Collective Emergence

An architecture for cultivating entrepreneurial growth in the isolated community of Khalambazo.

University of Pretoria (MProfArch)
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Research Field
Unit for Urban Citizenship

Programme
Glass up-cycling plant &
traders market

Site
Khalambazo, Mamelodi

Course coordinator
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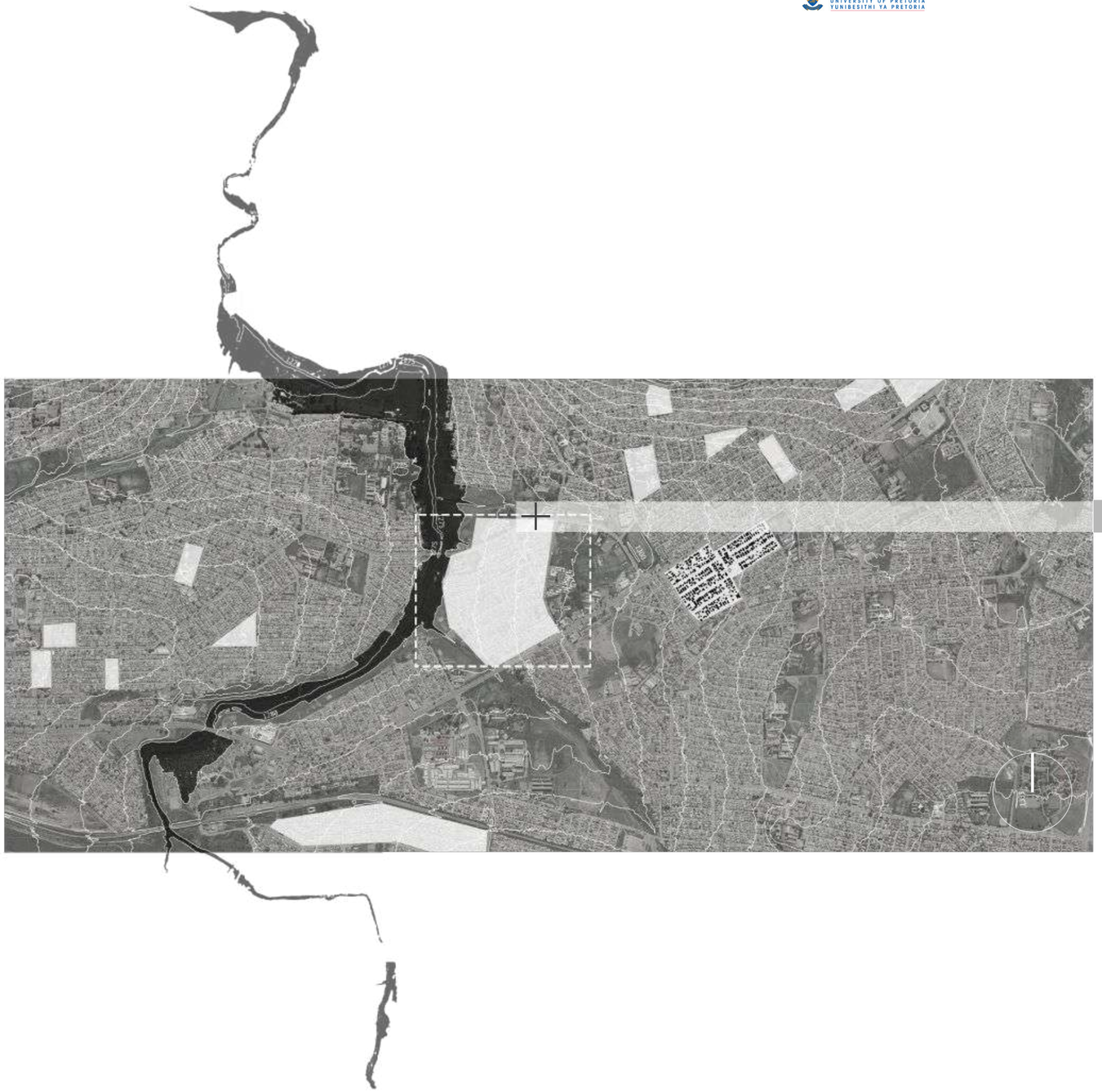


General Issue

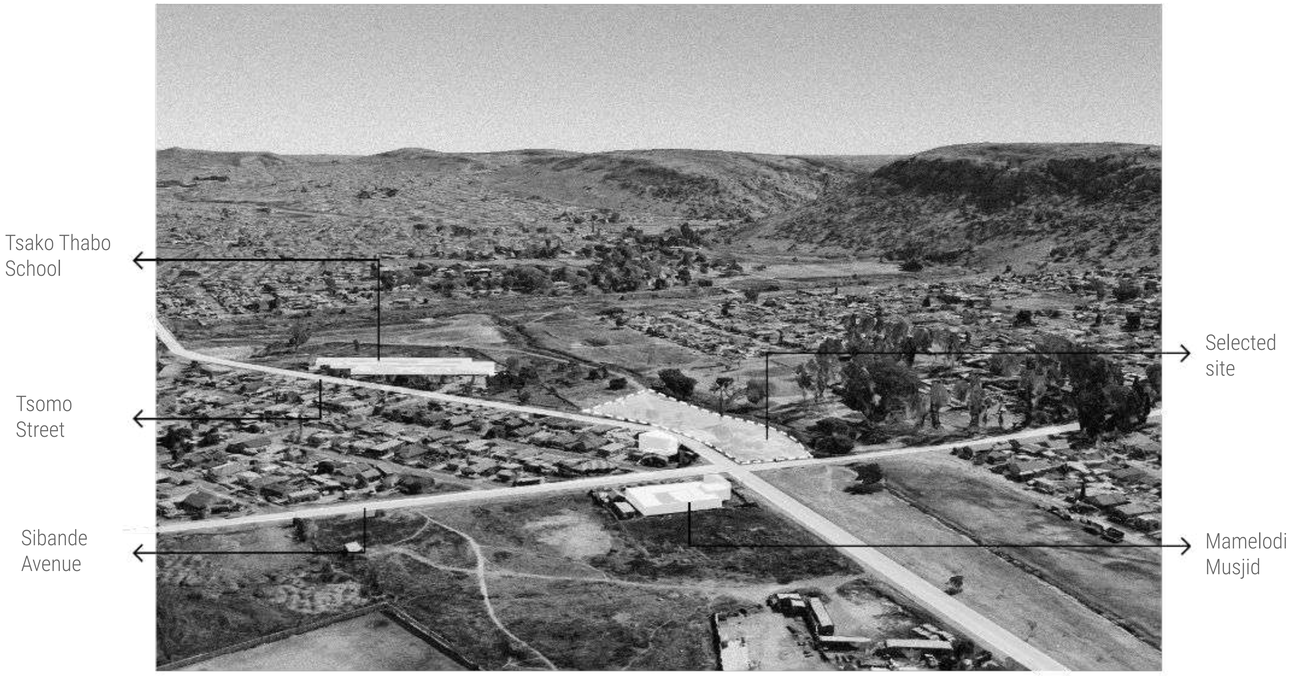
Scars of the past are etched onto our urban landscape

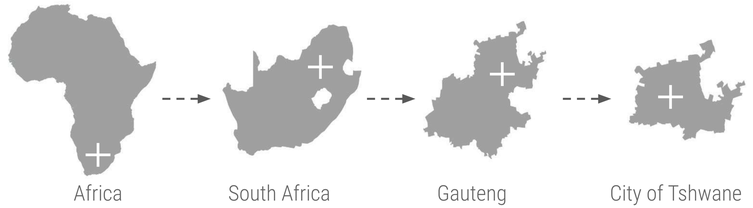
Khalambazo neighbourhood in Mamelodi, is severely stunted in its ability to meaningfully contribute to the local cultural-economic futures because it is structurally and spatial limited.

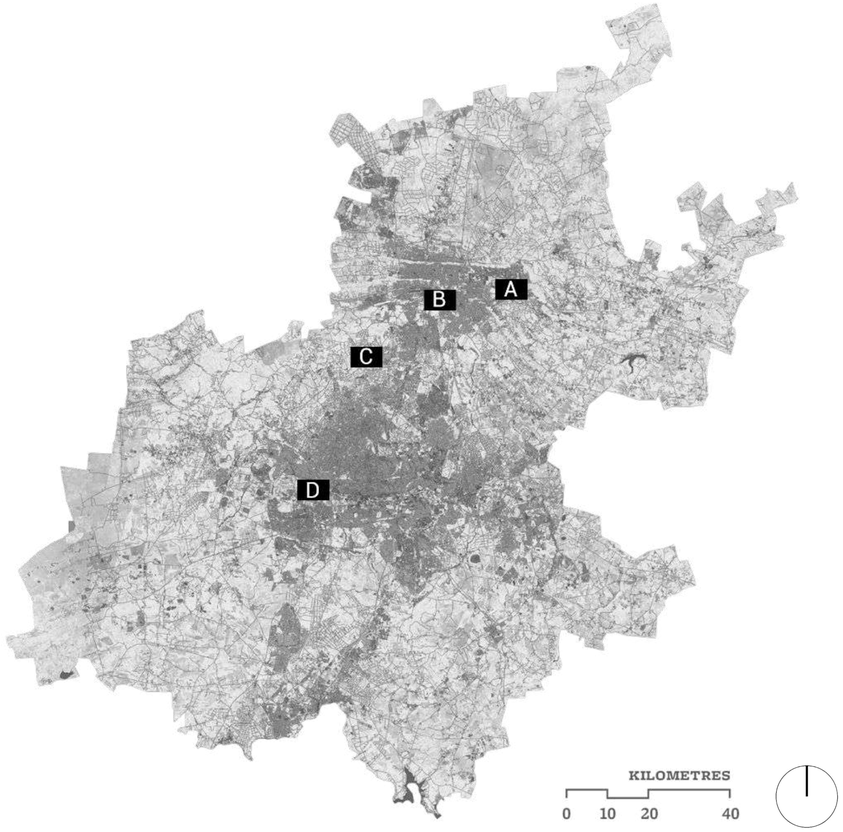
Site Locality

25.708639 S / 28.373877 E
Corner of Tsomo St. & Sibande Ave
Parcel No: 35465

Being removed from its greater surroundings (physically and economically) places the residents of Khalambazo in a state of vulnerability and socio-economic dependency (Levy 2020: 22).







A Mamelodi **B** Pretoria CBD **C** Diepsloot **D** Soweto

Urban Issue

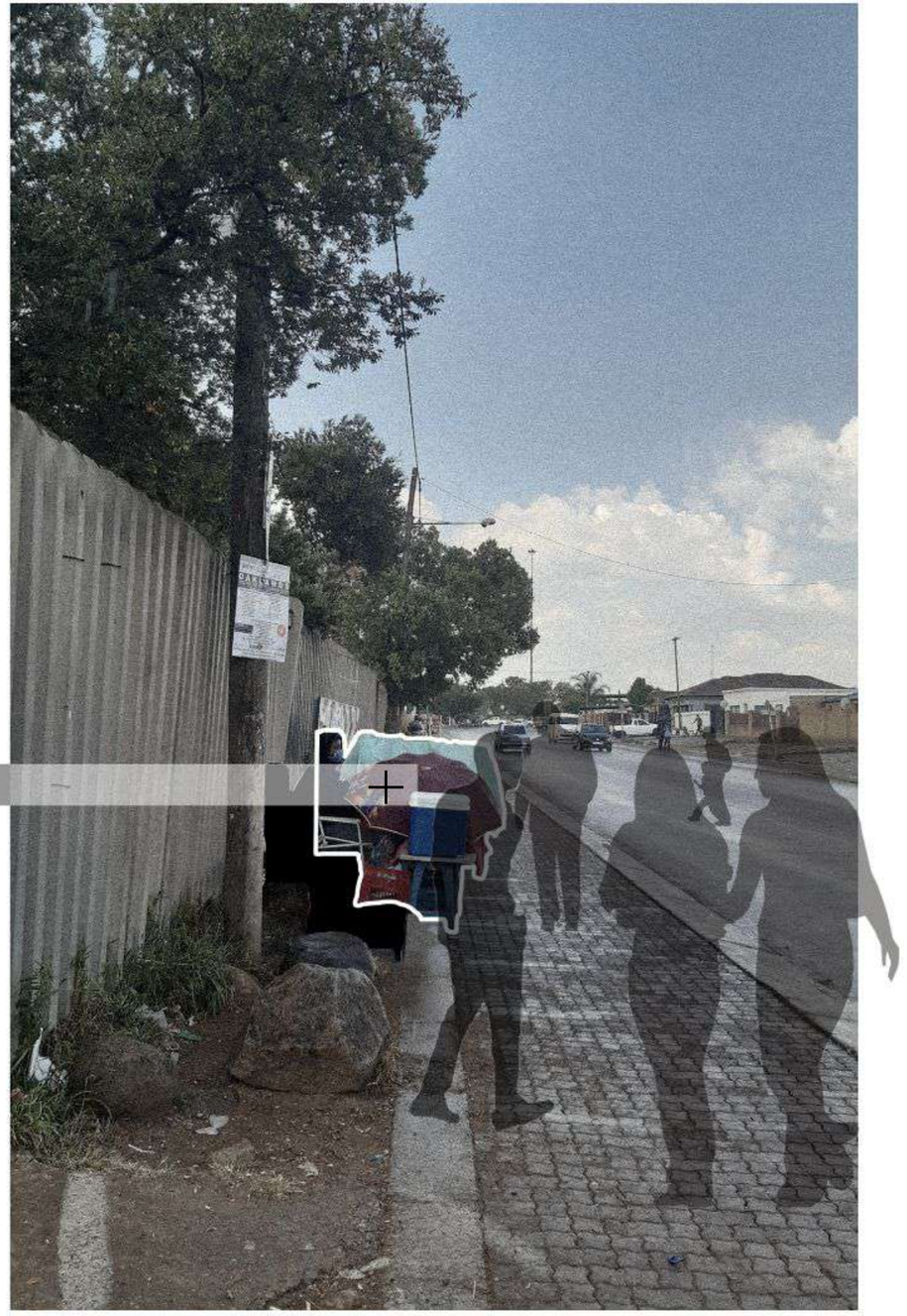
Lack of implementation of SDF's

This single-faceted landscape has resulted in a lack of informal & formal economic convergence spaces, public space, communal facilities and desirable living conditions, however, the micro urban fabric which has prevailed displays resilience in the form of appropriated street edges and an informal local economy.

Architectural Issue

Attenuation of public architecture

Thus the architectural issue which will be addressed is how to combat the attenuation of public architecture within Mamelodi while providing the members of Khalambazo with a platform which celebrates the vibrant local economy.



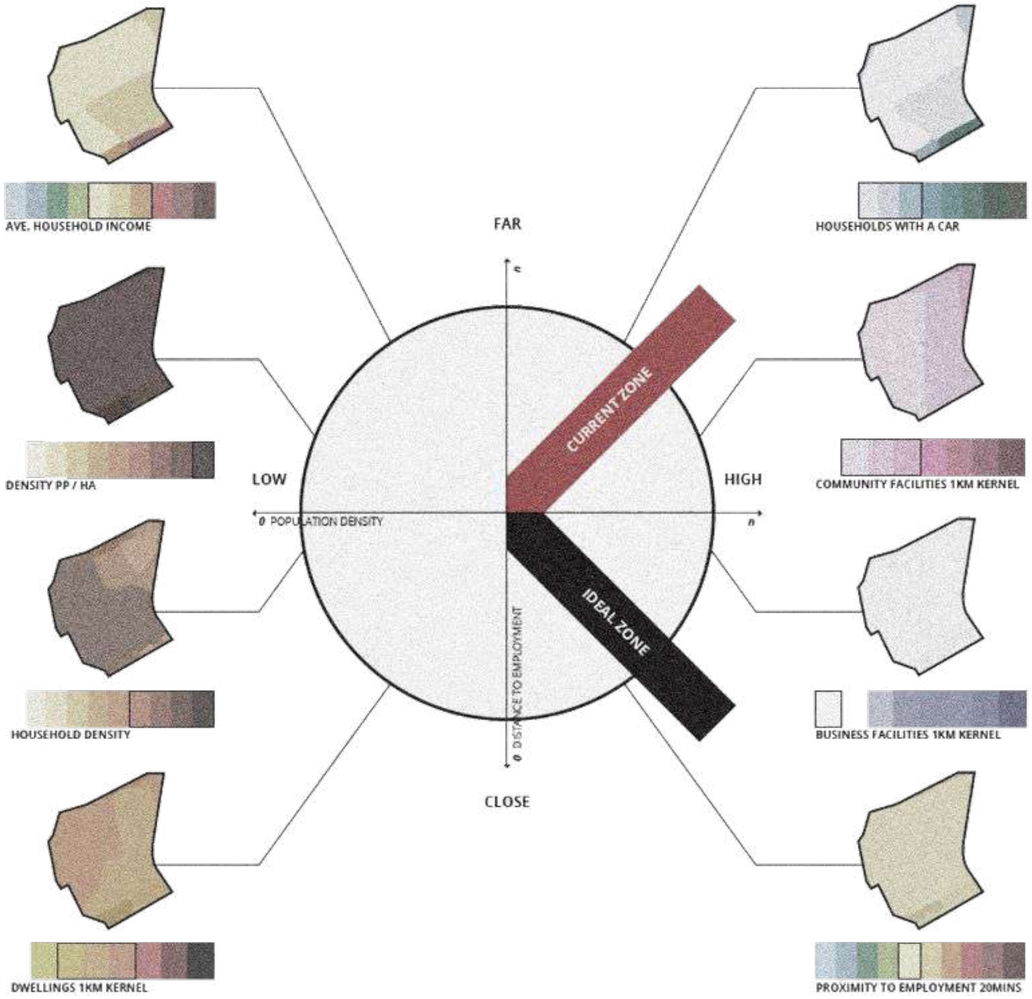
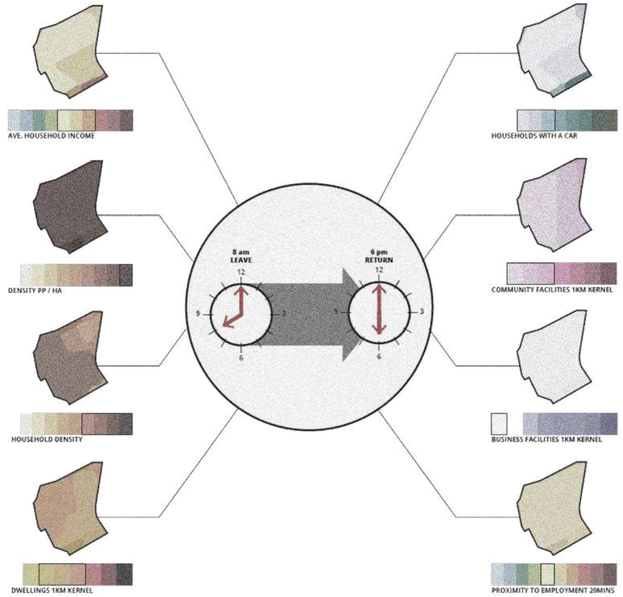


Figure 1: Macro mapping analysis taking into account a variety of factors (Levy 2020)

Macro Analysis

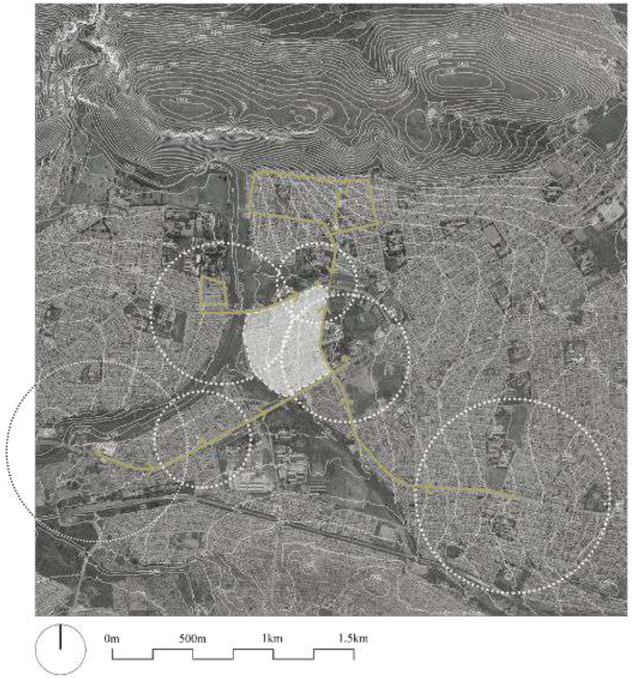
Limited Access / Limited Opportunities / Dormitory Settlement / Pendulum Migration



The study area is isolated from the greater economic activities of the region. People who reside within Khalambazo have to travel great distances to work, leaving early and arriving late in the evening. This makes employment difficult for those who cannot afford public transport or have commitments to stay at home during the day.

Meso Analysis

Movement of glass in Mamelodi

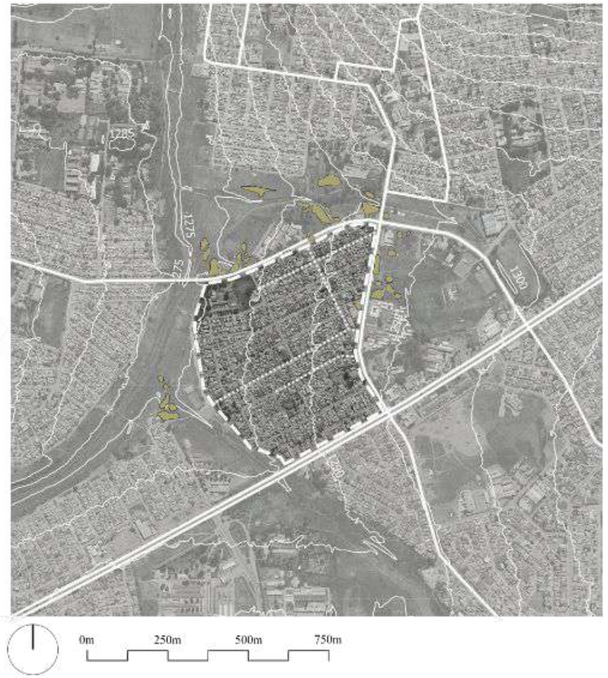


Movement of glass

Main sources of glass

Initial mapping revealed that Khalambazo generates vast amounts of glass which is then recycled. The success of glass recycling can be attributed to the contribution from the surrounding communities.

Green Economies & Waste

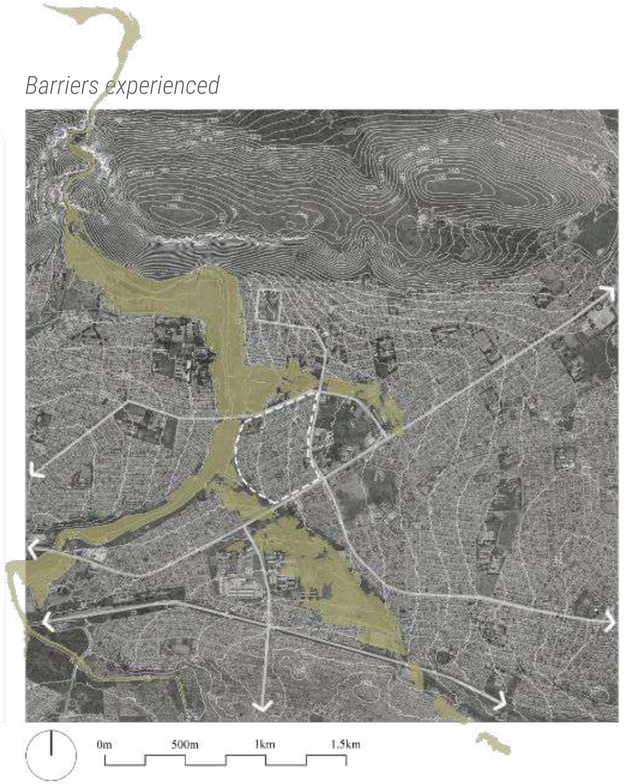


Dumping grounds or waste collection points

Main roads within Khalambazo

Due to the vast amount of recycling taking place in Khalambazo the green economy has developed and spread to other neglected areas, predominantly in green belts.

Barriers experienced



Natural border which isolates the community from its surrounds

Mapping reveals how isolated the community of Khalambazo is from its greater surroundings as the natural barriers inhibit natural movement and flow.

Meso Analysis

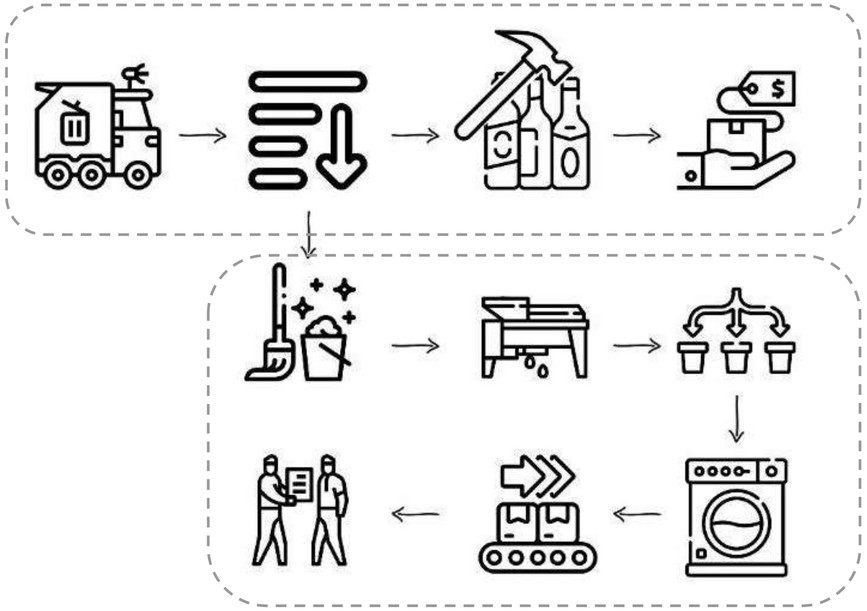
Kevin Lynch Elements of the City

In order to be able to generate a site vision, the elements of the site need to be analyzed and identified. Lynch (1960:41) classified the perceived physical forms into five convenient types of elements which include:

- *Nodes*
- *Landmarks*
- *Districts*
- *Edges*
- *Paths*

Micro Analysis

Glass life cycle within Khalambazo



Existing Process

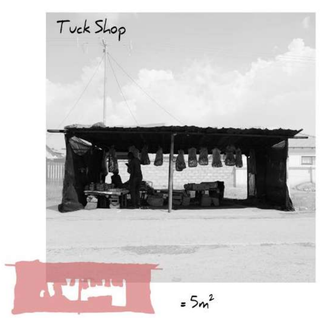
The current lifecycle of glass does not reach full potential as there are value laden steps which are missing.

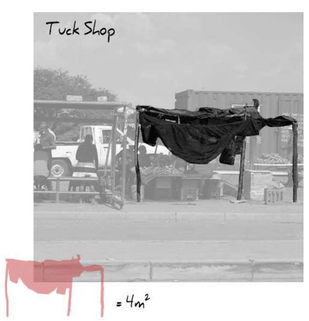
Proposed Process

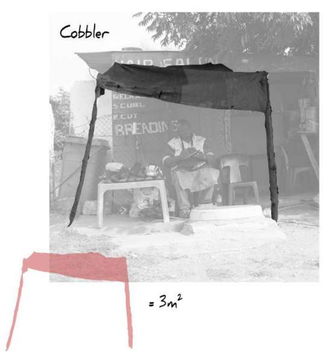
Mechanical crushing and processing allows for greater quality control where the glass can now be used for craft projects or in the construction industry.

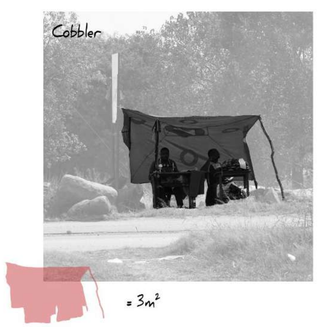
Site specific activities

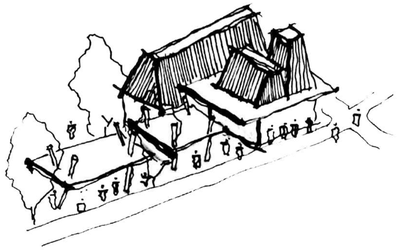
Formal and Informal trading conditions

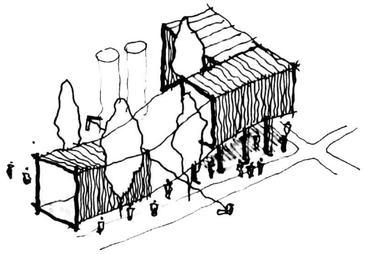


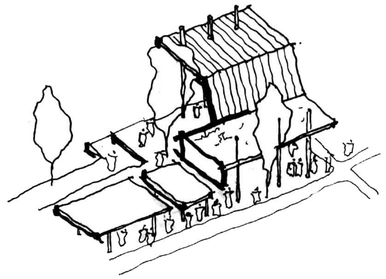








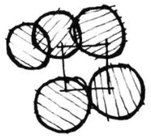




Conceptual Approach

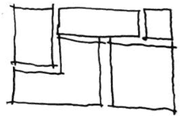
Drawing from the understanding of Space as Ritual, it is possible to articulate an understanding of African conditions by contrasting African philosophy with Western philosophy. Through an understanding of the space in question the most relevant approach to architecture would be to celebrate the intricacies which make the site unique.

Landscape



Together

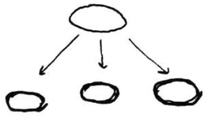
Mind



Pieces

Future

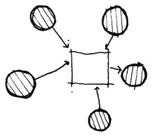
Harmony



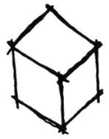
Share

Built

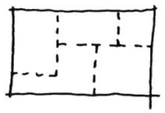
Alone



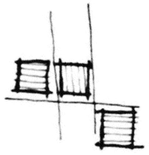
Material



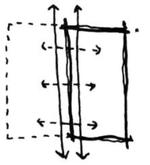
Whole



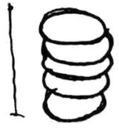
Past



Control

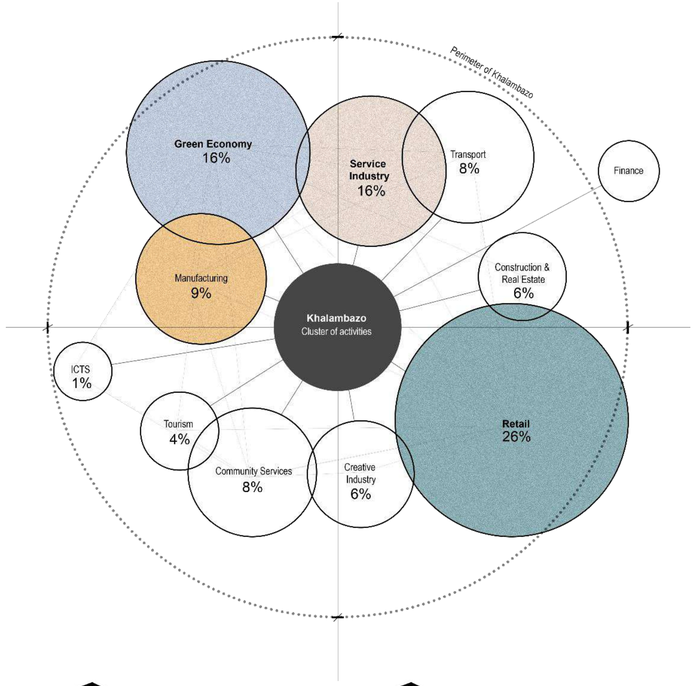


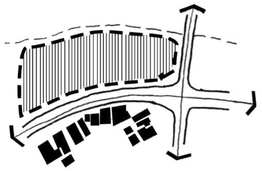
Accumulate



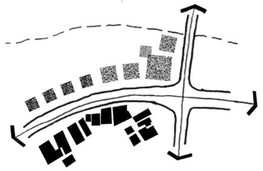
Site Vision

The potential in the site lies in utilising the sites underlying socio-economic vibrance and applying it to new infrastructures which can compliment or facilitate the existing spatial gestalt. Creating quality spaces is the result of the placemaking process which results in space where people want to work, play, shop and visit.

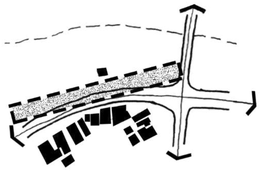




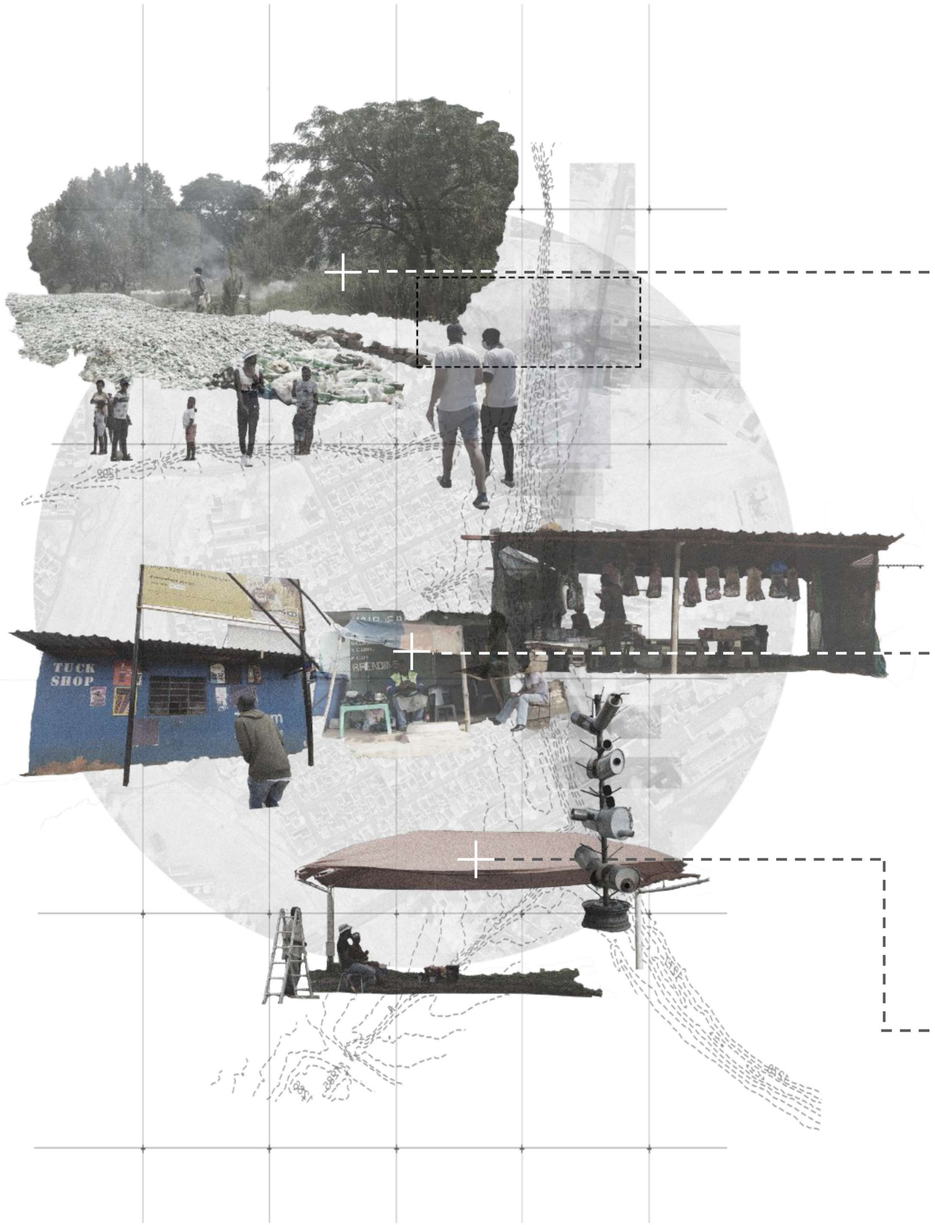
Recover and reintegrate underutilized space back into Khalambazo.



Inhabit and redefine the edge condition of site.



Intervention to define rhythm of site in appropriate scale.



Programme

Programme one

Glass upcycling & recycling plant

The primary programme responds directly to the site and its users which is predominantly composed of green economy activities such as recycling. This coupled with primary programme two act as the core for this dissertation.

Programme two

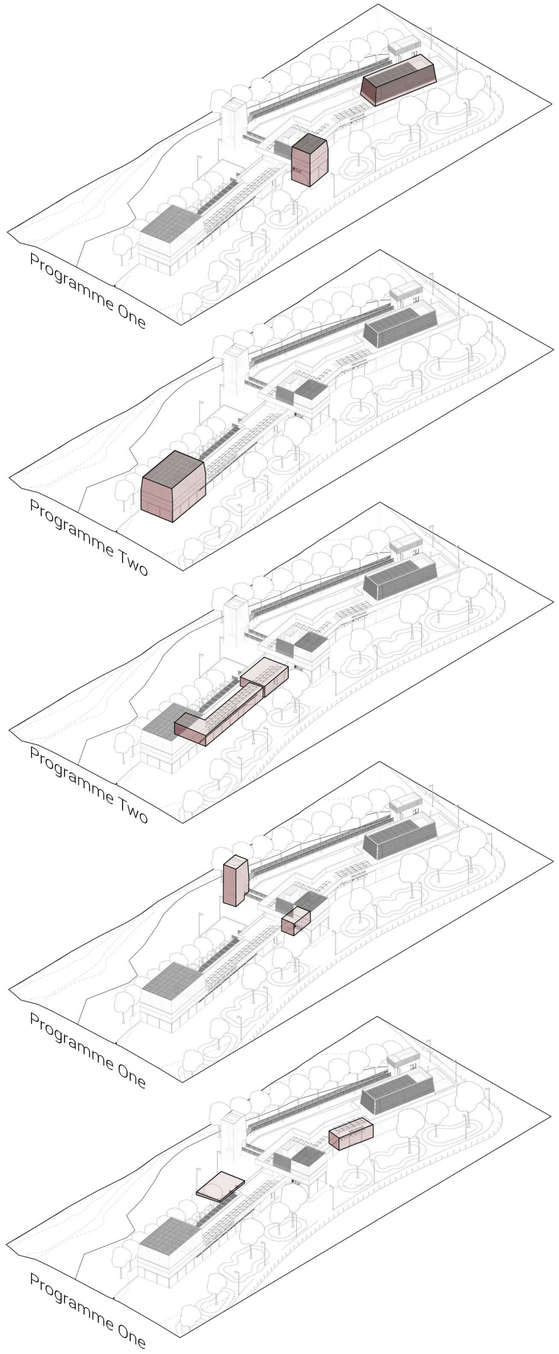
Public traders space

Primary programme two is focused on the retail scope of activities, this includes the SMME's within Khalambazo both formal and informal. This space will need to be multifunctional in order to facilitate the multiplicity of activities which take place on site.

Tertiary Programme

Spatial appropriation by street vendors

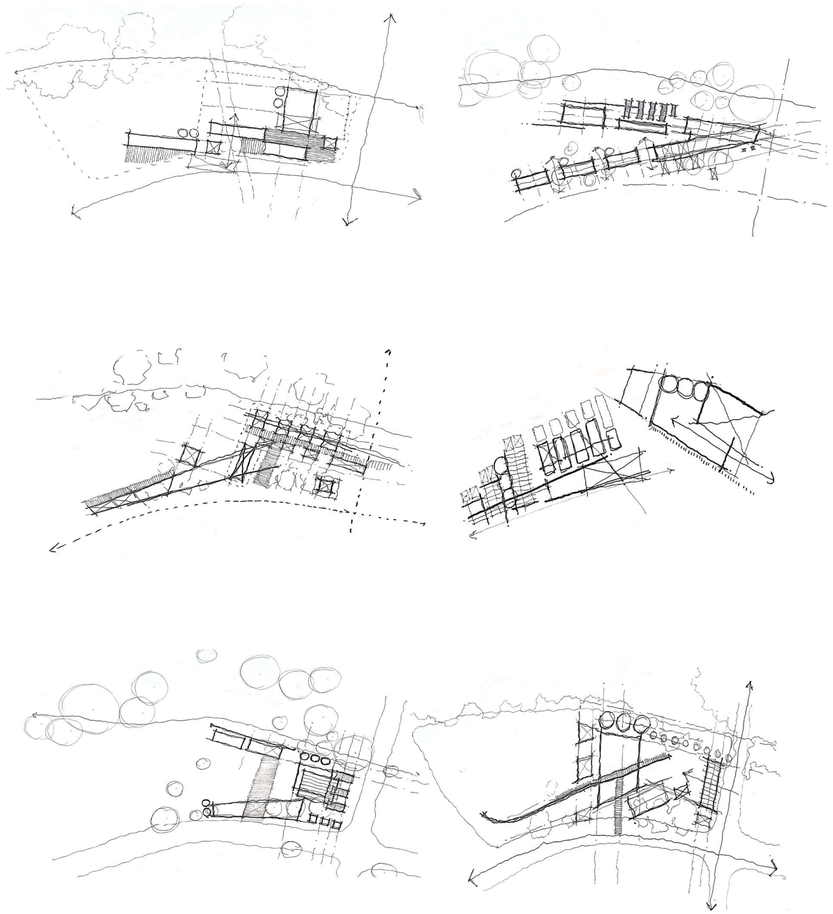
Much like the Refilwe Business Node activated its peripheral space, so is the intention of the Khalambazo node. This activation of programme is done unconsciously by the user and rests on the success of the previous two programmes.



Iterative Process

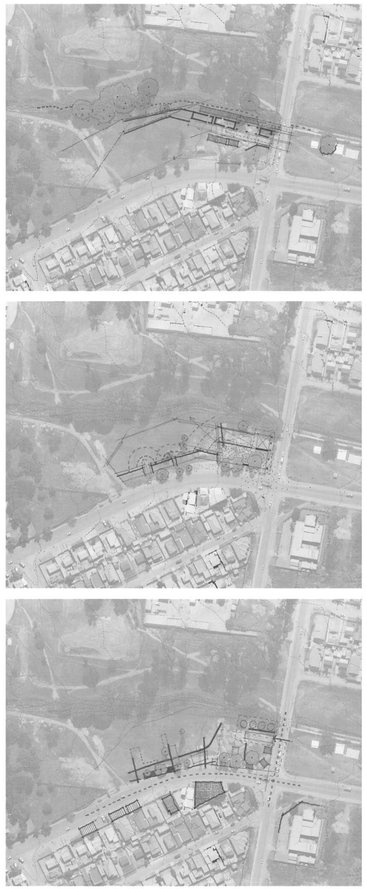
1

Bumf sketch design through rapid workshops held with students working in similar contexts



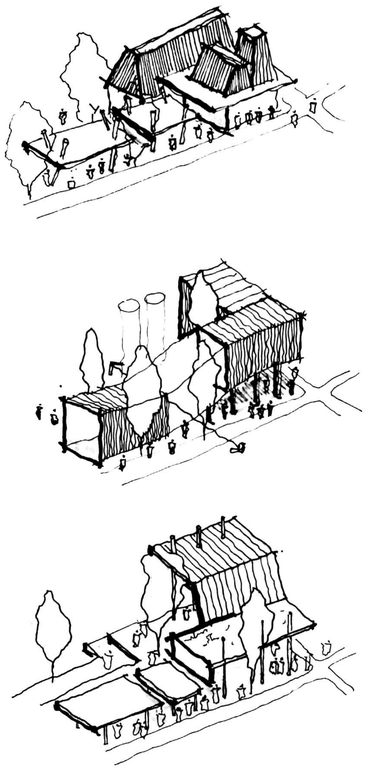
2

Superimposition of refined sketch ideas onto the proposed site to see how ideas translate to intervention



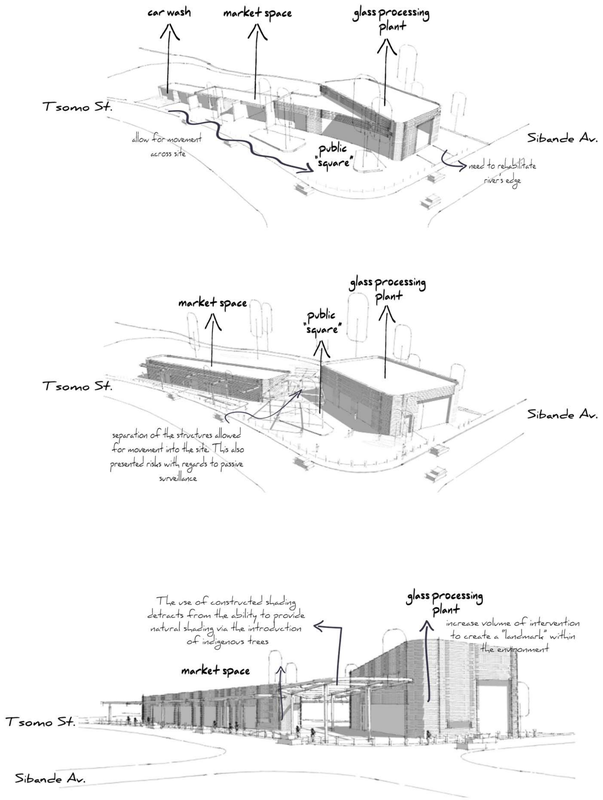
3

3D isometric volume explorations to elaborate on the definition of space and landmarks



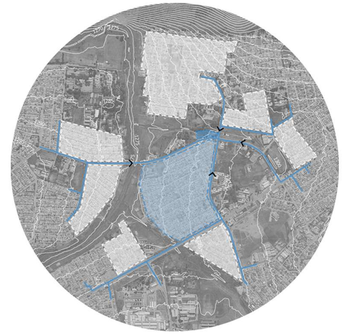
4

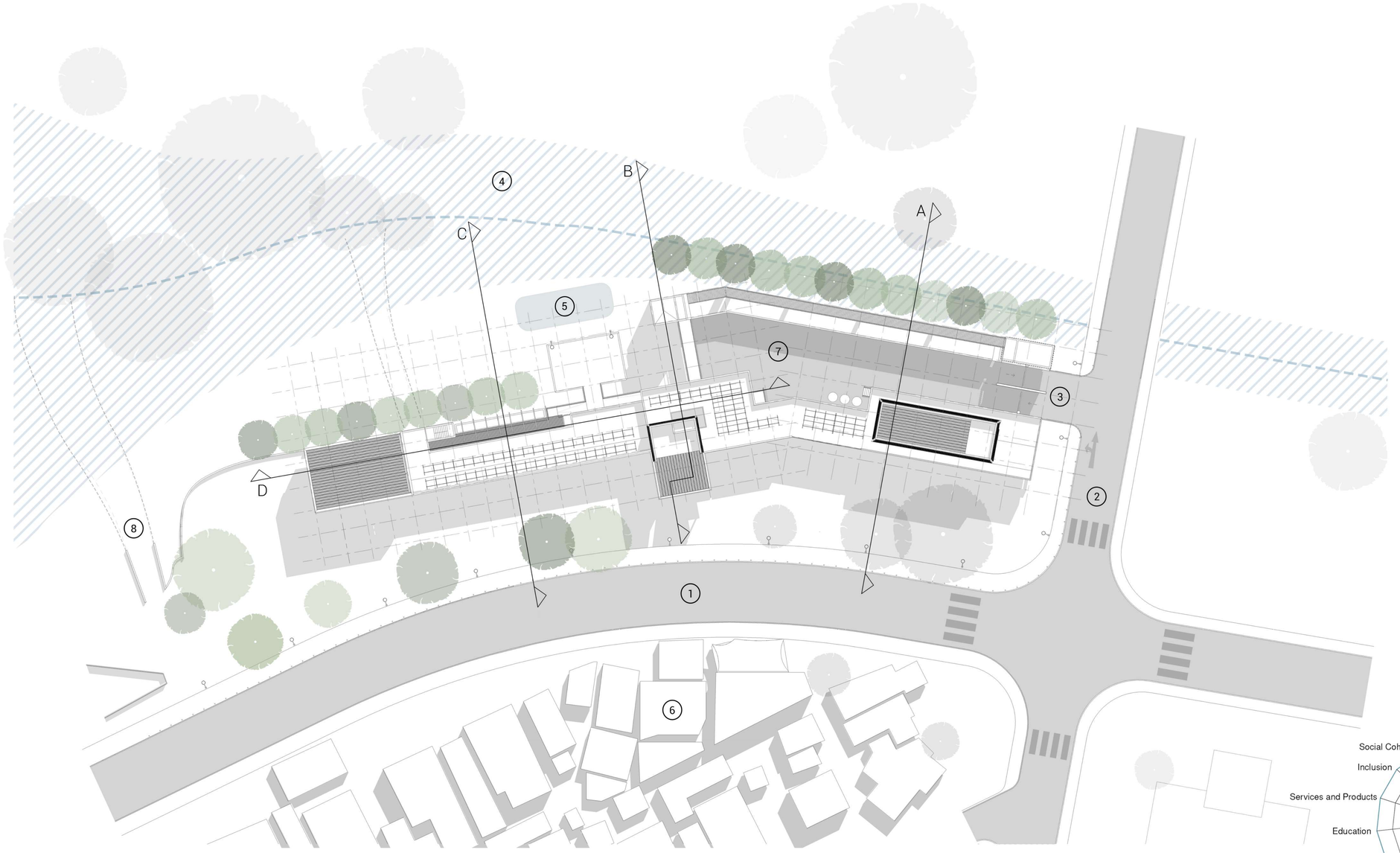
Iterative process which uses all previous design informants to arrive at the final iteration



Site Plan

00m 15m 30m 45m





1 Tsomo Street

2 Sibande Avenue

3 Vehicular entrance and exit into processing plant

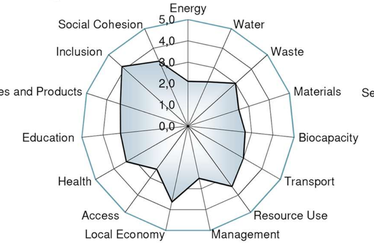
4 Pienaars River tributary

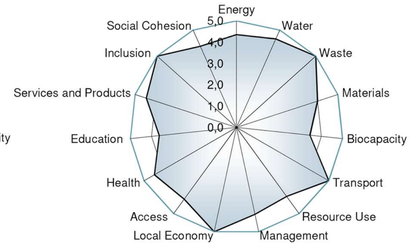
5 Wetland and water treatment process

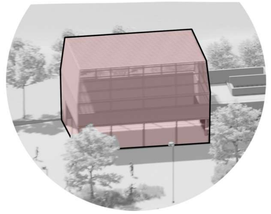
6 Khalambazo districts

7 Driveway for processing plant and offloading bay for trolley pushers

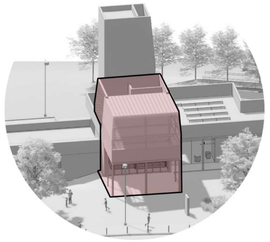
8 Stormwater bioswale infrastructure



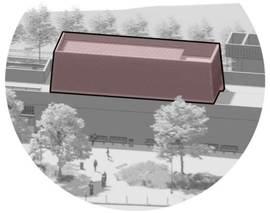




Informal Market Space



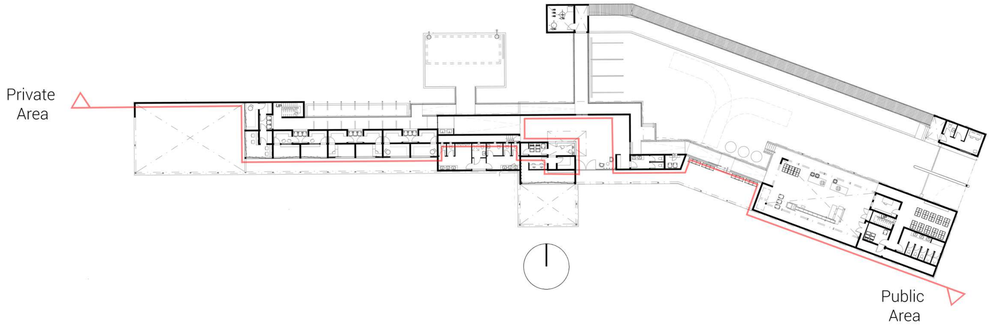
Recycling center outlet store



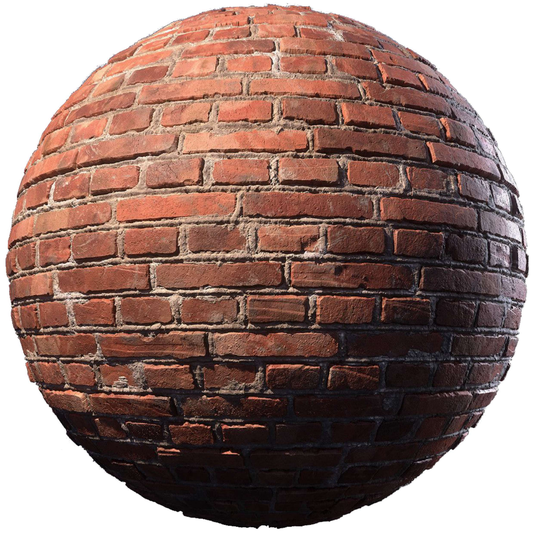
Glass processing plant

Intervention Responses

1. Fourways Fashion Lounge which contributes towards the local economic futures of the community
2. Tsomo Street which defines the southern edge of the intervention
3. Informal market space where traders can appropriate the space and the community can gather
4. Recycling center outlet store where the processed glass is sold in smaller quantities to members of the community and surrounding clients
5. Open landscape encouraging informal trade along its edge with an integrated stormwater bioswale to reduce noise pollution and provide a sense of “third space”
6. Water tower which is used for irrigation purposes, water is gravity fed down the tower and into the irrigation network
7. Glass processing plant is defined by the monolithic brick volume
8. Introduction of indigenous plant species to build up the rivers edge and provide a natural wind barrier
9. Sibande Avenue entrance and exit



Materials



The brick which will be used mostly through the project is the 222 X 106 X 73 mm Redwood Corobrik with a compressive strength greater than 20 Mpa. This brick is produced within Gauteng which reduced the carbon emissions of the building due to its close proximity.

Roof

- Cast-in-situ concrete slabs
- Safintra 0.50mm thick Saflok 700® Colorplus® AZ 150 interlocking roof sheeting
- Planted roof with associated waterproofing

Walls

Floor

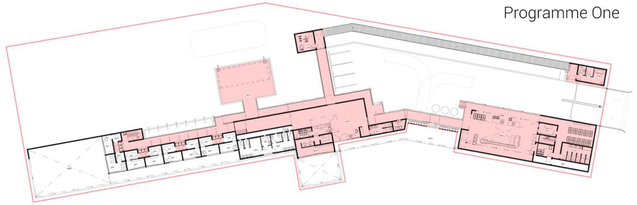
- Terrazzo Industrial Flowcrete
- Herringbone brick paving
- Cast-in-situ concrete slabs

Ground Floor Plan

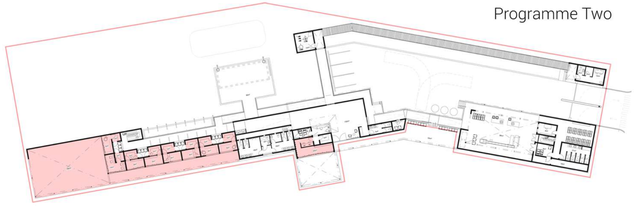
00m 08m 16m 32m

1. Public "square"
2. Informal traders space
3. Formal trade space
4. Public ablutions for male, female, and disabled
5. Processing and cleaning bay with water tanks underneath
6. Wetland and water treatment process
7. Outlet store for products produced in the glass up-cycling center
8. Foyer for processing plant
9. Storm-water bioswale running along the street edge
10. Recycling bay and drop off point
11. Trolley pusher deposit area and recycling bins
12. Flood preventative measures
13. Reintroduction of indigenous vegetation to build up rivers edge
14. Security building
15. Processing plant
16. Stairwell and vertical service core
17. Women's changing room

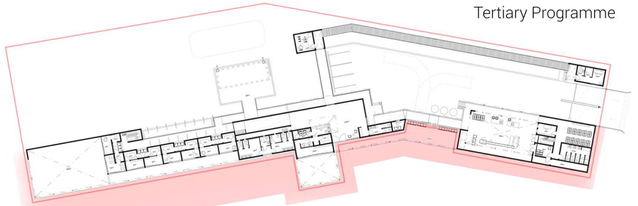
Programme One



Programme Two

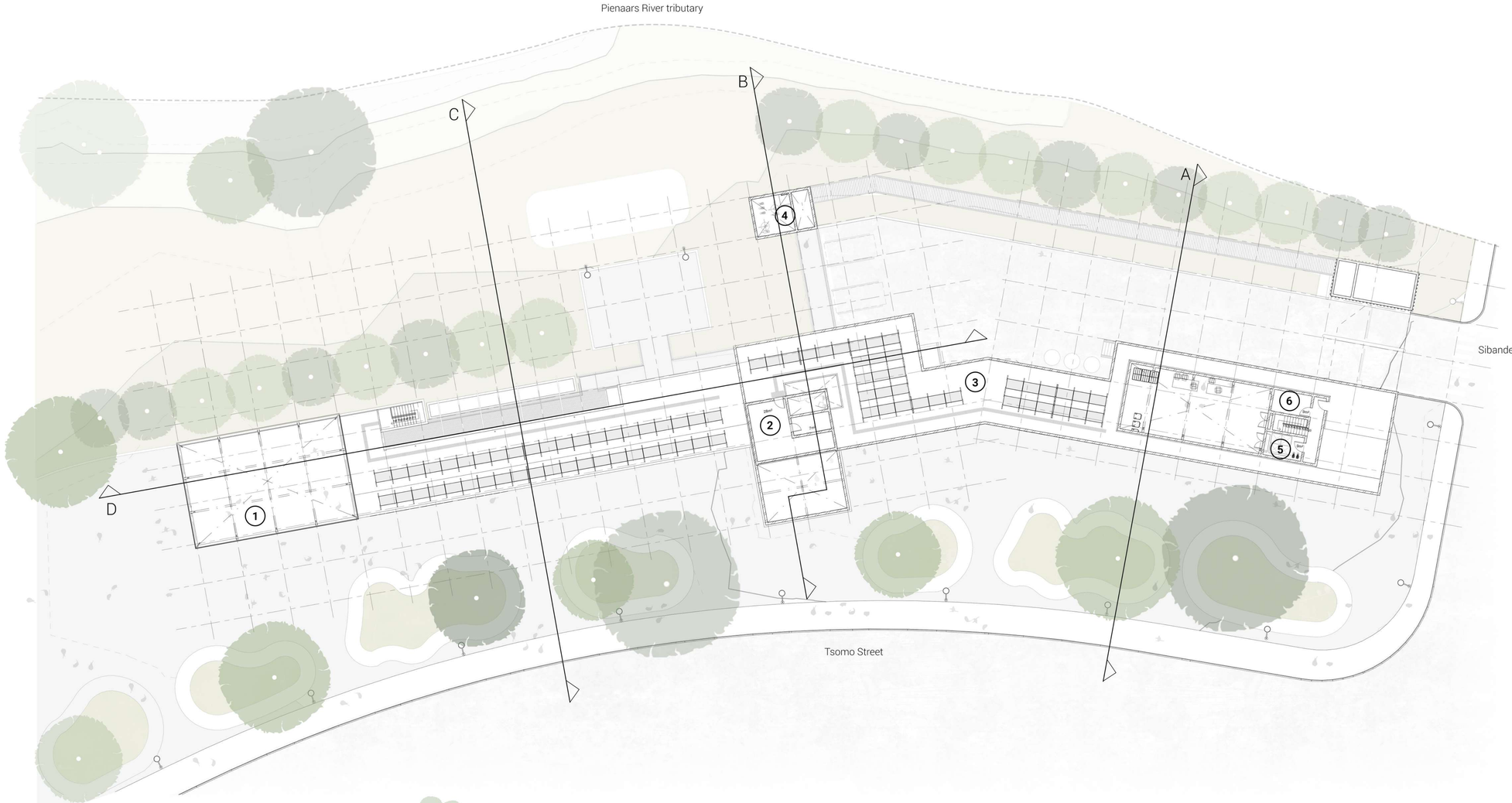


Tertiary Programme



First Floor Plan

00m 08m 16m 32m



1 Polycarbonate volume structure defining the informal trading space

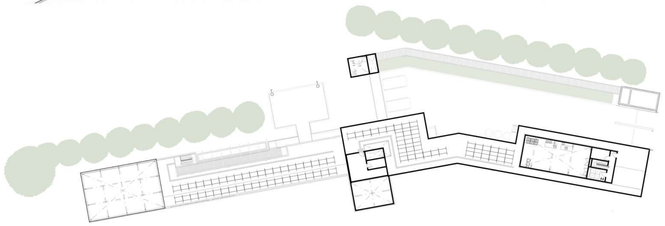
2 Inverter, battery and gardening rooms to serve the planted roof structure and solar panel maintenance

3 Solar panels located on top of the planted roof structure

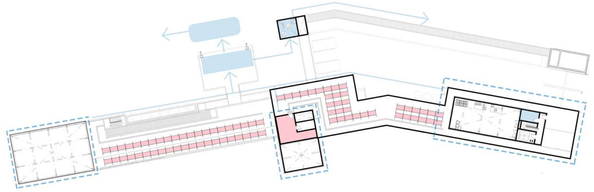
4 Pump room and water storage for irrigation throughout the site

5 Water tank and pumps for the fire sprinkler system

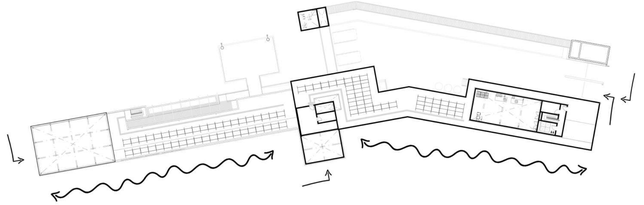
6 HVAC and plant room



Flood preventative measures

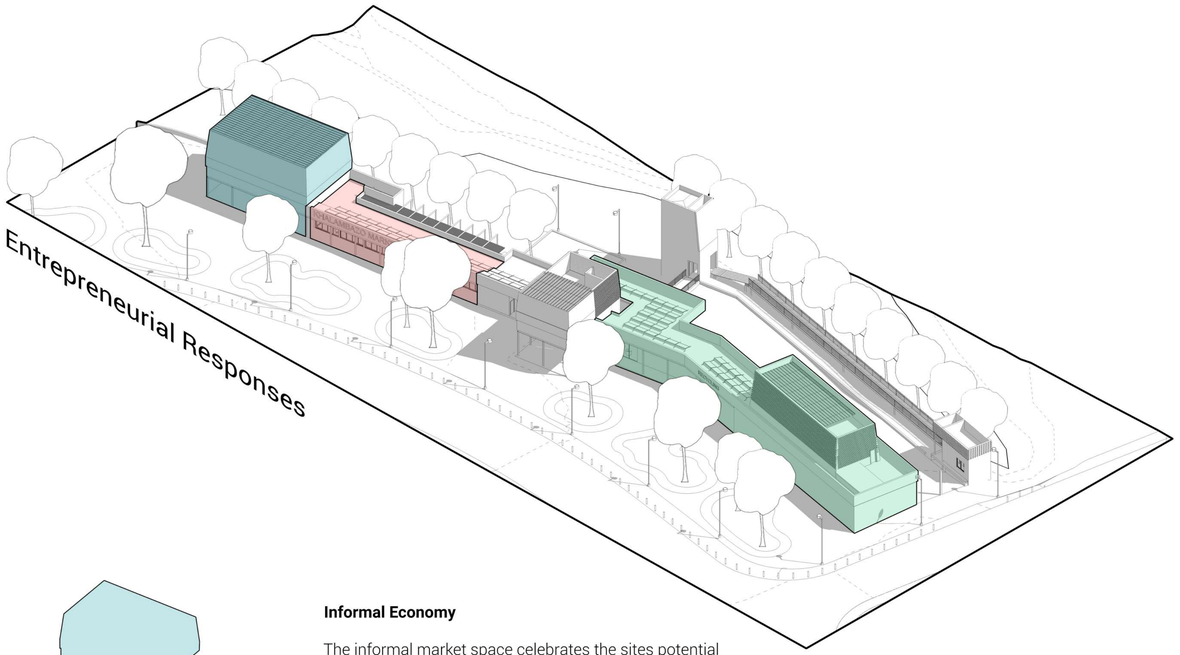


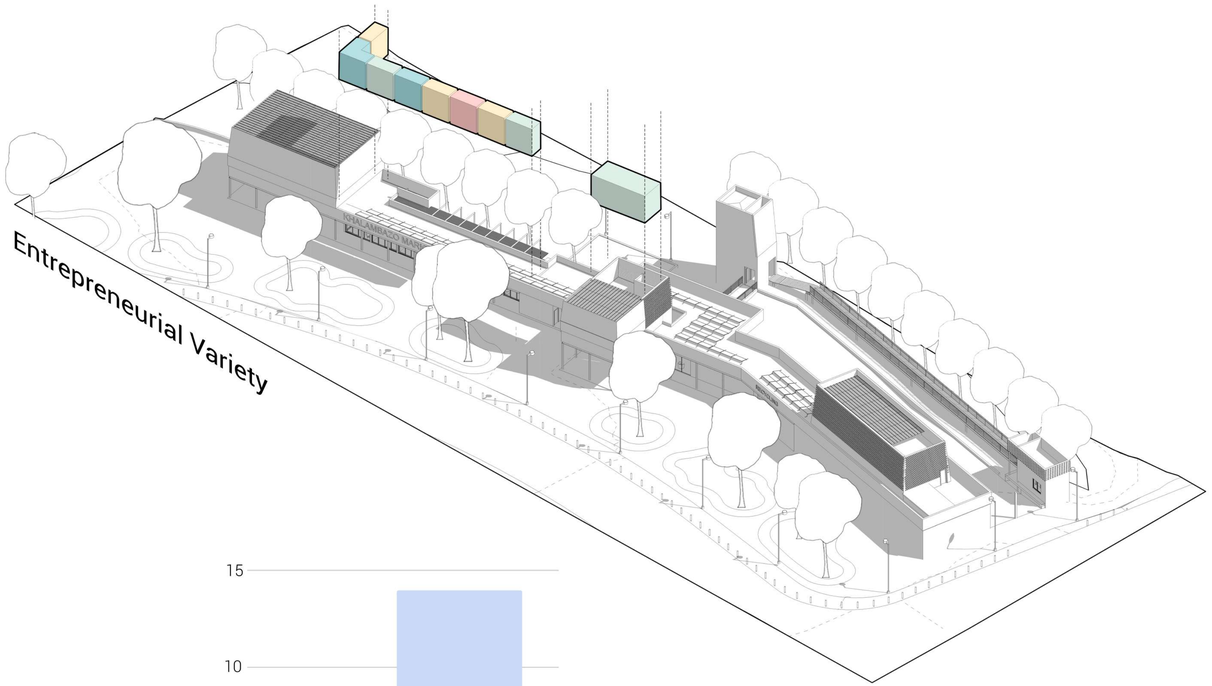
Solar & Water responses

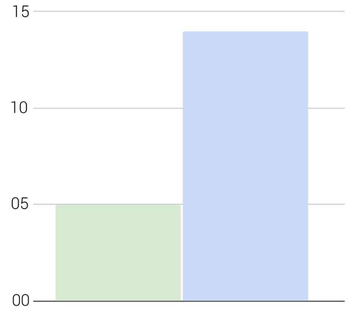


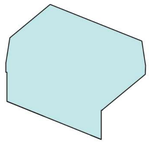
Pedestrian flow

Contribution



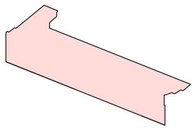






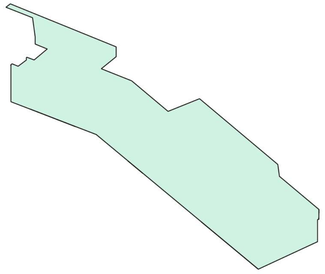
Informal Economy

The informal market space celebrates the sites potential by allowing the underlying socio-economic vibrancy to manifest through spatial appropriation to address the issue of impoverished urban space



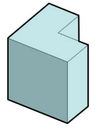
Formal Economy

The formal component of the intervention addresses the issues experienced within the landscape by providing access to business premises which stimulates economic activity in the premises and in Khalambazo by proximity



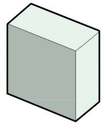
Green Economy

The glass up-cycling facility and recycling initiative contributes towards the growth of the green economy within Khalamabzo. This green infrastructure is a direct response to the existing glass recycling taking place on site and contributes towards environmental and economic success



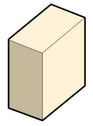
x 1

A corner store is the largest store to let, this could be a hairdresser as they are socially vibrant activators



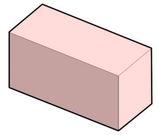
x 6

Multiple stores which offer the same area to let. General vendors, chemical store for car washes and tuck-shops



x 1

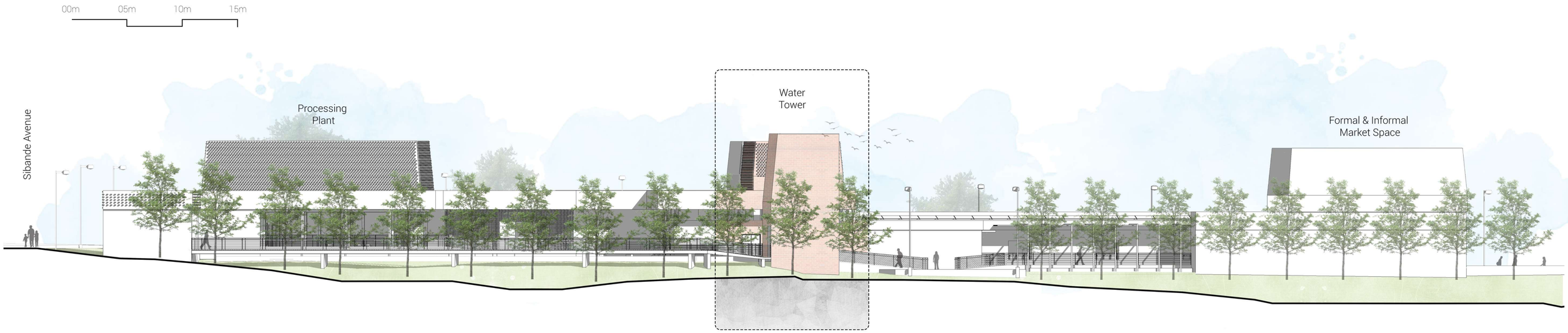
The vendor located in the corner of the informal market can rent out chairs and tables for the informal traders



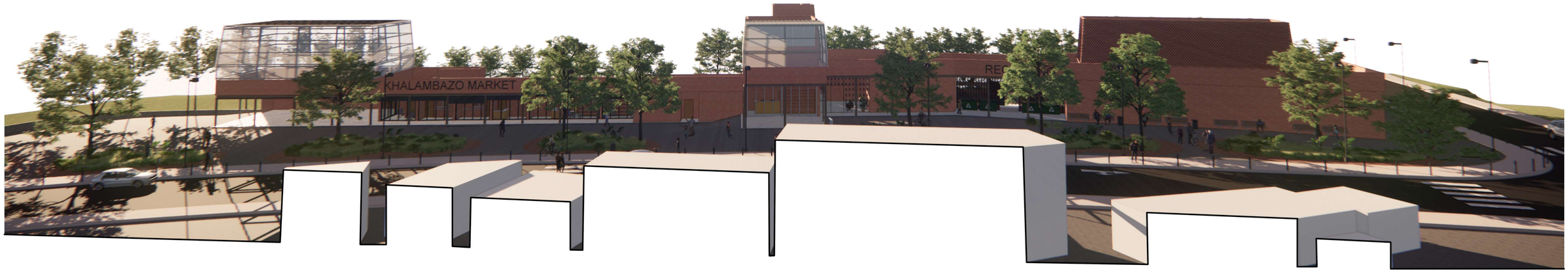
x 1

The glass processing plant outlet store is located in the center of the intervention and creates interaction between the processing plant and the community

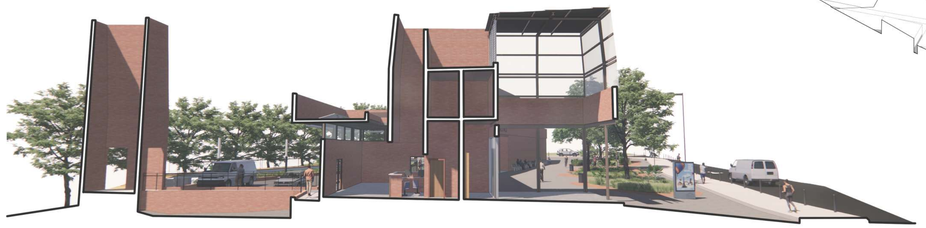
North Elevation

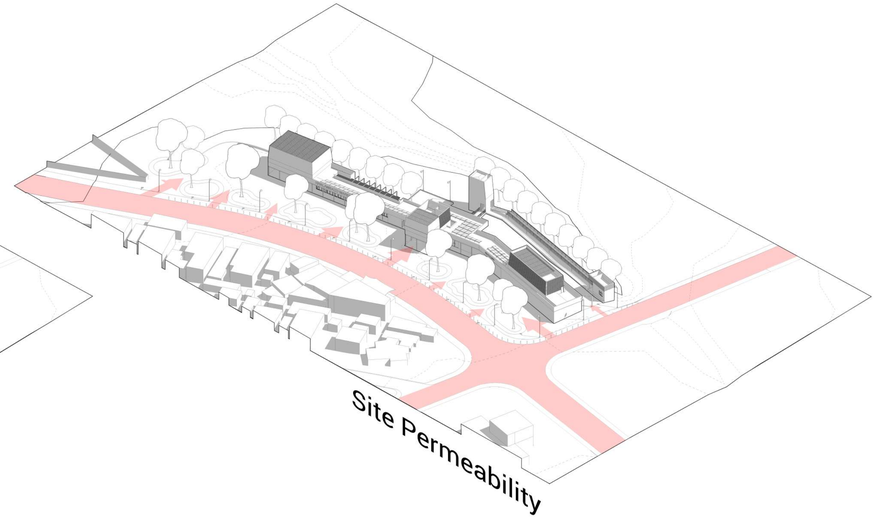


South Elevation



Section B





1 Pump and irrigation room

2 Foyer for glass processing plant

3 Storage for outlet store

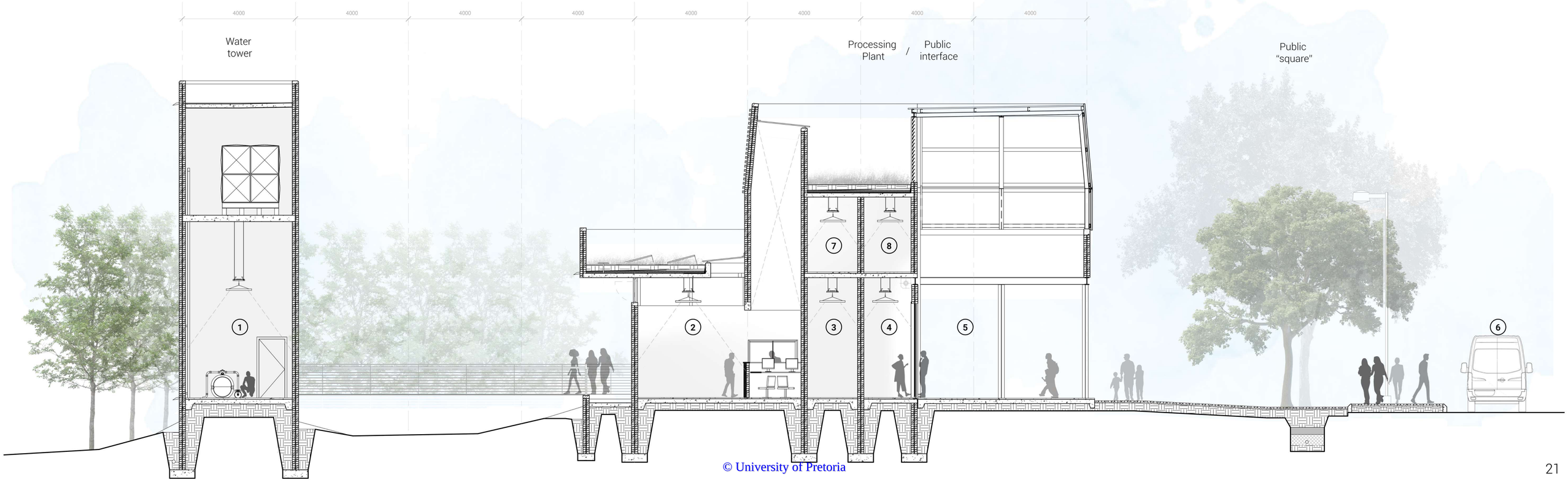
4 Outlet store for upcycled glass products

5 External public space

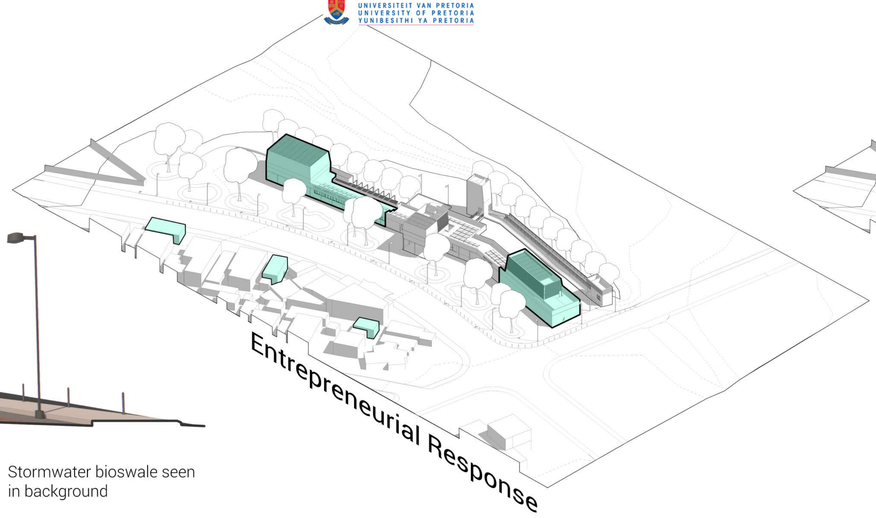
6 Tsomo Street

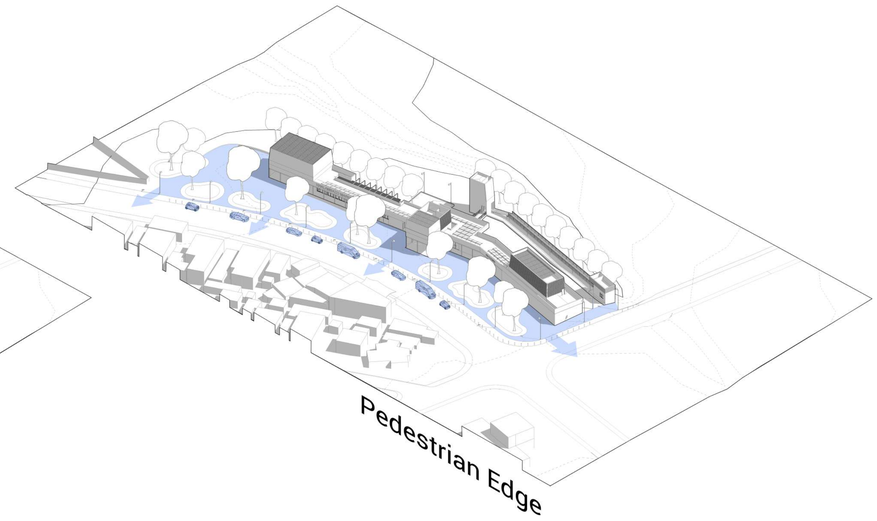
7 Maintenance room

8 Battery and inverter room



Section C





1 Artificial wetland to aid in water treatment process

2 Area for processing recyclable waste

3 Garden bed as flood preventative measure

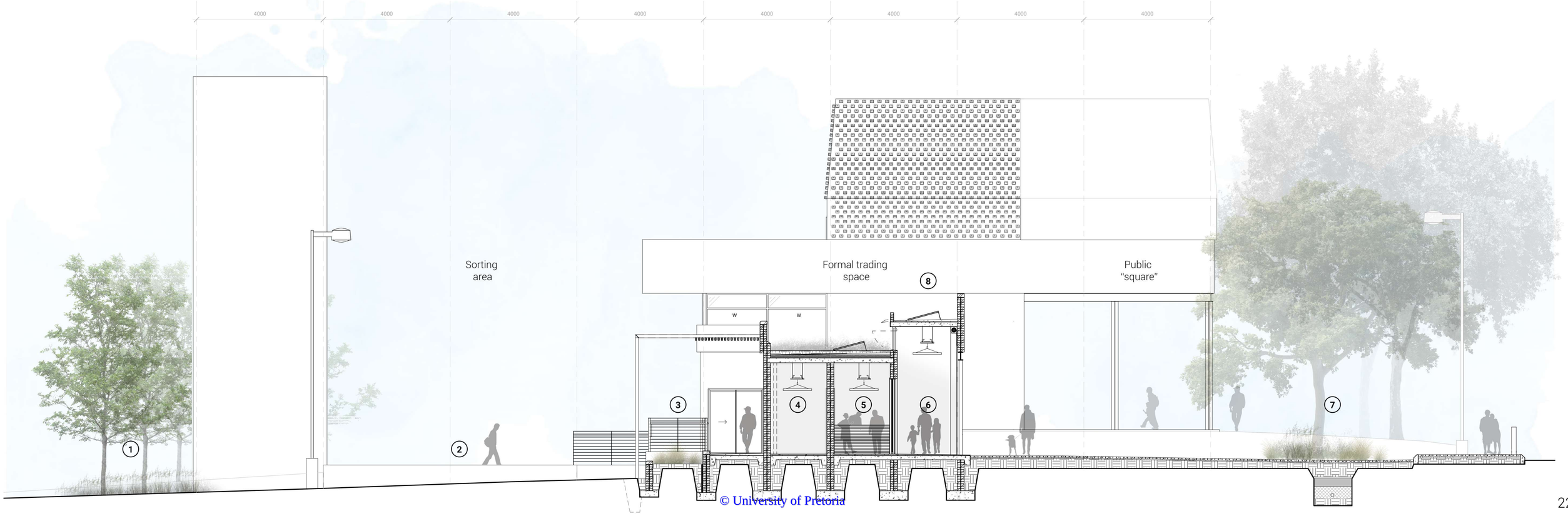
4 Storage for formal trading space

5 Formal trading space

6 Undercover passage which serves all formal stores

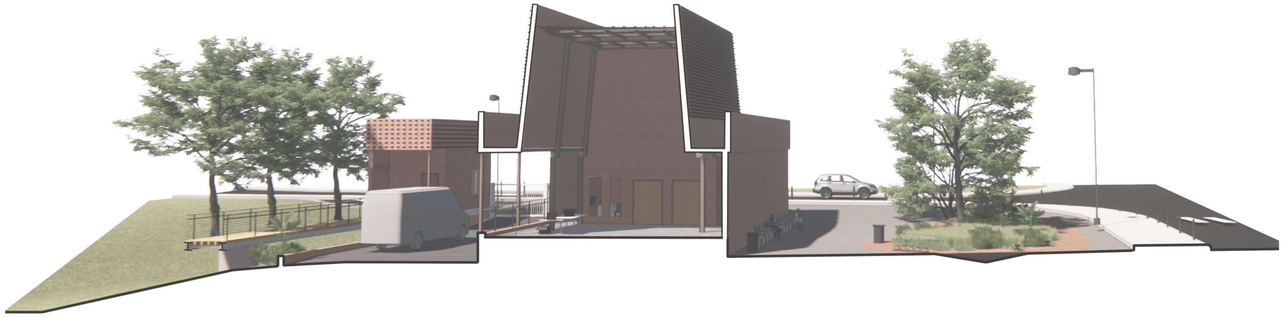
7 Stormwater bioswale seen in background

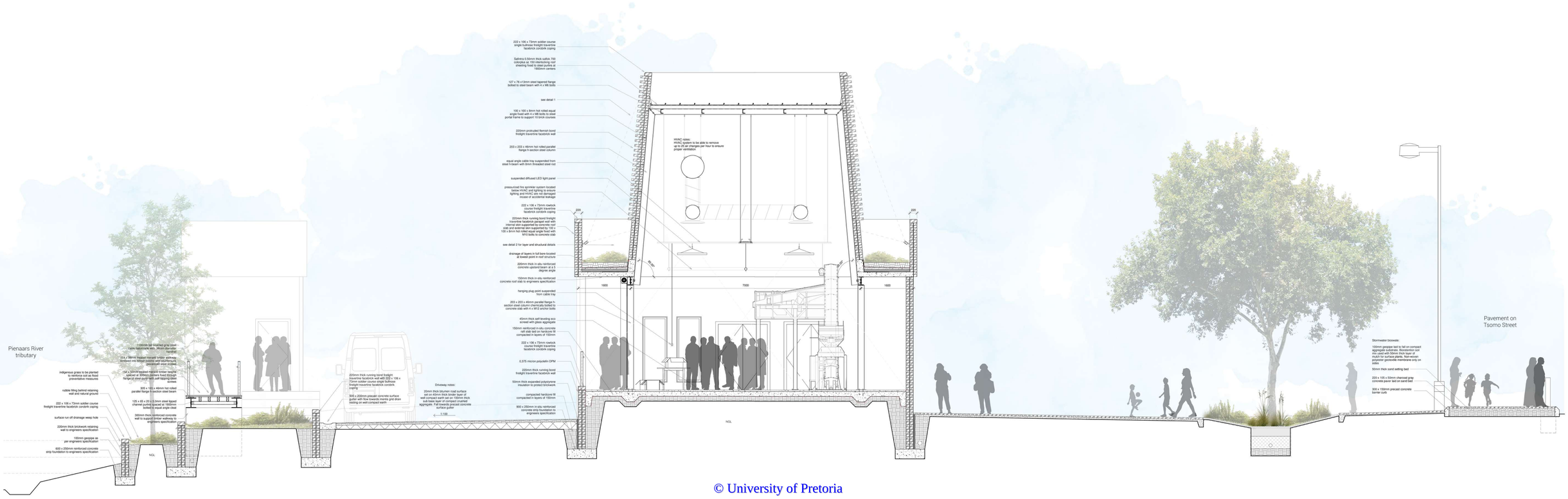
8 Planted roof structure with solar panels on the roof

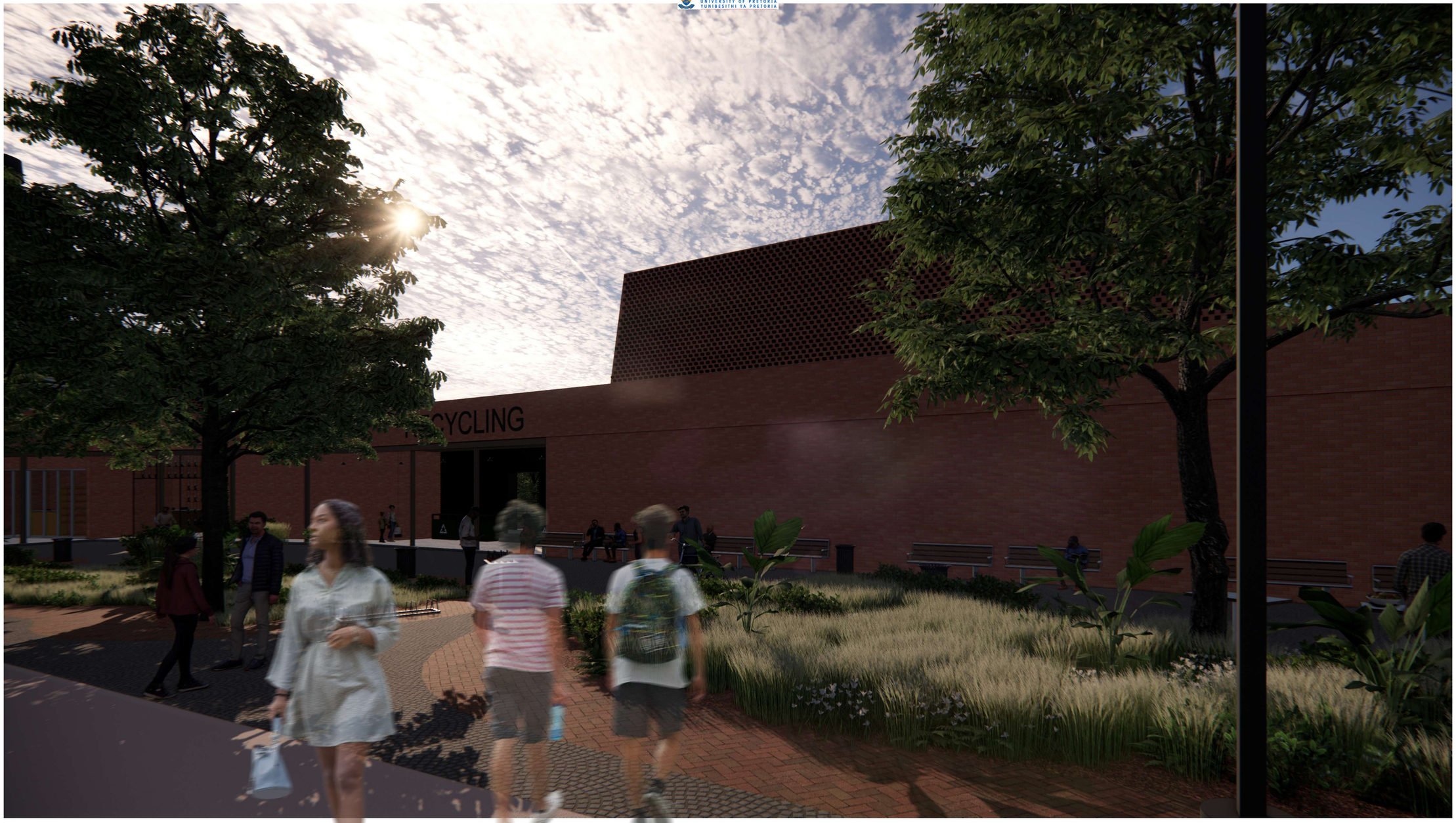


Section A

Section A is taken through the glass processing plant and illustrates the spatial configuration of the brick volume. This volume along with the brickwork become a beacon within the landscape with the brickworks rhythm and pattern contributing towards Khalambazo's image.





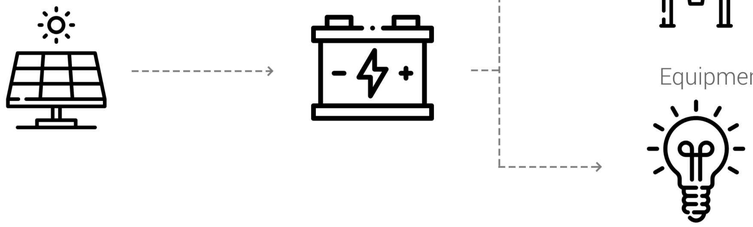


Sustainability Systems

implemented throughout the design

Solar Energy Strategy

Solar Panels → Storage → Fixtures / Equipment

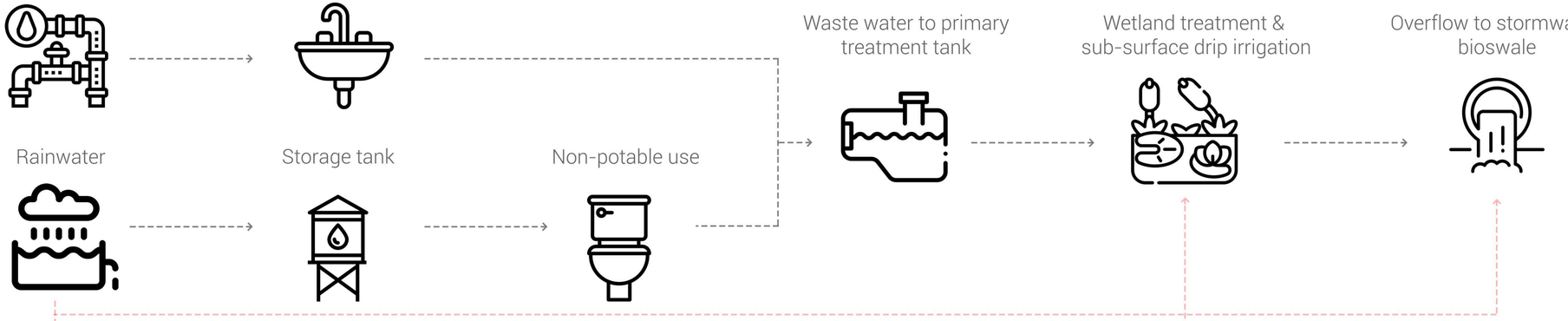


Water Strategy

Municipal supply → Potable water

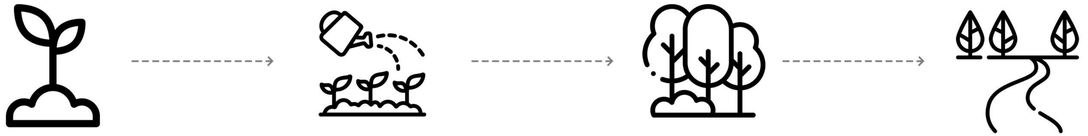
Rainwater → Storage tank → Non-potable use

Waste water to primary treatment tank → Wetland treatment & sub-surface drip irrigation → Overflow to stormwater bioswale



Ecological Strategy

Introduction of water sensitive indigenous plant species → Maintenance & care → Species establish themselves → River rehabilitation



Systems

01 Potable water travels to the public restrooms from the municipal source.

02 Rainwater is collected in underground tanks which prevents light from causing algae, tanks provide for non-potable uses such as sewage conveyance and irrigation needs. It is pumped up into a raised tank for further storage.

03 Greywater from the sinks and blackwater from the toilets is transferred to storage tanks for initial filtration.

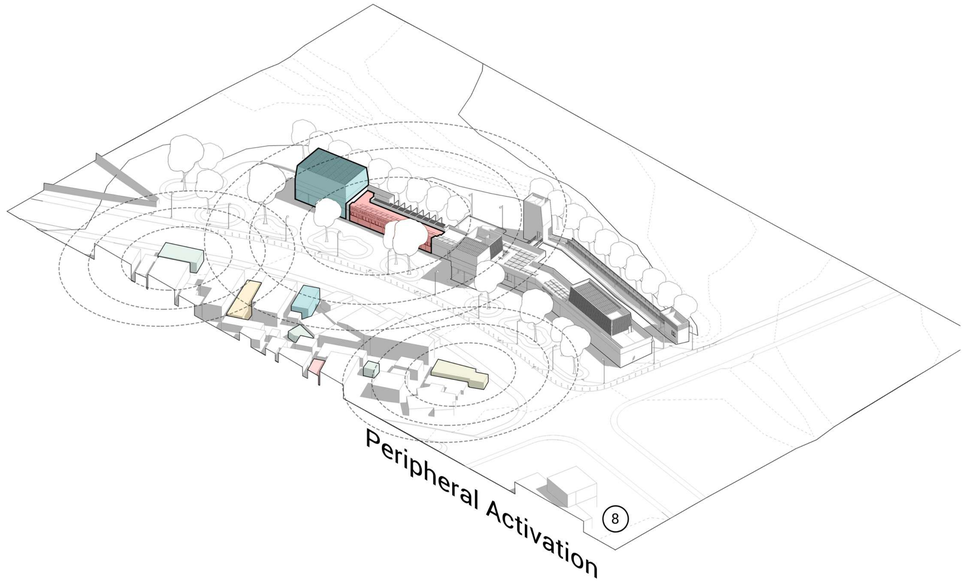
04 Water circulates through the constructed wetland several times, cleansed by the wetlands plant roots and gravel.

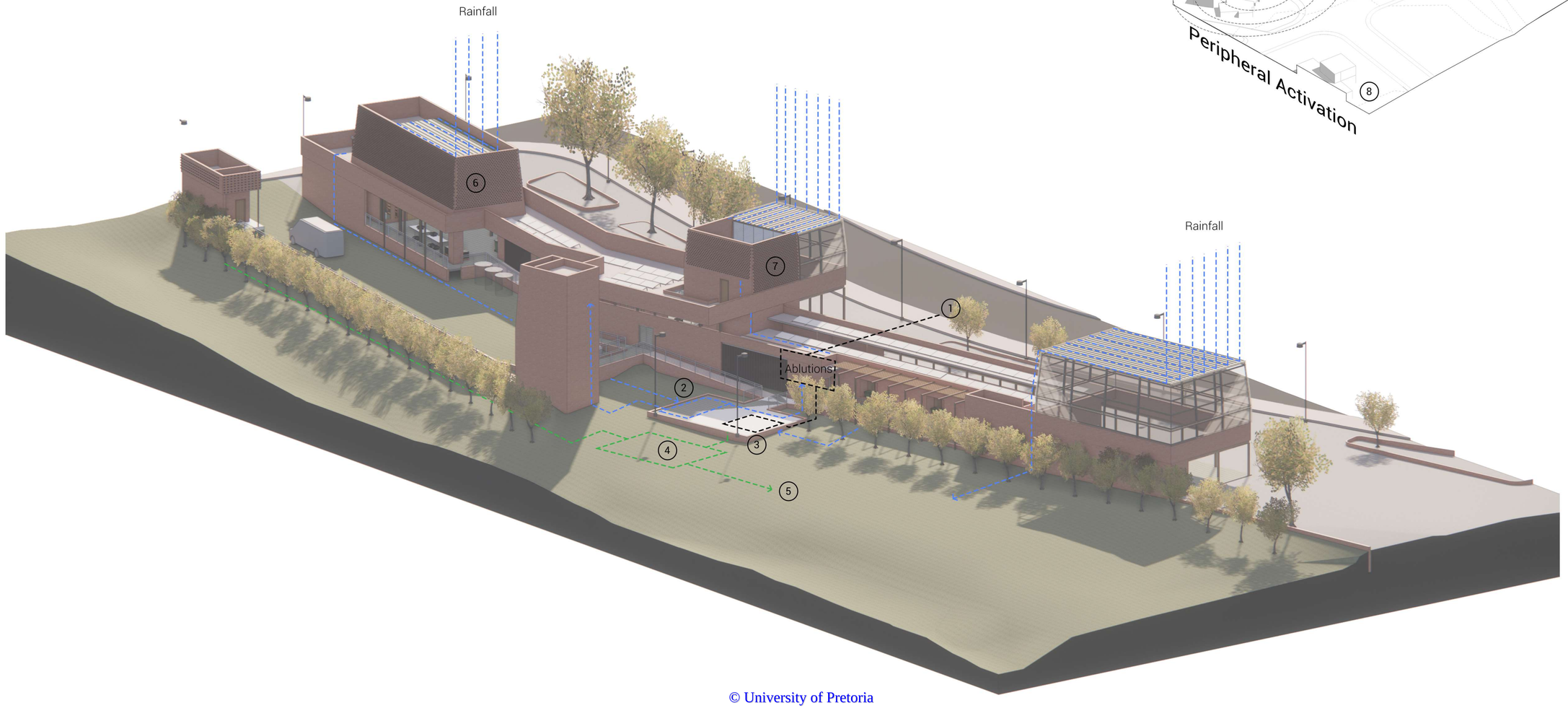
05 After the water has been cleaned, it is pumped to a drip field which returns the cleansed water through the earth and back into the tributary

06 The rainwater collected from processing plant roof is used throughout upcycling process, from cleaning to industrial tumbling.

07 Solar battery bank room & gardening room to serve the needs of the solar panels and planted roof.

08 The intervention also responds to the local economic infrastructure and stimulates other economic activities within Khalambazo.



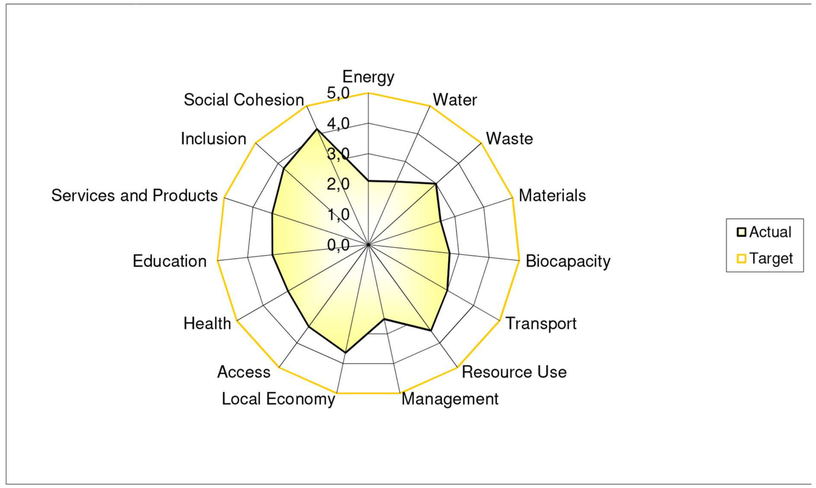


SBAT Report

Before intervention

Achieved

SB SBAT REPORT **3,1**

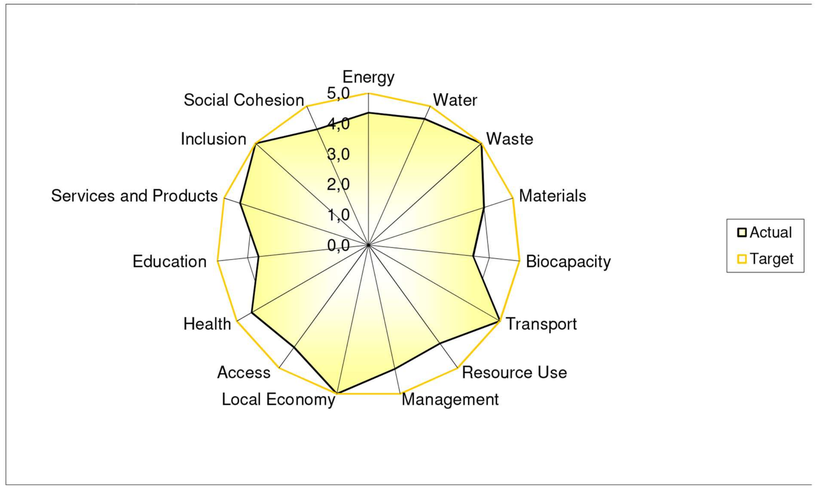


SB4 Environmental, Social and Economic Performance	Score
Environmental	2,5
Economic	3,2
Social	3,5
SBAT Rating	3,1

After intervention

Achieved

SB SBAT REPORT **4,4**



SB4 Environmental, Social and Economic Performance	Score
Environmental	4,3
Economic	4,5
Social	4,3
SBAT Rating	4,4

Visualisation 01

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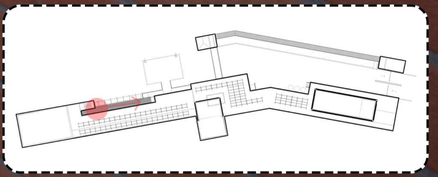
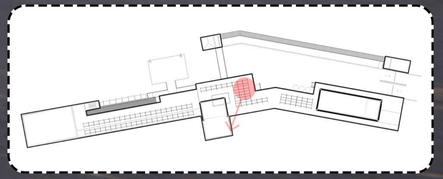
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

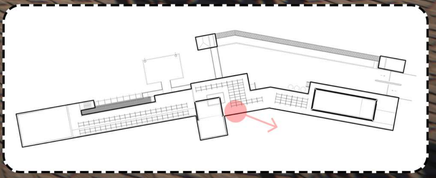
Visualisation 02



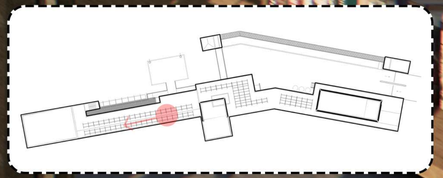
Visualisation 03

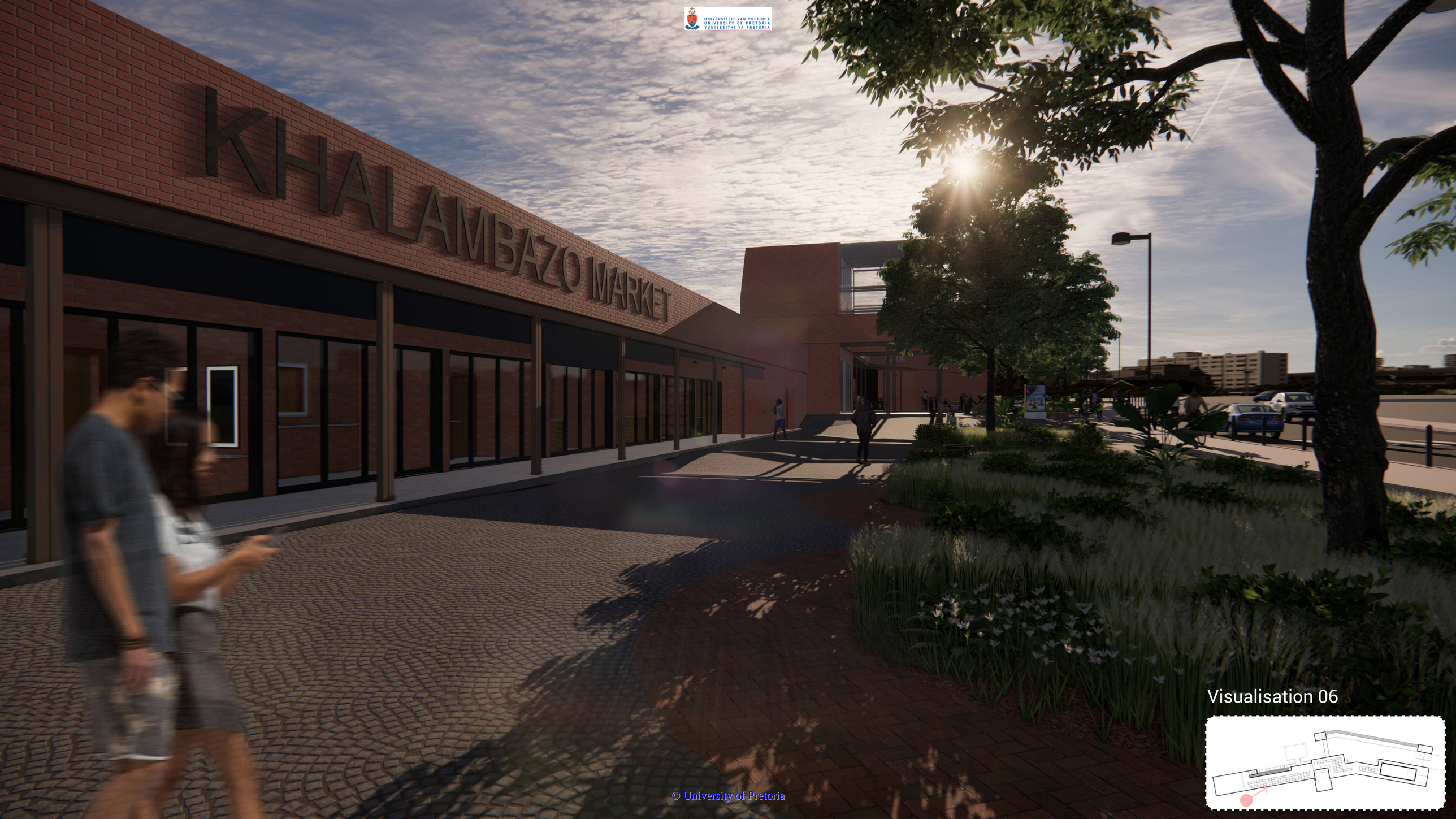


Visualisation 04



Visualisation 05





Visualisation 06

Visualisation 07

Visualisation 08