

SEASCAPE...

BY

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submitted to the Victoria University of Wellington in fulfilment of the
requirements for the Master of Architecture (Professional)

Victoria University of Wellington
School of Architecture

2021





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To my Supervisor Robin Skinner, thank you for your excellent support and help throughout this final year. To all my family and friends, thank you for all your encouragement throughout these past five years of my time here at Architecture School.

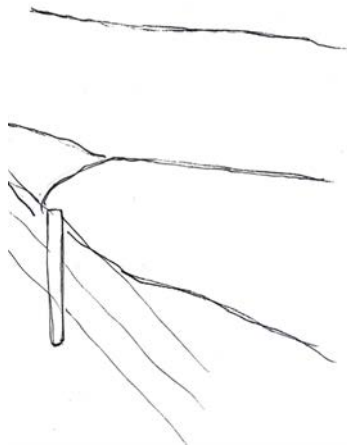




Fig. 1.0 ; Menzies Bay, Banks Peninsula
(Authors own photo)



MENZIES BAY

Banks Peninsula,
Canterbury
New Zealand



ABSTRACT

This design-led research will respond to two key criteria; first, creating an accessible and sustainable coastal environment, and secondly, the idea of keeping the informal and relaxed nature of the New Zealand coastal housing lifestyle which currently exists.

The coastline is a zone where the New Zealand lifestyle and cultural identity is manifest. It has deeply rooted with cultural and historic ties which are significant to Māori both spiritually and physically. Architecture defines the character of the region by balancing social and cultural needs of the location. Development along the coastline is an expression of what we are as a culture and has an immense opportunity to create environments that reflect contemporary ideas of the city, society, and culture.

The waterfront is seen as a New Zealand icon and makes up island living. Surrounded by continuous beaches and a dramatic coastline, the country enjoys powerful connections to its waterfronts. Living by the sea can be seen as the kiwi dream.

If we wish to continue to occupy the coastline, it is important that we are still able to enjoy it while not ruining the landscape around us.

While the research responds to one site only, this thesis of eight chapters will also be able to raise the broader argument of how these findings can be adapted to similar coastal sites in New Zealand. The nature of this research will be able to generate the possibility for further exploration of creating more housing on coastlines while retaining low-impact and sympathetic designs environmentally.

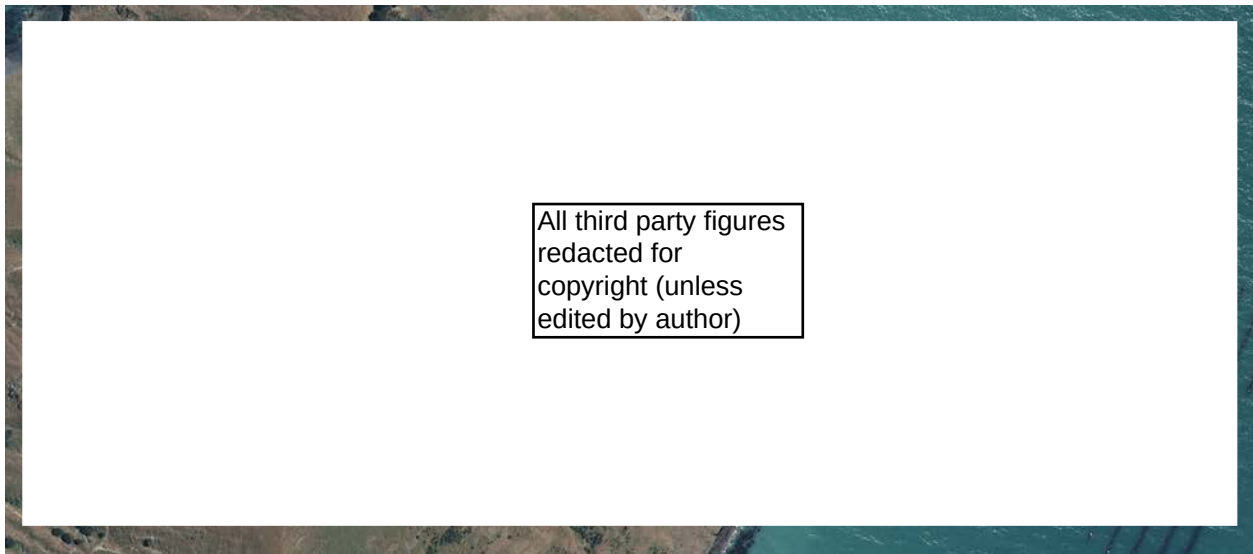


Fig. 1.11 ; Satellite Imagery of Menzies Bay, Banks Peninsula



Fig. 1.12 : Menzies Bay
(Authors Own Photo).

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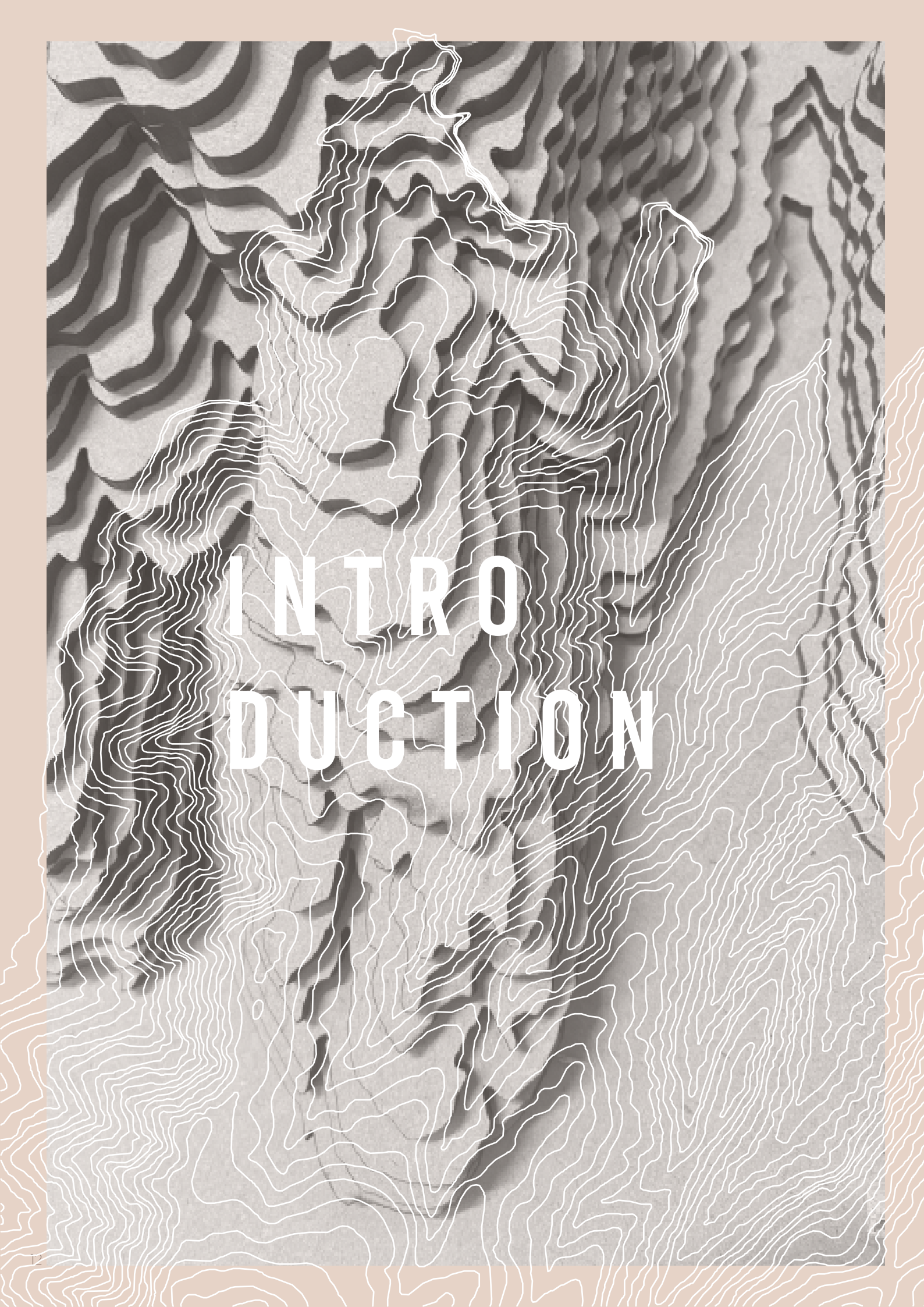
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The background of the page is a complex, layered composition. It features a light beige or tan color that serves as the base. Overlaid on this are various topographic map elements. A prominent feature is a series of white, concentric contour lines that form a large, irregular shape in the center, resembling a mountain range or a specific geographical feature. These lines are more densely packed in some areas, suggesting steeper slopes. Additionally, there are darker, more textured grey areas that appear to be part of the topographic map, possibly representing different elevations or land types. The overall effect is a sophisticated, abstract design that combines naturalistic elements with geometric precision.

INTRO DUCTION



CHAPTER 1

THE ISSUE

RESEARCH QUESTION

THE BACH + KIWI LIFESTYLE

METHODOLOGY

Growing up near the coast, I have always become attached to the freedom and the nostalgic escape that the coast gives. Visiting beaches in New Zealand is something that generates freedom, nostalgia, belonging, and generally strong feelings and connections of attachment in New Zealand.

Nostalgia is a sentimentality for the past, and a desire to return. It makes me feel like my life has roots and continuity. It is able to provide a texture to my life and gives me strength to move forward.

The developer residential sprawl along coastlines today in New Zealand has impacts on the natural environment. Examples include the unsympathetic holiday house which overshadows its surrounding natural environment and becomes the 'hero' rather than the landscape being a 'hero'. This contemporary holiday house has transformed from the traditional New Zealand bach which was always known to enjoy its surrounding environment and not overtake it. Another scene which can be found on the coastline is the sprawl of residential housing, not sympathetic with the coastline and natural contours at all. This over-development is ruining the coastline, with the lack of low-impact designs. Therefore if we wish to continue to occupy the coastline, then how are we able to continue to enjoy it without ruining it? To keep this sense of place that we once had as childhood memories, associated with things such as adventure and exploration.

As some could argue that some coastal environments should remain untouched, there remains a challenge of creating an environment which we are able to continue to enjoy, while remaining significantly low-impact and sympathetic. As New Zealand is a country which is defined by its coastline, the aim of this research is to provide a framework where untouched and sensitive land can be developed in the most sympathetic and sustainable way, while providing more of an access to the coast.

This research will extract key design principles from precedents such as from in the book 'Superlight', which has been influenced by the architect Glenn Murcutt's idea of 'Touching the Earth lightly', and David Leatherbarrow's 'Roots of Architectural Invention'.

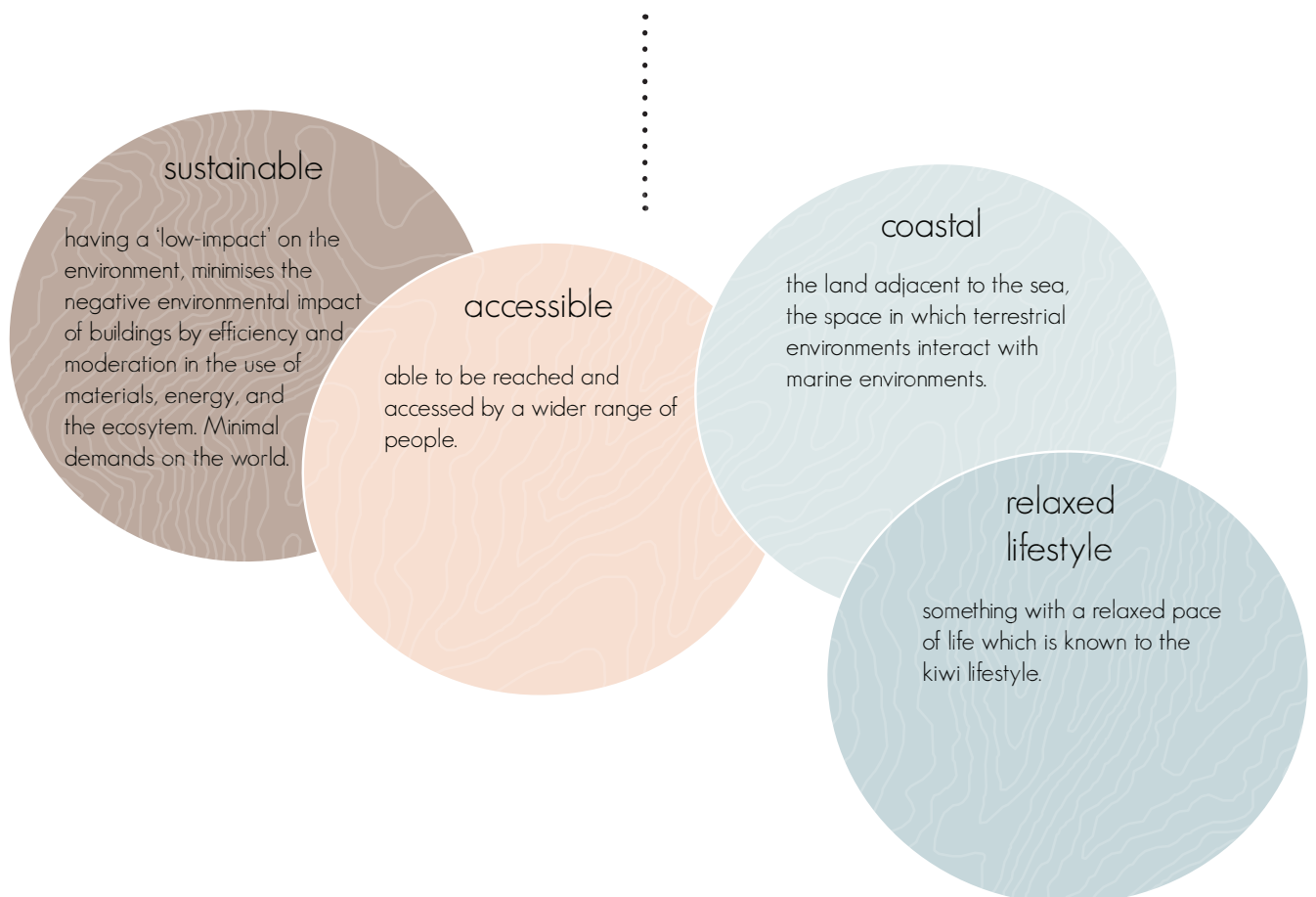


Fig. 1.13; The coastal edge to the east of Menzies Bay
(Authors Own Photo)

RESEARCH QUESTION

HOW CAN WE DESIGN HOUSING TO CREATE A SUSTAINABLE AND ACCESSIBLE COASTAL ENVIRONMENT, WHILE KEEPING AN INFORMAL RELAXED LIFESTYLE?

QUESTION DISSECTION



AIMS + OBJECTIVES

- Understanding the concept of the lifestyle and understanding the programme.
- To investigate low-impact / sustainable design and construction strategies suitable for a remote coastal site.
- To create dwellings which are able to enable more of an engagement with the waterfront.
- To incorporate cultural and historic values within the designs which respect the site and landscape.
- To reflect upon the design outcomes within the three different projects .
- A reconnection with the essential qualities of the surrounding landscape.

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Figure 1.14 : Taylors Mistake coastal baches.
Individual, seperate dwellings.
(McGregor, 2019)



Figure 1.15 : Taylors Mistake coastal baches.
Individual, seperate dwellings.
(Authors Own Photo)

THE KIWI LIFESTYLE AND BACH

The kiwi lifestyle is known to be a relaxed, simple and laid-back lifestyle which is able to define New Zealanders' sense of identity. It is revealed that kiwis of all ages define the typical characteristics of New Zealanders in positive lifestyle terms such as "sporty", "outdoors", "adventurous", and "friendly" (Collins, 2012). Kiwis tend to balance time at work with time to relax and unwind. This sense of laid-back lifestyle brings back a distinctive feature of many of New Zealand's coastal landscapes has been the constructed holiday home, traditionally known as a 'Bach'. In recent years, however, rapidly escalating beachfront property prices, and the associated development of elite residential landscapes have threatened the status of the bach (Kearns, 2006).

Alternative to suburban housing, the Bach 'has a psychological sentiment with the idea of connecting back to nature and things that are real and true' (Kearns, 2006). The word 'Bach' comes from the word 'bachelor' and has reference to the simple way that bachelors lived in the early part of the last century. Single men living in simple accommodation were historically said to be 'baching', and so an abbreviated form of this term was extended to basic holiday cottages and shacks (Orsman & Orsman, 1994). With walking distance from the sea and lake, the Bach can be seen as a "home away from home", matching up with the Kiwi lifestyle of balancing time at work with time to relax, involving activities revolving around the Bach such as swimming, sunbathing, boating, and fishing.

"It takes us back to our grassroots and signifies the simple things in life. Its synonymous with feeling relaxed and calm and its about core values" (Chatwin, 2019).

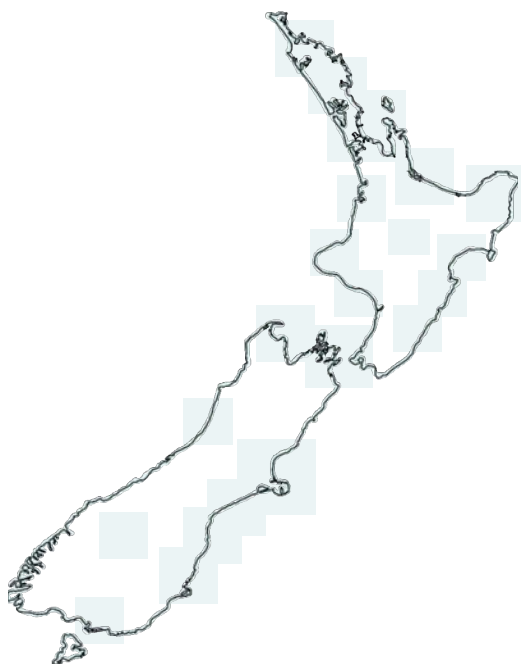
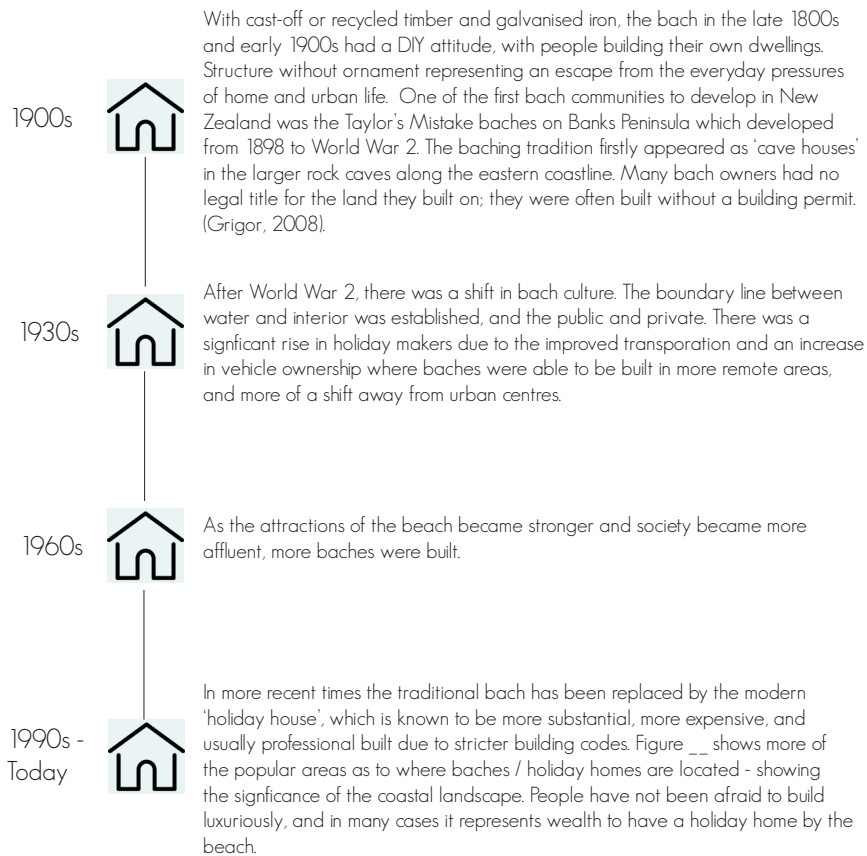
The kiwi bach is a popular part of summertime throughout the country for many. What primarily separates a bach from any other piece of architecture is its function. Baches are mainly in use when kiwis just want to get away from their normal lives. It is a nostalgic memory embedded in our national psyche. As a long-term expression of the nation's cultural values, it holds a powerful place in a New Zealander's imagination.

Simplicity is a key characteristic of the Bach, traditionally made from cheap fibrolite, weatherboards, or iron. The minimalist, do-it-yourself nature of construction meant that baches displayed a vernacular style of architecture. The first baches were built early last century at beaches, lakes and rivers that were close to towns and cities, but as road and transportation improved they were built in more remote areas, mostly where there was water for fishing or swimming.

The next popular age for bach building was the two decades after World War Two. They were often built without a building permit on land that may have been donated by a generous farmer; on Crown land without permission; or on Maori land.

Baches, or the holiday home today still follow the theme of being located by water or along the coastline. As an island nation, New Zealand is surrounded by, and defined by its coastline. A site of memory, a gathering place for family and friends, and a material as well as its symbolic connection between land and sea. We therefore see baches as a form of dwelling-at-a-distance. The therapeutic qualities of spending time at a beach is what attracts New Zealanders to the bach, which comfort is drawn created by the dwelling and coastal setting. '...The idea of the bach is to give you some place to go at the weekend so that you can relax, and commune with nature...' (Smith, 1947, 177).

THE HISTORY OF THE NEW ZEALAND 'BACH' OR 'HOLIDAY HOME':



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Figure 1. 16 : Taylors
Mistake coastal baches.
Individual, seperate
dwellings.
(McGregor, 2019)

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Figure 1. 17 Rangitoto Island Bach
(Unknown, 2010)

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Figure 1. 18: Bethells Beach
bach by Herbst Architects.
(Meiring, 2019).

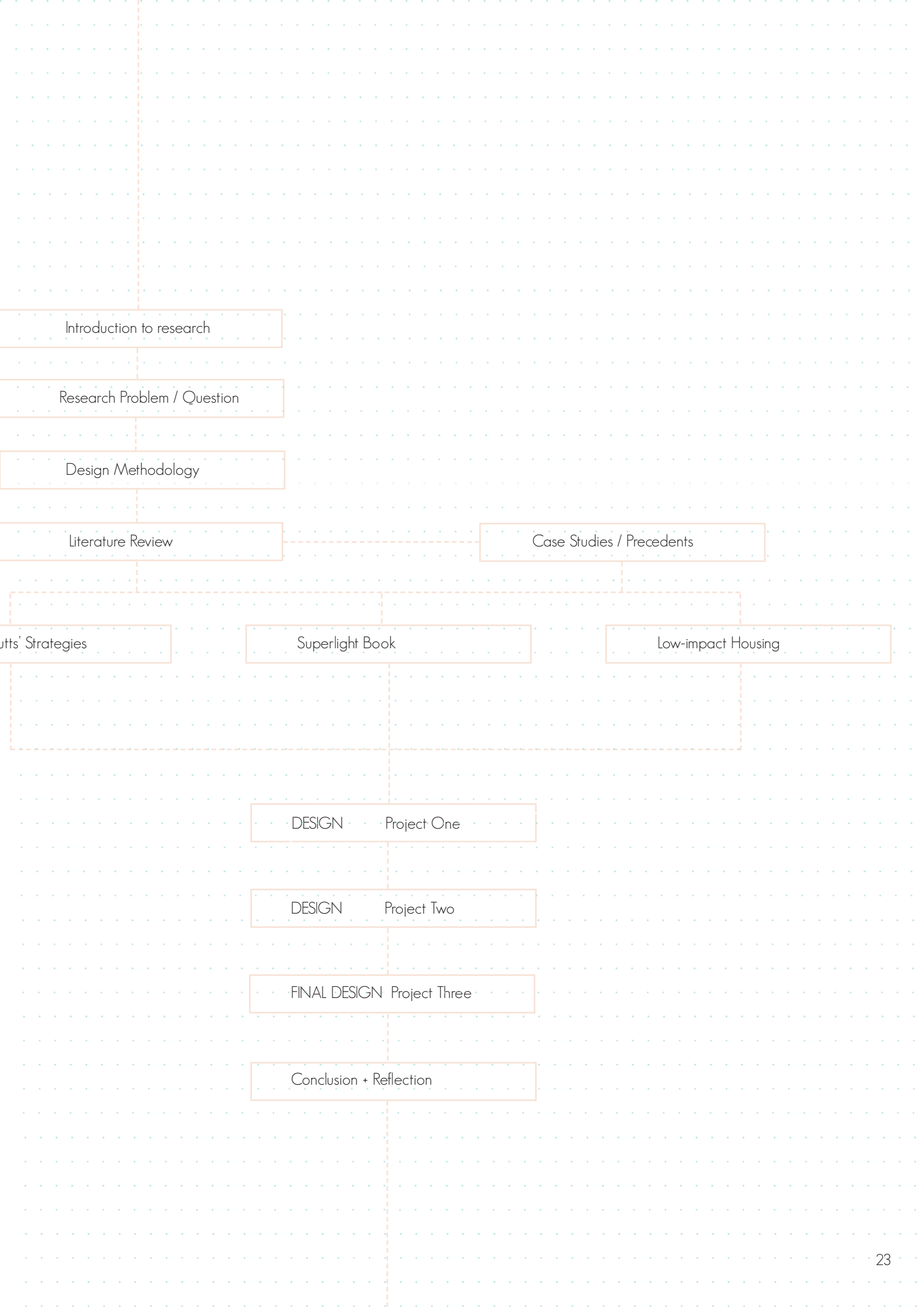
METHODOLOGY

This research will follow a design-led strategy which includes research for design and research through design.

The research will start off identifying and analysing key precedents which incorporate successful low-impact strategies which are able to respect the landscape.

Iterations of designs will be done through three design projects (research through design), which incorporate key design strategies previously identified such as sustainable development research and key factors relevant towards the coastal environment.







CHAPTER 2

BUILT ENV + OCEAN

LOW-IMPACT DESIGNS

MEDIUM DENSITY HOUSING

COASTAL DEVELOPMENTS

This literature review will look at previous knowledge and existing information that has been researched regarding:

- The relationship between the built environment and the ocean:
- What does it mean to design by the Ocean in New Zealand
 - The connection that Māori have had with the Ocean
 - Design concepts behind the Marae and Pa

01

02

- Sustainability / low-impact designs:
- The idea of lightness
 - Have current sustainable strategies been successful within designs

- Medium-density housing:
- What there is so far
 - What is wrong with the current medium-density housing in NZ

03

04

- Coastal Housing / Developments
- Current housing by the coast in NZ
 - How sustainable this is
 - Current coastal design strategies

1. THE BUILT ENVIRONMENT AND OCEAN

AMANDA YATES
OCEANIC GROUNDS //

'To be located in and around the Pacific is to confront the un-differentiated abyss that is the Ocean. Of all the grounds it is the most insubstantial because it has no particular identity, no fixed position(s) ... Thus Pacific theatre reflects the disparity of fixed identification and tends to deal with the moment, with the temporal environment that is filled with emotion'. - The Labrynth of the world and paradie of the theatre.

The term 'oceanica' is used by architect Mike Austin to describe the Oceanic region. Designer and sustainability researcher Amanda Yates has been interested in the way indigenous thought can influence contemporary architectural methods and her designs have relation to the components of the Maori pā. She sees these platforms sculpted from the landscape, with their additional architectural elements, as an urban form - partly natural, partly cultural (McCall, 2014, p. 22).

"The pā, as an architectural landscape, is a spatial type that is indigenous to this oceanic region and offers a useful model for thinking about creating environments".

In Amanda Yate's Thesis 'Oceanic Grounds', she explores the temporal environment through architectural design, testing these ideas in the design and construction of three houses: the Sounds House, the Ground House, and Tokatea. These are temporalised environments within Oceanic spatial thought and practice. This spatio-temporal concept challenges Western philosophical and architectural doxa that privilege stasis over temporal flux, and offers a mode by which to introduce alterity into architectural discourse (Yates, 2009).

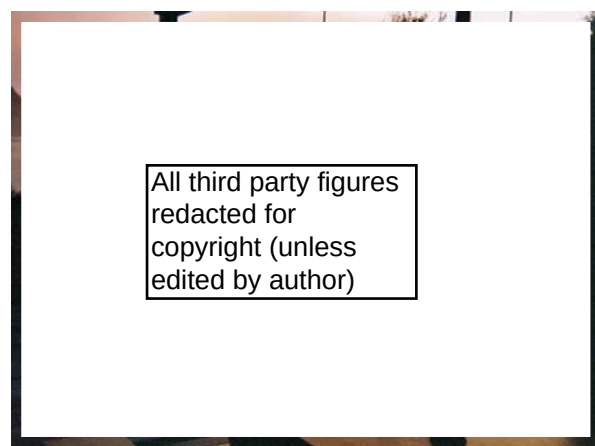


Figure 1. 19 Sounds House Interior (Yates, 2009).

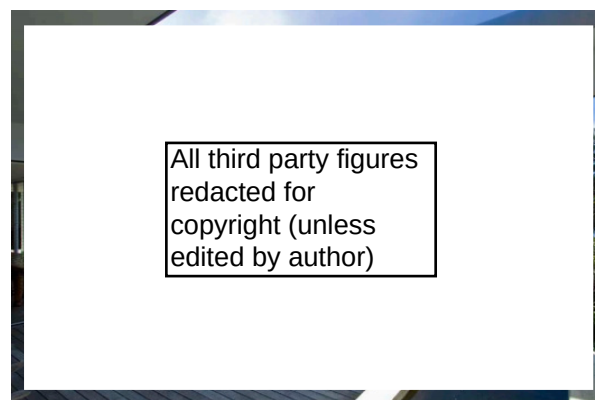


Figure 1. 20 : Sounds House (Yates, 2009).

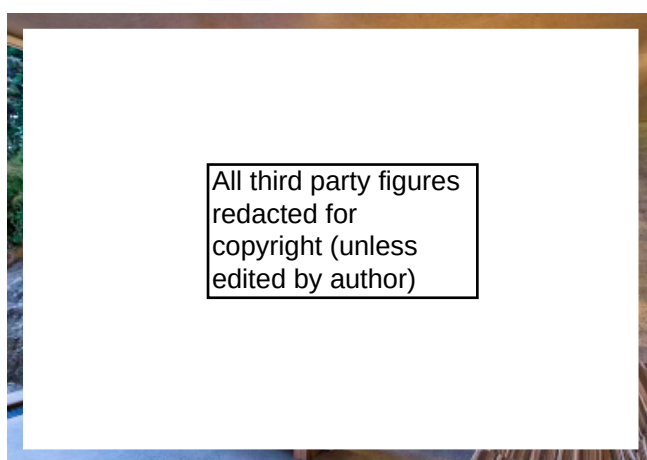


Figure 1. 21 : Ground House Living (Yates, 2009).

Yates concludes in her research that the findings were not always clear or easy to articulate, yet evident when experienced in space and time. She has learnt to render architecture more open to its outside - to the 'temporal', to the exterior, and to the doubled spatial practices of Oceania. The work questions what a spatial discourse and practice might be through experiential explorations in time, space and place.

The next following pages will describe each chapter of the Thesis and the connections involved.

1. OCEANSCAPE:

The ocean establishes a spatiality of openness which is evident in the marae (an open meeting space). The siting and orientation of the marae is determined by conditions of openness such that the marae faces the sea and flatlands. "The marae is the operation of opening up space and shaping space by means of platform". This meeting house holds a connection to the sea. Within the Sounds House that Yates explores, the central openness is influenced by the marae and acts as an 'open air living room'. With the technologies of movement, there are louvres which adjust, and sliding panels which retract; and can be seen as architecture that 'breathes'. The lack of architectural boundary and 'airy' architectural strategies shows spatial distinctions between the interior and exterior.

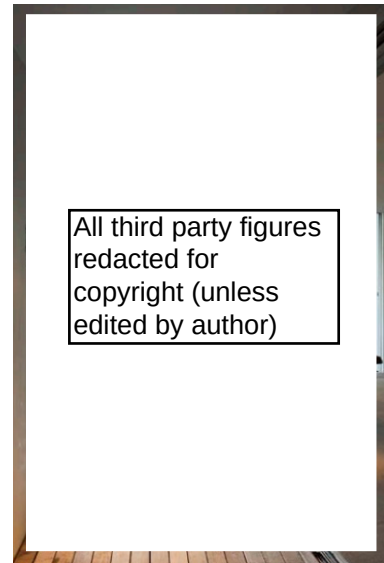


Figure 1.22 Sounds House connecting interior to exterior (Yates, 2009).

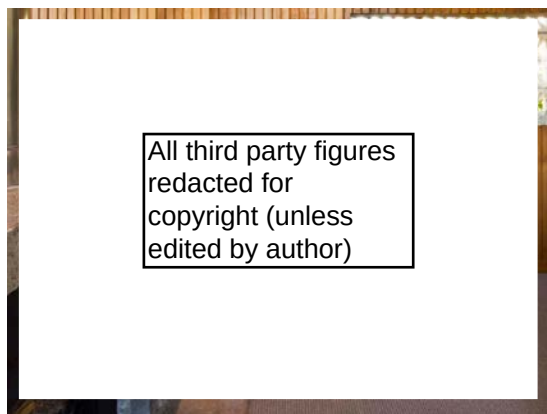


Figure 1.23 : Grounds House (Yates, 2009).

2. GROUNDSCAPE:

This chapter explores space-making within indigenous practice of forming the land to provide spaces for inhabitation. The ground is used as a building material, structure, and a generator of space. Spaces such as those within a terraced Pa become topographic interiors whose floors and partial walls are contiguous with the Earth. Within the 'Grounds House' that Yates explores, it operates as a terraced and inhabited landscape which connects the ground surface and space. A continuum of interior and exterior, these spatial strategies shows connections between nature and culture, and landscape architecture and the interior.

3. OCEANIC GROUNDS:

The final chapter within the research explores the idea of a dynamic and responsive space. It looks at the 'between-ness' of the previous concepts of oceanscape and groundscape. This can be seen within Māori houses (Whare) found in colder regions of the country, which are partially recessed into the ground, made from lightweight timber. This is then evident within the house of 'Tokatea'. The house contours to the sloping site, and has incorporated concepts from Oceanscape and Groundscape. Recalling the ocean, there is a spatial language of fluidity and mobility which is expressed. There is a sense of movement within the architecture through the use of slider doors which can retract into the walls. The house connects the interior to the exterior, and the in-between space of the timber platforms. Under inhabitation these spaces change.

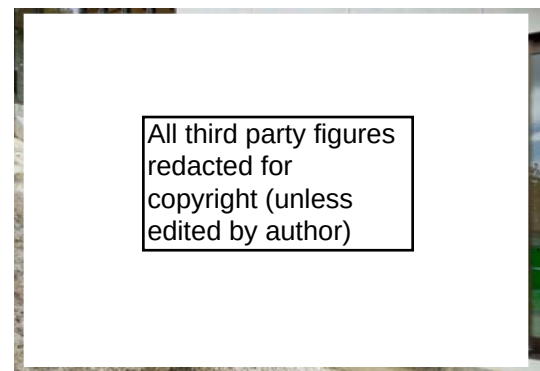


Figure 1.24 Grounds House connecting interior to exterior (Yates, 2009).



Figure 1.25 Grounds House Section (Yates, 2009).



Figure 1. 26 : Ground
House
(Yates, 2009).

Overlaid the conditions of the interior and exterior, 'Tokatea' is formed by a mobile and perforated enclosure with a changing and inhabited ground and is experienced as a 'spatial event'.

It is evident within this design-based research that indigenous design strategies have been explored and how they have been incorporated within some coastal houses in New Zealand. However, are these designs 'light' and low-impact in the construction processes and the final design?

2. LOW IMPACT DESIGNS

PHYLLIS RICHARDSON
SUPER LIGHT //

'Rethinking how our homes impact the Earth'

'Super light', written by Phyllis Richardson is able to show how buildings can weigh less and have minimal impact on their environments by displaying a combination of projects which approaches the idea of being 'lightweight'.

Glenn Murcutt connected architecture with the need to 'touch the earth lightly' and his conscientious building methods inspired a generation of followers to reconsider the impact of built structures on the natural landscape (Richardson, 2014, p. 6). Murcutts work will be looked at in the following pages.

The definition of lightweight can be expanded from referring to a structure that is lightweight both in terms of the required foundation and in the choice of materials, its mobility, how well it is constructed and how efficiently it uses resources and generates its own energy. The main approach displayed by projects within this book is the approach to materials.

Richardson's research is separated into five chapters; Floating, low-energy, urban light, escape, and extreme.

ESCAPE:

remote, low-impact, efficient.

This chapter shows designs located in a rural idyll, and places which are remote from major transport hubs. The houses shown are set in beautiful natural settings, and display an idea of being 'a respectful guest' to its surrounding environment.

Casa Apollo 11 - Parra + Edwards Arquitectos - Chile

This space is inspired by the remote, sloping site in the foothills of the Andes. It is lightly fixed to the landscape, and presents maximum transparency, allowing the natural setting to permeate the interiors and to be viewed through the structure. Rather than shutting out the landscape, it is able to absorb it.

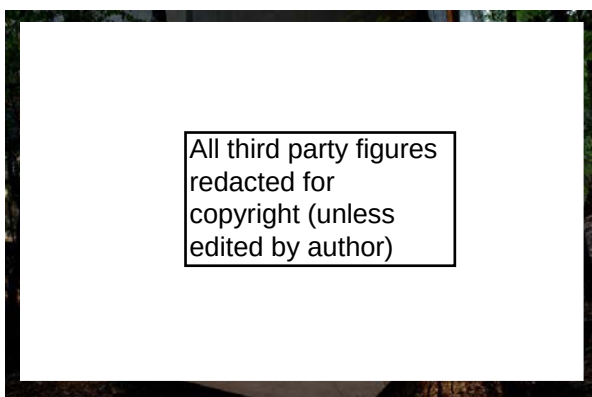


Figure 1. 28: Casa Apollo 11
(Unknown, 2011).

Key design ideas: using less energy, recyclable materials, respectful to the surrounding environment, lightly fixed to the landscape.

FLOATING :

over water, on stilts, mobile.

This chapter shows idea that houses which appear to 'float'.

Port-a-Bach - AtelierWorkshop - New Plymouth NZ

This is designed both to contain all of the necessities for a temporary home and to demonstrate the possibilities for shipping containers. It is compact, and lined with timber on the inside. It is able to show the potential for upcycling shipping containers.

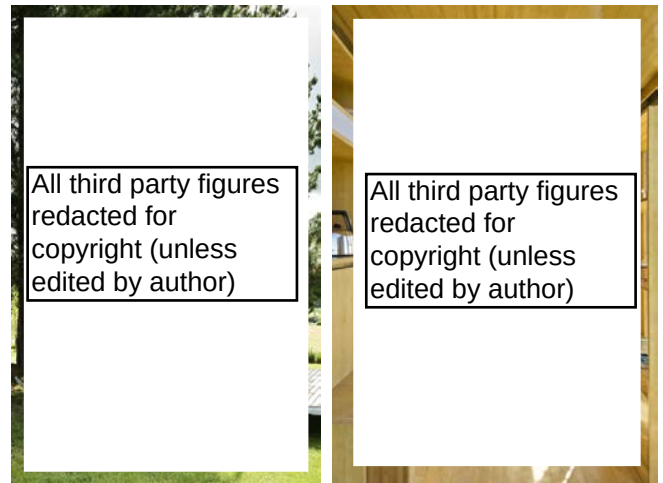


Figure 1. 27 : Port-a-bach
(McCredie, 2020)

LOW - ENERGY:

solar, sustainable, efficient.

This chapter represents to use less energy and to provide all of the power they do consume through passive systems.

First Light - VUW - 2011

This is a net-zero functional holiday home with photovoltaic panels and solar thermal heating heated directly by the sun. The house will also compensate for the embodied energy of its materials, creating it efficient overall. This design, much like the port-a-bach, was inspired by the traditional kiwi 'bach' but with a contemporary approach. Therefore there is a holiday feel about the design - with an extensive use of timber. Engaging with the environment is a key aim of the design, and is a celebration of the freedom and energy of solar power.

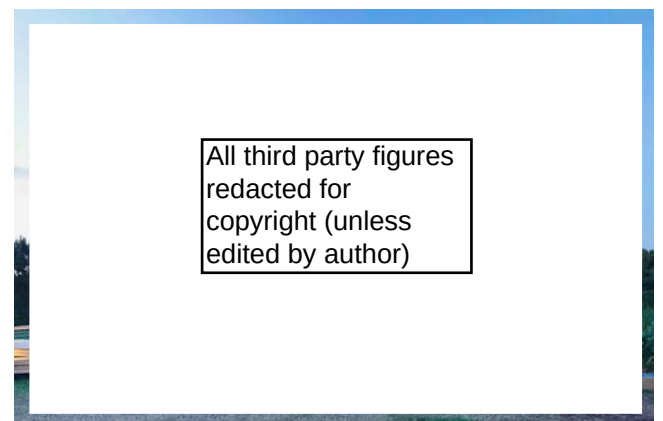


Figure 1. 29 : Meridian
First Light House (Unkown,
2009).

What does it mean to touch the Earth lightly?

Environmentally conscious architect Glen Murcutt is famous for his sensitive and sustainable designs that work with the landscape.

Murcutt emphasises how most modern housing developments in Australia do not take a sustainable approach. "Touching the land lightly is not about a building with just four columns. It's about: where did that material come from? What damage has been done to the land in the excavation of that material? How will it be returned to the Earth eventually, or can it be reused, can it be recycled, can it be put together in a way that can be pulled apart and changed and reused?".

Murcutt's projects are mostly based around coastal Australia. He successfully responds to the structure in nature, and not the beauty in it.

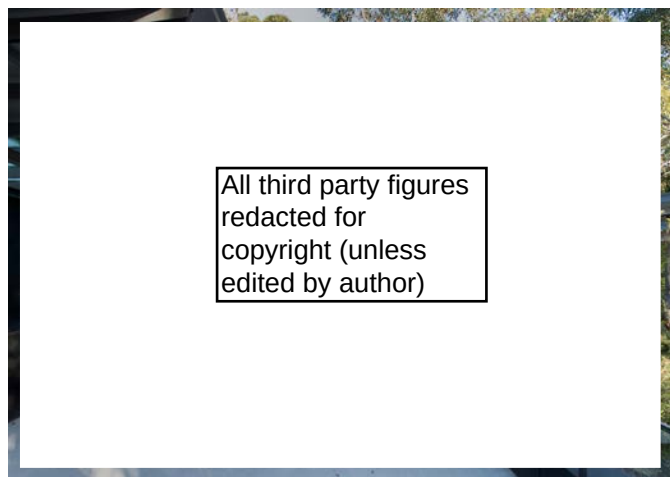


Figure 1. 31 : Donaldson House (Johnston, 2017).

"To touch the land lightly goes beyond just how you place a building on a site. It's how you minimise the energy impact of climatic conditions on a building. It's about minimal impact on the site, but its also about capitalizing on the best aspects of the site" - Murcutt.

Murcutt exemplifies this idea of treating each site as its own unique canvas, and successfully paints a building that merges into its site, respecting the natural landscape rather than manipulating it.

Key design ideas: 'Touching the Earth lightly', responding well to site, sensitive and gentle towards the landscape, running economically and sustainably well.

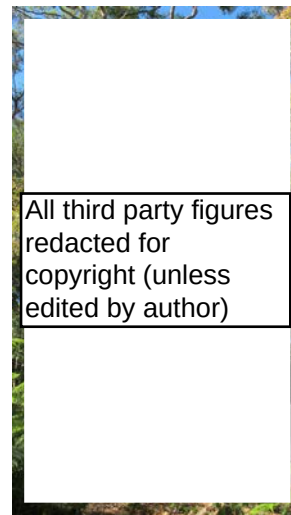


Figure 1. 30: Donaldson House (Johnston, 2017).

One of Murcutt's holiday home designs, 'Donaldson House', is located on a steep slope on the Palm Beach Peninsula, responds directly to the unique site demands with a number of sustainability features such as having water storage tanks, solar power, and no air conditioning.

3. MEDIUM DENSITY HOUSING IN NZ

The Ministry for the Environment's 2012 definition for medium-density housing is 'comprehensive developments including four or more dwellings with an average density of less than 350m² per unit. It can include stand-alone dwellings, semi-detached dwellings, terraced housing or apartments within a building of four storeys or less. These can be located on either single or aggregated sites, or as part of larger master-planned developments'. Two to four storey houses are known to cater to a wide demographic due to their versatility.

'The number of medium-density housing schemes throughout New Zealand today has historically been low'. (Voxell, 2020). It is recognised as a way of addressing priorities around key issues such as liveability, as well as providing more affordable options to a wider demographic.

An issue identified with medium-density housing is the lack of sustainable features and fitting into its environment. Massey University and the Building Research Association have recently revealed that most new-builds in the country are putting out carbon emissions five times higher than the levels set by the Paris climate change agreement. One of these main issues is the amount of construction waste being dumped; around fifty percent of the waste that goes to landfill is construction waste or demolition waste.

4. COASTAL HOUSING + DEVELOPMENTS

In many coastal towns, dwellings have mainly consisted of baches or cribs. As property prices and living standards have increased, these traditional structures have been replaced by larger holiday homes. Therefore, larger sections are being subdivided into smaller lots and vacant sections are being built on; increasing the overall number of houses within a settlement. When this is not carefully designed, this can detract from the 'sense of place' which is associated with the environment. It reduces the natural character, amenity and landscape values of the area.

Many coastal farms are being subdivided into rural-residential developments to accommodate the growing demand for 'lifestyle living' outside established urban areas. These houses are often located to maximise coastal views which once again can detract from the natural and wild character of the coast.

Previous research almost indicates that it is of course possible to create a coastal development which is sustainable and resilient within the landscape. As we derive benefits from coastal areas, the Sustainable development goal 14 of the 2030 agenda for sustainable development aims for conservation and sustainable use of the oceans, seas, and marine resources, explicitly considering coastal areas in two of its targets (Neumann, 2017).

Within the article 'Strong sustainability in coastal areas: a conceptual interpretation of SDG 14', challenges facing coastal zones and coastal sustainability were identified.

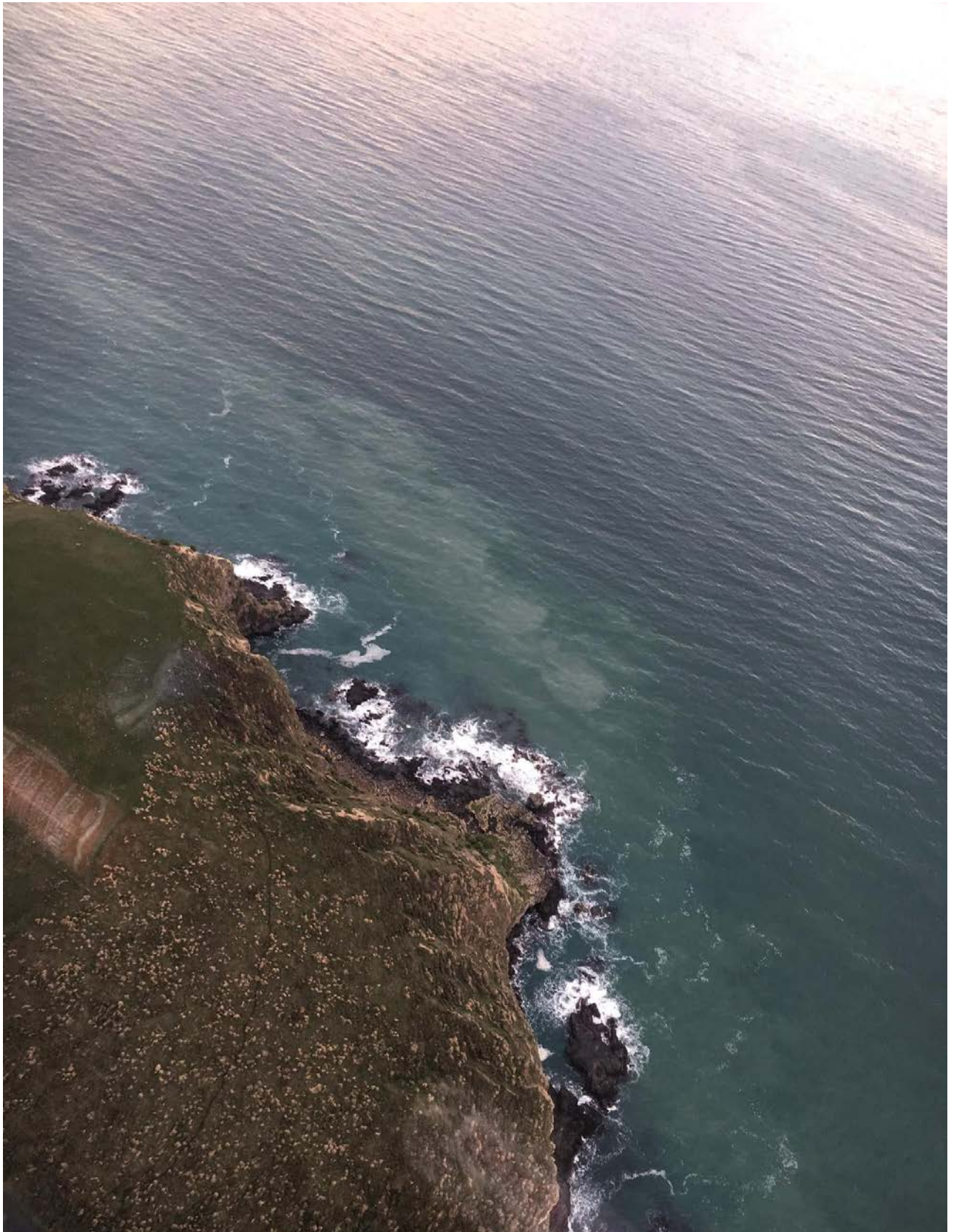
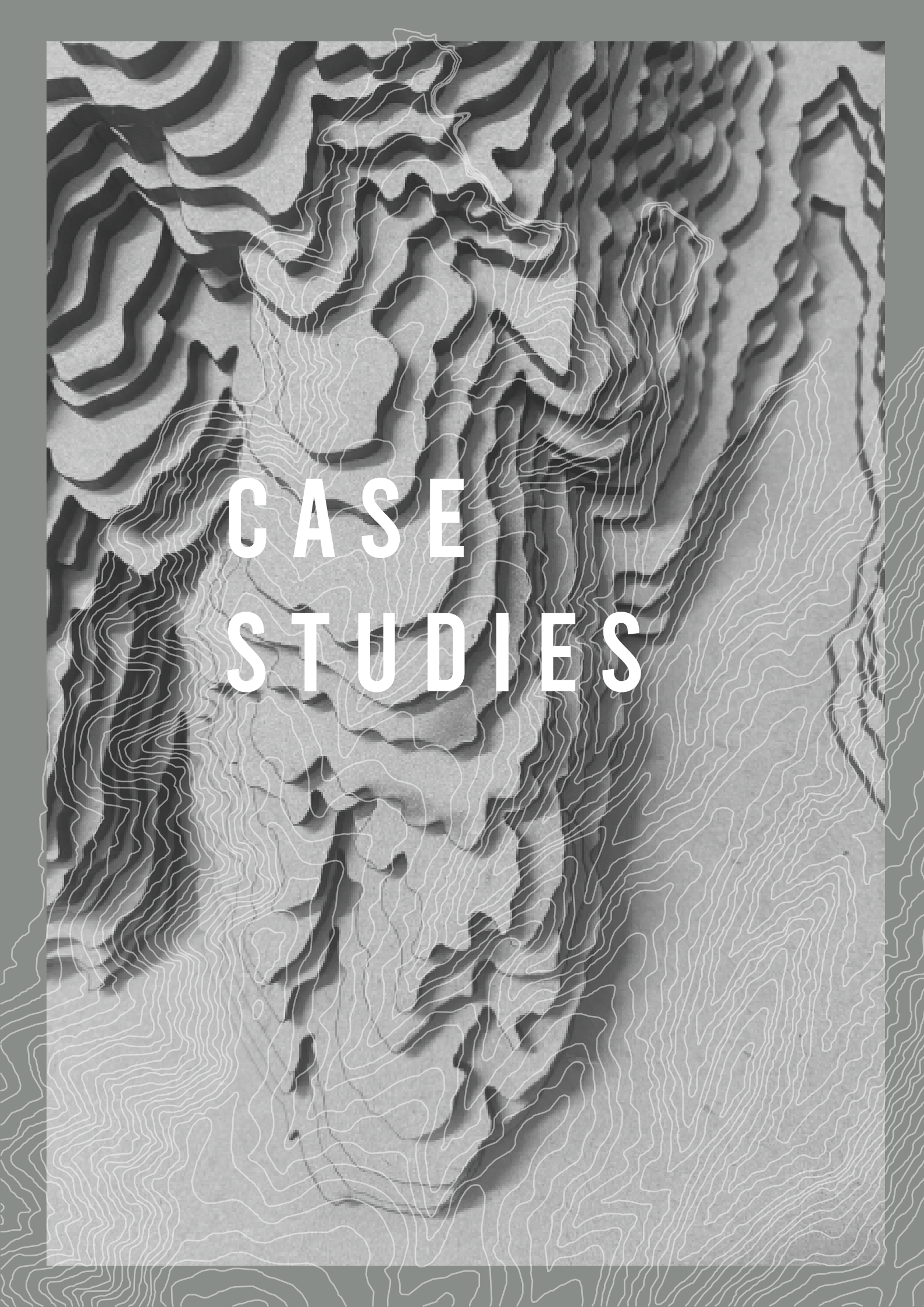


Fig. 1 . 311: Banks Peninsula
Rocky Coastal Edge
(Authors Own Photo)

The background of the image is a complex, monochromatic design. It features a series of white, irregular contour lines that resemble a topographic map, set against a dark gray background. These lines are layered to create a three-dimensional, relief-like effect, with some areas appearing to rise above others. The overall composition is abstract and textured, with the lines flowing across the frame in various directions, creating a sense of depth and movement.

CASE STUDIES

CHAPTER

CROXATTO CHILE CABINS

HUT ON SLEDS

PUREPODS

PATTERSON ARCHITECTS

TIMMS BACH

LOW IMPACT COASTAL DESIGNS

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Figure 1. 32: La Loica
(Palma, 2021).

This case study was chosen due to the similar contours that it has to Menzies Bay and the sympathetic use of materials. The dwelling acts as a sculptural gesture to the landscape which has created inhabitation to the coastline which is a driving factor of this research.

Figure 1. 33: La Loica
(Palma, 2021).

In order to sympathise with the surrounding coastal environment, it is important to design low-impact and sustainably. Sustainable design seeks to reduce the negative impacts on the environment, and the health and comfort of building occupants which is therefore able to improve building performance. The basic principles of sustainable and low-impact designs are to reduce consumption of non-renewable resources, minimise waste, and create healthy, productive environments. This is able to protect the surrounding environment and therefore the ecosystem at large.

CASE STUDY: CROXATTO AND OPAZO ARCHITECTS COASTAL HILLSIDE CABINS, CHILE.

Located overlooking the Pacific Ocean in Navidad, Chile, are two minimalist cabins designed by Croxatto and Opa-
zo Architects. Successfully blending in with its surrounding coastal landscape, the cabins are slender and compose of vertically stacked rooms. One of the main principles that it uses to become sustainable and low-impact is its materiality. The exterior is clad in timber which is manufactured from reclaimed oak sleepers and treated with petroleum oils to provide a barrier against the marine

corrosion. The interior is lined with recycled wood which not only fits well with its environment but acts as thermal insulation. The cabin consists of an open-plan living/dining/ cooking space on the ground floor with a lofted sleeping space above. This plan makes the most of the surrounding views and to protect the interiors from the weather. (Carlson, 2021).

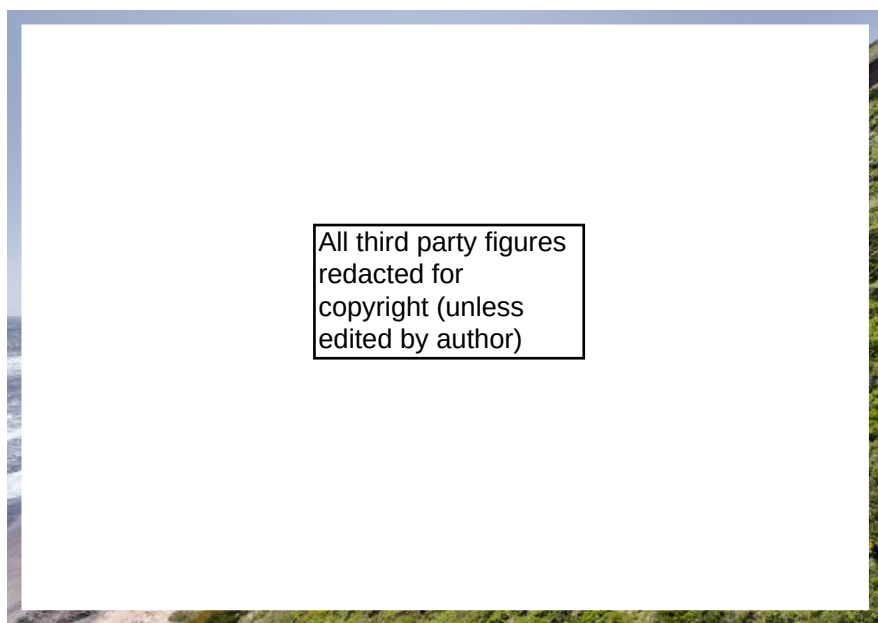


Figure 1. 34 : Coastal Hillside cabins (Palma, 2021).

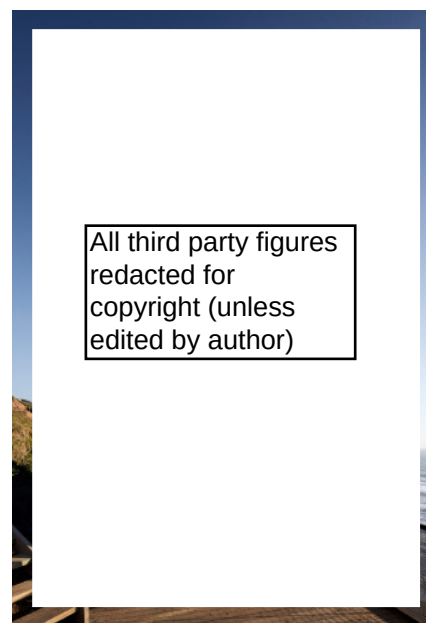


Figure 1. 35: La Loica (Palma, 2021).

This approach is relevant to this research with its low-impact approach upon a coastal environment. Acting as a 'holiday home' in Chile, it is able to create more of an access to the coastline and does not appear to be intruding the environment in any way. It is able to successfully sympathise with the coast with its use of materiality and able to minimise waste.

ESCAPE: Remote, low-impact, efficient.

'When building in densely wooded areas, steep inclines or places that are remote from major transport hubs, architects and clients need to make choices, including how much disruption they want to inflict on the landscape, not only by installing a functional house in the area, with all of its waste, energy and access requirements, but also how the building work will affect the environment. Having a minimal environmental impact with a maximum aesthetic value helps to point to the idea that being in nature doesn't have to mean dominating it'.

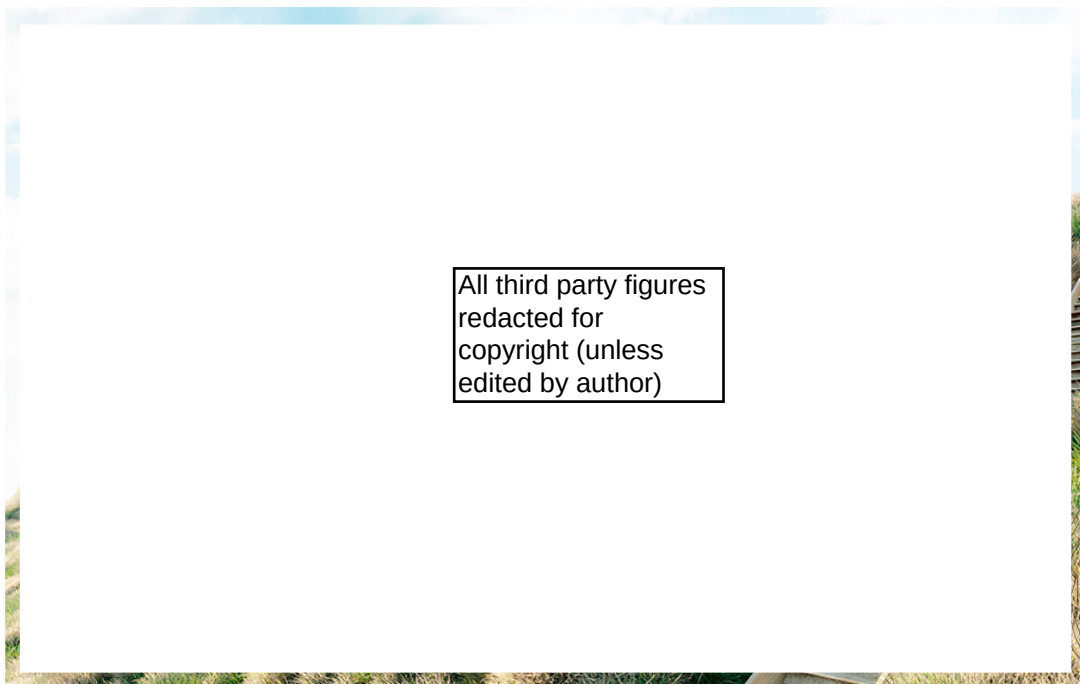


Figure 1.36 : Project renders of Casa La Garza, similar coastal cabins.

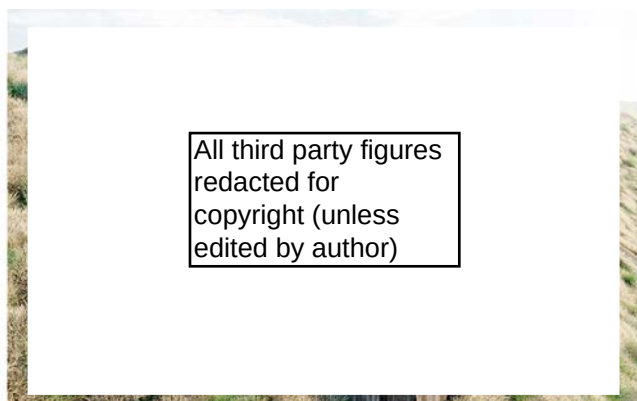


Figure 1.37 : Project renders of Casa La Garza, similar coastal cabins.

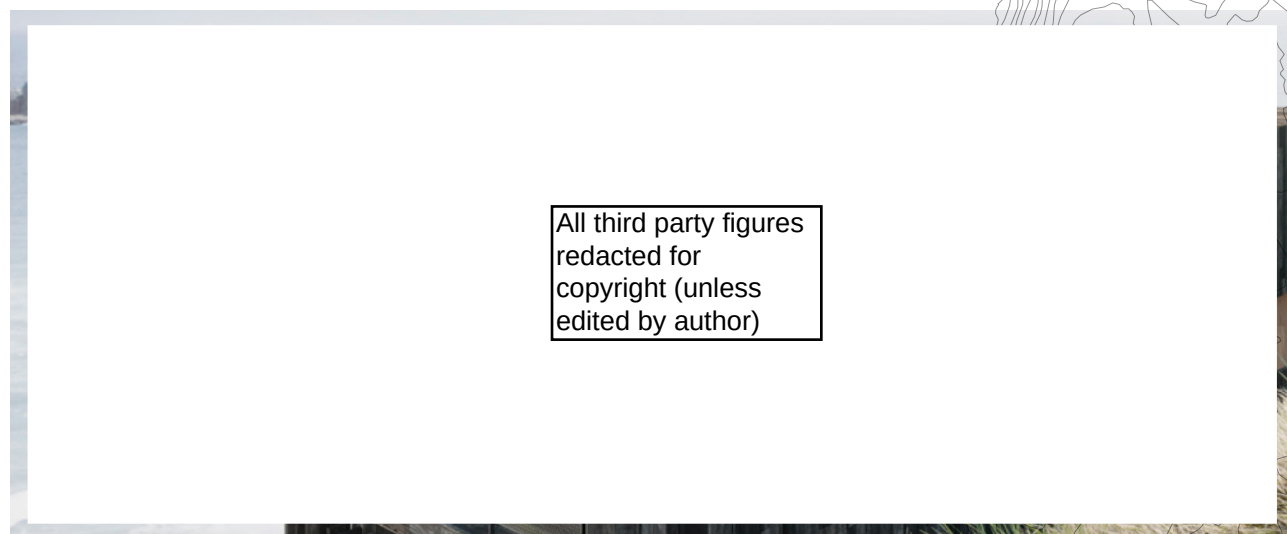


Figure 1.38 : Project renders of Casa La Garza, similar coastal cabins.

This currently unbuilt project sits on a steep site like La Loica, which is adjoined to the sea. The bedroom has two views; one towards the great hill that is to the South, and towards the Great Rock towards the North. The exterior is entirely clad in recycled sleepers which responds to the need for an element that manages to resist marine corrosion in the long-term, and providing a rustic image that blends with the landscape, still able to make the landscape a hero rather than the dwelling itself.

Like the previous precedent, this is a bigger cabin-like dwelling which forms a strong relationship with the sea. The interior is able to integrate with the exterior due to the doors opening wide out towards the ocean views. This terrace is strategically located and is able to be used for protection and shelter against the wind.

CASE STUDY: HUT ON SLEDS BY
CROSSON CLARKE ARCHITECTS,
COROMANDEL PENINSULA.

Located on a beach of the Coromandel Peninsula of New Zealand, the 'Hut on Sleds' is a structure that is able to be moved back inland or across the beach. Known as a 'holiday retreat', the dwelling is designed to fully close up against the elements when it isn't in use. The clients sought to explore the real essence of holiday living; small, simple and functional. Much like the previous case study, it is slender and vertically stacked with an open-plan. The use of timber within the cladding, structure,

lining and joinery and the manually operated mechanism. It is able to function as a self-sustaining organism with rain-catchment tanks, a worm tank waste system and grey-water tanks.

Principles from traditional baches or holiday homes in New Zealand have been used upon this hut such as the use of 'flat sheet' used as clad at the rare of the dwelling which is a cheap building material. (Crosson).

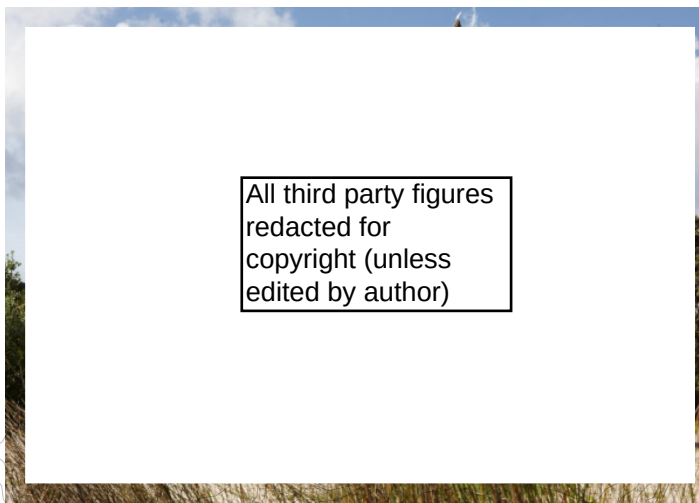


Figure 1. 39: Hut on Sleds
Exterior (Meiring, 2012).

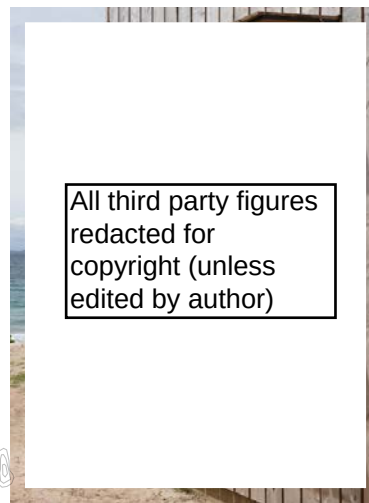


Figure 1. 40: Hut on Sleds
Windows (Meiring, 2012).

This precedent is located within the book 'Superlight' written by Phyllis Richardson which contains houses that 'touch the Earthlightly'. This idea originally came from Australian architect Glenn Murcutt who used conscientious building materials to reconsider the impact of built structures on the natural landscape.

Today, in the wider built environment the definition of lightweight can be expanded from referring to a structure that is lightweight both in terms of the required foundation and its mobility, how well it is constructed and how efficiently it uses resources and generates its own energy. This can be the definition of 'lightness' that the book revolves around. The different chapters in the book comprise of: Floating, Low-energy, Urban light, escape, and extreme.

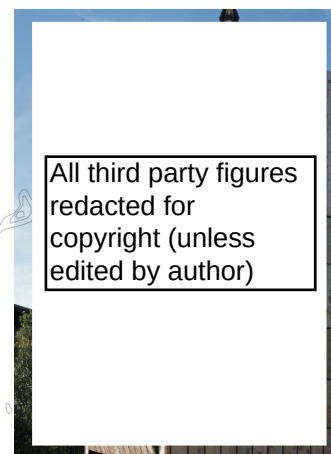
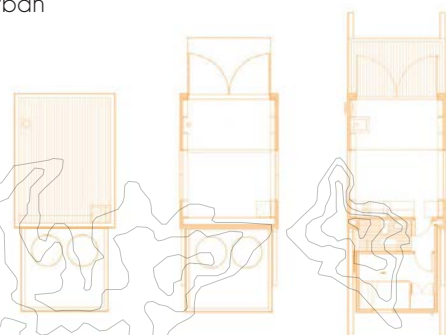


Figure 1. 41: Hut on Sleds
Windows (Meiring, 2012).



CASE STUDY: PUREPODS, NEW ZEALAND.

'PurePods' are known to be luxury eco-cabins, 'designed from the foundations up for environmental sustainability and minimalist luxury'. Located on private and remote land surrounded by nature, the small dwelling contains heavy duty glass so you are able to see everything, solar power, and bio-fuel capable heaters and therefore has a minimal carbon footprint. These pods are located in secret locations around New Zealand, such as Port Levy in Banks Peninsula.

Off the grid and in a unique location, the dwelling a low maintenance sewerage system. As the pods are mainly powered by sunlight, due to being mainly a glass form. It is totally immersed in nature, and is shut off completely by the outside world. The concept of PurePods was in response to the question of 'How can we get as close to pure New Zealand as possible?'. Rainwater is directed to the plants growing beneath the pod.

Figure 1. 42 : Port Levy
Purepods

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Even though this is a singular dwelling rather than a development of dwellings, the sustainable based design acts as a precedent with its connection to nature and its sustainable systems such as the rain water collection and solar panels.

This precedent sits lightly on the landscape with its sustainable features which can be incorporated within this research design process.

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Figure 1. 43 : Port Levy
Purepods

HOUSES OF AOTEAROA - PATTERSON ASSOCIATES ARCHITECTS

'Timeless, emotive architecture is about understanding the history, the culture, and the landscape of a particular place and incorporating all of it into a new end product'.

Patterson describes that land is a dominant factor in Polynesian cultures. For Māori, land is sacred and the physical landscape commands a respect bordering on worship. Patterson reflects this perspective in his work... 'The landscape of NZ envelopes us. It invites us to nestle in its folds, to be enveloped in the bosom of her majesty.'

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'Seascape' is a beachside retreat set into a rock escarpment built using all local materials and is constructed from basalt rock quarried near its site with in-situ poured concrete floors and an earth turfed roof. It is self-sustainable in respect to on-site water harvesting and wastewater treatment.

Located in the bay across from Menzies Bay, this is a precedent towards my research which shows resilience with its landscape.

Figure 1.44 : Seascape
(Devitt, 2018)

'Residential architecture is an extension of our physical presence; it is what links us to our environment'. - Patterson, p.72.

Patterson's book is separated into four different sections; 'The opportunity of New Zealand', 'Belonging', 'Thinking in patterns', and 'The search for beauty'.

Without the feeling of 'belonging', we can experience disconnection, confusion, and loneliness. When we do have the feeling of belonging; we feel connected, present, and have clarity. If a design feels like it belongs naturally to a place, to the world, to our time and culture, then it follows that the people who live there will feel a sense of belonging and connection too. Architecture is about manipulating a landscape or cityscape to create environments for people.

Judeo-Christian ideas have dominated Western architecture. The evolution of structures is thought of as man-made rather than as something that is natural. Over time, our human histories and relationships with the environment have changed, changing also the way we respond to our surroundings, how we assess them and how we design them.

The issue is, is that contemporary environments can threaten ecological and human connections.

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Figure 1.45: Scrubby Bay House (Devitt, 2018)

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Figure 1.46: Scrubby Bay House (Devitt, 2018).

Pattern and memory play a key part in polynesian storytelling and passing knowledge on throughout generations. In Maori architecture, the wharenui (meeting house), is a pattern of the people who use the building. Its form and structure resemble a body, arms stretched out ready to embrace; the face and spine of the founding ancestor is at the ridge, while rafters as the ribs are supported by carved panels representing ancestors of the people the building has been designed for. The building is a pattern or model for life and relationships. Rather than in western

architectural concept where the focus is on space, light and materials, in the Maori way of thinking, form follows whanau.

Many ancient spiritual practices have held that the higher your level of consciousness, the greater level of beauty you can perceive.

What makes an environment a beautiful place? Why does that environment give us a sense of belonging? What is the influence that it has on us and what is the attraction? Urban design theory suggests that attraction is in a buildings relationship with its urban environment, the space around the building rather than the building itself making for successful design.

TIMMS BACH HERBST ARCHITECTS

Located in the remote location of Great Barrier Island, this is a home which emphasises the informal character of the traditional kiwi Bach. It forms an approach to holiday living, and with a sustainable approach.

Creating privacy and a sense of seclusion from neighbouring dwellings was a challenge for Herbst so that occupants are able to experience the typical kiwi bach lifestyle of seclusion.

'Semi-outside' spaces were designed which is used to move between different areas of the house.

It is powered by a photovoltaic system, and rainwater is collected from the roof which is filtered and then put through an on-site sewage treatment system.

Sat amongst a series of similar sites, this home can relate to this research due to its proximity to the coast, its sustainable features, and the privacy and seclusion it incorporates from neighbouring houses to emphasise the kiwi holiday and coastal approach.

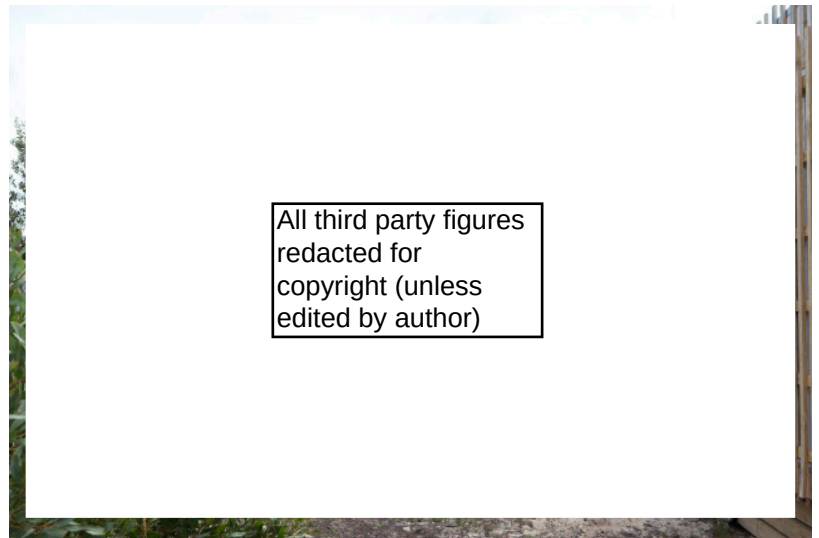


Figure 1. 47: Timms Bach,
(Meiring, 2010).

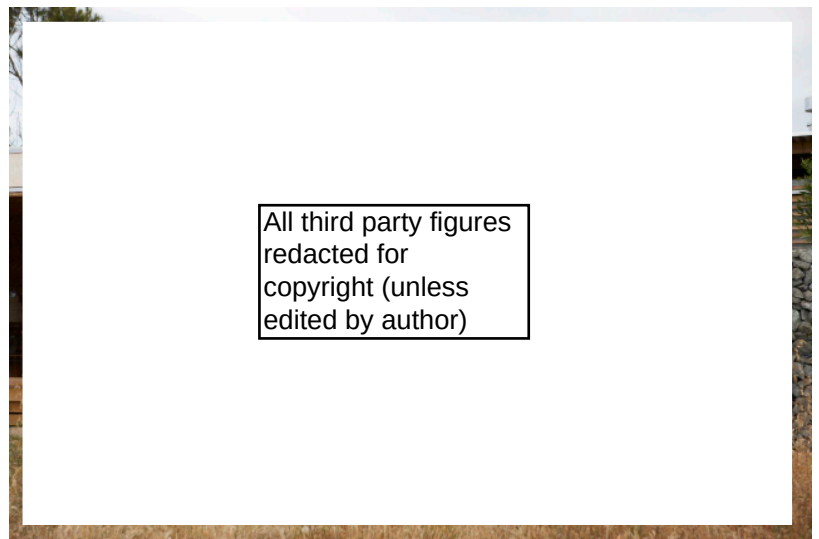


Figure 1. 48: Timms Bach,
(Meiring, 2010).

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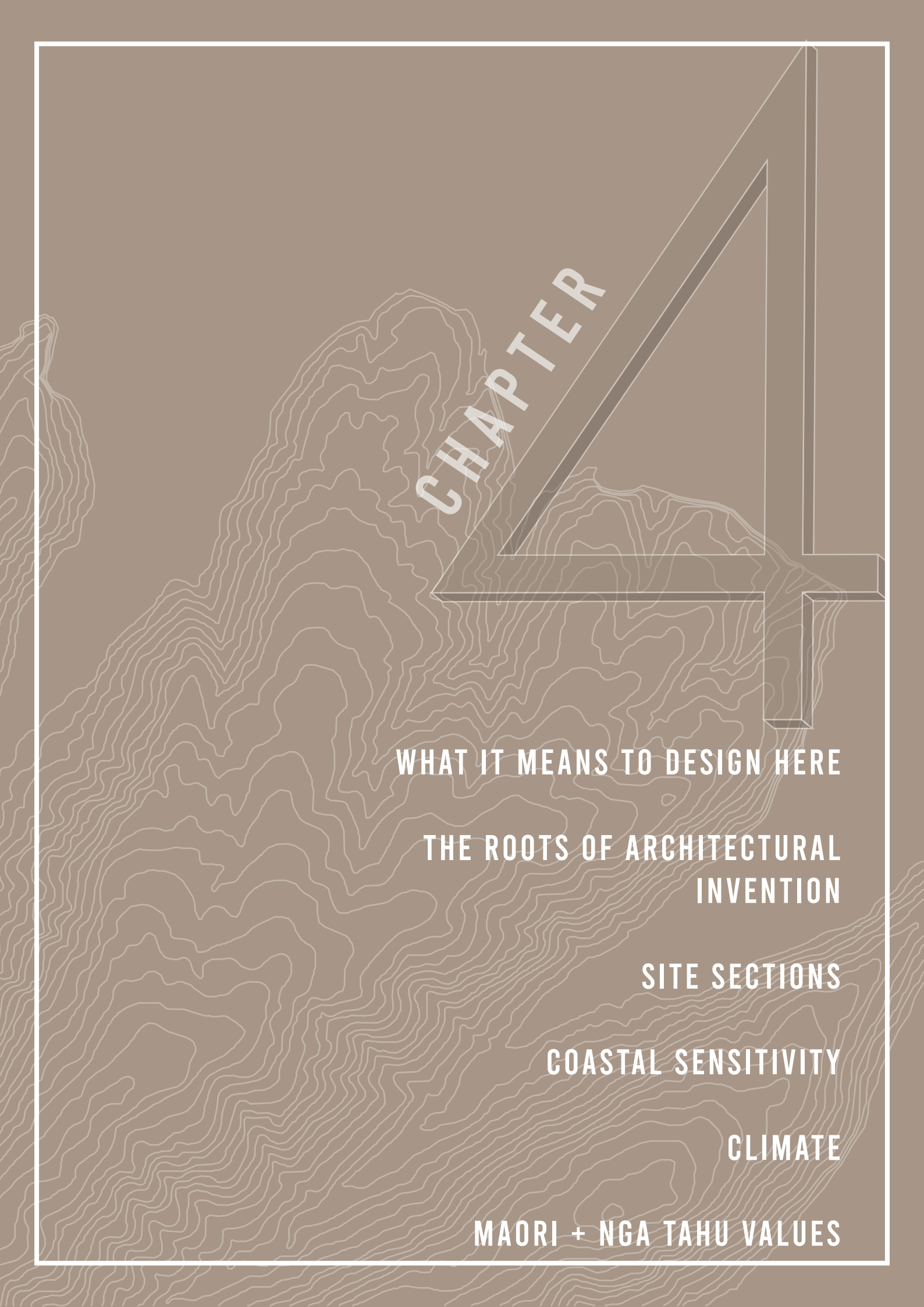
LONG SECTION INTO THE FIVE - 1100

1
151

Figure 1. 49: Timms Bach,
Long Section (Herbst,
2010).

A 3D topographical map with the text "THE SITE" overlaid. The map is rendered in a light gray color, showing a complex, undulating terrain with numerous ridges and valleys. The perspective is from a high angle, looking down at the landscape. The text "THE SITE" is written in a large, white, sans-serif font, centered horizontally and vertically. The background of the entire image is a solid, muted brown color. The map itself is a rectangular inset, with the brown background visible around its edges.

THE SITE

The background of the entire page is a topographic map with intricate contour lines. Overlaid on the right side of the map is a large, stylized number '4' formed by thick, dark lines. The word 'CHAPTER' is written in a bold, white, sans-serif font, oriented diagonally to follow the upper-left-to-lower-right slope of the '4'.

CHAPTER

WHAT IT MEANS TO DESIGN HERE

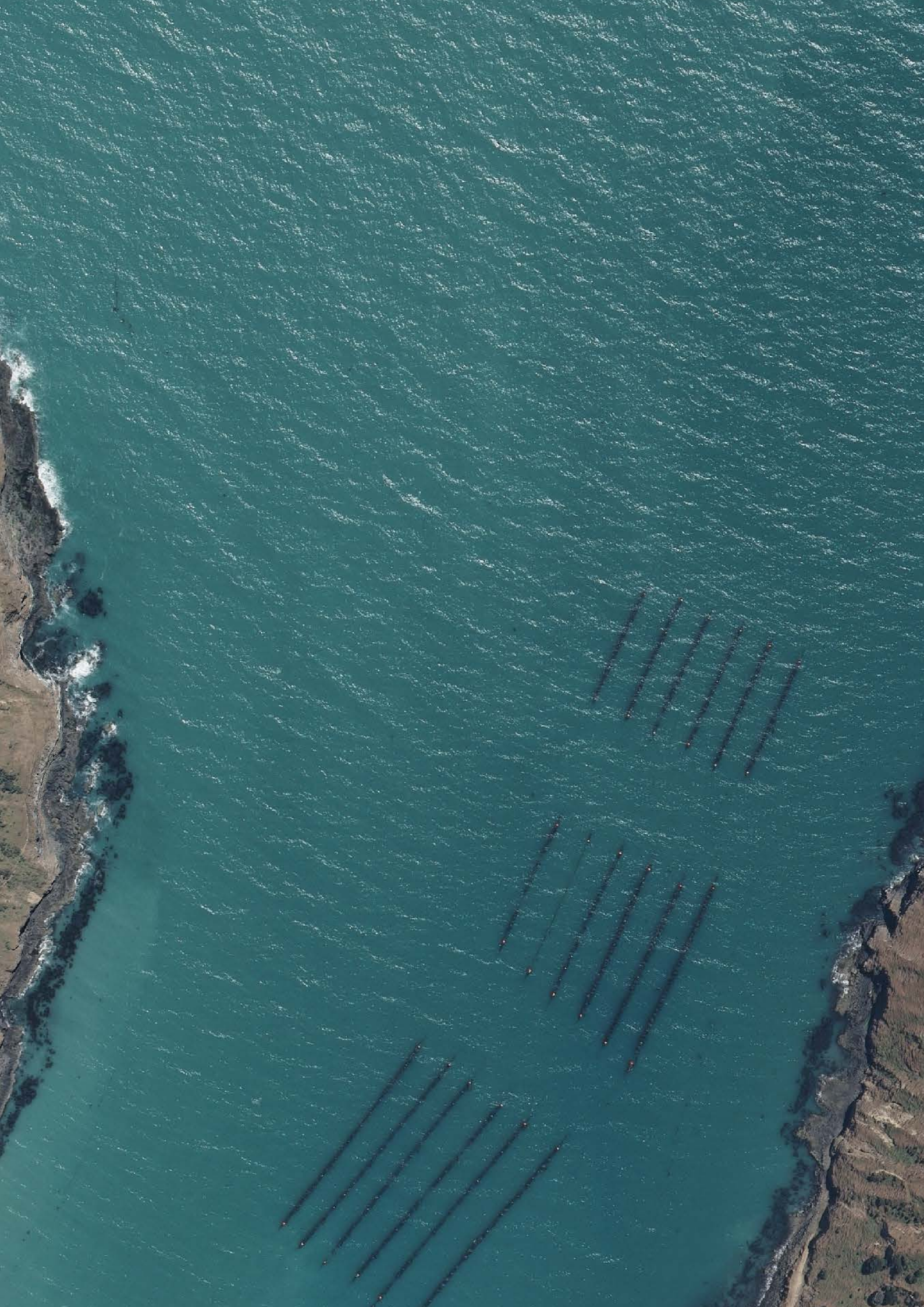
THE ROOTS OF ARCHITECTURAL
INVENTION

SITE SECTIONS

COASTAL SENSITIVITY

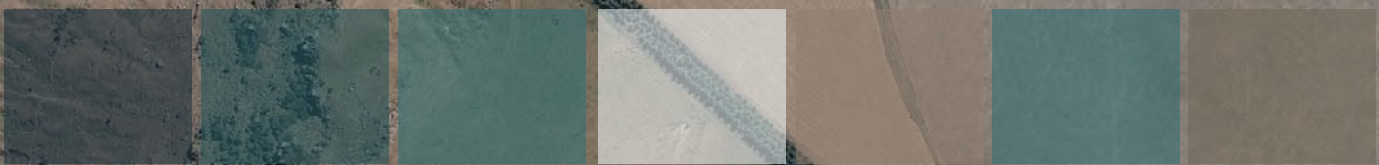
CLIMATE

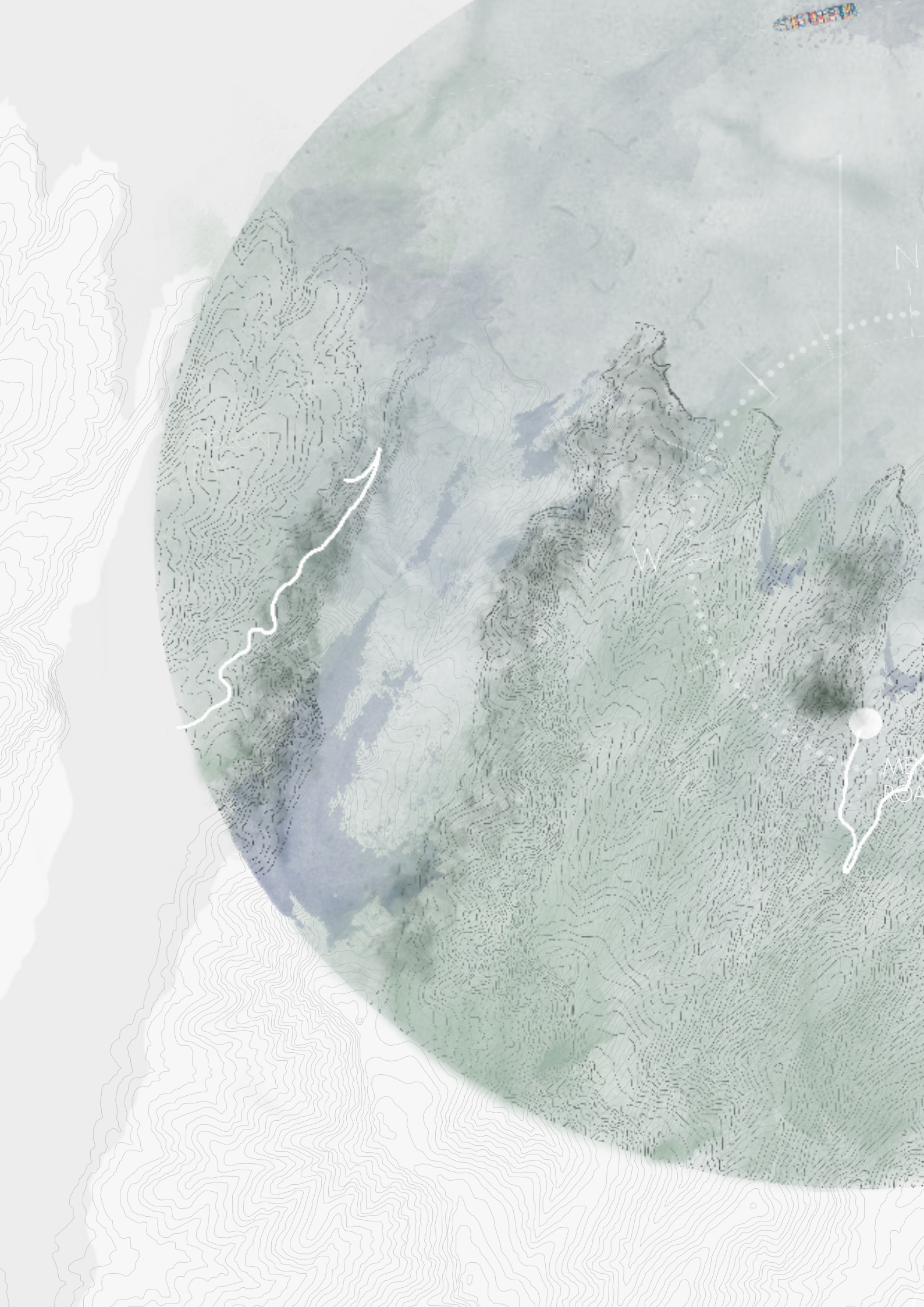
MAORI + NGA TAHU VALUES



THE SITE

PAST + PRESENT





WHAT DOES IT MEAN TO DESIGN HERE ?

Designing in a remote and little occupied location offers the potential to create freestanding, sustainable and serene design interventions with benefits to the environment and socio-economic culture of the region.

Menzies Bay is an hour and forty minute drive out of Christchurch. From Christchurch the road is followed toward Akaroa, turning onto the Summit Road at the Hilltop and then descending into Little Akaloa. Here, a road turns left to Decanter Bay and then Menzies Bay where the road descends. It is not easily accessed due to it being on the Northern side of Banks Peninsula.

Designing in Menzies Bay gives an opportunity to reconnect with nature and the coast by creating sustainable architecture which is able to sympathise with the surrounding environment.



MENZIES BAY
D
S

LITTLE
AKALOA

THE ROOTS OF ARCHITECTURAL INVENTION - SITE, ENCLOSURE, MATERIALS BY DAVID LEATHERBARROW

In his book, 'Roots of Architectural Invention', David Leatherbarrow argues that site, enclosure, and materials are fundamental elements in architectural design. It is sectioned out into different chapters which include theories which illuminate into the current importance of elements such as site, enclosure and materials.

The space:

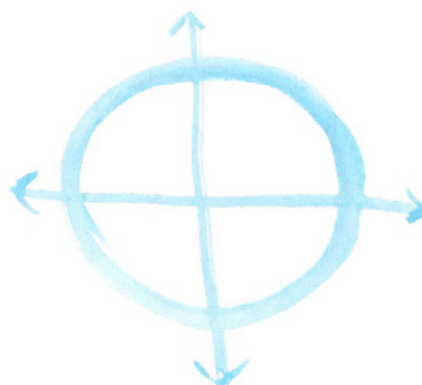
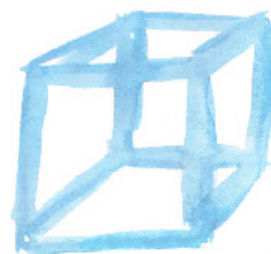
The site plan is able to propose the division of space. To consider space, as Isaac Newton once wrote, we must 'abstract from our senses, and consider things themselves, distinct from what are only sensible measures of them'.

The context:

Each site is defined by its surrounding physical context. The objects that surround any location are nowhere else, nothing is transferrable and nothing can be exchanged. Having a harmonious relationship between what is designed and what is given is achieved when the design "completes" the landscape. Harmony exists between a building and its topographical situation. Leatherbarrow argues that a site is an 'opening in a context'. The role of humans is not to pursue our own desires for the site but to let the conditions surrounding the site work their will upon it.

Material choice:

Solid materials are for structural purposes and lightweight or flimsy are for finishes. The task of structural materials is to ensure upright durability, not appearance.



The theories and discussions of these architectural elements within this book help with the idea of connection architecture towards its surrounding environment. As the site of Menzies Bay is isolated and currently an empty landscape, architectural elements have to be carefully considered in order for it to fit.

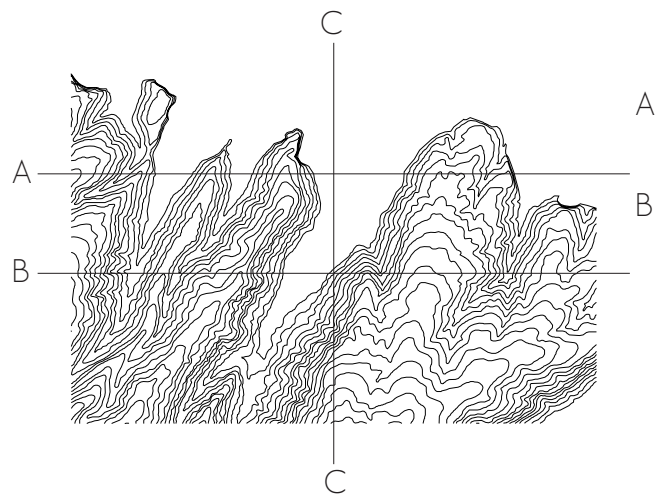


Figure 2.10: Section AA



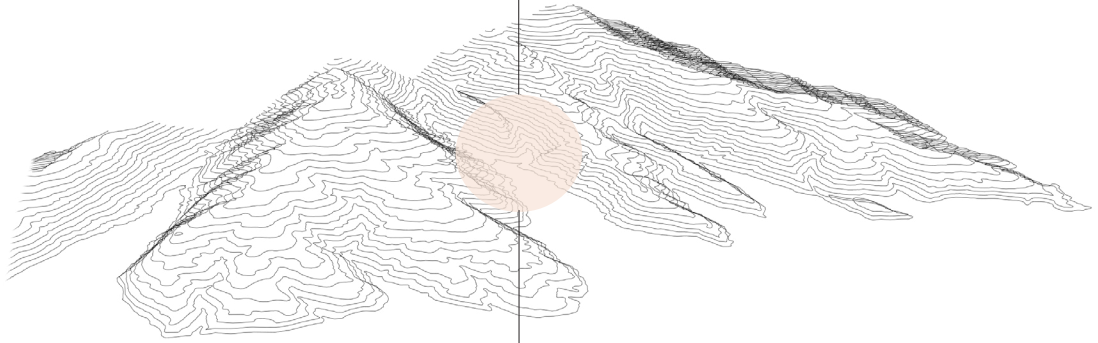
Figure 2.11: Section BB



Figure 2.12: Section CC



MENZIES BAY,
BANKS PENINSULA



COASTAL SENSITIVITY - THE 'RURAL ZONE'

Landscape or landform sensitivity can be defined as the ability of the landscape or landform to undergo a recognizable change in response to changes in external controlling variables (Brunsden and Thornes, 1979). Many coastal landscapes contain elements that are viewed as being both sensitive and insensitive to environmental change.

The coastal environment of Banks Peninsula is home to a range of landforms and landscapes which include those at either end of the sensitivity scale. The soft coastal landscapes of beaches, sand dunes, and mudflats represent fast-responding and mobile geomorphic systems that are highly sensitive to environmental change. The 'Rural Zone' covers most of the Peninsula, mostly the coastal environment.

Banks Peninsula first emerged as an island which thrust out of the sea by volcanic eruptions, roughly between 10 and 15 million years ago. The rocky outcrops which form some striking landscape features are a result of this volcanic activity. The erosive action of the sea and streams has shaped the land to form the pattern of valleys, coastal cliffs and indented bays that characterises the Peninsula today. Glacial action during the ice ages also contributed to the form of Banks Peninsula. Fine silt was produced which was carried by the prevailing north-westerly winds and deposited over this existing volcanic form. During the same time, rock eroded by the glaciers was carried by rivers and deposited at the coast. (CCC, 2011).



rocky bays. These landscape qualities have resulted from a variety of natural and human events and processes.

The main pressures on the landscape of Banks Peninsula today is the development of unsustainable dwellings which do not fit into the landscape. Settlement patterns vary in different parts of the peninsula; Lyttleton and Governors Bay are residential suburbs within commuting distance of Christchurch with a large portion of occupied dwellings. In contrast to this, Akaroa and Okains Bay have a large proportion of unoccupied dwellings which indicates a large number of holiday homes in these areas.

Important features of the landscape include the distinctive landforms of the area are resulting from the natural processes of volcanic activity, erosion and deposition, and the vegetative pattern of open grasslands. They help define the character of the Peninsula.

Buildings and structures located in these sensitive zones are relatively minor elements of the rural landscape. However, when they are located on prominent high points and ridgelines, they can visually detract from the existing landscape character which therefore has an affect on the landscape values. Policies are described to ensure that future development within this rural zone is carried out in a sustainable manner that respects the existing landscape character and amenity values which are highly valued by the community and visitors to the area. The density, siting and appearance of buildings and other structures shall be managed in a way that ensures the landscape character of the rural area is not compromised.

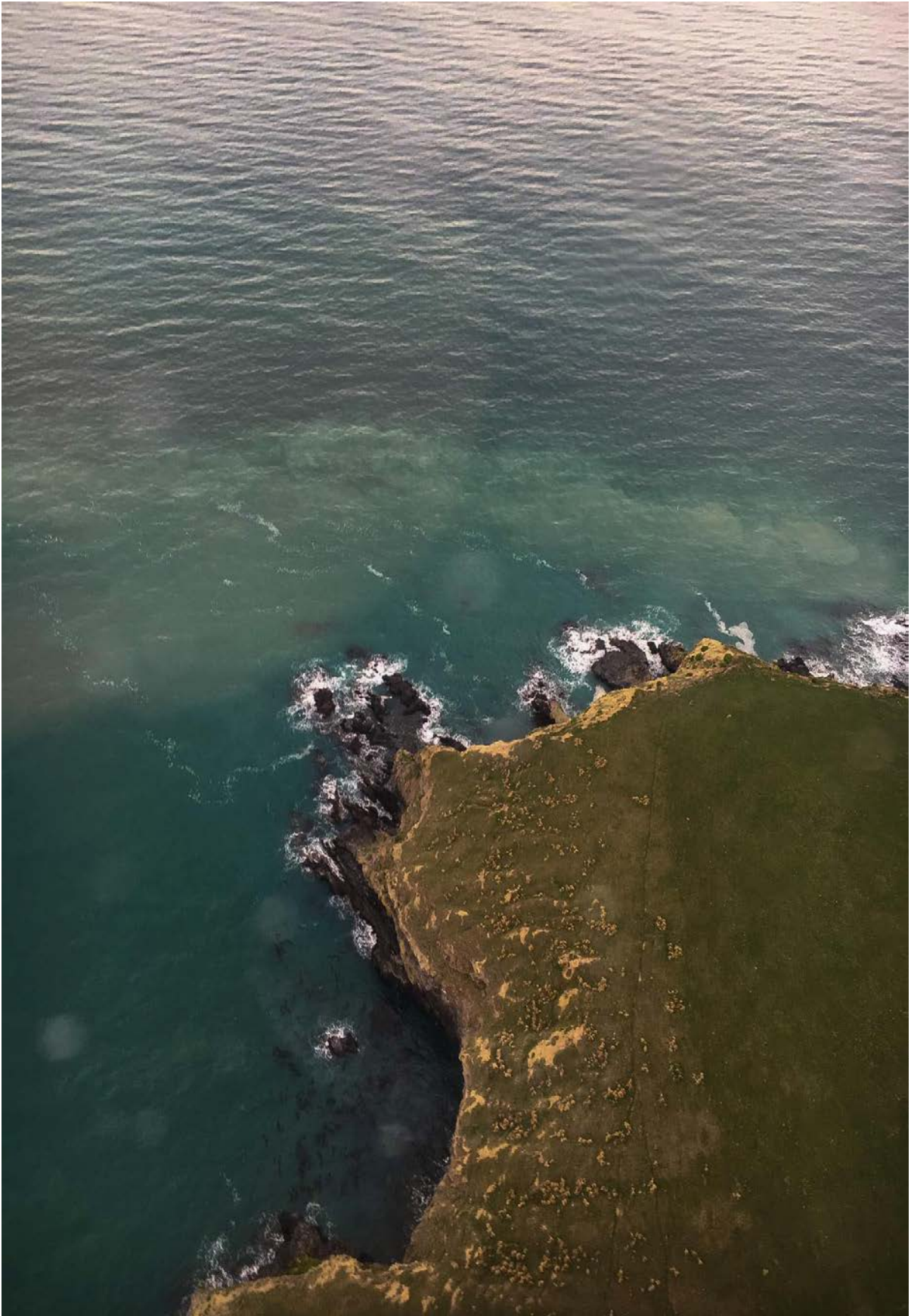
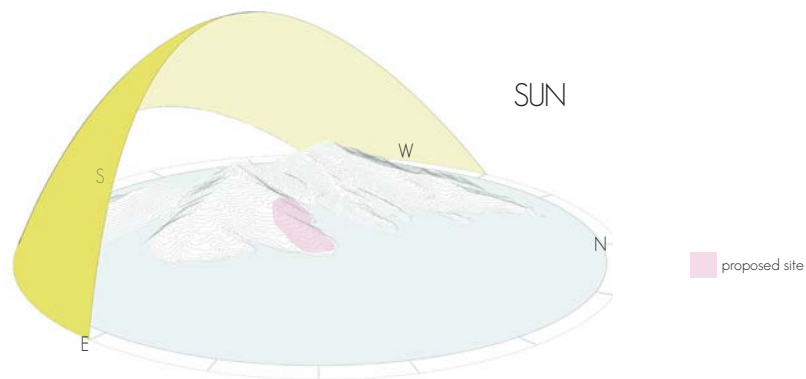


Fig. 2 . 121 : Banks Peninsula
Rocky Coastal Edge
(Authors Own Photo)

SITE CLIMATE

All aspects of the climate in Canterbury are dominated by the influence of the Southern Alps on the prevailing westerly airflows. The main divide of the Southern Alps acts as a barrier to the prevailing westerlies and therefore has an effect on the climate of Canterbury.



The proposed site would be able to receive the most sunlight around midday and during the afternoon.

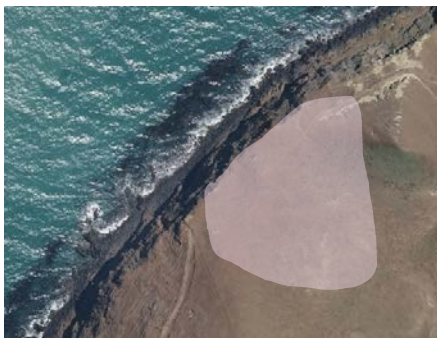
Figure 2.13: Sun Diagram



Low level North-easterly winds have been recognised as the dominant feature of the wind regime in Canterbury. Within Banks Peninsula, these would funnel down the valleys towards the sea.

Figure 2.14: Wind Diagram

Highlighted in Pink in the satellite images below are the different kinds of slopes located on the headland which will have dwellings designed.



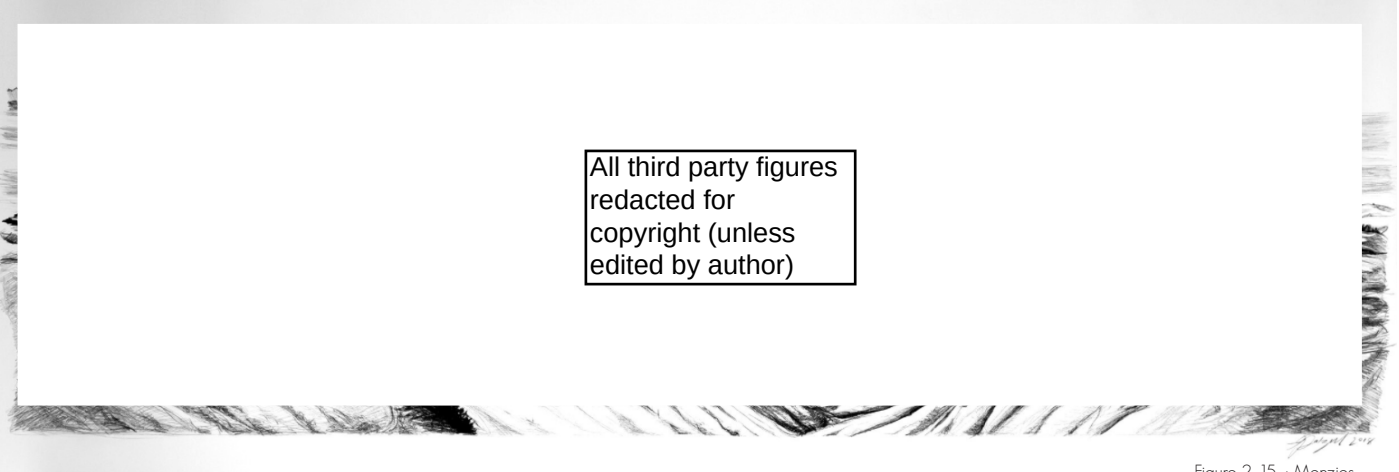
MAORI + NGAI TAHU

LANDSCAPE VALUES

‘THE PHYSICAL AND CHARACTERISTIC PRODUCTS OF THE INTERACTION BETWEEN HUMAN SOCIETIES AND CULTURE WITH THE NATURAL ENVIRONMENT. THEY CAN BE CONSIDERED TO BE SPATIAL AREAS WHERE PLACE SPECIFIC ELEMENTS AND PROCESSES REFLECT A PARTICULAR NATURAL AND CULTURAL HISTORY. THIS UNIQUE COMBINATION OF ATTRIBUTES MAY BE EXPRESSED VISUALLY OR IN TERMS OF MEANING AND SPIRITUALITY. BECAUSE THE UNDERLYING HUMAN AND NATURAL PROCESSES ARE SUBJECT TO CHANGE AND EVOLUTION, LANDSCAPES ARE DYNAMIC SYSTEMS’.

To Tangata Whenua, the landscape values of the Peninsula are distinct from a western perspective. The coastal terrain and harbour were 'abundant with kai moana (food from the sea) and seabirds which provided kai and feathers. Prominent formations would be used as landmarks of memory maps and places that have cultural significance (Wahi Tapu)'.

(Banks Peninsula Landscape Study, 2007).



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Figure 2.15 : Menzies
Bay (Dalzell, 2018)

In 1894, J. H Menzies began building the house 'Rehutai' at Menzies Bay which he designed around a large central hallway which was built to capture the spirit of a Māori meeting house. This hallway was decorated with kowhaiwhai patterns and Māori carvings, with a combination of Māori patterns and botanical reliefs of indigenous ferns. (Smith, 2018).

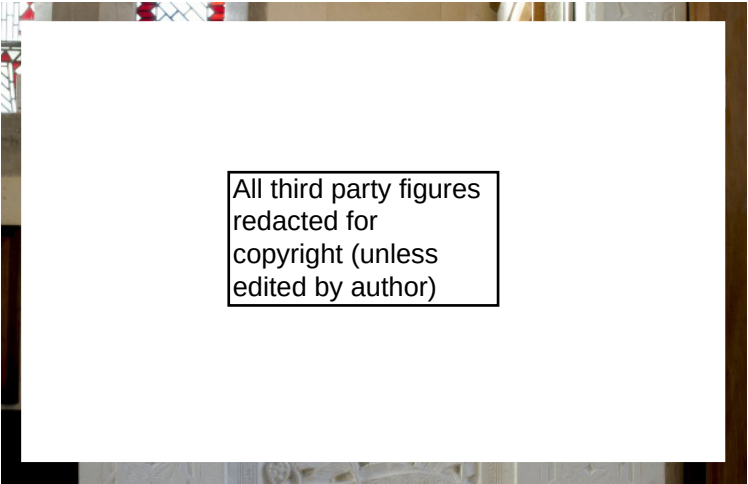


Figure 2 .16: The detail of the pulpit (Smith, 2016).

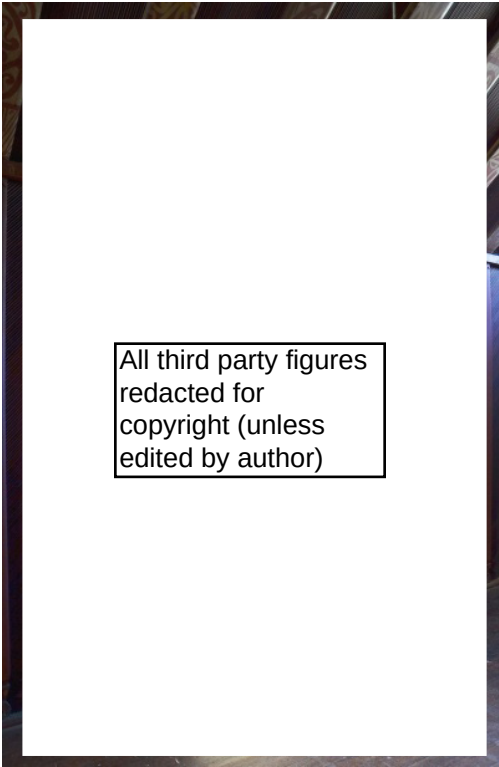
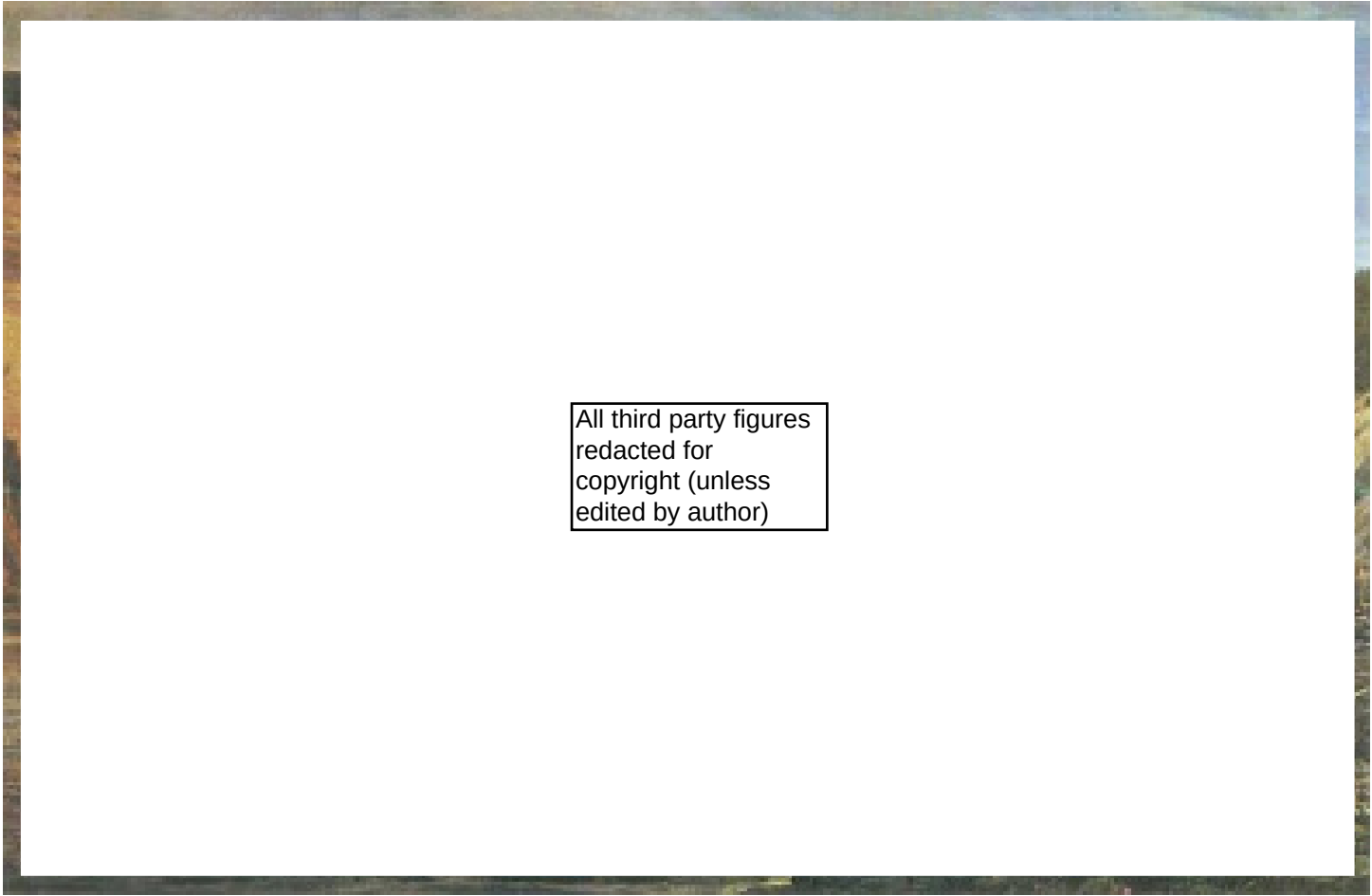


Figure 2 .17: Rehutai Hallway (Smith, 2016).

Rehutai is rated as a Category 1 building on the Heritage New Zealand list. Rehutai is wooden and the design represents an innovation in domestic architecture.



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Figure 2 . 18 : Kiri Kiri
Whare - a representation
of Menzies Bay. (Gibb,
1889).

Menzies Bay: The Ngāi Tahu Pā and village at Menzies Bay has been obliterated by farming activity, but some of the garden area remains intact. A painting by J. Gibb in 1889, reconstitutes the scene as described to him, and he has faithfully shown the valley and located the garden accurately on today's evidence.

In the early 1800s a Māori settlement with pa, hillside garden and a karaka tree groved nestled within the sheltered valley of Menzies Bay. A canoe landing channel had been cleared across the rock beach front. (Brailsford, 1997).

Today, the only surface evidence of occupation are the garden remnant, midden material and the canoe landing site. The garden lines are very impressive evidence of the determination of the Māori to succeed with agriculture in the cooler southern lands. Only the upper limits of the garden remain very clear and here the stone lines run up slopes of 20 degrees. Gibb reconstructs this scene in his 1889 painting (above).

CLIMATE CRISIS + INDIGENOUS WISDOM

Throughout history, indigenous communities have lived holistically with the natural environment, well accustomed to environmental change with generations of shared adaption and coping knowledge. This wisdom, which goes beyond the understanding of western scientific knowledge, is known to be all about the 'interconnectedness' of all things, with generations of collective knowledge of the land, sea, and sky. (Earthrise studio, 2021).

"In Te Ao Maori, there is tikanga around how people come together, how their people and visitors come onto the marae, with the inclusion of spaces for powhiri, mihi and whakatau. But Maori projects are essentially all about kaitiakitanga (guardianship) - it's values-led and sustainable architecture" (Tennent, 2019).

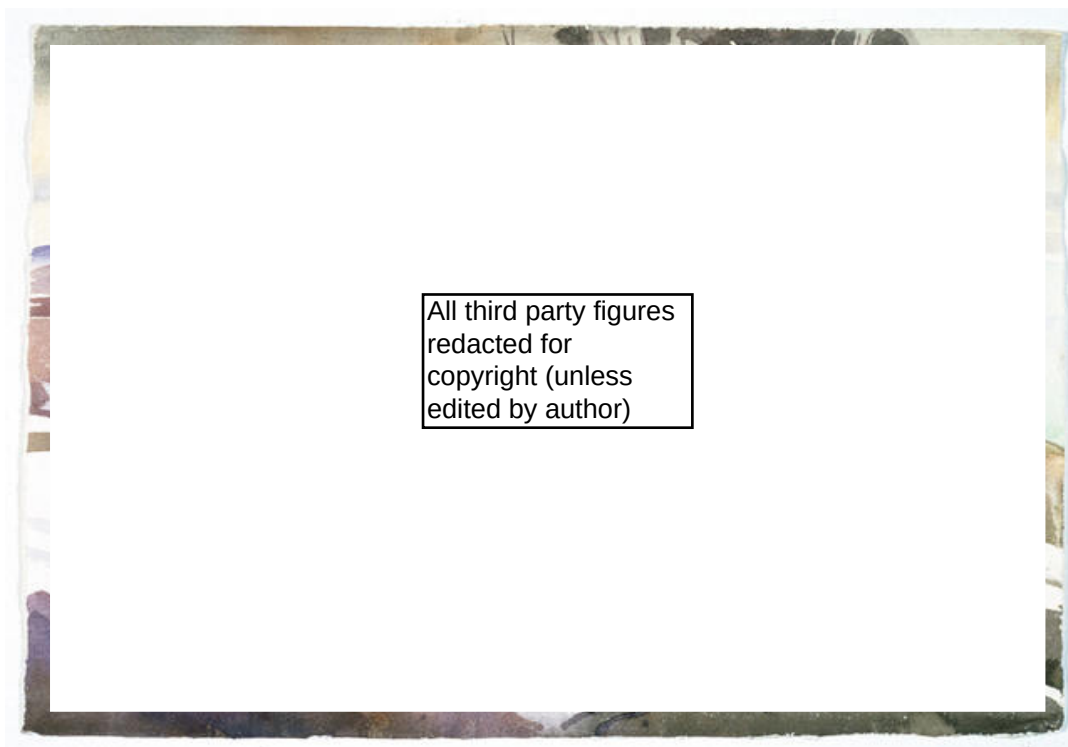
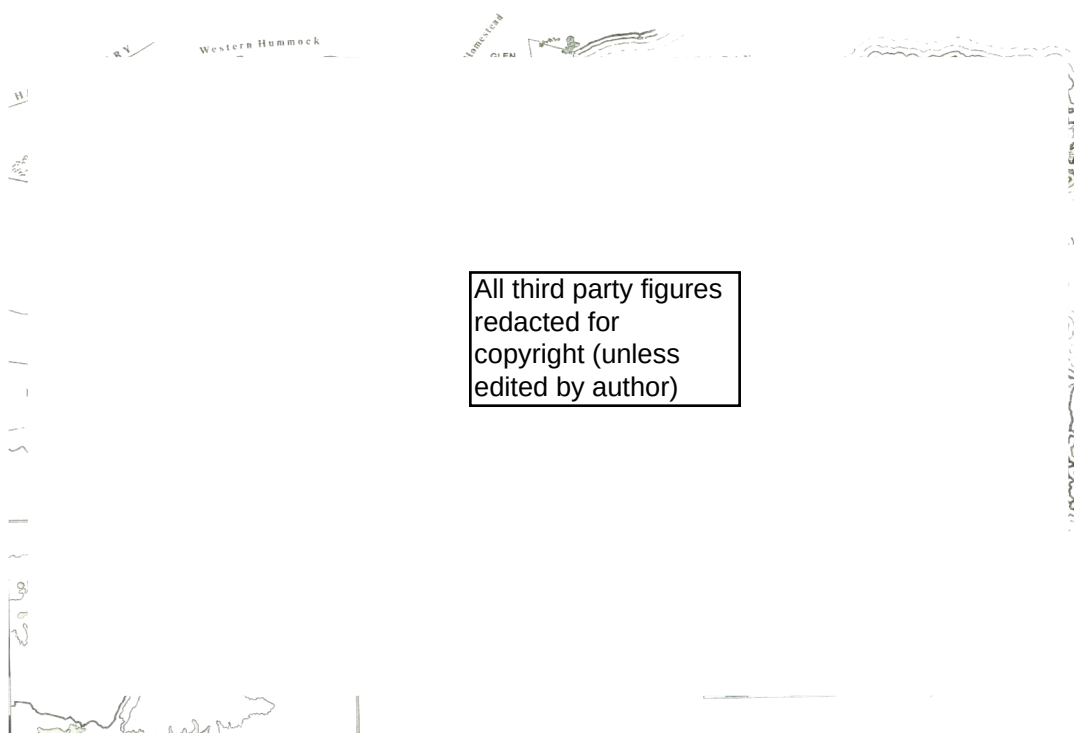


Figure 2.19 : Menzies Bay
(Bower, 1938).

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John Henry Menzies (1839-1919) purchased a farm in 1877 at Menzies Bay. Known as the Peninsula carver, his designs translated Maori art from the traditional objects he studies to new forms, giving an indigenous identity to everyday things. In 1894, Menzies began building the house 'Rehutai' at Menzies Bay (as seen in the photo above) which he designed around a large central hallway built to capture the spirit of a Maori meeting house. He was also known to carve furniture as decoration to the interior spaces. Rehutai was full of his works. (Christchurch City Libraries, CCL PhotoCD 12, IMG0047).

Figure 2. 20 : Menzies Bay (1895).



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Figure 2. 21 : Map of bay and hill to the East. (Menzies, 1970).

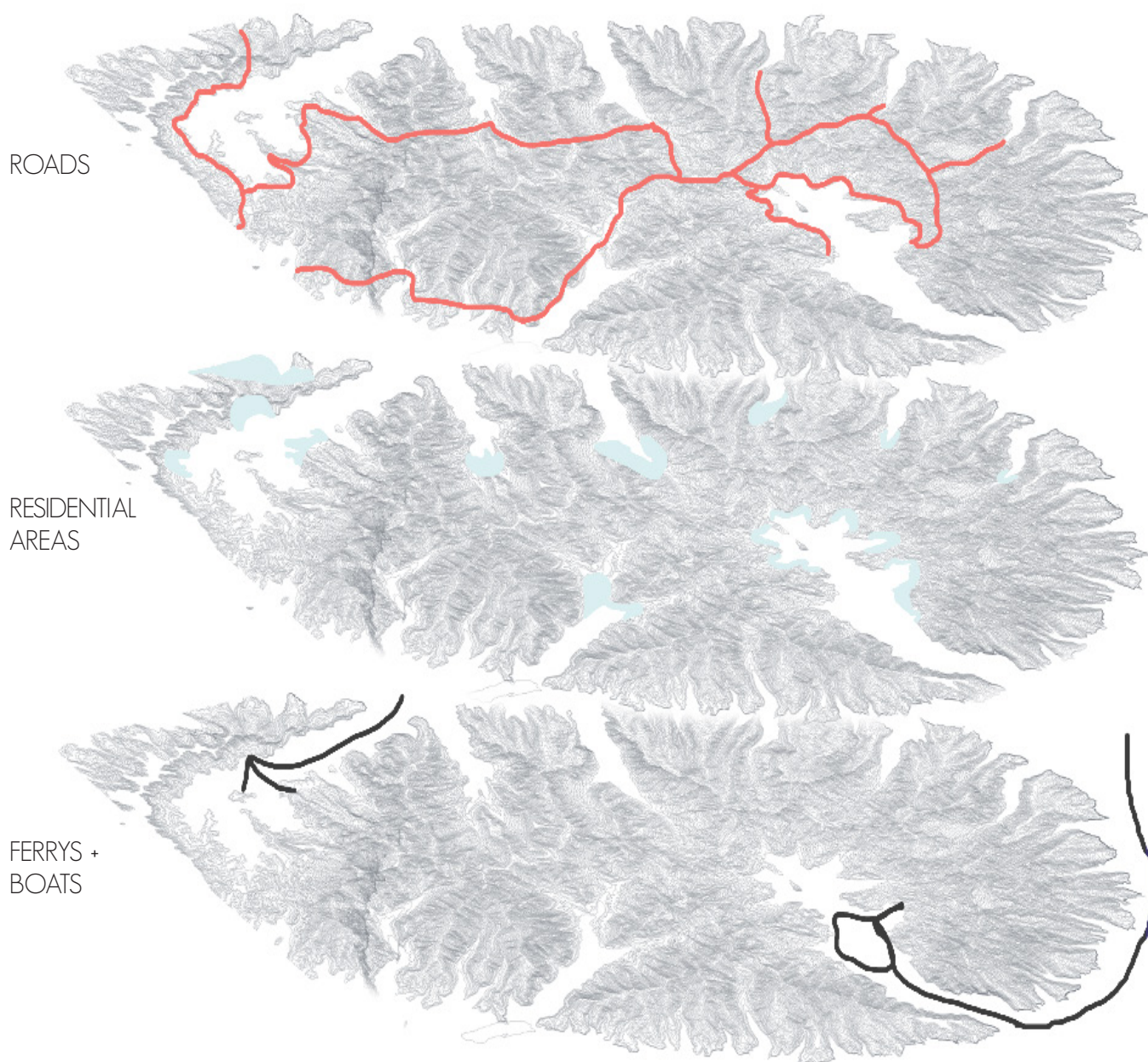


Figure 2. 22: Key areas of Banks Peninsula.

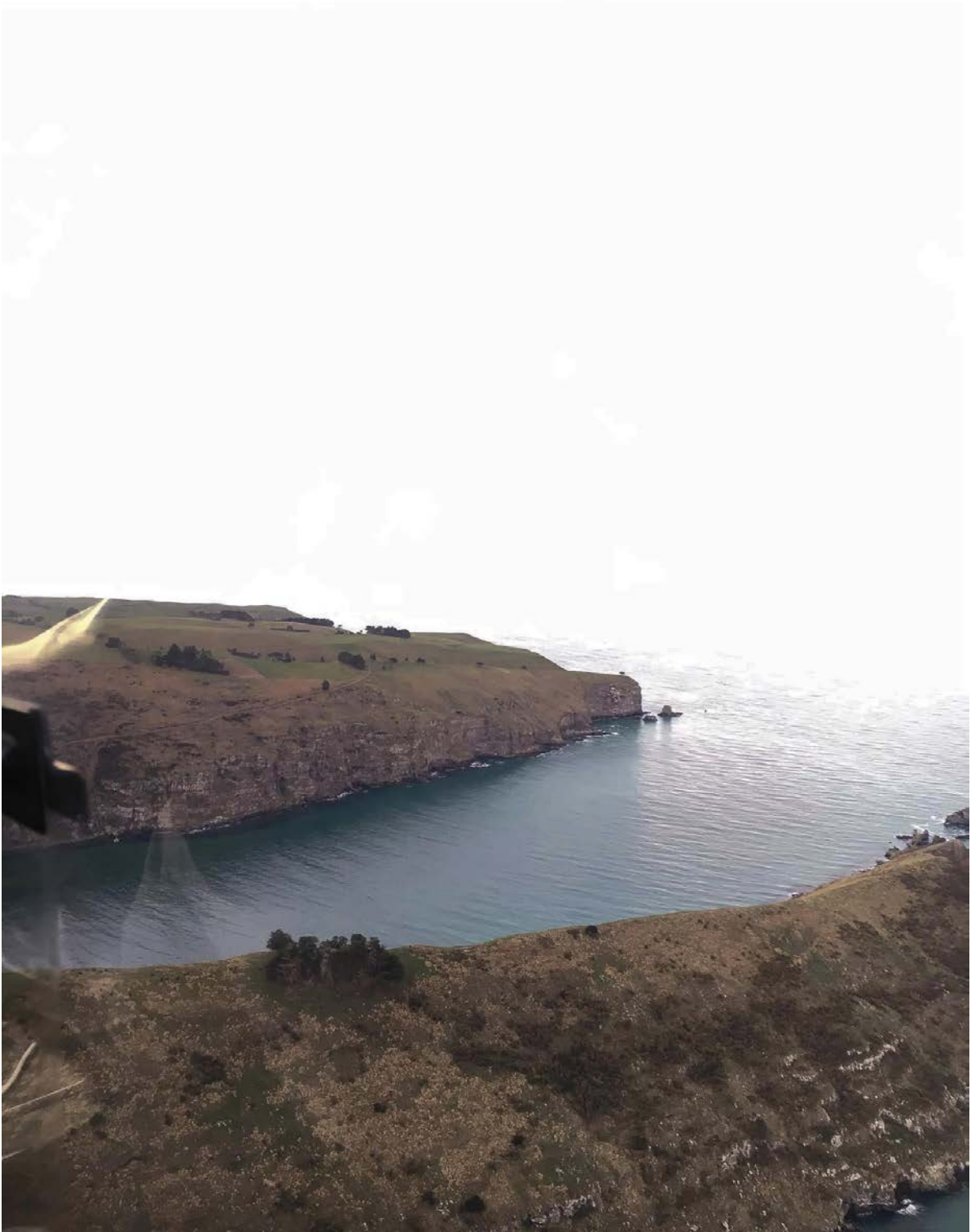
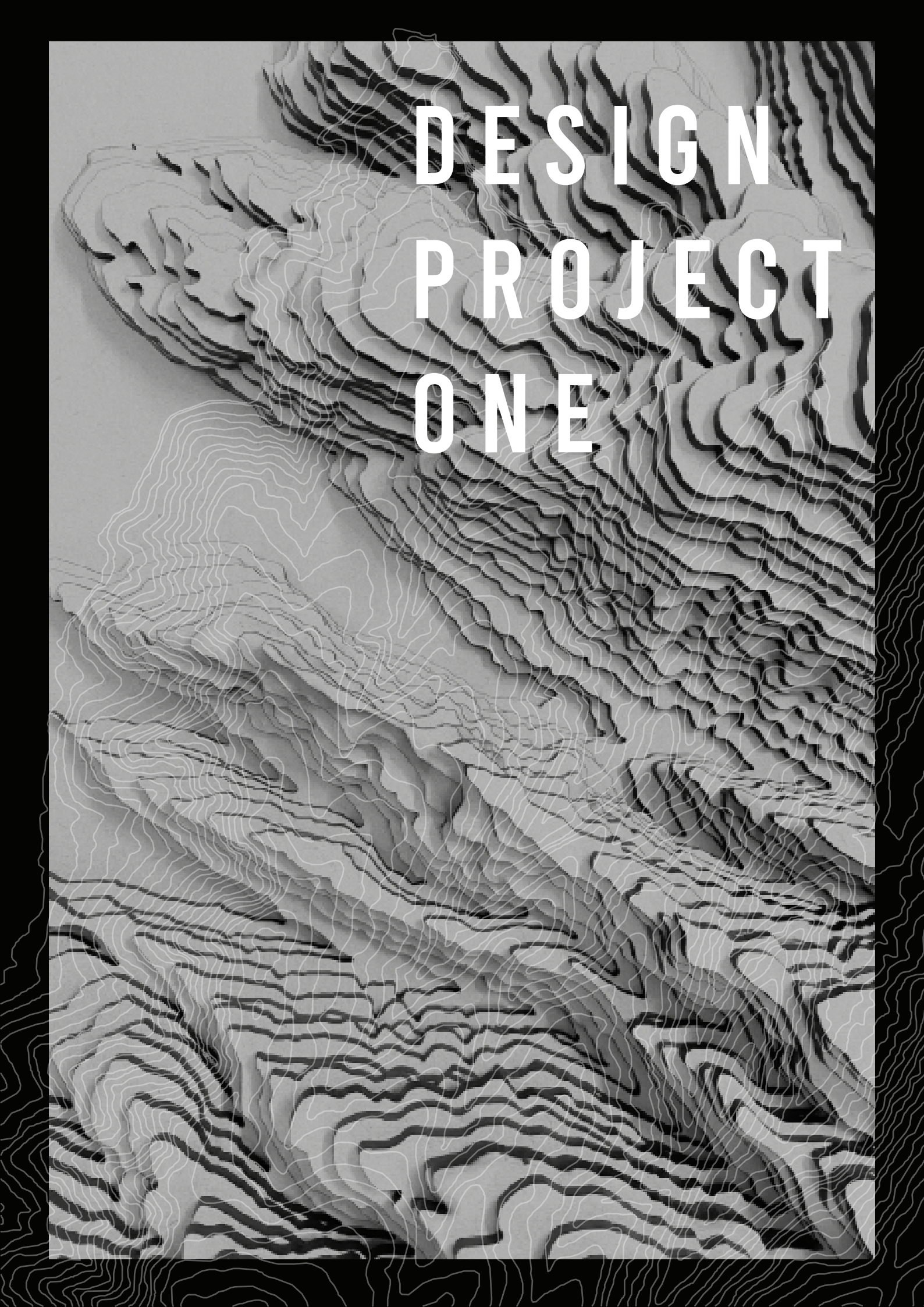


Fig. 2 . 23 Looking into Menzies Bay (Authors Own Photo)



DESIGN PROJECT ONE

The background of the page is a detailed topographic map with numerous contour lines. Overlaid on the right side of the map is a large, three-dimensional number '5' in a dark grey color. The word 'CHAPTER' is written in a white, sans-serif font, following the curve of the top of the number '5'.

CHAPTER

LOW IMPACT DESIGN STRATEGIES

SUPER-LIGHT

MURCUTT'S DESIGN STRATEGIES

INITIAL TYPOLOGIES

TPOLOGY ONE

TPOLOGY TWO

TPOLOGY THREE

INITIAL MASTERPLAN

OVERVIEW + REFLECTIONS

INITIAL SUSTAINABLE RESEARCH

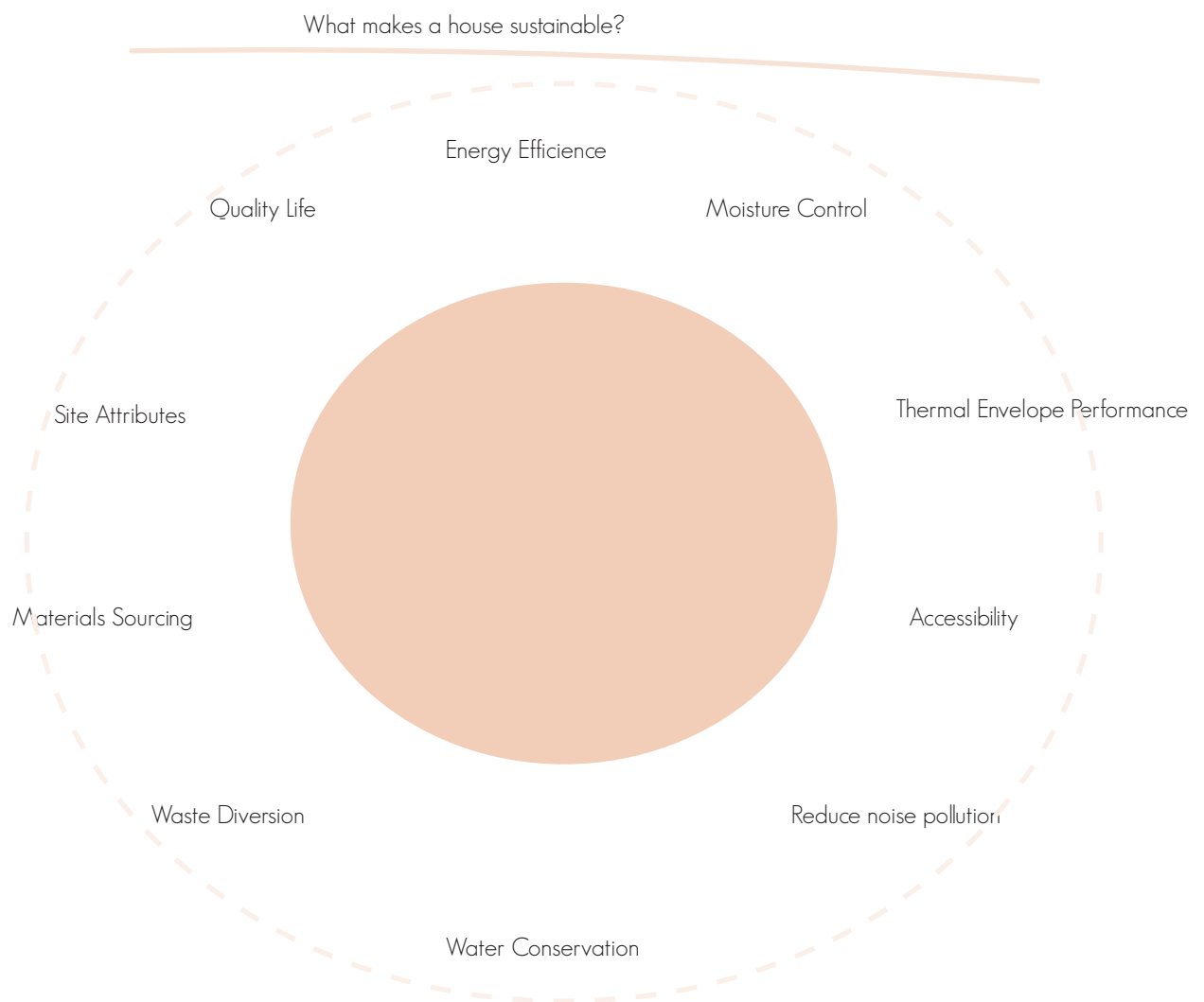


Fig. 2. 24 Homestar diagram of sustainability within a house. (NZGBC, n.d)

BENEFITS TO INDIVIDUAL:

- comfort
- save on operating costs
- emotional well-being
- higher resale value
- long-term liveability / resilience

BENEFITS TO NEW ZEALAND:

- low build footprint
- increased productivity
- less strain on grid

Circular Design:

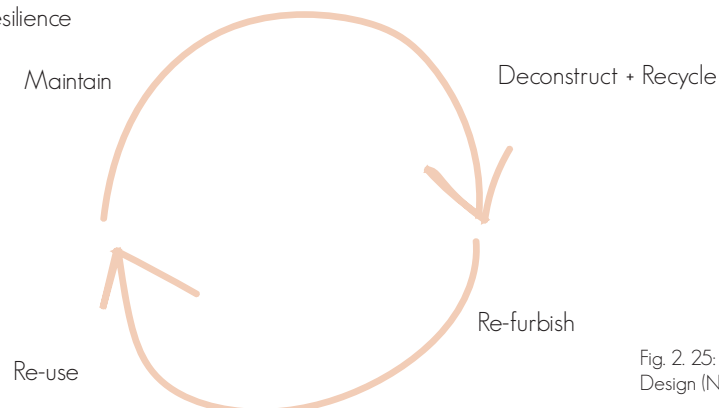


Fig. 2. 25: Homestar Diagram of Circular Design (NZGBC, n.d).

SUPER-LIGHT

The book 'Superlight' written by Phyllis Richardson successfully follows the powerful design philosophies of architect Glenn Murcutt's principle that buildings should "touch the earth lightly" and "rethinking how our homes impact the Earth". Influenced by the industrial revolution, architects have used solid foundations on house designs. However since climate change, new materials and restricted land use have given new lightweight solutions for dwellings. The projects within this book combine two strands of thinking; that buildings can weigh less and have minimal impact on their environments, and that this lightness - visual, material, ecological - can create ethereal houses that offer new and natural modes of habitation with greater connections with our natural surroundings.

There are 40 house designs within this book which are selected by Richardson and are represented well through photos and plans. The designs range from different forms, and these are separated out into five different categories of the book; floating, low-energy, urban light, escape, and extreme. These successfully display new solutions for designers and architects, with the definition of 'light' being expanded from weight to the impact on the site, energy consumption, and ability to cope with climate change. This book successfully presents factual material to designers or anyone interested in the environment.

Many of the designs within the book are located in coastal environments. Coastal environments can have sensitive landscapes and therefore the strategies displayed within the different categories of the book. Strategies are investigated within the following pages.

LOW IMPACT DESIGN STRATEGIES

Extracted from some of the references, are low-impact design strategies which will be a key aspect of all of my designs. Following from chapters in the book 'Superlight' and architect Glen Murcutt's idea of 'touching the Earth lightly'. Sustainability and respect are two themes within the that connect many of the projects within the book. These key low-impact design strategies are something which will be important to incorporate within the designs within this research.

Floating:



- Elevated designs such as on piles, stilts, or raised up a few feet for mobility are able to touch the land lightly and appear more delicate among the landscape.
- Lack of heavy consonants.
- A design which is raised off the ground means it doesn't have a foundation poured, a site prepared by leveling, or blasting away at rocky terrain to achieve a flat surface.
- Minimizing impact of a structure on the landscape is able to enable a house to coexist with its natural habitat.

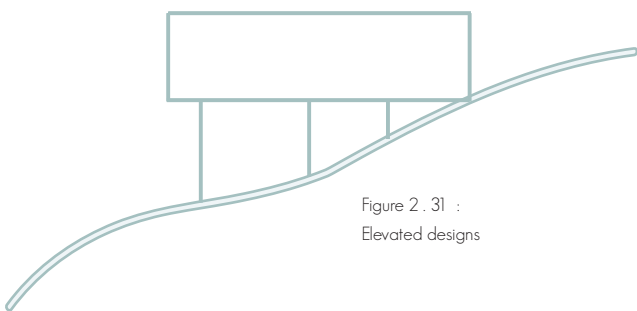


Figure 2.31 :
Elevated designs



Low-Energy:



- Use less energy as they provide all of the power that they consume through passive systems.
- They are also efficient through construction processes by using prefabricated elements which save material wastage on site, and materials that are procured locally or require a low level of manufacturing. This therefore reduces its embodied energy.

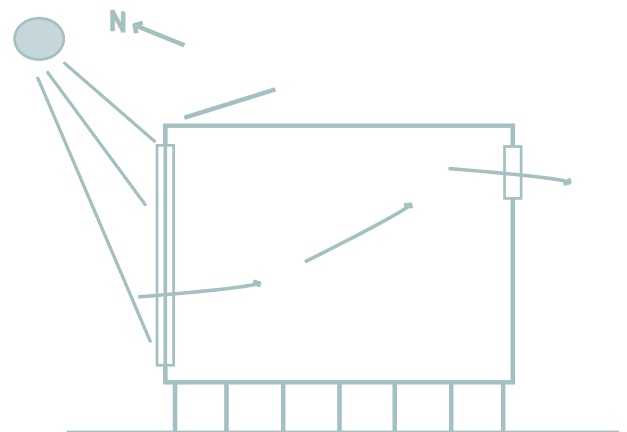


Figure 2.32:
Passive design

Key passive design principles:

- orientation on site - facing North for maximum sunlight.
- building layout
- insulation
- window design
- ventilation
- thermal mass, shading
- solar design

Escape:



- In remote locations, there are restrictions that are faced and therefore it is important to have lighter and more efficient building materials and methods.
- How much disruption will inflict on the landscape and how will the building work affect the environment.
- 'Lightweight' can also apply to the impact during construction.
- Designs are a 'respectful guest' that can be removed as quickly as it arrived, with parts recycled or reused.
- Minimal environmental impact with maximum aesthetic value.
- Parallel to contours which means no excavation needed.
- Timber framed designs have low embodied energy and are easy to transport to site, therefore low impact on the site.

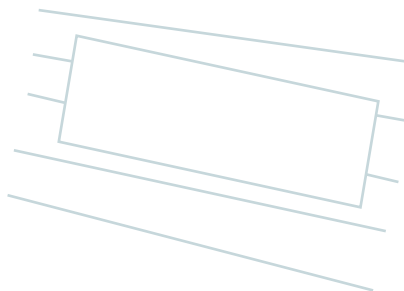


Figure 2.33 :
Parallel to contours

Extreme:



- In challenging conditions where there are harsher conditions, the designs in this chapter represent a consciousness of the impact of buildings on both the site and inhabitants.
- Building with poor materials and without an energy strategy is unsustainable.

Urban Light:



- Free flow around natural light.
- 'Lightness' concept of not only an open floor plan, but also vertically over levels. Having this lack of solid walls creates this feeling of lightness.
- Steel can also be considered a 'light' material.

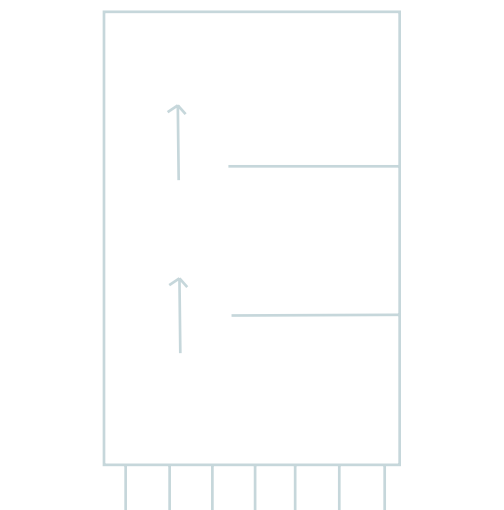
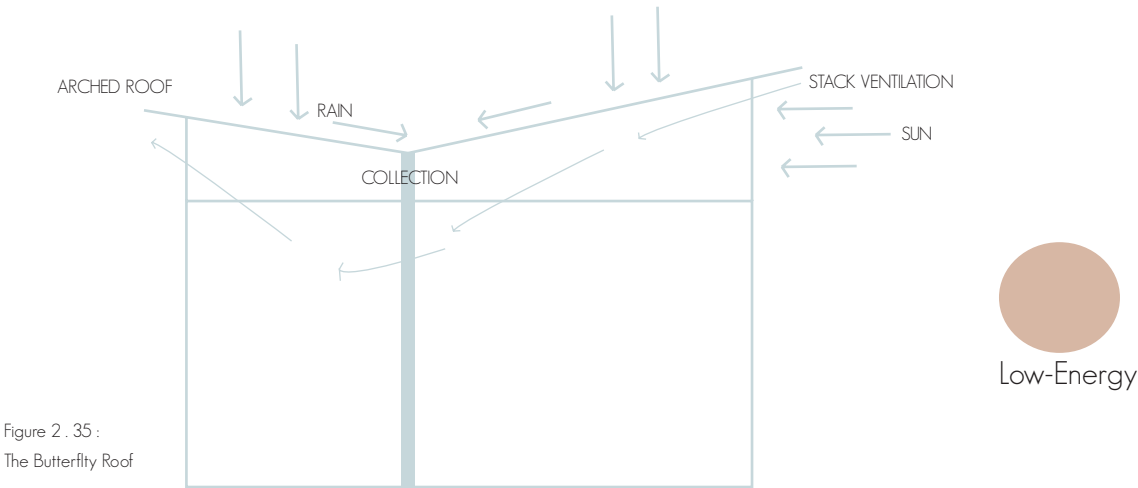


Figure 2.34 :
Open spaces

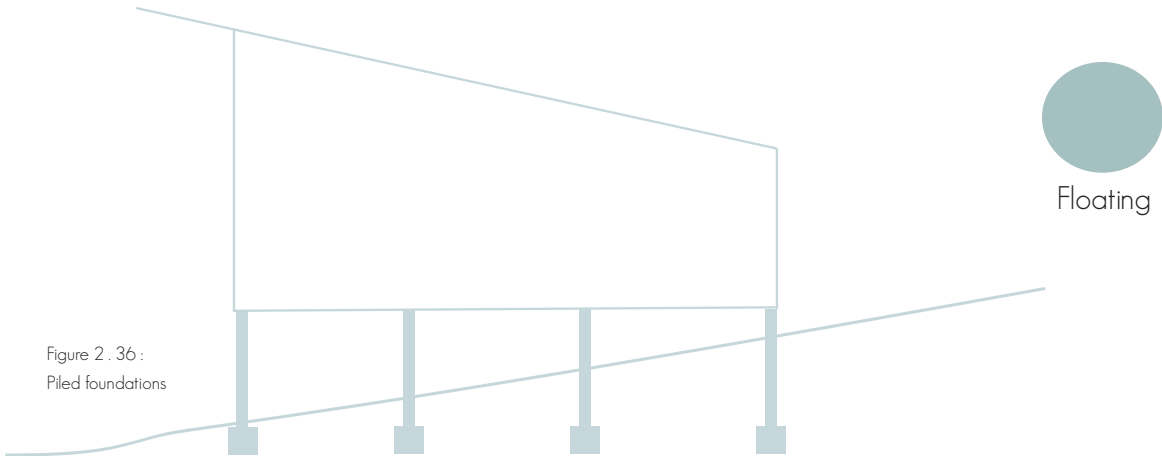
MURCUTT'S DESIGN STRATEGIES

THE BUTTERFLY ROOF:



One of Murcutt's most successful design strategies is the 'butterfly' V shaped roof. The shape of the roof serves many functions, such as a windbreak from winds, opens to the North in response to solar angles, and is able to collect rainwater that is recycled to be reused.

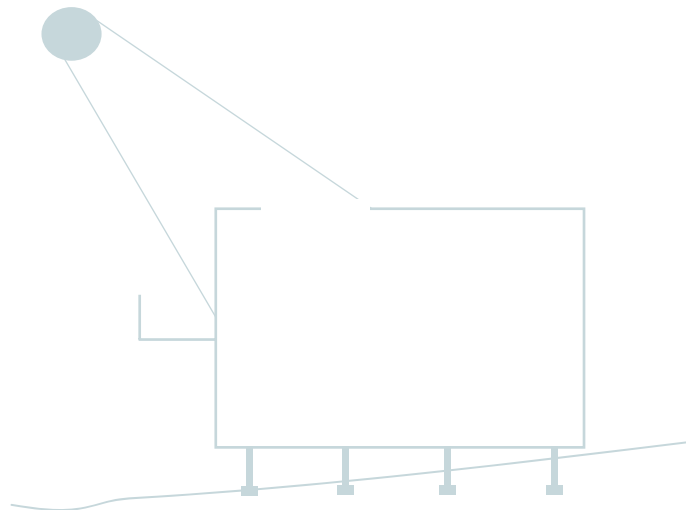
PILED FOUNDATIONS:



Pile foundations allow the ground to drain naturally.

HORIZONTAL LINEARITY:

Figure 2.37 :
Horizontal linearity



Urban light

Capitalizing on natural light, Murcutt uses verandas, skylights, adjustable louvers, and movable screens. Designs such as the Magney House, it is designed to capture the sun.

BUILDING TO THE ENVIRONMENT:

Figure 2.38 :
Building to the land-
scape, contours



Extreme

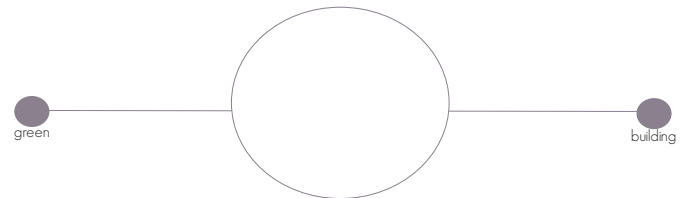
Every landscape creates different needs. "Life is not about maximising everything, its about giving something back - like light, space, form, serenity, joy" - Glenn Murcutt.

MORE ECO-CONSCIOUS STRATEGIES

According to the book 'Green Modern, Eco-conscious contemporary New Zealand homes' by Claire McCall (2014), design-conscious New Zealand houses are showcased which successfully embrace a more sustainable way of living.

BRANZ is known to call the construction game 'the 40% industry'. This is because New Zealand's buildings are responsible for 40% of the country's raw material use, 40% of energy consumption, and 40% of waste generated. The construction, operation, and demolition of buildings also creates 33% of carbon dioxide emissions.

It states that sustainability is a broad term that covers aspects such as energy efficiency, health and comfort, and environmental impact. The baselines that should always be delivered are correctly orientating a building to capture heat from the sunlight, storing it in a thermal mass to be slowly released, and then trap it with good insulation.



Eco-conscious strategies derived from the houses presented within this book:

- No steelwork used due to the high embodied energy
- Natural and cedar joinery
- Glulam timber used as the structural skeleton
- Elevated on piles
- Box homes means less energy to construct
- Low-e double glazing
- Ply-wood ceilings instead of plasterboard
- Sliding timber screens, shutters and louvres
- Dripper field from the wastewater treatment which feeds and waters the surrounding plantings.

MURCUTT'S DESIGN STRATEGIES

A strong influence on Murcutt was Ludwig Mies van der Rohe's use of ventilation and letting a house breathe.

Connecting to nature throughout the building is an important aspect that Murcutt includes with his designs. 'I hope my buildings will allow people to live within them so they can relate to the nature outside, without feeling the necessity to have paintings'.

Relating to the Land:

'We are part of this whole - we are not the whole... it is trees, it is climate, it is the earth, the water, the rocks, and the landscape which is real. When we fail to see ourselves belonging to and as a part of that we become unreal. It is our duty to act as custodians for one of the most remarkable landscapes' (Murcutt, 1999, p.88).

By responding to the land, Murcutt describes this as responding to the colour, texture, scale, and form of the land, to the shape of the trees, the trees delicacy, and most importantly the delicacy of the landscape.

Murcutt's use of linearity produces a dynamic quality which increases the tension and matching the linear landscape.

One of Murcutt's most important strategies is running with the contours. His buildings follow the contours of the land.

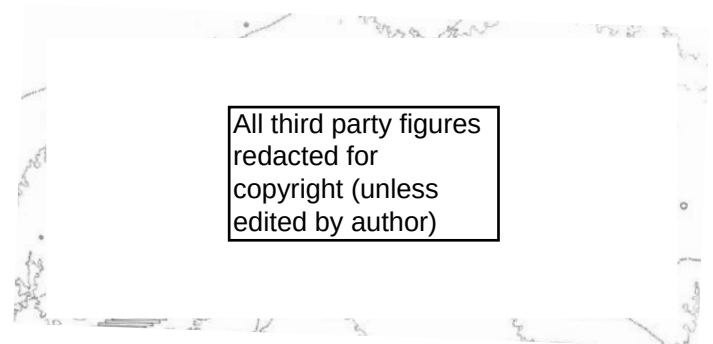


Figure 2. 39 :
Eastaway House Plan
(Murcutt, 1999).

Murcutt describes the transition from the land to sea as 'the most exciting place to be'. "If you're going to remain here, I'll make a place for you, and you will have to work with me". If you throw a rock at the water, nothing happens straight away. But give it a day, and the rock will submerge itself, will alter the patterns around it where the water has moved over and past it and created channels. '... so the water, the rock, the sand, the wind all find a balance between themselves. The edge of the sea is the termination of all those forces, which produce wave patterns'. The space where the land meets the sea is an incredible site of energy.

Murcutt plans his buildings with a degree of serenity. 'I hope that there's serenity, that there's peace, a sufficient order to feel at ease in my buildings, to make people feel good, and to help them communicate'.

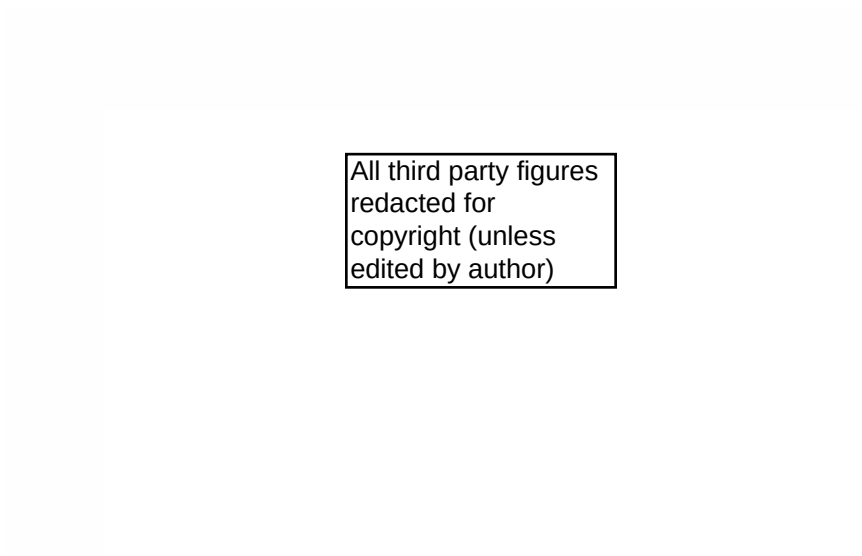
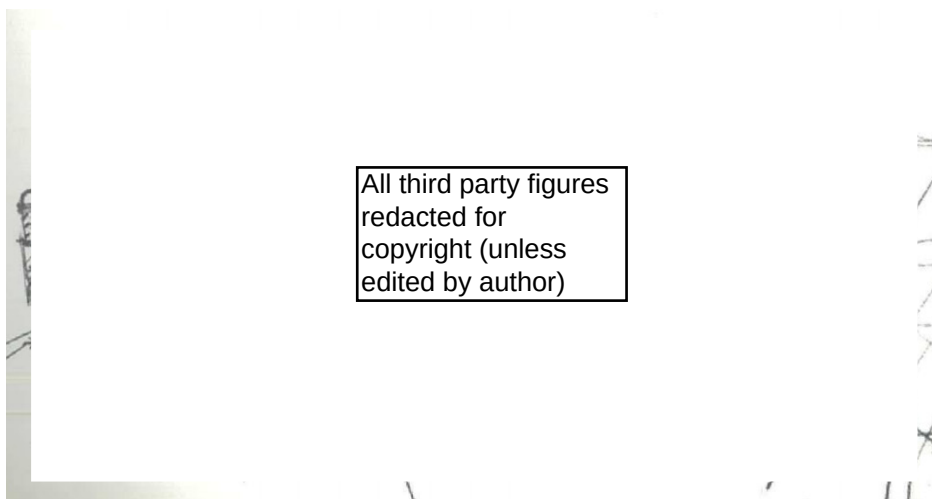
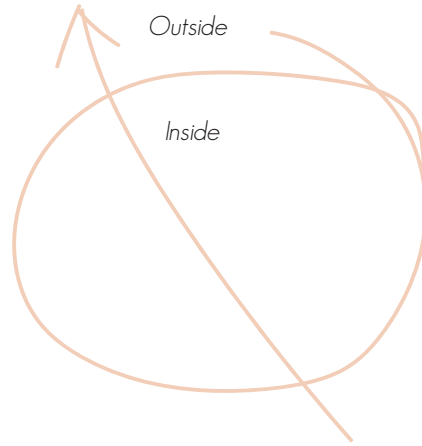


Figure 2. 40 : East-away House Sketches
(Murcutt, 1999).

Outside / Inside:

The building has two responses: it has its response to the landscape which is the relationship of the building to its environment, and a response to the client's programme, space, light, materials, costs, planning and interior furnishings.

Murcutt relates this to an apple; 'Once you bite into an apple, within it, the flesh is refined and very white'.



Linearity:

Murcutt states that linearity produces a dynamic quality which increases the tension. It connects the site, and Murcutt uses it through accessways, by the space moving over the walls, which can connect the two ends of the house.



THE SITE

Areas of interest for dwellings:

The East side of Menzies Bay is the sunny side of the bay, especially in the morning. This steep landscape can influence the design of the dwellings to be vertically stacked in order to optimise the built area on this steep slope.

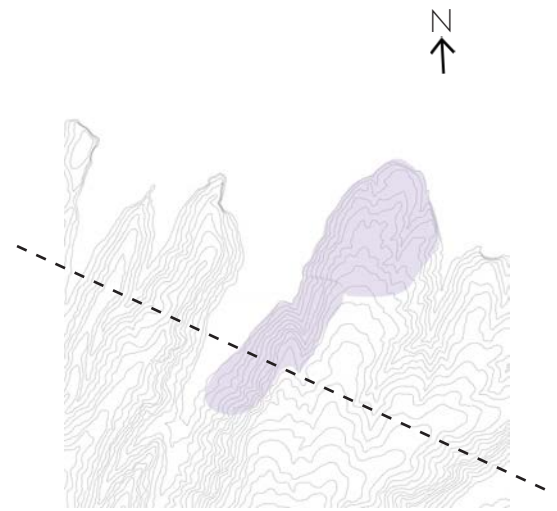


Figure 2.41 : Potential for coastal hillside dwellings.



Low-impact design strategies for a steep slope:

- parallel to contours
- Pile or stilt foundations
- Timber frame
- Vertical, tower-like structures
- Open levels
- Celebrate the contours

Cliff Faces



Figure 2.42 : Views

SUBDIVISION OF SITE

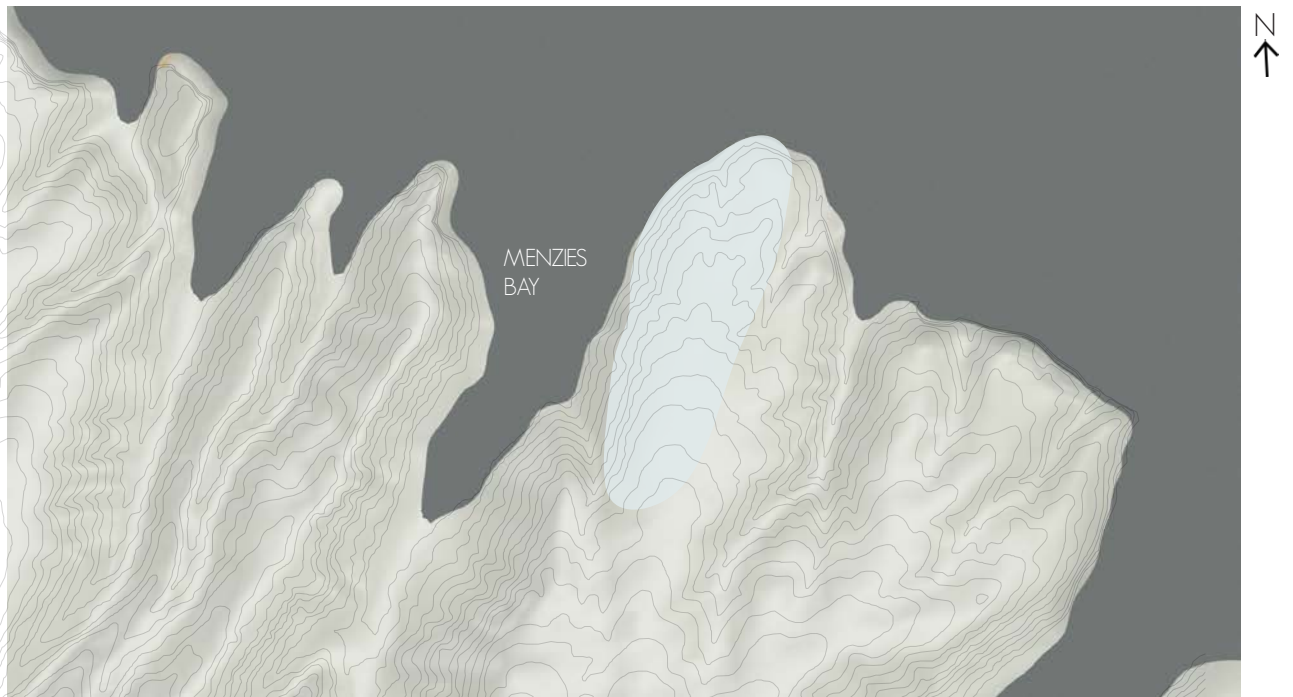


Fig. 2. 43 : Area chosen
for subdivisions



Fig. 2. 44 : Area chosen
for subdivisions



Fig. 2 . 45 : East side of
Menzies Bay (Authors
own photo)



Fig. 2 . 46 : East side of
Menzies Bay (Authors
own photo)

Design project one is the first stage of research through design, and is influenced from the key design strategies previously researched. Different typologies are used in order to relate to the steep and changing contours on site. Orientation towards North to capitalize on natural light is also an important feature considered within these typologies. Making the most of staying parallel with the contours means less excavation and construction on site.



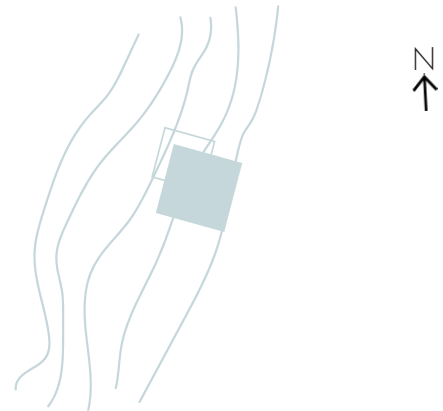
Typology One

Contours are parallel to the Northern orientation. The vertical and square form which has balconies facing North.

Located on more of a steeper slope looking out towards the sea.

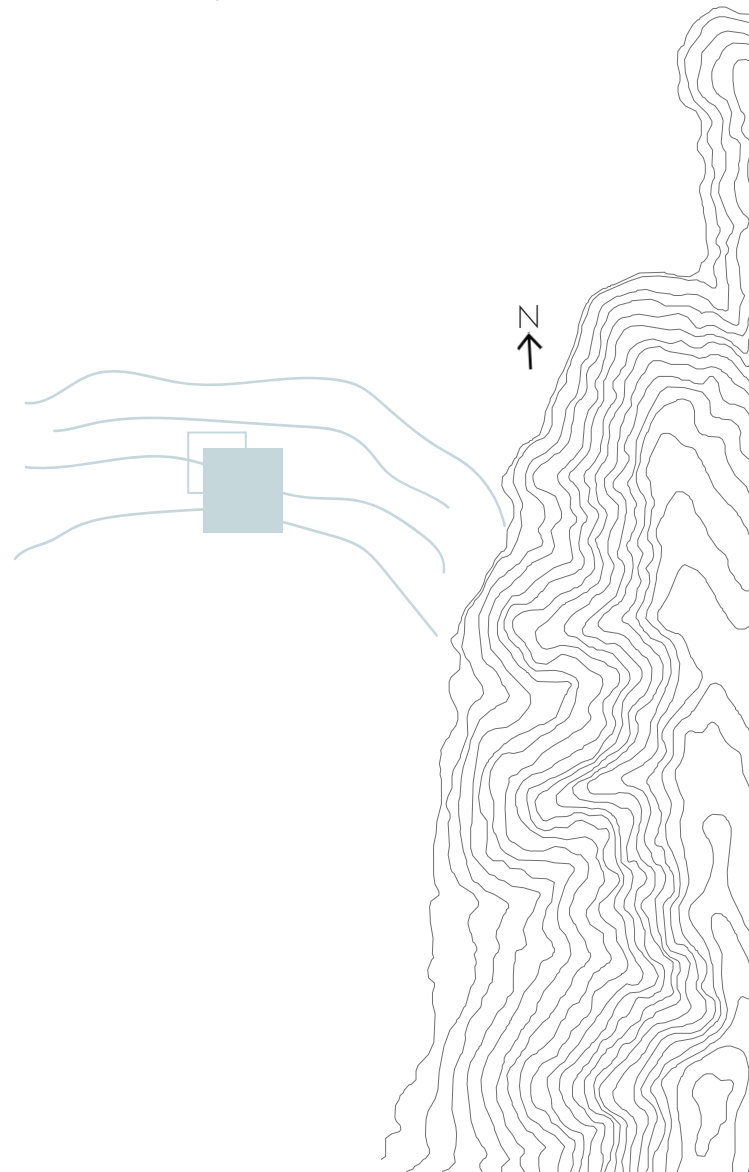
'Cabin-like' dwellings, one bedroom.

20 square metres.



Typology Two

Contours are perpendicular to the Northern orientation. With more of an undulating landform there is less of a steep slope compared to the typology one land.





Typology Three

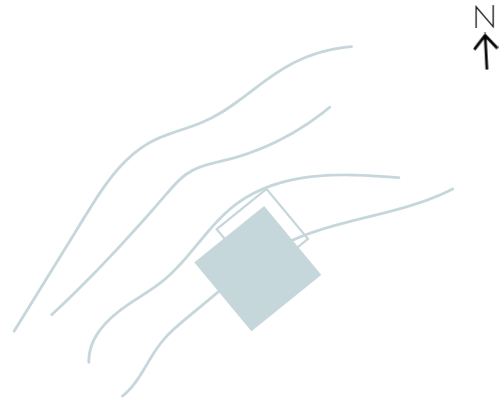
Contours are on a diagonal, not parallel not perpendicular.

North-East

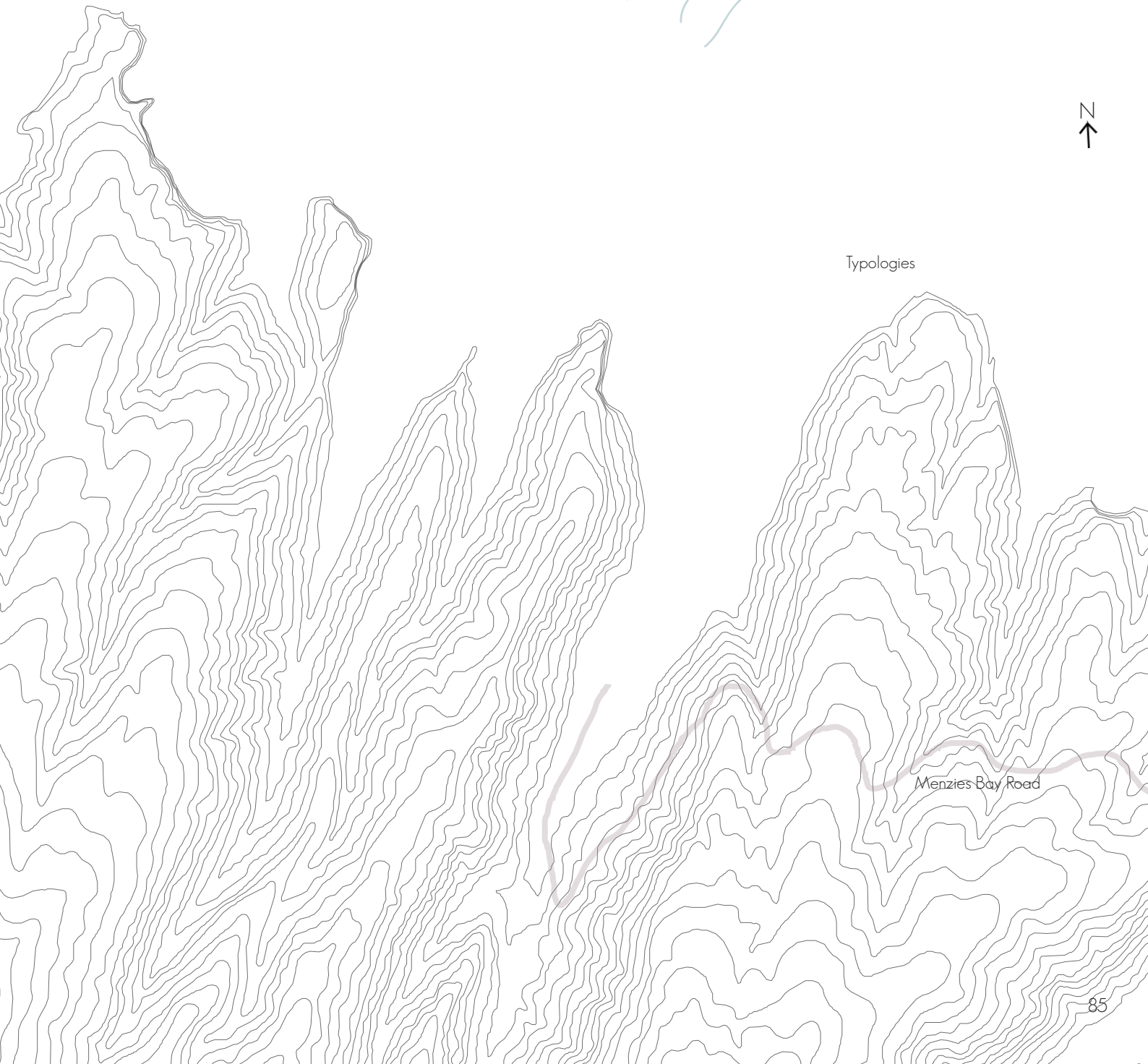
Inbetween typology one and two.

Two bedrooms, more house like.

10x10



Typologies



INITIAL CONCEPTS



Typology One

FLOOR PLANS



Figure 3.0: Lower Floor Plan (1:50)

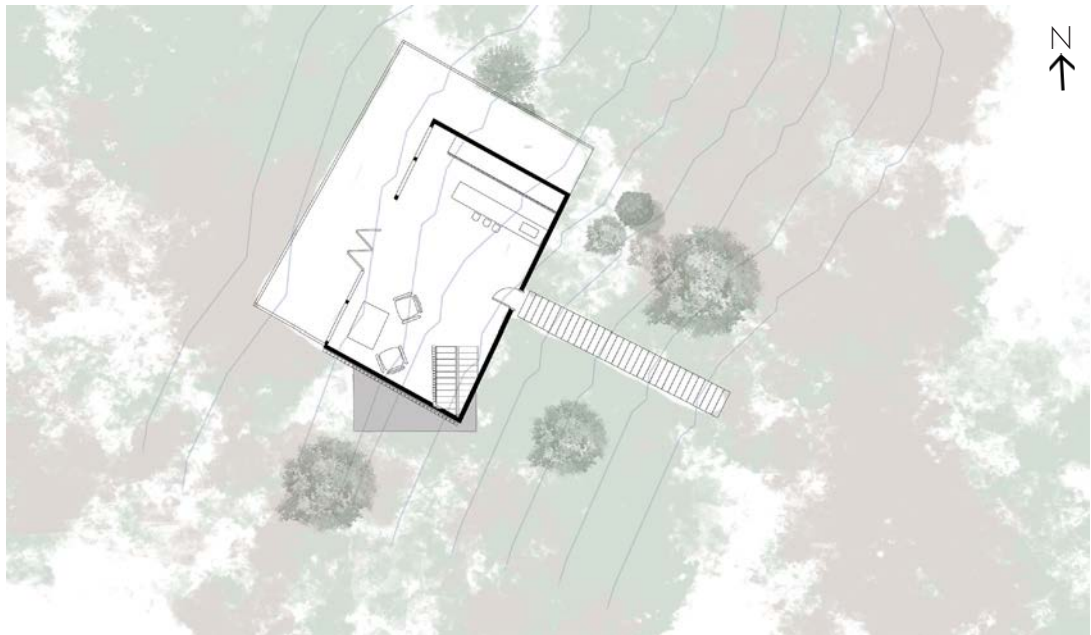


Figure 3.1: Upper Floor Plan (1:50)



Figure 3 .11: Exterior

The first dwelling within design project one is a minimalist designed single bedroom dwelling which sits parallel to the contours on the steep landscape sloping down towards the sea. The timber structural skeleton and vertical Macrocarpa cladding is a sustainable feature which is also able to blend within the landscape. Views are maximised .

LOW-IMPACT STRATEGIES USED

- Piled foundations
- Horizontal linearity
- Timber structural skeleton
- Building to the contours





Typology Two

FLOOR PLANS

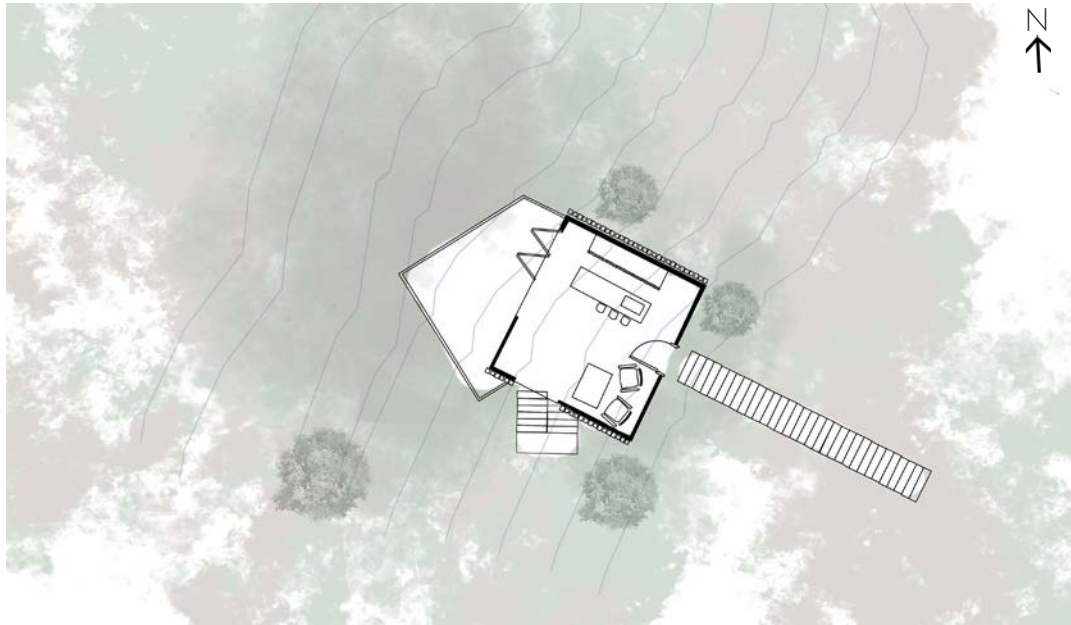


Figure 3.12: Upper Floor Plan (1:50)

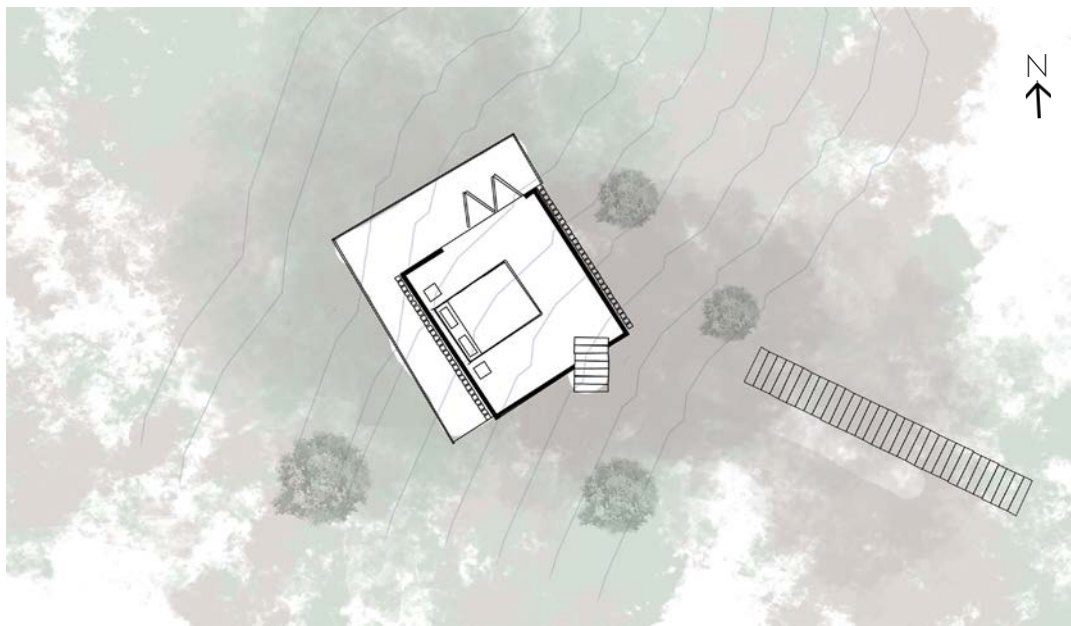


Figure 3.13: Middle Floor Plan (1:50)

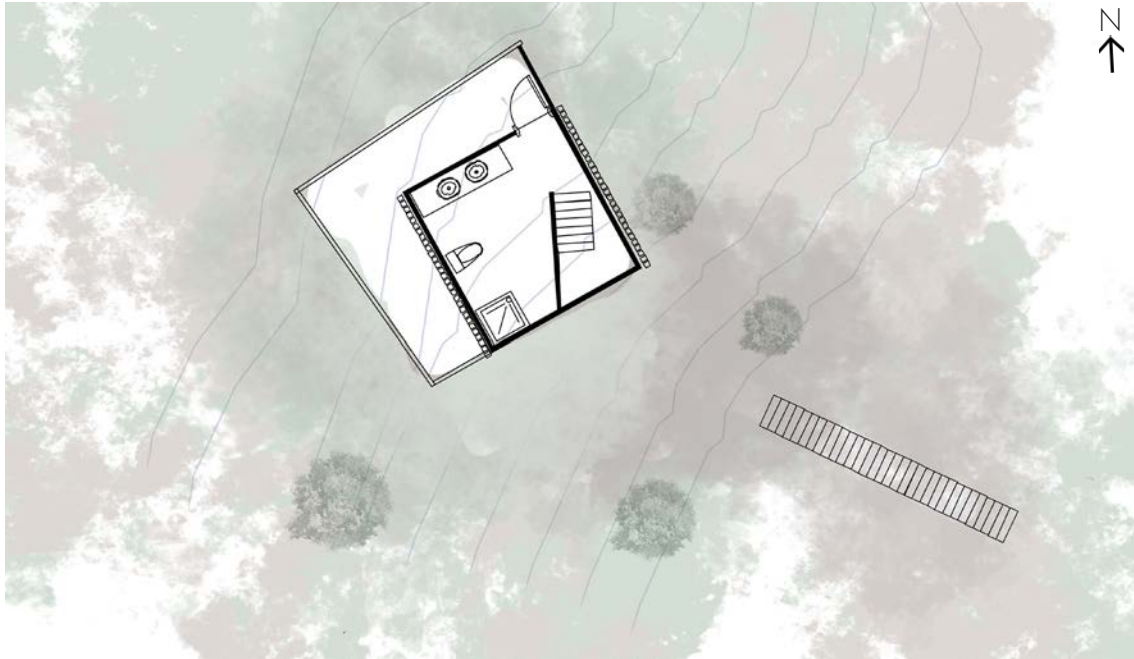


Figure 3.14: Lower Floor Plan (1:50)



Figure 3.15: Exterior

This next initial design of the next dwelling follows the contours and is rotated according to the surrounding views. The three 'cubes' are terraced down which has been a strong influence from the Maori terraced landscapes in previous times around Menzies Bay.



Typology Three

FLOOR PLANS



Figure 3.16: Upper Floor Plan (1:50)



Figure 3.17: Middle Floor Plan (1:50)

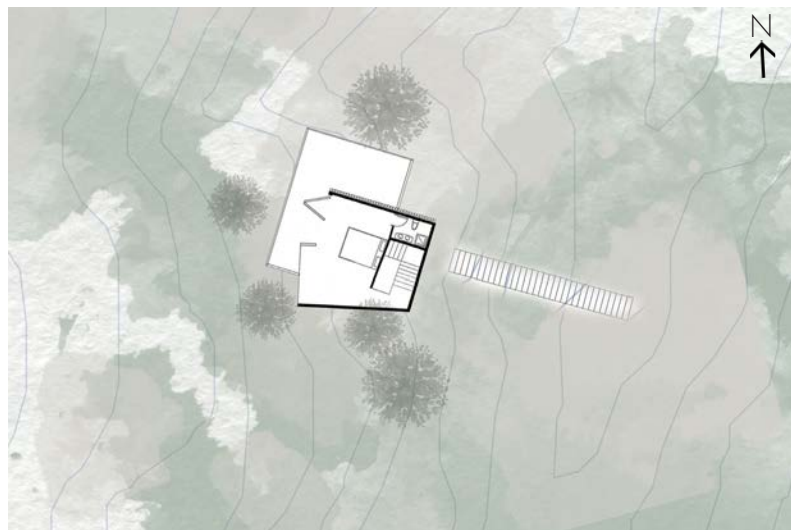


Figure 3.18: Lower Floor Plan (1:50)

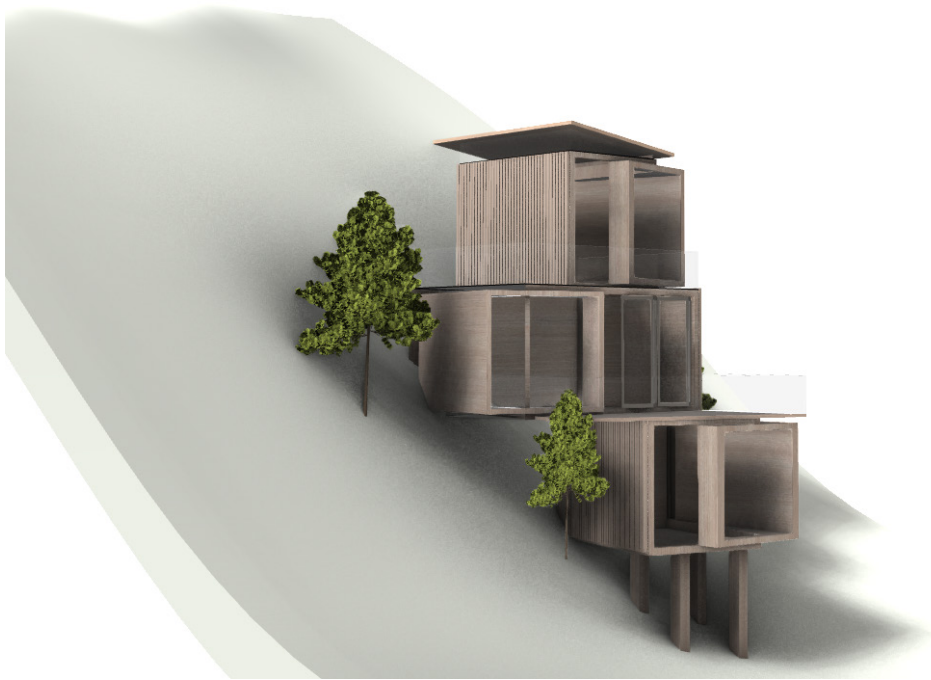


Figure 3 .19. Exterior

PROJECT ONE

REFLECTIONS

Project One is the starting point and the first stage of design within this research. Researching the site of Menzies Bay was an important aspect of this research in order to get a sense of the 'isolated' context, steep contours, surrounding vegetation, and climate. History of the site was also researched in order to incorporate cultural values within the design. Researching sustainable and low-impact strategies was also an important aspect of this research, which are also able to connect the building from the land to the sea in a sympathetic way. This starting research was able to commence answering the research question of: How can we design housing to create a sustainable and accessible coastal environment, while keeping an informal relaxed lifestyle?

This initial research resulted in designs of different initial dwellings which were able to sympathetically relate to the contours of the site. Acting as a starting point, a masterplan was developed which was able to show where these different types of dwellings are located. The dwellings are of small-scale, some vertical and some horizontal. This use of small-scale is able to lead towards low-impact design. Only a small amount of different types of materials have been used and will continue to use throughout the design phases which support the minimal and low-impact designs of fitting in with the landscapes.

An initial issue that showed up within this first design stage of the research was the amount of dwellings located on the site. Too many dwellings too close together meant losing the concept of low-impact/sympathetic designs connecting with the landscape. This will be more looked into with design project two. More low-impact features will be more deeply researched with the next stage. Accessibility will be designed more carefully in relation to accessing the water below.

Next objectives to further research and focus on within design project two:

- Affective access to each dwelling and the ocean
- Further low-impact research and designing
- The input and design of wharves
- Improved masterplan
- Developing the designs
- Maori marae research and further indigenous research to be incorporated within the designs



The background of the page is a detailed, black and white topographical map. The map features numerous contour lines of varying thickness and spacing, creating a sense of depth and relief. The lines are more densely packed in some areas, indicating steeper slopes, and more spread out in others, indicating flatter terrain. The overall effect is a complex, organic pattern that resembles a cross-section of a mountain range or a series of overlapping landforms. Overlaid on this map is the text 'DESIGN PROJECT TWO' in a large, bold, white, sans-serif font. The text is centered horizontally and vertically, with 'DESIGN' on the top line, 'PROJECT' on the second line, and 'TWO' on the third line. The white color of the text contrasts sharply with the dark, textured background of the map.

DESIGN PROJECT TWO

CHAPTER

LARGER SCALE SITING RESEARCH

PIHA BACH

MAORI MARAE INFLUENCES

LOW-IMPACT CONSTRUCTION RESEARCH

WATER COLLECTION

SITING ITERATIONS

CLIFFORD-FORSYTH HOUSE

DESIGN STRATEGIES USED

TPOLOGY ONE

TPOLOGY TWO

TPOLOGY THREE

OVERVIEW + REFLECTIONS

LARGER SCALE SITING RESEARCH



Figure 3 . 20 Wider Context

As seen in the map above, Menzies Bay seen in a wider scale on the Peninsula reiterates its remoteness from other towns and Christchurch City. But are creating 'connections' important within this research? The idea of remoteness and isolation is to be away from any towns or cities and

Prominent views to influence new forms:

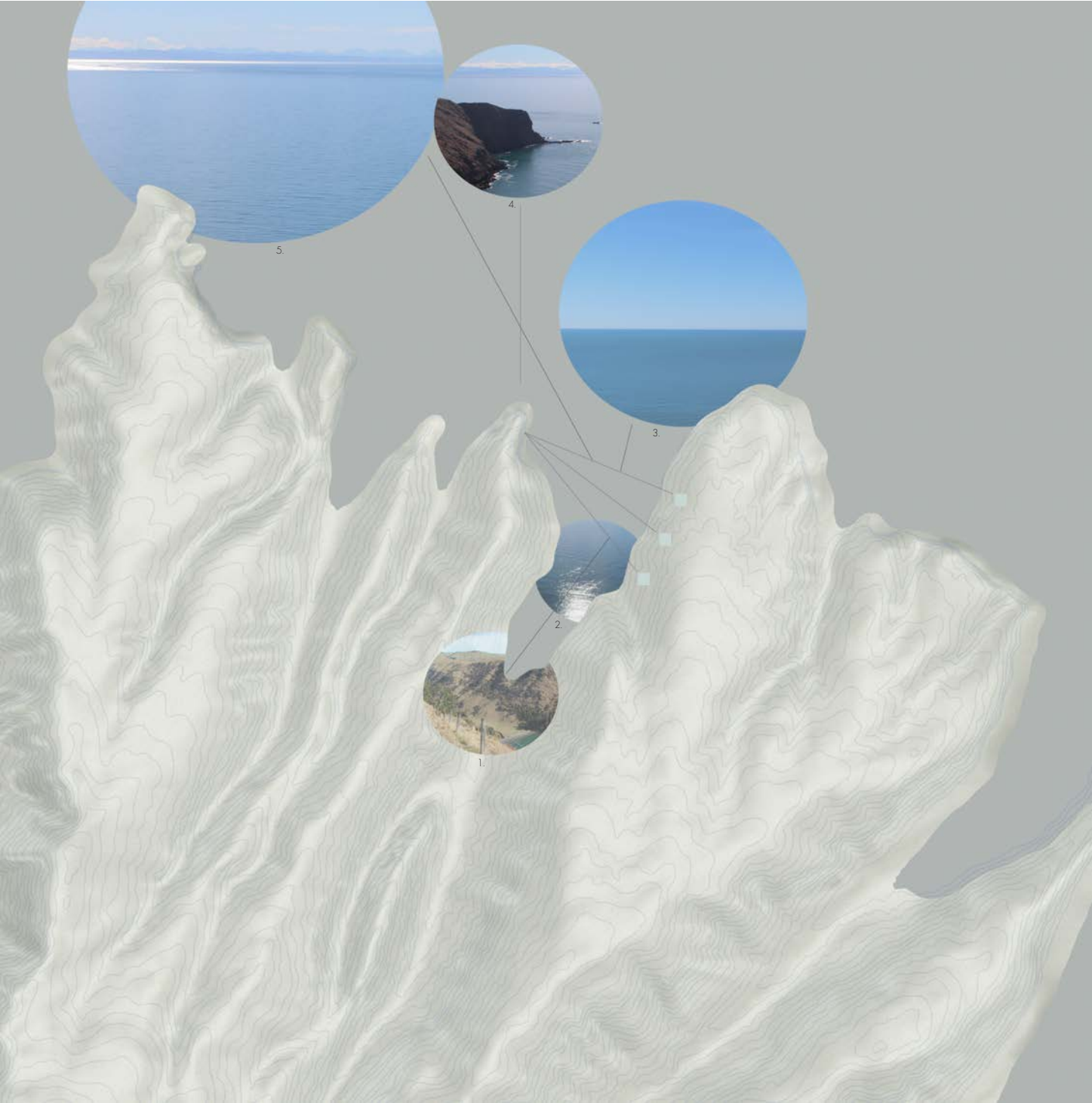


Figure 3 . 21 Prominent Views

- 1. Menzies Bay flat land
- 2. Mussel Farms
- 3. Pacific Ocean
- 4. Dramatic cliff + rock formations
- 5. South Island + mountains

A way to create a sense of connection from the landscape to the ocean is creating forms which respond to the views of different locations. This is a way to relate the buildings to the surroundings with prominent views.

HERBST ARCHITECTS 'CLASSIC KIWI BACH' - PIHA BACH

Known to have 'holiday self sufficiency', this is a low-key bach which successfully encourages a fluid transition between outdoor and indoor space. With sensitivity upon the site, the house fits into the surrounding landscape well and each bedroom connects with aspects of the site.

The use of steel stilts allows the house to be open to the views of the dense woodland to the beach. The concept of this design developed out of the need to maximise sun ingress and enable visual engagement with the beauty of the tree canopy. the front of the dwelling is able to open with sliding doors.

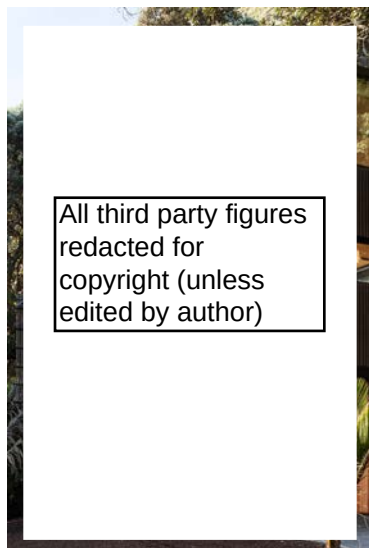


Figure 3 . 23 Piha Exterior
(Reynolds, 2018) .

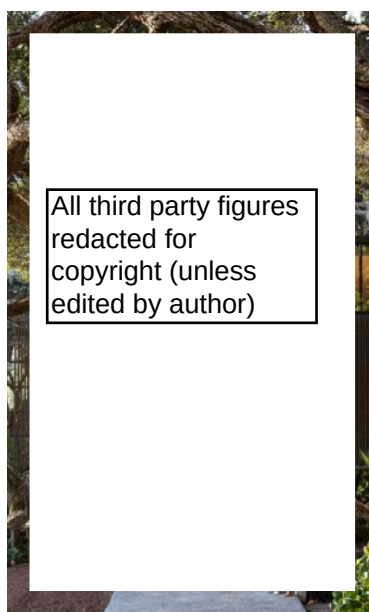


Figure 3 . 24 Piha Exterior
(Reynolds, 2018) .

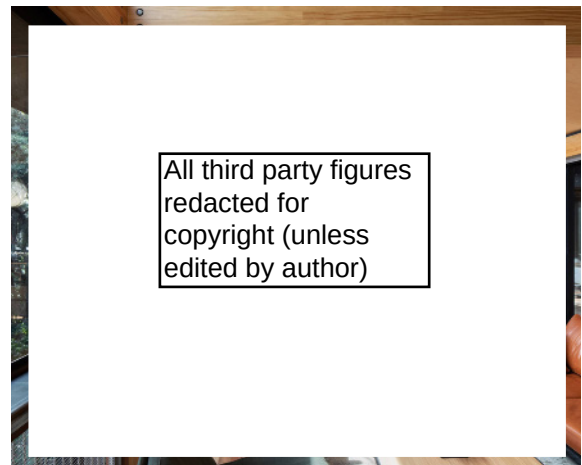


Figure 3 . 22 Piha Bach interior (Reynolds, 2018).

Herbst architects' response is 'to let the nature do the talking'.

'It is important to recognise that a bach is not a house; it's something else - a holiday destination. . . it is a place to escape to, where we can be close to nature. So we prefer to concentrate on the difference, rather than the similarities with city living'.

Although this site does not have similar conditions to the Menzies Bay coastal hillside, the design is able to demonstrate the visual engagement of the relationship between the interior and exterior, and the idea of maximising sunlight.

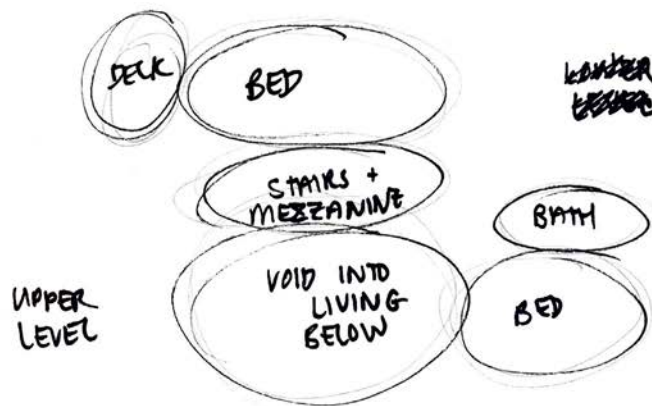
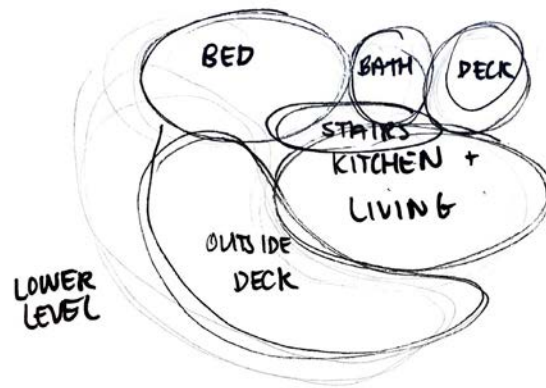


Figure 3 . 24 Spaces
within the bach (Authors own
diagram)

MAORI MARAE + PA INFLUENCES - INDIGENOUS THOUGHT

With Menzies Bay connections to the Māori Pā and Marae, architectural strategies can be put in place to represent its indigenous past.

'Sculpted from the landscape', the Māori Pā is known to incorporate architectural strategies which show its relationship to the landscape. The Marae evokes a connection to the sea, using the following strategies which can be incorporated within the further research. The Marae is a 'construction of openness' (Austin, 1980).

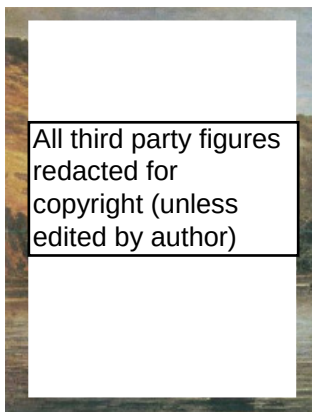
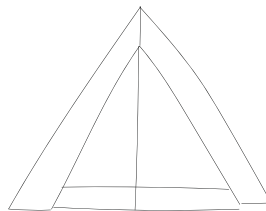


Figure 3 . 24 Kiri Kiri Whare - a representation of Menzies Bay. (Gibb, 1889).



Strategy 1 - Terracing into the landscape :

In Māori culture, a Pā represents the power and ability of an iwi. Most Pā's, including the Pā that was in Menzies Bay, are constructed on raised ground, especially if it is part of a volcanic hill. The natural slope of the hill is then terraced.



Strategy 2 - Space opening to the outside:

A Marae incorporates a carved meeting house (wharehau) which has an open space in front (marae atea). The siting and orientation of the marae is determined by conditions of 'openness' such as the marae facing the sea, and turns its back to the enclosure of mountains or bush.

The Marae is a light-weight dwelling constructed well with the landscape. Its meeting house resembles the human body in structure which represents an ancestor of the tribe.

Māori design strategies incorporate the landscape well between natural and cultural values. Housing in Menzies Bay along the hillside should incorporate some of these historic and cultural values.

Strategy 3 - Lightweight, breathing architecture:

The use of lightweight materials also emphasises the idea of a 'breathing architecture'. Identified by Austin, the shifting and transient quality is evident in the duration of the lightweight constructions and in their spatial quality. This is able to allow the building to breathe by letting the outside enter the inside.

Shown in the following figure, is the organisation and location of the typical marae and its importance to the landscape.

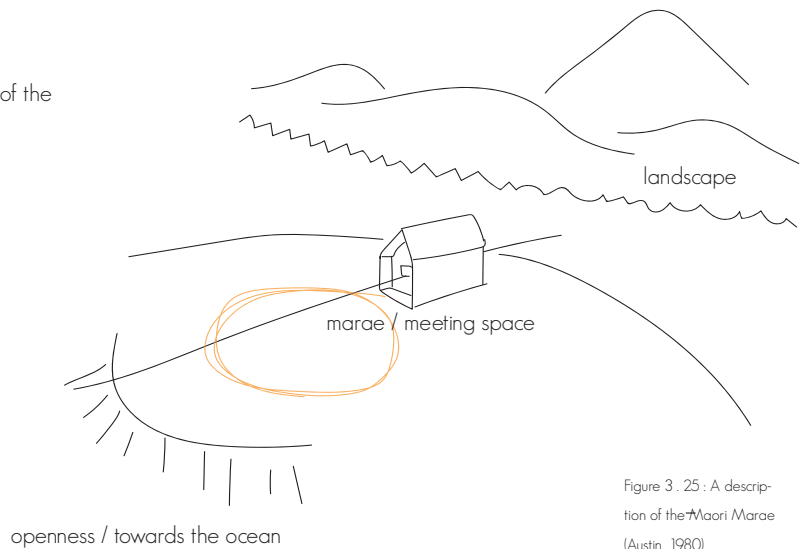
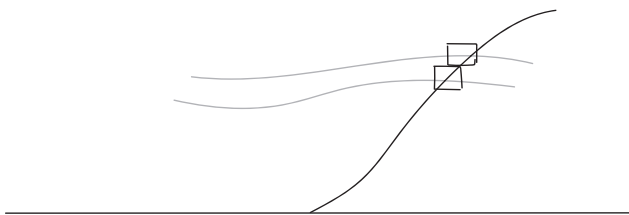
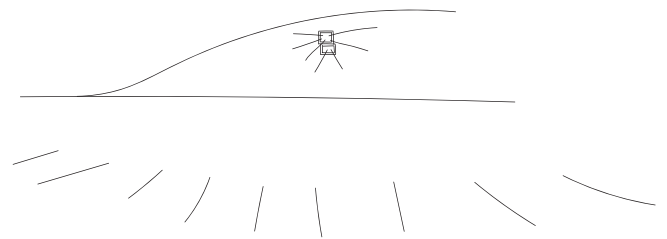


Figure 3.25: A description of the Maori Marae (Austin, 1980).

The idea of this 'openness' has been incorporated within these design projects, sitting inbetween the steep landscape and looking out towards the ocean.

The previous strategies looked at such as the terracing within the landscape almost connects the hill and the ocean together.

The marae space is "located in the natural landscape so that it faces outward towards open elements, and is backed by closing elements."



Connecting the landscape to the sea is an important part of this research as it means it will be able to sympathise with its environment. The notion of opening up towards the sea at the front and facing the closed elements such as the hill it sits on, also creates the dwelling to become the 'inbetween meeting space' influenced by the function of the marae.

FURTHER LOW-IMPACT CONSTRUCTION STRATEGIES

MATERIAL SELECTION:

In part 3 of his book, 'Roots of architectural invention', Leatherbarrow specifies that two factors are important when selecting materials; builders and site. All site work occurs in or near a city or town, where some but not all construction skills are predominate. Material selection should also be based on materials available in the certain region, and also the nature or properties of the material. Primary properties endure or persist through all modifications such as density, hardness, resistance to heat, brittleness, capacity to resist applied loads.

This leads to the idea of selecting 'low-impact' materials which is one of the main achievements within this research. Materials for this site will need to be selected carefully due to the sensitivity of the landscape and the remoteness of the location.

Maximising the efficient use of natural resources overall preserves the long-term health of the planet. Sustainable design principles encourage the reuse and recycling of building materials in order to decrease the demand for new materials and the environmental impacts associated with their use (Montoya, 2009, p. 18). A sustainable building considers how the building will affect the environment through its deconstruction. This incorporates materials and design elements which will allow the building to be deconstructed and the materials to be reused or returned to their natural state at the end of the building's useful life.

WATER COLLECTION + WASTE WATER MANAGEMENT

WASTE WATER MANAGEMENT:

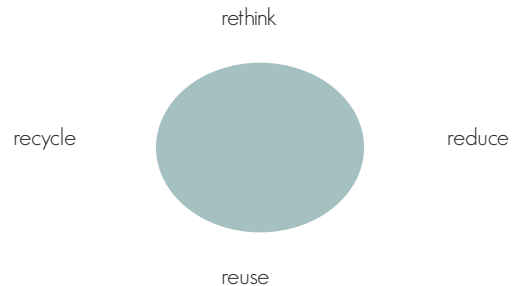
This is the 'impure' water which is used by the inhabitants for different daily purposes and is released into a water body. Architecture and the building sector are one of the largest users of water, starting from the primary stage of construction to the usage of the inhabitants.

Domestic wastewater:

This is the sewage water collected from residential complexes which are then classified into 'blackwater' and 'greywater'.

Sustainable construction principles:

- reducing and recycling construction waste
- controlling noise, light, and air pollution during construction
- controlling indoor air quality during and after construction
- protecting and restoring natural habitat
- limiting storm water runoff pollution and erosion
- ensuring that buildings efficiently as possible
- choosing low-emitting building materials
- controlling harmful emissions from construction equipment and vehicles



WATER COLLECTION:

Most buildings use the mains supply which is the most effective way to meet users' water needs. However, rainwater can be used to provide a water supply where there is no mains connection available.

Benefits of the use of rainwater for water supply:

- reduces costs for users
- reduce a demand on mains water supplies
- reduce demand on stormwater disposal systems

macrocarpa timber



cladding

frames

interior finishings



flooring

Untreated Macrocarpa timber is a durable soft wood which is ideal for cladding and solid beams. It has a low shrinkage and good stability. it is chemical free with no human intervention in the treatment. It accepts wood oils well which adds to its durability.

Density : 485 kg/m³

Hardness: 3.44 kN

Natural durability equivalent to H3.1

For this research, I believe that macrocarpa is a light material which is able to not only encourage the possibility of reusing and the recycling once the building has had a useful life, and also sit with the surrounding landscape and context in a 'light' and 'sympathetic' way. Also pleasing to the eye, this building material is one of New Zealand's most eco-friendly material.

local quarried
natural rock



cladding

interior finishings

Located near Menzies bay is Dacks Quarry which is able to extract the stone which was formed on the Peninsula millions of years ago. This stone can be versatile to achieve the aesthetic and performance. As a natural product of the Earth, it is recyclable and quarried sustainably. As it is a local quarry, these materials will be easier to get to site and able to represent the surrounding landscape.

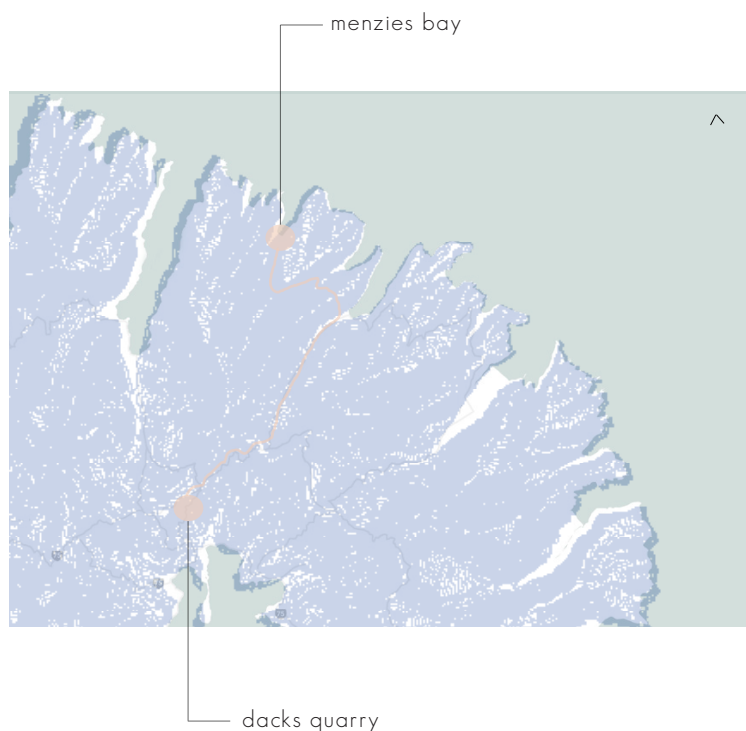


Figure 3 . 26: Distance
from Menzies bay to
Dacks Quarry

CLIFFORD-FORSYTH HOUSE

"... a certain antipodean lightness that comes of the logical economies of the new. There is a balance to this house that shows both a certainty and a courtesy towards its setting in both culture and nature". (Ume).

Location: Auckland

Completion: 1995

Architect: Patrick Clifford

Designed by Patrick Clifford and built for his family, this design investigates the relationship between a light wooden frame and solid retaining block walls, and an idea of creating the spirit of a 'boathouse', a place to retreat to, or a holiday house within the city.

The primary elements of construction, frame and walls, sit on a concrete base, while a folded plate roof, underlines with plywood, tops the whole.

There are double verandahs at each end of the house, which are able to provide a variety of shelter to suit the time of day and season. Large glass sliding panels also shield winds from either direction.

This precedent demonstrates the use of a light wooden frame, and creating a relationship between culture and nature. These are aspects which will be incorporated within this next design stage.

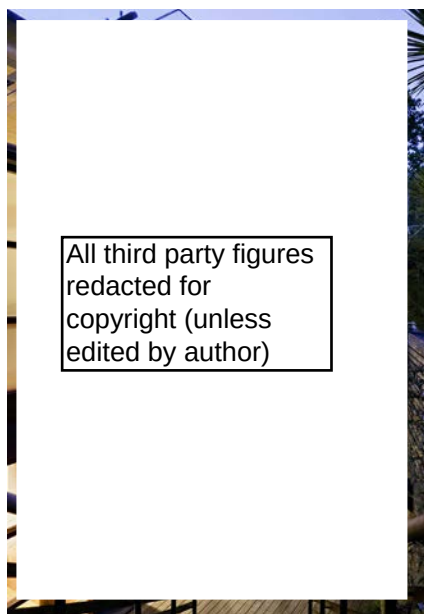


Figure 3. 27 : Clifford-Forsyth House (Ume)

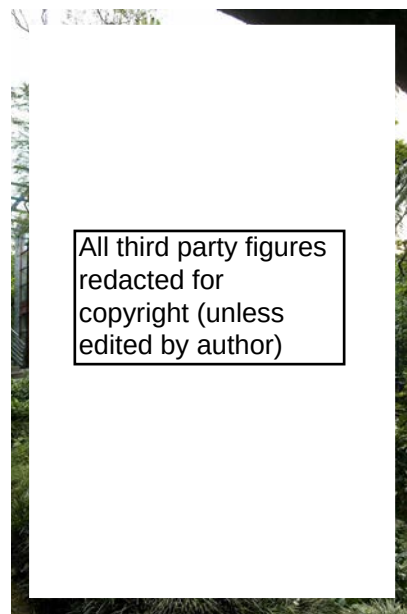


Figure 3. 29 : Clifford-Forsyth House (Ume)

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edited by author)

Figure 3 . 28: Model of
Clifford-Forsyth House

HORIZONTAL CONCEPTS

TPOLOGY ONE

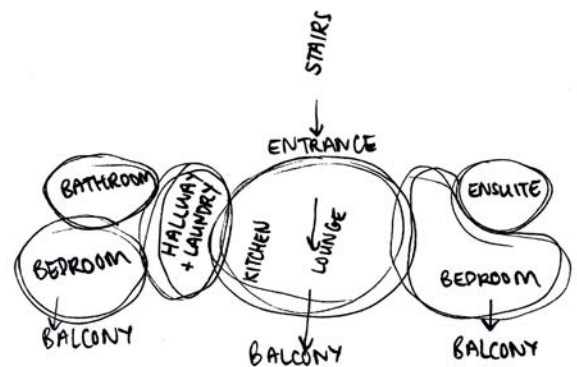
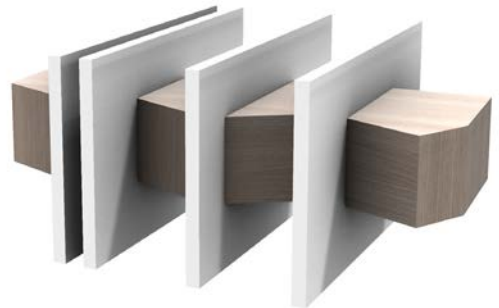
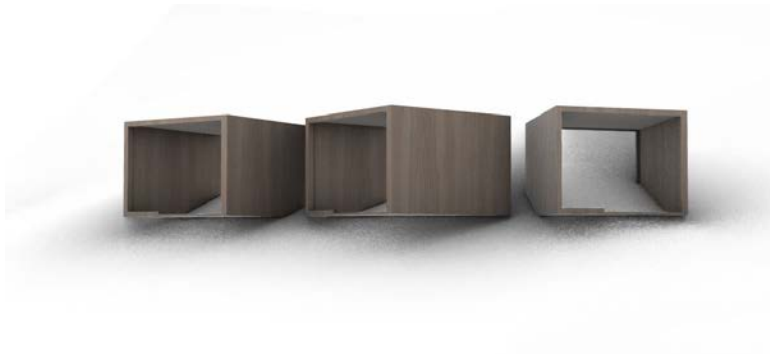
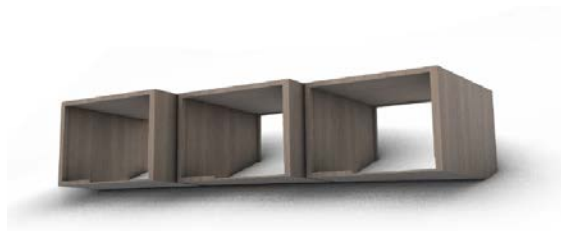


Figure 3.28: Spaces



Figures 3.29 - 34 : Horizontal Development

The main feature of this dwelling is the connection between the entrance and the verandah/balcony, throughout to the space of the ocean. As seen in the diagram above, the lounge is located in the centre of the building, acting as a 'meeting space' like the Mar-ae. This is connecting the natural landscape and ocean together. The two separate 'wings' of this meeting area are the two bedrooms, accompanied by bathrooms. All three areas of the dwelling can link up with the balcony which faces North-west.



THE BUTTERFLY ROOF

Influenced by Glen Murcutt's use of a 'butterfly roof', the roof portrays a V-shaped structure with adjacent panels. The two roofs slope downward towards the centre where rainfall can then flow into the gutter. Murcutt states that roofs don't only provide cover and protection from the sun and rain, but also act as active agents in ventilation and evaporative cooling techniques (Cooper, 2002, p.3). Therefore, the use of this 'butterfly roof' is effective for these principles.

THERMAL EFFICIENCY:

Is able to allow more entry of natural lighting which reduces the overall cost of energy costs. The roofing plan also allows the room to retain enough heat especially in the colder winter months. It is able to enhance proper ventilation into the interior space through the celestory windows. This reduces the energy demand and costs overall of the project.

WATER HARVESTING:

The direction of the slope on both panels allows maximum collection of rainwater which benefits rainwater harvesting.

"I enjoy the building breathing and letting the cool air pass through the house, and over me, as though the house were a filter between myself and the outside" (Murcutt, 1999, p.79).

THE VENTILATION PROCESS:

The use of clerestory windows are able to help the natural ventilation strategies. This asymmetrical opening near the ceiling of both sides of the central lounge space is able to capture light and peeps of nature. These are able to open up which are able to ventilate rising warm air and creates air movement. Clerestory windows are also located on both the sides of the dwelling on the bedrooms and bathrooms which also help with privacy along with letting air in and out.

As previously researched, low level North-easterly winds have been recognised as a dominant feature of the wind regime in Canterbury. These north-facing clerestory windows would therefore be able to maximise the suns warmth and allowing coastal air to pass through the home.

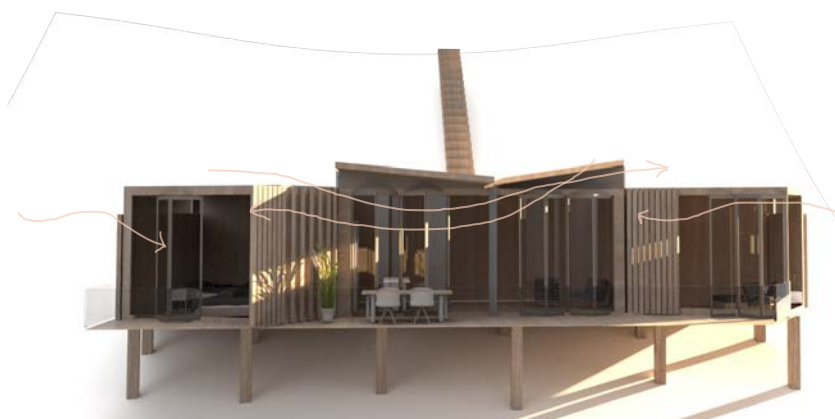


Figure 3.35 : Horizontal Circulation



Figure 3.36 : Exterior

HORIZONTAL CONCEPTS

TYPOLOGY ONE PLANS

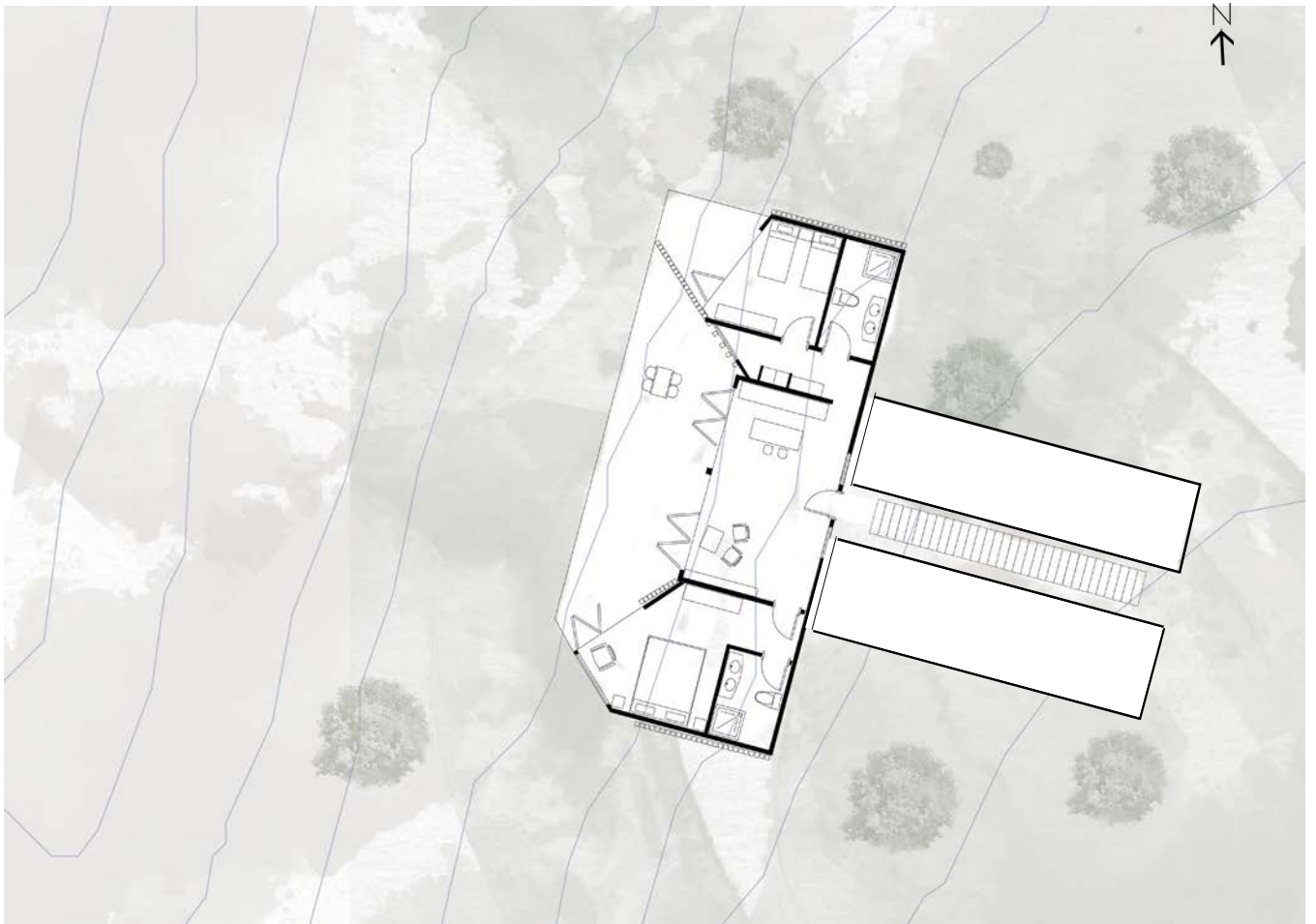


Figure 3. 37 : Horizontal Floor Plan



Figure 3. 38 Exterior Render

TYOLOGY ONE SECTIONS

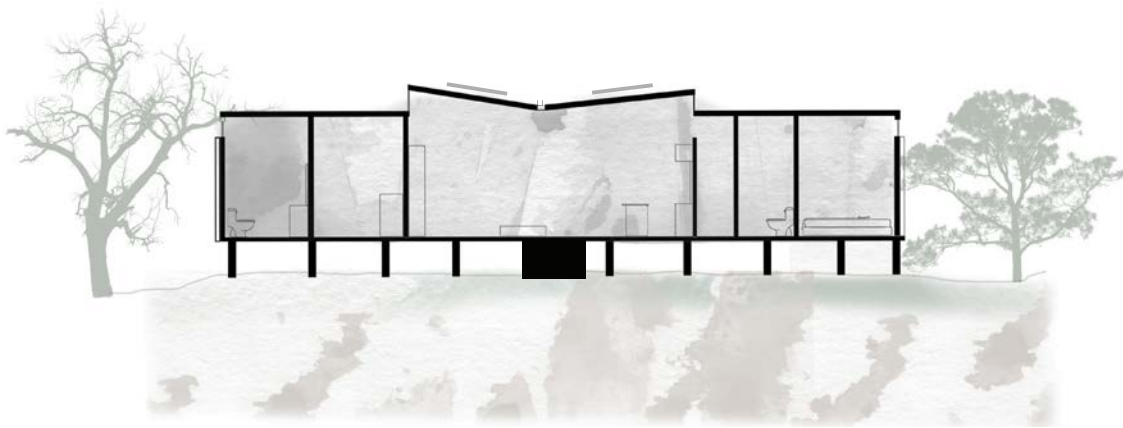
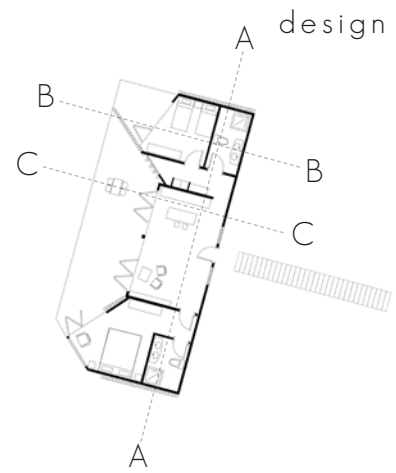


Figure 3.39 Section AA



Figure 3.40 Section BB



Figure 3.41 Section CC

INTERIOR + EXTERIOR RENDERS





Figure 3. 42 - 47: Exterior Renders for
Horizontal Design

PROJECT TWO DEVELOPMENT

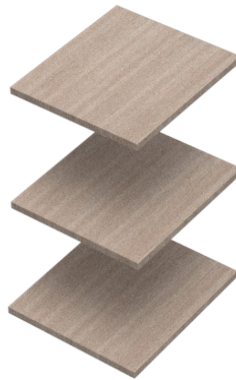
macrocarpa timber



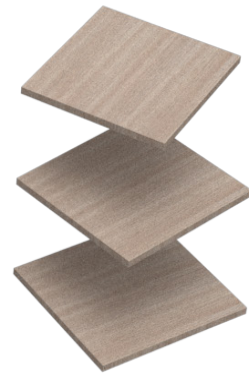
Responding to site has become more of a prominent idea within the development of this research.
Menzies Bay



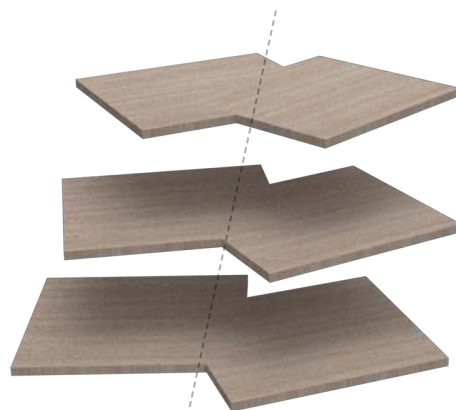
Levels



Shape



Orientation to light



additions for bigger dwelling

split in half to create two dwellings



Figure 4.0 : Exterior

TPOLOGY TWO PLANS



Figure 4.1 Lower Storey Plan (1:50)

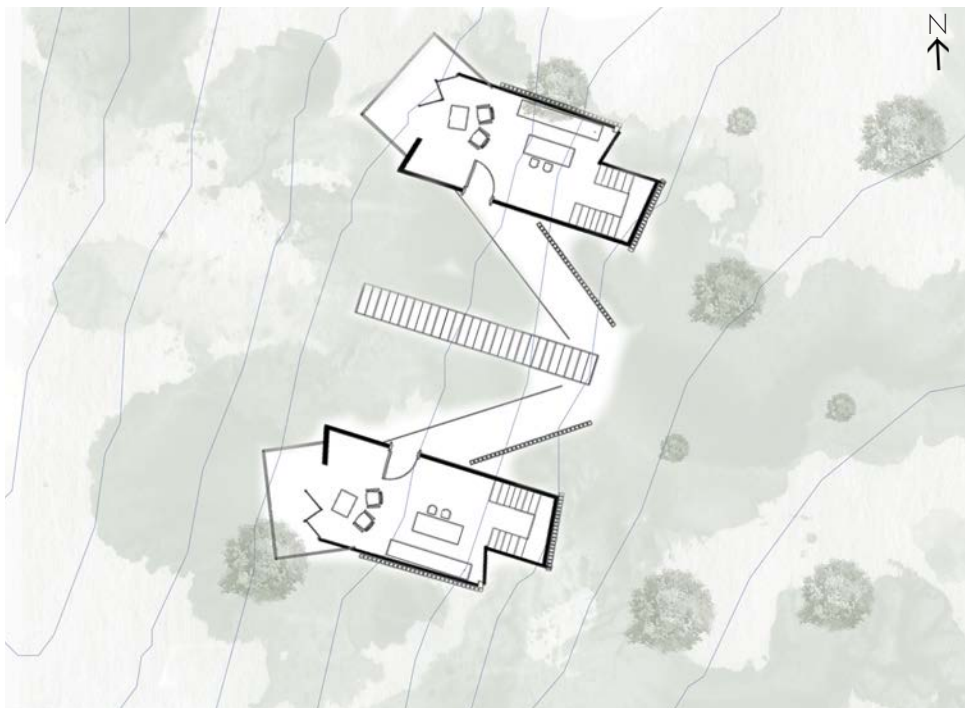


Figure 4.11: Lower Storey Plan (1:50)



Figure 4. 12 : Exterior render of butterfly dwelling.

RESOLVED SITING PLAN
MENZIES BAY FOR PROJECT TWO

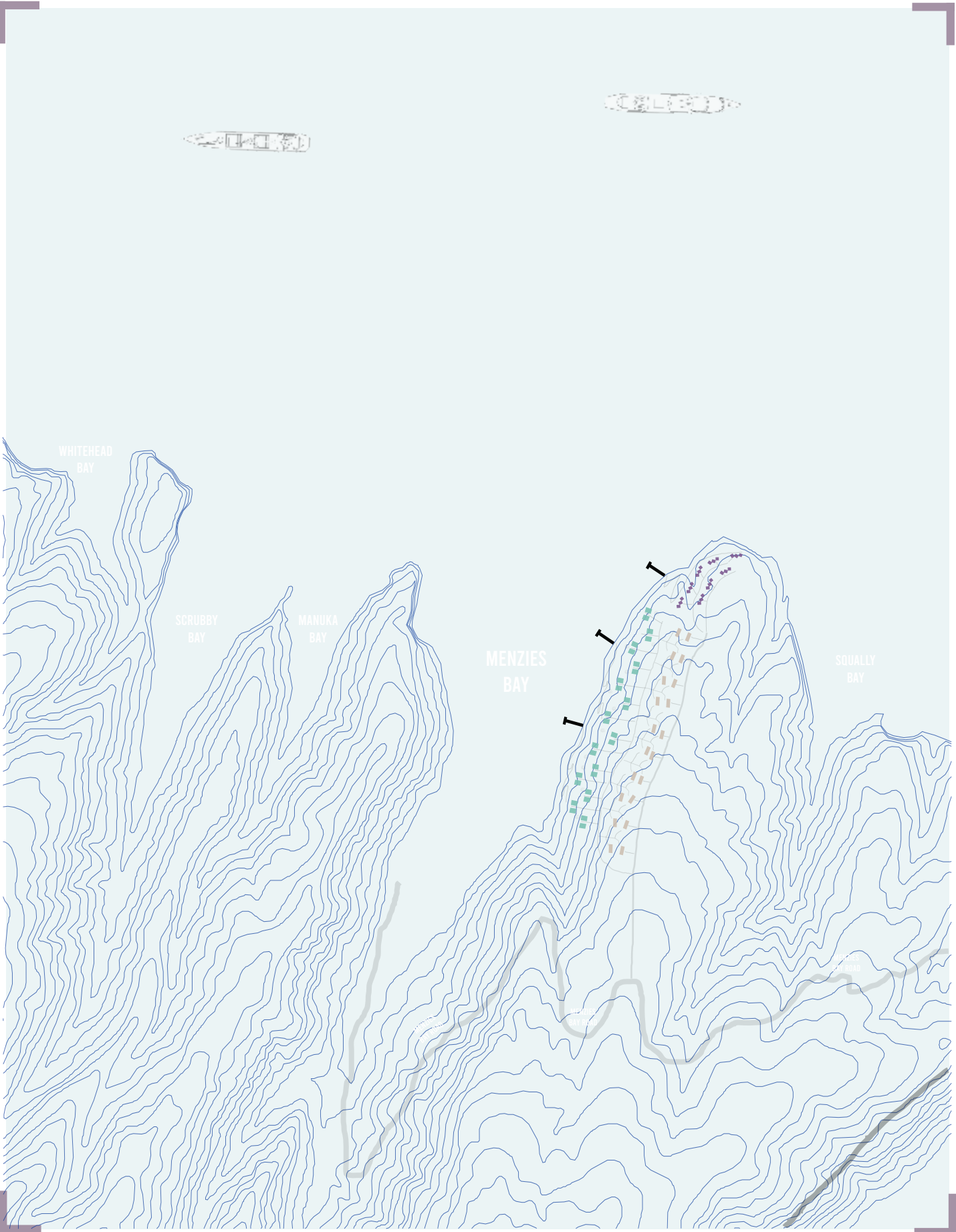
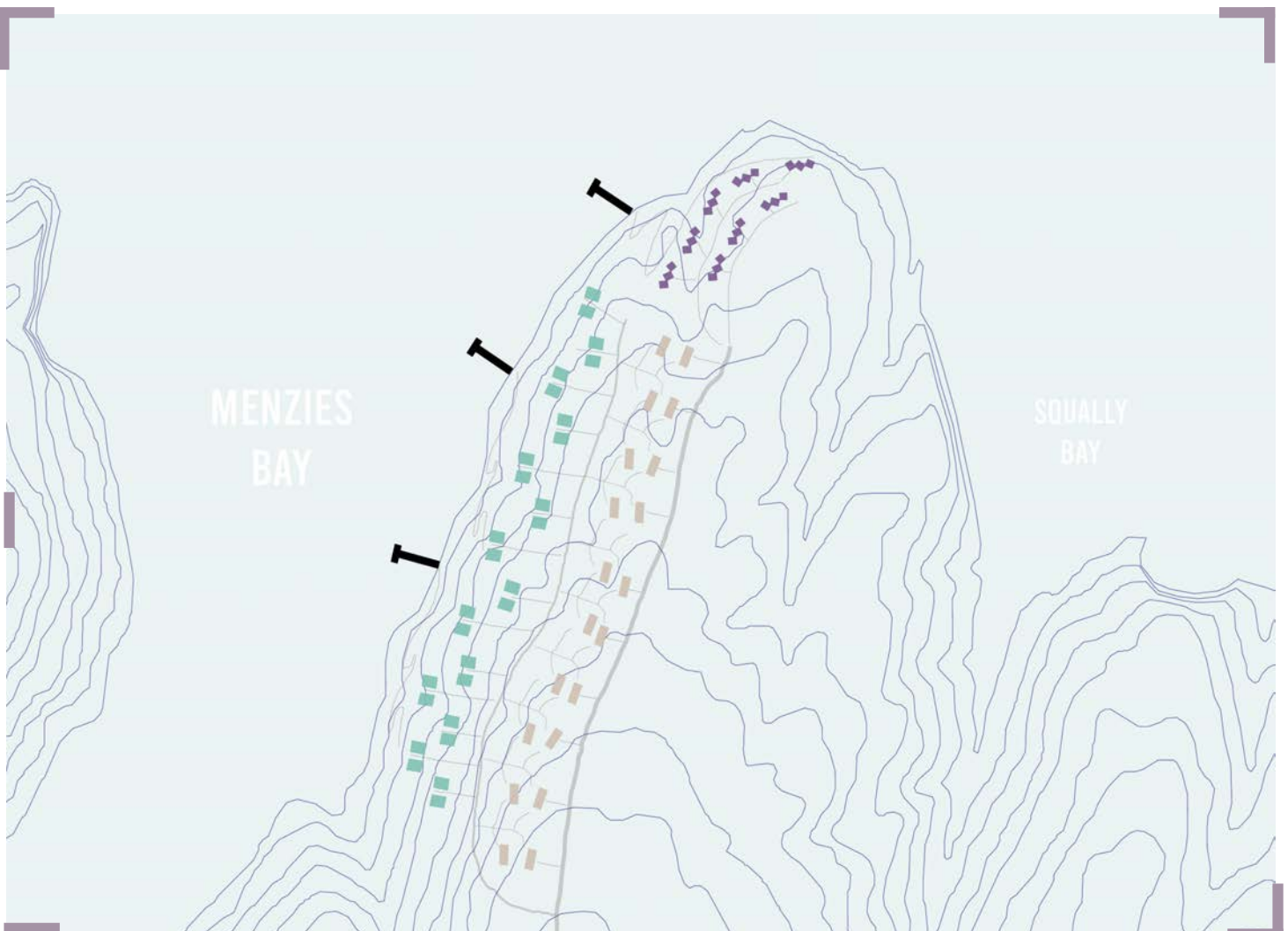


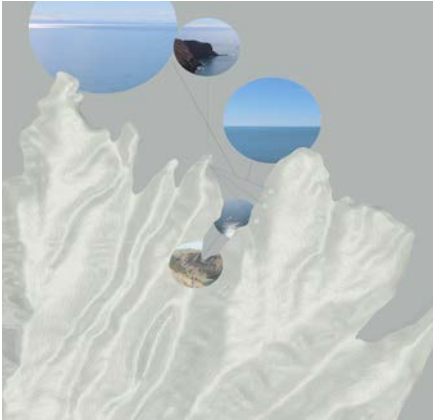
Figure 4. 13 : Siting Plan



Figure 4. 14 : Project 2 Site Section



SITING PLAN



The following siting plan which is explored will follow three different contours and this therefore is able to emphasise the dwellings being able to follow the contours and be parallel. This is therefore able to create a less impact environment. Parallel to contours means that less excavation would be needed. As this site by Menzies Bay is remotely located, less excavation would be an advantage to its sustainable ways.

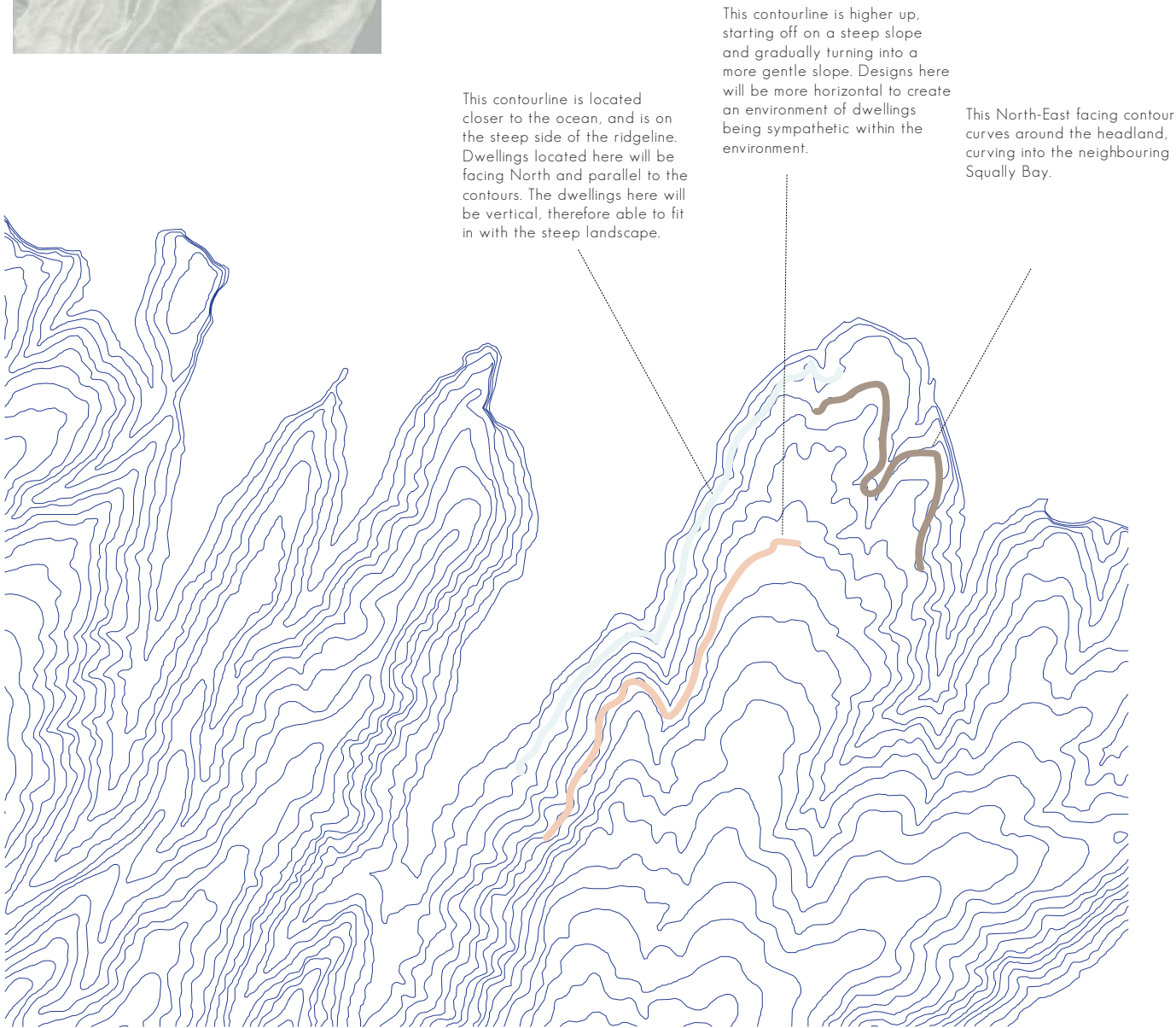
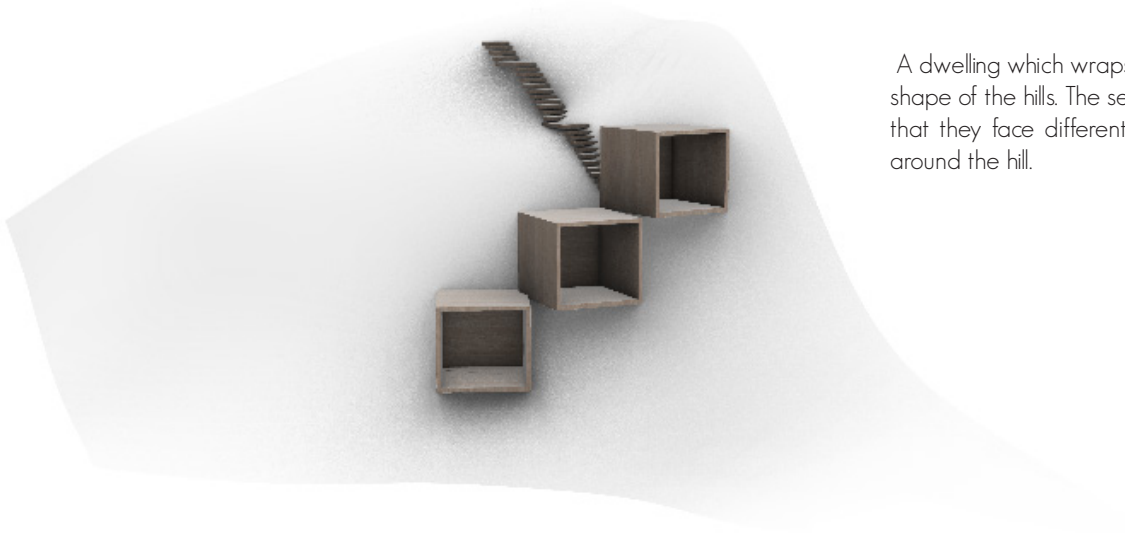


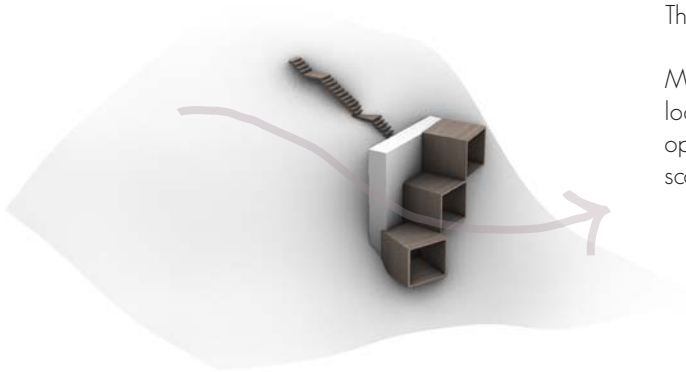
Figure 4. 15 : Siting Plan



TPOLOGY THREE CONCEPTS

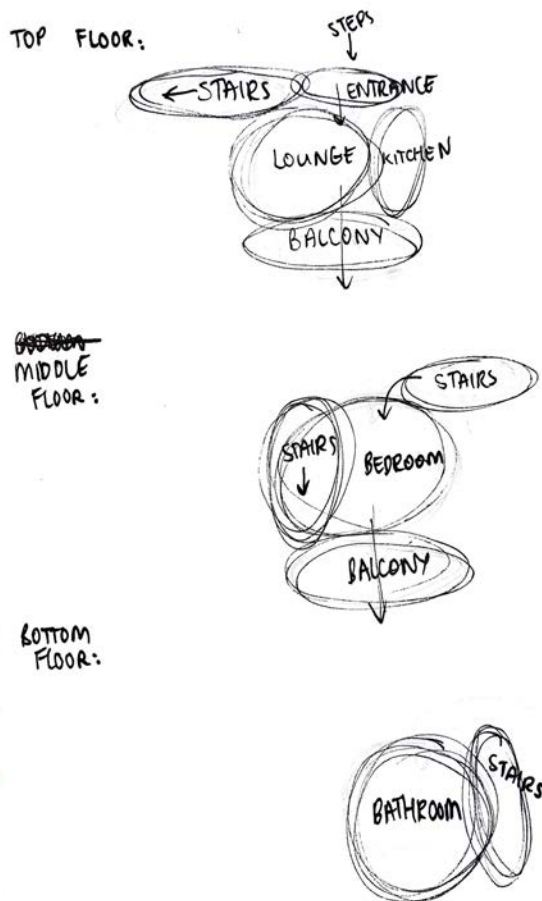


A dwelling which wraps around the contours and the shape of the hills. The separate 'cubes' are twisted so that they face different directions and almost wrap around the hill.



The concept of facing the sea:

Much like the space on the Maori Marae, the space is open and located in the natural landscape so that it faces outward to the open element of the sea. This strategy is able to place the landscape itself as the dominant value.



VENTILATION:

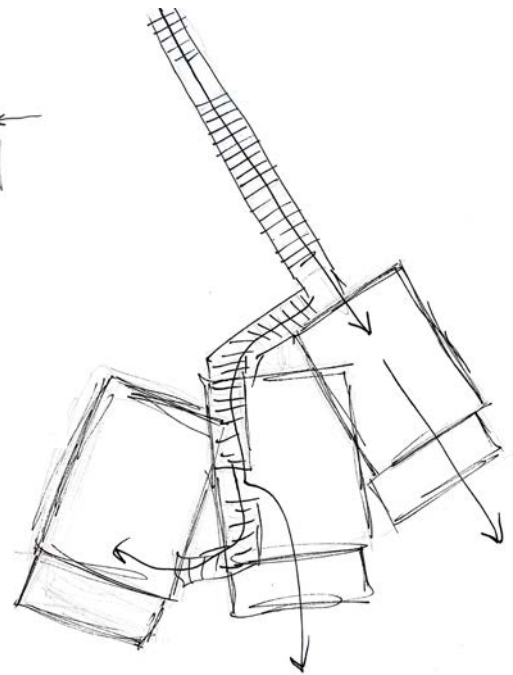
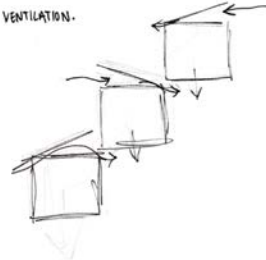


Figure 4. 20: Spatial Plans + Diagrams



As seen in the diagrams above, a passive design feature of the clerestory windows are able to let natural air and sunlight in. It is able to create air movement within the house. These windows are also able to create privacy and let air in at the same time. Bifold doors are also located at the front of the top and middle 'cubes' which also allow access onto the balconies/look-outs which open up towards the sea.

Figure 4. 21: Exterior View

TYPOLOGY THREE FLOOR PLANS



Figure 4. 22. Upper Floor



Figure 4. 23 Middle Floor



Figure 4. 24 Lower Floor

TYPOLOGY THREE SECTIONS

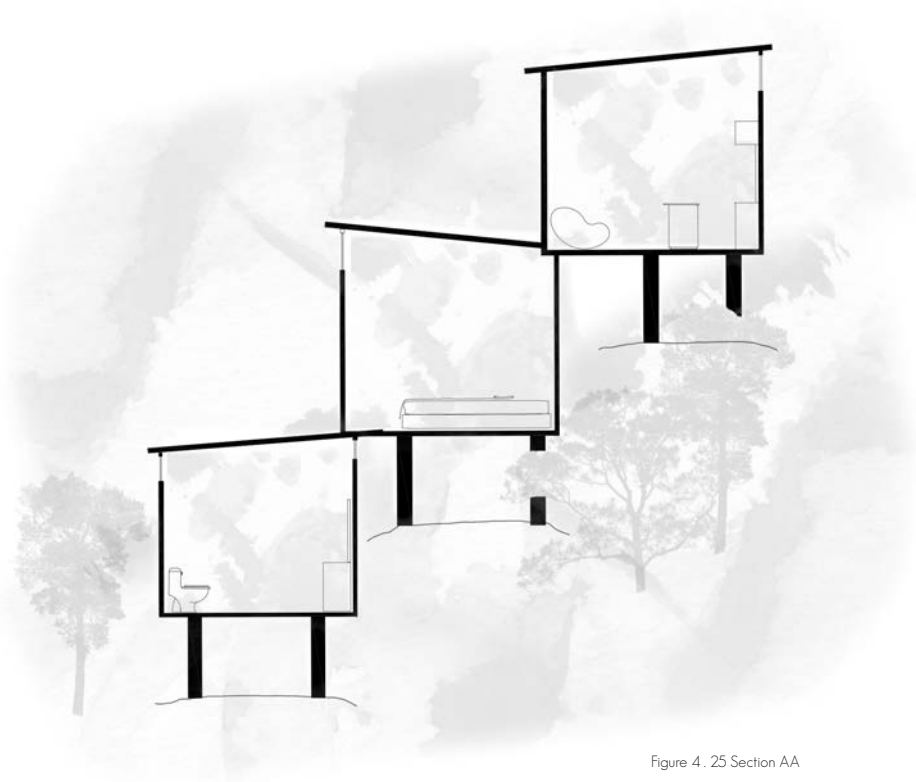
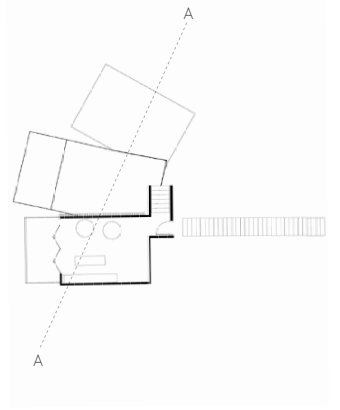


Figure 4 . 25 Section AA



Figure 4 . 27: Exterior View

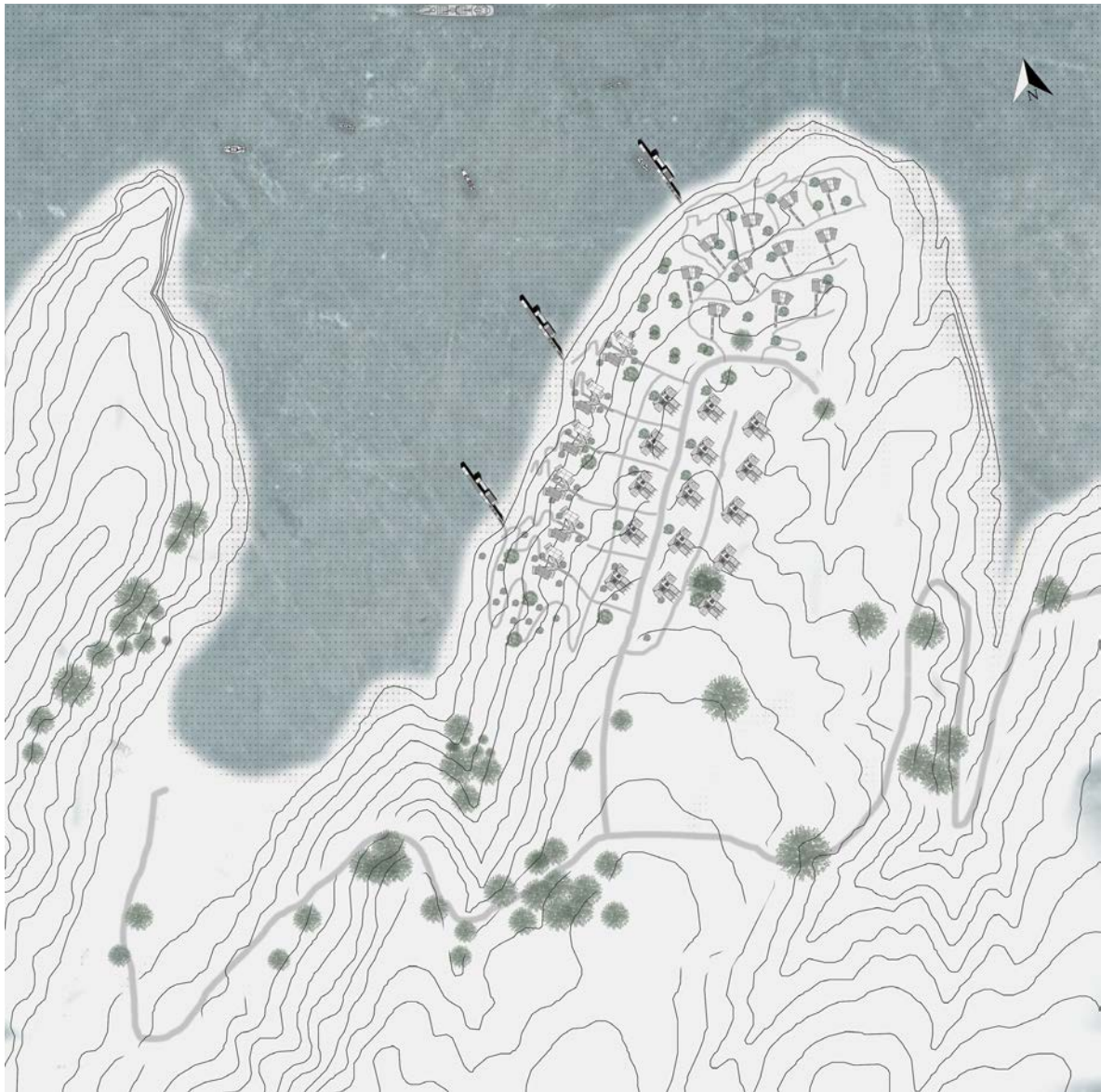
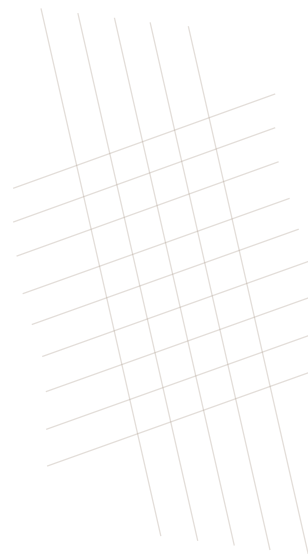
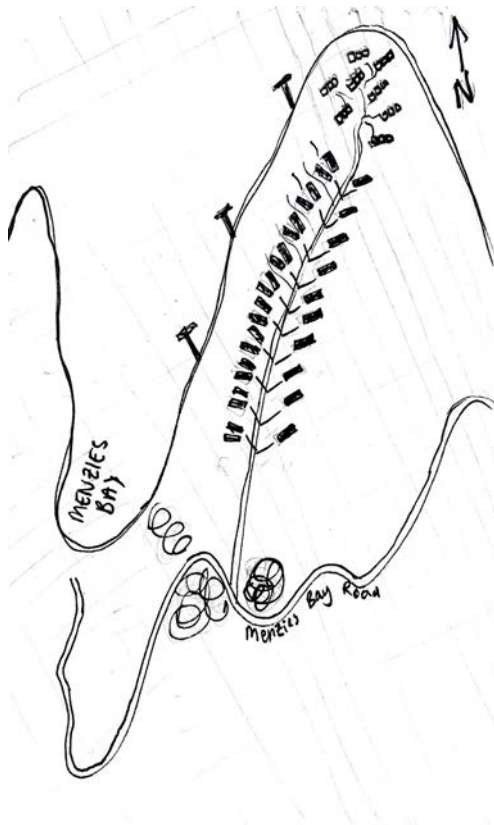
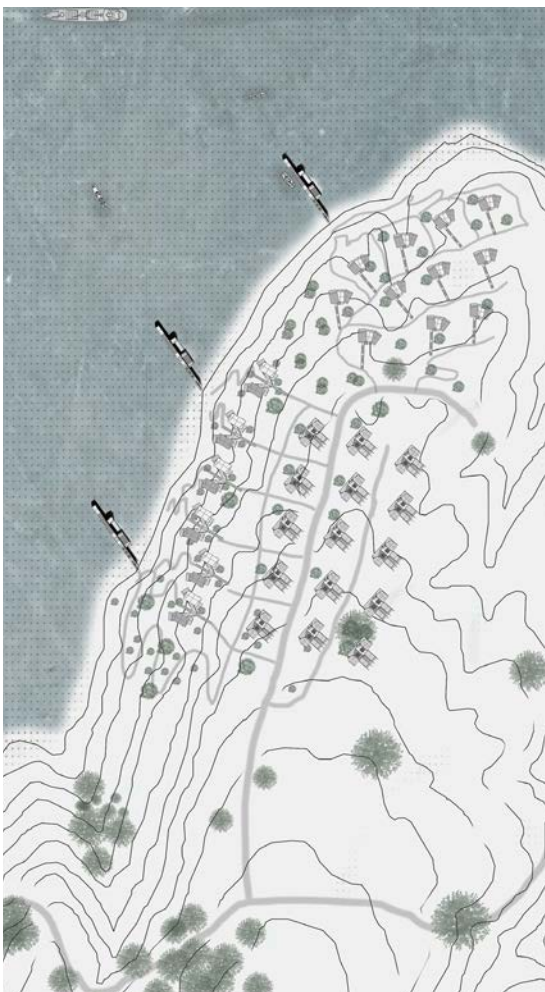


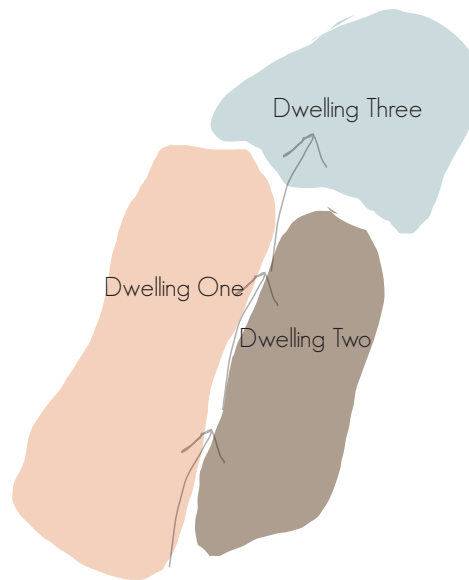
Figure 4. 28: Improved Siting Plan

This first initial siting iteration for design project two follows through with a



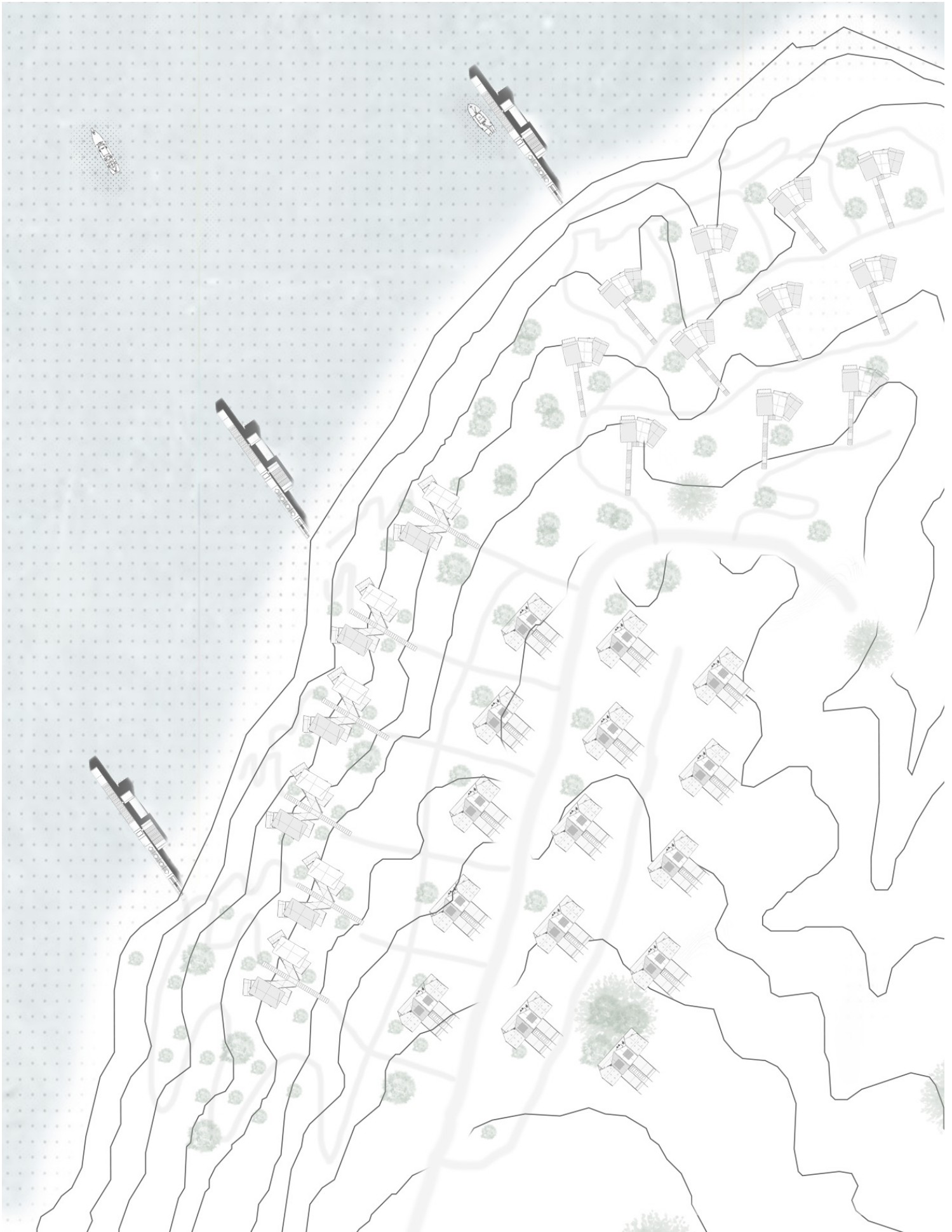
The following iteration follows through with a Northern directed grid, routes and walkways facing North which is able to emphasise the North facing dwellings which is a low-impact strategy.





It is important for all dwellings to be facing the Northern direction in order to maximise the sunlight, and also able to fit with the contours.

The road off Menzies Bay Road follows straight down the headland which separates the three different clusters. This is the main access road for all clusters, which then separate out into pathways to access the dwellings.



PROJECT TWO

REFLECTIONS

Project Two of the research delved deeper into the low-impact strategies and the influence from traditional Maori Maraes and Pa's which relate to the history of the site.

More of an iterative process was used for the design of the dwellings, which was able to improve each design according to its site and the prominent views that surround it. The idea of creating and experimenting with two separate dwellings joined together but with sufficient privacy between the two was introduced with typology three. The connected dwellings with a shared entrance are symmetrical and therefore will provide accessibility and masterplan the importance of accessibility to the water.

Design project one's common theme of vertically and narrowly stacked structures has branched out within project two, with designing horizontal narrow dwellings and still relating to the contours of the site. Horizontal concepts are also able to merge in with the landscape a bit more successfully compared to the vertical which stick out of the land. This is why the other vertically designed typology has been located on the steeper slope, located closer to the water, which would be less disrupting than if it was located higher and on more of a gentler slope.

Next objectives to further research and focus on within design project three:

- Researching the larger scale and connections of site
- The landscaping and vegetation surrounding the typologies
- Looking into the use of these dwellings
- Connecting the dwellings together and the use of public space.
- Exploring the use of curved designs which are able to curve into the landscape.



DESIGN PROJECT THREE

FINAL RESEARCH + DESIGNS



CHAPTER

BREATHE ARCHITECTURE

FURTHER SUSTAINABLE CONSTRUCTION RE-
SEARCH

NEW + IMPROVED STRATEGIES

PREFABRICATED DESIGNS

THE CONTOURS

TPOLOGY ONE FINAL DESIGN

HORIZONTAL VS VERTICAL

TPOLOGY TWO FINAL DESIGN

SITE SECTIONS

BREATHE ARCHITECTURE

Breathe Architecture is a firm which maximises positive impact and focus on sustainable homes which are able to have a connection with land, waters, and culture.

Designed to be deconstructed and reused, every piece of 'Edgar's Creek House's' cladding and decking has been screwed and bolted together rather than glued or permanently fixed, enabling materials to be dismantled and reused at the end of the building's life.

Incorporating recycled timbers and rammed Earth reflective of its natural surroundings.

The house is separated into three 'pavillions' which include sleeping, bathing, and living, and are all connected together by a central 'brise soleil'. This provides a visual connection to the water and climate, while also physically connecting these pavillions together.

'Materially, the building becomes part of the landscape, rather than an object inserted into the site'. -Jeremy McLeod.

Edgars Creek House is known to be a reconnection with the essential qualities of a landscape, and "is about the country and the landscape in which exists, and offers a way to live as a part of that system rather than trying to preside over it" (Onans, 2020).

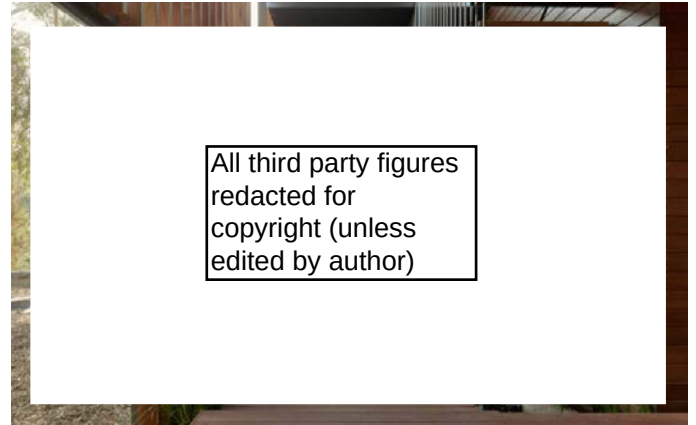


Figure 5.0 : Edgar's Creek House (Ross, 2018)

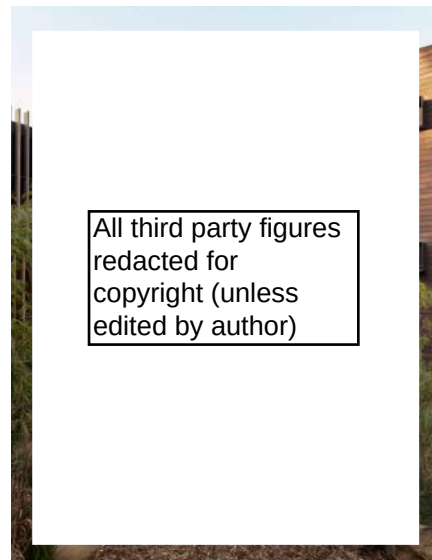


Figure 5.1 : Edgar's Creek House (Ross, 2018)

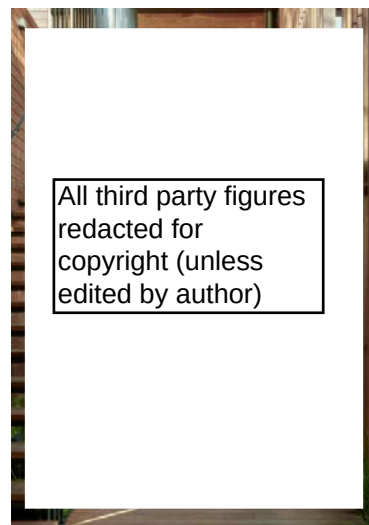
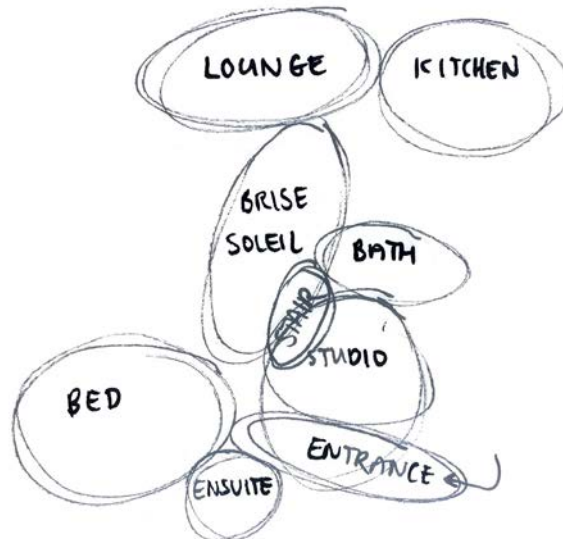
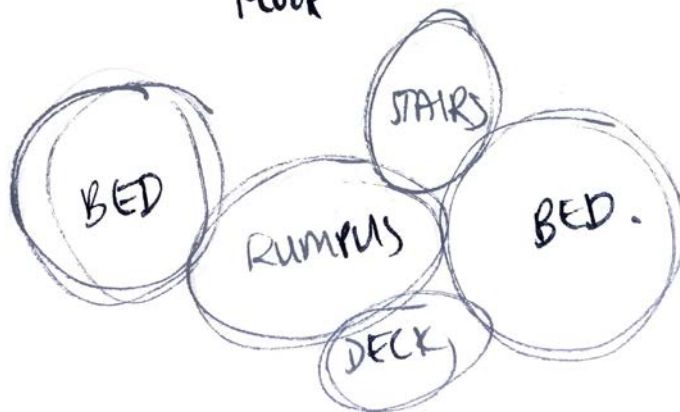


Figure 5.11 : Edgar's Creek House (Ross, 2018)

LOWER FLOOR



UPPER FLOOR



NEW + IMPROVED DESIGN STRATEGIES

WALKING TRACKS:

- Better access towards the water / Littoral Zone and Bays to create a greater connection with the coast.

PUBLIC vs PRIVATE:

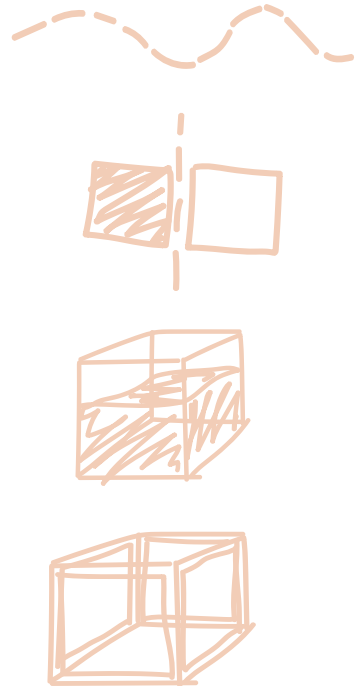
- Differentiating the public spaces to the private spaces, and allowing the dwellings to be private open spaces which are differentiated from the publicly accessible spaces.

IMPROVED STORAGE AREAS WITHIN DWELLINGS:

- Making use of space underneath dwellings,

PREFABRICATED DESIGNS

- Introducing the idea of prefabrication and how this can limit impacts from the construction phases.



This chapter follows the processes of the third stage of designs; more resolved concepts which are able to answer the initial research question of creating a sustainable development on the coast which is accessible for a range of people.

PREFABRICATED ARCHITECTURE

Prefabricated designs involve building various components at a particular location which are then transported to site. An example of a prefabricated home is the 'Mod.Fab' home designed and built by Frank Lloyd Wright. It is composed of prefabricated elements which included a steel frame and structural insulated panels which were built off-site. These building materials and methodology were chosen to allow for speed and economy, both on site and where they are made. The house can also function off-grid, with systems in place for rainwater collection and the reuse of grey water. Solar panels are also placed for maximum exposure. It is known to be an example of a 'simple, elegant and sustainable living in the desert' (Richardson, p. 106, 2014).

It consists of two enclosed volumes which are separated by a breezeway, as seen in own diagram below, and covered by a flat roof that extends beyond the wall planes at both ends. The openings are aligned so that there is a vista through the entire length of the house.

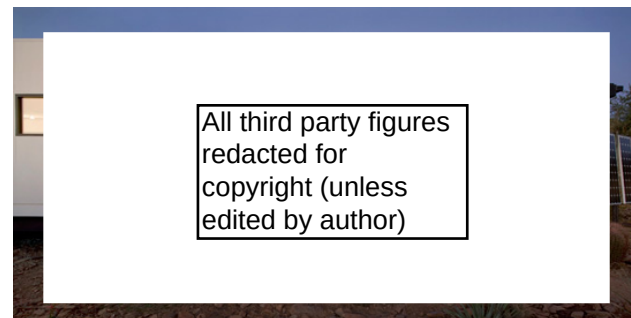
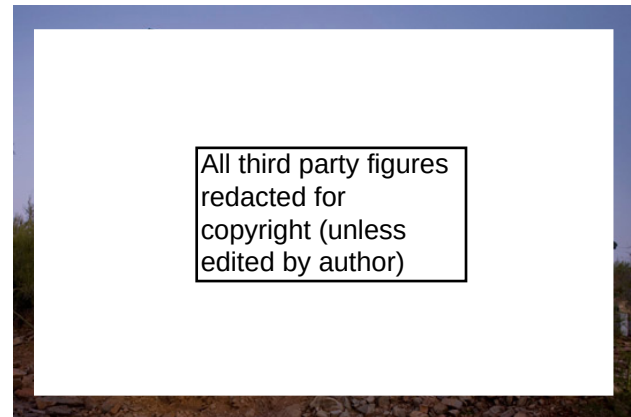


Figure 5. 12 - 13: Mod.Fab Exterior (Timmerman, 2009)

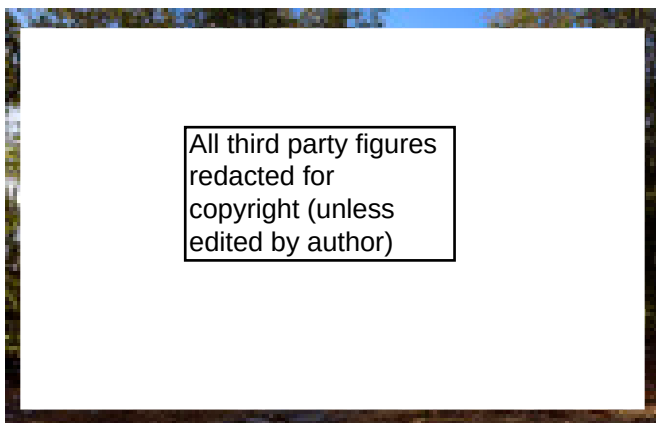


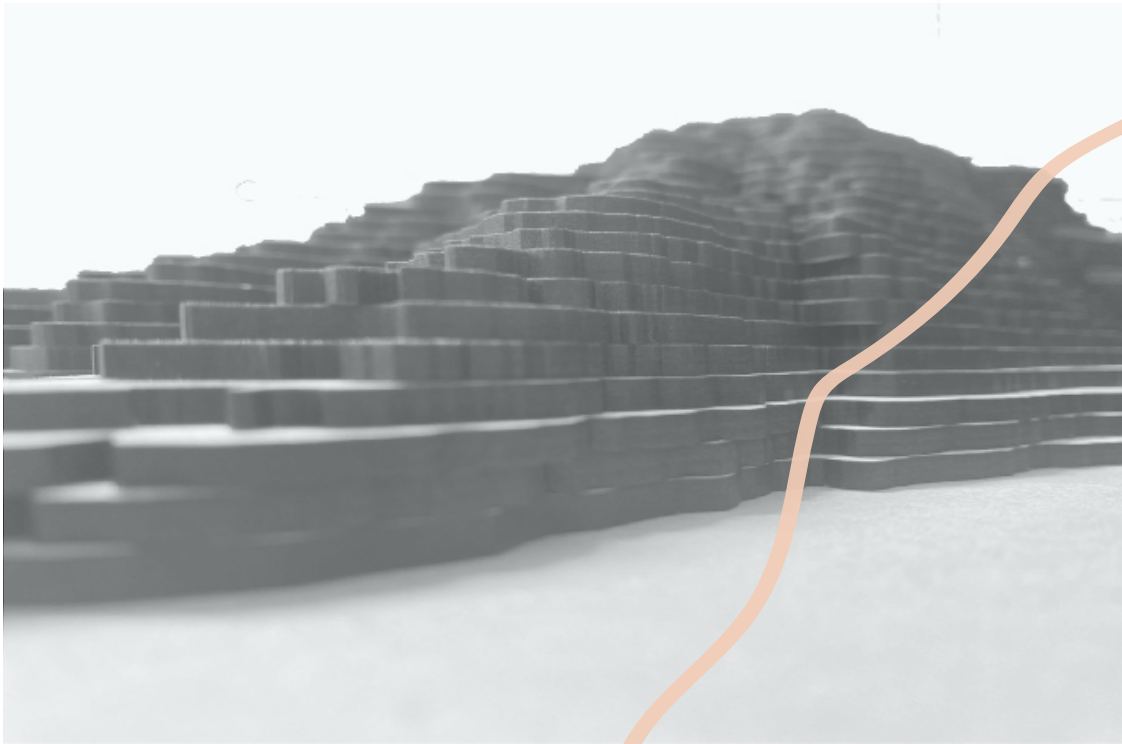
Figure 5. 14: Cape Russell Retreat (Jacobs, 2009)

Another example of a prefabricated house is the Cape Russell Retreat by Sanders Pace Architecture in Tennessee. Prefabrication was key to the project, which would minimise both time and cost. The use of a butterfly roof is also able to collect rainwater to a cistern on the side of the house. This raised design is able to give the building an appearance of a small, floating, sculptural presence, with an aesthetic and ecological achievement. (Richardson, p. 2014, 2014).



Figure 5. 15: Panel System (Jacobs, 2009)

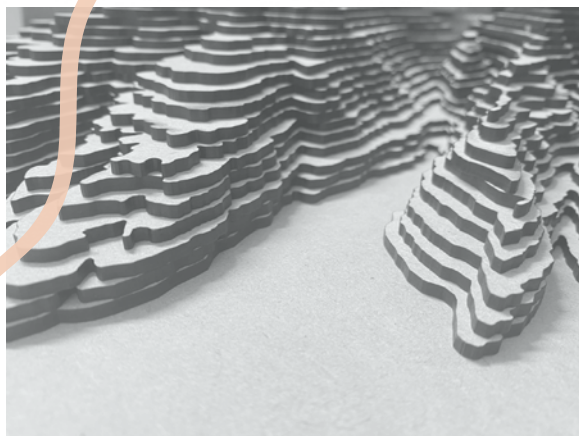
THE CONTOURS



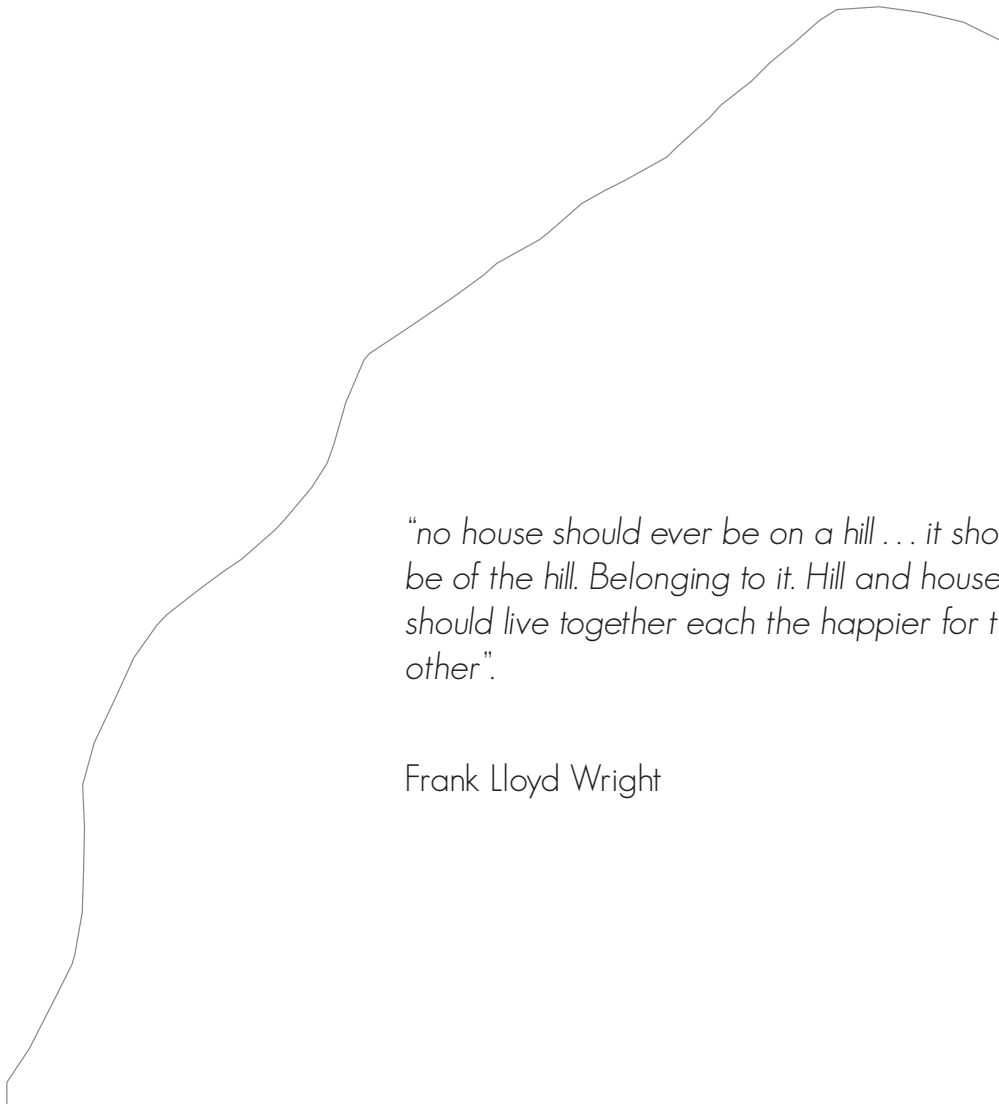
To help with the next iterations of the designs, it is important to consider the contours of the landscape leading down towards the ocean, as seen in the physical model above.

Terraced landscapes were used by the Māori previously such as Menzies Bay. As previously researched, these were specifically constructed as gardens to retain soil on steep slopes or where soils were thin.

The concept of creating a 'terraced' design is able to get the architecture to relate to its surrounding landscape. Parallel with the contours means more sustainable.



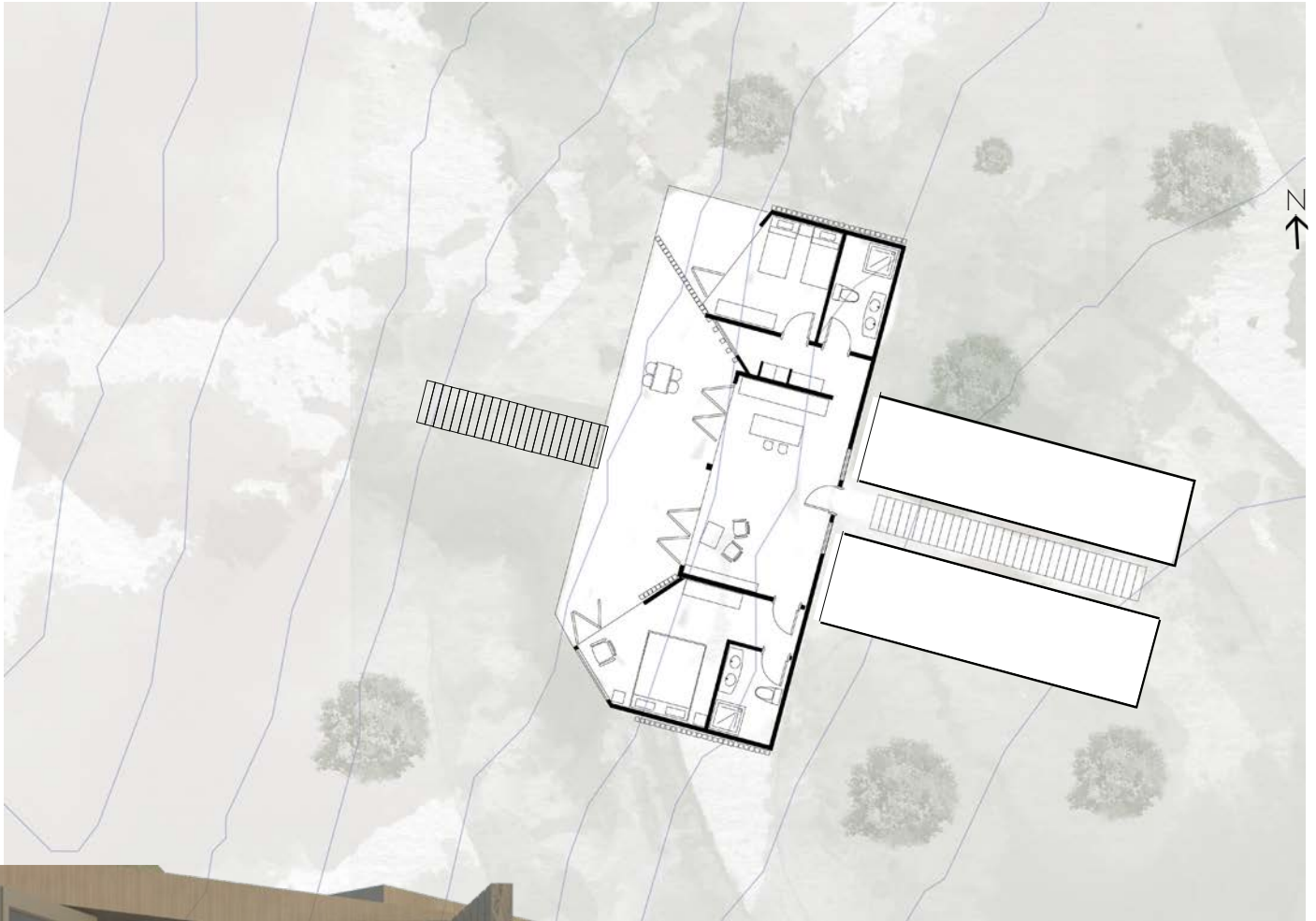
Figures 5. 16 - 17: Physical Model of Site (Authors own Work)



"no house should ever be on a hill . . . it should be of the hill. Belonging to it. Hill and house should live together each the happier for the other".

Frank Lloyd Wright

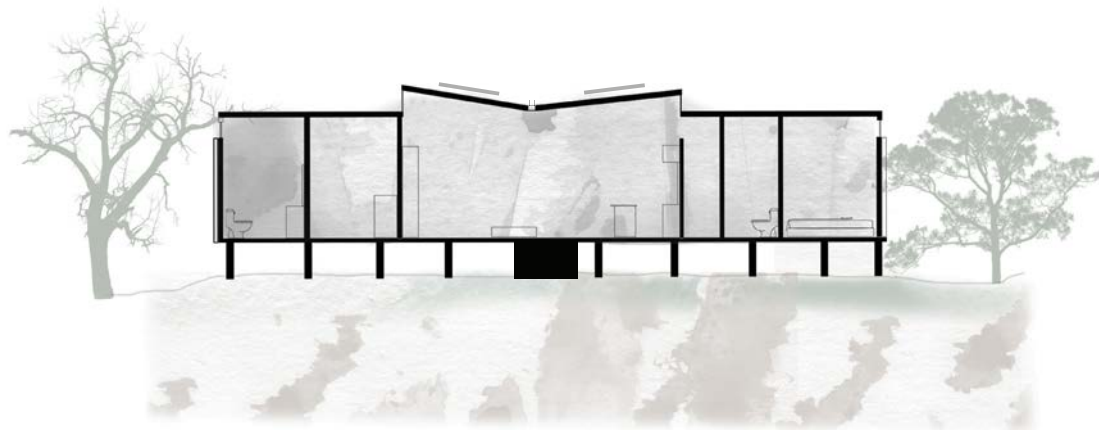
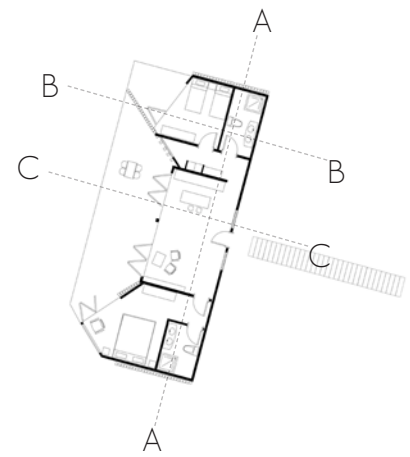
TPOLOGY ONE FINAL DESIGNS



Figures 5. 18 : Final Horizontal Floor Plan (1:50)



TYPOLOGY ONE SECTIONS



Figures 5. 19 : Section AA (1:50)



Figures 5. 20: Section BB (1:50)



Figures 5. 21: Section CC (1:50)

PREFABRICATION OF TYPOLOGY ONE

Prefabricated buildings are manufactured off-site in advance, which are usually in standard sections that can be easily shipped and assembled.

Prefabrication is able to speed up the construction process and is able to provide cost efficiency and minimal waste. Prefabrication means less construction time on site which therefore means less of an impact on site.

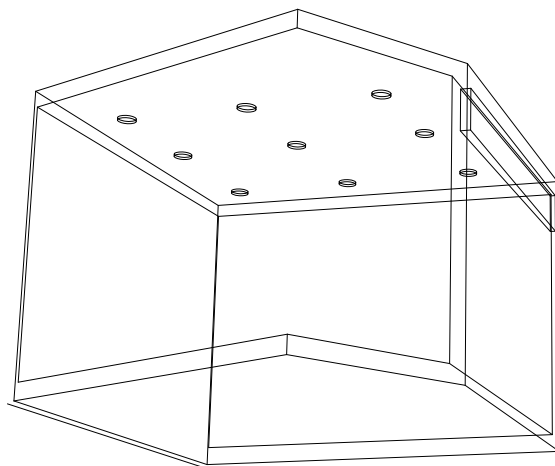
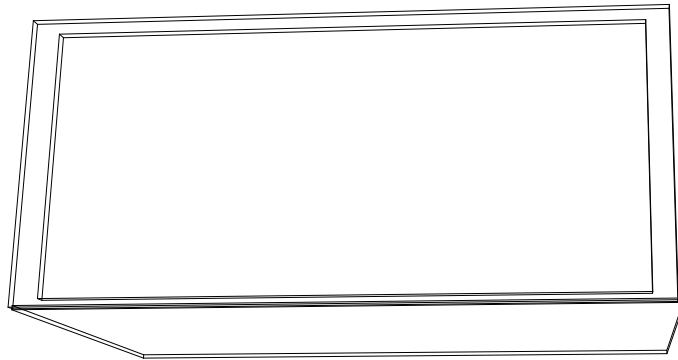
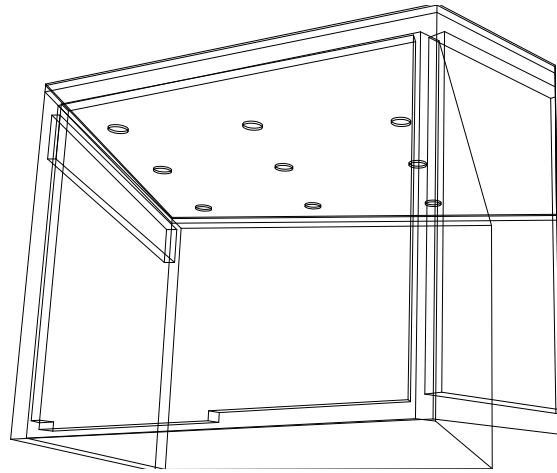
ADVANTAGES:

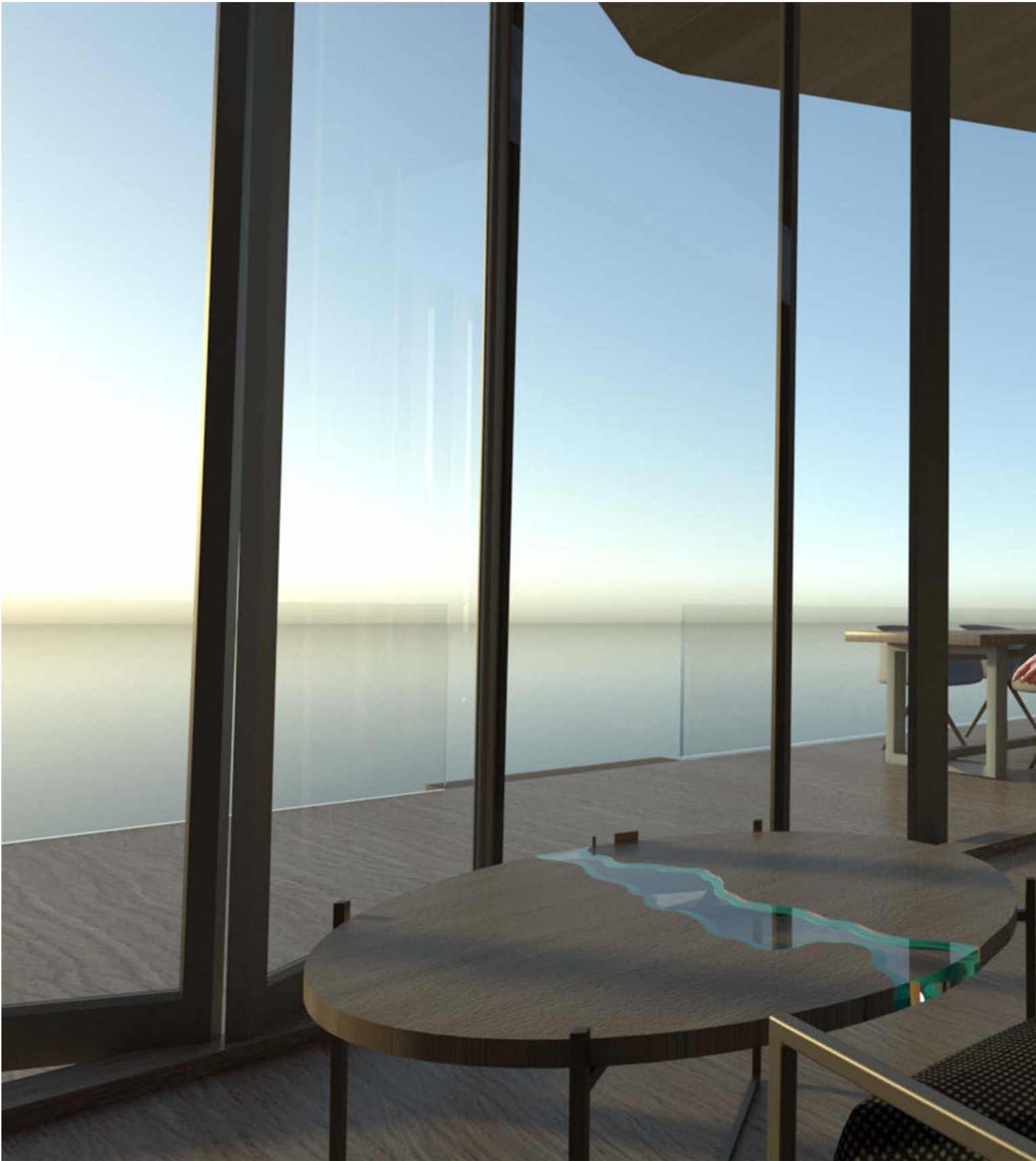
- Lower Cost
- Fast build
- Minimal site disruption and therefore sustainable
- Efficient use of materials

Prefabrication is a good option within this headland of Menzies Bay to minimise the impacts on the site. Typology One will could therefore have three different prefabricated parts which are then connected on site.



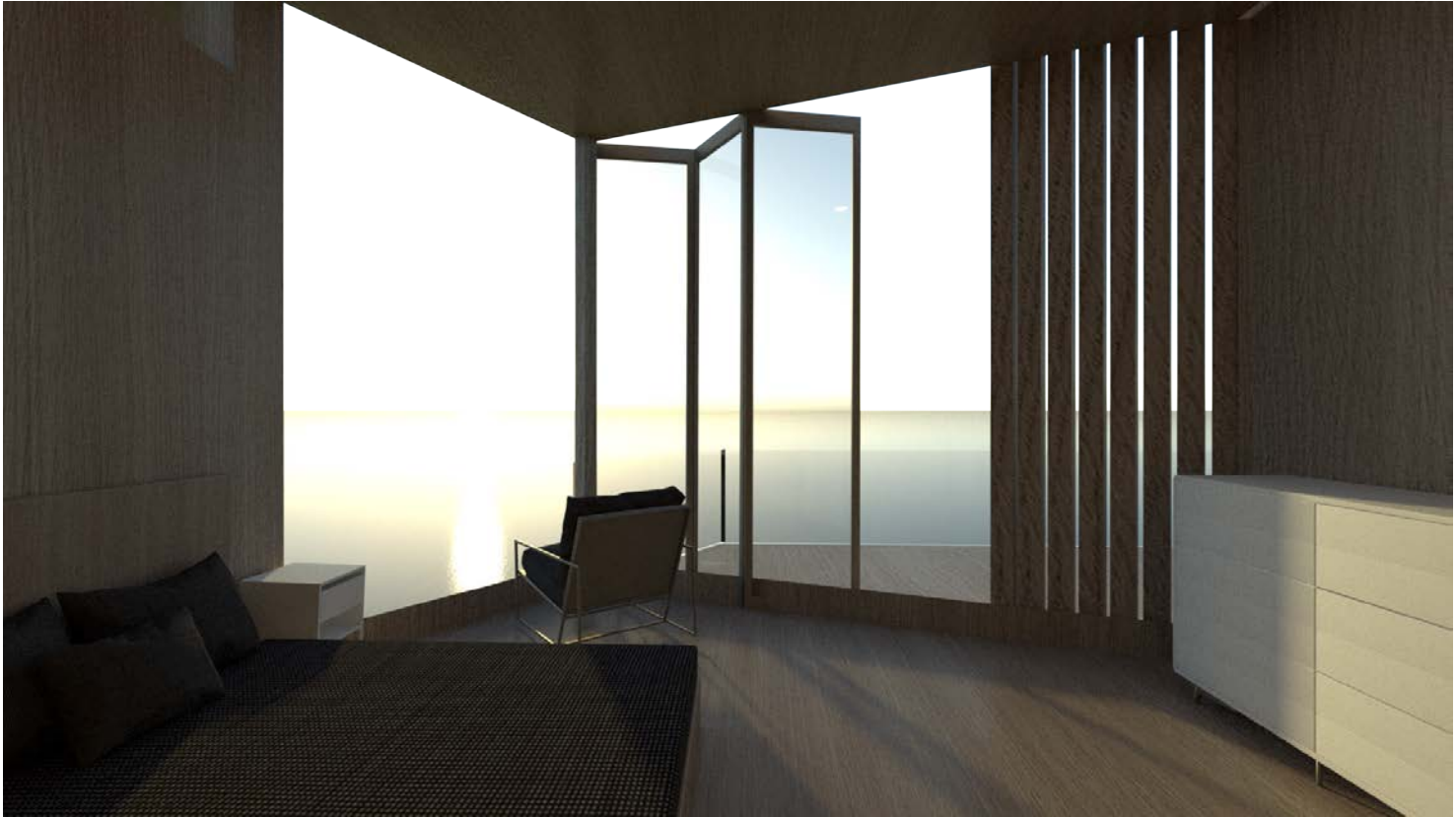
Figures 5. 22: Prefabrication of horizontal design

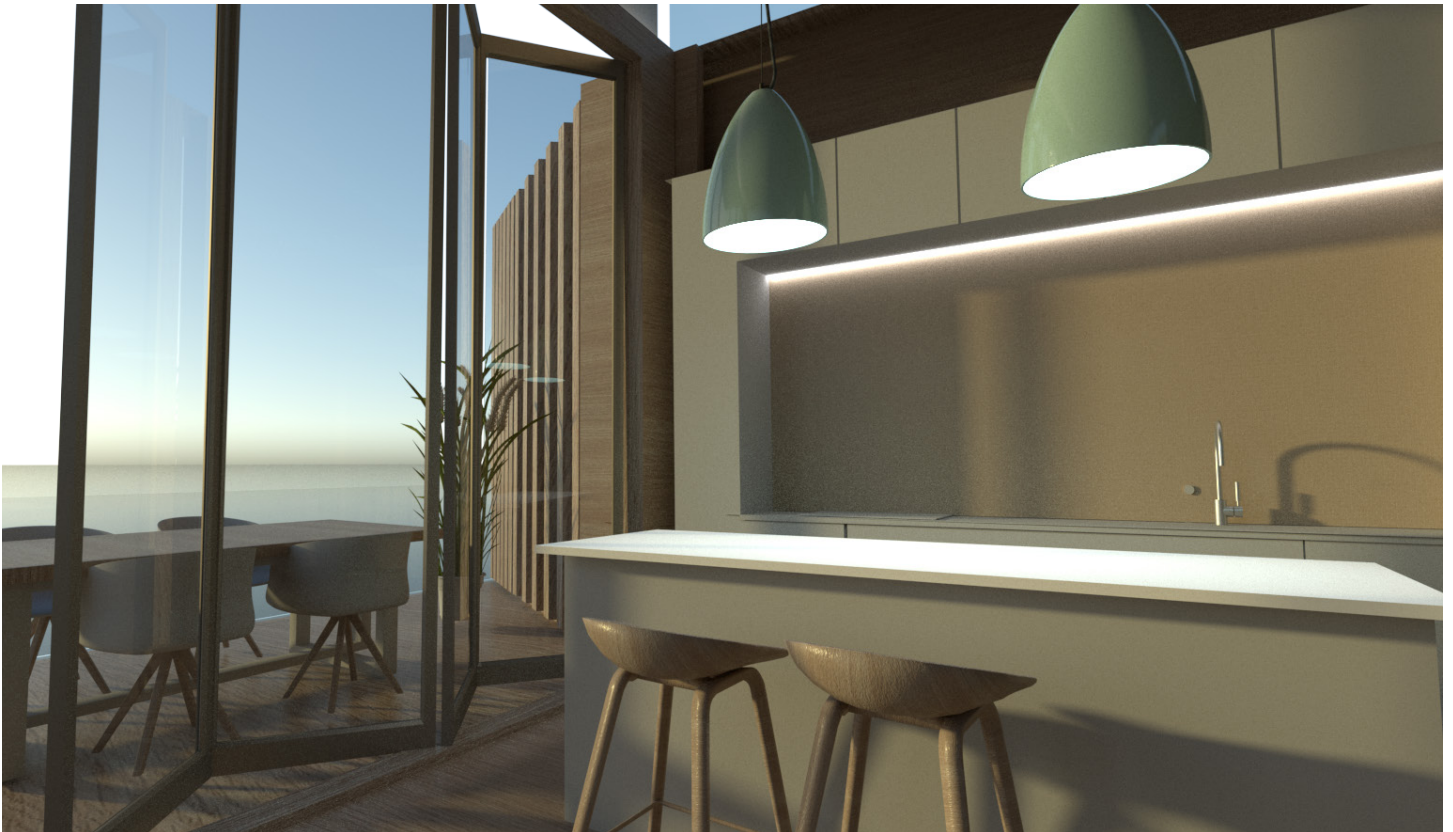






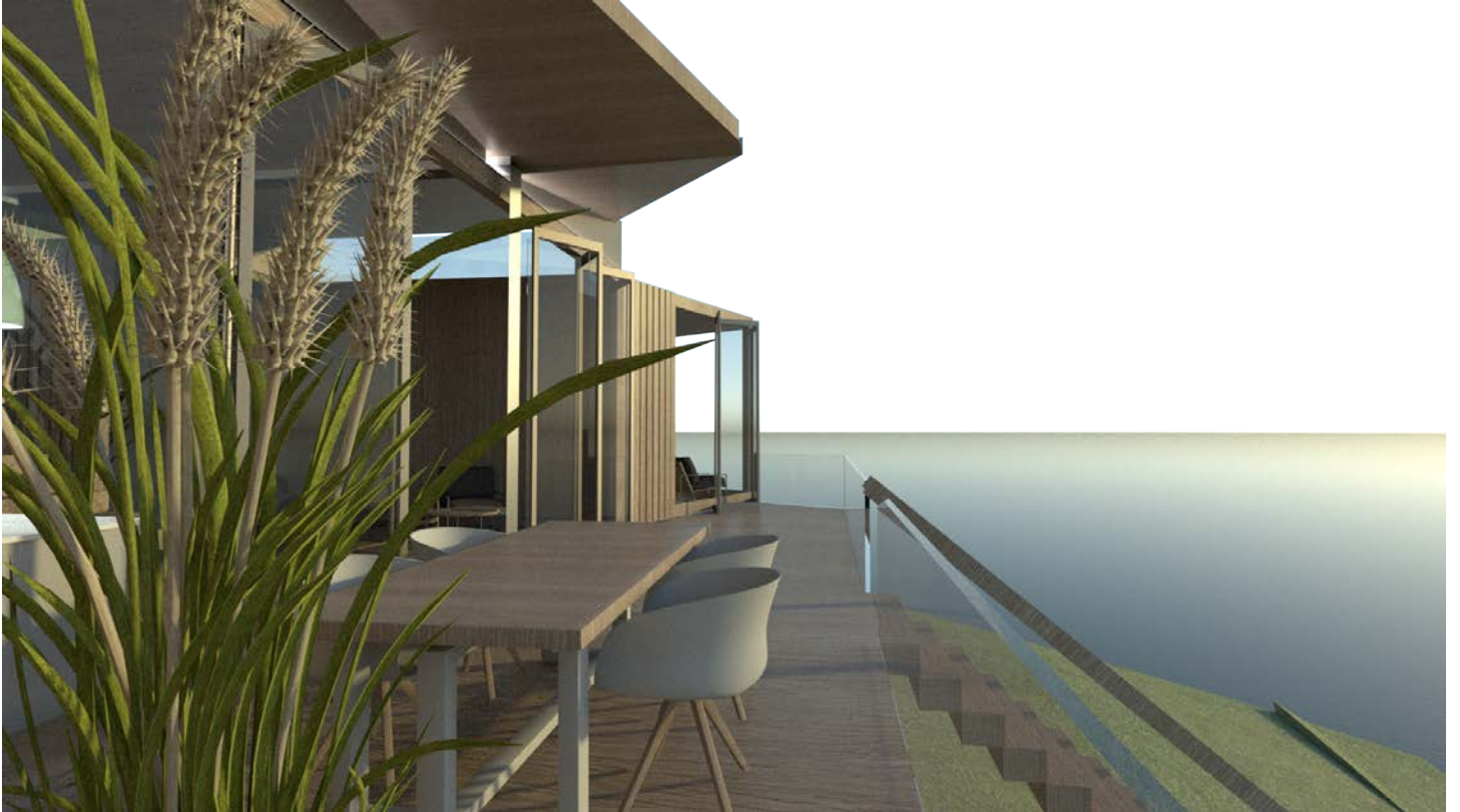
Figures 5 . 23: Interior Render of Horizontal Design





Figures 5 . 24-8: Horizontal Design Renders





Figures 5 . 29-30 : Horizontal Design Renders

HORIZONTAL VERSES VERTICAL STRUCTURES - A DISCUSSION

The construction type of a project depends on the area, land availability, and the building's purpose. This is an important discussion among this research due to the sensitivity and vulnerability of the site and the need for respect of this natural environment.

Housing is known to be a social condition that is able to determine the welfare of its inhabitant. The housing location and quality, which is influenced by the social environment, economy, and culture, defines the life of the inhabitant (Onibokun, 1974).

The physical housing environment needs to be built upon culture, faith, and the user's experience (Ismail, 2012).

HORIZONTAL Designs:

- Are characterised by a more pronounced length parallel to the ground and run along the ground surface.

Advantages:

- Are less protruding along the landscape. Would also mean that these dwellings would not get in the way of other dwellings and so views are maximised.
- Less likely to have more damage during earthquakes
- Fewer subcontractors needed
- Advantage when avoiding stairs and to create easy access for different areas.
- More space below house for storage

Disadvantages:

- Requires more land space to be built and therefore possibly more excavation.

VERTICAL Designs:

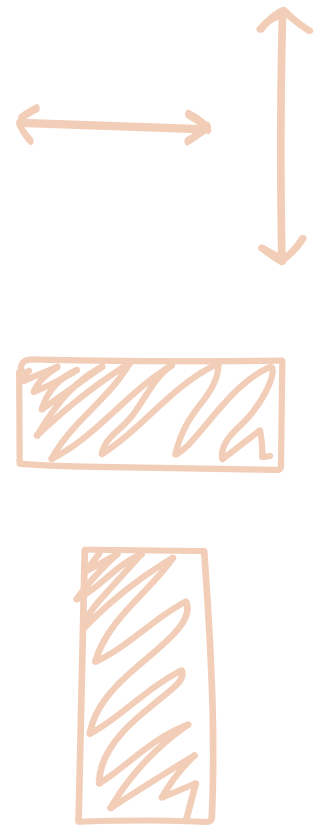
- A greater height than length

Advantages:

- Structure requires less space to build

Disadvantages:

- More costly
- More subcontractors needed on site
- Possibly more expensive to maintain



Horizontal housing creates an experience of a greater social interaction and communal. This interaction can be formed both physically and non-physically.

Vertical housing would be less of a social interaction and is more of an individual and non-physical interacting experience.

Horizontal structures are also would be able to emphasise the horizontal contours of the land, whereas vertical structures could also be intruding it.

CIRCULATION:

Circulation, defined as the 'movement through space', is critical to a building layout. The discussion of a horizontal versus vertical structure incorporates the circulation of the building. People could be referred to as the 'blood of the building' which are constantly moving around the building, creating a connective function and an important consideration when designing.

Circulation considerations:

- The direction of the movement: horizontal or vertical. This is also emphasised by the horizontal or vertical shape of the structure.
- The type of use: public or private, front of house or back of house.
- Time of use: morning, day, evening, or continuous.

Within this research, it is important to weigh up the different considerations from site and how people are expected to interact within this environment.

An important feature that is incorporated with these designs is the open plan living and kitchen space preferably to be located in the centre of the dwelling. This is following the emphasis of meeting and communal spaces influenced by the meeting areas of the Marae.

The physical environment setting is known to define its user's behaviour, and the difference in lifestyle background among the user also creates a difference in behaviour. Bringing in these cultural aspects within designing is able to bring attention to the historical cultural importance of site.

Horizontal designs appear to be more preferable for this research and site, due to its need for more social interaction to emphasise the meeting space within the middle of the dwelling.

The next step within this design process could be to create a vertical, multi-storey dwelling which is still able to have an easily accessible and open communal space in the centre. Introducing a good use of vertical circulation within vertical structures could open these up a bit more for more of a higher interaction within users.

FUNCTIONALITY:

As this research focusses towards the kiwi lifestyle, residential, and holiday living, it is important to incorporate this function and the experience of movement within the building.

Architectural elements are not just the visual elements of architecture, but are 'configurations which are able to interact with memory' (Pallasmaa, 2012, p.67), thought, imagination, body, and eye. It is also researched that 'continuity, sequence and flow are considered factors to promote movement' (Estremadoyro, 2013).

The concept of private verses public also encourages or discourages movement within a dwelling, and regarding these notions, senses of security and privacy can be considered as psychological motivations for a user moving from one place to another. For example, movements up a stairway convey the feeling of privacy or detachment (Ching, 2014, p.298).

This therefore creates a 'vertical' like structure to appear more closed, more private due to the multi storey levels and not as accessibly. The 'horizontal' structures would therefore create more of an accessible movement between areas and creating more of a flow.

The use of creating a high ceiling would create the perception of spaciousness and openness. The extra volume of air would create more natural and ventilation,

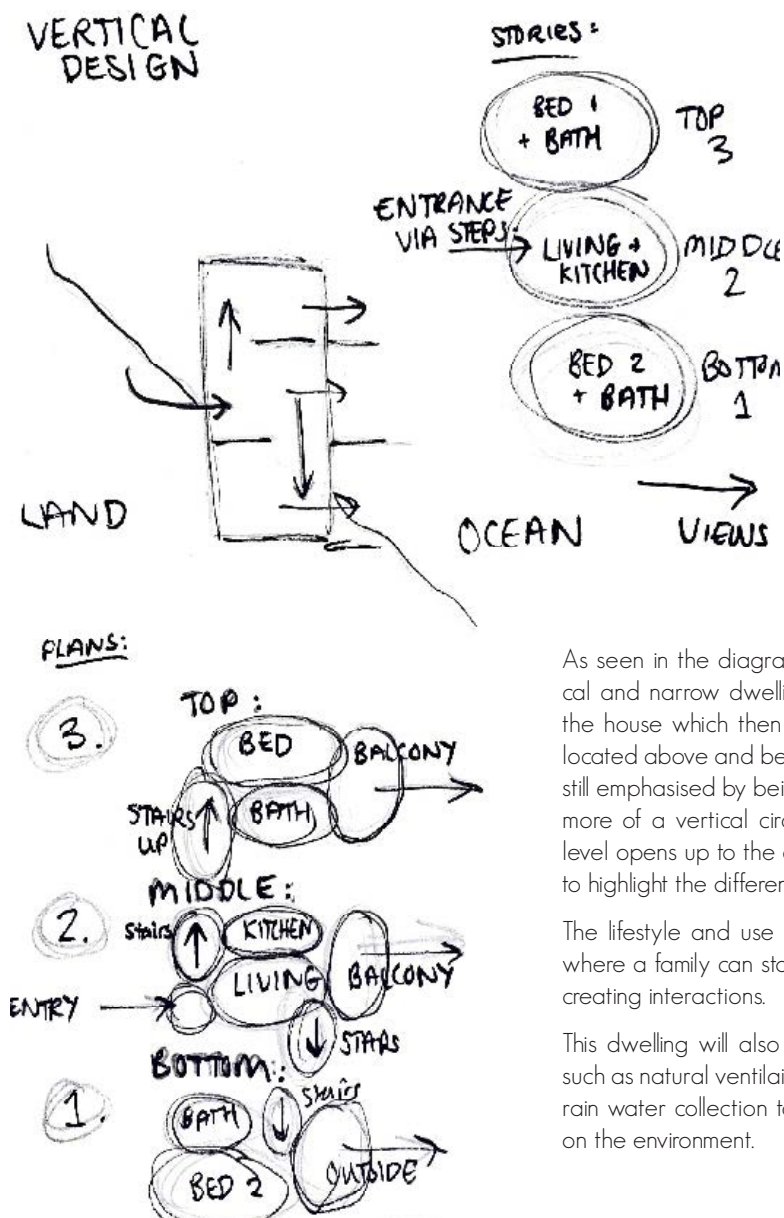
“... so the building becomes in a sense the instrument to all these things around us that are being picked up and being translated for you, as the participant, to experience.”
- Glenn Murcutt

TYPOLOGY TWO DESIGN - VERTICAL LIVING

The final designs within this research process considers the importance of circulation throughout the building which is able to open up the space towards the ocean and create interaction within an open plan living room and kitchen, known as the 'meeting space'. The vertical and narrow designs within the previous projects has limited open space which therefore restricts the interaction and creating successful circulation within the dwelling.

This next designs considers a high ceiling, which is able to open up the multiple floors. Following the first typology, the 'meeting space' will continue to be located in the centre of the dwelling.

Initial diagrams for circulation:



As seen in the diagrams, the middle floor of this vertical and narrow dwelling is the main 'meeting area' of the house which then opens up to the two bedrooms located above and below it. Privacy of the bedrooms is still emphasised by being on opposite ends. This creates more of a vertical circulation and 'togetherness'. Each level opens up to the outside with balconies, continuing to highlight the different ocean views.

The lifestyle and use of this dwelling is of somewhere where a family can stay, bringing people together and creating interactions.

This dwelling will also incorporate sustainable features such as natural ventilation, solar panels, green roof, and rain water collection to therefore have minimal impacts on the environment.

VERTICAL FLOOR PLANS



Figure 5 . 31 : Upper Floor Plan (1:50)

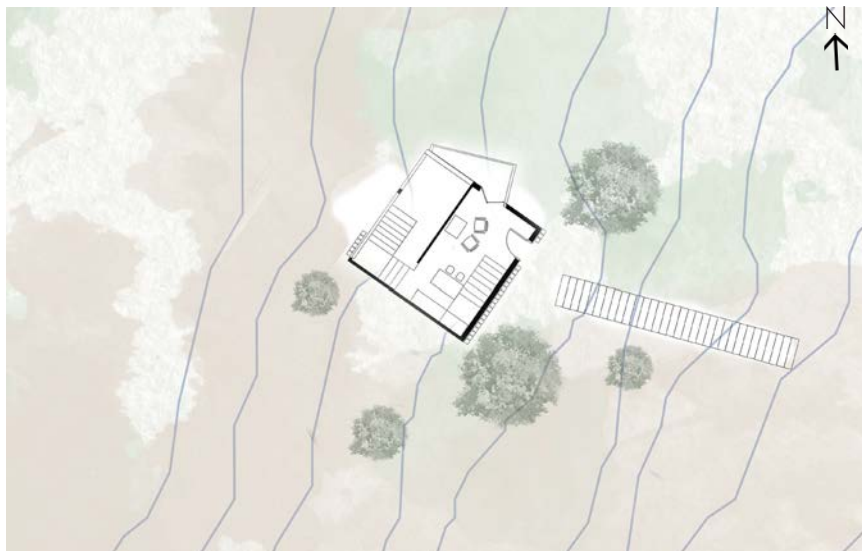


Figure 5 . 32 : Middle Floor (1:50)



Figure 5 . 33 : Lower Floor Plan (1:50)

VERTICAL DESIGN SECTIONS

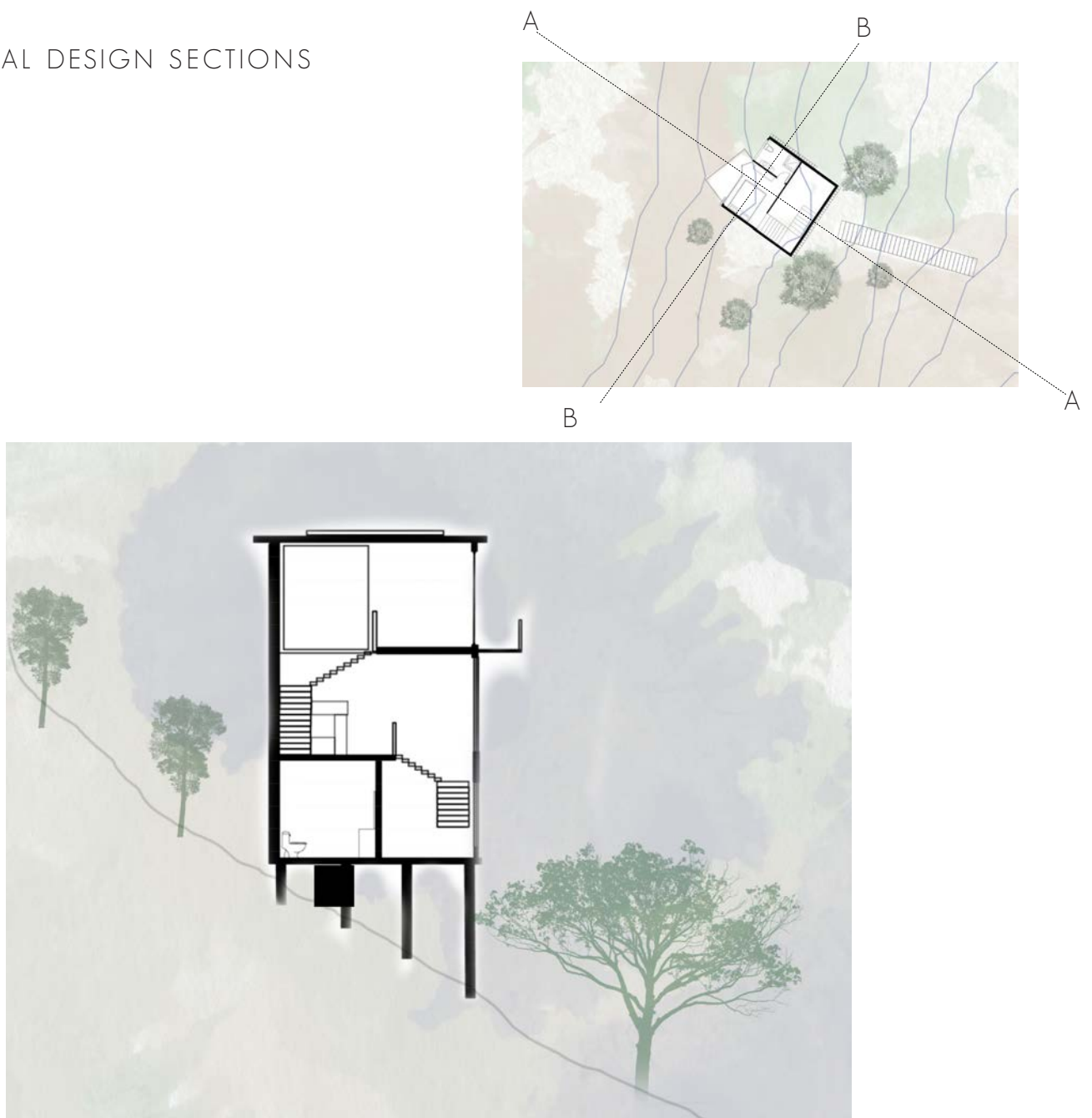


Figure 5 . 331: Section AA (1:50)

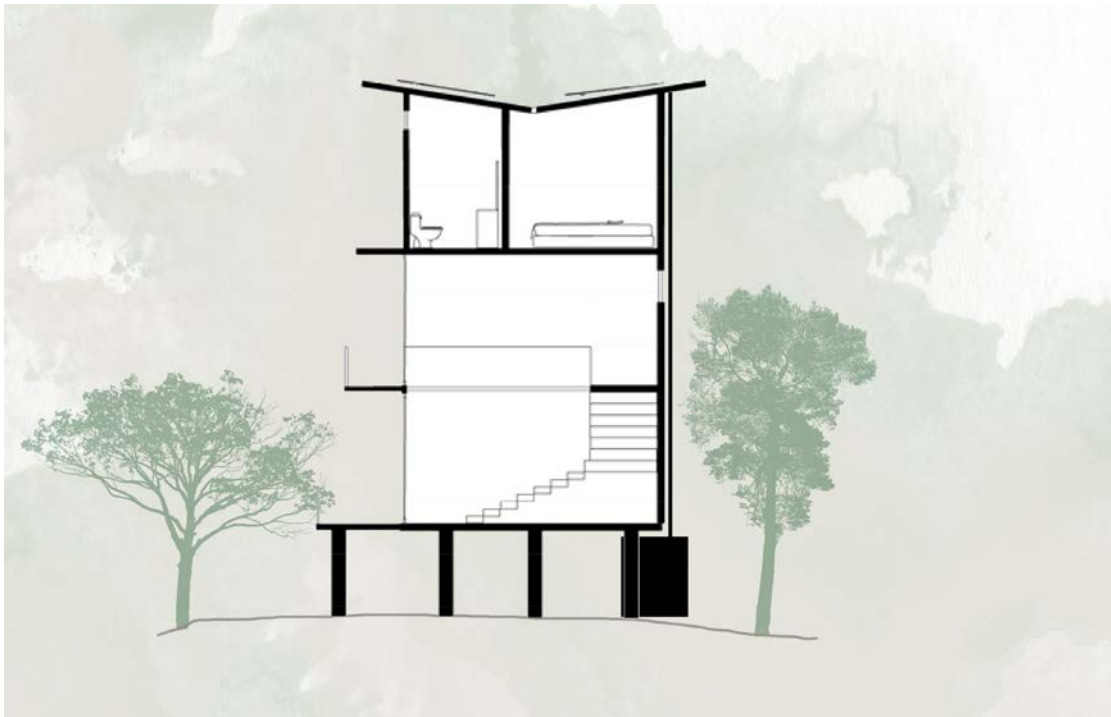


Figure 5 . 332: Section BB (1:50)

EXTERIOR VIEWS



Figure 5 . 34 Vertical Design Exterior
Renders



Figures 5 . 35-6: Vertical Design Interior Renders



Figures 5 . 37: Vertical Design Interior Renders

PREFABRICATION OF VERTICAL DESIGN

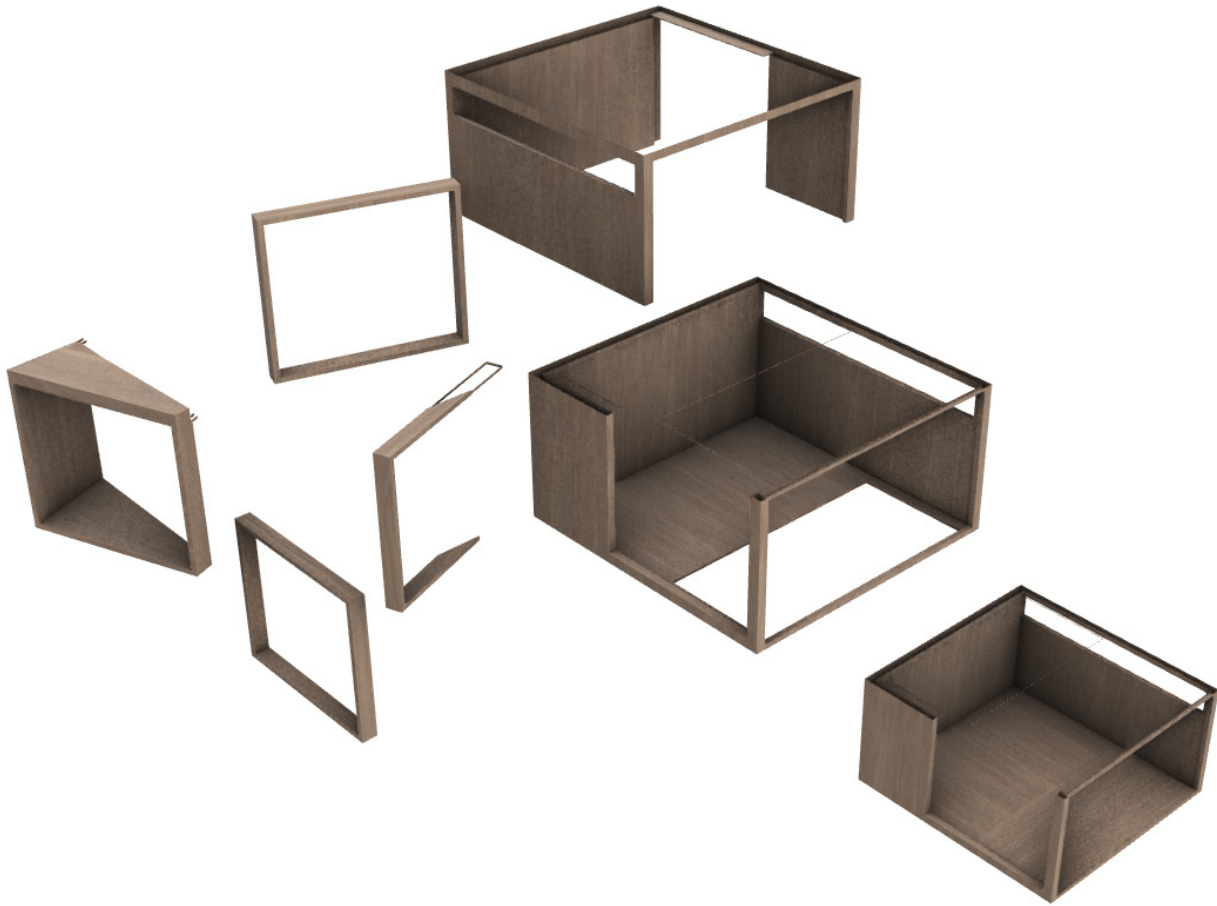


Figure 5 . 38: Vertical Design Prefabrication

TPOLOGY THREE
- SINGLE DWELLING

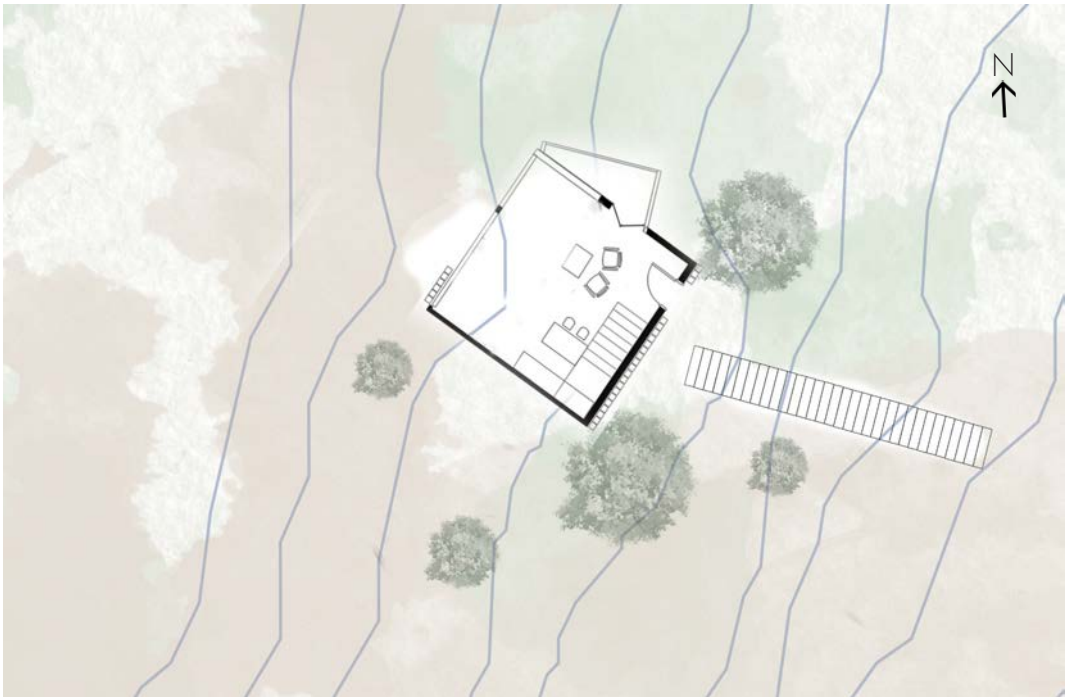


Figure 5 . 39 : Upper Floor Plan (1:50)

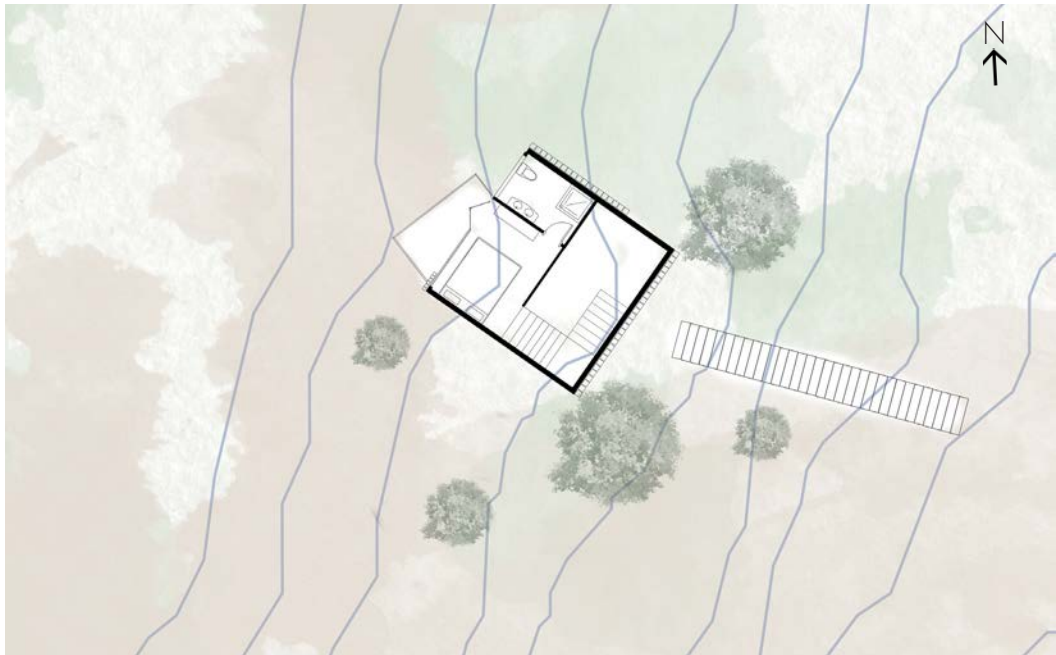


Figure 5 . 40: Lower Floor Plan (1:50)



Figure 5. 41: Single dwelling render

Following the previous typology, this typology is a single bedroom dwelling which continues using the vertical structure strategies with the open void in the middle. The bottom of the dwelling consists of storage space which makes the most out of the empty space.

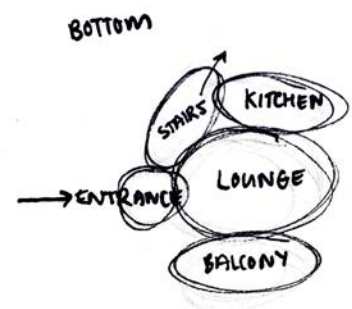
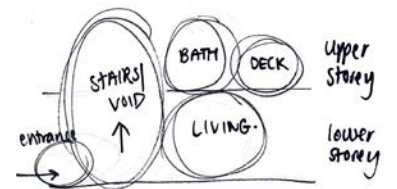
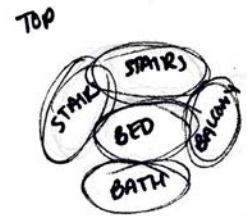


Figure 5. 42: Single dwelling render



SITE PLANS



Figure 5. 43: Closer Up Siting Plan
Showing rows of dwellings

FULL SITE
SECTION



Figure 5. 44 : Site Section (1:100)

As seen in figures 5.43 to 5.46, the three final dwellings are located within multiple rows off the additional road which comes off Menzies Bay Road. On the steeper part sit the three storey vertical dwelling, which is able to sit well with the shape of the landscape. The two storey vertical dwelling sits on the more gradual slope, and does not take away the views from the dwellings located behind. The 'horizontal' dwelling sits on the less steep part of the site, with maximised views. This one storey dwelling sits well with the more gradual and flat landscape.

There is road access to the dwellings which branches out from Menzies Bay Road. Cars are able to be parked at the top of each row of dwellings, and are then access via a walkway and steps down the slope. There are shared walkways down towards the sea and littoral zone of the bay where wharves are located, as seen in figure 5.46 below. Dwellings are facing north and are parallel with the contours.



Figure 5. 46: Site Plan of Headland

A grayscale topographic map with a 3D effect, showing a mountain range. The map features intricate contour lines and shaded relief, giving it a textured, layered appearance. The word "CONCLUSIONS" is overlaid in the center in a bold, white, sans-serif font, split across two lines: "CONCLU-" on the top line and "SIONS" on the bottom line. The background is a light gray with faint, white contour lines that extend across the entire frame.

CONCLU- SIONS

OVERALL REFLECTIONS + CONCLUSIONS

Throughout this research, the research question of *'How can we design housing to create a sustainable and accessible coastal environment, while keeping an informal relaxed lifestyle?'* was progressively addressed. The designs were interrogated and improved throughout each project as design strategies were developed and final conclusions were reached.

In Project One, initial low-impact strategies were investigated in order to incorporate these for the first designs so they would be in sympathy with the environment. Examples such as Glenn Murcutt's sustainable strategies and the desire of 'touching the Earth lightly' were considered to determine how it is possible to design to fit within the natural landscape. The steep slope was examined and low-impact strategies were considered that were suitable for this. Three different initial dwelling concepts were created, taking into account building to the contours, the use of timber materials in order to be reused, and the use of piled foundations. However, connecting these dwellings together and having accessible routes were not considered within this first project and were examined in subsequent projects.

Project Two looked at the Menzies Bay location from a wider scale, and considered prominent views and contours to influence new forms. The idea of connecting to the ocean was then researched further through bringing cultural aspects from the history of the Māori and their use of Marae from this area. Lessons from indigenous thought were incorporated within the next set of designs. Further low-impact strategies were researched, such as sustainable construction strategies to be used within the construction process, and sourcing local materials. The use of waste water management and collection was also researched in order to be incorporated in the designs. Along with this, ventilation was carefully considered with Murcutt's precedents in roof design where horizontal dwellings have created airflow. This is a change from the earlier vertical structures which were more intrusive on gentler slopes. The use of this butterfly roof is also able to function to collect rainwater to then store it in a reservoir below. Areas within this dwelling are also rotated to align towards the prominent views. The concept of facing the sea still stands and a 'stacked and turned' structure has been developed, from the previous vertical structure. This follows principles discerned in Māori Marae that connect the landscape to the sea has been one of the main concepts within Project Two.

The third dwelling is a symmetrical set of two dwellings creating a shared centre space between the two. The improved siting plan for this project therefore is developed into three different clusters to adapt to its contours. Three different contours around this headland are framed which were able to develop these dwellings to fit with the contours which vary in steepness. The horizontal dwelling is able to acknowledge the less steep of a slope, creating less of an intruding structure on the land. Project Three then addressed challenges that emerged in Project Two including accessibility to the water and vertical circulation within the vertical designs.

Project Three was the final project which finalises all nine months of research, and results finalised designs which was able to address the initial research question. The research successfully concluded that it is possible for low-impact houses to be situated in a piece of vulnerable coastal land in a remote location.

The final dwellings within Project Three are able to frame the surrounding nature and is able to capture the beauty and richness of the privileged site that it is. Taking into consideration the sensitivity of the site, the local materials from a natural and minimal palette led the dwellings to blend with its natural surroundings. The site takes into consideration the cultural consciousness of Menzies Bay's historical and cultural past of the Māori Marae and Pā. Successful ventilation strategies were incorporated within the vertical structures brought in from Project Two. Horizontal versus vertical structures were compared with respect to sustainably and functionally. In light of the success of the horizontal structure, a vertical structure was designed which incorporated a void within the middle. This was able to create an opening, allowing for vertical ventilation.

Driven by the idea of lifestyle, the final designs bring a sculptural gesture to the landscape of Menzies Bay. Inhabitation was created on the side of the bay which has been able to create greater access to the coast. The dwellings which connect the landscape to the sea are able to create a sense of place. The site is able to be experienced in a way that reinforces the concept of low-impact, and creates an opportunity for exploration within the coast.

KEY LEARNINGS AND STRATEGIES

PROJECT ONE

- Dwellings facing north to make the most of the sunlight
- Dwellings sitting with the contours / parallel to acknowledge the land, and less excavation of the land
- Natural and sustainable limited material palette such as timber and stone
- Local materials from nearby quarry used - easy access and less transportation
- Piled foundations which are easy to remove at end of building's life
- Bringing in low-impact strategies shown in case studies

PROJECT TWO

- Prominent views considered when creating new forms
- Cultural aspects from the Māori Marae were considered when creating these new forms
- Low-impact construction strategies researched
- Waste water management and collection studied
- The use of natural ventilation + roof designs
- Introducing the use of horizontal structures verses vertical
- Improved siting plan relating to three different clusters relating to the different contours
- Improved dwellings which share accessibilities

PROJECT THREE

- Finalising dwellings and exploring the use of curved features to relate to the contours
- Horizontal versus Vertical structures explored and compared
- Connecting the dwellings together and accessibility to the sea below with walkways
- Low-impact strategy of prefabrication introduced

OVERALL REFLECTIONS + CONCLUSIONS

KEY DESIGN STRATEGIES RESEARCHED AND USED:

- Dwellings running parallel to the contours
- Butterfly Roofs for ventilation and water collection
- Solar Panels
- Natural Ventilation
- Piled foundations
- Prefabricated timber structures to transport to site
- Low-impact materials such as timber
- Orientated North for maximum sunlight
- Balconies to make the most of sunlight
- Vertical circulation and the use of open voids / spaces
- The flow between the interior and exterior
- Connecting the landscape to the ocean

FOR FURTHER RESEARCH...

This research will be able to create further practice and research. Different alternatives such as a more of a dense housing development using low-impact strategies could be designed. The coastal housing within this research could also create a framework for a different location with the low-impact construction and design strategies.

CONCLUDING THESIS STATEMENT //

Driven through the idea of lifestyle, this thesis research has affirmed that sensitive coastal locations do have an opportunity to be occupied residentially throughout strategically low-impact and sympathetic ways. Creating accessible and sustainable coastal dwellings has improved the experience of the site and are a sculptural gesture to the land.

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