

ARCHITECTURE AS INFRASTRUCTURE

Essay 2: Design Research

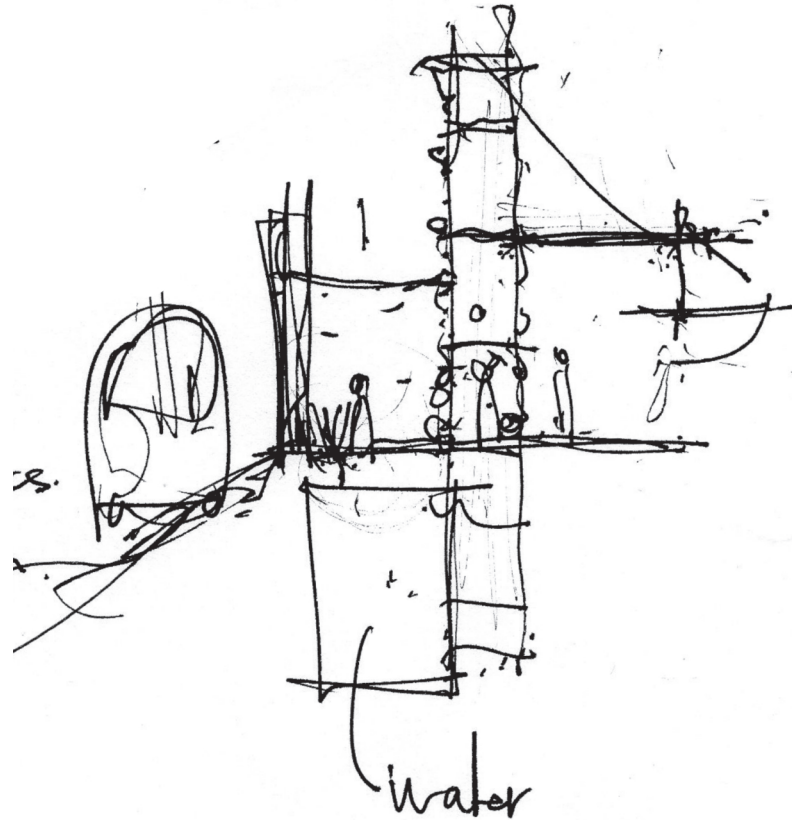


Fig. 43: Sketch of vertical farm structural concept (Nemasetoni 2021)

Architectural Approach:

The proposed project intends to explore the concept of architecture as infrastructure as a way of designing an architecture that brings value to the urban fabric by becoming an enabling or support structure that addresses some of the contemporary urban issues faced by our post-apartheid cities, for example, the Tshwane CBD, in a more effective way. A structure that enables can be thought of as one that 'allows individuals to grow' and develop. It 'empowers' a group to be able to act more effectively and also 'removes a barrier to action.'

When looking at the study area, the intention is to look at the under-used, under-developed, open and in-between spaces that exist in the city block and explore how infrastructure can be designed into these spaces. These spaces will then function as urban resources that are used to address vulnerabilities and urban challenges. What type of infrastructure can be used to revitalised the un-used pieces of land in a way that uplifts the street traders of the CBD who are in dire need of support services, the vast number of commuters that use and walk through this area on a daily basis as well as the wider growing urban community in need of public space and services for the building of resilient urban communities?

Architecture as infrastructure

By definition, Infrastructure is the most direct way to address basic human needs within the city. Traditionally, the word denotes to physical components such a roads, highways, cable and pipes.

In current discourse, there is no definitive architectural framework that guides an 'architectural approach to architecture' and according to Seewang, this could be due to how infrastructure is perceived on a much bigger more urban scale, whereas architecture is often understood more on a human scale. (2013) The effects of infrastructure are often perceived in a sort bird's eye view metropolis perspective whereas architecture tends to focus on the human eye perception of form and space. For the purpose of this dissertation, a new way of unpacking how infrastructure can be implemented architecturally will be developed using different perspectives. A desktop study of contemporary theory and ideas of what infrastructure could become was conducted in an attempt to create a framework that would guide the architectural design process.

Framework for Infrastructure as Architecture

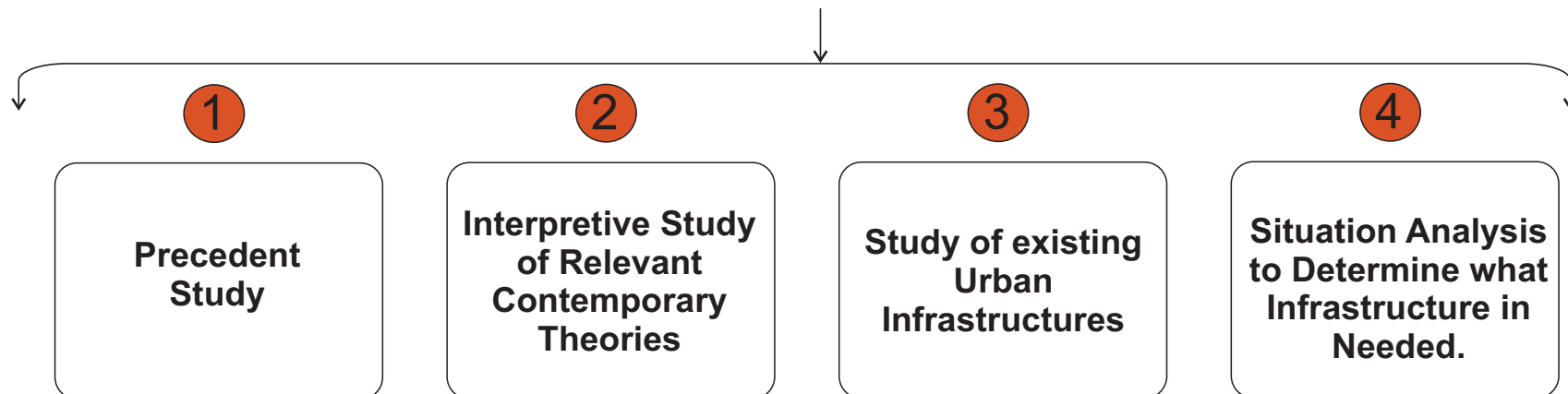
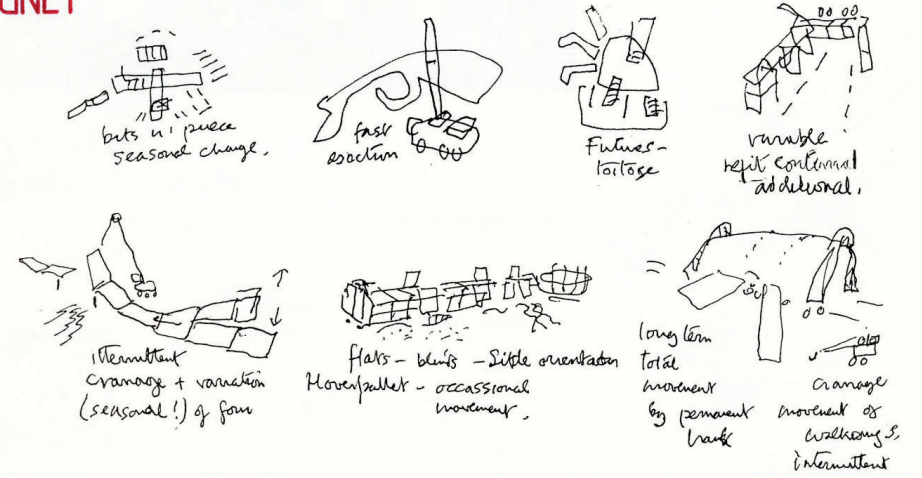


Fig. 44: Diagram of design approach informants (Nemasetoni 2021)

MAGNET



1

Theoretical Precedent:

Infrastructure as Architecture Concept Precedent

Cedric Price started his practice in 1960 with a focus on designing 'facilities, possibilities and activities,' with a focus on how his structures could be 'removed, re-used or demolished.'

His project named Magnets (1996) is a proposal of a 'series of structures which would be paid for by local authorities. These structures would be used to bring public amenities and spaces for public moment located in spaces not usually used as public spaces. Places such as the space above roads, spaces like streets, parks, lakes and railways. These interventions would bring something new to these sites such as information, 'sanctuary,' 'views and safety.' The aim was to take underused and overlooked spaces and bring better use and socially beneficial programmes (Iqbal Aalam. Architecture, planning, arts and crafts. 2012)

These structures are designed to be 'adaptable, mobile and re-usable.' (Iqbal Aalam Architecture, planning, arts and crafts. 2012). Traditionally infrastructural elements such as cranes, scissor lifts are used as the structures and adapted making these interventions both 'pragmatic' and complex for the benefit of the public (Iqbal Aalam. Architecture, planning, arts and crafts. 2012).

All the projects are contextualised in typical urban conditions such as shopping streets, major roads, parks, railways and shopping centres and offer this such as access and mobility, information and recreational programmes such as views and sanctuaries or pause spaces (Iqbal Aalam. Architecture, planning, arts and crafts. 2012).

The word Magnets speaks to the intention of these interventions to draw people and provide some much-needed social needs for the public. As much as these are structural components they can be seen as soft infrastructure added to the existing hard infrastructure in the city.

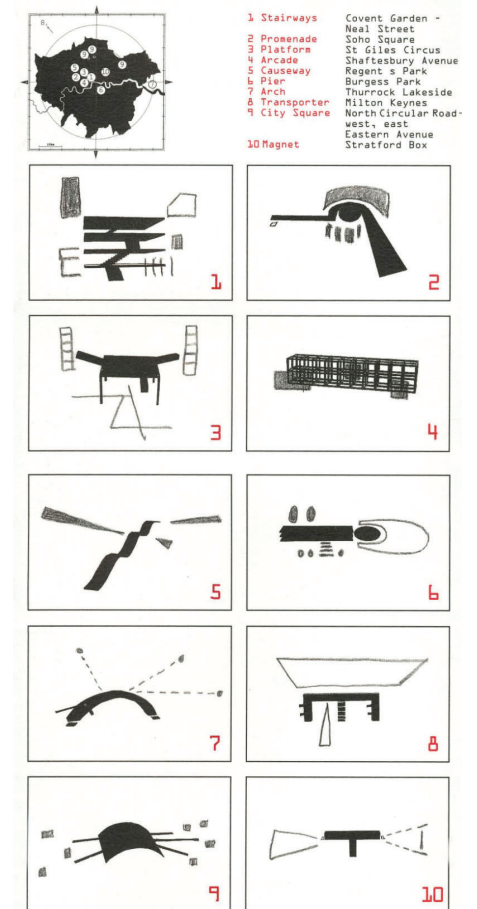
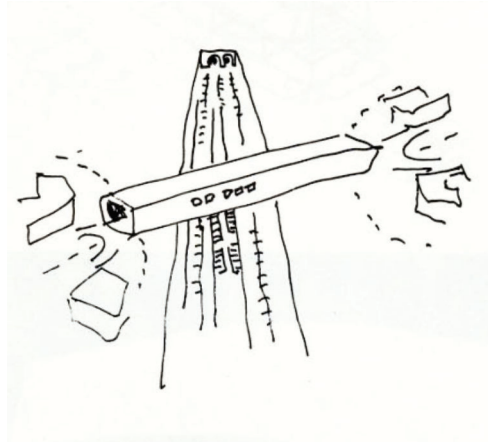


Fig. 45: Images of the Magnets (1996) project by Cedric Price ((Iqbal Aalam. Architecture, planning, arts and crafts, 2021)



2

Architectural as Infrastructure: Towards a Definition:

By definition, Infrastructure is the most direct way to address basic human needs within the city. Traditionally, the word denotes to physical components such a roads, highways, cable and pipes. Other concepts of what infrastructure could be the following:

1. Infrastructure must address the evolving needs of societies.
2. Infrastructure gives order to the city and symbolizes its culture.
3. Infrastructure is a civic project.
4. Infrastructure has the ability to offer a framework. (Connections between a system, its context and constituents).
5. Can be used to propose responsive strategies that address the predominant challenges facing urban economies today.
6. Infrastructure acts as the agent between social life and the architecture that accommodates it.



Fig. 46: Image of definition of infrastructure (Nemasetoni 2021)

3

Study of Urban Infrastructures :

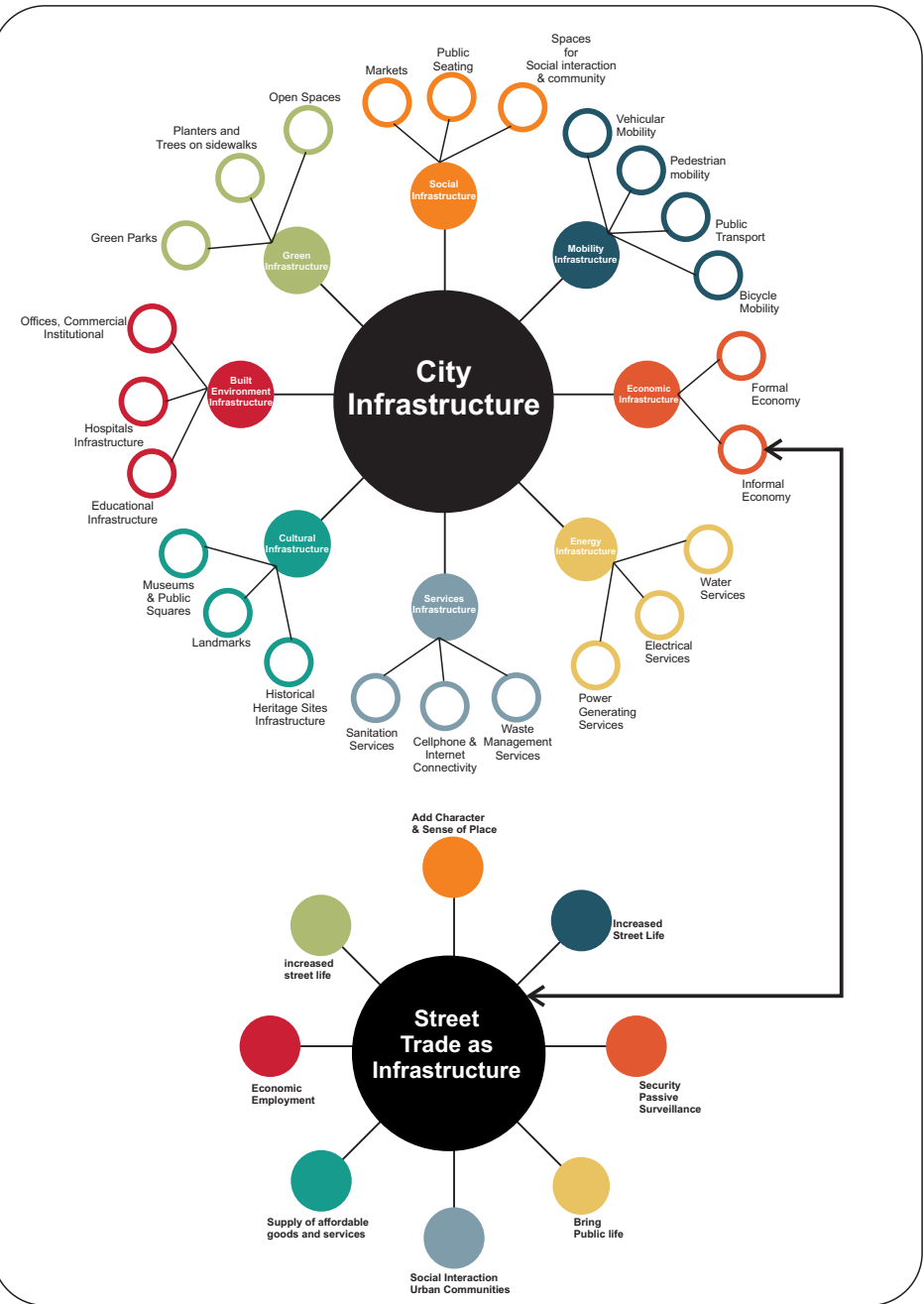


Fig. 47: Infographic of infrastructures in the city (Nemasetoni 2021)

Architecture as Infrastructure: Other Contemporary Theories

People as Infrastructure

(Synthesis of article by AbdouMaliq Simone, *People as Infrastructure: Intersecting Fragments in Johannesburg*)



1. Peoples activities in the city become the infrastructure.
2. Economic collaboration through social intersections create new opportunities for prosperity and opportunities dependent on these interactions.
3. Allows for economic opportunities that the marginalized would not be able to access in the formal system.
4. Collaborations and communities are diverse and not based on commonality of cultures and identities but rather on the commonality of purpose which is to survive and develop themselves. This leads to a more diverse, cohesive more inclusive urban experience.
5. These complex, multi-layered connections and networks work well based on the common goal to survive and develop oneself based on constant negotiation about ownership and individual and group responsibilities.

Fig. 48: Image showing how people can function as infrastructure through the urban networks they create (Nemasetoni 2021)

Streets as a Stage

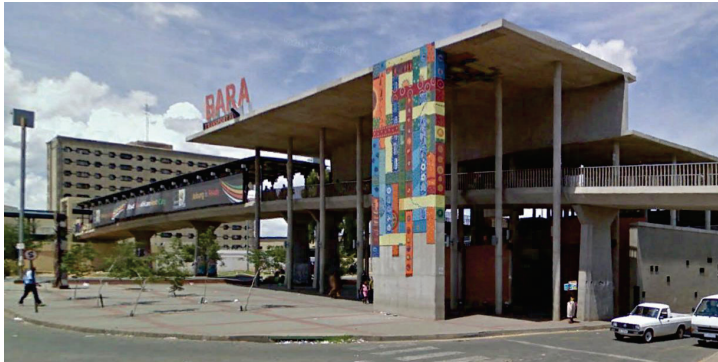


1. The streets have become the site of these exchanges as they are the ultimate public space accessible to all and used by all and are the only means that everyone in the City moves from point A to B.
2. The streets are spaces of production of resources that sustain its residents through collective collaboration within its existing systems. (Simone, 2004)

Fig. 49: Image showing how the street is a stage for the various urban networks (Nemasetoni 2021)

Precedent 2: Programmatic Precedent

Fig. 50: Photograph of the main Bara Transport Interchange Entrance (Nemasetoni 2021)



| | |
|------------------------|--|
| Project: | Baragwanath Transport Interchange and Traders Market |
| Client: | Metro Council Capital Budget Projects |
| Location: | Soweto, Johannesburg |
| Year Completed: | 2008 |
| Size: | 17000m ² |
| Architect: | Ludwig Hansen Architects and Urban Designers |

Project Description:

This project formalises and provides Infrastructure the busiest transport interchanges in Gauteng and is used by approximately 70% of all commuter who travel to and from Soweto. The design or layout intention of the project was the creation of an arcade that stretches 3000m² along Old Potch Road, which is the main road that connects all the areas within Soweto as well as links to major nodes in the city.

The Arcade is 50m wide to accommodate the large number of commuters that walk through it. This arcade acts as a 'structural spine' along the site which connects the various elements of the development with functional and support infrastructures that attach to it. This arcade also accommodates 500 'street traders' as well as support infrastructure for these informal traders such as storage facilities and stalls. These stalls would be of varying sizes to accommodate the different types and scales of street trading activities. These are interspaced with public amenities such as ablutions to increase the number of people walking along the spine. (Ludwig Hansen Architects and Urban Designers , 2020)

The spine also provides public transport public transport infrastructure and facilities with 20 bus ranking facilities for both long and short distance service providers as well as 12 taxi operators and provides space for 800 ranking taxis as well as 'holding bays.' In this way the project brings together mobility and commuters to public amenities as well as informal trade or economic activities. There are also public service buildings located at points along the site. (Ludwig Hansen Architects and Urban Designers , 2020)

Various focal points are located at different areas and

function as landmarks structures to further emphasize 'public entry points' as well as to serve for better orientation and navigation on the site. These landmarks are towers that are decorated by local artists that give the area a sense of place, identity and sense of ownership in the community. (Ludwig Hansen Architects and Urban Designers , 2020)

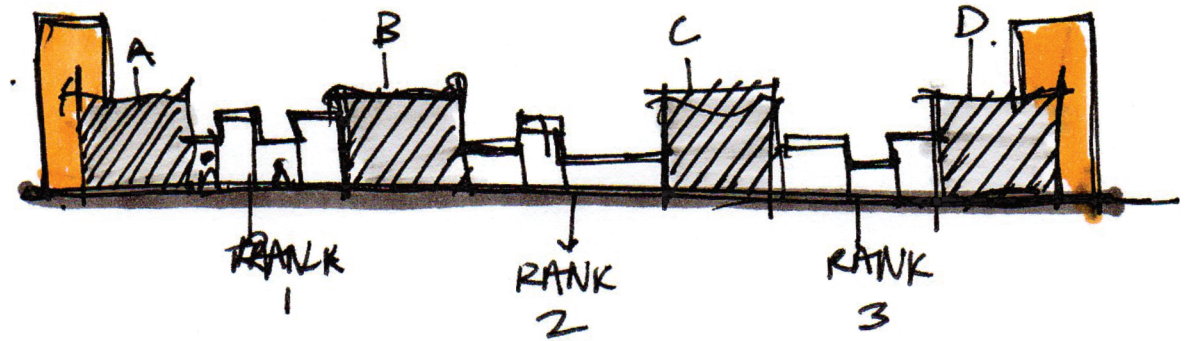
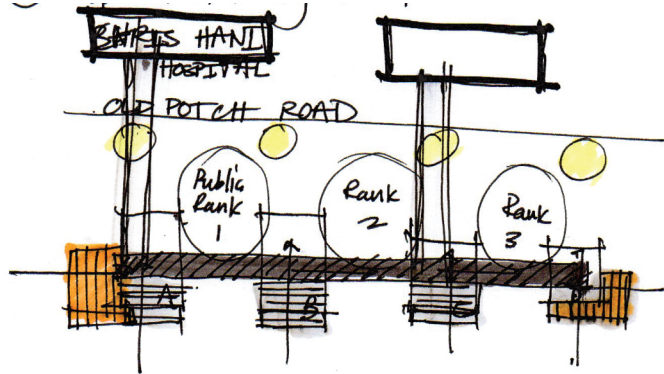
The main material used is concrete due to its robust and sense of permanence. This is a very long structure and so effort was made to explore different ways and shapes that can be made from concrete to bring diversity and break the monotony. Thus, the experiential quality of the space changes along this route and offers different options on how to inhabit the space. (Ludwig Hansen Architects and Urban Designers , 2020)



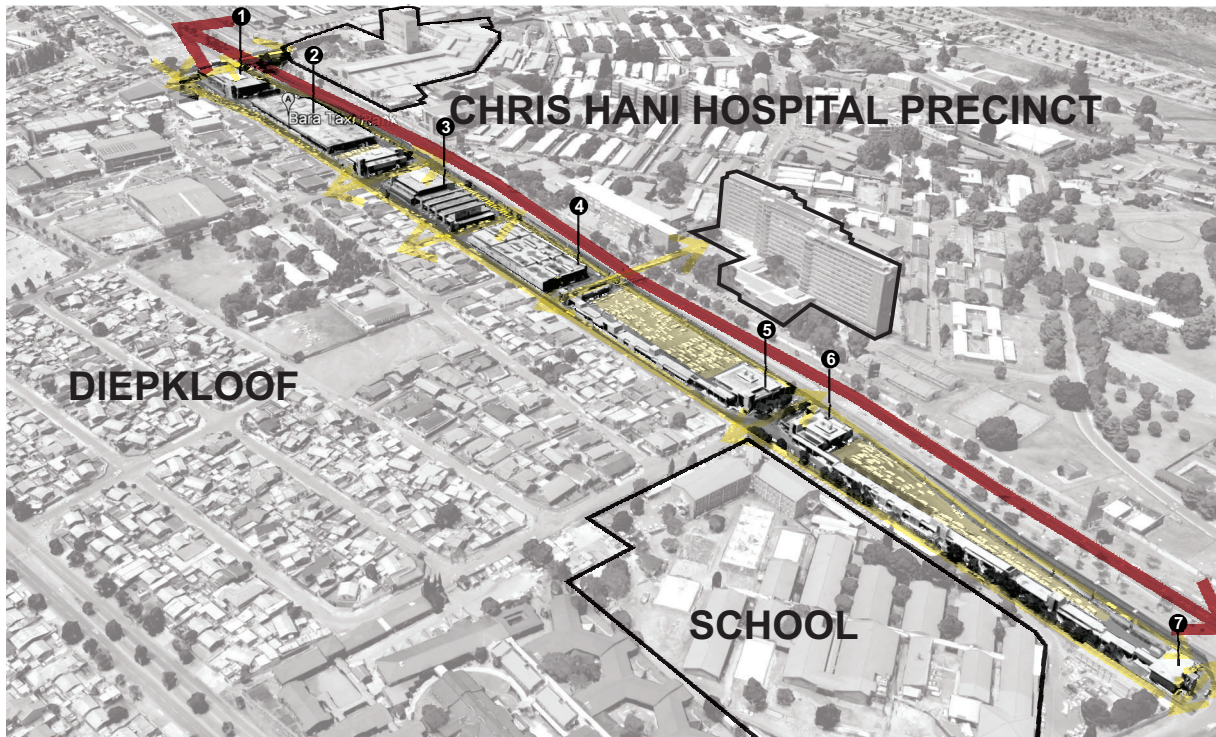
Fig. 51: Image showing precedent study analysis of Bara Transport Interchange (Nemasetoni 2021)

Precedent 2: Baragwanath Transport Interchange

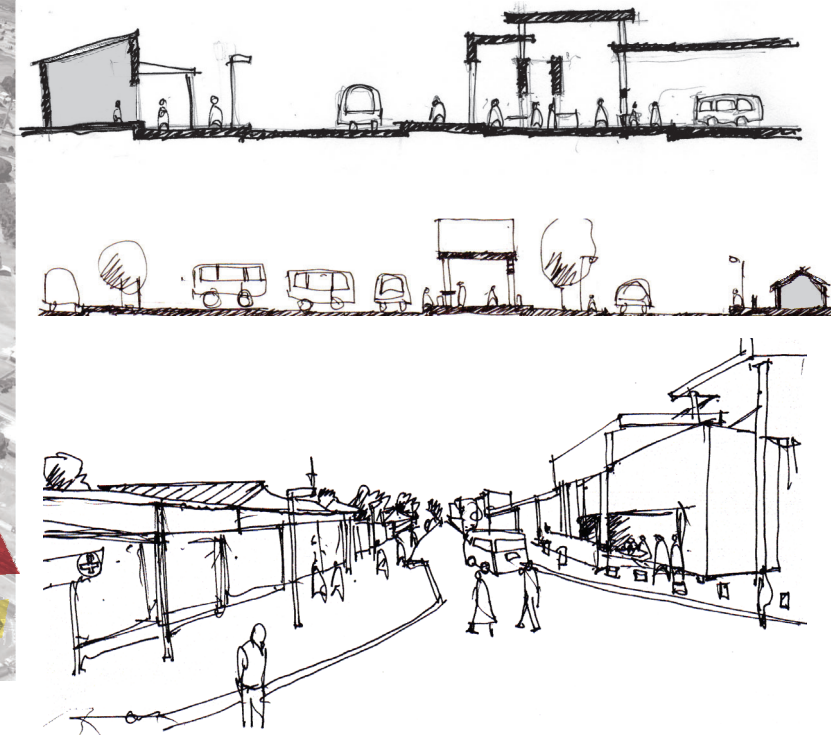
1. Spatial Planning Principles/ Building Concept



2. Context



Context Scale, Boundaries & Edges



Birds eye view showing project in context and the various connections and accessibility.

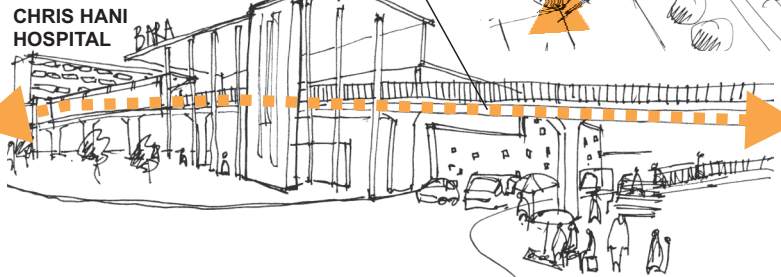
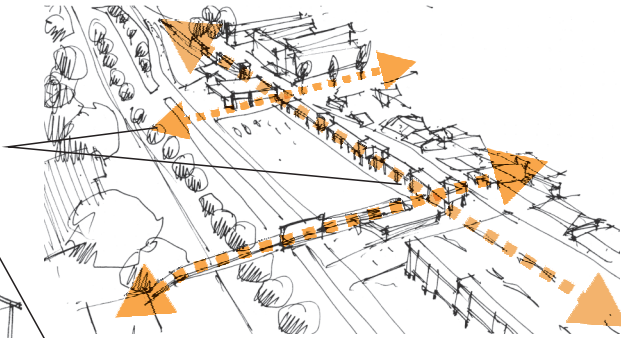
Fig. 52: Image showing precedent study analysis of Bara Transport Interchange (Nemasetoni 2021)



3. ACCESS AND ACCESIBILITY + CIRCULATION

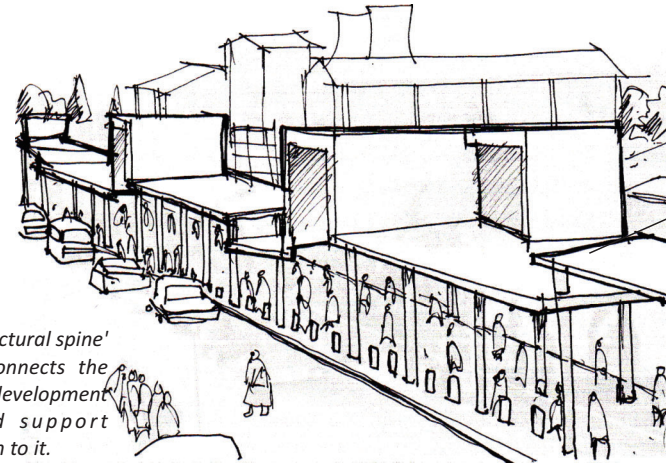
Strong east west axis is emphasized as main circulation space which is parallel to Old Potch Road. This is the primary route with secondary north south connections made by how the site is divided as well.

Direct links are made over the main road to the Chris Hani Hospital creating a safer access route from the public transport to the hospital.



This arcade acts as a 'structural spine' along the site which connects the various elements of the development with functional and support infrastructures that attach to it.

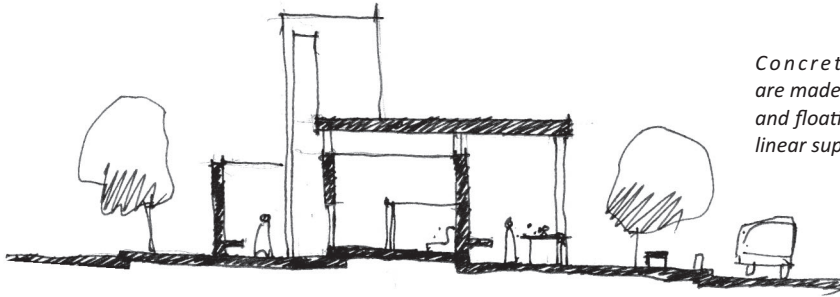
4. LIGHT AND SHADOW



Vibrant, dynamic floating concrete roof gives different spatial experience to commuters walking along the walkway.

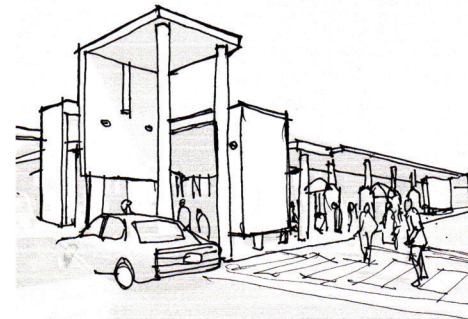
This walkway is wider and has a good civic scale. Varying height of the roof bring different scales along the route as a signifier of the types of programmes that happen along the route.

5. CONSTRUCTION AND MATERIALITY

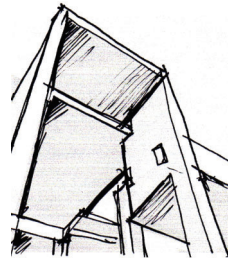


Concrete flat roofs are made to appear light and floating by long thin linear supports.

6. BUILDING USE/ PUBLIC LIFE/ INFORMAL ECONOMY



Seating areas are attached to walkway area which also provides street trader stalls across creating a pause area.



Concrete is explored for its versatility and robust quality.



The main material used is concrete due to its robust and sense of permanence. This is a very long structure and so effort was made to explore different ways and shapes that can be made from concrete to bring diversity and break the monotony. Thus, the experiential quality of the space changes along this route and offers different options on how to inhabit the space.

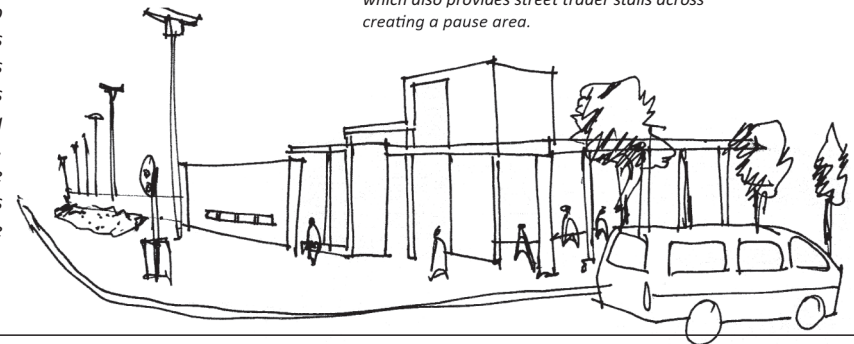
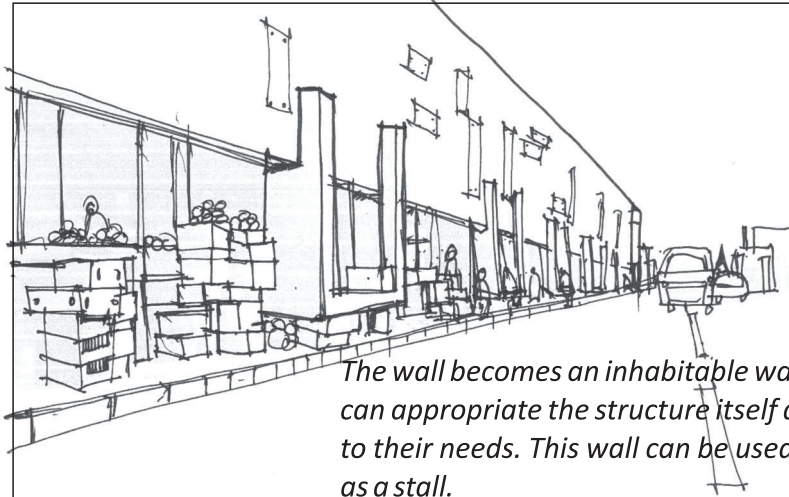
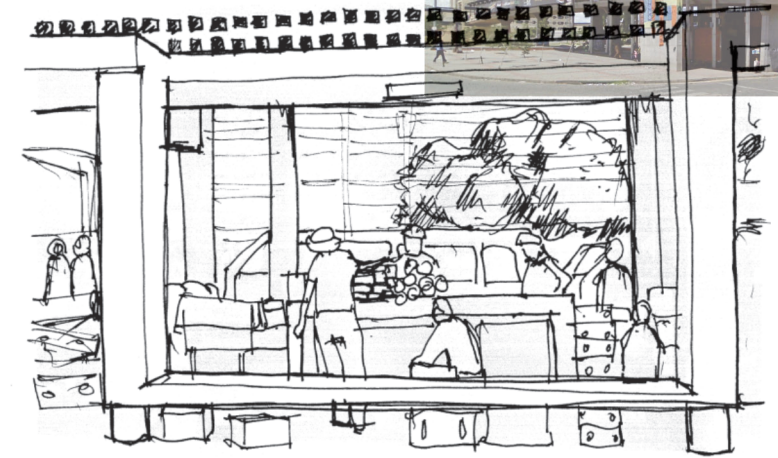


Fig. 53: Image showing precedent study analysis of Bara Transport Interchange (Nemasetoni 2021)

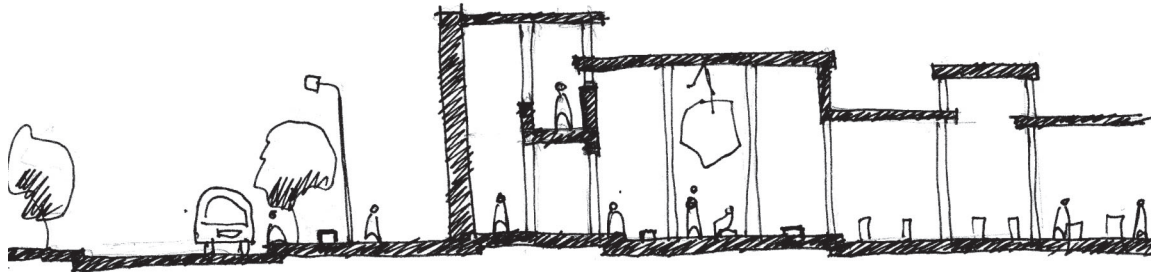


The wall becomes an inhabitable wall along the route where the users can appropriate the structure itself and the space around it according to their needs. This wall can be used for seating, storage, display and as a stall.

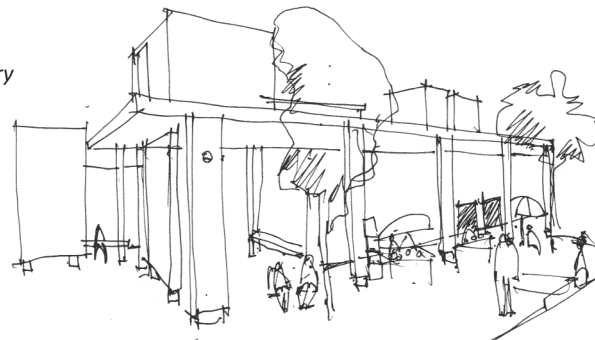
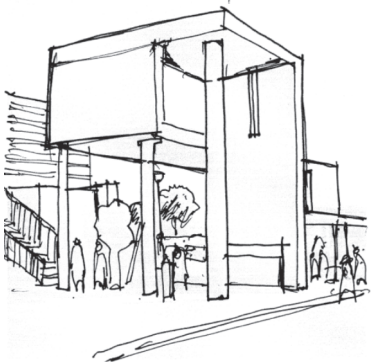


Sketch showing how concrete wall is used for seating and stalls bringing public life and the informal economy together.

7. BOUNDARIES AND SPACE



Landmarks are created at entry points for better orientation and navigation and define the boundary of the development.



Various focal points are located at different areas and function as landmarks structures to further emphasize 'public entry points' as well as to serve for better orientation and navigation on the site. These landmarks are towers that are decorated by local artists that give the area a sense of place, identity and sense of ownership in the community.

Precedent 2: Refiloe Business Node Upgrade

Fig. 54: Photograph of Refiloe Business Node Upgrade (New Urban 2016)



Project: Refiloe Business Node Upgrade
Client: Neighbourhood Development Partnership Grant (NDPG), National Treasury in the Metsweding Area, City of Tshwane
Location: Refilwe, Cullinan, Tshwane
Year Completed: 2009-2014
Architect: Holm Jordaan Architects and Urban Designers

Description:

Located in the Refilwe Township in the City of Tshwane, this project is part of a larger network of planned upgrades aimed at being a catalyst for the wider economic development of this small township. The upgrades are funded and supported by the Neighbourhood Development Partnership Grant (NDPG) and funds from National Treasury. (New Urban, 2016)

This project is an example of how urban acupuncture can be used to revitalise and catalyse development of a

larger area through the use of 'small-scale interventions. The first step in the design process was an extensive site investigation which involved the community to decide what kind of interventions would make the most valuable impact and support the existing activities and community around the site which included informality and informal economic activities, residential as well as more formal shops in the area. These interventions would also link and formalise existing networks and increase the sense of connection in the area. (New Urban, 2016)

The project features an 'open-ended' structure that is essentially a floating roof along the threshold of existing shops and residential houses. Along the structure at various points, basic amenities are provided, such as seating, water points and male, female and paraplegic ablutions. (New Urban, 2016)

The roof or structure in itself becomes or acts as a framework for other programmes and uses to happen along and branching from it. There is also SASSA pay point and this structure provides shelter, ablutions and seating space for pensioners waiting for their grants. As such, the structure becomes a gathering space as well as an economic space where informal traders can have access to market as well as appropriate the space and use the available space as display, shelter

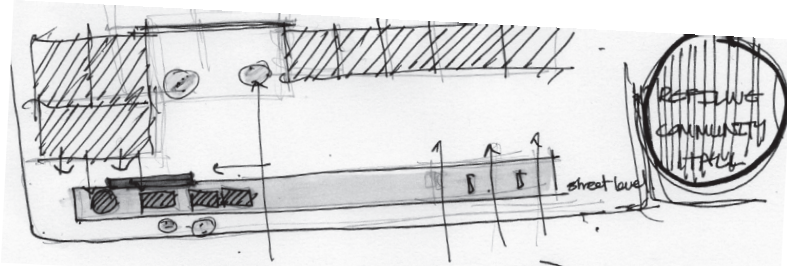
and service space. Programmes such as car washes, taxi drop-offs, pause space and many more can spontaneously activities can happen along this framework. Other recreational activities such as a chess board and moraba-raba are added to this space making this a play space catering to a wider range of ages and people in the community. (New Urban, 2016)

The structure is raised on a 'plinth' and makes a prominent feature and landmark in the space and gives this area a greater sense of place and identity. The public space around the plinth is 'formalised' with paving and planting with the upgrading of the space in the front of existing shops. (New Urban, 2016)

Fig. 56 Image showing precedent study analysis of Refiloe Business Node (Nemasetoni 2021)

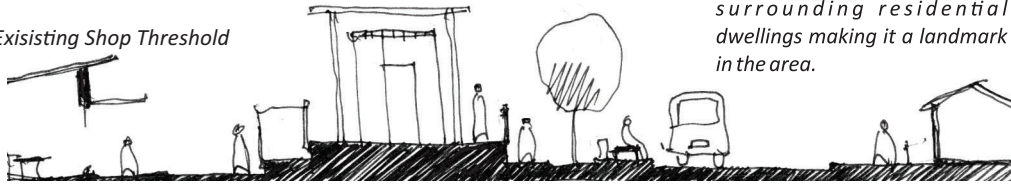


1. SPATIAL PLANNING PRINCIPLES/ BUILDING CONCEPT



Structure is slightly raised above surrounding residential dwellings making it a landmark in the area.

Existing Shop Threshold



Context Scale, Boundaries & Edges



Photograph showing the structure sitting on a plinth. The structure becomes a landmark in the area and a gathering and recreational space for the community.

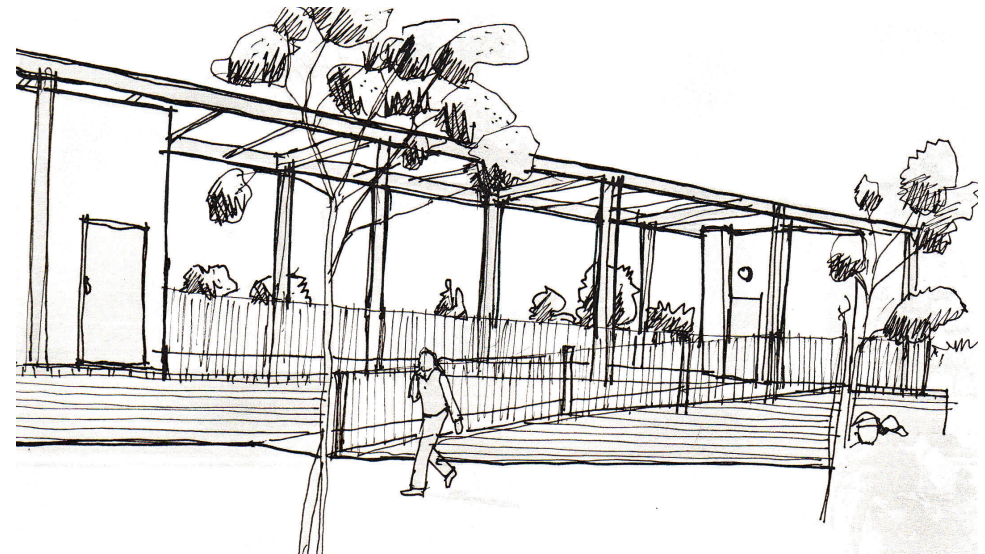
The structure is raised on a 'plinth' and makes a prominent feature and landmark in the space and gives this area a greater sense of place and identity. The public space around the plinth is 'formalised' with paving and planting with the upgrading of the space in the front of existing shops.

2. CONTEXT: SCALE, PROPORTION



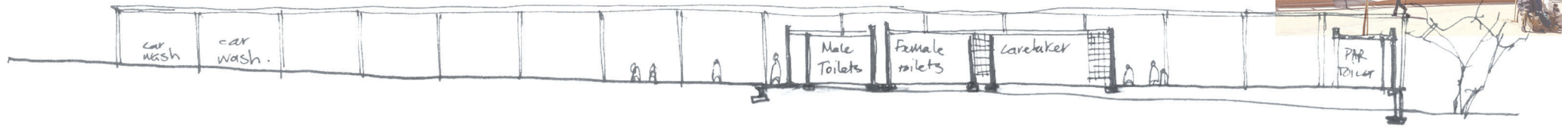
Bird's Eye View showing how the development sit in the context and how it relates to its surroundings. (New

3. ACCESS AND ACCESSIBILITY + CIRCULATION

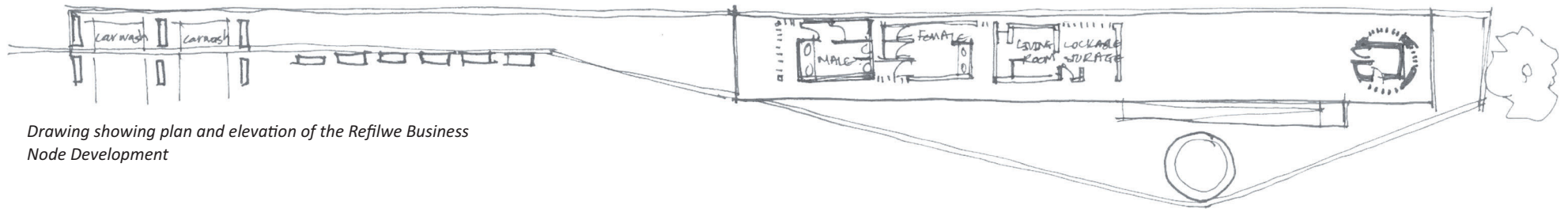


The project features an 'open-ended' structure that is essentially a floating roof along the threshold of existing shops and residential houses. Along the structure at various points, basic amenities are provided, such as seating, water points and male, female and paraplegic ablutions.

5. CONSTRUCTION AND MATERIALITY



Open ended framework structure. The roof is a hanging canopy detached from the structure housing the public amenities.



Drawing showing plan and elevation of the Refilwe Business Node Development

The roof or structure in itself becomes or acts as a framework for other programmes and uses to happen along and branching from it. There is also SASSA pay point and this structure provides shelter, ablutions and seating space for pensioners waiting for their grants. As such, the structure becomes a gathering space as well as an economic space where informal traders can have access to market as well as appropriate the space and use the available space as display, shelter and service space.

7. BOUNDARIES AND SPACE



Photograph showing amenity buildings sitting separate from the frame structure. (New Urban, 2016)



Public space around the structure is paved and landscaped. (New Urban, 2016)

Precedent 4: Contextual Precedent

Fig. 59. Photograph of Traders stalls in warwick junction (Markets of Warwick 2019)



Project: Warwick Junction Market
Client: eThekweni Municipality
Location: Durban, South Africa
Year: 1995 and ongoing
Architect: Architects Collaborative cc

Description:

The Warwick Junction Renewal project commenced in 1995 and is one of the few projects in South Africa that recognised the importance of street trading as an integral part of the city economy and employment of many of its residents. Here, street traders are catered for in the urban planning and spatial development. Street traders are considered as an asset to the urban morphology and the architects and planners aim to enhance their activities by providing appropriate

infrastructure suited to their needs.

The Junction is also a very important Transport Interchange with frequented by over 480 000 commuters on a daily basis. It also provides infrastructure for 1550 taxis and 300 buses operating from 19 taxi ranks and 5 bus terminals. There are an estimated 5000 to 8000 informal traders who operate from this interchange daily. These informal traders are spread out along the various roads, pedestrian bridges and walkways that connect the various public transport modes. There are also 8 different informal markets located at strategic covered public spaces at pivotal points of the various pedestrian routes. Each Market has a unique quality with some markets specifically selling limited types of products.

Similarly, to the project site, this location is not located 10 minutes away from the centre of the CBD and is the main connection point into and out of the city of Durban.

A small childcare centre that accommodates 70 children was also provided in a cordoned off area to ensure the safety of the children.

Fig. 60. Image showing precedent study analysis of Warwick Markets Development (Nemasetoni 2021)



1. SPATIAL PLANNING PRINCIPLES/ BUILDING CONCEPT

The Junction is also a very important Transport Interchange with frequented by over 480 000 commuters on a daily basis. It also provides infrastructure for 1550 taxis and 300 buses operating from 19 taxi ranks and 5 bus terminals. The Junction is also a very important Transport Interchange with frequented by over 480 000 commuters on a daily basis. It also provides infrastructure for 1550 taxis and 300 buses operating from 19 taxi ranks and 5 bus terminals.

There are also 8 different informal markets located at strategic covered public spaces at pivotal points of the various pedestrian routes. Each Market has a unique quality with some markets specifically selling limited types of products.

1. PROJECT CENTRE

This area is the main planning and admin space of the Junction. Routes to this space are lined with informal traders selling a wide variety of products

2. FRESH PRODUCE MARKET

This market is located at the intersecting point of 3 taxi ranks. Temporary shelters are erected where fresh produced packaged in smaller convenient packs are sold.

3. THE BOVINE HEAD MARKET

Located by the main eating area. It is an open covered structure where cooks line the edges and sell cooked meals. Benches and tables are provided where anyone can sit and eat in the middle space.

4. MIXED TRADING STRIP

Located along a busy pedestrian route from the Bovine Market on route to the Train Station. A wide variety of products is sold ranging from snacks to cigarettes. Traders sell items based on the time of day and the needs of the passers by. Some spaces are used by 2 or 3 different traders in one day based on this.



CIRCULATION/ FORMAL PEDESTRIAN ROUTES BETWEEN THE MARKETS

5. THE EARLY MORNING MARKET

670 lock-able trader stalls are located in this renovated building. The building has been adapted to allow good ventilation to keep the fresh produce fresher for longer. Here traders sell mainly fresh produce acquired from the Durban Fresh Produce Market which is relatively far from consumers.

6. THE MUSIC BRIDGE

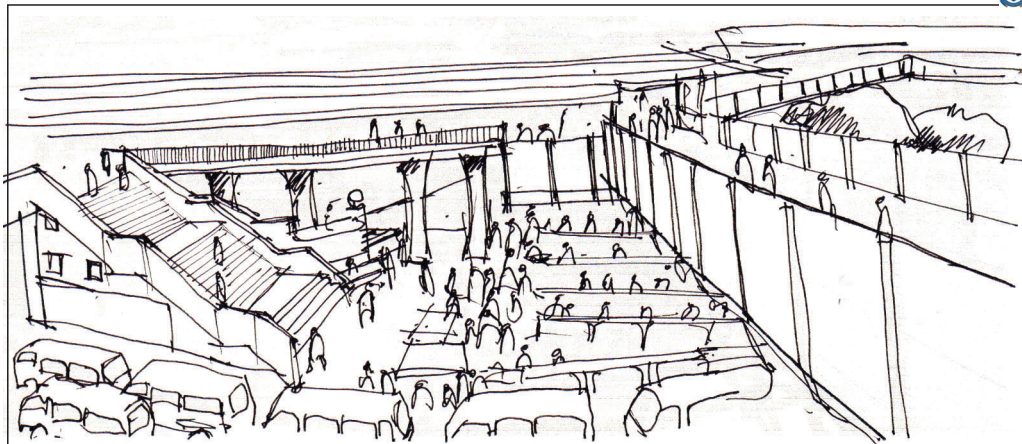
This market is located along a wide pedestrian bridge linking the early morning market with the bus terminal and station. The side barrier of the bridge has been made into a sloping shelf where music cd's are displayed. Performances also happen in this space.

7. THE TRADITIONAL MEDICINES MARKET

This market is located along a quieter less busy route so there is some level of privacy where people can come consult and buy traditional medicines for their healing

8. THE BROOK STREET MARKET

This market is a covered wide street with a mezzanine floor made by the access bridge from the muthi market. Here passers by look over into the busy space where mostly clothing is sold. The side wall has been adapted into storage space for the traders.



Routes between the different types of public transport modes are formalised, developed and articulated using bridges, paving, walkways, staircases and ramps.

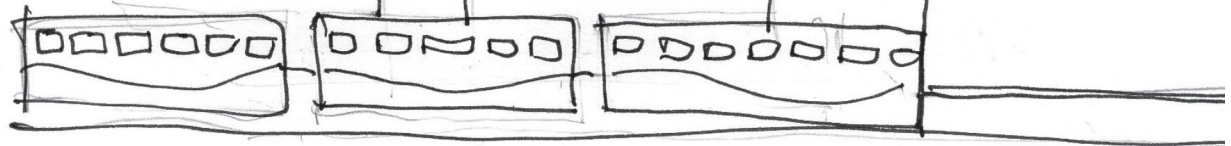
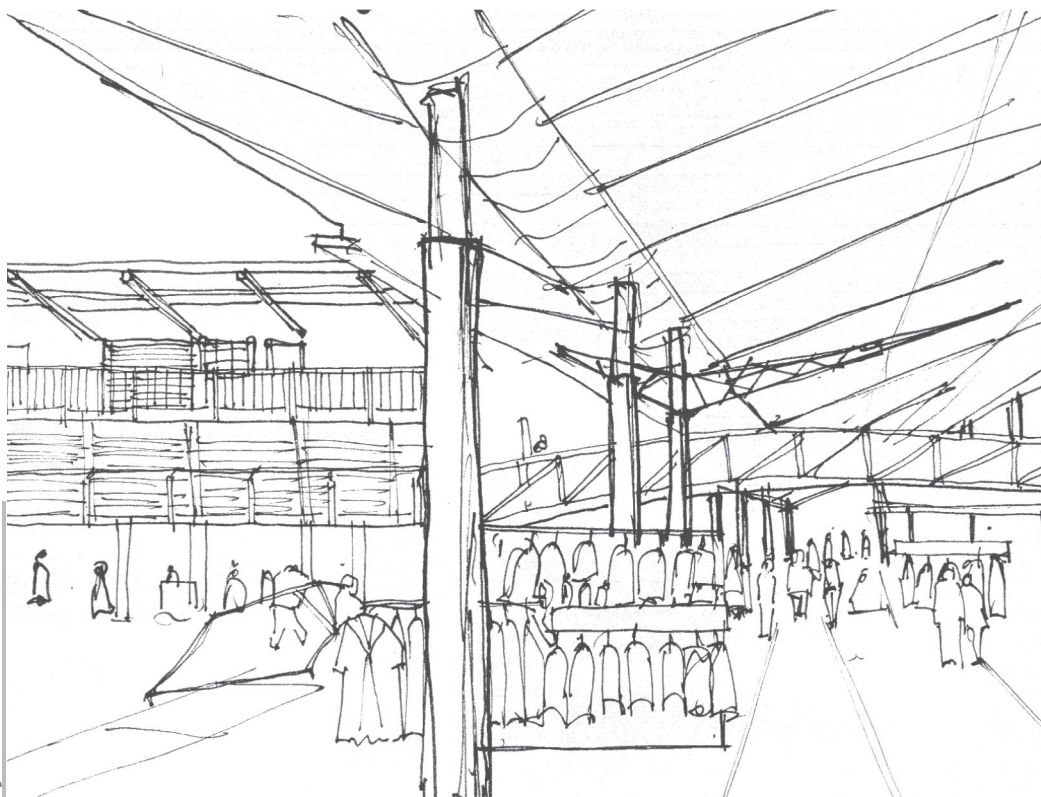


Fig. 61. Image showing precedent study analysis of Warwick Markets Development (Nemasetoni 2021)



Pedestrian bridges and access routes have been adapted into stalls. These bridges become more safe as side barriers are used as stalls creating a buffer zone. Passive surveillance is very prevalent in this space also increasing safety and activity.



Most formal markets are housed under open roofed structures which provide shelter and weather protection. Traders can then appropriate the space through a process of negotiation and organisation.

Traders appropriate space as needed and create boundaries, thresholds and edges using whatever materials they deem as appropriate and serves the purpose of storage and display etc.

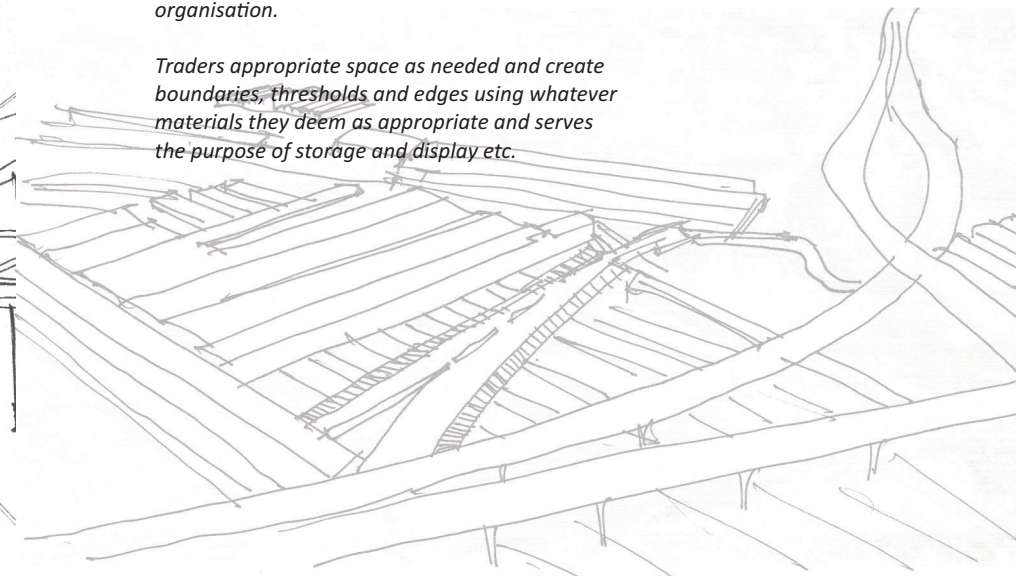
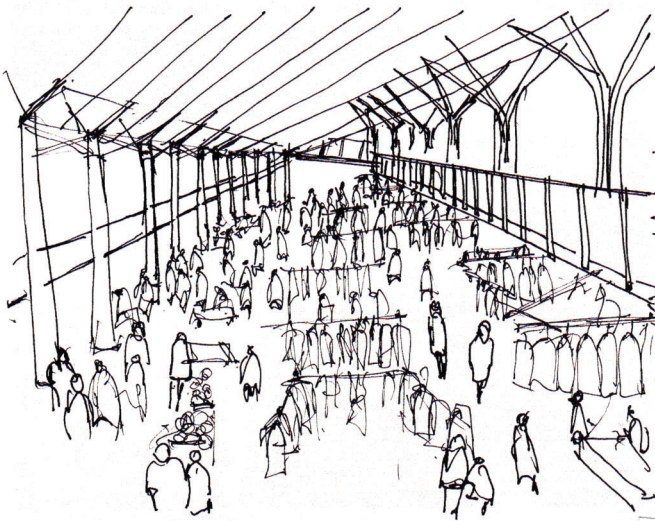


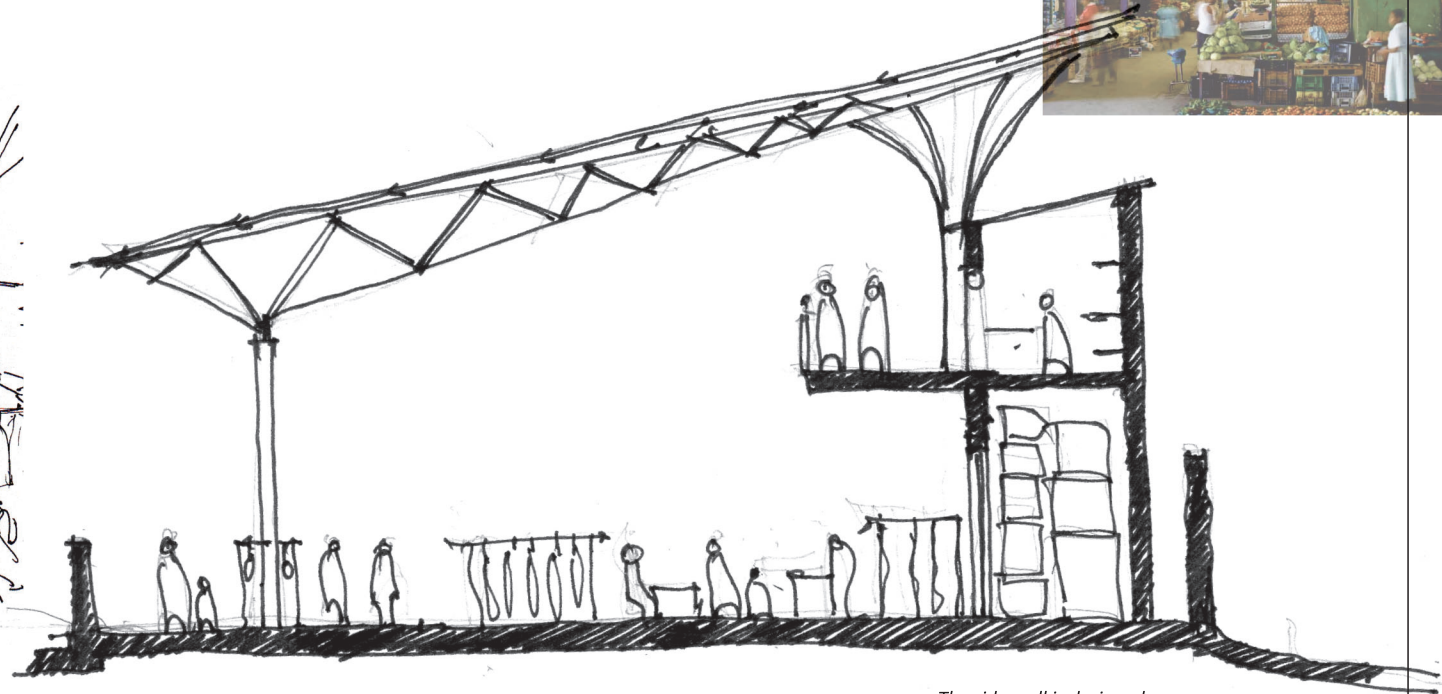
Fig. 62. Image showing precedent study analysis of Warwick Markets Development (Nemasetoni 2021)



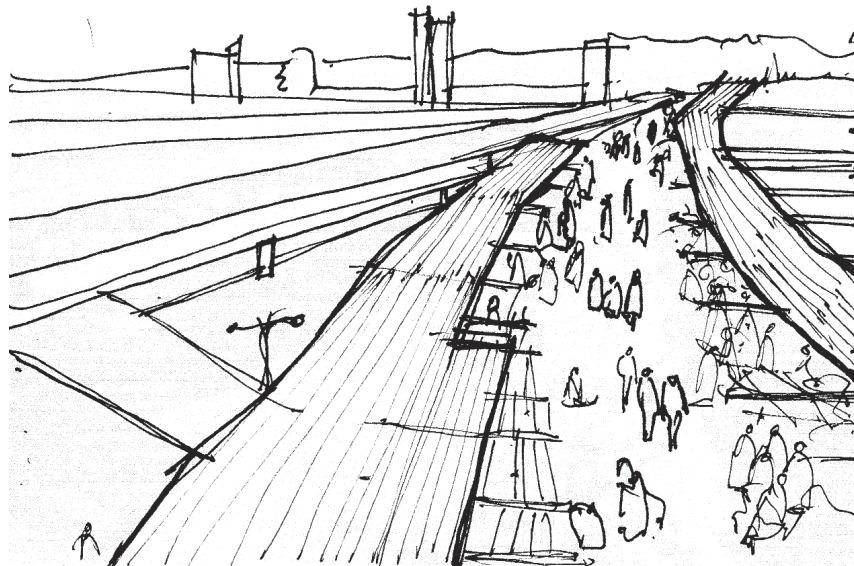
The Brooke Street Market



Walkway is located on the mezzanine floor and gives this market passive surveillance element making this a safer space.

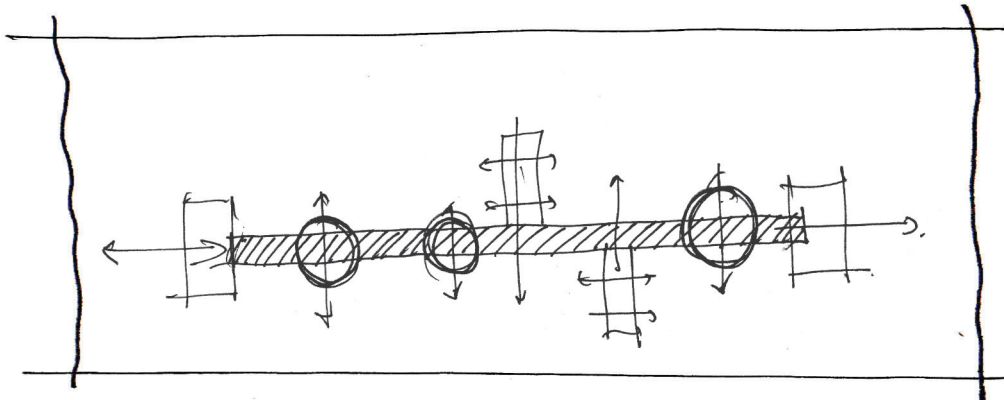


The side wall is designed as a storage area for the traders, located under the mezzanine walkway.

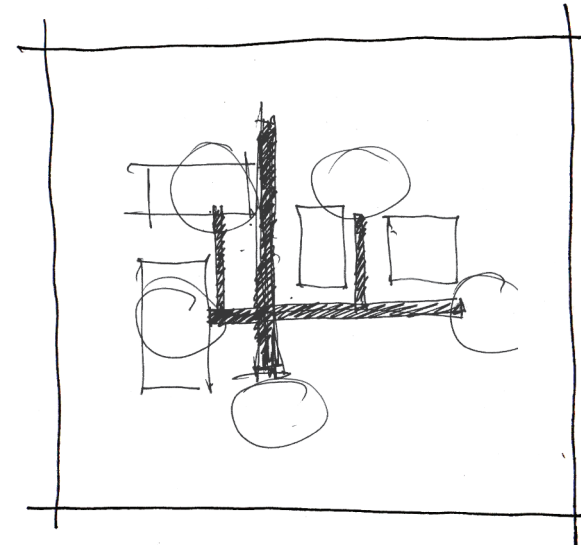


Most walkways and pedestrian bridges have been adapted into stalls bring more activity, safety and convenience for commuters.

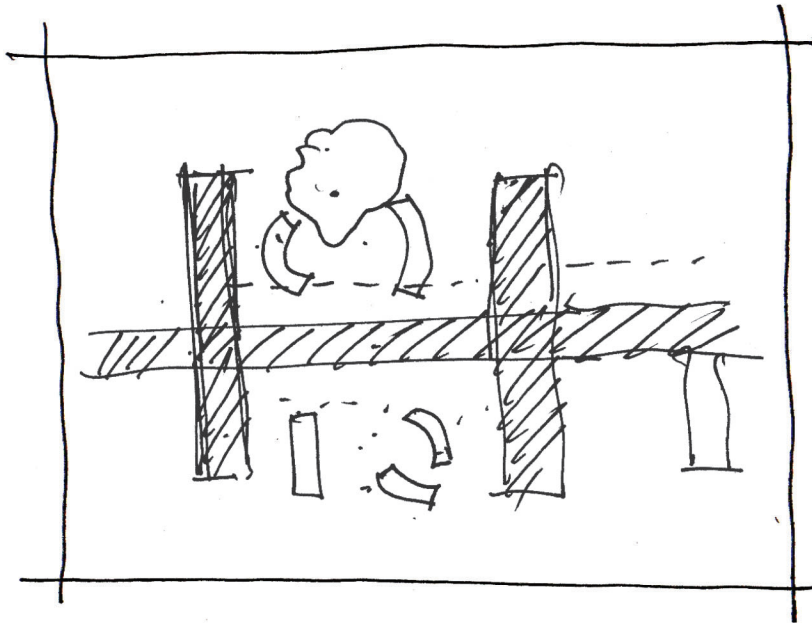
Design Principles from Analysis of Precedent Study:



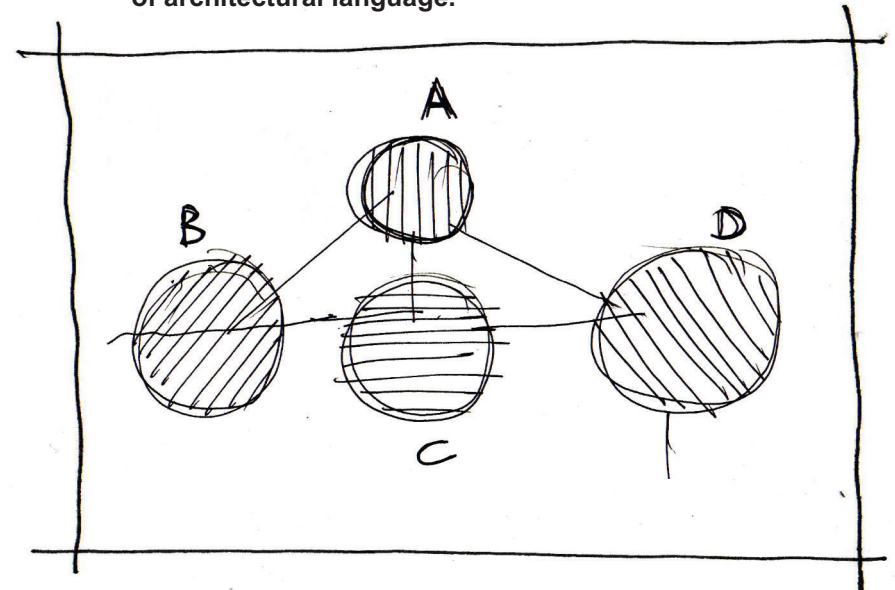
1. The use of a connecting 'spine' as the main ordering principles with other structures growing from it.



2. Links to important nodes in the area must be formalised and emphasized using some form of architectural language.

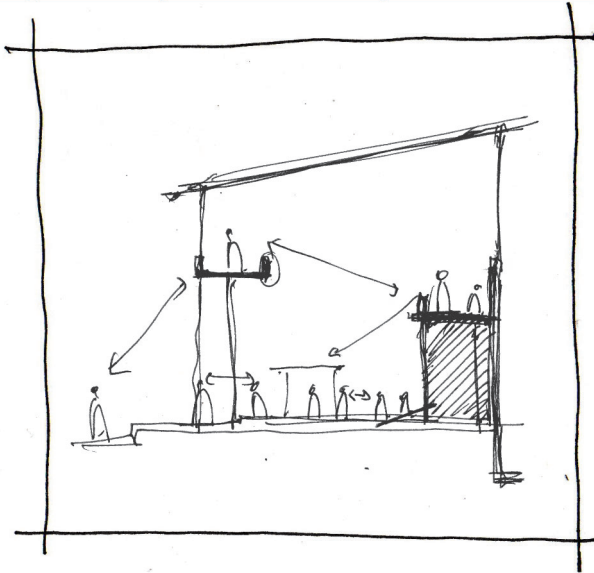


3. Courtyards to allow for smaller activities and gatherings to take place.

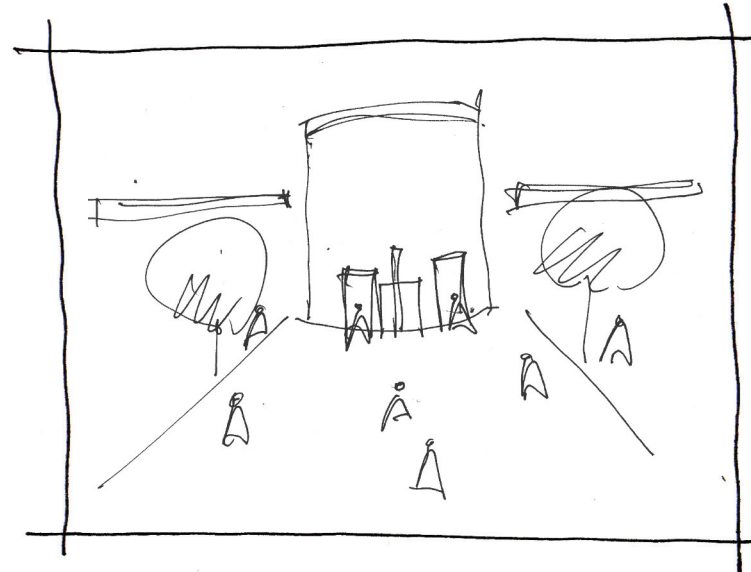


4. Different types of markets designed to cater for specific types of products sold/ specific activities. The markets must be appropriate for the context, people (passers by), time and what type of market is needed in the area of intervention.

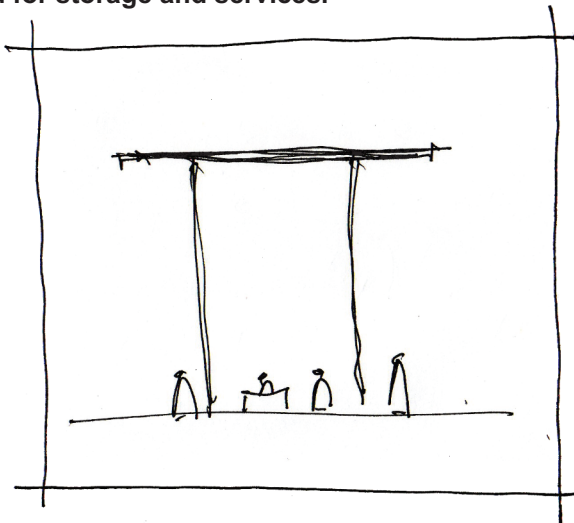
Design Principles from Analysis of Precedent Study:



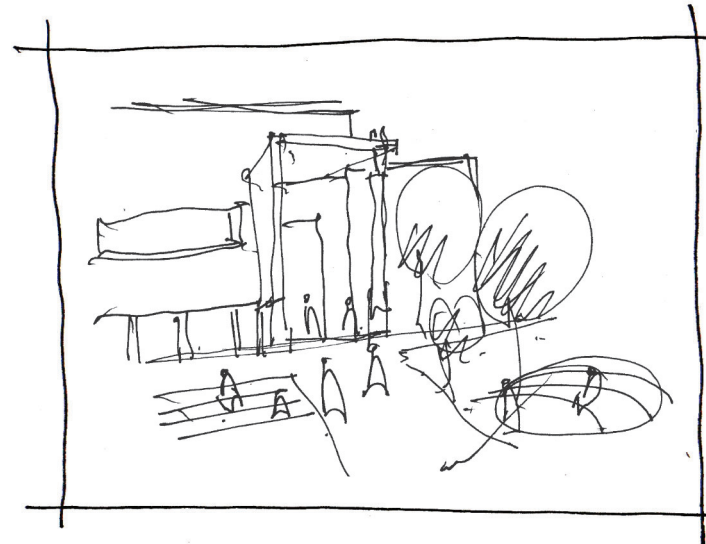
5. Walkways should be located on different levels overlooking the market space to allow for passive surveillance and increased safety. Leftover spaces such as the underneath of walkways can be used for storage and services.



7. Public amenities such as ablutions should be clear and visible from the street. (separate to make them stand out)

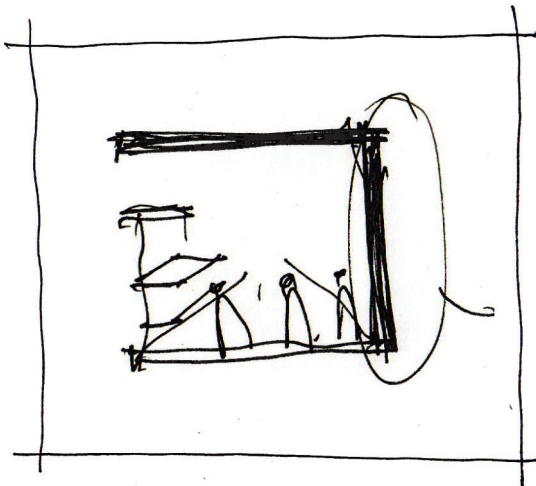


6. The use of open-ended structures as shelters for the market spaces.

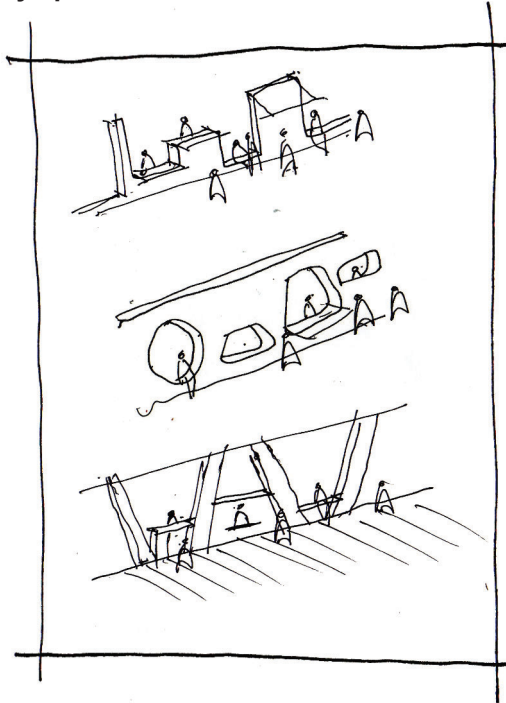


8. Entrances/ entry points have plazas or public squares as the threshold space.

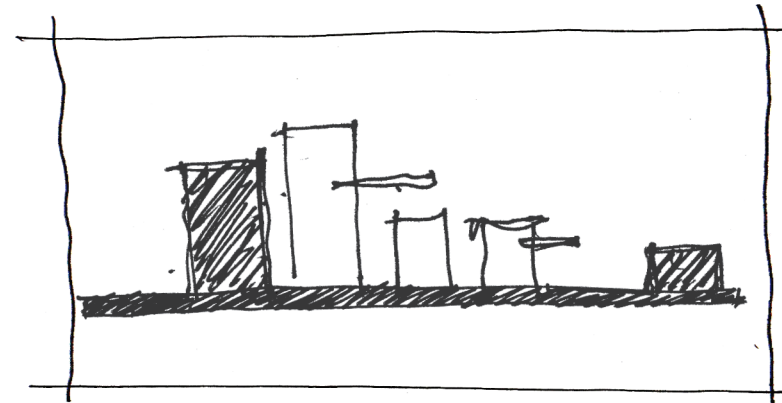
Design Principles from Analysis of Precedent Study:



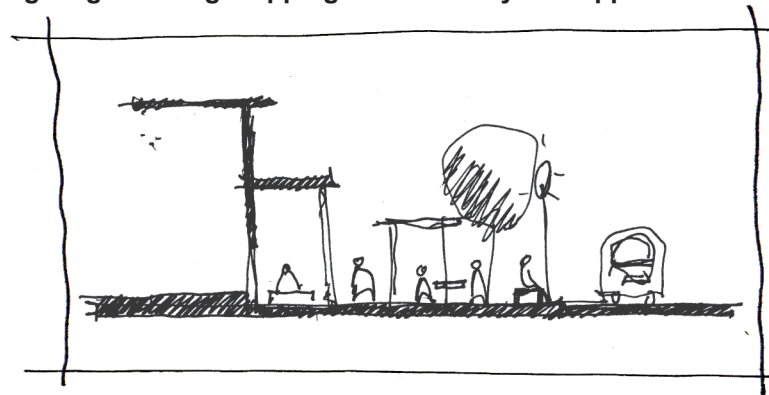
9. Barriers and balustrades along walkways should be designed as display spaces and also allow for other activities to take place.



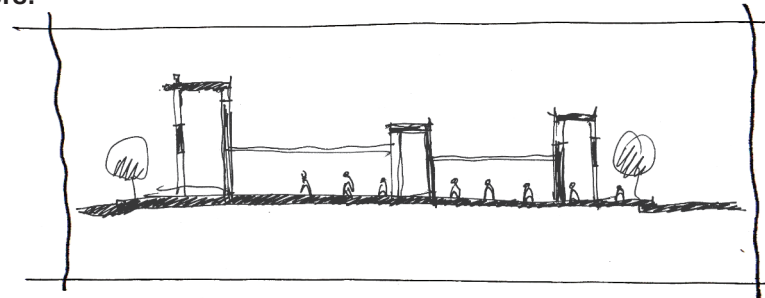
10. The use of inhabitable walls along important pedestrian routes that can accommodate various uses and activities.



11. Scale must relate to context and adjacent buildings. The intervention can be a bit higher than its surroundings. The building must be a mediating structure between surround building heights using stepping down and layered approach.








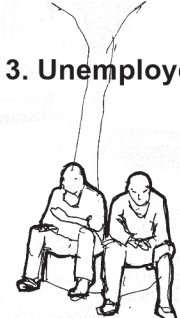
12. Edges and boundaries must be articulated to allow for spaces to be appropriated by informal traders and also allow for public life as a means to cater for public transport users.



13. Routes must be emphasized and clear by articulating important entry points as landmarks in the space. Various way finding structures/devices must be strategically placed along the route.






User Profiles:

Fig. 63: Image showing a study project user profile (Nemasetoni 2021)

| | Street Traders: | | | Commuters: | | |
|---------------------------------|---|--|---|---|---|---|
| | 1. Survivalist | 2. Self-Employed | 3. Micro-Enterprise | 1. Migrating to the City | 2. Employees | 3. Unemployed |
| |  |  |  |  |  |  |
| Reasons/ Motivations | Basic Needs Survival for themselves & family <i>poverty relief & upliftment</i> | Lack of jobs in the formal economy <i>Skills development</i> | Lacking capital and resources to be able to enter the formal economy <i>Support for business potential to grow</i> | In search for a better life and opportunities | Employed in various sectors in the city and commute daily from surrounds | In search of jobs both mostly unskilled labour force |
| Welfare Needs | Gov. Information Access to Free social services: -healthcare - SASSA - Adult Literacy Training - Access to Free/Affordable Day Care - Legal Advice and street trade regulations | Gov. Information Access to Free social services: -healthcare - SASSA - Adult Literacy Training - Access to Free/Affordable Day Care - Legal Advice and street trade regulations | Gov. Information Access to Free social services: -healthcare - SASSA - Adult Literacy Training - Access to Free/Affordable Day Care - Legal Advice and street trade regulations | Gov. Information Access to Free social services: -healthcare - SASSA - Adult Literacy Training - Access to Free/Affordable Day Care - Legal Advice and street trade regulations | -Gov. Information -Access to Free social services: -healthcare - SASSA | Gov. Information Access to Free social services: -healthcare - SASSA - Adult Literacy Training - Access to Free/Affordable Day Care - Legal Advice and street trade regulations |
| Support Needs | -Free/Affordable Trade stalls -Access to clean water, electricity, waste disposal, sanitation. - Storage facilities - Access to micro-finance - Access to hygienic food prep and cold room. - Basic business skills training | -Free/Affordable Trade stalls (varying levels of privacy) -Access to clean water, electricity, waste disposal, sanitation. - Storage facilities - Access to micro-finance - Access to shared Equipment and tools - Access to Up-skilling Training - Access to technology - Access to workshop space - Basic business skills training | - Business Incubation Services - Technical Skills Training - Need for links with formal Businesses - Linked to workshop space for product development - Storage space - Food Prep and packaging - Meeting Spaces - Marketing/Advertising space | -Information Board with jobs and opportunities -Access to basic needs | -Pause Spaces (Green public space) that supports public life - Clean and safe water, sanitation and waste disposal - Access to clean safe mobility infrastructure such as pedestrian paths etc. - Access to internet | -Information Board with jobs and opportunities -Access to basic needs |

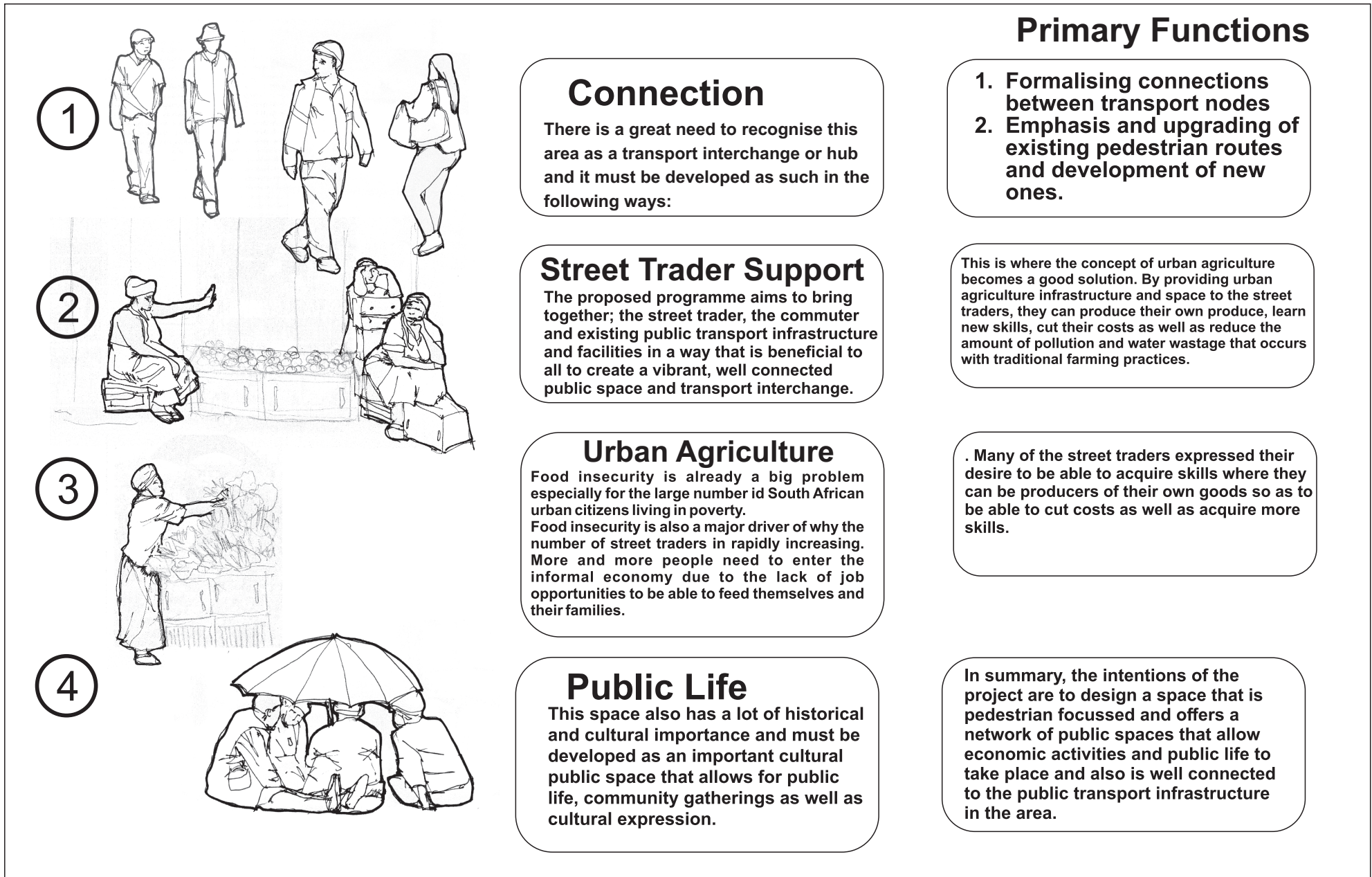
User Profiles:

Fig. 64. Image showing a study project user profile (Nemasetoni 2021)

| 4. Casual Visitor | Students | Young Children | Tourists | Station Employees |
|--|--|--|---|--|
|  |  |  |  |  |
| <p>Occasionally visit the city to access services(public/private)/shopping/recreation</p> | <p>Commute daily to access a better education in the city.</p> | <p>Travel to the city with parents who are street traders due to lack of affordability of daycare.</p> | <p>Visit the city for cultural / recreational reasons</p> | <p>Daily residents of the precinct area</p> |
| <ul style="list-style-type: none"> -Gov. Information -Access to Free social services: -healthcare - SASSA | <ul style="list-style-type: none"> -Gov. Information -Access to Free social services: -healthcare - SASSA | <ul style="list-style-type: none"> -Access to Free social services: -healthcare (immunization and check ups) - SASSA - Free/affordable daycare - safety and security - Access to basic needs | <ul style="list-style-type: none"> -Tourism Information -Access to local transport | <ul style="list-style-type: none"> -Gov. Information -Access to Free social services: -healthcare - SASSA |
| <ul style="list-style-type: none"> - Eating area - Recreational/cultural space - Access to local transport routes - Information (locating important institutional/ cultural sites) | <ul style="list-style-type: none"> - Eating area -Public green space/Pause area - Access to free internet - Access to information (career etc) - Access to computers, printers etc - Access to public seating and tables | <ul style="list-style-type: none"> -Safe and secure play areas - Spaces for learning - Access to basic needs - Adequate and comfortable classrooms | <ul style="list-style-type: none"> - Access to recreational/ cultural spaces - Access to tourism artifacts - Access to clean and safe eating areas - Access to public green spaces - Access to clean drinking water, sanitation and waste disposal | <ul style="list-style-type: none"> - Eating area -Public green space/Pause area - Access to free internet - Access to information - Access to computers, printers etc - Access to public seating and tables - Access to upskilling training |

Programme Justification:

Fig. 65: Image showing the main programme justifications (Nemasetoni 2021)



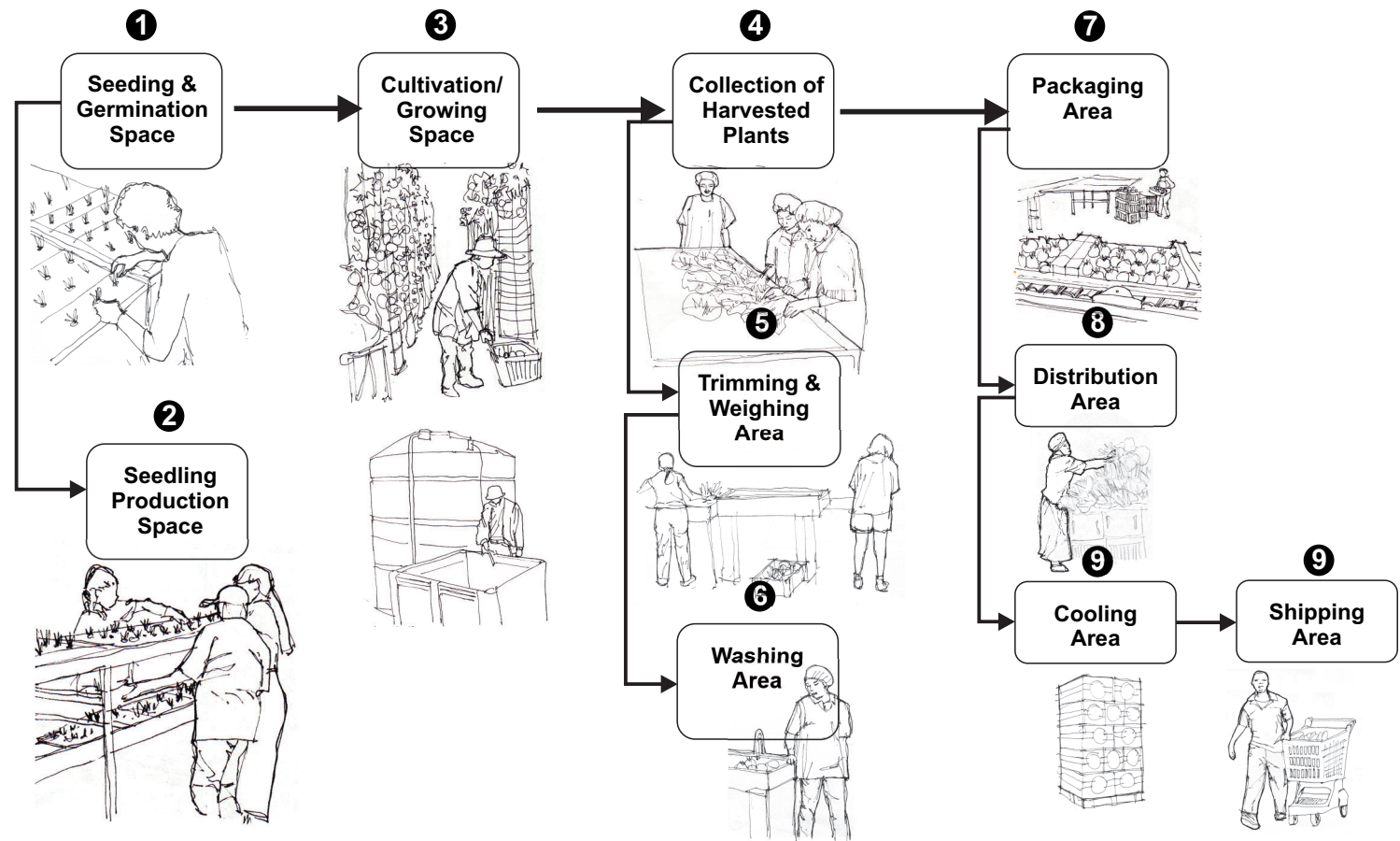
Urban Farming Spatial Design Requirements:

VERTICAL URBAN AGRICULTURE INTENTIONS

- 1 KNOWLEDGE AND LEARNING**
- URBAN COMMUTERS
- STREET TRADERS
- 2 WHOLE SALE TO STREET TRADERS**
- AT LOWER COSTS BECAUSE OF NO NEED FOR TRANSPORT AND PACKAGING.
- 3 SUPPLY TO FOOD ENTREPRENEURS**
- ENSURES LESS WASTAGE AS FOOD IS FRESH FOR LONGER AND COOKS CAN TAKE AS NEEDED AND THUS MORE PROFIT
- 4 INNOVATION**
- NEW WAYS OF VERTICAL URBAN FARMING CAN BE TRIED AND TESTED IN DIFFERENT URBAN SETTINGS

Fig. 66: Image showing the plant production process (Nemasetoni 2021)

//PLANT PRODUCTION PROCESS//



Intergrated Programme Concept and Diagrams:

The idea of ecosystem as infrastructure will be used as a framework for how the space will be integrated on the site. The diagram shown in fig shows how energy moves through the various trophic level, namely 'producers, consumers and decomposers' where the outputs of one level become the input of another creating a complete cycle where energy and resources is not wasted (Singh, 2020) The aim is for the this project to become a self sustaining development.

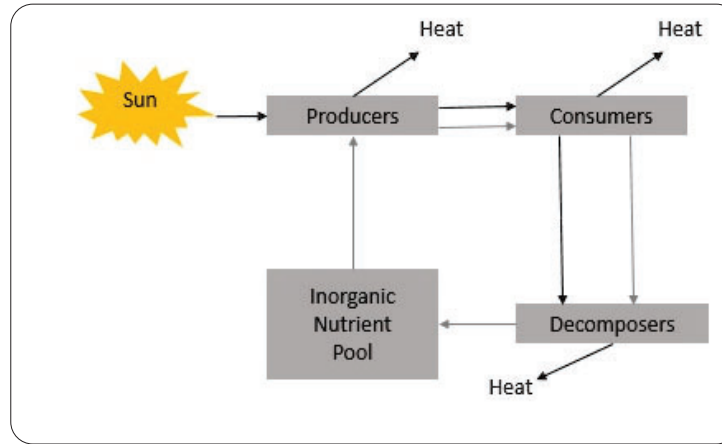
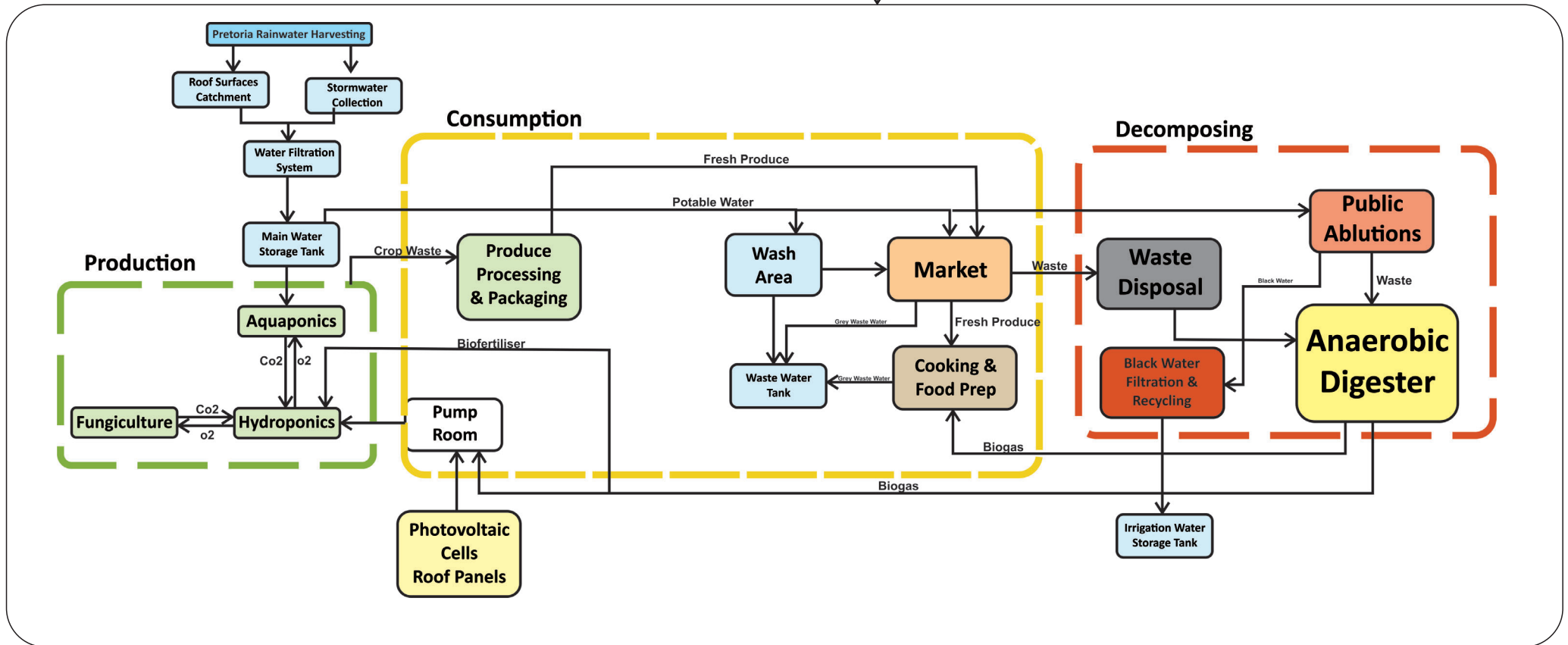


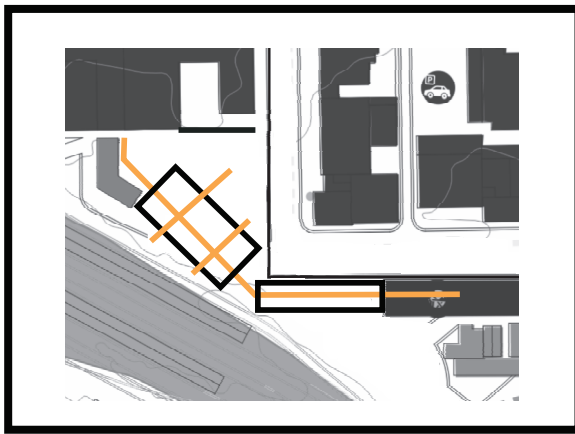
Fig. 67: Image showing the plant production process (Tutorials Point 2021)

Fig. 68: Image showing integrated programme diagram (Nemasetoni 2021)

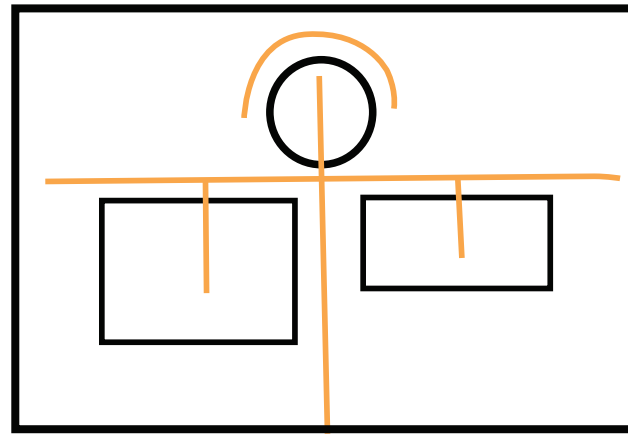


Street Trade Mapping and Form Concept:

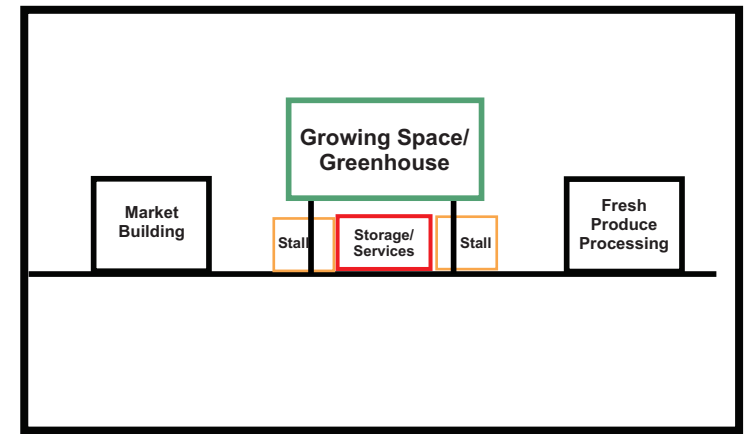
Below is a set of diagrams that shows the basic structural planning principles that will be used in the building.



Masterplan Concept



Building Massing Concept



Conceptual Section

Fig. 69: Image showing design concept diagrams (Nemasetoni 2021)

Street Trade Mapping and Form Concept:

1

Informal trader structures create an organic form against the formal orthogonal backdrop of the existing built urban forms.

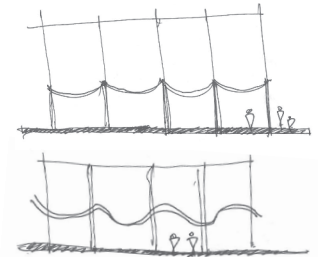
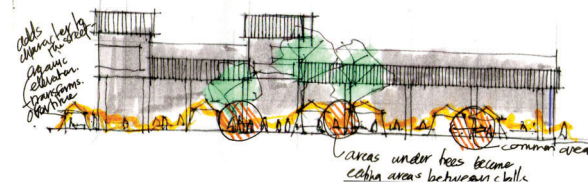
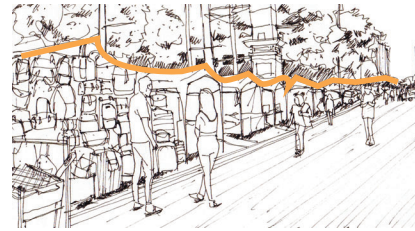


Fig. 70: Analysis of sketches of Tshwane CBD street trade mapping (Nemasetoni 2021)

2

Shelters and roofs are created by hanging structures, often waterproof fabrics between supports. These fabrics hang to allow water to flow off.

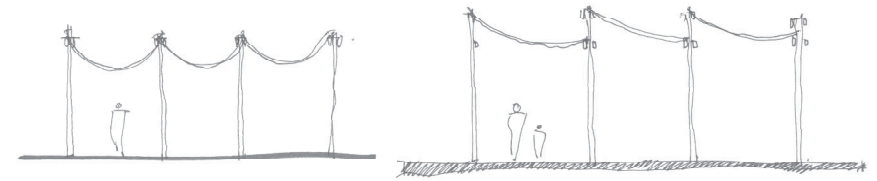


Fig. 71: Analysis of Tshwane CBD street trade mapping (Nemasetoni 2021)

3

Mappings of Church Street market shows how the canopy of trees along the sidewalk define the space and hover above the busy market street below.

Translated to Design: The Urban Greenhouses become like the canopy of trees hovering above 'boxes' that house the storage and support devices. These hovering greenhouse 'canopies' puncture into the public walkways as a design feature.

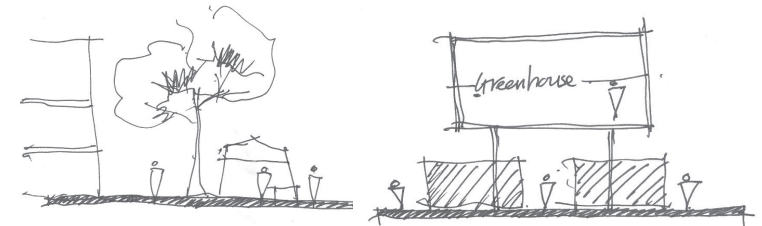


Fig. 72: Analysis of Tshwane CBD street trade mapping (Nemasetoni 2021)

4

Street Markets along the edge of the sidewalk create arcade space between shopfront and street markets where pedestrians have to navigate through this in-between space. In some areas, traders hang fabrics between their structures and the existing urban edges.

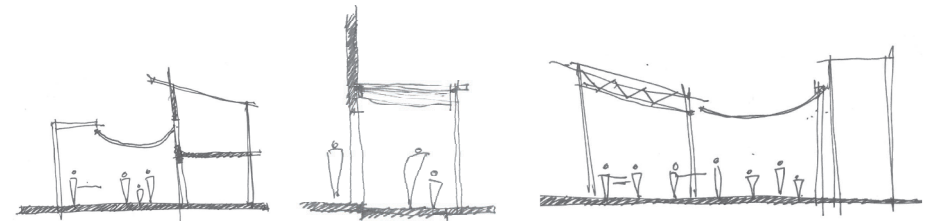
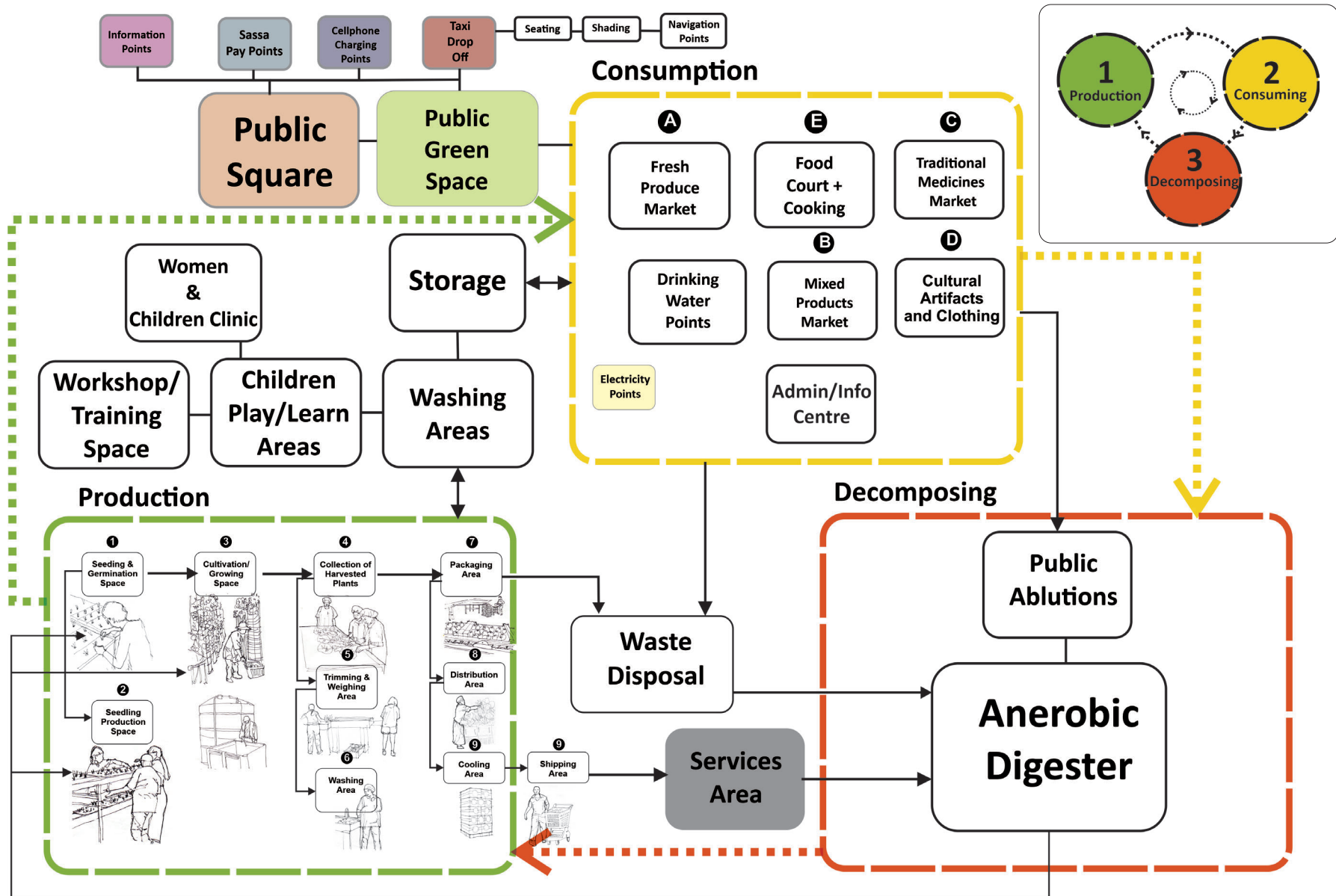


Fig.73: Analysis of Tshwane CBD street trade mapping (Nemasetoni 2021)

Intergrated Programme Diagrams:

Fig.74: Intergrated Programme Diagram (Nemasetoni 2021)



Connection, Technology and Public Life:

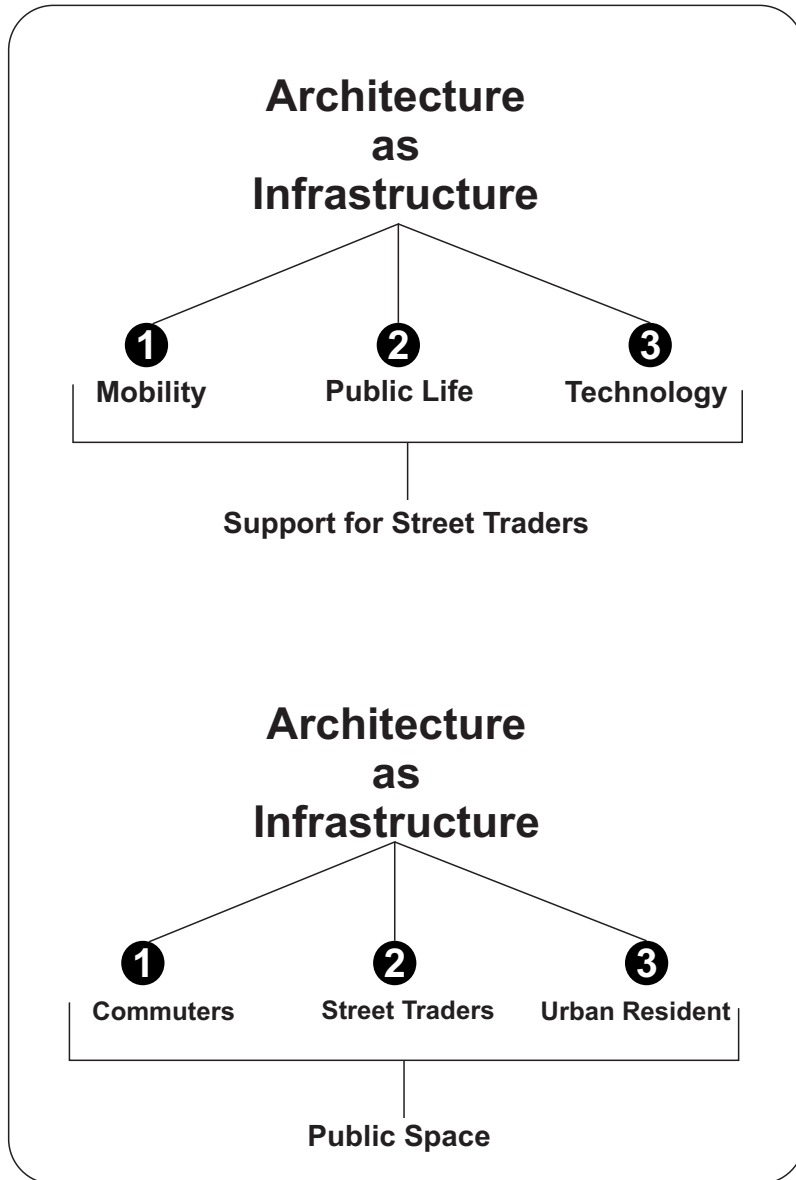


Fig.75: Project concept (Nemasetoni 2021)

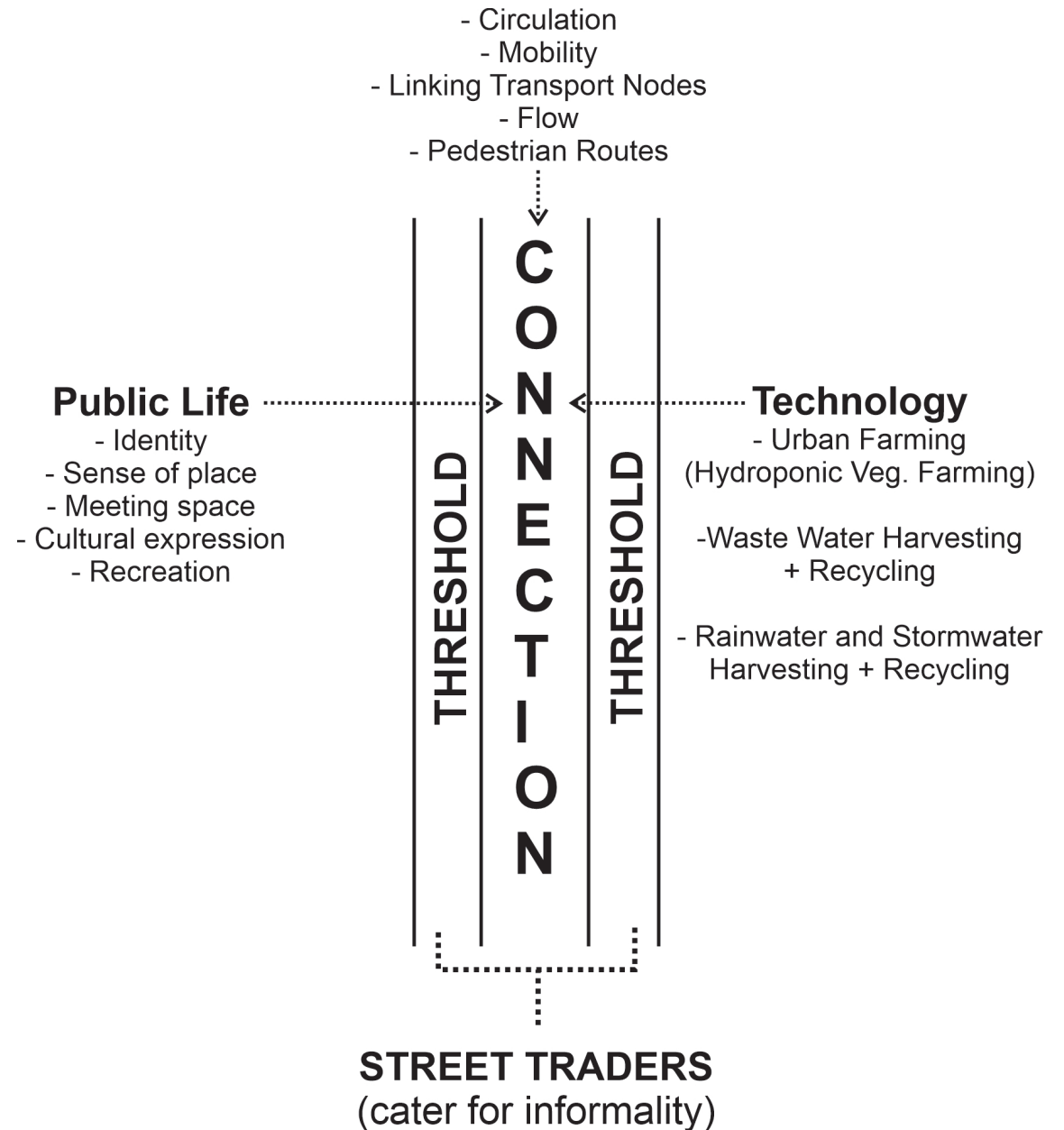
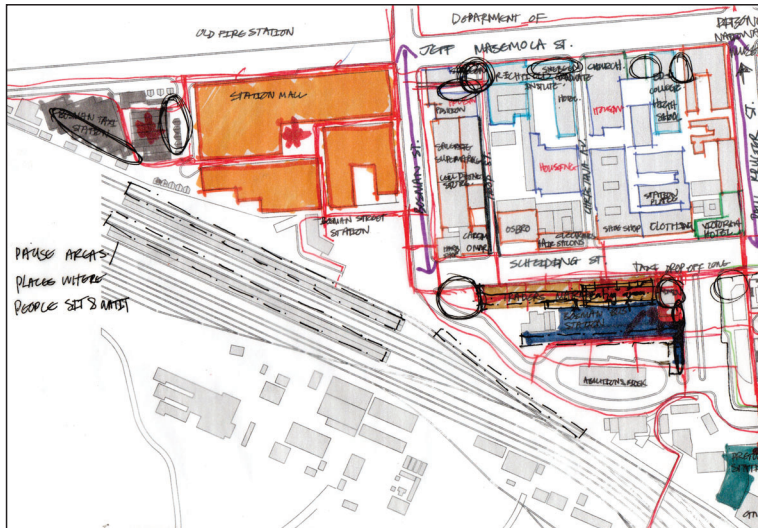
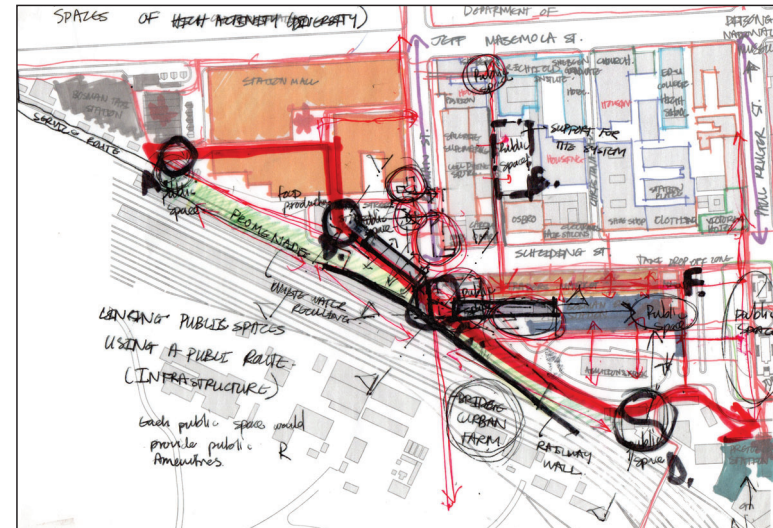


Fig.76: Project concept diagrams showing site planning principles (Nemasetoni 2021)

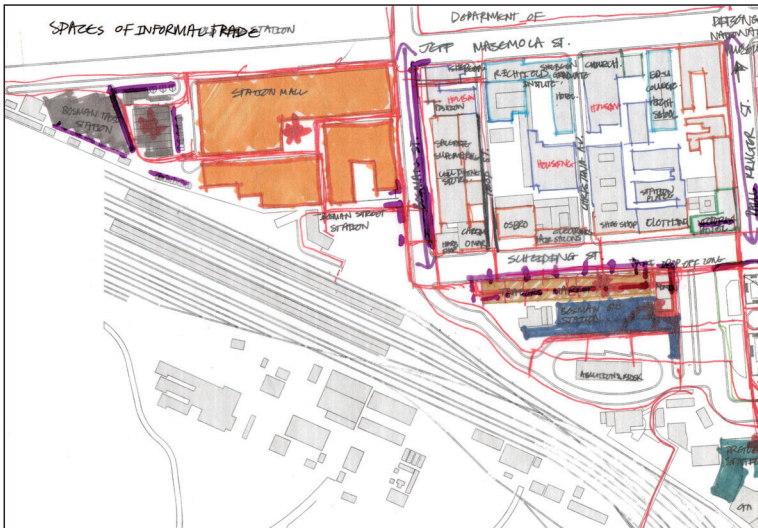
Connection, Technology and Public Life:



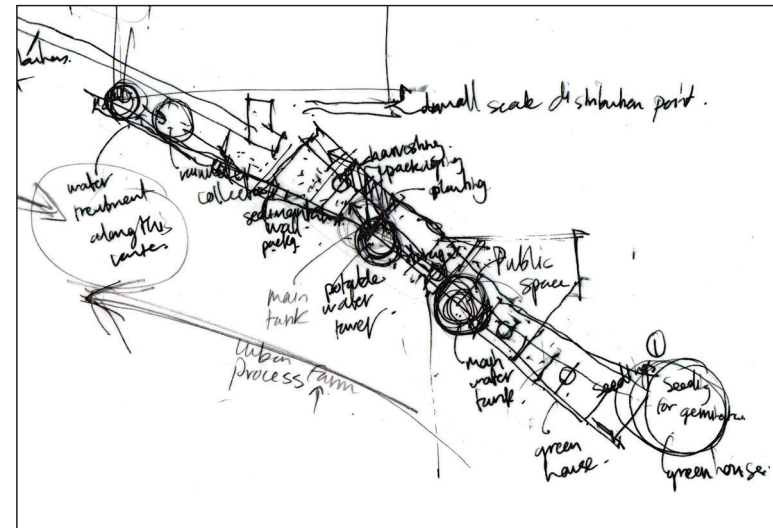
Site Mapping of spaces where people organically gather.



Site Mapping of spaces which could be developed into markets.



Site Mapping of pedestrian routes.



Spatial concept sketch.

Fig.77: Site mapping exploring how design concepts can be implemented on the site (Nemasetoni 2021)

Application of Concepts on the Site:

CONNECTION

1. Connection Between Various Transport Modes formalising pedestrian pathways with paving and navigation points to assist commuter when travelling using multiple public transport modes.
2. Connection between formal (Pretoria Station Mall) and existing informal trader's market.
3. Visual connectivity from the site to other important landmarks and nodes in the CBD. This will assist in connecting the Bosman Precinct to the wider CBD context.
4. Connection to Salvokop.



TECHNOLOGY

1. The New Concrete Rail way Line Wall will act not just be a safety and ordering device but become infrastructure in that most of the services to the various building on the site will flow along the wall.
2. The Wall (Retaining Wall) will also order the ecological services of the project such as the water filtration system where harvested and waste water will be recycled.
3. The wall will also order how the Urban Farming Greenhouse are positioned on site as they will be integrated with the proposed green promenade along the wall.



PUBLIC LIFE

1. Street Trader stalls along Bosman Street to accommodate the numerous existing traders.
2. Activation of Scheiding Street to be more pedestrian friendly with public seating and shading.
3. Trees and seating to be added in empty un-programmed areas of the site.

Fig.78: Axo showing how planning principles will be implemented on the site (Nemasetoni 2021)

Design Concept 1:

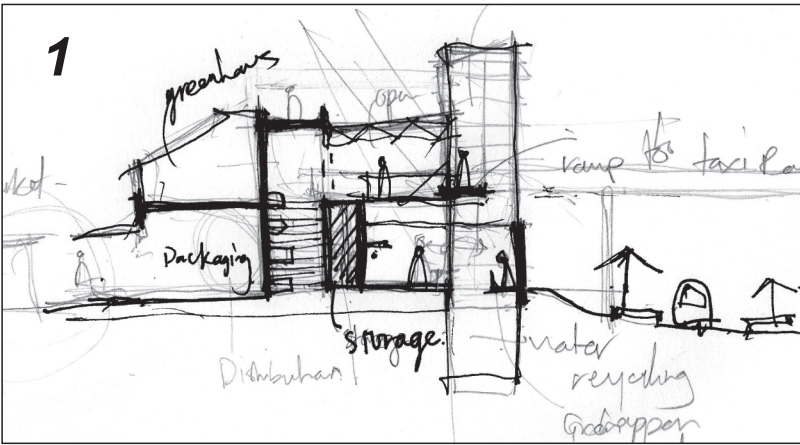


Fig. 83: Sectional sketch (Nemasetoni 2021)

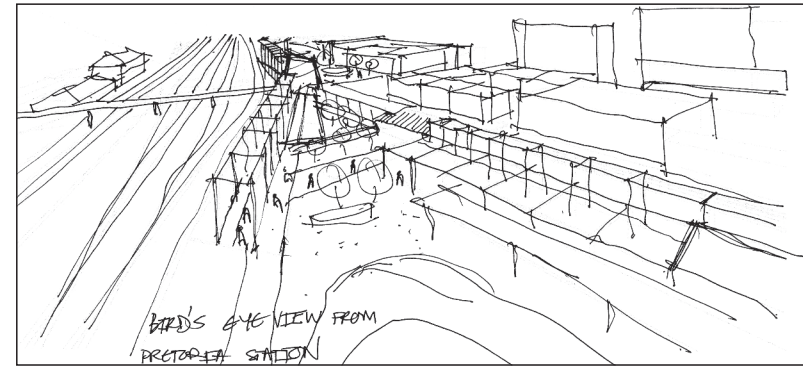


Fig. 86: Concept bird's eye view (Nemasetoni 2021)

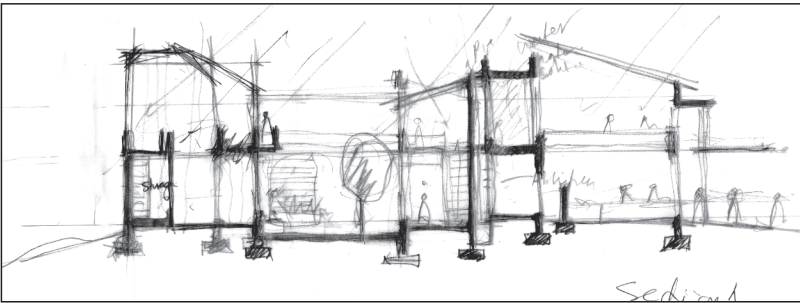


Fig. 84: Sectional sketch (Nemasetoni 2021)

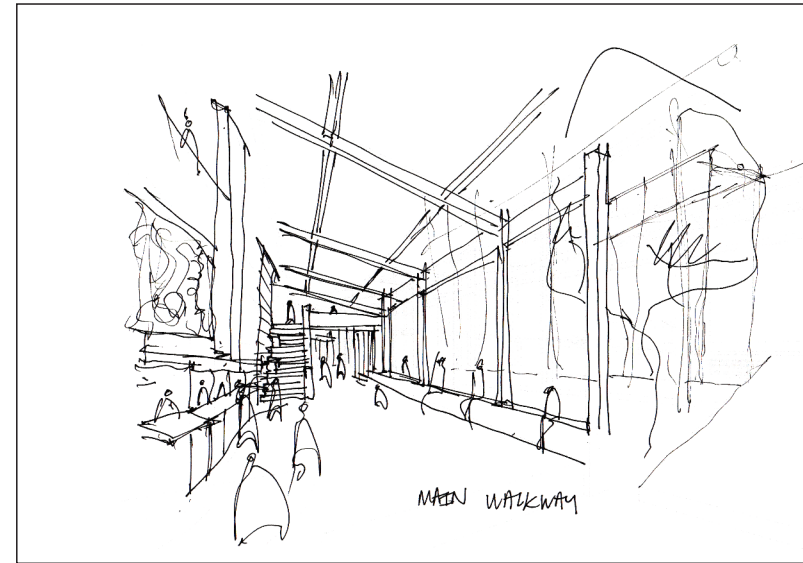


Fig. 87: Concept perspective (Nemasetoni 2021)

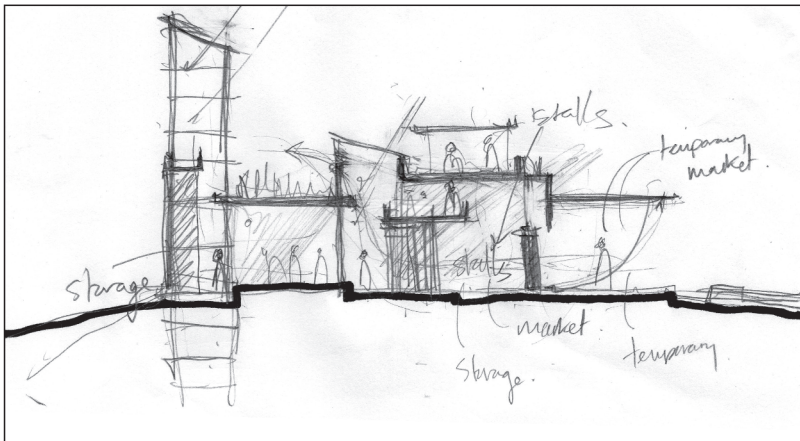


Fig. 85: Sectional sketch (Nemasetoni 2021)

Sectional Explorations:

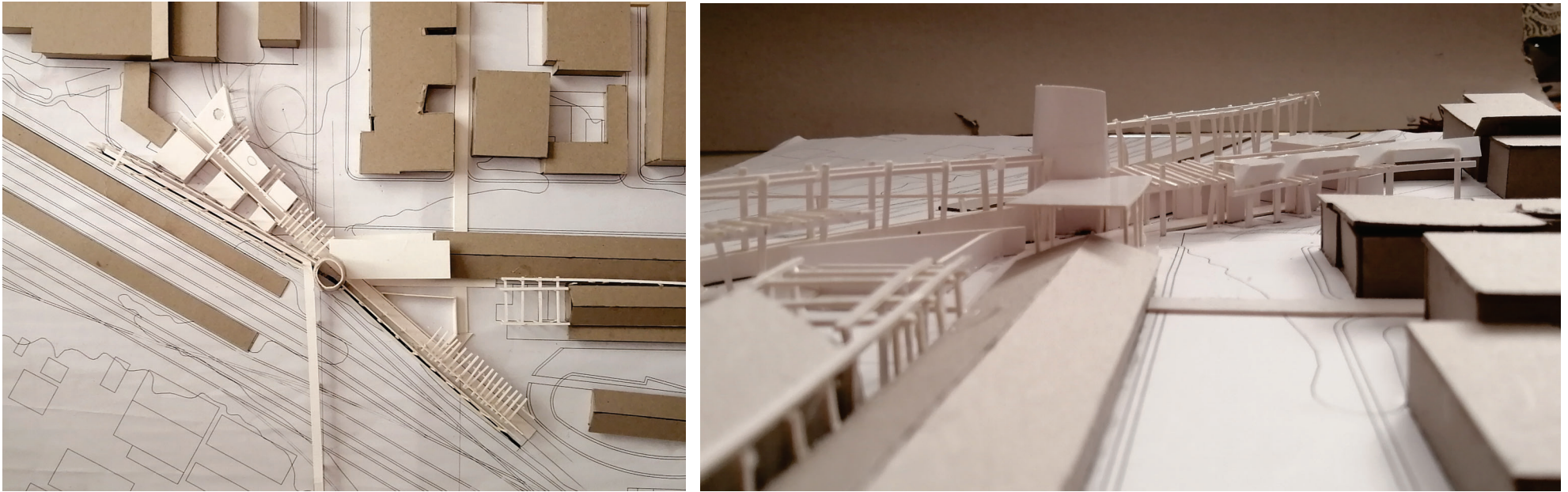


Fig. 88: Photographs of site model (1:500) (Nemasetoni 2021)



Fig. 89: Photographs of site model (1:500) (Nemasetoni 2021)