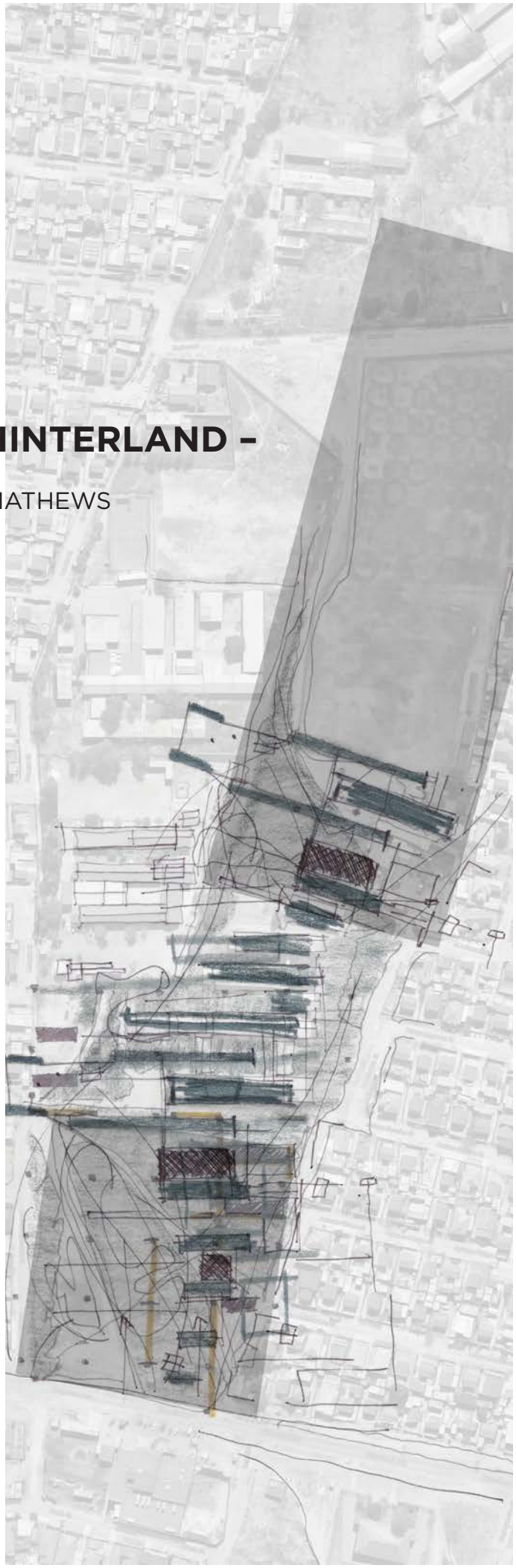
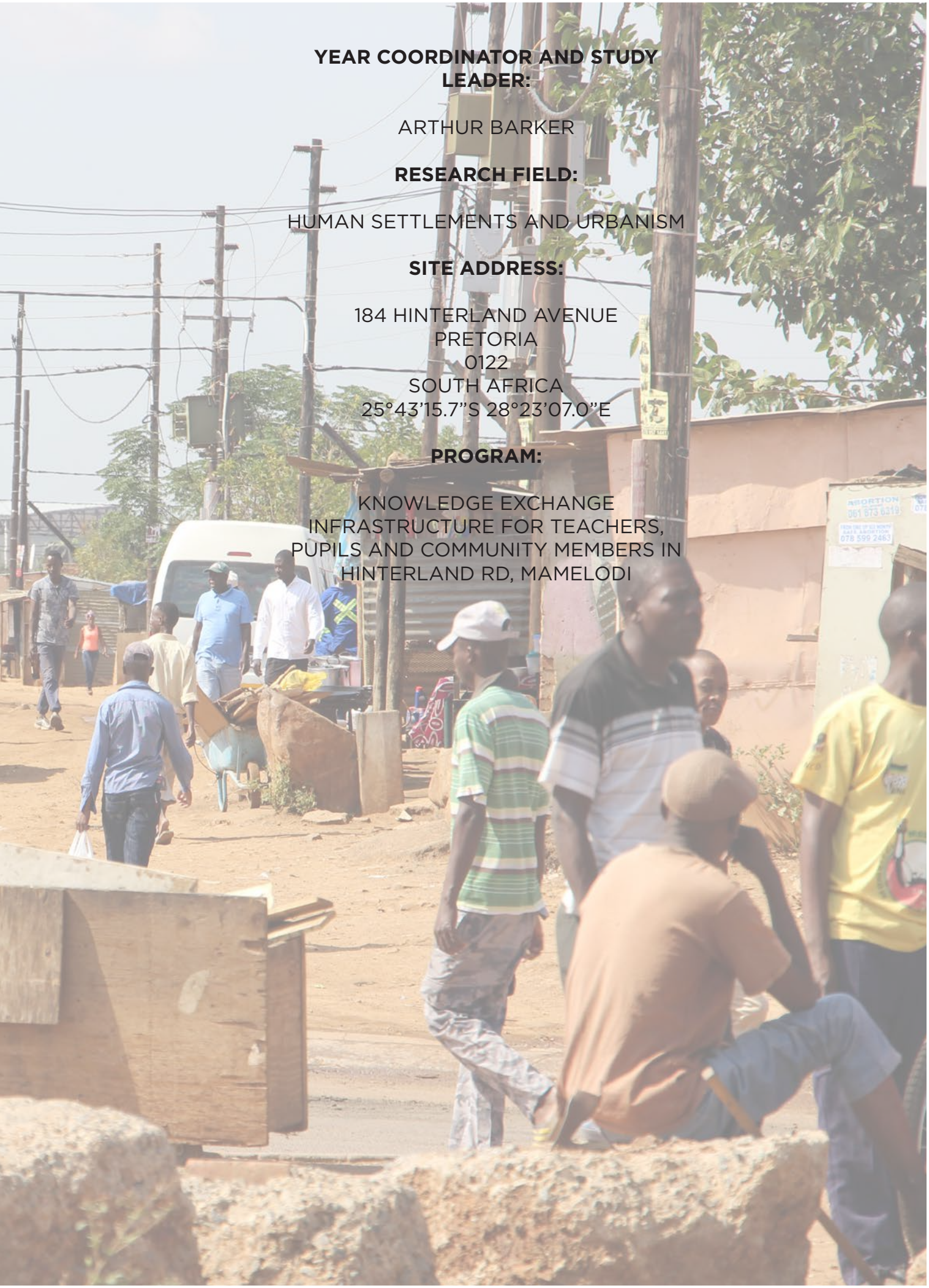


– ELMO IN THE HINTERLAND –

BY: HENRY MATHEWS



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PROGRAM:

KNOWLEDGE EXCHANGE INFRASTRUCTURE FOR TEACHERS, PUPILS AND COMMUNITY MEMBERS IN HINTERLAND RD, MAMELODI

SUBMITTED IN FULFILMENT OF
THE REQUIREMENTS FOR THE
DEGREE MASTER OF ARCHITECTURE
(PROFESSIONAL)

IN THE

FACULTY OF ENGINEERING, BUILT
ENVIRONMENT AND INFORMATION
TECHNOLOGY

UNIVERSITY OF PRETORIA

SOUTH AFRICA

7 DECEMBER 2017

IN ACCORDANCE WITH REGULATION 4(C) OF THE GENERAL REGULATIONS (G.57) FOR DISSERTATIONS AND THESES, I DECLARE THAT THIS THESIS, WHICH I HEREBY SUBMIT FOR THE DEGREE MASTER OF ARCHITECTURE (PROFESSIONAL) AT THE UNIVERSITY OF PRETORIA, IS MY OWN WORK AND HAS NOT PREVIOUSLY BEEN SUBMITTED BY ME FOR A DEGREE AT THIS OR ANY OTHER TERTIARY INSTITUTION.

I FURTHER STATE THAT NO PART OF MY THESIS HAS ALREADY BEEN, OR IS CURRENTLY BEING, SUBMITTED FOR ANY SUCH DEGREE, DIPLOMA OR OTHER QUALIFICATION.

I FURTHER DECLARE THAT THIS THESIS IS SUBSTANTIALLY MY OWN WORK.

WHERE REFERENCE IS MADE TO THE WORKS OF OTHERS, THE EXTENT TO WHICH THAT WORK HAS BEEN USED IS INDICATED AND FULLY ACKNOWLEDGED IN THE TEXT AND LIST OF REFERENCES.

.....
HENRY MATHEWS

ACKNOWLEDGEMENT

.

George and Hanti Mathews
for their unconditional love and support

.

Eloise Pretorius
for having patience, being my best friend
and teaching me to be kind

.

Prof. Arthur Barker
for incomparable guidance and tolerance

.

Bernhard van Renssen and Sakkie Venter
for the cash in hand and architectural shenanigans

.

Boukunde kids and staff
for lifelong friendships and a noble education

.

My heavenly Father
for all of the above

.

ABSTRACT

A lack in infrastructure and skills, in an inherited Apartheid spatial legacy, leaves a critical opening for much needed added spatial value.

By investigating and supporting existing networks and contributing to existing typologies, this dissertation speculates on educational resource infrastructure provision to marginalized communities in Pretoria, South Africa.

It is a **rethinking** of our South African city landscapes and civic/pedagogical architectural offerings, manifesting a critical stance to foster a prosperous community that has the potential to thrive.

Focusing a **speculative knowledge exchange infrastructure intervention** on already existing networks; this dissertation aims to resolve the potential of current typologies in urban planning, and the ability to foster a new teacher, pupil and community education infrastructure to empower local stakeholders to improve provided services.

Building a prosperous future on top of past spatial inheritance.

TABLE OF CONTENT

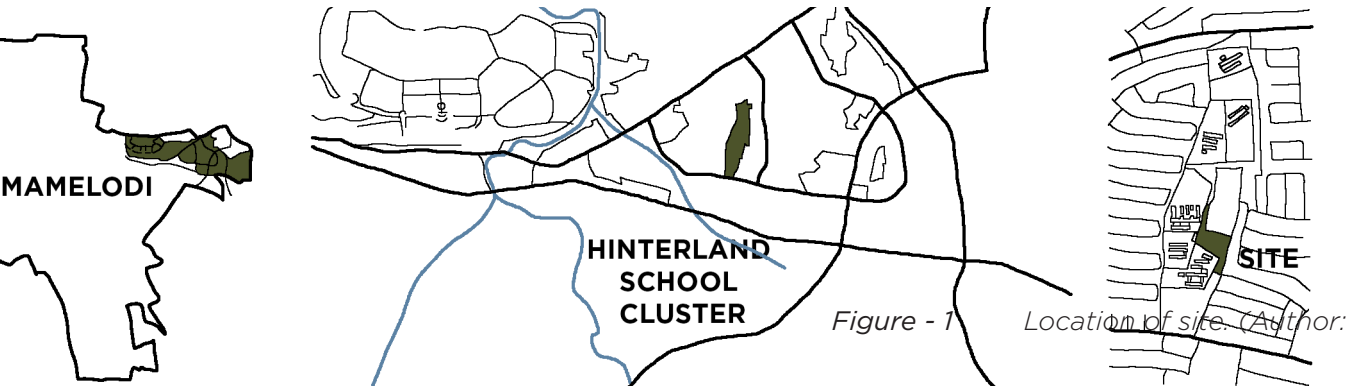
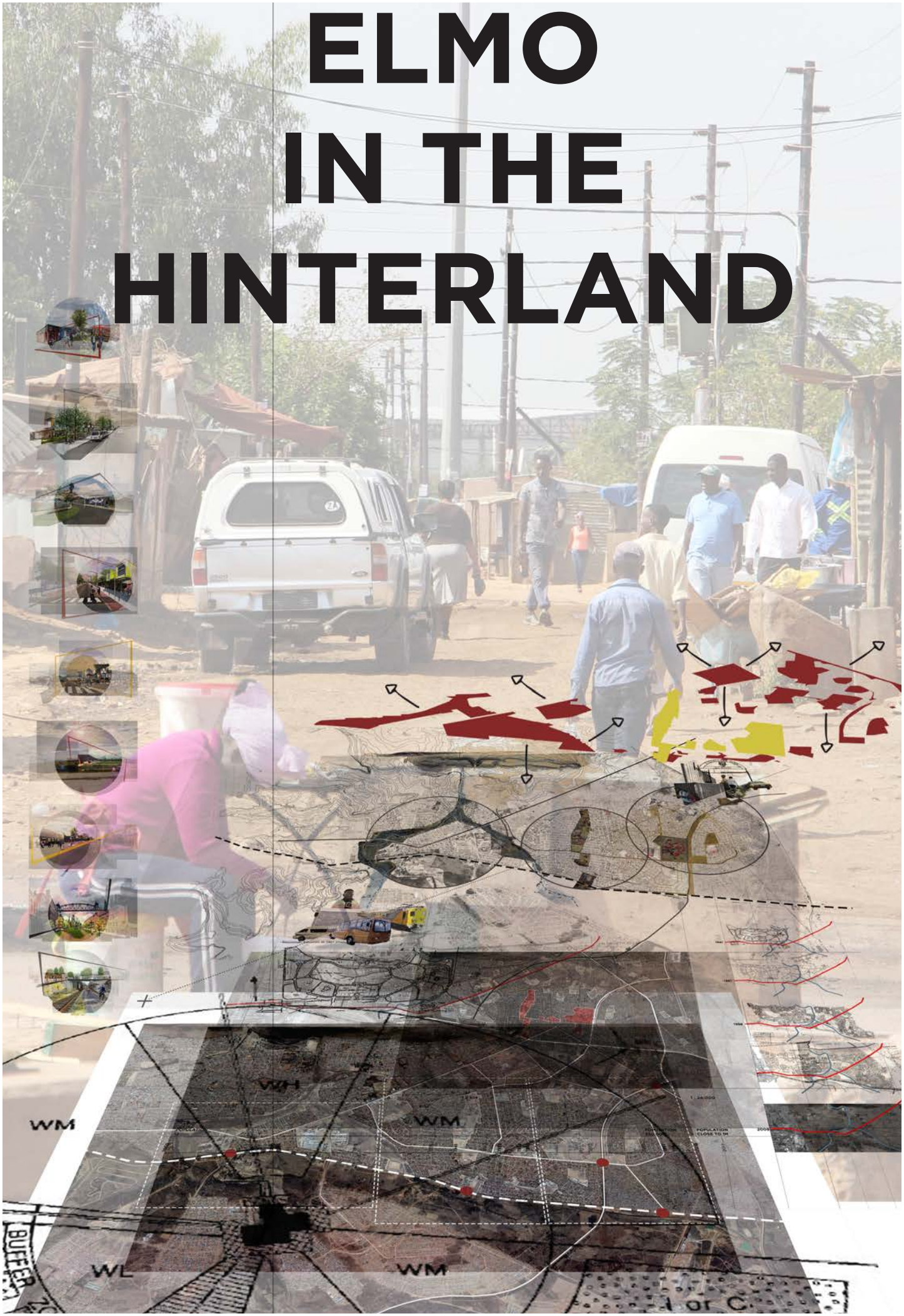


Figure - 1 Location of site. (Author: 2017)

ELMO IN THE HINTERLAND



INTRODUCTION

Under the University of Pretoria's **RESEARCH FIELD** of Human Settlement's an Urbanism, architectural discourse can lead from the front in speculating new and innovative ways in solving the spatial problems of the past, requirements of the present and visions of the future generations.

Nowhere is this more critical than in the **CONTEXT** of South African cities. As urbanization rates climb in an unprecedented way, we are firstly facing the task of adequately providing our citizens with the infrastructure and social opportunities to contribute to a prospering economy.

Our second biggest challenge lies cemented in our past. As our country arguably exemplifies success after a turbulent history, the remaining effects are unfortunately still too concrete to ignore. After nearly 23 years of democracy, the spatial construct of our cities still remain stagnant in its apartheid-like structure.

> *"(O)ur major tasks confronting South African architecture today is evidently to re-structure the routes – between cities and rural areas, townships and city centers, ethnic communities and individuals – that apartheid had turned into dead ends."*
>
> - Heinrich Wolff
> (DaimlerChrysler South Africa, 2008)

If freedom was granted to every South African citizen in 1993 and we can honestly testify that every citizen has the potential to live the African dream, only then can we finally turn away from the past and move permanently to the future.

The African dream is realised when our citizens are offered the opportunity of being part of a society characterised by social equality, equity and mobility. This simply implies that, you can dictate your own financial future free of historic inheritance, by diligently employing your talents and opportunities, regardless of the socio-economic class or ethnic background you are born into.

The greatest and, in my opinion, only persisting physical legacy carried over from our past and impacting on a thriving future, is the South African Urban Landscapes': Inherited Apartheid Spatial Legacy. Communities zoned to areas of the city and still affected by long commutes, lack of civic amenities, social services and infrastructure by the Group Areas Act of 1950.

It is this lack of infrastructure that requires the agency of architecture, as presented quite accuratly by Julian Cooke:

> *"Space was such a crucial factor in the shaping of the colonial and apartheid state that those urban and architectural skills should be in the forefront of dismantling and reshaping it."*
> (Cooke, May/June 2011)

Figure - 2 *Previous Page: South African inherited spatial legacies. (Author: 2017)*

Figure - 3 *Cover Page: Mamelodi School Cluster (Google Earth stich and scetch by Author: 2017)*

Figure - 4 *Front-matter page: Photograph of typical Mamelodi informal street (Author: 2017)*

CONTEXT

HUMAN SETTLEMENT AND URBANISM

GAUTENG is the urban capital of the continent, grown together between **PRETORIA** and Johannesburg; it is a landlocked oasis of trade and industry. These twin cities have transformed drastically in the last two decades.

The spatial development of cities in South Africa can be explained in terms of various phases, for example:

The **Colonial City** (1910),
The **Segregation City** (1950),
The **Apartheid City** (1985),
The **Ethnic City** (1985),
The **Apartheid City in Transition** (since 1985)

Today, the process of the deconstruction of the apartheid urban landscape and towards a...

Post-Apartheid City - since 1994 (Krige & Donalson, 2000).

The continuum of South African architectural theory has throughout history responded to this predicament.

If one traces the first attempts of critique and deconstruction (or reinterpretation) of the segregated city, you will find the work of Rudolf Sarel Uytenbogaart, responsible for the establishment of the Urban Problems Research Unit at UCT in 1974.

> *It was very active in setting out a critique of apartheid cities, but was closed down in the late 1990s. Today called The African Centre for Cities, it functions out of UCT, working across five scales of activity: UCT, the Cape Town city region, South Africa, Africa and the global South.*
> (African Centre for Cities, 2015)

South African Universities are still doing their part in leading the investigation on future human settlements and providing substantial research.

The seminal work done by the honours groups at the University of Pretoria's department of Architecture under the supervision of Dr Carin Combrinck between 2014 and 2017, has proved critical to a local understanding of human settlement and socio-spatial redress in Pretoria.

Suburbs that have been investigated include;

2014: Slovo Park (Soweto, Johannesburg),
2015: Alaska (Mamelodi, Pretoria),
2016: Plastic View (Moreleta Park, Pretoria) and
2017: Mamelodi Gardens (Mamelodi, Pretoria)

Through the platform of engagement and grassroots participation, I was part of the 2016 Plastic View research group.

In 2016, Architecture students were actively involved with the Morelettapark Church outreach program and its small primary school servicing 3000 informal settlers in Plastic View, an informal settlement in the heart of Pretoria's suburban sprawl. A deep understanding of the quotidian workings and networks inside the temporary cityscape made clear the complexity of solving the most critical issues faced by informal residents. There to serve the needs of city employment and playing a central role in the construction of the surrounding upper class suburbs, it is the success of these communities in urban slum spaces which will guarantee a just future.

In 2017, the research group investigated five early childhood development centers, or crèches, located in **Mamelodi**. Findings included the immense role teachers and parents play in the fabric of a township community.

Voices from other South African universities, critical to this debate include:

Iain Louw, (UCT and editor of Digest of South African Architecture)
Julian Cooke (UCT and past editor of Architecture SA),
Gerald Steyn (TUT)
Paul Jenkins(WITS)
David Dewar (UCT)

In practice, the first and foremost South African partnership of Jo Noero and Heinrich Wolff are fundamental to the formulation of perspectives for the post-apartheid architectural landscape.

They were instrumental in investigating possibilities of reinterpreting the architecture and urban Landscape.

> *"Noero's work, concerned with making buildings as cheaply as possible; are designed to present a forceful image without having to rely unnecessarily on detail."* (UIA Issue 8, 1985)

Post 1994, the language and role of architecture and providing identity thereto proved to be extremely complex. These role players however, proved successful in providing architectural solutions to the new vernacular.

> *Understanding that public buildings need to speak to people about the very nature of public buildings as well as looking for ways in which a building can merge education and cultural production, he, (Noero) explores the spaces in between.* (UIA Issue 8, 1985)

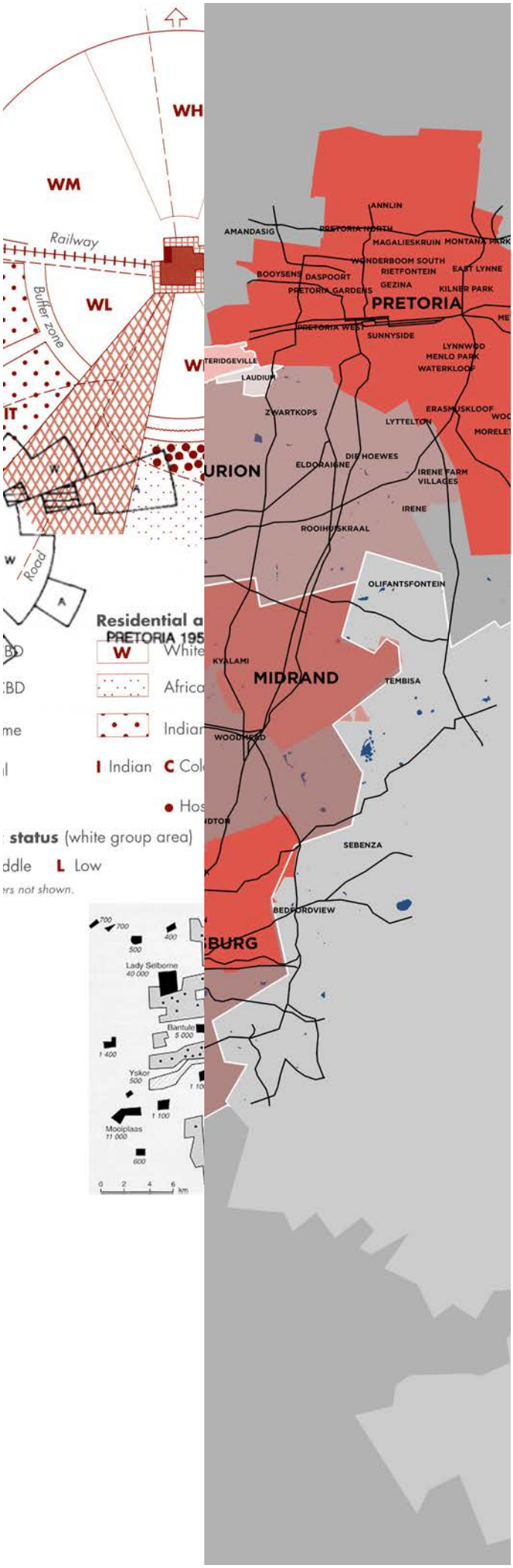


Figure - 5 *Gauteng, the African Megacity (Author: 2017)*

Another current voice in the continuum of architectural thinking and a contemporary contributor to the deconstruction and reinterpretation of the Apartheid city is Dr Kathryn Ewing, who presented the 2016 Roelof S. Uytenbogaardt UDISA Memorial Lecture,

She was honored for her contribution towards social change through urban design. Through her work, including that as director of the Violence Prevention through Urban Upgrading (VPUU) program, she has made a significant impact in research, education, advocacy and practice in architecture, planning and urban design fields.

> *Her work shows a commitment towards improving the lives of largely disempowered communities in low-income areas, making her a fitting successor to continue building on the legacy of Roelof S. Uytenbogaardt.* (UDISA, 2016)

As contemporary architects concerned with the future of human settlements and urbanism, our contribution towards the future post-apartheid city is liable to impact thousands if not millions of lives, and should come with great accountability and responsibility to take the lead.

In my opinion, the leader in research, innovation and implementation of solving the problems of a new growing country, is the **South African Government.**

Although a time consuming process, as can be expected from any government, the list of programs and initiatives funded by the South African government is commendable.

Skills provision and job creation through the EPWP and Working on Fire has had immense success.

The department of basic education's ASIDI has seen world class school building designed by world class South African architects in townships, shantytowns and informal settlements throughout the country.

The Departments of Public Works and Higher Education construction of two brand new University campuses in 2016 is commendable. The University of Mpumalanga in Mbombela and Sol Plaatjies University in Kimberly are a testament to the fact that progress is confidently being made.

Not to mention the abundance of visions for the future.

Unfortunately, these poster child projects ignore the large number of low-income communities who are waiting on jobs, houses and services promised routinely every four years by politicians enthusiastic to speak but failing to do.

Great future visions and infrastructure projects catalyze an economy, but a lack in quality education, resulting in skilled citizenry means greater economic divide and a society persisting with the scars of an unpleasant past.

And so in 2017, the apartheid spatial legacy and access to standard skill and infrastructure provision persists.

Figure - 6 *South African architectural discourse in the deconstruction of the apartheid city. (Author: 2017)*

1966 ROBERT VENTURI
"COMPLEXITY AND CONTRADICTION IN ARCHITECTURE" ROBERT VENTURI

1972 DEMOLITION OF THE PRUITT-IGOE BUILDINGS

DECONSTRUCTIVISM

CRITICAL REGIONALISM

(THE GROUP AREAS ACT OF 1950)
DISTRICT 6, CAPE TOWN
1966, THE YEAR IN WHICH IT WAS DESIGNATED A 'WHITE ONLY' AREA

1970

1961 JANE JACOBS
"THE DEATH AND LIFE OF GREAT AMERICAN CITIES"

1974 ROELOF SAREL UY-TENBOGAARDT
URBAN PROBLEMS RESEARCH UNIT

1977 CHRISTOPHER ALEXANDER
"A PATTERN LANGUAGE: TOWNS, BUILDINGS, CONSTRUCTION"
CHRISTOPHER ALEXANDER, SARA ISHIKAWA AND MURRAY SILVERSTEIN OF THE CENTER FOR ENVIRONMENTAL STRUCTURE

1980

1919 HANNES MEYER
BELIEVED IN THE RADICAL, EMANCIPATORY AND TRANSFORMATIVE POTENTIAL OF ARCHITECTURE; SEEING ARCHITECTURE, OR DESIGN MORE BROADLY, AS A WEAPON IN THE FIGHT FOR A MORE EQUAL SOCIETY

1956 VĀSTU-SHILPĀ CONSULTANTS
SET UP IN AHMEDABAD BY BALKRISHNA DOSHI, AN INDIAN ARCHITECT, PLANNER AND EDUCATOR. DOSHI IS CONSIDERED ONE OF THE LEADING EXPONENTS OF APPROPRIATE TECHNOLOGY

1952 GABRIËL FAGAN ARCHITECTS

1953 PANCHO GUEDES

1969 GIANCARLO DE CARLO - TEAM X
ARCHITECTURE'S PUBLIC, REMAINS A SEMINAL TEXT ON THE NEED FOR THE INCLUSION OF USERS IN THE DESIGN PROCESS AND THE INHERENTLY POLITICAL ROLE OF THE ARCHITECT.

1970 COMMUNITY TECHNICAL AID CENTRES
UK INSTITUTIONALISATION OF THE RADICAL COMMUNITY ARCHITECTURE OF PRACTITIONERS RALPH ERSKINE AND ARCHITECTS' REVOLUTIONARY COUNCIL

1977 PETER RICH

1978 UN-HABITAT 1

PARTICIPATORY PLANNING

1990

1989 https://www

1984 ARCHITYPE

1985 NOERO WOLFF ARCHITECTS

1989 SNØHETTA

1991 DESIGN CORPS RALEIGH, NORTH CAROLINA

1993 RURAL STUDIO
AUBURN UNIVERSITY, ALABAMA. FOUNDED BY LATE SAMUEL MOCKBEE

1994 JORGE MARIO JÁUREGUI ARCHITECTS (JMJA) FAVELA-BAIRRO

1996 SHACK/SLUM DWELLERS INTERNATIONAL
TRANSNATIONAL NGO: REPRESENTING 'FEDERATIONS' OF THE URBAN POOR AND HOMELESS GROUPS WHO HAVE ORGANISED THEMSELVES AT A CITY OR NATIONAL LEVEL
AFRICA, ASIA AND LATIN AMERICA.

THE DECONSTRUCTION OF THE "APARTHEID CITY"

1995 NABEEL HAMDI
1995 HOUSING WITHOUT HOUSES: PARTICIPATION, FLEXIBILITY, ENABLEMENT
1997 ACTION PLANNING FOR CITIES: A GUIDE TO COMMUNITY PRACTICE
2004 "SMALL CHANGE: ABOUT THE ART OF PRACTICE AND THE LIMITS OF PLANNING IN CITIES"
2005 URBAN FUTURES: ECONOMIC GROWTH AND POVERTY REDUCTION, URBAN MANAGEMENT SERIES

1997 PARAGON

1998 DIÉBÉDO FRANCIS KÉRÉ
SCHULBAUSTEINE FÜR GANDO (STONES FOR BUILDING SCHOOLS IN GANDO)

1999 ATELIER-3 - HSIEH YING-CHUN
RURAL ARCHITECTURE STUDIO

2000

2000 LUDWIG HANSEN
METRO MALL DEVELOPMENT FRAMEWORK AND IMPLEMENTATION

2001 SARAI
DELHI, INDIA CENTRE FOR THE STUDY OF DEVELOPING SOCIETIES (CSDS)

VERNACULAR AND CRAFT-BASED DESIGN

CURRENT ACADEMICS:

IAIN LOUW SAAD, UCT
DAVID DEWAR
JULIAN COOKE

2000 ELEMENTAL

2000 ECOSISTEMA URBANO

2002 TIAAN MEYER

2002 - 2009 SANS SOUCI CINEMA
A CAMPAIGN TO REBUILD THE SANS SOUCI COMMUNITY CINEMA IN THE SOWETO TOWNSHIP DISTRICT OF KLIPTOWN FOLLOWING ITS DESTRUCTION BY FIRE IN 1995

2002 BIG

SOCIAL DEMOCRATIC ARCHITECTURE

MAS CONTEXT ISSUE 1

2010

2003 PIET LOUW
HTTP://WWW.NMASSOCIATES.CO.ZA/ABOUT-US/PARTNERS/PIET-LOUW-ARCHITECTS

2005 PIERRE SWANNEPOEL STUDIO MAS
WALTER SISULU SQUARE OF DEDICATION
SOUTH AFRICA'S FIRST TOWNSHIP ENTERTAINMENT EXPLOSION CENTRE

2005 ABAHLALI BASEMJONDOLO
MEANS 'PEOPLE WHO LIVE IN SHACKS' IN ZULU

2006 MARTIN KRUGER URBAN DESIGN INSTITUTE OF SOUTH AFRICA EARLY CHILDHOOD ENRICHMENT CENTRE

2015 DR CARIN COMBRINK
"A MODEL TO ADRESS MARGINALITY OF THE ARCHITECTURAL PROFESSION IN THE SOUTH AFRICAN DISCOURSE ON INFORMAL SETTLEMENT UPGRADE"

2006 EKO PRAWOTO
ARCHITECT AND EDUCATOR WHO COMBINES CONTEMPORARY DESIGN WITH LOCAL KNOWLEDGE, COMMENTING THAT HE VIEWS HIS BUILDINGS AS SOCIAL ENTITIES AS MUCH AS PHYSICAL OBJECTS

2008 ASIYE ETAFULENI
('BRING IT TO THE TABLE' IN ZULU)
(NGO) SET UP TO SUPPORT INFORMAL TRADERS

WE ARE HERE

2020

2030

NATIONAL DEVELOPMENT PLAN 2030

2030 UN AGENDA FOR SUSTAINABLE DEVELOPMENT

2040

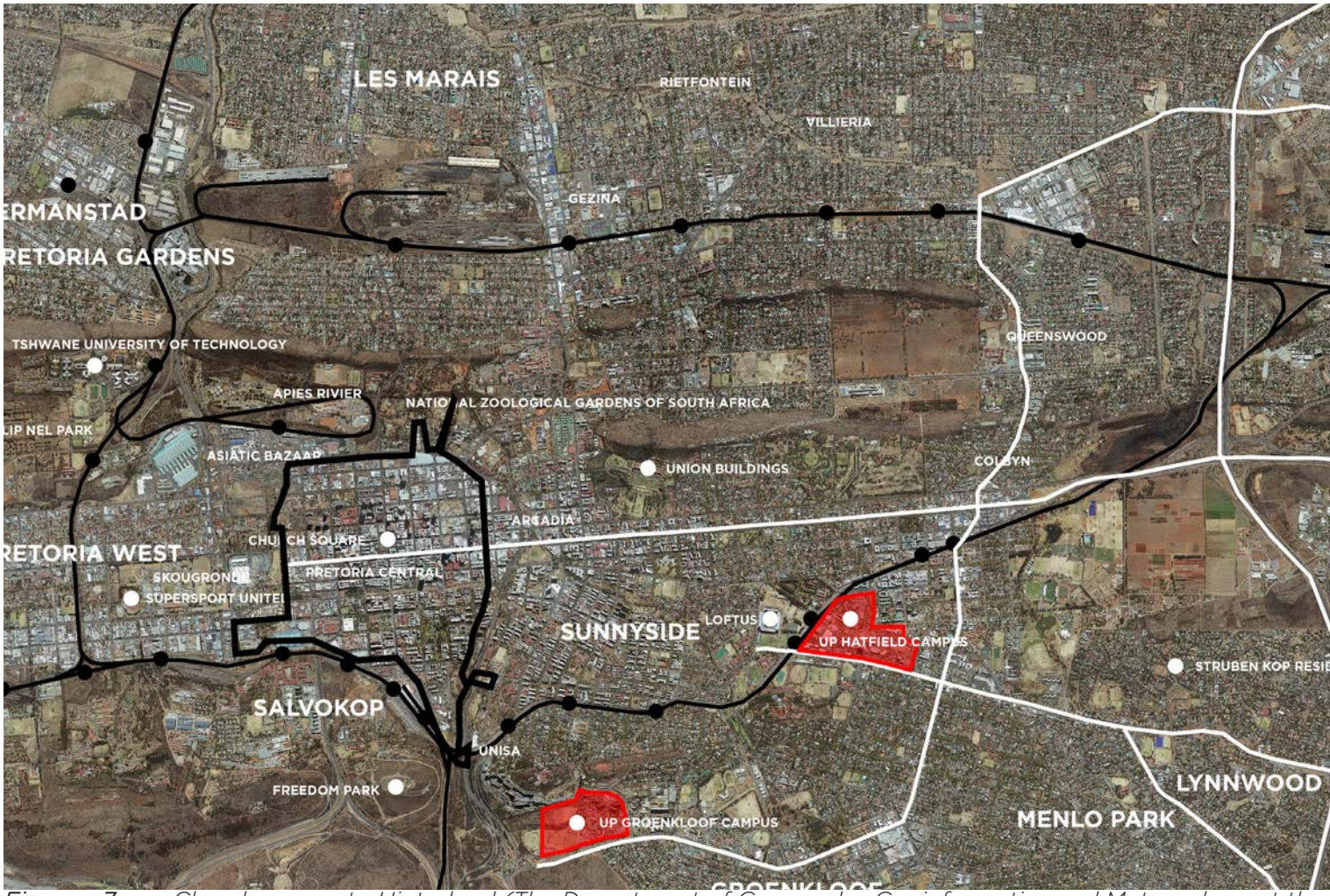
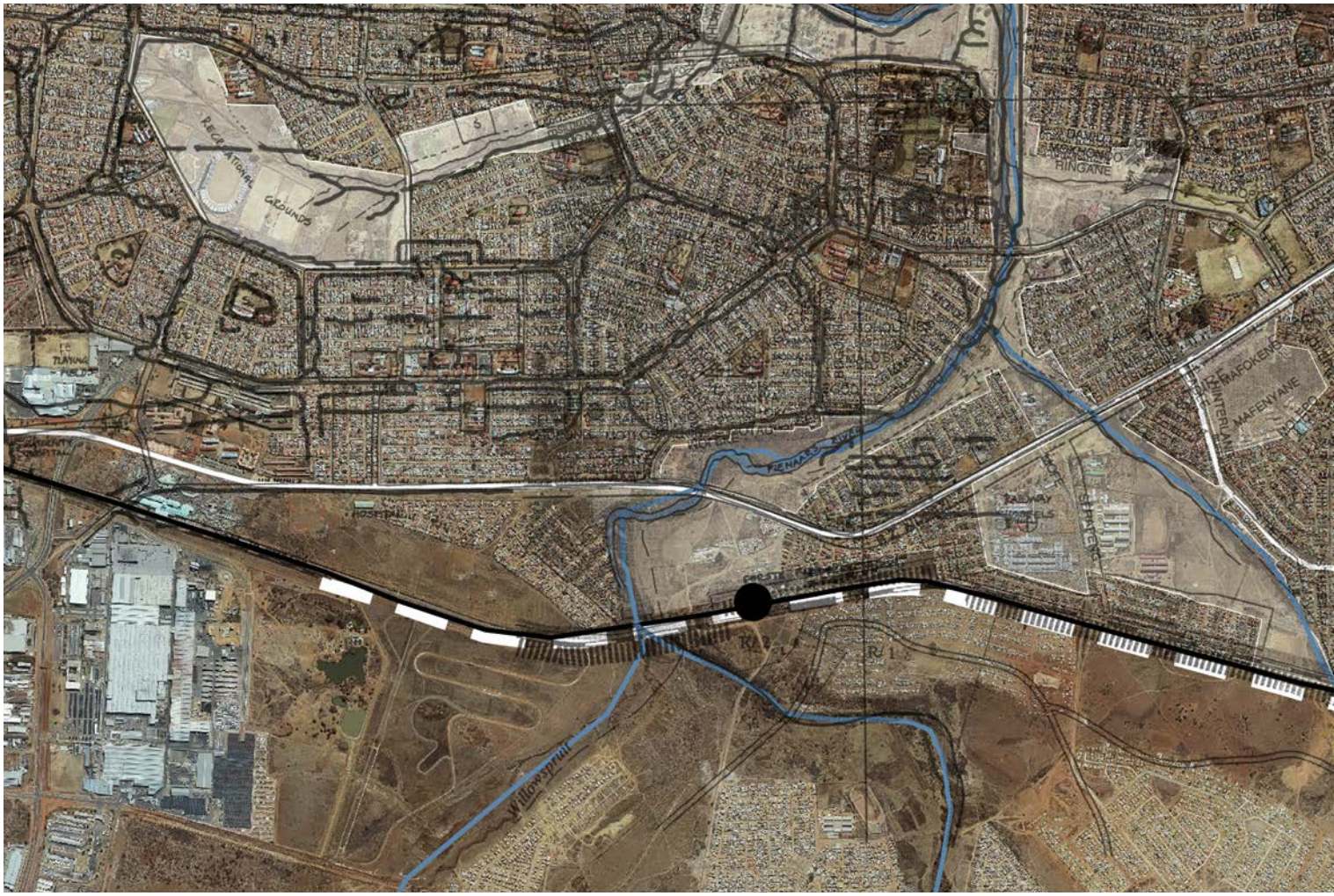
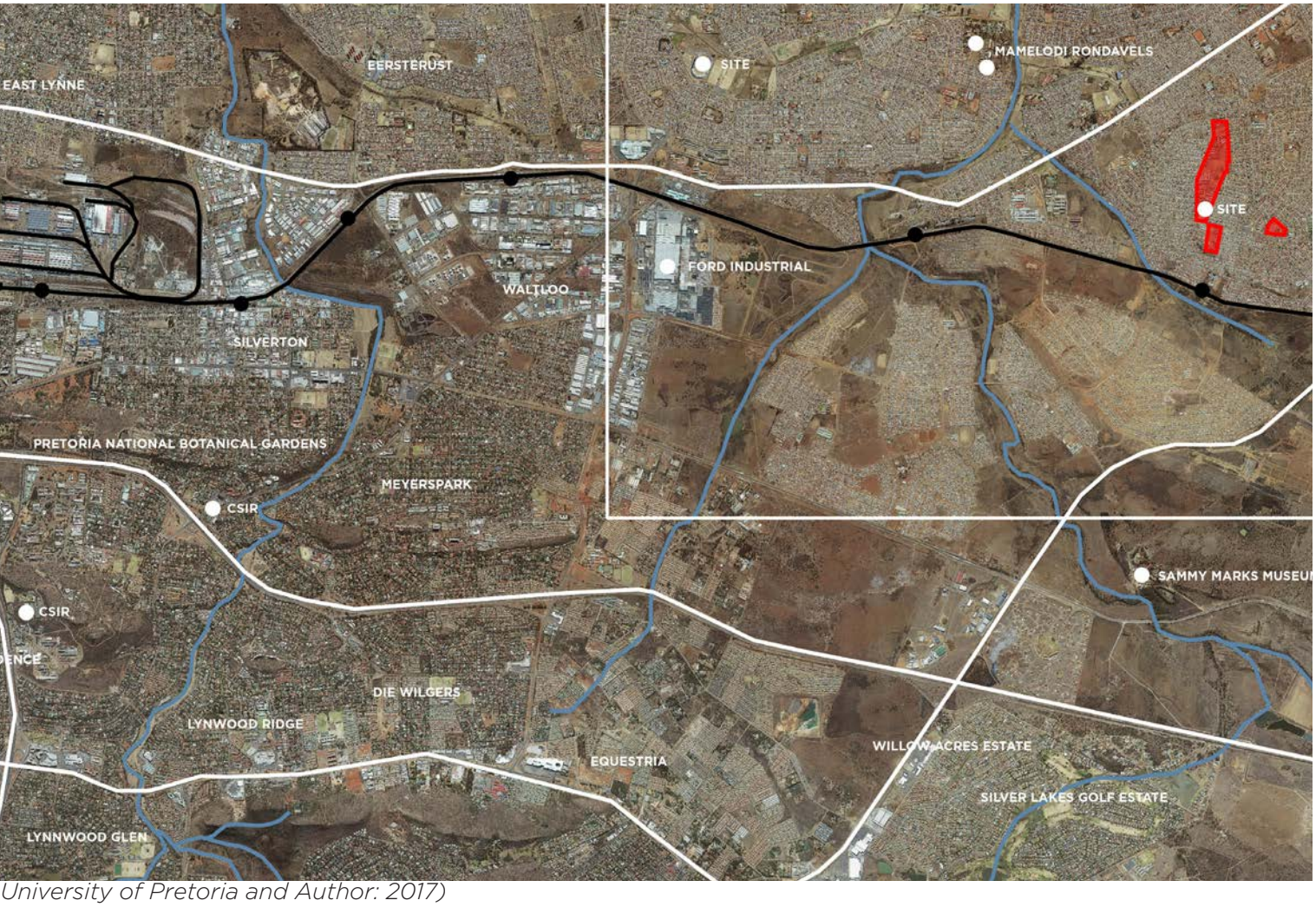


Figure - 7 *Church square to Hinterland (The Department of Geography, Geoinformatics and Meteorology at the*

Figure - 8 *Mamelodi 2017 (The Department of Geography, Geoinformatics and Meteorology at the University of*





University of Pretoria and Author: 2017)
Pretoria and Author: 2017)

Figure - 9 *Hinterland Ave (Author: 2017)*

Figure - 10 *(Author: 2017)*

Figure - 11 *(Author: 2017)*

Figure - 12 *(Author: 2017)*

Figure - 13 *(Author: 2017)*

Figure - 14 *PEDESTRIAN LANDSCAPE*

Figure - 15 *(Author: 2017)*

Figure - 16 *(Author: 2017)*

Figure - 17 *(Author: 2017)*

Figure - 18 *(Author: 2017)*

Figure - 19 *(Author: 2017)*

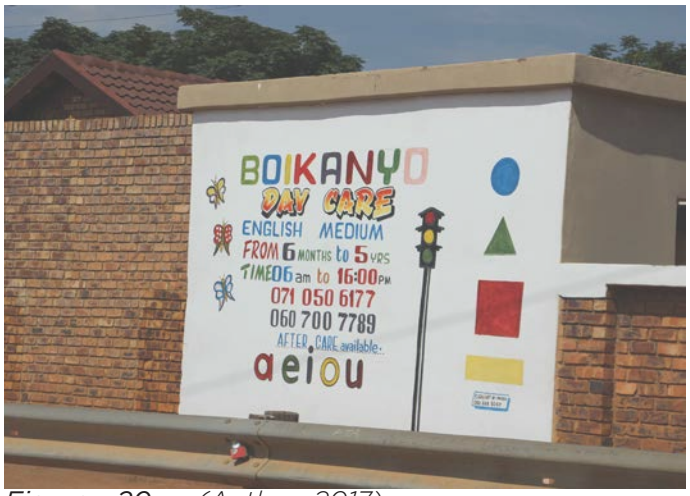


Figure - 20 *(Author: 2017)*

Figure - 21 *(Author: 2017)*

Figure - 22 *(Author: 2017)*

Figure - 23 *(Author: 2017)*

Figure - 24 *(Author: 2017)*

URBAN VISION
MAMELODI EMERGENCITY

Mamelodi is one of these communities where apartheid spatial legacy and access to standard skill and infrastructure provision persists.

Within the last thirty years the population has tripled, bordering on one million residents. With rapid urbanization in Pretoria, poverty and inequality has persisted.

Mamelodi East was chosen so that the state of human settlements in Pretoria, as it stands on the threshold of reaching critical capacity, could be investigated.

The city of Pretoria does not have the adaptive capacity to provide a solution to this problem. Mamelodi needs to be steered from potentially emergency settlement towards a thriving socio economic emerging city.

The Mamelodi Masters Groups' urban vision argues for a method to negotiate the impending tipping point. A unique opportunity has presented itself in the adaptive cycle of Mamelodi, it is crucial to carefully negotiate a transition between the current state to a new, possibly improved one.

Figure - 25 *Mamelodi has filled nearly all available space imposed upon it by physical barriers (Author: 2017)*

> *"A rushed process can destroy positive aspects, destroying the genius loci.*
>
> *Opportunity exists for unpredictable change to be consciously managed and adapted to, without requiring crisis management"* (Du Plessis & Peres 2013:5).

Mamelodi has been evolving within its inherited spatial legacy and it still has an effect on how the city functions. Through the mapping to the following can be conclusions were derived:

1. Because it was designed to easily control as self-contained area, it has limited accessibility, thus causing it to function separately from the city.

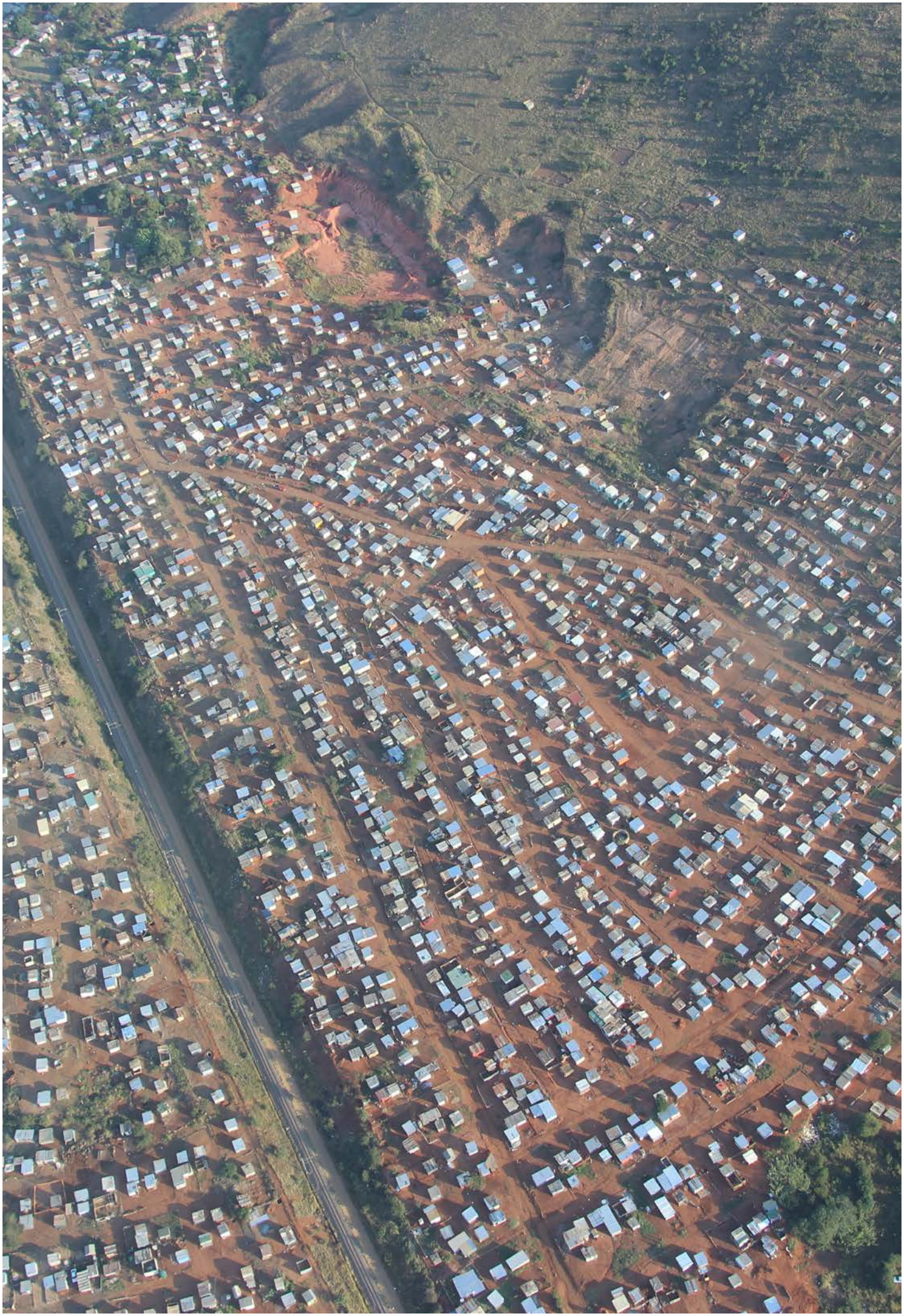
2. Because of the vast distance between Mamelodi, and the rest of the city, the urban poor are forced to live in the cheap accommodation and commute extensive hours, at a great cost.

3. The current single-use zoned residential typology is not only causing urban sprawl, but also spatial, social and economic fragmentation (Steyn, Patterns for people-friendly neighborhoods in Mamelodi, South Africa, 2005)

4. Services are drastically lower than outside the dormitory suburb. Education and healthcare services are present, but can be stated as critically insufficient

As a result of the above mentioned points, we found that the streets become the public space where ceremonies are held, public gatherings emerge, where pedestrians walk, 'spaza shops' appear and where cars are serviced.

> *"While the complexity of a modern city calls for continuity, it also furnishes a great delight: the contrast and specialization of individual character"* (Lynch 1960:108).



The study focused its attention on the uniqueness of character found in the street culture and its inherited landscape.

In the urban framework, we took the stance that townships and informal settlements are here to stay, and that the apartheid spatial legacy will seemingly endure to the distant future. It becomes a preliminary exploration that focused its attention on the strengths found through the mapping to pre-empt new nodes of development that could increase accessibility, offer economic choice, and contribute to an improved urban fabric.

In exploring the qualities, which according to Prof. Gerald Steyn - "*...make up a successful urban condition: compact, accessible, walkable and mixed use landscapes with high level of economic self-sufficiency*" (Steyn, 2005) our interventions embodied the following themes:

1. STRENGTHEN NETWORKS
Strengthening existing economic, environmental and social networks. Relying on locally-based networks will create complete communities of resilience and accessibility. These networks need to become complete and integrated, realizing the connections between economic, environmental and social well-being.

2. CELEBRATE UNIQUENESS
The unique street-culture and vibrancy of Mamelodi can begin to inform methods of place-making and identity on an urban scale. The day-to-day character of Mamelodi can contribute to the engagement of communities and the ownership of the urban fabric as a collective and individually.

3. DENSIFY AND DIVERSIFY
The densification of nodes within the urban fabric will contribute to the resilience of neighborhoods. Bringing economic choice and diversity through mixed-use precincts will combat the mono-functional nature of suburban Mamelodi, allowing for effective use of space and nodes of economic, social and cultural activity.

4. UPGRADE INFRASTRUCTURE
Upgrading existing and redundant infrastructure to become durable and reliable. Infrastructure and service delivery are pertinent to the development of emerging cities. The economic, social and cultural health of communities rely on the efficiency and sustainability of infrastructural systems.

Figure - 26 *The urban vision aimed to restructure the township typology into a good, sustainable neighborhood through architectural interventions placed along the negotiated street edge, congested centers and urban dead zones (Author: 2017)*

EXISTING CONDITION
The streets serve as ceremonial gathering spaces.

ENVISIONED CONDITION
Through the upgrade of infrastructure an emphasis is placed on communal identity that celebrates this uniqueness in street culture.
Figure - 27 *(Mprof Mamelodi Group: 2017)*

EXISTING CONDITION
Undefined spaces leads to fragmented economic conditions.

ENVISIONED CONDITION
High pedestrian traffic creates opportunity for mixed-use street edges.
Figure - 28 *(Mprof Mamelodi Group: 2017)*

EXISTING CONDITION
Isolated platforms creating a hard edge between urban and rural conditions, preventing potential connections between the two sides.

ENVISIONED CONDITION
Bridging the two conditions with commercial activity and introducing a cycle route within the current urban condition next to the railway line.
Figure - 29 *(Mprof Mamelodi Group: 2017)*

EXISTING CONDITION
Isolated platforms creating a hard edge between urban and rural conditions, preventing potential connections between the two sides.

ENVISIONED CONDITION
Bridging the two conditions with commercial activity and introducing a cycle route within the current urban condition next to the railway line.
Figure - 30 *(Mprof Mamelodi Group: 2017)*

EXISTING CONDITION
Lack of defined space and infrastructure leads to cold and bare spaces that suppress the connection of networks and negotiation of street space.

ENVISIONED CONDITION
Lack of defined space and infrastructure leads to cold and bare spaces that suppress the connection of networks and negotiation of street space.

Figure - 31 *(Mprof Mamelodi Group: 2017)*

EXISTING CONDITION
Leftover spaces on primary roads present an opportunity for development in the densification of Mamelodi.

ENVISIONED CONDITION
Pedestrians are drawn to the previously leftover space, due to commercial magnets. A genius loci is instilled by means of spatial definition through building.

Figure - 32 *(Mprof Mamelodi Group: 2017)*

EXISTING CONDITION
Isolated platforms creating a hard edge between urban and rural conditions, preventing potential connections between the two sides.

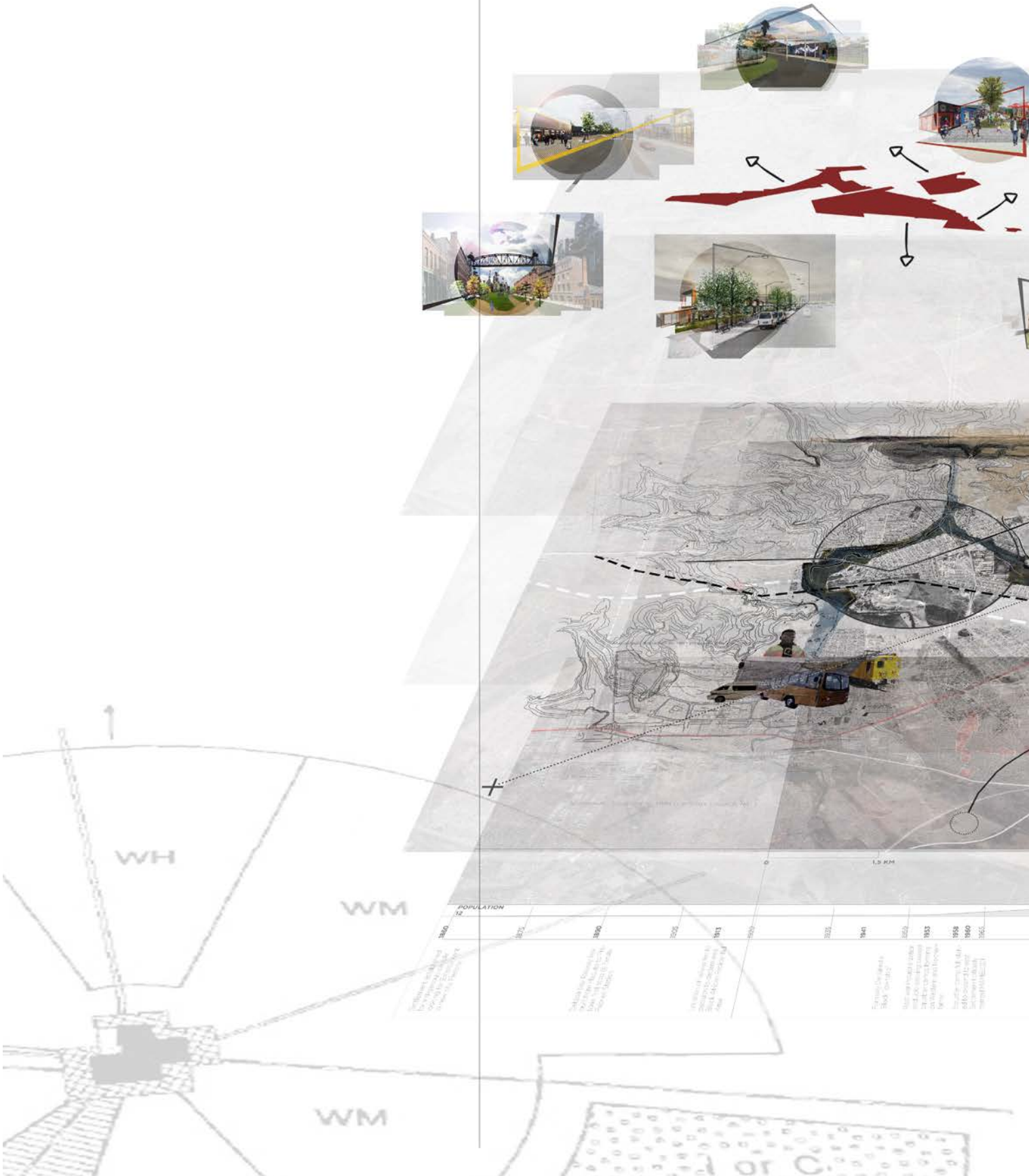
ENVISIONED CONDITION
Bridging the two conditions with commercial activity and introducing a cycle route within the current urban condition next to the railway line.

Figure - 33 *(Mprof Mamelodi Group: 2017)*

EXISTING CONDITION
The ineffectivity of the street edge is encouraged by the hardness of the institutional boundary, creating an isolated, unhierachical space that is only utilized as a taxi stop.

ENVISIONED CONDITION
Introducing diversity on the street edge transforms an unused area into vibrant public space. The layering of economic, social and infrastructural functions stimulates around-the-clock activity.

Figure - 34 *(Mprof Mamelodi Group: 2017)*



URBAN VISION
Pre empting New
Nodes of Development

FRAMEWORK
Strengthen Networks
Regenerate immediate Context
Celebrate Uniqueness

MAPPING
Make
Learn
Serve

CONTEXT
Mamelodi

HISTORY
1960 Vlakfontein
Group area's act
Development

Figure - 35 *(Author: 2017)*

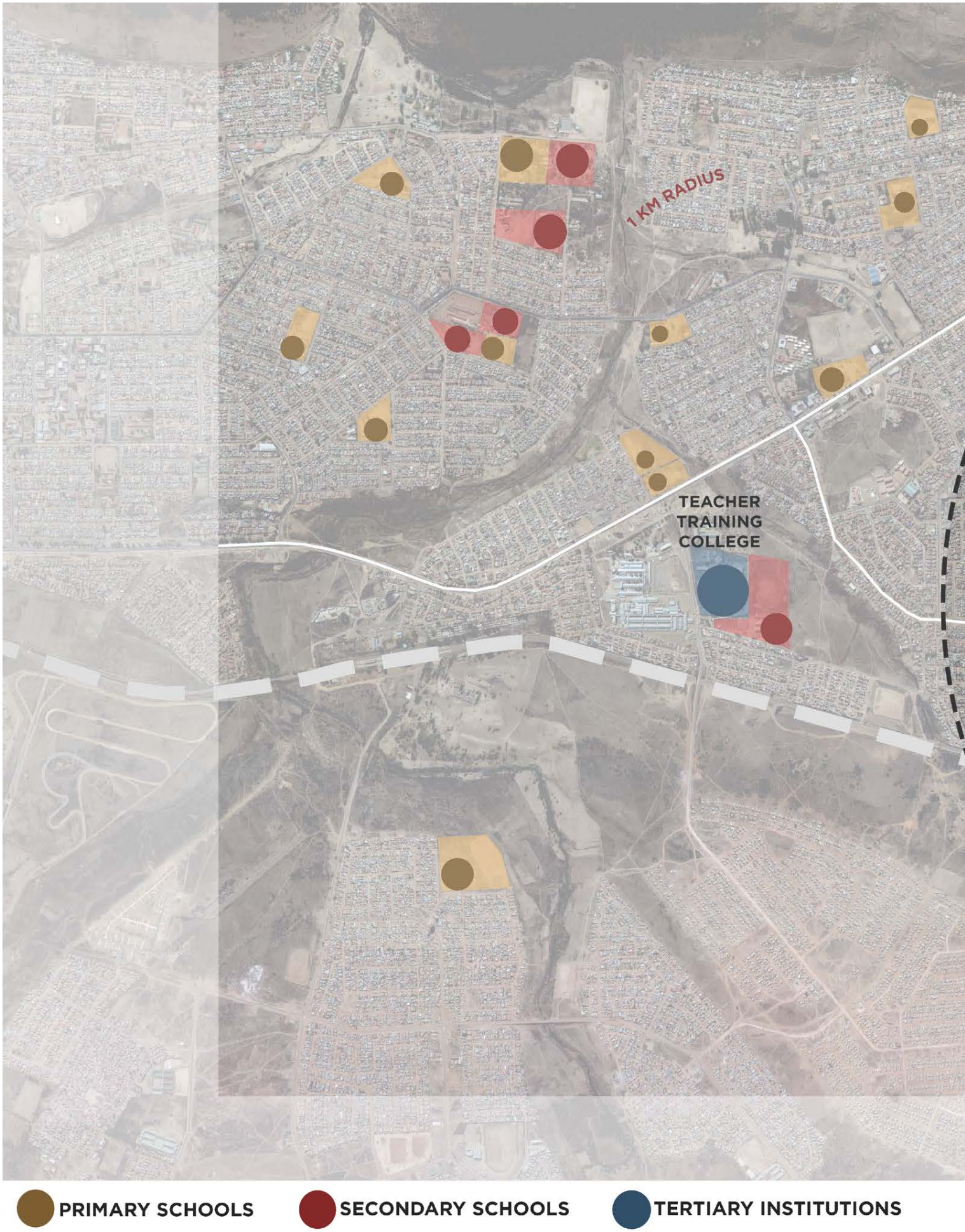
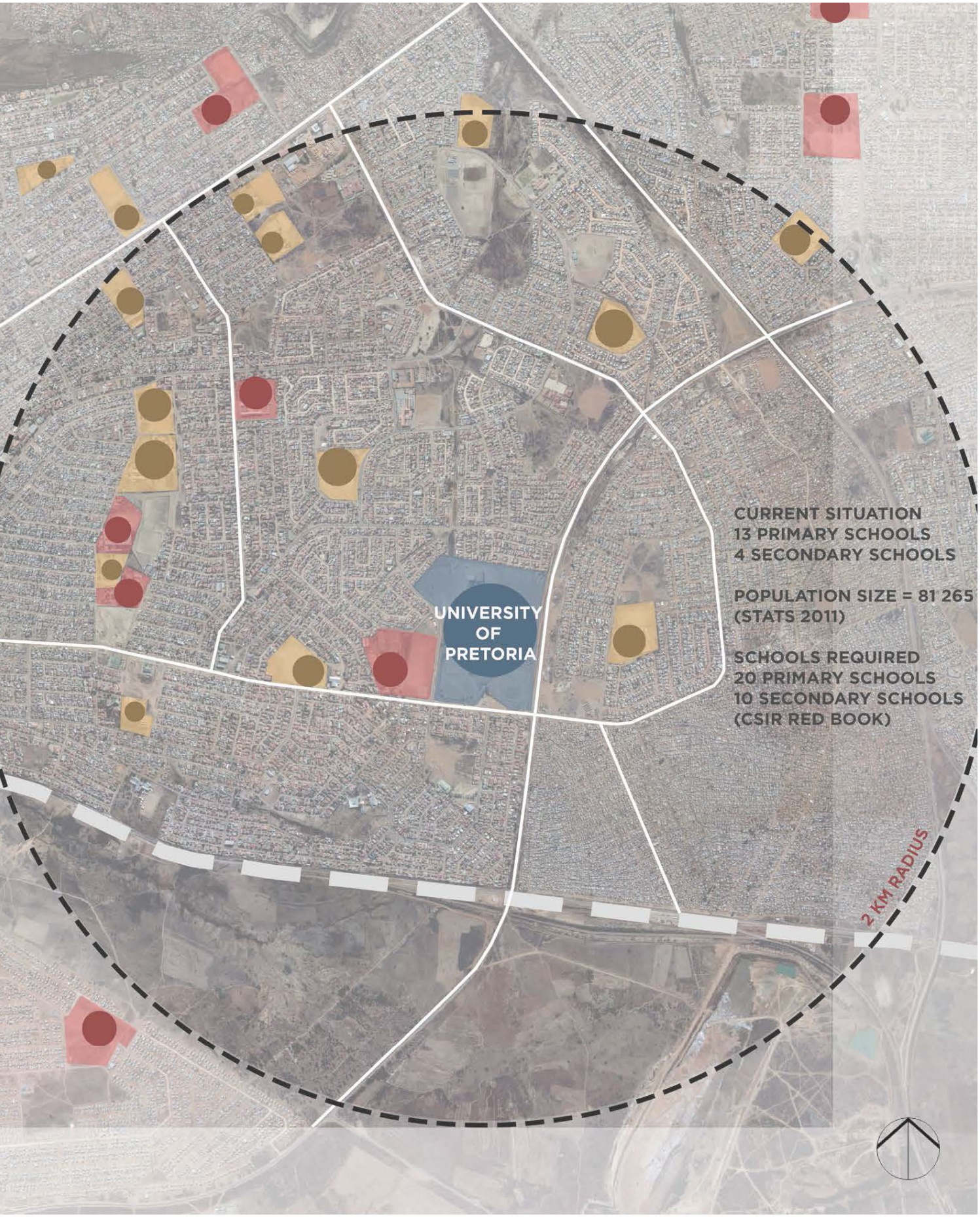


Figure - 36 *(Mprof Mamelodi Group: 2017)*



EDUCATIONAL INSTITUTIONS

SPHERE OF INFLUENCE

Figure - 37 *(Author: 2017)*

THEORY FOR PRECINCT VISION

PATTERN LANGUAGE AND PATTERNS FOR PEOPLE-FRIENDLY NEIGHBOURHOODS IN MAMELODI

Christopher Alexander and Prof. Gerald Steyn's human urbanism is adapted into appropriable precinct and site frameworks to accomplish a theory based design approach.

Alexander's Pattern language was a fundamental shift in new Western Urbanism. To solve an African problem in a segregated city based on western principals, Prof, Steyn (from the Tshwane University of Technology) proposed adapting both Western and African urban trends, to form an adaptable framework in which to approach township urbanism .

Prof Stein argues that the township of Mamelodi consists of housing patterns contributing towards unsustainable environments.

> *"Strictly zoned single-use dormitory suburbs, "security estates" and so-called townships are not only causing urban sprawl, but also spatial, social and economic fragmentation"* (Steyn, 2005).

He asserts that these urban structures are continuing the prevalence of poverty. Steyn frames seven tentative patterns at urban, neighborhood and building scale. These patterns take into account and reflect spatial, morphological and technological concerns

> *"We define patterns as configurations of the elements of the physical environment that can be applied to accommodate and support social and economic activities"* (Steyn, 2005).

1 – Medium-sized compact cities;

2 – Urban villages in superblocks;

3 – Appropriate boundaries and streets;

4 – Mixed-use main streets as interfaces;

5 – Self-sufficient, walk-able neighbourhoods;

6 – Low-rise, medium density architecture with robust courtyards;

7 – Small-scale and local/self-help and semi-skilled technologies.

The seven identified patterns are not unique.

They were observed in a majority of South African townships and along the East Coast of Africa, and they were substantiated by New Urbanism projects and Alexander's Pattern Language (Steyn, 2005).

It is hoped that the implementation of these patterns, combined with economic empowerment, could eventually contribute towards reducing poverty and environmental degradation. Such patterns could, in fact, improve sustainability across the socio-economic landscape.

Steyn's survey includes findings that shed some light on community opinion.

1 - POSITIVES

Inhabitants appreciated the cheap shelter and the ubiquitous minibus-taxis.

Most respondents considered the streets safe for children.

Many enjoyed the community spirit and associated street life.

Some commented on the low levels of crime.

2 - NEGATIVES

Nearly all, however, complained about the lack of economic opportunities, civic amenities and services.

Many complained about long walking distances.

Others commented on the lack of trees and parks.

3 - OVERLOOKED

Surprisingly, very few commented on the quality of shelter in spite of an almost uniform low level of climatic comfort.

Also, very few respondents seemed aware of the health hazards caused by the lack of clean energy or fully understood their devastating impact on the environment (informal sprawl, low building quality and pollution).

The seven patterns described above would conceivably offer a physical setting that not only enhances the positive aspects of life in the informal suburbs of Mamelodi, but also responds to the stated concerns that are directly related to the built environment, such as long walking distances to amenities and jobs.

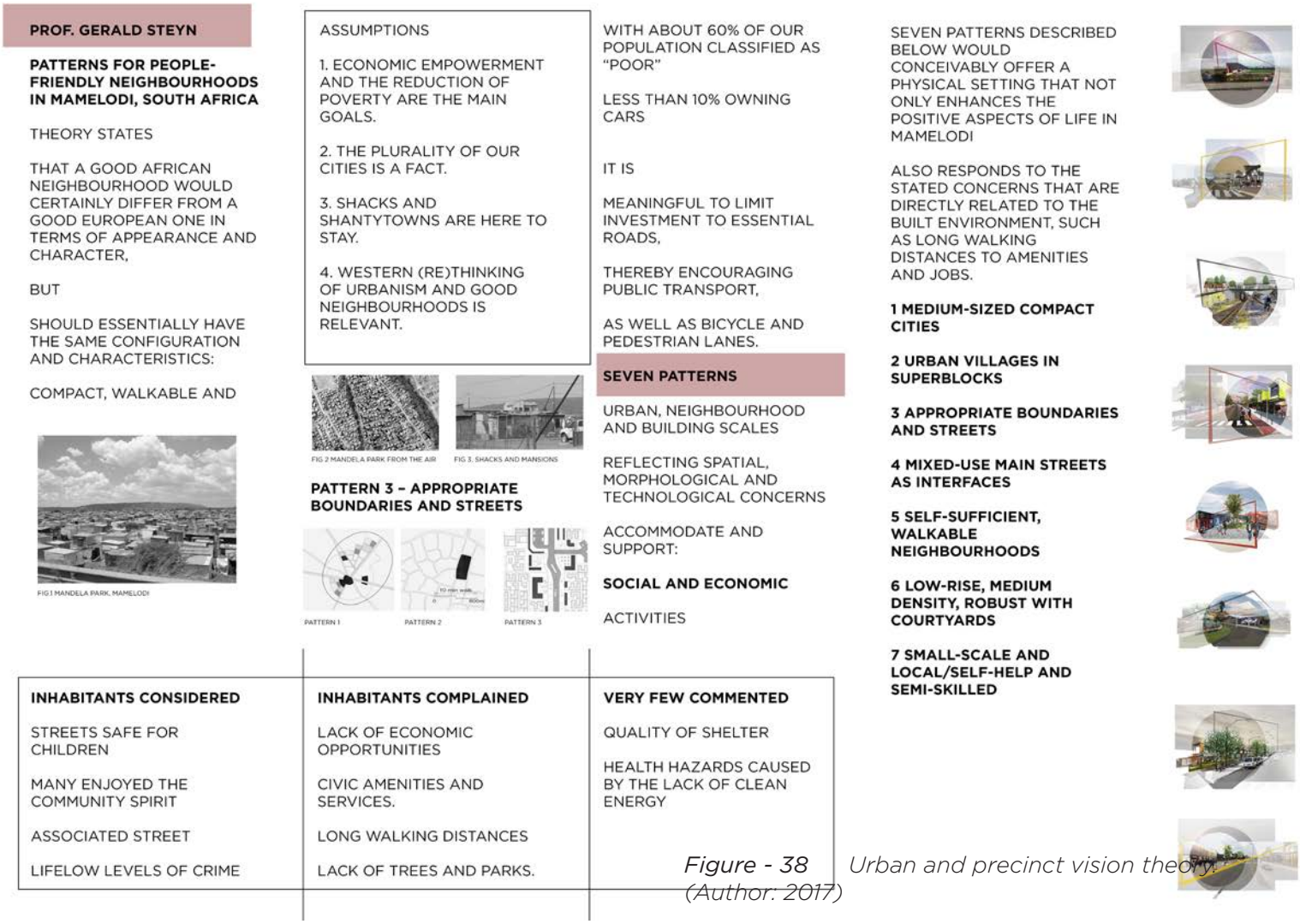
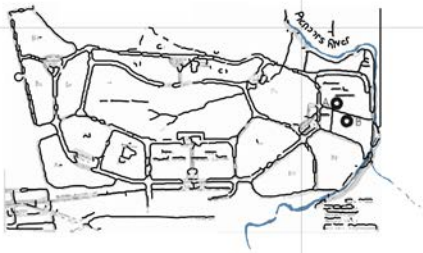


Figure - 38 *Urban and precinct vision theory.* *(Author: 2017)*

URBAN GROWTH OF VLAKFONTEIN FARM TO CURRENT DAY MAMELODI



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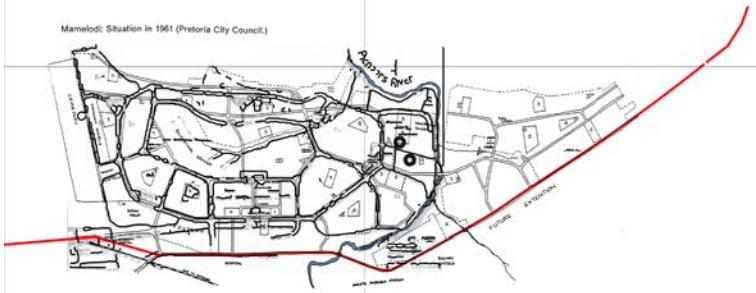

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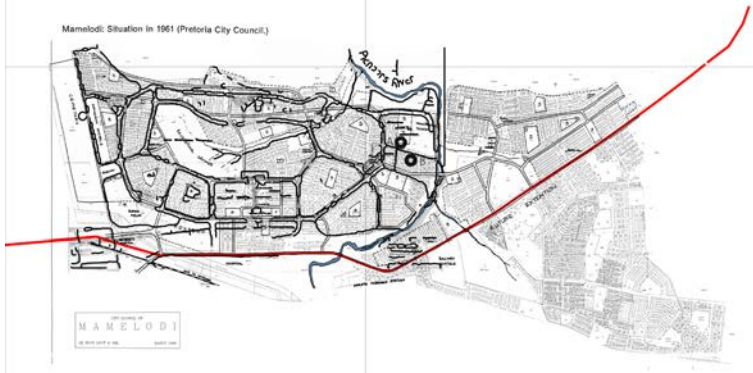

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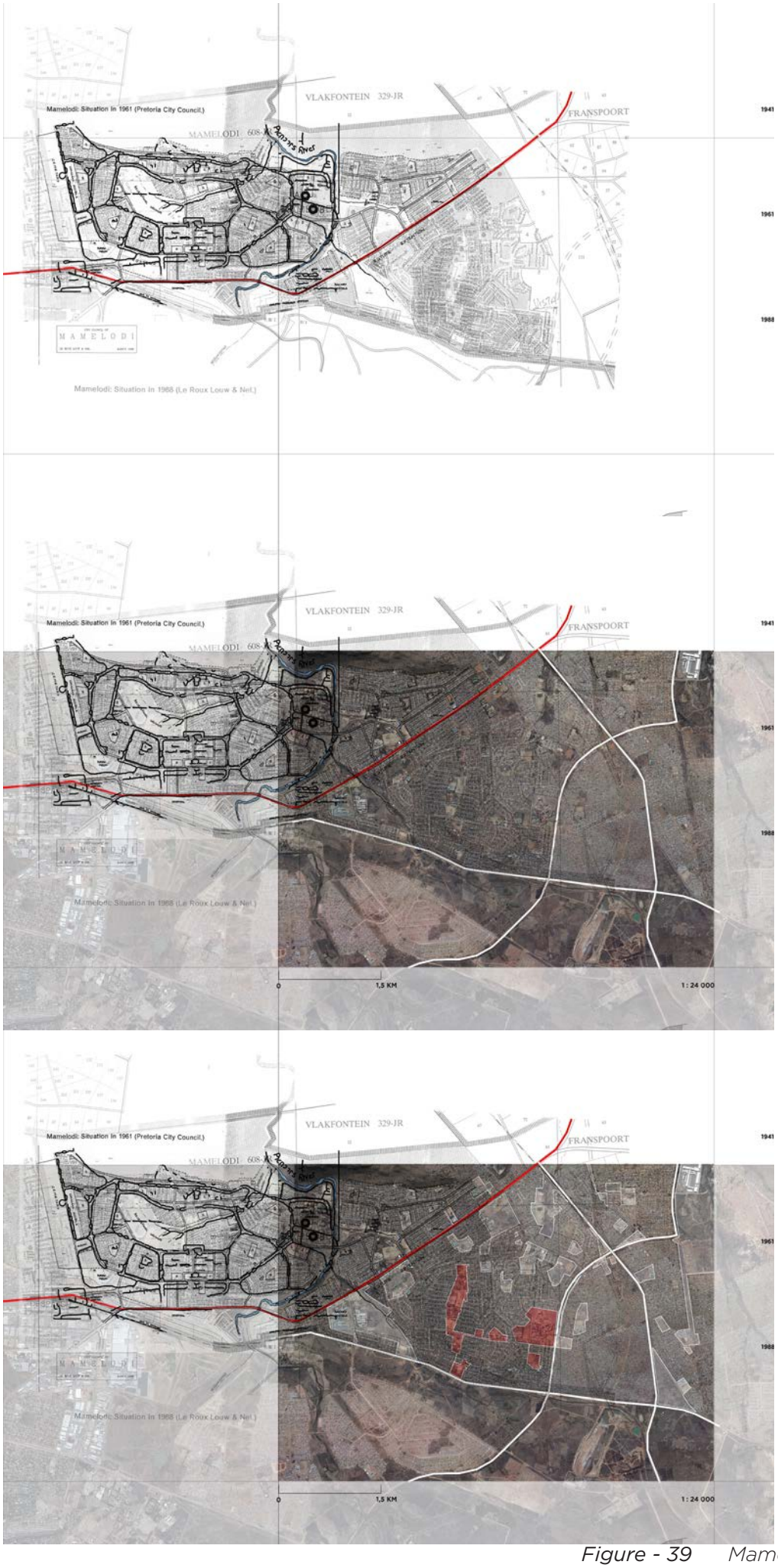


Figure - 39 *Mamelodi Development Timeline (Author: 2017)*

MAMELODI AND EDUCATION

The 2017 Mamelodi Masters and Honours research groups' investigation maintained the unfortunate fact that the spatial legacy problem does not only entail spatial complications of access and mobility. Access to infrastructure and services has persisted. The greatest of all complications in the inherited landscape is the deprived access to adequate **EDUCATION** and healthcare.

The one investment that is guaranteed to make the most profound difference in improving the prospects of a family is education...

In effect, two public school systems exist in South Africa, wealthier schools; and the poor majority (75%).

Of every 100 learners entering the school system, 50 make it to grade 12, 40 pass, and 12 qualify for university. (Stephen, 2014)

Education is the greatest ally to the freedom that is social mobility. If the service in education can be transformed from the dire state that South Africa experiences - to a culture of improvement and quality - than the country as we know it would look completely different.

> *"It is for this reason that a large proportion of township kids find themselves on a minibus taxi in the morning going to a school outside of their community in search of a better quality education. This reflects the desire of most parents to wring every Rand to ensure the best possible opportunities for their kids. It also reveals the profound inequality between the quality of education, teaching and associated infrastructure between public and private schools. It also reveals how your neighbourhood can limit or expand the opportunities you have access to and sometimes your future"* (Stephen, 2014).

QUALITY OF EDUCATION, TEACHING AND ASSOCIATED INFRASTRUCTURE is the critical legacy we as architects need to address.

The key to improving education is in strengthening the relationships and networks already established, and to form part of- and appropriate - the inherited infrastructure landscape.

PROVIDING A NEW TYPOLOGY OF KNOWLEDGE EXCHANGE INFRASTRUCTURE IN MAMELODI.

Figure - 40 *City of Tshwane Campaign in Solomon Mahlangu Freedom School Classroom (Thabang Mahlomuza: 2017)*

Figure - 41 *Solomon Mahlangu Freedom School Teacher Evaluated in the Classroom (Thabang Mahlomuza: 2017)*

SOCIO/EDUCATIONAL/ POLITICAL LANDSCAPE

Unfortunately, we cannot investigate a form of knowledge exchange infrastructure without looking at the current socio/educational/political discourse currently practised in South Africa.

> *"The #FeesMustFall movement that has swept across South Africa has evolved into a critical force for change"* (Low, 2016).

With its origins starting in South Africa's oldest university, The University of Cape Town, and the world's second oldest, Oxford, this movement rose to be the greatest political force in the new democratic South Africa. Bringing the term; the deconstruction of inherited legacy, into a completely different light.

> *"In the face of this intensity, our academic institutions have been subject to increasing contestation of the sustained comfort they inherited from colonialism"* (Low, 2016).

#FeesMustFall has since emerged as a synthetic force, not only cementing protests across all of South Africa's higher education institutions but aligning itself in support of those with similar grievances.

> *"A new form of citizenship has emerged by articulating a clear set of demands that relate not only to fees but, more significantly, to decolonial, quality education. Appealing to the nation, as representative of both contributors and beneficiaries of higher education, FMF is confronting historical exclusion of the previously marginalized as related to individual citizens, but also as to its sustained pedagogy and curriculum"* (Low, 2016).

These demands point to a new phenomenon - the collapse of public institutions into private companies. Contesting the very nature of the university as a site of knowledge exchange and production.

A radical new approach must be applied in the structuring of our institutions. A sufficient high school education can not only be obtained by 40% of the country. Skills training and professional development must be structured, not as a right, but as a system created by government and community alike.

> *"When change is not democratic and inclusive, it becomes contested"* (Low, 2016).

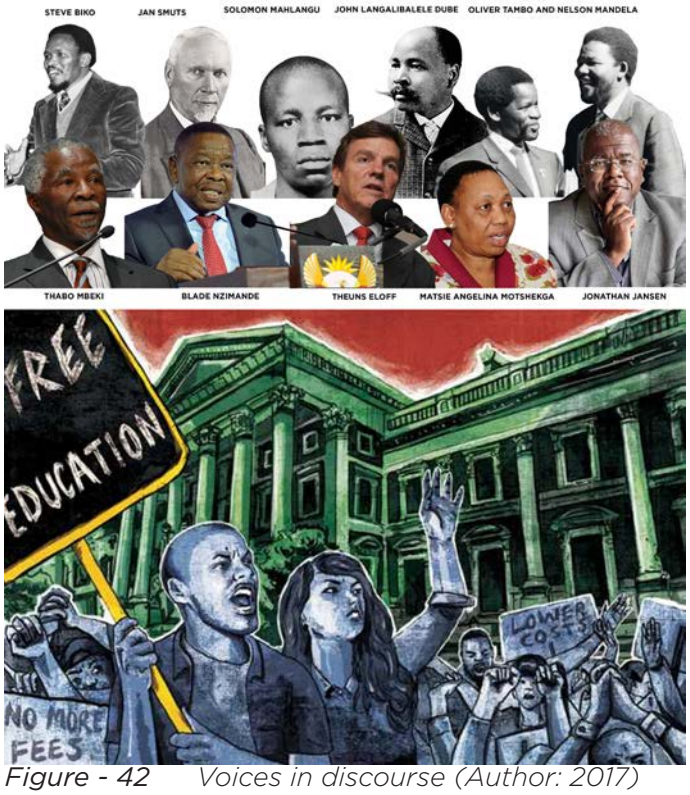


Figure - 42 *Voices in discourse (Author: 2017)*

Figure - 43 *School Clusters in different EMERGENCitIES in South Africa (Google Earth stich by Author: 2017)*

SITE

A study of **urban typology** in different EMERGENCitIES in South Africa found that in the apartheid planning of some of these settlements, **clusters** were used to place schools in close proximity, firstly, to share resources and limit government spending. Secondly, to cater to the diverse population that is housed under the black settlement category.

These school clusters are still visible today and form great educational cores in these communities.

One located in Mamelodi has been chosen as a potential **SITE** of investigation.

Figure - 44 *Mamelodi School Cluster (Google Earth stich by Author: 2017)*

Figure - 45 (Author: 2017)

CLUSTER DESCRIPTION AND VISION:

The site consists of six schools, two secondary and four primary. An additional three lie less than 200m away and five more schools 500m away, bringing the total to 14 schools of reasonable size (500-1600 learners) in a 500m radius.

Located on one of the main roads in Mamelodi, Hinterland Avenue, the cluster is in close proximity to a Shoprite Super U Save, Putco Bus depot, and the neighbourhood Phahameng clinic. Most importantly, but untapped, the potential of being a 16 min walk (1.4km) from the University of Pretoria's Mamelodi Campus, allocated for students who aspire to tertiary degrees, but without the qualifications to apply for university.

The 6 schools are:

Solomon Mahlangu Freedom School
(English)
Boikgantho Primary School
(Sepedi)
Ribane Laka High School
(Sepedi)
Sikhanyisele Primary School
(Sepedi)
Mashaba Primary School
(Sepedi)
Mamelodi Tse leshome primary school
(Sesotho)

Additional three 200m away:

N'Wa-Vangani Primary School
Lehlabile Secondary School
Uoane Primary School

Other in a 500m radius:

Koos Matli Primary School
Rethakgetse Primary School
Stanza Bopape Secondary School
Balebogeng Higher Primary School
Gatang Secondary School

Figure - 46 *Mamelodi School Cluster (Google Earth stich by Author: 2017)*

The urban spatial legacy then does have its benefits; due to the close proximity to one another and the size of these schools, addressing a single spatial issue can impact multiple schools at a time.

The potential exists for these clusters to be reimagined as prominent landscapes of improvement and opportunity. Collaborating together to strengthen skills and create uplifting environments.

Most research on education quality emphasizes the key role of teachers and school leadership play in bringing about educational change in a community.

Change takes place in the classroom, behind many doors and further depends on the motivation and qualification of teachers.

Little opportunity for teachers professional development leads to a cycle of non-development. Put together, these conditions constrain the delivery of quality education in such marginalized areas.

Bringing teachers together, and providing the infrastructure to accelerate professional development while improving education quality in Mamelodi, creates the opportunity for an architectural intervention to have a great and lasting impact.

Figure - 47 *Mamelodi School Cluster Analysis (Google Earth stich by Author: 2017)*

Figure - 48 *(Author: 2017)*

Figure - 49 *(Author: 2017)*

Figure - 50 *(Author: 2017)*

Figure - 51 *(Author: 2017)*

Figure - 52 *(Author: 2017)*

Figure - 53 *(Author: 2017)*

Figure - 54 *(Author: 2017)*

Figure - 55 *(Author: 2017)*

Figure - 56 *(Author: 2017)*

Figure - 57 *(Author: 2017)*

Figure - 58 *(Author: 2017)*

Figure - 59 *(Author: 2017)*

PROGRAM
SCHOOL CLUSTER

PREFACE

The premis stated in the cluster vision introduces the **PROGRAM** of a **SCHOOL CLUSTER NETWORK**

Combining multiple schools for education and administrative purposes, it acts by sharing resources to improve the level of education delivered.

Established as early as 1940 in Great Brittan and India, they were set out to pool rural schools together to share resources for education (Giordano, 2008).

Practiced currently in Cambodia, Bangladesh, Bolivia, Zimbabwe, Namibia and Kenya, the network is not unfamiliar with third world context. It is also implemented in the urban context, as in Mombasa, Kenya and Los Angeles.

In South Africa, school cluster networks are a relative new concept, primarily in a trial phase, in spite of the rich history in the 1980's and 1990's amongst a number of non-governmental organizations (Ndlalane & Jita, 2009).

One example of such a network has been tested in Mpumalanga, South Africa.

MPUMALANGA SECONDARY SCIENCE INITIATIVE

The research and development project; Mpumalanga Secondary Science Initiative (MSSI) was launched, and developed science teachers though cluster networks between 2000 and 2006 proving particularly effective.

120 Cluster leaders from three regions of Mpumalanga had attended the MSSI professional development workshops. MSSI used the concept of teacher clusters (or networks) to pursue its professional development activities (Ndlalane & Jita, 2009).

The initiative demonstrated the efficiency of a school cluster network in underperforming schools. The main findings included the critical role of overcoming the barriers to sharing.

Only then can the process of challenging and changing teachers' **Content Knowledge and Pedagogical Content Knowledge** start. Also, reshaping teachers' classroom practices appear encouraging and effective in the process (Ndlalane & Jita, 2009).

An investigation of the Mamelodi schools cluster and its roleplayers found that no relationship exists between the local schools. Speculation started on the potential added spatial value architecture can contribute in fostering such a network.

The community soccer field contains a club where high school learners participate irrelevant of the school they attend. This then becomes the first great landscape of collaboration between various schools and between school and community.

A short study on the educational accomplishments and current situation of each school proves that they can complement each other.

SOLOMON MAHLANGU FREEDOM SCHOOL has a number of good teachers teaching subjects where pupils obtain more distinctions than neighbouring schools (English and Life Sciences in this case).

RIBANE LAKA HIGH SCHOOL, however, enjoys a good governing body and school leadership. By managing its teachers and student commitment well, it has had a high matric pass rate for the last 5 years. It is also by far the school with the neatest sport grounds and its facilities are in good condition, proving a sense of ownership imposed by the entire school body.

Architecture and a fair amount of precinct design can then facilitate a collaborative landscape of improvement in the neighbourhood. By providing teachers with a place to exchange skills and resources, a roof dedicated to the improvement of the quality of education would be mandatory if we would like to see just that, improvement.

Speculating on the spatial requirements of such a program to be housed in architecture, a clear understanding of the manner in which teachers exchange knowledge is required.

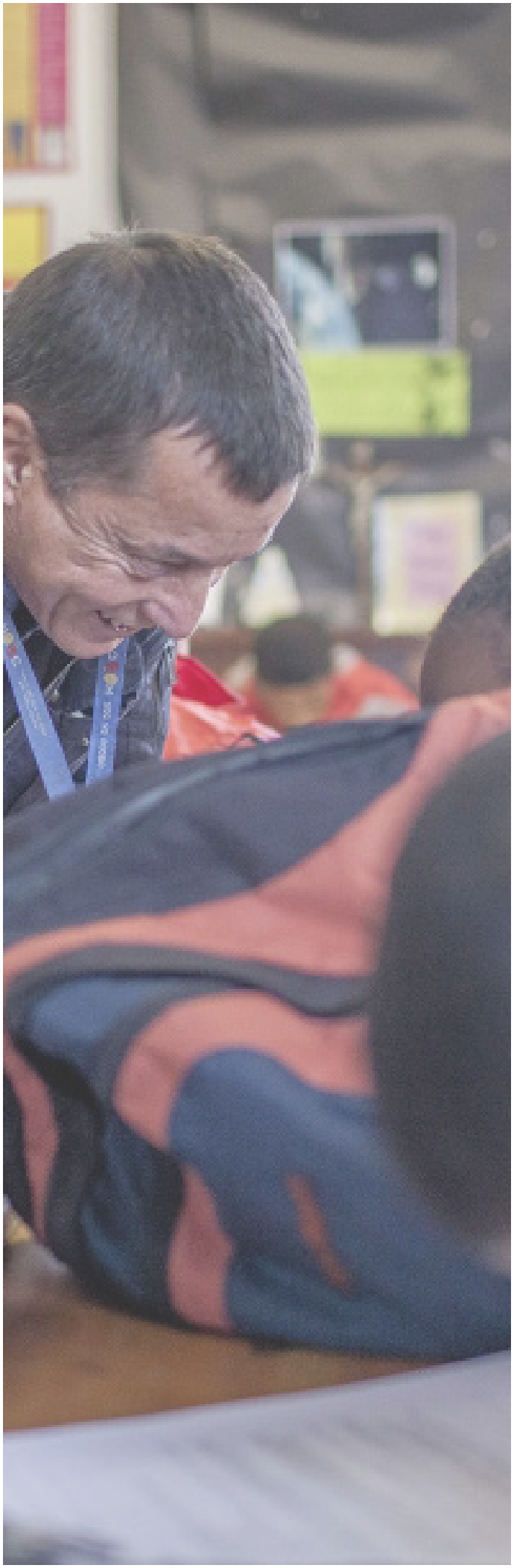


Figure - 60 *Alfonso Louw, the principal of St Agnes Primary in Woodstock (**Stephen, 2014**)*

SPATIAL CONSTRAINTS

> *"Observing teachers has been a contentious practice in South Africa ever since the days of rigid inspections during the apartheid era. Luckily, networks in other contexts have managed to generate a process through which teachers communicate, address issues, observe one another and bring in experts from other fields"* (Ndlalane & Jita, 2009).

A short dialog below explains the process of overcoming the barrier of communicating content knowledge - Here, teachers share their knowledge of photosynthesis (Recorded during the MSSI between 2000 and 2006) (Ndlalane & Jita, 2009).

Sara: "Photosynthesis is the manufacturing of food in plants."

Thoko: "It is not the manufacturing of food in plants but in the leaves of the plant, to be specific."

Sihle: "It is in the green parts of the leaves that have chlorophyll."

Nomsa: "Should we then say photosynthesis is the process of making food or is food?"

Mpho: "It is the process of making food in plants and this process takes place in the leaves of the plant in the presence of sunlight."

The institutional space where these teachers communicate can not only support sharing and open arrangements of knowledge exchange, but addressing the variety of needs brought together by teachers with different depths of content knowledge.

In the local context, this is a development for two reasons:

FIRST, clusters are crucial for a country in which the majority of teachers continue to struggle with either the content of the curriculum or the teaching thereof (Ndlalane & Jita, 2009).

SECOND, for a country with a national curriculum and centralised planning, it is significant to find a fairly decentralised instructional guidance system to implement. Centralising it however, on the neighbourhood level, to provide a designated space for the program where teachers can assemble.

Classrooms are essential, but the critical difference comes in facilitating different methods and scales of knowledge exchange.

The African School for Excellence (a township-based private school) incorporates this in their teaching manifesto. The school's education model incorporates designating spaces for self study, partner-learning and instructional learning (ASE, 2016).

Local Studio, the architects of their Tsakane School, achieved this through a light weight, structural steel warehouse design comprising of various learning spaces.

> *"The flexible design of the building allows for modularity and the addition of complimentary elements, such as sound and thermal insulation, which have been added as budget becomes available"* (Local Studio, 2016).

Providing flexible, multi-use school cluster network infrastructure in Hinterland has other process orientated benefits when combined with responsive architecture.

It provides a platform from where teachers can collaborate between schools in other parts of the township, experiencing similar challenges and problems. From their cluster, teachers can play a central role in not only their own professional development, but provide development to other teachers in the area once

improvement becomes reality.

It must also provide opportunities for more engagement between teachers, pupils and community, providing service and shelter for all. Extending the user base to adult learning and especially illiterate parents of pupils, as this is one of the main reasons an education is so challenging in the inherited environment.

The architecture then sets out in creating a culture of improvement through the appropriation of an inherited spatial legacy, grounded in already existing networks.

A complementary programmatic requirement of such a space must involve not just support and the grouping of networks initially, but also a source of resources provision.

> *"A resource centre may be housed within a cluster school to provide cluster teachers with professional and pedagogical support"* (Giordano, 2008).

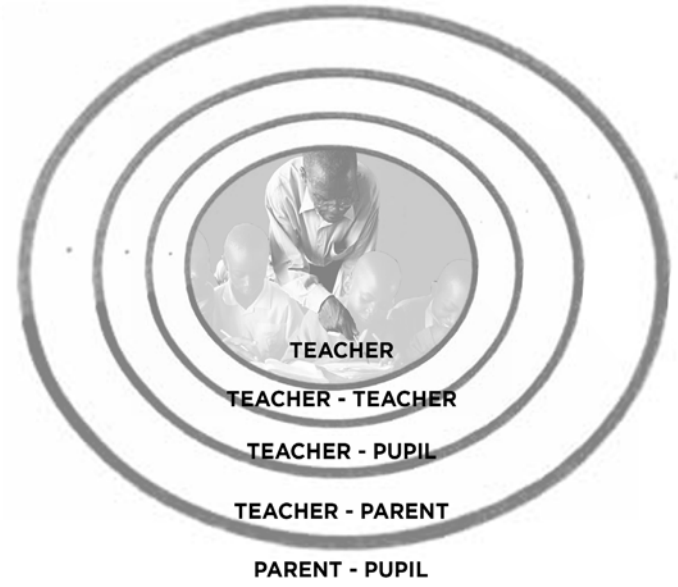


Figure - 61 *Teacher Network (Author: 2017)*
Figure - 62 *Civic facilities can no longer cater to only the pupils and teachers if it is to embody a social democratic way of design.(**Stephen, 2014**)*

TEACHER RESOURCE CENTRE

A school cluster network located in an appropriated context creates the ideal location and source of focus for a Teacher Resource Centre (herinafter reffered to as "TRC").

> *"TRC's were created to help rural teachers combat isolation by allowing them to come together to exchange ideas and experience with other teachers and to work on their own professional development"* (Giordano, 2008).

Also developed in the United Kingdom, TRC's where located in locations were it had the largest number of schools to influence. Teachers could meet and discuss with one another, develop material to use in classrooms, work on curricula and, most importantly, develop their own personal knowledge and skills.

> *"Following the World Declaration on Education for All formulated at the Jomtien Conference in 1990, TRC strategy has since grown to be a common feature of educational reforms and improvement programmes through the developing world, particularly in Asia and Africa"* (Giordano, 2008).

This manifesto saw teachers as the primary agents for educational change, and the access to resources as a major factor in educational quality. In order to provide universal basic education, countries such as Malawi and Uganda needed to train massive numbers of teachers as quickly as possible. Aid programmes have utilized resource centres to ensure the rapid delivery of in-service training or to train unqualified teachers.

This portrays that a program of a teacher resource centre situated in a school cluster, is sensible:

TRC's, incorporated in school clusters, were set up in various countries up to the late 1970's and was promoted throughout the developing world as a way to develop teachers as professionals and improve classroom teaching and learning.

> *"From the late 1970's, a major wave of educational reform in Asia and Latin America bought teacher resource centres and school clustering to the forefront as innovative strategies to improve teaching and learning conditions in neglected rural schools and in post conflict areas"* (Giordano, 2008).

Figure - 63 *(Google: 2017)*

Figure - 64 *(Google: 2017)*

Figure - 65 *(Google: 2017)*

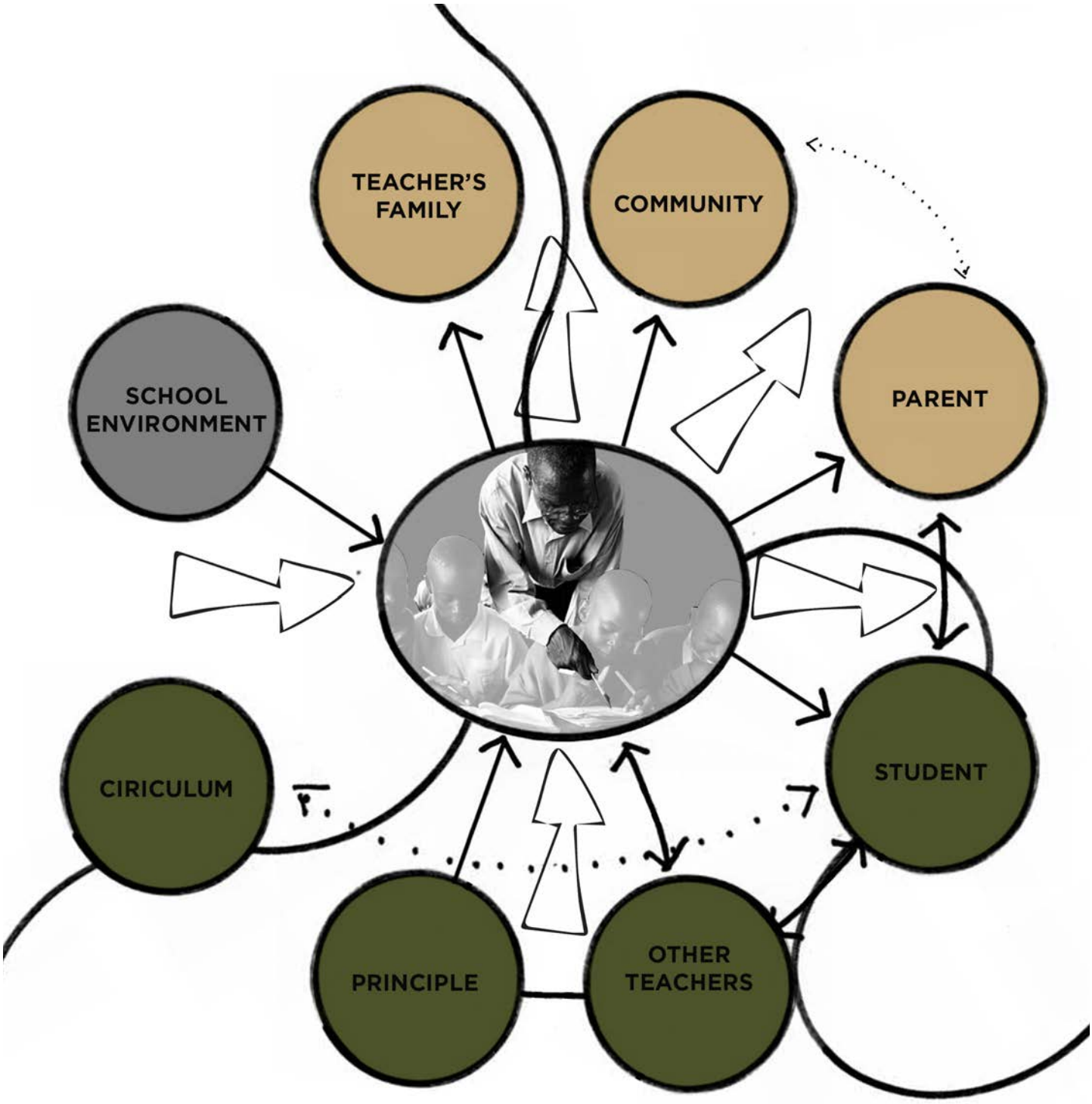


Figure - 66 *Teacher Network (Author: 2017)*

DESIGNING FOR THE RESOURCE CENTRE MODEL

A number of donor programmes have been using teacher resource centres as a base unit for in-service and teacher support. TRC's are meant to increase inputs for teachers and the resources available to them while providing support services closer to a school level. They have been used to improve the management of schools.

Nepal's resource centre programme uses teacher resource centres as a final delivery point of educational services and providing equipment to schools.

New York's teacher centres are an initiative of the teacher unions, whose purpose is to provide teachers with a structure for their own professional development (or CPD); the centres also act as a forum for action for the teachers unions. Their stated objectives are to assist teachers in their work with students, provide a site for training educators in information technology, promote educational research for developing materials and curricula, and provide an atmosphere for exchange among teachers. (Giordano, 2008).

Other terminologies for this intervention in counties of note include:

1 Teacher activity centres in Mombasa, Kenya.
2 In Colombia and Chile, these centres are called Microcentros Rurales.
3 In Ecuador, it is known as Micro Grupos.
4 Some states in the USA use the term LAAMP 'schools families'.
5 The UK has Education Action Zones
6 In Venezuela and Argentina, it is simply known as Redes.

Resource centres generally serve one or more school clusters. All the cases studied here make use of physical resource centre facilities, some purpose built and others incorporated into existing school buildings.

Teacher centres are generally housed in schools or school board buildings. There is no single format for a teacher centres, but it generally contains:

A lending library and an IT lab. Activities are provided by the teacher centres, including training and support, mentoring, peer coaching, credit courses, IT training, mini grants, action research and opportunities for peer exchange and professional reflection.

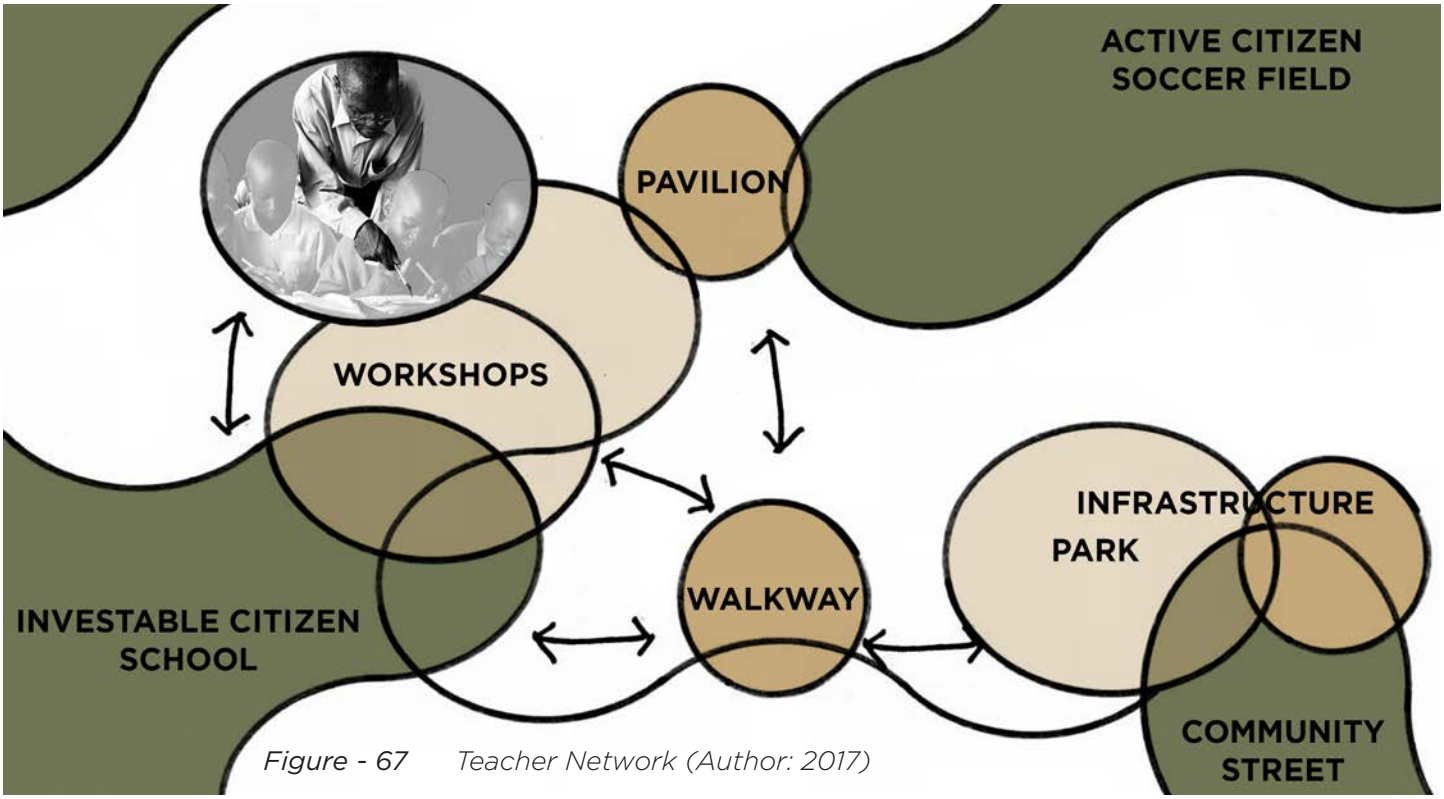


Figure - 67 *Teacher Network (Author: 2017)*

In the context of Mamelodi, it is the existing landscape and networks that would provide an understanding of the relationship between program and built form. This informs drivers and influences the appropriate site, typology and orientation.

INHERITED SITE AND EXTRAMURAL

Investigating the context and facilities in the Mamelodi school cluster, the inherited spatial legacy can be traced into the physical construction of the:
SCHOOL ARCHITECTURE LANDSCAPE.

An example hereof would be that school halls were excluded from black public schools before the 1990's to disallow great student gatherings. Small halls were since constructed in the two high schools in the cluster, but could only cater to a small portion of the school body. This excludes critical events such as:

1 Assembly by the entire student body and faculty;

2 Hosting of a school dance, fundraising dinner or science expo;

3 Performances by a school choir, revue or drama department;

4 Graduation ceremonies.

Therefore, the courtyard has since become critical to student and faculty organisation. This informed the conceptual continuation of the animated courtyard space in the precinct vision. It will extend beyond the school to catalyse the orientation and layout of the building.

Space inside the school walls is also limited, and the construction of classroom facilities and parking for teachers take preference over open fields, playgrounds or sport facilities.

This has led to the schools catering very little to extramural activities.

Research suggests these activities are critical to the fostering of relationships between teacher, parent, pupil and community. The timely "twice a day" school break, also see thousands of children inhabit a space no larger than half a soccer field.

A lack in sufficient recreational area results in the following:

No tennis team, cricket team, swimming, athletic team or newspaper redaction. This does however not excuse events which can be facilitated in already existing classrooms... including chess teams, debate or drama.

Fortunately for this site, all asbestos classroom facilities have been replaced with brick and mortar, the last one removed as late as 2012.

On 20 June 2017 it was reported that Gauteng still has 29 schools constructed completely oyt of asbestos and 214 schools partially(Business Insider, 2017).

These facts embody the critical backlog and construction still required in South African schools.

Figure - 68 *(Google: 2017)*

Figure - 69 *(Google: 2017)*

COMBINING THREE PROGRAMS SPATIALLY

In order for a school cluster and TRC to flourish and prove successful, it must form strong bonds with the surrounding community.

School clusters are critical points of departure in order to foster an alternative in teachers CPD. Teacher resource centres can provide the infrastructure necessary to create a space for the collective improvement in the way in which teachers communicate, and improve the content of what is taught.

It is the marriage of these two programmatic frameworks that form the start of a relationship capable of altering educational quality futures.

Therefore, to truly impact the landscape of schooling in Mamelodi, the dissertation marries the program of a school cluster network, a teacher resource centre and facilities that can expand the extra-mural activities of the school.

In order to ground the architecture, the spaces will respond to existing community networks. The surrounding sport facilities will be incorporated into the continuation of the landscape. The school program of learning space vs. social interaction space will be appropriated to include various hierarchies of the private and public participation.

Not only will this infrastructure foster school programs, but will also help the surrounding community. With spaces to incorporate adult learning and especially multipurpose facilities were young people that have experienced the impact of poverty and bad service delivery have the chance to improve their education or write matric again.

CASE STUDY OF TRC'S UNDERTAKEN IN SCHOOL CLUSTER NETWORKS

A precedent study of various projects initiated by United States AID program in the last decade, provides insight into the workings of school clusters fostering teacher resource centres, along with their target stakeholders engagement and various implementation strategies.

They work with a number of partners to initiate these cluster based training programs. Found throughout the world, in countries like Namibia, Cambodia, Malawi, Guinea, Mali, Haiti, Indonesia and Pakistan, every cluster is unique in providing the needed services every context requires.

The concept is however appropriable to various conditions; the constant becomes the social agency and dedicated interaction in facilitating professional development.

In Guinea, the clusters were formed in 1999 and now reach 25, 000 teachers in 1432 clusters or so-called 'grappes'. Teacher development is based on teacher groups, assembling teacher's bi-monthly to explore new teaching practices, using round table discussions and peer observations

In Pakistan, key teacher resources are distributed through school clusters to encourage the creation of a teacher learning community. Cluster schools organize teacher education and facilitate resource mobilization for early childhood education.

In Malawi, Quality Education through Supporting Teachers (or QUEST), set up schools cluster networks and a teacher mentoring programme to improve teacher support. The mentors, called primary education advisers, provide on-site support and training through the cluster.

This programme trained cluster "mentor teachers" so they could carry out cluster based development sessions for other teachers.

In Mali, a multi-functional school cluster programme has been set up in several provinces to improve delivery of education services at the grass roots level.

Groups of teachers from two to four nearby schools come together to exchange their best practices, for peer coaching and mentoring, and provide help in understanding the new bilingual curriculum.

Supporting and training takes place through the corresponding *Centres d'animation pedagogique*, or CAP (more of a district education office). There are also plans to develop ten pilot community learning and information centres, to make available an ICT library and radio access to assist teachers with curriculum and pedagogy.

Other components include the use of an education management information system at the regional level, encouraging increased community participation in education, and the development of radio education programmes targeted towards "teaching learning".

The examples mentioned abobe illustrate the wide variety of teacher development activities addressed by clustering and providing a base for development (Anzar, Harping, Cohen, & Leu, 2004).

In Mamelodi, the greatest problem which presents itself is the lack of quality teachers to pupil ratio. Mothers are employed in the primary schools to help with the management of the children, which can be critiqued to become the first step toward poor service delivery.

This predicament is out of the need to attend to, and provide surveillance over the schoolchildren.

Figure - 70 *(Google: 2017)*

Figure - 71 *(Google: 2017)*

Figure - 72 *(Google: 2017)*

Figure - 73 *(Google: 2017)*

Figure - 74 *(Google: 2017)*

"There are 37-odd children scattered about a Grade 1 classroom in St Agnes Primary. They are being exposed to a mock-test situation, and it is organised chaos. The children's names are a medley of Xhosa, English, Afrikaans and Muslim.

"One boy, focused on everything other than his paper and the board, interrupts his teacher over 20 times in 10 minutes (he's a foster child, diagnosed ADHD and "difficult" to handle). Others are concentrating, some randomly getting up and down, or having a chat. One boy is listening to instructions, but obviously unable to decipher the English; his paper is a mass of erasures, drawings and gaps. The teacher, a remarkable woman, doesn't miss a beat. Moving between children, she answers questions and defuses arguments. It looks exhausting."

"You have to take your hat off to the foundation phase teachers," Alfonso tells me back in the safety of his office. "They've got their work cut out for them. But if you get it right in the foundation phase, the rest of the building blocks fall into place."

This is the phase where South Africa's education system is falling down. For various reasons, children in state schools—particularly those in lower income areas—are simply not performing" (Stephen, 2014).

If teachers and mothers can constantly improve on their teaching ability, primary phase pupils will have the necessary capacity to adequately perform in the next phase of schooling.

If secondary teachers and school leadership can improve on their content knowledge, teaching skills and management of the pupils post school strategies, Mamelodi youth will see the benefit in a quality education and more adequately finding their foot in the South African economy.

ALFONSO LOUW SOMETIMES TELLS A WRY JOKE WHEN INTRODUCING HIMSELF. "HELLO, I'M A PRIMARY SCHOOL PRINCIPAL," HE SAYS. "WHAT KIND OF SUPERHERO ARE YOU?"

Figure - 75 *Alfonso Louw is the principal of St Agnes Primary in Woodstock. It is a good school with a diverse student body, hands-on leader and innovative learner-focussed projects. But St Agnes is also a poor school in a working-class neighbourhood, meaning the odds are massively stacked against its learners succeeding. (**Stephen, 2014**)*

INOVATION STAKEHOLDER SUMMARY

Current initiatives:

In 2016, South Africa's first virtual school - offering a CAPS and Cambridge curriculum from Grade R to Grade 12 - was launched. THINK Digital College (Leita, 2016).

The virtual schooling system makes it possible for students to work from home or from a Think Tutor Centre at the click of a button. Registrations for the 2017 academic programme are currently open with fees varying from R3,500 per year for Grade R to R9,500 for Grade 12. Students who get accepted into the school will join an online community and communicate virtually with classmates.

All the student requires is a smart phone or tablet and internet connection to complete their schooling from anywhere in the world.

> *"Our aim is to produce young adults who are innovative, creative and independent in their thinking, who have courage, perseverance and resilience, and who believe in themselves and their potential(Leita, 2016)."*

- THINK Digital College CEO Janessa Leita

Students will be able to complete their school curriculum with guidance from online teachers by using an interactive process where a combination of animation and video will be used as teaching tools.

This is a remarkable innovation in providing a new pedagogical solution to South Africa and manifests the opportunities that are available but yet to reach their full potential.

Unfortunately, affordable web connections are yet to become a reality. Luckily, there are solutions in progress.

The CSIR's Wireless Africa group is researching ways and means to develop sustainable information and communication technology in developing countries. They want to achieve this through community-owned decentralized mesh networks built on open source technology.

The Mamelodi Broadband E-Learning Pilot Project of 2013 had aimed to explore educational opportunities between five schools in the Pretoria, using a Motorola Canopy Radio Network. The initial phase of the project had been made possible by a small grant from the Department of Communications (Beyers, 2013).

The main problem that was addressed was the issue of affordable broadband connectivity in the area, as most community members in Mamelodi cannot afford the extremely high cost of internet access.

The key driver for this network was the expansion of an already established information and education network to more people such as teachers and learners. They also wanted to use the Mamelodi mesh to connect CSIR staff living in Mamelodi to the CSIR.

> *"It's was a huge success. The kids are hungry for it and because it's totally interactive and the learners are actively involved, it highlights the difference between theoretical or book learning and real time visual, practical learning* (Beyers, 2013)*."*

- Founder of Wireless Africa, Ron Beyers

Figure - 76 *Architectural detailing of these systems must provide future proofing in developing interior and exterior spaces, able to accommodate methods of education and study. (**Wireless Africa, 2014**)*

Given the success of the pilot project, Beyers is now seeking further sponsorship and partners to expand the concept and bring real time interactive ICT learning to more schools. These systems provide critical infrastructure and methodologies to facilitate digital education. Integrating these prospective technologies into the first Mamelodi school cluster and TRC is critical.

THREE HIGHSCHOOLS IN MAMELODI WERE INVESTIGATED

Investigation of the site and its role-players found that no relationship between schools existed. Speculation started on the potential added spatial value architecture can contribute in fostering such a network.

The community soccer field contains a club were high school learners participate irrelevant of the school they attend. This then becomes the first great landscape of collaboration between various schools and between school and community.

Educational accomplishments and the current infrastructure condition of each school proves they can complement each other.

Solomon Mahlangu Freedom School has a number of good teachers giving subjects where pupils obtain more distinctions than neighbouring schools. English and Life Sciences in this case.

Ribane Laka High School, however, enjoys a good governing body and school leadership. Managing its teachers and student commitment well, it has had a very high matric pass rate for the last 5 years. It is also by far the school with the neatest sport grounds and facilities in good condition, proving a sense of ownership under the entire school body.

Architecture and a fair amount of precinct design can then facilitate a collaborative landscape of improvement in the neighbourhood. By providing teacher with a place to exchange skills and resources, a roof dedicated to the improvement of education quality is mandatory if we would like to see just that, improvement.

Figure - 77 *The Three schools (**Author, 2017**)*

THREE HIGHSCHOOLS IN MAMELODI WERE INVESTIGATED

1 LEHLABILE SECONDARY SCHOOL
EDUCATORS: 44
PUPILS: 1275
EDUCATOR TO PUPIL RATIO: 1:28
2016 MATRIC RESULTS
110 STUDENTS

PASS TYPES		
CERTIFICATE	30%	
DIPLOMA		42.7%
BACHELORS		27.3%
DISTINCTIONS		
LIFE SCIENCES		1
LIFE ORIENTATIO		4
MATHEMATICS	2	
GEOLOGY		1
PHYSICAL SCIENCES	1	
SEPEDI		13
ENGLISH FAL	1	
TOTAL DISTINCTIONS	23	
PUPILS WITH 1+ DISTINCTIONS	15	

2 SOLOMON MAHLANGO FREEDOM SCHOOL
EDUCATORS: 44
PUPILS: 1409
EDUCATOR TO PUPIL RATIO: 1:32
2016 MATRIC RESULTS
128 STUDENTS

PASS TYPES		
CERTIFICATE	34.4%	
DIPLOMA		35.2%
BACHELORS		30.5%
DISTINCTIONS		
LIFE SCIENCES		6
LIFE ORIENTATIO		22
MATHEMATICS	4	
MATHEMATiCAL LITERACY	2	
GEOLOGY		1
PHYSICAL SCIENCES	2	
SEPEDI		3
BUSINESS STUDIES	1	
TOTAL DISTINCTIONS	41	
PUPILS WITH 1+ DISTINCTIONS	27	

3 RIBANE LAKA HIGH SCHOOL
EDUCATORS: 47
PUPILS: 1600
EDUCATOR TO PUPIL RATIO: 1:34
2016 MATRIC RESULTS
175 STUDENTS

PASS TYPES		
CERTIFICATE	7.4%	
DIPLOMA		54.9%
BACHELORS		37.7%
DISTINCTIONS		
LIFE SCIENCES		2
LIFE ORIENTATIO		5
MATHEMATICS	2	
MATHEMATiCAL LITERACY	1	
GEOLOGY		0
PHYSICAL SCIENCES	2	
SEPEDI		12
BUSINESS STUDIES	2	
TOURISM		3
ACCOUNTING	3	
TOTAL DISTINCTIONS	35	
PUPILS WITH 1+ DISTINCTIONS	20	

(skools.co.za, 2016)

Figure - 78 *Ribane Laka High School Matric Achievements Board (Author, 2017)*

Figure - 79 *The late principal of Ribane Laka High School, Thabo Molifi - He was famouse around the community for his influential role in establishing a tradition of quality education and a tradition of improvement (Mamelodi Gazette, 2017)*

Figure - 80 *School children in the make shift school hall at Ribane Laka High School (**Thabang Mahlomuza**: 2017)*

PROGRAM OF THE INFRASTRUCTURE

MAIN PROGRAM:

SCHOOL CLUSTER NETWORK
TEACHER RESOURCE CENTRE
EXTRA MURIAL SPACES

In this civic infrastructure landscape, there are elements that already exist and are successful...

CONTINUATION

There are also elements that are in need of critical upgrade...

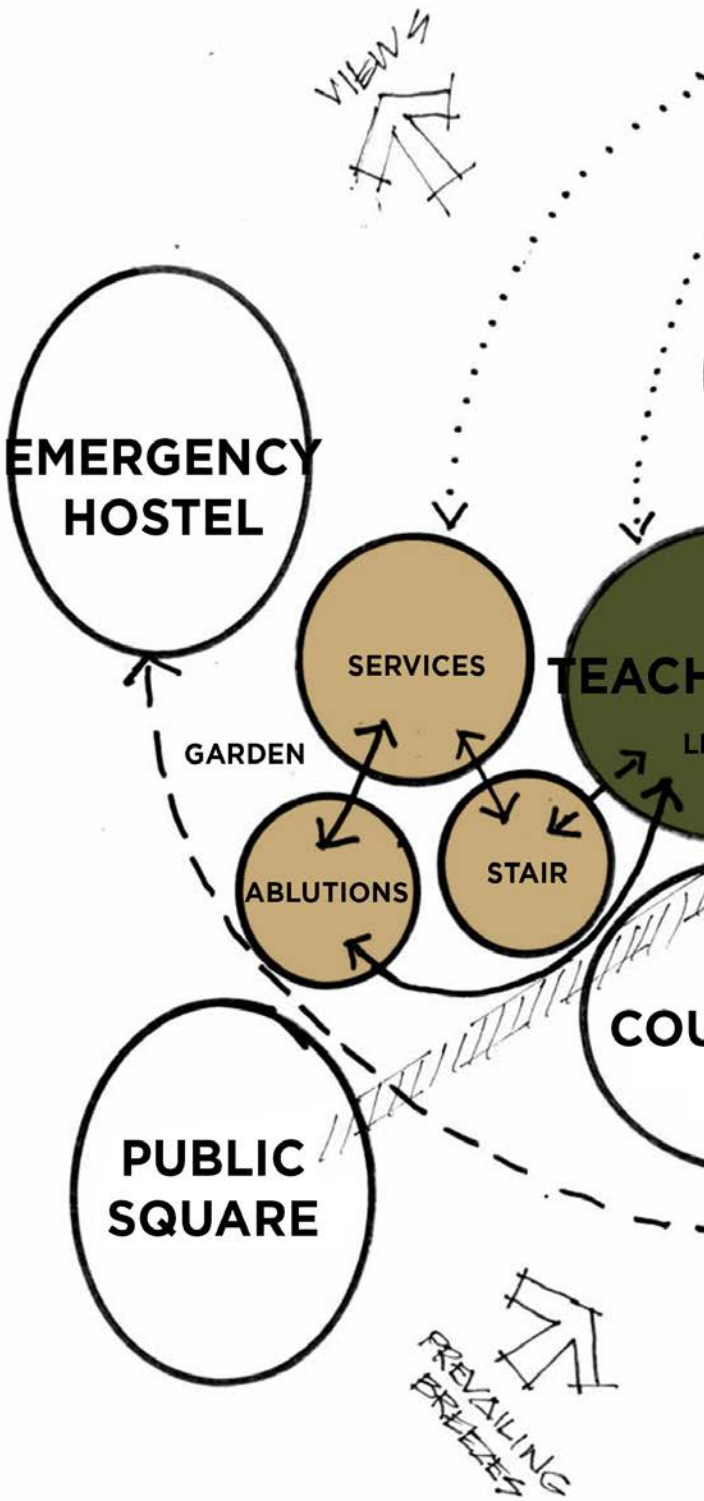
COMPLETION

There are however elements that are non-existent and must be implemented from scratch...

ADDITION AND INFILL

-

Collaborating hand in hand to successfully implement the proposed project, these three concepts will introduce, inform and complete the necessary design proses needed.



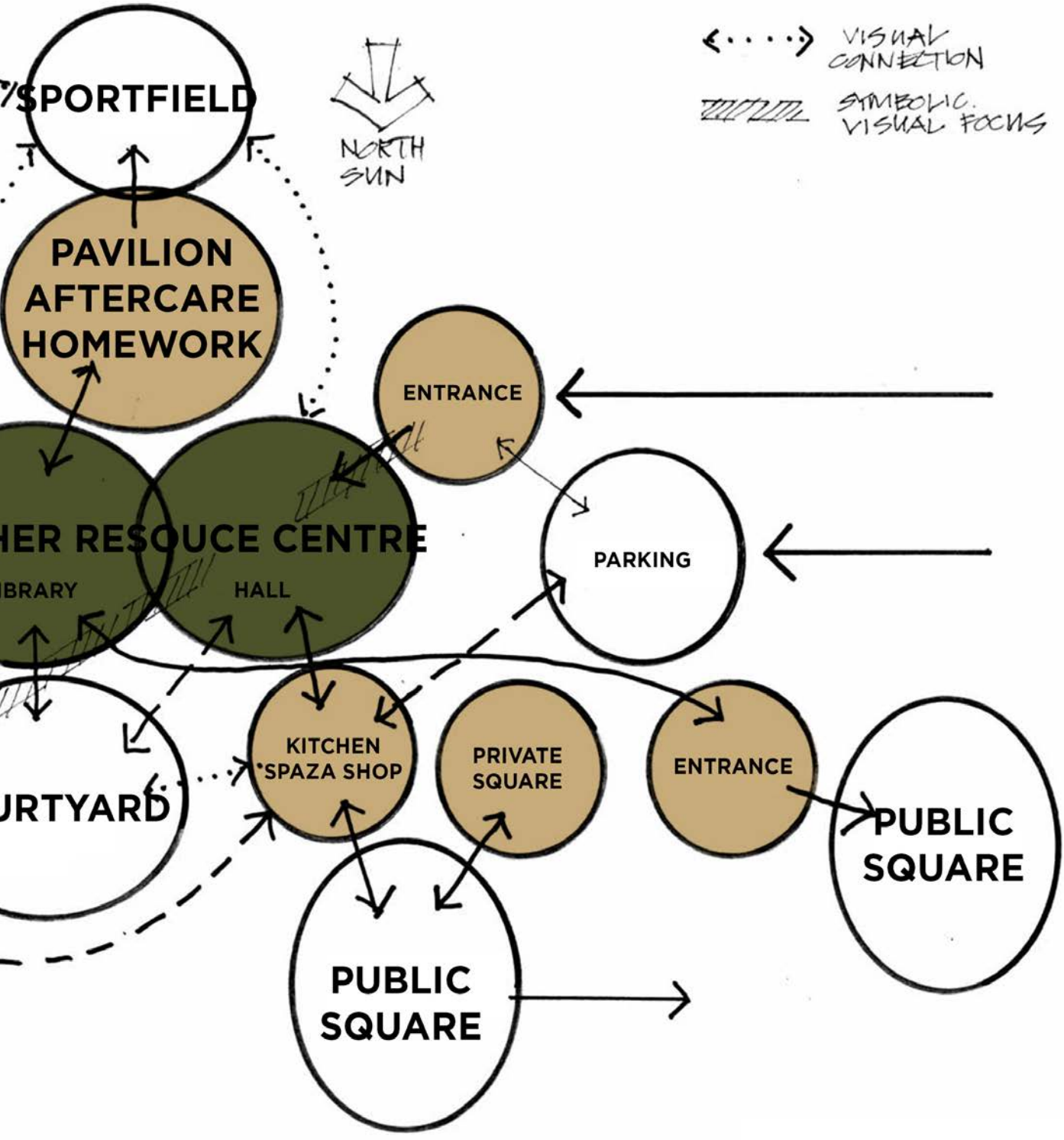


Figure - 81 *Program outline (Christopher Alexander and edited by Author: 2017)*

Figure - 82 *Program on site (Author: 2017)*

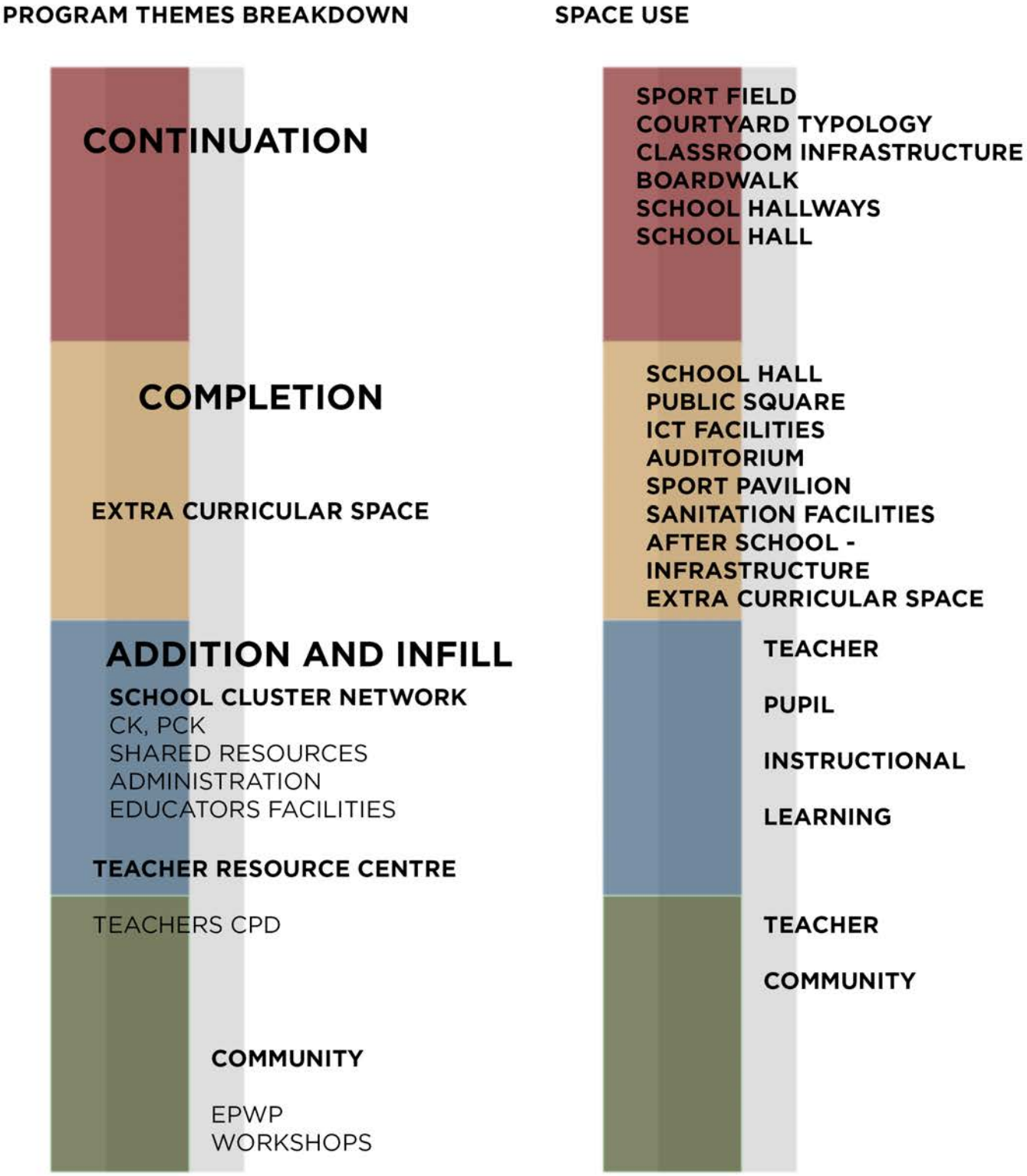


Figure - 83 *Program diagram (Author: 2017)*

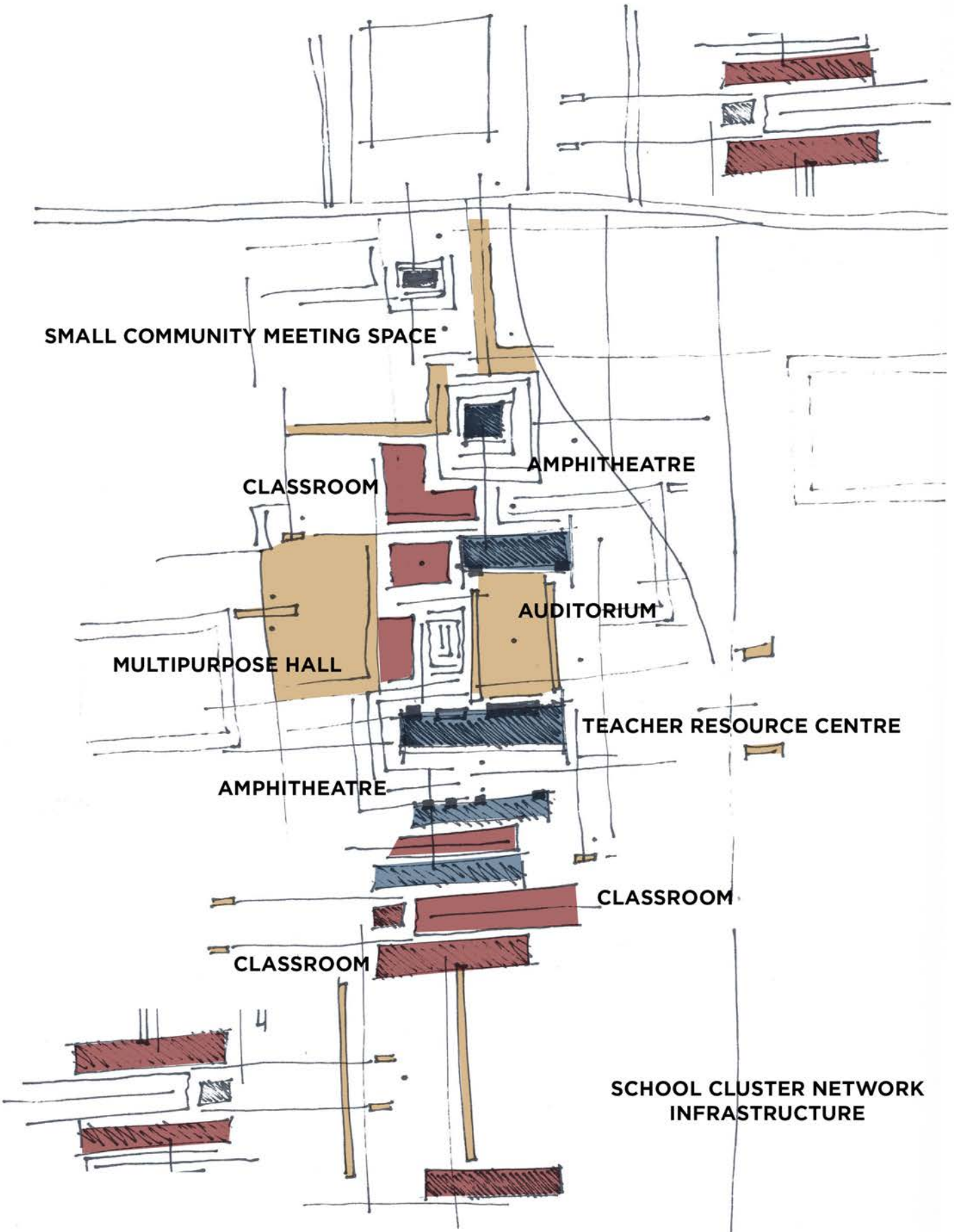


Figure - 84 *Program sketch (Author: 2017)*

PROGRAM IN ARCHITECTURE

CLASSROOM COMMUNITIES

TEACHER RESOURCE CENTRE

AUDITORIUM
CHOIR, CHURCH
TED LECTURE
SMALL COMMUNITY MEETING
GRADUATION

MULTIPURPOSE HALL
SCHOOL DANCE, MATRIC EXAM
MARKET, TSHWANE WIFI
LARGE COMMUNITY MEETING

SCHOOL CLUSTER NETWORK
TEACHER RESOURCE CENTRE

PEDESTRIAN SCAPE

SCHOOL CLUSTER NETWORK

SPACE ALLOCATION

SCHOOL CLUSTER NETWORK
MULTIPURPOSE HALL
ADMINISTRATION
LIBRARY
TSWANE WIFI

TEACHER RESOURCE CENTRE
TEACHERS CPD
4 CLASSROOM COMMUNITIES
ICT FACILITY
LIBRARY AND STAFF ROOM

EXTRA CURRICULAR SPACE
AMPHITHEATRE
COURTYARD
X
X

COMMUNITY
MULTIPURPOSE HALL
EPWP, TSWANE WIFI
WORKSHOPS
AUDITORIUM

PROGRAM TIMELINE

Figure - 85 *Program diagram 2 (Author: 2017)*

CONTRIBUTION AND CONCLUSION

As we enter the age of the Anthropocene, we are the first species to contest evolution. Instead of environments altering our characteristics, we have the power to alter our environment for our needs and preferred outcomes.

Nowhere better can these outcomes still fluctuate as severely and be hereafter established than the future cities of Africa, the last continent to enter the urban population tipping point, as well as other counties still to shift from developing to developed.

As the next century will personify the future of the continent, South Africa can decide between reluctant leader or patriotic frontrunner in establishing its future.

As custodians of the global South's discourse in the future of human settlement and urbanism in developing counties, architects can not only innovate and speculate, but implement and realize.

It is the responsibility of politicians and architects to recognize this, as leaders and facilitators of new construction in the way our built environment responds to the needs of humans.

Through investigations such as Elmo in the Hinterland, the first step protrudes from the local context, in solving the immediate needs, but also in creating a platform for future visions.

Our future prosperity lies in the social capital which is our citizens. The level of proficiency of our people will determine how the future cities appear and express our humanity. Somewhere between the Plastic View Slum, Mamelodi Township and Silver Lakes estate and revitalised CBD's, a realistic utopia is not far off.

Working with existing networks, this infrastructure contribution illustrates ultimately that resource centres and school clusters do have the potential to contribute to improvements in our human settlements and urbanism.

Appropriating current typologies, and providing substantial infrastructural contributions, the local communities primary benefit from architecture, where it allows educators to exchange with their peers.

In order to create a culture for improvement of education conditions, practices and management where the majority of the community have a vital role and have the possibility to lead from the front.

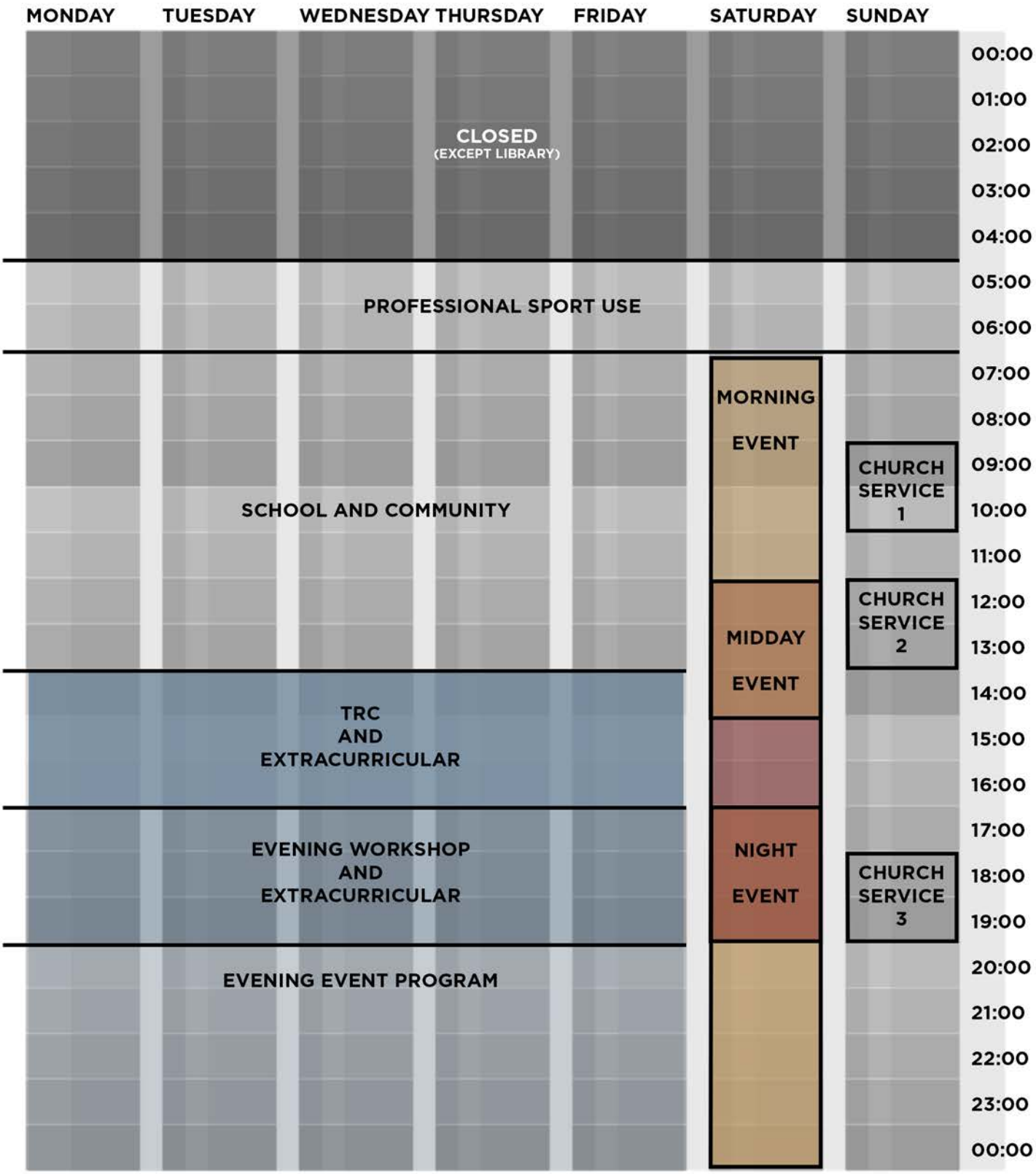


Figure - 86 *Program timeline (Author: 2017)*

WHO IS ELMO?

Elmo in the Hinterland set out to investigate the potential of fostering new knowledge exchange infrastructure in the mentioned South African urban landscape.

The title references Elmo, the famous Sesame street teacher, his reinterpretation as Neno in the South African adaption, Takalani sesame, and the consequent reinterpretation of communicating in a specific context.

Were Sesame street has its focus on early childhood development, the focus of this study resolves around the continuous practical development of teachers, as this is an area were the greatest impact can be made.

Hinterland not only references the physical location of the site, but is also the hopeful desired destination for educational change and improvement.

Figure - 87 *(Author: 2017)*

CONCEPT, DESIGN AND TECHNICAL DEVELOPMENT

Figure - 88 *(Author: 2017)*

CONCEPT DEVELOPMENT

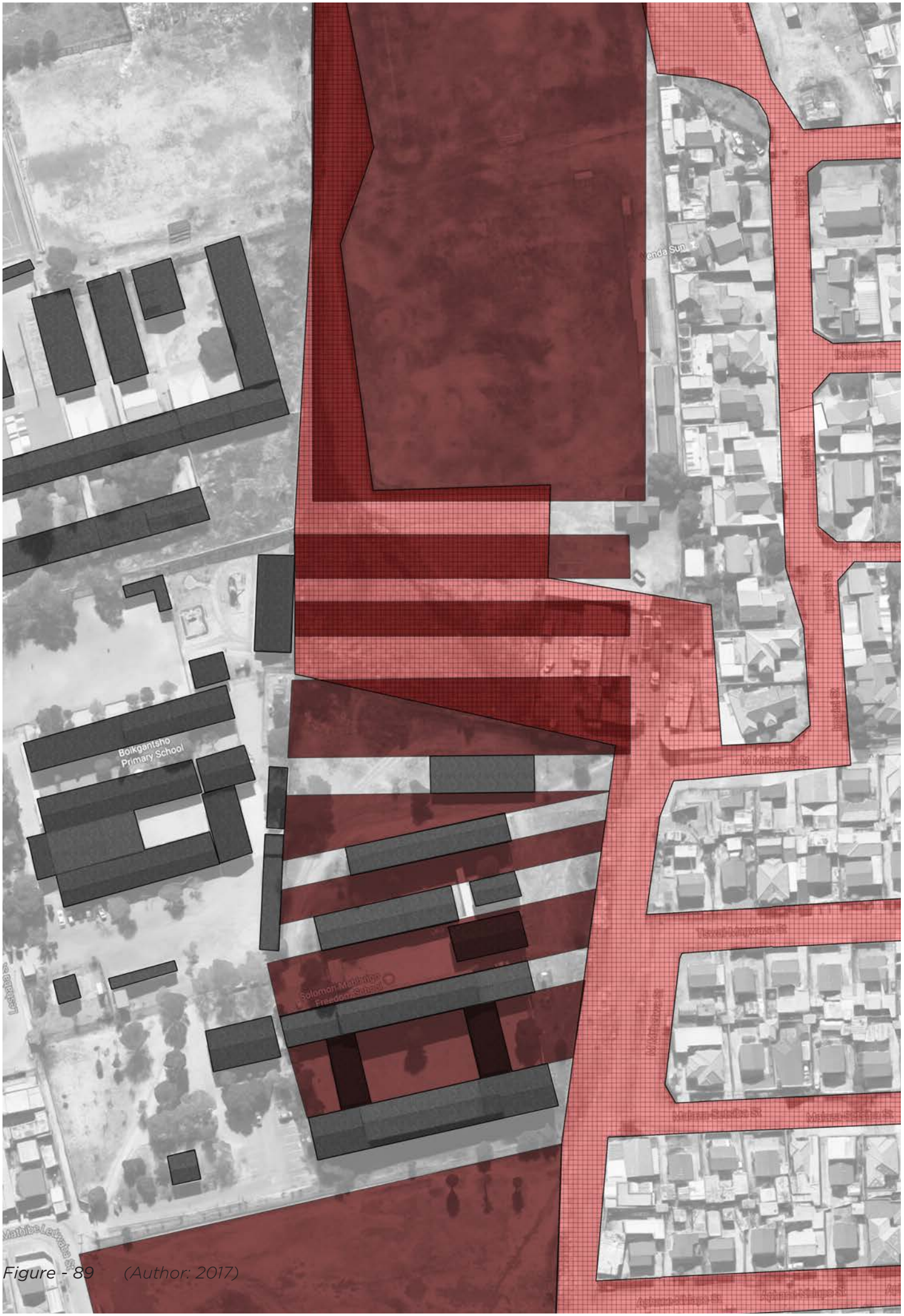


Figure - 89 *(Author: 2017)*

INTRODUCTION

Stemming from the urban vision 'EMERGENCitY' and the current human settlements and urbanism state, experienced in the post-apartheid landscape, the dissertation project embodies a catalytic presence, acting as a pre-empted node of development to upgrade the existing urban landscape conditions.

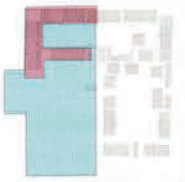
In this inherited landscape, it must respond, support, engage and create infill to existing networks, stakeholders and community energies, forming a continuation of the educational, civic infrastructure landscape.

To contextualise the architecture, appropriation of form, material and composition/arrangement will draw from the vernacular of already existing architecture in Mamelodi.

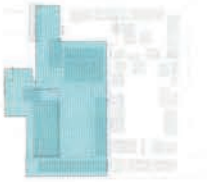
As the focus of the infrastructure is to provide a basis for interaction among teachers and pupils, encourage exchange and establish a collective project, it will do so by fostering a culture of improvement from within the community and teaching body.

If a community infrastructure intervention is to successfully respond to its conditions and foster not only a specific program, but also to provide room to expand and further respond to the needs of what the community might require, it must do so with appropriate form, material and edge conditions.

Figure - 90 *(Author: 2017)*



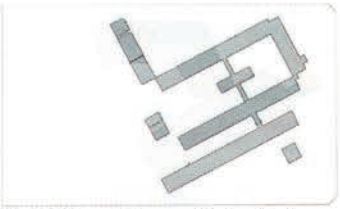
Phase 1
Clear site for new school



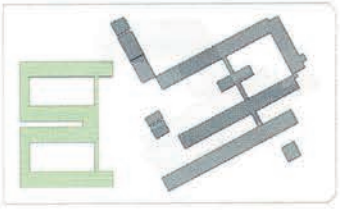
Phase 2
Construction of new school

Phase 3
Removal of existing school's temporary units

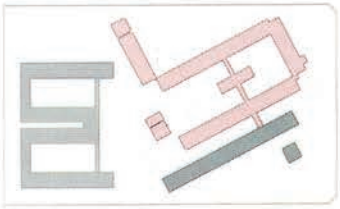
Phase 4
Building new sports fields in place of original building



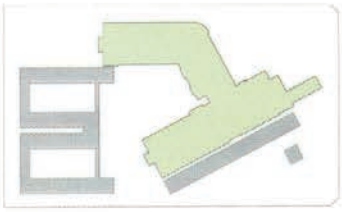
Existing Vooruitsig Primary School



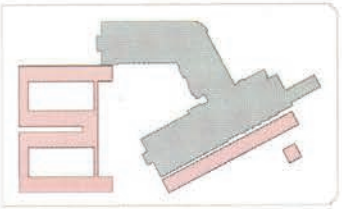
Existing Vooruitsig Primary School temporary mobile classrooms



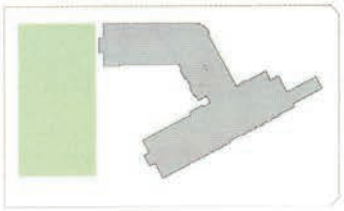
Existing Vooruitsig Primary School demopished



NewVooruitsig Primary School built



Temporary mobile clasroom units removed from site



New sports field to be instaled after removal of temporary mobile classroom units

Figure - 91 *(Digest of South African Architecture, edited by Author: 2017)*

ARCHITECTURAL PROBLEM

The architecture must not distance itself from the surrounding environment, but must create a new experience in the existing urban typology. This can be achieved by completing the civic educational infrastructure delivered to the community.

CRITIQUE

Currently, South Africa is making great strides in delivering school infrastructure to marginalized communities. the program is called ASIDI (Accelerated School Infrastructure Delivery Initiative).

> *"The Department of Basic Education established ASIDI with the aim of eradicating backlogs in school infrastructure in the 2010–14 strategic planning period and beyond, by applying a combination of strategies for immediate and medium-term improvements in infrastructure delivery"* (ASIDI, 2013).

The objective of the ASIDI is to replace existing schools on the same site. Usually, the schools have to be delivered within an accelerated time frame with tenders at PROCAP stage 2(Design concept stage) (Anesa & Barbosa, 2016)
This initiative has seen world class designed schools delivered in minimum time.

Schools completed in 2016 alone - and showcased in the Digest of South African Architecture 21 – are commendable.

1) Du Noon Primary School – Du Noon, Cape Town, Western Cape
2) Vooruitsig Primary School – Darling, Western Cape
3) Red River and Silverstream Primary School – Manenberg, Cape Town – Western Cape
4) IThemba Labantu Aftercare Centre – Philippi, Cape Town, Western Cape.

Unfortunately, these are the only projects of note, and they too, have critique against them:

All the new schools were:

1) Built on the existing sport fields and the old buildings were demolished and turned into sports fields, or...

2) the school body was housed in temporary classrooms on the sport field, the existing school demolished, and the new school built where the existing school previously was, the sport field had to be restored after the temporary building was removed.

This method is wasteful of already existing infrastructure, and is twice as expensive. Taking into acount the massive backlog in South Africa, there is no way the current approach will deliver adequate facilities quick enough to see change in our lifetime.

All these successful projects are also located in a single province, being the best administratively run province in the country.

A new approach to infrastructure delivery must be investigated if we are to provide the same to the rest of our country, a country where service delivery ranges from standard to far below standard.

These are also the only the projects that realized as to be critiqued. The ASIDI is in a worryning state of non-performance and minimal delivery.

Figure - 92 *(ASIDI: 2017)*

SUMMARY OF ASIDI UNDER SPENDING

2012

> *"Out of the R1 billion committed for 2011/12, only R59 million was spent; R900 million was rolled over to 2012/13. The Department had planned to get rid of 50 of these schools, electrify 164, supply water to 188 and deliver sanitation infrastructure to 354 during the 2011/12. Out of 49 schools being constructed in Eastern Cape in 2011/12, only four had been completed. Reasons cited for the delays included inclement weather, difficult terrain, procurement problems and non-performing implementing agents"* (Parliment Monitoring Group, 2012).

2013

Progress on Water:
Of the 1 120 projects, 1 039 remained.

Progress on Sanitation:
There were 741 sanitation projects nationally, 107 of these had been provided by others. There were 488 in the pipeline.

Progress on Electrification:
916 schools had been identified, 384 of which had been provided by others. 369 had been allocated to Implementing Agents or IA's (Parliment Monitoring Group, 2013).

FAST-FORWARD TO 2016

> *"In its presentation to Parliament, Treasury conceded that "underspending of this grant has been a problem since its inception in 2011/12"* (Parliment Monitoring Group, 2016).

As a result, budget allocations have been decreased to align with spending.

Not only did the ASIDI programme receive R413.6 million less over the Medium Term as stated by then Finance Minister Nhlanhla Nene in his 2015/16 budget speech, but as reported by the Treasury, the DBE underspent on ASIDI by a further R423.4 million last year. That is therefore a collective 'loss' of R830 million to this grant – and an R830 million loss to eradicating dangerous, dysfunctional school infrastructure – due to poor administration and a lack of focused implementation (Equal-Education, 2016).

2017

The problem is, unfortunatly, not getting better. Treasury reported that in the first quarter of 2016/17, the DBE only spent R176 million against a projected amount of R929 million for this grant.

This means that more under spending is on the cards for 2017. In this year, not a single school has been provided with electricity through the government's ASIDI Initiative programme (October, 2017).

Figure - 93 *A state-of-the-art Asidi school built in partnership with the Coega Development Corporation in Ugie, Eastern Cape, at a cost of R38-million. (ASIDI: 2013)*

Figure - 94 *Asidi school (ASIDI: 2013)*

URBAN INTENTION:

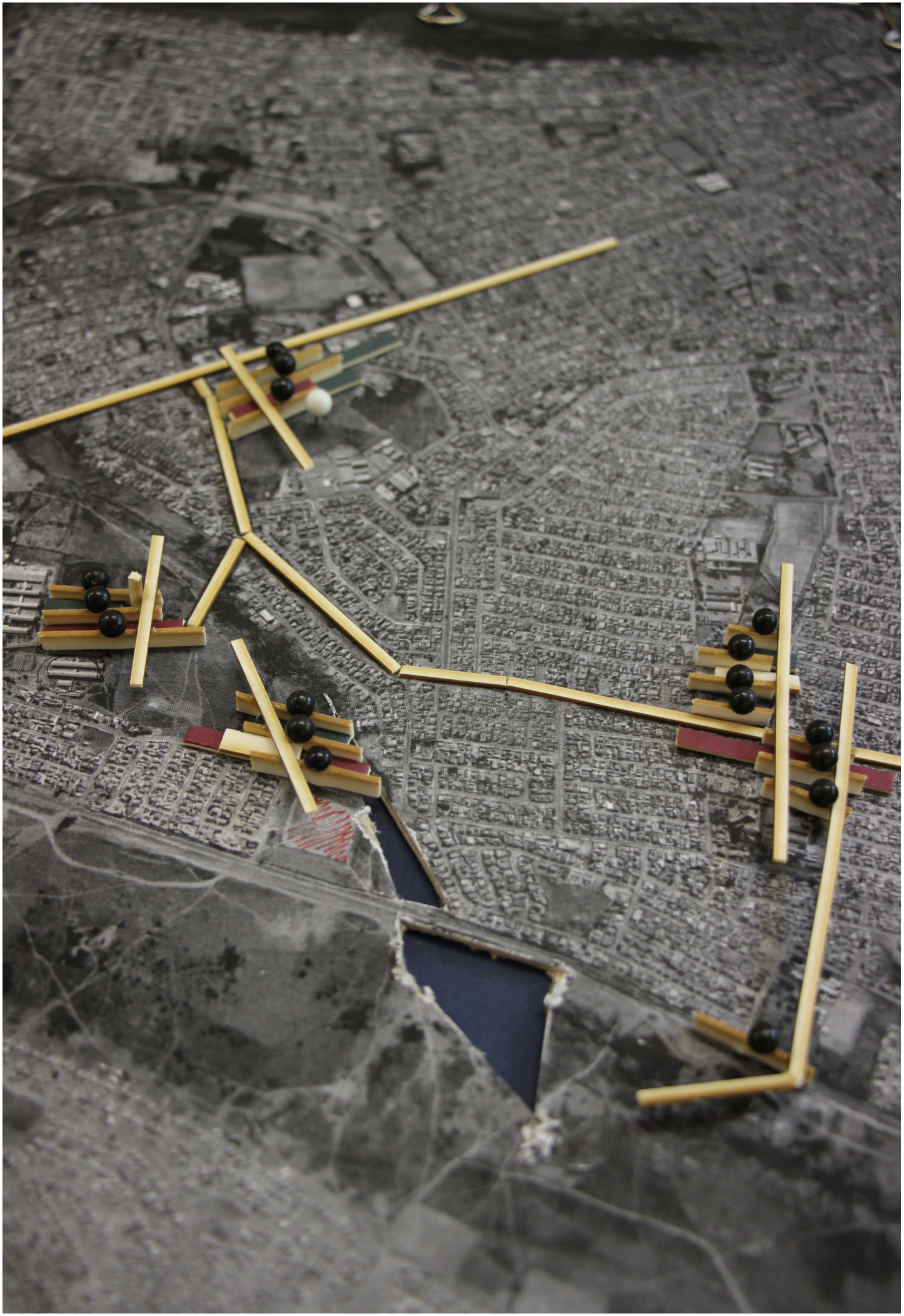
Therefore, the urban intention must take into account the fact that we can rather build shared world class facilities between schools, sharing the infrastructure that is of critical need. Upgrading existing classrooms as time moves along.

This must be implemented as soon as possible, requiring a need for an overarching, quick implementable urban and architectural framework.

It must however, respect the needs of the labour issue in our country, and provide jobs and skills to local community.

Setting milestones in the urban and architectural framework for the projects completion is a critical value.

Figure - 95 *(Author: 2017)*



ARCHITECTURAL INTENTION

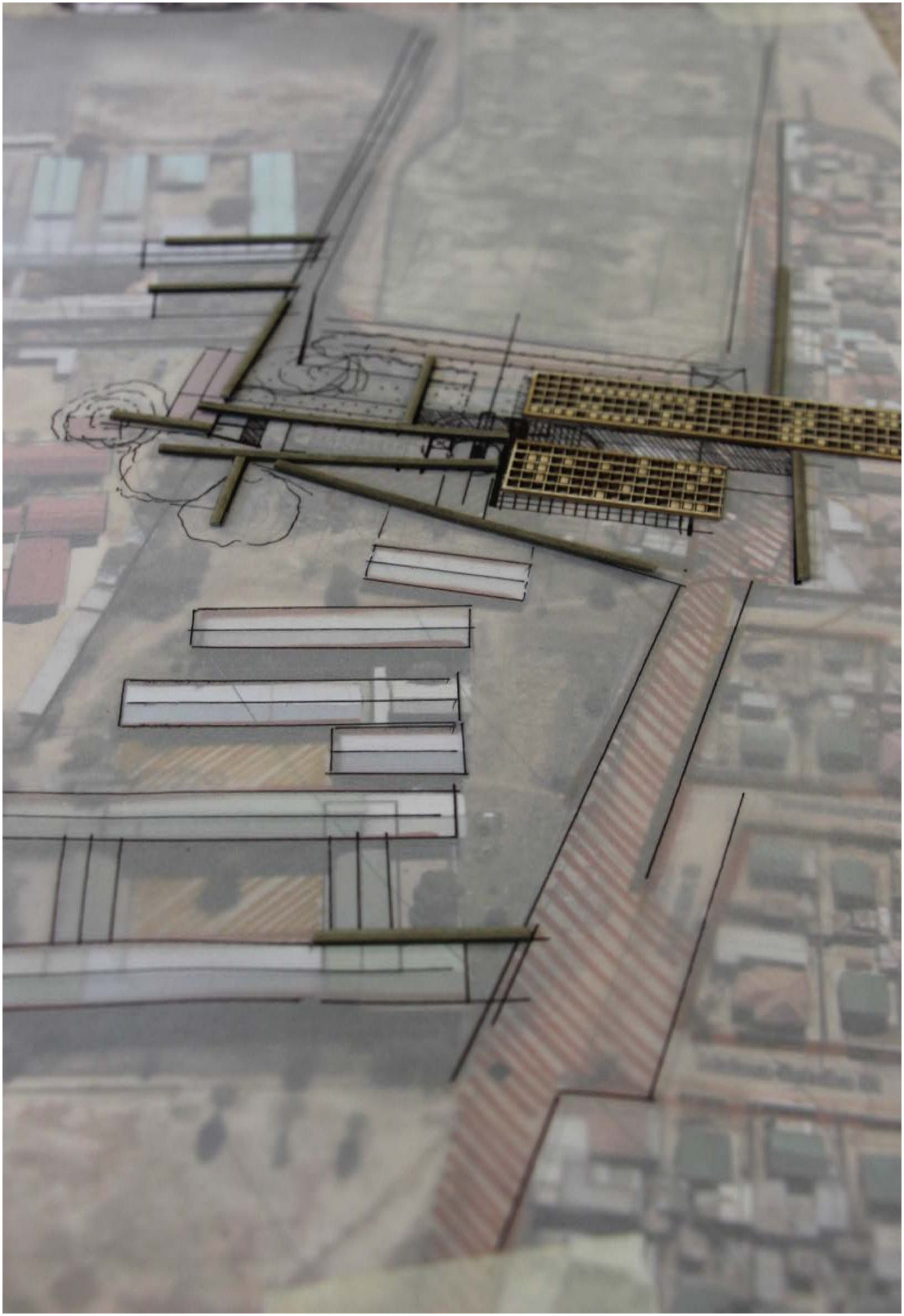
The architectural intention must take into account the fact that we should rather build shared world class facilities and add infrastructure that is of critical need, and upgrade existing classrooms as time goes on.

Also, it must be implemented as quickly as possible, requiring a need for an overarching, quick implementable framework.

It must however, respect the needs of the labour issue in our country, and provide jobs and skills to local stakeholders.

Setting milestones in the architectural framework for the projects completion is a critical advantage.

Figure - 96 *(Author: 2017)*



SPATIAL INTENTION

The spatial intention can be summarized by creating didactic and communicating spaces inside an infrastructure framework, to encourage knowledge exchange and promote communication.

Delivering much needed spatial infrastructure, but fostering community based infill. The design will seek to negotiate a heritage of sub-standard civic delivery, and will utilize community energy to secure the completion of the world class standard of architecture delivered.

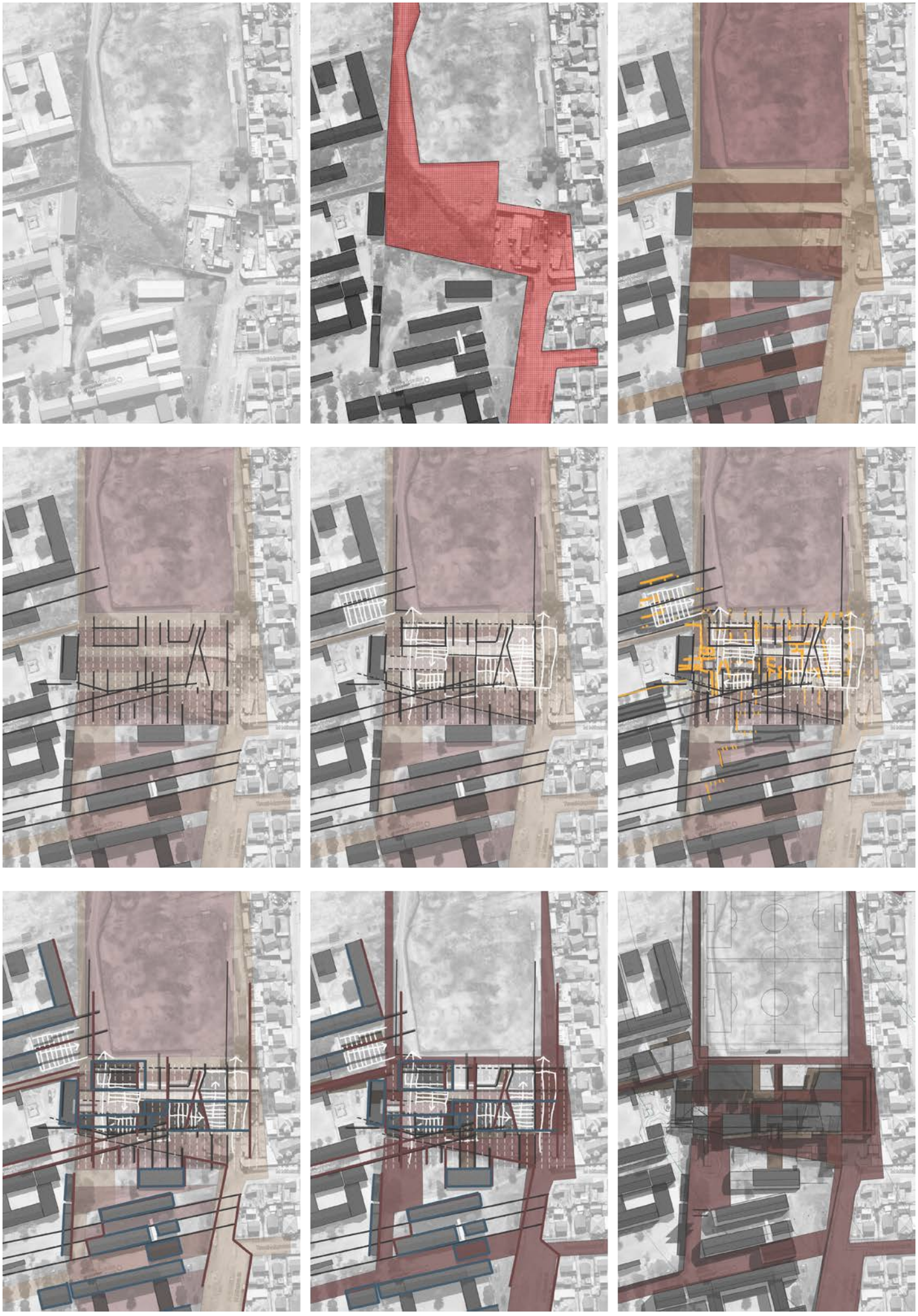
These facilities must be acoustically and thermally comfortable. Daylight and internal atmosphere are also essential when building new educational facilities.

Therefore, a load bearing, quick implementable structure will form a framework, and non-load bearing elements will be set up by community infill.

This will focus local construction efforts on the thermal comfort of internal spaces, exchanging knowledge from professionals to locals. This will focus the completion of the interior and exterior environment to local stakeholders, with time constraints suggested by the tectonic framework.

The architecture then not only exchanges knowledge for its users when complete, but forms part of a didactic experience for the people involved with building it.

Figure - 97 *(Author: 2017)*



The structure and roof subsequently becomes a canopy under which all levels of knowledge exchange take place.

Summarized as a DENDRIFORM structure: a tree like canopy will foster comfortable ease of communication and learning underneath.

FOSTER COMMUNICATION AND EXCHANGE OF KNOWLEDGE, BREAKING DOWN EXISTING TYPOLOGIES IN PEDAGOGICAL INFRASTRUCTURE AND CREATING COMFORTABLE ENVIRONMENTS USING HIGH AND LOW TECH CONSTRUCTION TECHNIQUES AND MATERIALS

Figure - 98 *(Author: 2017)*

CONCEPT DEVELOPMENT

The knowledge exchange infrastructure development started as a response to a lack of delivered skills and infrastructure.

As not to fall in the existing ASIDI framework of demolition and rebuild, it will only complete the necessary needed spaces, and form a communal campus to be shared by the entire community.

In this landscape, three main conceptual and programmatic drivers where identified were architecture should implement the added spatial value it possesses.

MAIN CONCEPTUAL DRIVERS:

-

In this civic infrastructure landscape, there are elements that already exist and are successful...

CONTINUATION

There are also elements that are in need of critical upgrade...

COMPLETION

There are however elements that are non-existent and must be implemented from scratch...

ADDITION AND INFILL

-

Collaborating hand in hand to successfully implement the proposed project, these three concepts will introduce, inform and complete the necessary design proses needed.

Grouping the required spaces together using these drivers will present the opportunity in creating exchange between old, new and future development.

Creating an environment with the ability to share information and foster effective, multi functional education spaces should be taken into account.

HIERARCHY OF KNOWLEDGE COMMUNICATION

Informed by various architectural educational models and specifically the African School for Excellence, the spatial programmatic conditions will focus and revolve around the hierarchy in knowledge communication from individual all the way, to large groups.

Self-study: 1 person
Computer lab, reading room, study area.

Peer to peer learning: 2 people
Courtyard, peripheral edge, walkway, reading room, study area, computer lab.

Discussion: a group of 3 - 6
Small classrooms, stairs, hallway.

Group workshops: groups of 6+
Workshop rooms, cafeteria, courtyard, amphitheatre.

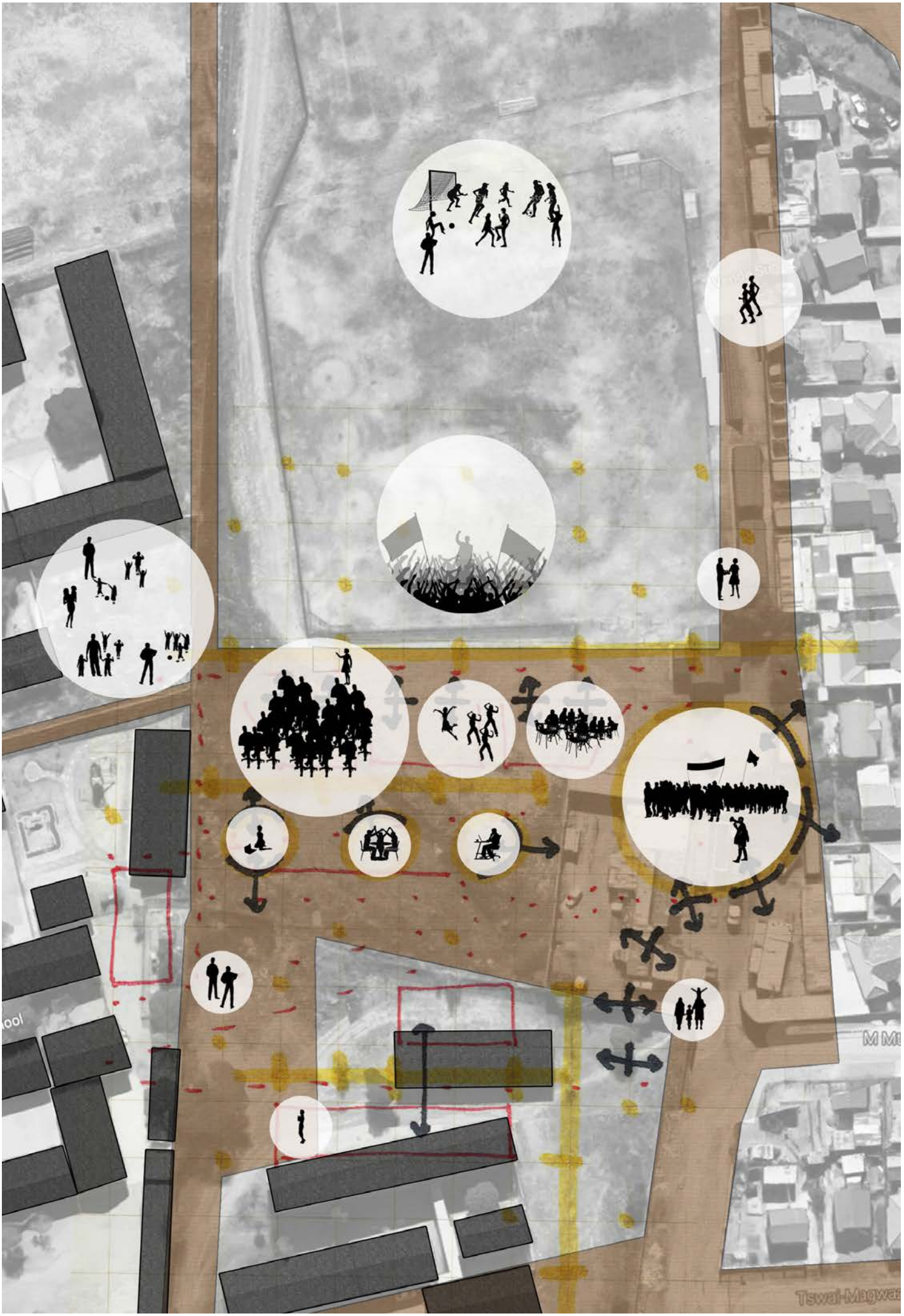
Lecture: 30 or more people
Auditorium, classroom.

Assembly: 100 or more people
Hall.

Public Participation: 10 - 1000 people
Public plaza, sports field.

Therefore, the conceptual model emphasizes the space inside as energy embodied by the exchange of knowledge in various hierarchies as well as programmatic intention.

Figure - 99 *(Author: 2017)*



APPLIED SPACES

The infrastructure must house and address the following aspects to successfully foster a landscape of improvement.

Spaces embodied in Continuation, Completion and Addition principles.

CONTINUATION:
Sport field, courtyard typology, classroom infrastructure, boardwalk and school hallways, and school hall

COMPLETION:
School hall, public square, ICT facilities, auditorium, sport pavilion, sanitation facilities, after school infrastructure

ADDITION:
New school cluster network infrastructure, new teacher resource centre, water harvesting and management

Therefore, the urban layout of these spaces would be enforced by already existing infrastructure falling under Continuation and Completion:

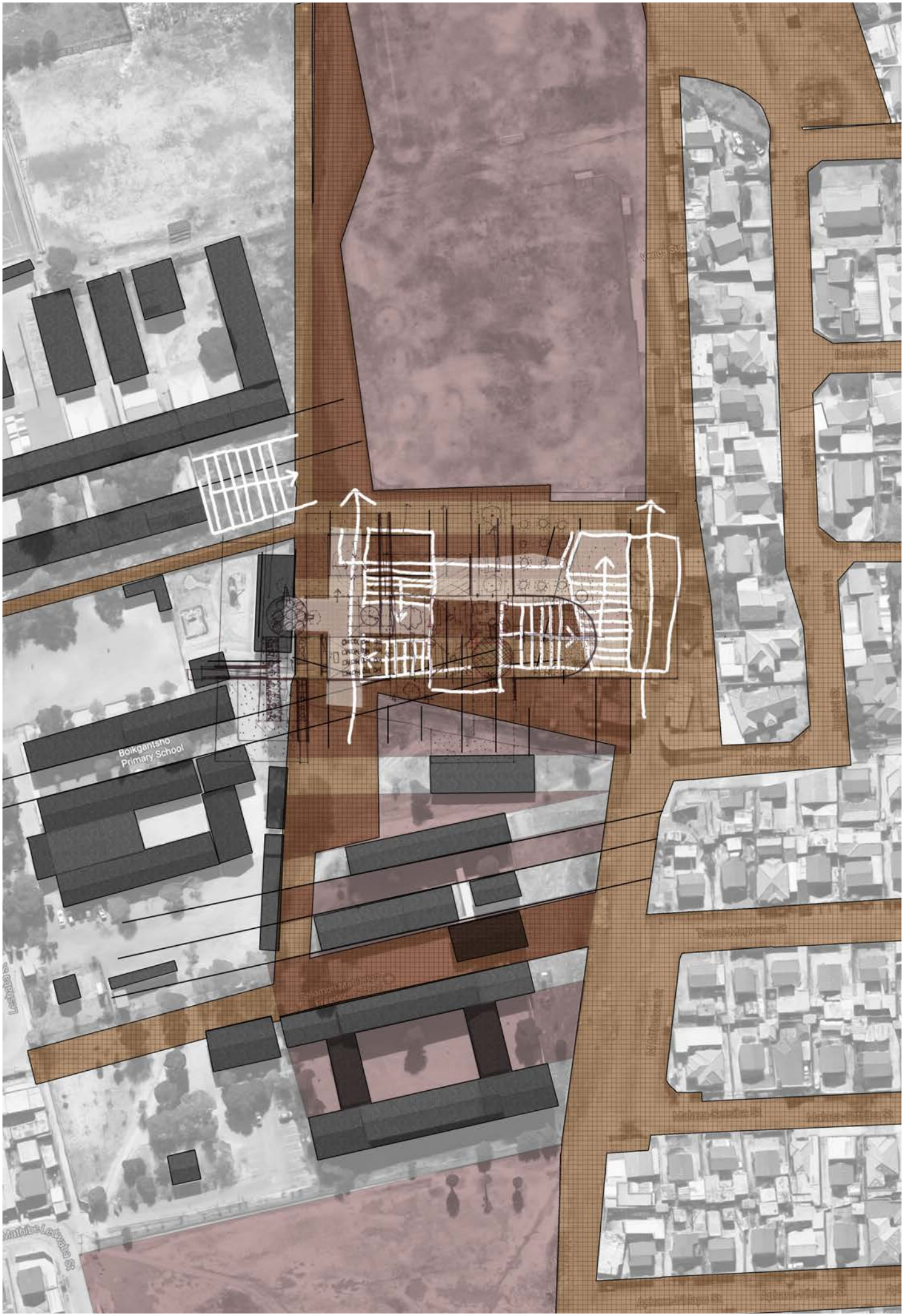
The existing school building, their orientation, sport fields, walkways and site layout.

The Addition (TRC) will sit above.

Between these spaces, tying them together, informal social spaces will create conections, tying the three drivers together.

These spaces also have various depths of knowledge exchange and would be grouped around the hierarchy of knowledge communication mentioned previously.

Figure - 100 *(Author: 2017)*



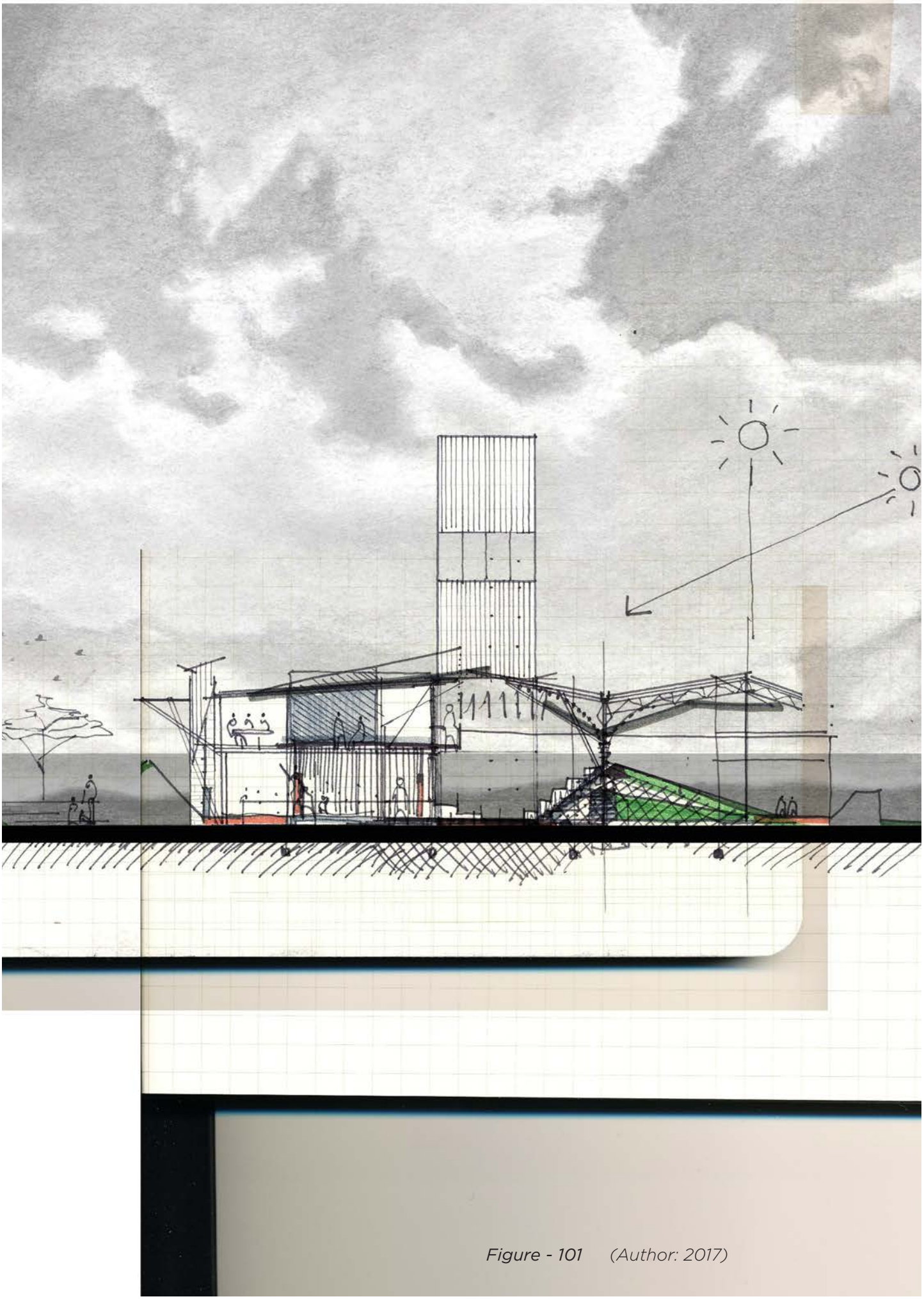


Figure - 101 *(Author: 2017)*

Figure - 102 *(Author: 2017)*

THRESHOLD

The thresholds between knowlege communication space, social space and public space are of critical importance.

The architectural edge condition used to lead one spaces to another or introduce a program-specific room should be some of the most important elements in implementing design.

Therefore, the last conceptual driver will focus on the threshold space binding these spaces, where informal discussions and social activity are most likely to take place.

Examples of threshold spaces investigated in this dissertation.

1 Sports Fields, the construction of the spectator pavilion and its role as after school space or an informal learning environment that becomes a social classroom.

2 Classroom, opening up onto a courtyard and its potential as an informal classroom or amphitheatre

3 Walkway that becomes a public plaza leading up to the main hall with office balconies overlooking the public space

4 Spaza shop and kitchen and its service space for the cafeteria, the seating as foyer to the hall and auditorium, as well as the sport field.

5 Auditorium for graduation ceremonies, the process of the proceedings from the resource centre and the relationship with the stage

The above threshold spaces can clearly be seen in the sectional development of the project.

PRINCIPLES

THE FOLLOWING CONCEPTUAL PRINCIPLES ARE SUGGESTED AS DESIGN DRIVERS.

PRIMARY DRIVERS:

CONTINUATION

The language in the landscape of the education school typology will be continued to include the school cluster network and teacher resource centre built environment, and draw out the energies contained in the courtyard spaces.

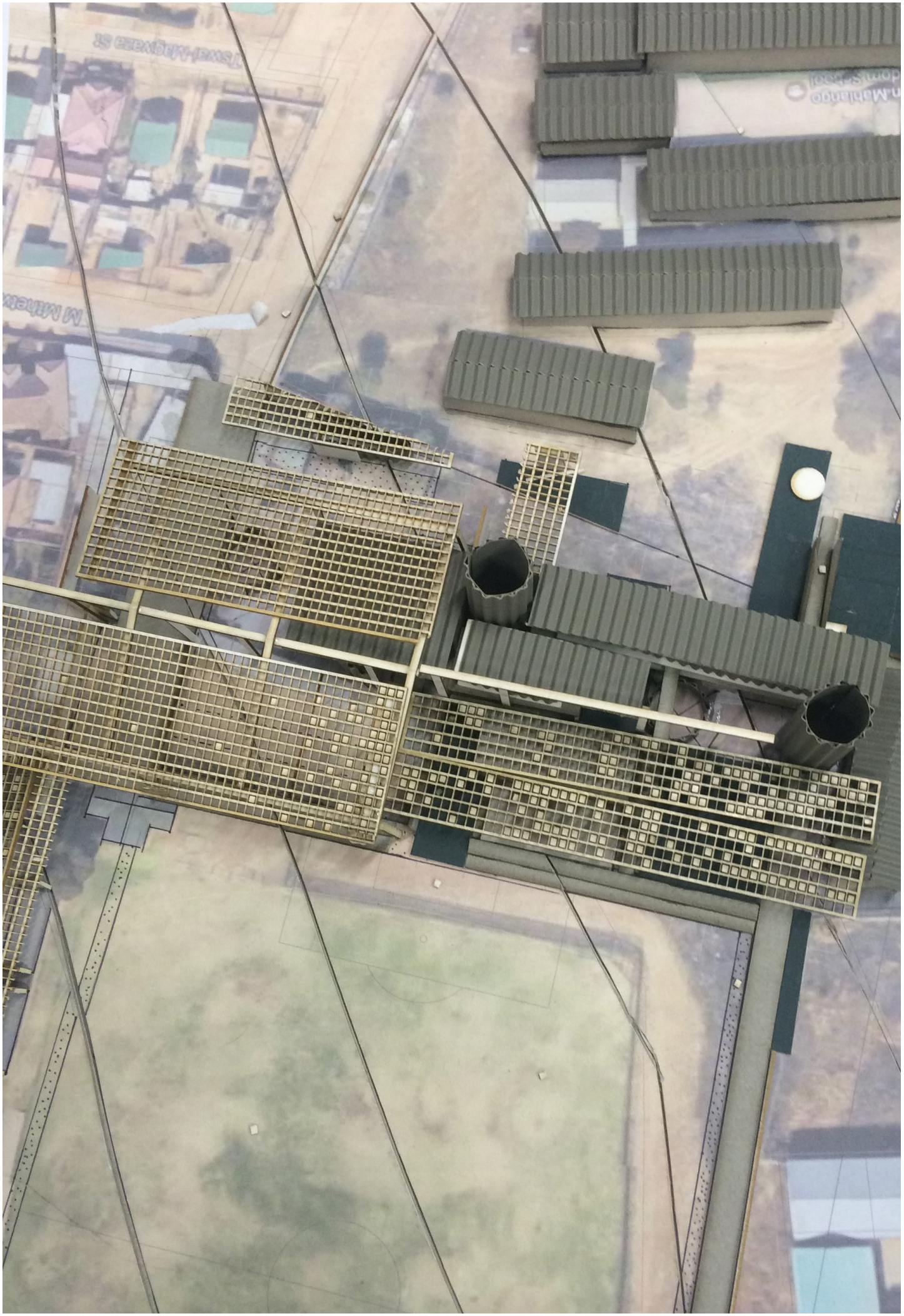
COMPLETION

Complete the lack of educational infrastructure in the inherited landscape, providing the necessary means to complete the needed spaces for educational support and growth for the community's teachers and learners.

ADDITION

The possibility of introducing new infrastructure components are critical, for instance, the likes of the school cluster network and teacher resource centre in this inherited landscape.

Figure - 103 *(Author: 2017)*



SECONDARY DRIVERS:

REINTERPRETATION

It is a rethink of South African educational infrastructure offerings. It is focused specifically on the teachers' cluster network and resource centre. Reinterpreting traditional elements such as courtyard, classroom, amphitheatre, sport pavilion and sport field, to create a successful infrastructure intervention.

APPROPRIATION

Sub themes: Re-appropriation, Nominal Appropriation, Failed appropriation.

Appropriating contextual building methods and elements in the inherited landscape, it must use the typology in a bold new way. Keeping to the *genus loci* of Mamelodi, it must also introduce a world class building to a humble emerging community.

HIERARCHY

The interplay of public and private spaces and their role in the construction of such an infrastructure intervention will focus the composition. Questioning the common implementation of public and private spaces and reassessing how we develop a gradient onto entering a built environment.

THRESHOLDS

The key component of this architecture will be its edge and transitional spaces, conditions, when confronted by various programmatic interior constraints and the interplay of spaces to provide facilitation of their exterior space requirements. The thresholds must foster a sense of inclusiveness, but security, openness, but containing the energy.

ADAPTABILITY

The future proofing of this structure will depend on its adaptability and fostering of diverse ways of facilitating these programs in the coming years.

APPROPRIATE CONSTRUCTABILITY AND MATERIALITY

The construction and material choice will form a strong driver from the inception stage.

Training, discourse, dialogue, knowledge exchange and evaluation all form key roles in the detailing of the interior and exterior finishes.

REDUCE AND DESIGN TO REUSE

Reduce dependency on municipal services like power supply and water supply and incorporate the reuse of materials as well as the future reuse of new materials used.

FRAGMENTATION AND CONNECTION

Separate programmatic requirements to be bought together to form a holistic whole but maintain the inherent and diverse specialities.

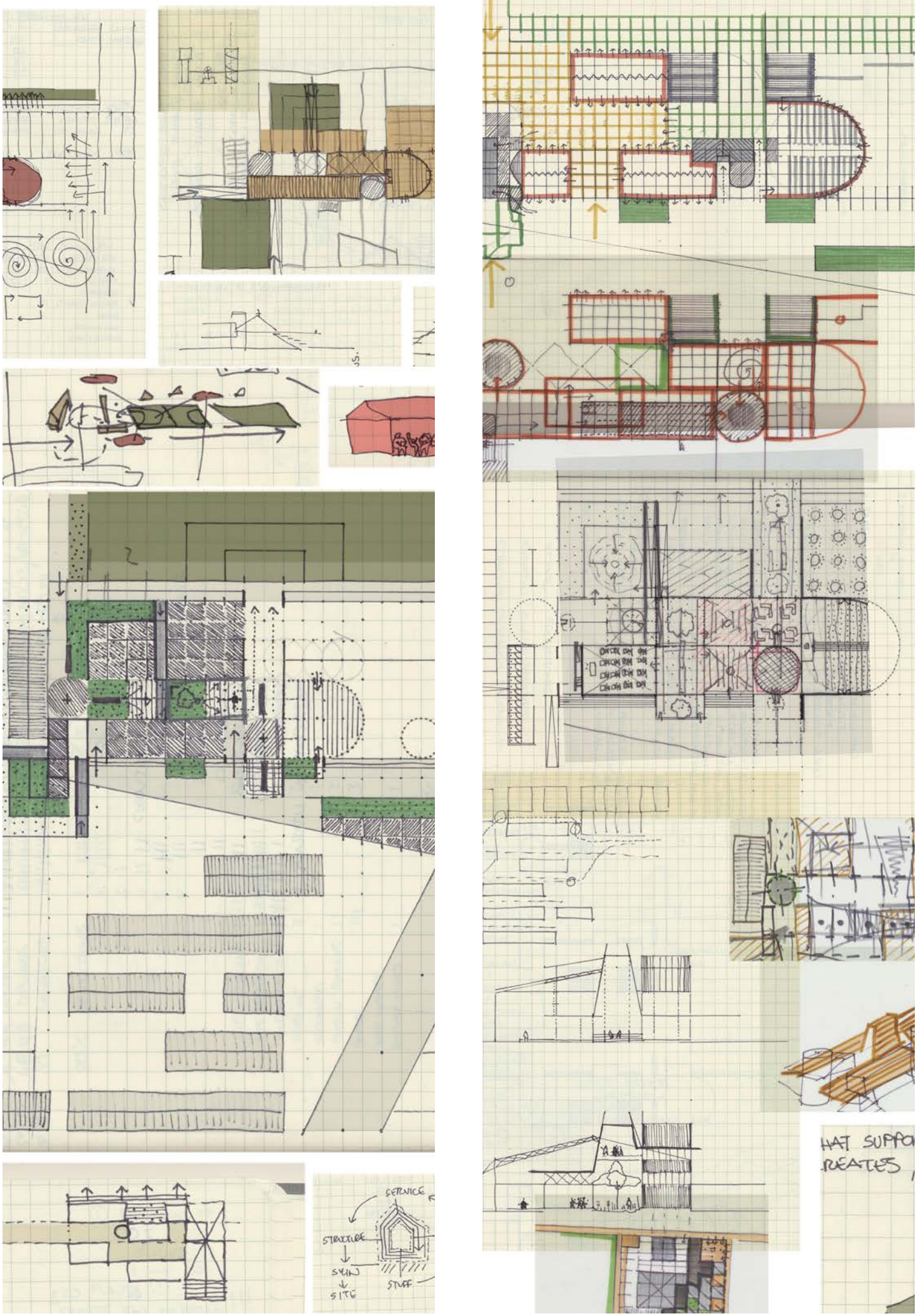
BASIS OF FORM

The basis of form is therefor produced by the drivers of:

1)Hierarchy of knowledge exchange
2)Applied spaces
3)The thresholds binding the various programmatic relationships.

4)With secondary drivers influencing construction, materials and technology

Figure - 104 *(Author: 2017)*



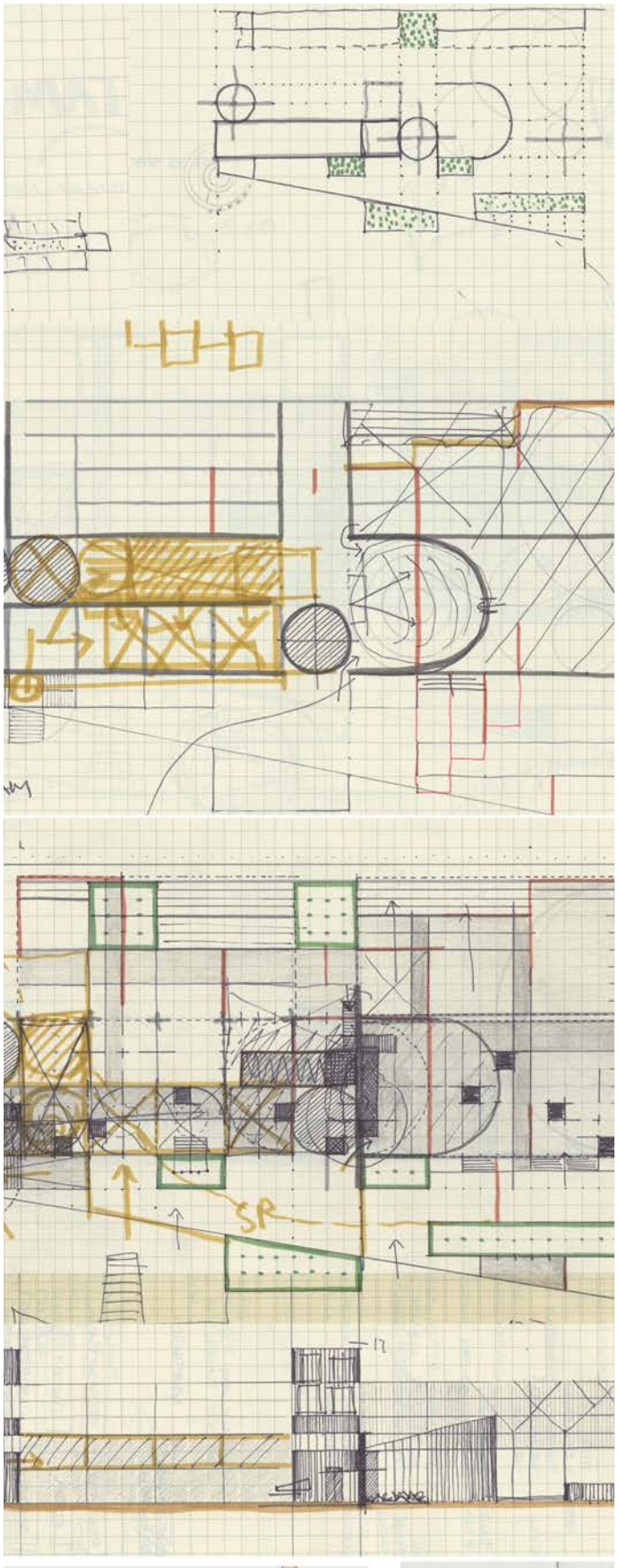
CONCEPT CONCLUSION

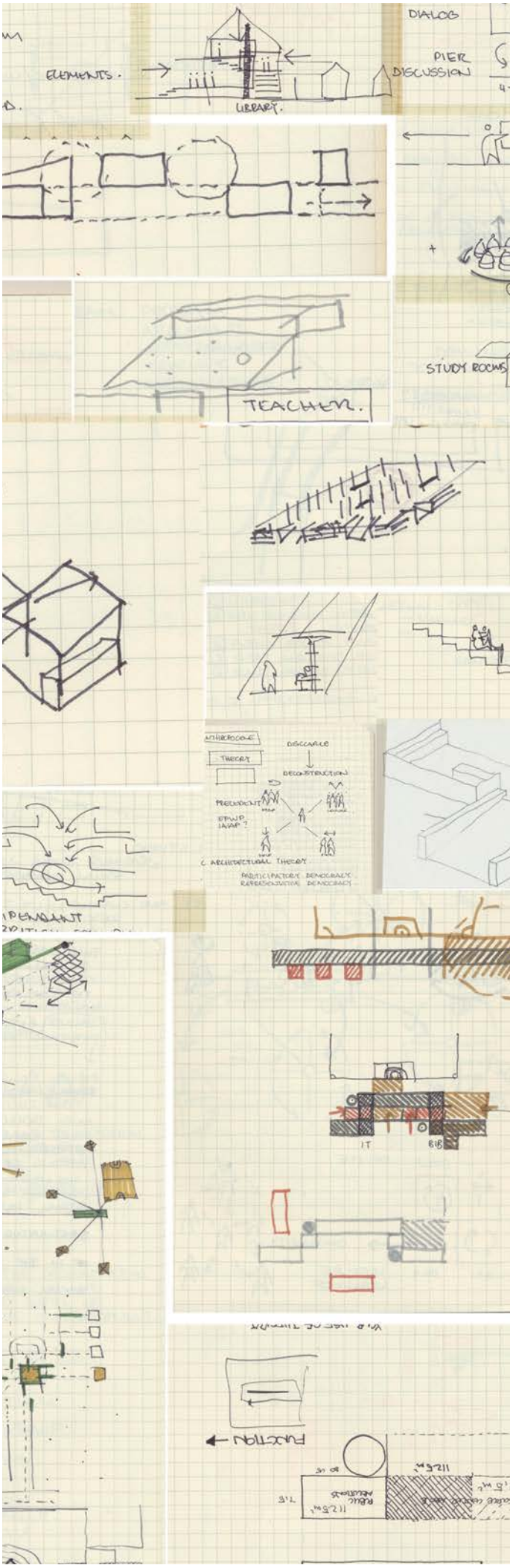
Architecture must adequately respond to the surrounding environment, and create truly open and dynamic spaces, but also provide suitable intimacy and privacy.

The completion and continuation of the Hinterland pedagogical infrastructure landscape will develop a supportive super structure and appropriated responsive infill.

By creating various levels of interaction and fostering communication and sharing, the conceptual approach will influence the design development to adequately respond to the completion, continuation and addition to the much needed spatial value of education infrastructure provision, for teachers, pupils and community members alike.

Figure - 105 *(Author: 2017)*





PRECEDENT STUDY

The following precedent studies embody the positive and critical stance that architecture, education and a prosperous African future are contained in the same equation.

They range from complex to simple design solutions, but describe the critical role architecture can have in producing the perfect environment for the exchange of knowledge and in fostering communication.

LOCAL STUDIO
AFRICAN SCHOOL OF EXCELLENCE

The innovative yet appropriate way in which the project solves school infrastructure proves the effective way architecture can contribute to this predicament.

The School describes itself as a non-profit organisation and it aims to revolutionising the face of modern education in Africa.

A construction firm did a feasibility study and showing that, by combining a 30 classroom school, administration block and multipurpose hall in a single 5 000m2 structure, one could save almost 50% of the cost of a traditional school. (Chapman, African Scool for Exellence, 2016)

The idea that a school could borrow from industrial warehouse typologies on the East Rand contextualizes the problem for infrastructure with the typology of the environment.

The notion of school as mega structure was used, and the architect designed the building as *a series of six U shaped classroom clusters arranged around a vast central space. Each of these classrooms clusters (termed learning communities) is designed around the ASE education model (to rotate learners between spaces for instructional learning, peer to peer based learning and self-study throughout a school day, which starts at 07:00 and ends at 16:30 (*Chapman, 2016).

The 200m2 hall space is imagined as a large courtyard, with lightweight sculptural roof floating above the classroom buildings.

The main urban intervention in the building is the extrusion of the building's east elevation outwards to create a triple volume entrance portico designed to welcome the public into the building. This portico, along with the building's faceted roof, is apparently visible as from far away in Tsakane.

"As with the Architect's Outreach Foundation Community Centre in Hillbrow, the choice of white chromadeck steel and clear polycarbonate (although this time all in an IBR profile) as the primary cladding material was governed by the need to create a clear contrast with the context of the buildings and to abstract the building form" (Chapman, 2016).

Figure - 106 *(Local Studio: 2017)*

Figure - 107 *(Local Studio: 2017)*

Figure - 108 *(Local Studio: 2017)*

Figure - 109 *(Local Studio: 2017)*

RUF PROJECTS AND LUYANDA MPAHLWA DESIGN SPACE AFRICA

NIKE FOOTBALL TRAINING CENTRE

The Nike FTC in Soweto was an existing football training ground for approximately 1200 youth clubs under the administration of the South African Football Association SAFA, Soweto.

> *"The design objective was to refurbish the center and transform it into a state of the art facility, which is intended to be a performance center for the development of soccer in Soweto."*
>
> (Mpahlwa, 2016)

The project brief included the erection of two new artificial football pitches, with floodlights to FIFA standards for training and match practice grounds.

Two pitches were upgraded to junior grass pitches with standard flood lights. The playing fields are linked to a fully equipped gym facility and physio/first aid rooms, wich will hugely improve the standard of training and contribute to higher performance levels for the Soweto youth.

> *"The biggest challenge for the architects and the entire project team was the short contract period of five months. "*
>
> (Mpahlwa, 2016)

In order to meet this deadline, a steel structural system combined with concrete retaining walls was chosen for speed, as well as flexibility and to mitigate contextual constraints. Early co-ordination with structural engineers was critical for the delivery of the project.

> *"The concept for the building was that it should be unique, high end design, but appropriate and well integrated into the Soweto environment."*
>
> (Mpahlwa, 2016)

The skin of the building comprises three layers – brick in fill between steel frame, sandstone cladding and timber screens, allowing adequate flow of natural light and ventilation.

The project, conceptualized by Nike designers, was a product of international collaboration.

Nike also commissioned very talented local and international designers and artists to produce artwork and graphics of a very high standard. The new building provides a clubhouse character in the bigger network of facilities, comprising the training center.

> *"The building is designed to create a flexible space for football specific events, but also host community gatherings, creating a safe place for youth to spend their free time constructively, use the internet, learn about soccer both on and off the pitch, and engage in physical training at the gym facilities."*
>
> (Mpahlwa, 2016)

This high performance centre in Soweto provided a lasting legacy for the development of soccer in the community as well as country.

Figure - 110 *(RUF: 2017)*

Figure - 111 *(RUF: 2017)*

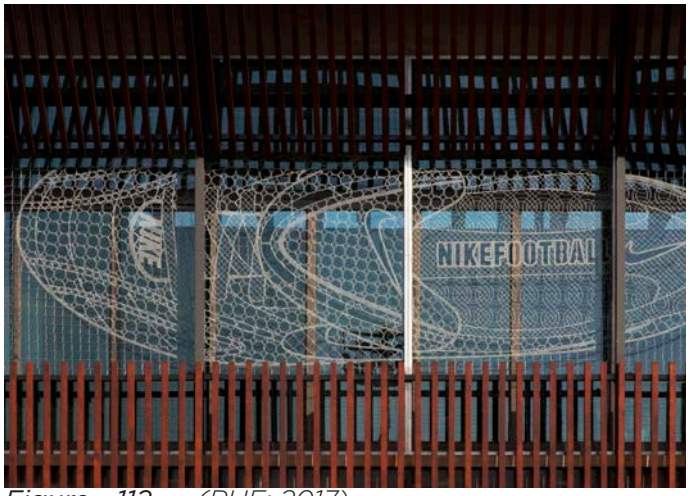


Figure - 112 *(RUF: 2017)*

Figure - 113 *(RUF: 2017)*

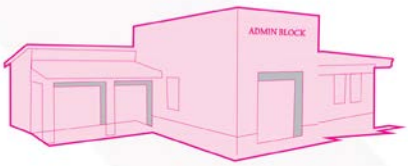
Figure - 114 *(RUF: 2017)*

LUYANDA MPAHLWA
DESIGN SPACE AFRICA DBSA ASIDI

50 schools in 50 weeks building program

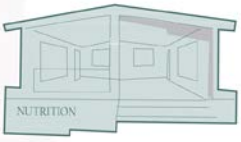
Project concept: a kit of parts approach and courtyard typology

CLASSROOM BLOCKS- C
RESPONSIVE TO TOPOGRAPHY AND ORIENTATION

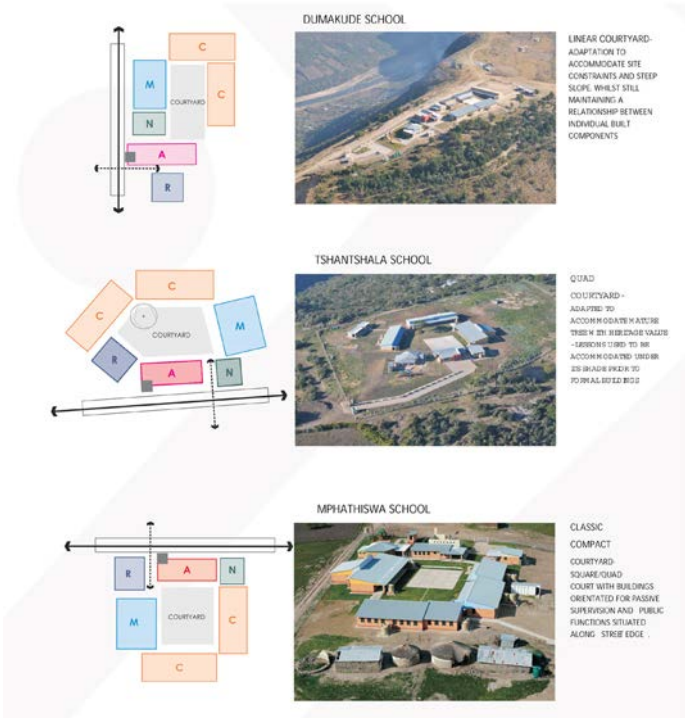


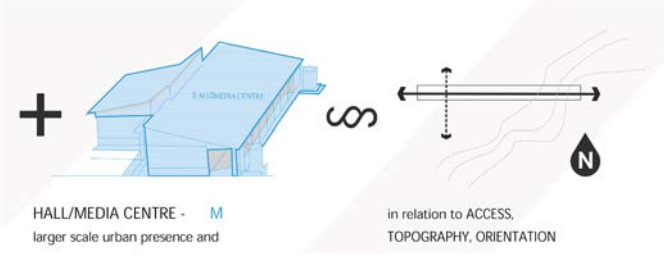
ADMIN -ICONIC LEGIBLE ELEMENT

GRADE R- R
SELF CONTAINED INCORPORATING ABLUTIONS AND PLAY AREA



NUTRITION CENTRES- N
SHADED OUTSIDE DINING AREAS





HALL/MEDIA CENTRE - M
larger scale urban presence and
in relation to ACCESS,
TOPOGRAPHY, ORIENTATION

Figure - 115 *(Design Space Africa: 2017)*

ASIDI SCHOOL
ZWELIHLE PRIMARY SCHOOL

The designs are informed by the understanding that a school should provide spaces for communication and allow for interaction to occur during, between and after classes. Internal gathering spaces which promote interaction and which link to outside playing areas have been created.

The layout of the generous internal passages and protected gathering spaces assists the learners with easy orientation within the school building.

The concept of creating internal, naturally lit gathering spaces was developed from an architectural response to create a space for the junior learners to spend time indoors, encouraging positive dynamics between playing and learning while not being inside a formal classroom.

(Mpahlwa, 2016)

Figure - 116 *(Design Space Africa: 2017)*

Figure - 117 *(Design Space Africa: 2017)*

EARTHWORLD
FUTURE AFRICA CAMPUS

To further prove the relevance of the drive for a new way of knowledge exchange catered specifically to the African condition, the University of Pretoria is also in the proses of understanding and changing the outcome of relevant education structures and the immense role space and place has in the success of these ideologies.

(Earthworld, 2017)

With approaches to education beginning to change in South Africa, the University of Pretoria began to remodel the Doctoral degrees the university offers.

The new approach undertaken was based on new methods of learning and teaching, revolving around a lifestyle rather than a lecture hall.

The brief required for a number of programs to be accommodated on the campus, including a dining hall, a conference centre, research commons and 300 living units, with varying scales, ranging from single bedrooms, to family units.

A further requirement was to keep further expansion in mind from the beginning.

The project required a holistic approach to the subsequent urban design and architecture of the campus, with a specific focus on how architecture can play a role in fostering critical thinking and research.

(Earthworld, 2017)

Located on the northern ridge of Strubenkop in Pretoria, the campus anchors the Southern edge of the University's experimental Proefplaas.

The ridge offers panoramic views over the campus sprawling in front of it, allowing for a variety of interaction with Pretoria's natural Highveld landscape.

(Earthworld, 2017)

AFRI-TECH

Combining high level design processes with local resources and skills

"From the outset, the intention was to challenge existing design and construction processes. Each program would be addressed through a solution specific to each set of conditions.

In order to minimise time on site, as well as to rethink how traditional materials are employed, 300 housing units are prefabricated from precast concrete and would be assembled on-site, with services and fittings having already been installed.

Each living unit would be constructed from a series of precast concrete modules, allowing for variation in composition and size.

This approach would also improve quality control and challenge traditional uses for precast concrete as a construction material."

(Earthworld, 2017)

FUTURE AFRICAN RESEARCH COMMONS

"The research commons focuses specifically on interconnectedness of space and knowledge, flowing between informal discussion pits, meeting rooms and study tables.

Defined by brick envelop exterior keeping with a regional vernacular, the interior is defined by a timber structure establishes the more informal shared areas"

(Earthworld, 2017)

FUTURE AFRICA CONFERENCE CENTRE

The conference centre is the focal point of the campus, in which the sharing of knowledge as a collective would be key to the success of the campus.

CAMPUS

The campus is intended to play as much of a role in the education of the student body as the architecture is. Designed as a productive landscape.

Once completed, the University of Pretoria's Future Africa Campus should inform the studies of the scholars it houses as much as the research they do can.

The architecture of the campus plays an active role in shaping minds, as much as it does in shaping environments.

(Earthworld, 2017)

Figure - 118 *(Earthworld: 2017)*

Figure - 119 *(Earthworld: 2017)*

Figure - 120 *(Earthworld: 2017)*

OTHER NOTABLE PRE-EMPTED NODES OF DEVELOPMENT IN SOUTH AFRICA

OUTREACH FOUNDATION COMMUNITY CENTRE IN HILLBROW
LOCAL STUDIO

The building houses three primary functions: a computer centre on the ground floor, a dance studio on the first floor, the offices and meeting areas on the second floor.

Designed as a small piece of urban design, an open staircase creates a vertical street, leading users from a central courtyard up to the public roof garden.

> *The roof garden was partially funded by housing companies in the area. It complements the building and forms a platform from which users of the centre can interact with the city below.*
>
> (Chapman, 2016)

GUGULETHU/MANENBERG YOUTH SAFE HUB
SUN DEVELOPMENTS

The safe hub in Gugulethu is a good example of applying the safety principles of the Violence Prevention through Urban Upgrade approach to provide a safe zone for youth in after school activities at Intshukumo secondary school.

> *The safe hub model was designed by Amandla edufootball to disrupt the cycles of poverty, unemployment and inequality that trap youth in urban slums. Each safe hub includes an artificial turf field, a training academy, a psychosocial support centre and offers free Wi-Fiaccess and a meeting space. A platform for community engagement and youth development, the safe hub includes commercial space for young entrepreneurs and local start-ups, as well as shared office space for local NGO's and government initiatives.*
>
> (Sun Developments, 2016)

Figure - 122 *(Local Studio: 2017)*

Figure - 121 *(Sun Developments: 2017)*

KUYASA REGIONAL LIBRARY COMPLEX
CCNI ARCHITECTS

Kuyasa regional library complex on Walter Sisulu drive forms part of the larger Kuyasa station precinct development.

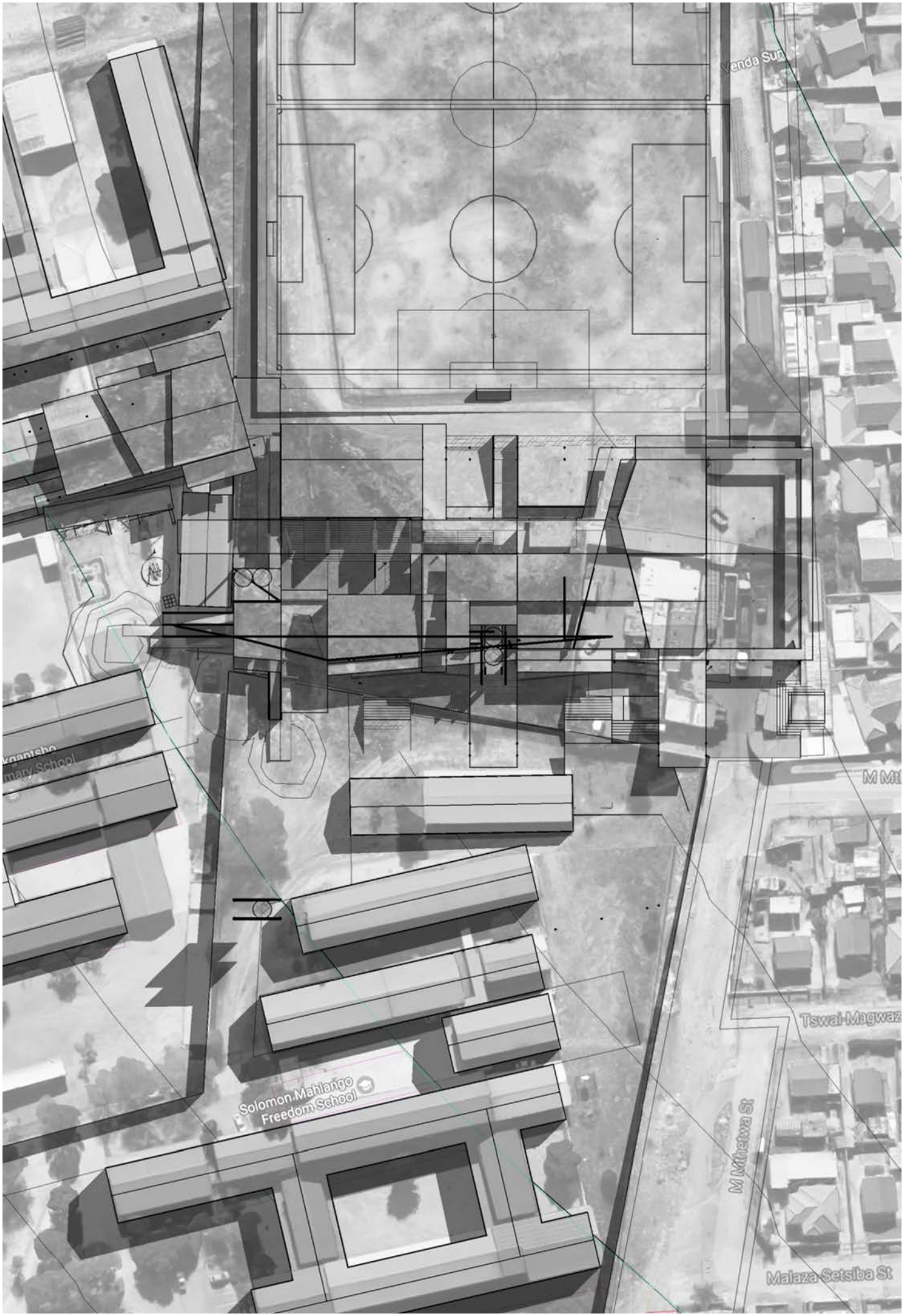
> *The precinct in envisaged as a higher order node in khayelitsha where proposed facilities serve the need not only of local residents but also of residents in surrounding areas.*
>
> *A point of difference of this project is the desire to embed the possibilities of a mixed use city natured project in our everyday environment, with living, working, learning and shopping happening in an integrated manner.*
>
> *The project comprises retail spaces on the ground floor, with regional library, meeting and training rooms, two apartments and sub council offices on the next two levels.*
>
> (CCNI Architects, 2016)

Figure - 123 *(CCNI: 2017)*

Figure - 124 *(CCNI: 2017)*

DESIGN DEVELOPMENT

Figure - 125 *(Author: 2017)*



SITE DESIGN DEVELOPMENT

Seven schools form an educational corridor that runs from North to South, parallel to Broadway Street, between main spine roads: Hinterland and Tsamaya Road.

As the infrastructure should act as a catalytic pre-empted node of development, precinct studies were undertaken as to fully realize the potential of the surrounding schools and ultimately, the full educational corridor.

Desire lines were completed to create flow in the urban landscape and keep ease of access fully utilized.

The location of the infrastructure was approved where it had the greatest impact on its surrounding inherited apartheid spatial legacy environment, and subsequently had to have a relationship with the existing sport fields and school yards.

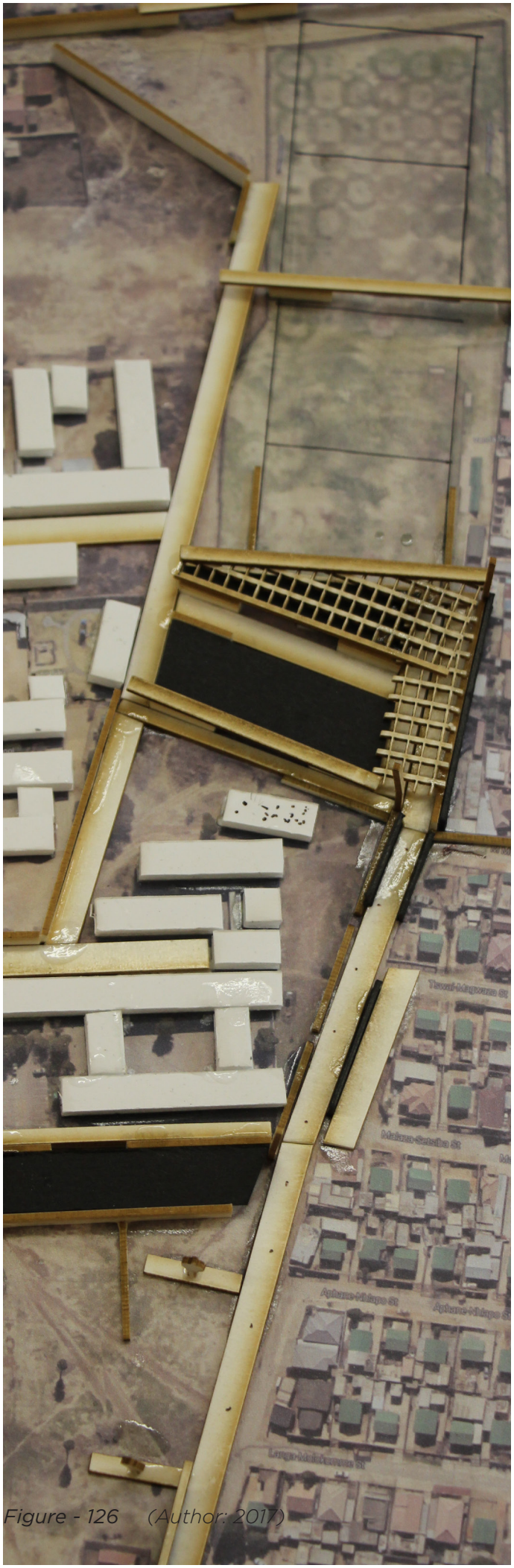


Figure - 126 (Author: 2017)

Figure - 127 *(Author: 2017)*

Figure - 128 *(Author: 2017)*

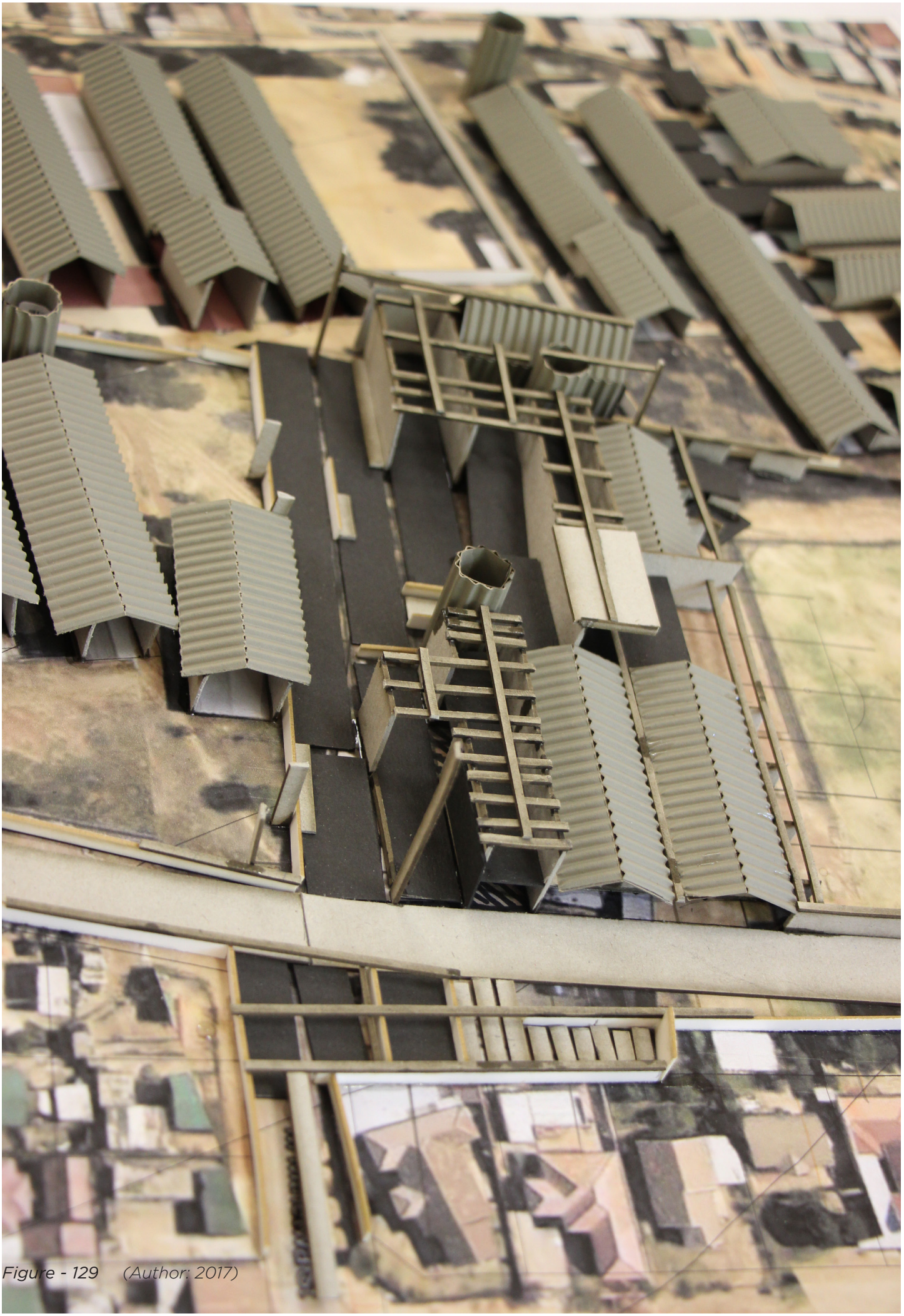


Figure - 129 *(Author: 2017)*

SUMMARY OF DESIGN INFORMANTS

Conceptual principles

1 Existing school infrastructure layout and programmatic relationship between stakeholders.

2 Programmatic layout and relationships between interior spaces of a new school cluster network and teacher resource centre as well as continued elements such as the courtyard and classrooms.

3 Appropriation of existing built form to create continuity in the urban landscape.

4 Various responses to the formalistic realization of the building were investigated, expressed and iterated through models and circulation plans.

5 Doing so, connection to the existing landscape was promoted and the built form successfully reacts to create a precinct of new knowledge exchange architecture and foster a breakdown of existing perception resulting in a new openness to communication.

Figure - 130 *(Author: 2017)*

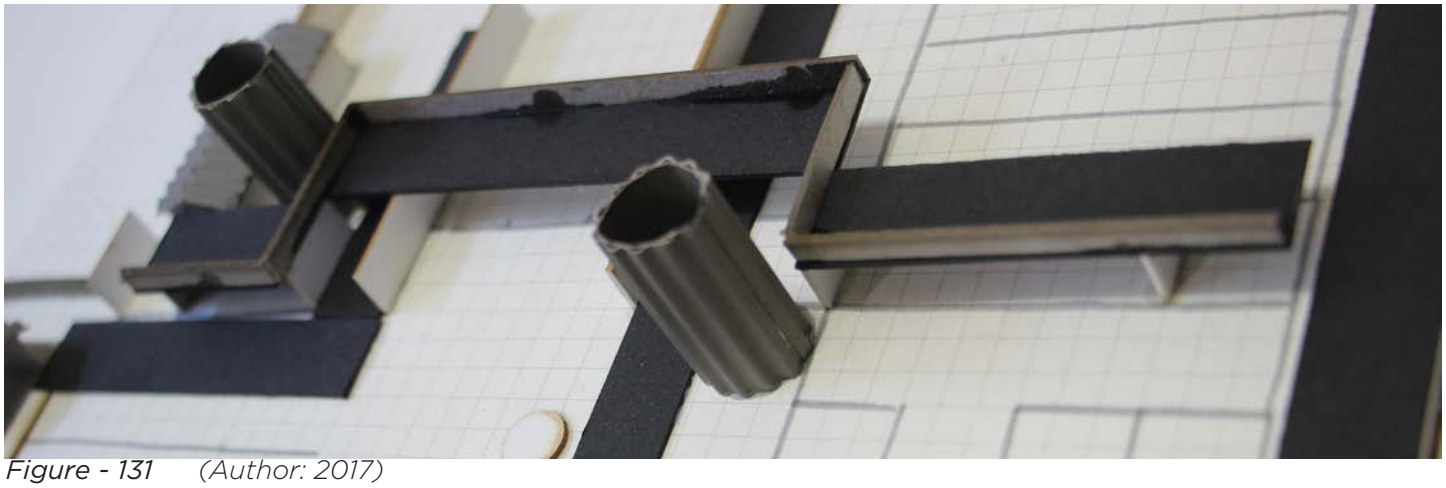


Figure - 131 *(Author: 2017)*

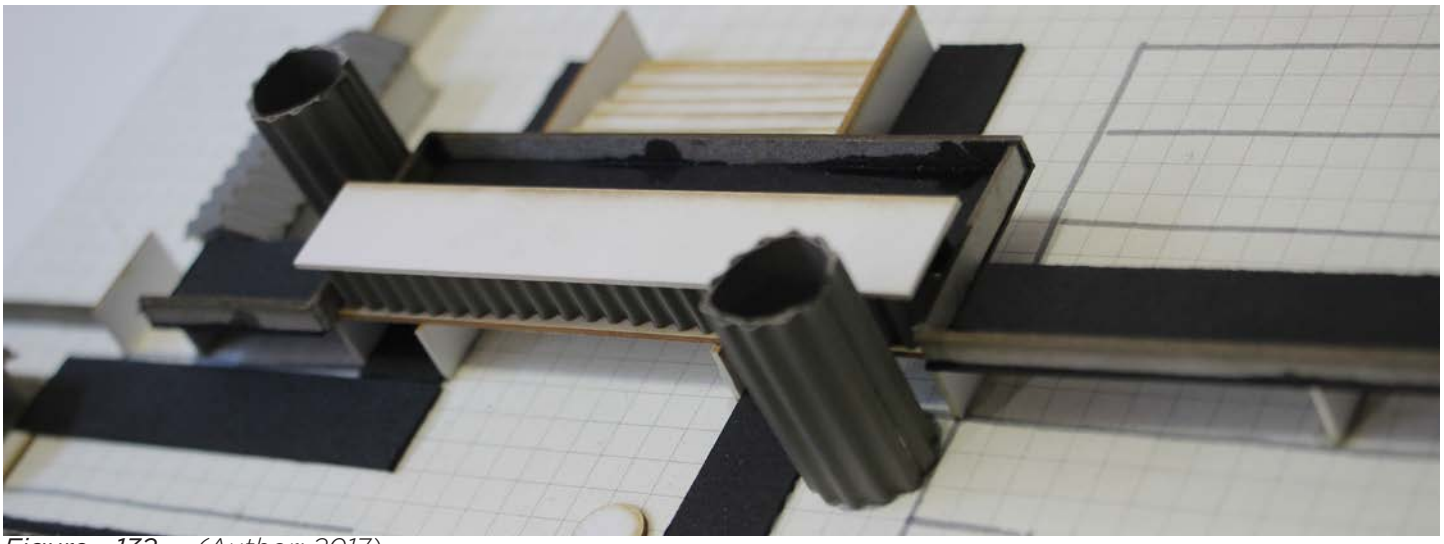


Figure - 132 *(Author: 2017)*

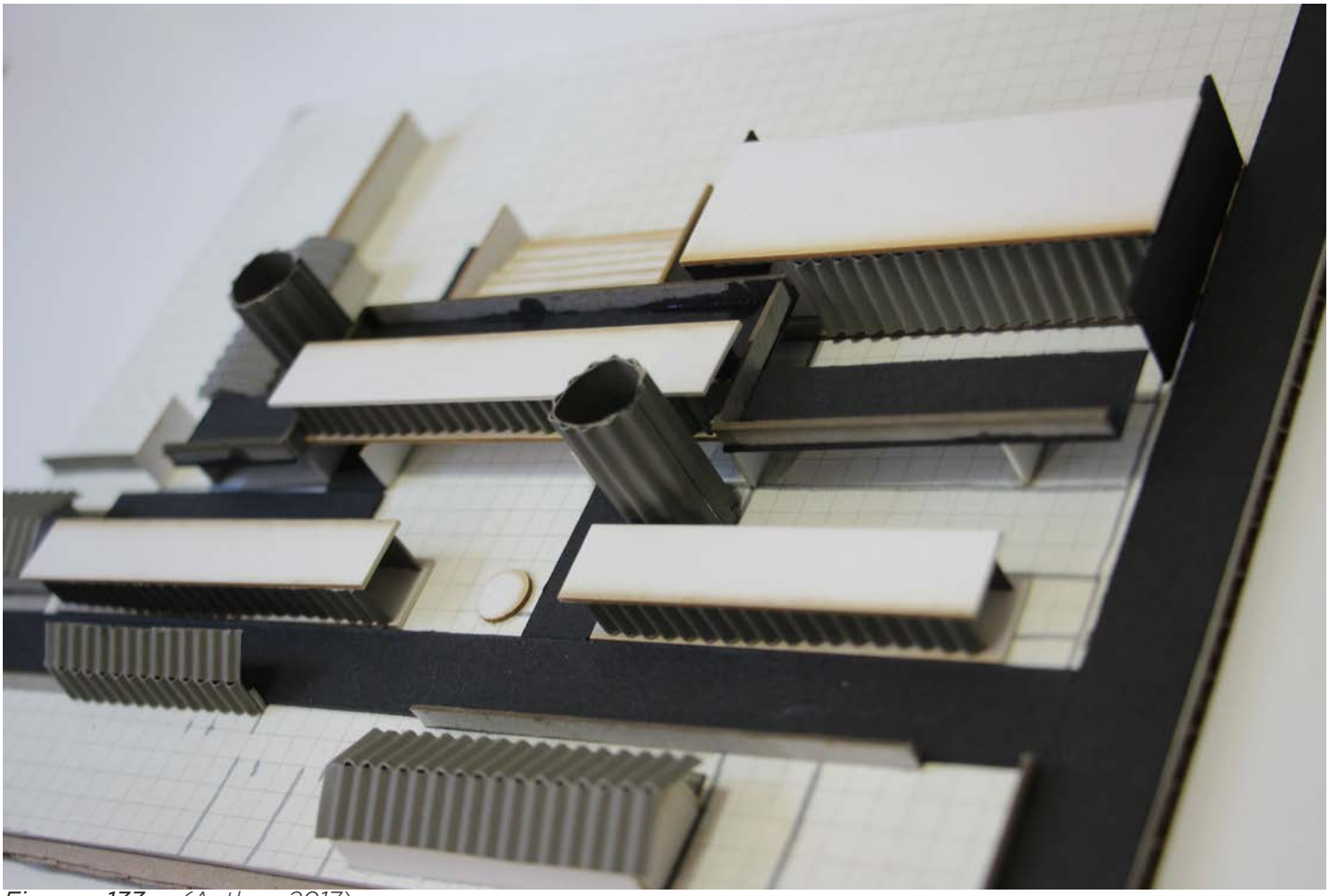


Figure - 133 *(Author: 2017)*

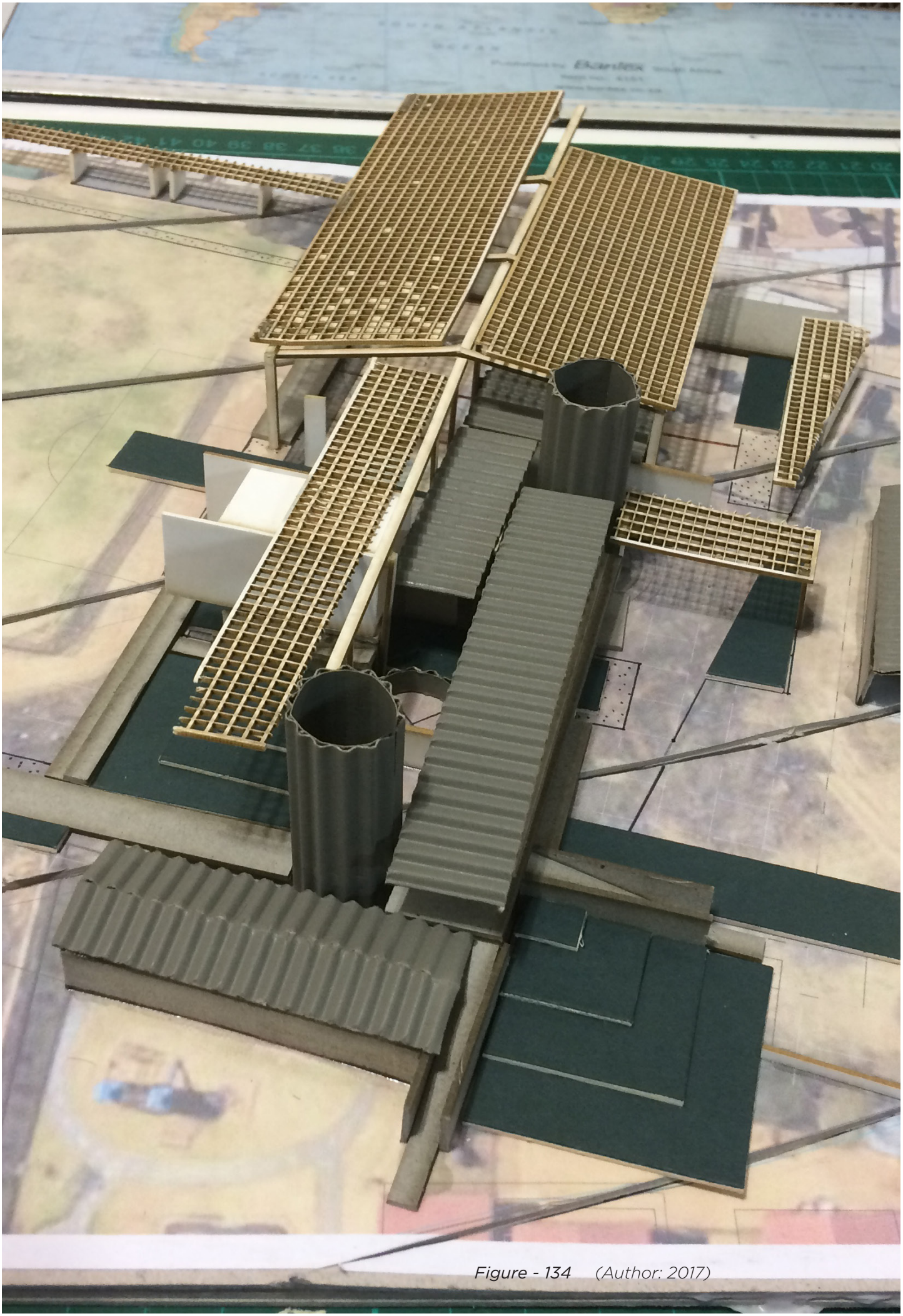


Figure - 134 *(Author: 2017)*

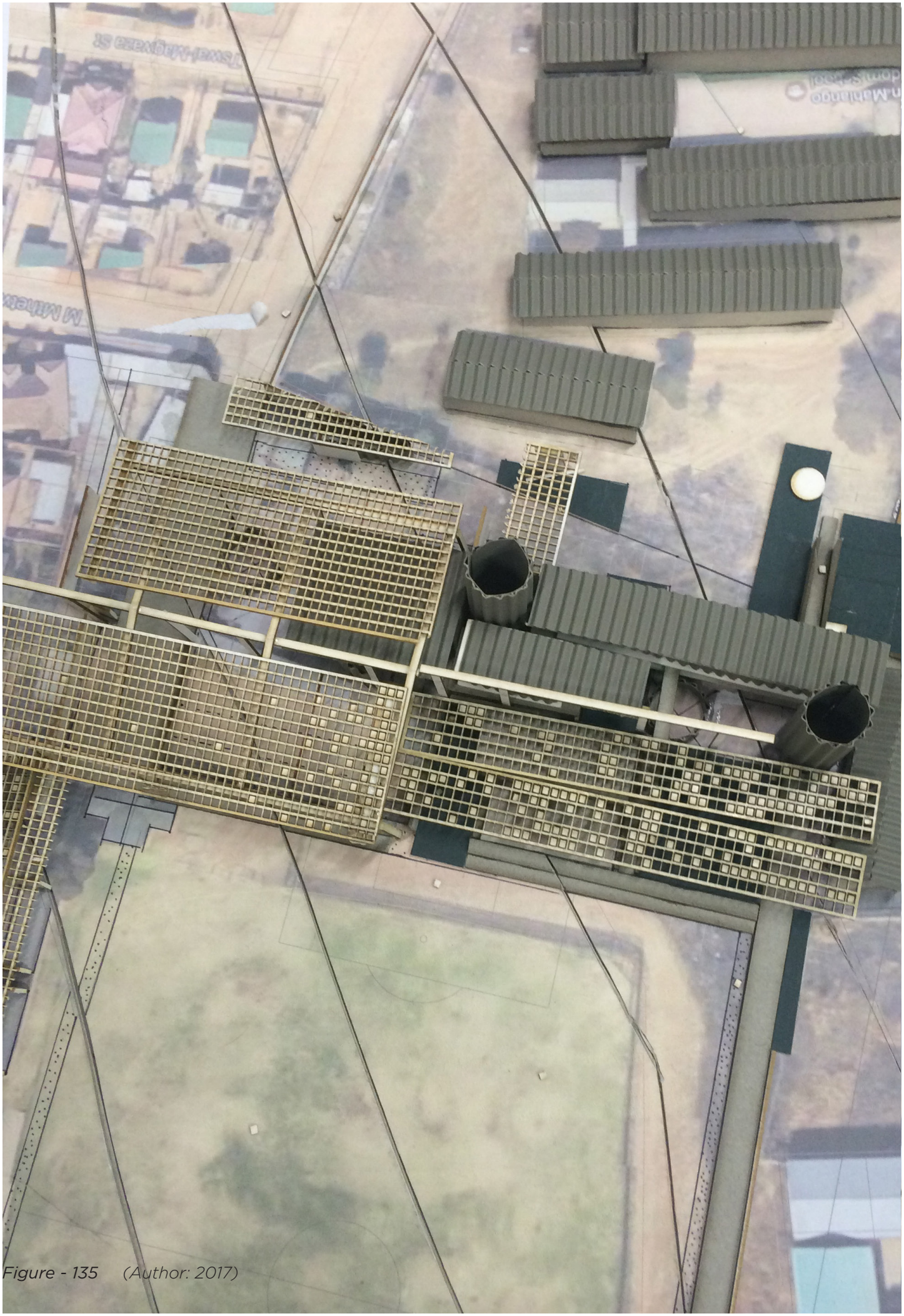


Figure - 135 *(Author: 2017)*

PLANS, CIRCULATION AND SECTION

PLAN

Plan exploration was informed by the optimal flow of the user, and the user's relationship and needs for the building.

Teachers and pupils and community members all have a different approach and circulation hierarchy in the layout, creating multiple entry points and focusing circulation to certain gathering and focal points.

The main entrance has a reception, were the secondary entrance leads directly to the useable spaces.

CIRCULATION

Programmatic spatial environment and user circulation informed the iterated layout of the building. Their response to adjacent programs and transition between spaces created the flow and reflection necessary to investigate and iterate knowledge exchange in three dimensions.

SECTION

Lastly, sectional exploration was driven by optimal edge conditions and appropriate environmental approaches. Focusing design resolution on indoor acoustic environment, passive heating and daylight optimization.

The main section of the dissertation cuts through the classroom, courtyard, outdoor amphitheatre and sport pavilion. It embodies the projects manifesto for communication in various circumstances.

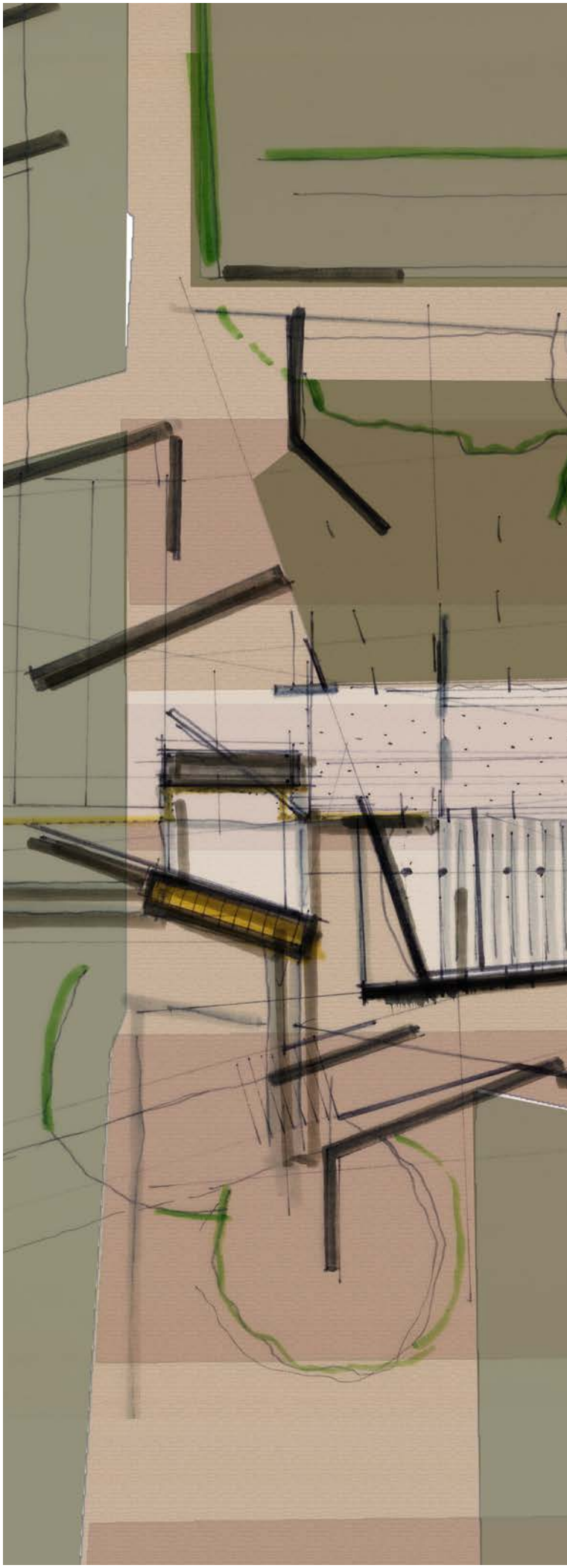
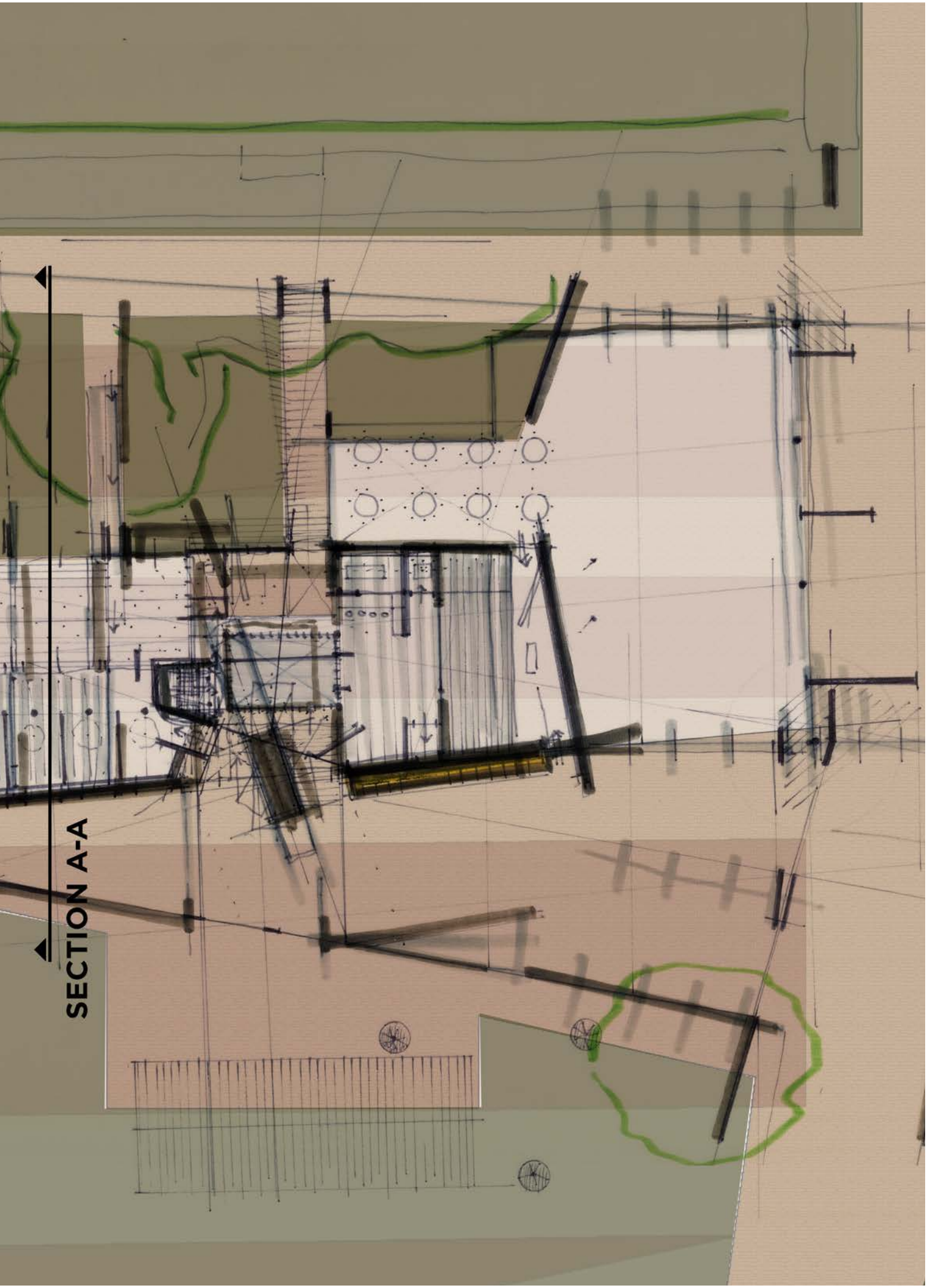


Figure - 136 *(Author: 2017)*



DESIGN DELIVERABLES

The design iteration strived to adhere to the conceptual framework and the practical implementation in all the infrastructure spaces.

PRECINCT:

WALKWAYS AND PEDESTRIAN ROUTES

The site has a dense urban fabric with narrow streets lined with informal Spaza shops, crèches and informal house extensions. With open space in Mamelodi at a premium, the streets are true spaces where, out of necessity, pedestrians take precedence over motor vehicles.

ACCESS

General thoroughfare in and around the site is designed with all stakeholders in mind, while maintaining the safety of learners, teachers and facilities through various hierarchies of access and security.

The architecture of the new facility is proposed as a continuation of the old school buildings.

The building juxtaposes a sheltered, enclosed public plaza to the east, education personnel and pupil public plaza to the south, entrance into the building for personnel and pupils to the west and an expansive opening up onto the playing field to the north.

FOCUS POINTS

Water towers act as waypoint in the landscape, creating a presence of the community knowledge exchange infrastructure as far away as 1000m.

SITE BOUNDARY AND DESIGN:

The new architecture has to accommodate its features in the limited area available outside the existing school.

With direct access around the site and between the multiple spaces, its aim is to offer flexibility of use and ease of flow between the hall, cafeteria and sports field during special school events. Three main entry points are proposed, each catering to different methods and users in entering the building.

SECURITY AND PRIVACY

Those familiar with the architecture enter on the furthest western entry, with entry to an information and reception desk in the centre. A large public peristyle invites the common public when an event is scheduled in the main hall, such as, sport or market days can be held.

To the east, a multi-functional courtyard combined with classrooms and ablutions buildings anchors the school architectures private face, fronting the entrance onto the walkway.

Off shutter concrete peristyles extend across the public façade of the complex. The design of visible structural elements complements the functional aspects of the building. The new architecture, together with the existing schools, forms a generous public square or public artery.

RELATIONSHIPS WITH EXISTING SURROUNDING ENVIRONMENT:

The sport field continues halfway into the building, acting as a pavilion as well as a privacy envelope for the resource centre.

The geometry of the surrounding school courtyards informs entrance ways into the building. The continuation of the architectural language of classrooms appropriate to create the building.

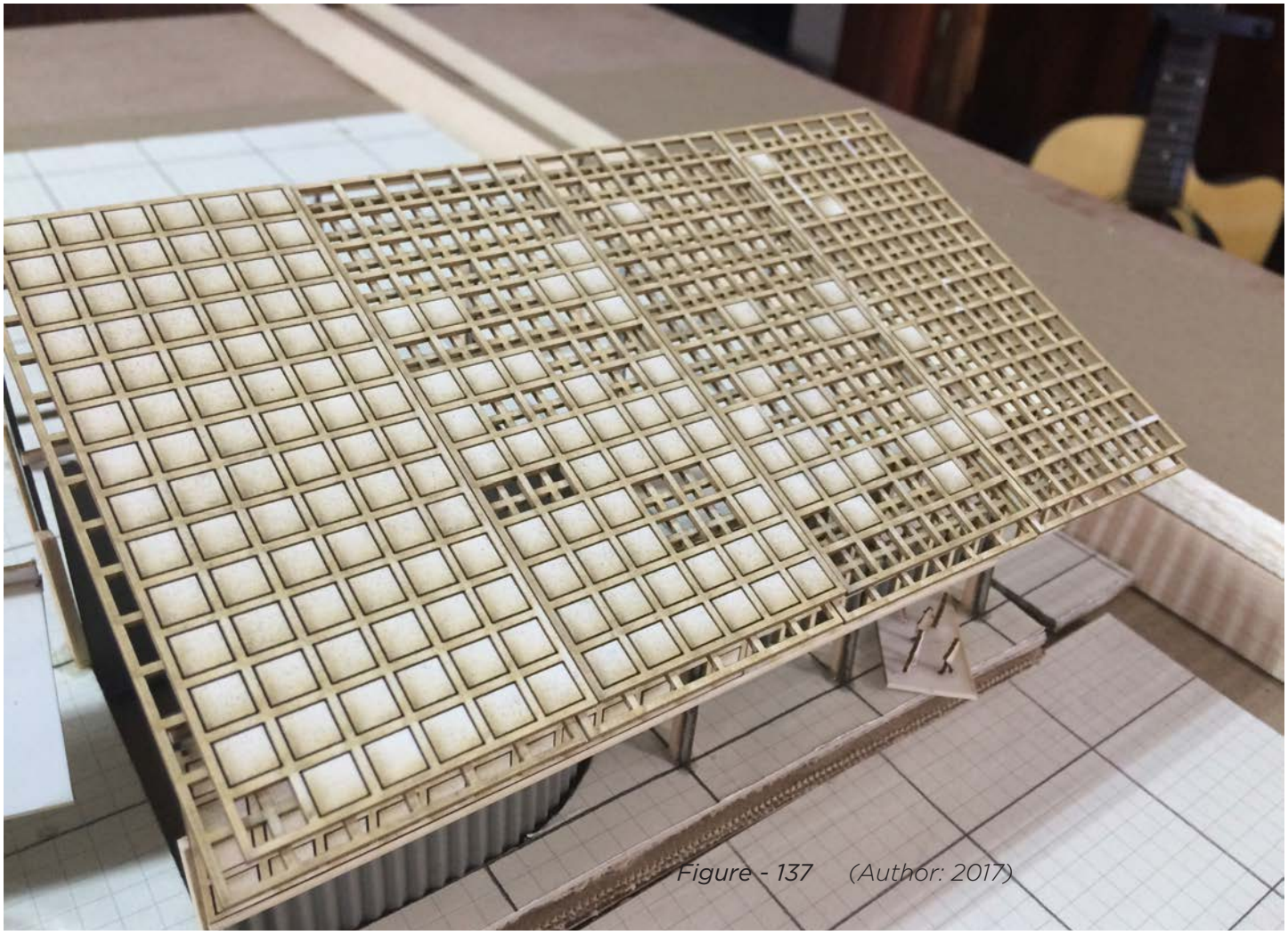


Figure - 137 *(Author: 2017)*

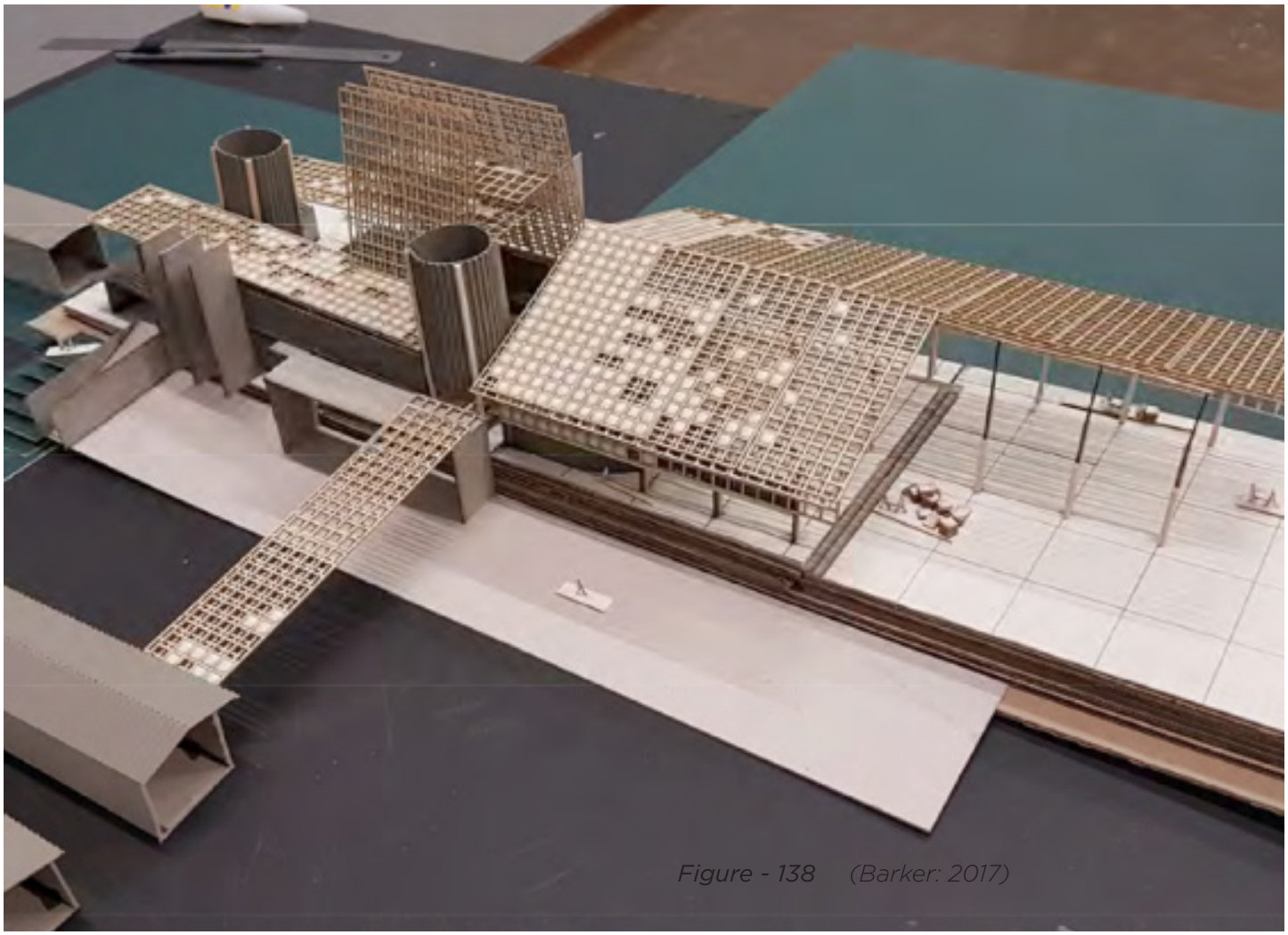


Figure - 138 *(Barker: 2017)*

INFRASTRUCTURE FRAMEWORK:

Water towers are located at the centre and western end of the classroom block, acting as vertical landmarks in the featureless Mamelodi cityscape. The towers are fed by rainwater from the schools to reduce reliance on the municipal water supply.

This will be used for irrigating the sport fields and flushing the school toilets, and another separate system producing potable, drinking water will also be in place.
A covered but open courtyard and informal knowledge exchange amphitheatre relates directly to each formal classroom.
The concept for the resource centre required a highly flexible and multi-functional hall space, suitable for functions of virtually any description, from school assemblies, standing and seated, from theatre productions to meetings and writing examinations, market days, lectures and graduation ceremonies.

“Public-ness” is maintained through height in certain areas, to allow for place making in the otherwise very low dense urban fabric.

Five separate buildings were arranged around a hierarchy of sheltered courtyards and informal social spaces. The large shared public plaza allows for outdoor play and assembly of learners while the smaller, covered courtyards between the classrooms provide protection from the elements and act as gathering space for teachers and smaller children.

ROOF CANOPY:

Hot air extraction in communal covered areas reduces heat build-up. The main foyer is located in the middle of the centre complex underneath the administration offices, overlooking the main entrance plaza.

This configuration facilitates safety, control and access for public functions during after-hours use of facilities such as the media centres, school hall, computer classrooms and the administration block.

At the heart of the internal courts are the two most significant structures of the schools, namely the multi media centre and the hall. The multi media centre has been interpreted as a sanctuary of learning and the form of the roof and ceiling have been shaped to allow light from the south onto the desk of offices and study areas.

The sanctuary of learning building contains four multipurpose classrooms, a computer laboratory, ablutions facilities and a projection room for the auditorium.

SPATIAL INFILL:

Rather than taking the ASIDI approach, the scheme accepts the existing education landscape and proposes the necessary spatial intervention to influence skills delivery.

Circulation routes become hybrid spaces accommodating lockers and seating, also encouraging interactive play, communication and teaching.

The intention behind the design of the school was to create an inspirational environment for its occupants that would be sufficiently robust to reduce maintenance costs, and would last for many generations of future teachers and learners and potential future adaptability.

A concept of fragmentation was developed to reduce general building size and proportions, linking the scale of the building more closely to its surroundings.

In respect to the typology of Mamelodi, the schools traditional materials of face brick and corrugated roof sheeting is used. Creatively appropriated in some areas to fully present the potential of using these local building techniques

The sanctuary of learning library is located on the first and second floor and accessed via a double volume concrete staircase.

Figure - 139 *(Barker: 2017)*

Figure - 140 *(Barker: 2017)*

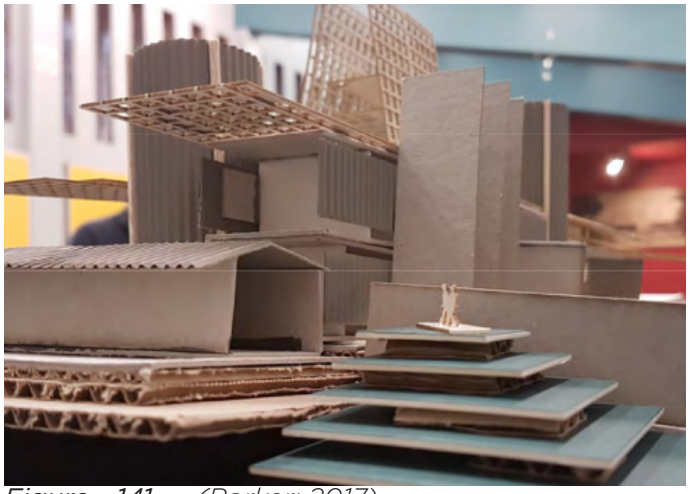


Figure - 141 *(Barker: 2017)*

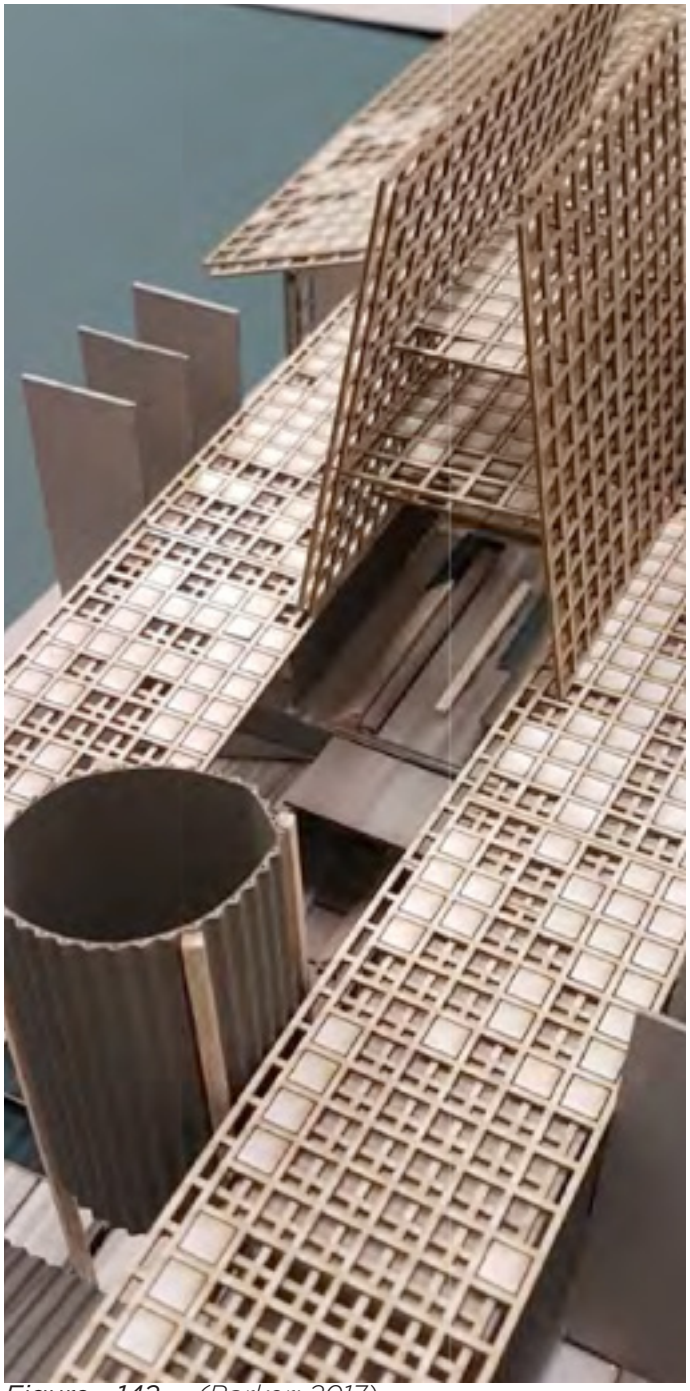


Figure - 142 *(Barker: 2017)*

Figure - 143 *(Barker: 2017)*

TECHNICAL DEVELOPMENT

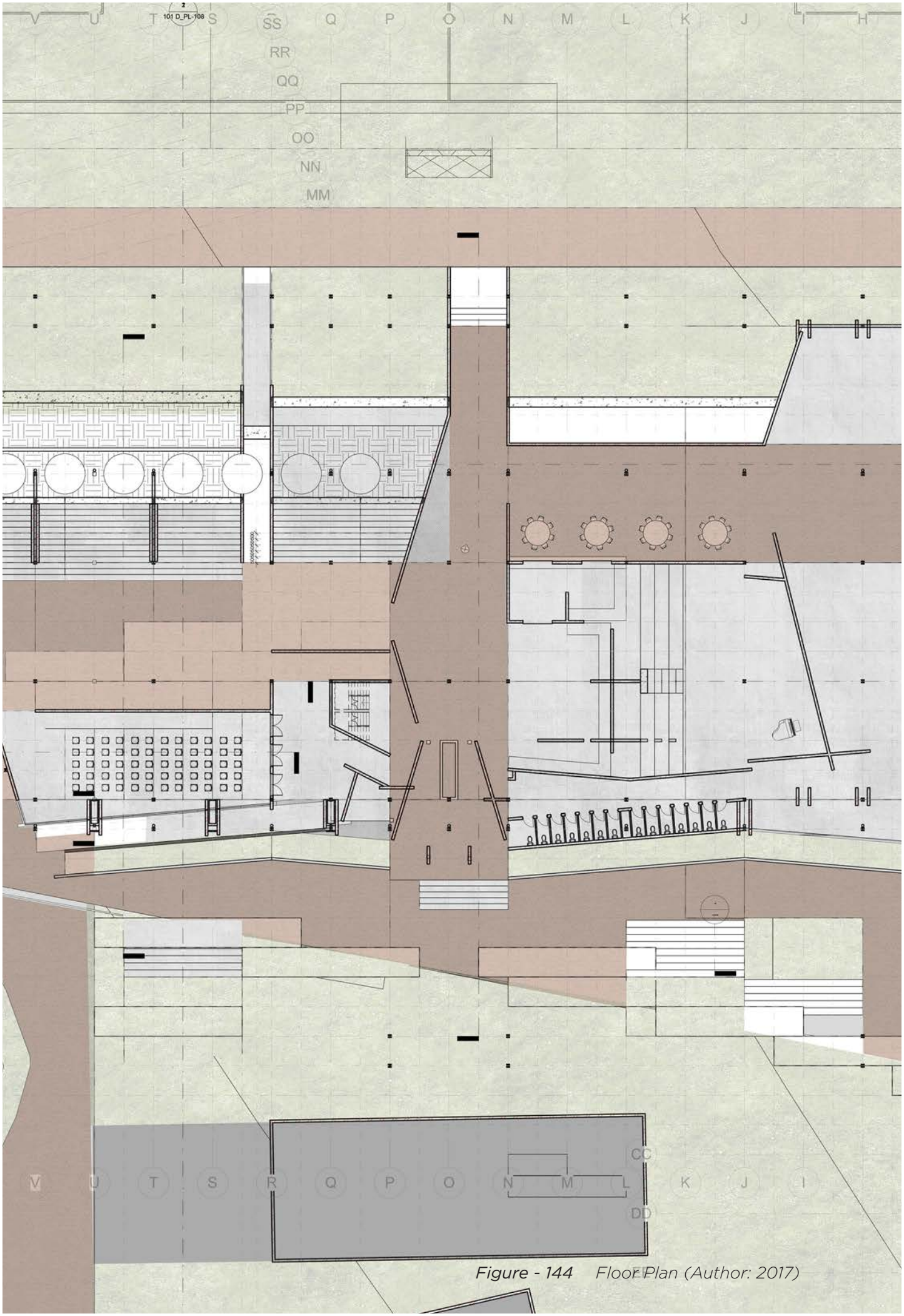


Figure - 144 *Floor Plan (Author: 2017)*

CONCEPT

Architects have the ability to impact multiple spheres of society though their design decisions.

In South Africa, our blueprints impact a sector of the economy were various levels of skills, education and income groups work together in realizing a building.

> *"As we find ourselves in a country where our design decisions carry great weight, our sustainable architecture should not only fulfil climatic requirements and potentials, but accommodate the up-skilling and support of local communities to attain economic empowerment" (Low, 2016).*

The dissertation therefore suggests the potential in fostering development of small scale contractors, and their inclusion in part of the construction process, as well as using the skills and technologies possessed by our country's professional teams, and our industrial capacity, embodied in Mamelodi's neighbouring areas such as Silverton.

The stereotomic and tectonic become a relationship between worlds seldom brought together within designs and developments, but may prove to be critical in contributing to a prosperous future.

THE TECTONIC CONCEPT

– A supportive framework – developed by the professional sector and funded by the public sector.

Attributes include high performance, high level of skill and technology, medium impact on the environment and cost efficiency, low labour need and quick implementation.

Material pallete: light gauge steel, precast concrete slabs, Permaform concrete slabs, space frame design, all services and systems.

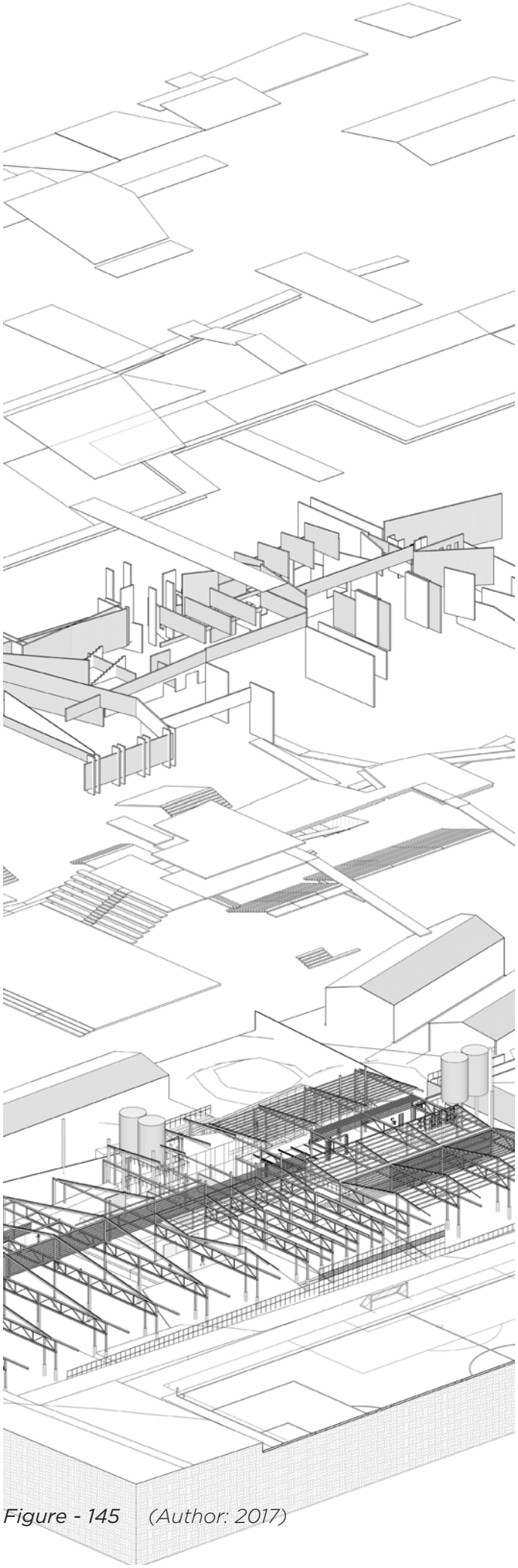


Figure - 145 *(Author: 2017)*

THE STEREOTOMIC CONCEPT

– A Community based infill – driven by private community networks and small contractors.

Attributes include: High climatic performance and high labour need, time intensive construction, low skill and low technology processes, low impact and cost effective design.

Material pallete: Mamelodi made clay and concrete brickwork, corrugated iron, EPWP technologies, black wattle acoustic screen crafting and recycled and reused materials.

INTENTION

The dissertation's technological intention is to contribute to a field of architectural solutions critical to the implementation of educational infrastructure.

As discussed, the ASIDI framework is in need of a critical rethink.

Its major drawback in terms of construction is that contractors do not deliver on time, and that the professional team is too small and inefficient.

This type of construction, has in the past led to a situation where pupils and educators had to move into another building in order to proceed with the year's curriculum. Due to further inefficiency, some school buildings were never handed beck to the school board at all.

One can however, not ignore the amount of workless individuals in our emerging cities. Therefor a careful and creative balance must be accomplished.

Also, the construction and manufacturing of the building is critical to successfully implement the project in more locations, across the country.

A symbiotic relationship could be fostered between professional teams and unemployed, low skill level workers, as well as the school governing bodies and other community stakeholders.

The Governments EPWP program can be seen as a possible solution to this predicament.

EXPANDED PUBLIC WORKS PROGRAMME (EPWP)

The Expanded Public Works Programme eminated from the Growth and Development Summit (GDS) of 2003. First announced by former president Thabo Mbeki, it is a major government initiative based on utilising labour intensive technologies to build and maintain infrastructure, whilst simultaneously accommodating the need for skills transfer and creating work opportunities for unemployed people (The Department of Public Works, 2009).

Hence, beneficiaries are empowered to improve their long term capacity too earn a living and be productive members of society, while simultaneously building much needed infrastructure. This, in my opinion, is an excellent example of creating a South African solution to an African predicament.

Consider, for instance, that 70% of young people in the 16 to 34 age group, in our country, have never been employed, and that 59% of unemployed people have never worked at all (The Department of Public Works, 2009).

This is a profound problem for our society, hinders the dream that all South African's can live a meaningful and productive life.

The high levels of unemployment and poverty remain issues of grave concern in our country, and the debate continues on how to address this situation in the most effective way. The EPWP model, however, is one of government's more significant tools in the fight against these persistent social challenges, having as it does, the power to both alleviate poverty through employment and create solid infrastructure.

The Teacher Resource Center by EPWP standards must contain a work force of 65% youth, 55% women and 2% disabled people. The total percentage to consist of 90% local inhabitants. To construct this project, the budget must adhere to the following figures.

46% Spent on Materials and Equipment
35% Wages
18% Project management costs
2% Training
1% Wage Compensation and Community Facilitation

The 2% Training is of critical importance. This is for non-accredited Training. It includes the likes of Plumbers, Bricklayers, Brick Makers and Health and Safety Officers. An additional 5% can sometimes be added for Accredited Training to comply with the National Qualifications Framework (Mathews, 2016).

This then ties perfectly into building knowledge exchange infrastructure in emerging suburbs.

It must however be adopted to deliver on time and on budget.

A tectonic superstructure is proposed to comply with the load bearing elements and form a kind of milestone guideline to ensure productivity.

THE KNOWLEDGE EXCHANGE CENTRE THEN BY DEFINITION RECEIVES A PRELIMINARY EDUCATIONAL INTRODUCTION EMBEDDED IN ITS FLOORS AND WALLS.

Figure - 146 *EPWP Praxis (Author: 2017)*

Figure - 147 *EPWP Praxis (Author: 2017)*

Figure - 148 *EPWP Praxis (Author: 2017)*

Figure - 149 *EPWP Praxis (Author: 2017)*

Figure - 150 *EPWP Praxis (Author: 2017)*

Figure - 151 *EPWP Praxis (Author: 2017)*

Figure - 152 *EPWP Praxis (Author: 2017)*

Figure - 153 *EPWP Praxis (Author: 2017)*

Figure - 154 *EPWP Praxis (Author: 2017)*

Figure - 155 *EPWP Praxis (Author: 2017)*

Figure - 156 *EPWP Praxis (Author: 2017)*

Figure - 157 *EPWP Praxis (Author: 2017)*

Figure - 158 *EPWP Praxis (Author: 2017)*

Figure - 159 *EPWP Praxis (Author: 2017)*

Figure - 160 *EPWP Praxis (Author: 2017)*

Figure - 161 *EPWP Praxis (Author: 2017)*

Figure - 162 *EPWP Praxis (Author: 2017)*

Figure - 163 *EPWP Praxis (Author: 2017)*

Figure - 164 *EPWP Praxis (Author: 2017)*

STRUCTURE

The building will consist of one main structural system engineered and pre-manufactured in the neighbouring industrial areas.

Inherited from the past, the relationship between township and industrial area has long been part of the South African heritage due to apartheid planning.

By the use of hot rolled steel in various profiles, bolted together, it would present the framework for the knowledge exchange centre.

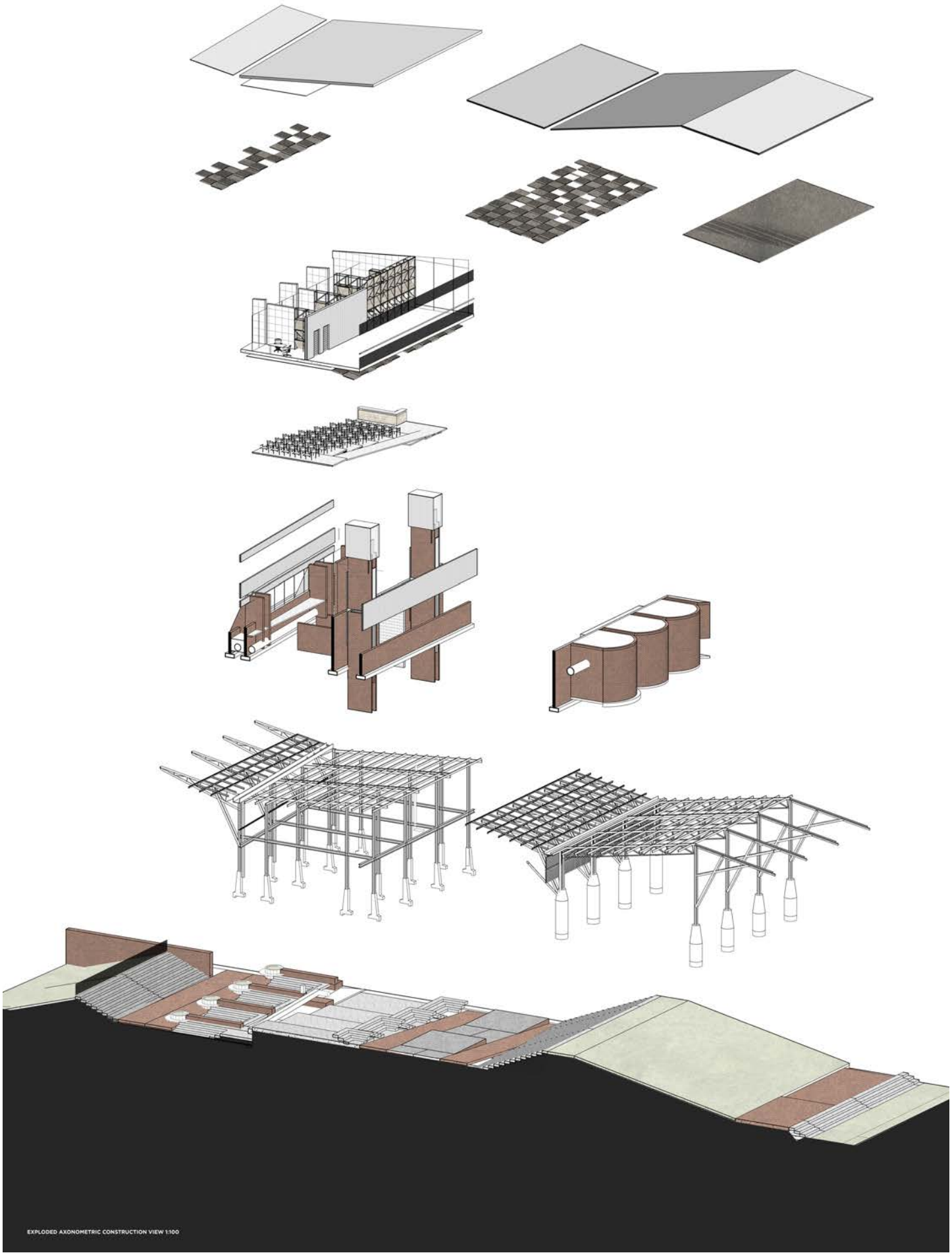
The roof structure will only accommodate the minimum space for the essential program, and all additional shading devises and infrastructure should be completed by using the low skill labour available in the local area.

These additional architectural elements will however be adequately designed to form the blueprint for the labour team and will form part of the construction process delivering skills and techniques.

A well designed, luxurious gum pole roof structure will tie all the fragmented elements together. This construction will aim to develop labour skills and introduce a crafted element to the industrial design.

Figure - 165 | *EPWP implementation (Author: 2017)*

Figure - 166 *Exploded view (Author: 2017)*



TECHNOLOGY

It is with the tectonic steel and concrete superstructure and stereotomic infill of brick, gum pole and artisanal screens, that the construction process will guarantee successful implementation and ultimately, a world class built environment.

The extruded axonometric view depicts the layered construction of the building.

1) First, the site will be adequately prepared.

Due to Mamelodi's good ground conditions as well as bad clay conditions, a specialist whould have to investigate the soil situation on the spesific site.

Potentially, G7 ground fill can be proposed, but a previouse site investigation showed that most of the existing built environment did not show signs of clay soil indications in the precinct.

The first intervention will be to level the sports field to adequately cater to accredited sporting codes. The topsoil will then be used to create the impressive grass embankments to shelter the knowledge exchange infrastructure, provide an amphitheatre for discussions, and create a leisurely grass embankment for spectators and after school informal gatherings, presenting a pleasant space to do homework in.

Figure - 167 *EPWP implementation (Author: 2017)*

2) In the second stage, the superstructure will be implemented. With concrete footings, the steel structure consists of hot rolled 200 x 200 H profile columns, 200 x 200 I Profile beams and C channel roof purlins held up by 45 x 45 angle iron joinery.

3) The third step would be to finish the professional services; this implies all roof sheeting and insulation. The delivery of the modular water tower manager and all first and second story, Permaform, concrete floors.

4) With the construction of the roof and structural floors finished, the first EPWP program will commence. After all the professional deliverables, the EPWP team will commence on the crafted infill of the infrastructure. This includes laying paving, constructing face brick walls and brise soleil walls.

The gum pole acoustic classroom and auditorium and acoustic treatments will also be constructed.

5) The infrastructure receives its final finishes and the site can be handed over to the teachers.

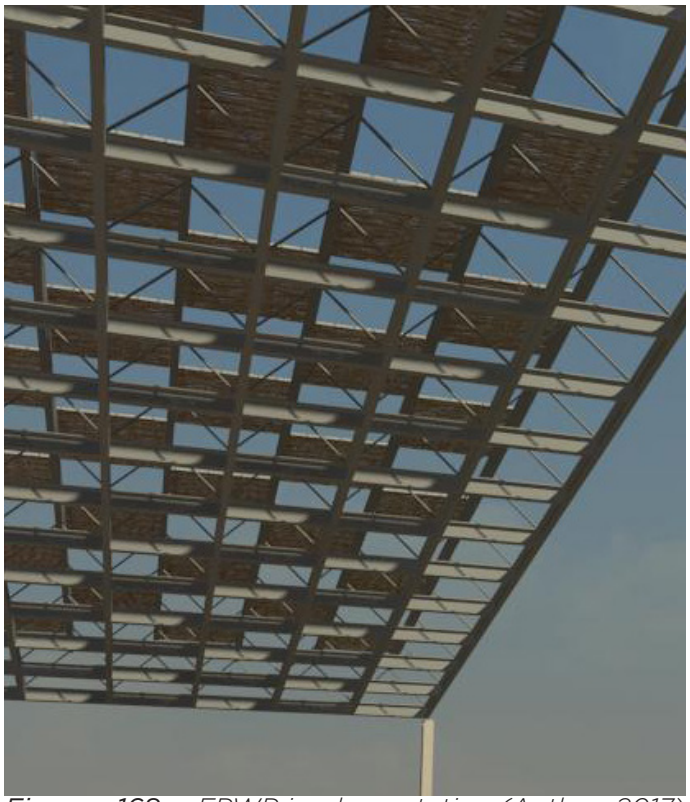


Figure - 168 *EPWP implementation (Author: 2017)*

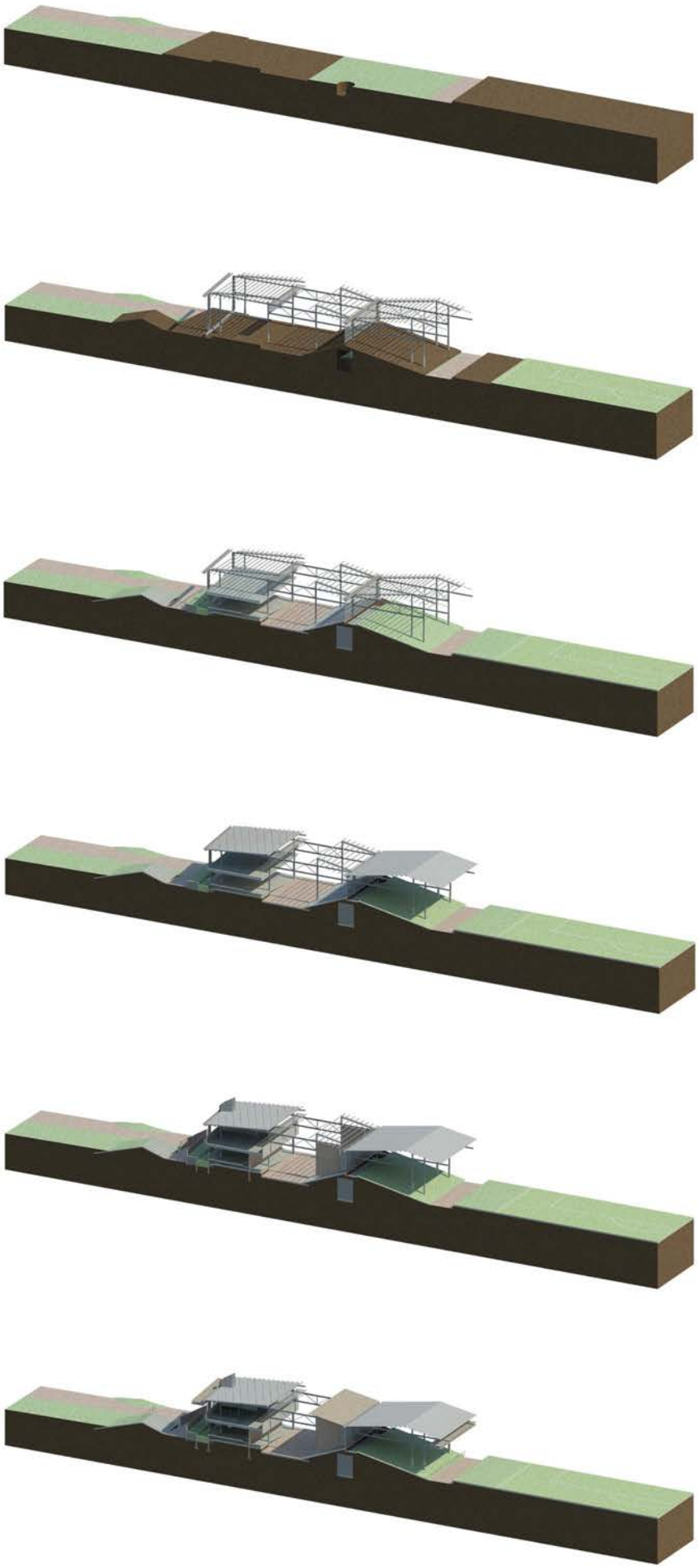


Figure - 169 *EPWP implementation (Author: 2017)*

MATERIALITY

The material composition of the structure is appropriately simple. The two construction phases between tectonic and stereotomic dictate the appropriate material. With respect to existing construction methods used in Mamelodi to ensure a continuation in the built environment, the materials will be paired into two categories.

KEY TO MATERIAL CATEGORIES:
EPWP=Expanded Public Works Program – in situ, in training construction
PROF: Professional, Industry supplied and installed building materials

EXISTING MATERIALS
Brick, Clay roof tiles, Corrugated Iron Roof Sheeting

STRUCTURAL SUPPORT
PROF: Cold rolled Mild Steel Column on Reinforced concrete column footing
EPWP: Timber Gum Pole Column with rebar structural support

FRAMEWORK
PROF: C channel and Cold rolled I Profile beam with riveted and bolted connections
EPWP: Timber gum pole beams, held together with rebar

ROOF
PROF: Corrugated roof sheeting in IBR profile
EPWP: Gum pole timer construction
With Polycarbonate roof sheeting
Without Polycarbonate roof sheeting

FLOOR
PROF: Ground floor: In situ concrete floor, power floated
First floor: Permaform In situ Concrete floor
EPWP
Classroom: Recycled Timber floor finish
Outside veranda: Polished Concrete
Public Plaza: Paving in herringbone pattern

WALLS
PROF: Shop front, double glazed wall.
EPWP: Brick- Brick de Soli-
Custom in situ corrugated indoor wall panel system.

SCREENS
EPWP : Mentis Grid
Black Wattle crafted screen
Acoustic Panel Wall system

MATERIALS ON SITE



Figure - 170 *(Author: 2017)*

CONSTRUCTION MATERIALS AND TECHNIQUES IN AREA



Figure - 171 *(Author: 2017)*

EPWP CON-STRUCTION



Figure - 172 *(EPWP: 2017)*

MATERIAL AND CONSTRUCTION PRECEDENT



Figure - 173 *(Diébédo Francis Kéré: 2017)*

PRAXIS 2016 - 2017



Figure - 174 *(Author: 2017)*



Figure - 175 *(Author: 2017)*

Figure - 176 *(Author: 2017)*

MATERIALS ON SITE



Figure - 177 (Author: 2017)

MATERIAL PRECEDENT
MADE IN EARTH STUDIO

Figure - 178 (Made in earth: 2017)

MAMELODI BRICK



Figure - 179 (EPWP: 2017)

MATERIAL CONCEPT

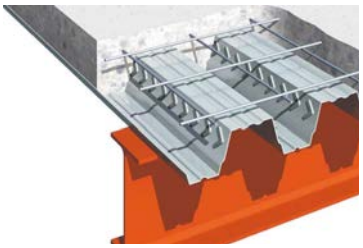




Figure - 180 (Google: 2017)

PRECEDENT ARTIST RESIDENCY AND CULTURAL CENTRE



Figure - 181 (Toshiko Mori: 2017)

FORMAL PRECEDENT W.O. LOCKRIDGE PUBLIC LIBRARY

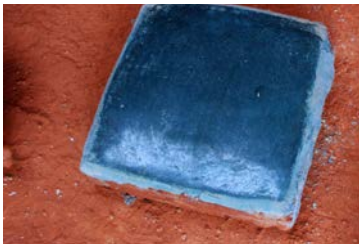


Figure - 182 (David Adjaye: 2017)

FUNCTIONAL PRECEDENT: ASIDI 50 SCHOOLS IN 50 WEEKS




Figure - 183 (Luyanda Mpahlwa: 2017)



SYSTEMS

ACOUSTICS, PASSIVE INDOOR ENVIRONMENT AND LIGHTING

Educational establishments in general, usually place great demands not only on acoustics, but on the whole spectrum of building physics.

More than any other type of building, the most diverse, and in some instances conflicting, requirements have to be fulfilled. Besides acoustic issues (good room acoustics, high sound insulation for rooms where larger groups of people come together to learn), both the thermal and visual comfort and, in particular, the quality of the air are extremely important.

This dissertation then evaluates the appropriate measures to implement quality acoustic environments, both thermal and visual comfortable spaces and systems to improve the quality of air.

The proposed infrastructure does however set out to achieve this though low tech, low budget design, EPWP construction methods and environmentally sustainable solutions

Figure - 184 *SECTION A-A (Author: 2017)*

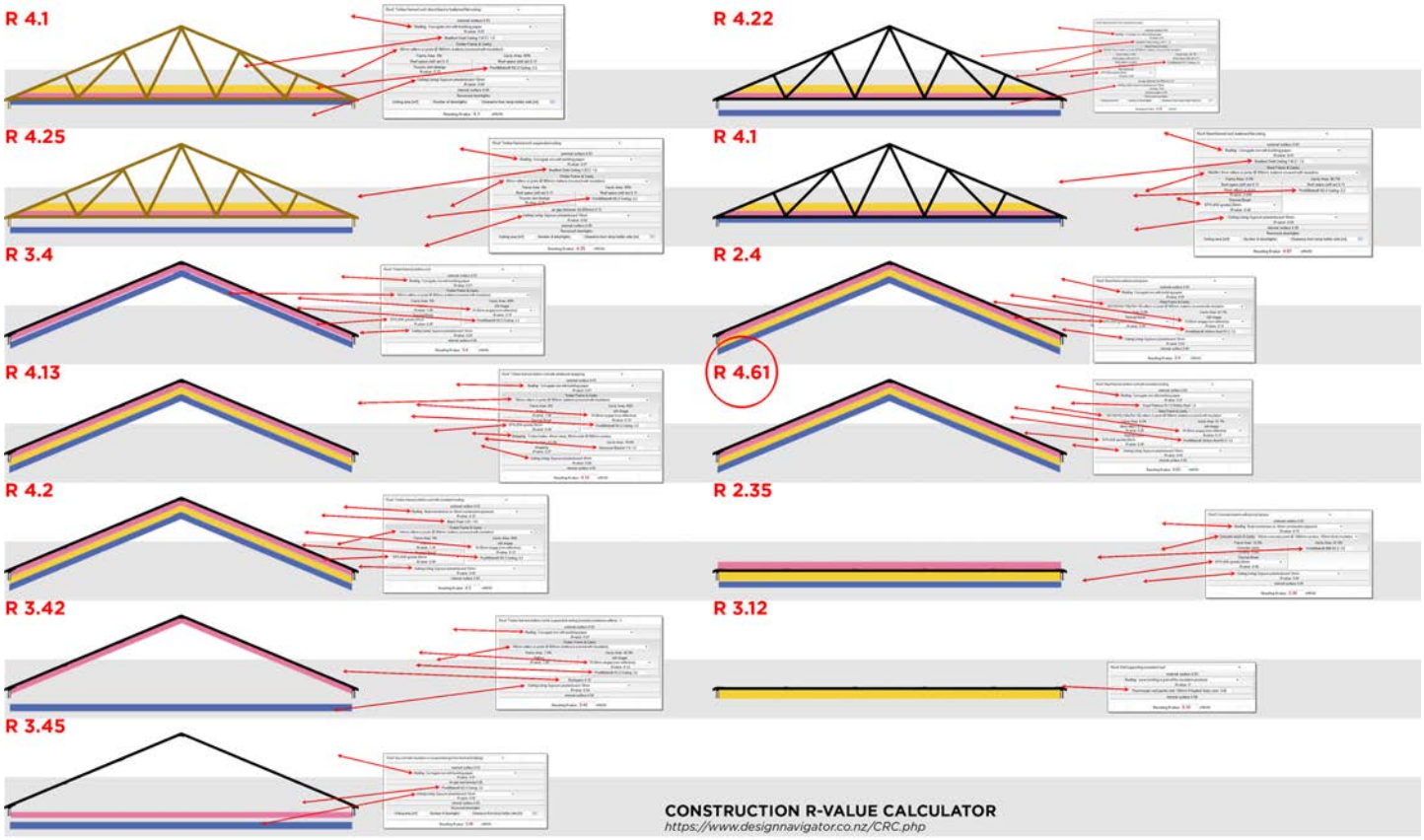


Figure - 185 *(Author: 2017)*

BEFORE INFRASTRUCTURE INTERVENTION

Figure - 186 *(SBAT and Author: 2017)*

SUSTAINABLE BUILDING ASSESSMENT TOOL RESIDENTIAL

1,04

Achieved

SB SBAT REPORT 3,1

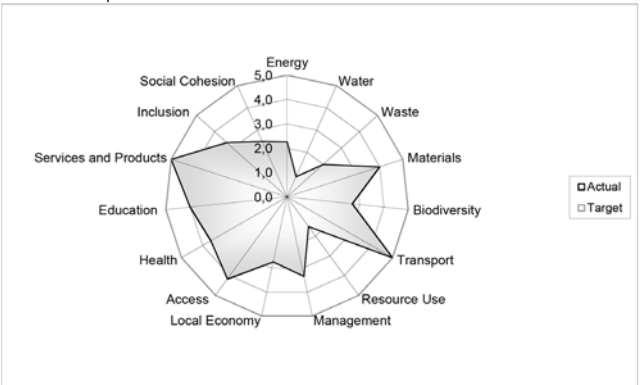
SB1 Project

ELMO IN THE HINTERLAND

SB2 Address

184 HINTERLAND AVENUE MAMELODI, PRETORIA, SOUTH AFRICA

SB3 SBAT Graph



SB4 Environmental, Social and Economic Performance	Score
Environmental	2,4
Economic	3,3
Social	3,7
SBAT Rating	3,1

SB5 EF and HDI Factors	Score
EF Factor	3,2
HDI Factor	3,4

SB6 Targets	Percentage
Environmental	47
Economic	67
Social	74

SB7 Self Assessment: Information supplied and and confirmed by

Name	Date
Signature	

SB8 Validation: Documentation validated by

Name	Date
Signature	

SB9 Validation Report Version

IVR

AFTER INFRASTRUCTURE INTERVENTION

Figure - 187 *(SBAT and Author: 2017)*

SUSTAINABLE BUILDING ASSESSMENT TOOL RESIDENTIAL

1,04

Achieved

SB SBAT REPORT 4,6

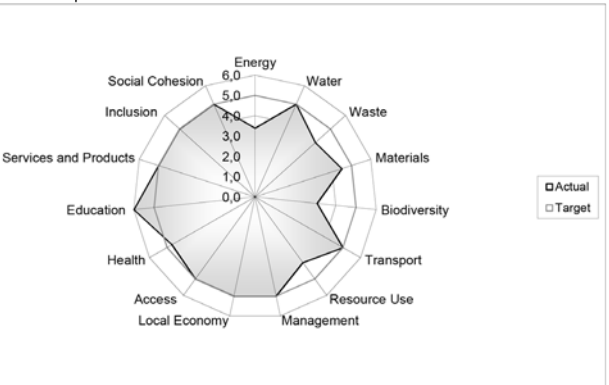
SB1 Project

ELMO IN THE HINTERLAND

SB2 Address

184 HINTERLAND AVENUE MAMELODI, PRETORIA, SOUTH AFRICA

SB3 SBAT Graph



SB4 Environmental, Social and Economic Performance	Score
Environmental	4,0
Economic	4,8
Social	5,1
SBAT Rating	4,6

SB5 EF and HDI Factors	Score
EF Factor	4,1
HDI Factor	5,2

SB6 Targets	Percentage
Environmental	80
Economic	96
Social	103

SB7 Self Assessment: Information supplied and and confirmed by

Name	Date
Signature	

SB8 Validation: Documentation validated by

Name	Date
Signature	

SB9 Validation Report Version

IVR

ACOUSTICS COMFORT

"Acoustics" is derived from the Greek word (akouein), which means "to hear", and is the branch of science that deals with sound, including its generation, transmission, analysis and perception.

It is critical that education infrastructure achieves one important goal, that is to facilitate adequate spaces for communication. Therefore, acoustic resolution of the classrooms is a mandatory requirement in this project.

ACOUSTIC CASE STUDY

ZOLLVEREIN SCHOOL OF MANAGEMENT AND DESIGN IN ESSEN

LECTURE THEATRES, CONGRESS HALLS AND PLANARY CHAMBERS

The unconventional architecture rendered special acoustic solutions necessary. For instance, sound absorbing surfaces are absent from the ceiling of the 200 seat auditorium and practically absent from the walls.

Instead, the floors were acoustically activated by laying a carpet (suitable for displacement ventilation and with appropriate flow resistance) on perforated, raised floor panels.

At the bottom of the walls, the carpet is affixed to a perforated plate concealing an attenuated void.

This construction achieves broadband sound absorption encompassing all speech frequencies.

The walls are of glass and the inner leaf is inclined inwards at an angle of 1 degree to prevent flutter echoes.

The double-leaf glass façade not only houses the blackout blinds, but also insulates the room very effectively against the noise coming from the lively foyer with its cafeteria.

Glass and fair face concrete surfaces dominate visually in this design, but the form of construction chosen nevertheless achieves the best acoustics for communication.

(DETAIL, 2015)

Figure - 188 *(HJORTSHØJ: 2017)*

Figure - 189 *(HJORTSHØJ: 2017)*

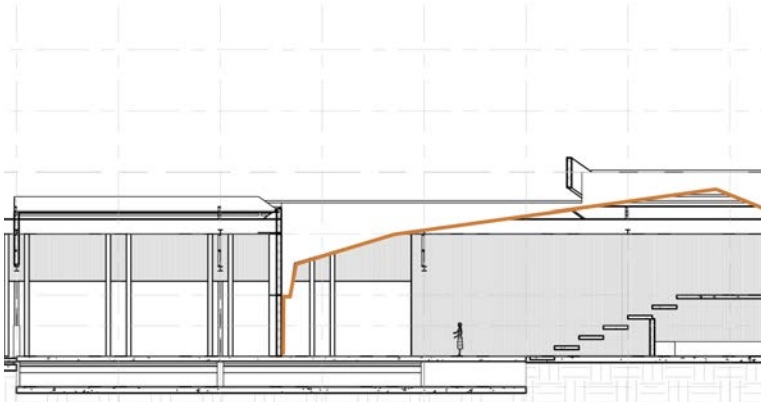


Figure - 190 *(Author: 2017)*

Figure - 191 *(HJORTSHØJ: 2017)*

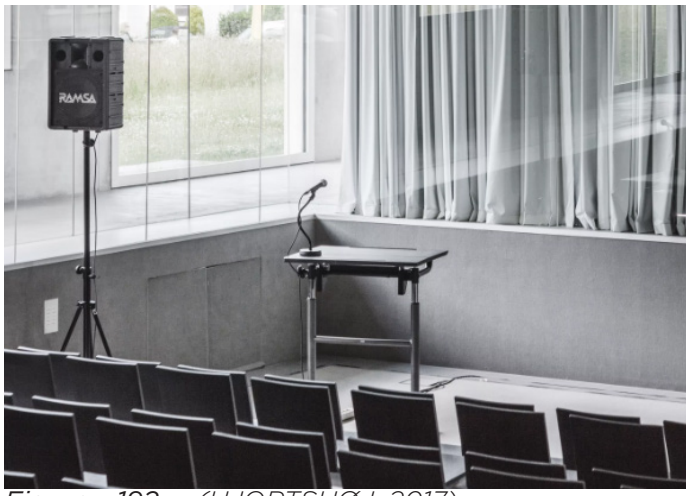


Figure - 192 *(HJORTSHØJ: 2017)*

Figure - 193 *(HJORTSHØJ: 2017)*

Figure - 194 *(HJORTSHØJ: 2017)*

ACOUSTIC RESOLUTION:

CLASSROOM:
Appropriating the acoustic methodology of Zollverein School of Management and Design, a raised recycled timber floor, supported by gum poles or low one brick walls is proposed.

In the lecture rooms however, a carpet is proposed for ultimate performance.

A flat weave carpet on 36 mm calcium silicate foam boards with proportion of holes at 16% is recommended.

AUDITORIUM:
Two things are set out to be achieved:

Good speech intelligibility and good visual contact with the speaker or screen. This is crucial for the proper functioning of the auditorium.

The arrangement of the auditorium is tailored to achieve optimal sightlines.

It can also expand to house a larger number of guests. Therefore, careful design consideration is given to the indoor acoustic layout.

To improve clarity it will be of great importance that the geometric and acoustic design of the ceiling results in that early reflection reaches the audience.

This means that the front, central part of the ceiling should be designed to reflect the frequency range significant for speech. The boarders and rear part of the ceiling can include absorbent material to assist the attenuation within the room.

Ideally, the rear wall should also be sound absorbent, at least over the area starting 1m above the floor and especially when seating is not raked. An absorbent rear wall will prevent delayed reflections, which hinder speech intelligibility, from being reflected back to the podium.

DISCUSSION ROOMS:
Despite their low mass, cross-laminated timber or similar timber floors can be used to achieve the sound insulation requirements for housing or schools, provided suitable floating screeds are laid on the floors.

Adequate wall and ceiling insulation also guarantee indoor climate and acoustics.

Figure - 195 *(Author: 2017)*

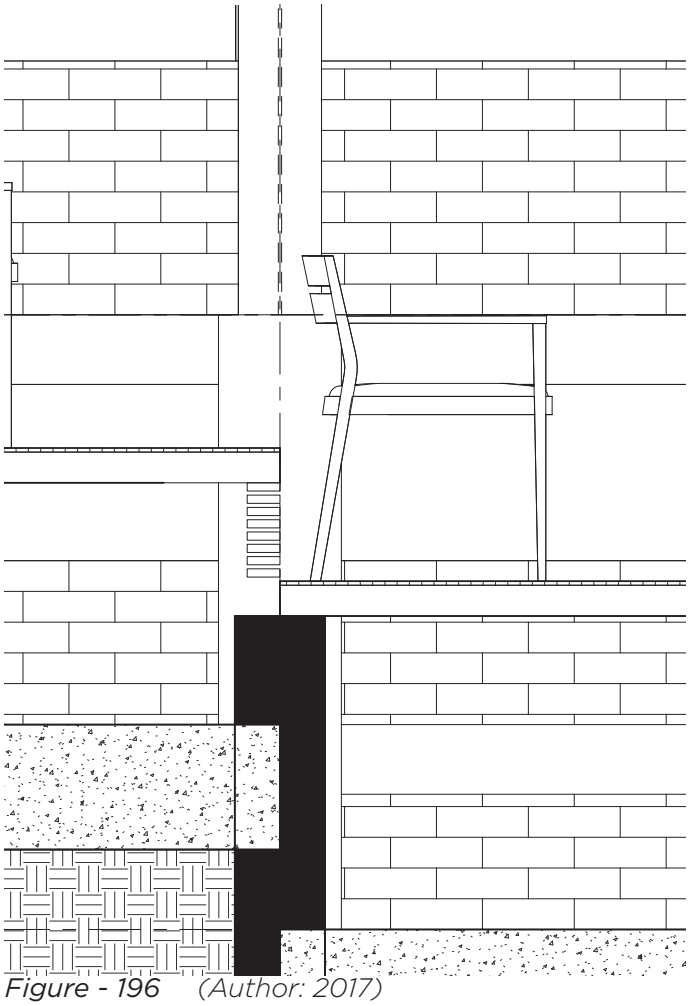


Figure - 196 *(Author: 2017)*

Figure - 197 *(Author: 2017)*

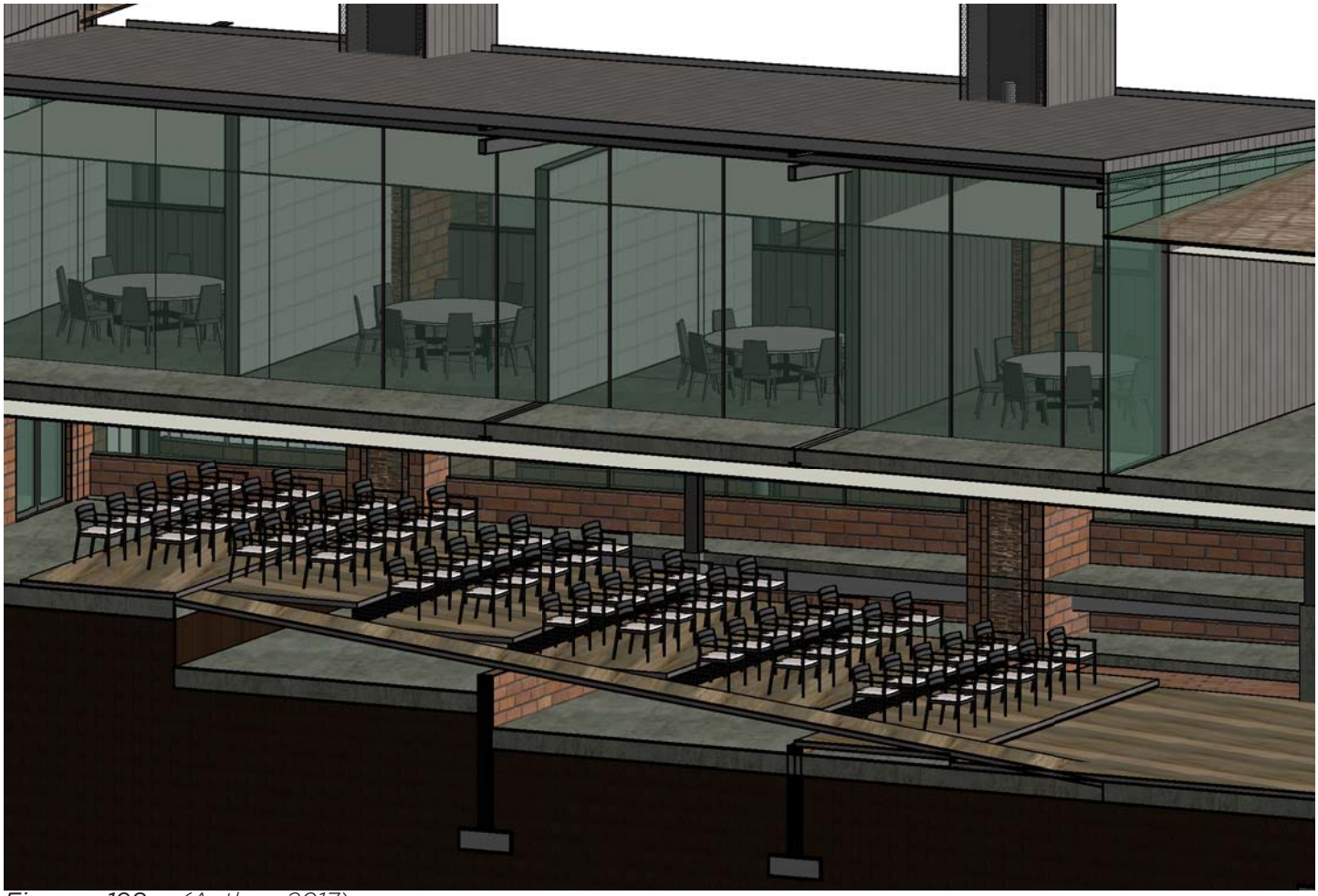


Figure - 198 *(Author: 2017)*

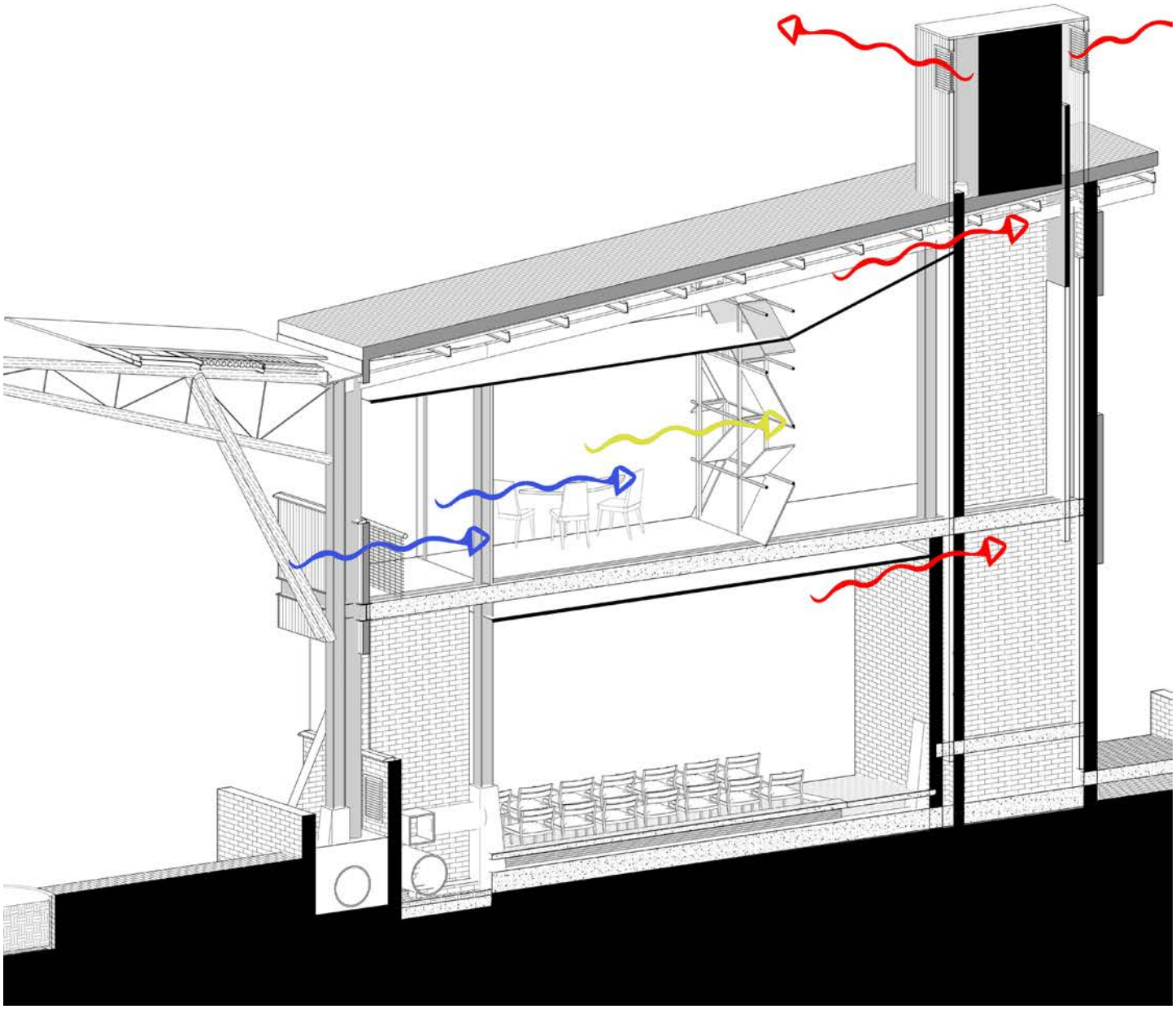
INDOOR ENVIRONMENT

Figure - 199 *(Author: 2017)*

Due to the fact that the classrooms are well insulated, an active strategy is needed to properly ventilate and control indoor temperature and allow fresh air into the classroom space.

Analysis of the built form in *Sefaira* and *Revit's Insight 360* from *Autodesk*, showed shading in this instance has too little effect on a comfortable indoor environment. Therefore, an additional ventilation strategy is proposed.

The concept maintains that the superstructure will only cater to the bare minimum that is essential in respect of infrastructure; therefor, a barefoot architectural approach is required.



TROMBE STACK VENTILATION AND EVAPORATIVE COOLING TOWERS

Trombe stack ventilation and evaporative cooling towers are proposed on the southern side of the classrooms, with the top part extruding beyond the resource centre.

These towers will use solar gain to promote ventilation.

This passive system consists of a 150mm wide glazed cavity with thermal mass in the form of a dark coloured steel drum filled with gravel.

The thermal mass is heated through solar radiation which in turn heats up the air in the cavity, causing the warm air to rise.

The top design of the tower causes a stack effect, it essentially creates a void, suction or negative air pressure in the highest part exposed to the sun, drawing out the warm air and carbon dioxide of the users. A solar powered fan might be necessary to start this effect.

To further support this effect, the lower part of the stack will penetrate a planter with naturally cool soil, that also houses the water services and in so doing, cools the lower part even more. This will guarantee the effectiveness of the system.

The adjacent wall has adequate ventilation louvers right above the floor to promote the suction of fresh, cool air. The air inlet is however slightly different to cater to the acoustic needs as can be noted from the acoustic chapter.

LIGHTING

Natural daylight is promoted through large southern facing windows. This orientation prevents glare from all the spaces assigned to the southern elevation.

Northern windows have adequate shading devises made of gum pole shade screens, constructed in the EPWP construction cycle.

Using *Autodesk's Revit Daylight* analysis, the adequate room LUX in the classroom spaces is designed to be around 300, 700 and 1000 LUX depending on the program of the space.

Figure - 200 *Canopy (Author: 2017)*

SERVICES
BUILDING METRIC

WATER
RAINWATER HARVESTING

Rainwater harvesting is essential to the scheme, as to not depend or use municipal water for irrigation and services, and provide a net positive infrastructure.

Water calculations:

LOCATION: HINTERLAND ST, MAMELODI, PRETORIA, 0181, SOUTH AFRICA,
LATITUDE: -25.83355
LONGITUDE: 28.30244

AVERAGE RAINFALL IN AREA:
MONTH/LITER PER M2/L PER MONTH

JANUARY/133/372 400
FEBRUARY/87/243 600
MARCH/94/263 200
APRIL/48/134 400
MAY/9/25 200
JUNE /10/28 000
JULY/6/16 800
AUGUST/7/19 600
SEPTEMBER/29/81 200
OCTOBER/78/218 400
NOVEMBER/112/313 600
DECEMBER /108/302 400
YEAR/720/2 016 000lpy

RAINWATER CATCHMENT AREA
2800 M2

ESTIMATED RAINWATER HARVEST(80%)
2 016 000L OR 2 016 M3

TOTAL WATER HARVEST ANNUALLY:
2 016 000L OR 2 016 M3

WATER MAGEMENT

Water transmission will be achieved through concrete storm water pipes buried inside the planters. Linked to the gutter system, it will divert all roof runoff to underground *JoJo* tanks.

From there, only the necessary amount of water will be pumped up into the water towers for treatment to insure optimized water usage.

Each tower has a capacity of 20 000l

The current proposal in for 4 towers to be built

The maximum capacity for the development is 80 000L

FIRST PHASE
This water will be filtered for all necessary toilet services.

SECOND PHASE
The second phase treatment will produce drinkable water
Used for irrigation and building services and contributing to a net positive structure.
Management and Route and Storage
Treatment
Sand
Sand, carbon, uv chlorine
Fibre Wrapped Polyethylene Cylinder.

Utilisation- Irrigation and building services

Figure - 201 *Water on section (Author: 2017)*

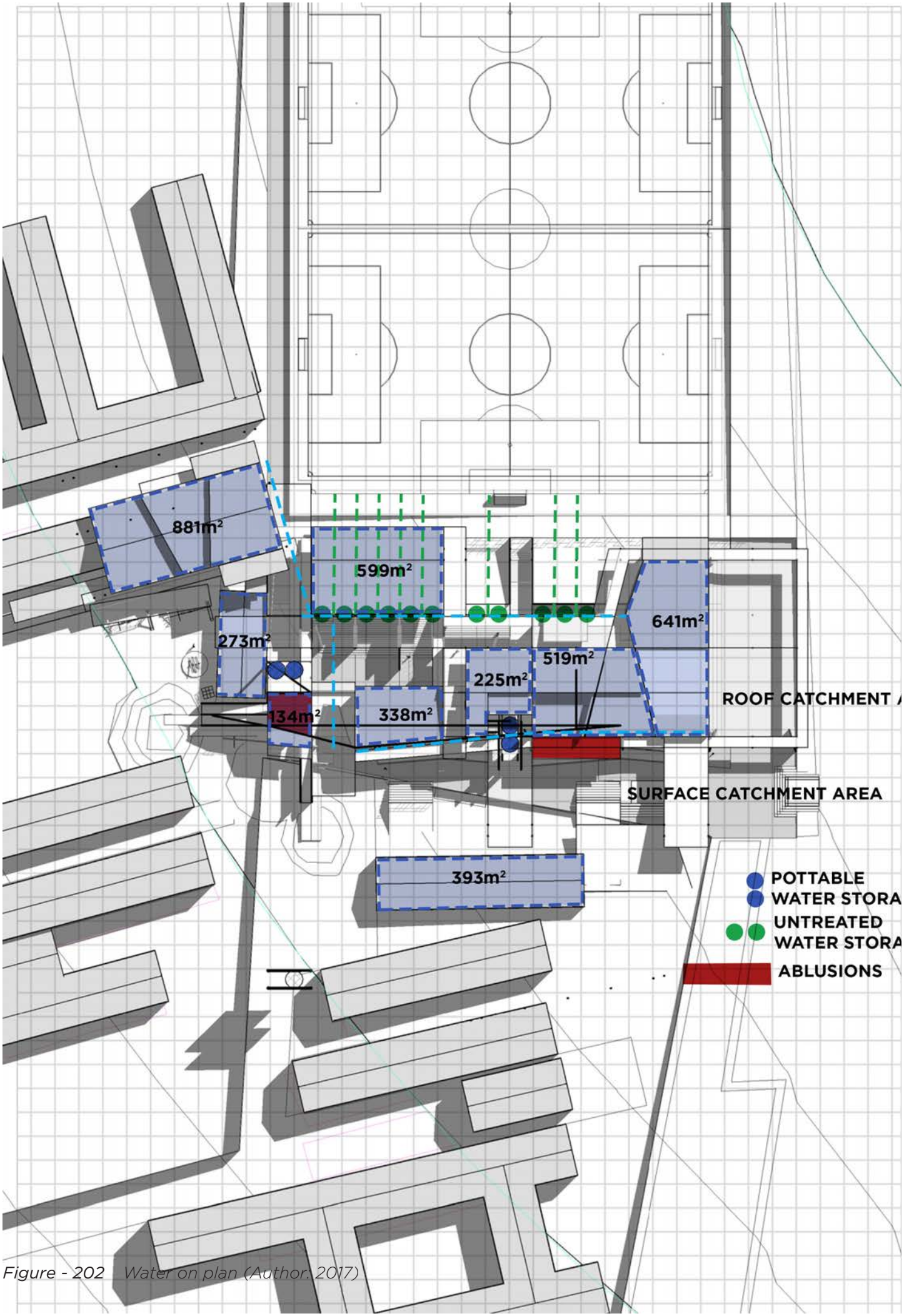


Figure - 202 Water on plan (Author, 2017)

TECH CONCLUSION

The utilising of labour intensive technologies to build and/or maintain much needed infrastructure is proposed. In doing so, the need for skills transfer and training can be acomodated.

In the proses work opportunities for marginalized and unemployed communities are created.

Partnerships between Government and the Private Sector stakeholders can be strengthened to ensure increased access to services such as basic infrastructure, food, water, energy and transport.

Professional teams of experienced architects, engineers and project managers as well as relationships with private sector firms are vital to the successful implementation of these government programs. If we are to act as stewards between human kind and constructed space, adequate mapping of the intangible and cultural landscapes of our communities are irreplaceable and instrumental to the success and impact of our understanding and realization of this built environment.

The power of architecture does not only sit in the design of structures or landscapes, but the proses of planning and building them. For in Africa, we will have to adapt and change the established methodology and typology of the built environment as an industry, as to fully integrate our communities and positively change our urban environment, for those with and without wealth.

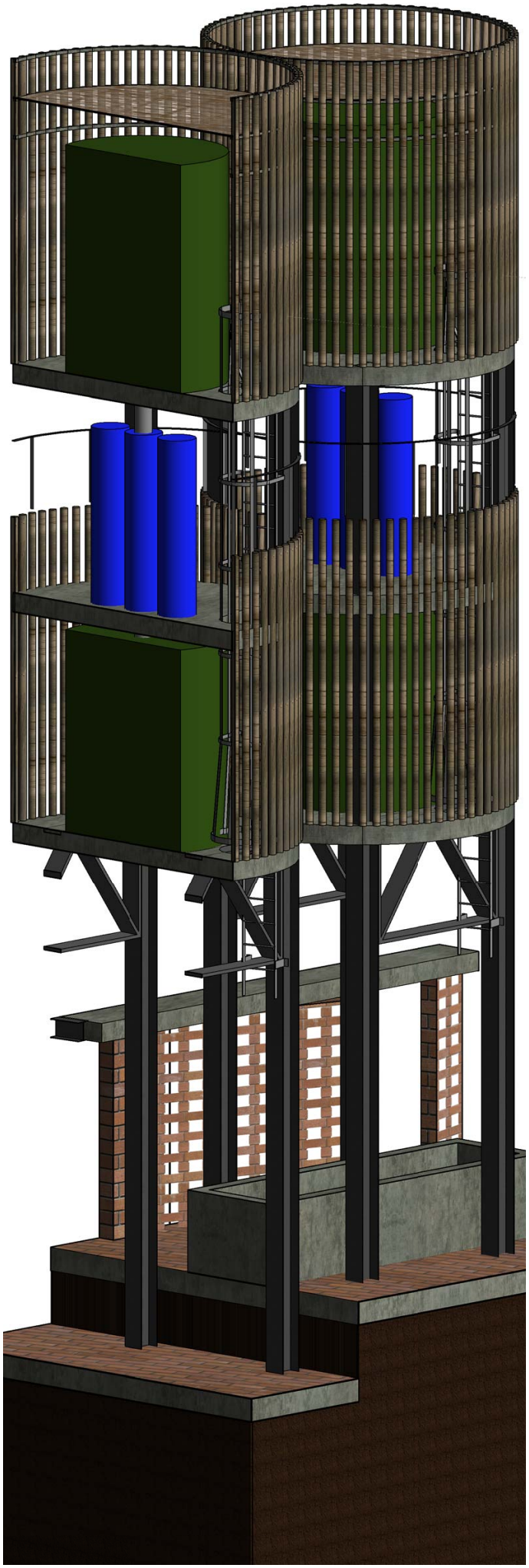


Figure - 203 *(Author: 2017)*

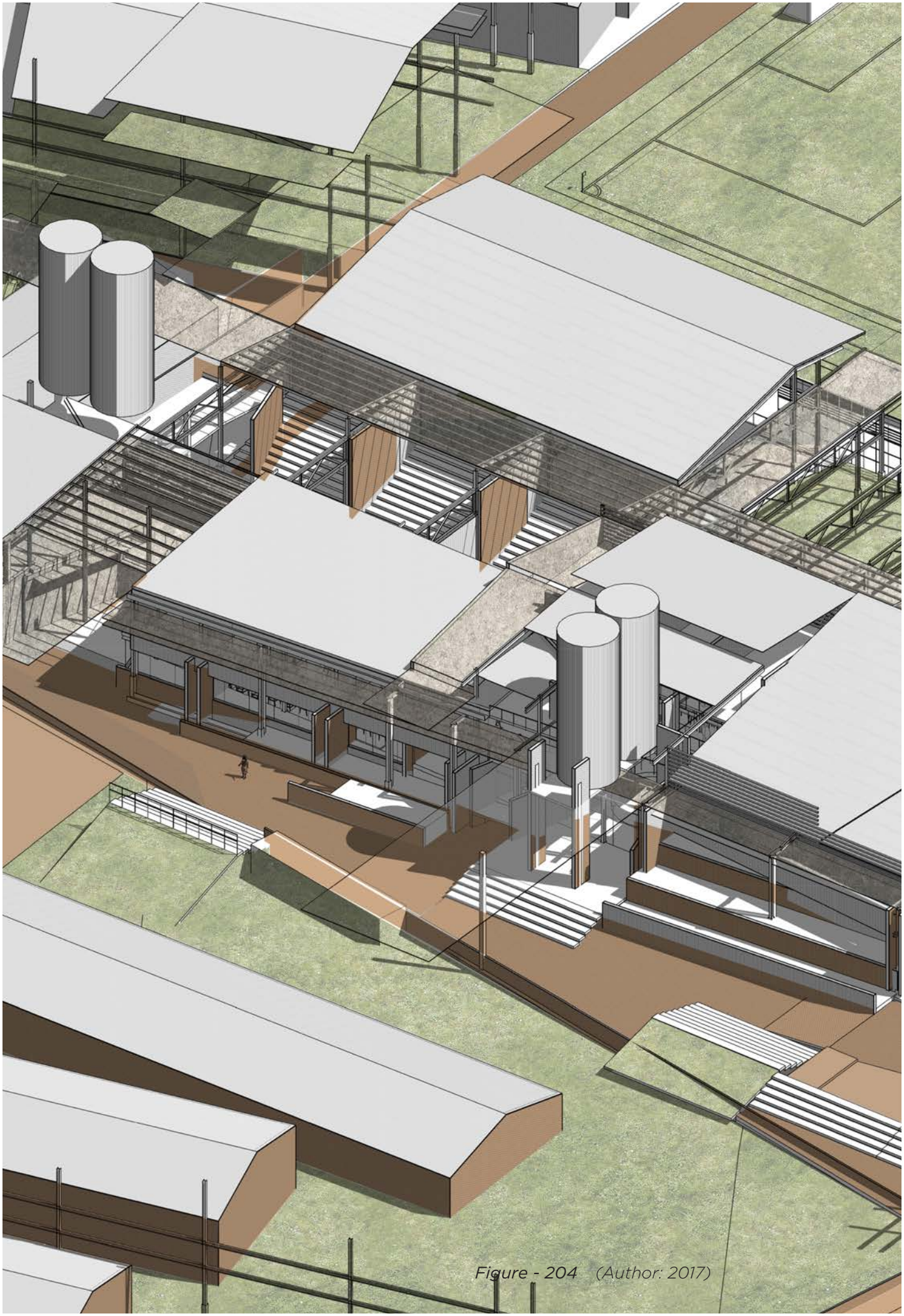


Figure - 204 *(Author: 2017)*

FINAL CONTRIBUTION AND CONCLUSION

As we are in the new age of the Anthropocene , we are the first species to contest evolution. Instead of environments altering our characteristics, we have the power to alter our environment for our needs and preferred outcomes.

Nowhere can these outcomes still fluctuate as severely and be better established than in the future cities of Africa, the last continent to enter the urban population tipping point, as well as other countries to shift from developing to developed.

As the next century will personify the future of the continent, South Africa can decide between reluctant leader, or patriotic frontrunner in establishing its future.

As custodians to the global South's discourse in the future of human settlement and urbanism in developing counties, architects can not only innovate and speculate, but implement and realize.

It is the responsibility of politicians and architects to recognize this, as leaders and facilitators of new construction - in the way our built environment responds to the needs of humans.

Through investigations such as Elmo in the Hinterland, the first step is in the local context, and solving the immediate needs, but also creating the platform of future visions.

Our future prosperity lies in the social capital which is our citizens. The level of proficiency of our people will determine how the future cities appear and express our humanity. Somewhere between the Plastic View Slum, Mamelodi Township and Silver Lakes estate and revitalised CBD's, a realistic utopia is not far off.

Working with existing networks, this infrastructure contribution illustrates ultimately that resource centres and school clusters do have the potential to contribute to improvements in our human settlements and urbanism.

Appropriating current typologies, and providing substantial infrastructural contributions, the communities primary benefit from the architecture consists in allowing educators to exchange with their peers to create a culture for improvement of education conditions, practices and management were the majority of the community have a vital role and have the possibility to lead from the front.

Figure - 205 *(Author: 2017)*

FINAL DESIGN

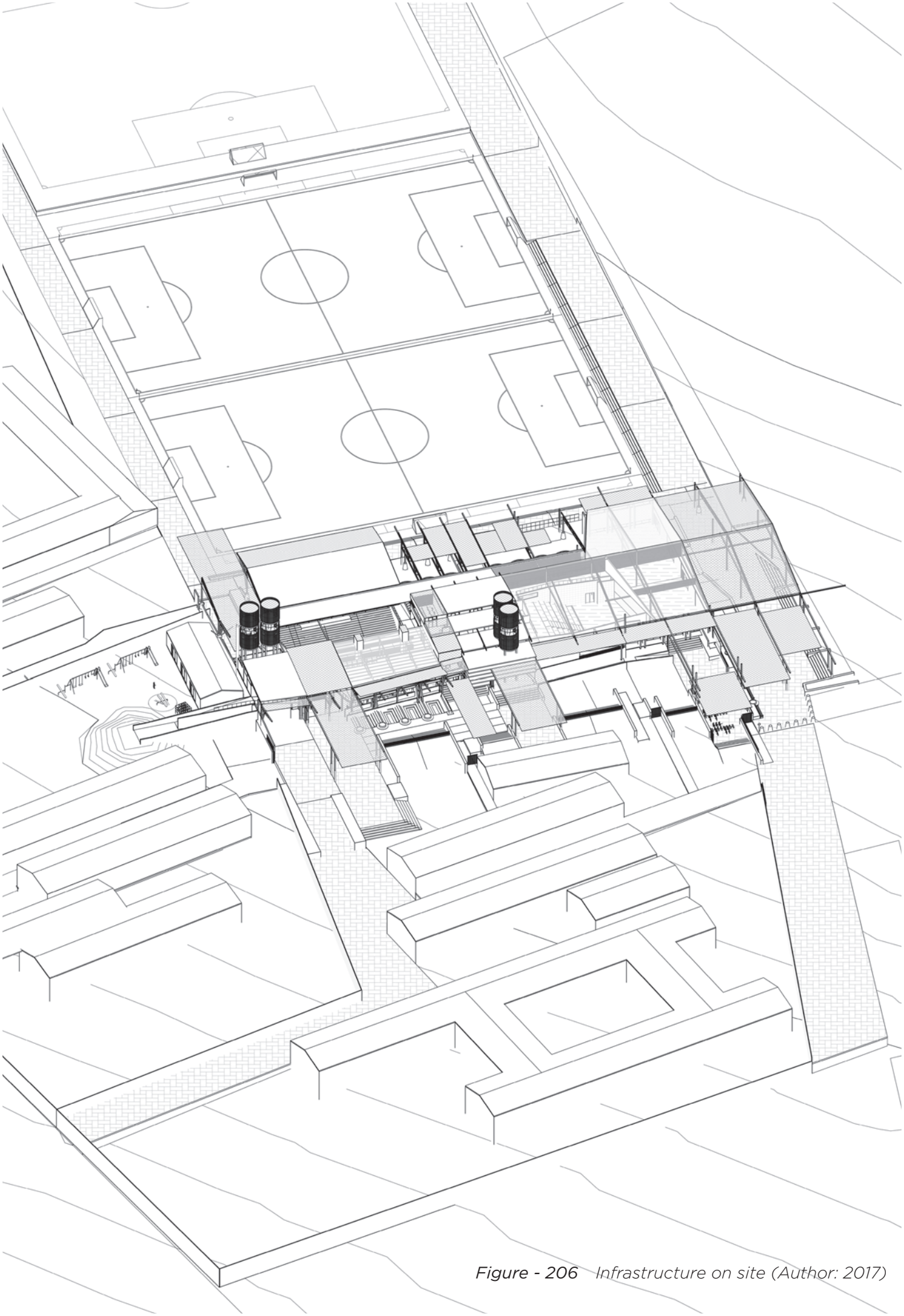


Figure - 206 *Infrastructure on site (Author: 2017)*

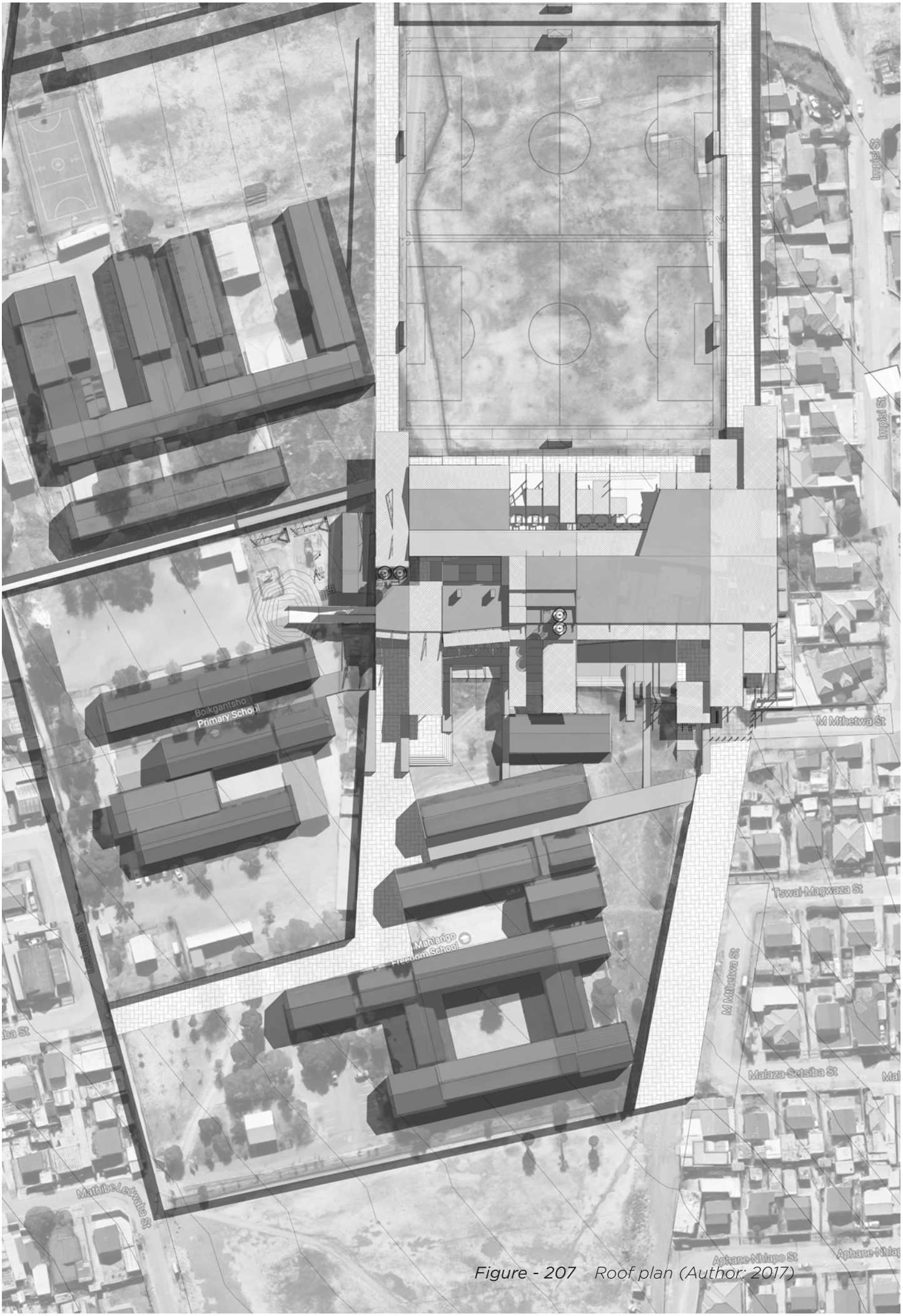


Figure - 207 *Roof plan (Author: 2017)*

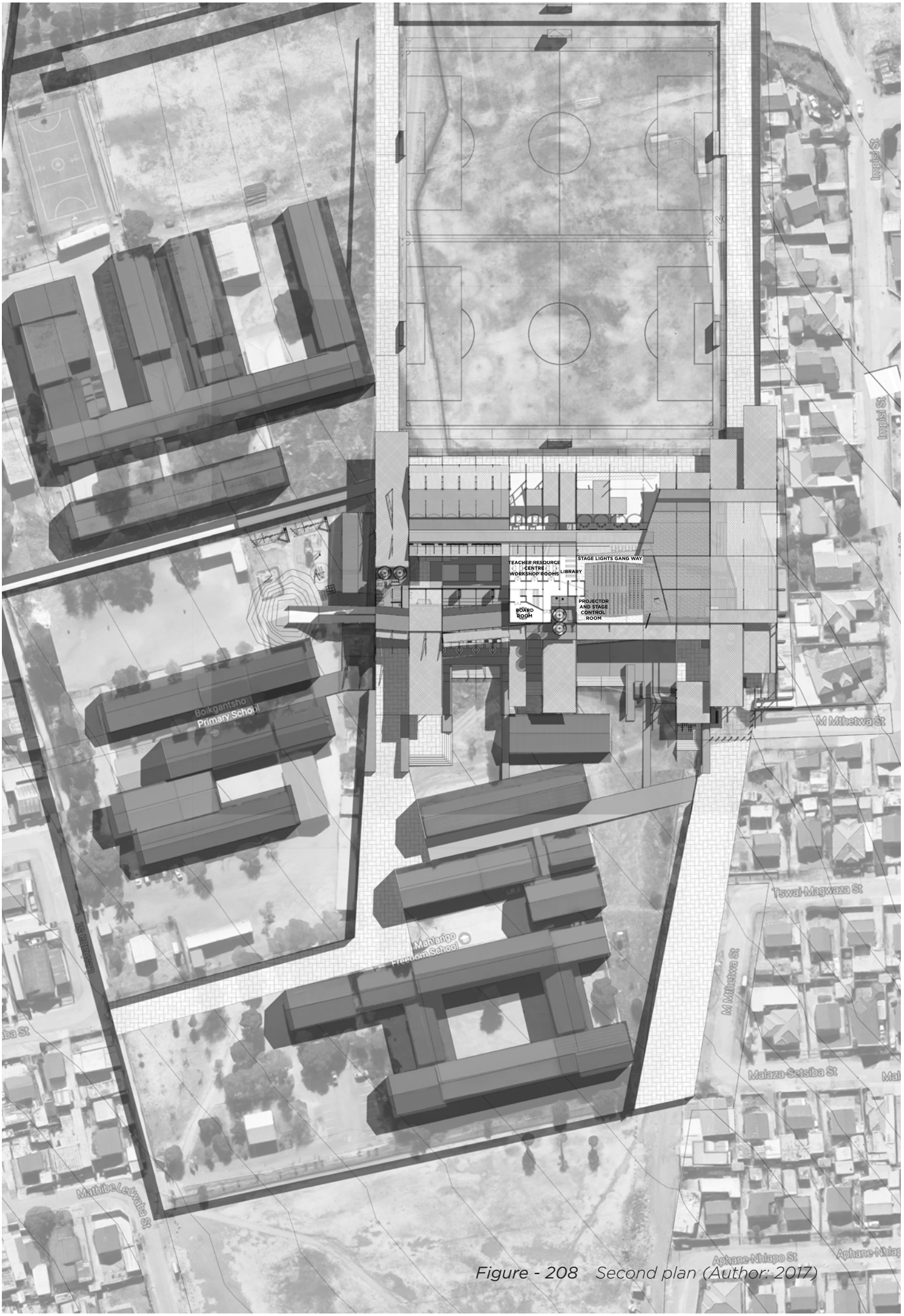


Figure - 208 *Second plan (Author: 2017)*

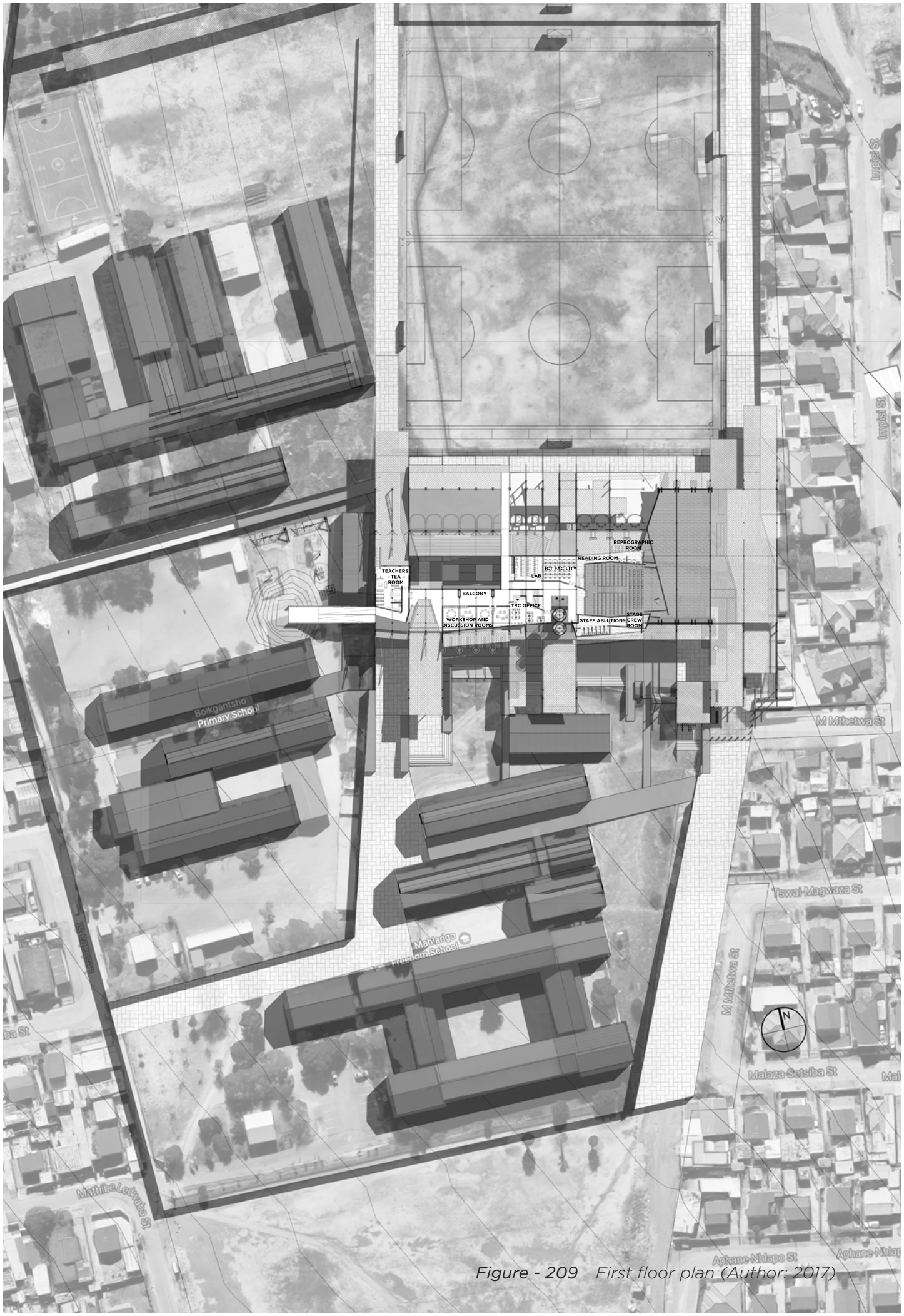


Figure - 209 *First floor plan (Author: 2017)*

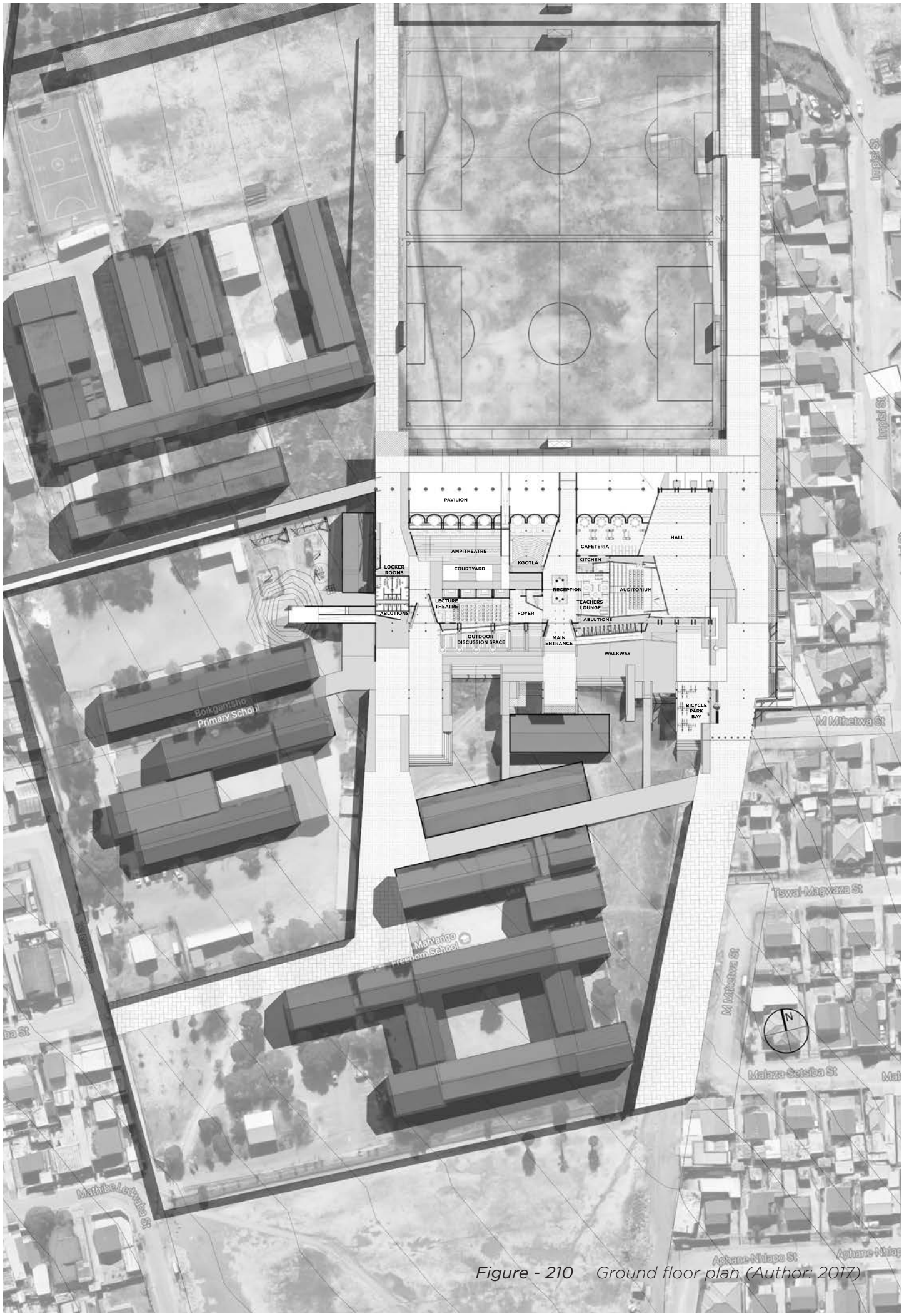


Figure - 210 *Ground floor plan (Author: 2017)*

Figure - 211 *Ground floor (Author: 2017)*

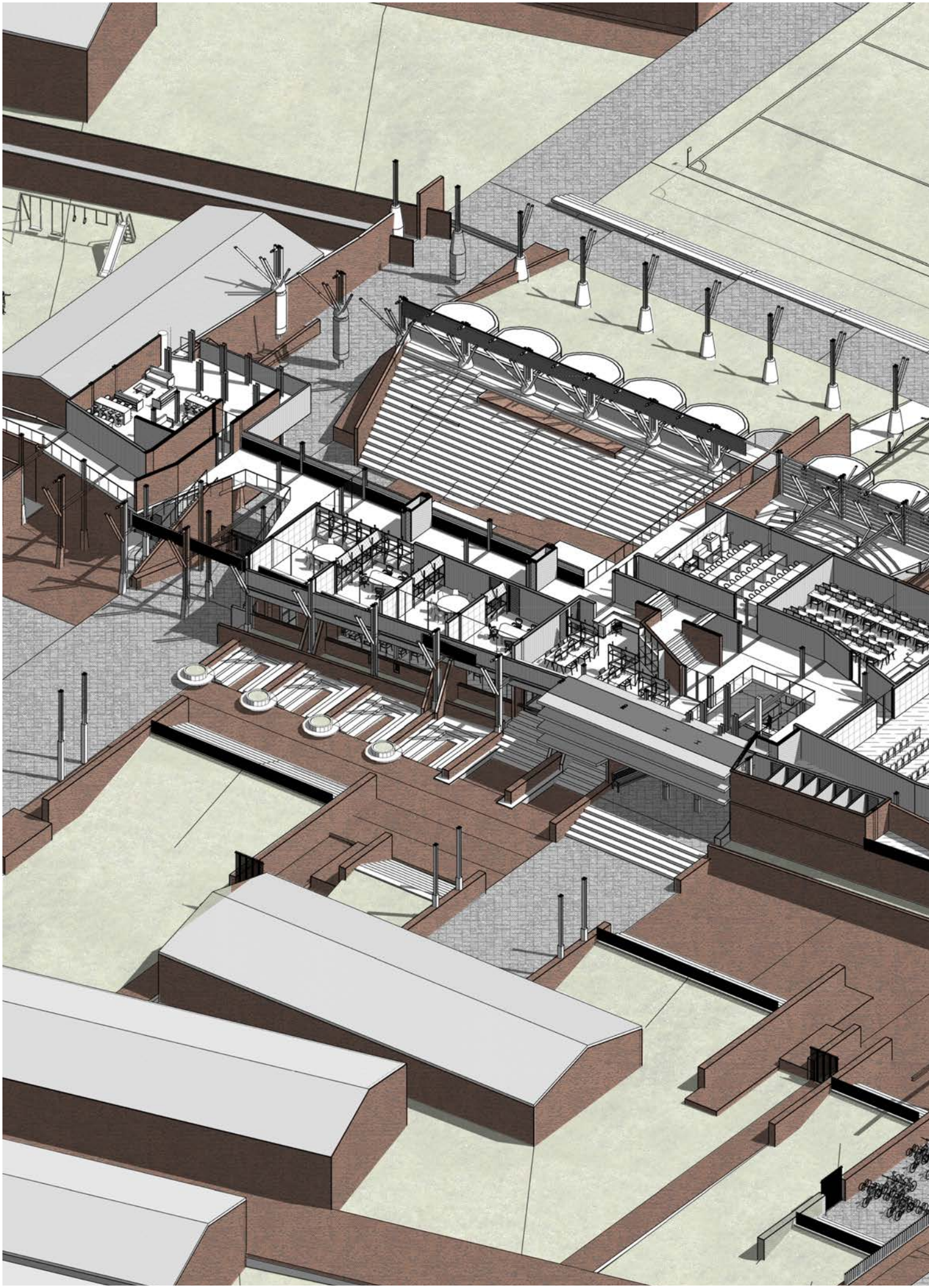
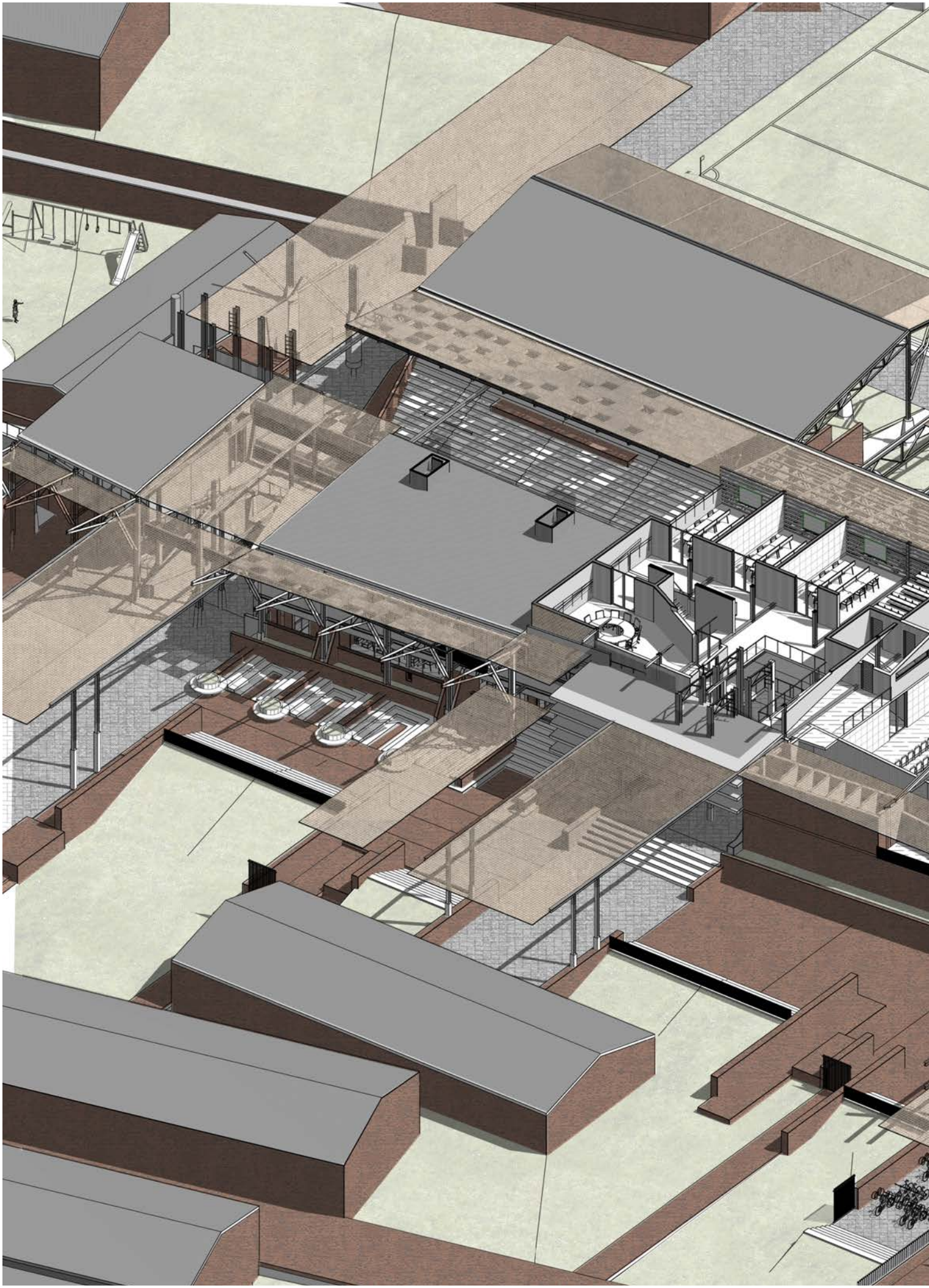


Figure - 212 *First floor (Author: 2017)*



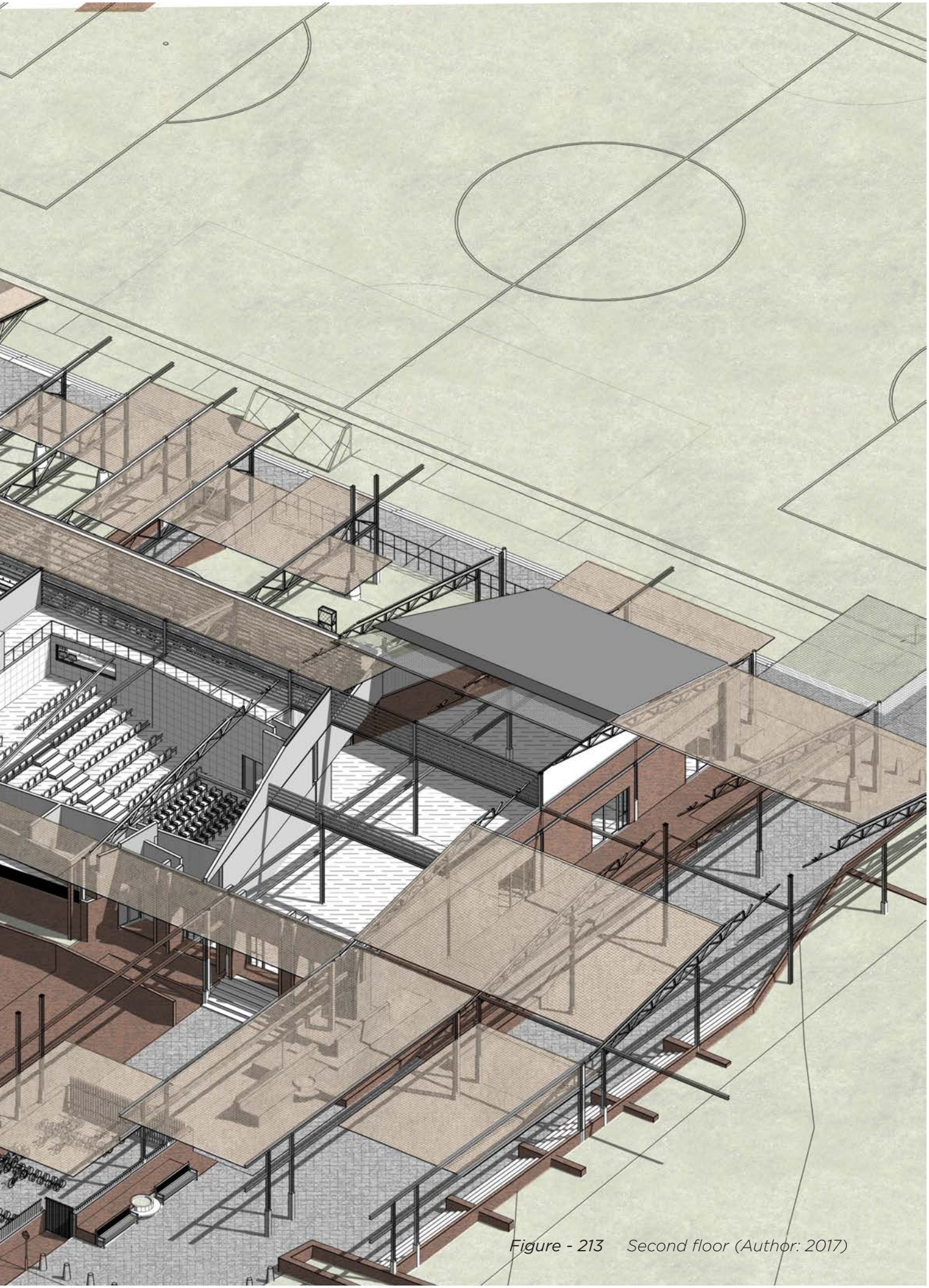


Figure - 213 Second floor (Author: 2017)

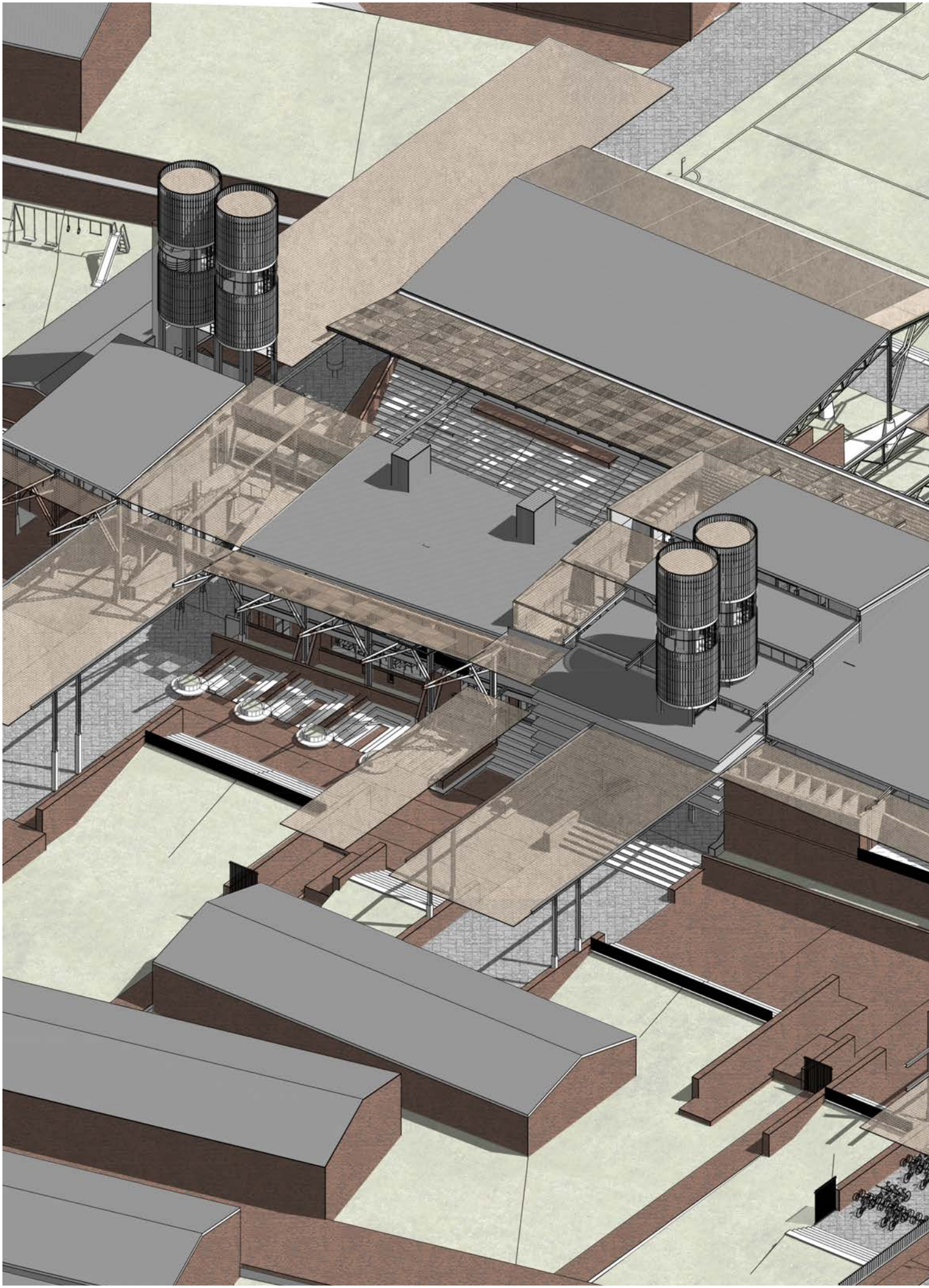
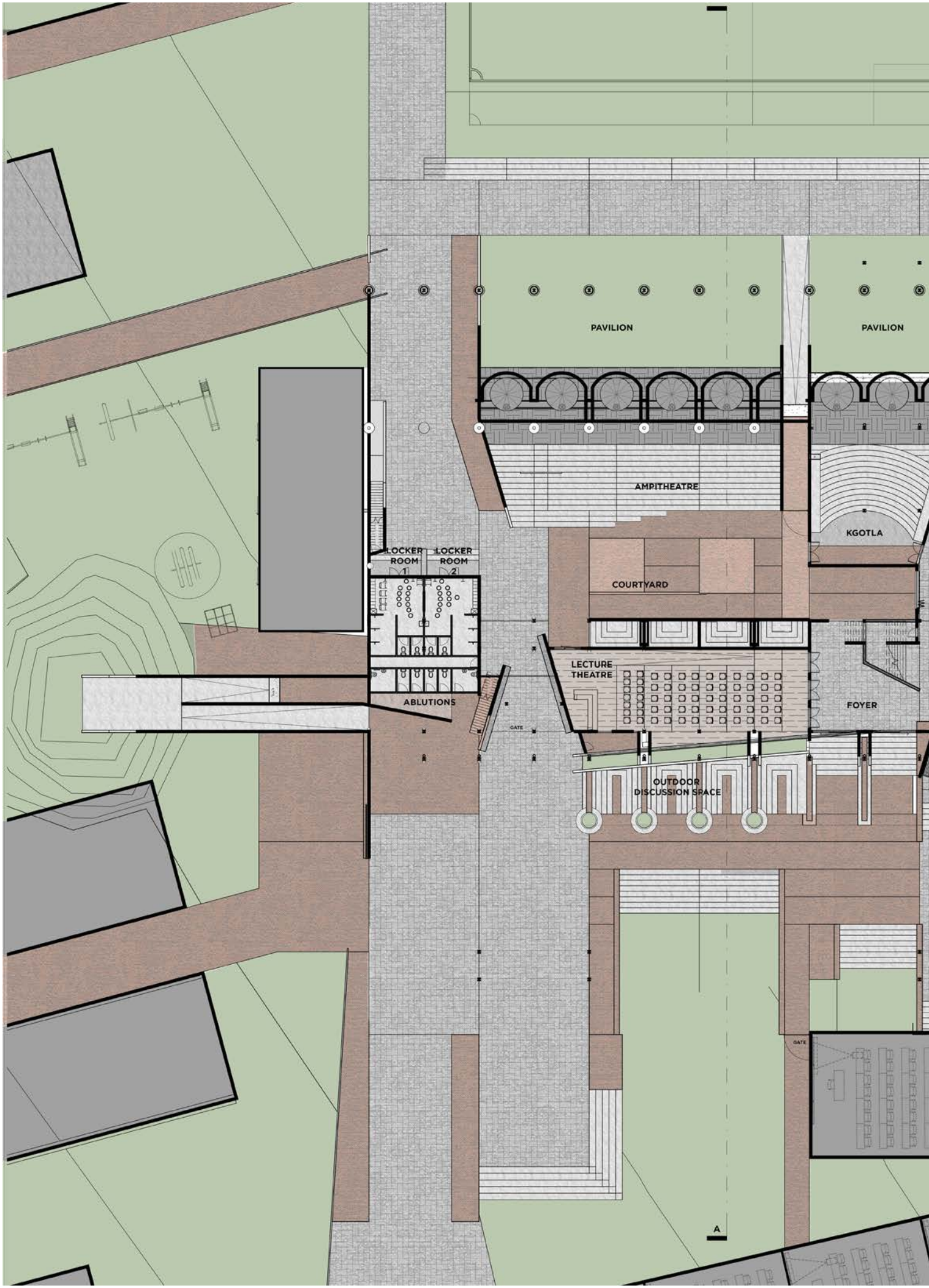


Figure - 214 *Roof (Author: 2017)*



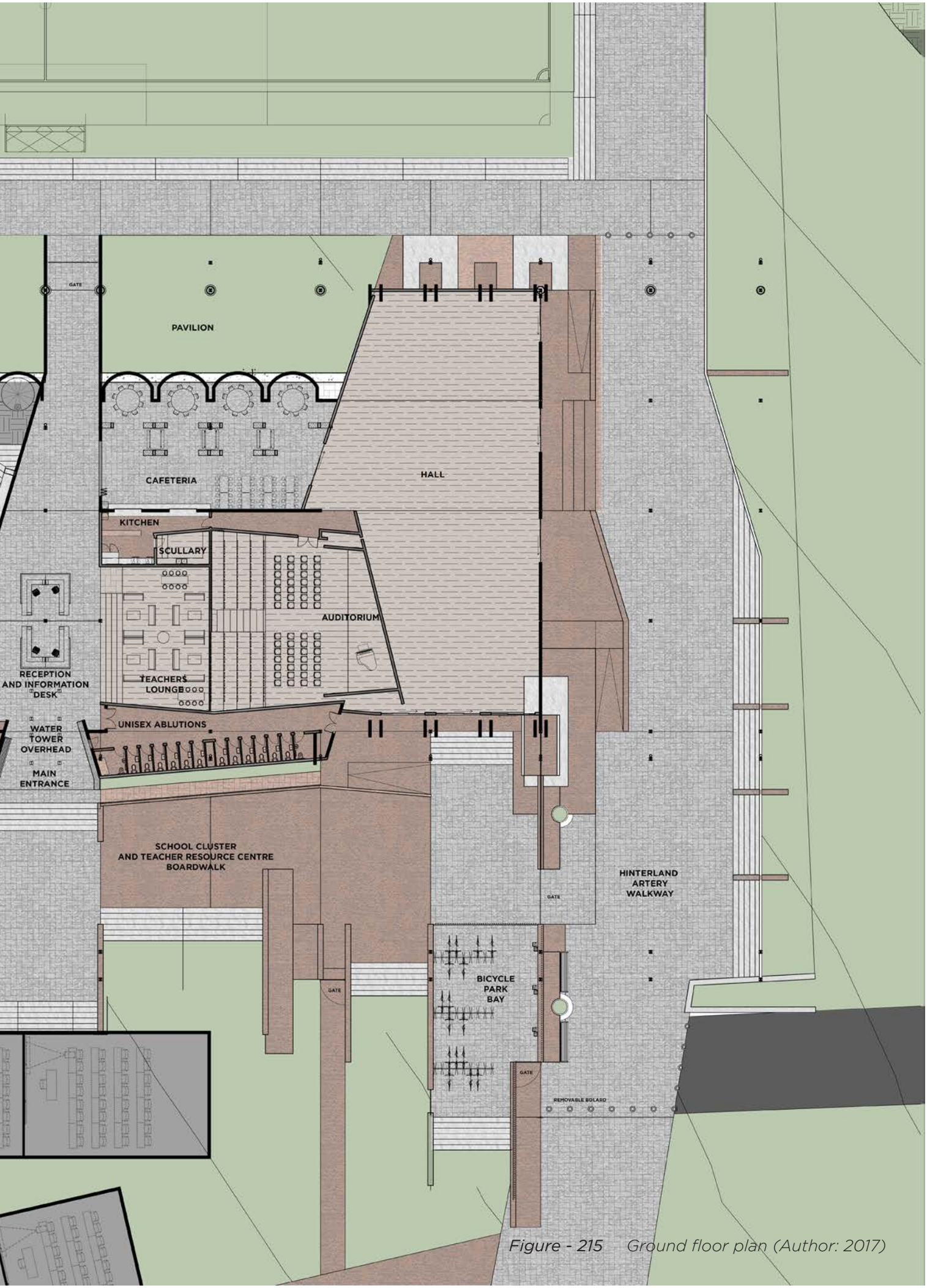
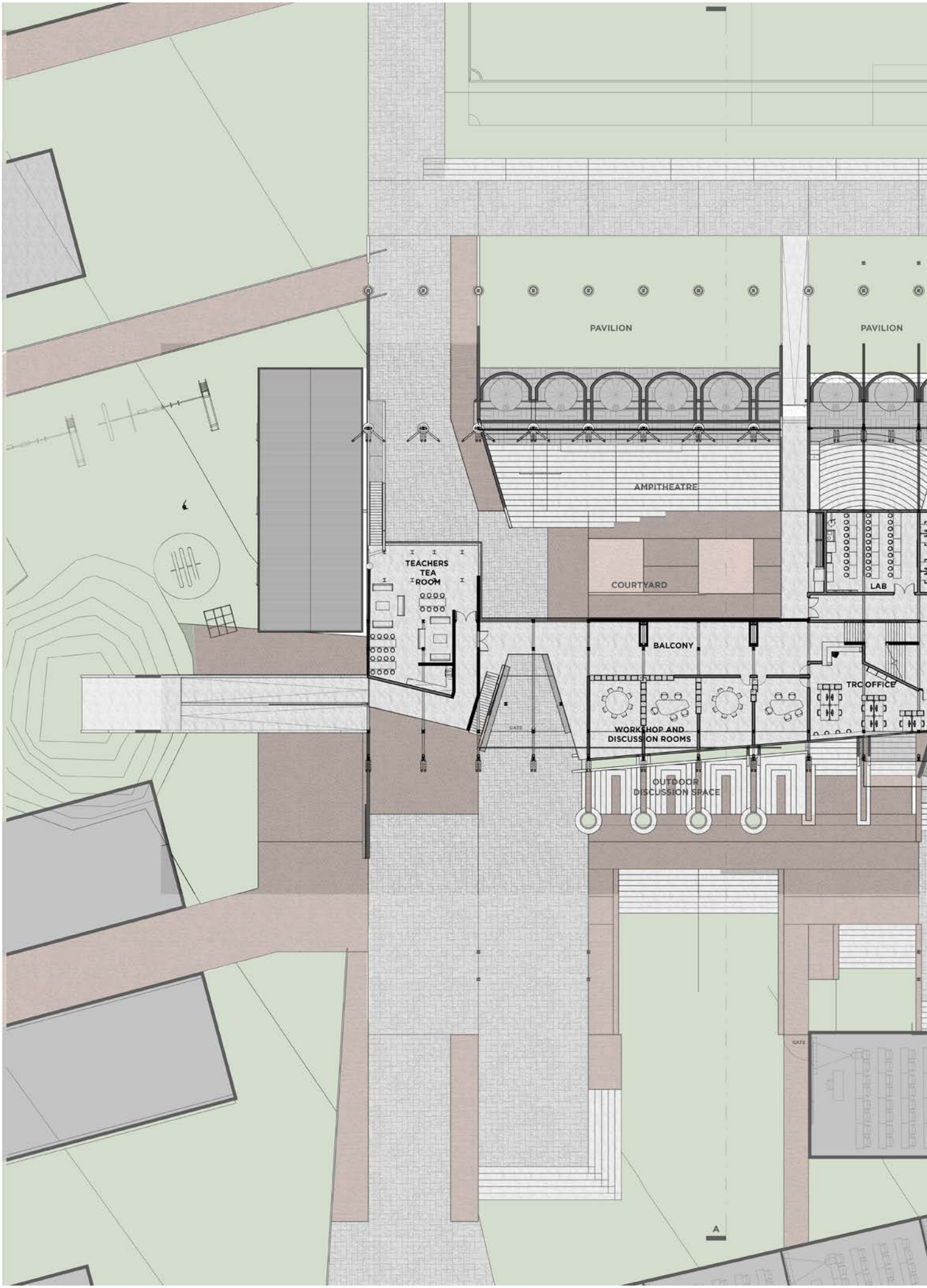


Figure - 215 *Ground floor plan (Author: 2017)*



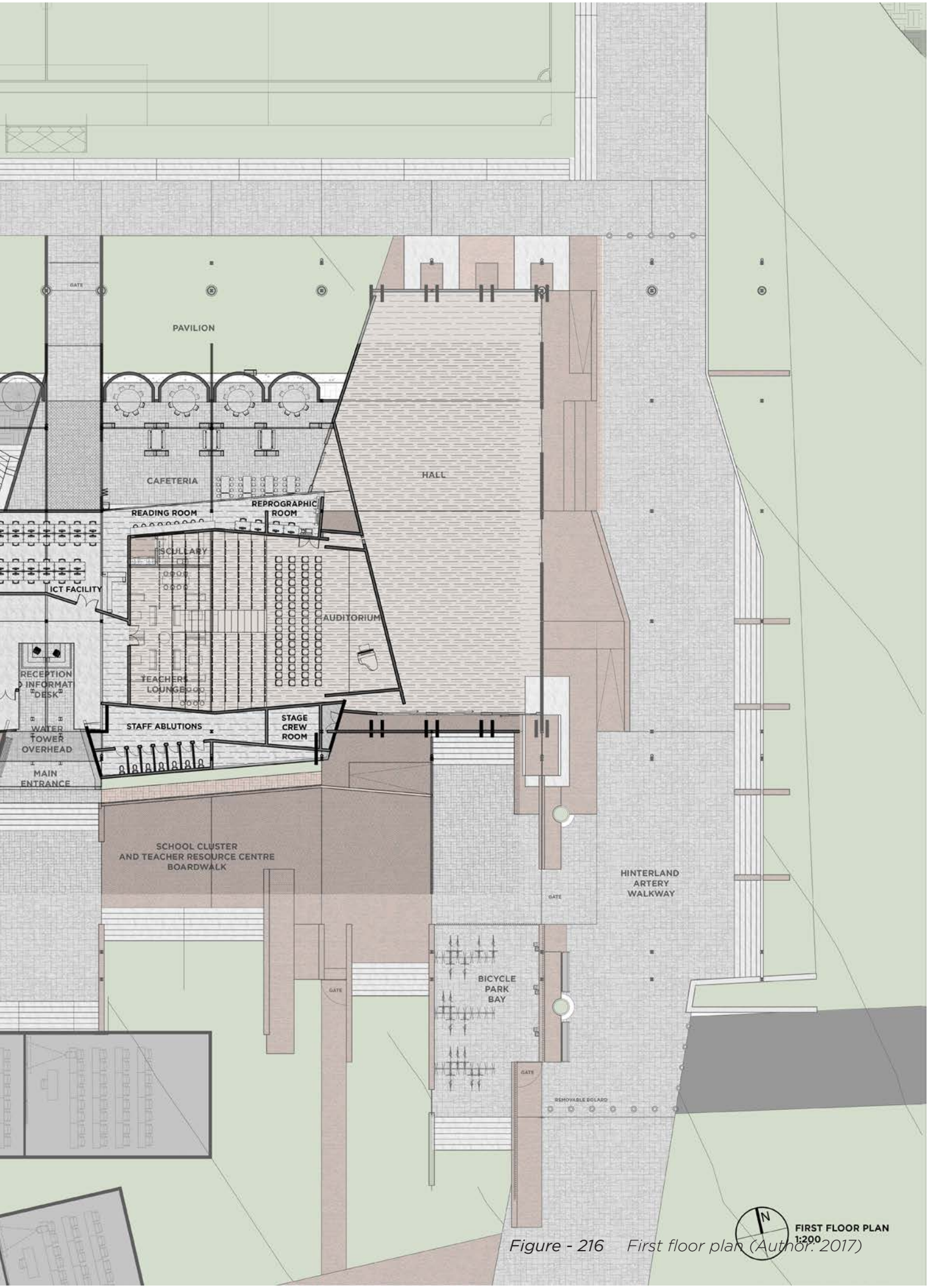
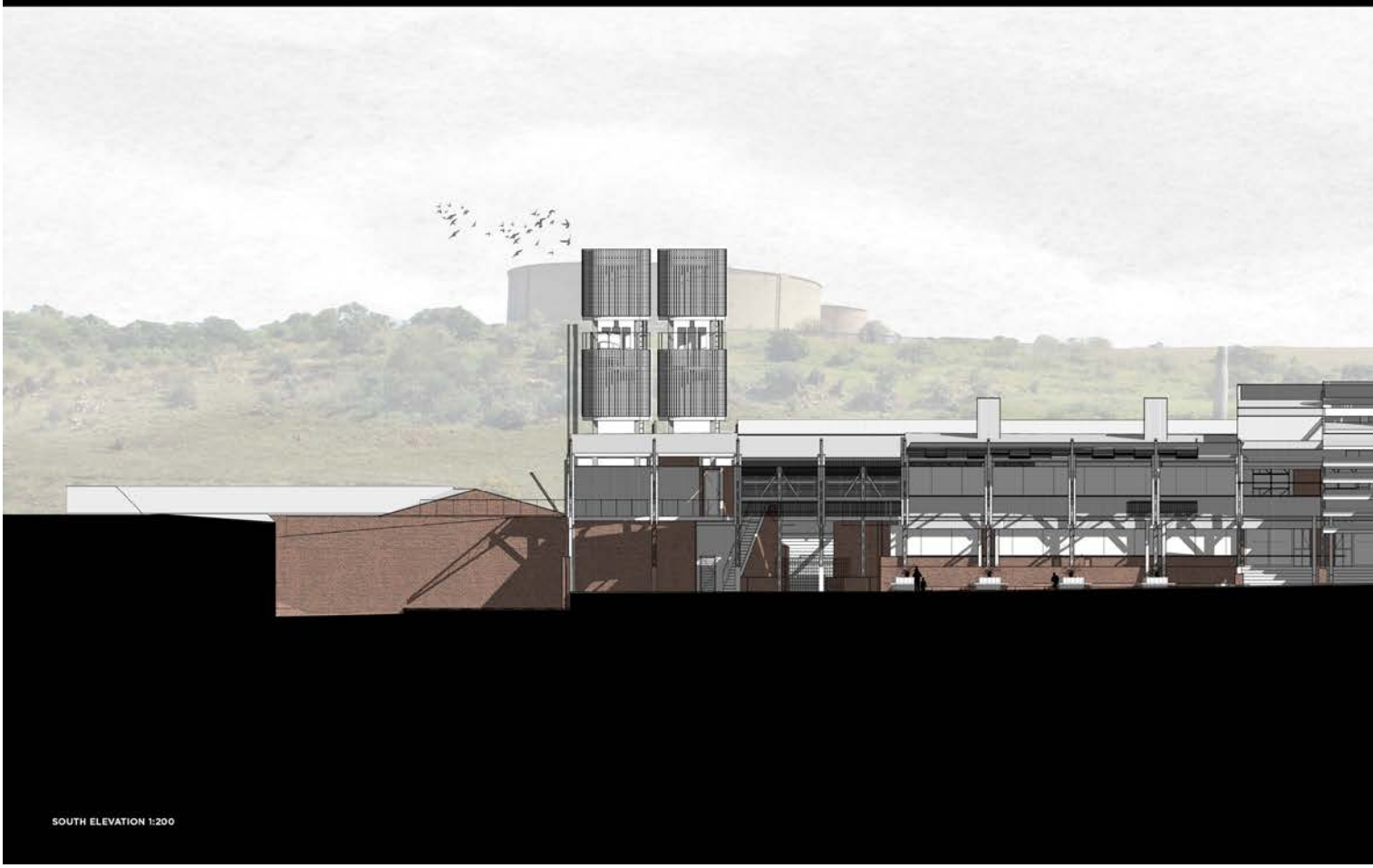


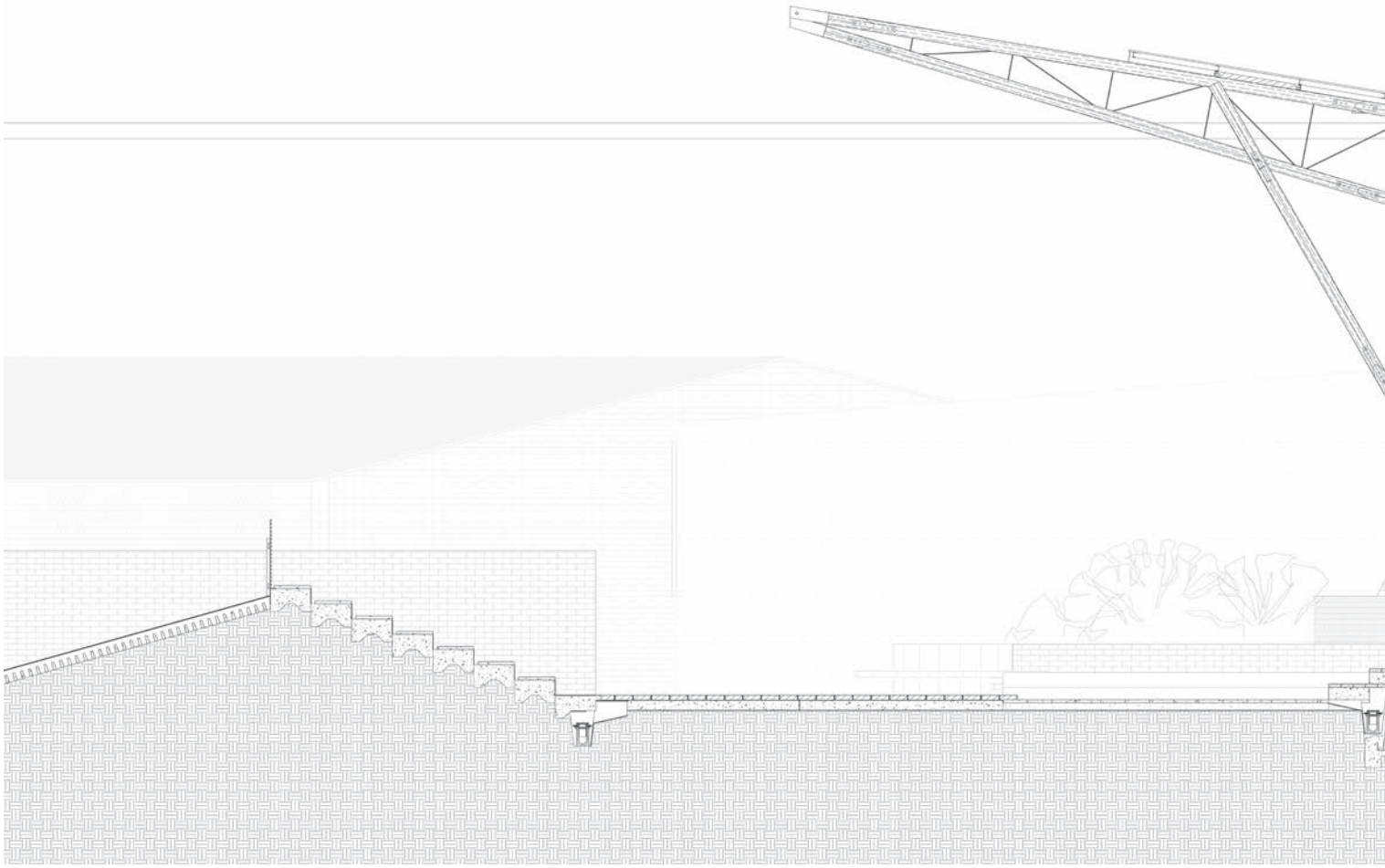
Figure - 216 *First floor plan (Author: 2017)*

NORTH ELEVATION 1:200



SOUTH ELEVATION 1:200

Figure - 217 *North and South Elevation (Author: 2017)*



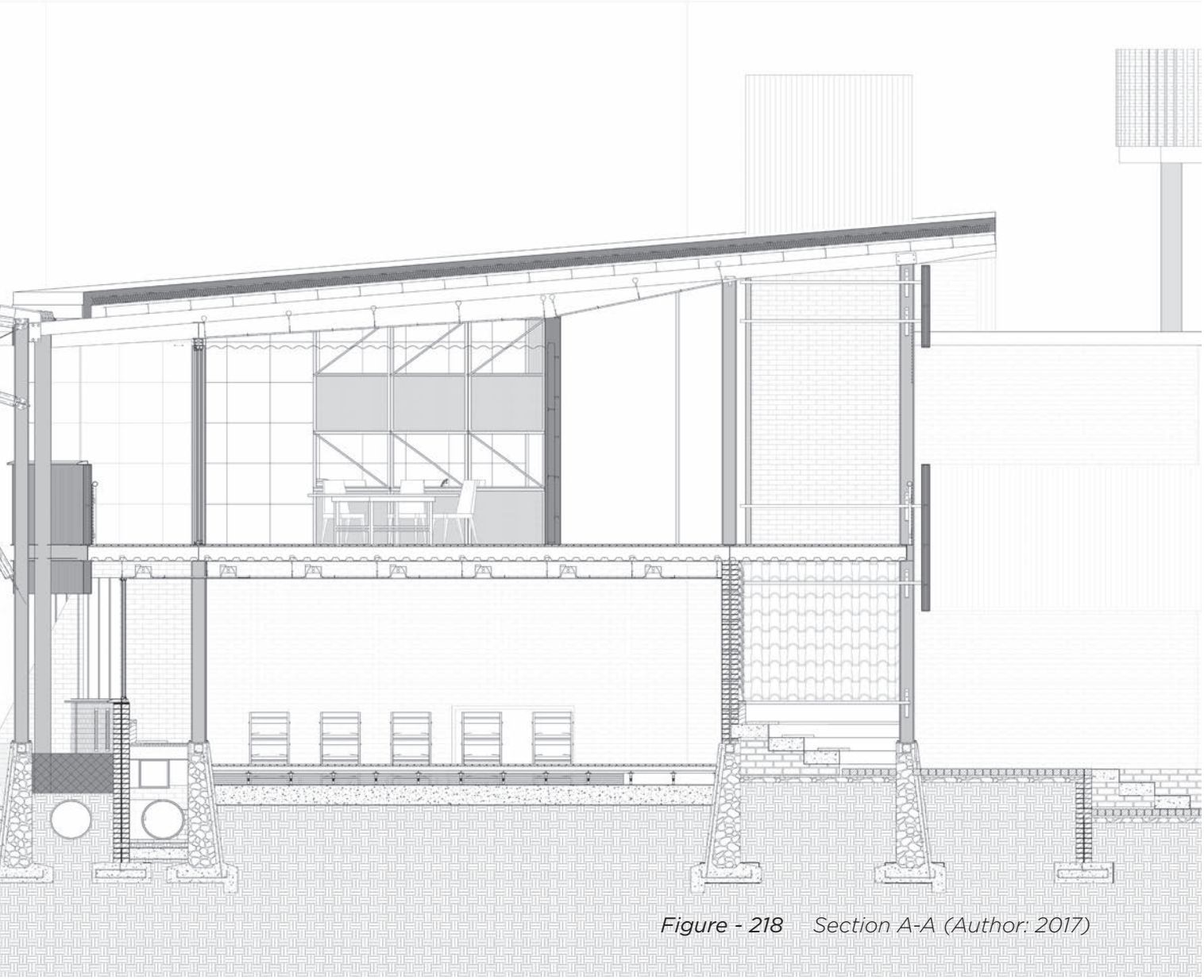
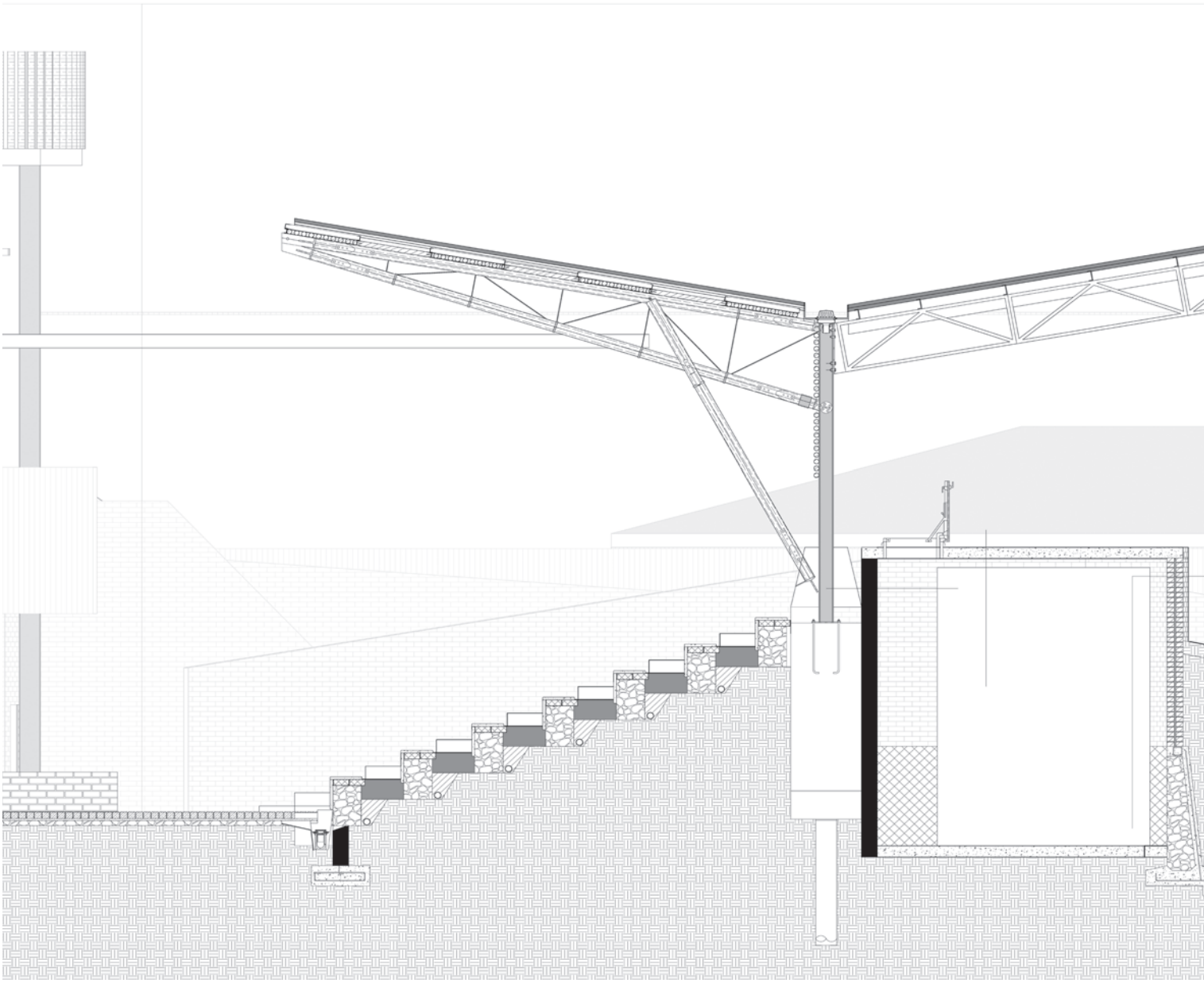


Figure - 218 Section A-A (Author: 2017)



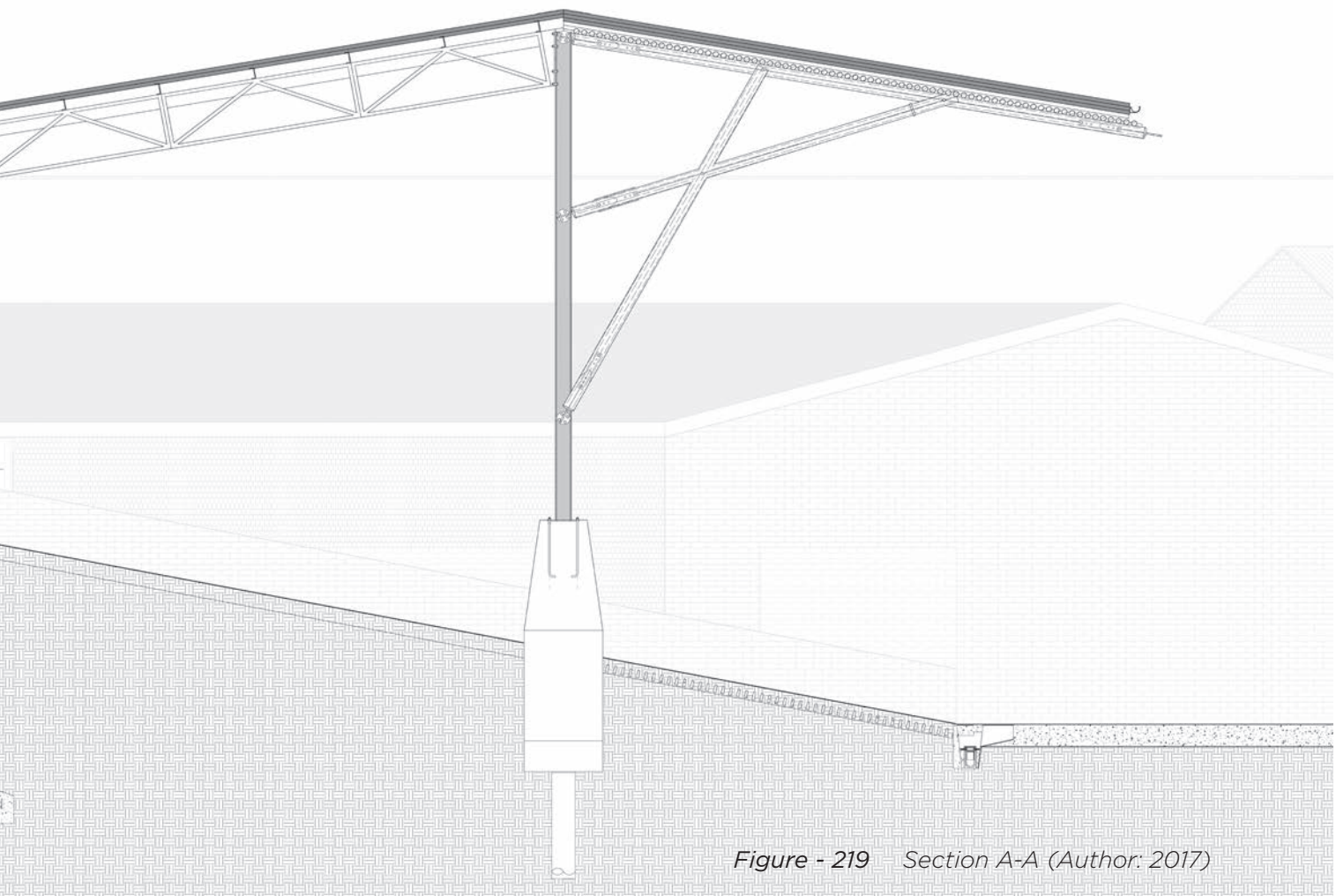
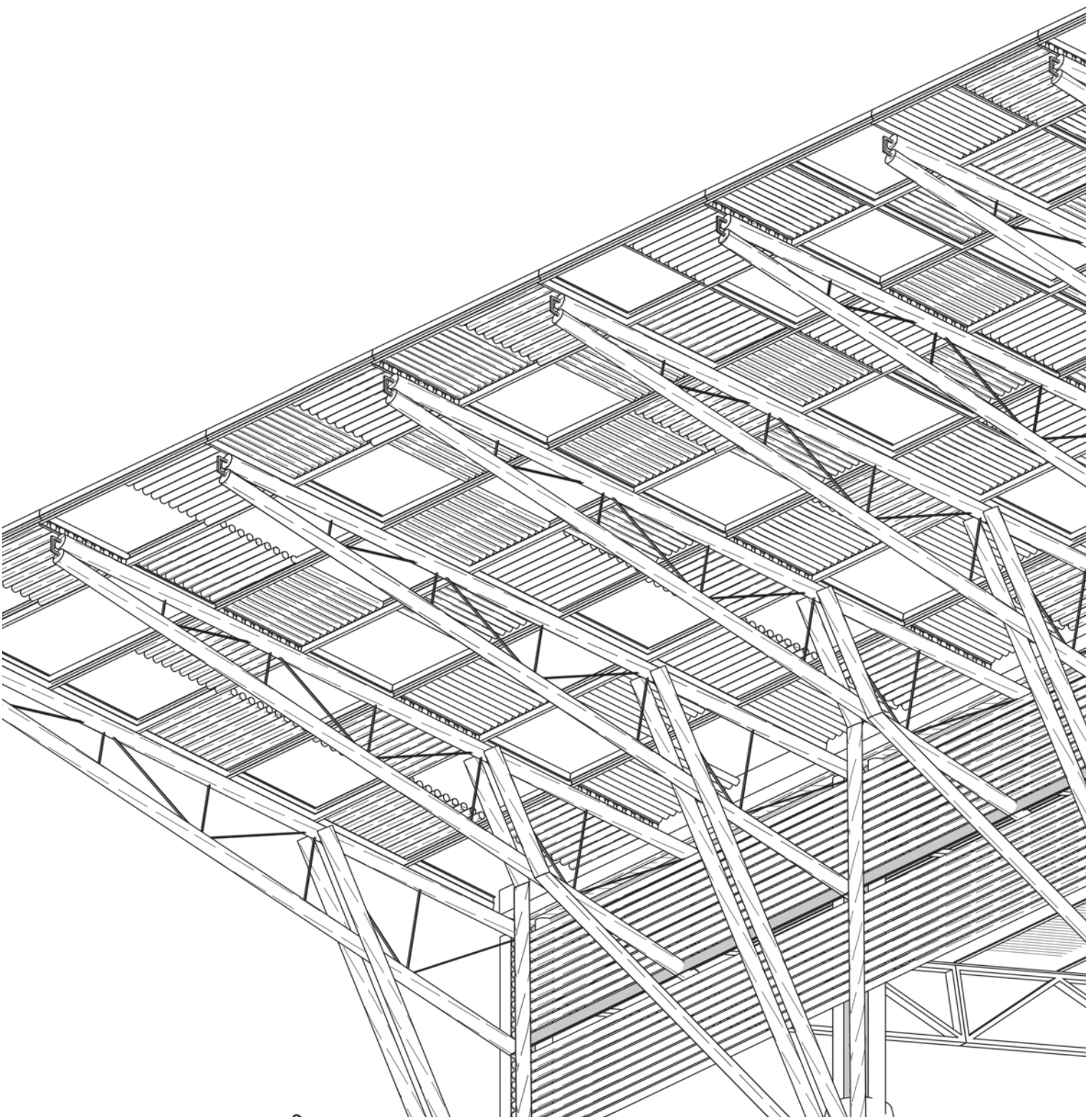


Figure - 219 Section A-A (Author: 2017)



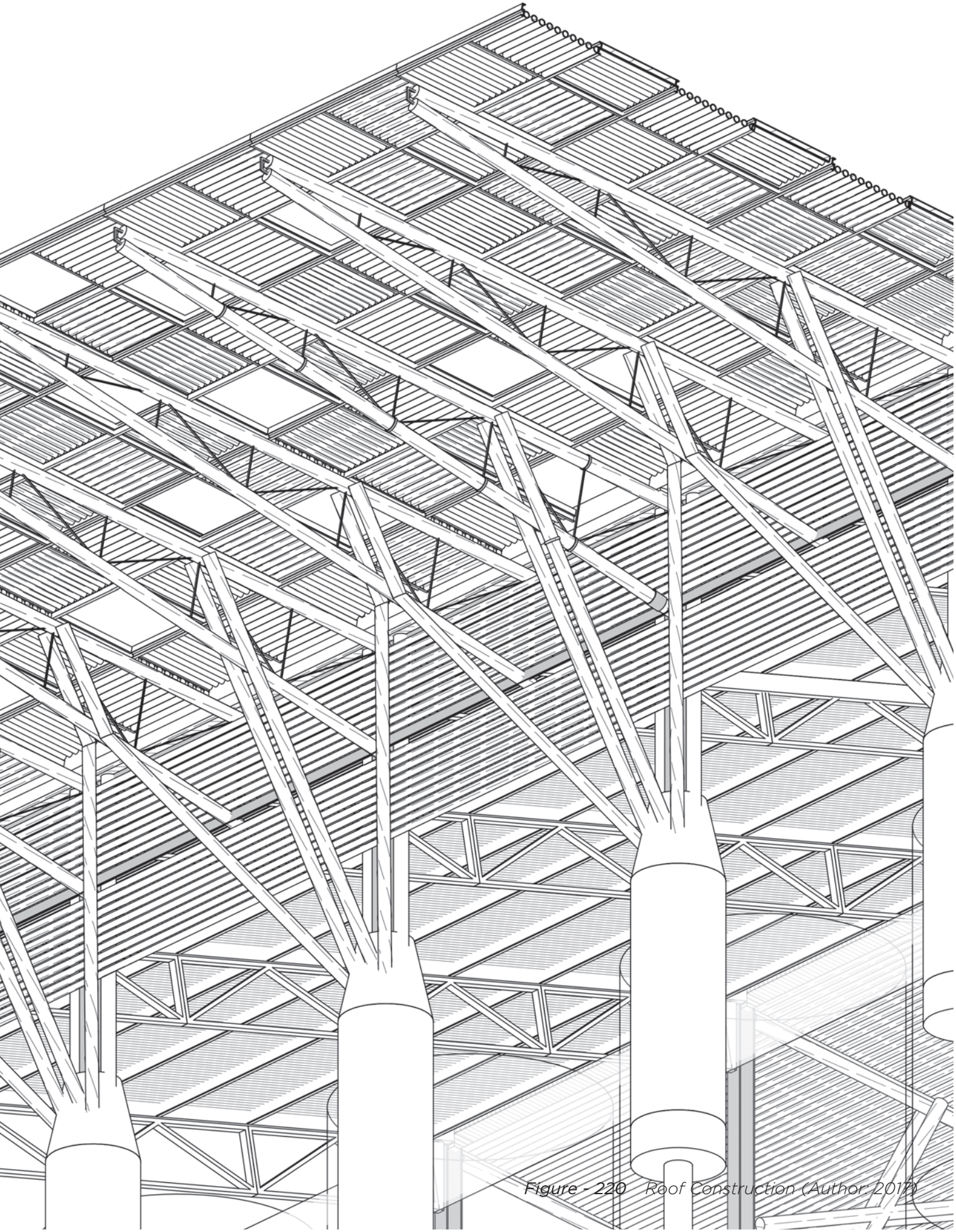


Figure - 220 Roof Construction (Author, 2017)

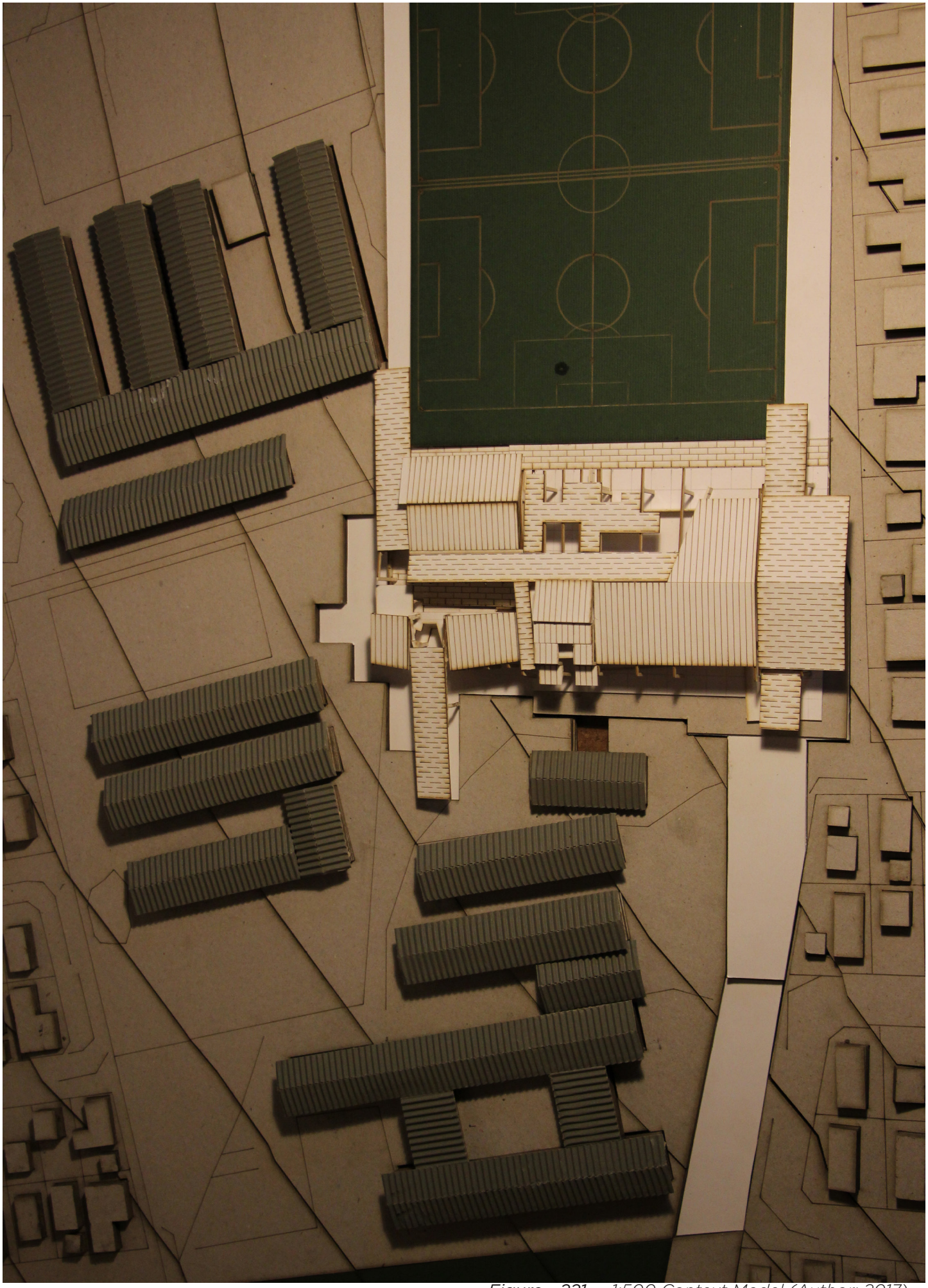


Figure - 221 *1:500 Context Model (Author: 2017)*

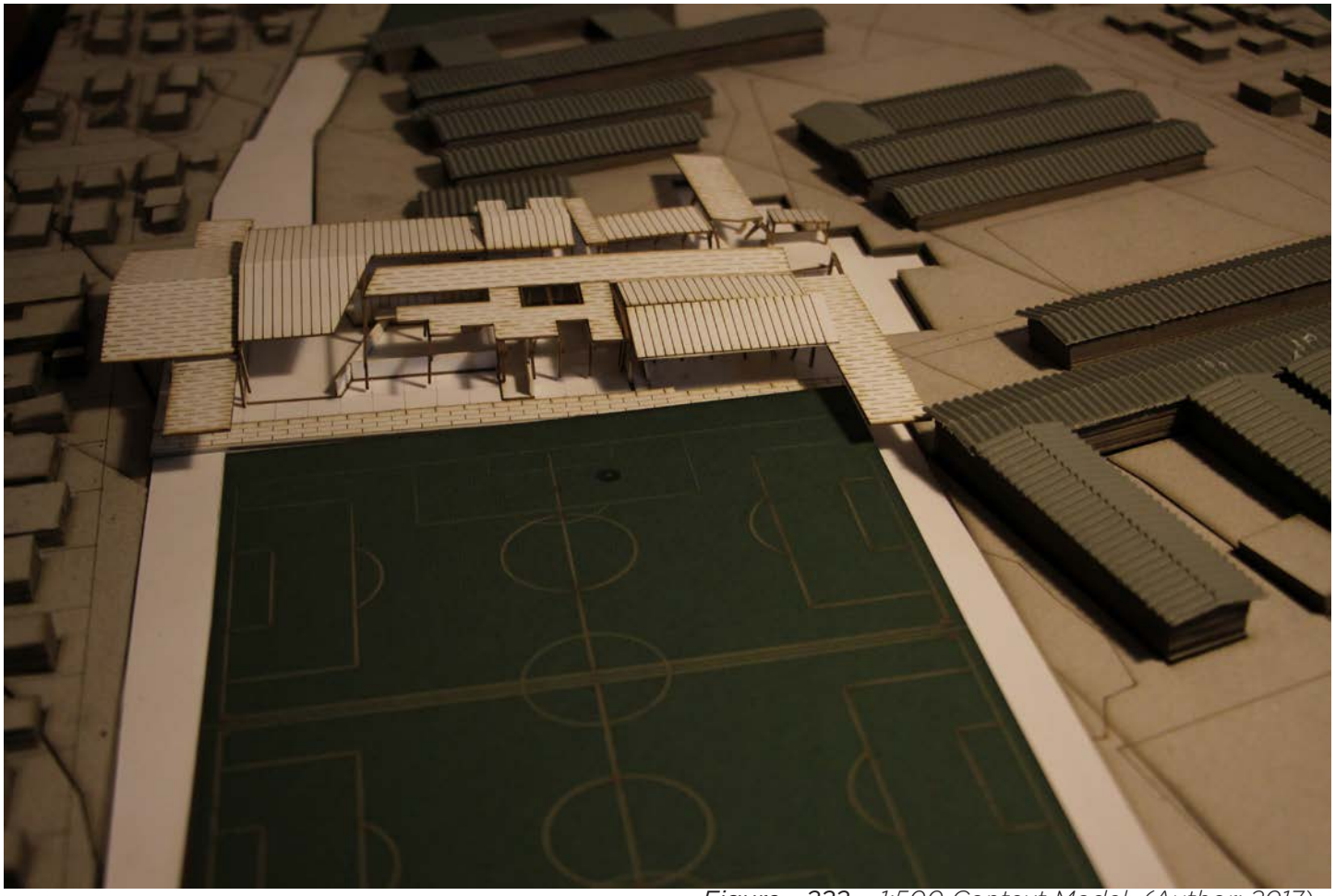


Figure - 222 *1:500 Context Model (Author: 2017)*

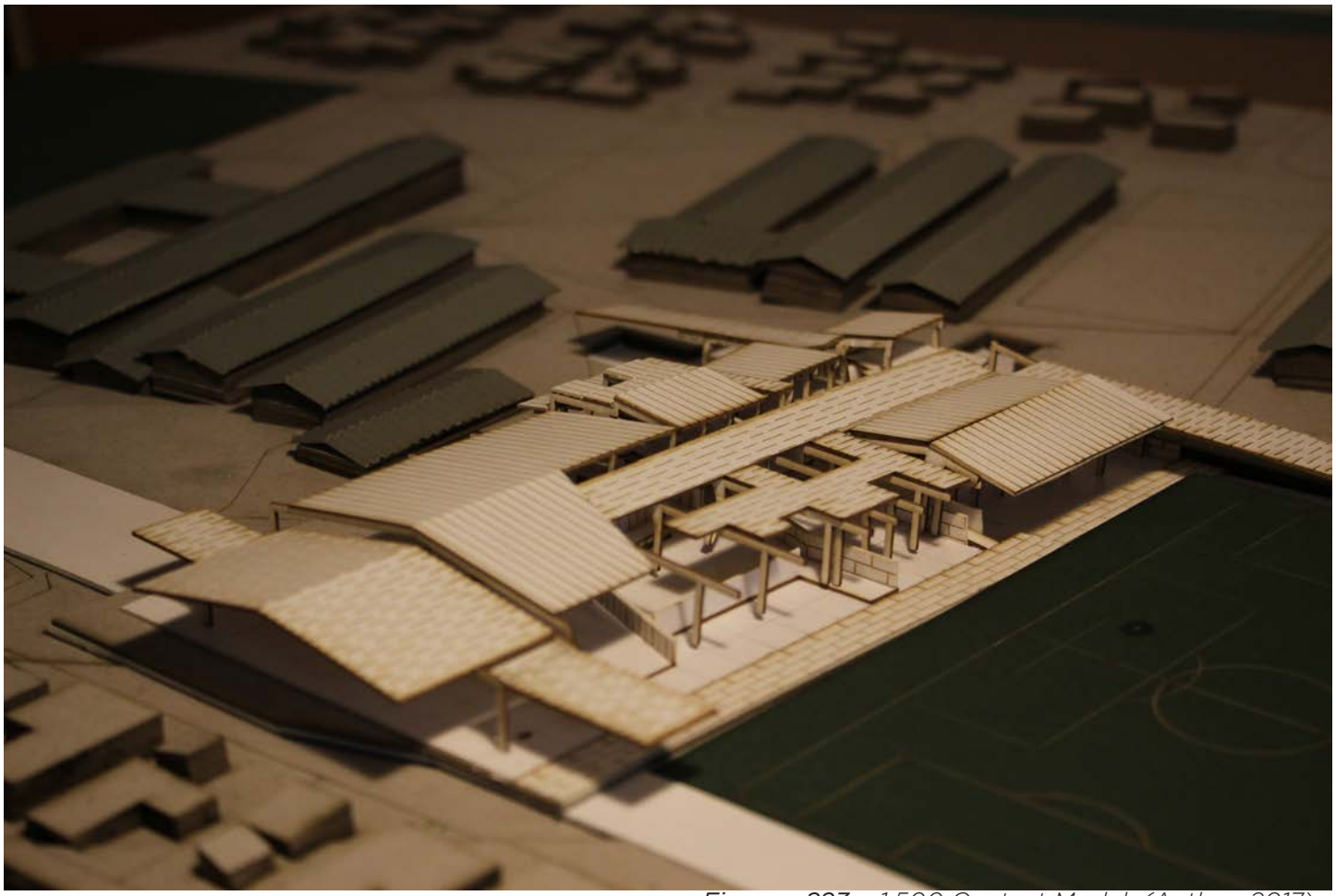


Figure - 223 *1:500 Context Model (Author: 2017)*

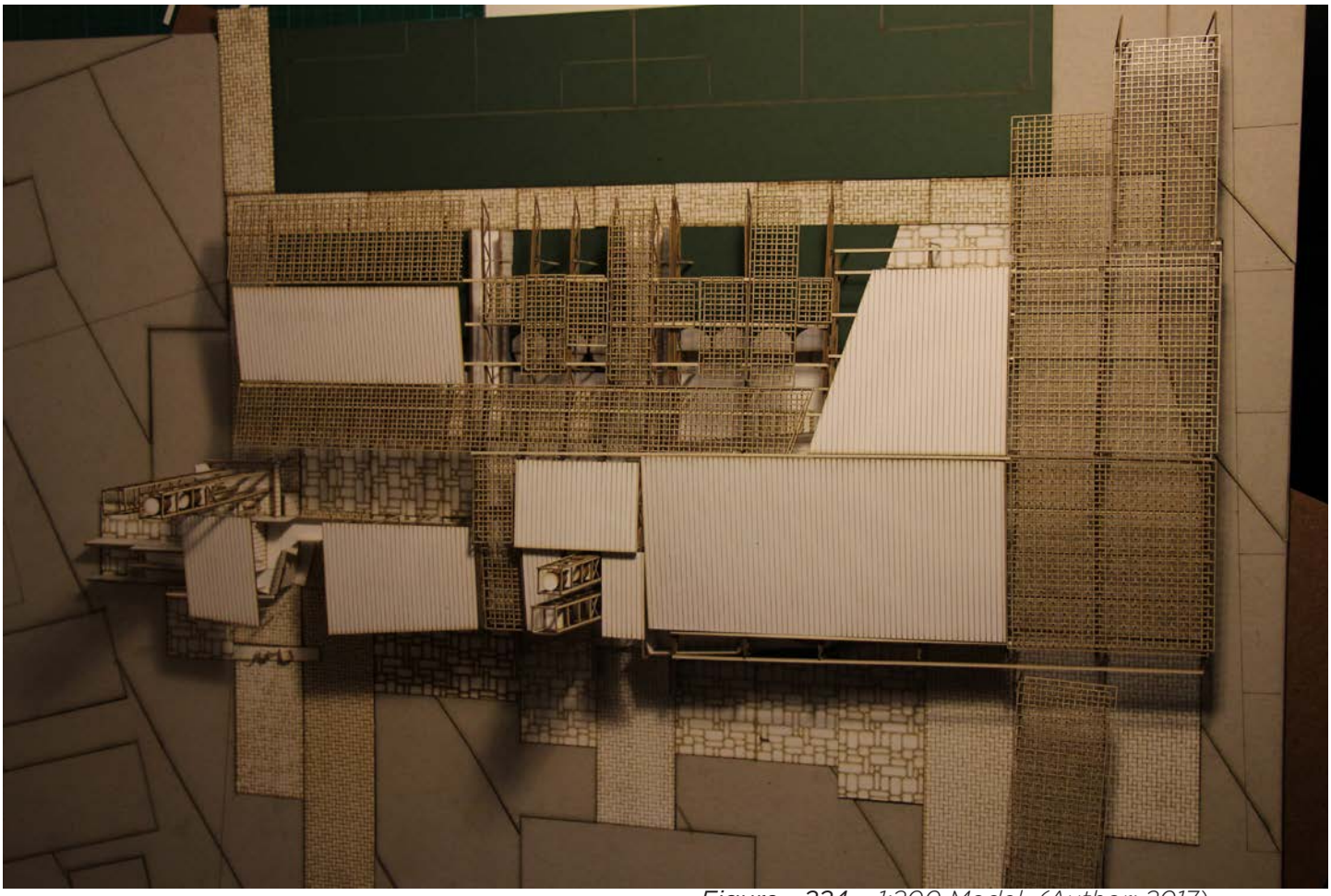


Figure - 224 *1:200 Model (Author: 2017)*

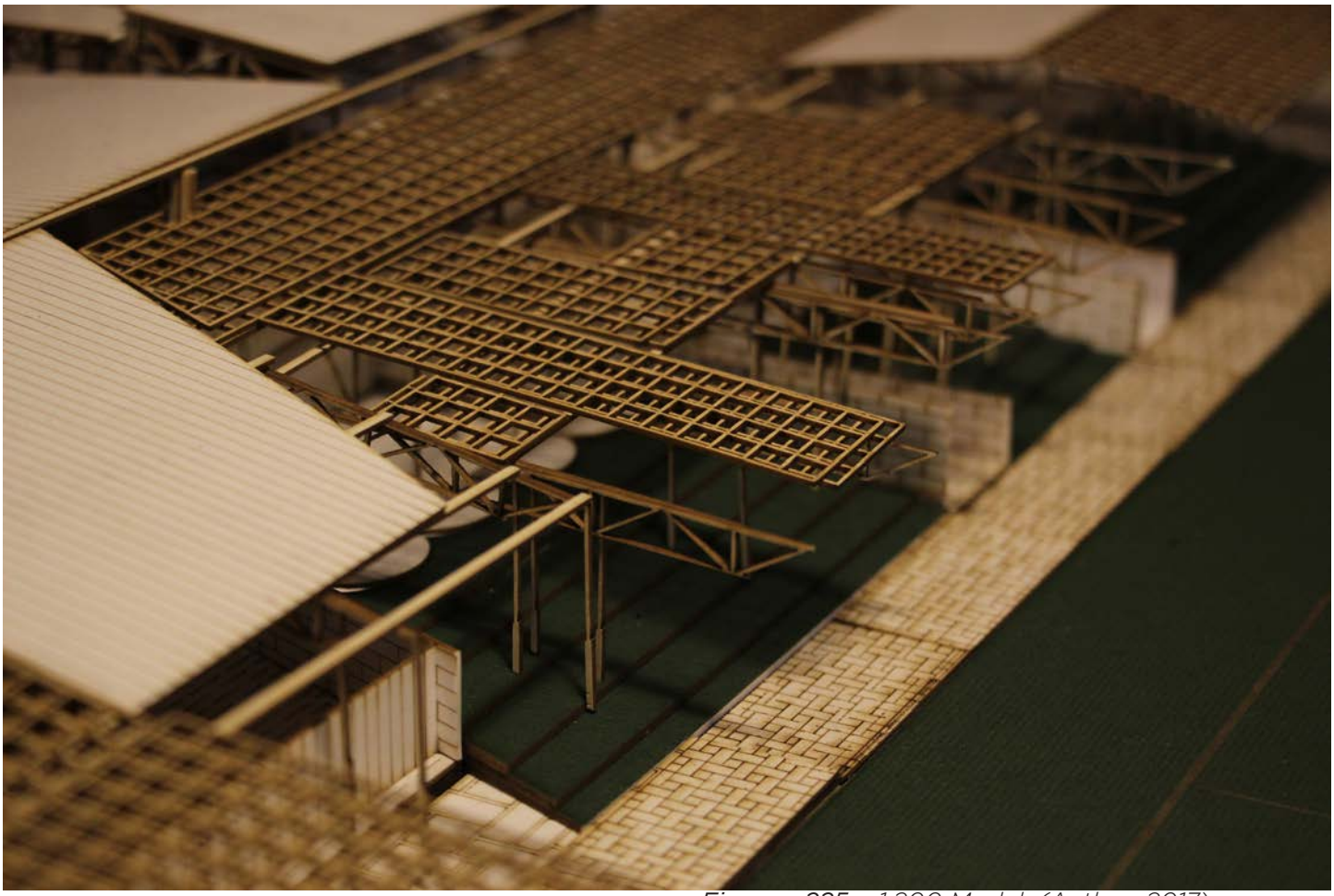


Figure - 225 *1:200 Model (Author: 2017)*

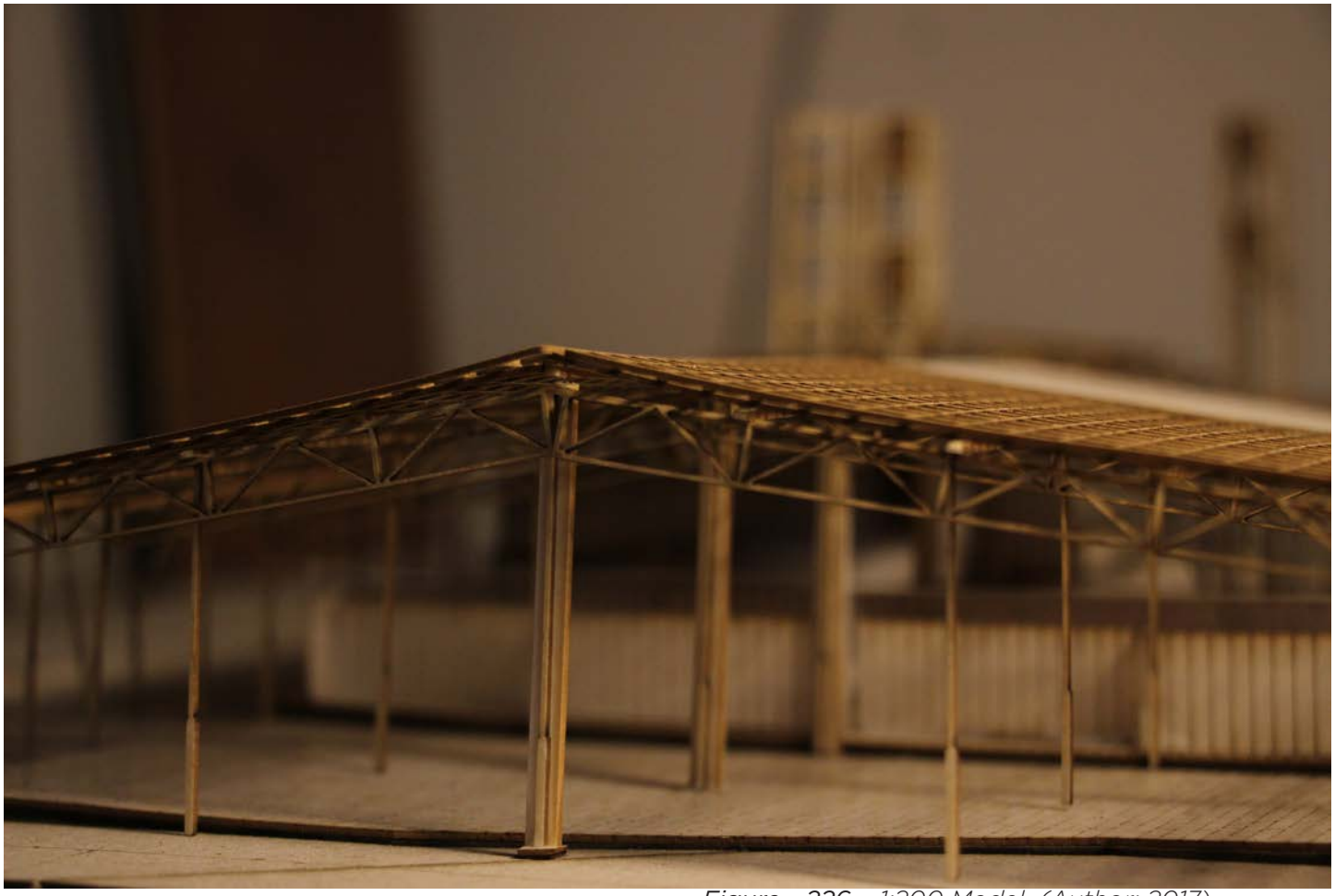


Figure - 226 *1:200 Model (Author: 2017)*

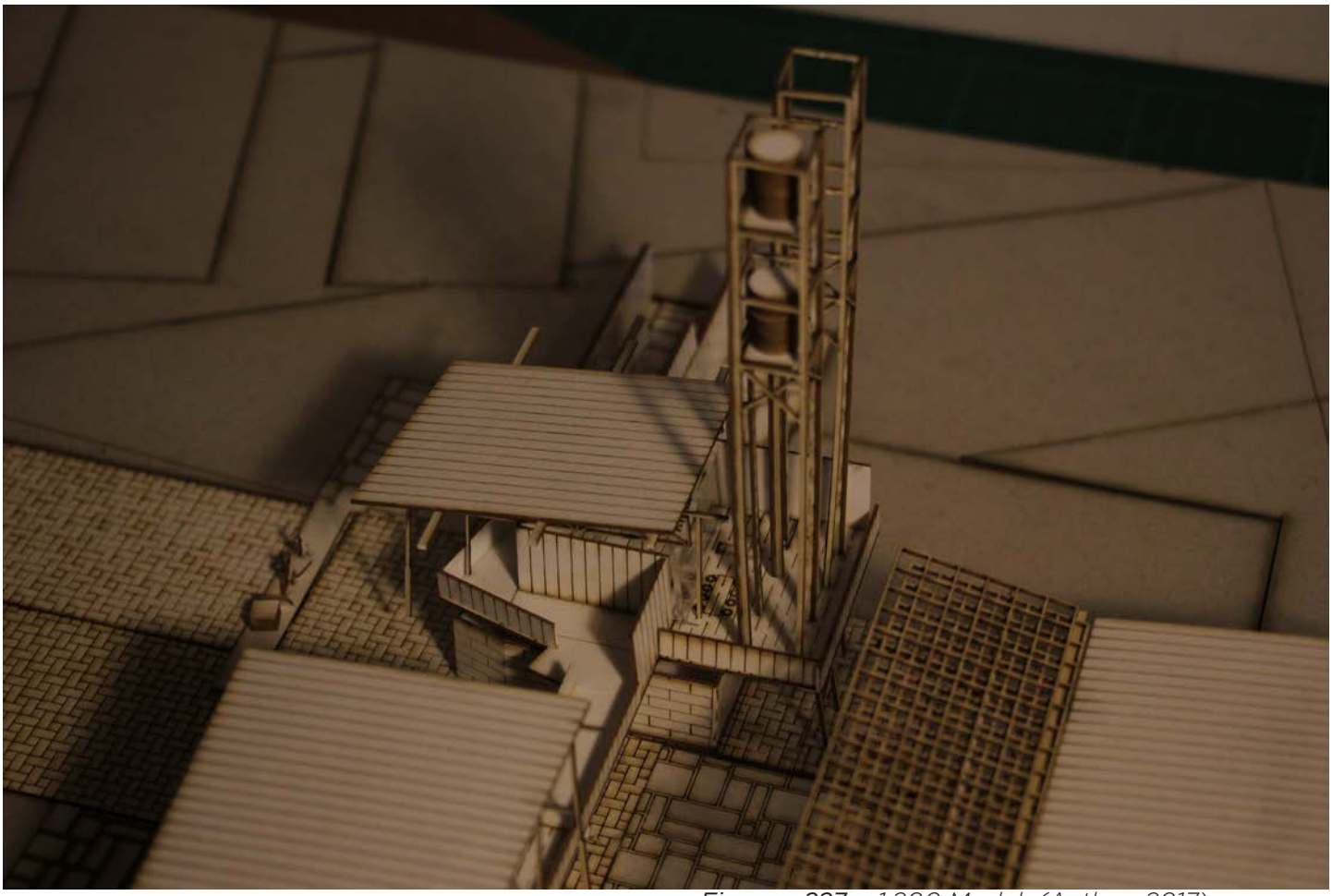


Figure - 227 *1:200 Model (Author: 2017)*

Figure - 228 *1:200 Model (Author: 2017)*

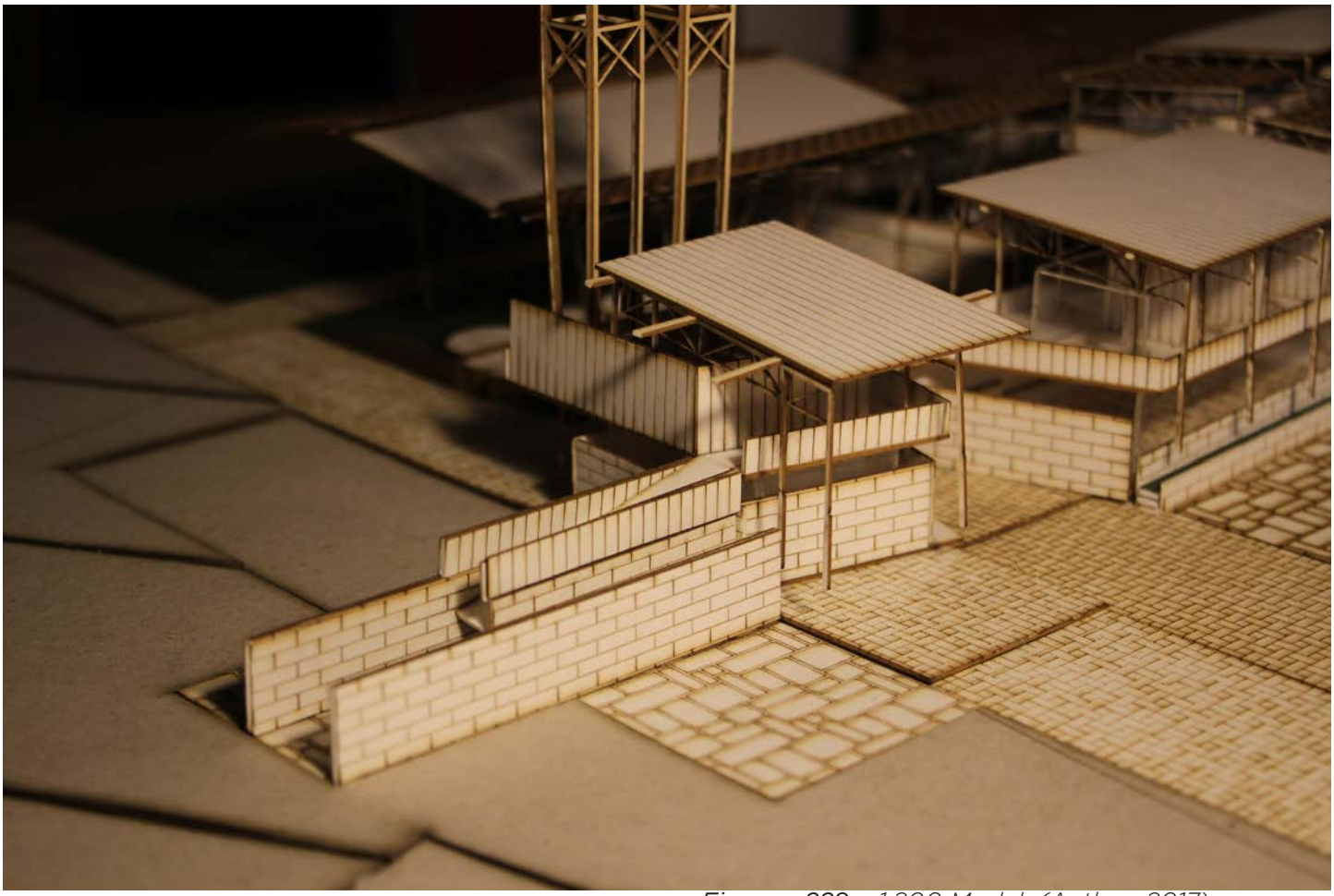


Figure - 229 *1:200 Model (Author: 2017)*

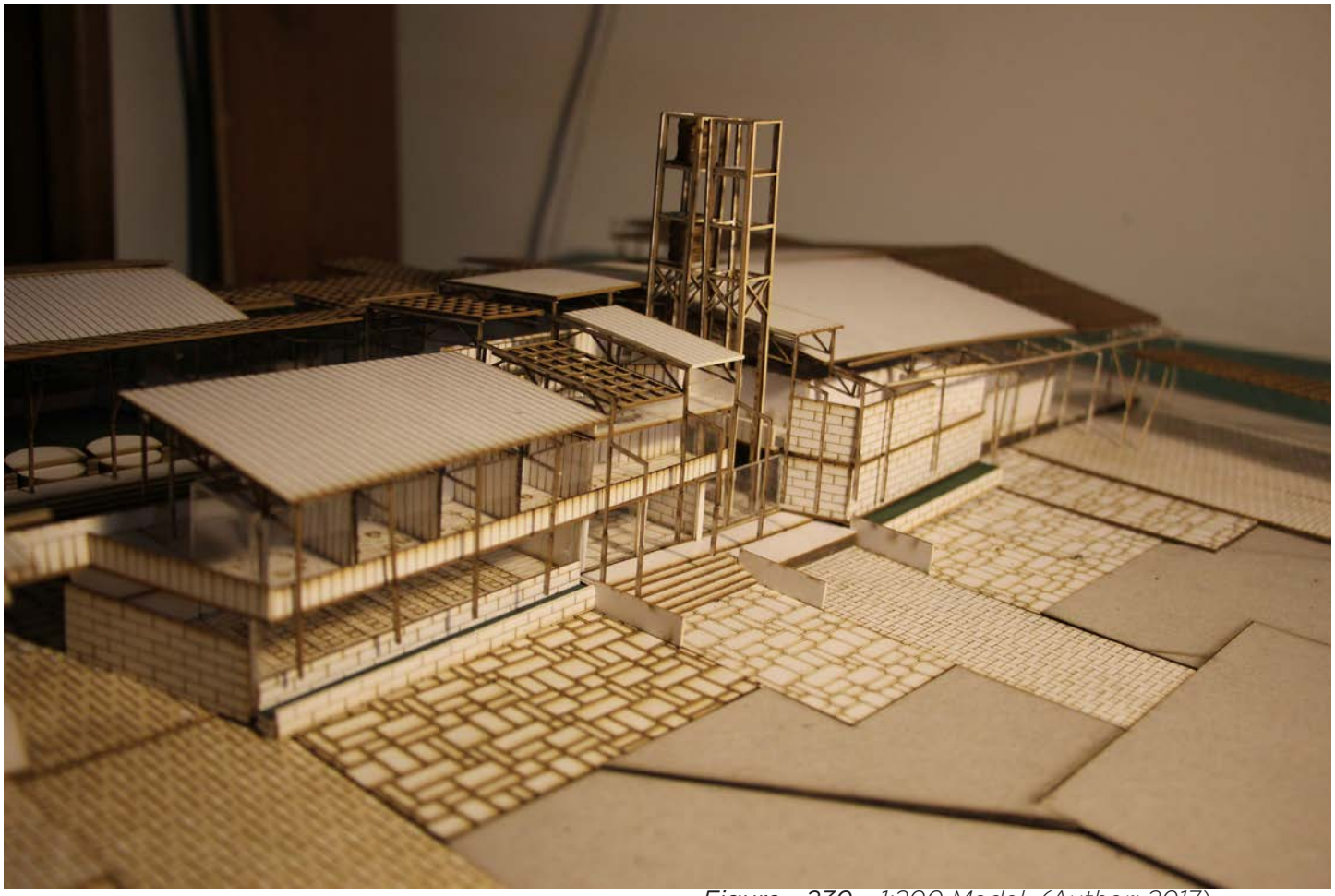


Figure - 230 *1:200 Model (Author: 2017)*

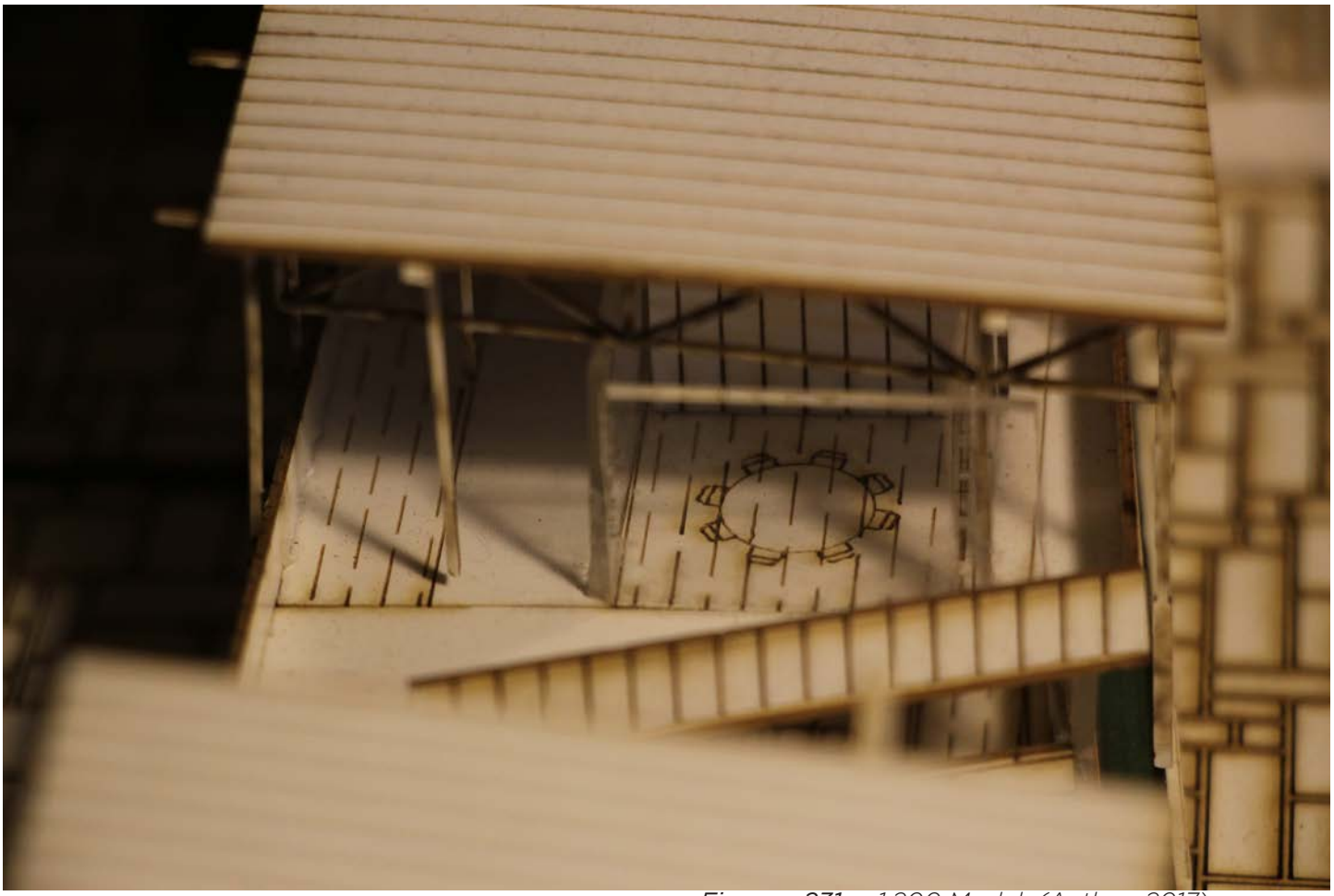


Figure - 231 *1:200 Model (Author: 2017)*

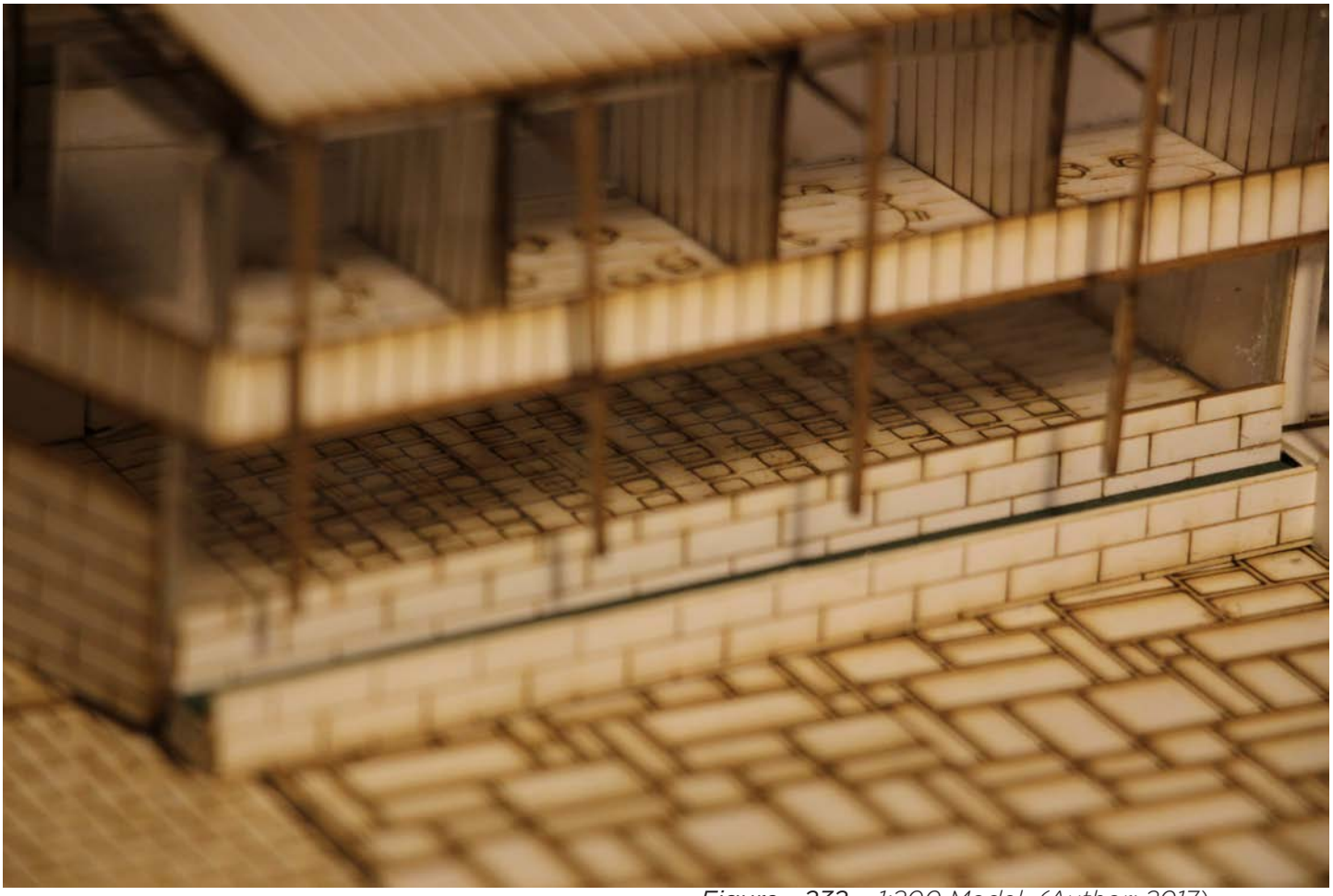


Figure - 232 *1:200 Model (Author: 2017)*

Figure - 233 *1:200 Model (Author: 2017)*

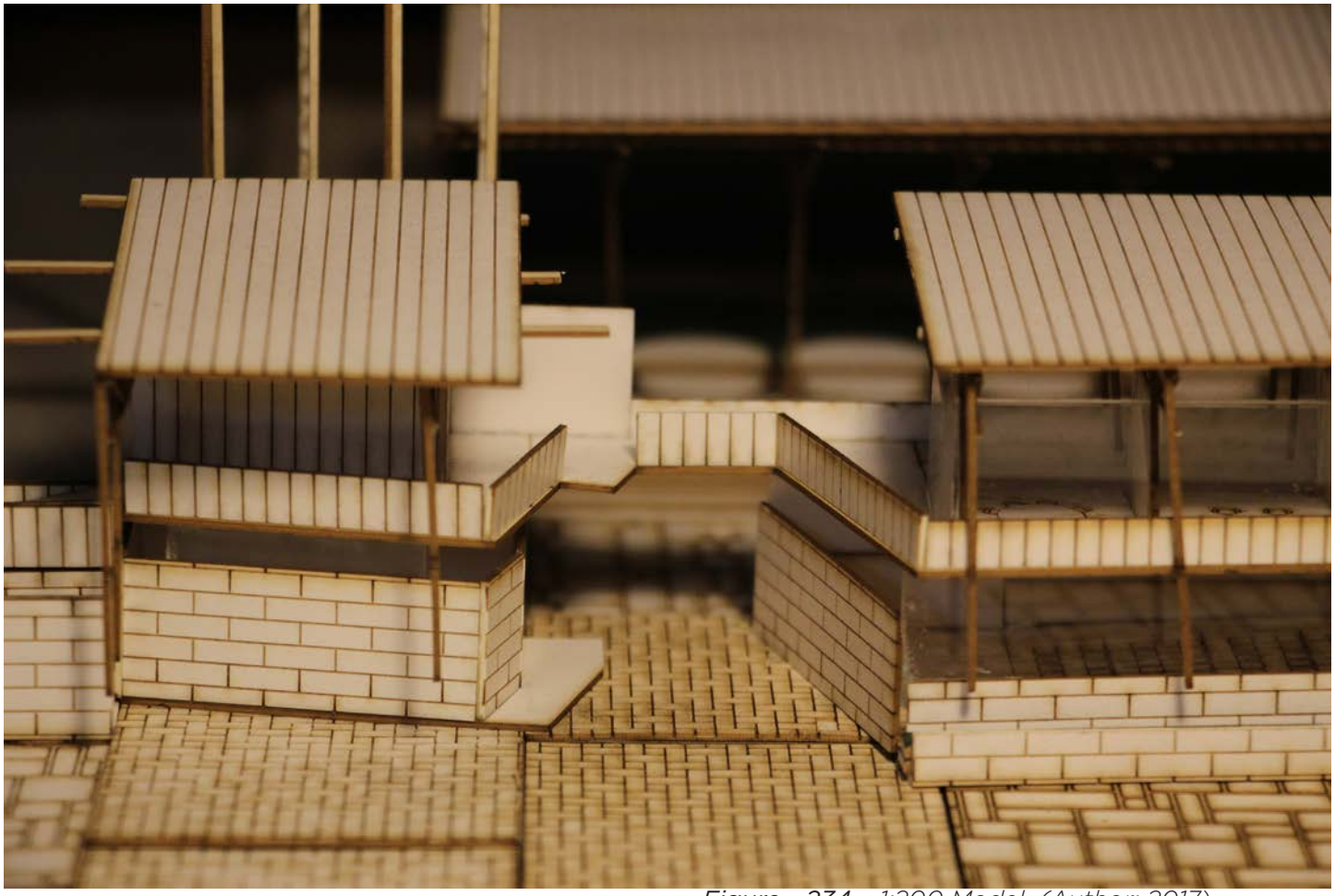


Figure - 234 *1:200 Model (Author: 2017)*

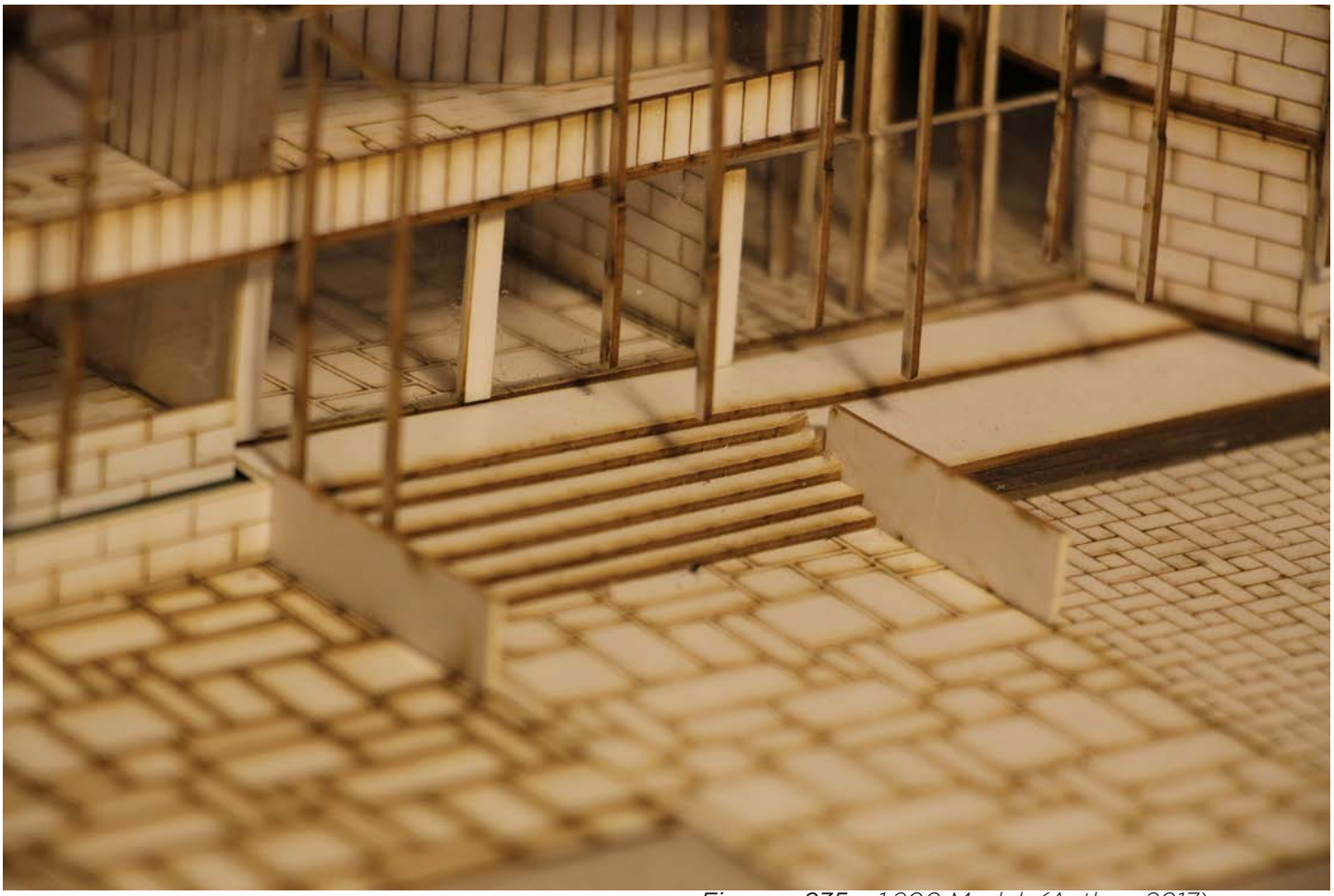


Figure - 235 *1:200 Model (Author: 2017)*

APPENDIX

PRAXIS 2016 – 2017

Noun, plural praxises, praxes [prak-seez]
Practice, as distinguished from theory; application or use, as of knowledge or skills.

> *"Knowledge emerges only through invention and re-invention, through the restless, impatient, continuing, hopeful inquiry human beings pursue in the world, with the world, and with each other."*

Paulo Freire

INTRODUCTION

To fully grasp the act of design in its social responsibility, various projects were undertaken between 2015 and 2017 to understand and research the effect of the process of engagement and the act of communication and knowledge exchange between a plethora of role players and community networks as well as the infrastructure holding it together. Implementing design in practice is essential to understand the field and to contribute meaningfully to its discourse.

Praxis

(The process by which a theory, lesson, or skill is enacted, embodied, or realised)

Figure - 236 *(Author: 2017)*

AFFIES KUNSTE KAMPUS 2015

As a candidate architect, I believed that a critical and thorough investigation must be put forward in the implementation of a building and the network and relationship between stakeholders to fully grasp the design process.

In 2015, Mathews Architects and Associates broke ground on the implementation of The Afrikaanse Hoer Seunskool in Pretoria's Kunste Kampus.

Consisting of a main hall for orchestral and choir practice (including a recording studio) four acoustically sound classrooms, 20 individual practice rooms, and offices and administration facilities for staff, the new Arts Campus set out promote musical education in a dedicated, through a vibrant knowledge exchange precinct.

Zoned to a small leftover portion of land between the existing school hall and the railway track running along the school's boundary, the challenges of the site informed the intricately connected design.

The design strived to resonate with the learners, encouraging a greater appreciation of the arts and continuing the schools proud tradition of creating and nurturing great future musicians and artists.

The idea was to document the full construction process of implementing the knowledge exchange infrastructure.

Cooperation between architect, school governing body, teachers, and project team consisting of quantity surveyor, acoustic specialist, engineer and contractor was vital. Meeting every week, the project team worked with the school governing body to implement the project on time and under budget.

The project won a PIA 2017 award for educational architecture.

Figure - 237 *(Author: 2017)*

Figure - 238 *(Author: 2017)*

Figure - 239 *(Author: 2017)*

Figure - 240 *(Author: 2017)*

Figure - 241 *(Author: 2017)*

Figure - 242 *(Author: 2017)*

Figure - 243 *(Author: 2017)*

Figure - 244 *(Author: 2017)*

Figure - 245 *(Author: 2017)*

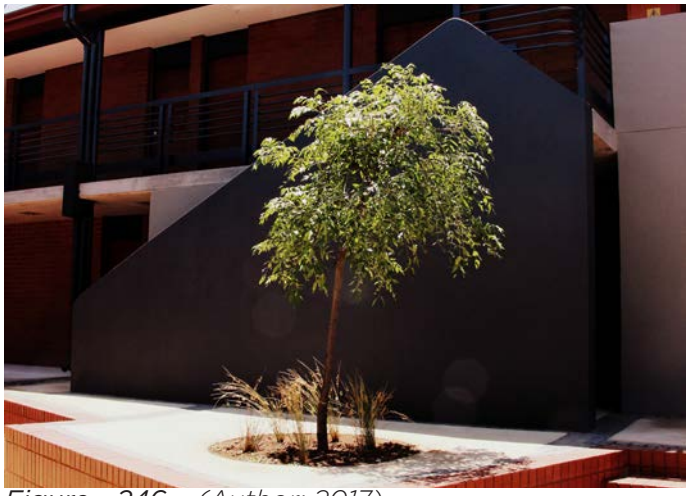


Figure - 246 *(Author: 2017)*

Figure - 247 *(Author: 2017)*

Figure - 248 *(Author: 2017)*

PLASTIC VIEW 2016

BOUKUNDE HONOURS GROUP, PLASTIC VIEW AND COOL CAPITAL 2016

In the first quarter of 2016, a group of Honours students from the University of Pretoria started their post graduate course in the suburbs of Moreleta Park in Pretoria, South Africa.

What they studied, in the midst of urban sprawl suburbia, was a legalised informal settlement that was generated out of unlawful tenants living on a portion of land owned by the Gauteng Government. The settlement is currently more commonly known as Plastic View. It was established out of the need for housing for people working in the area.

The group had intensively mapped the communities' social, political, economic and cultural landscape. The Honours students came to the conclusion that these people were there out of necessity in serving the broader community with their services. From golf estate green keepers to household staff employed by wealthy families in the area, not accommodating this community was out of the question.

The second quarter saw the mapping of Plastic View landscape and community heritage value. The themes of planning history and critical special models and narrative, cultural identity and responsive development were explored. This produced projects anywhere from sports pavilions, brick recycling structures and craft art workshops. When asked to initiate a Cool Capital Biennale intervention, the Honours Group decided to follow a comparable EPWP model in utilising labour intensive technologies, in this case beaded key chains to be sold as merchandise for Cool Capital, as to build and maintain infrastructure. This simultaneously addresses and accommodates the need for skills transfer and creates work opportunities for unemployed mothers of the settlement. Therefore, beneficiaries are empowered to optimistically improve their long term capacity to earn a living and be productive members of society, while all together building much needed infrastructure. In this instance, the funds gathered will go to the upgrading of the four JoJo water tanks located in the settlement.

Through the platform of engagement and grassroots participation, I was part of the 2016 Honours Plastic View research group. In 2016, architecture students were actively involved through the Moreletapark Church and its small primary school servicing 3000 informal settlers in Plastic View, an informal settlement in the heart of Pretoria's suburban sprawl. A deep understanding of the quotidian workings and networks inside the temporary cityscape made clear the complexity of solving the most critical issues faced by informal residents. There to serve the needs of city employment and playing a central role in the construction of the surrounding upper class suburbs, it is the success of these communities in urban slum spaces which will guarantee a just future.

The reaserch finding concluded the immense role the residence play in the surrounding urban landscape. As well as the amount of community network needed to sustain a peaceful informal settlement, with strong leadership structures and vibrant and active community participation and dialog. On an architectural point, the homes were magnificently crafted.

Figure - 249 *(Author: 2017)*

BOTTLES OF LIGHT 2016

Sonop Jool Initiative

Figure - 250 *(Author: 2017)*

Figure - 251 *(Author: 2017)*

Figure - 252 *(Author: 2017)*

Figure - 253 *(Author: 2017)*

Figure - 254 *(Author: 2017)*

COOL BEADS PROJECT 2016

BOUKUNDE HONOURS GROUP 2016

SMALL IS BIG COOL BEADS

OR: THE NARRATIVE AND CULTURAL IDENTITY OF CREATIVE AND CRAFT CURRENCY, SUSTAINABLE COLLABORATION AND CRAFT CONSCIOUS COMMERCE, AND ITS CULTURAL SIGNIFICANCE IN HERITAGE DESIGN AND PRESERVATION AS WELL AS THE EXCHANGE OF KNOWLEDGE.

There are 4 inefficient JoJo tanks with a combined water storage capacity of 25 000 l (filled twice per day) servicing the informal settlement of Plastic view in Moreletapark's 3 000 residence. (Providing 17 l per resident per day)
The idea was simple.
1) Use the creativity and craft skill possessed by local residence of plastic view.
2) Use the design know how and social reach of Boukunde students.
3) Create craft currency and use to upgrade critical infrastructure in the informal settlement.

With 400 key chains sold, a water tank in plastic view can be upgraded from an inefficient water storage facility to an environmentally friendly, waste less and productive community node.

Unfortunately time was against us and the project never realized its full potential. Constraints of disrupting established community systems and the potential of a negative social impact limited the projects outcome.

It did however provide our Crafter, Talent (079 663 6498) with much needed income in the second quarter of 2016 and gave us critical insight into the workings of grassroots community projects and the potential of design.

Figure - 255 *(Author: 2017)*

Figure - 256 *(Author: 2017)*

Figure - 257 *(Author: 2017)*

Figure - 258 *(Author: 2017)*

Figure - 259 *(Author: 2017)*

Figure - 260 *(Author: 2017)*

Figure - 261 *(Author: 2017)*

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