seasonal crossing space over the river.

Figure 18: Initial masterplan design (Author, 2025)

Figure 17: Masterplan during iterations (Author, 2025)

Figure 16: Current working masterplan (Author, 2025).

TECHNIFICATION

SYSTEMS

Three systems were assed in the design, the main system being water and then two secondary systems being waste and human health and wellbeing. This assessment allowed the project to be scored according to criteria related to these systems and allowed for informed improvements. Further the assessment informed the sizing of the treatment terraces based on the amount of water redirected from the stormwater system and harvested from the building roofs and paved areas. For more information regarding these systems please view the addenda.

MATERIALITY

The material palette was inspired by the surrounding area drawing on the language that existed. Bricks are used to complement the existing brickwork found around the site. Rocks along the river edges and terraces speak to the natural heritage of the site and is sourced from nearby developments. The planting palette aims to re-introduce native species to the CBD while being functional pollutant removers.

TECHNICAL DETAILING OF TERRACES

The treatment terraces were further developed technically with a focus on the overflow areas. Drawing inspiration from a river system the overflows increase from a single overflow to multiple outlets in the last terrace. The technical development of this showcases not only the functionality but also the experiential quality of these elements.

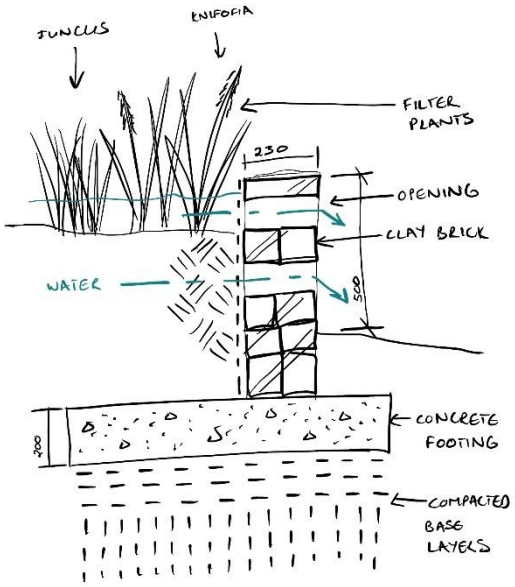


Figure 19: Typical detail of treatment terrace edge condition (Author, 2025)

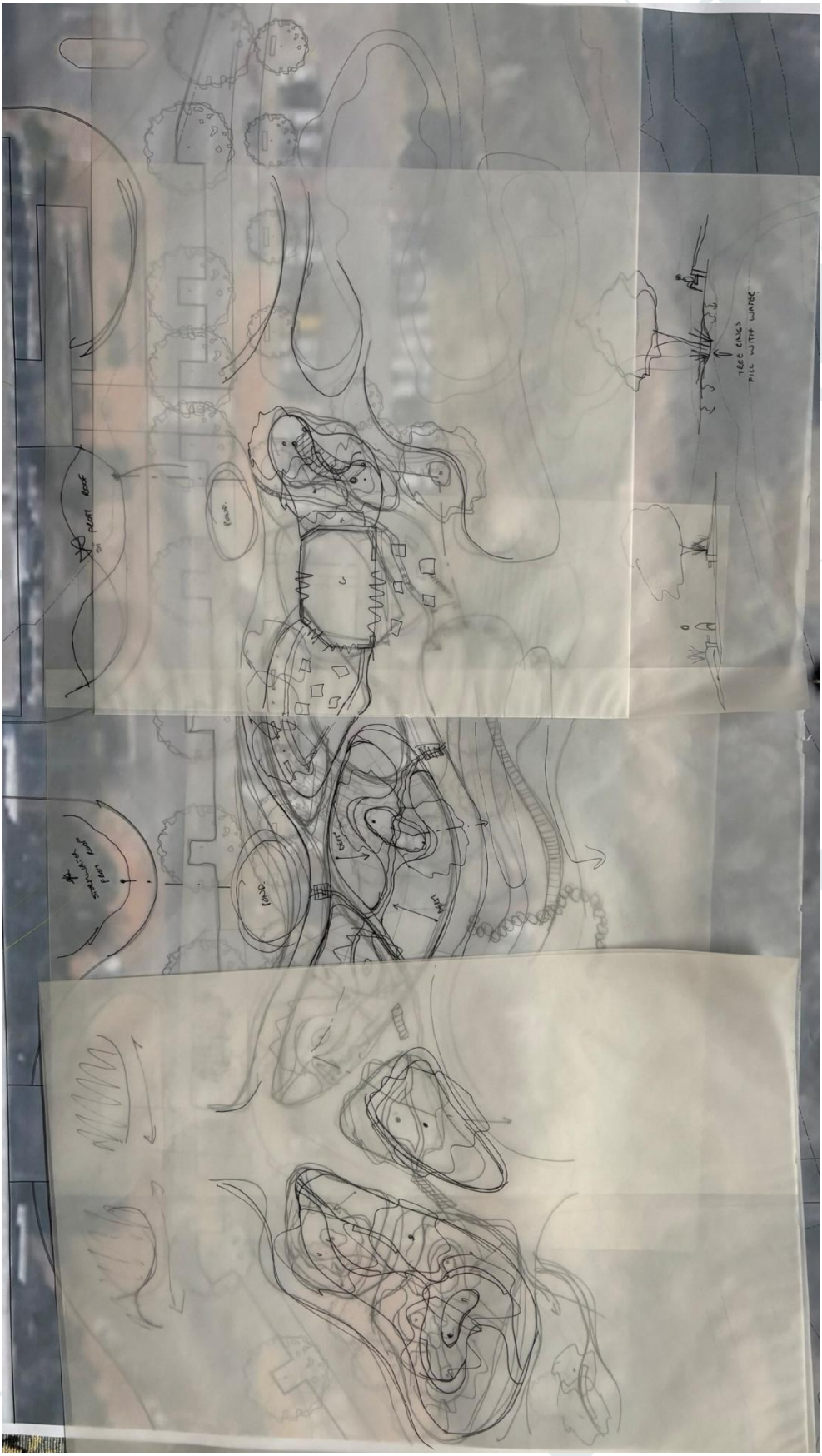


Figure 20: Current working sketch plan (Author, 2025)

CRITICAL REFLECTIONS

The final design acts as a showcase of what is possible when water systems form the main basis of the design, especially a river system. Allowing the river to spread into two channels with the creation of an ecological island allows the river to mimic natural occurrences lower in its course. This also allows the opportunity for various water related interactions with the river, be it the direct access to the wider slower flowing main channel or the visual and auditory appeal of the faster flowing secondary channel that flows over a series of vertical drops before it joins the main channel again.

With the improvement of the river channel new floral and faunal life is brought into the site. The ecological island acts as a safe haven for the smaller animal species while still allowing humans to observe and appreciate the ever-growing ecosystem. Not only do the improvements attract wildlife, but it also attracts humans back into what was a decaying urban center. This influx of visitors allows for the densification and upgrade of the historical CBD, which in turn strengthens the sense of place experienced within Alberton.

It was critical to make the water system work in this project. This was done through various interventions ranging from site scale (treatment terraces, widening of floodplains, etc.) to city scale proposals (permeable streetscapes, public detention spaces, etc.). This understanding of water systems and complimentary interventions is where the project's strength and importance lie.

Personally, this masters project allowed me to expand my interests and excited me with the potential that it holds. However, it came with a series of challenges that had to be addressed throughout the year, such as testing various scenarios and making quick decisions based off the information at hand, processing valuable feedback without being overloaded or directed into a different direction. All of this has allowed me to build confidence in my decisions and showed me where my potential contribution to the landscape architectural field lies within the future.

CONCLUSION

As one of the most valuable resources on earth, water within our natural environments and urban spaces needs to not only be considered but allowed to shape the spaces that we find ourselves in. Urban centers have buried and ignored these resources, losing their connection to nature and water. The result is lifeless city centers that are being abandoned in favor of newer developments

that better consider and incorporate water and nature. This project showcases how by allowing water to shape and form spaces in our urban environments life can be brought back into decaying sites.

The resource that often became the dictating factor for deciding where humans should settle has been forgotten and neglected, it is time that we re-open our rivers and waterways and reconnect to the force that brings life, hope and (if used well) a sense of place.

REFERENCES

Iberdrola. 2025. Green corridor. *Iberdrola.* Available from: https://www.iberdrola.com/sustainability/green-corridor [Accessed: 6 May 2025].

Limba, A. 2025. Site visits reveal pollution disaster. *Alberton Record.* 23 April, 1.

McDonald, A. 2020. *Cape Town's Liveable Urban Waterways: A compendium of case studies: Guiding the transition to a water sensitive future.* City of Cape Town.

Medium, 2023. The role of rivers in the development of cities. *Medium.* Available from: https://medium.com/@seedbaba/the-role-of-rivers-in-the-development-of -cities-61e1e415ab5d [Accessed: 10 April 2025].

Pauleit, S. Hansen, R. Rall, E. L. & Andersson, E. 2017. Urban landscapes and Green Infrastructure. *Oxford Research Encyclopedia of Environmental Science.* 1-53. Available from: https://www.researchgate.net/publication/318055183_Urban_Landscapes_and_Green_Infrastructure [Accessed: 9 April 2025].

Pinto, PJ & Kondolf, GM. 2015. Rivers in urban history: tales of fear, harmony, destruction and opportunity. Berkeley: University of California, 1-3.

Rivers are Life, 2023. Unveiling the Ecological Importance of River Ecosystems. *Rivers are life.* Available from: https://riversarelife.com/articles/unveiling-the-ecological-importance-of-river-ecosystems#:~:text=Rivers%20play%20a%20vital%20role,with%20essential%20resources%20for%20survival. [Accessed: 16 May 2025].

Shahady, T. D. 2021. Degradation and Improvement of Urban River Water Quality. In: Dunea, D. *Water quality – Factors and Impacts.* Available from: https://www.intechopen.com/chapters/77293 [Accessed: 22 April 2025].

Wenk Associates, 2007. Los Angeles River Revitalisation Master Plan. *WenkLa.* Available from: https://www.wenkla.com/projects/los-angeles-river-revitalization. [Accessed: 10 March 2025].

Waters of Place

Re-imagining sense of place in Alberton through Water-led landscapes

Assessment framework and criteria

This project investigates the potential of functioning natural and semi-natural water systems in improving the sense of place experienced in forgotten urban landscapes. The project focusses specifically on a site located within the older central area of Alberton. In this project a variety of systems are considered including water, human health and wellbeing, and waste. These systems relate directly to the project objectives in a variety of ways. The project has three main objectives that relate to the systems on site. These objectives are:

1. Revitalise the river corridor.
    a. This will be done through cleaning litter from the river, re-establishing buffers and re-connecting isolated corridors. Further native fauna and flora will be re-introduced, and river functioning will be restored where possible.
2. Celebrate the stormwater system
    a. The implementation of Sustainable Urban Drainage Systems (SUDS) and flood control measures will result in improved stormwater quality allowing human interaction and re-use of stormwater in certain areas.
3. Empower the community through social nodes and opportunities
    a. By including the community in the design and construction process, a better sense of ownership is established. Further work will be done to tie in with the mall, civic centre and library next to the site. The establishment of a market space will allow for local vendors and weekend markets, while the trails and lawn areas allow for custom uses. Further the project aims to empower disadvantaged community member (poor and homeless) through training and work in the upkeep of the park.

The systems are informed and rated according to the SITES rating system (McCormic, 2015) and supplemented with additional resources found during research done on rating systems available. The rating system will assess the design at a Masterplan level before focussing on the Sketch plan area.

Water system

The main system in consideration for this project is the water system located within and around the site. The Natal Spruit, a semi-natural water system passes through the design site and informs the initial planning of the water system. Additionally, a main stormwater pipe exits into the site and informed the secondary water system. The regional water system consists of various zones namely the Filtering zone, Permeable streetscapes, Public detention activity spaces, Partial to full river rehabilitation and existing green spaces for upgrades (see fig. 1). These zones contain various designed interventions to treat stormwater/river water, improve water quality, detain storm events and provide human-nature interaction moments (see fig. 2) at the city-wide scale.

Figure 2: Urban water system design.

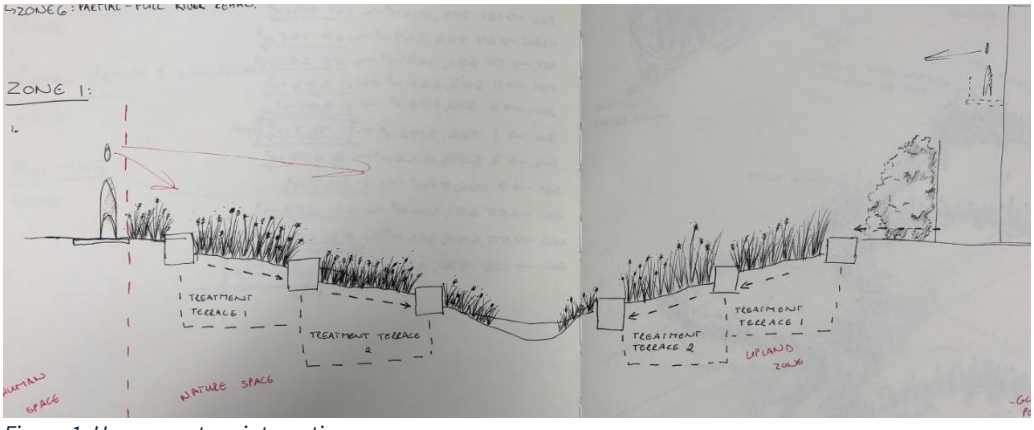


Figure 1: Human-nature interactions.

Figure 3: Main water system on site

The main water system on site is the Natal Spruit which is re-designed to have a secondary channel to treat some of the river water as well as the introduction of specific access points for human interaction. The secondary system includes a series of "treatment terraces" that receive and clean stormwater from the main stormwater pipe. This system aims to deal with half of the annual stormwater flowing from that pipe (approximately 330 376m^3 annually).

When consulting the SITES rating system the water category is scored according to 6 criteria:

3. Site Design - Water		**Possible points**	**Existing**	**Design**
WATER P3.1	Manage precipitation on site	4	3	4
WATER P3.2	Reduce water use for landscape irrigation	4	4	4
WATER C3.3	Manage precipitation beyond baseline	6	4	6
WATER C3.4	Reduce outdoor water use	6	3	5
WATER C3.5	Design functional stormwater features as amenities	5	0	5
WATER C3.6	Restore aquatic ecosystems	6	4	6
		Total scored	**18**	**30**

The design excels in the ratings for functional stormwater features and restoring aquatic ecosystems. By rehabilitating riparian edges (fig. 4) and using native fauna in the planting palette space is created for nature to come back. Further stormwater features that are used to create space (see fig. 5) (such as

informal treatment terraces and a detention pond/multifunctional sports field) facilitate human interaction and sensory experiences.

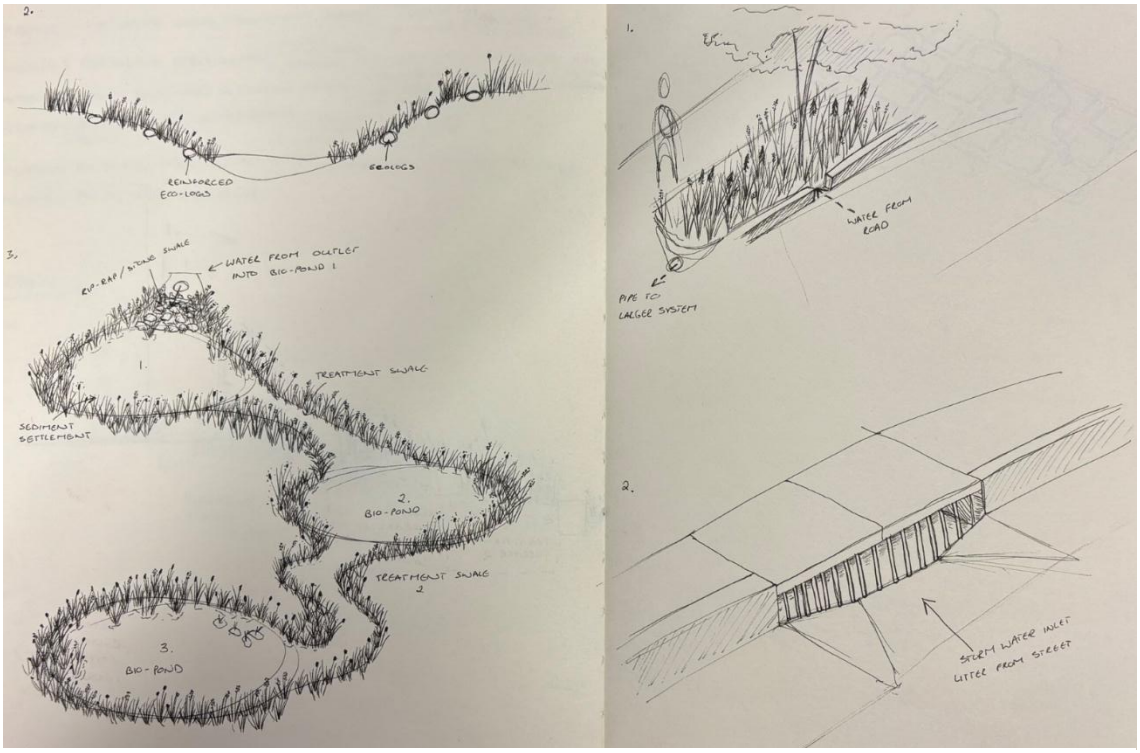


Figure 4:Rehabilitation of riparian edges and alternative stormwater measures.

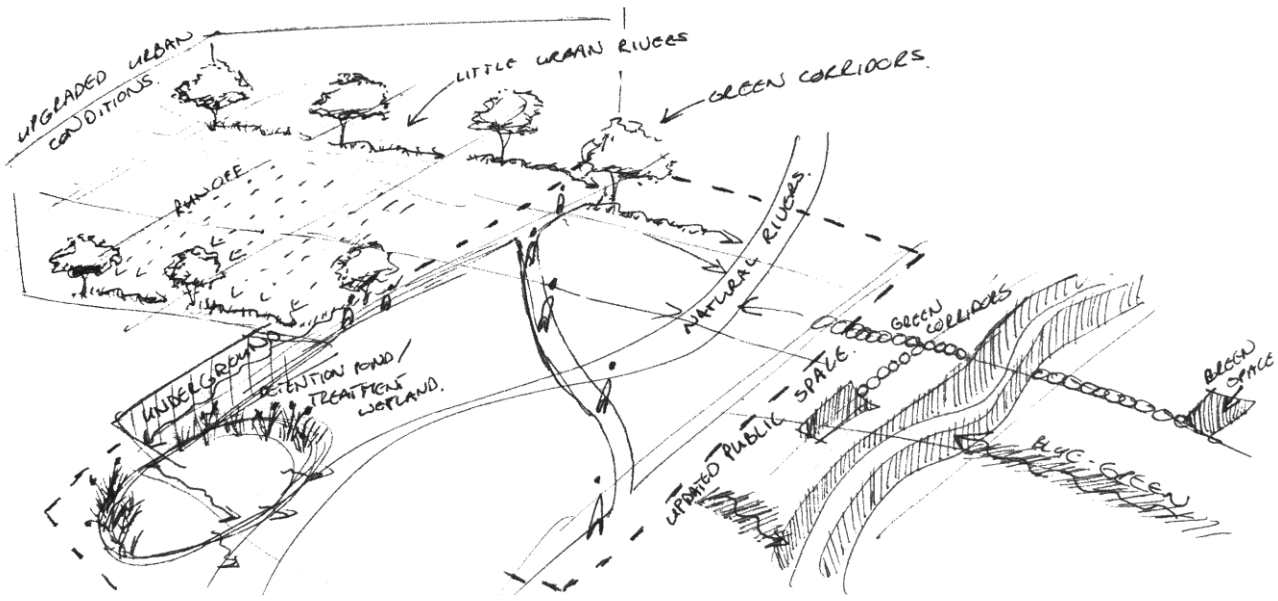


Figure 5: Creation of place though water elements

The introduction of a secondary channel to the Natal spruit and the subsequent widening of the river channel allows for the lowering of the 1:50 flood line resulting in less flooding within the urban environment. The SITES rating system provides a baseline for considering the water systems on site but lacks certain criteria such as water quality and connecting back to the floodplains. The Cape Town Liveable Urban Waterways Programme (McDonald, 2020) seeks to rehabilitate waterways in Cape Town by using water-sensitive design, nature-based solutions and green infrastructure. The programme utilises a simple rating system considering ecological, social and climatic factors. From this rating system three additional criteria are added to the SITES criteria to supplement the rating for the project.

3. Site Design - Water		**Possible points**	**Existing**	**Design**
WATER S3.7	Manage water quality up to an acceptable level	4	1	3
WATER S3.8	Connect the water way (& stormwater) to the water table and floodplain.	4	3	4
WATER S3.9	Provide a range of Ecosystem services	4	2	4
		Total scored	**6**	**11**

Waste system

An important consideration alongside the water system is the impact of waste within the urban environment and its related water systems. To deal with solid waste that enters the water system a series of interventions are implemented from the regional context to the site context and functions in a curated waste system.

Starting at kerb inlets, simple litter traps in the form of steel mesh and planted filter strips are utilized to direct the flow of solid waste during rain events towards specific gathering points. These systems are easy to use and widely accepted within the existing urban framework. From here recyclable waste will be collected by recyclers while the unrecyclable waste will be dealt with through a public-private partnership between home/business owners and the municipality.

On site solid waste will be dealt with by providing waste bins labelled according to the waste that it caters for (plastic, organic, paper, metal, etc.) The recyclable material bins will be emptied by recyclers working with the park management on a weekly basis. The bins containing organic waste and unrecyclable waste will be dealt with through a public-private partnership allowing the bins to be emptied at least twice a week.

The SITES rating system deals with storage and collection of recyclables and recycling of organic matter in the Operations and Management category but does not address waste within a water system. As such an additional criterion is added to address the treatment of solid waste within natural and man-made water systems.

8. Operations and Maintenance		Possible points	Existing	Design
O+M P8.1	Plan for sustainable site maintenance		N	Y
O+M P 8.2	Provide for storage and collection of recyclables		N	Y
O+M C8.3	Recycle organic matter	5	0	3
O+M C8.4	Minimise pesticide and fertiliser use	5	0	5
O+M C 8.5	Reduce outdoor energy consumption	4	4	3
O+M C8.6	Use renewable sources for landscape electricity needs	4	0	3
O+M C8.7	Protect air quality during landscape maintenance	4	2	4
		Total scored	**6**	**18**
8. Operations and Maintenance		**Possible points**	**Existing**	**Design**
O+M S8.8	Manage solid waste within water systems (River & Stormwater)	6	3	6

Human Health and Well-being

Human health and wellbeing is a well explored criteria within the SITES rating system. The design looks at how various human-nature interactions can be facilitated through water systems and promote improved human well-being. Further the design enhances the programs existing on site by providing easy site access and wayfinding, various spaces for physical activity (walking/jogging/cycling routes) and spaces for social connection (market spaces, informal terraces). Further indigenous edibles are spread throughout the site for informal picking and eating.

6. Site design – Human Health + Well Being		Possible points	Existing	Design
HHWB C6.1	Protect and maintain cultural and historic places (project must have existing feature)	3	2	2
HHWB C6.2	Provide optimum site accessibility, safety, and wayfinding	2	1	2
HHWB C6.3	Promote equitable site use	2	2	2
HHWB C6.4	Support mental restoration	2	1	2
HHWB C6.5	Support physical activity	2	1	2
HHWB C6.6	Support social connection	2	2	2
HHWB C6.7	Provide on-site food production	4	3	3
HHWB C6.8	Reduce light pollution	4	4	3
HHWB C6.9	Encourage fuel efficient and multi-modal transportation	4	2	4
HHWB C6.10	Minimise exposure to environmental tobacco smoke	2	0	1
HHWB C6.11	Support local economy	3	3	3
		Total scored	**21**	**26**

Final rating

The site in its existing state scored a rating of 139 out of 273 points leading to an average of 50,92% and a gold rating by SITES. The designed site scored 243 out of 274 points leading to an average of 88,69% and a platinum rating by SITES. Thus, by focussing on improving the water system and developing a functioning natural (river) and semi-natural (stormwater) system the design adds value to the greater region by facilitating improved human-nature relationships.

Design progress and iterations

The final design had gone through a series of iterations (figures 6, 7 & 8) to achieve the objectives that were set out. The masterplan went through various zoning exercises before the final layout and positioning of elements were achieved. The most important aspects of the masterplan include the redesign of the river channel and the connection of the civic centre and library to the river corridor.

Figure 6: Initial masterplan

Figure 7: Masterplan with adjusted areas and river intervention.

Figure 8: Final Masterplan showcasing secondary river channel and improved layout

Initial masterplan	Areas for improvement	Final masterplan
Minimal intervention in river course. Allows minimal interaction with water.	Allow better access to the river itself and include various sensory experiences.	Addition of secondary channel and widening of floodplain. Various forms of human-nature and sensory interactions with the river and the water it contains.
		Creation of an “island” allows for protected habitat space for small animals and birds to nest.
Stormwater system is too small and does not function correctly.	Deal with stormwater in various ways. Use appropriate sizing for the stormwater received.	Stormwater system functions properly without being overwhelmed (overflow mechanisms available). Stormwater terraces become part of the experience of the site and not just functional elements.

Large unprogrammed spaces.	Include more programs in the site to allow for better public interaction and ownership.	Various programs available on site as well as space for spontaneous or unplanned activities to take place.
SITES Rating: 243		SITES Rating: 250

Final design resolution

Figure 9: Sketch plan focus area.

The final design resolution (Figure 9) focusses on the sketch plan area of the masterplan. This area showcases a smaller version of the treatment terraces (figure 10) and how these create specific interactions with nature. Various human-water interactions are created and facilitated within the terraced area of the Sketch plan showcasing terraces stepping down towards an artificial island on the river edge (figure 11). The proximity of this space to the Civic Centre allows for functions and events to spill out into the park.

Towards the Northern side of the sketch plan, opposite the library a nature route (figure 12) is created with rest spaces and vistas towards the river. Further the inclusion of a small coffee shop attracts a variety of users to the space. Vistas over the river and the park facilitated through the nature walk, terraces and steps entice visitors to further explore the park and experience various moments of nature connectedness. Through different sensory experiences of water (auditory, visual, etc.) visitors are gently enticed along the route towards the seasonal crossing over the river, further emphasising the importance of water in the landscape.

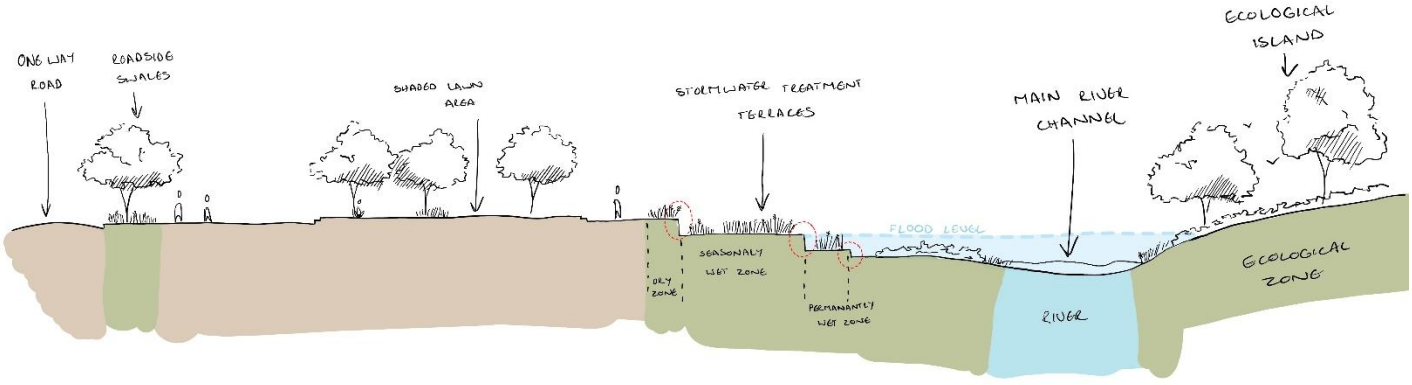


Figure 10: Section through smaller treatment terraces towards river edge.

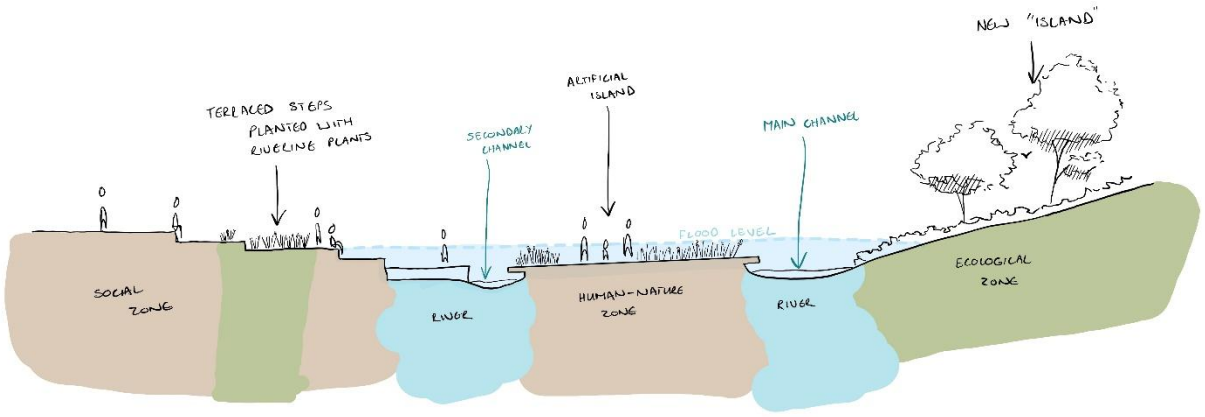


Figure 11: Section through terraces and informal island across from the Civic Centre..

When looking at the rating system discussed earlier in this document the final design improves on the original park design by cleansing the river water, creating space for wildlife, dealing with stormwater and preventing flooding as well as providing space for human-water-interactions to take place. The design aims to divert up to 50% of the low flow state of the river and through a winding secondary channel, utilises planting and natural systems to clean the water before returning it to the main channel. The smaller terraces within the sketch plan aims to clean stormwater from the road surface and a section of the mall roof before allowing it to enter the river system. These terraces aim to showcase how nature-based cleaning systems can be aesthetical, functional and practical. Further the integration of this system into the social spaces showcases how these systems add to the sense of place experienced within these areas.

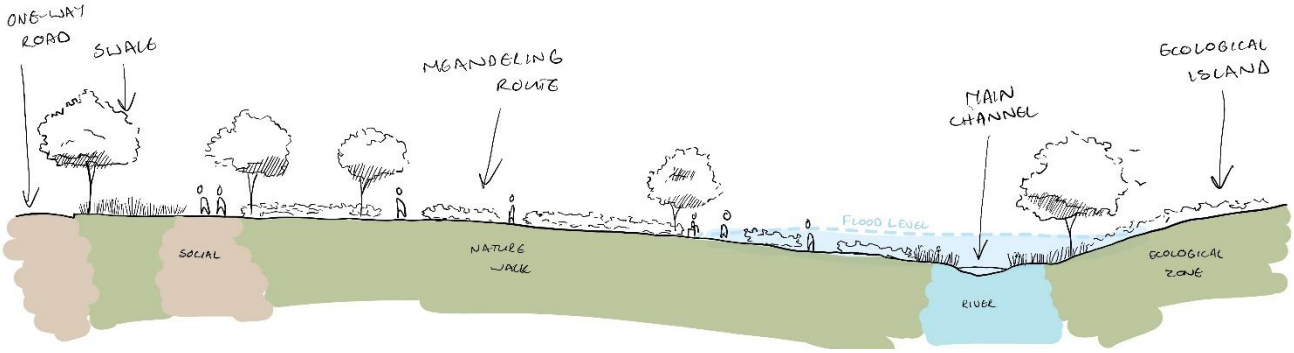


Figure 12: Nature route across from Library.

Construction technology

The construction focus for this project looks at how clay bricks can be used in different ways to reinforce the concept of the project. A key element is the various terraces within the landscape used to create spaces that clean and filter water (figure 13).

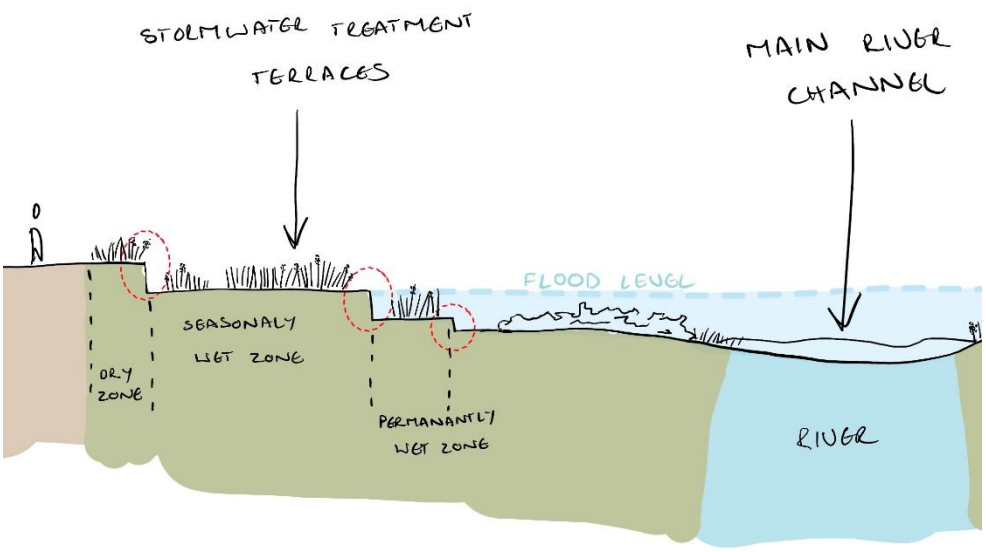


Figure 13: Construction focus area - terrace edges

Each terrace has a unique spillover at the top which draws inspiration from the river system and how the amount and flow of water changes from the origin point to the formation of a strong flowing river to the eventual delta that empties into the ocean. By using various brickwork patterns with openings in them, these terraces create unique visual appeal but also sensory appeal as the water splashes through the openings in the walls. By combining unique brickwork patterns with various metal spouts there is potential to create different experiences (figure 15).

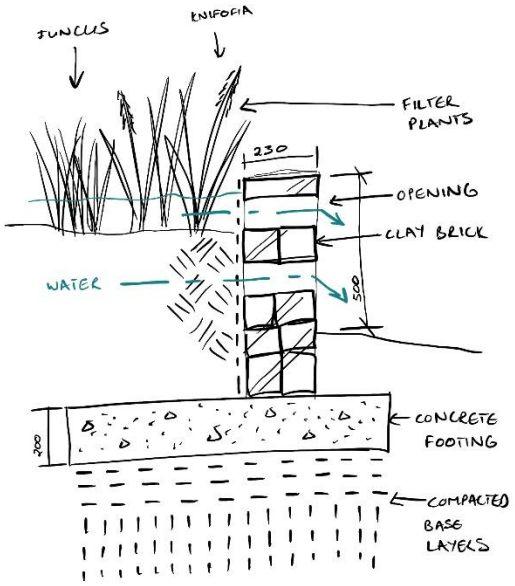


Figure 14: Basic construction detail of brick terraces.

Throughout the project various forms of paving and paving patterns are used to abstractly represent water and its flowing nature. By drawing inspiration from a series of experiments and the different effects that water has on materials (weathering of rocks and clay bricks, differing dry time of materials, various flow patterns, etc.) these areas create unique ever-changing experiences based on the season, weather and age of the various materials. Along with this the porosity of the clay bricks

used for the terraces allows moss and other Bryophyta to establish over time, symbolically allowing nature to shape and change these spaces over time.

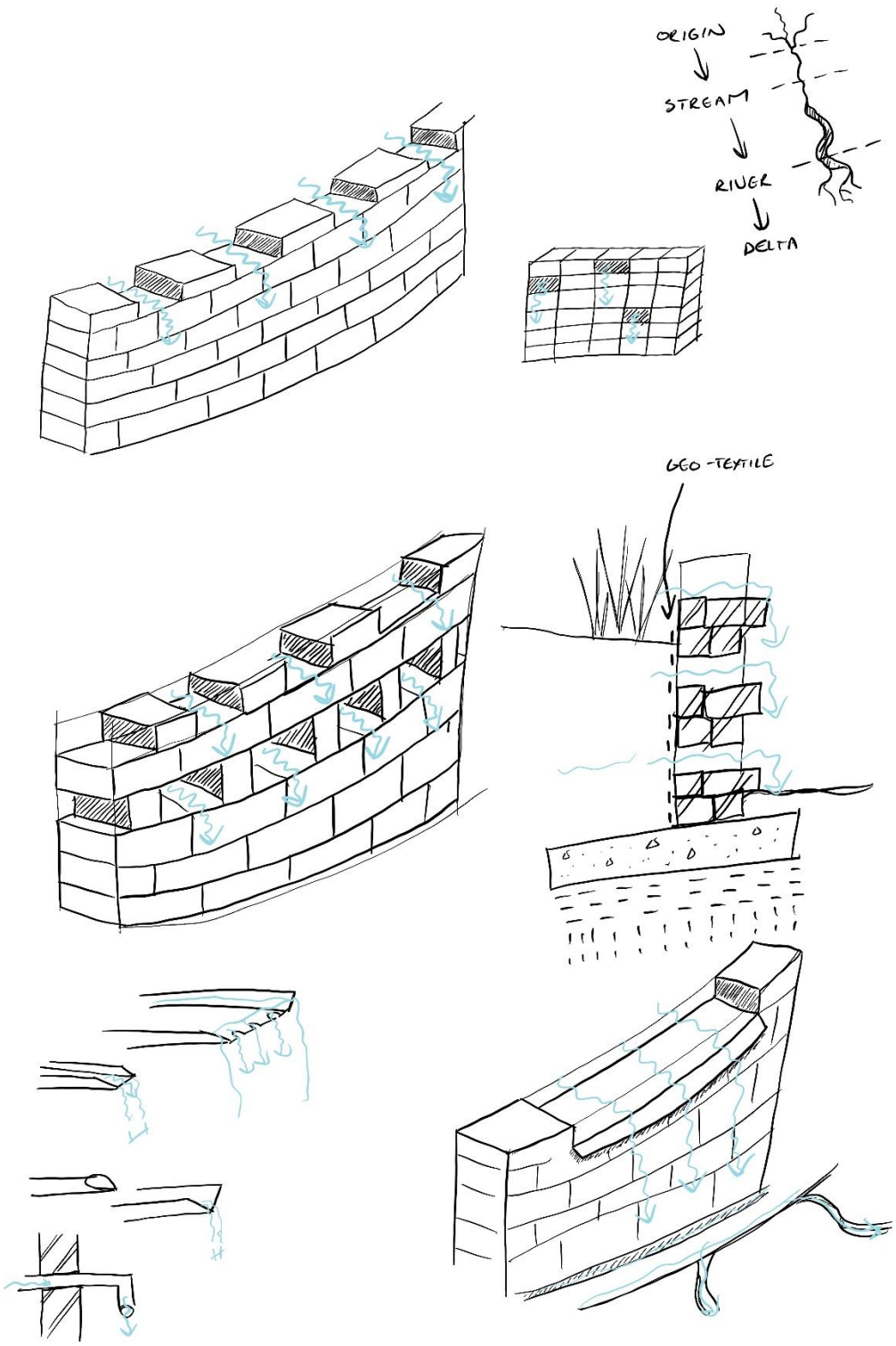


Figure 15: Different terrace edges and spouts allow water to spill over in various ways.

References

McCormic, K. 2015. *SITES v2 Rating System: For Sustainable Land Design and Development.*

McDonald, A. 2020. *Cape Town's Liveable Urban Waterways: A compendium of case studies: Guiding the transition to a water sensitive future.* City of Cape Town.