Chenél de Bruyn | M.Arch (Prof) | 2020

THE RIPENING

AN ARCHITECTURAL CELEBRATION OF CRAFT BEER IN HEROLD, GEORGE

Chenél de Bruyn | 2015036060 | cheneldb16@gmail.com | 071 159 2884

Supervisors:
Prof. J. Smit, P. Smit, H. Raubenheimer, Prof. G. Bosman

Department of Architecture, Faculty of Natural and Agricultural Sciences
University of the Free State.

This dissertation is submitted in partial fulfilment of the requirements for the degree M. Arch. (Prof).

Declaration of original authorship:
The work contained in this dissertation has not been previously submitted to meet the requirements for a qualification at this or any other institution of higher education. To the best of my knowledge, this dissertation contains no material previously published or written by any other person except where due reference is made.

Acknowledgements:
Acknowledgement of editorial and proof-reading services:
The work contained in this thesis has been submitted for proof-reading and editing to Mrs Wanda Verster.

Dedication and Thanks:
I would like to thank our Heavenly Father, without whom this journey would not have been possible. Thank you to my parents, for the infinite love and support. You have given me everything I need in life to succeed and I hope to make you proud every day.

Thank you to the Cilliers, my second family, who have been cheering me on every step of the way.

This dissertation is dedicated to Ems. I wish you could have been here.
x x x

Figure 1: Close-up photograph of the existing kiln's facade and roof.

PREFACE

'Filled with mingled cream and amber,
I will drain that glass again.
Such hilarious visions clamber
Through the chamber of my brain.
Quaintest thoughts, queerest fancies
Come to life and fade away.
What care I how time advances;
I am drinking ale today.'

Edgar Allan Poe, 1848

Edgar Allan Poe had written this poem as payment, at Washington Tavern, Massachusetts. The poem is a delightful homage of the experience of beer drinking. Thus, as a fellow beer devotee, I felt adjured to grasp at this treasured opportunity of translating the experience into a physical place.

P R O G R A M M E
Craft beer brewery & beer academy with an integrated social brewpub

S I T E
SA Brewery Afgunst Farm
Herold
Western Cape
33° 50' 49.6" S 22° 26' 43.8" E

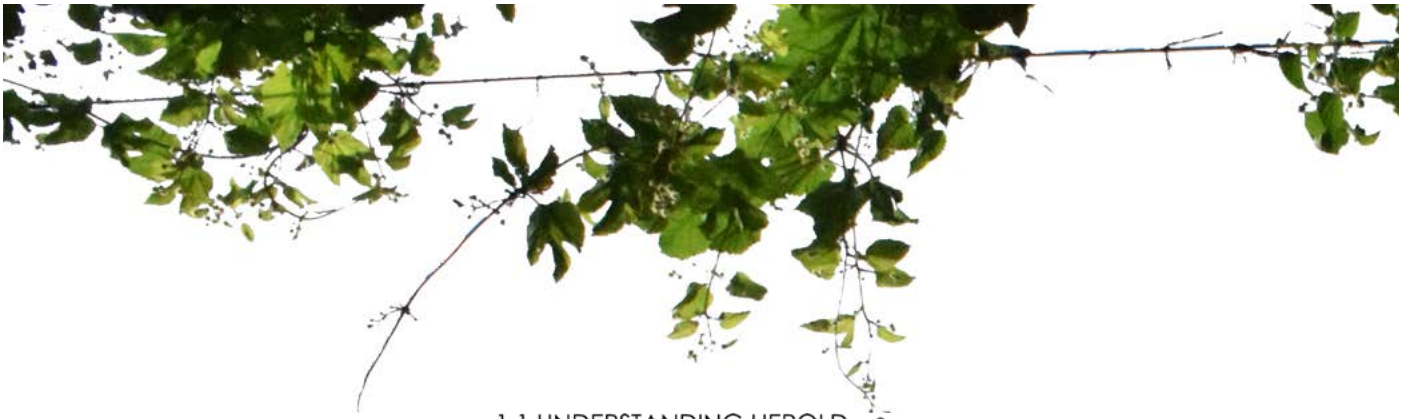
R E S E A R C H T H E M E
An investigation into the parallels in ruin and fermentation (ripening) and the hops plant and architecture, and how these parallels can be reinterpreted into an architectural experience.

ABSTRACT

The haptic engagement of brewing and drinking beer poses many similarities to the phenomenology of the landscape and architectural spaces. However, working with a vernacular architectural language within an existing building adds another experiential layer that needs to be handled carefully and thoughtfully by the architect. How can this multi-layered experience of landscape, beer and vernacular building be sensitively reinterpreted and narrated through means of built form, in order to contribute to the genius loci of Herold? The unique character of every site and its existing structure demands individual attention and a critical investigation into the genius loci. Investigating precedents such as Mariendahl Brewery or Walden Studios allows insight to the approach of another architect, from which design principles can be extracted. By introducing a craft brewery into the existing fabric and onto the site, a strong narrative is created through the proposed scheme, leading the dweller through moments of tension to the climatic ripening that is the celebration of the craft, landscape and existing narrative. Addressing the site-specific sensitivities, abstract concepts are distilled from the site and its elements, along with contextual analysis, which is implemented to meaningfully reinterpret the topology, morphology and typology that is introduced to the site. This investigation draws on meaningful place-making and the reimagining of craft breweries in the landscape.

KEY WORDS
adapted Cape Dutch | hops farming | craft beer brewing | rural industrialism | natural and human-made fermentation | critical regionalism | experientiality and hapticity

Figure 2: Hops growing on its human-made training structures.



X

1
THE INGREDIENTS

2
THE RECIPE

3 THE FERMENTATION

4 THE FINAL BREW

Y

DESIGN PREMISE

BREWERIES REIMAGINED

As the internal systematics of breweries need to be sanitary and isolated, the visitor is simply an outsider, peeking into the cogs of an independent system. The objective of this scheme is to reimagine the role of visitors in a brewery, without compromising the quality and regulations involved. Thus, creative architectural solutions are investigated to explore different methods of submerged experientiality within the space.

Figure 3: Close-up photograph showing texture and original components of the kiln.

INTRODUCTION

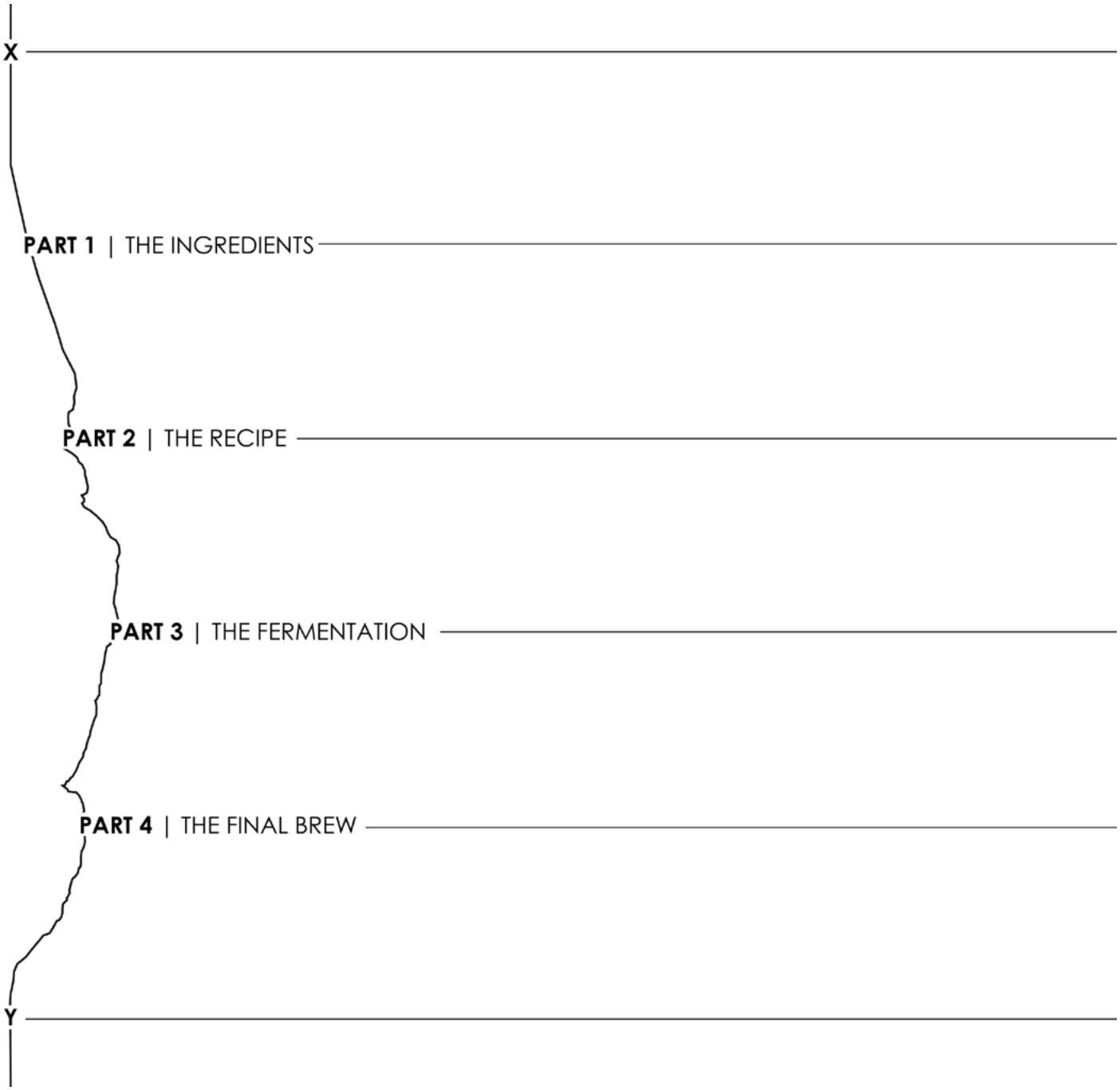
In this dissertation, the processes of growing hops and brewing beer are explained and connected to Herold – a hamlet located in the Outeniqua mountains near George, in the Western Cape. These processes are reinterpreted, along with Herold's vernacular built form, to create a foundation for an investigation into the typology, morphology and topology of the proposed scheme. The culture of contemporary beer crafting is woven through the dissertation to form a significant component in the theoretical approach.

As mentioned in the abstract, case studies by Gawie Fagan (Mariendahl Brewery, 1997), SuperLimão Studios (Toca do Urso bar, 2018), Jensen & Macy Architects (Walden Studios, 2016) and Malherbe Rust Architects (TukTuk Microbrewery, 2016) were used to better understand the act of integrating old and new. These precedents also relate to the functional aspects of the proposal, having sensitive thresholds and links between public and private spaces. Theories from Christian Norberg-Schulz (1979, 1985 & 1988), Juhani Pallasmaa (2005 & 2011), Kenneth Frampton (2007), Tadao Ando (1994), Alexander Tzonis and Liane Lefaivre (1996) are discussed. The theories in terms of narrative, genius loci and phenomenology are incorporated into the dissertation in supporting design decisions and ensuring the arrival at an appropriate design solution.

Herold and the chosen site are of an enriching experience, unique to its elements and spaces. This inimitable atmosphere contributes to the phenomenology and is identified by Norberg-Schulz (1979:18) as "genius loci" or "the Spirit of the Place", which adds layers of complexity to both the site and the design.

Figure 4: The kiln, as seen from the site entrance, with the Outeniqua mountains in the background.

DOCUMENT FRAMEWORK



Introduction to project, design and research objectives, as well as the site location.

Part 1 sets out the 'ingredients' necessary for the design process to be brought to fruition. The site and its context are discussed along with the proposed function. This gives the reader a better understanding of the setting, which is necessary to move on to the 'recipe'.

Part 2 describes how the elements discussed in Part 1 is approached, reinterpreted and applied in the design process to appropriately address the site and proposed function. This part provides the reader with a better understanding of the theoretical approach to every element and how the final synthesis is achieved.

Part 3 encompasses the ripening of the final synthesis. It provides a comprehensive explanation of design decisions and considerations, along with the design development – the fermenting of the design to arrive at a final 'brew'.

Part 4 presents the awaited brew – the final synthesis. The proposed design is introduced to the reader, explaining the implementation of the theoretical approach throughout the dissertation. Design and construction investigation set out the various significant facets of the built form.

Overall conclusion of the dissertation - a personal reflection on the project and the original objectives and limits are reviewed.

RESEARCH METHODOLOGY

RELATIVE DESIGN INVESTIGATIONS

When investigating the nature of the scheme, the brewing of beer contains engineering knowledge that concerns specific subjects. Specific jargon, spatial conditions and working spaces are necessary for the brewing process to be successful within the designed project. Thus, the dissertation contains the following:

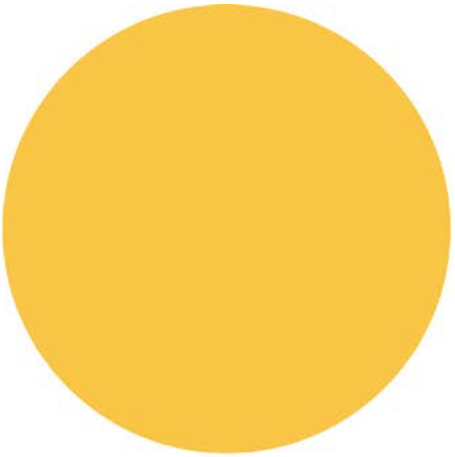
1. Case studies (to analyse other approaches to similar functions, structures and contextual fabric)

2. Explanatory explorations (to convey the analysed information to the reader to broaden their knowledge of the process)

3. Interpretive explorations (prominent elements on site and in the brewing process will be interpreted into architecture to create a meaningful design)

4. Literature study: The first step is to investigate the theoretical and architectural meanings of tension, narrative and fermentation (ripening), and how to investigate, explore and interpret these terms in a design. Secondly, to investigate the differences and similarities between these terms – which could become possible connection points (moments) within the architecture. An investigation into the mid-point between the two terms is also significant, which could substantiate a certain architectural approach towards the connection between the existing and new. Thirdly, the explored concepts are also investigated in terms of architectural solutions and will be used throughout the design in terms of design and planning decisions.

Figure 5: Close-up photograph of a bolt sitting within the existing kiln's facade.



PART 1

THE INGREDIENTS

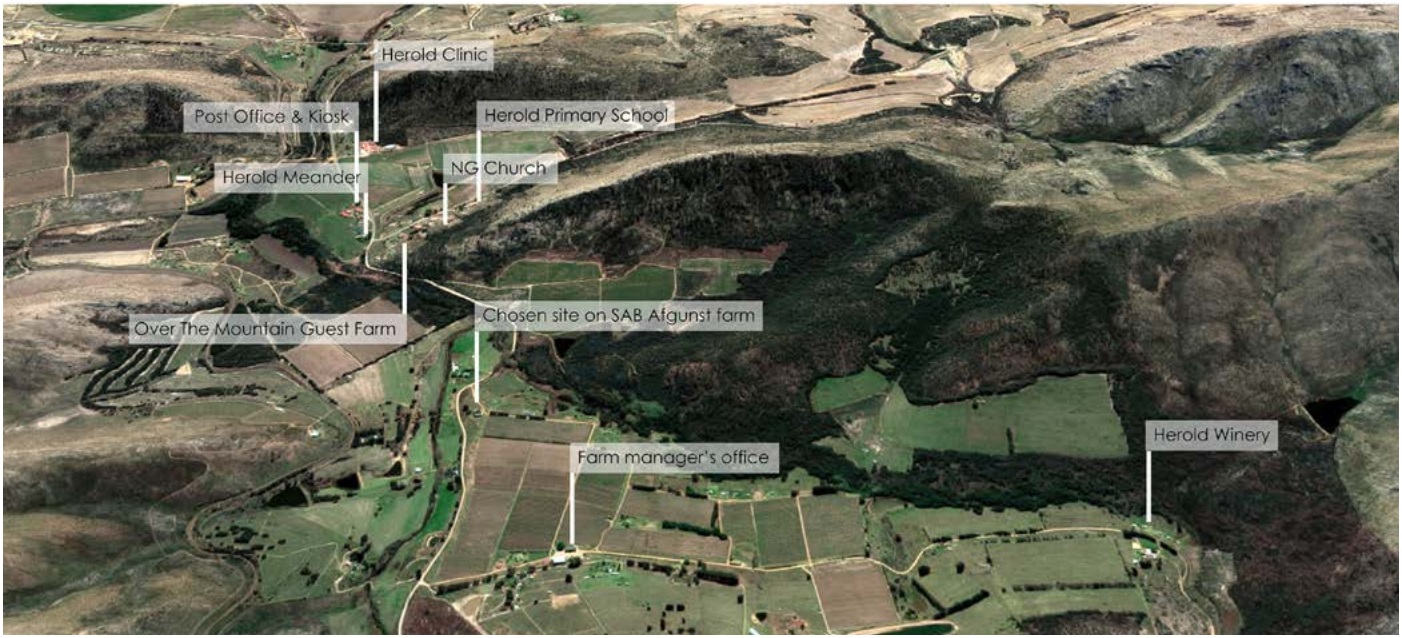
Part 1 sets out the 'ingredients' necessary for the design process to be brought to fruition. The site and its context are discussed along with the proposed function. This gives the reader a better understanding of the setting, which is necessary to move on to the 'recipe'.

1.1 UNDERSTANDING HEROLD

Herold marks the beginning of the Montagu Pass, the oldest unchanged pass in South Africa, which links George and Oudtshoorn (SAHO, 2019:online). The Montagu Pass is the main circulation vein through Herold (refer to image 6), and according to Mulder (2016:online) was built by convict labour during 1945.

Herold is a farming community, some residents are permanent, but there are also seasonal workers who find work when hops or grapes need to be planted and harvested. Hops are replanted annually, whereas grapes are perennial. The hops and wine farms make out the majority of the seasonal employers, needing additional workers to complete the planting harvest of both. Both hops and wine farms can be identified when driving past; with the tall hops training structures and the shorter grapevine training structures. Other farms in the area keep cattle or sheep and make use of full-time labourers. The village also has a few essential amenities, such as the church, kiosk, primary school and clinic, all mostly present-day extensions of the village (refer to images 7 to 10). The original buildings, such as the police station and first post office, have been incorporated into the Over The Mountain Guest Farm (refer to image 11).

Figure 6: Aerial map of Herold with the main amenities, showing its location within the Outeniqua mountains, as well as the layout of the hamlet.



1.

2.

3.

4.

5.

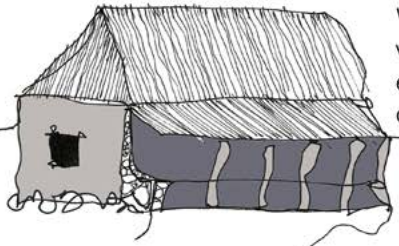
1. Figure 7: The Outeniqua Route through Herold.
2. Figure 8: Herold's post office.
3. Figure 9: Herold's only church.
4. Figure 10: Herold's governmental health clinic.
5. Figure 11: Over The Mountain Guest House.

The original buildings, such as the police station and first post office, have been incorporated into the Over The Mountain Guest Farm (refer to image 11). The original amenities were changed over to accommodation units when the properties were bought over in 1999 (OTM, [n.d.]:online). Image 6 below shows a visual layout of Herold and its amenities and image 12 shows a progression of significant architectural elements in Herold.

Figure 12: Sketches showing the progression of significant architectural built form as one moves through the hamlet past the site.

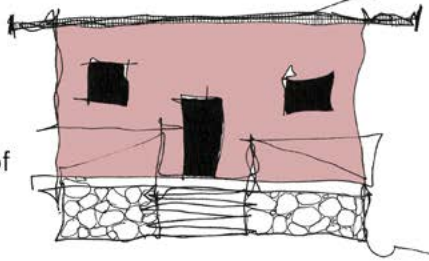
The entrance to Herold is announced along with the beginning of the Montagu Pass and the Outeniqua Mountain. This marks the beginning of the architectural and experiential journey to the site.

A lone cement dam, empty and weathered, rises out of the green landscape.

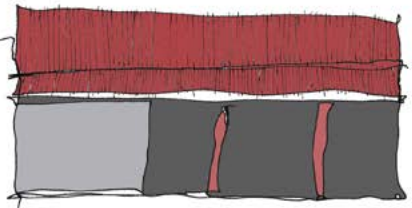


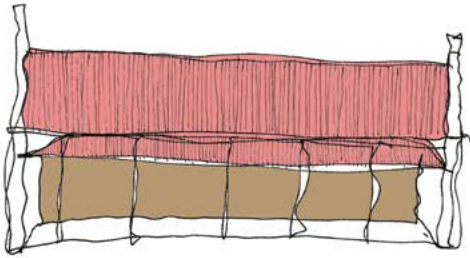
Workers' houses paint the roadside with eye-catching form and colour, each with their own character and aged appearance.

Chimneys, porches and columns form a staple in the architectural language of Herold.



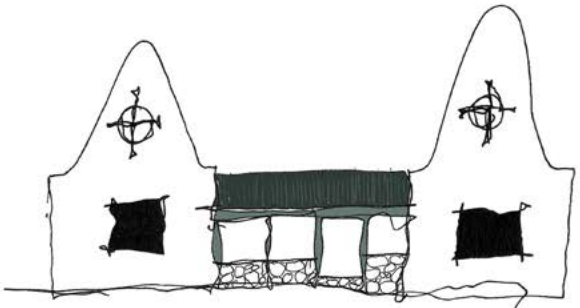
A pink clinic break the rural feel of the workers' houses, and the lack of columns or chimneys conveys a sense of 'otherness'.



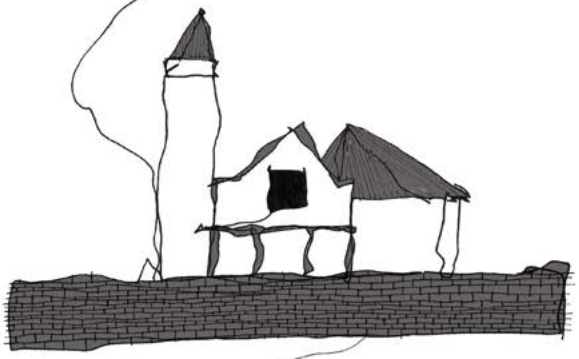


The Herold Meander, its facade dominated with triangular gabled walls and porch, opening up to the roadside.

The post office appears inconspicious and hides its interior function until one physically explores the space.

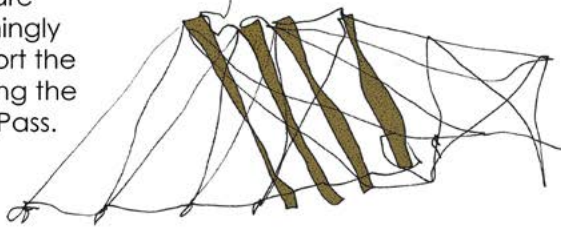


Over the Mountain Guest Farm greets all visitors with its striking white gables and further entices one with its historical significance and preservation. Definitely sets the architectural tone towards contemporary existence within historic buildings.

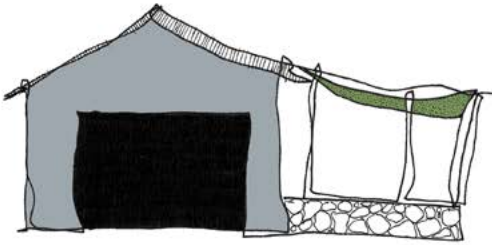


The NG Church resembles the colonial element within Herold, although the friendly pastor waving from his porch makes one feel right at home in Herold.

The first glimpse of hops are worth the wait! The seemingly complex structures support the climbing greenery, framing the left side of the Montagu Pass.



The kiln sits prominently against the hops fields, its human-made facade contrasting against the greenery. The roofline catches the eye and the materiality relates to Herold's rural feel.



The architectural journey ends at Herold Winery. An industrial shed alongside natural materials create a rural, yet contemporary character.

1.1.1 THE LANGUAGE OF HEROLD

> "This translation happens through a process of 'gathering. The building (settlement) becomes a 'thing' when it 'gathers world' … What is gathered, Heidegger says, is the earth as 'inhabited landscape'. An inhabited landscape obviously is a 'known' landscape, that is, an environment with which we identify, in which we can orientate, and in which we come together with our fellow men. This landscape is brought close to us by 'building'. This implies that the buildings gather the properties of the landscape and by means of the language of architecture make the landscape 'speak'… An inhabited landscape obviously comprises natural as well as man-made entities" (Norberg-Schulz, 1979:44).

Norberg-Schulz (1979:44) explains that there exist three features of the language of architecture, a mechanism enabling architects to 'gather' or translate the world (landscapes or specific sites) into a built reality. Refer to image 14 and 15 for a graphic visualisation of Norberg-Schulz's concept of 'gathering'. This dissertation uses these three basic investigative components, namely topology, typology, and morphology to thoughtfully translate the landscape and built language of Herold to arrive at an appropriate design solution for the proposed brewery.

Figure 13: An abandoned building in Herold, showcasing the rural architectural language.

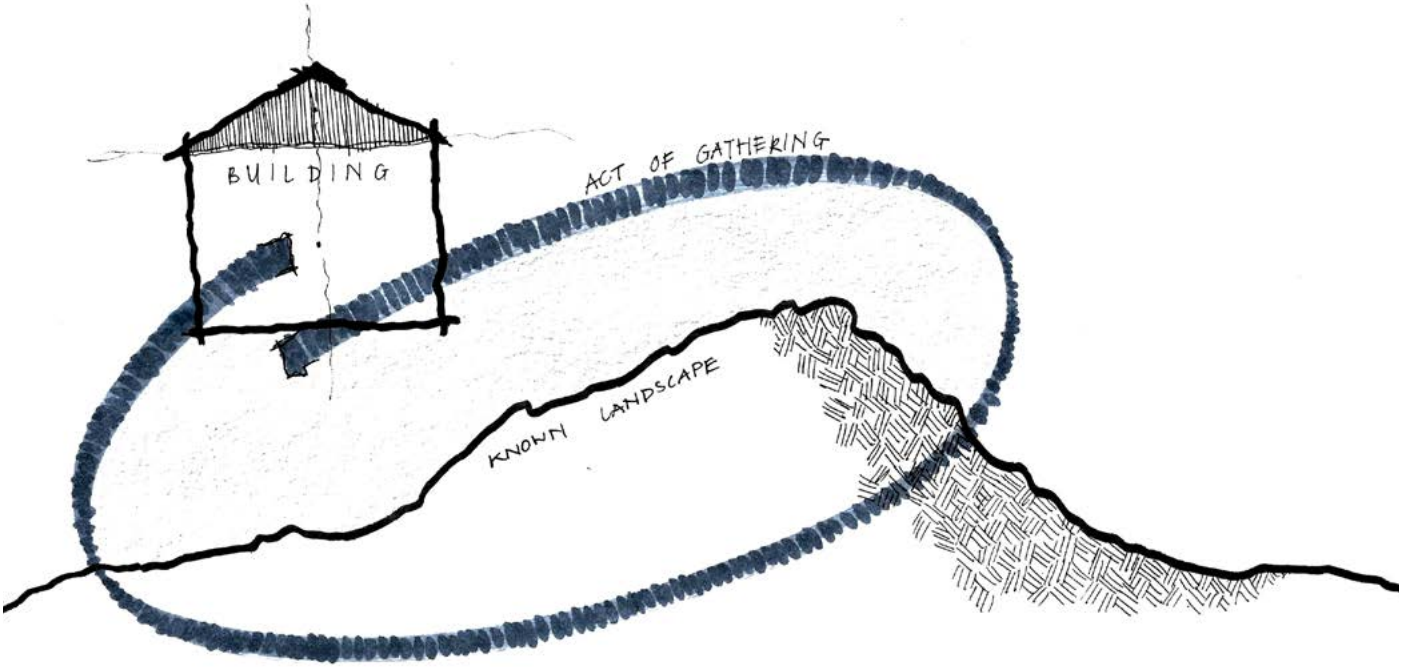


Figure 14: Sketch illustrating architecture's act of gathering the landscape.

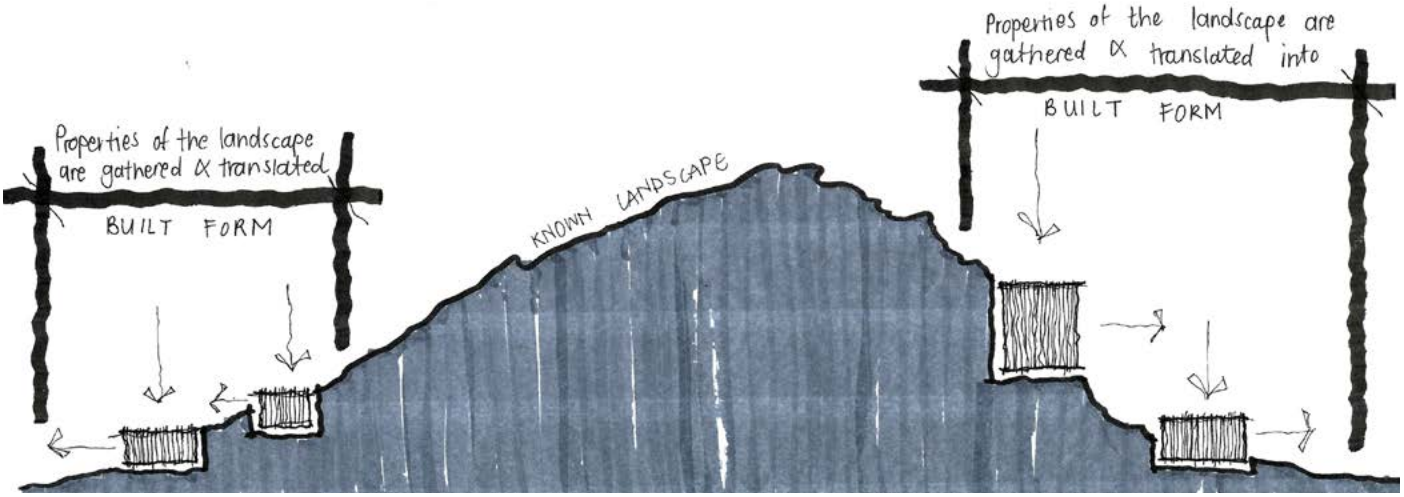


Figure 15: Sketch illustrating how architecture translate the gathered properties of the landscape into built form.

1.1.2 TOPOLOGY

Topology relates to spatial organisation and the ordering of elements within the space, whether it be within the landscape or urban fabric (Norberg-Schulz, 1979:42). Norberg-Schulz (1985:27) states that topology relates more to the architectural space than the mathematical and grasps the spatial interrelationship between elements. He also extrapolates this concept into its basic components: 'centre', 'path' and 'domain'. Norberg-Schulz (1979:42) adds, "The simplest model of man's existential space is, therefore, a horizontal plane pierced by a vertical axis."

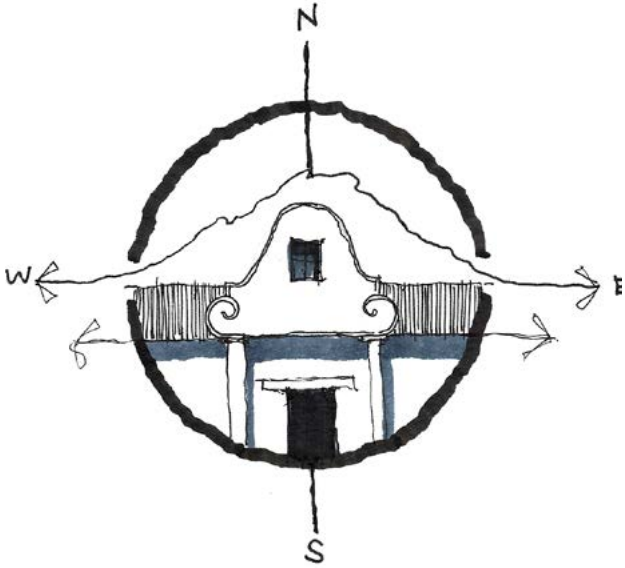


Figure 16: Abstract sketch illustrating how the landscape (mountains) and built forms (gables) act as orientational devices.

Ching (2007:35) defines orientation as the direction of an element relative to a plane, compass directions, other elements or to the viewer. In accordance with Ching, Ots adds that topology is also the field where the human body is engaged within the visual dynamic (2004:154). Therefore, it can be concluded that orientation can be ever changing and personal from one person to another and can be utilised as an experiential tool when designing architectural spaces. Topology is thus an important organisational tool within a design, implemented to integrate the orientational elements. This can also relate to orientation within the landscape. Natural elements in the landscape act as beacons, allowing one to constantly be aware of one's orientation and spatial relationship to other elements. See Figure 16 for an abstract sketch of topology.

The Outeniqua mountains - a distinct natural beacon - surrounding Herold and the harmonious, yet individualistic built form, speak of a classical landscape, all elements retaining a sculptural quality. Similarly, to how an object is placed within a horizontal plane, Herold is seemingly placed within the horizontal plane that is the Outeniqua mountains. The different elements within Herold also have vertical axis – some elements' axis is stronger than others. For example, the church has a stronger vertical axis that the residential houses. However, investigating each element on its own, a vertical axis is present. The Outeniqua mountains orientate one to the south, its vertical axis gracefully dominating the surrounding landscape.

Human-made structures and dwelling spaces start to appear between thicket and streams, gradually increasing and intensifying as you near the core - the integration of human shaped by the landscape and nature (refer to image 17).

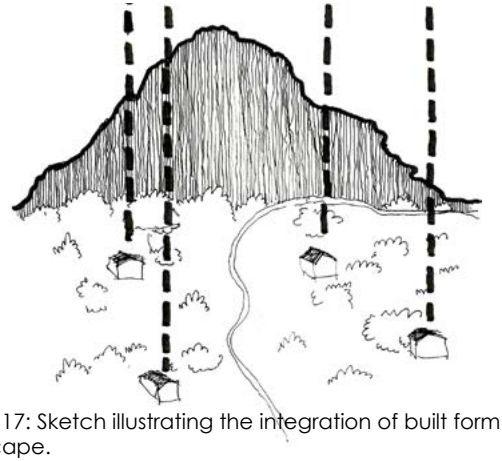


Figure 17: Sketch illustrating the integration of built form within the landscape.

The Cape Dutch architecture derivation delivers a strong contrast in the landscape – minimalistic whitewashed buildings are contrasted against the greenery and direct the dweller to built architectural spaces. Porches, steps and gables further orientate people towards the buildings' entrances, acting as identifiable topological elements within a composition. Even humble workers' houses provide these elements to allow humans to orientate themselves. See Figure 18-21.

Therefore, topology can be seen as the connection of a human and their environment – both earth and sky - and its corresponding elements. When removing the emphasis from the human, the focus moves to the connection between earth and sky.

Figure 18: A footpath worn into the rocky landscape, leading up to a worker's house.

Figure 19: With mountains in view, buildings peek out from beneath the vegetation, creating a connection between sky and landscape.

Figure 20: The main road through Herold (Montagu Pass) follows the natural environment, swerving around hillocks or ridges and following rivers.

Figure 21: All roads lead to Outeniqua mountains - these distinct mountains are a permanent signal tower, regardless of one's position in Herold.

1.1.3 MORPHOLOGY

Morphology narrates the relationships between the built form and the earth and sky, and how the building reacts to these relationships (Norberg-Schulz, 1979:42). Therefore, it can be seen as a layered connected between the highest element; sky, the middle; built form and the lowest; the landscape. Pallasmaa (2011:119) describes architecture's function as a 'thing' that adds meaning to nature and its accompanying elements, as well as giving structure to human behaviour, relationships and institutions. Thus, there is a clear objective to provide shelter from the environment (sky and earth) and accommodate human-natured activities (experience-rich happenings within the enclosed structures). In conjunction, morphology also divides the horizontal living plane of a human into outdoor and indoor, which ultimately also identifies different spaces within the built form.

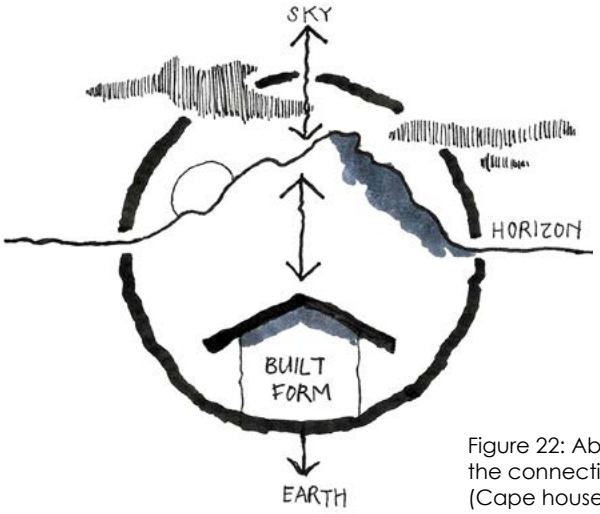


Figure 22: Abstract sketch illustrating the connection between sky, built form (Cape house) and earth (landscape).

Norberg-Schulz (1979:42) further clarifies that this refers to the identification of architectural forms, articulation and spatiality, which is personified in how the built form changes to acknowledge certain boundaries and edges. He also divides these thresholds into basic building elements – floor, wall and roof. See Figure 22 for an abstract sketch of morphology.

Discussing morphology, Norberg-Schulz (1979:43) then asks: "… how do buildings (settlements) stand, rise and open?" He thereafter explains the references in his question: 'stand' refers to the physical relationship with the earth (refer to image 23). How does the building mass connect with the earth? Is it sunk into the ground or floating lightly above? It is safe to conclude that this becomes a boundary between the architecture and the environment? 'Rise' denotes the connection to the sky, the vertical axis that births a celebration between earth and sky. This could refer to a silhouette of a building contrasting against another or celebrating a mountain within its backdrop (refer to image 24). Thirdly, 'open' conveys the conversation between inside and outside. This addresses openings within a building, as well as how one is encouraged to move from inside to outside, from one space to another (refer to image 25). Solid, static masses communicate differently from a punctured, porous building.

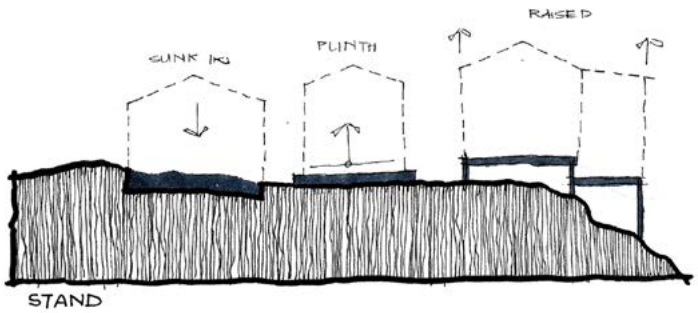


Figure 23: Sketch illustrating how the action of 'standing' can be architecturally implemented through different foundational approaches.

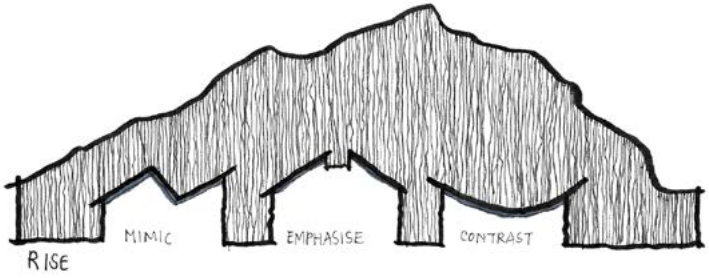


Figure 24: Sketch illustrating how the action of 'rising' can be architecturally implemented through different roof shapes.

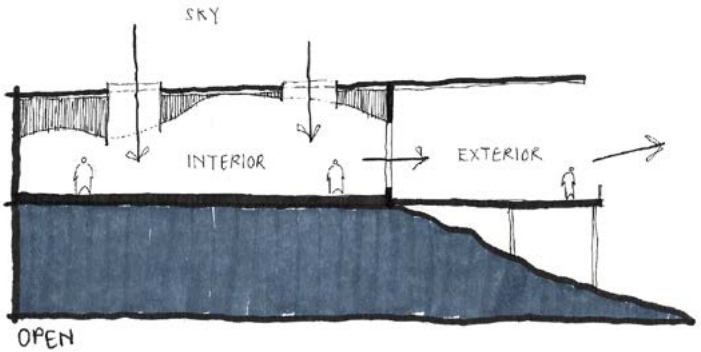


Figure 25: Sketch illustrating how the action of 'opening' can be architecturally implemented through different spaces, as well as indoor versus outdoor.

Subsequently, Herold's built forms are scattered along the rural landscape, sturdily connected to the landscape – both through mass and materials. True to Cape Dutch characteristics, the buildings are constructed of local materials such as stone or clay bricks. Walls and gables are usually whitewashed, and the entirety of the building speaks of a uniformity, axiality and proportionality (De Bosdari, 1964:19-20). Roof lines and gables articulate the direct joint between the building and the sky and also act as a vertical and horizontal axis (see Figure 26-31).

In conclusion, the morphology interlinks the sky, architecture and earth into one consideration. This prescribes a sensitive building response to appropriately address these elements at their meeting point. Moving further, the investigation narrows down to the communication between the built form and humans.

6. Figure 26: Gable walls creates a vertical connection with the sky.
7. Figure 27: The adapted Cape housing become a stark white block within the landscape, with thick walls and small openings.
8. Figure 28: A farm shed displays an amalgamation of Cape housing and shed architecture, contributing to the architectural language of Herold.
9. Figure 29: Use of natural materials in local cabin.
10. Figure 30: Industrial steel sheds are adapted to the more rural and natural language of Herold.
11. Figure 31: Mix between natural and industrial.

6.

7.

8.

9.

10.

11.

1.1.4 TYPOLOGY

Typology can be defined as "the basic structures of 'Being-with'", relating to the meeting point between human beings and architectural language (Norberg-Schulz, 1985:29). From this statement one can conclude that this refers to architecture as a communicator.

> "Architecture is a language. As such it keeps the spatiality of the world. The architectural language consists of archetypal images that reveal those structures which are invariant with respect to place and time" (Norberg-Schulz, 1988:153).

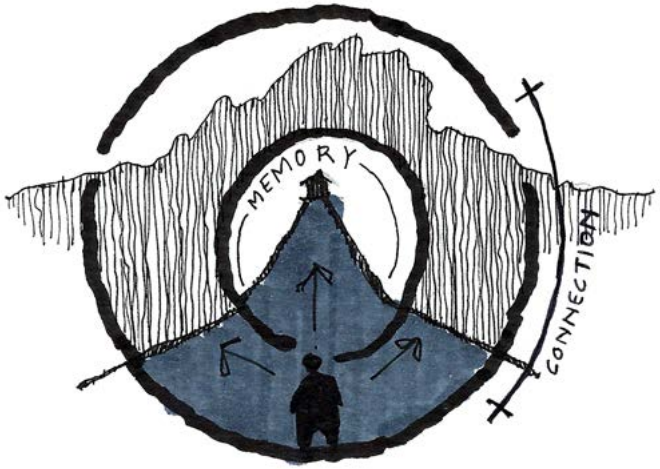


Figure 32: Abstract sketch illustrating the experience of the visitor with a typological element and the evocation of memory (association).

Roth & Roth Clark (2018:21) also refers to the basic architectural elements of Vitruvius and states that architecture must always provide its inhabitants with utility, firmness and beauty. Utility is described as the functional approach to the design process of the plan layout, as well as the spatial organisation. Firmness refers to the construction and material quality incorporated.

Lastly, beauty is labelled as the proportionate, pleasing appearance of the built work. "A thing is determined by its nature and if it is to be fashioned so as to work properly, its essence must be investigated and fully grasped," words of Walter Gropius (1926:95-96). Roth and Roth Clark (2018:22) responds to this statement by summarising that beauty would automatically be the result of utilitarian architecture. In other words, different specific functions within a built form tend to shape how the building is designed. Norberg-Schulz (1979:2) concurs that architecture becomes an expression of human institution – how humans choose to be in the world. Thus, the form of architecture speaks of the nature thereof. See Figure 32 for an abstract sketch of typology.

Therefore, certain archetypal images convey their nature, either spatial or architectural. This can be seen in just a few local typologies, such as factories, schools, sheds and churches. The individual roles of utility, firmness and beauty have variations of importance when comparing a factory to a church. Factories are by nature an extremely functional building and the design entails a larger extent of utility and firmness that the consideration of beauty. A church focuses more on beauty and the experience that is brought from the layout and materials.

The typological elements of Herold are as follows:

- Whitewashed walls
- Gables
- Thick walls punctured by openings
- Local materials, such as stone or clay bricks
- Porches defining threshold
- Thick fireplace chimneys
- Simplistic, symmetrical facades
- Stone masonry
- Corrugated iron sheds
- Concrete dams
- Concrete silos
- Reuse of alien pine trees
- Tension-like structures for vineyards and hops fields

See Figure 37-45 for photographs of typological elements in Herold.

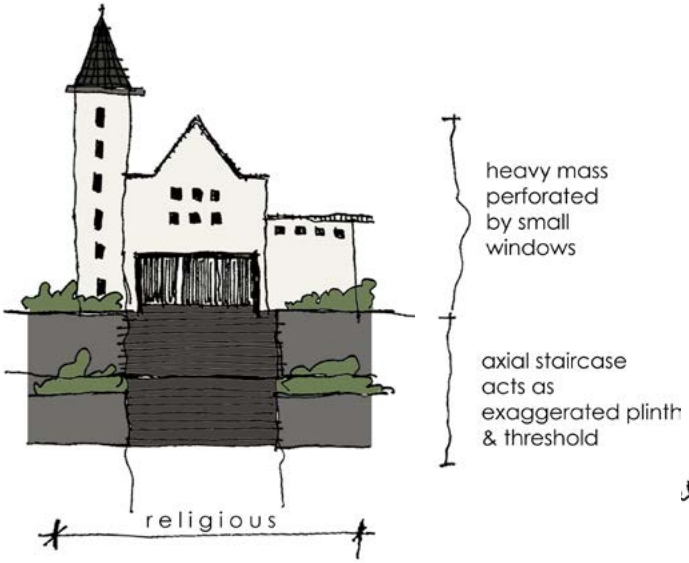


Figure 35: Analysing the architectural elements of the local church, although a more colonnial style, still incorporates vernacular elements.

Figure 33: Sketch portraying the use of adapted gable walls in Herold.

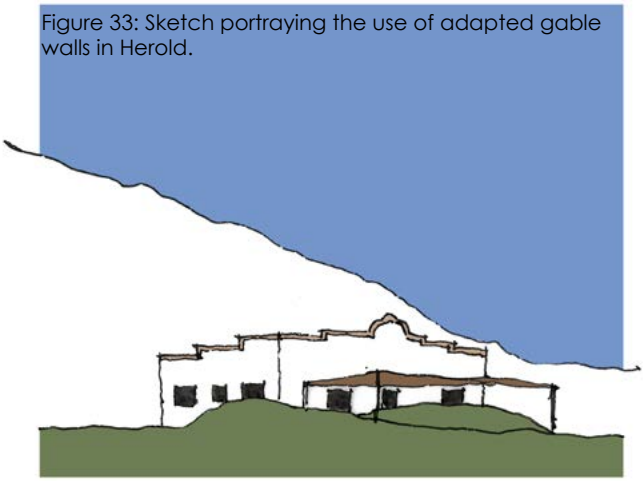


Figure 34: Illustration analysing the use of porches to define thresholds.

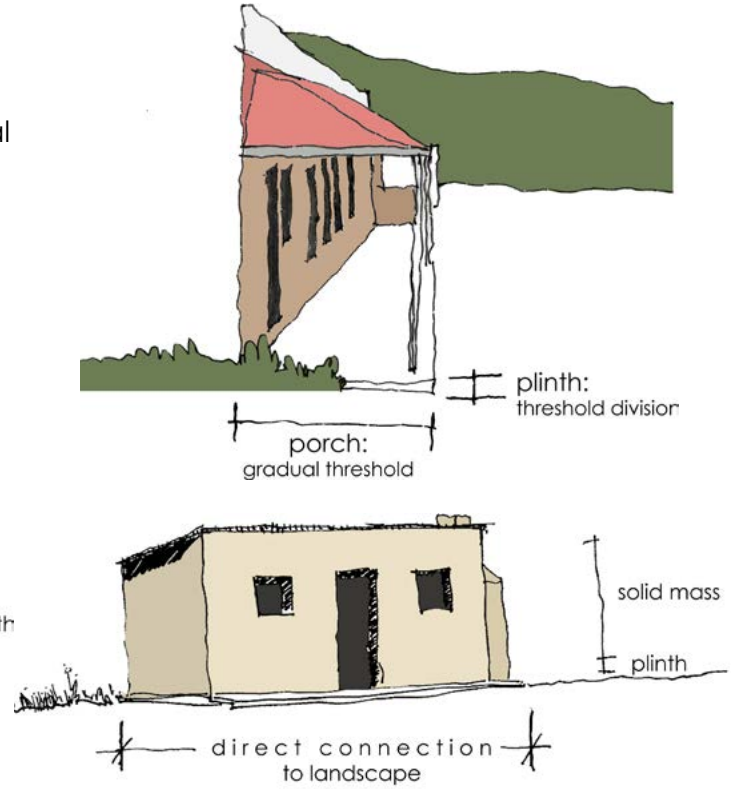


Figure 36: Graphic illustration of the vernacular language of Herold - simplistic buildings placed on a plinth.


12.


15.


18.


13.


16.


19.


14.


17.


20.

12. Figure 37: A rural house, featuring an adapted gable wall, with the highest point orientating the dweller to the entrance.
13. Figure 38: Symmetrical facades are punctured by small openings.
14. Figure 39: Heavy chimneys attached to the side of houses are a common sight.
15. Figure 40: Porches adorn the entrances to buildings, emphasising the hierarchial point of entry.
16. Figure 41: Columns supporting verandahs form a part of Herold's rural language.
17. Figure 42: The use of rock as a building material.
18. Figure 43: Industrial farm sheds form part of Herold.
19. Figure 44: Vineyards frame the roadside, using tension structures.
20. Figure 45: The iconic hops, with its tension structures creating an intricate view.

1.2 UNDERSTANDING THE SITE

Figure 46: To understand the site, it is necessary to first experience it.

Finding a site for this project involved different experiences, that are worth telling. The function of a proposed brewery was settled before a site was agreed upon. As Herold, together with its neighbouring settlement, Waboomskraal, are South Africa's hops capital, it only seemed natural to investigate the area as it is ideal locality for a brewery. Two other sites were identified, respectively in Waboomskraal and Herold. Arriving in Herold on a Sunday, the small town was in a peaceful afternoon snooze, with everything closed except the guest house. In-depth research had already been done before departure, so I set out to experience the spaces that I read about, camera at the ready. It was during this casual drive that the old hops kiln appeared – leaving me awestruck. The magnificent façade demanded all my attention. With the car in park and camera in hand, the temptation to jump the fence was immense. This ruin begged to be interacted with, not content with the admiration it received from a distance. Reluctantly, I moved on.

The effort needed to reach the initial sites' respective owners was more than anticipated. Many phone calls, closed doors and wrong turns ensued, and when the owner of the initial site in Herold was identified, at last, it came to light that he had removed all hops from his farm and wanted no contact from a stranger, not even a post-graduate student. In my frustration, I stopped at the SA Breweries farm to ask for assistance and possible direction to someone who could advise in identifying a new site. Speaking to the SA Breweries farm manager, a fellow Kovsies alumna, Megan Bruintjies gladly granted me permission to roam the farm in search of a new site. Nonchalantly, she mentioned the old hops kiln next to the road, next to the hops fields. By chance, the perfect site presented itself.

The hops kiln came into existence due to a specific functional need. The historical overview of how Herold came to be a hops capital sheds light on the subject. According to the Pauline Lourens, a George Herald journalist (2016:online), Mr Ernest Baker is deemed the father of the South African Hops Industry. Baker formed part of the Forestry Department in 1920 and became convinced that George will be the perfect location for commercial hop production. After many attempts of importing hops cuttings, Baker finally succeeded. In 1936, the Union Hop Growers was founded and in time, it merged with SAB and Ohlssons Cape Breweries. This new guild the purchased Afgunst farm as one of their first production advances, which is facing directly onto what can be considered the main road through Herold. On the most northern part of the farm is an abandoned building that had been previously used as a drying oven in which the hops were dried before entering the brewing process. The building, with its striking roof profile, faces the roadside and is bordered by hops fields on its eastern side. The majestic Outeniqua mountains are prominent in the background and creates a noteworthy visual connection.

1.2.1 TOPOLOGY

As mentioned above in the discussion of the topology of Herold, topology is described as an organisational tool to integrate the orientational elements on a site or in a landscape. These elements make the dweller aware of their orientation and spatial relationship to other elements. 'Centre', 'path' and 'domain' are also described as the three main spatial organisational elements.

Gordon Cullen (2006:9) also discusses the relationship between the surrounding environment and the positioning of our bodies within it. This act of orientation gives way to a sense of identifying a 'here' and a 'there', and they exist within a harmonious relationship with each other. The sense of 'here' and 'there' also creates enclosures or domains, similar to Norberg-Schulz's classifications (see Figure 47). The art of topological relationship is also through the weaving together of environmental and human-made elements (Cullen, 2006:7-8).

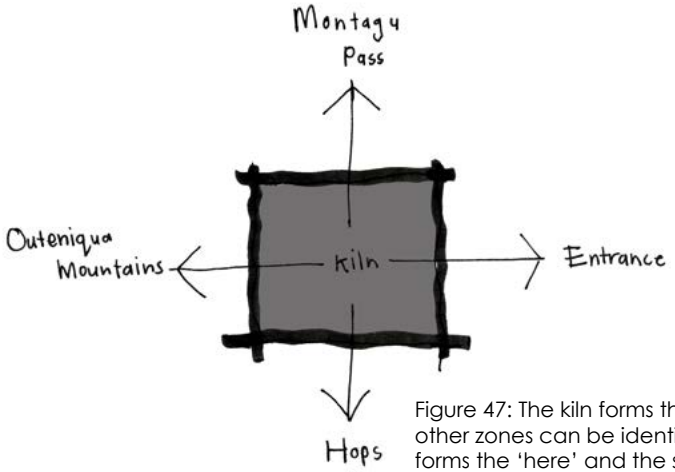


Figure 47: The kiln forms the centerpart - the main orientational element. From this element, other zones can be identified and their spatial existence is measured from the kiln. The kiln forms the 'here' and the surrounding domains form the 'there'.

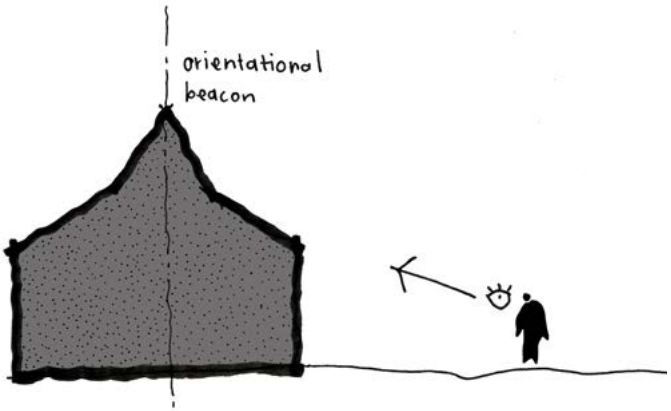


Figure 48: The kiln acts as a beacon, its structure creating a vertical axis, similar to the functionality of a gable.

The old kiln is both a human-made element and the primary orientational element. It becomes an immediate beacon travelling along the road and on site (refer to images 48). It also becomes the 'centre' that Norberg-Schulz (1985:27) refers to. The building is orientated east-west, with the prominent roofline displayed to the Montagu Pass. The linearity of the roof creates the illusion of a gabled façade, which is interpreted as a 'path' or axiality, both on the site and throughout the building. It can also be classified as an enclosed 'domain' on site whereas the hops can be seen as semi-enclosed space and the area in between as open space. The structures on which the hops grow, act as a threshold moving into the semi-enclosed domain. Refer to Figure 49-52 for photographs of Herold's morphological elements.

21. Figure 49: Showing the relationship of the kiln with the existing dirt road on site.
22. Figure 50: From within the hops fields, the kiln maintains a visual relationship with the visitor.
23. Figure 51: Looking to the south, the Outeniqua mountains emphasises the skyline. A spatial connection exists between the kiln and the hops fields.
24. Figure 52: The dirt road create a threshold as one moves from the site towards the hops.

1.2.2 MORPHOLOGY

As mentioned, morphology describes the relationship between the built form, earth and sky. Norberg-Schulz (1979:43) also investigates the 'stand', 'rise' and 'open' of the built form. As discussed, this investigates different connections between these three elements. To reiterate; 'stand' refers to the connection between built form and its environment, 'rise' refers to the connection between the built form and the sky and 'open' refers to the connection between different spaces – interior and exterior.

'Stand', 'rise' and 'open' will now be applied to the elements on site. When investigating the 'standing' of elements on site, there is a contrast between the hops and the kiln. The hops touch the ground lightly while the kiln sits heavily on the site, as shown in Figure 53. The hops make use of tension cables and gum poles anchored into the ground to support the cable trellis structure, as well as diagonal poles to keep to tension in the horizontal cables. The old kiln is connected directly to the site as if a white play block placed on a patch of grass and becomes weaved into the delicate relationship between human-made and landscape.

The 'rise' also refers to a delicate relationship between the kiln and the hops with the sky, both holding unique and detailed silhouettes. See Figure 54. The kiln connects with the sky through a unique roofline and the pitched roof creates a vertical axis. From afar, the hops fields may seem undetailed and plain. Observing the fields from closer, one becomes acutely aware of the intense verticality, fine construction joints and how everything is held together. Along with this, the hops reach wilfully into the sky, protruding past the structure.

Exploring the 'opening' of the site, the hops structures act as a threshold moving into the vertically enclosed field. This sense of threshold, however, is not experienced at the kiln, as the connection to the landscape and visitor is immediate and direct. Any defined space of arrival has weathered away during the decay of the structure. This contrasts to the defined arrival of the adapted architectural language of Herold. See Figure 55 on the following page.

Figure 56-59 documents the morphological elements present on site.

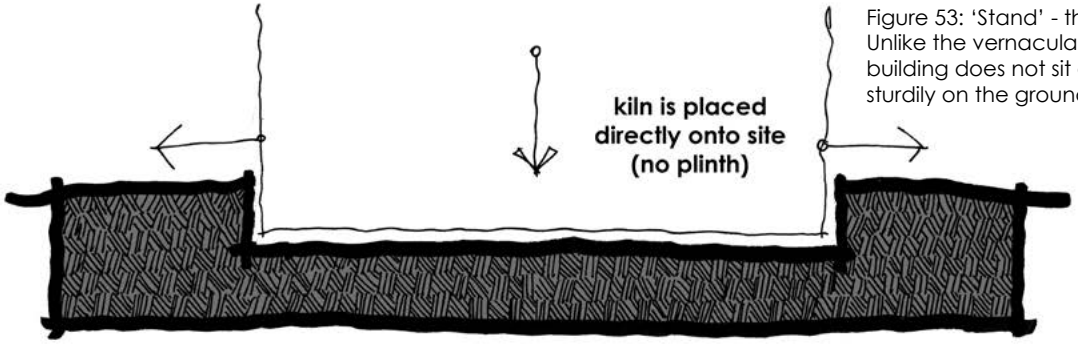


Figure 53: 'Stand' - the kiln is placed *into* the site. Unlike the vernacular language of Herold, the building does not sit on a plinth, but instead sits sturdily on the ground.

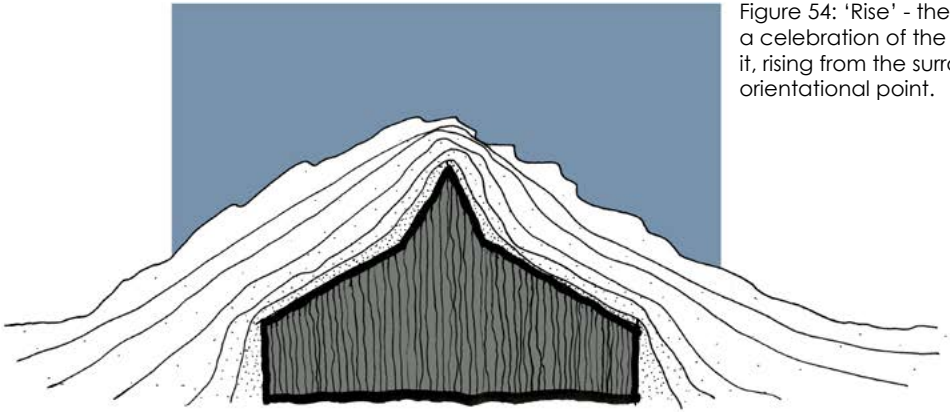


Figure 54: 'Rise' - the kiln's roofline can be seen as a celebration of the Outeniqua mountains behind it, rising from the surrounding landscape to form an orientational point.

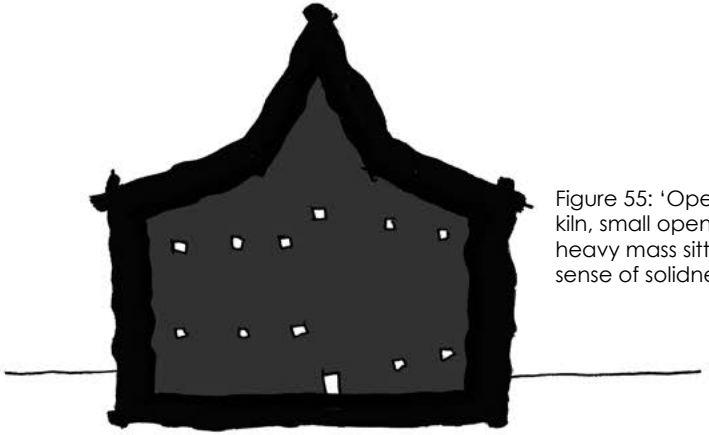


Figure 55: 'Open' - regardless of the wide facades of the kiln, small openings puncture its walls, creating a feeling of heavy mass sitting on the landscape. The kiln conveys a sense of solidness, becoming more delicate towards its roof.

25.

27.

26.

28.

25. Figure 56: The kiln has a direct connection with the site - placed on the site without a plinth.
26. Figure 57: The kiln rises into an intricate roofline, creating a significant celebration against the sky.
27. Figure 58: The hops structures consist of detailed joints and connections, dictating a design approach.
28. Figure 59: Similar to the kiln, the anchor poles of the hops also sit directly on the site without footing.

1.2.3 TYPOLOGY

As previously reviewed, typology refers to the archetypal image that is associated with a certain architectural or spatial function. Within Herold's context, most typologies are identified as either adapted Cape architecture, farming sheds and structures. These built forms have developed a certain archetypal image.

On-site, the hops kiln seems to be an amalgamation of the archetypal image of adapted Cape Dutch architecture and the functionality of a hops kiln. The structure of the kiln is typologically categorised as a ridge ventilated kiln, which possesses a vent running along the ridge of the roofline (Geograph, 2009:online).

This allows the hot air from the drying furnaces to rise up and through the ventilation ridge, while at the same time sucking in cool air from the additional air vents near the ground (refer to Figure 60 below). This results in a continual circulation of cool fresh air in the kiln (Grattan, 2015:online). The physical built form relates back to the aforementioned discussion of utility – the function of the building determines the form thereof. Although this roofline does not correspond with contextual architectural language, the materiality of the kiln is native to Herold: the white-washed walls, use of masonry walls and timber roof trusses and relevant support structure. Refer to Figure 61-64 for photographs of typological elements on site.

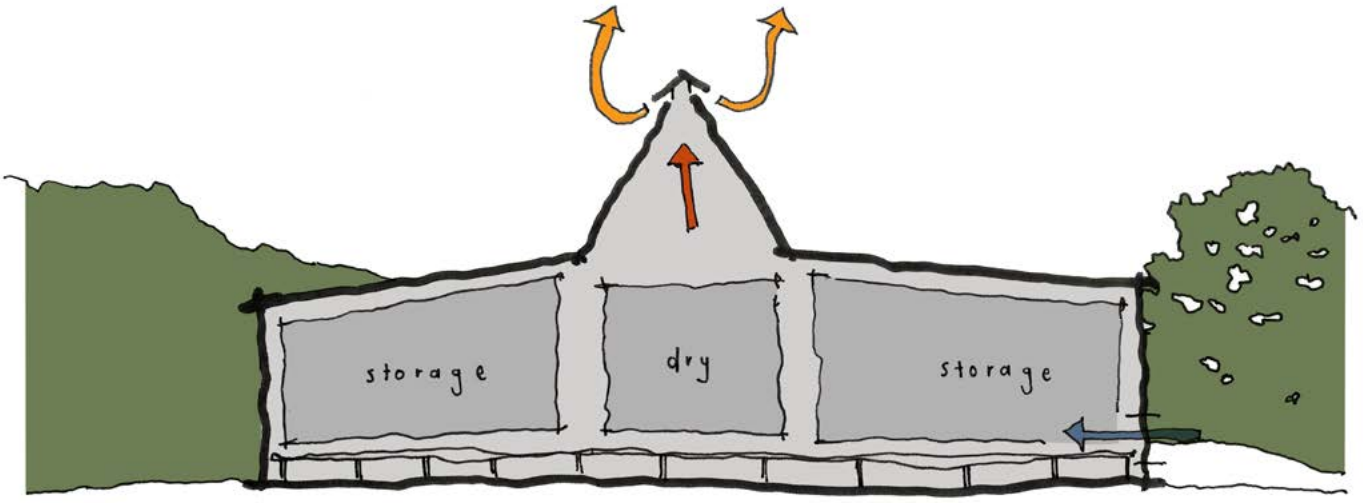


Figure 60: Sketch showing the internal functioning of the hops kiln and its ventilation system.

29.

31.

30.

32.

29. Figure 61: The kiln's typology is formed by its function.
30. Figure 62: A close-up view of the ventilation ridge.
31. Figure 63: A bolt fixed to the wall of the kiln.
32. Figure 64: Ventilation openings on the facade, allowing cool air to move through the building.

1.2.4 SITE LAYOUT

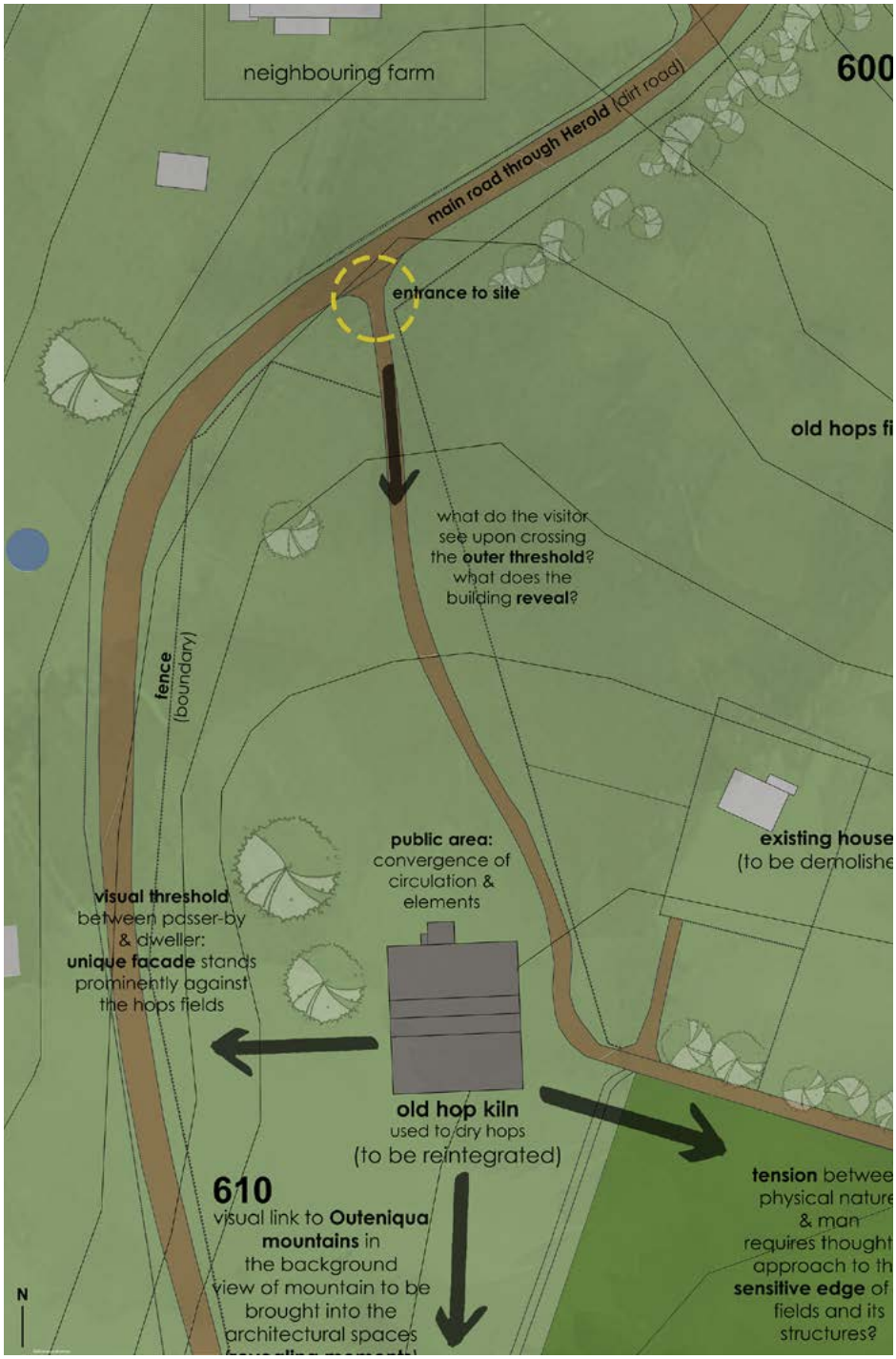
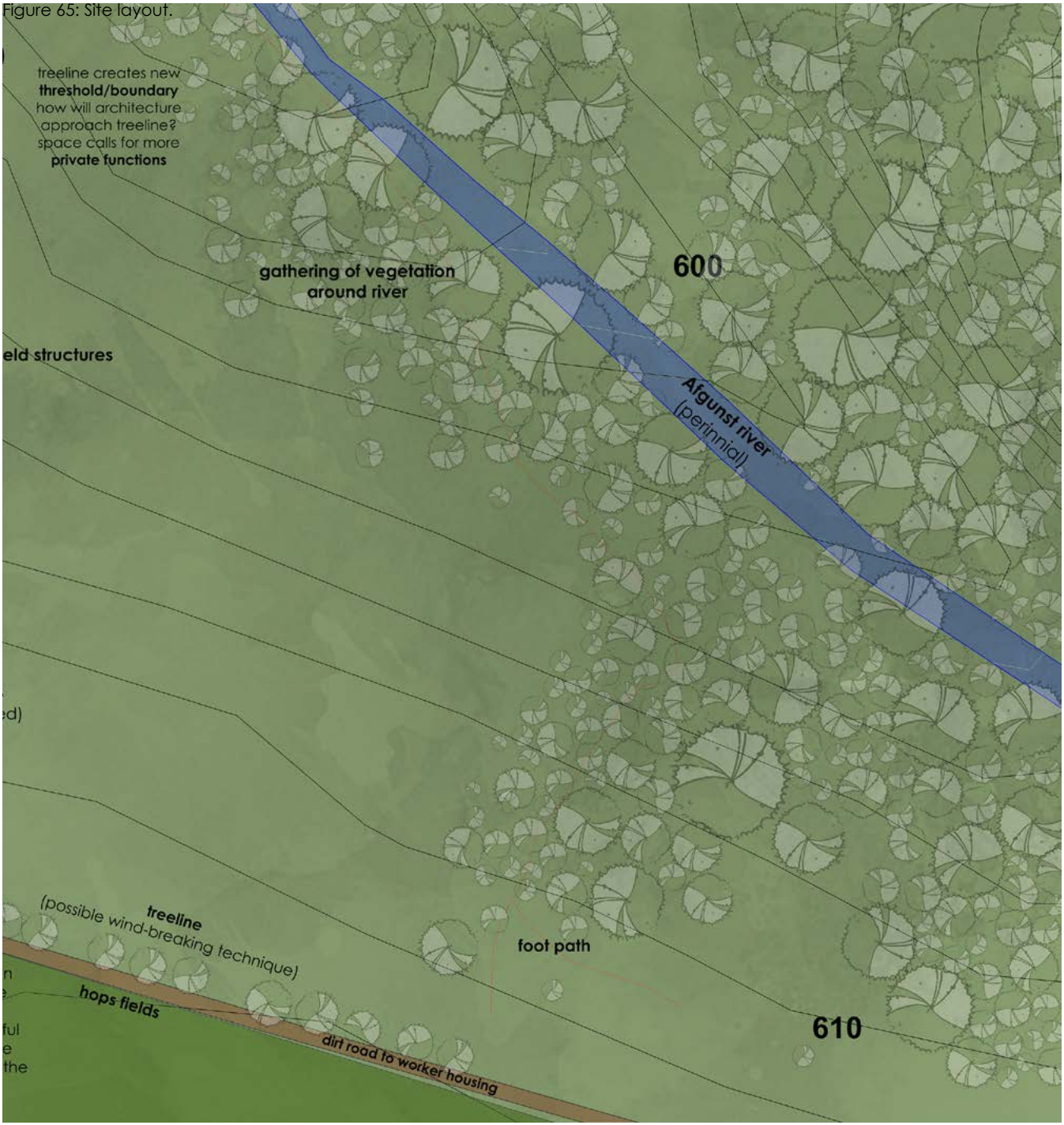


Figure 65: Site layout.



1.2.5 SITE VIEWS

33. Figure 66: As seen from the entrance, the kiln with the Outeniqua mountains in the back.
34. Figure 67: Looking back from the kiln towards the entrance, where the site connects with the Montagu Pass.
35. Figure 68: The Montagu Pass, running past the site (left) and a neighbouring farm (right).
36. Figure 69: Partial eastern facade of the kiln, as seen from the hops fields.
37. Figure 70: Observing the open field to the south of the kiln.
38. Figure 71: A footpath leading into the site, access used by the farm workers.
39. Figure 72: The northern facade of the kiln, as seen from the Montagu Pass.
40. Figure 73: The hops fields.
41. Figure 74: An unused hops field, to the north of the kiln,
42. Figure 75: Partial southern facade of the kiln.
43. Figure 76: Viewing into the hops fields, a tunnel is created with light falling in from above.

35.

33.

36.

34.

37.


38.


39.


40.


41.


42.


43.

1.2.6 MATERIALITY


45.

44. Figure 77: Wooden poles used as fencing structures.
45. Figure 78: Wooden poles are also used as anchoring for the hops structures.
46. Figure 79: Wild succulent plants found on site.
47. Figure 80: Wild succulent plants found on site.
48. Figure 81: Timber planks fastened to the existing kiln.
49. Figure 82: The roof consists of timber and asbestos.
50. Figure 83: The walls of the kiln are plastered and finished with paint.
51. Figure 84: Certain parts of the kiln showing the effect of neglect and weather.
52. Figure 85: Connections consisting of timber and tension cables.
53. Figure 86: Hops.


44.


46.


47.

48.

51.

49.

52.

50.

53.

1.3 UNDERSTANDING THE CRAFT

> "Yet all arguments of beer's importance historically aside – ignoring its sterility in dirty environments, its ability to preserve grain, and its insights into the world of microbes and modern medicine – the most incredible thing about beer isn't all the things it's done. The most incredible thing is that we'd still drink it even if it wasn't incredible at all" (Wilson, 2012:online).

As a beer and brewing enthusiast, the approach towards this dissertation orientated from personal experiences. Having observed and taken part in numerous brewing attempts, it is safe to say that Wilson hit the nail on its head. Brewing beer can be compared to an emotive expedition, with specific ingredients needed, recipes that need to be followed and conditions that must be met. The brewer pledges to a systematic process of patience, preparation, execution and committing to the anticipated results, namely a brilliantly brewed beer. The development of a beer from its raw products to its famous 'liquid gold' form is an experience within itself.

The enchantment of brewing and drinking beer resides in its utter individuality. Every brewing attempt delivers a unique product and experience. Every drinker experiences the same beer in their own exclusive manner. The significance of a beer lies in the embodied, sensory experience.

Figure 87: Photograph of hops cones, at the SAB Afgunst farm.

1.3.1 HOPS IN THE WESTERN CAPE

Once believed to be impossible to grow in South Africa, hops flourish in Western Cape climates. Areas outside George is known for lavish green hop farms, having the most ideal conditions in South Africa for these fickle plants to thrive (ZA Hops, 2020:online). The 'national' crop inspired the naming of the Outeniqua Hop Route, inviting travellers to hop over the Outeniqua mountains and explore the nearby area and coastline. Refer to Figure x and X for photographs of hops.

"Hops from South Africa's Western Cape are sought after by craft brewers around the world," writes McDougall and Giokos (2018:online).

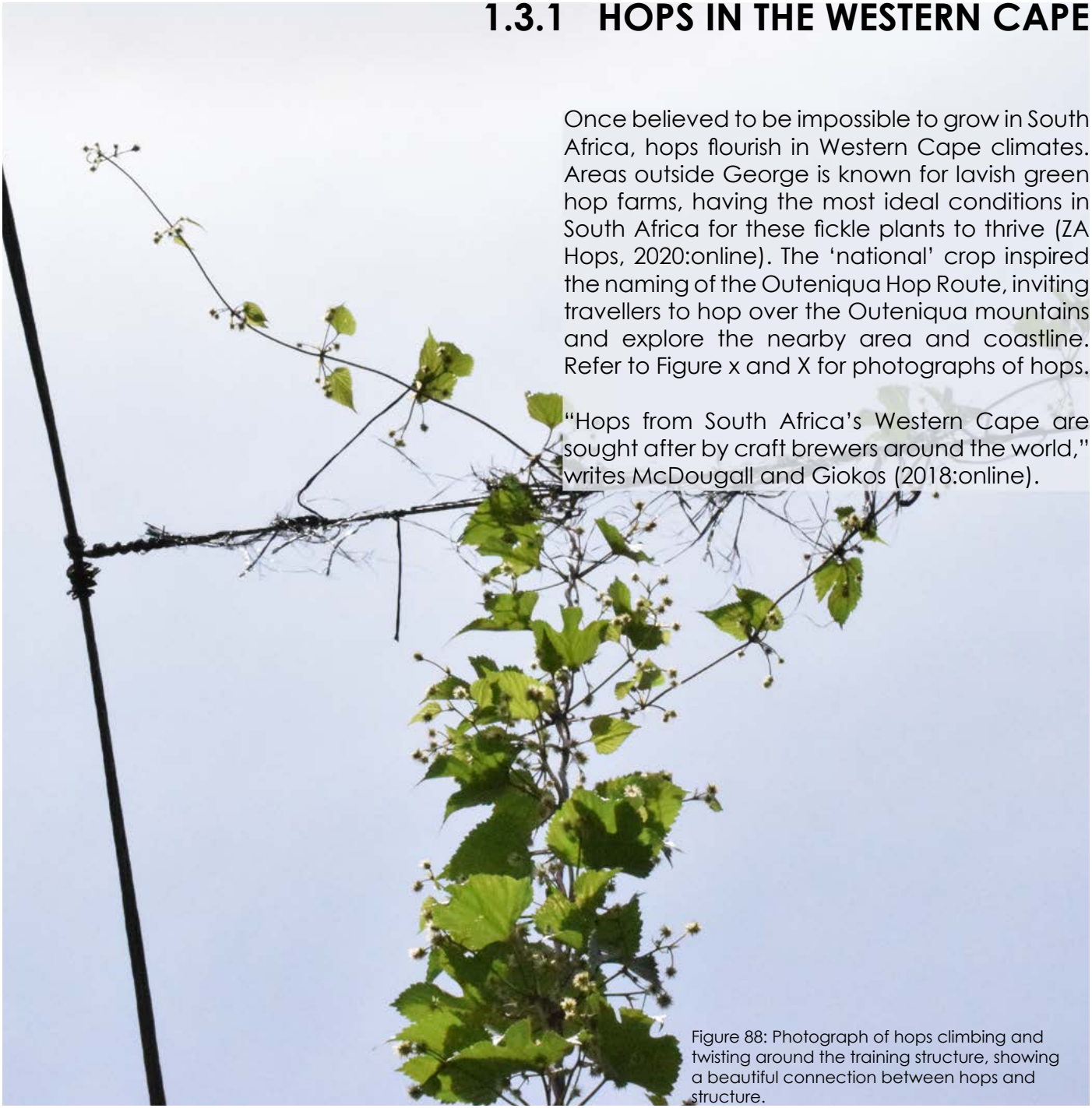


Figure 88: Photograph of hops climbing and twisting around the training structure, showing a beautiful connection between hops and structure.

i. HUMULUS LUPULUS

Hops are famous for their well-known role in the beer industry, acting as a natural preservative and flavouring (Daly, 2020:online). Hops form part of the same family as Cannabis and the tall training structures for the vines are a common sight in the Western Cape. Hop vines grow up to 7,6 meters during peak season and hop varieties are split into three different categories, depending on their intended function: bittering, aroma and dual (Daly, 2020:online).

Hops plants are dioecious, meaning that the female and male flowers grow on separate plants (Burgress, 1964:19). The female flowers are also referred to as cones, containing the acids and oils necessary to impart flavour (refer to Figure 89 and 90 for an illustration the anatomy of a hops cone). Male plants, on the other hand, are multi-branched producing only small white flowers and pollen that is carried to female cones – resulting in the production of seeds (Sirrine, 2017:online). Consequently, it is custom to remove male plants, as fertilised cones (seeds) influence the beer flavour.

Figure 89: A photograph of a hops cone, showing the golden resin inside (ZA Hops, 2020:online).

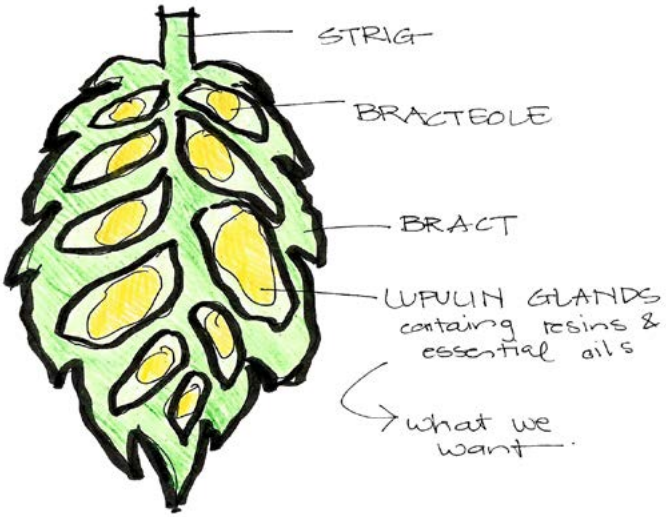


Figure 90: Sketch illustrating the anatomy of a hops cone.

ii. TRAINING & STRUCTURES

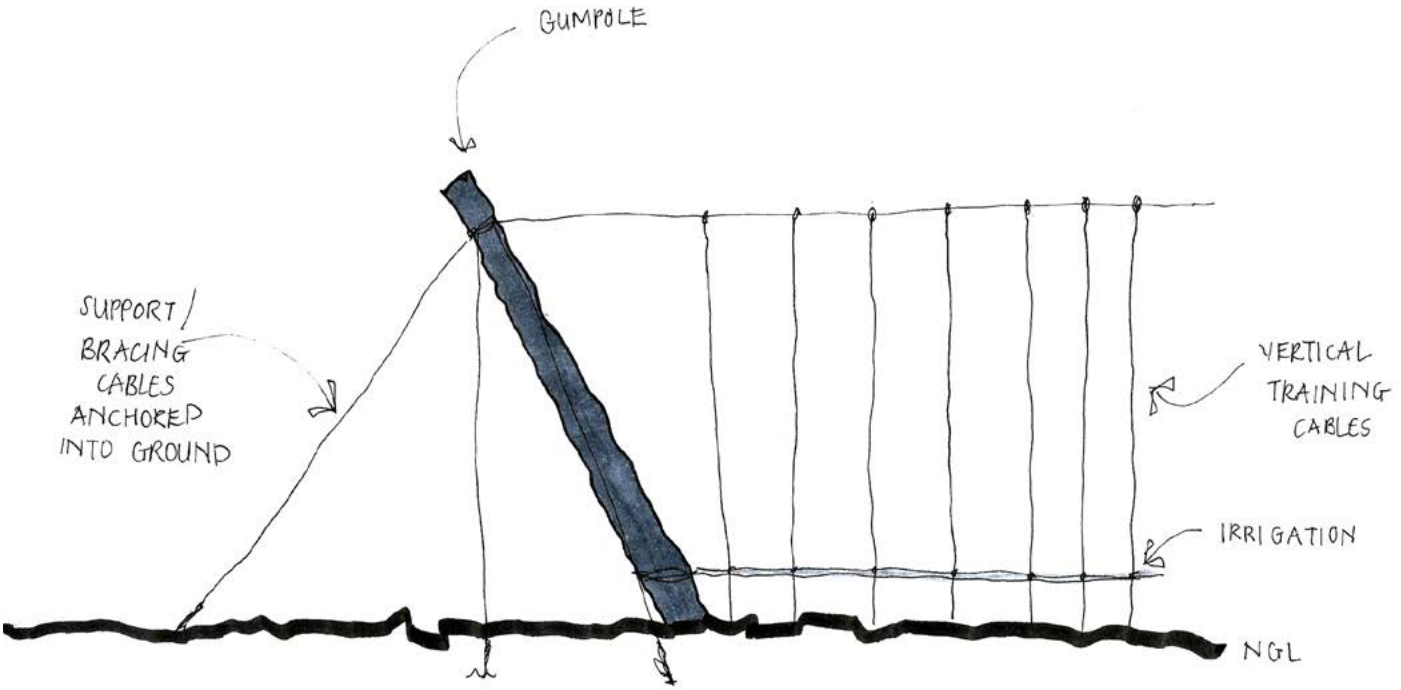


Figure 91: Sketch illustrating the hops structural system.

According to Burgress (1964:89), 'wild' hops are usually found near trees, as the plant needs a support structure for its climbing vines. By providing support to the vines, more energy and resources in the plant are distributed towards better growth and delivering more crops. Hops are planted and grown in vertical path and row systems, which allow for more produce within a specific square meter area. This method also makes it easier for workers and farming vehicles to move between rows, giving access to every plant to be nurtured and ultimately harvested.

Therefore, hops farmers incorporate trellis structures to train hops. Figure 91 below provides a visual reference of the hops structural system. These trellis systems make use of grounded support poles, embedded in the soil, that support both the horizontal and vertical carrying wires. The vertical carrying wires are attached to the horizontal wires – which span from pole to pole – and extend from the top of the trellis down to the soil (Burgress, 1864:90). The carrying wires support the hops vines. The training systems generally implemented in South Africa stabilise the exterior row of poles, securing these poles through means of a stabilising anchorage system.

iii. PICKING & PROCESSING

Hops picking methods are either hand-picked or machine-picked. The hops farms around George make use of manual labour to harvest the hops at the end of the season. Workers on high platforms attached to a truck cut down the vines and to be transported and delivered to the processing plant, as shown in Figure 92 to 95. The cut hops vines are fed into a machine and are stripped of the precious hops cones. Conveyor belts transport the cones to a container, from which they are collected and placed in the kiln (refer to Figure 96). The kiln regulates a temperature of approximately 65°C for eight to twelve hours. Lastly, as shown in Figure 97 to 99, the hops are processed into pellets and packed into bales, ready for distribution (Tessenforf, 2018:online).

Figure 92: A worker carefully cuts the hops from the training structure (ZA Hops, 2020:online).

Figure 93: Conveyor belts transport the cones to a container, from which they are collected and placed in the kiln (ZA Hops, 2020: online).

Figure 94: Hops vines being cut down by workers on farm vehicles (ZA Hops, 2020:online).

Figure 95: A tractor transports the cut hops vines to the warehouse where the hops will be removed from the vines (ZA Hops, 2020:online).

Figure 96: The hops being transported by the conveyor belt to be separated and dried (ZA Hops, 2020:online).

Figure 97: Workers perform a quality check by hand before the hops are further processed (ZA Hops, 2020:online).

Figure 98: The hops cones, separated from the vines, on the way to be dried in the kiln (ZA Hops, 2020:online).

Figure 99: After going through the necessary processing, the hops pellets are packaged and distributed (ZA Hops, 2020:online).

1.3.2 BREWING

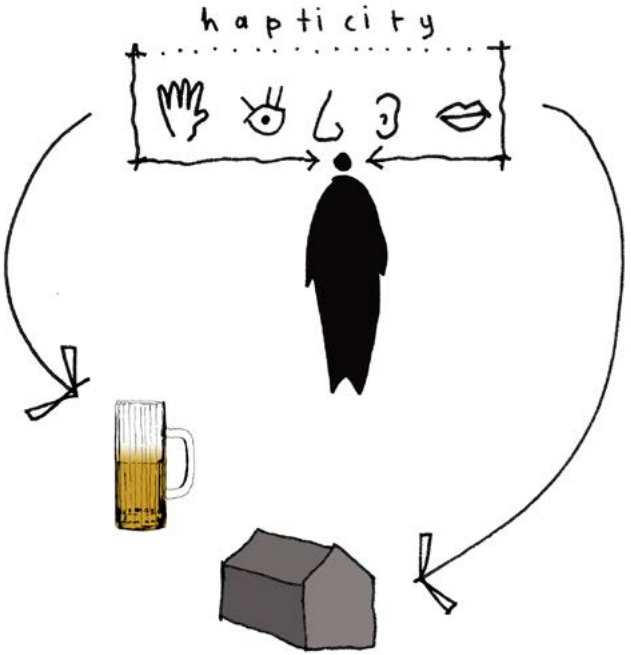
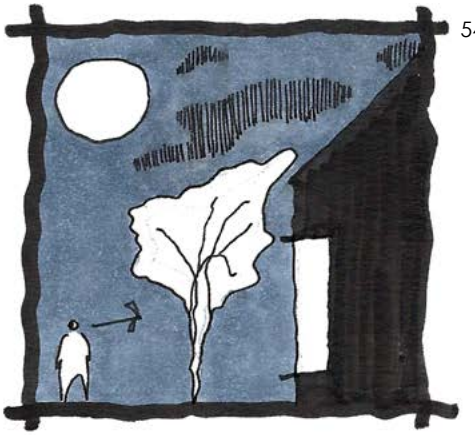


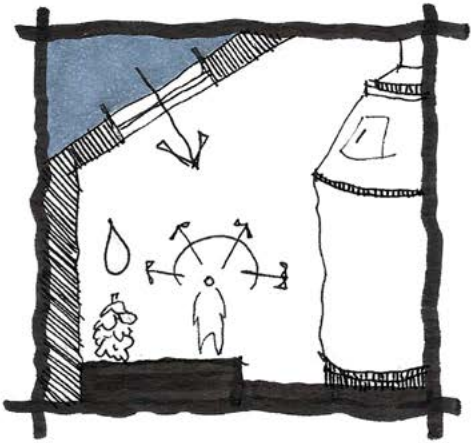
Figure 100: Comparing the hapticity of architecture and beer tasting.

Although hops are a crucial part in the flavouring of beer, other ingredients also play an integral role. The primary ingredients of beer are water, malted barley (malt) and yeast. Other ingredients such as fruit, spices, maize or wheat can be added to create unique flavours within a brew.

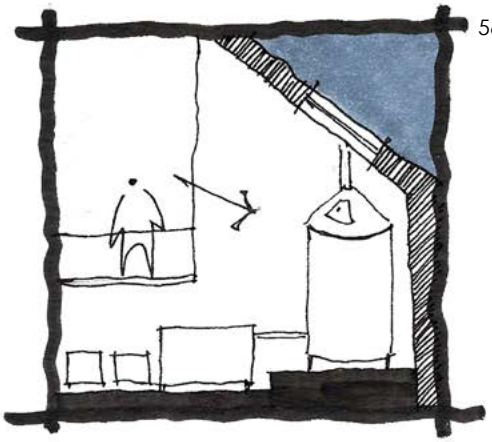
James Morton (2016:14), a world-class author and avid homebrewer, admires the authenticity of beer and its flavours: "The single best thing about beer is that if I pour you a German wheat beer and tell you it tastes like banana or clove, it tastes exactly like banana or clove. If I say there are tropical and citrus fruits in the aroma of an Indian Pale Ale, you'll sniff it and one by one, you can tick them off: 'lychee, passion fruit, lime, grapefruit'. These flavours aren't figments of a sommelier's imagination, they're there for you to absorb." This sensorial engagement of beer tasting can be compared to the phenomenological aspect of architecture (refer to Figure 100). People are very reliant on their senses when dwelling within a space. In The eyes of the skin: Architecture and the Senses, Pallasmaa (2005:40) describes how architecture is a bodily experience. He speaks of measuring spaces with his legs and projecting his body onto a façade of a cathedral. He furthers extrapolates how he measures the façade's curves and nooks by the shape of his body and states that he experiences himself within the city and thus, the city ultimately exists through his physical body.



54.



55.



56.

Ultimately, a phenomenologically endowed space needs to focus on the senses of the visitor and how these spaces are experienced in measure with their bodies and consciousness. Within the proposed brewery, the different classifications of inhabitants experience different narratives of the brewery. Refering to Figure 102, the brewers and staff have a submerged, mechanical and fully functional involvement within the brewery, working with the raw materials, production process and finished product. Figure 103 portray how visitors move through the gallery and experience the materiality and sensorial depth of both the brewing and the architecture, as well as the exploration of the landscape and the beer tasting. Passers-by only have a visual experience – an observation of the relationship of architectural elements, as seen in Figure 101.

Dividing the inhabitants into these different classifications, it becomes possible to design the narrated experience that each will have – specific views, pathways or spaces they will have access to. Keeping in mind the experientiality of both beer tasting and architectural spaces, it is important to design a brewery experience that focuses on the haptic envelopment.

54. Figure 101: The experience of the passer-by.
55. Figure 102: The experience of the brewer.
56. Figure 103: The experience of the visitor.

i. THE REGIONALITY OF BEER

Similar as to how wines are mainly divided into red, white and hybrid wines, beer can be categorised into lagers, ales and hybrids. From these three categories, dizzying numbers of style families have been developed, with origin connections from Britain, Belgium, America, India and even Germany. This section consists of a brief overview of the most popular beer types, giving information about how different beer types fit into the beer culture, as well as setting out the comparability between beer and architecture.

As previously mentioned, beer is divided into three major categories – lagers, ales and hybrids. Lagers are also fermented at a lower temperature and for longer time period than ales. Hybrids are fermented either by using lager yeast at a higher temperature, or ale yeast at a lower temperature – thus, can be seen as an amalgamation of the fermentation methods of the aforementioned types (Miller, 2016:online). Despite the differences in taste, aroma and colour, the biggest difference between lagers and ale is the type of yeast that is used during the fermentation process. Figure 104 illustrates this difference. Top-fermentation is used in producing ales, stouts, porters and wheat beers, while bottom-fermentation is used when producing lagers, dark lagers, pilsners, bocks and märzen (The Beer Community, 2019:online). Top-fermenting yeast floats at the top of the brew, and ferments the beer mixture from the top to the bottom, while bottom-fermenting ferments from the bottom to the top (Miller, 2016:online).

These different types of beers have different origins across the globe, which contributed to their name, seasonality or nature.

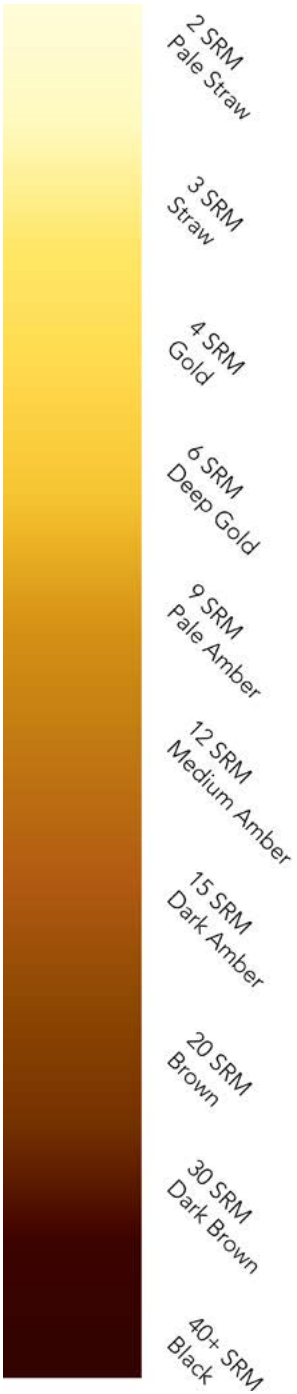
Starting with the spearhead of top-fermentation, ales - the oldest type of beer known to man - originate from Britain, Belgian and German, each with their own characteristics and design. Ales are typically fruity and dry, due to its higher fermentation temperatures. Ales' appearances range from pale to copper, to near black (Koljonen, Olli & Zmijewska, 2017:online). Stouts and porters stem from London and are both extremely dark beers. They are known for their harsh and strong taste, as their flavour is dominated by roasted compounds. Porters used to be well favoured, but had been replaced with the well-known stout beers, the porter's stronger opponent (Koljonen et al, 2017:online). Wheat beers spring from southern Germany and sit next the popular Pilsner on the drinking list. Wheat beers are lightly flavoured and coloured, with a refreshing and fruity taste. As wheat replaces barley as the main ingredients in the beer, wheat beers can appear cloudy and highly carbonated (Koljonen et al, 2017:online).

Figure 104: Sketch illustrating the difference between top and bottom fermentation used to brew lagers and ales.

The popular lager is the frontrunner of bottom-fermentation beers. Lagers have also been dubbed as the most popular and well-known beer in the world, as well as one of the youngest beer type. It requires cool temperatures in order to ferment and refrigeration systems were only implemented in the late 19th century. Lagers are characteristically pale and light, with a defined hoppy taste (Koljonen et al, 2017:online). Dark lagers were the forerunner of lighter, clearer lagers, and originate from the Bayer and Bohemian region in Europe. The colour can vary from amber to almost black and dark lagers usually have low alcoholic volume. Notes of caramel, toffee or chocolate accompanies this dark horse, along with a sweet and full taste (Koljonen et al, 2017:online). Pilsner beer is described as the 'mother' of all lagers and originate from Pilsen, in Bohemia. This beer is exceedingly popular in Germany and is known for its smooth taste and strong bitterness. It has a clear golden colour and varies from lighter and less hopped versions to a full-bodied malty taste (Koljonen et al, 2017:online). Märzen beer is also known as a Vienna lager or Oktoberfest beer, which, as the name indicates, are enjoyed at festivals and seasonal festivities in many a country. As refrigeration systems are a modern convenience, märzen beer were originally brewed during early spring and left for fermentation until autumn. Märzen beer can appear golden or coppery and is generally malty and sweet with a strong hoppy aroma (Koljonen et al, 2017:online). Another German beer is the Bock, a strong flavoured lager originating from Einbeck, Germany. Bocks are a seasonal beer and are exclusively served during Christmas and springtime. This beer is characteristically strongly hopped flavoured with a copper-brown colour and sports a malty taste (Koljonen et al, 2017:online).

Refer to Figure 105 on the right for a comprehensive colour chart of all the known beer styles, for a better idea of the colout differences beween the different beer styles.

Parallel to the influence of the regionality of a beer on its nature, architecture be influenced by the region from which it stems. This regionality provides the beer with distinctive flavours and historicity, exclusive to every type of beer. Although, modern technology allow brewers with more freedom in terms of environmental control, these original beer types carry a narrative of authenticity that refers to Norberg-Schulz's concept of genius loci – a character of place that is authentic and unique. This can be translated into architecture and how different architectural languages develop in different regions. These languages have developed due to circumstances uniquely inherent to a place, which can be environmental, cultural or economical. Investigating the architectural language of Herold, which had originally stemmed from the colonial Cape Dutch houses and developed into rural Cape cottages, had advanced due to the nature of Herold. Therefore, it can be concluded that the genius loci of a place characterise both its beer and its architecture.



SRM	BEER STYLE
2 - 7	Pilsner
2 - 4	Witbier, Berliner Weisse
2 - 4	Belgian Strong Ale
4 - 10	Maibock
7 - 14	Vienna Lager
4 - 12	Oktoberfest
6 - 14	American Pale Ale
5 - 14	Pale Ale
4 - 8	English Golden Ale
4 - 10	Bavarian Weizen
8 - 14	Bitter, ESB
7 - 15	Märzen
5 - 11	Imperial Pale Ale
6 - 13	Bière de Garde
9 - 13	Dunkel Weizen
11 - 18	Amber Ale
12 - 22	English Brown Ale
15 - 30	Bock
20 - 40	Porter
25 - 40	Oatmeal Stout
17 - 40	Baltic Porter
30 - 65	Foreign Stout
50 - 80	Imperial Stout

Figure 105: Image illustrating the varying colours of different beer styles, along with the SRM (Standard Reference Method), which is a method used to specify a beer's colour. Colour graph adapted (Palmer, 2017:2).

ii. A BEGINNER'S GUIDE TO DRINKING BEER

Parallel to the world of wine, beer has its own etiquette - and similar to wine, the tasting experience also has a specific order and method. Morton (2016:17) emphasises the importance of paying each beer its due respects before taking that first sip. Following this practice also allows the beer's flavours and complexity to be enjoyed fully. This becomes a paused moment, where all focus is shifted to the golden liquid in one's hand – the smell, the colour, the coolness - celebrating the journey this brew has come just to reach you. A beer tasting will proceed, starting with the initial observation of your beer.

Firstly, and most importantly, pour your beer into a container (refer to Figure 111). There are a large variety of beer glasses to choose from and every glass serves its own purpose. Firstly, beer mugs are a well-known icon of beer drinking and are generally used to serve all types of beer (refer to Figure 106). This sturdy mug has thick glass walls that act as insulation to keep your beer cold, with a handle to prevent your hands from warming up your beer when holding on to it (Flowers, 2013:online).

Beer steins are inherently similar to beer mugs, but with the useful addition of a hinged lid for hygienic purposes. Beer steins, as shown in Figure 107, are mostly ornamental and kept as souvenir glassware. Thirdly, a more extravagant option is a chalice or goblet (refer to Figure 108). This glass works perfectly with heavy, malty beers, like German Bocks and Belgian ales. This glass has a large bowl sitting on a stem, which also encourages users to hold only the stem to

Figure 106: A beer mug.

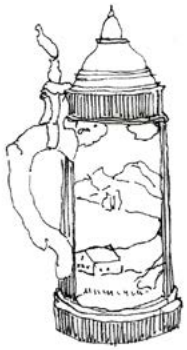


Figure 107: A beer stein.

Figure 108: A chalice or goblet.

Figure109: A Weizner glass.

Figure 110: A Pilsner glass.

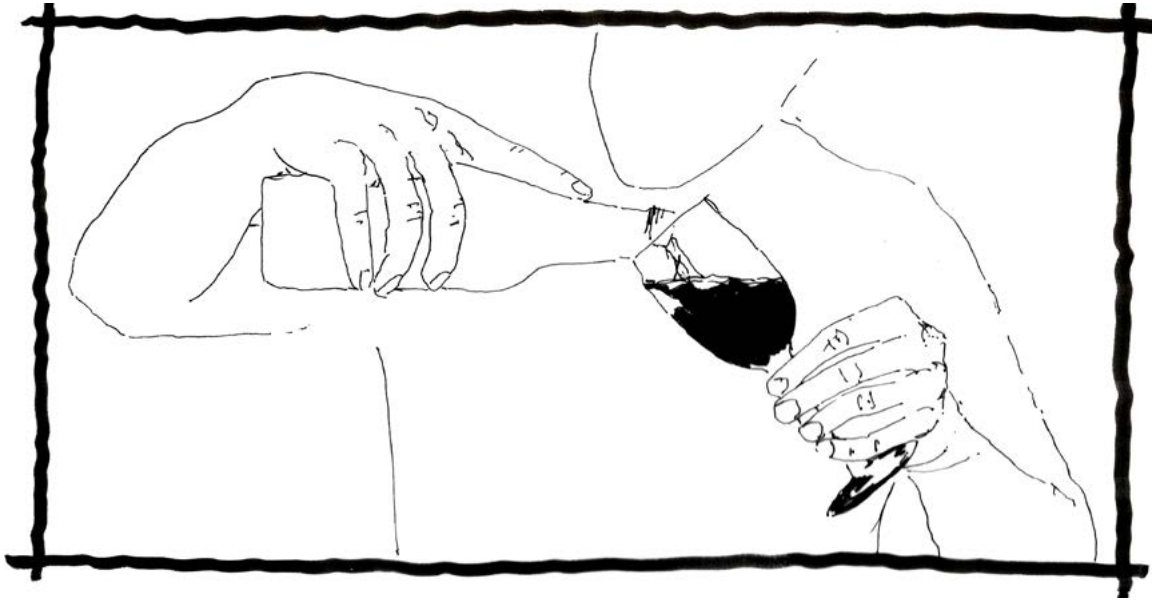


Figure 111: The act of pouring a beer forms the first step of the process.

The wide opening allows the drinker to analyse the colour, clarity and aromas of the beer, as well as making you consume your drink faster - while narrow rims do the opposite (Flowers, 2013:online). Fourthly, the Weizner glass has a narrow base that curves up into a comfortable opening (refer to Figure 109). This glass is perfect for wheat beers that are served with a thick head – the top layer of foam that forms when a beer is poured – as the curved lip at the top traps the head, which enhances the aroma that accompanies wheat beer (Flowers, 2013:online). The Pilsner glass is often confused with the Weizner glass and comparing, the Pilsner glass is more skinny and less curvy and usually used to serve lighter beers (refer to Figure 110).

The slender design allows for optimal colour and carbonation appreciation and the wider top retains the foam head (Flowers, 2013:online).

Along with the shape of your container, the action of pouring beer maximises the aroma and releases aromatic compounds, allowing you to get a wonderful whiff of exactly what the beer tastes like.

Now poured from the bottle, can or keg, the opportunity arises for you to take a moment appreciating the beauty, as illustrated in Figure 112. What does it look like? Is it fizzy or flat? Are you holding a light ale or dark brew? Is it a cloudy beer? From here, you form your first impression and start to imagine what you think this beer might taste like.

Figure 112: Observing the beer to form an idea of what one can expect.

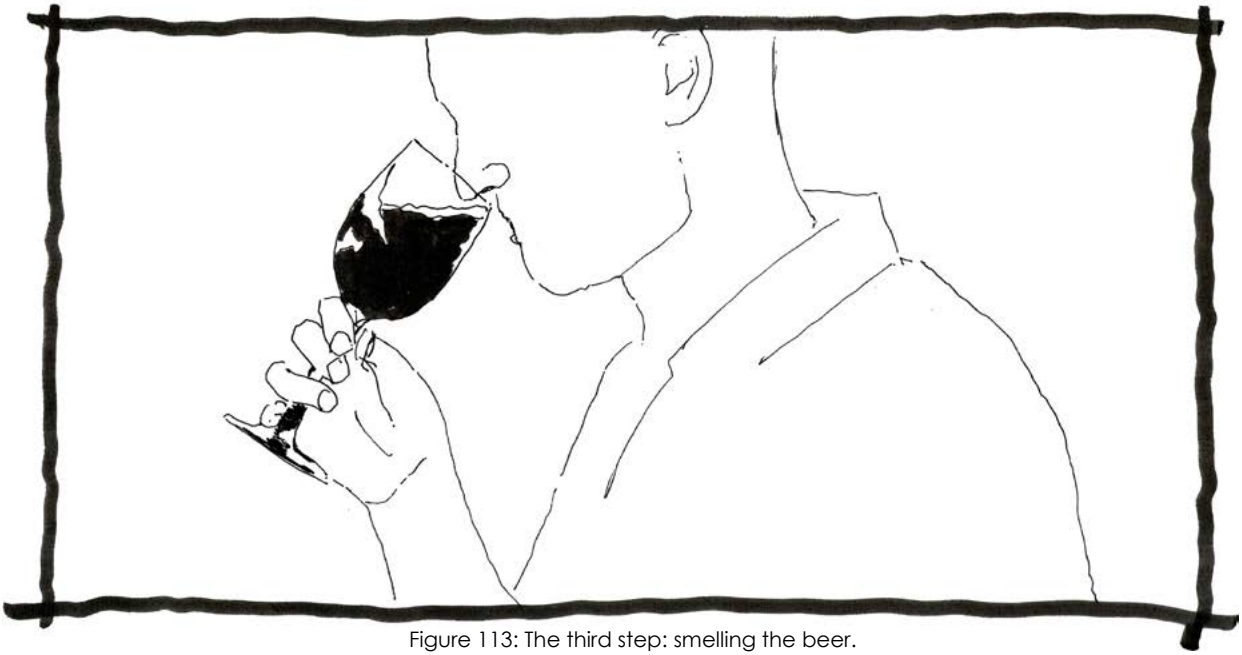


Figure 113: The third step: smelling the beer.

Next, smell your beer. Morton (2016:17) mentions that no self-proclaimed beer lover can take a swig of their beer without smelling its aroma. With your nose in the glass, breathe in deeply through your nose, remove the glass and breathe out, as shown in Figure 113. As mentioned above, the different beer glasses will have an effect on the aroma and how the flavours reach your nose (Hines, 2017:online). What does it smell like? Are there any fruity notes that you can pick up? Or does it smell bitter and hoppy? Possible hints of coffee or caramel? Attempt to align what you are smelling with the four primary ingredients of beer. Aromas such biscuits, bread or caramel originate from the malted barley. Darker beers will have undertones of coffee or chocolate.

Hops ensure a floral or citrus scent. Yeast delivers a unique scent, one that enhances the other scents and brings out all the fruity or spicy flavours. By now, you should have a good idea what the beer is going to taste like.

Last but not least, take a large mouthful of beer (refer to Figure 114). The bigger the sip, the more taste receptors are activated in your mouth. The more taste receptors activated; the more signals are sent to the brain. Taste is categorised into 5 different parts: sweet, sour, salt, bitter and savoury (Morton, 2016:20). Bitterness is one of the most prominent flavours of most beers. Sweet beers are usually the strongest of the brews, due to the high alcohol content. Beers can also be described as 'dry', which refers to the lack of sweetness – similar to white wines or champagnes. Certain beer styles have a defined sour trait, which has become a new trend in craft brands.

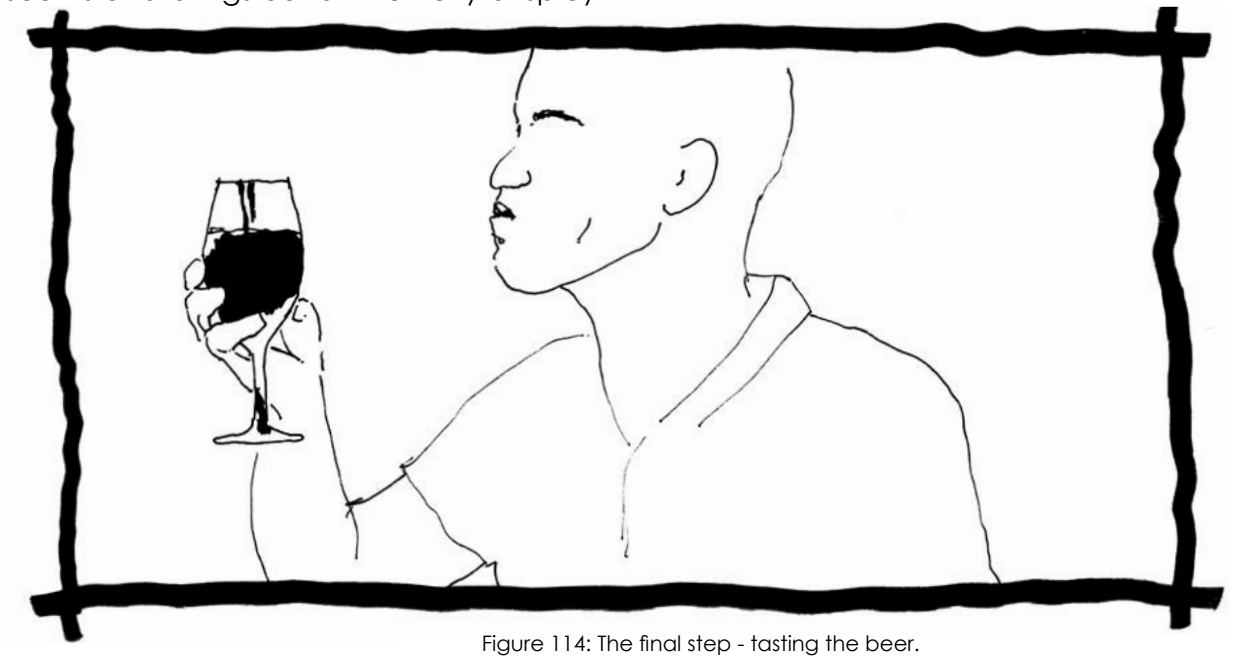


Figure 114: The final step - tasting the beer.

iii. THE BEER BREWING PROCESS

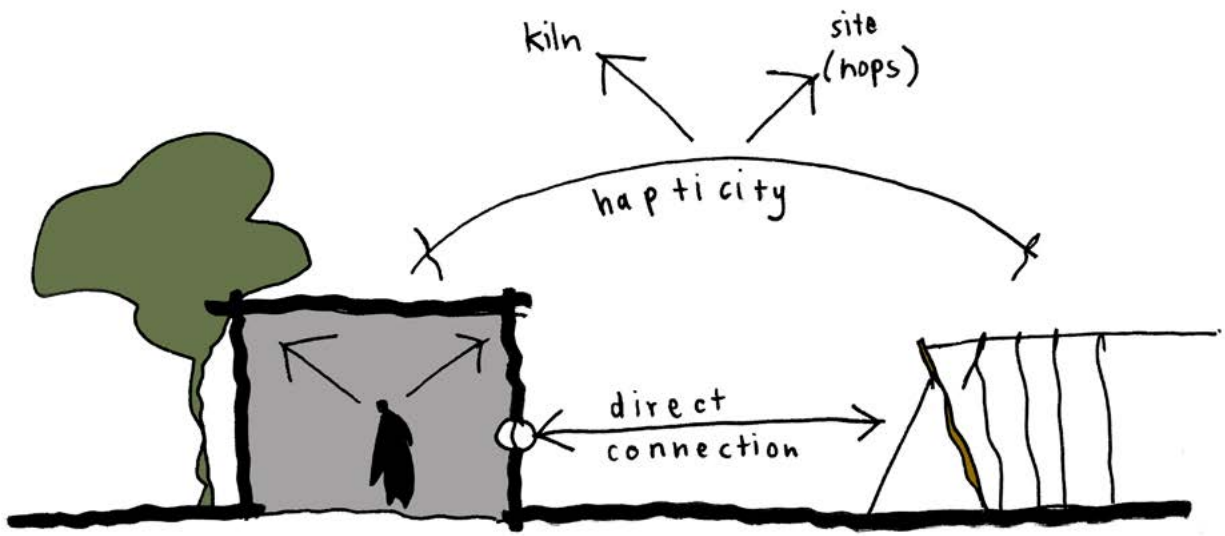


Figure 115: The sensorial experience of the site relates to the sensorial experience of drinking beer, thus a fitting comparison to guide the design process.

To successfully brew a beer, a recipe or method needs to be followed. This recipe can be seen as a story or narrative told for others to understand what they must do and in what order when brewing beer. The recipe must be very understandable and clear to others to avoid confusion. Likewise, Sophia Psarra writes in Architecture and Narrative, that architects design the narrative the visitor follows to experience the spatiality through the building (2009:87). Consequently, architecture simply becomes a conduit through which a story or progression of events is told in the same way a brewer tells a story through their beer.

Comparing the journey of drinking a beer to architecture, helps one create an analogy through which the experience of drinking beer can be translated into architectural elements, as applied to the site in Figure 115. Merleau-Ponty's (2002:271) understanding of the senses of being "never-endingly integrated into one knowing organism" is interpreted by Jennifer Lauwrens, she states that this concludes that the human body is not just a compilation of organs placed next to each other, connected with blood vessels and matter, but instead link together as a synergic system that contribute to the consciousness of the human being (2014:229). Therefore, the sensorial experience of tasting beer or experiencing architecture contributes to the drinker's lived reality and their inimitable perspective of the reality of beer. Each step discussed above will be translated into an architectural moment – a person experiencing an architectural space or built form from beginning to end. This narrative is incorporated into the proposed brewery.

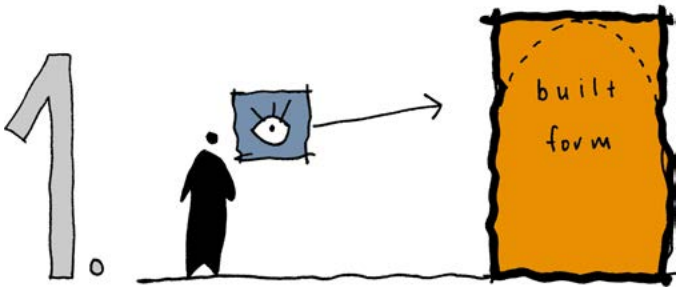


Figure 116: Arrival at a building. Brief but superficial obeservation takes place.

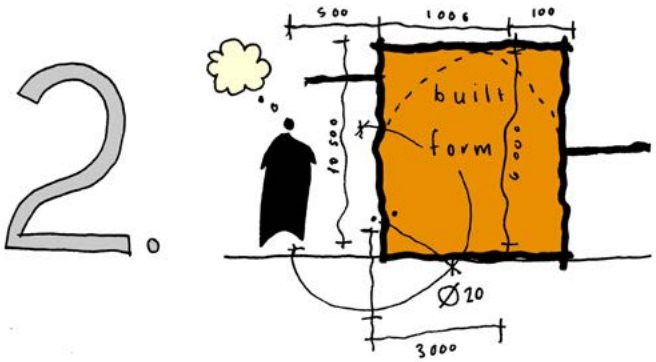


Figure 117: Approaching the building, an inverstigation takes place which orientates us within the site.

First, the chosen beer, still unopened, in the hand of the drinker – this can be compared to the arrival of a person at a building (Figure 116). Perhaps brief moments of observation had taken place during arrival, but the person still only has a superficial idea of the extent of the building.

Then, the person moves towards the building. This refers to the opening and decanting of the beer. Several secrets reveal themselves from behind its glass veil – the colour and clarity of the beer, the fizziness and the thickness of its foam head. As mentioned, this is where the first impression is formed. The faculty of sight is used to investigate the beer. Within the comparison, now the orientational relationship between built form and human is becoming more prominent. Cullen (2006:8) states that we as humans primarily depend on our sight to apprehend our environments, during an initial exploration of an unknown setting, as well as a familiar one. The person uses their vision to orientates themselves within the topological setting of the building and its site – surrounding elements such as gardens, trees, free-standing sculptures or structures weave themselves into the relationship. Other senses are at play, but not leading the exploration. Still, the person cannot judge the full extent of the building from the outside. Refer to Figure 117 for an illustration.

Following the visual exploration, the sense of smell is then applied to further create an impression of the beer. This progression of senses relates to the entering of an architectural space

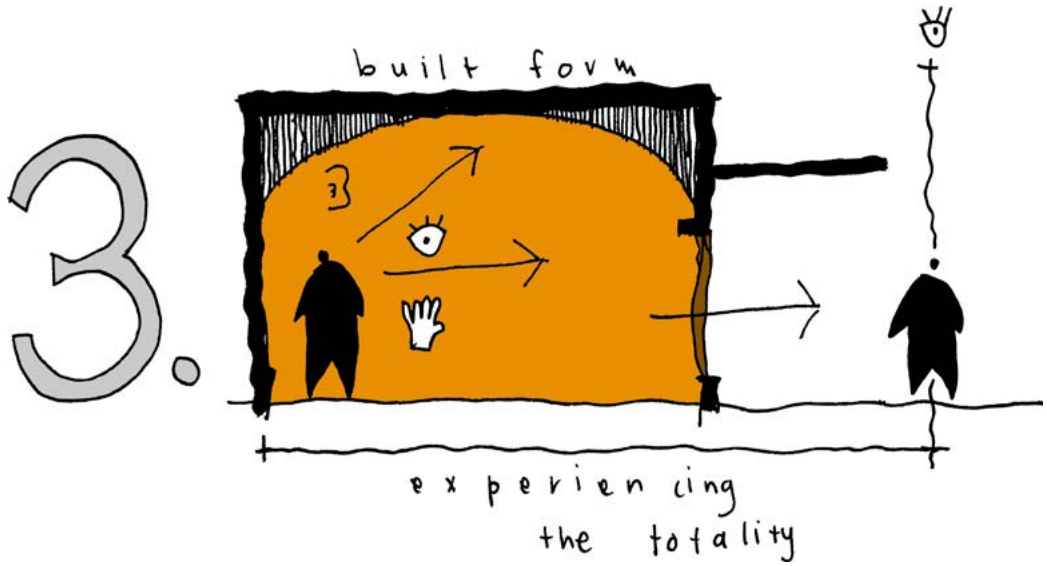


Figure 118: Moving through the building, the senses are applied to experience the building in its totality.

albeit covered outside space, or an enclosed interior (see Figure 117). Smelling the beer divulges its ingredients. The drinker can now deduce whether it is a fruity or hoppy beer and whether it is a light or heavy beer. Equally, the person can now begin to identify the architectural ingredients of which the building is now composed. The morphology of the built form comes into play in terms of the building's materiality, the composition of structural elements, how spaces develop and are accentuated. Parallel to brewing, these architectural elements have been developed together to produce a final product – the building.

The first sip ensues. The drinker takes a mouthful of beer and finally has a full understanding of the promised product. Correspondingly, the person moves through the building and its spaces and experiences the totality of what the architect attempted to create as shown in Figure 118. The architect strives to convey a narrative, atmosphere or experience to the inhabitants in a similar way that the brewer strives to convey certain tastes, memories or stories with their beer.

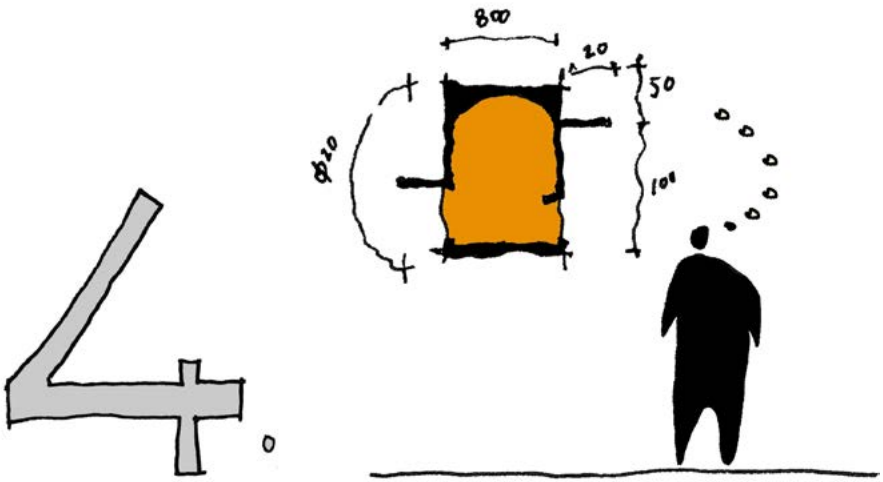
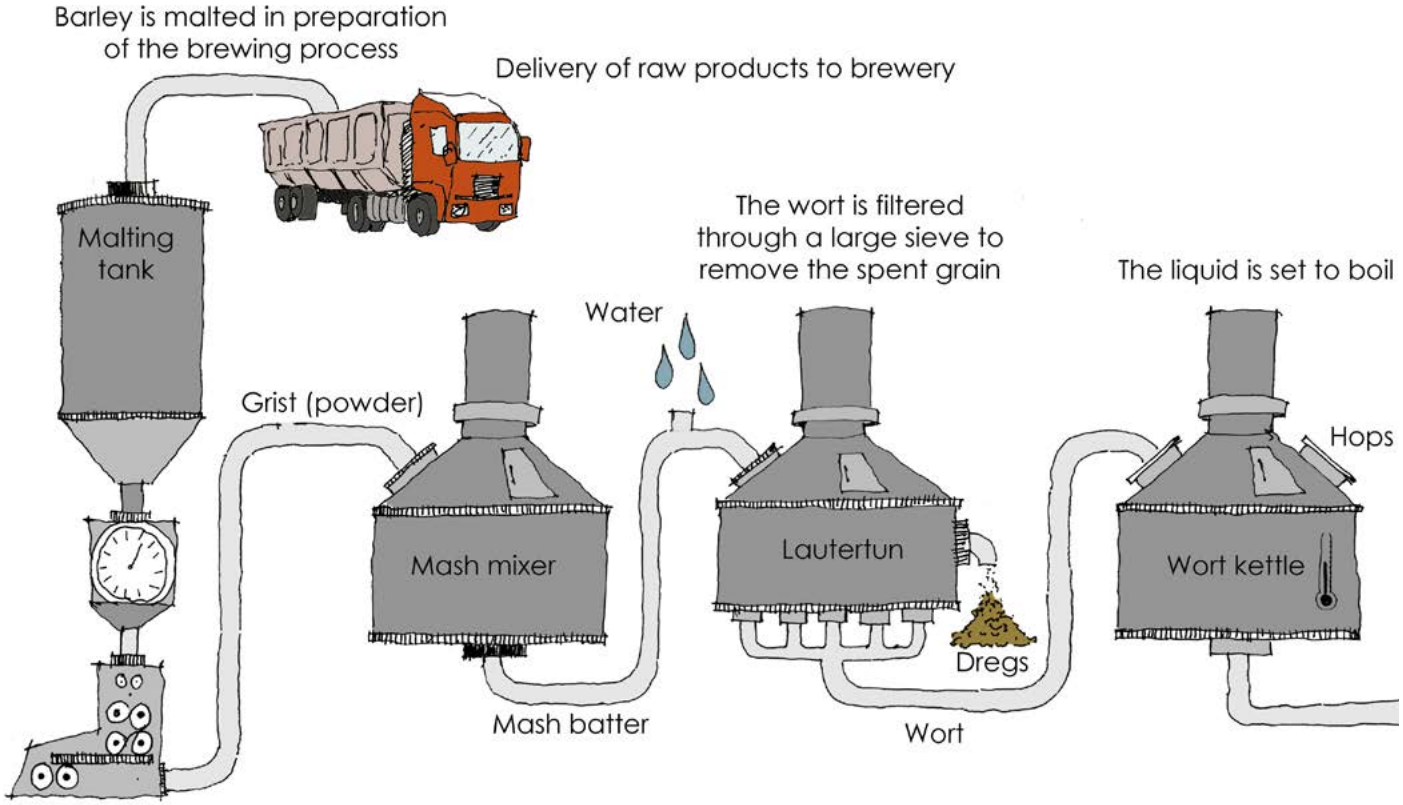


Figure 119: A memory of the experience remains, along with a connotation.

Conclusively, after the first sip the drinker attaches a positive or negative connotation to the beer, depending on their personal preference. An aftertaste or a memory of gustation lingers. Equivalently, the person leaves the building. However, they keep the memory and the possible connotations they experienced, which they associate with this building. Figure 119 above illustrates this process. As mentioned before, typology refers to the communication between built form and the inhabitant, as well as the type or memory of the built form. Also, building forms are shaped by the function that is situated within. This also creates a 'memory' of the structure – breweries are generally industrial, incorporating steel structures and cladding with open floor plans for maximum functionality. These identifiable elements become architectural ingredients that exist in parallel to the brewing ingredients, going through a process of amalgamation to produce the final product.

As this comparison can be seen as a narrative in which architecture is related to the sensorial experience of drinking a beer, it is also important to understand the mechanical process of brewing beer. This provides information needed to understand the design approach – again, focussing on utility, firmness and beauty as ingredients within a recipe – and ultimately the final product. Refer to Figure 120 on the following page for a visual explanation of the brewing process.


Barley is malted in preparation of the brewing process
Delivery of raw products to brewery
Malting tank
The wort is filtered through a large sieve to remove the spent grain
The liquid is set to boil
Water
Grist (powder)
Hops
Mash mixer
Lautertun
Wort kettle
Dregs
Mash batter
Wort
Malted barley is weighed (above) and then milled through a roller mill.

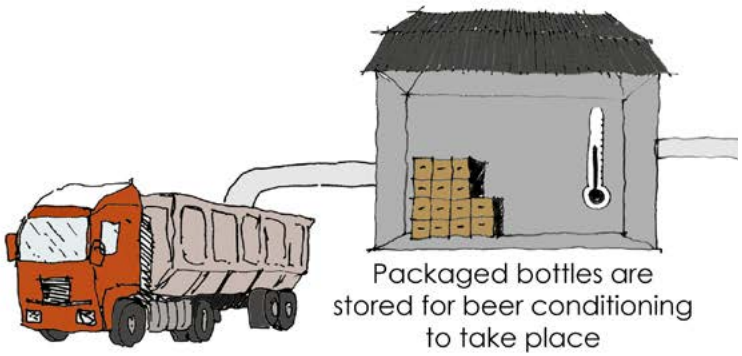
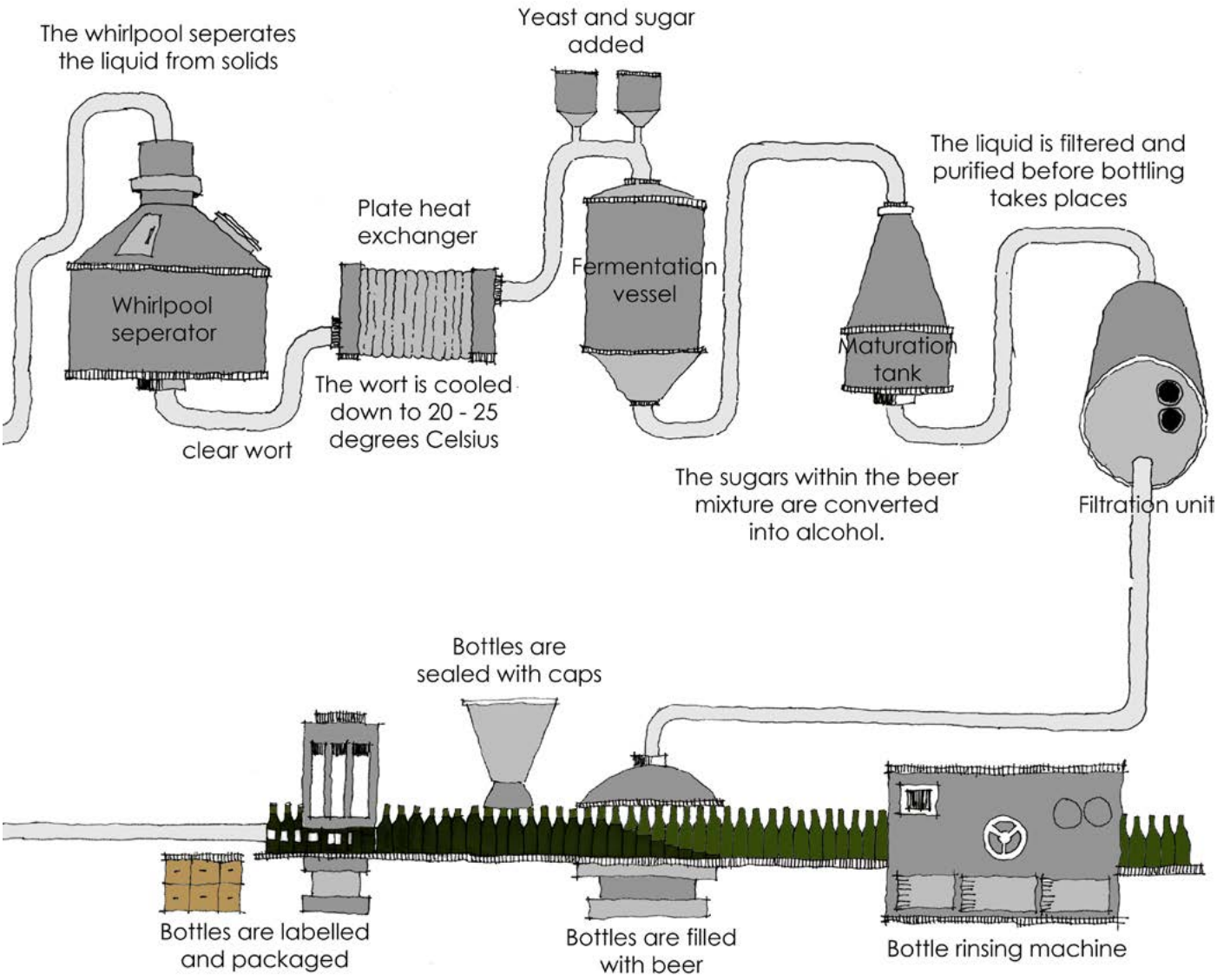

Packaged beer is picked up and sold commercially or at the place of brewing.
Packaged bottles are stored for beer conditioning to take place

Figure 120: A graphic illustration of the brewing process and the equipment involved.



As with any other recipe, the necessary ingredients need to be sufficiently prepared for the brewing process to achieve the desired outcome. Thus, the malted barley or grain is steeped in hot water in a mash tun to promote germination by increasing its moisture content. This allows the breaking down of proteins and carbohydrate reserves within the kernel. The germinated grain is transferred to a kiln, where it is dried before being used in the next step of the brewing process. However, a malting facility is usually reserved for large commercial breweries due to the financial and spatial implications. Smaller breweries, such as the proposed brewery, resort to buying readily germinated and dried malt, stored in silos. Thereafter, the malted barley is milled, and the refined grist is moved to the mashing stage (Ramukhwatho, Seetal & Pienaar, 2016:6).

The second step, as shown in Figure 120, is the mashing of the grist - hot water is added and the mixture and constantly stirred. The process of mashing is done at extremely specific temperatures, which ensures that enzymes are activated to break down any starches within the grains into sugar. This contributes a great deal to the flavour and colour of the beer. After approximately an hour of mashing, most sugars in the grain have been dissolved in the hot water, resulting in a hot, sticky liquid, called 'wort' (Morton, 2016:15). The mixture is moved to the lautering stage.

Pumped into the lauter tun, the wort is filtered through a large sieve to remove the spent grain. The spent grain is set aside, as a by-product of the process, as shown by Figure 120. The sieved liquid is pumped to the wort kettle (Jansen van Vuuren & Stamp, 2015:191).

In the wort kettle the liquid is set to boil and during this stage, hops are added, as set out in Figure 120. According to Morton (2016:15), hops act as both a flavouring agent and a preservative – adding a trace of bitterness to the beer if added at the beginning of the boiling and a distinct aroma if added during the end. The boiling of the wort is done for various reasons (Ramukhwatho et al, 2016:6):

To extract and isomerise hop components;
To coagulate proteins;
To sterilise and inactivate enzymes;
To form reducing and aromatic compounds;
To form colouring substances;
To remove undesired substances;
To acidify the wort and evaporate water.

The boiled wort is cooled down to approximately between 20 to 25 degrees Celsius and is prepared to be moved to the fermentation tanks.

Once in the fermentation tanks have cooled down sufficiently, yeast and sugar are added. Over the next few days, as seen in Figure 120, the sugars within the beer mixture are converted into alcohol. The amount of sugar also influences the strength of the beer.

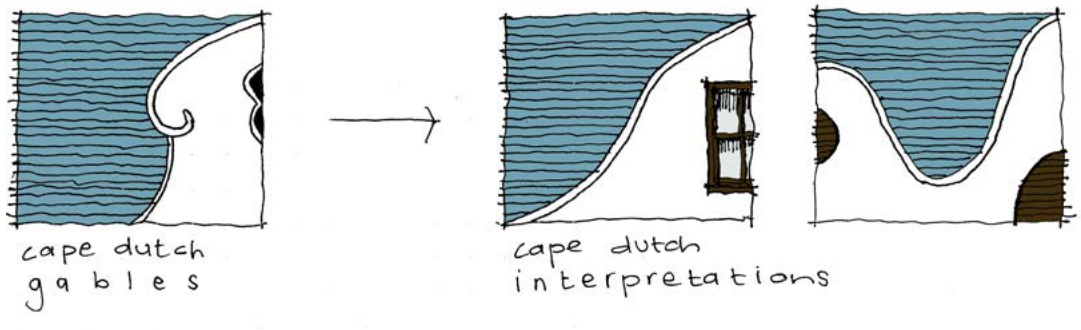
Morton (2016:15) deems this as the most important stage – one that decides the fate of the beer. From the fermentation flasks, the beer micture moved to the maturation tanks for futher fermentation. A lager will usually ferment at a temperature between 8 and 12 degrees Celsius for ten days, while an ale will ferment at a higher temperature between 14 and 18 degrees Celsius for only five days (Jansen van Vuuren & Stamp, 2015:191). With this, the maturation stage concludes, and the beer is transferred to the bottling or kegging facility.

Beer is available to the public in either bottles, cans or kegs. There are two methods of carbonation – achieving the fizziness of the beer. Large commercial breweries prefer to use the more time-efficient method, in which carbon dioxide is pumped into the mixture before it is poured into bottles and kegs. Craft breweries, such as the proposed brewery, prefer to bottle condition their beer. The beer mixture is poured into bottles without any carbonation. Thereafter, sugar is added, which will be metabolized by any remaining yeast, resulting in a built-up pressure within the bottle. The fermentation process is a delicately balanced action – too much sugar will result in an explosion, too little and the beer will not be carbonated (Morton, 2016:15).

Considering the comparability of the narratives of experiencing beer and architecture, the proposed scheme strives to become the conduit through which the haptic narrative of beer is conveyed. This narrative is not only a sequential order of functions but also an order of moments – moments that celebrate the craft, the landscape and the conduit.

iv. CONTORTING THE ARCHETYPES

Figure 121: Illustration of the reinterpretation of traditional Cape Dutch gables into contemporary elements.



Breweries by nature possess an industrial or factory-like character, with identifiable typologies and morphologies (refer to Figure 122). However, Weber (2012:11) states that the fundamental danger of working with strong typologies and morphologies, is falling prey to mimesis. Mimesis is defined as the act of mimicry or imitation (Merriam-Webster, 2020:online). Although the morphology and typology of a region can be incorporated within a building to refer to its contextual language, mimesis refers to the thoughtless and meaningless use of regional architectural elements to create a building that imitates its surroundings. The investigation of local architecture leads one to the interpretation of elements and its original function (as shown in Figure 123 on the right). The objective is to design a building that links with the genius loci, sits sensitively in the landscape and communicates with the surrounding architectural language. Thus, designing a building that is unique to its site.

Taking the Cape Dutch gable for instance, it was incorporated as a method of orientating the inhabitants to the entrance, as well as preventing the traditional thatched roofs to collapse on the entrance if a fire should occur. It also kept the front door free from any dripping that occurs during rainy weather – which is quite normal weather for the Cape regions (de Bosdari, 1964:24). Reinterpreting the intention of the gable allows one to incorporate creative design to reimagine the element in a manner that will reference the context and symbolically incorporate its elements (as shown in Figure 121 above). This approach of thoughtfulness will be applied within the proposed brewery.

The objective of the proposed brewery is to engage with the concepts of Norberg-Schulz, analyse typological industrial breweries and meaningfully reinterpret these elements to amalgamate the regionalistic language with that of a brewery (see Figure 123). All the necessary layers need to be considered: the contextual shed structures, the old hop kiln, typological breweries, and the landscape. These layers are all important role-players within the reimagining of the brewery's structure.

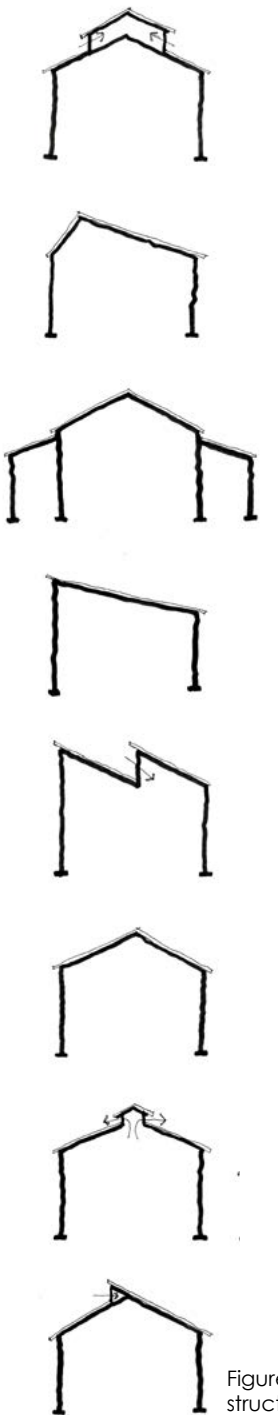
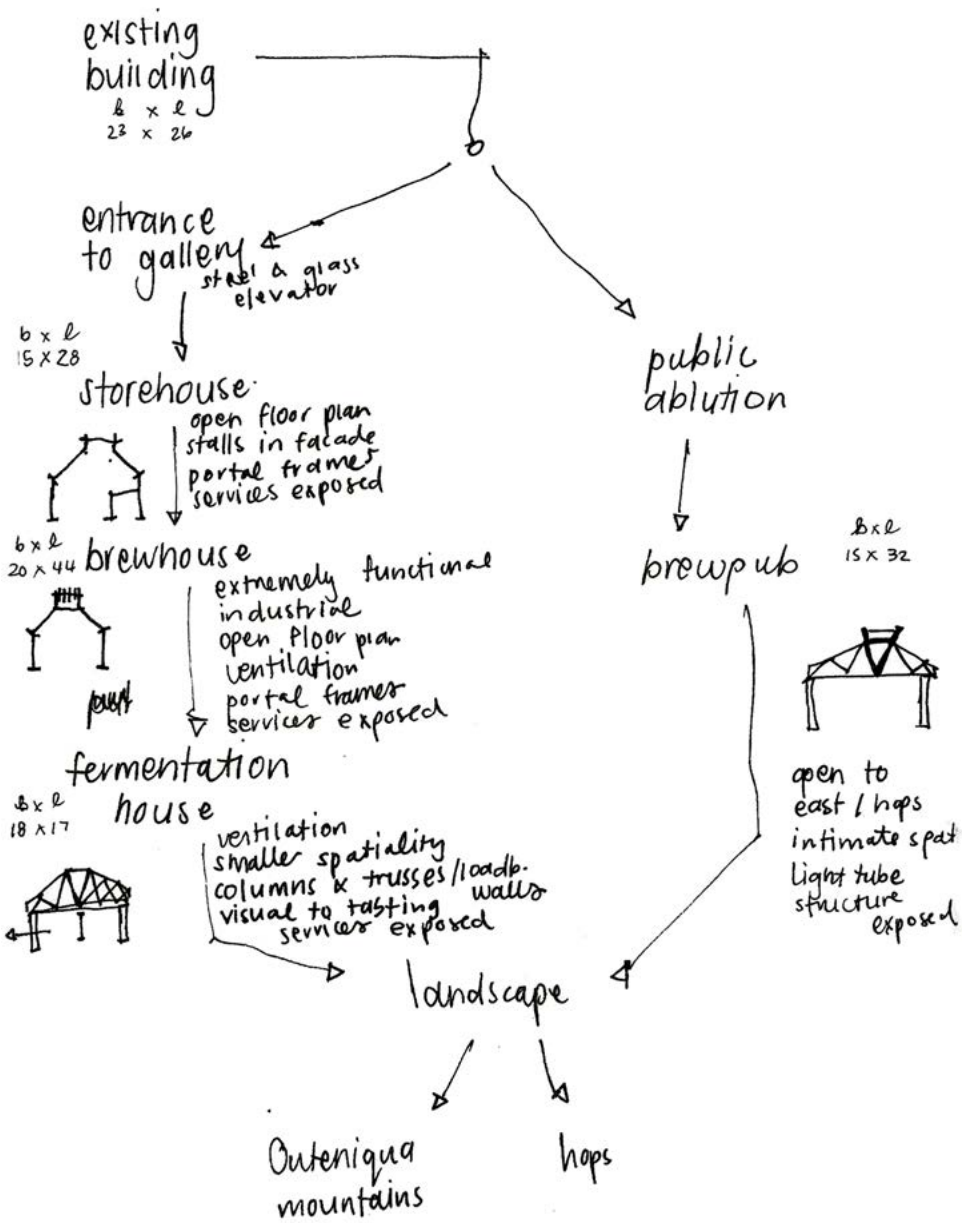


Figure 122: A compilation of typical typological structures used in industrial buildings.

Figure 123: Process of contorting industrial typologies in order to adapt to the interior functions of a brewery.



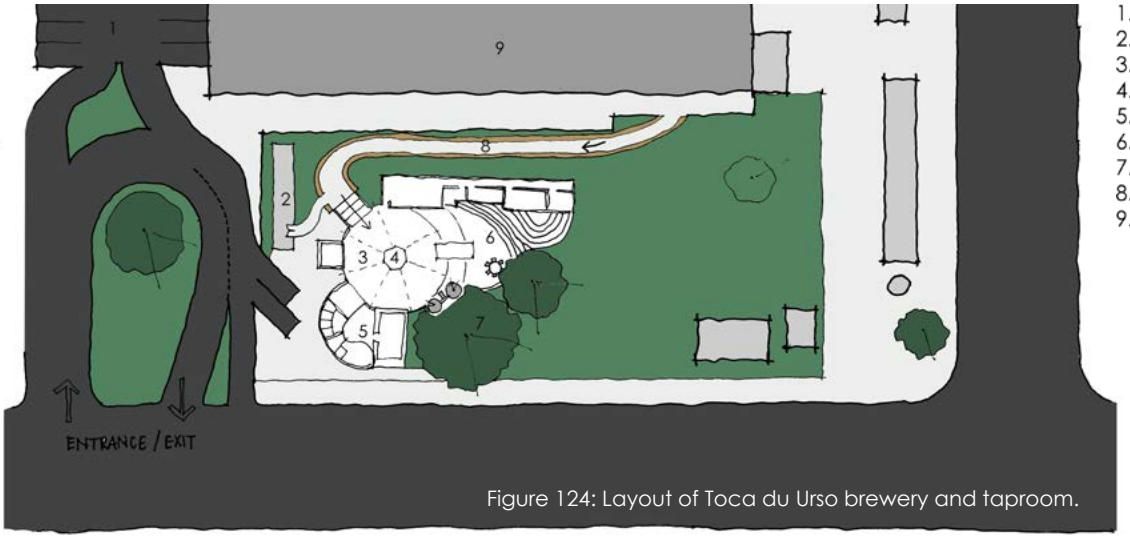


Figure 124: Layout of Toca du Urso brewery and taproom.

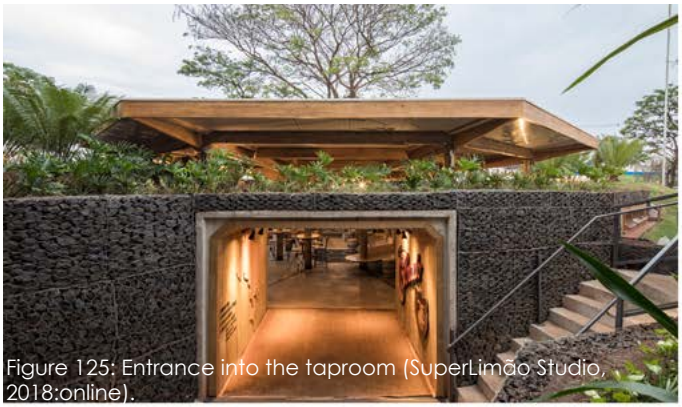


Figure 125: Entrance into the taproom (SuperLimão Studio, 2018:online).

Figure 126: Seating is centralised around the water well, with circulation on the outer edge (SuperLimão Studio, 2018:online).

Figure 127: Self-help beer taps allow visitors to pour their own drink (SuperLimão Studio, 2018:online).

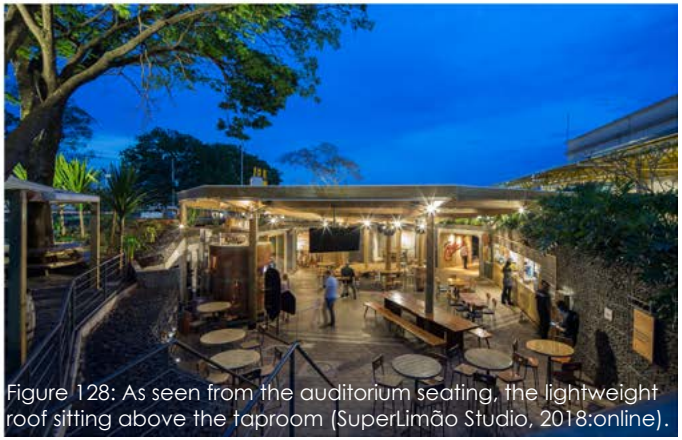


Figure 128: As seen from the auditorium seating, the lightweight roof sitting above the taproom (SuperLimão Studio, 2018:online).

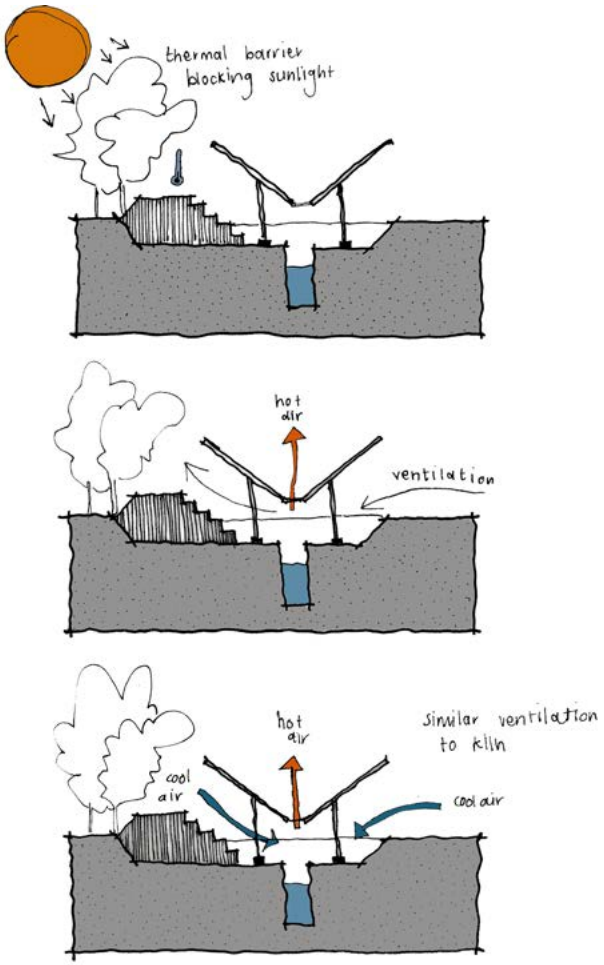


Figure 129: Thermal considerations of the Toca taproom.

As depicted, the proposed structure will be reminiscent of its industrial nature. However, elements and materials from the landscape and context will be incorporated to soften the juxtaposition between old and new, as well as the contrast between industrial and nature. The introduction of a natural materiality in an industrial scheme is exhibited by the Toca do Urso bar in Ribeirão Preto, Brazil. Also situated in the Southern Hemisphere, Ribeirão Preto experiences a climate comparable to that of South Africa, which allows one to investigate this precedent for its integration of active and passive design measures (Climate Data, 2020:online).

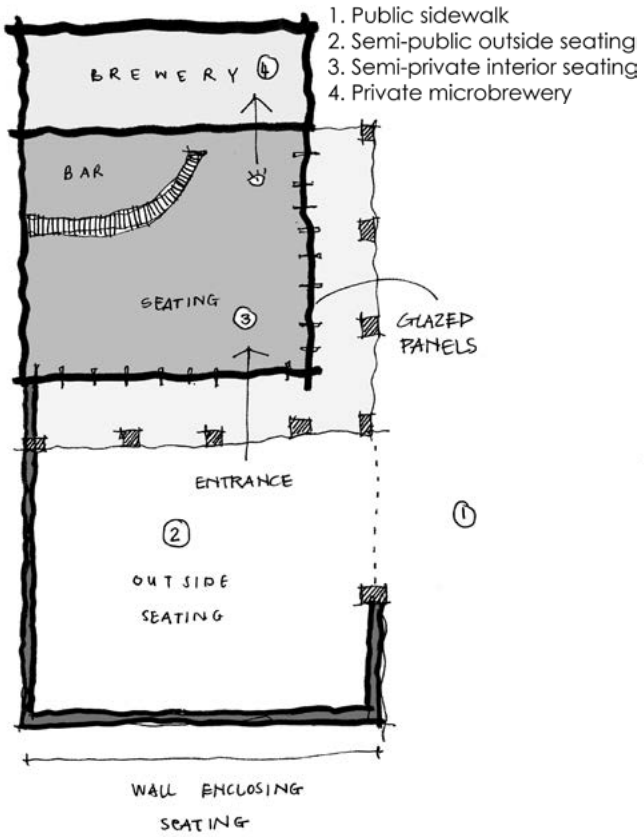
Colorado Brewery introduced a new taproom to their industrial brewery complex in 2017 (see Figure 124). SuperLimão Studio designed a space that functions similarly to a bear burrow – Colorado Brewery's logo is a bear – which translates to 'Toca do Urso'. This beer cave is sunk into the ground and implements numerous vernacular and passive techniques (as shown in Figure 129), therefore relinquishing the need for any manual air conditioning (SuperLimão Studio, 2018:online). A water well in the centre of the taproom allows evaporative ventilation. Toca do Urso incorporates more natural materials into their structure, which directly differs strikingly with the typological industrial feel of the brewery. Not only does this deep-set space reflect a more organic approach, but when entering the taproom, the presence of the industrial structure becomes much more subtle. Refer to Figure 125 for a photograph of the entrance. Gabled walls and pavilion seats represent the earth in which it is sunk. The free-standing roof (refer to Figure 128) allows ample natural light into the space, as well as allowing the brewery's roofline to remain in sight. Entry to the open-plan taproom immediately allows the visitor a view of the copper beer tanks, with more intimate seating spaces breaking away from the centre (as shown in Figure 126 and 127). The free-standing roof is cladded with lightweight roofing materials, which allowed for the use of lightweight timber beams. This permitted the roof to be anchored without deep foundations (SuperLimão Studio, 2018:online).

Another successful contemporary brewery situated within regionalistic architecture is the TukTuk Microbrewery in Franschhoek, Cape Town. This microbrewery was designed by Malherbe Rust Architects and forms part of the Leeu Collection of boutique hotels (Wallace, 2016:online). This microbrewery forms part of a series of existing Cape Dutch buildings, complete with gables and white-washed walls, as seen in Figure 132.

Similar to Cape Dutch characteristics, the threshold to the brewery is gradual – a defined exterior social space leading to a covered porch-like area which ultimately leads to the inside. This gradual approach also creates depth in façade. Psarra (2009:87) states that elements of transition include "entrance halls, ramps, stairs, passages, ante-chambers and roof terraces" and these elements define the visitor's entrance to and progression and departure from one space to another (see Figure 130).

The TukTuk microbrewery makes use of kinetic glazed panels that slide open to create an open façade (refer to Figure 131 and 133). All seating areas of the microbrewery is designed to have a visual connection with both the street and the brewing area within. The brewing aesthetic is implemented throughout the building through exposed services and structures, as shown in Figure 134 and 315. The exposed structures contrast with the white-washed Cape Dutch facades and brick walls. This chapter investigated the amalgamation of industrial and regional, along with the juxtaposition that is created by aligning the social and industrial spaces.

Figure 130: Layout of TukTuk Microbrewery, showing the gradual progression of thresholds.



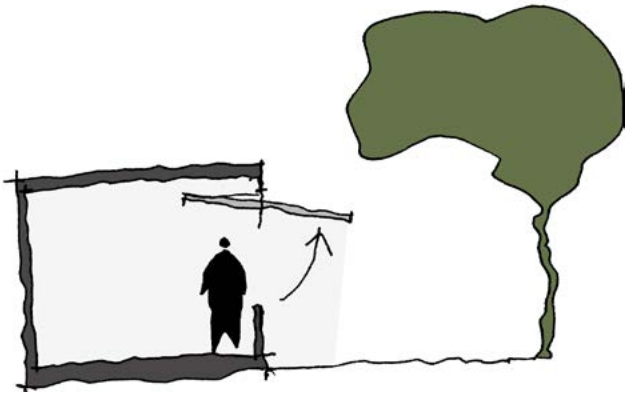
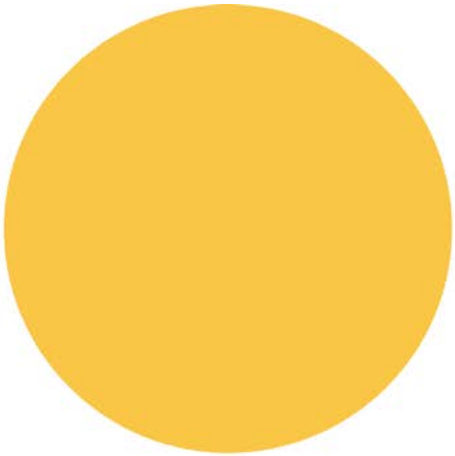


Figure 131: Section sketch showing the glazed panels opening towards outside, functioning as a partition and shading.

57. Figure 132: The TukTuk Microbrewery, with its typological gable, columns and exterior seating (Malherbe Rust Architects, 2016:online).
58. Figure 133: The glazed facade opens up, allowing for both ventilation and social interaction to take place (Malherbe Rust Architects, 2016:online).
59. Figure 134: The brewing equipment can be seen from the seating area, but a glass wall shields the brewing process from any unwanted interference (Malherbe Rust Architects, 2016:online).
60. Figure 135: The bar area, with its vaulted masonry ceiling (Malherbe Rust Architects, 2016:online).



PART 2

THE RECIPE

Part 2 describes the 'recipe' – how the elements discussed in Part 1 is approached, reinterpreted and applied in the design process to appropriately address the site and proposed function. This part provides the reader with a better understanding of the theoretical approach to every element and how the final synthesis is achieved.

2.1 REINTERPRETING THE CRAFT & HEROLD

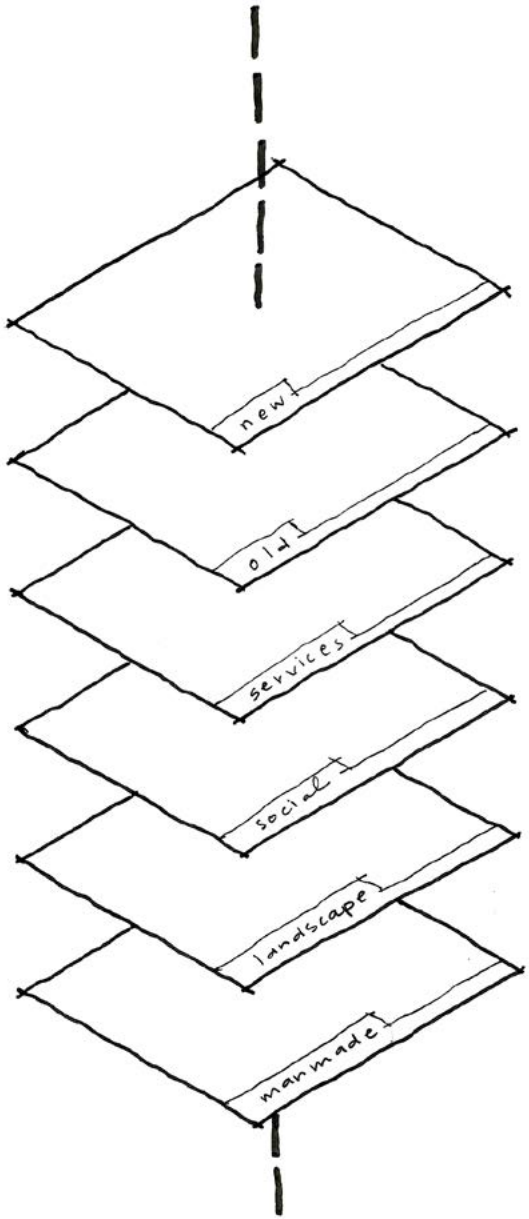


Figure 135: Graphic illustration of the layers on site.

Even with the best products available during the brewing process, the recipe is the ultimate key to a successful brew. The manipulation of the raw products makes or breaks the brew. This may be compared to architecture, in the way that the manipulation of the various layers is imperative during the design process – no layer can be excluded, neglected or handled insensitively. This is illustrated in Figure 135 on the left. Incorporating each layer into the design scheme leads to a successful 'fermentation' and delightful 'brew' enjoyed by many.

2.1.1 TOUCHSTONES

A touchstone is an abstract manifestation that relates to the proposed topic, implemented to reflect on during the design process. Thus, it is the essence or end goal of your project. The touchstone will relate to both the theoretical approach of tension, narrative and transformation and construction methods such as steel construction and the integration of natural materials to settle the brewery into the landscape.

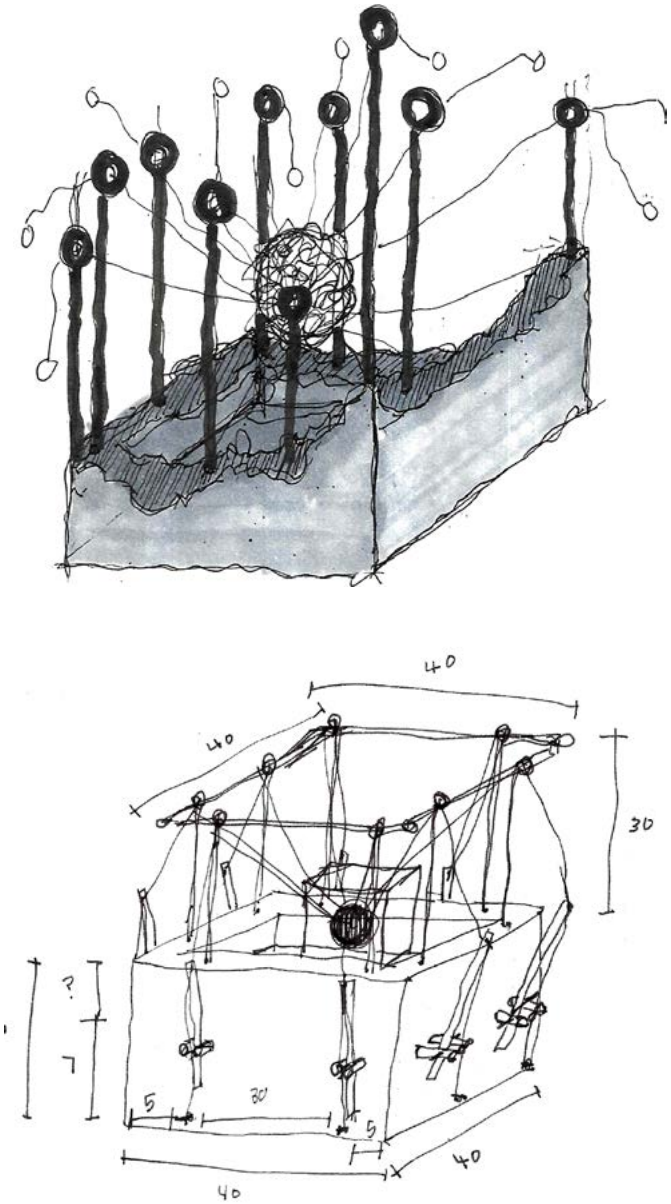


Figure 136: Working sketches of the design touchstone. The top sketch focusing on the material and the bottom focusing on the measurements.

Fermentation is a natural process, but humans have intervened and exercised control over the raw produce and the process to achieve the final product they desire. This speaks of a juxtaposition existing within the brewing process. This brewing process of beer is also a visually hidden one, with formalistic machinery that hides the physically changing product behind copper and steel. The ripening of the seed/ beer/ruin can also refer to the inhabitant who enters the building (process) and goes through various preparations to become 'ripe' for the final stage of the process – the moment where the final product is celebrated. This final product refers to the beer, the proposed brewery and the relationship created with the landscape.

The revelatory reveal of the craft through the process of transformation and tension.

The 'reveal' refers to the visual narrative or interaction that takes place between inhabitant and brewing. The 'craft' refers to the brewing of the beer, both in its development and in its final product. The 'transformation' refers to the narratives that are present within the proposed brewery and the brewing process – the development from seed to hop to mixture to beer. It also addresses the transformation of the inhabitant as they experience the haptic environment, as previously compared to the experience of tasting beer. 'Tension' refers to visual, physical and abstract conflicts that exist between human and landscape, natural and human-made fermentation and natural processes within a human-made system.

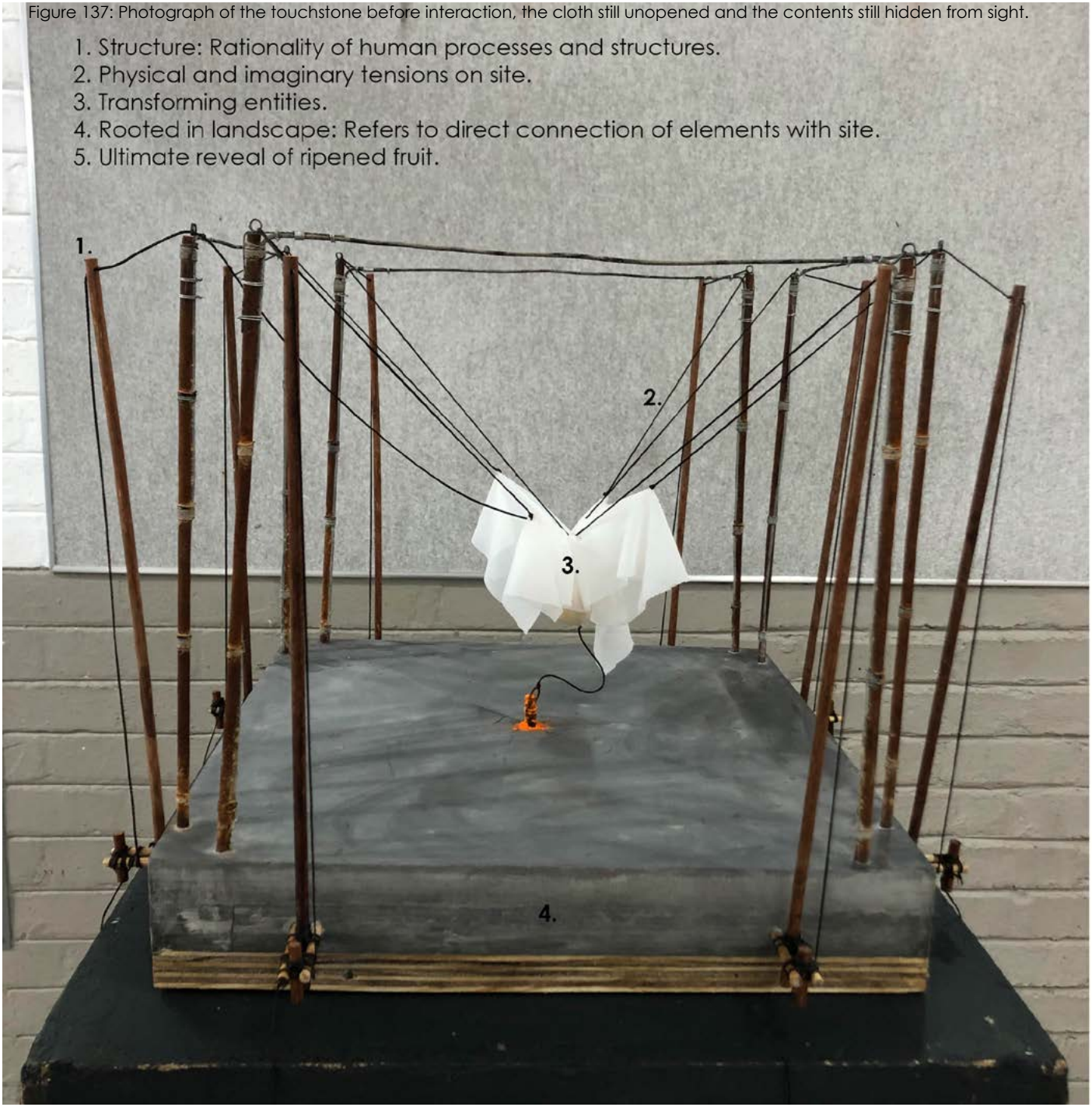
The mechanical and scientific nature of brewing beer can be set out as input, process and output. These three steps can be translated into a classification into which the transformation of the seed, raw produce and abandoned kiln can be sorted. Therefore, the touchstone becomes a physical translation of the ripening of the seed; beer; existing kiln. Hops plants are planted as seeds and experiences the natural process of growth and maturation into a developed plant with a flower that is ultimately harvested.

Comparably, beer brewing harnesses natural processes to transform a raw product to a beer. Likewise, the existing kiln will be going through a process of change as it is manipulated by the architect in order to become a meaningful place where the past can be celebrated through the new insertion. Refer to Figure 136 for sketches of the touchstone. See Figure 137 and 138 for final photographs.

Looking at the touchstone:

- **Structure:** rationality / engineering / rigidness of process
- **Cloth:** transforming entities (seed/raw produce/ruin) going through a transformation
- **Yellow powder:** the ultimate reveal of ripened 'fruit' (flower/beer/brewery)
- **Tension:** both physical (structures) and imaginary tension (mentioned above)
- **Interaction:** refers to the human intervention in a natural process/catalyst of process.

Figure 137: Photograph of the touchstone before interaction, the cloth still unopened and the contents still hidden from sight.



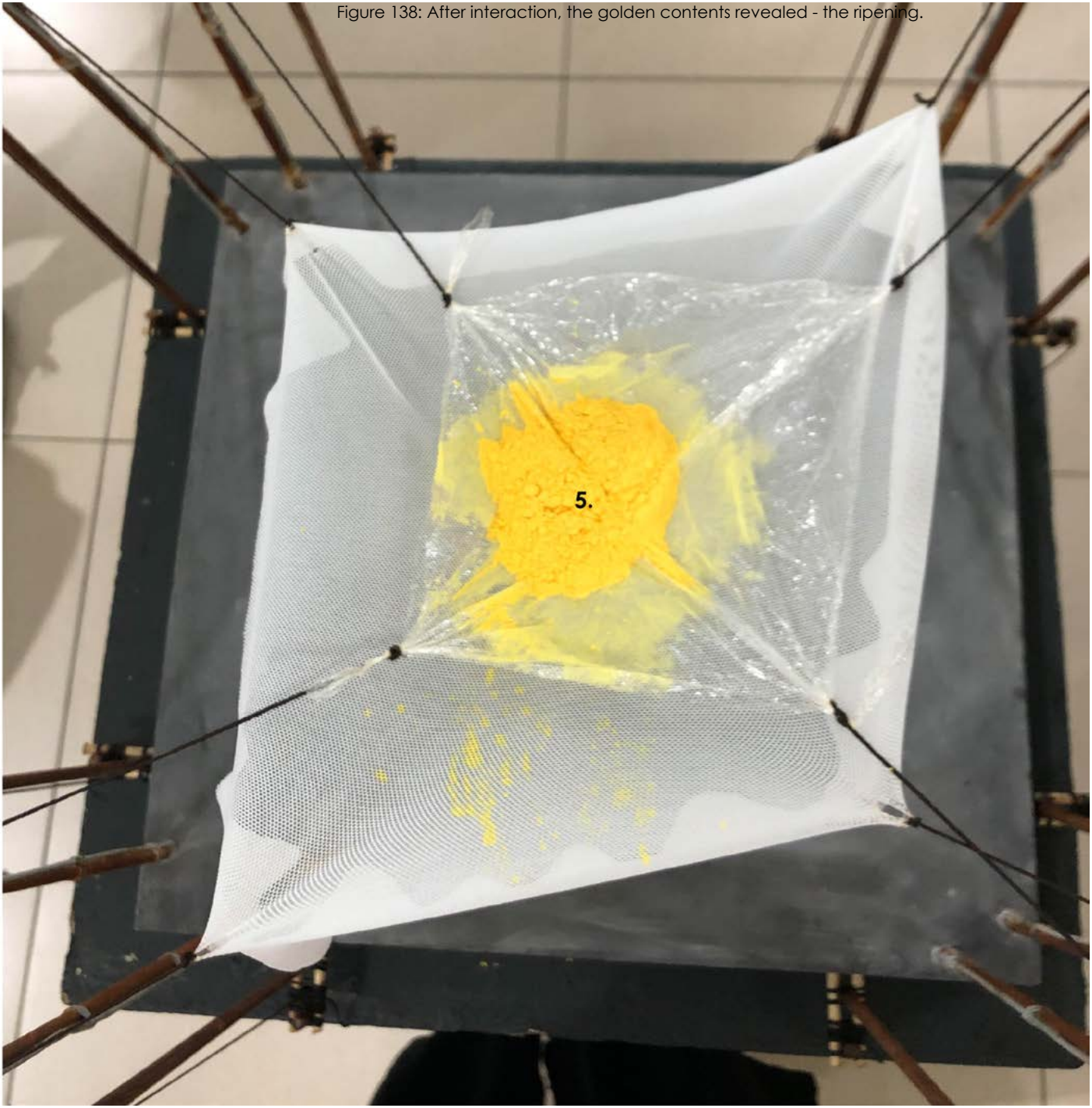


Figure 138: After interaction, the golden contents revealed - the ripening.

ii. CONSTRUCTION

The construction touchstone (refer to Figure 140 on the following page) explores the tectonic approach towards the dissertation. It functions as an exploration of various architectural applications that are identified through the design concepts.

Real and imaginary tensions
The use of suspended planes, anchoring and gradient spatial thresholds, which all refer to the hops structures. The touchstone also explores the incorporation of a stereotomic steel structure fixed to the existing masonry structure, creating a visual tension between old and new. The honesty of structure is also important, revealing services and construction.

Transformation as a narrative
Following the written narratives on site and within the brewing function, the proposed design is divided into different levels – each level housing a different function within the brewery. The important aspect within a brewery that is open to the public, is the visual connection – to the industrial elements, staff, brewing process and different spaces.

Emergence of craft from ruin
The new structure will penetrate and attach lightly to the existing, weaving itself through the old. An important aspect is the visual honesty between the old and new, leaving openings within the new through which the old can be seen or highlighted.

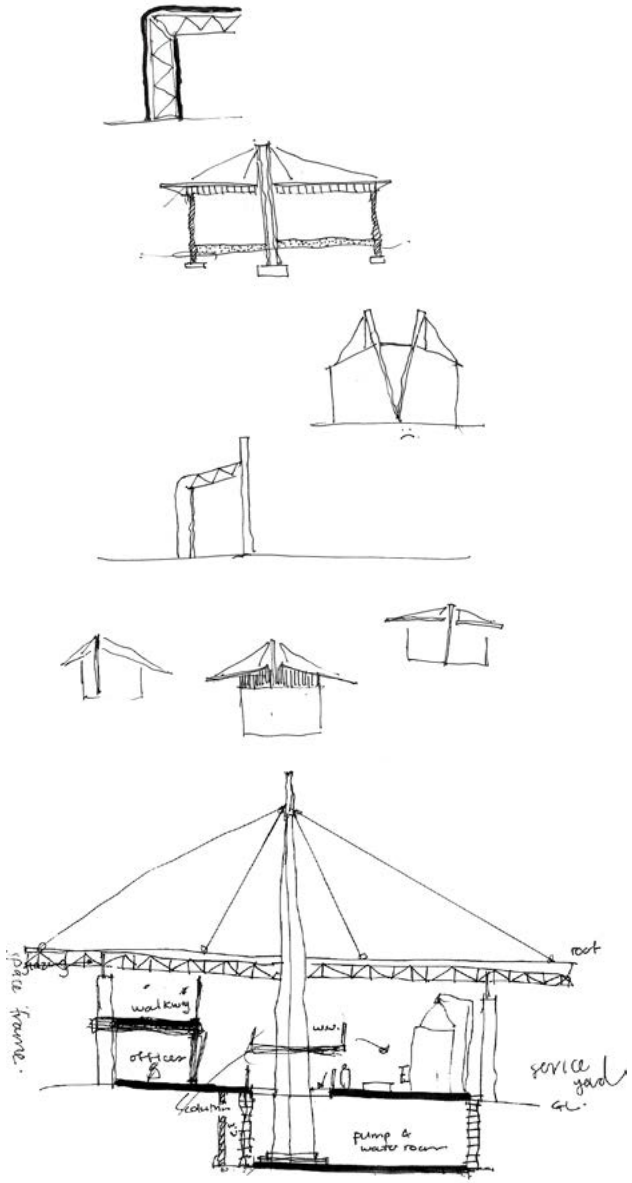


Figure 139: Rough sketches showing the development of the main structural system.

Figure 140: Perspective of the construction touchstone.

2.1.2 CONCEPTS
i. REAL AND IMAGINARY TENSIONS

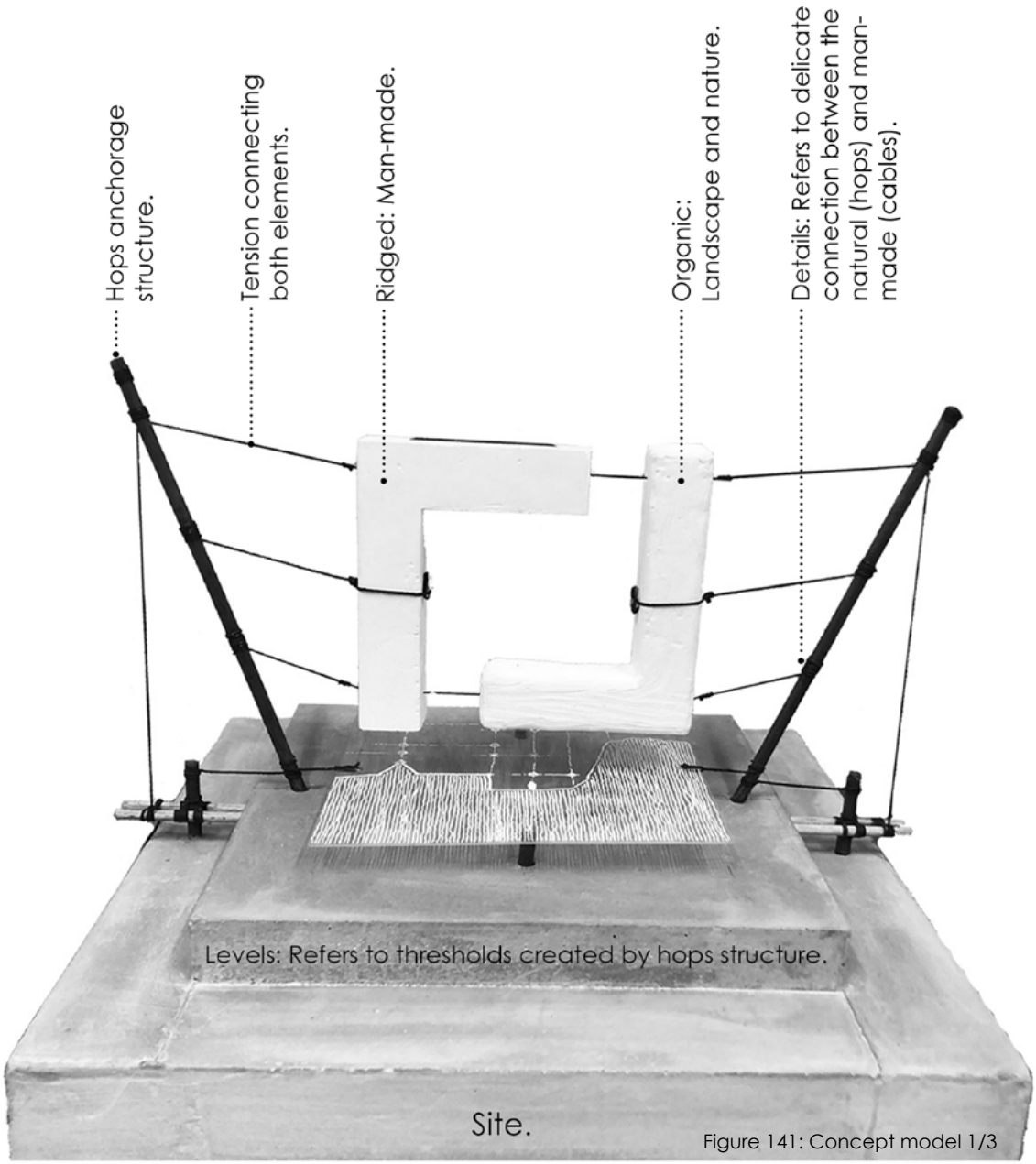


Figure 141: Concept model 1/3

Definition of tension: state of being / stretched or stained / always between more than one element

As a concept: showing the relationship of both real and imaginary tension on the architecture

Refers to tensile or kinetic facades powered by tension - transforming buildings through means of mechanical systems. Transformation relates to all three concepts.

Model – connection to the site is through threshold and static articulation / structurally

Figure 142: Photo montage portraying the real and imaginary concepts on site.

ii. TRANSFORMATION AS A NARRATIVE

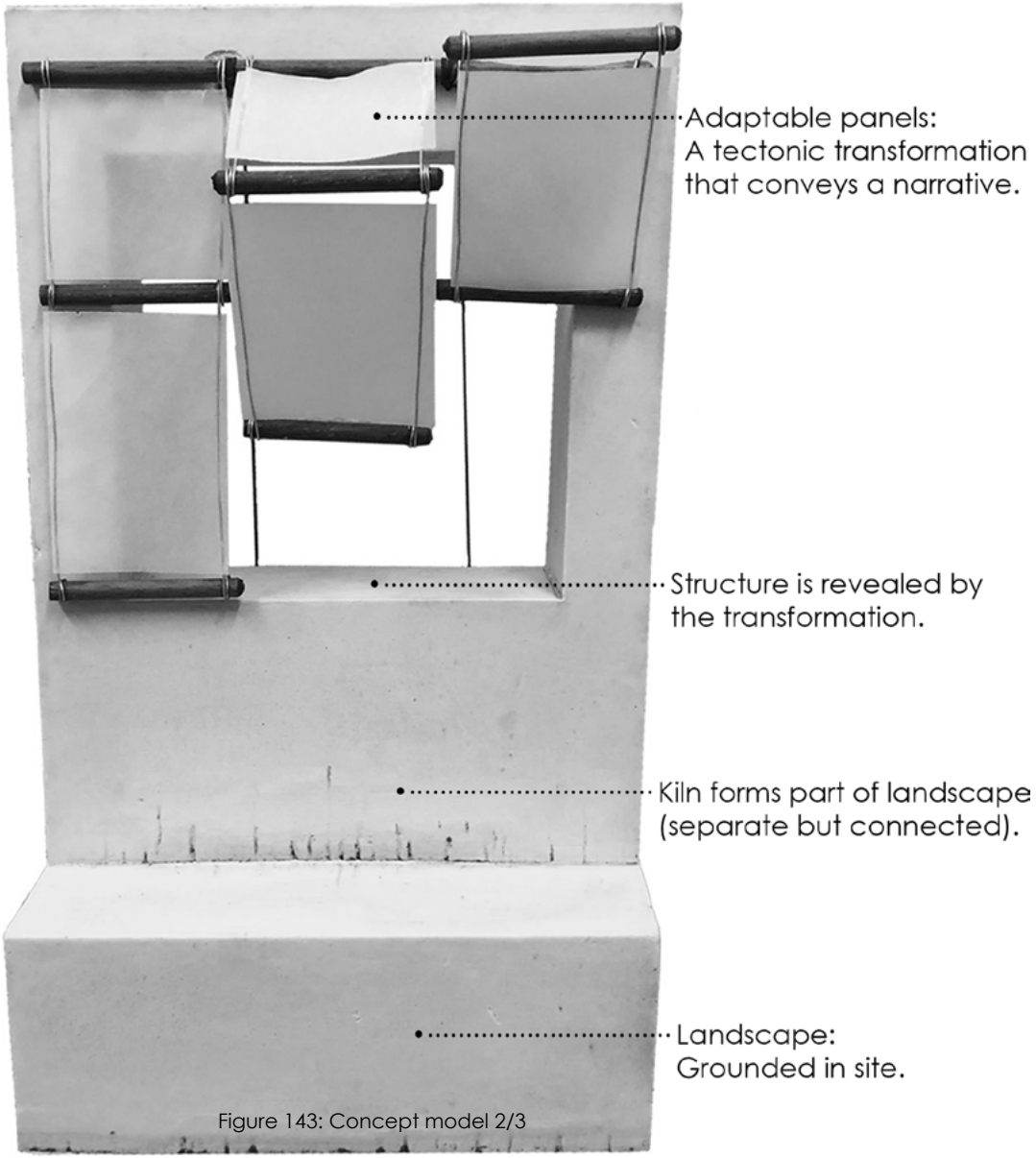


Figure 143: Concept model 2/3

Definition of transformation: architectural 'thing' is altered through a series of manipulations in response to context or conditions without loss of identity or concept.

Thus, does not change completely, but adapts to context or conditions. Transformation happens through the new – to the old – within the amalgamation.

As a concept: showing how the theoretical process of ripening can be interpreted into architecture.

Refers to the change in architecture due to factors (human interaction/ brewing process)

Model – connection to the site is grounded, but elements within itself are dynamic and adaptable.

Figure 144: Photo montage portraying the process of transformation as a narrative.

iii. EMERGENCE OF THE CRAFT AS RUIN

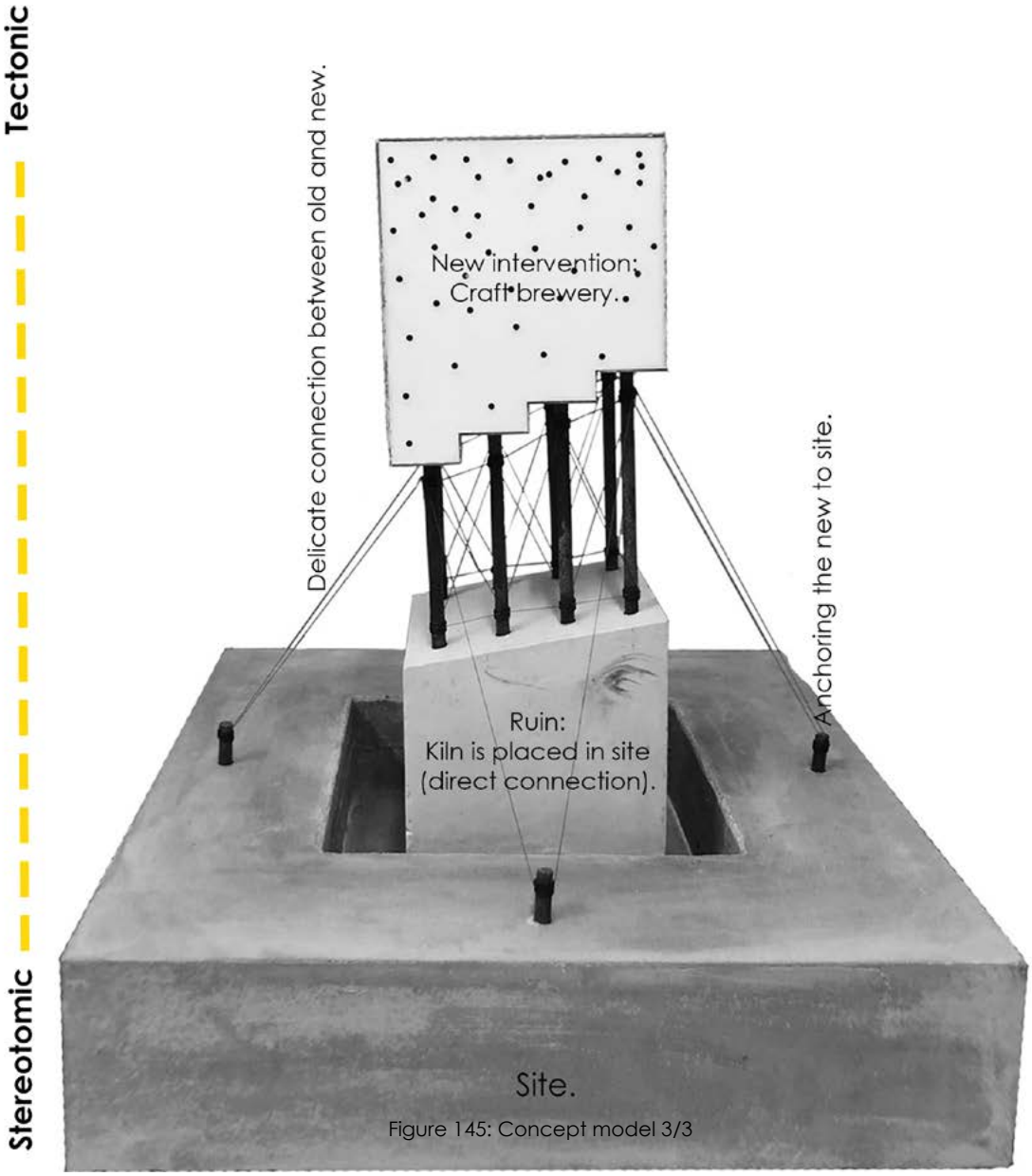
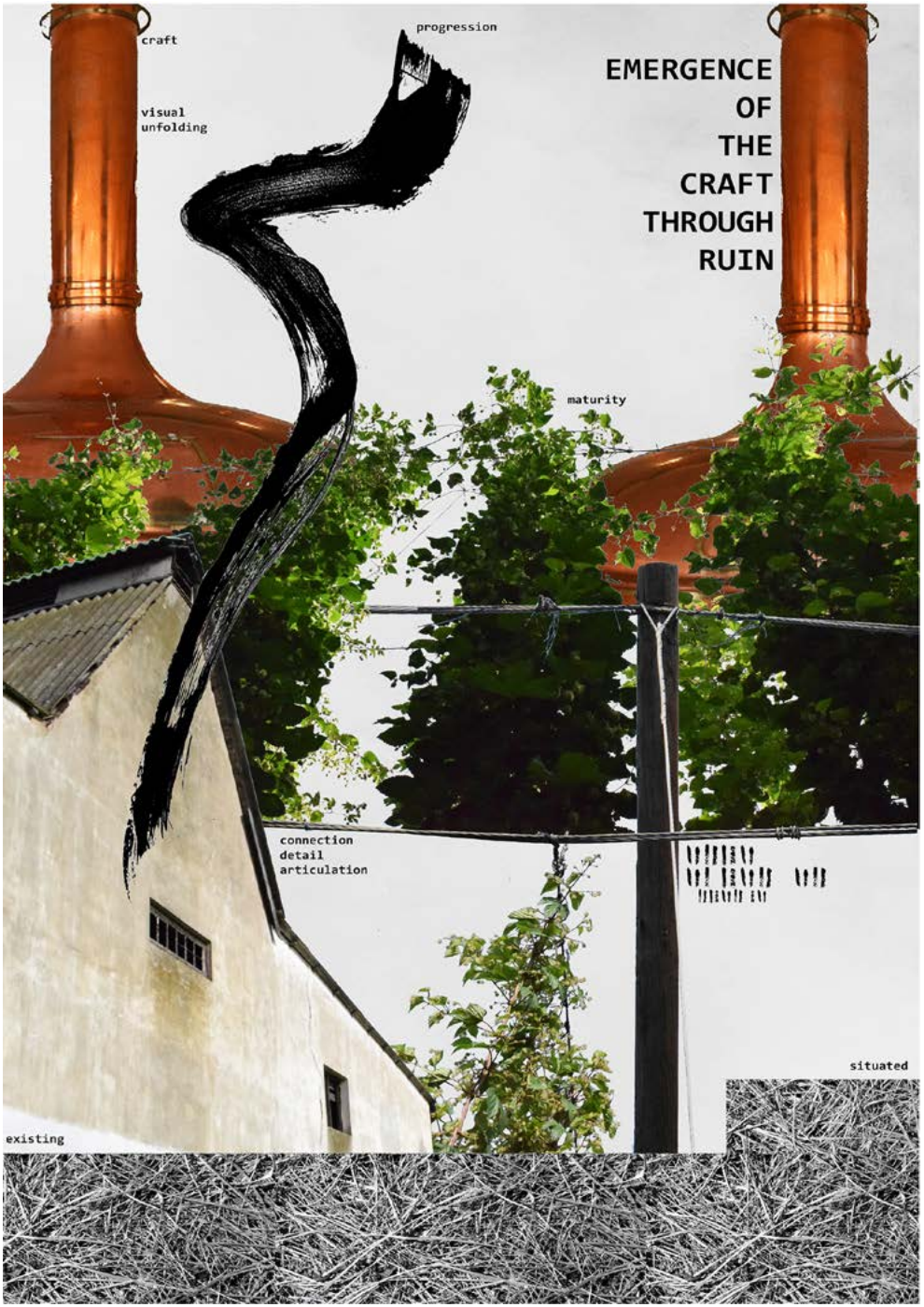


Figure 145: Concept model 3/3



Definition of ruin: physical destruction/disintegration of an element. Being reduced to a state of decay. The abandonment of existing place and rituals.

As a concept: the integration of NEW rituals within an existing environment, along with existing rituals.

Refers most importantly, the connection between the OLD and the NEW, is the function or craft.

Model – ruin is emerging from the site, forms part of the site but is still a separate element. Connection to ruin is sensitive and visually dynamic.

Figure 146: Photo montage portraying the emergence of the new craft from the ruin.

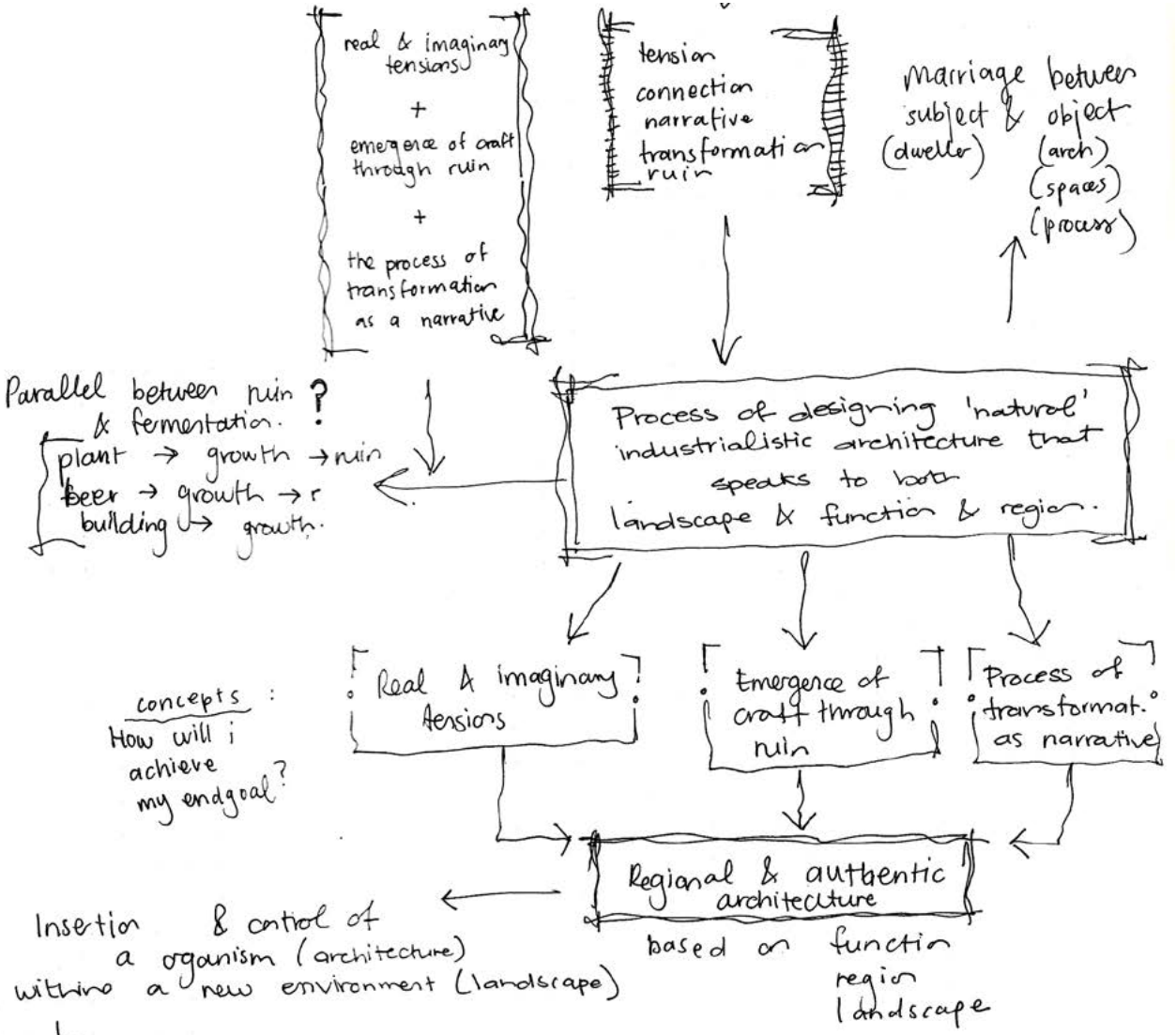


Figure 147: Documenting the thinking process of relating the theoretical concepts and research question into an architectural approach.

2.1.3 CRITICAL REGIONALISM

Architect and historian, Kenneth Frampton (2007:327), describes critical regionalism as an architecture that is consciously bound to the region or territory, without discarding the progressive facets of universal or modern architecture. This concurs with Norberg-Schulz's concept of sensitively designing according to the genius loci of the site by reinterpreting the topology, morphology and typology thereof, as previously discussed. Thus, you can construe that critical regionalism strives to balance between the universality of modernism and the individualism of postmodernism.

According to Frampton's concept of critical regionalism, any building that follows this approach is designed to be site-specific, instead of a free-standing object placed on a site with no meaningful connection. In other words, the proposed brewery should be unique to the Afgunst farm in Herold and should not be applicable to another site in another region. The architectural language should be vernacular and connecting the built form to the site. Ando refers to this as being "universal and particular at the same time" (1994: 479). Frampton considers this objective and states that, consequently, critical regionalism is an extremely sensitive approach to cultural and regional styles of architecture, where local elements are reinterpreted, opposed to the direct or meaningless use thereof (2007:327). These local elements can be found both on site and within its context. As discussed in the typological assessment of both Herold and the chosen site, elements that influence the formgiving have been identified and form part of the reinterpretation process to sensitively convey the same architectural language.

Regarding critical regionalism, Tzonis and Lefaivre (1996:489) explain the process of the application in design – as unique regional elements that are identified, defamiliarized and then recomposed to present a meaningful reinterpretation of the local architecture. Hence, critical regionalism is derived from the direct surroundings, drawing its morphology from the context (Tzonis & Lefaivre, 1996:490).

In other words, critical regionalism delivers a contemporary, unfamiliar reinterpretation of an individualistic architectural style that enriches the existing heritage of the region. Therefore, to investigate the architectural manifestation of critical regionalism, an analysis of Walden Studios by Jensen & Macy Architects in Geyserville, California, is imperative. The scheme balances a meaningful intervention of a new architectural language within an existing one, transforming an abandoned warehouse into a contemporary gallery space. The existing building was used as a sleeve to house the new function, giving recognition to the prominent gabled walls and breathing new life into a decrepit industrial structure. The architects' main objective was to respect the existing structure, and designed an art gallery that was built within the existing warehouse (Jensen, 2016:online).

Regarding critical regionalism, Tzonis and Lefaivre (1996:489) explain the process of the application in design – as unique regional elements that are identified, defamiliarized and then recomposed to present a meaningful reinterpretation of the local architecture. Hence, critical regionalism is derived from the direct surroundings, drawing its morphology from the context (Tzonis & Lefaivre, 1996:490).

In other words, critical regionalism delivers a contemporary, unfamiliar reinterpretation of an individualistic architectural style that enriches the existing heritage of the region. Therefore, to investigate the architectural manifestation of critical regionalism, an analysis of Walden Studios by Jensen & Macy Architects in Geyserville, California, is imperative. See Figure 149 for a photograph of the renovated building and Figure 152 for a layout of the building within the site. The scheme balances a meaningful intervention of a new architectural language within an existing one, transforming an abandoned warehouse into a contemporary gallery space. The existing building was used as a sleeve to house the new function, giving recognition to the prominent gabled walls and breathing new life into a decrepit industrial structure. The architects' main objective was to respect the existing structure, and designed an art gallery that was built within the existing warehouse (Jensen, 2016:online).

An important aspect working within the existing structure was the celebration of the tensions originating from the contrast between old and new, transparent and solid, heavy and light. The intervention not only creatively showcases the interesting gabled walls but gracefully penetrates the heavy concrete to fully settle itself within the existing, as seen in Figure 148 and 151. This is a manifestation of Ando's definition of site-specific architecture as mentioned earlier. The architectural response to the surrounding site is intensely acute - Figure 150 shows the interior spaces opening up towards the vineyards.The ground floor is opened up for commercial space, with ample fenestration – which allows natural light in, visual connection with the surrounding vineyards and lightening the solid connection to the earth. The protruding glass box on the first floor opens up over the vineyard and houses more exclusive working spaces. Although the new structure penetrates the gables with glass lightboxes, the top structure sensitively shies from the gables, sitting loosely between them. This gives the gables even more prominence on every elevation and increases the architectural tension between old and new. The existing roof is removed to allow more design freedom. This sensitive approach of creating a visual contrast between new and existing structure concurs with Gawie Fagan's approach of the Mariendahl Brewery, which will be discussed and analysed in the following heading.

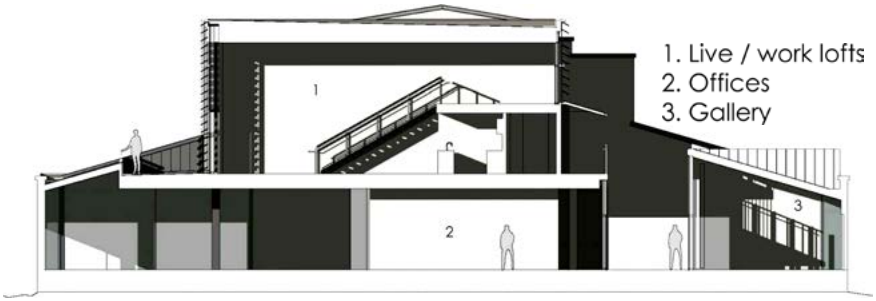


Figure 148: Cross-section of renovated building (Jensen, 2016:online).

61. Figure 149: Northern facade of the building, with the glass box penetrating the facade and opening up towards the vineyards (Jensen, 2016:online).
62. Figure 150: Interior view, towards the vineyards (Jensen, 2016:online).
63. Figure 151: A glass box penetrates the end facades, along with puncture holes - creating a more porous facade (Jensen, 2016:online).

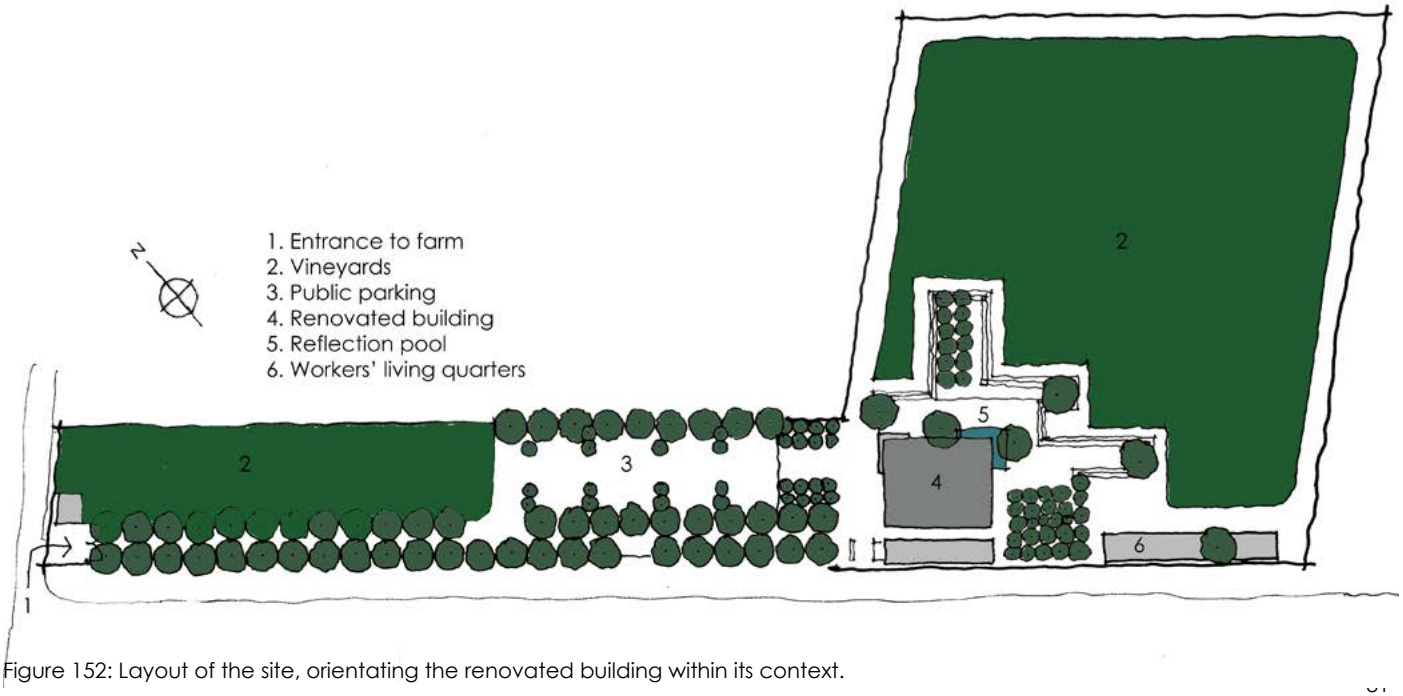


Figure 152: Layout of the site, orientating the renovated building within its context.

As mentioned, Herold's built environment is influenced by references to Cape Dutch architecture, as well as functional farm sheds and barns. Similar to this gradual and meaningful adaptation of the Cape Dutch gable and architecture, this dissertation strives to thoughtfully reinterpret the context and built element on site into a new understanding of the existing architectural language. The site itself has prominent and inimitable elements, such as the hops and the abandoned hops kiln, that deliver another architectural layer onto the proposed brewery. Refer to Figure 153 for an illustration of the implementation of haptic senses in order to understand the site.

Similarly, breweries also have a certain typological language, as discussed previously. Therefore, this language can be regarded as a local or typological dialect, from which elements can be identified, defamiliarised and recomposed to introduce innovative perceptions of what a brewery within a specific landscape can and needs to be. Considering the above-mentioned theories, the reinterpretation of these various layers into a new architectural approach, allows the designer to bring forth new solutions to an existing tectonic dialogue.

Frampton (2007:327) writes that critical regionalism gives significance to the immediate bodily experience of its dweller. Tactile senses are deemed as imperative as the visual experience of the building. Following Frampton, Pallasmaa (2005:78) elucidates that the phenomenology of architecture seeks to reveal the inner language of the building. This inner language refers to the experientiality within a building; the dweller's perception, emotions and thoughts.

Figure 153: The implementation of tactile senses on site form part of the experiential understanding.

Tilley (2004:1) provides a different perspective towards phenomenology, describing it as the way "the world is experienced directly by a subject as opposed to how we might theoretically assume it to be". This allows for an open-ended approach focussing on the inhabitant's experience of architecture and how it is placed within the landscape. The similar way that every person experiences their own lived reality of the world, relates to the genius loci of any given site, in the way that every site possesses their own character that is site-specific and influences the design that is placed on it.

From the discussion of the theoretical design concepts, narrative plays an imperative role throughout the proposed brewery, which concentrates on the individual experiences that inhabitants may experience.

Figure 154: Photograph of hops.

Walking between the rows of towering hops, light filters through from above, mixing with the smell of soil and plants. Through the hop rows peeks the kiln – white paint peeling, and stark against the vivid forest-green of the hops. The kiln speaks of a void, containing lost space within, but the unique phenomenology of the site is enchanting and alluring. This experientiality of the existing elements on site are important multi-sensory layers on site, that speak of a site-specific and peerless layer that affects the senses and allows for regionalistic cues to be taken. Conveying this phenomenology, along with the regionalist expression of Herold and a brewery, the design has the opportunity to be deemed as an appropriate insertion of architecture.

Figure 155: Photograph of hops.

2.1.4 FRAGILE ARCHITECTURE

Interlinking with the idea of sensitive design and giving thought to the genius loci of a site, fragile architecture communicates a preference of reactive and conscious architecture over dominating, monumental works. Vattimo's concept of fragile architecture will be discussed below, along with an investigation of Gawie Fagan's restoration of the Mariendahl Brewery, in order to better understand how to approach the design process of the proposed brewery.

Bachelard (2011:118) states that buildings are often presented as an object independent from their site and social and cultural context. He further mentions that these buildings become aesthetic images that are cut off from their realities and values. Norberg-Schulz (1985:63) emphasises the importance of the concretization of the genius loci of a site – the adaptation of buildings to the character of the site, to create meaningful place. In accordance with Norberg-Schulz, Bachelard believes that architectural works are condensed representations of the surrounding cultures, that orientate us and organise our thoughts. Architectural images act as testimonials of the place, atmosphere and historical and cultural eras (Bachelard, 2011:121). These testimonials are the physical expression of self and reveal the spirit of the place (Norberg-Schulz, 1980:180).

The aforementioned testimonials can also be regarded as layers within a region. South Africa consists of numerous regions within the province, due to the ethnic diversity and historical background of colonialism, Apartheid and war. Roth & Roth Clark (2018:549) classifies South African architecture as a duality – architecture of South Africa and architecture in South Africa. Architecture of South Africa refers to the indigenous or vernacular way of building, such as the thatched Zulu beehive dwellings, the geometric and colourful facades of Sotho and Tswana dwellings. See Figures 156-158 below for visual references of South African dwellings.

Figure 156: Traditional Sotho architecture.

Figure 157: Traditional Tswana architecture.

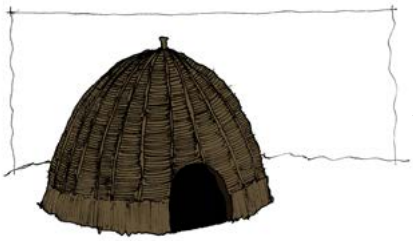


Figure 158: Traditional Zulu architecture.

Architecture in South Africa, according to Roth and Roth Clark (ibid.), encompasses the "introduced colonial European architecture in the nineteenth century". As the European nations imposed their culture, language and architecture on various parts of South Africa, an amalgamation came into existence between the vernacular and the foreign. Roth and Roth Clark (2018:553) refers to the Union Buildings in Pretoria, designed by Sir Herbert Baker, a British architect. See Figure 159 below for a photograph of the Union Buildings.

Figure 159: A photograph of the Union Buildings with the Louis Botha statue visible in front (Warren, 2020:online).

They explain that the formgiving contains various colonial elements, such as the encircling colonnade and two towers that represent the two primary colonial languages – Afrikaans and English. Thus, South Africa is a complex architectural playing field with many influences and historicity. Due to the complex layers that are revealed when investigating both an empty site or an existing building in South Africa, architects need to incorporate these layers or architectural references within their design approach, as well as sensitively approaching the landscape of the region.

Designing architectural spaces within such a rich historical country such as South Africa, a design strategy must be decided upon – a method of manoeuvring the architectural landscape and translating the dialect in order to arrive at an appropriate design. Bachelard (2011:133) discusses Gianni Vattimo's notions of 'weak' or 'fragile' architecture, explaining that it can be better described as either architecture of weak structure and image and architecture with strong structure and image. Strong imaged architecture strives to strongly influence through the means of a prominent solitary image, almost monumental, whereas the architecture of weak structure and image tends to be contextual and reactive, focused on haptic interaction and submergence, as well as welcoming individual interpretation and adaptation (Bachelard, 2011:121, 136).

Herold's architectural language can be described as fragile architecture – reactive to its context and proposed function, focussed on housing its inhabitants and contributing to the character of Herold. The kiln has become part of Herold's morphological language, relating to the hops in a functional aspect and acts as a representation of the hops heritage and history. Thus, referring to the discussed theorists, this approach of regional and reactive designing is the most appropriate design approach to ensure a site-appropriate design in a layer-rich nation such as South Africa.

In other words, fragile architecture hones a sensitive approach to its surroundings, especially its dwellers. This weakening of architecture can be seen in the renovation and re-establishment of existing buildings - the functional and symbolic adaptation reveals new layers of phenomenology within a building, much like Gawie Fagan's renovation of the Old Letterstedt or Mariendahl Brewery in Newlands, Cape Town.

Fagan (1997) delivered a summary of the project brief he had received in 1997, regarding the brewery and malt-house. The brewery was previously known as the Old Letterstedt Brewery or Mariendahl Brewery. The Letterstedt Brewery, Malt House and Kiln were declared a National Monument on 22 September 1995 (see Figure 160). Fagan mentioned that the brewery and malt-house that were on site, were the oldest in South Africa, along with a modern complex of buildings where SAB are still producing beer.

Fagan was briefed to appropriate and reuse the two old buildings in a significant and sensitive manner. He restored the buildings with minimal invasiveness. The original structures were retained and only strengthened where necessary. The project was concerned with preserving heritage and conservation, by placing the historical and modern in contrast with each other, as well as revealing information to the visitors as they journey through the building (Vogel, 2007:57).

Figure 160: Top showing the Malt House and bottom showing the Mariendahl brewery (Scurr, 2010: 94; 96).

64. Figure 161: The glass spine emphasising the walkway next to the water channel (Fagan, 2020: online).
65. Figure 162: The symbolic water feature with its pavilion, a significant intervention of Fagan to celebrate the historicity of the brewery (Fagan, 2020: online).
66. Figure 163: The underground parking garage, pierced with circular light-wells, allowing planted poplar trees to grow through the slabs. This marks the start of the new circulation route (Fagan, 2020: online).
67. Figure 164: The vertical elements - the glass elevator shaft and the reconstructed masonry chimney (Scurr, 2010: 94; 96).

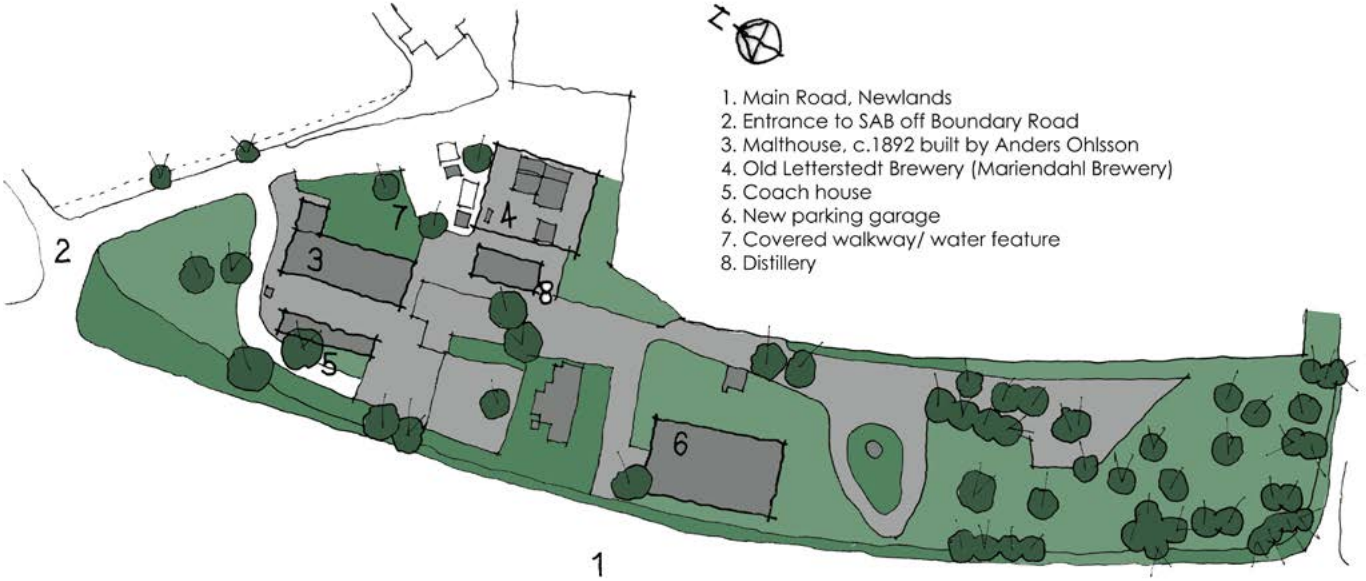


Figure 165: Site layout, showcasing the various new and existing elements on site.

Inge De Beer (1995:13) mentions in a journal article that Fagan's approach to re-use and allowing the historic fabric to acquire a new use is not dissimilar to that of Carlo Scarpa – who meshed historic layers together revealing contrast rather than restoring it to original form. Certain Scarpa-esque elements can be identified in the approach to Fagan's interpretation of the brewery, such as the water channel, the glass spine and details of the concrete canopy over the subterranean exhibition entrance. See Figure 161 and 162 for a photograph of the water channel and water feature.

A new circulation pattern was incorporated, with the new movement route kept separate from the old. See Figure 165 for the layout of functions on site. The new journey through the site and its historical functions are enhanced through symbolism, spatial experience and physical interaction. This circulation route starts at the underground parking garage, pierced with circular light-wells, allowing planted poplar trees to grow through the slabs. Fagan worked with his son, a structural engineer, to design the newly incorporated two-level parking garage (refer to Figure 163). The visitors follow a clear narrative through the site, along a walkway that incorporates a symbolic water feature and pavilion as a pause in the narrative. The visitor enters an underground tunnel, viewing exhibited artefacts of a previous furnace excavated by archaeologists. A hydraulic glass lift in a glazed 'chimney' transports visitors from this subterranean space through the next three floors of the redesigned brewery (Figure 164). In an interview (2010), Fagan recalled the experience of emerging from the ground in the frameless glazed lift, moving from the dark

Figure 166: Visual tension between the original timber staircase and the new colour-coded steel staircase (Scurr, 2010: 97).

Figure 167: Arched opening allow visitors to view the brewing process on both sides of the walkway (Berman, 2015: 19).

basement to the light-filled top floors. When arriving at the top of the brewery, the visitors follow colour-coded stairs which lead them down through the brewery to the basement – the bar area.

The original buildings appear to be of masonry construction with a timber roof structure. Steel details of Fagan's walkway contrast with the simpler original stairs and are accentuated by detailed support braces and joints. These specific finishes make the interventions appear more polished and thought through, even if they are quite humble. Glass railings prevent the obscuring of views and submerge the visitor within the process (see Figure 167).

Fagan placed the above-mentioned colour-coded stairs in direct contrast with the existing, turning the existing structures into an exhibition of its own. The industrial steel of the new staircase contrasts strongly with the vulnerability of the aged timber stairs (see Figure 166).

De Beer (1995:15) notes: "The Mariendahl Brewery, an extension of Letterstedt's earlier brewery, was changed in 1881 from a horizontal to a vertical, gravity-driven process, for which this new tower was added." The glazed lift tower acts as a modern spine that is sensitively connected to the existing through circulation nerves flowing from the spine into the building. Fagan intended to thread the new through the existing complex. Detailed drawings of Fagan also show the reconstruction of a masonry chimney, as shown in Figure 168 on the left). When investigating these drawings, it appears that the original chimney was only a stub base and the rest of its structure was lost due lack of maintenance. Fagan rebuilt approximately half the height of the chimney with masonry details and delicate profiles. The masonry chimney complements the glass tower of the circulation system, as well as adding to the verticality of the design. The reconstruction of this almost forgotten element celebrates and brings remembrance to the process.

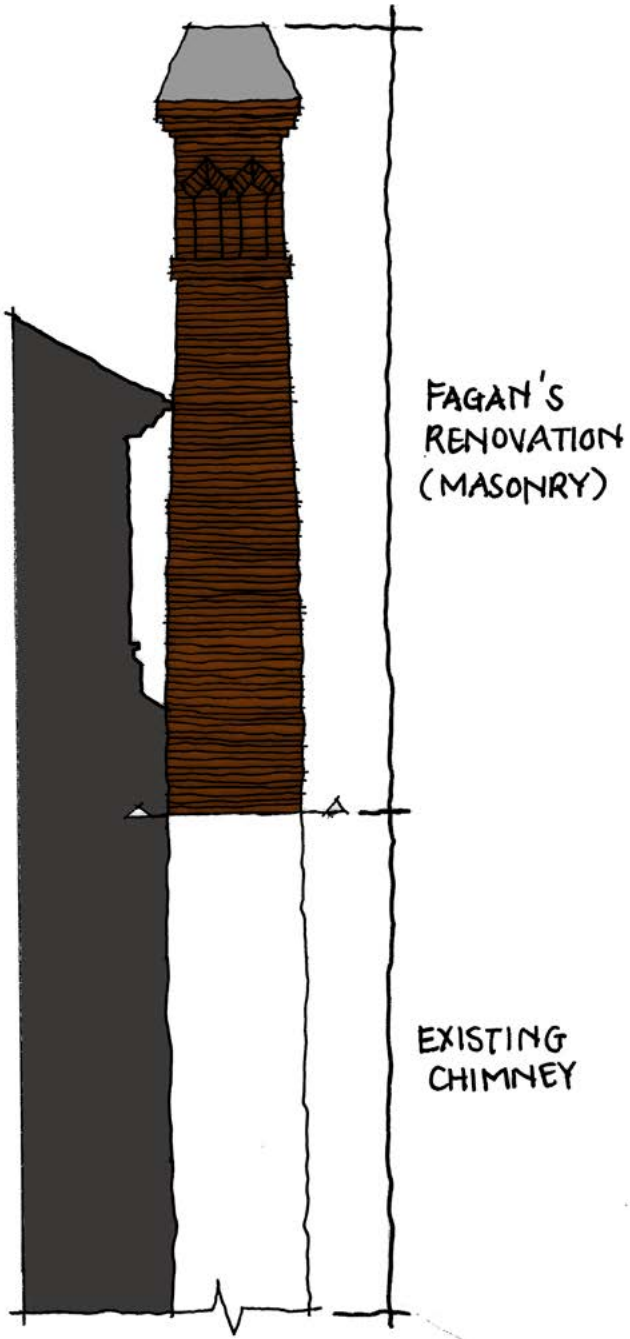
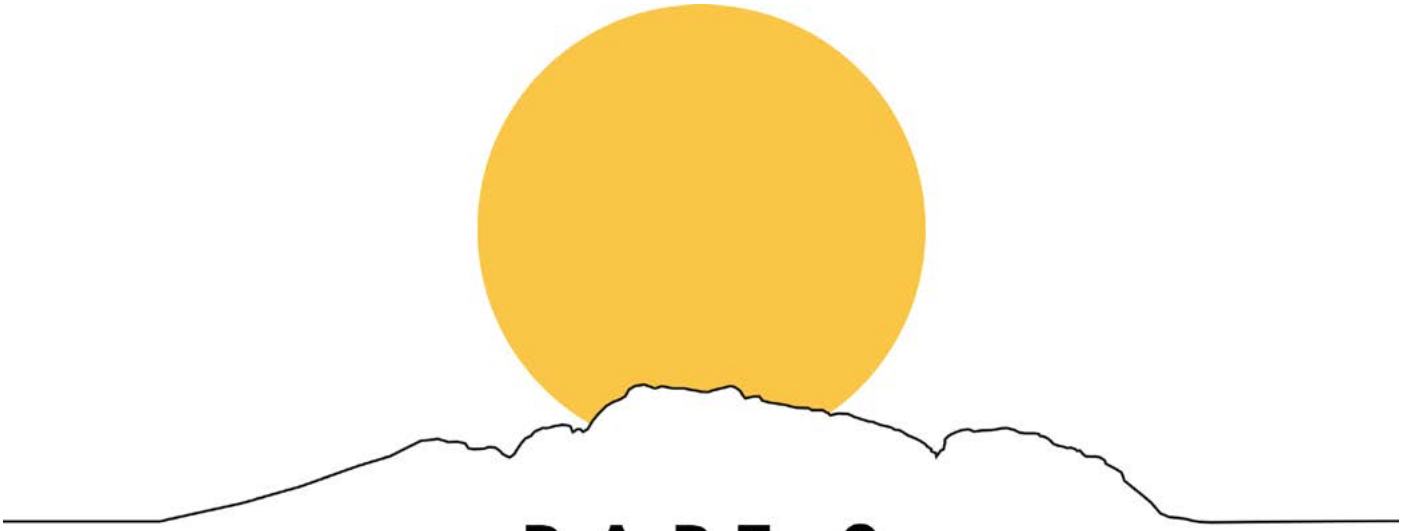


Figure 168: Illustrating Fagan's intervention with the existing chimney.

Openings have been punched through original walls to enable viewing of the brewing equipment, making one aware of the wall thicknesses and the subtle arch referring to the brewing kettles (as shown in Figure 167 on the left). Services have been left exposed, forming part of the industrial aesthetic, similar to the manner the roof structure is also revealed. Stainless steel service pipes are in certain instances attached to the roof, becoming a detail and a constant sight throughout the entire brewery. This creates constant awareness of the function and nature of the architecture, while also avoiding unnecessary additions or changes to the existing. In certain areas, the rotten timber roof structure had to be replaced. The new intervention also incorporated timber structures, but left the timber structure unpainted, unlike the original structure. The new dark timber support beams contrast strongly with the white painted ceilings, immediately being discernible as different.

Referring back to the chosen site, the old hops kiln speaks of a humanising vulnerability, and as Bachelard writes (2011:134), achieves a heightened intimacy as the outer layer of perfection is weathered away. Following the thoughtful nature of fragile architecture, the connection to the hops kiln will be embedded within the physical memory and historicity of the building, details arising from this encounter.



PART 3

THE FERMENTATION

Part 3 encompasses the ripening of the final synthesis. It provides a comprehensive explanation of design decisions and considerations, along with the design development – the fermenting of the design to arrive at a final 'brew'.

3.1 BRIEF

Similar to the brewing process, this dissertation consists of the ingredients, steps and conditions needed to attempt to brew a successful final product. This project and architectural attempt endeavours to embrace both the journey and the unpredictable final project, as the objective of the architectural attempt is the phenomenological journey.

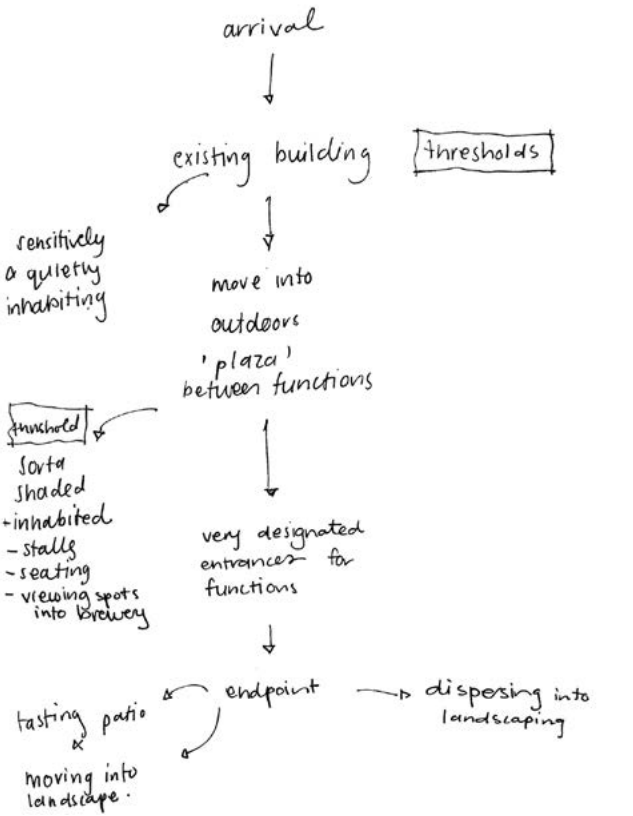


Figure 169: Aligning the functions according to the narrative.

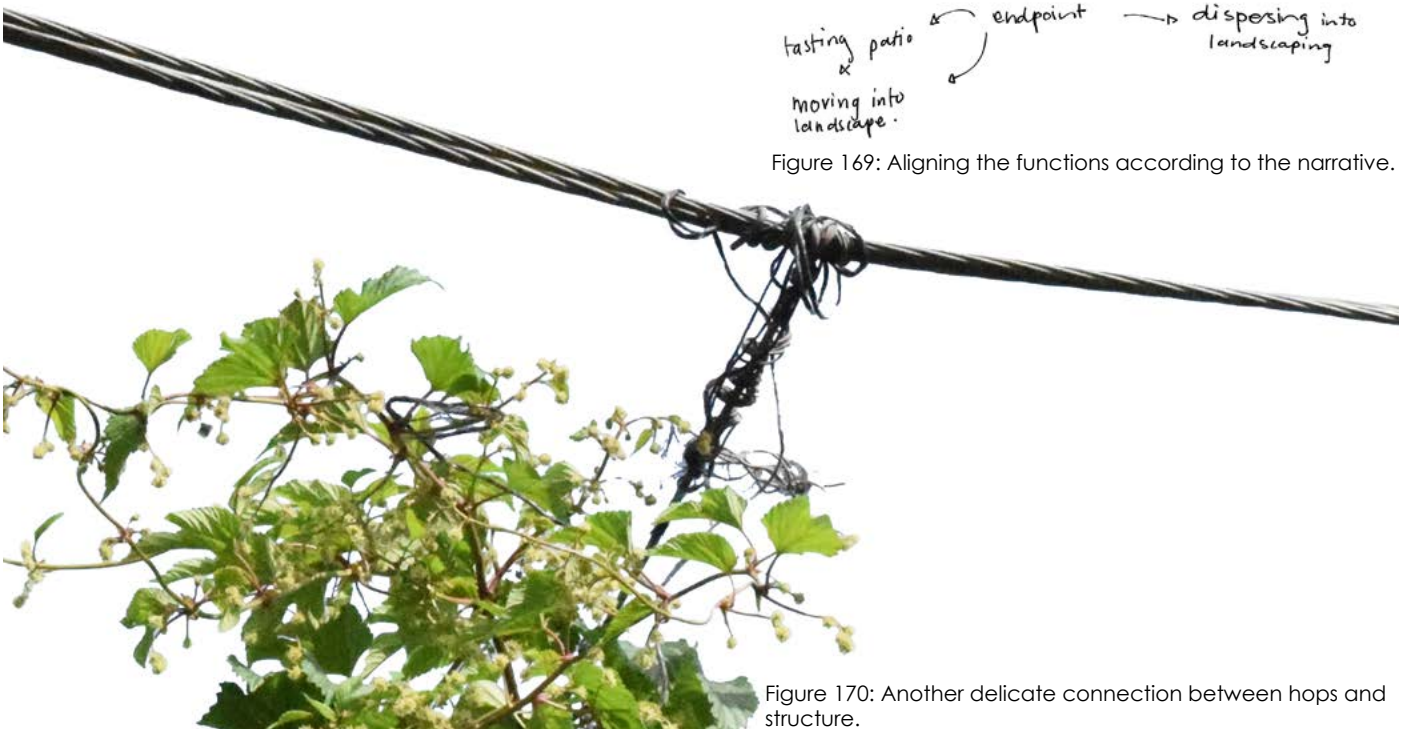


Figure 170: Another delicate connection between hops and structure.

3.2 ACCOMMODATION LIST

Tower:
- Entrance lobby **27,8m²**
- Gallery lobby **27,8m²**
- Observation lobby **27,8m²**
- Pump storage 1 **27,8m²**
- Lift **4,6m²**

Storehouse:
- 2 x Storeroom **24,2m²**
- 2 x Office **28,6m²**
- 6 x Grain silos **17,3m²**
- Loading bay **43,5m²**
- Staff ablution **44,5m²**
- Mill **53m²**

Brewhouse:
- 2 x Storeroom **57,6m²**
- Reception **49,3m²**
- Kitchenette **38,5m²**
- 2 x Office **26,7m²**
- Brew laboratory **66,1m²**
- Cold store **26,4m²**
- Dry store **26,4m²**
- Brewing hall **361,9m²**
- Staff ablution **44,5m²**
- Pump room **440m²**
- Service yard **126,61m²**
- Loading bay **43,5m²**
- Staff parking **167,8 m²**

Fermentation house:
- Lobby **42m²**
- Maturation hall **163,4m²**
- Cold store **27,9m²**
- Dry store **22,4m²**
- Loading bay **35m²**
- Bottling facility **131m²**
- Kitchenette **11,6m²**
- Tasting floor **157,7m²**

Brew pub:
- Bar & seating **142,5m²**
- Interior eatery seating **82,5m²**
- Exterior patio seating **132,6m²**
- Preparation area **23,8m²**
- Cold room **4m²**
- Dry store **4m²**
- Washing area **16,2m²**
- Service yard **50,5m²**

Brewing academy:
- Entrance foyer **25m²**
- Office 1 **14m²**
- Office 2 **14m²**
- Classroom 1 **50,4m²**
- Classroom 2 **50,4m²**
- School brew studio **107,8m²**
- Lounge **33,2m²**

Other:
- 6 x Shops **267,7m²**
- Outdoor marketplace **822,5m²**
- 6 x Exhibition stalls **36m²**
- Public parking **875m²**

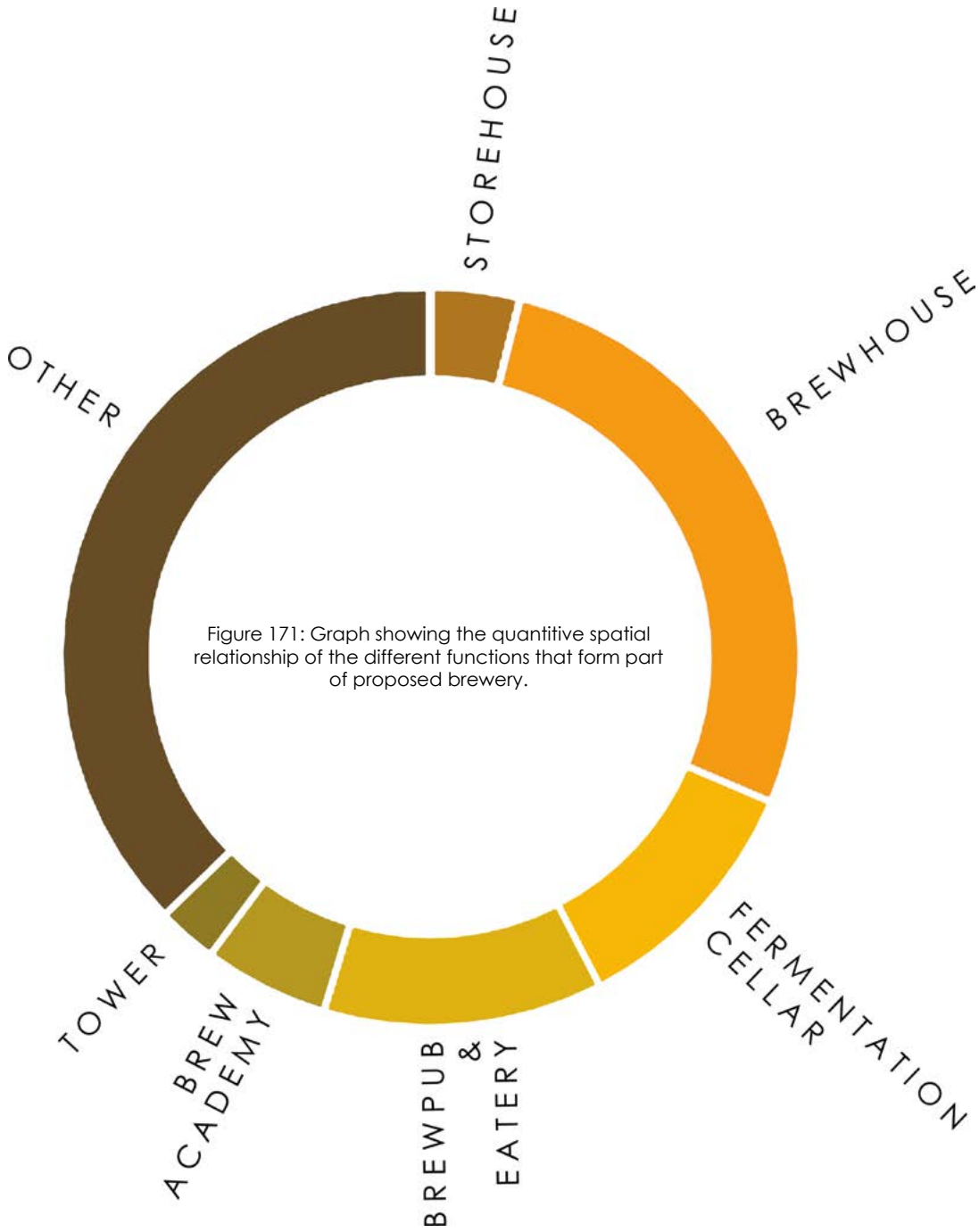


Figure 171: Graph showing the quantitive spatial relationship of the different functions that form part of proposed brewery.

3.3 CLIENTS

The Outeniqua Tourism Association | OTA

The OTA provides a platform for businesses and individuals that contribute to Outeniqua's tourism. OTA is responsible for the sustainable expansion of tourism infrastructure, providing financial support for adequate marketing of the area and is in close contact with municipalities and government legislators. The Outeniqua Hop Route is a marketing brand of OTA and provides travellers with a suitable guide of hops-related attractions, focussing on sustainable tourism to fund hops and beer businesses (Outeniqua Hop Route, 2020:online).

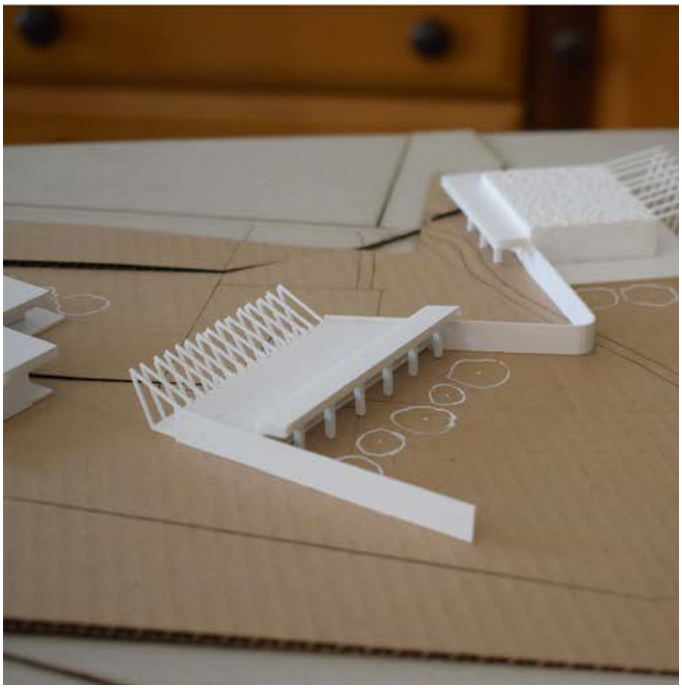
The South African Breweries | SAB

SAB is currently the second largest brewery in the world, dating back to the pioneering days in 1888. The company owns seven breweries and 40 depots in South Africa, as well as various companies within the brewing industry. SAB is not only industry-orientated but strives for a sustainable and socially responsible role within the communities.

3.4 DESIGN DEVELOPMENT

The design process moved from an abstract point of view to a more realistic one. The touchstone, concepts and theoretical information had been gathered and needed to be applied on site. The first architectural attempt was an informal exercise with the placement of functions, overlaying of elements and how volumes can be used to create certain desired spaces. This exercise was repeated for each one of the concepts. Initially, the brewery was proposed to be placed on the northern side of the kiln and the hops.

Along with the models, initial sketches were made, which illustrates the further exploration of an architectural approach towards structure, layout and design. Although these models and drawings may have been made in an informal nature, certain elements can be seen in the final proposition – such as the courtyard, progression of functions and the envelopment of exterior spaces.

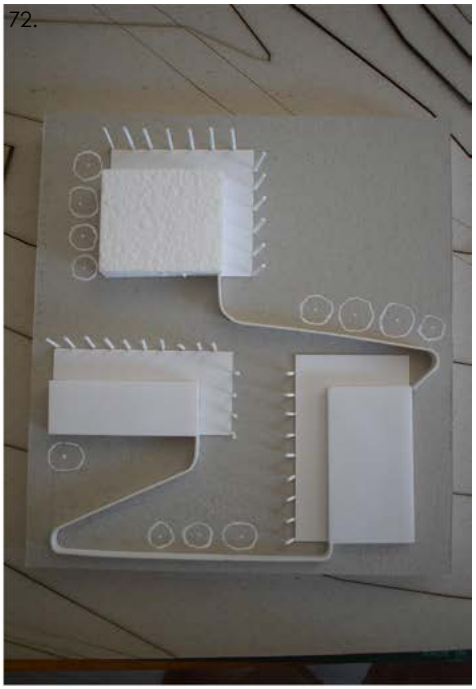


68-73. Figure 172-177: Perspective of working model for concept (Real and imaginary tensions).

68.

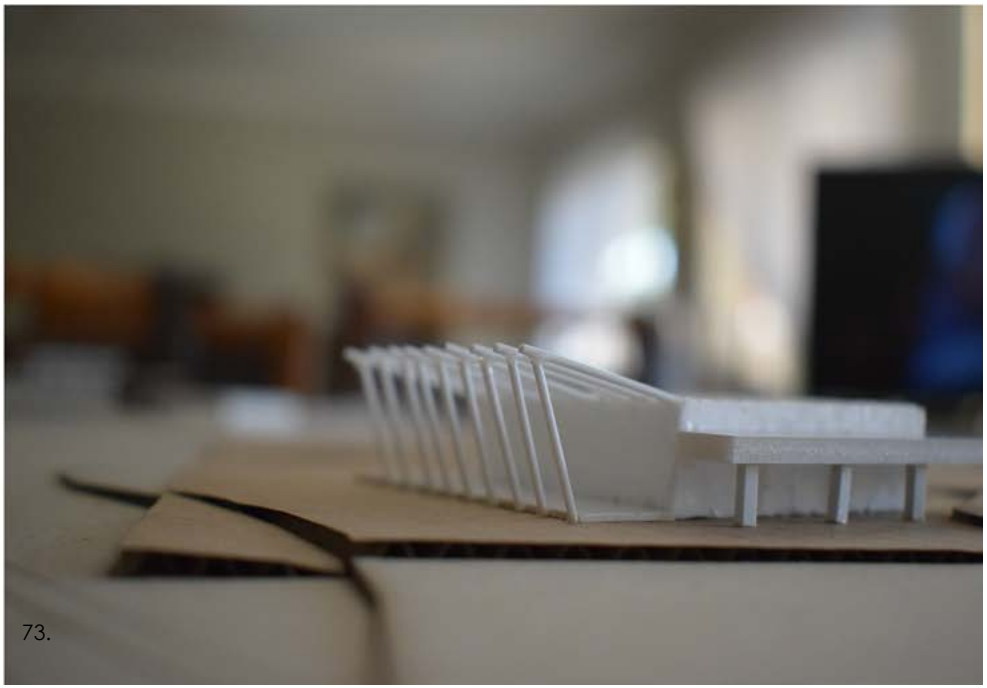
70.

71.

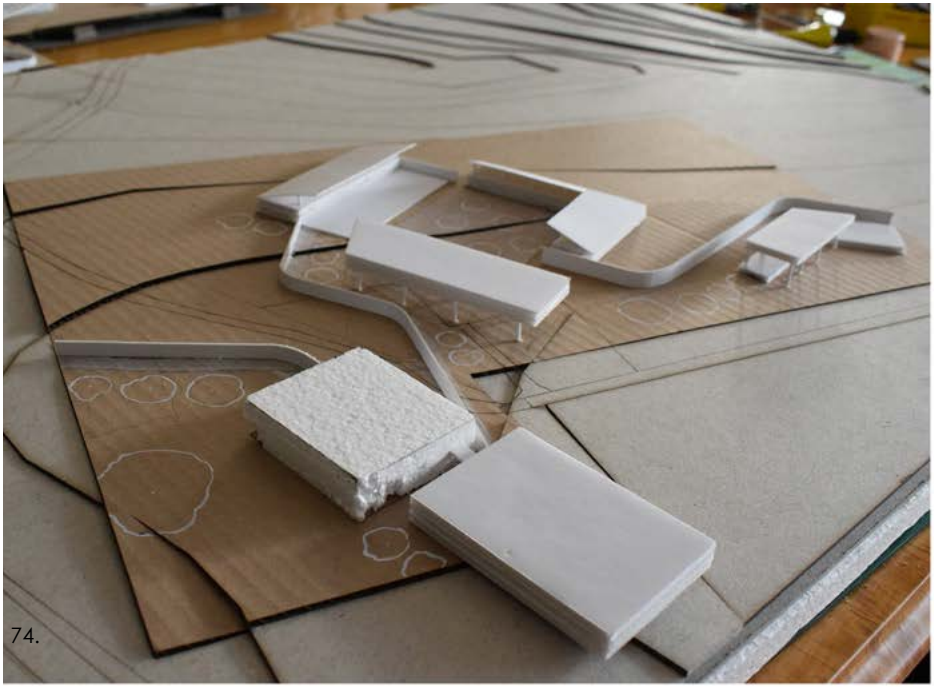


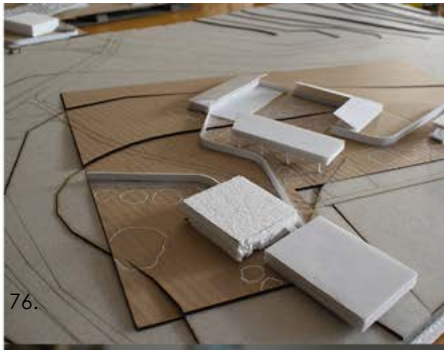
72.

69.



73.


74.

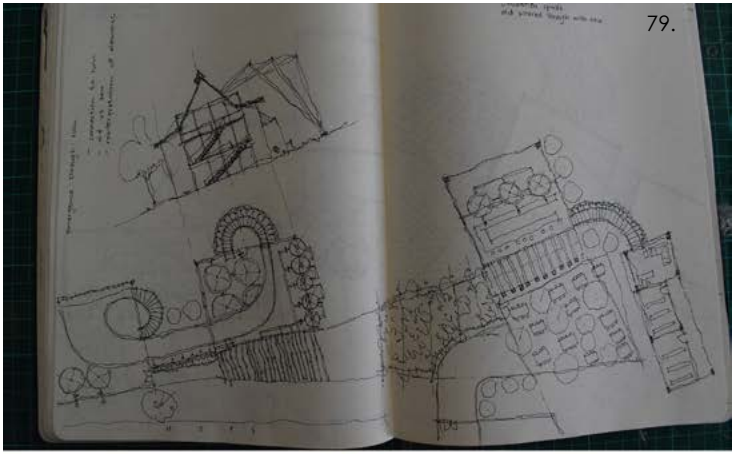

76.

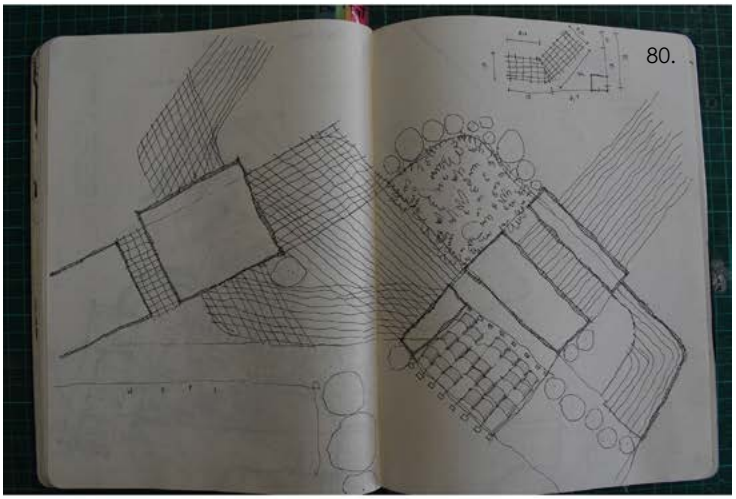

77.

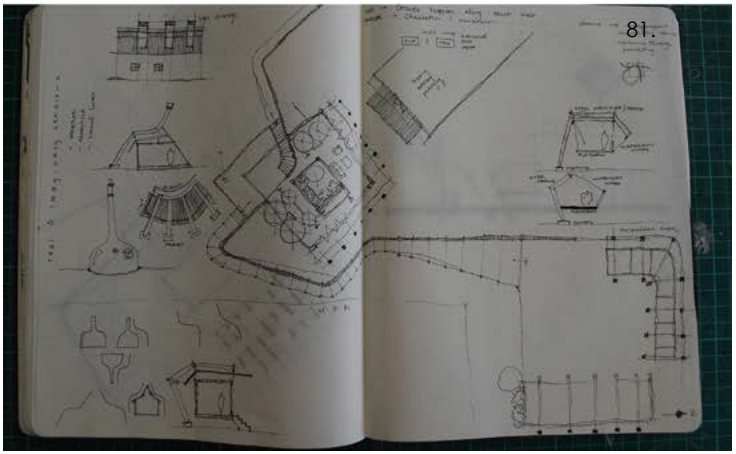
74-78. Figure 178-182: Perspective of working model for concept (Transformation as a narrative).
79-81. Figure 183-185: Experimental drawings of architectural possibilities.


75.

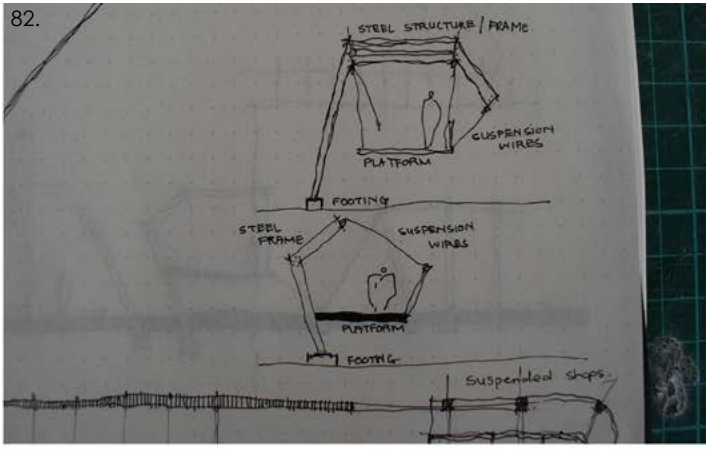

78.

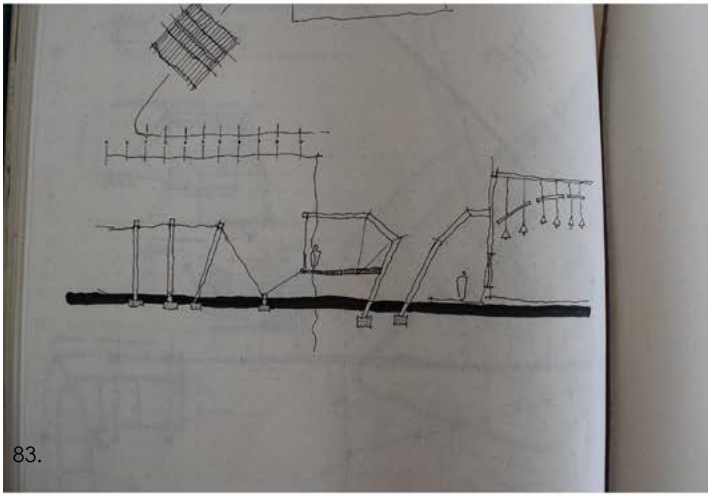

79.


80.


81.

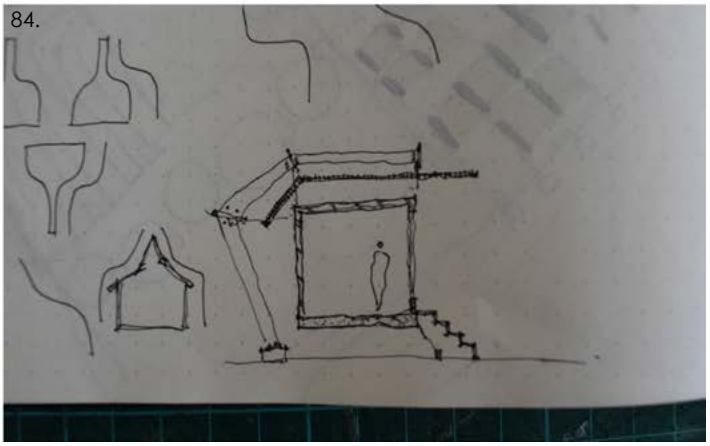
82.


STEEL STRUCTURE / FRAME
SUSPENSION WIRES
PLATFORM
FOOTING
STEEL FRAME
SUSPENSION WIRES
PLATFORM
FOOTING
Suspended steps



83.

84.

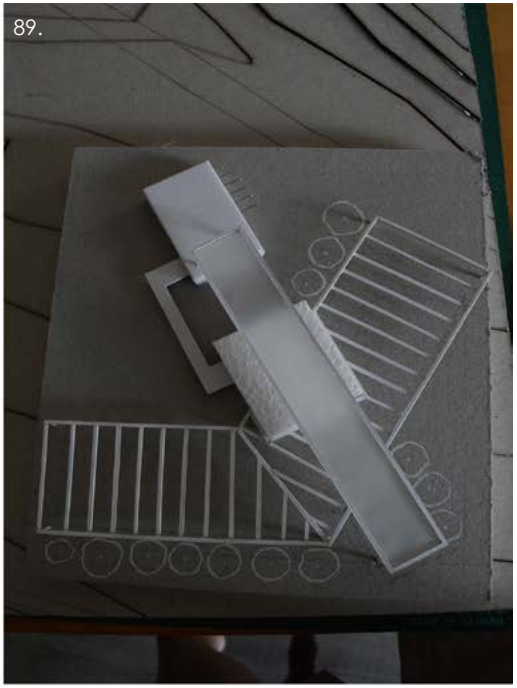


85.

86.

87.

88.



89.

82-84. Figure 186-189: Experimental drawings of architectural possibilities.
85-90. Figure 190-195: Perspective of working model for concept (Emergence of the craft from ruin).

90.

Moving along, a more structured layout was implemented, working on very defined axis, with the brewing process placed on the left and the social functions placed on the right. The layout originated from an exploration into the hops structure, as well as the two layers that formed two narratives or axis – rigid and organic. The rigid layer refers to the human-made constructs – hops training structures and brewing process. The organic layer refers to the natural elements – the hops growing on the structures and the fermentation happening within a human-controlled process.

Additional functions – the beer spa – still formed part of the accommodation list. However, the defined separation of the two narrative (social and brewing) resulted in a unoccupiable middle space. The progression from arrival to the kiln was also troublesome, as the kiln was hidden and only introduced as a non-priority in the layout.

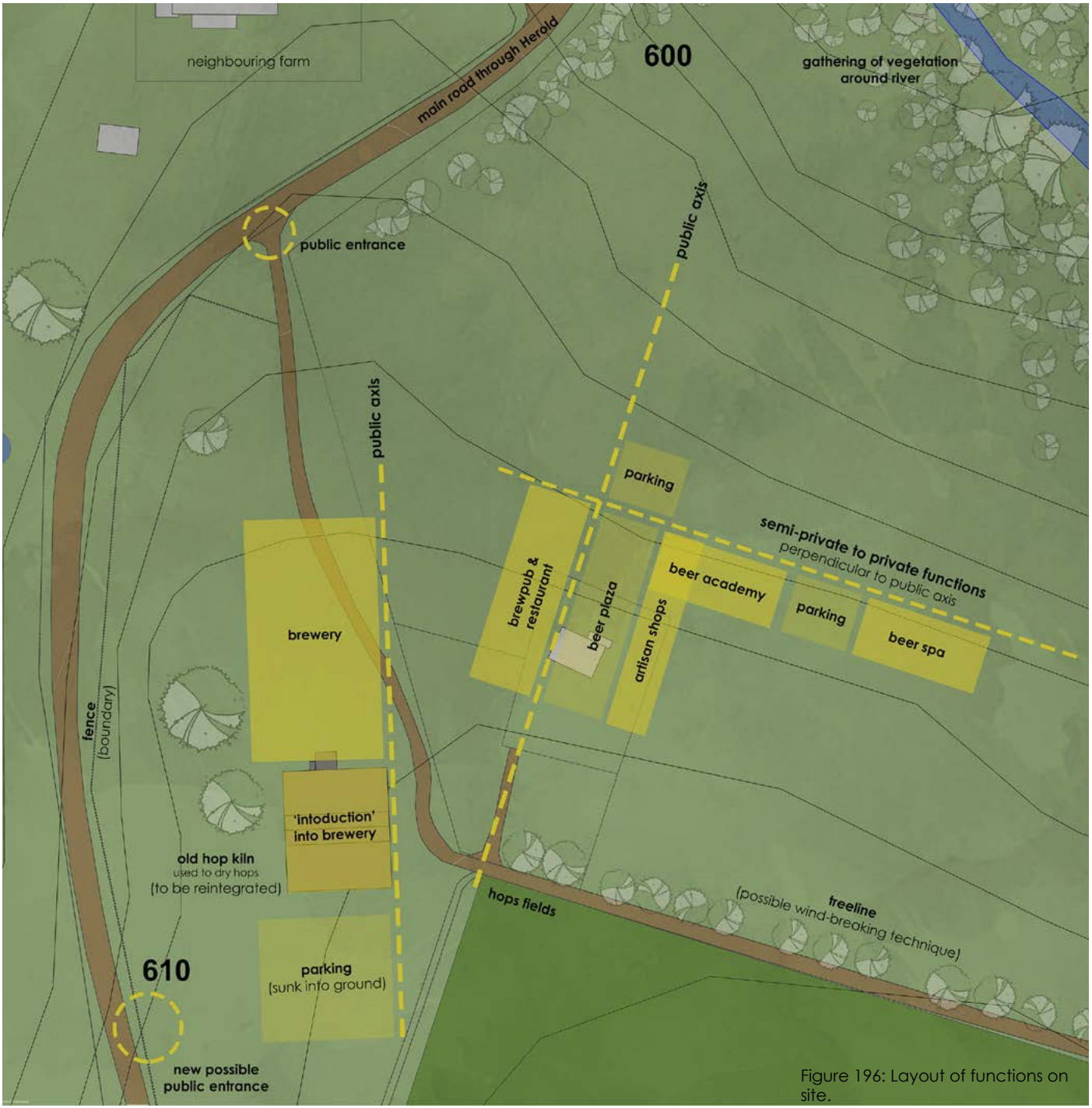
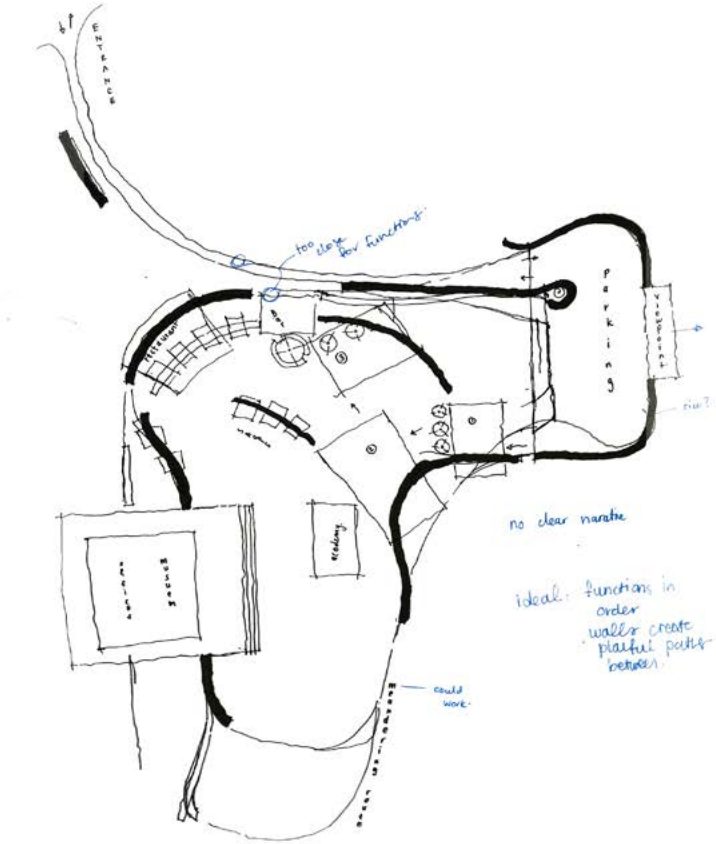


Figure 196: Layout of functions on site.

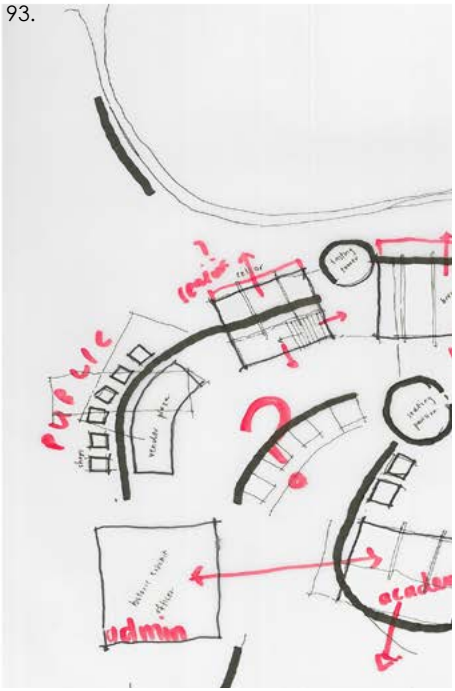
Thereafter, moving away from the two defined axis, an exploration into a curved but singular progression resulted in a boomerang-shaped layout, that folded around the corner of the hops field. Curved, organic lines formed part of the layout, with the plan developing into various adaptations. Although the curved plan layout seemed visually pleasing, the narrative was still unclear. The function placement began to shift south, pushing past the kiln and sliding into the space between the Montagu Pass and the hops fields.

91.

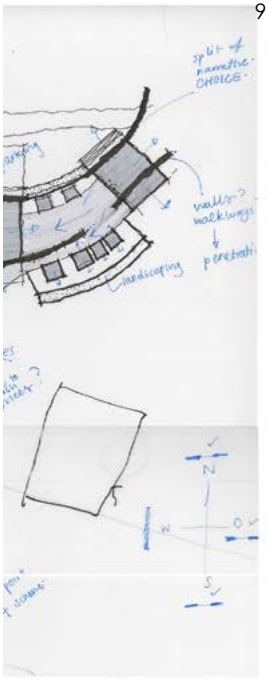


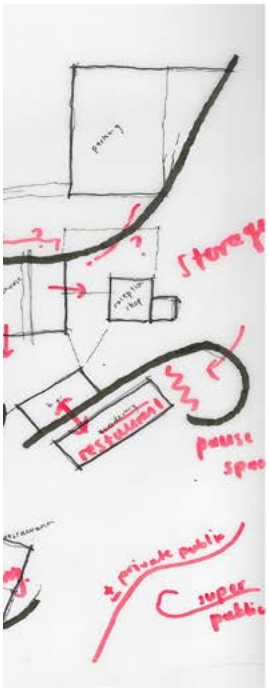
92.

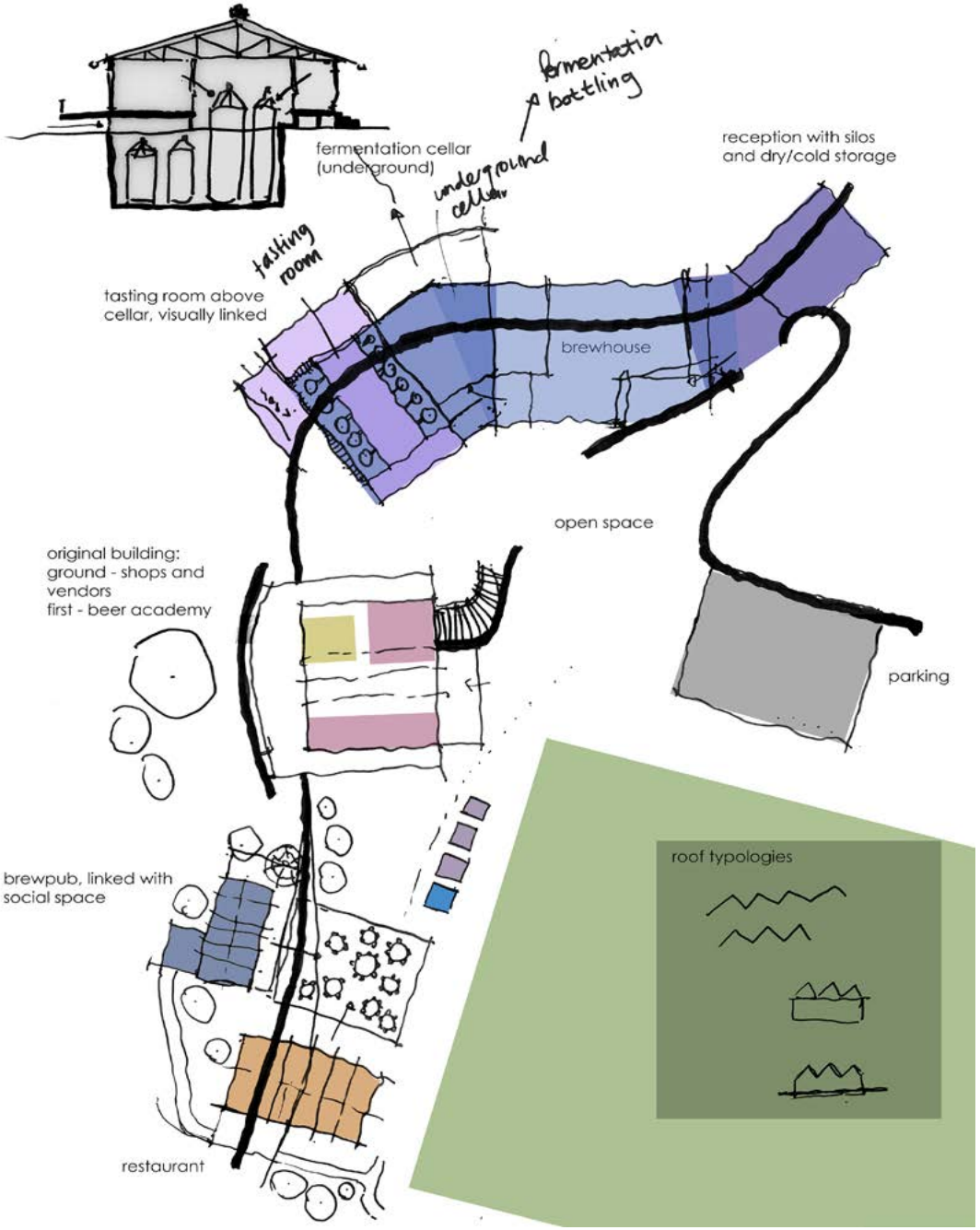
93.



91-94. Figure 197-200: Rough drawings showing the progression of the shape of the plan.







During a crit with the design lecturers, the previous exploration sketches were reviewed. It was observed that a quick pencil sketch of a plan layout was worth reviewing. Retracing the steps, the functions were once again manipulated into the original sketch, opening up to the north, with the kiln at the southernmost point of the plan. The initial idea was of a scheme breaking open, splitting the functions apart into two narratives, with a courtyard or plaza forming between these two axis.

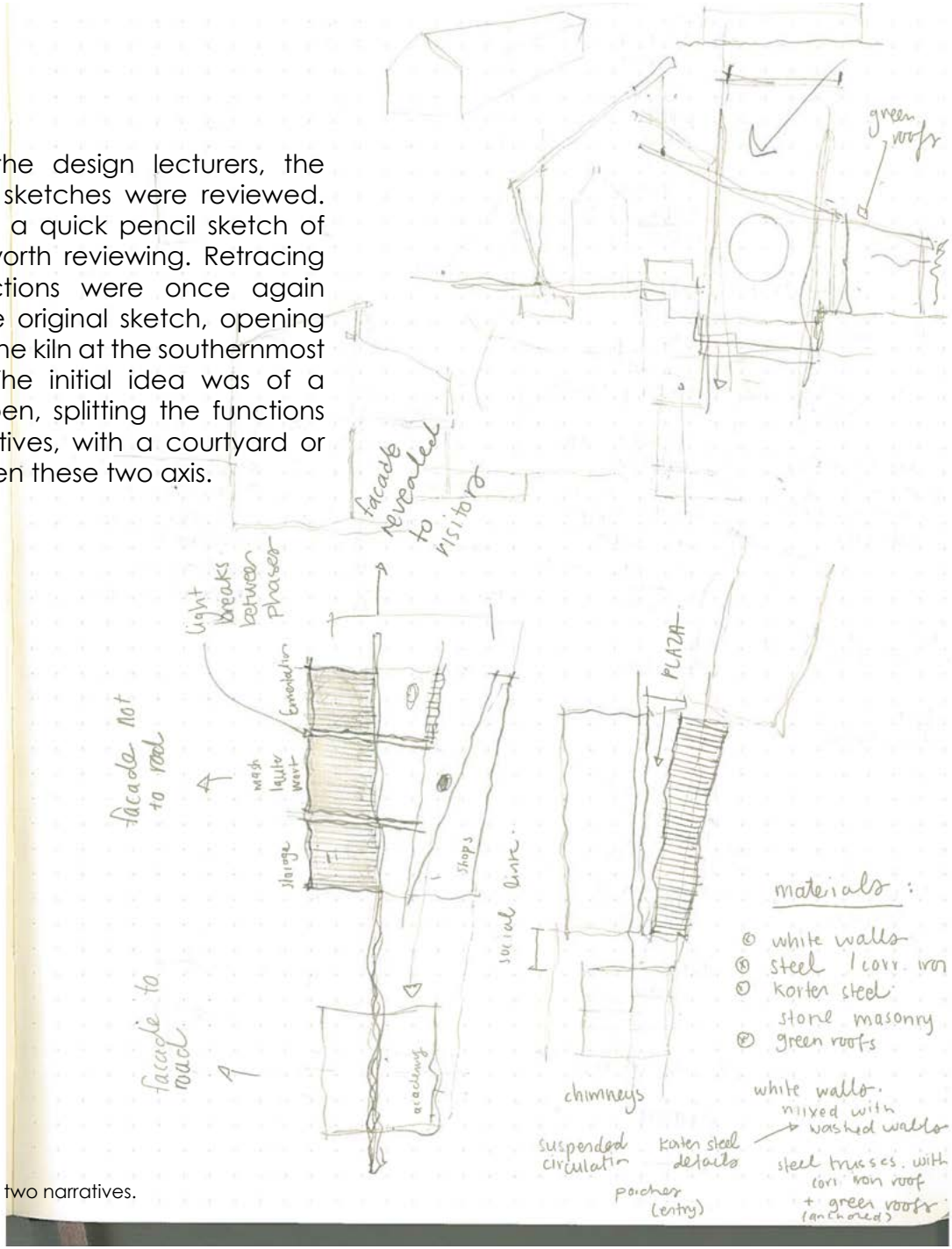
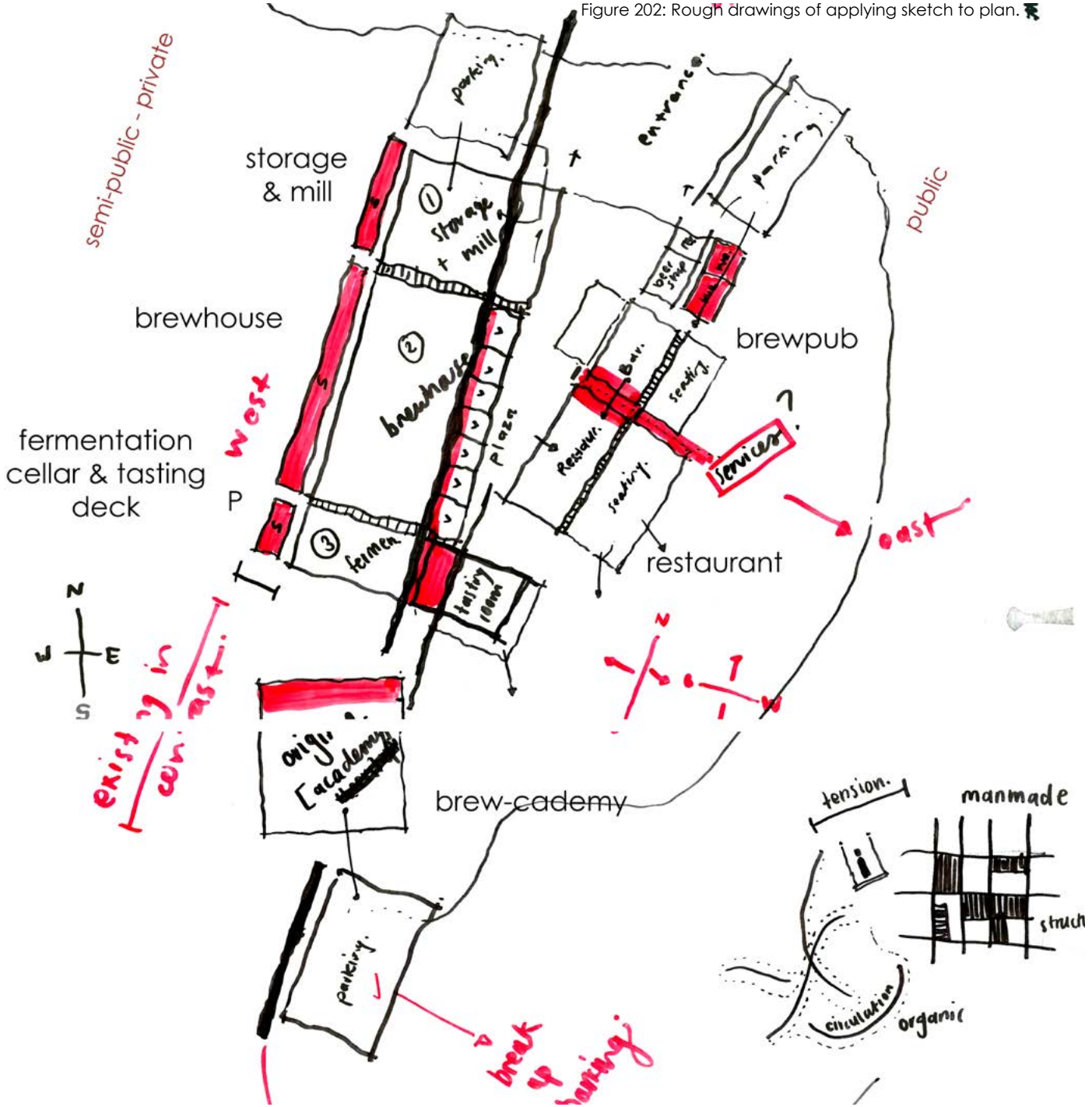


Figure 201: Journal excerpt of two narratives.

Figure 202: Rough drawings of applying sketch to plan.



After a good amount of struggling, the plan was mirrored to the south. The kiln now sitting at the topmost point of the scheme, and the two legs stretching down to the south past the hops fields. The kiln became the starting point of the scheme, both visually and physically and the scheme and courtyard opened up towards the Outeniqua mountains. However, the arrangement and order of the brewing functions still needed attention, as the circulation was severely lacking.

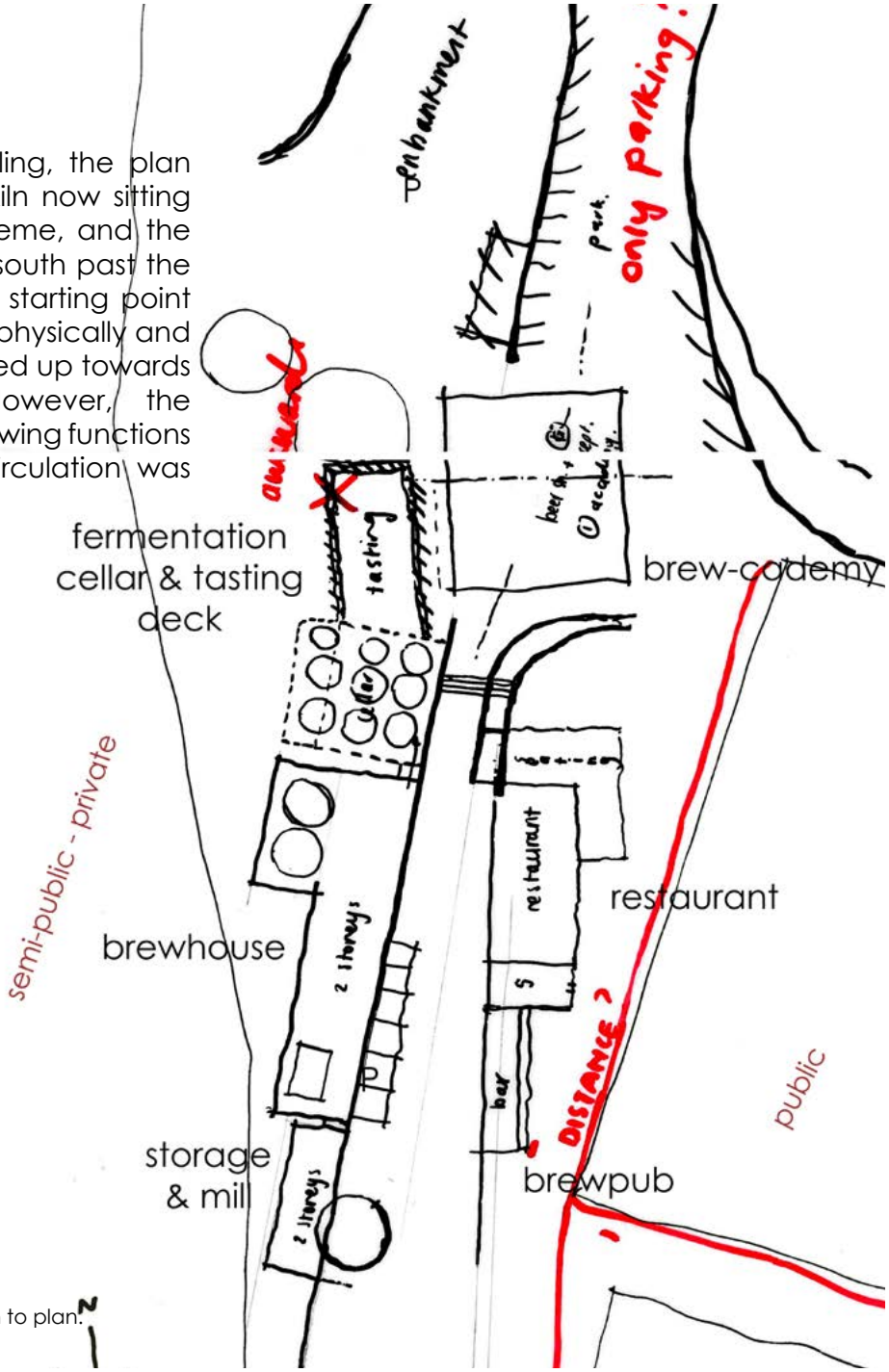


Figure 203: Rough drawings of applying sketch to plan.

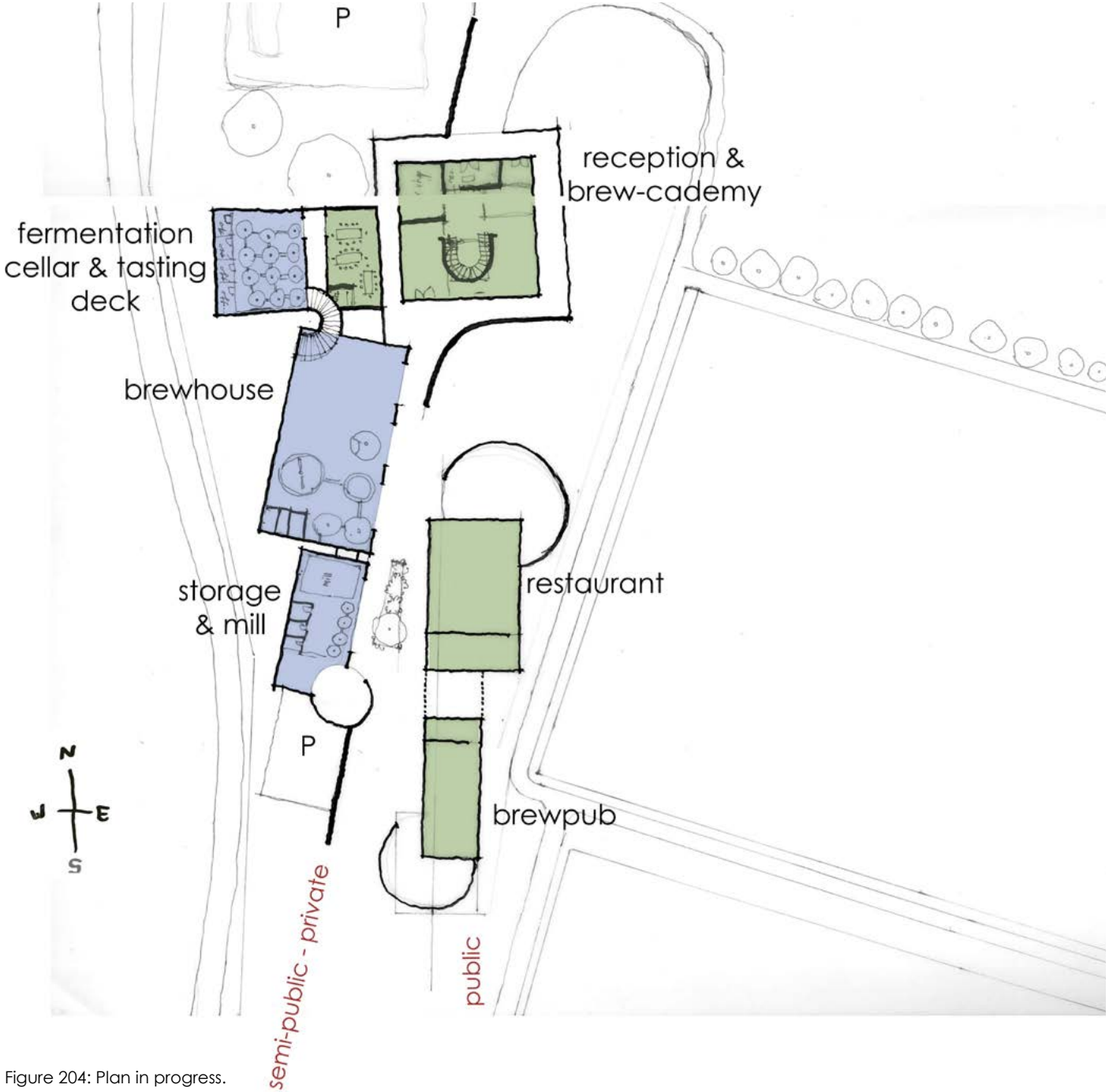


Figure 204: Plan in progress.

The investigation moved onto the volumetric and massing aspect, with a model looking at the scale of the different functions in relation to each other, as well as in relation to the kiln. It was important for the kiln to not be overshadowed by the new functions' size. Although the new functions were now orientated north-south, this presented the opportunity for an intricate façade to become a part of the view from the Montagu Pass. Circulation was still very problematic.

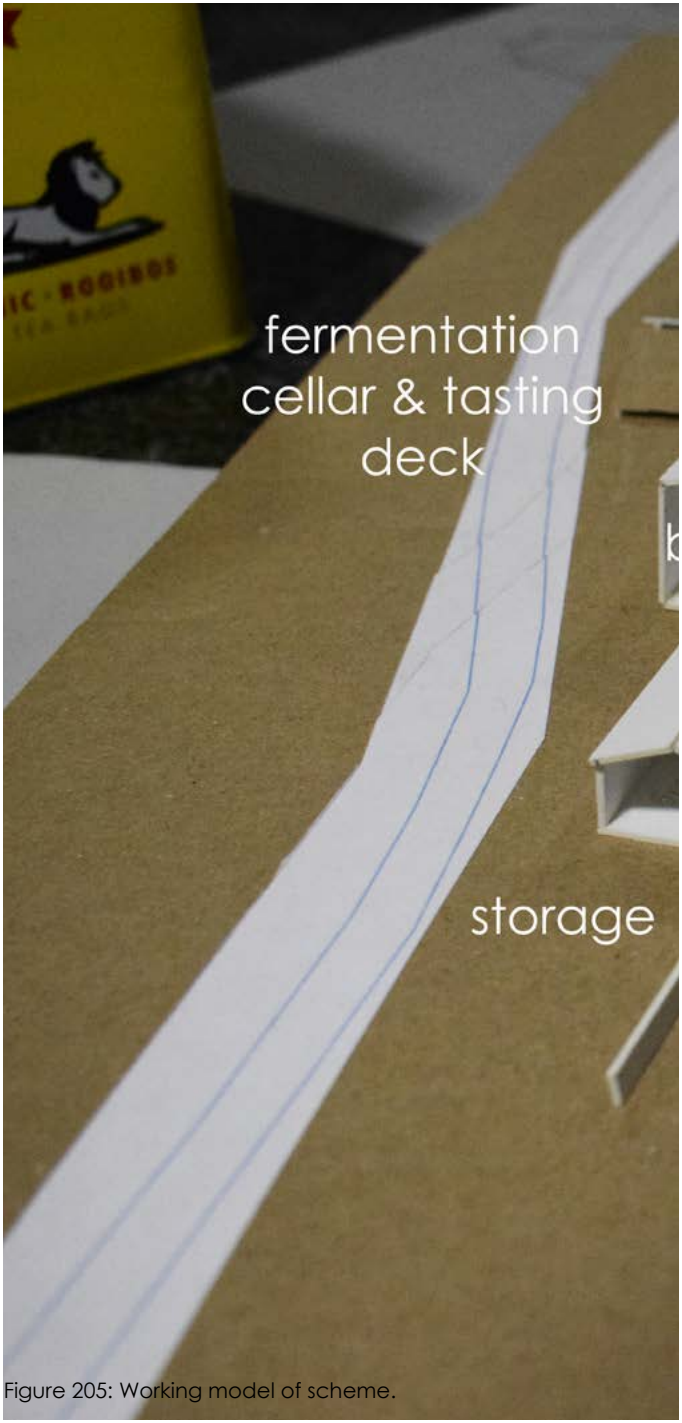
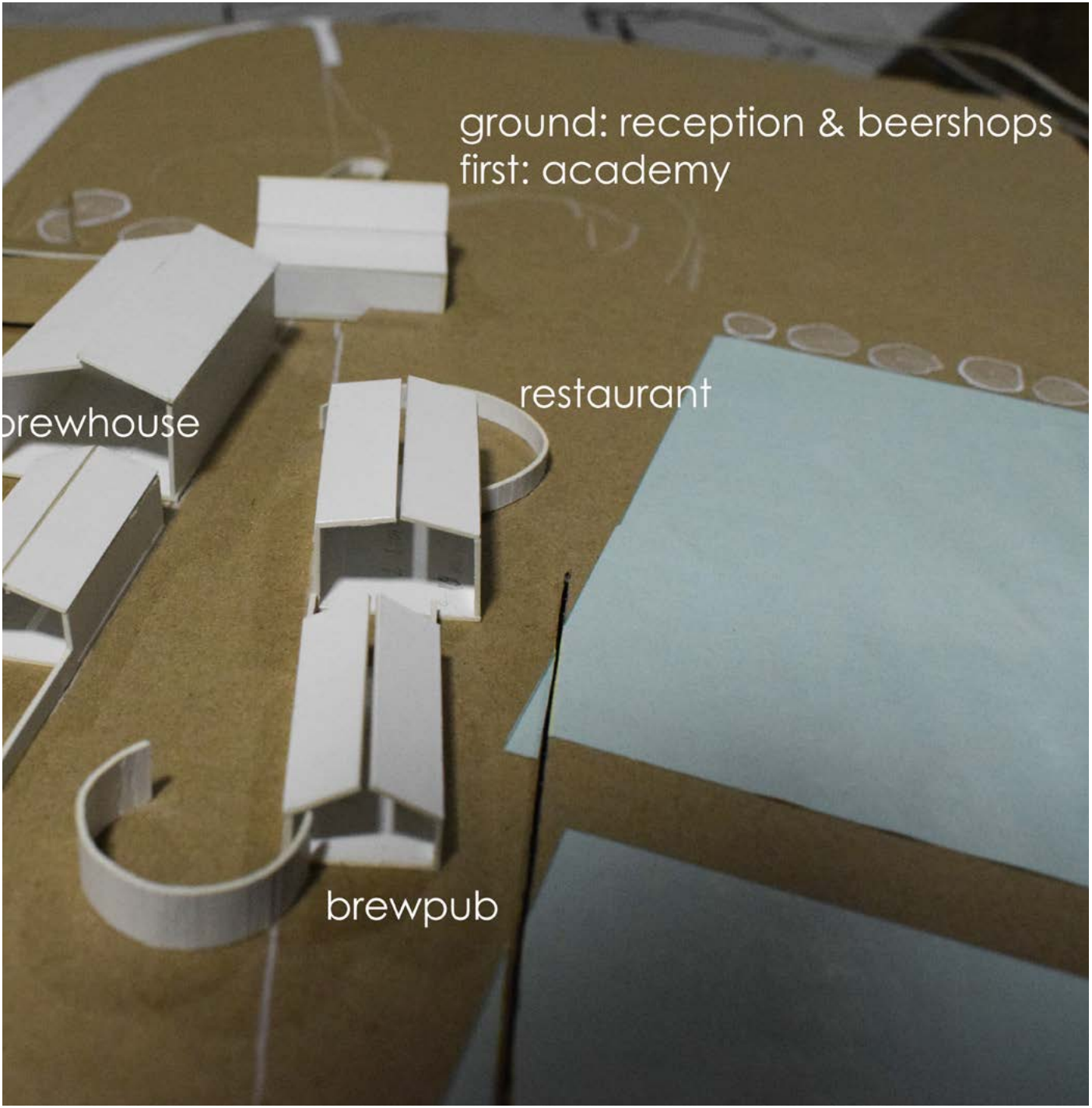
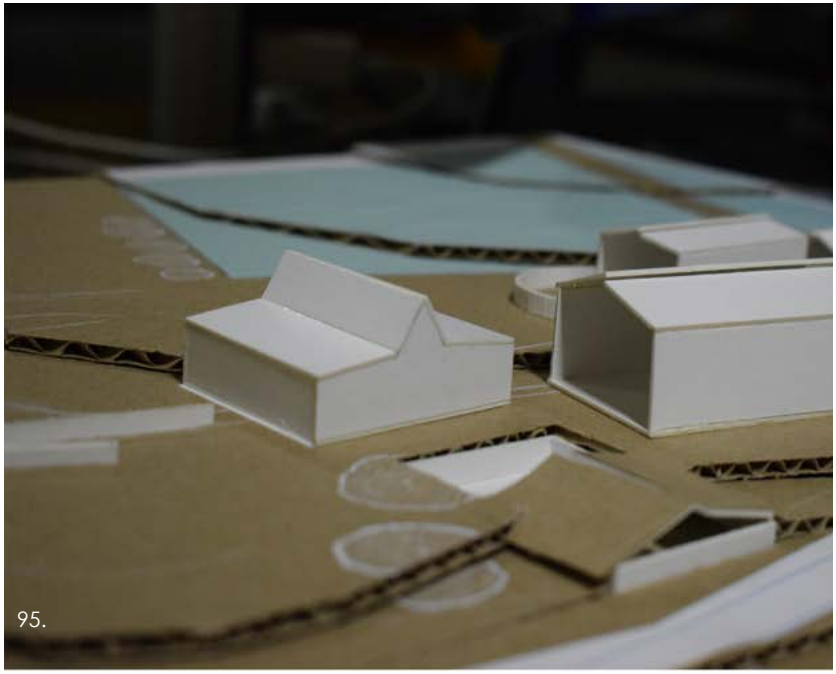
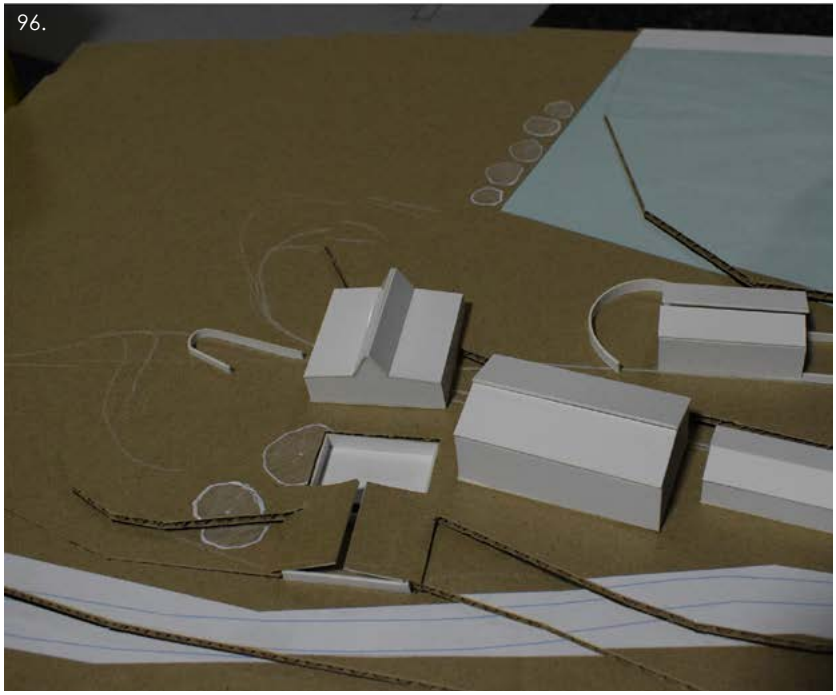


Figure 205: Working model of scheme.

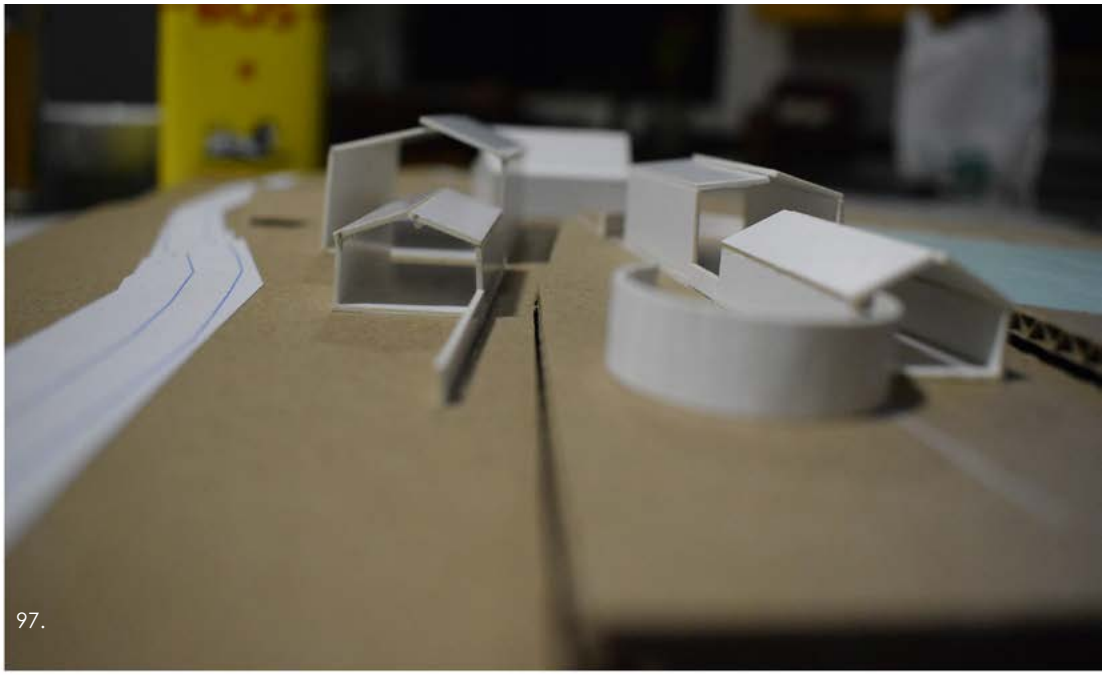

ground: reception & beershops
first: academy
restaurant
brewhouse
brewpub

Preliminary roof designs were considered, with the primary focus on skylights along the roof ridge. This refers back to the hops fields and the cathedral-like light falling in from above between the 5m high rows. Tension and composite trusses were investigated, in order to reference the cable training structures and the concept. The initial proposal for a lookout tower was discussed – originating from circular contextual elements; concrete dams and tall silos. The use of thresholds to address the entrances and exits from buildings were incorporated, in order to emphasise the movement from landscape to enclosed, to interior.


95.

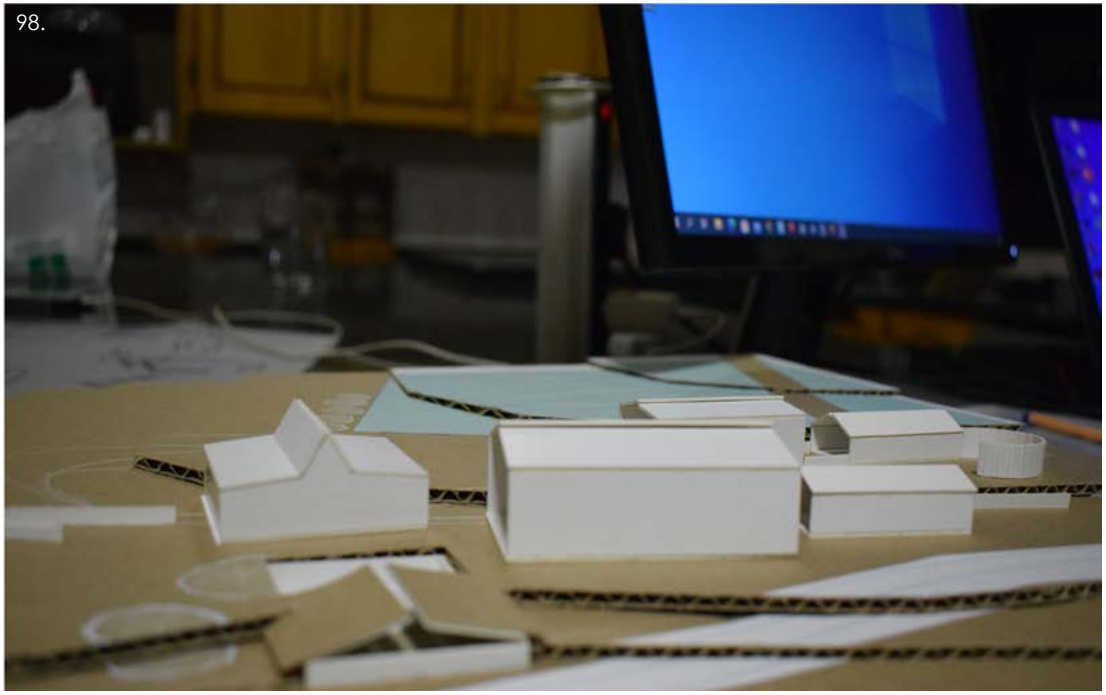

96.

95-98. Figure 206-209: Working model of scheme.



97.

98.



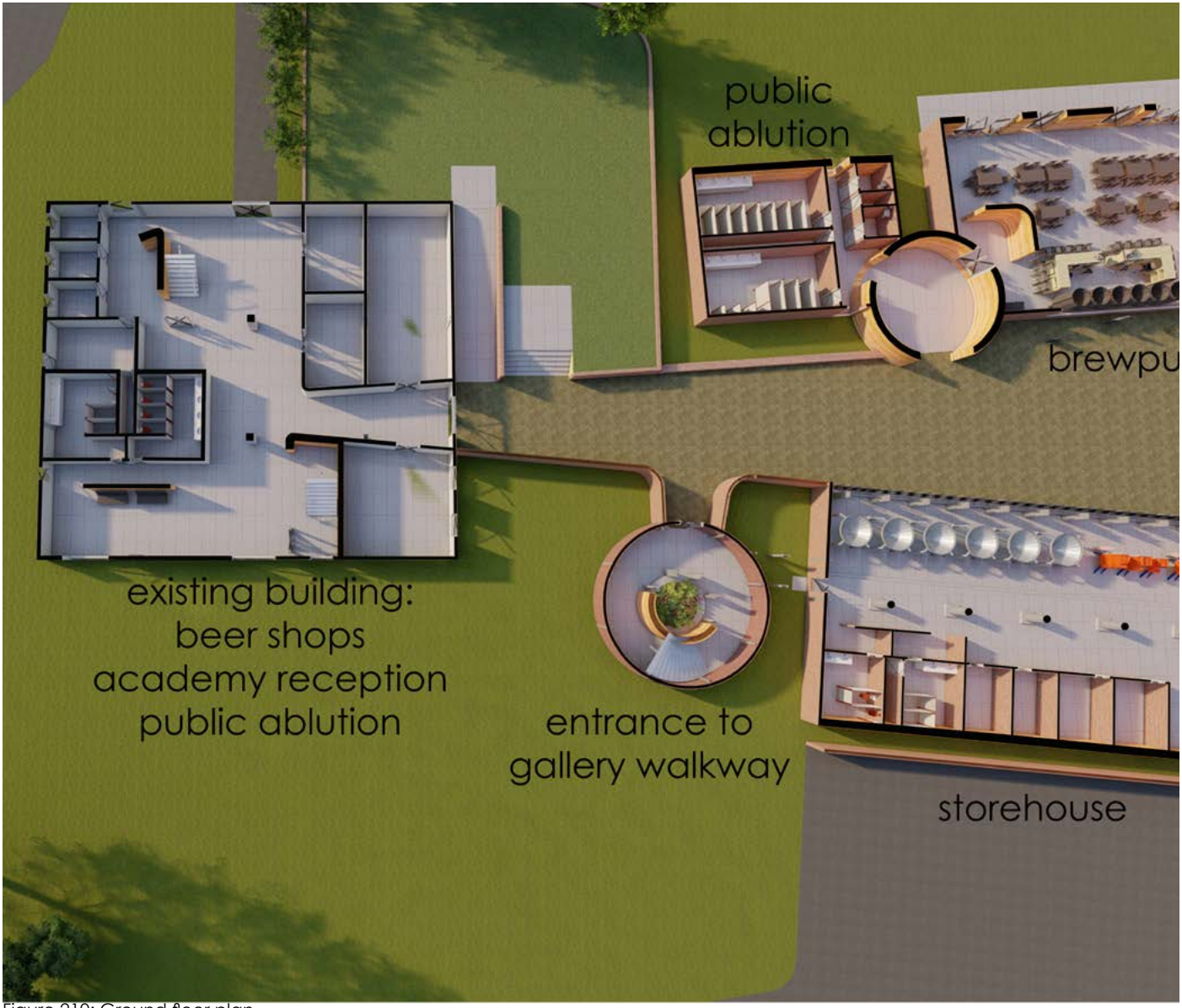
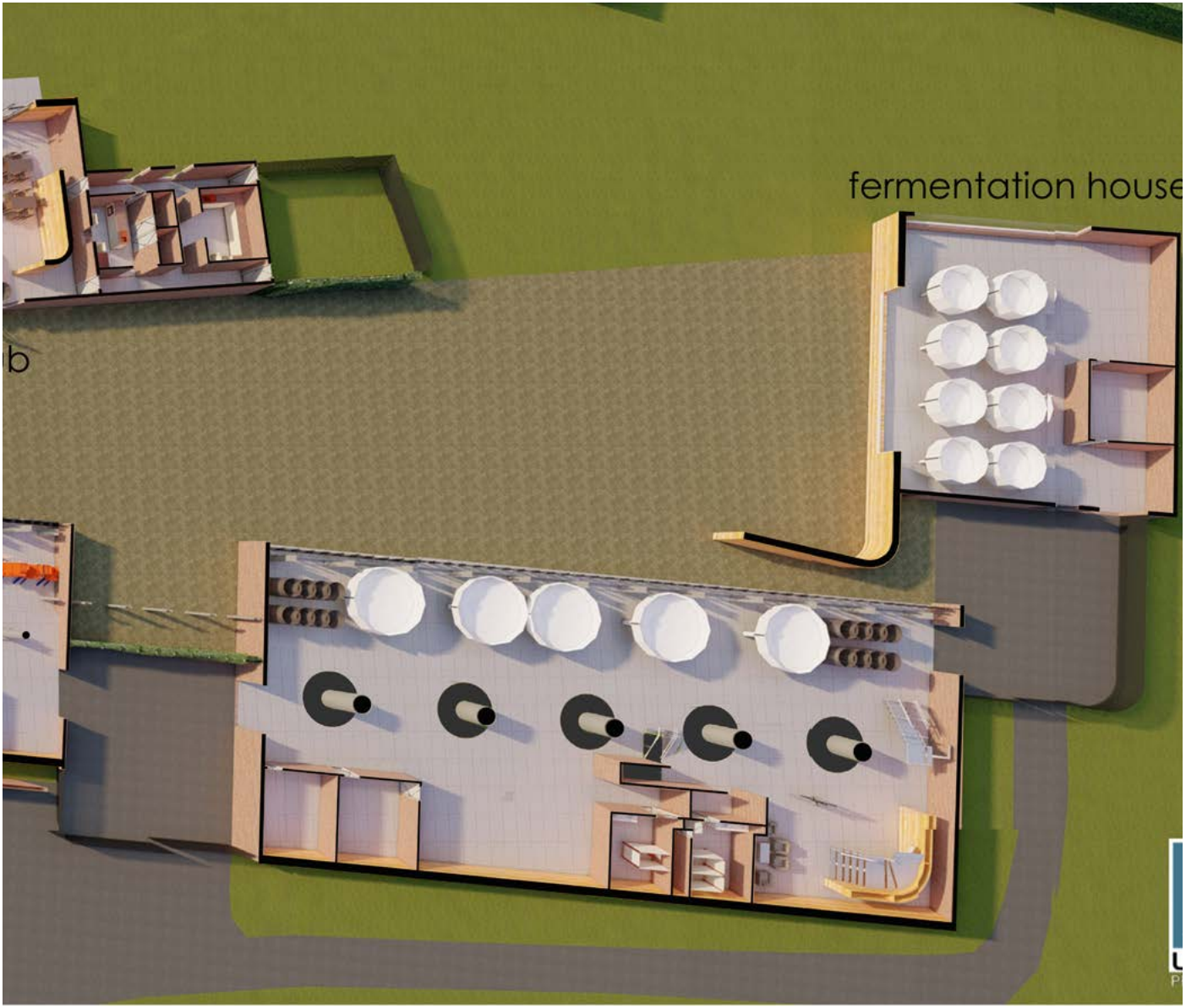


Figure 210: Ground floor plan.


fermentation house
b

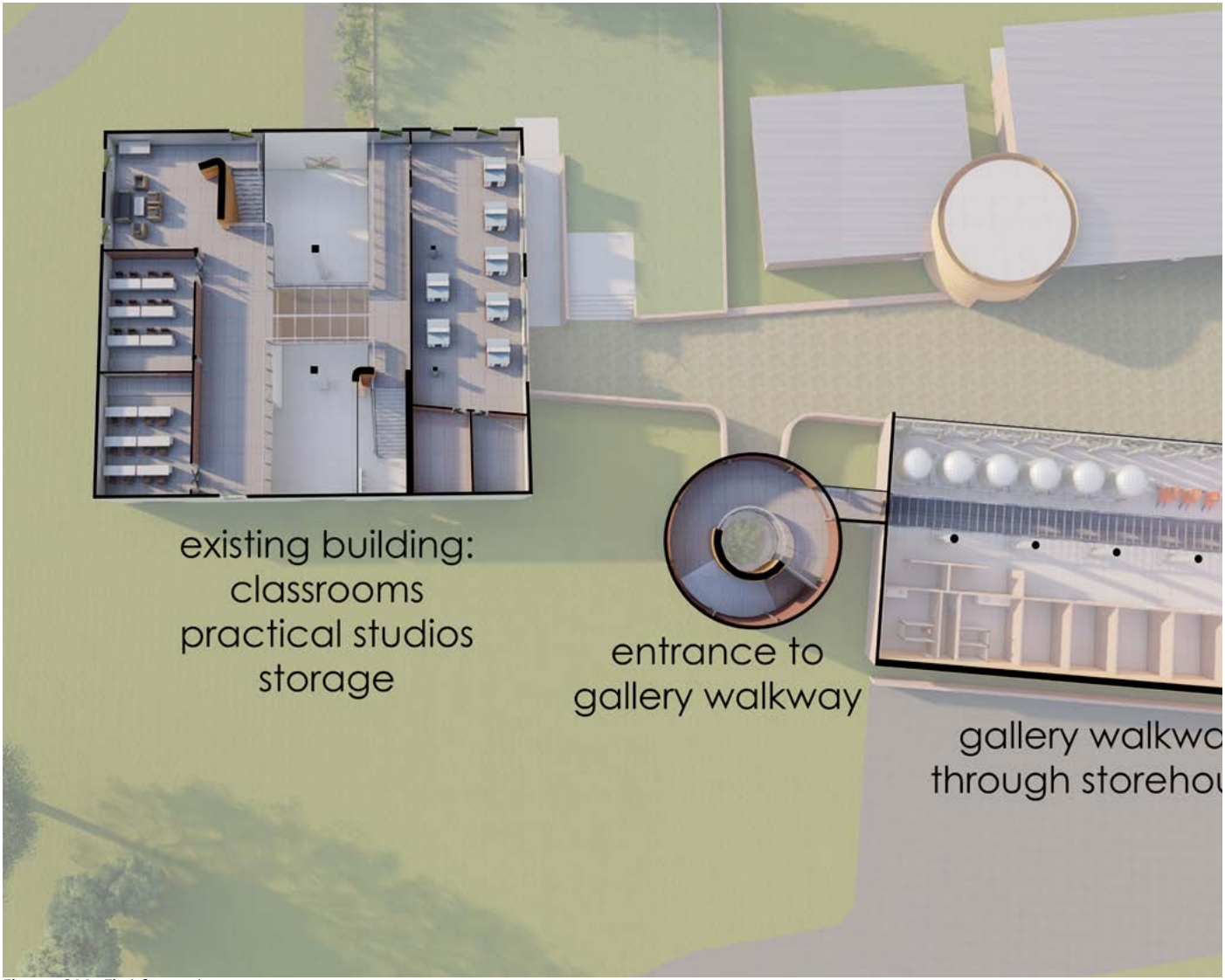
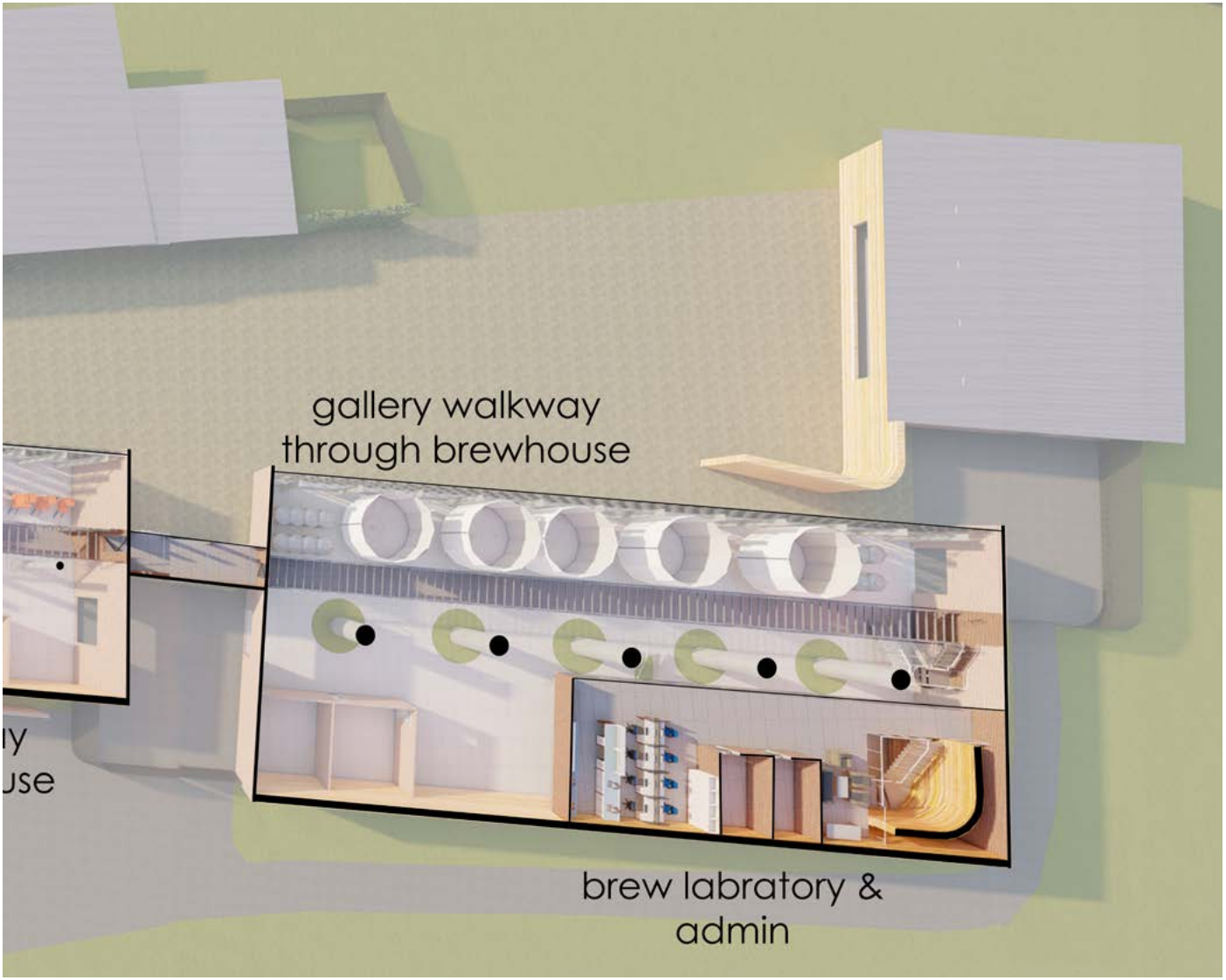


Figure 211: First floor plan.


gallery walkway
through brewhouse
brew labratory &
admin

Moving towards a more finalised plan layout and preliminary three-dimensional design, a detailed model was built to achieve a better idea of the connection of the brewery with the site. This allowed a suitable perspective towards scale and façade design. The lift shaft was deemed too short, and it was decided that it would be made twice as tall, ultimately acting as an observation tower looking out over the scheme, the hops and the context. This tower also celebrates the horizontality of the kiln.


99.

The roof design changed from symmetrical pitched roofs to asymmetrical, sweeping roofs as shown below. This granted the buildings with seating spaces or hierarchical points of entry for staff members, as well as big overhangs that protect the rammed earth stub walls from possible rainfall. The asymmetrical rooflines also create a visual line that guides the eye towards the fermentation cellar and tasting floor situated at the culmination of the scheme.

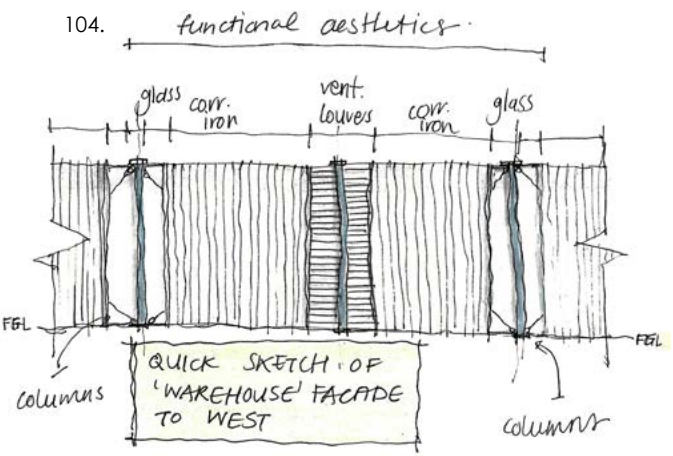

100.

Circular elements were replaced with a repeating greenery covered steel pergola, creating a focus on the movement from exterior to interior. The form of this element references the design approach used throughout the proposed brewery. This design is also implemented in the design of the gallery walkway as one moves from the tower to the storehouse and then to the brewhouse. This creates an awareness of transition and thresholds – this also allows the guide to gather the group of visitors together, provide them with an introduction of the upcoming function and then lead them inside.


101.

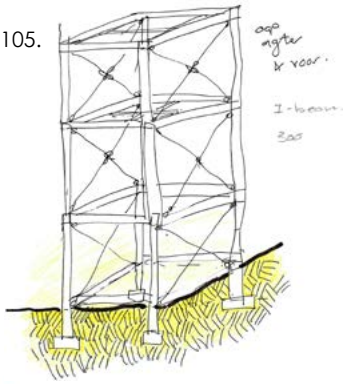
102.

104.



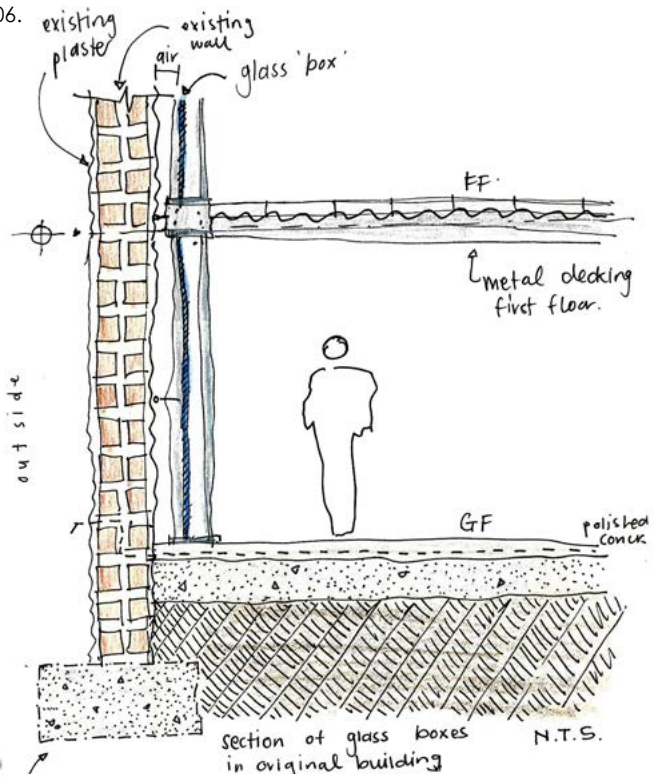
99-103. Figure 212-216: Refined model investigating materiality, mass and scale.
104-105. Figure 217-218: Free-hand drawings from the design process.

105.

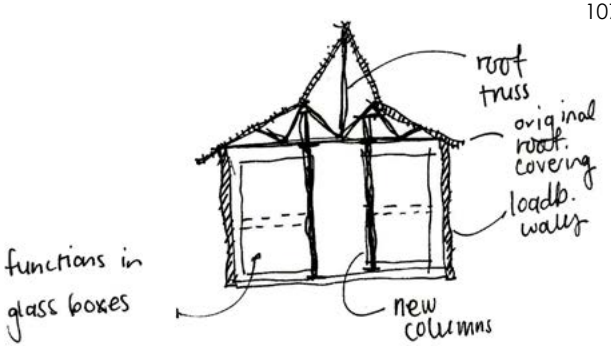


103.

106.



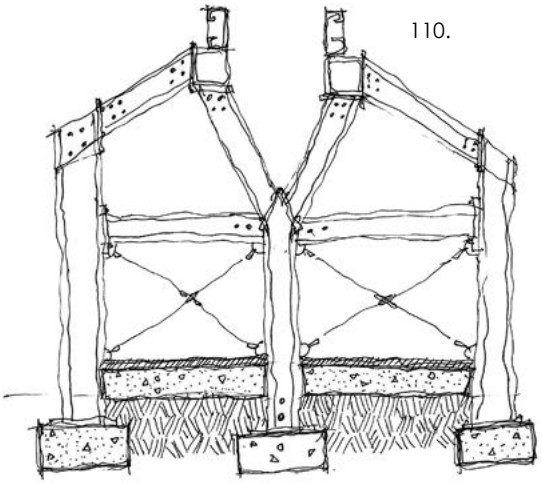
107.



108.

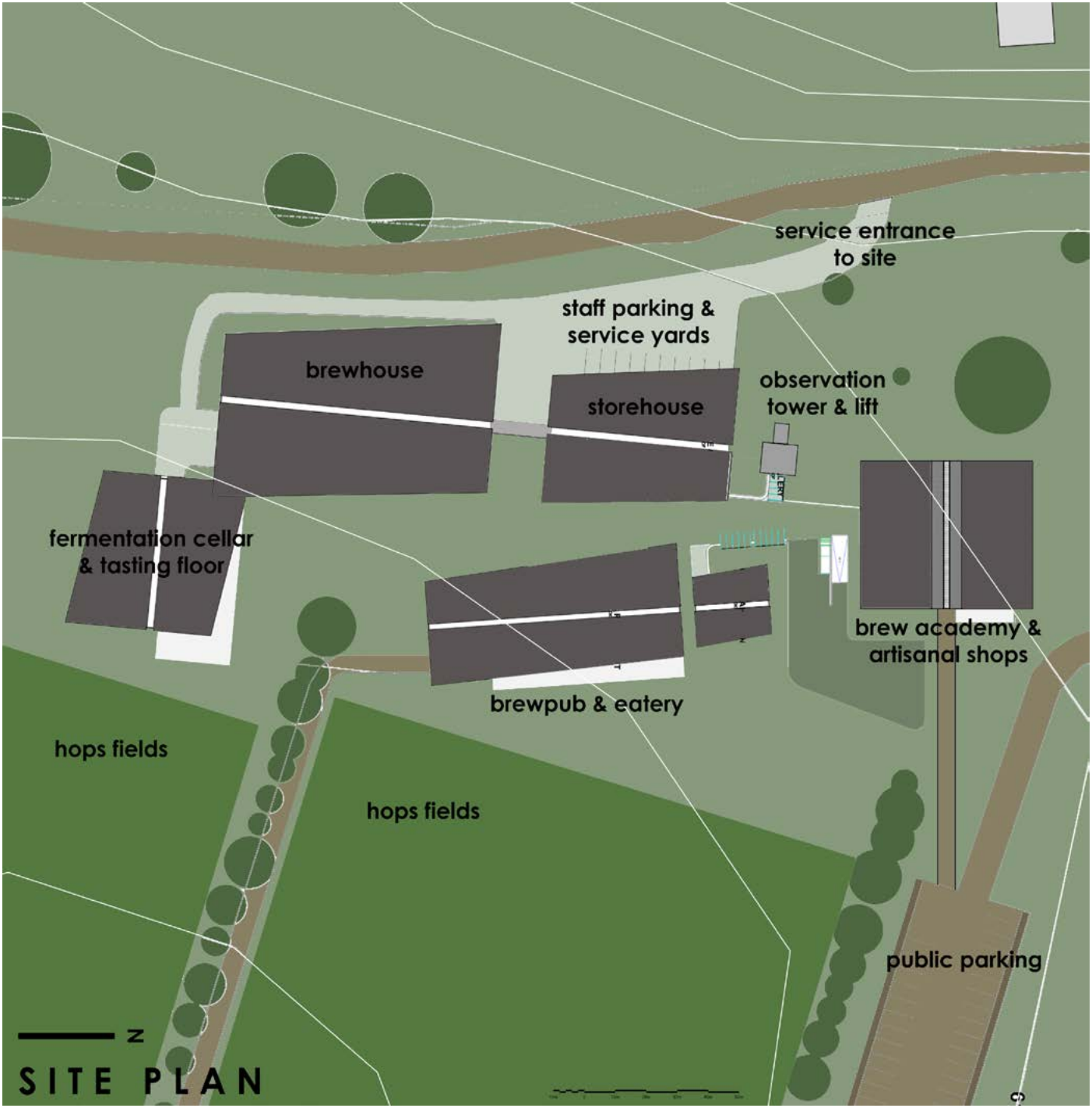
106-107. Figure 219-220: Free-hand drawings from the design process.
108-109. Figure 221-222: Refined model investigating materiality, mass and scale.
110. Figure 223: Free-hand drawing from the design process.
111. Figure 234: The model placed on site, showing the reaction to the hops.

109.



110.

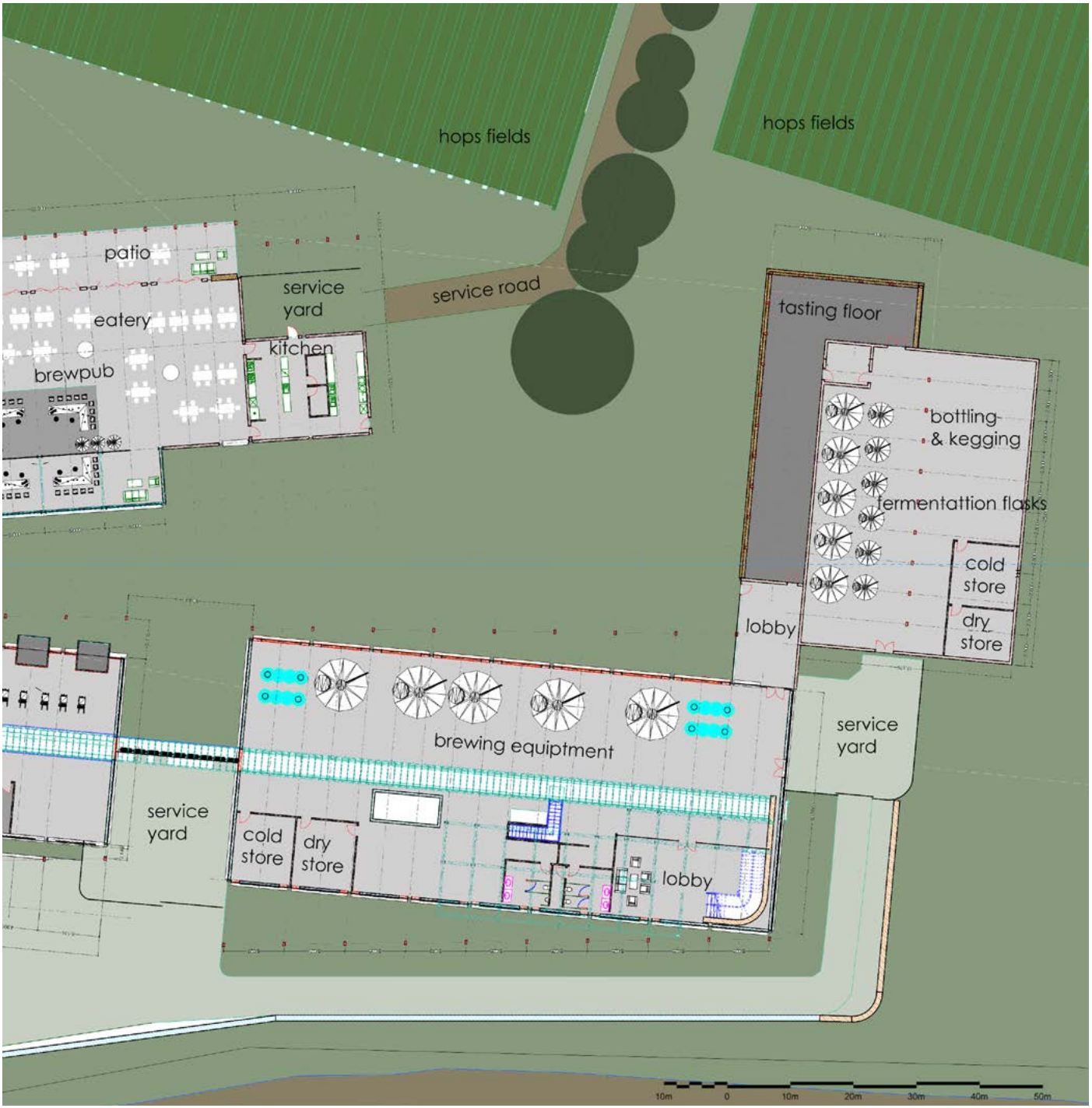
111.

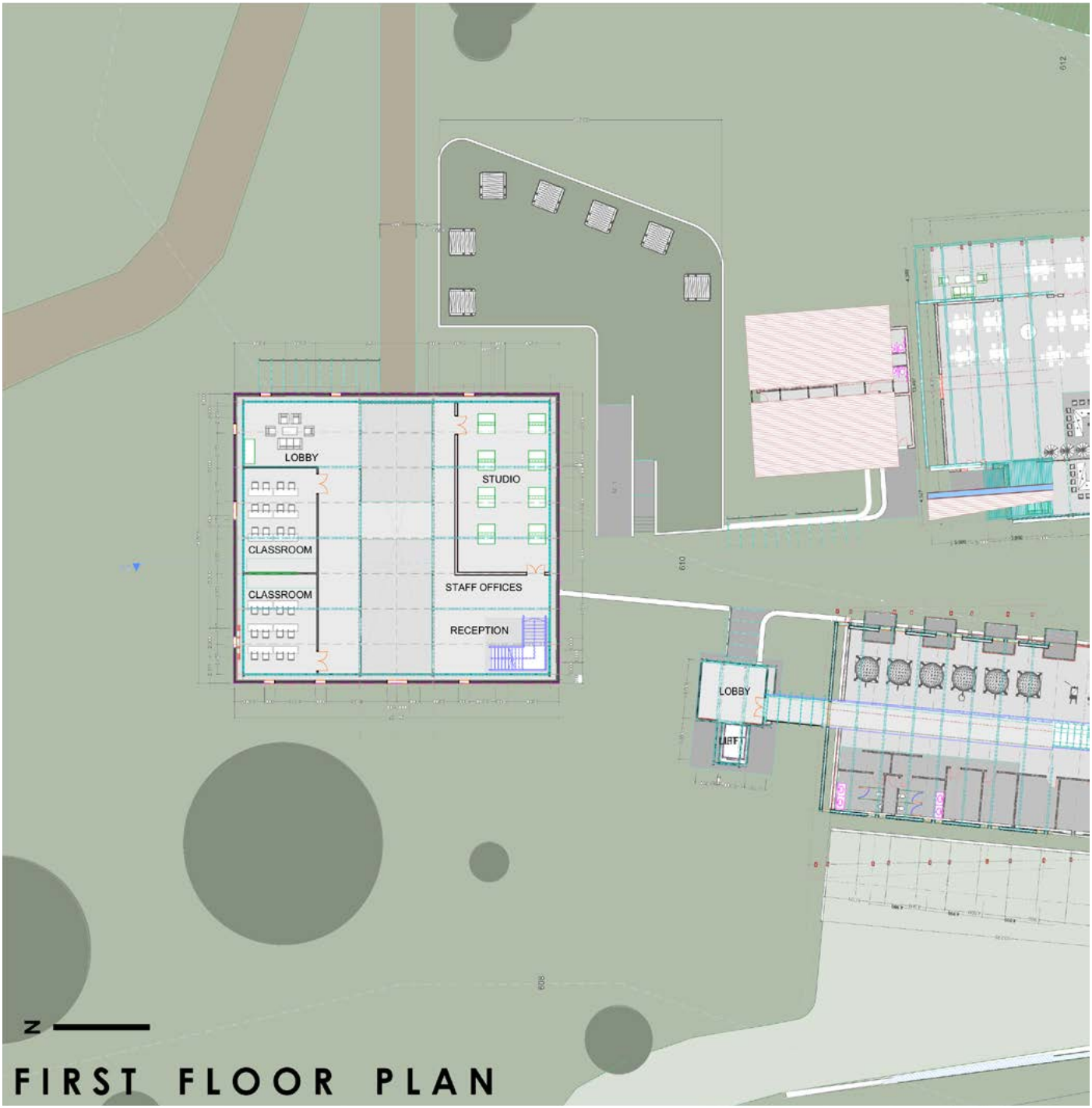

service entrance
to site
staff parking &
service yards
brewhouse
storehouse
observation
tower & lift
fermentation cellar
& tasting floor
brew academy &
artisanal shops
brewpub & eatery
hops fields
hops fields
public parking
N

SITE PLAN


montagu pass
neighbouring farm
public entrance
to site
610
608
606
604
602
600
598

GROUND FLOOR PLAN


hops fields
hops fields
patio
eatery
brewpub
service yard
kitchen
service road
tasting floor
bottling & kegging
fermentattion flasks
cold store
dry store
lobby
service yard
brewing equiptment
service yard
cold store
dry store
lobby
10m
0
10m
20m
30m
40m
50m



FIRST FLOOR PLAN


10m
0
10m
20m
30m
40m
50m

PART 4

THE FINAL BREW

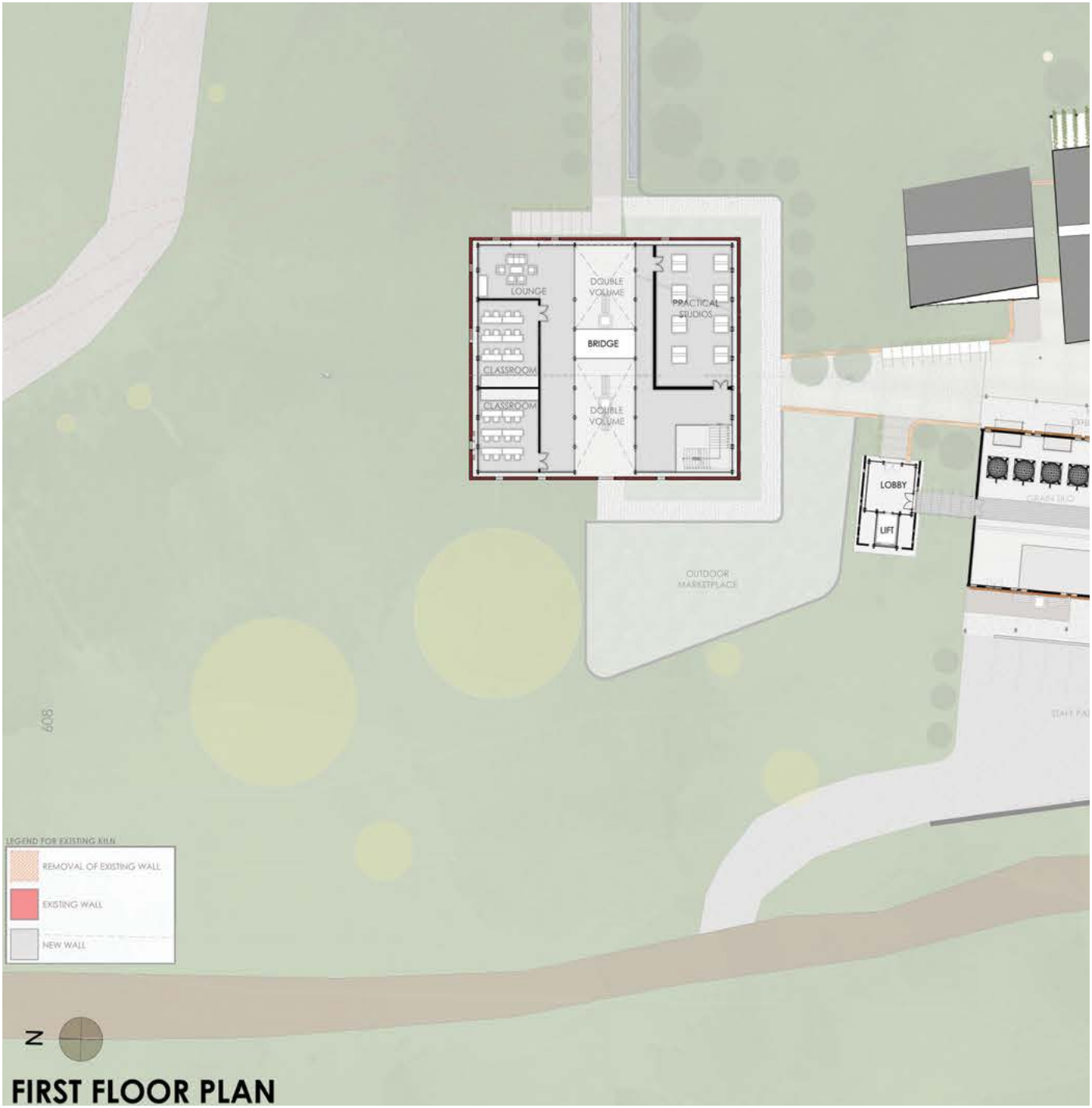
Part 4 presents the awaited brew – the final synthesis. The proposed design is introduced to the reader, explaining the implementation of the theoretical approach throughout the dissertation. Design and construction investigation set out the various significant facets of the built form.

SITE & ROOF PLAN


600
Algunsi river
(perennial)
602
604
gathering of vegetation
around river
606
608
610
612
existing workers' house
614
616
618

GROUND FLOOR PLAN


SEATING
SERVICE YARD
KITCHEN
BREWPUB
COVERED
OUTDOOR
COURTYARD
MILL
DRY
STORE
COLD
STORE
SERVICE YARD
VIEWING
DECKS
BREWHALL
COLD
STORE
DRY
STORE
RECEPTION
LOBBY
TASTING
DECK
BOTTLING
DRY
STORE
COLD
STORE
FERMENTATION
HALL
LOBBY
SERVICE YARD
MONTAGU PASS

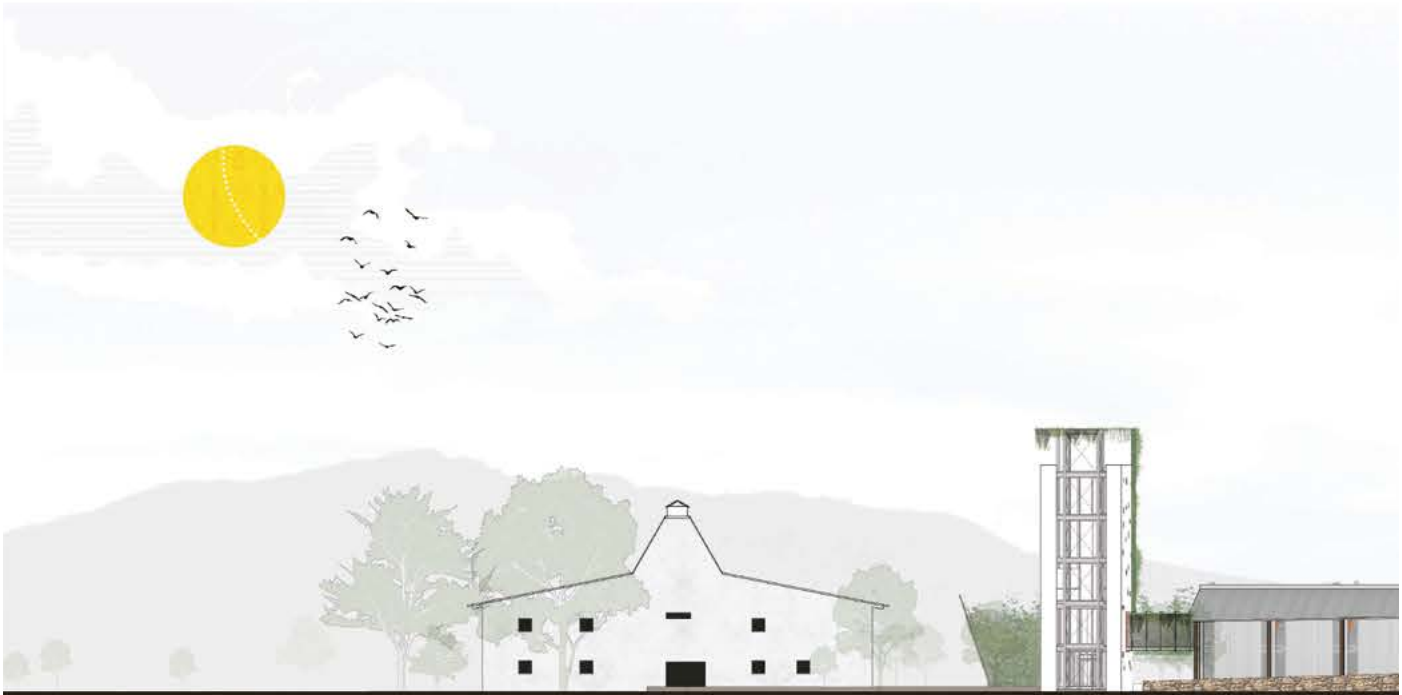


FIRST FLOOR PLAN


COVERED
OUTDOOR
COURTYARD
GALLERY
WALKWAY
SERVICE YARD
GALLERY WALKWAY
LABORATORY
OFFICE
LOUNGE
SERVICE YARD
MONTAGU PASS

SECTION THROUGH KILN
SCALE 1:100

SECTION THROUGH BREWHOUSE
SCALE 1:100



WEST ELEVATION
SCALE 1:200

4.2 TOPOLOGY

Figure 235: Approaching the kiln from the parking area with a footpath, the roofline is celebrated fully.

As previously set out in the Design Development, the layout of the functions on site originated from a sketch depicting the scheme breaking open, splitting the functions apart into two narratives, with a courtyard or plaza forming between these two axis. With the kiln at the most northern point, the new intervention emergences from it and breaks open towards the Outeniqua mountains. This allowed for a play of visual tension or conflict throughout the proposed brewery; between existing and new; and between the industrial feel of the brewery and the green hops and mountains.

As shown on the site and ground floor plan, upon arrival the visitor is guided into the parking lot situated next to the hops fields, and then with a footpath to the existing kiln (refer to Figure 235 on the left). This arrival creates the opportunity for visitors to observe the kiln, as well as haptically interact with it as they move through its ground floor towards the rest of the scheme (refer to Figure 236). The upper floor houses the beer academy and although it opens up towards the ground floor, a more private threshold is implemented to accommodate its functions. Moving through the existing kiln, the visitor arrives at the beginning of the courtyard (see Figure 237). From here, the functions open up and visually guide the visitor along.

The storehouse and exhibition are placed next to the brewpub and eatery (see Figure 238). The brewpub and eatery open up towards both the inner courtyard and the hops fields, which allows its visitors to enjoy either the beautiful landscape or the bustling courtyard with its exhibitions and stalls (see Figure 239).

Figure 236: The exposed roof structure within the kiln creates a stark contrast against the old.

Figure 237: Moving out from the kiln intothe courtyard, the buildings jut out in turn to interact with the visitor.

Figure 238: The storehouse with its exhibition spaces, placed across from the eatery.

Figure 239: The brewpub and eatery, looking into the courtyard at the bustling exhibition space.

As the proposed brewery is orientated north-south, the length of the scheme ran next to the Montagu Pass (refer to Figure 240). Although the north-south orientation exposes the buildings to maximum western sun, the structural and design approach will be discussed below in the section of Morphology. However, the placement allowed for the opportunity to carefully design the facades of the industrial sheds, as to provide the passer-by with a rhythmic and detailed elevation without dominating the existing kiln. The placement of the functions along the main through Herold, resulted in industrial sheds where the eastern, inner elevations open up in a commercial manner, whereas the western, outer side caters for services, necessary deliveries and parking.

Ultimately, the scheme culminates in the tasting floor, sitting in front of the fermentation cellar – the physical celebration of the proposed brewery (see Figure 241). Here, the narratives conclude, similar to the conclusion of the brewing process. Throughout the courtyard, the existing kiln stays in view – a topological element of orientation (see Figure 241). The Outeniqua mountains in the south and hops peeking in between the eastern functions, constantly orientates the visitor to the landscape, enveloping the industrial brewery.

Figure 240: The west elevation of the brewery, as seen from the Montagu Pass.

Figure 241: The courtyard as seen from the tasting patio. The existing kiln remains in view.

4.3 MORPHOLOGY

The morphological development of the proposed brewery referred to various elements on site and in the context. These elements – the hops, the kiln, the contextual sheds, adapted Cape houses, the brewing process, the hapticity of beer tasting – contributed to the connection between the site and the brewery, as well as the connection of one space to another. As previously discussed, morphology studies the way a building stands rises and opens. The proposed brewery will now be set out according to these three actions.

'Standing' refers to the manner in which the proposed brewery is linked to the site. The brewery sits on a concrete plinth, thus sturdily connected to the site - similar to the architectural context of Herold. The primary steel structural system is then fixed to the plinth. The buildings' facades consist of infill panels of glazing, ventilation louvers and Klip-Lok sandwich walls, which are grounded in a rammed earth stub wall (refer to Figure 242). These panels are situated between the steel columns, which are braced with tensile connections. The rammed earth as a natural element grounds the industrial buildings in the landscape and creates a tension between natural and industrial materials. The action of raising the functions on a plinth also creates a threshold between interior and exterior, as well as protecting the rammed earth walls from water on finished ground level.

'Rising' represents the correlation between the proposed brewery and the sky, as well as the vertical development of the brewery. The observation tower surpasses the kiln and other functions in height, compiled of a steel frame with glass, brick and steel louver infills to convey a lightweight presence, with its verticality complementing the vertical orientation of the kiln.

Figure 242: The facade of the brewhouse opens up towards the inner courtyard.

Figure 243: The lift tower creates a powerful vertical axis within the landscape.

The tower functions as a lift shaft to provide entrance to the gallery walkway (refer to Figure 244), a lookout space, as well as a greywater storage space. The other functions rise into an asymmetrical roof. The roof overhang is stayed by extended trusses resting on a beam supported by freestanding beams – which protects the rammed earth from possible rainfall while simultaneously creating covered exterior spaces alongside the buildings. The connection between the roof and the sky is emphasised by a light shaft running along the spines of the proposed buildings. This light shaft supports the gallery walkway running through the storehouse and brewhouse, in addition to providing ventilation through additional ventilation louvers. The functional design of the kiln's ventilation system is implemented into the industrial storehouse and brewhouse. As hot air rises and escapes through the upper ventilation louvers, cooler air is pulled in through the ventilation louvers in the façade, ensuring constant ventilation throughout the building, Along with mechanical ventilation, the interior temperature can be controlled according to standard temperatures needed for the brewing process. The light shaft is also implemented in the brewpub and eatery, letting natural light into the seating area. Figure 245 shows the interior view of the brewhouse.

Figure 244: the gallery walkway connecting the lift tower and storehouse.

Figure 245: Interior view of the brewhouse as seen from the gallery walkway.

Figure 246: Interior view of the brewpub, looking out into the courtyard.

Figure 247: The inner courtyard disperses into the landscape through levels.

The management of rainwater forms part of the structure system of the roofs. An angled L-section forms a gutter, which is fixed to the extended trusses at roof's edge. The rainwater is channelled downwards to water tanks, from which it is then pumped up into storage tanks at the top of the observation tower. This water is then reused along with greywater, supplying the brewery's toilets with water.

'Opening' encompasses the conversation between inside and outside – openings in facades, as well as moving from one space to another. The facades of the storehouse and brewhouse allow visual connection with the processes that are taking place inside, thus creating a visual link with the bustling courtyard, but remaining exclusive to staff and visitors in the gallery (refer to Figure 245 & 247). The existing kiln's openings have been preserved and serves as ventilation openings, in addition to contributing to the conflict between new and existing. Counter to the closed industrial functions, the social functions of the brewery opens up into the landscape with patios covered with timber pergolas (see Figure 246). The light shafts running along the spine of the roofs refer back to the light quality experienced within the hops rows, thus recreating the experience within the buildings.

Figure 248: The inner courtyard with the brewhouse on the right and brewpub on the left.

4.4 TYPOLOGY

The typological development of the proposed brewery focusses primarily on the design of the roof trusses, the hops structures on site, as well as the reinterpretation of an industrial shed. These elements make up an important part of the formalistic influences of the proposed brewery.

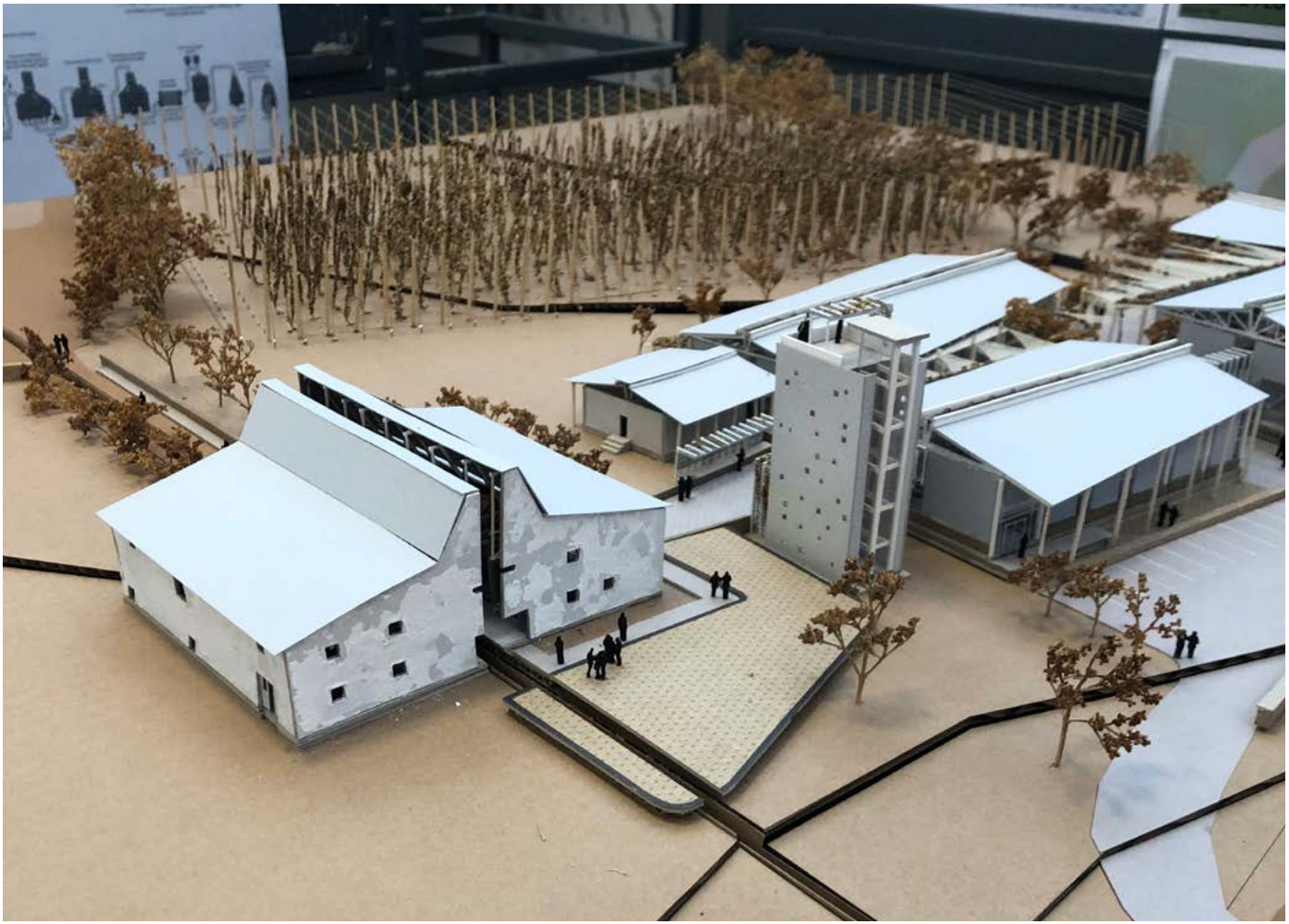
As already discussed in 4.3 Morphology, the roofs of the proposed functions are adapted, asymmetrical pitched roofs with a light shaft that runs along its spine. Although each function's roof consists of a similar shape and structure, every building's roof is unique to the nature of the building. This refers to the identified concept of transformation acting as a narrative through which significance can be conveyed.

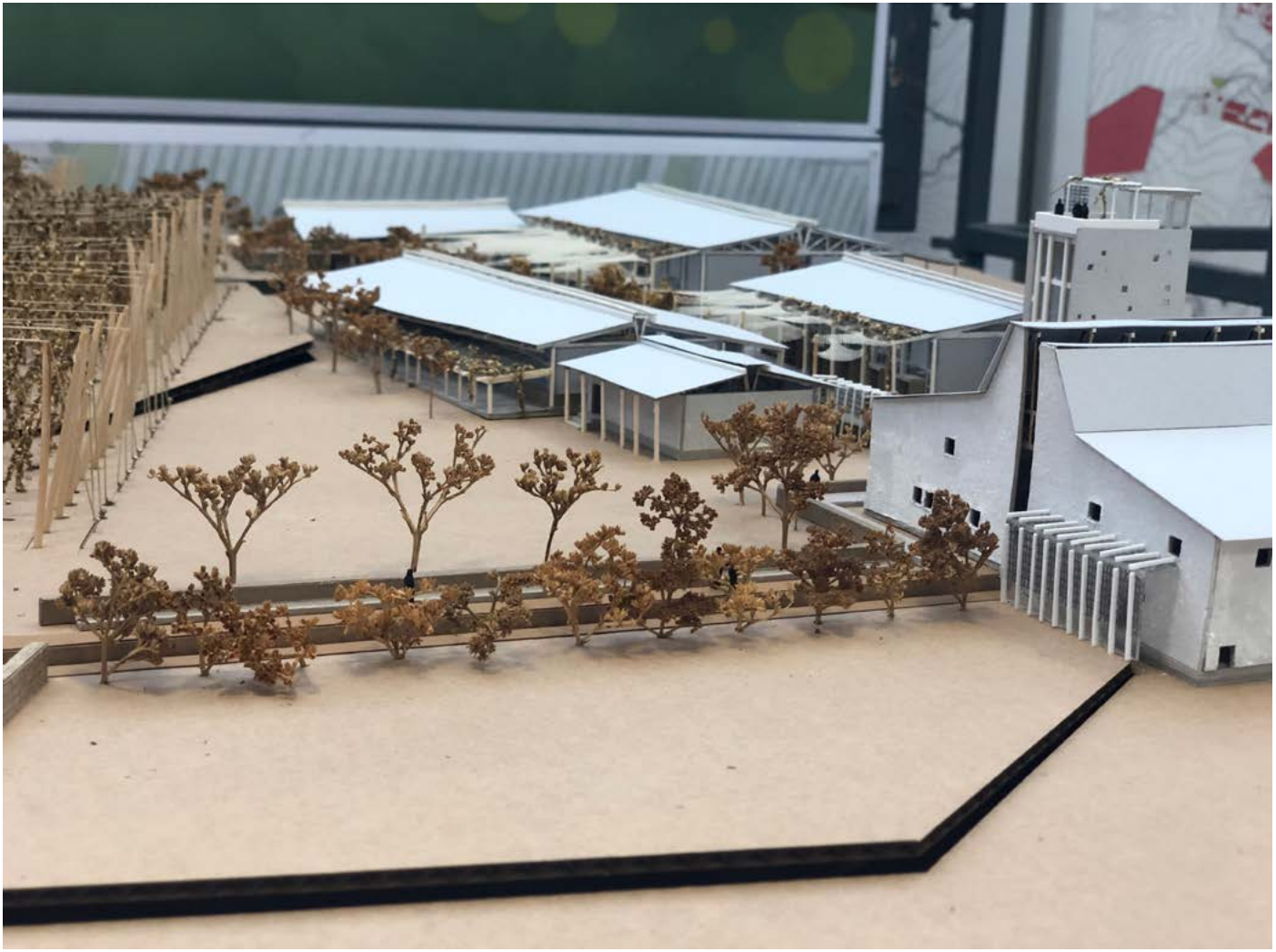
The storehouse marks the start of the tale of trusses – raw ingredients are stored and prepared before it can be used in the brewhouse. The storehouse also necessitates an open floor plan for the mechanical movement of raw ingredients in and out of storage. Ventilation and natural indirect light are also important, along with the integration of the gallery walkway into the roof structure and exhibition spaces into the facade. The storehouse roof truss is a composite of steel, timber and tensile bracing – an interpretation of the balance between natural and human-made. Similar to the storehouse, the brewhouse's floorplan needs to cater for functionality, allowing necessary movement to take place. Due to the internal processes taking place in the brewhouse, the roof trusses consist only of steel members and tensile bracing, reflecting a

functional approach as well as referring to the industrial process happening inside. The fermentation cellar shifts towards a natural materialistic approach, striving to integrate the industrial process with the natural landscape. The materials used in the fermentation cellar's structural system consists of primarily timber with tensile bracing and minimal use of steel. This references the natural fermentation that is taking place inside. The fermentation cellar is also divided into two parts; the fermentation flasks and the bottling facility. Therefore, the structure speaks to this change in the process through timber columns that separate the two spaces. Thus, the roof trusses are supported by loadbearing exterior walls and a central column. The light shaft consists of opaque glazing, as to only let through diffused light into the fermentation cellar. The restaurant also requires an open plan to accommodate seating, thus the roof trusses were supported by columns on the outer edge. Comparable to the fermentation cellar's roof trusses, the restaurant's trusses also consist mainly of timber, with tensile bracing. Once again, this use of natural material symbolises the integration of the industrial organism within the landscape. The light shaft is also cladded with an opaque Perspex, allowing diffused light to enter the building. Additionally, the underside of the trusses is cladded with timber slats to further manipulate the light that falls in from above, manifesting the light quality between the hops rows in an architectural space. Thus, the function of the buildings shaped the materiality and formgiving thereof, while meaningfully redesigning contextual elements in a contemporary manner.

In the same way the functions shape the roof structure of the buildings, the beer brewing process had an influence on the manner in which construction elements and services were approached. During the brewing process, there are only elements present that are necessary for the final product to be achieved. This was translated into a structural honesty and purity. The services are sensitively placed but left exposed. The proposed brewery celebrates structural elements and connections, the beauty of these connections created simply by their functionality.

4.6 DETAILED MODEL





CONCLUSION

The architectural language in Herold will continue to live through the inhabitants' interpretation of the landscape. The environment is multi-layered and encourages a multi-sensory approach to both dwelling and designing within the landscape. The critical regionalism becomes an intricate guideline from which the design process flows.

Along with the site, the existing hops kiln and hops on site evoke an experiential approach, which is woven through the dissertation. The multi-layered nature of the experientiality on site creates meaningful narratives and moments in the dissertation. The hapticity of the landscape correlates with the hapticity of beer culture – making, tasting and drinking beer. It is also important for designers to be finely tuned to the genius loci of the site, investigating the context and site for clues to guide the design towards the most appropriate destination.

This dissertation questioned how the multi-layered experience of landscape, beer and vernacular building can be sensitively reinterpreted and narrated through means of built form, in order to contribute to the genius loci of Herold.

The reinterpretation of industrial architecture within the landscape is a delicate journey to undertake, to create a significant intervention that can be deemed as a vernacular attempt at a contemporary design. Along with this reinterpretation, the architectural language of Herold was also thoughtfully integrated into the brewery, along with elements that celebrate the existing elements on site. Thus, it can be concluded that the proposed brewery can be deemed successful within its aims and objectives. The proposed brewery contributes to the genius loci of the site and Herold, as well as celebrating the ripened product - an architectural celebration of craft beer in Herold.

PERSONAL REFLECTION

The subject of this dissertation is something that I personally hold close to my heart. I have always been a collector of craft beers and an opportunity to enjoy a cold beer in a beautiful space never fails to excite me. Thus, this dissertation is the amalgamation of my passion for designing spaces that people would never want to leave, with the passion I have for beer and its transformation from raw products to its famous final product. I have been visiting the George region annually for 20 years and I would not have been satisfied doing this brewery in any other place. I can only dream that one day I may be presented with the prospect of taking part in designing a brewery and being part of the construction process.

Although I did try my hardest to fulfil the expectations I had set for both myself and this proposed brewery, I do wish that I had ventured deeper into sustainability, possibly designing a building that gives more than what it takes from the landscape.

However, I believe that I have conceived and developed a reactive and meaningful scheme that contributes to both the genius loci of the site and Herold, while creating a place where the beer brewing process can be enjoyed and interacted with. This dissertation has taught me a great deal about designing architecture that tunes into the character of a place, as well as the meaningful reinterpretation of important elements into a design.

LIST OF FIGURES

REFERENCES

Ando, T. 1994. Interview with Tadao Ando. In: Co, F.D. (ed.). Tadao Ando Complete Works. London: Phaidon Press, pp. 476-481.

Bachelard, G. 2011. The Architectural Image. In: Pallasmaa, J. (ed.). The Embodied Image: Imagination and Imagery in Architecture. Chichester, UK: John Wiley & Sons, pp. 118-138.

Berman, A. 2015. Interim Completion Report: South African Breweries, Erf 96660, Newlands Cape Town. [pdf] Urban Design Services. Available at: <https://www.hwc.org.za/system/tdf/Projects/Files/SAB%20Interim%20Completion%20Report%202015.pdf?file=1&type=node&id=177&force=> [Accessed 21 April 2020].

Burgress, A.H. 1964. Hops. New York: Interscience.

Ching, F.D.K. 2007. Architecture: form, space & order. (3rd ed.). New Jersey: John Wiley & Sons.

Climate Data, 2020. Ribeirão Preto Climate. [online]. Available at: <https://en.climate-data.org/south-america/brazil/sao-paulo/ribeirao-preto-3193/> [Accessed 30 September 2020].

Cullen, G. 2006. The Concise Townscape. Oxford: Architectural Press.
De Beer, I. 1995. SAB Visitors Centre – Newlands. Architecture SA. Sept Oct: 13-16.

Daly, C. 2020. How to Grow Your Own Hops: Beer Making in South Africa. [online]. Available at: <http://southafrica.co.za/how-to-grow-your-own-hops.html> [Accessed 17 May 2020].

De Bosdari, C. 1964. Cape Dutch Houses and Farms. Cape Town: Gothic Printing Company Limited.

Fagan, G. 1997. (Gabriël Fagan Architects). SA Breweries, 1993. Office document. Unpublished.

Fagan, H. 2020. Henry Fagan & Partners: Consulting structural and civil engineers. [online]. Available at: <http://fagan.co.za/ohlssons-brewery-sab/> [Accessed 20 April 2020].

Flowers, J. 2013. 10 Types of Beer Glasses to Complement Your Beer. [online]. Available at: <https://vinepair.com/articles/beer-glass-impacts-taste/> [Accessed 30 September 2020].

Frampton, K. 2007. Ten Points on an Architecture of Regionalism: A Provisional Polemic. In: Canizaro,

V. B., (Ed.). Architectural Regionalism, Collected Writings on Place, Identity, Modernity and Tradition. New York: Princeton Architectural Press, pp. 375-385.

Geograph. 2009. Oast Houses. [online]. Available at: <http://www.geograph.org.uk/article/Oast-Houses> [Accessed 24 July 2020].

Grattan, P. 2015. The Process of Hop Drying. [online]. Available at: <http://oastandhopkilnhistory.com/oastsandhopkilns/the-process-of-hop-drying/> [Accessed 20 July 2020].

Gropius, W. 1926. Dessau Bauhaus: Principles of Bauhaus Production. In: Conrads, U. (ed.). Programs and Manifestoes on 20th Century Architecture. Cambridge: The MIT Press, pp. 95-96.

Hines, N. 2017. Does the Shape of Your Beer Glass Actually Matter?. [online]. Available at: <https://vinepair.com/articles/beer-glass-impacts-taste/> [Accessed 1 October 2020].

Jansen van Vuuren, A. & Stamp, J. D. 2015. 'Once upon a lager': transforming a batch process into the 'hero's journey' story structure. In: Wirth, R., Serrati, D. & Macedulska, K. (eds.) Storying humanity: narratives of culture and society. Oxford, UK: Inter-Disciplinary Press, pp. 187-197.

Jensen Architects. 2016. Walden Studios: Glass Marvel in Earthquake Country. [online]. Available at: <https://jensen-architects.com/work/walden-studios/> [Accessed 23 July 2020].

Lauwrens, J. 2014. Beyond Spectatorship: An exploration of embodied engagement with art. Unpublished thesis (MPhil). Bloemfontein: University of the Free State.

Lourens, P. 2016. History of George Revisited During Hops Harvest. [online]. Available at: <https://www.georgeherald.com/News/Article/AgriEco/history-of-george-revisited-during-hops-harvest-20170711> [Accessed 2 October 2020].

Malherbe Rust Architects. 2016. Micro Brewery, Franschhoek. [online]. Available at: <https://www.mrarch.co.za/microbreweryfranschhoek> [Accessed 10 April 2020].

McDougall, M. & Giokos, E. 2018. Turning hops into South Africa's 'next wine'. [online]. Available at: <https://money.cnn.com/2018/02/28/news/economy/craft-beer-hops-south-africa/index.html> [Accessed 14 May 2020].

Merleau-Ponty, M. 2002 [1945]. Phenomenology of perception. Translated by Colin Smith. Oxon: Routledge.

Merriam-Webster Dictionary. 2020. Definition of mimesis. [online]. Available at: <https://www.merriam-webster.com/dictionary/mimesis> [Accessed 23 July 2020].

Morton, J. 2016. Brew: The foolproof guide to making world-class beer at home. London: Quadrille Publishing.

Mulder, J. 2016. Grahamstown & Frontier Country: Montagu Pass Revisited. [online]. Available at: <https://www.grahamstown.co.za/news/montagu_pass_revisited> [Accessed on 18 May 2020].

Norberg-Schulz, C. 1979. Kahn Heidegger and the language of architecture. Available at: <https://www.scribd.com/document/249289419/Norberg-Schulz-Kahn-Heidegger-and-the-Language-of-Architecture>

Norberg-Schulz, C. 1979. Genius Loci: Towards a phenomenology of Architecture. New York: Rizzoli.

Norberg-Schulz, C. 1985. The Concept of Dwelling, on the way to figurative architecture. New York: Rizzoli.

Norberg-Schulz, C. 1988. Roots of Modern Architecture. Tokyo: A.D.A. Edita.

Olivier, S. 2005. Touring in South Africa. Johannesburg: Struik.

Ots, E. 2004. Topology (topos). In: Porter, T. (ed.). Archispeak: An illustrated guide to architectural terms. London: Taylor & Francis Group, pp. 154.

Outeniqua Hop Route. 2020. Reasons for Joining the Outeniqua Tourism Association. [online]. Available at: <https://outeniqua-hop-route.co.za/about/> [Accessed 20 May 2020].

Over The Mountain. [n.d.]. Over The Mountain Guest Farm. [online]. Available at: <http://www.overthemountain.co.za/> [Accessed 15 May 2020].

Pallasmaa, J. 2005. The Eyes of the Skin: Architecture and the Senses. Chichester: John Wiley & Sons Ltd.

Pallasmaa, J. 2011. Architecture and the existential sense: space, body and the senses. Bacci & Melcher : 579-598.

Palmer, J. J. 2017. How to Brew: Everything You Need to Know to Brew Great Beer Every Time. Boulder: Brewers Publications.

Psarra, S. 2009. Architecture and Narrative. London: Taylor & Francis Group.

Ramukhwatho, F., Seetal, A. & Pienaar, H. 2016. Water and Wastewater Management in the Malt Brewing Industry. (2nd ed.). Pretoria: NATSURV.

Roth, M.L. & Roth Clark, A.C. 2018. Understanding architecture: its elements, history, and meaning. (3rd ed.). New York: Routledge.

Scurr, M. J. 2011. Contemporary Interventions in Historic Fabric: Context and authenticity in the work of Gabriel Fagan. Unpublished thesis (MPhil). Cape Town: University of Cape Town.

Sirrine, R. 2017. Why are my hops producing male flowers? [online]. Available at: <https://www.canr.msu.edu/news/why_are_my_hops_producing_male_flowers> [Accessed 17 May 2020].

South African Brewery. 2020. South Africa's Top Brewer: SAB Heritage. [online]. Available at: <http://www.sab.co.za/heritage> [Accessed on 21 May 2020].

South African History Online. 2019. Herold, Route 62. [online]. Available at: <https://www.sahistory.org.za/place/herold-route-62> [Accessed 13 May 2020].

SuperLimão Studio. 2018. Toca do Urso. [online]. Available at: <http://www.superlimao.com.br/item/toca-do-urso/> [Accessed 24 July 2020].

Tessenforf, K. 2018. Welcome to beer school: How hops are grown and harvested in South Africa. [online]. Available at: <https://www.food24.com/welcome-to-beer-school-how-hops-are-grown-and-harvested-in-south-africa/> [Accessed 19 May 2020].

Tilley, C. 2004. The materiality of stone: explorations in landscape phenomenology. Oxford: Berg.

Tzonis, A. & Lefaivre, L. 1996. Why Critical Regionalism Today? In: Nesbitt, K. (Ed.). Theorizing A New Agenda for Architecture: An Anthology of Architectural Theory. 1965 – 1995. New York: Princeton Architectural Press, pp. 484-491.

Vogel, K. 2007. Multi-Brew: Creative beer brewing facility for Pretoria CBD. Unpublished thesis (MArchProf). Pretoria: University of Pretoria.

Wallace, L. 2016. TukTuk Brew. [online]. Available at: <https://www.houseandgarden.co.za/travel-leisure/tuktuk-brew-16258000> [Accessed 23 July 2020].

Warren, L. 2020. The Union Buildings. [online]. Available at: <https://gcs.thesouthafrican.com/2020/05/a9971373-presidency-announces-a-covid-19-positive-staff-member-at-the-union-buildings-in-pretoria.jpg> [Accessed 28 November 2020].

Weber, H. 2013. On Building Typology. Chicago: Hanno Weber & Associates.

Wilson, M. 2012. The Miraculous, Magical, Magnificent History of Beer. [online]. Available at: <https://www.fastcompany.com/1669289/the-miraculous-magical-magnificent-history-of-beer-infographic> [Accessed 21 July 2020].

ZA Hops. 2020. Our Farmers: SAB Hop Farms. [online]. Available at: <https://www.zahops.com/#za-hops-descriptions> [Accessed 29 September 2020].

APPENDIX 1: GLOSSARY

Acidity
Vinegar like or lemon like; can be caused by bacterial infection.

Ale
Beers distinguished by fermenting at warmer temperatures than lager beer, and their by-products are more evident in taste and aroma and are usually fruitier.

Anchorage
The action of securing something to a base or the state of being secured.

Aroma
A distinctive, typically pleasant smell.

Bottle conditioning
Secondary fermentation and maturation in the bottle, creating complex aromas and flavours.

Brewpub
Pub that makes its own beer and sells at least 50% of it on premises.

Brewhouse
The collective equipment used to make beer.

Carbonation
Sparkle/ bubbles caused by carbon dioxide, either created during fermentation or injected later.

Catalyst
A substance that increases the rate of a chemical reaction without itself undergoing any permanent chemical change.

Coagulate
Changing to a solid or semi-solid state.

Dioecious
Having the male and female reproductive organs in separate individuals, thus being classified as either male or female organisms.

Enzymes
Catalysts that are found naturally in the grain. When heated in mash, they convert the starches of the malted barley into maltose, a sugar used in solution and fermented to make beer.

Fermentation
Conversion of sugars into ethyl alcohol and carbon dioxide, through the action of yeast.

Genius Loci
Spirit of a place

Germination
The development of a plant from a seed or spore after a period of dormancy.

Grist
Brewers' term for milled grains, or the combination of milled grains to be used in a particular brew. Derives from the verb to grind. Also sometimes applied to hops.

Isomerise
Changing from one isomer to another.

Kiln
A furnace or oven used for burning, baking, or drying. For example, hops are dried in a kiln before being used in the beer brewing process.

Lager
Beers produced at colder fermentation temperatures than ales. This cooler environment inhibits the natural production of esters and other by products, creating a crisper tasting product.

Lautering
To run the wort from the mash tun. From the German word to clarify. A lauter tun is a separate vessel to do this job. It uses a system of sharp rakes to achieve a very intensive extraction of malt sugars.

Malt
The process by which barley is steeped in water, germinated, then kilned to convert insoluble starch to soluble substances and sugar. The foundation ingredient of beer.

Mashing
To release malt sugars by soaking the grains in water.

Mash tun
A tank where grist is soaked in water and heated in order to convert the starch to sugar and extract the sugars and other solubles from the grist.

Maturation
Microbrewery
Small brewery generally producing less than 15,000 barrels per year. Sales primarily off premises.

Milled
Reduced to fine particles by grinding in a mill.

Phenomenological
Denoting or relating to an approach that concentrates on the study of consciousness and the objects of direct experience

Silo
A tall tower or other airtight structure on a farm used to store grain.

Sommelier
A trained and knowledgeable professional, who specializes in all aspects of service as well as drink and food pairing.

Steeped
To soak in water or other liquid so as to extract its flavour or to soften it.

Sterilize
Deriving an object from bacteria or other living microorganisms

Taste receptor
A taste receptor is a type of receptor situated on the tongue which facilitates the sensation of taste. When food or other substances enter the mouth, molecules interact with saliva and are bound to taste receptors in the oral cavity and other locations.

Wort
The solution of grain sugars strained from the mash tun. At this stage, regarded as "sweet wort", later as brewed wort, fermenting wort and finally beer.

Yeast
A micro-organism of the fungus family.

APPENDIX 2: BREW-IT-YOURSELF

An excerpt from Palmer, J. J., How to Brew: Everything You Need to Know to Brew Great Beer Every Time, pp. 5-23

1 Brewing Your First Batch of Beer

What Do I Do?

If you are like me, you are probably standing in the kitchen wanting to get started. Your beer kit[1] and equipment are on the counter, and you are wondering how long this will take and what to do first. Well, my best advice would be for you to read the first ten chapters, which cover everything from cleaning and sanitation to ingredients to boiling, fermentation, and packaging. These chapters will teach you all the fundamentals of the brewing process, so you won't be misled by incomplete instructions in the kit, and you will have an outstanding first batch.

But, if you are like me, you probably want to do this right now while you have some time. Therefore, this first chapter is designed to walk you through your first batch—start to finish—and give you a complete overview of the brewing process. Brewing can be broken down into three main events: making the wort, fermenting the wort, and bottling, or packaging, the beer. What is wort? That's what we call the sugar solution that is boiled with hops and then left to ferment into beer. Making the wort today is going to take about three hours, and it will be about one month before you can drink your first batch.

[1] If you don't have a beer kit, then either assemble the ingredients for the "Cincinnati Pale Ale" recipe in this chapter, or buy one, such as a Palmer's Premium™ Beer Kit, from your local brew shop or online supplier.

Today's brew is going to use what I call the "Palmer Brewing Method," a partial boil method where only half of the wort will actually be boiled with the hops. The rest of the wort (actually malt extract) will be added to the kettle at the end of the boil to pasteurize and this higher gravity wort will then be diluted in the fermentor to the final volume of about 5.5 gallons (gal.), or 21 liters (L) for those readers using metric units.

The instructions in this first chapter are the bare bones; to understand all of the whats and whys of brewing you will need to finish reading the first ten chapters of section 1 of this book, "Brewing Beer Kits." These chapters will discuss all of the brewing ingredients and processes in detail, and explain the purpose behind each step. You will then understand what you are doing, rather than doing it that way just because "that's what it said. . ."

However, you can read all of that tomorrow while your beer is fermenting. Let's get started!

Before We Get Started: The Top Five Priorities for Brewing Great Beer

Do you want a great beer? Success or failure starts here. This list is prioritized from highest to lowest; meaning that, if you make mistake in a higher priority, it can't be fixed by doing a lower priority correctly. Don't worry, I will walk you through all of this as we go, but I want you to understand the big picture first.

1. *Sanitation.* Good sanitation is the most important factor for brewing great beer. Brewing is all about preparing and fermenting a wort to your specification. Good sanitation ensures that your chosen yeast is the only microorganism in the brew.
2. *Fermentation temperature control.* After good sanitation, a healthy fermentation is the most important factor for brewing great beer, and good temperature control is key. Yeast are living organisms and their activity is controlled by temperature.
3. *Proper yeast management.* Good beer needs well-managed yeast. After temperature, the most important factor for managing the fermentation is pitching the proper quality and quantity of yeast. These topics are discussed in chapters 6 and 7.
4. *The boil.* The ingredients are cooked during the boil. If the wort is not cooked right, the beer will not taste right. Yes, you can undercook or overcook your beer. This will be discussed more in chapter 4.
5. *The recipe.* The definition of a good recipe is that it has the right proportions of ingredients to provide both complexity and balance of the flavors. A typical recipe will consist of a majority of a pale "base" malt, with additional specialty malts for signature flavors or accents, and enough hops to provide a balance of bitterness, flavor, and aroma to the beer. It is important to realize that a great recipe will not overcome poor brewing techniques and a good recipe does not need to be complicated.

Figure 1.1. Here you see the typical equipment a beginning brewer will use. Fermentors, brew kettle, bottle capper, bottle caps, and bottles.

Brew Day

Equipment Needed to Brew Today

The following is a list of the minimum equipment you will need for this first batch. Most of these items are available at homebrewing supply shops as part of a beginner's equipment kit. Before we begin, please note that both US units of measure and metric units are used throughout the book. The conversion conventions used in this book are given in appendix H.

Airlock. Two basic kinds of airlock are available: single-piece or "bubbler" airlocks, and three-piece airlocks (fig. 1.2). Airlocks are filled with water or sanitizer (do not use bleach!) to prevent contamination from the outside air. Three-piece airlocks have the advantage of disassembly for more thorough cleaning, but can inadvertently allow the liquid within the airlock itself to be sucked back inside the fermentor if the internal pressure drops, which can be caused by either a drop in temperature as the wort cools or by lifting the plastic bucket if the walls of the bucket are not very rigid. Bubbler-type airlocks will not suck liquid back inside the fermentor, but are more easily clogged by fermentation gunk and they cannot be disassembled for cleaning. Both types are inexpensive. If your fermentor is a carboy, you will also need a drilled rubber stopper to hold the airlock.

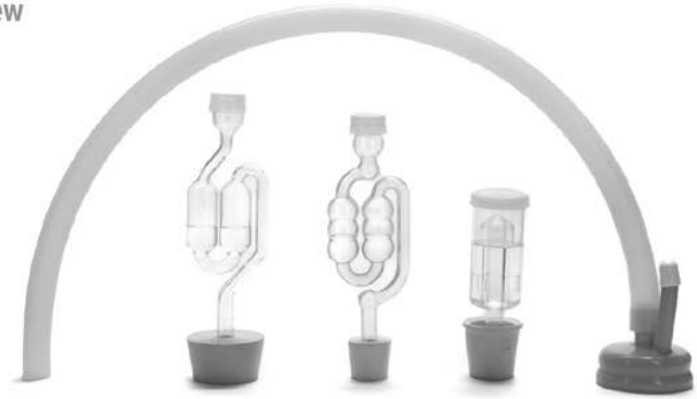


Figure 1.2. The basic types of airlocks available for homebrewers, and a blow-off hose.

Boiling kettle. For a boiling kettle, a heavy duty 5 gal. (19 L) aluminum or stainless steel stock pot is a good choice. Stainless steel is tougher and easier to maintain, but is usually more expensive than aluminum. The kettle must be able to comfortably boil a minimum of 3 gal. (11.4 L), while allowing for the fact that the wort will foam up as it is boiling. Choose a kettle that has a thick (about 0.1" or 2.5 mm) or aluminum-clad bottom, as this will help prevent scorching.

Fermentor. The fermentor should be able to hold at least 5 gal. of wort with about 3 in. (8 cm) of headspace for the fermentation foam. A 6 gal. food-grade plastic bucket is recommended for beginners, because they are very easy to work with and are inexpensive (the actual volume to the rim is closer to 7 gal. [26.5 L]). Carboys are also available, made from either glass or plastic. The carboy shown in figure 1.3 can also use a blowoff hose that ends in a bucket of water, which takes the place of an airlock. Buckets are nice because they typically come with a spigot for easy draining, whereas carboys are nice because you can more easily see the activity of fermentation.

Figure 1.3. A variety of bucket and carboy-type fermentors. Blow-off hoses, ending in a small bucket of water, can be used in place of an airlock.

Grain bag. A grain bag is typically a medium-sized muslin or nylon mesh bag, which is used for steeping crushed specialty malts to add more flavor to the recipe. In a pinch, a large clean sock will work as a makeshift grain bag.

Plastic wrap or aluminum foil. Plastic wrap or aluminum foil are very handy for covering jars or fermentors to keep them clean and sanitized until ready for use. These items are typically sanitary right out of the box.

Pyrex® measuring cup. A quart-sized or larger Pyrex measuring cup will quickly become one of your most valuable tools for brewing. It can be used to measure boiling water and is easily sanitized.

Stirring spoons. You will need a big, long-handled food-grade plastic or metal spoon for stirring the wort during the boil, and a regular spoon that you can use when rehydrating the yeast.

Figure 1.4. A hydrometer, which measures the density of a solution relative to water to give its specific gravity. Water has a specific gravity of 1.000.

Sanitizer. Chemical sanitizers are necessary to ensure that the yeast is the only microorganism growing in your beer. Popular no-rinse sanitizers are iodophor and Star San. See chapter 2 for more information on sanitizers.

Thermometer. Electronic digital thermometers are readily available and generally inexpensive, but always calibrate your thermometer using water that is boiling or otherwise at a known temperature. Having an accurate thermometer is most important for mashing.

Hydrometer. A hydrometer (fig. 1.4) is needed to measure specific gravity. Specific gravity is a measure of the density of a solution relative to water, which has a specific gravity of 1.000. In wort, the more sugar dissolved, the higher the specific gravity. The hydrometer measures specific gravity by how high it floats when immersed. Original gravity (OG) is the gravity of the wort before fermentation and final gravity (FG) is the gravity after. As the fermentation progresses, the yeast consumes the sugars and the OG decreases toward the anticipated FG. Advice on using hydrometers can be found in appendix A.

Preparation (30 Minutes)

1. Assemble the Ingredients

You may have purchased a brewing kit at a homebrewing shop that contains the ingredients and instructions to brew a particular style of beer (fig. 1.5). A typical 5 gal. (19 L) beer kit consists of one or two containers of malt extract, steeping grains, hops, and yeast. These preassembled kits are the simplest to use.

If you don't have a kit, then head to a homebrew supply store and buy the ingredients outlined in the "Cincinnati Pale Ale" recipe below. We will be using the Palmer Brewing Method to brew

Figure 1.5. A typical homebrewing recipe kit that includes malt extract, hops, and yeast.

the recipe. The Palmer Brewing Method is a partial boil method, meaning that roughly half of the malt extract will be boiled with the hops in 3 gal. (11.4 L) of water. This portion of the total malt extract is listed as one of the ingredients under "Wort A" in the recipe given below. The remaining extract will be added to the boiling kettle after the boil, where it will be pasteurized by the residual heat, and then be diluted in the fermentor with an additional 3 gal. (11.4 L) of water to reach the full recipe volume. The purpose of this method is to reduce the volume of wort that needs to be boiled, saving time and energy while producing the same flavor development that would occur during a full-volume boil using the same ingredients. The reasons for this are explained in chapter 4, "Brewing With Beer Kits and Extracts."

Cincinnati Pale Ale

American Pale Ale

Original gravity: 1.042
Final gravity: 1.010
IBU: 30
SRM (EBC): 5 (10)
ABV: 4.2%

Palmer Brewing Method		
Wort A	**Gravity points**	
2.5 lb. (1.14 kg) pale ale DME	37.5	
0.5 lb. (225 g) caramel 80°L malt—steeped	2.5	
Boil Gravity for 3 Gallons	1.040	
Hop schedule*	**Boil time (min.)**	**IBUs**
0.5 oz. (15 g) Nugget (12% AA)	60	21
0.5 oz. (15 g) Cascade (7% AA)	15	6
0.5 oz. (15 g) Amarillo (10% AA)	Steep 15	3
Wort B (add after boil)	**Gravity points**	
2.5 lbs. (1.14 kg) pale ale DME	37.5	
Yeast strain	**Pitch (billions of cells)**	**Fermentation temp.**
American ale	200	65°F (18°C)

** Note: Different hop varieties may be substituted depending on availability, just be sure to use varieties with similar alpha-acid (AA) percentages (±1%–2%). Chapter 5 contains further details about using hops.*

2. Clean and Sanitize

It cannot be overstated: the most important factor for success in brewing is good cleaning and sanitization. Clean first, then sanitize. Clean all equipment that will be used during the brew with a mild, unscented dishwashing detergent, and be sure to rinse well. Some equipment will need to be sanitized for use after the boiling stage, as outlined below in table 1.1.

You can easily sanitize most of your equipment by filling your fermentor bucket with a couple of gallons (7–8 L) of water and adding the recommended amount of no-rinse chemical sanitizer at a typical concentration of 1 fluid ounce per gallon (1 fl. oz./gal.), or 8 milliliters per liter (8 mL/L). Swirl the sanitizer solution to make sure the walls of the fermentor are sanitized as well. Soak all items that need to be sanitized in this fermentor bucket for five minutes (see the manufacturer's instructions for specific minimum sanitization times).

After soaking and sanitizing your equipment, dump the sanitizing solution and cover the fermentor with the sanitized lid. Place the small spoon and the thermometer in the measuring cup and cover completely with plastic wrap to keep them sanitary. Chapter 2 discusses cleaning and sanitizing in more depth.

TABLE 1.1. CLEANING AND SANITIZATION CHECK LIST

Boiling kettle	❒	Clean		
Big stirring spoon	❒	Clean		
Regular stirring spoon	❒	Clean	❒	Sanitize
Pyrex measuring cup	❒	Clean	❒	Sanitize
Fermentor and lid	❒	Clean	❒	Sanitize
Airlock	❒	Clean	❒	Sanitize
Thermometer	❒	Clean	❒	Sanitize
Hydrometer	❒	Clean	❒	Sanitize

Making Wort (1 Hour)

Now we begin the fun part of brewing—creating the wort.

Figure 1.6. Have your ingredients laid out and ready before you begin your brew.

3. Create the Wort

Pour 3 gal. (11.4 L) of clean, low-mineral water in the boiling kettle. Also, pour another 3 gal. (11.4 L) of the same water into your cleaned and sanitized fermentor. It is best to use a low-mineral water source, such as distilled water, when brewing with malt extract, because the extract already contains minerals from the water used in the creation of the extract. You will be boiling the malt extract using the water in the boiling kettle and then diluting the resulting wort in the fermentor to make a total of about 5.5 gal. (21 L). You can expect to lose some water to evaporation during the boil (around 0.5 gal., or about 2 L). More water will be lost to the trub (hop and protein residue), so we start out with about 5.5 gal. in the fermentor to end up with 5 gal. (19 L) of finished beer.

4. Mix and Heat the Wort

Add 2.5 lb. (1.14 kg) of pale malt extract to the cold water in the boiling kettle and stir to dissolve. (Hint: dry malt extract dissolves without clumping in cold water.) If you are brewing from a pre-assembled beer kit you purchased, I recommend you follow that kit's instructions (the principles should be the same). At this point, begin heating the wort and stir frequently to prevent scorching of any undissolved malt extract on the bottom of the kettle.

Figure 1.7. Stirring the malt extract into cold water in the kettle.

5. Steep the Grains

If your purchased kit does not contain crushed grain, proceed to step 6. Put the 0.5 lb (225 g) of crushed grain in your grain bag. Heat the wort to a temperature of 120–170°F (49–77°C). The steep may be started cold, placing the grain bag in the kettle as it heats, but do not exceed 170°F (77°C). Submerge the bag and stir to make sure all of the grain is wetted. The grain bag is steeped in the

hot wort just like a teabag for 30 minutes. At the end of this time, the steeped grain is removed and the wort is brought to a boil. Steeping the grains in wort as opposed to plain water improves the wort pH and, along with moderating the steeping temperature, also reduces the risk of bitter tannin extraction from the grain husks. Likewise, do not squeeze the grain bag to get all the wort out after steeping. However, a gentle squeeze to prevent dripping on the stove is fine.

Figure 1.8. Steeping the grains in the wort.

6. Boil the Wort

If you have not done so already, because you skipped step 5, bring the wort to the boil. As the wort boils, foam will form on the surface. This foam will persist for a few minutes until the wort goes through what is called the "hot break" stage (when it stops foaming). The wort will easily boil over during this foaming stage, especially when hops are first added, so stay close by and stir frequently. Let the wort boil for 5–10 minutes before adding the first hop addition. If it begins to boil over, blow on it, spray it with a little cold water from a spray bottle, turn the heat down, or do a combination of any of those three things.

Putting a few copper pennies[2] into the kettle will help prevent boilovers. Adjust the heat so that the wort in your kettle is boiling moderately, not just simmering. It should be bubbling and visibly churning at the surface, but not to the extent that it splashes out of the kettle. Do not cover your kettle during the boil, because there are volatiles that need to boil off and it is also more likely the kettle will boil over (see chapter 4, "Brewing with Beer Kits and Extract," for more information).

[2] Yes, I know that US pennies are mostly zinc and just plated with copper, but that is fine. It's the copper plating that is important, because copper doesn't corrode in wort, and other coin metals, such as nickel, can cause haze.

Figure 1.9. A good rolling boil is important.

7a. First Hop Addition

Add 0.5 oz. (15 g) of Nugget hops to the kettle and start timing the hour of boiling.

Note: Different hop varieties may be substituted depending on availability or preference; just make sure the percentage of alpha acids (% AA) is nearly the same (within 1%) for the variety you are substituting. See chapter 5 for a more detailed discussion of hop alpha acid and quantifying hop bitterness.

7b. Second Hop Addition

After 45 minutes has elapsed, add the second hop addition of 0.5 oz. (15 g) of Cascade hops. These will be boiled for 15 minutes before the heat is turned off.

7c. Third Hop Addition

At the end of the hour, turn off the heat and add the last hop addition of 0.5 oz. (15 g) of Amarillo hops. This last hop addition will steep for 15 minutes in the hot wort before cooling or chilling.

8. Add the Remaining Malt Extract

Immediately after you have finished adding the last hop addition, slowly add the remaining 2.5 lb. (1.14 kg) of dry malt extract—that is, the part of the extract listed under "Wort B" in the Palmer Brewing Method recipe—while stirring gently to help prevent the extract from clumping and forming floating blobs. Crush any blobs against the side of the kettle with the spoon, and stir until all of the extract has dissolved. Let the kettle sit for 15 minutes before cooling. It will only take a couple of minutes for the heat of the wort to pasteurize the added extract, but the rest of the 15

Figure 1.10. Adding the first hop addition to the wort.

minute period is to allow the aromatic oils from the last hop addition to diffuse into the wort. Chapter 2 has more information on heat pasteurizing and chapter 5 has more information on hop oils and hop steeping.

9. Chill the Wort

After the 15 minute steep, the wort needs to be chilled to the fermentation temperature.

For best results, the wort should be cooled quickly. First, because handling hot wort is dangerous, and second, because it is convenient—quick cooling allows you to get on with your brew day. Only once your wort has cooled to the fermentation temperature can you can pitch your yeast and be done.

Hot wort (generally anything above 120°F [49°C]) is a safety hazard, and wort between 90°F and 140°F (32–60°C) is also easily contaminated by airborne yeast and bacteria. What follows are a few options for chilling your wort.

Pouring into cold water. The smaller volume of the partial boil method allows the hot wort to be mostly cooled by pouring it into the cold water in the fermentor. It is important to understand that this method will not fully chill the wort, but only take it down to about 140°F (60°C), which is a risky zone for contamination by bacteria. The fermentor will need to be sealed and allowed to cool overnight to the fermentation temperature before you can proceed. If your sanitation is good, the wait will not a problem.

Keep in mind that handling hot wort is dangerous, but the use of pot holders and a modicum of care are usually all that is needed to use this method successfully (fig. 1.11). But there are other ways to cool your wort more quickly and save you time and worry.

Figure 1.11. Pouring hot wort into cold water in fermentor. Notice the hot pads for protection and towel on the floor in case of spillage.

Figure 1.12. Place the kettle into an ice bath to chill it quickly. Keep the kettle covered to prevent contamination.

Cold water bath. Placing the kettle in the kitchen sink or a tub filled with ice water will chill it down to 70°F (21°C) in about 20–30 minutes. The ice water can be circulated around the kettle to speed up the cooling. You can also stir the wort to improve the cooling, if you are careful. Do not get the cooling water inside the kettle, because this is a contamination risk. If the cooling water gets warm, replace it with colder water. The closer you can get the wort to your fermentation temperature, the better.

Copper wort chillers. The best solution for cooling your wort quickly is to use a copper wort chiller. A wort chiller is a coil of copper tubing that is used as a heat exchanger to cool the wort in place. Wort chillers are a necessity for chilling full volume boils, because you can leave the wort on the stove instead of carrying it to a sink or bathtub. Five gallons (19 L) of boiling hot wort weighs almost 45 lb. (20 kg) and is dangerous to carry.

There are two basic types of wort chillers: immersion and counterflow. Immersion chillers are the simplest and work by running cold water through the coil. The chiller is immersed in the wort and the water carries the heat away. Counterflow chillers work in an opposite manner. The hot wort is drained from the kettle through the copper tubing while cold water flows around the outside of the chiller. Immersion chillers are often sold in homebrew supply shops or can be easily made at home. Instructions for building both types of chiller are given in appendix D.

No chill. There is also the option of no-chill, if you have the proper equipment. The proper equipment in this case is a 5.3 gal. (20 L) high-density polyethylene (HDPE) jerry can for drinking water. These are common in Australia, where this no-chill technique was invented. The basic procedure is that right at the end of the boil, as soon as the heat is off, you drain the boiling hot wort into the jerry can, squeeze out all the air, and seal the lid. The heat of the wort sanitizes the container. The wort

is allowed to cool overnight (and often through the next day) until it has cooled to fermentation temperature. The wort can then be aerated by pouring it to a fermentation bucket, or aerated in the jerry can and fermented with an airlock in that.

Assuming you don't have a copper wort chiller at this point, the simplest method at this stage is pouring your wort into the cold water in the fermentor.

10. Pouring the Wort into the Fermentor

Pour the hot (or cooled) wort into the cold water in the fermentor. Pouring the wort through a strainer to remove most of the spent hops and hot break material is optional, but often helpful. This material, called "trub," will not hurt the fermentation; in fact, retaining some trub is nutritionally beneficial for the yeast. But some styles, like IPA, have so much spent hops in the wort that the hops can soak up a lot of beer after fermentation, lowering your yield. Straining the trub for the Cincinnati Pale Ale recipe is not necessary.

Cover the fermentor (if using a bucket) and move it to a cool room. Clean and sanitize the airlock and stopper, if you have not already done so. Fill the airlock to the indicated level with water and insert it into the lid. Allow the wort to cool to the fermentation temperature (65–70°F [18–21°C]) before pitching the yeast. Ideally, the wort should be at fermentation temperature and your yeast pitched within minutes—rather than hours—of finishing the boil to reduce the risk of bacterial contamination before fermentation. However, if your sanitation is good the batch should be fine, even if the wort cools slowly overnight and you don't pitch your yeast until the next day.

11. Aerate the Wort

When your wort has cooled to the fermentation temperature and you are ready to pitch the yeast, you should first aerate the wort to provide the oxygen the yeast need to grow big and strong so it can ferment your wort completely. This is the only time during the brewing process where you actually *want* to aerate, or add oxygen, to your wort or beer. The yeast will use this oxygen to synthesize nutrients it needs for growth. See chapters 6 and 7 for a complete discussion of yeast and fermentation.

The best way to aerate wort is with an aeration wand, which is a long tube with an airstone, or carbonation stone, on the end. Using an aquarium air pump and filter, you pump HEPA-filtered air through the wand into the bottom of the fermentor for 5–15 minutes. This will supply about 8 parts per million (ppm) of oxygen for the yeast to use. (If you were wondering, HEPA stands for high-efficiency particulate arrestance.)

Alternatively, you can aerate your wort by pouring it back and forth a few times into the clean and sanitized boiling kettle (see fig. 1.14). However, this method has the risk of airborne contamination, so make sure you do it in a clean room and pitch the yeast immediately after.

12. Pitch the Yeast

No, this doesn't mean to throw the yeast away. It means to throw it into your wort. Open two packets of dried ale yeast (a single packet of dried yeast is usually 10 g). Measure 1 cup (250 mL) of warm (77–85°F [25–30°C]), pre-boiled water into your measuring cup and add the yeast. Allow the yeast to sit for 15 minutes before stirring. Stir the yeast gently and allow it to thoroughly rehydrate for 10–30 minutes before pouring (pitching) it into the fermentor containing your (now cooled) wort. You end up with healthier yeast if you rehydrate first in plain water rather than simply sprinkling dry yeast directly onto the wort. Chapter 7 goes into more detail about yeast management.

Figure 1.13. An immersion wort chiller placed in the boiling kettle.

Figure 1.14. Pouring the chilled wort for aeration.

Figure 1.15. Rehydrating the yeast.

Figure 1.16. Pitching the yeast.

13. Fermentation

Fermentation should start within 12–36 hours. Choosing a location that has a stable temperature in the range 65–70°F (18–21°C) is critically important for beer flavor. A warmer temperature of 75°F (24°C) is okay, but above 80°F (26°C) the beer will exhibit solventlike or phenolic off-flavors. If the temperature falls 5°F (2°C) or more below the recommended range, the yeast will perform sluggishly and may not ferment well, which often leads to raw pumpkin (acetaldehyde) and butter (diacetyl) flavors. For best results, the temperature of the room should be steady within the recommended range and not fluctuate between day and night.

14. Clean Up

Now is the time to wash out your boiling kettle and other equipment. Only use the cleaners recommended in chapter 2, and rinse well.

Fermentation Week(s)

Be prepared to amaze your family and friends with a bubbling airlock! (You laugh now. . .) The science of fermentation is discussed in detail in chapter 6, "Yeast and Fermentation," which will help you understand what is going on in your fermentor. Chapter 7, "Yeast Management," more fully explains how to select, grow, and care for your yeast to achieve the best fermentations.

Figure 1.17. Fermenting wort in a glass carboy. Clear glass or plastic carboys allow you to more easily see the activity of fermentation.

15. Leave it alone!

The airlock will start bubbling steadily after about 24 hours, the exciting evidence of fermentation. Figure 1.17 shows what it looks like inside the fermentor. The fermentation will proceed like this for two to four days, depending mainly on the temperature and amount of yeast pitched. The yeast creates alcohol, carbon dioxide, and a host of important flavor compounds as it ferments the wort sugars.

The airlock will bubble vigorously for the first few days and then decrease dramatically as the fermentable sugars are consumed by the yeast. Visible activity may cease altogether within one week, but the yeast are still active. For best results, allow the fermentor to sit undisturbed for at least one week after visible activity in the airlock has slowed (although it typically takes about two weeks in total). This will give time for the beer to condition and mature, and improve its clarity for bottling. As it clarifies, the beer will appear to get darker due to less haze scattering the ambient light.

Bottling Day

The second big day in your career as a homebrewer comes two weeks later, when fermentation is complete. Everything outlined below is more thoroughly discussed in chapter 10, "Priming, Bottling and Kegging."

Figure 1.18. Bottling equipment. You will need a bottle capper, caps, and either a siphon with a bottle filler attachment or a bottling bucket with a filler attachment.

To bottle your beer, you will need:

Bottles. You will need at least 48 non-twistoff 12 fl. oz. (350 mL) bottles for a typical 5 gal. batch. Alternatively, you could use 30 of the larger 22 fl. oz. (650 mL) bottles to reduce capping time. Twistoff bottles ("twistoffs") do not re-cap well and are more likely to break during capping. Champagne bottles also work well, if you have the right size caps and your capper can accommodate them.

Bottling bucket. You will also need a 6 gal. (23 L) food-grade plastic pail with attached spigot and fill-tube to use as a bottling bucket (fig. 1.19). The finished beer is racked into the bottling bucket for priming prior to bottling. Racking into the bottling bucket makes for clearer beer with less sediment in the bottle. The spigot is used instead of a bottle filler, allowing greater control of the fill level without the hassle of a siphon.

Bottle capper. Two styles of bottle capper are available: hand cappers and bench cappers. Bench cappers are mounted to a metal stand and can be operated with one hand, allowing the other hand to hold the bottle, as opposed to a hand capper, which requires both hands to operate.

Bottle caps. For bottle caps, either standard or oxygen-absorbing crown caps are available.

Bottle brush. For a bottle brush, you will find a long-handled, nylon bristle brush is necessary for the first hardcore cleaning of used bottles.

Siphon. Available in several configurations, siphons usually consist of clear plastic tubing with a racking cane and bottle filler. A siphon is a less-recommended alternative to a bottling bucket.

Racking cane. A racking cane consists of a rigid plastic tube with a sediment stand-off (a cap) to make sure the trub stays out of the bottle when siphoning.

Bottle filler. Finally, you will need a bottle filler, which consists of a rigid plastic tube with a spring-loaded valve at the tip.

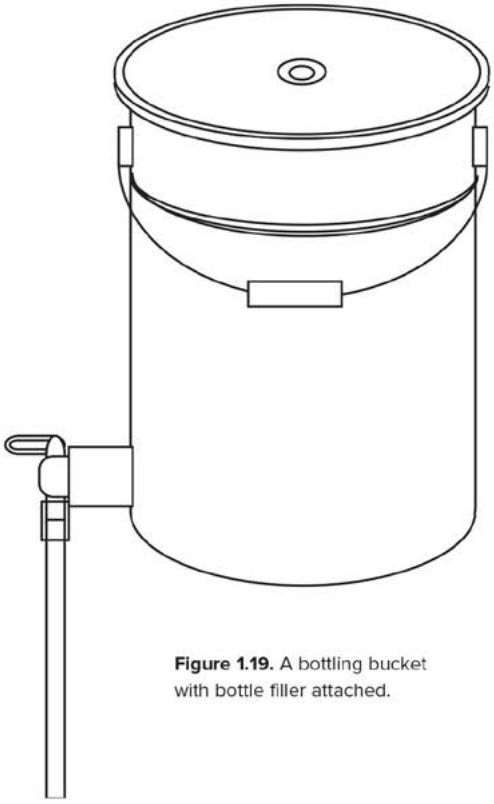


Figure 1.19. A bottling bucket with bottle filler attached.

16. Prepare Your Bottles

A typical 5 gal. (19 L) batch requires roughly 48 12 fl. oz. (350 mL) bottles for bottling. Thoroughly clean and sanitize the bottles before use. If you are using old bottles, check them for dirt or mold deposits inside. Bottles with deposits may need to be scrubbed with a bottle brush to get them clean. Always clean first, then sanitize.

17. Prepare Your Bottle Caps

The bottle caps should be clean (assuming you're using new caps), but it doesn't hurt to sanitize them too. Some homebrewers use flip-top (Grolsch®-style) bottles. The ceramic part of the flip-top lids can be sanitized along with the bottles. The rubber seals can be sanitized separately, like bottle caps.

18. Prepare Your Priming Sugar Solution

Adding a priming solution just before bottling gives the yeast a little sugar to re-ferment, which helps carbonate the beer in the bottle. For your priming solution, bring to a boil ¾ cup (4.7 oz. [133 g] by weight) of corn sugar or ⅔ cup (4 oz. [113 g] by weight) of table sugar in two cups (0.5 L) of water. Look to make sure the sugar is thoroughly dissolved. Cover the pan and allow it to cool.

19. Combine the Beer and Priming Sugar Solution

The best method is to use a separate container, the same size as your fermentor, as a "bottling

bucket". Clean and sanitize the bottling bucket, then gently pour your priming solution into it. Next, siphon the beer from the fermentor into the bottling bucket (fig. 1.20). Do not simply pour the beer into the bottling bucket, and do not let the beer splash as you siphon it in. Instead, put the end of the siphon under the surface of the beer as it fills. The swirling motion of the beer as it enters the bottling bucket will be sufficient to evenly mix the priming solution into the beer with little aeration.

If you don't have a bottling bucket, you can gently pour the priming solution into the fermentor and gently stir it in. Allow the sediment in the fermentor to settle for 15–30 minutes before proceeding to the next step. You can fill the bottles using the bottle filler attachment on your siphon, but it's better to have a dedicated bottling bucket (figs. 1.21 and 1.22).

Figure 1.20. Racking from fermentor to bottling bucket.

Figure 1.21. Filling bottles from the bottling bucket.

Figure 1.22. Filling bottles from a siphon with a bottle filler attachment.

20. Bottle and Cap Your Beer

Carefully fill the bottles to within about ¾ to 1 in. (2.0–2.5 cm) below the rim with the primed beer, place a sanitized bottle cap on each bottle, and crimp it using the bottle capper. At this stage it is helpful to have a friend operate the capper while you fill the bottles, or vice versa.

21. Leave to Carbonate

Place the filled and capped bottles away from light in a warm environment (room temperature, 70–80°F [21–27°C]). The bottles will take about two weeks to carbonate, depending on the temperature, and will have a thin layer of yeast on the bottom. The priming and bottling processes are discussed in more detail in chapter 10.

Serving Your Beer

At last, you get to sample the fruit of your labors. It's been about a month since brew day, and you are ready to open your first bottle and see what kind of wonderful beer you have created. During the past two weeks the yeast remaining in the beer has consumed the priming sugar, creating just enough carbon dioxide to carbonate your beer perfectly.

Okay, so maybe you couldn't wait that long and you already opened a bottle. You may have noticed the beer wasn't fully carbonated or that it seemed to have a "green" or yeastlike flavor. It

may have an aroma or flavor that is apple-ciderlike or buttery. These flavors are the sign of a young beer. The two-week maturation period not only adds carbonation, but also gives the yeast time to clean up some of the off-flavors it created during fermentation, as well as settle itself out, leaving a clean-tasting—and clean-looking—beer. Further descriptions of off-flavors and what they may signify are given in chapter 25.

22. Chill Your Beer

Once carbonated, your bottled beer should be stored cold to help preserve its flavor. It will keep for approximately six months, depending on how well you managed to avoid exposure to oxygen during the last stage of fermentation and during the bottling process. The beer will naturally oxidize as it ages, losing some of its hop character and acquiring stale flavors. Only a few beer styles age well; most should be consumed within six months. The optimal temperature for serving beer depends on the style, varying from 40–55°F (4–12°C). In general, the darker the beer, the warmer it should be served, but that guideline varies as well.

23. Pour Your Beer

To pour the beer without getting yeast in your glass, tip the bottle slowly to avoid disturbing the yeast layer on the bottom of the bottle. With practice, you will be able to pour everything but the last quarter-inch of beer without getting any yeast in your glass.

24. Savor the Flavor

Finally, enjoy the aroma, then take a deep draught and savor the flavor of the beer you created. Over time, pay attention to the aroma, flavor, bitterness, sweetness, carbonation level, and more. These observations are your first steps to understanding your beer and designing your own recipes.

But Wait! There's More!

Your first batch is a success and you are on your way to a brighter future. But, as you keep brewing, keep reading. The following chapters will again lead you through extract brewing, but this time with greatly expanded information about the process and the huge variety of hops, yeast strains, and malts that can make each brew deliciously and uniquely your own.

Fluit fluit, my storie is uit.