PLANTING SEEDS : FOR A FOOD SECURE FUTURE

BY

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PLANTING SEEDS

FOR A FOOD SECURE FUTURE

By Anesha Parsot

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Thanks to my supervisor Fabricio Chicca for your support and encouragement throughout the year.

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Abstract

Food insecurity affects a large number of young New Zealanders every day. It is associated with low-income families and exists when people do not have access to enough healthy food, experience hunger, consume less nutritious foods due to limited options or rely on food relief and banks (Dastgheib).

In New Zealand, there is a rising concern for food insecurity among adolescents. In 2012, 11% of young people reported food insecurity often or always, with 33% reporting food insecurity concerns occasionally (this being a 3% and 5% increase from 2007) (Utter, Izumi and Denny). Other issues are the increasing rates of obesity and other health concerns. (Stevenson, *Growing Healthy Communities* 37). The New Zealand population has one of the highest levels of obesity in the world, and this is a reflection of food insecurity and poverty (Thomas and Hunt). When families are food insecure, they are more likely to turn to the ease and affordability of fast food and highly processed food for their meals (Utter, Izumi and Denny). However, a diet based on fast-food has a low nutritious value and may generate a vicious cycle of obesity. An unhealthy meal reduces the amount of energy and motivation someone has (Cespedes). When adolescents consume a high level of fast food, the motivation to work is decreased, leading to lower grades, suspension and unemployment later in life (Government of South Australia; Gorton 3). In addition to this, their health and wellbeing are threatened, and medical bills can rise significantly producing a cycle of poverty (Todd).

This research proposal will try to break the cycle of food security and poverty by providing families with an alternative choice to fast-food and takeaways. A pavilion is designed for Otara, Auckland, which combines the programme of a church, greenhouse and a community kitchen to encourage a healthy lifestyle. It will be located near Ferguson Intermediate and provide the facilities and environment to help individuals overcome food insecurity in their households.

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SECTION 01

INTRODUCTION

This section introduces the problem, the research question, aims and objectives, design response and methodology for the research.

PROBLEM STATEMENT

The World Food Summit defines food security as "when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life" (qtd. in Stevenson, *Growing Healthy Communities* 2). When this is not present people are known to be food insecure. Food insecurity is a socioeconomic problem, which can have a significant impact on households and communities living in an obesogenic food environment (Rush 14; Dastgheib; Martin).

Being food insecure means not having enough access to healthy food, experiencing hunger, consuming less nutritious foods due to limited options or relying on food relief and food banks for their meals (Dastgheib). In New Zealand, food insecurity has been linked to obesity and other nutrition related diseases (Stevenson, *Growing Healthy Communities* 37). This is due to the unhealthy food environment that low-income families surround themselves in (Stevenson, *Growing Healthy Communities* 2). There are more fast food and takeaway stores and less healthy food located within low deprived areas (Martin). These areas are known as obesogenic as they promote obesity (Stevenson, *Growing Healthy Communities* 30). Due to this environment and the constraint of money, people are turning towards the ease and affordability of fast food and highly processed food to feed their family (Utter, Izumi and Denny). However, this diet consumed at a young age may have long term effects on their livelihood as well as their health and wellbeing. These meals have low nutritional value and may decrease motivation to work, causing problems at school, suspension and unemployment later in life (Government of South Australia; Gorton 3). In addition, their health and wellbeing are threatened, and medical bills can rise significantly creating a cycle of poverty shown in figure 1.01 (Todd).

Currently, New Zealand is the third most obese country in the world and the people affected are likely to increase as the number of food insecure people rise (Thomas and Hunt; Barclay). In 2012, 11% of young people reported food insecurity often or always, with 33% reporting food insecurity concerns occasionally (This being a 3% and 5% increase from 2007) (Utter, Izumi and Denny). This a major concern for their future but also the future of New Zealand and its health system.

This research by design aims to address the problem with food security by designing a pavilion which can host church services, a community kitchen and greenhouse, thus ultimately encourage people to have a healthier lifestyle.

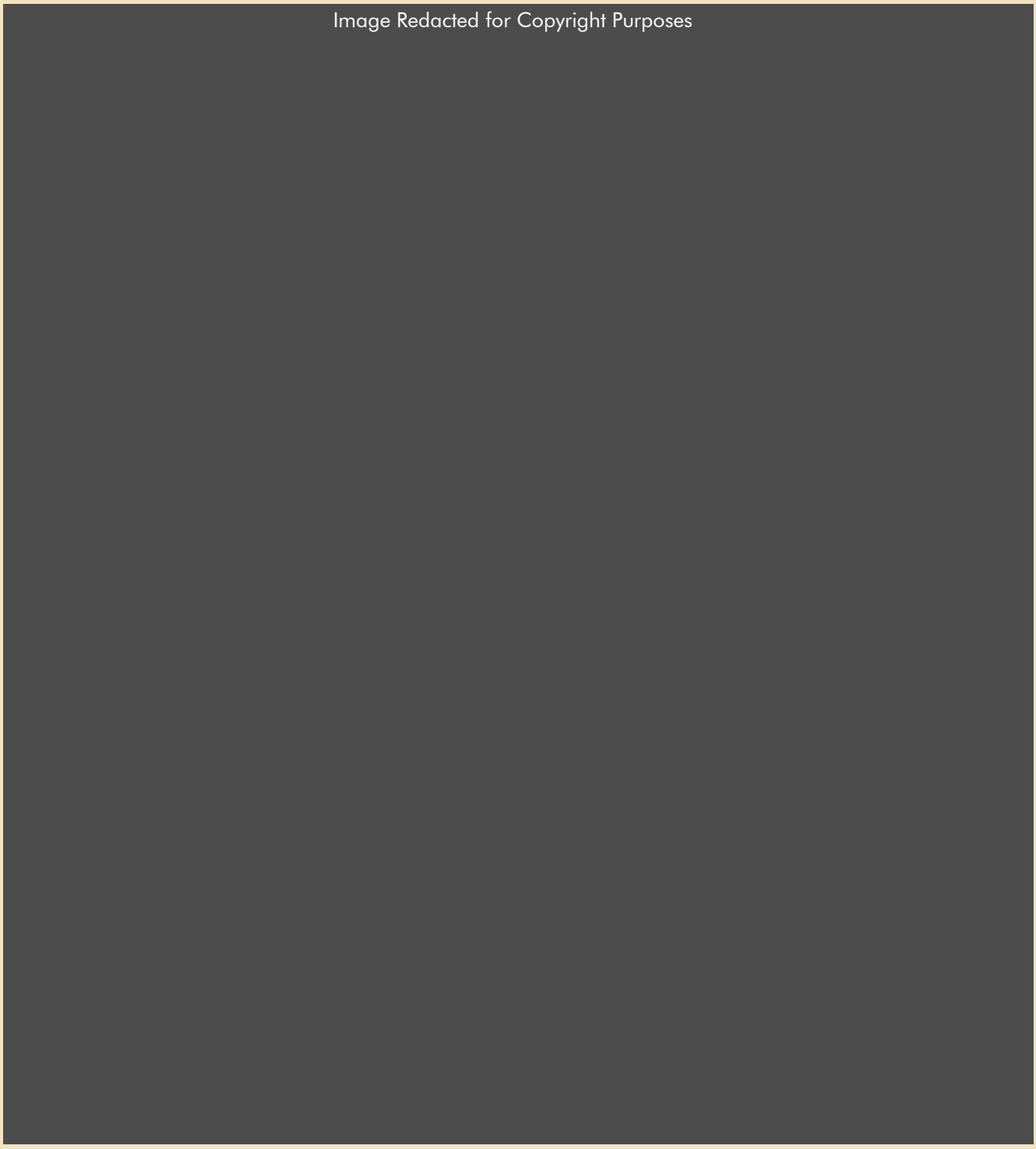


Fig 1.01. Cycle of Food Security, Obesity & Poverty

RESEARCH QUESTION

How can Architecture design contribute to improving Food Security, in feeding the ever-increasing population of South Auckland?

AIM

- Design an environment that enables children to learn the skills to grow and cook their own food and contribute to breaking the cycle of bad diets.

- Decrease the number of families that face food insecurity in Otara by making fresh produce more readily available and accessible.

- Design a public space that brings people and communities together to celebrate food.

OBJECTIVE

- Create a multi-use building that combines an ecumenical space with a community kitchen and a greenhouse

- Use edible plants as landscaping and interior features

- Integrate the building with the surrounding pathways to make it more accessible to pedestrians

DESIGN RESPONSE

Otara is one of the most obese regions in Auckland (Dastgheib). Most of the residents have a Pacific heritage and have close ties to the church (Stats NZ; Rush 12). Their food environment is very unhealthy and can be described as obesogenic. From the research, it is suggested that one of the reasons that the region faces food security issues is the lack of availability and access to fresh and healthy food. Because of this, a ecumenical space, greenhouse and community kitchen is proposed in Otara. The building aims to create a healthier food environment; by creating a place where people can come together to learn to grow and cook nutritious food. It can also be used as a space where raw food can be exchanged for a cooked meal; a concept influenced by Ridleys Temporary Kitchen. Other design strategies utilised in the design, include a Pataka Kai (food pantry), terraced gardens, a school horticulture garden and urban edible planting. All these strategies have been proven to help individuals with food security concerns. Beyond the site, a new supermarket and restoring Otara creek were also considered but not developed in this research due to the scope.

METHODOLOGY

The method used for this investigation was research through design. The literature review and case studies were used to define the problem and produce design strategies. Physical and digital modelling was then used to test form and spatial qualities. The design research is structured in three design phases, followed by a brief conclusion.

Preliminary design one experiments with physical hand modelling to trial forms for the design strategies and ideas for the site. This method provides a better sense of the form and qualities of the space.

In preliminary design two, the design was developed further on Sketchup. Sketchup allowed the design to be drawn to scale and onto the site.

In the final design phase, the project is further developed in Revit. Revit provides a more accurate representation of the building and allows the exploration of more in-depth aspects of the building.

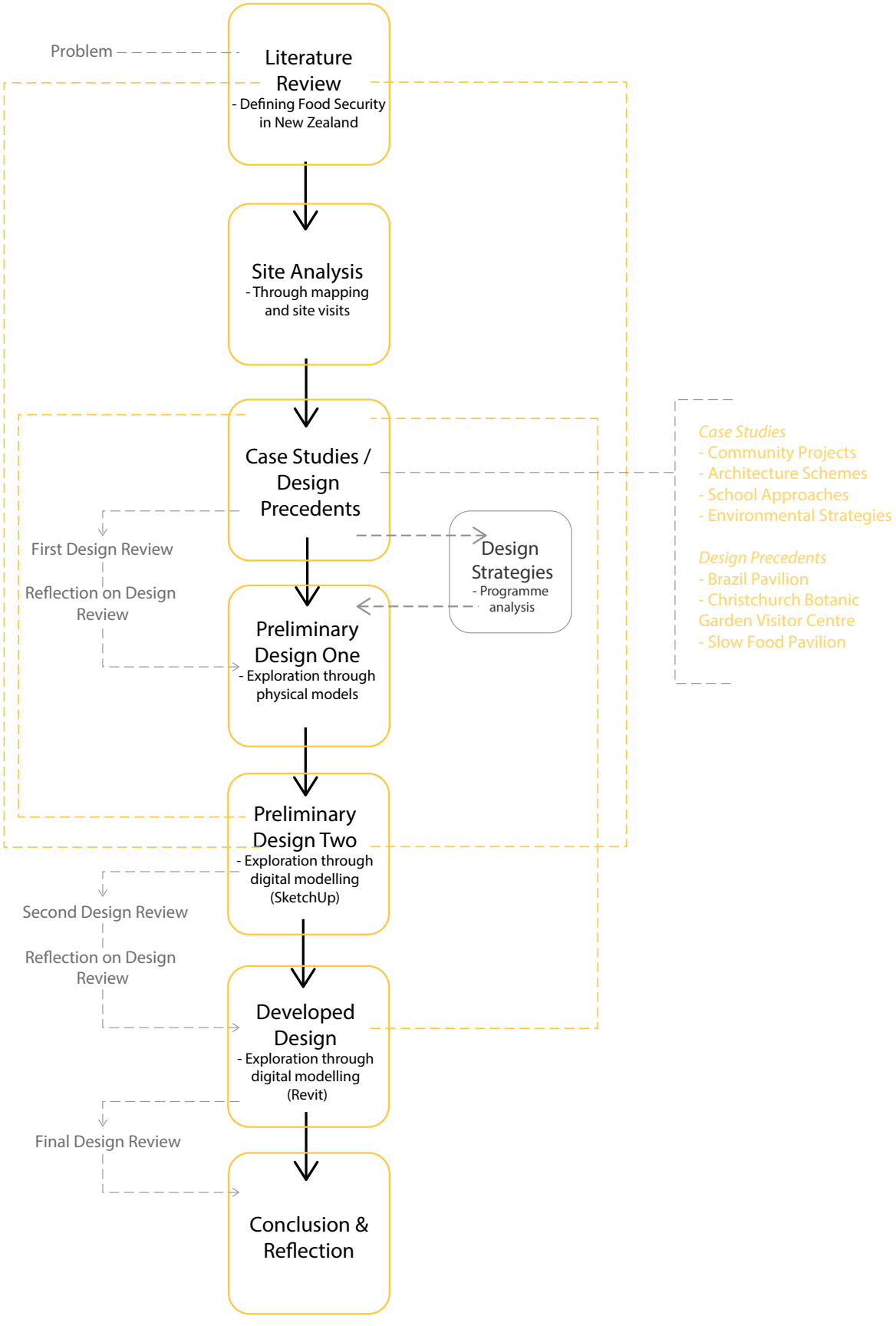


Fig 1.02. Methodology Diagram

SECTION 02

LITERATURE REVIEW

This section examines the background and impact of food insecurity in New Zealand.

BACKGROUND

What is food insecurity?

Food insecurity is defined as when people do not have "reliable access to a sufficient quantity of affordable, nutritious food" to maintain a healthy lifestyle (Oxford Dictionaries). It is a global problem which can occur in a first world country as well as in a third world country (FAO, IFAD, UNICEF, WFP, WHO). The level of food insecurity can range from occasionally not having proper nutritious food to a full-scale famine (Stevenson, *Growing Healthy Communities*).

In New Zealand, food insecurity affects a large number of low-income families. Having low incomes makes it hard for people to grow their food and also purchase healthy sustaining food. Growing food is difficult to achieve because they do not necessarily have the knowledge and resources to grow their own food (Calder). In addition to this, Ottilie Stolte, a senior lecturer at Waikato University says in the article *Growing vegetables is easy, but also hard*, "A garden is really a long-term project. A garden takes three or four months before you can harvest crops and the
crops may fail, and if people are hungry today they are not going to sit and wait for the silverbeet to grow". Also, they are more likely to move houses, so are not able to stay there long enough to see or eat the food produced (Calder).

In 2008, a survey reported that 41% of households are food insecure sometimes or always. This percentage is a 16% increase since first recorded in 1997 (University of Otago and Ministry of Health 312). The level and percentage of people facing food insecurity in New Zealand is represented in figure 2.01.

Image Redacted for Copyright Purposes

Fig 2.01. Food Security Categories, by sex
(2008 National Adult Nutrition Survey)

According to Robinson (2010), the majority of New Zealanders who have been identified as food insecure have a Maori or Pacific background. It is predominant in females, sole parents, and large households with children, young age group (25-44 years), unemployed and people living in highly deprived areas (Robinson 4).

Pacific Communities

In South Auckland, Pacific communities are affected by food insecurity more than any other ethnic groups. (Stevenson, *Growing Healthy Communities*, 6) They are relatively new immigrants to the country and had to face a new culture, language, climate and environment upon arriving in New Zealand. In comparison to other New Zealanders, they are relatively young, have a lower socioeconomic and educational status (Rush 12). In 2013, 295,941 Pacific people lived in New Zealand; approximately 66% of them are living in Auckland, and more than half of them are born in this country (Stats NZ; Rush 11). Pacific communities are established around the family, the church and the village. Their households are usually large and contain multiple children (Macpherson). Because of this, Pacific children, are significantly affected by food insecurity (Robinson 4).

Food is an essential aspect of all societies. It is needed for nourishment and survival but also to bring people together. It provides individuals with their identity and place. In Pacific societies, food plays an important social and cultural role (Rush, 3). Traditionally, food security in the islands was achieved through gardening, fishing, hunting and selling products or labour for cash (Barnett). However, when migrating to New Zealand their food environment and culture completely changed. In 2001, 98% of the Pacific population moved into urbanised areas where the environment has been described as obesogenic. They had to face changes in their social, economic, cultural and political landscape, which have an impact on the way they obtain and consume food (Rush 7-11).

Pacific communities have a strong association with the church (Rush 12). The hierarchy structure of the church is often a reflection of the village hierarchy back on the islands. Where the minister in the church, who is the most powerful and respected person, is similar to the position of a chief in a village. With the help of some government agencies, the church provides people with health and educational services, sport, music and social activities (Macpherson). Because of this, the church is a significant aspect of their life.

Understanding their background and upbringing will help determine the strategies best suited to improve their food environment.

What causes food insecurity?

Sarah Stevenson, in her report *Edible Impact* mentions that The World Health Organization describes food security as built on these three pillars:

Food Availability

Sufficient quantities of food available on a consistent basis

Food Access

Having sufficient resources to obtain appropriate foods for a nutritious diet

Food Use

Appropriate use based on knowledge of basic nutrition and care, as well as adequate water and sanitation (Stevenson, *Edible Impact* 4)

When one of these things are not present, food insecurity can occur. In New Zealand, income is a significant factor in food insecurity. The healthy food that is available in lower socio-economic areas is either too expensive to buy or more challenging to access. People are more likely to turn towards the ease and affordability of fast food and takeaway to feed their family. However, these meals do not provide nutritional value to maintain a healthy lifestyle. According to the article *New Zealand's high rate of obesity 'inevitable'- study* "People living in lower socio-economic areas have three times the number of fast food and takeaway outlets around them than those in less deprived areas" (Martin). Because of this unhealthy food environment, New Zealand has become the third most obese country in the world (Thomas and Hunt). This unhealthy food environment, are known as food deserts. Food deserts have little or no access to large grocery stores but contain fast food restaurants, convenience stores or no food stores (Stevenson, *Growing Healthy Communities* 29). Regularly consuming meals from these places can have long-term effects on individual health and wellbeing (Robinson, 4). Food insecure people are prone to obesity, diabetes and micronutrient deficiency. They are likely to have mental health concerns and poor physical health leading to higher medical bills and health care costs in the future (Carter, Kruse and Blakely; Robinson, 4).

Adolescent

Adolescents experiencing food insecurity can create long-lasting repercussions on their life. There are risks of physical, behavioural and psychosocial outcomes, which can "lead to lower economic productivity in adulthood and higher health care cost" (Gorton 3).
Based on the income distribution of New Zealand society, it was suggested that children are more prone to live in a household with lower income (Stevenson, *Edible Impact* 5). Low-income families are associated with food insecurity and are likely to have a diet of takeaways and highly processed food (Utter, Izumi and Denny). This is a problem, as these diets have no nutritional value and can generate a vicious cycle of obesity. An unhealthy meal may reduce the amount of energy and motivation someone has (Cespedes; Todd). When a young person consumes this diet, the motivation to work is decreased, leading to lower grades, suspension and unemployment later in life. Adjacent to this, their health and wellbeing are, threatened and medical bills rise significantly creating a cycle of poverty (Todd).

It has been recorded that 1 in 10 children in New Zealand are overweight or obese due to food insecurity issues at home (Martin). There is an indication that the problem will increase in the future, particularly for households with older children. (Rush, 7) According to the Ministry of Health (2012), younger children (2 – 12 years) in general have better food and nutrient intake than older children (13 - 18 years). They are more likely to bring food from

home to consume at school and eat food at home after school. This dependency of food from home may be the reason young kids are less likely to be obese in New Zealand.

Food insecurity creates a significant barrier for adolescents to prosper in their life. It denies them their fundamental right to a "standard of living adequate for health and wellbeing… including food" (Ministry of Health). New Zealand Adolescents health and wellbeing are essential, not only for their lives now but also for their future and the future of the nation (Ministry of Health).

Chapter Summary

Food insecurity is a concern in New Zealand. In South Auckland, there is a large number of low-income families struggling to get healthy nutritious food. Their low incomes makes it harder for people to purchase healthy sustaining food, or to grow their food as they do not have money to invest in agriculture (Calder). Many of the families affected have a Pacific background and are born overseas (Robinson 4; Rush 11). Upon arriving in New Zealand, they had to face a new culture, language, climate and environment. Most of them moved to urbanised areas which made it difficult to practice their traditional way of gardening, fishing and hunting to maintain food security (Barnett). The food environments in low socioeconomic regions contain a lot of fast-food takeaway and highly processed food (Martin). Because of this obesity, diabetes and micronutrient deficiency are prone in these communities. Many of the households who face food security concerns have adolescents living in them (Stevenson, *Edible Impact* 5). This unhealthy food environment can create significant barriers for children to succeed in life (Ministry of Health).

SECTION 03

CONTEXT

This section analyses the environment associated with food insecurity and the specific site conditions of the selected site.

SITE SELECTION

Region Selection

In Auckland, three of the most food-insecure regions are Glen Innes, Otara and Manurewa (Dastgheib). To choose a site for this research, the food environment of these regions was examined. As mentioned above, food security is formed on these three pillars; food availability, food access and food use. To examine the food environment of these regions, the location of food sources and schools were highlighted on a map (figure 3.0). There was more availability and access to fast-food, takeaways, and super value stores compared to supermarkets or healthy food. For instance, during one of the assessments of the region, there were no supermarkets located within the region of Otara. It is easier for people to eat takeaway than to get to the nearest supermarket as it is walkable and requires no reliance on public transport or vehicles. Due to this, the environment of Otara was explored further.

Fig 3.01. Location of the most food insecure regions in New Zealand

Fig 3.02. Location of food sources and schools in Glen Innes, Manurewa & Otara

Otara

Otara is a suburb located 18 kilometres to the southeast of the Auckland CBD. It is positioned near the head of the Tamaki River, which extends south towards the Manukau Harbour. The region is well known for its farmers market (figure 3.06) that occur severy Saturday morning in the Otara Shopping centre carpark. This market provides households with a weekly source of fresh vegetables and fruit. The nearest supermarket in Otara is the Papatoetoe Countdown. This Countdown is situated on the other side of the motorway and is approximately a 5 minute drive from Otara city centre (figure 3.03). The next closest supermarket is a PaknSave in Orminston. This is approximately, a 10 minute drive from Otara city centre. Both these supermarkets are not walkable for the residents living around Otara and will need reliance on a car or public transport to get there and back. Located in and around Otara is a large number of fast food, takeaways, bakeries, superette, and mini supermarket stores providing food for their residents. These stores do not have a large variety of affordable fresh or healthy food that is appealing to the locals. Because of this, food availability and food access are the two main factors of food insecurity in Otara.

Demographics of Otara

Otara is part of the Papatoetoe and East Tamaki local board (figure 3.03). Because of this, the demographics are assessed in the entire area:

Population: Around 75,663 people reside in Otara-Papatoetoe

Age Rage: Median age is 29.3 yrs. However, 26% of the population is below 25, which is considerably higher than the national median of 20.4%

Households: There are 19,959 households in Otara-Papatoetoe. Only 46% of households own the dwelling they live in

Family Types: 48.8% of families are couples with children, 27.8% are a sole parent with children, and 23.4% are a couple only households

Ethnicity: 46% Pacific, 31% Asian, 21% European, 16% Maori

Birthplace: 46.6% of the population are born overseas

Income: Median household income is $60,800, this is $15,700 below the regional average household income

Schools: There are 31 schools, most rated decile 1 or 2 (2016)
(Auckland Council; Stats NZ)

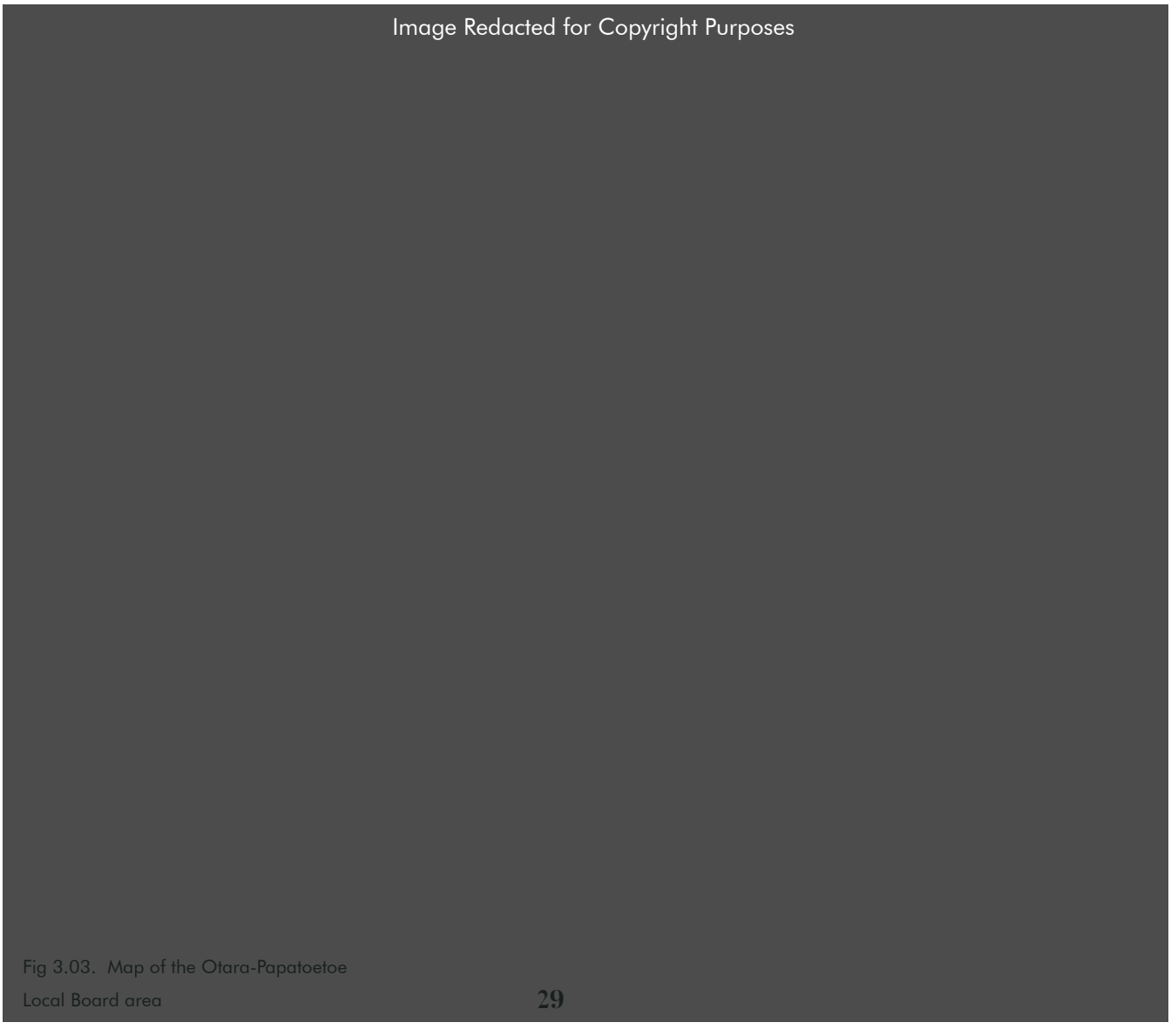


Fig 3.03. Map of the Otara-Papatoetoe Local Board area

Fig 3.04. Supermarkets located in Otara

Fig 3.05. Convenience Store located in Otara

Fig 3.06. Otara Saturday Markets

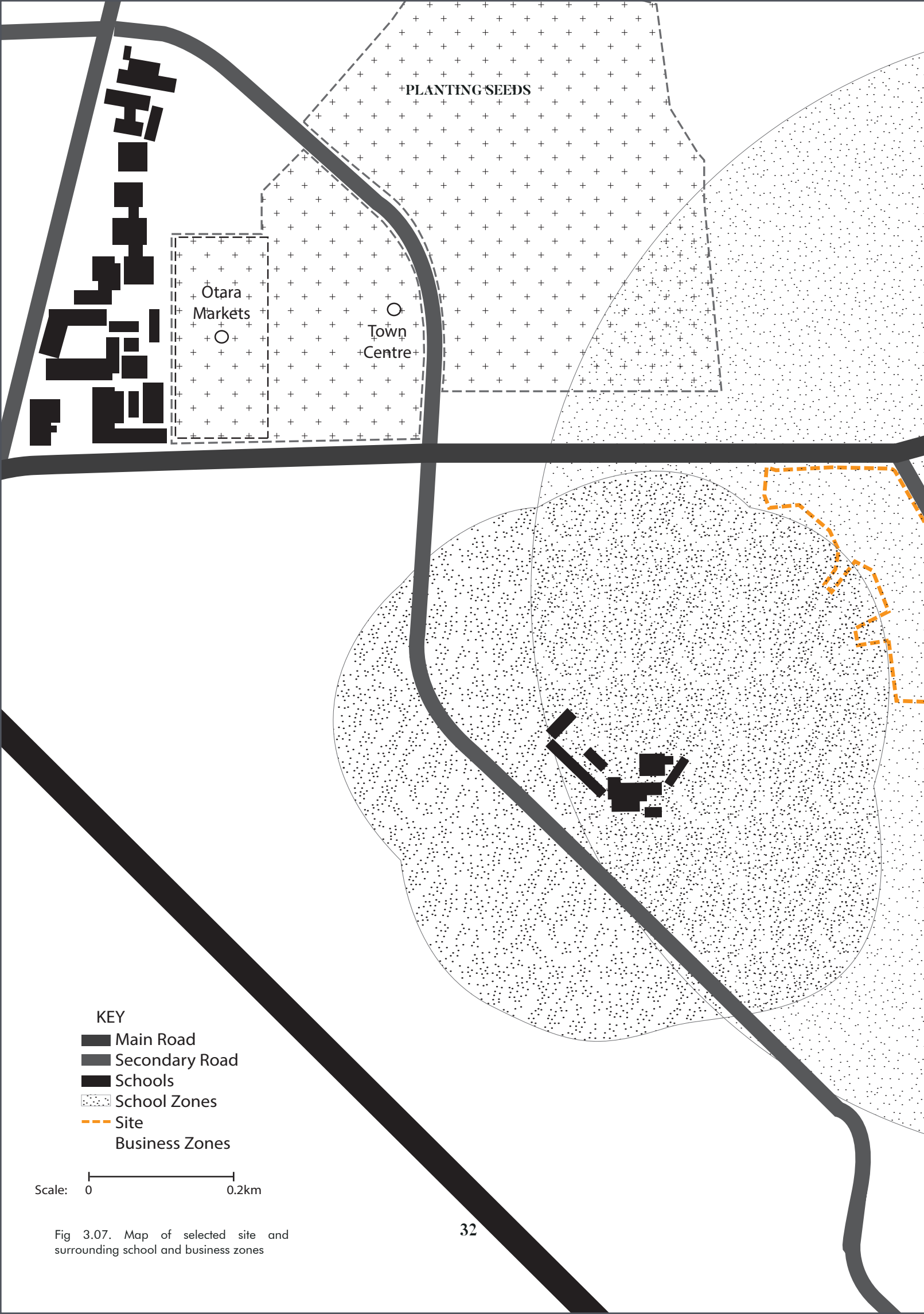


Fig 3.07. Map of selected site and surrounding school and business zones


Freedom Fruit
Garden Orchards
Urban Agriculture
Farm

Criteria

A criteria for choosing the site, is that it had to be close to schools. Food insecurity is affected by the environment in which we surround ourselves in. Children spend a lot of their time during the day at a school. So a school environment will provide an appropriate setting for this research. Another criteria for selecting a site was that it had to be central and easily accessible to the majority of the people in Otara, to provide them an alternative option to unhealthy food.

Site

- The site selected is across the road from Ferguson Intermediate and is off East Tamaki Drive; one of the main roads in Otara (figure 3.08).
- It is easily accessible to students and acts as a transitional space between the residents and the school.
- The Intermediate is the zone for three primary schools in that area (figure 3.07).
- The site is also very central and close to the farmers market.

Fig 3.08. Map of site and surrounding features

FERGUSON INTERMEDIATE

Ferguson Intermediate is a co-educational school for 11 to 13 year olds. In 2018 there were about 464 pupils enrolled at the school. (Education Count).

The majority of students have Maori or Pacific heritage and are from low-income households (Education Review Office).

The school's curriculum and students' learning opportunities are enriched by a good level of community and family/whanau engagement (Education Review Office).

Fig 3.09. Ferguson Intermediate from Ferguson Road

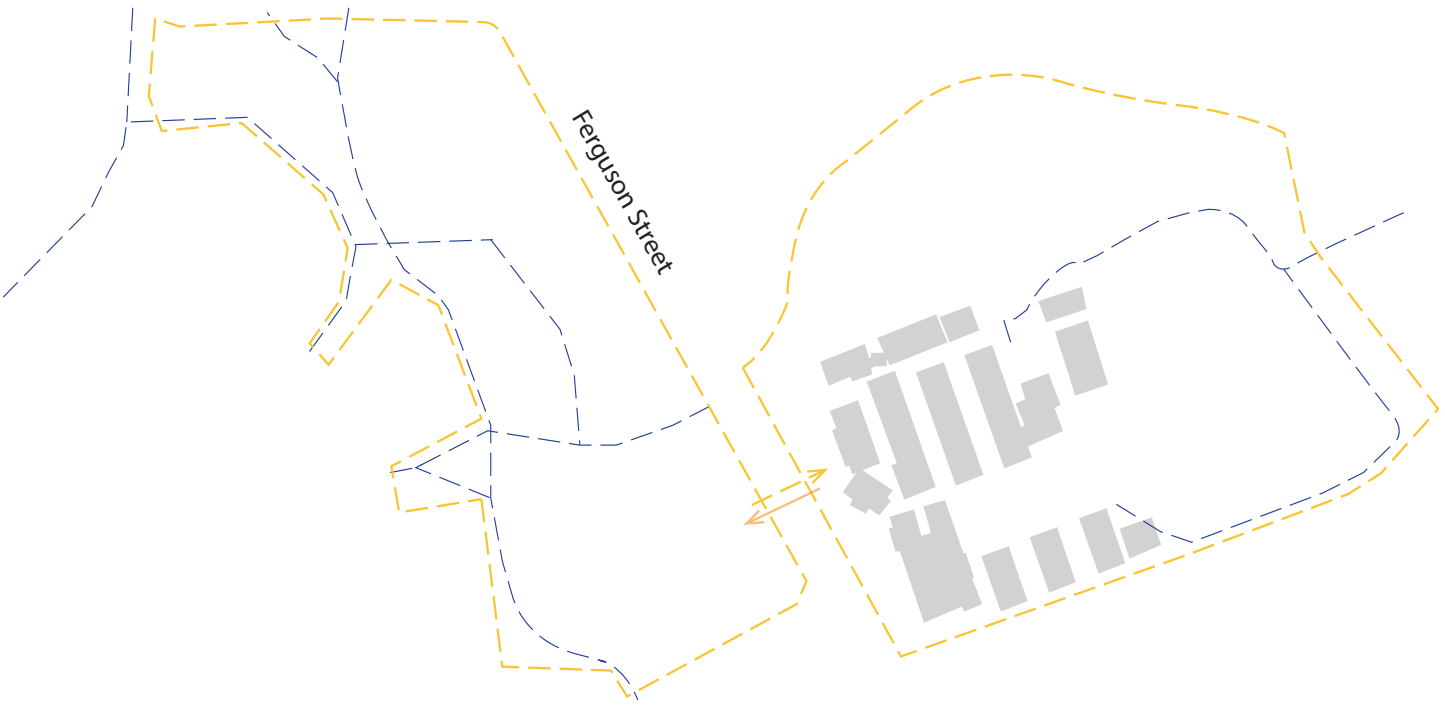


Fig 3.10. Link between the Site and Ferguson Intermediate

Fig 3.11. Site Analysis of Existing Buildings, Pathways, Vegetation & Stream

SITE ANALYSIS

Existing Buildings

There are three two-story houses and two church buildings present on the site. There is a Pacific Island Presbyterian Church and an Otara kia mataara (Maori Church)

Pacific Island Presbyterian Church (figure 3.23)
- Has service every Sunday
- Programmes for young children and their parents
- Youth programmes
- Cultural groups and activities
- Alpha programmes that introduce people to Christianity.

Holiday programmes for children and young people.
(Presbyterian Church of Aotearoa New Zealand)

The Presbyterian Church of Aotearoa New Zealand believes it is called by God to work with others in making Jesus Christ known.

Otara kia mataara (Maori Church) (figure 3.24)
-Has a service every Sunday at 11 am
-Ratana Church, is a religious organisation of Maori people based. It's teachings and principles are based on the faith healer and Prophet Tahupotiki Wiremu Ratana (Tikkanen)

- The existing building for this church looks like a temporary office building (figure 3.24)
- There is potential in redesigning this church and including it in the programme

Lack of Amenities
- There are no public toilets, rubbish bins or seating areas
- Students are peeing on the fence
- Rubbish especially alcohol bottles are laying around

Potential to incorporate public bathrooms and recycle rubbish bins into the design.

Pathways

This site is surrounded by four roads. Because of this, multiple pathways link up all the roads.
- All the pathways are made of gravel. There is no lighting present, making it unsafe during the night (figure 3.20).
- There are a couple of bridges across the stream. However, one is inactive and has been barricaded (figure 3.21). The bridge shakes when people walk across it.
- From the bridge, fishes can be seen swimming up the stream (figure 3.12). Because of this, it creates a moment of pause along the pathway
- A few residents have straight access to the site from their backyard.

Vegetations

- This site forms part of a green corridor through Otara.
- Many of the surrounding residential properties have backyards which lead out onto the site
- There are mandarins from neighbouring property falling onto the site (figure 3.16).

Stream

The site is a catchment for flood water and runoff from the road. Because of this, there is a stream running through the middle of it. The stream flows north and merges into the Otara creek, which flows into Otara Lake, then into the Tamaki River and out into the Hauraki Gulf (Manukau City Council).

The waterway running through the site is formed of a concrete base (figure.315). Fish can be seen swimming through this channel (figure 3.12). There are six types of fish found in the Otara stream; Shortfin eel, Longfin eel, Banded kokopu, Crans bully, Mosquito fish and Koi carp (Beca Carter Hollings & Ferner Ltd 47). Shortfin eel, Longfin eel used to be fished for food until it became "one of the most polluted waterways in the Auckland region" (Beca Carter Hollings & Ferner Ltd 47; Moody). People can no longer swim or fish in the stream (figure 3.33).

Te mauri o te rangi
Te mauri o te whenua
Te mauri ora o Tara
'Everything is connected'

'When the lake, waterways and wildlife flourish, the people flourish.'

(Otara Waterways and Lake Trust)

Site Photos

Fig. 3.12. Eel found in the stream 1

Fig. 3.13. Waterway through the site 1

Fig. 3.14. Waterway through the site 2

Fig. 3.15. Concrete channel 3

Fig. 3.16. Neighbouring fruit tree 4

Fig. 3.17. Neighbouring banana plant 5

Fig. 3.18. Vegetation on site 6

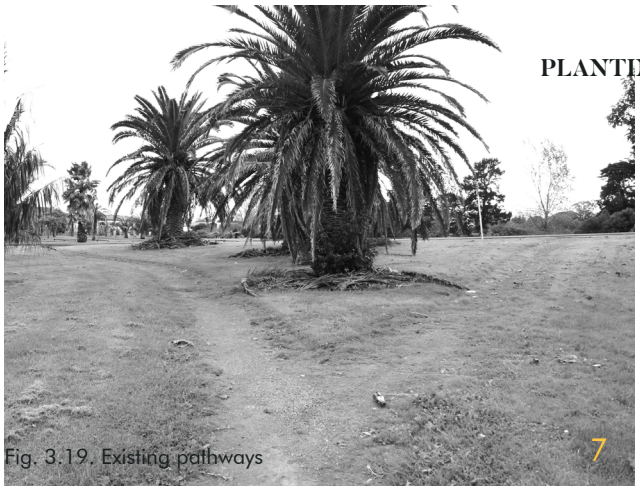


Fig. 3.19. Existing pathways 7

Fig. 3.23. Pacific Island Presbyterian Church 11


Fig. 3.20. Existing pathways 8

Fig. 3.24. Otara kia mataara 12


Fig. 3.21. Unusable bridge 9


Fig. 3.22. Neighbouring houses 10

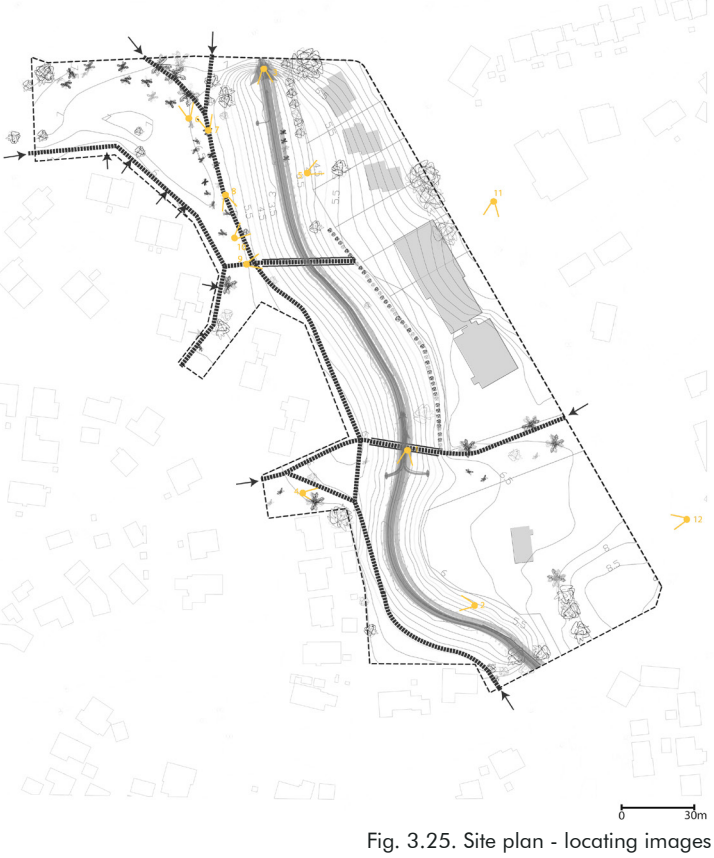


Fig. 3.25. Site plan - locating images

History of Otara Creek

1943

Fig. 3.26. Tamaki: Department of Lands & Survey, This map includes the Otara area to the south of the Tamaki River

Image Redacted for Copyright Purposes

Historically
Tangata whenua from the Ngati Otara Marae, used the creek as a supply route from the sea to bring in provisions and materials needed (Ministry of Business, Innovation and Employment)

Locals would swim, fish and collect watercress from the stream (Moody)

The Stream was like the

Food Basket of Otara

Image Redacted for Copyright Purposes

1958

Fig. 3.27. Showing the motorway causeway across the Tamaki River,and the first houses in Block I, the Wymondley Road area, under construction (Whites Aviation, no. 469)

1968
Otara Lake was created with the construction of a weir between the creek and the Tamaki River. It was developed to provide cooling water for the Otahuhu power station (Manukau City Council)

1970 - 1980
Teachers at Hillary College used to take students out to the creek for activities like kayaking and recreational sport (Ministry of Business, Innovation and Employment)

The weir disrupts the tidal nature of the creek and a significant amount of sediment built up in the lake. It is polluted with heavy metals like zinc, copper, arsenic and nickel (The Ōtara Waterways and Lake Trust)

Tyres, black rubbish bags and a bus stop sign have been thrown in the creek. While newspaper and plastic/glass bottles are scattered through the mangroves (Moody)

1999
The council spent $250,000 investigating what was needed to clean up the creek (Moody)

2000
The Otara Community Board organised an annual clean-up of the creek (Moody)

Image Redacted for Copyright Purposes

2010

Fig. 3.28. Hundreds of dead eels found in the Puhinui Steam due to a concrete spill (Harrowell)

The creek gained a reputation as

"one of the most polluted waterways in the Auckland region"

(Moody)

Fig. 3.29. Otahuhu Power Station

2013
Otahuhu Power Station closed down (Ireland)

Fig. 3.32. Restoration for part of the stream

2018
3100 plants were planted alongside Otara Creek (The Ōtara Waterways and Lake Trust). This is to reduce the sediment and runoff into the lake. When the trees grow and mature they will cool the water of the stream and improve habitat for fish. This will also provide shelter and food for native birds (Wellington City Council)

2016
Residents use the lake as a dumping site. 200 supermarket shopping trolleys removed from the Puhinui Stream during a major clean-up (Harrowell)

Fig. 3.30. Trolleys removed from the Otara stream

Fig. 3.31. Trolleys can be seen dumped in Otara stream

Present
The creek is still highly polluted; Fish can be seen in the stream but are unsafe to eat

Fig. 3.33. Public health warning sign located on site

Chapter Summary

The Otara population is relatively younger compared to the rest of New Zealand. A large portion of the population is born overseas and has a Pacific background (Auckland Council; Stats NZ). In Otara, there is more access to fast food, takeaways and highly processed food than there is too fresh healthy, nutritious food. There is no supermarket which means people have to rely on public transport or vehicles to do their grocery shopping. The construction of the Weir in 1968 has also had an impact on the accessibility of fresh food in Otara (Moody). People used to be able to catch fish and collect watercress before the water became too polluted. Because of this unhealthy food environment, Otara has become one of the most obese regions in New Zealand (Dastgheib).

Fig. 3.34. Current state of the site

SECTION 04

CASE STUDIES

This chapter discusses a range of architectural case studies based around community, school and environment.

Community Projects

Strategies used in this research proposal are based off the report *Growing Healthy Communities* by Sarah Stevenson. The report recommends community projects like community gardens, community kitchen and edible landscaping as a way to help improve food insecurity (20).

Community Gardens

A community food garden is shared plots of land where people can come together to grow fruit and vegetables. (Stevenson, *Growing Healthy Communities* 20) Sharing land to grow food can have many positive influences on the community:
- It can bring neighbours together, make new friends and build community spirit.
- Provide healthy outdoor exercise.
- Creates a sense of place and identity by allowing an individual to take care of and have responsibility for an area of land.
- Provides people with a sense of achievement for growing their own food.
- It can also reduce food insecurity by giving residents the resource and environment to grow nutritious food and learn about the growing cycle. (Russ Grayson)

A community garden has recently been set up in the corner of Hainings and Tory Street, Wellington. Compassion Soup Kitchen transformed a carpark using wooden pallets into an urban garden (figure 4.01). This community garden provides a gardening workshop and offers the opportunity to learn new skills and build connections with people (Sustainable Trust). This gardening workshop cost $10pp, per workshop but the money goes towards making it free for Soup Kitchen whanau (Sustainable Trust).

Fig. 4.01. Compassion Soup Kitchen Urban garden, Wellington

Urban Edible Planting

Urban edible planting is growing fruit trees and vegetable in areas that are easily accessible to everyone in the community. This is achieved by planting fruit trees at parks and playgrounds or along footpaths where traditional non-fruit trees are. Fruit trees provide the same benefits as a non-fruiting tree but also a healthy snack. (Stevenson, *Growing Healthy Communities* 22)

A.D.Schierning is an artist in New Zealand whose aim is to plant edible gardens throughout the country. His project Freedom Fruit Gardens is "Creating increased accessibility to the simple pleasure of harvesting and eating fruit straight from the tree." He wants to remind consumers that food is not something that has initially come from a supermarket rather a tree or a plant. One of his projects is based in Otara (figure 4.02). In 2010, a large variety of trees were planted on Preston Road reserve which is on the edge of Rongomai Primary School. (A.D.Schierning) The students at the school selected feijoa, plum, peach, orange, mandarin, pear, banana and kiwifruit to be planted in the orchard. The planting and maintenance of the orchard will be done by the students and families of Rongomai Primary as well as residents (Tanner).

A downfall with fruit trees is that sometimes the fruit is left unpicked and can fall to the ground. This can leave a mess and attract pests. However, if the community is aware of the fruiting season and where they can be picked, this is unlikely to happen (Stevenson, *Growing Healthy Communities* 22).

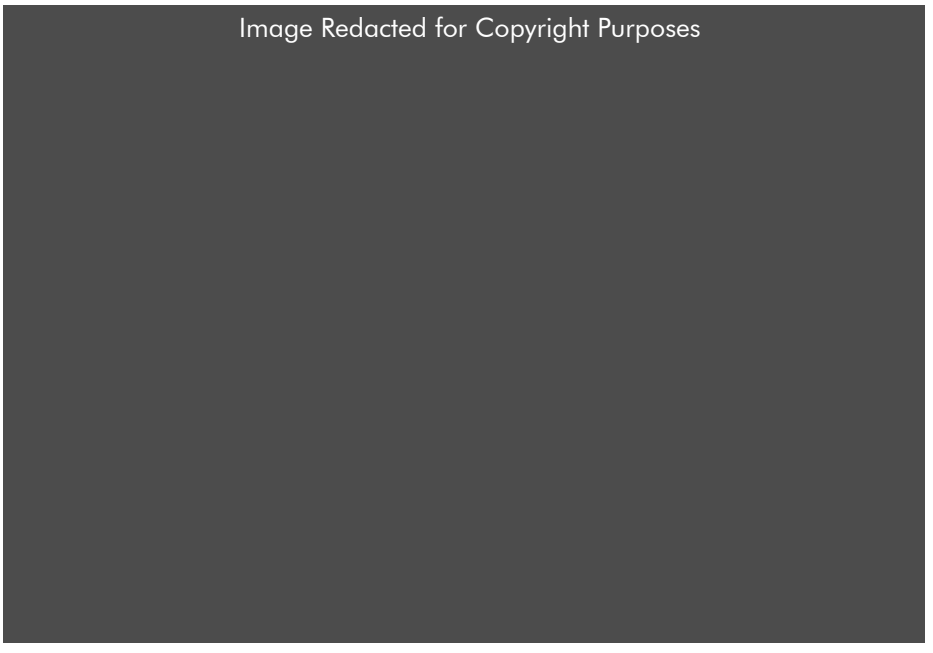


Fig. 4.02. Urban edible planting at Preston Road Reserve, Otara

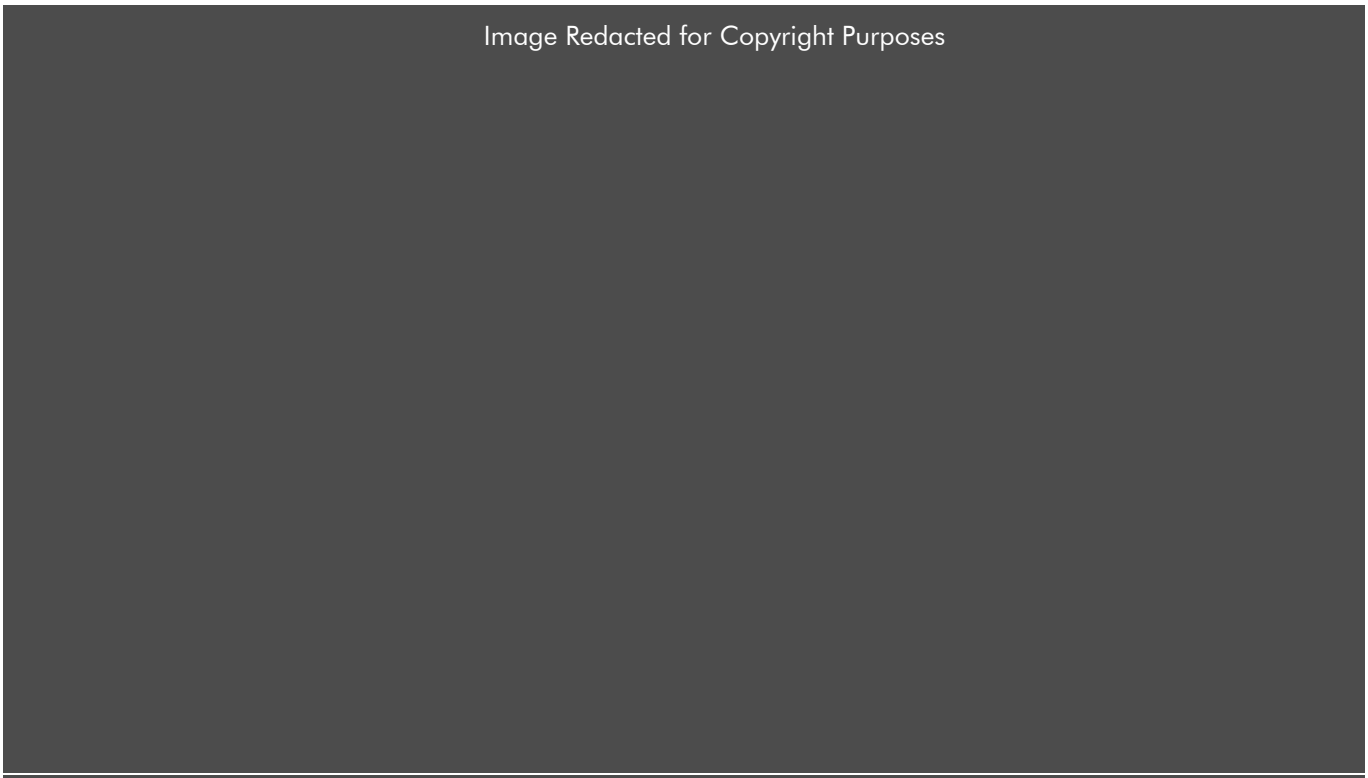
Community Kitchen

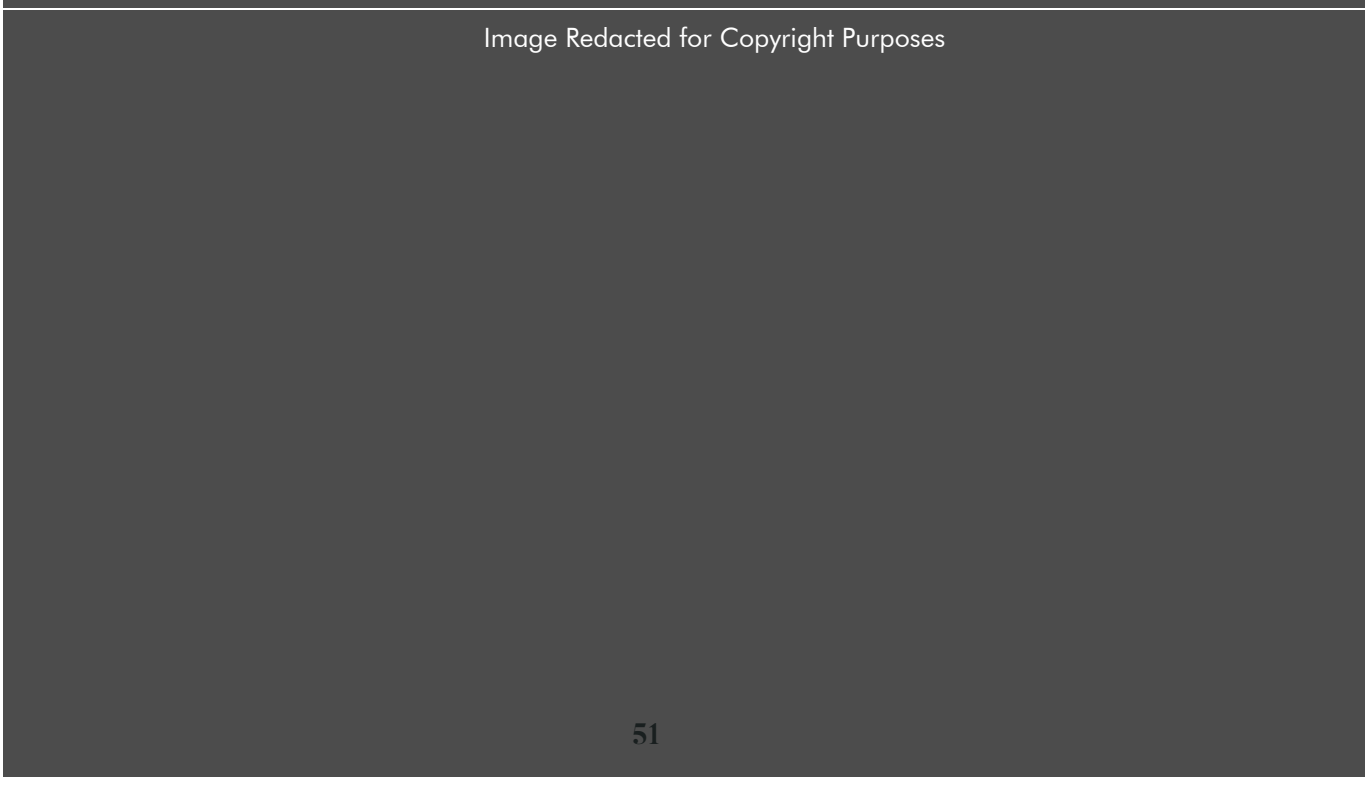
A community kitchen provides the facilities and environment for people to cook, develop food knowledge and learn how to prepare healthy, tasty and nutritious meals on a budget. It is a welcoming place where a small group of people can meet regularly to prepare meals together. The location of the community kitchen is crucial for the success of it. It needs to be located in an area that is accessible to everyone and the equipment required. For example; community centres, community halls, churches, schools, family resource centres and neighbourhood houses have the potential for a thriving community kitchen (Lowitt 6).

Common Unity Project converted a shipping container shed (figure 4.04) into a commercial community kitchen which can be uplifted and transported to another site. This community kitchen is designed to be entirely off the grid as it collects rainwater, has its own solar power supply and uses gas tanks. The kitchen is intended to cook 200 meals for children at low-decile schools and the community (Tso). Julia Milne, Common Unity co-ordinator aims to use the project as a way to teach schools and other organisations how easy it is to grow and cook their own food (Tso).

Community kitchens can help improve food security amongst the participants by increasing physical and economic access to adequate amounts of healthy food (Lowitt 6). It can provide an alternative option to fast-food and takeaways. However, for it to have an impact on food security, participants had to use it for at least 5% of their meals. Research on community kitchen shows that those who use the kitchen for 25% of their meals had the most significant effect on food security (Stevenson, *Growing Healthy Communities* 24).

Fig. 4.03. (Top) Inside the shipping container
Fig. 4.04. Outside the shipping container





School Projects

Food insecure households are more likely to have children living in them (Stevenson, *Edible Impact* 5). As a result, children go to school hungry and have low academic performance. To overcome food insecurity, these two precedents can integrate horticulture with their schools to provide food for their pupils at lunch as well as to educate them on nutrition and growing food.

Epuni Primary School

Common Unity Project Aotearoa at Epuni Primary School, Wellington – Is located in an area where food security is a concern. They transformed an unused soccer field into a horticulture farm to produce enough crop to feed 90 pupils three times a week (figure 4.05). It encourages parents and the wider community to come to school each day and learn, share and educate one another and therefore helping with food insecurity concerns (Milne).

Community School 55

Community School 55 is a school in New York – Greenbrox Machine transformed an empty library in a 100+ year old school building into a National Health, Wellness and Learning Centre at CS 55. The School integrates plant-based teaching with school core-curriculum to grow healthy food for students and improve academic performance. They achieve this by using hydroponics to grow food within the in existing structure (figure 4.07). Using this system, they can grow vegetables on vertical surfaces (Ritz).

Both these systems will be challenging to maintain over the school holidays. Because of this, a maintenance plan will be required over those periods to ensure that plants are being fed and taken care of. (Stevenson, *Growing Healthy Communities* 60)

Fig. 4.05. Epuni Primary School horticulture farm

Fig. 4.06. Learning Garden at Community School 55

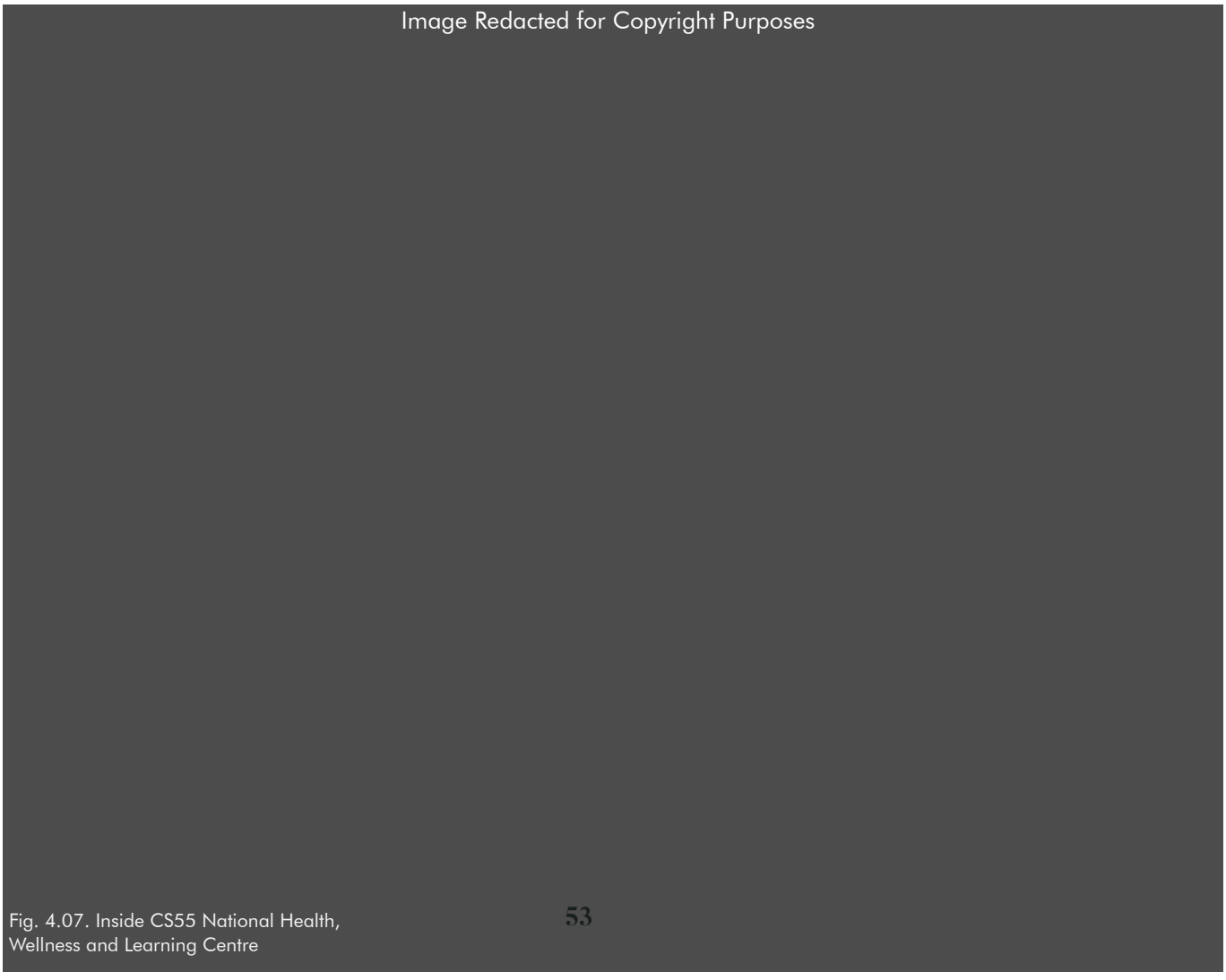


Fig. 4.07. Inside CS55 National Health, Wellness and Learning Centre

Architecture Schemes

Pasona Urban Farm

To ensure there are enough crops to feed the children at Ferguson Intermediate, plants can be grown within the architecture of the building. They can be grown on the roof, walls and ceilings of buildings using hydroponic and soil-based farming. An example of this is in Pasona Urban Farm. This project was an existing nine-storey office building that was renovated in 2010 to integrate horticulture within the existing structure. The project aims to reverse the declining trend in the number of farmers in Japan and ensure sustainable future food production. The building successfully grows 200 species of plants, fruit, vegetables and rice that are harvested, prepared and served in the cafeteria on site. Inside the building there are lemon or passionfruit trees used as a partition wall (figure 4.08), tomato vines suspended above the conference table, and salad leaves growing inside seminar rooms. There is also seasonal flowers and orange trees planted within the double façade and a rice paddy and broccoli field found in the lobby. To maximise the plant growth and produce, Kono Designs has equipped the crops with metal halide, HEFL, fluorescent and LED lamps and an automatic irrigation system (Kono Designs). Where the environment is altered by “an intelligent climate control system, monitors humidity, temperature and breeze to balance human comfort during office hours and optimise crop growth during after hours” (Kono Designs). These crops are harvested and maintained by the employees with the help of agriculture specialist (Andrews). By being able to be actively involved in food production, they gain the skills and knowledge to grow their own food.

Rooftop gardens, green walls and interior partitions make most of the vertical surfaces and also provides an environment which could help food security. It provides a more sustainable food distribution system as there are zero food mileage and less energy and transport cost. However, these systems may not be the most energy efficient or affordable option to run. These systems require much energy to create the right environment for the plants to grow, which can be quite costly (Andrews).

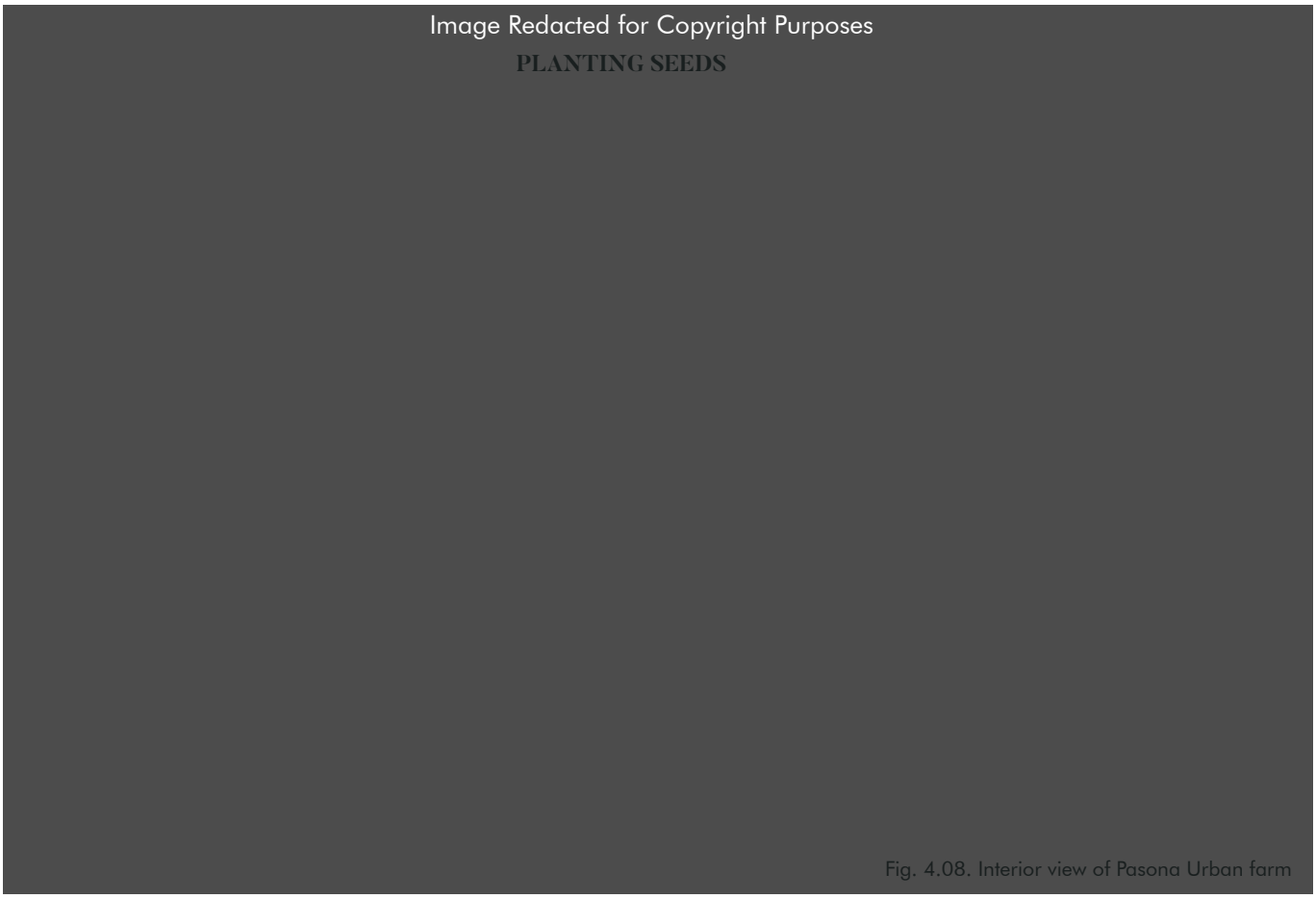


Fig. 4.08. Interior view of Pasona Urban farm

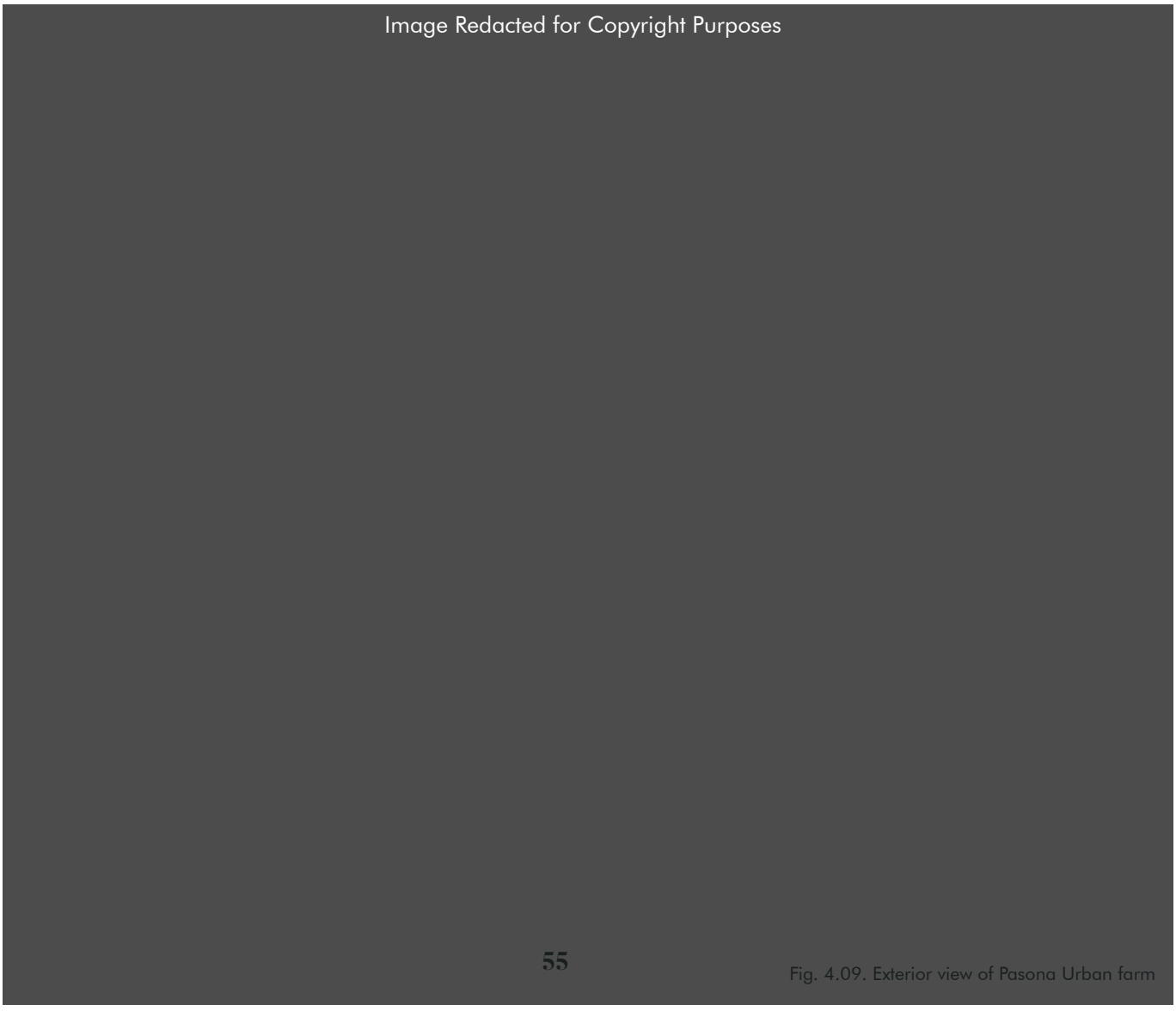


Fig. 4.09. Exterior view of Pasona Urban farm

Environmental Strategies

Terrace Gardens

Terraced garden is a strategy used in many countries to cultivate plants on steep sites. Steps are built on hills or mountains to create a platform for plants to be grown on. These steps are designed to hold the soil nutrients and prevent erosion and soil runoff when it rains (Omondi). Fruit and vegetables that have been grown in these gardens include; rice, wheat, maize, potatoes, grapes, olives, tea (Omondi; Heimbuch). This terrace gardening is achieved at a massive scale to produce the crop. They can transform unusable land into the most productive farm. However, it does require a substantial input of labour to construct and maintain which can be expensive to run (Omondi). Figure 4.01. Shows terrace gardens in Sapa, Vietnam used to cultivate rice. The repetitions of steps create beautiful landscapes which are photogenic and attract people to the area.

The site selected in Otara acts as a catchment for water to access the stream. Because of this, the site is made up of steep slopes that lead down to it. The scale of the site is not as large as the one shown above, but terraced gardens can still be built up around the site to provide platforms for crops to be grown on and also attract people to the site.

Fig. 4.10. Terrace gardens used to grow rice in Sapa, Vietnam

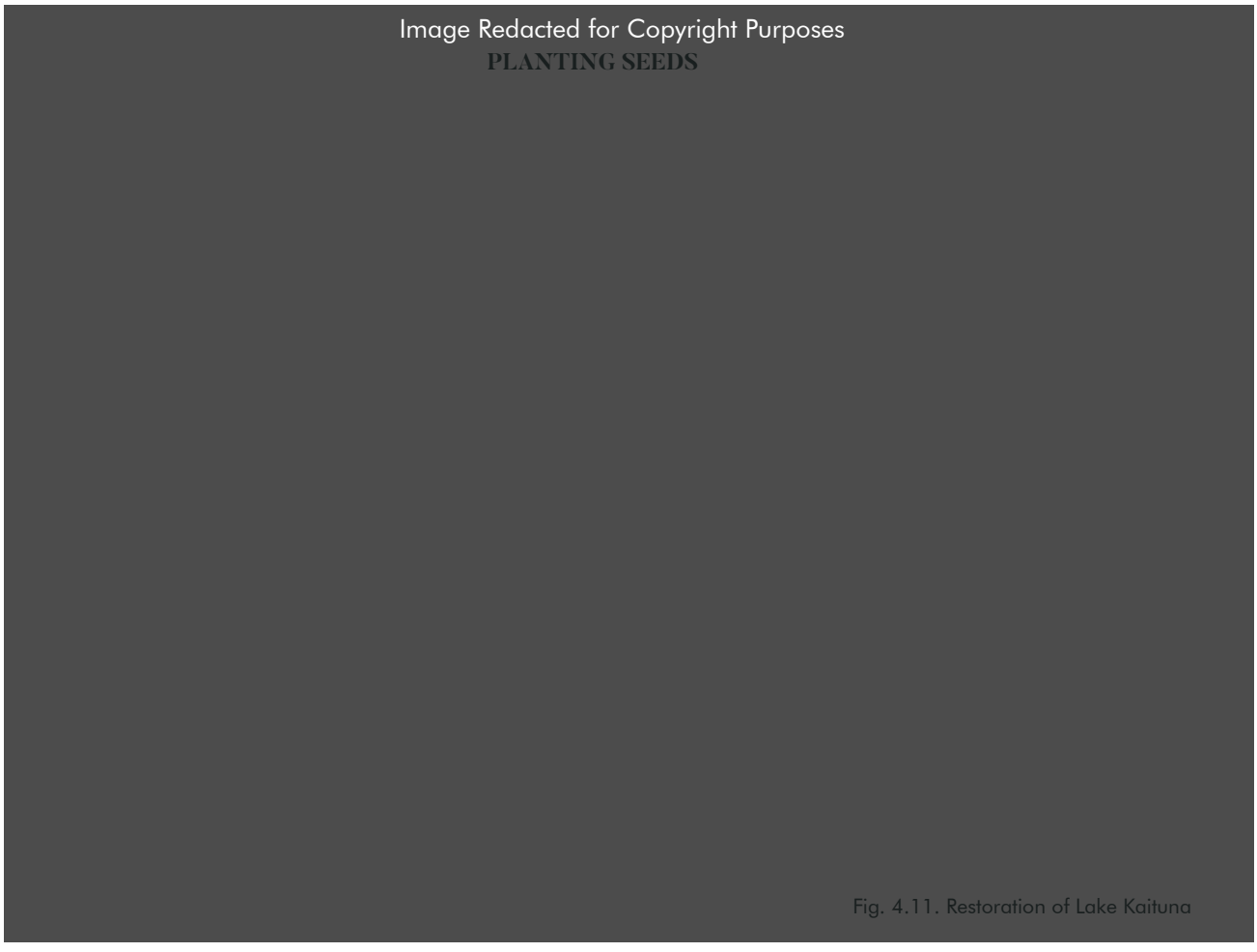


Fig. 4.11. Restoration of Lake Kaituna

Riparian Planting

"When the lake, waterways and wildlife flourish, the people flourish."
(The Otara Waterways & Lake Trusts)

Otara stream is one of the most polluted waterways in Auckland. The site selected is part of the Otara stream catchment. This strategy can be used to help clean the stream and return it to its original state. Currently, the waterway going through the site is constructed with a concrete channel (figure 3.15). This system increases the water temperature, creates poor ecological and social values, and provides no water quality treatment. (The Otara Waterways & Lake Trusts; Victorian Government 6) Because of this contaminates are built up, and the water became polluted.

In 2014, BLA 4th years at Unitec University did a study on Otara Lake, Waterway and Community. In the research, they make recommendations on cleaning the polluted waterways in the region. A low impact catchment management plan suitable for the stream running through the site is Riparian planting (Unitec BLA Year 4 Studio 7). Riparian planting is used to provide shelter and habitat for fish, clean water by filtering out some pollutants (Wellington City Council). Figure 4.11 shows Riparian planting done for Restoration of Lake Kaituna. When waterways are well maintained and are accessible, they can provide a public space that discourages criminal behaviour (Lewis, Simcock and Davidson 4).

Other Projects

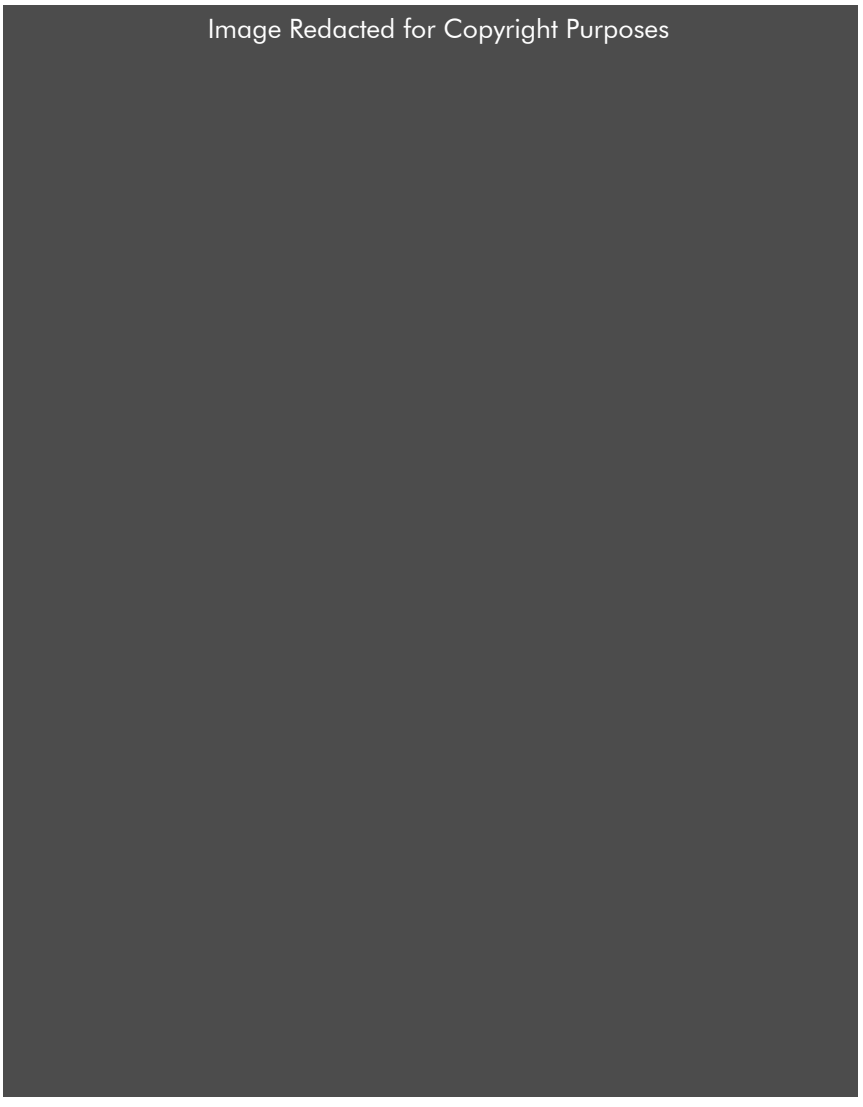


Fig. 4.12. Pataka kai at Fisher Crescent, Otara

Pataka Kai

"Take what you need, and give what you can"

Pataka kai also known as a food pantry is a new movement currently happening in Otara to mitigate food insecurity concerns. Residents and people in the community are opening pantries on the side of the road, which allow people to donate and take free food (figure 4.12). The concept was originally inspired by the Maori lifestyle over 100 years ago. "It encompasses the way of life for Maori, in the way that they shared food and worked on one thing for the benefit of all" (Lapointe).

Ridleys Temporary Restaurant

A farmers market is held in Otara every Saturday morning 700m from the site. The fruit and vegetables there are usually cheaper and fresher compared to being brought in a store. However, even though there is the availability of fresh produce, it does not mean people know how to use it or have access to the facilities and equipment to cook it. This case study Ridleys Temporary Restaurant (figure 4.13) looks at exchanging raw food for a cooked meal. Ridleys Temporary Restaurant was a temporary installation that occurred in a farmers market in London, 2011. The project had a list of ingredients on display and people would have to go out into the market, buy the ingredients and bring it back to the stall for an exchange of a meal. In the stall, there would be volunteer chefs cooking the meals (The Decorators).

This concept of exchanging raw food for a cooked meal can be explored as one of the uses for a community kitchen. The community kitchen contains the facilities and equipment to cook the meal. It can be a place where people bring raw food to be cooked, share recipes and learn new skills.

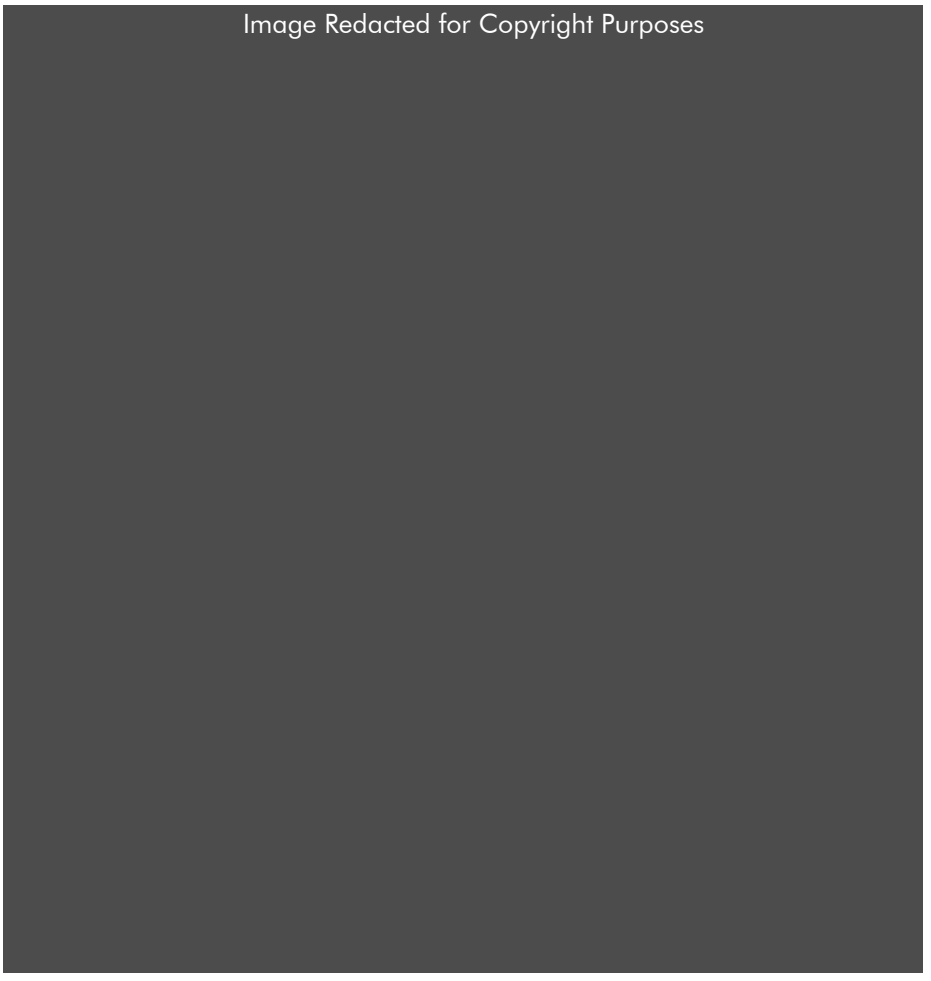


Fig. 4.13. Exterior view of Ridleys Temporary Restaurant

KEY TERMS

Hydroponics

Hydroponics is a system that cultivates plants in a water base, nutrient rich solution. This system can be used to grow plants on building or in areas where the soil is limited. Hydroponics is a useful system where there is minimal space or water (Fullbloom Hydroponics; Max).

Pros

- 80% less water compared to soil based plants
- Better growth rate so less fertiliser required
- Fewer pests and diseases, therefore, less use of pesticides
- No weeds
- Able to grow crop all year round (Max)

Cons

- Experience and technical knowledge required
- System failure threats – water and electricity risk
- High start-up cost – and long return per investment
- Disease and pests may spread more quickly (Max)

Aquaponics

Aquaponics is similar to hydroponics except fish, prawns or clams are added to the system to provide nutrients for the plants. The animal discharge is used to produce nutrients for the plants, and in return, the plant provides filtration for the water (North).

Pros

- 90% less water compared to soil based plants
- No weeds
- Able to grow crop all year round
- Better growth rate so less fertiliser required
- Environmentally friendly (Travis)

Cons

- Unsustainable amount of fish food which can be quiet costly
- High start-up cost
- A complex system with more risks
- A relatively new system with unsecured success (Travis)

SECTION 05

PROGRAMME ANALYSIS

This part explores design strategies and programme based on the research in previous chapters.

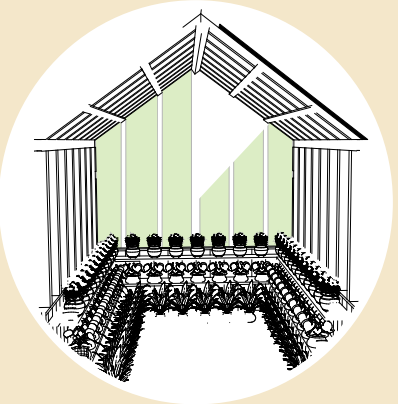
DESIGN STRATEGIES

Based on the on the case studies, literature review and site analysis, these design strategies (figure 5.01) were selected to help improve food insecurity in Otara. The design strategies range in a variety of scales; some of them are site specific, and others can be used in a broader context. The bubble diagram (figure 5.02) highlights how the strategies can be connected and the outer community.

Restore Otara Stream

New Market

Community Kitchen



Community Greenhouse

Terrace Garden

School Horticulture Garden

Hydroponics/Aquaponics

Pataka Kai

 Fig. 5.01. Design Strategies

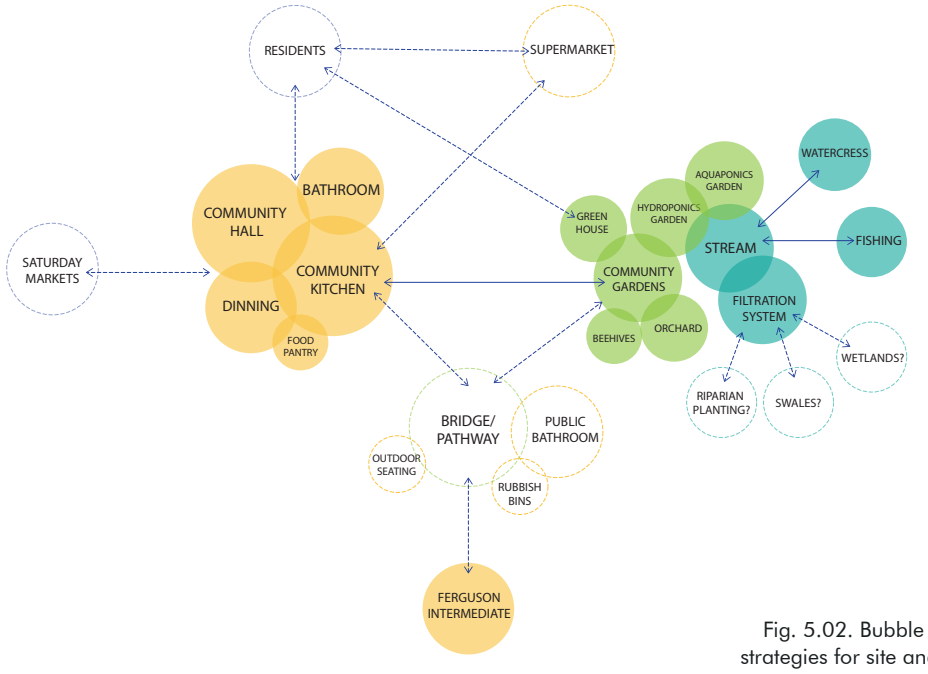


Fig. 5.02. Bubble diagram of design strategies for site and the wider context

Aims

Design Strategy: New Market
Aim: Localising fresh/healthy food and provide an alternative option to the unhealthy food already present

Design Strategy: Riparian Planting
Aim: Cleaning part of the waterway that flows through the site and into Otara stream. With the long term goal of restoring the stream to its original use of fishing, and collecting watercress

Design Strategy: Community Greenhouse
Aim: To teach the community how to grow fresh produce all year round

Design Strategy: Community kitchen
Aim: To provide facilities for the school and community to teach practical cooking skills as well as cook together

Design Strategy: Terrace Gardens
Aim: To grow fresh produce on unusable land

Design Strategy: School Horticulture Garden
Aim: To combine plant-based teaching with the school core-curriculum to teach students how to grow and cook food

Design Strategy: Hydroponics/Aquaponics
Aim: To grow fresh produce all year round for the community to consume

Design Strategy: Pataka Kai
Aim: Provide more places where people can donate and take free food without judgement

Design Strategy: Ecumenical space
Aim: To re-imagine the church so that it can be adaptable for other religions and multiuse

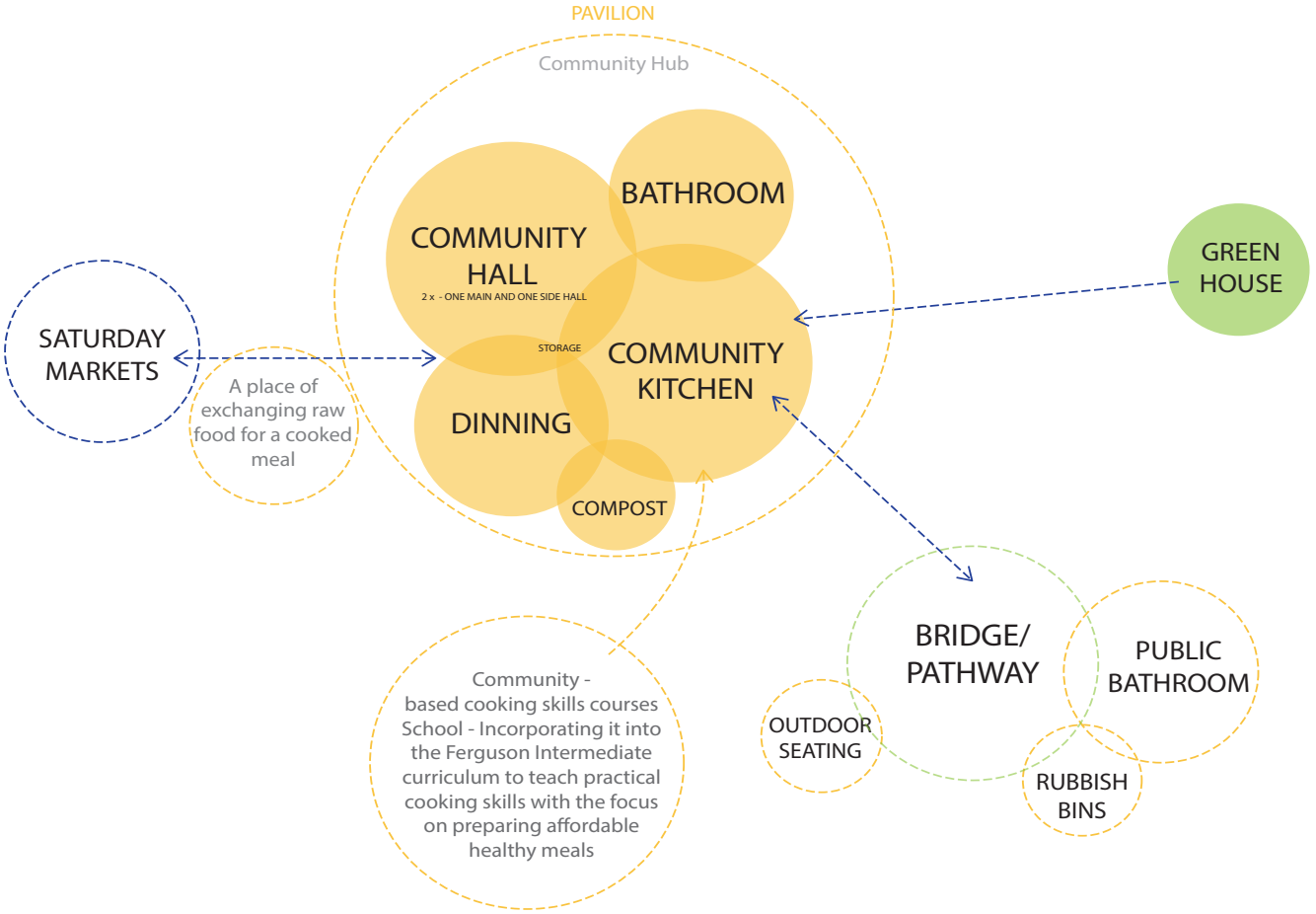


Fig. 5.03. Bubble diagram of programme for building proposed

Scope

Designing for each of the strategies will make the scope for this research too large. Because of this, the next part of the proposal will focus on designing a public space that facilitates a community kitchen, ecumenical space, and a greenhouse. The bubble diagram (figure 5.03) shows the programme for this building.

Design Intent

The intent for this project is to create a welcoming environment that brings the community together to celebrate, eat and enjoy healthy food. It will be a place, where people can share their food and help others struggling with food insecurity. This design proposes a healthier alternative to the takeaways and fast-food restaurants already present in Otara. The design aims to create a friendly environment where students can learn the skills to grow and cook their food. To achieve this, a programme for an ecumenical space, community kitchen and greenhouse will be combined to create a good public space.

SECTION 06

PART 1
Preliminary design one

This section experiments with physical modelling to test concepts and forms.

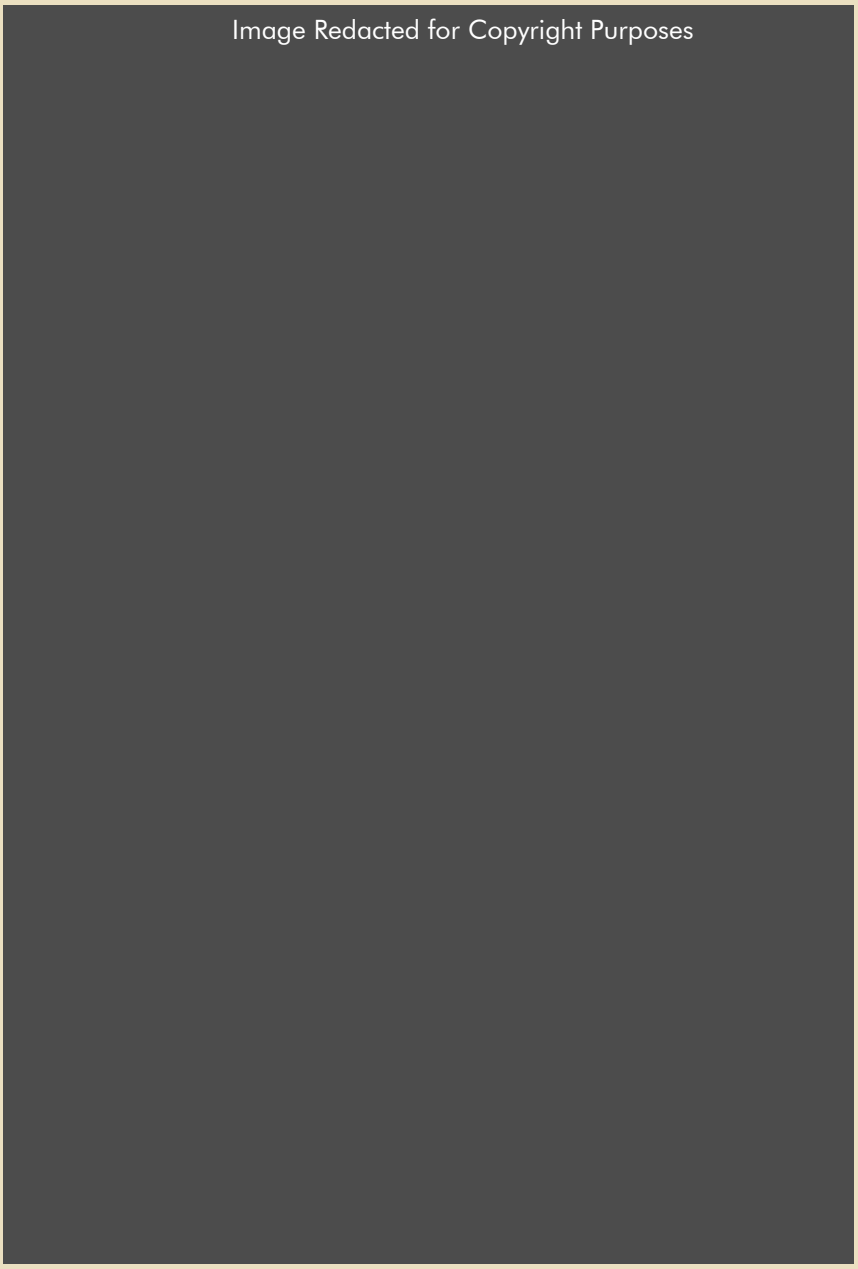


Fig. 6.01. Coastal village,
Savai'i, Samoa

DESIGN APPROACH

The first design iteration experiments with physical hand modelling to trial forms for the site. Components of similar size and shape were made using a laser cutter and then glued together to create a volume.
A fish found in the stream inspired the shape of the components. The waterway was sketched as a fish bone, which was later transformed into a series of gable roofs (figure 6.02). These rooflines are extruded to create a series of houses that resembled the formation of a village (figure 6.01). A large number of the residents in Otara are initially from the Pacific islands, where they lived in a village environment. Another positive aspect of the site is its capacity to bring back the village and their cultural identity, in order to achieve this the site can be further occupied with different types of buildings placed around the stream

In the model making process, different size components of similar shapes were used to experiment forms for greenhouses, community kitchen and ecumenical spaces. Each of these spaces has different spatial qualities and design criteria. The models will aim to achieve the following:

Ecumenical Space
The ecumenical space will be intended for various church services; this area will be designed to be multi-use so that it can hold a variety of functions and events. To achieve this, a large volume without the interference of internal partition walls and structure is preferred. This layout is more flexible and can adapt to other uses without the worry of obstacles. For this space to be comfortable, it will need to have good lighting, ventilation, and sound qualities. The building will need to be recognisable from the outside and easy to read. In addition to this, the building will require good circulation and access to the other areas of the site. These physical models will test for form, openings, light and access for an ecumenical space.

Greenhouse
The greenhouse is designed to grow crop all year round and provide a space to educate students on how to grow food. This space requires an enclosed area with lots of natural light to maximise plant growth. The area will also need access to water, and natural ventilation for a comfortable learning space and to prevent overheating. Additionally, the greenhouse will need good circulation and access to the other areas on the site. These physical models will test for form and light access for a greenhouse.

Community Kitchen
The community kitchen will provide cooking facilities for the community and school. This space will need to be very functional and practical, so the layout of cooking equipment, wash areas, benches, storage and dining area is vital. The area will need proper ventilation and easy access to the greenhouse, ecumenical space and school. These physical models will test for combining forms to create areas for a community kitchen.

To design these building the components were laser cut again at different sizes. The sizes were based on the existing church on site. They are scaled at 1:500, 20m wide and range from 1 to 3 stories high. Some were also cut in half to add some variation to the designs. Using these six different components; 46 models exploring different ideas and concepts were generated.

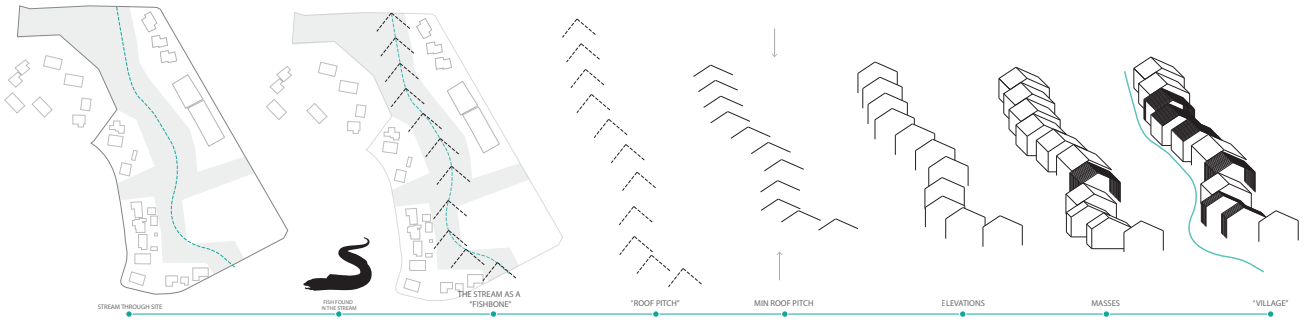


Fig. 6.02. Development of component

DESIGN OUTCOME

Figure 6.03. These first models create the simplest forms. They were the same size component glued together to create a structure. The idea is to create individual buildings that had its own use.
- The components are all glued on the same axis to create a gable roof form. This creates flat, unwelcoming elevations on two sides of the building. These elevations have no opening and create a solid wall.The other two sides are open and will need to be developed to create an enclosed space
- The components in these forms can be used at structural portal frames
- The forms create one large volume which would be suitable for an ecumenical space
- These forms will be the baseline model for the other experimentations

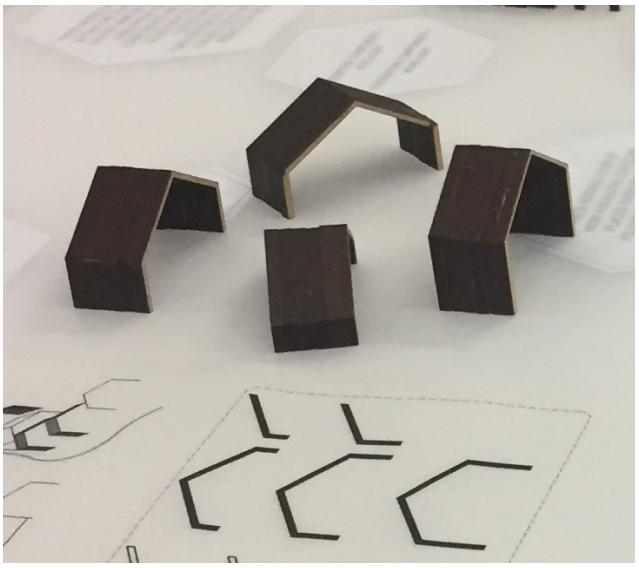


Fig. 6.03. Base model

Figure 6.04. In the next models, components were removed from the baseline models. This provided openings on the side and allowed for natural lighting to enter the space. They created spaces that would be suitable for a greenhouse.
- Adjusting the spaces between the components can also be used to alter the level of privacy and lighting into the building
- The components are all glued on the same axis to create a gable roof form. This creates flat elevations on two sides of the building. The other two sides are open and will need to be developed to create an enclosed space
- The components in these forms can be used at structural portal frames

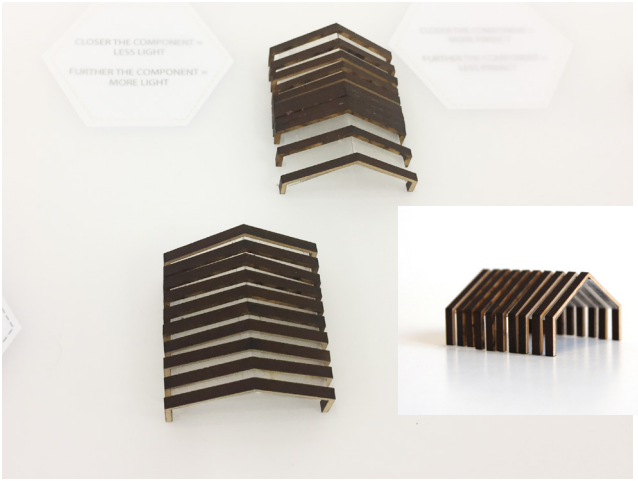


Fig. 6.04. Iteration one models - removing components

Figure 6.05. These models experiments with combining components of different heights to create variation in the roof form. This created more openings for light and allowed for another level.
- The floor and internal walls would need to be developed
- This creates flat, unwelcoming elevations on two sides of the building. These elevations have no opening and create a solid wall.The other two sides are open and will need to be developed to create an enclosed space
- These forms are more interesting than the baseline model, but it is still straightforward and does not stand out compared to other models.

Fig. 6.05. Iteration two models - combining different height components

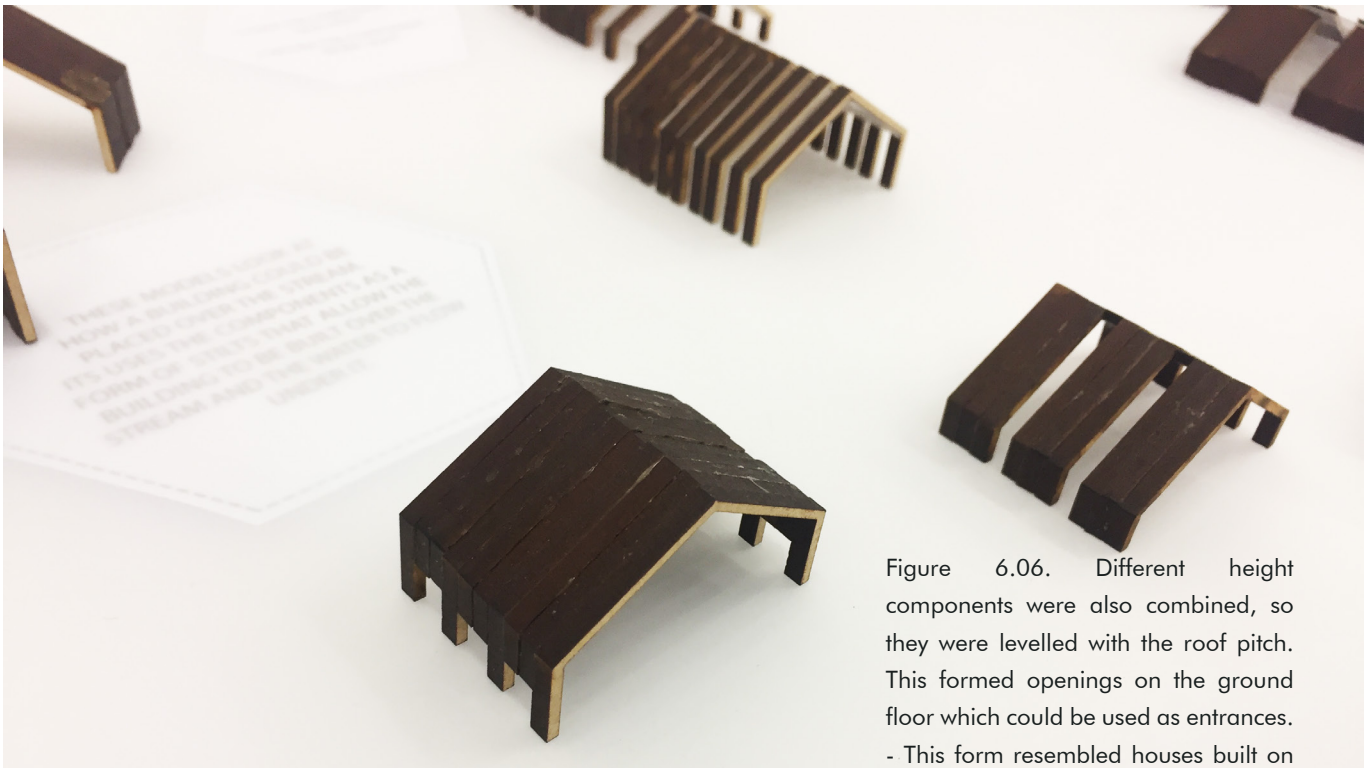


Fig. 6.06. Iteration three models - combing different height components on same axis

Figure 6.06. Different height components were also combined, so they were levelled with the roof pitch. This formed openings on the ground floor which could be used as entrances.
- This form resembled houses built on stilts. This technique can be used to design a building over the stream.
- The floor and internal walls would need to be developed.

Figure 6.07.The same design approach was tested, to see how the building could be built on the slope of the site. The smallest components were joined together and then attached to a more extensive group of components. This created a building where the top floor is levelled with the top of the slope, and the ground floor is levelled with the bottom.

Fig. 6.07. Iteration four models - sloped site

Fig. 6.08. Iteration five models - openings for access

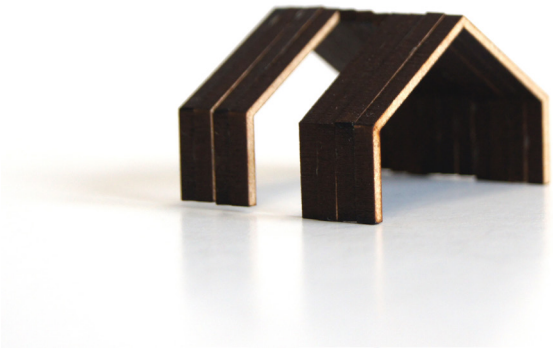


Figure 6.08. These models look at how access and entrances can be made from using the half components or offsetting the form to create an opening.
- half components created large voids in the form which is difficult to see from all perspectives
- offsetting the components made a more obvious entrance, but it altered the floor area of the building

Fig. 6.09. Iteration six models - half components

Figure 6.09. The next series experiment with the half components and how they can be used to create shelter. In these first models, the same size component was glued together to create a baseline model.
- These models would be suitable for creating small shelters along the pathway
- The elevation on three sides of the building will need to be developed.

Fig. 6.10. Existing Presbyterian Church

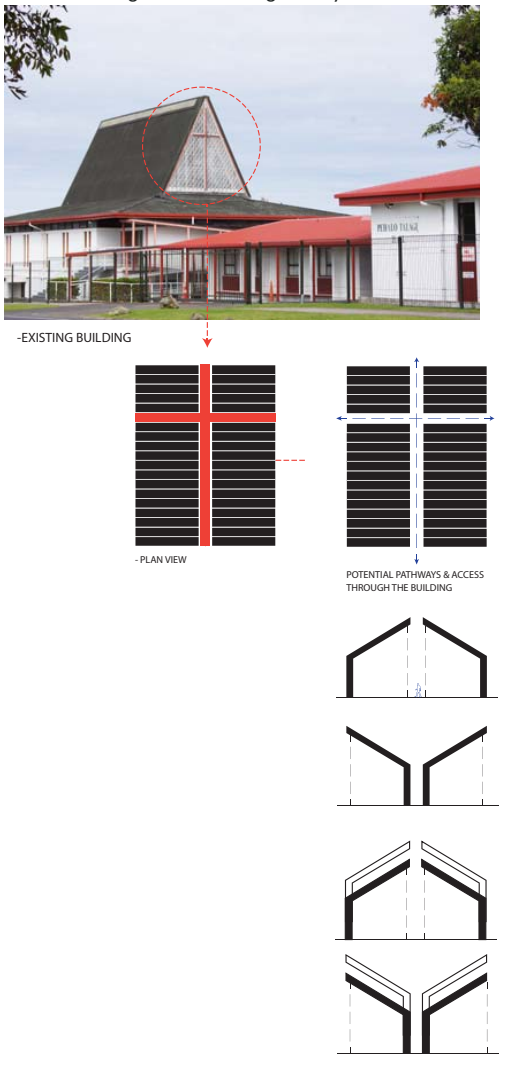


Fig. 6.11. Iteration seven development diagrams

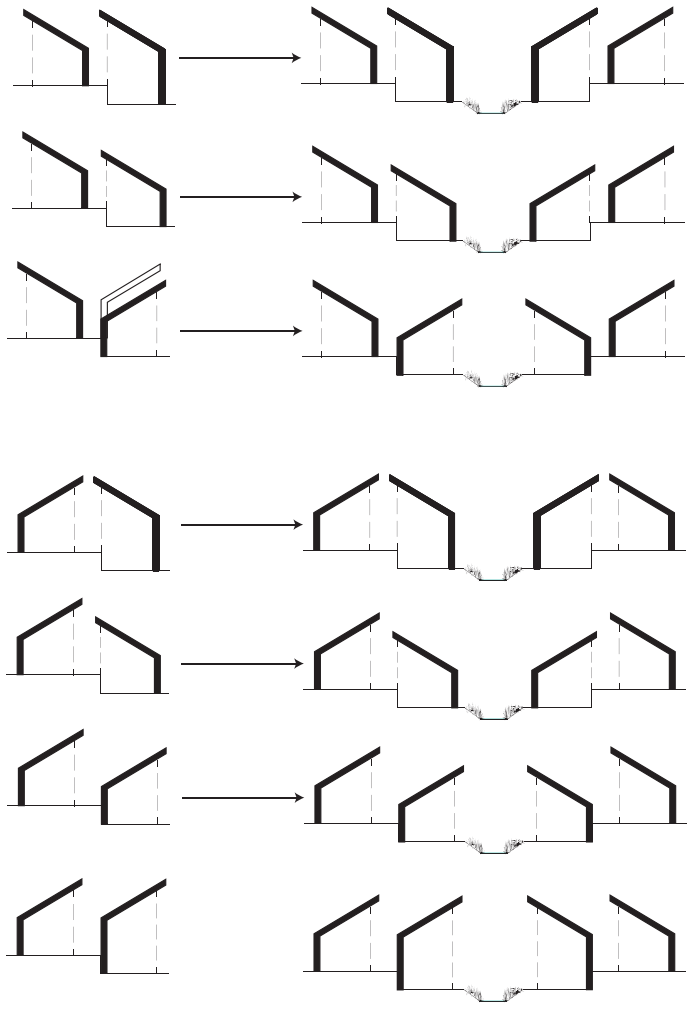


Fig. 6.12. Iteration seven model - top view

In figure 6.12. The models were placed to form a symbol of a cross when viewed from the sky. By doing this individual forms were created. However, in this layout, the buildings are very isolated from each other. This formation creates solid exterior walls which are un-inviting and gives the appearance of a shed.

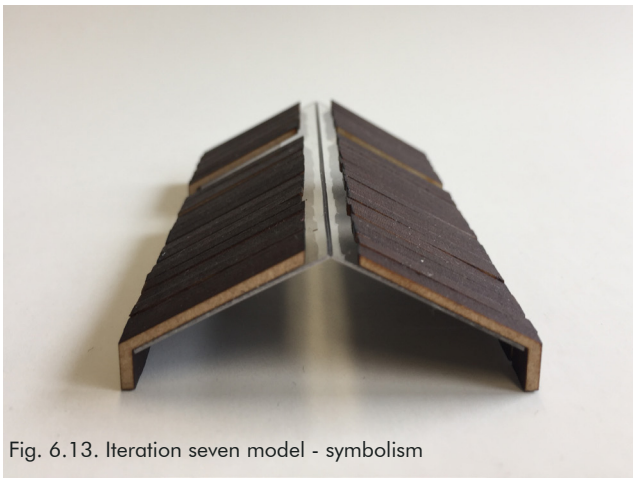


Fig. 6.13. Iteration seven model - symbolism

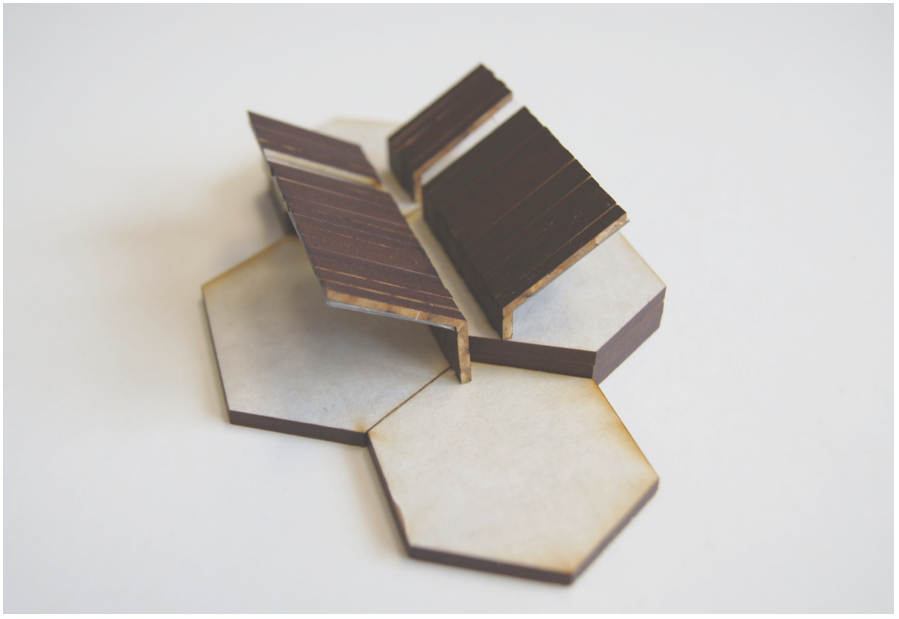
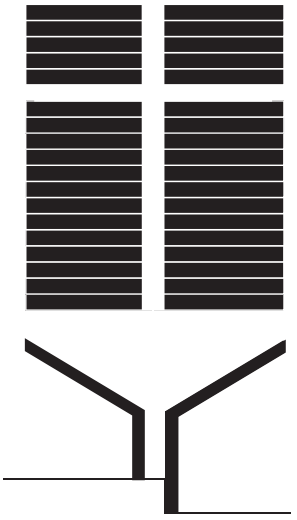


Fig. 6.14. Iteration seven model - developed onto site



In figure 6.14 The form is developed to fit on the slope of the site by changing the size of the components. This allows for another level in two of the masses. The elements were also switched around to create a hallway in between.

- Having two solid walls between the different spaces created a strong boundary that did not make the areas seem welcoming.

- The programme for this form is explored in figure 6.15. A second level is used for office space and openings are created between the walls to connect the areas. However, this design does not work well functionally. The space between the forms that dictate the cross create narrow hallways that can feel tight if large crowds were moving through them.

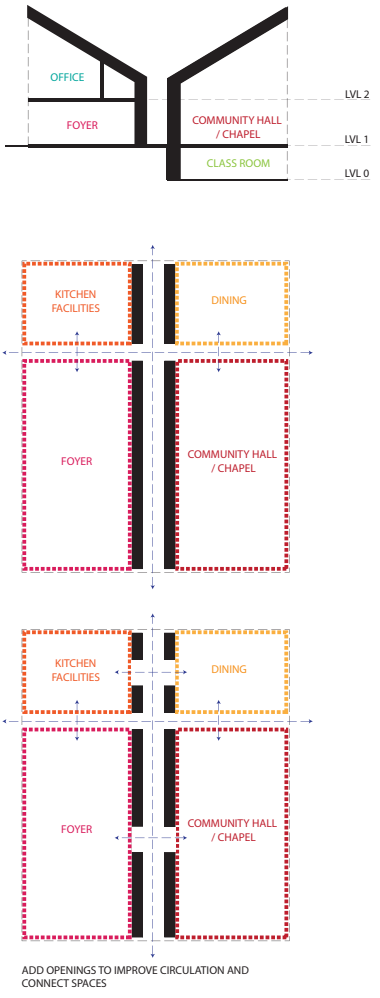


Fig. 6.15. Programme diagram for iteration seven

In this model, the components are shifted slightly to create variation in the form (figure 6.16). This form creates a very solid mass with minimal gaps for openings. Because of this, it is not the most welcoming form.

Fig. 6.16. Iteration eight model - offsetting components

In this model, the components are shifted on the same axis to create a circular building (figure 6.17). The layout of the structure creates many openings and could make an interesting form for a greenhouse. However, it would be difficult for other programmes to fit within the structure.

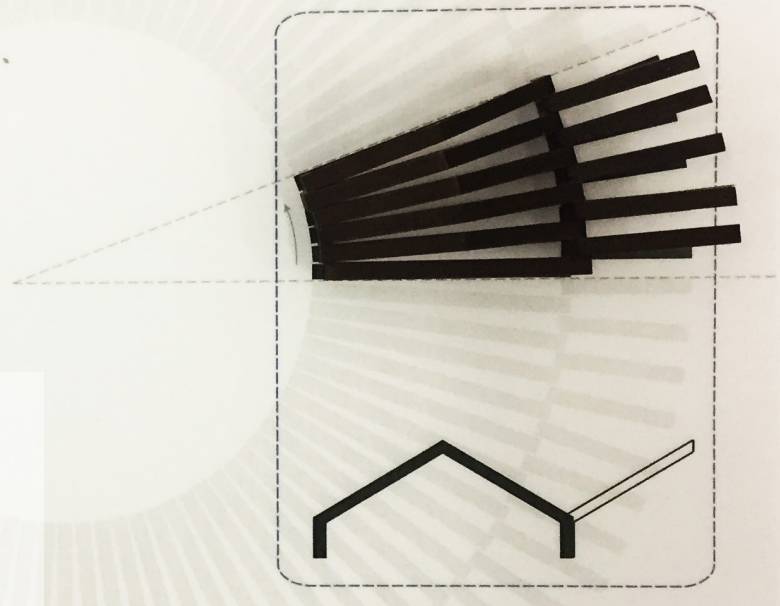


Fig. 6.17. Development of iteration nine diagram

Fig. 6.18. Iteration nine model - circular form

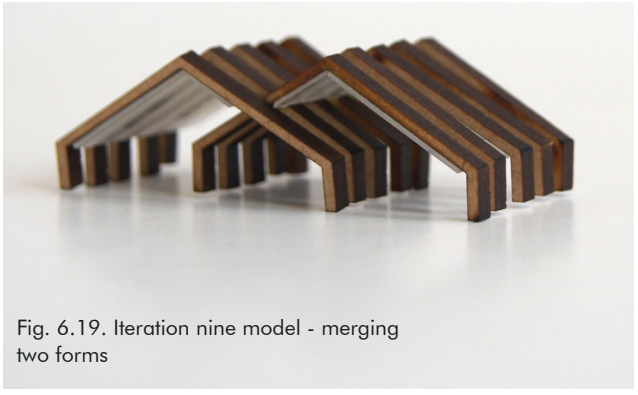


Fig. 6.19. Iteration nine model - merging two forms

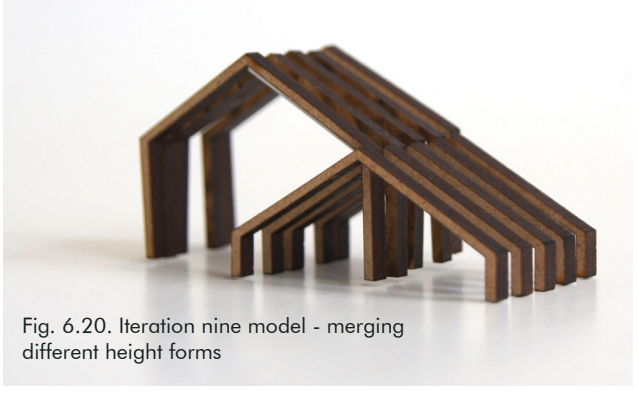


Fig. 6.20. Iteration nine model - merging different height forms

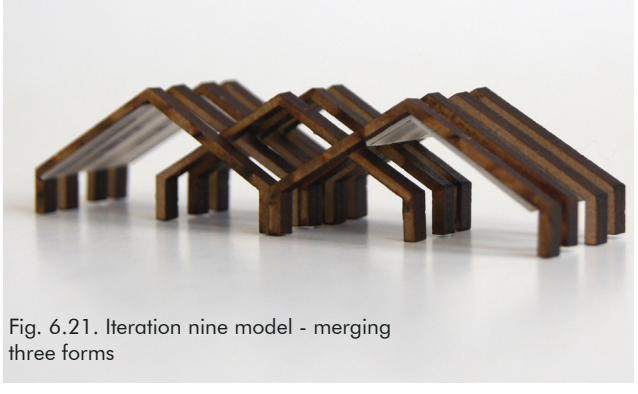


Fig. 6.21. Iteration nine model - merging three forms

Fig. 6.22. Iteration nine model - merging thicker forms

These models were merged to create a new form and break up the volume. This created a way of using the structure to divide the space. However, this form created openings in the roof and wall which gave the appearance of a skeleton (figure 6.19, figure 6.20 figure 6.21).

Merging three forms (figure 6.21) created a lot of interference in the space. This area would be challenging to hold services, as there are columns in the way. Some of the columns can be removed and replaced with a beam to distribute the loads.

In figure 6.22 the components were glued together to increase the thickness. This provided a better form, but there are still many openings in the roof which will need to be developed

In figure 6.23 the half components were used to fill the gaps in between
- This provided a fascinating, interlocking roof detail. When one component goes under the other, it looks like the beginning of a simple weave (figure 6.25).
- The roof inside the model looks like it has been woven and resembles a fish bone. Both these patterns have a tie to Pacific culture. The building has multiple openings on the ground floor. They provide good access as well as natural lighting into the building. Because of these qualities, it would make a suitable design for a church in Otara.
- The programme and form for this design is explored in figure 6.24

Fig. 6.25. Weave formed by flax

Fig. 6.24. Programme and form diagram for interlocking model

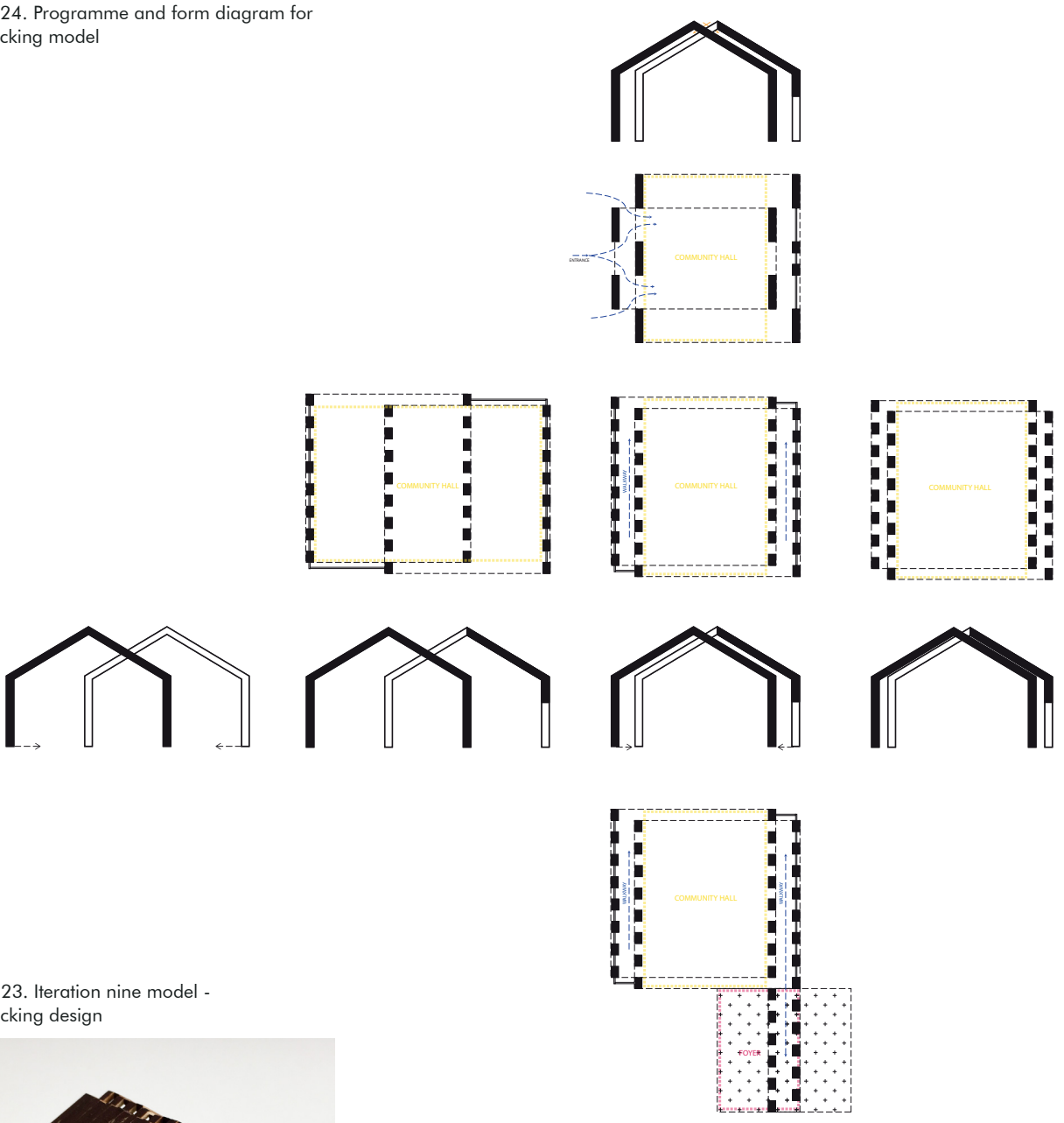
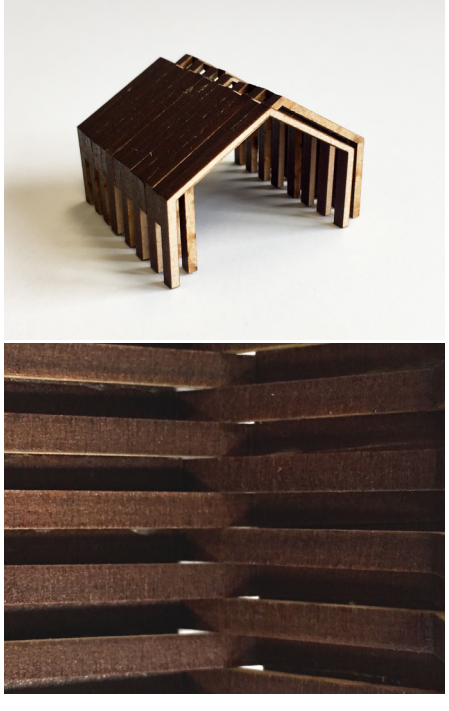


Fig. 6.23. Iteration nine model - interlocking design



In this design iteration, models and ideas are combined to create forms that fit the site (figure 6.26).

- Most of the structures are designed to sit on the slope of the site. They try to use the components as a way to divide the space for a community kitchen and other uses
- The buildings can be used as a bridge across the stream and connect with the surrounding pathways
- There are no floors or internal walls in these forms. They will need to be developed further for it to be functional.

Fig. 6.26. Iteration ten models - combined forms

Fig. 6.27. Interlocking form on site

In this form, the idea of interlocking is adjusted to fit on the slope of the site by changing the size of the components. The programme for this form is explored in figure 6.28.

- This design provides a flat elevation that faces the main road. The elements create a solid wall, which is unwelcoming and will need to be redesigned for access.
- The forms do not provide spaces suitable for a church service. The large volumes are intersected with other components making it less practical. The columns can be removed and replaced with a beam but that will take away the qualities of the elements. Other forms can be added to this design for an ecumenical space.
- This form has the potential to be developed into a functional building.

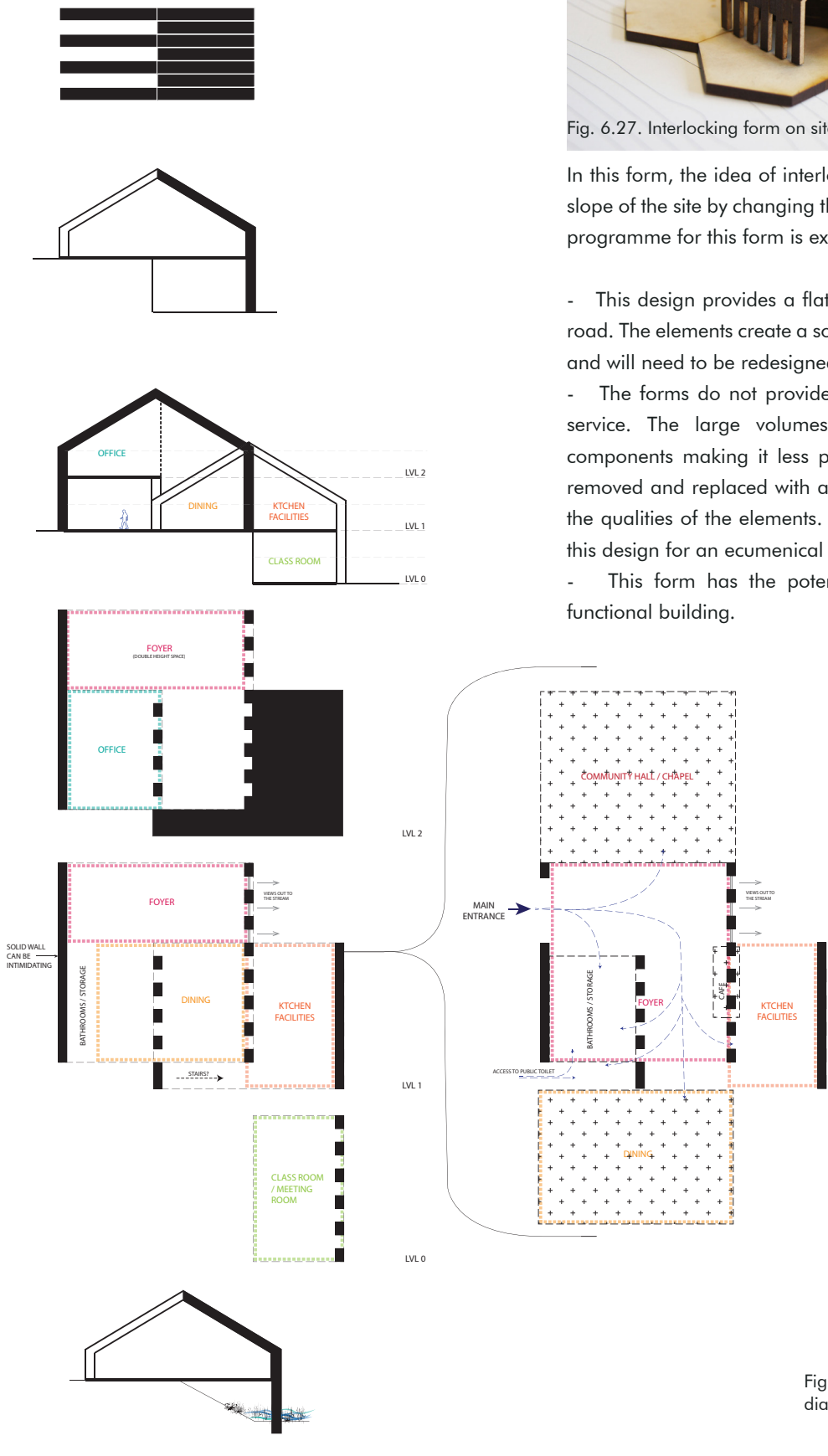


Fig. 6.28. Programme and form diagram for interlocking form on site

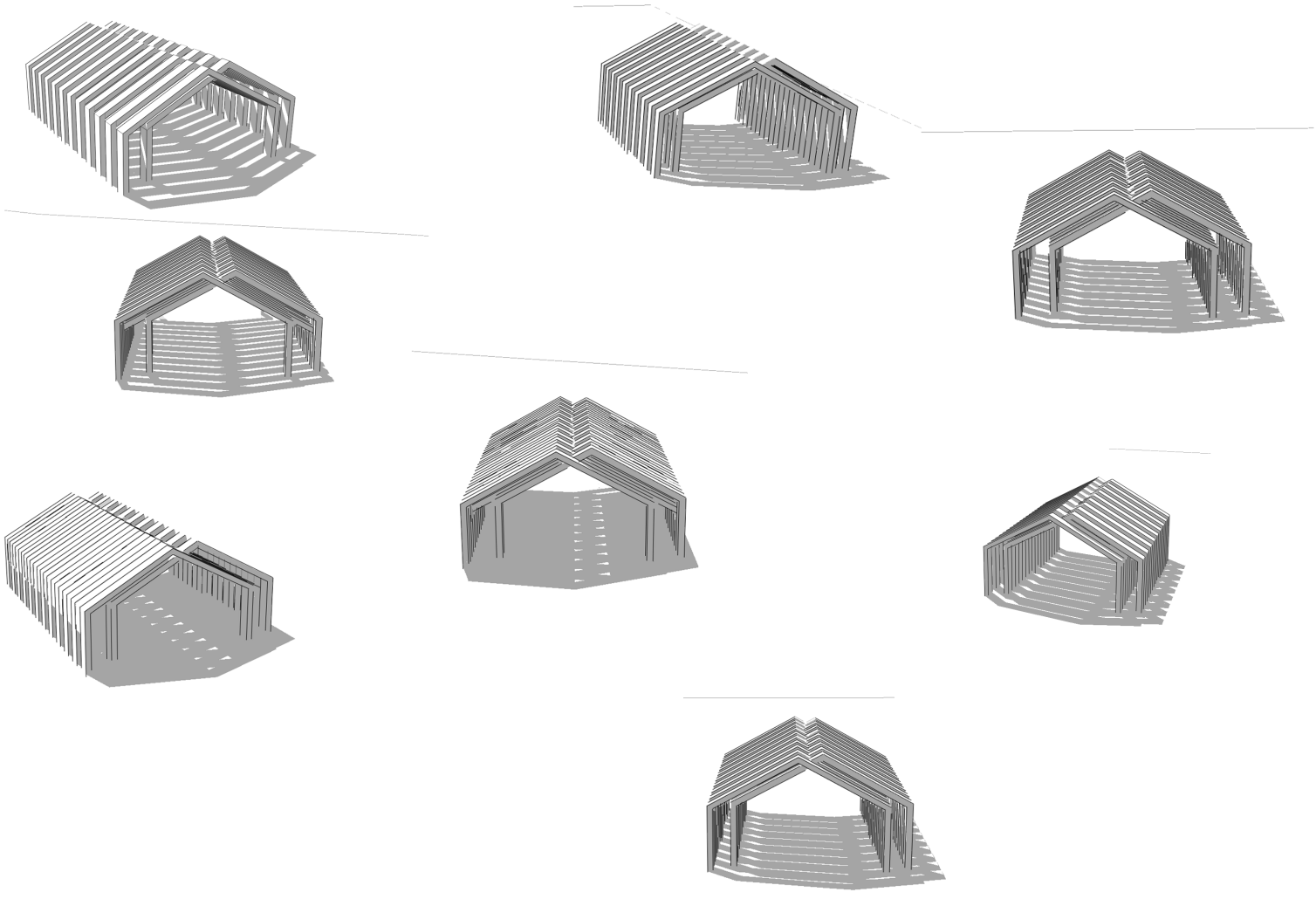


Fig. 6.29. Selected design

DESIGN SUMMARY

When these components are joined together, they create a large variety of forms that could be used at different scales and buildings on the site. Some of the components can be used as portal frames to transfer loads to the ground, while others can be used to create shelter along pathways and buildings for greenhouses, church or community centre. The form most suitable for a church service is shown in the figure 6.29. It was produced by interlocking two forms together. This created interesting detail in the roof and ceiling of the building. The building also has multiple openings on the ground floor which would provide good access as well as natural lighting into the building. This form is appropriate for a ceremony because it is one large volume with an area in the middle, ideal for services. However, the components in this form can be used as a way to divide the space. They can slide in and out of each other which changes the size of the area. Because of this function, the church, greenhouse or community centre can be designed to fit in one building.

DESIGN REFLECTION

Using only these components for the design created restrictions in the design outcome. This restriction had benefits and drawbacks. The main drawback was that there was a limited amount of design opportunities. On the other hand, it was good because it created an obvious starting point and required more creativity efforts to produce a successful result. It can be seen in the design iterations how a simple form is developed to test new forms with variety between them. Without these restrictions and trial, this final model would not have been formed.

The selected form is a shell (figure 6.29). It has attractive qualities suitable for a ceremony. It is one large volume with rows on either side for people to walk up and down it. The design is successful in integrating the structure with the architecture. The components that form the building can be designed to be portal frames. This form expresses the structure through the roof and external walls. The interlocking structure creates openings for skylights, which highlight the weaving patterns in the ceilings. Spaces between the structure form openings on the ground. These openings fracture the light creating a beautiful interior experience. Spaces between the structures have the potential to become an entrance. The building is designed to have an extra high ceiling to incite a feeling of amazement and awe as they enter the space.

In order to have a fully functional building, some basic infrastructure has to be equally considered. The building needs spaces for bathrooms, foyer, meeting rooms, kitchen and storage. Creating levels and adding walls within this form would cover the ceiling details and take away its uniqueness. Because of this, another form can be added to the site for these uses. While the original model wanted to experiment and explore different forms, it was designed without the consideration of the site. Ideas tested in the other models to do with the site can be tried with this form. Overall this form creates a good baseline model for the next stages in the development. It is a simple but intriguing form that can be adjusted to meet the function of the building.

SECTION 07

PART 2
Preliminary design two

This section reviews and improves the initial design outcome through digital form.

DESIGN OUTCOME

In preliminary design two, the model was developed further on Sketchup. Sketchup allowed the design to be drawn to scale and onto the site. The chosen model to be developed is made up of two forms which can be shifted in and out of each other. This movement can be modified quickly and efficiently on Sketchup to create new forms. The first few design iterations experiment with this idea.

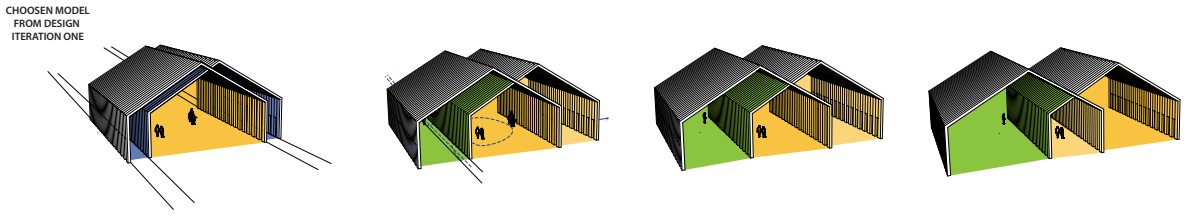


Fig. 7.01. Design Iteration One

Figure 7.01 The first iterations experiment with moving the forms away from each other. This allows the components to divide the space for other uses.
- These initial models explore how the greenhouse, church and community kitchen can be integrated into one building
- The design successfully breaks the boundary between inside and outside
- The building form doesn't compliment or reflect the nature of the site. The building is very rigid and boxy, whilel the site has more natural and organic qualities

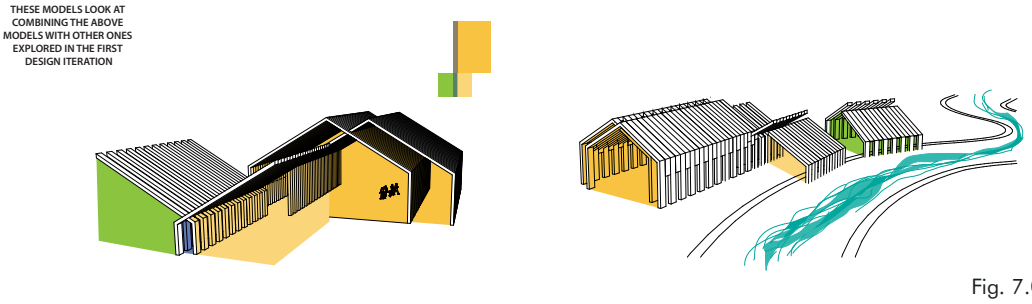


Fig. 7.02. Design Iteration Two

Figure 7.02 The second iterations combine the original model with other explored in preliminary design one.
-These forms are very isolated from each and create a separation in the programme. Because of this, it does not encourage people to come together
-A shelter will be required in the in-between spaces for people to move comfortably from one building another

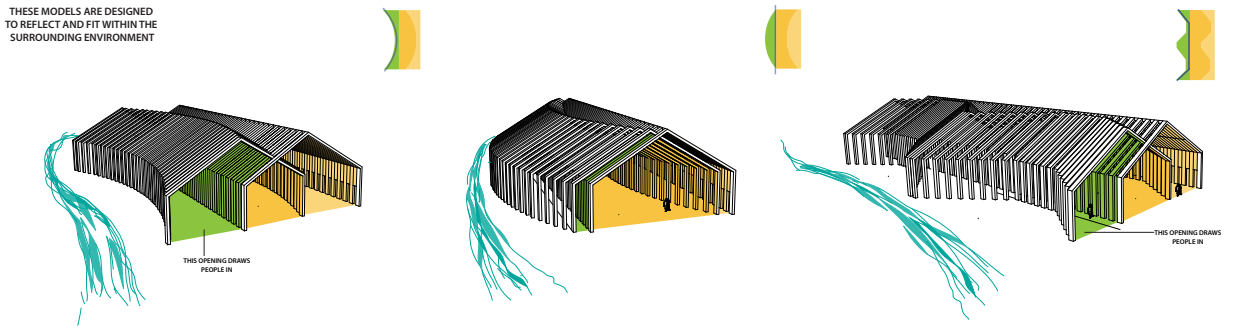


Fig. 7.03. Design Iteration Three

Figure 7.03 In this design iteration, the component in the models is shifted to reflect the environment of the site. The components of the West elevation were altered to reflect the curves of the existing stream.
- These models created interesting North, West and South elevations. However the East elevation was still flat and did not highlight the building or entrance from the road

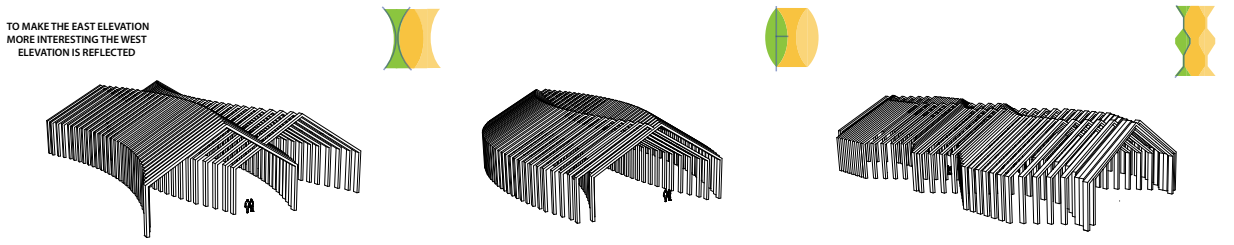


Fig. 7.04. Design Iteration Four

Figure 7.04 To make the East elevation more interesting, the West elevation was reflected in the models.
- By doing this, internal spaces became more restricting and less functional
- To open the spaces, some of the structure could be removed and beams added to distribute the load

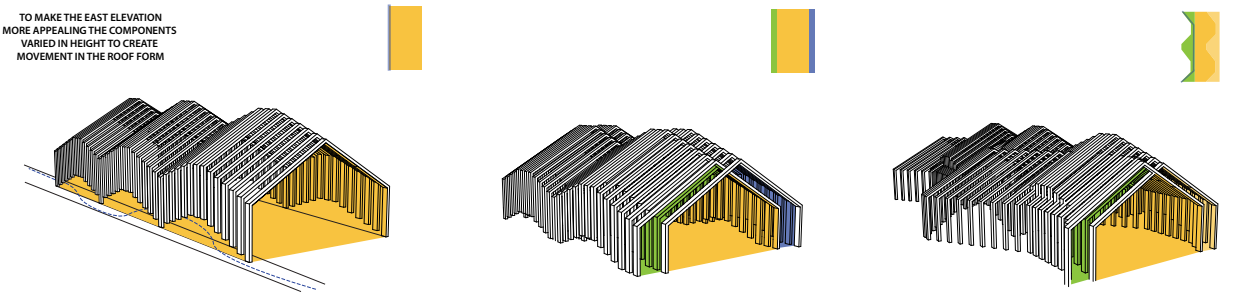


Fig. 7.05. Design Iteration Five

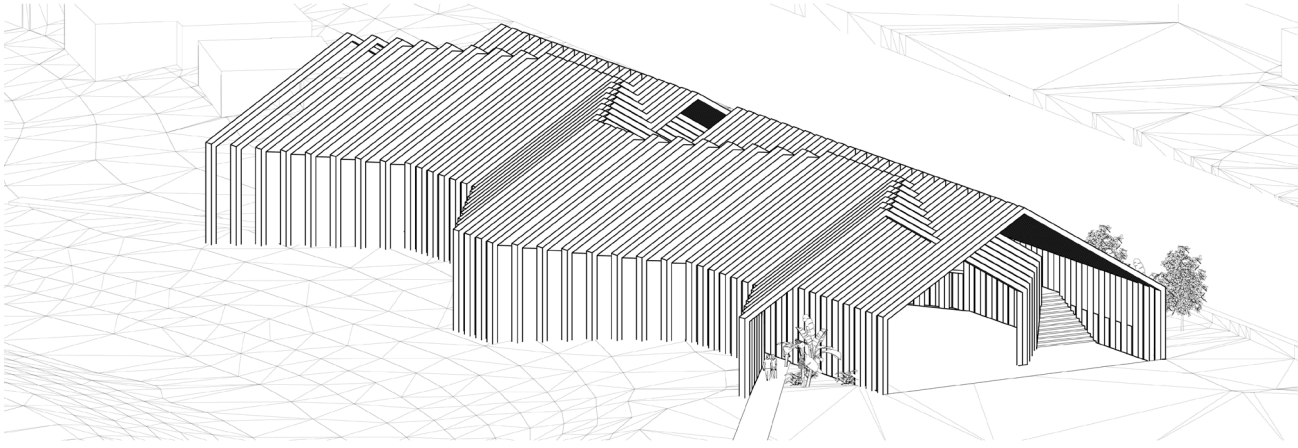
Figure 7.05 In this design iteration, the heights of the component are shifted up to reflect the nature of the site.
- This created nice openings on the ground floor
- The formed itself was not appealing. There was too much going on and no focal point in the design which makes it unwelcoming

DESIGN SUMMARY

The model most suitable for the function of a church, community kitchen and greenhouse is shown in figure 7.07. The internal spaces are very open and ideal for church services and other functions. Initially, the proposal was for a series of buildings, each with a different use. However, through the design process, it seemed a pavilion would be more suitable for the programme. The pavilion can hold the functions of a church, community kitchen and greenhouse in one building. The design uses the components to break the boundary between all these spaces and make them more accessible and approachable to the users. The pavilion is designed to be three levels (figure 7.06). The top level is in line with the road and has the main entrance and atrium space. The second level (ground level) is a multiuse space, designed to accommodate the programme of a church. It has one extended area in the middle, with moveable walls in the centre to divide the space for a ceremony or other function. There is also a small auditorium that comes off this level, which acts as a teaching room, and a communal kitchen that provides facilities for the school to teach practical cooking skills in their curriculum. This kitchen can also be used for a community based cooking skill courses and a space for exchanging raw food for a cooked meal. The greenhouse is also accessible from the ground level. The greenhouse faces the stream and is positioned on the west elevation of the pavilion. A pathway can be designed to go through the greenhouse, making fresh food more accessible.

Fig. 7.06. Section through design

Fig. 7.07. Perspective of design



DESIGN REFLECTION

At this stage of the design process, the building is very unresolved and needs to be developed. There is a rough idea of the uses for the spaces, but there are still many areas that need to be worked on to make it a satisfactory public space. As a public building, the strategy aims to address these 4 points: accessibility; people engagement; comfort and image; and good social space. The project of public space website confirms the importance of these aspects.

They are accessible

- Currently, the building is not very accessible to vehicles. If there are events to be held in the pavilions, cars would need access to carry loads in and out.
- The building needs to become accessible to people with disabilities. The building is designed so that the main entrance and atrium is on the 3rd floor. However, the main spaces are on the 2nd level. A lift needs to be placed on the 3rd floor to have access to the level below in a way where it does not interfere with the main spaces of the pavilion.
- Circulation in and around the building also needs to be developed to make the different areas more accessible at all times.

People are engaged in activities

- The Pavilion will be designed to be a multi-use building. There are areas for church services, community kitchen, greenhouse, teaching room, and café. There is a range of activities that occupants can get involved with. However, these spaces will need to be developed in the building to make sure they fit and are functional.

Space is comfortable and has a good image

- From the main road, the building does not provide a welcoming image. The elevation is very flat, and the main entrance is difficult to identify. This area will need to be developed in the next stage to make it more inviting.
- The greenhouse, church services and community kitchen are all housed in one building to make it more comfortable for people to get to different functions.

A sociable space

- The functions of the building are aimed to bring neighbours together and socialise over food. These areas will need to be developed further to provide areas to sit and eat.
- To make the space sociable, there need to be considerations on how to deal with the public and private areas.

DESIGN PRECEDENTS

These design precedents were looked at for inspiration. They are real life projects which successfully intergrates horticulture with the architecture. They were chosen because they have similar uses or programme to the building being designed.

Slow Food Pavilion - Herzog & de Meuron

Slow Food Pavilion was designed by Herzob & de Meuron for the Milan 2015 Expo. The pavilion aims to show the significance of agriculture and biodiversity to the visitors (Herzog). The Pavilion contains three forms, all with different uses. The first form houses an exhibition area, the second a tasting space and the third a theatre. In between these forms is an internal courtyard where fresh food is grown in rectangular planters (figure 7.08).

The pavilion for the exhibition area is very open. There are no external walls and the portal frame structure defines the boundary. This makes the space look welcoming and friendly because it allows people to go in and out of the building without restriction. Additionally, the natural timber structure makes the space look warm and comfortable.

Fig. 7.08. Slow Food Pavilion Internal Courtyard

Christchurch Botanic Garden Visitor Centre

Christchurch Botanic Garden Visitor Centre design by Patterson Associates is a building in New Zealand which is designed to connect people with plants (Smales). It brings the outdoor, indoor by housing people and fauna in a greenhouse conservatory environment. The centre includes a shop, café, library, function room, meeting room, an exhibition area, a large greenhouse and shade house.

The building has a good image, and the spaces look comfortable and welcoming. These attributes are achieved by white screens used to filter the light and make the room seem airy and forest like (figure 7.09). This architecture detail successfully replicates the light qualities found in nature to bring the outdoor indoors. This space is suitable for both plants and humans. Similar spatial qualities shown in this building could be developed into the pavilion.

Fig. 7.09. (Top) Christchurch Botanic Garden Visitor Centre café area
Fig. 7.10. Christchurch Botanic Garden Visitor Centre Greenhouse

Fig. 7.11. External view of Pavilion

Studio Arthur Casa + Atelier Marro Brajoviv

Studio Arthur Casa + Atelier Marro Brajoviv designed a pavilion in Brazil that integrates a pathway among several plants (figure 7.12). The design aims to create a public square that draws people together and stimulate curiosity. The building is a large volume that deals with the transition between the inside and out, architecture and scenography (Archdaily). This building has a similar programme and ideas for the pavilion proposed in Otara. There is an outdoor space and an indoor space. The outdoor area supports the public uses, while the indoor space is designed for private uses. The outdoor space is semi-enclosed, this makes the space appear safe and welcoming as it allows people to look in as well as look out. This spatial layout of the Brazil Pavilion can be used to organise the public and private areas of the proposed pavilion.

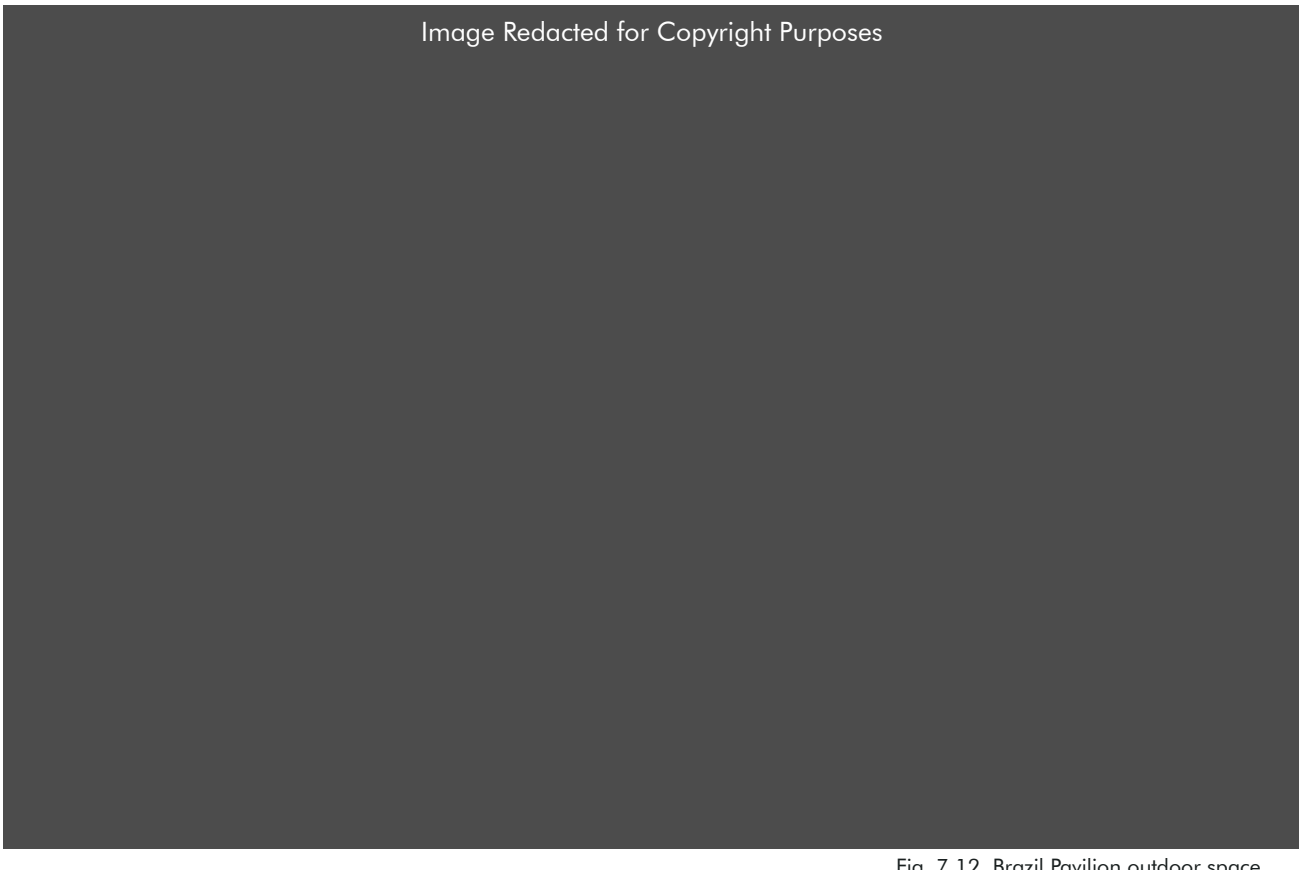


Fig. 7.12. Brazil Pavilion outdoor space

SECTION 08

PART 3
Developed design

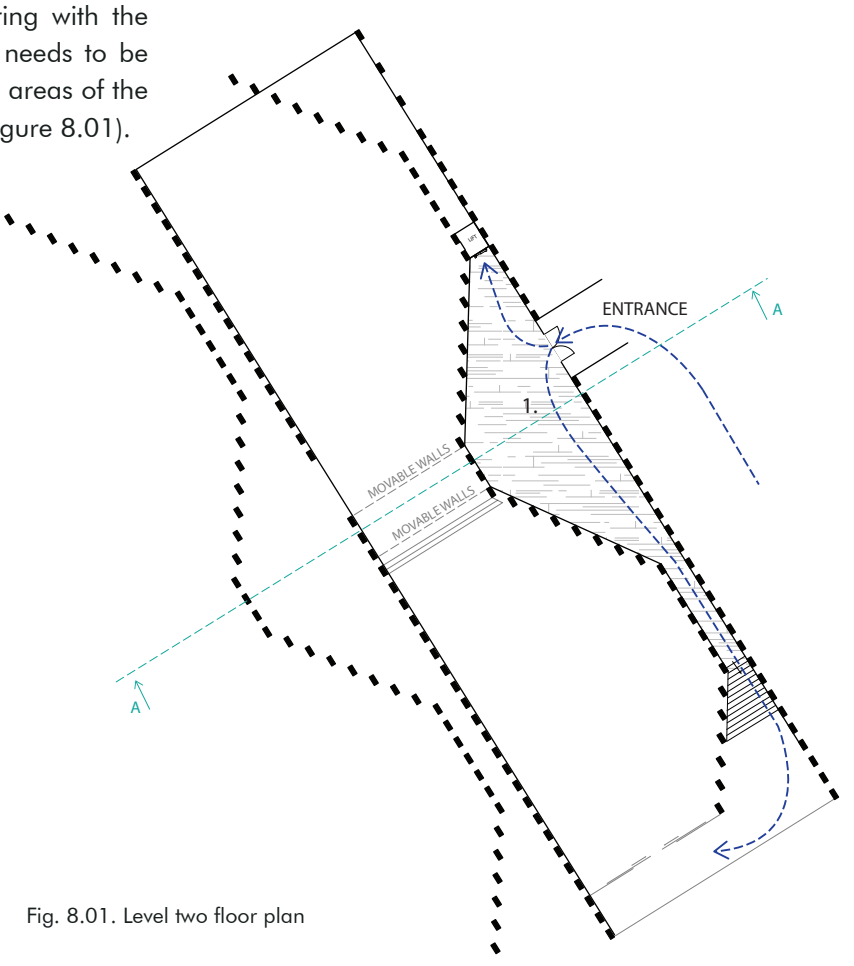
The building is developed further to meet the research aims. The final design outcome is also presented in this section.

DESIGN OUTCOME

The design is further developed on Revit. Revit provides a more accurate representation of the building and allows the exploration of more in-depth aspects of the building.Therefore, making it easier to produce plans and spatial layouts for the building and the technical viability of the buildings and its spaces.

Circulation: The site is on a slope, as a result, the building is designed so that the 2nd floor (main entrance) is levelled with the road. The main space is one level down. This is so when visitors arrive they can look down and have a sense of the whole building and all the uses. The ground level is then levelled with the surrounding landscape and greenhouse. There is a pathway running through the greenhouse which connects the building to the surrounding pathways.

Level two floor plan: The ground floor can be divided into two different room by removable walls in the centre. When the rooms are divided, it is difficult to get around the building without interfering with the used space. Because of this, circulation needs to be developed so access can be gained to all areas of the building when one space is being used (figure 8.01).



KEY
1. FOYER
2. GREENHOUSE
3. TOILETS
4. KITCHEN
5. PAVILION
6. AUDITORIUM

Fig. 8.01. Level two floor plan

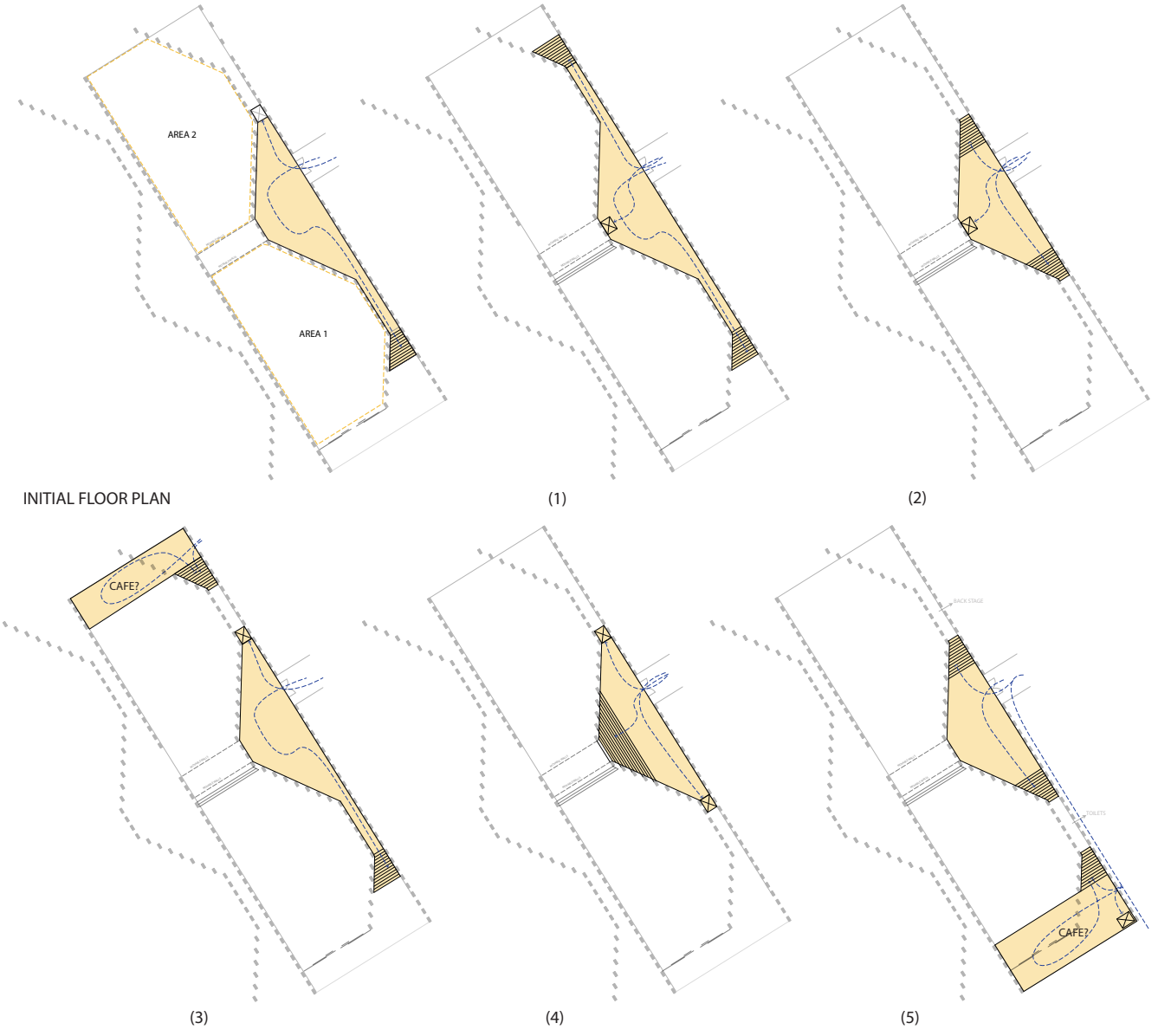


Fig. 8.02. Development of level two

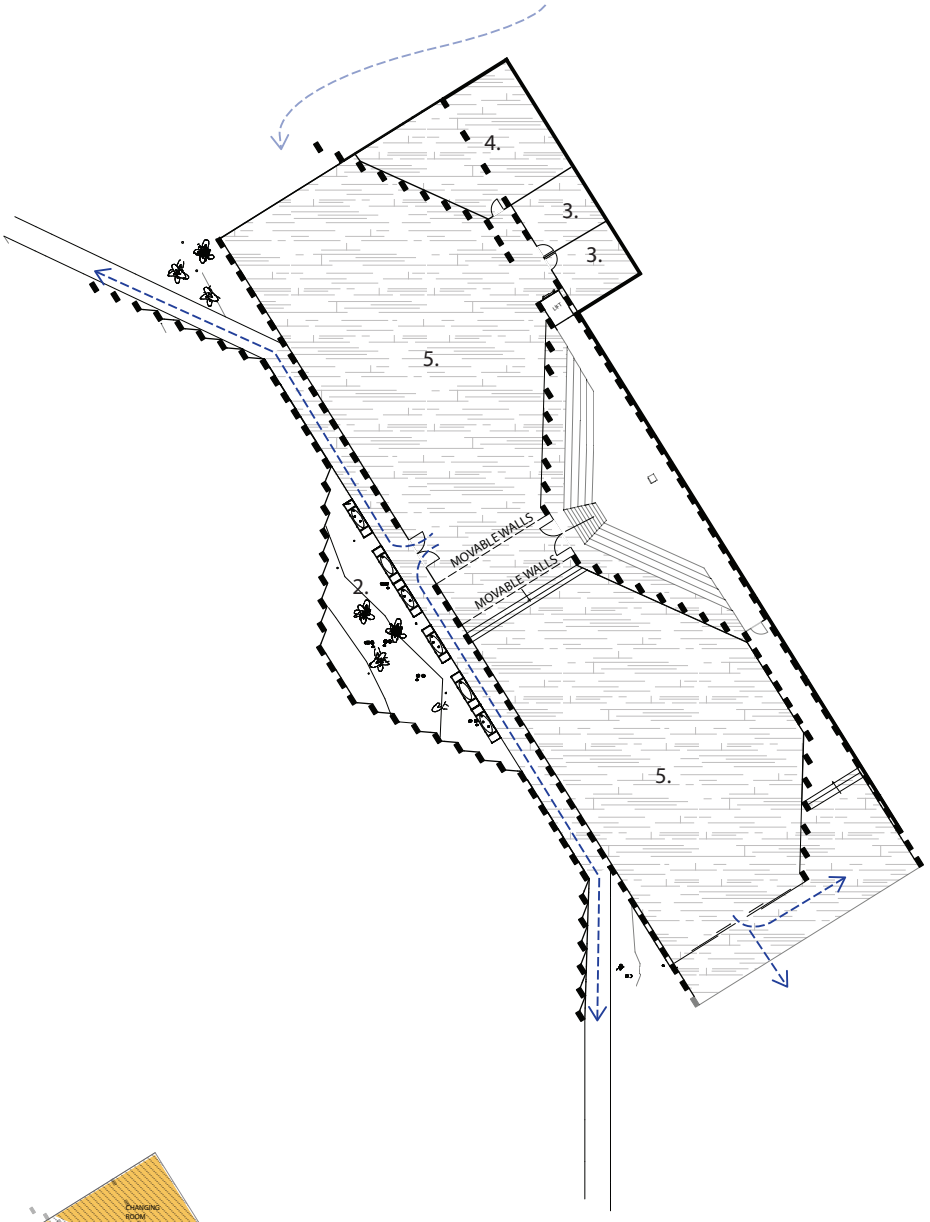
Plans 1 & 2
- Having the lift in the centre of the building decreases the openness of the pavilion

Plans 1, 2 & 4
- Positioning the lift here blocks the entrance into the auditorium as well as the view into the pavilion
- However, there is access to both the main areas of the pavilion
- There is also direct access to the greenhouse

Plans 3 & 5
- Another floor area is added on the second level
- This allows for a secondary entrance and a cafe that looks out into the pavilion

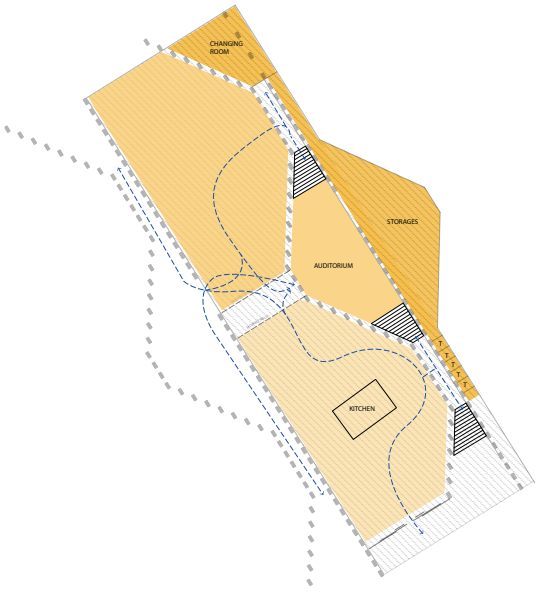
Plan 5
- A disabled person will have to go outside the central atrium space to have access to the lift
- This could be uncomfortable unless shelter is provided between the two entrances
- There is access to both the main areas of the pavilion

Fig. 8.03. Level one floor plan



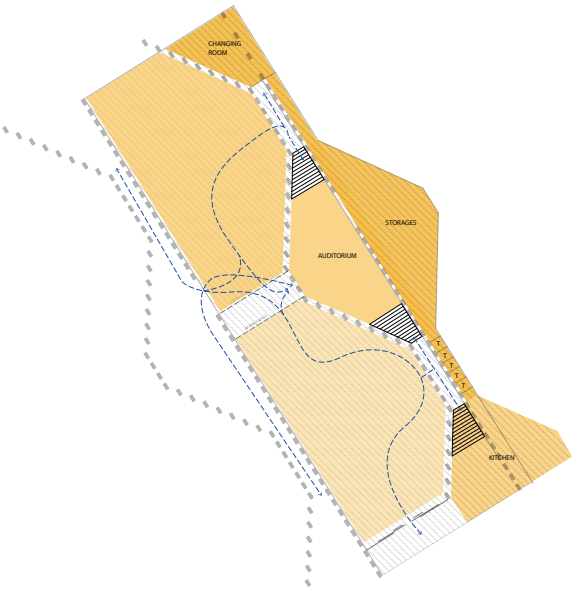
Ground floor plan:
On this level toilets are only accessible from area 2 or the lift from the atrium. This means when area 2 is in use, access to toilets will be difficult (figure 8.03).

Fig. 8.04. Level of privacy and circulation on ground floor



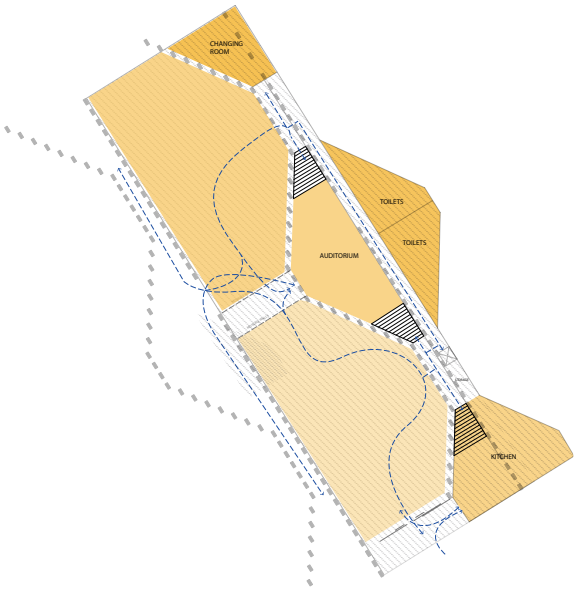
(1)

Plan 1
- The shape of the storage space was reflected from the auditorium space
- It allows for a pathway to be placed on top which connects the main entrance to the main road
- In this layout, there are not enough toilets for the size of the pavilion
- Having the cafe in the centre also decreases the openness of the pavilion



(2)

Plan 2
- A community kitchen is added on the south side of the building to allow for the pavilion to be more open
- The shape of the kitchen is a reflection of the building form created by the components



(3)

Plan 3
- A block of toilets is placed where the storage is, and the storage has moved another level below so that it is in line with the auditorium
- This allows for better circulation in the pavilion
- Toilets can be accessed from both area one and two
- This creates side entrances into the main areas, making it more accessible
- This layout places the private areas of the building such as toilets / changing room and storage area at the back of the building or underground so that it would not interfere with the openness of the pavilion

Fig. 8.05. Development of level one

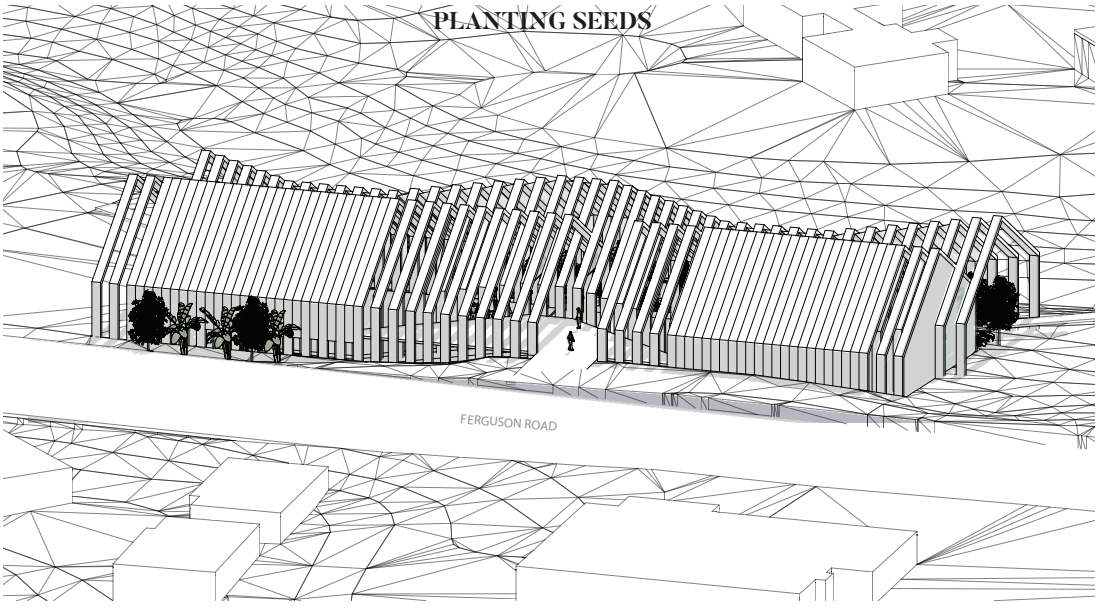


Fig. 8.06. Exterior perspective of entrance

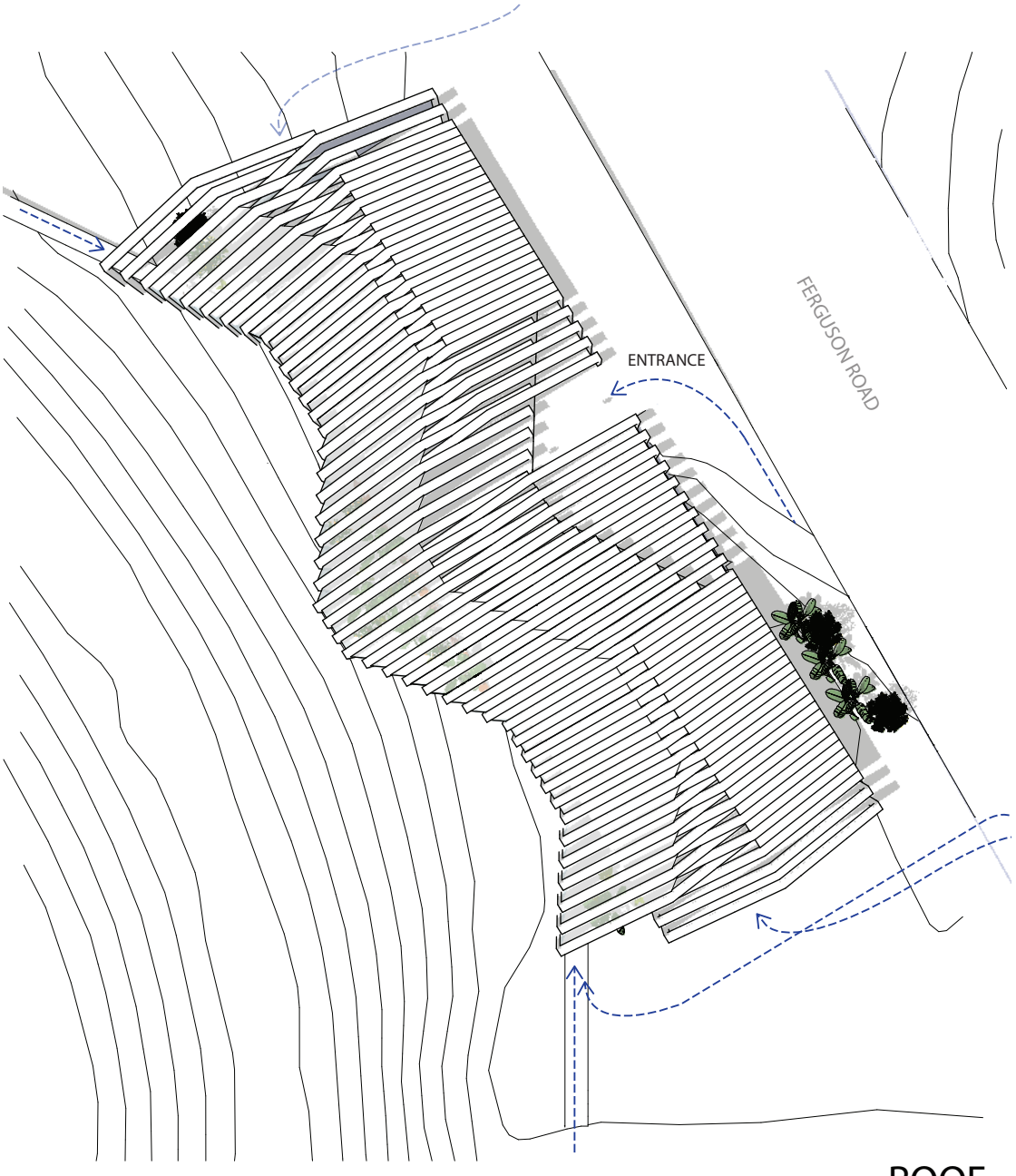
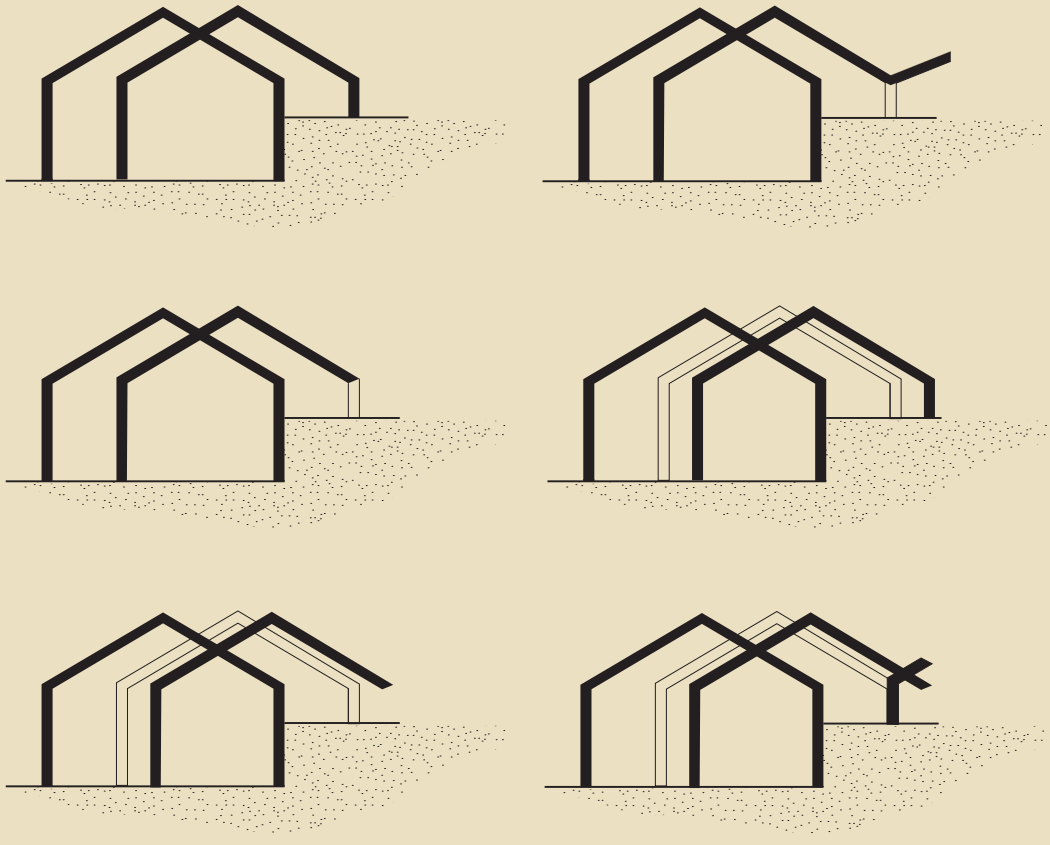


Fig. 8.07. Roof Plan

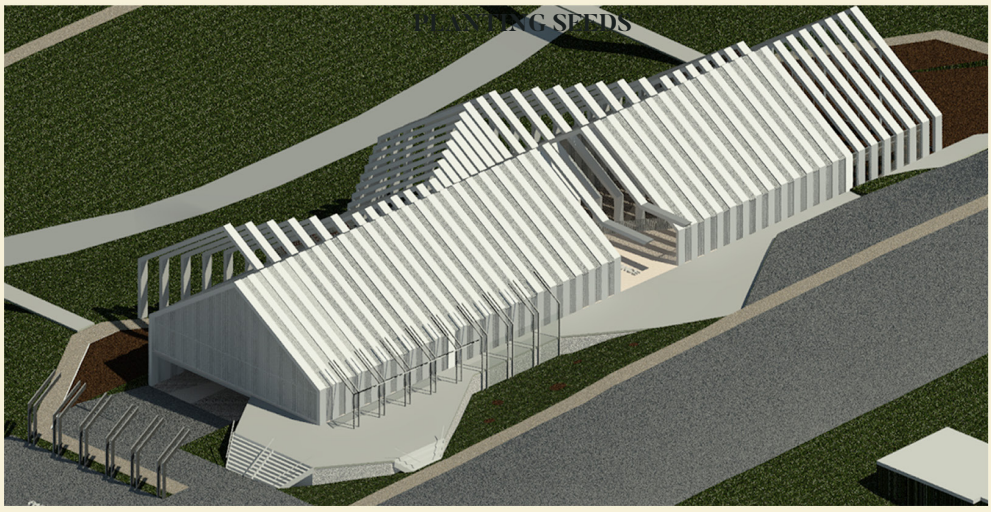
ROOF PLAN

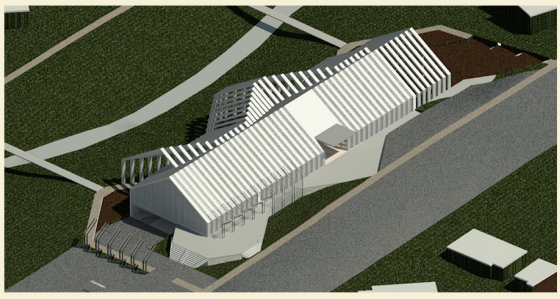
Image: *The building image is vital for a public space to be successful. It needs to be welcoming and comfortable for people to come in and want to stay. From the road, the building does not look appealing. The main entrance was created by the removal of components to provide an opening in the facade (figure 8.06). However, this is not visible from the main road and makes the building look flat. The entrance is developed to create a point of focus in the façade. Figure 8.08 shows exploration of the main entrance through the section. The chosen entry reflects the same pattern in the roof and ceiling of the pavilion.*

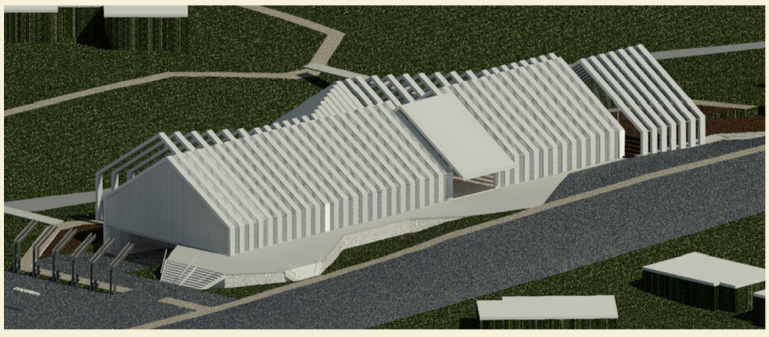
Fig. 8.08. Exploration of the main entrance through section

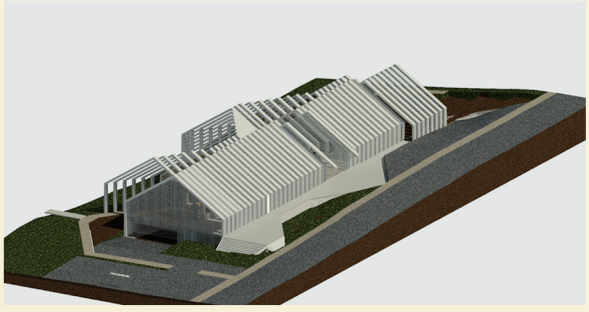


- THIS DESIGN WAS SELECTED AS IT REFLECTED THE FISH BONE PATTERN IN THE ROOF AND CEILING OF THE PAVILION









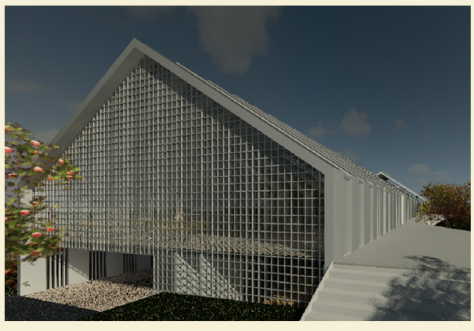
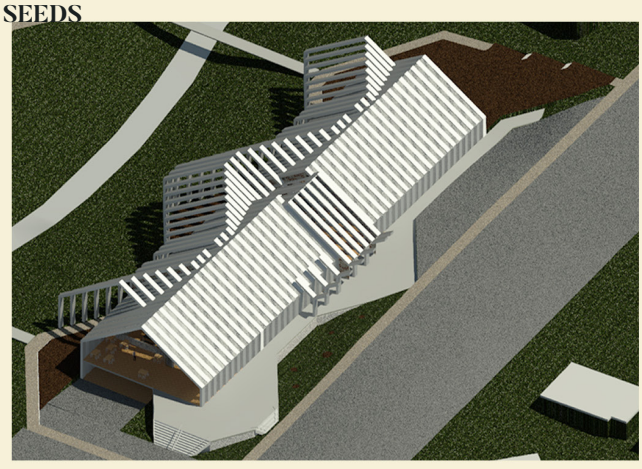
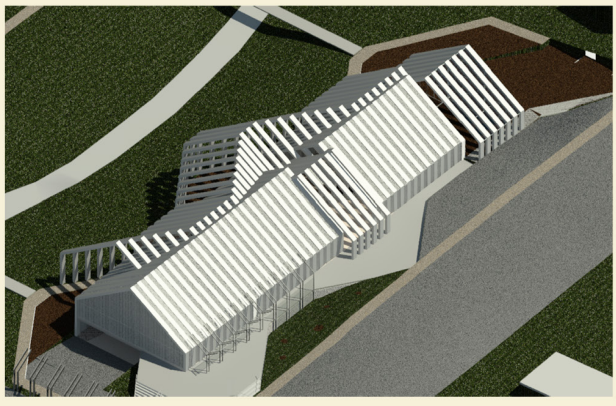
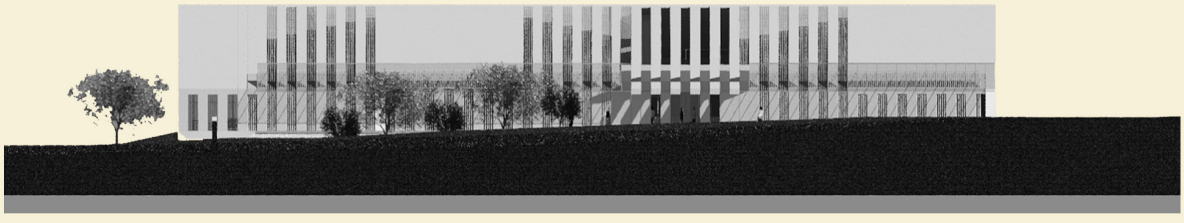


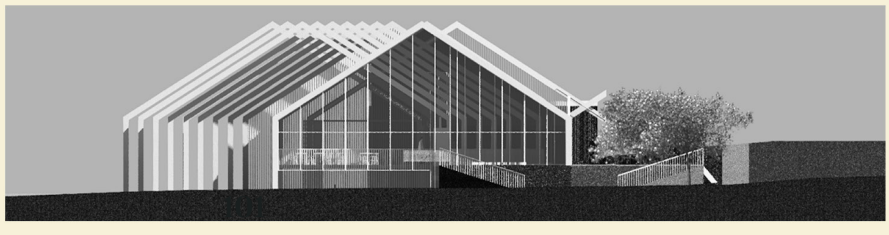
Fig. 8.09. Perspectives of the different entrances tested

PLANTING SEEDS









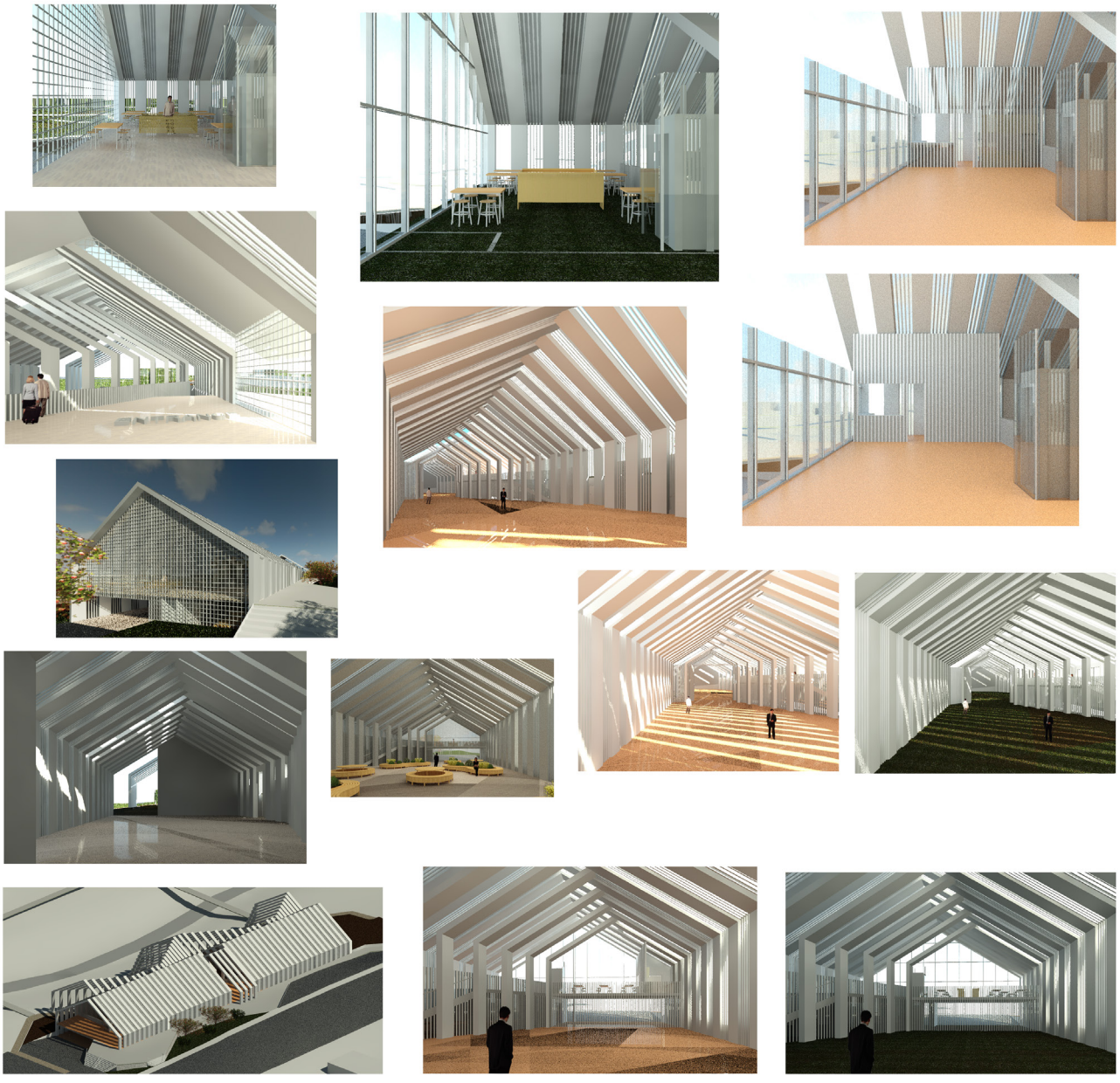


Fig. 8.10. Interior perspectives of the different materials and colours tested

The colour can have an impact on the image and comfort of the building. Different material colours are tested in figure 8.10. Initially, the components that make up the building were designed on Sketchup so that they looked white. The Christchurch Botanical Gardens Visitors Centre influenced this colour scheme. This colour scheme makes the building look very open and flash. However, this seemed a bit intimidating and did not quite fit the environment of Otara. The components colour were changed to be a more natural timber colour (figure 8.11). This colour expressed the structure better and made it seem more welcoming and approachable.

Fig. 8.11. Design Outcome

PROPOSED DESIGN

Fig. 8.12. Exterior perspective from Ferguson Street

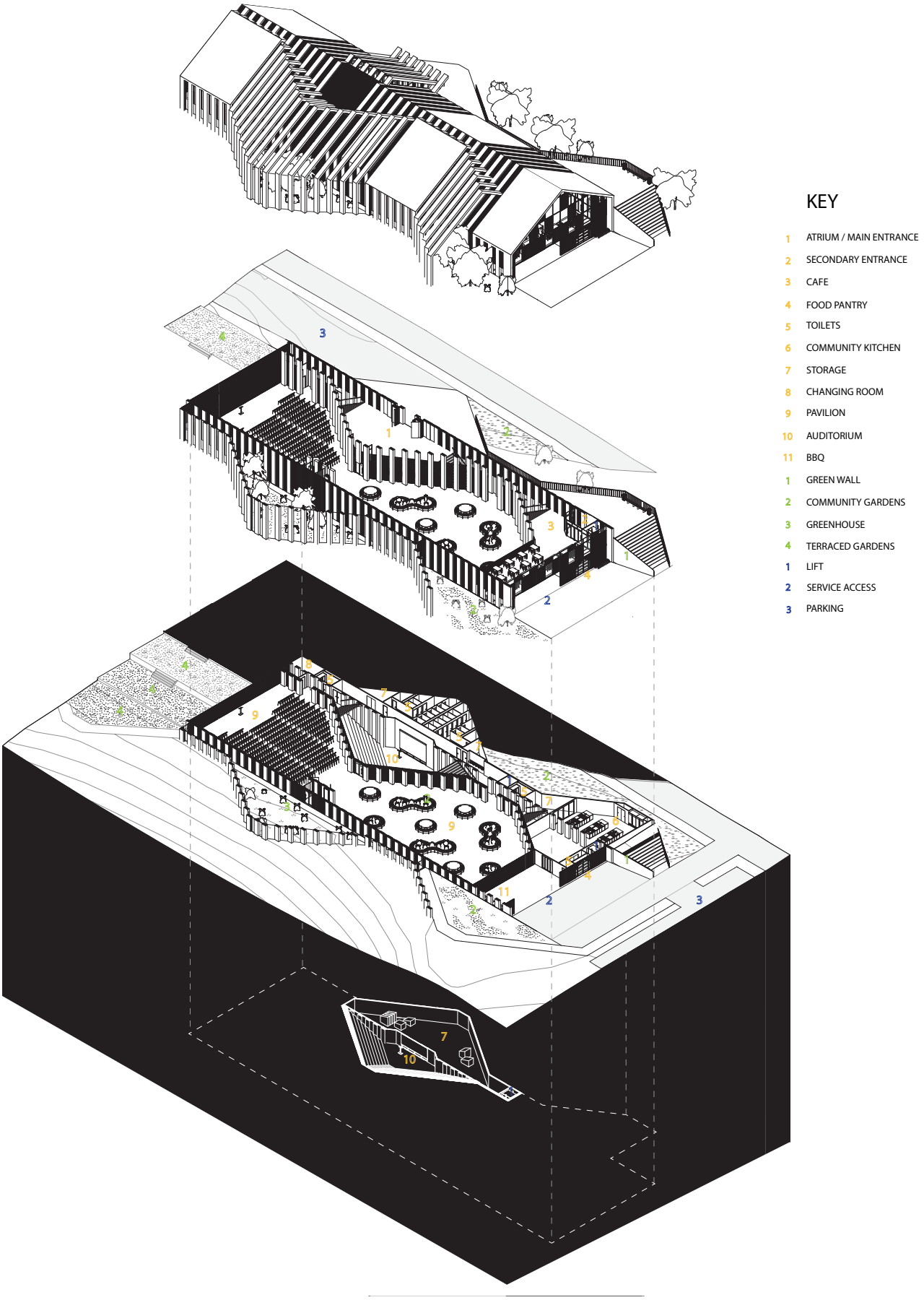


Fig. 8.13. Exploded axonometric of the pavilion

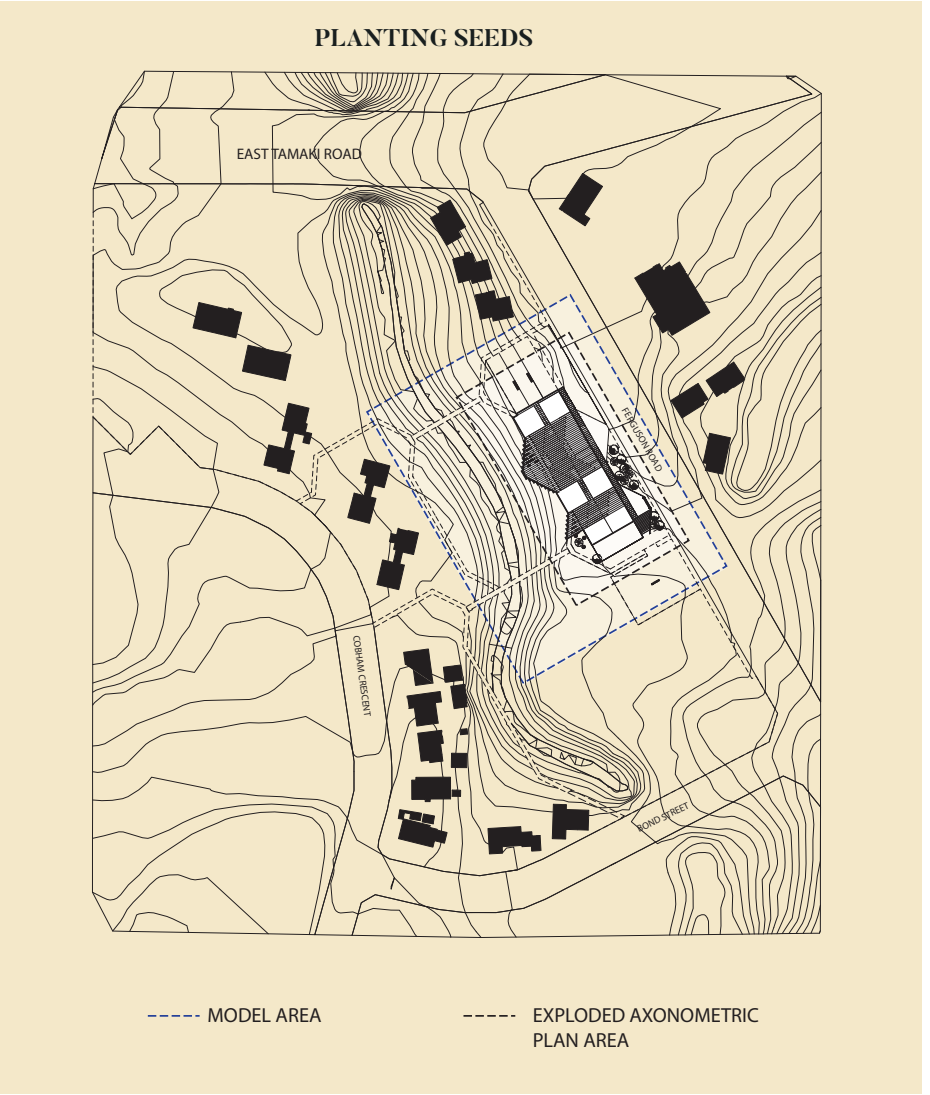


Fig. 8.14. Site Plan

DESIGN SUMMARY

The building is situated where the original church was (figure 8.14). The main entrance for the pavilion comes off Ferguson Street and leads into the atrium that overlooks the main areas of the building. On the right and left side of the atrium, some stairs go down into the pavilion. On the same level as the atrium is a café; there is a lift in this area that goes down to level one. This space also looks out into the pavilion.

The building is designed so that the South end of the pavilion is more public then the North end. The South end is closer to the school and pathways which therefore creates a more active edge. On the South end of level one, is the community kitchen. This area has a BBQ and public food pantry to provide people with free food. On this side, there is also access for cars and people into the main pavilion. On the South side of the building, there are tables and planters shown on in the exploded axonometric (figure 8.13) for people to gather, grow, eat and celebrate food. On the North side, chairs are shown for a church service. These furnishings are temporary and can be removed to create an open building. In the middle of the pavilion, there are a couple of movable walls that allow the spaces to be closed off or opened depending on the use. In the centre of the building, there is access to the greenhouse and auditorium. In the greenhouse, there is a footpath that connects with surrounding pathways. To keep the pavilion open, all the private and storage areas are at the back of the building or underground. Around the building, a new walkway is proposed to link up with the existing pathways, a terraced garden to grow fresh produce and riparian planting to improve the quality of the water in the stream.

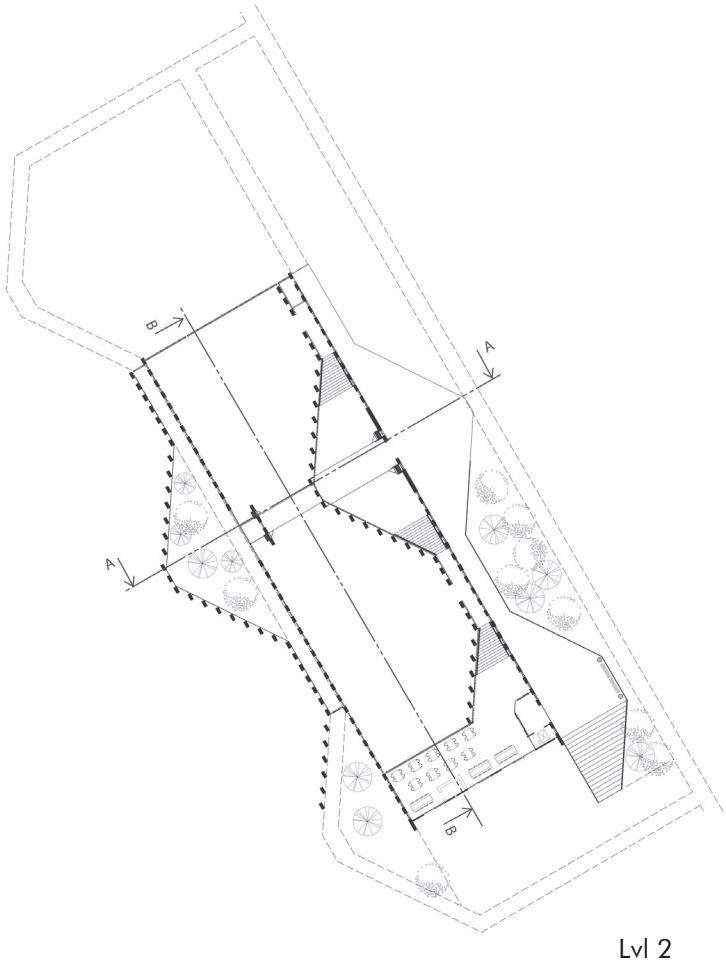
DESIGN REFLECTION

Access and Linkages

The pavilion is located in an area, which is walkable, accessible and convenient for the locals. It is situated in a transitional zone between Ferguson Intermediate, and the residential area, therefore providing a link between the two places. The site consists of pathways used daily by the residents and students. Because of this, a pathway is designed to go through the greenhouse and into the pavilion. To make the buildings more welcoming and safer to access at night, the pathways that lead to the pavilion and around the site can be designed to have lighting and areas of seating.

The access to the pavilion is improved to make it easier for the occupants to use the building. There are multiple entrances on both levels of the building. One entrance is developed to allow cars to access the structure. On the South elevation, there is a load off zone and vehicle entrance so that it is more convenient for users to get food and other heavy objects in and out of the building.

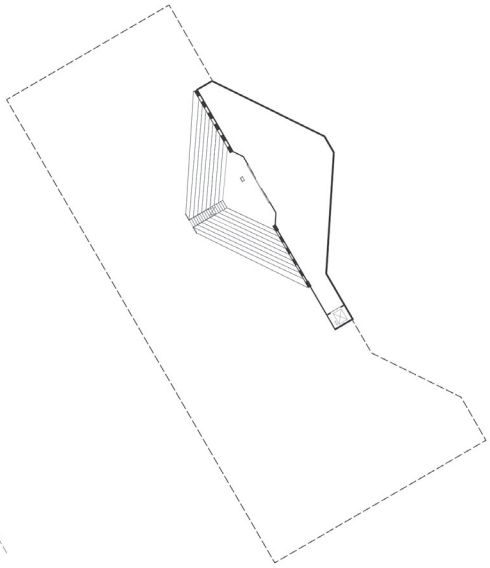
Inside the building, the circulation has been significantly improved to be more functional and multiuse. The public can access areas like the toilets and kitchen without interfering with the main events. These spaces are also accessible for people with disabilities. There is a lift and ramp that enters the ground floor from the top floor of the building.



Lvl 2

Fig. 8.15. Floor Plans

Lvl 1



Lvl 0

Fig. 8.15. Floor Plans

Fig. 8.16. Section in the y-direction

Comfort & Image

The building image is designed to feel welcoming and safe. This is achieved through an exterior facade which allows people to look in and of the building, and designing an atrium which overlooks the whole building. The exterior façade on two sides of the building are made of timber portal frames, and in-between is glass and a vertical louvre system. The timber structure makes the building feel warm and homely, and the building plan is open too making it feel safe. The building tries to reflect Pacific culture through a simple herringbone weave pattern in the ceiling and entrance. The original design, which came from weaving tries to connect the building with the user's culture. This strategy aims to make the user feel comfortable using the building. However, this idea could have been developed further and made more evident throughout the building.

There are areas in the design that need to be researched further to make the space comfortable for both the occupants and plants. There is minimal consideration of the circulation of air and environment qualities within the building. The building faces North and is a part greenhouse and part a community centre. Because of this, the building is likely to overheat and become uncomfortable for the users. Environmental controls systems can be developed into the building. At the Pasona Urban farm in Tokyo, an intelligent climate control system is installed. It monitors the humidity, temperature and breeze to ensure the humans are comfortable during the working hours and plants are in their optimised environment after hours. (Kono Designs) A similar active system can be developed into this design. The research can also look into more passive design options. Such as creating more openings for ventilation and using the vertical louvre system to block out the heat. These strategies are relatively low-cost and require less maintenance compared to active systems.

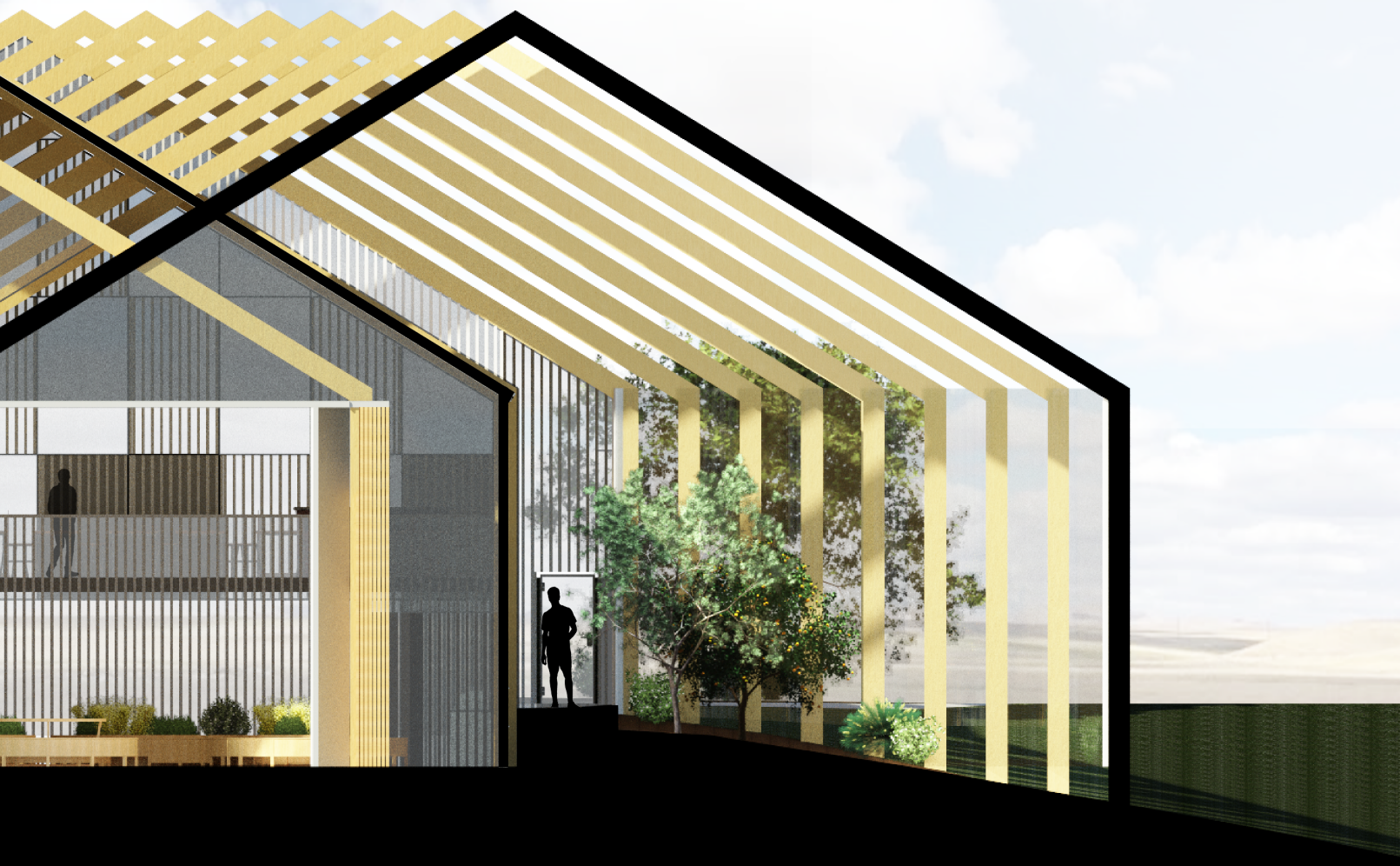


Fig. 8.17. Section in the x-direction

Fig. 8.18. Interior perspective of pavilion

Fig. 8.19. Interior perspective from the café looking down into the pavilion

Sociability / Uses and Activities

The purpose of the building is to provide an environment that celebrates healthy and nutritious food in a fun, active way. The structure and its surroundings are designed to offer facilities for the school and the community to grow and cook their food. Community gardens and community kitchens, encourage neighbours to come together and co-operate in creating food in which they can share and enjoy. This environment is achieved, through the multi-use spaces of the pavilion. The area can be transformed to have spaces for dining, seating and planters to grow the crop (figure 8.19). These furnishings can then be removed and put into the storage when unused. This area can be developed to have an automatic watering system or a hydroponic/ aquaponic system, but these systems would be more difficult to move and therefore limiting the flexibility and use of the space. Growing and producing their food can develop a sense of pride and strength within the community.

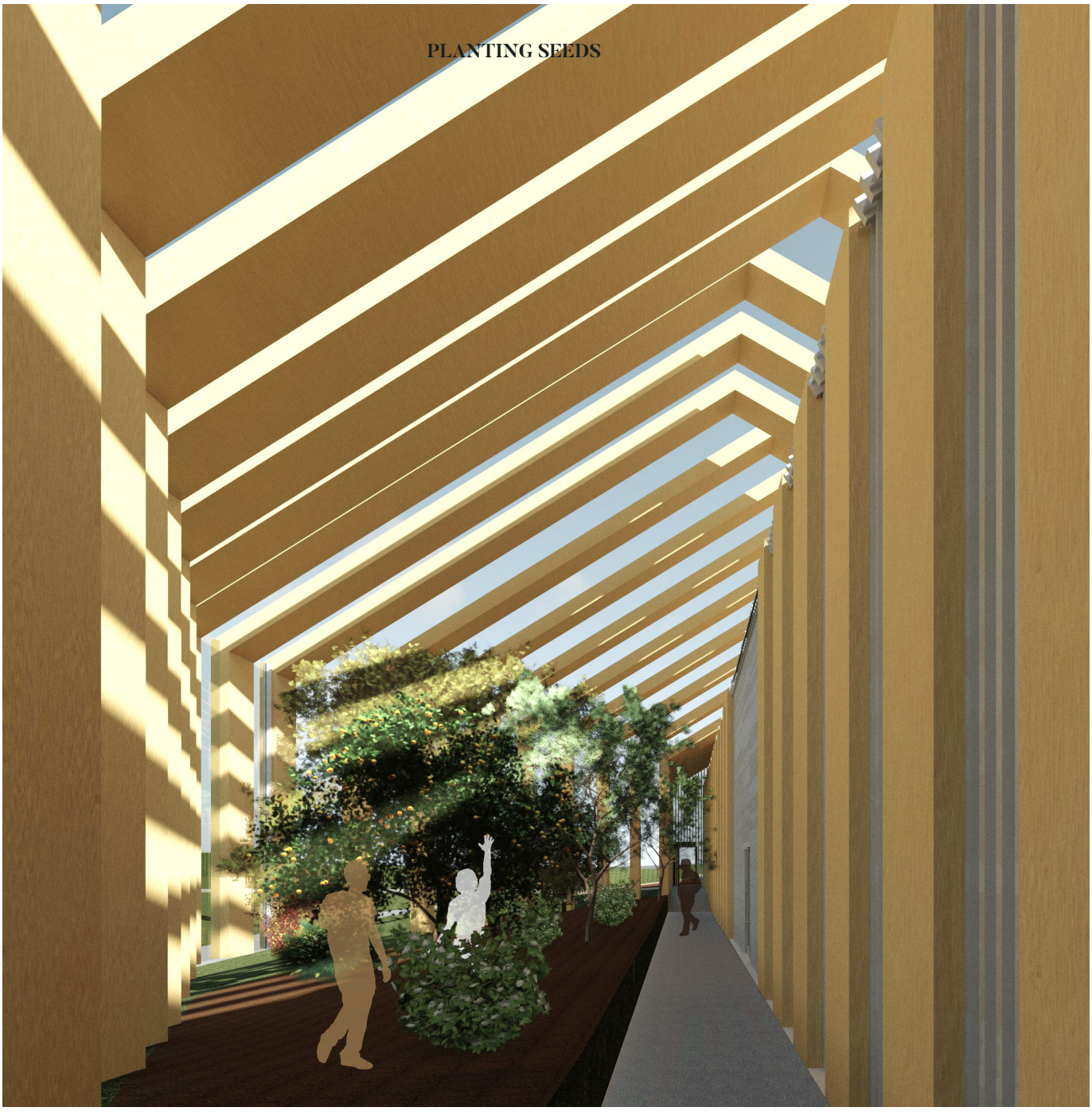
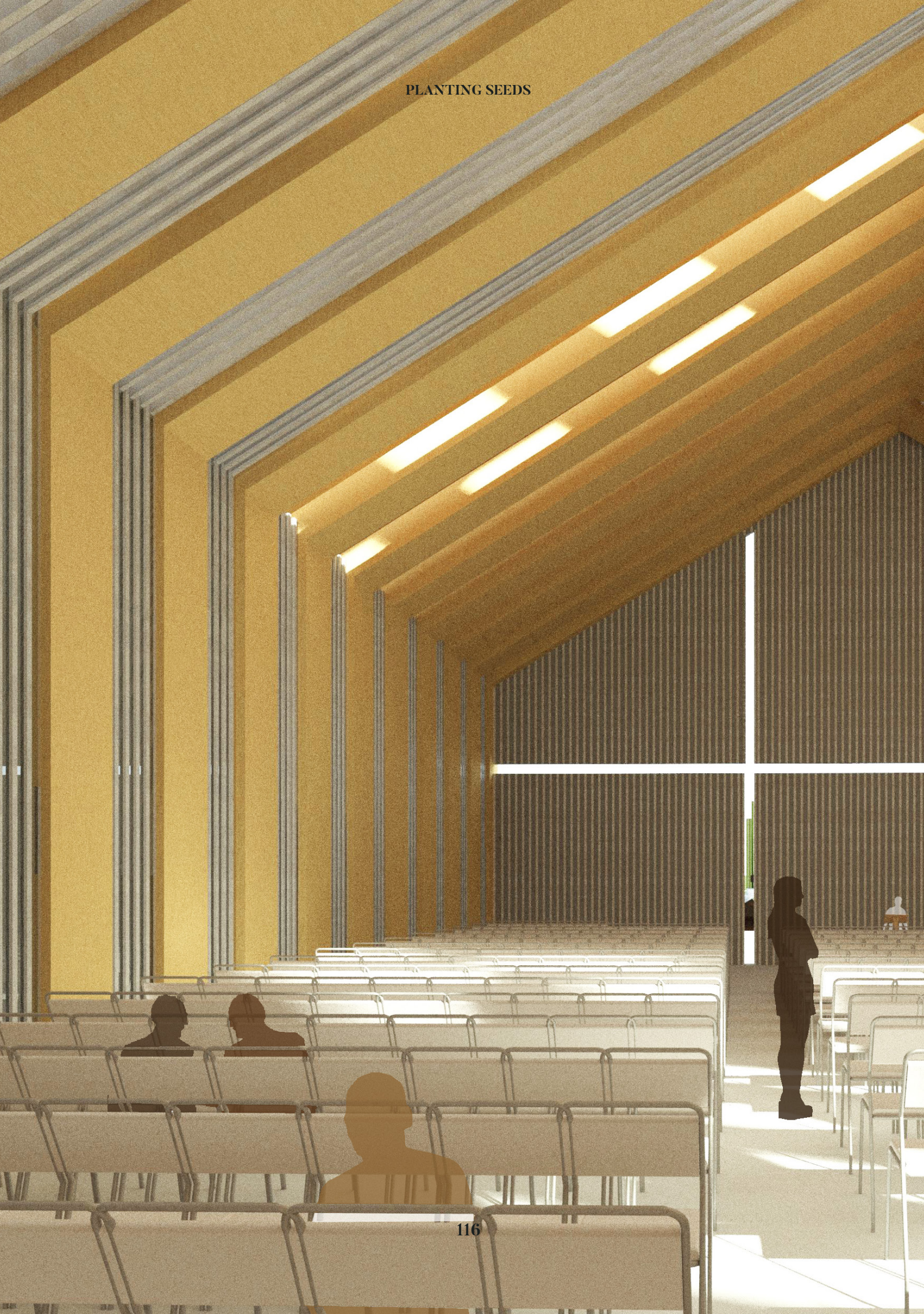


Fig. 8.20. Interior perspective of the greenhouse

The pavilion is designed to hold church services. In Otara, a large portion of the community is from the Pacific islands (Auckland Council). When migrating to New Zealand, most of them left behind their village life and family. The church often becames their support system, and it is normal for them to go to the church to socialise and make friends. Because of this, the church is an important aspect of their life and included as one of the uses for the pavilion (figure 8.21).

Riparian planting can be used to help clean the stream in Otara. It's proposed that riparian planting is applied along the waterway on site. Cleaning the waterways will bring activities like fishing, swimming and kayaking back to the area. However, this strategy alone will not clean the entire stream. Other tactics throughout the creek will also need to be put in place, to have an overall impact. This was not developed further, as it did not meet the scope of the research.



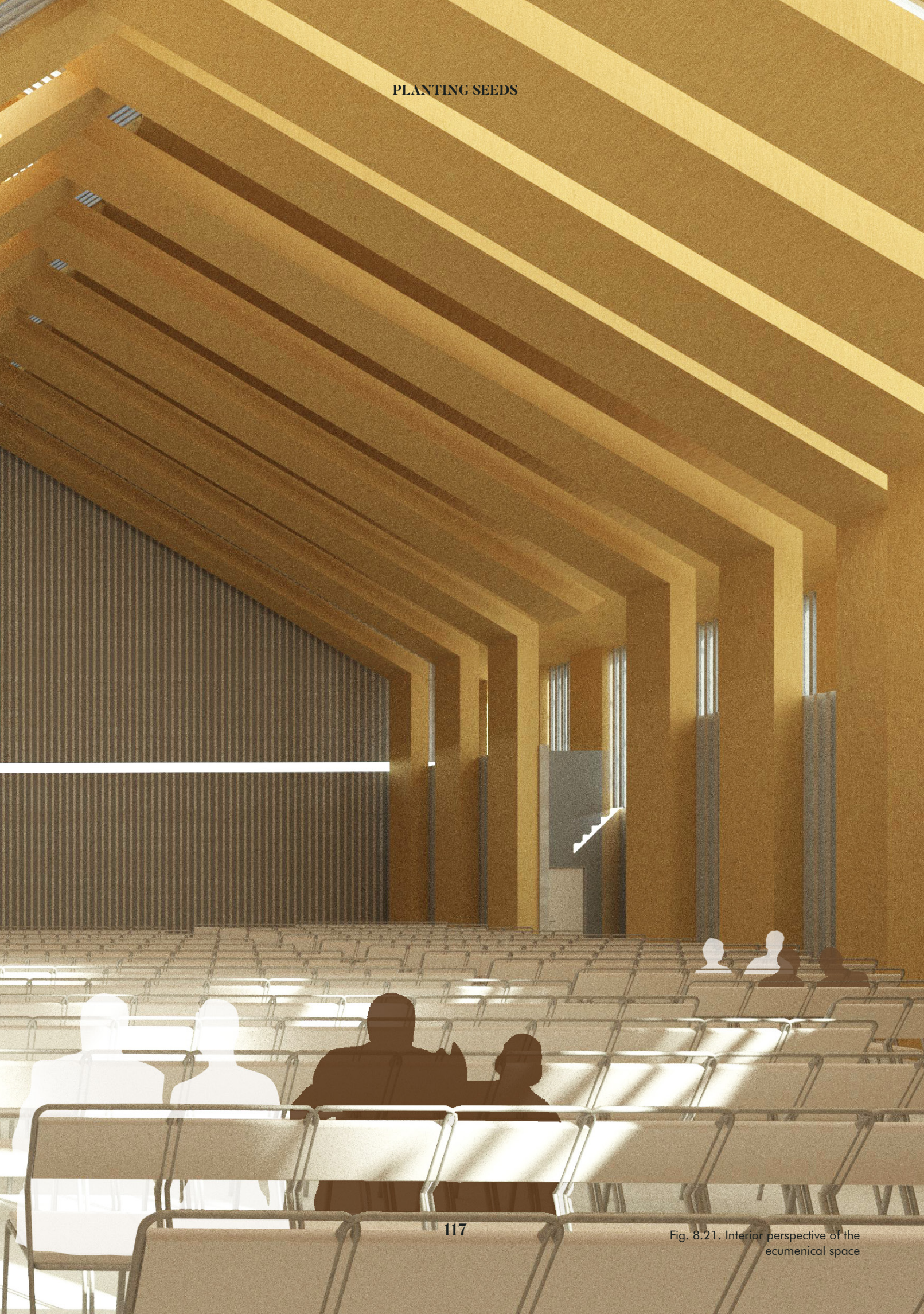


Fig. 8.21. Interior perspective of the ecumenical space

SECTION 09

CONCLUSION

This section reflects on the final outcome and how the design can affect food security concerns in Otara.

CONCLUSION

Food security is a complex issue. There are multiple factors that can influence food security in a household and communities (Gorton 5). The biggest and most common factors are socioeconomic in conjoint with the environment they surround themselves (Carter, Kruse and Blakely 1). In New Zealand, obesity has become a sign of poverty (Dastgheib). Low-income families are known to live in areas where there are three times as more takeaways/fast food stores compared to other regions (Martin). Fresh and healthy food is often more expensive and harder to access which may explain why obesity rates have increased (Gorton 6). Obesity is normally a reflection of food security issues in New Zealand. Food security significantly affects households in New Zealand including those with small children. When adolescents consume an unhealthy diet, they are more likely to do poorly in school and less likely to do exercise. This is because an un-nutritious meal can cause tiredness and decrease the capacity to work (Government of South Australia). As a result, their health and wellbeing are impacted, this may lead to unemployment and higher medical costs later in life. This thesis aims to provide an alternative, an educational space that can host different activities such as church services, markets, cooking and growing food, ultimately presenting to families profoundly affected by the obesity crisis in New Zealand an alternative. The Studio Arthur Casa Pavilion creates a successful public space, which draws people in through its activities and uses. The Christchurch Botanic Garden Visitor Centre creates a beautiful interior experience using screens to create a forest like experience.

The building was developed using research through design methodology approach. The form and layout were tested through handcraft and digital modelling. The outcome of this research is a public building that is functional and has multi-uses. It is a building where the form supports function. The website Project for Public Spaces (2009) suggests that “the most successful places grow out of understanding what a space needs to offer so that people will use it”. This building programme was based on site research and literature review, and the building was developed to support these uses. The pavilion is designed to be mult-iuse; it has a large volume in the middle which can be divided into two separate rooms using removable walls. Coming off these spaces is an atrium, café, auditorium, community kitchen, greenhouse and bathrooms. It is an accessible building that contains a range of activities and uses to encourage a sociable environment. The pavilion tries to break the boundary between inside and outside by bringing horticulture indoors and integrating with a greenhouse. This idea of biophilic interior design could have been developed further to be used as partition walls.

At this stage, the building is unfinished and needs to be developed further to make it suitable for both plants and people. Humans and plants require different environments to prosper and be comfortable (Kono Designs). Because of this environmental controls systems will need to be developed into the building. In addition to this, materials, structure and construction details would have been developed further if this research was to continue. Based on research, this building provides the tools and environment that can help families overcome food security concerns. It uses a range of community strategies to help build community resilience and empower the community to overcome and respond to future food security (Stevenson, *Growing Healthy Communities* 17). The exploration is very speculative, so it is uncertain how much of an influence it would have. However, the building is designed to provide an alternative option to families who rely on fast-food and takeaways to feed their family. It attempts to make fresh and healthy food more affordable by making it accessible and available. To have a bigger impact on food security a wide range of socioeconomic and environmental factors will also need to change (Stevenson, *Growing Healthy Communities* 7). However, these strategies will require support from the local and central government to change the overall food environment and enforce regulations for food supply and access (Rush, 7).

This research and approach to architecture aims to plant seeds in people minds about the potential and possibilities of growing and cooking their own food. It will not solve the underlying issues of food security but hopefully, change the way people perceive food.

From small ideas, big things can grow.

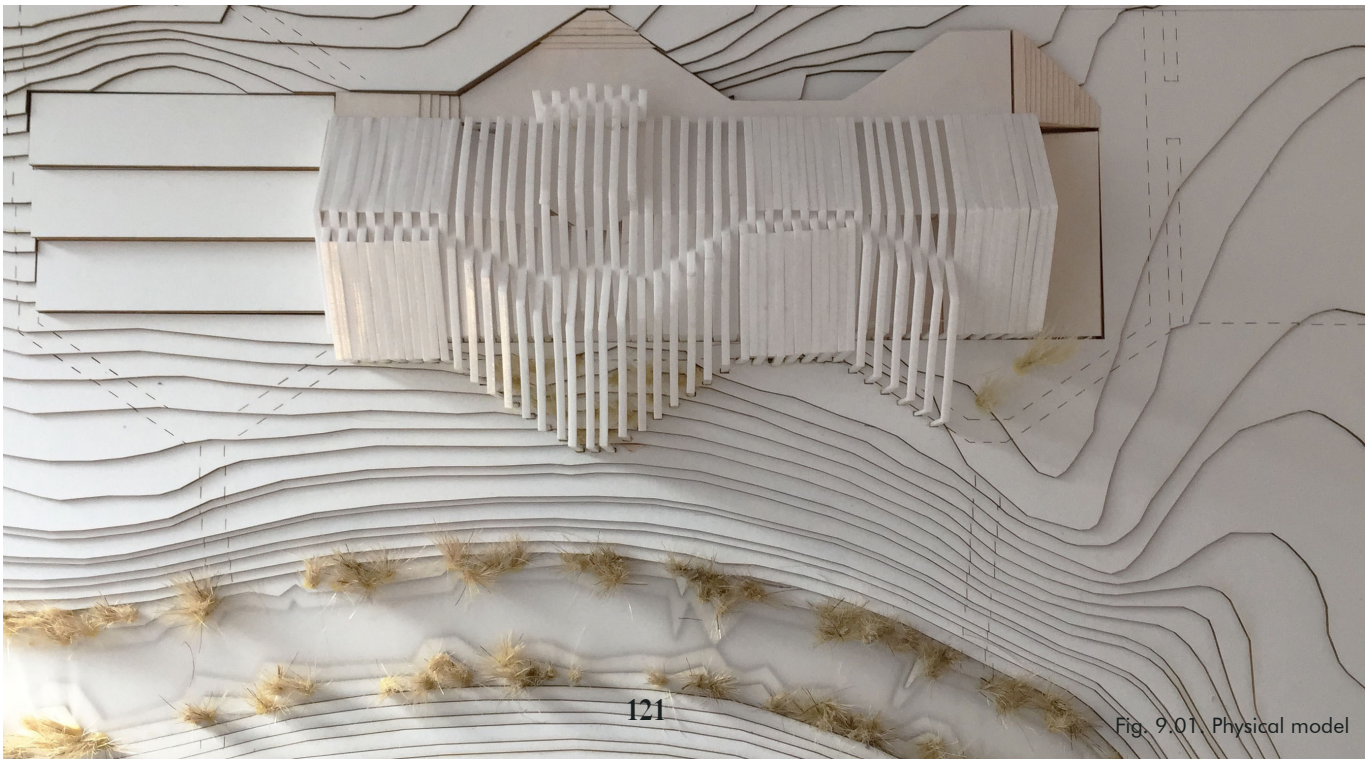


Fig. 9.01. Physical model

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