

• CAREL NICOLAAS SMIT U17017719 •



# URBAN RIVERSCAPE

THE CITY AND RIVER IN TENSION

**AUTHOR** CAREL **NICOLAAS SMIT**

**STUDY LEADER** PROF ARTHUR BARKER

**COURSE COORDINATOR** PROF ARTHUR BARKER

**RESEARCH FIELD** DESIGNED ECOLOGIES

**CLIENTS** SAVF ( SUID-AFRIKAANE VROUEFEDERASIE)  
CITY OF TSHWANE

**PROGRAMME** STORMWATER RESEARCH  
RECREATIONAL  
SAVF SOCIAL INTERFACE

**STUDY AREA** APIES RIVER, CBD, PRETORIA

**SITE LOCATION** JOHANNES RAMOKHOASE ST.

**COORDINATES** 25°44'35.1"S 28°12'02.1"E

## ABSTRACT

The river was first an element of attraction for early settlements. Riverscapes were established due to the potential use of the river as a resource or industrial driver. However, over time, riverscapes, as we see them today, became indeterminate and indifferent because the river has lost its ability to contribute to the lived experience of the city. We find rivers and riverscapes neglected, vacant, and in dire need of a response and development to give value back to the city and its urban residents.

## DECLARATION

In accordance with Regulation 4(c) of the General Regulations (G.57) for dissertations and theses, I declare that this thesis, which I hereby submit for the degree of Master of Architecture (Professional) at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution.

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

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

SIGNATURE \_\_\_\_\_



**CONTENT**

• POSITION + SITUATION •

---

**02 - 03**

NORMATIVE POSITION  
INTRODUCTION TO DISSERTATION

---

**04**

URBAN RIVERSCAPE

---

**05**

RESEARCH PROBLEM

---

**06 - 07**

RESEARCH QUESTION  
RESEARCH METHODS  
PROBLEM STATEMENT

---

**08 - 09**

A RESPONSE TO THE URBAN RIVER CONDITION

---

**10**

RIVERSCAPE AS A HYBRID CONNECTED PROGRAM

---

**11**

STORY OF THE RIVER

---

• DESIGN - RESEARCH •

---

**13 - 15**

RIVERSCAPE AS IMPORTANT CITY PLACE  
LANDSCAPE URBANISM  
LANDSCAPE URBANISM PRECEDENTS

---

**16 - 17**

URBAN VISION

---

**18**

URBAN RIVER PRECEDENT

---

**19**

SITE JUSTIFICATION

---

**20 - 22**

SITE ANALYSIS

---

**23 - 25**

LIVED EXPERIENCE  
RIVERSCAPE, SPACE, DESIGN  
RESULT OF ANALYSIS

---

**26 - 30**

PROGRAM & CLIENT  
ARCHITECTURAL CONCEPT  
ARCHITECTURAL CONCEPT EXERCISE

• SYNTHESIS •

---

**32**

CONSOLIDATED DESIGN INFORMANTS

---

**33 - 47**

DESIGN DEVELOPMENT 1  
DESIGN DEVELOPMENT 2  
DESIGN DEVELOPMENT 3

---

**48 - 59**

DESIGN OUTCOME

---

**60**

TECHNOLOGICAL CONCEPT

---

**61 - 63**

SYNTHESIS AND RESOLUTION  
ARCHITECTURE AS TEMPORARY CONSTRUCTION

---

**64 - 66**

1:200 SECTION A - A & 1:50 SECTION A - A  
DETAILING

---

**67 - 69**

STORMWATER MANAGEMENT SERVICES  
DAYLIGHTING  
SBAT

• REFLECTION •

---

**71**

REFLECTION

---

**71**

DISCUSSION

---

**71**

CONCLUSION

• REFERENCE SECTION •

---

**72**

REFERENCES

---

**73 - 74**

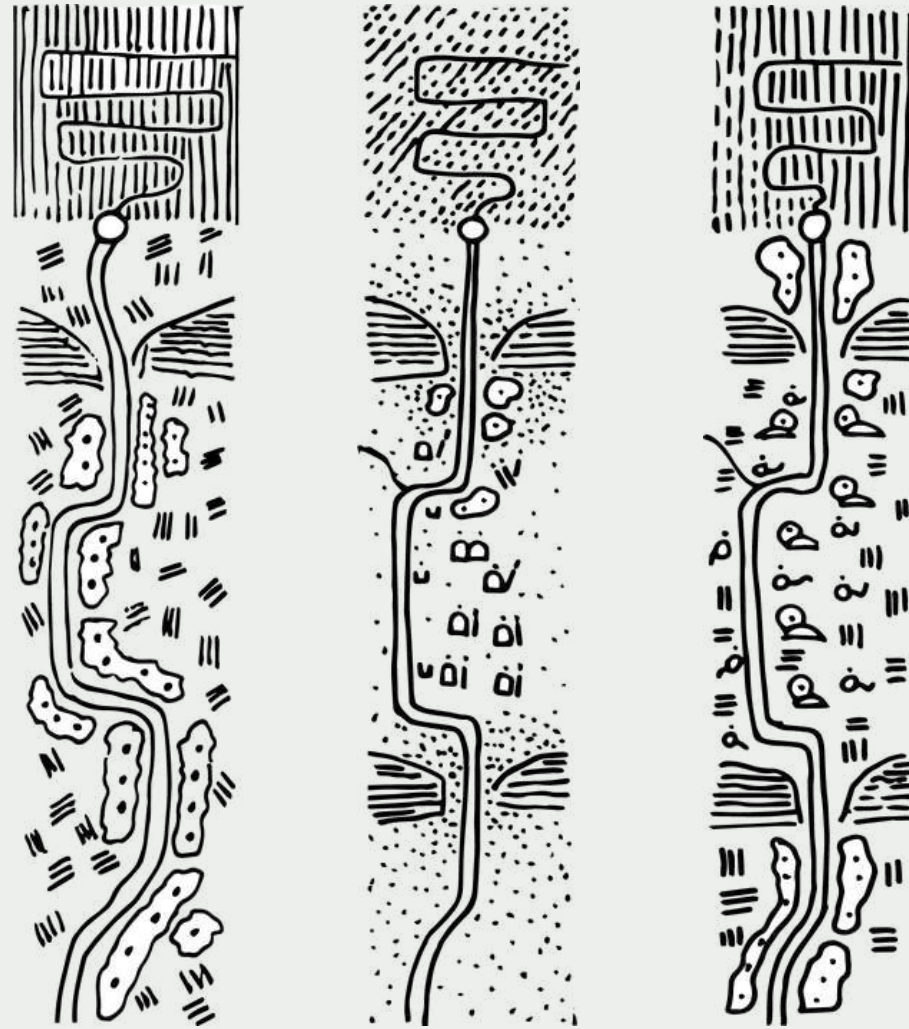
LIST OF FIGURES

---

**75**

APPENDIX A - ETHICAL CLEARANCE

• URBAN RIVERSCAPE •



POSITION + SITUATION

## NORMATIVE POSITION

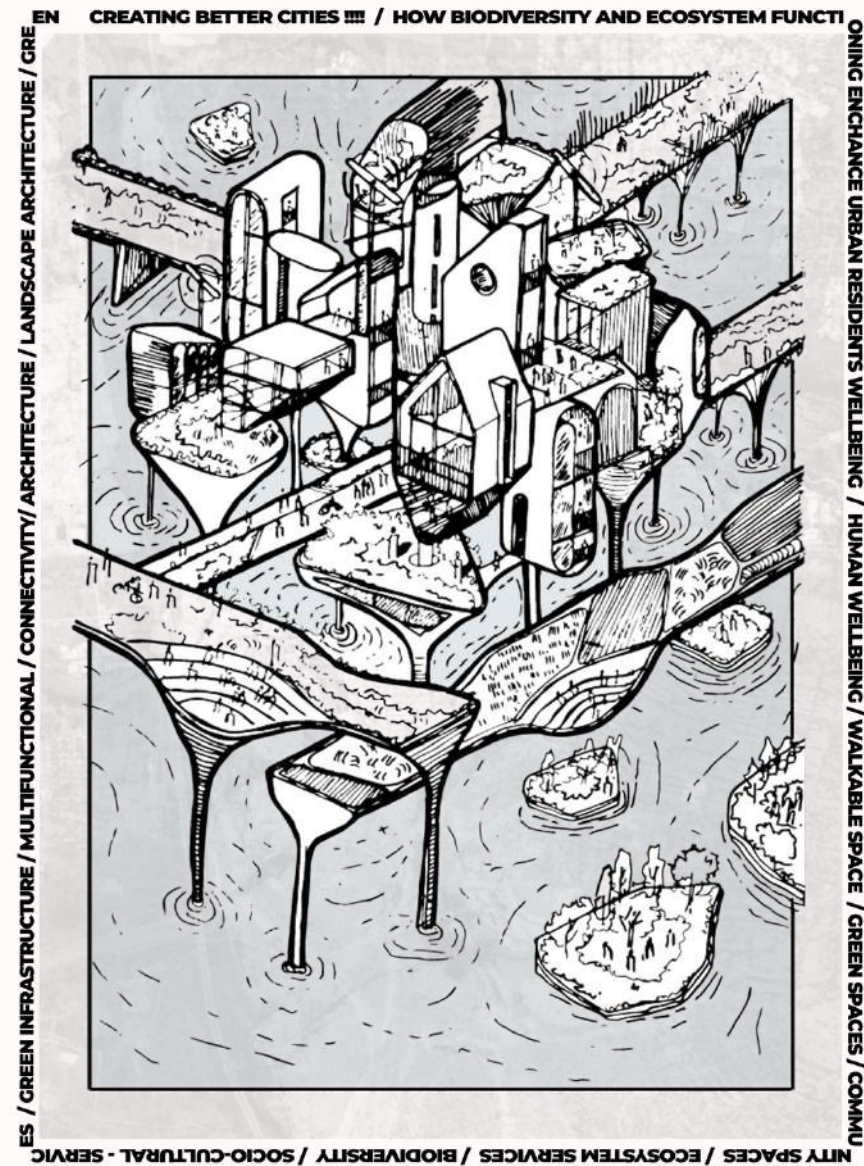


Fig 1. Graphic representations of a better city (Author 2022)

Natural systems, open green landscapes, and urban green spaces are all vulnerable. Human settlements and the infrastructure that supports them are presently intended to mitigate biological processes. As a result, unique ecosystem functions, green open spaces, and urban green spaces are vanishing (Rey Benayas et al., 2009:1122).

When global issues such as climate change, biodiversity loss, and continued urbanisation are considered, it is clear that alternative approaches to designing within new and existing urban fabrics are required. New research demonstrates the importance of biodiversity and ecosystem service to the well-being of urban residents. In the continued urban fabric, the urban resident needs to experience spaces of relief from their daily urban condition (Taylor & Hochuli, 2015:748).

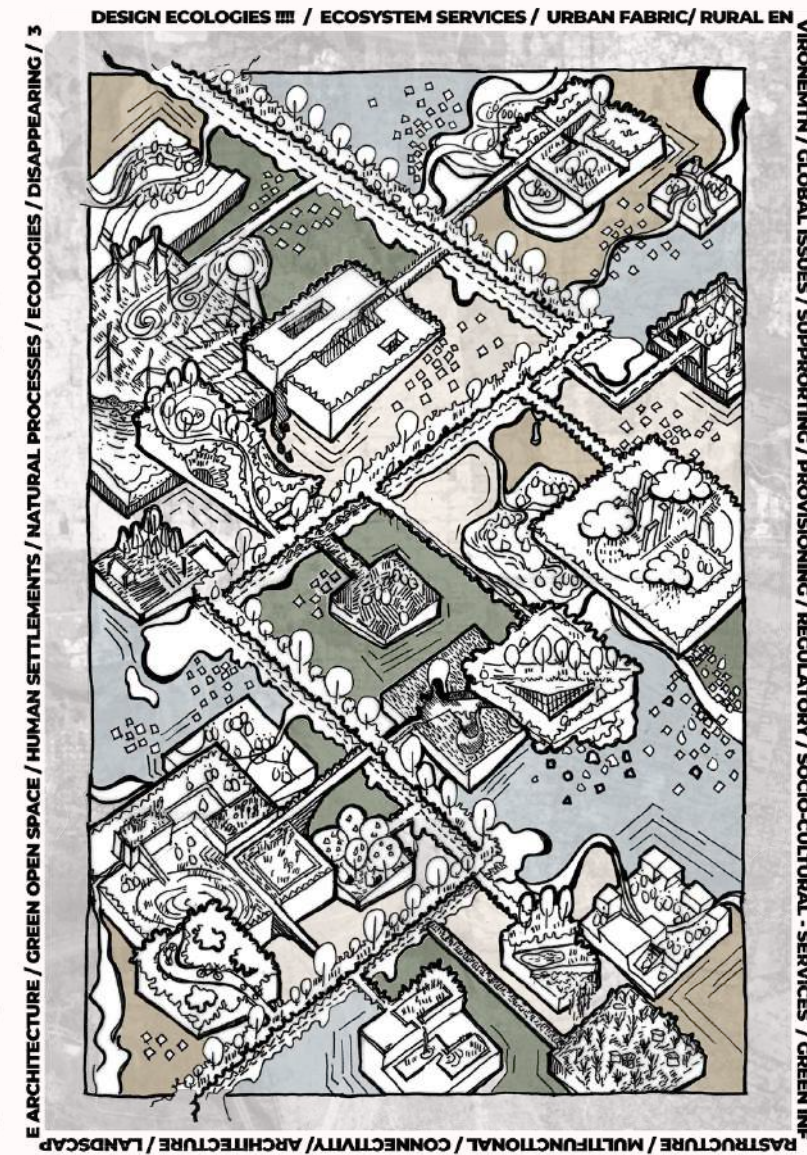


Fig 2. Graphic representations of ecosystem services (Author 2022)

Consequently, to provide spaces for relief and design more environmentally conscious. City planning should adopt a multi-layered direction of influence that could transcribe the transition from urban scale to site scale/ human scale. Mitigating from different disciplines of urban design and architecture, we should understand that it is vital to make a spatial designer flexible to mediate between scales of disciplines to conclude with more trans-disciplinary design solutions. The ineffective disciplinary boundaries created by the modern era to make society function more efficiently have broken meaningful connections to sibling disciplines (Weldheim 2006: 15). In response to adopting a sustainable ideology as an architect, one could evolve your understanding of other disciplines and how spatial design has a cross influential effect to its surrounding environment, landscape, city and human well-being.

## INTRODUCTION TO DISSERTATION

"Rivers are frequently used as defining, founding aspects of urban communities, but urbanisation has deteriorated them to the point where no longer supplies the services to the society of which the settlements were established" (Everard & Moggridge, 2012:2). River systems have been one of the essential elements of cultural landscapes throughout history in terms of usage, visual and phenomenal features, perception, and appreciation at both the rural and urban catchment scales. Today, the river appears indifferent to urban life (Backouche, 2008).

In today's urban environment, urban rivers are frequently modified and rehabilitated to perform new contemporary roles in recreation, aesthetics, and ecological purposes while ignoring the river's cultural value, which contributes to the city's and community's identity (Kristiánová, Gécová & Putrová, 2015). Heritage rivers and their historical significance offer recreational opportunities and places for residents and visitors. Consequently, riverscape design is crucial in preserving the heritage river's historical values while enabling activities and visual comfort for the urban community (Nayan et al., 2020).

Contextually the City of Tshwane formed as a result of the interpretation through the natural landscape. The surrounding hills, fountains, valleys, rivers, and natural corridors, but it was apparent that the river and relational riverscapes gave further direction in the formation of the city as we know it today (Jordaan, 1989: 28) making the Apies River the main historic resource element that established the exciting city structure and identity. However, over time unsympathetic urban development, population growth and inner-city industrialisation during the industrial revolution have undone much of the river's original value as a natural resource. The current river has been reduced to a canal. It serves as a stormwater channel (Jenkins, 1955:26). The remaining water from the fountains can also be discharged back into the river (Dippenaar, 2013: 63). Leaving only the significant cultural heritage of the river as a respected subject matter. Concerning the river, riverscapes are being neglected and left vacant due to the river's incapable ability to add value to the city in its current state as a natural resource (City of Tshwane, 2015: 32).

Over the years, the City of Tshwane municipality has been eager to contribute to reshaping the condition of the river and to re-establish its paramount importance to the City's Estate (City of Tshwane, 2015: 23). Despite their many proposed revitalisation riverscape design strategies over the years, the most prominent attempts failed to materialise.

This necessitates the reassessment of urban riverscape design and its role in the city of Tshwane. In order to reconsider the articulation of urban riverscape design for the City of Tshwane, the understanding of urban riverscape, research problem, research question, research methods, problem statement, a response to the urban river condition, and riverscape as a hybrid connected program as an essential subject will aid and inherently contribute to defining the new direction of riverscape design for the City of Tshwane.

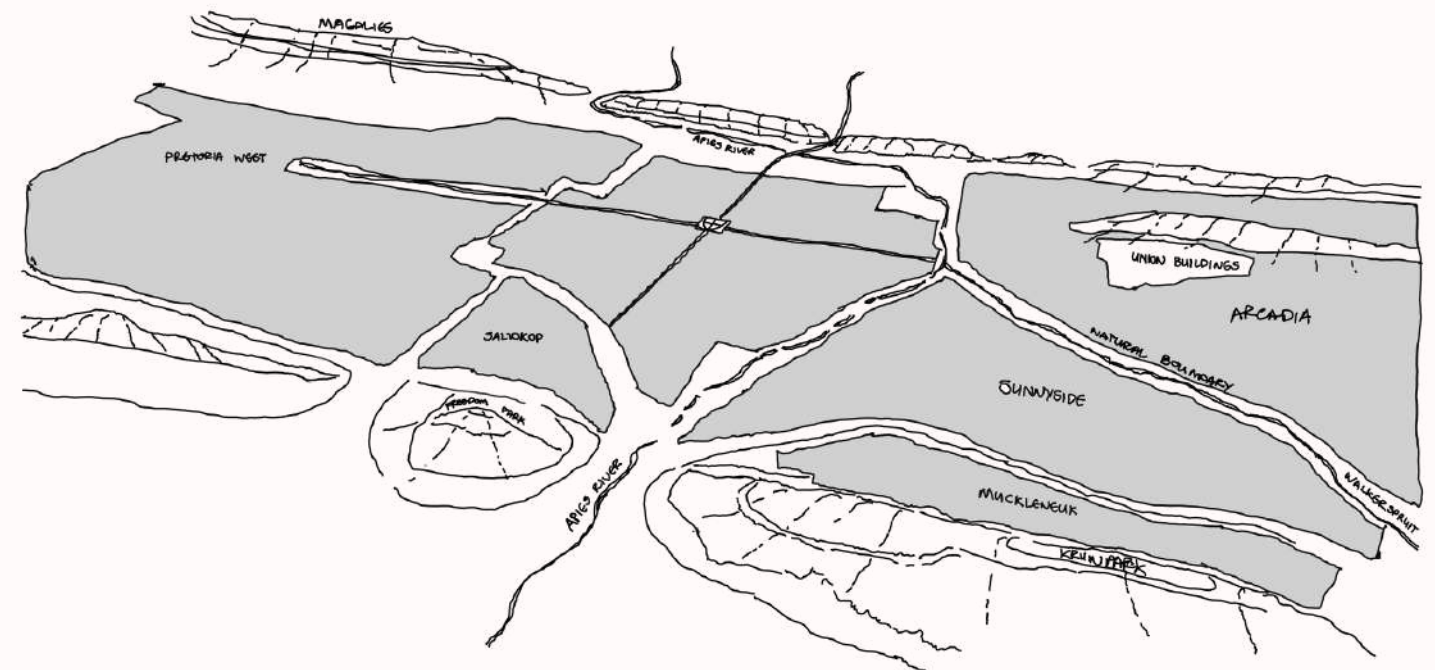


Fig 3. Perspective graphic of the city of Tshwane (Author 2022)

## URBAN RIVERSCAPE

Riverscapes can be described as an “interface of aquatic and terrestrial conditions, heavily influenced by the complex interactions of many factors, including hydrology, sediment transfer, soil-vegetation dynamics, biogeochemical processes, and other biotic interactions, as well as land use and pollution” (Matthias Wantzen et al., 2015:2). Transferring the natural description to a compound term of urban riverscape carries the respective complexities and interpretative meanings of both words.

In the context of urban environments, the riverscape has experienced a range of influences throughout history. Besides the many complex natural interactions, riverbanks firstly accommodate historic communities, and with progressive development and societal evolution, the community grew into towns and modern cities. The increased property value along rivers became inherently crucial for the urban structure. Riverscape was employed to facilitate development, utilising the river for industry and manufacturing. As industries grew, there was a need to stabilize the riverbanks to increase flood conveyance (Nayan et al., 2020:1). With the city's development to its modern prospects, a lot of the river's future use and need for the city were lost. In response, the land use on riverscapes became indifferent to the natural river (Levin-Keitel, 2014).

Reflecting on riverscape conditions in Tshwane, we experience that the underused need for the river creates underutilised land parcels along the river's edge. Land banking along the river has also added to the urban decay of the riverscape. Subsequently, extensive tracked appearances of underutilised space and dilapidated urban fabric along the river (Council, 2009). The spatial experience at the site scale, I would agree that creating these indeterminate spaces along the river is the unacknowledged misconstruction of the city hierarchy toward the river. Secondly, adjoining sites along the riverfront are passive toward the river's edge. This creates spaces of that absorb isolation. Contrasting spaces appear between the river, the neighboring site, and the city. Lastly, the riverscape becomes introspective and loses its interrelated relationship with its context or natural environment. Eventually, they adopt an individual identity and become self-dependent (City of Tshwane, 2015).

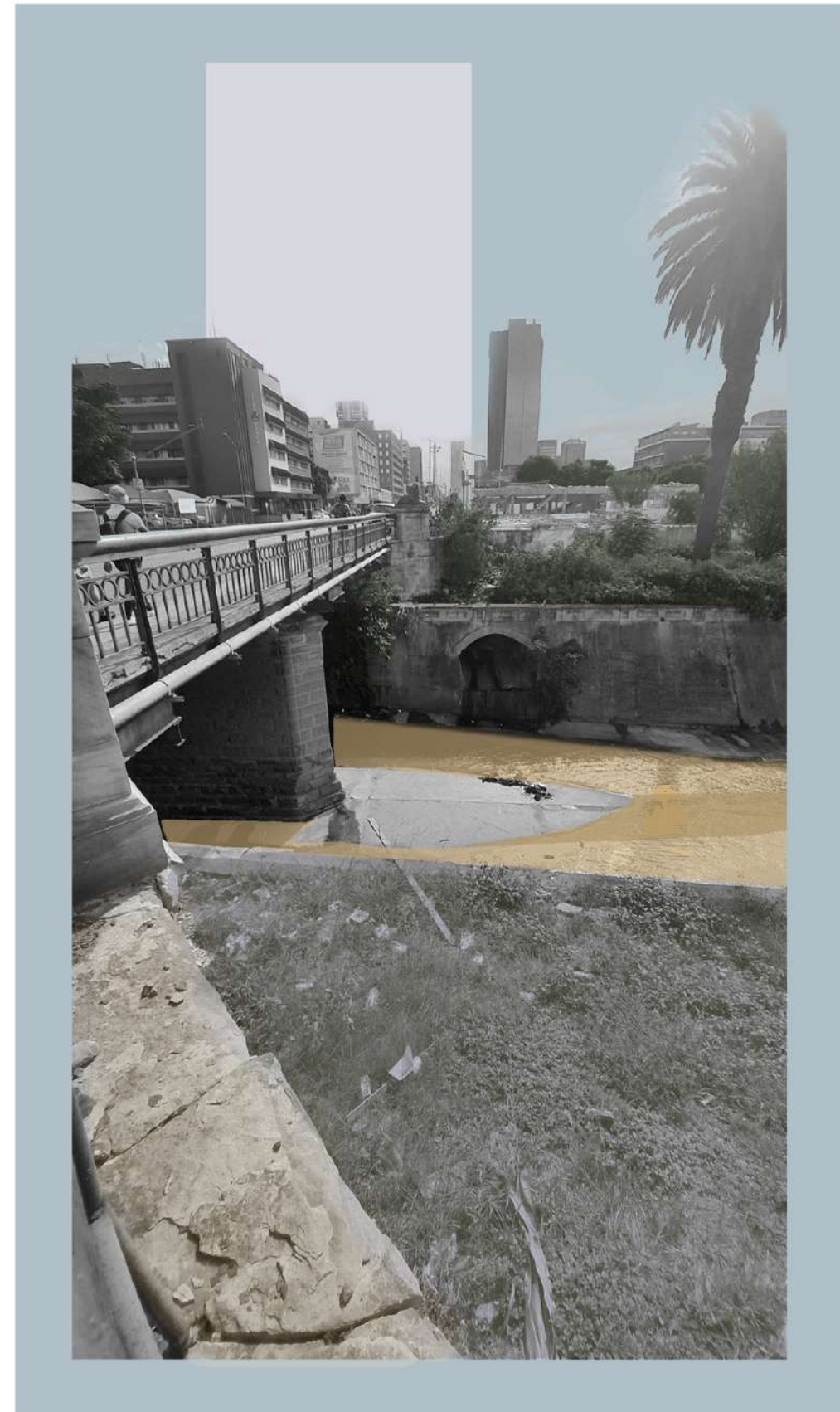


Fig 4. Image taken of indeterminate spaces along the Apies River (Author 2022)



## RESEARCH PROBLEM

### GENERAL ISSUE

The riverscape of the Apies played an essential part in the daily lives of early settlers. The river not only served as a natural source of clean water and resourceful food systems, but it was also a place of social and spiritual attainment. (Jeppe 1906:7). As the city of Pretoria developed, it focused mainly on developing the built environment through positivist planning schemes and as a result neglected its lived experiences along the riverscape and in the process 'lost' the initial sense of place of the city (Biljon 1993:42). Leaving the urban riverscape indeterminate!

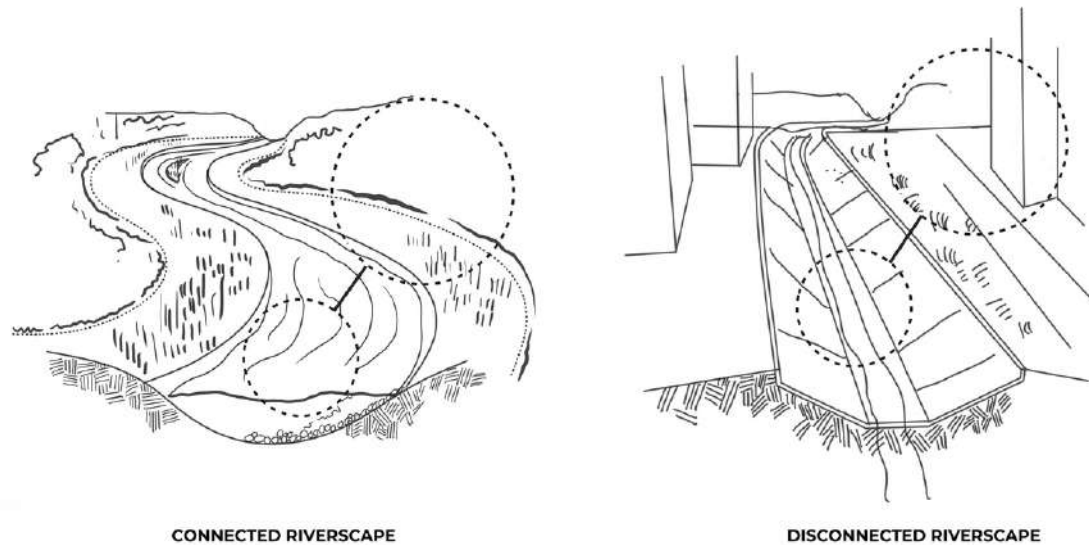


Fig 5. The comparisons between natural and urban riverscape (Author 2022)

### ARCHITECTURAL ISSUE

A lost sense of riverscape as a place in the City of Tshwane due to the fact that the city is a neglected afterthought of the modernist industrial city.

### URBAN ISSUE

Pretoria CBD is currently an afterthought of the modernist industrial city. The unspoken intention of the modernist city was to design optimally. Functions were separated in order to be more efficient. As a result, the city became a monofunctional, hostile, fixed, and sterile environment devoid of a feeling of place and belonging. The emphasis has shifted from people to infrastructure.

It was between 1875 and 1909 that the Apies river was known for its periodic flooding, which caused damage to surrounding properties, homes, and gardens and loss to livestock where canalised. An apparent response of efficiency and control for the future modernist city of Pretoria. In effect, the river lost its ecosystemic services and became a monofunctional stormwater system for the city (Jenkins, 1955:26).

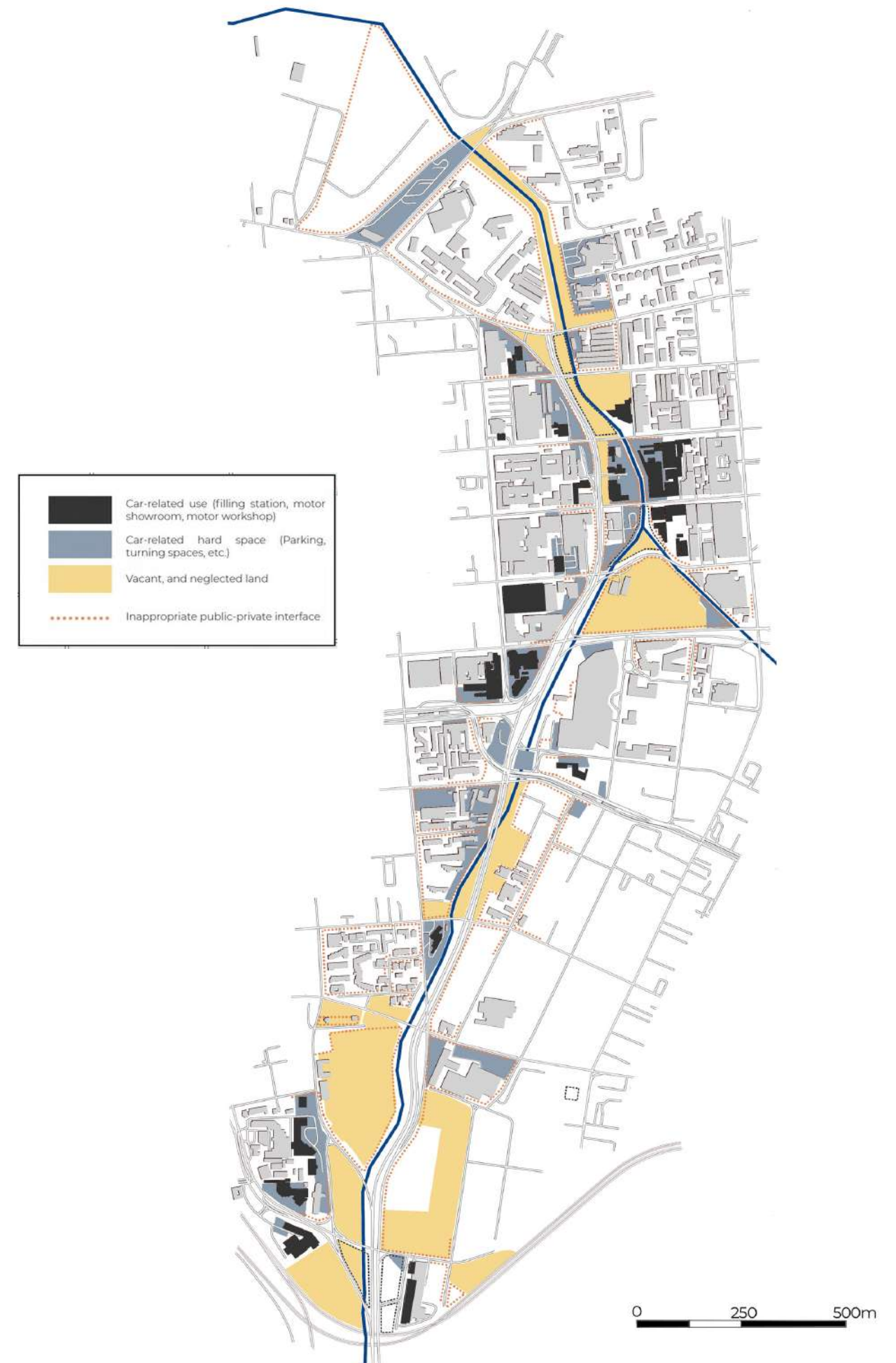


Fig 6. Urban analysis of the river and its neighbouring sites (Author 2022)

## RESEARCH QUESTION

How can urban riverscape design act as a mediator between the disconnected river and fractured city to regain the lost sense of riverscape as a place in the City of Tshwane and enhance the lived experience of the urban residents?

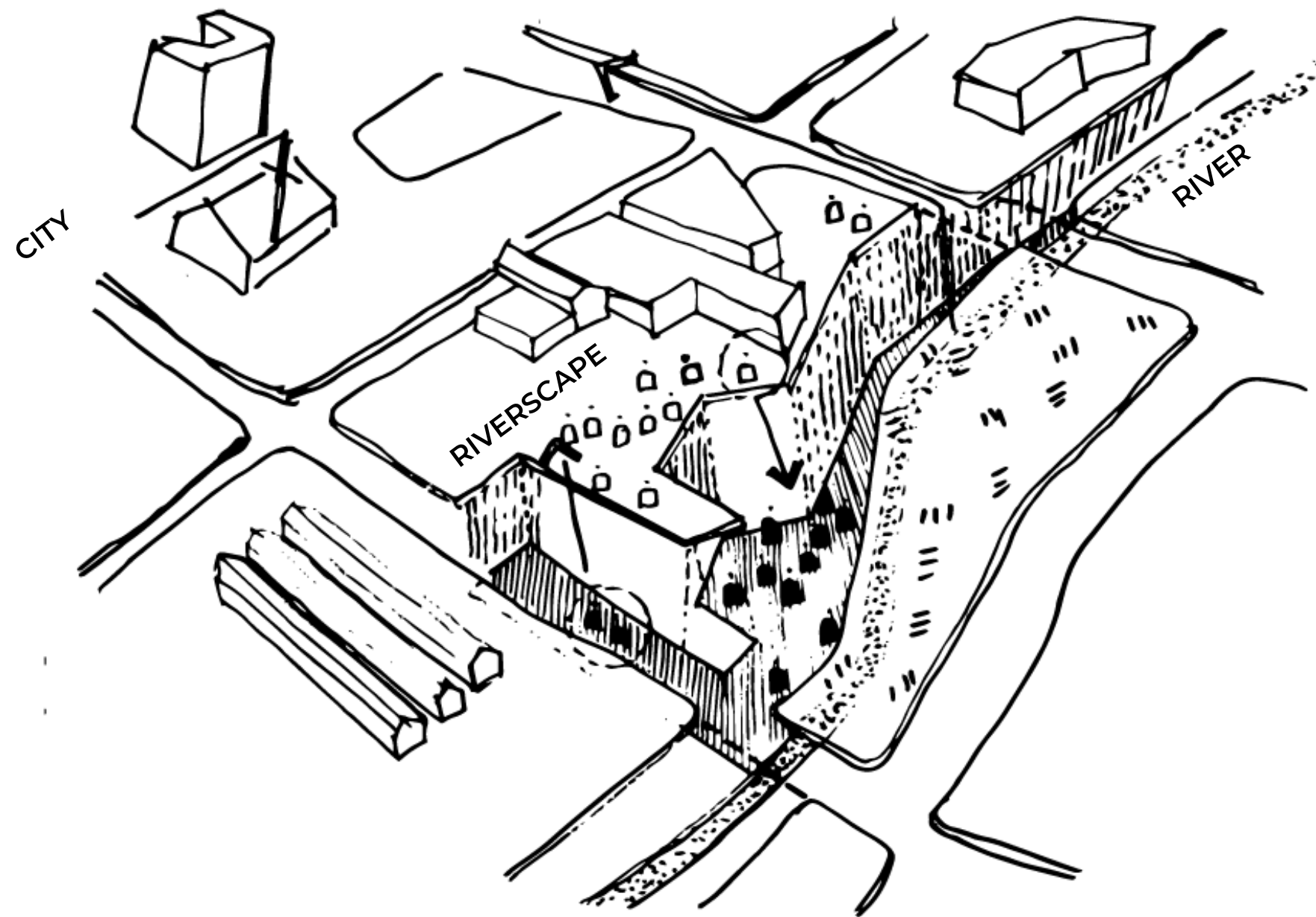


Fig 7. Conceptual representation of architecture as mediator (Author 2022)

## RESEARCH METHODS

The aim of this dissertation is to use and apply urban design theories in conjunction with historical research of the riverscape as typology as quantitative analysis and qualitative analysis of the lived experience in an attempt to repair the lost character of the riverscape as a place, by creating new productive and spiritual connections between people, place, and nature.

A historical study regarding how riverscape spaces in the City of Tshwane have changed over time is undertaken to understand the relations between the past lived experiences and currently lived experiences in order to expose how the condition of the riverscape has changed from a natural environment to an artificial landscape and in doing so losing its connection to the everyday city context and experience. Correlating new connections from this quantitative research, an urban design theory is applied as a response in effect to resolve this lost connection.

An observational analysis of the context surrounding the site is carried out in followed by a qualitative analysis. This will be done as a desktop study by making use of photos and mapping programs like Google Earth and QGIS. To further understand the social identity of the context, an interview with SAVF will be conducted to find and understand the social and lived experience of the surrounding community. This will consequently aid in designing appropriately for the specific needs of the context and creating essential links between the social and environmental functions of the riverscape (Hofstee, 2006: 2).

The concluding discoveries of this mixed methods approach will serve as the impetus for architectural design to realise the new latent potential of urban riverscape spaces.

## PROBLEM STATEMENT

The river was first an element of attraction for early settlements. Riverscapes were established due to the potential use of the river as a resource or industrial driver. However, over time, riverscapes, as we see them today, became indeterminate and indifferent because the river has lost its ability to contribute to the lived experience of the city. We find rivers and riverscapes neglected, vacant, and in dire need of a response and development to give value back to the city and its urban residents.

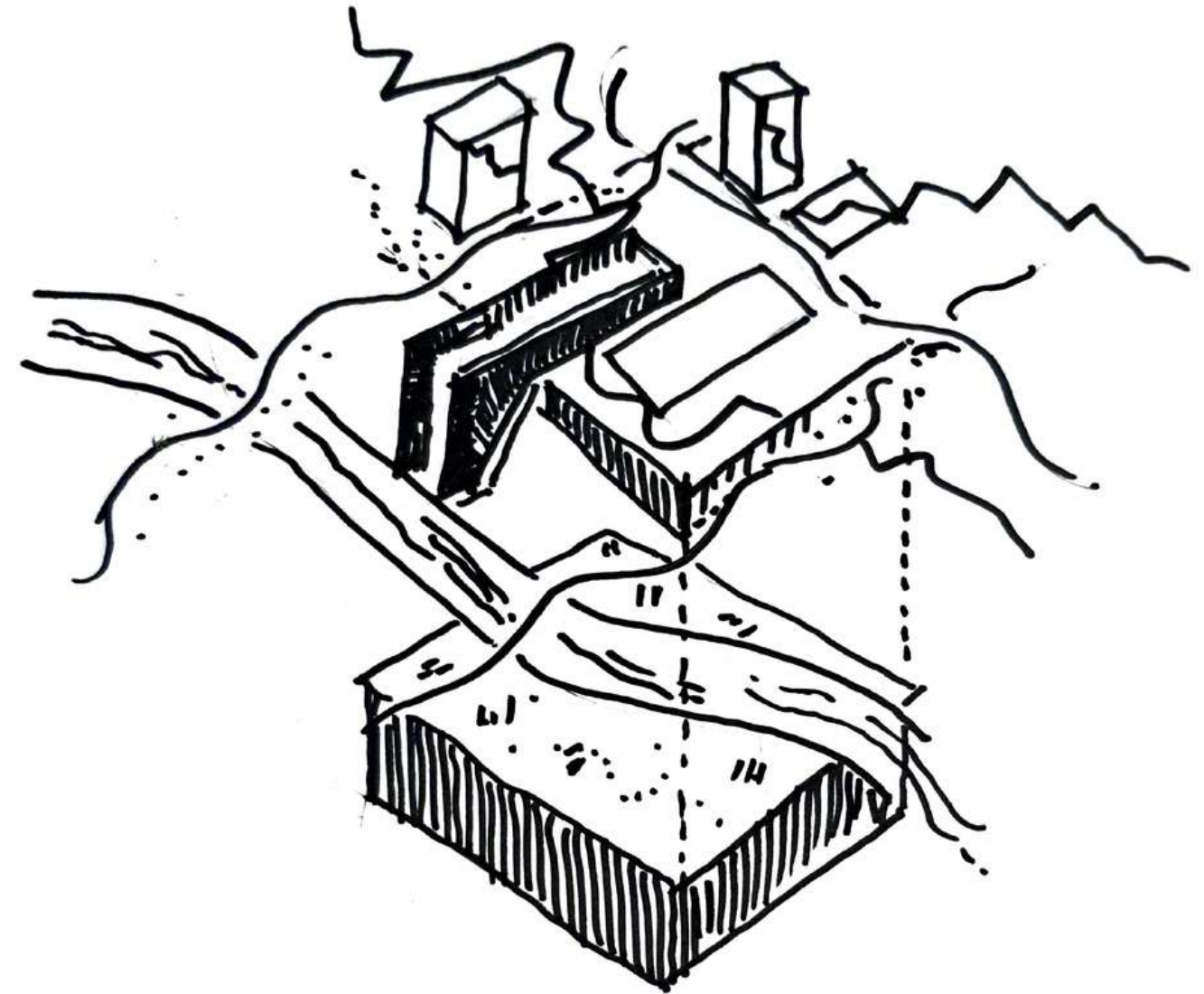


Fig 8. Conceptual representation of the city's development above the river (Author 2022)

## A RESPONSE TO THE URBAN RIVER CONDITION

With the need to respect riverscapes and adopt new meanings and identities, common responses and revitalisation strategies for modern urban rivers and surrounding riverscapes were researched. A literature review was undertaken to establish common gaps and findings regarding how studies have responded to urban rivers. This concludes with a comparative theoretical framework and an appropriate approach for a context like Tshwane.

To describe the new meanings that emerge from the Urban River, a pragmatic approach is followed to describe that the river provides an ecosystem service. This explains society's multiple benefits from the river as an ecosystem (Daily, 1997). The benefits these ecosystem services provide for people, and an urban context are generally described through four main categories: cultural, provisioning, regulating, and supporting services (Defra, 2007).

In the study completed by (Shafaghat et al., 2017) in their attempts to create a "sustainable riverscape rehabilitation strategy framework for Malaysia's historical heritage cities from the urban design and planning perspective", they evaluated the literature on the criteria that would be followed by urban design and planning studies for riverscape rehabilitation. It was concluded that the literature focuses on numerous criteria and clusters of physical, social, environmental, and economic aspects. Still, it is interesting to note that cultural heritage was an insignificant criterion in riverscape rehabilitation.

Confirming statements that measures conducted as part of a city's urban regeneration programs usually and indirectly concentrate on economic advancement and the restoration of the riverscape's ecological stability, disregarding the riverscape's cultural values that attribute to the urban and local identity (Middlebrook, Gullick & Gibson-Hill, 1951). The problem with using physiological ecology as grounds for rehabilitating urban streams is typically challenging because ecological validity and natural ecosystems are difficult to achieve or recognise in urban areas (Findlay & Taylor, 2006). Given that people prevail in urban environments, studying urban stream ecology will involve broadening stream environmental research to include socioeconomic, ritual, and cultural studies (Walsh et al., 2005b). They formally state that some river revitalisation strategies do not fully integrate with their urban context for exercise, tranquility, and educational possibilities (EA, 2006).

Cultural services are the intangible advantages people derive from ecological services, such as spiritual, aesthetic, and educational qualities and recreational possibilities (MEA, 2005). For millennia, it has been shown that natural surroundings give more than just water as a resource and food as provisioning; but also offer remedial and promotive health benefits (Ward Thompson, 2010).

Restoring urban rivers is considered a chance to reconnect urban residents with nature and promote well-being by providing safe and beautiful locations for exercise, tranquility, and educational possibilities (EA, 2006).

In an attempt to further understand the different revitalisation strategies and how interventions effectively expose different ecosystem services we can refer to a paper by Findlay & Taylor (2006). In their attempt to understand why urban river systems should be rehabilitated, they altered the graph from Rutherford et al. (2000). (See Fig. 9)

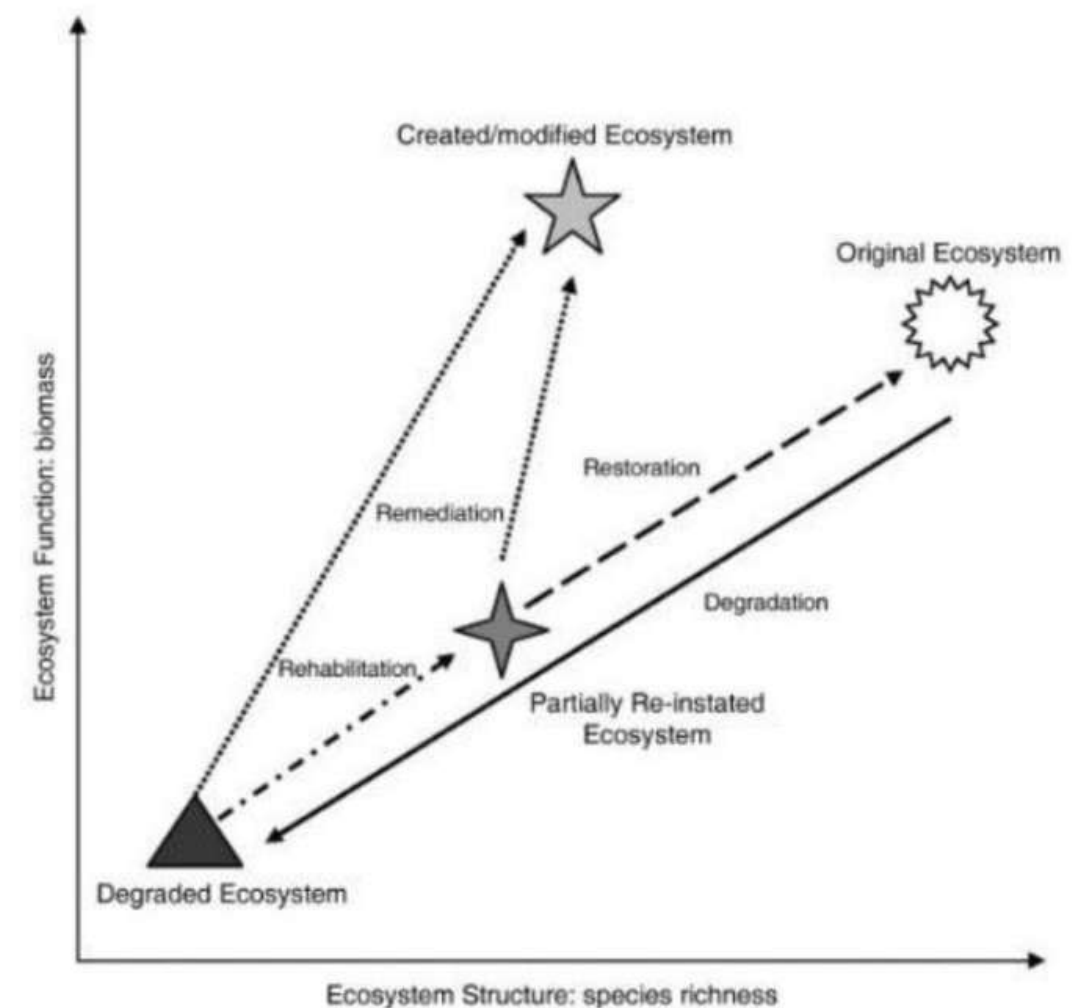


Fig 9. A diagram illustrating the differences between rehabilitation, remediation, and restoration. (Findlay & Taylor, 2006).

Figure 9 illustrates the relationships between urban river reconstruction, rehabilitation strategies, and ecosystem organisation and structure. These are all commonly used terms among professionals (Brooks et al., 2001). The term "restoration" refers to returning a river infrastructure to its native state. Rehabilitation, on the other hand, refers to a situation in which parts of the biophysical natural process are restored along the same axis as restoration (Rutherford et al., 2000), but trying to fully restore the river within urban fabric one could refer back to the words of Findlay & Taylor (2006), where they mention that rehabilitating or restoring urban streams are typically difficult, because ecological integrity and ecosystem services are not easily accomplished or recognisable in metropolitan location (Findlay & Taylor, 2006: 314). As a result, the single most crucial and pragmatic option for the predominance of urban river systems is remediation, which involves managing a river to generate a unique vector of ecosystem advancements (Fryirs & Brierley, 2000). Although this strategy does not amount to complete system restoration, it does promote positive changes in ecological processes and species composition (Findlay & Taylor, 2006: 314).

Before concluding, the last paper reviewed the ecosystem services of urban rivers. Specifically, the variety of ecosystem services connected to various urban rivers and lakes are presented, including provisioning, supporting, regulating, and cultural ecosystem services.

The boxed area notably shows that when restoring a river, one can extract several ecosystem values from the river. However, the other forms of river revitalisation strategies are not present on the table; we can agree that rehabilitation and remediation strategies would extract a number of values and services scalable between the channelised river and a restored river.

River management in urban areas is a critical infrastructural necessity, but it has traditionally been done independently of other urban activities and spatial prerequisites. Successful water management in urban contexts necessitates a strong transdisciplinary understanding (Lundy & Wade, 2011). In accordance, it is possible to study the impact of waterways on an urban spatial configuration, combining critical environmental aspects and cultural and historical meanings (Cheng, 2007). In other words, recognising the ecosystem service and benefits of urban rivers can help create healthy and beautiful riverscapes, with the objective of generating dynamic urban spaces by magnifying the meaning of the river and its link to people's urban spaces (Jamali & Mosler, 2014).

Category of ecosystem service	Type of ecosystem service	Type of urban water component					
		Channelized watercourse	Natural and restored watercourse	Lakes and ponds	Reservoirs and settlement ponds	Vegetated filters	Groundwater
Supporting	Primary production	X	✓	✓	X	✓	X
	Oxygen production	X	✓	✓	X	✓	X
	Soil formation	X	✓	✓	X	X	X
	Water cycle	✓	✓	✓	✓	✓	✓
	Habitat	✓	✓	✓	✓	✓	X
Provisioning	Food	✓	✓	✓	✓	X	X
	Water	✓	✓	✓	✓	X	✓
	Renewable energy	✓	✓	X	✓ <sup>a</sup>	X	X
	Genetic resource	✓	✓	✓	✓	✓	✓
Regulating	Climate regulation	✓	✓	✓	✓	✓	X
	Water regulation	✓	✓	✓	✓	✓	✓
	Erosion control	✓	X	✓	✓	✓	✓
	Water purification	X	X	✓	✓	✓	✓
Cultural	Spiritual value	X	✓	✓	✓ <sup>a</sup>	X	X
	Educational value	X	✓	✓	✓	✓	X
	Aesthetics	X	✓	✓	✓ <sup>a</sup>	✓	X
	Recreation	X	✓	✓	✓ <sup>a</sup>	X	X

Fig 10. Independent categories of ecosystem service compared to water systems (Lundy & Wade, 2011).

## RIVERSCAPE AS A HYBRID CONNECTED PROGRAM

Rivers' longitudinal connectivity has historically been most significant in their responsibility as main transport paths between towns and cities along their course. However, balanced against this regional longitude connectivity has been lateral and vertical connectivity which hosted the simple everyday transactions of town residents. This made the riverscape a facilitatory space for trade and exchange programs between the historic city and the river. Within this lateral and vertical connectivity, we experience layers of interactions and complexities between people, the palace and nature. As a critical infrastructure necessity in urban areas, the river gained purpose by providing necessary ecosystemic services besides transport. It was categorised as supporting, provisioning, regulating and cultural exchange. On the other hand, the city used these services as resources to grow, sell, trade, and produce on the riverscape. Internationally riverscape became an important threshold space (Kondolf & Pinto, 2017:184).

In the context of the City of Tshwane, the riverscape was historically an important natural landscape filled with agricultural, social and cultural remarks (Jeppe 1906:7). The riverside environment presented a beautiful expression for some local artists due to its representative nature of Tshwane as a place (Bolsmann, 2001). Contradictory conditions today have caused the river to become a separate expression of infrastructure from the city's daily living. Tshwane riverscape has lost its exchangeable and interconnected property to facilitate the social, natural and cultural programs.

In response to these issues, the aim of the dissertation will be to facilitate programs of social, natural and cultural value. Eager to reintroduce new connections between the river and the city. Promoting a hybrid and layered expression of natural, social and cultural.



Fig 11. Independent type of cities developed along the river & riverscape (Pattacini, 2021).



Fig 12. Representation that riverscape space has a wider field of influence (Author 2022).

## STORY OF THE RIVER

Urban rivers carry multiple values for the urban infrastructure, but human activity and responses in an urban fabric have, over time, diminished these values. In response, riverscape sites became a liability for the city as they did not employ valuable industries, and consequently, these sites had to adopt new land uses. Built environments that did not absorb new meaning along the urban river became dilapidated. Some sites were cleared as they no longer supplied meaningful services to the surrounding context, leaving underutilised land parcels.

In the current City of Tshwane, we find a culturally valued river and riverscape which could provide new contemporary roles for the city context. In response, we would extract new meanings from the existing river by creating a dynamic urban riverscape design.

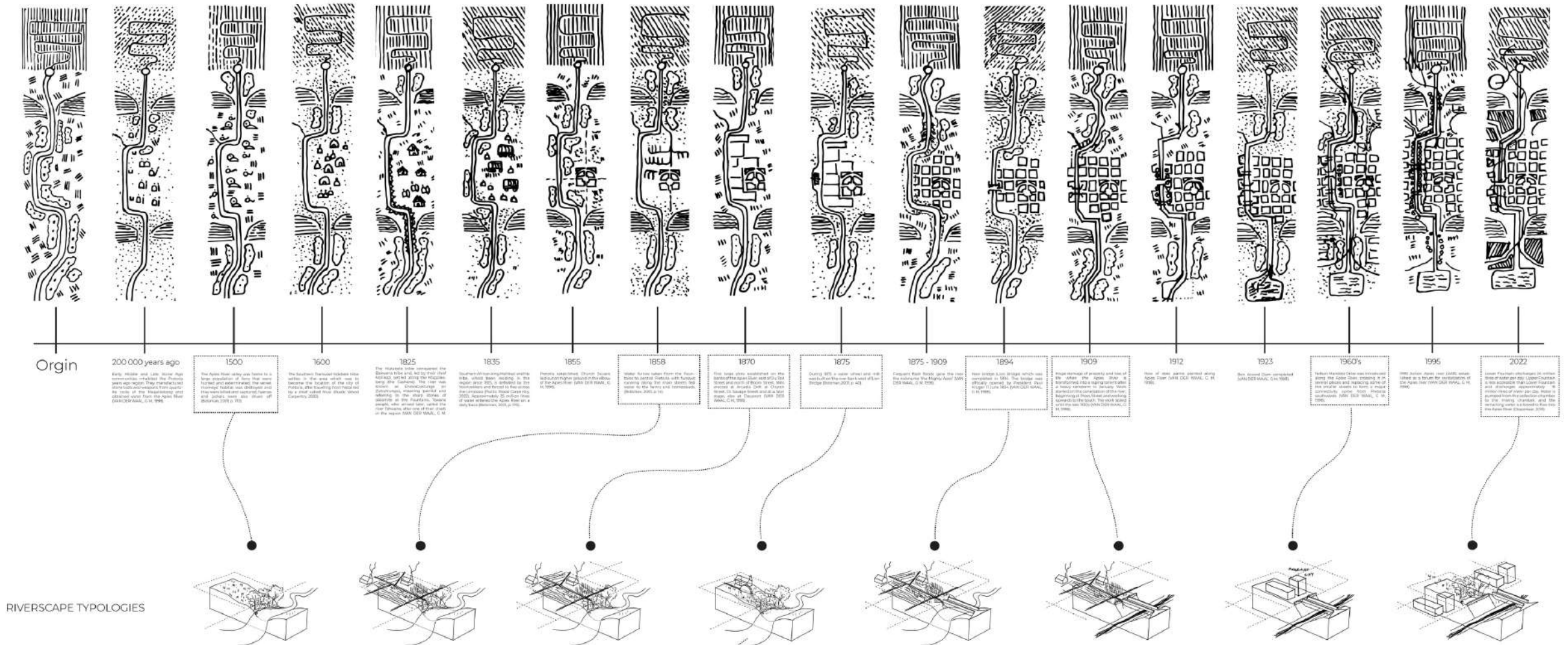
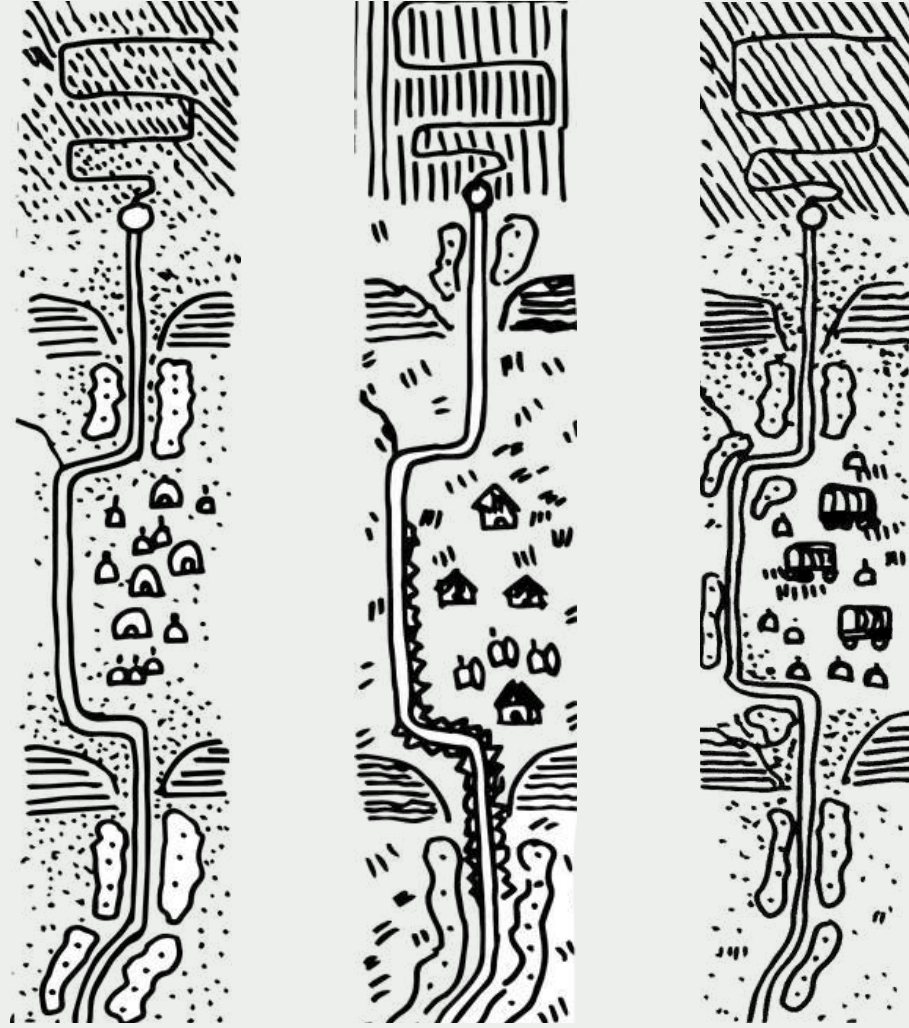


Fig 13. Historical representation of the city's development over time and how this had an influence on its riverscape space and its meaning to the city (Author 2022).



Fig 14. These are paintings done by artist over time to represent the riverscape of Tshwane and how its nature has changed (Author 2022).

• U R B A N R I V E R S C A P E •



D E S I G N - R E S E A R C H



## RIVERSCAPE AS IMPORTANT CITY PLACE

International riverscape spaces in cities are identified as systems that has the ability to sculpt the evolving interactions between people, cities, and nature (Jamail, 2014:2). We experience the well-known river city of Paris. Historically the left (La Rive Gauche) and right (La Rive Droite) riverscape environments represented different meanings and had strong cultural connections to the riverscape experience of the city. La Rive Gauche seen as having connections with writers, artists, and café culture and La Rive Droite had strong ties to commerce and trade. Today the general public can be subjected to choose which riverside they would be defined as (Chicago Tribune, 2009). Making the riverscape a representational space in the city and could be defined as a space that defines & shape the character and identity of its inhibitors.

Contextually the Apies River was significant to the inhabitants of Pretoria during its early days. The riverscape was a site of spiritual and social fulfilment in addition to being a physical source of freshwater and a productive food system. (Jeppe 1906:7). Pretoria disregarded its lived experiences as it grew, concentrating instead on the constructed environment through modernist urban designs. As a result, the city lost its original spirit of place (Biljon 1993:42).

Unsympathetic urban development, population growth and inner-city industrialisation during the lifetime of the city have undone much of the river's original value as a natural river space (Jenkins, 1955:26). As a result of this shift, the urban residents are no longer physically connected to the Apies and are unable to engage with the river in a meaningful and productive manner. Historically people have always been drawn to riverscape environments globally, as these spaces consist of social, physical, and environmental benefits that enrich the welfare and well-being of urban residents (Jamail, 2014).

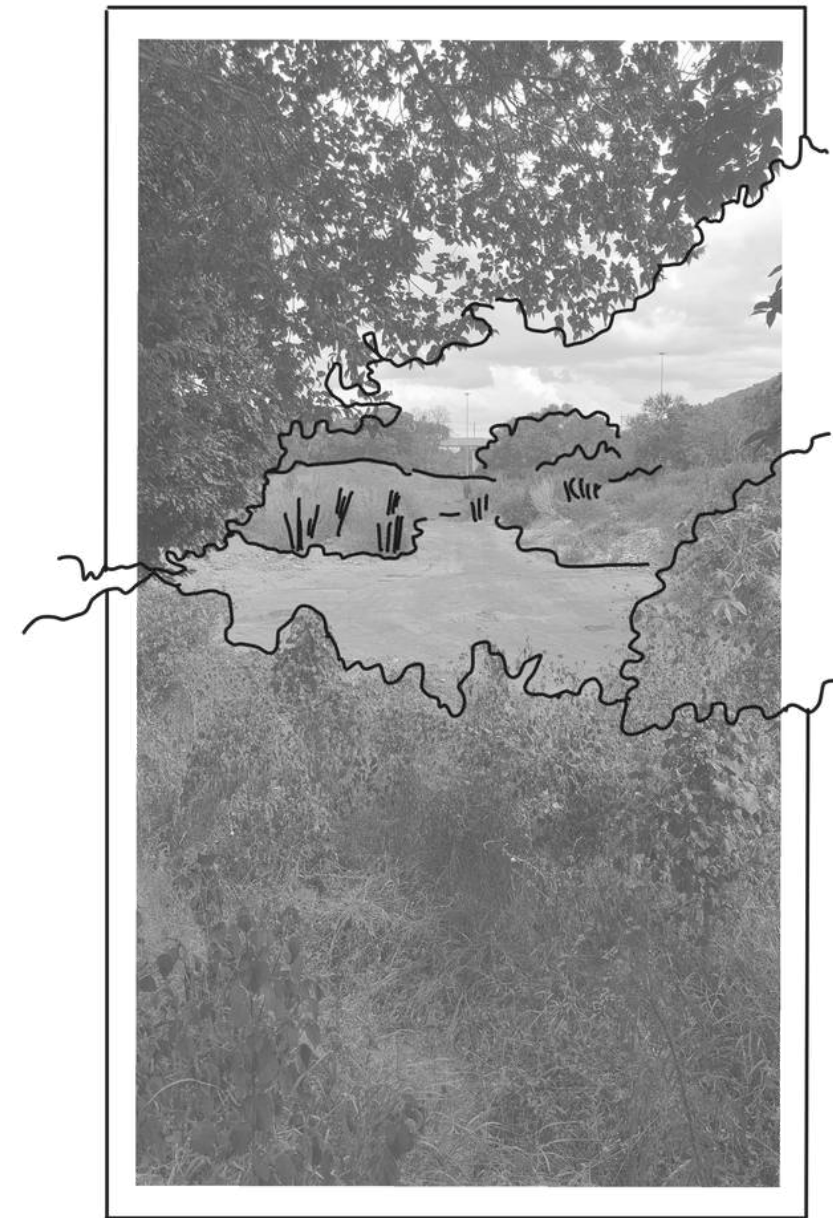


Fig 15. The natural expression of riverscape space in City of Tshwane (Author 2022)

## LANDSCAPE URBANISM

In an attempt to address the disconnection between the degraded river and fractured city to regain the lost sense of riverscapes as a place in City of Tshwane and improve the riverscape experience for the urban residents, this dissertation looks to Landscape Urbanism as a theory to generate and support the architectural intentions.

Landscape Urbanism provides a means of regaining relations to people, context, and natural environment in the designed community and urban context. The theory suggests that the use of such systems as an adaptable strategy to address the present concerns and issues of urban circumstances through reintroducing important links with natural and invisible processes through the marriage of landscape and urbanism (Scenario Journal, 2011).

Through the architect's mind, the architectural response is to adopt a theory that would speak to the existing issues of the built environment, but Landscape Urbanism argues that instead of the organisation of things and structures, the city is made of a linked and environmentally rich horizontal field state. The process of staging the surface involves managing the field of change of the horizontal plane in a way that will enable the process to unfold gradually, releasing a site's inherent capabilities and creating new opportunities for it.

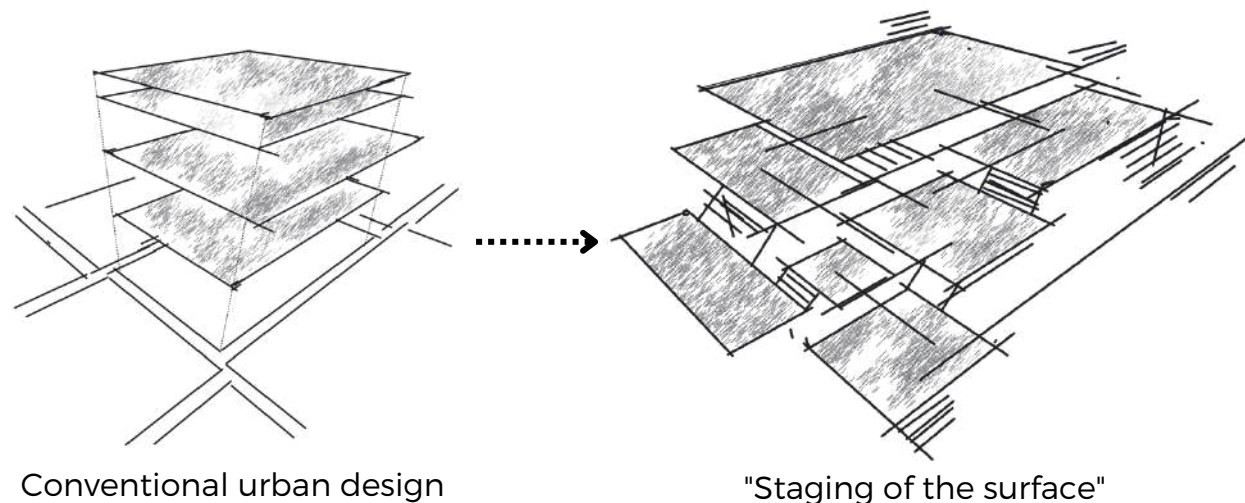


Fig 16. Representation of "staging the surface" (Author 2022)

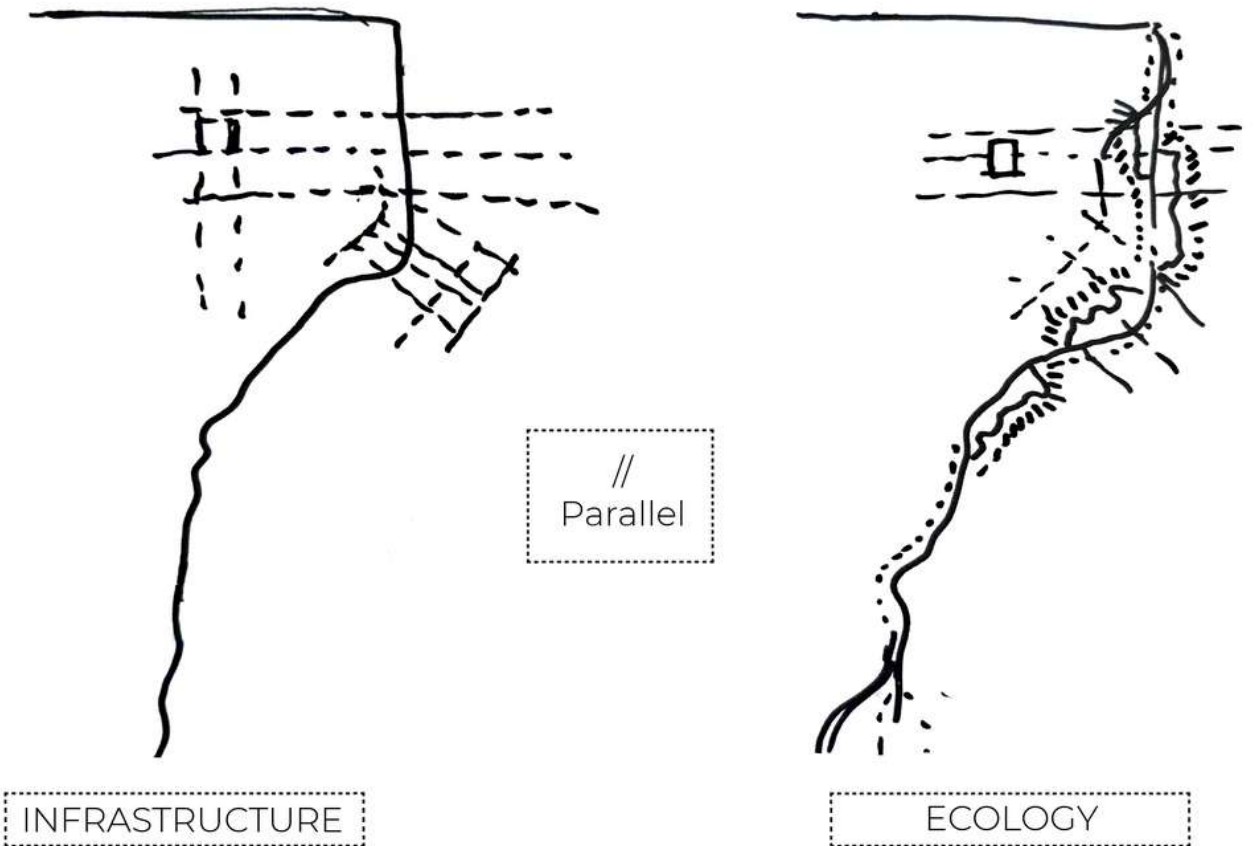


Fig 17. Predominantly use of landscape as a restructuring process, in parallel with infrastructure and ecology (Author 2022)

Waldheim (2006) describes that in both proposals for Park de la Villette one by Bernard Tschumi and the other by Rem Koolhaas, The park's infrastructure supports an adaptable, non-hierarchical, layered, and strategic layout that can accommodate activities, everyday life, and many applications of use (Waldheim, 2006: 040-041). This type of project exemplifies the common intervention carried out in a post-industrial environment, with the transformation of abandoned urban sites into densely programmed public areas. Rem Koolhaas and Bernard Tschumi's suggestions serve as examples of how landscape design theories might be applied at the urban scale to rehabilitate blighted areas (Cermasi, 2017: 117-118). To put it differently, both architects have used the landscape as a creative tool to develop a city's infrastructure. A pattern of horizontal surface developments and a network of linkages make up this infrastructure, which will serve as a platform for succeeding shared activities.

## LANDSCAPE URBANISM PRECEDENTS



Fig 18. Brooklyn bridge park, pier 3 (Author 2022)

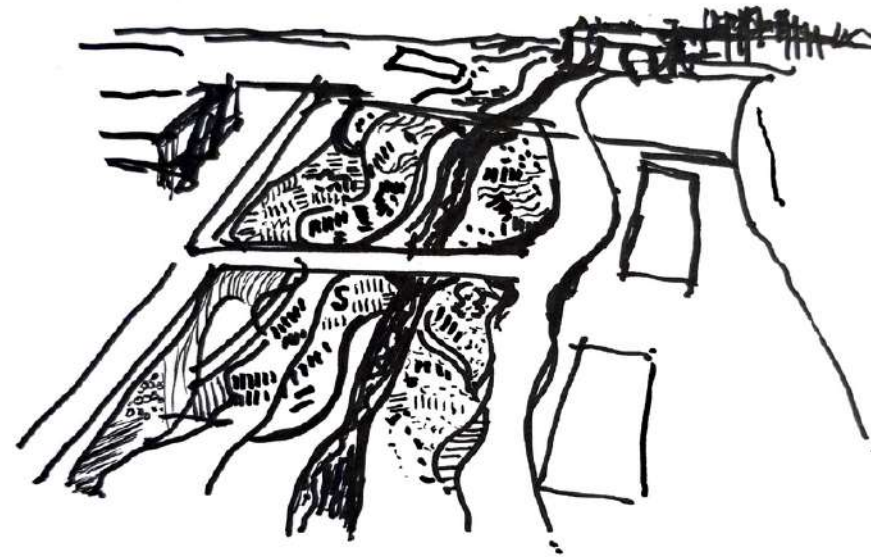


Fig 19. New transformed River lea, Olympic park (Author 2022)



Fig 20. Highline running through the city as green park (Author 2022)

### BROOKLYN BRIDGE PARK

Over the past two decades, Michael Van Valkenburgh Associates (MVVA) has altered a 1.3-mile extension of the once industrial riverfront into a vibrant and revitalized resource for New Yorkers. Pier 3, one of the concluding parts of the final five piers to be constructed, was completed on time, offering a verdant landscape for locals to escape to during the pandemic. This park on a pier has drawn a diverse range of tourists as they briefly leave behind the pressures of dense urban living during a summer of COVID restrictions (Broome, 2020).

### LONDON 2012 OLYMPIC PARK

According to LDA Design, the master plan established a solid basis for the entire site, assisting in making the London Olympics among the most sustainable to date. The Olympic Park's unique shape organically divides the park into a natural green northern half, The North Park, and a more urban South Park. A three-dimensional variety of new environments, including wetlands, swales, wet woods, dry woodland, and meadow, have been incorporated into the previously canalized River Lea to provide an absorbent flood-control strategy. The design incorporates specific ecosystems and ecological features to sustain important species found in the Olympic Park environment (THE DIRT, 2012).

### NEW YORK, HIGHLINE

The former West Side industrial railway is now known as the High Line and is governed by the Department of Parks & Recreation. The last cargo train used this 1.45-mile-long raised steel bridge, which was erected in the 1930s, in 1980. It crosses the western part of the city, beginning at Gansevoort Street in the Meatpacking District, continuing through the West Chelsea gallery district, and coming to a stop at 34th Street, which is close to the Jacob Javits Convention Center. A public competition was organized in 2003 to transform the train rail into a city park. The composition was won by James Corner field operations and so the Highline came to be a part of New Yorkers' daily lives (Cilento, 2009).

## URBAN VISION

Over the years the current government has been eager to contribute to reshaping the condition of the river and to re-establish its prominent importance to the City's Estate. The Nelson Mandela Green Corridor development is one of the city's identified initiatives for regeneration in accordance with the future vision for 2055 and the Tshwane Open space framework. Through sustainable solutions on both sides of Nelson Mandela Drive, this project focuses on rezoning and spatially redesigning the urban fabric. It also upgrades the Apies River into a promenade with pedestrian access and mobility that interacts with the river itself (City of Tshwane, 2015: 23).

In an attempt to address the indeterminate state of the riverscape along the Apies of today and meet the proposed regenerative goals for the future city, the dissertation will situate itself within Tshwane's 2055 vision for the city. In correlation with Landscape Urbanism, the concurring shift envisioned for this dissertation would be where urban design not only conforms to man-made structuring but starts to relate to green infrastructure and natural environments. Adopting a hybrid placement between architecture and landscape.

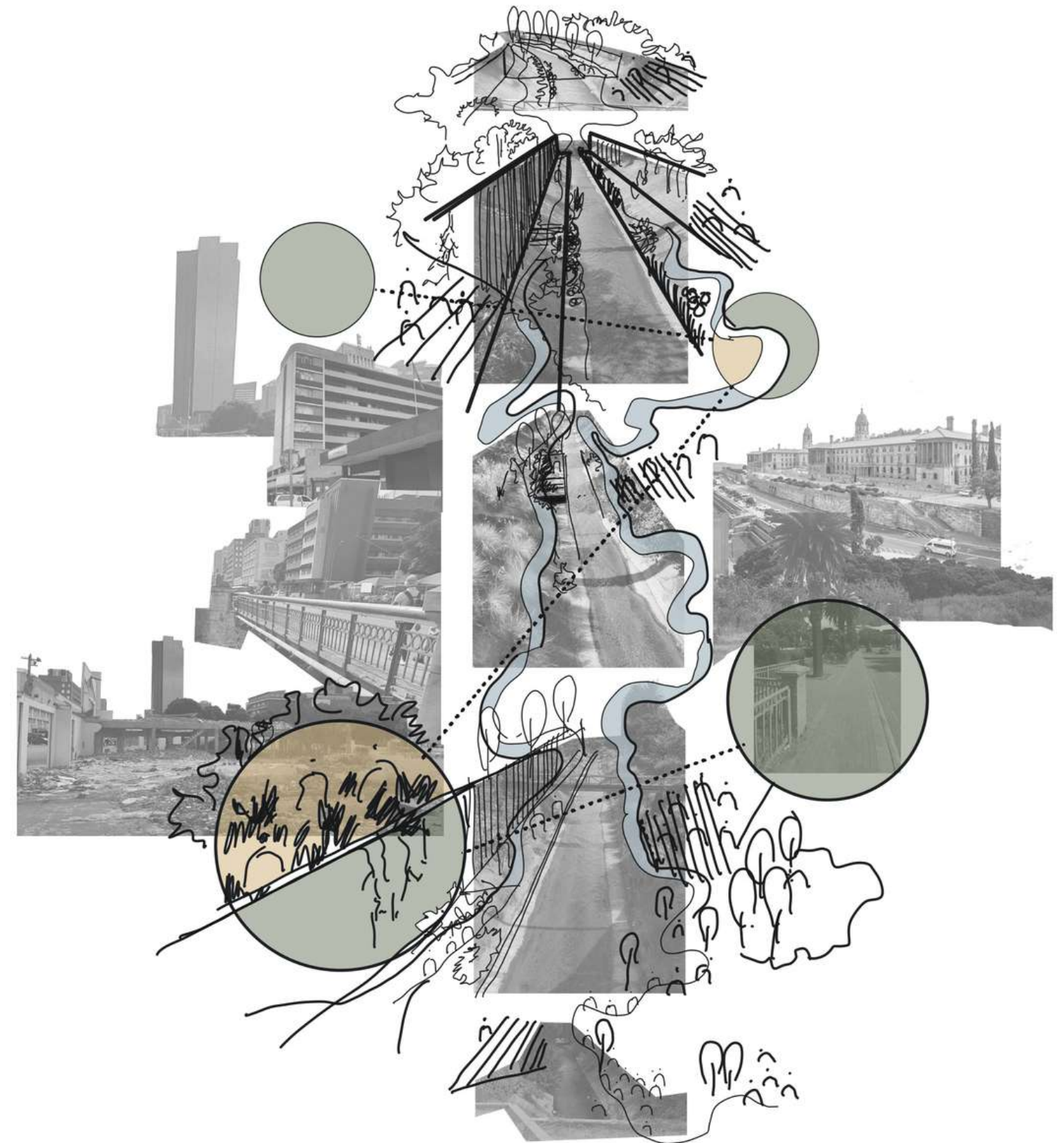


Fig 21. Proposed urban vision for the City of Tshwane (Author 2022)



Fig 21.1 Proposed urban vision for the Apies river - City of Tshwane (Author 2022)

## URBAN RIVER PRECEDENT

The Cheonggyecheon restoration project was a watershed moment in the shaping of Seoul, substituting cars and man-made structures with nature, generating a human-centred landscape in the city, and imbuing the area with cultural values and identity. It also caused a significant shift in peoples' conscious experience.

Whenever it comes to the contentious issue of how much historical remains should be restored, it was relevant that the municipal council took a step-by-step approach rather than recovering everything at once, because doing so would incur excessive costs to society in the volatile situation of downtown. Nevertheless, it is unfortunate that the city did not achieve a sufficient majority consensus on this front. The revitalised Cheonggyecheon was a re-creation rather than a restoration. It was essentially about dismantling the cover and raised highway and replacing it with a pedestrian-friendly and environmentally-friendly stream.

The proposal also included the construction of sewage procedures and flood prevention infrastructure. If the stream's self-purification capacity was relied on by hundreds of thousands of individuals in the past, the restoration project transformed Cheonggyecheon into an environmentally friendly, human-friendly downtown public space with historical values and future growth potential. The redevelopment of the urban neighbourhood is still ongoing today, owing to the re-creation of a unique public space (Global Designing Cities Initiative, 2022).

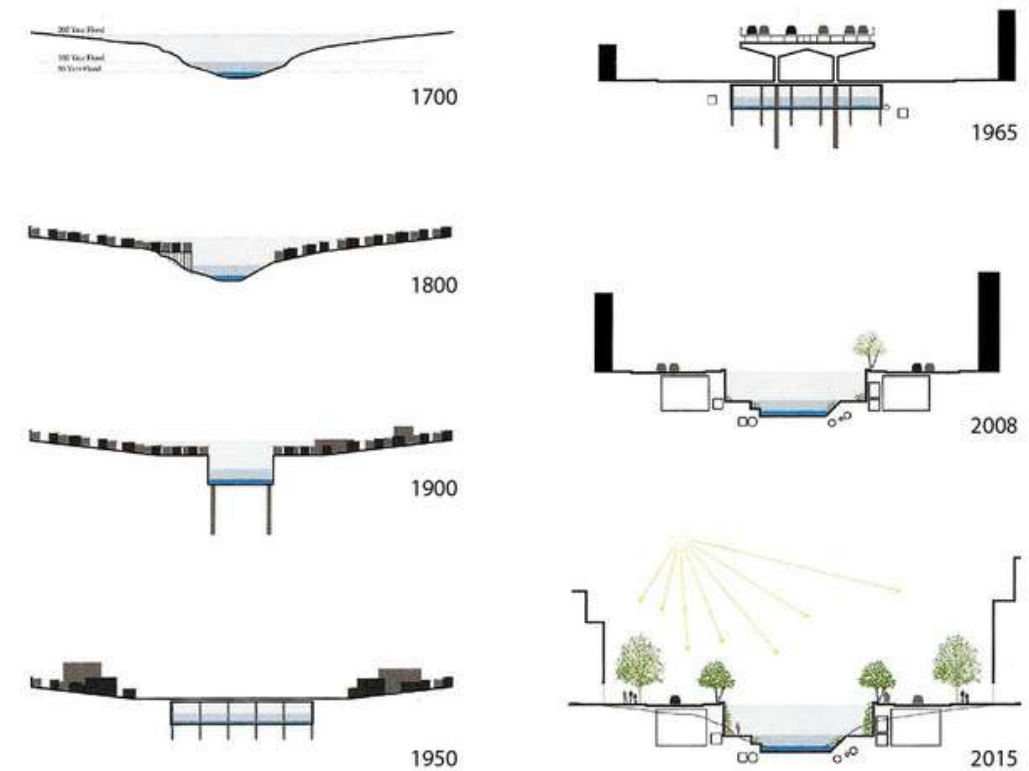


Fig 22. The Cheonggyecheon (river) restoration over time (Author 2022)



Fig 23. Before and after images of the recreated river landscape (Author 2022)

## SITE JUSTIFICATION

According to the City Planning, Development, and Regional services Department, the following sites (figure 4) still need to be developed in response to achieving the city's regenerative goals. The proposed site (number 6 in figure 4) is currently the only vacant piece of property within the Nelson Mandela Green corridor proposal. To appropriately apply the theories of Landscape Urbanism in the dissertation. Site justification criteria demand the site be situated along an urban green infrastructure (Apies River), be an example of a post-industrial site, and have a responsive open edge towards the riverfront.

The selected site in Arcadia is a perfect example of a fragmented city. The proposed site was first developed and now it functions as a vacant piece of land open for the urban dweller to inhabit. The chosen site is a vacant and neglected piece of land along the river with an adjacent site over the river. The site has three active edges with one facing the riverfront.

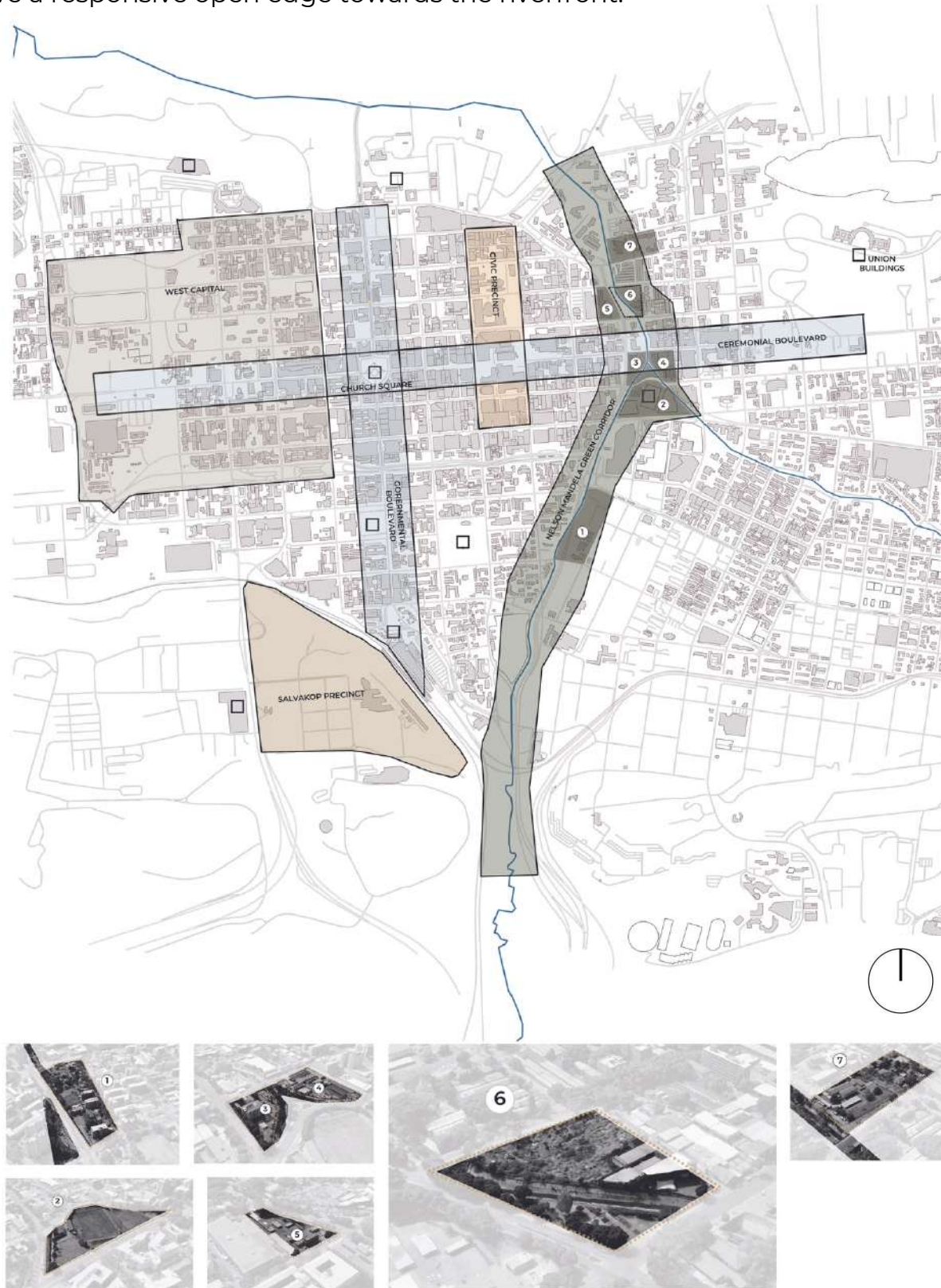


Fig 24. Urban map of City of Tshwane with highlighted sites along green corridor precinct (Author 2022)

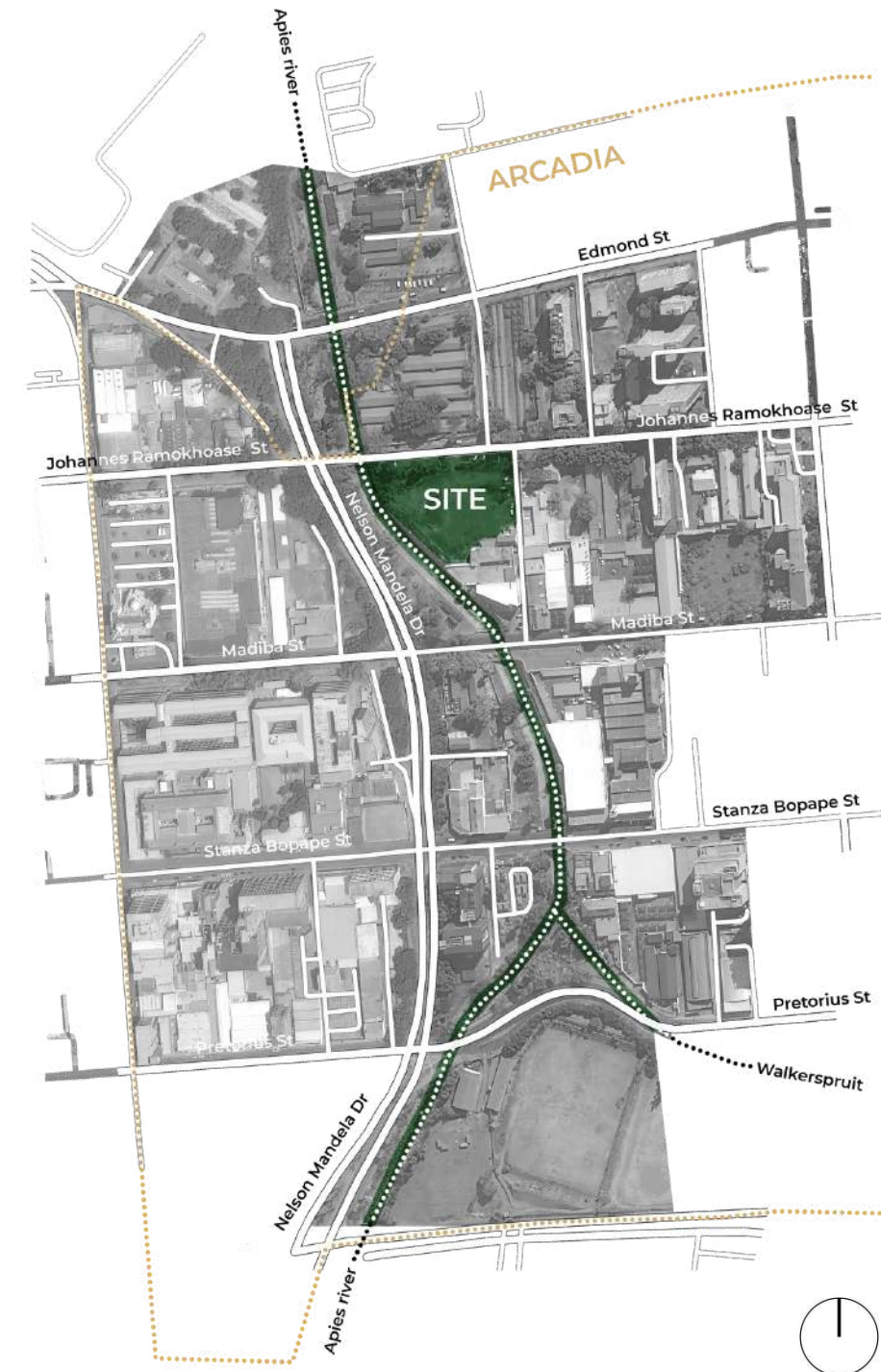


Fig 25. Urban map of City of Tshwane with selected site (Author 2022)

In redesigning, the chosen site I will be able to demonstrate how urban design theories in conjunction with historical research of the riverscape as a typology and with a qualitative analysis of the lived experience, could be used to repair the lost character of the riverscape as a city place through creating new provisioning and cultural connections between people, place, and nature.

## SITE ANALYSIS

Over time riverscape environments have become multifaceted landscapes. Composed of mixed use of different infrastructural layers. Built from and through the modernist allocations of systems as separate interactions to function more efficiently. In the analysis of the chosen site, the site is dissected to expose the separate functioning layers of the modernist city. This is done to expose the boundaries between functions to eventually in the understanding of 'staging the surface', make new connections between the separated existing infrastructural layers.

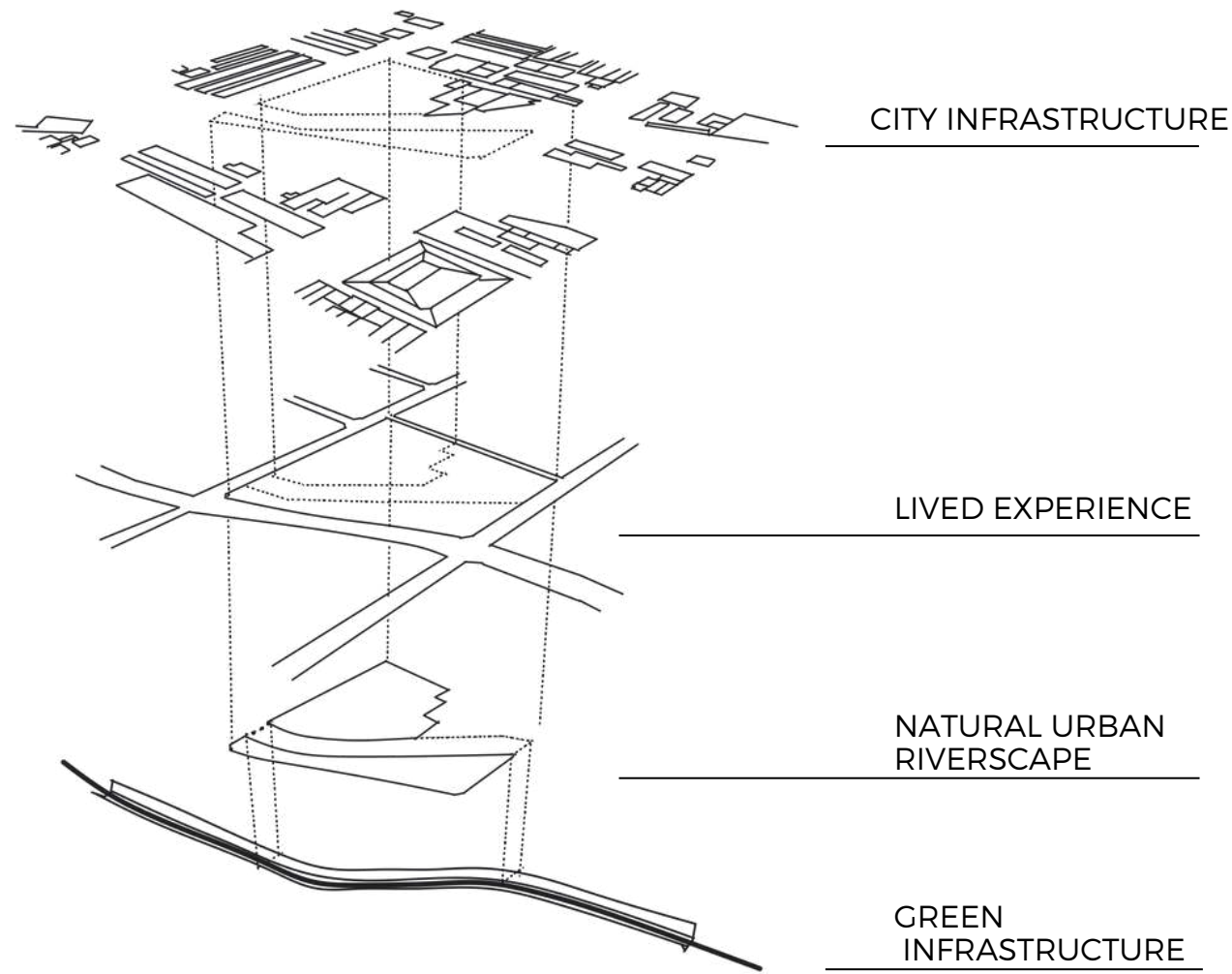


Fig 26. Site context extracted into different layers (Author 2022)

In the city infrastructural layer and according to the proposed Nelson Mandela green corridor development scheme the proposed site would fall in the mixed-use region and could cater to retail, amenity, residential, small-scale offices, and medical suites. Building coverage is medium and rests are left as open public spaces. As expressed in Fig 27 Land uses around the site are mainly commercial, Industry, civic and residential.

Due to the vacant nature of the site and the undetermined program, the site poses a serious safety risk for the surrounding community as it does harbor unwanted waste and socially destructive activities. Over time the site experienced a number of developments, but currently, the present City of Tshwane hasn't determined its newly fixed purpose. Offer a unique opportunity for a mixed-use development with strong identities and a response to a sustainable living agenda



Fig 27. Immediate city context's land use (Author 2022)



## SITE HISTORY

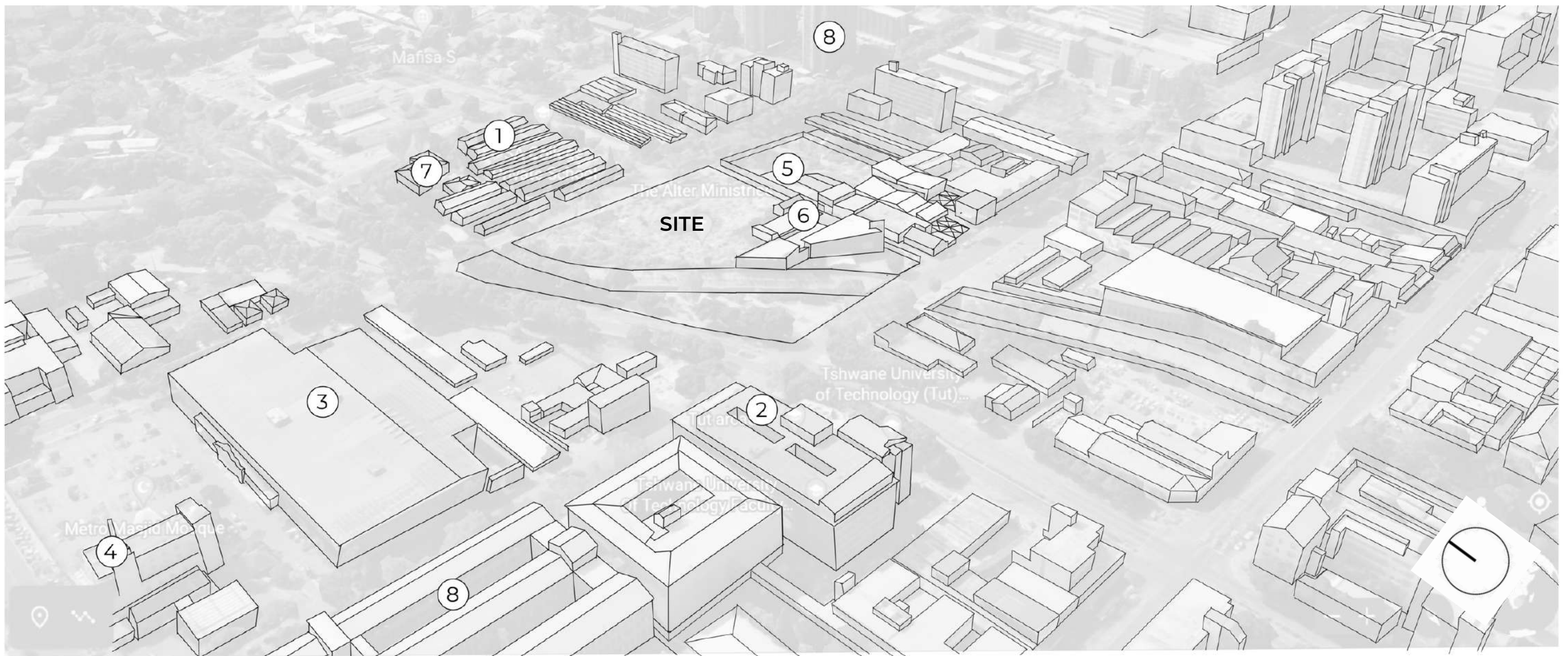
Over the past 20 years, the site has been exposed to a large amount of development. At it, the current point of its life span no new development has been done. Giving the natural environment the opportunity to overtake and expose the natural edge present along the river. As an open space in the city, the site has already provided the possibility to interact with the river by exposing its riverside edge.



Fig 28. The sites history over past 20 years (Google Earth, 2016)

## SURROUNDING CONTEXT

The site is surrounded by a number of mixed-use programs. A combination of educational, residential and other. In response to the riverside edge, most buildings are fenced off and unresponsive towards the river.



1. SA Collage Private School 2. Tshwane University of Pretoria Arcadia 3. Metro Home Centre ( Arcadia) 4. Metro Masjid Mosque 5. Mechanics 6. Kanuga Auto 7. Blesbok flats 8. Tshwane North Collage Pretoria Campus 7. South African Red Cross Society

Fig 29. Perspective of site and its immediate context (Google Earth, 2016) & edited by (Author 2022)

## SITE PHOTOS

An observational analysis of the current site environment shows a clear expression of post-development. The site still houses an existing structure in the southwest corner as seen in image position 1. The noticeable site edges are unresponsive towards all sides and don't provide transitional thresholds onto and off the site. Isolating the riverscape space from the existing lived experience of the city. The formal transformation of the river has made it impossible for urban residents to interact and escape to as natural feature with in the city context.

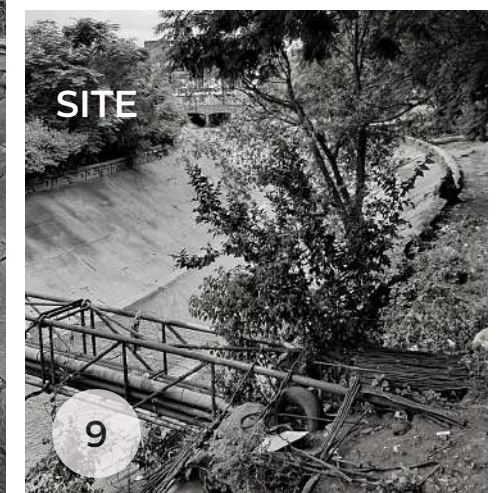
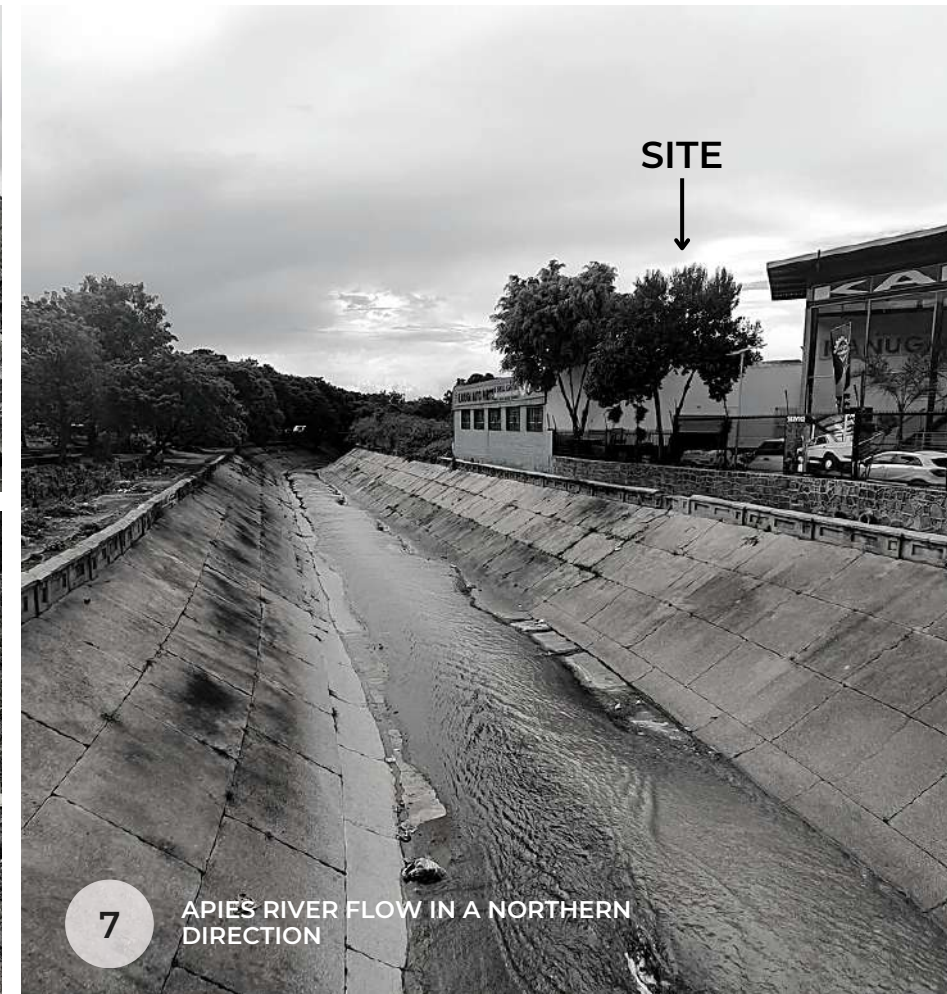
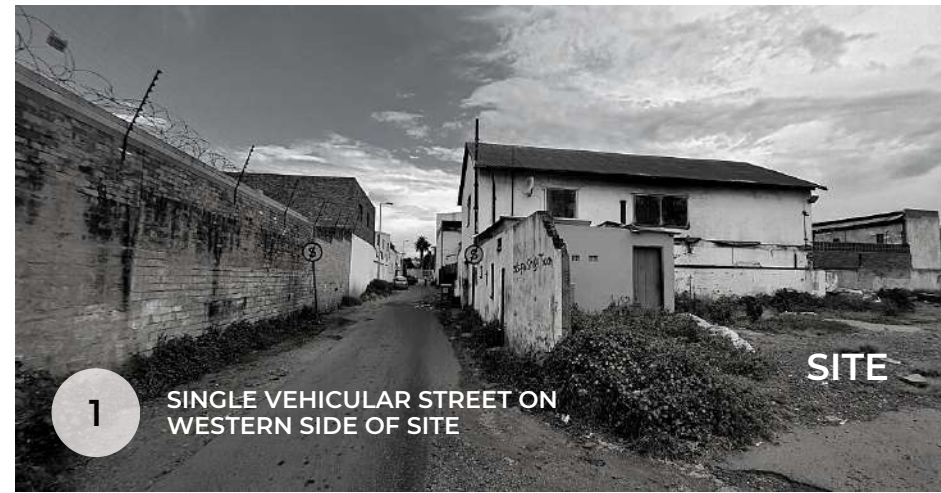
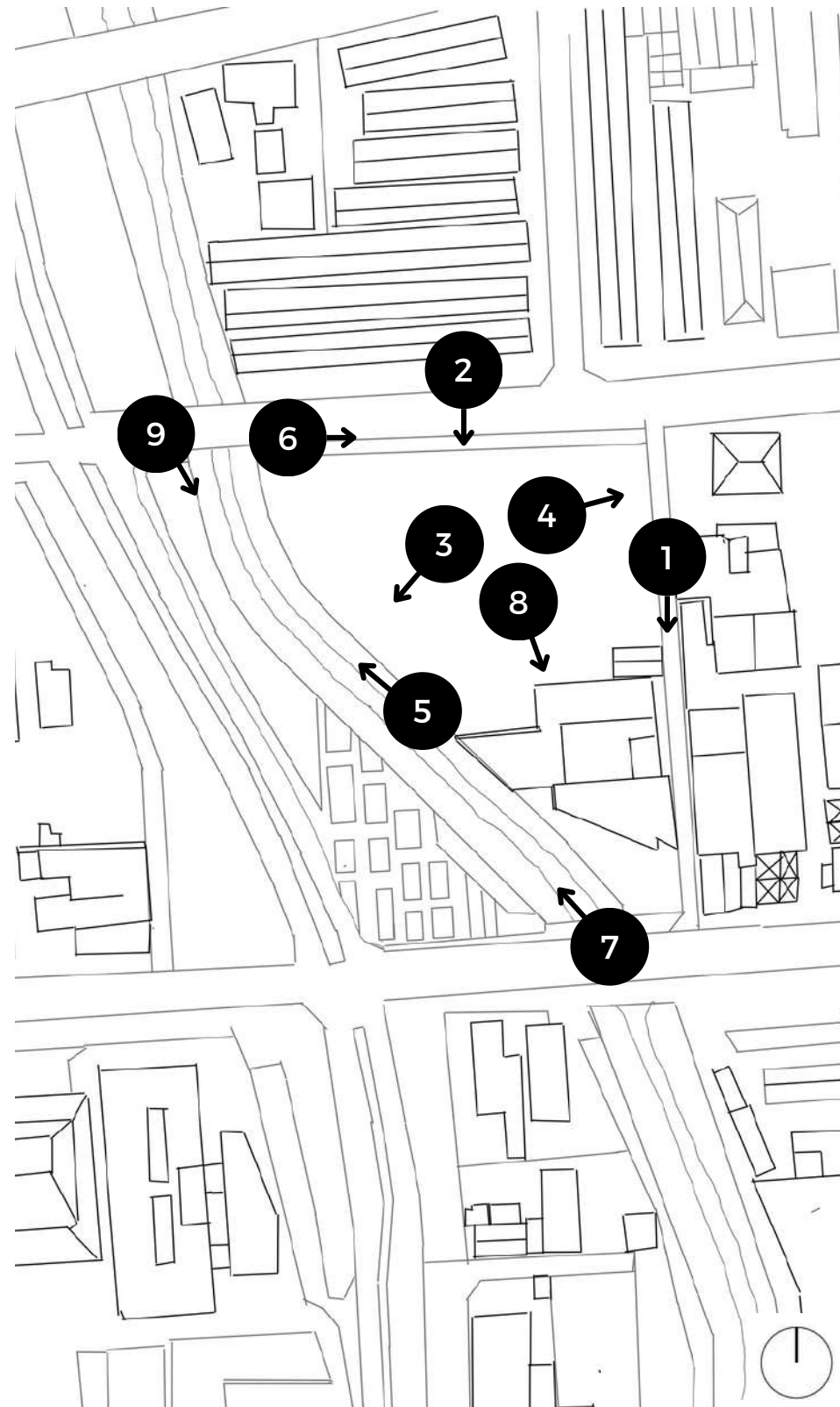


Fig 30. Map of where photos on site was taken (Author 2022)

Fig 31. Photos taken on site ( Author 2022)

## LIVED EXPERIENCE

In the on-site analysis through careful photo observations on and around the site. Conclusions were made to determine the general expression of the lived experiences in the context. To further explain what is meant by the lived experience of the urban environment we can refer to theorist Henri Lefebvre who gives clear definitions of the separate elements that create the production of space.

According to Lefebvre, spaces can be defined through three distinct definitions. Lived, perceived, and mental space. Distinctively these three spaces could not be defined separately, but could only be brought forth through the investigation of urban space. In theory, the lived experience of space would specifically refer to the practice of daily rituals. The experience of lived space is where an individual or a residential community can create an identity, and this identity has the ability to dramatically enhance a sense of belonging within an urban environment (Lehtovuori 2010:55).

In the wider concept of lived experience, we can further separate lived space into two experiences of formal and informal ritual. Informal expressed through unregulated and spontaneous appropriation and formal as the controlled and tidy conceived practice of daily routine within a formal building environment (Lutizo 2016:7), but in the contradictory approach there exists an opportunity for interaction between the two spheres of practice which could be defined as the liminal threshold. In Lutizo's opinion the deferential existence of the two spheres as two separate experiences, takes away from the opportunity to integrate the experience of conceived and appropriated space (Lutizo 2016:9). Through the strong beliefs of Lutizo by embracing both spatial practices within the lived experience, architects could foster and create a spatial platform that results in more meaningful encounters within the lived experience of the city (Lutizo 2016: 11)(Minnaar, 2019).

In the photographic analysis (Figure 32) informal and formal rituals were documented and exposed in an attempt to act as informants for the development of the design and specifically the program of the dissertation and riverscape experience.

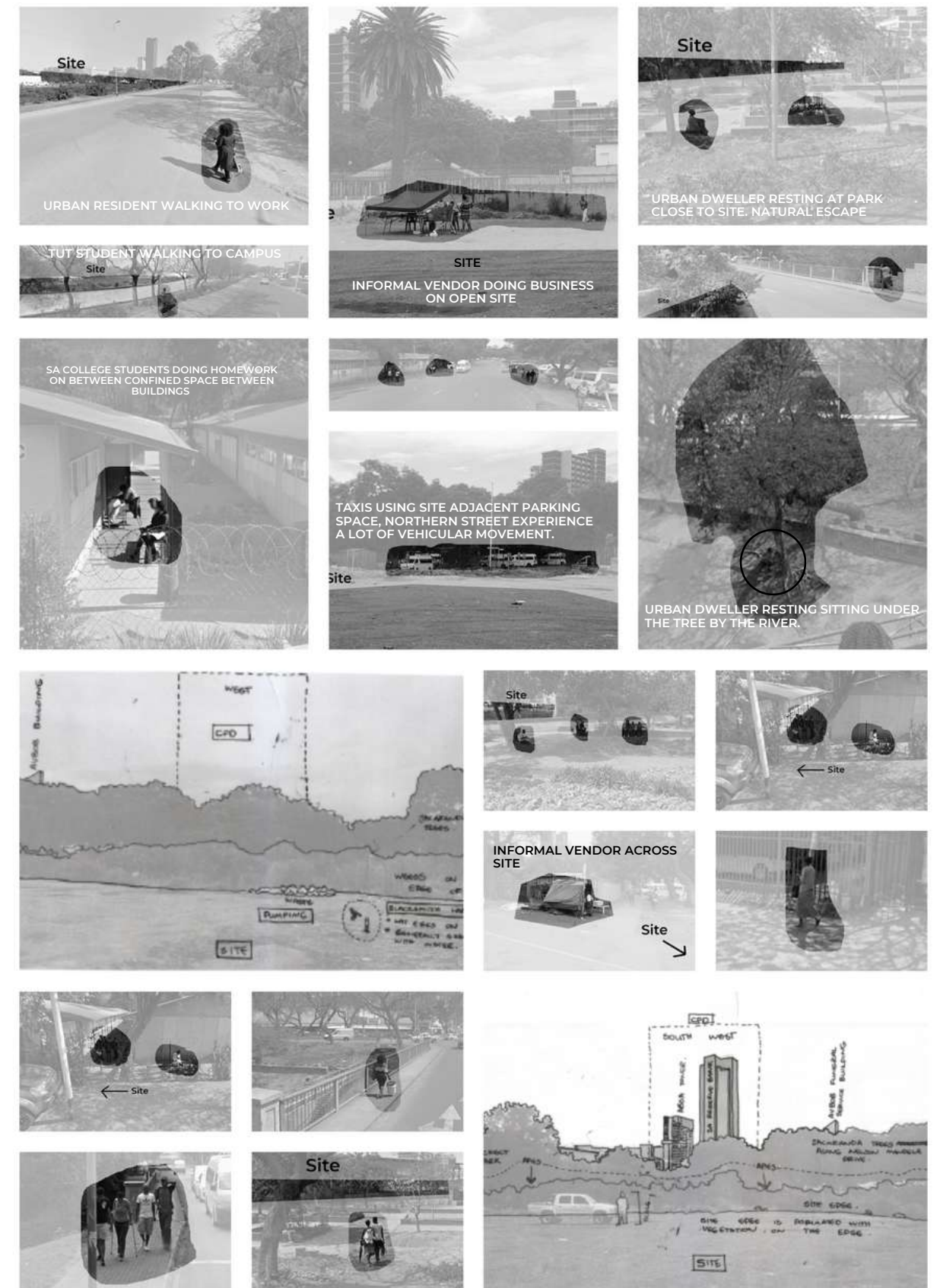


Fig 32. Photos of daily rituals on and around site (Author 2022)

## RIVERSCAPE, SPACE, DESIGN

The main design reaction is left unexplored in the indicated layered approach to the site study and riverscape.

In response to the urban river, A riverscape edge response study was done to understand how the transitional threshold between river and riverscape could be bridged. This study looked at responses to the specific edge of a riverscape and how this edge could be shaped and designed to accommodate moments of interaction with the urban river.

Furthermore, this exercise defines specific attitudes towards the river. Riverside spaces could foster interaction with the river through linear spatial expansion (A1), selective spatial expansion (A2) or tolerating (A5) the river in meanings of underwater steps etc. Other attitudes are defined as temporary resistance (A3), over the water (A4) and adapting (A6).

Through this design research I could establish a design framework which aided me in designing meaningful spaces on the riverside edge of the project.



Fig 33. Riverscape edge design responses (Prominski et al., n.d.)

## RESULT OF ANALYSIS

In the expression of the living riverscape dweller, we can see that once again the dweller is confined by the urban edge. How do we start to create interlinking space for the urban dweller to move freely between city spaces without being exposed to a confined street edge.

Concluding the analysis has exposed layers of interactions that have been grouped in order to define the different layers present in the urban riverscape. These could be defined as green, urban, and dweller.

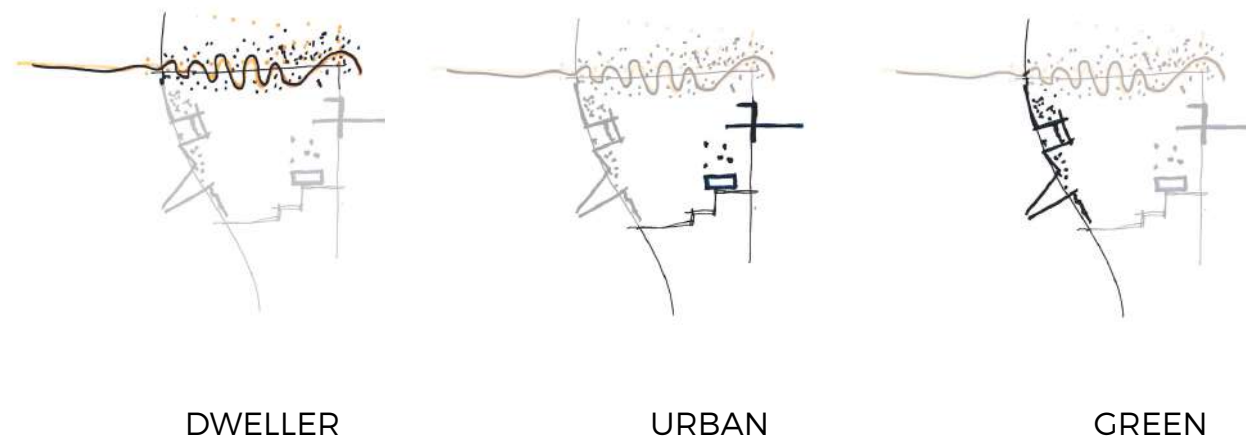


Fig 34. Three concurring themes (Author 2022)



Fig 35: Different layers present on site (Author 2022)

## PROGRAM & CLIENT

The program was reinforced through the meaning that riverscape space in urban environments provided valuable opportunities and space of exchange to exist between the natural river resource and the developed human city. As represented in the typology study done in the story of the river, we can clearly see that in the context of Tshwane, riverscapes adopted a number of identities and programs over time. The river was consistently in service to the city's needs and development. Expressions of fertile ground for agriculture, fertile vegetation for grassing livestock, anchor point to connect and bridge neighborhoods and important ritual-based thresholds to the river. As the city grew it demanded more of the river as resources and in exchange, the city provided nothing back. Through the ages, the river became depleted and lost its ability to provide enough for the growing city. This caused the city to search for new resources to satisfy its growing need. With the disappearance of the river, it became a mono-functional storm water system. Leaving the urban riverscape to adopt a one-sided program from the city. Through the new expression of riverscape design, the program reintroduces a reciprocal relationship to mend the disconnected exchange between the river and city program.

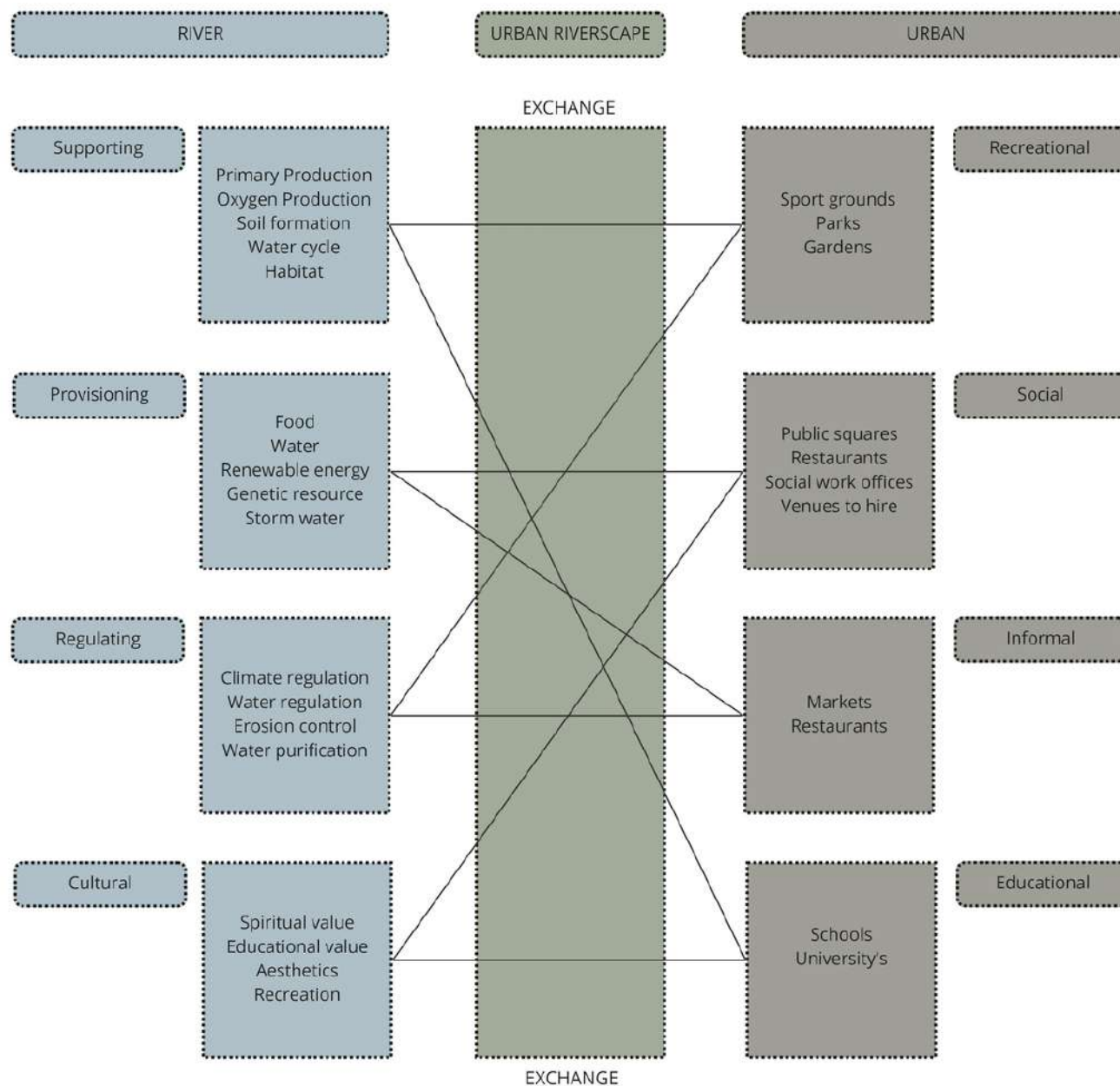


Fig 36. Diagram explaining the exchange between river and city program (Author 2022)

From the riverside, the proposed service was identified and these are productive, cultural, regulating, and provisioning with the urban vision in this dissertation, some of those services are being restored in different forms - Arboretum for riverside studies. Please refer back to the section (A RESPONSE TO THE URBAN RIVER CONDITION) and the diagram of the proposed service the river provides.

The proposed initiatives, which include the SA College Private School and the SAVF, are an expansion and support of already-existing activities in the local community.

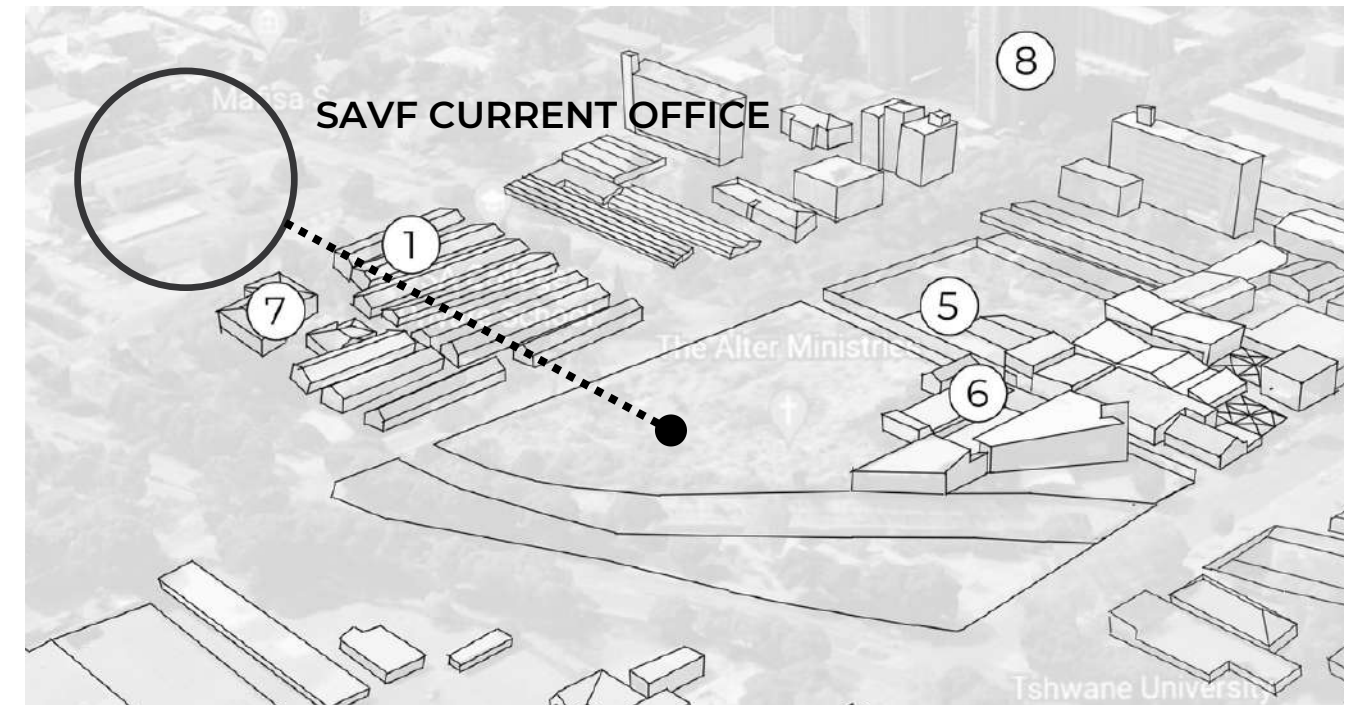


Fig 37. Location of current SAVF office

### SAVF CHARITY SHOP

SAVF charity shops are social enterprises that mainly sell used goods such as clothing, books, and household products. Charity shops support countless persons in need, but also promote fundraising. The public can make a contribution by donating clothes and unwanted household goods and finding bargains themselves (SAVF -, 2022)

### SAVF PUBLIC INTERFACE OFFICE

In the expression of the public interface interviews with SAVF established that there was a disconnected relation after covid to interact and exchange relations and services between the SAVF and the general public.

Intention: To establish a link between the general public and the service the SAVF provide.

### PUBLIC SQUARE

The public square act as an introduction space to the rest of the site and design. The intention of the public square is to obtain or accumulate the general public moving past the site. As this is the first open-plane visual from the northern street edge.

## THE URBAN STORMWATER RESEARCH

Through this specific program the unforgiving mistreatment of the city by the river in the past. This program tries to give back to the river and its natural motion of services. Not extracting the river resources but to re-establish its natural purposes and poses as a hybrid service that could benefit both the city and the natural river.

The urban stormwater research facility accommodates research in response to how future cities could treat and use stormwater in different systems on-site and through the use of landscape systems.

## STORMWATER GARDEN

The stormwater garden filters and retains stormwater to eventually be used on site by the productive landscape and water sources in the buildings.

## RETAIL WHITE BOX

The retail white box act as a general interchangeable program that could accommodate any program in accordance with the needs of the context. This could range from food, education, etc.

## INFORMAL MARKET SPACE

The informal market gives the informal sphere a relevant space to interact with the formal environment. The intention is to formulate an exchange between the formal lived experience and the informal lived experience.

## GREEN CAFE

The intention of the green cafe is to express the possibilities that are available through using the productive landscape within the city environment to make and produce food. The green cafe also translates the importance of sustainability to the general public.

## PRODUCTIVE LANDSCAPES

The intention of the green cafe is to express the possibilities that are available through using the productive landscape within the city environment to make and produce food. The green cafe also translates the importance of sustainability to the general public.

## AFTER SCHOOL FACILITY

The intention of the after-school facility is to give surrounding educational facilities a space to do after-hour research and homework. This program more specifically accommodates the SA college private school which according to the lived experience analysis, does not have after-hour homework spaces and they are forced to do homework on the porch space between classrooms.

## WORKSHOP SPACES

The intention of the workshop space is to give the SAVF and the urban stormwater management facility space where the workshop could be facilitated. These workshops would involve informative sessions on the importance of stormwater management within a city environment. Another workshop could also be held between the general public and the SAVF on topics like "early childhood development, child- and youth care, child protection, preventative and therapeutic programmes, empowerment of teenagers and mothers and fathers, family care, root enquiries, community programmes such as empowerment, skills development, poverty eradication, HIV programmes, employee health and wellness, aged care in homes, housing, luncheon clubs, home support services " (SAVF -, 2022).

## MULTI PURPOSE HALL

The purpose of the hall is to accommodate a range of needs between the different programs on site. SAVF can use it for annual conferences or as a classroom. Urban stormwater management facilities can also use this space for meetings etc.

## MULTI PURPOSE SPORT COURT

This recreational program gives the SA college private school and surrounding residential environment a space to exercise and find an escape from the city environment. Accommodating a social exchange between the general public and the rest of the programs on-site.

## HOW THE PROGRAMS ARE CONNECTED.

As explained through the diagram you have clear expectations that each program could be categorized either from the urban or the riverside and could also be classified as being natural, social, and educational. The mix-used functions of each program have different interlinking connections and links. Functioning in support of each other.

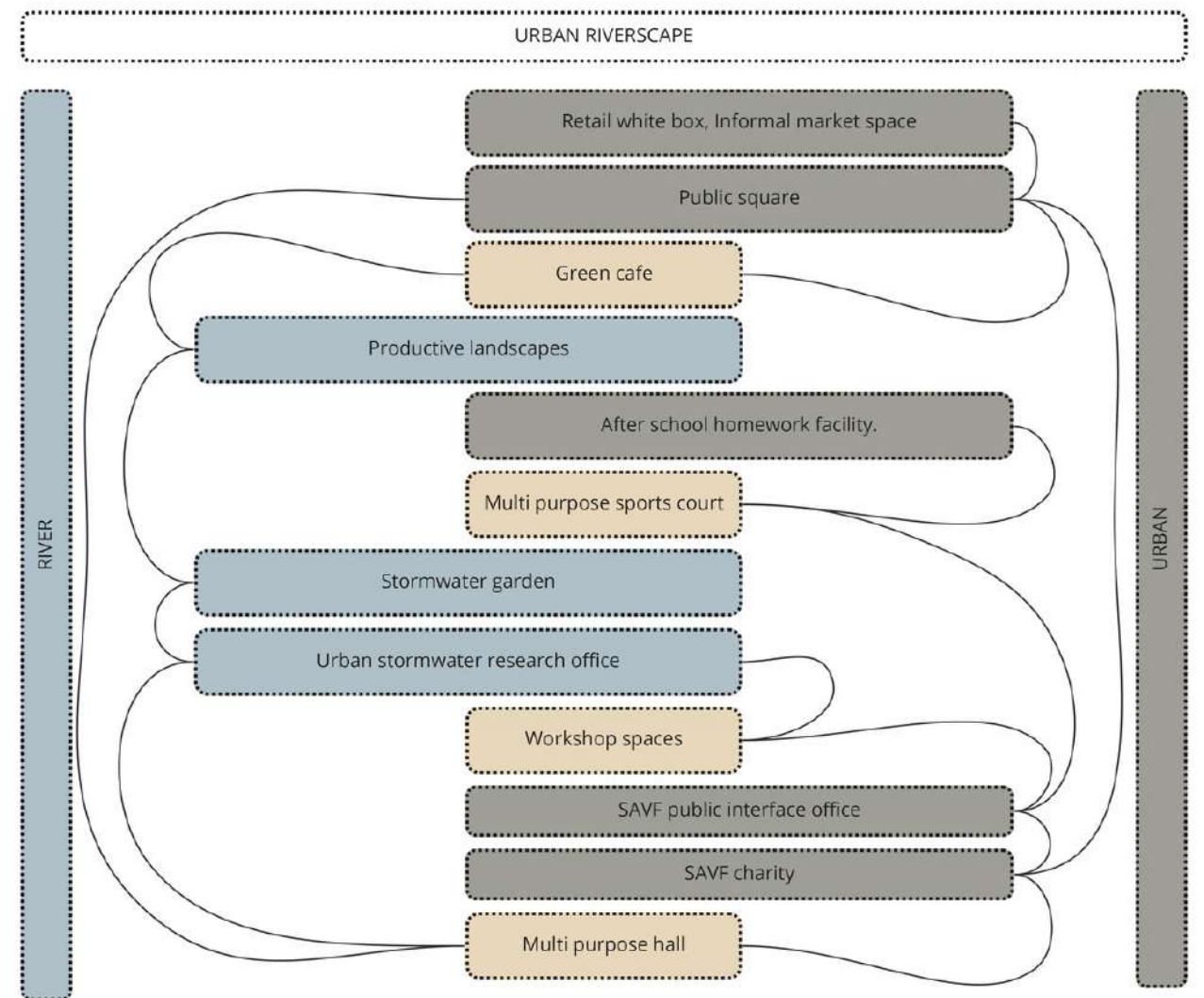


Fig 38. Diagram of how programs are connected (Author 2022)

PROGRAM STRUCTURE

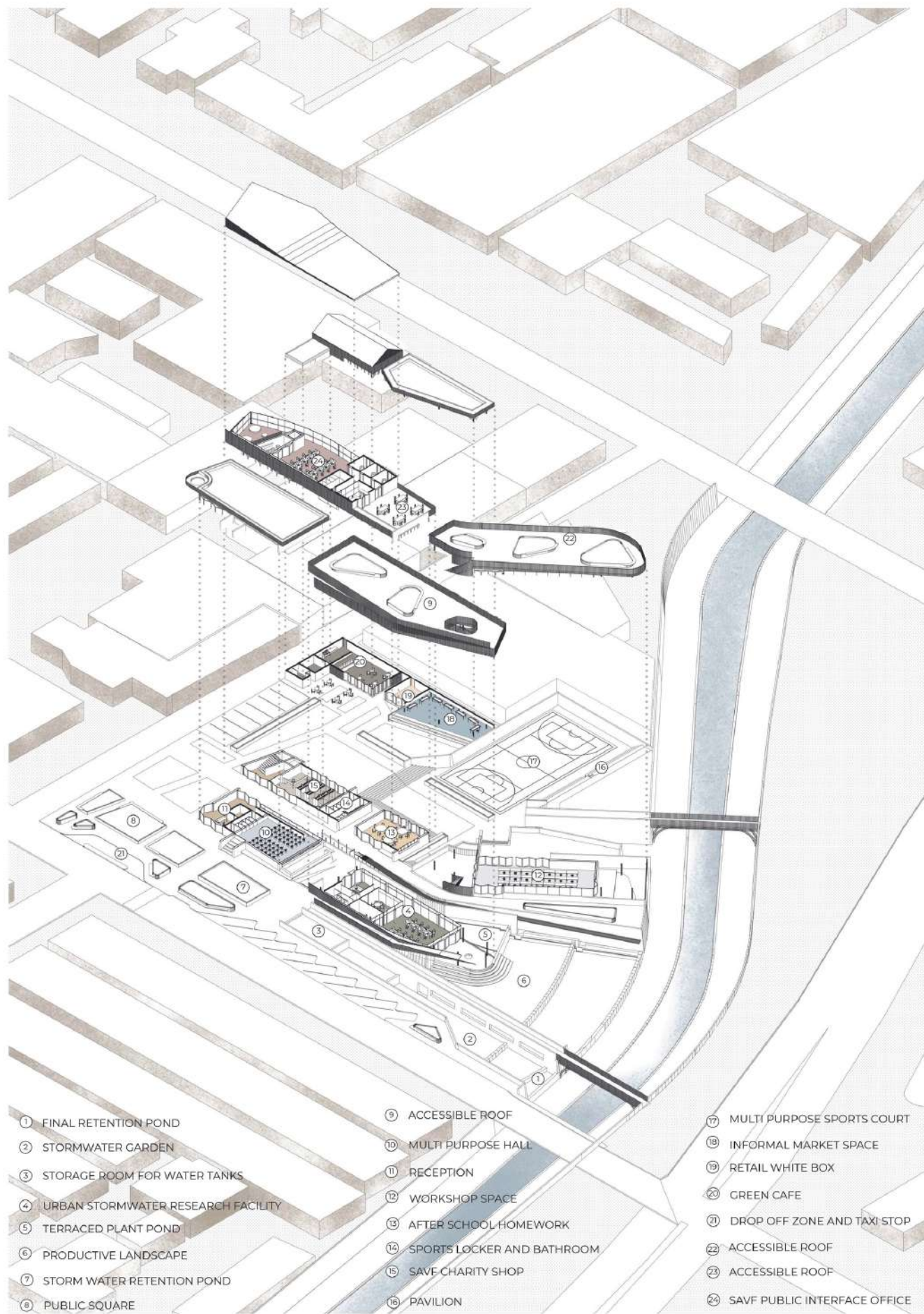


Fig 38.1 Diagram of how programs are structured (Author 2022)

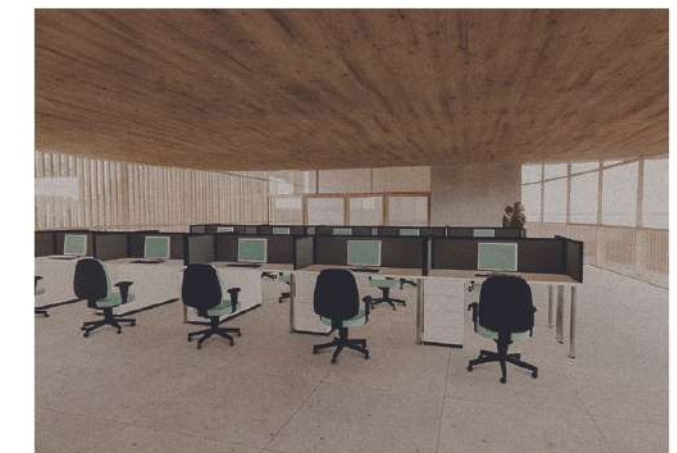


Fig 38.2 Interior photos of programs (Author 2022)

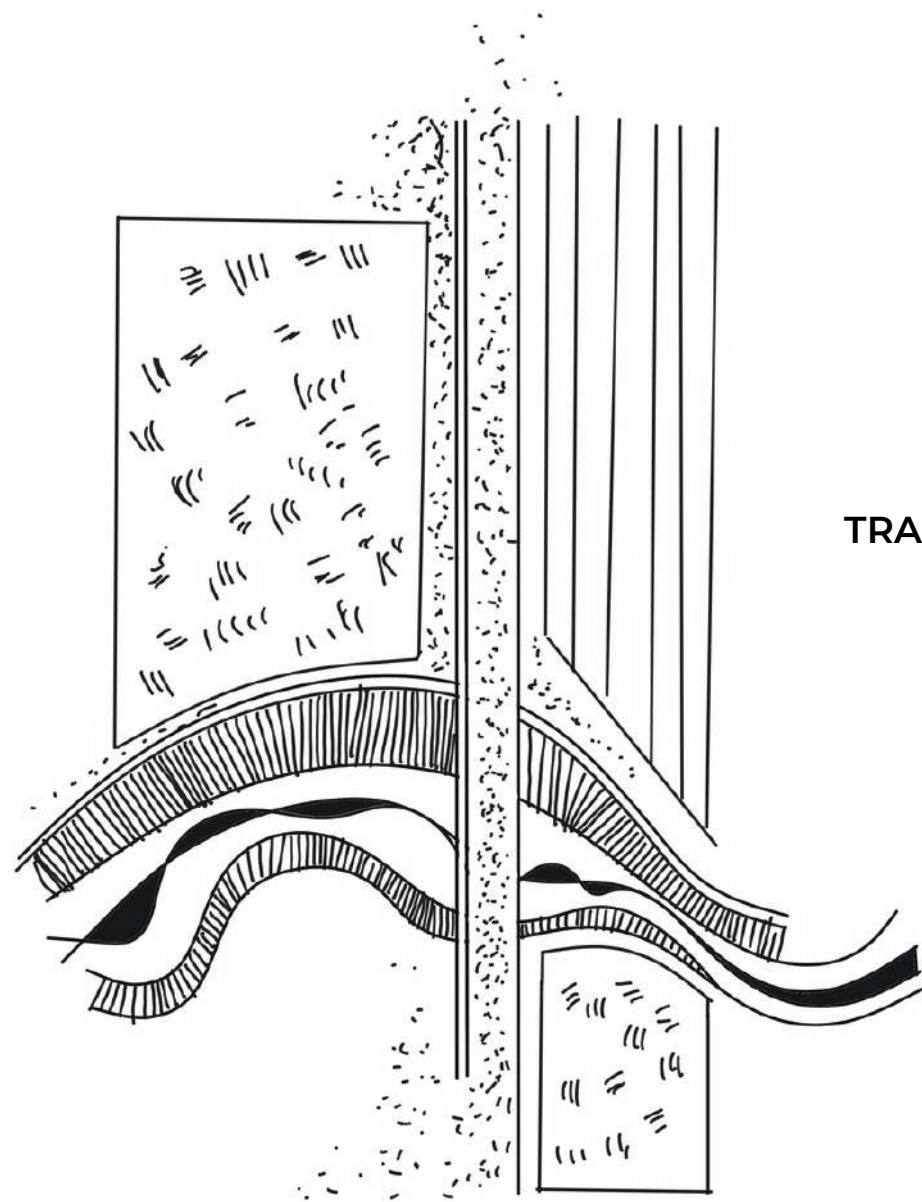


## ARCHITECTURAL CONCEPT

The expression of the riverscape is an ever-shifting landscape that changes and morphs to accommodate the interrelated relationships between the city and the river. The riverscape was designed to be shaped in accordance with its program or transactional abilities between the river and the city.

Through an exercise of "topomorphosis" the urban riverscape was morphed to create and accommodate spaces of interaction and exchange between the city program and the river program.

In an attempt to make relevant connections between horizontal planes, architectural objects are designed to mark these connections in the form of pushing, pulling, and cutting the riverscape.



Separated systems - modernist city

TRANSFORMATION OF RIVERSCAPE

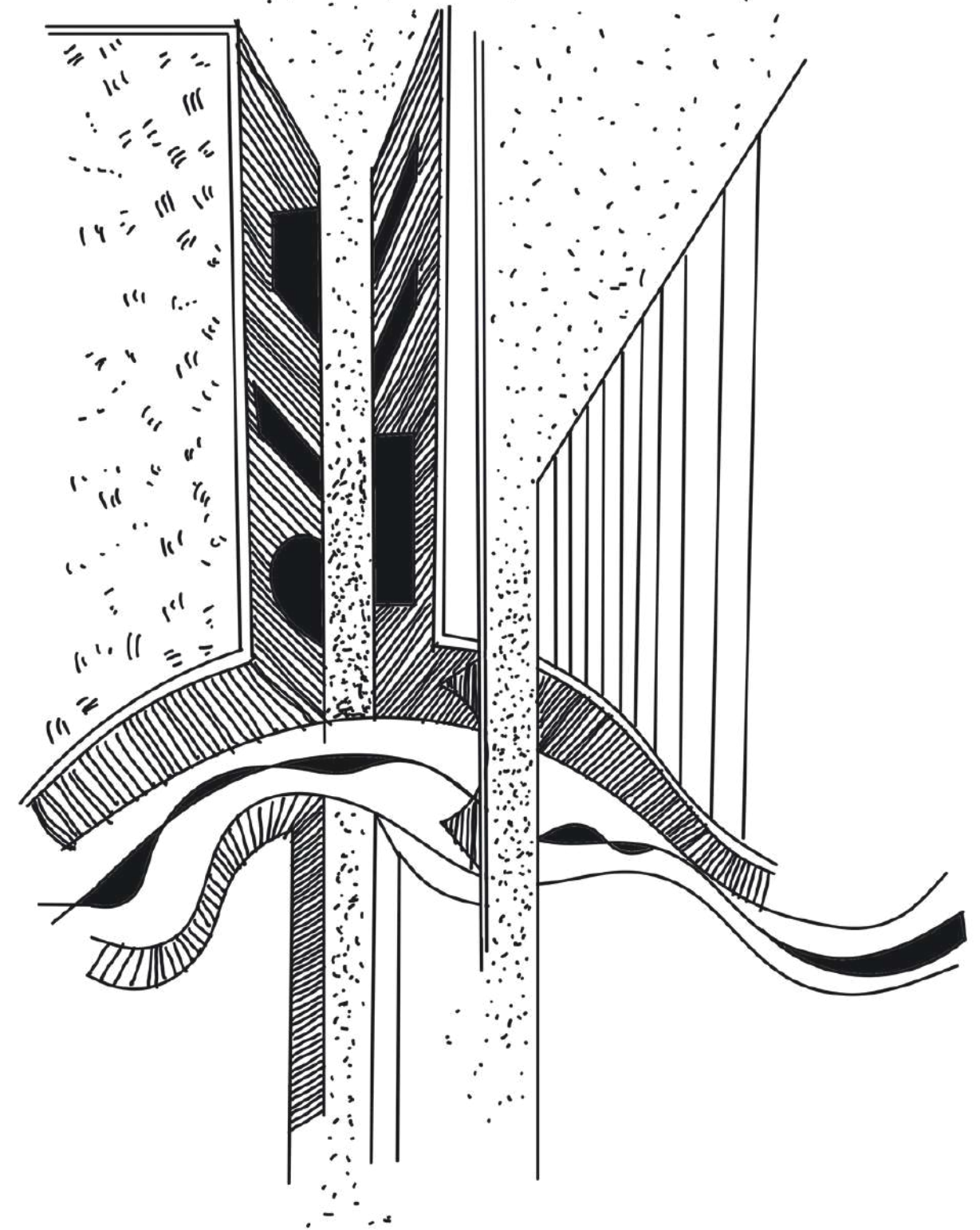
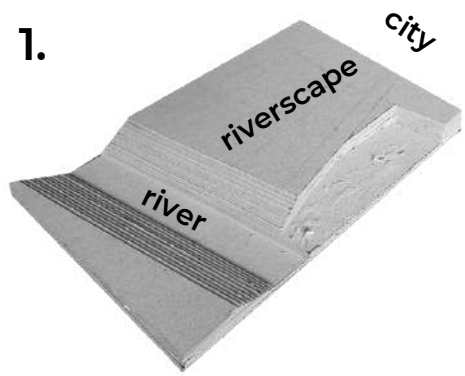
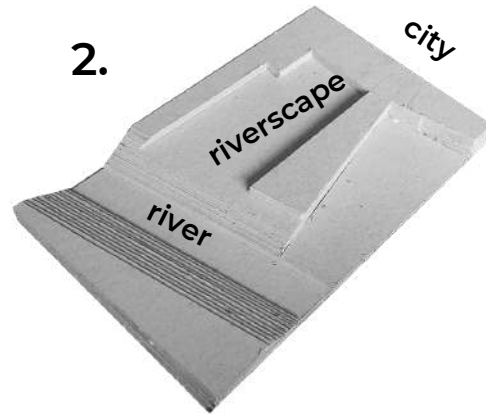


Fig 40. Overlapping interactions between fields (Author 2022)

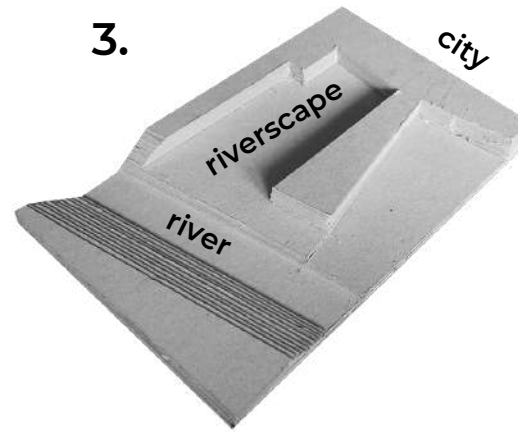
Fig 39. Architectural concept (Author 2022)



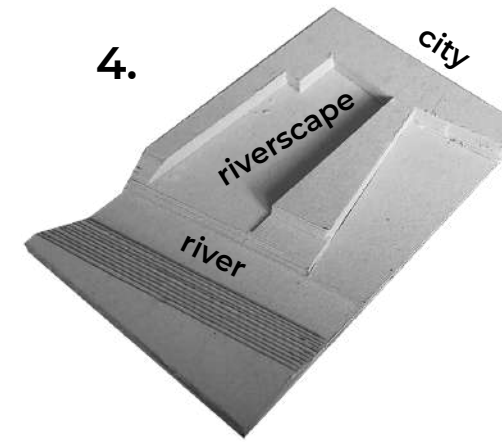
1. Firstly the riverscape was cut to accommodate the steep interaction between the river and city



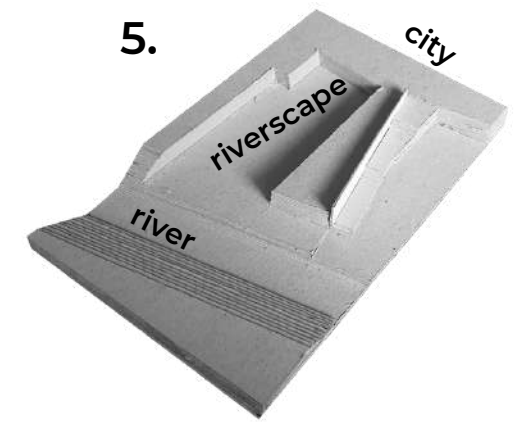
2. More horizontal planes were cut into the riverscape to create different spaces



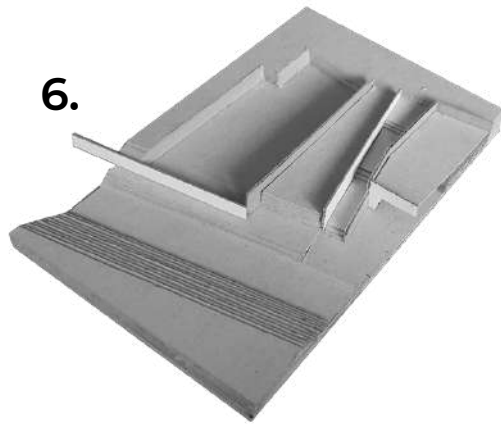
3. riverscape spaces were deepened to connect to riverside spaces



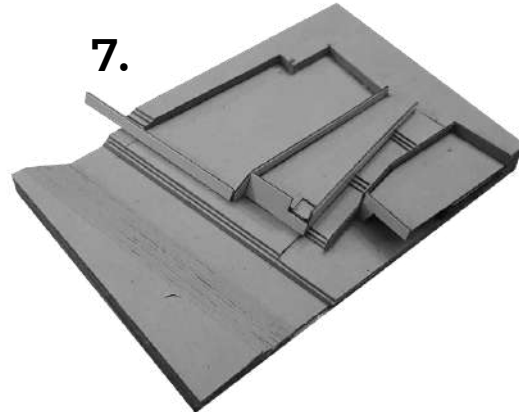
4. Space was stepped to give access between river and city



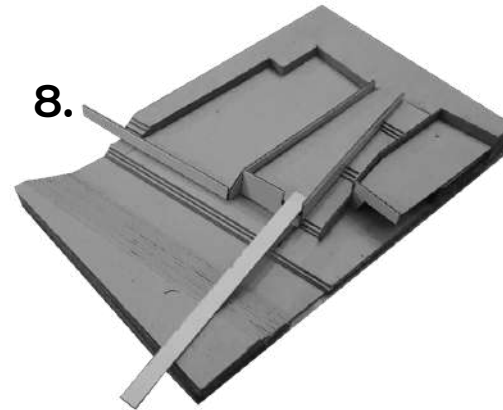
5. Wall was added to retain the spaces created through cutting



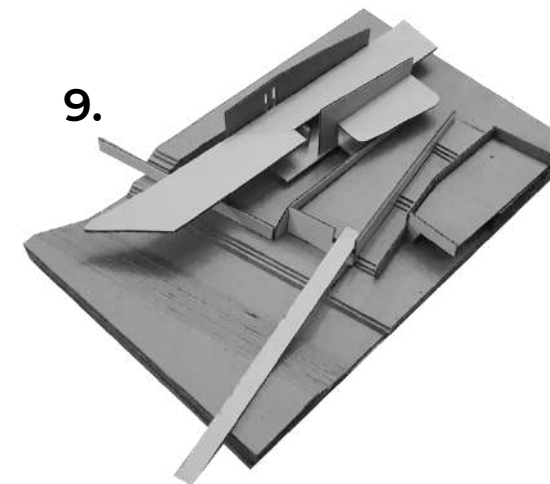
6. Wall was added to retain the spaces created through cutting



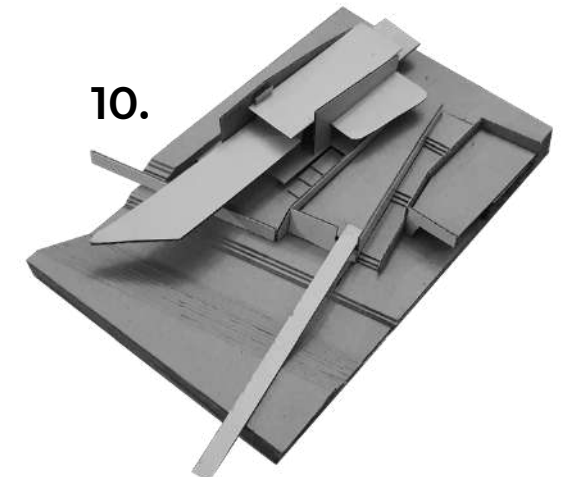
7. Underground spaces were created on the riverside



8. Bridge elements were added to cross the river



9. Architecture was designed in response to spaces created in the riverscape

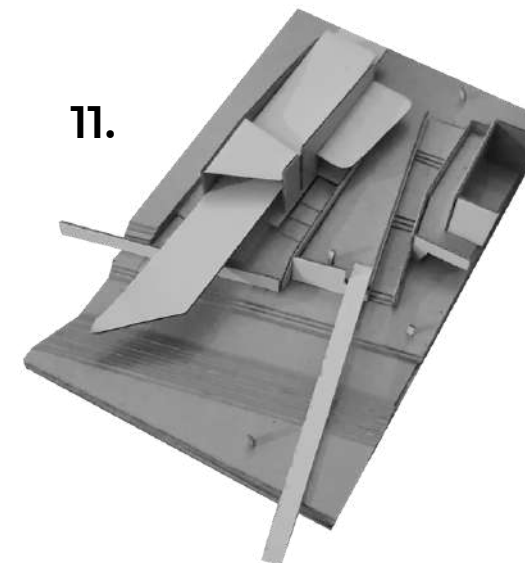


10. Layers were added to see how architecture accommodates a horizontal connection

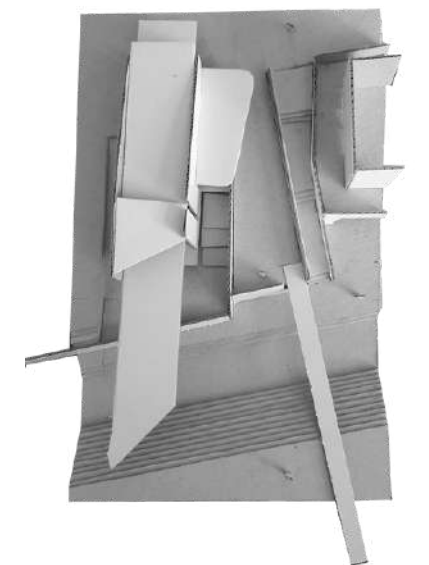
Fig 41. Architectural concept expressed in an exercise (Author 2022)

## ARCHITECTURAL CONCEPT EXERCISE

The purpose of this exercise was to translate the intentions of the architectural concept into a physical form and expression of space. This later informed more of the design iteration and expression of riverscape design

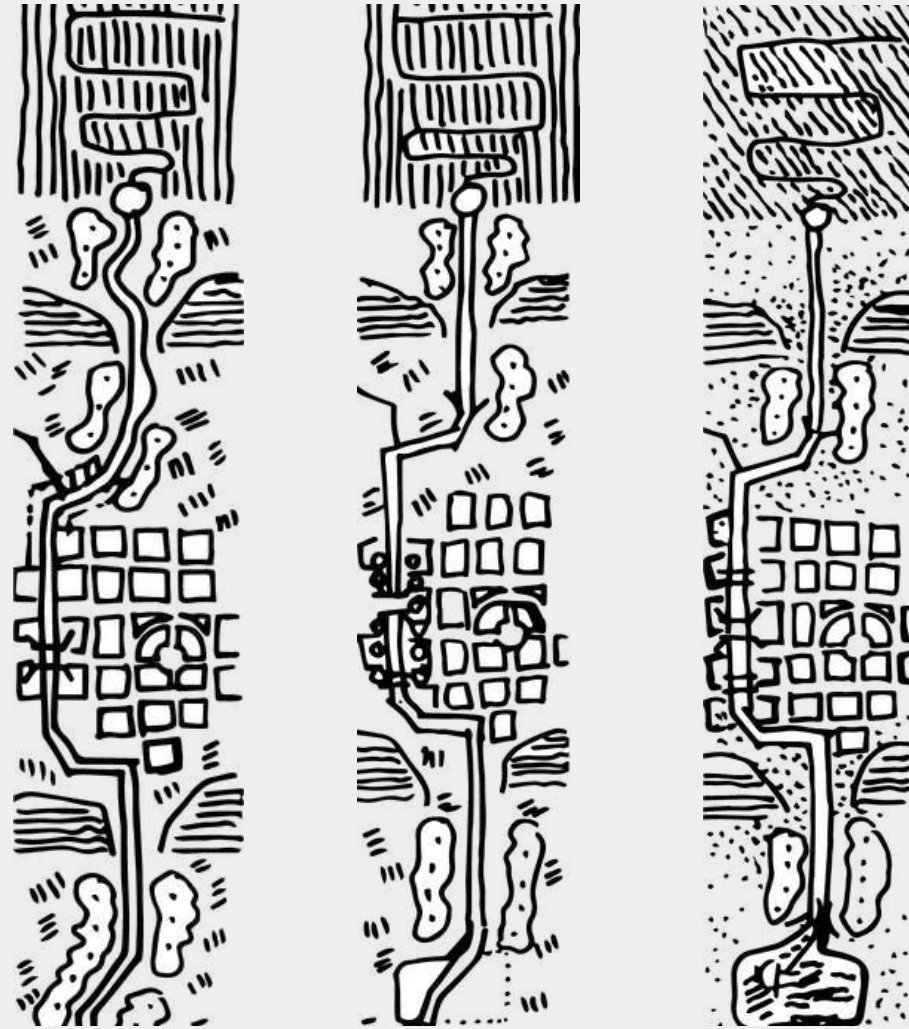


11. Final exercise outcome



Expression of riverscape design

• U R B A N R I V E R S C A P E •



S Y N T H E S I S

## CONSOLIDATED DESIGN INFORMANTS

The expression of the urban riverscape as mentioned before is a multifaceted landscape, composed of different layers of engagement. Extracted from the analysis were three concurring themes of importance. In further translation, the themes could be seen as informants for the rest of the dissertation.

### Urban/city:

- Surround urban programs informed the formation of new programs on site
- Urban design theories were applied to respond to the larger scale the river has on the city

### Green/riverscape:

- Natural riverscape
- Surrounding open spaces
- River
- how the river could become a sustainable resource to the city

### Lived experience / urban dweller:

- The users and inhabitants of urban riverscape were identified.
- Design according to urban dwellers and their lived experience.
- Improve the lived experience.

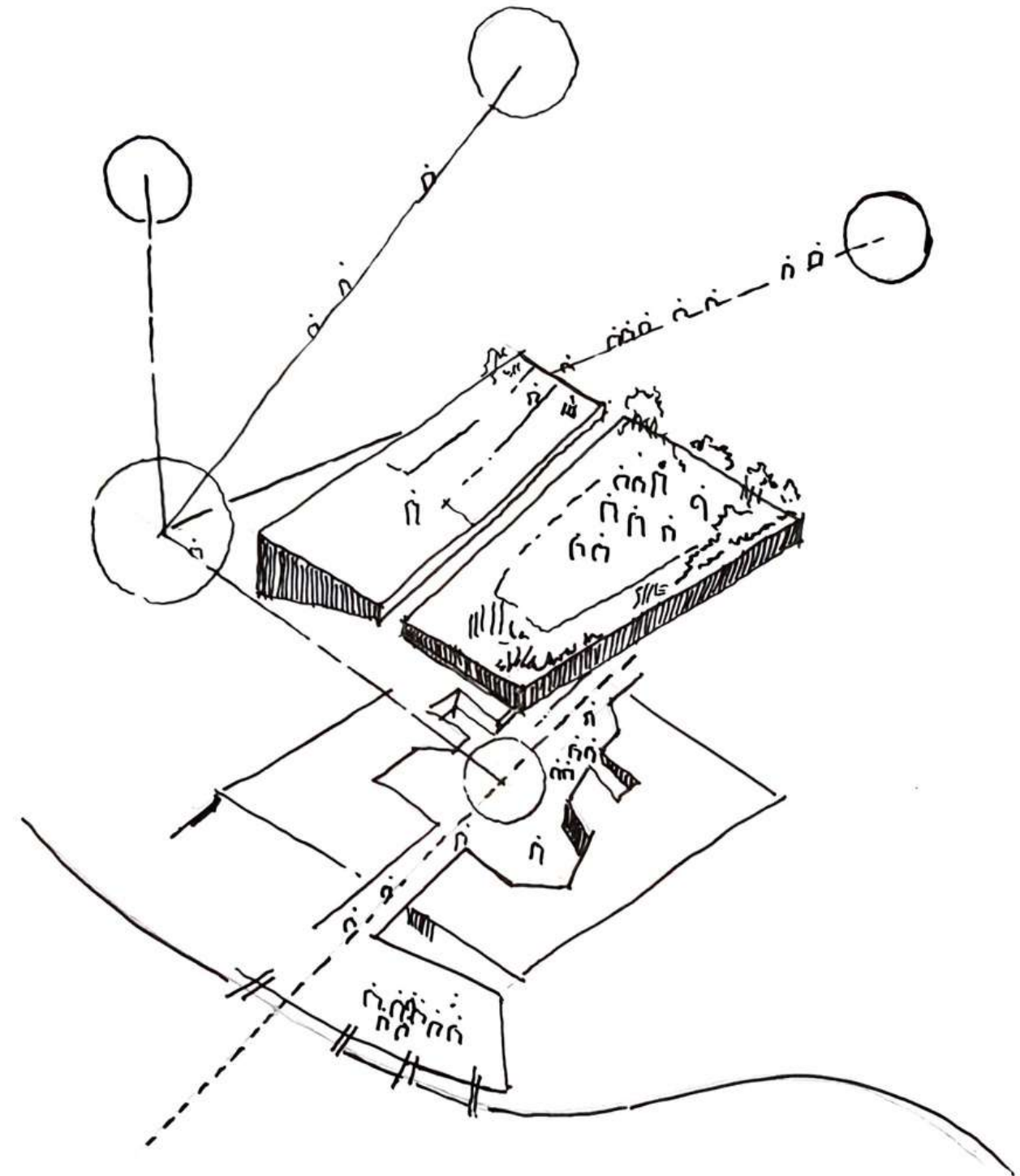
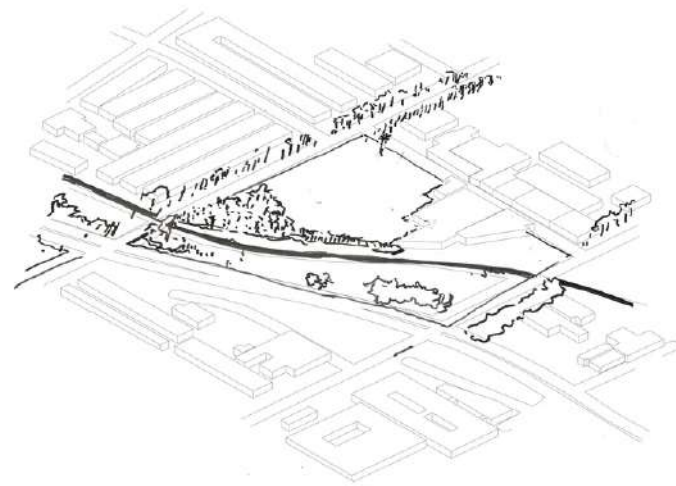


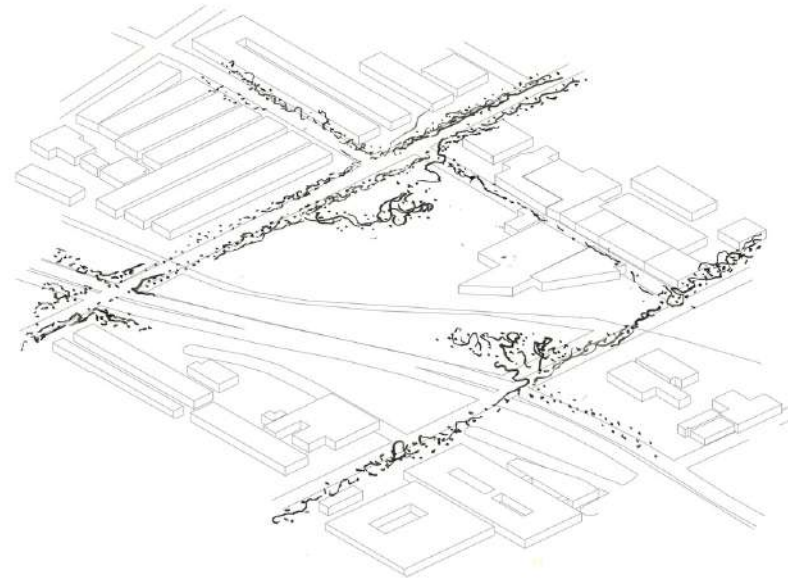
Fig 42. Consolidated design diagram (Author 2022)

## DESIGN DEVELOPMENT 1

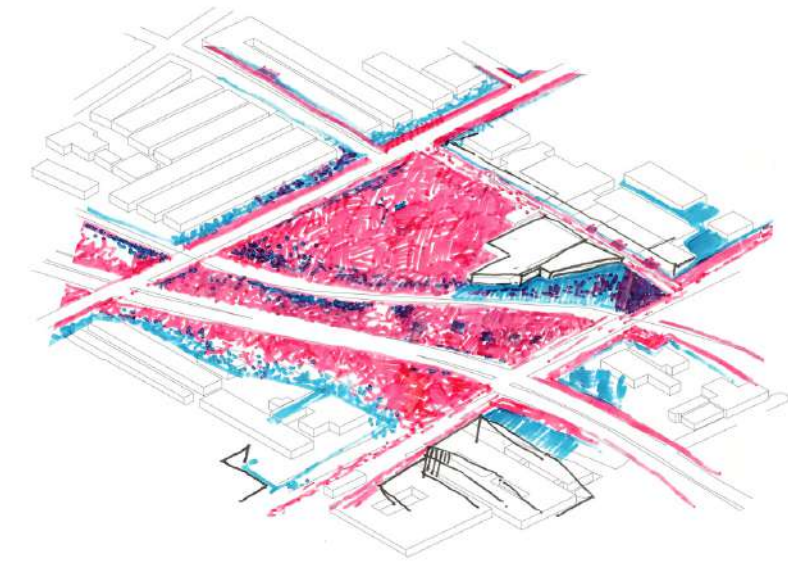
Through the first design development exercise layers of relevance were placed upon each other to start formulate and design space according to the informant expressed through each layer



Layer 1 : Natural environment

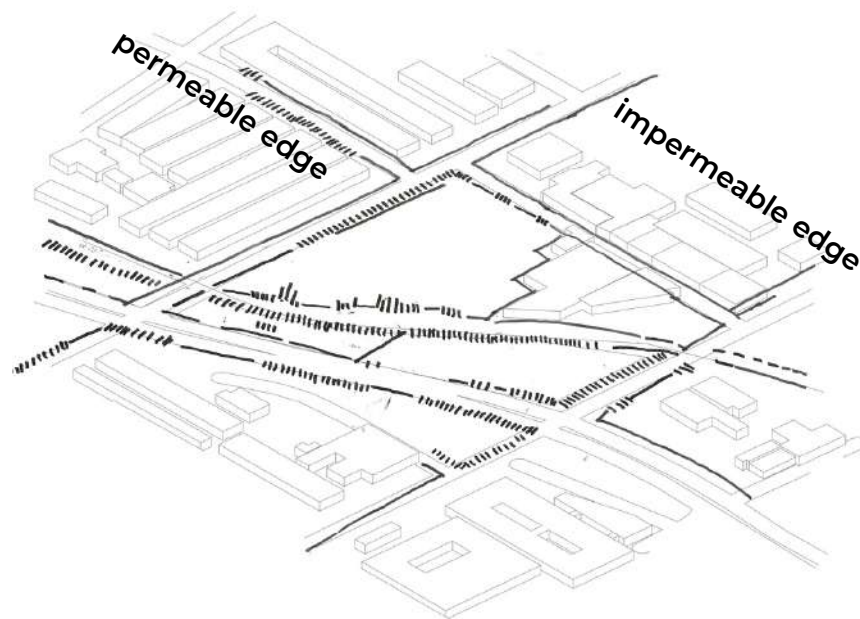


Layer 2: Movement and lived experience

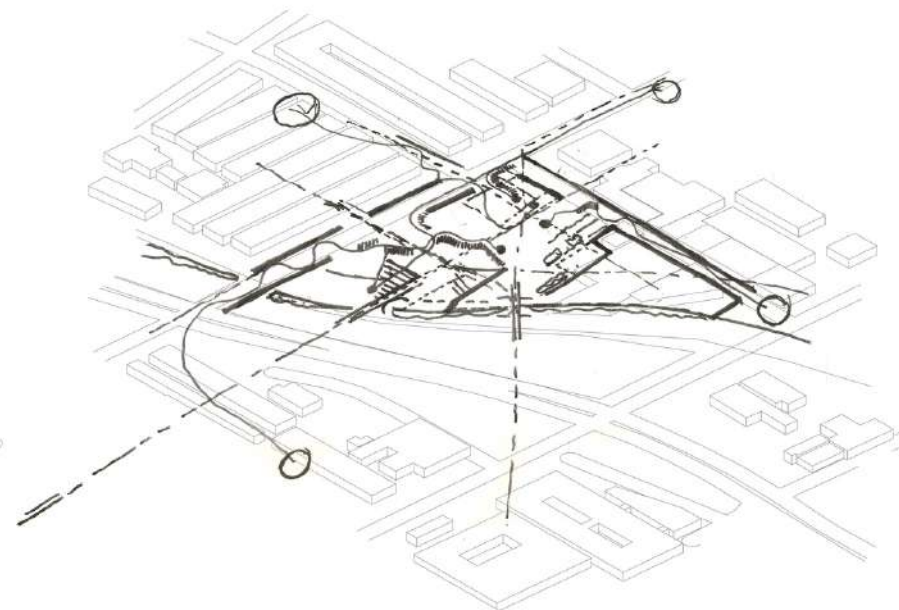


Private blue and public red

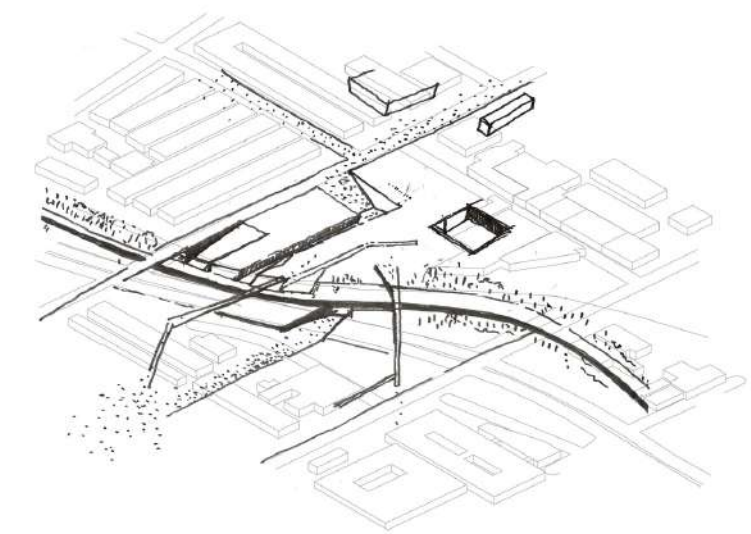
Layer 3: Private and public space



Layer 4: Edge condition



Layer 5: Creation of space from layers



Layer 6: Creation of form through layers

Fig 43. Consolidated layers and informants conclude with first form and design (Author 2022)

## DESIGN DEVELOPMENT 2

Through the second exercise of design development, the result of DD 1 was iterated in to different expression and oppsition.



Fig 44. Progress in iterations (Author 2022)

### DESIGN DEVELOPMENT 3

By the third development, a fixed form was adopted and was then further iterated to accommodate the three activate edges on site and their interaction with each edge.

The importance of these iterations was to create a design that fosters exchange between the different edges and then how eventually they come together on a riverscape environment. These connections made different spaces within the riverscape environment to facilitate exchange.

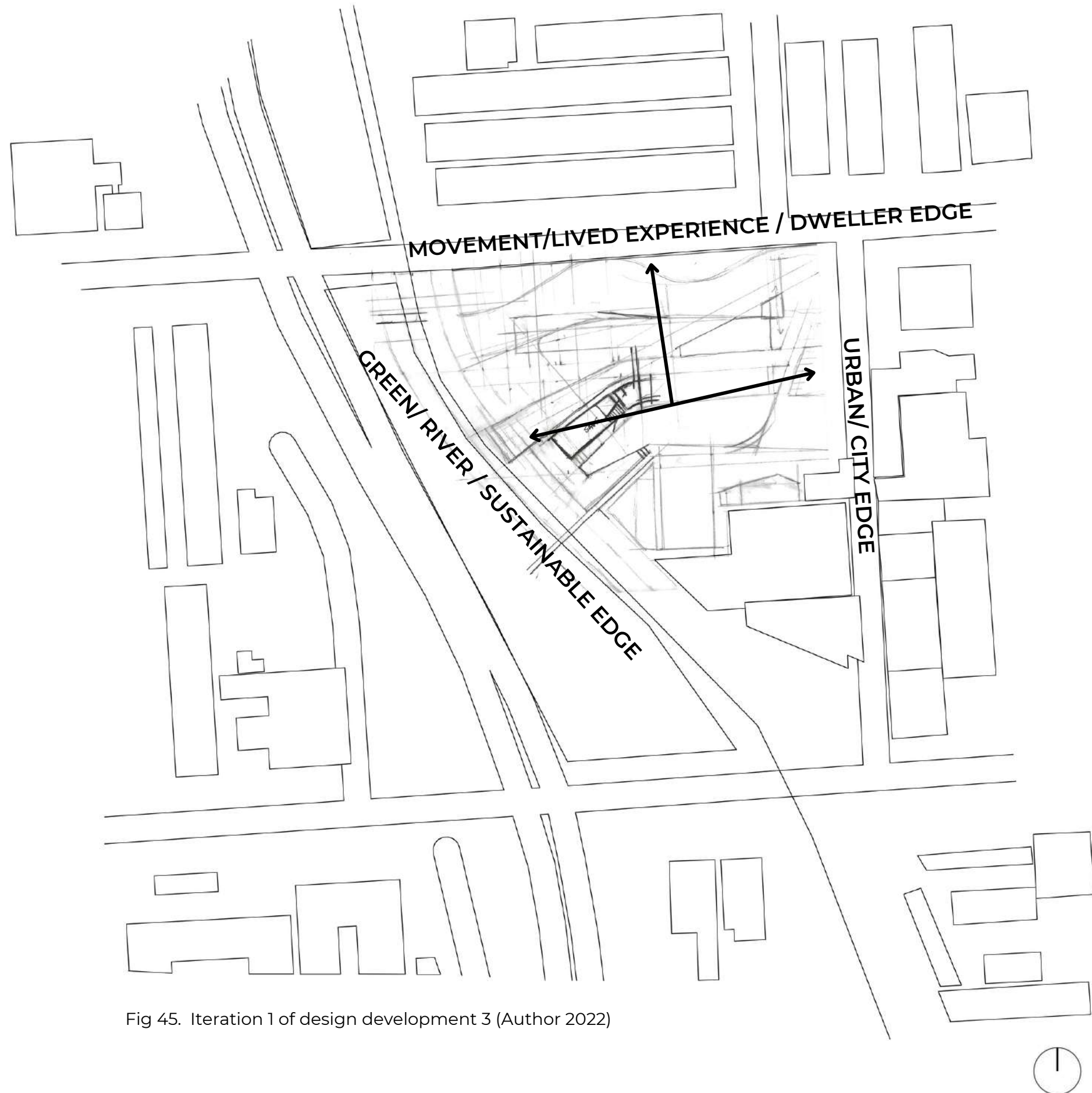


Fig 45. Iteration 1 of design development 3 (Author 2022)

ITERATIONS 2

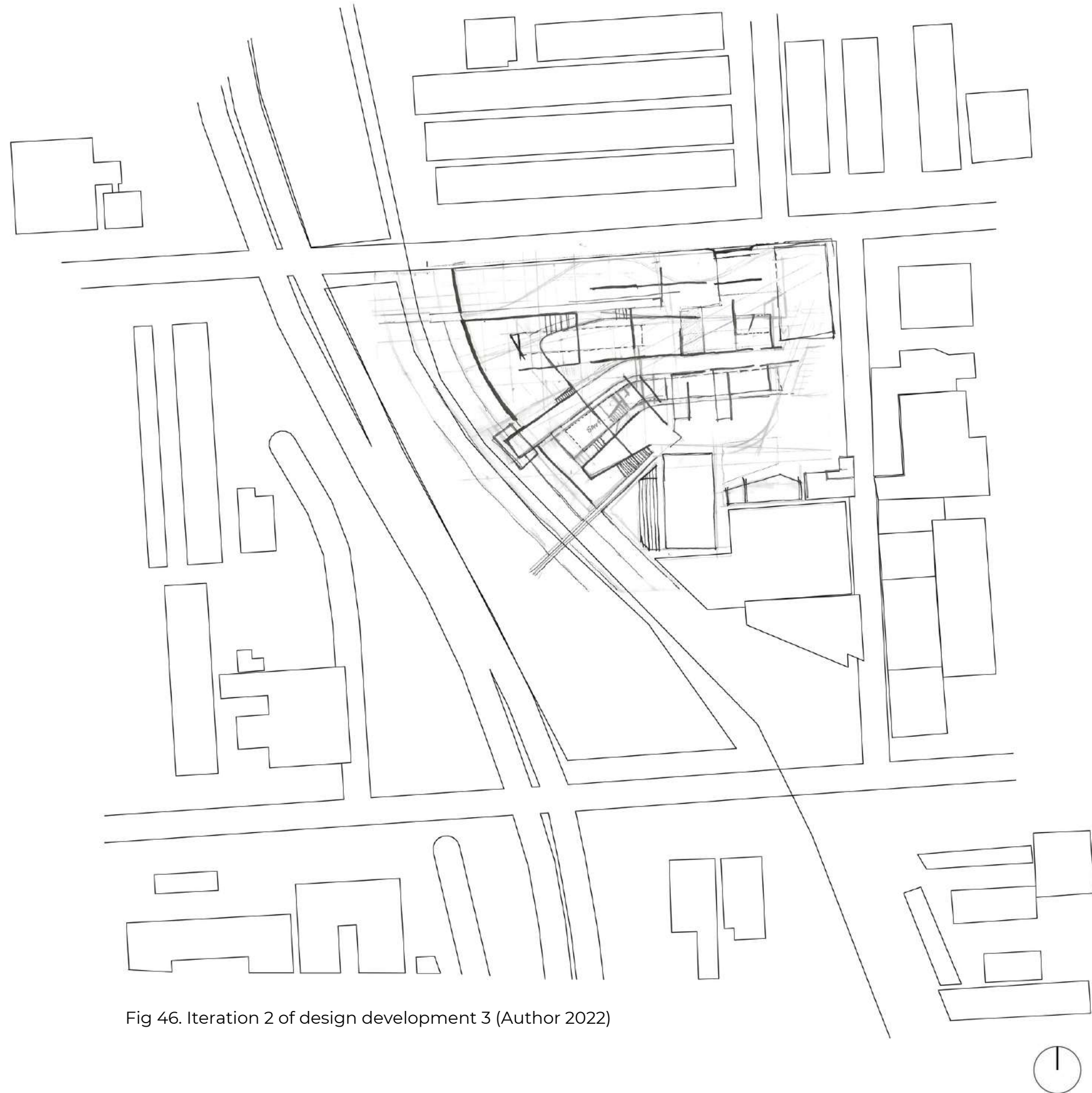


Fig 46. Iteration 2 of design development 3 (Author 2022)



### ITERATIONS 3

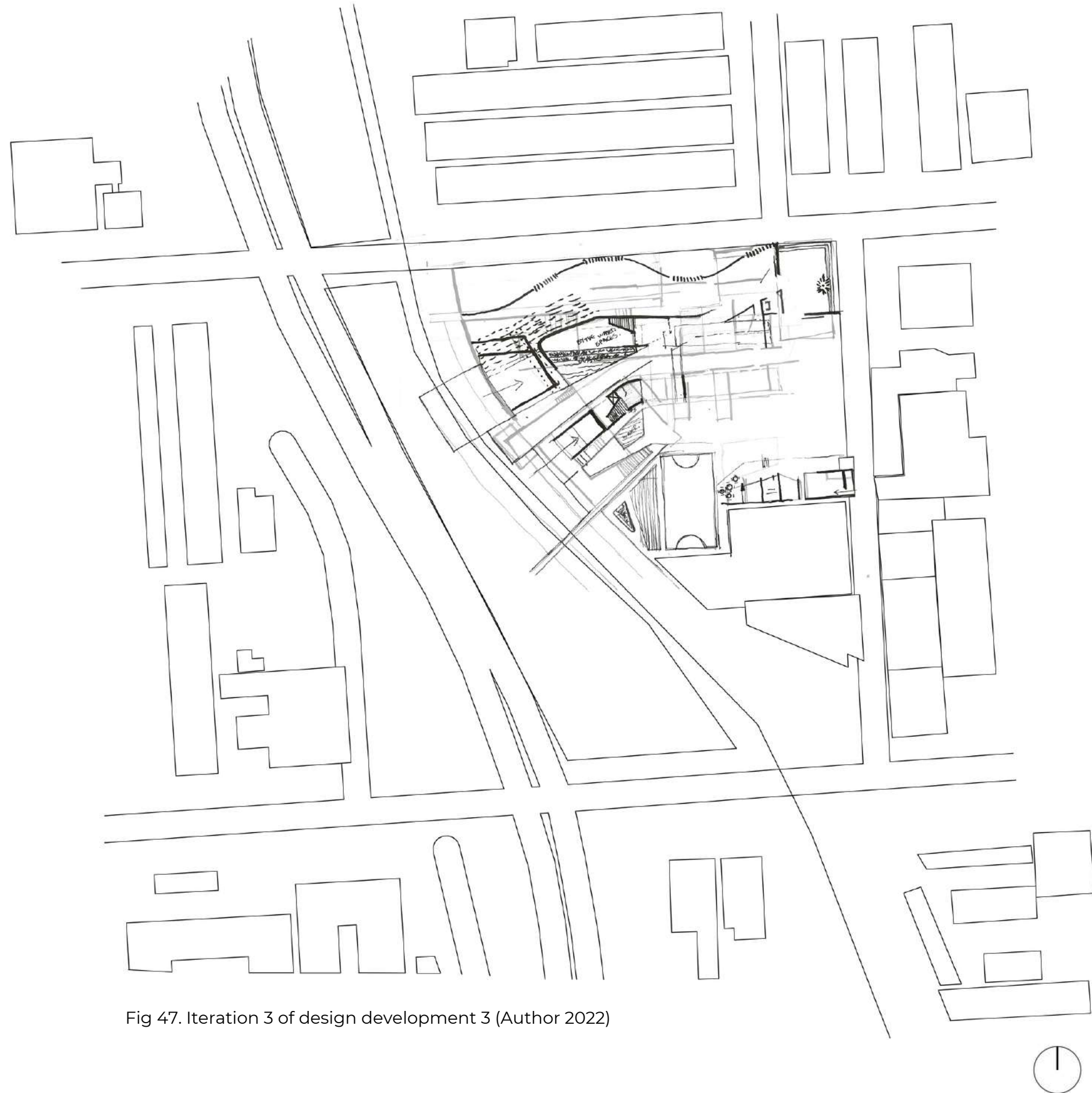


Fig 47. Iteration 3 of design development 3 (Author 2022)

ITERATIONS 4

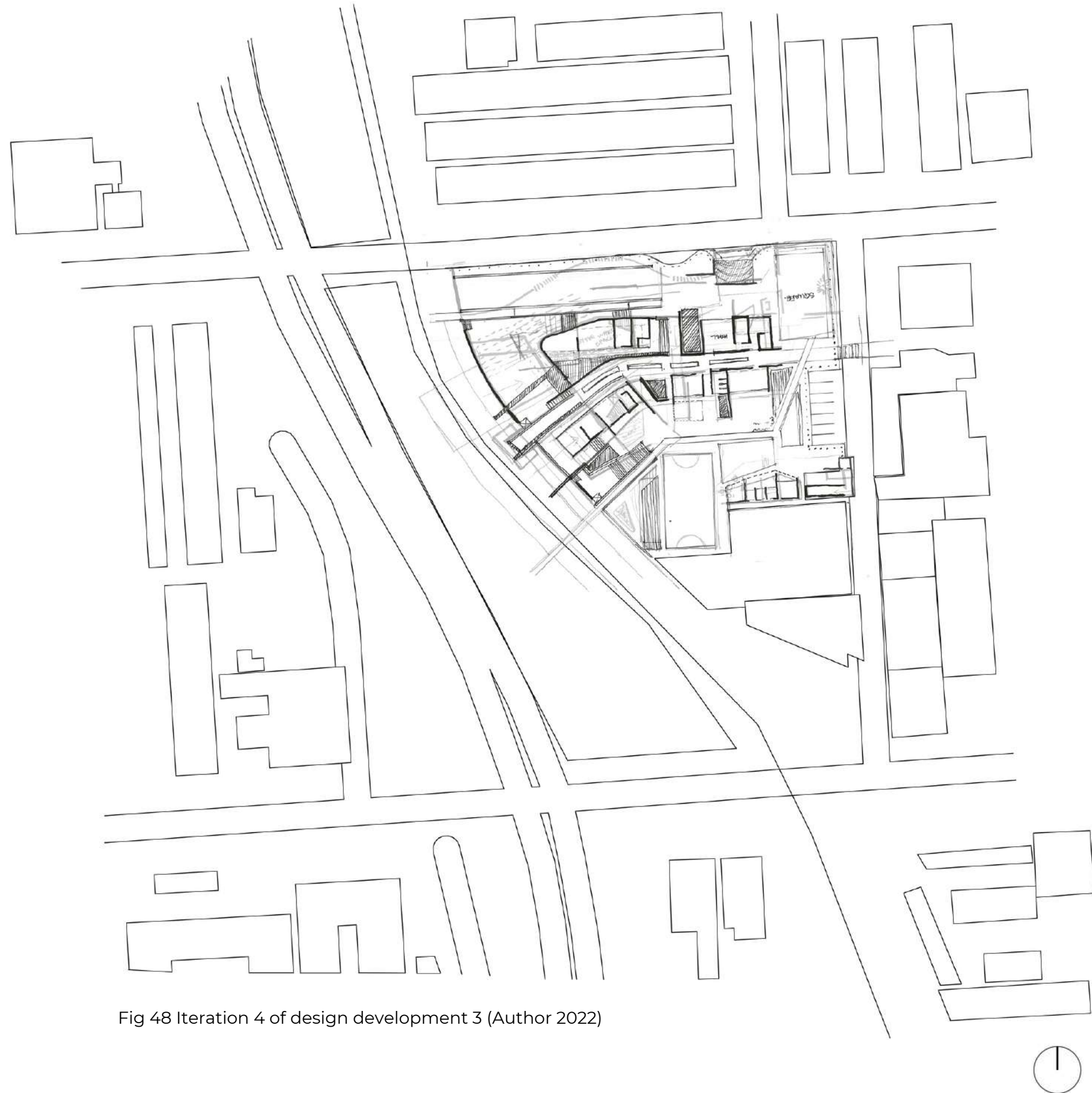


Fig 48 Iteration 4 of design development 3 (Author 2022)

ITERATIONS 5



Fig 49. Iteration 5 of design development 3 (Author 2022)



## ITERATIONS 6 RESULT

The last iteration was then again explored through a model.

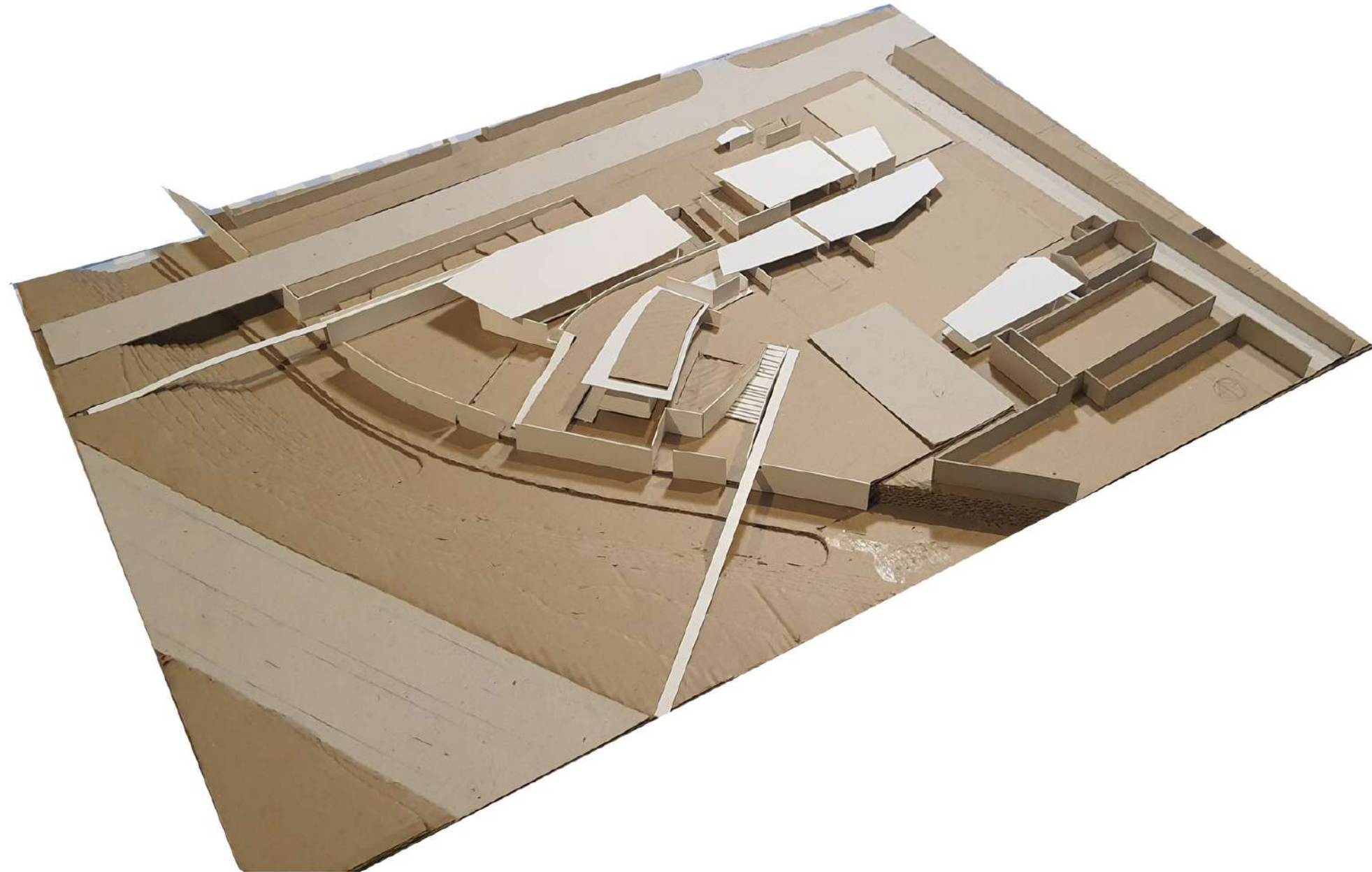


Fig 51. Iteration 6 result of design development 3 (Author 2022)

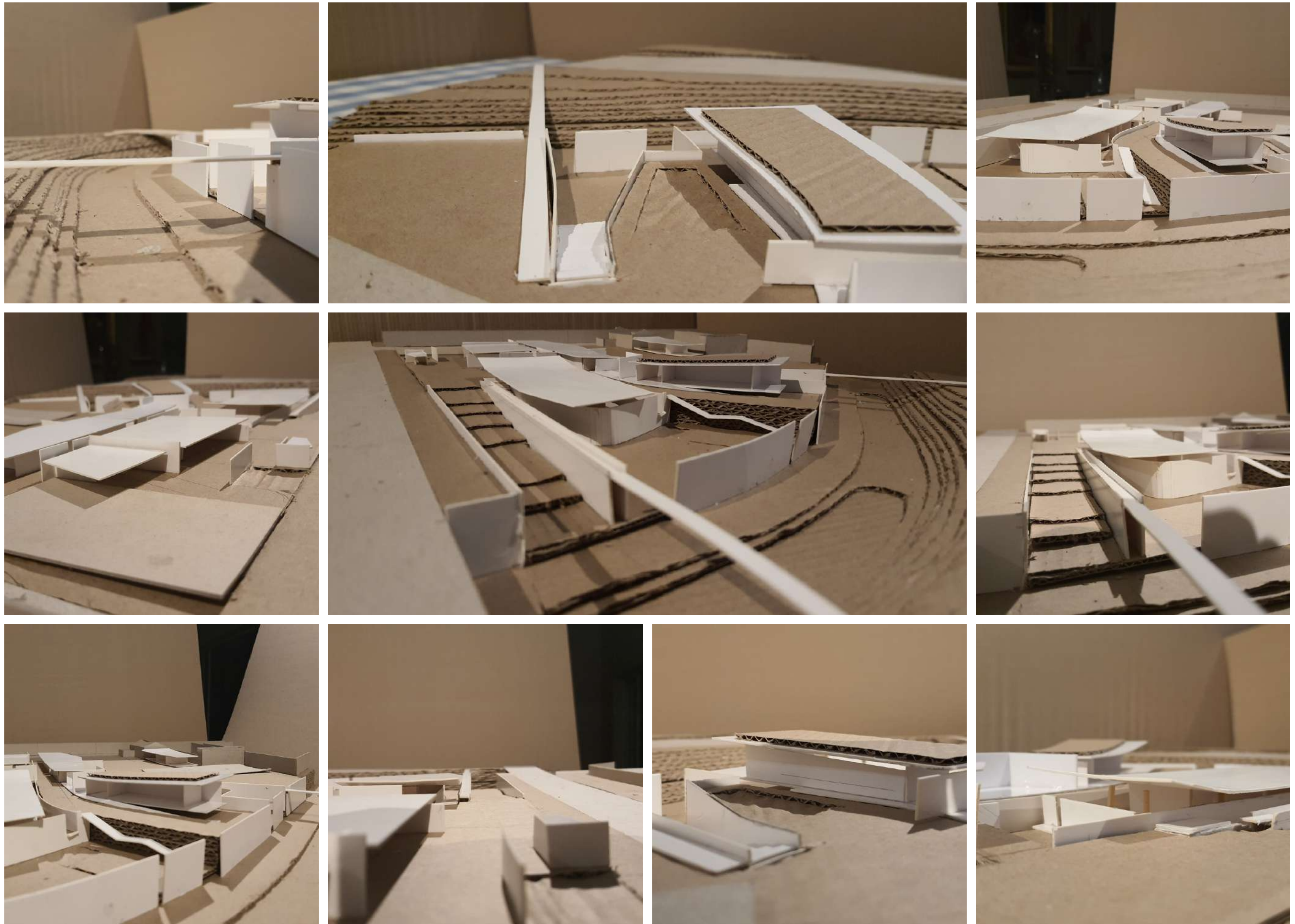
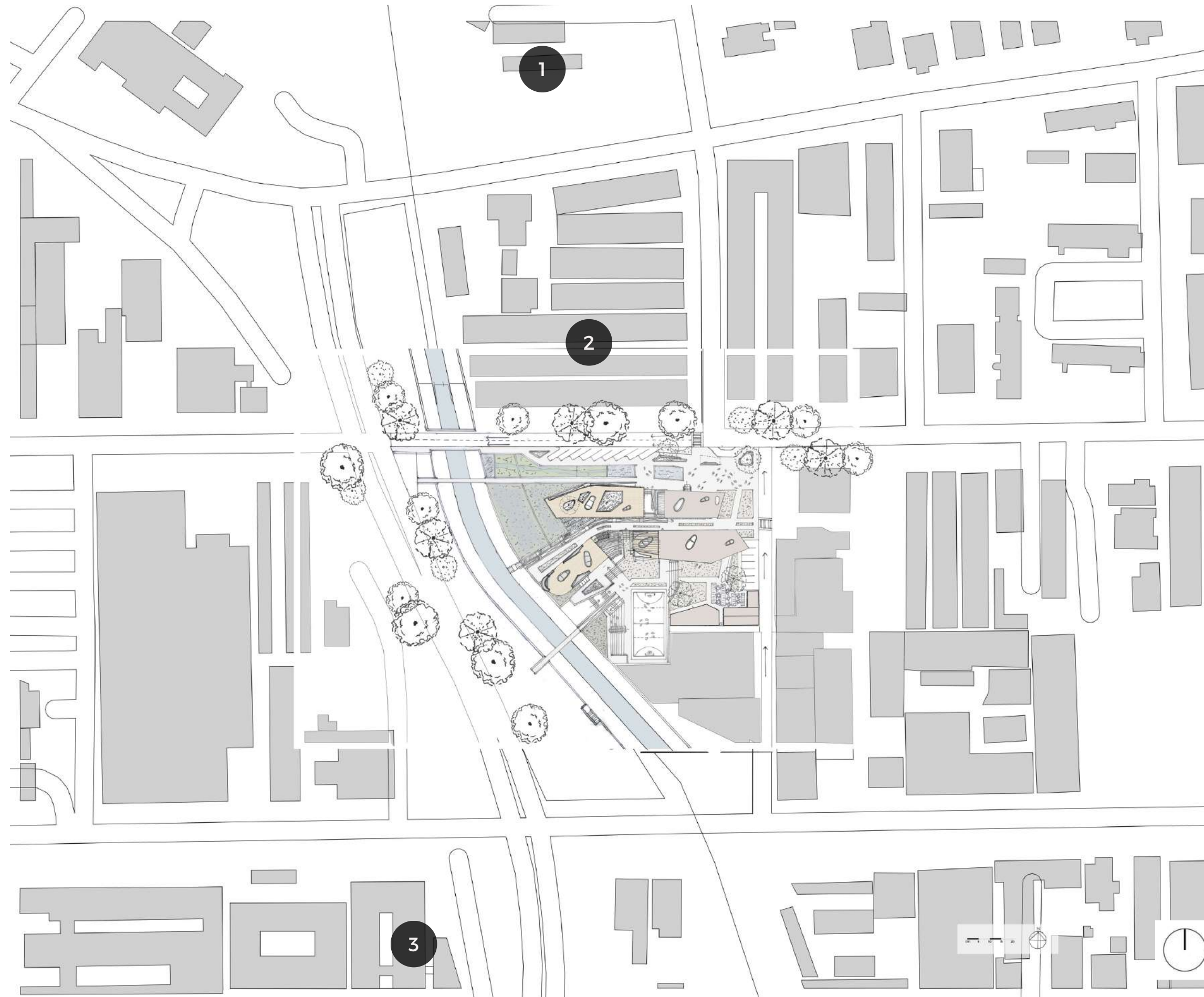


Fig 52. Iteration 6 result perspectives of design development 3 (Author 2022)

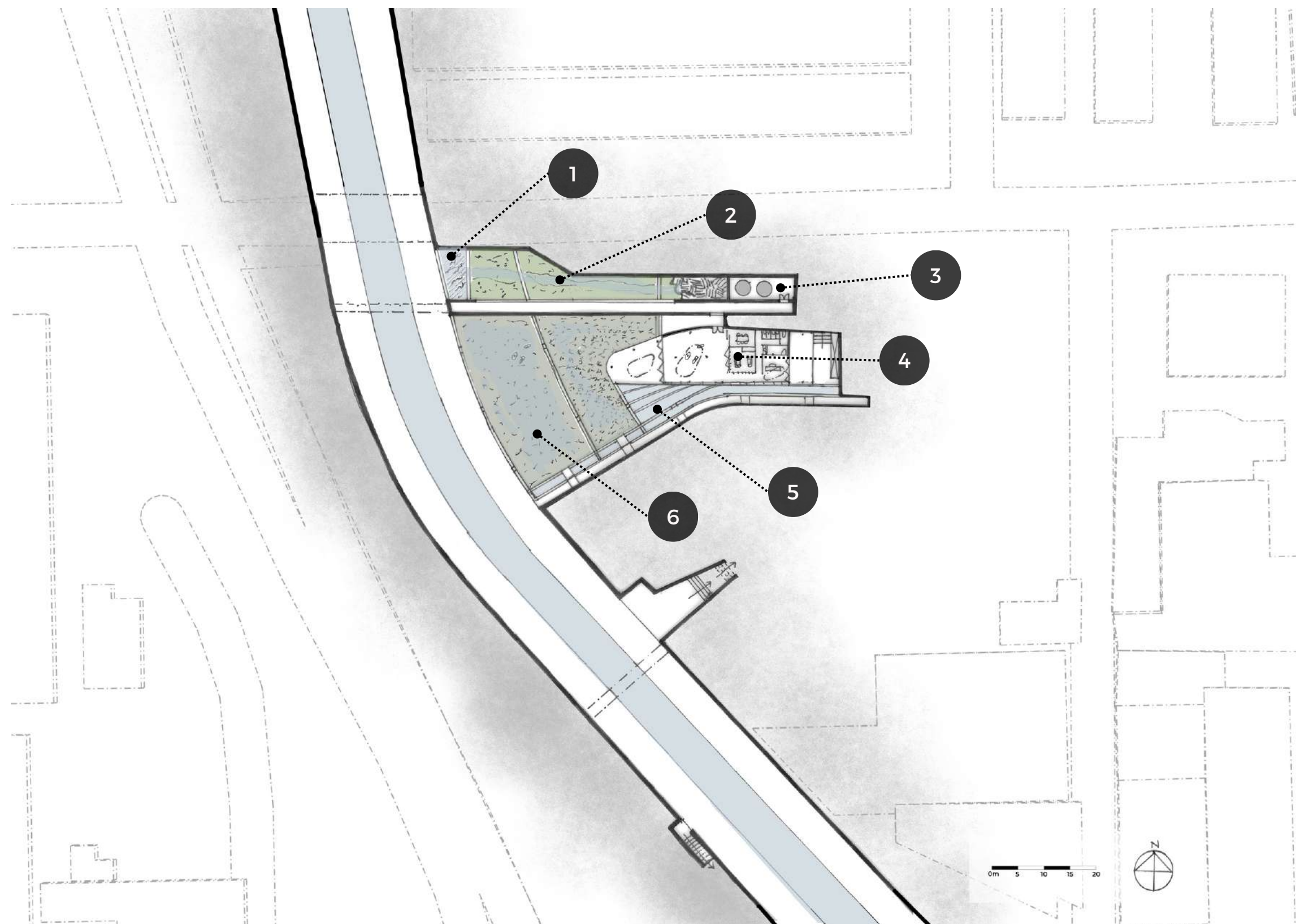
# FINAL ITERATIONS - SITE PLAN



- 1. SAVF OFFICE
- 2. SA COLLEGE PRIVATE SCHOOL
- 3. TUT ARCADIA

Fig 53. Site plan (Author 2022)

## FINAL ITERATIONS - RIVERSIDE FLOOR PLAN



**1. FINAL RETENTION POND**

**2. STORMWATER GARDEN**

**3. STORAGE ROOM FOR WATER TANKS**

**4. URBAN STORMWATER RESEARCH FACILITY**

**5. TERRACED PLANT POND**

In this pond, water plants species are placed into stormwater pond to study there response towards cleaning the urban stormwater indifferent ways.

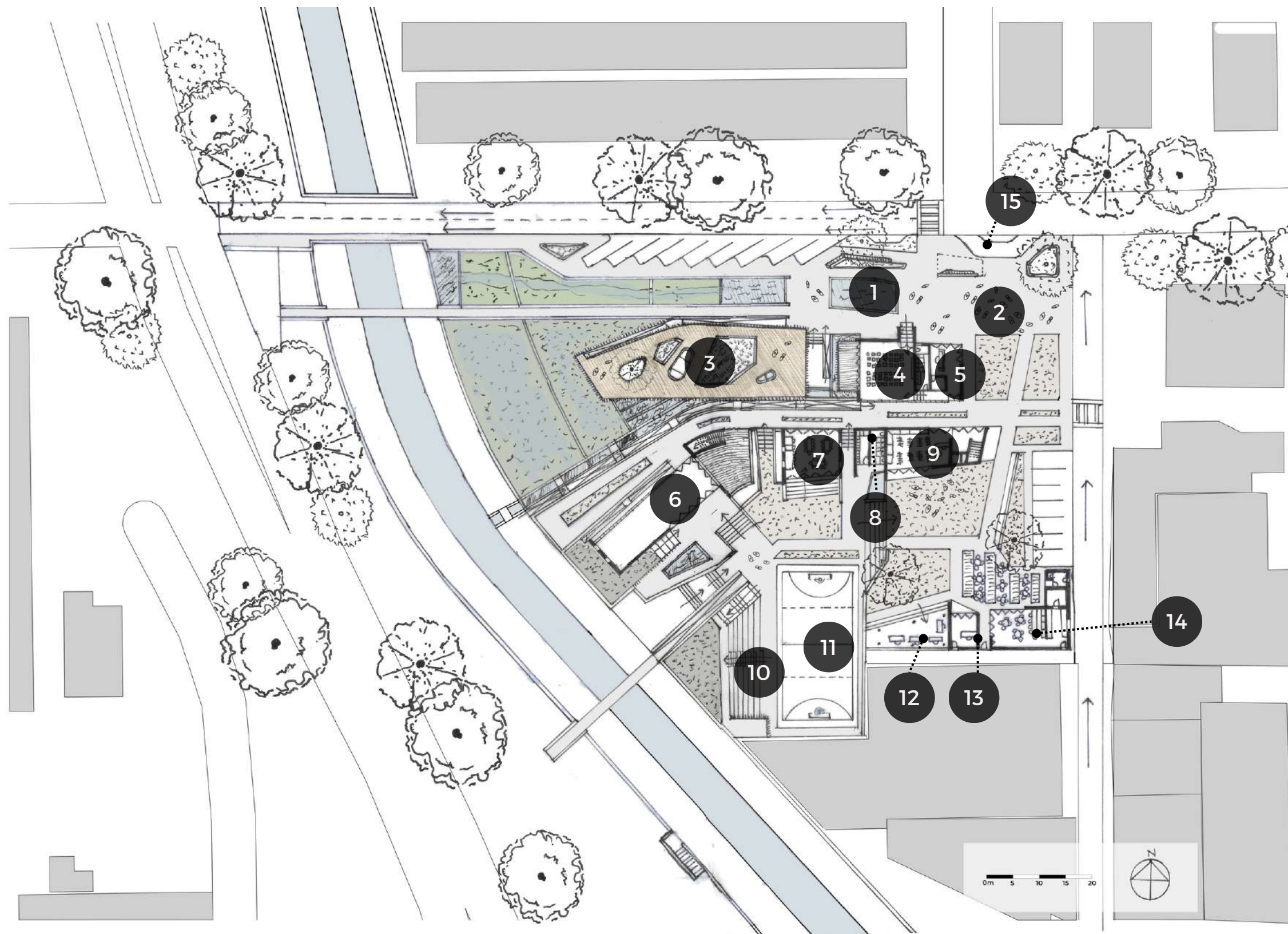
**6. PRODUCTIVE LANDSCAPE**

The productive landscape is used to grow produce for the green cafe. The garden is irrigated with water from stormwater system explained in technology section of the dissertation.

Fig 54. Riverside floor plan (Author 2022)



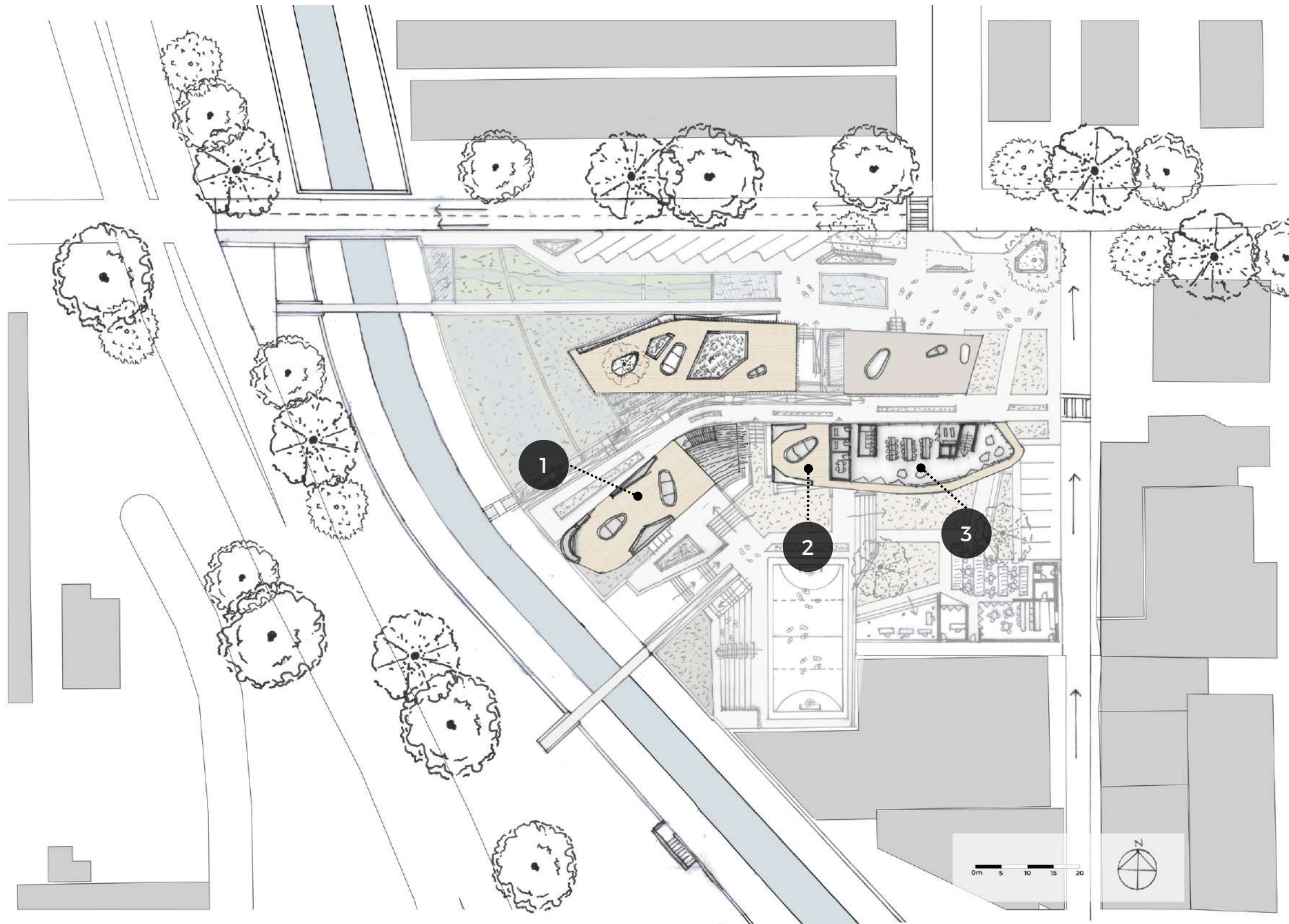
FINAL ITERATIONS - GROUND FLOOR PLAN



- 1. STORM WATER RETENTION POND
- 2. PUBLIC SQUARE
- 3. ACCESSIBLE ROOF
- 4. MULTI PURPOSE HALL
- 5. RECEPTION
- 6. WORKSHOP SPACE
- 7. AFTER SCHOOL HOMEWORK FACILITY
- 8. SPORTS LOCKER AND BATHROOM
- 9. SAVF CHARITY SHOP
- 10. PAVILION
- 11. MULTI PURPOSE SPORTS COURT
- 12. INFORMAL MARKET SPACE
- 13. RETAIL WHITE BOX
- 14. GREEN CAFE
- 15. DROP OFF ZONE AND TAXI STOP

Fig 55. Ground floor plan (Author 2022)

# FINAL ITERATIONS - FIRST FLOOR PLAN



- 1. ACCESSIBLE ROOF
- 2. ACCESSIBLE ROOF
- 3. SAVF PUBLIC INTERFACE OFFICE

Fig 56. First floor plan (Author 2022)

# FINAL ITERATIONS - ROOF PLAN

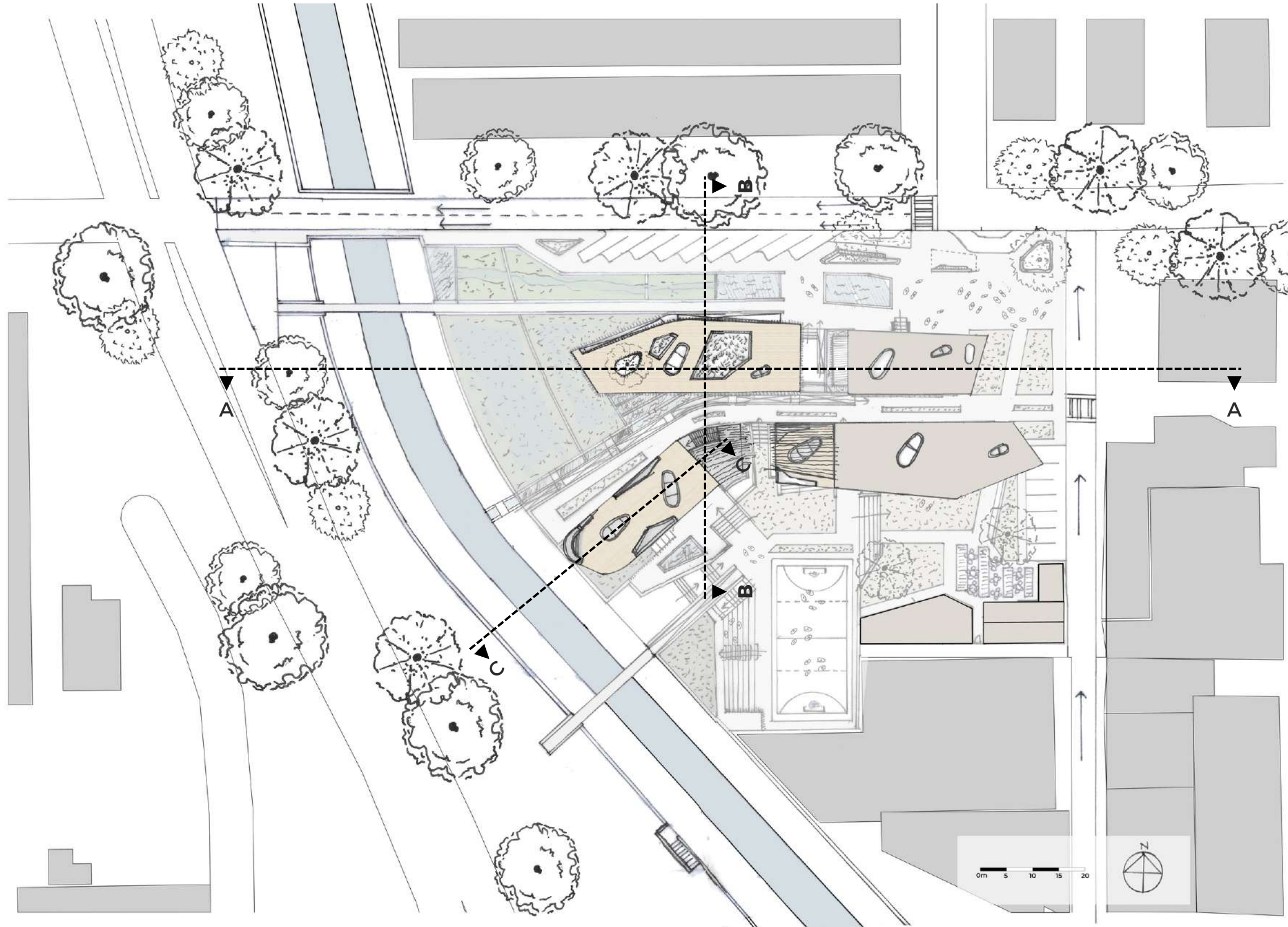


Fig 57. Roof plan with sections lines (Author 2022)

• U R B A N R I V E R S C A P E •

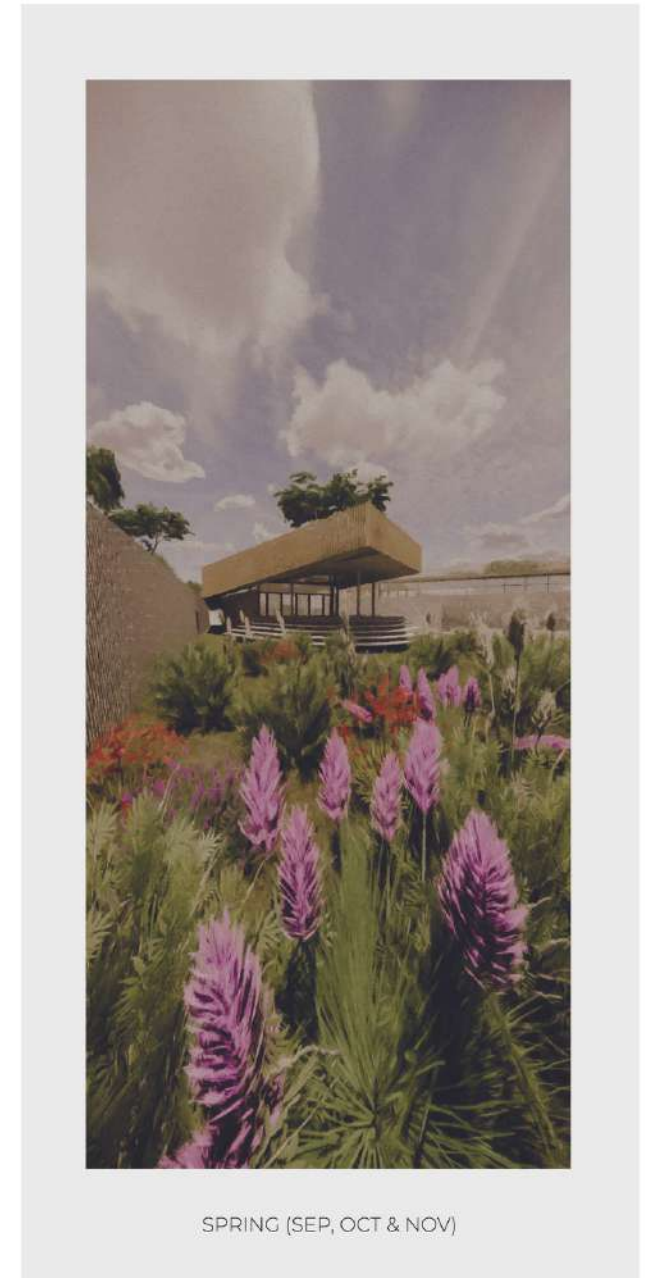
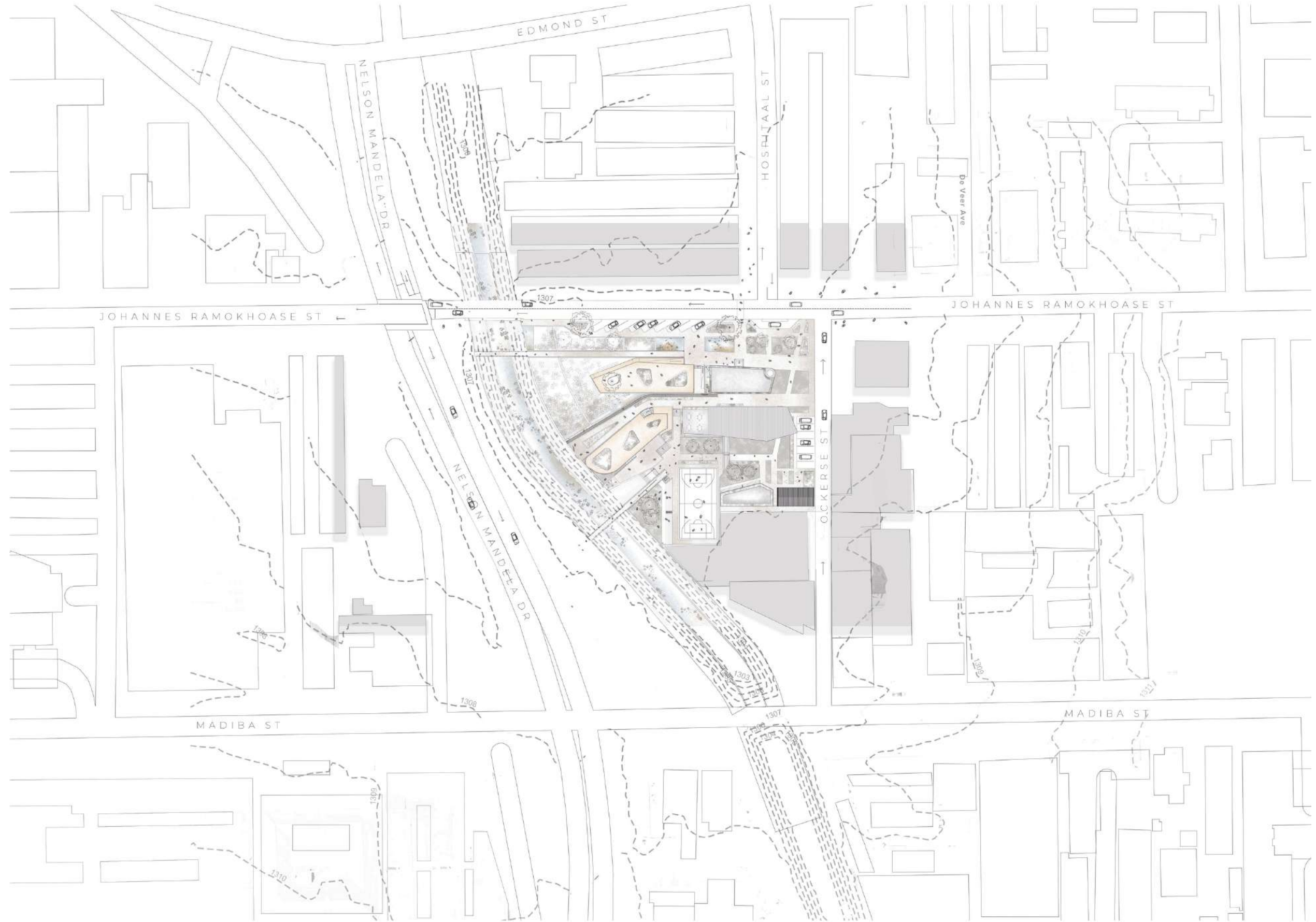


Fig 58. Seasons (Author 2022)

D E S I G N O U T C O M E

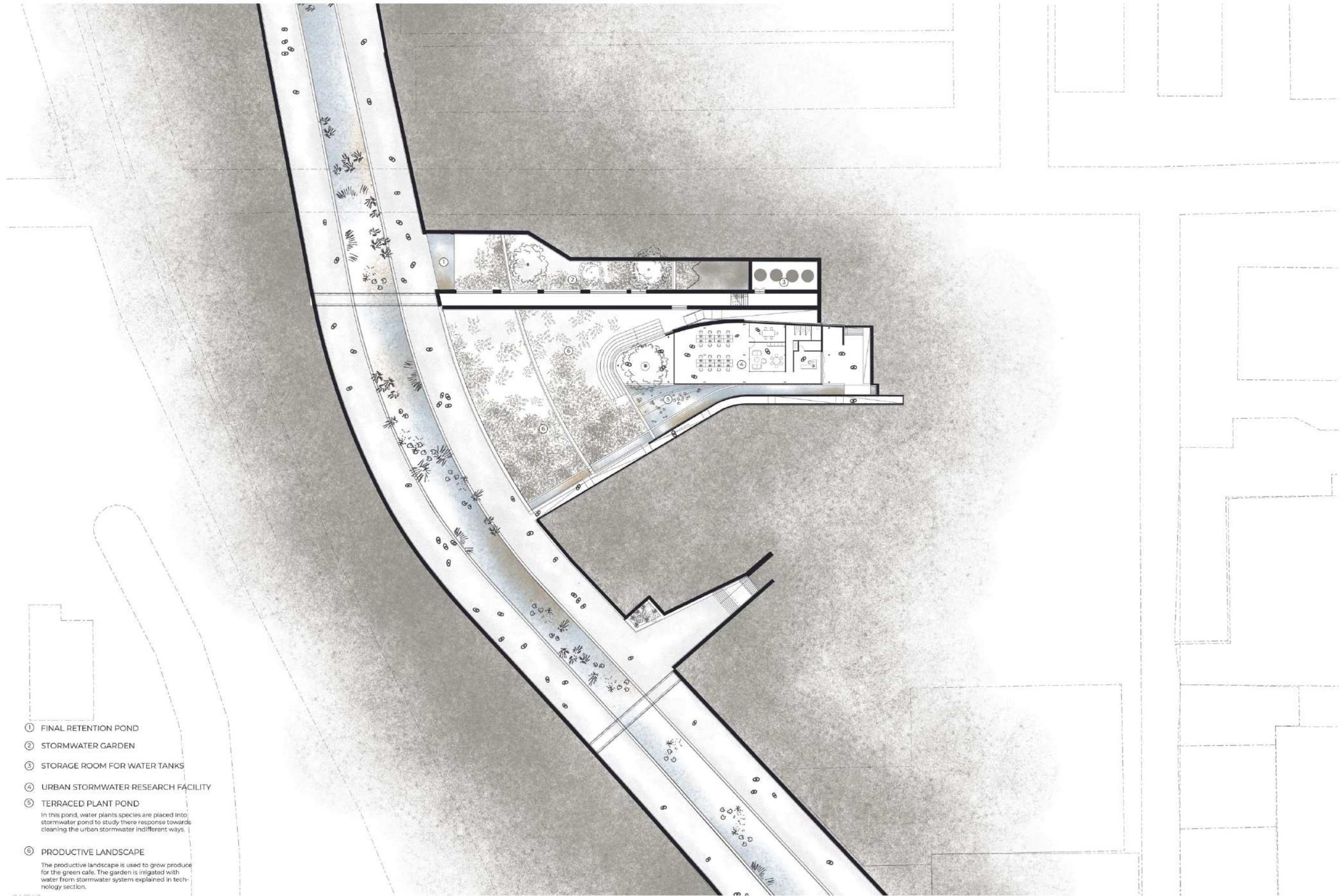
# SITE PLAN



1:500 SITE PLAN

Fig 59. Site plan (Author 2022)

# RIVER SIDE PLAN

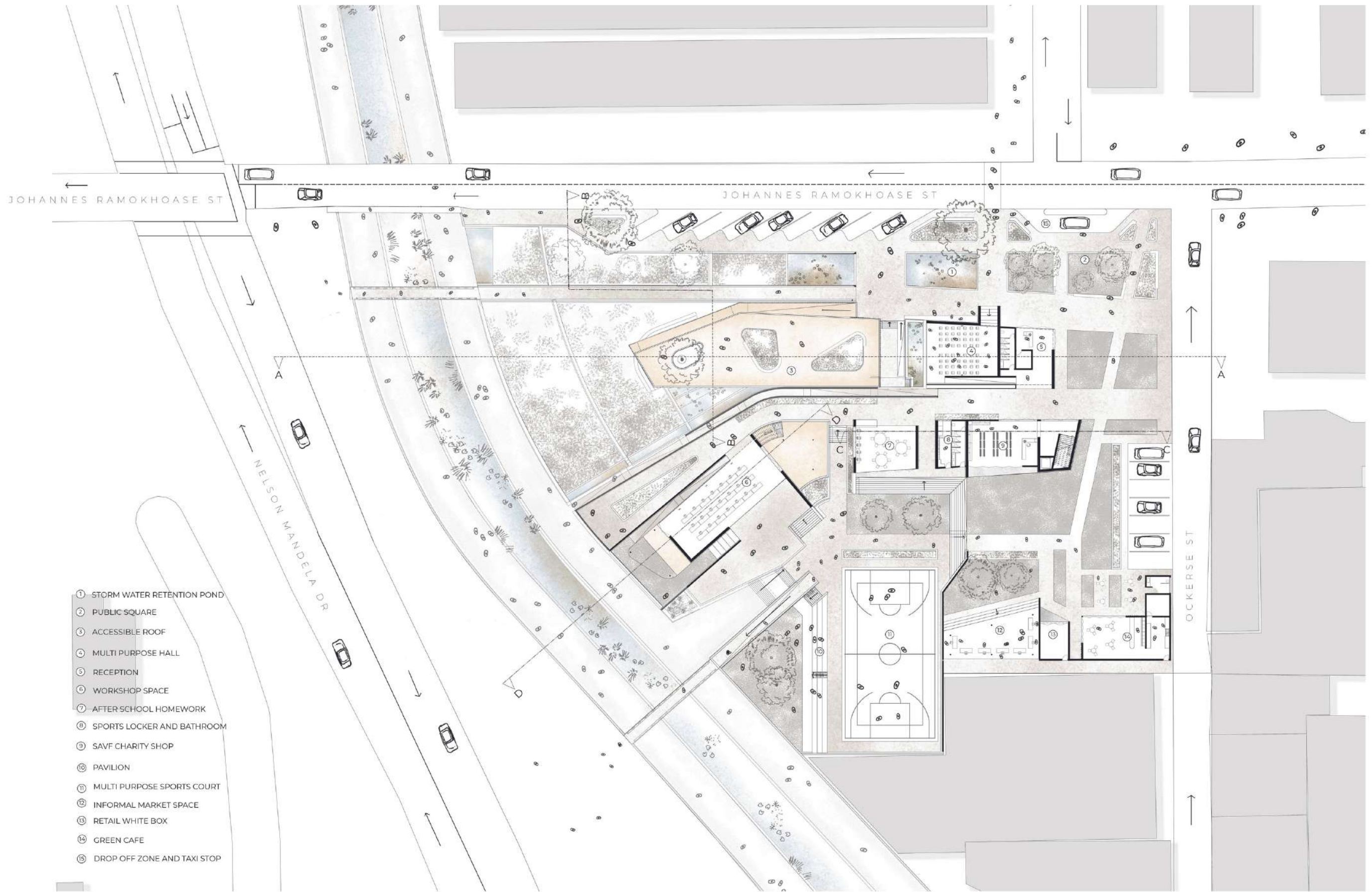


1:200 RIVER SIDE PLAN

0 5 10 20m

Fig 60. River side plan (Author 2022)

# GROUND FLOOR PLAN



1:200 GROUND PLAN

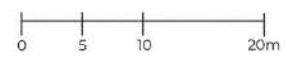


Fig 61. Ground floor plan (Author 2022)

# FIRST FLOOR PLAN

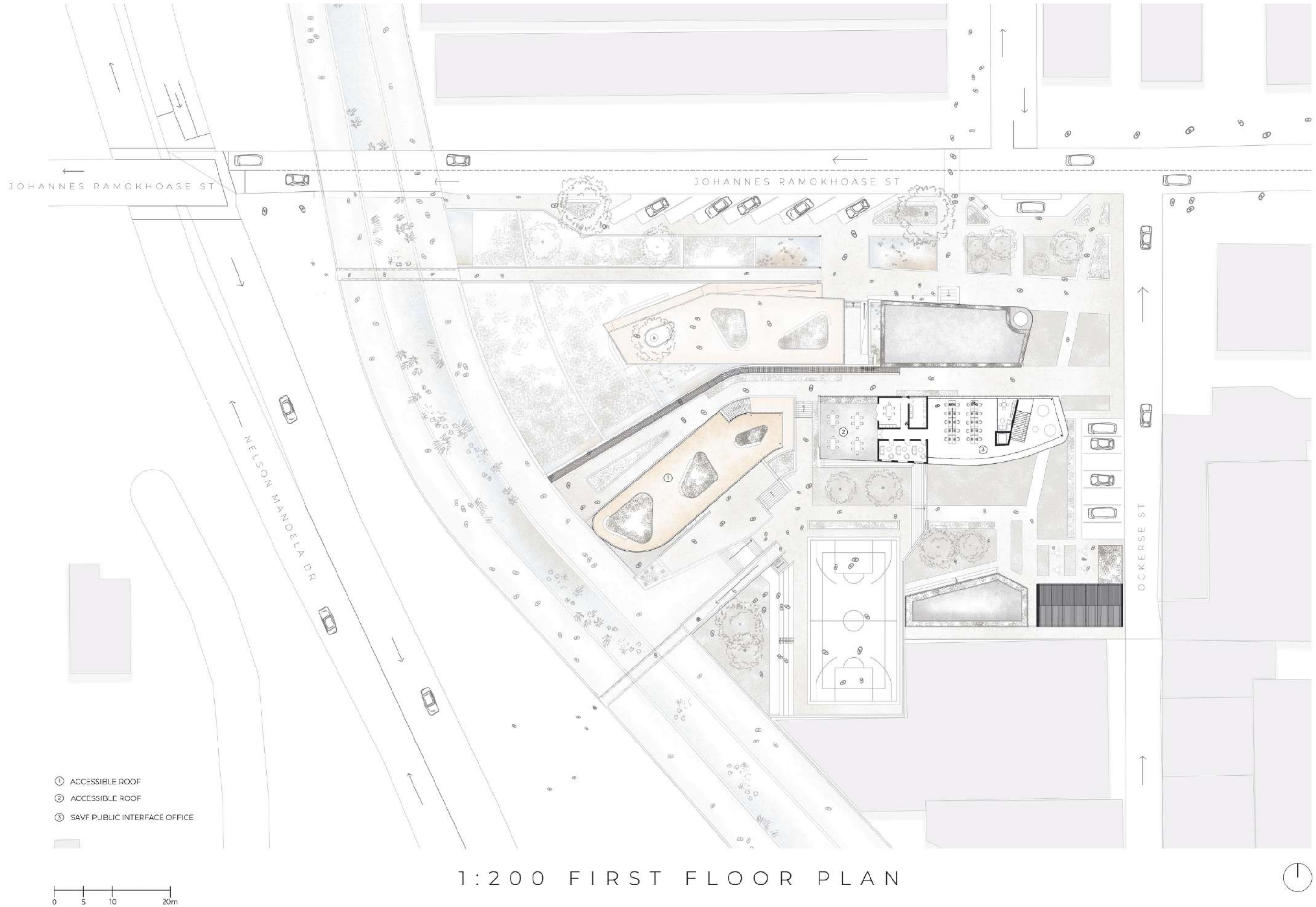
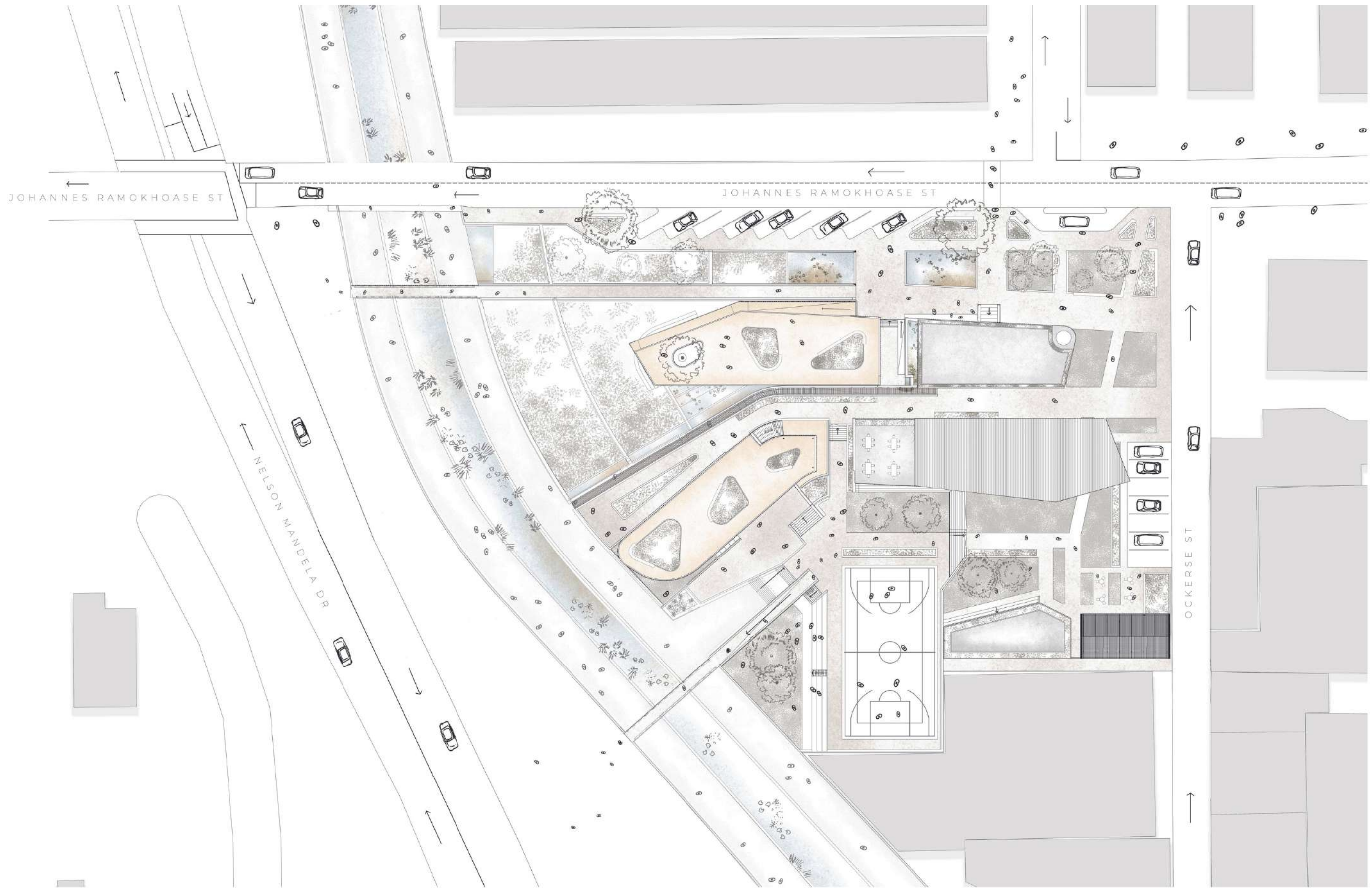


Fig 62. First floor plan (Author 2022)



# ROOF PLAN



1:200 ROOF PLAN

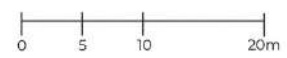


Fig 63. Roof plan (Author 2022)

# SECTIONS



Fig 64. Sections A- A & B - B (Author 2022)

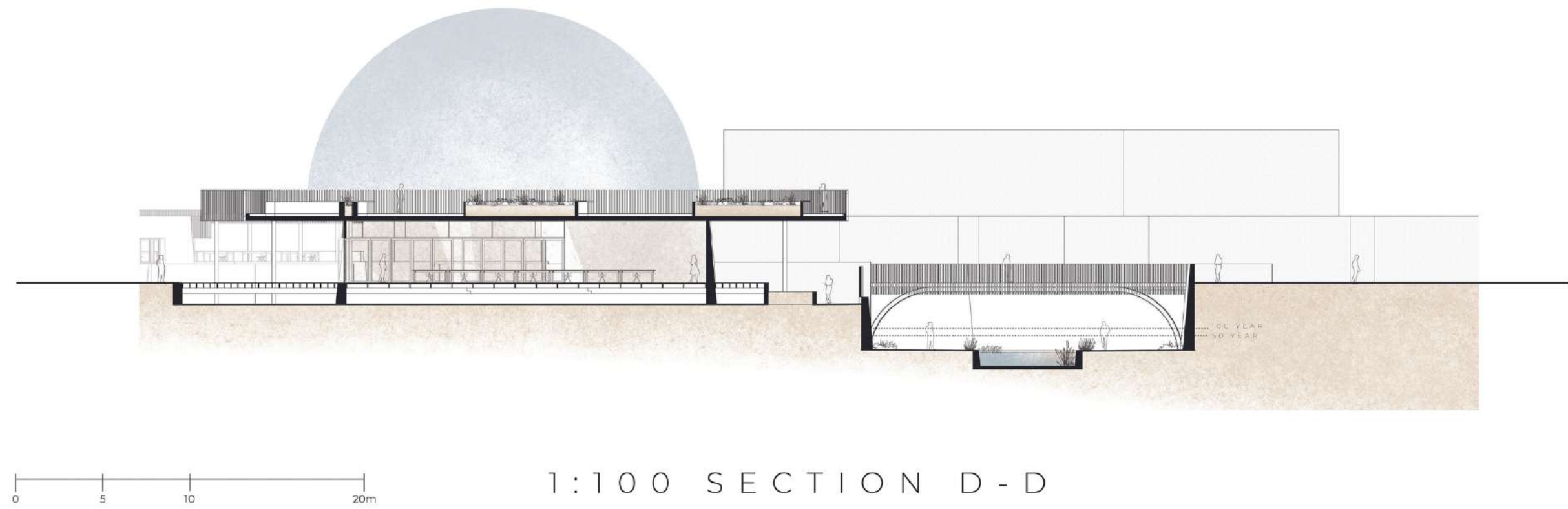
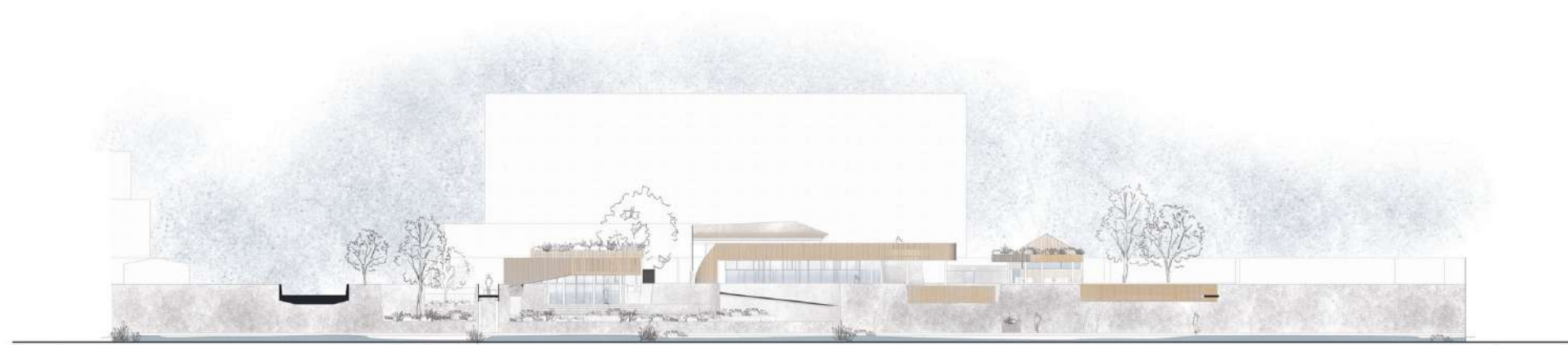


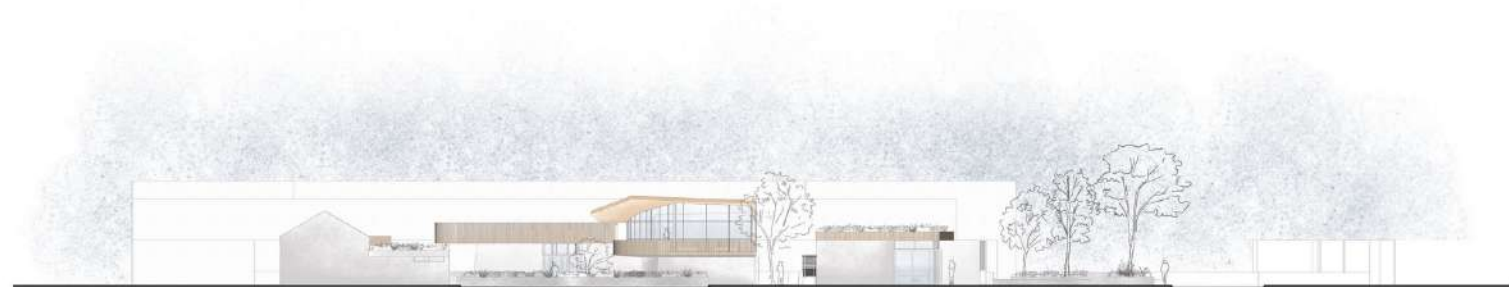
Fig 65. Sections C- C & D - D (Author 2022)



NORTH ELEVATION



1:200 WEST ELEVATION



1:200 EAST ELEVATION

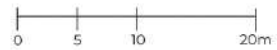


Fig 66. Elevations (Author 2022)

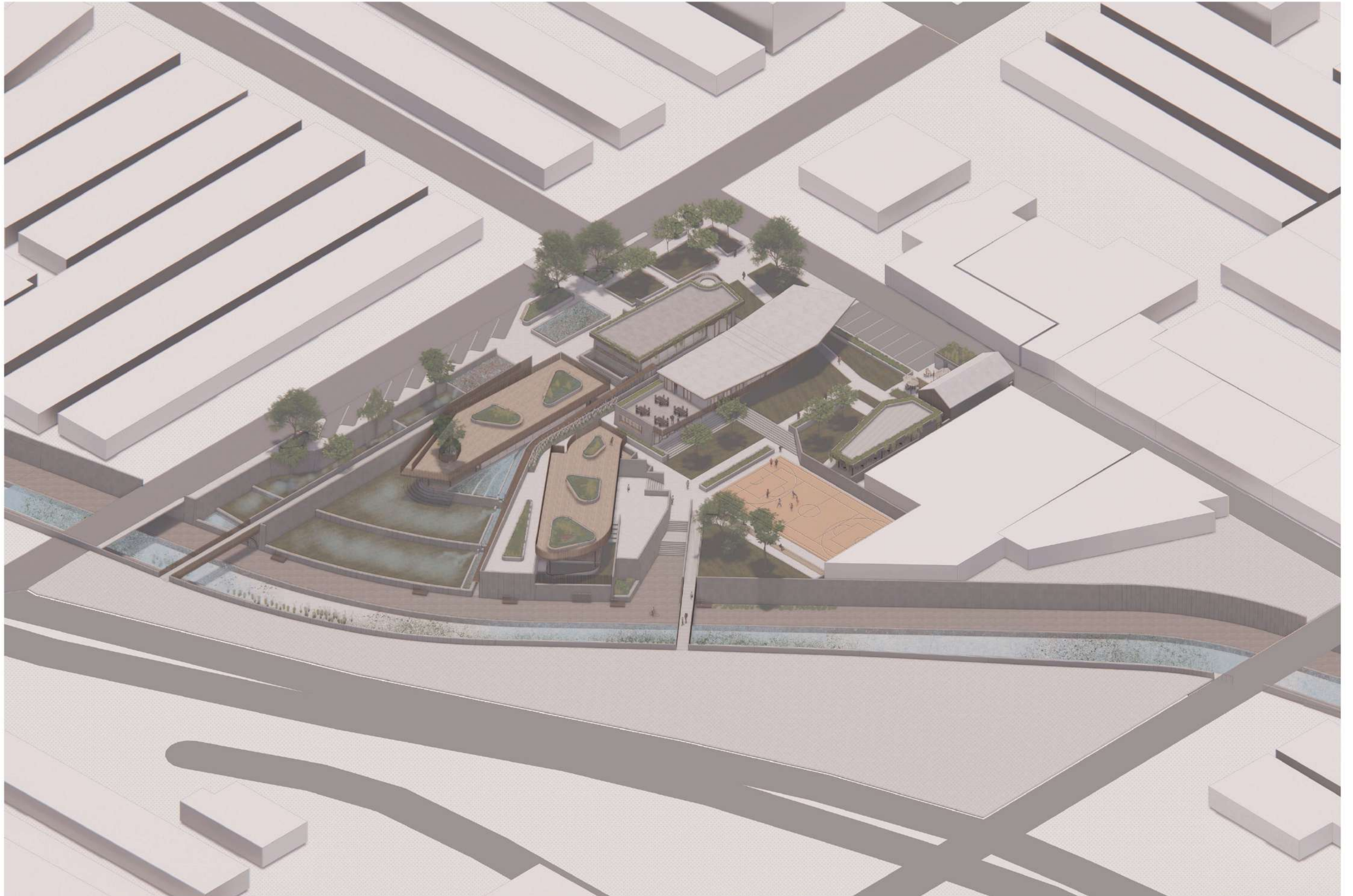
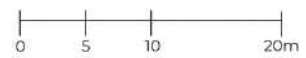


Fig 67. Iso of site (Author 2022)



1 : 2 0 0 I S O M E T R I C O F S I T E



Fig 68. Perspectives (Author 2022)

# P E R S P E C T I V E S



Fig 68.1 Perspectives (Author 2022)

# PERSPECTIVES

## TECHNOLOGICAL CONCEPT

The riverscape becomes the transitional interface between the city and the river. This project being in the riverscape will control and mediate how movement transfers from a city to a river environment. Thus the design transforms from natural to artificial to accommodate the transitional experience from the river to the city.

From the natural or riverside, the riverscape edge tries to re-establish a natural vernacular through the expression of vertical reeds that creates a rhythm and identity between the sky and ground technologies.

In response to the conventional hierarchical construction of the urban design. Cities are a product of architectural urbanism where buildings were considered the primary building blocks, woven together by a network of mono-functional infrastructure. Shifting this idea toward landscape urbanism. The landscape is at the forefront placing the primary focus on nature and the horizontal plane and merging it with urban and ecological infrastructure. Buildings take second priority and are informed by the landscape.

Conceptually the Architecture would be represented as the interchangeable/Infill and the landscape as the primary or anchoring elements. The architecture should be designed to be deconstructed. Leaving the permanence of the landscape to inform the future reference of urban design. The landscape floor and horizontal roof become new and fixed planes of potential. Facilitating exchange within the horizontal space. Thus vertical wall barriers should accommodate the interchangeability of different exchanges.

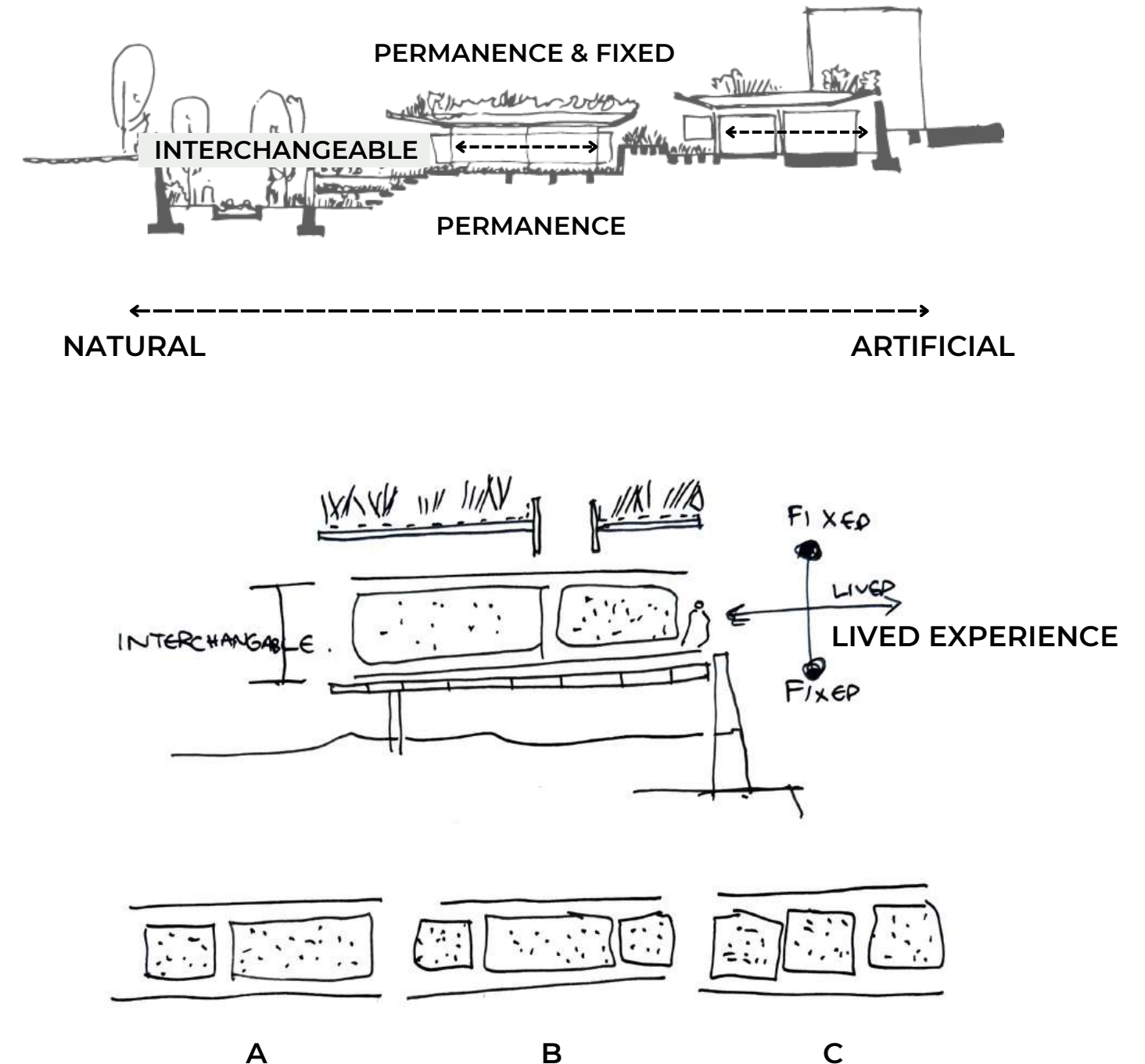


Fig 69. Technological concept (Author 2022)



## SYNTHESIS AND RESOLUTION

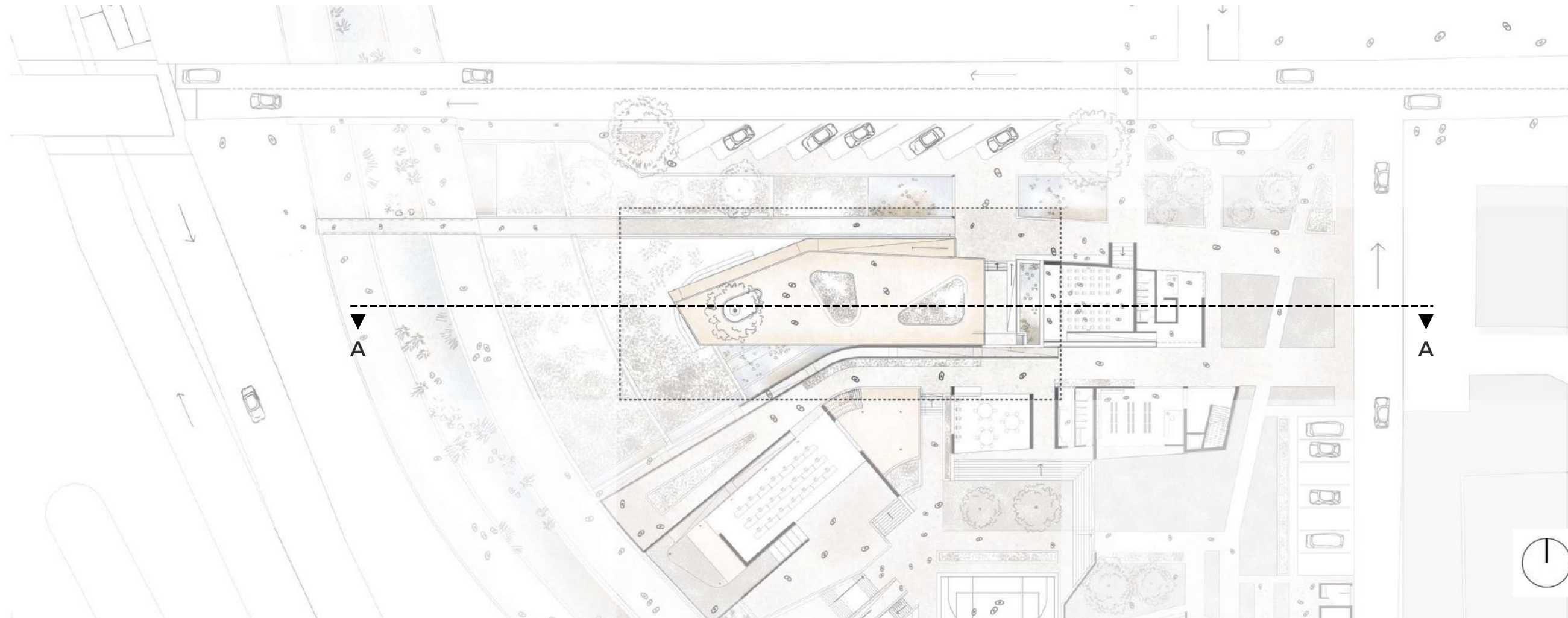


Fig 70. Technology focused area on plan view (Author 2022)

Due to the scale and scope of the project, the synthesis and resolution would primarily focus on only detailing a part of the project. The main focus area was chosen due to its nature representing the most relevant to the intention and focus of this dissertation.

As shown in Figure 61 the detailing of this project will focus on the highlighted area most commonly referred to as the urban stormwater research facility

## ARCHITECTURE AS TEMPORARY CONSTRUCTION

The temporality of the architecture is expressed through the following diagram. Through the live time of the building, the intention is to eventually leave the riverscape as natural again when the architecture is taken away and deconstructed.

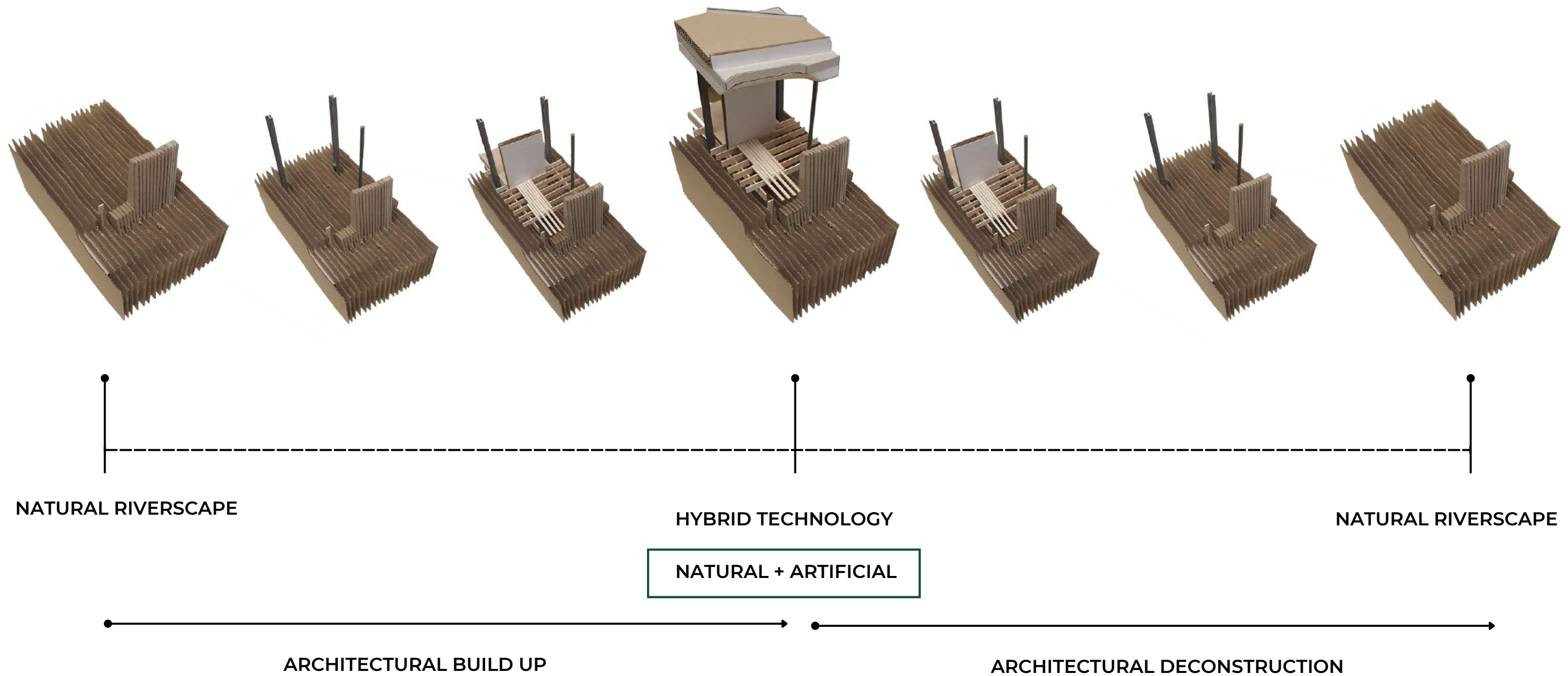


Fig 71. Conceptual expression of architecture as temporary structure (Author 2022)

# NATURE OF STRUCTURE

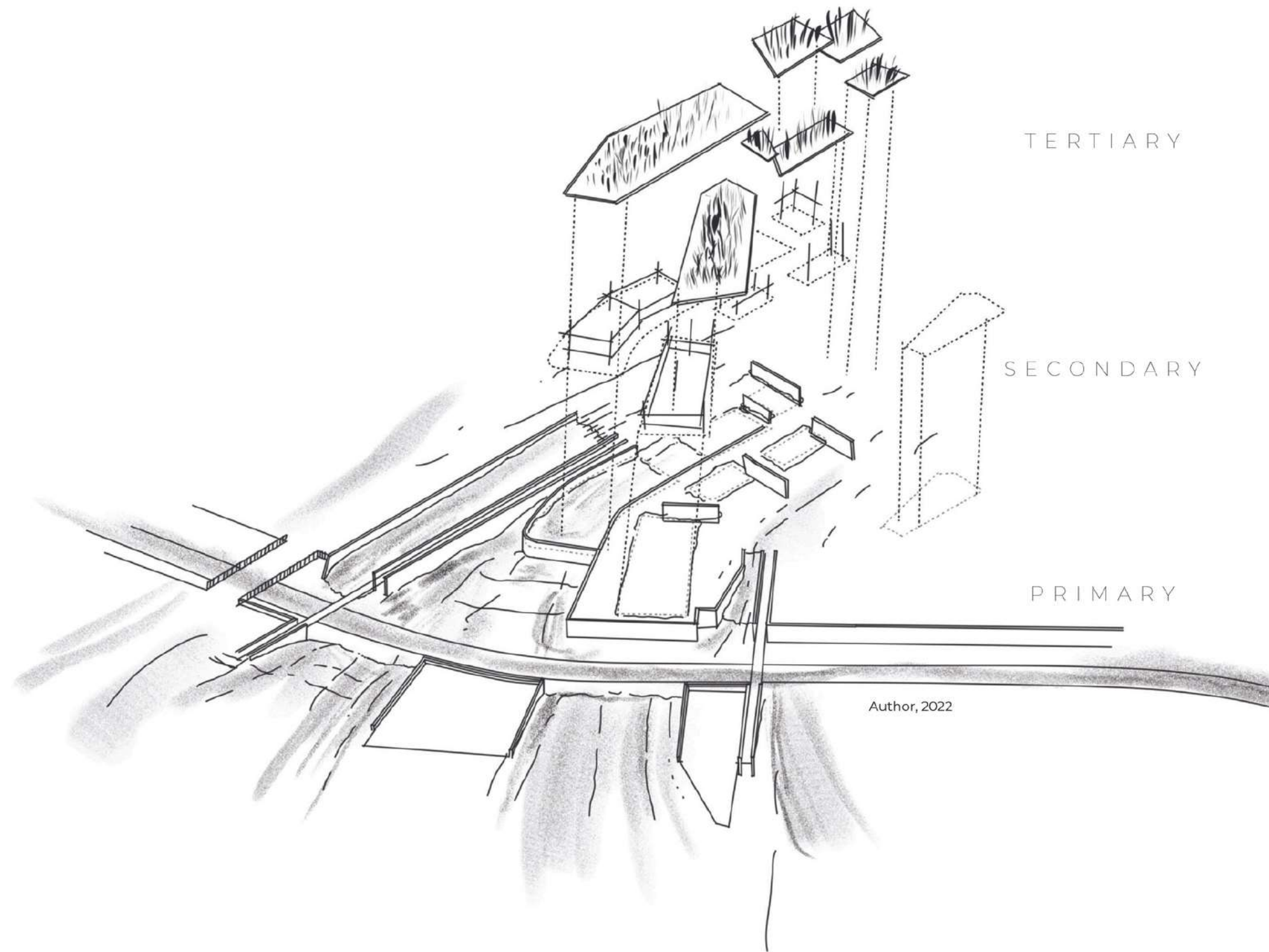


Fig 72. Nature of structure (Author 2022)

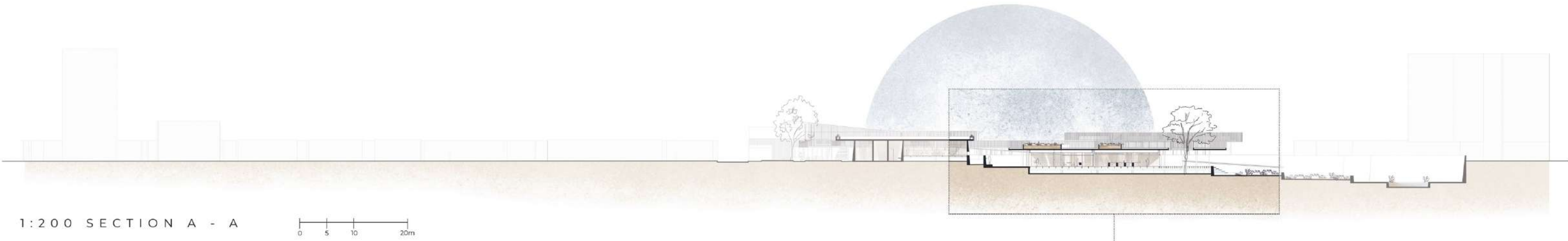


Fig 73. 1:200 Design section (Author 2022)

Author, 2022

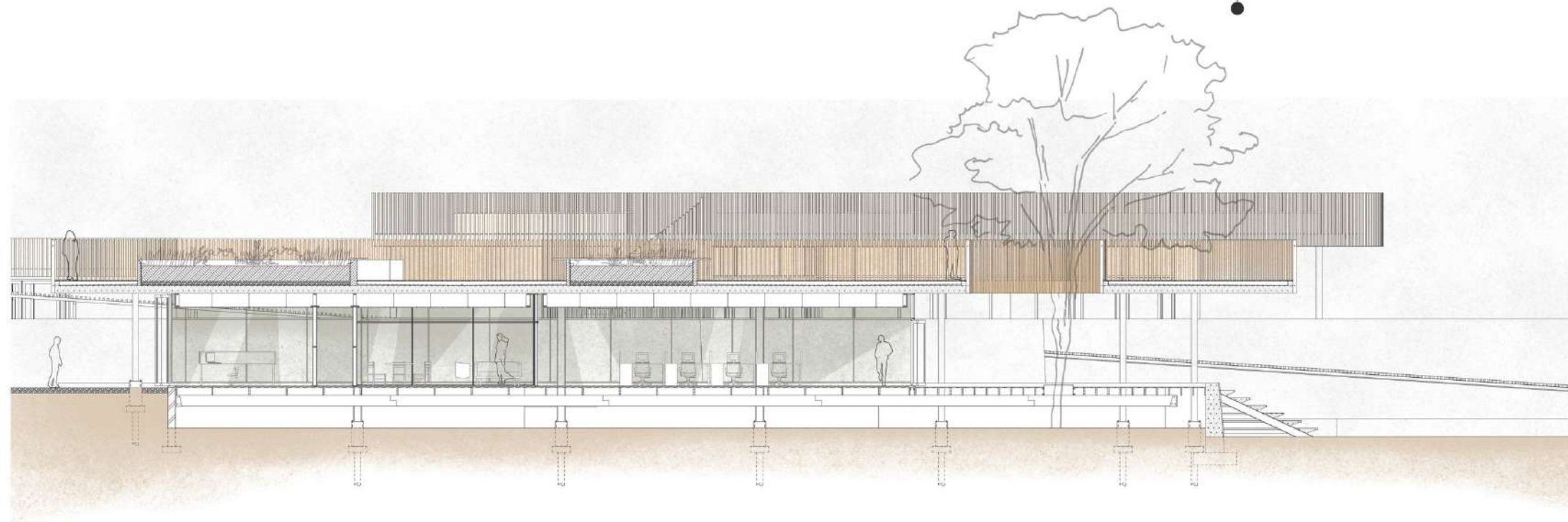


Fig 74. 1:50 Tech section (Author 2022)

Author, 2022

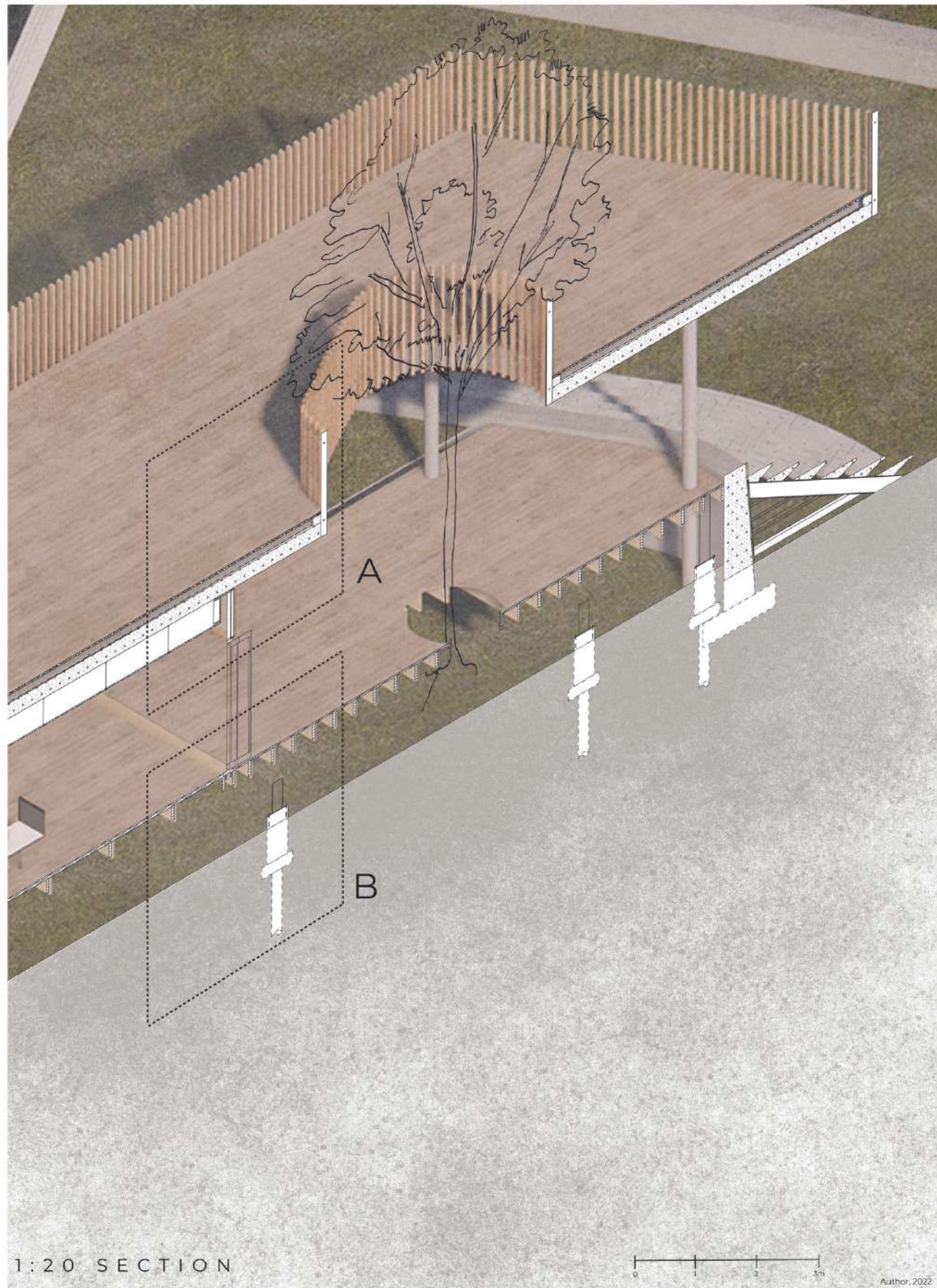


Fig 75. iso section (Author 2022)



Fig 77. Detail B of iso section (Author 2022)

### ROOF FLOOR

- ① 38 X 114 mm Saligna timber balustrade fixed to 5 x 70 x 100 mm galvanized + painted steel angle, with self tapping screw
- ② 20 mm Ø Stainless steel sleeve 150 mm spacer
- ③ 15 mm Ø Galvanized steel rod
- ④ Hidden storm-water outlet pipe
- ⑤ 150 x 150 mm (up stand) rc concrete to eng. details
- ⑥ 50 x 150 mm timber floor joist fixed to concrete slab.
- ⑦ 25 mm min. sand screed to 1:100 fall cast on concrete roof slab.
- ⑧ 27 x 140 mm Rhinowood reeded floor boards mechanically fixed to timber floor joists, with black teflon plastic clips
- ⑨ Derbigum torch-on waterproofing on screed layer, wraps over concrete up stand + timber joists

### CEILING

- ⑩ 38 X 114 mm SA Pine rail fixed to concrete roof slab with anchoring screws
- ⑪ 38 X 114 mm SA Pine stud
- ⑫ 38 X 114 mm SA pine rail fixed to stud with wood screw.
- ⑬ Galvanized suspension rod & t-section clip as secondary support for birch plywood ceiling
- ⑭ 15 x 1220 x 2440 birch plywood suspended ceiling board
- ⑮ 250 mm reinforced concrete in-situ off shutter roof slab.

### WINDOW & DOOR & FLOORS

- ⑯ Oil treated saligna hardwood window frame with 6 mm safety glazing
- ⑰ 6 x 25 x 144 mm tongue and grooved, polyurethane sealed, internal saligna hardwood floors
- ⑱ 38 x 1220 x 2440 mm marine plywood internal sub-floor boards, nailed to joists.
- ⑲ 45x210 mm laminated Saligna floor joist @ 1200 mm c/c
- ⑳ 70 x 352 mm laminated Saligna bearer beam @ 4,3 m c/c
- ㉑ Oil treated Saligna hardwood door frame with 6 mm safety glazing
- ㉒ 38 x 114 mm Saligna door frame support rail
- ㉓ 38 x 50 mm Saligna support rail

### FOUNDATION

- ㉔ 10 x 400 x 400 mm galvanized steel column base plate bolted to 400 x 400 mm concrete ground column.
- ㉕ 600 x 600 mm reinforced pile cap
- ㉖ 200 mm Ø steel & concrete pile foundation
- ㉗ 200 mm Ø painted galvanized hollow section steel column, painted, casted into roof and bolted to ground column.

## ROOF FLOOR

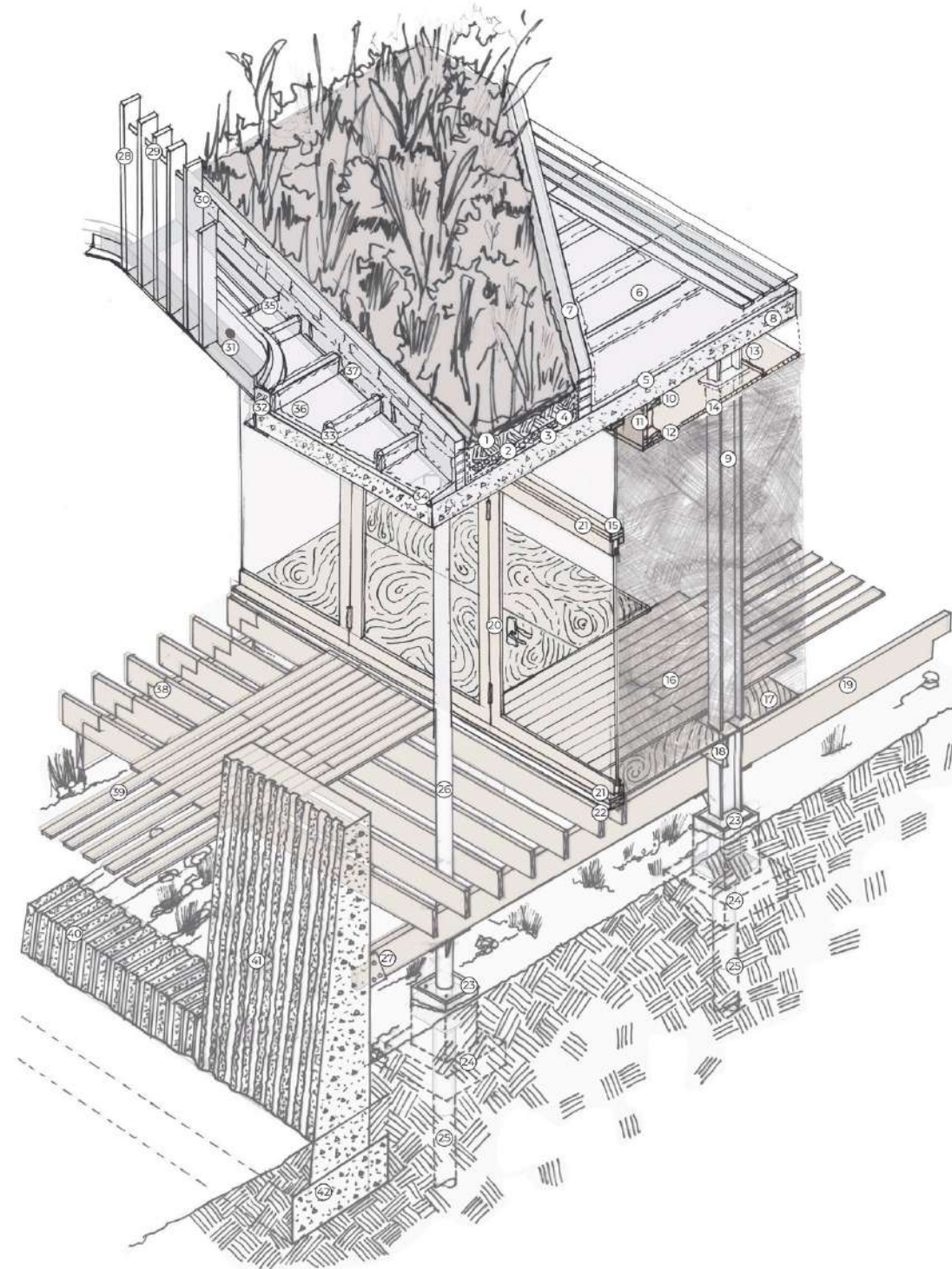
- 38 X 114 mm Saligna timber balustrade fixed to 5 x 70 x 100 mm galvanized + painted steel angle, with self tapping screw 28
- 20 mm Ø Stainless steel sleeve 150mm spacer 29
- 15 mm Ø Galvanised steel rod 30
- Hidden storm-water outlet pipe 31
- 150 x 150 mm ( up stand ) rc concrete to eng. details 32
- 50 x 150 mm timber floor joist fixed to concrete slab. 33
- 25 mm min. sand screed to 1:100 fall cast on concrete roof slab. 34
- 27 x 140 mm Rhino-wood reeded floor boards mechanically fixed to timber floor joists, with black Teflon plastic clips 35
- Derbigum torch-on waterproofing on screed layer, wraps over concrete up stand + timber joists 36
- Weep hole drains with bitumen cloth every fourth brick course 37

## FLOOR SUPPORT

- 45x210 mm laminated Saligna timber floor joist @ 400 mm c/c 38
- 22 x 100 x 1220 mm exterior Saligna timber planks with 10 mm open joints 39

## LANDSCAPE WALL

- 500 mm base thickness, cast in-situ reinforced concrete retaining wall, with a ribbed form, with polished texture 40
- 500 mm base thickness, cast in-situ reinforced concrete retaining wall, with a ribbed form, with bush hammered texture 41
- 400 RC strip foundation 42



Author, 2022

1:20 ISO SECTION



## GREEN ROOF

- 1 350 mm growing medium as per landscape architects speci-
- 2 1.2 mm anti-root layer on waterproofing
- 3 One layer derbigum based torch-on waterproofing membrane, sealed to primed surface
- 4 100mm gravel drainage
- 5 Min. 50 cement screed with 1:50 fall to drainage
- 6 Drainage channel to edge of roof
- 7 150 mm single stock brick, bagged + externally painted white, 490 mm height green roof wall.
- 8 250 mm reinforced concrete in-situ off shutter roof slab.
- 9 10 x 146 x 254 mm painted I - beam column casted into concrete roof slab.

## CEILING

- 10 38 X 114 mm SA Pine rail fixed to concrete roof slab with anchoring screws
- 11 38 X 114 mm SA Pine stud
- 12 38 X 114 mm SA pine rail fixed to stud with wood screw.
- 13 Galvanized suspension rod & t - section clip as secondary support for birch plywood ceiling
- 14 15 x 1220 x 2440 birch plywood suspended ceiling board

## WINDOW & DOOR & FLOORS

- 15 Oil treated saligna hardwood window frame with 6 mm safety glazing
- 16 6 x 25 x 144 mm tongue and grooved, polyurethane sealed, internal saligna hardwood floors
- 17 38 x 1220 x 2440 mm marine plywood internal sub-floor boards, nailed to joists.
- 18 45x210 mm laminated Saligna floor joist @ 1200 mm c/c
- 19 70 x352 mm laminated Saligna bearer beam @ 4,3 m c/c
- 20 Oil treated Saligna hardwood door frame with 6 mm safety glazing
- 21 38 x 114 mm Saligna door frame support rail
- 22 38 x 50 mm Saligna support rail

## FOUNDATION

- 23 10 x 400 x 400 mm galvanized steel column base plate bolted to 400 x 400 mm concrete ground column.
- 24 600 x 600 mm reinforced pile cap
- 25 200 mm Ø steel & concrete pile foundation
- 26 200 mm Ø painted galvanized hollow section steel column, painted, casted into roof and bolted to ground column.
- 27 Galvanized + painted steel patent bearer beam hanger

Fig 78. Spatial isometric section of technology (Author 2022)

## STORMWATER MANAGEMENT SYSTEM

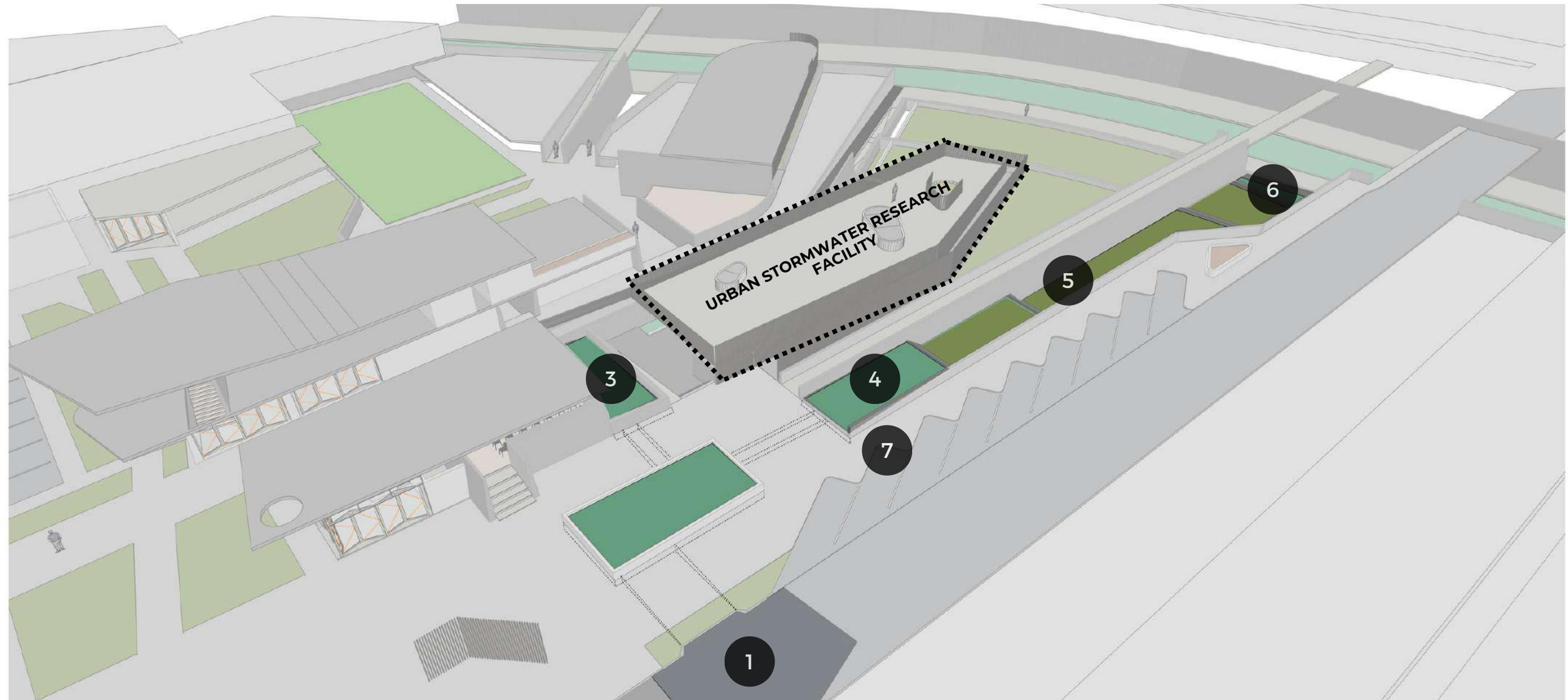


Fig 79. Storm water management system (Author 2022)

- 1. ROAD SIDE DRAINAGE    2. STORMWATER RETENTION POND    3. SEDIMENT POND NO. 1    4. SEDIMENT POND NO.2    5. STORMWATER GARDEN**  
**6. FINAL RETENTION POND    7. STORAGE TANKS**

The chosen system links back to one of the programs developed for the project. In an ever-increasing expanding urban environment we need to reconsider how we deal with stormwater within an urban environment. The amount of impervious surface and runoff can have a number of impacts on site and within a city environment for instance flooding etc.

The system is compiled out of a number of terraced ponds that move and process the stormwater throughout the urban riverscape to eventually retain and use the stormwater. Stormwater runoff from the street side is collected by the roadside drainage (1), Collected runoff is then retained within the stormwater retention pond (2), Water from the retention pond is distributed between two separate sediment ponds (3 & 4), where water is held and stored for a while, to give the soil and debris in the water time to settle out and become sediment. After sediment is settled, water is released from the ponds into the separate stormwater garden (5). Water moves through the garden to be cleaned by the filtering capabilities of the soil. This water is then once again collected in the final retention pond(6). Cleaned and filtered water is pumped back to storage tanks (7) that are stored in an underground room as seen on the riverside floorplan.

## DAYLIGHTING - SHADOW STUDY

The urban stormwater research facility as shown in the figures expresses the movement of sunlight throughout important sun positions in the year. Ideally, the use of the northern facade would foster light and heat gain within the context of Pretoria but due to the complex roof and building design, skylights and the southern facade were added to aid in improving the daylight factor in the space.

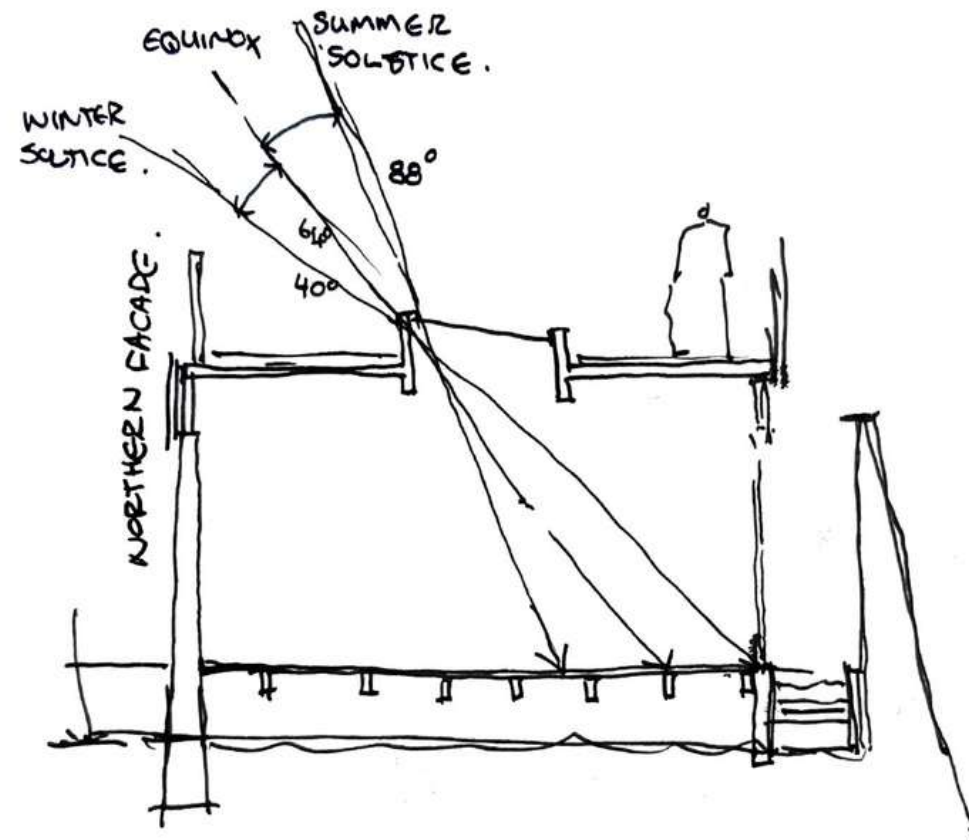


Fig 80. Solar angles in Pretoria (Author 2022)



WINTER SOLSTICE (21 JUNE 2022)

Fig 81. Winter solstice perspective (Author 2022)



SUMMER SOLSTICE (21 DECEMBER 2022)

Fig 82. Summer solstice perspective (Author 2022)



EQUINOX (20 MARCH 2022)

Fig 83. Equinox perspective (Author 2022)



SEFAIRA-DAYLIGHTING ITERATIONS

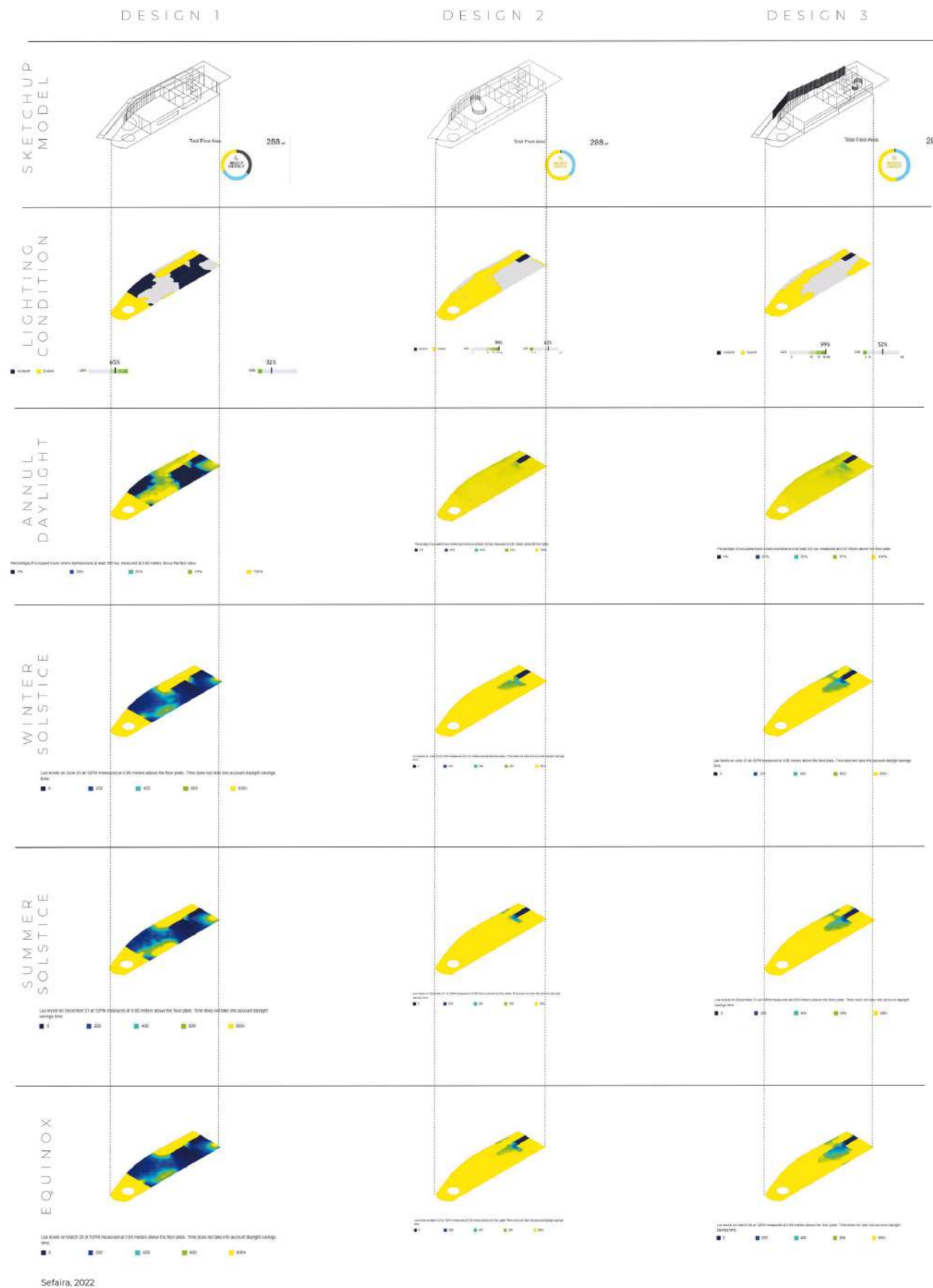


Fig 84. Daylighting iterations (Author 2022)

EFFICIENCY - SBAT

Numerous passive design elements, like natural lighting and ventilation, are included throughout the project. These are evident in the urban stormwater research office. Furthermore, the project's social, environmental, and economic sustainability performance was evaluated using the Sustainable Building Assessment Tool (SBAT). A strong achievement is shown for transportation, management, services and products, health, education, and social stability in the SBAT report (figure 70).

This rating is in line with the project's goals of creating an exchange interface that fosters user upliftment and well-being in particular as well as improved lived experience in the city. However, the analysis does show a possible rise in the project's water and waste efficiency.

SUSTAINABLE BUILDING ASSESSMENT TOOL RESIDENTIAL

1.04

Achieved

SB SBAT REPORT

3.6

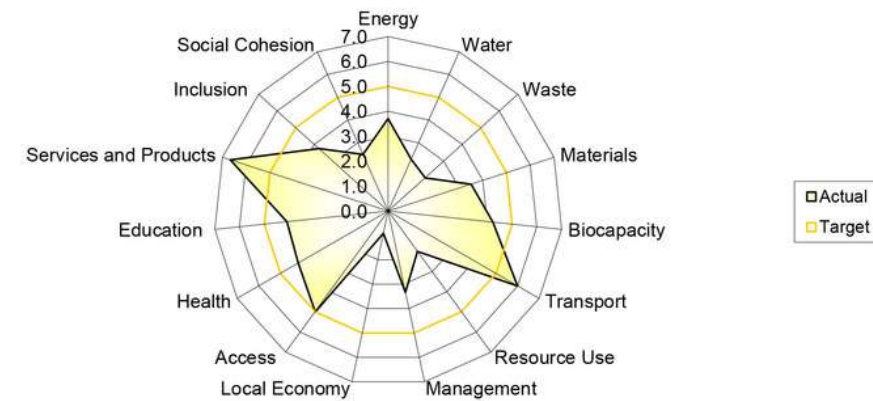
SB1 Project

Urbanriverscape interface

SB2 Address

1118 Arcadia, Pretoria, 0007

SB3 SBAT Graph



SB4 Environmental, Social and Economic Performance

Score

Environmental	3.1
Economic	3.4
Social	4.2
SBAT Rating	3.6

SB5 EF and HDI Factors

Score

EF Factor	4.0
HDI Factor	3.2

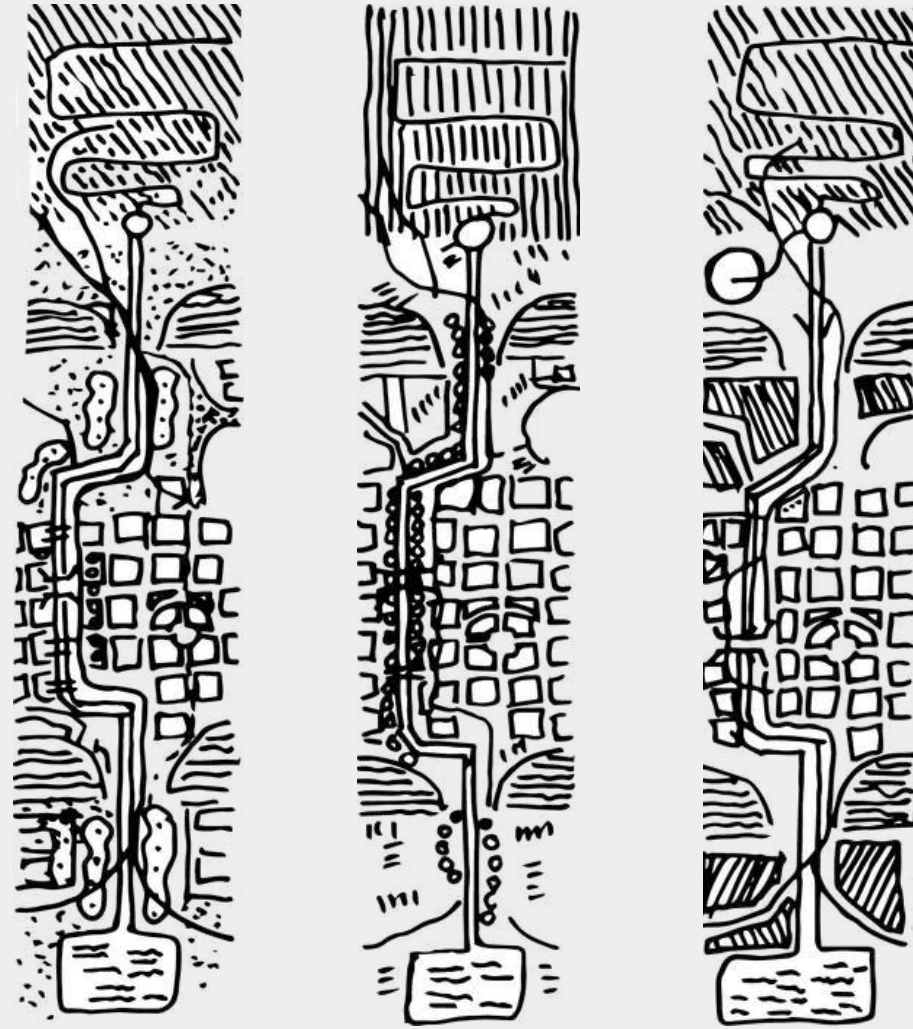
SB6 Targets

Percentage

Environmental	63
Economic	69
Social	85

Fig 85. SBAT report (Author 2022)

• U R B A N R I V E R S C A P E •



R E F L E C T I O N

## INTRO

The dissertation came from the belief in designing for better cities in mind. Through a normative stance, I expressed that we live in cities composed of both natural and artificial spaces and systems, and with our continued existence as humans on planet earth we have grown consequently reliant on the artificial. Consequently, some of our natural systems have also adopted artificial identities. This has proven to have an influence on the lived experience of urban residents and their physical and mental health. Natural green spaces are important. Providing spaces for them in our cities gives great value back to urban residents and the environment. Through this specific dissertation, I believe that riverscape spaces within the urban environment could provide a hybrid solution that meets both the needs of the city and the natural world. It is thus through riverscape design that we could foster a new connection between sustainability and urban design.

## DISCUSSION

In the formation of and development of this dissertation and its different stages of research, design, theory, technology, etc. I believe I tried to challenge the conventional architectural response by adopting principles of sustainable design and trying to understand the considerable effect that architects have on the natural and built environment. Through a transdisciplinary understanding, we can achieve greater value to space by working in parallel with other disciplines.

Research and theory gave way to different perspectives on addressing indeterminate land parcels alongside green infrastructure. Adopting urban design theories to understand the larger influence a site or a response could have on a city environment. Furthermore, design research intently observed and translated the current lived experience in urban riverscape environments to include the relevance of the experience of the urban resident/urban dweller.

Findings and informants were then translated into a design approach. Heavily reliant on plan configurations and sought out ways of improving the lived experience of urban riverscape environments. Through constant iteration and purpose-giving activities, the design evolved to become different planes of interaction and exchange. Purposefully improving the threshold between the natural river and the artificial city. Concepts and intentions gave further influence to response in technology. If the landscape could be seen as the permanent infrastructure within the city then the architecture should accommodate the ever-changing development of the user experience.

As a final outcome, the design provides opportunities where the urban dweller can have a healthy exchange with the natural environment in urban riverscapes and thus improve their lived experience within the city context.

## REFLECTION

Through the consent development of this dissertation, I found that the research and design investigation of riverscape design within a South African context are complex thresholds to understand and design for. Without a significant precedent available in a South African context as a standard to compare and evaluate one's own design, it was proven difficult to determine the success of the project within the local context. Although expression and precedents could have been drawn from international examples. It was still proven difficult to establish if urban riverscape design could be a possible venture for the South African context.

Besides the difficulty of determining the project's success, I could still amend that these spaces within our cities are proven to have a lot of opportunities and possibilities and could have the potential to foster new intercultural and as well as sustainable connections between people, natural, and the city.

As a personal reflection on this topic and subject, I believe my effort towards responding to the research questions was done to the best of my educational capabilities. Upon further exploration and the evolution of this dissertation, I believe it will happen as I gain practical experience and experience new ways of dealing with different types of environments. What I am trying to conclude is that I am looking forward to how this dissertation will transform my understanding of architecture in practice and eventually have this constant iteration of a dissertation evolve at the back of my mind.

## REFERENCES

Backouche, I. 2008. "From Parisian River to National Waterway" in *Rivers in History*, Ed. by Mauch C and Zeller T (University of Pittsburgh Press, Pittsburgh) 26-41.

Benayas, J.M.R., Newton, A.C., Diaz, A. and Bullock, J.M. (2009). Enhancement of Biodiversity and Ecosystem Services by Ecological Restoration: A Meta-Analysis. *Science*, 325(5944), pp.1121–1124. doi:10.1126/science.1172460.

Biljon, L. 1993. 'Pretoria: Geneis and the successive layers of its evolution, *Planning History*, Vol 15, no. 2, pp. 37-43.

Bolsmn, E. 2001. *Pretoria - Artists' impressions 1857 - 2001*. Pretoria: Protea Book House.

Brooks, AP., Brierley, GJ. & Millar, RG. 2003. The long-term control of vegetation and woody debris on the channel and flood-plain evolution: insights from a paired catchment study in south-eastern. *Australia Geomorphology* 51 7– 29

Cermasi, O., 2017. Contemporary landscape urbanism principles as innovative methodologies: the design of an armature of public spaces for the revitalisation of a shrinking city. *The Journal of Public Space* 2, 111. doi:10.5204/jps.v2i2.97

Cresswell, T. 2004. *Place: A short Introduction*. Malden, MA: Blackwell

Cheng, X. Z. C. (2007). River and Urban spatial structure. *Urban Studies*, 1, 005

City of Tshwane. 2015. *NELSON MANDELA GREEN CORRIDOR TSHWANE INNER-CITY REVITALISATION STRATEGY*. Tshwane.

Council. 2009. *Approval of the Mandela Development Corridor*.

Daily, G.C. 1997. *Nature's Services: Societal Dependence on natural ecosystems*. Island Press.

Defra. 2007. *An introductory guide to valuing ecosystem services*.

Dippenaar, M. A. (2013). *Hydrogeological Heritage Overview: Pretoria's FOuntains-arteries OF LiFe*.

EA. 2006. *Bringing your rivers back to life. A guide to restoring rivers in North London*. Environment Agency for England and Wales, Thames Region, NE Area Office: Hatfield

Everard, M. & Moggridge, H.L. 2012. Rediscovering the value of urban rivers. *Urban Ecosystems*. 15(2):293–314. DOI: 10.1007/s11252-011-0174-7.

Findlay, S.J. & Taylor, M.P. 2006. Why rehabilitate urban river systems? 1–14.

Fryirs, K & Brierley, G. 2000. A geomorphic approach to the identification of river recovery potential. *Physical Geography*. 21: 244 – 77.

Hofstee, E. (2006) *Constructing a good dissertation: a practical guide to finishing a master's, mba or phd on schedule*. Sandton, South Africa: EPE.

Jamali, F.S. & Mosler, S. 2014. The Role of Cultural Ecosystem Services in Urban Riverscape Restoration. DOI: 10.13140/2.1.4550.1129.

Jenkins, G. (ed) 1955, *Pretoria 1855 - 1955, Die Stadsraad van Pretoria*, 1st edn, Wallach's P. & P. Co. Ltd., Pretoria.

Jeppe, C. 1906. *The Kaleidoscopic Transvaal*. (2nd ed.) London: Chapman and Hall LTD.

Jamail, F. (2014). The Role of Cultural Ecosystem Services in Urban Riverscape Restoration. 1–13. <https://doi.org/10.13140/2.1.4550.1129>

Kondolf, G. M., & Pinto, P. J. (2017). The social connectivity of urban rivers. *Geomorphology*, 277, 182–196. <https://doi.org/10.1016/j.geomorph.2016.09.028>

Kristiánová, K., Gécová, K. & Putrová, E. 2015. Watercourse as cultural heritage in contemporary urbanism: Preservation approaches from Košice and Prešov in Slovakia. *Archnet-IJAR*. 9(1):122–133. DOI: 10.26687/archnet-ijar.v9i1.522.

Levin-Keitel, M. 2014. Managing urban riverscapes: towards a cultural perspective of land and water governance. *Water International*. 39(6):842–857. DOI: 10.1080/02508060.2014.957797.

Lehtovuori, P., 2016. *Experience and Conflict: The Production of Urban Space*.

Lutizo, L. 2016. 'In-formalised urban space design: Rethinking the relationship between formal and informal, City, Territory and Architecture, vol. 20, no. 3, pp. 1-13.

Lundy, L. & Wade, R. 2011. *Integrating Sciences to Sustain Urban Ecosystem Services*.

Middlebrook, S.M., Gullick, J.M. and Gibson-Hill, C.A., 1951. Yap Ah Loy (1837-1885). *Journal of the Malayan Branch of the Royal Asiatic Society*, 24(2 (155), pp.1-127.

Minnaar, P. (2019). *Building Landscapes : mending the fracture between cite' and ville through an urban architecture of place*. Up.ac.za. [online] doi:A2020.

Nayan, N.M., Jones, D.S., Bahaluddin, A., Ghani, I. & Rahman, N.A. 2020. Designating Urban Rivers as National Heritage: A case study of Sungai Kelang and Sungai Gombak, Kuala Lumpur, Malaysia. In *IOP Conference Series: Earth and Environmental Science*. V. 409. Institute of Physics Publishing. DOI: 10.1088/1755-1315/409/1/012035.

Rutherford, I., Jerie, K. & Marsh, N. 2000. *A rehabilitation manual for Australian streams, volume 2*. Co-operative Research Centre for Catchment Hydrology, Brisbane

SAVF -. (2022). Home - SAVF - Services to Children, Families And The Elderly. [online] Available at: <https://www.savf.co.za/> [Accessed 7 Nov. 2022].

Shafaghat, A., Mir Ghasemi, M., Keyvanfar, A., Lamit, H. & Ferwati, M.S. 2017. Sustainable riverscape preservation strategy framework using the goal-oriented method: Case of historical heritage cities in Malaysia. *International Journal of Sustainable Built Environment*. 6(1):143–159. DOI: 10.1016/j.ijbe.2017.03.003.

Taylor, L., & Hochuli, D. F. (2015). Creating better cities: how biodiversity and ecosystem functioning enhance urban residents' well-being. *Urban Ecosystems*, 18(3), 747–762. <https://doi.org/10.1007/s11252-014-0427-3>

Scenario Journal. (2011). *Landscape Urbanism: Definitions & Trajectory*. [online] Available at: <https://scenariojournal.com/article/landscape-urbanism/> [Accessed 2 Jul. 2022].

Waldheim, C. and Waldheim, J.E.I.P. and C. of L.A.C. (2006). *The Landscape Urbanism Reader*. [online] Google Books. Princeton Architectural Press. Available at: <https://books.google.co.uk/books?hl=en&lr=&id=kqhoMHcYkiAC&oi=fnd&pg=PA13&dq=Waldheim> [Accessed 7 Nov. 2022].

Ward Thompson, C. 2010. Linking landscape and health: The recurring theme. *Landscape and Urban Planning* 99: 3-4, 187-195

Wantzen, K.M., Ballouche, A., Longuet, I., Bao, I., Bocoum, H., Cissé, L., Chauhan, M., Girard, P., Gopal, B., Kane, A., Marchese, M.R., Nautiyal, P., Teixeira, P. and Zalewski, M. (2016). River Culture: an eco-social approach to mitigate the biological and cultural diversity crisis in riverscapes. *Ecohydrology & Hydrobiology*, 16(1), pp.7–18. doi:10.1016/j.ecohyd.2015.12.003.

## LIST OF FIGURES

- Figure 1. Graphical representations of a better city (Author 2022)
- Figure 2. Graphic representations of ecosystem services (Author 2022)
- Figure 3. Perspective graphic of the city of Tshwane (Author 2022)
- Figure 4. Image taken of indeterminate spaces along the Apies River (Author 2022)
- Figure 5. The comparisons between natural and urban riverscape (Author 2022)
- Figure 6. Urban analysis of the river and its neighbouring sites (Author 2022)
- Figure 7. Conceptual representation of architecture as mediator (Author 2022)
- Figure 8. Conceptual representation of the city's development above the river (Author 2022)
- Figure 9. A diagram illustrating the differences between rehabilitation, remediation, and restoration. (Findlay & Taylor, 2006).
- Figure 10. Independent categories of ecosystem service compared to water systems (Lundy & Wade, 2011).
- Figure 11. Independent type of cities developed along the river & riverscape (Pattacini, 2021).
- Figure 12. Representation that riverscape space has a wider field of influence (Author 2022).
- Figure 13. Historical representation of the city's development over time and how this had an influence on it riverscape space and there meaning to the city (Author 2022).
- Figure 14. These are painting done by artist over time to represent the riverscape of Tshwane and how its nature has changed (Author 2022).
- Figure 15. The natural expression of riverscape space in City of Tshwane (Author 2022)
- Figure 16. Representation of "staging the surface" (Author 2022)
- Figure 17. Predominantly use of landscape as a restructuring process, in parallel with infrastructure and ecology (Author 2022)
- Figure 18. Brooklyn bridge park, pier 3 (Author 2022)
- Figure 19. New transformed River lea, Olympic park (Author 2022)
- Figure 20. Highline running through the city as green park (Author 2022)
- Figure 21. Proposed urban vision for the City of Tshwane (Author 2022)
- Fig 21.1 Proposed urban vision for the Apies river - City of Tshwane (Author 2022)
- Figure 22. The Cheonggyecheon (river) restoration over time (Author 2022)
- Figure 23. Before and after images of the recreated river landscape (Author 2022)
- Figure 24. Urban map of City of Tshwane with highlighted sites along green corridor precinct (Author 2022)
- Figure 25. Urban map of City of Tshwane with selected site (Author 2022)
- Figure 26. Site context extracted into different layers (Author 2022)
- Figure 27. Immediate city context's land use (Author 2022)
- Figure 28. The sites history over past 20 years (Google Earth, 2016)
- Figure 29. Perspective of site and its immediate context (Google Earth, 2016) & edited by (Author 2022)
- Figure 30. Map of where photos on site was taken (Author 2022)
- Figure 31. Photos taken on site (Author 2022)
- Figure 32. Photos of daily rituals on and around site (Author 2022)
- Figure 33. Riverscape edge design responses (Prominski et al., n.d.)
- Figure 34. Three concurring themes (Author 2022)
- Figure 35. Different layers present on site (Author 2022)
- Figure 36. Diagram explaining the exchange between river and city program (Author 2022)
- Figure 37. Location of current SAVF office
- Figure 38. Diagram of how programs are connected (Author 2022)
- Fig 38. 1 Diagram of how programs are structured (Author 2022)
- Fig 38. 2 Interior photos of programs (Author 2022)
- Figure 39. Architectural concept (Author 2022)
- Figure 40. Overlapping interactions between fields
- Figure 41. Architectural concept expressed in an exercise (Author 2022)
- Figure 42. Consolidated design diagram (Author 2022)
- Figure 43. Consolidated layers and informants conclude with first form and design (Author 2022)
- Figure 44. Progress in iterations (Author 2022)
- Figure 45. Iteration 1 of design development 3 (Author 2022)
- Figure 46. Iteration 2 of design development 3 (Author 2022)
- Figure 47. Iteration 3 of design development 3 (Author 2022)

Figure 48 Iteration 4 of design development 3 (Author 2022)

Figure 49. Iteration 5 of design development 3 (Author 2022)

Figure 50. Iteration 6 of design development 3 (Author 2022)

Figure 51. Iteration 6 result of design development 3 (Author 2022)

Figure 52. Iteration 6 result perspectives of design development 3 (Author 2022)

Figure 53. Site plan (Author 2022)

Figure 54. Riverside floor plan (Author 2022)

Figure 55. Ground floor plan (Author 2022)

Figure 56. First floor plan (Author 2022)

Figure 57. Roof plan with sections lines (Author 2022)

Fig 58. Seasons (Author 2022)

Fig 59. Site plan (Author 2022)

Fig 60. River side plan (Author 2022)

Fig 61. Ground floor plan (Author 2022)

Fig 62. First floor plan (Author 2022)

Fig 63. Roof plan (Author 2022)

Fig 64. Sections A- A & B - B (Author 2022)

Fig 65. Sections C- C & D - D (Author 2022)

Fig 66. Elevations (Author 2022)

Fig 67. Iso of site (Author 2022)

Fig 68. Perspectives (Author 2022)

Fig 68. 1 Perspectives (Author 2022)

Fig 69. Technological concept (Author 2022)

Fig 70. Technology-focused area on plan view (Author 2022)

Fig 71. Conceptual expression of architecture as temporary structure (Author 2022)

Fig 72. Nature of structure (Author 2022)

Fig 73. 1:200 Design section (Author 2022)

Fig 74. 1:50 Tech section (Author 2022)

Fig 75. iso section (Author 2022)

Fig 76. Detail A of iso section (Author 2022)

Fig 77. Detail B of iso section (Author 2022)

Fig 78. Spatial isometric section of technology (Author 2022)

Fig 79. Storm water management system (Author 2022)

Fig 80. Solar angles in Pretoria (Author 2022)

Fig 81. Winter solstice perspective (Author 2022)

Fig 82. Summer solstice perspective (Author 2022)

Fig 83. Equinox perspective (Author 2022)

Fig 84. Daylighting iterations (Author 2022)

Fig 85. SBAT report (Author 2022)

## APPENDIX A - ETHICAL CLEARANCE



Faculty of Engineering,  
Built Environment and  
Information Technology

Fakulteit Ingenieurswese, Bou-omgewing en  
Inligtingtegnologie / Lefapha la Boetšenere,  
Tikologo ya Kago le Theknolotši ya Tshedimošo

8 August 2022

Reference number: EBIT/123/2022

Mr CN Smit  
Department: Architecture  
University of Pretoria  
Pretoria  
0083

Dear Mr CN Smit,

### FACULTY COMMITTEE FOR RESEARCH ETHICS AND INTEGRITY

Your recent application to the EBIT Research Ethics Committee refers.

Conditional approval is granted.

This means that the research project entitled "The city and river in tension" is approved under the strict conditions indicated below. If these conditions are not met, approval is withdrawn automatically.

Conditions for approval:

Contacts of the participants are to be sourced with compliance to POPIA.

If voice recording is to be used, consent from the interviewee needs to be reflected in the informed consent form. No video recording of the participants is allowed.

This approval does not imply that the researcher, student or lecturer is relieved of any accountability in terms of the Code of Ethics for Scholarly Activities of the University of Pretoria, or the Policy and Procedures for Responsible Research of the University of Pretoria. These documents are available on the website of the EBIT Ethics Committee.

If action is taken beyond the approved application, approval is withdrawn automatically.

According to the regulations, any relevant problem arising from the study or research methodology as well as any amendments or changes, must be brought to the attention of the EBIT Research Ethics Office.

The Committee must be notified on completion of the project.

The Committee wishes you every success with the research project.

**Prof K.-Y. Chan**

Chair: Faculty Committee for Research Ethics and Integrity  
FACULTY OF ENGINEERING, BUILT ENVIRONMENT AND INFORMATION TECHNOLOGY