

## **AN AIRFIELD IN THE NORTHERN CAPE LANDSCAPE**

**EXPLORING MEANINGFUL PLACE-MAKING TO ESTABLISH  
A GLIDING CLUB THAT RELATES WITH DOUGLAS.**

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## DECLARATION

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This dissertation is submitted in partial fulfilment of the requirements for the degree M. Arch. (Professional) at the Department of Architecture, Faculty of Natural and Agricultural sciences, University of the Free State.

The research and work in this document is my own, unless acknowledged otherwise.

The work contained in this thesis has been submitted for proof-reading and editing by Ms. I. Kluyts.

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## PREAMBLE

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The inspiration for this dissertation comes from a personal love for my hometown, Douglas, located in the Northern Cape, 100 km south-west of Kimberley, South Africa. My curiosity drove me to explore what a contemporary architectural language might look like in such a rural town. Also, I wonder what an architect's way of thinking can contribute to such a community. The exploration of the spirit of place of Douglas provides the parameters for this design dissertation; to create a space that becomes a meaningful place that celebrates the complexity of Douglas. The uniqueness of this rural town lies in the fact that it is an oasis in contrast to the surrounding cosmic landscape.

Annually, people travel to Douglas to engage in the adventurous act of gliding. The proposed site, the Douglas airfield, located 3 km from the town on the farm Backhouse, becomes a threshold that introduces people from different backgrounds to the dwellers of Douglas through this technologically sophisticated sport. The aim of the study is to develop the airfield so that it can facilitate the World Gliding Championships (Fédération Aéronautique Internationale, 2019: online), which could stimulate growth, allowing the opportunity to present the uniqueness of this place, and the people who settle here, on a global scale.

I will first provide an overview of Douglas to orientate the aims of the dissertation. A deeper investigation will follow, allowing a broader understanding of the place and the people who dwell there. Exploring the historical narratives and the complex traces of the dwellers of and travellers through Douglas will allow the creation of a place with which both the dweller of and traveller to Douglas can identify.

# TABLE OF CONTENTS

---

Introduction .....	6	2.3. Site Investigation .....	24
Research Methodology .....	7	2.3.1 Regional Map.....	24
Part 1.....	8	2.3.2 Meso Map of Douglas.....	25
1.1. The Location .....	10	2.3.3. Douglas and the Neighboring Towns.....	26
1.1.1. The town .....	10	2.3.4. The Town of Douglas .....	27
1.1.2. The airfield.....	11	2.3.5. The Pioneers of Douglas.....	29
1.2. The Client .....	12	2.3.6. Analysis of the Site .....	31
1.2.1. General management .....	12	3.4. How a Sailplane Works.....	37
1.2.2. Restaurant .....	12	3.4.1 Building a aircraft.....	38
1.2.3. Gliding Centre South Africa .....	13	3.5.The concept of place .....	40
1.2.4. Jonker Sailplanes .....	13	Part 3.....	42
1.2.5. Crop Dusters.....	13	3.1. Design Development .....	43
1.3. Accommodation List .....	14	3.2. Northern Cape Legislature Building.....	44
Part 2.....	16	3.3. First Endeavor .....	45
2.1. The Touchstone .....	18	3.4. Second Endeavor.....	48
2.2 Concepts.....	20	3.5. Third Endeavor .....	50
2.2.1. Adventure.....	21	3.6. Fourth Endeavor.....	52
2.2.3. Landscape .....	22	3.7. Fith Endeavor .....	56
2.2.4. Oasis .....	23	3.8. David Klaaste Multipurpose Centre, .....	60
		3.9. Red Location Museum of Struggle, .....	61
		3.10 Towards a Final Design.....	62

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Part 4.....	88	4.4. Structure .....	112
4. Technical Report .....	89	4.4.1 Structural Development.....	113
4.1. The site analysis .....	90	4.4.2. Vitsoe HQ and production building, .....	114
4.1.1. Cadastral Information.....	90	4.4.3. Structure used for the Factory.....	115
4.1.2. Topographic Analysis .....	92	4.4.4. Boat Hangar, .....	116
4.1.3. Climatic Information.....	95	4.4.5. Hangar H16,.....	118
4.1.4. Geo technical Analyses.....	97	4.4.6. Structure used for the Hangars. ....	119
4.2. Sustainability.....	98	Reflection .....	120
4.2.1 The Sustainable City .....	99	List of References (Design) .....	122
4.2.2. Passive Systems .....	100	List of References (Technical Report).....	124
4.2.3. Water harvesting systems .....	102	Addendums .....	126
4.2.4. Photovoltaic panels .....	104	Similarity report.....	126
4.3. Materiality .....	105	Proof Reader Declaration.....	127
4.3.1 GWK Barns .....	106	Surveyor General Diagram of Backhouse (no. 149) .....	128
4.3.2 Barn on Atherton Farm.....	107	Surveyor General Diagram of Portion 21 .....	129
4.3.3. Historic Houses in Douglas.....	108	Documentation drawings.....	130
4.3.4 Material Selection.....	109		

# INTRODUCTION

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The inspiration for this dissertation comes from a personal love for my hometown, Douglas, located in the Northern Cape, 100 km south-west from Kimberley. Not only is this the place where I was born and bred, but it is also the place where my heritage can be traced back by five generations. Douglas is the place where my great-great-grandfather, Hendrik Francois Cilliers (1883 - 1953) (van den Berg, 2018), started farming by irrigating his crops on the banks of the Vaal River. I am not only a representation of the current dweller in Douglas, I also represent history; a living testimony of the people who wandered this landscape where my predecessors settled and called home. It is my belief that these narratives of the past provide a complexity to the way of life in Douglas.

My curiosity drove me to explore what a contemporary architectural language might look like in such a rural town. Currently, the architecture of Douglas seems watered down in terms of its potential. The architecture becomes merely a space consisting of a floor, enclosed by walls with openings punched into it, and topped with a roof. Dwellers overcome challenges in the most convenient and affordable way possible. A growing family requiring another room would brick up the veranda, causing a climatic catastrophe for the spaces that are robbed of natural light and ventilation. If a space is hot, install an air conditioning unit. This is not such a strange occurrence; it is happening everywhere and it is the sacrifice of progress. However, it is an irreverent approach that

discounts what a building represents; layer upon layer of the dwellers' history – and this makes it horrifying.

Annually, people travel to Douglas to engage in the adventurous act of gliding. The proposed site, the Douglas airfield, located 3 km from the town on the farm Backhouse, becomes a threshold that introduces people from different backgrounds to the dwellers of Douglas through this technologically sophisticated sport. The aim is to develop the airfield so that it can facilitate and encourage this phenomenon to grow. In doing so, it allows the opportunity to present the uniqueness of this oasis that is Douglas and the people who settled in this cosmic landscape. The uniqueness of this rural town lies in the fact that it is an oasis in contrast to the surrounding cosmic landscape.

I will first provide an overview of Douglas to orientate the aims of the study. A deeper investigation will follow, allowing a broader understanding of the place and the people who dwell there. This will be done by exploring the historical narratives and complex traces of people who travelled through Douglas and the dwellers who chose to settle there. All these explorations must allow the creation of a place with which the dweller of and traveller to Douglas can identify.

This study is divided in to parts. Part one will introduce the reader to the location of the site, the client brief and the accommodation list. This is done to orientate the reader of what is to be designed and where it will be

designed. The second part will follow providing the conceptual approach that is developed from the touchstone. Next an analysis of the town Douglas and Douglas airfield will follow. A history of aviation and Douglas will then provide a deeper understanding of the place and the potential it has. Finally the ideas and aims will be brought together with the theories on dwelling by Norberg-Suldz. Part three will provide the design development discussing the challenges and how the where addressed during the design process progressing towards the final design.

# RESEARCH METHODOLOGY

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The research of this dissertation is done around the exploration of four broad problem statements relating to the fundamentals of design:

- What is the design and for whom?
- Where it is designed?
- How is the composition of the design influenced?
- How is the design constructed?

For the purpose of this study, these questions will relate to the sources of knowledge that influence the logic of type (typology), topos (topology), form (morphology) and structure/construction (tectonics).

The research originated from a personal passion for Douglas, aviation and history. The investigation aims to create a place with which the Douglas tourist and dweller can identify by engaging past narratives. To this end, different sources of knowledge were explored in an attempt to develop a design methodology specific to this design project.

## **Touchstone**

The touchstone is an abstract representation that explores the project's initial ideas and the aim of the architectural intervention. The conceptual framework is developed from the initial ideas portrayed in the touchstone.

## **Conceptual Framework**

Initial ideas are investigated through precedent, case studies and exploration grounded in theory. Translation of the conceptual framework into architectural solutions and suggestions creates an initial response for the design synthesis.

## **Site Investigation**

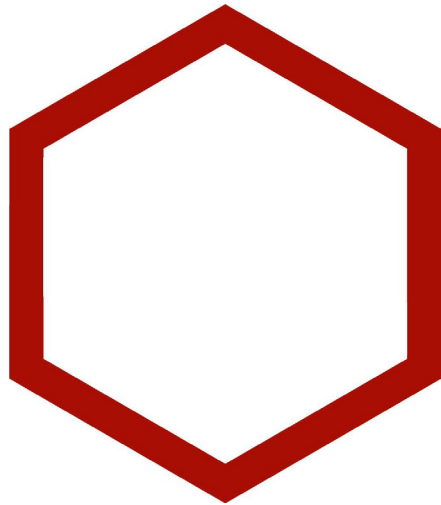
- Qualitative information: The actual measurements of the site from literature to sources like municipalities, maps, sun studies, etc.
- Quantitative data: Representative of experiential measurements of the site through site visit and exploration.
- Cognitive analysis: A phenomenological description of the site as a lived experience.

## **Interview**

Interviews with the client and individuals involved in the programme and site.

## **Critical and Creative Reflection**

Reflection through the interpretation and analysis of literature and theory.

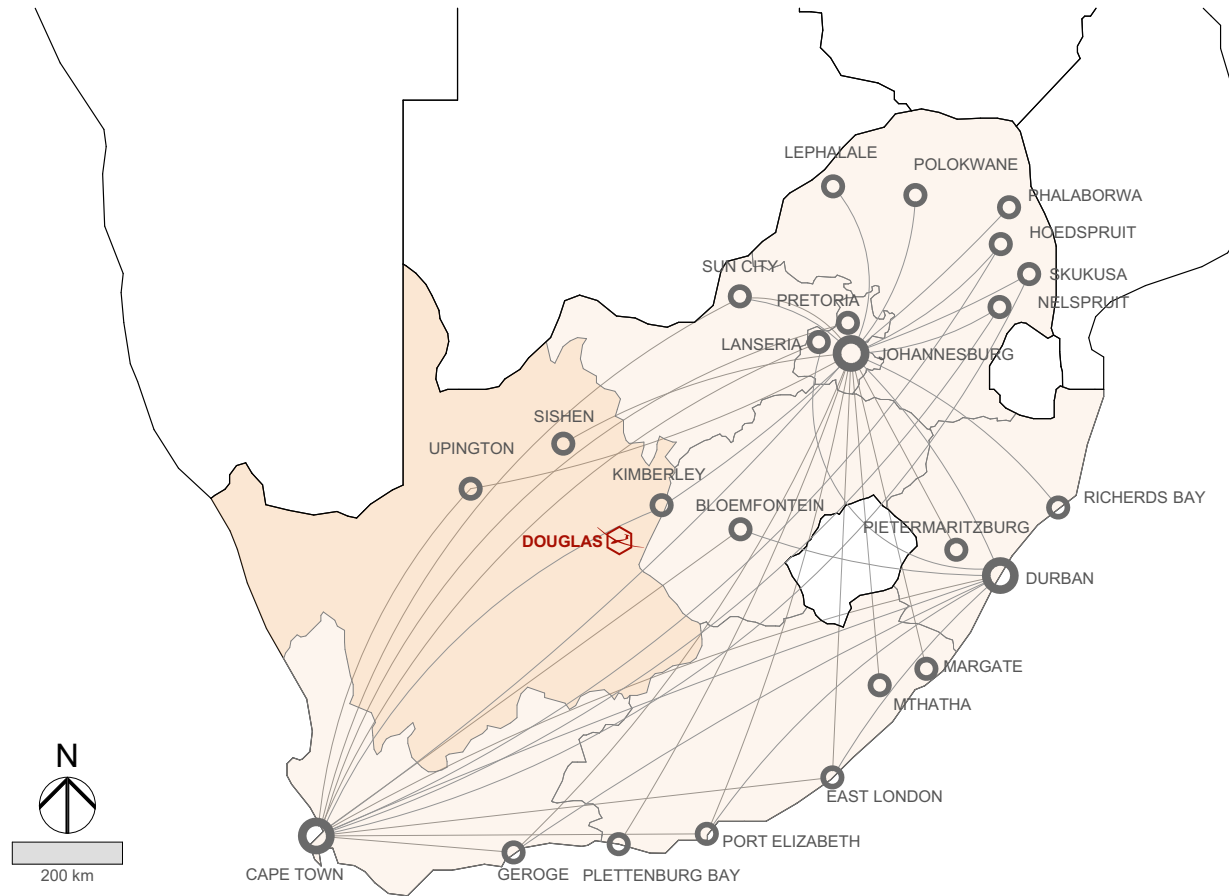


# PART 1



## 1.1. THE LOCATION

### 1.1.1. THE TOWN



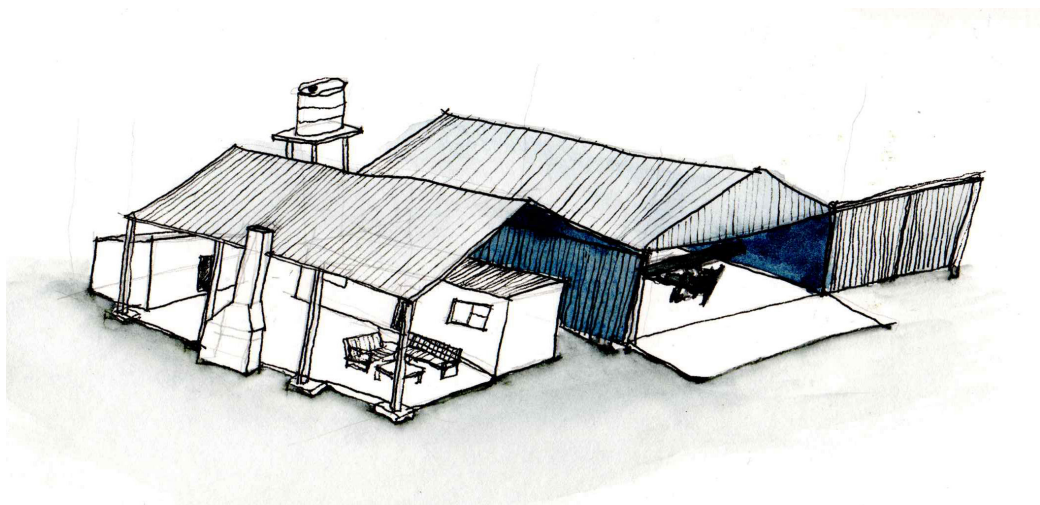
Map of South Africa indicating the project location. Adapted from maps of Cape-town international, King Shaka and O.R. Tambo Aripport.

Douglas is a central South African town, located in the Northern Cape. The town is 100 km south-west of Kimberley and 15 km from the confluence of the Vaal River and Orange River. The rivers are the lifeline in this area. Douglas has a diverse farming community along the Riet, Vaal and Orange River. The highest concentrated pivot irrigation industry is located in this area. Diamond mines are located to the south-west of the town, along the banks of the Orange River. Farmers out of reach from the waters of the rivers, especially farms on the Ghaap Plateau located north-west from Douglas, farm with livestock and game. There are two photovoltaic power plants; one is located outside Douglas and the other between Douglas and Prieska. The Head Office of the Griekwaland-Wes Koöperasie (GWK) is situated in Douglas, providing the majority of the employment in town (GWK, 2019: online). The magistrate's courts in Douglas also provide an extra complexity of judges and lawyers among the dwellers of Douglas.

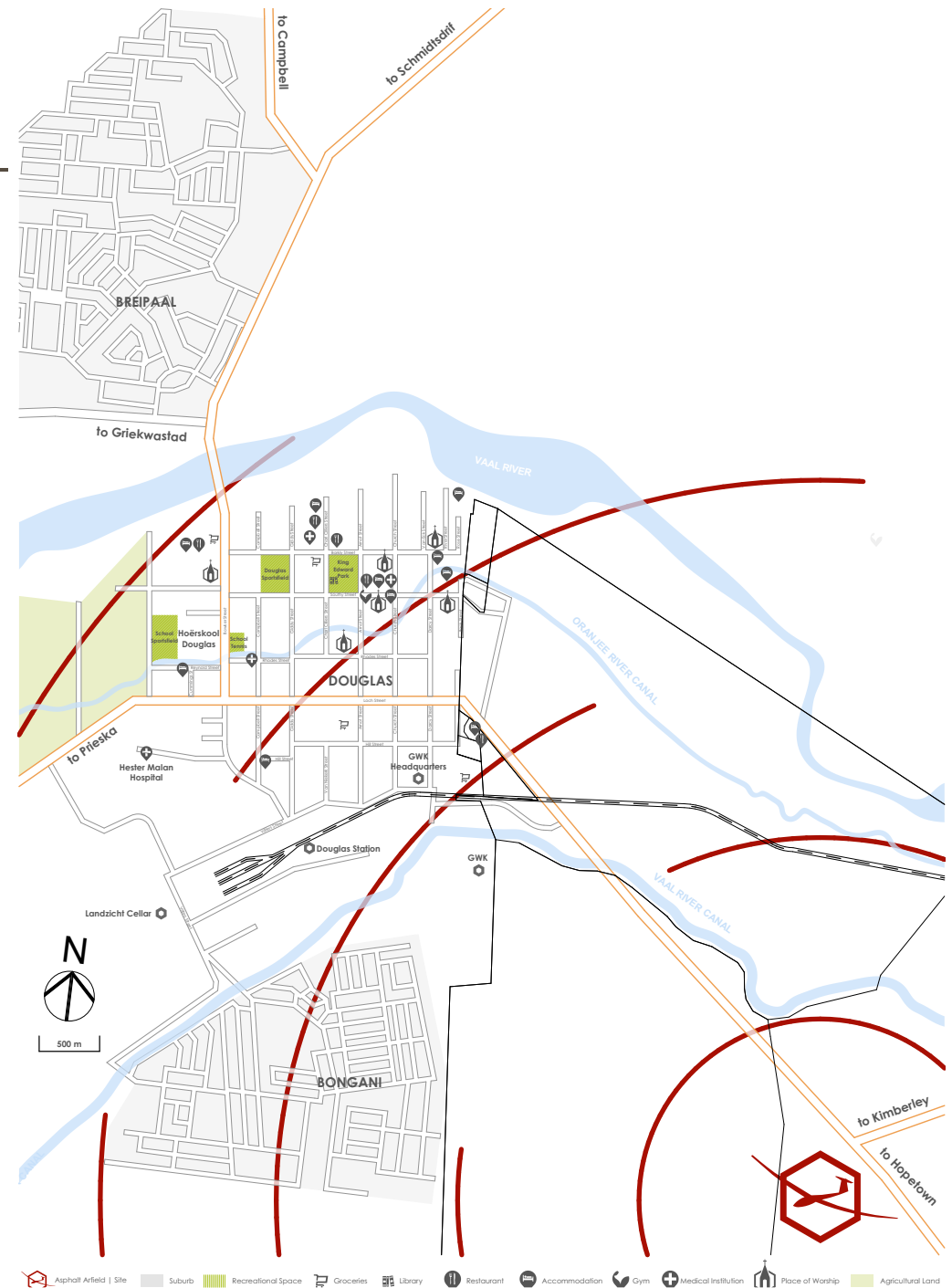
## 1.1.2. THE AIRFIELD

Douglas airfield is situated on the farm Backhouse (no. 149) 4 km from Douglas. Except for GWK's silos, the airfield is the first thing the traveller sees when he/she approaches Douglas from Kimberley. There are many airfields in the area that support the agriculture industry. Douglas airfield is, however, superior because of the fact that it has a 1,5 km long asphalt runway. The town's central location in South Africa, together with the clear airspace, provides a superior place to do gliding. The hot temperatures and developed cumulonimbus clouds provide the perfect climate conditions for sailplane gliding (Lessle, 2019).

The Douglas Backhouse airfield is registered at the South African Civil Aviation Authority in the voluntary aerodrome registry. There is one 1 500m X 12m wide runway for daylight operations only (SACAA, 2017: online), with four hangars currently in use and two hangars used by the farm owner as barns for storage. One of the larger hangars is used by the gliding club, Gliding Centre South Africa (Lessle, 2019). The other three hangars are privately owned. The proposal is to dismantle the existing structures, sell the roof sheeting and reuse the steel for the structures of the new buildings.



Existing Gliding Club Buildings. (sketch by author)



Location map. Adapted from <https://www.openstreetmap.org>

## 1.2. THE CLIENT

The client brief is determined by an interview with Mr Martin Lessle, the Chairman of the Gliding Centre South Africa, after which the accommodation list will be compiled. The aim is that the Douglas airfield will be able to facilitate the World Gliding Championships (Fédération Aéronautique Internationale, 2019: online) and other national and international championships. Facilities must be added to accommodate 500 guests, of whom 130 are competing glider pilots. The championships take place over a period of three weeks consisting of one practice week and two competing weeks (Lessle, 2019). The challenge is that such an event might take place every two years. Thus, the added facilities must be sustainable during off-seasons. The gliding season is during the warm summer months (Lessle, 2019).

### 1.2.1. GENERAL MANAGEMENT

An airfield normally consists of multiple users who all share the runway. Each of these users manage themselves, while a managing body is responsible for the management and maintenance of the general infrastructure, such as the control tower, fuel depot, runways, etc.

A secondary 1500m X 14m asphalt runway and a taxiway that connects it to the main runway will be added to accommodate the extra air traffic during a championship. There is a small terminal consisting of a control tower, reception, and administrative and management offices. Throughout the year, the directors of GWK can use the airfield to travel to meetings and conferences, and hunters from America can arrive here for their hunting trips to South Africa. If the tourism industry develops in Douglas, the terminal will also be the place to gather for chartered flights and sky diving. The terminal will also double as the reception for the accommodation and camp site.

The accommodation consists of six units that provide a total of 12 bedrooms. Ablution facilities serve the camp sites together with a communal kitchen and braai area where the travellers can gather and socialise during the evenings. In glider off-season, the accommodation will be available for weary travellers to stay overnight. The visiting hunter can also stay here overnight while waiting for his/her flight back to the international airport.

### 1.2.2. RESTAURANT

The restaurant is the common ground where the travellers and the Douglas dweller would meet and exchange stories of adventures. This will allow these two different entities, the traveller and the dweller, to broaden their understanding of each other. The restaurant will be managed by the local celebrity, Mareli Visser, the winner of KykNET's second Koekedoor competition and the host of her own TV show "Die Koektannie" (VIA, 2019: online).

Providing the travellers with a culinary experience with fresh ingredients produced from the land will expose the traveller to the culture and hospitality of Douglas. The restaurant will include a kitchen, bathrooms, a dining area and a lounge with a bar and braai.

### 1.2.3. GLIDING CENTRE SOUTH AFRICA

The Gliding Centre South Africa was established in 2013 at Douglas Airfield, and is functional every year from November to February, the months with the best weather conditions for gliding. In a normal season, about 50 pilots would come and glide here (Lessle, 2019). It claims to be “the best long distance soaring and holiday centre in the world with the best weather imaginable” . Some pilots achieve gliding distances of up to 1 250 km in one continuous flight. Other pilots attempt to improve national gliding records (Gliding Centre South Africa, 2019: online). Others would simply come and enjoy the excellent flying conditions with travellers from Europe, especially the Netherlands.

The Gliding Club will need a hangar for the gliders that will double as a briefing hall for the morning briefs before the pilots launch that day. In addition to this, it will also need a workshop for minor repairs, a lounge, bathrooms, a storage room for chairs and presentation equipment, and a water depot for the ballast tank of the sailplanes, along with storage for oxygen cylinders.



Gliding Centre South Africa logo  
(source: <http://glidingcentresa.com/>)

### 1.2.4. JONKER SAILPLANES

With sailplanes becoming a familiar sight to the dwellers of Douglas, a satellite factory of Jonker Sailplanes will allow the dwellers not only to admire the aircraft from a distance, but also to form a more significant part by manufacturing these gliders as well. Jonker Sailplanes is a South African company based at the Potchefstroom airfield that designs, manufactures, and maintains sailplanes. The company started with a team of three engineers and three technicians, who combined their knowledge to produce a sailplane that would be known as the JS1 success story. Jonker Sailplanes works closely with M&D Flugzeugbau in Germany, which allows them to pursue their dream of becoming world leaders in their product (Jonker Sailplanes, 2019: online).

The factory will consist of a reception, manager and administrative offices, boardroom, engineer’s office, staff room, storage, yard, paint room, showroom and the manufacturing area.



JONKER SAILPLANES

Jonker Sailplanes logo  
(source: <https://jonkersailplanes.co.za/>)

### 1.2.5. CROP DUSTERS

The local crop dusters are a family business at the Backhouse airfield. I propose to move this business to the Douglas airfield since there are better facilities. This client will require a hangar for their aircraft: An Air Tractor, Piper Pawnee and Cessna Agwagon. Further accommodation consists of administrative facilities, reception, workshop for small repairs, and chemical storerooms.

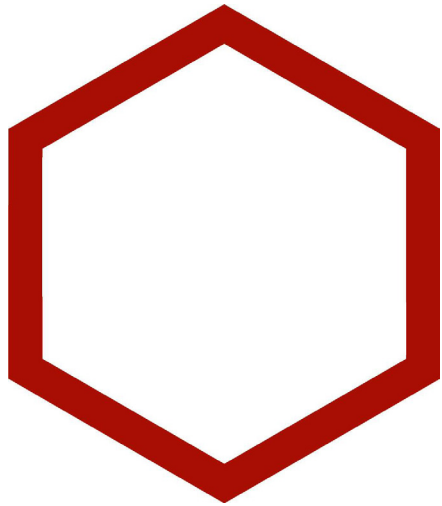
### 1.3. ACCOMMODATION LIST

<b>GLIDER HANGAR</b>	<b>1 050,3 m<sup>2</sup></b>	<b>TERMINAL</b>	<b>273,2 m<sup>2</sup></b>
Hanger	316,5 m <sup>2</sup>	Foyer	62,7 m <sup>2</sup>
Lounge	31,3 m <sup>2</sup>	Control Tower	20,0 m <sup>2</sup>
Storage	9,2 m <sup>2</sup>	Administrative Office	11,0 m <sup>2</sup>
Toilet	3,2 m <sup>2</sup>	Manager Office	19,7 m <sup>2</sup>
Workshop	17,2 m <sup>2</sup>	Medical bay	19,5 m <sup>2</sup>
Oxygen store	2,8 m <sup>2</sup>	Toilets	7,4 m <sup>2</sup>
Total Area	380.2m <sup>2</sup>	Passage	42,7 m <sup>2</sup>
		Total Area	m <sup>2</sup>
<b>CROP DUSTER HANGAR</b>	<b>885,5 m<sup>2</sup></b>		
Hangar	697,5 m <sup>2</sup>	<b>RESTAURANT</b>	<b>633,4 m<sup>2</sup></b>
Reception	29,0 m <sup>2</sup>	Dining	159,8 m <sup>2</sup>
Archive	3,4 m <sup>2</sup>	Toilet	32,0 m <sup>2</sup>
Toilet	6,5 m <sup>2</sup>	Broom Closet	5,1 m <sup>2</sup>
Workshop	16,9 m <sup>2</sup>	Lounge	105,1 m <sup>2</sup>
Hazard chemical store	9,0 m <sup>2</sup>	Bar	16,9 m <sup>2</sup>
Chemical store	20,1 m <sup>2</sup>	Liquor Store	10,4 m <sup>2</sup>
Total Area	m <sup>2</sup>	Kitchen	40,0 m <sup>2</sup>
		Wet store	6,0 m <sup>2</sup>
<b>PRIVATE HANGAR</b>	<b>678,4 m<sup>2</sup></b>	Dry store	5,7 m <sup>2</sup>
		Scullery	15,5 m <sup>2</sup>
		Manager office	10,8 m <sup>2</sup>
		Checkpoint	10,2 m <sup>2</sup>

<b>SAILPLANE FACTORY</b>	<b>1 806.9 m<sup>2</sup></b>	Service yard	51,1m <sup>2</sup>
Reception	59,7 m2		
Archive	5,9 m2	<b>ACCOMMODATION UNITS</b>	<b>80,2 m<sup>2</sup></b>
Showroom	287,2 m2	Bedroom	18,0 m <sup>2</sup>
Factory	907,2 m2	Bathroom	7,3 m <sup>2</sup>
Painting room	88,9 m2	Walk-in-closet	4,4 m <sup>2</sup>
Administrative office	19,9 m2		
Manager office	15,8 m2	<b>COMMUNAL RECREATIONAL AREA</b>	<b>141,7 m<sup>2</sup></b>
Boardroom	19,1 m2	Communal Recreation Area	105,0 m <sup>2</sup>
Toilet	29.3 m2	Kitchen	20,7 m <sup>2</sup>
Staffroom	56,6 m2	Ablution	52,6 m <sup>2</sup>
Locker room	13.2 m2		
Engineer office	87,2 m2		
Printing room	11,0 m2		
Inverter room	8,0 m2		
Compressor room	5,7 m2		



Concept sketch visualizing the design

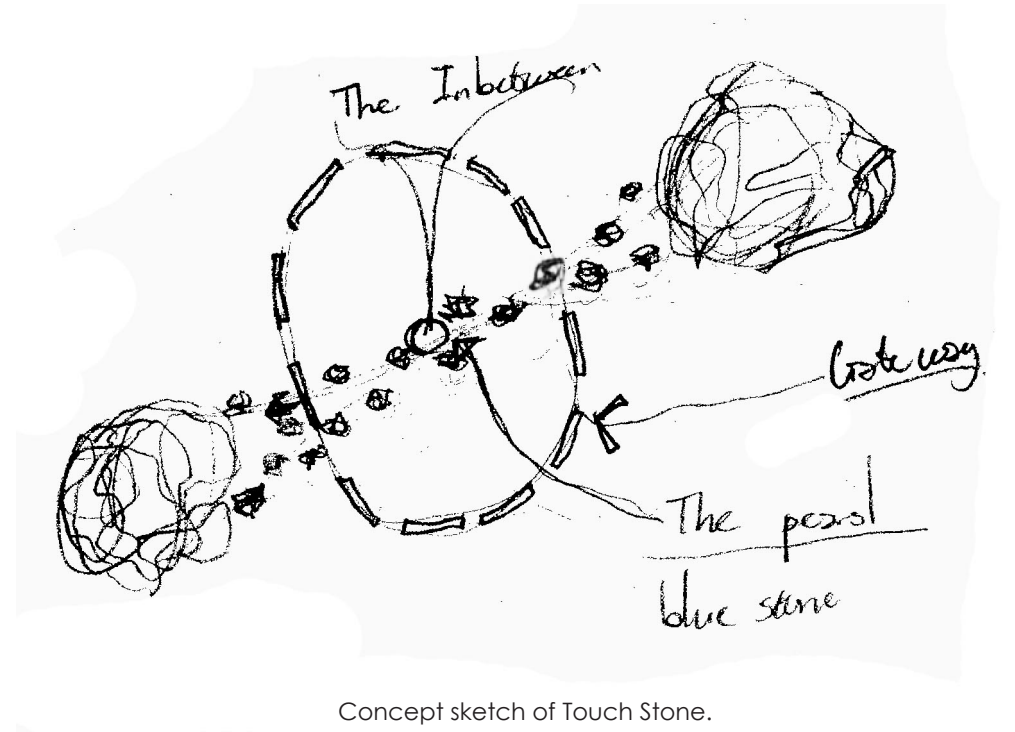


# **PART 2**

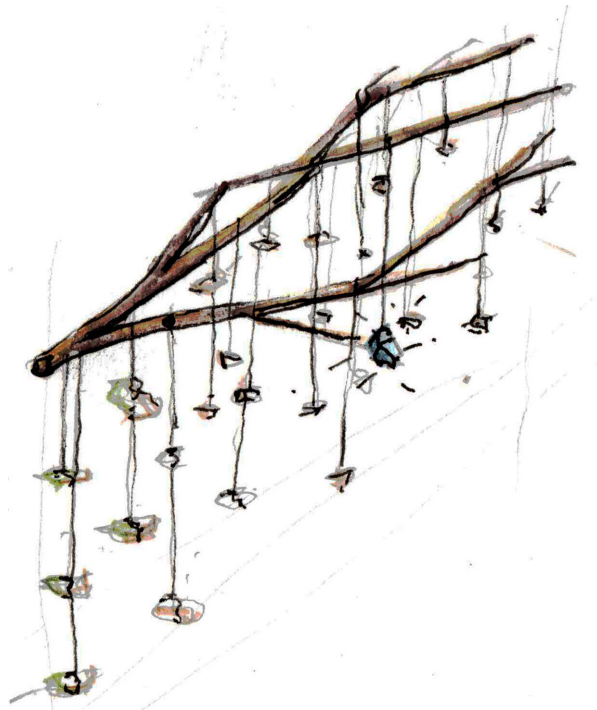




## 2.1. THE TOUCHSTONE TITLED "UNTANGLING"



Concept sketch of Touch Stone.



Throughout the year, one's thoughts tend to tangle, which leads to the need for self-reflection at the end of the year to rejuvenate and prepare for the coming year. The touchstone installation consists of a branch of a "swarthaak" (black thorn) tree with stones, collected from site, suspended from the branch with rope. The entire touchstone is suspended, creating the effect that it is defying gravity. The branch represents the idea of the rivers flowing through the landscape that are the life source of the industry in the region. Heavier stones appear more static with moss growing on them and the installation progresses from the large stones to smaller stones, which appear more dynamic and more likely to tangle. This transition reinforces the progression from heavy to light, which imitates the feeling when one is successful in untangling one's mind. In the centre, there is a blue glass stone that depicts the moment of tranquillity.

This is what the travellers will do when they visit and glide in Douglas. It is the end of the year and one travels to this particular place to share your interest of gliding with friends and family. You are on an adventure to prepare yourself for the coming year.

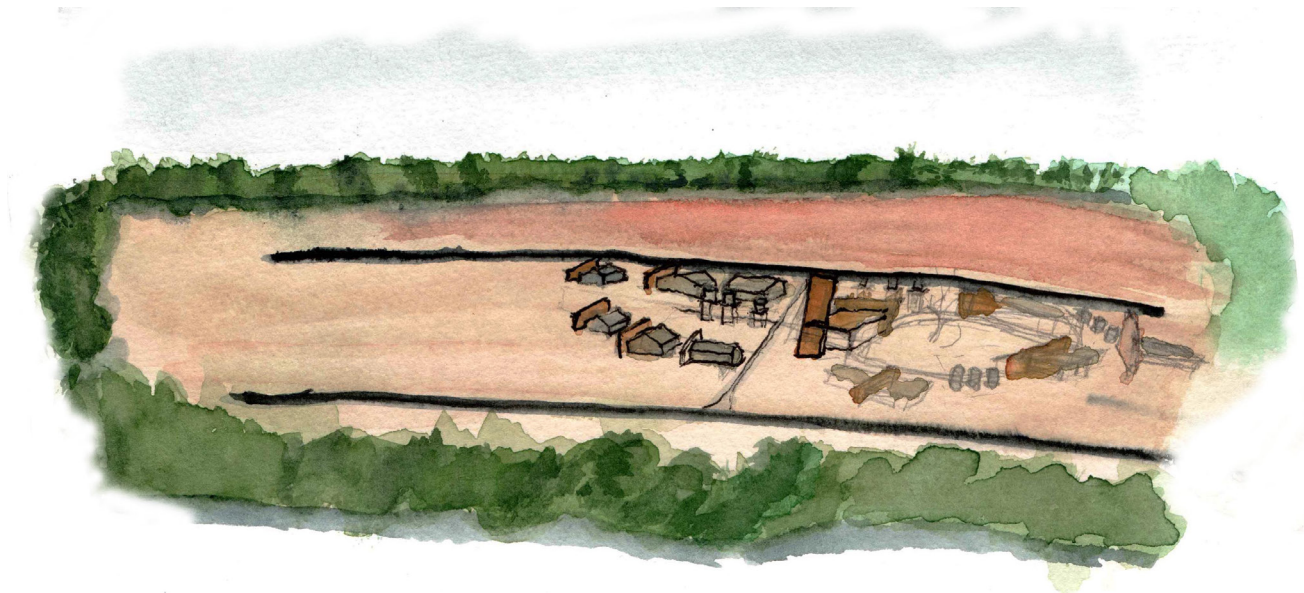
This touchstone illustrates the relationship between the earth and sky, which is one of the challenges addressed in the study. The typology of the project requires an elegant relationship between stereotomic and tectonic structures. Architecture in a cosmic landscape demands a geometric design resting heavily on earth. However, as the design is an airfield, it requires a relationship with the sky.

All the materials are from the region. The stones and the "swarthaak" branch are sourced from the site. The copper wire used for the harnesses for the rocks are stripped from old wiring from an irrigation pivot and the rope is bought from GWK.

## 2.2 CONCEPTS

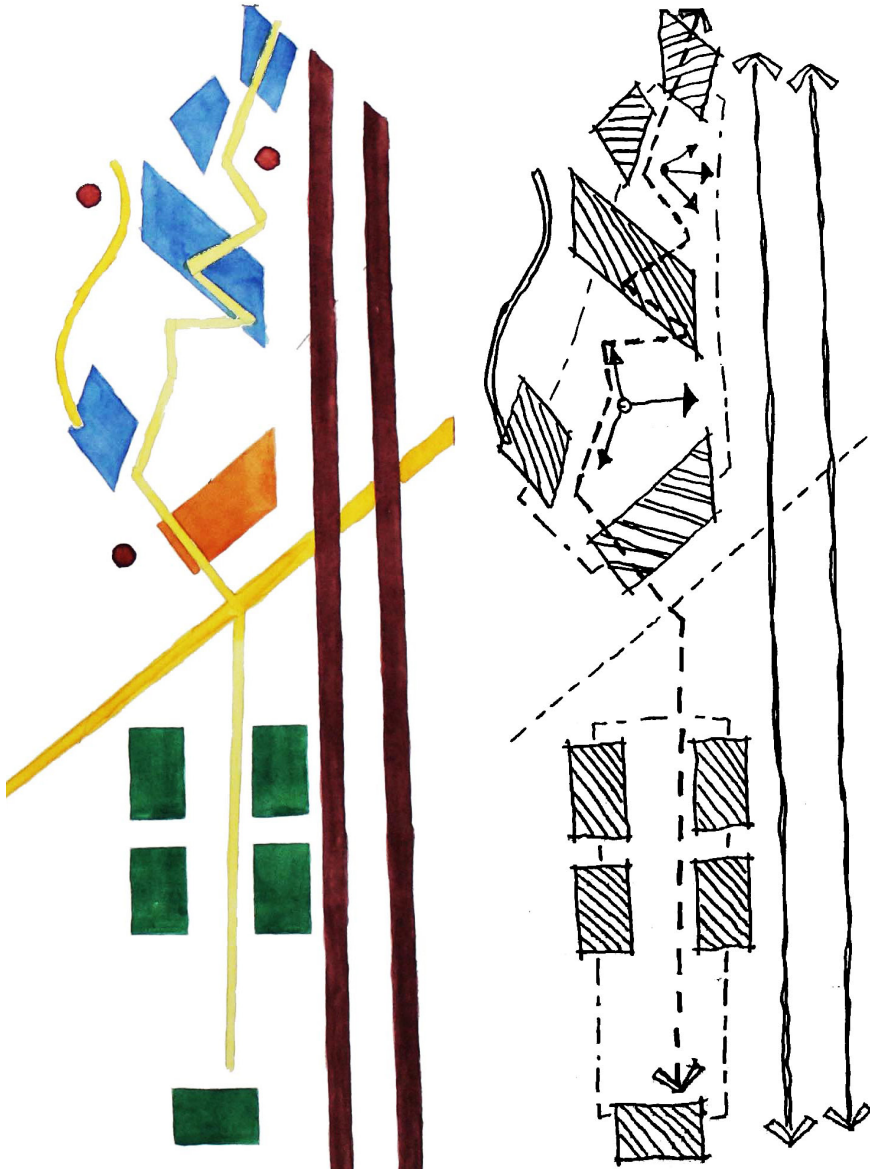
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The next step is to develop the abstract ideas of the touchstone into concepts that can be placed on to the site. There is a total of three concepts exploring different approaches to the design. Different layouts are explored using the runways (red lines), the public spaces (blue masses) and the private spaces (green masses). The terminal with the control tower is located in the centre, becoming a beacon within the landscape. The typology of an airfield provides the opportunity to develop a aerial view which can be experienced by the approaching aircraft.



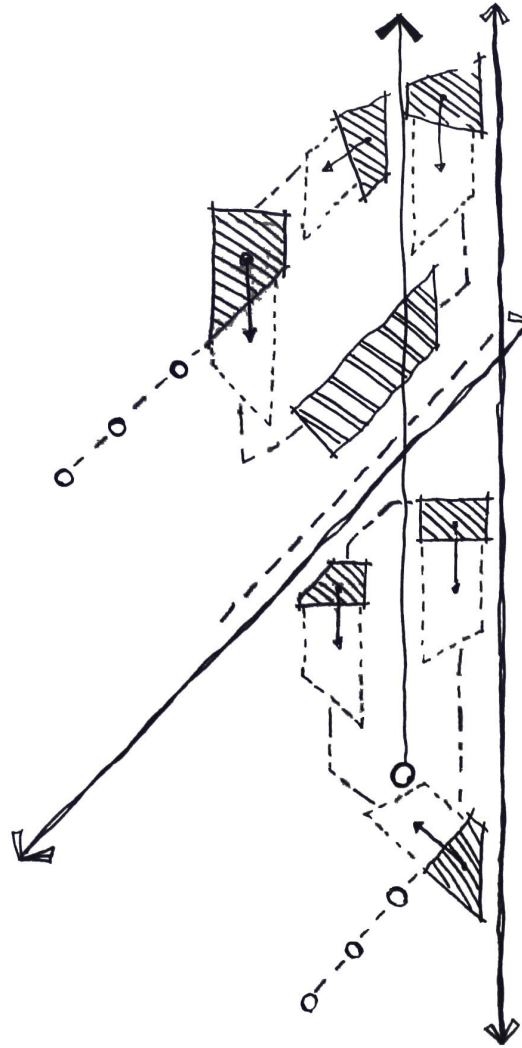
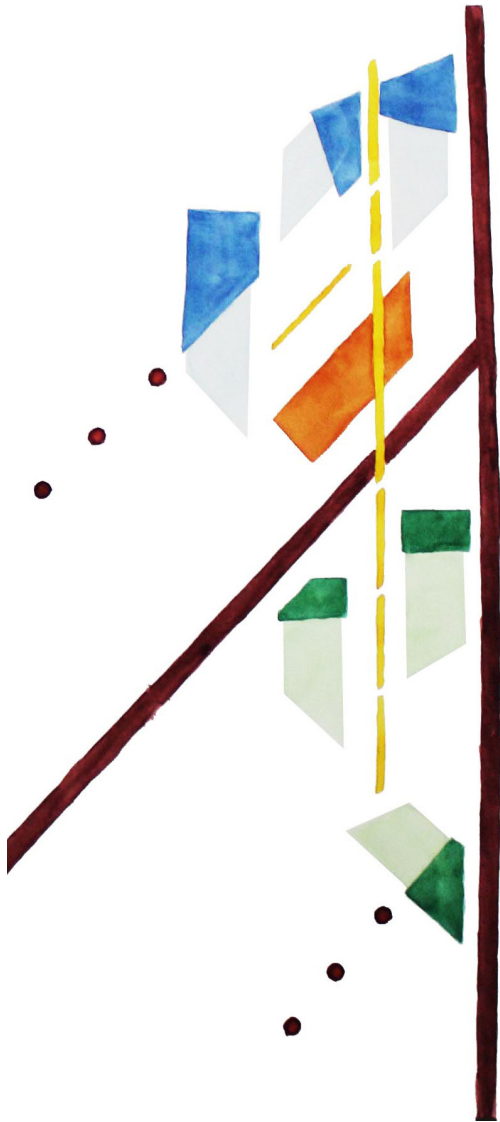
Concept sketch visualizing the design

## 2.2.1. ADVENTURE



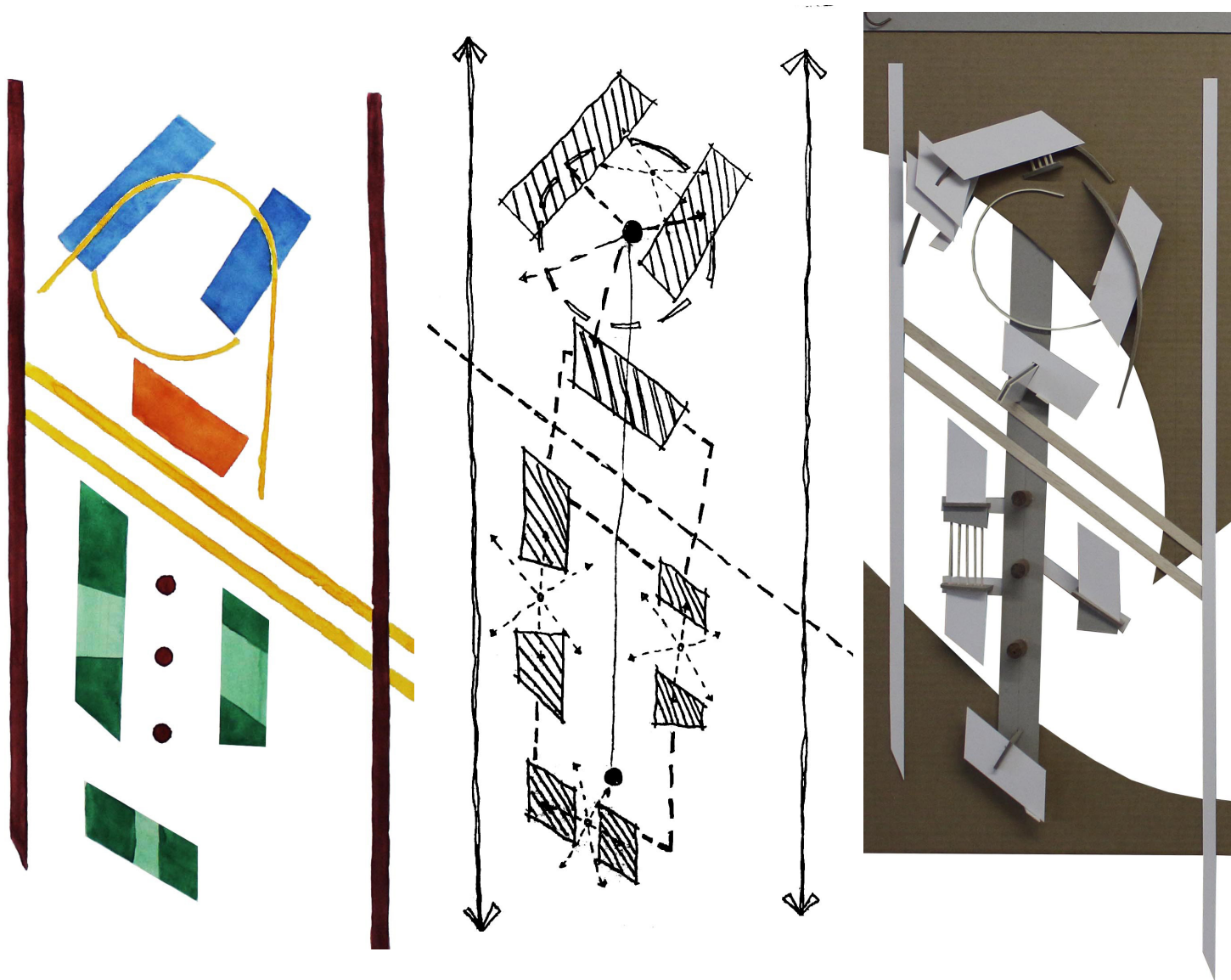
Gliding is an adventure. You climb in to your aircraft and you are towed into the air and when you release the line you are dependent on the natural elements to keep you and your aircraft airborne. One does not know where you will venture and what you will see. This concept explores design that is organised along a route that is more dynamic in the public spaces and pacified in the private spaces. The user can travel along this route discovering different spaces.

## 2.2.3. LANDSCAPE



This concept is a geometrical design with masses resting heavily on the earth and roof structures spanning in to the sky. The masses are clustered around courtyards creating micro climates to shelter the user. These courtyards will also double up as gathering spaces.

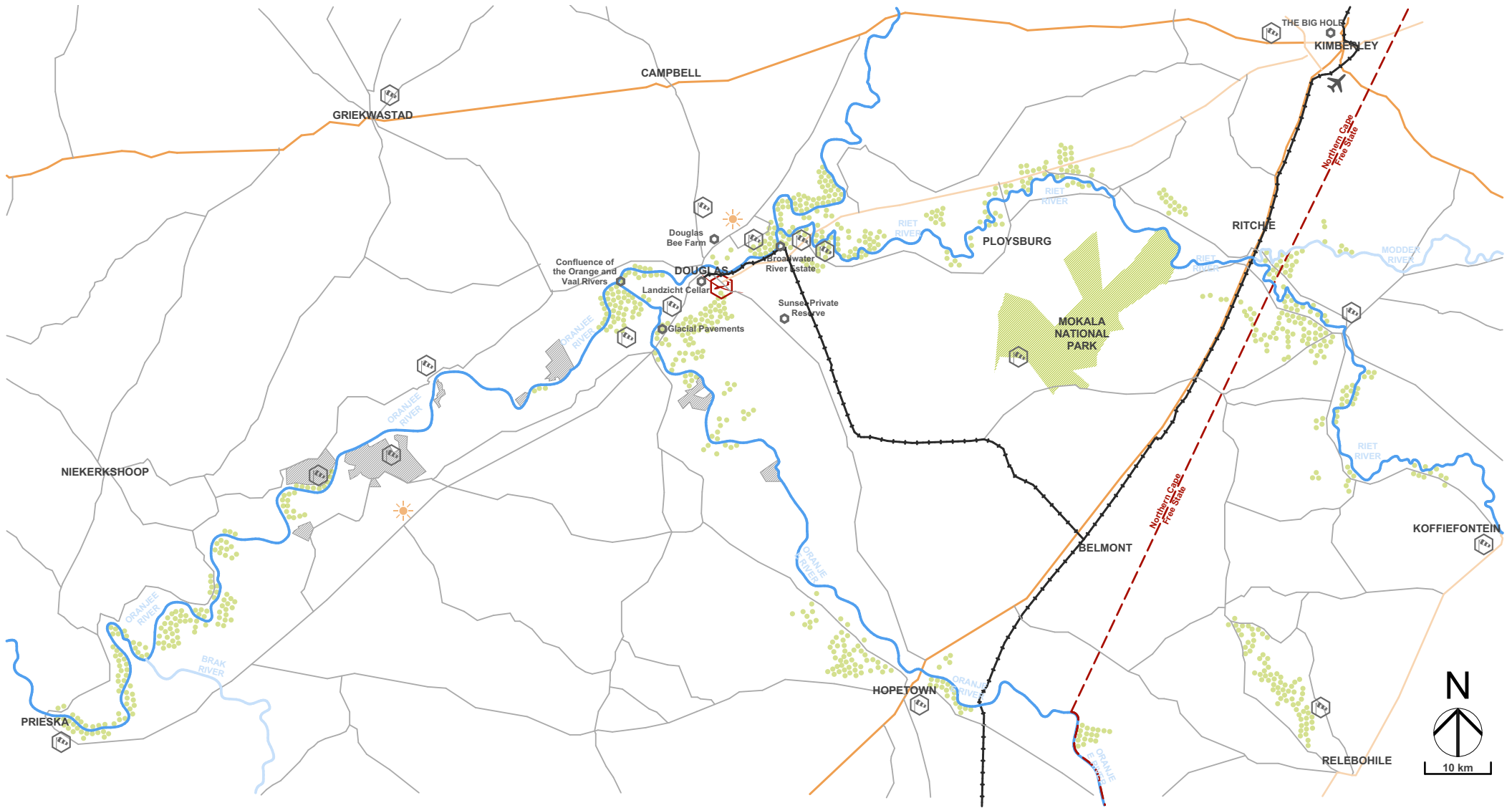
## 2.2.4. OASIS



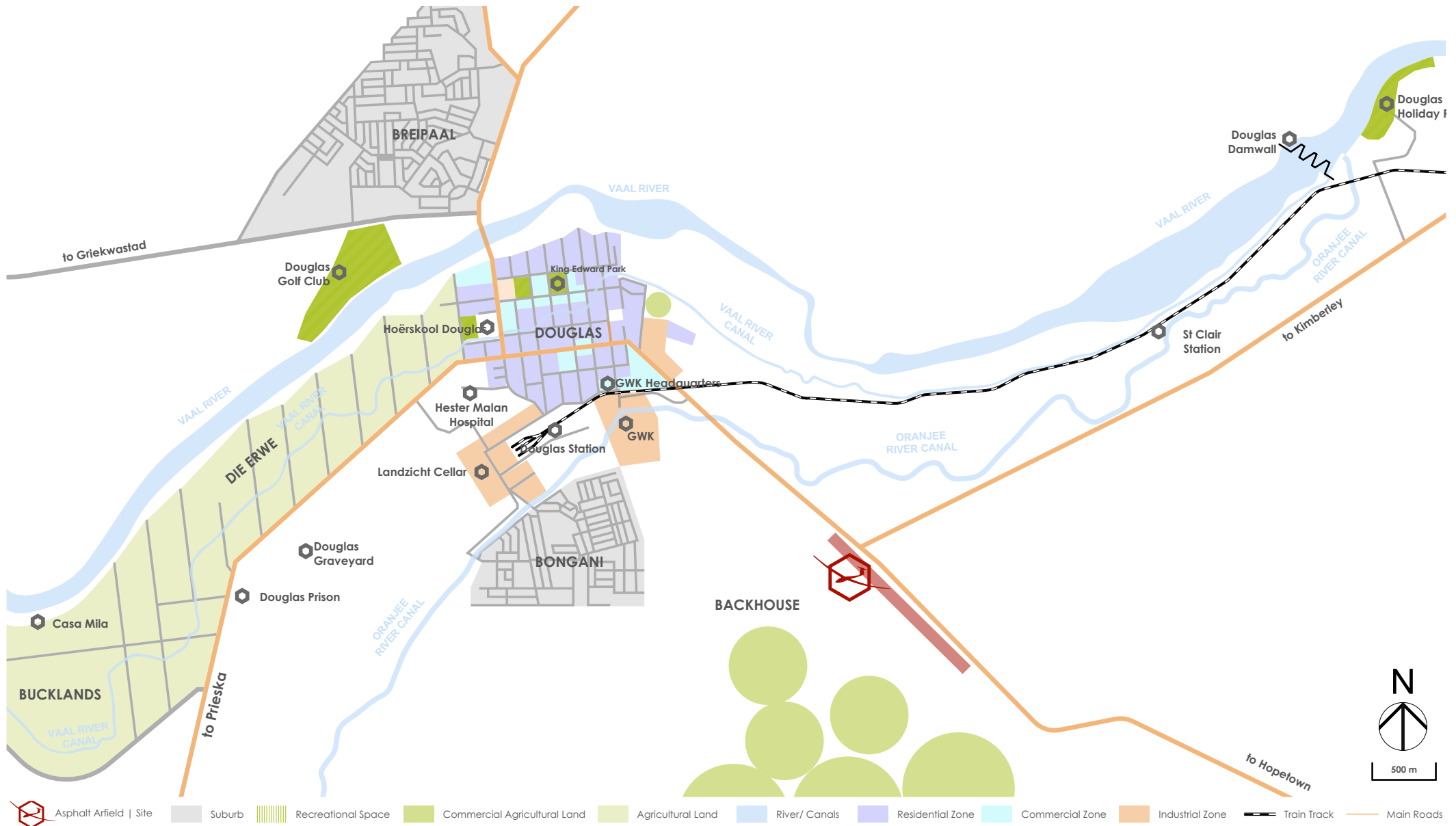
In the Northern Cape settlement grow around a water source. Douglas is able to contrast the arid landscape because of the presence of the rivers, providing the water on which the industry there is dependent on. The river is also the place to find relief from the heat after a day of hard work. The person travelling here to glide is also looking for a chance to break away and rejuvenate. Gliding in the cool atmosphere like an eagle seems like the perfect sanctuary. The focus of this concept is to provide a courtyard space where the dweller and traveller can gather and find shelter. From this main courtyard the rest of the design will follow. The design is nestled between the two runways, with the taxiway forming a threshold between the public and private spaces.

## 2.3. SITE INVESTIGATION

### 2.3.1 REGIONAL MAP



## 2.3.2 MESO MAP OF DOUGLAS



Map of Douglas with point of interests. Adapted from <https://www.openstreetmap.org>

### 2.3.3. DOUGLAS AND THE NEIGHBORING TOWNS

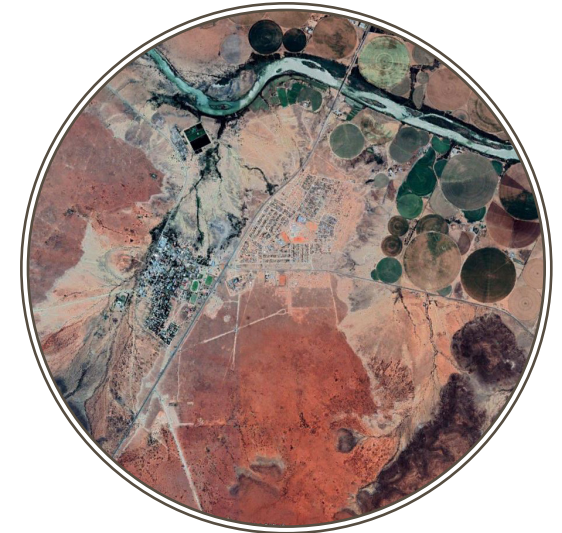
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**DOUGLAS**



**PRIESKA**



**HOPETOWN**



**CAPBELL**

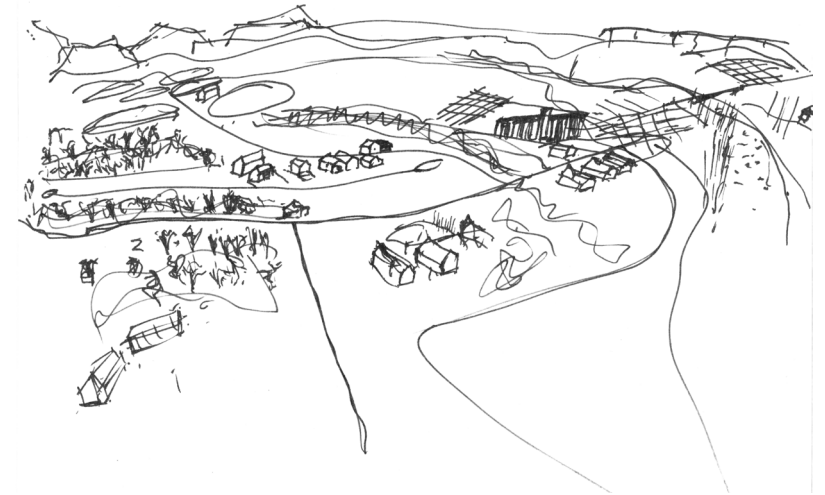
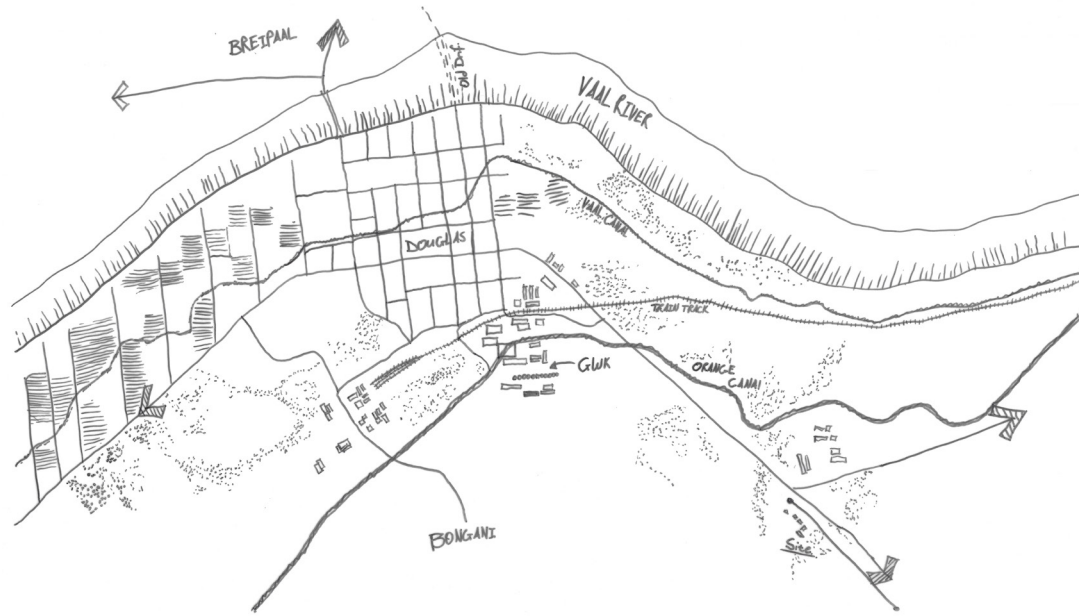


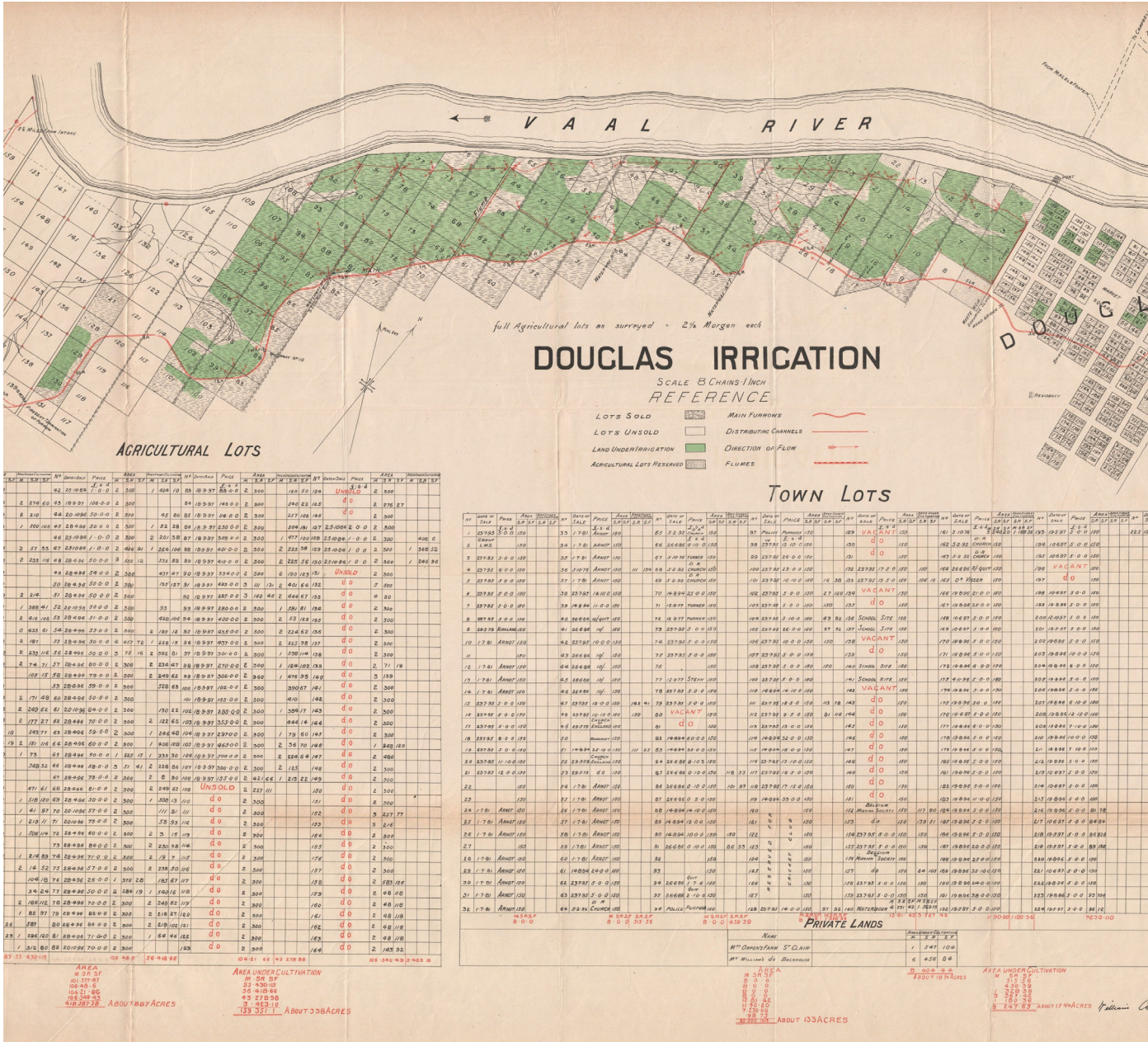
**GRIEKWASTAD**



**NIEKERKSHOOP**

## 2.3.4. THE TOWN OF DOUGLAS





Photograph of Vaal River, 1910's (source: McGregor Museum Archives Kimberley)



Bridge over Vaal, Dougals, 1934 (source: McGregor Museum Archives Kimberley)



Street scene, Douglas, 1934 (source: McGregor Museum Archives Kimberley)

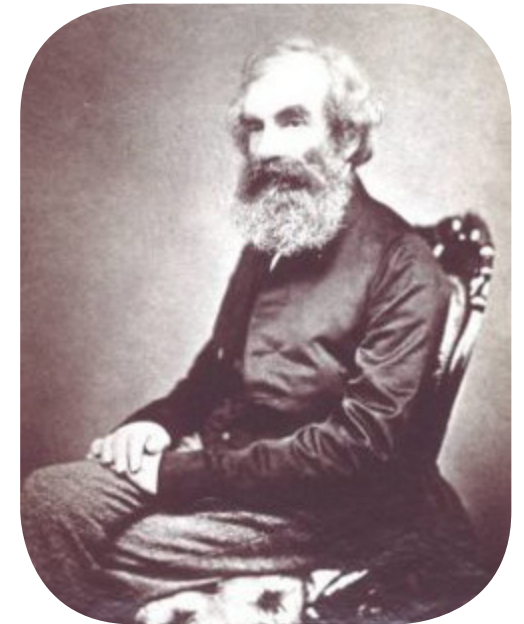
### 2.3.5. THE PIONEERS OF DOUGLAS

The story of Douglas started when James Backhouse (1794–1869) a reverend of the Religious Society of Friends, embarked on an adventure to visit the missionary stations in South Africa between 1839 and 1840 (Trott, 1966: online). After visiting the Griquatown Missionary and experiencing the hardship caused by the extended drought, Backhouse had a meeting with the people who settled at the then Soutpandrift, named so because of the salt wagons that passed through the area (Bruwer, n.d), to discuss the establishment of a settlement at the banks of the Vaal River. This settlement would use the water from the river to irrigate the land to grow crops and relieve the people of the neighbouring districts affected by the drought (Backhouse, 1844: 443, 444). This drought relief still occurs today. Earlier this year, young farmers of the Douglas district teamed up to support the livestock farmers of the Griquatown district (Muller, 2019: online). On Backhouse's return to England, he collected funding to establish a missionary station at the banks of the Vaal River. This missionary station was later established in 1845 by Isaac Hughes, and he named it Backhouse in honour of James Backhouse. (Bruwer, n.d.)

Hughes investigated the possible irrigation scheme on the Vaal River. Hughes built a mission house and church. The mission station formed the centre of all government operations, and famous men like David Livingstone and Robert Moffat, among other leaders, visited the mission station in those pioneering days. After the death of Hughes, Backhouse served as the seat of Griqualand West administration. It later became the court and post office until

the town of Douglas was established in 1880. Through the effort of Francis Orpen and the authority of Cecil John Rhodes, the Cape government approved the water scheme and it came into use in 1896. This was the first water scheme established at the Vaal River (Inggs, 1961).

The story of how the town got its name is also an interesting one. On 4 September 1876, a meeting in Grahamstown discussed the concept of the Albenian, a British colonial settlement of Griqualandwest (Kurtz, 1988), of Constitution Act. This concept stated that a town would be founded at the missionary station of Backhouse and that it would be called Waterford, named after Nicolaas Waterboer. This town would be the seat of the magistracy of Albenia. Days later, Sir Percy Douglas, the Lt. Governor requested that the new town be named after him. This request was approved. The first plots were set out in 1870 by Joseph Orpen and the work was completed in the early 1880s. John Mintern reopened the town when the work was completed. Douglas received a town manager in 1897 and became a municipality in 1905. (Bruwer, n.d.)



Photograph of James Backhouse, (source: <http://adb.anu.edu.au/biography/backhouse-james-1728>)

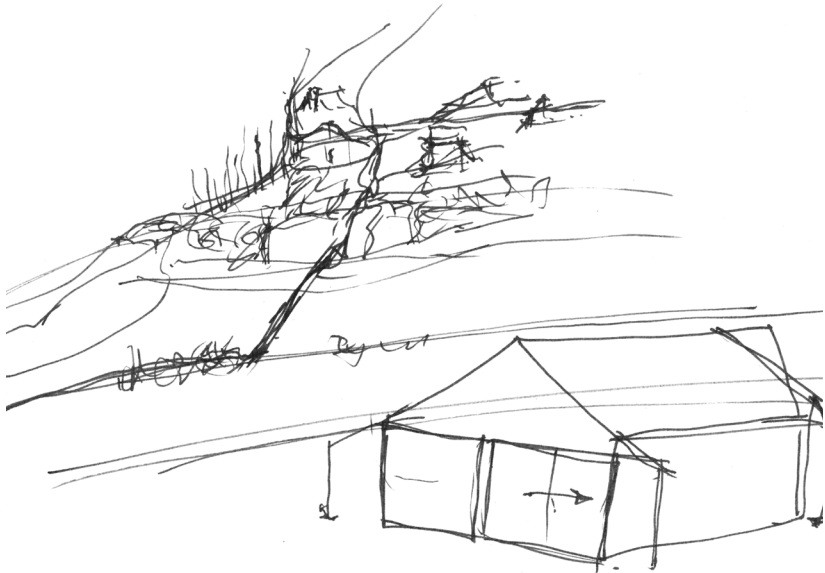
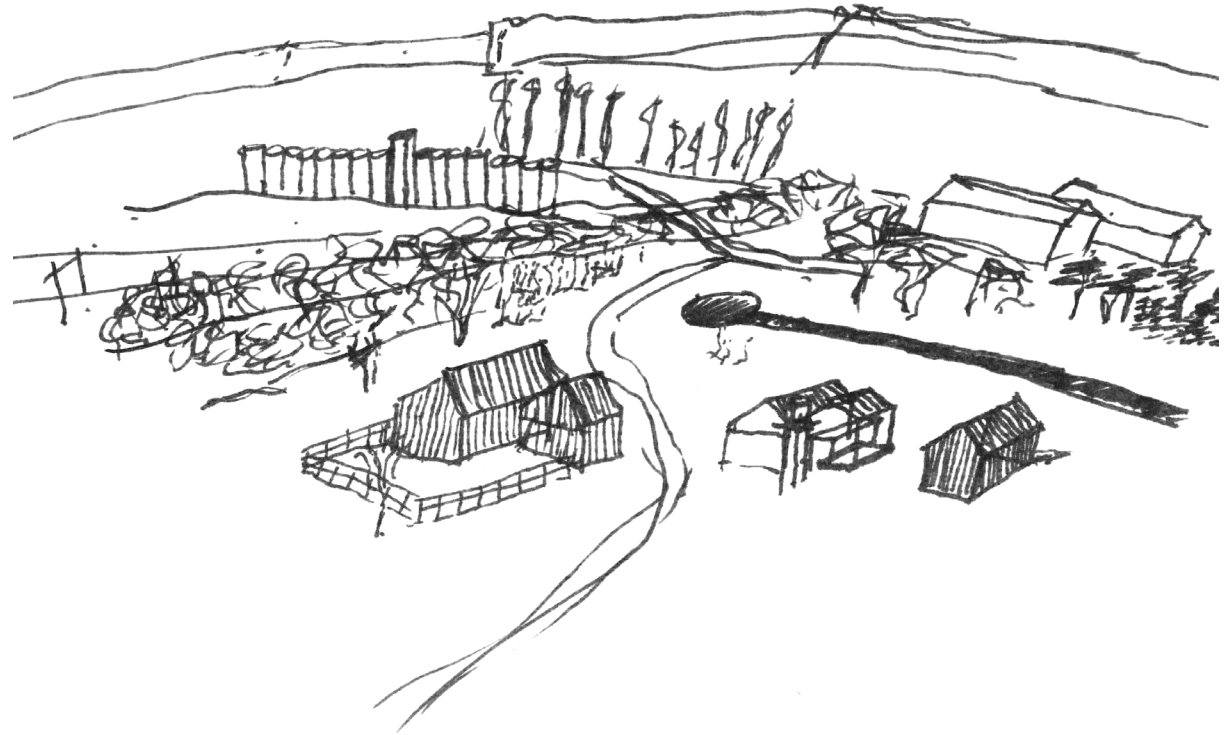


Photograph of existing hangars on site. Photograph by H.F. van den Berg. 2019

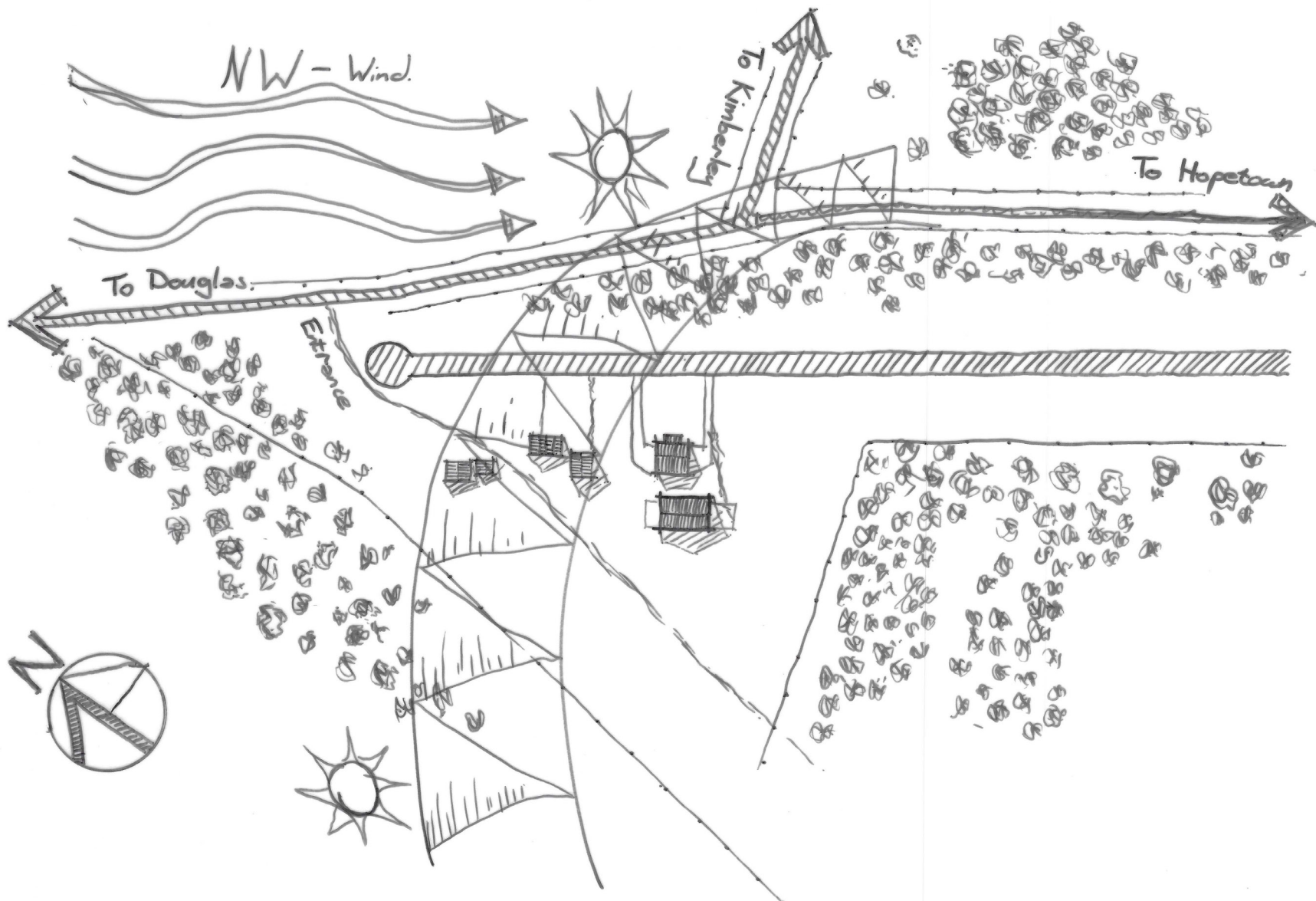


Photograph of site when approaching Douglas from Kimberly. Photograph by H.F. van den Berg. 2019

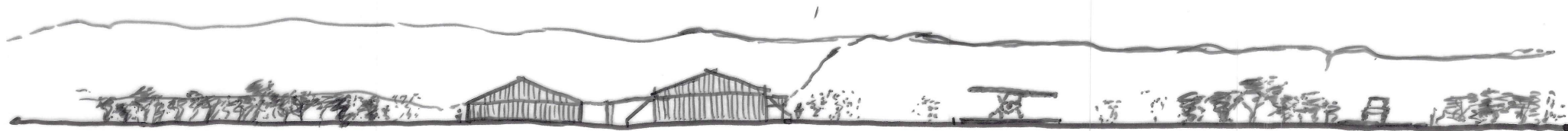
## 2.3.6. ANALYSIS OF THE SITE



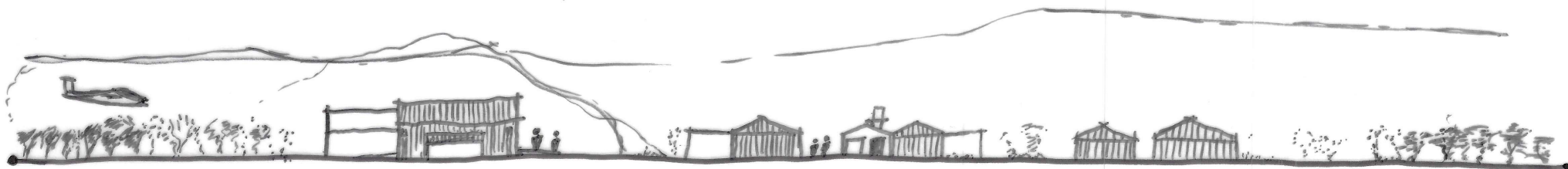




Sketch of site with existing hangars.



Site section alongside the runway showing the existing hangars.



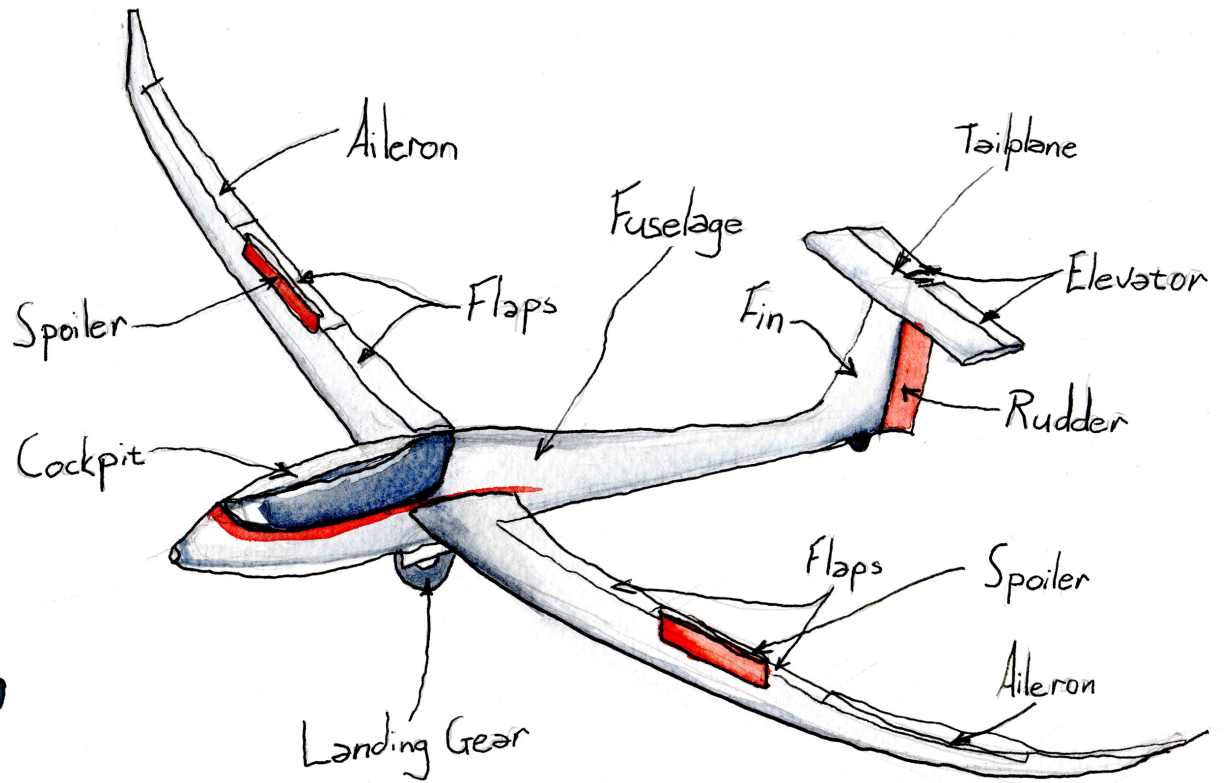
Site section across the runway showing the existing hangars.



Section of site through the existing runway.



Sketch illustrating the aspect ratio between a Cessna and a Glider.



Sketch of an annotated glider.

### 3.4. HOW A SAILPLANE WORKS

Sailplanes are amazing, graceful machines. It is the closest a human can get to soaring like a bird. The fact that this aircraft is un-motorised fundamentally changes the way in which a glider remains airborne. The fuselage is designed to be as small and aerodynamic as possible. Contemporary gliders are constructed from seamless material like fibre glass and carbon fibre. When comparing a glider to a conventional aircraft, one will discover that there is a considerable difference in the shape and length of the wings. A glider has a high wing aspect ratio. This allows the glider's wings to be efficient in harnessing the airflow and sustaining flight (Brain & Adkins, 2019: online).

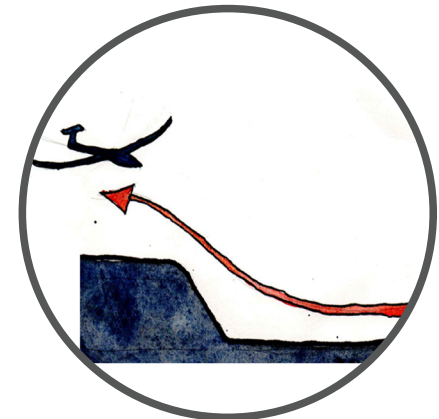
Some gliders are equipped with an engine, which allows them to "self-launch". Gliders without a self-launcher rely on two methods of take-off. "Aero-tow" is used when a power airplane tows the glider into the air with a long rope. When the desired altitude is reached, the pilot in the glider will release the rope. The second method is "winch launching". The glider is dragged along by a winch on the ground at a high speed. In this process, the glider achieves a high altitude and the winch line is released before continuing flight (Martin, 2015: online).

Contemporary gliders have a gliding ratio of 60:1; for every metre the glider descends, it travels 60m. The pilot must only obtain altitude to remain in the air. There are three main ways of raising air that a glider pilot uses to gain altitude (Martin, 2015: online).

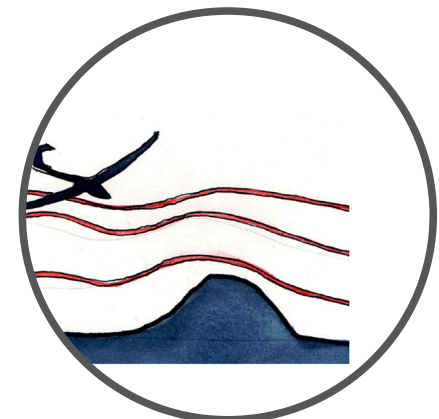
Gliders carry a ballast tank filled with water to increase the weight of the aircraft. The weight allows the glider to sink faster, producing more speed. A full ballast reduces the glider's rate of climb. The pilot can regulate the weight by releasing water to adjust the weight. The ballast is emptied to slow the glider down for landing (Martin, 2015: online).



Sketch illustrating thermal lift.



Sketch illustrating ridge lift.



Sketch illustrating wave lift.



Weston in front of his flying machine. (source: <http://www.johnwestonaviator.co.uk/first-aviator/>)

### 3.4.1 BUILDING A AIRCRAFT

Maximilian John Ludwick Weston (1875 - 1950), more commonly known as John Weston, had an adventurous life. He is renowned as a pioneer of South African Aviation. (John Weston Aviator, 2018: online) Throughout his continuous wandering around the globe, he remained in touch with the development of aeronautics at the main centre and the success achieved by the Wright brothers on December 17, 1905. This must have been what eventually awoke a compelling interest in his keen and capable mind. (Oberholzer, 1972: 15)

Weston designed and started to build an aeroplane while at Kalkdam, near the present town of Bultfontein. This was the first aeroplane ever to be constructed on the African continent. The design of this aeroplane was based, to a great extent, on ideas of his own, but was also influenced by the designs of the flying machines of the day – such as the Wright Flyer and the French Aéroplanes Voisin.

He completed his aeroplane; however, the 30 horsepower water-cooled Panhard did not have enough power to get his ground. He packed up his aeroplane and took it with him to Europe in 1910 while on a study tour visiting the main aeroplane centres of the world. In the factory of the Farman brothers in France, Weston's aeroplane was modified on Farman lines and fitted with one of the revolutionary seven-cylinder air-cooled rotary engines of the Genome type. Weston called this modified Genome-powered machine the 'Weston-Farman Biplane' and, after having obtained the aviator's certificate of

the French Aero Club in February 1911, he returned to Brandfort to make a spectacular re-entry into South African aviation.

With Weston's return to South Africa, he founded a non-profit organisation, the John Weston Aviation Company Ltd. with a group of friends. The purpose of this organisation was to enable him to pursue his intentions to improve humanity's ability to conquer the air (Oberholzer, 1972: 16).

Weston had flown his aircraft in France, but this first conquest of the South African air was at the Coronation Gala at Kimberley in a test flight on the evening of June 18, 1911. It must be remembered that in these early days of flying, a machine "flew" if its wheels ceased to make contact with earth, even if only for a short distance. Weston's success at Kimberley, where he reached a height that overshadowed all previous attempts by other pioneer aviators who had flown before him, and was a mark of his achievement. Weston's flight on 18 June 1911 at Kimberley made him the sixth man to successfully fly a power-driven aeroplane in South Africa.

Weston continually emphasised that he was not a circus man. He was in aviation because he believed in its future. He also spoke quite confidently about the great "airliner", to use his own term, which would soon be taking us from here to London in a day or two. Weston stated: "... crude as the Flying Machine is, even today it is undoubtedly the forerunner of the future Aerial Liner, and only

short-sighted individuals will persist in considering the aeroplane as a mere expensive toy or an acrobatic appliance of no importance of the human race” (Oberholzer, 1972: 17).

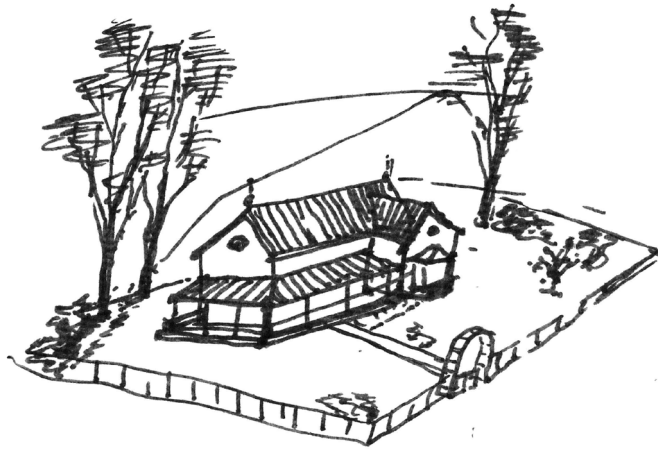
The story of the Jonker Sailplane Company is similar to John Weston’s introduction of aviation. Tienie Jonker was the father of the founders of Jonker sailplanes. When Tienie saw a Tiger Moth towing a glider in the air one afternoon, he followed the aircraft to the Air Force Gliding Club’s Summer Camp at the Potchefstroom airfield. There, Tienie had his first flight in a Ka-7 and returned home that night with a big smile on his face. Unable to purchase a new glide, he started construction on his own Tern in the Jonker Family’s backyard in 1975. Tienie test flew his Tern in 1980, and soon Tienie and his sons filled the skies with their flying voyages in a glider they had built themselves (Jonker Sailplanes, 2019: online).

The stories of Jonker and Weston about the act of building an aircraft became the thing that contributed to who they are. The glider is now a thing that is a familiar sight to the dwellers of Douglas, contributing to the character of the place. With the Jonker Sailplane factory Douglas can also be known for not only to fly the glider but to manufacture it as well. The dweller will look to the sky at the glider, knowing that his hands put that thing together. The factory also brings engineering minds to form part of and contribute to the community. Weston’s air shows brought people together. The championships will do so as well. A group of people from different backgrounds



Tienie Jonker constructing his own glider in the 1970's (source: <https://jonkersailplanes.co.za/history-of-jonker-sailplanes/>)

### 3.5.THE CONCEPT OF PLACE



Sketch of a typical farm house with a garden and eucalyptus trees.

Christian Norberg-Schulz (1926–2000), a Norwegian architectural theorist states the following in *The concept of dwelling*: “To settle in the landscape means to delimit an area, a place. We stop our wandering and say: ‘Here!’” (1985: 31) We humans are on a journey called life. Our lives are a collection of events and experiences of people we meet and places we dwell and travel to. We go on adventures to break the sometimes mundane routine of our daily lives. People go on adventures to make their life stories more unique. We willingly depart from the place where we settle and enter different realms of different complexities that contribute to the uniqueness of that place.

We leave the place where we are settled and feel safe to go out on an adventure. To go on an adventure, one takes a certain amount of risk, not knowing necessarily where one might end up. You cannot say for certain if you shall return safely to where you dwell. However, the adventures we take expose the traveller to the uniqueness of other dwellers and their places. This exposure is a unique “genius loci” (Norberg-Schulz, 1980); the spirit of place that is developed between the people that dwell within a specific landscape. A character is formed and developed between the dweller and the landscape in which they settle.

While driving through the vast landscape at Douglas, one sees “koppies” (rocky hills) that push up towards the sky. Other, manmade, vertical elements are the radio masts and windmills. Large barns and the concrete monolith-

ic silos are beacons of industry in the landscape. These structures are beacons within the landscape which are the “things” that contribute to fine experience when approaching a settlement. (Norberg-Schulz, 1985: 31) With regards to Douglas this “thing” would be the GWK silo, the god of industry and prosperity where the majority of Douglas dwellers labour. When I travel to Douglas I always feel a leap of joy when I see the outline of the silo, knowing I am almost home.

The settlement is therefore a point of arrival. (Norberg-Schulz, 1985: 31) The question is: when do you know you have arrived in Douglas? What is the character of this place that makes it different from others? For me it is when I pick a fruit, dry the dew drops and feel the juice coat my pallet; when I feel the aura of twilight serenading the landscape and the arrival of starry night. Douglas is an oasis, a place that contradicts the arid surroundings. An oasis is associated with a place of rest, a sanctuary to rest your weary feet on your travels, which leads to the other “thing” that contributes to the point of arrival, the Riet, Vaal, and Orange river. The river is the goddess of fertility and leisure, lined with the Eucalyptus trees providing shade and coolness from the heat. The rivers also cause tension between the relationship between the earth and sky when the sky is reflected in the water. This allows the landscape to bend with the sky, creating a striking relationship, which attracts people (Norberg-Schulz, 1985: 31).

Een en ander oor daardie dorp Douglas, is a recollec-

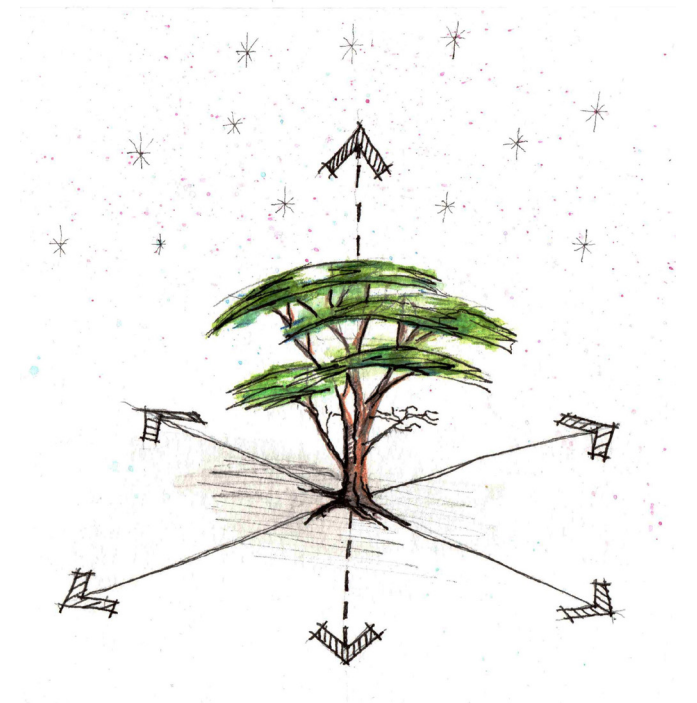
tion of an unknown Douglas dweller archived at McGregor Museum, Kimberley. The author wrote that In the 1930s, the dwellers of Douglas would gather on the river on a regular basis with boats, eating watermelon, playing violin and having a jolly time under the moonlight (unknown author , 1975: 3). This ritual developed into a culture where the river will always be a sanctuary. Every year during Christmas time, the river is packed with barges; music and the aromas of a braai fill the air, forming part of the enjoyable time with friends and family.

The oldest known name of Douglas, given by the Griqua people, is “Guahanop”, which means ‘Grove of Camelthorns’ in the Koranna language (Bruwer, n.d.), as this used to be found in the area. Only one tree survived during the establishment of Douglas. One of the greatest demands on the camel-thorn tree is harvesting the wood for fuel, which leads to the decline in numbers of this tree. At present, this harvesting is illegal in South Africa (Seymour & Milton, 2003: 17). The thing of which a place is known for can change.

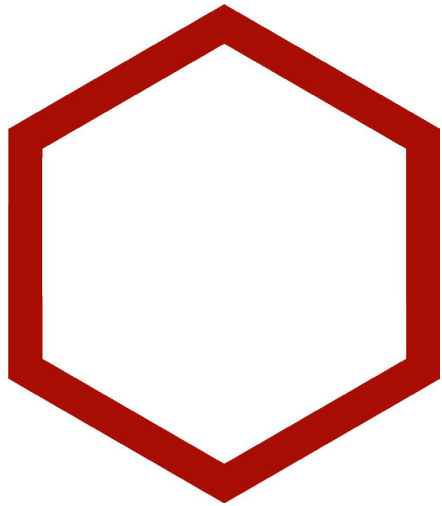
In the Concept of Dwelling, Norberg-Schulz states that the challenge is to settle in a friendly relationship, implying that man respects and takes care of the place where he chose to settle (1985: 31). The camel-thorn tree is a good example of this careful relationship with its surroundings. Some part of the tree has medicinal uses, a number of game species and livestock feed on its pods, the tree improves the soil quality, birds nest in its branches and insects find sanctuary in the thorns of the tree

(Seymour & Milton, 2003). In a sense good architecture should be like a camel-thorn tree. After the place is established it should be able to work in its surroundings to give back.

The aim is to create a place that the dwellers of Douglas can relate to and a place that relates to Douglas. The presence of the Vaal, Riet and Orange River make this place an oasis within its arid landscape. The approach to this study is not to “save” Douglas, but to understand it and, through that understanding, assemble architecture that celebrates the place. The theory of Norberg-Schulz is useful to achieve this aim. Allowing the airfield to be a place with which the dweller can associate with and the traveller can associate with Douglas.



Sketch of a camel-thorn tree on top of the earth under the sky



# **PART 3**

### 3.1. DESIGN DEVELOPMENT

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In this section the process and the design development will be discussed. I will refer to each design undertaking as an endeavour. This is with relation to the concept of adventure. The design process is an adventure, exploring different ideas to discover what the design needs become. I believe there is an element of unknown when exploring. There are a total of five endeavours that will lead to the final design. After every endeavour the response to the findings will be discussed. Precedent studies will further reinforce the design decision making.



Concept sketches of elevations

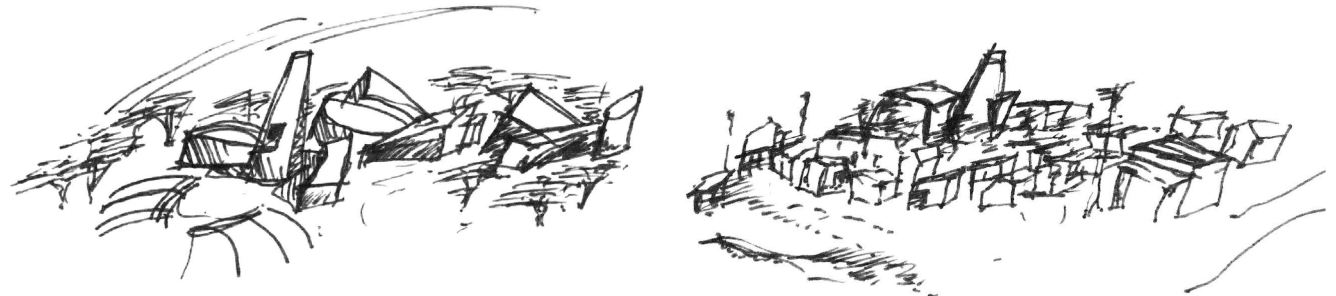
### 3.2. NORTHERN CAPE LEGISLATURE BUILDING, SILVA & JOHNSTON (2004)



Source: <http://www.thesolomon.co.za/northern-cape-legislature-building.html>

The Northern Cape Legislature forms a beacon of hope for the community. Upon visiting the building, the first thing to observe is the differing architectural forms of the cosmic landscape of the Northern Cape. It is also reflection of the history and cultures of the Northern Cape. The use of different forms, material finishes and details provide a unique architectural identity for each function. The human-like configuration with the legislature, the tower as the head, sided with arms that embrace the gathering point in the centre. (McInerney, 2009: 242)

The building is successful in how it sits in the landscape with the heavy masses resting on the landscape surrounded by clusters of acacia trees, with the main legislature tower becoming a beacon within the natural landscape. A metaphorical approach might be an interesting way to start.



### 3.3. FIRST ENDEAVOR

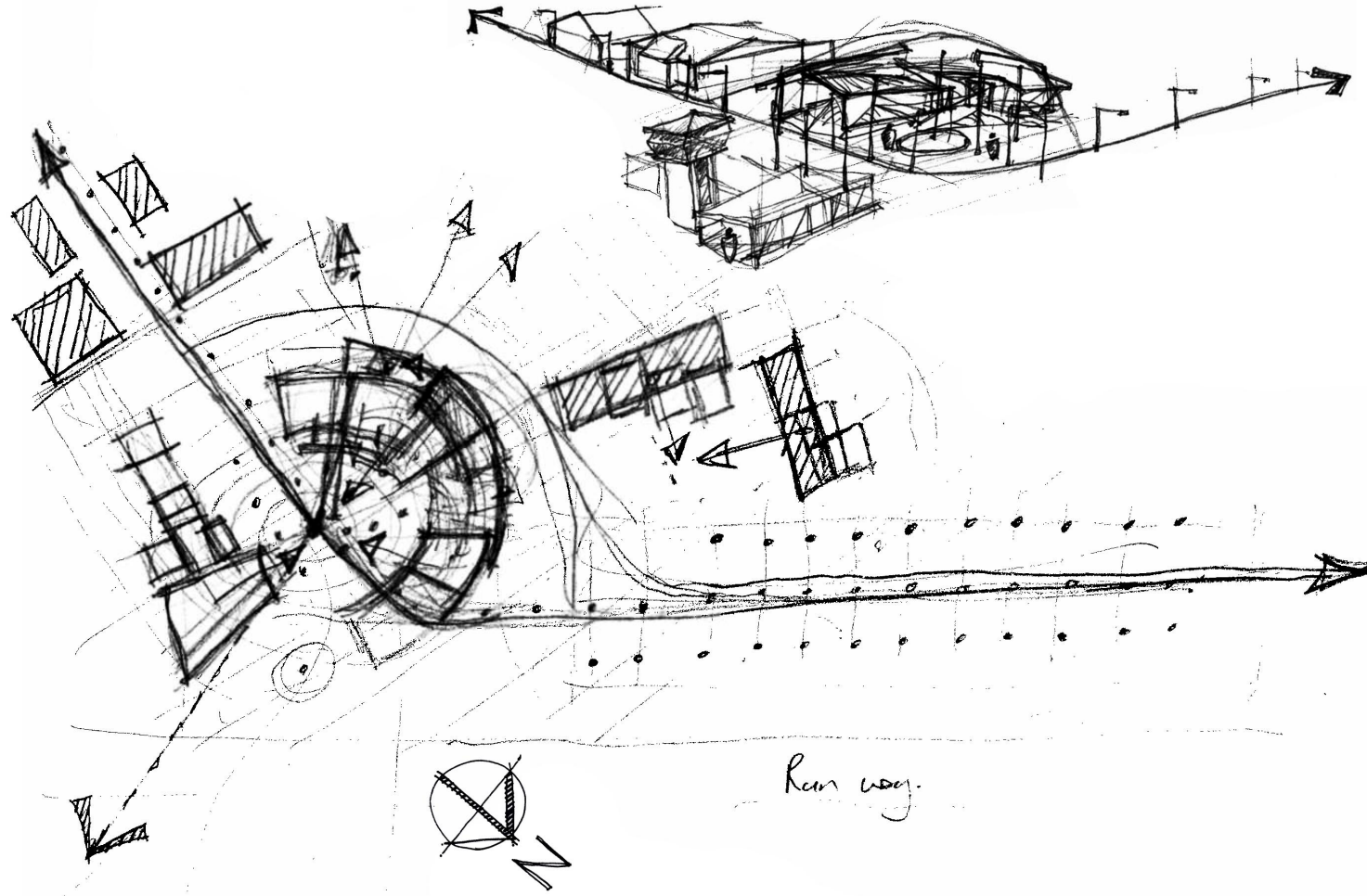


Diagram and perspective exploring the general layout.

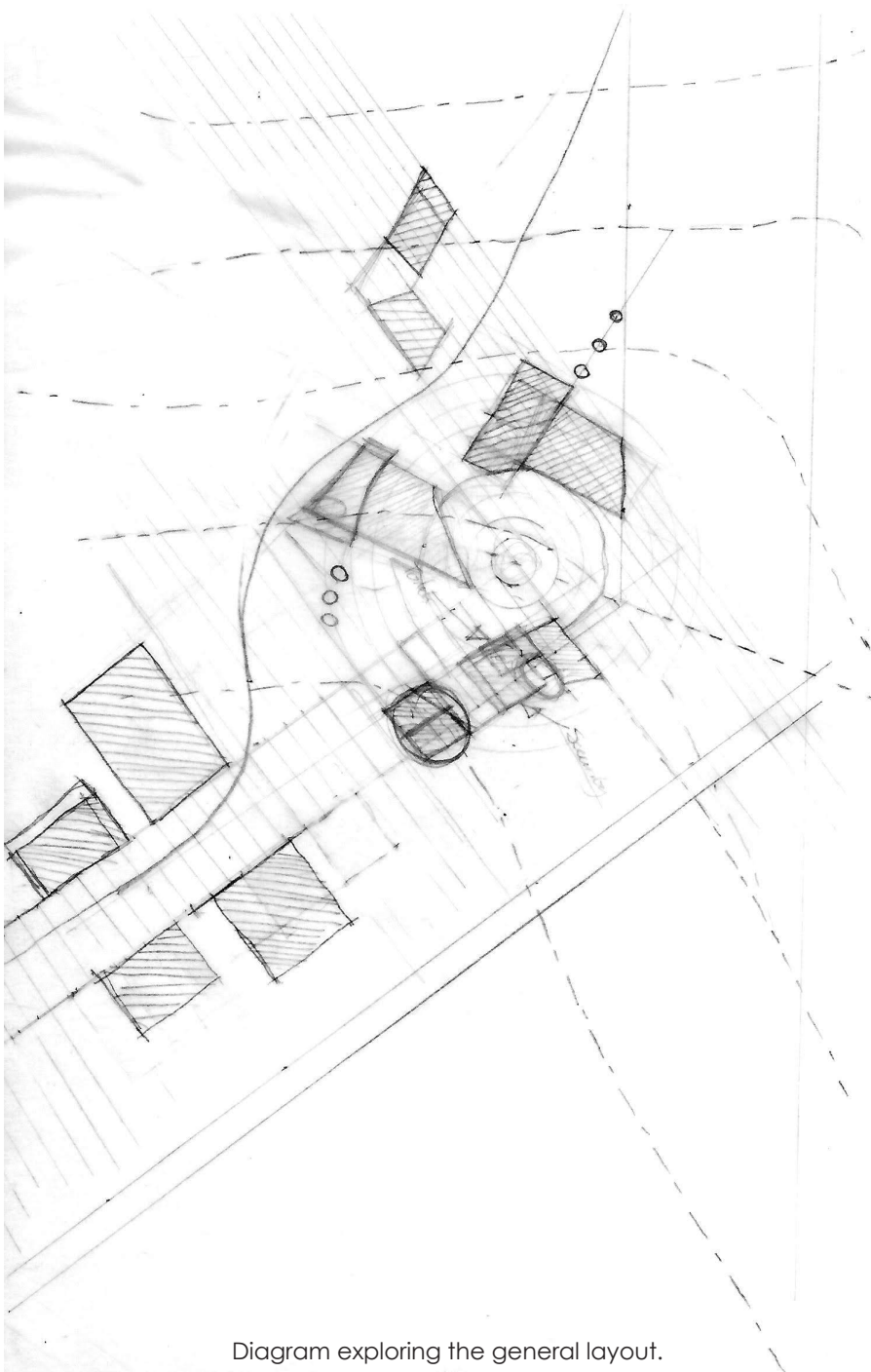


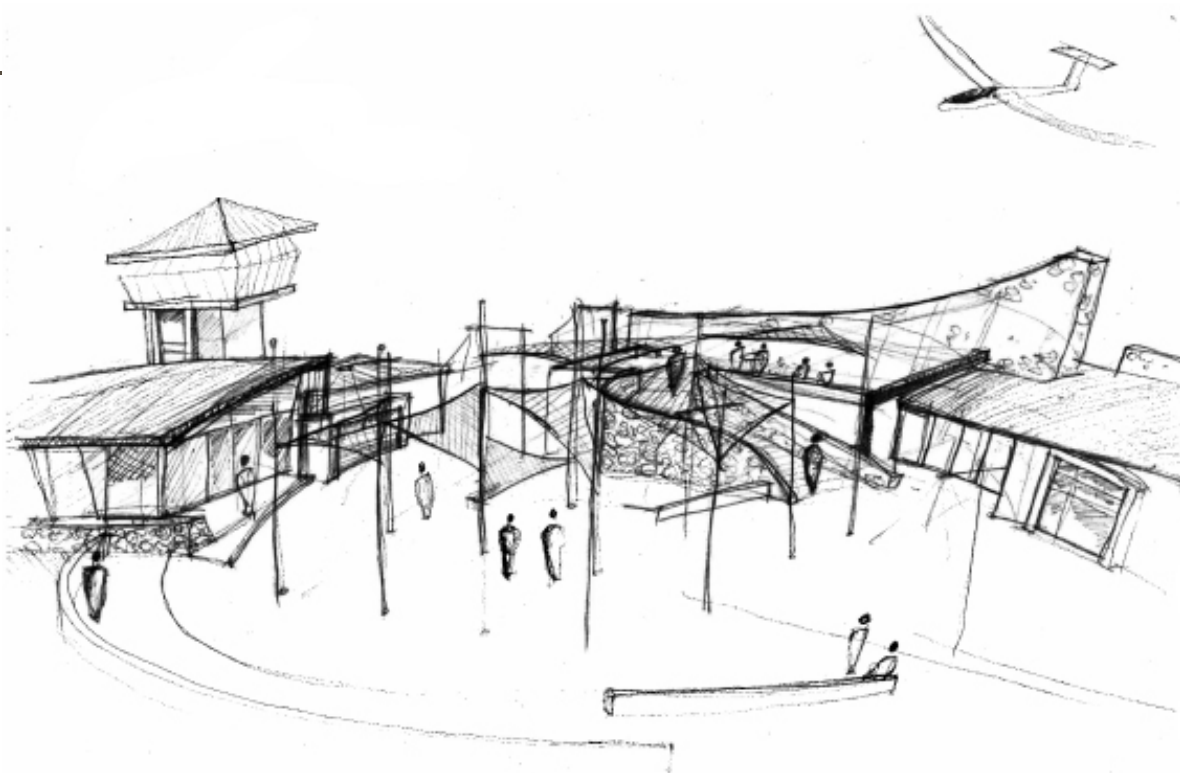
Diagram exploring the general layout.

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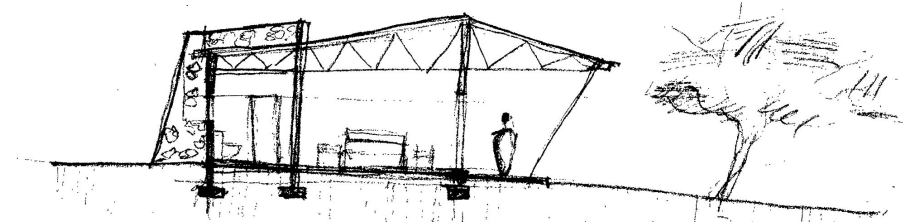
The first endeavour is exploring the metaphorical idea of a water drop falling on the earth which becomes the focus of the design. A radial structural grid is placed on this focus point around which the design is organised. The focal point is determined by a visual line from the R 357 when approaching the site from Kimberley. The more public functions, restaurant and terminal, is closer to the centre point, allowing a courtyard to form where the guests and Douglas dweller can gather. The more private services, the hangars and accommodation, is located further from the focus and is less influenced by the radial grid. How do you know when you have arrival in Douglas?

The problem with this endeavour is that the metaphor that instigated the design can be interpreted wrong, causing conflicting ideas. The form of the architecture also has a problem to relate with the context of Douglas. The scheme's program was also too small and the program struggled to tap in to the complexities of the context. The radial grid, together with the metaphorical approach was dropped. However the set out of the functions of the spaces was kept and developed on further. The Jonker Sailplane factory was added to the accommodation list, allowing an opportunity for job creation and a better relation between the Douglas dweller and the gliders. This will reinforce the relation of Douglas with not only a place where you can go gliding, but also a place where the glider is made as well.

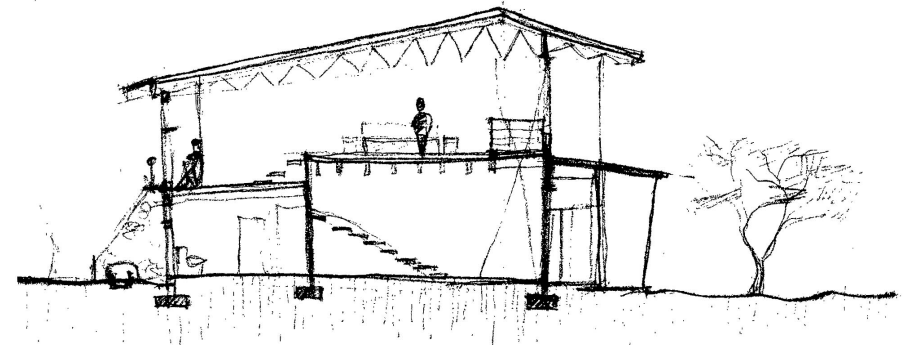
Even though the Northern Cape Legislature Building was meant to be a beacon of hope for the surrounding communities, it fails to relate to the surrounding urban context where it is clear that poverty prevails. A contrast is formed by the authority of the beacon luxuriously finished with the poor urban landscape shrouding it. Currently, it is more a beacon of unfulfilled promises, making it a flawed precedent to look at.



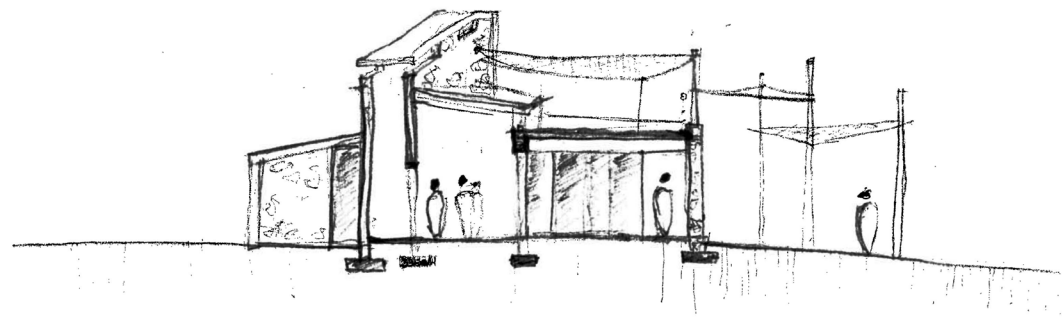
Sketch of public courtyard.



Sketch of section through single accommodation unit.



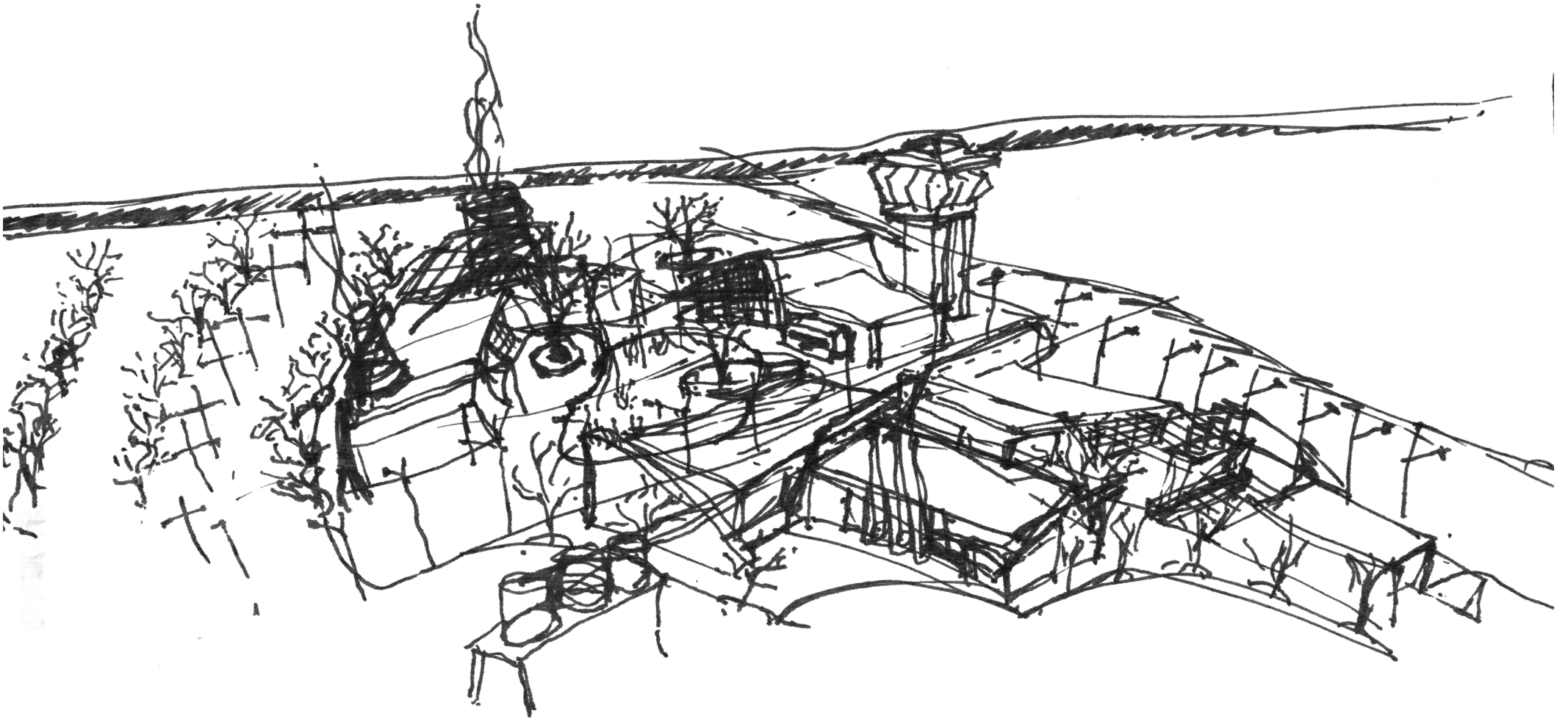
Sketch of section through family accommodation unit.



Sketch of section through hall.

### 3.4. SECOND ENDEAVOR

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Sketch of perspective of the second endeavor.

The second endeavour is a quick exploration to have the architectural language of the public buildings be more organic, contrasting the more rigid layout of the hangars and factory. This approach is generated from the idea of in what way fire will be used. The fire at the organic side is for celebration and recreation; while the fire in the factory is industrial. The factory is a threshold between the public and semi-public spaces, with the showroom opening on to the courtyard to form part of the public activities. The restaurant will also lock out to the north, viewing the GWK silos that are bacon with in the landscape. In the end the organic approach was abandoned because it leads to a conflicting architectural language that would be too contradicting. Idea of fire relates with none of the concepts discussed and a further investigation into the idea would be counterproductive.

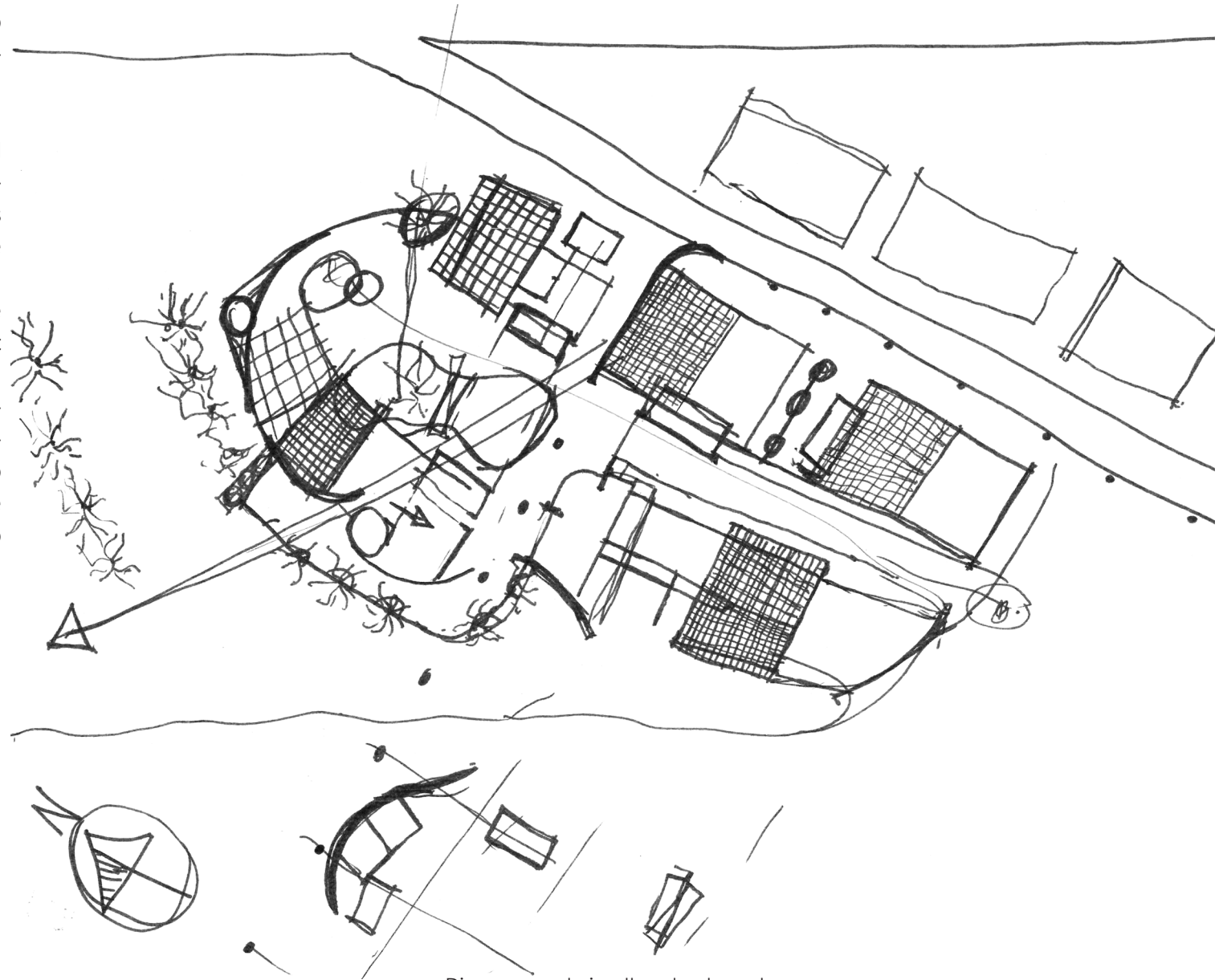
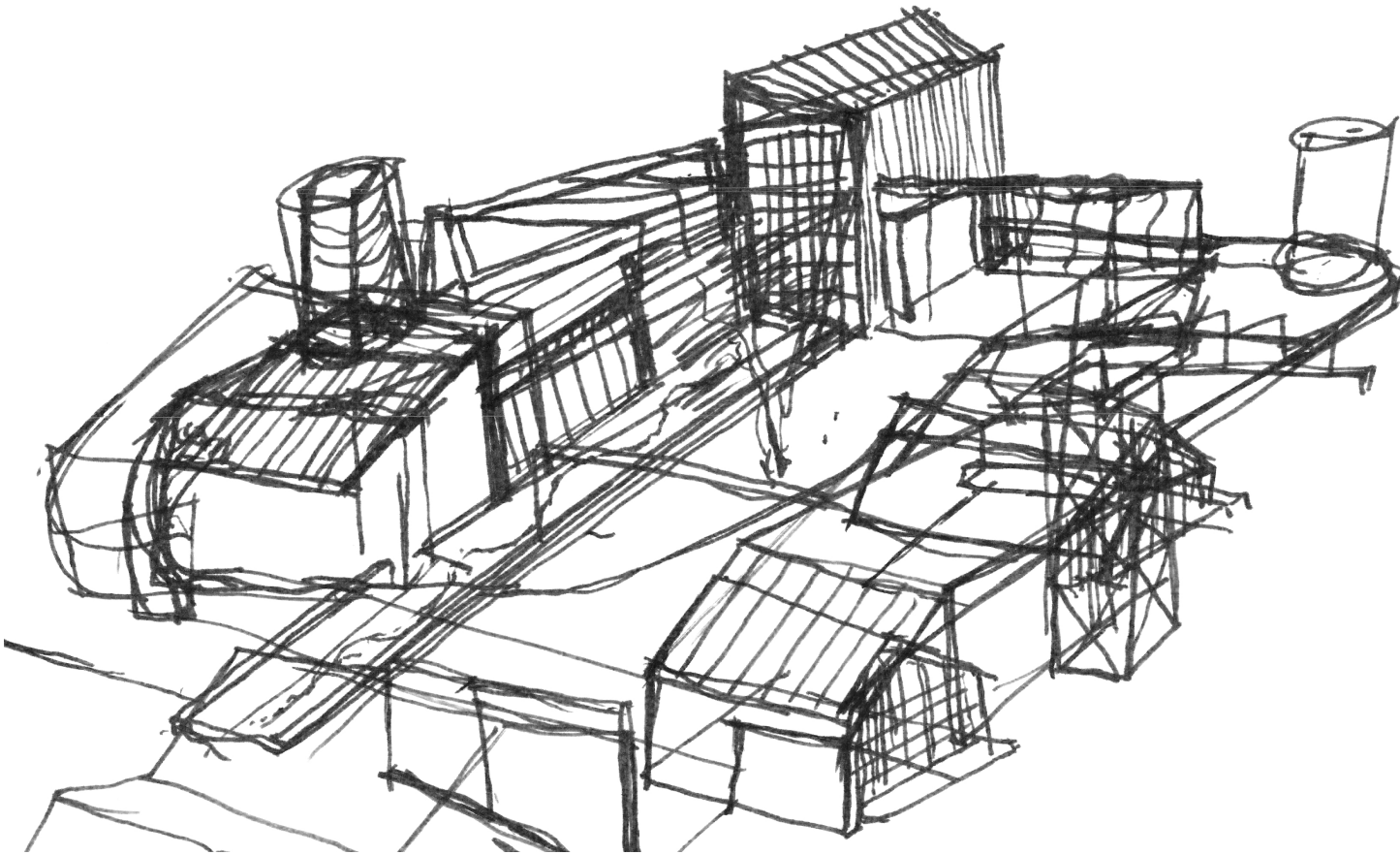


Diagram exploring the plan layout.

### 3.5. THIRD ENDEAVOR

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This endeavour is more geometric. It mainly explores the relation of the spaces with one another and a other possibility resolution of the form of the buildings. This endeavour turned to be too complex. There is also an problem with how the buildings related to each other.



Sketch of perspective of the third endeavor.

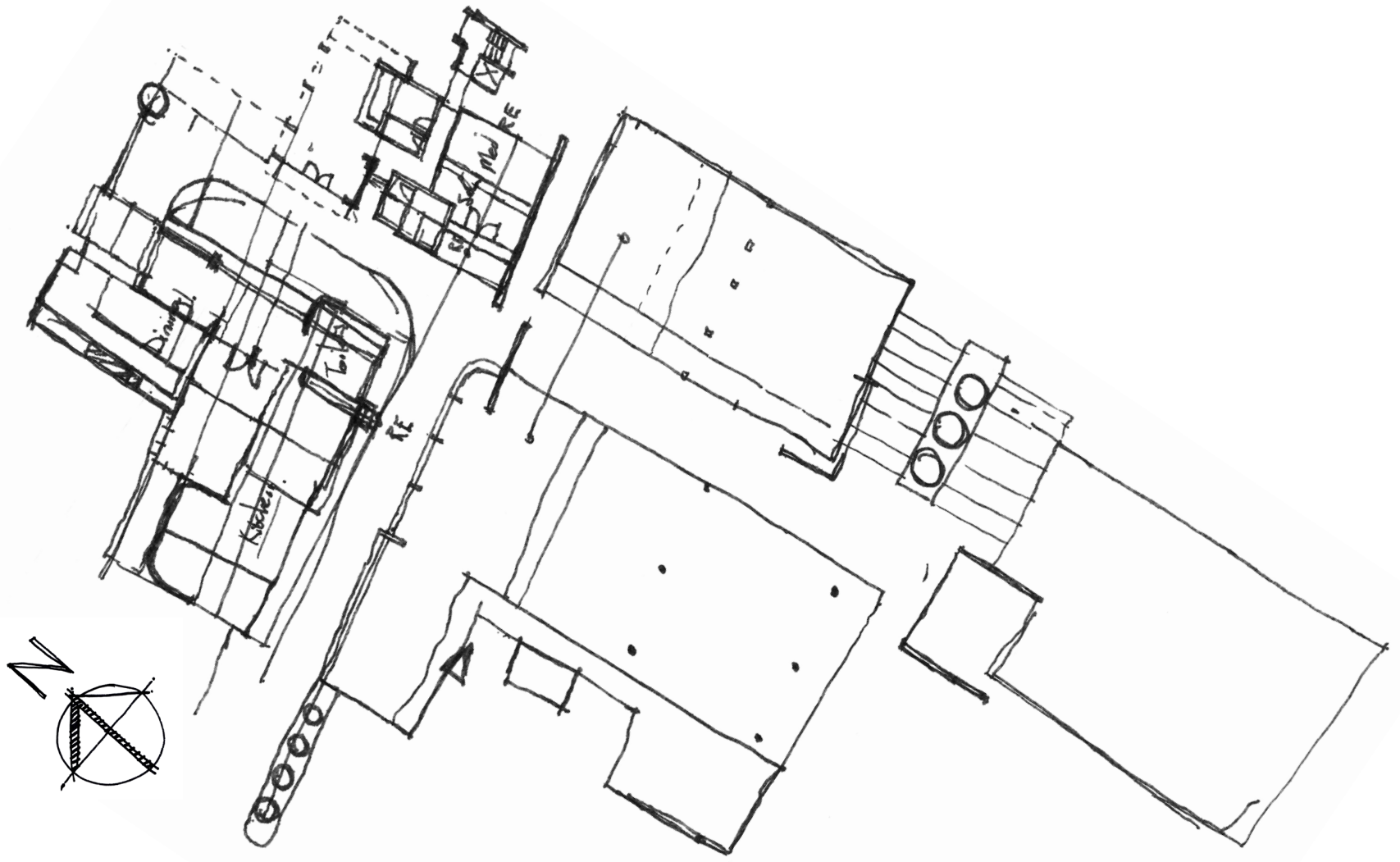
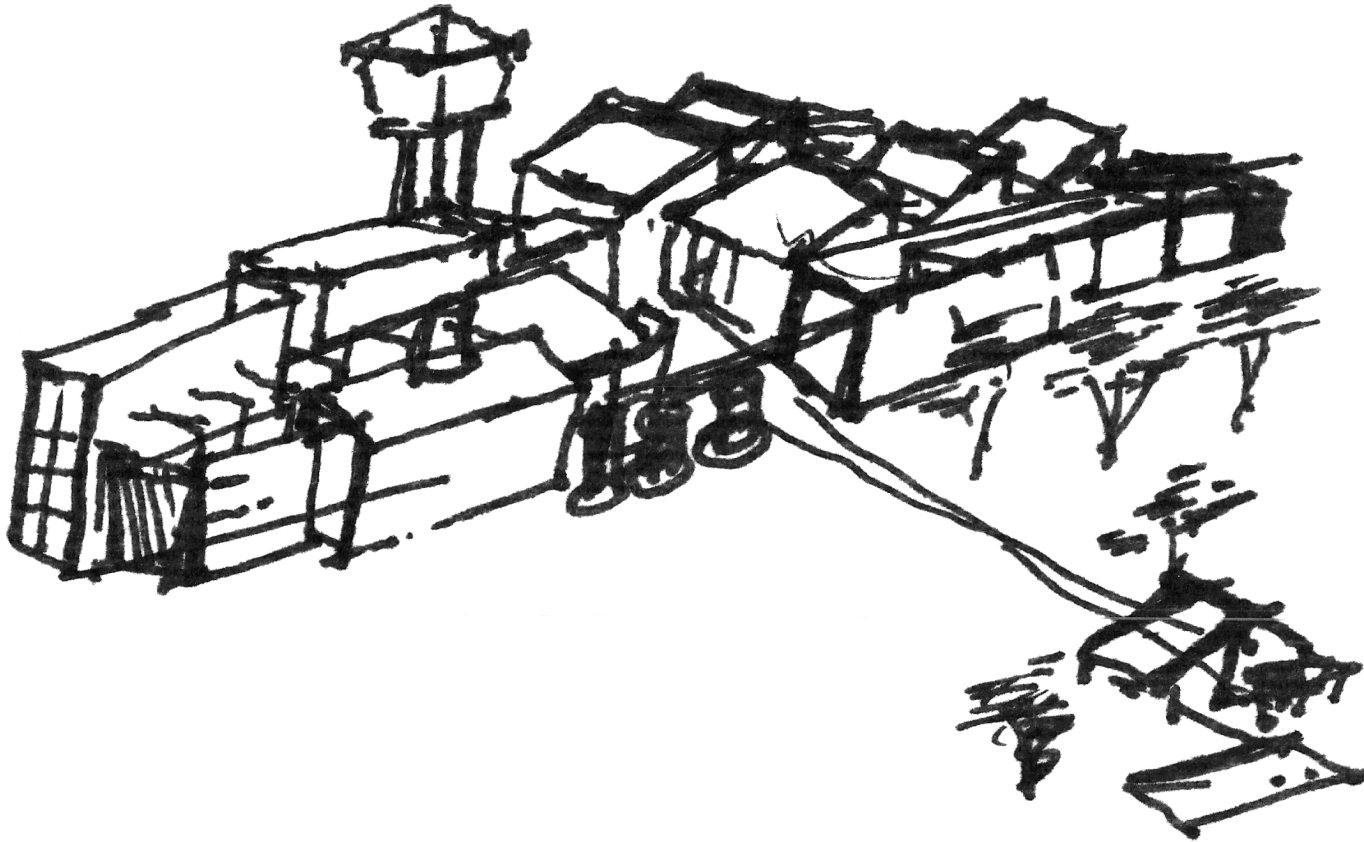


Diagram exploring the plan layout.

### 3.6. FOURTH ENDEAVOR

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Sketch of perspective of the fourth endeavor.



Concept sketch of elevation.

The control tower becomes a beacon that leads the user from the parking to the entrance towards the public court yard. The user can orientate them in the courtyard before going to where they need to be. The terminal and restaurant opens up towards the courtyard. A roof terrace on top and the courtyard provides a safe space to observe the incoming gliders.

The glider club hanger will double up as the briefing hall for the pilots during the gliding season. During off season the Jonker factory can use the glider hanger to store the manufactured gliders and make it available during the gliding season. The crop duster is located next to the glider hanger with access to the taxiway. The plan is further developed with thick walls allowing the buildings to relate with each other.

However the architectural language differs too much from building to building. The control tower is also very conventional and did not come to its full potential. The space between the factory and the glider hanger also has the potential to be a secondary courtyard flowing in to the primary courtyard that can be used for exhibitions and stalls during the championships.

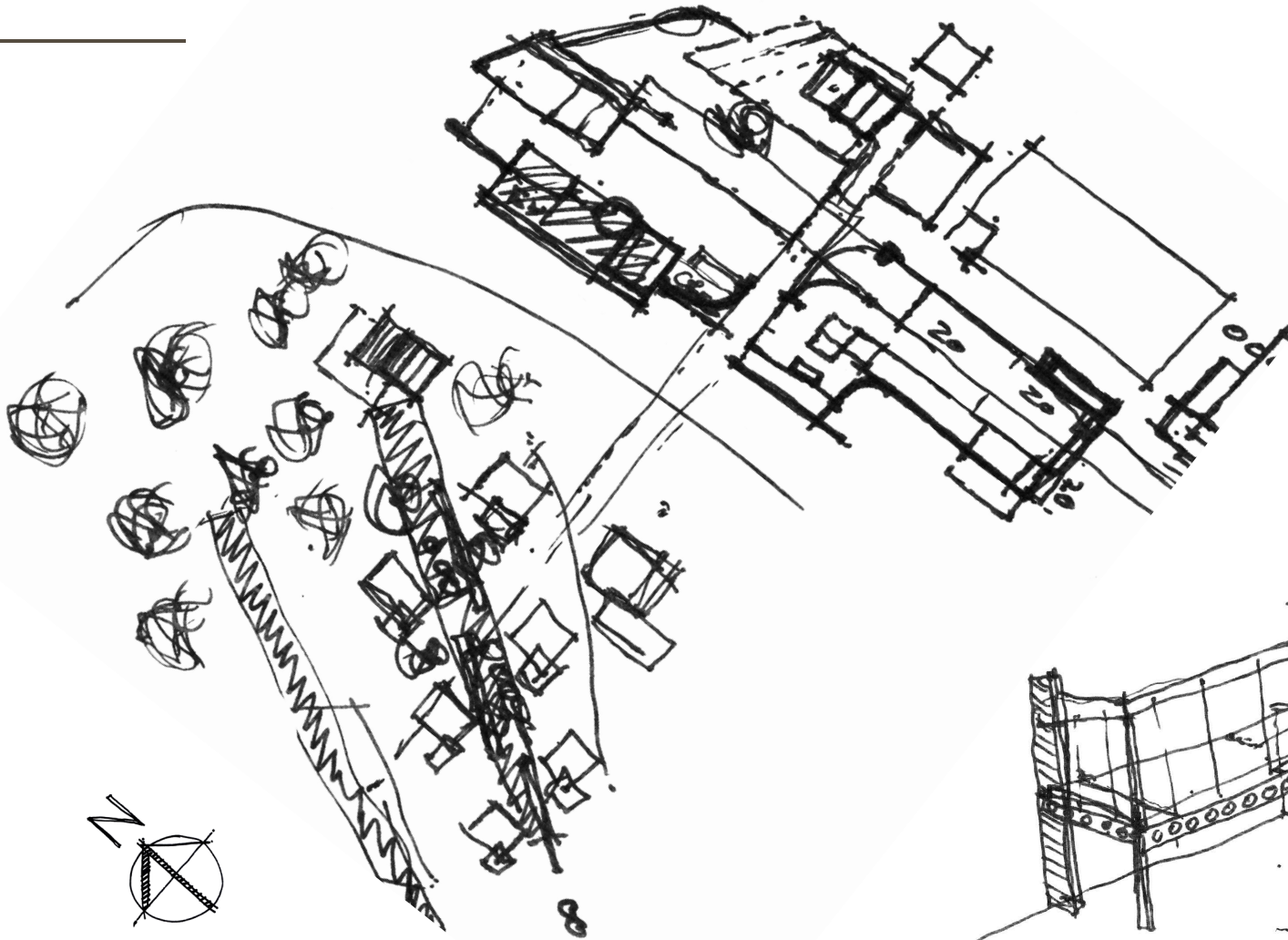
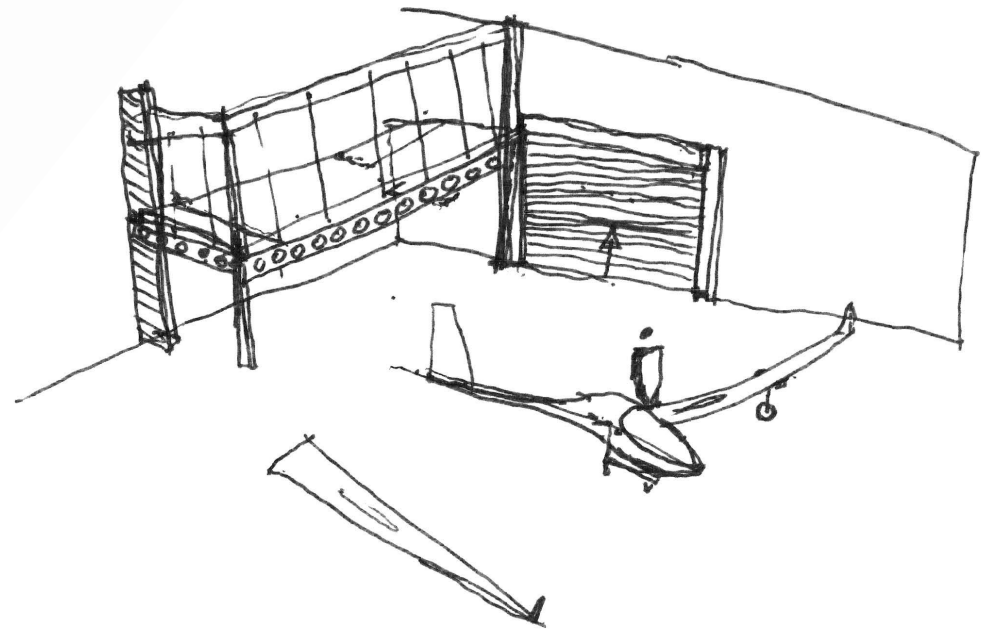
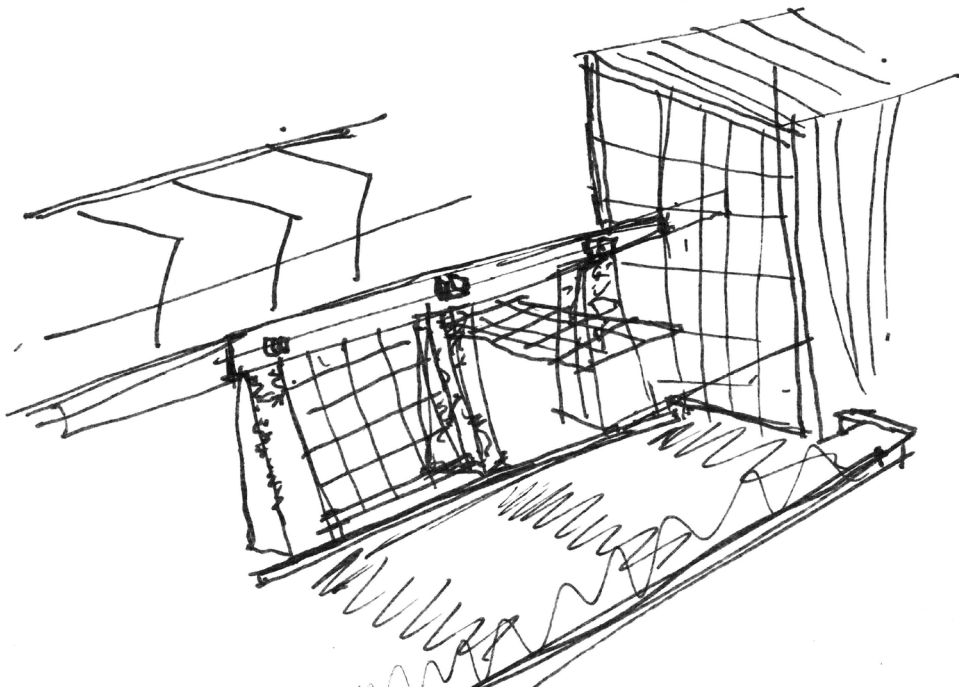


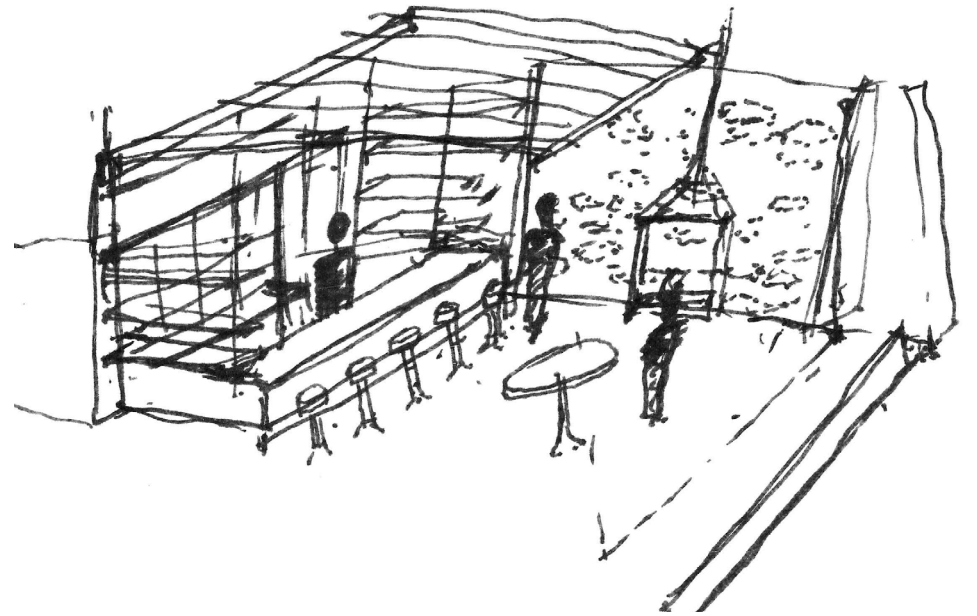
Diagram exploring the plan layout.



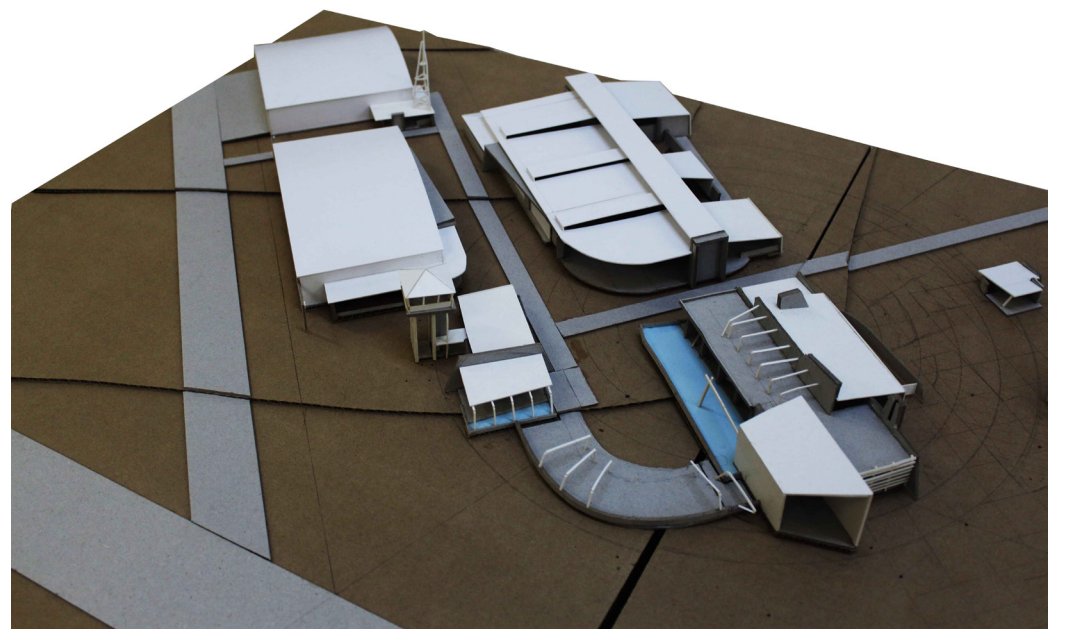
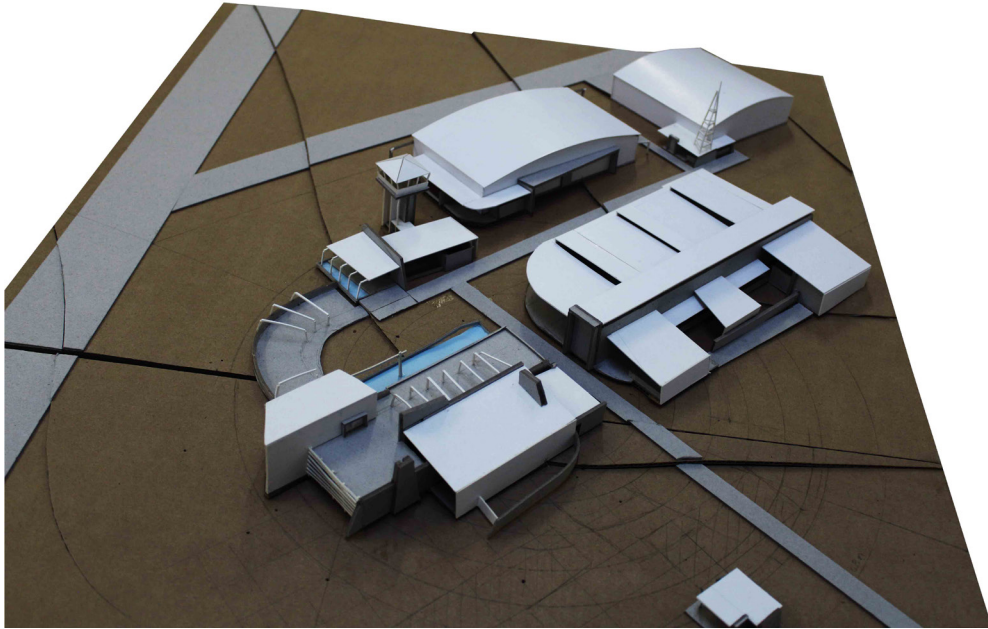
Concept sketch of factory interior.



Concept sketch of reflection pool at restaurant.



Concept sketch of bar interior.



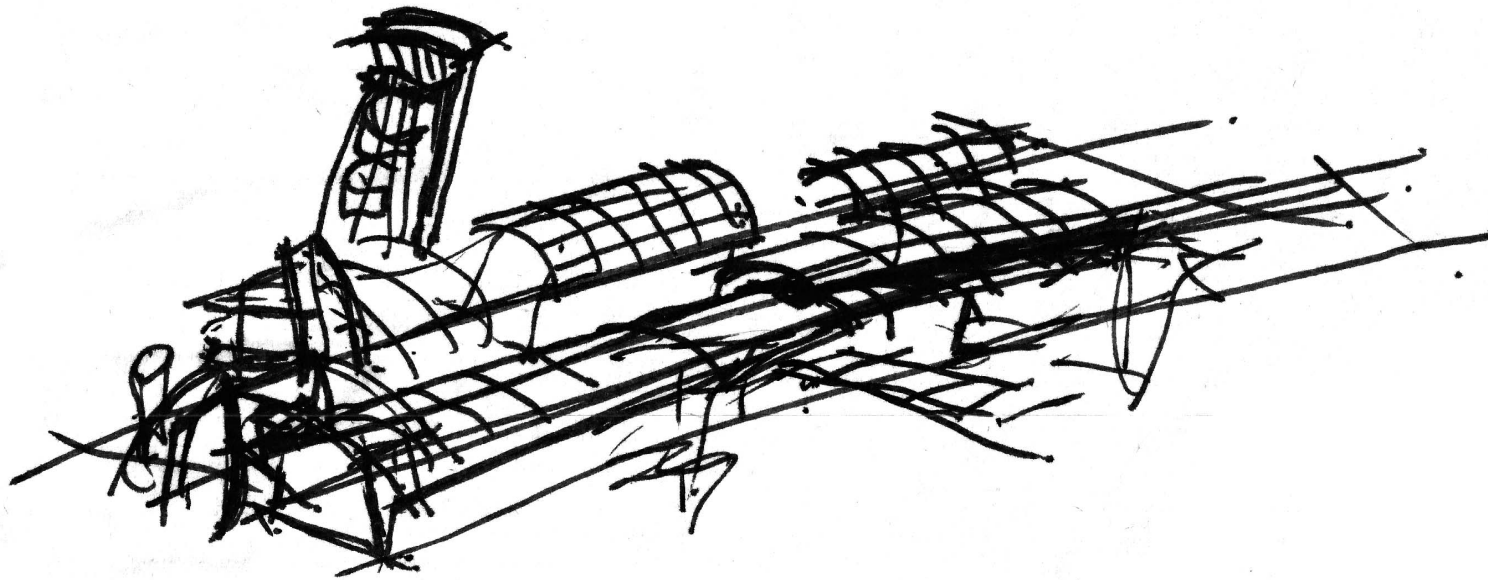
Models of fourth endeavour.



Sketch plan.

### 3.7. FITH ENDEAVOR

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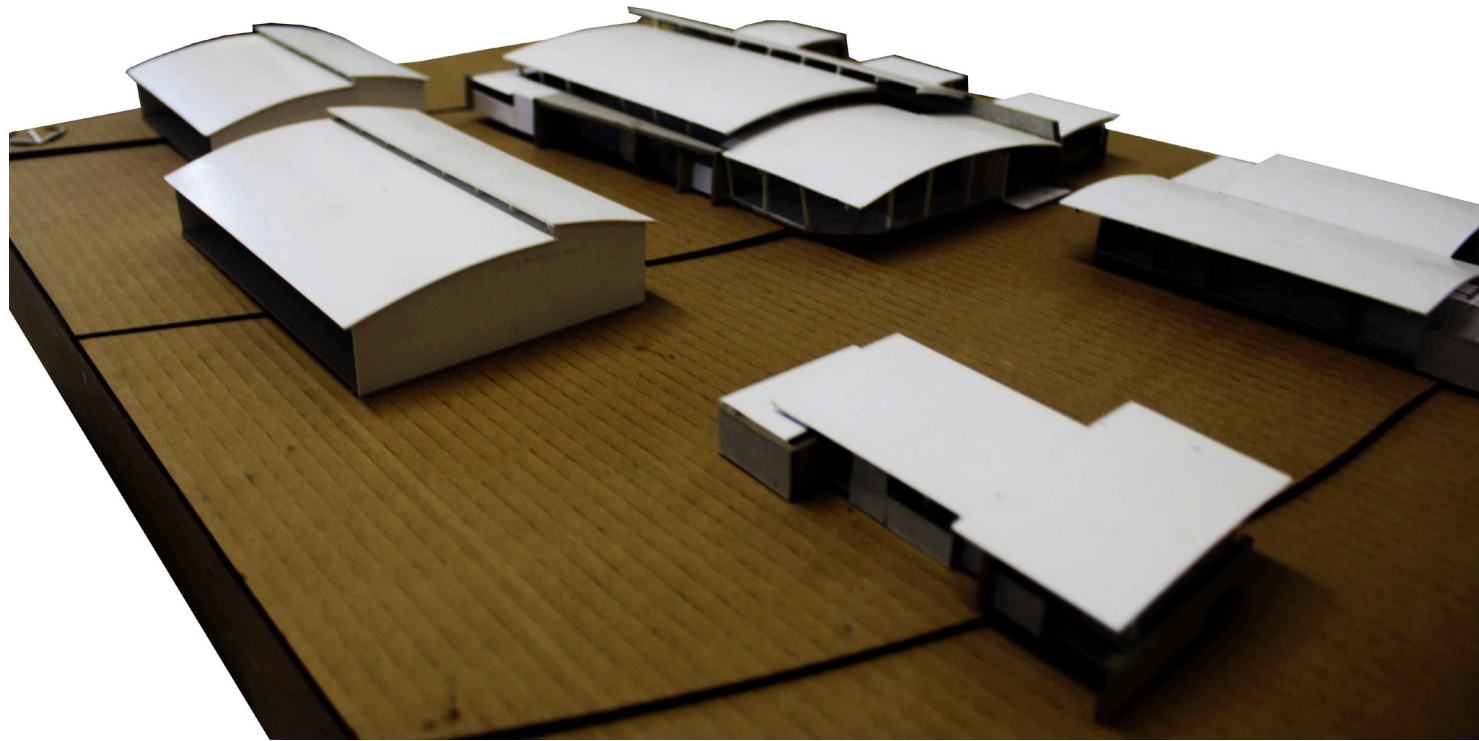


Sketch of perspective of the fourth endeavor.



Sketch of perspective of courtyard.

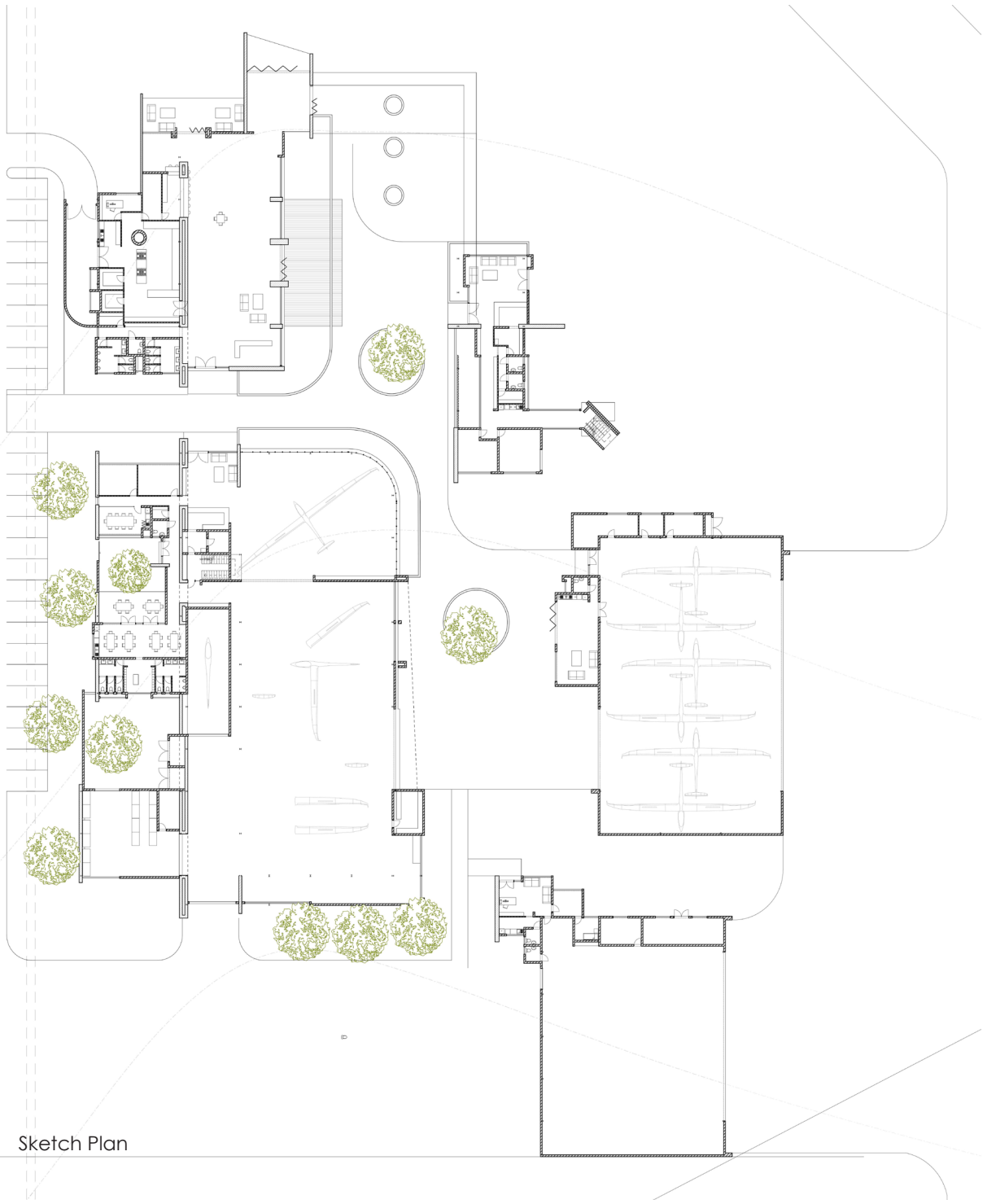
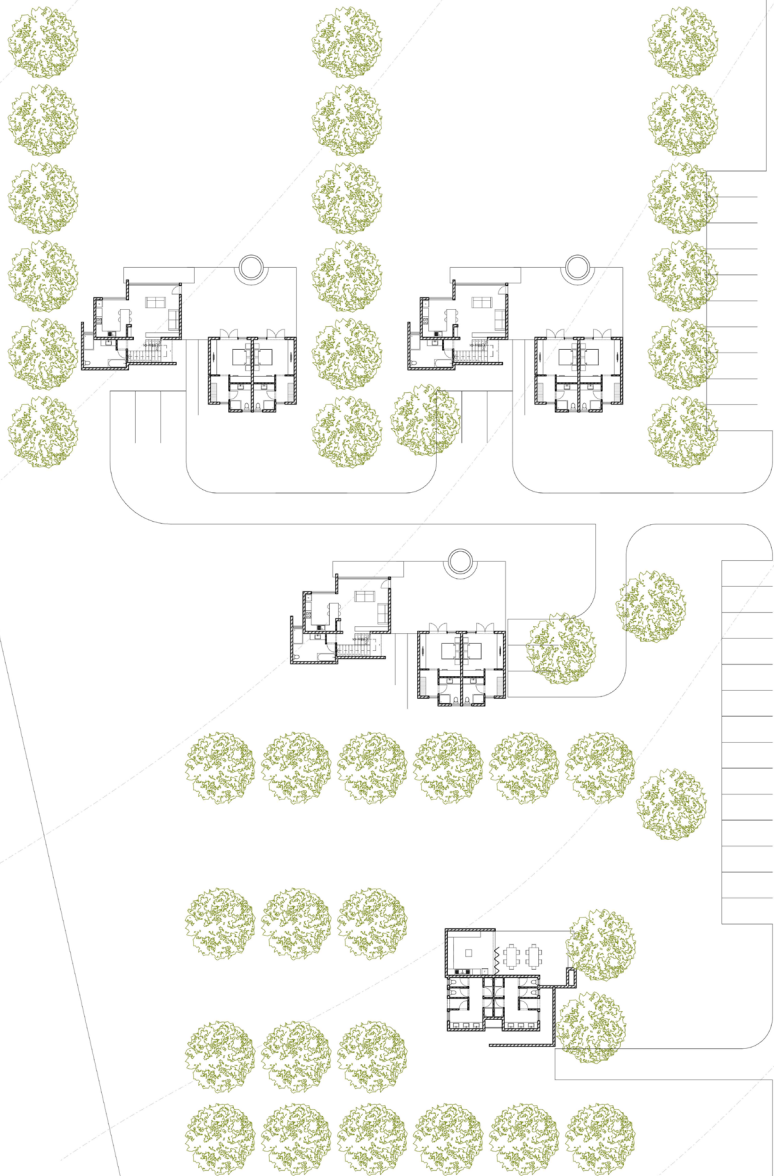
With response to challenge of the architectural language an attempt is made to resolve this by using curved rooves throughout the design. Even though there was a more relatable language between the designs the overall design did not relate to Douglas, which is the main aim of the dissertation. The curved roof arching towards the earth contradicts the idea of flight. Over all this design is too sterile, being nothing more than a attempt to be a more exiting structure.



Models of fifth endeavour.



Concept sketch of elevation.

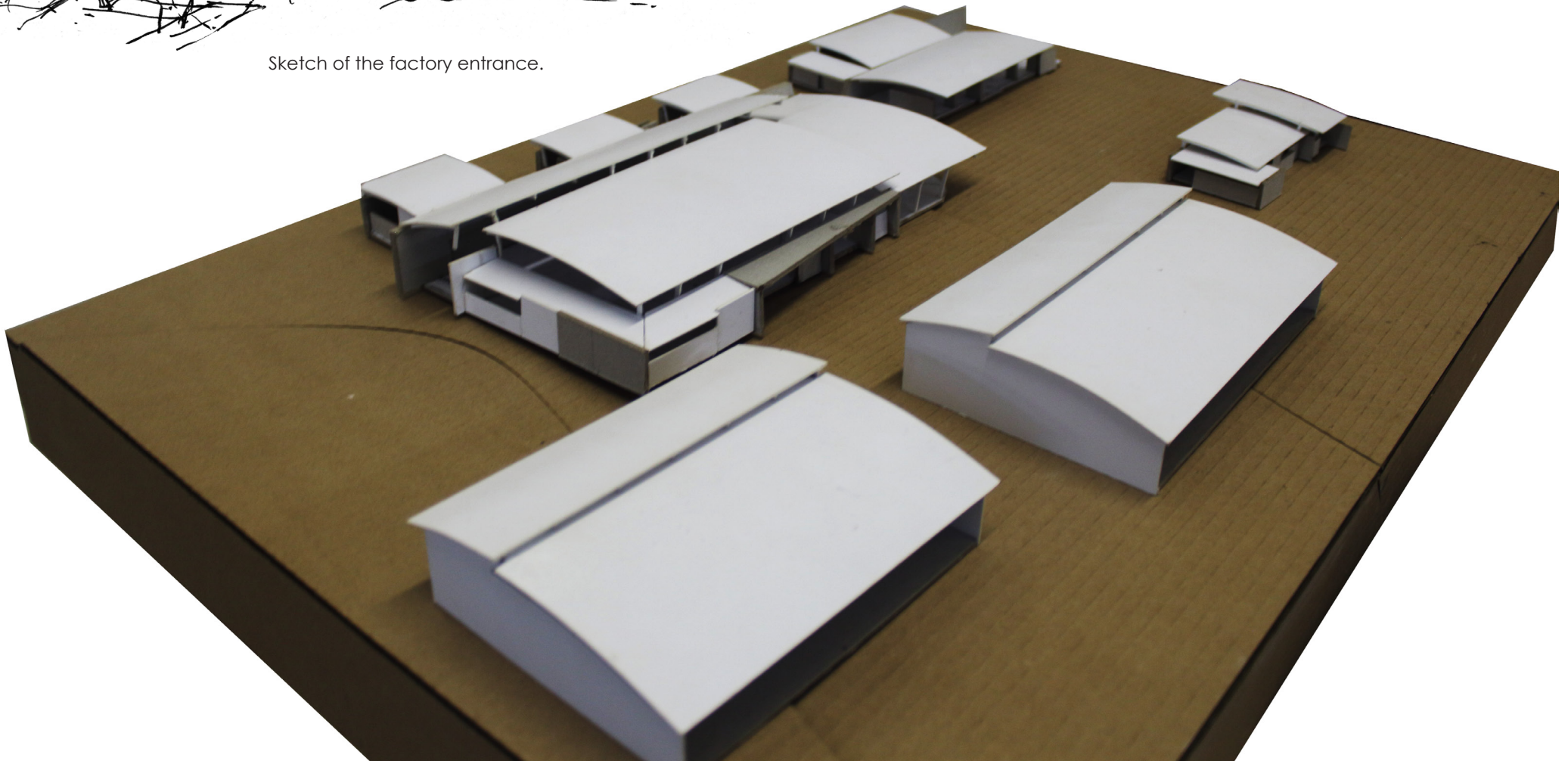


Sketch Plan





Sketch of the factory entrance.



Models of fifth endeavour.

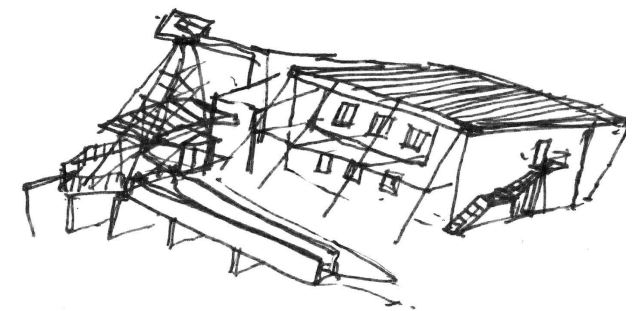
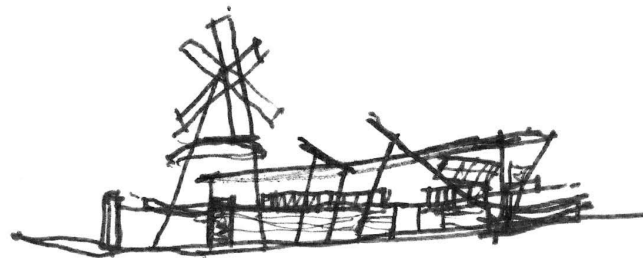
### 3.8. DAVID KLAASTE MULTIPURPOSE CENTRE, CS STUDIO ARCHITECTS (2005)

In my opinion, this project is successful in achieving an architectural language that the community can relate to. The symbol of the windmill and train is known within the Karoo landscape, and the images are distorted and form part of the design. Architect Carin Smuts and sculpture Willie Bester produced a series of models exploring the architectural language. The distortion relates to the windmills, electricity pylons, farm sheds and railway junctions familiar to the Karoo landscape (Cooke, 2009: 246). By relating to the things that contribute to the point of arrival of a place is a clever way for the architecture to relate with the site and its context.

w

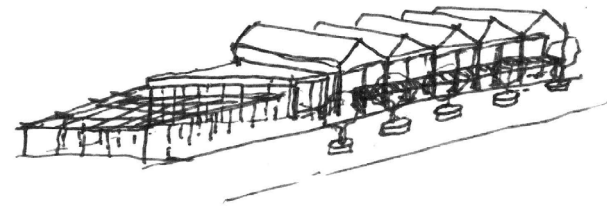


Source: <https://csstudio.co.za/laingsburg.html>



### 3.9. RED LOCATION MUSEUM OF STRUGGLE, Noero Wolff Architects & John Blair Architects. 2006

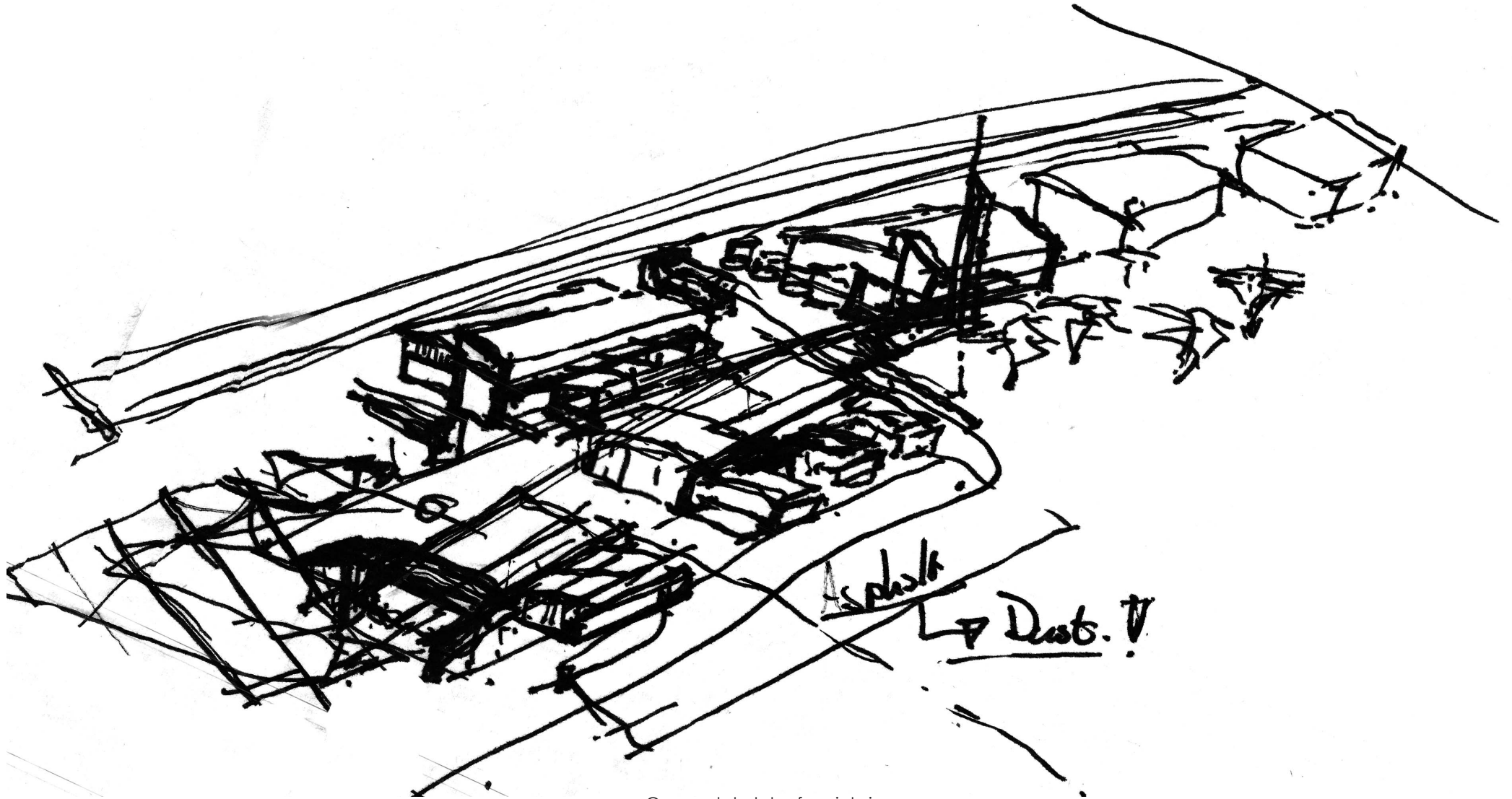
A design competition was made public to engage in the historical complexities of Red Location. The project is in a harsh environment with run-down surrounding shacks with a disorganised street system (Gerneke, 2009: 370). The building engages with the community by taking inspiration from the surrounding material use, the factories from the nearby industrial area, and the behaviour of the people. Instead of the typical exhibition spaces, the exterior shell houses twelve “memory boxes”. This is inspired by the metal trunks in which workers of Red Location would safeguard their artefacts. There is no order to the boxes in which the visitor should visit them. It is more a fleeting experience of memories within a single volume for reflection. The surprisingly light roof structure with slender columns is further deconstructed by light filtering through the roof. The entrance is extended with a timber pergola providing a semi-sheltered space for the use of the community. The timber structure also reduced the scale of the structure, bringing it down to a more human scale and also placing emphasis on the entrance. Though the building is much larger than the neighbouring residential area, it does not overwhelm it.



Source: <http://www.noeroarchitects.com/project/red-location-museum/>

### 3.10 TOWARDS A FINAL DESIGN

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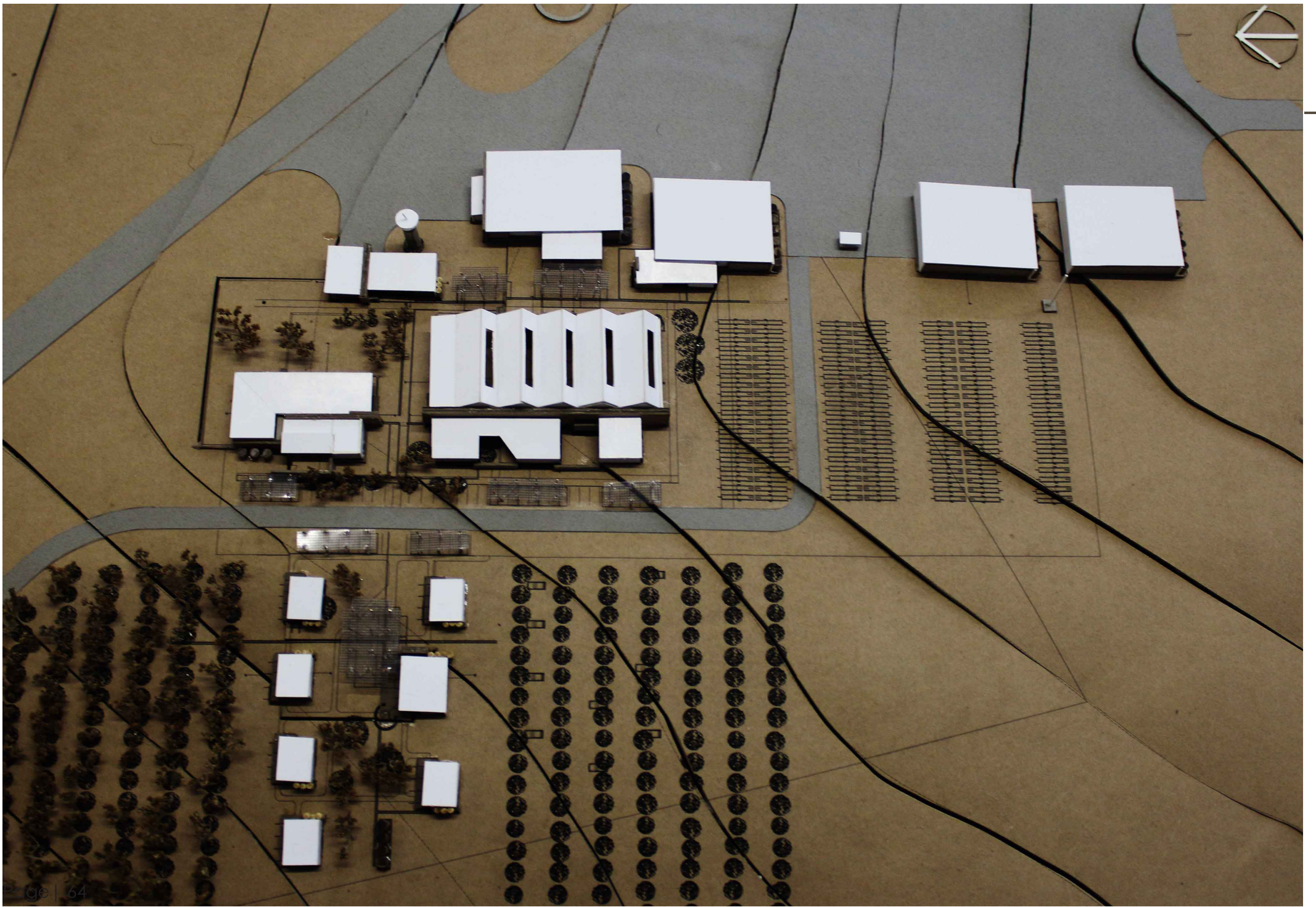
Concept sketch of aerial view.

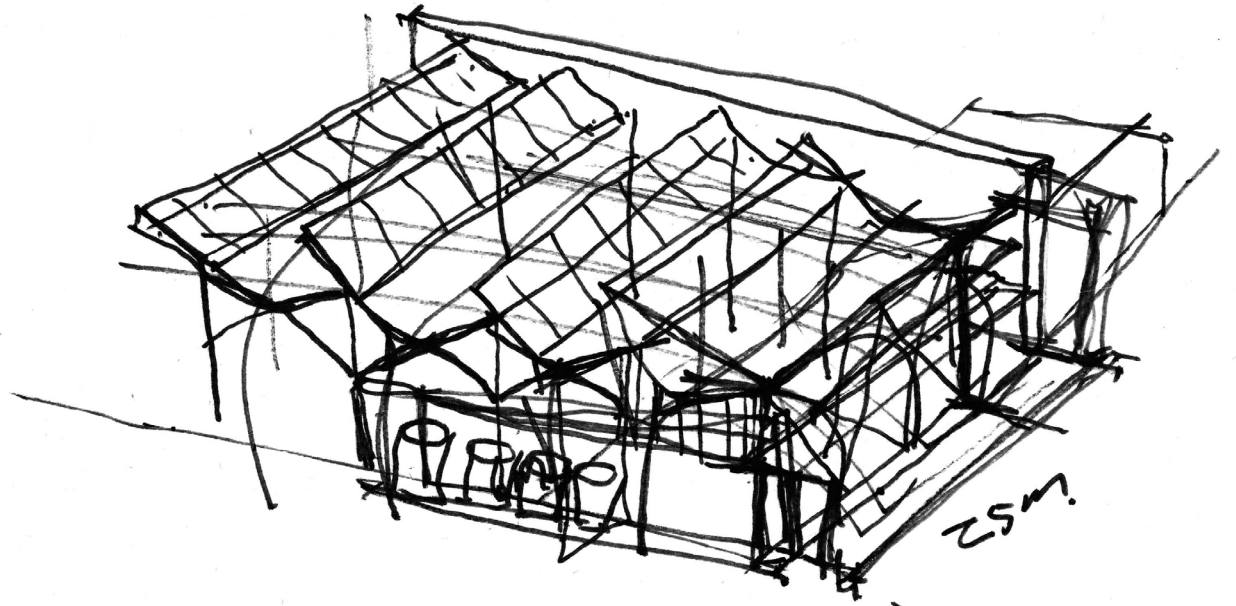
The precedent studies of Red location and David Klaaste Multipurpose Centre proved to be more useful. The designs are different because it facilitates different users with different requirements. The hangars can relate, the factory can have its own form, while the restaurant and terminal can imitate one another. A uniform architectural language can be achieved with material. Similar functions can also look the same.

The accommodation units taps in to the rest of the design via an axis between the control tower and boma at the communal recreational area. The structure of the control tower imitates the silo that can be seen from site. The concrete cylinder pushing from the earth with a steel structure housing the control room and a viewpoint a story below it that is open to the public. The thick walls from the fourth endeavour developed to accommodate for a box gutters cladded in stone sourced from site.

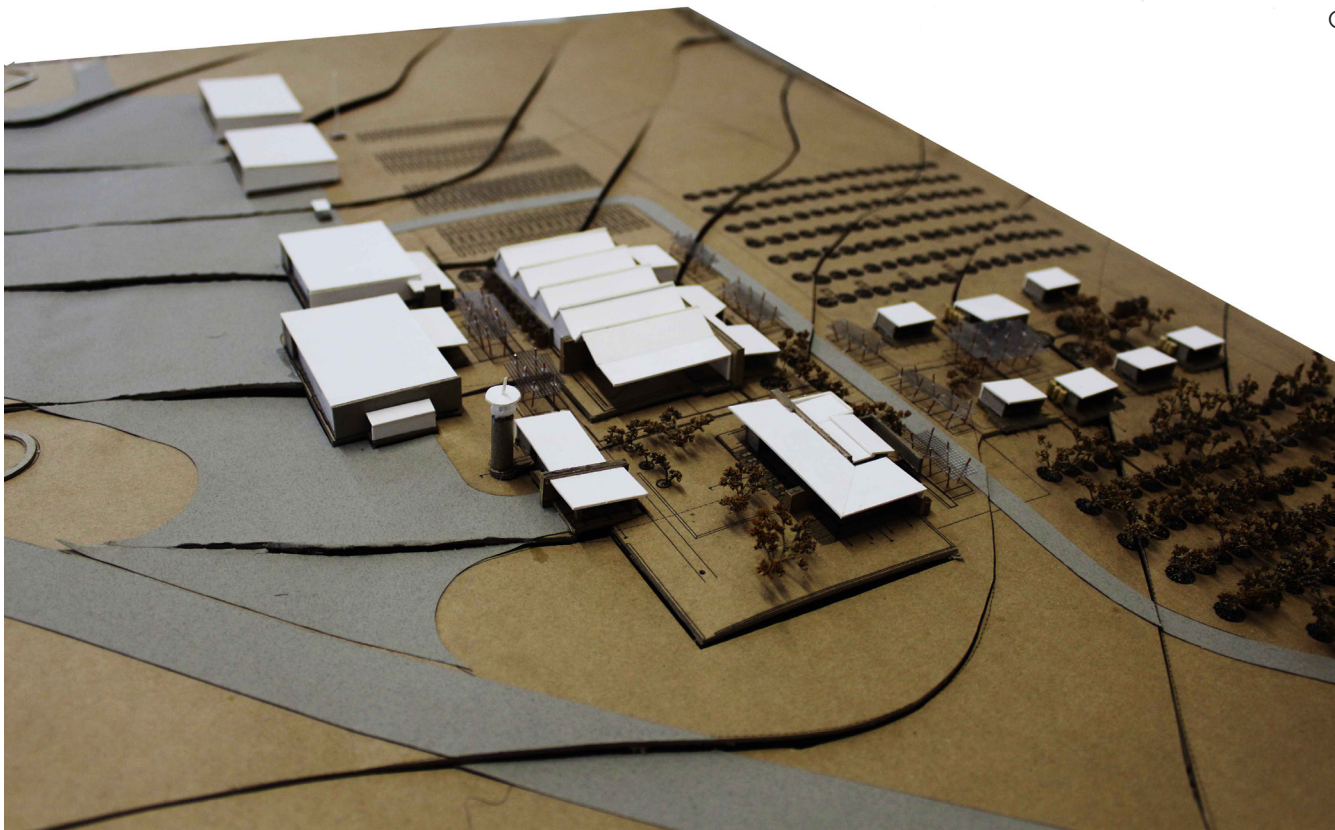
The factory is fitted with a factory truss system orientated north on to which photovoltaic panels are fixed. Polycarbonate sheeting on the southern side of the roof allows natural light to light the factory. Every opportunity is seized to harvest rain water. The overflow would be channelled in to fishponds that act as reflection pools and to create a micro climate. Pergolas with grape vines are used in the restaurant and the accommodation units to filter the sunlight and to bring the scale of the building down. A pecan orchard is also added to relate to the agriculture industry of Douglas. Daisy lawn and gravel planes create datum to bind the design as a whole that can be experienced from an aerial view.

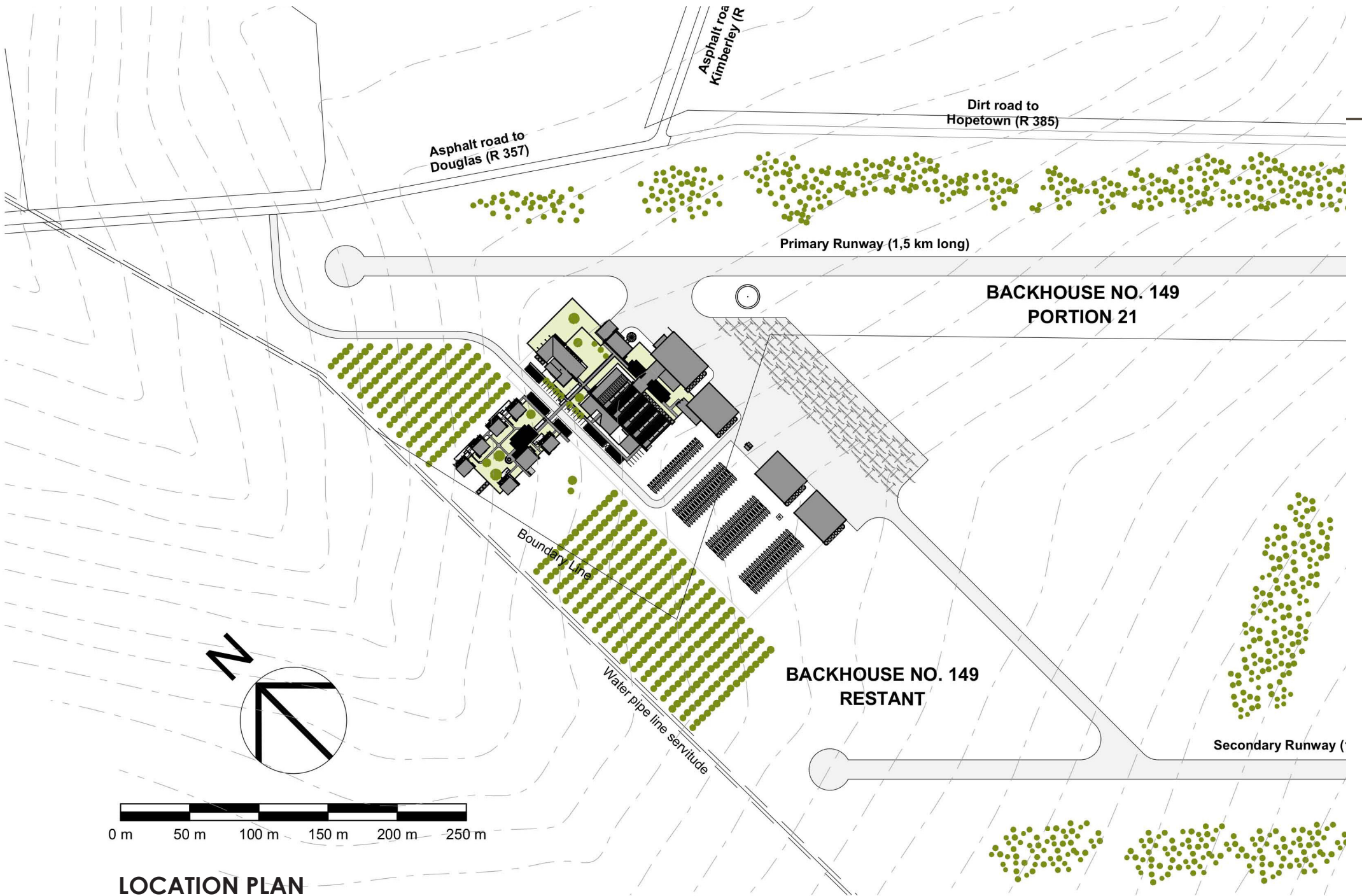






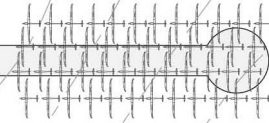
Concept sketch of factory.



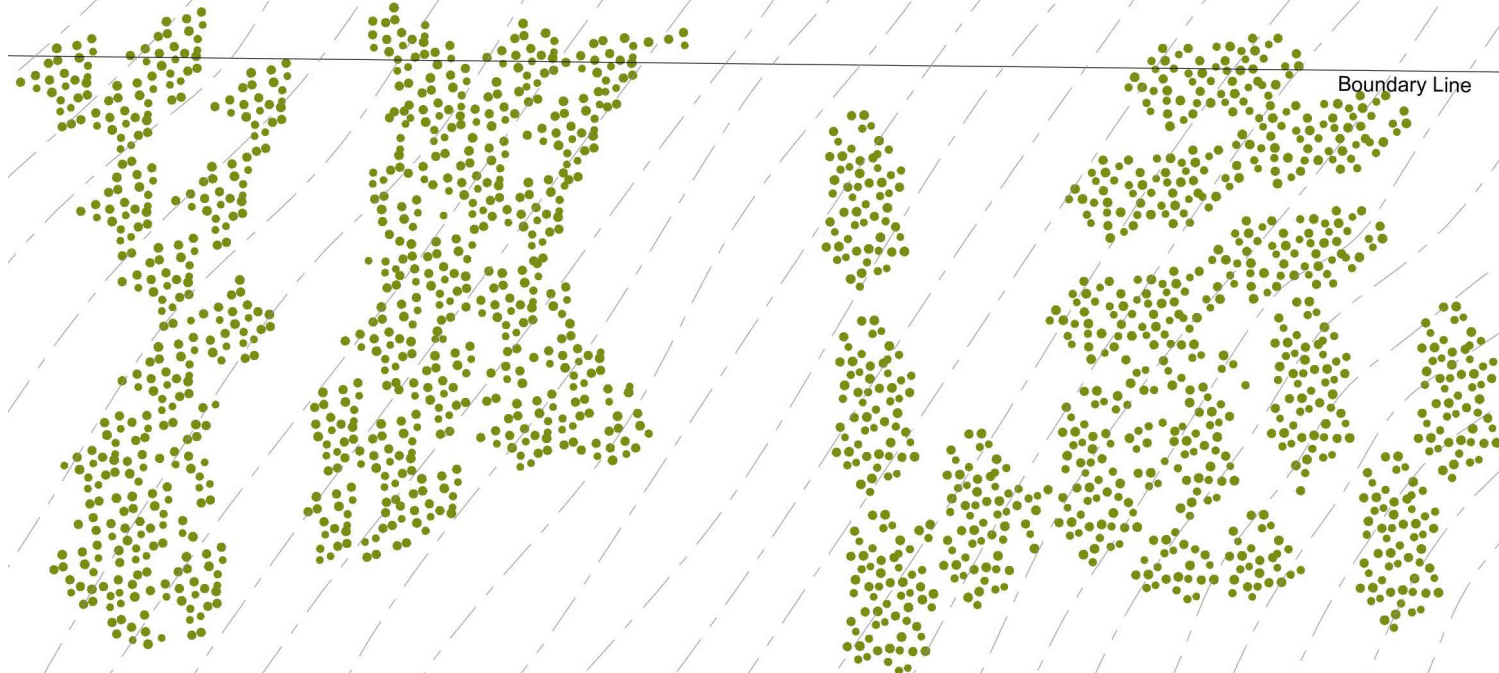


**LOCATION PLAN**

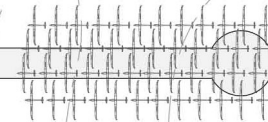
Boundary Line



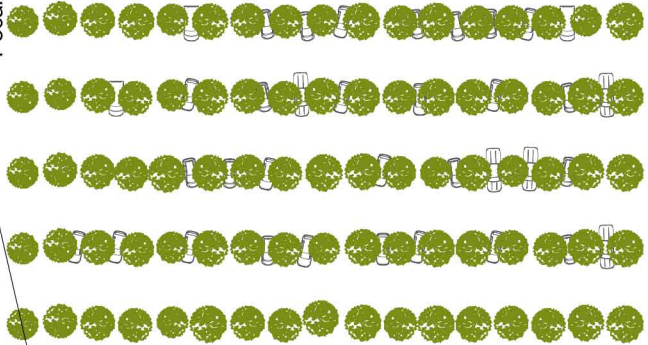
Boundary Line



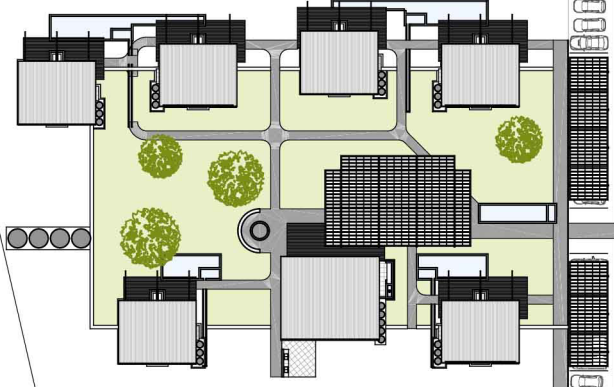
1,2 km long)



Pecan orch

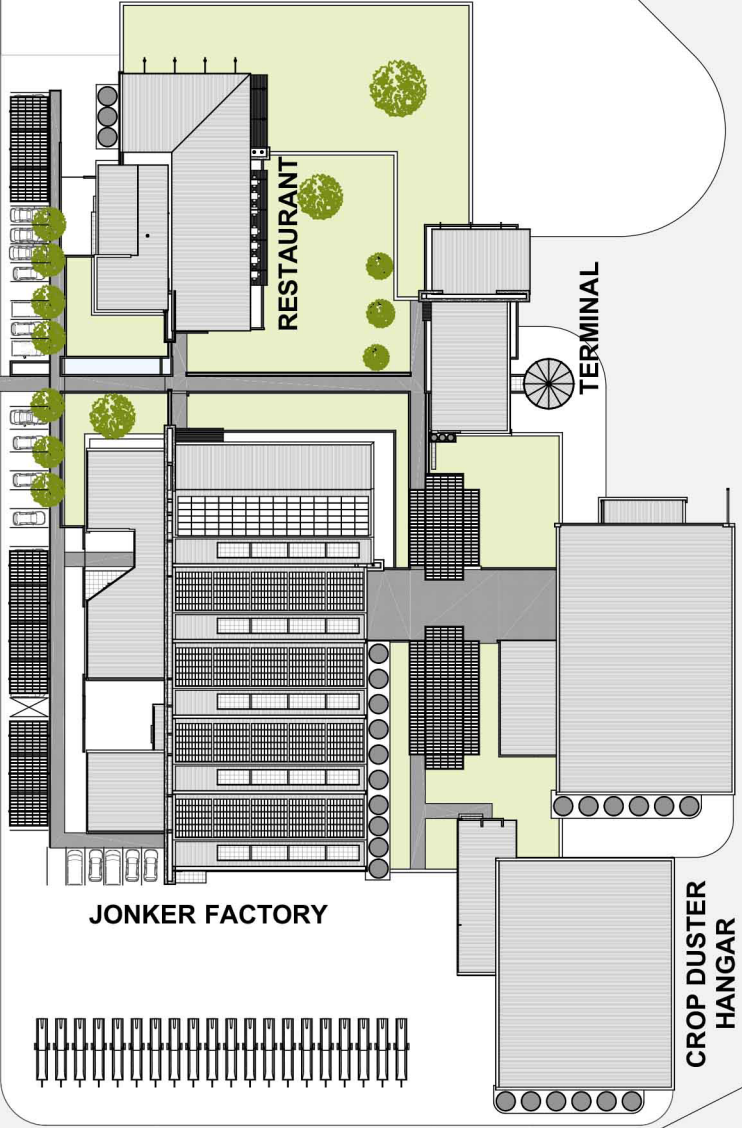
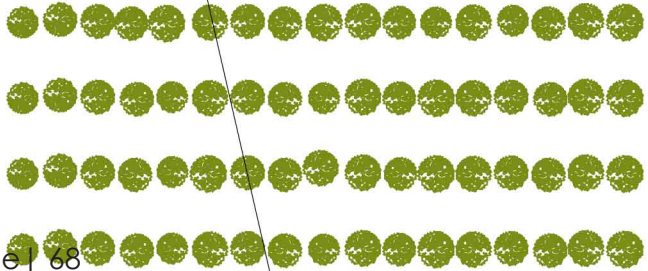


ACCOMMODATION



SITE PLAN

Pecan orchard



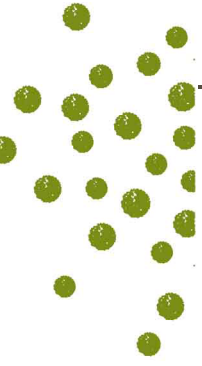
RESTAURANT

TERMINAL

GLIDER HANGAR

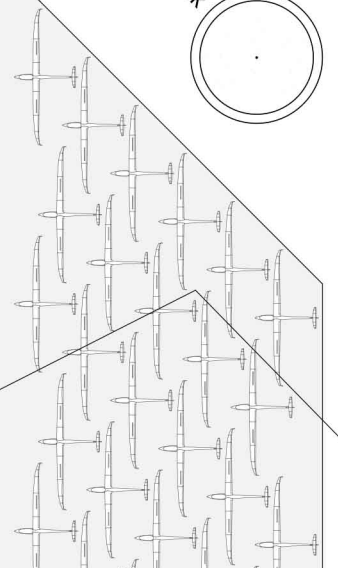
CROP DUSTER HANGAR

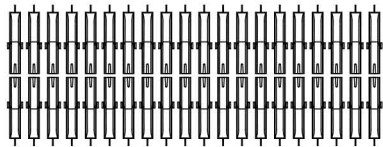
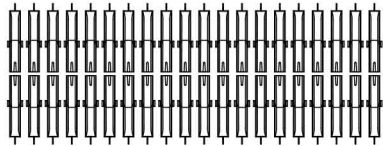
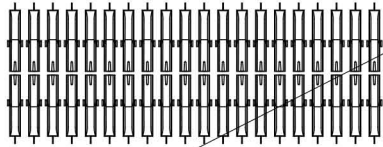
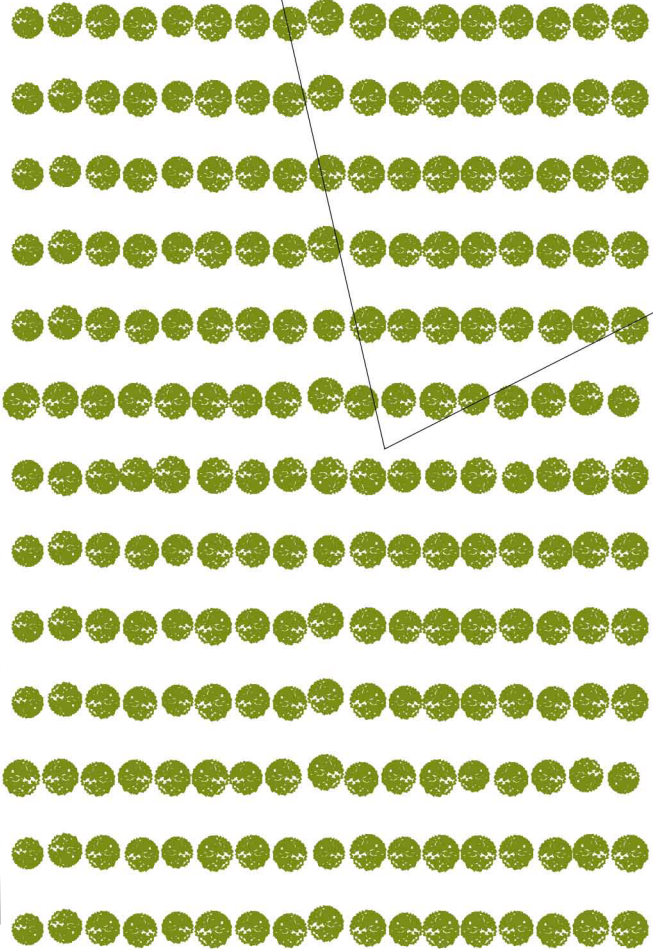
JONKER FACTORY



Primary Runway

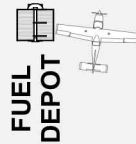
Windsock





Gravel

Radio Mast



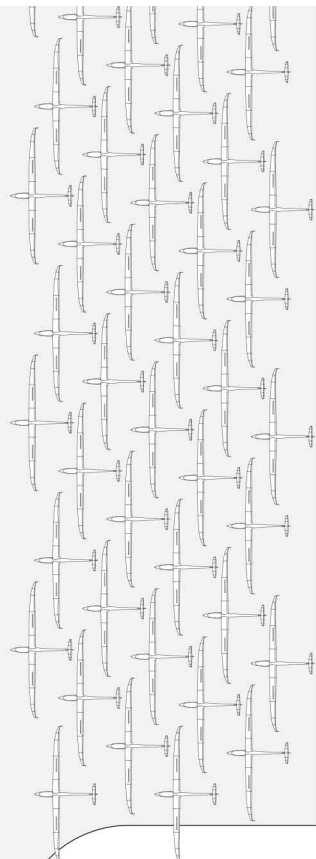
FUEL  
DEPOT



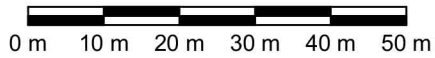
PRIVATE HANGAR  
01



PRIVATE HANGAR  
02

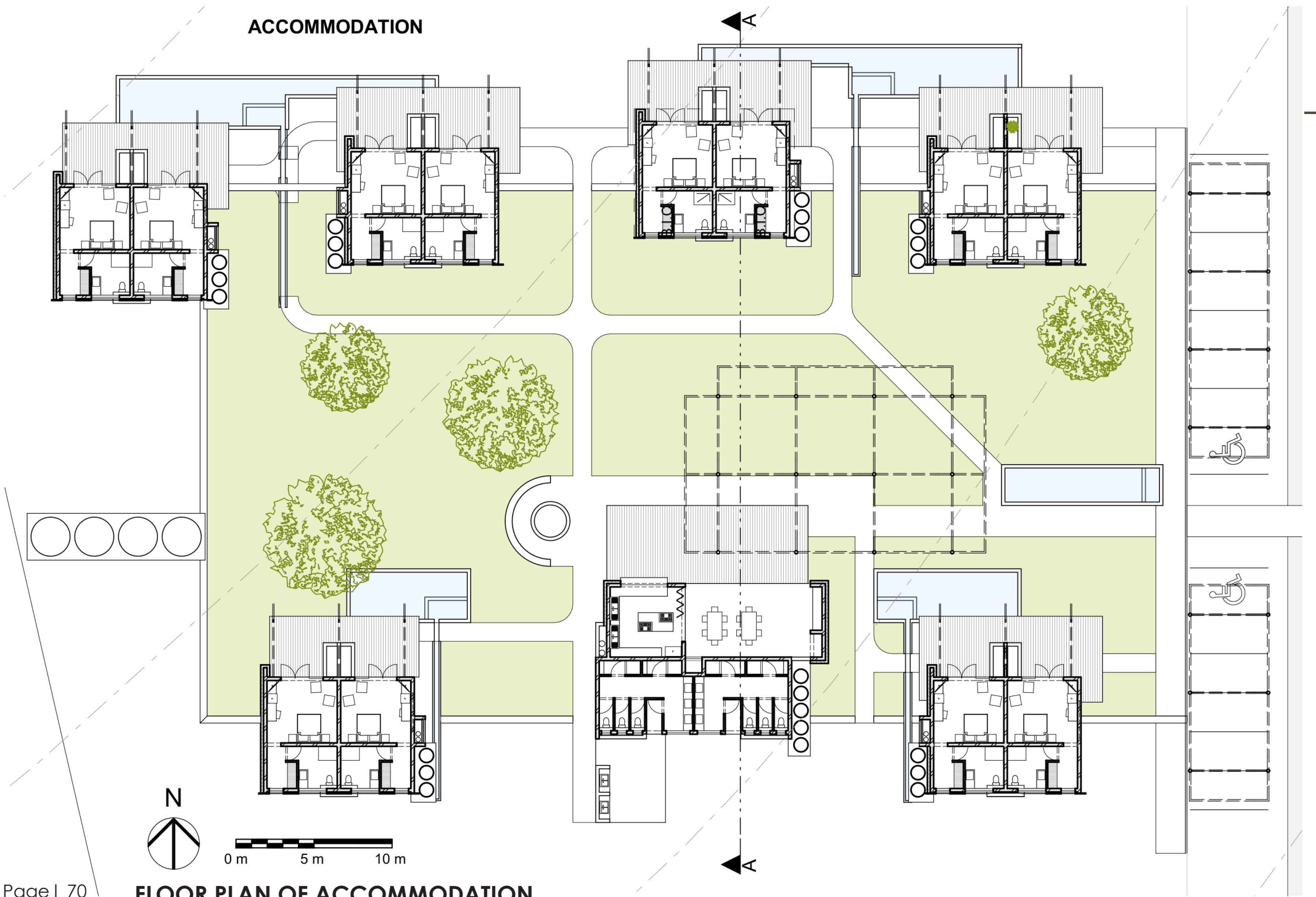


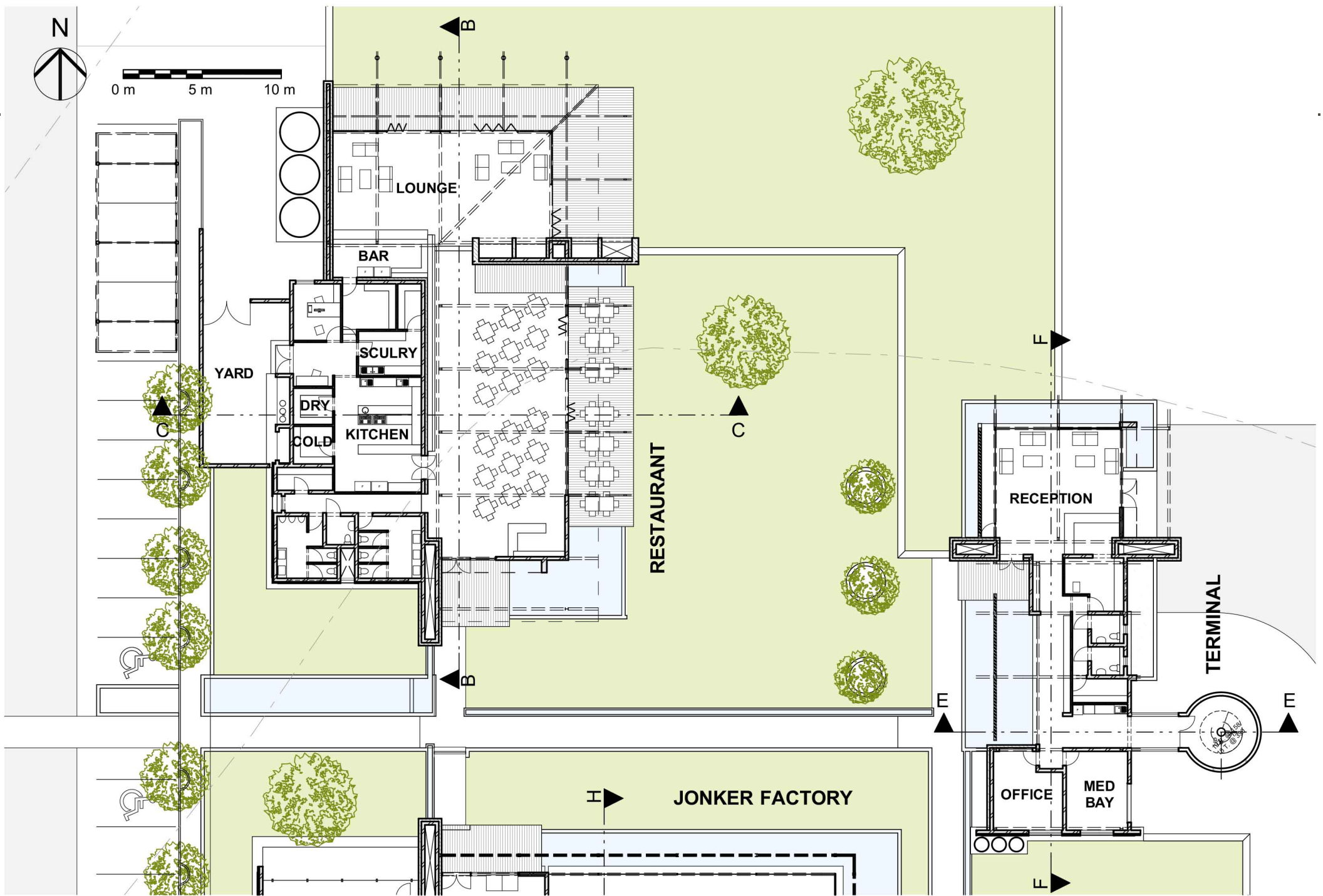
Taxiway



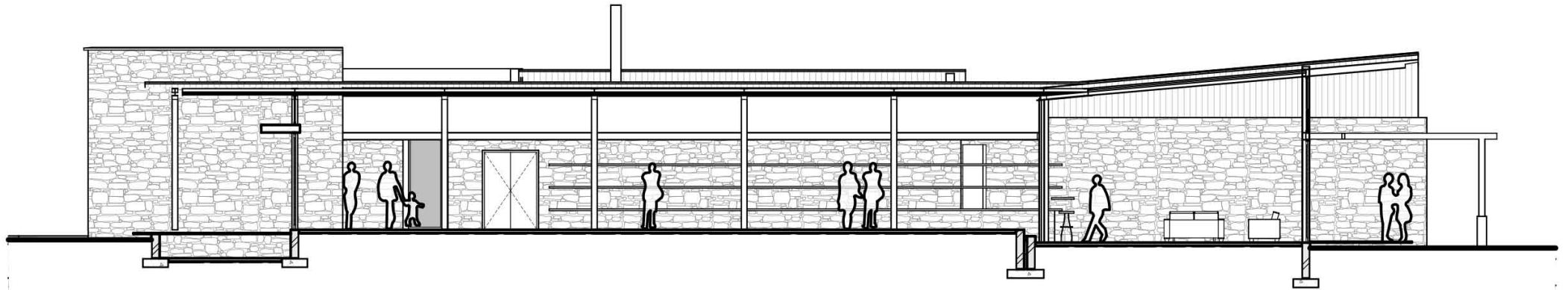
# SITE PLAN

ACCOMMODATION

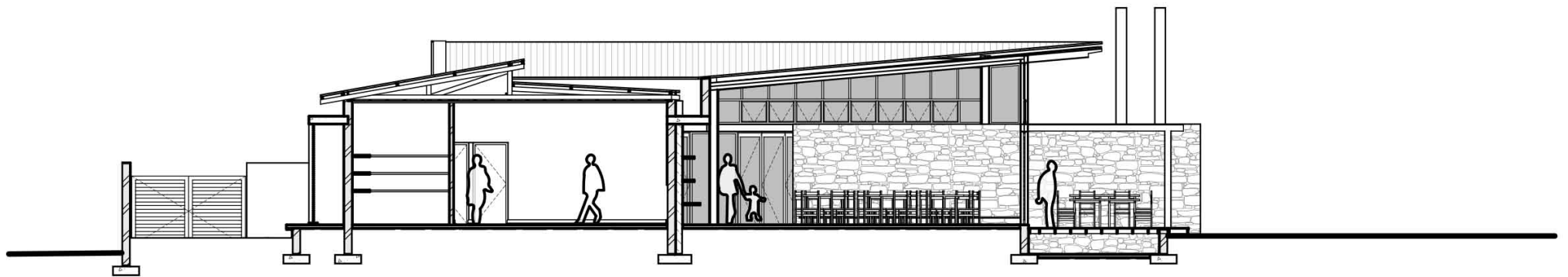




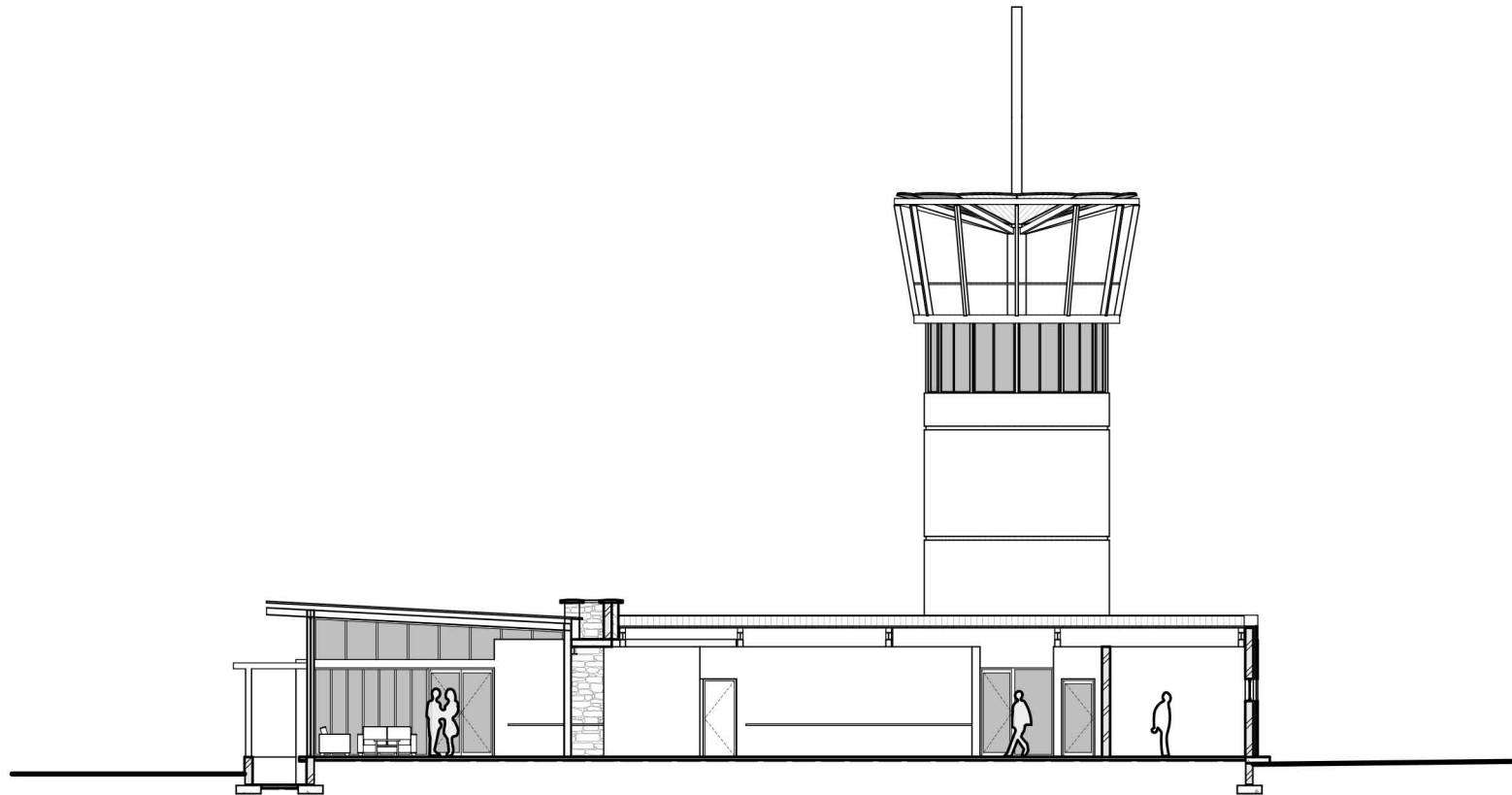
FLOOR PLAN OF RESTAURANT AND TERMINAL



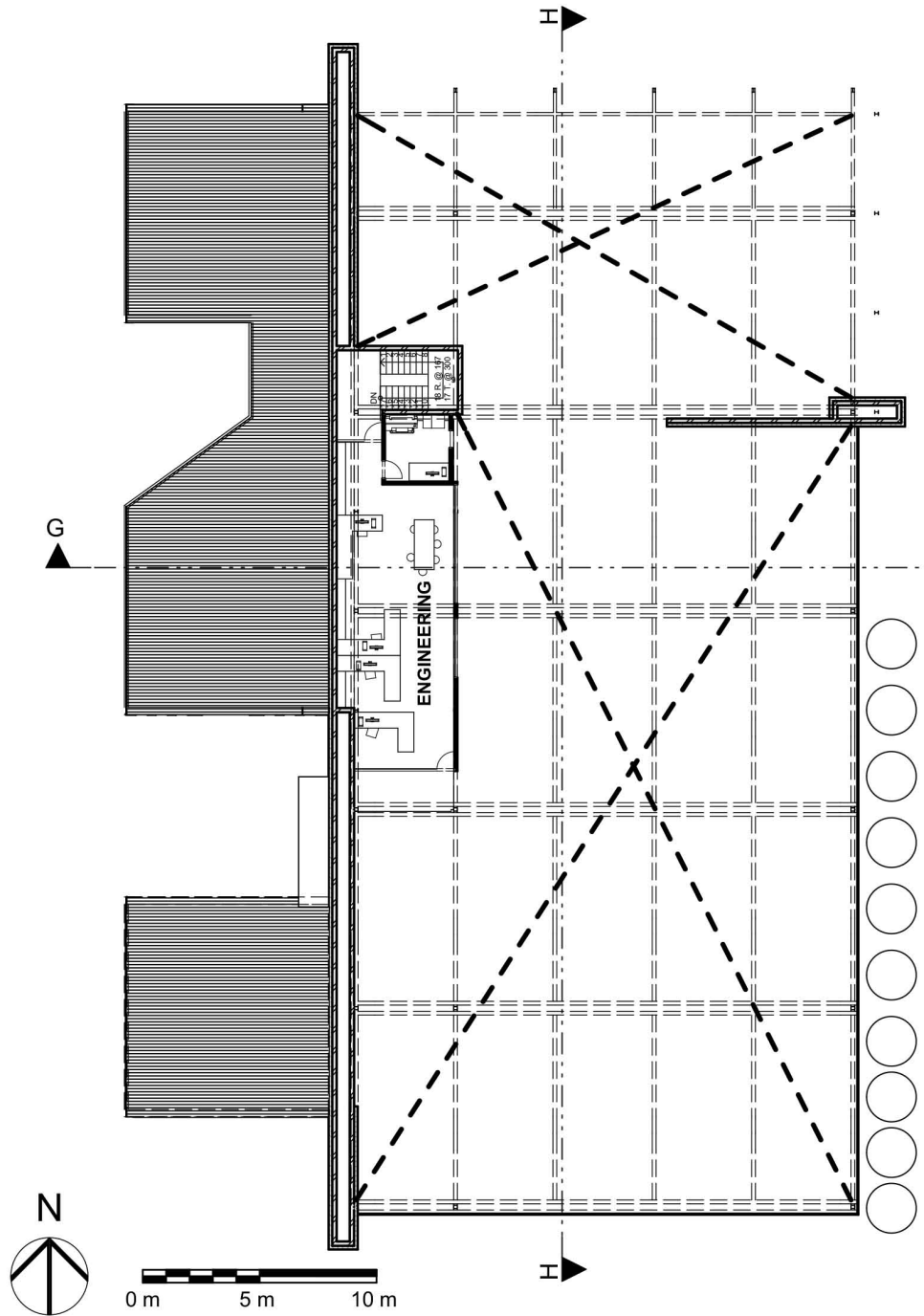
**SECTION B-B**



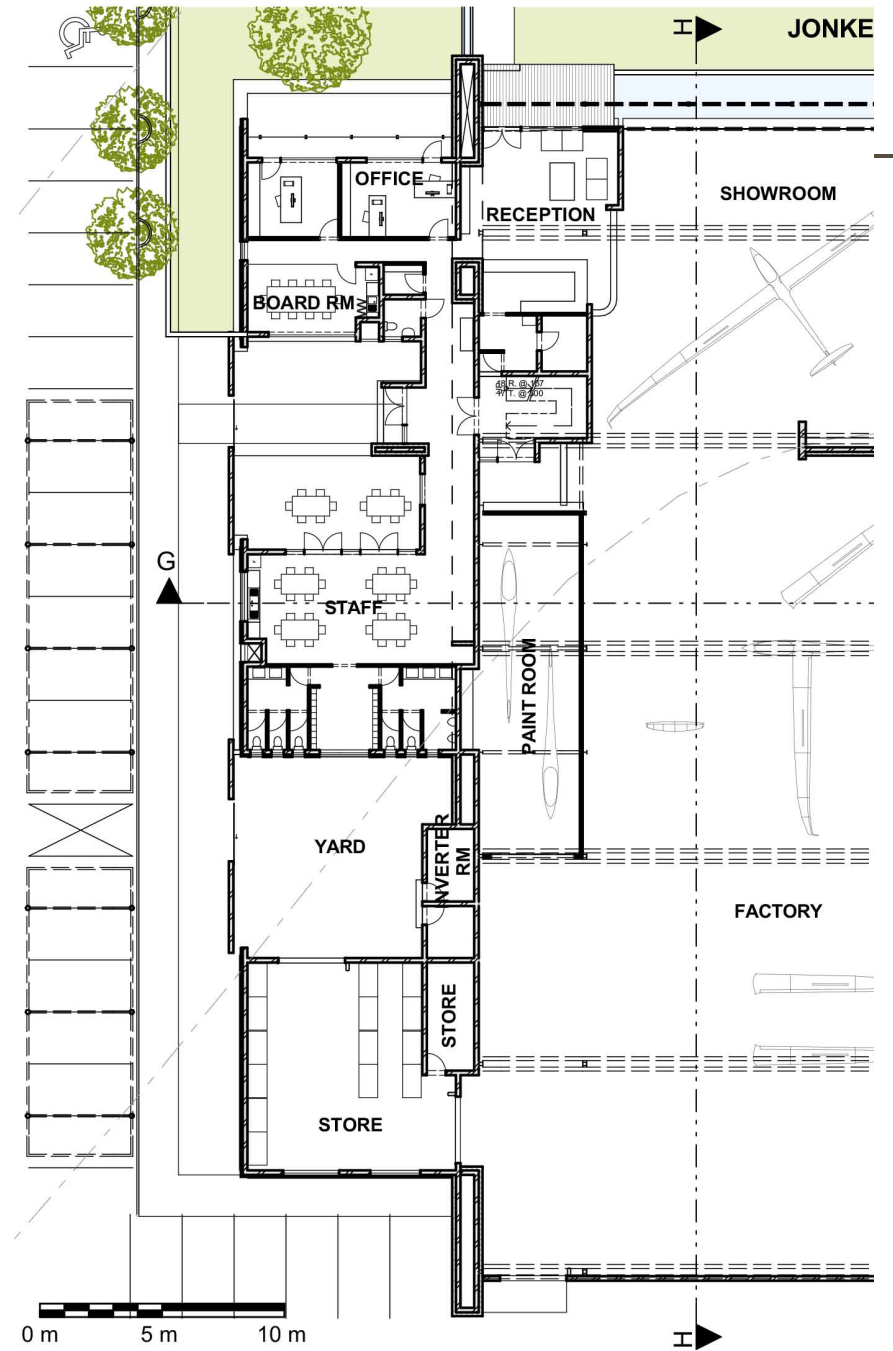
**SECTION C-C**



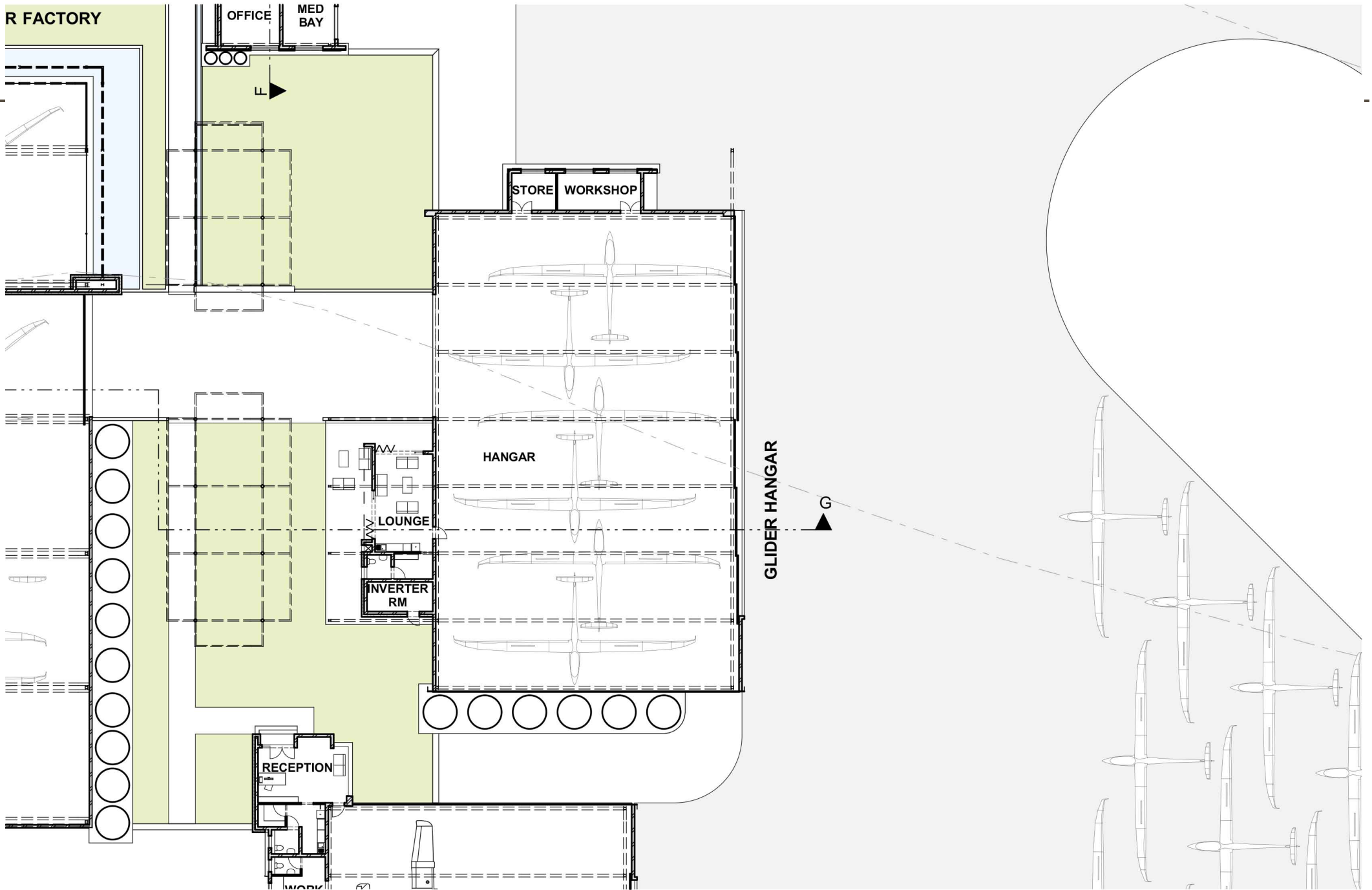
SECTION F-F



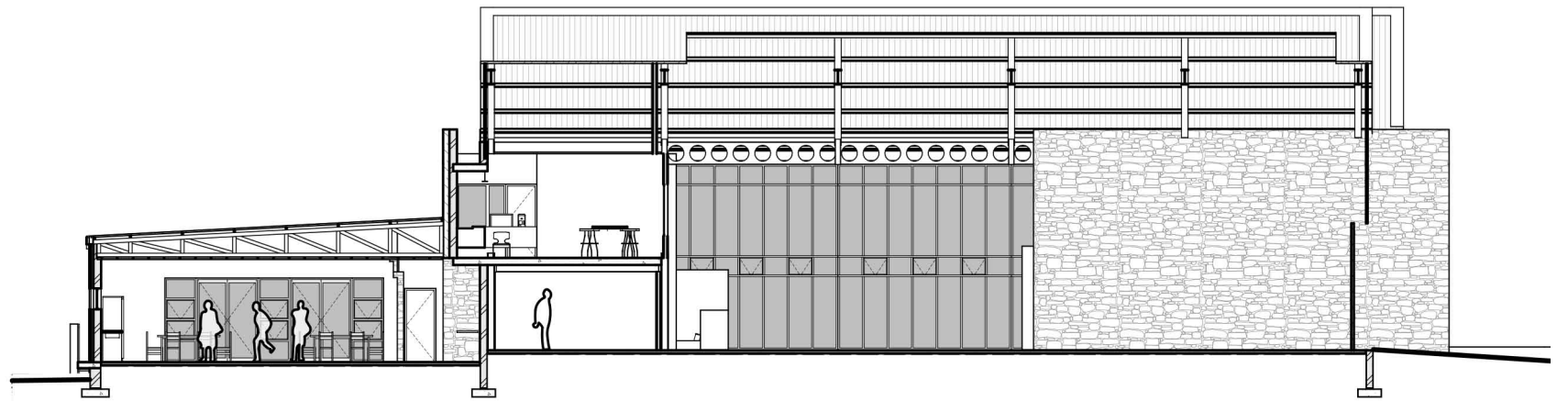
**FIRST FLOOR PLAN OF FACTORY**



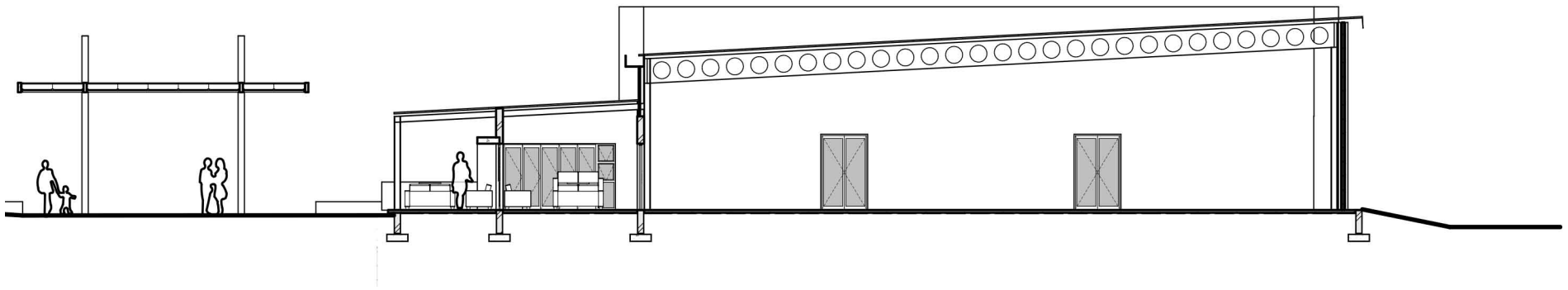
**GROUND FLOOR PLAN OF FACTORY**

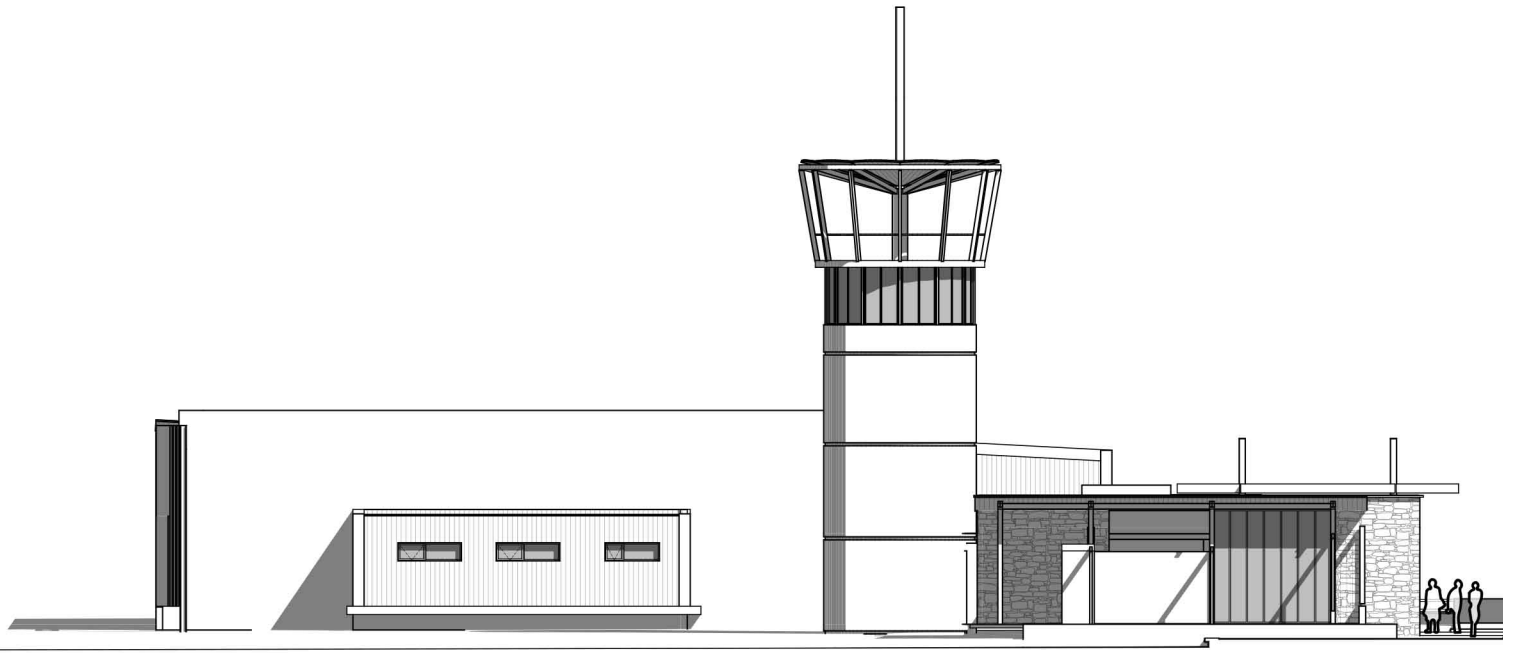


**FLOOR PLAN GLIDER HANGAR**



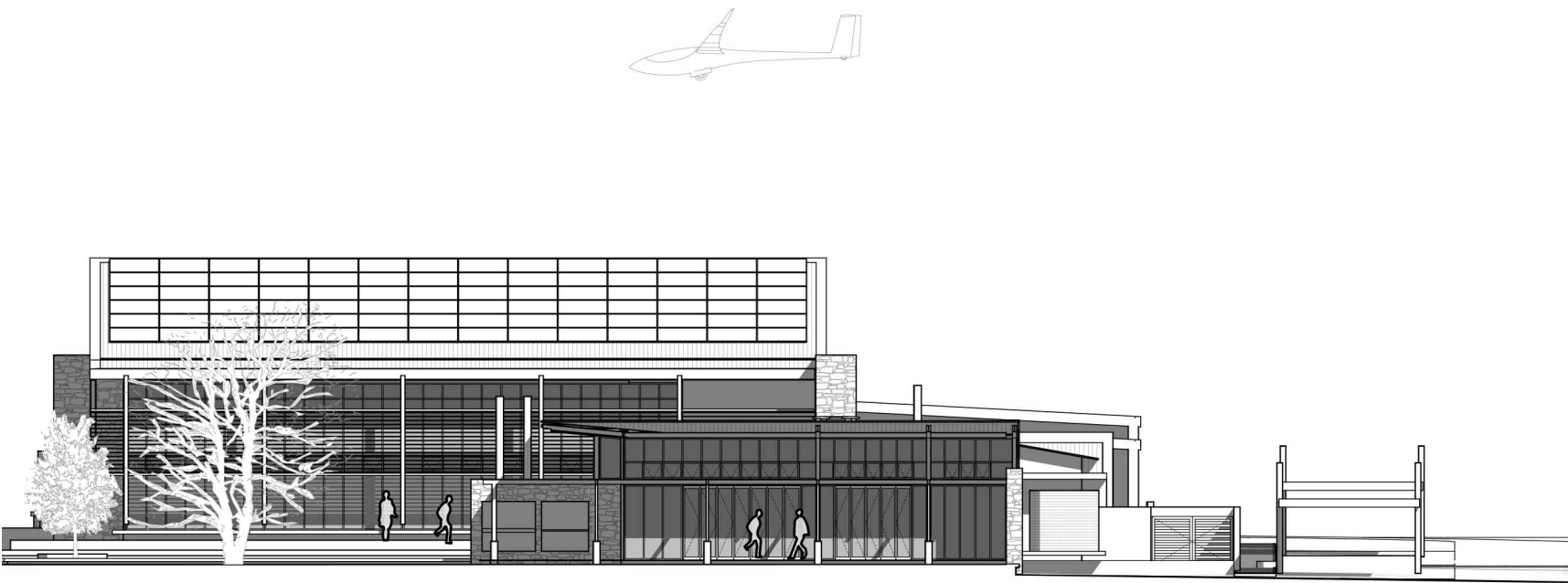
**SECTION G-G**

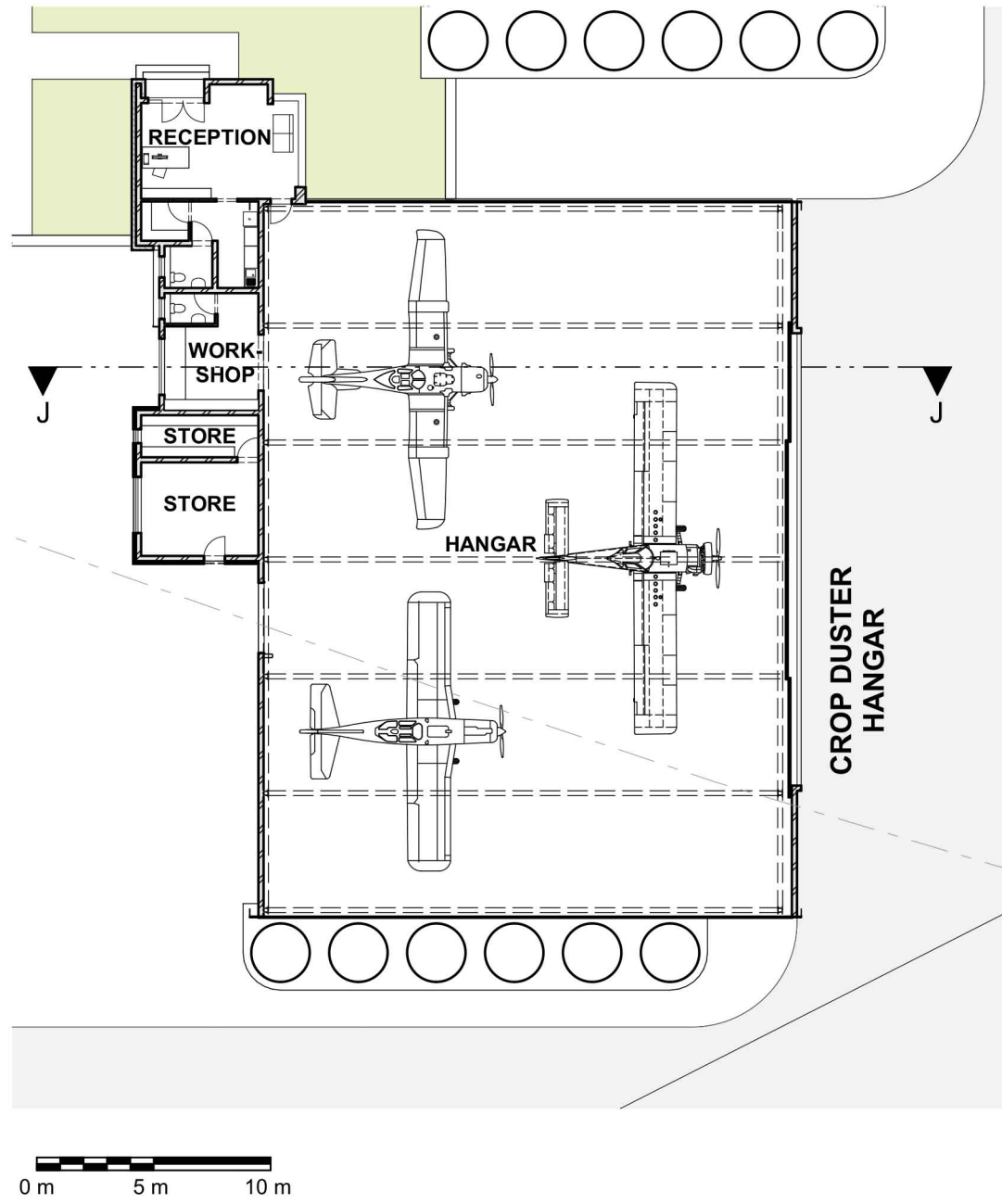




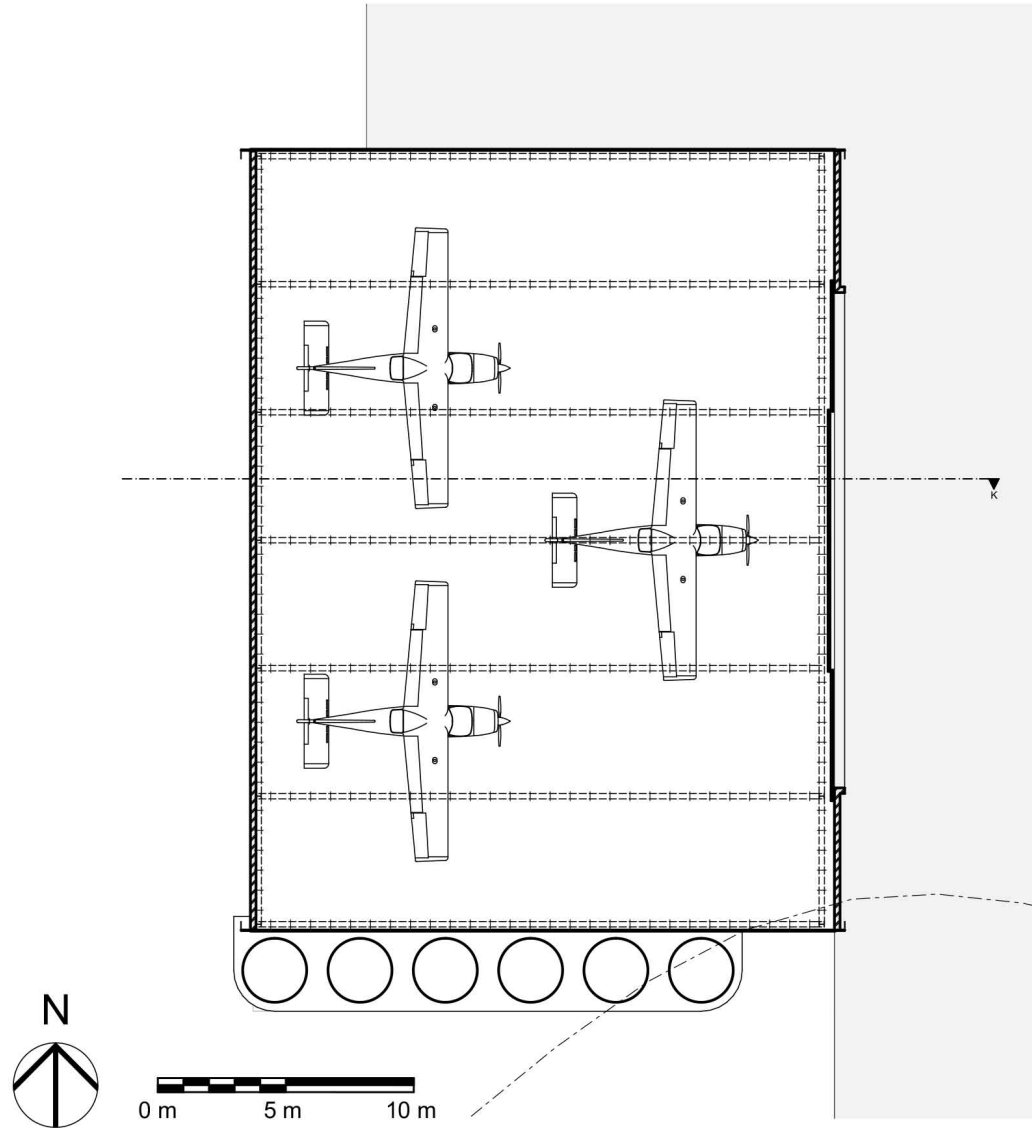
0 m 5 m 10 m

**NORTHERN ELEVATION**

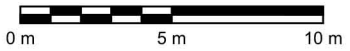
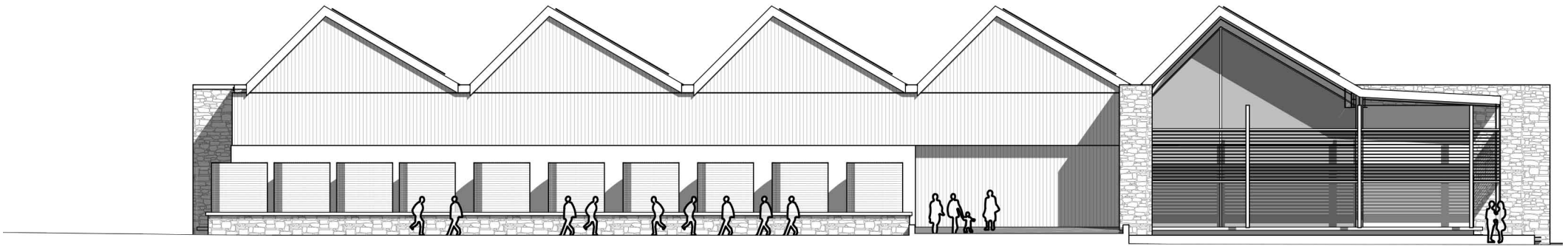




**FLOOR PLAN OF CROP DUSTER HANGAR**

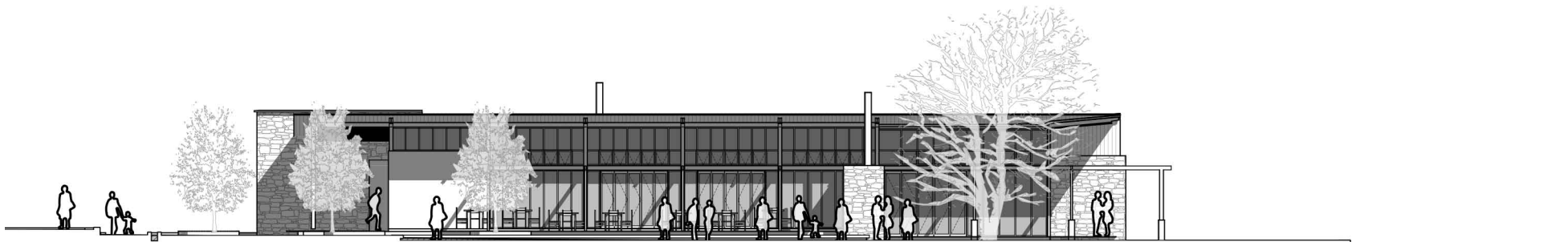


**FLOOR PLAN OF TYPICAL PRIVATE HANGAR**

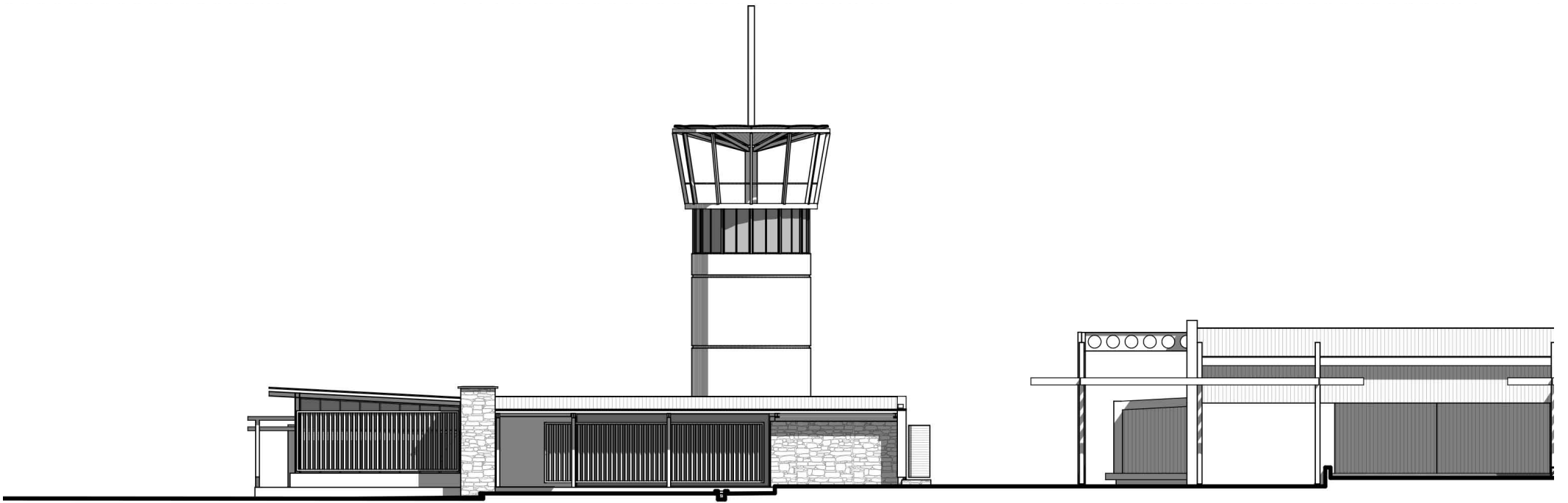


## JONKER SAILPLANE FACTORY

### EAST ELEVATION THROUGH COURTYARD

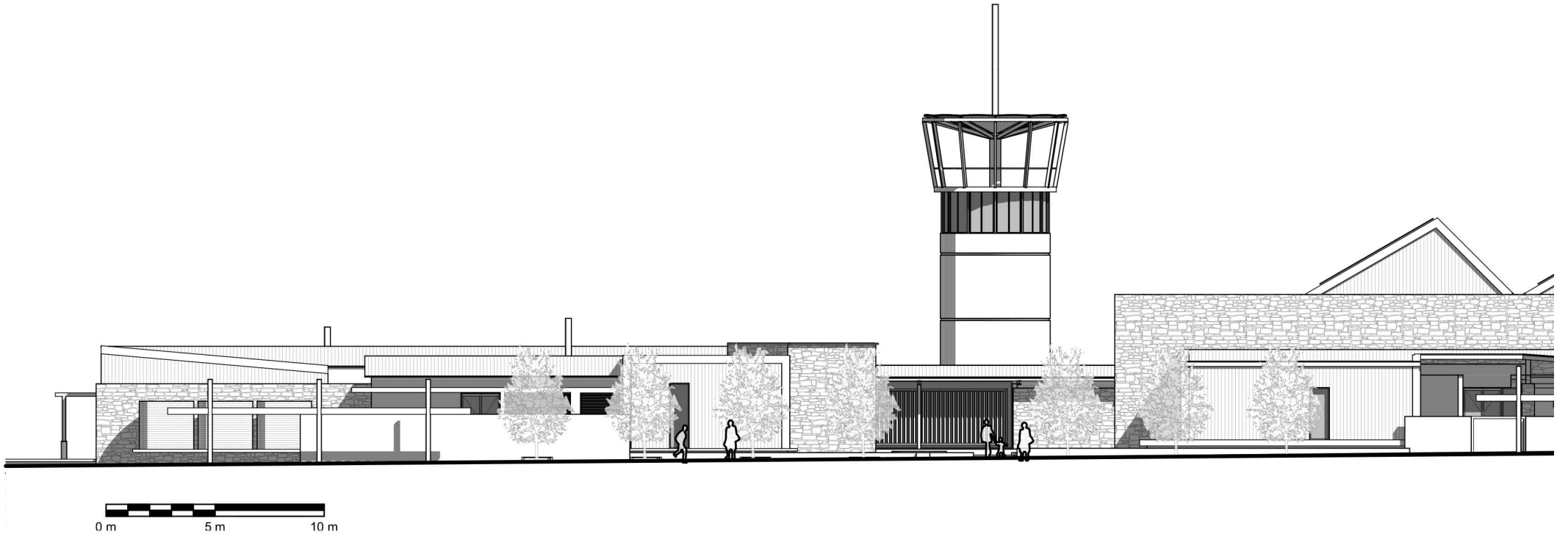


**RESTAURANT**



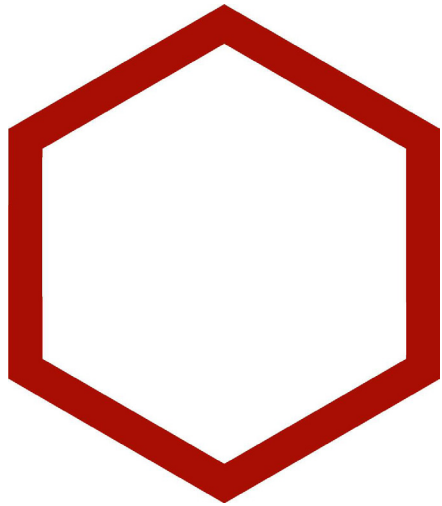
**WEST ELEVATION THROUGH COURTYARD**





**EAST ELEVATION THROUGH ROAD**





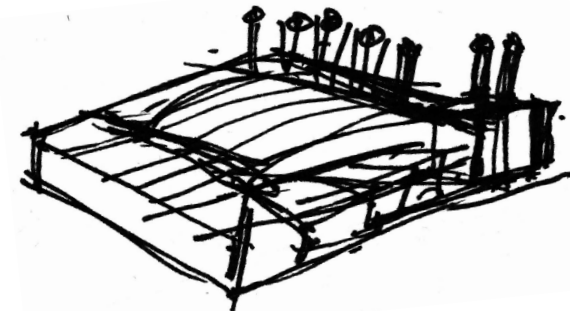
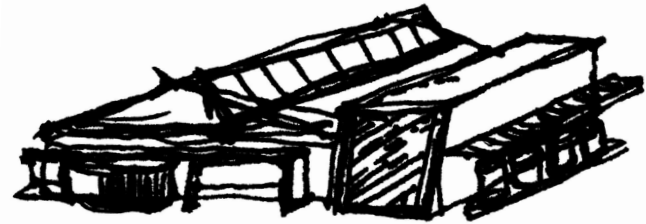
# **PART 4**

## 4. TECHNICAL REPORT

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The technical report forms part of the design resolution by investigating the specific site conditions, the sustainability approach of the design, material selection, structural development and the services that are unique to this design project. The aim of the technical report is to critically investigate the above components and allow it to become an intricate part of the design. A construction approach will be identified to effectively and contextually address the particular needs of the design.

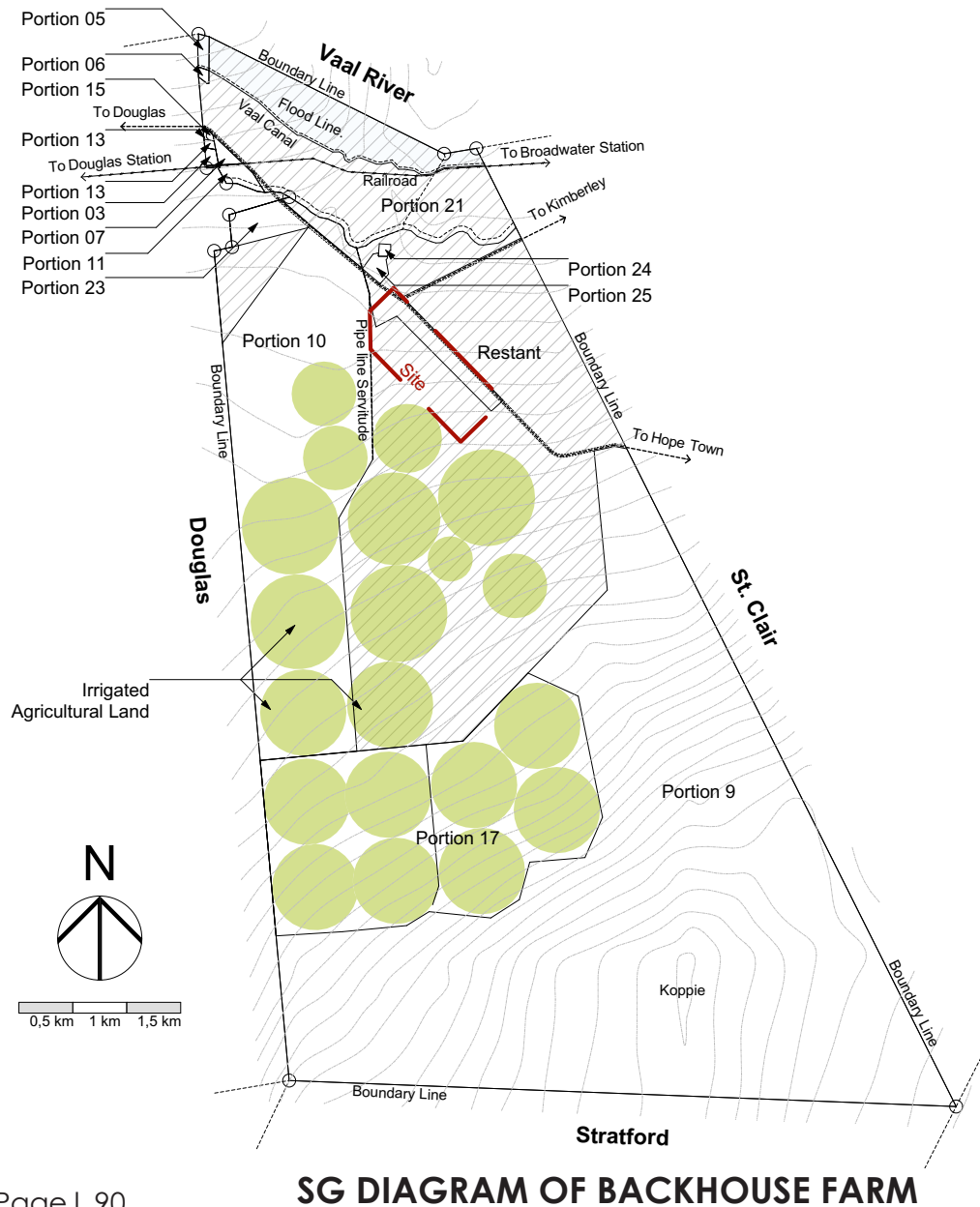
Annually, people travel to Douglas to engage in the adventurous act of gliding. The Douglas airfield, located 3 km from Douglas, becomes a threshold that introduces people from different backgrounds to the dwellers of Douglas through this technologically sophisticated sport. The aim of the study is to develop the airfield so that it can facilitate the World Gliding Championships (Fédération Aéronautique Internationale, 2019: online), which could stimulate growth, allowing the opportunity to present the uniqueness of this this place, and the people who settle here, on a global scale.



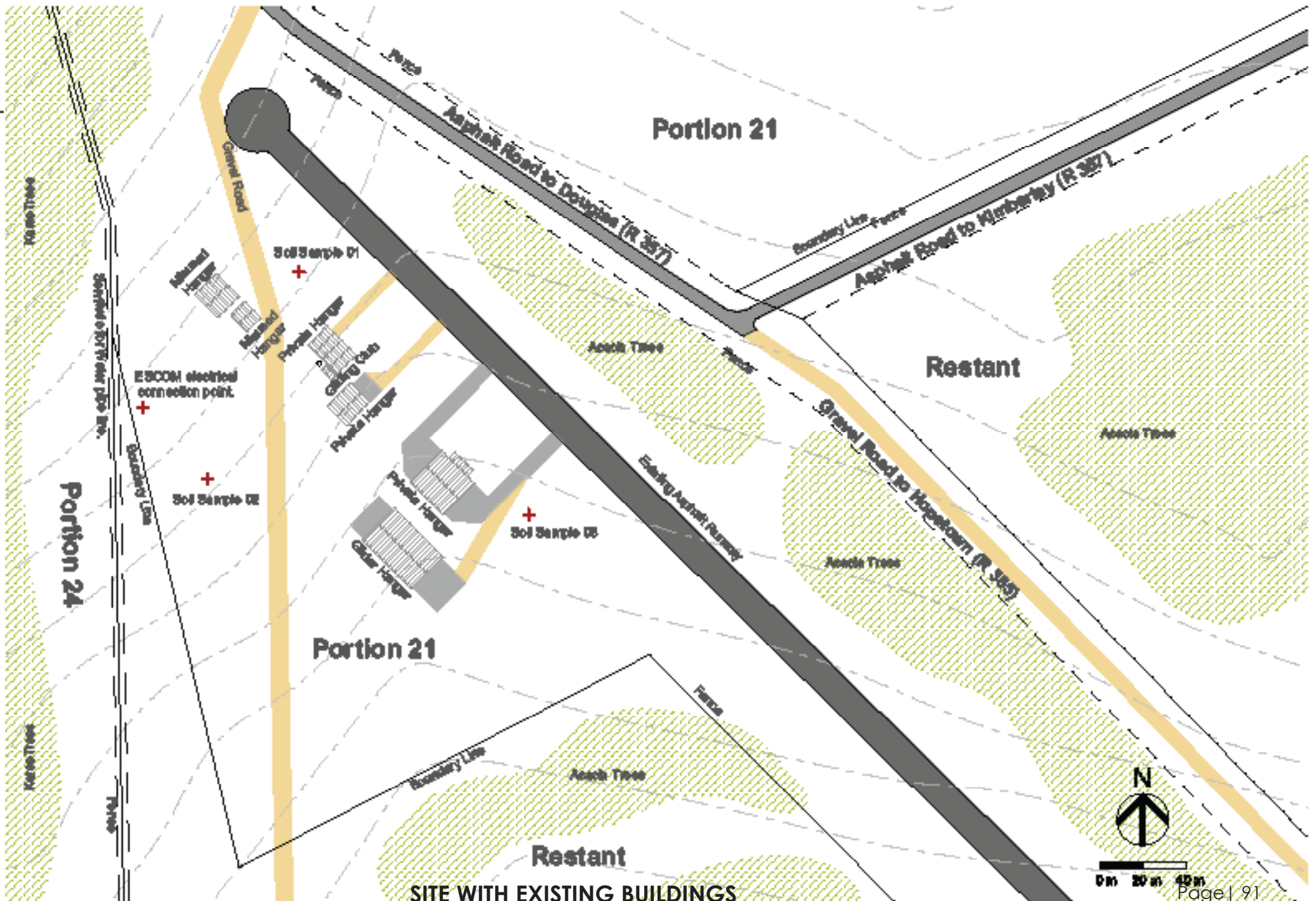
Sketches of conceptual development of factory.

## 4.1. THE SITE ANALYSIS

### 4.1.1. CADASTRAL INFORMATION



The site, Douglas airfield, is located in the Northern Cape near Douglas; a small town 100 km south-west of Kimberley and near the confluence of the Orange and Vaal River. Douglas airfield is situated on the farm Backhouse (no. 149) neighbouring the town. The project will be on portion 21 and remainder of Backhouse farm, see grey hatches area on SG Diagram of Backhouse farm on page 90. The site is highlighted in red. The servitude of the Vaal and Orange canals are also indicated. The Vaal canal serves as the flood line of the Vaal river. Contours on the SG Diagram of Backhouse are in intervals of 5m and the site plan is 500mm. The Title Deed, which is the original deed signed by Isaac Hughes (read 2.3.5. Pioneers of Douglas), provided me with the information of servitude for a water line located on one of the boundaries. With regards to the development rights: there are no building lines or height restrictions. The boundary line and the servitude, as indicated on the Site plan on page 91, must be respected.



**SITE WITH EXISTING BUILDINGS**

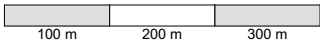
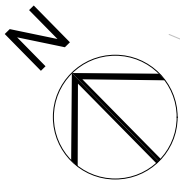
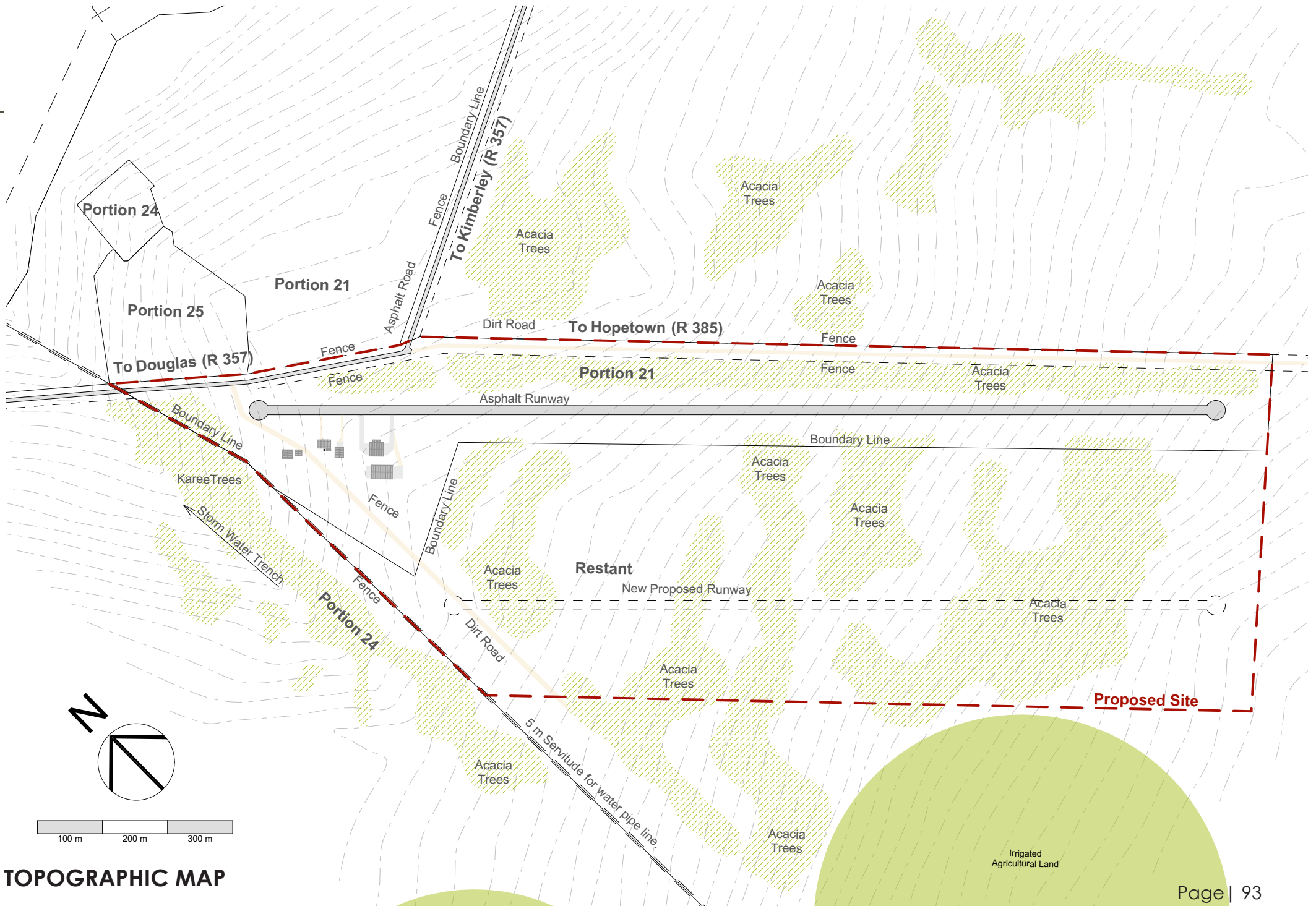


## 4.1.2. TOPOGRAPHIC ANALYSIS

Indicated on the Topographic Map, page 93, is the existing structures on the site are barns and hangars constructed with portal frame structures, clad in IBR steel sheeting. Trees located on-site are Acacia trees, of which the majority are Swarthaak and Pendoring. A grove of Karee trees are located in the ditch which is indicated by the contour lines with 500 mm intervals. The area around the existing structures is cleared from vegetation. Storm water flows into the natural eroded ditch down to the Vaal River. The main road (R357) drives past the Douglas Airfield. Except for the GWK (Griekwaland-Wes Korporatief) Silo's, the airfield is the first place one sees on your way to Douglas from Kimberley.

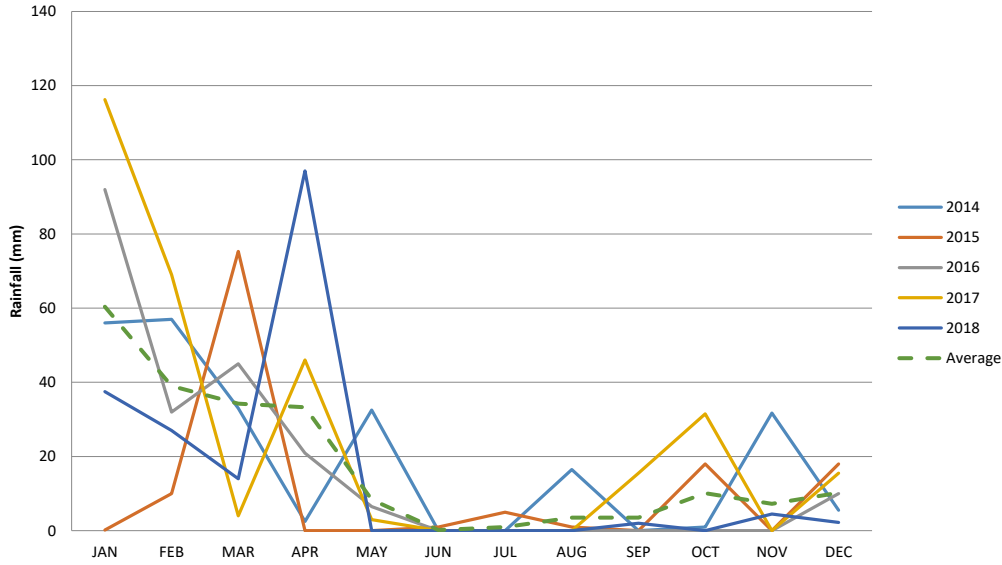


Photographs of existing structures. Photograph by author.

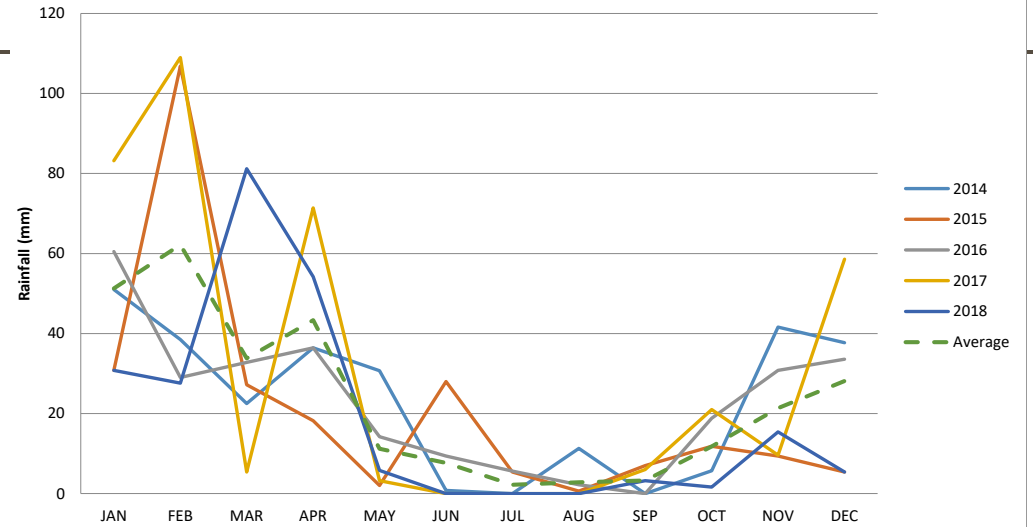


**TOPOGRAPHIC MAP**

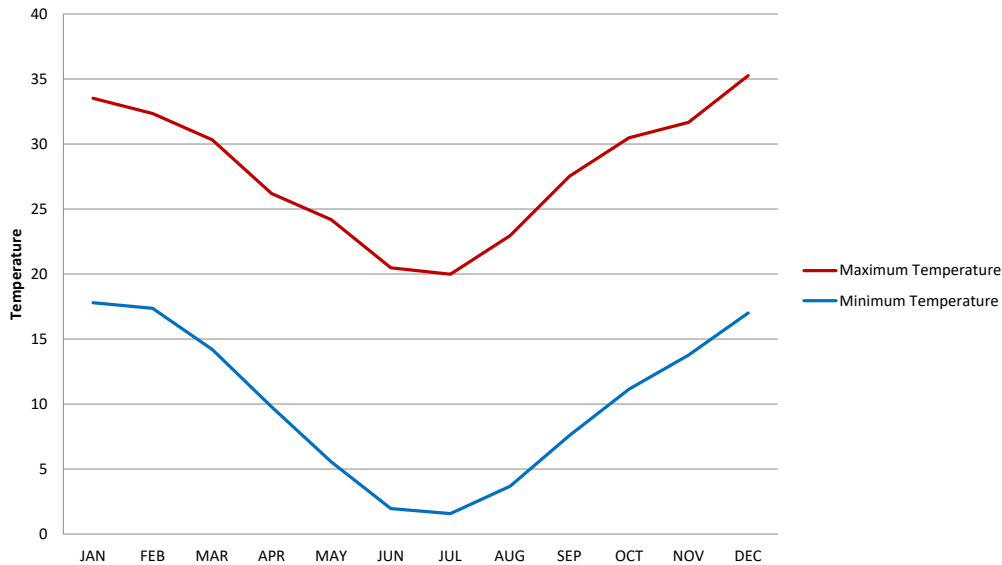
**Monthly Daily Rain - DOUGLAS measured at 08:00**



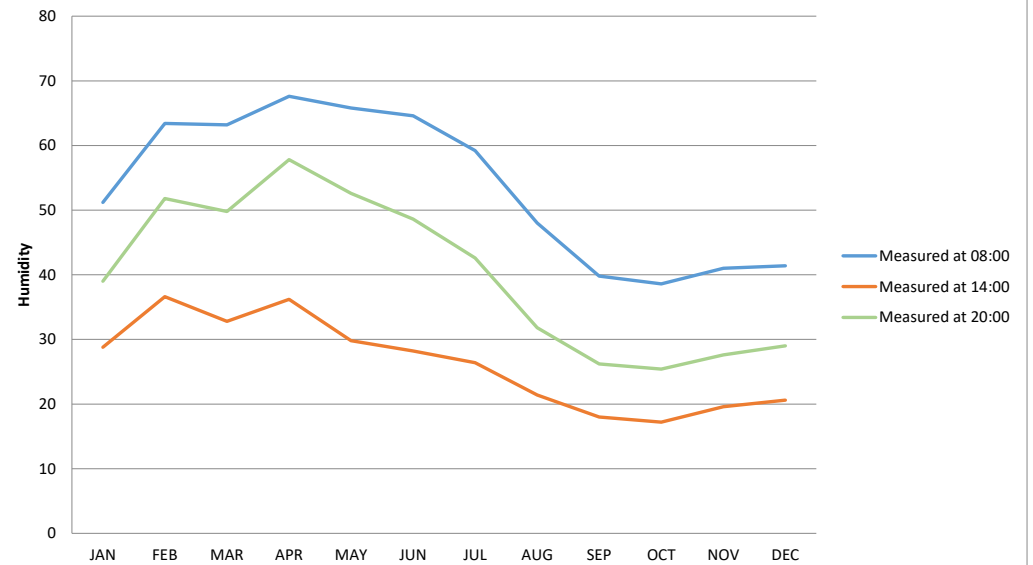
**Monthly Daily Rain - KIMBERLEY measured at 08:00**



**Average Temperature - Kimberley measured at 08:00**



**Average Humidity - Kimberley**

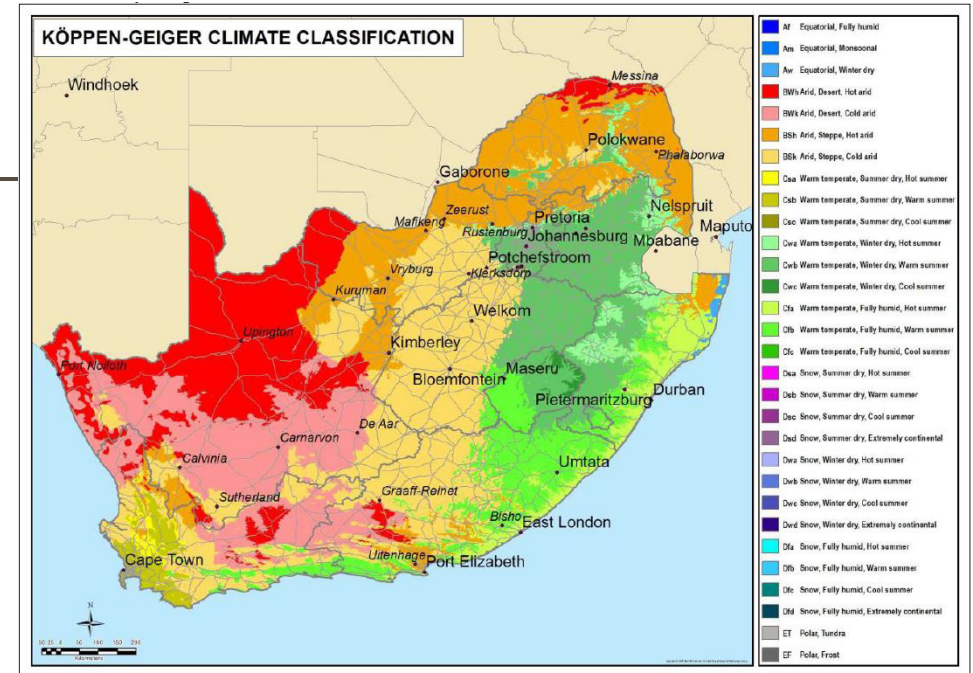


### 4.1.3. CLIMATIC INFORMATION

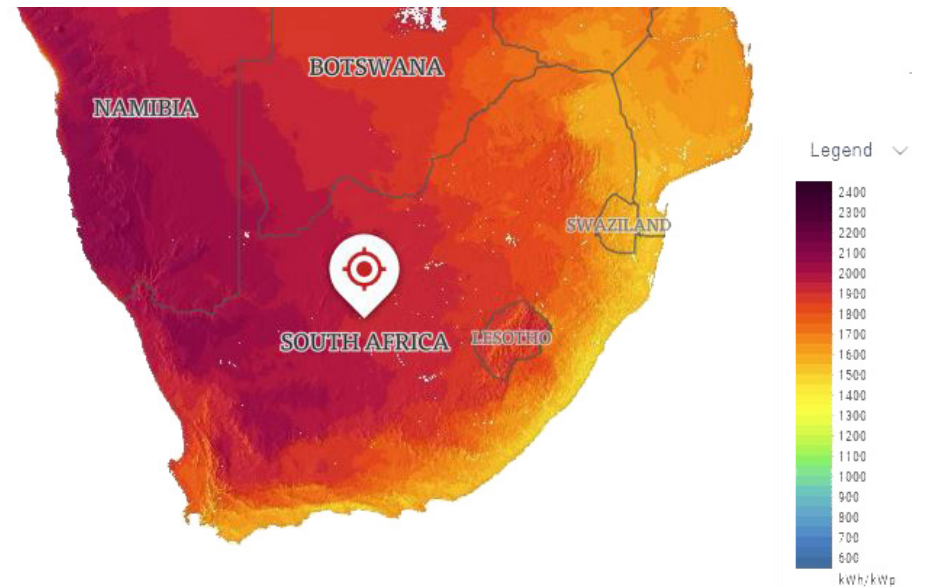
The Köppen-Geiger classification is an international used climate classification system constructed by Köppen. The CSIR (Council for Scientific and Industrial Research) created a new Köppen-Geiger map plotting accurate climatic zones based on 20 years data from the South African Agricultural Research Council (Conradie, 2012: conference object). According to the map, see Köppen-Geiger Classification Map, Douglas is in the red zone which is characterised as arid, desert like and hot.

Weather data for the last five years was acquired from the South African Weather Service and is processed in to graphs as shown on page 94. This data confirms that the region has a low rain fall with hot temperatures in the summers. See page 32 and 33 for analytical sketches of the weather on site. The hot temperatures and developed cumulonimbus clouds provide the perfect climate conditions for sailplane gliding (Lessle, 2019).

South Africa has a average solar irradiation between 5 to 8 kWh/m2 per day, which is a much higher in compared to Europe and USA that is 2,5 and 3.6 kWh/m2 per day. (Azimoh, 2015: 309) The solar irradiation profile of this area is 7,5 kWh/m2 per day and 1900 kWh/m2 a year, see Solar Irradiation Map. This makes this the ideal conditions to generate electricity with photovoltaic solar panels.



Köppen-Geiger Classification Map (source: [http://stepsa.org/climate\\_koppen\\_geiger.html](http://stepsa.org/climate_koppen_geiger.html))



Solar Irradiation Map (source: <https://globalsolaratlas.info/map?c=-21.841105,12.480469,5&s=-29.05617,23.80188&m=site>)



Photograph of all the soil samples.



Soil sample 1



Soil sample 2



Soil sample 3

#### 4.1.4. GEO TECHNICAL ANALYSES

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The site has bedrock of lime stone, which can be challenging to excavate, especially if there is a thin crust of lime stone with soil underneath. Rocks that can be found in Douglas are of the Transvaal, Karoo and Kalahari Super group (McCarthy & Rubidge, 2005). The soil is fairly stable and a reinforced strip foundation should work. The solid conditions also have a good drainage capability that reduces a storm water problem. The soil samples are taken on three points on the site which is indicated on the Site Plan on page 91.

## 4.2. SUSTAINABILITY

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Reflecting on Bryn Hudson's TEDx talk: "Green Buildings are more than Brick and Mortar", it is clear that the terms 'sustainability' and 'green building' are used in such a way that it becomes a gimmick. Sustainability relevant to architecture is about concise and informed design choices. Information and understanding of the entire region are valuable in assisting with critical thinking. It has an impact on the surrounding region on an environmental, technical and social level. Understanding of the region must reflect in the architecture, which leads to an alternative term to sustainability, "Critical Regionalism". Murcutt believes that a building must be similar to a ship or a plane in the sense that you must work the building to get the best performance. By doing this, you are aware of the capability of the building. In a sense, the building develops a consciousness where a relationship and understanding develops between the user and the building. If better ventilation is required, one will know which windows to open to achieve the desired comfort, because of this understanding. Murcutt talks about the poises of how the building relates to the cultural and natural environment. Often the design challenges can be resolved by a simple understanding of the site and its surroundings.

Some aspects I would like to address further are the energy consumption of the building. Some of the energy the building will need can be generated with solar panels. Use of the harvested water can be incorporated into the design, so that it can contribute to the regulation of the climate within the building.

## 4.2.1 THE SUSTAINABLE CITY

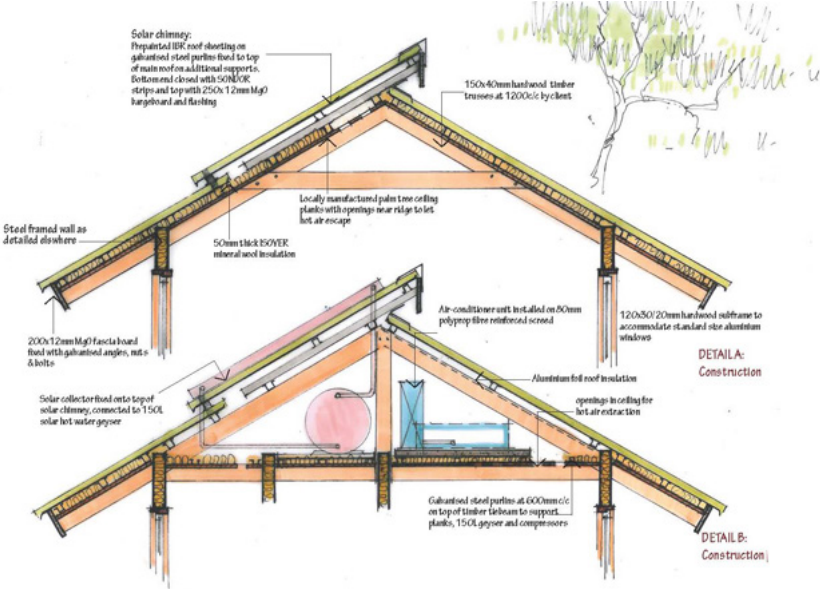
The United Arab Emirates is known as one of the world's biggest oil producers which lead to one of the largest greenhouse-gas emitters. However in the last two decades the UAE government made an effort to turn to alternative energy sources that are more environmentally-friendly in an effort to lower the UAE dependence on fossil fuels. The UAE aims to have 75% of Dubai's energy come from clean sources by 2050 (Garfield, 2018: online). The Sustainable City by Dubai-based Diamond Developers is a new development that aims to achieve net-zero energy city. The development consists of a dense, mixed use, solar-powered residential community, where grey water is recycled and residents travel within the city by foot or via electric vehicle. (Mammoser, 2019: 32)



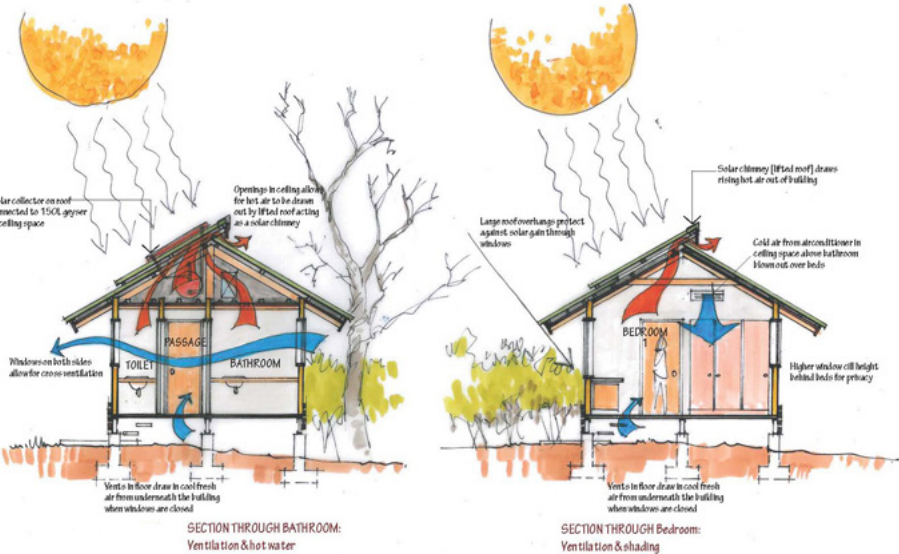
Photograph of "The Sustainable City" (source: <https://www.thesustainablecity.ae/>)

### 4.2.2. PASSIVE SYSTEMS

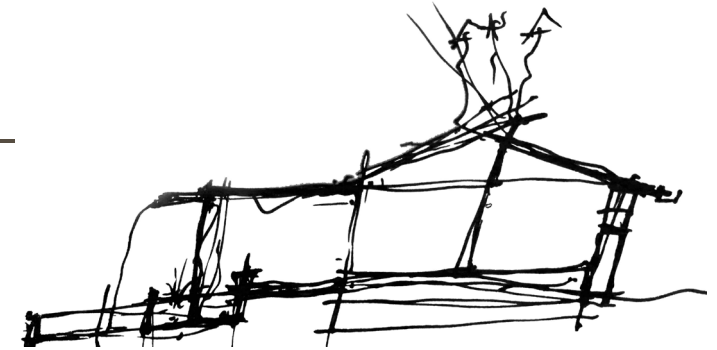
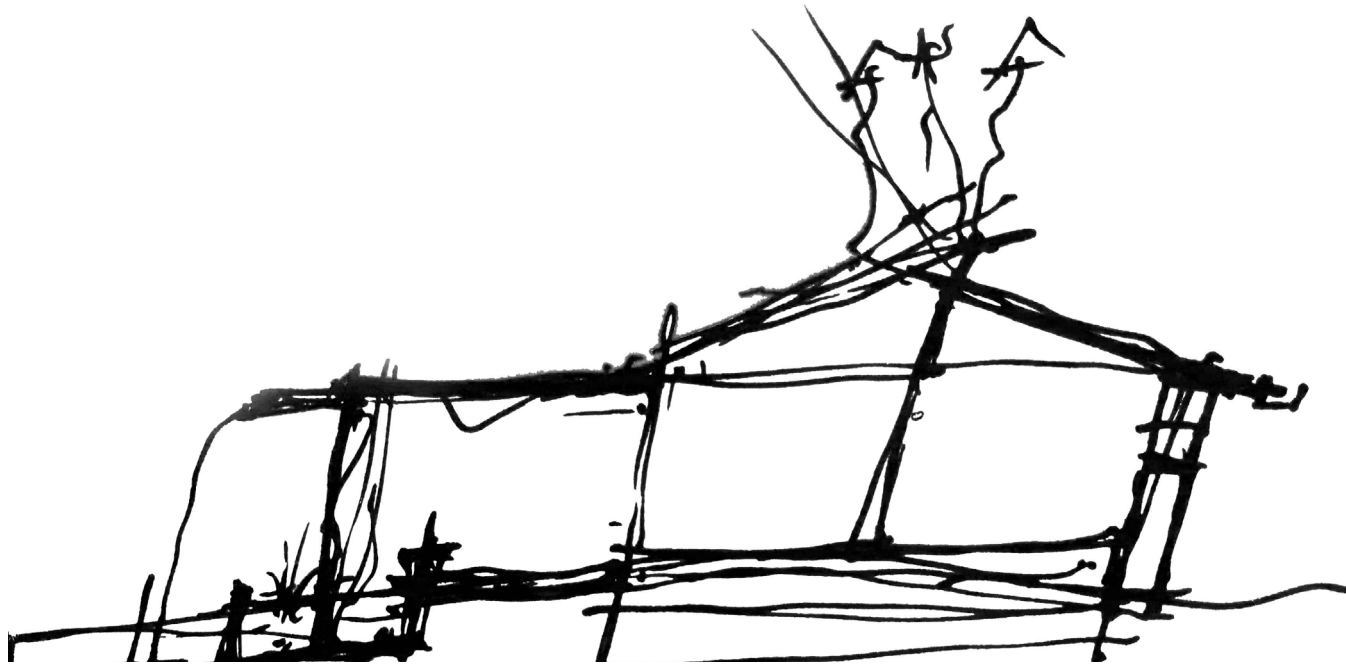
At the Gorongosa Biodiversity Scientific Services (designed by Crafford and Crafford) in Madagascar, the building incorporates a unique passive design principle. The use of a solar stack, that forms a crucial part of the roof design, draws hot air upwards and out through the roof. The structure is elevated from the ground, allowing colder air underneath the buildings to be drawn into the buildings through openings in the floor. Termites mounds use this ventilation system as well, providing habitable conditions inside the nests. (Plan Eco, 2017:online) This is a very clever approach to cool a building. The challenge will be to keep the public spaces cool during the summer.



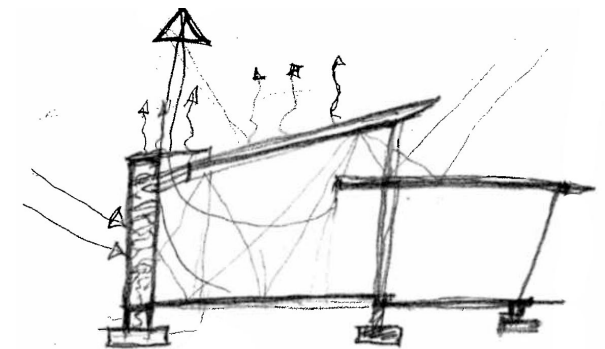
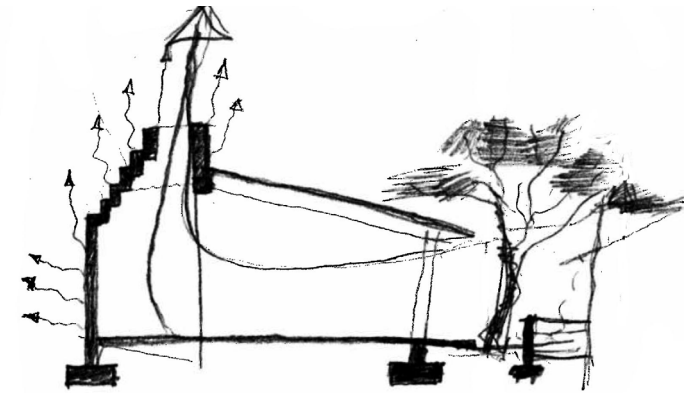
Sketch illustrating the roof structure at Gorongosa Biodiversity Scientific Services by Crafford and Crafford. (source: Plan Eco, 2017:online)



Sketch illustrating the passive system of the building at Gorongosa Biodiversity Scientific Services by Crafford and Crafford. (source: Plan Eco, 2017:online)



An investigation was made in to solar chimneys that bake in the sun, pulling the air through the building. This seemed too be a conventional approach and the system was developed further by using fishponds and pergolas covered with grape vines. The fish will keep the mosquito population in control. Pergolas with grapevines that can provide shade in the summer and in winter allow the sun to enter the room when the vines are prone. Mechanical systems can be used in factory to cool the space since electricity is generated from with photovoltaic panels.



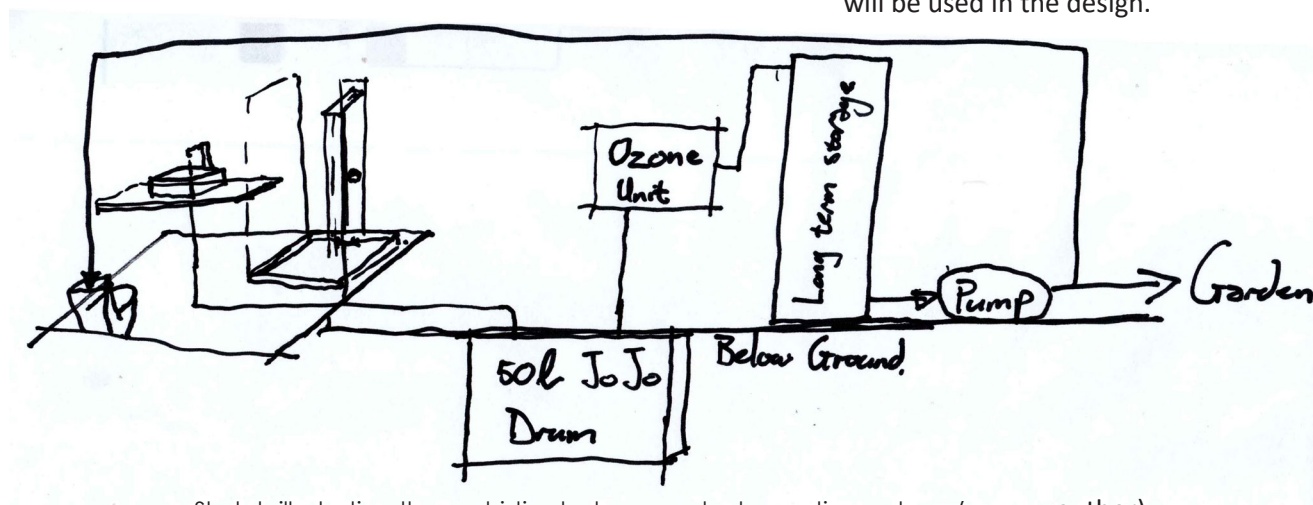
Concept sections investigating passive systems in accommodation units. (source: author)

### 4.2.3. WATER HARVESTING SYSTEMS

Water is a precious resource and with the low rainfall in Douglas it is practical to use water efficiently. A grey water harvesting and rainwater harvesting systems will help to achieve this. The aim is to be more water conscious and not for the design to be completely dependent on the harvesting systems.

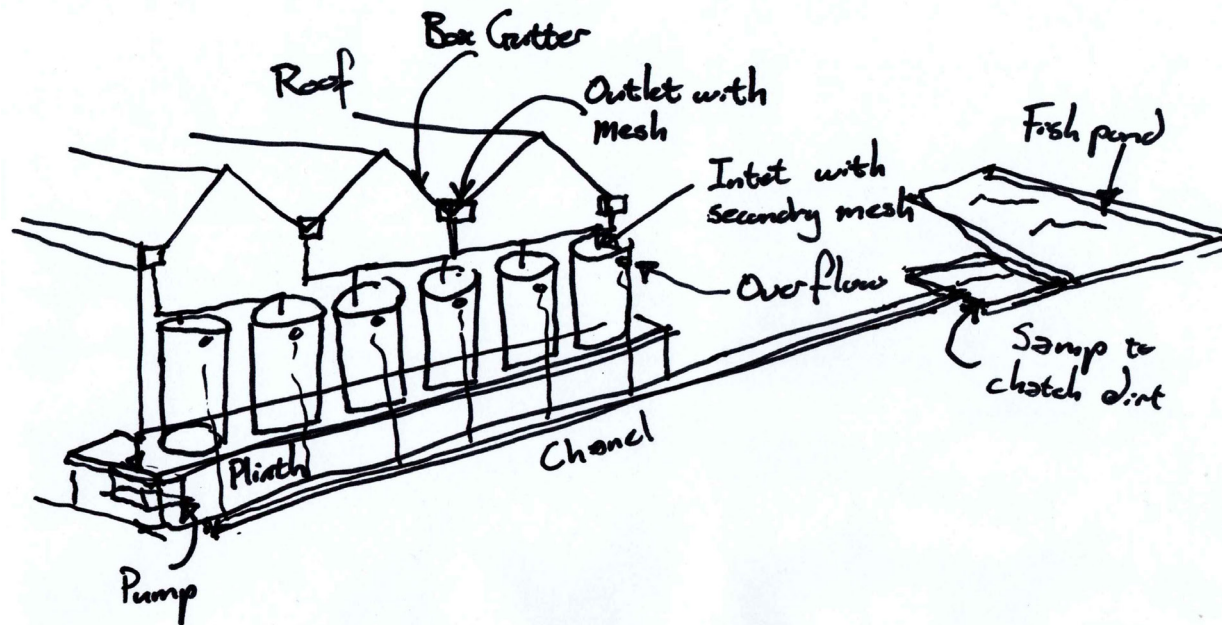
Water from hand wash basins, showers, baths and washing machines is considered as grey water. This water does not include water from the toilets, kitchen sinks or dishwasher. (JoJo, 2018: online) The average household uses 200 litre of water daily of which the majority is classify as greywater that can be reused with treatment. If biodegradable soapes are use, using grey water can be beneficial for the plants in the garden. (Home Instulations, 2019: online)

A simple harvesting system the grey water flows into a 50 litre drum and is filtered with a macro filter before use. This water must be used within 24 hours, limiting the time bacteria has to grow. In a more sophisticated system, the water is pumped from the 50 litre drum into an above ground storage tank where it treated with ozone, increasing the time the water can be stored. Greywater harvesting is very complex and a professional will design and install this system. (JoJo, 2018: online) The sophisticated system will be used in the design.



Sketch illustrating the sophisticated grey water harvesting system. (source: author)

The quality of harvested rainwater cannot be guaranteed and is mainly fit for low-grade uses. Water must be purified to be fit for human consumption. This issue can be easily resolved by installing a filtration system under the counter where needed (JoJo, 2018: online). The tank must have an internal lining preventing algae growth. The tank must also be installed on a sound, level and smooth surface, ideally with a concrete surface bed at least 85mm thick (JoJo, 2018: online). Water tank will therefore be placed on top of a plinth, which will accommodate the pump systems. The pumps will be powered by the solar energy. Grids and meshes will prevent leaves from entering the tank and the overflow will be channelled to the fishponds with a sump catching the most of the dirt and sand.



Sketch illustrating the rainwater harvesting system. (source: author)

#### 4.2.4. PHOTOVOLTAIC PANELS

As seen in the climatic information, see page 95, the photovoltaic panels are ideal to generate energy. The saw-tooth pitched roof of the factory is orientated north, making it ideal to install the panels. Structures fitted with photovoltaic panel are used to shade carports and public spaces.

The photovoltaic panel generate a DC electrical current when sunlight shines on the panel. This electrical current is regulated to charge the battery bank. Since the majority of appliances functions on AC current the DC current needs to be converted with use of an inverter. A generator can be used to power the building in the absent of sunlight. If the more energy is generated more than used it can the option is there to tap in to the national electrical grid. The problem is that if the power of the grid is of, the site is without power as well. (Ecotraders, 2019: online)

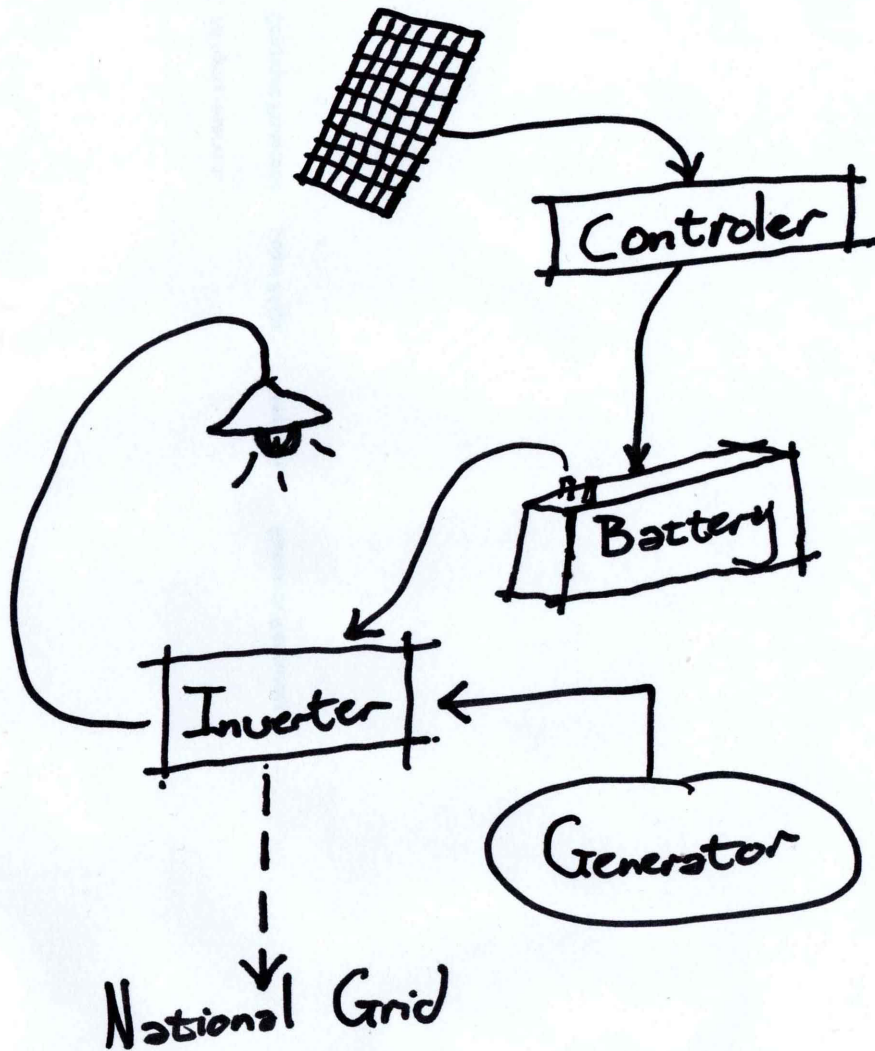
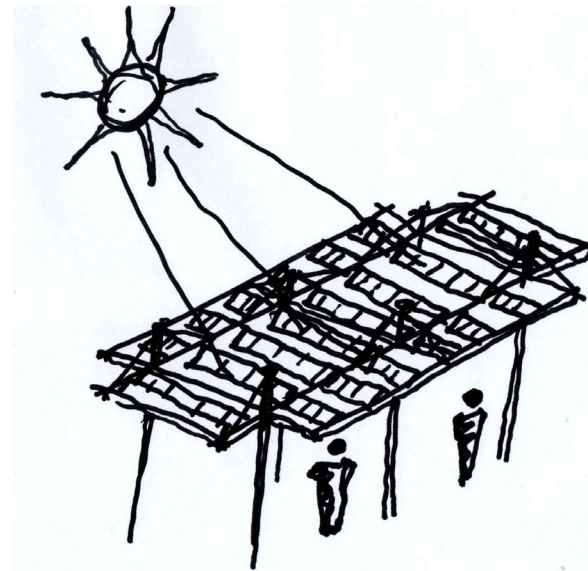


Diagram illustrating the photovoltaic system. (source: author)



Sketch illustrating the structure fitted with photovoltaic panels. (source: author)

### 4.3. MATERIALITY

While driving through the vast landscape at Douglas, one sees “koppies” that push up towards the sky. Other, manmade, vertical elements are the radio towers and windmills. Large barns and the concrete monolithic silos are beacons of industry in the landscape. Familiar materials here are corrugated roof sheeting fixed on steel portal frames and concrete for the lasting reliable structures such as bridges and silos. The preferred material to construct homes is cement brick plastered and painted with a corrugated roof sitting like a hat on top of the loadbearing structure. In an article titled “Materiality in Four Climatic Zones”, Mike Louw discusses the work of Crafford & Crafford Architects and how their design is a response to a specific local environment. The Craffords’ design process is primarily driven by the selection and alteration of local materials and skills. (Louw, 2014: 36) Materials are a crucial decision, as it will assist in the decision of the construction methods to be used to construct the buildings. “The particular place is part of the identity of each individual” (Norberg-Schulz, 1985: 9), the material develops the architectural language with which the user can identify. To make a more definitive choice of material, I investigated the local architecture.



On the left a photograph of a radio mast in the town. On the right the GWK silos as seen from the far, Atherton. (source: author)

### 4.3.1 GWK BARNES



The 30 X 60m old grain barns at GWK are constructed of a concrete plinth to which the timber structure is fixed. The timber structure is clad in corrugated galvanised sheets from the roof to the facade. The timber structure is fixed to a steel plate that is casted into the concrete plinth. The structure is closed with corrugated galvanised sheeting with sliding doors with the rails fixed to the side of the barn.

The 75 X 12m old lucerne barns also had a timber structure, but were replaced with steel after it burned down. The concrete plinth steps down the slope to which the I-profile steel columns are fixed. To the columns, a space frame is bolted, which constructed from steel angle profile steel. Corrugated steel clads the facade from the eaves to the top of the plinth. Sliding doors at the end allow access at the end of the barn with side doors to allow multiple receiving points.

Photograph of the old GWK grain barns, currently used as warehouses. (source: author)



### 4.3.2 BARN ON ATHERTON FARM



During the Second World War, there was only round galvanised corrugated sheeting available, often used for building dams. Farmers used these sheets for constructing barns. This led to some unique barn designs, like this barn on Atherton. The structure consists of painted, rectangular profile steel columns, spaced at 20 X 12m and fixed to a concrete block footing. Fixed to the columns are arch steel spaceframe trusses, constructed of angle profile steel for the top and bottom cord and steel rod for the structure webbing. With steel lipped angles bolted to the trusses to which the roof sheeting is fixed. The space frame is further braced with a steel rod. An unflustered masonry wall is built up to window-sill height. The entire side facade is covered with corrugated steel with sliding doors of a steel frame and corrugated sheeting that slides on a rail fixed on the exterior of the barn.



Photograph of barn on atherton. (source: author)

### 4.3.3. HISTORIC HOUSES IN DOUGLAS



The structure is constructed from adobe bricks plastered and painted on which the timber roof structure rests to which corrugated roof sheeting is fixed. Stones were used to construct a sturdy plinth. The approach to the dwelling transitions from the side walks through to a lawn leading to the veranda with often decorative columns. The veranda is not only an important transitional space, but also provides the building with a micro climate that protects the building from the hot summer sun. The area around the house is cooled down further with a luscious garden. High ceiling heights with small windows punched in to the walls allow the dwelling to remain cool by reducing the floor space reached by the sun. Straw is placed on the ceiling to insulate it further with a fireplace in strategic places to warm the dwelling in winter. The veranda is articulated by ending in higher masses. Painted timber windows equipped with louvers can be used to filter the sunlight even further.

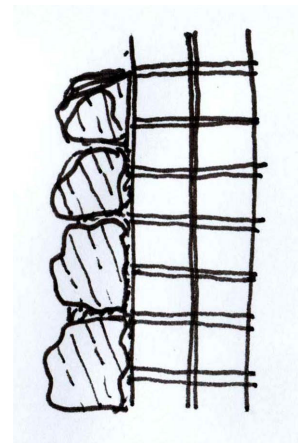


### 4.3.4 MATERIAL SELECTION

Steel will be used for the long spans of the hangar and the factory. The dismantled steel members of the existing structures can be easily reused in the construction of the new structure. Since the hangars require a dust-tight and reliable roof, I have decided to use concealed fixed roof sheeting with a white Chromadek finish for the roof cladding which is dust-tight with a warranty against leakage. It also allows PV panels to be easily fixed to the roof structure.



Image of uncoursed stone masonry.  
(source: <https://gharpedia.com/>)



Sectional sketch of stone masonry  
with brick backing.

### STONE MASONRY

Stone masonry allow an opportunity to reinforce the relation of the project and the landscape. This will also reintroduce the skill of working with stone back into the community. Stone is widely available; if not at the rocky riverbanks of the Vaal, then definitely from the stone cleared from the irrigated agricultural land. It will be more fitting to use the stone from the agricultural land, because it will resemble the colour of the landscape surrounding the site. The finish, random uncoursed rubble stone masonry is constructed by stacking broken stones of different sizes and qualities that sourced from site. Minimal work is done to prepare the stone before it is laid. This is considered as the cheapest and roughest type of stone masonry. (Dimensions.Guide, 2019: online) A brick backing will be used to assure a reliable interior surface, quality of construction and reduce costs.

## COMPOSITE DECKING



Image of composite decking. (source: <https://www.eva-last.co.za/>)

Timber will not be durable in the arid climate and harsh sun of Douglas, therefore a cellulose-polymer composite deck plank that primarily consists of bamboo and high-density polyethylene is selected. The durability and colour fastness of the material is further improved with other additives. The material is available in several natural colours that will contribute to a hospitable atmosphere. This material will be used as a deck for outside and entrances spaces of the buildings. The composite deck will be fixed with a hidden deck clip system, allowing for a clean and neat finish, to a lightweight galvanised steel support structure. (Eva-Last, 2019: online)



Image of lightweight galvanized steel support structure. (source: <https://www.eva-last.co.za/>)

## VINYL FLOORING



Image of vinyl flooring finish. (source: <http://www.floorworx.co.za/>)

Vinyl flooring will be used for the floor finish except for the factory. The material is durable, easily maintained and hygienic meaning it ideal to be used in the restaurant. The floor finish resembles timber flooring again contributing to a cosy atmosphere. An acrylic adhesive is used to fix the it to the floor surface. (Floor Worx, 2019: online)



## 4.4. STRUCTURE

The typology of the project requires an elegant relationship between stereotomic and tectonic structures. Architecture in a cosmic landscape demands a geometric design resting heavily on earth. However, as the design is an airfield, it requires a relationship with the sky. Stone sourced from the site, together with masonry, is used to construct the stereotomic structure. Heavy walls are used to protect the design from the heat of the west and allow for the opportunity to use the energy stored in the structure to heat the building. Steel construction is used for the tectonic structure. The roof structure must allow for atriums to bring sunlight and ventilation into the factory. Distorting the farm “stoor” of the vernacular architecture provides a familiarity for the local community.

The local engineering workshop in Douglas can manufacture the steel components. The workshop also has a CNC plasma cutter that allows the design to have custom-designed shading systems.

The hangar is a typology known to be a steel structure that allows for long spans. This frees the floor space from columns that can interfere with the manoeuvrability of the aircraft that are going to be housed inside. Hangars are normally massive structures that dwarf the human scale. Subtonic structures are used in the design to bring the scale of the project down to the human scale. Tectonic structures such as pergolas can also bring the scale down.

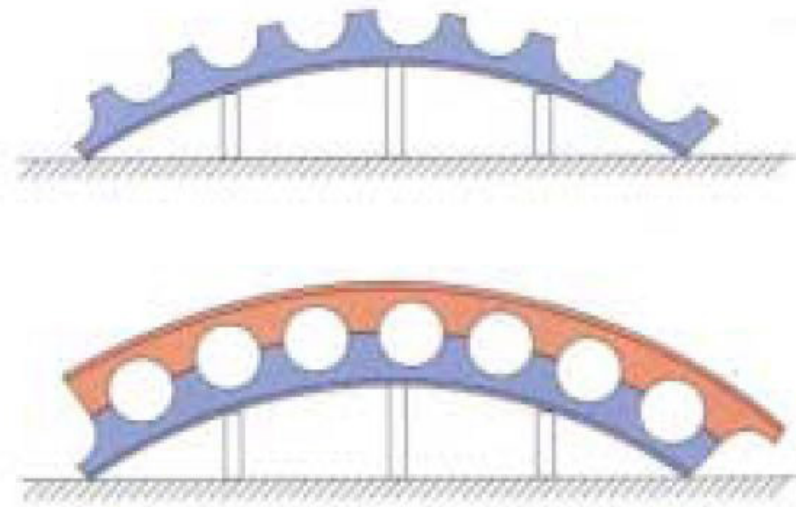
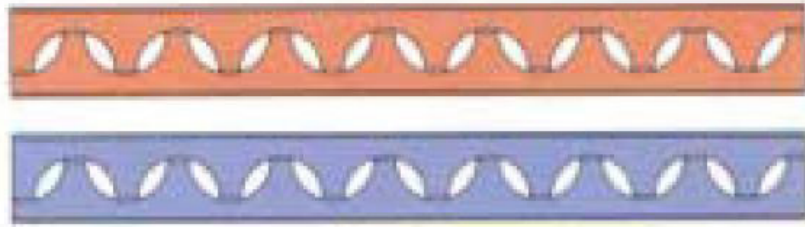


Manufacturing cellular beams. (source: (Macsteel Trading, 2003))



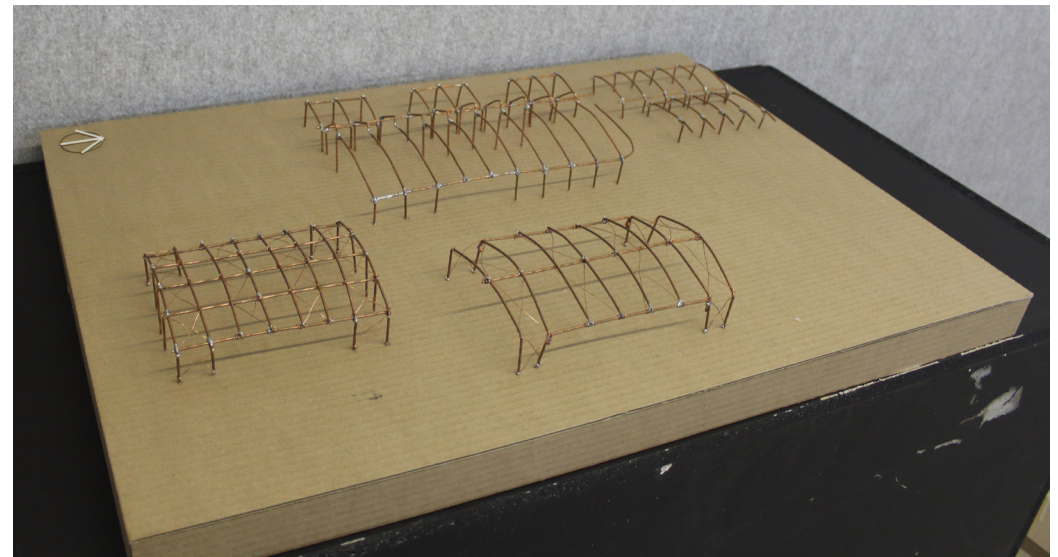
Structure of constructed of curved cellular beams. (source: (Macsteel Trading, 2003))

## 4.4.1 STRUCTURAL DEVELOPMENT



As mentioned before the existing portal frame structures on site are to be dismantled and the steel members are to be reused for the structure of the new buildings. The steel I profile beams can be sandblasted and converted in to cellular beams, increasing the strength and the span capability of the beam. The cellular beam is up to 1,6 times deeper than its parent universal beam and up to seven times stronger. A straight simple support can span more than 40m (Macsteel Trading, 2003: 11). This conversion can be done at the local engineering works in Douglas. The largest steel beams can be manufactured at Macsteel, in Kimberley, and transported to site.

The first structure was a from curved beam members, which is ideal for cellular beams (Macsteel Trading, 2003: 12). This structural design was abandoned since morphology of the design did not work.



Structure model of structure with curved beams.

#### 4.4.2. VITSOE HQ AND PRODUCTION BUILDING, VITSOE AND MARTIN FRANCIS (2017)



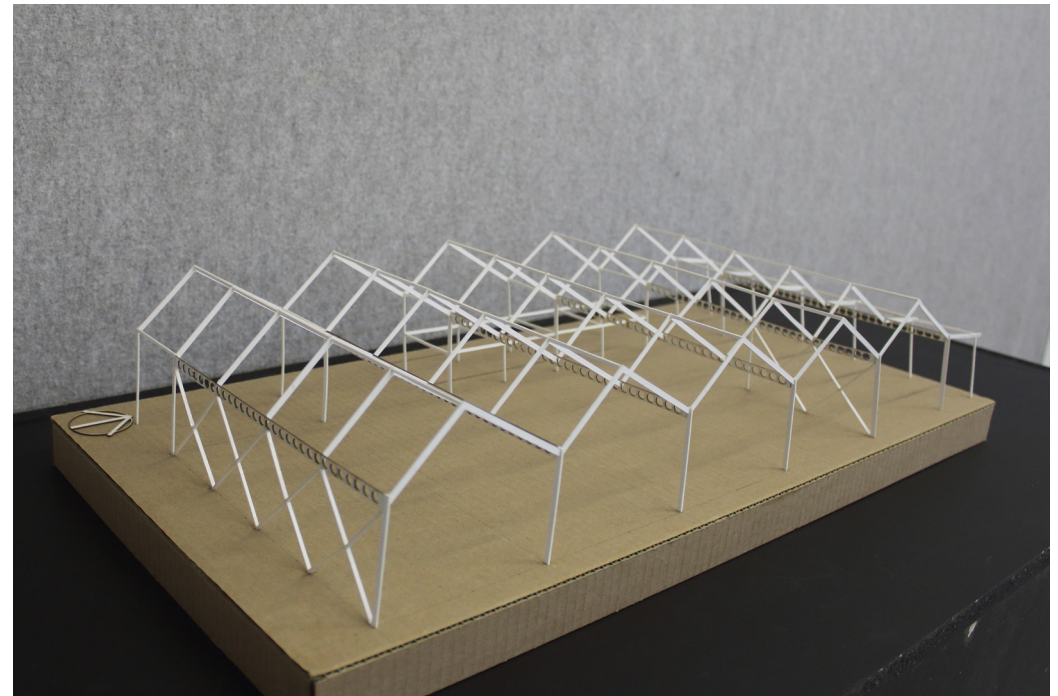
Photographs by Dirk Linder, 2017,



The Vitsoe HQ, in Royal Leamington Spa, United Kingdom, has a unique structure that spans 135 metres in length, 25 metres in width and 6 metres in height. What makes this building unique is that it is the first in the UK with a structure made entirely of a newly developed beech laminate-veneer (LVL). The building is naturally ventilated and lit during the day by the north facing saw-tooth roof lights. Prevailing wind provides cross ventilation while the high ceiling height allows heat to rise for comfort in summer (Francis, 2019: online).

### 4.4.3. STRUCTURE USED FOR THE FACTORY.

The second structural design for the Sailplane factory uses a double spine beam system, which is a common method to increasing usable floor space in a single storey building. The double beam system allows for the required space for the box gutter. The Vitsø HQ uses the same spine beam system to which the roof rafters are fixed. Cellular beams efficiently span three, four or even five bays between columns, creating vast open floor areas at minimum cost (Macsteel Trading, 2003: 15). For columns some of the smaller steel I profile members are boxed in pairs to create a stronger column.

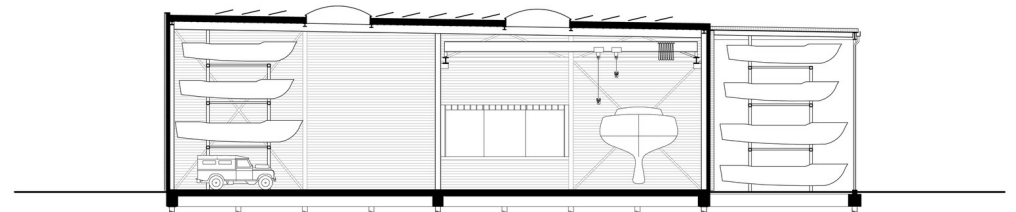
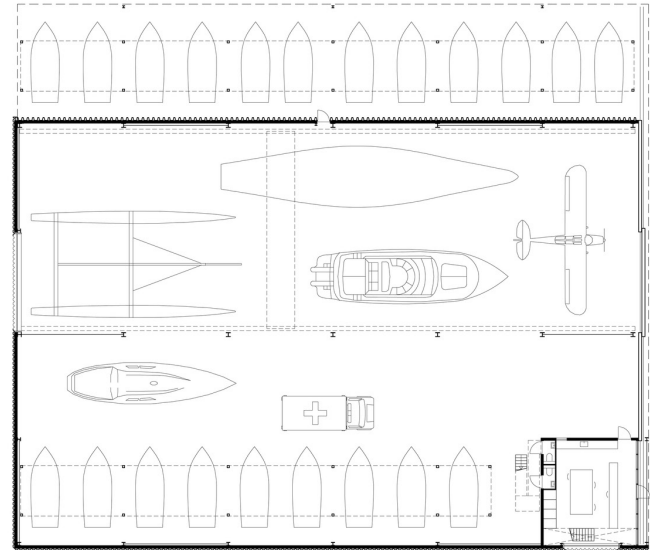


Structure model of the manufacturing area of the factory.

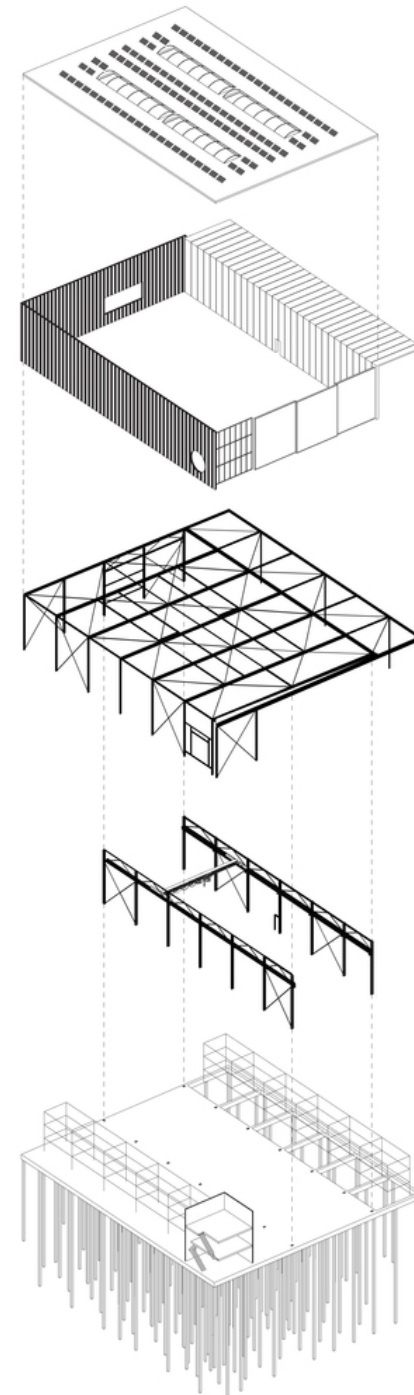
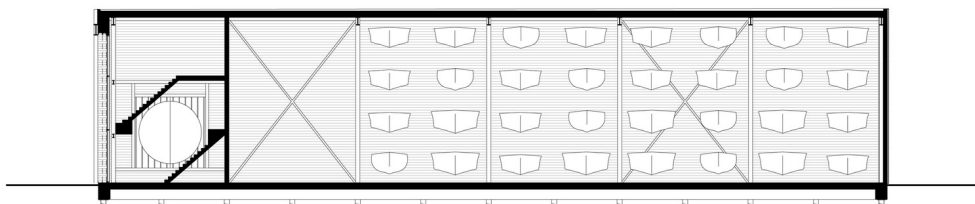
#### 4.4.4. BOAT HANGAR, BETA (2018)



<https://www.archdaily.com/431304/hangar-h16-comte-and-vollenweider-architectes>



Boathouse in Amsterdam, the Netherlands, has a primary structure that consists of a crane gantry onto which a secondary lightweight structure is built, defining the span of the building. Drawing upon the hangar archetype, three full-height sliding doors allow the full width of the structure to be opened towards quay and canal. This allows easy access to the building when storing the boats, making it also flexible to be used as an area to staging events. Solar panels are also fixed to the mono pitch roof. The generated solar energy is used to for floor heating and cooling. Four skylights offer ample daylight for boat builders and craftsmen. A structural grid of 7,5 meters was used that allowed the most efficient space to store boats. (BETA, 2018: online)



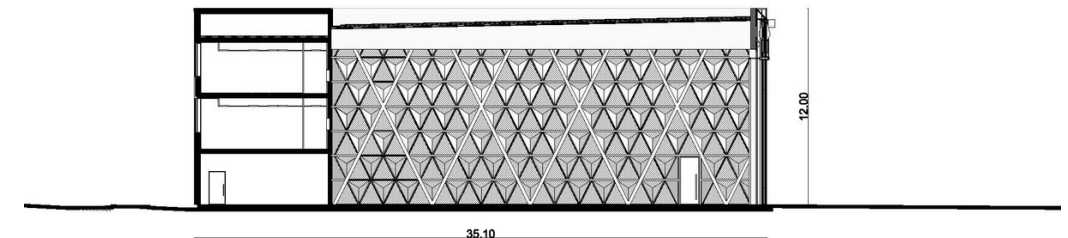
#### 4.4.5. HANGAR H16, COMTE & VOLLENWEIDER (2013)



<https://www.archdaily.com/431304/hangar-h16-comte-and-vollenweider-architectes>

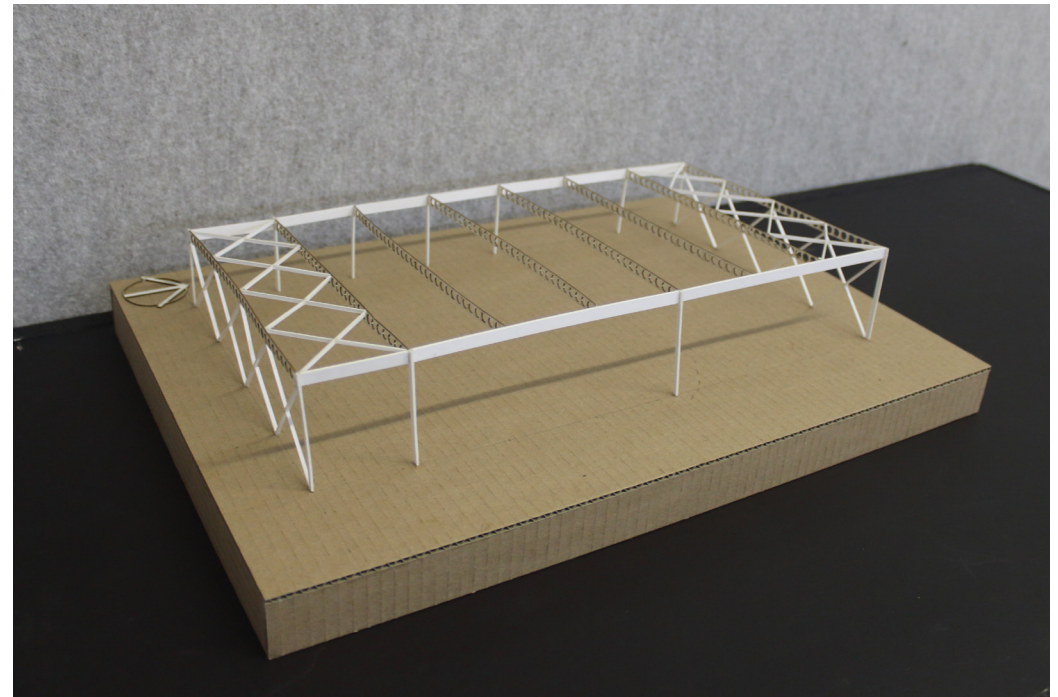


Hangar H16 in Alpes-Maritimes, France, is designed in such a way that most of the volume is obstacle free, allowing total freedom for the manoeuvring and maintenance of the planes. The structure consists of a timber framed of triangulated lattice beams constructed from laminated timber joined to solid timber members. The hangar is 12 meter height by 96 meter in length and 36 meter wide. These dimensions are multiples of 12 allowing the opportunity to design various patterns within the structure. (Comte & Vollenweider, 2013: online)

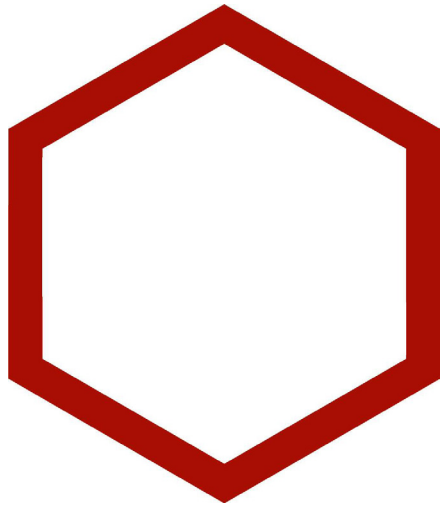


#### 4.4.6. STRUCTURE USED FOR THE HANGARS.

The structure used for the hangars is similar to that of Hanger H16 and the boat hanger only that the structure is of steel and not timber. The simple mono pitched roof is constructed of the deepest cellular beams used in the project and will most likely be newly manufactured in Kimberly. The same paired column system is used as in the factory for the glider hanger and crop dusters hanger. Larger new H profile columns is used for the private hangars.



Structure model of the manufacturing area of the factory.



**REFLECTION**

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In a sense this dissertation attempts to pay homage to the community of Douglas that raised and made me the person who I am today. I have always wondered what contemporary architecture in a rural town such as Douglas, would look like. I believe being an architect is not only to be a competent person that designs reliable and safe buildings for humans, but we leaving behind a trail of work for future generations to work with. Hopefully they will know who we were and find our work worthy. The history provides narratives that contribute to the way of life we are living currently. Architecture represents the dweller's way of life. The theories of Norberg-Schulz prove to be use full in understanding the character of a place. By relating to the "things" that contributes to this character and understanding how it influences the point of arrival helps to design a space that can contribute to the spirit of the place.

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Assignment Inbox

preferences

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This is your class homepage. To submit to an assignment click on the "Submit" button to the right of the assignment name. If the Submit button is grayed out, no submissions can be made to the assignment. If resubmissions are allowed the submit button will read "Resubmit" after you make your first submission to the assignment. To view the paper you have submitted, click the "View" button. Once the assignment's post date has passed, you will also be able to view the feedback left on your paper by clicking the "View" button.

#### Assignment Inbox: NAS PLAGIARISM CHECK \_123\_1

Assignment Title	Info	Dates	Similarity	Actions
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# PROOF READER DECLARATION

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## CONFIRMATION OF LANGUAGE EDITING

I hereby confirm that I edited and proofread the language and style of the following dissertation:

### TITLE

A glider's club in the Douglas landscape: Exploring meaningful place-making for the spirit of adventure to form an oasis within a cosmic landscape

### AUTHOR

HF van den Berg

**Please note:** The edited work referred to here may not be identical to that submitted. The author at their sole discretion has the prerogative to accept, delete or change amendments made by the editor before submission.

Ingrid Kluyts

*BA Hons Language Practice*

*Member of South African Translators' Institute*

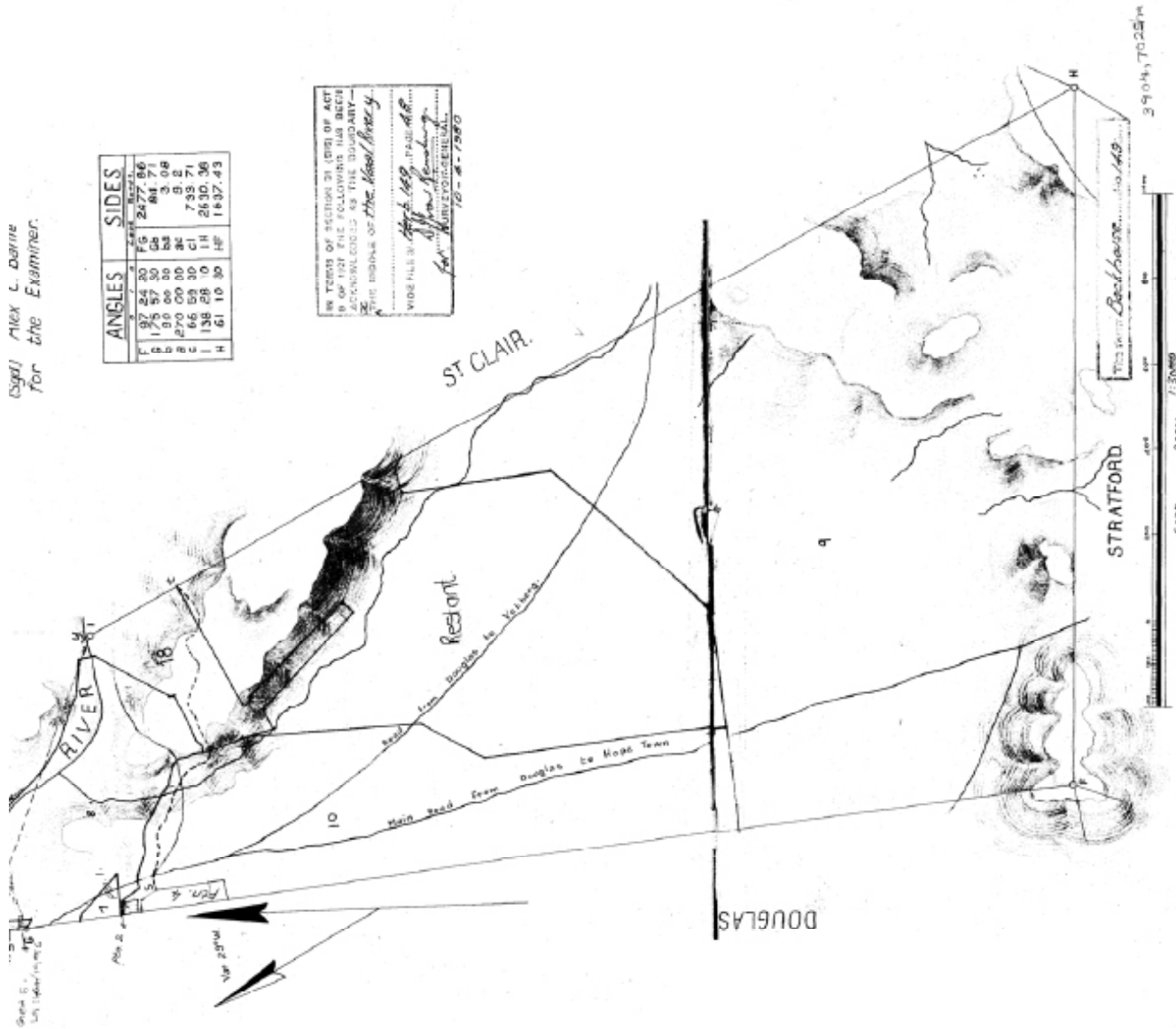
[ingridkluyts@gmail.com](mailto:ingridkluyts@gmail.com) | 082 908 4655

**SURVEYOR GENERAL DIAGRAM OF BACKHOUSE (NO. 149)**

(Sgd) Alex L. Darrin  
For the Examiner.

ANGLES	SIDES
F 92 24 30	FG 2477.66
G 175 57 30	GH 71
B 93 00 00	BC 3.09
E 270 00 00	ED 3
C 66 58 30	CI 735.36
I 138 28 10	IP 2632.36
H 61 10 30	HP 1937.43

IN TERMS OF SECTION 31 (27) OF ACT  
19 OF 1912 THE FOLLOWING HAS BEEN  
ACKNOWLEDGED AS THE BOUNDARY  
OF THE BOUND OF THE Backhouse  
WIDE FILE NO. 149 PAUL  
for Howe Family  
1912-12-1280



The above diagram represents 4559 morgen and 441 roads of land, being the farm Backhouse No. 149 situate in the Division of Howe bounded N<sup>o</sup> by the Vaal River, NE<sup>o</sup> by the farm St. Clair, S<sup>o</sup> by the farm Stratford, and W<sup>o</sup> by the Town Commonage of Douglas. Surveyed by order of Govt by me, (Sgd) J. M. Gillilan Govt Surveyor December 1874.

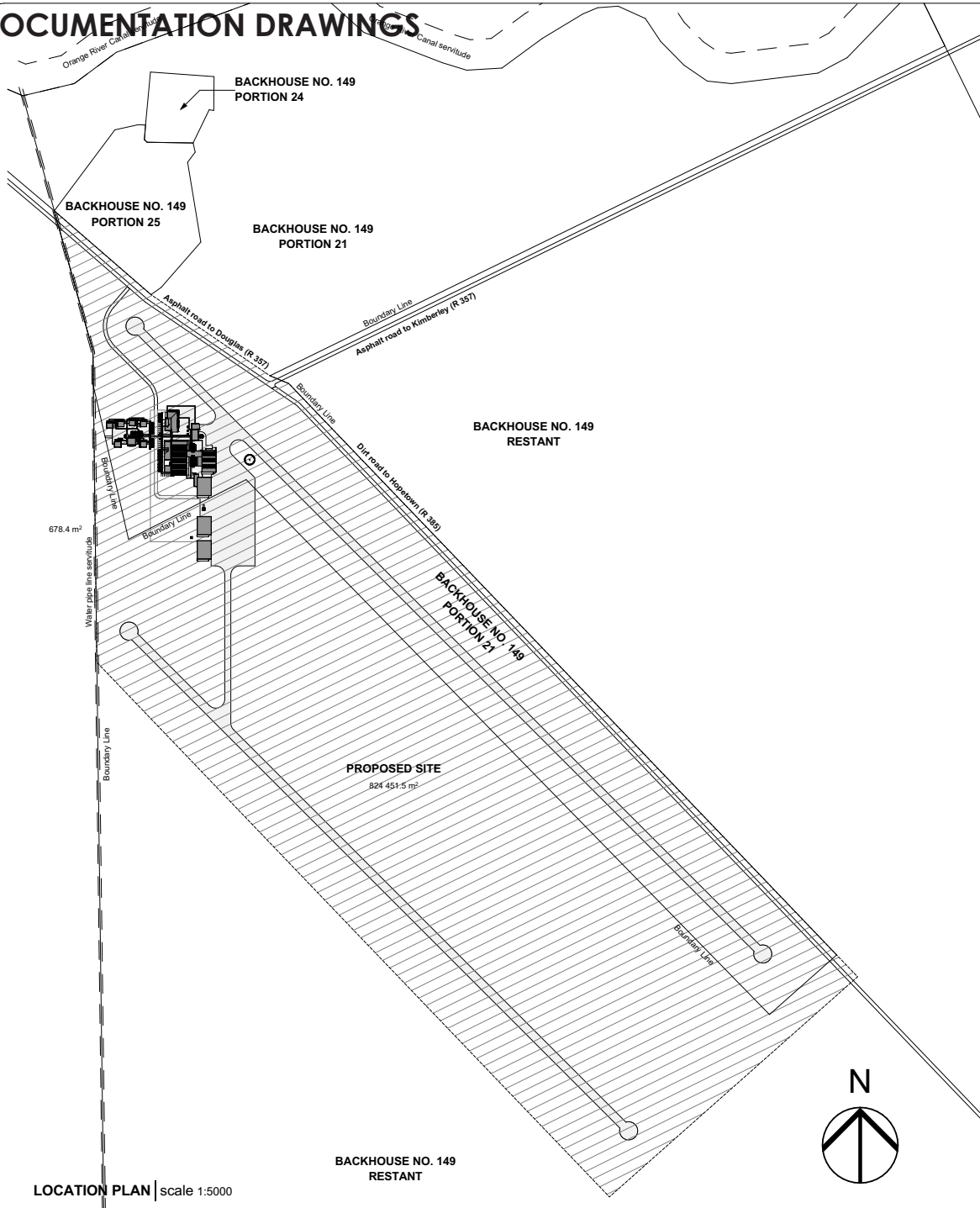
Note The rectilinear figure contains 4567 morgen 369 roads. Area of the above diagram in English measure 9648.74 Acres.

Obtained from the diagram attached to Land Grant. This Deed dated the 24<sup>th</sup> of 1877 in favour of Howe Family of Howe. C.M.I.C. 3-10

FM-28CC SHEET FM-28C (5500) FM-2(5497) FM-28CA (5502) For the 2<sup>nd</sup> of 1877



# DOCUMENTATION DRAWINGS



SCHEDULE OF RIGHTS			
PROPERTY DESCRIPTION			
Err/Portion:	BACKHOUSE NO. 149 PORTION 21	Site Area:	#Site Gross Area m <sup>2</sup>
Township:	SIYANCUMA	Title Deed no:	T 1342/2014
ZONING INFORMATION			
Town planning Scheme:	SIYANCUMA MUNICIPALITY	Amendment Scheme no:	
Zoning:	INDUSTRIAL II	Occupancy:	H
		Annexure no:	T
DEVELOPMENT CONTROL MEASURES			
Permissible	Control	Actual	
N.A	Height of Buildings	-	
75%	Coverage Shops	-	
66.66%	Coverage Business	-	
No Restriction	Bulk	-	
N.A	Floor Area Ratio (F.A.R)	-	
9.2m	Height	-	
-	Floorprint Area of Buildings	-	
H Business	Density	-	
0m Street	Building Lines	0m Street	



## REFORMING THE DOUGLAS AIRFIELD

#Project Description

**CONS 7908**

M. Arch (prof.),  
Department of Architecture,  
University of the Free State

Name: **H.F. van den Berg**

Student Number: 2012 027 617

Layout Name: **Location Plan**

Drawing Number: A101

Scale: 1:5000, 1:100 Date: 18-Nov-19

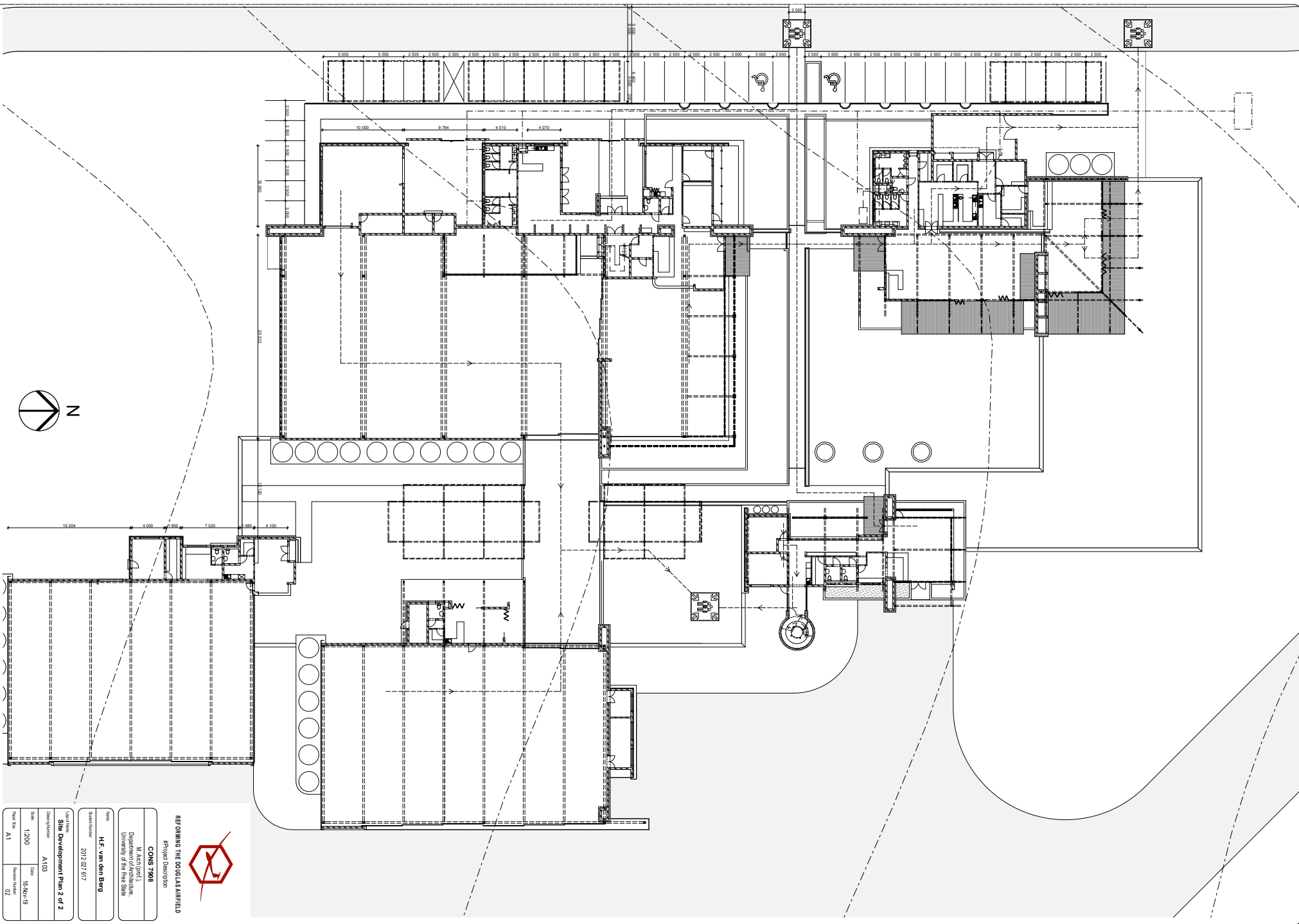
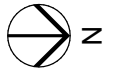
Paper Size: A1 Revision Number: 02

D:\-Arch\CAD-UFS 2019\Concept 05\Concept 05 REV 04 G.pln

LOCATION PLAN | scale 1:5000

BACKHOUSE NO. 149  
RESTANT





REOPENING THE DOUGLAS AIRFIELD

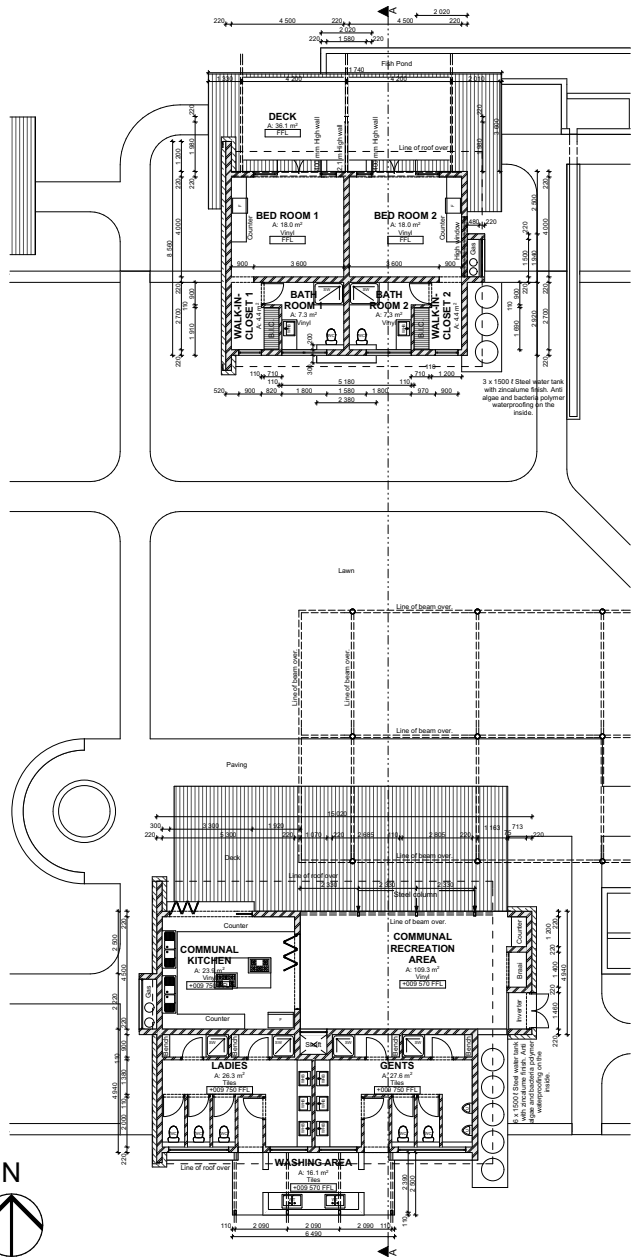
Project Description

CONS 7908

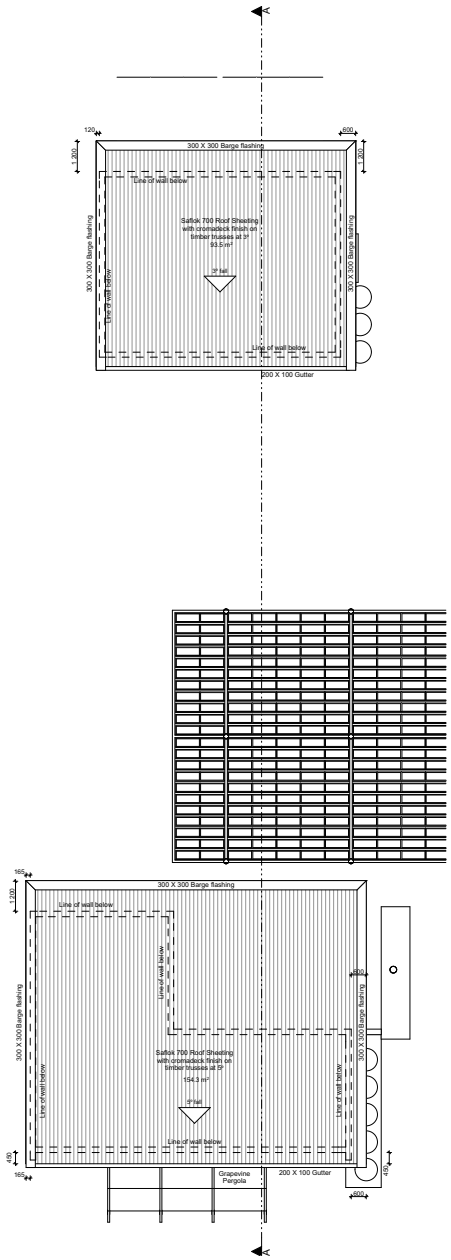
Name: H.F. van den Berg  
M. Architect  
Department of Architecture,  
University of the Free State

Student Number: 2012 027 817

Client Name	Site Name
University of the Free State	Site Development Plan 2 of 2
Scale	Date
1:200	16 Nov '19
Sheet No	Sheet Count
A1	02



**GROUND FLOOR PLAN** scale 1:100



**FIRST FLOOR PLAN** scale 1:100



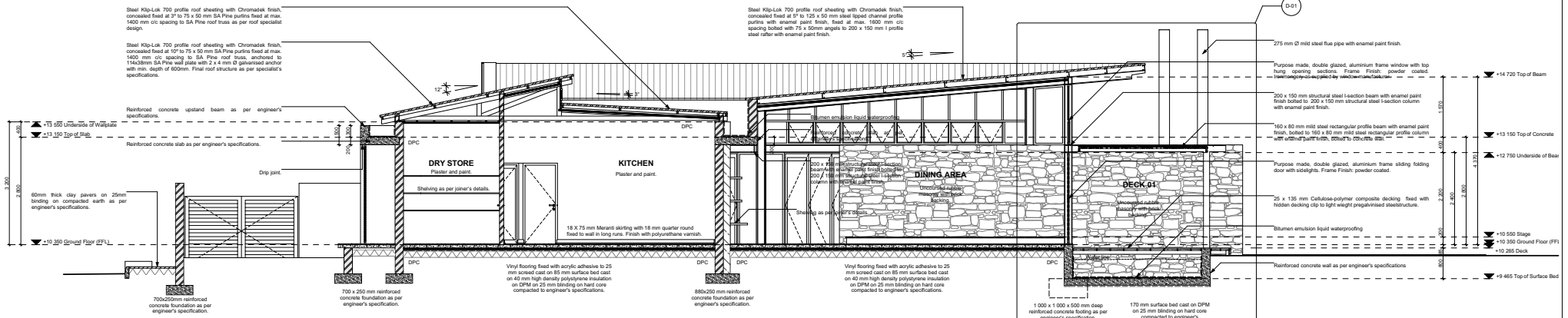
REFORMING THE DOUGLAS AIRFIELD  
#Project Description

**CONS 7908**  
M. Arch (prof.),  
Department of Architecture,  
University of the Free State

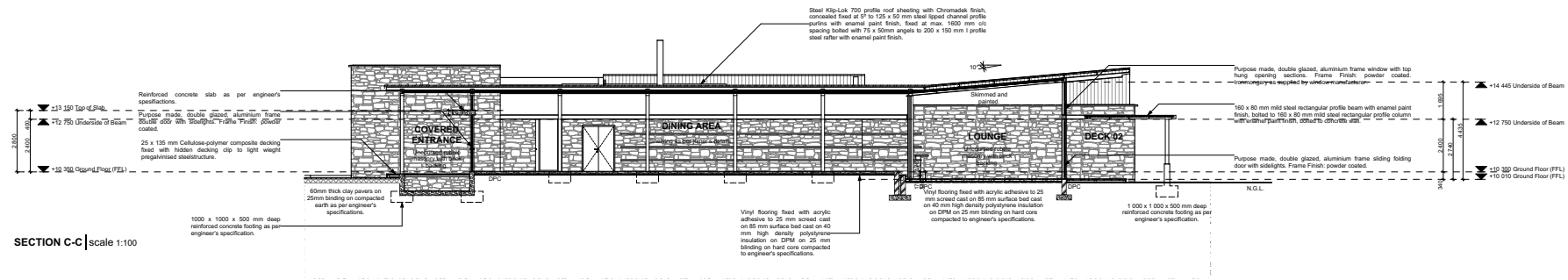
Name: **H.F. van den Berg**  
Student Number: 2012 027 617

Layout Name: **Typical Accommodation Floor Plan**  
Drawing Number: **AA101**  
Scale: 1:100 Date: 18-Nov-19  
Paper Size: A1 Revision Number: 02





SECTION C-C | scale 1:50



SECTION C-C | scale 1:100



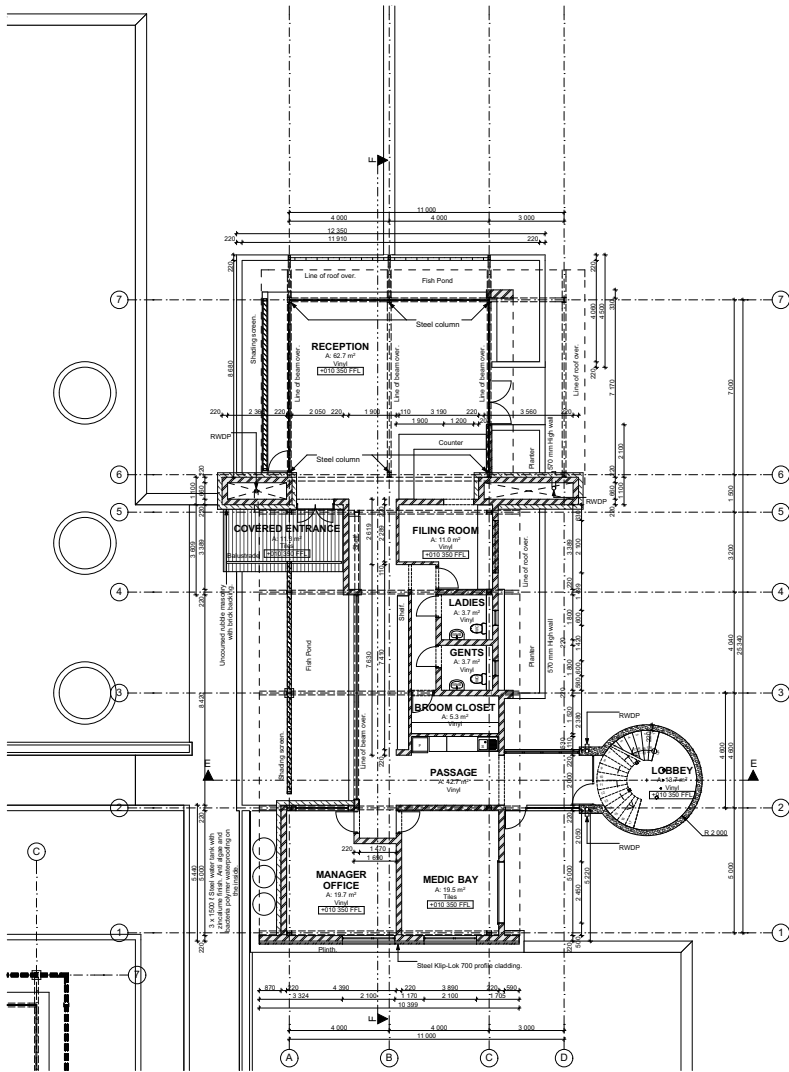
REFORMING THE DOUGLAS AIRFIELD

#Project Description

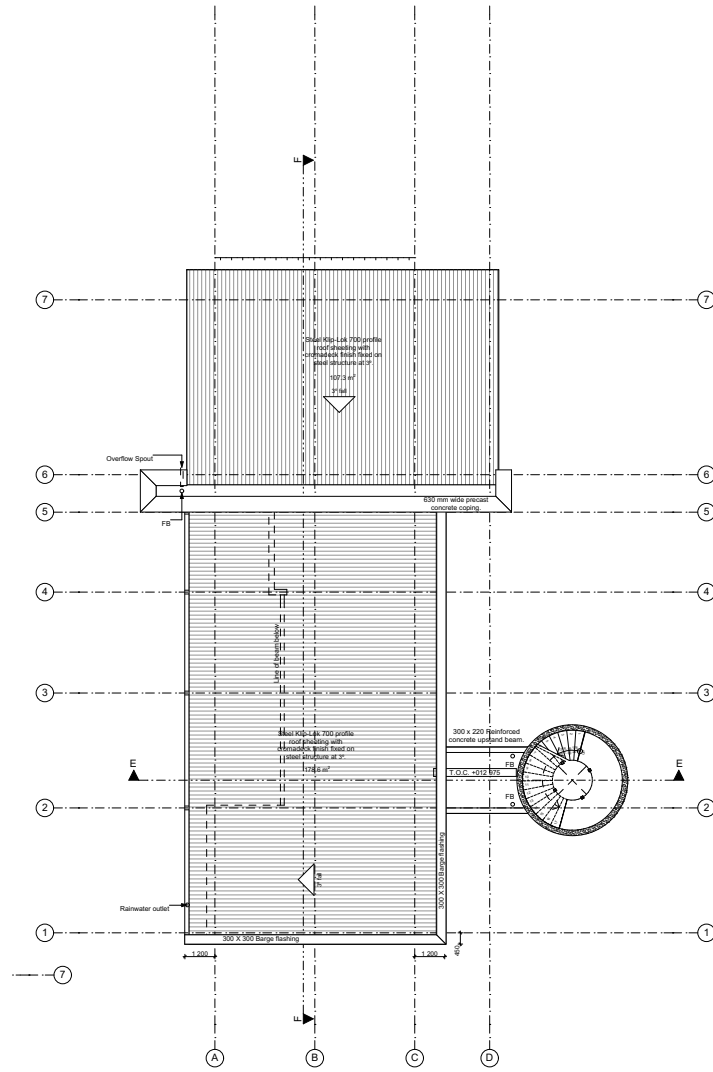
**CONS 7908**  
M. Arch (prof.),  
Department of Architecture,  
University of the Free State

Name: **H.F. van den Berg**  
Student Number: 2012 027 617

Lay-out Name: **Sections**  
Drawing Number: **AR301**  
Scale: 1:50, 1:100 Date: 18-Nov-19  
Paper Size: **A1** Revision Number: **02**



GROUND FLOOR PLAN | scale 1:100



ROOF PLAN | scale 1:100



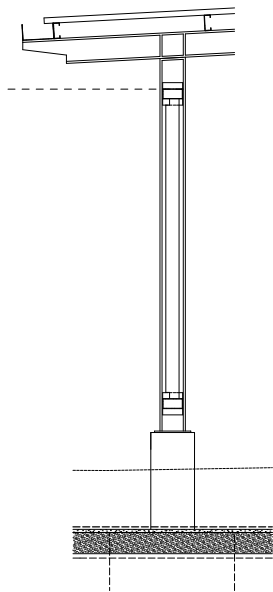
REFORMING THE DOUGLAS AIRFIELD  
#Project Description

CONS 7908  
M. Arch (prof.),  
Department of Architecture,  
University of the Free State

Name: H.F. van den Berg  
Student Number: 2012 027 617

Layout Name: Terminal Floor Plan  
Drawing Number: AT101  
Scale: 1:100 Date: 18-Nov-19  
Paper Size: A1 Revision Number: 02

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Steel Rip-Lok 700 profile roof sheathing with Chromadek finish, concealed fixed at 20 to 125 x 50 mm mild steel lipped channel profile purline with enamel paint finish, fixed at max. 1600 mm o/c leaving batten with 75 x 50mm angle to 200 x 150 mm I profile steel rather than enamel paint finish.

40 mm high density polystyrene insulation fixed with concealed clips to 35 x 38 mm pre-galvanized light steel battens fixed at max. 900 mm o/c to 125 x 50 mm mild steel lipped channel profile purline.

200 x 150 mm structural steel I-section beam with enamel paint finish, bolted to 200 x 150 mm structural steel I-section column with enamel paint finish.

125 x 200 mm wide gutter with enamel paint finish fixed to 125 x 50 mm mild steel lipped channel profile purline.

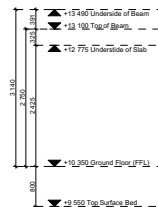
Blindings system fixed to 100 x 40 mm mild steel rectangular profile beam with enamel paint finish, bolted to 300 x 100 mm structural steel I-section column with enamel paint finish.

Purpose made, double glazed, aluminium frame window with louvre opening sections. Frame finish: powder coated, non-ferrous as supplied by window manufacturer.

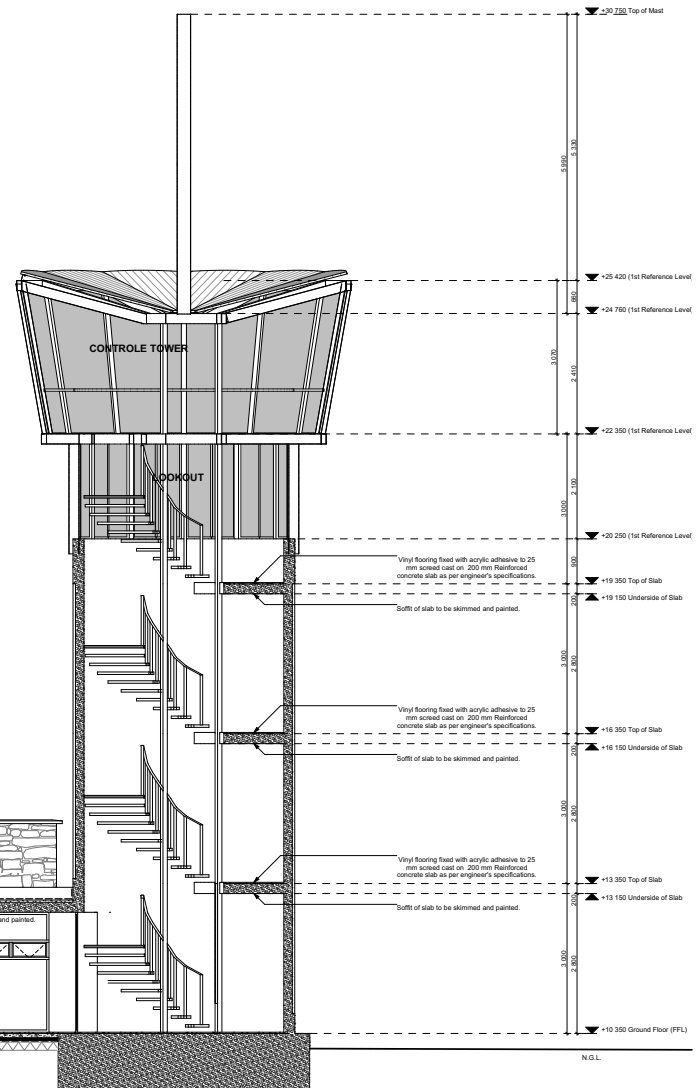
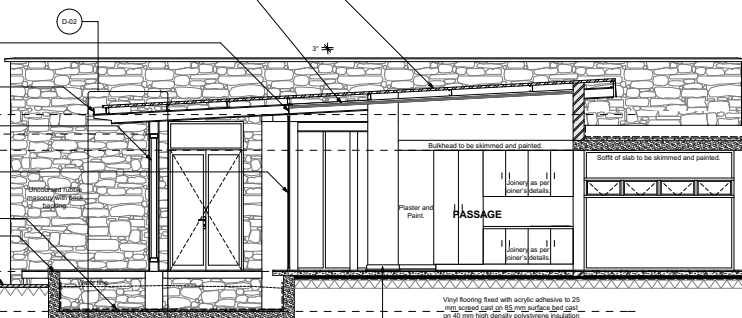
Bitumen emulsion liquid waterproofing.

Reinforced concrete wall as per engineer's specifications.

60mm thick clay pavers on 25mm bedding on compacted earth as per engineer's specifications.



SECTION E-E scale 1:50

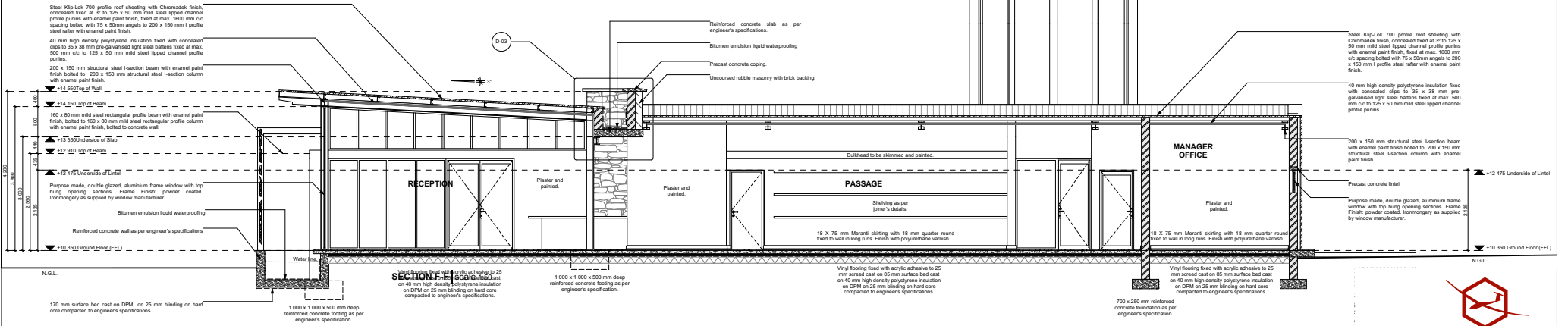
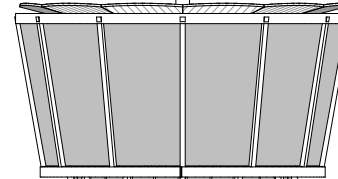
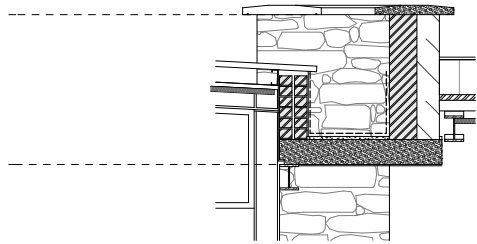


REFORMING THE DOUGLAS AIRFIELD  
#Project Description

CONS 7908  
M. Arch (prof.),  
Department of Architecture,  
University of the Free State

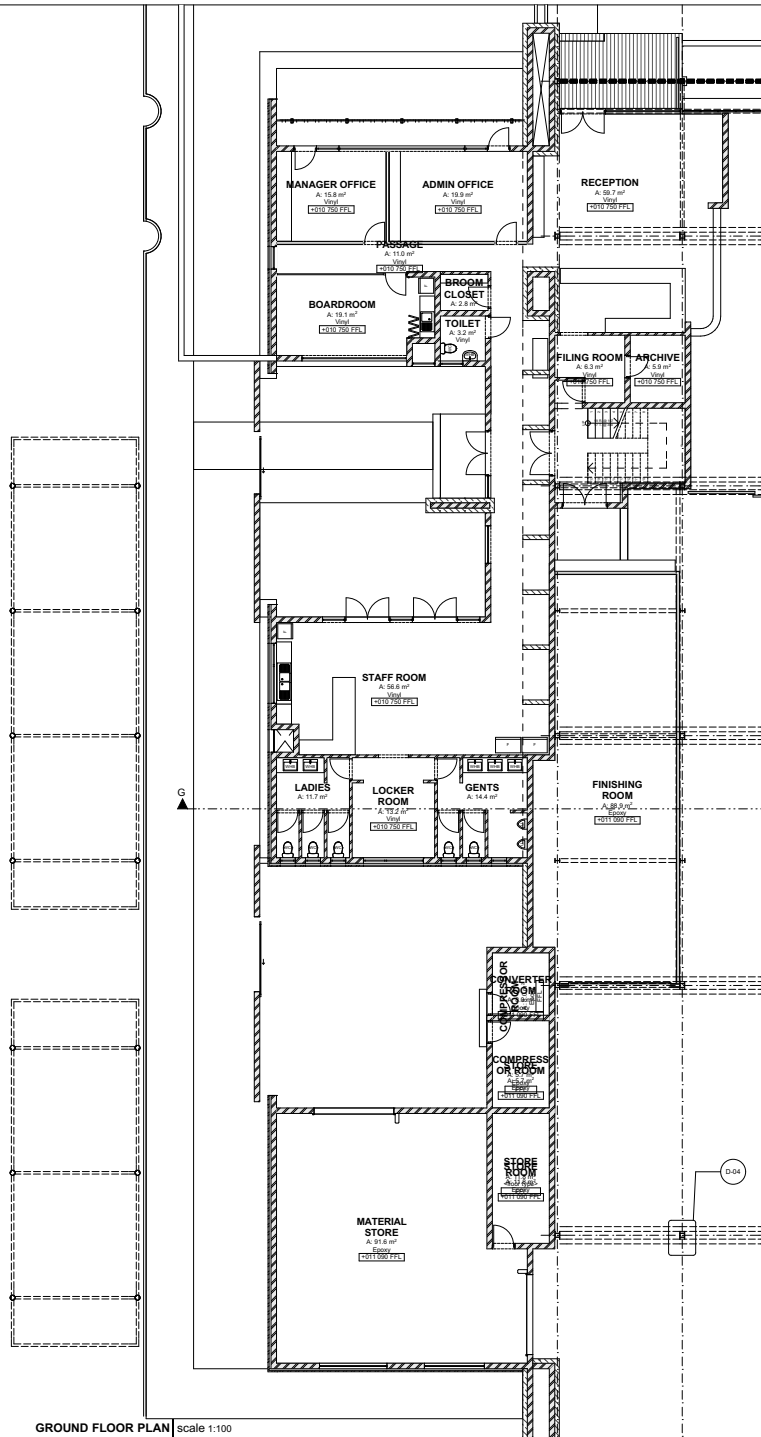
Name: H.F. van den Berg  
Student Number: 2012 027 617

Layout Name: Sections 1 of 2  
Drawing Number: AT301  
Scale: 1:50, 1:20 Date: 18-Nov-19  
Paper Size: A1 Revision Number: 02

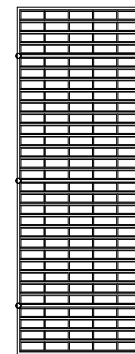
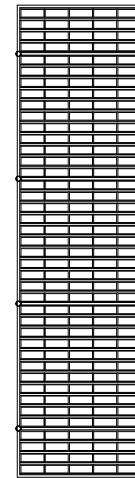


REFORMING THE DOUGLAS AIRFIELD

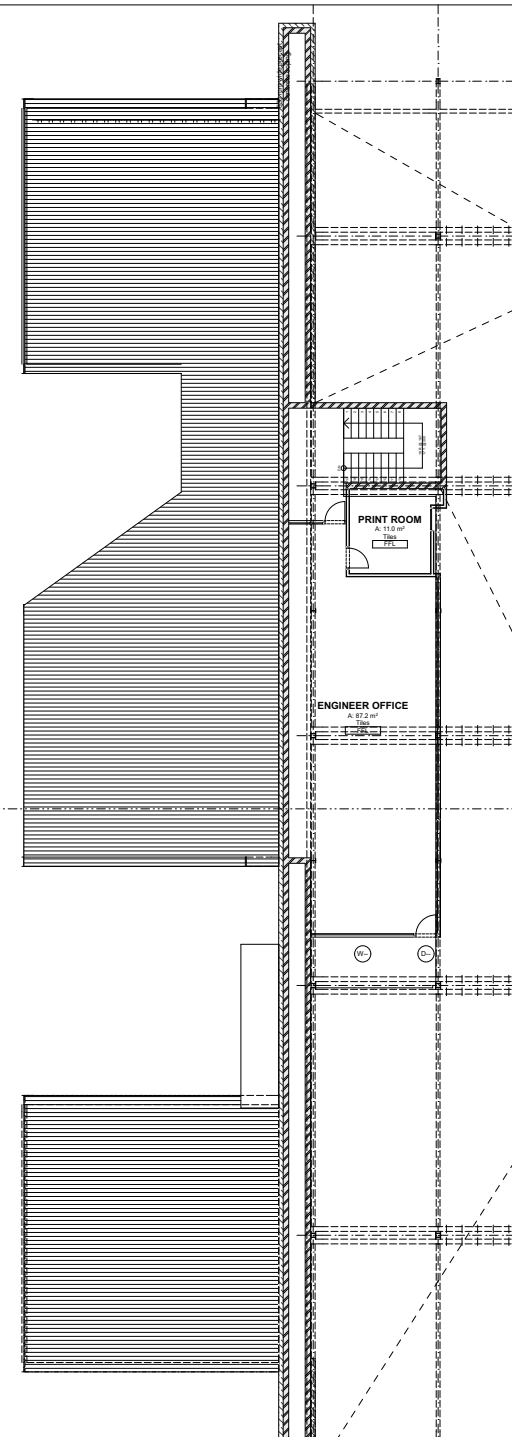
#Project Description	
<b>CONS 7908</b>	
M. Arch (prof.), Department of Architecture, University of the Free State	
Name:	<b>H.F. van den Berg</b>
Student Number:	2012 027 617
Layout Name:	<b>Sections 2 of 2</b>
Drawing Number:	<b>AT302</b>
Scale:	1:50, 1:20
Date:	18-Nov-19
Paper Size:	A1
Revision Number:	02
DU-ARCHCAD-UPFS 2019 Concept 09/Concept 05 REV 04 G.jpg	



GROUND FLOOR PLAN scale 1:100



FIRST FLOOR PLAN scale 1:100



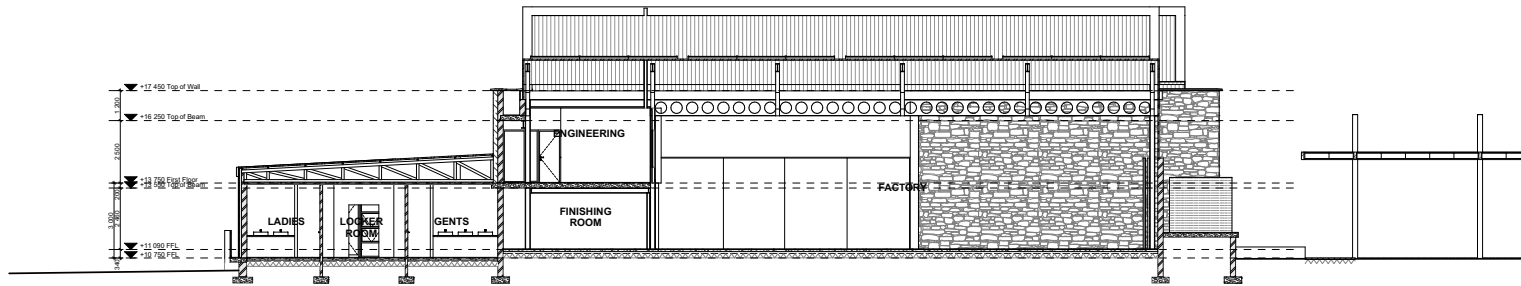
REFORMING THE DOUGLAS AIRFIELD  
#Project Description

**CONS 7908**  
M. Arch (prof.),  
Department of Architecture,  
University of the Free State

Name: **H.F. van den Berg**  
Student Number: 2012 027 617

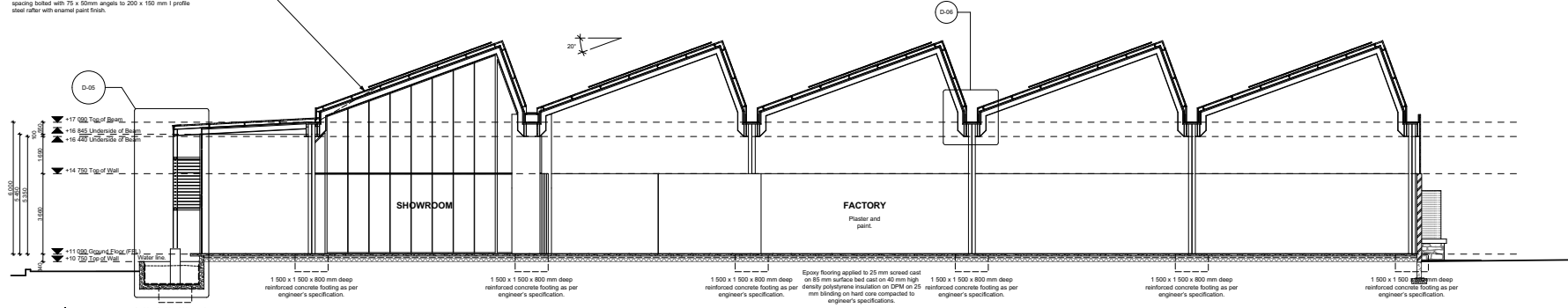
Layout Name: **Factory Floor Plan**  
Drawing Number: **A F102**  
Scale: 1:100 Date: 18-Nov-19  
Paper Size: A1 Revision Number: 02

D:\-ARCHCAD-LIPS 2019\Concept 09\Concept 05 REV 04 0.jpg



SECTION G-G | scale 1:100

Steel Kilo-Lok 700 profile roof sheeting with Chromadek finish, concealed fixed at 20° to 125 x 50 mm mild steel lipbed channel profile profiles with enamel paint finish, fixed at max. 1600 mm o/c spacing bolted with 75 x 50mm angles to 200 x 100 mm I profile steel rather with enamel paint finish.



SECTION H-H | scale 1:100



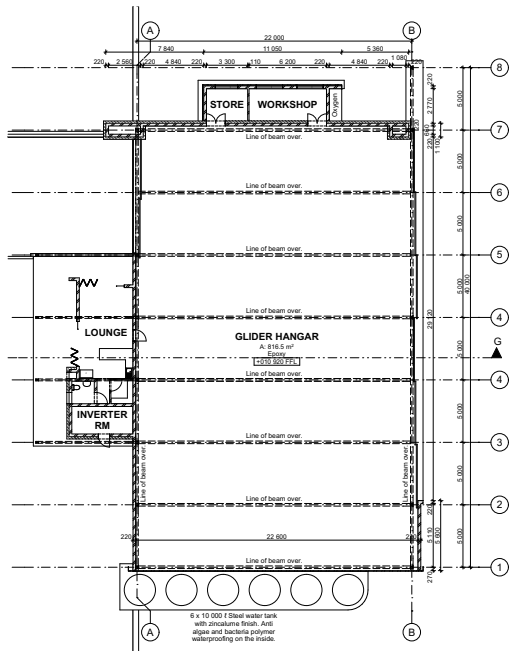
REFORMING THE DOUGLAS AIRFIELD  
#Project Description

**CONS 7908**  
M. Arch (prof.),  
Department of Architecture,  
University of the Free State

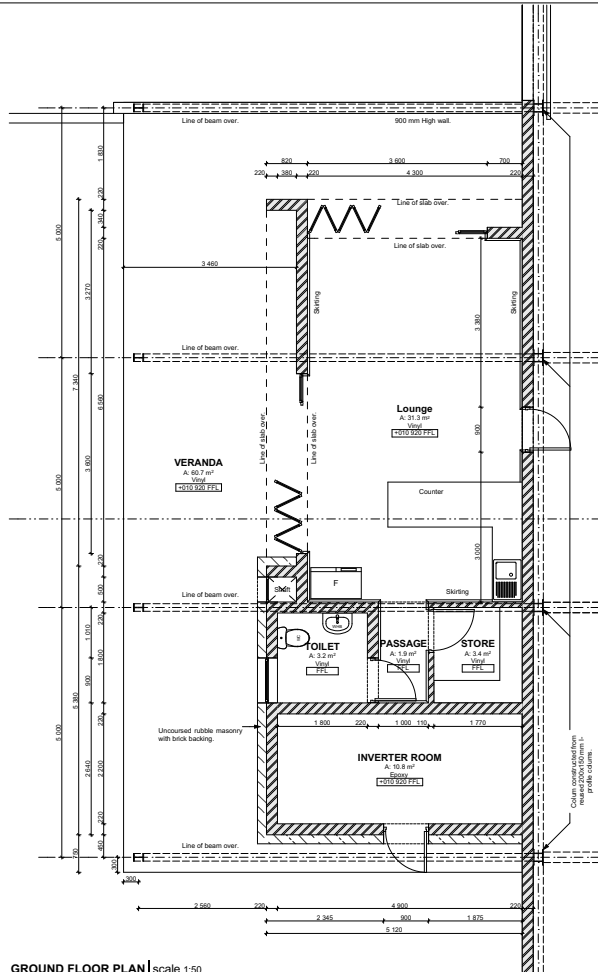
Name: **H.F. van den Berg**  
Student Number: 2012 027 617

Layout Name: **Sections**  
Drawing Number: A F 301

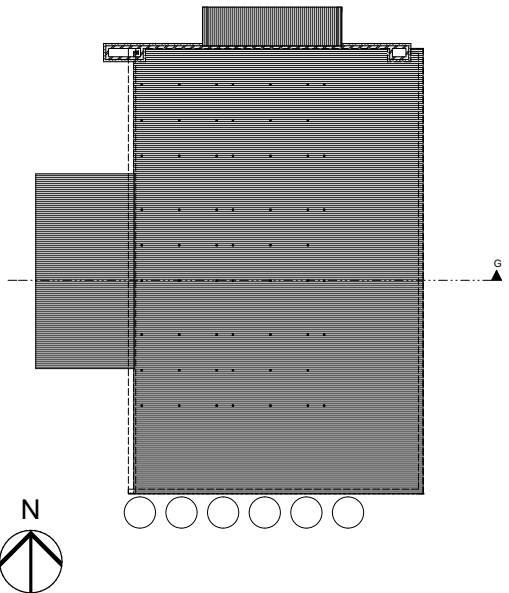
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Paper Size: A1	Revision Number: 02



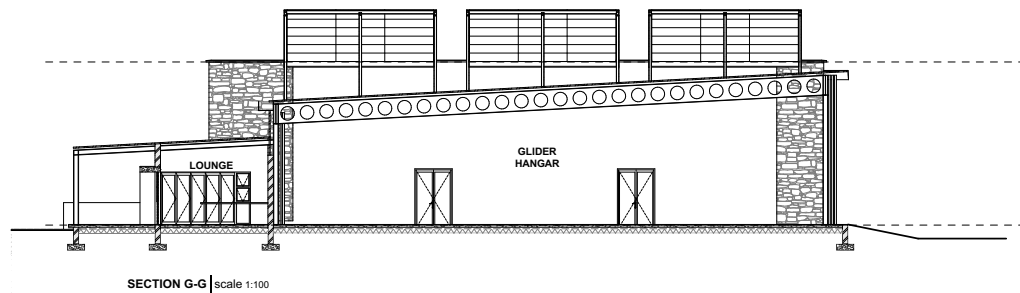
GROUND FLOOR PLAN | scale 1:200



GROUND FLOOR PLAN | scale 1:50



SECTION G-G | scale 1:100



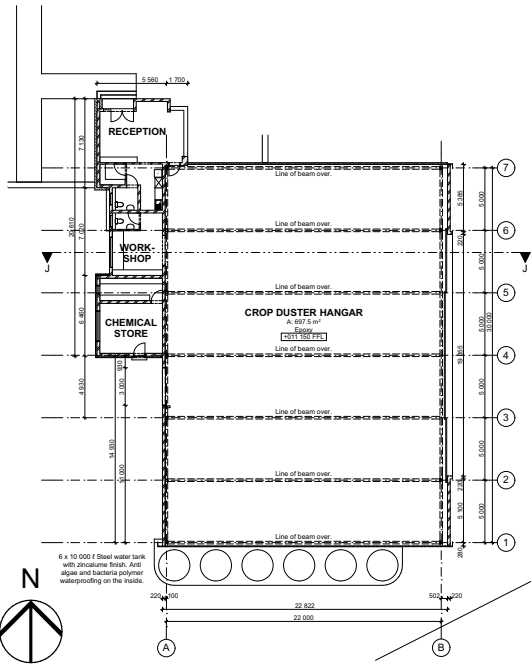
REFORMING THE DOUGLAS AIRFIELD  
#Project Description

**CONS 7908**  
M. Arch (prof.),  
Department of Architecture,  
University of the Free State

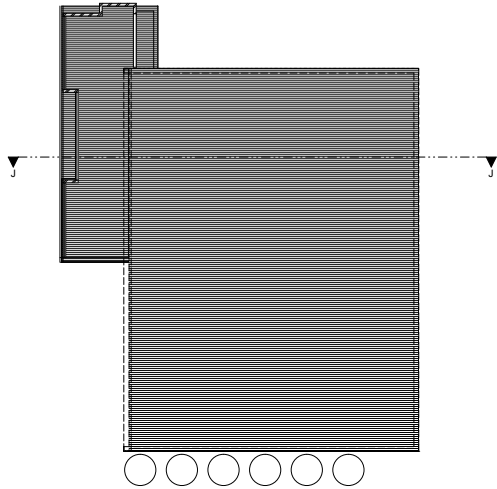
Name: **H.F. van den Berg**  
Student Number: 2012 027 617

Layout Name: **Glider Hangar Floor Plan**  
Drawing Number: **AGH101**  
Scale: 1:200, 1:50, 1:100 Date: 18-Nov-19  
Paper Size: **A1** Revision Number: **02**

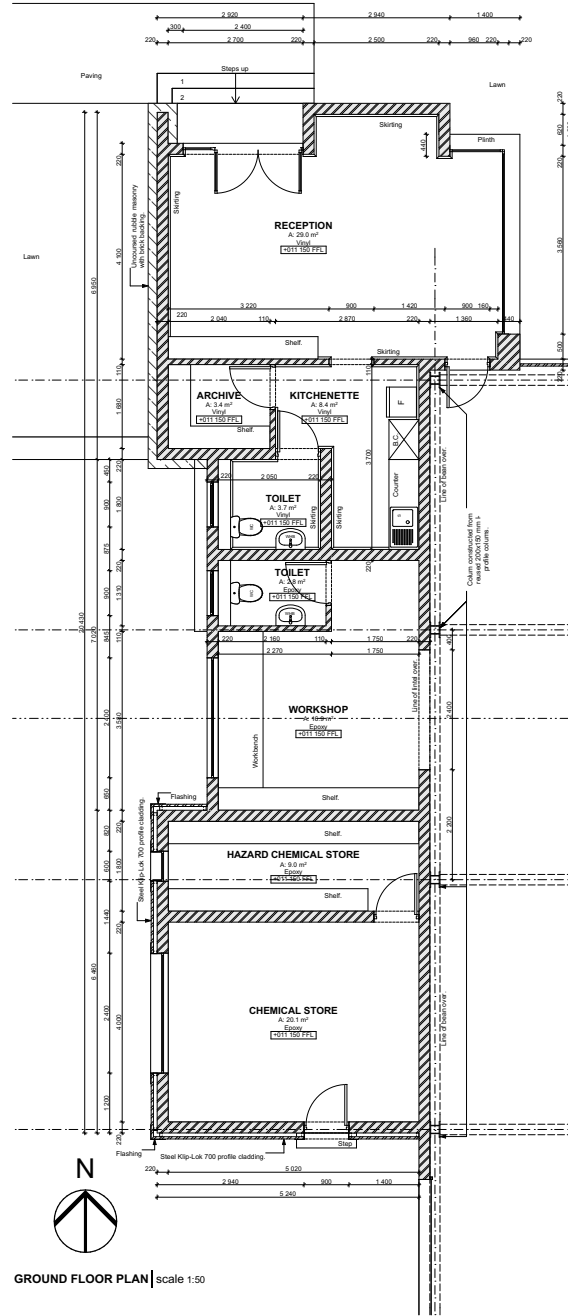
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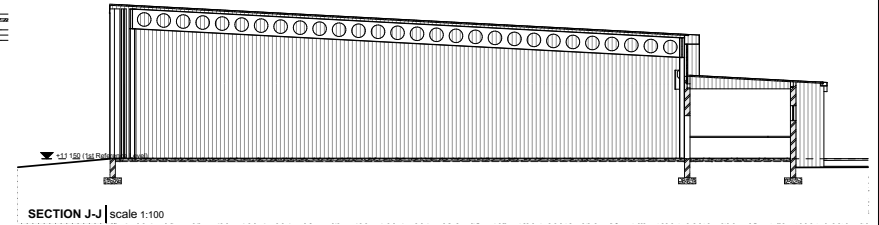
GROUND FLOOR PLAN | scale 1:200



ROOF PLAN | scale 1:200



GROUND FLOOR PLAN | scale 1:50



SECTION J-J | scale 1:100



REFORMING THE DOUGLAS AIRFIELD  
#Project Description

CONS 7908  
M. Arch (prof.),  
Department of Architecture,  
University of the Free State

Name: **H.F. van den Berg**  
Student Number: 2012 027 617

Layout Name: **Crop Duster Hangar Plan**  
Drawing Number: ACH101  
Scale: 1:200, 1:50, 1:100 Date: 18-Nov-19  
Paper Size: A1 Revision Number: 02

