CHAPTER

02

SITE ANALYSIS

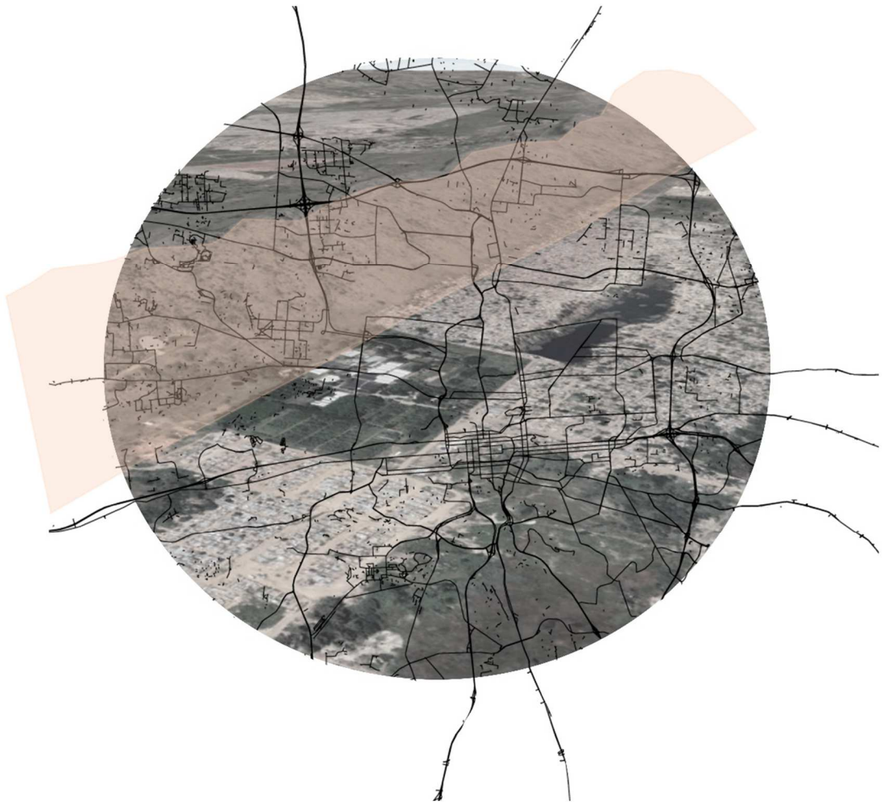


Figure 2.1: Macro site analysis of Melusi and the surrounding environment (Author 2021).

A Urban Analysis

B Daspoort climate

C Site selection of intervention

D Program selection

E Precedent studies

F Analogy

A

URBAN ANALYSIS

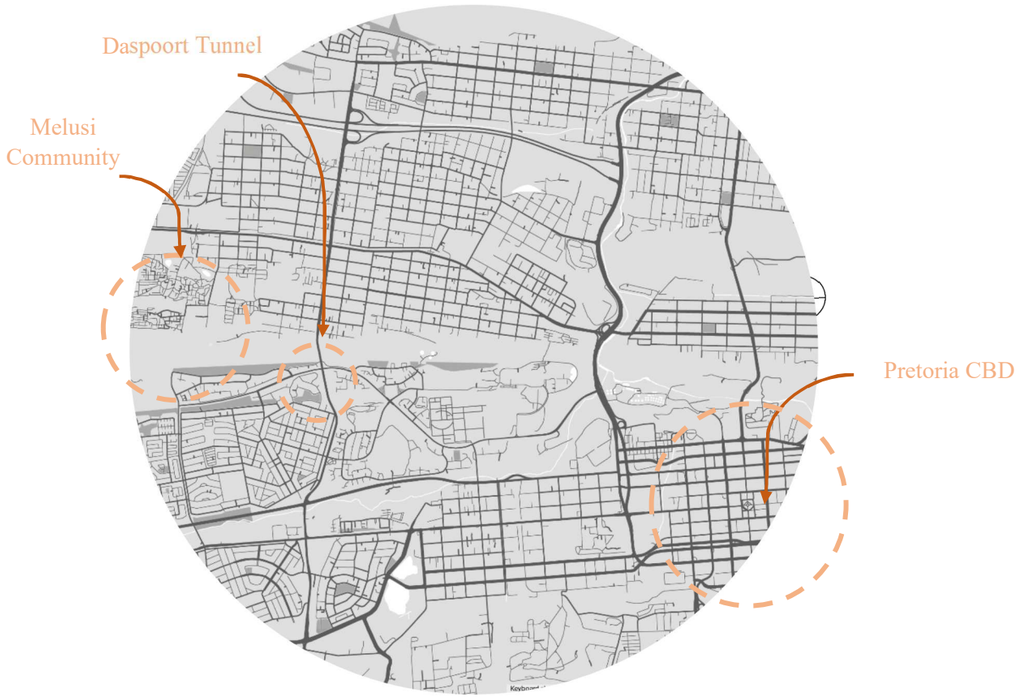


Figure 2.2: Melusi Settlement in relationship with Pretoria CBD (Author 2021).

MELUSI INFORMAL SETTLEMENT IN RELATION TO SURROUNDING INFORMAL SETTLEMENTS

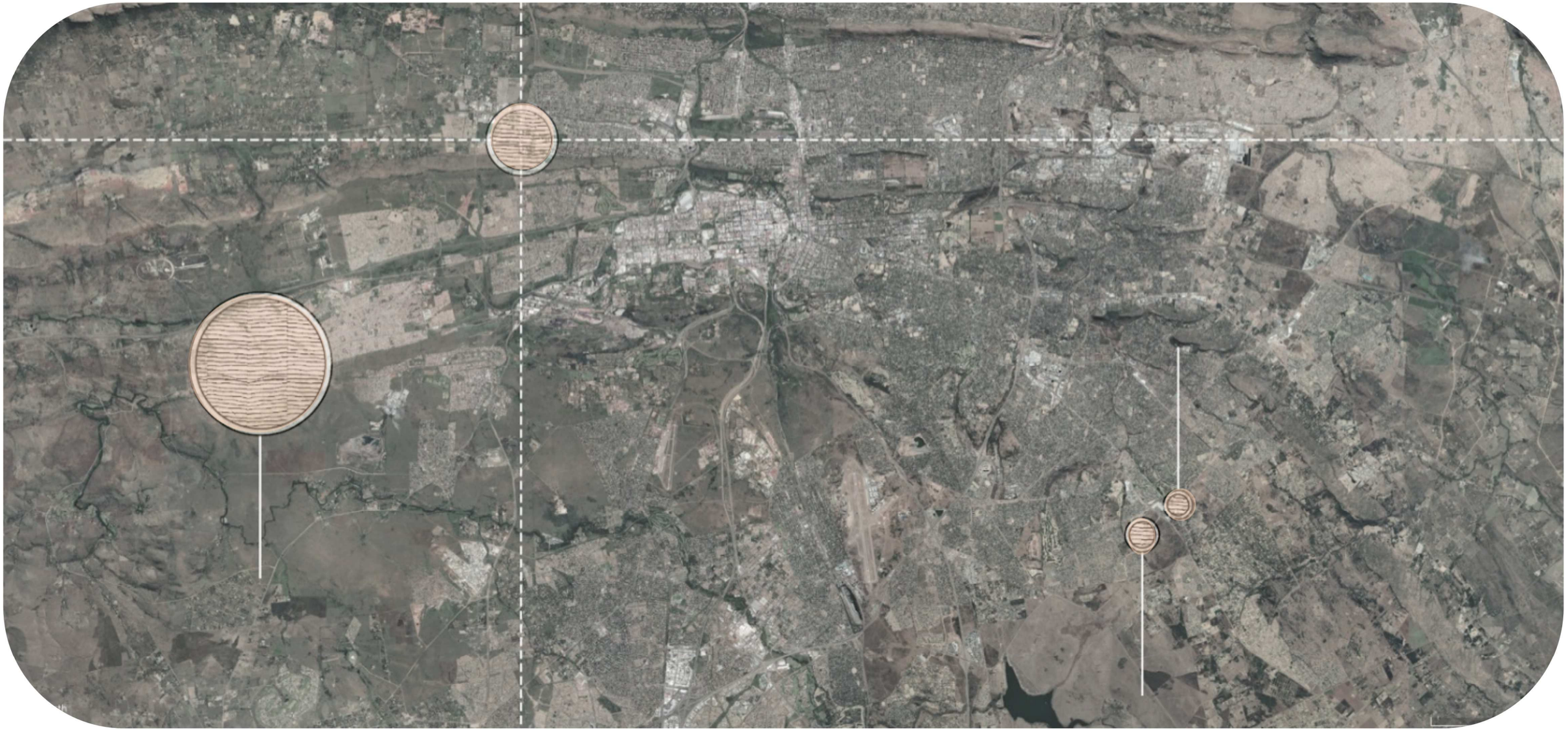


Figure 2.3: Broader Context of Melusi. Original Orthophoto obtained from Google Earth (Climate adaptation Studio 2020).

Figure 2.4: Illustrates the land ownership of which Melusi informal settlement is situated on (Author 2021).

The City of Tshwane GIS platform indicated plans for future development and infrastructure. Image 2.4 indicates the future infrastructure plans for the Zandfontein 317 farm. The proposal is to implement a western highway bypass west of the big quarry hole in Melusi see figure 2.5. This western bypass will require a tunnel through the Skurweberg ridge. The Author superimposed the Melusi Nolli map with the Tshwane GIS map to visualize the physical spatial implication of the proposed roads on the residents. The author has some critique regarding the realization of the future.

Figure 2.5: Google Earth Map illustrating the future proposed roads and the proposed western bypass as per Tshwane GIS (Author 2021).

Critique 1: The financial implication of building a western bypass highway together with a tunnel is financially an excessively big burden on the municipality especially in the current time of the Covid-19 pandemic.

Critique 2: City of Tshwane is formalizing Melusi 2 through supplying services and electricity to the community where the proposed routes are indicated.

In conclusion, it is visible that the community is formalizing because of all the Municipal interventions and formalization such as services and Erf layout which are taking place and therefore the proposed intervention (public space) is appropriate to add value to the community.

MELUSI SITE ANALYSIS

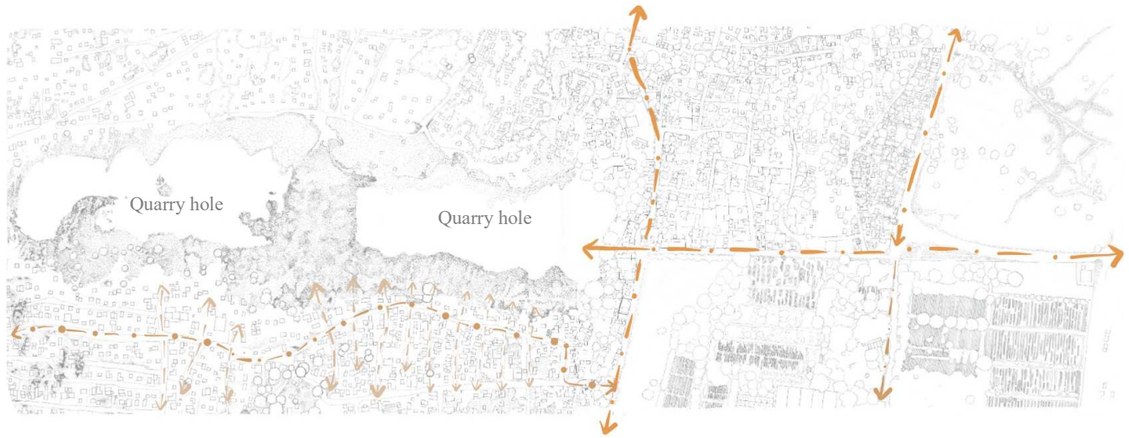


Figure 2.6: Main access roads (Author 2021).

Main access roads

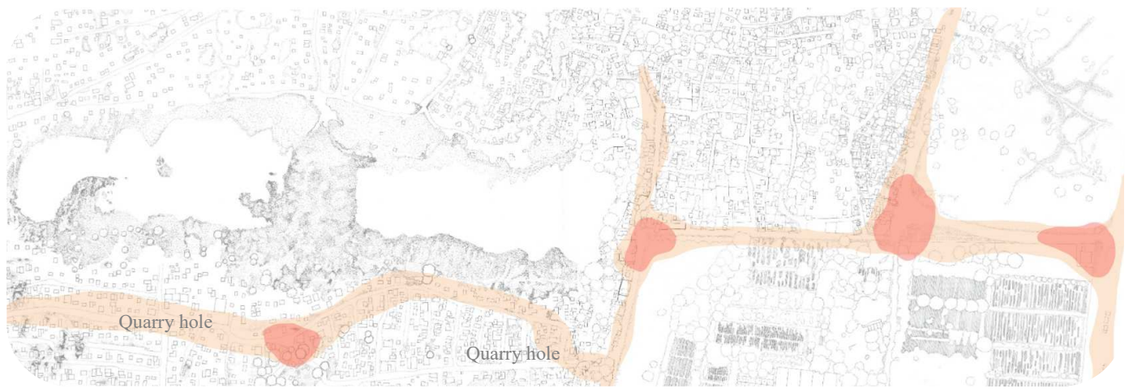


Figure 2.7: Busy intersections and main access roads (Author 2021).

Busy streets

Busy intersections

MELUSI SITE ANALYSIS

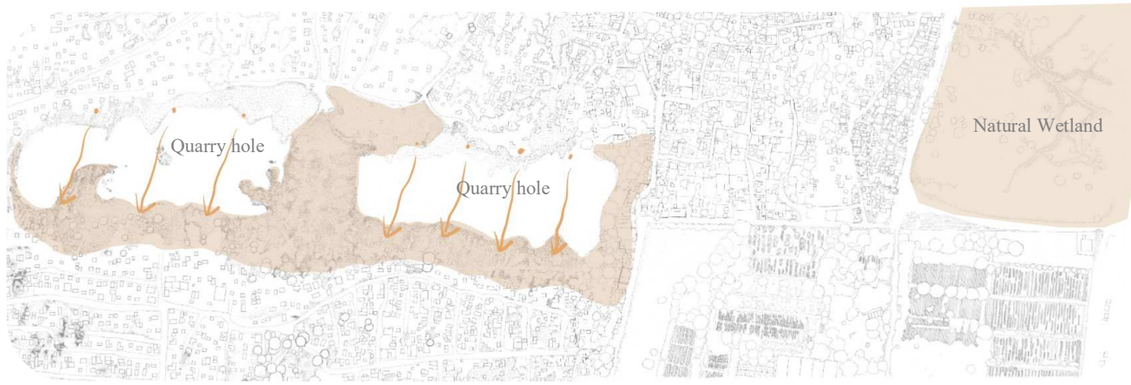


Figure 2.8: Open available public space (Author 2021).

Current available public space

North facing slope

Figure 2.9: Developing landscapes vs developed landscapes (Author 2021).

Residential

Municipal land

MELUSI SITE ANALYSIS

Figure 2.10: Water bodies and water run off (Author 2021).

Figure 2.11-2.12: Google Earth image illustrating the Skurweberg on the Southern side of the settlement therefore the site slopes towards North (Author 2021).

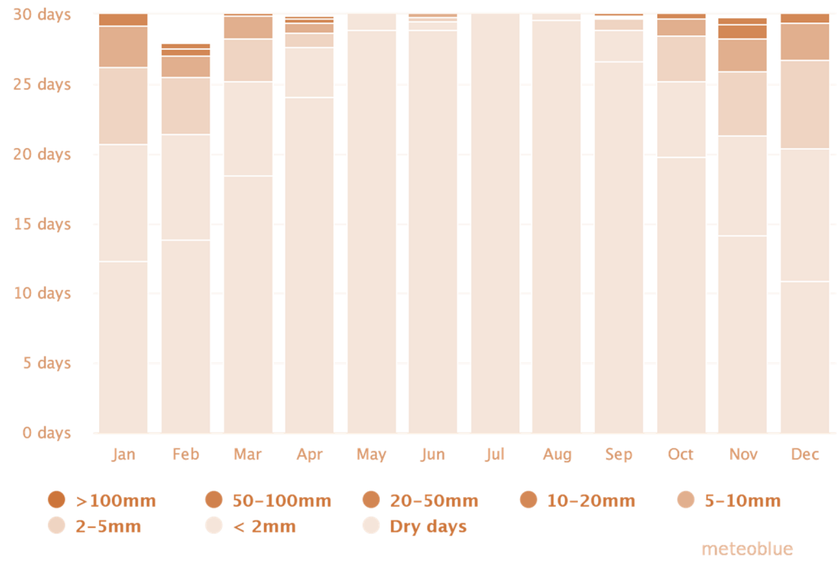


Figure 2.13: Daspoort's average precipitation (Meteoblue 2021).

B

DASPOORT CLIMATE

Figure 2.14: Melusi is situaged between Magalies ridges (Zorn 2021).

DASPOORT CLIMATE

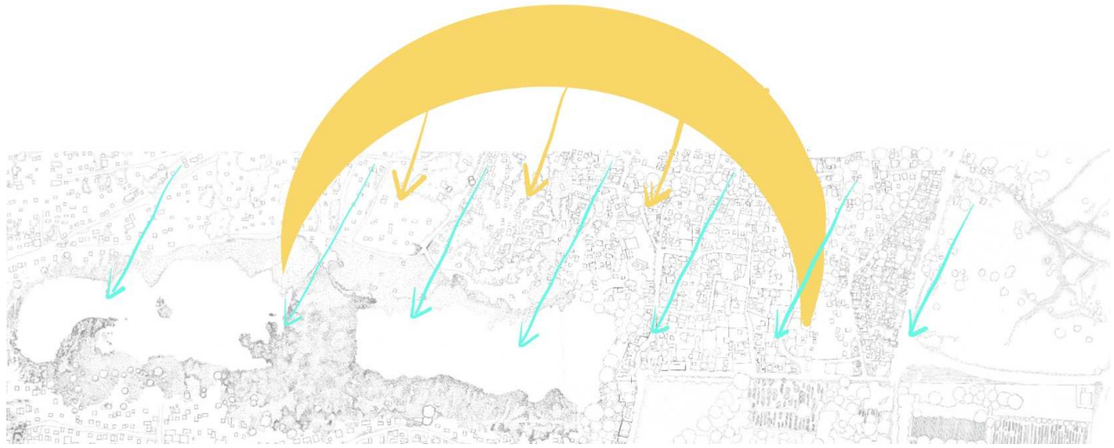


Figure 2.15: Wind direction and solar angel (Author 2021).

Solar Angle

Wind Angle

Daspoort is situated north-west from Pretoria CBD. Pretoria's temperature is classified for being warm (Climate-Data.org nd). According to the Köppen-Geiger climate classification map of 1980-2016 Pretoria is classified as a Cwa climate which is a Monsoon-influenced humid subtropical climate. Pretoria's average annual temperature is 18°C with an average precipitation of 661 mm per year (Climate-Data.org nd). The Subtropical climate of Pretoria with its warm temperatures, dry winters and warm summers is the perfect opportunity to implement an aquaponic farm as a program. Aquaponic farms have a low evaporation rate which is more water effective, especially in dry winters in Pretoria. Pretoria's winter temperatures do not reach temperatures under 0 degrees Celsius and therefore makes it possible to have a fish farm, such as an aquaponic farm. See figure 2.17.

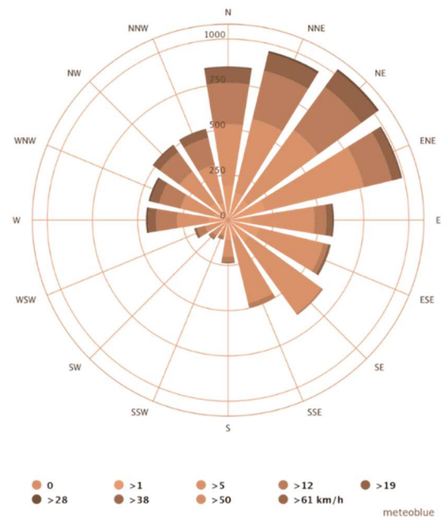


Figure 2.16: Daspoort's wind rose (Meteoblue 2021).

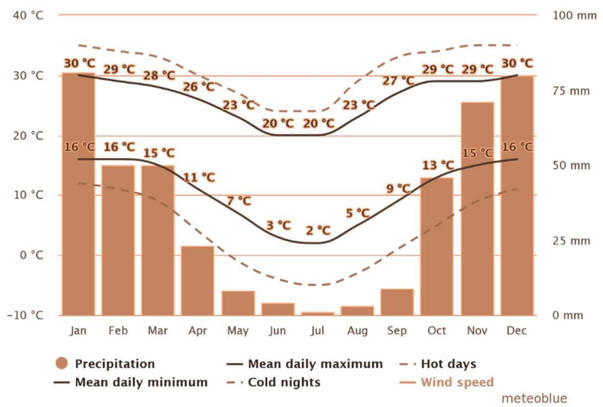


Figure 2.17: Daspoort's average temperatures throughout the year (Meteoblue 2021).

C

SITE SELECTION OF INTERVENTION

Figure 2.18: Chosen site situated on the southern edge of the quarry (Author 2021)

SITE SELECTION OF INTERVENTION

The Melusi field team developed an urban framework in collaboration with the Swedish students from Reality Studio, which will be implemented in multiple phases as proposed by Nabeel Hamdi (2010) as *Now-Soon* and *Later* interventions.

These phases will be discussed further in chapter 3. Visible in figure 2.19 is the phases indicated in the sequence it would be implemented. The first phase will be implemented in the street with all the active stakeholders.

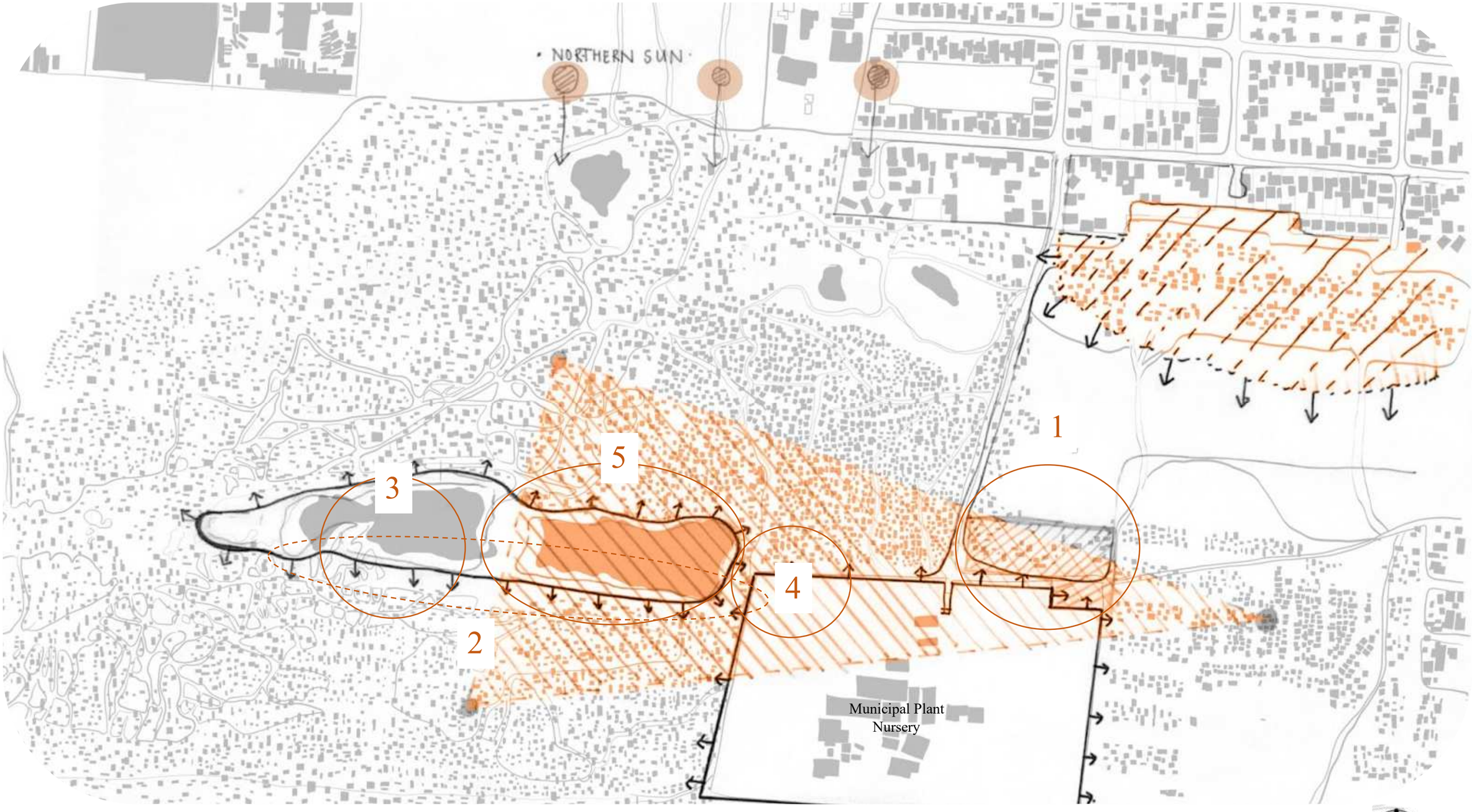


Figure 2.19: Nolli Map illustrates the linkages between the three different parts of Melusi (Author 2021).

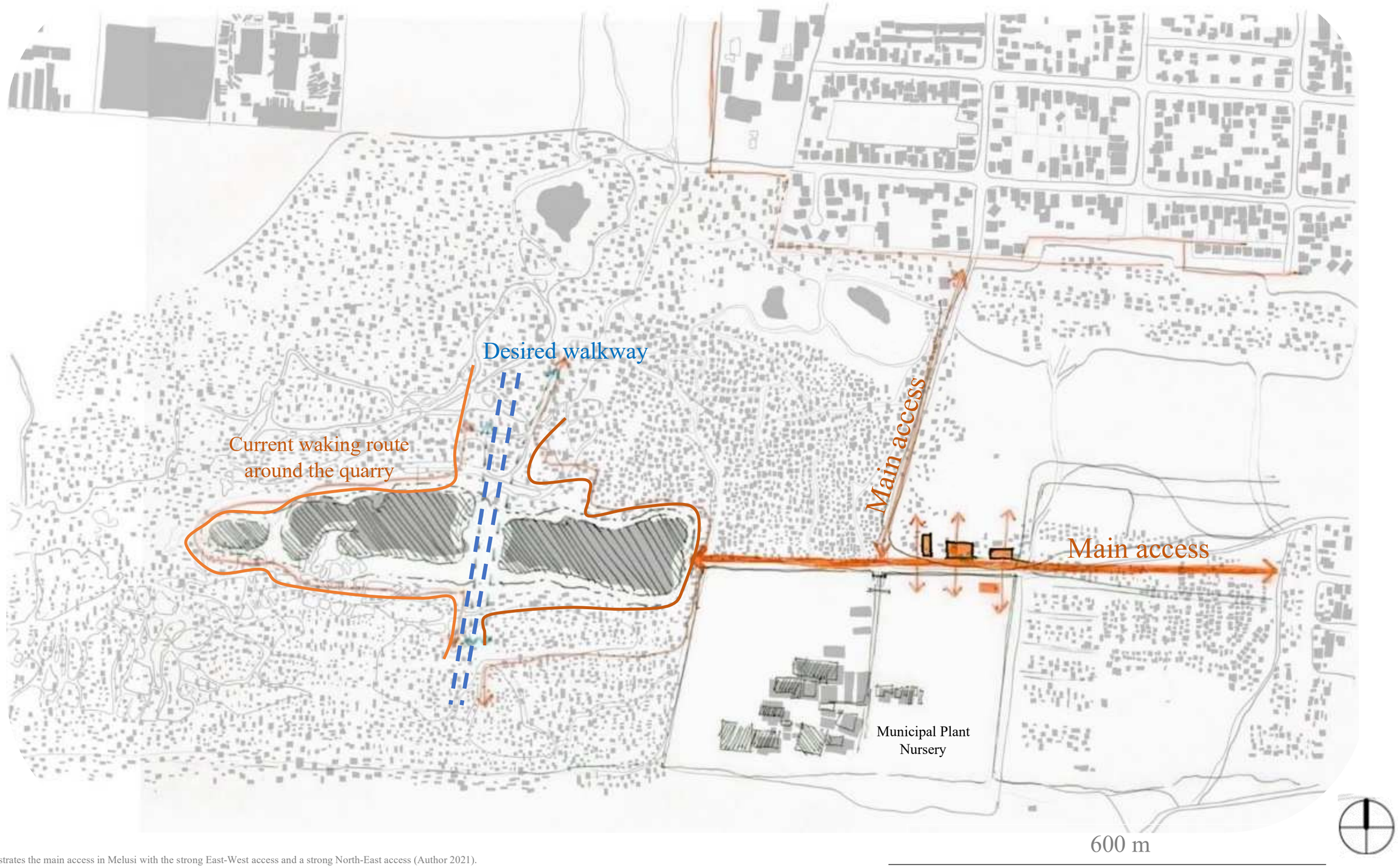


Figure 2.20: Illustrates the main access in Melusi with the strong East-West access and a strong North-East access (Author 2021).

The ideal practice would be to create a strange attractor (catalyst) in the community on the east-west side of the community to create a possible connection between the two major strange attractors in the community, which is the Mydo Youth Centre and the ECD. This results in the opportunity for strange attractors to be linked through further development.

This mini dissertation will intervene on the southern edge of the quarry hole as well as bridging over the quarry using the existing island, separating the big quarry into two parts A and B in figure 2.20.

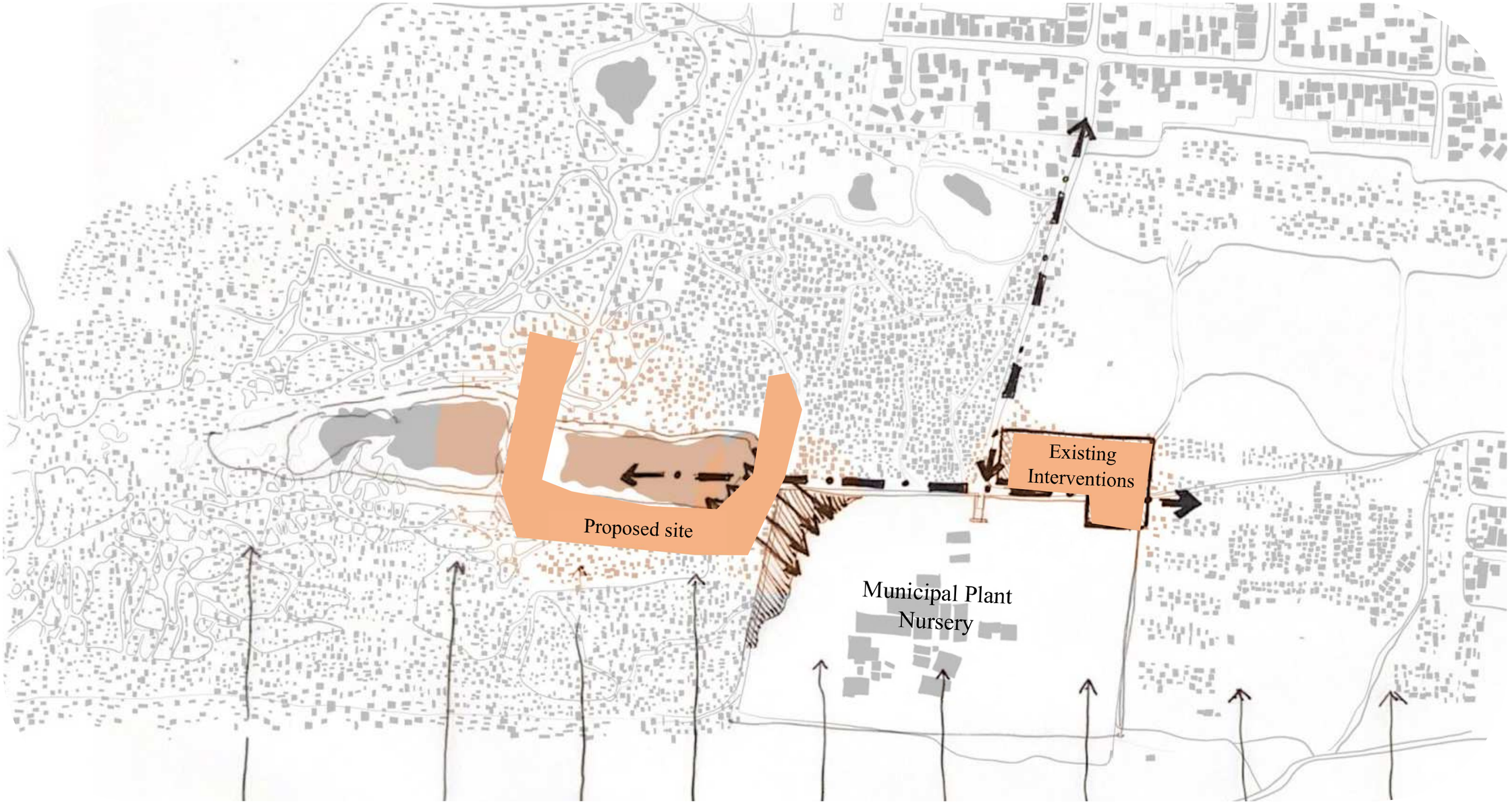


Figure 2.21: Illustrates the existing interventions currently implemented on the North-East side of the community (Author 2021).

D

PROGRAM SELECTION

Figure 2.22: Melusi water services are lacking and dependant on Municipal resources (Hugo 2020).

MAPPING THAT LED TO SPECIFIC PROGRAM DEVELOPMENT

Melusi consist out of three parts. Melusi one, two and three, as seen in figure 2.24. Poor sanitation and poor service deliver has been the most evident challenge identified. From transect walks and interviews led to the realization that alternative sanitation methods are currently used such as pit toilets, buckets, and chemical toilets. Figure 2.23 & 2.24 should be read in conjunction with each other.

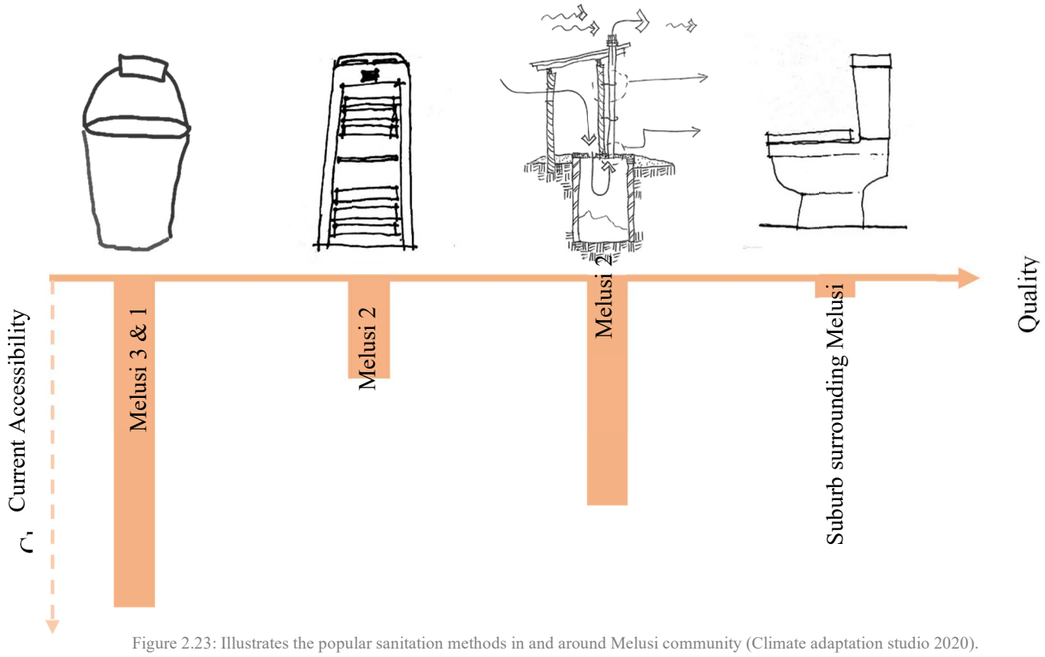


Figure 2.23: Illustrates the popular sanitation methods in and around Melusi community (Climate adaptation studio 2020).

Figure 2.24: Original Orthophoto obtained from Google Earth illustrates the three different parts of Melusi informal settlement (Climate adaptation studio 2020).

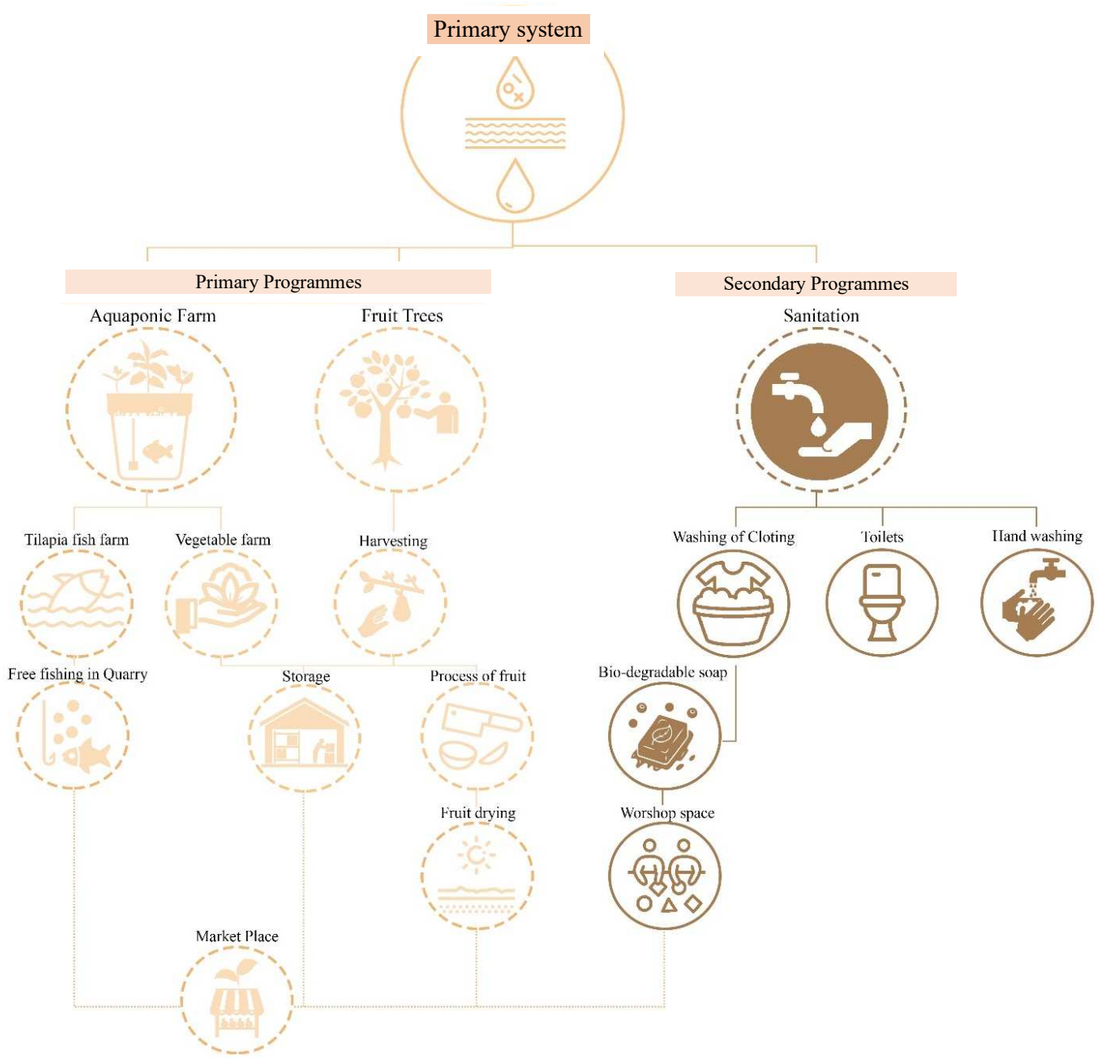


Figure 2.25: Illustration of the programs identified to be implemented in the intervention (Author 2021).

The primary system is identified to be the water filtration system. One of the main project objectives is to make the Melusi community more independent and self-sustaining, reducing Municipal resources. This program will put some relief on the municipal resources.

Primary programs are the Aquaponic system producing vegetables to the community through a rent a plot system where the community pays a monthly fee to use the facilities to farm their own vegetables to reduce travelling costs to Marabastad. This is especially problematic during the Covid-19 pandemic where public transport is a health risk.

The architecture will allow the community to also do informal fishing and use the fish from the aquaponic system as a source of protein which were identified through on-site interviews with teachers or the ECD and through the Melusi Plate Game it became evident that the children do not take in sufficient protein. The second secondary program will be the community fruit tree initiative which is open for all community members to eat and use the fruits produced reducing hunger in the community. The third secondary program will be basic sanitation, and water infrastructure improving community dignity and self-respect.

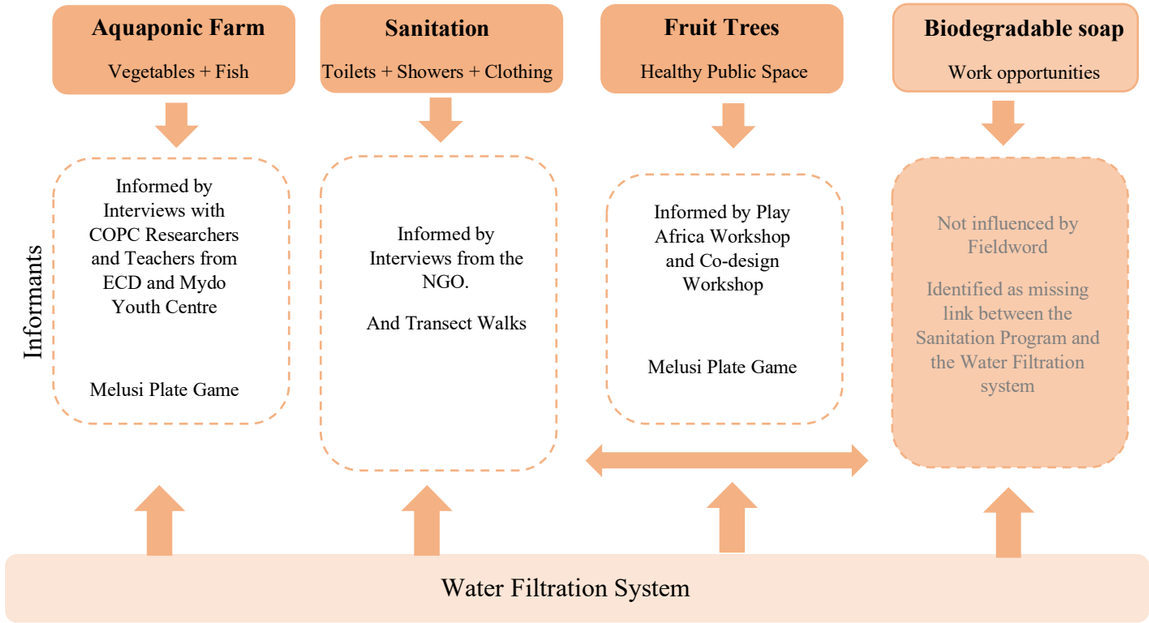


Figure 2.26: Diagram illustrate the informants led to the specific programs chosen (Author 2021).

E

PROGRAM SYSTEMS

Figure 2.27: Selected programs (Author 2021).

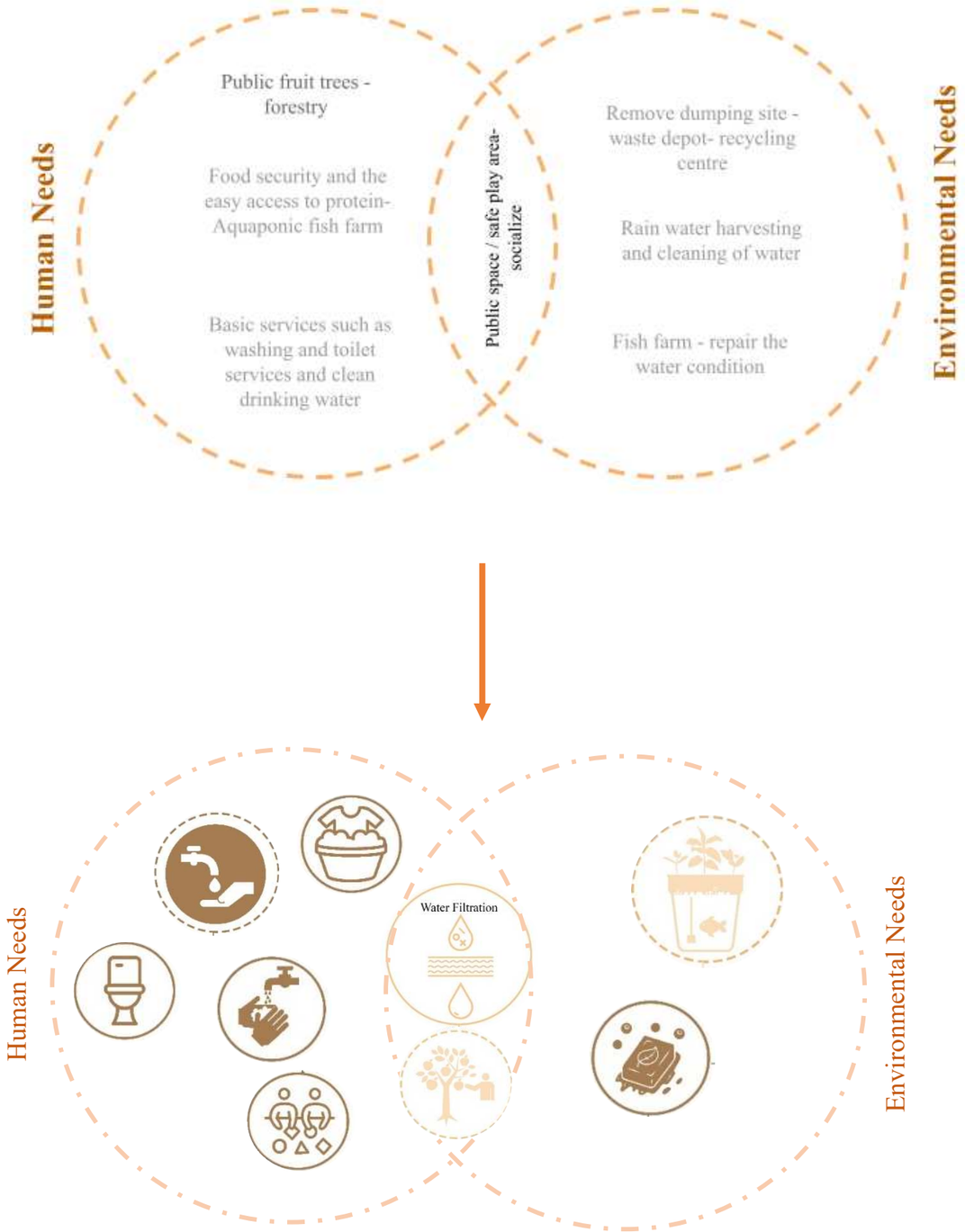


Figure 2.28: Diagram illustrates the programs chosen and how the programs address the socio and environmental needs (Author 2021).

PRIMARY PROGRAM

Aquaponic Farm

Figure 2.29: Aquaponic farm at Karoo Kafee in Pretoria and the produce for sale (Author 2021).

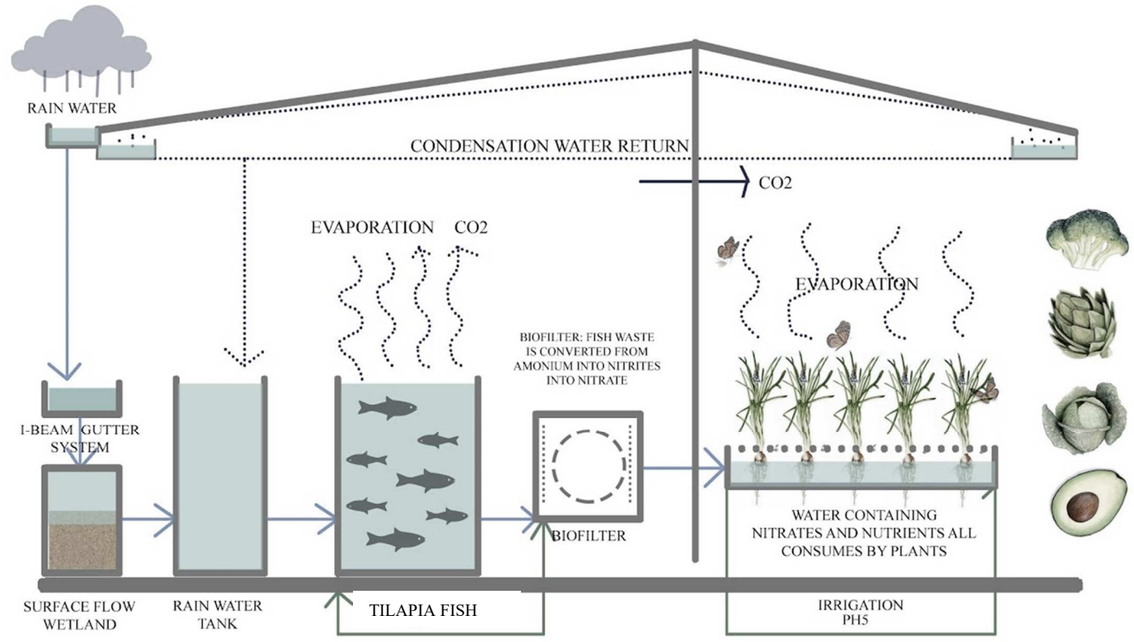


Figure 2.30: Aquaponic farm system (Author 2021).

PRIMARY PROGRAM

Public space and Fruit Trees

Figure 2.31: Fruit trees (Author 2021).

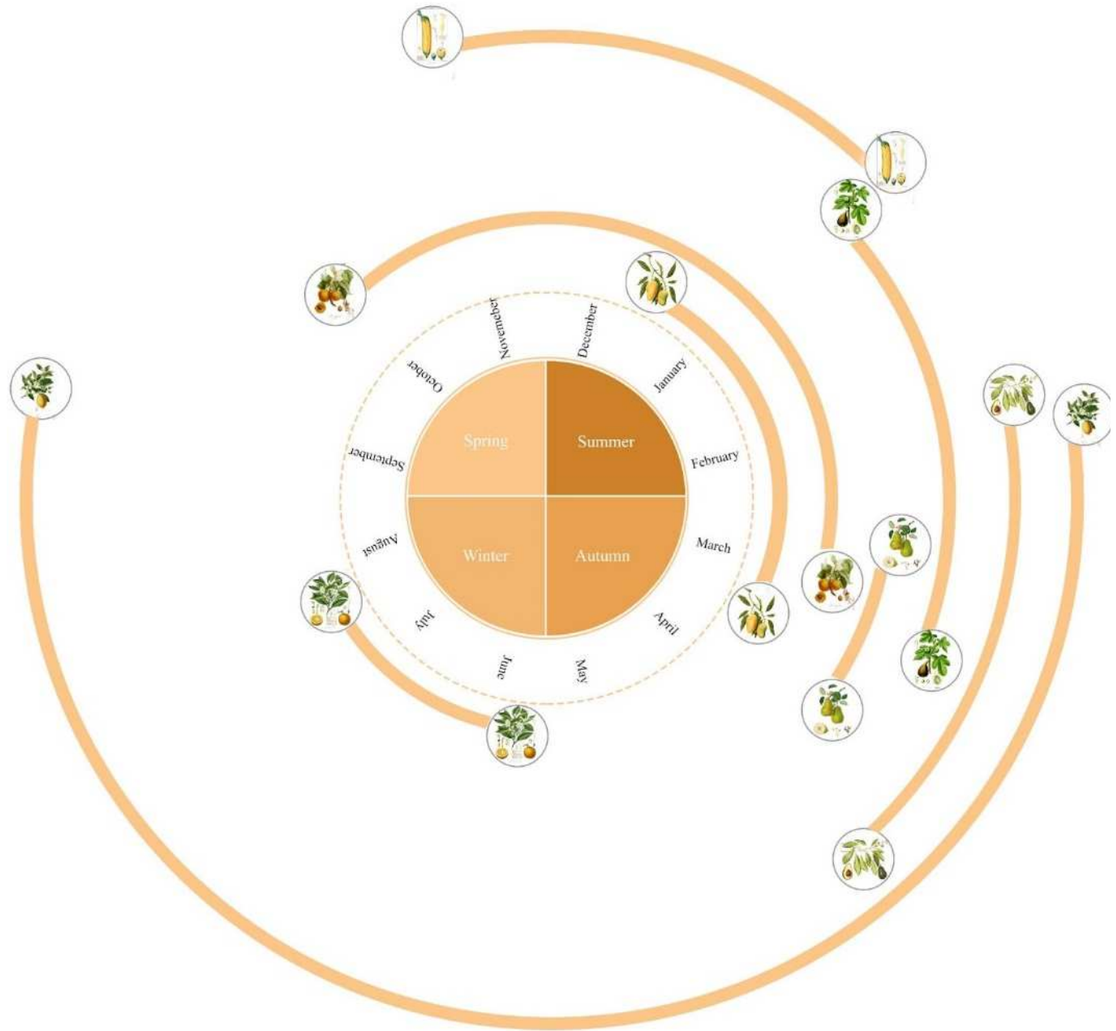


Figure 2.32: Diagram illustrates the different fruit trees and the harvesting season (Author 2021).

SECONDARY PROGRAM

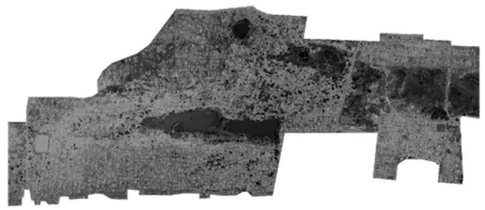
Sanitation, Laundry Facility and Biodegradable soap factory

1
Sanitation Facility

2
Laundry Facility

3
Biodegradable Soap Factory

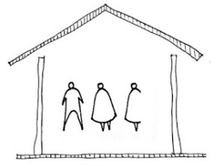
Figure 2.33: Secondary programs (Author 2021).



1 710 000 m²

9240 Units

185 m²



= 26 813

= 9 240

2.9 / Unit

Figure 2.34: Melusi area and household size (Climate Adaptation Studio 2020).

SANITATION FACILITIES

Only Biodegradable soap will be used in the facility

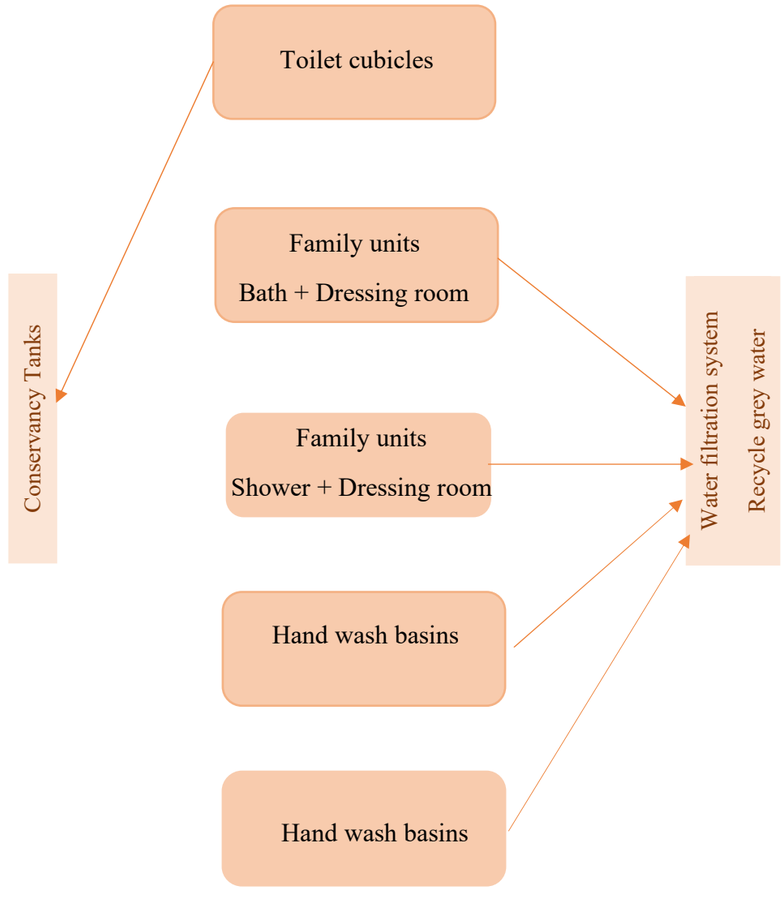


Figure 2.35: Sanitation facilities and how it functions (Author 2021).

LAUNDRY FACILITY

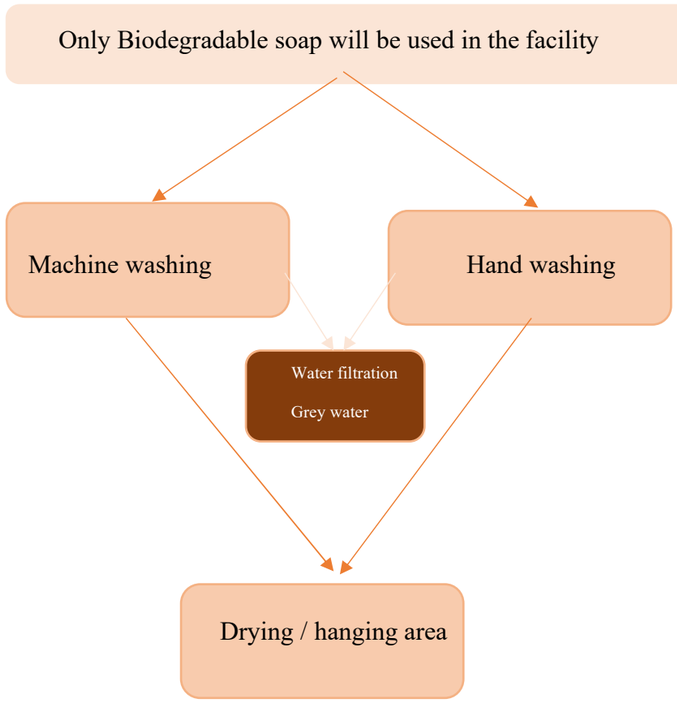


Figure 2.36: Laundry facility process (Auntor 2021).

BIODEGRADABLE SOAP FACTORY

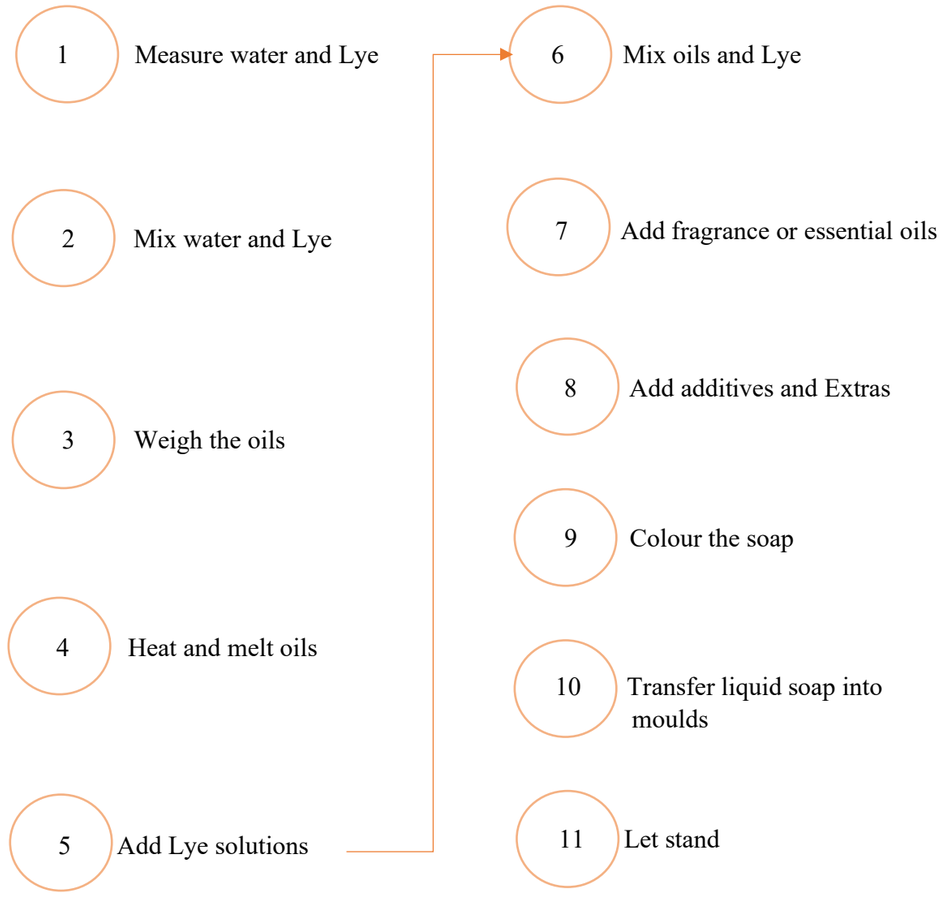


Figure 2.37: How to make biodegradable soap (Fisher 2020).

F

ANALOGY OF CARDIOVASCULAR SYSTEM

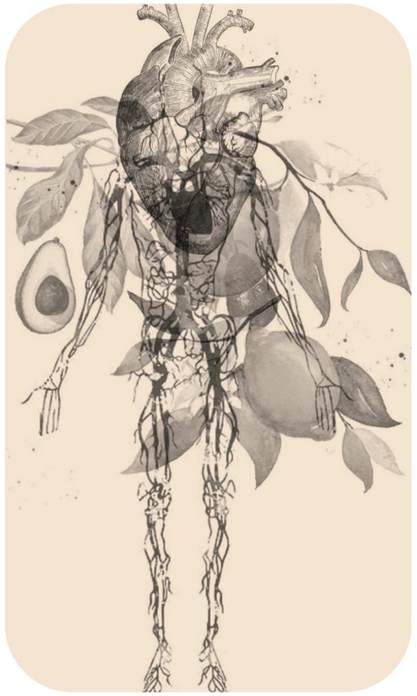


Figure 2.38: Analogy of the water filtration system (Author 2021).

Due to the high complexity in- Melusi dealing with socio and ecological challenges which consist of both complex systems, one should look at the most complex, wondrous, and holistic workable system in the universe; - the cardiovascular system.

An analogy has been drawn to the cardiovascular system, which is a complex arrangement of hydraulic, yet living components (Swain 2000:43). This analogy will act as an informant on how a hydraulic system works spatially and conceptually.

The layout of programs will be allocated along the flow of the water filtration system and will inform the location of certain programs. The water filtration system will relate to secondary water systems connected to the main line of water flow as per figure 2.40.

Analogous of the cardiovascular systems	Main Water filtration System.
Heart	The Quarry hole
Aorta	Surface Flow Wetlands
Arteries	Pipes supplying water to all the multiple programs

Figure 2.39: Table comparing the analogy of the water filtration system (Author 2021).

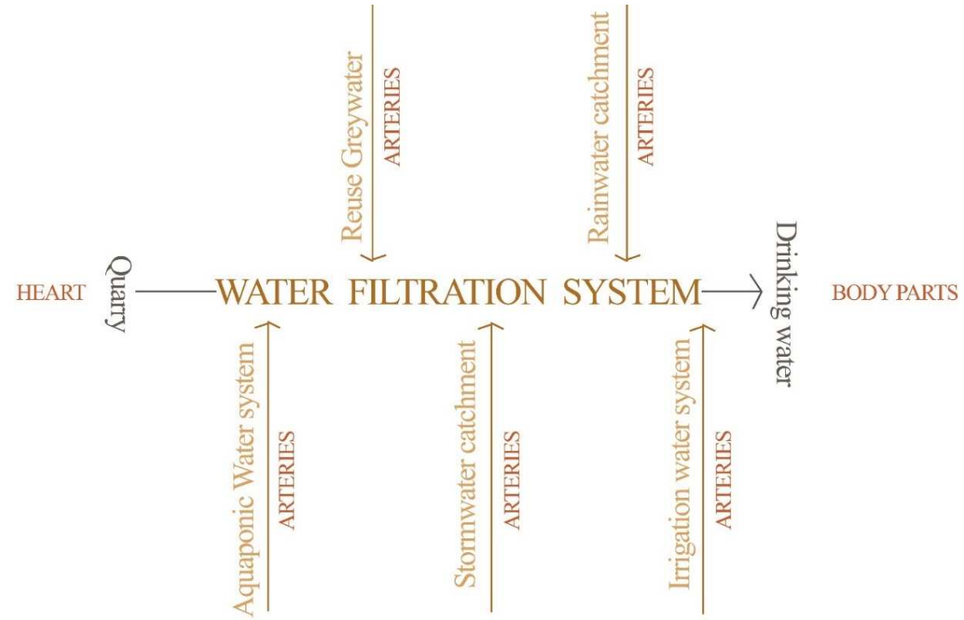


Figure 2.40: Illustrates that the water filtration concept and how the water feeds the programs (Author 2021).