COURSE CODE: APG 5058S

COVER SHEET

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ESSAY WRITING REQUIREMENTS

This sheet is an overview of the minimum requirements for any essay or written work you submit for all courses in the School. As this is only a brief summary, use the recommended resources for further direction.

Essay Structure

Thesis: No matter the purpose of the essay, you must have a thesis and build your paper so to explicate that thesis.
Outline: Your essay must have a clear and organized structure. Start by developing an outline. Break the essay down into the following categories:

Introduction: At least one paragraph which introduces the essay topic. It includes the thesis statement, usually as the last sentence in the first paragraph.
Body: Develop the themes and points that explicate your thesis in the body of the essay.
Conclusion: A final paragraph(s) that re-states your thesis and contextualizes or summarizes the body of the essay. Never add a new topic or point of explication in your conclusion.

Paragraphs: It is very important that you develop well-structured paragraphs. The rule-of-thumb is that each topic or theme is developed in a single paragraph. However, that rule may be modified if a paragraph becomes too long (which can be tiresome to read) or you have too many brief paragraphs (which are also tiresome). Include transitions at the end and beginning of paragraphs so that they flow together well.
Writing style: Your essay must be clear, concise, and flow smoothly. Academic essays require a certain degree of formality, but do not complicate the writing style or word choice unnecessarily. Utilize punctuation correctly! Check your grammar (pay particular attention that subject and verbs, pronouns and antecedent nouns agree)! Read your essay out loud to yourself to check for flow and clarity! **Proof-read and spell check!**
For further reading or assistance, see:
http://startup.curtin.edu.au/study_skills/writing.html, or http://www.lib.uct.ac.za/infolit/report.htm, or The Humanities Library at UCT has a large collection of writing skills reference books, or visit The UCT Writing Centre (http://www.ched.uct.ac.za/adp/writing/), which offers writing assistance to all students.

Referencing

All academic writing requires you to cite all the sources that you have read and consulted in the preparation of your work. Not citing all of your sources is an act of plagiarism: essentially the stealing of others' words, thoughts and ideas, and is treated as fraud. Students found guilty could at best fail their course, at worst face expulsion. Every single instance of using phrases and ideas that are not your own must be acknowledged.
Quoting: When you quote someone's words directly, you *have to place these words in quotation marks.*
Longer quotations, which you should use sparingly, should be "blocked" to make them stand out clearly. This means indenting and single-spacing the entire quotation, also possibly using a smaller typeface.
Referencing: You must choose one method of referencing (or citation) and use it consistently throughout your essay: either the Harvard system or the footnote (Chicago or Oxford) system. No matter which system you choose to use, the information you must ascertain and include is:

- **Name** of the originator(s) of the document or the part of a document you are using as a source.
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- For an electronic resource only, the **medium**, which may be given as "Online" or "CD-Rom" in square brackets, or you may use "Electronic" if you are not sure whether the source is online or networked CD-Rom.
- **Publication details**: Place of publication and Publisher if the item is a book; Volume and/or issue number if the item is a journal. For an electronic resource give the **uniform resource locator** (URL) which may sometimes be given between angle brackets (< >). If the URL is very long, it may be written on two lines, but try to break a line only where a punctuation mark occurs and do not *add* a hyphen, as this will alter the URL.
- Inclusive **page numbers** if the reference is to an item smaller than a whole book.
- For an electronic resource, the **date** on which the document was last **accessed**, often in square brackets.

Harvard System

In the Harvard system, referencing is done by inserting the author surname and publication date in parenthesis within the main body of the text. For a complete guide to the Harvard system, see http://www.lib.uct.ac.za/infolit/bibharvard.htm.

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In the footnote system, a reference in the text to another source is signalled by a numeral giving the number of the citation. This numeral corresponds to a numbered note at the bottom of the page (a footnote), or at the end of the paper. For a complete list and discussion of footnoting, see http://www.lib.uct.ac.za/infolit/bibchicago.htm or Turabian, K. 1996. *A manual for writers of research papers, theses and dissertations*. 6th ed. Revised by John Grossman and Alice Bennet. Chicago: University of Chicago Press.

Contemporary Interpretation of a Winery in the Cape Winelands:

Understanding Terroir

Design Research Project APG 5058S

Submitted in partial fulfilment of the requirements for the degree

Master of Architecture (Professional)

By

Sarah-Jane Jackson

October 2012

University of Cape Town

University of Cape Town

Dedicated to Mark, Charmaine, Peter and Stephen Jackson.

Colossians 1 v 9-12

The nature of the ground; its effect on the vine and subsequently on the wine. The bond between the organism and the soil that nurtured it, underlies the character of red wine."

(Biermann, 1972, p10)

Introduction

The primary concern that prompted this thesis is the growing separation between product and source in contemporary culture. The current consumer culture gives little thought to where products come from. This phenomenon is prevalent within architecture too; much contemporary work is purely image-based, following ever-changing international trends which often result in buildings which are inappropriate to their context. Basic principles of how a building relates to its site and surrounds have been negated in a time of increasing commercial and economic pressure.

This issue, combined with my own passion for wine and the Cape Winelands stimulated me to explore an architectural thesis in this realm.

There are many parallels between wine and architecture. The landscape is a significant factor in both realms. The influences of climate, geographical and geological positioning are profound in shaping the character of both wine and architecture, yet, the degree to which the relationship with the landscape is understood and fully utilized in both has been largely underestimated.

The international wine market has recently experienced a movement to re-establish the connection between each wine and its own landscape, allowing for expression of the vine's growing environment in shaping the character of the wine. This approach to landscape can be interpreted within the realm of architecture, allowing the surrounding environmental factors to shape the architectural character.

Research into traditional knowledge provides solutions for many contemporary problems. (Fathy 1986 xv) In addition to new ways of looking at the landscape, reconciling the relationship between architecture and landscape suggests an understanding of the vernacular architecture of the area, as it was developed over generations by those who lived in close association with the land. Vernacular construction technologies are also of value; they were developed through what was locally available and are inherently sustainable. Within the context of the Winelands, key principles of the vernacular can be extended forward and applied in the design of current architecture.

Earth-based construction is an ideal technology to explore for a project located within the winelands as earth is of major significance within the realms of both wine and architecture. This investigation is located within a broader research of earth-based technology and its current day interpretations. Rammed earth is of specific interest as it is expressive of its surrounding environment and construction process.

The aim of creating an architectural experience which unites product and source by amplifying the influence of the landscape in shaping the architectural character, utilizing principles extracted from the vernacular and an understanding of earth-based technologies, formed the basis for the design of a contemporary interpretation of a winery within the Cape Winelands.

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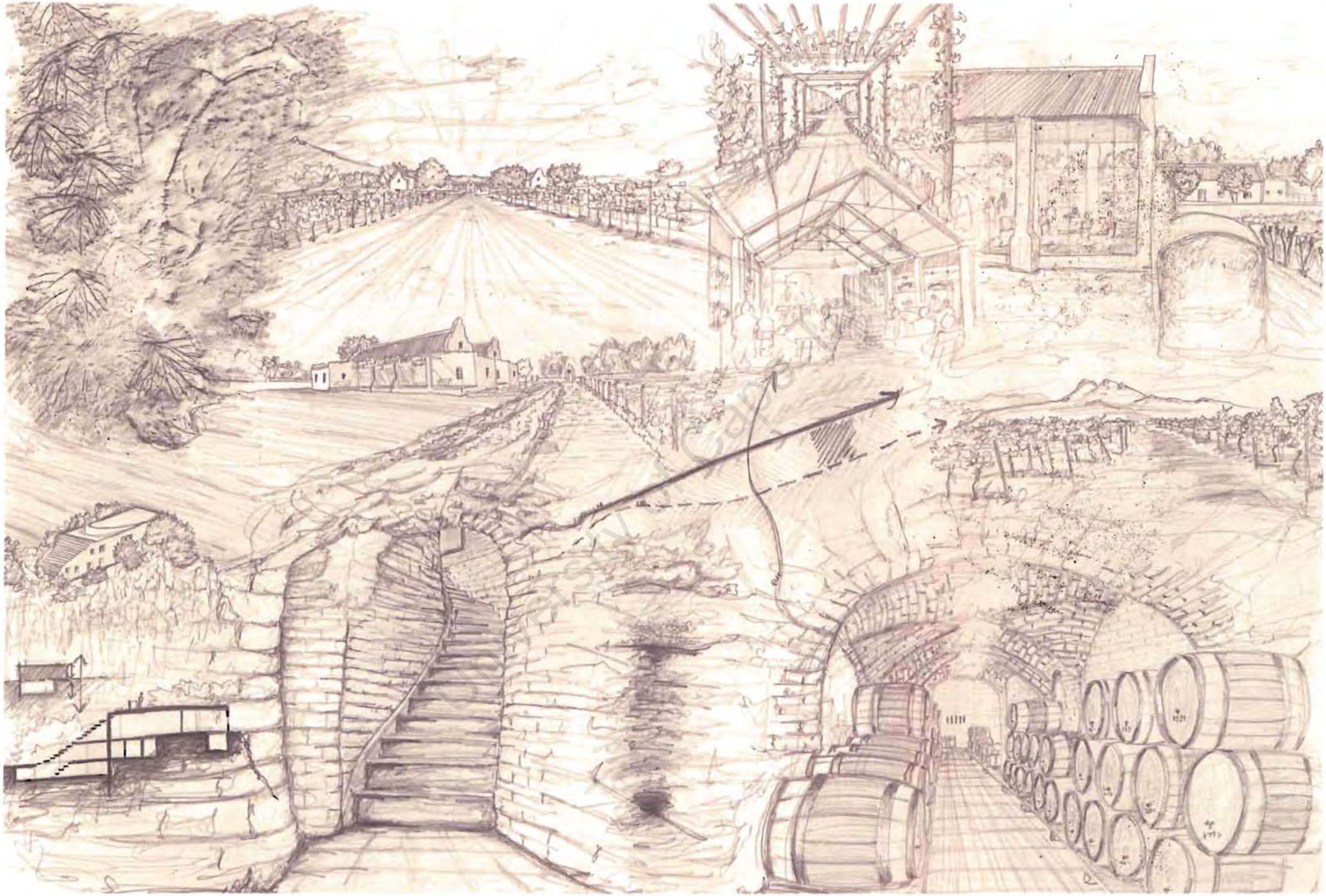
Outline:



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1_ Theoretical Positioning

Wine and Architecture

There are many parallels between wine and architecture; both are manifestations of science and technology, as well as art and culture. (Strafrod in Fraser, 2011, p6) Wine and architecture are both influenced by climatic, geographical and geological positioning. The proximity to water, orientation, elevation, prevailing winds, soil and ground drainage influence the quality and character of both wine and architecture. Aging is also an important factor to consider in both wine making and architecture.

The work of Barrie Biermann was a substantial influence in this research paper. Biermann was an architect, academic and wine-enthusiast who pioneered extensive research in both realms of wine and architecture. Biermann's PhD, *A Contribution to the Study of the Origins of Colonial Architecture at the Cape (1952),* was one of the first academic investigations into the origins of Cape Dutch architecture. *Red Wine in South Africa* (1971) provides a localized view of the broader aspects of wine; its history, industry and culture. The work of Biermann emphasizes the multi-faceted nature of both wine and architecture.

I spent much of this year exploring the Cape winelands, beginning to understand its vast diversity, complexity and wealth of talent. I met an array of interesting people in the industry; the passion they have for their craft captured my imagination.

Above: Exploratory sketches of Badenhorst Family Wines cellar, Swartland. *(Author)*

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Terroir

An expanding wine market of the present day has greatly increased the quality standards of wine; the tendency is toward quality rather than quantity. Premium wines are expressive of their terroir.

Terroir is a French term which refers to the growing environment of the vine. Terroir greatly influence on the character of a wine. The factors which make up terroir are climate, topography and soil. These factors can be further expanded: *Climate* refers to temperature, rainfall, humidity, wind, and sunlight hours. *Topography* covers altitude, aspect, slope steepness, and exposure or openness of the landscape. *Soil* relates to depth, composition, sub-soil composition, drainage, texture, nutrient status and colour. Terroir has a spatial dimension as it changes over distance; some characteristics vary of short distances while others remain largely unchanged for a much larger distance.

Terroir takes in the complex relationship of environmental factors in the vineyard, rather than viewing each in isolation. All wines have terroir; its influence on the wine character can be enhanced through appropriate agricultural methods and winemaking. The emphasis of terroir bodes well for all wine estates as it supports farming and wine making processes that are inherently suited to each farm.

In Red Wine in South Africa (1971) Biermann places special focus on the underlying geology of each wine region, emphasizing its profound influence on the character of a wine. Within the definition of terroir, geology is taken into account through its effect on the soil composition.

Note: For the purposes of this paper the term winemaker refers to the viniculturist; the cultivator of grapes and the maker of wine.

Above: Terroir Elements; Climate, Soil and Typography. *(Author)*
Below: Geology and Soil Mapping of the Stellenbosch Wine Region *(Biermann)*

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Landscape and Architecture

Within the realm of architecture landscape is largely regarded as the natural backdrop for the built; a singular entity that is to serve the architecture, this trend was set down during the era of Modernism. "Through this physical, programmatic and semantic emptying of the ground the context mutates into that mass without qualities." (Ruby, 2006 p.10) When functioning in isolation architecture lacks contextual, social and environmental suitability. Much of contemporary architecture continues to follow this trend to negate the ground on which the building rests.

However, in recent times an entirely opposite position has been adopted; landscape dominates architecture. "The ground is essentially an instrument used to camouflage the architectural object." (Ruby, 2006, p19) Architecture becomes subservient to landscape as the built is hidden or concealed by the land.

Above: Unité d'Habitation, Marseille, France, 1947-52 *(manmakehome.com)*
Below: Domonique Perrault's Ewha University Campus, Korea, 2004. *(royalacademy.org)*

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A balance between these two opposing view is intriguing; an architecture distinct from the landscape, yet collectively the two empower each other. Le Corbusier's principle of fusion of opposite's best describes this: "Fusion results in balance, equilibrium and harmony... The vertical gives the meaning of the horizontal. One is alive because of the other." (Le Corbusier in Corner, 1999, p 179) The horizontal can be equated to landscape and the vertical to the architecture; it is through juxtaposition of these opposites that each one is enhanced.

An example of this fusion of opposites is demonstrated by Frank Lloyd Wright's Falling Water house; the built and the natural remain distinctly identifiable, yet the power of each is amplified by the presence of the other. Wright's intricate understanding of site is coupled with a bold architecture that responds to its surrounds, reaching out into the natural setting.

Above: Falling Water, Frank Lloyd Wright, Bear Run, USA. 1934-37 *(wright-house.com)*

Re-envisioning Landscape/Architecture, a symposium held in 1998 at the Arizona State University, suggests that both architecture and landscape are both multi-faceted terms which are interwoven in many ways. In a similar view James Corner's *Recovering Landscape* reasserts the importance of landscape in architecture; "At their best building projects are conceived less in terms of isolated objects and more as site-specific constructs that are intimately bound into larger contexts and processes." (Corner, 1999, p16) Architecture designed in relation to its landscape results in an enhanced spatial experience and perception of the greater environment.

"Invention as an essential ingredient of reclamation (of the site), engendering new kinds of landscape." (Corner 1999 p13) Reconciling the relationship between architecture and landscape requires a new conception of what constitutes landscape itself. As discussed by Corner, the term landscape has become too limited; the picturesque rural scenery or back drop to buildings. (Corner, 1999, p8)

From this position I regard it is possible to consider landscape in terms of *terroir*; the climate, topography and soil and thus the 'growing environment' of the architecture. Equating landscape with terroir opens up new avenues of exploration and interpretation in its relationship with architecture. The multiple parallels between wine and architecture and the location of this thesis within the winelands gives further substantiation to this viewpoint.

Above: Understanding landscape in terms of Terroir; climate, soil and typography. *(Author)*

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Architecture and Terroir

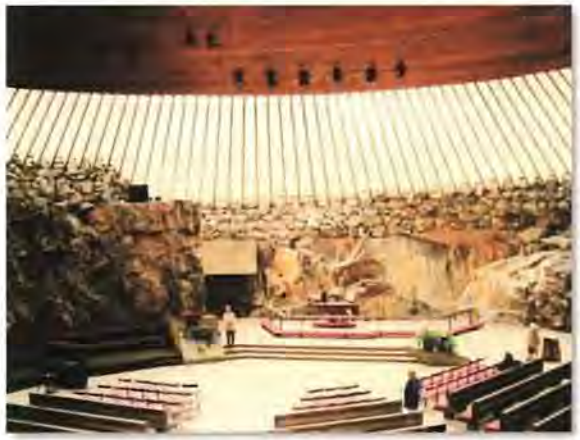
An intricate understanding of the terroir is essential for the winemaker to create a quality wine which is expressive of its terroir. Likewise in architecture, an intricate understanding of all the elements of the terroir is crucial to generate an architecture which is responds to, and is thus expressive of, its terroir.

As mentioned, terroir is a three-fold term; *Climate* and *Soil* are not elements that can be manipulated; they are factors which the architecture needs to respond to such as thermal performance, structure and weathering. However, *Topography* is an element that can be altered.

The extent to which the winemaker is able to shape the topography of the land is marginal when considering the overall scale of the site yet, within the discipline of architecture the possible extent of topographical manipulation is far more substantial; "heightening local attributes and a collective sense of place". (Corner, 1999, p13) The manipulation of topography has considerable influence on the spatial quality of a place; highlighting certain aspects, shaping particular routes or vistas.

In *Groundscapes* Ruby discusses the concept of *Raised Ground*; lifting the ground creates a tension between underground and above ground which "allows for paradoxical spatial situations to develop." (Ruby, 2006, p71) *Raised Ground* allows for some programmes to be embedded below ground, yet have a direct connection with other 'above-ground' elements. Ruby also discusses the concept of *Exposed Ground*: "Ground transforms material into building material and thus becomes visible." (Ruby, 2006, p159) *Exposed Ground* amplifies the presence of the land in architecture by creating buildings which rise out of, and the display the nature of, the ground on which they stand.

Altering any of the elements that constitute terroir will result in a change in the character of a wine, thus the winemaker must have thorough comprehension of the terroir and the outcome of any changes. Likewise in architecture, a thorough understanding of the terroir must be coupled with the insight of how its manipulation will influence the architectural character.



Above: Raised Ground - Casa Malaparte, Capri, Italy 1938-42 Adalberto Libera and Curzio Malaparte *(crystalinks.com)* The rooftop is like a level plateau and the surrounding ground as the adjoining lowland.
Below: Exposed Ground - Temppeliaukio Church in Helsinki, Finland 1968-69) Timo and Tuomo Suomalainen *(architectenwerk.nl)* The raw materials of the ground that used to create the architecture are exposed.

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Vernacular Architecture Exploration

"We have to know from where we are coming from to know where we are going." - *Charles Correa* (Pearson, 1994, p121)

Vernacular – *noun*

1 the language or dialect spoken by ordinary people of a country or region.

2 architecture concerned with domestic and functional rather than public or monumental buildings. *Oxford Dictionary2012*

The history of the vine in South Africa runs parallel to the development of our nation and its architecture. In 1655 the very first *vitis vinifera* (wine grape) was brought to the Cape by Jan van Riebeeck, the first Commandant of the Cape, just three years after the Cape had been settled in 1652. The pioneers of the vine in the Cape also played a crucial role in the establishment of the Cape's vernacular architecture, which is broadly labeled as *Cape Dutch*.

After living and studying in the Cape for the past 6 years I felt I did not have adequate knowledge of the vernacular architecture of the area to begin an architectural thesis in this context. I used the first semester as an opportunity to explore the design theory and construction technology of the Cape Dutch farmstead.

Cape Dutch architecture was developed over generations by those in close association to the landscape, yet it is clearly distinguishable from its surrounds. By the 18th C a universal building idiom for the Cape farmstead (*werf*) had been established. (Harrop-Allin 1975 p64); there was a uniformity of scale, proportion and texture. "The greatness of Cape Dutch architecture lies in its totality." (Biermann, 1952, p6) The buildings of the Cape Dutch werf do not have the same power when viewed in isolation, but collectively the werf has a striking unity and command in relation to the surrounding landscape.

Above: The Cape Dutch werf is distinctively identifiable from the surrounding cultivated and natural landscape. *(Biermann)*

Overleaf: Timeline – Development of the Cape Farmstead in relation to the growth of the South African Wine Industry (Author)

DEVELOPMENT OF THE CAPE FARMSTEAD

WINE IN SOUTH AFRICA

Establishing Burgher Society

UNIVERSAL BUILDING IDIOM

ECCLECTIC BUILDING STYLES

Jan van Riebeeck arrives in the Cape **1652**

First Free Burghers released (9) They settle along the Liesbeeck (Amstel) River 1657
Land initially granted by v.Riebeeck significantly reduced - Commissioner van Goren.
Khoi-Khoi launch a series of successful on Free Burgher herds. 1659
Jan v. Riebeeck leaves for Batavia 1662

1675

Simon van der Stel arrives in the Cape _Becomes Cape Governor 1679
First Burghers settle in Stellenbosch
Freedom on Stellenbosch Free Burghers revoked - Commissioner van Rheede 1685
Stellenbosch reconfigured to match VOC's urban geography preferences.
More land granted to Free Burghers in the Drakenstein 1687
French Huguenots arrive in the Cape to escape religious persecution, settle in Franschhoek. 1688
Simon v.d Stel retires, his son Willem Adrian v.d Stel succeeds him as Cape Governor. 1699

1700

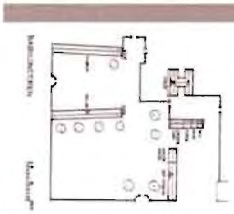
1655 First *Vitis Vinifera* brought to the Cape by Jan van Riebeeck

1659 First Wine Produced in the Cape
"Today, praise be to God, wine was pressed for the first time from Cape grapes" - J.v Riebeeck

1680 Vines first planted in Constantia

1699 Simon v.d Stel retires to Constantia (770ha) to produce excellent wines

1700 Willem Adrian v.d Stel acquires Vergelegen (244ha) He is an avid viticulture pioneer



The Farm Complex - A small village
Careful thought to movement and view axis
- Social prescription of desired movement
Appearance from afar
Spectacular entrance
Elements:
Thick whitewashed walls (6m room width limitation)
Steep pitched thatch roof
Gables - Main and Side
Plinth forming a stoep
Low werf wall

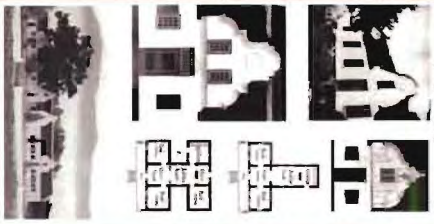
Willem Adrian v.d Stel's removal from office. 1707
Wellington, The Swartland and Land van Waveren settled. 1710

1725

Second Generation of Farmers in the Cape 1730

1750

1712 Simon v.d Stel dies. Constantia subdivided into Constantia, Bergvliet, & De Hoop op Constantia



5000 Free Burghers in the Cape. 1751
VOC adopts the Cape Dutch (Free Burgher) style of Building. 1755
Joostenburg and Klapheuwel built (earliest surviving examples of Cape Dutch Architecture) 1756
- Clearly stated façade (no forward projections visible)
1777 - Arrival of Anton Anreth
(First famous SA sculptor, Groot Constantia Pediment)

1775

1783- Arrival of Louis Michel Thibault
(Most versatile professional to work in the Colonial Cape)
(Groot Constantia Redevelopment)

10 500 Free Burghers 1780
The Cape is bilingual.
VOC liquidated. 1795
British seize control of the Cape

1800

1778 Hendrik Cloete purchases Constantia - He greatly develops viticulture. Produces 'Vin De Constance'

1800's - Rise of the Georgian style
- Voorhuis replaced with Lobby and passage
- Privacy of British culture)
- Forward projecting flat roofed sections on both façade ends.
1860 - Corrugated iron
- the demise of the gable and thatch style.
- 'Economic advantages marketed'
- Eves level raised, pitch reduced from 50-30°
- (Proportion of wall to roof - dramatic change)
- Roof sheets fixed on top of wall ends - No need for gables
- Small loft windows below eves - ventilate the roof space

British take over the Cape. 1806

1825

The Great Trek begins. 1836

1850

1800 5 million litres of SA Wine Production

1813 Britain reduces import duties on S.A Wine - A boost for the local market.

1821 Wine exports amount to 63% of all SA exports

1850 20 million litres of SA Wine Production

1875 - Rise of the Victorian Era
(Cape Dutch thatch and gable style and Georgian style end)
- Asymmetry and irregularity (opposition to logic of Classicism)
- The veranda (Break down of traditional clean façade)
- Romantic and picturesque.
- Adornment of the veranda
- decorative cast iron work
- Reaching out to landscape
- Bay windows, tall chimneys and turrets.
- Eventually wrap around verandas.

Railway from the Cape reaches Wellington 1860

Genootskap vir Regte Afrikaans established in Paarl

1875

The South African War 1899

1900

1859 Outbreak of vine diseases - huge blow to vine crops.

1861 Britain lowers tariffs on French wine imports. Blow to SA wine industry.
1865 Brandy sales double. Boost to local market.

1883 Earliest grapes planted in the Northern Cape (Table Grapes)
1884 Phylloxera devastates Cape Winelands. Wine exports collapse.
1888 Grafting south vines onto phylloxera-resistant American root stock. Still a practice today.
1892 First table grapes successfully exported.

Treaty of Vereeniging (end of the South African War) 1902
Union of South Africa established 1910

1920's - Cape Dutch Revival Style
- Eclectic combination between Cape Dutch and Victorian eras.
1930's - Influence of the international style across South Africa
- Much of traditional architectural styles and replaced with Modernist styles.
- Traditional construction methods supplemented with new technologies.
- Dissolving of traditional werf formation, distribution of farm operations.

1925

Population Registration Act

1950

1902 Commission appointed to investigate depressed SA wine industry.
1909 First grape farmers co-op formed.

1918 KWV formed, initially a lifeline for local farmers.

1925 Pinotage developed. SA's own grape by Professor Perold in Stellenbosch by combining Pinot Noir and Hermitage (Cinsaut) varietals.

1955 Viticultural Research Centre - Nietvoorbij established.

Republic of South Africa established - independent of British dominion 1961

- Distinct differences in accommodation of farm managers and staff - often inadequate housing for farm workers.

1975

Unbanning of the ANC and other anti-apartheid activist groups. Nelson Mandela released 1990
Group Areas act, Population Registration Act and Land Acts abolished 1991
South Africa _A democracy 1994

- Following the establishment of a new democracy there is a huge revival sparked in wine industry and the redevelopment of many farmsteads begins to take place.

2000

1970's Automation and mechanisation of wine begins in SA.
1971 First Wine Route established_Stellenbosch
1973 Wines of Origin Certificate system introduced.

1990 1 Million cases exported to the Uk.
50 million litres in total exported.
1992 KWV quota abolished, the end of a monopoly, the market opens up for all grape farmers.
1993 Wine of Origins Seal on the bottle introduced.
1996 11 Million cases exported to the Uk.

- Investments in the wine industry continue to soar and many farmsteads are redeveloped with an international contemporary image.
- Winery now seen as flagship of the farmstead.
- Bold structural forms and use of materials to establish each farms particular identity.
- Often no expense spared - Branding of the wine farm through its winery.

2012

2009 395,5 Million litres exported.
49% of all wine produced is exported.
SA celebrates 350yrs of wine making.

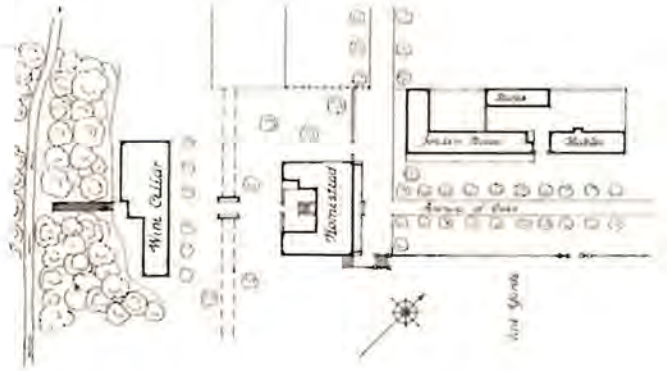
The architectural character of the Cape Dutch werf was profoundly influenced by its terroir. On a larger scale, the terroir was the determining factor in the locality the early Free Burghers settlements; along the rivers and sheltered valleys of the countryside where there was a supply of water and rich soil to farm. On the farm, the view toward and from the werf was a critical role in the location and arrangement of the werf; the manor house was positioned to face the best view. (Fagan, 2004, p305) Proximity to water for domestic use and access to crops were also important factors in locating the werf. *(Fagan, 1994)*

The materials used for construction were locally available and used in innovative ways to create an architecture which was compatible with its surrounds. The benefit of this is displayed in the remarkable aging ability of Cape Dutch buildings.

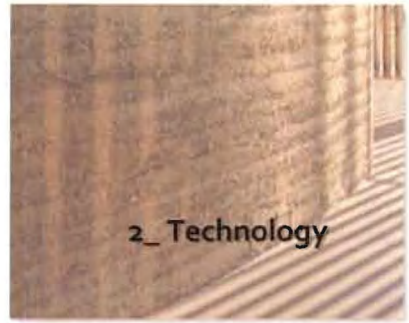
As discussed, climate and soil are not factors that can be manipulated; these were factors that the vernacular architecture needed to respond to. The majority of these issues were addressed through the construction technology. However, typography is an element of terroir which was manipulated to enhance the architectural character of the Cape Dutch werf.

Such as in the case of Groot Constantia: The sloping ground of the werf has been retained to the North-West and built up on the South-East, producing a flat plain onto which the werf is built. Thus the werf is raised above the level of the surrounding farmland; accentuating the view out toward the False Bay peninsula. Manipulation of topography created a sense of anticipation when approaching the werf; an ascent to the werf gates then a descent through the werf and toward the manor house. As the long section reveals, the werf forecourt appears flat, yet in reality it slopes toward the South-West, allowing ground level access to the cellar below the manor house.

The character of Cape Dutch architecture resulted from a thorough understanding terroir, how the architecture could respond its environment, coupled with a vision of how the terroir could be manipulated to enhance what the architecture.



Above: Groot Constantia werf layout *(Pearse)* adapted to accentuate the view. *(Author)*
Below: East-West section through main approach of Groot Constantia werf *(Author)*


2_ Technology

Balance

"Wine moves between the modern large steel tanks used for the fermentation to the time-honored wooden barrels for maturation." (Biermann, 1972, p132)

Balance is a key aspect of wine making; a balance between tradition and modern advancements. In the present day it is not feasible for a winemaker to remain entirely in past traditions, ignoring current innovation. Evolving technology allows for new cultivation and production possibilities. Technologies such as mechanized picking and crushing, temperature-regulated stainless steel tanks and the addition of yeast cultures have vastly increased the volume and efficiency of wine production. These replaced traditional techniques such as hand picking, basket pressing, natural fermentation and maturing wine in oak or concrete vats. However, recently there has been a resurgence within the 'new world wine regions' such as California and the Cape to return to more traditional methods of winemaking as these are inherently more expressive of the vines terroir.

Thus a holistic understanding of the vines growing environment, coupled with a balance between traditions and advances of modern technology will produce an outstanding, yet feasible, wine that is expressive of its terroir.

Within the realm of architecture I am intrigued by a similar approach: an intricate understanding of site combined with a balance between traditional construction methods and current advancements to generate an architecture that is compatible with, and expressive of, its environment yet appropriate in the present day.

Top: Stainless Steel tanks for wine Production, Groot Constantia *(Author)*
Middle: Oak Barrels for wine maturation, Groot Constantia *(Author)*
Bottom: Concrete vats and oak barrels, Badenhorst Family Wines *(Author)*

Vernacular Construction Technology

"Recognition of the contribution traditional knowledge can make to the solution of many contemporary problems." (Fathy 1986 xv)

The lack of stone and scarcity of timber resulted in the majority of the Cape population using a variety of earth-based construction methods. The earliest structures at the Cape were constructed of wattle and daub. (Pearse 1957 p.7) Cob, mud bricks and rammed earth were also popular methods of wall construction. (Pearse 1957 P.21).

A protective coating for the walls was required due to the heavy winter rainfall of the Cape and the susceptibility earth-based construction to erosion from water. A lime based plaster was developed using sea shells that were burnt in a kiln to extract the lime. (Fitchett 1996 p626) The white lime plaster was painted onto the walls and re-applied annually.

Timber was used for roof construction. The locally source timber had a limited length of 6-7m, resulting in the standardized floor plan width of around 6m. The roof structure was thatched with an indigenous plant known as thatching reed, which is much more durable than straw. A *brandzoler* (fire ceiling) formed the manor house ceiling; an arrangement of timber beams, boards, puddled clay and tiles. (Pearse 1957 p8) Reeds sown together substituted the timber boards for ceilings of the outbuildings.

The construction of Cape Dutch architecture is inherently sustainable through the innovative use of locally sourced materials. The earth-based construction systems resulted in massively thick walls and thus excellent thermal qualities; the interior spaces remained temperate throughout the year. The white wash plaster protected the walls from erosion, assisted in reflecting solar heat gain and gave the werf a striking visual unity. The thick thatch roof, coupled with an insulated ceiling provided excellent thermal insulation. The use of earth-based construction is of particular interest to me due to the importance of earth in both architecture and winemaking.

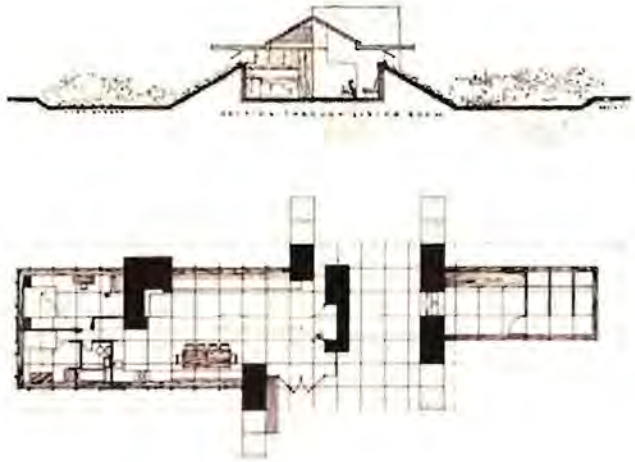
Above: Axonometric section of an H-Plan Cape Dutch Manor House. *(Biermann)*
Below: Boschendal Manor House and werf wall, contrasting to the backdrop of the Drakenstein Mountains. *(Biermann)*

Earth-based Construction Technology

Presently, three billion people live in buildings constructed of earth which makes it the most widely used building material in the world. (Rael 2009 p9) Earth refers to "clay, gravel, sand, silt or other friable soils, in which organic materials sometimes exist" (Rael 2009 p9) Earth is an inherently sustainable material; it requires little embodied energy and is highly recyclable. Earth based technologies, used in both wet and dry climates, represent some of the world's oldest inhabited buildings.

The majority of earth buildings are constructed by owner-occupiers. However, many well-known architects have utilized earth-based technology such as Antoni Gaudi, Adolf Loos and Frank Lloyd Wright. Le Corbusier wrote a small book in 1942, *Les Constructions Murondins*, which promoted earth-based technologies. More recently, earth-based construction was immensely promoted by the Egyptian architect Hassan Fathy. He used traditional building methods in innovative new ways to serve the contemporary society. His book, *Architecture for the Poor (1969)*, inspired many others to use this technology.

However, earth-based construction technology is still largely unexplored in contemporary western architecture. It is difficult to create earth building standards as soil composition differs substantially over very short distances. Yet, as more research and projects use earth-based construction, the greater the understanding and appreciation of this technology will become.



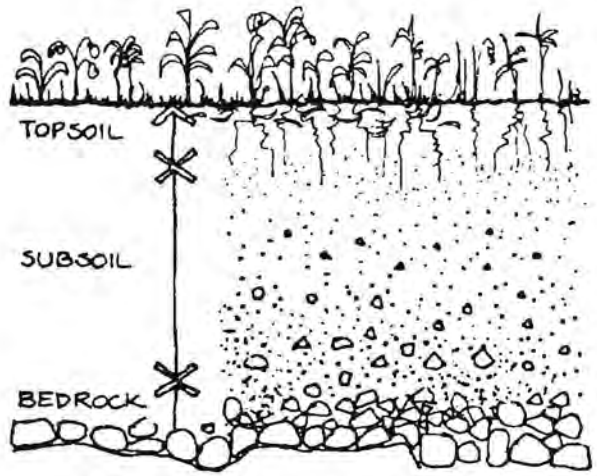
Above: Taos Pueblo, New Mexico. *(newmexicohistory.org)* The oldest continuously occupied dwelling in North America, is constructed entirely from adobe. (Rael 2009 p9)
Below: Frank Lloyd Wright's Cooperative Homestead project *(eartharchitecture.org)*

Earth can largely be divided into three layers: *Topsoil*, containing mainly organic matter and thus nutrients, *Subsoil*, containing little or no organic matter and *Bed rock*, the geological foundation of the soil. Generally the earth suitable for construction comes from the subsoil layers. (Norton 1997 p3) Topsoil should be removed and stockpiled when excavating earth so it can be re-used for cultivation at a later stage.

Soils are composed of four grades of particle sizes: Gravel, Sand, Silt and Clay. Clay acts as the binding agent and is unstable as it swells when wet and shrinks when dry. Understanding the proportional soil make-up of these four elements is vital to select the appropriate building method.

Earth is strong in compression but weak in tension; it is used as a load-bearing material. The compressive strength of a wall is further increased by compaction, this increases the strength of soil but it is still vulnerable to water. "A basic rule of building with earth is to either protect in from moisture or make the earth less sensitive to the effects of water." (Norton 1997 p4) Earth-based construction is highly susceptible to erosion from water as it causes the clay losing its binding capacity.

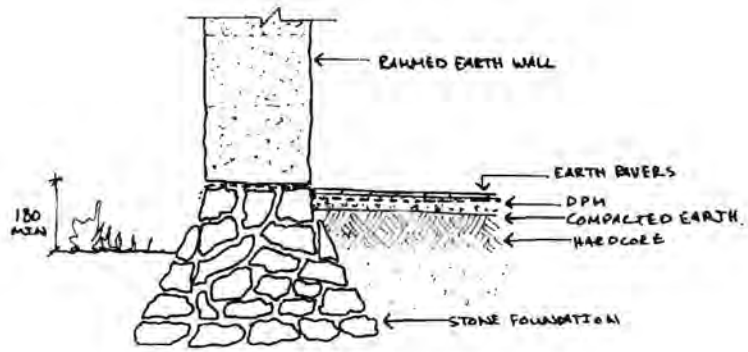
Soil stabilizers are added to increase the compressive strength or reduce the affect that moisture has on it. The main stabilizers are *cement* which is best in sandy soils and *lime* which is best in clay soils. In some cases adding additional sand or clay to alter the soil mix is sufficient and no further stabilizers required. The nature of the soil determines the most suitable stabilizer and this is usually this is combined with compaction. (Norton 1997 p27)

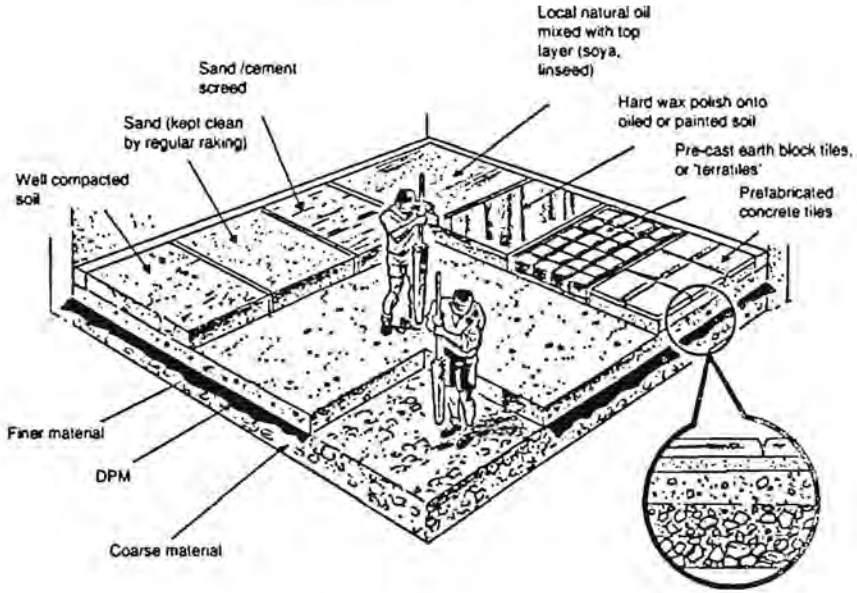


Above: Standard soil profile *(Norton)*
Below: Soil composition illustrated through a sedimentation test *(Minke)*

Renders may be added to the wall surface for many reasons; waterproofing, appearance and reduced heat gain. Cement based renders do not adhere well to earth walls and thus earth or lime based plasters are most commonly used.

"The critical factor is to make sure that the base of the building stays dry." (Norton 1997 p63) Impervious materials such as fired brick, stone or cement should be used for foundations, onto which the earth wall is built. Generally the foundation footing is spread out at a 60' angle and three or four brick courses thick. A damp proof membrane should be run over the top of foundations and under the floor.





Above: Typical foundation for earth-based construction (Author)
Below: Basic floor preparation with displaying a variety of finishing options (Keable)

There are approximately twenty different earth-based construction techniques. (Rael 2009 p9) The most suitable technique depends on many factors; climate, soil conditions, construction costs, maintenance and labour skills. The value of traditional building methods combined with current innovation can be appreciated through well considered contemporary interpretations.

Combination walls are non-load bearing; earth is combined with a supporting framework. The walls are usually thinner and without the same thermal benefits of other earth-based methods. However, due its lightness and flexibility, it is perfectly suited to earth-quake areas. *Wattle and Daub* is one of the oldest of all building technologies. (Rael 2009 p9) The *Wattle is* the woven lattice of plant elements which is held together in a timber frame. The *Daub* is the mud used as a plaster over the wattle.

Peñalolén House by Sur Tierra Arquitectura in Chile is an innovative interpretation of the traditional building method; the customary bamboo wattle was substituted with a steel frame and wire mesh, making it more durable framework capable of further spans. Lime was introduced to the traditional daub of mud and straw, resulting in more control of clay expansion in the daub and increased the water impermeability.

Above: Traditional Wattle and Daub construction in Venezuela (Minke)
Below: Peñalolén House by Sur Tierra Arquitectura in Chile, 2005 *(Rael)*

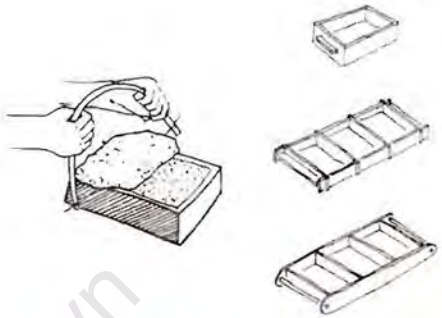
Moulded earth walls are load bearing; the wall thickness offers excellent thermal benefits. The walls are formed earth which is piled up, shaped and compacted by hand. This construction method requires no formwork or specialized tools. *Cob* is the most basic form of earth building; mud mixed with straw is moulded and piled up to form a wall. Each layer is left to dry before the next is applied.

The Handmade school in Bangladesh by Heringer-Roswag Cooperation combines traditional building methods with contemporary design. Traditional cob building in Bangladesh suffers from considerable erosion due to lack of clay in the soil. The architects' used local resources to extend the longevity of the building by adding rice-straw, substantially increasing the wall binding capacity.

Above: Traditional Cob building, Yemen (Minke)
Middle: The Handmade school by Heringer-Roswag Cooperation, 2005 (Minke)

Adobe is the Spanish word for mud brick; the most common earth-based technology. Mud, straw and water are combined and shaped to form bricks. Minimal equipment is required; moulding of the mud bricks is commonly done by hand or with a wooden mould. Mud is also used as the mortar between bricks.

The Bodega en Los Robles, by José Cruz Ovalle, was the wine cellar built for the first organic vineyard in Chile. The building utilizes traditional building with contemporary construction technologies. Local artisans made the mud bricks by using soil from the site. The thick walls provide substantial thermal mass and the curvature assists with acoustics. The angular roof and timber ceiling gives the building a striking appearance externally and rich spatial quality internally.



Above: Adobe brick moulding with various wooden moulds (Minke)
Below: Exterior and Interior, Bodega en Los Robles, by José Cruz Ovalle, 2002 *(Rael)*
Below: Section through the cellar complex (Rael)

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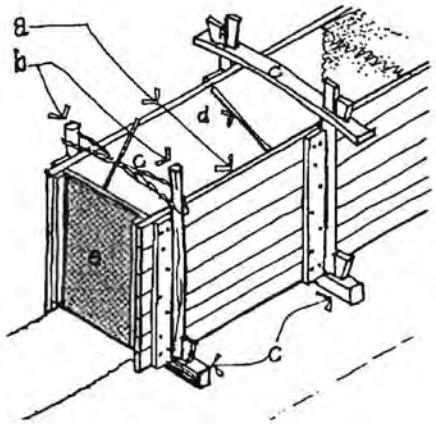
Rammed Earth

Rammed earth, commonly known as its French name *Pisé de Terre,* has been used for centuries in other parts of the world including the Cape. It requires more equipment, earth and skill than most other earth-based construction methods but due to the compaction it has a greater compressive strength and resistance to moisture. The compacted layers of earth are beautifully illustrative of its construction process.

Earth is poured between the shuttering panels of formwork and then compacted with a tamping device. Tamping was traditionally manually done but today pneumatic tampers are common. Soil selection is crucial; ideal soil content is 18% clay, 20% coarse aggregate, 30% sand, 32% silt. Yet this can vary and up to 30% of the soil can be clay as it provides good cohesion. Too much clay can be remedied by adding sand to the mixture.

The formwork must be rigid to resist great pressure during compaction. Traditional formwork was constructed from wood but today steel panels are more common, providing a more crisp finish. The length and height of each earth layer is determined by the formwork. Openings over doors and windows will require extra bracing during compaction. The design of formwork and its fixings are an important consideration as their imprint will be visible on the finished wall.



Above: Rammed Earth Wall, Chapel of Reconciliation, Berlin, Germany. 2000 *(Minke)*
Below: Traditional wooden formwork comprise of (a) two sides with (b) a bracing vertical posts, (c) transverse ties (d) formwork spacing sticks and (e) end boards. *(Norton)*

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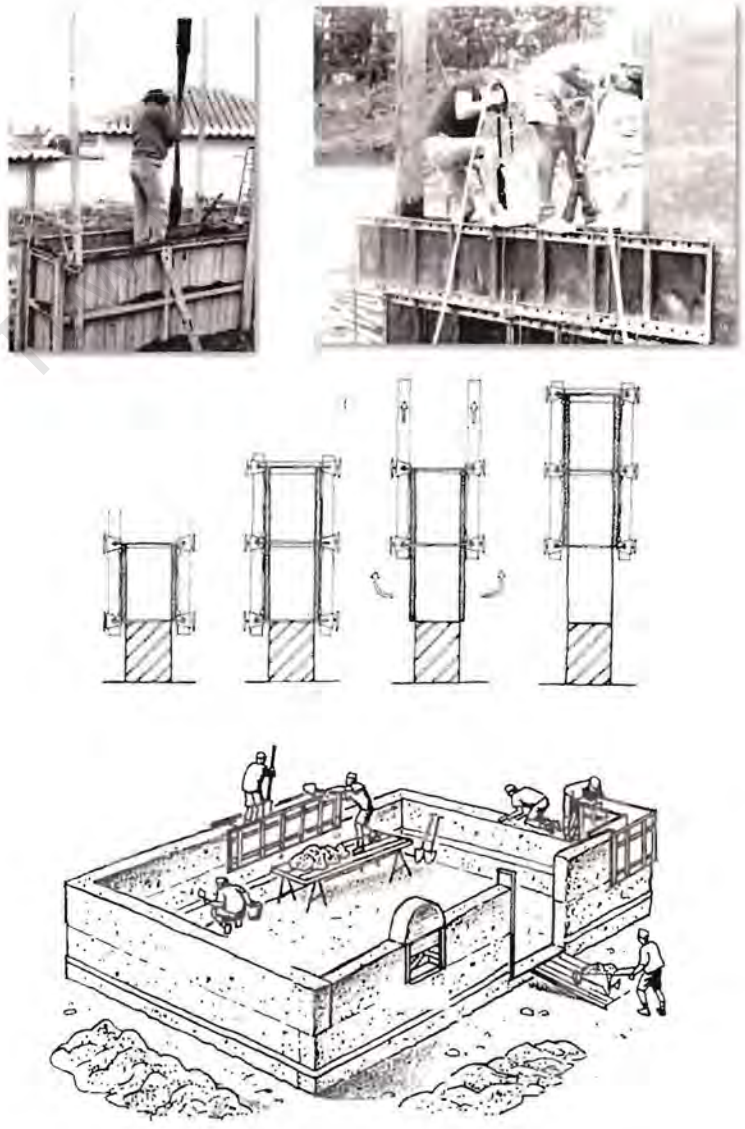
Rammed earth has a hydroscopic character; acting as a humidity battery by absorbing or releasing water vapor in relation to the surrounding levels and thus stabilizing the interior humidity level.

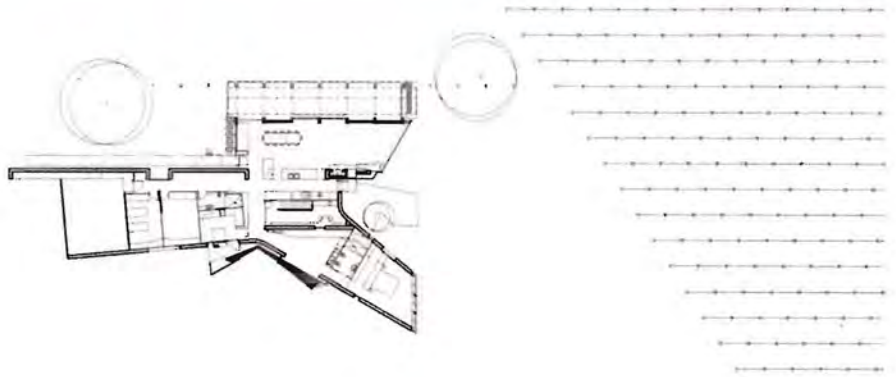
Rammed earth walls which are unstabilized and unfinished are highly susceptible to erosion from water. Usually the addition of a stabilizer is required: Portland cement is commonly used but due to its crystalline properties, it seals the wall, losing inherent humidity benefits of rammed earth. Hydrated lime is a superior stabilizer as it is also hydroscopic; allowing water vapour movement through the wall but stopping water droplets. A clear finish can be applied for additional protection but this too should be hydroscopic.



Above: Manual tamping with wooden formwork in Equador. *(Minke)*
Pneumatic tamping with steel formwork in Germany. *(Minke)*
Middle: Wall construction in vertical sections. *(Minke)*
Below: Wall construction in horizontal sections. *(Keable)*

University of Cape Town

The Vineyard Residence by John Wardle Architects in Australia used rammed earth and timber which are reminiscent of a traditional vineyard farmhouse. The earth used was mixed with crushed granite and a small amount of off-white cement. A solvent-based saline water repellent was also added assist in erosion protection. The tapered and angled earth walls have a powerful spatial dynamic internally and externally; a radical departure from the static quality generally associated with rammed earth.



Top: Vineyard Residence, John Wardle Architects, Australia 2002 *(Minke)*
Middle: Angled and tapering walls of the Vineyard Residence *(Minke)*
Bottom: Vineyard Residence Floor Plan *(Rael)*

The Cemetery Extension and Chapel of Rest in Austria display the poetic outcome of rammed earth in an elegant, clean design. The chapel's subtle appearance does not distract from the adjacent to a historic church. Congregation members took part in the build, using soil excavated from the site without the addition of any stabilizing additives. The compacted layers of the wall are enhanced by a roof light; a vertical wood strip embedded in the wall and the illuminated horizontal layers of the earth are reminiscent of a cross. The polished earth floor is illuminated by narrow slot below a suspended wall, supported by a concealed steel beam. The qualities of rammed earth are enriched through well thought-out detailing of this project.

The study of contemporary examples provides insight into how traditions of rammed earth can be extended forward. Rammed earth has the rare ability to combine technology and experience; it poetically communicates its construction. The stratified layers display the unique characteristics of the material and of the context. Its construction sequence and formwork can be designed to enrich the appearance of the final product. Careful consideration of measures against erosion will increase the lifespan of the wall substantially, while maintaining all its inherent benefits. Rammed earth also offers exceptional environmental qualities, such as thermal mass and ideal humidity levels, both crucial factors in the production and storage of wine.

Above: The Cemetery Extension and Chapel of Rest, Marte.Marte, Austria, 2001 *(Rael)*
Middle: Interior experience is enhanced by the roof slot and hovering wall. *(Rael)*
Below: Section and detail of suspended rammed earth wall. *(Rael)*

3_ Site

An extensive search into the Cape Winelands, through literature and explorations, lead me to a small wine farm situated between N1 and the R101 in Klapmuts.

Back Round

Welgemeend was one of the pioneering farms in the establishment of modern South African wine culture. The16 ha farm, previously part of a much larger farm called Monte Video, supported various agricultural activities before being purchased by Willie Hofmeyer in 1975. Mr Hofmeyer was a townplanner by profession but his interest and passion in wine, particularly French wine, inspired him to buy the piece of land which he recognised has having good potential for red wine grapes. Although small in comparison with many wine farms in the Cape, Welgemeened is of similar size to the majority of wine farms in France.

While continuing his townplanning occupation he began building up the farm incrementally. At the time acquiring new grape varietals was challenging; a nursery was set up on a farm to propagate vines for the rest of the farm. The patchwork of vines was a result of this incremental growth, following the contours of the site and in correlation to Bordeaux vine block techniques.

Above: Site Locality in relation to surrounding towns.
Below: Aerial Photograph of site

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Welgemeend was the first farm in South Africa to produce a *Bordeaux Blend;* a combination of Cabernet Sauvignon, Carbernet Franc, Petit Verdot, Malbec and Merlot grape varietals. This type of blend has since then become one of the most popular in South Africa, made by numerous farms. Mr Hofmeyer passed away in 2000 and the farm has changed ownership, but the Welgemeend is still remembered among many prominent contemporary winemakers in the Cape as being hugely inspirational in the start of their own careers. Welgemeend continues to produce wines of excellent quality, but is the winery is currently in need of a major upgrade, including a new public interface.

The Cape Winelands has experienced a major resurgence in the last two decades. A winery has taken on a new role beyond mere functionality and efficiency; it has become a pivotal part of the marketing a wine. The winery is seen as the emblem of the farm, embodying the qualities of the wine produced there. It is both a production space and tourist destination. In many cases the aesthetic ambitions compromise the practicalities of production. This is a problem prevalent in much of contemporary architecture as a whole due to the current image-based consumer culture of society.

In addition, there is a lack of understanding, and thus appreciation, about the production of wine. As mentioned, I aimed to create an architecture which reconciled the relationship between project and source through an experience which combined these two realms. Taking the visitor through the processes of production but without hindering the production became a core principal of the design.

The landscape, or terroir, was hugely significant in the design process which required extensive site investigations and observations.

And that was when the real fun began.

DIE stigtingsvergadering van die Onverbonde Wynmakersgilde is onlangs op die plaas Welgemeend van mnr. Billy Hofmeyer gehou. Op die foto, wat na afloop van die vergadering geneem en net voor die eerste amptelike wynproeëry geneem is, verskyn van links agter: mnr. Etienne le Riche van die landgoed Schoongezicht en maker van die bekende rooiwyn Rustenberg, prof. Jool van Wyk, hoogleraar in wynkunde aan die Universiteit van Stellenbosch, mnr. Braam van Velden van die landgoed Overgaauw, mnr. Peter Finlayson van die Hamilton Russell Vineyards naby Hermanus en mnr. Achim von Arnim, wynmaker van Boschendal. Voor sit die gewese Springbok-rugbyspeler Jan Boland Coetzee, wat deesdae op die plaas Vriesenhof in Paradyskloof naby Stelenbosch wyn maak, Kevin Arnold van die landgoed Delheim, Billy Hofmeyr van Welgemeend, en Walter Finlayson van die landgoed Blaauwklippen op die Stellenbosse Wynroete, wat onlangs teruggekeer het van 'n besoek aan die VSA en verskeie wynproduserende lande in Europa nadat hy die Diner's Club se Wynmaker van die Jaar vir 1981 was.

Above: Mr Hofmeyer and several influential Cape winemakers. *(Die Burger – 1982)*
Below: Wine bottle labels of some the earliest vintages.
Overleaf: Exploratory sketches of site

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Site Analysis & Exploration

On the farm there were several buildings; the farm house and wine cellar complex, the workers houses and a barn. Apart from the cellar, the rest of the buildings were in good working order. This thesis focused on the redevelopment of the wine cellar and its public interface; a contemporary reinterpretation of a winery through understanding terroir.

I found the aerial photograph of the site fascinating, the texture of the striations created by the vines and ploughed spaces between. Subsequently this element was to inspire much of the design.

In addition to general site visits, the family of Mr Hofmeyer and the current owners of the farm were very generous is sharing further information about the site. I found the detailed soil analysis information of the farm to be very intriguing, prompting me to do various mappings.

Right: Aerial Photograph of Welgemeend *(1985)*
Overleaf: Locality of existing structures.
Soil Mapping

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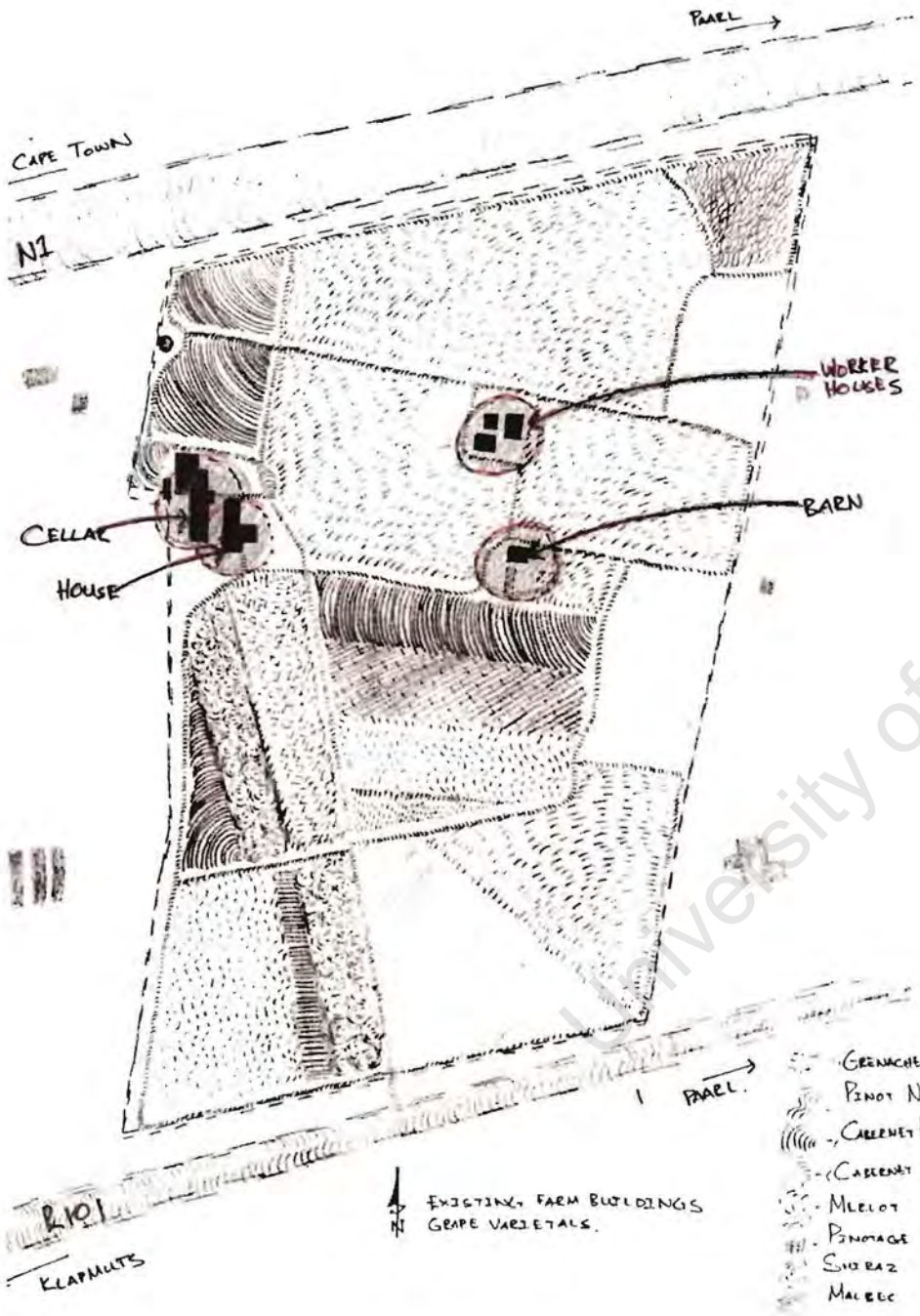

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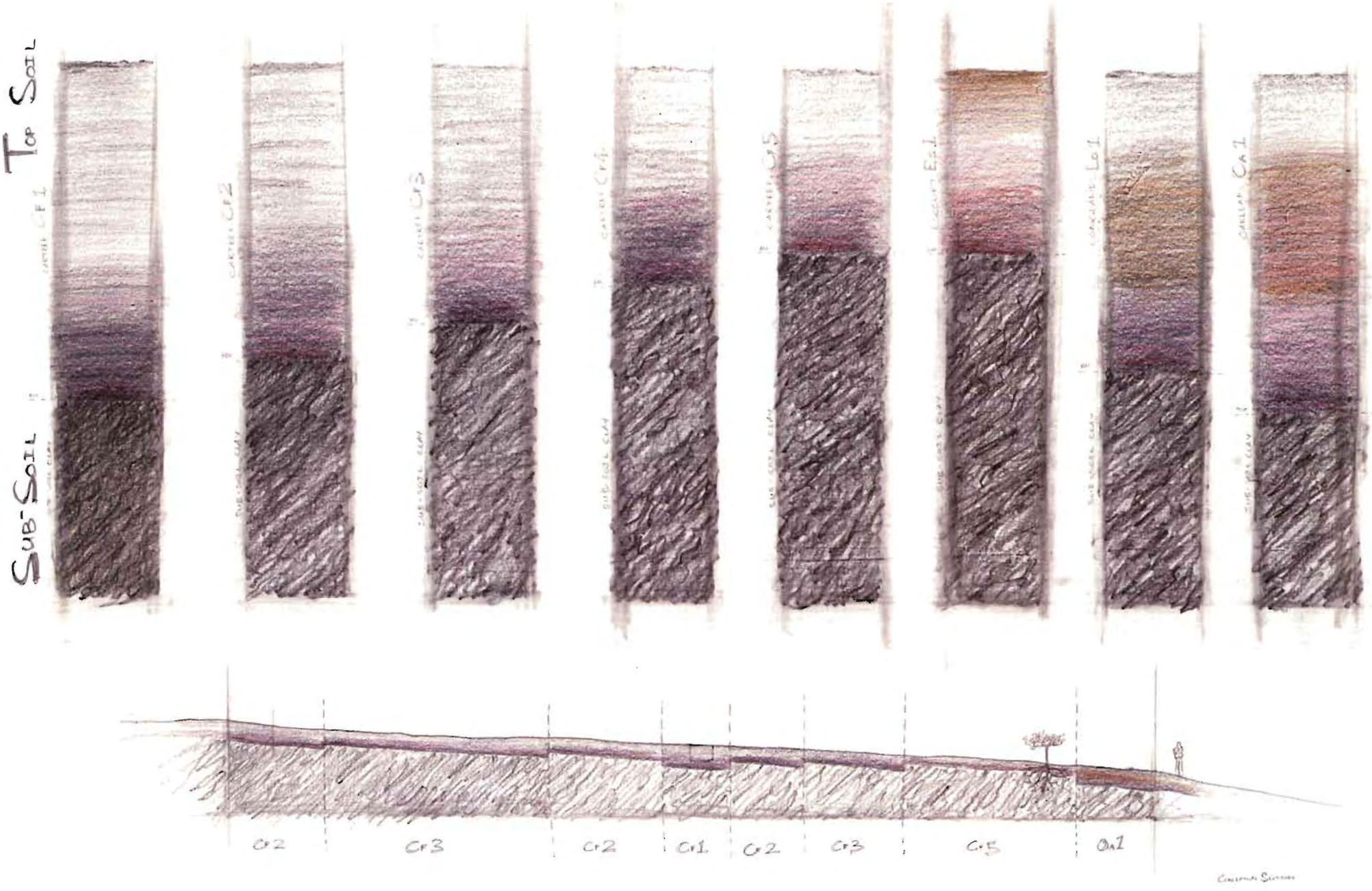
Top Soil
Sub-Soil
Cr1
Cr2
Cr3
Cr4
Cr5
Es1
Lo1
Ca1
Cr2
Cr3
Cr2
Cr1
Cr2
Cr3
Cr5
Ou1

There are four different soil types on the farm: Escourt, Oakley, Longlands and Cartref, these can be further divided into sub-types, such as Cartref 1 or Cartref 2. The properties of each soil type vary considerably but essentially the most fertile soil is that which contains the largest depth of topsoil above the subsoil, such as Cartref 1 or Oakley 1.

Cartref 5 is the most nutritionally deficient soil; minimal topsoil which is not of a good quality, evident in the lack of growth in this area on the aerial photograph. (The block to the east of main entry route into the farm – labelled 2733) The absence of growth stimulated me to investigate how a building could find its footing it this space, causing minimal disruption to the surrounding farmland, which is crucial on a farm of such small scale.

The block of vines in this area has subsequently been pulled up due to the poor growth of vines, opening up an ideal space for a built intervention.

The site slopes gradually to the South and very slightly to the East.
From the site there is a direct view of the Simonsberg Mountain to the South.
The Drakenstein mountains of Franschoek and Wemmershoek Mountains beyond Paarl are visible to South-East and East.

Originally the site was ploughed in an East-West direction, following the contours. In an attempt to improve its poor productivity it was then ploughed North-South. This scarring is still visible on the open site, and subsequently the block to the East has begun to encroach on the site.

Previous Page: Soil Sections, in detail and comparatively.
Right: Exploratory sketches of specific site location.
Overleaf: Terroir Mapping of site at larger scale.
Exploratory sketches of site and ploughing of farmland.

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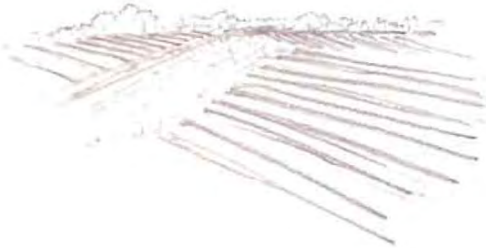
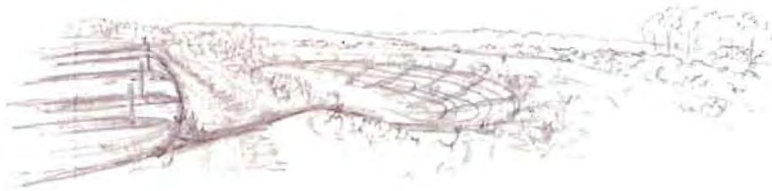
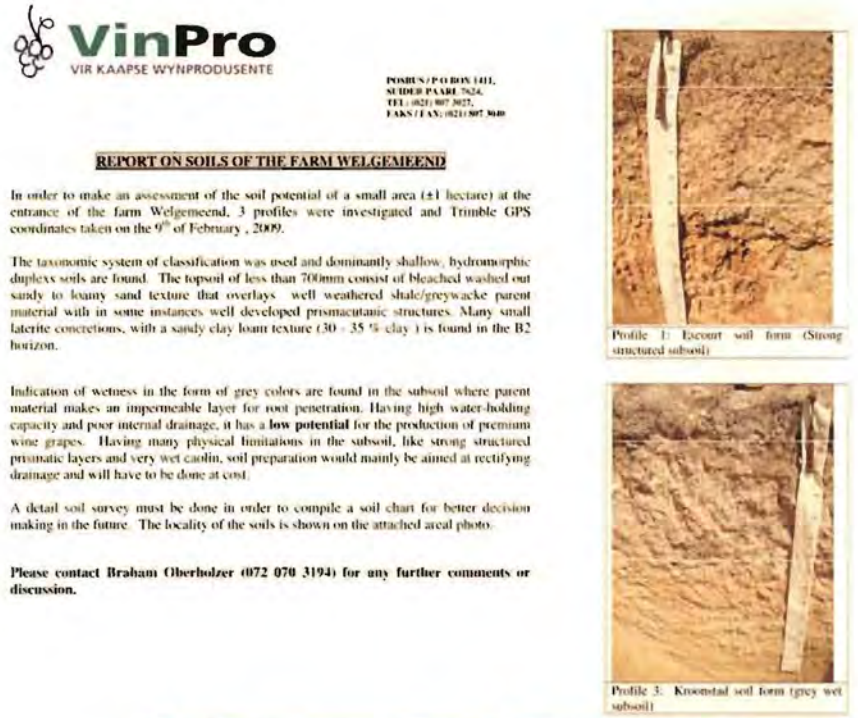




A more detailed analysis of the soil on this site revealed the subsoil was 30-35% clay; ideal for rammed earth construction. The site could thus be the raw material source for the architectural product.

With all this information in mind I began a series of drawings based on what was above and below the ground to locate a footprint for the building.

Right: Laboratory tests of site sub-soil. *(VinPro)*



VinPro
VIR KAAPSE WYNPRODUSENTE

POSBUS / P O BOX 1411,
SUIDER PAARL 7624,
TEL : (021) 807 3027,
FAKS / FAX : (021) 807 3040

REPORT ON SOILS OF THE FARM WELGEMEEND

In order to make an assessment of the soil potential of a small area (±1 hectare) at the entrance of the farm Welgemeend, 3 profiles were investigated and Trimble GPS coordinates taken on the 9th of February , 2009.

The taxonomic system of classification was used and dominantly shallow, hydromorphic duplexx soils are found. The topsoil of less than 700mm consist of bleached washed out sandy to loamy sand texture that overlays well weathered shale/greywacke parent material with in some instances well developed prismacutanic structures. Many small laterite concretions, with a sandy clay loam texture (30 - 35 % clay) is found in the B2 horizon.

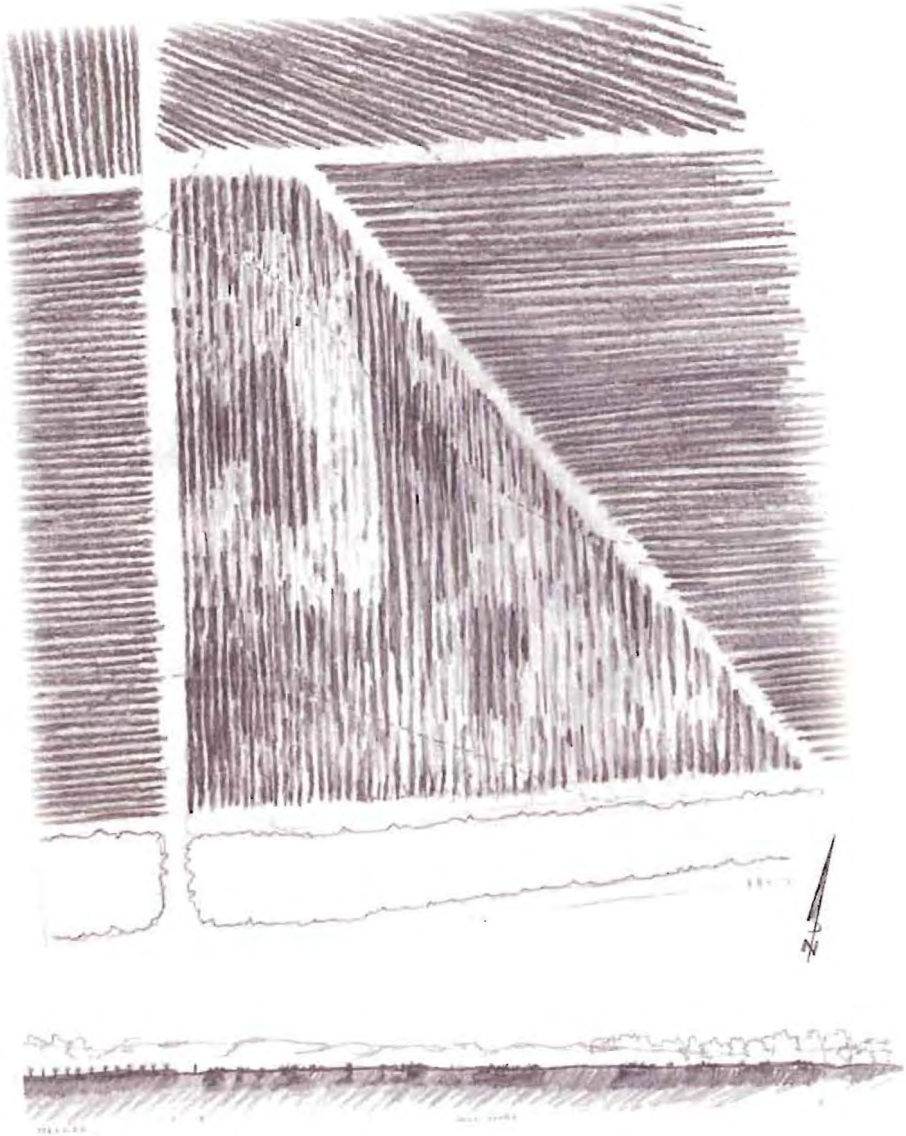
Indication of wetness in the form of grey colors are found in the subsoil where parent material makes an impermeable layer for root penetration. Having high water-holding capacity and poor internal drainage, it has a **low potential** for the production of premium wine grapes. Having many physical limitations in the subsoil, like strong structured prismatic layers and very wet caolin, soil preparation would mainly be aimed at rectifying drainage and will have to be done at cost.

A detail soil survey must be done in order to compile a soil chart for better decision making in the future. The locality of the soils is shown on the attached areal photo.

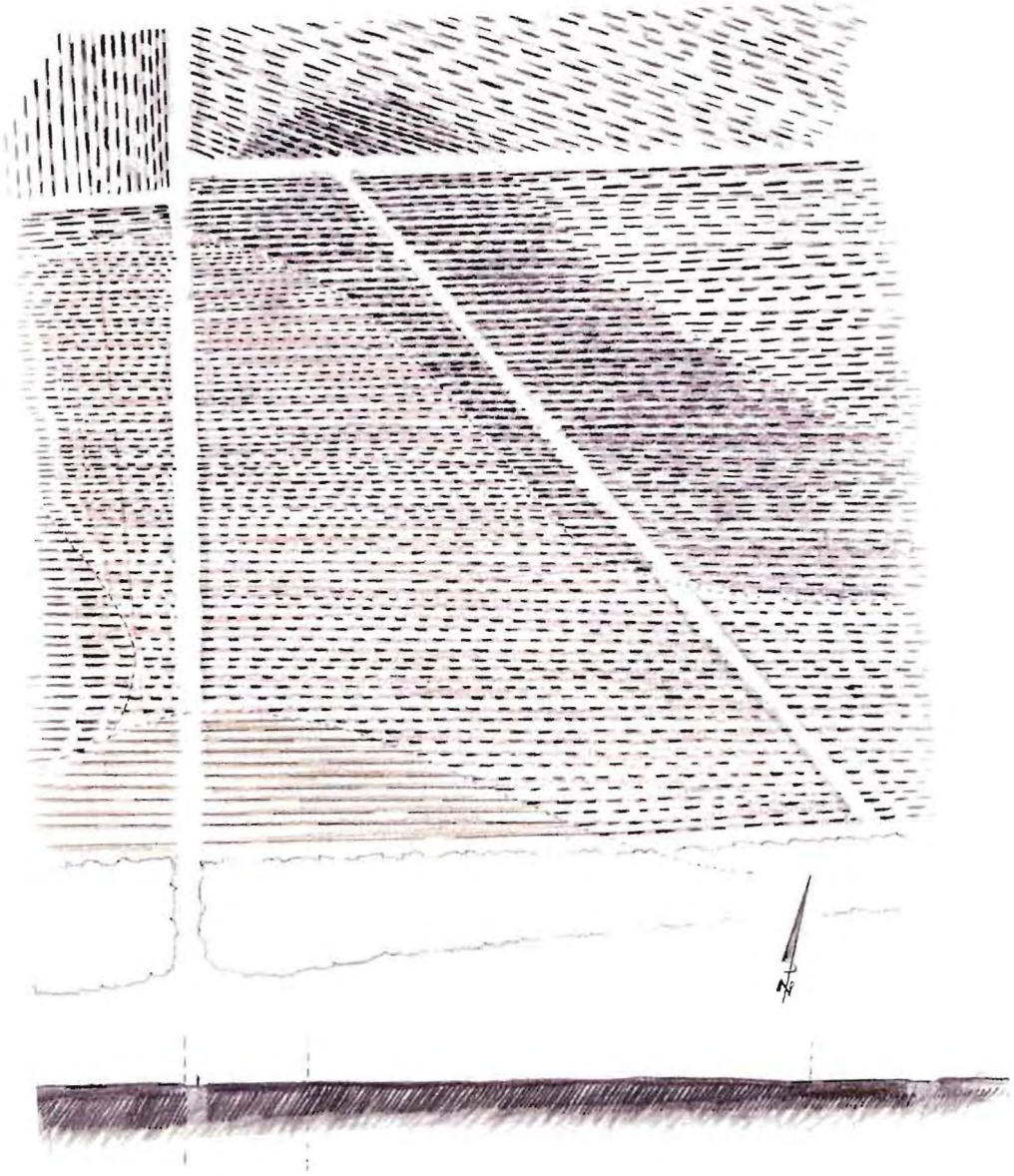
Please contact Braham Oberholzer (072 070 3194) for any further comments or discussion.

Profile 1: Escourt soil form (Strong structured subsoil)

Profile 3: Kroonstad soil form (grey wet subsoil)



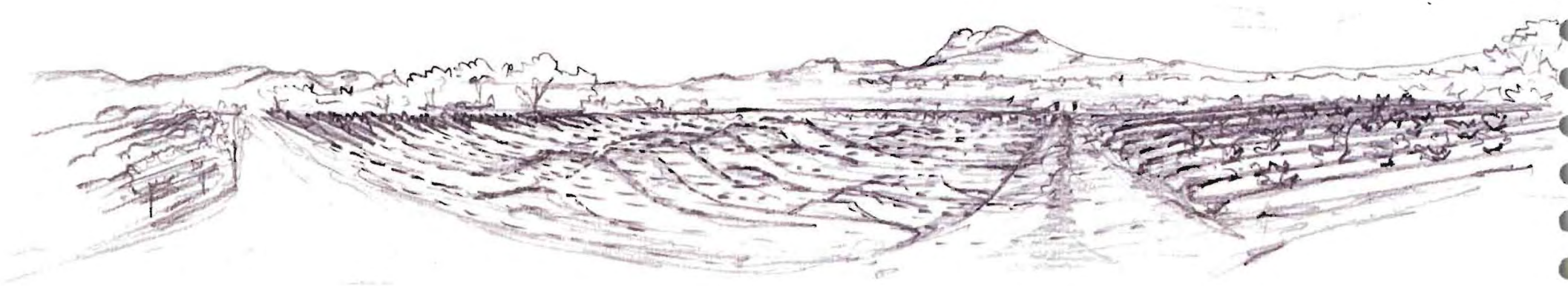
Above: Striations Above _Growth Patterns.



Above: Striations Below _Soil Type Mapping.

Above: Exposed Ground_ Combining Patterns from above & below.

Above: Locating Footprint _Result from site mappings.
Overleaf: Conceptual Perspective _South-East facing.

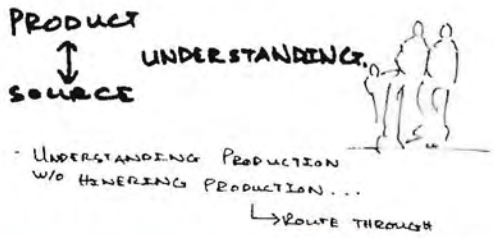


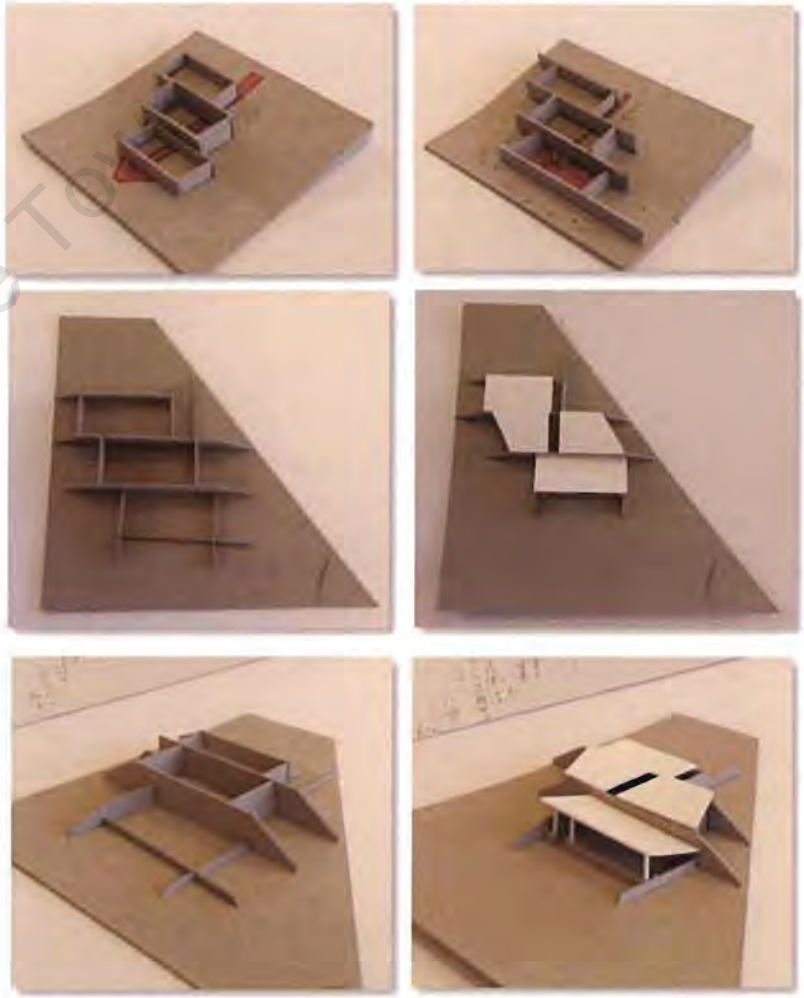
4_ Design Approach

- *The Main Public Route threaded through the Processes of Production.*

The main processes of production were separated out with a public route threaded these together, allowing the visitor to experience each stage of production; moving from the raw source; the processing of grapes, to the refined product; tasting the wine.

The route was to start at the top of the site, and follow the slope in a South direction toward the striking mountain views.





Above: Initial Public Route Concept Models
Below: Preliminary Models exploring Public Route Concept

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Grounding Concepts

During the course of site investigations, core design principles began to be established; how the terroir of the site could be expressed through the architectural character of the building.

- *Existing Geometries on the site*

Previously horizontal ploughing (East-West) to follow contours but due to lack of growth, vertical ploughing (North-South) was practised, eventually the entire block was uprooted, yet scars of ploughing remain on the site.

- *Up and into the Vineyard*

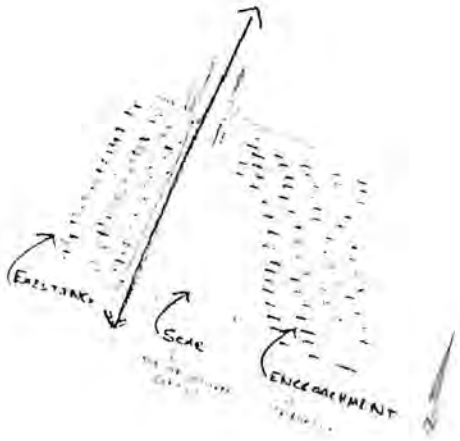
The visitor is brought up and into the site to increase the awareness of vine environment. This followed existing farm paths and allowed for a better vantage point for views.

- *Service and Public Areas*

Working with existing geometries of the site in relation to efficiency, ease of access and views of surrounds. Services are located to the West, while public areas are to the East and South.

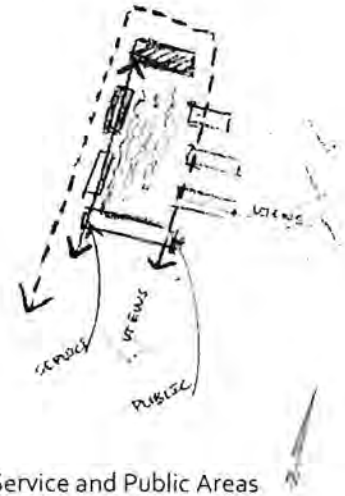
- *The Vineyard Heart*

All activity of the farm centres around the vine. All activity of the winery centres around a vine courtyard, inspired by mappings of previous growth on the site.



Existing Geometries on the site

Up and into the Vineyard



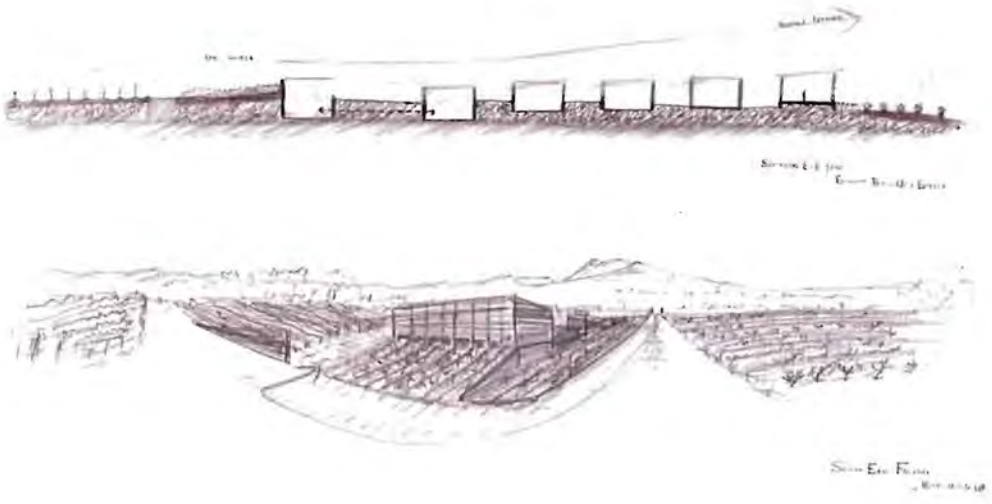
Service and Public Areas

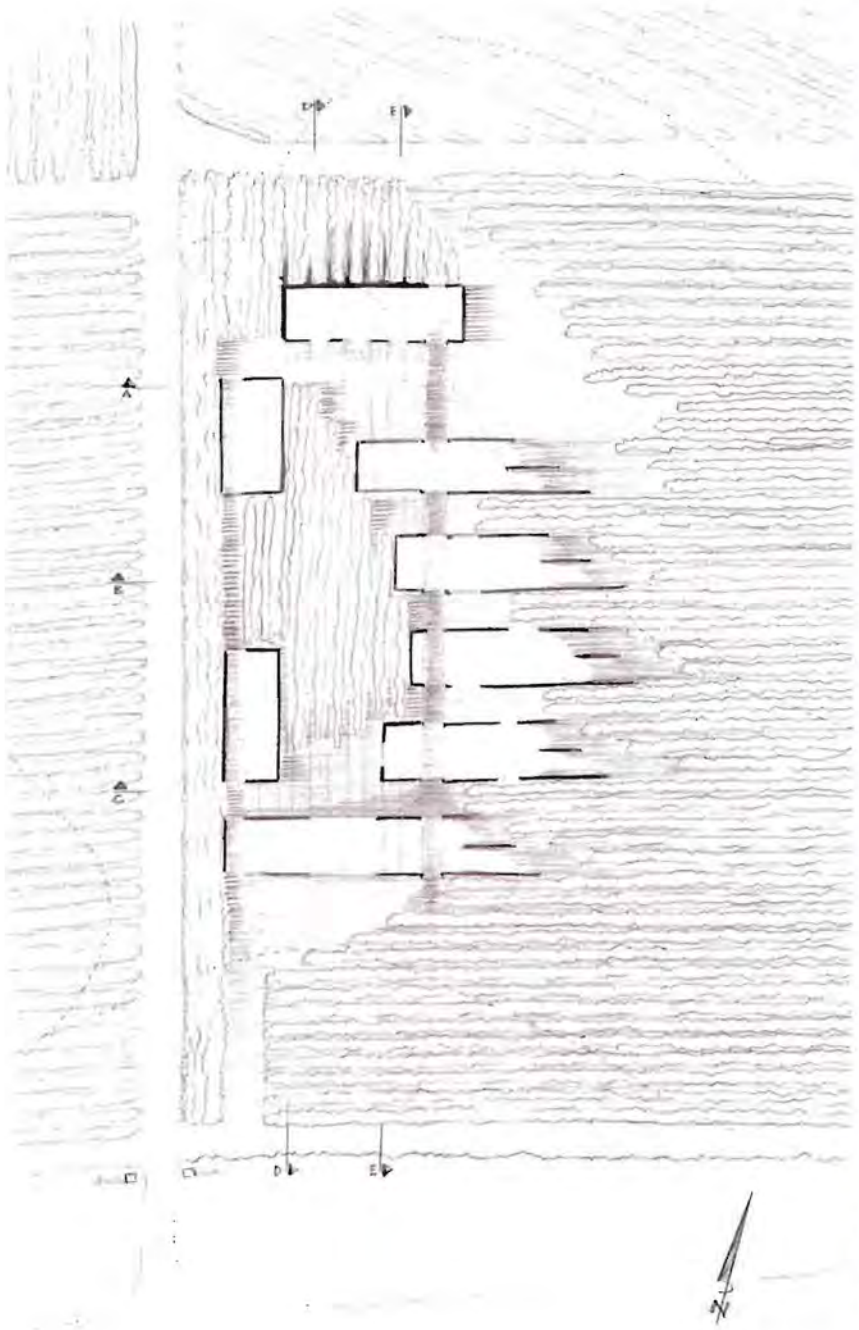
The Vineyard Heart

Mid-Review Sketch Plan

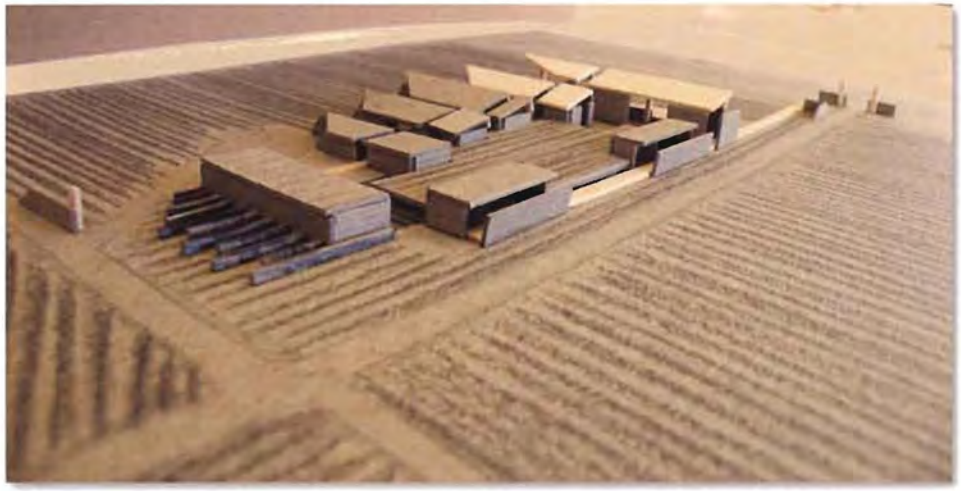
The initial conceptual models changed substantially once the site mappings were done; the processes of production were located in relation to the mapped footprint, immersed into the landscape. This scheme was presented for the Mid-Review at the end of first semester.

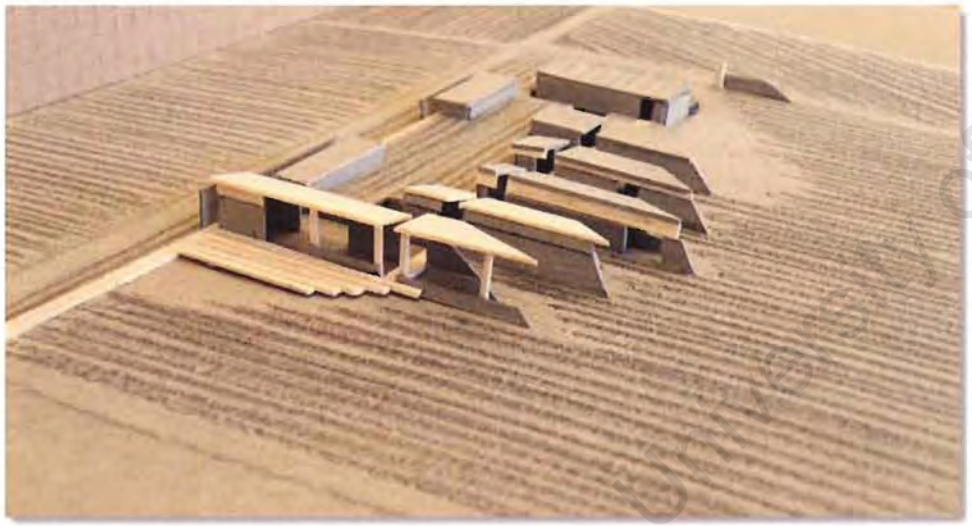
The North-South layout follows the contours of the site and is interspersed with vines, revealing mountain views toward the East and South. The route began with a monolithic architecture embedded in the ground and progressed toward that which was raised above the ground and more refined.

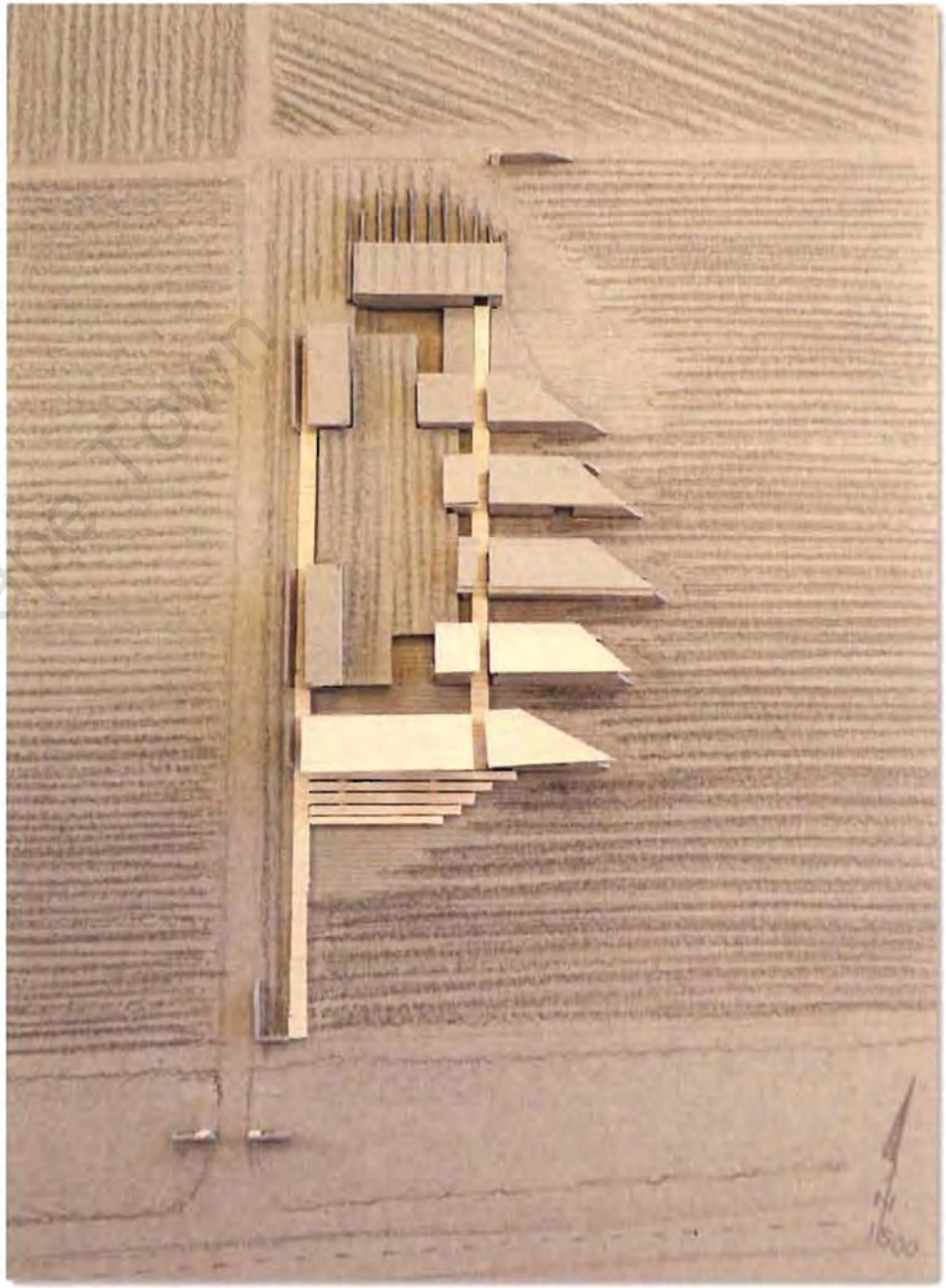




Above: Conceptual North-South Section and South-East facing perspective
Right: Conceptual Ground Plan for Mid-Review







Above: Conceptual North-South Section and South-East facing perspective
Right: Conceptual Ground Plan for Mid-Review

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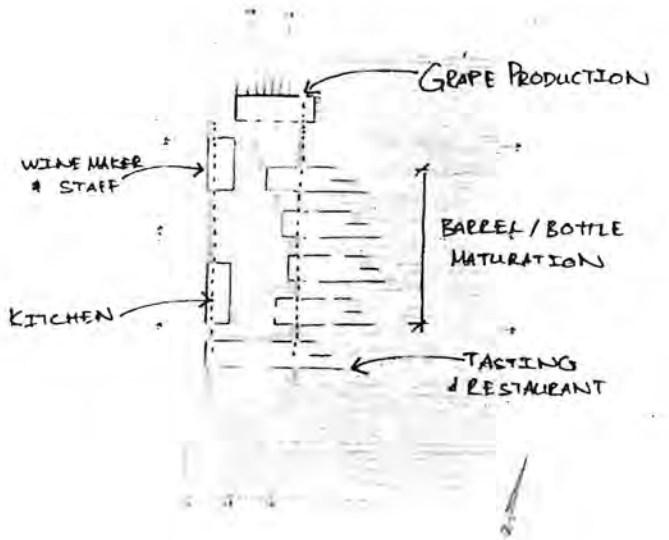


Above: Conceptual program distribution

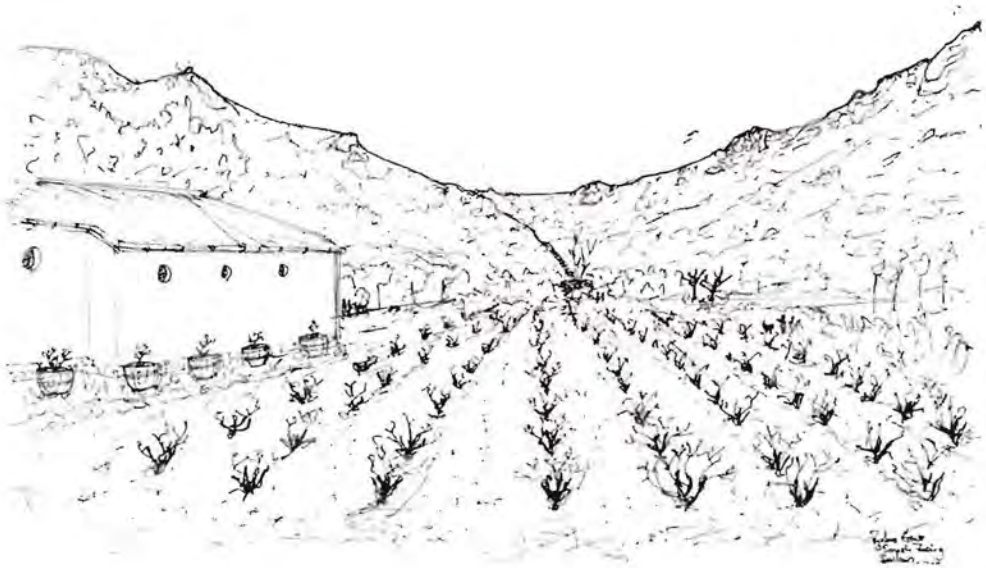
Issues raised during the presentation:

- A need for additional economic activity to support the activities of the winery, especially considering current economic difficulties by many in the wine industry.
- A farm is a constructed landscape; utilize the manipulation of topography more boldly to enhance the architecture.
- The scale of the vine; how could this influence the architecture it surrounds.

5_ Living in the Landscape

With all the work done during the first semester and the feedback given at the Mid-Review, I set about getting more hands on experience in the Cape Winelands; I volunteered to work on a small organic wine farm in the Swartland for 3 weeks. My aim was to attain a fuller comprehension of the vine's growing environment, beyond just being a day visitor on a farm.

Dragon Rigde Winery is located on Fynbos Estate. The farm is situated in the Joubertskloof valley of the Paardeberg mountain. 10km South of Malmesbury. 20ha of vine, and small portion of olive trees and the remaining 220ha is mountain nature reserve. Fynbos Estate is a member of the World Wide Organisation of Organic Farmers (WOOF) which aims to educate volunteers about more sustainable farming practices and lifestyles by offering board and lodging in exchange for manual labour on the farm.



Above: Map locating Fynbos Estate *(GoogleMaps)*
Right & Overleaf: Some of the sketches done on the farm by author.

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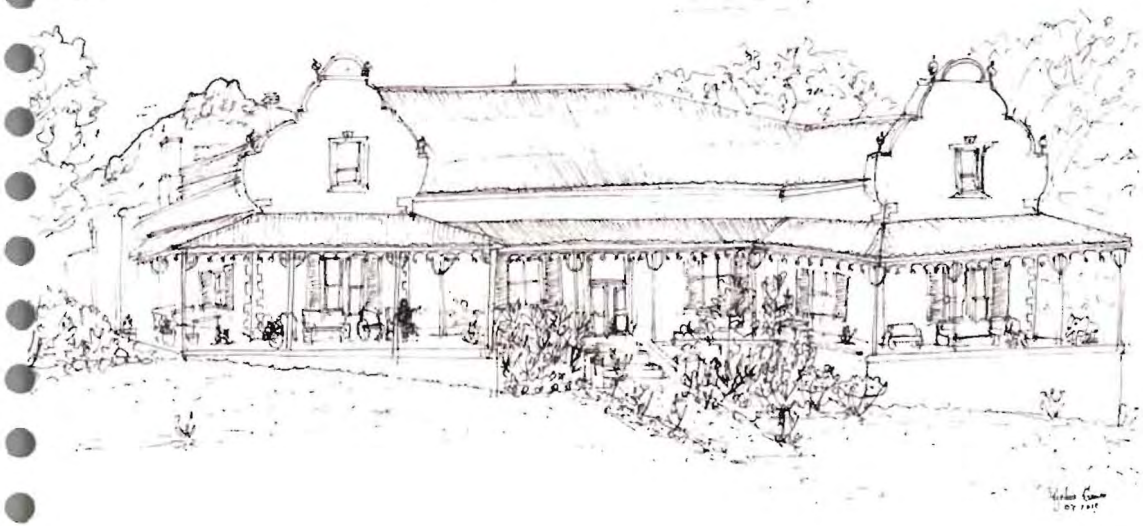
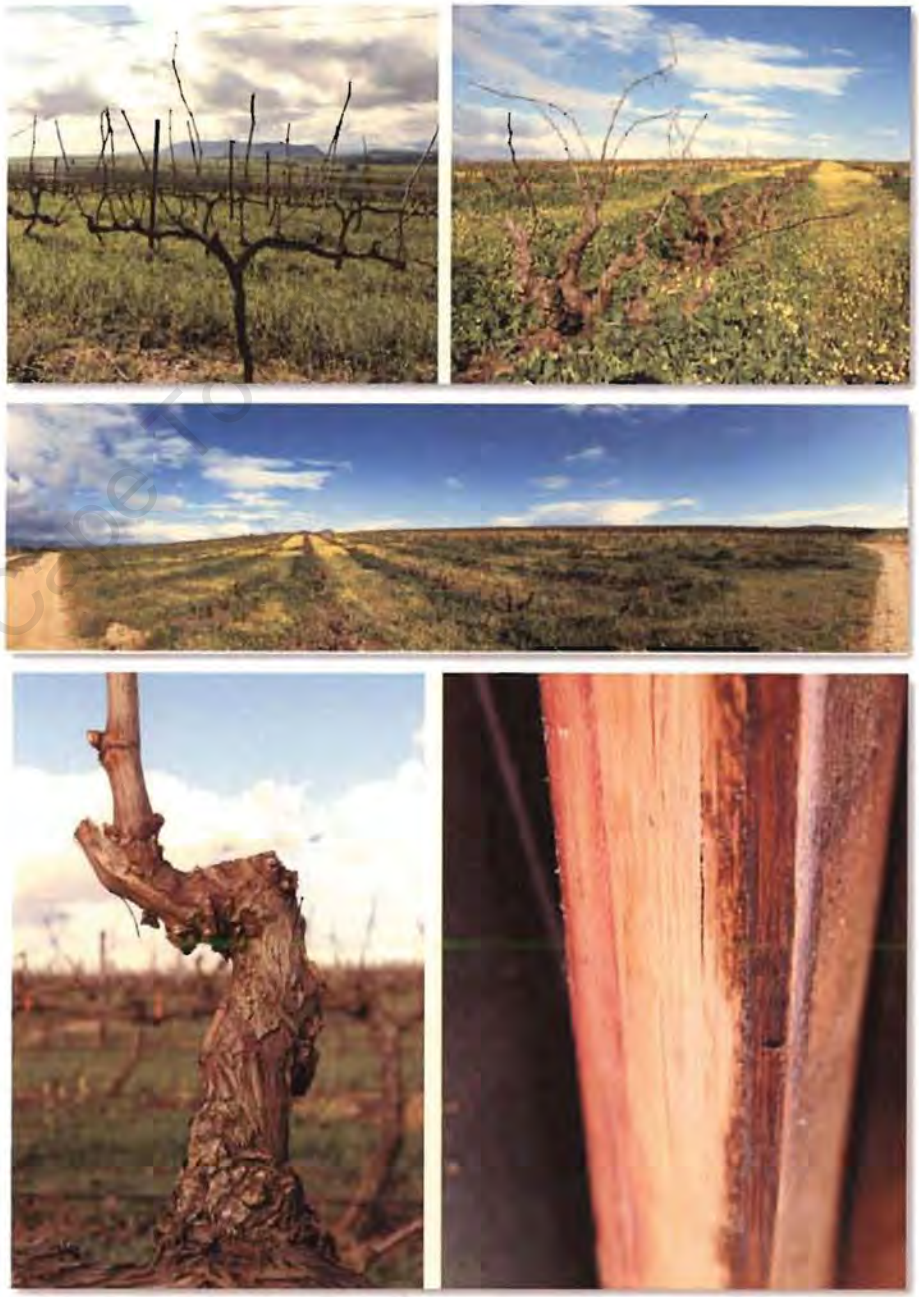


The Swartland is currently one of the most revolutionary areas in the Cape Winelands. The return to more traditional methods of grape farming and wine making has praised by wine communities around the world.

"the success of this philosophy is in repeat visits...spreading the word of this exquisitely personal and increasingly critically acclaimed pocket of the Swartland.." *- Winemag.co.za*

3 Weeks was spent between working on the farmland in rain and sun, assisting in the winery, visiting surrounding wine farms in my free time and talking to winemakers; discussing some of the numerous theories and opinions surrounding grape farming and winemaking. Terroir and its expression in the wine, through appropriate farming and winemaking techniques, were certainly the most prominent principles.



Right: Trellised vines, bush vines, bush vine panorama, pruning detail, barrel detail (Author).

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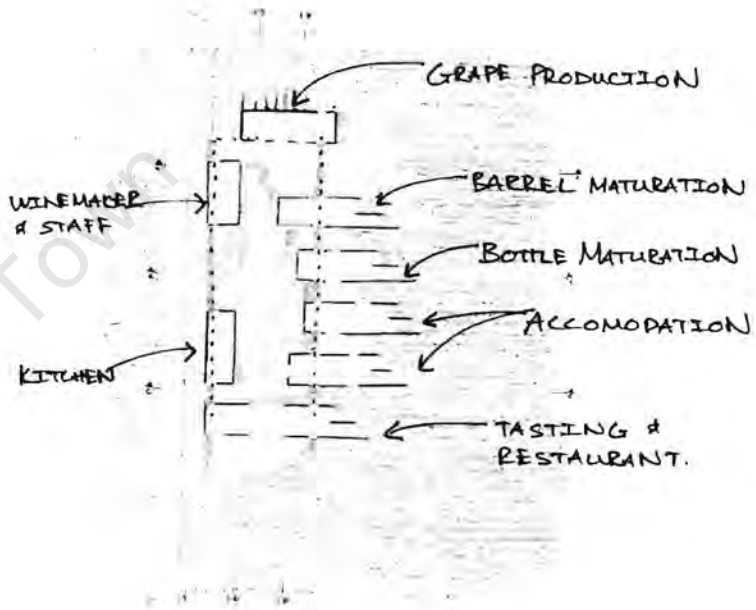
Influence on the Design Process

- An Additional Economic Activity: Accommodation

Creating a space which would allow others to have a similar experience to me; interns or volunteers could stay there over the harvest. All year round accommodation for tourists and wine enthusiast, it could also accommodate a group of people for various kinds of retreats, including outreaches into the Klapmuts community.

The accommodation is basic as most time would be spent outdoors and in the broader environment. The rooms are 1-2 person private rooms with a bathroom and small kitchenette. The majority of meals would be served by the restaurant so the accommodation needed to be in close proximity.



Right: Conceptual reworking of program distribution

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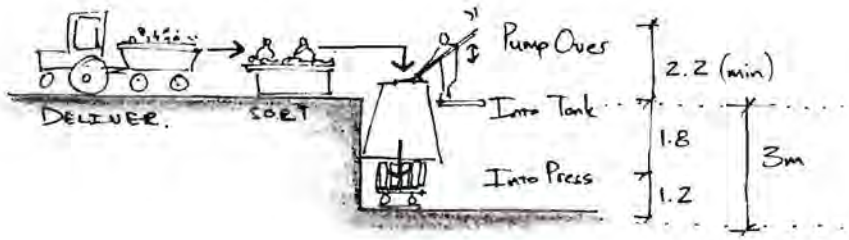
- Gravity

Prior to my time on the farm I had been doing much reading on the importance of gravity in wine production; allowing the grapes and juice to move through the process of wine production without any mechanical pumping as this is considered to compromise the wine quality. Many cellars have been constructed around the principal of free flowing grapes and juice, often at the enormous expense.

After many lengthy, and often animated, conversations with several wine makers in the area I began to realize that although the concept of a pure gravity cellar was fantastic, it was almost entirely impossible, as pumping would be required at some point. Despite the impressive appearance and marketing value of a 'gravity cellar', these are often immensely impractical working spaces for the winemaker.

The most critical role of gravity is the handling of the grapes and juice after first fermentation as this is when it is at its most fragile. This is the most crucial time to avoid mechanical pumping: after first fermentation the juice is drained out of the tank into another and the grape pulp is moved out of the tank and into the press.

The grapes arrive at a higher level to be dropped into the fermentation tanks, there is a minimum height of 2.2m to allow for pump-overs done by hand *(pigeage)* during fermentation. The tanks are usually around 1.8m high, and a press usually at 1.2m high and thus the lower floor is 3m high.



Above: Conceptual Diagrammatic section of 'Gravity Consideration'

- Other Key Considerations:

-Temperature:
Production, Barrel Maturation and Bottle Maturation often require different temperatures. Maintaining a constant temperature in each stage is crucial.

- Lighting:
Natural lighting is ideal, carefully considered to alleviate energy costs without raising the temperature.

- Drainage:
Equipment is constantly being washed down, especially in wine production areas so the floors must drain properly.

- Flexibility of Space:
Equipment and ways of working never totally fixed, spaces must allow for various arrangements and working methods.

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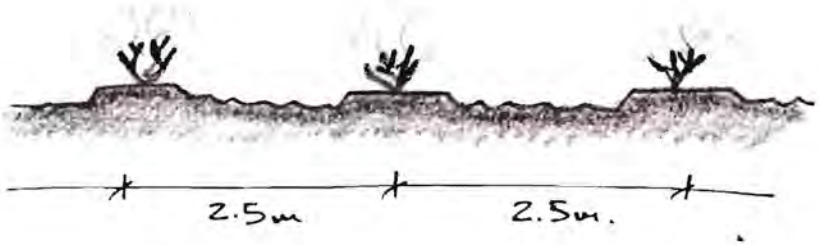
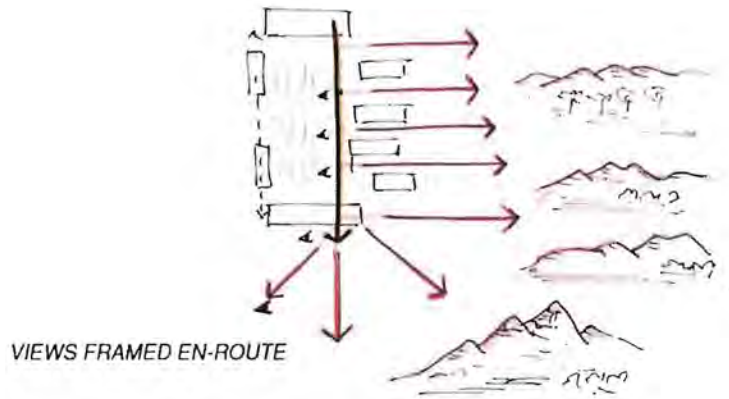
6_ Design Development

From the Start of 2nd Semester

- *The Vi*neyard Module

The farmland of Welgemeend is ploughed at 2.5m centres. This module was used throughout the plan to order proportions, and structural bays. Inside spaces were balanced with outside spaces along the route, the built framing views out toward the surrounding landscape.





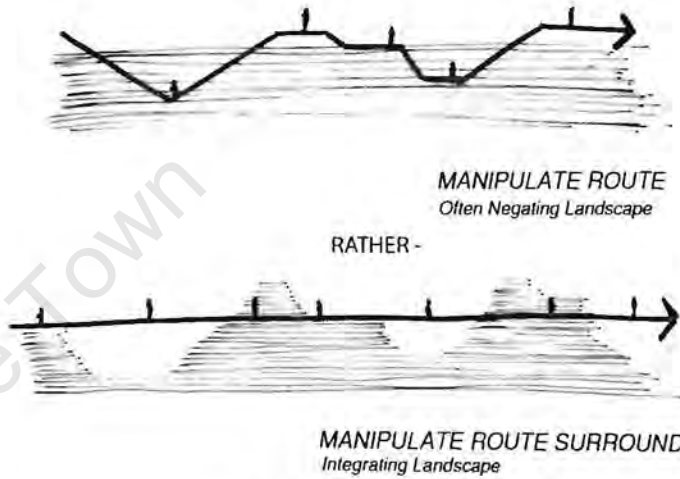
VIEWS FRAMED EN-ROUTE

Above: Diagrammatic section of plough centres on site
Below: Diagrammatic plan of framed views

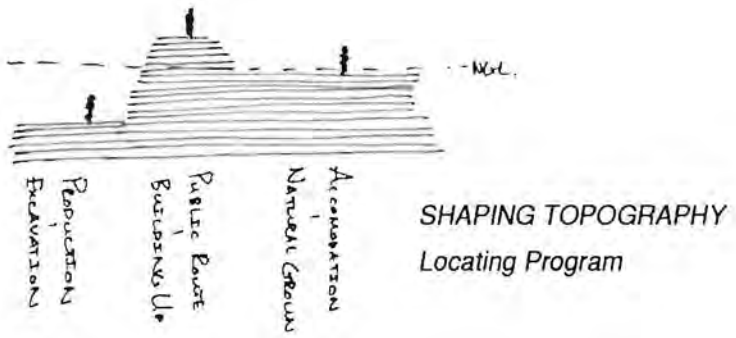
- *The Constructed Landscape*:

Manipulating the topography to allow for gravity based wine production in the initial stages. The level that the grapes are delivered was raised so that the juice and pulp can move down through the tank and press without the need for pumping. The raised platform gave rise to an elevated public route, moving through and above the various stages of wine making without hindering production taking place below.

Subtle differences in levels allowed for distinction between public, private and service areas, despite their close proximity.



_The Constructed Landscape



Above: Diagrammatic sections of topography manipulation
Below: Diagrammatic program distribution.

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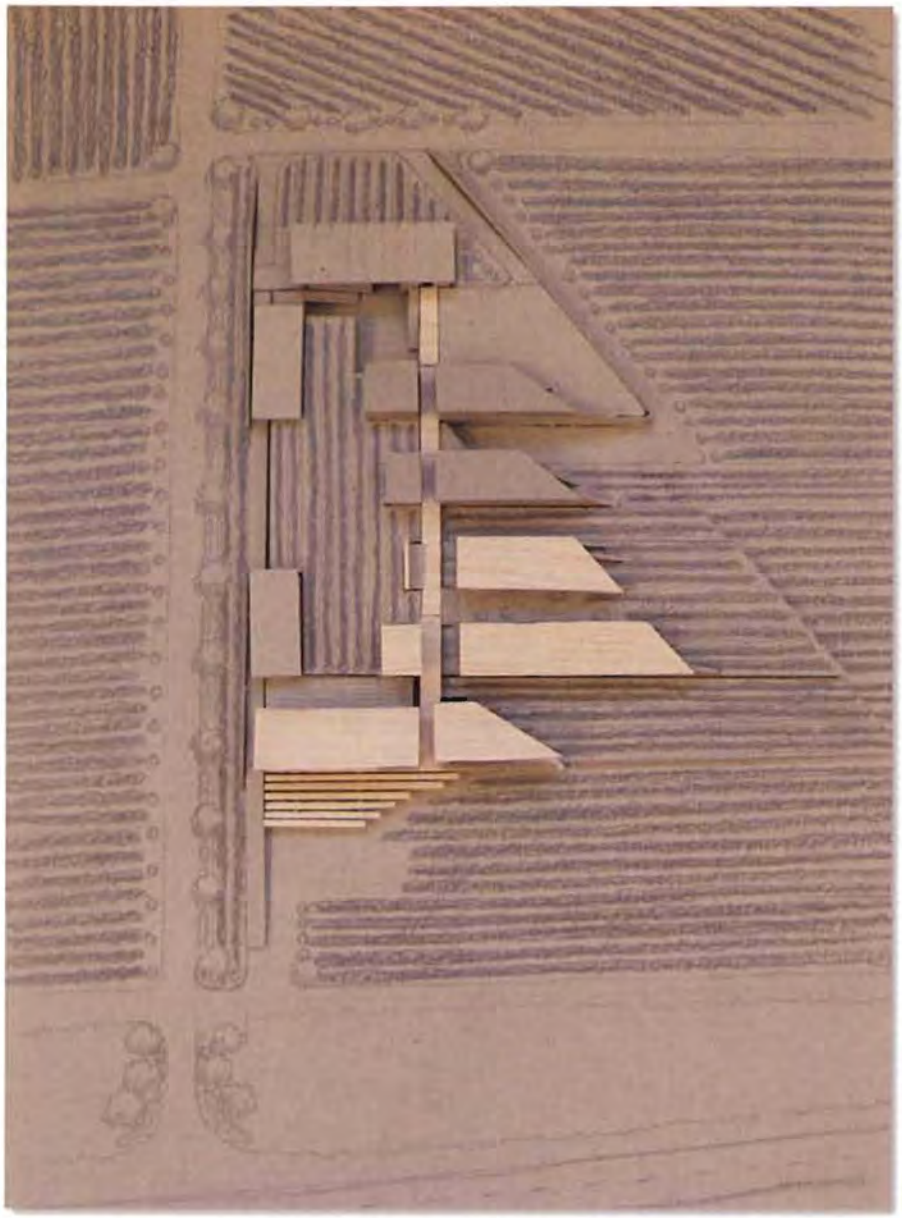
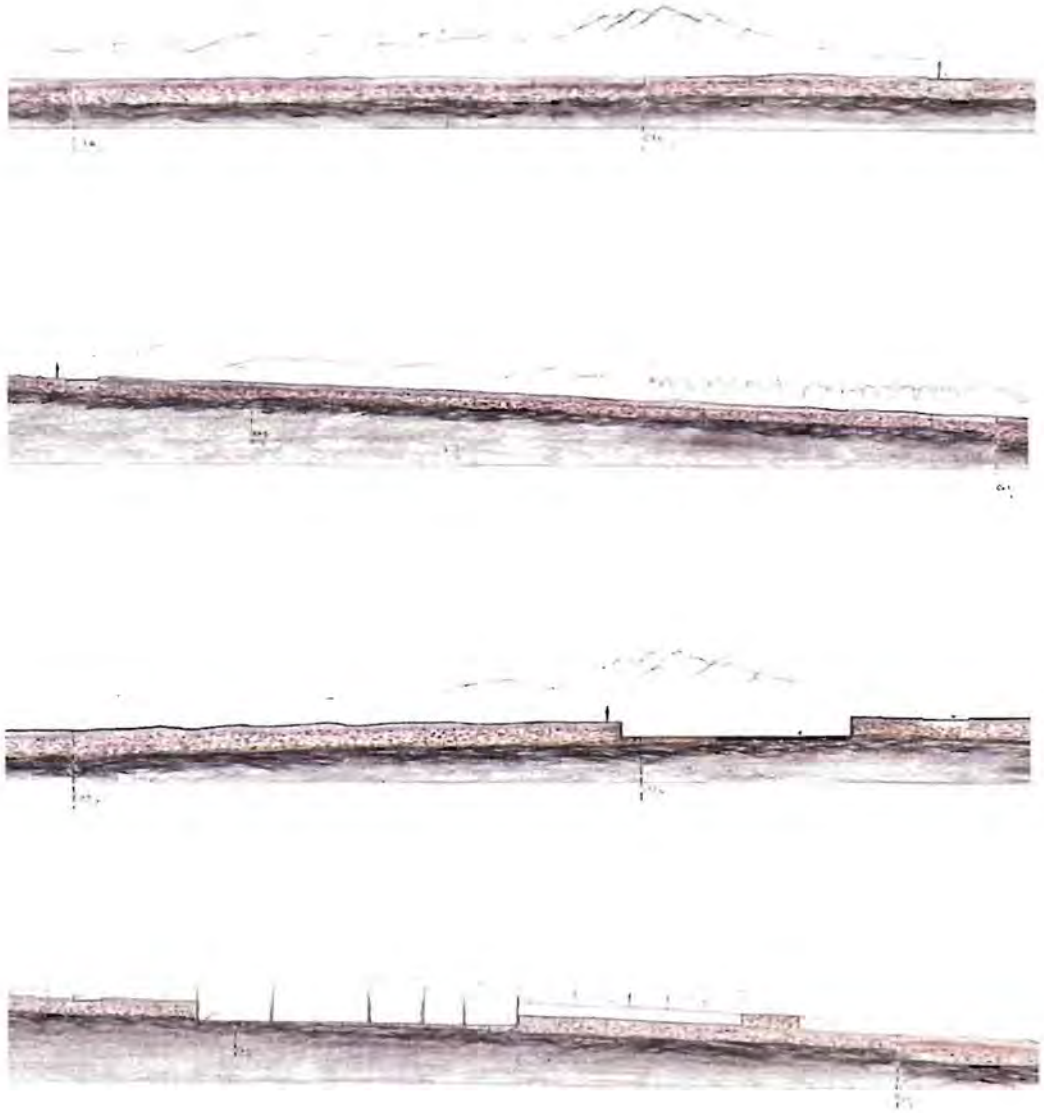


Above: Model 2_ exploring typography manipulation
Right: South-West Elevation, North-West Elevation, East and South-East Elevations.

- *But where does all this soil come from?*

It was time to go back to more terroir analysis to attain a more detailed understanding of the sites soil resources and the existing typography, in order to utilize and manipulate it most effectively.

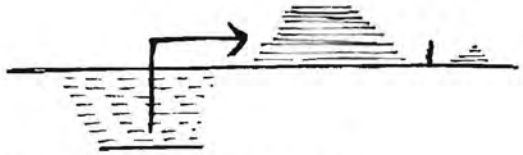


Above: Soil & Typography Analysis _ East-West and North-South Sections.
Right: Cut & Fill explorations _ East-West and North-South Sections.

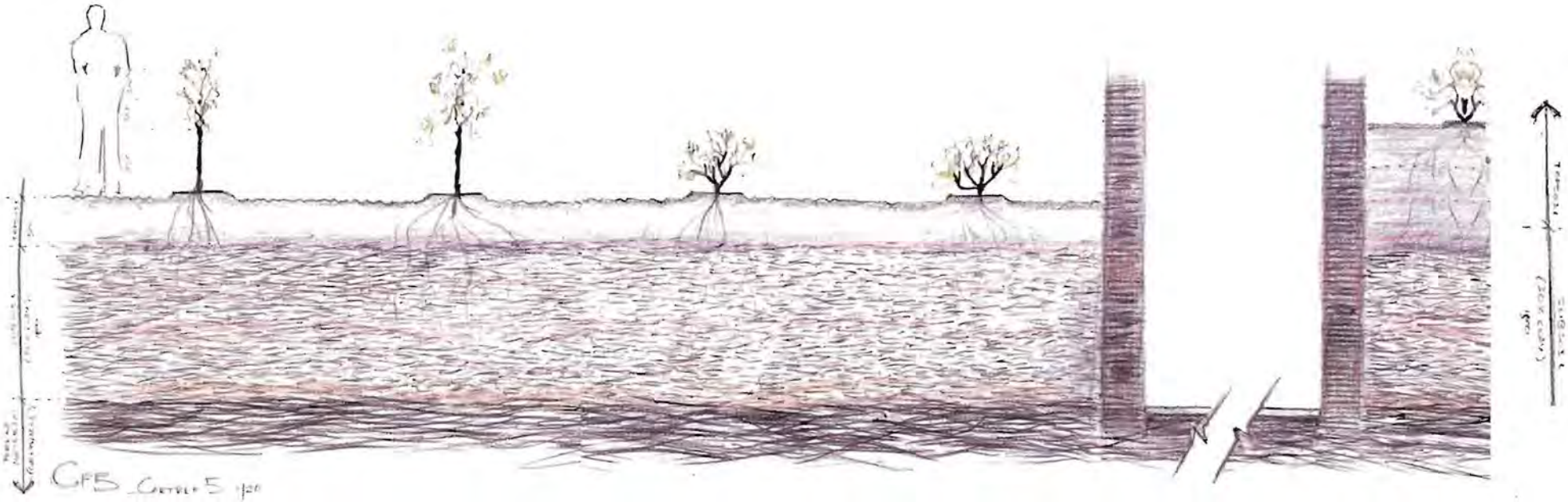
- *The Building process as self-sustaining*

More precise sections through the site revealed how much sub-soil was available to excavate, before the 'parent material' below was reached. The sub-soil is what is required for earth-based construction. The top-soil excavated could be moved to enrich other areas of the site for cultivation.

So it became about excavation and building up based on the sites resources.



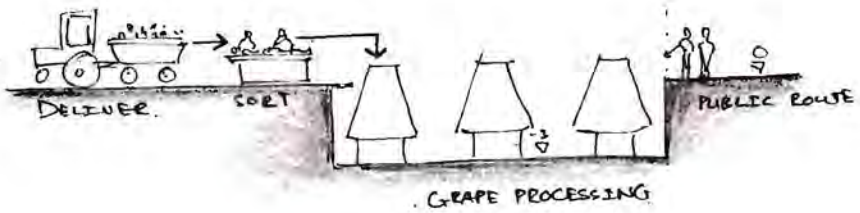
EXCAVATED = BUILDING SOURCE



Above: Diagram of self-sustaining construction process
Below: Detailed section to understand site soil conditions, and construction potential.

This influenced the design in multiple ways:

A more subtle manipulation of topography based on calculating the resources available from the site. The existing contour level (189 000) was used for both grape delivery and visitor arrival, yet excavating allows for wine production utilizing the flow of gravity, as well as maintain the public route over the production process. The public route then it gradually ramps down, following the sites contours, but remaining slightly elevated above the surrounds.
Understanding the sites contours resulted in more efficient vehicular access to the working courtyard.

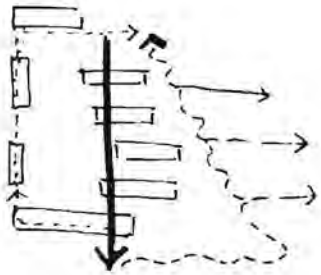


Excavating and Building Up the Existing Ground Level

Above: Diagram East-West section of grape production area
Below: Diagrammatic North-South section through the main public route.

- *The Return Route?*

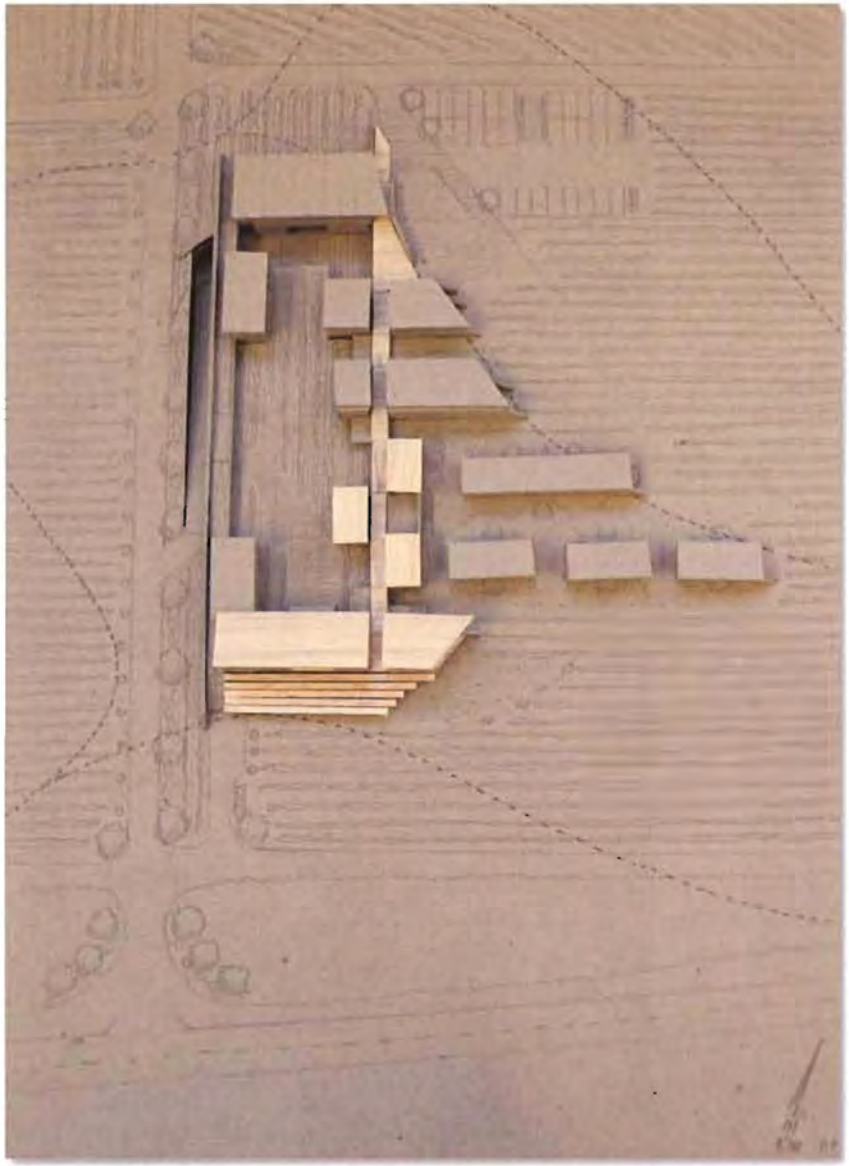
Until this point the design focus had been very much in one direction, it was important to look at alternative return routes, such as a meaner through the vineyards. A route was informed by the pre-existing diagonal road through the east of the site.
Pause spaces along the main route were also became an important consideration.



ARRIVAL ROUTE
RETURN MEANDER OPTIONS

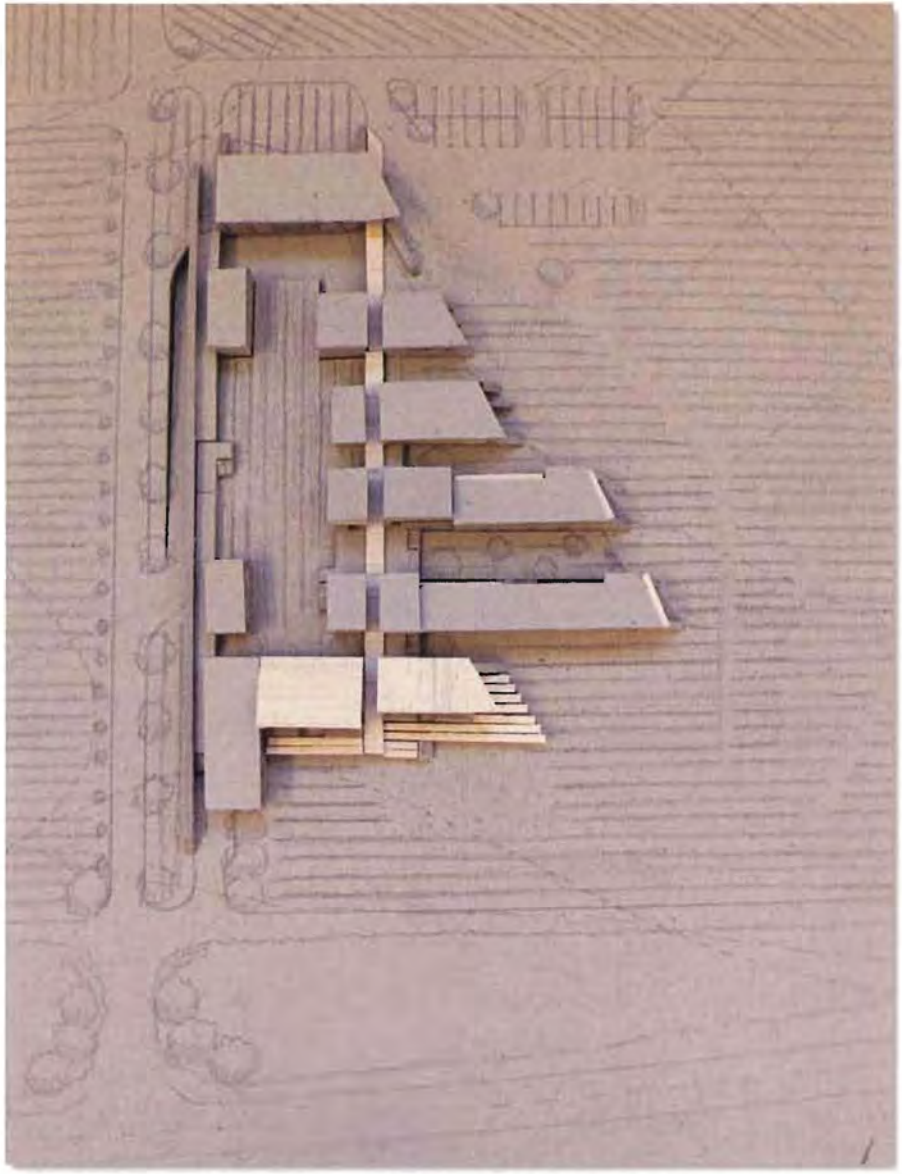
PAUSE MOMENTS
ALONG THE ROUTE

Right: Diagrams exploring route variation.



Above: Model 3_ exploring less typography manipulation and alternative accommodation arrangements.

Right: South-West Elevation, North-West Elevation, East and South-East Elevations.



Above: Model 4_ Reinforcing geometry of original concept model but exploring concealing 'final destination' (restaurant/tasting) from entry point into the site: Making it less axial with road and pushing service forward.

Right: South-West Elevation, North-West Elevation, East and South-East Elevations.

-The Roof?

The focus on the plan had limited roof exploration until this point. The pitched roofs seemed too jarring in relation to the surrounding undulating horizon, I began exploring what would resonate more the surrounds. A light structure would contrast and visually reinforce the solid, heavy earth walls.

Light was also an important consideration, how it entered the interior spaces; shielding from the North and West, while opening up to the South.

For the main route I was inspired by the idea of walking under a canopy of vine leaves, the filtering and abstraction of light..

A continual overhead covering blurs the inside and outside spaces; skylights filter light into internal spaces and the outside spaces between are covered by a trellis, onto which vines could grow.

The roof appears as appearing as an undulating sweep, tying the scheme together.

Above: Roof in relation to surrounds diagram.

Middle: Barajas Airport, Spain, Richard Rogers *(Detail Magazine, 2005)* I was inspired by the combination of an undulating roof and skylights.

Vine Canopy *(stockphoto's.com),* Light through leaves *(Author)*

Below: Concept diagram over the main route.

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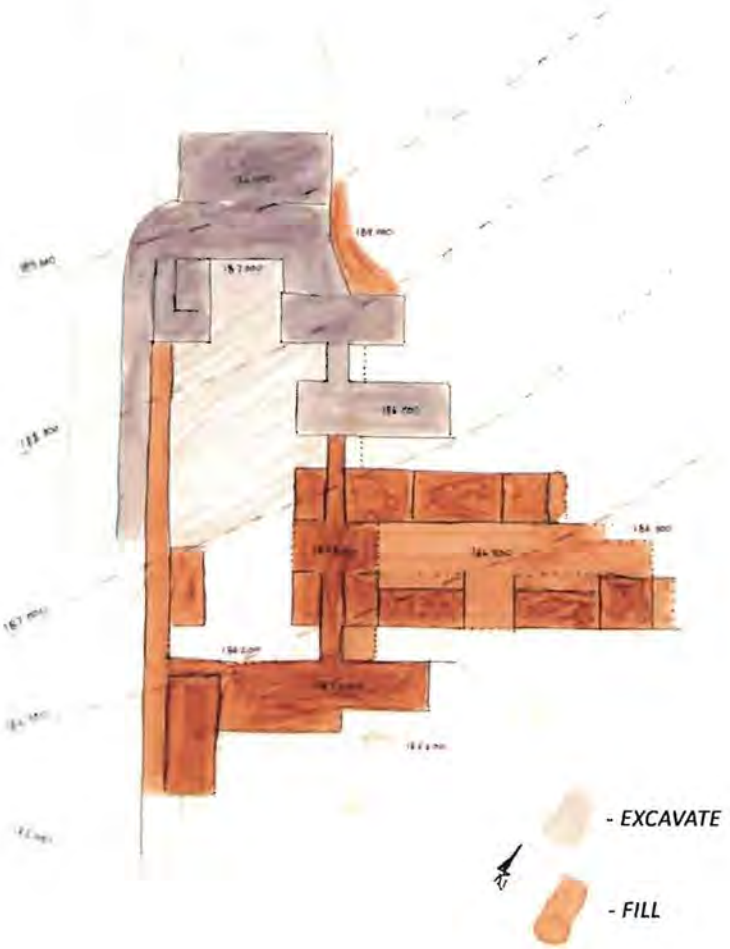
Snap Shots

Design at the time of Dissertation Document submission.



Excavate / Build-Up

Excavation:

Topsoil: 600 m³ _*Enrich elsewhere*

Subsoil: 1750 m³ _*Construction Material*

Total: 2350 m³

Courtyard: 800 m³ _ *fill to build up*

Building Up:

Walkways, Platforms, Deli, Offices, Bathrooms,

Restaurant & Tasting: 580 m³

Accommodation Platform: 500 m³

Total Fill Required: **1080 m³**

Construction:

Production Area: 312 m³ _*800mm thick walls*

Barrel Maturation: 180 m³ _*600mm thick walls*

Bottle Maturation: 234 m³ _*600mm thick walls*

Platforms, Deli, Offices, Bathrooms, Kitchen

Restaurant & Tasting: 316 m³ _*400mm thick walls*

Accommodation: 273 m³ _*400mm thick walls*

Retaining Walls: 130 m³ _*500mm thick walls*

Total Construction Material Required: **1445 m³**

Construction: 1750 – 1445 = 305 m³ _Surplus

Fill: 800 – 1080 = 280 m³ _Deficit

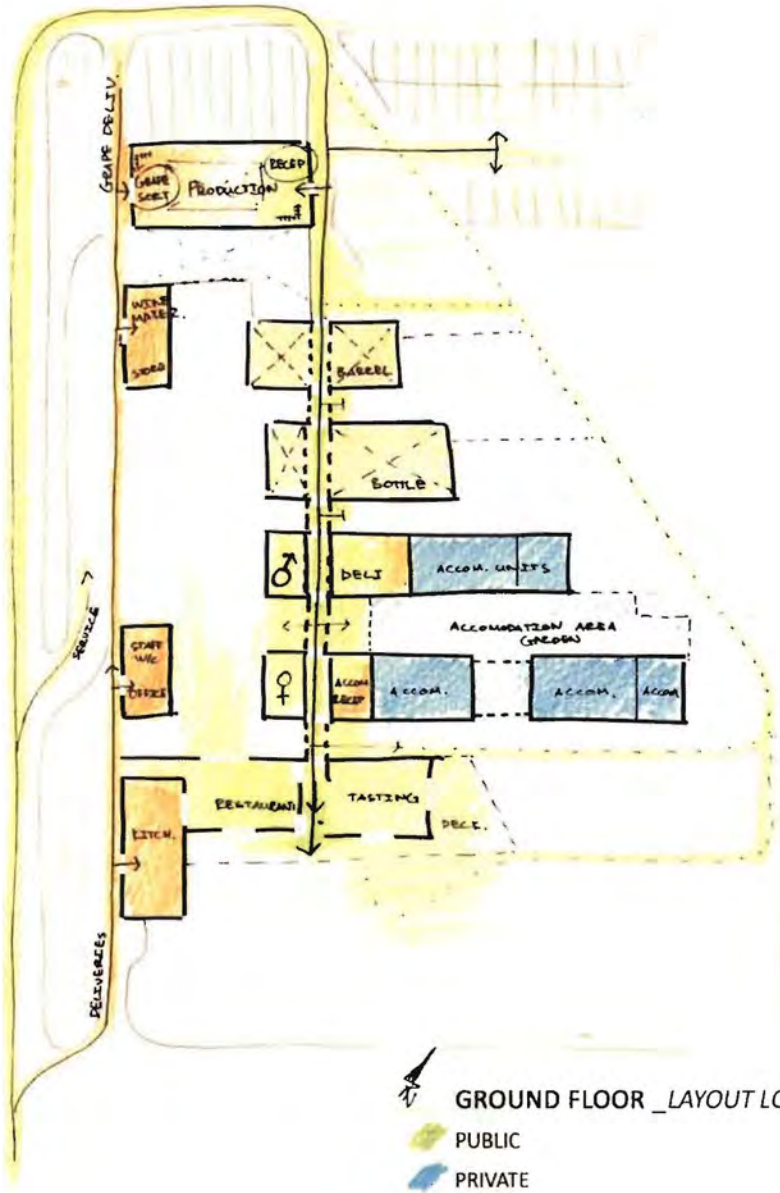
Use remaining subsoil of 305 m³

Subsoil remaining: 25 m³

Top Soil remaining: 600m³ _Enrich elsewhere

Above: Conceptual North-South Section

Below: Calculating Soil Excavation and Building Resources.

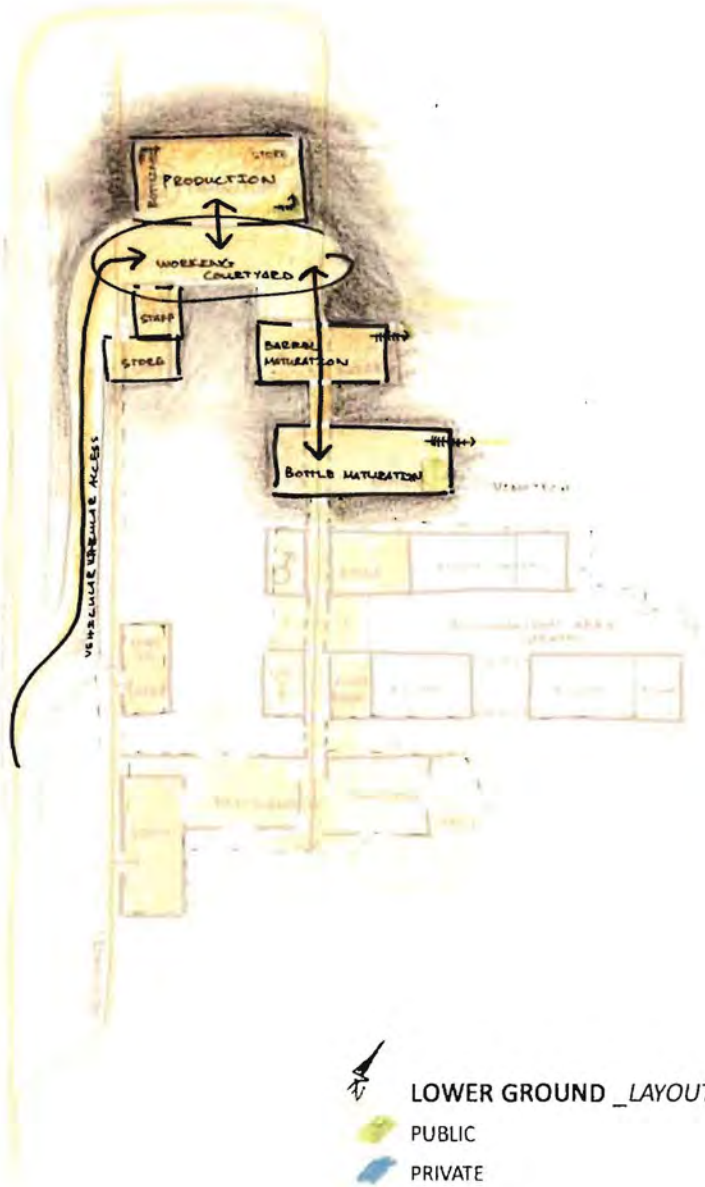


GROUND FLOOR _*LAYOUT LOGIC*

PUBLIC

PRIVATE

SERVICE

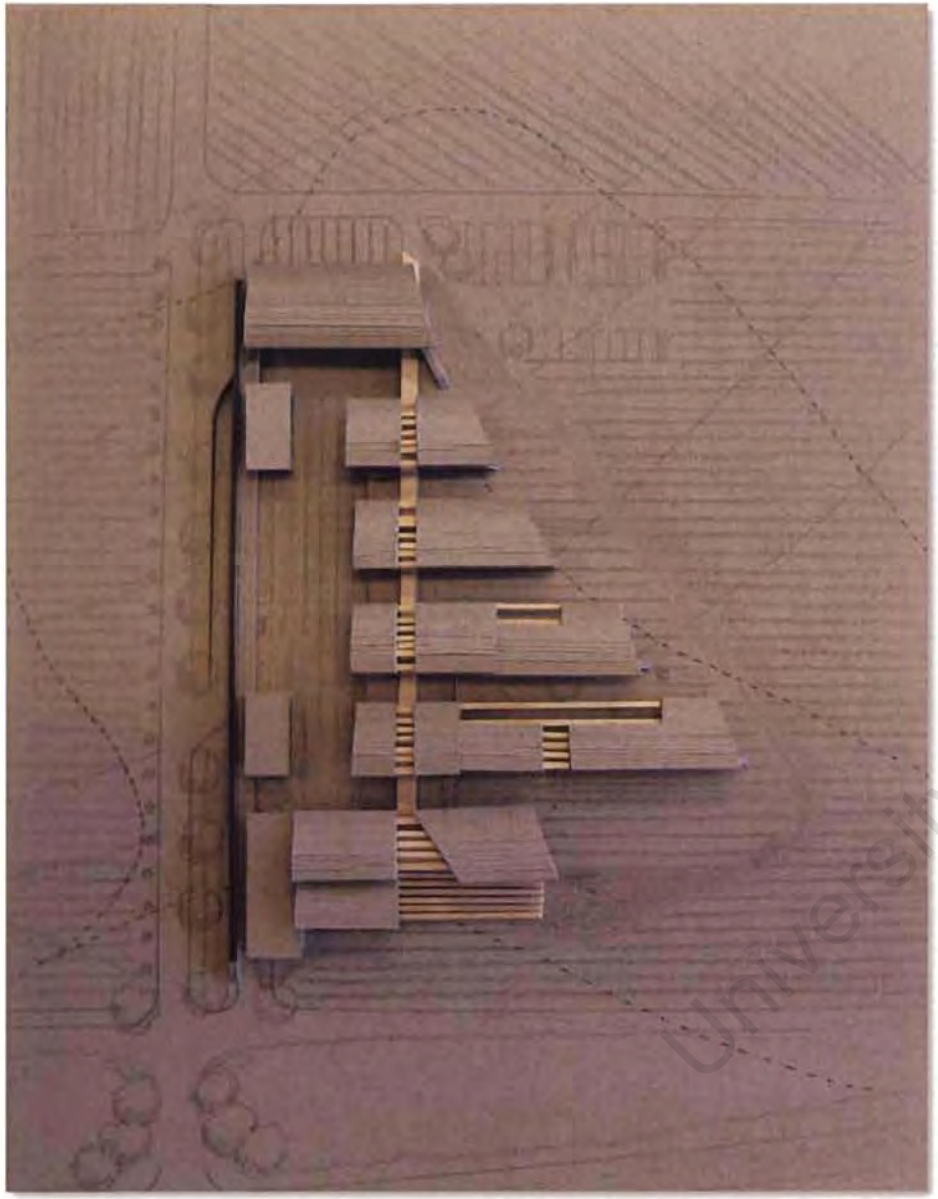


LOWER GROUND _*LAYOUT LOGIC*

PUBLIC

PRIVATE

SERVICE



Above: Model 5_ Exploring the roof and enrichment of the main route.
Right: South-West Elevation, North-West Elevation, East and South-East Elevations.

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7_ Reflection

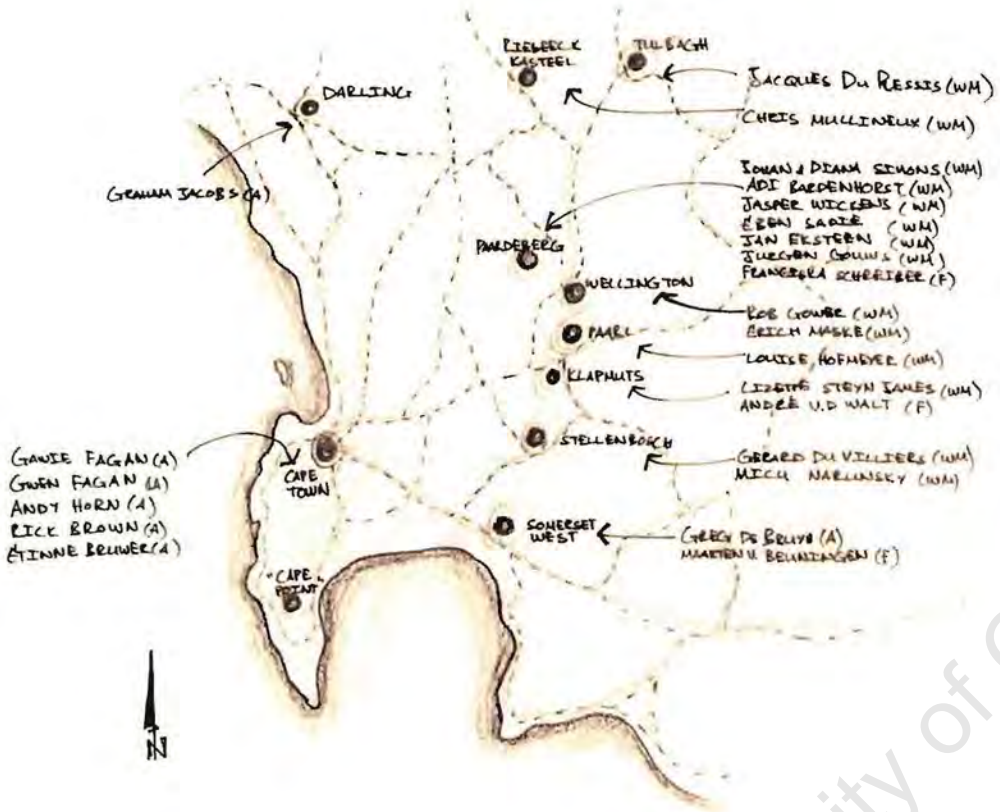
This year has far exceeded any expectations I had for what an architecture thesis year could entail. The process of this year has vastly expanded my understanding and passion for both realms of wine and architecture.

Much about architecture is learnt, not through reading or lecturers but rather through first hand observation and experience. The same can be said for wine. Both realms are highly subjective as they are open to interpretation by the individual; controversial opinions are inherent but this also adds to the intrigue of both.

My thesis has immensely broadened my understanding of the broader context of Cape Town in many ways; I view the skyline from the city differently as I recognise each wine area by its surrounding mountains, I now appreciate the Cape from a historical perspective through understanding its settlement and the development of its vernacular architecture. The Cape Winelands forms an incredible part of our heritage as a nation; architects have the responsibility to work in this area with respect, yet imaginatively to ensure it is maintained but also remains continually inspiring for future generations.

I finish this year feeling more passionate about architecture and its broader implications than I have ever been. And whatever the end result, this has made the challenging journey of studying architecture all worthwhile.

Now the next voyage is about to begin.



Through the course of this year I have met a vast array of inspiring people both in architectural and winemaking realms, each of them have contributed to the journey of my thesis. Thank-you.

And a very big thank-you to my classmates, Jo Noero, Nic Coetzee, Jani Goussard, Joanne Strannack and Dylan Pope.

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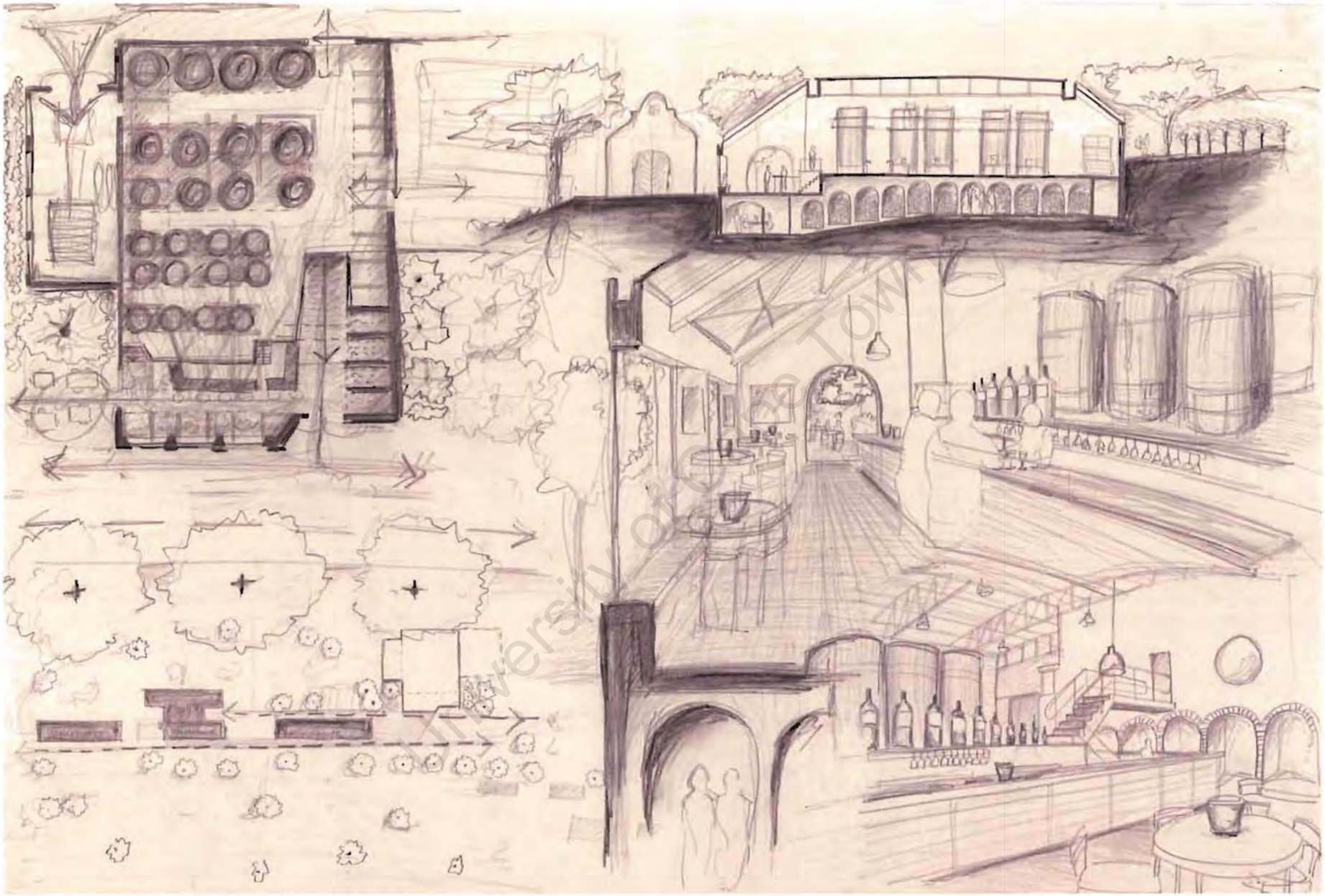
8_ Addendum



Above: Rust en Vrede Wine Farm, Stellenbosch: *Exploratory sketches.* *(Author)*

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Welgemeend

The couple climbed out of the car and walked slowly across the pebbled ground. They looked around the tiny farm wedged between the freeway and the old highway to the north. There were a few thousand vines, unkempt and untended, in ragged rows with roughly in the centre of the property a small farmhouse and a few outbuildings. Their plans were small, their means were modest and it looked like a pretty good place to start. All they wanted was a place in the country to live, somewhere to grow a few vines and make a little red wine.

Billy Hofmeyr, a land surveyor by profession, won a national wine tasting competition in 1974. Shortly thereafter he and his wife Ursula put their savings together and searched for a smallholding with a wine quota, where he could indulge his dreams and she could extend her garden. The 14-hectare piece of land they found stands on a ridge adjoining the southern extremity of Landskroon, one of Paarl's top red wine Estates. During his first winter, Billy planted small blocks of Cabernet Sauvignon and Pinotage vines, separated by the farm road that runs down the centre of the property. He then obtained a few hundred vines of Merlot, Cabernet franc and Petit Verdot, and made a small mother plantation from which he selected cuttings to establish vineyards beside the Cabernet Sauvignon in later years. He subsequently planted blocks of Shiraz and Grenache beside the Pinotage, and the recipe for two different styles of blended wines began to develop.

Following the classic recipe for a top-class blended red, Billy has planted the major part of the property with 70 per cent Cabernet Sauvignon, 20 per cent Merlot and Cabernet franc, and 10 per cent Malbec and Petit Verdot. His second vineyard, when completed, will have equal parts of Pinotage, Shiraz and Grenache. Conditions of life for these vines are rather harsh. There is a little sand in the surface layer of soil, with some humus. The soil mixture has a gravel base with pockets of sand, and stands on a platform of clay that varies greatly in depth, showing on the surface in some parts, but is mostly between one and two metres below the surface. Where the clay approaches the surface, Billy has had to break it up to get the vines to grow. Two small dams provide water for the establishment of young vines in this rather severe environment.

Rainfall on the Welgemeend Estate is inconsistent, but the average of 600 mm per year is sufficient for the vines to grow and produce 6 to 7 tonnes of grapes per hectare per year when mature. The clay holds sufficient moisture in the autumn for the vines to ripen the grapes without significant loss of acidity.

Billy has found that he has chosen, quite by accident, a farm with a number of natural advantages for the growing and ripening of Cabernet Sauvignon. The texture and geological structure of the soil are similar to those of St. Emilion in Bordeaux. The Bordelais prefer not to irrigate their vines and Billy has insufficient water to do so. Cabernet Sauvignon in Bordeaux produces 6 to 7 tonnes of grapes per hectare, just as it does at Welgemeend. The farm is situated on the crest of a ridge, in line with the south-east wind coming through a gap between the Simonsberg's foothills and Klapmutskop. This prevailing summer afternoon wind moderates the temperature and gives the vines cool nights through most of the ripening period.

Harvest time coincides with that of Paarl and precedes the majority of Stellenbosch Estates by between one and two weeks. The summer rains that cause hazards for Stellenbosch's later-ripening Cabernet Sauvignon have not yet been a problem for Welgemeend. Billy's Cabernet Sauvignon does not all ripen at the same time, and because the farm is small he and Ursula are able to bring in all the crop at close to Billy's chosen degree of ripeness over a period of about ten days. The moment for harvesting comes when the grapes have an average sugar content of 21,5 °Balling, regardless of pH and acidity content. The pH of the grapes is always low at this point and the low pH factor is retained by all the wines.

The Merlot, Cabernet franc, Malbec and Petit Verdot are picked and crushed together. The Cabernet Sauvignon reaches the same degree of ripeness about ten days later and is fermented separately. The mash of skins and juice is fermented with a culture of dried yeast, at a temperature of about 25 °C. Billy's first wines, in 1979, were fermented cooler, but turned out to be very delicate. He believes he extracts greater flavour without sacrifice at the higher temperature. The sugar is allowed to reduce to about 3 °Balling before the skins are removed and pressed in an hydraulic basket press. All the pressed liquid is returned to the fermenting must and the combination is allowed to ferment dry in a closed tank. After fermentation has ceased, the wine is allowed to settle. When clean, it is put into small oak casks to mature and gain some extra character. One third of the Welgemeend wood is replaced each year with new oak from France, so each Welgemeend Cabernet blend benefits from contact with new wood. This wine remains in wood for at least a year, after which it is bottled and released to the market under the name Welgemeend.

The Estate's second wine, Amadé, is made from the vineyards of Grenache, Shiraz and Pinotage. The grapes are picked and crushed together. The fermentation technique is similar to that used for the Welgemeend wine but the wood maturation period is appreciably shorter. When casks have been used for three years to mature the Cabernet blend, Billy has them scraped out by a cooper and uses them for one further season, in which Amadé is given 3 to 4 months' wood ageing, after which they are sold.

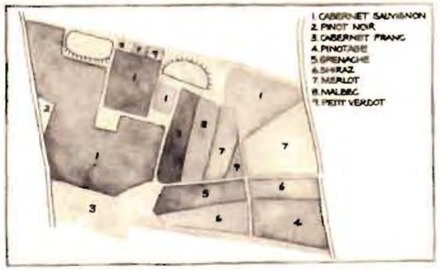
The size of the farm and Billy's surveying abilities have meant that harvesting and wine making on Welgemeend have always been a family affair. Ursula's contribution to the quality of the wines has been considerable. The couple's pioneering work in small-scale, intensive wine making has already influenced many others.

The wines are fresh and lively with soft tannins, and show a capacity for development with further maturation in the bottle.

Wine is for sale on the Estate on Saturday mornings.

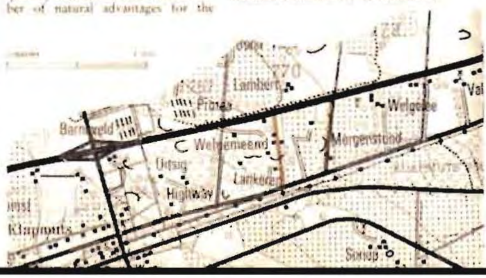
Grapes are picked in lug boxes to prevent premature crushing.

Once sufficient colour has been extracted, skins are pressed in the hydraulic basket press to obtain every drop of flavour.



Billy Hofmeyr, the Cape's first producer of a Bordeaux-blend red.

Fourteen hectares of red varieties take two weeks to harvest.



Amadé ESTATE WINE Hofmeyr LANDGOED -WYN Welgemeend

NEWSLETTER NO. 1: DECEMBER 1980

Welgemeend is the first wine estate in South Africa to be developed in the French tradition.

Planting commenced in 1974 and when completed in 1984 the vineyard will comprise 12 ha. This is minuscule by South African standards but on a par with the Bordeaux region and quite large when compared with the domaines of Burgundy.

Up to the present only red grape varieties were planted on the following basis:-

WELGEMEEND Estate Wine

The wine bearing the name of the Estate is blended during the early stages of vinification from the noble cultivars Cabernet Sauvignon, Cabernet Franc, Merlot, Petit Verdot and Malbec, all of which have their origin in the Bordeaux region of France and give rise, with the exception of Malbec, to the elegant Clarets of that region more often than not.

The Welgemeend blend is dominated by Cabernet Sauvignon (±70%) which ensures depth and longlevity, whereas the other varieties and judicious wet [illegible] add flavour and complexity to the wine. Early harvesting ensures a relatively low alcohol, resulting in a medium to light bodied wine, but one with a considerable depth of colour.

"AMADÉ" Estate Wine

– is blended at the pressing stage from Pinotage, Shiraz and Grenache grapes, all of which have their origin in the Burgundy and Rhône regions of France. Pinotage is in fact a South African cross of Pinot Noir (Burgundy) and Cinsaut (Rhône).

These varieties ripen at different times but are picked and pressed together to yield an alcohol of 12% or less. A relatively high fruit-acid ensures freshness and a considerable depth of flavour. This unique wine is matured in new oak casks for a limited period only.

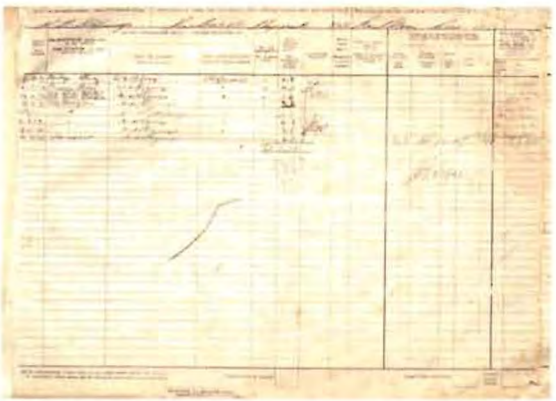
Other wines from Welgemeend

Various circumstances e.g. differing yields, blending factors etc., may give rise to variations the proportion of each variety that goes into Welgemeend or Amadé wines, resulting in wines that are bottled and marketed under different labels. An example was the Vin Rouge of 1979, and it is foreseen that a 1980 vintage Cabernet Sauvignon will be released. Circumstances may even give rise to uncertified wines being marketed from time to time.

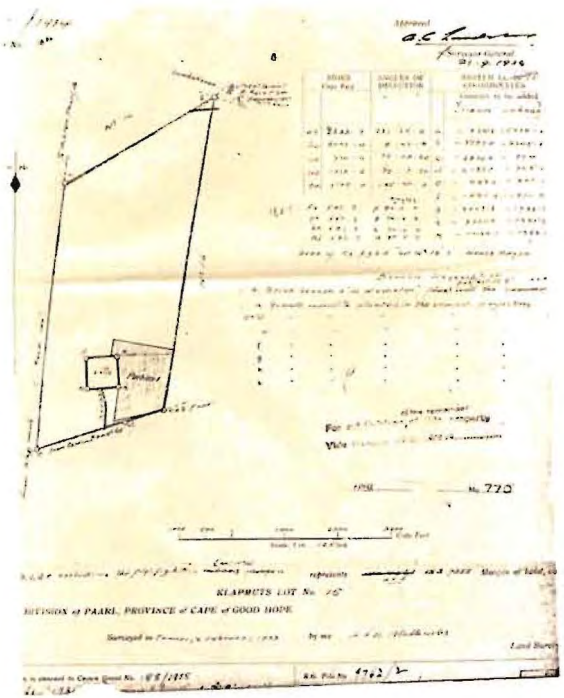
Record of 1979 Welgemeend Wines:-

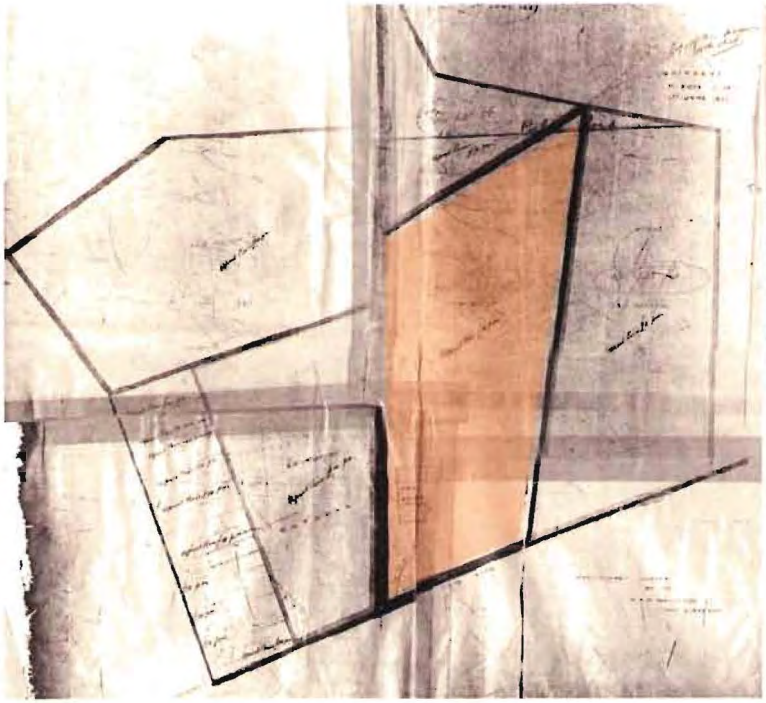
	Alc	TA	VA	TSO_2	pH
AMADÉ	11,5	6,3	0,55	77	3,41
VIN ROUGE	11,4	6,3	0,70	87	3,55
WELGEMEEND	11,2	6,2	0,56	70	3,52

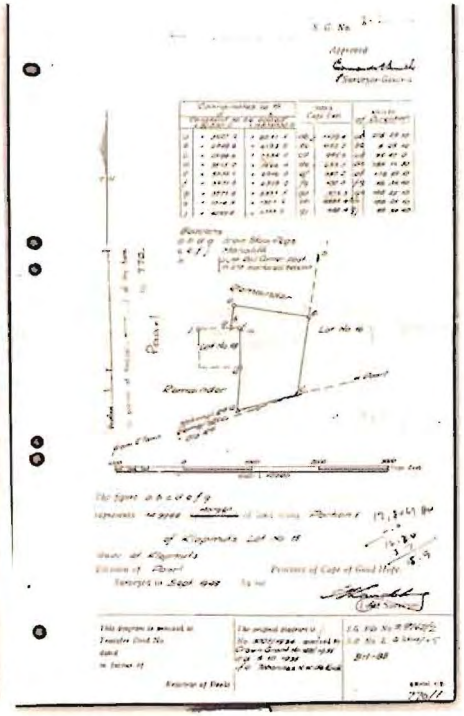
W.A. Hofmeyr

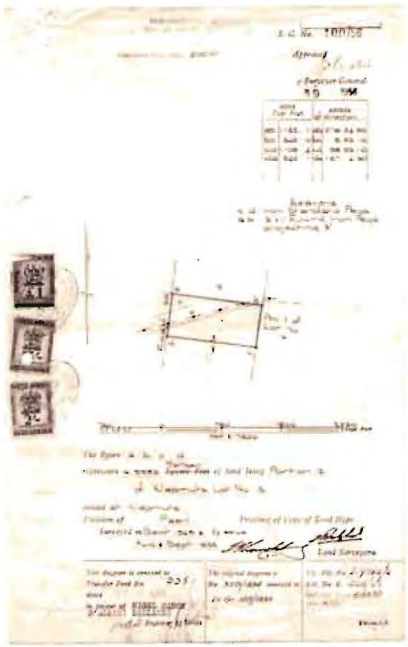


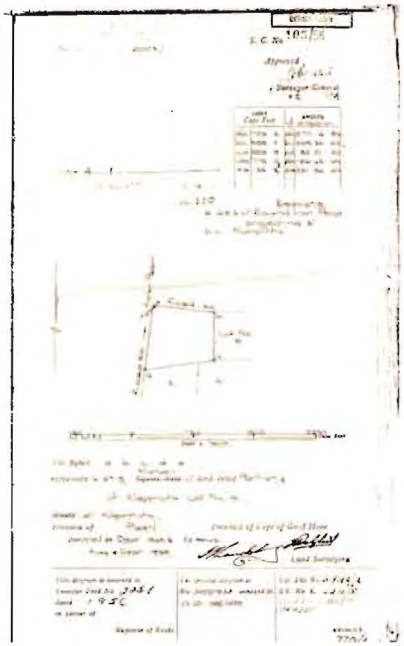
DIE stigtingsvergadering van die Onverbonde Wynmakersgilde is onlangs op die plaas Welgemeend van mnr. Billy Hofmeyer gehou. Op die foto, wat na afloop van die vergadering geneem en ná voor die eerste amptelike wynproeëry geneem is, verskyn van links agter: mnr. Etienne le Riche van die landgoed Schoongezicht en maker van die bekende rooiwyn Rustenberg, prof. Joël van Wyk, hoogleraar in wynkunde aan die Universiteit van Stellenbosch, mnr. Braam van Velden van die landgoed Overgaauw, mnr. Peter Finlayson van die Hamilton Russell Vineyards naby Hermanus en mnr. Achim von Arnim, wynmaker van Boschendal. Voor sit die gewese Springbok-rugbyspeler Jan Boland Coetzee, wat deesdae op die plaas Wiesenhof in Paradyskloof naby Stellenbosch wyn maak, Kevin Arnold van die landgoed Delheim, Billy Hofmeyr van Welgemeend en Walter Finlayson van die landgoed Blaauwklippen op die Stellenbosse Wynroete, wat onlangs teruggekeer het van 'n besoek aan die VSA en verskeie wynproduserende lande in Europa nadat hy die Diner's Club se Wynmaker van die Jaar vir 1981 was.

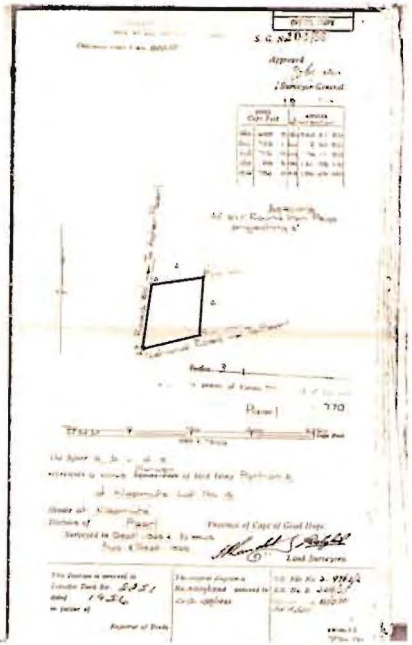


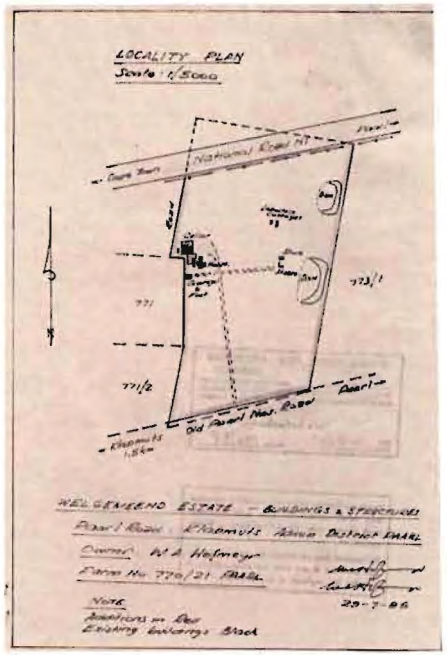











LOCALITY PLAN
Scale 1/5000
National Road No 1
Paarl
Old Paarl Mun. Road
WELGEVEEND ESTATE – BUILDINGS & SUBDIVISION
Owner W.A. Hofmeyr
Extent No 770/21 PAARL
Date 29-7-86
NOTE
Additions on the
Existing Buildings Block

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