

Fig 34: Retort 1-Built in 1950's (Author, 2017)

Chapter

2

2-Design_

2.1 Mapping

2.1.1. Mapping lenses 45
Nucleur (addressed in 1.6)
Macro potential 47
Macro electro 49
Macro kinetic 51
Renewable
(will be addressed in 2.4 Design)
Combined Kinetic map 53

2.1.2 Meso context 56
2.1.3 Visual Tour of current site 62
2.1.4 Notable details and genius loci of site 64
2.1.5 Conclusion 67

2.2 Restitution Park

2.2.1 Group vision
2.2.2 Restitutive relationship diagrams 70
2.2.3 Precedents (Urban vision) 72
2.2.4 Rezoning strategy 74
2.2.5 Urban vision 78

2.3 The third retort

2.3.1 Response to restitution park 82
2.3.2 Site analysis 84
2.3.3 Climatic data 86
2.3.4 Coal to gas process 87
2.3.5 Program 89
2.3.6 Research field focus 90
2.3.7 Precedents 92
2.3.8 Spatial requirements 94
2.3.9 Intuitive sketches 100

2.4- Concept

2.4.1 Didacticism as driver 102
2.4.2 Creating the didactic route 104
2.4.3 Concept diagrams 109

2.5- Design development

2.5.1 Design development 110
2.5.2 Parti diagrams 130

2.1.1 Mapping Lenses

ENERGY AS LENS

The following section will investigate the site, its currents condition, as well as how it functions and slots in with the context of the city. The mapping lenses of energy were selected to mark different types of energies experienced on-site The understanding of its history, development, and possible shortcomings produced layers of information. This information is weighed against the frameworks of the City vision 2040 to seek opportunities for architectural intervention. These interventions aim to strengthen the site as a future potential catalytic project for the empire Perth corridor.

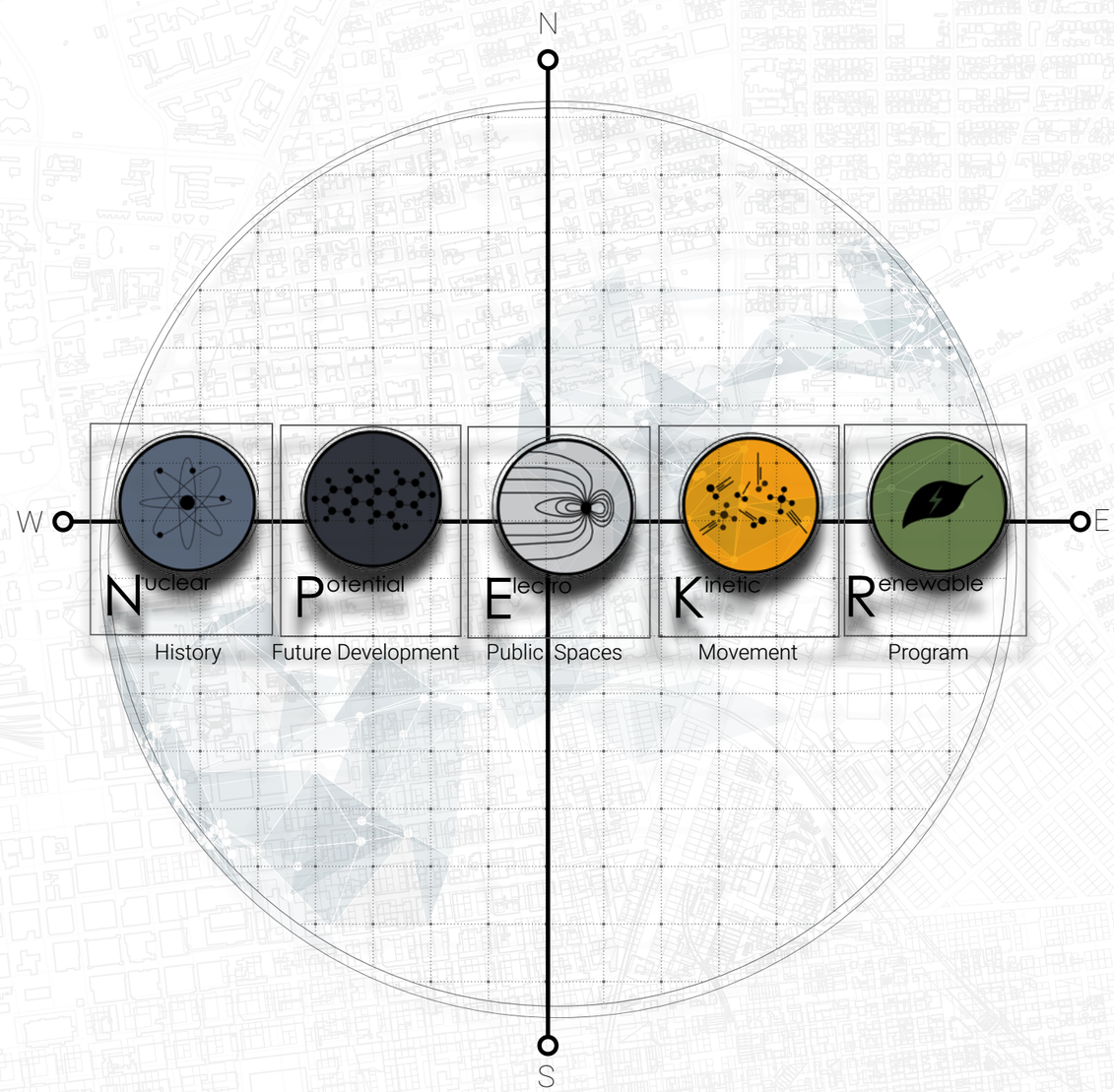


Fig 35: Mapping lenses (Restitutive Park group, 2017)(adapted by author, 2017)
Fig 36: City map (Restitutive Park group, 2017)(adapted by author, 2017)

Potential

N



Surrounding nodes
Figure 37 indicates the mixed-use nodes nearby to the site. It includes Braamfontein, the central business district, Milpark, Parktown, Empire Road, Killarney, Hillbrow, Rosebank Oriental Plaza, Brixton and Richmond,

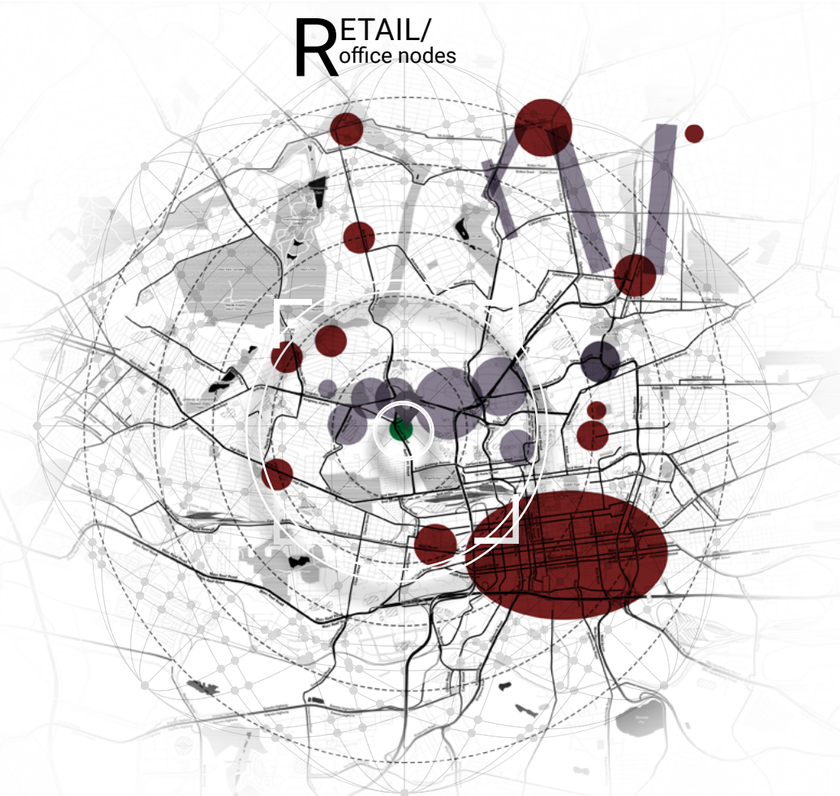


Fig 37: Retail Nodes from Gapp frameworks (adapted by author,2017)



Mixed-incomed groups surround the restitution park site.To the north and the north-east of the site are the upper-income residential suburbs of Westcliffe, Parkview, Melville, Greenside, Parkwood and Emmerentia; to the west and north-west, are the middle-income suburbs of Mayfair, Westdene and Auckland Park; and to the south low-income suburb of Vrededorp.

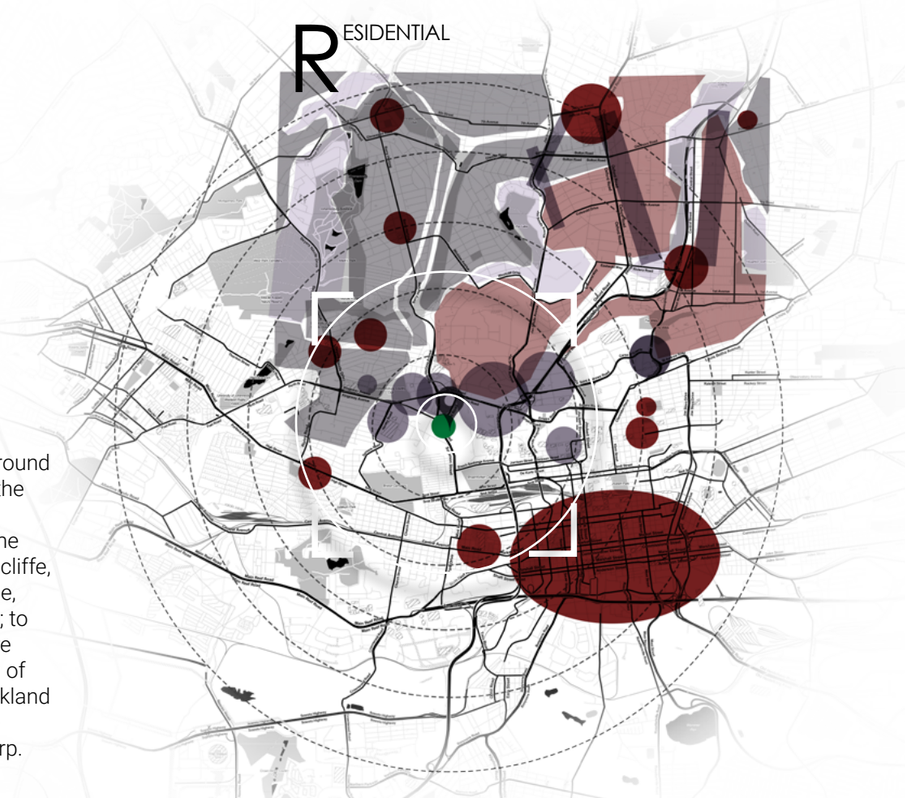


Fig 39: Residential from Gapp frameworks (adapted by author,2017)



Institutional Belt
The Restitution park is part of an east-west "Institutional Belt." As indicated in figure 38, it contains important institutional uses such as SABC, private hospitals, government, two universities and schools.



Fig 38: Institutional belt from Gapp frameworks (adapted by author,2017)



The site is ideally located in a "Zone of integration." as indicated in figure 40.It is surrounded by a collection of different uses, is part of an east-west "institutional belt", has a range of residential income suburbs surrounding it and is exceptionally well located in the region to become a major mixed-use node.

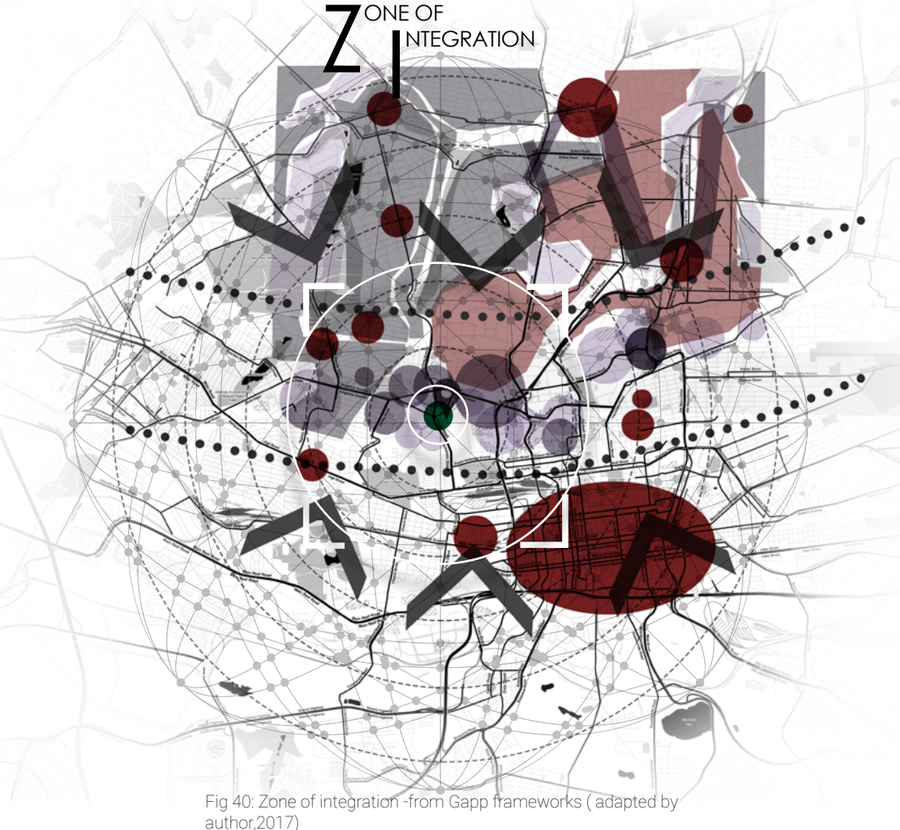


Fig 40: Zone of integration -from Gapp frameworks (adapted by author,2017)

Electro

N

PUBLIC PARKS

Green spaces in Johannesburg
Johannesburg has green spaces scattered around the city. However, most of these green spaces are private and not accessible to the general public. The Restitution Park is part of these green spaces, but it becomes unique in the way that it is available to the public and the restitutive relationships that it possesses.

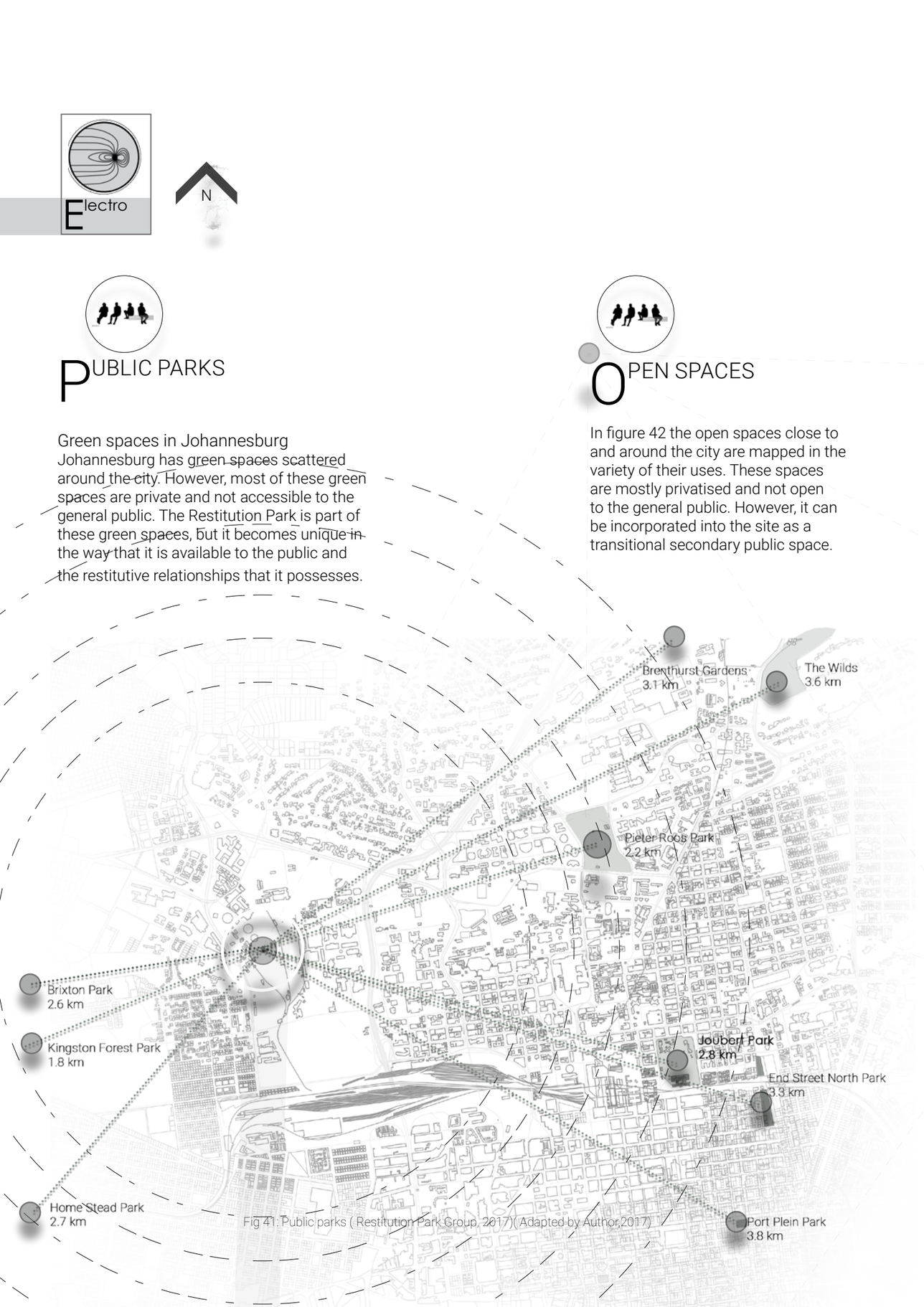


Fig 41: Public parks (Restitution Park Group, 2017)(Adapted by Author,2017)

OPEN SPACES

In figure 42 the open spaces close to and around the city are mapped in the variety of their uses. These spaces are mostly privatised and not open to the general public. However, it can be incorporated into the site as a transitional secondary public space.

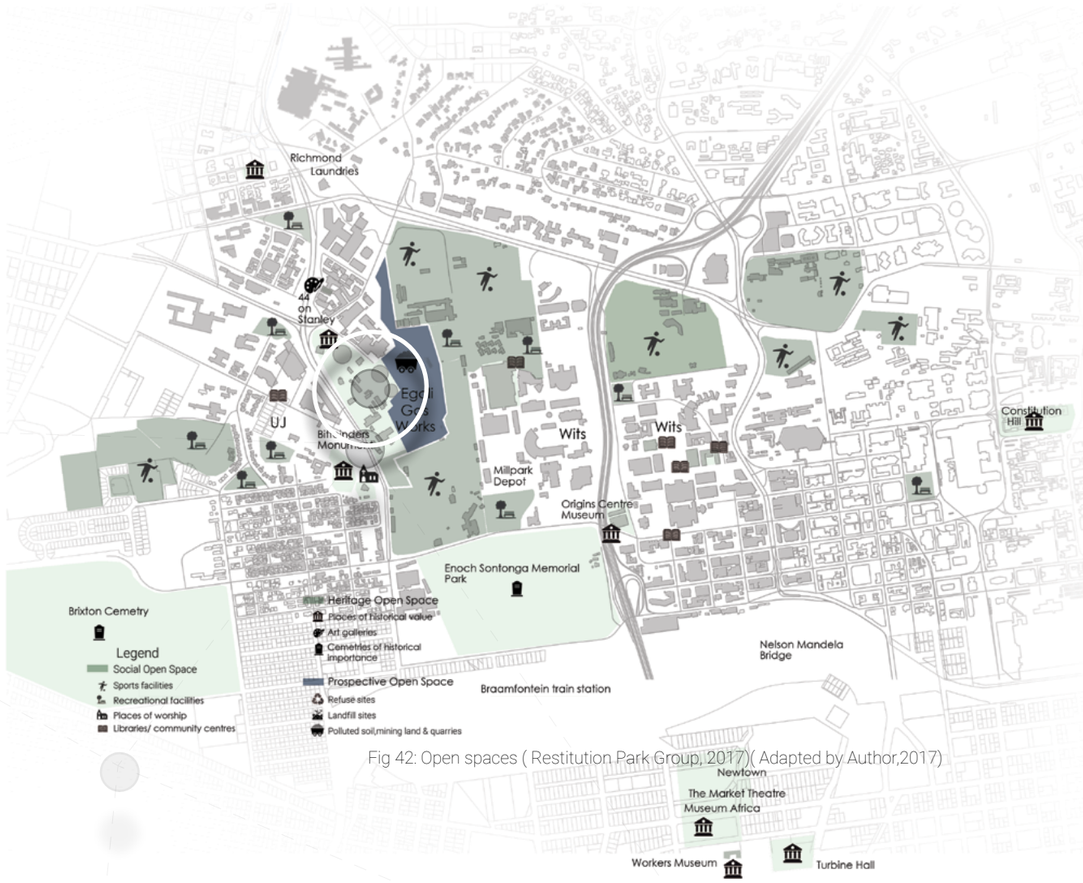


Fig 42: Open spaces (Restitution Park Group, 2017)(Adapted by Author,2017)

EDUCATIONAL

Educational

Figure 43 portrays the school network in a greater area of Johannesburg. Although the proposal will have a connection to other schools in Johannesburg, it will focus mainly on the University of Johannesburg, the University of the Witwatersrand, the CSIR, and the John Orr Primary school.



Fig 43: Educational Spaces(Restitution Park Group, 2017)(Adapted by Author,2017)

Kinetic

Metro Bus

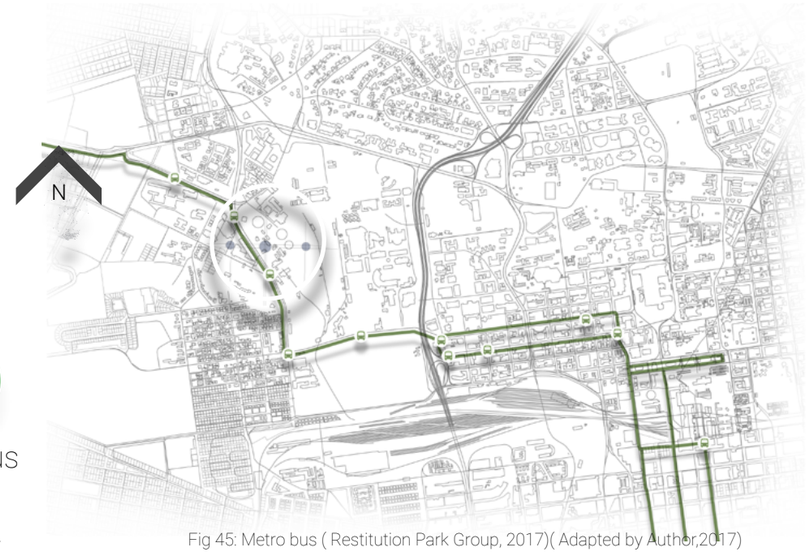


Fig 45: Metro bus (Restitution Park Group, 2017)(Adapted by Author,2017)

Gautrain bus



Fig 46: Gautrein bus Restitution Park Group, 2017)(Adapted by Author,2017)

Taxi Routes

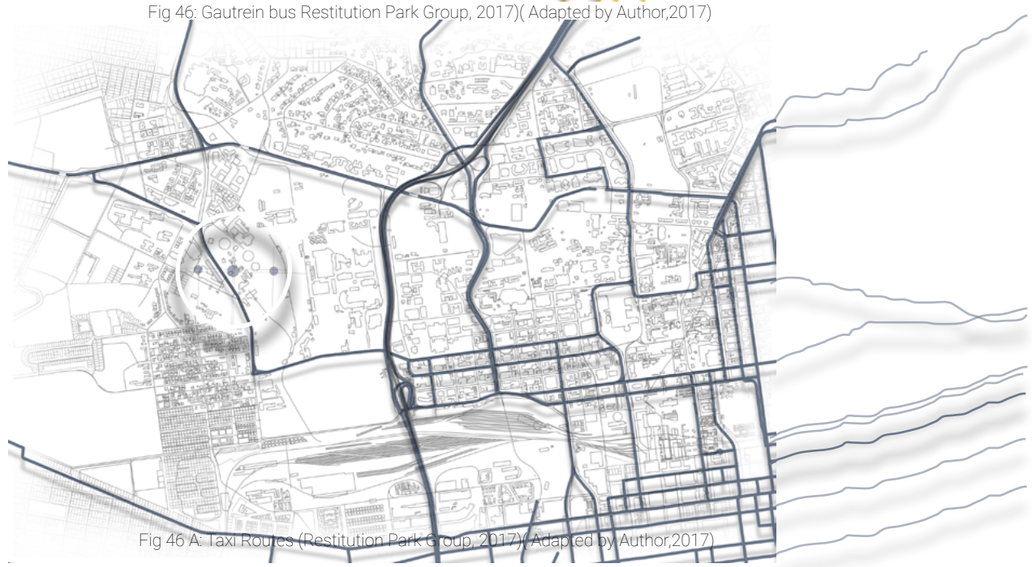


Fig 46 A: Taxi Routes (Restitution Park Group, 2017)(Adapted by Author,2017)

RAILWAY

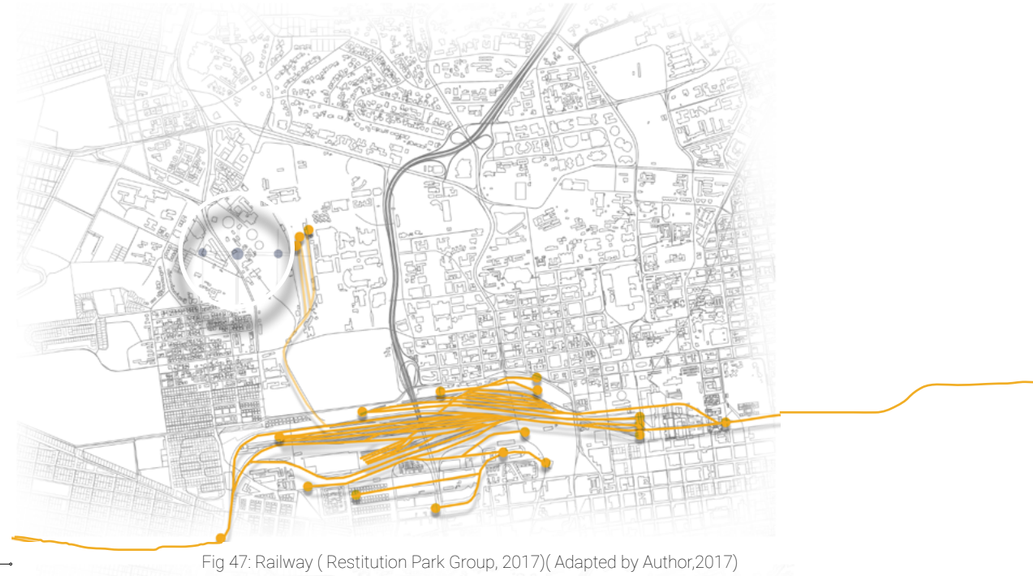


Fig 47: Railway (Restitution Park Group, 2017)(Adapted by Author,2017)

REA VAYA

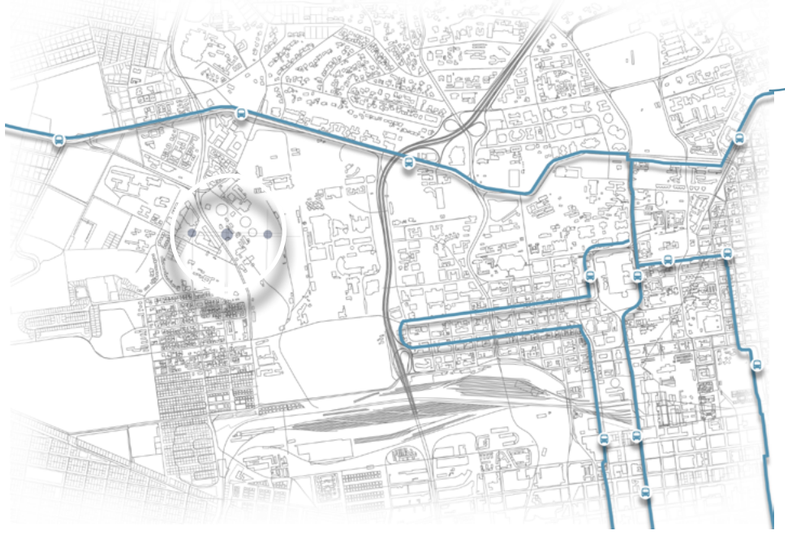


Fig 48: Rea vaya (Restitution Park Group, 2017)(Adapted by Author,2017)

Gautrein

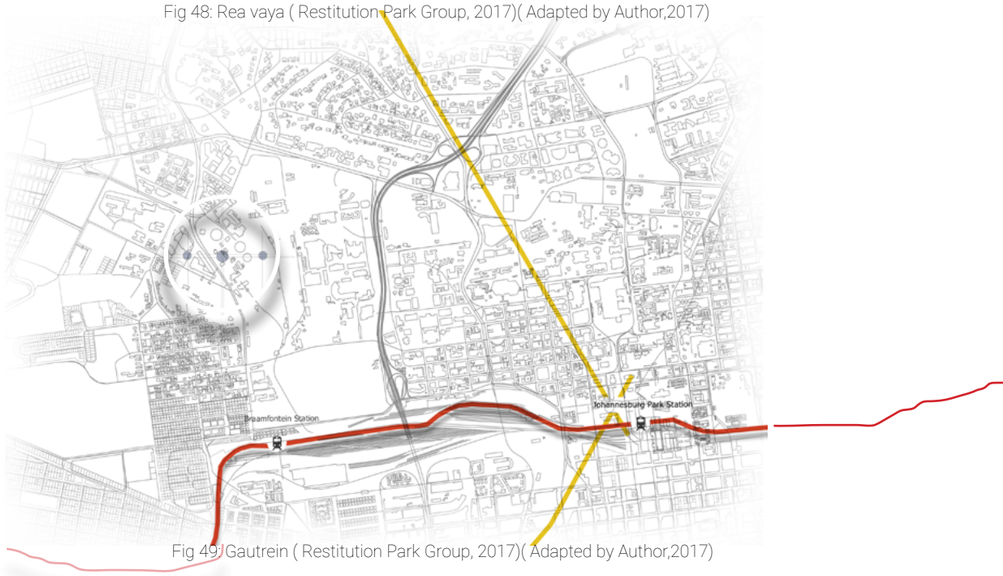


Fig 49: Gautrein (Restitution Park Group, 2017)(Adapted by Author,2017)

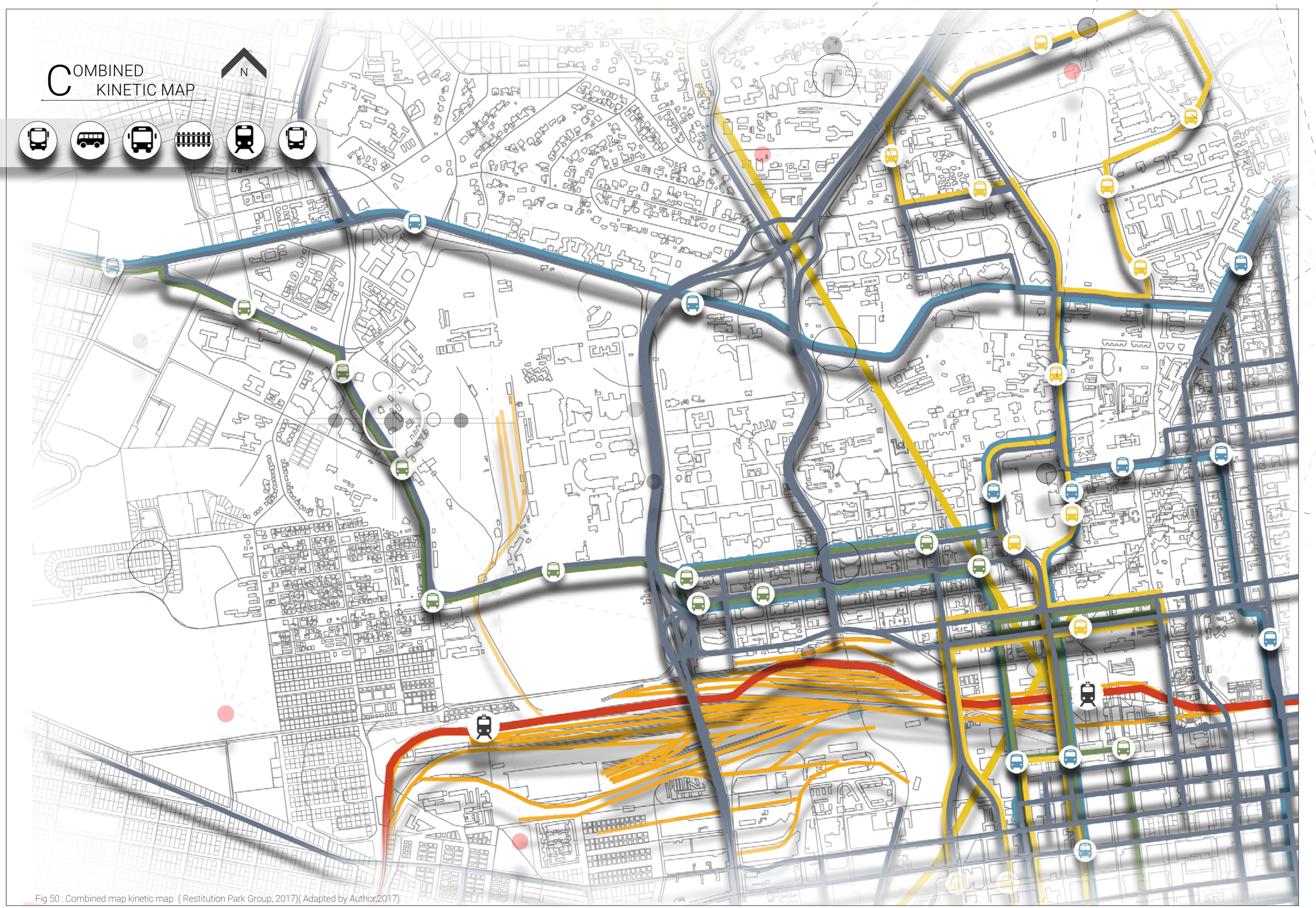


Fig 50 : Combined map kinetic map (Restitution Park Group, 2017)(Adapted by Author,2017)

Energy” in and Out

Energy In and Out

Figure 51 is a conceptual illustration of how the site is perceived as once being a giver of energy in any way to the city, and now it has become a dead node in an area brimming with energy.

Fig 51: Conceptual diagram energy out (Author,2017)

N

Fig 52: Conceptual diagram energy In (Author,2017)

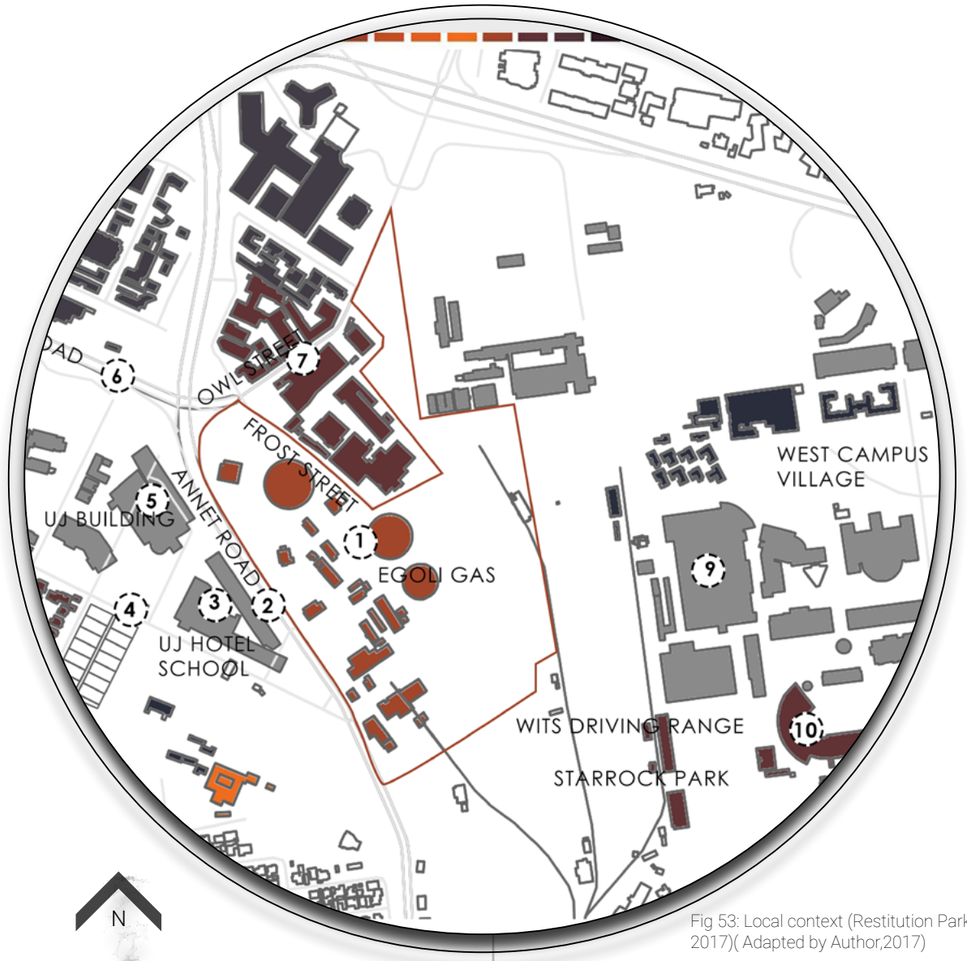


Fig 53: Local context (Restitution Park Group, 2017)(Adapted by Author,2017)

- Old Johannesberg Gas Works building
- Educational building
- Public transport
- Residential
- Mixed use building
- CSIR
- Commercial
- Religious building

Local Context

Figure 53 shows the site and its relationship with the immediate surrounding developments. Immediately east of the location is the University of the Witwatersrand; to the west of the location Bunting Road Campus of the University of Johannesburg; to the north is the John Orr school, the Atlas Film Studios, Loft Apartments, Millpark office node and 44 Stanley Avenue and to the north and west is the Millpark Hospital, Richmond Office node, Empire Road office node, the SABC, Netcare hospital, The Johannesburg Country Club, Media 24, ABSA, Campus Square shopping centre and the Kingsway Campus of the University of Johannesburg. Braamfontein, a large office and residential node is to the south-east

0 800 N

TRAFFIC

1 300 N

TRAFFIC

1 700 N

TRAFFIC



Fig 54:Traffic 8am(Restitution Park Group, 2017)(Adapted by Author,2017)



Fig 55: Traffic 1pm (Restitution Park Group, 2017)(Adapted by Author,2017)

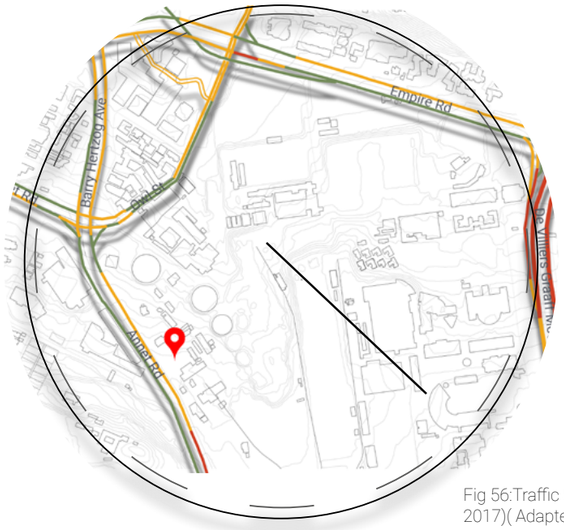


Fig 56:Traffic 5pm (Restitution Park Group, 2017)(Adapted by Author,2017)

N

BOUNDARY

Figure 57 indicates the surrounding road system. The main roads close to the site are:
-Empire Road to the North which is a major east-west arterial which also contains the proposed BRT currently under construction
-Enoch Santana road to the south which runs east-west and connects Braamfontein and Vrededorp.
-Annet street which runs on the western boundary of the site and connects Empire Road/ Barry Hertzog Avenue with Enoch Sontonga Road and will provide access to the site.
-Owl Street to the north which connects Annet Road to Empire Road
-Frost Avenue which currently is a cul-de-sac and will provide additional access to the site.A red line indicates the boundary of the site.

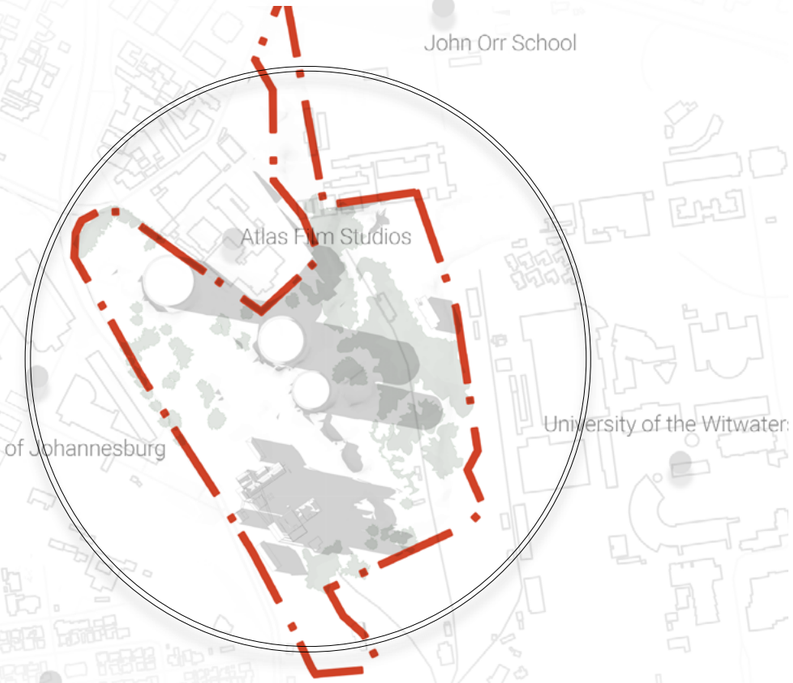


Fig 57: Boundary conditions (Restitution Park Group, 2017)(Adapted by Author,2017)

WATER

Figure 58 ¬indicates that the Braamfontein Spruit runs through the site. There is sufficient bulk water to supply for the new proposal. Wastewater- The existing municipal sewer network will be sufficient for the normal flow of new developments. Storm Water- A stormwater management plan (SMP) will be required to effectively manage the storm water as the site has a steep fall.



Fig 58: Water(Restitution Park Group, 2017)(Adapted by Author,2017)

VEGETATION

Figure 59 is a mapping of the plant species on the site. After the site shut down in the 1990's nature has reestablished itself on the site and has encroach all the way through the site even through some of the buildings that are abandoned.

Legend
- Acacia mearnsii- Eucalyptus spp. woodland
- Artificial ponds and scrub
- Hyparrhenia hirta grassland
- Kikuyu - Ipomoea scrub



Fig 59: Fig-Vegetation (Restitution Park Group, 2017)(Adapted by Author,2017)

POLLUTION

Pollution and Contaminants

A considerable amount of work has been undertaken by GeoRem International over the past few years on the contamination of the site from the production of gas. This work has been conducted to identify the areas of contamination as well as the depth quantity and amount of contamination. In addition to this, there has been a continuous monitoring of the condition of water entering the site and exiting the site through the storm water culvert and the stream.

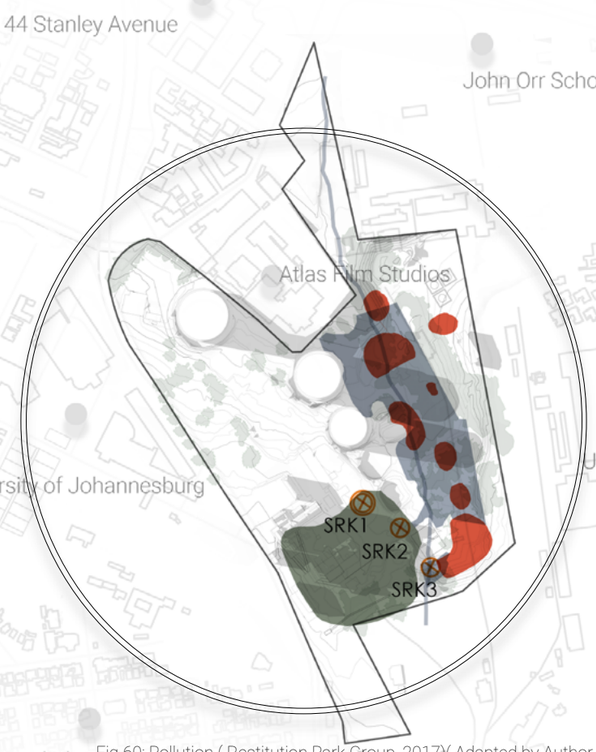


Fig 60: Pollution (Restitution Park Group, 2017)(Adapted by Author,2017)

PEDESTRIAN MOVEMENT

Legend
- Residents from Vrededorp
- Local pedestrians
- Students from UJ
- Workers of Egoli Gas
- Children from school (john Orr)
- Students from afda/stanley 44



Fig 60A: Pedestrian Movement (Restitution Park Group, 2017)(Adapted by Author,2017)

EXISTING STRUCTURE

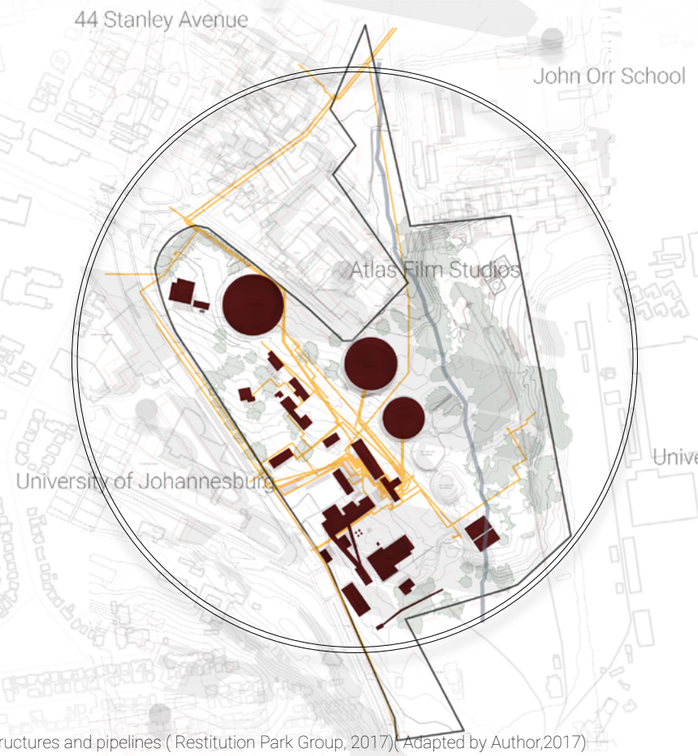


Fig 61: Existing structures and pipelines (Restitution Park Group, 2017)(Adapted by Author,2017)

COMBINED

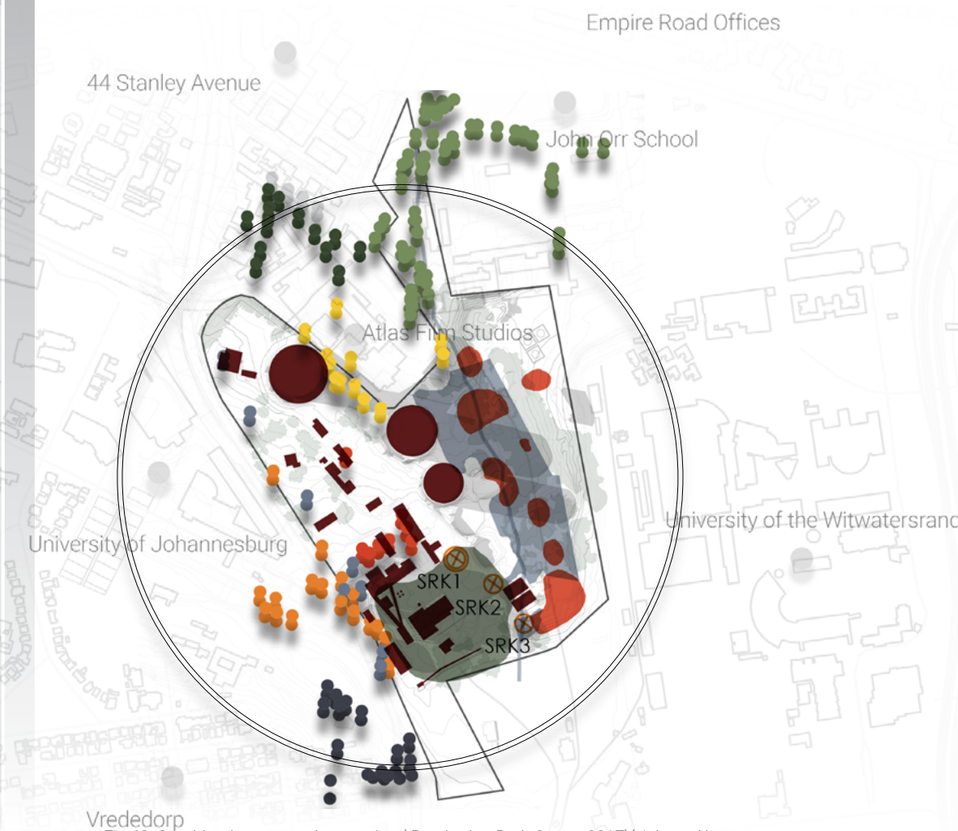


Fig 62: Combined meso scale mapping (Restitution Park Group, 2017)(Adapted by Author,2017)



Fig 63: Existing structures pn site (Author, 2017)

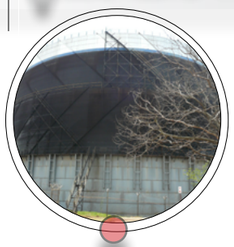


Fig 64: Gas Holders 68-81 Years

1 of 18



Fig 65: Gas Workshops

2 of 18



Fig 66: Service Quarters

3/4 of 18



Fig 67: Offices 90 Years

5 of 18



Fig 68: Historical

6 of 18



Fig 69: Boiler House 67 Years

7 of 18



Fig 70: Powerhouse of retort 1 67 Years

7 of 18

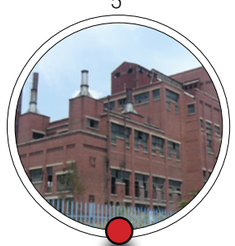


Fig 71: Retort 1 67 Years

8 of 18

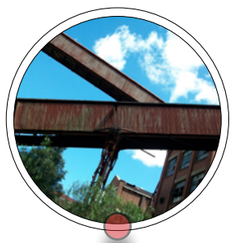


Fig 72: Conveyer belt between retorts

9 of 18



Fig 72.A: No. 1 C.G.W Plant

9 of 18



Fig 73: No. 1 C.G.W Plant

10 of 18



Fig 74: Weighbridge

11 of 18



Fig 75: Coke storage

12 of 18



Fig 76: Workshop

13 of 18



Fig 77: Retort 2 67 years

14 of 18



Fig 78: Lancashire chimney 67 years

15 of 18



Fig 79: Ash Plant 63 years

16 of 18



Fig 80: Condensor 67 years

17 of 18



Fig 81: External Gas pipes 90 years

17 of 18

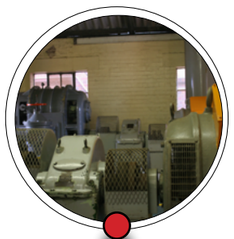


Fig 82: Booster Pump and workshop

18 of 18

Historical significance

High
Medium
Low

All photographs by (Author, 2017)(see list of figures)



Fig 83: Visual Tour of Old Johannesburg(Author, 2017)

Fig 84: Genius loci of site (All photographs by Author, 2017)

2.1.5 Conclusion

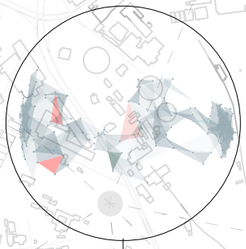


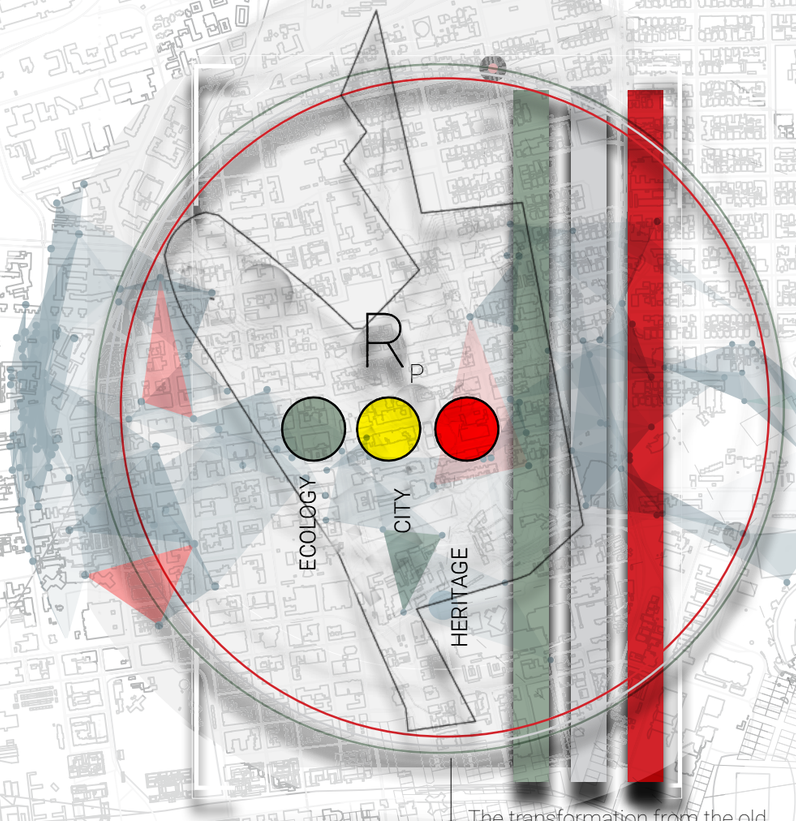
Fig 85: Sketch or Old Johannesburg Gas Works (Author,' February 2017)

The Old Johannesburg Gas Works site poses potential for a future regional mixed-use node. It is situated in between two large educational institutions and the site has easy access to many city infrastructures. The site has been inoperative for an extended period, and if not utilised it might become a dead node in the urban fabric that will become detrimental to the brimming neighbouring nodes. The Old Johannesburg Gas Works has layers of hidden character and heritage waiting to be used and experienced by the city.

2.2 Restitution Park

2.2.1 Group vision





The transformation from the old Johannesburg to a Restitution park aims to restore specific relationships that have been destroyed through the coal to gas process. The original inter-connection between the city, the Gas Works and the landscape has been lost. In response to this, the proposed framework seeks to restore these lost relationships and connections.

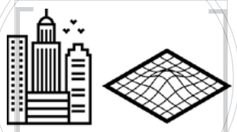
Restitution Park

Fig 86 Restitution park "logo" (Restitution Park Group, 2017)(Adapted by Author,2017)



SITE TO CITY

THE RESTITUTIVE APPROACH



The proposal is to design the site to be a future regional node for the Empire-Perth corridor to fit into the SDF for Johannesburg. to also program the site to form part of 6 open space types as defined by JMOSS- ecological, social, institutional, heritage, agricultural and prospective & provide recreation, conserve natural resources, be ecologically productive. provide environmental education, provide agricultural opportunities, be a viable economic entity and enhance the city's appearance.

Fig 87: Site to city (Restitution Park Group, 2017) (Adapted by Author,2017)



ECOLOGY TO INDUSTRY

THE NEED

THE RESTITUTIVE APPROACH



Remediate the polluted areas of the landscape via phytoremediation amongst other strategies. Use programs that form mutually beneficial relationships with nature and programs which use and strenghten the natural production system

N

Fig 88: Ecology to industry (Restitution Park Group, 2017)(Adapted by Author,2017)



HERITAGE TO PUBLIC

THE RESTITUTIVE APPROACH



Serve people by repurposing the industrial heritage the re-use of structures to create the new; as palimpsest to the old. Illustrate layers of history as a way forward In terms of education; exposure to previous privatised processes. Displaying elements & processes by explained signage. Integration into the site & Architecture.

N

Fig 89: Heritage to public (Restitution Park Group, 2017))(Adapted by Author,2017)



LANDSCAPE TO PEOPLE

THE NEED

THE RESTITUTIVE APPROACH



Providing recreational space (non-privatised - exercise, health, walking, jogging,cycling, gym) Creates relationship to land as a provider of consumable resources.

N

Fig 90: (Restitution Park Group, 2017)(Adapted by Author,2017)

TURBINE HALL

Country: Johannesburg, South Africa
Original use: Jeppe Street steam driven power station

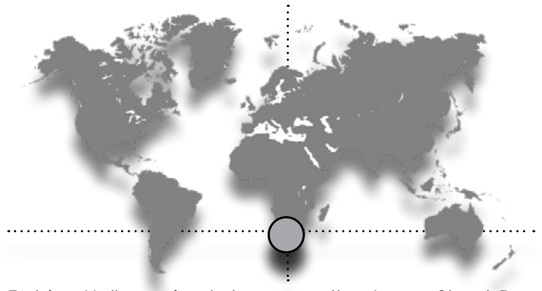




Fig 91: Turbine Hall (Crowdtalk, 2009)

Turbine Hall, previously known as the Jeppe Street Power Station, is now home to the Anglo Gold Ashanti family. This regenerative project made use of the heritage as a resource, by allowing the old building to shine through. The designers respected the history and responded sensitively to the context by incorporating all these influencing factors into e new building. This is a good example of paying homage to industrial heritage without turning it into a stagnant monument, but rather breathing new life into the existing structure in a respectful and sensitive manner. (Bethlehem, 2008)

KOKEREI ZOLLVEREIN

Country: Ruhr district, Germany
Original use: Coking plant





Fig 92: Zollverein (Archdaily, 2014)

Perhaps the success of the complex lies in its programmatic diversity. The Zollverein not only offers spaces for art and entertainment, but also provides the public with ice-skating facilities during winter, when the water basins that run along the ovens' batteries freeze up. During the warmer months the open-air swimming pool, nestled between pipes, furnaces and the rusting ruins is opened up. It was originally intended as a temporary artistic installation, but after visitors started jumping into the pool and having a blast, it was decided to leave the installation as a permanent fixture (Vollmer & Berke, 2010:96).

DUISBERG-NORD

Country: Germany
Original use:





Fig 93: Duisburg-Nord (Archdaily, 2013)

One of 100 projects in the International Building Exhibition Emscher Park built in the Ruhr District in a period of 10 years. (Landezine, 2011) A re-interpretation was made by taking and developing existing patterns and fragments formed by the industrial uses. The existing is interwoven with the new landscape (Landezine, 2011).The 230 hectares' steelworks site consists of 230 hectares. The central theme of regeneration evolves around the natural processes including phytoremediation that decontaminates the soil over a longer period (Cumberlidge & Musgrave, 2007).

THESEN ISLAND POWER STATION

Country: Knysna, South Africa
Original use: Mill and Power Station

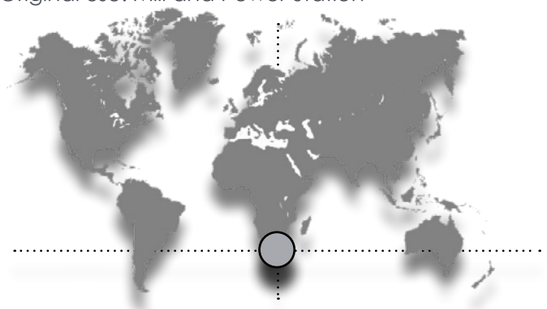




Fig 94: Turbine Hotel (Baker, 2012)

The Thesen Island was a timber mill production unit with a few industrial buildings on it, nested in a large wetland area. The site was re-appropriated with the idea of conservation and preservation. It hosts a bird sanctuary and human-made canals that criss-cross the development and are home to some rare and endangered species such as the Knysna Seahorse. The Turbine Hotel is one of the conversions of the old mill power station and is especially unique in that many of the first power generation turbines, and fittings have been integrated into the design of the hotel. The main restaurant is especially interesting as you have direct access to two levels to explore the turbines while you enjoy your meal. Some tables are situated just metres away from the old turbine units and create an enjoyable atmosphere (Baker, 2012).

WESTERGASFABRIEK

Country: Amsterdam, Netherlands
Original use: Production of gas

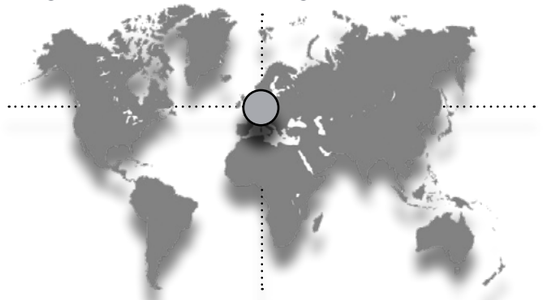




Fig 95: Inside Westergasfabriek (Westergasfabriek, n.d)

In 1885 the Imperial Continental Gas Association commissioned the construction of the Western Gas Factory near the waterways, railways and roads of Amsterdam. The factory ceased production of gas in 1967 and the site was left in a heavily polluted state. In 1992 the buildings were used temporarily for creative and cultural activities and since then entrepreneurs and artists have flocked to the site. The site was so suitable for the hosting of cultural events that it was later designated as a cultural zone. The site also contains a park and the historic buildings are used by creative entrepreneurs as work space and also for hosting events, musical performances, markets and festivals (Westergasfabriek, 2016).

FRESH KILLS PARK

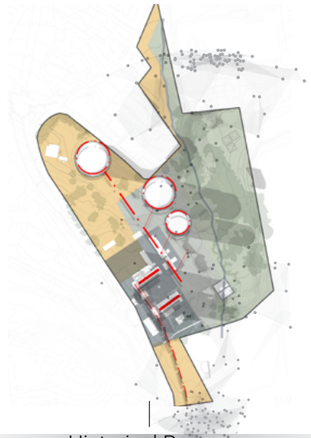
Country: New York, United States of America
Original use: Landfill site





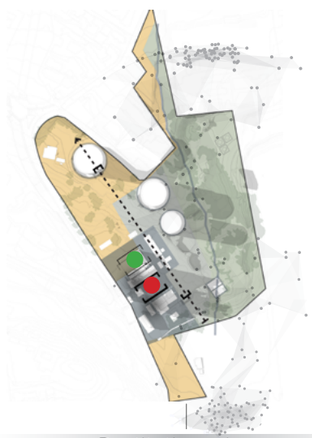
Fig 96 Fresh Kills in 2016 (Lange, 2016)

The City of New York established the Fresh Kills Landfill in 1948; by 1955 it was the largest landfill in the world. In 1996 a state law was passed requiring that the landfill cease accepting waste after 2001. NYC conducted an International Design Competition in 2001 to foster the development of a master plan; to generate ideas and innovative park designs and respond to the natural and constructed history of the site. Fresh Kills Park, when finished over the next 30 years, will be almost three times the size of Central Park, transforming the landfill into a productive, beautiful cultural destination, making the park a symbol of renewal and an expression of how society can restore balance to its landscape. It will provide a wide range of recreational opportunities, ecological restoration and cultural and educational programming that will emphasize environmental sustainability (New York City Department of Parks and Recreation, 2017).



Historical Process

Historical Process influencing the new movement route of entrances to the site, as well as pause points to reflect on the historic structures



Restitutive axis

Central movement through the site in a robust linear axis, called process lane moving past heritage square and a newly proposed energy square, moving from restituting ecology to a new public interface of the site to city.



Conceptual Production axis

Process lane is situated in the middle of the site separating the recreational landscape of the park to the site nucleus surrounding heritage square, and energy square and incorporating 4 main themes to frame the nucleus. The axis progresses in program in the way of human use and consumption

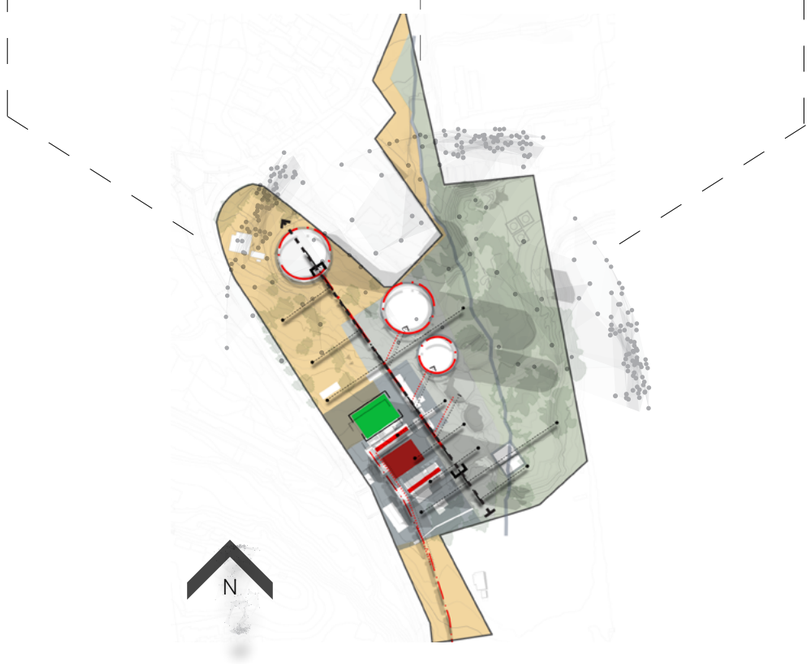


Fig 97: Rezoning-Historical process (Restitution Park Group, 2017) (Adapted by Author,2017)
Fig 98: Rezoning-restitutive axis (Restitution Park Group, 2017)(Adapted by Author,2017)
Fig 99: Rezoning-Conceptual production axis (Restitution Park Group, 2017)(Adapted by Author,2017)
Fig 100: Rezoning-Combined (Restitution Park Group, 2017)(Adapted by Author,2017)



Fig 101: Creation of an entrance, foyer and primary public square (Sketch by Author, 2017)



Fig 102: Creation of secondary access points | two added programs to the nucleus(Sketch by Author, 2017)

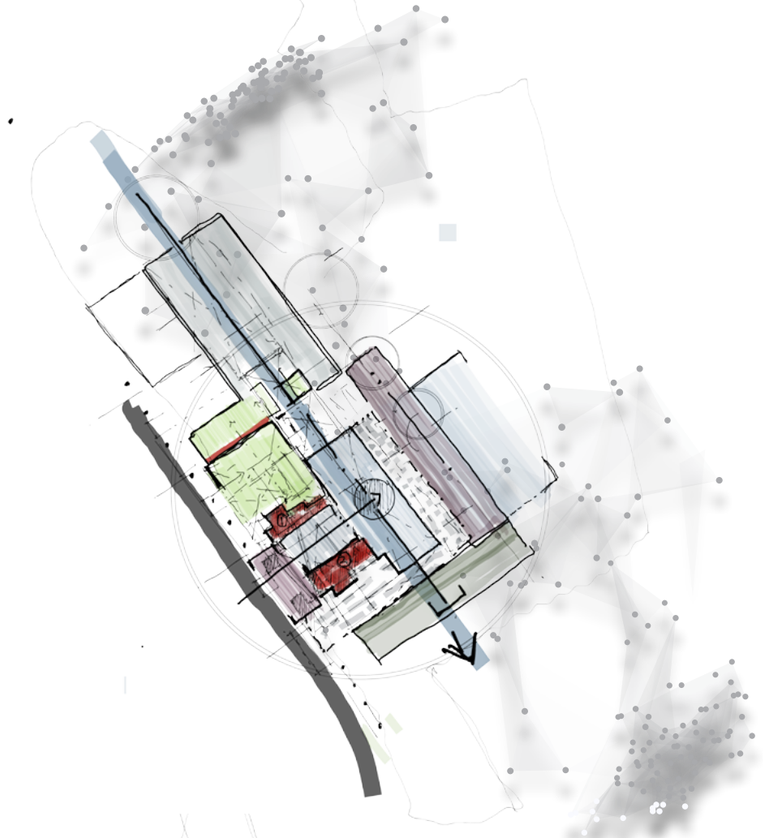


Fig 103: Creation of energy square, human-made wetland and permeability to recreation park (Sketch by Author, 2017)

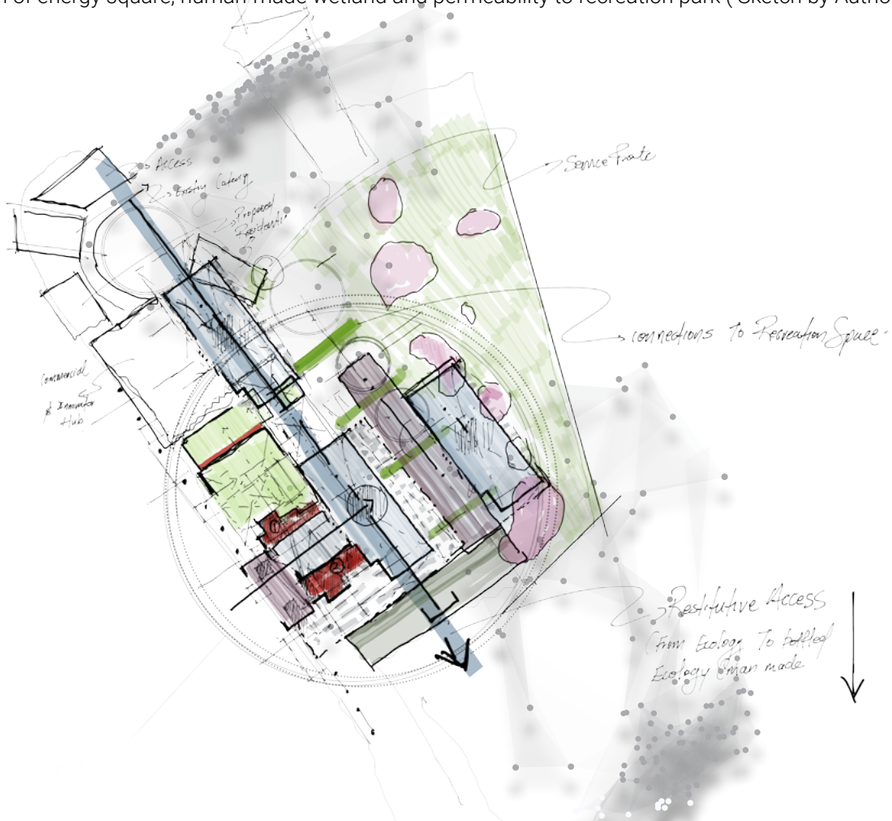


Fig 104: Added programs to the process lane as a restitutive axis.,(Sketch by Author, 2017)

"The structural order specifies the ongoing interaction of each species with others. The functional order explains the flow of energy and material, while locational order determines the topography, soil and climatology. These elements are all linked to one another. Thus the premise of integration helps to identify the urban parameters, while regenerative approach underlines the importance of interdependence. (Emmanuel, 2016)" - As mentioned before the site uses the principles of regenerative theory by sharing resources and feeding of the waste, to start a regenerative loop. (Restitutive park group, 2017)

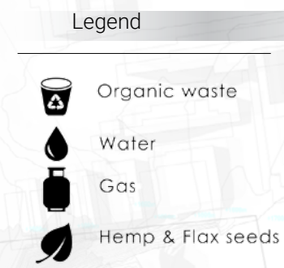




Fig 105: Site nucleus and resource and waste sharing(Restitution Park group) (adapted by Author, 2017)

Restitution Park gives back to the city in more ways than one. It restores relationships that were destroyed by the coal-to-gas process.It will act as a mixed-use node and link this once dead node back into the urban fabric. It has a wide variety of activities and recreational facilities that provides the fast pace city life a place and space of rest and refuge in the heart of the city,

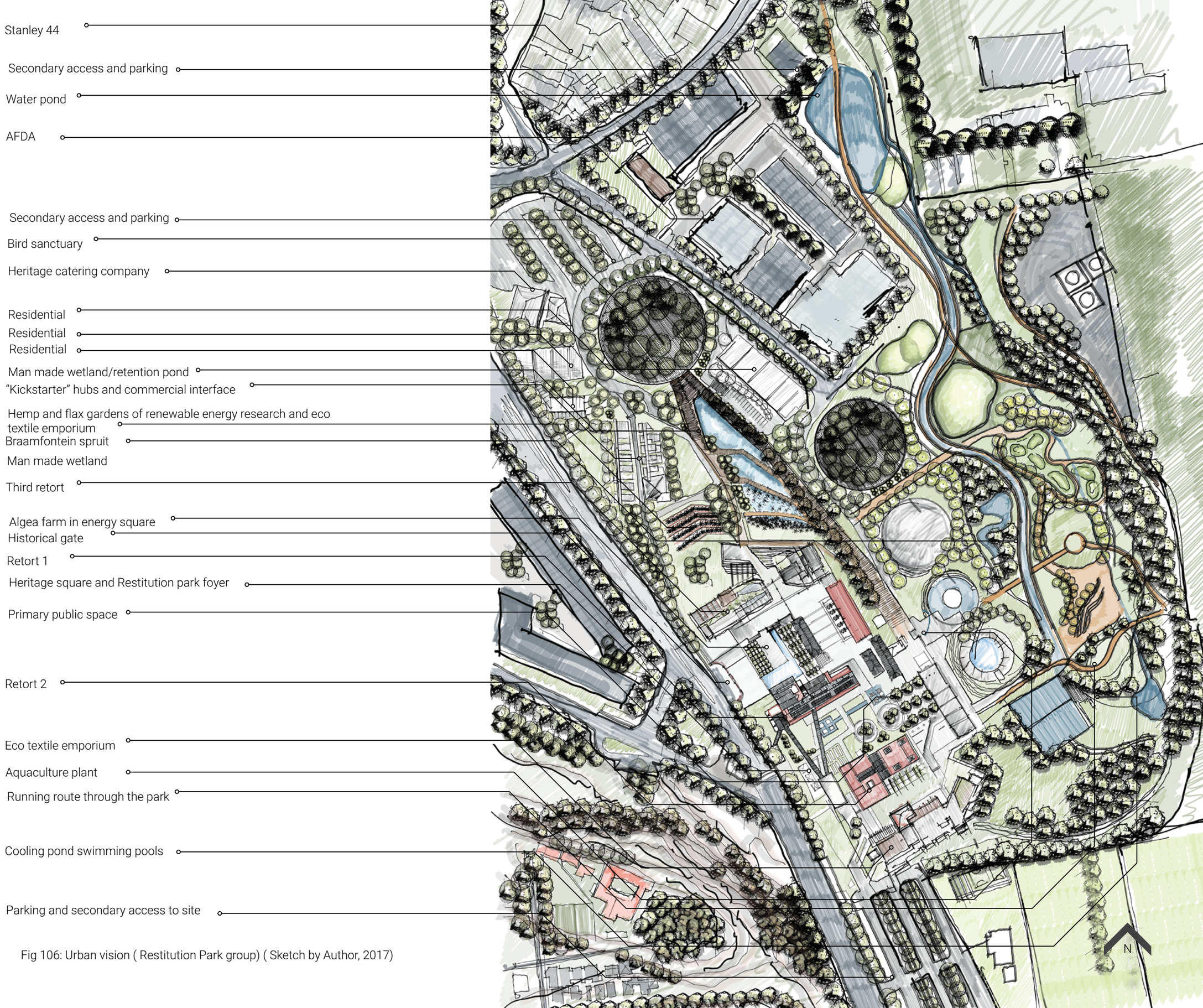


Fig 106: Urban vision (Restitution Park group) (Sketch by Author, 2017)

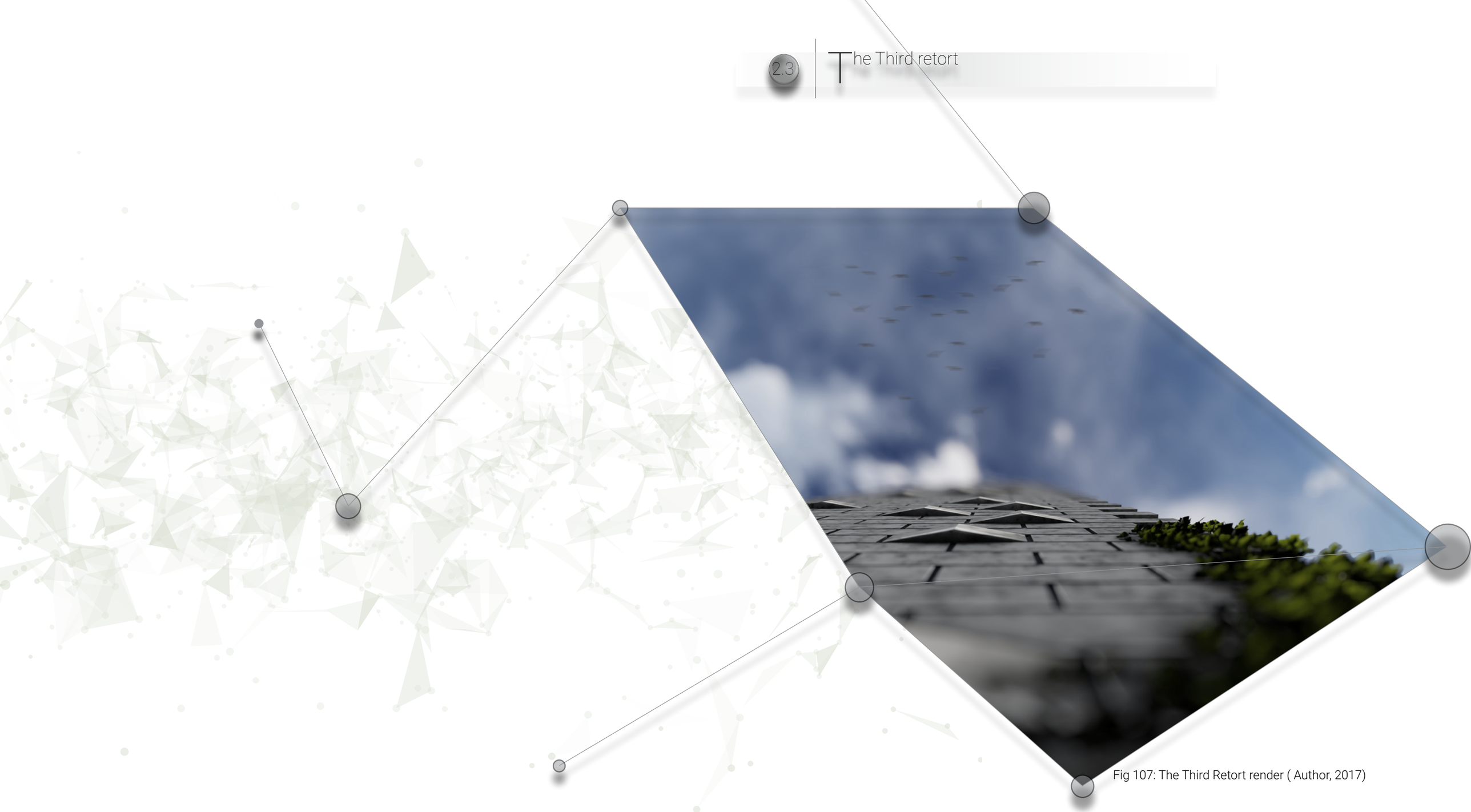
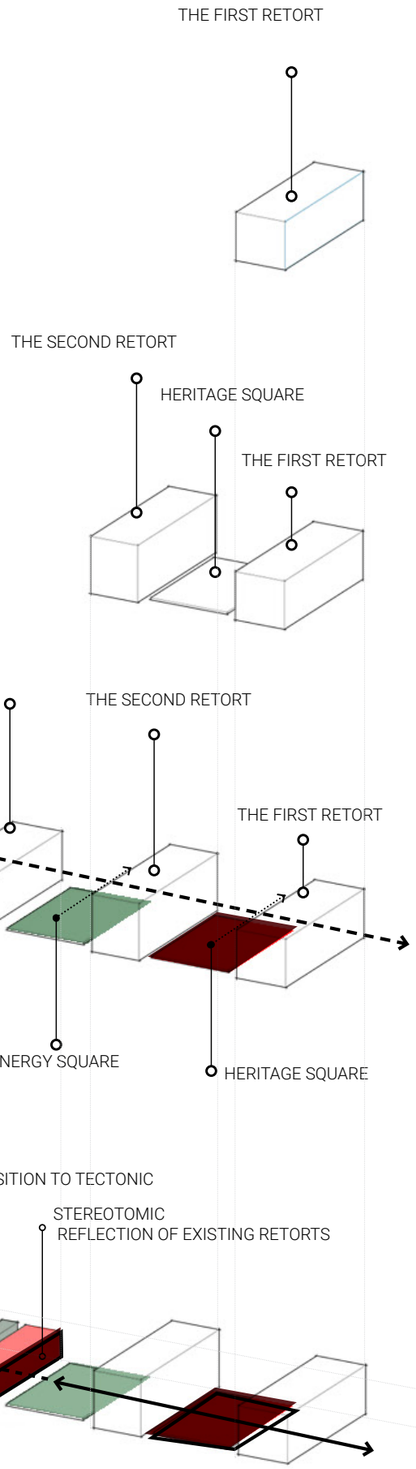


Fig 107: The Third Retort render (Author, 2017)



The Third retort is poetically situated in a narrative in the same geometry as the existing two retorts. The movement toward the structure is strengthened by Restituve parks Process lane. The movement is different from the first two retorts as it passes alongside the historical process route but now passes through the structure to engage with the public.

Fig 108: Response to Restitution Park diagrams(Author, 2017)

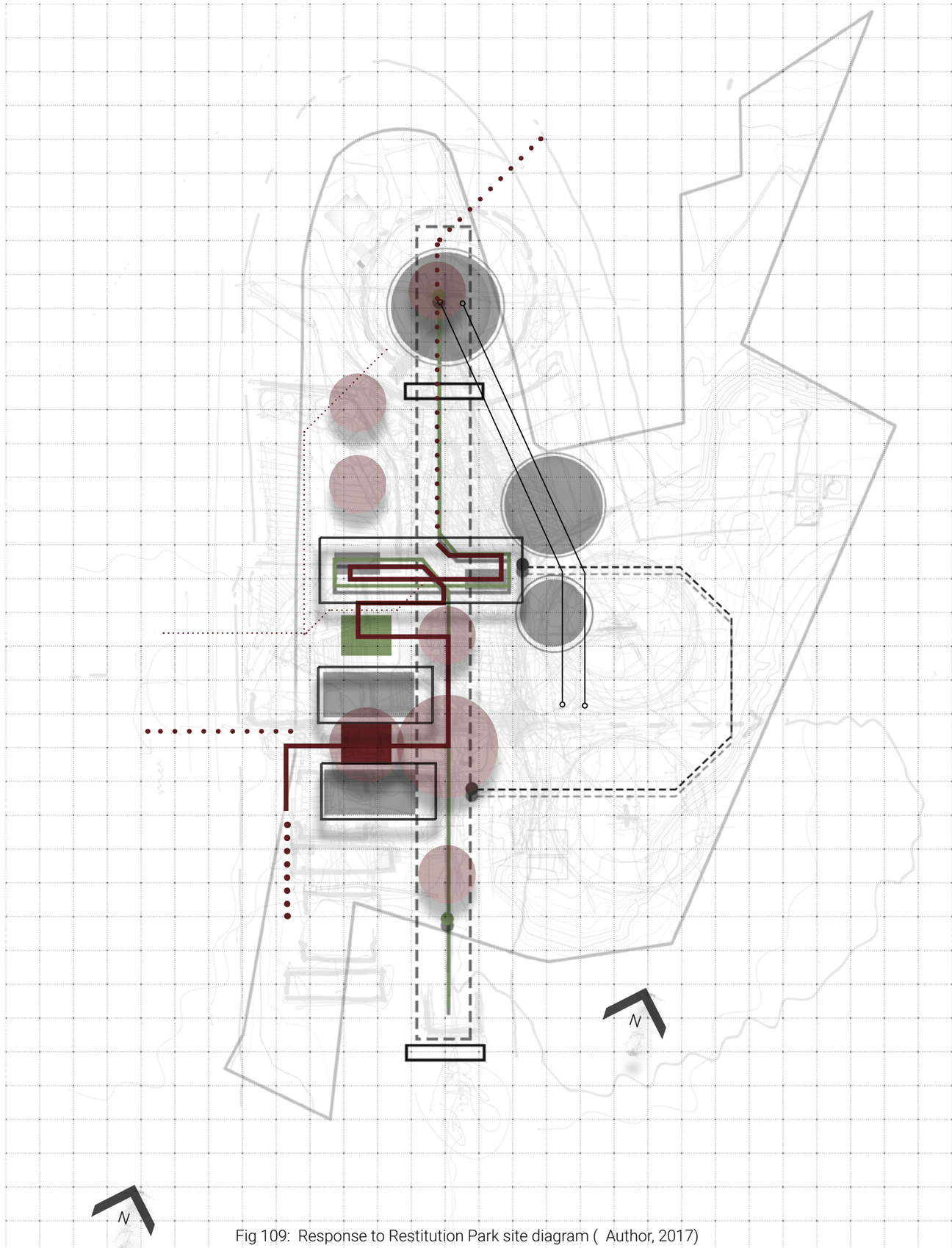


Fig 109: Response to Restitution Park site diagram (Author, 2017)



Fig 110: 1-Worksops to be demolished in bad condition



Fig 115: 6-Portal to recreation park



Fig 120: 11-Old service quarters-to be re-appropriated



Fig 125: 16-Double retaining wall



Fig 111: 2-Pipes exposed on site



Fig 116: 7-Boiler House



Fig 121: 12-Powerhouse of retort 2



Fig 126: 17-axis to recreation park (gradient not according to Sans10400



Fig 112: 3-Workshop condition to be demolished



Fig 117: 8-Very steep broken paving to be removed and replaced according to Sans10400 gradients



Fig 122: 13-Workshop with potential upgrading pipes



Fig 127: 18-Iconic interior pipe use

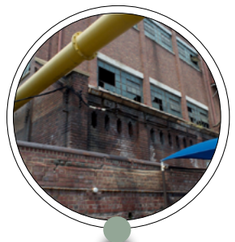


Fig 113: 4-Overhead gas pipes



Fig 118: 9-Iconic offices to be re appropriated



Fig 123: 14-offices with typical portal frame to be stripped down for new use



Fig 128: 19-Exposed tar pollution



Fig 114: 5-Exterior pipe use from workshop



Fig 119: 10-Offices to be re-appropriated



Fig 124: 15-High retaining wall- breaking space



Fig 129: 20-Historic gate

Didactic potential

Fig- All photographs by (Author, 2017)(see list of figures)

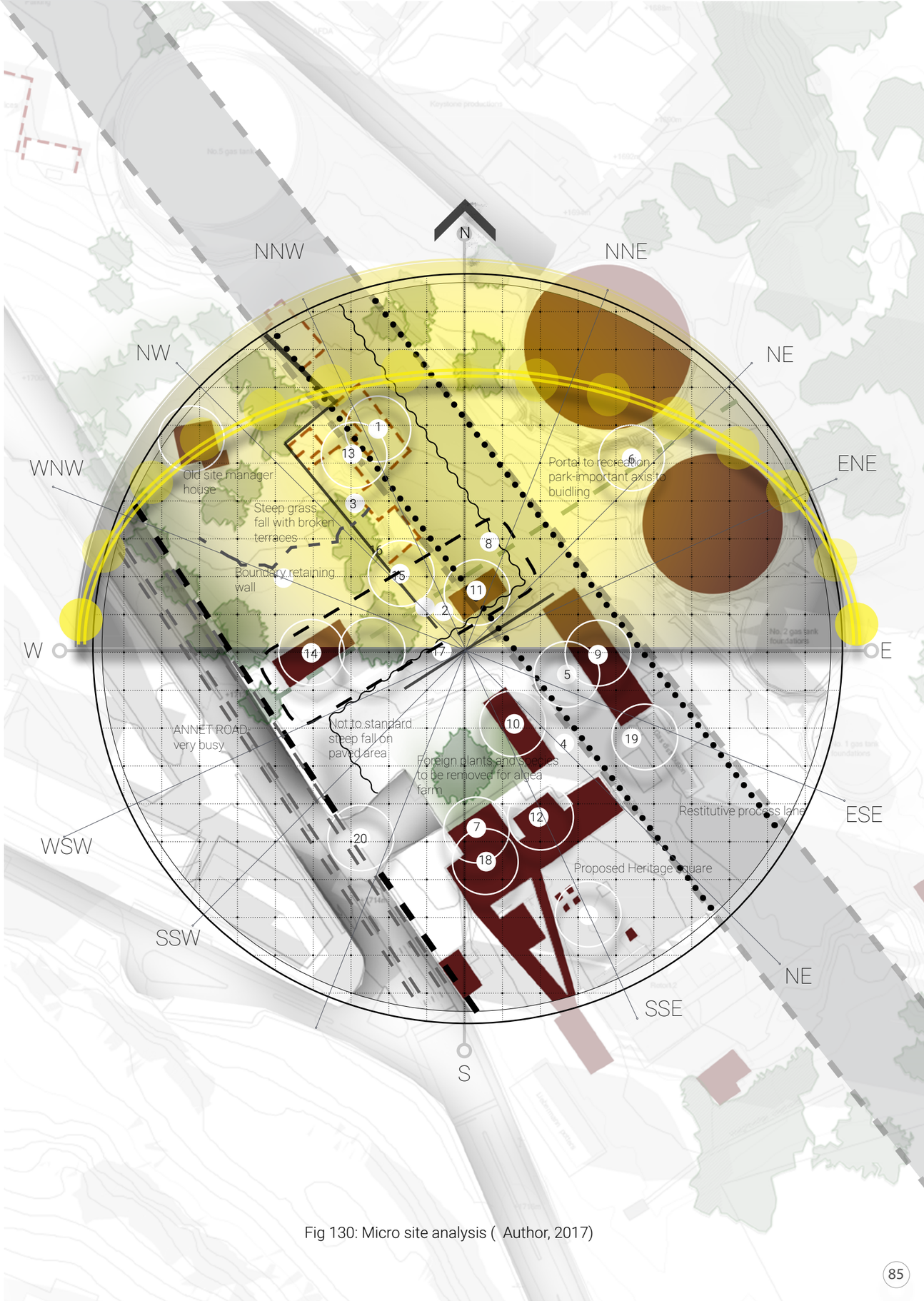


Fig 130: Micro site analysis (Author, 2017)

SITE LOCATION:

1 Annet Road, Cottlesloe Johannesburg,2092

GPS COORDINATES:

26'11'20'20 S 28'01'10'E

Average temperature : 23-28 °C

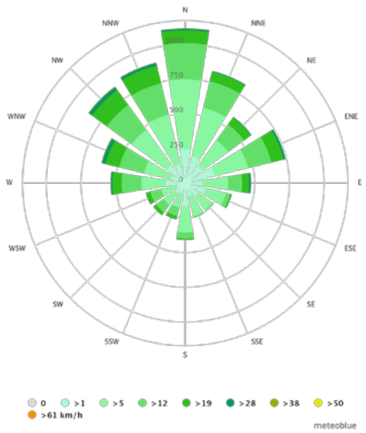
Maximum Temperature : 32 °C

Minimum Temperature : -5 °C

Average Rainfall :

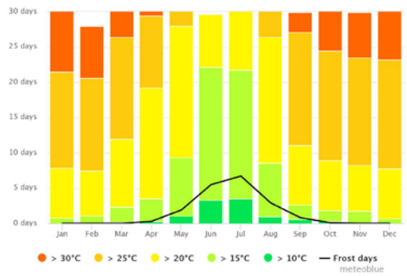
Maximum Windspeed : 38 km/h

Fig 131: Dominant wind Direction



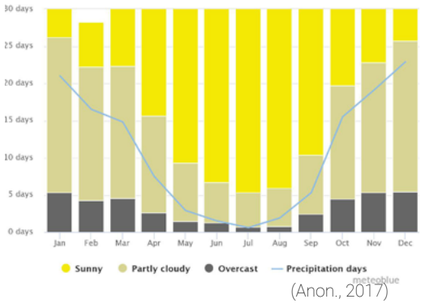
(Anon., 2017)

Fig 132: Temperature



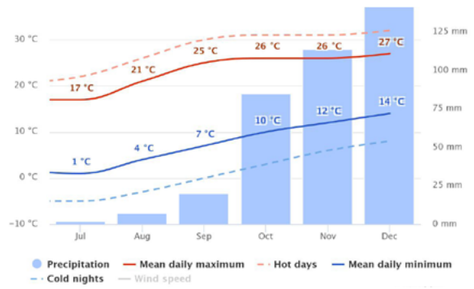
(Anon., 2017)

Fig 133: Weather



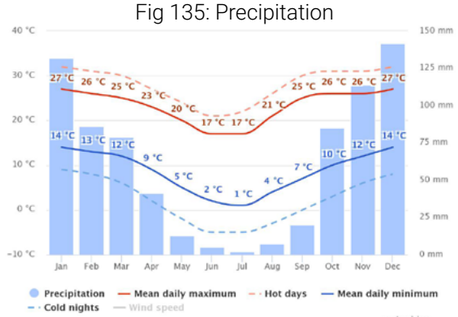
(Anon., 2017)

Fig 134: Precipitation



(Anon., 2017)

Fig 135: Precipitation



(Anon., 2017)

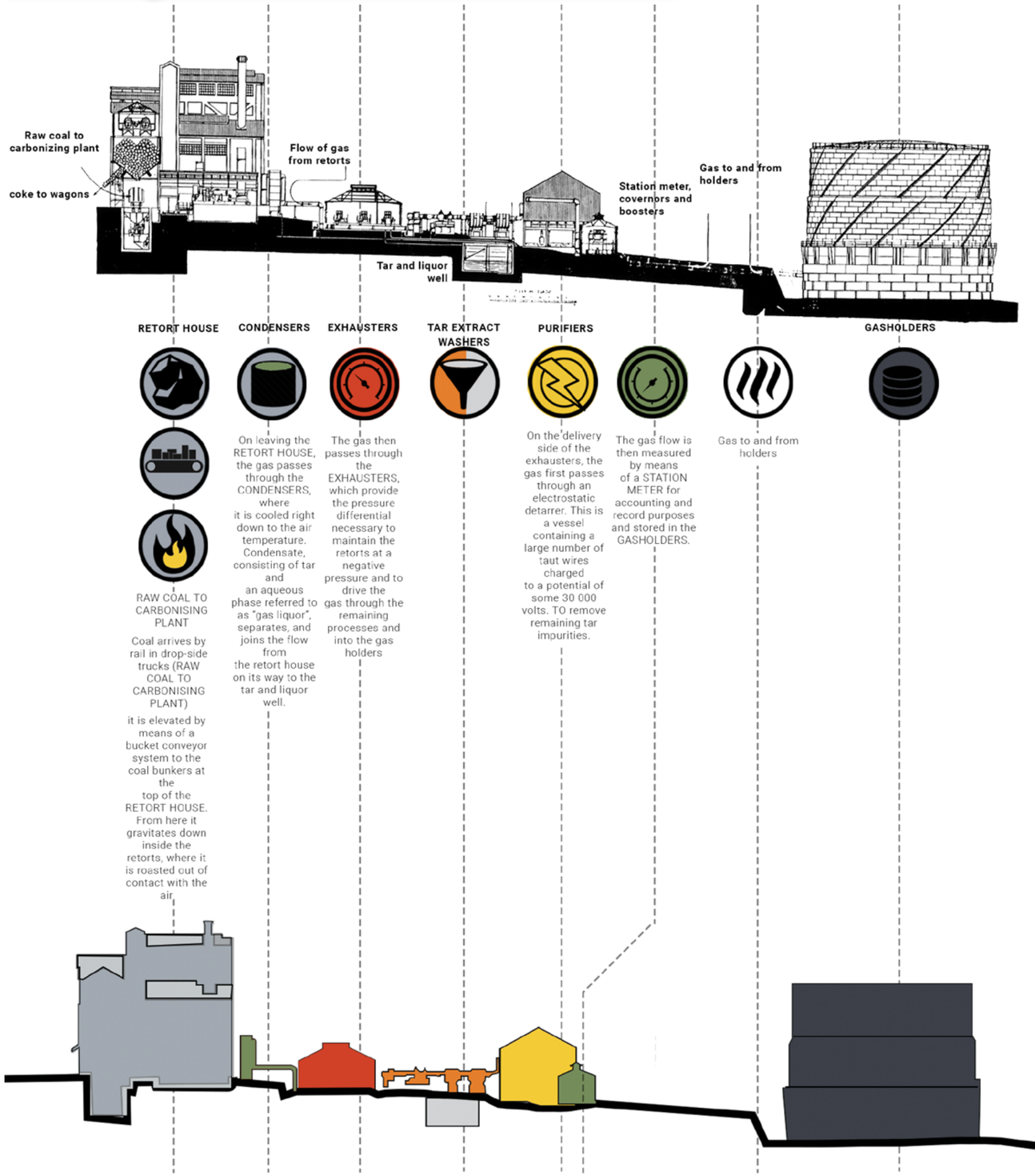


Fig 136: Process analysis (Restitution Park group)adapted by (Author, 2017)

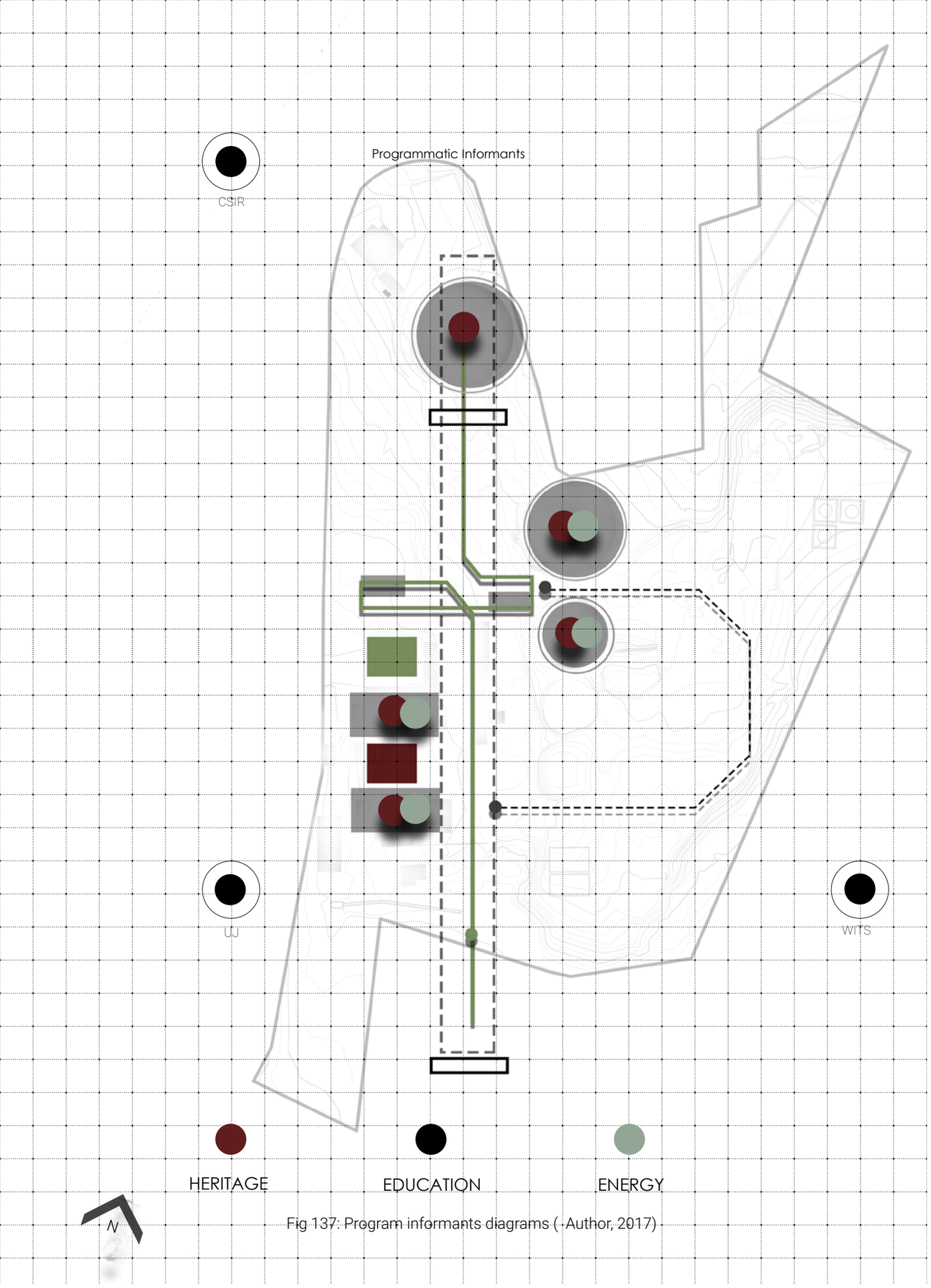


Fig 137: Program informants diagrams (Author, 2017)

The program was selected by three main themes: heritage, education and energy. This gave credence to an energy research station, which through the lense of didacticism, can deal with the memory and place of the heritage site. The heritage and memory, will contextualise energy research, and the process of energy production on site gives opportunity for learning, research and has historical ties.

(SITE VISION)
REGENERATIVE THEORY IN THE FORM OF RESTITUTION

REGENERATIVE THEORY IN THE FORM OF RESTITUTION

Programmatic themes

HERITAGE

The site has a rich architectural and process history and represents a time of great progress for the city of Johannesburg, the site is inoparative and poses great potential for sensitive reappropriation

history
old
memory
originate
Avant-Garde
place
pollution
linnear
coal to gas

EDUCATION

The site is situated between two very large educational institutions and closely connected to the CSIR.

direct teaching
indirect teaching
architecture as educational device
creating a green economy
learning from the past
preparing for the future

ENERGY

The site once was the first to produce energy to the city of Johannesburg when it was only a mining camp. Today with pressing environmental issues we need to rethink energy production, and the education thereof to the general public

green energy
environmenal potential
closed loop system
sustainable
off the grid
natural gas

DIDACTICISM

(DESIGN)
DIDACTICISM | Contextual regenerative theory
MEMORY|EDUCATION|HAPTICITY|DIALOGUE

THE THIRD RETORT

Local research facilities

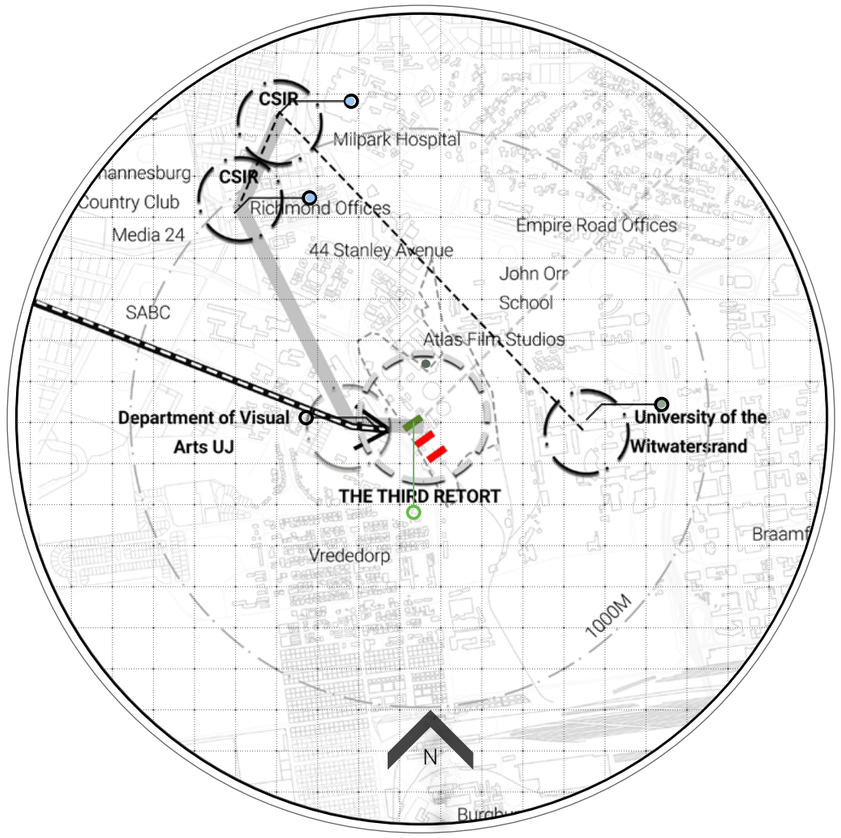


Fig 138: Contextualising energy research from UJ into the public realm. Author, 2017)



CSIR

Area of focus

1.Energy storage
2.Energy systems
3.Energy market and policy
4.Energy industry



WITS

Area of focus

1. Renewable energy sources
2. Electrical energy conversion
3. Intelligent energy systems
4. Load identification and understanding of usage



THE THIRD RETORT
PEETS

Area of focus

1. Renewable energy
2. Energy effiecency
3. Water
4. Pollution

PEETS PROFILE(PROCESS, ENERGY AND ENVIRONMENTAL TECHNOLOGY STATION)

1-BACKGROUND
The research station opened in 2010 at University of Johannesburg (UJ). It is part of the Faculty of Engineering and Built Environment. The Technology Innovation agency finances the station.
"The primary mandate for the PEETS is to contribute towards improving the competitiveness of industry through the application of specialised knowledge, technology and facilitating the interaction between industry (especially SMEs) and the academia to enable innovation. "
The station is committed to providing the highest level of quality and professionalism in the interaction with stakeholders. We pride ourselves in stating that we are the only organization that catalyses to shorten the gap between Academia and Industry in the Energy and Environment space. " (agency, 2010)

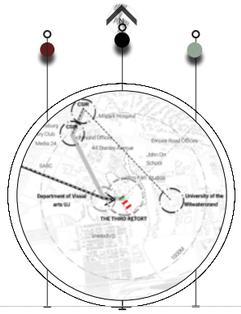
2-VISION
"The vision of the research station is to establish a vibrant green economy, that drives South Africa's socio-economic success."
3- MISSION:
Providing technical oriented enterprise development support in the Energy, and Environmental sector by means of appropriate technological innovations to grow South Africa`s socio-economy sustainability.
4- EXTRA PRODUCTS AND SERVICES
• Air quality auditing
• Energy auditing
• Process optimization
• Testing /analysis
• Product and process development / Improvement
• Waste characterization
• Engineering consultation
• Technology research and development
• Environmental Impact assessment
• Prototype assembling
• Training and demonstration

CONTEXTUALISING ENERGY RESEARCH

HERITAGE EDUCATION ENERGY

THE THIRD RETORT

PROCESS, ENERGY AND ENVIRONMENTAL TECHNOLOGY STATION



CONTEXTUAL REGENERATIVE THEORY

DIDACTICISM



UJ

THE THIRD RETORT
PEETS

1. Renewable energy
2. energy efficiency
3. water
4. pollution

HISTORICAL LINK | RESTITUTION WITH RESEARCH

First production of energy for Johannesburg as a mining camp

BINDING PROCESS|

ABSORBS CO2 FROM AIR INTO CLOSED LOOP SYSTEM FOR ALGAE GROWTH

PLANTATION ABOVE THE POLLUTED SOIL

A_x pollution through Coal to fire process

SO^2 pollution through tar as by-product

Mal-management of waste into braam fonteinspruit

Water pollution through ammoniac and tar pollution

POLLUTION

RENEWABLE ENERGY

ENERGY

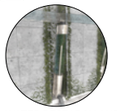
ENVIRONMENT

WATER

ENERGY EFFIENCY

Process driver architecture mono-functional

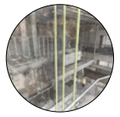




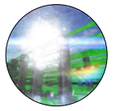
WATER RESEARCH AND REUSE



WATER PURIFICATION CLASS 1-3



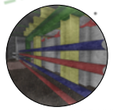
RENEWABLE NATURAL GAS



SOLAR ENERGY|NEEDED FOR PHOTOBIOREACTOR



WATER CATCHMENT AND REUSE



UNDERFLOOR HYDRONIC PIPES



LOUVRE FACADE AS BUILDING SYSTEM ABSORBING UV

Fig 139: Fig-Research field of UJ (Adapted by author, 2017)

BIG's Waste-to-Energy Plant Breaks Ground

Architects: Breaks Schemas
Location: Copenhagen, Denmark



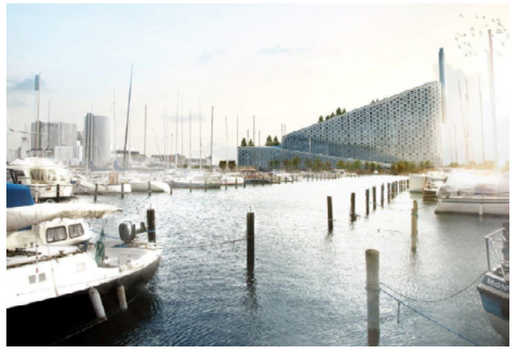


Fig 140: BIG render: (Quirk, 2013)

This energy plant breaks ground in the way that it uses two very different programs situated next to each other. The waste to energy plant is placed in the city context -a plant that usual sits on the outskirt of the city has now become a destination, rather than a space that is ignored.(Quirk, 2013)

Hysolar Institutsgebäude, Universität Stuttgart

Architects: Behnisch & Partner
Location: Stuttgart, Germany



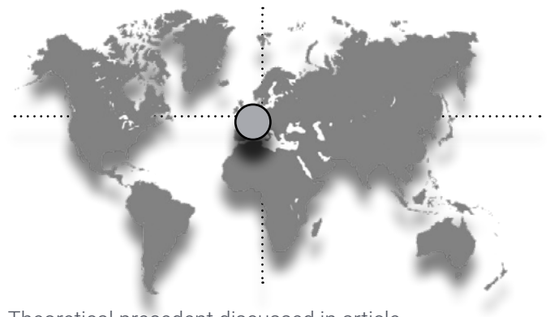


Fig 141: Hysolar institute: (Partner,

This building houses two institutes: research of solar cells and low-cost techniques for separating the elements of water. The projects contains the following spaces:some laboratories, a storehouse and ancillary service rooms. The idea of "free equilibrium" provided an uninhabited source of freshness and directness for the architecture. (Partner, 2005)

Bernard tschumi national library

Architects: Bernard Tschumi Architects
Location: France, Paris



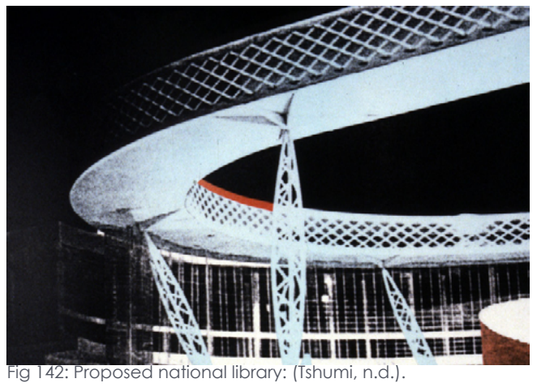


Fig 142: Proposed national library: (Tshumi, n.d.).

Theoretical precedent discussed in article

A Forest-Inspired Biomass Unit for Copenhagen

Architects: Gottlieb Paludan Architects
Location: Copenhagen, Denmark





Fig 143: render of biomass unit: (Giermann, 2015)

The biomass unit placed near the cities significant cultural sites, and it occupies a prominent location along the skyline, that is why the appearance is of considerable concern. This architecture is an example of placing the process in the urban context, to deal with environmental issues at the source. (Giermann, 2015)

Gas and Steam Power Plant Winning Proposal

Architect: HENN
Location: Wedel, Germany





Fig 144: Render of Gas and steam power planrt1: (Furuto, 2013)

The Henn power station, allows the uninterrupted riverside promenade passage to be accessible to the public. Even though the majority of the existing plant has been demolished, the most essential industrial relics and architecturally significant elements, such as the listed machine hall, are retained and put to cultural use. (Furuto, 2013)

World's Largest Waste-to-Energy Plant

Architect: Schmidt Hammer Lassen Architects, Gottlieb Paludan A
Location: Shenzhen, Guangdong, China



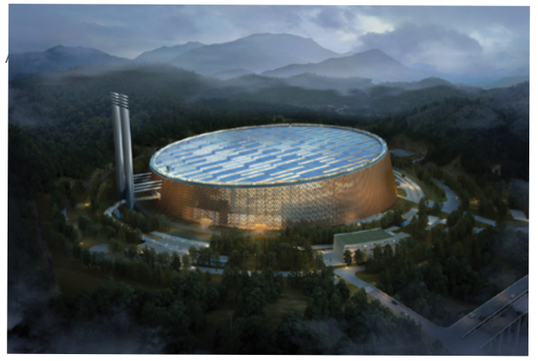


Fig 145: Render of Shenzen waste-to-energy-plant: (Rosenfield,

Apart from the 5000 tonnes of waste that this waste-to-energy plant can incenerate in one day, one of the main focuses of the architecture was to teach people what space is built for and why it is so important. (Rosenfield, 2016)

	Space	Description	Occupants		Spatial Requirements & Functional Requirements	Size	Multi-sensory space facilitates the formation of new memories and meaning	Didactic connection
	Entrance lobby	Designed to capture the didactic route pedestrians into the interactive, constantly changing exhibition space then leads to research pods, workshops and living labs.	Public | Students | Lecturers		Exposure to indirect natural light | Natural ventilation & mechanical Ventilation | Connected to public circulation space | Single volume | Public viewing space/route (allowing for controlled public access to space | Public Space to be inviting | Landmark of orientation | Storage space | Electronics | Inclusive	8 x6 m	**Sight** | Smell | taste | Sound | **touch**	Memory | Education | Hapticity | **Dialogue** | Experienced Information
	Lecture room	A space where information is taught directly.	Students | Lecturers | Public		Exposure to controlled natural daylight | Natural ventilation & Mechanical ventilation | Connected to public circulation space | Special acoustic treatment | Single volume | Public viewing space | Public Space | Minimal Storage space | Electronics | Inclusive	36m2	**Sight** | Smell | taste | **Sound** | **touch**	Memory | **Education** | Hapticity | **Dialogue** | **Experienced Information**
	Collaborative space	This is a space were collaboration is encouraged between students overseen by lectures through different designed group settings that will lead to different levels of collaboration and interaction.	Students | Lecturers		Exposure to controlled natural daylight | Natural ventilation & Mechanical ventilation | Connected to public circulation space | Special acoustic treatment | Single volume | Semi- intimate space | Private extension of the solar amphitheatre therefore blurring the boundary between exterior and interior collaborative spaces | Vistas over site | Inspirational space	20m2 10m2	**Sight** | Smell | taste | **Sound** | **touch**	**Memory** | **Education** | **Hapticity** | **Dialogue** | **Experienced Information**
Research pods	**Individual research**	Where information is already gathered and individual research and interpretation is encourage.	Students		Exposure to controlled natural daylight | Natural ventilation & mechanical ventilation | Connected to public circulation space | Special acoustic treatment | Single volume | Intimate space | Quit space	20 x 12	**Sight** | Smell | taste | Sound | touch	**Memory** | **Education** | Hapticity | Dialogue | **Experienced Information**
	Small group research	This is where peers reflect on their research and more focused group brain storming occurs	Students		Exposure to controlled natural daylight | Natural ventilation & mechanical ventilation | Connected to public circulation space | Special acoustic treatment | Single volume | Intimate space | Semi- intimate space | Vistas over site	5 x 8	**Sight** | Smell | taste | **Sound** | touch	Memory | **Education** | Hapticity | **Dialogue** | **Experienced Information**
	Toilets	The opportunity for learning has been taken advantage of, by the exposing of service and the reuse of grey water	Public | Students | Lecturers		Natural ventilation & mechanical ventilation | Connected to public circulation space | Single volume | Visual connection to water system | Wet services	7,5 x 10,5 m	Sight | Smell | taste | Sound | touch	Memory | **Education** | Hapticity | Dialogue | Experienced Information
full scale Work shops	**Wood and steel workshop**	For a hands on experience, students and lecturers to make full scale working models from prototypes	Students | Lecturers		Exposure to controlled natural daylight | Constant lighting needed for workshop | Natural ventilation | Special acoustic treatment | Robust materials to be used | Double volume | Semi-intimate space | Blurring the boundary between exterior and interior collaborative spaces | Inspirational space | Storage space | Electronics | Link to assembly workshop | Link to Prototype workshop	26 x 11 Size	**Sight** | **Smell** | taste | **Sound** | **touch**	**Memory** | **Education** | **Hapticity** | **Dialogue** | **Experienced Information**
	Assembly and exterior workshop	This is where full scale models are assembles and partially exhibited.	Public | Students |Lecturers		Exposure to controlled natural daylight | Natural ventilation & mechanical ventilation | Connected to public circulation space | Special acoustic treatment | Robust materials to be used | Double volume | Public space | Blurring the boundary between exterior and interior collaborative spaces | Vistas over site | Link to Prototype workshop | Link to wood and steel workshop | Link to exhibition space | Inspirational space	5 x 15mm of which half is exterior space	**Sight** | **Smell** | taste | **Sound** | **touch**	**Memory** | **Education** | **Hapticity** | **Dialogue** | **Experienced Information**
	Research exhibition	Where newly produced information is examined as well as exhibited to the public, reflecting didactic principles and stimulate green economy.	Public | Students | Lecturers		Exposure to controlled natural daylight | Natural ventilation & mechanical ventilation | Connected to public circulation space | Double volume | Public space | Making research produced transparent to the public | Vistas over site | Inspirational space	100m	**Sight** | **Smell** | **taste** | **Sound** | **touch**	**Memory** | **Education** | **Hapticity** | **Dialogue** | **Experienced Information**
Public exhibition	**Reception**	Designed to capture the didactic route pedestrians into the interactive, constantly changing exhibition space which leads to the public exhibition	Public | Students | Lecturers		Exposure to controlled natural daylight | Natural ventilation & mechanical ventilation | Connected to public circulation space | Special acoustic treatment | Triple volume | Public space | Blurring the boundary between exterior and interior spaces | Vistas over site | Spatial link to research exhibition | Link to small scale exhibition | Link to large exhibition | Inspirational space | Storage space	9 x 10	**Sight** | Smell | taste | **Sound** | **touch**	**Memory** | **Education** | **Hapticity** | **Dialogue** | **Experienced Information**
	Small scale exhibition	This is where smaller items are displayed in more intimate spaces.	Public | Students | Lecturers		Exposure to controlled natural daylight | Natural ventilation & mechanical ventilation | Special acoustic treatment | Single volume | intimate space | Spatial Link to research exhibition | Link to reception | Link to large exhibition | Inspirational space | Exhibition space	10 x 8 m	**Sight** | Smell | taste | **Sound** | **touch**	**Memory** | **Education** | **Hapticity** | **Dialogue** | **Experienced Information**
	lower exhibition	A typical exhibition space that could potentially draw people into the interior spaces.	Public | Students | Lecturers		Exposure to controlled natural daylight | Natural ventilation & mechanical ventilation | Connected to public circulation space | Special acoustic treatment | Triple volume | Public space | Blurring the boundary between exterior and interior spaces | Vistas over site | Spatial Link to research exhibition | Link to small scale exhibition | Inspirational space	9 x 9	**Sight** | Smell | taste | **Sound** | **touch**	**Memory** | **Education** | **Hapticity** | **Dialogue** | **Experienced Information**
	Solar amphitheatre	This outdoor space is needed for Restitution Park performances as well as a gathering space for students and public as it provides electricity.	Public | Students | Lecturers		Connected to public circulation space | Robust materials to be used | Public space | Vistas over site | Link to wet land | Inspirational space	15m x 20	**Sight** | **Smell** | taste | **Sound** | **touch**	**Memory** | **Education** | **Hapticity** | **Dialogue** | **Experienced Information**
	Micro Gasification plant	This is where wet biomass is produced into natural gas and biocrude oil. Due to the position and visual accesbility of the process, people are educated at the same time.	Public | Students | Lecturers		Connected to public circulation space | Semi -public space | Vistas through the site | Link to laboratories | Link to algae farm | Educational space |	26 x 7,5	**Sight** | **Smell** | taste | **Sound** | **touch**	**Memory** | **Education** | **Hapticity** | **Dialogue** | **Experienced Information**

	Wall climbing	An interactive surface that originated from the dis-programming theory to allow the public to interact with the building in a non-programatic way, while learning on a daily basis	Public | Students | Lecturers		Connected to public circulation space | Public space | Vistas through the site | Link to laboratories | Link to algae farm Link to research pods | Educational space	16m heigh	**Sight** | Smell | taste | **Sound** | **touch**	**Memory** | Education | Hapticity | Dialogue | **Experienced Information**
	Circulation space	Is used as an extension of the didactic route	Public | Students | Lecturers		Connected to main entrance space | Public space | Vistas through the site | Educational space		**Sight** | **Smell** | **taste** | **Sound** | **touch**	**Memory** | **Education** | **Hapticity** | **Dialogue** | **Experienced Information**
	Offices	This space is occupied by specialists in the specific research field	Lecturers | Specialist		Exposure to controlled natural daylight | Natural ventilation & mechanical ventilation | Special acoustic treatment | Single volume | Intimate space | Vistas over site | Link to Living lab	10 x 10	**Sight** | Smell | taste | Sound | touch	Memory | Education | Hapticity | **Dialogue** | Experienced Information
	Water living lab	This space is occupied by specialists in the specific research field but now placed in a environment for collaborative experimentation	Lecturers | Students | Public		Exposure to controlled natural daylight | Natural ventilation & mechanical ventilation | Special acoustic treatment | Single volume | Semi-intimate space | Vistas over exhibition space | Link to exhibition space | Connected to Offices | Connected to Grey water on site | Connected to storm water catchment pit | Connected to water from wet biomass to natural gas | Connected to water harvested for roof "		**Sight** | **Smell** | **taste** | **Sound** | **touch**	**Memory** | **Education** | **Hapticity** | **Dialogue** | **Experienced Information**
	Offices	This space is occupied by specialists in the specific research field	Lecturers | Specialist		Exposure to controlled natural daylight | Natural ventilation & mechanical ventilation | Special acoustic treatment | Single volume | intimate space | Vistas over site | Link to Living lab		**Sight** | Smell | taste | Sound | touch	Memory | Education | Hapticity | **Dialogue** | Experienced Information
	Renewable living energy lab (algae to natural gas and bio crude oil)	This space is occupied by specialists in the specific research field but now placed in an environment for collaborative experimentation	Lecturers | Students | Public		"Exposure to controlled natural daylight | Natural ventilation & mechanical ventilation | Special acoustic treatment | Single volume | Intimate space | Vistas over site | Connected to Offices | Connected to research exhibition | Connected to hemp and flax seed gardens for bio-fuel research | Connected to solar amphitheatre | Connected to wet biomass to natural gas		**Sight** | **Smell** | **taste** | **Sound** | **touch**	**Memory** | **Education** | **Hapticity** | **Dialogue** | **Experienced Information**
	Offices	This space is occupied by specialists in the specific research field |Product and Process Development / Improvement	Lecturers | Specialist		'Exposure to controlled natural daylight | Natural ventilation & mechanical ventilation | Special acoustic treatment | Single volume | intimate space | Vistas over site | Link to Living lab		**Sight** | Smell | taste | Sound | touch	Memory | Education | Hapticity | **Dialogue** | Experienced Information
	Solar and air pollution living lab	This space is occupied by specialists in the specific research field but now placed in an environment for collaborative experimentation| Environmental Impact Assessment	Lecturers | Students | Exhibition goes		Exposure to controlled natural daylight | Natural ventilation & mechanical ventilation | Special acoustic treatment | Single volume | Intimate space | Vistas over site | Connected to Offices | Connected to research exhibition | Connected to solar amphitheatre | Connected to wet biomass to natural gas		**Sight** | **Smell** | **taste** | **Sound** | **touch**	**Memory** | **Education** | **Hapticity** | **Dialogue** | **Experienced Information**
	Board rooms (PRIVATE)	Collaborative space for lecturers, specialists and guests	Lecturers | Public | Specialists		Exposure to controlled natural daylight | Natural ventilation & mechanical ventilation | Connected to public circulation space | Special acoustic treatment | Single volume | Semi- intimate space | Private extension of the solar amphitheatre therefore blurring the boundary between exterior and interior collaborative spaces | Vistas over site | Inspirational space		**Sight** | Smell | taste | Sound | touch	Memory | **Education** | Hapticity | **Dialogue** | Experienced Information
	3D Printing | Laser cutting	A prototyping room | Technology Research and Development	Students | Lecturers		Exposure to controlled natural daylight | Mechanical ventilation | Connected to public circulation space | Special acoustic treatment | Single volume | Semi- intimate space | Inspirational space | Link to full scale workshop		**Sight** | **Smell** | taste | **Sound** | **touch**	Memory | Education | Hapticity | Dialogue | Experienced Information
	Printing	A prototyping room	Students | Lecturers		Exposure to controlled natural daylight | Mechanical ventilation | Connected to public circulation space | Special acoustic treatment | Single volume | Semi- intimate space Inspirational space | Link to Full scale workshop		**Sight** | **Smell** | taste | **Sound** | **touch**	Memory | Education | Hapticity | Dialogue | Experienced Information
	Toilets	The opportunity for learning has been taken advantage of, by the exposing of service and the reuse of grey water	Public | Students |Lecturers		Wet services	7,5 x 10,5 m	Sight | Smell | taste | Sound | touch	Memory | Education | Hapticity | Dialogue | Experienced Information
Research pods 1 (on site research wet biomass	**Control room**	This space is used to monitor each and every tubular photo bio-reactor for optimum yield | Waste Characterisation |Engineering Consultation	Lecturers |Specialists		Exposure to controlled natural daylight | Natural ventilation | Single volume | Semi- intimate space | Link to algae farm		**Sight** | Smell | taste | **Sound** | **touch**	Memory | Education | **Hapticity** | **Dialogue** | **Experienced Information**
	Offices	This space is occupied by specialists in the specific research field | Energy auditing| Process Optimisation	Public | Students | Lecturers		'Exposure to controlled natural daylight | Natural ventilation | Single volume | Semi- intimate space | Link to algae farm		Sight | Smell | taste | Sound | touch	Memory | Education | Hapticity | Dialogue | Experienced Information
	Control room	This space is used to monitor each and every tubular photo bio-reactor for optimum yield	Lecturers |Specialists		Exposure to controlled natural daylight | Natural ventilation | Single volume | Semi- intimate space | Link to algae farm		**Sight** | Smell | taste | **Sound** | **touch**	Memory | Education | **Hapticity** | **Dialogue** | **Experienced Information**
	Offices	This space is occupied by specialists in the specific research field | Testing | Analysis	Public | Students | Lecturers		Exposure to controlled natural daylight | Natural ventilation | Single volume | Semi- intimate space | Link to algae farm		Sight | Smell | taste | Sound | touch	Memory | Education | Hapticity | Dialogue | Experienced Information
	Control room	This space is used to monitor each and every tubular photo bio-reactor for optimum yield	Public | Students | Lectures		Exposure to controlled natural daylight | Natural ventilation | Single volume | Semi- intimate space | Link to algae farm		Sight | Smell | taste | Sound | touch	Memory | Education | Hapticity | Dialogue | Experienced Information



ENTRANCE

1 of 16



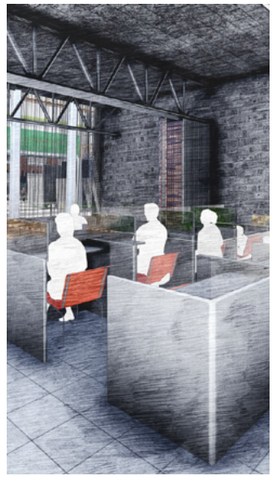
LECTURE ROOM

2 of 16



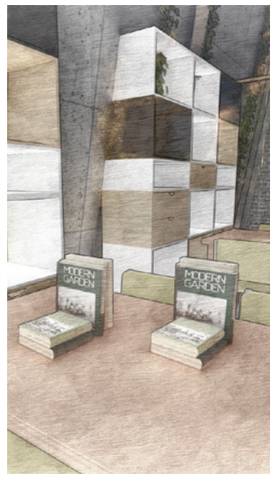
COLAB SPACE

3 of 16



INDIVIDUAL RESEARCH

4 of 16



SMALL RESEARCH

5 of 16



FULL SCALE WORKSHOP

6 of 16



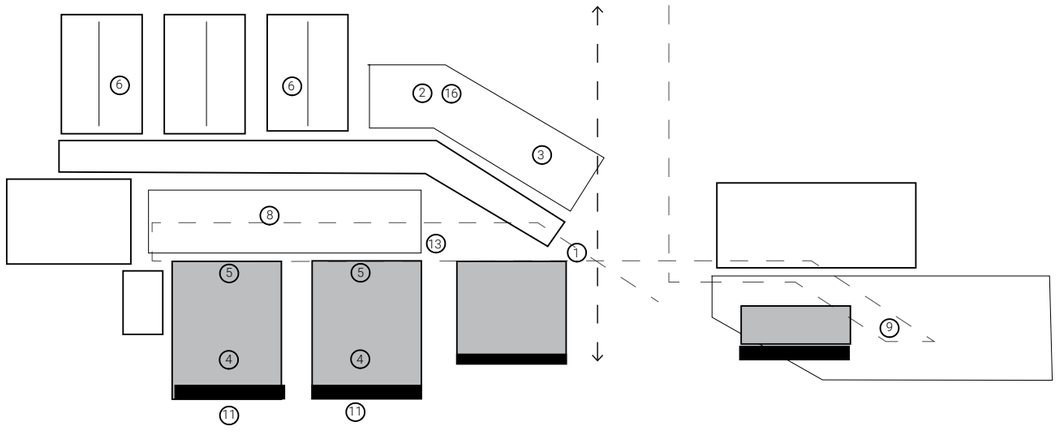
ASSEMBLY & EXTERIOR WORKSHOP

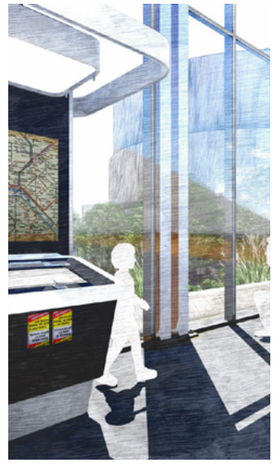
7 of 16



RESEARCH EXHIBITION

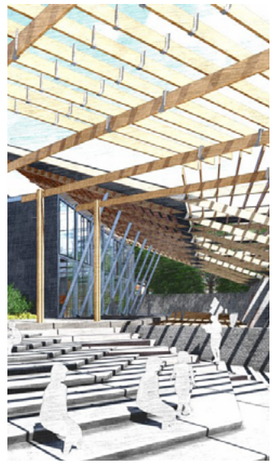
8 of 16





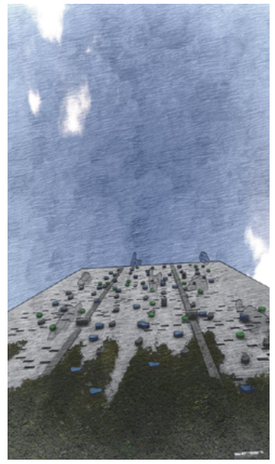
SMALL SCALE EXHIBITION

9 of 16



SOLAR AMPHITEATRE

10 of 16



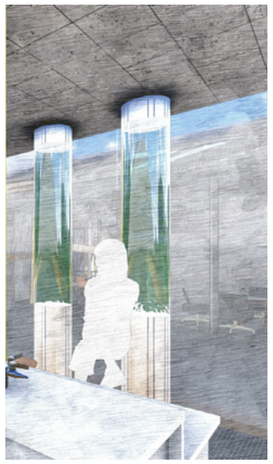
WALL CLIMBING

11 of 16



WATER LIVING LABORATORY

12 of 16



RENEWABLE ENERGY LIVING LABORATORY

13 of 16



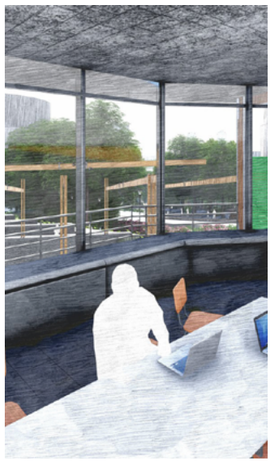
MICRO GASIFICATION PLANT

14 of 16



ALGEA POWER WALL

15 of 16



BOARDROOM

16 of 16

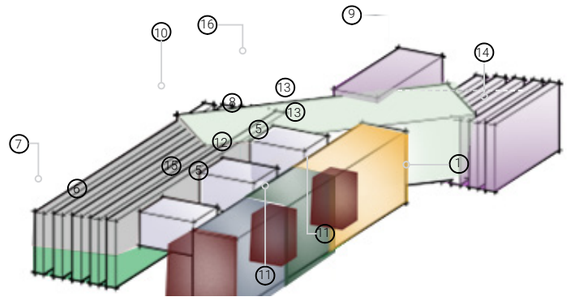


Fig 145 A: Spatial Requirements poster (Author, 2017)

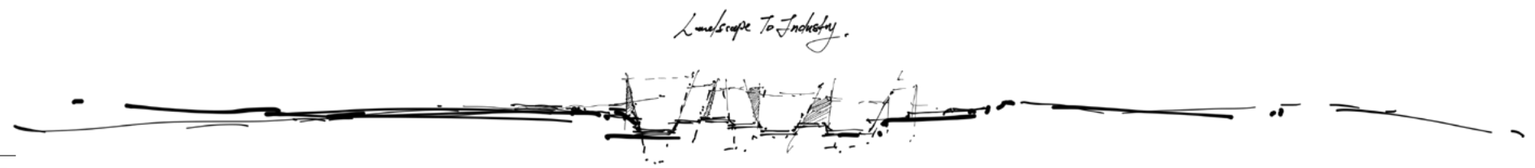


Fig 146:Landscape to Industry (Author, March 2017)

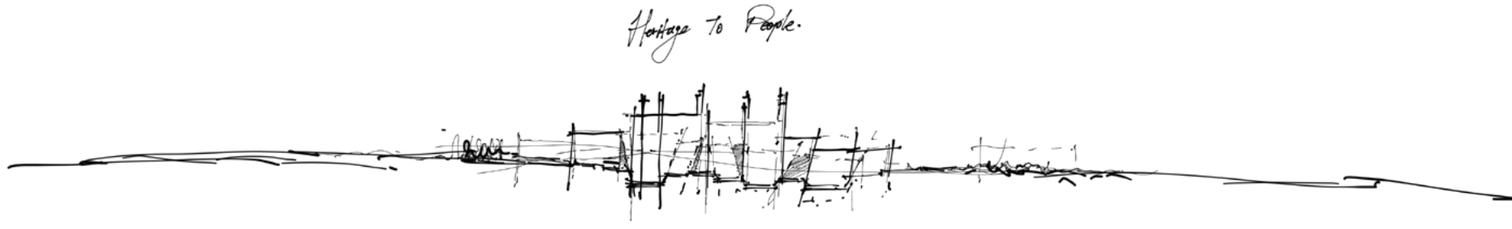


Fig 147: Heritage to people (Author, March 2017)

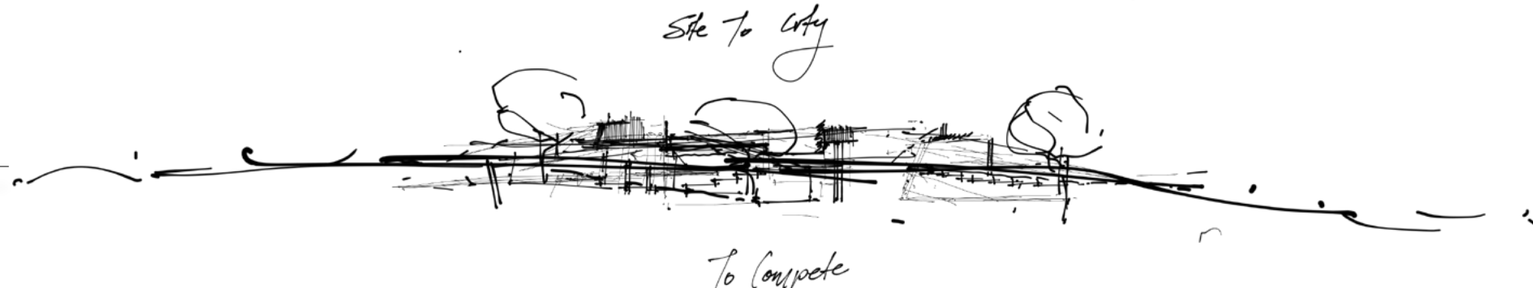


Fig 148: Site to city (Author, March 2017)

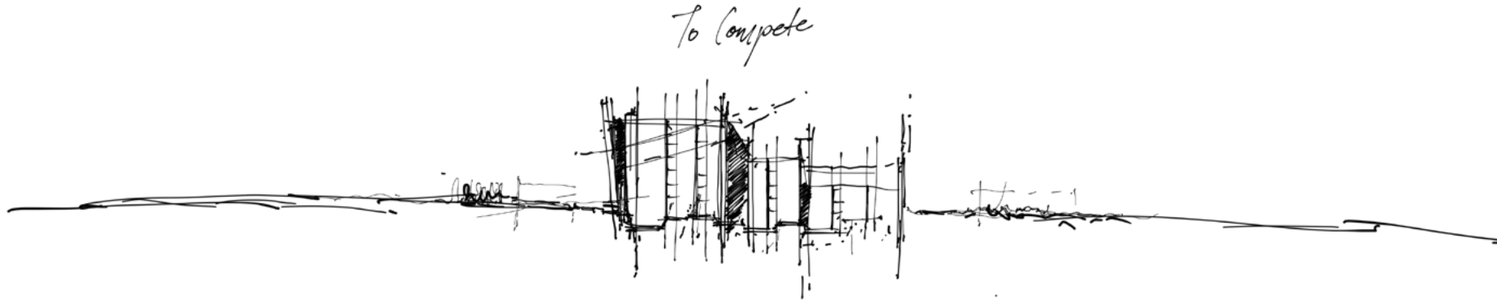


Fig 149: To Compete against retorts (Author, March 2017)



Fig 150: Non Compete against retorts (Author, March 2017)



Fig 151: Compiled intuitive sketches (Author, MArch 2017)

2.4.1 Didacticism as driver

We should learn from architecture. This can be translated that architecture should and can be a didactic device. The interpration of architecture as didactic device has been narrowed down to four components. This aims to frame didacticism as an architectural design driver.

Memory

The architecture of memory

The method of loci is a mnemonic or memory aiding device, which originated in ancient Rome. The method states that if certain items need to be memorized, they need to be placed or pinned down in some visual cue and strung together into a thought-out narrative giving a journey through space. According to Foer, for this mnemonic device to work, there is often a need for a hyperreal or exaggeration of normalcy to stand out in mind, Our memories are the outcomes of our body's experience of physical space.

From an architect's view the transformation of a site/space into place is for the architect to create a structure that enables the installation of memories, and that turns that structure into place. Professor Donlyn Lyndon explains, "'Place,' as I understand it, refers to spaces that can be remembered, that we can imagine, hold in mind, and consider."
Lyndon argues that "Good places are structured so that they attract and hold memories; they are sticky—or perhaps you would rather say magnetic." In the spatial essay Recall, Professor Juhani Pallasmaa states, "Human memory is embodied, skeletal and muscular in its essence, not merely cerebral," He goes even further by quoting Casey a philosopher, "body memory is…the natural centre of any sensitive account of remembering."

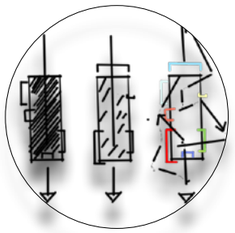


Fig 152: Memory diagram(Author, April 2017)

Education

Architecture as the three-dimensional textbook.

Architecture should facilitate a community of learning. The users of the spaces should bond with their physical environment, and there should be spatial harmony that will form part of the users' collective memory. The physical elements must also dispense visual education by creating a coherent spatial whole. For the campus to have emotional and intellectual harmony, it should become a spatial metaphor. This harmony is consciously designed to impact on the learning community and stimulate empathy. The architecture should present a powerful image in keeping with its essential missions. It should also be accessible from both a conceptual and physical point of view and strive to maintain social, geographic, cultural andarchitectural traditions.
An academic institution should ensure that its architecture and urban planning are in harmony with its surrounding geographical and climatic conditions. It should be exemplary about the environment, biodiversity and sustainability. (Calvo-Sotelo, 2010)

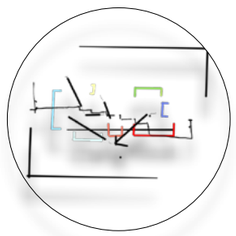


Fig 153: Education diagram(Author, April 2017)

Hapticity

Architecture aggressively seeking

Every touching experience of architecture is multi-sensory; qualities of space and scale are measured equally by the eye, ear, nose, skin, tongue, skeleton and muscle. Architecture strengthens experiences and one's sense of being in the world, Instead of mere vision or the five conventional senses, Architecture involves many realms of sensory experience which interact and fuse with each other. The Psychologist James J Gibson regards the senses as aggressively seeking rather than mere passive receivers. He categorises our senses into visual, auditory, taste-smell, basic orienting and the haptic system. He states that we use more or less 12 senses most of the time. (Pallasmaa, 2005, pp. 41,42)

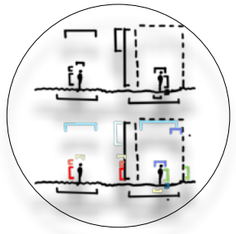


Fig 154: Hapticity diagram (Author, April 2017)

Dialogue

So the dialogue continues...

If I asked you to describe what architecture is, 'what would you say? Would you launch into a diatribe about space and function and economy? Would you mention light? Texture, materials? Technology? Construction? Emotion? History? Is architecture about creativity? Is it about individual expression? Is it about design? Is it art?
Maybe.
But maybe not.
Architecture is a dialogue, with each structure lending its voice and its point of view to the overall conversation of the city. Each building is an individual expression of an artist until it is released into the fabric of the community, then the community responds to this with another point, and a counterpoint, and contradiction.
Each architect marks his place in time.
And then the city responds, quietly.
Someone else chimes in, in built form.
And then another.
So, the dialogue continues."Extracted and adapted from (Brown, 2012)



Fig 155: Dialogue diagram (Author, April 2017)



Fig 156: Didictacism concept (Author, April 2017)

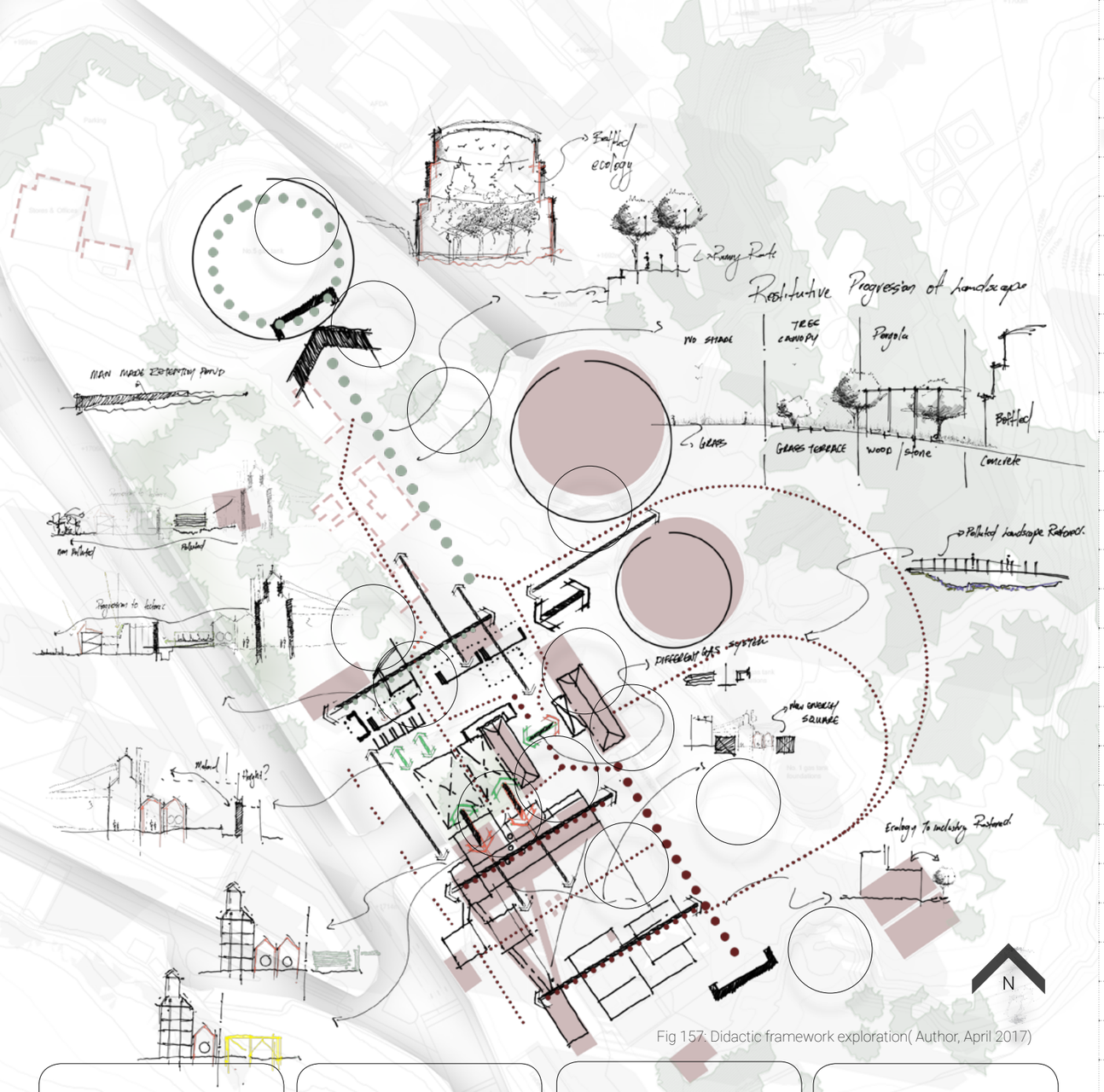


Fig 157: Didactic framework exploration(Author, April 2017)

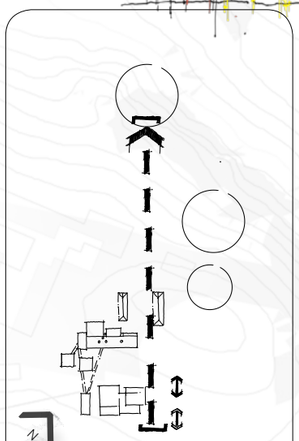


Fig 158: Site existing diagram (Author, April 2017)

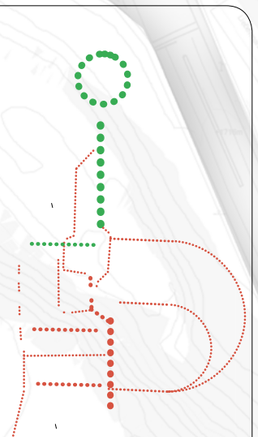


Fig 159: Didactic route (Author, April 2017)

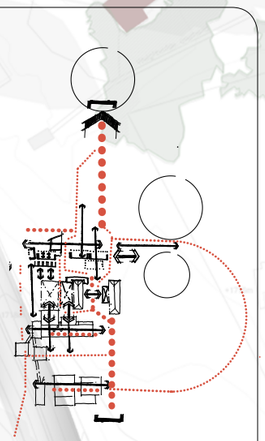


Fig 160: Didactic route on urban vision (Author, April 2017)

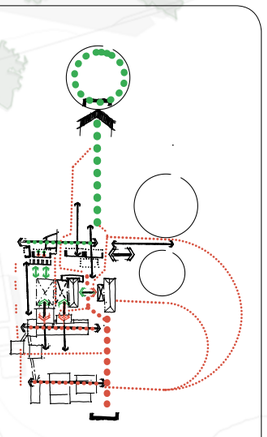


Fig 161: Didactic route points of interaction (Author, April 2017)

2.4.2 Creating the didactic route as framework for the Third retort

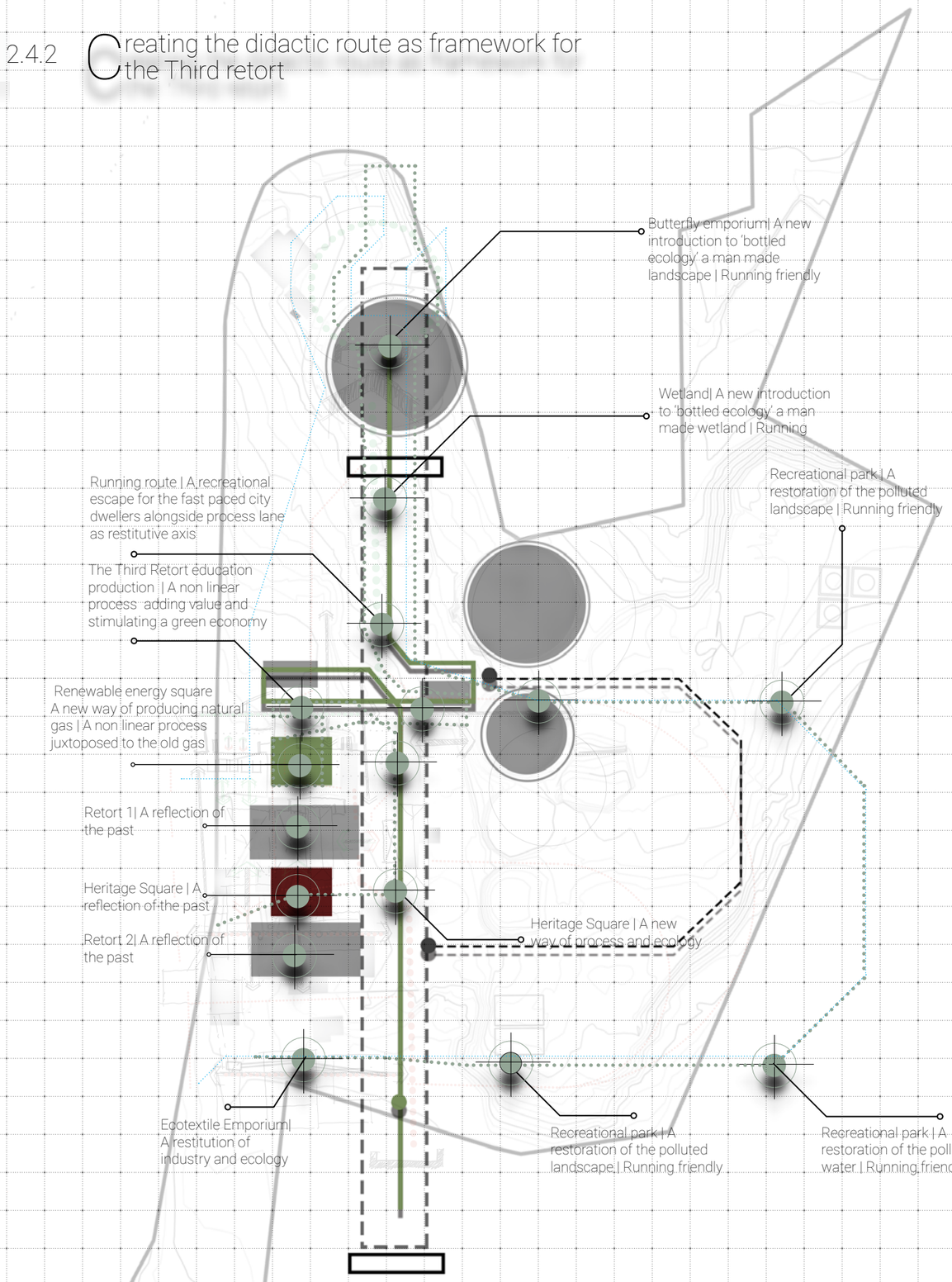


Fig 162: Didactic framework diagram(Author, April 2017)

Didactic framework



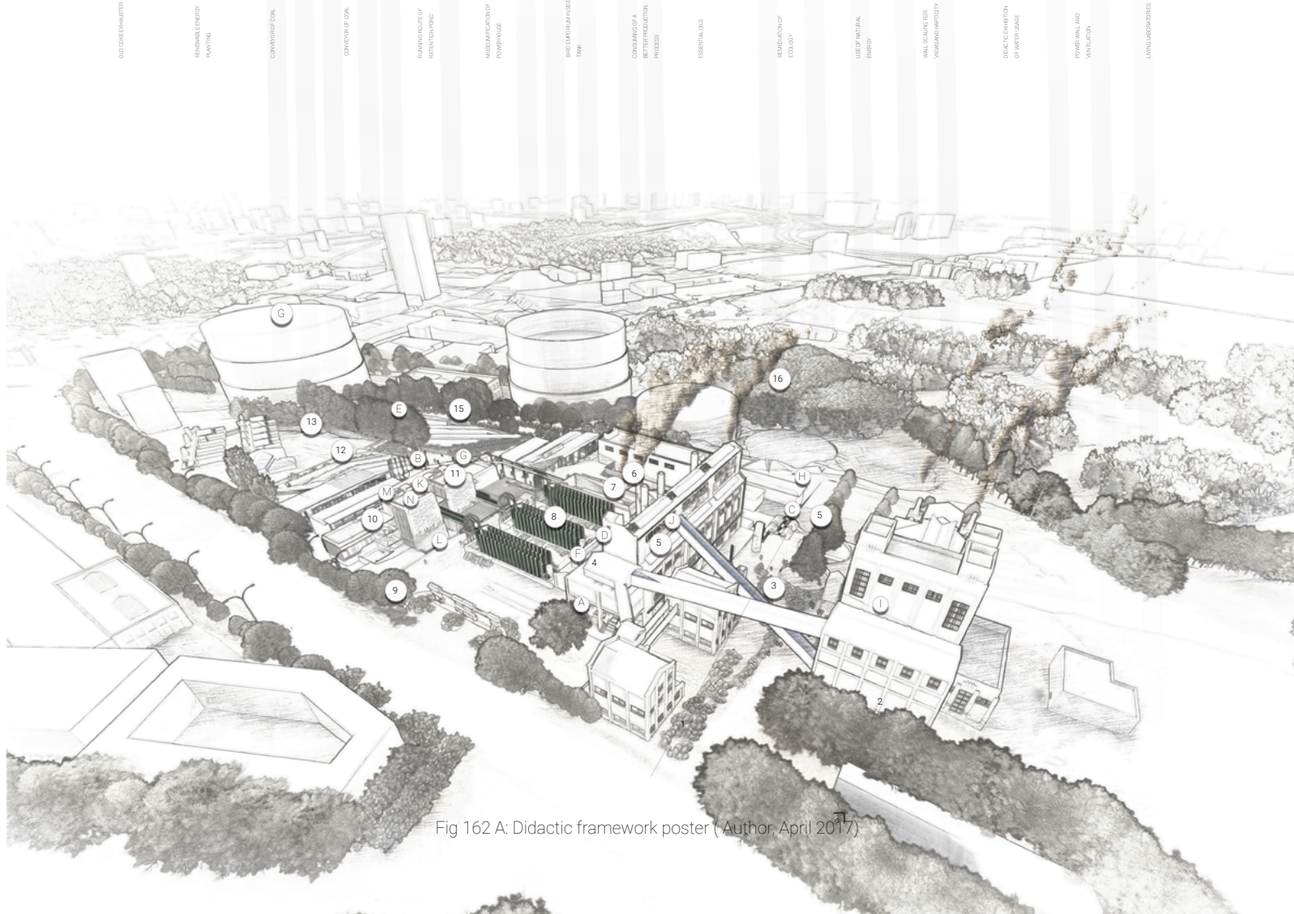
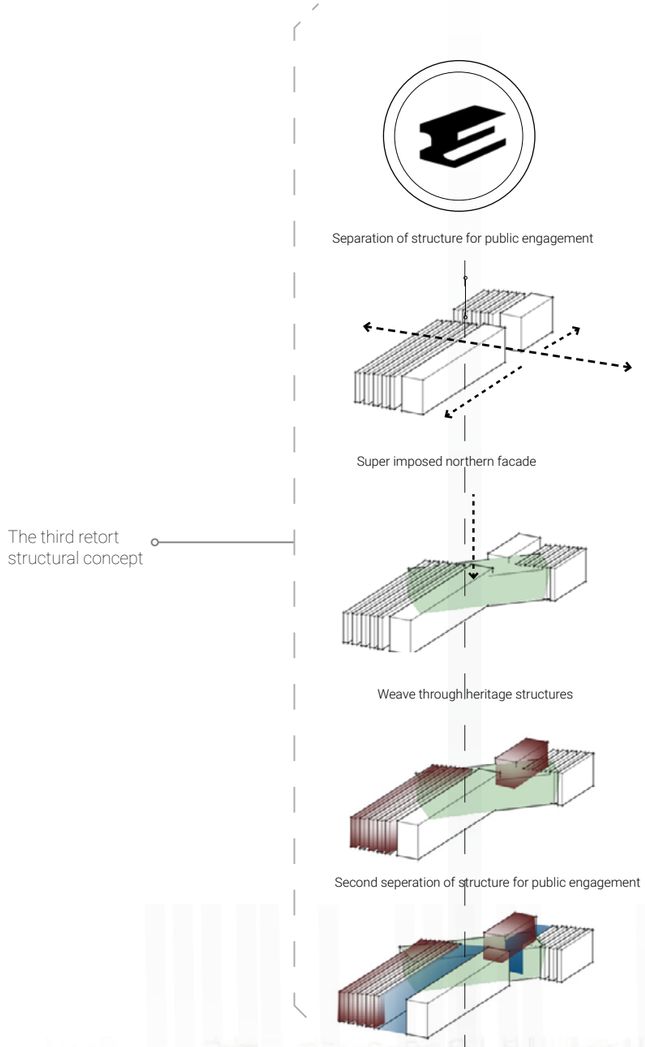


Fig 162 A: Didactic framework poster (Author, April 2017)



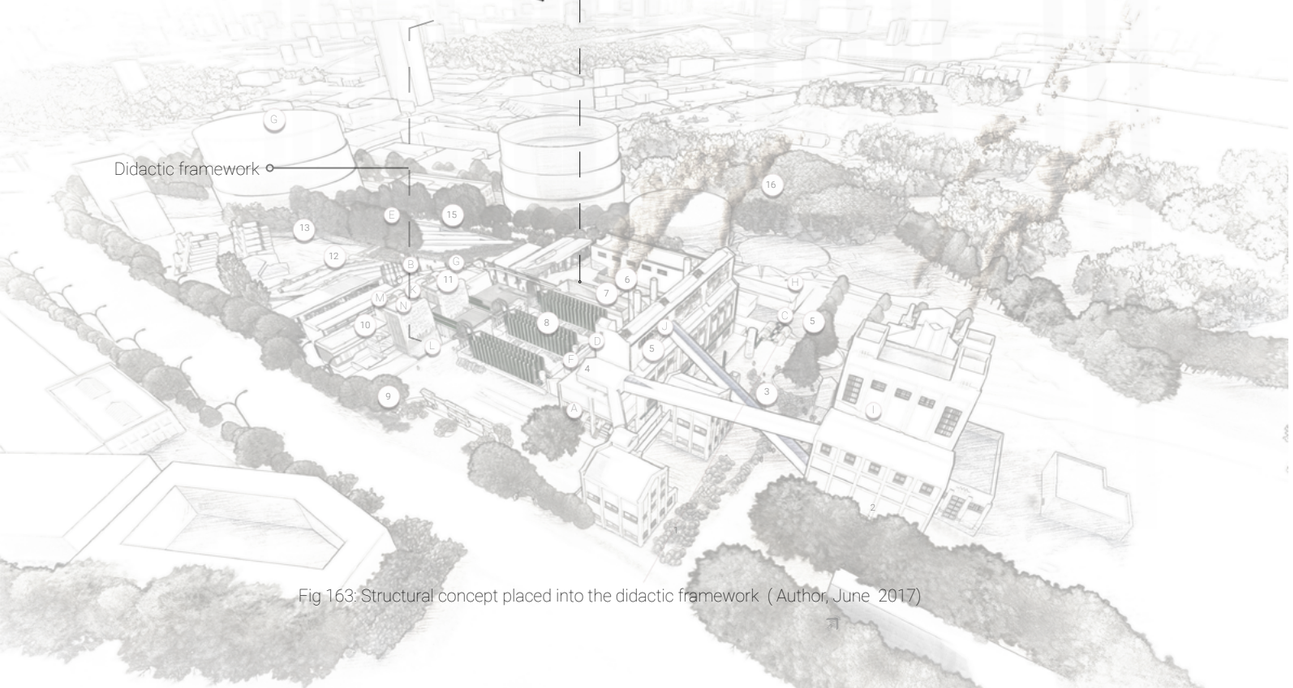


Fig 163: Structural concept placed into the didactic framework (Author, June 2017)

2.4.3 Concept diagrams

STRUCTURE

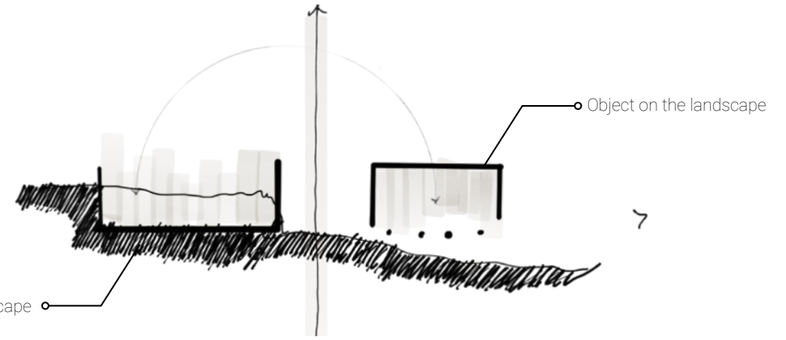


Fig 164: Structure concept diagram (Author, May 2017)

PROGRAM

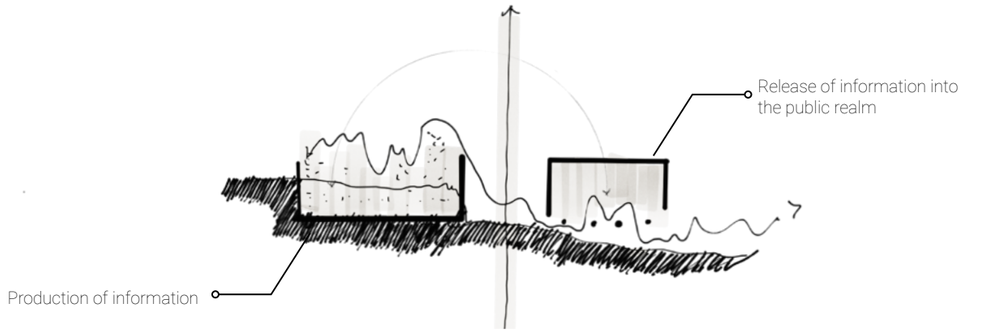


Fig 165: Program concept diagram (Author, May 2017)

DIDACTICISM

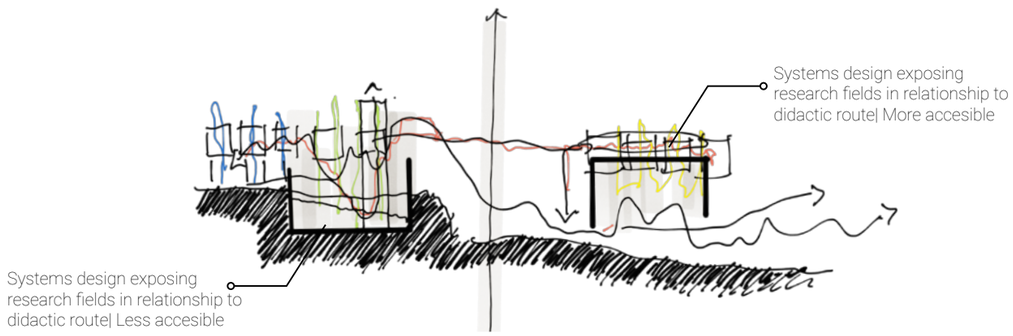
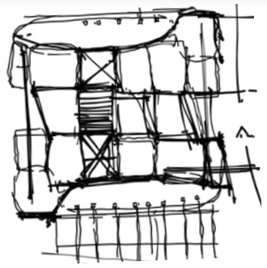


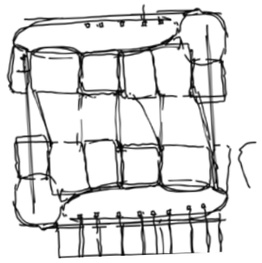
Fig 166: Didactis lens diagram (Author, May 2017)

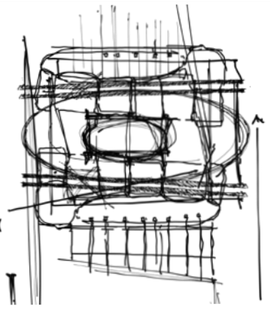
MOVING FROM A SYNTHETIC POLLUTED LANDSCAPE TO A HYBRID RESTITUTIVE LANDSCAPE

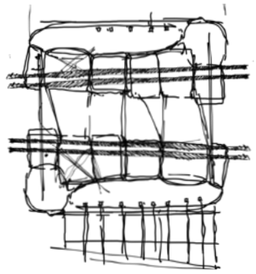


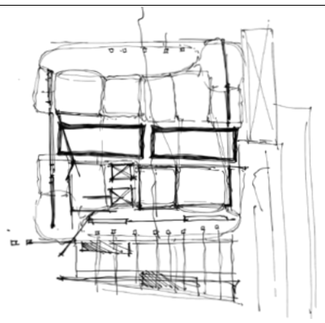
Fig 167: The third retort narrative changing in energy production (Author, May 2017)











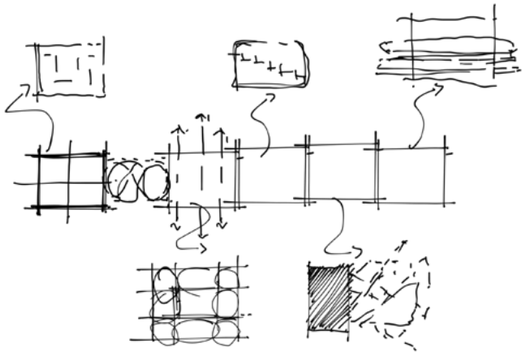


Fig 169: Early programmatic iteration responding to space allocations(Author, April 2017)

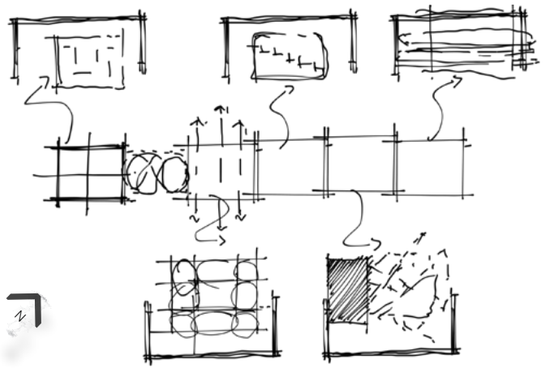


Fig 170: Early programmatic iteration responding to dis-programming. theory space allocations(Author, April 2017)

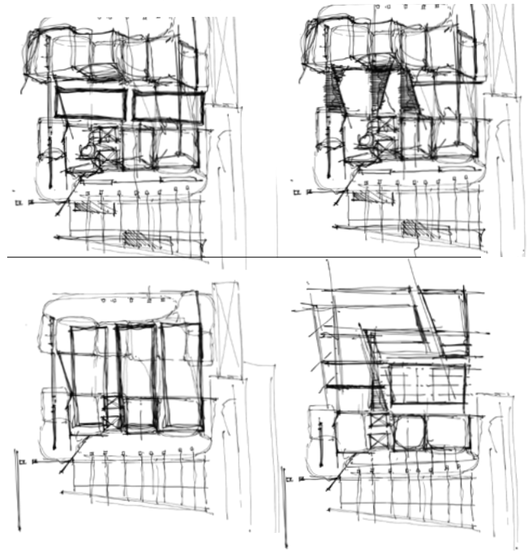


Fig 168: Early design iterations of geometry and the application of dis-programming theory. Using a running track placed into the structure feeding off Restitution Park (Author, April 2017)

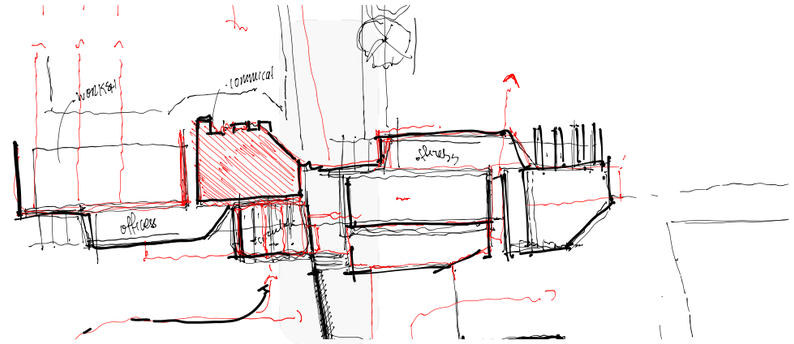


Fig 171: Plan development focusing on the separation of the structure (Author, April 2017)

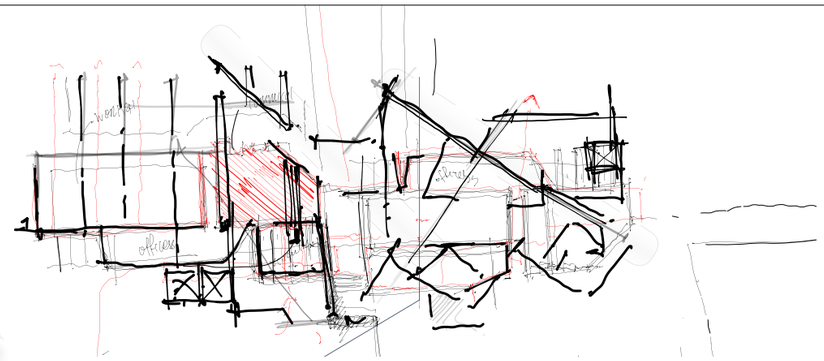


Fig 172: Plan development focusing on the northern facade while maintaining the first two retort geometry (Author, April 2017)

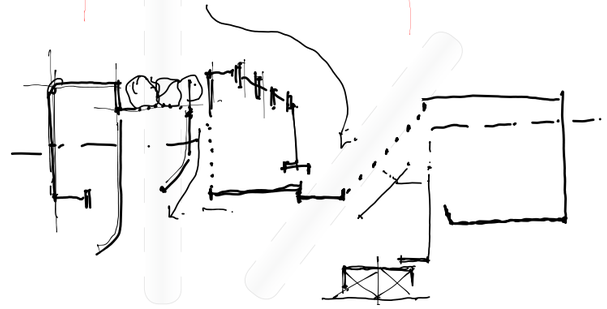


Fig 173: Plan development focusing on pulling the landscape in the structure and opening up the structure (Author, May 2017)

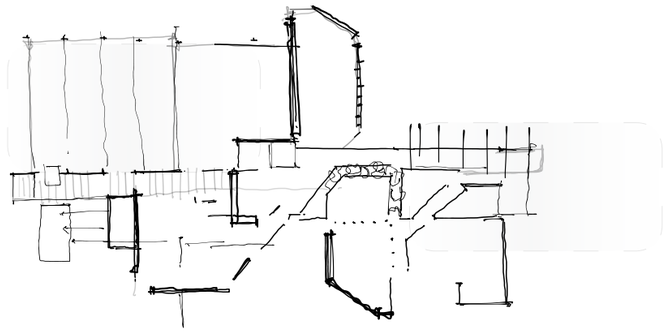


Fig 174: Plan development focusing on weaving between the existing heritage structures (Author, May 2017)

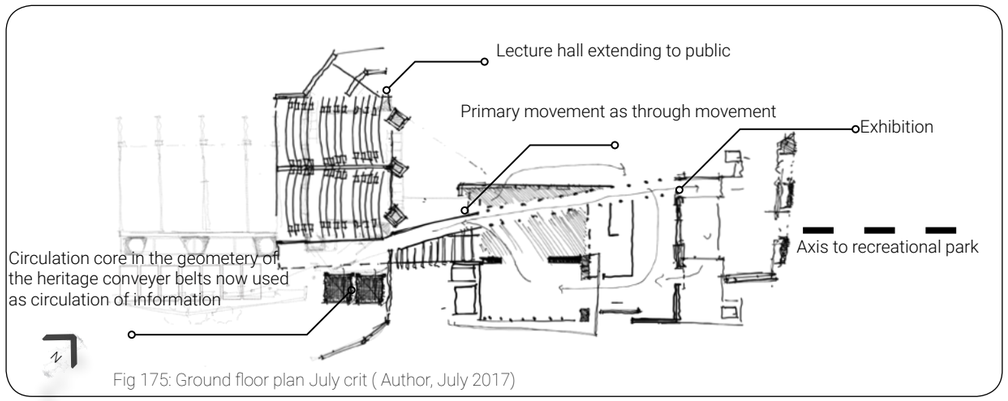


Fig 175: Ground floor plan July crit (Author, July 2017)

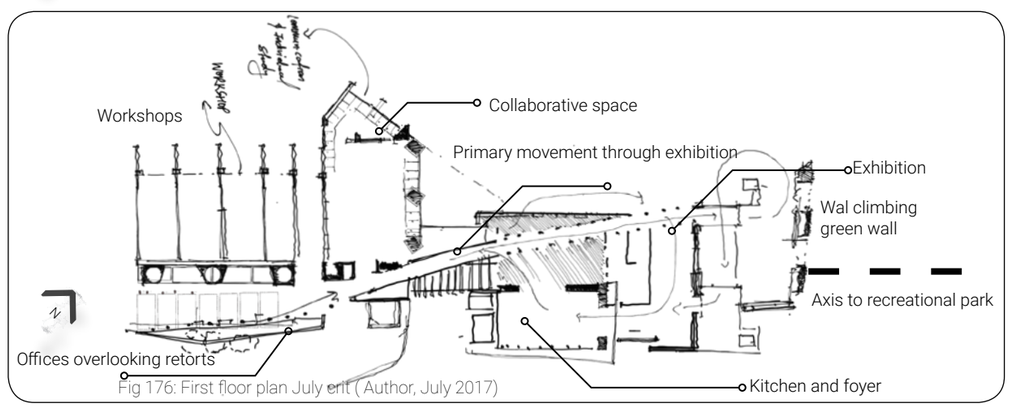


Fig 176: First floor plan July crit (Author, July 2017)

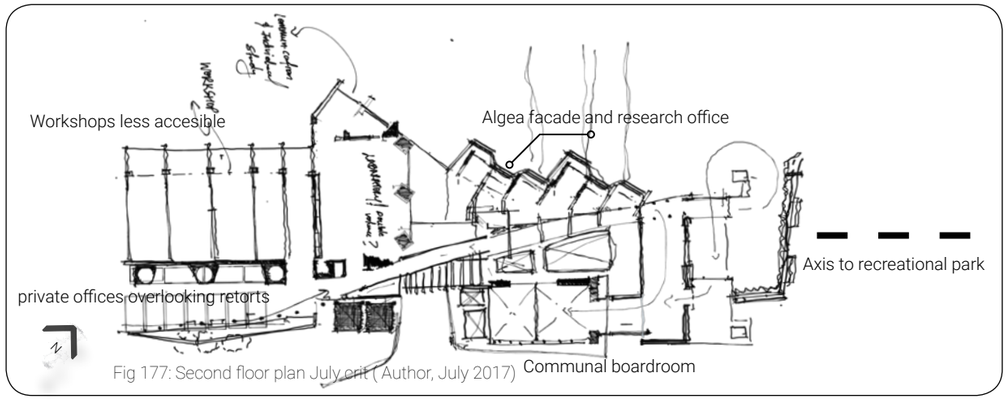


Fig 177: Second floor plan July crit (Author, July 2017)

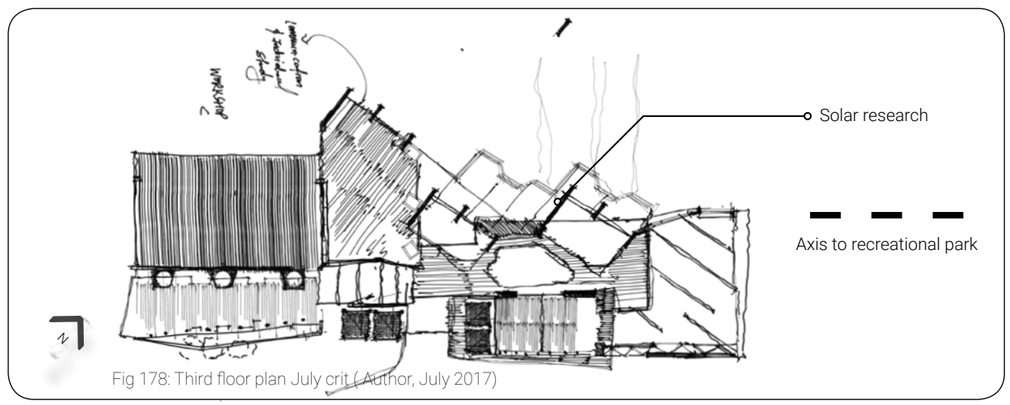


Fig 178: Third floor plan July crit (Author, July 2017)

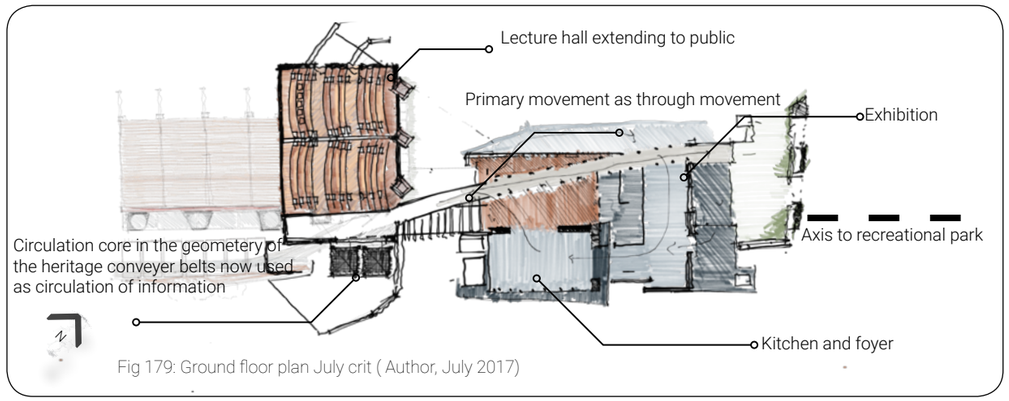


Fig 179: Ground floor plan July crit (Author, July 2017)

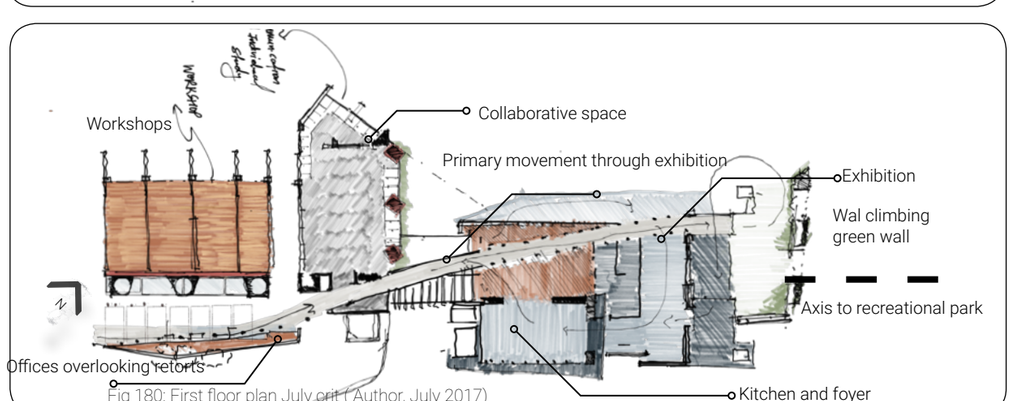


Fig 180: First floor plan July crit (Author, July 2017)

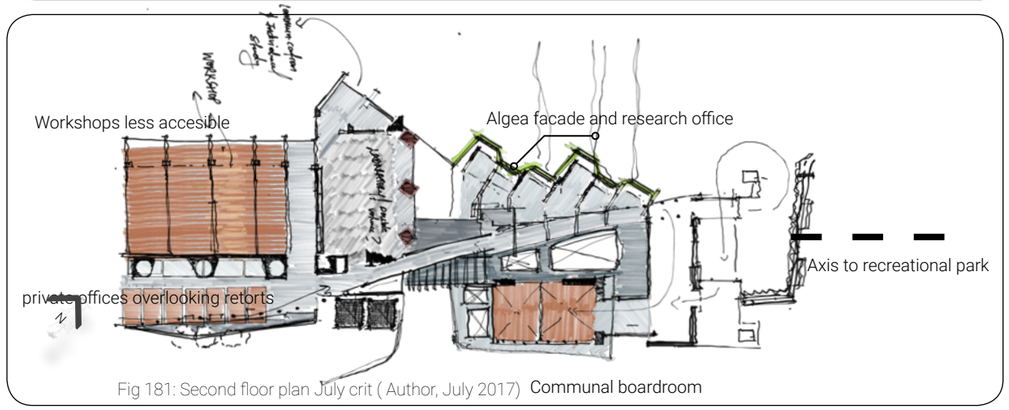


Fig 181: Second floor plan July crit (Author, July 2017)

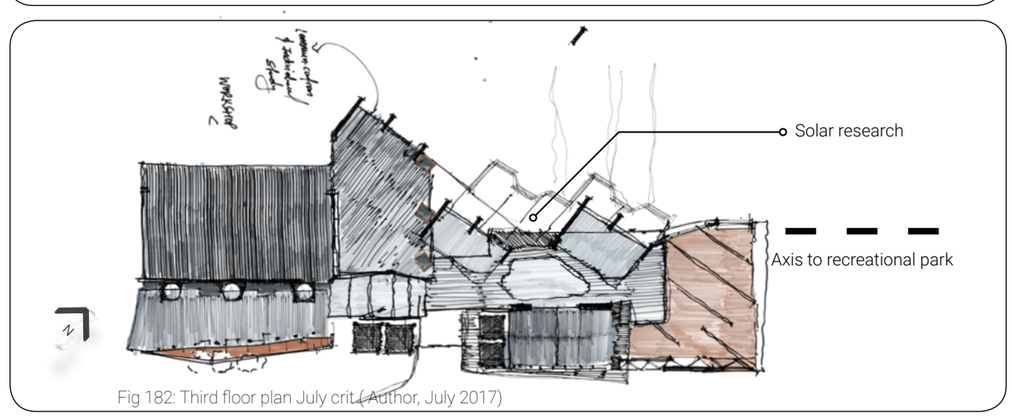


Fig 182: Third floor plan July crit (Author, July 2017)

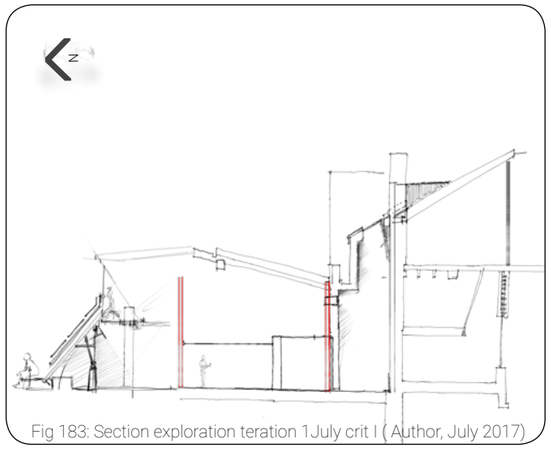


Fig 183: Section exploration teration 1July crit I (Author, July 2017)

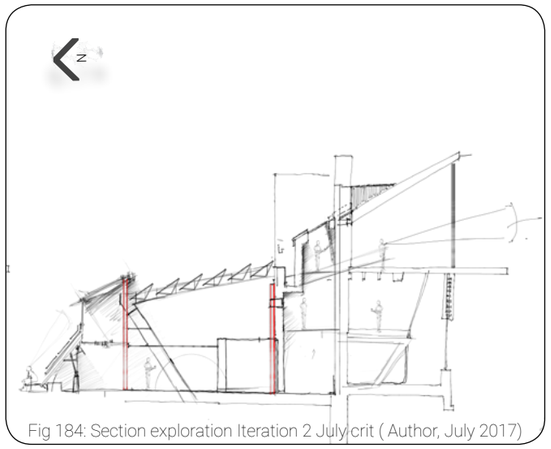


Fig 184: Section exploration Iteration 2 July crit (Author, July 2017)

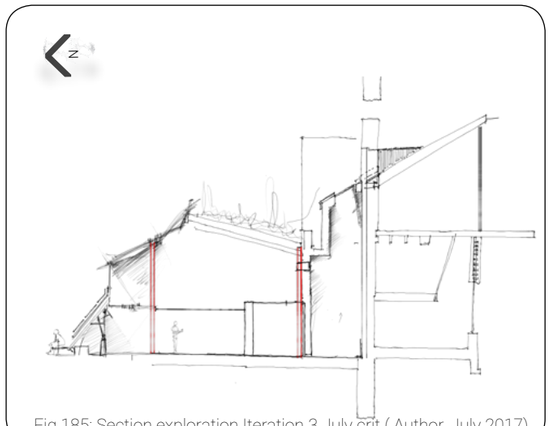


Fig 185: Section exploration Iteration 3 July crit (Author, July 2017)

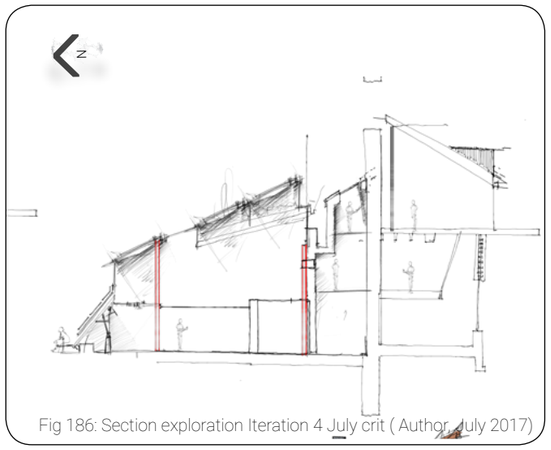


Fig 186: Section exploration Iteration 4 July crit (Author, July 2017)

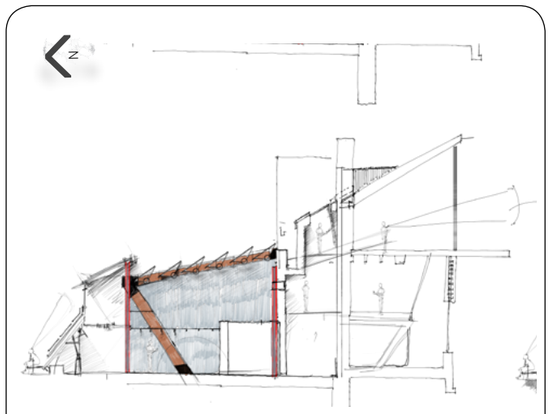


Fig 187: Section exploration Iteration 5 July crit (Author, July 2017)

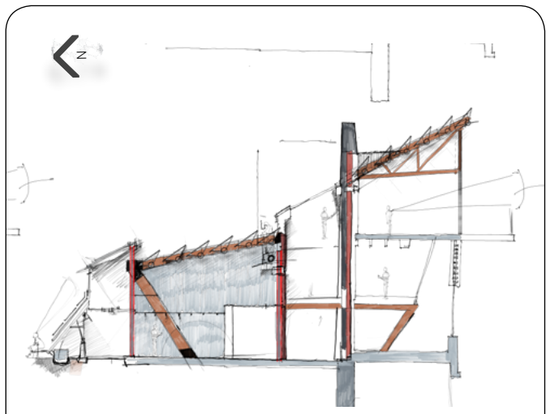


Fig 188: Section exploration Iteration 6 July crit (Author, July 2017)

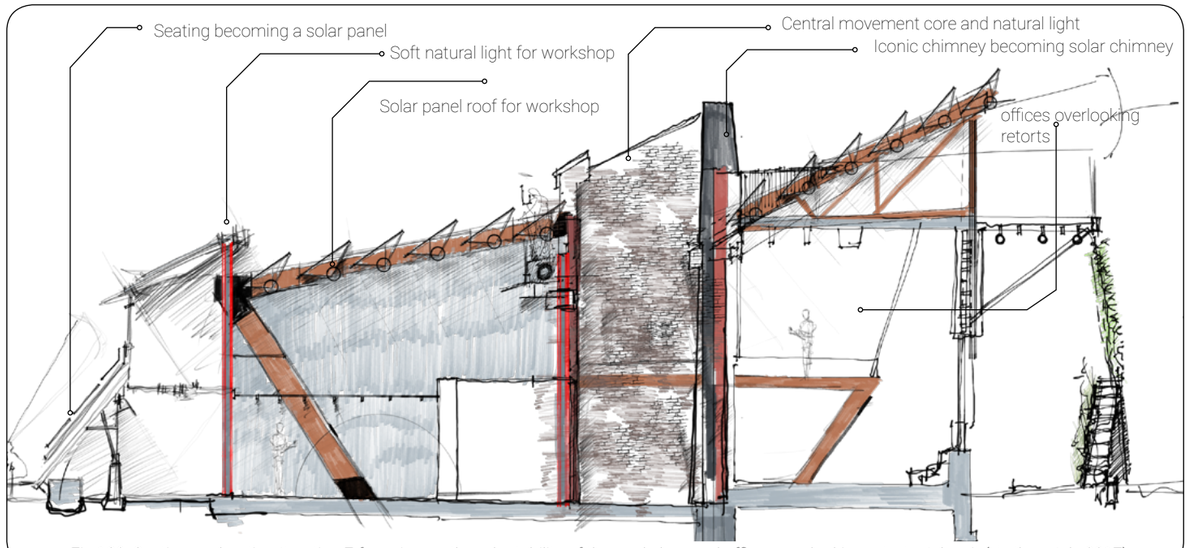


Fig 189: Section exploration Iteration 7 focusing on the adaptability of the workshop and offices overlooking retorts July crit (Author, July 2017)

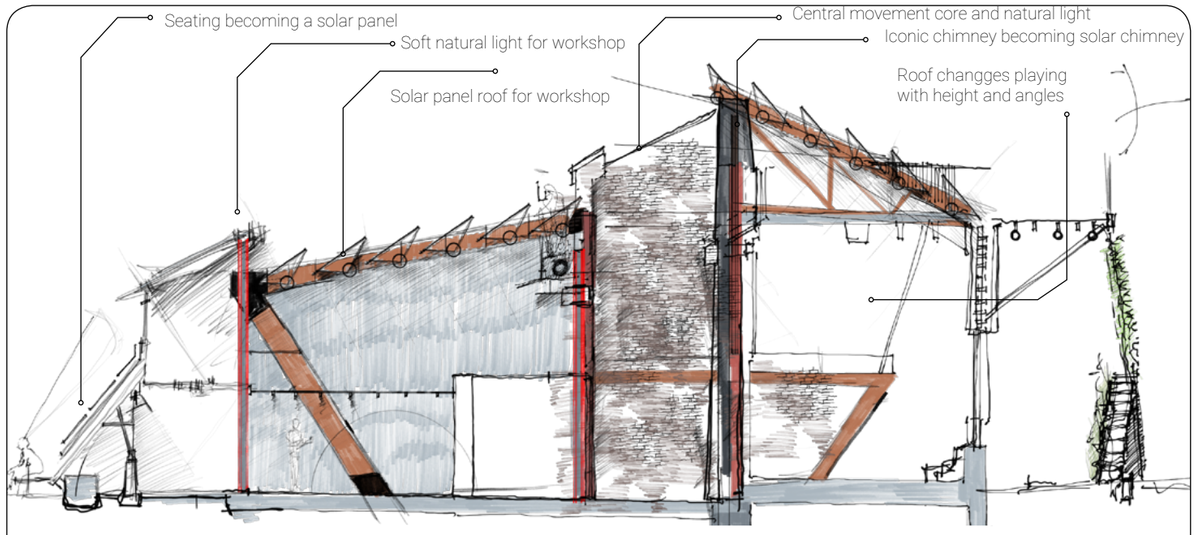


Fig 190: Section exploration Iteration 7 focusing on the adaptability of the workshop and offices overlooking retorts July crit (Author, July 2017)

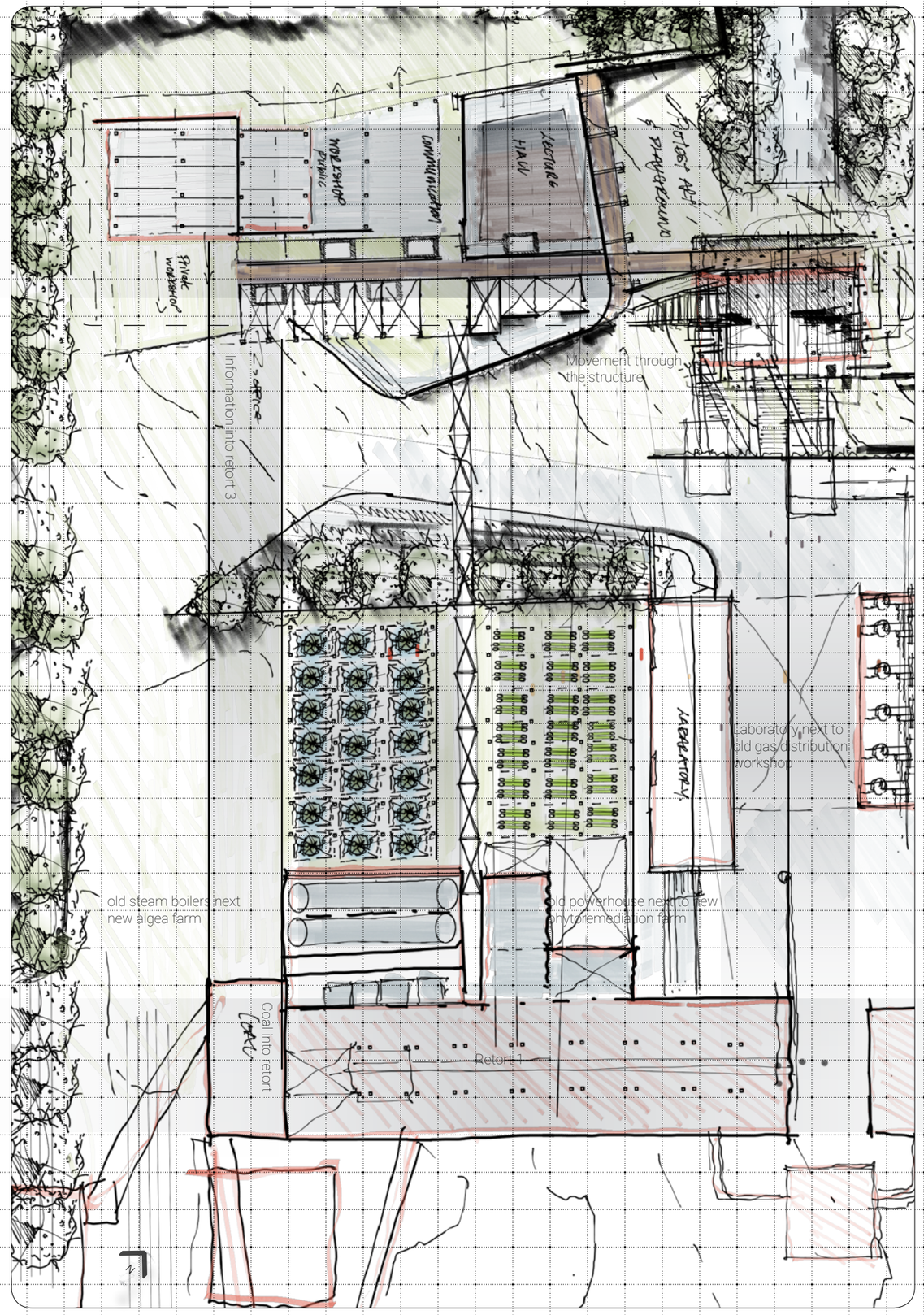


Fig 191: Site and ground floor plan July crit (Author, July 2017)

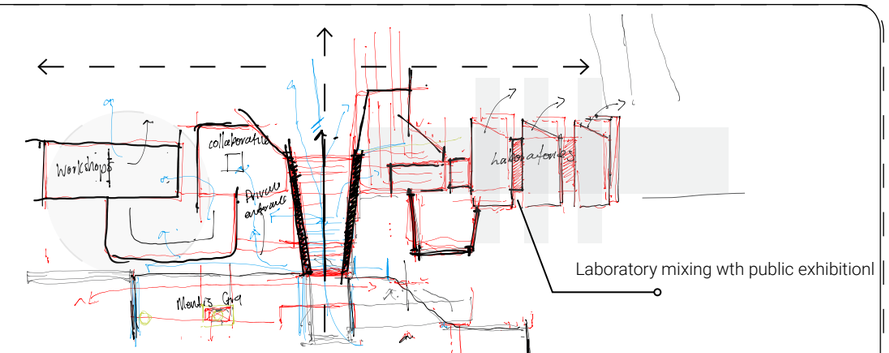


Fig 192: Plan development separating programs from less accessible research to information released into the public realm through exhibition(Author, August 2017)

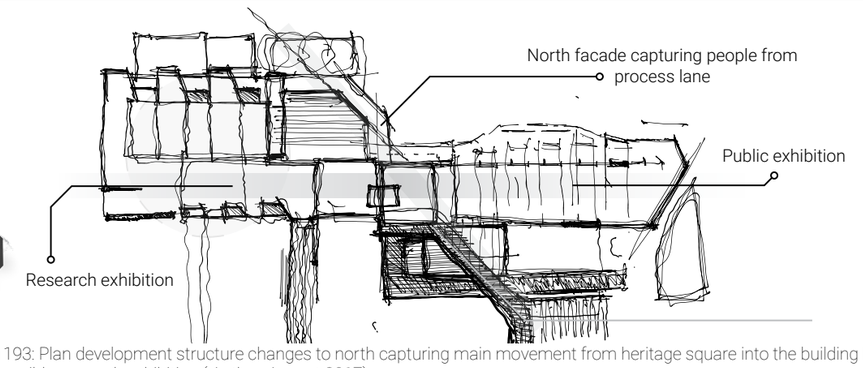


Fig 193: Plan development structure changes to north capturing main movement from heritage square into the building less accessible research exhibition (Author, August 2017)



Fig 194: Plan development: finding an architectural language in geometry (Author, September 2017)

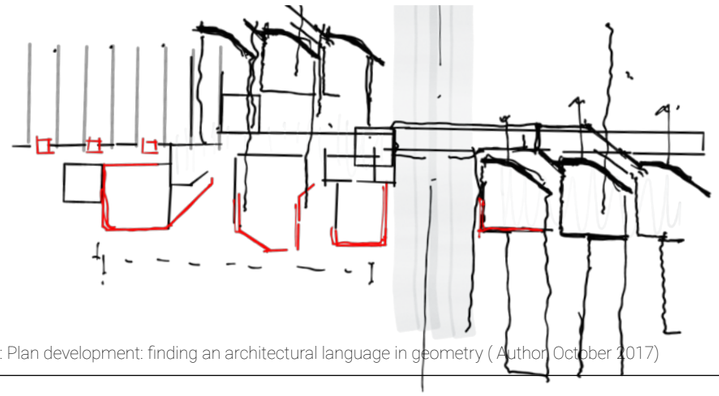


Fig 195: Plan development: finding an architectural language in geometry (Author, October 2017)

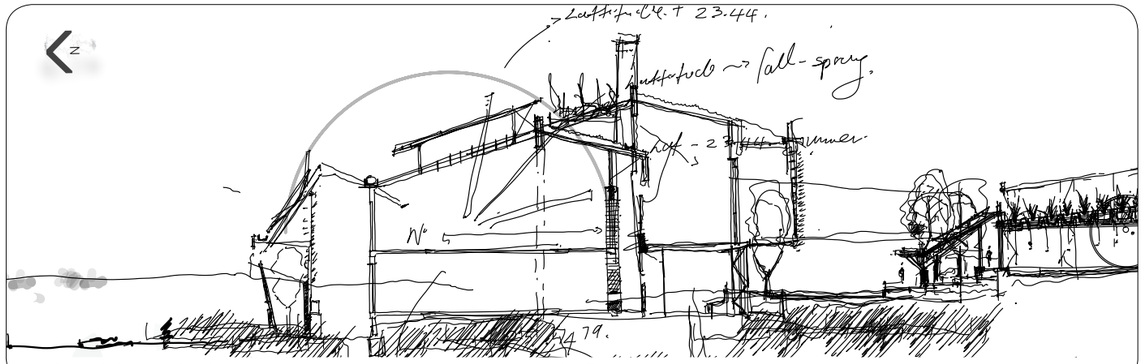


Fig 196: Section development looking at sun angles (Author, August 2017)

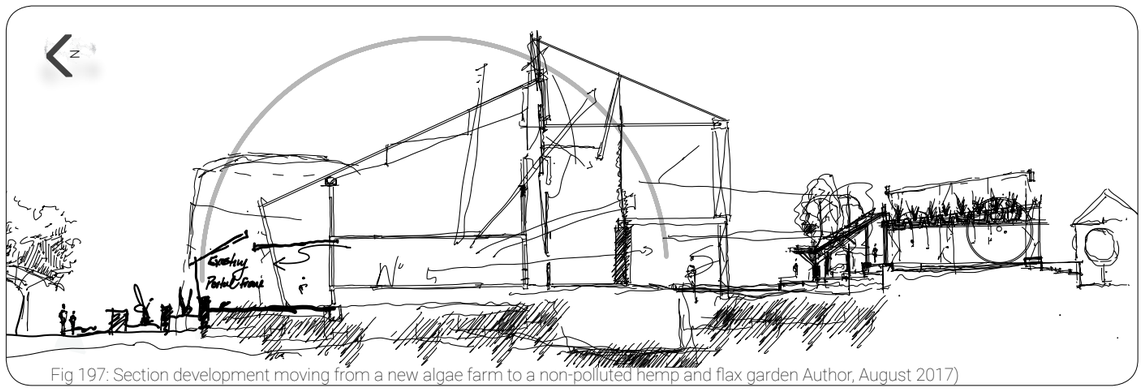


Fig 197: Section development moving from a new algae farm to a non-polluted hemp and flax garden Author, August 2017)



Fig 198: Section iteration 1 through collaborative space Author, August 2017)

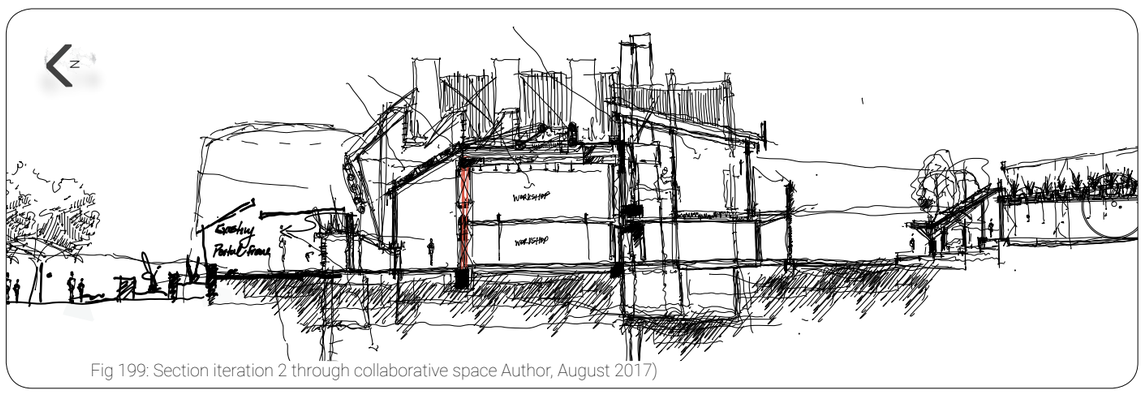


Fig 199: Section iteration 2 through collaborative space Author, August 2017)

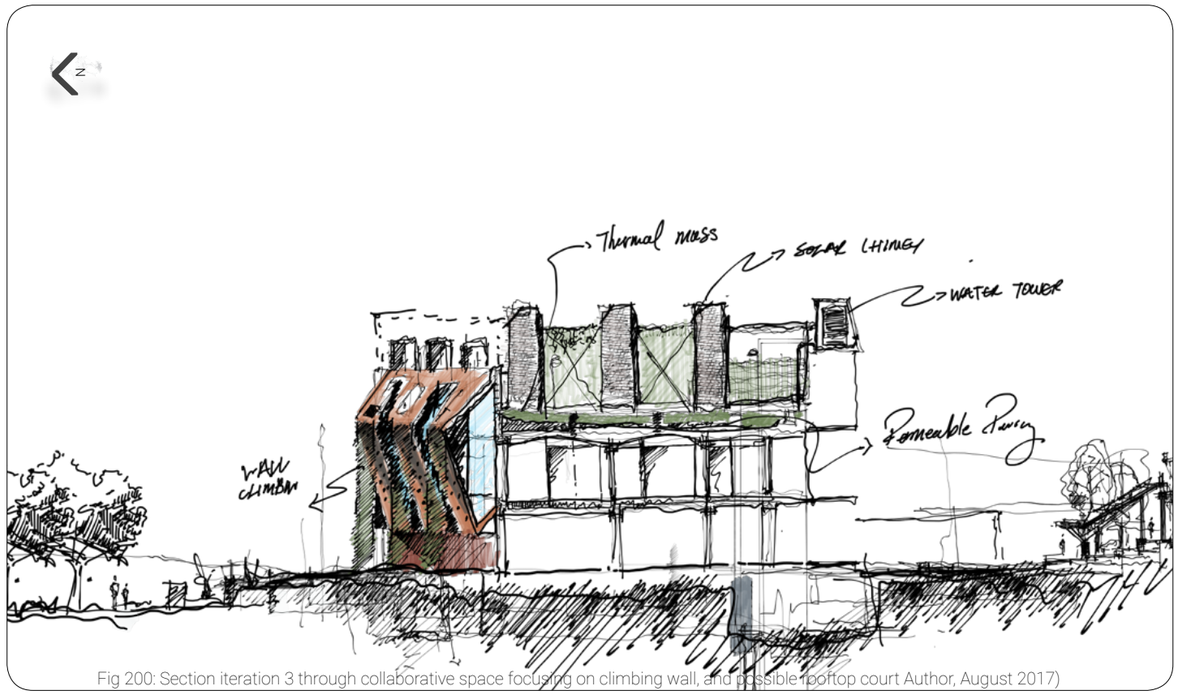


Fig 200: Section iteration 3 through collaborative space focusing on climbing wall, and possible rooftop court Author, August 2017)

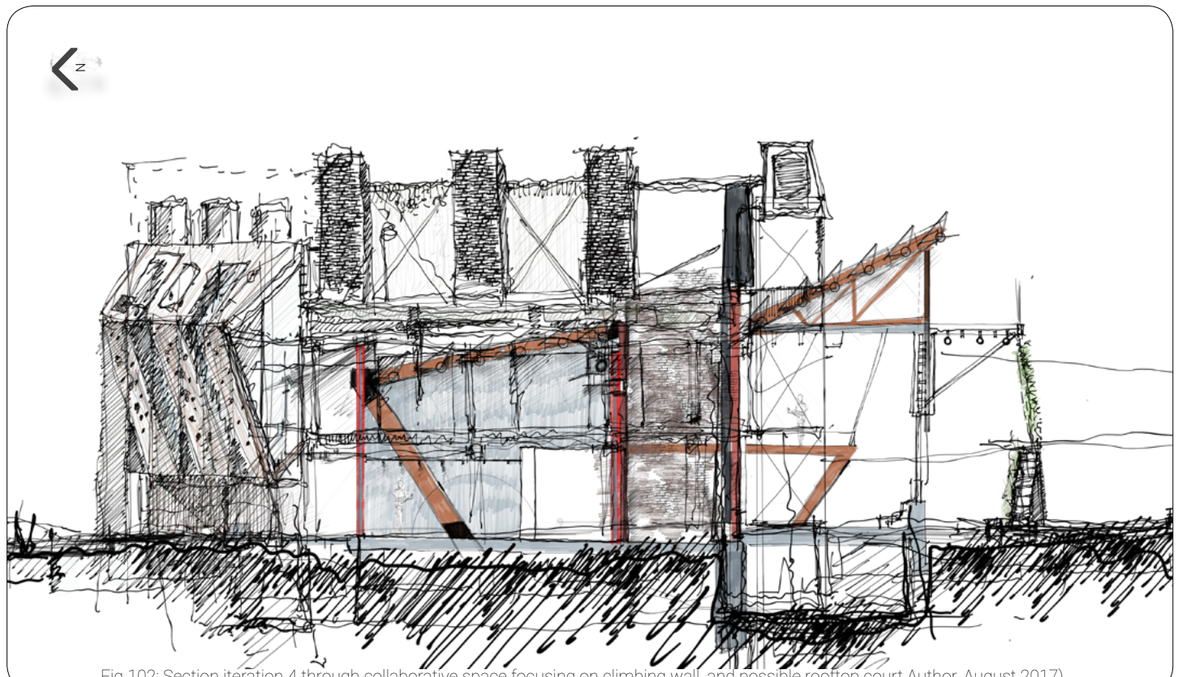
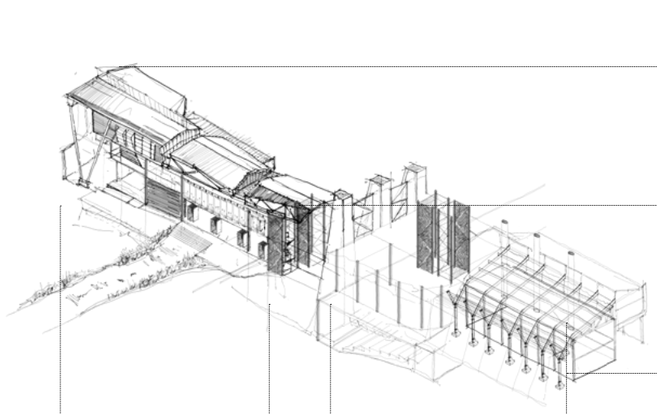


Fig 102: Section iteration 4 through collaborative space focusing on climbing wall, and possible rooftop court Author, August 2017)



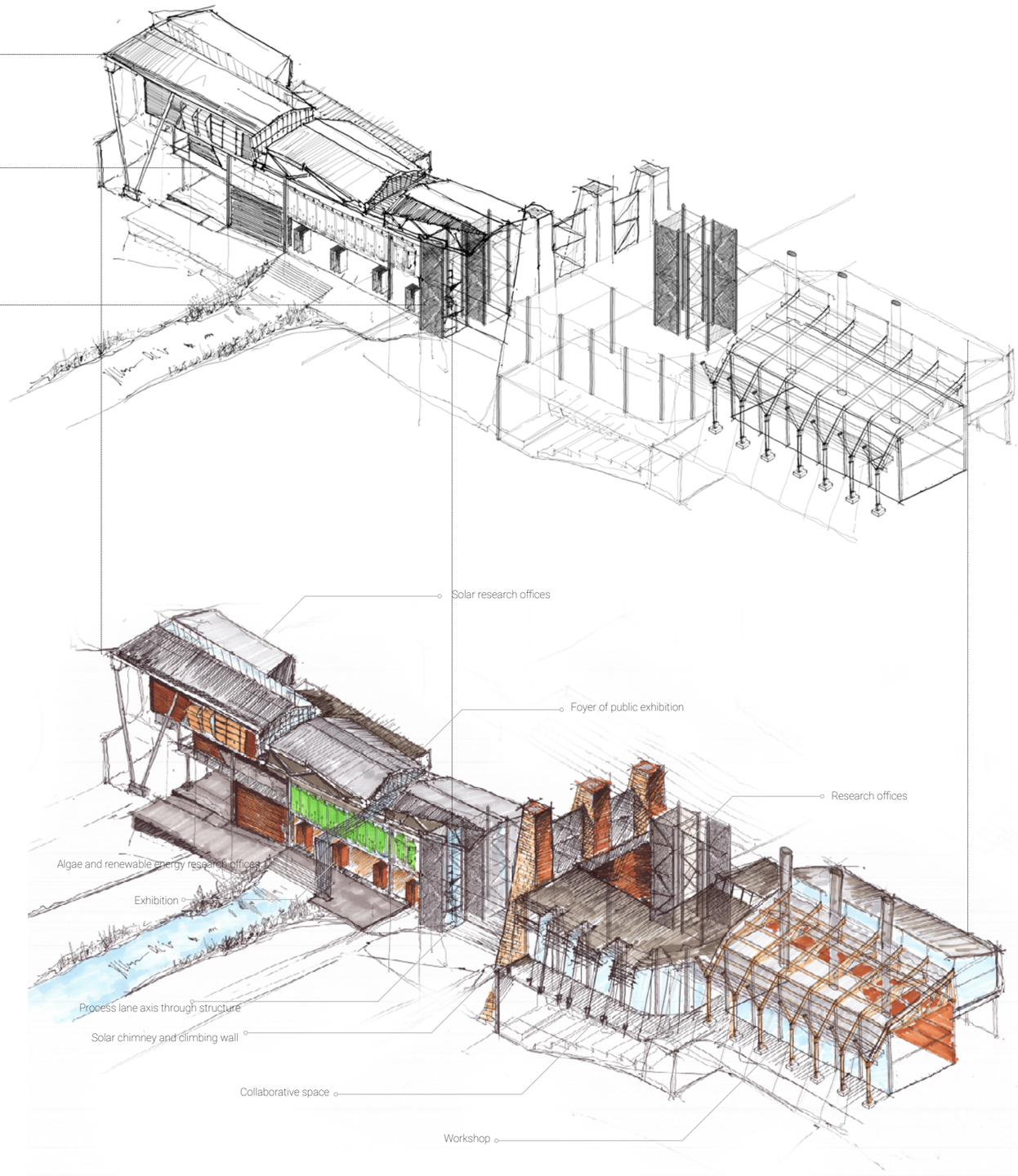


Fig 202: Axonometric exploration July crit Author, July 2017)

Fig 203: Section iteration sketch 1 July crit (Author, July 2017)



Fig 204: Section iteration sketch 2 (Author, August 2017)

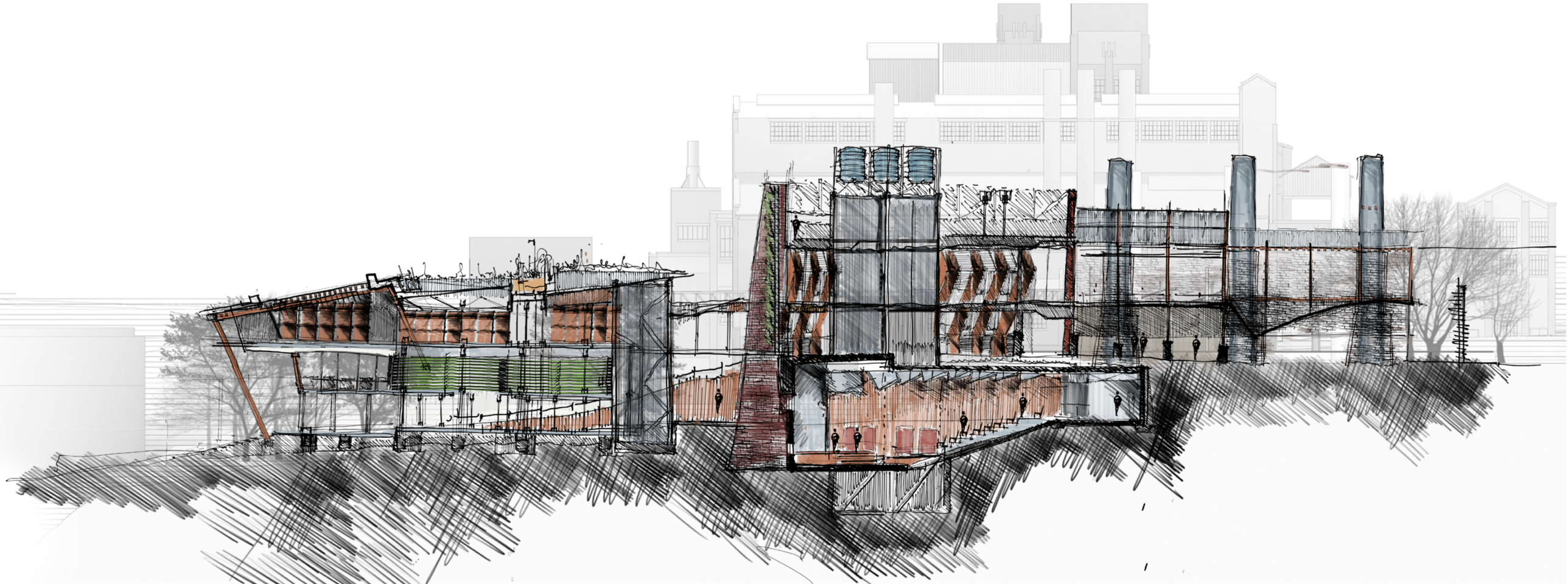


Fig 205: Section iteration 3 sketch (Author, September 2017

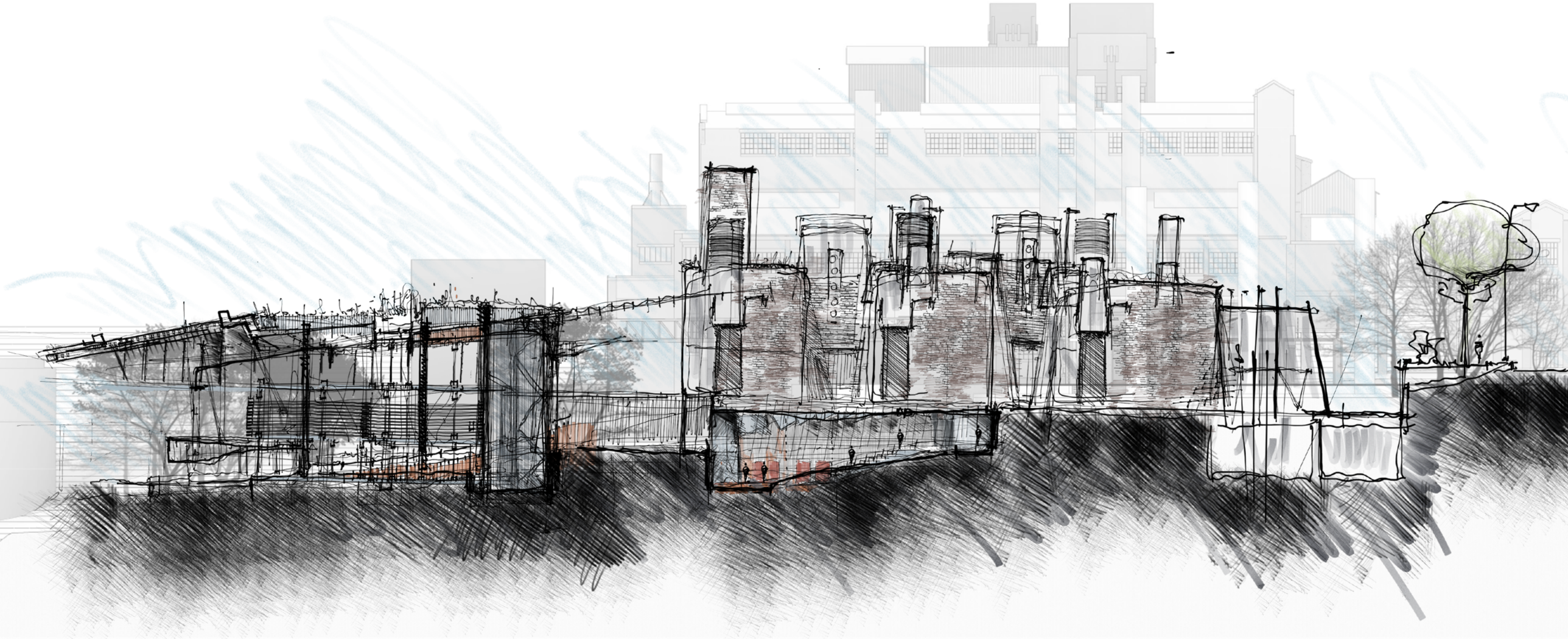


Fig 206: Section iteration sketch (Author, September 2017)



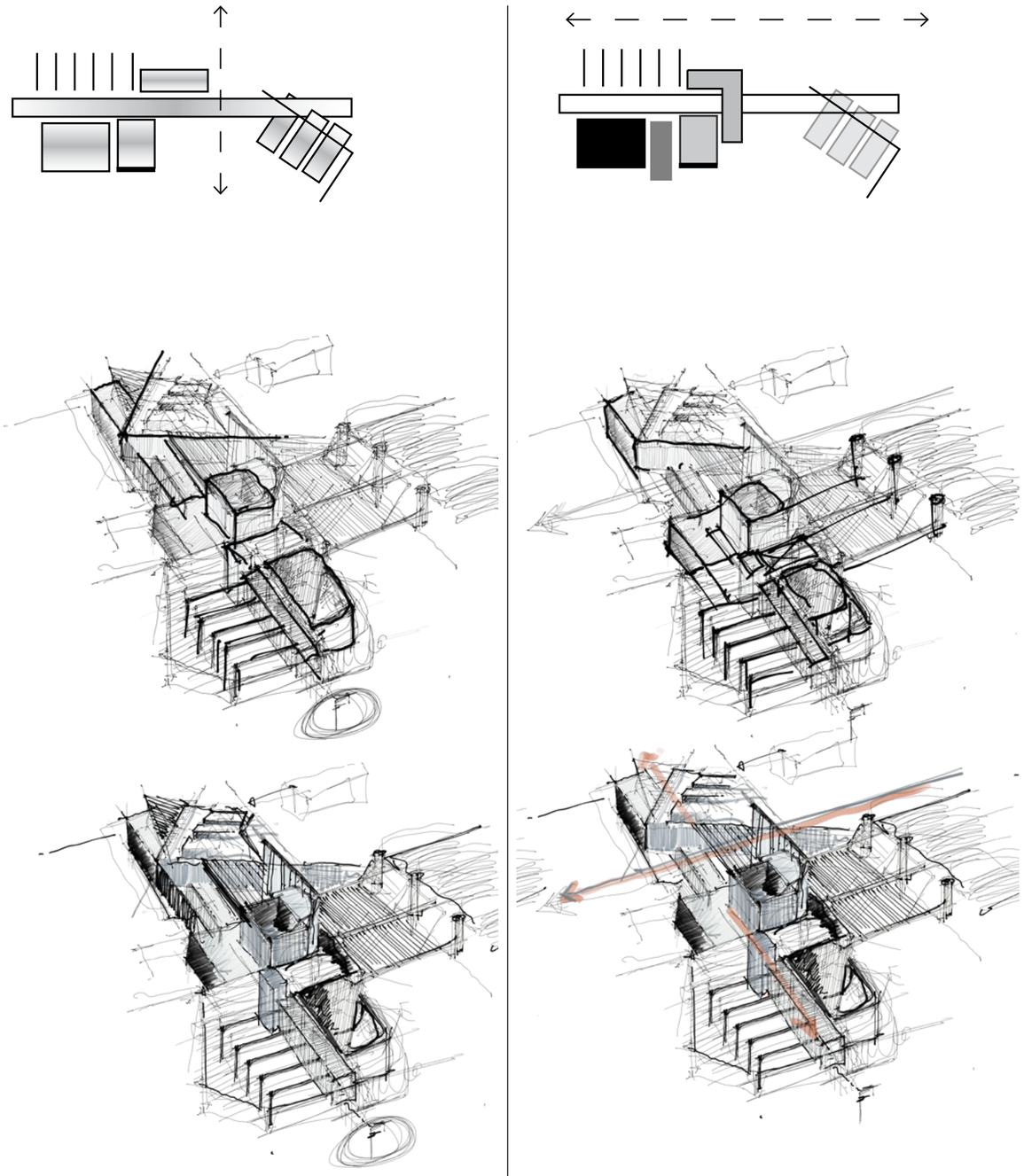


Fig 207: Creating an architectural language: axonometric geometry sketch iteration 1 : focusing on central axis and changing structure from south to north (Author, October 2017)

Fig 208: Axonometric geometry sketch iteration 2 : focusing on exhibition through structure and changing structure from west to east (Author, October 2017)

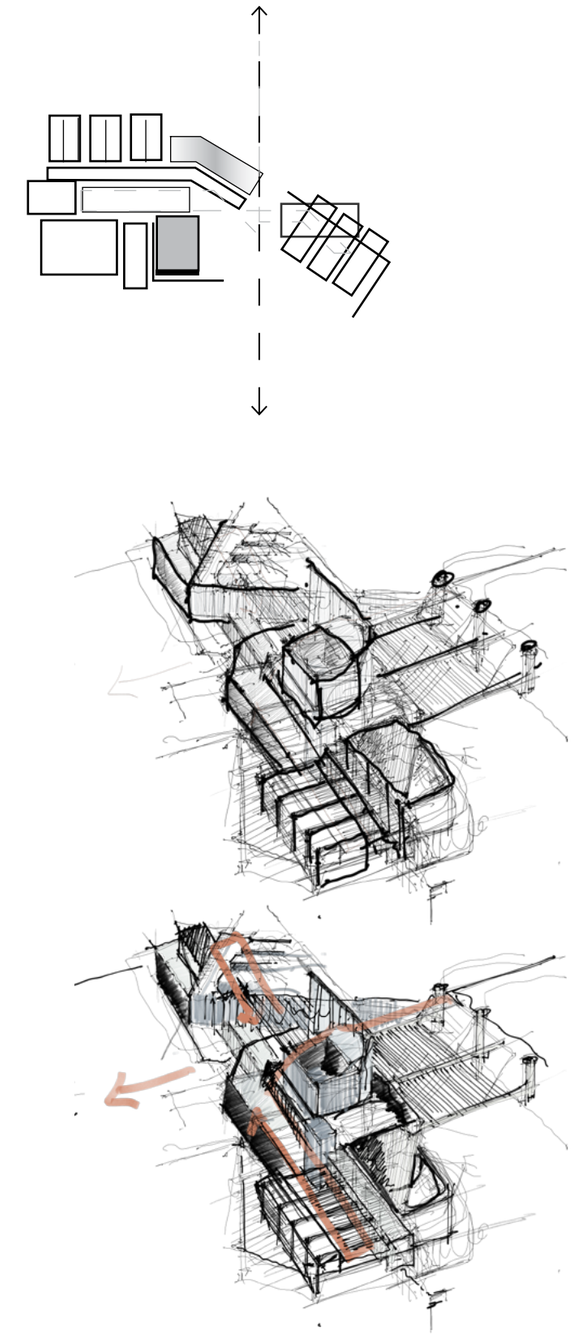


Fig 209: Axonometric geometry sketch iteration 3 : focusing on northern collaborative space and exhibition through structure connecting process lane axis. Creation of a research pod (Author, October 2017)

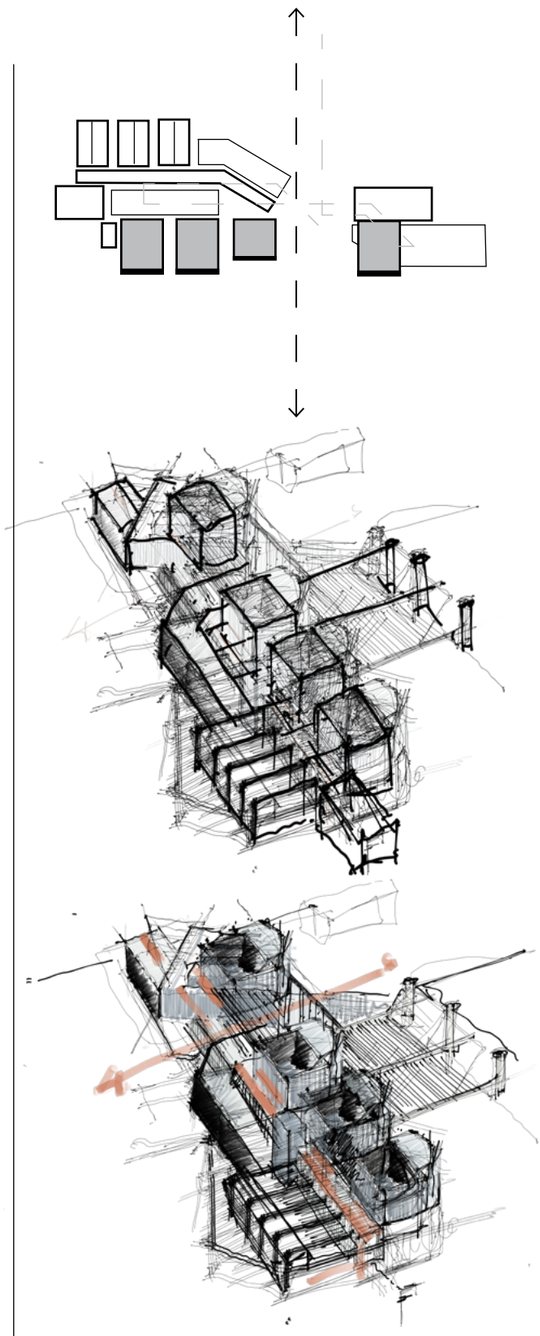
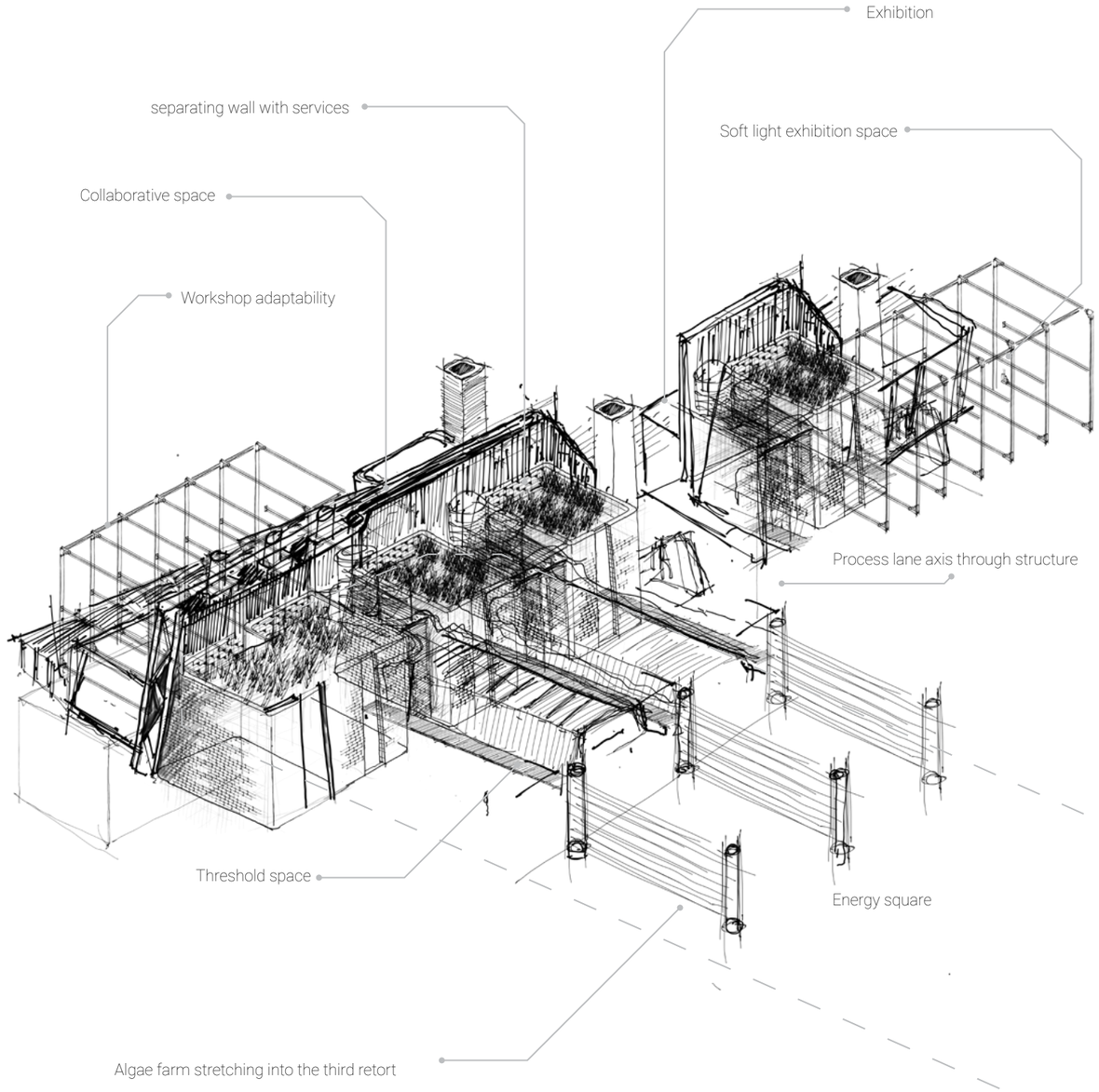


Fig 210: Axonometric geometry sketch iteration 4 : focusing on research pod multiplication and mixing with exhibition movement. (Author, October 2017)



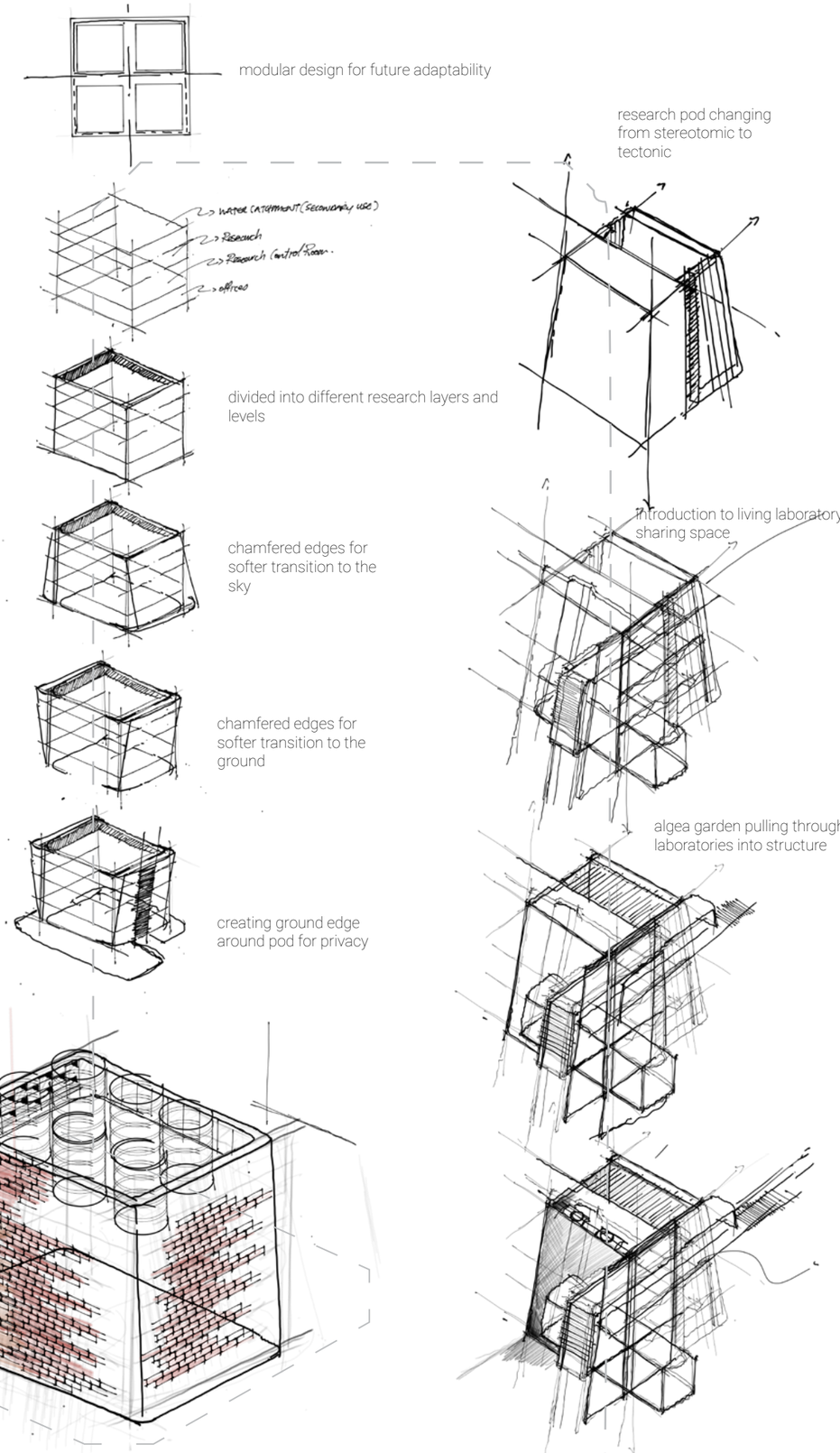


Fig 211: Axonometric sketch iteration : focusing on process integration(elaboration in chapter 3)- extraction of research pod for technical development (Author, October 2017)

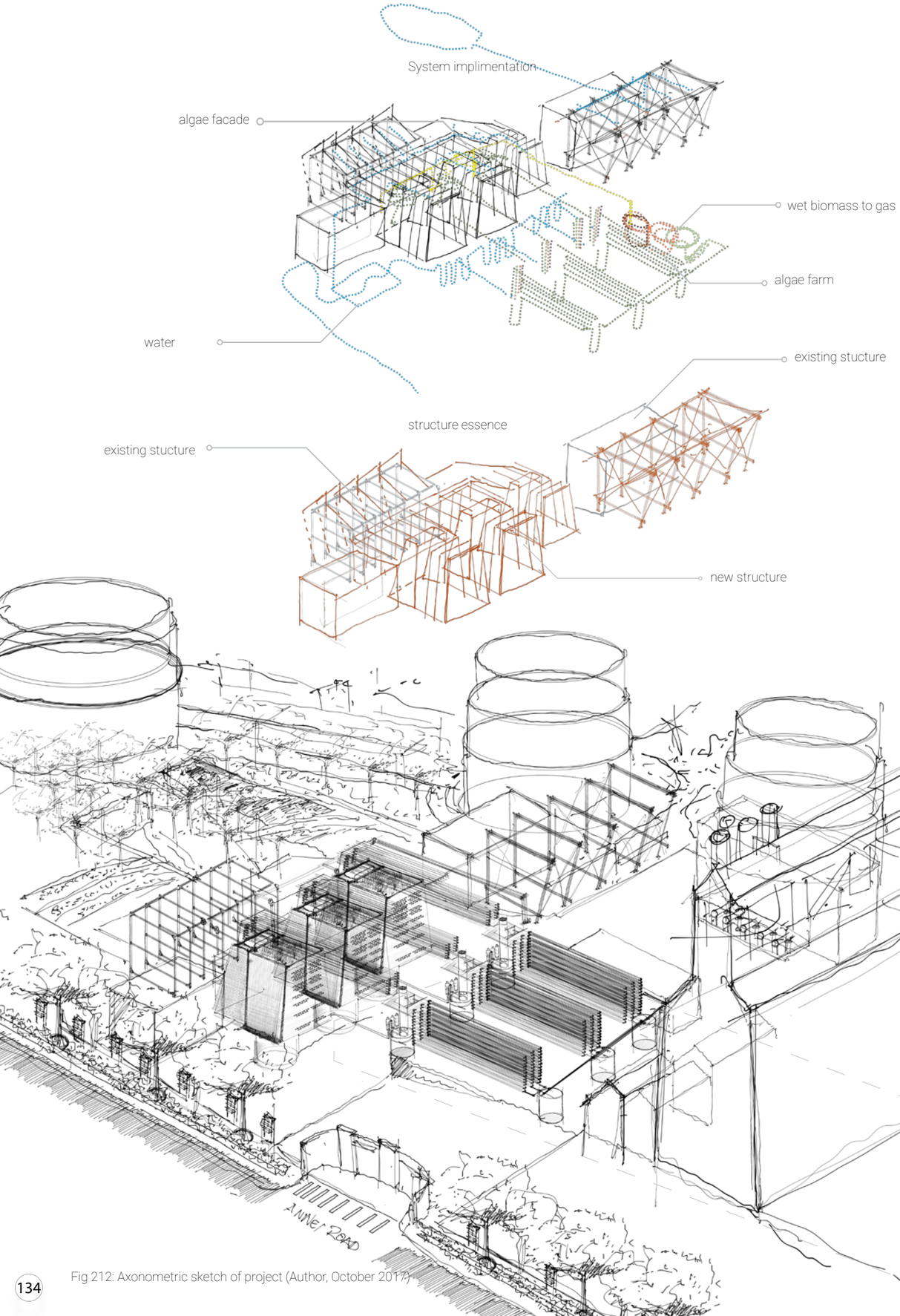


Fig 212: Axonometric sketch of project (Author, October 2017)

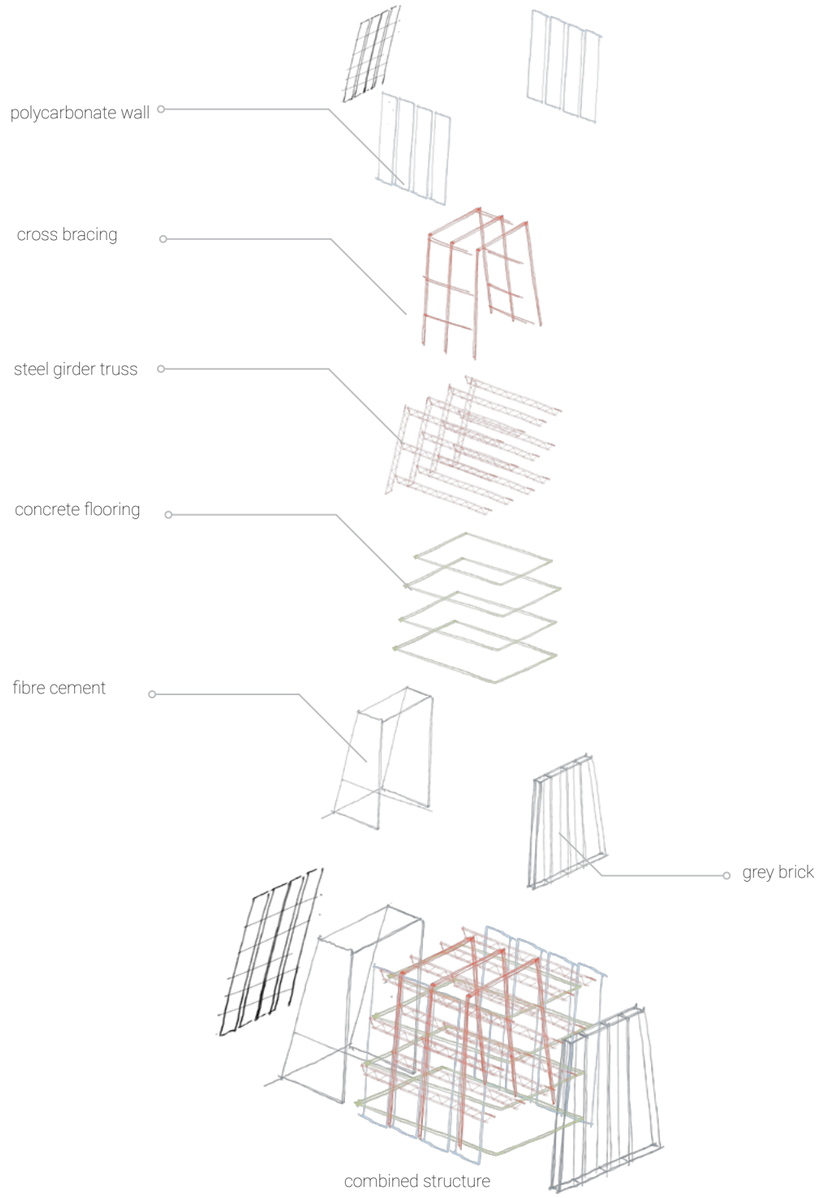


Fig 213: Axonometric sketch of pod for technical resolution (Author, October 2017)