

# CHAPTER 7

## Elephant in the Garden

*This chapter focuses on conceptual exploration and design development that took place in response to various design informants relating to site, programme, and of course, the elephants.*

*The design aims at creating a place of sanctuary for displaced elephants. A place for healing and refuge.*

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*Experiential journey*

*As visitors walk across the bridge over the natural river and approach the building, they are directed towards a funnelling public entrance. The monumental, monolithic concrete walls wrapping the elephant enclosure come to view, providing a glimpse into the building. Inside, elephants are frolicking about in the sand, spraying themselves with water, while enjoying the fruits of the Marula trees.*

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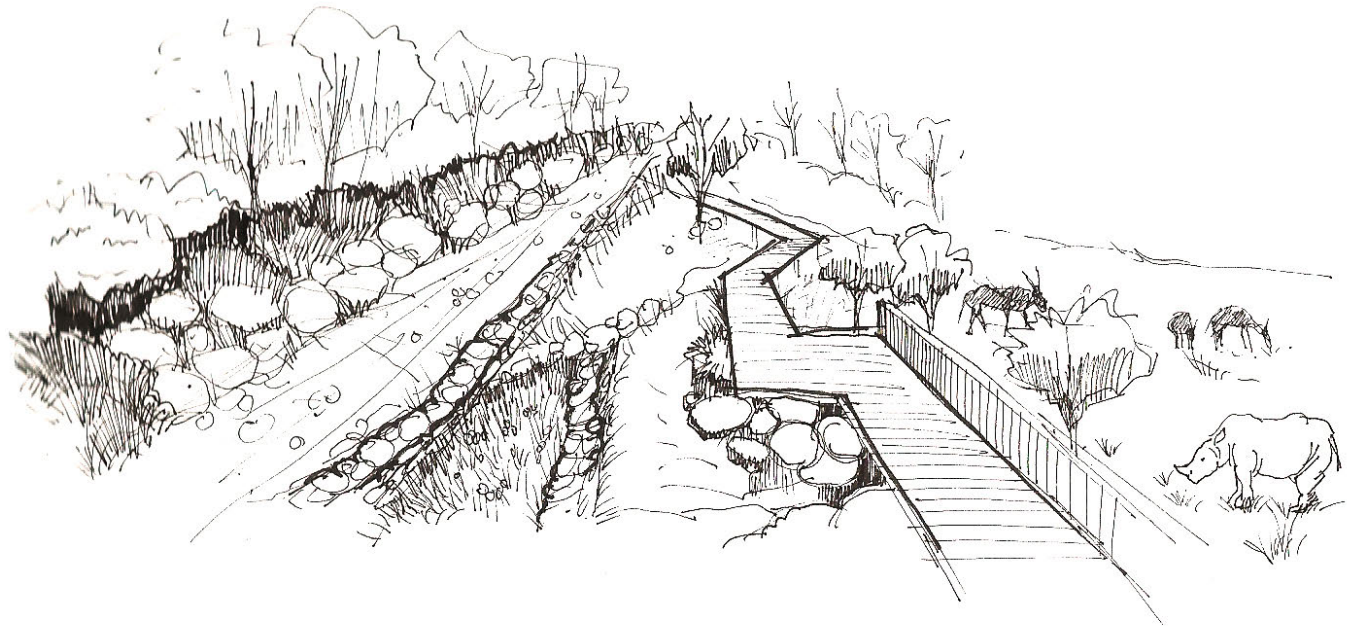
## Design Review Introduction

*The design aesthetic of the project is determined by three factors.*

Firstly. The design is a response to the natural and environmentally aware stigma associated with designing for wild animals.

Secondly. The design adheres to the functional requirements and regulations stipulated by international as well as local standards, when dealing with elephants in captivity. Issues such as materiality, access, flooring, safety and protection were considered.

Thirdly. The architecture is meant to symbolise the ethereal nature of these magnificent creatures; our living dinosaurs. The spaces where humans and elephants encounter are meant to make visitors aware of being in a presence greater than themselves; A space where the extraordinary intelligence and presence of elephants is showcased.



*Figure 7.1 Initial sketch of proposed Garden of Captives (Author, 2016).*

# The Elephant in the Room

## Design informants

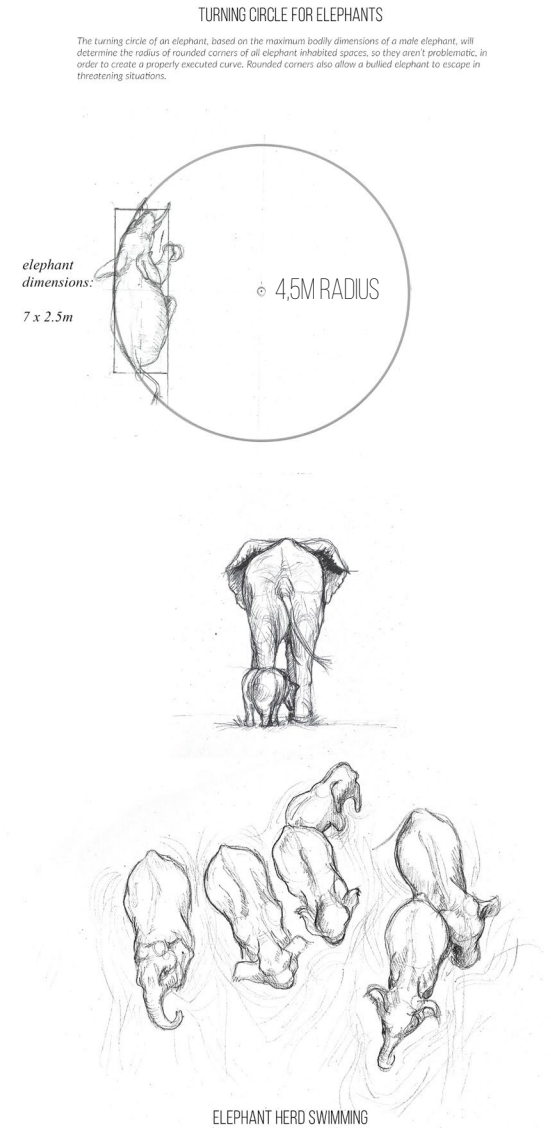
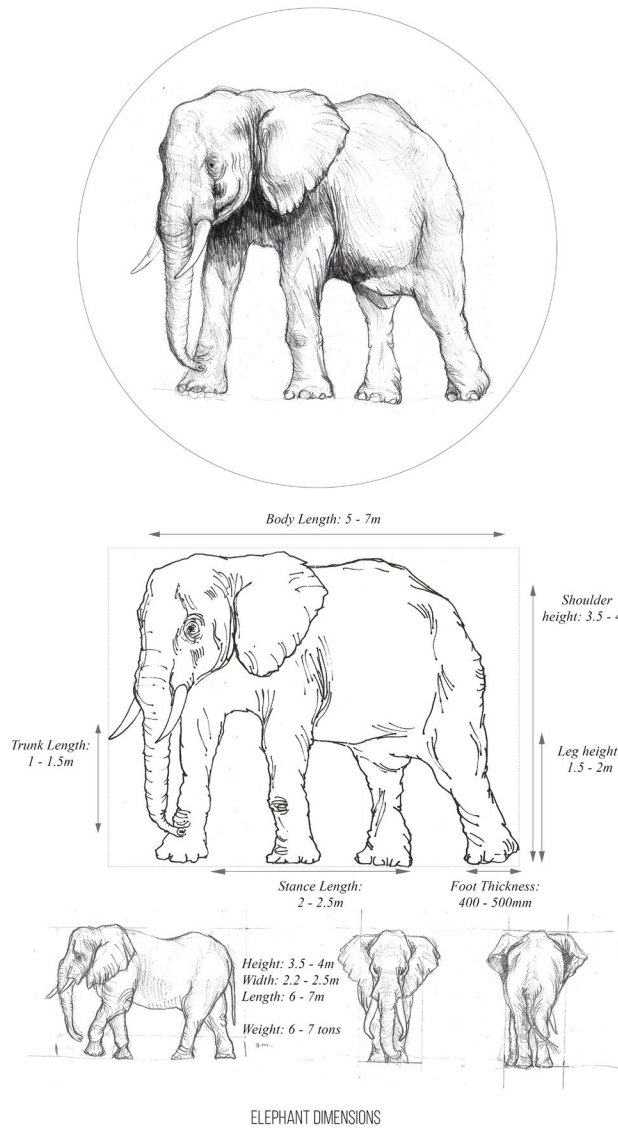
### The Modular Elephant

The Modular Elephant was developed by establishing the bodily dimensions of a fully grown, 6 ton male elephant. The body length, shoulder height, stance length and width were used to determine dimensions of circulation passages, doorways, ramps, swimming pool slope and steps, reaching heights and ceiling heights.

### Turning Circle for elephants

The turning circle of an elephant, also based on the maximum bodily length and width of a fully grown bull, will determine the radius of rounded corners of all elephant inhabited spaces, to ensure that the corners are not problematic or wasted space – due to the large size of elephants. The turning radius is therefore used to create a properly executed curve to be repeated throughout the ground floor plan. Rounded corners also allow a smaller, bullied elephant to escape in any threatening situations before staff can intervene.

Figure 7.2 Modular elephant (Author, 2016).



## Primary users

### African Elephants (*Loxodonta Africana*)



#### Weight

males 4,700 - 6,048 kg  
females 2,160 - 3,232 kg



#### Height

males 3.2 - 4m  
females 2.2 - 2.6m



#### Habitats

Tropical and Subtropical Moist Broadleaf Forests, Flooded Grasslands and Savannahs, Miombo woodlands, Acacia savannahs



#### Status

Vulnerable



#### Water

200 litres per day



#### Food

100 - 270 kg per day

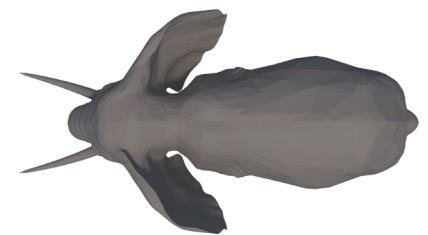
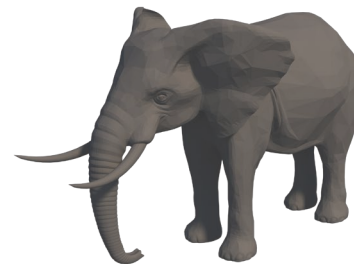
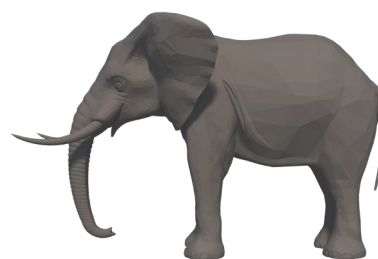
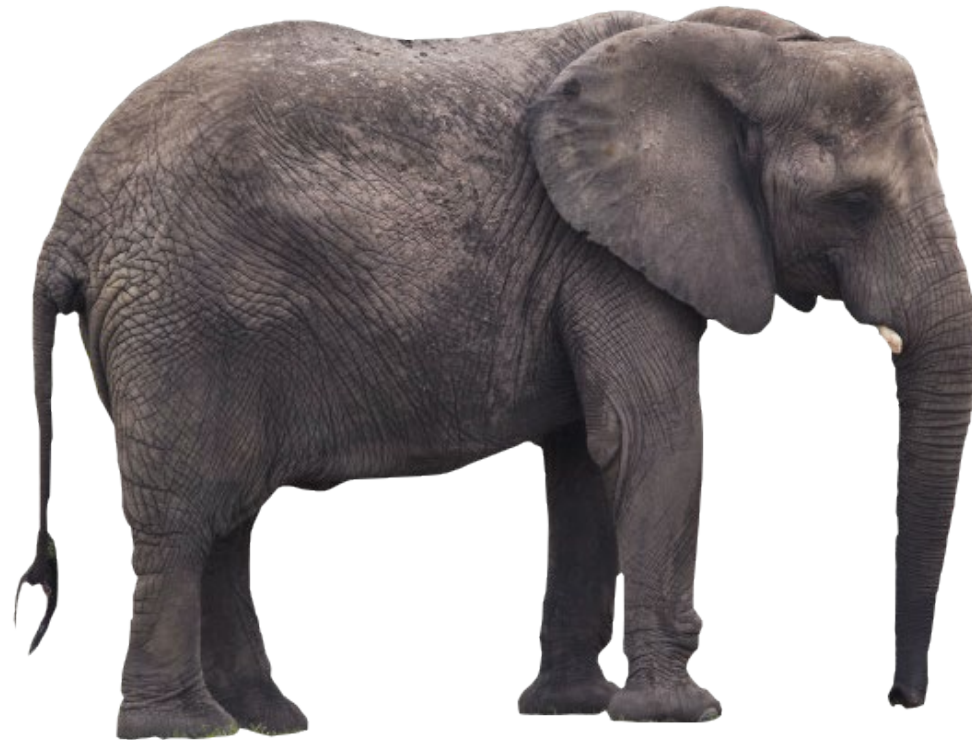


Figure 7.3 African elephant analysis (Author, 2016).

## Celebrating elephants in various natural conditions which aid in rehabilitation

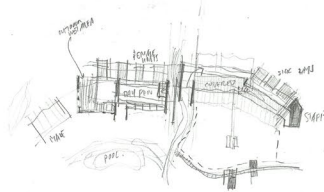




*Figure 7.4 Elephants in natural conditions photograph collage (Author, 2016).*

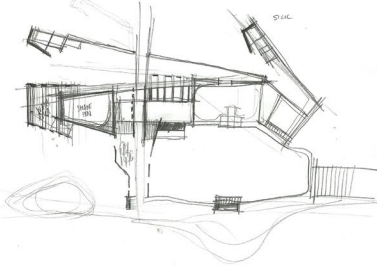
# CONCEPT DESIGN EXPLORATION

SITE PLAN



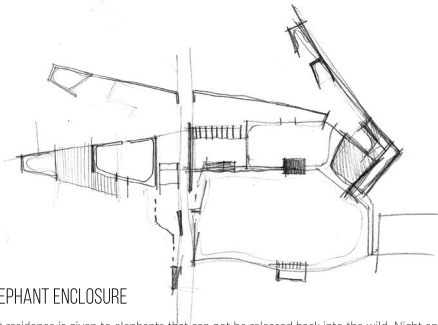
## 01 SERIES OF SENSUAL GEOMETRIES TO CREATE FORM

The thin, long building and structure is seen as a journey and an experience, that includes gradual disclosure and sudden surprise. The user is taken through a process of rehabilitation and recovery while being exposed to distant views of the river, the landscape and surrounding animals occupying the shared Garden.



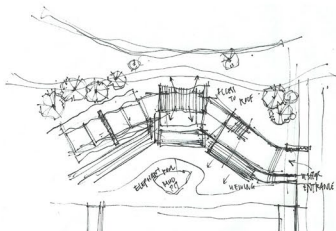
## 02 SEPARATE PATHS

Using levels and difference in height, scale and volumes to separate paths of elephants, visitors and staff members

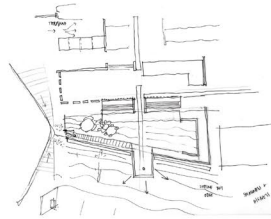


## 03 ELEPHANT ENCLOSURE

Permanent residence is given to elephants that can not be released back into the wild. Night and day spaces are built in the landscape around the natural elephant pool and island.

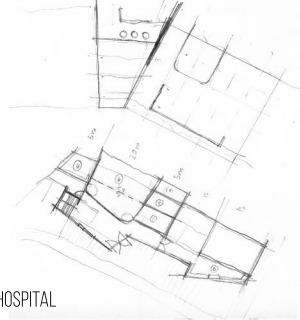


GROUND PLAN



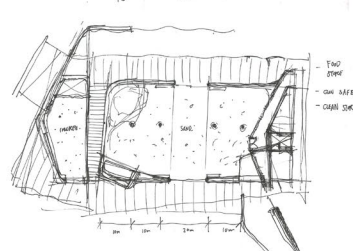
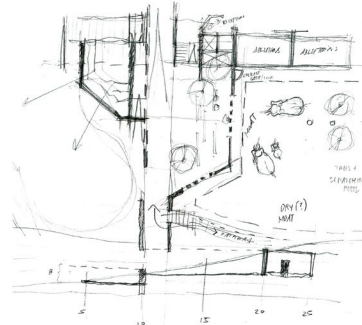
## 01 REHABILITATION

Water forms an important component in the design and rehabilitation programme, that is used to tie both indoor and outdoor rehabilitation spaces for the elephants. The theme of water also ties into the river and water purification and rehabilitation framework set by the urban vision.

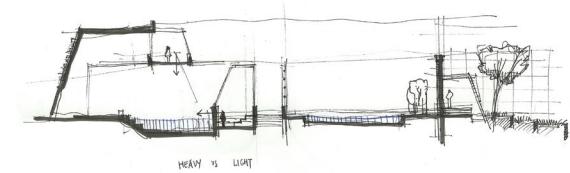


## 02 ELEPHANT HOSPITAL

The elephant hospital will contain isolated sick rooms which are the furthest away from the public. A main operating space allows the staff to examine, treat and operate if necessary on the elephants. The hospital is supplied with a pharmacy, bio bank, food store, equipment store and gun safe.

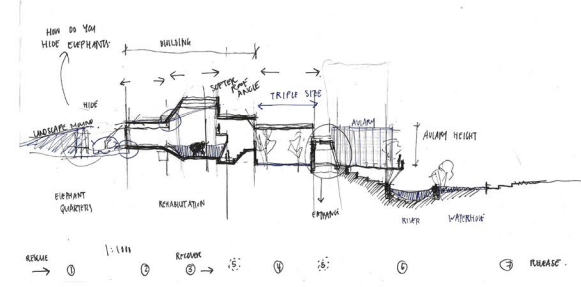


SECTION



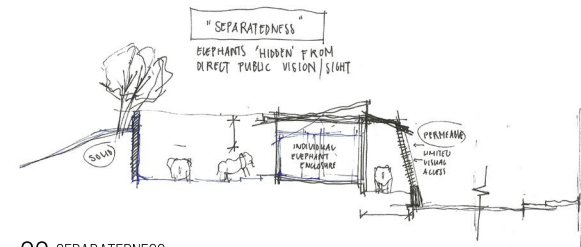
## 01 MATERIALITY: HEAVY VS LIGHT

Aspects of GRAVITY and HEAVINESS represent the significantly greater scale and weight of elephants in comparison to humans, which is also shown in the volume of spaces.



## 02 SECTION TO TELL A STORY

Elephants are brought in and kept in isolation while they recover. The recovery process involves examination, treatment, medical procedures, indoor play and water therapy (rehabilitation), outdoor play and engagement with humans and the landscape, before being introduced to the rest of the elephant herd and into the Garden.



## 03 SEPARATEDNESS

Rescued elephants first brought to the sanctuary are kept in isolated recovery units hidden from public access. The connection of the building to the landscape is important.

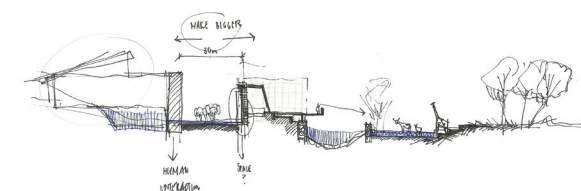


Figure 7.5 Concept design exploration (Author, 2016).



## *Site Plan functions*

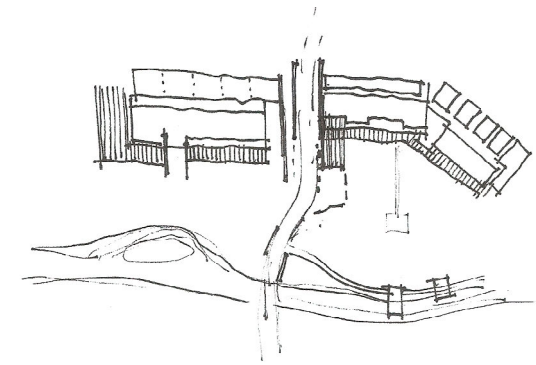


Figure 7.6 Site plan exploration (Author, 2016).

### *Series of sensual geometries to create form*

The building is seen as a series of different spaces and structures nestled into the landscape, reconnecting the elephants to the earth. The separation and placement of the separate ‘buildings’ making up a whole contributes to the journey and experience of visitors as they move through the different spaces. Each space includes a unique experience and intake of information, contributing to the journey of gradual disclosure and revealing. The visitor is taken through a process of elephant rehabilitation and recovery while being exposed to views of the river, the landscape and elephants in the Garden.

### *Separate Paths*

Optimum safety and security considerations are of utmost importance to ensure the protection of both animals and people. When dealing with elephants, this importance is escalated due to their supreme scale and strength. Therefore, maximising the slope of the site to create levels and height differences, as well as difference in scale and volumes of space, can assist in establishing separate paths of elephants, staff and the visitors. These changes in levels allow varied interaction and vantage points of the elephants from underwater, ground level and higher levels to further contribute to the user experience.

### *‘Separatedness’*

Rescued elephants brought to the sanctuary need to be first kept in quarantine, to receive necessary treatment while recovering. This isolated recovery ward is hidden from public access, situated on the furthest and most private edge of the site.

## *Ground Plan functions*

### *Elephant enclosure facilities*

Permanent residence is given to elephants that cannot be released back into the wild due to injury, disease or circumstance. Therefore, sufficient indoor space needs to be provided for elephants to move around and rest without restriction. The design challenges traditional approaches in zoological enclosure designs, particularly in designing shelter for elephants.

### *Standard and measurement*

Enclosure sizes recommended by the AZA, include providing 37m<sup>2</sup> per single elephant indoors (56m<sup>2</sup> for an adult elephant with calves) and 500m<sup>2</sup> per elephant outdoors (AZA, 2012). These sizes form the minimum suggested stall areas for circumstances such as extreme weather conditions that require elephants to remain indoors for extended periods of time. Therefore, these spaces need to be adequate enough for elephants to exhibit natural behaviours, social interac-

tions and allow for better movement.

A large, mostly open day area of 1320m<sup>2</sup> is provided with a 1200mm layer of sand substrate, Marula trees and a small wading pool for drinking and cooling purposes. According to AZA requirements, the space is large enough to accommodate 23 adult elephants with calves, as 56m<sup>2</sup> per elephant and calf is stipulated. This space allows elephants to congregate together as a herd. The space, with only 30% roof cover, is purposefully left opened for elephants to be aware of changing daylight patterns. This also provides for full natural ventilation, an important and necessary design measure for animal shelter design, as well as for effective drying of the sand substrate after routine cleaning.

Three sleeping quarters with insulated rubber flooring, built into the landscape to optimise the use of thermal mass, are each 90m<sup>2</sup> in size. As elephants in the wild tend to sleep together in groups or pairs, the floor areas of each night quarter are large enough to accom-

modate more than one elephant, as well as mothers sleeping with their calves. A fourth, larger sleeping quarter, with a sand substrate floor, is 140m<sup>2</sup> in size – large enough to accommodate 4 adult elephants.

In order to accommodate bulls' natural tendencies to separate from the matriarchal herd when reaching sexual maturity, a separate bull enclosure is provided. This space, with an area of 315m<sup>2</sup>, can accommodate five bulls as per the AZA minimum requirements.

### *Rescue Elephant Clinic*

In accordance with the AZA and similar elephant regulations, the project will include an elephant clinic. This clinic, located at the furthest and most private point of the immediate site, will accommodate sick, recovering elephants and new elephants brought to the zoo that need to be kept in quarantine before being allowed to join the rest of the herd.

The clinic will also contain an Elephant Restrain Device (ERD) with an elephant scale, built into the transfer hall leading to the isolated, quarantine area. This allows for handlers and veterinarians to examine, treat and perform both minor and complex procedures to elephants safely.

An appropriately stocked pharmacy, or drug store, and temporary bio bank storage areas are included in the clinic for handlers and veterinarians.

### *Elephant Transfer Hall*

The elephant transfer hall is the primary circulation passage for elephants that directs them and connects different spaces such as the day area, night quarters, hydrotherapy pool and the clinic – all spaces nestled along the topography of the site. The transfer hall is wide enough to accommodate 2 elephants walking side by side (such as a mother and calf), as well as providing enough room for an elephant to turn around. The thick, reinforced concrete walls on the one side and rows of square steel columns on the opposite side of the hall form the primary and secondary containment – to ensure staff safety.

## *Water & Rehabilitation*

### *Rehabilitation & water therapy*

The process of bathing and cleansing is an important ritual for the physical health and mental wellbeing of elephants during their daily rehabilitation and recovery process.

Elephants are highly dependent on water and should be bathed or showered daily in captivity. Hydrotherapy pools will aid in their recovery as heated water provides therapeutic advantages, and allow for stronger muscle development through play. Water channels or swimming pools intersect with the human spaces. Visitors are then able to view the elephants from different viewpoints, levels and heights, with varying degrees of physical and visual interaction.

### *Water & remediation wetlands*

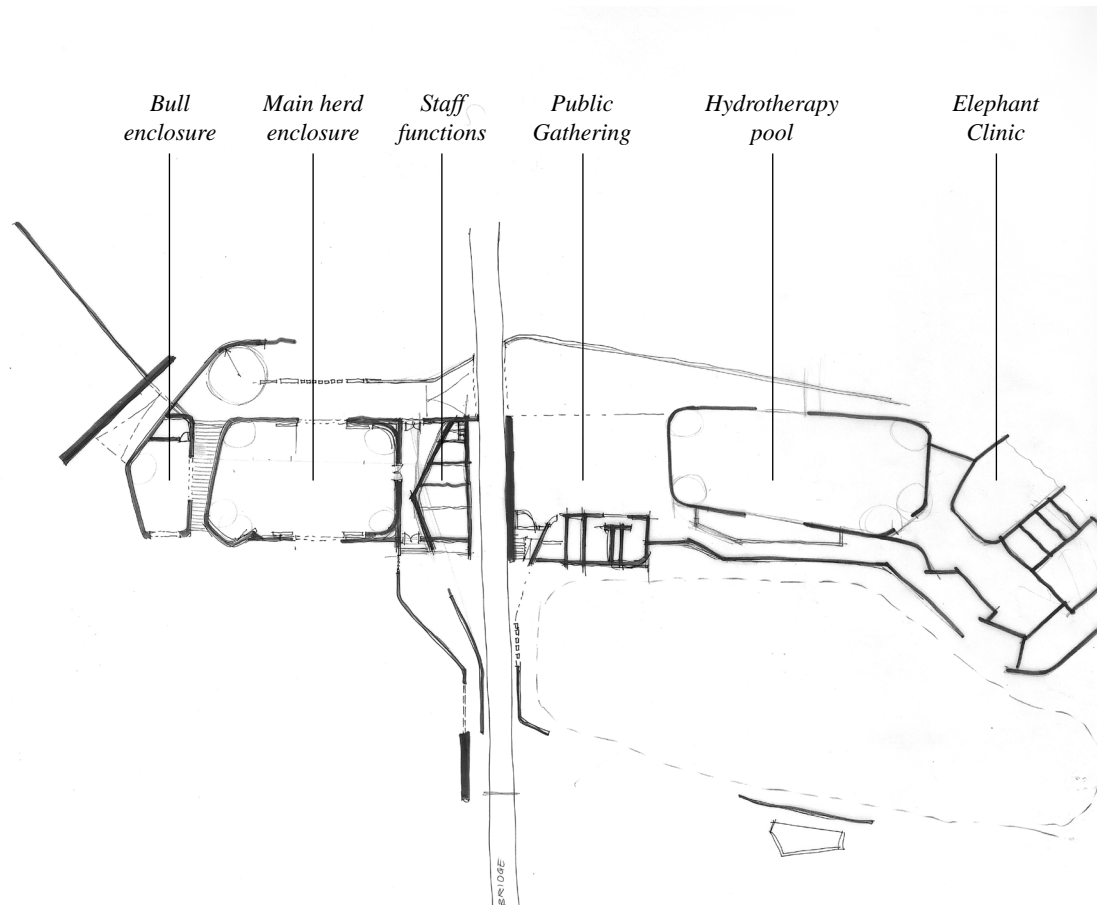
Water is a critical component in the overall design scheme; it facilitates interaction between humans, elephants and nature. Rehabilitating the Apies River, and in turn the zoo, can be achieved through different devices such as terraced wetlands and water filtration and treatment systems. Observational walkways or boardwalks will allow visitors to celebrate water and nature and be made aware of the water purification process.

Through a series of water collection pipes and pumps, gabion wall systems and flood control, various wetlands and retention pools, traps, bio filters and UV filters, the water from the Apies can be purified and stored, and directed to various waterscapes and pools in the overall scheme.

### *Journey of the visitor & viewing opportunities*

The design layout allows for an experiential journey for visitors, with a gradual unfolding of information as they walk along the route. Small glimpses of elephants are revealed through the dense placement of trees, as visitors walk towards the building. These glimpses slowly build anticipation until visitors are able to view elephants in their entirety – whether playing in the sand, foraging fruits from the Marula trees or swimming gloriously in the deep pool.

## Design iterations Plan



*Figure 7. 7 Parti Diagram indicating main functions*

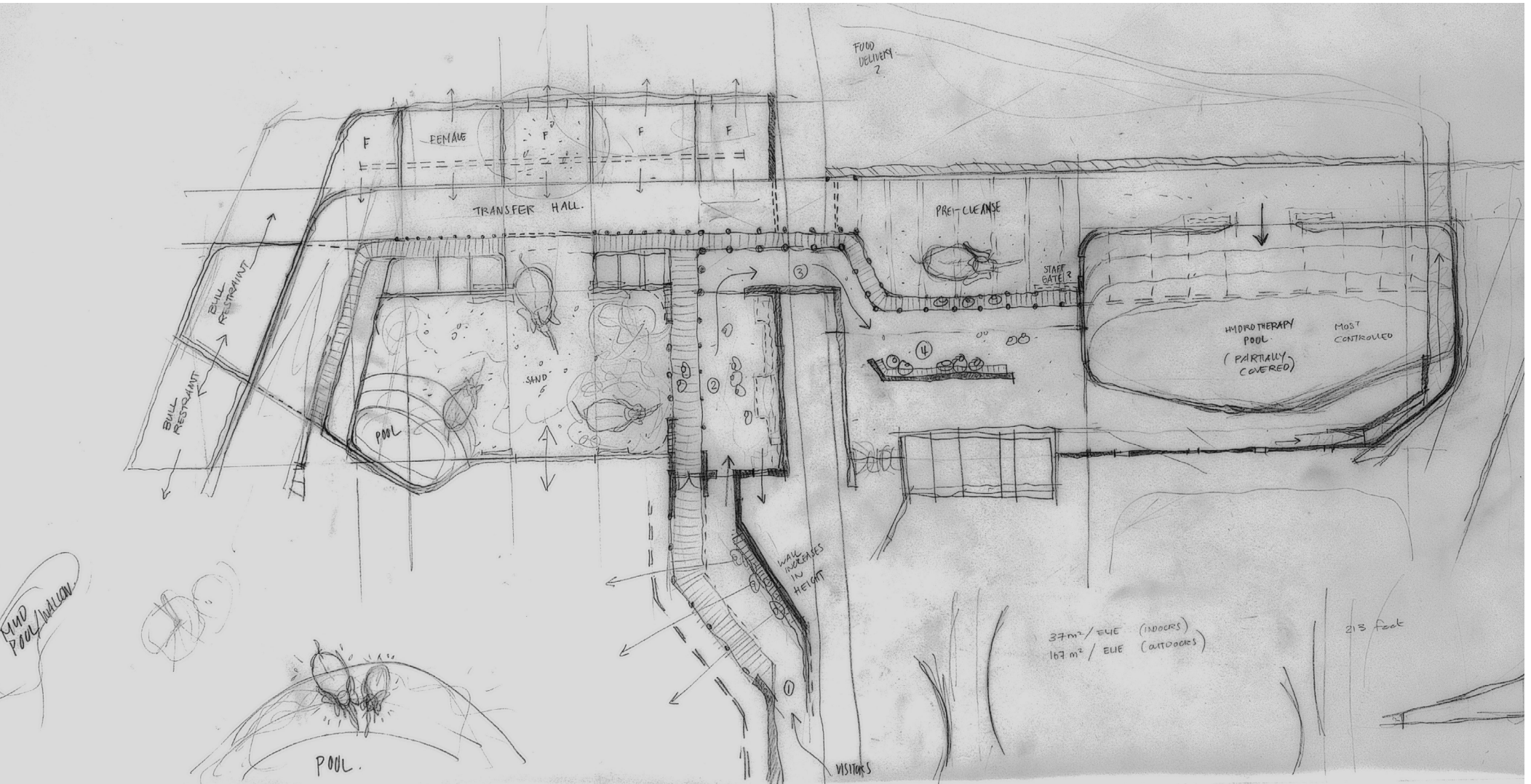
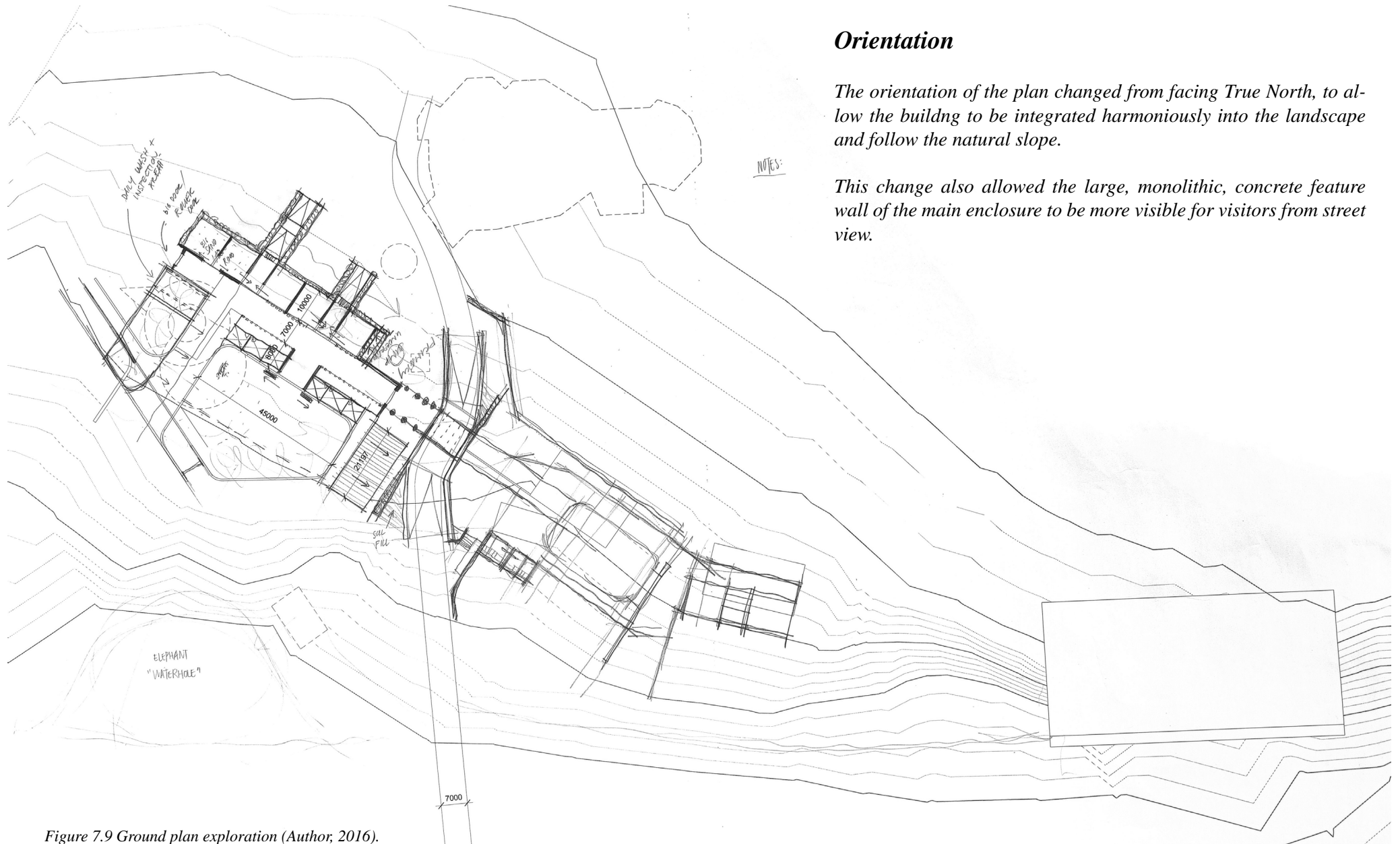


Figure 7.8 Ground plan exploration (Author, 2016).



## Orientation

*The orientation of the plan changed from facing True North, to allow the building to be integrated harmoniously into the landscape and follow the natural slope.*

*This change also allowed the large, monolithic, concrete feature wall of the main enclosure to be more visible for visitors from street view.*

Figure 7.9 Ground plan exploration (Author, 2016).

*Exploration of public spaces adjacent to the main road, connecting to the two primary elephant viewing spaces.*

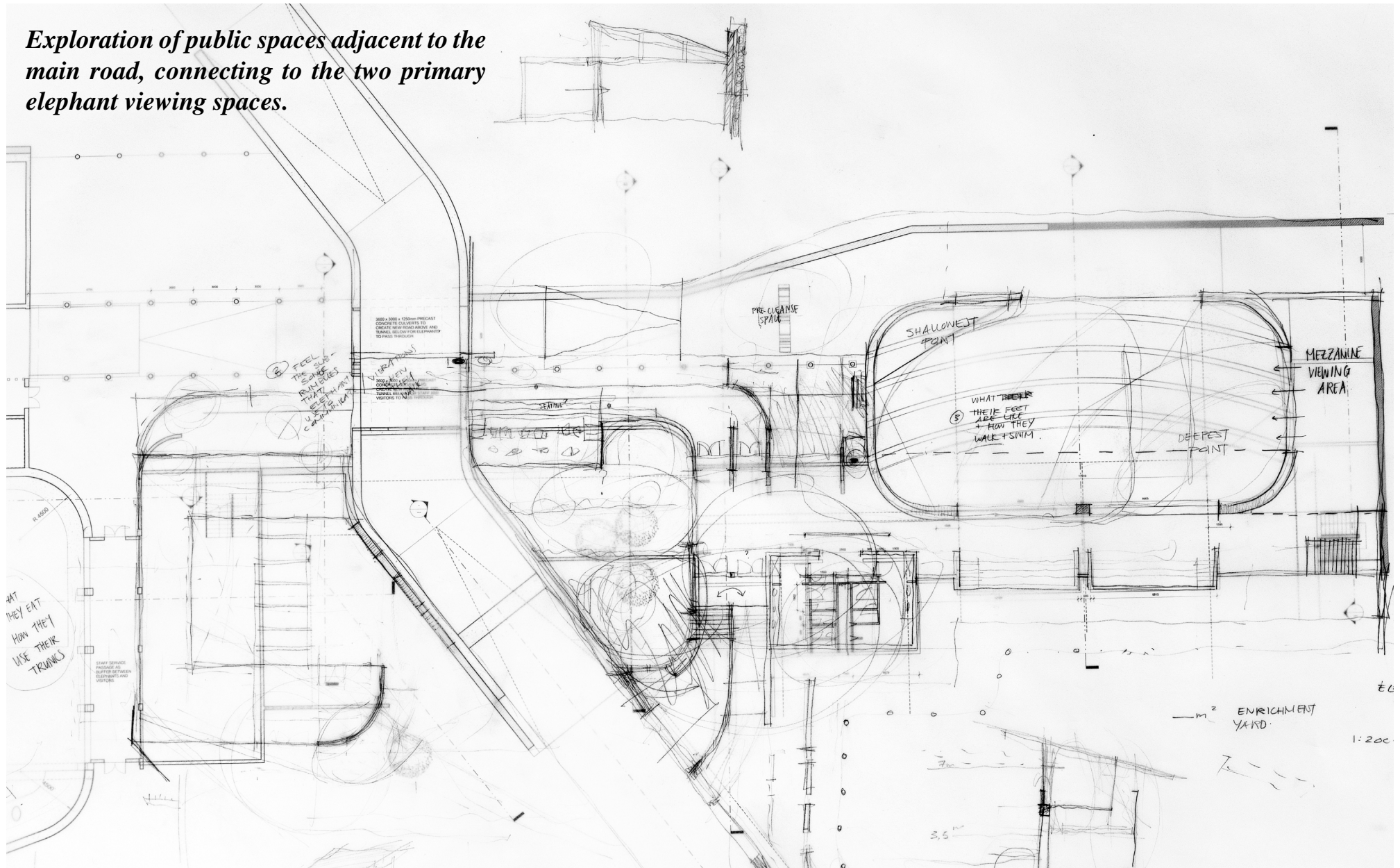


Figure 7.10 Ground plan exploration (Author, 2016).



*Digital translation of conceptual design  
development drawings.*

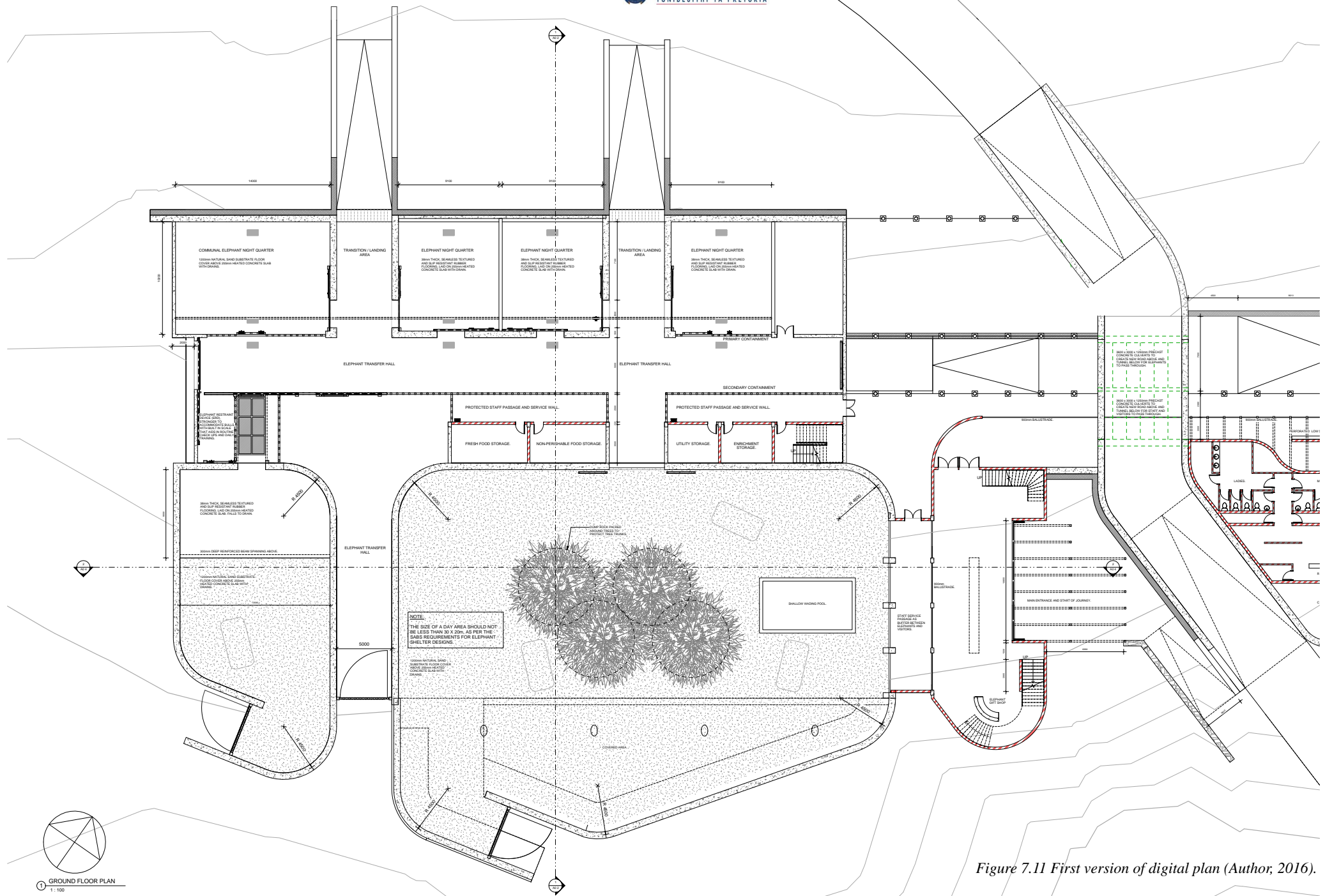
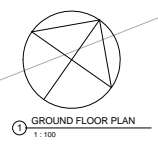
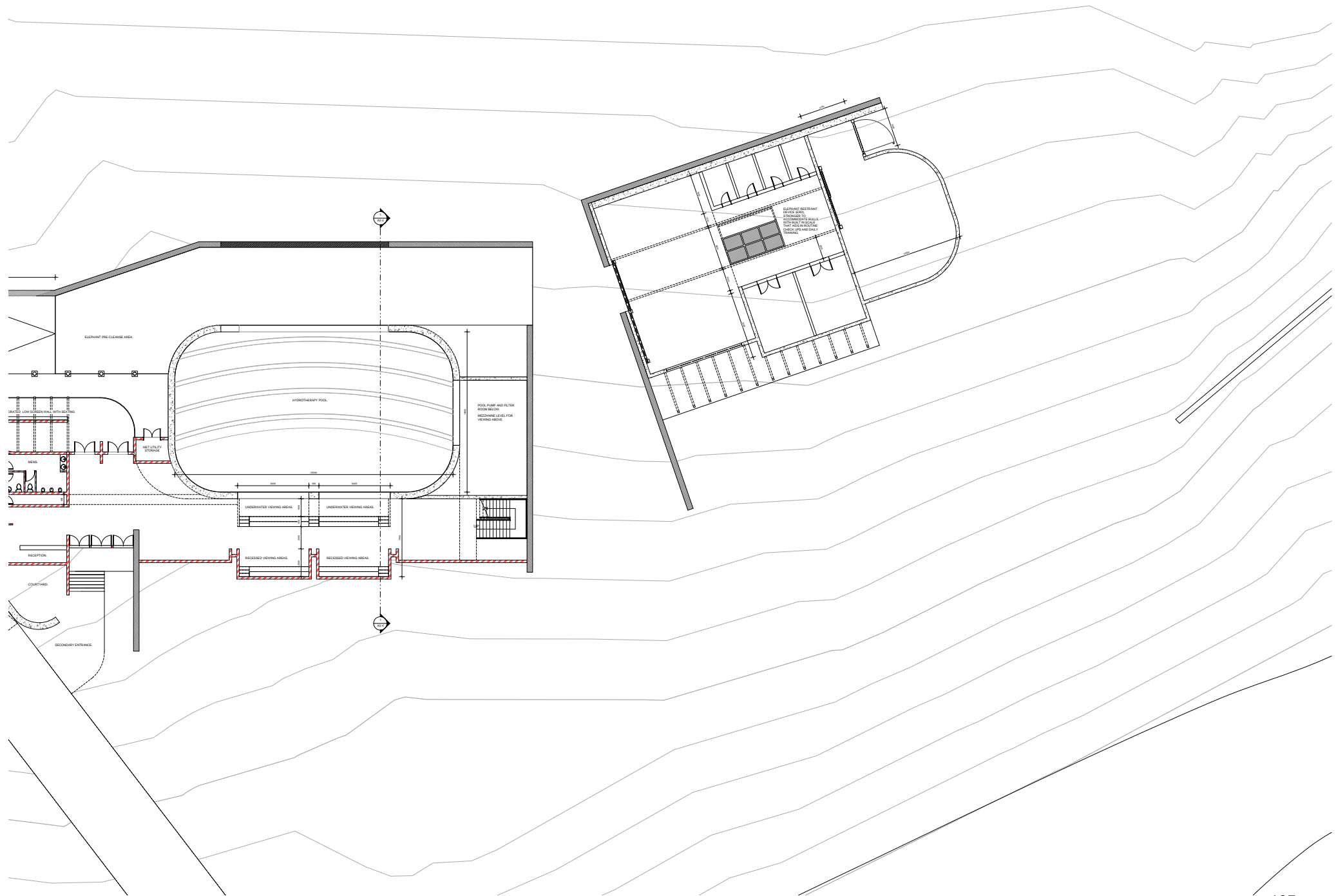


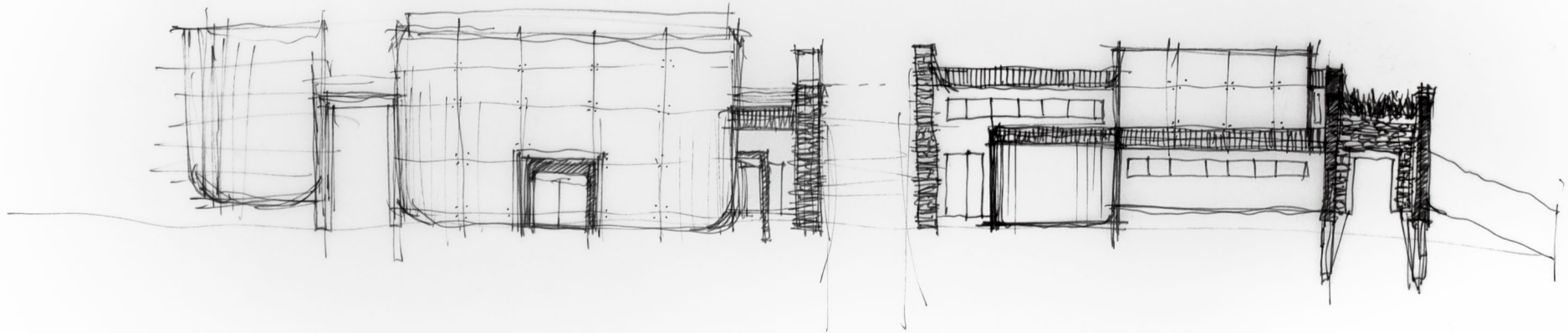
Figure 7.11 First version of digital plan (Author, 2016).



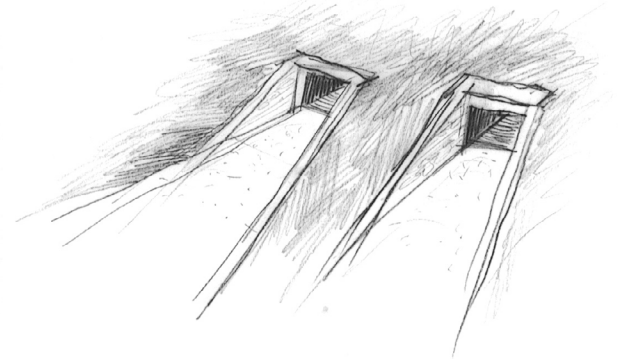
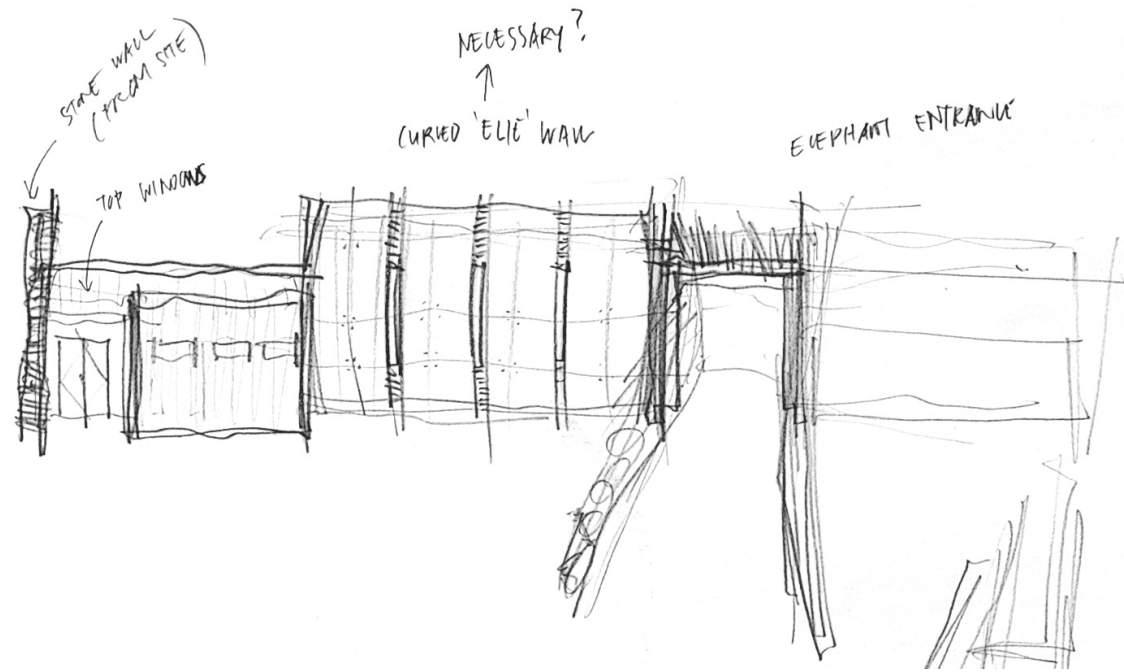
GROUND FLOOR PLAN  
1:100



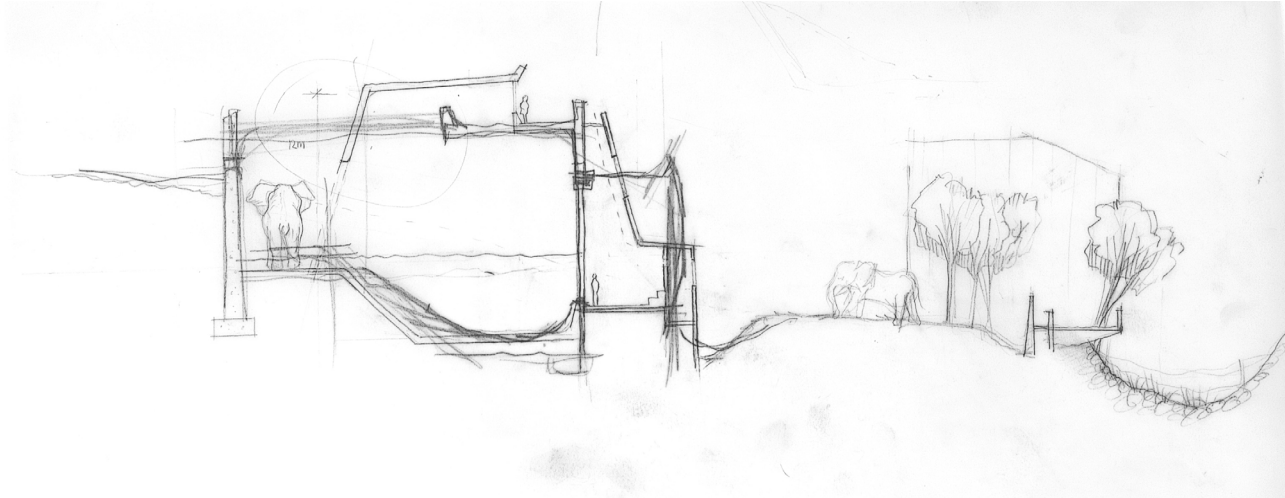
## Design iterations Elevation



*Figure 7.12 - 7.14 Elevation exploration (Author, 2016).*



# Design iterations Section



## Section exploration - curved concrete wall

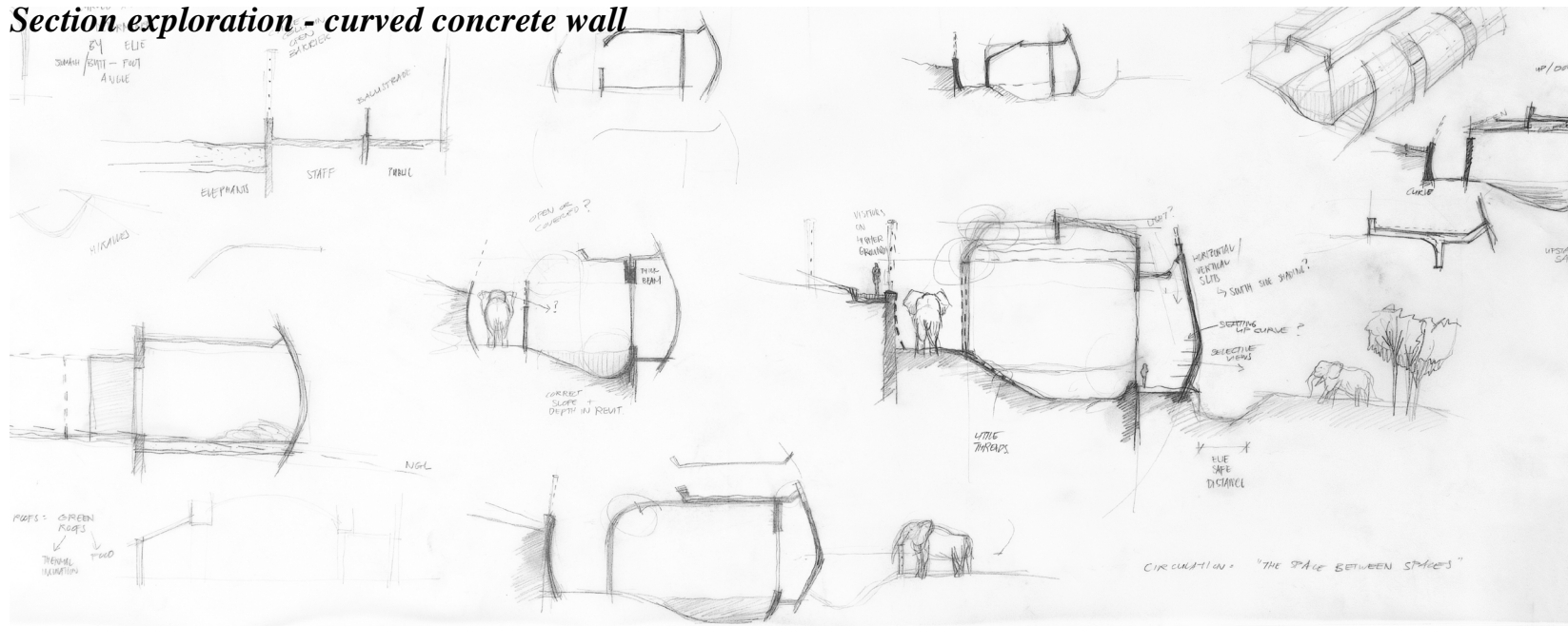
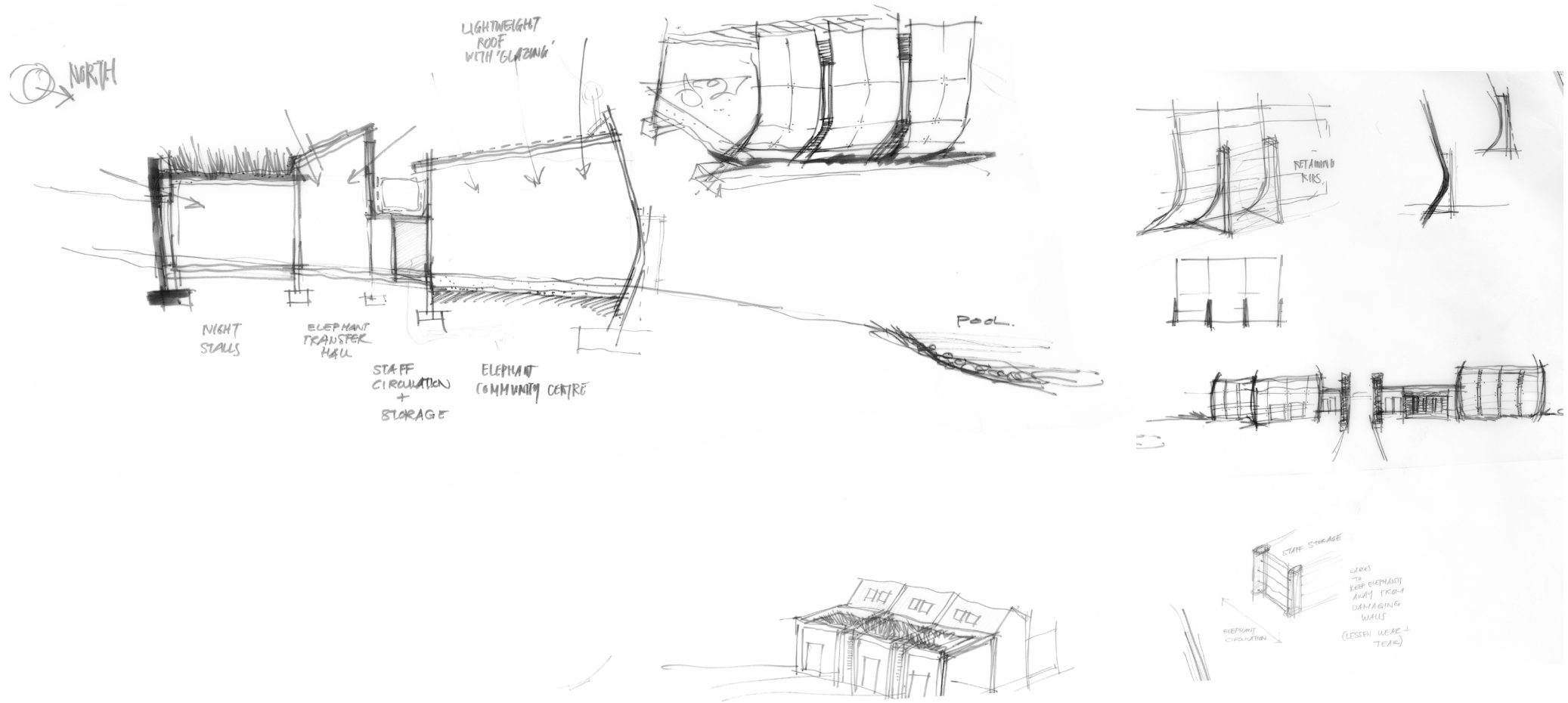


Figure 7.15 - 7.18 Section exploration (Author, 2016).



*Secondary Sections exploration -  
focusing on public interaction*

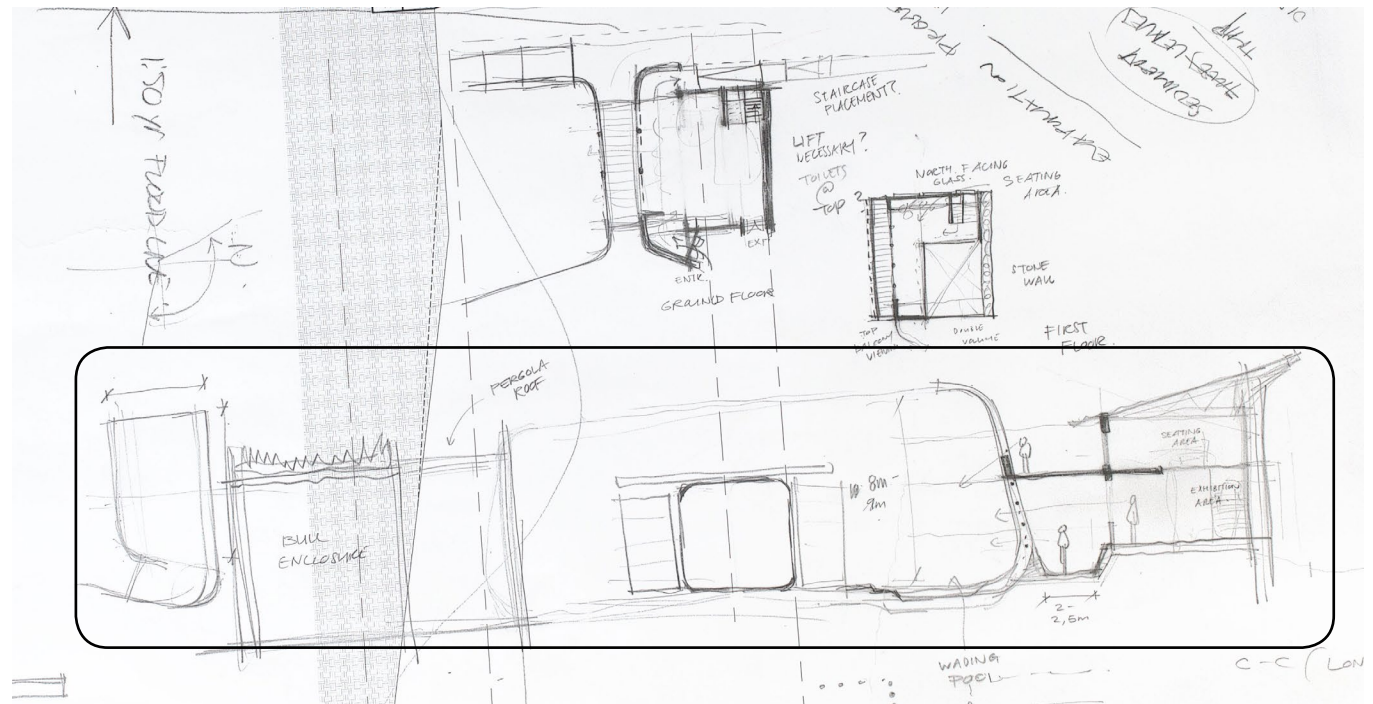
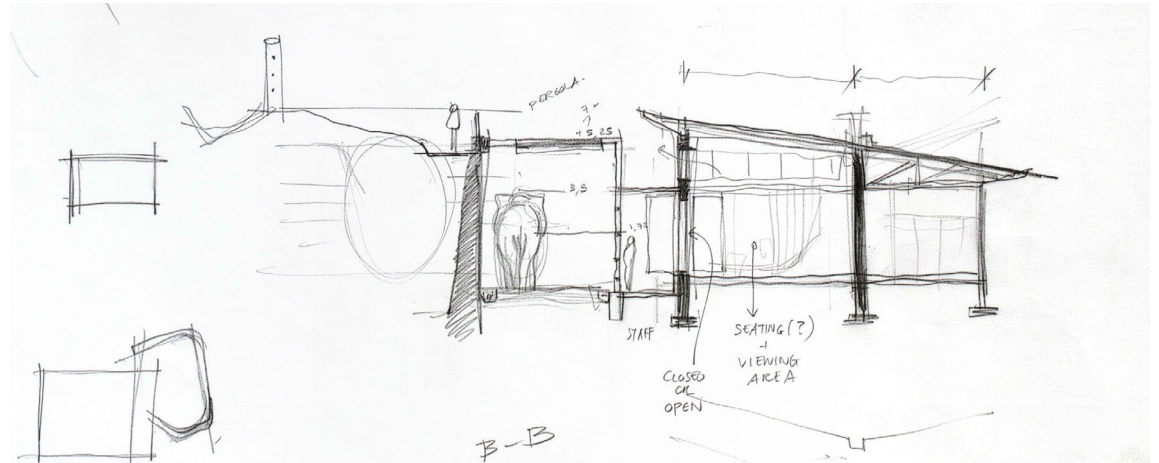


Figure 7.19 - 7.20 Section exploration (Author, 2016).



**First digital drawing produced allowing for further exploration and resolution**

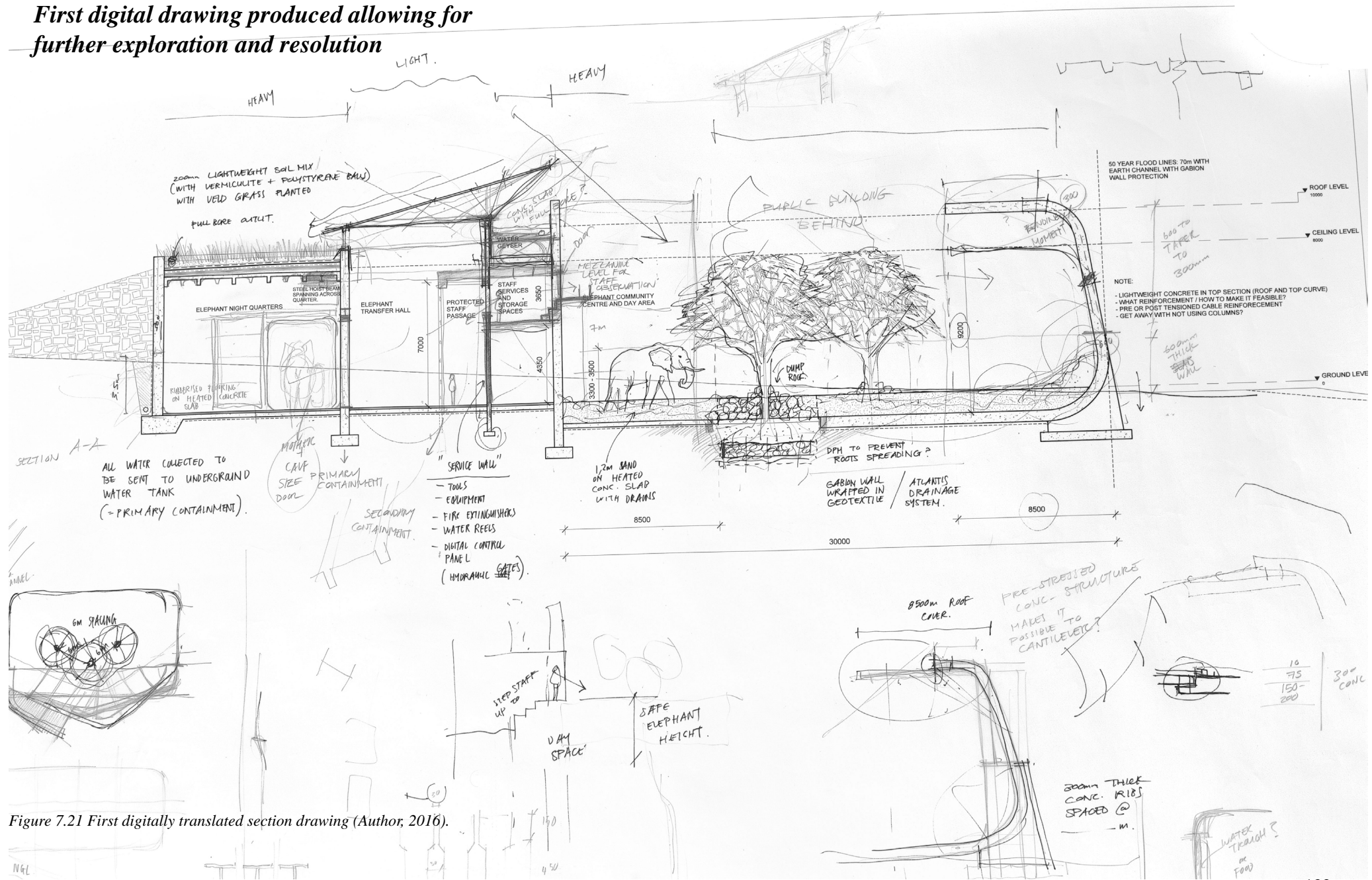
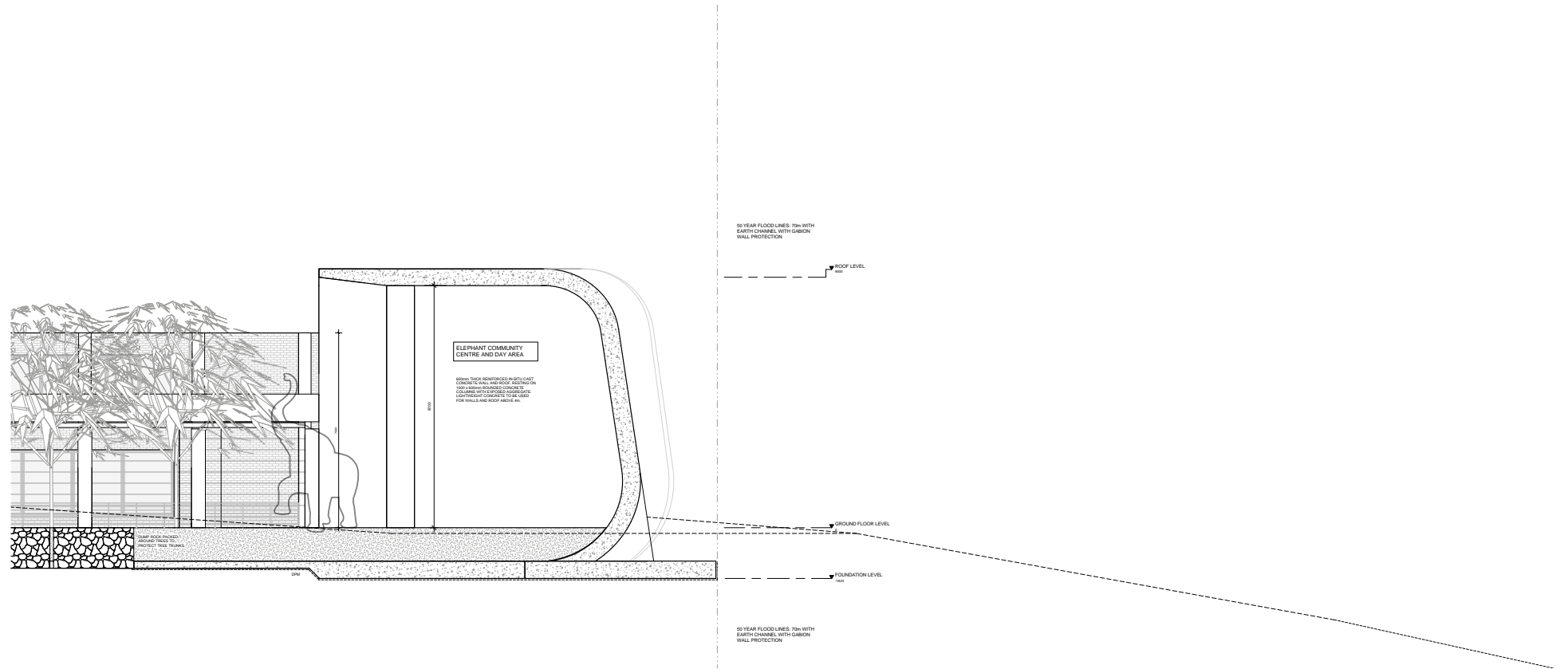


Figure 7.21 First digitally translated section drawing (Author, 2016).









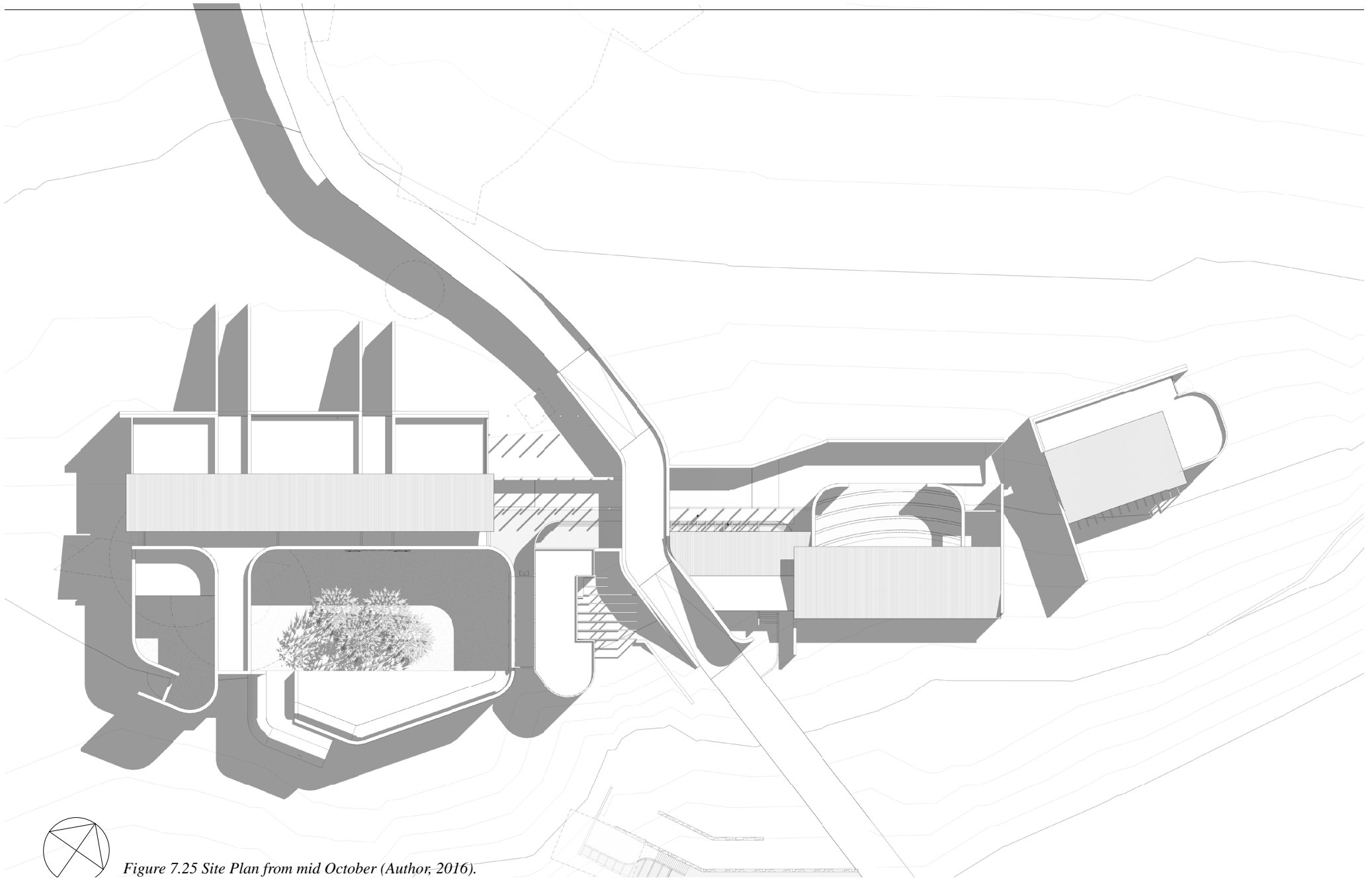


Figure 7.25 Site Plan from mid October (Author, 2016).

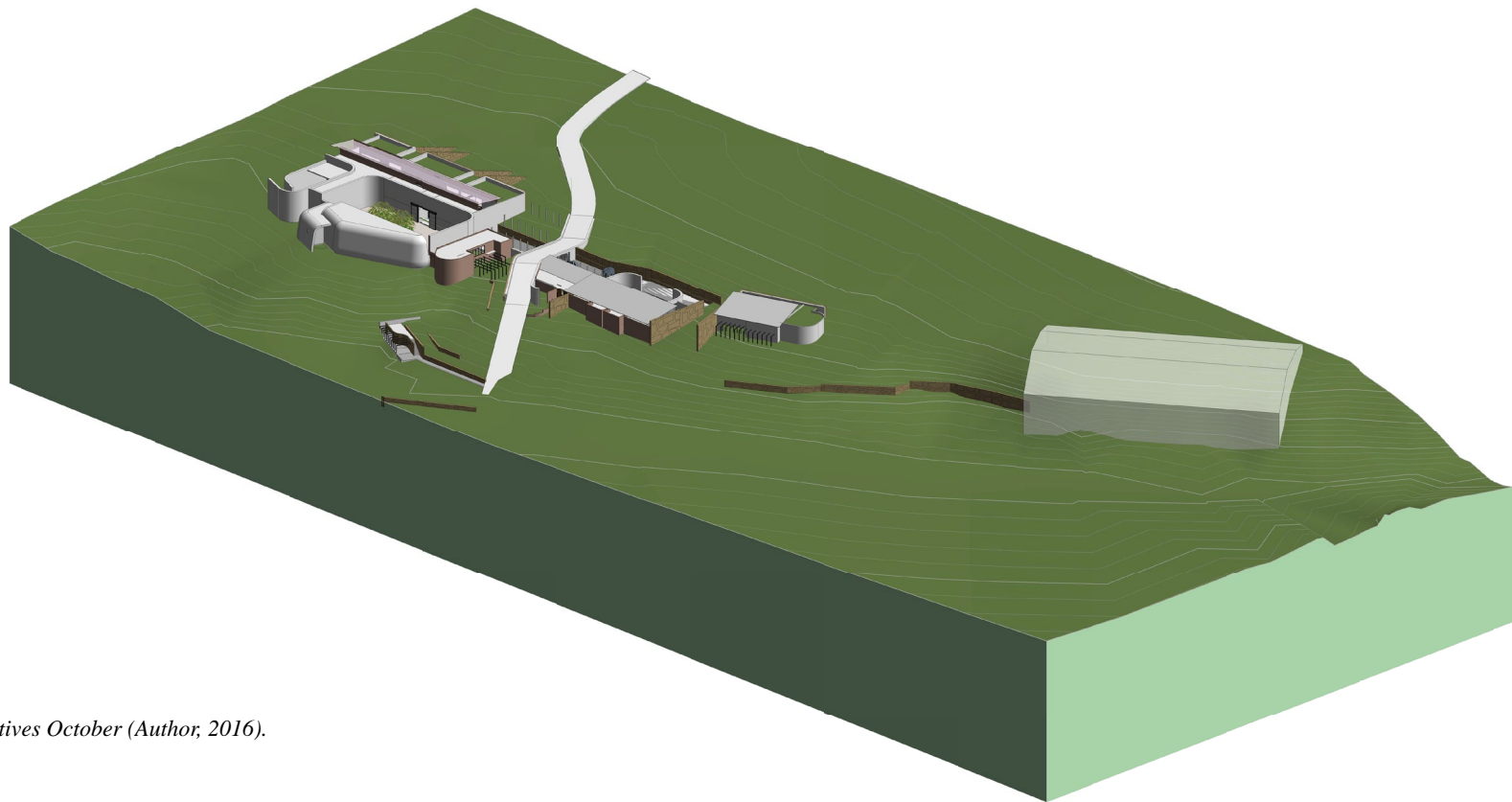
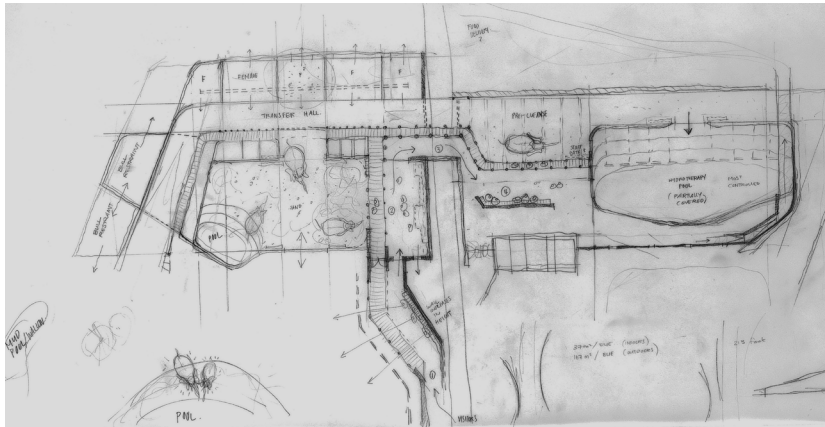
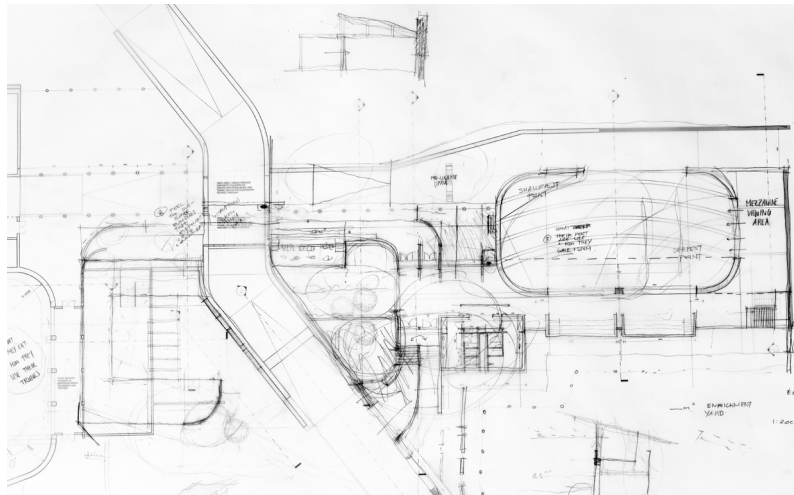


Figure 7.26 Site perspectives October (Author, 2016).

# PROCESS WORK | ITERATIONS



*Ground plan exploration - as linear process for elephant rehabilitation*



*Exploration of public spaces adjacent to the main road, connecting to the two primary elephant viewing spaces.*



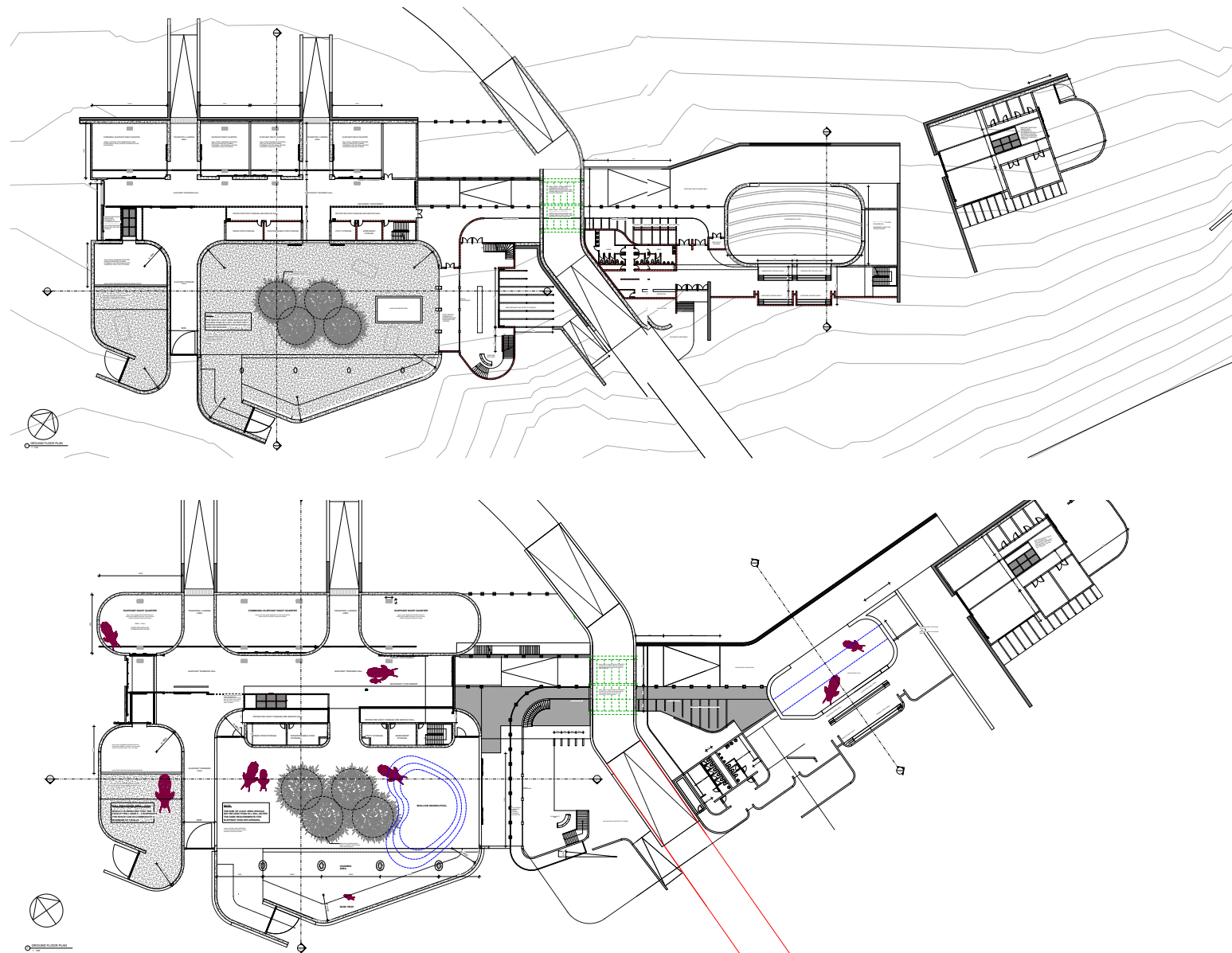
## *Orientation*

*The orientation of the plan changed from facing True North, to allow the building to be integrated harmoniously into the landscape and follow the natural slope.*

*This change also allowed the large, monolithic, concrete feature wall of the main enclosure to be more visible for visitors from street view.*



## DIGITAL TRANSLATION OF DESIGN DEVELOPMENT DRAWINGS



### *Orientation*

*To ensure effective heat gain for the water in the hydrotherapy pool, and to minimise heat loss, the hydrotherapy pool as well as the clinic were orientated to face true North. The buildings resulted in being integrated into the landscape more effectively.*

### *Services integration*

*The support staff areas were redesigned to be centrally located in the main elephant building to effectively service all immediate spaces. The ERD was integrated into the staff protected passage with the service wall positioned behind, to aid in treating and examining elephants on a daily basis.*

Figure 7.30 & 7.31 Final plan iterations (Author, 2016).

