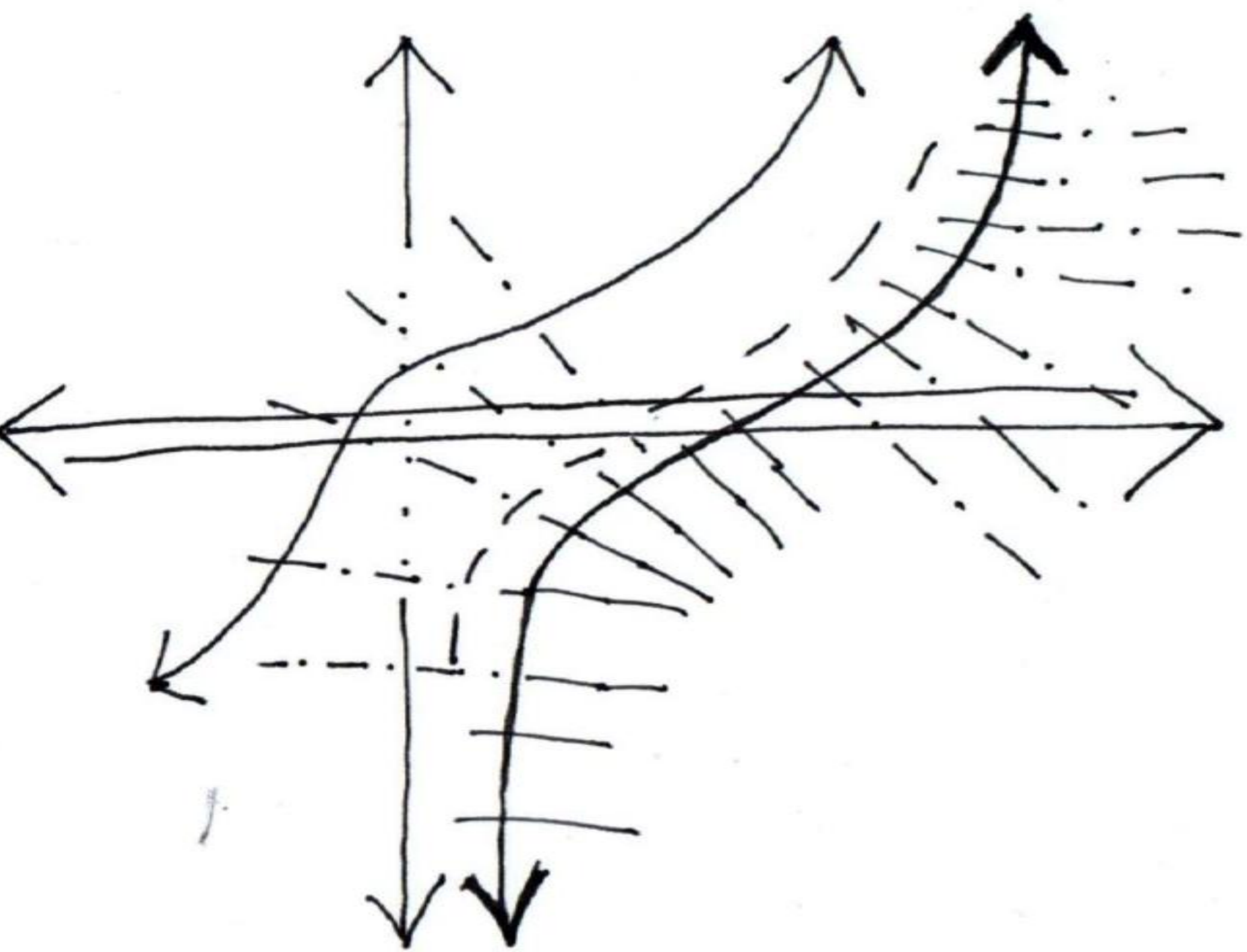


BRIDGING BOKSBURG:

INFRASTRUCTURE
ASSEMBLAGES FOR
COMMUNITY AND ECOLOGICAL
INTEGRATION AND
REHABILITATION.



Department of Architecture

Discipline coordinator: Jan
Hugo

Supervisors: Jan Hugo & Paul
Devenish

Co-supervisor: Tariq Toffa

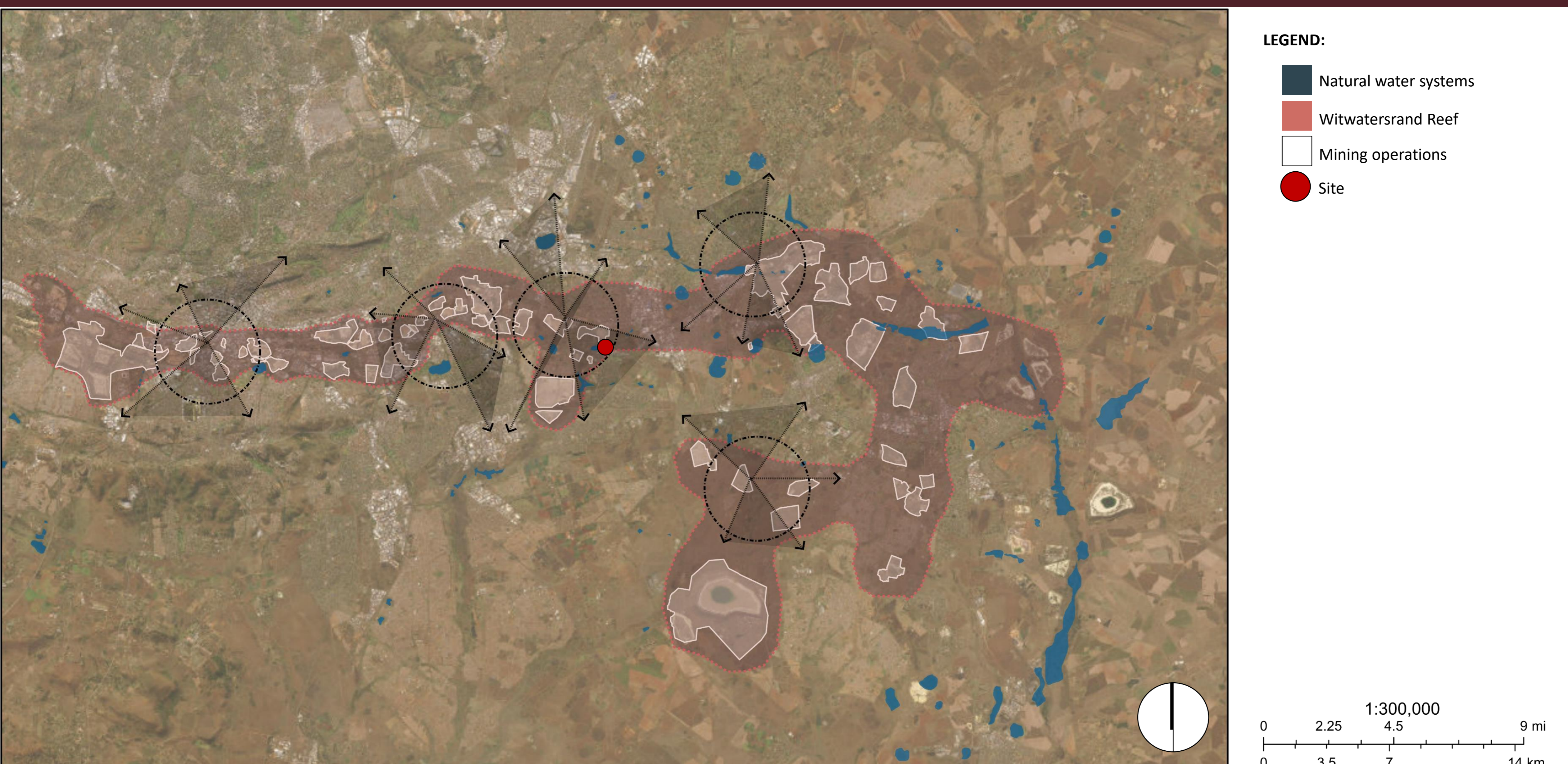
MACRO SCALE MAPPING: EARLY DEVELOPMENT

The project Bridging Boksburg aims to entangle and mediate the human (urban) and non-human (natural) contexts. The project therefore begins with a mapping exercise to understand the relationship between the current urban manifestation of Boksburg CBD and the immediate natural context from which it emerged. By documenting the urban and spatial development along the Witwatersrand Reef, helps uncover the significant historic events that shaped the urban context that exists today. This mapping informs the events that furthered urban and natural disparities, and what to specifically confront to create a more than human context (a context inclusive of human and non-human perspectives and agency). The mapping starts by recognizing the Witwatersrand Reef as the natural system before urban development, that connects to other ecological habitats through natural water systems. The first modern human intervention over this landscape was agriculture which was supported by the existing water network.

MACRO SCALE ANALYSIS: NATURAL SYSTEMS



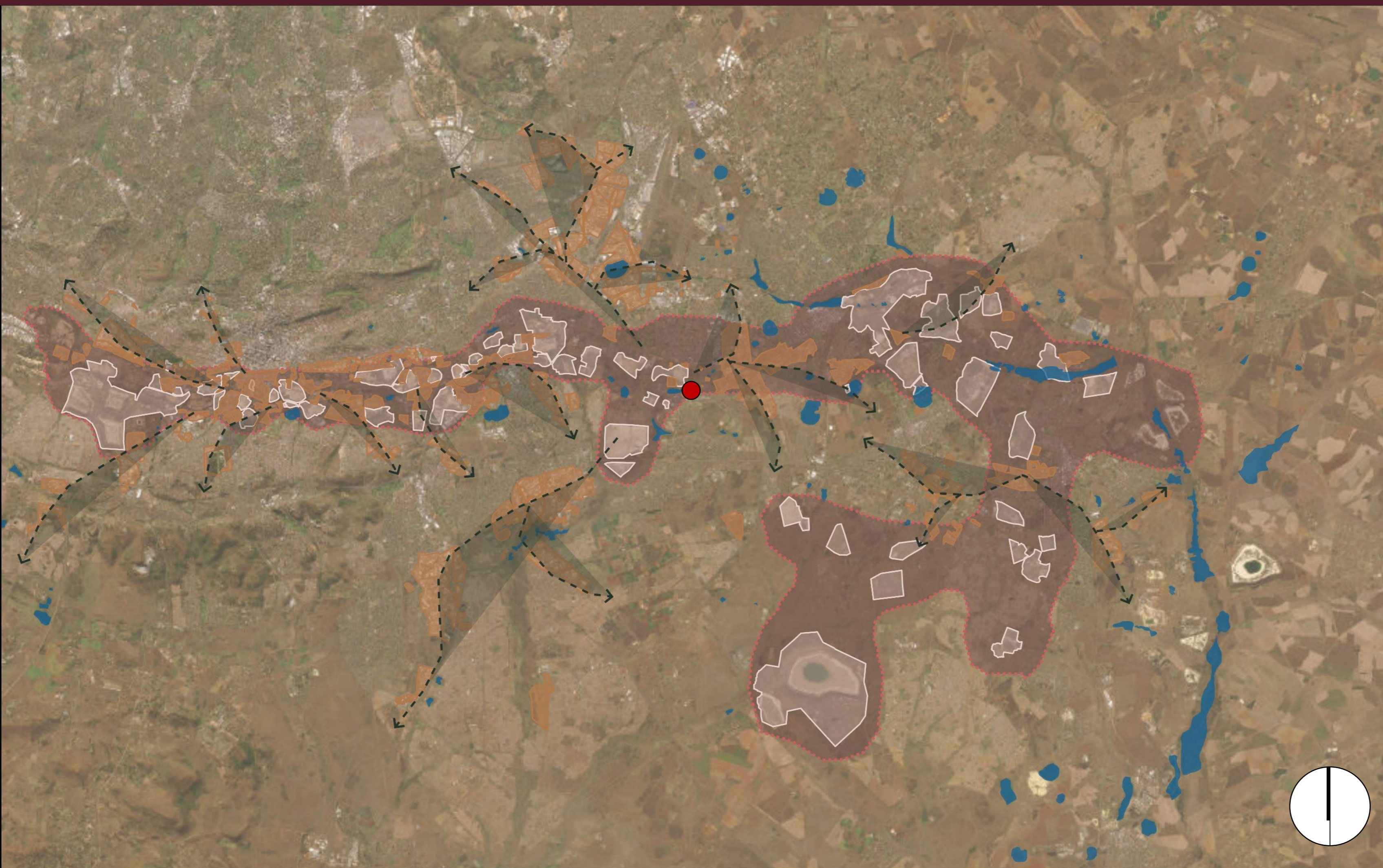
MACRO SCALE ANALYSIS: MINING OPERATIONS



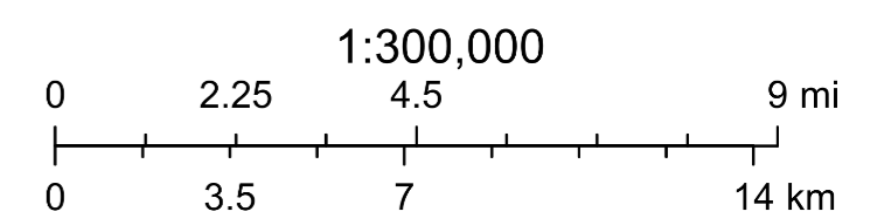
MACRO SCALE MAPPING: BOKSBURG'S URBAN FABRIC

The discovery of gold in the area and the rapid urban expansion of mining operations encouraged further invasive development of the supporting industrial precincts. The combination of mining and industry are the economic characteristics that define Boksburg's contribution and value to the East Rand/ Ekurhuleni Municipality. Both mining and the industrial operations have caused significant scarification to the ecological systems within the area. In each instance, both urban developments are characteristically anthropocentric and assert human dominance and agency which exploits and others the natural landscape. The apartheid system utilised these damaged landscapes, mining and industrial sites as buffers to enforce segregation and other non-white inhabitants.

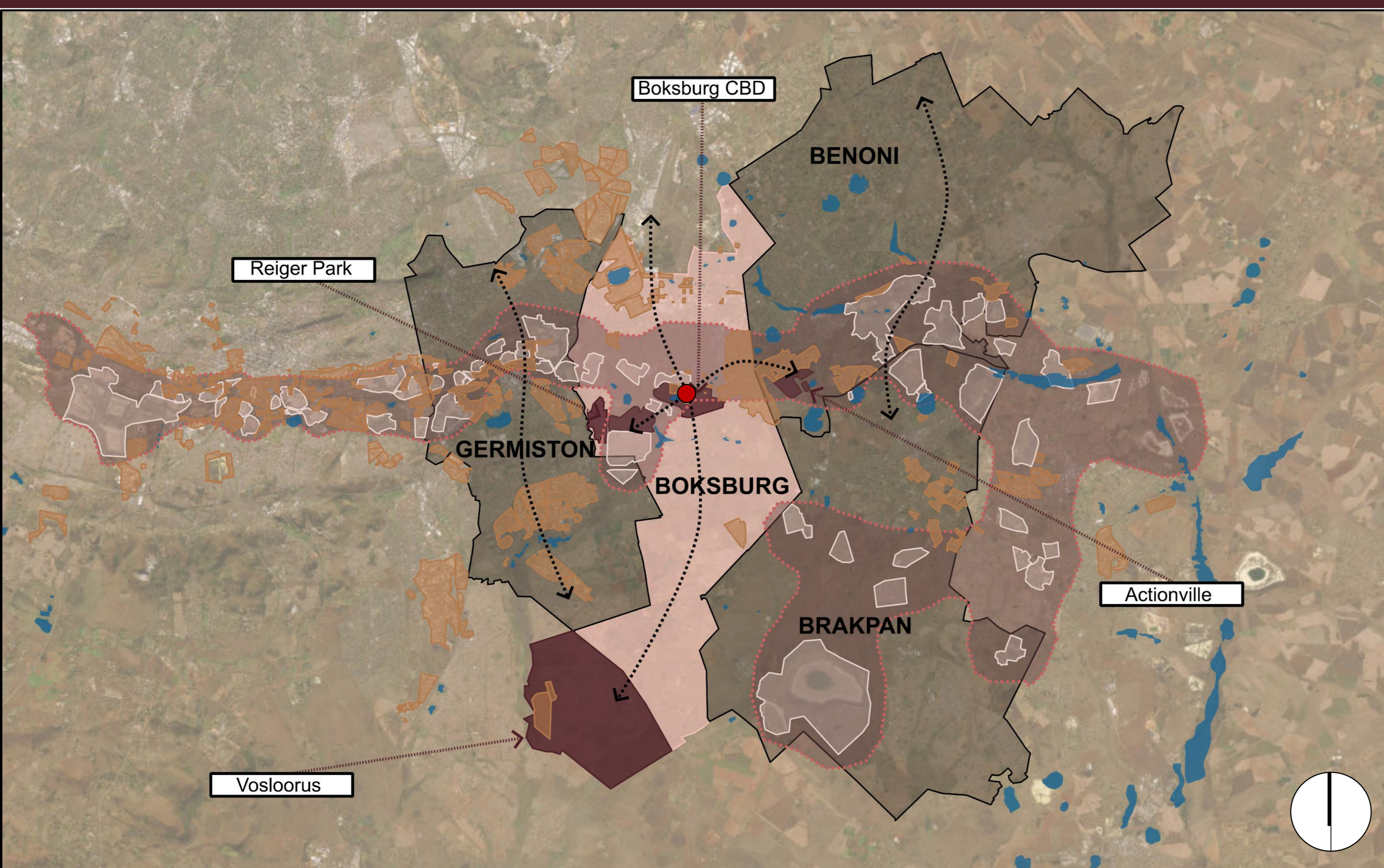
MACRO SCALE ANALYSIS: INDUSTRIAL OPERATIONS



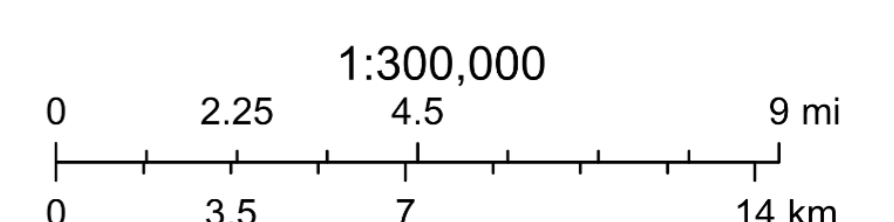
- LEGEND:**
- Natural water systems
 - Witwatersrand Reef
 - Mining operations
 - Supporting industrial development
 - Site



MACRO SCALE ANALYSIS: AREAS OF SEGREGATION AND CITY PERIMETERS



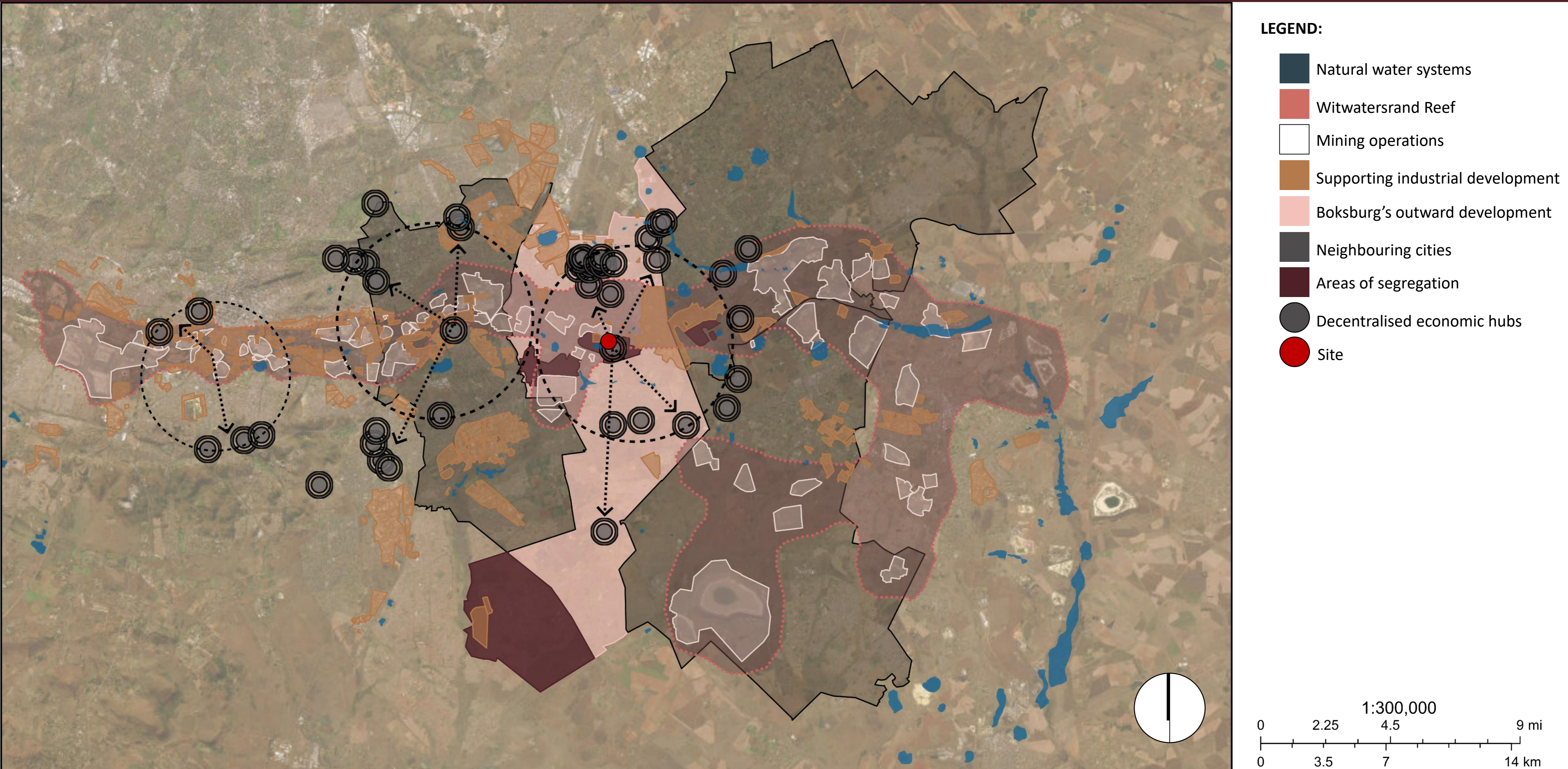
- LEGEND:**
- Natural water systems
 - Witwatersrand Reef
 - Mining operations
 - Natural water systems
 - Boksburg's outward development
 - Neighbouring cities
 - Areas of segregation
 - Site



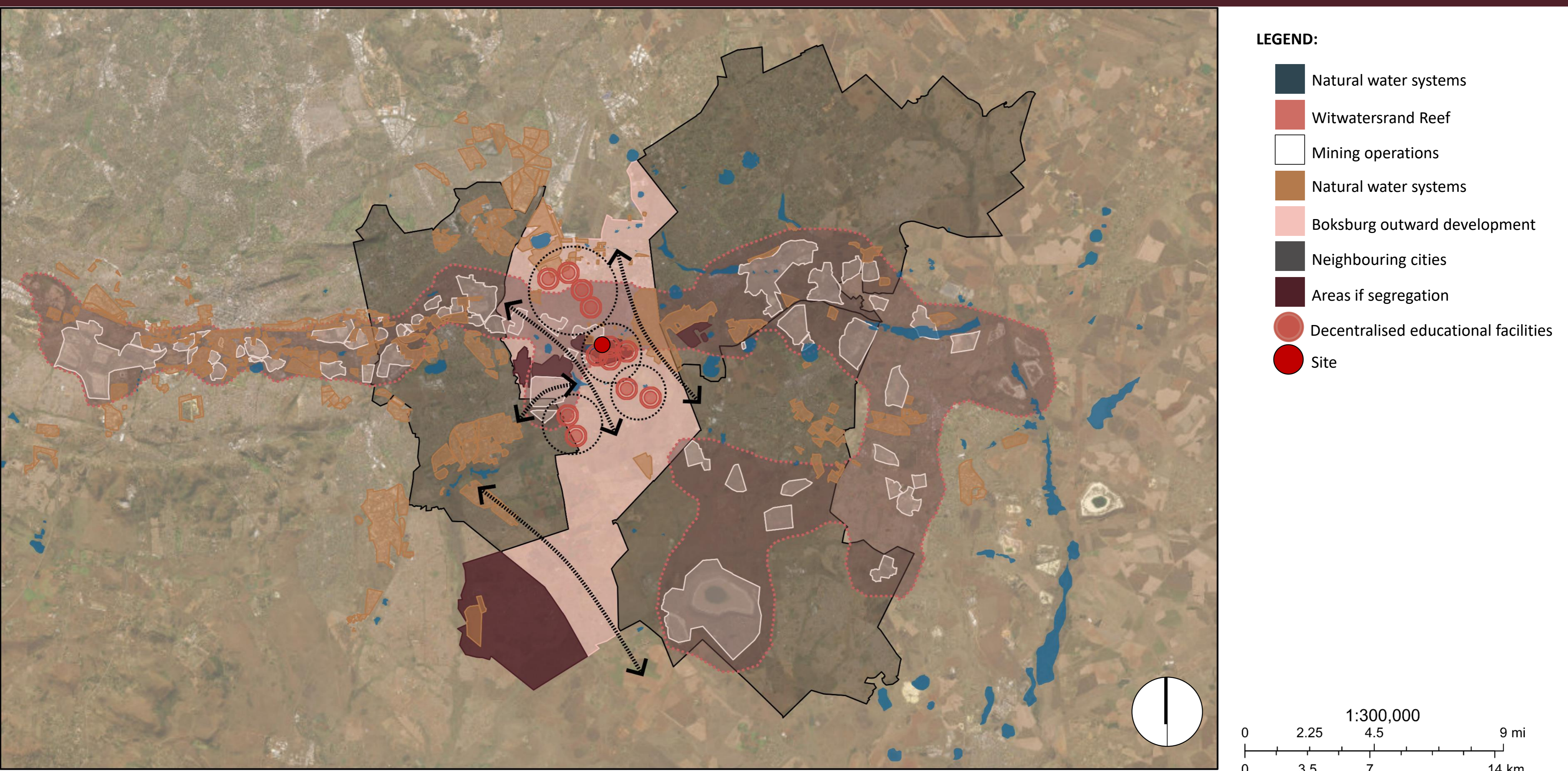
MACRO SCALE MAPPING: THE INHERITED CONTEXT

The contemporary Boksburg CBD context inherited these anthropocentric urban developments that decentralised access to economic and educational opportunities. The current Boksburg CBD reflects historic and current developmental focusses towards specialised industrial operations. These operations display the anthropocentric narrative, rationalised engineered and monofunctional systems and precinct operations that occur as infrastructural barriers that perpetuates a fragmented city, injustice, inequality, and minimal consideration of the multiple perspectives of its human and non-human inhabitants.

MACRO SCALE ANALYSIS: DECENTRALISATION OF ECONOMIC OPPORTUNITIES



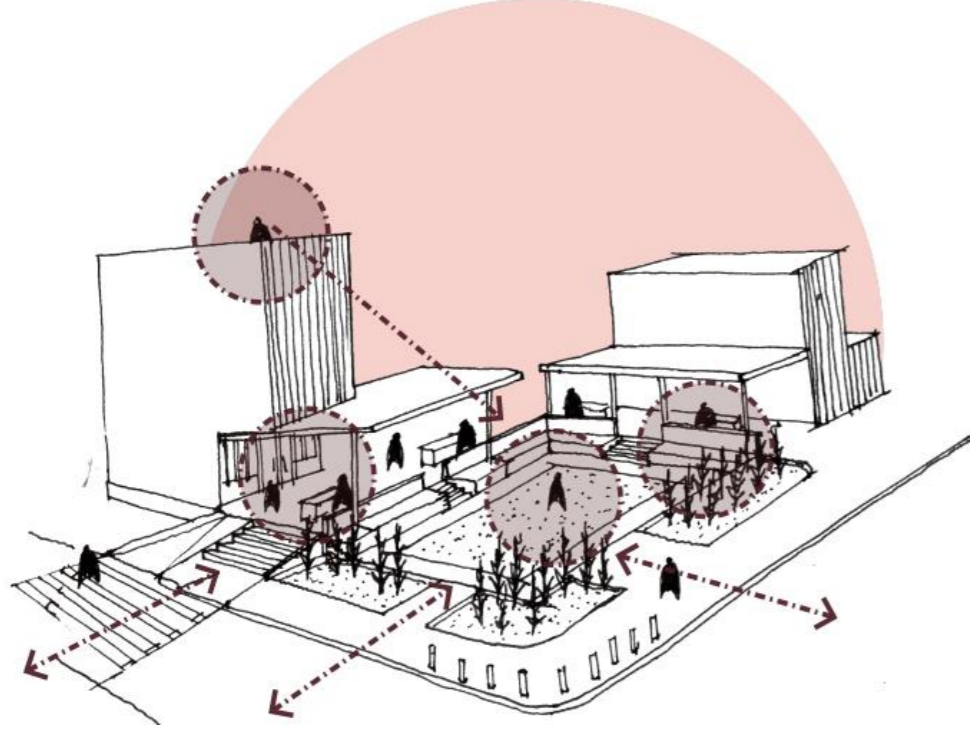
MACRO SCALE ANALYSIS: UNEQUAL ACCESS TO EDUCATIONAL OPPORTUNITIES



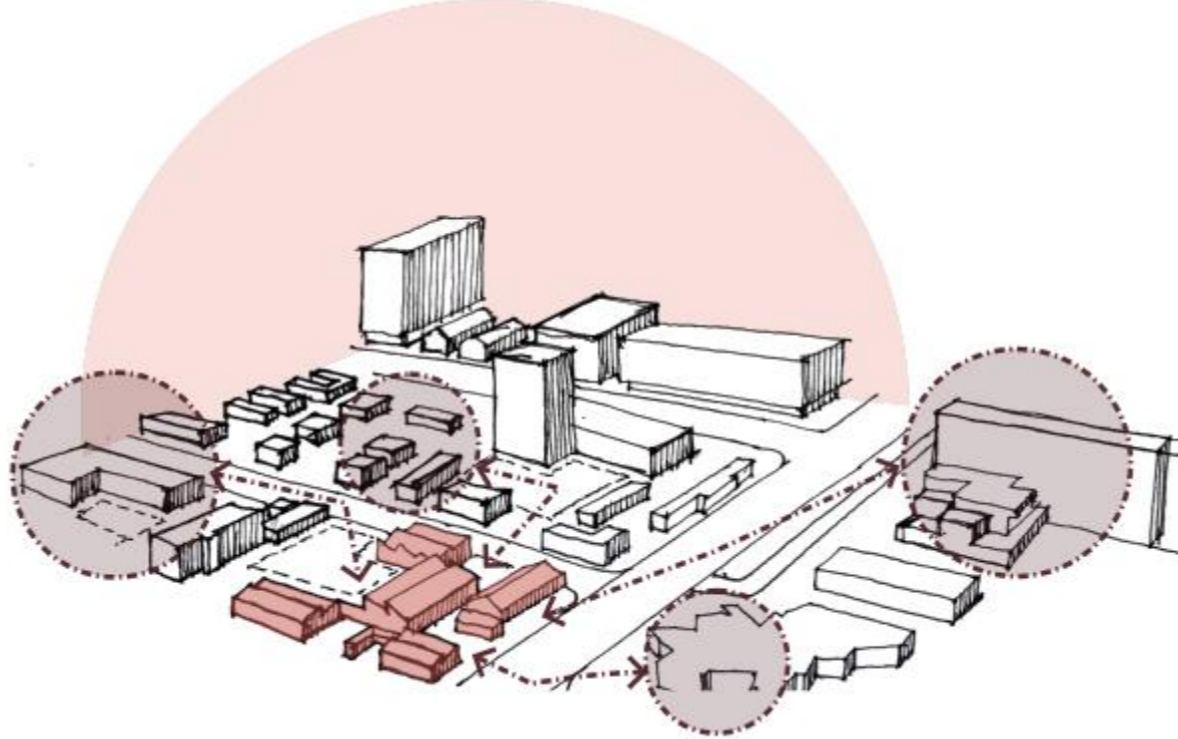
URBAN STRATEGIES: SEWING THE SEEDS FOR COMMUNITY

After investigating the macro scale narrative of urban development along the Witwatersrand reef, the urban framework explores urban ideas and visions that could reorientate the Boksburg CBD narrative. From the anthropocentric spatial planning practices of the colonial and apartheid era that scarred the natural landscape, this urban framework aims to stitch and repair the Boksburg context by providing opportunities for both human and non-human agency and entanglement.

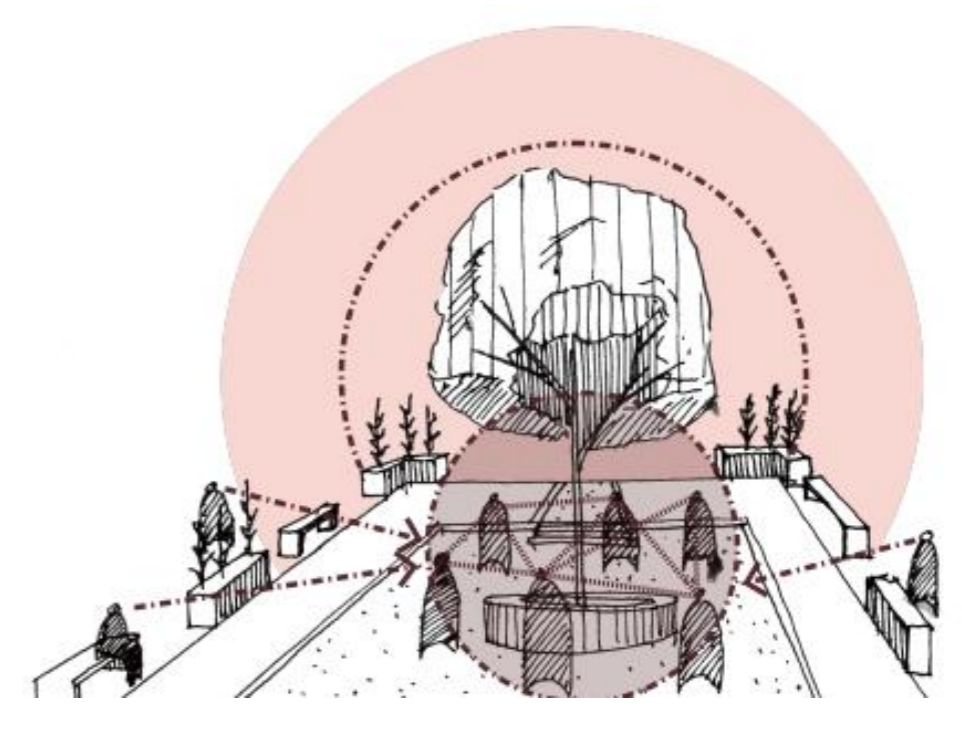
URBAN STRATEGIES:



1.) SPATIAL AGENCY

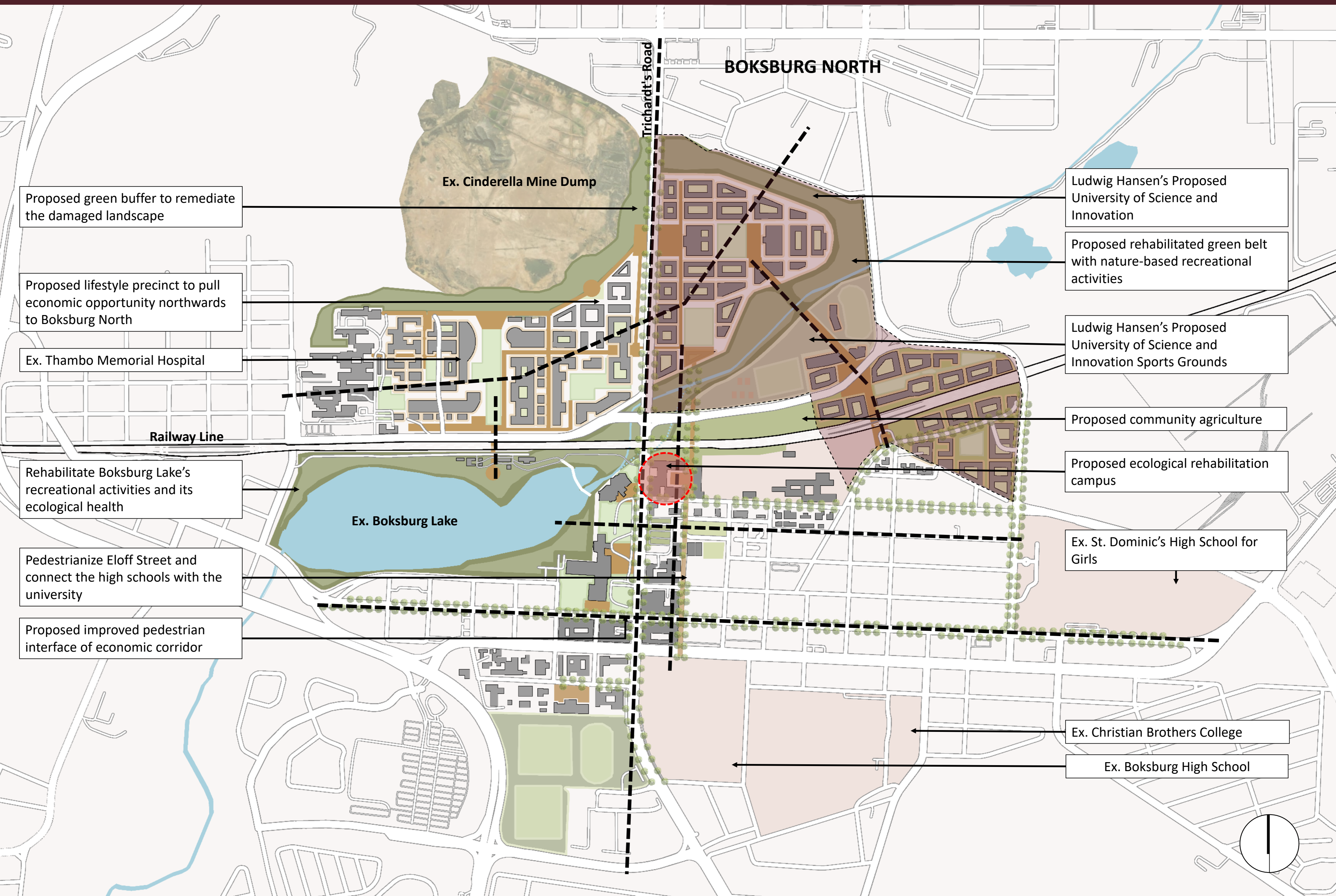


2.) COMMUNITY AND MULTIDISCIPLINARY COLLABORATION

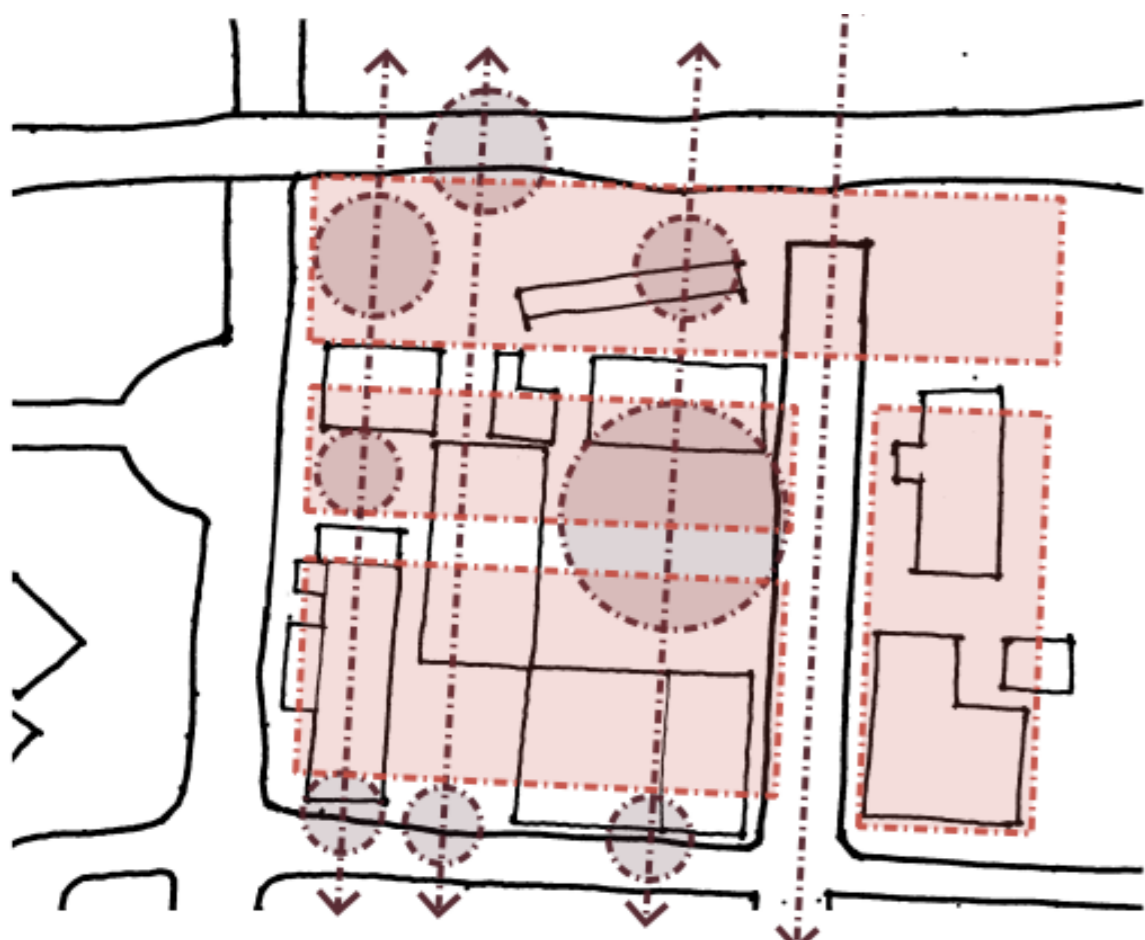


3.) MULTIPLICITY OF REPRESENTATION & COMPLETENESS OF THOUGHT

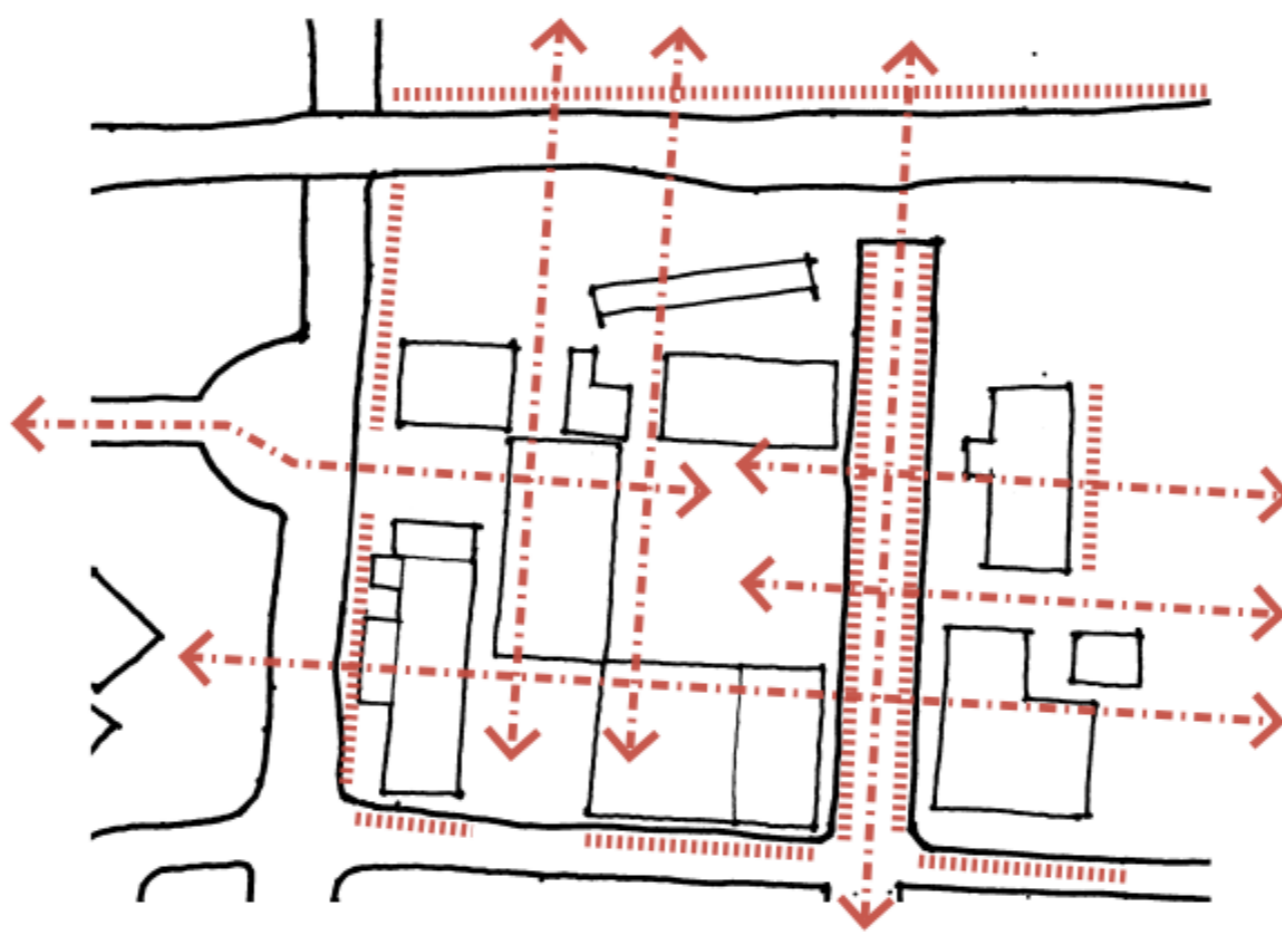
URBAN VISION: STITCHING THE URBAN FABRIC FOR URBAN BENEFIT



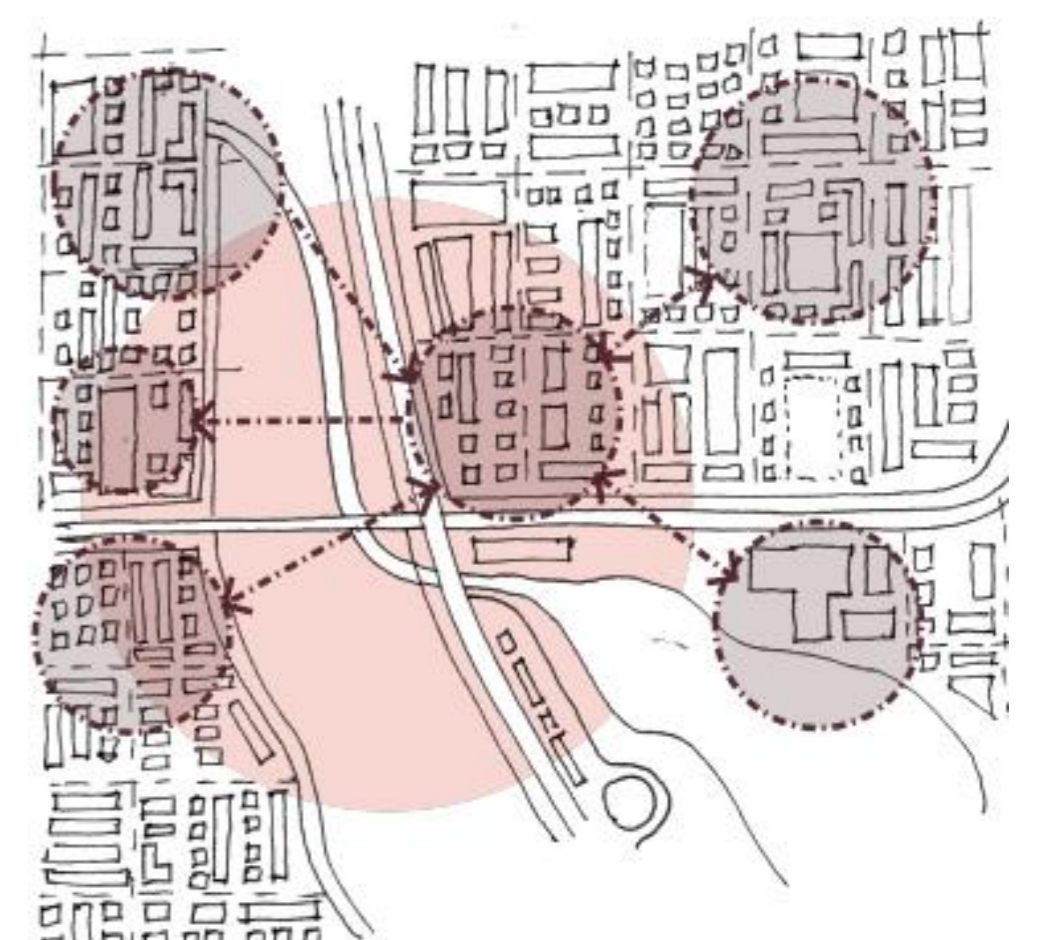
POSSIBLE SITE STRATEGIES:



4.) ACCESS AND PERMEABILITY



5.) OVERCOME STATE UTILITARIAN RATIONALITY



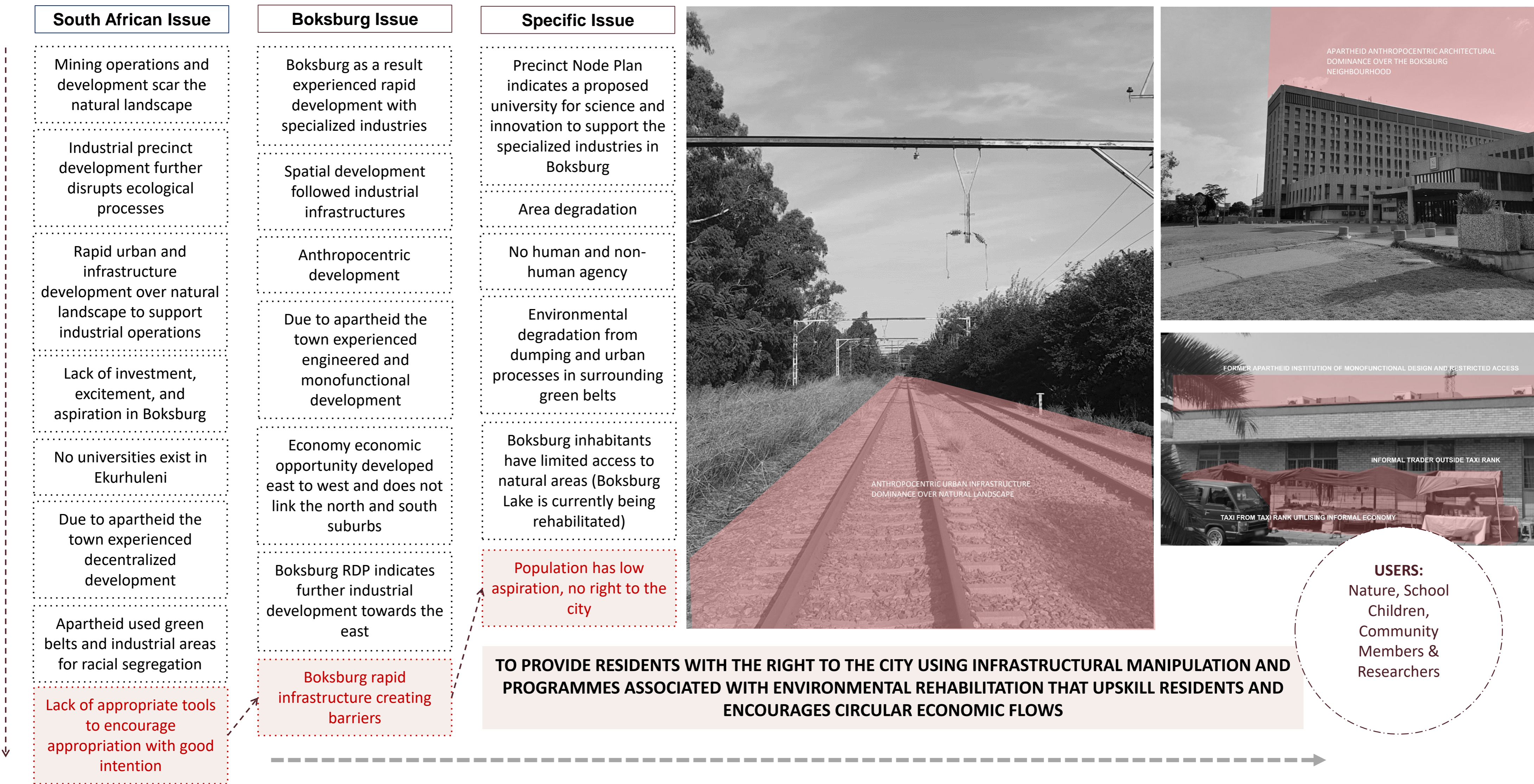
6.) CENTRALISATION & REPAIRING THE FRAGMENTED

THEORETICAL FRAMEWORK: RIGHT TO THE CITY

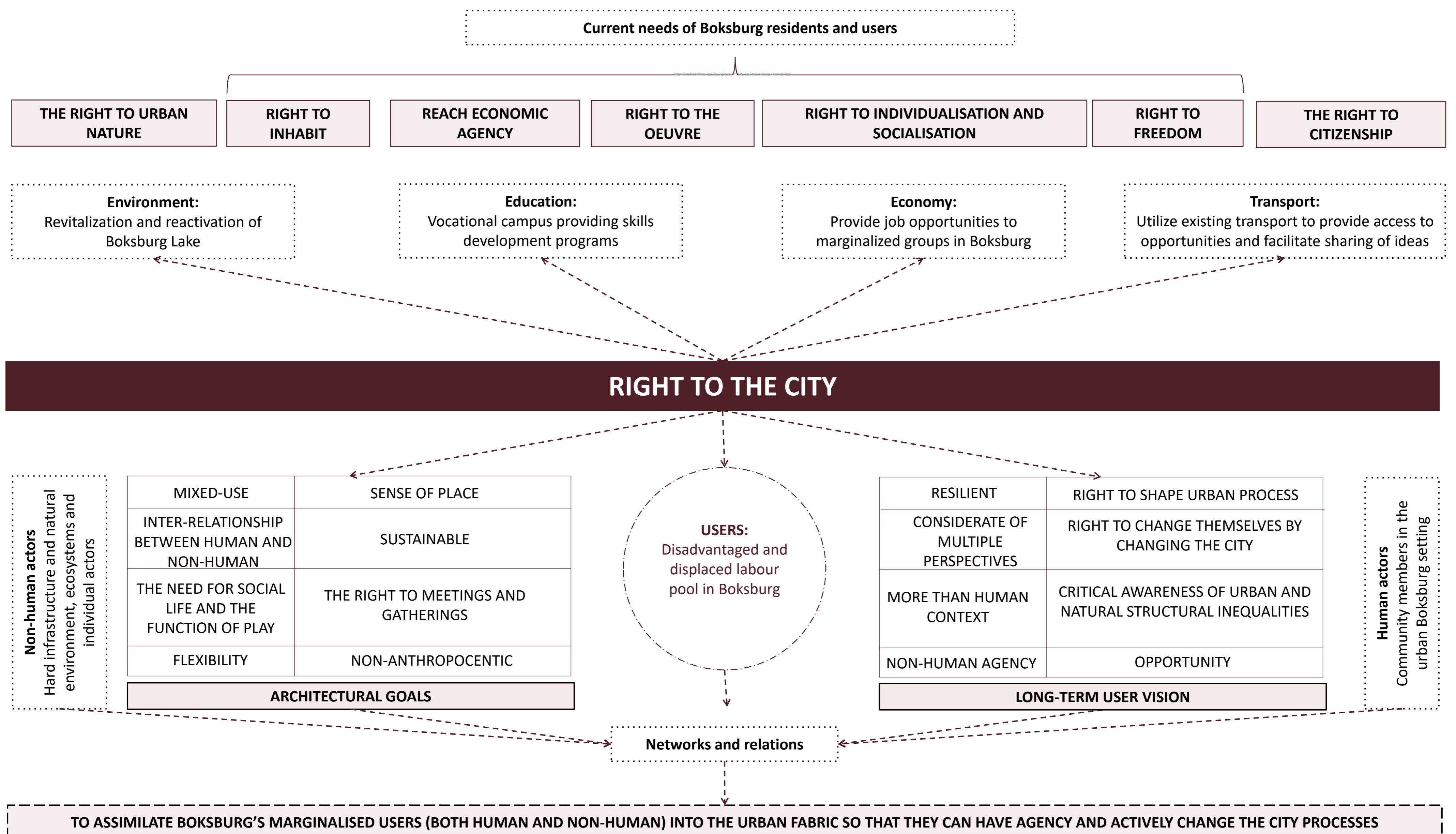
A critical theory to "urban life, to renewed centrality, to places of encounter and exchange, to life rhythms and time uses, enabling the full and complete usage of these moments and places" (Lefebvre in Seixas, 2021: 2)

Castro Seixas, E., 2021. Urban (digital) play and right to the city: A critical perspective. *Frontiers in psychology*, 12, p.636111.

CONTEXTUAL ISSUES: SCALES OF HUMAN AND NON-HUMAN OTHERING



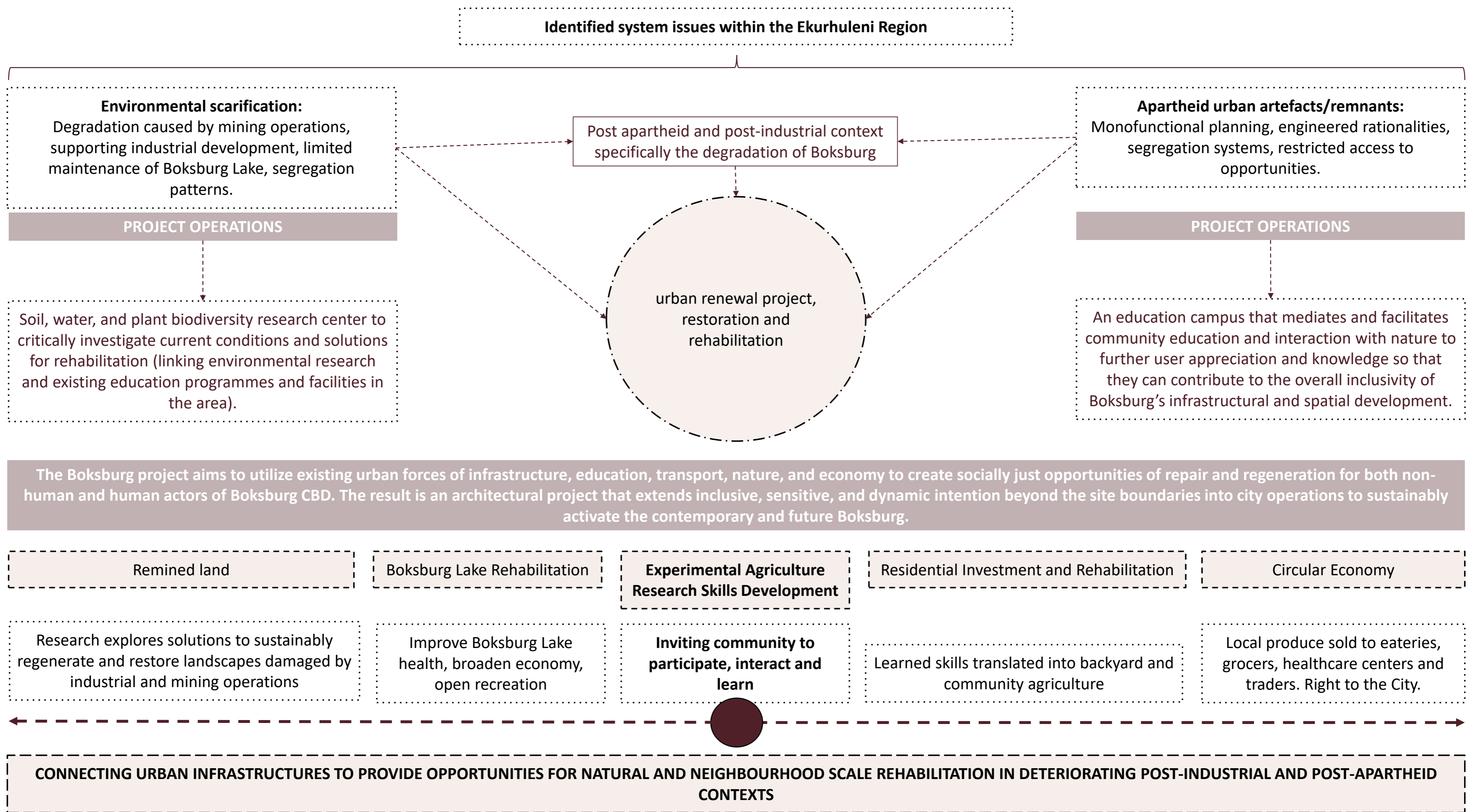
THEORETICAL FRAMEWORK: RIGHT TO THE CITY



PRACTICAL FRAMEWORK: INFRASTRUCTURAL RECODING FOR AREA REHABILITATION

Interlacing the research framework details from within the DIT Urban Infrastructures and Inequality Study to DPD, the following diagram illustrates the identified project premise and its future tangibility's between the urban and natural context

CONTEXTUAL ISSUES: SCALES OF HUMAN AND NON-HUMAN OTHERING



USER ANALYSIS: INHABITANTS OF THE BOKSBURG NEIGHBOURHOOD

Interpreting and recoding mono-functional, separate and rational urban infrastructures into rhizomatic entanglements (a connected and interrelated focus of infrastructure agency bound through the design's operation that is plugged into the identified urban and natural system). The user groups are therefore localised to inhabitants, dwellers, operators and consumers within these infrastructures. Emphasis is placed on community upliftment and achieving the right to the city, marginalised Boksburg residents seeking education, employment or marketable skills, as well as researchers and students that could enable knowledge transfer to occur – in addition to support research towards the sustainable natural rehabilitation in the area.

PRIMARY USER: FUTURE RESEARCHERS	SECONDARY USER: NEIGHBOURHOOD HIGHSCHOOL STUDENTS	TERTIARY USER: BOKSBURG COMMUNITY MEMBERS
<p>Description:</p> <p>Extending from the existing education infrastructures and exploiting the educational potential of the proposed university. New investment into environmental research and conservation, as well as investigating research into the associated rehabilitative processes and the necessary engineered systems to support future restoration projects.</p>	<p>Description:</p> <p>Highschool students in the Boksburg area already support and encourage environmental, sustainable movements and are actively involved in the learning, cleaning and conservation of Boksburg Lake. This environmental support focus and the additional life science curriculum can be translated into inter-school activities on site</p>	<p>Description:</p> <p>Boksburg inhabitants living in the residential area of the CBD, who actively participate in fresh produce production and trade, and those who wish to contribute to community and environmental upliftment programmes. These community members can further their knowledge and skills for produce production and environmental conservation.</p>
<p>Community Contribution:</p> <ul style="list-style-type: none"> Research into rehabilitating land scared due to mine and industrial processes. Resilient and sustainable solutions to restore and rehabilitate Boksburg Lake. Resilient and sustainable urban backyard agricultural solutions for community members 	<p>Community Contribution</p> <ul style="list-style-type: none"> Schools can facilitate interschool activities and gathering. Initiatives of learning around natural conservation and urban agriculture can better inform the knowledge transfer for future generations. Support in environmental initiatives and activities 	<p>Community Contribution</p> <ul style="list-style-type: none"> Residential properties and public spaces that can support community urban agriculture. The maintenance and care of these spaces. The urban processes of planting, production, harvesting, trading and distribution of these resources into the local economy.
<p>Programmatic Needs:</p> <ul style="list-style-type: none"> Research rooms Agricultural testing grounds Lecture spaces Practical spaces and labs Resource center Offices Presentation room 	<p>Programmatic Needs:</p> <ul style="list-style-type: none"> Amphitheatre Safe circulation between schools and site Community gardens and projects Recycling station Labs Hall for interschool initiatives, exhibitions and functions 	<p>Programmatic Needs:</p> <ul style="list-style-type: none"> Community garden Workshops Trade spaces (greengrocer, eateries, healthcare retail) Recreational space/courtyard Community gathering space (sharing of knowledge) Transport provision

CONCEPT DEVELOPMENT: INFRASTRUCTURES OF POTENTIAL

CONCEPT DEVELOPMENT:

The concept of bridging developed from the initial narrative of connecting infrastructures. Bridging starts to initiate operational and physical structures that distributes processes, circumvents infrastructural and natural barriers. Bridging also reconciles the disparate or independent. Through which the larger differences between identified groups made less significant. In this case bridging ensures an integrated approach that reconciles disparate and seemingly opposing groups of Boksburg's landscapes i.e. infrastructure and nature, education and economy, the human and the non-human context.

MACRO SCALE: BRIDGING COMMUNITY, NATURE AND INFRASTRUCTURE



LEGEND:

- URBAN AGRICULTURE AND COMMUNITY GARDENS
- EDUCATION FACILITIES
- TRANSPORT LOADING FACILITIES
- RECREATION
- SITE LOCATION
- MIXED USE DEVELOPMENT
- RAILWAY LINE
- PEDESTRIAN CIRCULATION
- FUNCTION AND THE ASSOCIATED INFRASTRUCTURAL LINK

MESO SCALE: BRIDGING COMMUNITY, NATURE AND INFRASTRUCTURE



LEGEND:

- URBAN AGRICULTURE AND COMMUNITY GARDENS
- EDUCATION FACILITIES
- TRANSPORT LOADING FACILITIES
- RECREATION
- PUBLIC GATHERING AND FORECOURT
- MIXED USE DEVELOPMENT
- PEDSTRIAN CIRCULATION
- TRICHARDT'S ROAD
- RAILWAY LINE
- THRESHOLD SPACES BETWEEN INFRASTRUCTURES

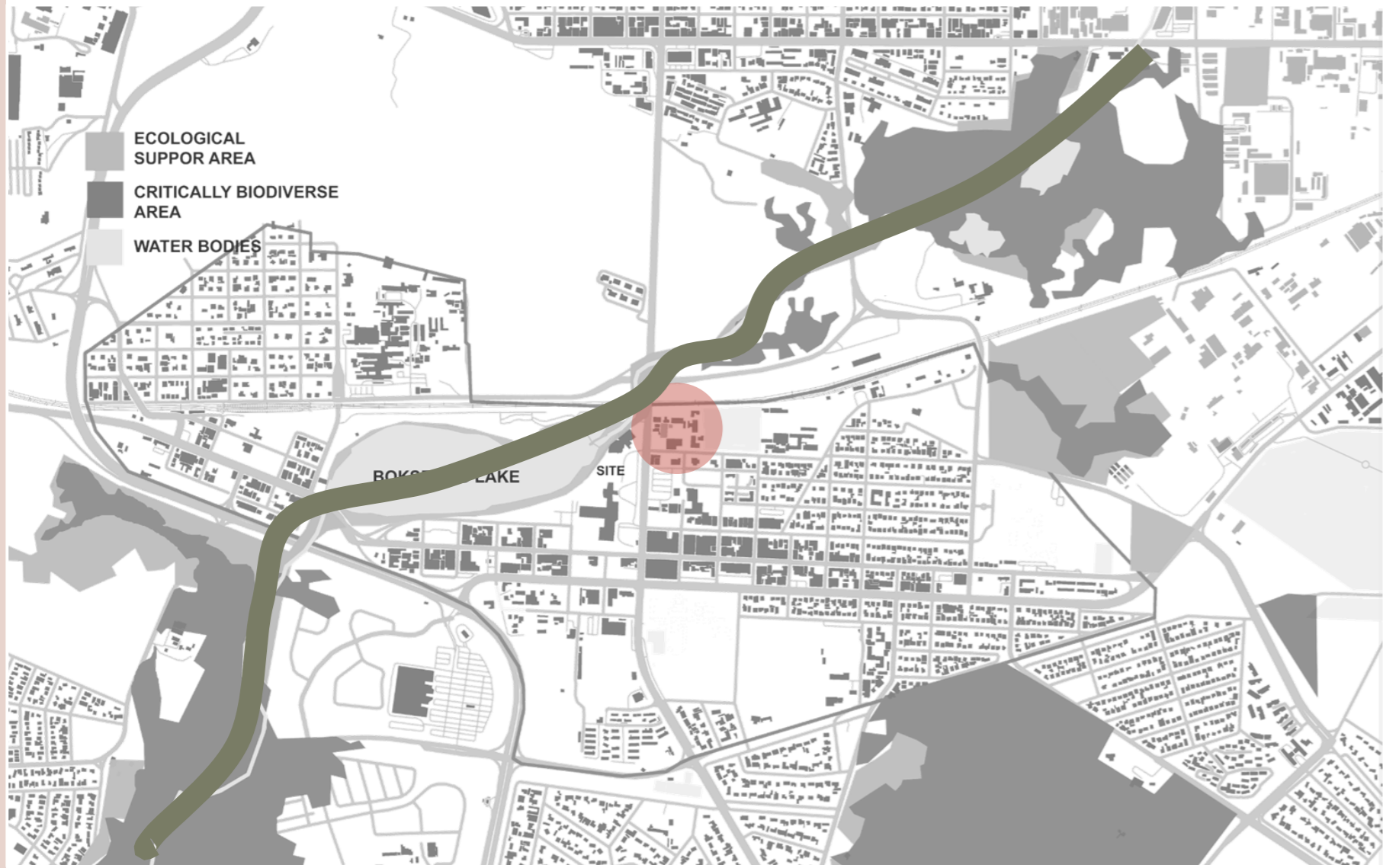
INFORMANTS: BOKSBURG INTEGRATIONS

IDENTIFYING SITE INFORMANTS:

The concept 'Bridging Boksburg', for this interactive community-based environmental upliftment research center, looks at integrating urban infrastructures of education, transport, and economy. It also looks at bridging the gap, diminishing the disparity between and provide right to the city for the human (urban Boksburg), and the non-human (natural landscape). The informants are selected for their potential within the Boksburg environment to connect the urban fabric and its operations.

CONTEXTUAL INFORMANTS: SITE AS MEDIATOR FOR CONTEXT

GREEN BELTS AND ECOLOGICAL INFRASTRUCTURE



THE BOKSBURG LAKE SYSTEM PROVIDES INSPIRATION IN THE FOLLOWING WAYS:

- Function:** To carry nutrients, connect to and remediate larger ecological habitats from one site
- Form:** To follow the natural stream flow into the urban setting and nestle into the landscape
- Technology:** Construction to start with a stereotomic base from which the lightweight emerge

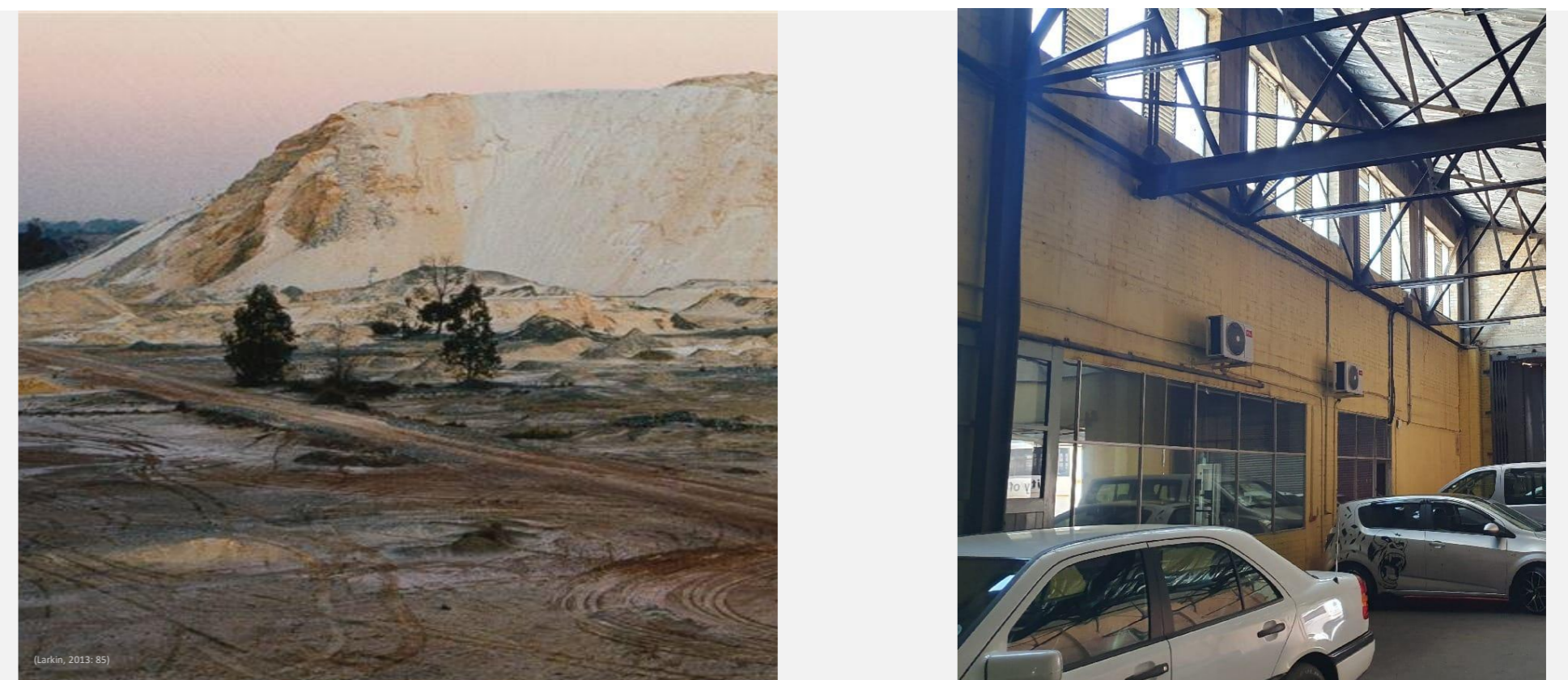
LOCAL ECONOMY



THE LOCAL ECONOMY PROVIDES INSPIRATION IN THE FOLLOWING WAYS:

- Function:** To develop and connect to larger scale urban neighbourhoods and networks
- Form:** Open architecture with courtyards and spaces for appropriation and gathering
- Technology:** To utilise the existing systems of veranda's, lightweight shading devices

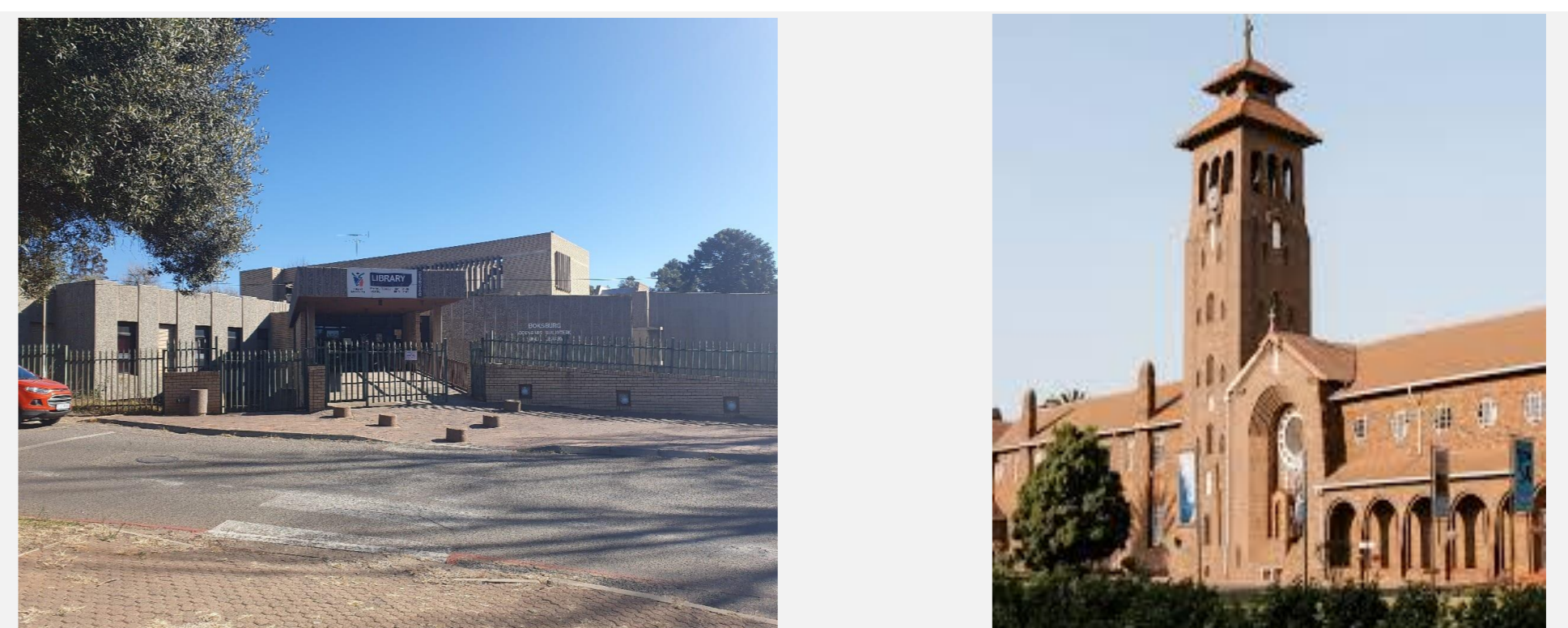
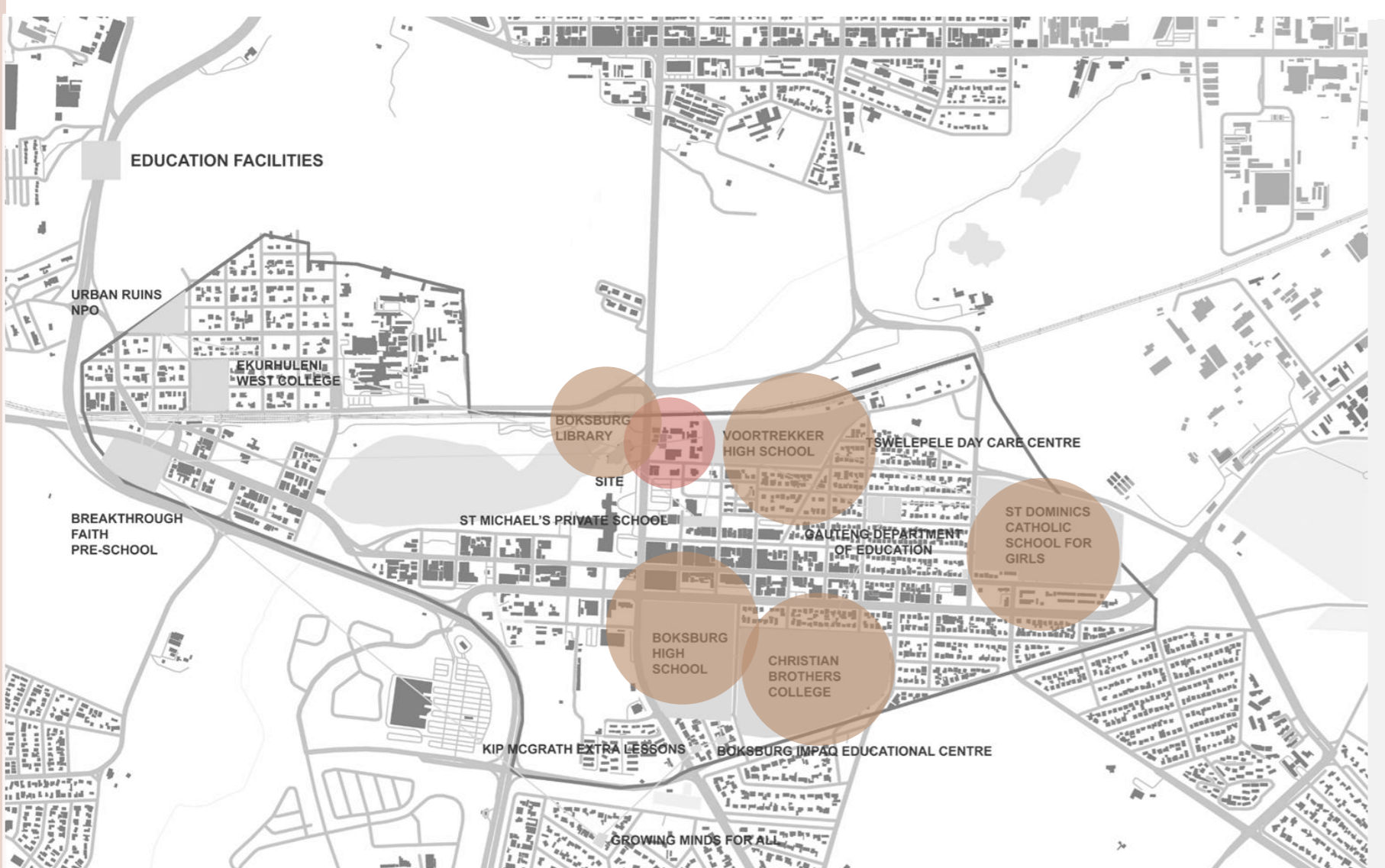
MINING AND INDUSTRIAL OPERATIONS



THE INDUSTRIAL ECONOMY PROVIDES INSPIRATION IN THE FOLLOWING WAYS:

- Function:** To develop and connect to larger scale urban neighbourhoods and networks
- Form:** Open architecture with courtyards and spaces for appropriation and gathering
- Technology:** Adobe brick with mined soil, gabion walls with rubble, steel construction

EDUCATIONAL DIVERSITIES



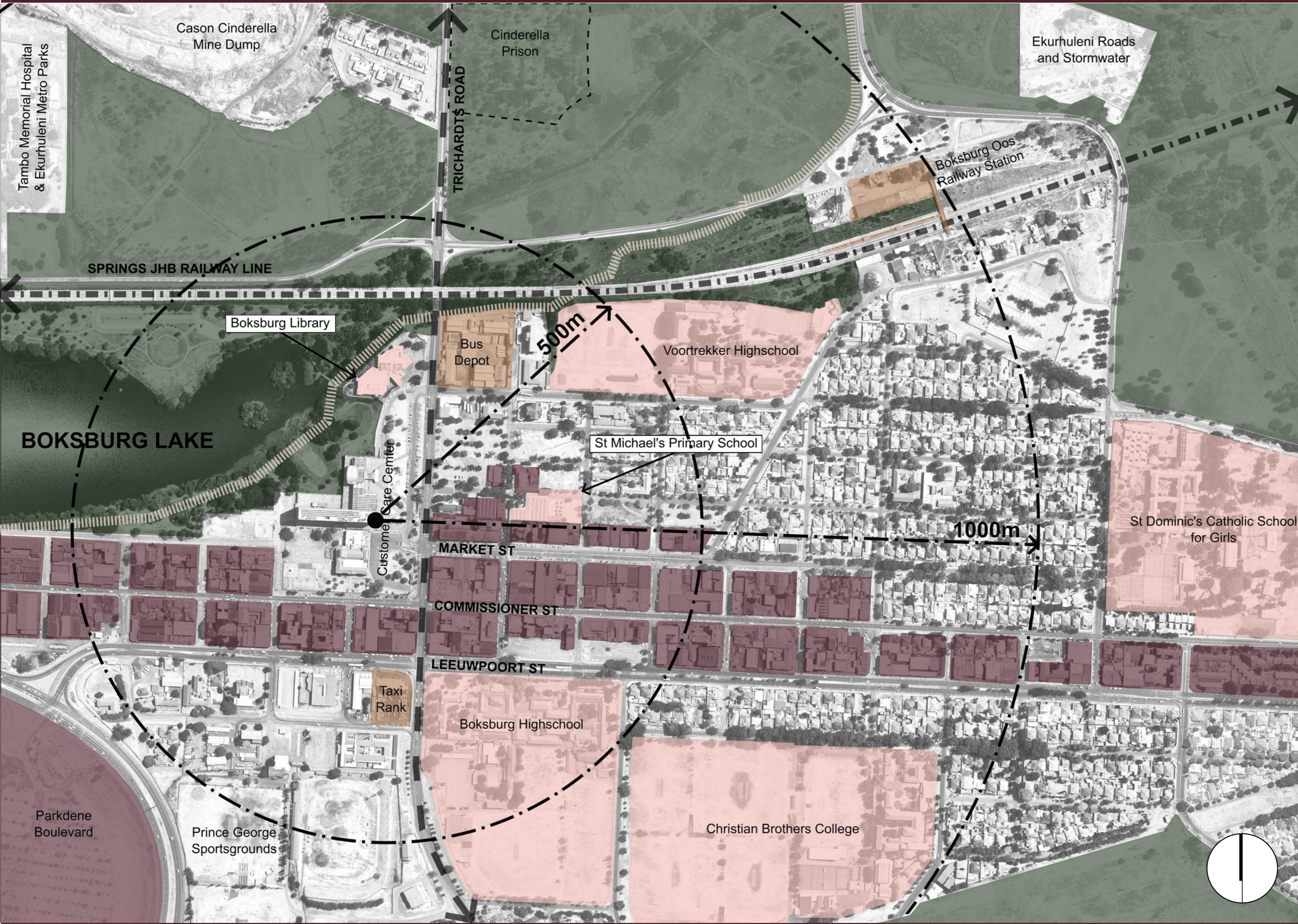
EDUCATION PROVIDES INSPIRATION IN THE FOLLOWING WAYS:

- Function:** Expose & host various user perspectives and learn through didactic architecture
- Form:** Courtyard spaces to exchange ideas & circulation to follow research processes
- Technology:** Glass construction exhibits lab investigations & expose processes of remediation

MESO: INTERPRETING BOKSBURG'S INFRASTRUCTURE

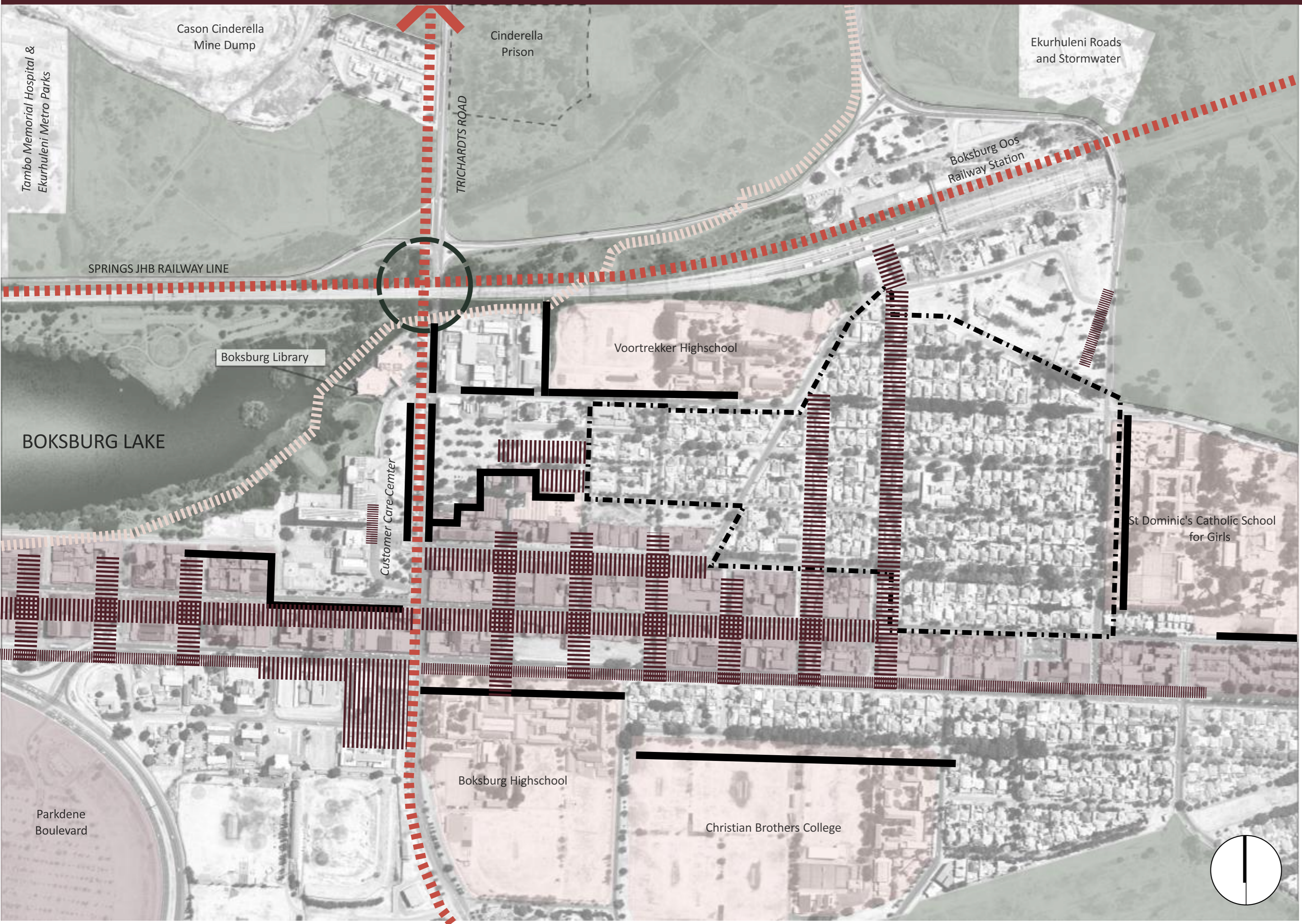
Having identified the existing infrastructural informants of education, transport, economy and nature with their relational proximity in the neighbourhood context. It is revealed that Boksburg has a well-established and diverse network of urban infrastructures with a significant potential to be harnessed, manipulated, and entangled to create an interconnected context of systems that could support, uplift, activate and be inclusive of multiple perspectives of the neighbourhood. This could provide a sustainable resilience. However, when analysing the urban context there are infrastructure barriers that limit the interconnectivity potential and unified operation of the precinct.

MESO ANALYSIS: INFRASTRUCTURE OF POTENTIALITIES



- LEGEND:**
- Boksburg economic corridor
 - Hard transport infrastructure
 - Inactive perimeter boundaries
 - Boksburg CBD gateway flooding
 - Education facilities
 - Active pedestrian street frontages

MESO ANALYSIS: INTERPRETING INFRASTRUCTURAL BARRIERS

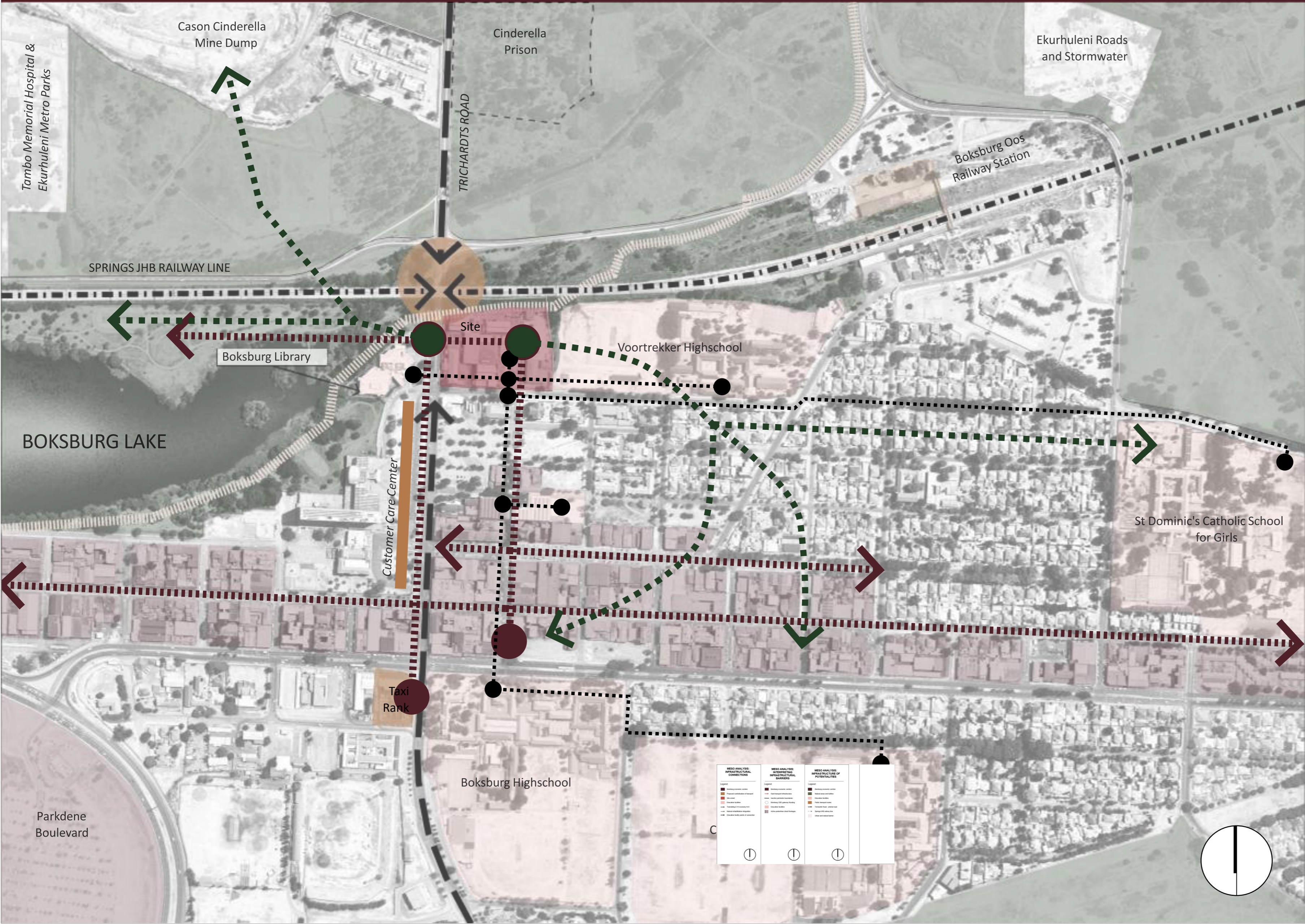


- LEGEND:**
- Boksburg economic corridor
 - Natural areas and buffers
 - Education facilities
 - Public transport nodes
 - Trichardt's Road - arterial road
 - Springs/JHB railway line
 - Urban and natural barrier

MESO: AN INTEGRATED BOKSBURG CBD PRECINCT

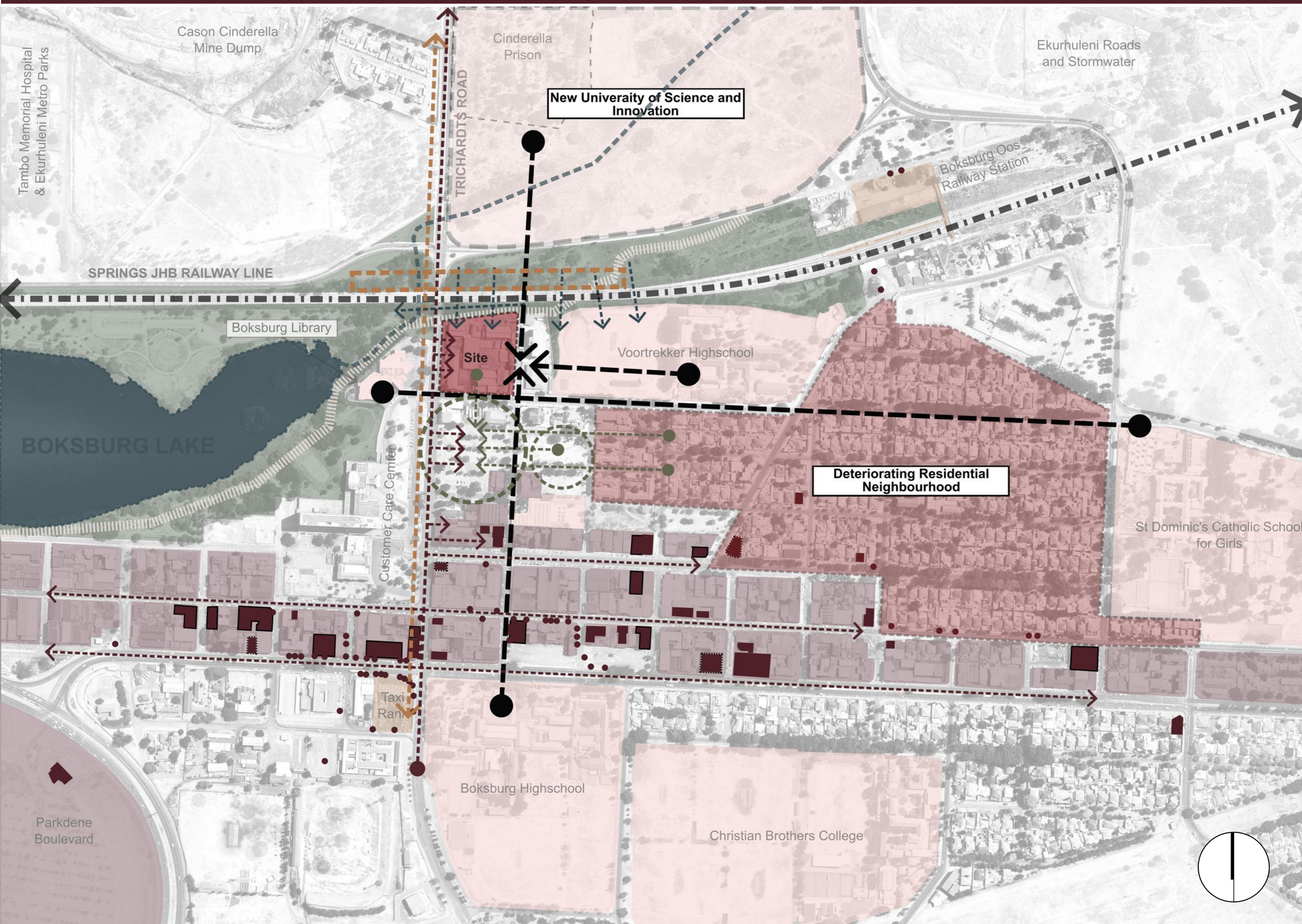
Having acknowledged which rationalised infrastructures impeded the potential integration of Boksburg CBD urban processes, infrastructures and its users (the human and non-human), as well as determining the current infrastructures that could be integrated to unlock urban and natural integration for remediation potentials, the following maps illustrate how the bus depot site is critically positions itself between these infrastructures of potential and how they could be recoded to overcome existing barriers to create a more activated and integrated city considerate of multiple perspectives to provide both human and non-human users with a right to the city.

MESO ANALYSIS: INFRASTRUCTURAL CONNECTIONS AND SENSE MAKING



- LEGEND:**
- Boksburg economic corridor
 - Proposed centralisation of transport
 - Site extent
 - Education facilities
 - Translating E-W economy N-S
 - Natural rehabilitation integration
 - Education facility points of connection

MESO ANALYSIS: RECODING INFRASTRUCTURE RATIONALITIES

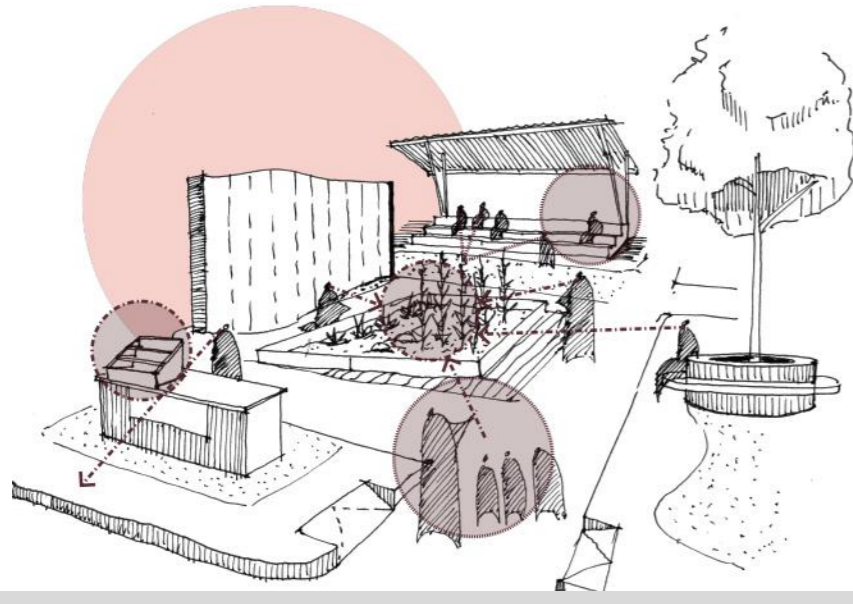


- LEGEND:**
- Education facilities
 - Site extent
 - Proposed urban agriculture exchange
 - Proposed education integration
 - Proposed centralised transport densify
 - Proposed economic network integration
 - Informal trade
 - Green grocers
 - Healthcare facilities
 - Eateries

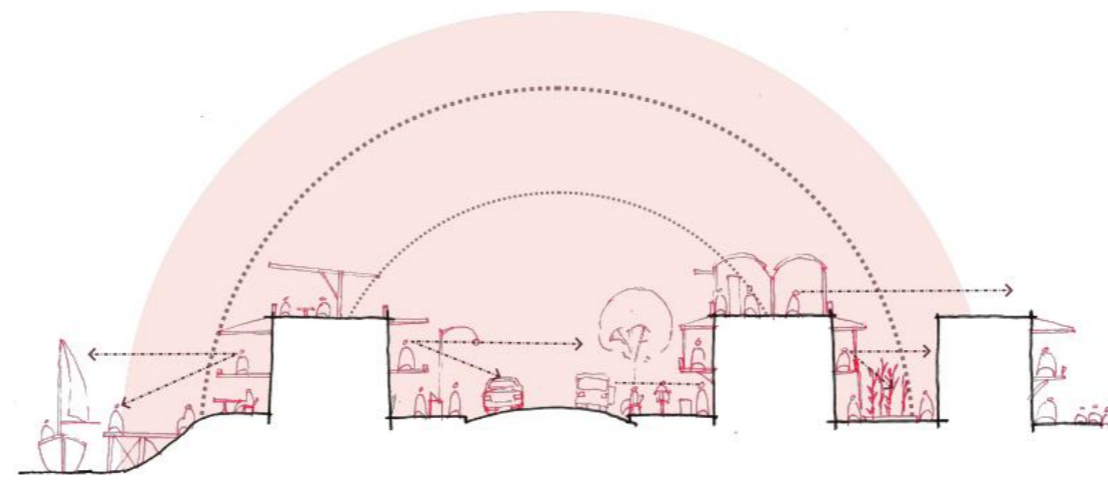
BLOCK STRATEGIES: REINFORCING BOKSBURG CENTRALITY

The block vision of Boksburg investigates the possible operations of the identified surrounding and relevant infrastructures and tests their interconnectivity to provide new opportunities for actors of the community to contribute to and entangle the urban and natural environment so that Boksburg CBD becomes an integrated and inclusive context.

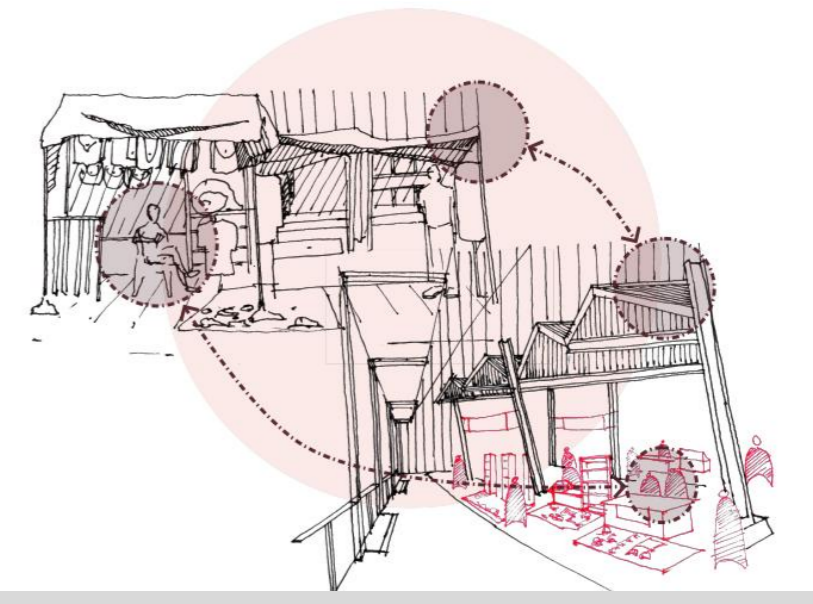
URBAN STRATEGIES:



1.) SPACE OF PARTICIPATION

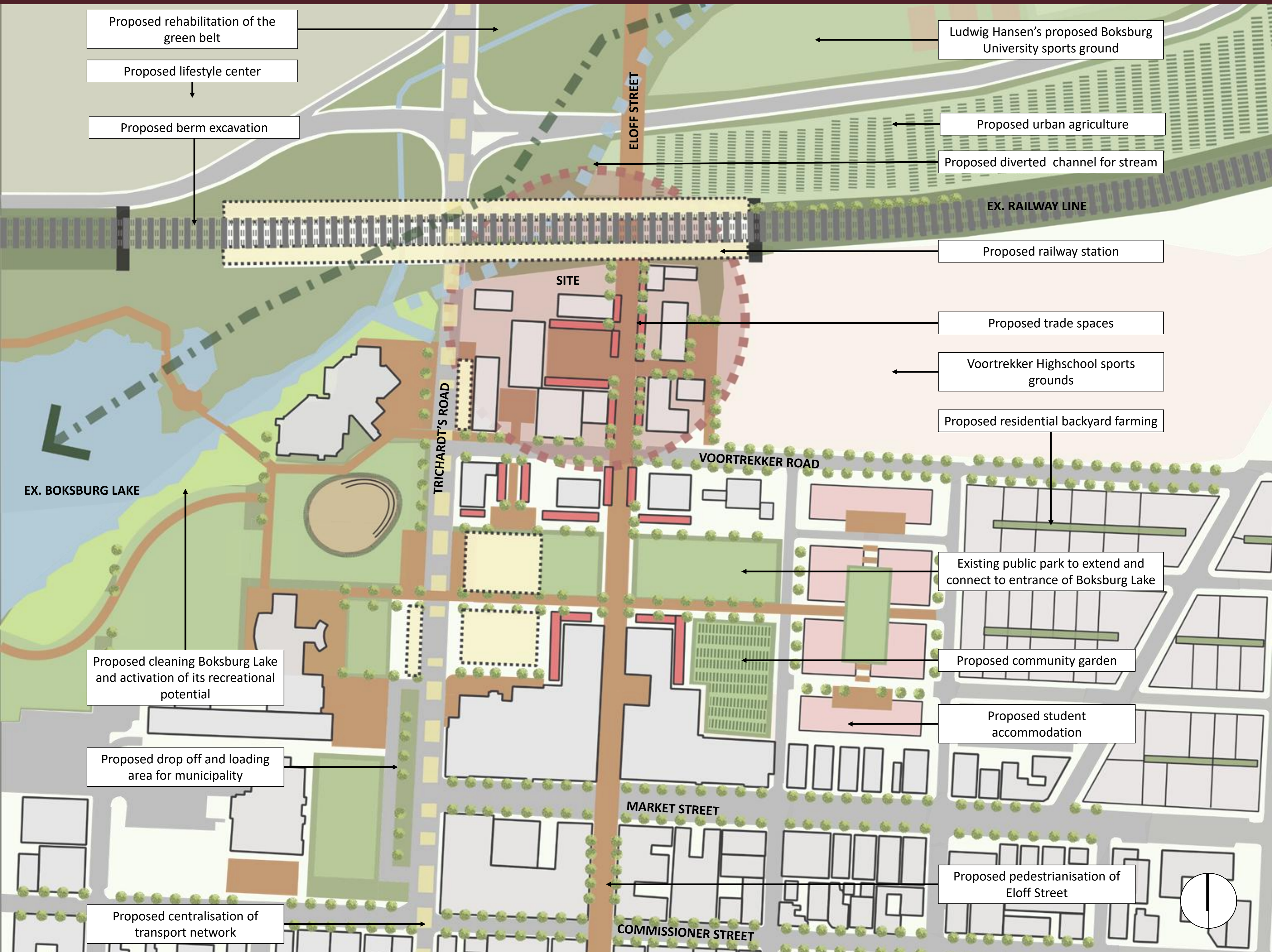


2.) MULTI-SENSORY CONSCIOUSNESS & ACTIVE COMMUNITY

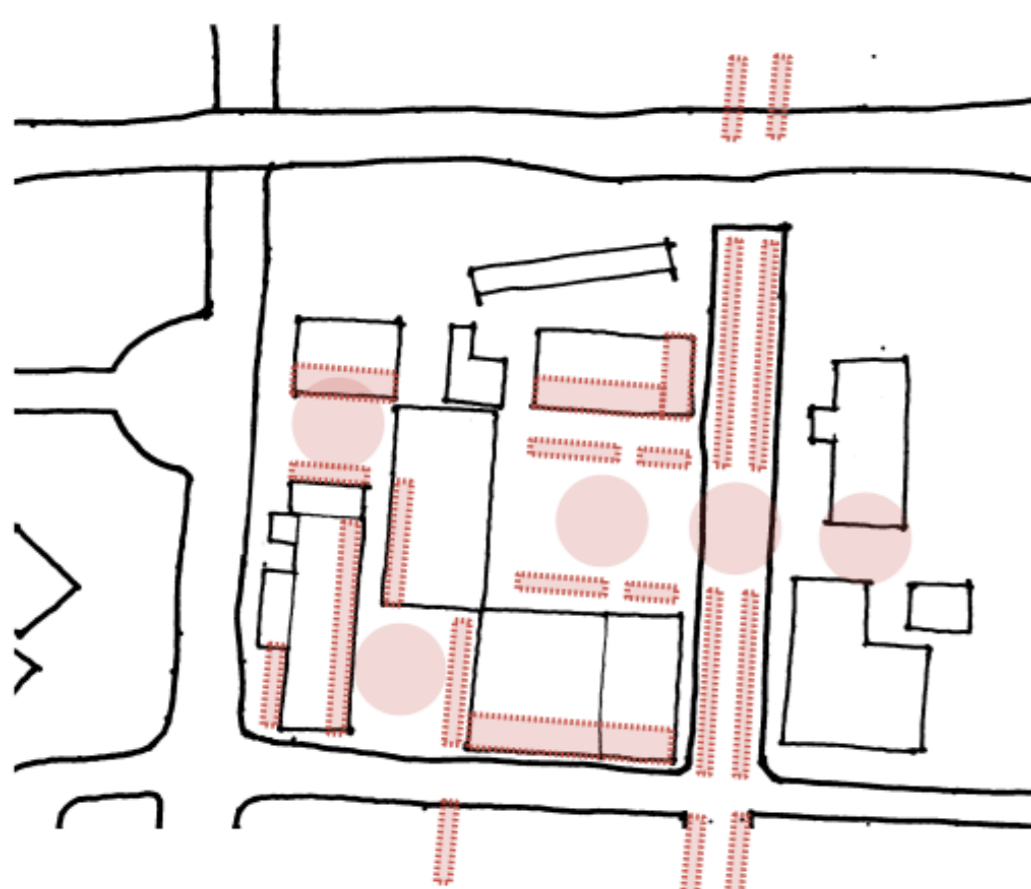


3.) BEING AND BECOMING

BLOCK VISION: ESTABLISHING PROCESS AND INFRASTRUCTURE INTEGRATION



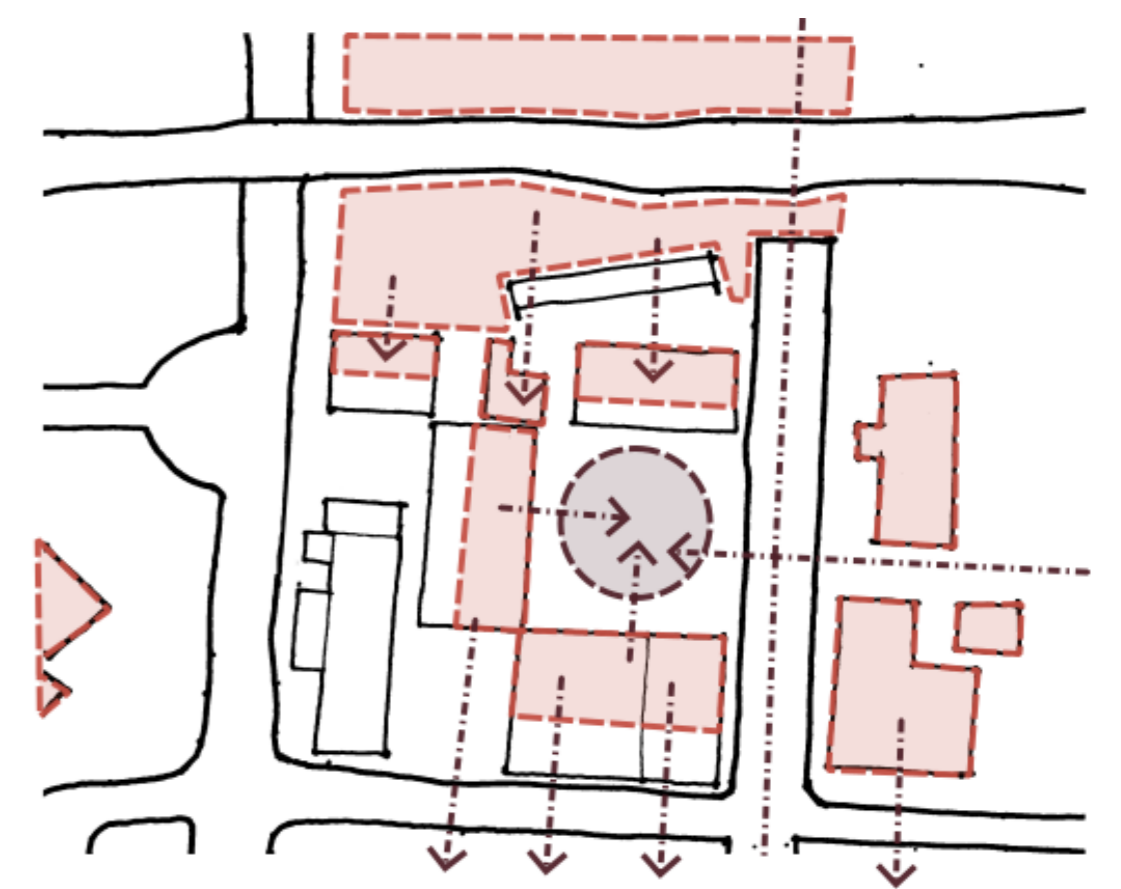
POSSIBLE SITE STRATEGIES:



4.) COMMUNITY GATHERING AND EXCHANGE



5.) INTERTWINING INFRASTRUCTURE, SOCIAL RELATIONS AND URBAN PROCESSES

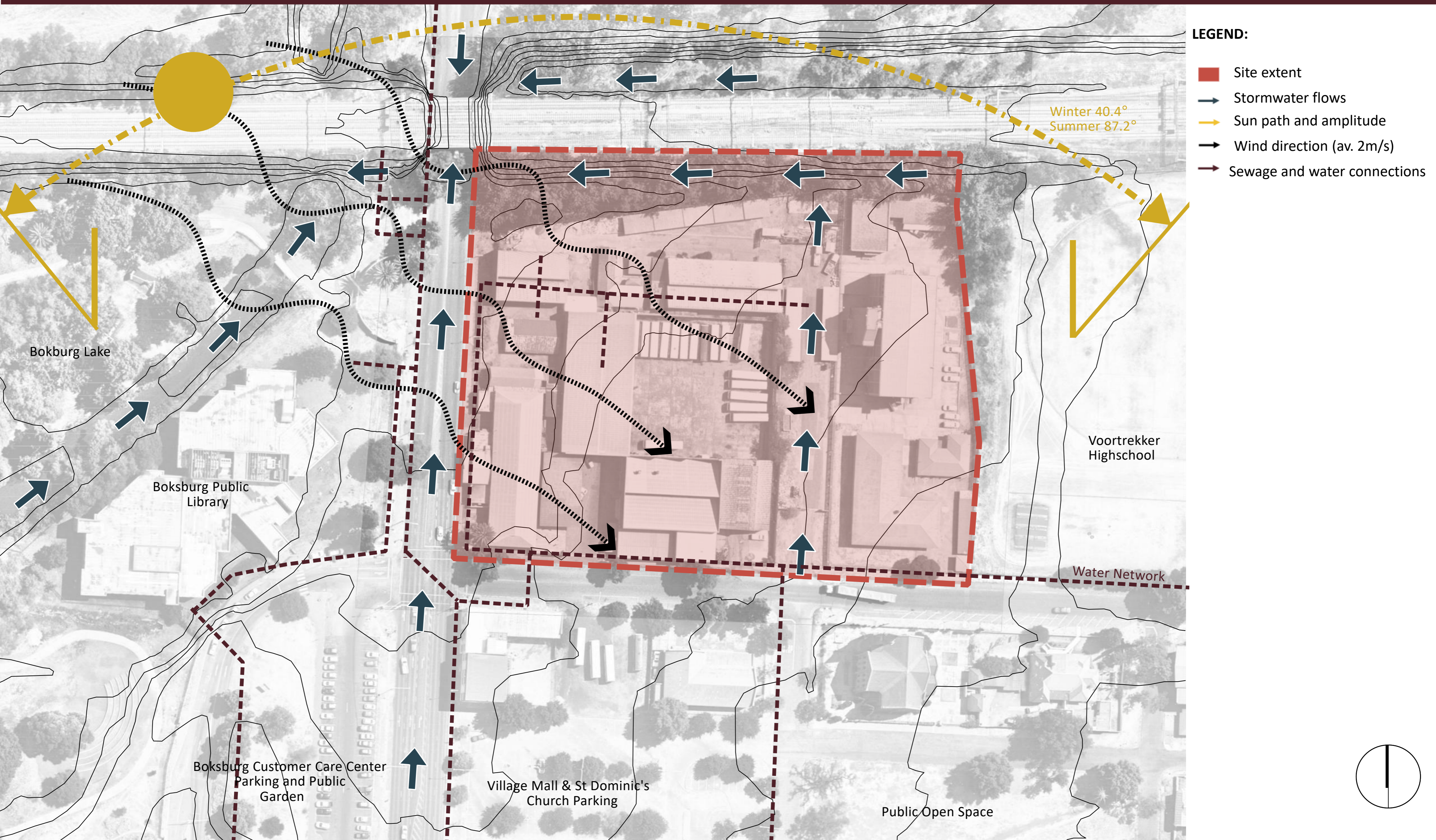


6.) URBAN GOVERNANCE AND LIFE

MICRO ANALYSIS: SITE OPPORTUNITIES AND ISSUES

A brief analysis of the climatic conditions, existing building uses and services of the bus depot site was done to determine existing issues and opportunities that may occur within and around the site. The site experiences significant stormwater runoff since it is the lowest point between the Boksburg North and Boksburg CBD area. The bus depot also consists of a warehouse typology that could be better adapted and activated for community engagement and gathering.

MICRO ANALYSIS: THE BUS DEPOT'S CLIMATIC CHARACTERISTICS



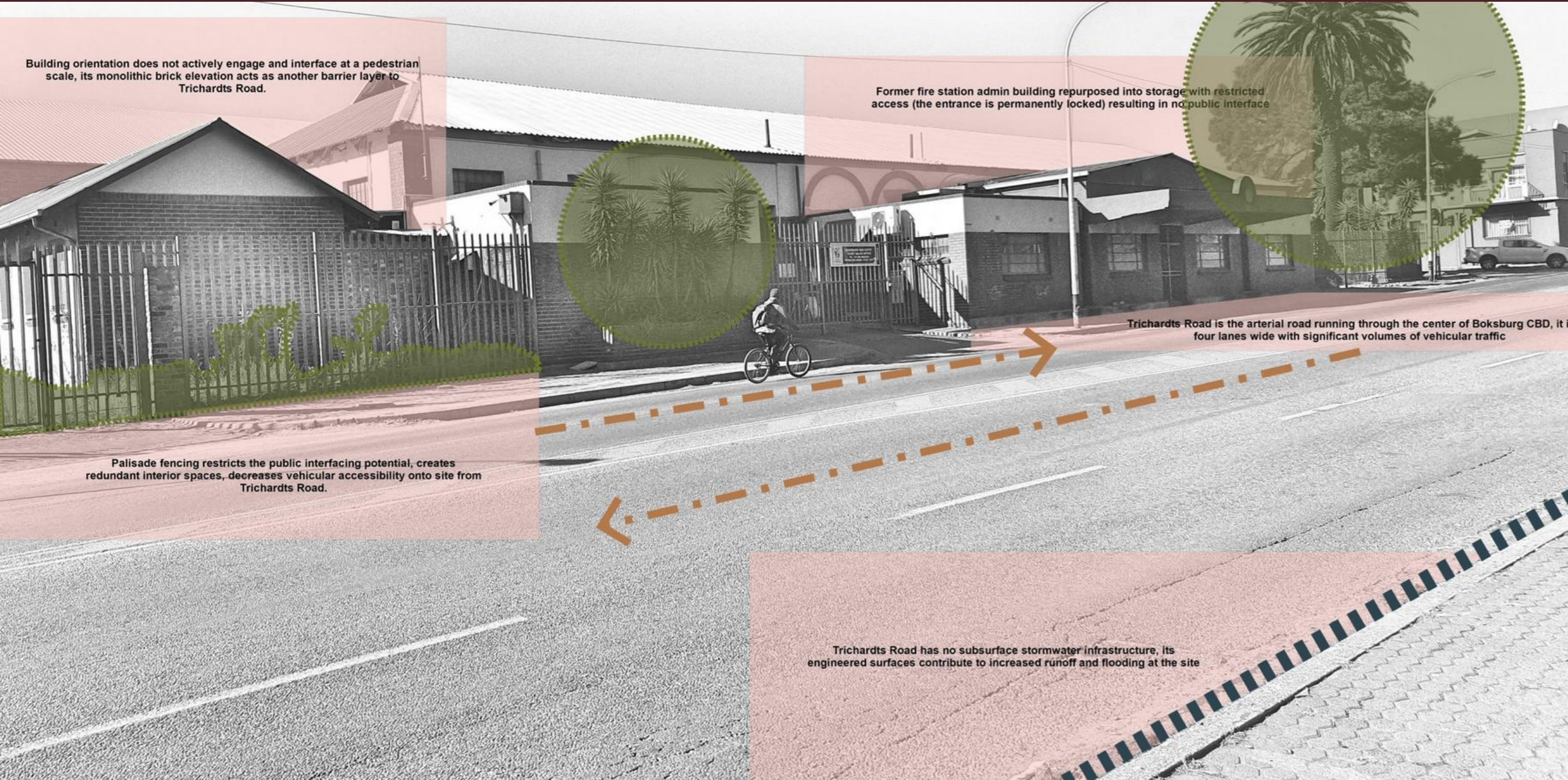
MICRO ANALYSIS: THE BUS DEPOT'S SERVICES & EXISTING PROGRAMMES



PERSPECTIVES: ANALYSIS OF THE SITE'S EDGE CONDITIONS

An edge condition analysis was conducted at the bus depot precinct was done to determine the characteristics of the site's exterior and how best to orientate the design project and position the intended programmes. Investigating the bus depot revealed that Trichardt's road would not be the optimal location for the site's main entrance due to the significant volumes of vehicular traffic and its unsafe and narrow pedestrian pathways before the berm. Therefore, it would better to use this edge for infrastructural exchanges. Whereas Eloff street is ideally located on the quieter edge of the bus depot site, allowing for the slow flowing, pedestrian scale circulation and gathering to occur.

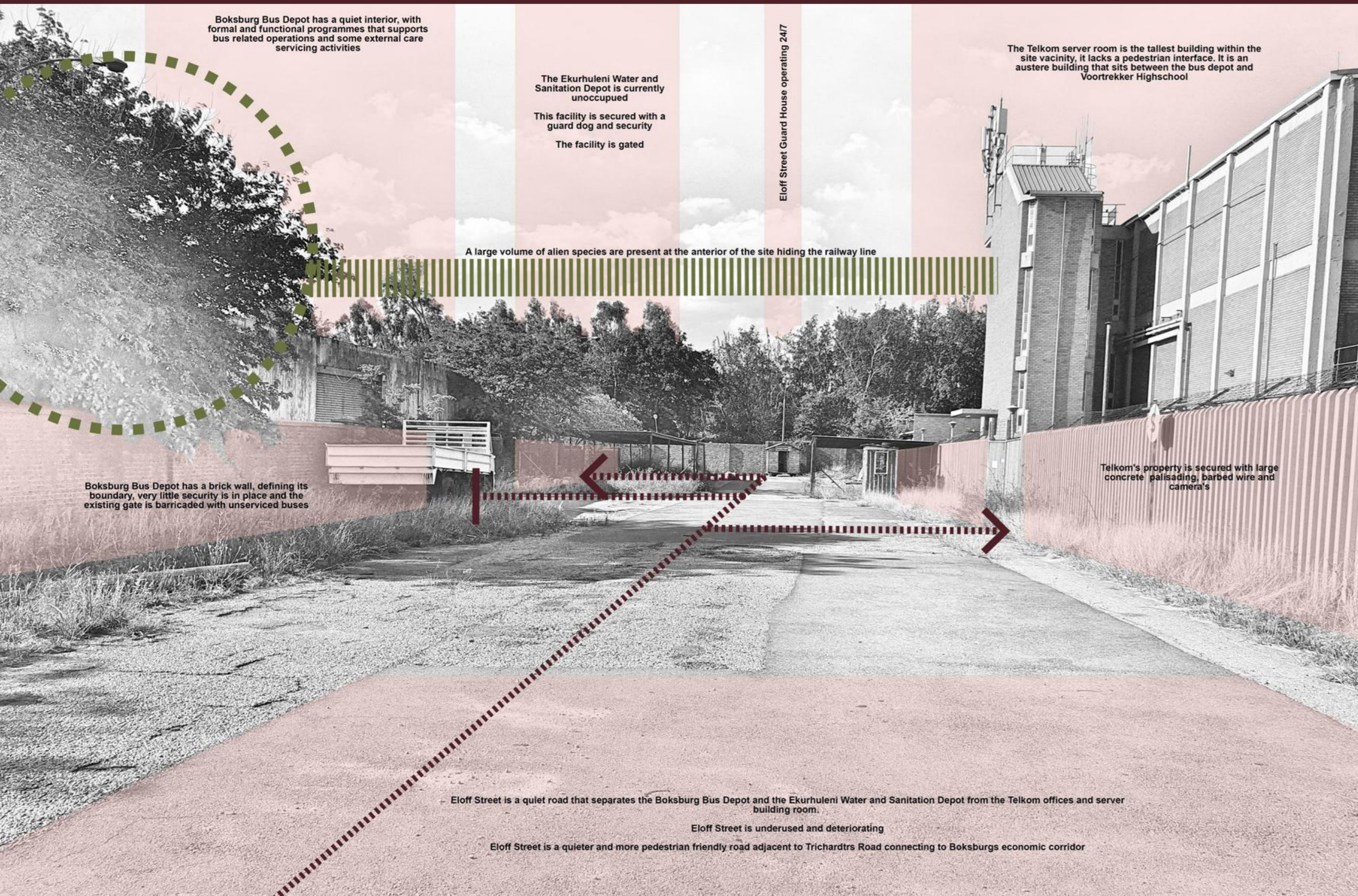
TRICHARDT'S ROAD: SIGNIFICANT VEHICULAR TRAFFIC AND INFRASTRUCTURE



LEGEND:

- Edge exchange callouts
- Vegetation
- Direction of traffic flow
- Stormwater runoff

ELOFF STREET: PEDESTRIAN FRIENDLY, SHELTERED AND QUIET



LEGEND:

- Edge exchange callouts
- Established vegetation
- Pedestrian access

VOORTREKKER STREET: PUBLIC, LESS TRAFFIC, EASY ACCESS FROM PARKING



LEGEND:

- Pedestrian circulation
- Road connection to education facilities
- Established species on railway line
- Edge exchange callouts

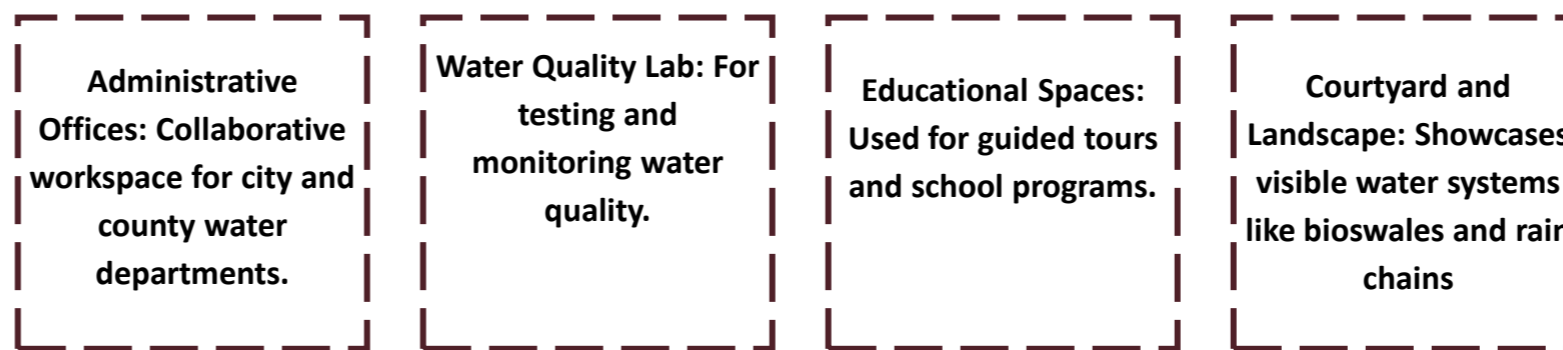
PRECEDENT STUDY: BUILDING FORM AND PROGRAMMES

Projects were carefully selected to provide the necessary relevant information regarding the strategies and methods for environmental conservation, education, and community engagement. The precedents selected were investigated for their relational position between the non-human (nature) and the urban infrastructural requirements. The projects were investigated as the critical interface to bring about desired change and how the architecture hosts and blends the urban architectural requirements with nature to achieve the desired outcome. Through this investigation the project aims, the programmatic relation with the building strategies and the principles were highlighted to determine the appropriate method for this design project to achieve both human and non-human agency and therefore a right to the city.

WATSONVILLE WATER RESOURCES CENTER PETALUMA, CA, WATSONVILLE,

CALIFORNIA, USA
2009
WRNS STUDIO

PROGRAMMES:



BUILDING STRATEGIES:



Visible rain chains direct water into swales, showcasing water flow.



Nano Walls: Walls open in the lunch and conference rooms to bring the outdoors into these interior spaces.

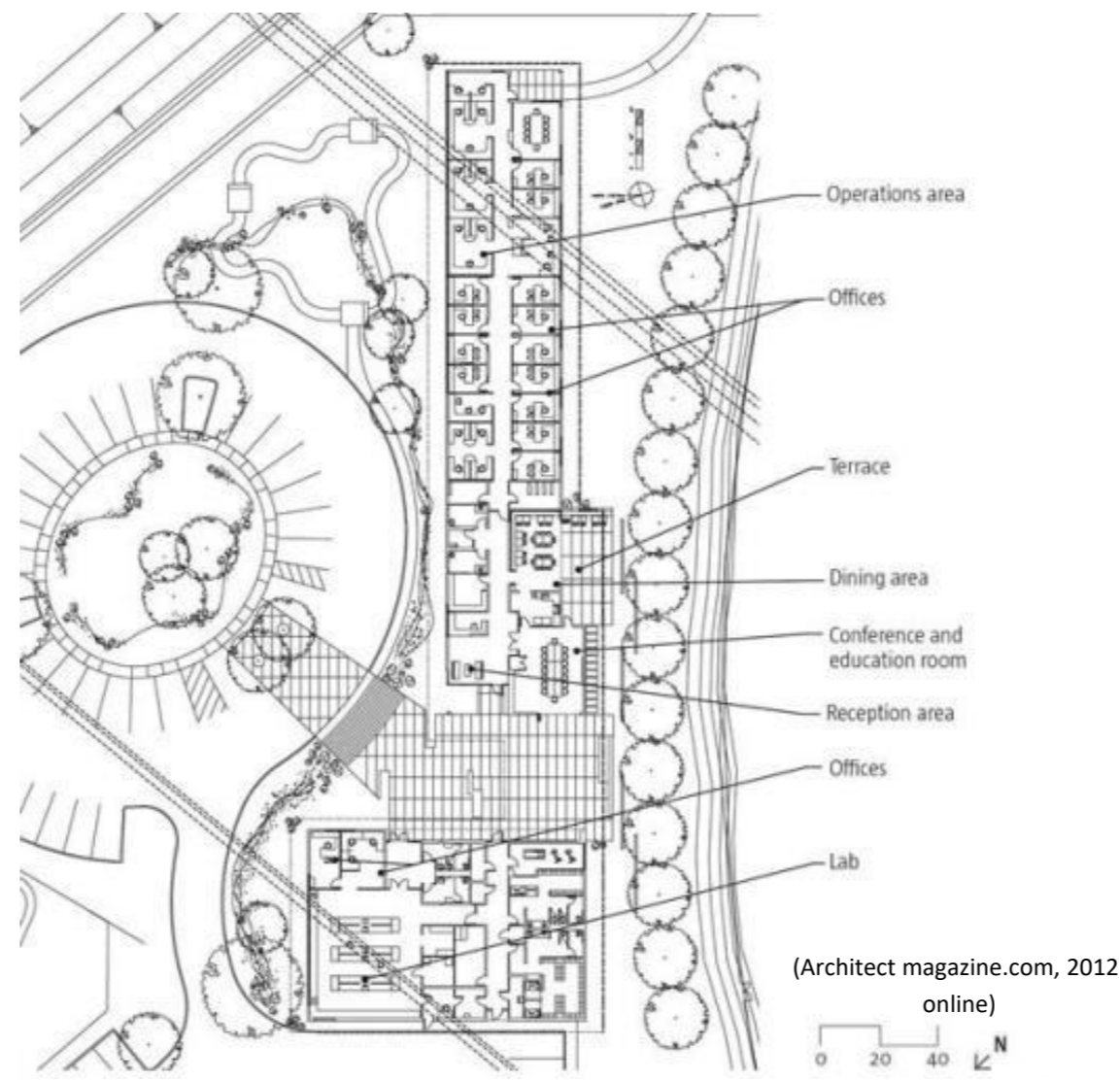


Locally milled California redwood for cladding, sourced 8 miles from the site.



(Souza, P. n.d.: online)

Project intention: to aid in the Water Recycling Project. This project conserves groundwater, and reduces effluent so that wastewater can be used in agricultural production. It incorporates education, sustainability, and energy-efficient systems relevant to water conservation and recycling (Souza, n.d.: online).



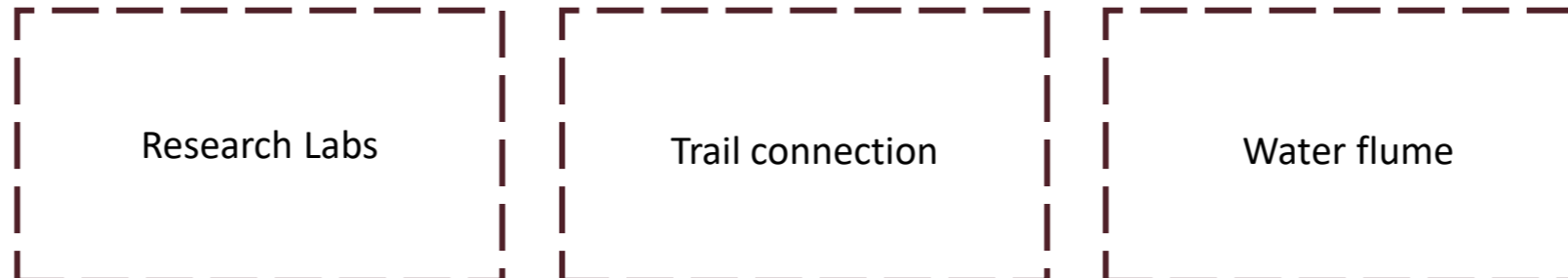
PRINCIPLES:



WATER POLLUTION CONTROL LABORATORY

PORTLAND
1998
MURASE ASSOCIATES, MILLER HULL ARCHITECTS, AND SERA ARCHITECTS

PROGRAMMES:



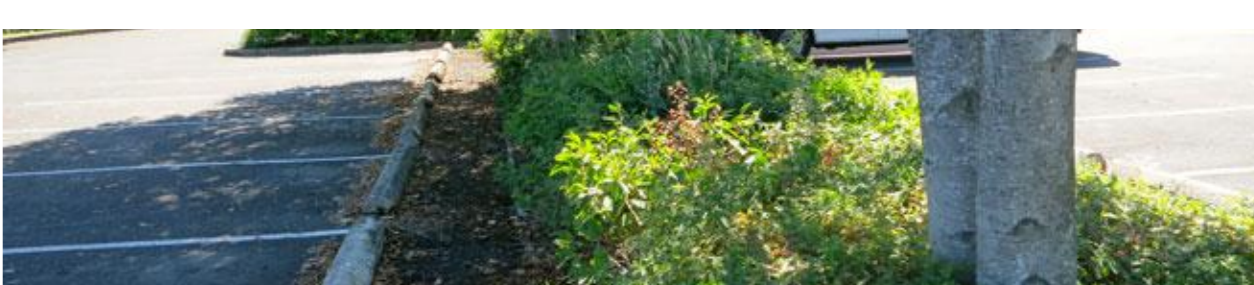
BUILDING STRATEGIES:



Stormwater flows through stone channels into ponds with wetland plants that filter out dirt and pollutants.



A viewing pier and signs help visitors learn about water cleaning and environmental care.



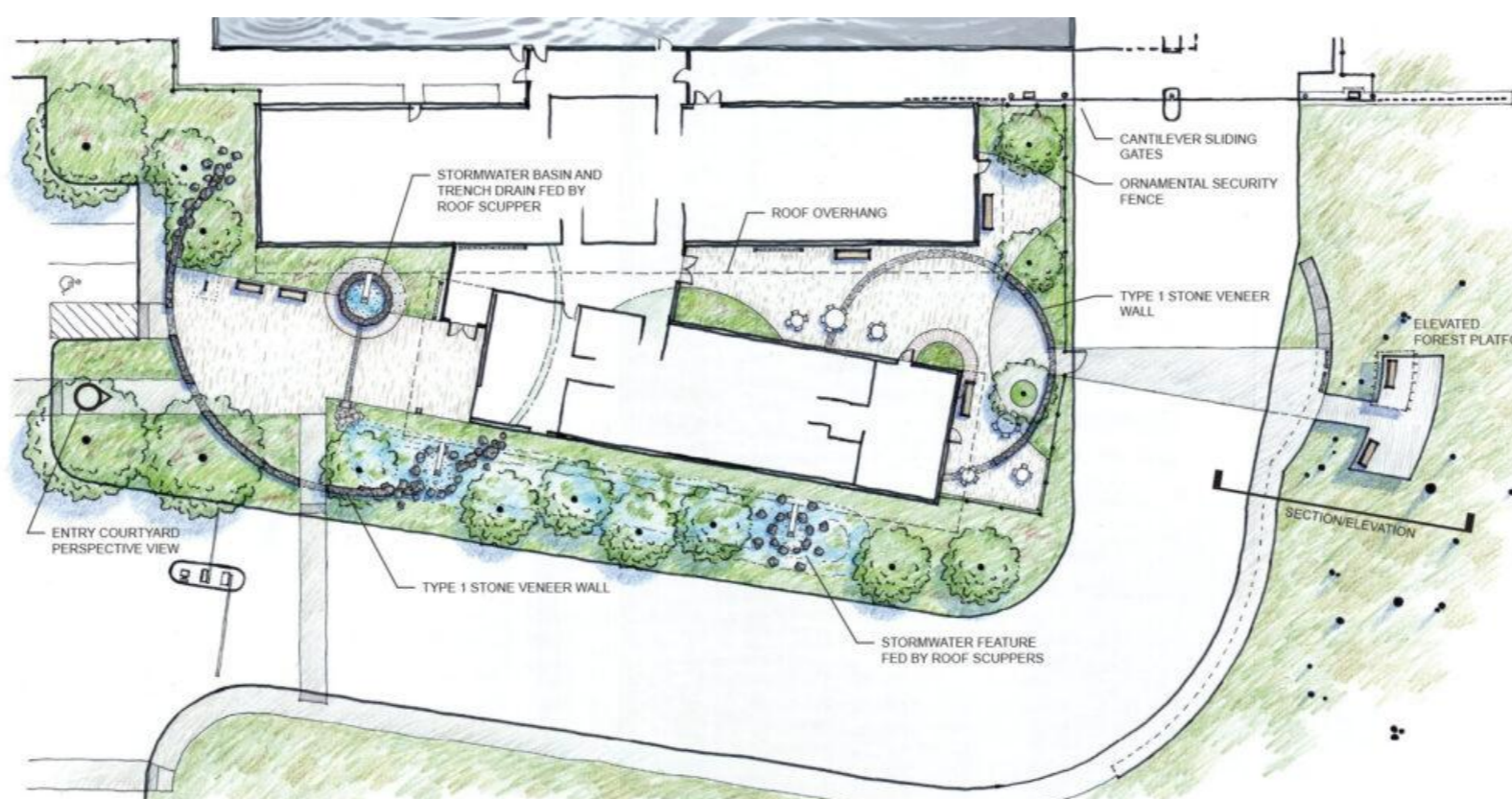
Bioswales across the site reduce runoff, and the riverbank is stabilized with rocks and plants to prevent erosion.



(Murase.com, n.d: online)

The Water Pollution Control Laboratory serves as both a research facility and a public education hub focused on water quality monitoring and pollution prevention. The lab is designed to improve water quality through research and innovative pollutant detection techniques, using natural systems like wetland plants for water purification (Murase, n.d.:online).

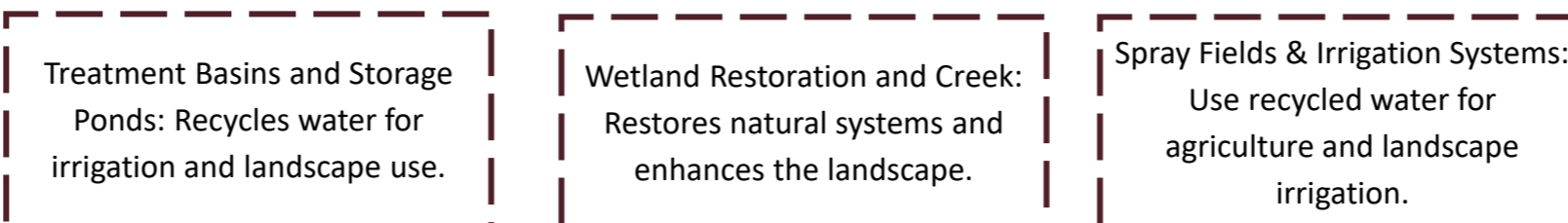
PRINCIPLES:



USCG WASTEWATER TREATMENT FACILITY & TRAINING CENTER

PETALUMA, CA, UNITED STATES
2015
MARCY WONG DONN LOGAN ARCHITECTS

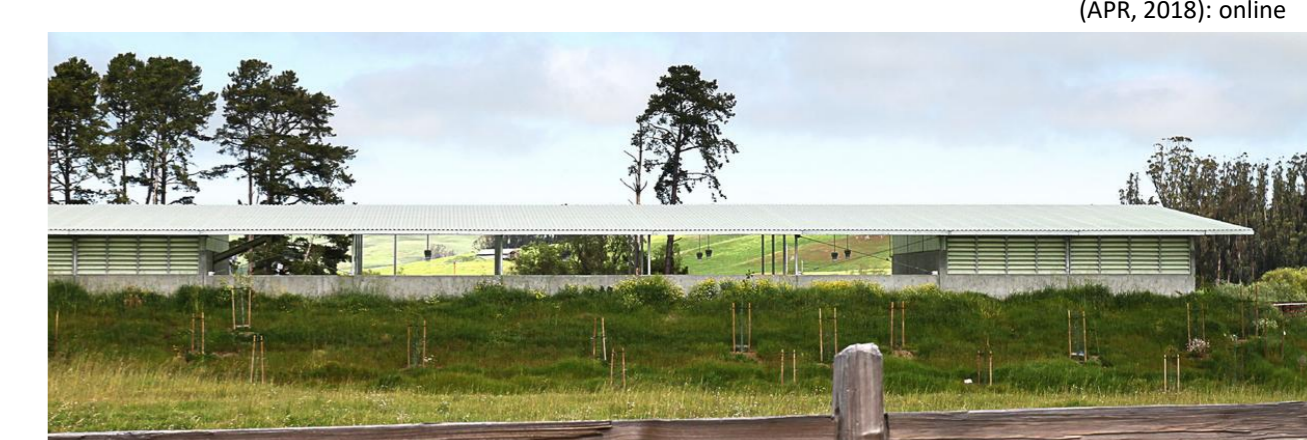
PROGRAMMES:



BUILDING STRATEGIES:



Efficient Water Use: Expanded ponds and advanced systems clean and recycle wastewater for irrigation



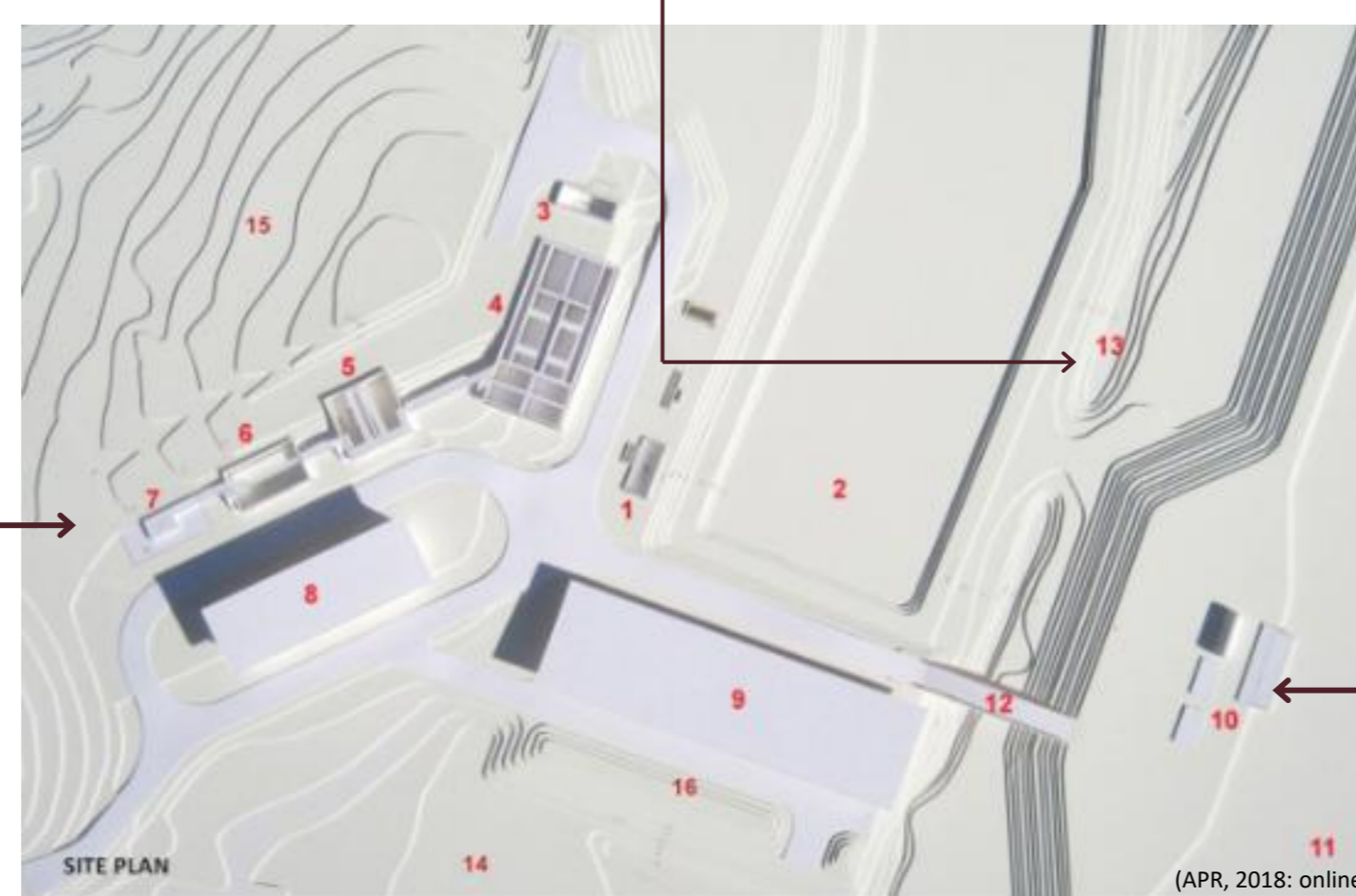
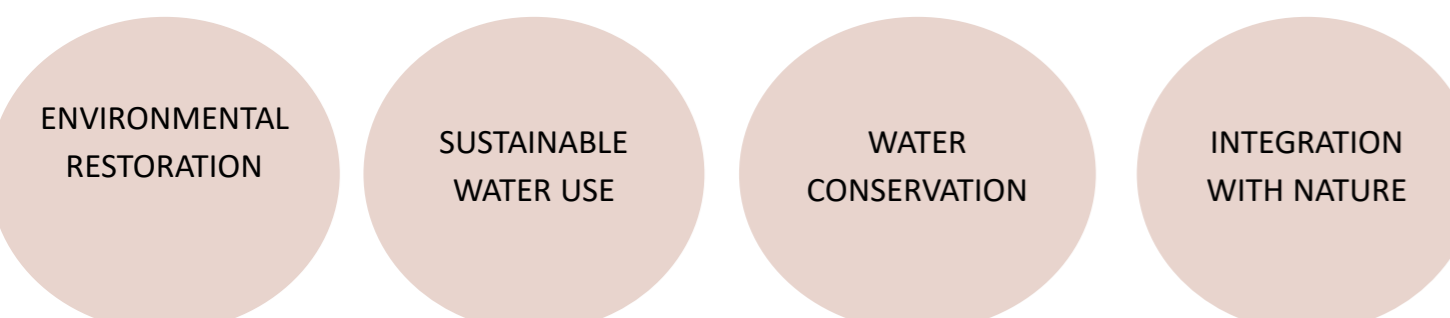
Riparian restoration stabilised riverbanks with plants and rocks, enhancing the environment.



(Wong Logan, n.d.: online)

The facility successfully integrates strategies, new ideas and advances in fields of architecture, landscape architecture and engineering to efficiently rehabilitate and store resources from the center's waste. Effluent collected from site is cleaned and recycled to be used in the irrigation of the natural systems in the area and as well as agriculture (Wong Logan, n.d.: online).

PRINCIPLES:



REFERENCES:

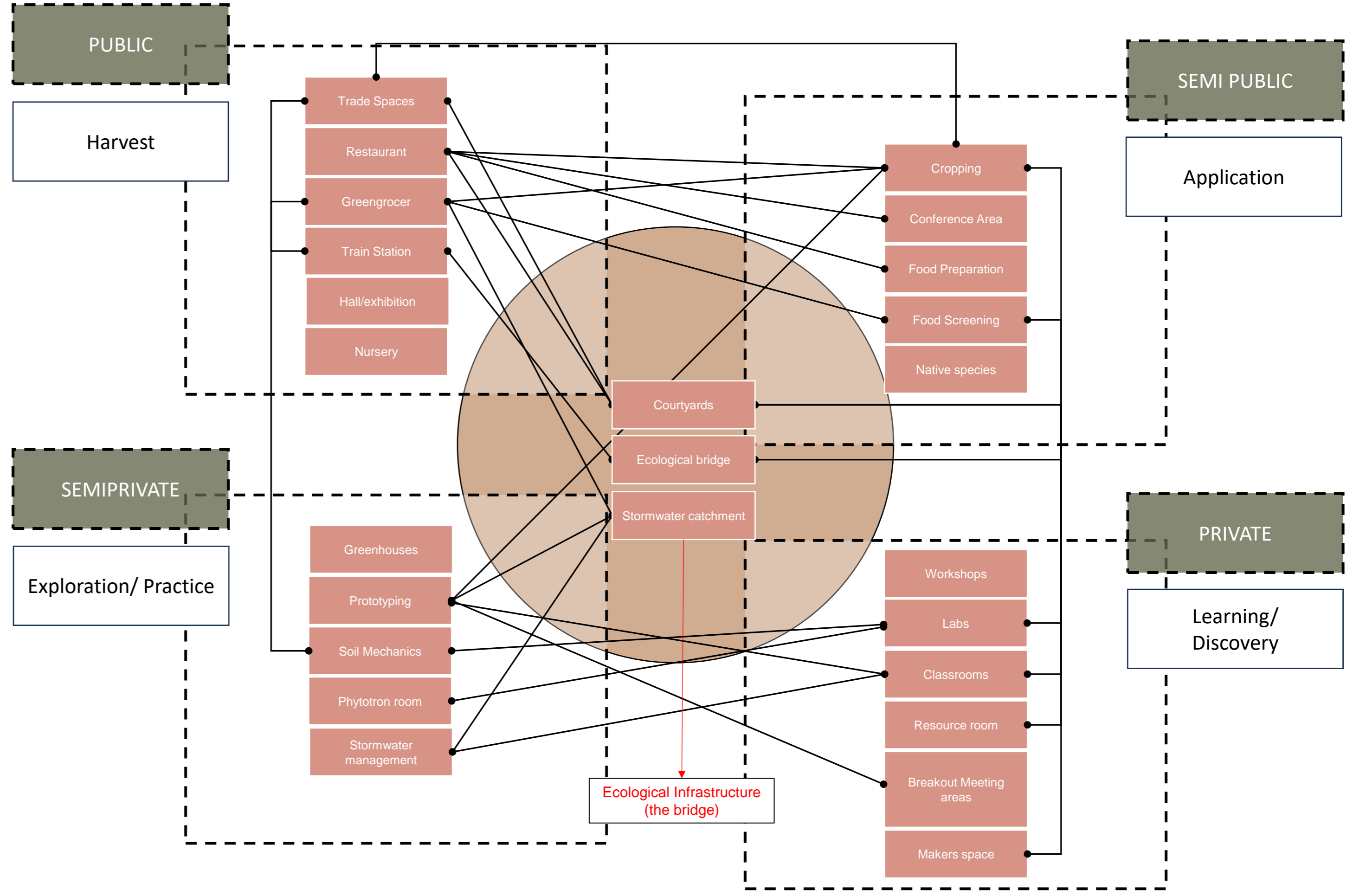
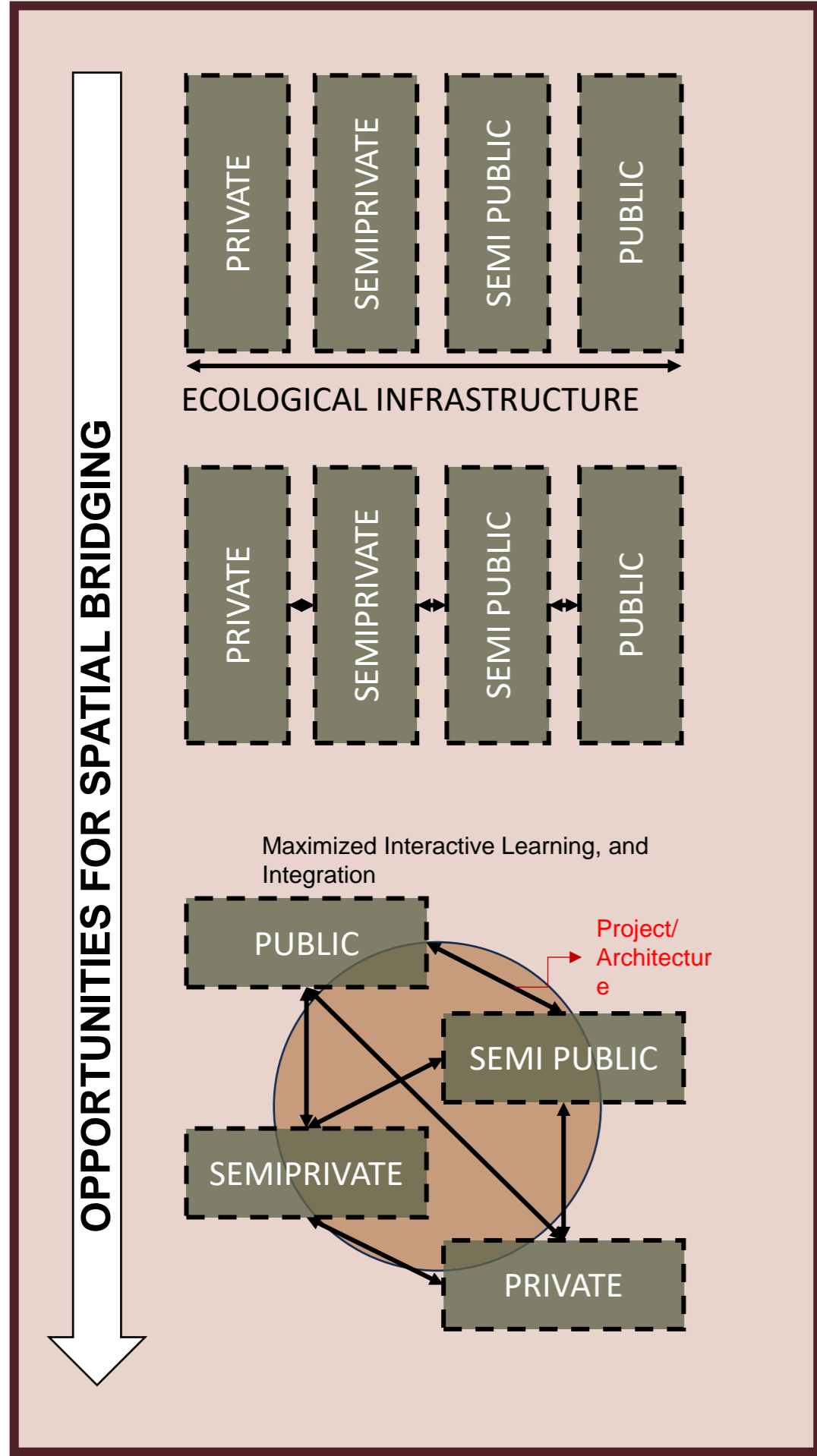
- APR, 2018. USCG Waste Water Treatment Facility & Training Center by Marcy Wong Donn Logan Architects. Available at: <https://www.architecturepressrelease.com/uscg-waste-water-treatment-facility-training-center-by-marcy-wong-donn-logan-architects/rgallery/slideshow> (Accessed: 24 November 2024).
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CONCEPT DEVELOPMENT: BRIDGING

SITE OPERATIONAL AND ARCHITECTURAL CONCEPT DEVELOPMENT:

The stance of bridging, as a space, becomes the negotiation and mediation between destinations. For this project bridging hosts the intra-relation and integration between human and non-human (nature), infrastructures, education phases/users, urban process, functions and post-apartheid and post-industrial focusses (the past and present). Bridging is the threshold or transitional point of sharing knowledge and skills to help provide new opportunities for interactive learning and community engagement - the transitional point in the lives of the intended user. Bridging is reflective of natural root systems (just as urban infrastructures should be), diversified unrelated systems interconnected, receptive and nurturing.

BRIDGING INTENTION: COMMUNITY, NATURE AND INFRASTRUCTURE

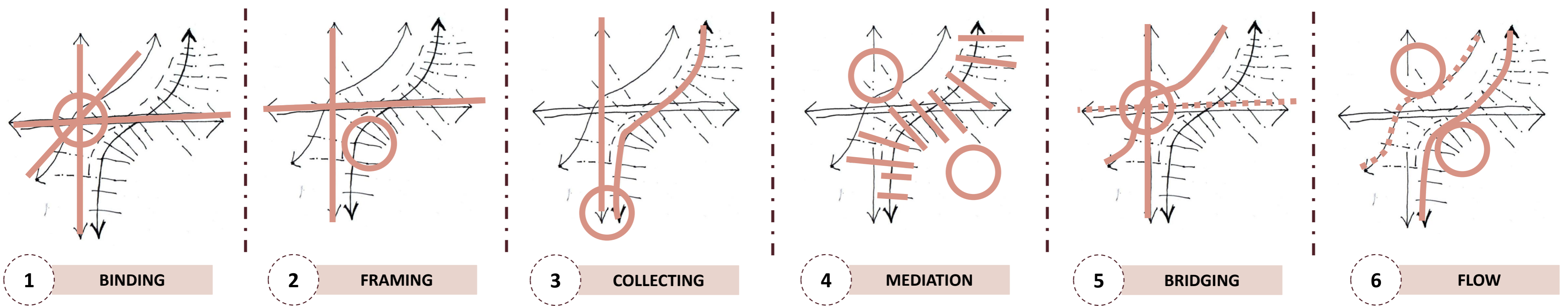


1 Ecological Story – Water, soil, urban agriculture and uplifting the community

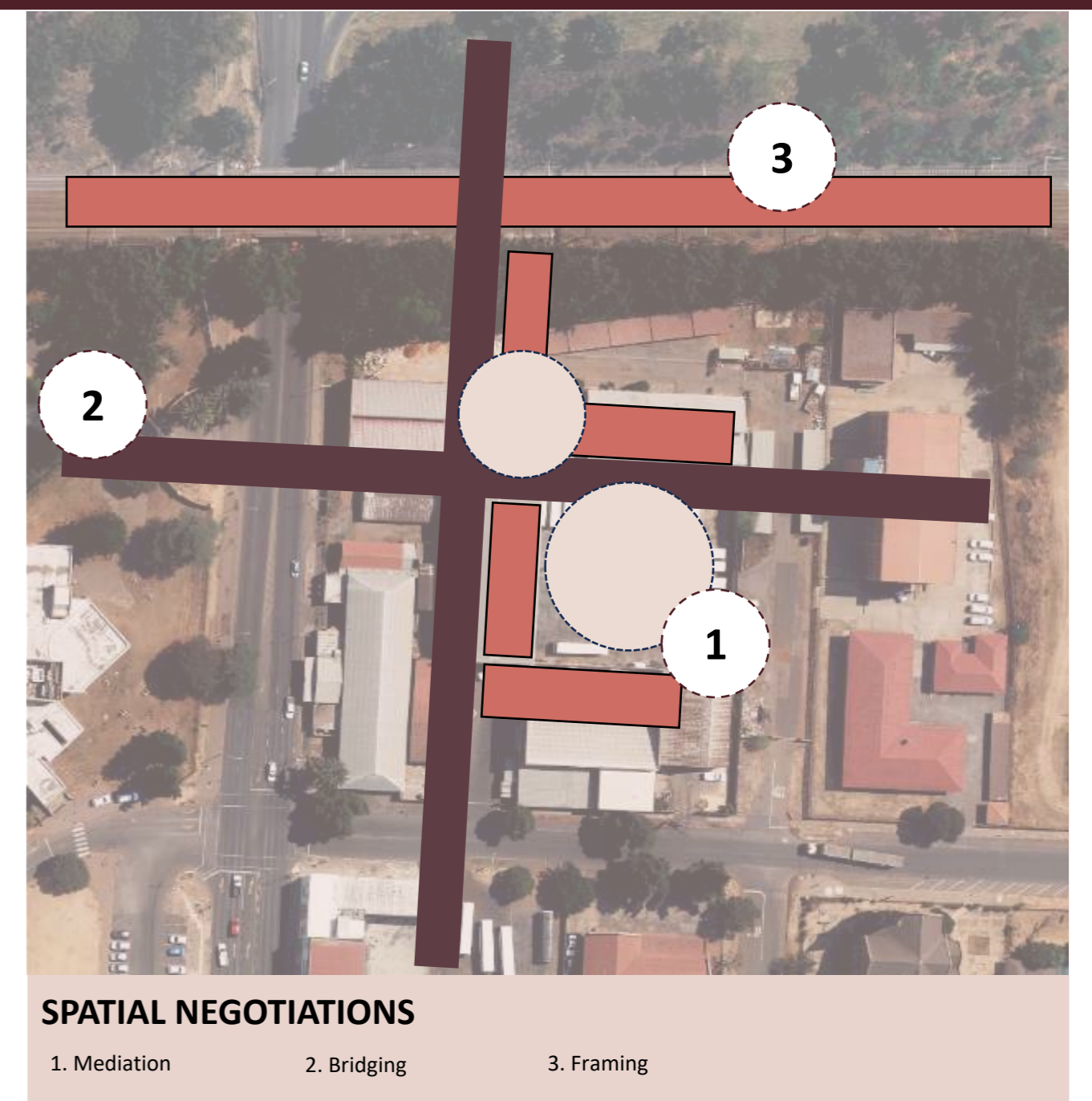
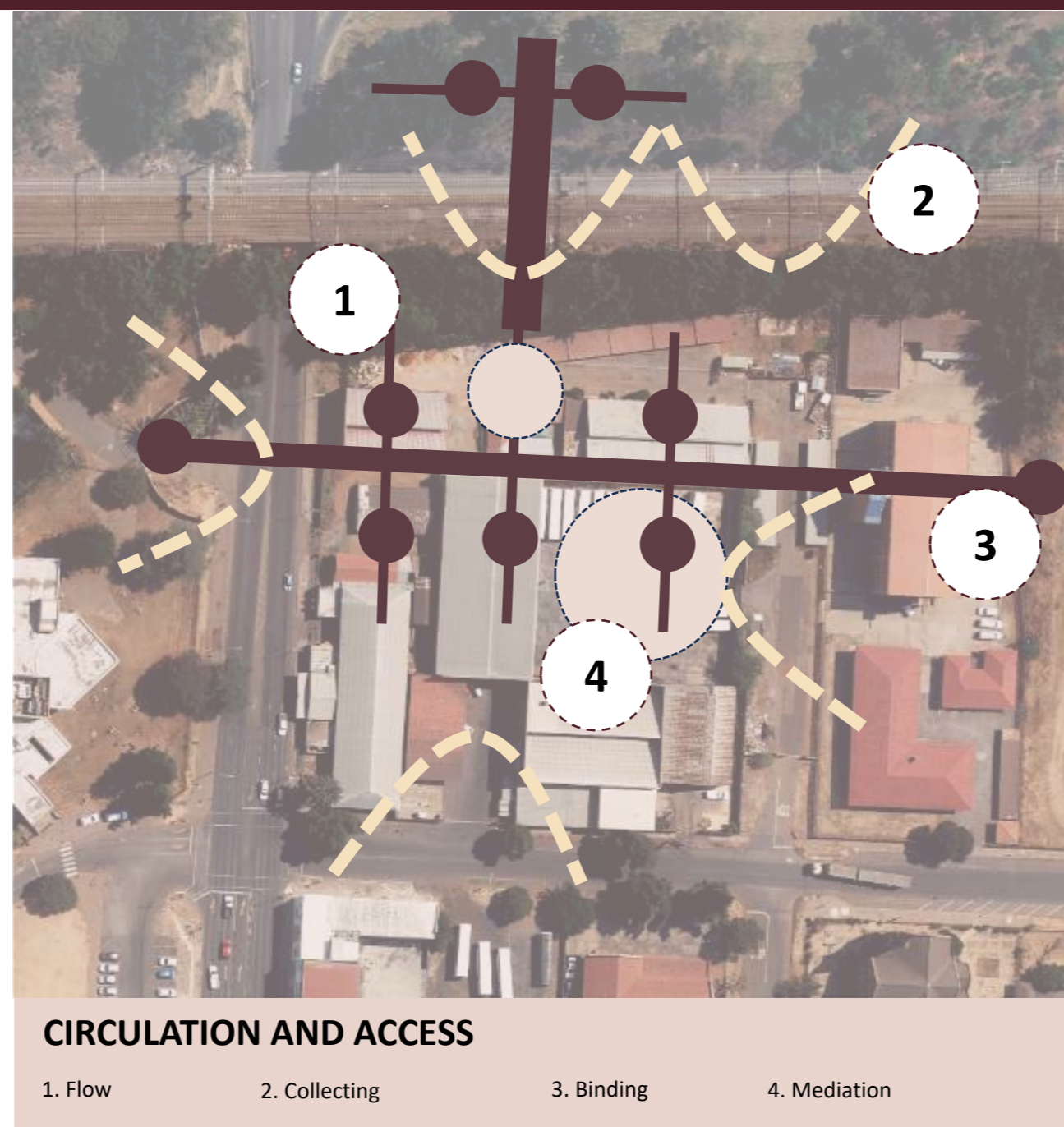
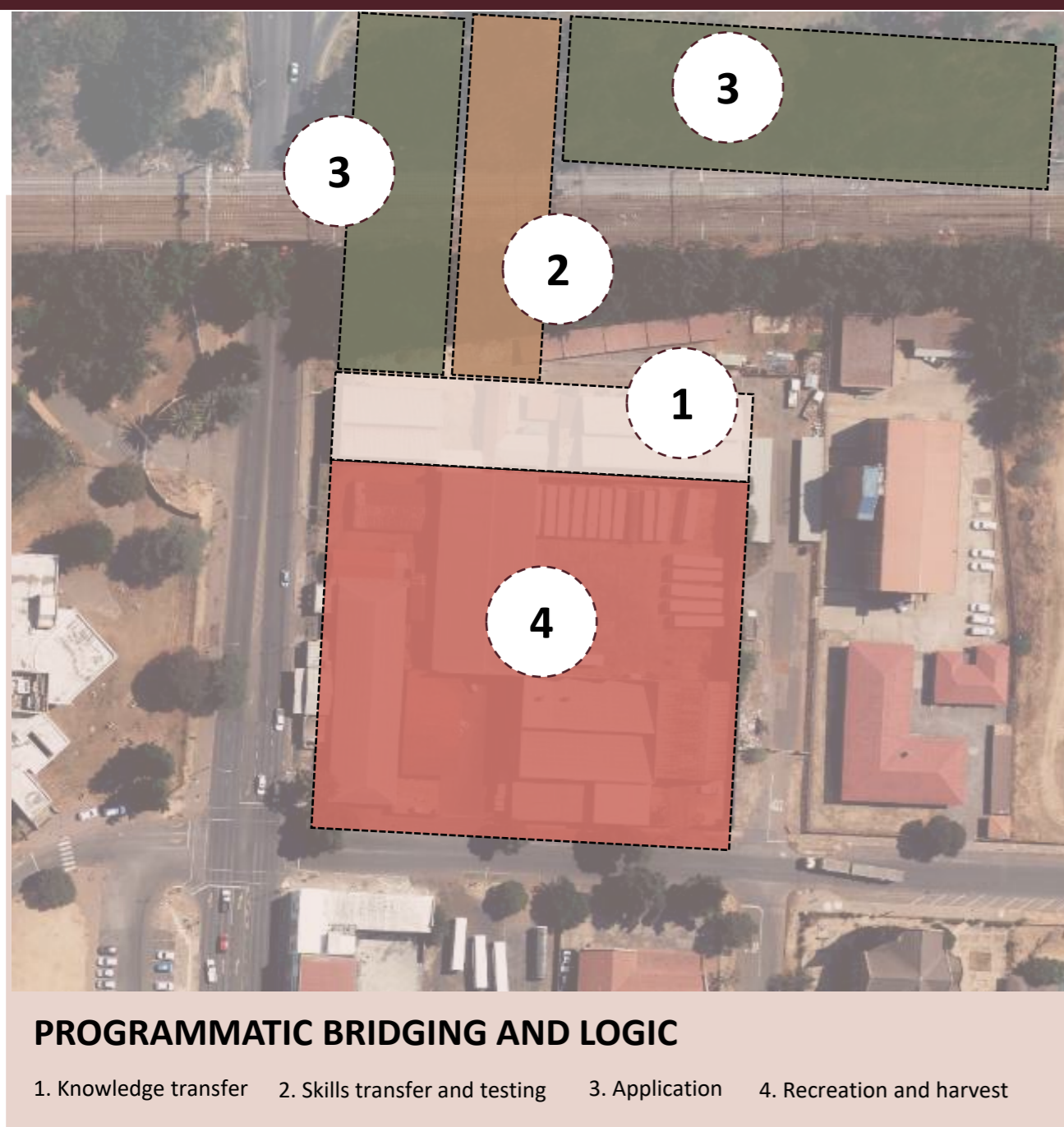
2 Ecological Application – Ecological flows, urban infrastructure and social integration

3 Ecological Theory – Knowledge and skills transfer for post-industrial and post-apartheid contexts

BRIDGING STRATEGIES: APPROACHES TO ARCHITECTURAL INTEGRATION



BRIDGING INTENTION: SITE SCALE APPLICATION OF STRATEGIES



SITE FRAMEWORK: URBAN AND NATURE LINKAGES

The urban and block framework aimed to integrate and connect Boksburg CBD's infrastructures and bridge between the non-human and human actors at a precinct scale. The site framework is developed in a series of interventions that respond to the existing and inherited infrastructures and spatial planning conditions, as well as proposed precinct conditions of the urban and block frameworks. This site framework critically positions the site as an interrelated and connected campus, that aims to enable agency (and therefore the right to the city) to the natural (non-human) and human. The following diagrams illustrate the site's critical role in establishing a more-than-human context that facilitates appropriate, sensitive and sustainable urban developments, as well as illustrate the site's connection, configuration and function in respect to the urban framework investigations.

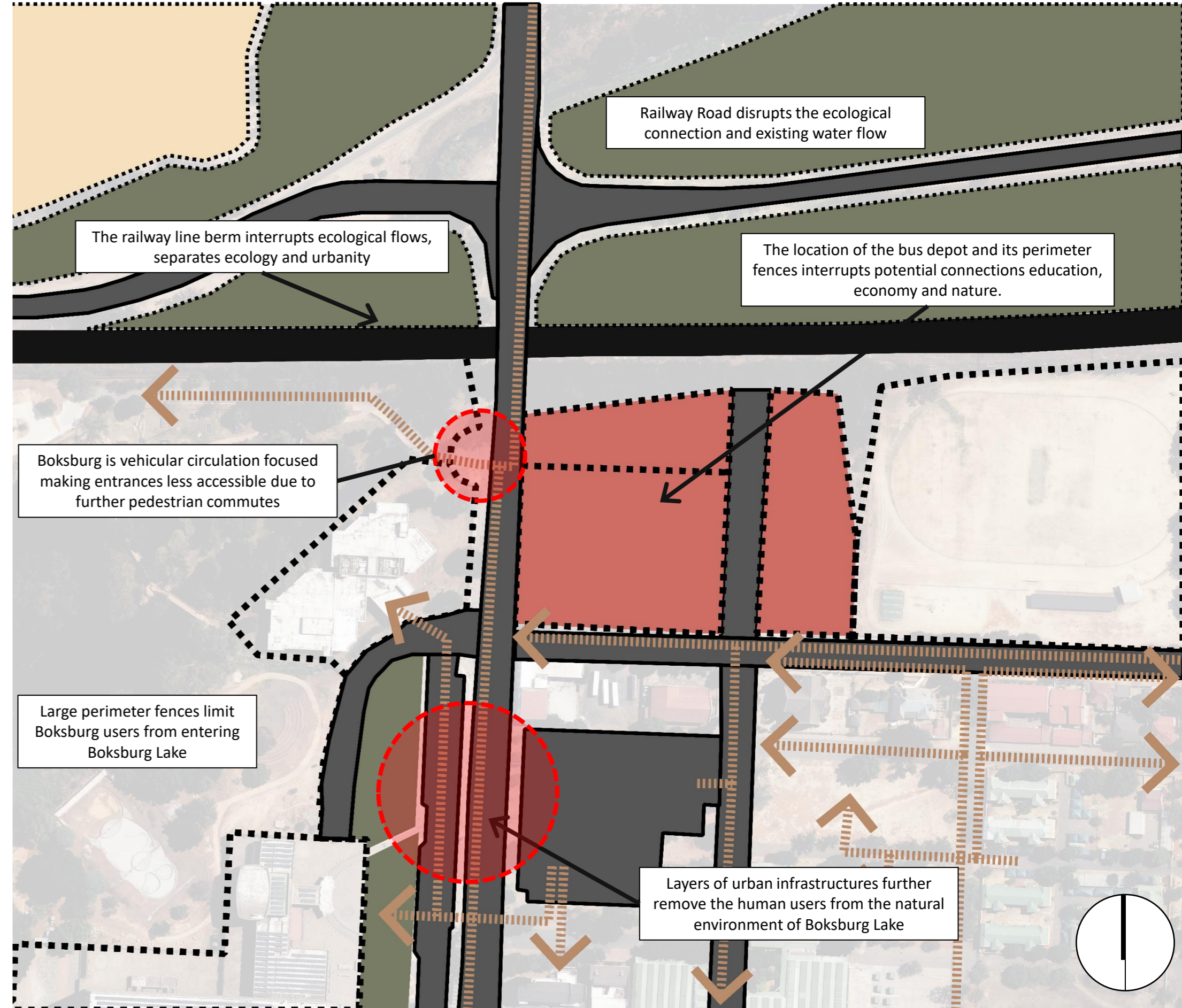
SITE IN CONTEXT: INFRASTRUCTURAL BARRIERS AND ITS RELATION TO THE SITE

THE SITE WITHIN ITS EXISTING CONTEXT:



The Boksburg bus depot is ideally located at the main entrance to the precinct, and it is also ideally located between critically identified urban infrastructures that could activate, uplift and benefit the Boksburg CBD precinct. However, the existing function of the bus depot limits public access and lessens the possibility of integrating with surrounding beneficial infrastructures. Around the site exists infrastructural barriers that further limit the potential of integrating with the infrastructures of benefit. Therefore, the bus depot should be adapted to function, as a gateway into the city, which receives and mediates the natural and urban condition.

HIGHLIGHTED INFRASTRUCTURAL BARRIERS:

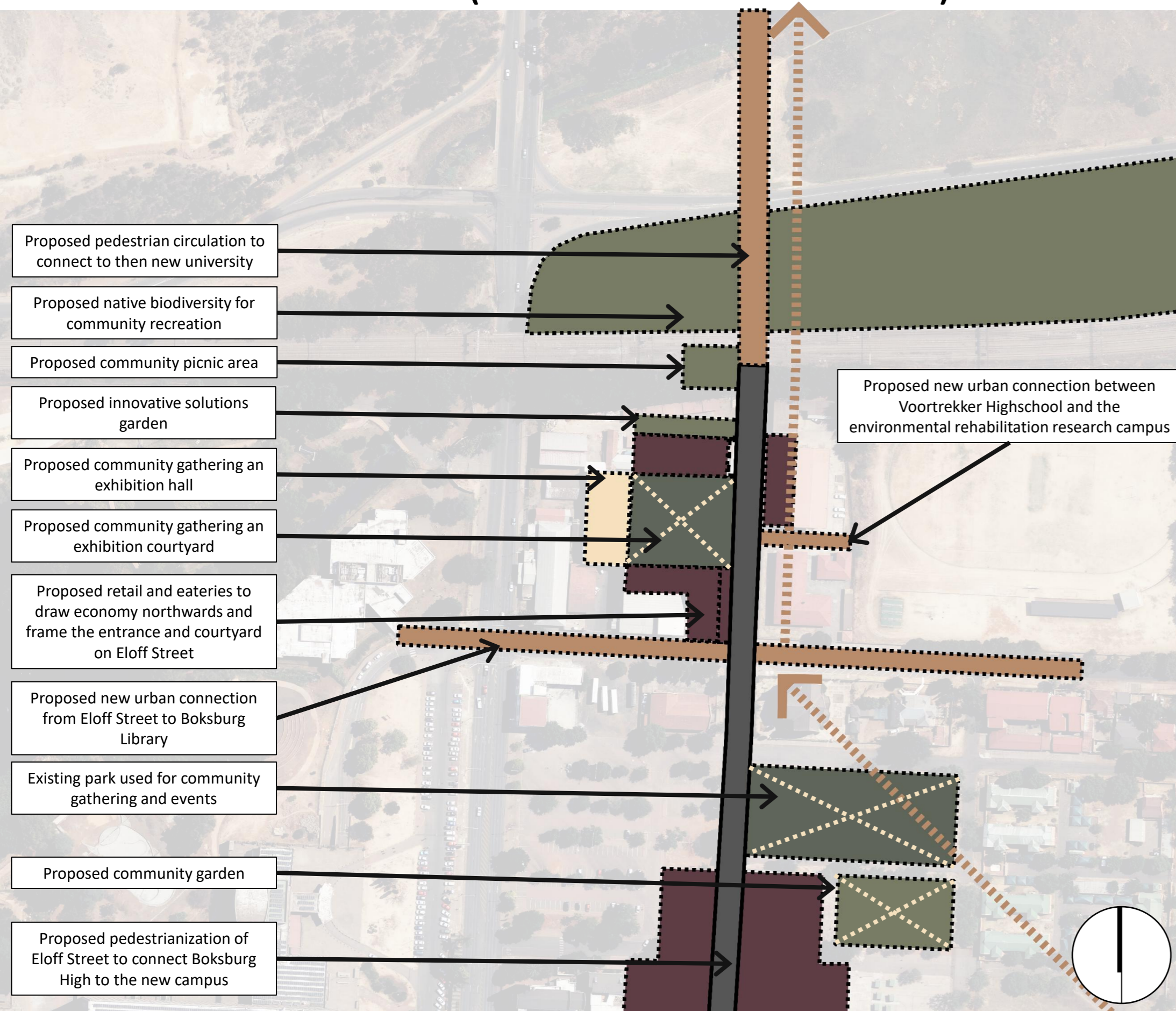


LEGEND:

- Restricted user circulation around the site due to barriers
- Existing green space barriers
- Vehicular circulation as access barriers.
- Existing site boundaries as access and circulation barriers
- Site as a circulation barrier
- Existing railway line berm disrupting ecological flows

SITE & THE URBAN CONTEXT: BRIDGING COMMUNITY, NATURE AND INFRASTRUCTURE

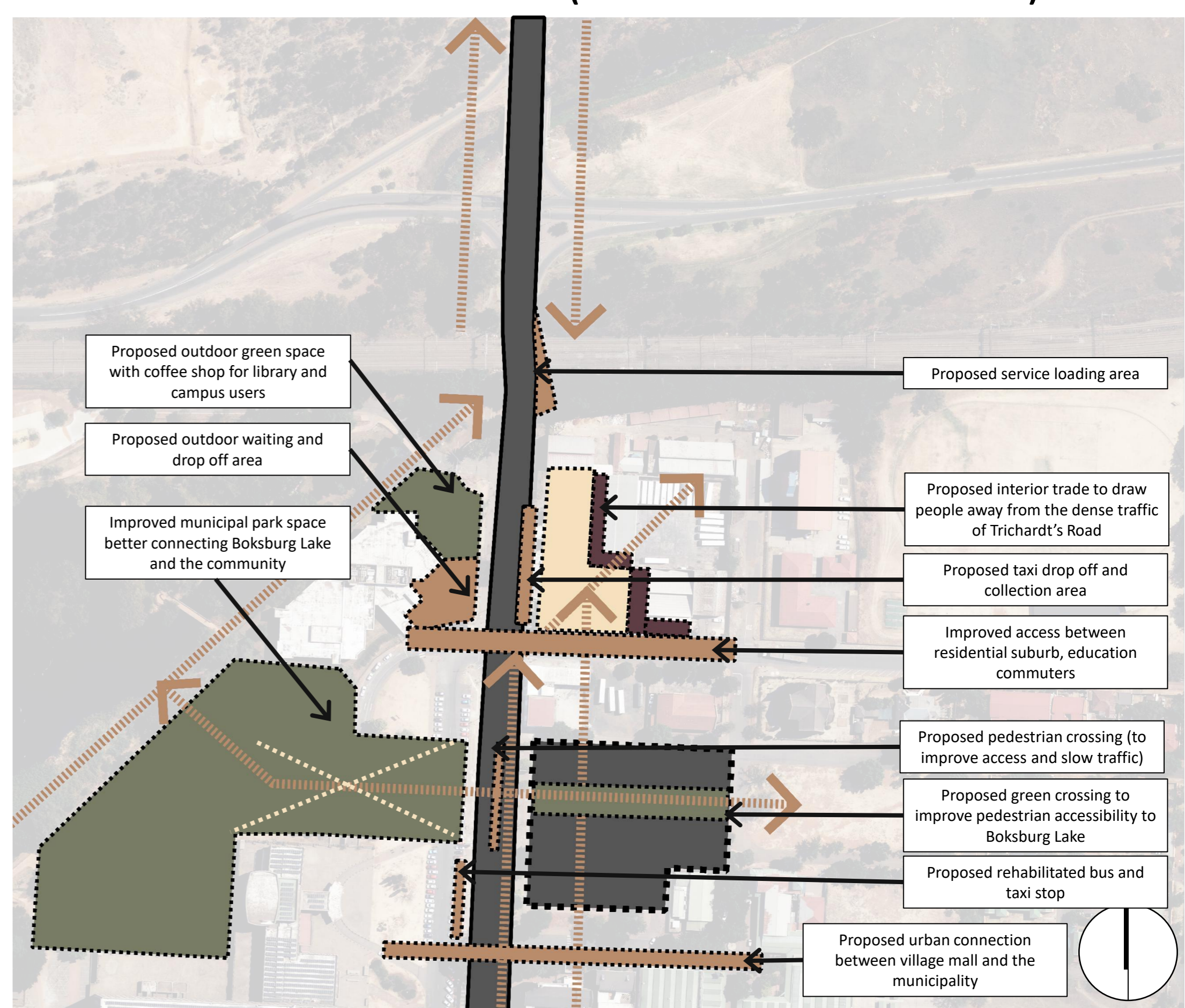
THE SITE ALONG ELOFF STREET (SOFT INFRASTRUCTURAL EDGE)



LEGEND:

- Establishing new urban connections and flows
- Improving community access and relationship with green spaces
- Pedestrianized vehicular circulation.
- Spaces for community gathering
- Economic opportunities pulled northwards to improve economic interest and connection with Boksburg Lake

THE SITE ALONG TRICHARDT'S ROAD (HARD INFRASTRUCTURAL EDGE)



LEGEND:

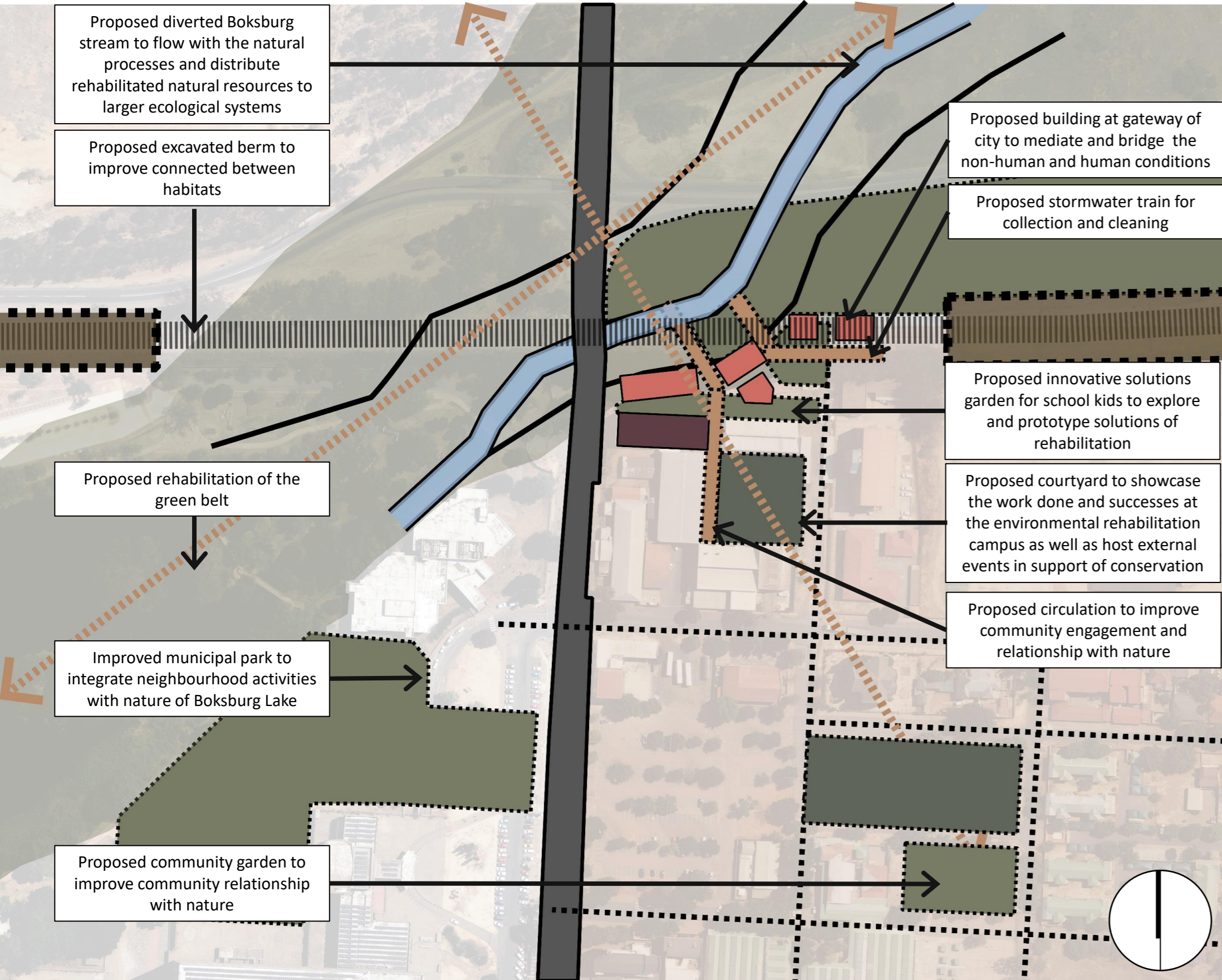
- Establishing new urban connections and flows
- Improved community access to green spaces
- Vehicular circulation and parking
- Permeable threshold and community gathering
- Economic opportunities on the site interior

SITE FRAMEWORK: CONTINUED

The urban and block framework aimed to integrate and connect Boksburg CBD's infrastructures and bridge between the non-human and human actors at a precinct scale. The site framework is developed in a series of interventions that respond to the existing and inherited infrastructures and spatial planning conditions, as well as proposed precinct conditions of the urban and block frameworks. This site framework critically positions the site as an interrelated and connected campus, that aims to enable agency (and therefore the right to the city) to the natural (non-human) and human. The following diagrams illustrate the site's critical role in establishing a more-than-human context that facilitates appropriate, sensitive and sustainable urban developments, as well as illustrate the site's connection, configuration and function in respect to the urban framework investigations.

SITE AND THE NATURAL CONTEXT: BRIDGING COMMUNITY, NATURE AND INFRASTRUCTURE

THE SITE ALONG THE GREEN BELT (GREEN INFRASTRUCTURE)



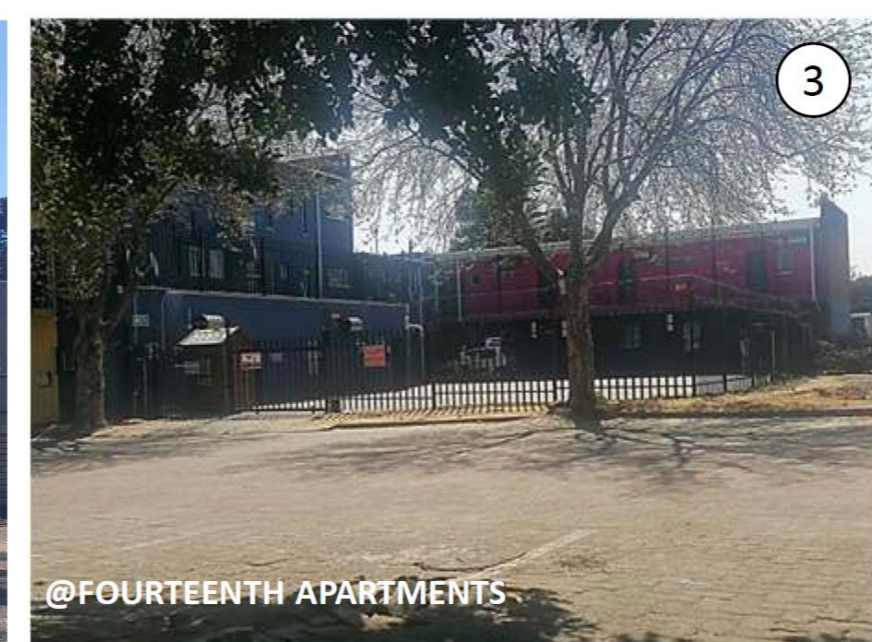
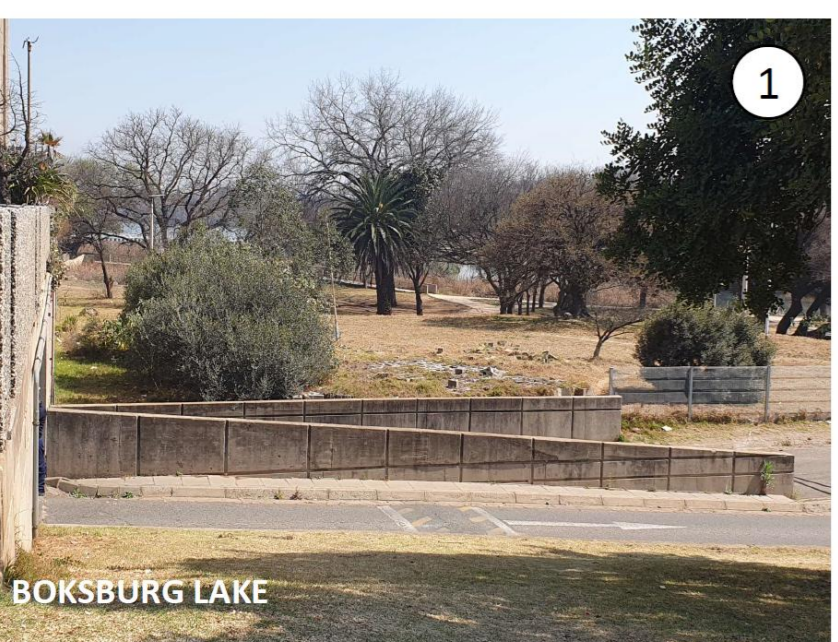
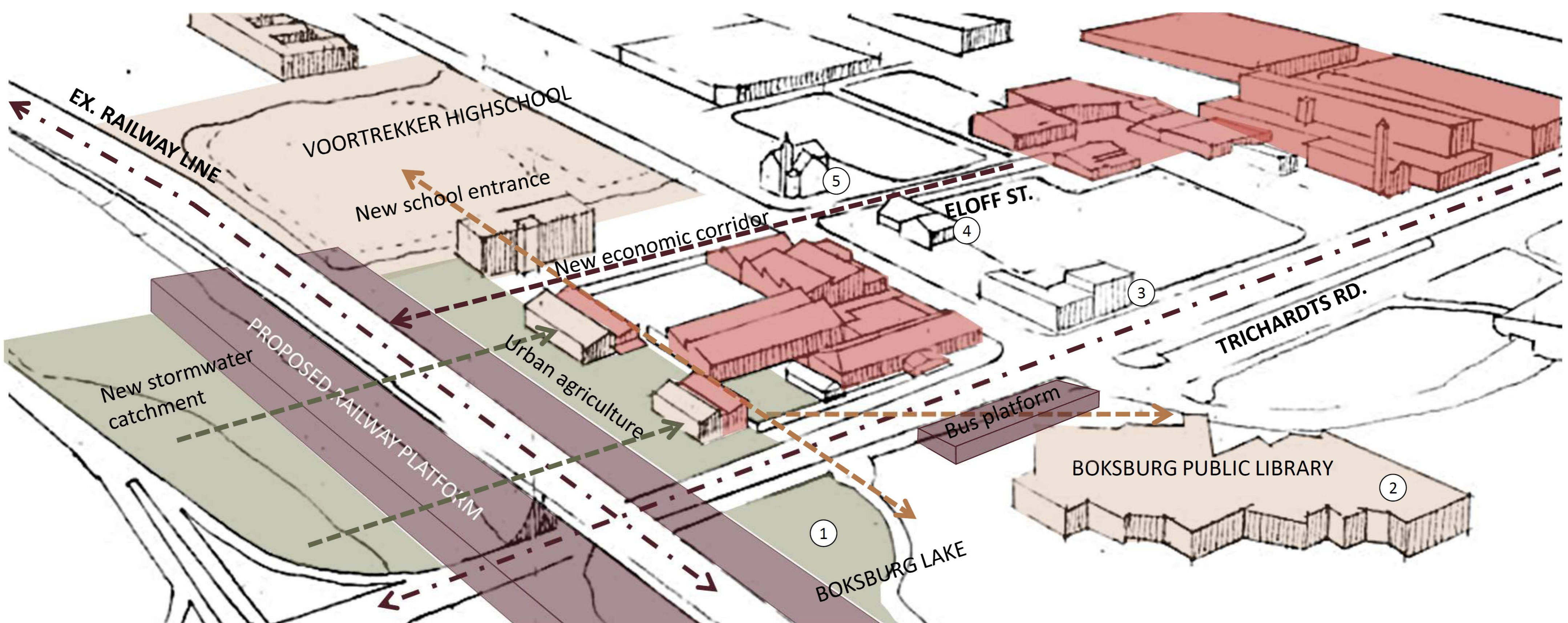
- LEGEND:**
- Establishing new urban connections and flows
 - Proposed new buildings for environmental rehabilitation campus
 - Economic opportunities pulled northwards to reorientate economic development
 - Improving community access and relationship with green spaces
 - Diverted Boksburg stream

THE FORMATION OF THE SITE (ALL THREE EDGE CONDITIONS):



- LEGEND:**
- Establishing new urban connections and flows
 - Proposed new buildings for environmental rehabilitation campus
 - Economic opportunities pulled northwards to reorientate economic development
 - Improving community access and relationship with green spaces
 - Spaces for community gathering
 - Diverted Boksburg stream

SITE IN CONTEXT: A PERSPECTIVE OF PROJECT INTENTION



MATERIAL CONSIDERATIONS: BRIDGING

MATERIAL SELECTION AND APPLICATION:

The material selection was derived from the possibility of sourcing local material that reflect the contemporary Boksburg industrial typology. It was also motivated by supporting local trades and industries. However, a sustainable approach to material acquisition that reflects the industrial and mining heritage of the area would be to utilise the existing industrial materials of brick and steel, however, to accompany this primary selection with usable mine waste material through adobe bricks and stone rubble to bridge the contemporary design intentions with the heritage value of the area.

SOURCING MATERIAL: MINE WASTE MATERIAL CONCEPTUAL INTENTIONS

Material concept: To remember a historically significant mining origin, whilst providing a new sustainable, inclusive and contemporary Boksburg identity through familiar raw materials (of the mines), as well as incorporating systems and architectural typologies of the site and area. This precinct project at the Boksburg Bus Depot, is an adaptive reuse project that aims to transform the existing buildings into a relevant public space to uplift the community through job creation, cultural activities, and education.


MATERIAL REFERENCE

MATERIAL SELECTION


MATERIAL APPLICATION

SITE APPLICATION


CASON CINDERELLA MINE DUMP



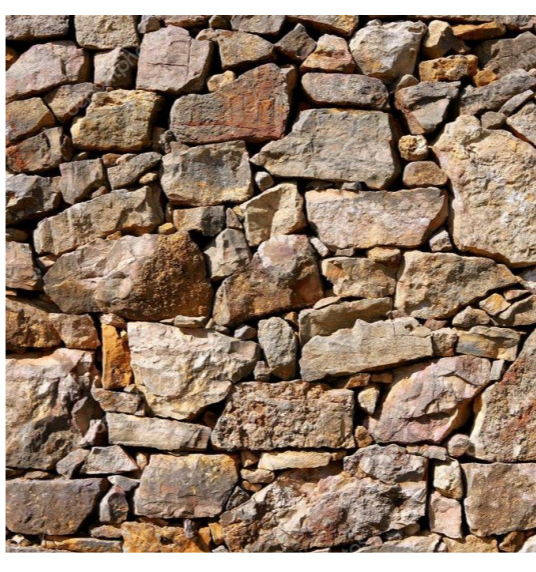
STONE RUBBLE SOURCED FROM MINE DUMPS:
To sustainably source natural rock from the mine dump areas.




SAND SOURCED FROM MINE DUMPS:
Different sands to be collected from the mine dump areas and incorporated into wall systems



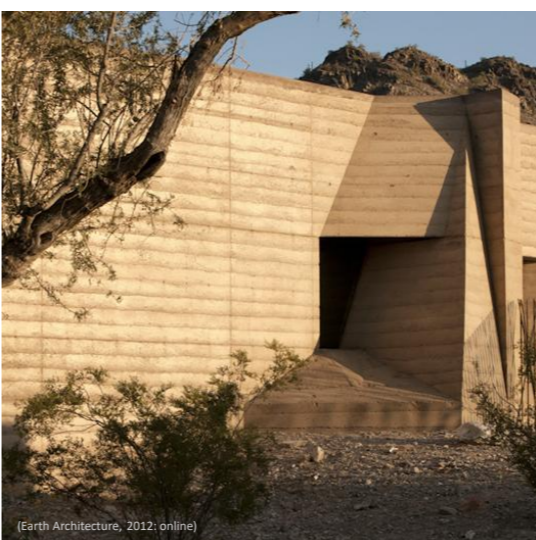
NATURAL STONE RUBBLE WALLING



PLYWOOD INTERIOR CEILING OR CLADDING TO MIMIC SAND



USE SOIL FROM MINE DUMP TO MAKE STRUCTURAL WALLS



Mining Industry Process: Virgin Mine → Mineral ore → Mineral processing → Marketable waste → Processing waste → Mine effluents → WASTE ROCK → Environmental, Health, Social.

Ceramic Industry Process: Virgin quarry → Mineral ore → Product manufacturing → Marketable ceramics → Processing waste → Productive waste → Environmental, Health, Social.

Site Application: CASON CINDERELLA MINE DUMP (393m) and SITE.

UTILISING AND REFERENCING THE MINING HISTORY OF BOKSBURG

RECYCLING MATERIALS: STRUCTURES AT BOKSBURG BUS DEPOT

Material concept: Recycling concepts for existing building material and elements which their first life cycle are explored to achieve a sustainable architecture. Indexes of recyclability - recycled, infracycled, reused and infraused materials are more suitable to improve the environment during construction. This approach assists design and construction thinking toward a closed-loop material cycle. Materials gained from the disassembly process of structures at the Boksburg Bus Depot are selected and extracted to sustainably contribute to the material palette and construction for this project. (Vefago, et. al., 2013: 127)


MATERIAL REFERENCE

MATERIAL SELECTION

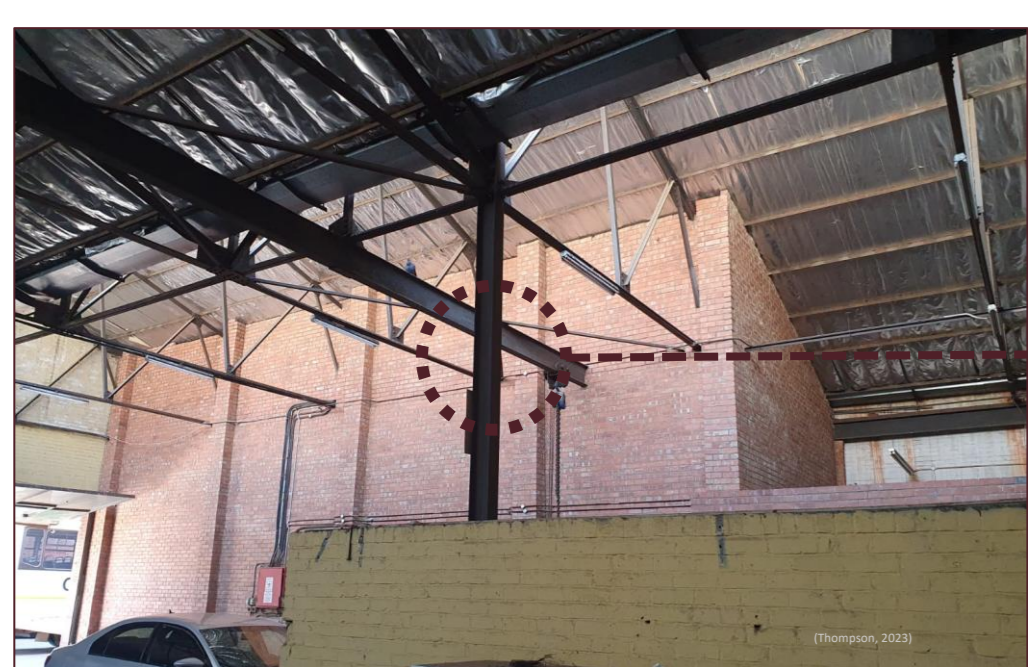
MATERIAL APPLICATION

PROXIMITY TO SITE

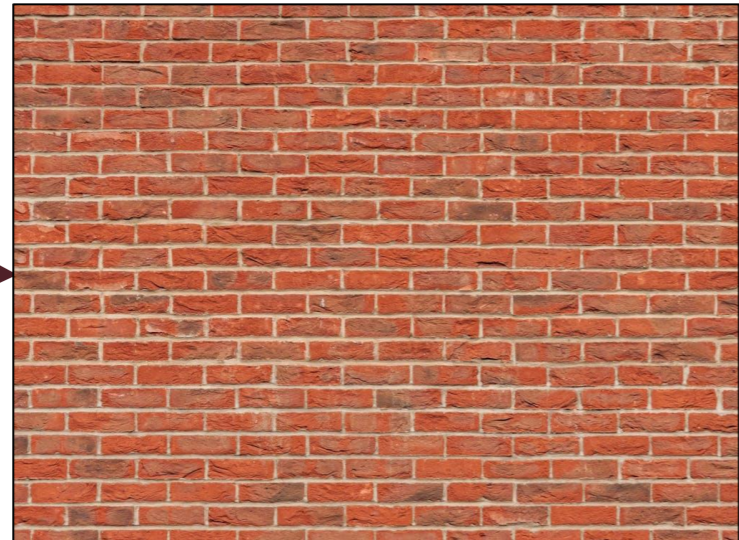
BUS DEPOT MAINTENANCE AREA




BUS DEPOT FLEET WAREHOUSE




RECYCLED BRICK FROM THE BOKSBURG BUS DEPOT
To disassemble bricks from the dilapidated or altered structures.




REUSED STEEL MEMBERS FROM THE BOKSBURG BUS DEPOT



RECYCLED BRICK FOR NEW WAREHOUSE FLOORING, PARTITIONS & PLANTERS



REUSED CORRUGATED ROOF SHEETING, STEEL TRUSSES AND SECTIONS



CIRCULAR CONSTRUCTION - METALS

DECONSTRUCTION: Building element (beam) → DESTINATION: Recycled → FABRICATION: Recycled → APPLIED IN OTHER BUILDING: Beams, Profiles and plates.

CIRCULAR CONSTRUCTION - CERAMICS

DECONSTRUCTION: Building element → DESTINATION: Infracycled → FABRICATION: Infracycled → APPLIED IN OTHER BUILDING: Element with recycled aggregate.

Site Application: BUS DEPOT (SITE).

RECYCLING DILAPIDATED STRUCTURES AT SITE

REFERENCES:

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PRECEDENT STUDY: MATERIAL & TECHNOLOGY

MATERIAL CONCEPT:

The material concept is developed from the architectural concept of Bridging. The intention is to bridge and express construction techniques of the industrial apartheid era, with a contemporary post-industrial and post-apartheid vision. To bridge industrial building hard interfaces with the natural landscapes that demarcate the border and weave through Boksburg CBD. The structural intention is to mediate the existing stereotomic industrial typology from the existing bus depot, and to transition into a lightweight construction elevated and integrated sensitively with the natural processes.

THE RWANDAN EDUCATION CENTRE

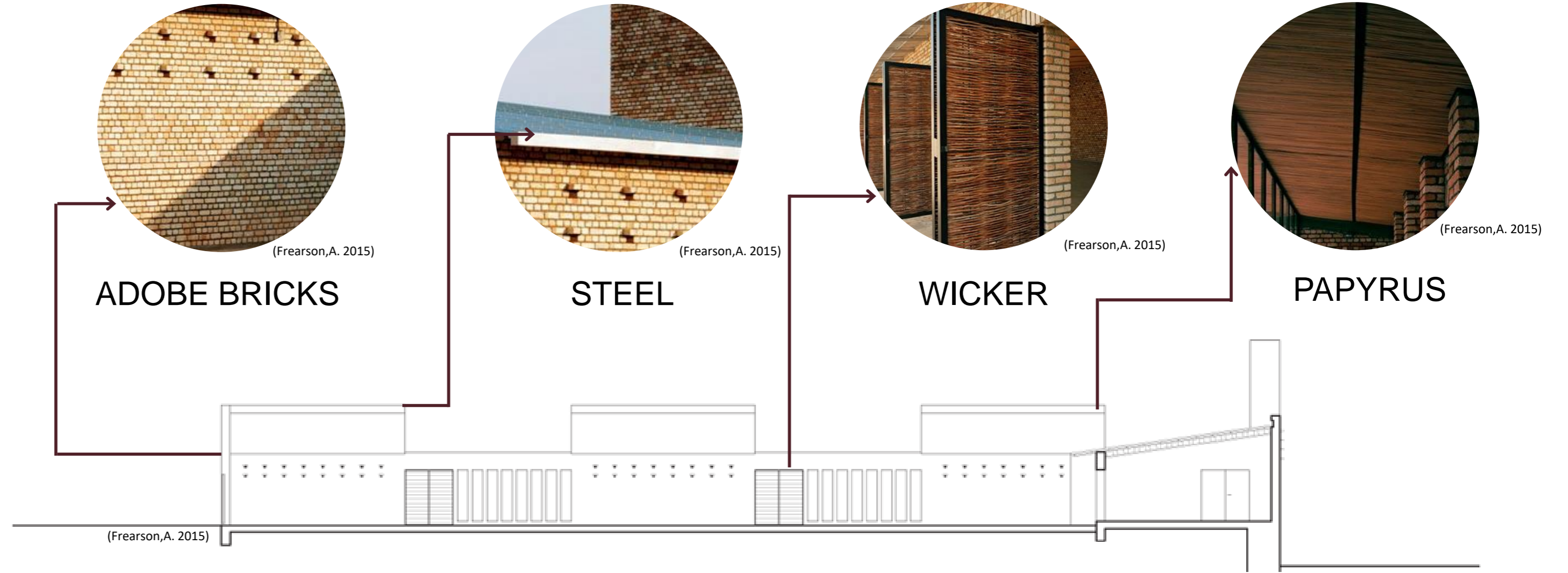
RWANDA
2011
DOMINIKUS STARK ARCHITEKTEN



(Michler, A. 2011)

The Education Centre in Nyanza, Rwanda, uses local materials like adobe bricks, steel, wicker, and papyrus. Built with local labor, its simple, contemporary design includes passive cooling and meets various community needs.

MATERIALITY



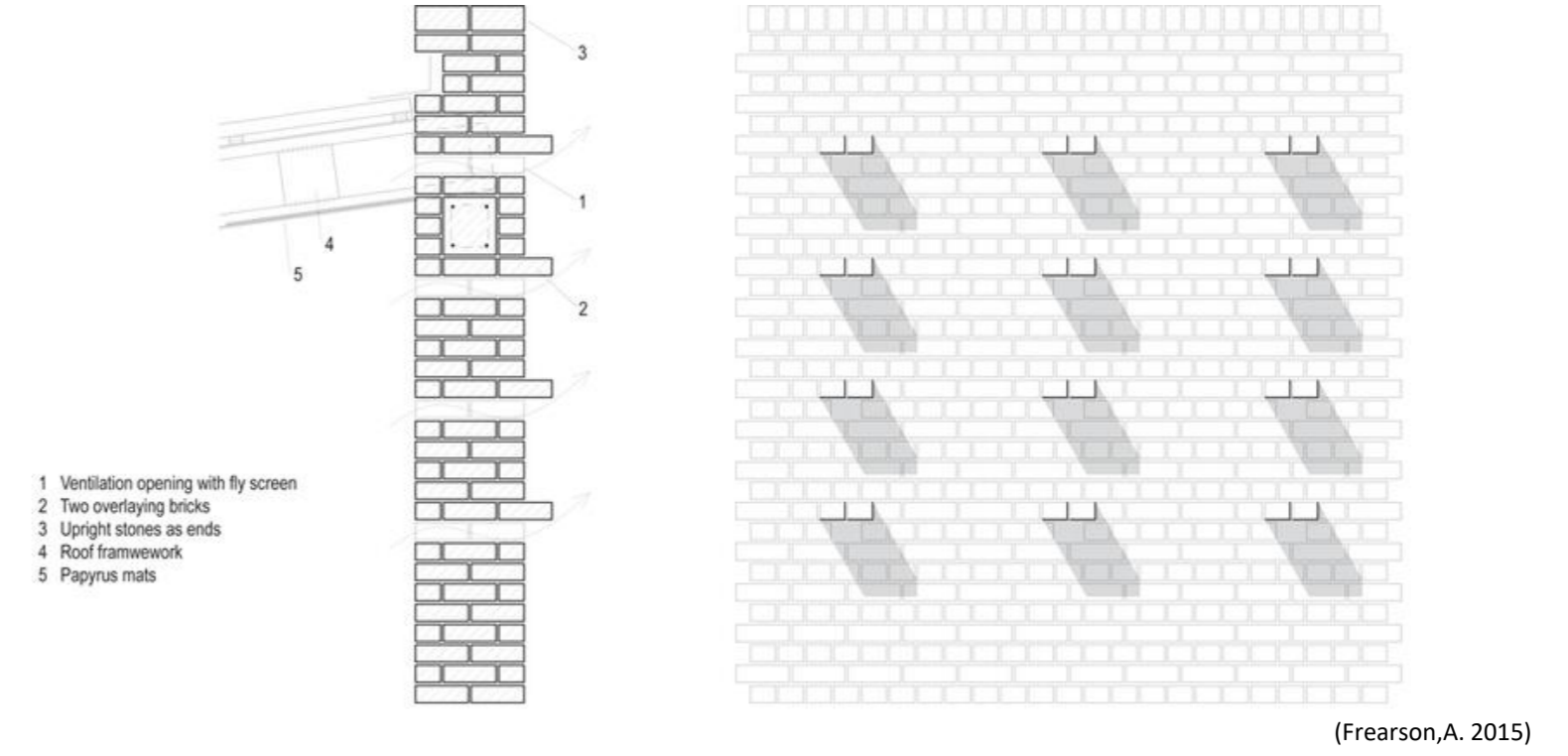
(Michler, A. 2011)

Narrow patio spaces and colonnades establish a connection and relationship between the courtyard and the surrounding rooms.



(Frearson, A. 2015)

Gaps in the masonry construction allow natural ventilation to occur. The mono-pitched roofs channel, collect, and recycle stormwater.

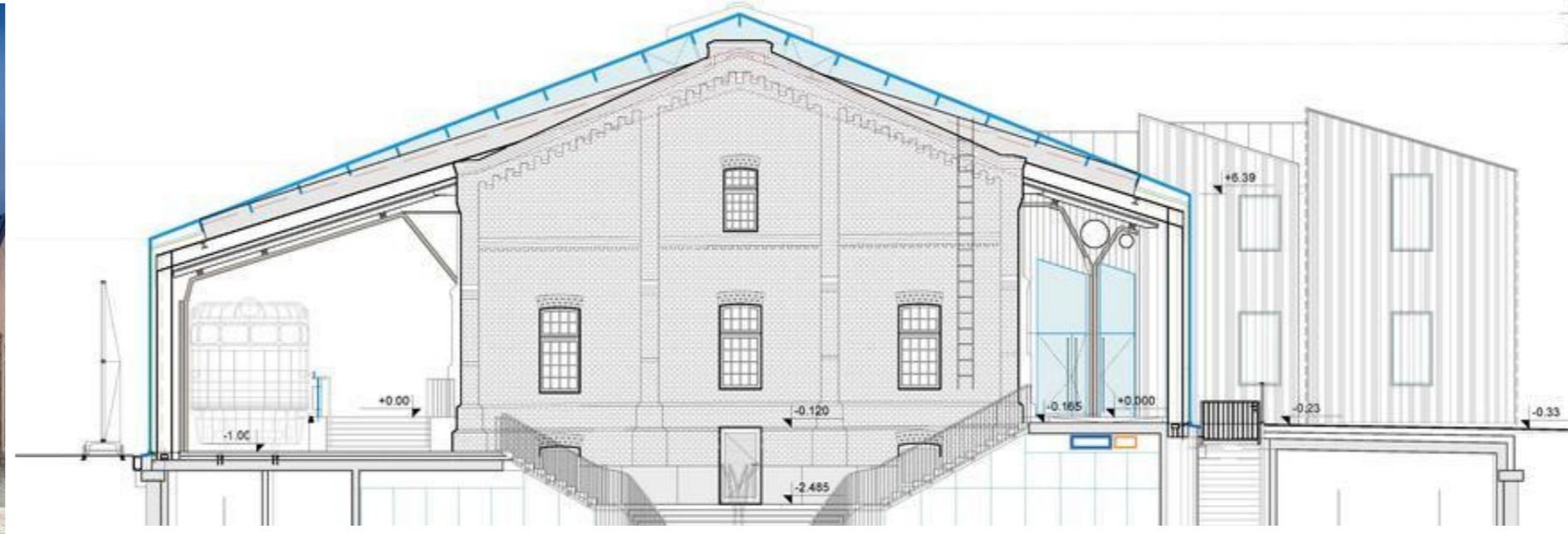


HANZAS PERONS CULTURAL CENTER

LATVIA
2019
REINIS LIEPINS, SUDRABA ARHITEKTŪRA



(Pintos, P. 2020)



(Pintos, P. 2020)

Sudraba Arhitektūra and Reinis Liepins transformed a historic warehouse in Riga into Latvia's largest private cultural venue. They preserved the original brick and wood structure, including a spacious column-less hall, while adding a modern steel and glass exterior. The project blends historical elements with contemporary design and energy efficiency, creating a sophisticated event and cultural space.

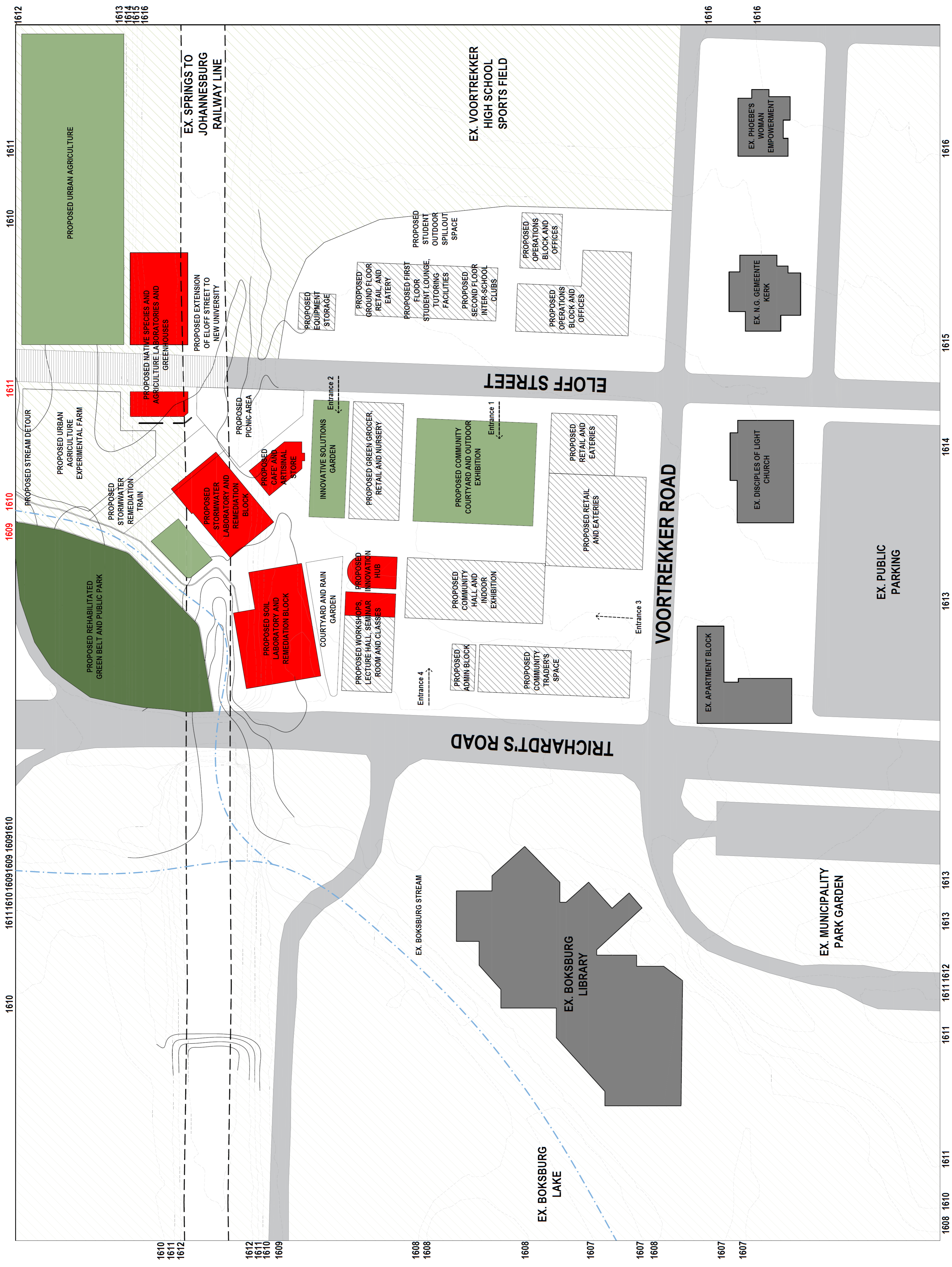
MATERIALITY



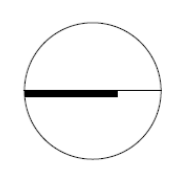
Column: To avoid obstructing the interior space, steel columns were added externally.
Walls: To preserve the brickwork of the original building, the structure became the internal walls of the project.
Roof: The addition of a contemporary roof structure that extends beyond the original building frames and provides new lobby spaces.

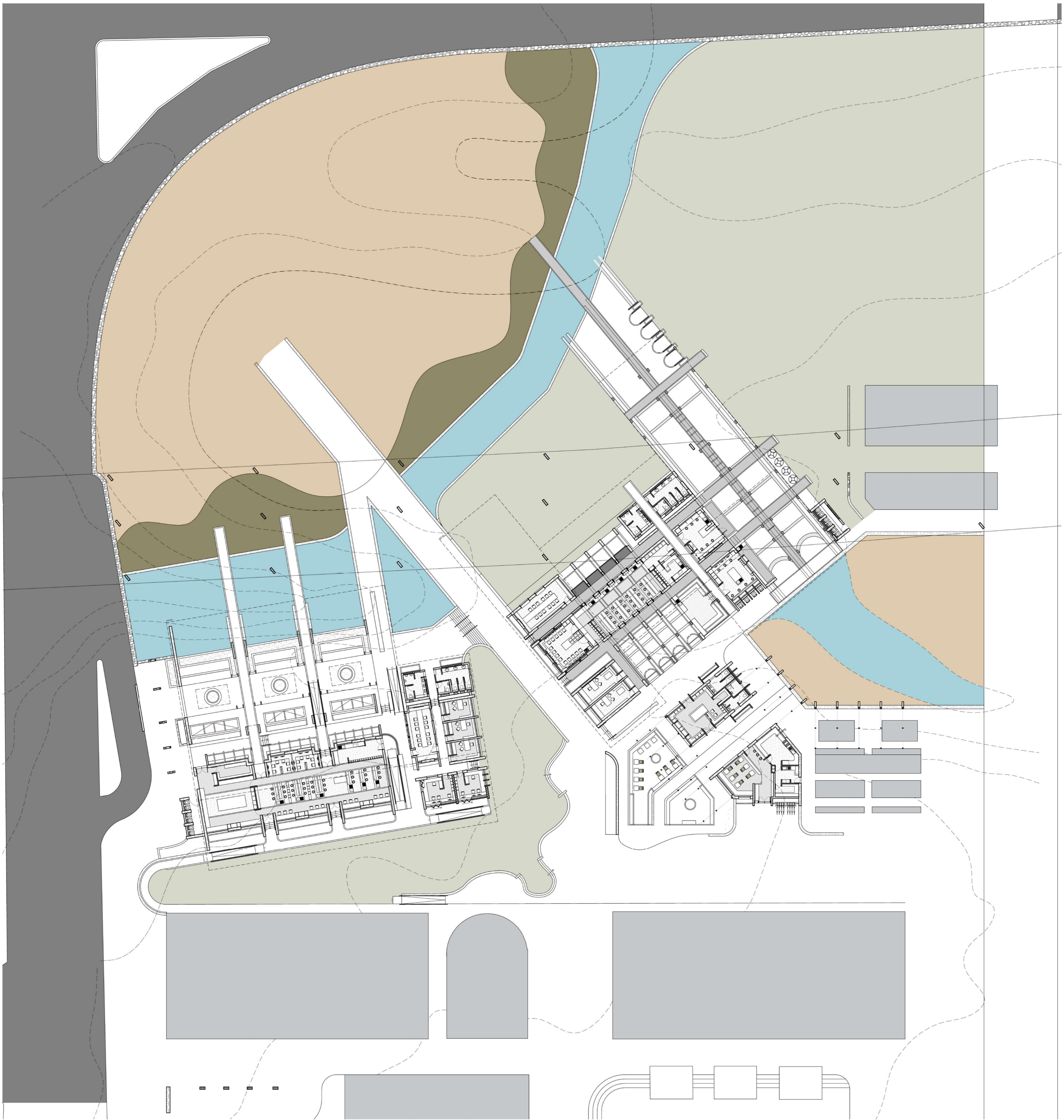
REFERENCES:

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- Pintos, P., 2020. Hanzas Perons Cultural Center / Reinis Liepins + Sudraba Arhitektūra. Available at: <https://www.archdaily.com/933174/hanzas-perons-cultural-center-sudraba-arhitektura/> (Accessed 05 August 2024).



BRIDGING BOKSBURG
 SITE LAYOUT PLAN
 SCALE 1:500

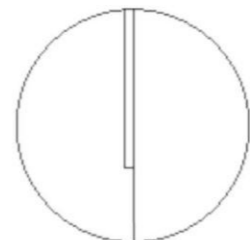


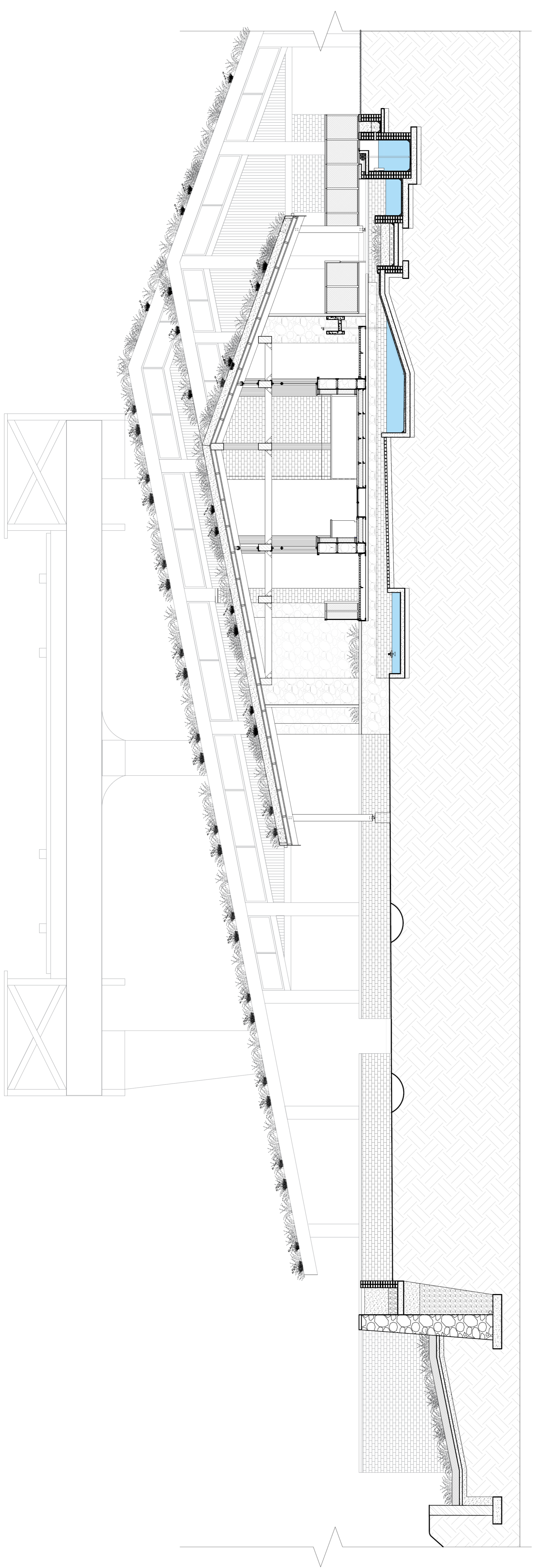


BRIDGING BOKSBURG

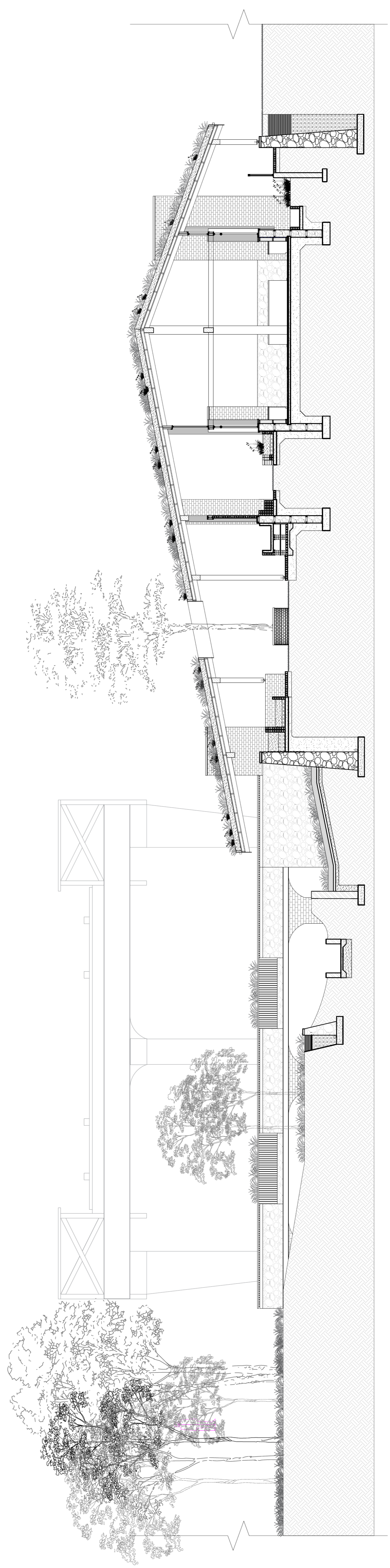
GROUND FLOOR PLAN

SCALE 1:100

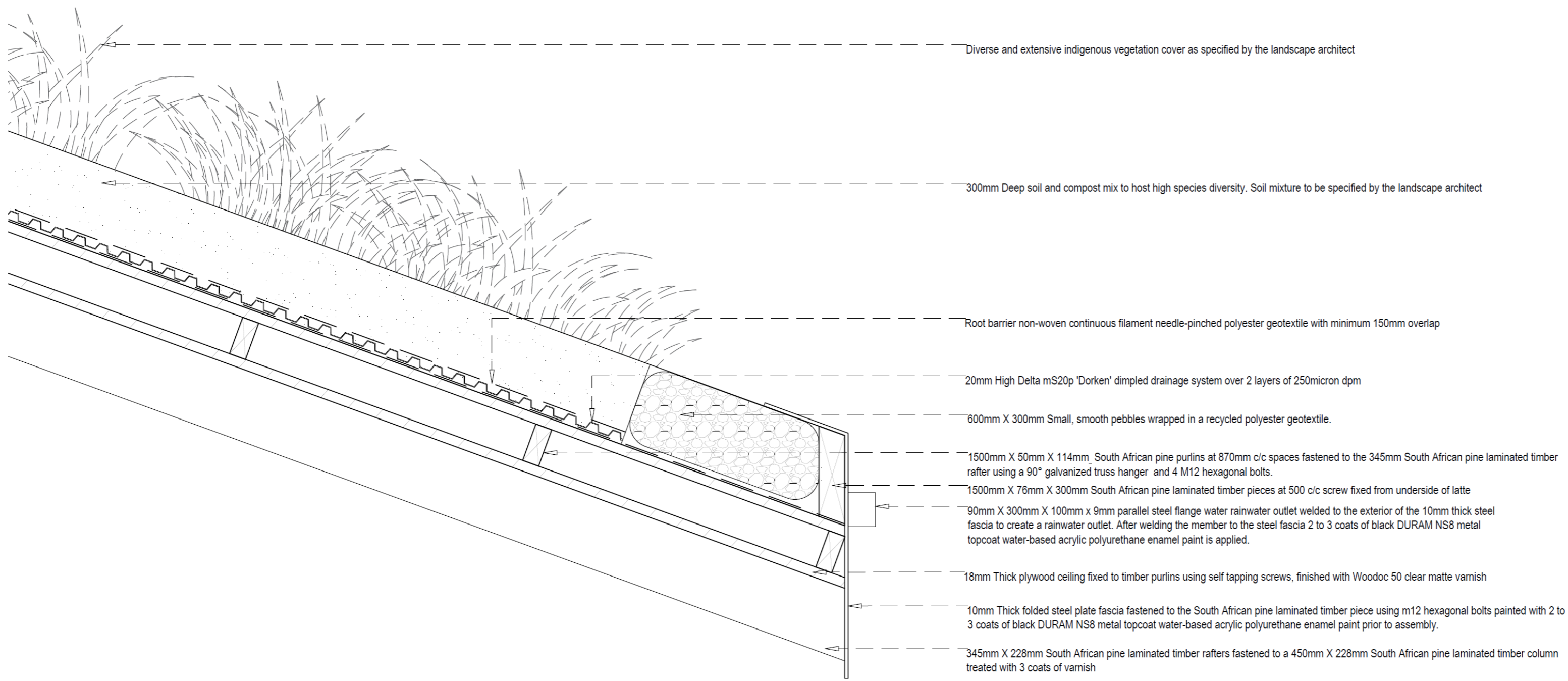




BRIDGING BOKSBURG SECTION A-A
 STORM WATER TESTING LAB
 SCALE 1:50

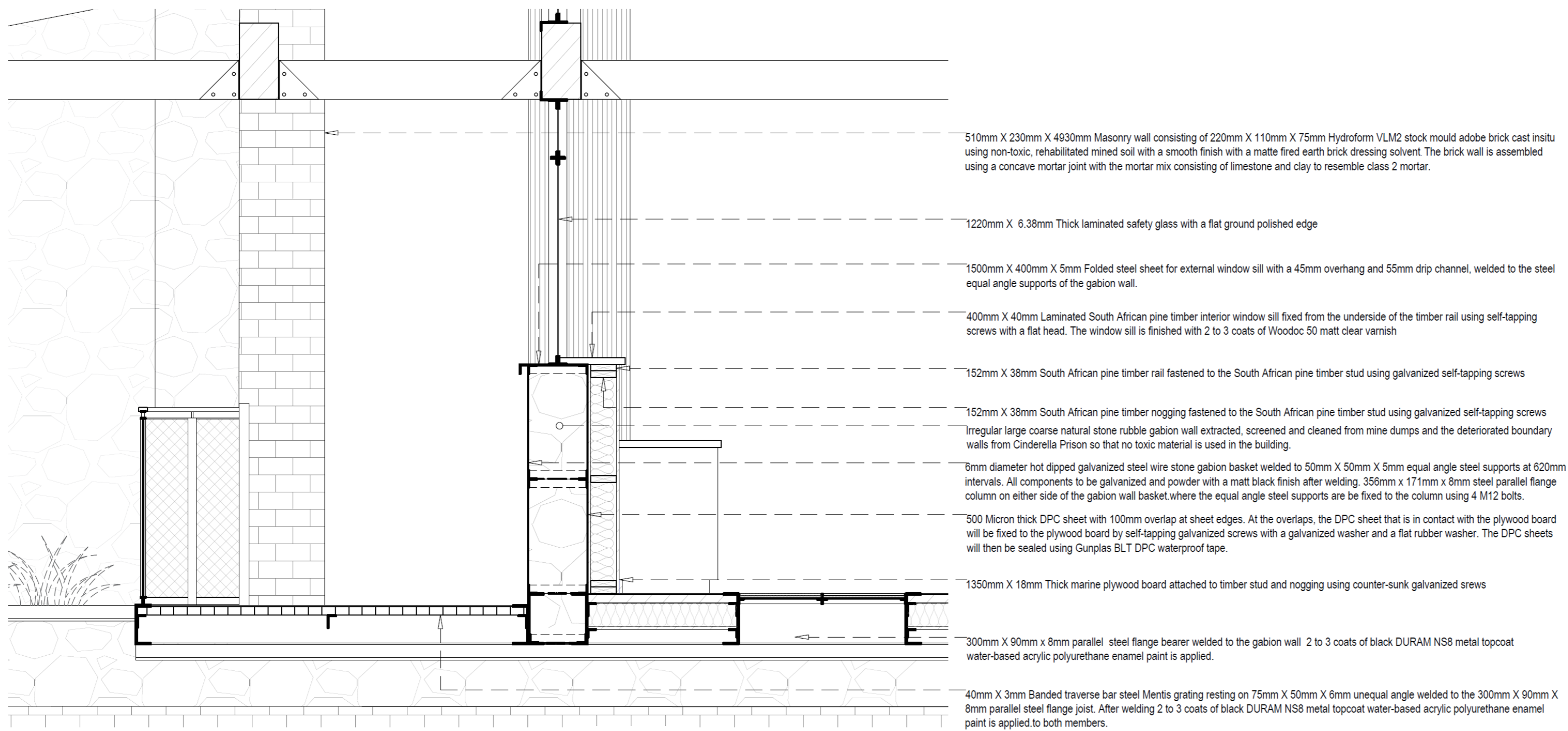


BRIDGING BOKSBURG SECTION B-B
 SOIL RESEARCH AND TESTING FACILITY
 SCALE 1:75



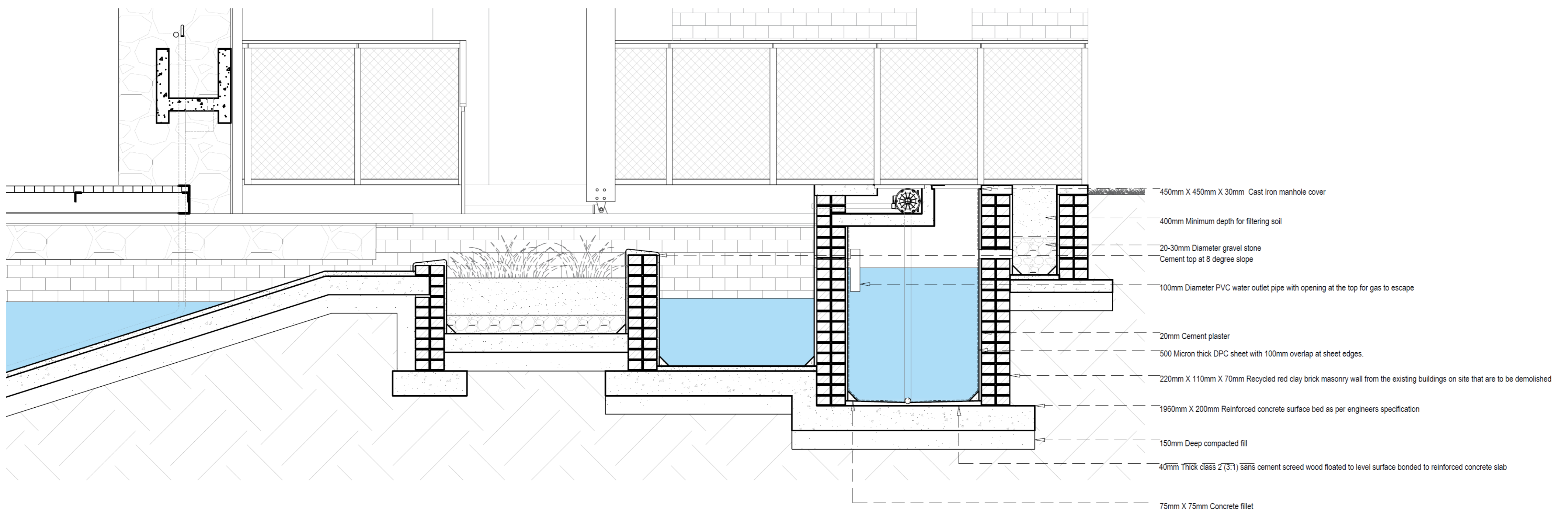
BRIDGING BOKSBURG DETAIL 1

GREEN ROOF GUTTER
SCALE 1:20



BRIDGING BOKSBURG DETAIL 2

STORM WATER LAB FACADE
SCALE 1:20



BRIDGING BOKSBURG DETAIL 3

STORM WATER TRAIN
SCALE 1:20