DIS MASTERPIECE
"Disasterpiece"

"How can architecture turn a human disaster into a positive contribution to an area that was affected?"

Master Thesis Explanatory Document

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Abstract

Human disasters are a fact of life and can cause catastrophic results to the environment and society. Minimising and preventing these disasters is the best course of action, but in reality, humans make mistakes. We are left with the consequences and the issue of how to deal with them.

This project focuses on how architecture can positively contribute to an area that has been affected by a human disaster. The Bay of Plenty suffered from a human disaster when the MV Rena ran aground on 5 October 2011. This project will look at the negative impacts of the disaster and, through this example, discuss how architecture might rehabilitate, reinvest and positively contribute to an affected area.
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MV Rena Disaster

Motiti Island
1.0 MV Rena Disaster

1.1 Context

Human disasters are a fact of life and can cause catastrophic results to the environment and society. Minimising and preventing these disasters is the best course of action, but in reality, humans make mistakes. We are left with the consequences and the issue of how to deal with them.

Human disasters are caused by a wide array of different actions, some are intentional and some accidental. However, one aspect remains common to most of them, the post-disaster response. The standard approach is to restore the affected area to its pre-disaster state and construct a form of memorial in remembrance of the event that has taken place. This project will focus on delivering an outcome that will provide greater benefit to the disaster-affected area.

On 5 October 2011, the MV Rena container ship ran aground on the Astrolabe reef. It was suggested to be “New Zealand’s worst maritime environmental disaster”. The disaster caused a vast array of environmental, social, economic and cultural impacts to the Bay of Plenty. After managing the initial impacts of the disaster, authorities have turned their attention toward the options of how to remediate areas that were the worst affected by the disaster.

Paul Harper, “Tomorrow is Much Worse”, http://www.nzherald.co.nz/sharethe/48167,
  div=multimedia&i=10734196
On Wednesday 5 October at 2:20 am, while sailing from Napier to Tauranga, the 37000-tonne cargo ship MV Rena ran aground on the Astrolabe Reef in the Bay of Plenty. The ship was carrying 1,900 tonnes of oil and 1,368 containers, eight of which contained hazardous materials.

Leakage from the ship over the following days developed into a five-kilometer oil slick that soon started washing ashore the pristine coastline of the Bay of Plenty. It was estimated that the oil killed 20,000 birds, including many native species. In addition to the birds that were killed, the oil affected sea life on the east coast of the North Island. Consequently, restrictions were placed on gathering food from the ocean. While the oil spill was a key focus, there was also concern about the cargo aboard the ship. In the first week, 30 containers had been washed overboard, with countless more lost in the following weeks due to bad weather. When the containers and their cargo started to wash ashore, clean-up crews were required to pick up the debris.

At this stage more than 1,500 people volunteered to help clean up and rehabilitate affected marine life. Beaches were closed for this period as contact with the oil could cause vomiting, nausea and rashes.

The continuous bad weather and swell that battered the ship caused a large crack in the hull. This caused the ship to break in two. With the stern section submerged, the disaster became a salvage operation to remove debris and minimise the long-term effects.
Figure 1.4 (Left): MV Rena grounded on Astrolabe Reef, 15 October 2011
Figure 1.5 (Right): MV Rena grounded on Astrolabe Reef, 5 July 2012
1.3 Physical Context

The Astrolabe Reef is located 10 kilometers off the coast of Tauranga and is roughly halfway between Motiti Island and Mayor Island. New Zealand Tourism once described the Astrolabe Reef as being "renowned for pristine water, spectacular drop-offs to 37m and shallow plateaus alive with fish and the occasional seal." When the MV Rena ran aground, the disaster caused a number of effects, some of which are irreversible. The collision of the Rena into the reef was the first impact. The force and momentum when the ship hit the reef was enough to break the rock structure and create a furrow and paint scrapings through part of the reef. Consequently, these damages are permanent.

In addition to the initial effects of the collision, the other physical damage mainly encompassed the wreckage, cargo and oil from the ship. There were 200 tonnes of heavy oil that had leaked from the ship, and it filled the sea and coastal beaches from Waihi to Whakatane. These were mainly short-term effects that were alleviated as regional council staff, NZDF personnel and volunteers removed oil from the beaches. The wreckage and cargo of the ship also had a major physical impact since it directly affected the Astrolabe Reef. Salvage teams have continued to work extensively on removing hazardous goods and parts of the wreckaged for four years. During this period, they have removed 850 tonnes of debris and 77 percent of the containers. The current state of the reef now has small portions of the bow cut down 1 meter below lowest astronomical tide, structural elements of the stern and various bits of debris scattered along the sea floor.

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Figure 1.5 (Top): Approximate extent of the debris field in April 2014

Figure 1.6 (Bottom): Location of MV Rena grounded on the Astrolabe Reef

Figure 1.7 (Right): Location of Astrolabe Reef
The initial effects of the Rena disaster posed a significant impact ecologically, mainly due to the water contamination from the leaked oil. However, in the months that followed, authorities worked extremely hard to contain the oil and pump the remaining oil from the ship. This action significantly reduced the ecological effect of the disaster. One potential threat to bird species in the area is concentrated deposits of small plastic beads used in plastic production that came from cargo containers on the ship. These continue to spread from the wreckage and are harmful to birds.

“Oil Pumping continues on Rena”, (Accessed 22.08.15), http://www.stuff.co.nz/environment/rena/crises/5955448/Oil-pumping-continues-on-Rena

The wreck in its current state now occupies only 1 percent of the reef. Leaving this portion of the wreck does not pose any threat to wildlife as the seafalls can avoid hazards. There will be no impact on threatened marine species as they are known to live at depths below 300 meters, and the wreck is only 65 meters below the surface. There is more concern over removing the wreck due to the threat to the ecology of the reef from salvage barges and vessels with large anchors and cables that would damage the reef. Also, the ongoing noise from underwater machinery and sonar equipment would be detrimental to the marine life. Although the major ecological effects have been significantly reduced, the area has been occupied by machinery and salvage crews for four years and remains off limits. This has meant people have not been able to visit and appreciate the natural ecology of the area and have stopped fishing and diving.

Cultural Context

The Rena disaster has had a massive cultural impact. The Maori and many local iwi share a close connection to the Astrolabe Reef. The grounding of the Rena has affected both their physical and cultural connections with the reef.

The Rena disaster has impacted many of the beliefs of the Maori people. Here are some of their beliefs that have been affected by the disaster:

- Obligation to ancestors to be the active guardians for the safeguarding of the land and its resources;
- Responsibility to ensure their birthright is passed on to future generations in either the same or better conditions;
- Actions are a reflection and reminder of who they are as people, and
- Obligation to respect both the seascape and landscape as it is the burial place of their ancestors who have provided for them.

The following section looks further at the cultural impacts of the disaster.

Political Context

In May 2014, the Rena’s owners lodged a resource consent application under the Resource Management Act to leave sections of the wreck and associated debris in place on the Astrolabe Reef. The application is a plan that offers an alternative to removing the wreck. It takes into consideration cultural, environmental and safety elements.

The owners of the Rena have decided to proceed with a council hearing to discuss their plan with commissioners who will make a final verdict. The commissioners are experts in specific fields, who will help evaluate every aspect of the resource consent. People with direct concern and interest have had the option of submitting their concerns and technical reports.
1.6 Mitigation Package

The current cleanup has cost the insurance company $235 million to date, and it is estimated that the government has spent up to $47 million. This cost is set to rise if the wreck is completely removed.

Due to research showing that salvagers would experience unsafe working conditions and that it would cause more damage to remove the remaining wreckage than to leave it as is, the Regional Council may grant consent for portions of the wreckage to be left on the reef. The owner and insurer of the MV Rena are proposing a community restoration package which targets assistance to areas that were affected. It will aim to administer funds towards helping affected areas socially, culturally and economically.

Some key principles will be taken into consideration when allocating these funds, which are set out across the page.


**Environmental**
- Environmental enhancement or restoration along coastal margins in the area of benefit

**Social**
- Development of coastal communities in the area of benefit
- Provision of education and training in marine and coastal sciences, environmental management, commercial fishing, navigation and seamanship, emergency management, pollution, contamination and related areas
- Areas of research for the furtherance of knowledge in the marine and coastal environment, processes, oceanography, commercial fisheries, marine mammals and birds
- Implementation of projects that provide for the remediation of coastal and marine environments for the benefit of local communities
- Assist community groups and affected sector groups involved in surf lifesaving, coast care, non-commercial fishing and diving, emergency response and management in the area of benefit

**Cultural**
- Provision of education and training in marine and coastal sciences, environmental management, commercial fishing, navigation and seamanship, emergency management, pollution, contamination and related areas for tangata whenua whakapapa to Te Patuwai Hapu, Tauwhao ki Motiti and Te Arawa Iwi with coastal interests
- Implementation of projects for the benefit of the tangata whenua of Motiti that provide for an improved natural, physical, social or cultural environment on the island

**Economic**
- Projects and research that provide for innovation and economic enhancement in the marine and coastal environment with a particular focus on added economic value in the Bay of Plenty area
2.0 Introduction

2.1 Research Question

How can architecture turn a human disaster into a positive contribution to an area that was affected?
2.2 Aims and Objectives

The MV Rena disaster had significant negative impacts on Motiti Island and the Astrolabe Reef, both from the initial physical damage caused to the reef and the subsequent damage caused by toxic waste spilling into the ocean causing irreversible harm. The disaster not only caused physical harm but also severely affected the people of Motiti Island and their cultural heritage. This project will look at what steps can be taken to heal the physical and emotional stress that has occurred in the area.

Limited efforts have been undertaken to rectify the situation to date. The island is currently crippled by poor access and limited infrastructure. This opens the doorway for architecture to be used as a medium for improving the island’s function in a way that celebrates the Maori culture. An architectural remedy not only could help people on the island by improving the physical conditions but also would be an important step towards rectifying the cultural and emotional damage caused by the disaster. Reusing parts of the ship in the architecture would visually demonstrate how a positive situation can come from such a disaster and begin a healing process that helps relieve the harsh negative feelings towards the disaster.

Figure 2.2 (Above): Aerial view of Motiti Island from the southwest corner.
The focus of this project will be to create a design solution that will contribute positively to an area that was affected by the disaster. This event has affected people in different ways, some more than others. Currently there are conflicting future plans and the aim is to find a solution that responds positively to the collective interests. This will require a considered approach that respects the cultural significance and physical presence of the site. However, there will be certain elements that cannot be solved through an architectural intervention, but this project will look to achieve the aims set out the best it possibly can.

It is important to understand that this project does not suggest human disasters are beneficial. But if an accident does occur, it will show that architecture can help rehabilitate areas affected by human disasters.

2.3 Focus and Challenge

2.4 Thesis Structure

This thesis is comprised of two sections. Firstly, it will contextualize Motiti Island and look at how the Rena disaster affected the people living there. It will then focus on architectural strategies and case studies that can help address some of these issues while trying to contribute positively. Secondly, the design component will explore how these strategies can be applied to the area and context.
With a focus on trying to improve the island’s function and heal the emotional damage from the disaster, this section will outline Motiti Island and the impact of the disaster. It firstly looks at the importance of our coastline on a national scale before focusing on the Bay of Plenty and Motiti Island. This information will then be used to devise strategies to help contribute to Motiti Island and reduce the negative impacts from the disaster.
3.1 New Zealand Coastline

New Zealand has the 9th longest coastline in the world, with a total of 15,000 kilometers. This is large in proportion to the total landmass of the country. This proximity to no person in New Zealand being further than 120 kilometers from the coast. This close, physical connection to the coastline is reflected in the cultural and social aspects of New Zealanders’ lives.

“The coast plays host to a wide variety of public activities. People utilise the coast in various ways, whether to relax on the beach or participate in various water activities. In addition to recreational activities, the coastal area supports a range of commercial industries in New Zealand, including the food supply and tourism.”


Figure 3.1 (Above): Table of Lengths of Coastlines by country

Figure 3.2 (Above): Port Waikato Coastline
3.2 Bay of Plenty Coastline

The Bay of Plenty coastline is the large indentation on the eastern side of the North Island. It stretches from the Coromandel Peninsula to the West Cape Runway. The coastline extends 259 kilometers long and encompasses a few large islands in the area. The coastal environment of the Bay of Plenty is identified as being one of the key reasons why people choose to live in the area. The experience of the coastal environment and how people value the area can be largely associated with the amount of activities in which people engage near the coast. Recreational activities range from fishing and diving to beach activities like swimming, surfing and surf lifesaving. The Bay of Plenty also provides a teaching resource for many educational providers. Local marine science education programmes visit the Astrolabe Reef and the surrounding islands to observe the rich marine environment and presence of marine mammals.

Figure 3.3 (Above): Mount Maunganui Beach
Motiti Island is a small rural island situated in the western Bay of Plenty, about nine kilometres from the mainland coast, closer to Maketu Point to Tauranga, and five kilometers south of the Astrolabe Reef. The island is relatively flat, with the highest altitude on the island being 56 meters in contrast to the volcanic mountain grandeur of its better-known neighbours, Mayor Island and White Island.

3.3.1 Physical Context

Motiti is 720 hectares of low-lying flat grasslands that is bounded by large stretches of cliffs. It is made up of a vast amount of prominent headlands and isolated rock forms that stretch out into the surrounding waters inhabited with rich marine resources.

The headlands and rock forms of the island were made through volcanic activity and consist mainly of hornblende and pyroxene andesites. These types of rocks are also found on the mainland west of Te Puke. The presence of a submarine ridge suggests that they are connected to Motiti Island.

For further information, please refer to:

Figure 3.9 (Left): View across Motiti Island
Figure 3.10 (Above): View of Motiti Island looking south
3.3.2 History

Motiti Island has a long history of Maori occupation, beginning with the migration of the Te Awara canoe. This was the first recording of people landing on Motiti Island and apparently the waka made a brief call on the journey from Hawaiki to Maketu in about A.D 1340.

The descendant groups affiliated with the Te Awara waka eventually moved inland to settle in the area between Taupo and Maketu after claiming Motiti Island. The migration of the Mataatua descent group then determined the occupation of Maketu and Motiti Island. This caused a bitter dispute between Maori settler groups, but the Mataatua groups eventually went on to displace the Te Awara descent groups. It was during this time that Motiti Island was occupied by the Te Putawai tribe, a descendant of the Mataatua group. The Te Putawai tribe has always been known as a hardworking, self-reliant and hospitable people, that not only industriously farmed their land at Motiti, but also carried the produce to market in their own boats over an open ocean to make a living. This tribe is still on the island today.

Motiti was first discovered by Europeans in the late 18th century. The island was known to Europeans as “Flat Island” as this name was given to it by the great English navigator, Captain James Cook. On Cook’s first voyage to New Zealand in 1769, he sailed close inshore to Motiti Island, and reported that as he saw the most “extensive complex fortified villages” he had seen on his travels.

The first European settler on Motiti Island was Daniel Farrow, in 1867. His house was located on the southern portion of the island in Orongatea Bay. He was thought to live there for a short period of time, before George Alexander Douglas took over this area. In 1862, Douglas retired from business life and went to live on the island, “where he devoted his attention chiefly to improving the breed of considerable mobs of cattle and horses.”

One of Douglas’ main concerns was transportation. The fertility of the soil was well known, and there was an abundance of good water from the numerous springs, but there were no natural harbours on the island’s rocky coast. He experienced difficulty in getting his principal exports, cattle and horses, transported to and from the island. Douglas solved this problem by buying a steamboat and developing a rail system in Orongatea Bay to help cattle disembark the boat. Although this system is no longer used due to the improvement of the private ramp, it was the start of animals living on the island.
3.3.3 Social Context

Motiti Island is the only inhabited offshore island along the Bay of Plenty coastline. The 69-hectare island has approximately twenty-five inhabitants but lacks basic infrastructure. The isolation of the island from the mainland has historically insulated island life from many of the trappings of contemporary Western life.

The island was once fully controlled and occupied by the Te Patuwai tribe and has been passed down through generations. However, in the 19th century, a member of the tribe sold their land on the island. This led to a split in ownership of the island. The northern portion of the island is now occupied by Te Patuwai and the southern portion is occupied by Europeans.

The northern portion of Motiti Island is controlled by Maori under a shared title and has over 700 shareholders, most of whom do not live on the island. The large number of shareholders is due to the average Maori family having 4.2 children. Due to the large number of shareholders, the land owners can sometimes lack cohesion and have difficulty with group communication between them. This makes it very difficult to discuss issues and develop the island. The outlook for the northern portion is grim in part due to the polarized demographic that brings no source of income to the island.

The southern portion of Motiti Island is privately owned by around seven European owners, each having separate land titles. These few owners have a close relationship and share their own airstrip, ferry landing and basic infrastructure. This is in part possible because they have established economic stability through growing and exporting avocados to the mainland.

The Maori and European inhabitants interact with one another, but there is a major physical and social split between the two groups. This project will look at strategies to improve conditions in the northern portion of the island, since the people living in this area were more affected by the disaster because of their cultural connection to the land and sea.


Motiti Masterplan (accessed on 01.05.14), http://www.whatarchitecture.com/project.php?id=118

Figure 3.16 (Above): Family tree showing Hoete Family who are from the Te Patuwai Tribe

Figure 3.15 (Above): Map showing the split between Maori and Europeans on Motiti Island
3.3.4 Cultural Context

The Maori have a strong cultural connection with Motiti Island due to their long-standing occupation of the land. The land has been occupied by the Te Putawai tribe for many centuries and is the burial ground for many of their ancestors.

There are 28 distinct Pa sites, 29 settlements, and 30 ancient monuments situated on Motiti Island and the surrounding seabed. These sites are very important to the Maori people of the island, and it important that great respect for these areas is kept foremost in mind when designing and planning architecture for the island.

Motiti Island has two maraes located in the cluster of housing on the western side of the island.

Figure 3.17 (Above): Marae on Motiti Island
Figure 3.18 (Above): Marae on Motiti Island

3.3.5 Agriculture

In the past, the island has been known for agriculture. The fertile soil and frost-free environment provides ideal conditions to grow vegetables; however, the island went through a period where it was infected with a disease that killed produce and cut the export to the mainland. The northern portion of the island never recovered, resulting in the land being under-utilised. The southern portion boasts 82 hectares of planted avocados trees, the largest in New Zealand. Providing a constant income for the southern residents.

Figure 3.19 (Above): Avocado Farms on southern portion of Motiti Island, 2013
Figure 3.20 (Above): Map showing the agriculture on the island in 1944
3.3.6 Housing

There are currently 69 housing units on the island; 51 of these housing units are semi-permanent and 18 are permanent. With only 28 full-time residents, most dwellings are uninhabited most of the year. It has become a common trend for shareholders to construct semi-permanent housing to accommodate their short stays on the island. These housing units are usually low quality and are subject to deteriorate due to the lack of both use and upkeep.

The housing units are mostly scattered across the island, mainly due to people seeking a unique surrounding. There are, however, a grouping of houses around the two maraes on the island.

There is currently one place on the island equipped for families to stay on the island. This dwelling consists of 3 bedrooms and a shared living area. Though it potentially can cater up to 12 people, it does not provide the current needs of accommodation on the island.

Figure 3.21 (Above): Scattering of housing on the western side of the island near the two maraes

Figure 3.22 (Above): Map showing Housing on the Island

Figure 3.23 (Above): Current accommodation for visitors on Motiti Island

Figure 3.24 (Above): House on Motiti Island

Figure 3.25 (Above): House on Motiti Island

Figure 3.21: Scattering of Housing on the Western Side of the Island Near the Two Maraes
Currently, there are two options for getting to Motiti Island. The most common method of transport to Motiti Island is by chartered flights. This is because it is not viable to run frequent water transport due to the lack of visitors. These chartered flights take about 10 minutes to travel there but is expensive due to rising operation costs. This also makes transporting goods to the island difficult due to the small aircraft.

The alternative option is going by boat. Boat access to the island currently is very limited since boat transportation is only used to drop off supplies. However, this is the most efficient transportation method as they can also bring large amounts of supplies to the island. In order to make this viable, it would be essential to increase the number of visitors to the island, thus splitting the overhead costs of transport.

While on Motiti Island, transport is limited mostly to tractors, quad bikes and old 4WD cars since some of the terrain is rough, but the island is perfectly suited to walking as it is small and flat.

There are two airstrips currently being operated on the island. The Maungaroa Airstrip is a private airstrip located at the southern end of the island that is owned by Motiti Avocado Ltd. Access to this airstrip is granted only through request. The other airstrip is located on the northern side of the island. It was developed by the Maori people on the island, but several attempts have been made to close it due to safety. These airstrips are very basic and consist of a mown strip of grass that is fenced off.

The main water access for the Maori people on the island is at Wairamki Bay. This is a natural beach access at mercy to the elements. There has been consideration for the development of a safe landing point here, and this is of high priority for the future. A secondary point of water access is through a private jetty situated at Otukino Bay. This is available for use, only at the request of the owners.
3.3.9 Infrastructure

The infrastructure on Motiti Island today is minimal. Overall the island generates very limited income making it difficult to fund the cost of the necessary infrastructure. Due to the lack of infrastructure, dwellings on the island are mainly self-contained and forced to provide their own electricity, sewer, water and telephone connections.

The power on the island is mainly provided through solar energy. Most of the housing units are equipped with large solar panels with batteries to store the energy. The other source of power is wind turbines, though these are less frequently used. Wind turbines are a particularly good source of power because the island is prone to the ocean winds. Both of these systems perform well, but they’re all built on a small scale as they only accommodate one dwelling.

The main source of drinking water is provided by rainwater collection. This is adequate throughout most of the year; however, in rare cases, water sometimes needs to be transported from the mainland. The other source of water on the island is through fresh water springs. This water is not suitable for drinking, but it is commonly used for the vegetation on the island.

Figure 3.32 (Above): Water pumps from fresh water springs
Figure 3.33 (Above): Main road on Motiti Island
Figure 3.34 (Above): Solar panels and water storage tanks on a home at Motiti Island

Motiti Island was impacted both physically and culturally by the Rena disaster event. The close proximity of Motiti Island to the Astrolabe Reef resulted in oil and debris washing ashore. It was these physical effects that also impacted on the cultural beliefs and values of the Maori people.

The Astrolabe Reef was historically known as Otaiti or Te Tau Otaiti, meaning “the gateway to Motiti Island”. The navigator named it this after he performed a karakia upon descending on Motiti Island. These spiritual connections have been damaged due to the Rena events.

The sea and its resources are a major part of people’s lives on the island. The ongoing pollution harmed the resources of the reef and shoreline. It was for the first time ever, apart from severe but short-term weather conditions, people were prevented from accessing their traditional food source. These fishing grounds were once needed for survival, and to an extent, it still applies. Through many centuries, Motiti Island fishing was a major part of their culture. Sharing the catch around to their whanau was important.

Below are some of the beliefs from the Te Patuwai tribe that were affected by the Rena disaster:

– Respect for ourselves as Maori people with a valued historic heritage that is our inheritance – mana.
– Respect for the active practice of our culture through the observance of proper traditions and protocols that guide our lives, including theui of the powhiri and tangi; the use of te reo rangatira, waiata, pepeha, whakapapa, pakiwaitara, kapa haka, poi and the many things that distinguish us as Ngai Te Hapu. tikanga
– Respect and reverence for all the places that are important to us; including the cultural landscape and seascape that we live in – our waterways, islands, reefs, coastal margins – the sea, our traditional lands. All these things are permanent reminders of who we are as a people and help identify our place in the world – kaitiakitanga
– Respect for our ancestral marae, our remaining lands and our homes because they constitute our turangawaewae – our place to stand – mana
– Respect for the burial places of our dead, the ancestors from whom we have sprang and who provided these places for us – mana, whakapapa
– Respect for our hapu responsibilities and obligations to be active guardians for safeguarding the maori and the mana of our heritage and the resources that are our birthright and to do what we can to ensure that those things that have been left to us are passed to the next generation in the same or better condition than when they came to us – kaitiakitanga

4.0 Strategies

This section looks at various strategies that aim to heal the emotional stress caused by the Rena disaster to Motiti Island. It will look at how reusing wreckage can work collectively with Maori architecture to contribute positively to the island. These strategies will focus mainly on the northern section of Motiti Island that is occupied by Te Putawai, since this area is in high demand for development and was the most affected by the disaster due to the people’s cultural beliefs.
4.1 Function

The programme is a very important element in this proposal. It will look to improve the infrastructure and respond to the functional needs of Motiti Island. This will include improving existing infrastructure and providing new facilities that attract people to the island.

4.1.1 Access

Improving access to the island is an important step to the revitalization of Motiti Island. Creating frequent travel via ferries will offer a more sustainable and cheaper transport option to the Island. It will allow residents to commute to and from the island on a regular basis while attracting visitors to come for day trips or overnight stays.

The regular connection via ferries will also make it easier to import supplies and export goods from the island. It has the potential to kick start agriculture on the northern side as the lack of infrastructure has been a drawback.

The functional aspects of creating access to the island will include a jetty for passengers and goods to be unloaded, this will need to be usable at all tides and in all weather conditions. There will also be an area for boats to be moored or anchored long-term, either in small marina berths or at a breakwater that provides protection. In addition, the island will also need a concrete slipway to enable barges to unload bigger items, including cars and other goods. The slipway will need to be a sheltered area and will also be used for residents to launch and retrieve boats. This will be a great asset to residents of the island as it will make it easier for them to gather kaimoana (sea food).

An airstrip will be included within the new proposal to replace the current one that is suggested to be unsafe. This airstrip will have to accommodate single-engine airplanes and be situated in close proximity to the main visitors centre with a strong connection to it.
4.1.2 Visitors Centre/Hub

An issue that arose from the incident of the Rena disaster was the separation and segregation of people on the island. The authorities have been negotiating mitigation packages, and it has shown the lacked of cohesion and communication between residents. This has led to them being left out of decisions that concern them. Creating a hub on Motiti Island will aim to create a shared space that looks to unite the residents in a similar way to a community center.

The hub will also act as a visitors center for people coming to the island. Creating a strong connection from both access routes (air or sea) will act as a gateway to the island. In addition to this, it will educate visitors about the history of the island and the impacts of the Rena disaster. Providing exhibition spaces, an information desk, and a multipurpose classroom will be some of the functional elements required in the visitors centre.

4.1.3 Marine Centre

The marine centre will educate visitors about marine science and give them the opportunity to experience the marine environment firsthand. It will look to provide interactive displays to engage the viewer and educate visitors on future protection of the marine environment. The primary purpose will be to ensure protection and enhancement of the local ecosystem and everything connected to it.

The marine centre will provide a place to control the ongoing monitoring of the wreck. The close proximity of Motiti Island to the Astrolabe Reef makes it an ideal location since it is readily accessible. Creating a marine centre has been approved by the Rena mitigation package. Locating it on Motiti Island is an ideal way to attract people to the island.

4.3.4 Accommodation

Accommodation will be one of the cornerstone programmatic elements of this proposal. Creating accommodation will aim to resolve the issue of residents constructing low-quality homes for short-term stays. It will provide a place for visitors and workers of the marine center to stay when coming to the island. The accommodation will provide a range of options to suit groups and families of all sizes. These options will use a system that provides a sustainable source of power, water and waste disposal that is shared with the other buildings in the proposal.
4.2 Maori Architecture

Motiti Island has a strong Maori presence as most of the residents are descendants of the Te Putawai tribe. Using the Maori culture and respecting their beliefs will be important to the design aspect. These beliefs and values are overviewed in the cultural context of Motiti Island.

Another aspect of integrating Maori architecture into the design is the role of symbolism. Symbolism is a significant part of Maori architecture. This is where narratives are interwoven with the built form to create spaces full of meaning. Symbolism has the power to represent narratives by connecting physically and emotionally with the viewer. With the rich essence and ideas of the Maori culture, architecture has the power to symbolize these elements through the built form. The cultural beliefs and heritage of Maori were one of the main impacts to Motiti Island. Intertwining small elements of the Maori culture in the built form will portray the significance of Maori culture on the island.

When analysing the traditional wharenui, it is apparent that every aspect of the built form symbolizes a narrative. This is done through structure, carvings, weaving, ornamentation or paintings. It uses these physical elements as a metaphor to communicate the stories. For example, when you enter a wharenui, you enter through the embrace of the founding ancestor, the tupuna, the carved koruru figure at the apex of the roof is the face and the large bargeboards on each side are the outstretched arms. The interior walls are often adorned with ancestral figures that are carved, woven or painted. These connect to the main wharenui ancestors through the heke (rafters) and tahuhu (ridge beam). The tahuhu is the most sacred part of the wharenui and represents the backbone of the ancestor. Residing within it is the mauri, or the life spirit that binds the people and the building together.

Modern Maori Architecture

The use of Maori architecture in the contemporary architecture is becoming a more popular idea. An example of this is the Te Papa museum in Wellington. This was built in the early 1990s. One of the main aims was to create “a National Museum that powerfully expresses the total culture of New Zealand.”

One of the main design elements is an axis that runs through the center of the building. This acts as a metaphor that symbolizes “ambiguous separation and linkage between the Tangata Whenua (the people of the land) and the TangataTiriti (post treaty settlers of New Zealand).” In addition, the axis is “aligned with the mythical pathway to Hawaiki that is ubiquitous and readily understood in the culture of the tangata whenua.”

It is these subtle design elements in modern architecture that add depth to celebrate the Maori culture.

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40 The Designing of Te Papa,” special issue, Architecture New Zealand, 1998
41 Michael Linzey, A fault-line at Te Papa, 2
4.3 Reuse

The fundamental principle of reuse is to use material from something that no longer serves its intended function and utilise it in a way to serve a new function. It is thought to be one of the most sustainable techniques of construction in the modern day. It eliminates wastage while also preserving the embodied energy that it took to produce the material. Growing concern for the environment, rising fuel costs and expense of materials has made reuse a popular construction technique. Reusing parts of the Rena presents an opportunity to utilise the wreckage for something more beneficial than shipwrecking it. There are many advantages to using the wreckage from the Rena. Firstly, the wreckage is well suited to withstand the natural elements of the ocean. The materials are ideal for the conditions that the building will be exposed to on Motiti Island as ships are designed to withstand the elements of the ocean. Ships are also designed and engineered to support the dynamic forces of the ocean and the heavy shipping loads. This would allow sections of the ship to be structural elements of the building.

Figure 4.3 (above): Container ship deck showing the structural elements to support containers

Figure 4.4 (above): Maersk container ship

4.3.1 Ship Wrecking

Shipwrecking is a common method for decommissioning ships. On average, 1200 ships are decommissioned each year. More than 90 percent of these ships end up on the shores of India, Pakistan, Indonesia, or Bangladesh, where labor is cheap, the demand for steel is high and the environmental regulations are relaxed. This has led to public criticism about the environmental impacts and the occupational health hazards of the low-paid workers who carry out the extremely difficult work of shipwrecking face significant risk. In addition, the environmental impacts are very detrimental because of the pollution from toxins being released into the environment.

The negative impacts on both the workers and environment in the shipwrecking industry present a strong argument for the benefits of reusing ships in a way that is not so harmful to the workers and the environment. Although the Rena has been partly deconstructed due to its specific circumstances, parts of the ship are still likely to go through the same harmful process. This project will look to use architecture as the gateway to endorsing a sustainable, innovative and different approach to disposing ships.
4.3.2 Interest

Reusing parts of the MV Rena will create a unique and interesting aspect to the design. People all over the world go diving through shipwrecks to experience the unique characteristics of ships that have been degraded and exposed to the elements of the ocean. This process will be prominent on parts of the Rena wreckage as they have been underwater for up to four years. The Rena will also have many elements specific to the disastrous events that took place. For example, there are sections or torn metal that buckled under the stress of the ship being on the reef. When looking specifically at the grounding of the Rena, it is considered to be a rare circumstance. It is the biggest ship to have sunk in New Zealand and of those ships that have sunk only 2 percent have been cargo ships.17 It is these large ships that harness many unique qualities unseen to many. The engineering of these ships to be able withstand the forces of their duties mean there are many interesting elements that can be utilised in the design. This ranges from the double skin steel hull to container fixings.

An example of the interest of shipwrecks in this area is the Taioma, a boat sunk off the south-east coast of Motiti Island. It has become an increasingly popular attraction for divers to explore as it has degraded and integrated into the marine life.18 It is this same process that parts of the Rena have been exposed to while sitting on the Astrolabe Reef. Although some of these living organism will be lost when reusing the material to build a new structure, the material will still have the unique character etched into it.

This proposal will look to integrate parts of the wreckage into the design to make it accessible to people who cannot otherwise experience shipwrecks.
Lebbeus Woods is a conceptualist who developed the scheme ‘Radical Reconstruction’. He focusses on buildings and places that have been torn apart by war or natural disasters and looks at how he can assist in the recovery and healing process. Woods believes that it is not possible to immediately repair the affected area to its former state. After events like these, ‘too much has been suffered and lost, the price of learning at this great a price to be quickly forgotten’.

He states the common approach for places that have suffered violence and destruction is to ‘reinstall the old, former state. After events like these, “too much learned at too great a price to be quickly forgotten.”’

In these spaces voided by the destruction is to reinstall the old, former state. After events like these, “too much learned at too great a price to be quickly forgotten.”

Woods advocates for showing respect for the tragedies that has occurred, erasing the attached memories. He sees this as a first layer of reconstruction, a way of acknowledging the war that has lead to the destruction.

Generally, his theory usually neglects areas that have been abandoned due to dysfunction as an opportunity to move forward. In these areas voided by destruction, new structures can be injected. He sees reconstruction as a way to progress, allowing people to use the technology for this action, something that needs to be covered up and forgotten. Woods sees restoring the existing structure to its previous state as a step backward since it doesn’t progress from the previous knowledge. The act of restoration ignores the hardship and calamities that has occurred, erasing the attached memories. Woods advocates for showing respect for the tragedies suffered by the structures. He makes a strong case for the need to expand on buildings damaged by war as a way to acknowledge the war that has lead to the destruction.

This significant event has lead to the destruction, the scars form a first layer of reconstruction, sheltering an exposed interior space and protecting it through its transformation. This is the initial response to the event that has occurred. Then the scar that forms is a deeper level of reconstruction that fuses the new and old. It looks to honour and mark what has been lost and gained. In doing so, it signifies the rise and decay of the building, proudly revealing to history and not allowing it to be ‘disguised’ through cosmetic restoration. As time passes, the scar slowly fades, but it still exhibits the relationships between people and structures. It helps nourish the development of pre-existing knowledge and enhance it in a way for emotional recovery.

Woods assimilates this to the idea that a building – a work of architecture – could directly catalyze a transformation, so that the society that built it. It’s the idea that a building project, once complete, will actually change the society that built it in the way that follows up on events, not be a leader of events. There’s also the incredibly interesting possibility that a building project, once complete, will actually change the society that built it in the way that follows up on events, not be a leader of events.

In a blog he wrote on the World Trade Centers, Woods presents no sympathy for the name of mass murder in terms of symbolics. He goes on to suggest that we must notask the architects to be ‘creative transformed into a new generation of memorials that celebrate the living’.

Lebbeus Woods theory is mainly based around a specific site but I believe this theory can be adapted and applied to the Rena disaster. This significant event has been monumental in the history of Motiti Island. It will forever remembered so why not nourish the pre-existing knowledge and enhance it in a way for emotional recovery?

By implementing new function in to the wreckage it presents the opportunity to move on and celebrate the future.
4.4.1 911 Memorial Museum

The 9/11 Memorial & Museum, located in New York City was built to commemorate the lives lost in the September 11 attacks. The memorial is built on a 16-acre site in downtown Manhattan and features two enormous reflection pools set within the footprints of the original towers, with the museum located underground. The museum has incorporated debris and various elements from the original towers. For example, in the entrance of the museum, there are two of the original columns from the World Trade Center acting as sculptures in the entrance foyer. These columns were reused to connect with the viewer on an emotional level, but it can be argued that the original columns could have been used more creatively, possibly could have been incorporated into the actual structure of the building.

The architecture symbolizes the event by recognizing the inverted footprint from the buildings that collapsed. The inverted footprints have become reflection ponds intended to communicate the idea of what once was there and now has been lost. This approach is symbolic by continuing a memory in a modern way honouring those who lost their lives.

Figure 4.22 (Above): Column used as sculpture in entrance of the museum

Figure 4.23 (Above): Original stair case from WTC

Figure 4.24 (Above): Exposed slurry wall in museum

Figure 4.25 (Above): Survivor tree that withstood the collapse of the WTC

Figure 4.26 (Right): Reflection pond
The Gabion Houses are located near Port au Prince, Haiti. The houses were to provide shelter for people affected by the earthquake of 12 January, 2010. Following the magnitude 7 earthquake, at the shallow depth of 22km, the city suffered catastrophic results of 230,000 fatalities and extensive building damage. Following this, one of the main issues was to deal with the amount of rubble in alleyways and lanes that blocked access. Clearing the predicted 20 million cubic meters of rubble was estimated to take more than 27 years and cost about $500 million. This resulted in the idea to create gabion housing. A gabion house is constructed by vertically stacking gabion baskets to form walls and using wooden trusses for the roof. A gabion basket is a wire cage lined with chicken mesh and filled with rocks. Traditionally these were used as retaining walls. The gabion houses in Haiti were constructed by filling the gabions with rubble from the earthquake to create house walls. This proved to be a great housing solution as it helped clear rubble whilst providing effective shelters, which cost 50 percent less than traditional houses. These houses provide a multi-beneficial response to a disaster and another example of how architecture can assist in the recovery of an area by providing accommodation for affected people.
4.4.3 USS Arizona Memorial

The USS Arizona Memorial is located in Pearl Harbor, Hawaii. It marks the resting place of 1102 sailors that were killed in the Japanese attack on 7 December 1941. This serves the function of a memorial to the people that were lost, but in doing so creates an interesting place for tourists to visit. It is one of the most visited memorials in the world in part because of how the architecture relates to the reuse of the ship. The memorial is not only visually appealing but also communicates what has happened in the past. It also looks to move forward and celebrate the future. The design of the memorial has two peaks at each end connected by a sag in the center of a structure. It represents the height of American pride before the war, followed by the depression of a nation after the attack and the subsequent rise of American power after the war.

Figure 4.32 (Above): Aerial view of the USS Arizona Memorial
Figure 4.33 (Above): Part of the USS Arizona above the waterline
Figure 4.34 (Above): Interior view of the USS Arizona Memorial
Figure 4.35 (Above): Exterior view of the USS Arizona Memorial
Figure 4.36 (Right): View from ferry approaching the USS Arizona Memorial

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The Windshield Chapel is located in Mason Bends, Alabama. Mason Bends is a small town in Hale County, the second poorest county in Alabama. The building was designed and built by the Rural Studio, an undergraduate program at Auburn University. The aim of the building was to create a community hall which could host church services and various other activities. The building is a good example of reusing materials to save costs and create a unique architectural space.

The main façade of the building is constructed from eighty scrapped car windscreens which overlap and are fixed to the structure in a way which allows ventilation and light into the building. This adds a functional element to the reused materials.

The Windshield Chapel is a great example of reusing materials in an effective way. Not only does the design reuse materials, but it also utilises them in an architectural way to create an effective aesthetic appeal that responds to the social needs of the community.

Figure 4.37 (Above): Exterior view of the Windshield Chapel
Figure 4.38 (Above): Interior view showing the structure
Figure 4.39 (Above): Façade made from car windscreens
Figure 4.40 (Above): Interior view of the façade
Figure 4.41 (Right): Windshield Chapel at night
Landschaftspark is a public park located in Duisburg-Meiderich, Germany. The site was previously a coal and steel production park that was abandoned in 1985, which left the site significantly polluted. The architects Latz + Partner intended to heal and understand the industrial past, rather than trying to reject it. For them, “it implies a re-presentation or understanding of the past which helps heal the area.”

In trying to achieve this they have preserved as much as the existing site as possible and have created these experiences through certain programmatic elements; old gas tanks have become swimming pools, the steel mill has been turned into a plaza and concrete walls are now used for rock climbing.

This has all helped reconnect existing patterns from its past use and create new interpretations for of the area.

4.4.6 Landschaftpark

Figure 4.42 (Above): Pathway integrated into existing structures

Figure 4.43 (Above): Landschaftspark rock climbing wall

Figure 4.44 (Above): Existing metal structure from coal and steel production

Figure 4.45 (Above): Existing metal structure from coal and steel production

Figure 4.46 (Right): Existing structures integrating into the landscape as time passes


Ibid

3.2.2 Theoretical Summary

The ways in which these strategies can contribute positively to the island become evident through research and practical examples. Understanding the ways in which each of these strategies can connect and relate to each other fundamental to providing real benefit to the area and helping to heal the negative feelings that are associated with the Rena disaster. To understand how these strategies work, it is important to properly comprehend the events that have taken place in context.

Firstly, the Rena disaster has had a major impact on the people on Motiti Island. One of the main effects was its impact on the culture and beliefs of the Maori inhabitants. Integrating features that represent Maori culture, along with reusing parts of the ship and integrating programmatic elements, will serve to create an interesting piece of architecture which represents the culture, helps heal the negative perception and celebrates the future of Motiti Island.

When looking at how to positively contribute to an area that has been affected by a disaster, it is important to understand the context and what has happened. Through analysing past theories and developing a new approaches, it is possible to create a range of strategies that can be implemented in the design process. It is important to understand these strategies work as a collective, to achieve the objectives of the project. Reuse is one of these such strategies and is an important aspect to this project as it will reuse parts of the ship for something more useful than scrapping them. Adding a functional element that will benefit the area affected will also help to change negative perceptions of the ship. In addition it will look to create an unique architectural experience. One of the most significant impacts of the event, was the effect on the Maori beliefs. Although some damage is irreparable, the use of Maori architecture as a means of celebration and education can help contribute to the area.
Design Process

5.0

5.1 Initial Concepts

The initial concepts of the proposal were located on the Astrolabe Reef as this was thought to be the place most affected by the disaster. These concepts look at various options of how architecture could reuse the wreckage to benefit the area. They aimed to create a dive platform and area for disaster and islands poor recreation around the reef infrastructure; it became the new site for the proposal.

Further research uncovered the main impacts of the disaster were the cultural and emotional damage to the residents of Motiti Island. With the combination of both

Figure 5.1 (above) Initial sketch showing dive platform on the Astrolabe Reef.

Figure 5.2 (above) This concept look at how you could receive the vision of the Rena positioned on the Astrolabe Reef. These structures then become places for boats to tie up and explore the wreckage below.
5.2 Site

5.2.1 Site Location

In order to find a site that would be the most beneficial to Motiti Island it was vital to understand the dynamics and current activity on the island. The first priority was finding a site that was close to water because creating access via boat is a major objective. Another consideration that dictated the site location was finding an area that could be used for the new airstrip. It was important for these to be in close proximity so they could both have a strong connection to the visitors center. This would allow the visitors center to become the gateway to the island.

Motiti island has limited areas that are accessible by water due to steep cliffs and rocky coastline. The current access by water is at Wairanaki Bay. This will be the main area of the site. The rest of the site stretches from Wairanaki Bay along the meandering stream to the adjacent cliff on the island. The main reasoning behind choosing this site was because it provided access by both air and sea whilst also being in close proximity to the town. Choosing a site that is not in the centre of the town means tourism will not affect the dynamics of the island.
5.2.2 Physical Analysis

Wairanaki Bay, located on the north-western side of the island, is situated between prominent headlands on either side of the bay. The average elevation of the island is about 30 metres above water level, so the transition from land to sea has varying gradients. Wairanaki Bay is accessible at all tides by their are various reefs off the coast. On the southern end of Wairanaki Bay, there is a large rock formation extending 15 metres into the sea. Through the middle of the site, a stream meanders between the hills and flows down to Wairanaki Bay. The flow of water varies depending on how much precipitation has occurred, but generally it is stagnant. Along the stream is located a small pond constantly filled with water, and the stream flows in and out of this pond.

Figure 5.5 (above): Site Location
Figure 5.6 (above): Contour map of site
Figure 5.7 (above): View from the eastern side of Motiti Island
Figure 5.8 (above): View from north-western side of Motiti Island
Figure 5.9 (above): View from western side of Motiti Island

Sections A-A: Marine Centre
Sections B-B: Marine Centre
Sections C-C: Marine Centre
5.2.3 Site Visit
5.3 Function

5.3.1 Hub

There will be three main areas that the hub will connect to. The first is the water access, this will be the primary entrance and will provide a gateway to visitors coming to the island. It is important to create a strong connection here. The second connection will be to the airstrip to cater to visitors coming by plane and the third connection links to the existing cluster of houses.

Figure 5.18: Diagram showing the theory behind creating a hub.

Figure 5.19: Diagram showing connection points to hub

Figure 5.20 (above): Diagram showing connection points to hub.

Key
- Proposed Site Location
- No Site
- Water Access
- Pathways showing connection between township, airstrip and water access

Proposed and existing site features

Central Hub

Pathways connecting new and existing features of the site.
5.3.2 Master Planning

The site has been broken down into four different zones according to their functional requirements. The site consists of four areas: marine center, visitor’s center, accommodation, and airstrip. The marine center and airstrip are anchored at each end of the side due to their physical requirements. The accommodation is located in the valley between the airstrip and visitor’s center. Having the accommodation in this location means it can share infrastructure with the main visitor’s center while also being close to the marine center which will allow short term workers to stay here. With the small population and quiet community locating the accommodation for visitors out of the main cluster of housing will not disturb the local dynamics of the area but will still be closely connected.

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**Figure 5.21 (above): Zone 1 - Marine Centre**

**Figure 5.22 (above): Zone 2 - Visitor Centre**

**Figure 5.23 (above): Zone 3 - Accommodation**

**Figure 5.24 (above): Zone 4 - Airstrip**

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...Pathway connecting both access points
5.3.3 Concepts

This section looks at the exploration of design ideas with relation to the context. It shows how the surrounding features connect to the hub.

Figure 5.26 (above): Diagram showing connections to hub

Figure 5.25 (above): Initial layout design

Figure 5.27 (above): Conceptual section showing possible connections through visitor centre to built-up areas

Figure 5.28 (above): Perspective showing from southern side showing the visitor centre

Figure 5.29 (above): Plan view showing section cut

Vehicle access to boat ramp

Pathways showing connection to airstrip, accommodation and exiting built-up areas

Vehicle access to boat ramp

Pathways showing connection to airstrip, accommodation and exiting built-up areas

Concept

Concept

Concept
5.4 Maori Concepts

A prominent design feature on a marae is the axis that passes through an entry threshold and runs to the wharenui. This axis and threshold that you pass through on arrival creates a strong gateway. Creating a gateway on Motiti Island is a key objective. This concept looks at how the traditional design principles can be applied to the hub on Motiti Island.
5.5 Reuse Concepts

Establishing techniques on how to intertwine the materiality, structure and identity of reused material in the architecture will be one of the key elements to engage the viewers and educate them on the disaster that occurred. Varying the scale of objects will be used to try create interesting elements.

Regardless of all the arguments surrounding whether the wreck should or even can be partially or fully removed, this viable scheme is based on reusing parts of the wreck that have already been removed from the shipwreck.

Figure 5.34 (above): Mv Rena with container cradle highlighted

Figure 5.35 (above): Plan showing container cradle in visitors center

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Reuse Concepts

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Figure 5.47 (above): Detail showing container roof
Conclusion

This thesis explored how architecture can be employed to help contribute to an area that was affected by a human disaster. It became apparent that devising a universal solution would be difficult because of the wide array of contextual conditions. This led to the focus on a specific event, the Rena disaster in the Bay of Plenty.

The design process began on the Astrolabe Reef where various options were explored on how to reuse the wreckage in a functional way that reinvigorated the area. Further research uncovered the reality that the main impacts of the disaster were the cultural and emotional damage it caused to the people on Motiti Island.

Through the exploration of design and theories from Lebbeus Woods, the proposal looked at how the disaster could reuse portions of the wreck as the catalyst to transform Motiti Island. Though providing improved access, additional accommodation, a new marine and a new visitors centre, it would create a place of economic and social stability.

On an architectural scale, the exploration of visitor's centre presented new ideas on how it is possible to reuse parts of the wreckage. Through the integration, functional approach and visual appeal of the wreckage material, the hope is that it can heal the emotional damage while creating a unique piece of architecture. In addition integrating small portions of Maori architecture into the design celebrated the culture that was damaged in the event. It is accepted that many of the impacts could not be addressed by architecture alone.

This design process demonstrated that the strategy developed was one of many possibilities but it is hoped that this proposal would contribute to the survival and rejuvenation of Motiti.
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Figure 4.12: Marine growth on the Rena shipwreck Reproduced from http://www.rasanproject.co.nz/new_img/vessel4.gif

Figure 4.13: Cross Section showing the structure of a ship hull Reproduced from http://www.shipstructure.org/

Figure 4.14: Detail showing container arrangement on a ship Reproduced from http://www.shipstructure.org/

Figure 4.15: Perspective section showing structure that supports containers Reproduced from http://www.shipstructure.org/

Figure 4.16: Diagram showing container loading pattern Reproduced from http://www.shipstructure.org/

Figure 4.17: Long section of a container ship the same dimensions as the Mv Rena Reproduced from http://www.electrician.com/webnews_image1.gif

Figure 4.18: Lebbeus Woods Radical Reconstruction Reproduced from Lebbeus Woods, Radical Reconstruction

Figure 4.19: Lebbeus Woods Scar Reproduced from Lebbeus Woods, Radical Reconstruction

Figure 4.20: Lebbeus Woods Radical Scab Reproduced from Lebbeus Woods, Radical Reconstruction

Figure 4.21: Lebbeus Woods Sketch Reproduced from Lebbeus Woods, Radical Reconstruction

Figure 4.22: Column used as sculpture in entrance of the museum Reproduced from http://www.dispatch.com/content/graphics2/2014/05/15/mgm-ggp3f0-tmp-11-museum.jpg?w=9987.jpg

Figure 5.1: Initial sketch showing dive platform concept on Astrolabe Reef

Figure 5.2: Concept look at how you could recreate the vision of the Rena positioned on the Astrolabe Reef. These structures would then become places for boats to tie up and explore the wreckage below

Figure 5.3: Proposed Access to Motiti Island

Figure 5.4: Site Location

Figure 5.5: Site Location

Figure 5.6: Contour map of site

Figure 5.7: View from the eastern side of Motiti Island

Figure 5.8: View from north west side of Motiti Island

Figure 5.9: View from north west side of Motiti Island

Figure 5.10: Diagram showing the theory behind creating a hub

Figure 5.11: Diagram showing connection points to hub

Figure 5.12: Pathways connecting new and existing features of the site

Figure 5.13: Zone 1 Marine Centre

Figure 5.14: Zone 2 Visitor Centre
Figure 5.23: Zone 3 - Accommodation

Figure 5.24: Zone 4 - Airstrip

Figure 5.25: Initial layout design

Figure 5.26: Zone 3 - Diagram showing connections to hub

Figure 5.27: Conceptual section showing possible connection through visitors center with change of levels

Figure 5.28: Perspective showing from southern side showing the visitors centre

Figure 5.29: Plan view showing section cut

Figure 5.30: Plan showing conceptual organisation of hub

Figure 5.31: Entrance to a marae showing the axis to the wharenui. Reproduced from http://www.naumaiplace.com/site/naumai/wharenui.jpg

Figure 5.32: Plan view shows the axis to the entry of the wharenui


Figure 5.33: Diagram showing how the axis could be replicated on Motiti Island to welcome visitors.

Figure 5.34: MV Rena with container cradle highlighted.

Figure 5.35: Plan showing container cradle in visitor center

Figure 5.36: Sketch showing perspective view of container cradle

Figure 5.37: Image showing the double skin hull of the MV Rena. Reproduced from http://img.scoop.co.nz/stories/images/1201/383d342fb5dd50792ade.jpeg

Figure 5.38: Cross section of the MV Rena hull

Figure 5.39: Plan showing placement of ship hull within the plan

Figure 5.40: Conceptual sketch showing integration of ship hull as facade

Figure 5.41: Cargo lid on deck of the MV Rena

Figure 5.42: Plan showing how the cargo lids could be retaining walls for the entrance

Figure 5.43: Sketch showing cargo lid as retaining wall for entrance

Figure 5.44: Exploring options how you can use portions of the double skin hull to form the access path to the jetty.

Figure 5.45: Image showing the double skin hull of the MV Rena

Figure 5.46: Using the top panel of containers joined together to form the roof

Figure 5.47: Detail showing container roof
9.0

Appendix B

Final Presentation Drawings
Human disasters are a fact of life and can cause catastrophic results to the environment and society. Minimising and preventing these disasters is the best course of action, but in reality, humans make mistakes. We are left with the consequences and the issue of how to deal with them.

This project focuses on how architecture can positively contribute to an area that has been affected by a human disaster. The Bay of Plenty suffered from a human disaster when the MV Rena ran aground on 5 October 2011. This project will look at the negative impacts of the disaster and, through this example, discuss how architecture might rehabilitate, reinvest and positively contribute to an affected area.