THE GATEWAY TO THE SOUTH

Enhancing Connectivity between Port and Town

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‘UNLESS OTHERWISE NOTED, ALL ILLUSTRATIONS ARE THE AUTHOR’S

A 120-POINT THESIS SUBMITTED TO THE VICTORIA UNIVERSITY OF WELLINGTON IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE DEGREE OF MASTER OF ARCHITECTURE
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2015.

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ACKNOWLEDGEMENT

I would like to firstly thank my supervisor Chris, it was your guidance and support that allowed me to complete the project. Secondly I would like to thank my family and my friends for ensuring me that I could make it to the finish line. Lastly to my arci friends, you kept me sane and always made me laugh with quality banter, I couldn't have made it without you and I am honored to have shared my journey with my friends.

Figure 1: Overview of the Marlborough Sounds

Figure 2: Overview of Picton

ABSTRACT

This thesis explores how issues that have arisen from large scale ferry ports and industrial developments have resulted in disrupting the connectivity to neighbouring townships. It proposes a novel architecturally resolved terminal and ferry port, with a speculative siting in Picton to re-establish a relationship between port and township through connectivity and synergy.

Rapid change, growth and master planning within the ferry industry all play a vital role in anticipating land and infrastructural needs. A key interface between a ro-ro (roll-on roll-off) vessel and the shore is essential to ensure optimum traffic flow for fast operation. Due the ferry’s ro-ro service of transporting and carrying vehicles it is common for the main highways to and from the port to bypass a neighbouring township, resulting in fewer tourists visiting the neighbouring town centre. Railway tracks also play a similar role in creating boundaries of segregation between the port and town. In towns where the port is disproportionately large in relation to township, such as Dover in South-East England, Ballygillane, Rosslare Ireland and Picton New Zealand, infrastructural pressures have resulted in an imbalance in hierarchy between the ferry port and the township. It is important to re-establish a relationship between ferry ports and their neighbouring towns to rehabilitate the small township to ensure its place for future use.

The thesis investigates architecture’s role in reconciling a large scale ferry terminal with a small township. It asks how architecture, urban design and infrastructure can be applied to a township to enforce connectivity between ferry port and town. This thesis explores the question by proposing a case study design in Picton New Zealand. The relationship that ro-ro ferry terminals have to their local context is impeded by train tracks, rail yards, car parking and marshalling yards. To analyse this large land-use component, the design uses three key functioning scales; Urban,

Infrastructure and Architectural.

i) Urban: The Urban Design reinforces the connection of the land to the sea. This was achieved by excavating a large portion of reclaimed land. This acknowledges the towns past and history, both topographically and culturally. This was developed into a new marina, bringing the sea edge closer to the township acting as a connection to the terminal and port.

(ii) Infrastructure: Functionality and layout is critical, Port infrastructure layouts were studied to determine the most beneficial arrangement. The rail marshalling yards were pushed away from the town centre to eliminate segregation of the township, and the vehicle stacking yards were moved closer to the town to encourage movement between the town and port.

(iii) Architectural : The architectural design of the Ferry Terminal uses inspiration from historic narratives and case study analysis from iconic ferry terminals around the world such as Naoshima ferry terminal, White Bay Cruise terminal and Vancouver Cruise terminal. The architectural scale also consists of three other key design elements that enhance the journey from terminal to town a drawbridge, a designed town edge and a redevelopment of the Edwin fox museum. These three structures are positioned on key pathways for community and social interaction.

The three scales above identify individual key drivers of each scale in the design. The thesis argues that the introduction of a “new” ferry terminal coupled with a new urban design framework could improve connectivity between the ferry and the township transforming Picton into a more dynamic, economically viable township.

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Figure 3: Photograph of Picton Harbour

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1. INTRODUCTION

Rapid change, growth and master planning within the ferry industry all play a vital role in anticipating land and infrastructural needs. Optimisation of the interface between a ro-ro vessel and the shore is essential to ensure optimum traffic flow for fast operation. This globally expanding fast-paced business is modernising slowly over time to compete with population and freight growth. Due to a ferry ports autonomous authority, coupled with its size and infrastructural needs, they often develop without much consideration of connecting to the neighbouring town. For most port townships, public interaction stops where the port infrastructure begins due to its progressive expansion. As a result, the spatial hierarchy of waterfront edge has become imbalanced. This thesis questions how the design of the ferry ports industrial zones and terminal can be improved to create better connections and relationships between a ports industrial zones and the neighbouring town. To develop this idea the methods and works of Bill Hillier, Gordon Cullen, Charles Waldheim, Kevin Lynch, Charles Jencks and Will Jones are investigated. These are used to analyse and develop the ferry port/ township relationship focusing on connectivity, integration, visual experience and accessibility.

Problem Statement

This thesis explores how large scale ferry ports and associated industrial developments have disrupted the connectivity between port and town. It proposes a novel architecturally resolved terminal and ferry port, speculatively sited in Picton. The design case study re-establishes a relationship between port and township by creating a journey to and from the terminal.

Research/ Design Intentions (Aims and Objectives)

The aim of this thesis is to explore the connectivity between ferry ports and their neighbouring towns. The project responds to the predicament of a port's ever expanding industrial area and its lack of connection to local urban fabric. The thesis proposes an urban scale master-plan complemented by four architectural interventions; a designed edge along a developed marina consisting of hotels, retail and townhouses, a drawbridge linking the town to the port via the water's edge, a re-design of the Edwin Fox boat shed and museum and a ferry terminal that acts as the gateway. All these aspects combined make a journey that enhance the link between the port and the town by emphasising the pathways and circulation of spaces together addressing the industrial, urban and the civic needs simultaneously.

The thesis argues that these developments when applied to a ferry port township will enhance access and connections allowing people to easily move between town and port. This improvement will enhance the atmosphere of the town and allow it to once thrive again.

Design approach

The design case study uses three scales Urban, Infrastructure and Architectural.

- (i) Urban: Uses the urban fabric to reinforce the connections between the port and town. The urban framework will also link to the ports infrastructure to allow a seamless connection to be created amongst all zones. This zone focuses on using natural elements combined with architectural and activity nodes to develop connections.
- (ii) Infrastructure: Determines the most practical layout, size and position of the marshalling and stacking yards in relation to accessing the town centre and the terminal.
- (iii) Architectural: The buildings and the structures added to the urban environment completes the journey to/from the town. A built edge developed will allow a link from the town to the terminal using “conventional” architecture. Most of these buildings and structures are inspired from the historic narratives of the port township.

The thesis argues by using all three of these scales connectivity can be achieved allowing terminal, ferry port and township to connect and interact with one another.

The scope of the design research encompasses urban design, infrastructure development, waterfront design and architectural planning. As the thesis is design-led, the research will be carried out through design investigations.

- Case studies and Precedents on existing and proposed ferry ports terminals and waterfronts from around the world are a key component in developing and analysing trends and similarities between the port and town relationship.
- Informative mapping and diagramming will be a key medium. Mapping and diagramming the ports context is essential to understand the systems and operations of each port such as vehicle, train and passenger movement. This step is essential in understanding how a terminal can be developed in any site context.
- Historical research is used to develop inspiration for architectural and urban design applications.
- Hand drawings of building concepts, site analysis, and layout of the marshalling and stacking yards.
- Physical model investigations, used to develop architectural forms and plans.
- Digital 3d modelling will allow the project to become more precise and manipulated digitally.

These are the key methods of the design approach. These methods will follow a iterative process of development and redesign.

Why Picton?

Due to New Zealand’s urban population growth and increase in freight since the late 1990’s, there has been a desperate need for the expansion of the ferry port and its industrial yard. The ferry is seen as essential to the development and presence of Picton, but the ferry port’s expanding development has disrupted the connectivity and synergy between the urban and the industrial scales. Picton relies on the business of the ferries and the cruise ships to boost the local economy. In 2011 the New Zealand government proposed that the southern ferry port of the Cook Strait voyage located in Picton at the top of the South Island was to be relocated to Clifford Bay (Ministry of Transport). Clifford bay is 55kms south of the current terminal and located down the east coast of the South Island positioned between Kaikoura and Blenheim. Fortunately this relocation of the ferry and port operations proved to be too large, a task with an estimated cost of \$525 million (Brownlee, 1). This has left the opportunity for this small port township to develop and reflect its iconic landscape. However the reflection of the iconic landscape has been lost and stops where the port infrastructure begins. Picton’s ferry port infrastructure has slowly expanded over the years and has gradually outweighed the town’s urban character, particularly around the water’s edge.

RESEARCH PROCESS DIAGRAM

The research methodology is represented in the form of a flow diagram. The main method was research led design with sub regions comprising in historical, conceptual and iterative physical modelling and programmatic digital investigation. The case studies and precedent investigations of the Port and the terminal were used to develop architectural and urban design principals that lead to the development of the Final Design.

2. CONNECTIVITY

“One building standing alone is experienced as a work of architecture, but bring six buildings together, and several things begin to happen in the group, which would be impossible for an isolated building. Around street corners buildings surprise, a notion that would not occur if there was only a singular building. In the group there is a building that does not conform to the rest. This building is recognised to be of importance to the community. By itself the buildings detail, colour and size is evident. But put the building back into the group and the buildings scale and size immediately stands out from the other buildings.”

Gordon Cullen, *The Concise Townscape*, page 7.

Transport routes and town placement

Figure 5: Authors sketch of Picton of key transport routes.

2.1.

WATERFRONT, TOWN, FERRY PORT AND INFRASTRUCTURE

In the text “The Concise Townscape” by Gordon Cullen, he discusses that an isolated building is not as strong as if it was in a group of buildings. That the key focal building will create a bigger impact in a group than individually. This theory applies to a ferry terminal as they are often isolated buildings on the water’s edge surrounded by large infrastructure. For a ferry terminal to be connected to its neighbouring township a group of buildings and structures need to be designed to generate a connection. These will create a series of viewpoints and interactions throughout the journey to the terminal. For the buildings to create a journey, pathways need to be developed to apply the buildings to. These pathways will be designed following Gordons Cullen’s theory of Serial vision. Serial vision can be described as, when you walk to a destination you navigate through a towns streets turning corners, walking through parks and following curving roads (Figure 6). In this journey the scenery of the town is released one by one in a series of jerks and surprises (Cullen 9). Serial Vision uses the contrast of the town, the urban, and the architecture to manipulate the emotions of the user. When the three elements align they evoke visual memories and experiences that allow the town to come alive in a powerful juxtaposition (Cullen 9). Serial Vision can be split into two elements, the existing view and the emerging view (Cullen 9). The existing and the emerging view work together in a sequence of events along a journey. It is this juxtaposition between spaces that makes the journey an enjoyable memorable experience.

For Cullen’s theory of Serial Vision to be applied to a port township, key design elements need to be identified. These elements are waterfront, town, ferry port and terminal (Figure 7). In a lot of current port townships these design elements act individually. But by using Cullen’s theories to create pathways and view ports, they are to become stronger and develop a relationship to the site and surrounding context. The development of the waterfront, town, ferry port and terminal have all been recognised as the main design drivers to create connectivity between the port and the township.

Figure 6: Diagram explaining view ports and serial vision.

Figure 7: Key design elements. The extra architectural buildings are associated with the town and Waterfront.

Figure 8: Looking towards Picton's town centre, from on board the Interislander ferry.

D.1.

PRELIMINARY SKETCHES

After selecting Picton as the design case study, brief preliminary design sketches and site analysis were developed. The first of these were a set of small abstractions. These abstractions explore the disconnection between the port and the town. In (Figure 9) the raised areas that extended out of the map are core walls stopping access to occur throughout the town. These raised walls create a large negative space between the top of the town centre and the ports infrastructure. Figure 11 is a small design exercise sketched

over photographs of Picton. These drawings are helpful as they have allowed the initial design response to be recorded before studying other port townships around the world. These initial site sketches allowed a simple brief understanding of the town's layout.

Figure 9: Defining the existing barriers

Figure 10: Establishing the waters edge

Figure 11: Boardwalk, edwin fox development and terminal extention

Zone 1

INFRASTRUCTURE

Figure 1-2 Looking out over the rail marshalling yards

3. PORTS

3.1

THE PORT-CITY-WATERFRONT INTERFACE

Port cities and port townships have always been iconic infrastructural nodes in transportation. But as freight demand increased over time the port industry had to evolve its infrastructure and its methods of operation. This development of the ports technology and functionality meant that it no longer needed to rely on the city's economy like it had in the past, therefore resulting in ports and cities growing apart economically and geographically (Hoyle 430). There are several factors that have resulted in this occurring, some include the evolution of maritime technology such as roll-on roll-off handling methods, container terminals and bulk cargo facilities (Hoyle 430). These new developments meant that ports now needed larger land space requirements and saw them expanding autonomously from their neighbouring city. Which led to spatial and functional segregation between the city and the port, resulting in a disconnection between the city and the waterfront (Wiegman 576).

Figure 14: Hoyle's diagram- Zone of conflict

For the connection of the port and the city interface to be developed, problems and design factors have to be identified. Brian Hoyle developed a diagram that shows how the factors of the city and the port interject with one another (Figure 14). The diagram looks at function and spatial relationships of the port, town and waterfront. In the centre of the circle it shows the zone where the port/ city's core zone used to be. This is to be compared to the zone where the port is now. This diagram references the spaces in between referred to as the "the Zone of conflict". This space is caused by the port either expanding towards or away from the city creating a zone that has different types of land use (Figure 15) (Wiegman 581).

Figure 15: Stages of port movement away from township. Based on Wiegman's diagram from Norcliffe.

In many cities the withdrawal of port activities from the waterfront (Port expanding away from the city) allowed free space to open up along the water's edge (Hoare 129). This presented development opportunities for the waterfront such as housing, heritage, sports, recreation, tourism and green space (Hoare 129). An example of this development is the Canary Wharf Project in London designed by Skidmore, Owings and Merrill (SOM) (Figure 16). The project began in 1988 and is estimated to be fully completed in 2025. This development of old dock land has allowed the city's architecture to carefully jump towards the waterfront energizing the old port. Another large similar development is Battery Park in Manhattan. The idea for the Battery Park was inspired by the crash of 20 ports along the water's edge of the Hudson River (Meghna). The design is built above the old piers and saw the introduction of a small "city" like waterfront development (Figure 17). This new urban development was designed to reconnect the neighbourhood to the waterfront allowing continuous public accessibility along the water's edge. One of the smaller piers next to the historic Battery Park has a ferry terminal that is used for visits to the Statue of Liberty (Meghna).

These two examples have proved that by developing, either old port land or the intervening spaces into an urban waterfront, benefits the city's vibrancy, economy and connections to, through and from the city.

Figure 16: Diagrams of Before and after Urban development of Canary Wharf.

Figure 17: Diagrams of Before and after Urban development of Battery Park.

WAITOHI WHARF
ACCESS ROAD
LAGOON
TOWN CENTRE

Figure 18: Photograph of Picton in early 1950's

3.2.

PICTON TOWN AND PORT

Port townships and port cities share similar traits where port expansion is usually developed away from the town centre. Due to the location of Picton's port it developed inland, towards the town centre rather than away from the town centre. It was in the 1950's when the port showed the development of expanding inland, it consisted of one large wharf (Waitohi Wharf) and was positioned facing away from the township. A large lagoon separated the majority of the port and the town, the only connection being an access road (Figure 18).

Over time port expansion and town developments have resulted in the port invading the urban environment, disregarding its connections to the township. Along with the ports infrastructure growth into the urban landscape it has also created a boundary along its edge blocking connections off to the waterfront. This has created a "zone of conflict" between the port the terminal and the city (Figure 19).

In this zone of conflict there are a number of factors causing minimal through-movement to occur, these are; the positioning of the railway lines and marshalling yards, arterial roads diverting traffic away from the township, road layout, lack of clear pedestrian pathways and retail shops, excessive amount of unused car parking, fencing and the lack of response to the public (Figure 20). This zone is important due to it being the entry point of walk off passengers from the interislander terminal into Picton. They leave the terminal feeling confused and unsure of where to go and how to get to the town centre. All these factors need to be resolved to eliminate the "zone of conflict".

Figure 19: Diagram of the ports infrastructure moving towards Pictons township. Authors interpretation Based on Wiegman's diagram from Norcliffe.

Figure 20: Image of Picton Currently, with the zone of conflict highlighted.

3.3.

PORT CASE STUDY

Port observations detected a problem with ports and their connectivity to their townships. A port study will be completed to see if ports around the world share the same/ similar problems. A diverse range of port cities and port townships have been selected from the developed categories below:

- Small port with roll- on roll- off port facilities
- Roll-on roll-off facilities for freight/ passenger vehicles
- Cruise Ship facilities (passenger)
- Freight or cargo ports
- Large scale port with roll-on roll-off handling methods.
- Passenger Terminal

In total forty five ports were initially collected (Figure 21). The ports selected were then analysed on a series of factors to identify problems and successes in the connections between their town and port. This meant that mapping each port was necessary to allow for an accurate understanding of the layout of the port and its relationship to its surroundings. To analyse the interactions between the port, township and waterfront a series of key elements were identified to be mapped. These elements were derived from the problems and connections identified from Hoyle, Wiegman and the design case study Picton.

These key elements were used to eliminate nine ports from the initial forty five that did not meet the criteria. Thirty six ports were entirely mapped identifying the placement and connections of the key elements

Key Elements

- Green Space
- Port area (infrastructure)
- Car parking
- Stacking yards
- Railway yards
- Terminal
- Town centre
- Arterial roads
- Connector roads

Figure 21 : World map showing the different categories of Ports around the world that were collated for port analysis.

Lyttleton, Christchurch New Zealand

Troon, Larn Scotland

Ardrossan, Larn Scotland

Burnie, Tasmania

Genoa Port, Italy

Port Askaig, Scotland United Kingdom

Tobermory, Ontario Canada

Avon De Pedro, Buenos Aires (Port City)

Tallinn, Estonia

Aqaba, Jordan Israel

St Helier, Jersey United Kingdom

Hirtshalls, Denmark

Chikko, Tamano Japan

Kraljevica, Croatia

Cairns, Queensland Australia

Figure 22 : Maps of Ferry ports around the World.

1:20000
N

Larvik, Norway

Barcelona Port

Santa Cruz, De Tenerife Spain

Algeciras, Gibraltar Spain

Ceuta, Spain

Port Phillip, Victoria Australia

Santa Cruz de la Palma, Spain

Port Chalmers, Otago, New Zealand

(Celtic Link Ferries) Rosslare, Ireland

Juneau, Alaska United States

Naoshima, Japan (Sanaa terminal)

Ystad, Sweden (Rail)

44. Picton, Marlborough New Zealand

Hakodate, Japan

Oslo, Norway

Key								

Figure 23 : Maps of Ferry ports around the World.

1:20000
N ↑

Roscoff, France

Cherbourg, France

Pembroke, Wales United Kingdom

Holyhead, Wales United Kingdom

Wellington, New Zealand

Takamatsu, Japan

Key

Green Space

Port Area

Carparks

Stacking yards

Railway lines

Terminal

Town Centre

Arterial Roads

Connector roads

1:20000

PORT CASE STUDY PROCESS

45 Ports Collected

36 mapped in detail

3.4.

PORT CATEGORIES

From analysing the thirty six ports a series of trends were noticed throughout the study. These trends were key structures that either aided or diminished the connections between port and town. The key trends were then developed into six main categories.

- A. Main Arterial transport routes separate Town/ Suburb to Port.
(Barriers to movement)
- B. Railway positioned on edge of Port
- C. Public waterfront.
- D. Proximity of Town Centre to port.
- E. Connectivity - roads/ pathways that allow movement into the port. (Gordon Cullen's theory of Serial Vision)
- F. Architecture as Mediator

These categories developed will help to direct the design decision into identifying how/what to advance, for connectivity to occur between port and town. Each category derived from the port case study was then developed into examples of the “right and wrong” way for connectivity to be achieved for the category. These examples of the “right and wrong” are based solely on the individual category and have not been combined with the remainder of the results.

A.

THE ARTERIALS (Barriers to movement)

Based off Gordon Cullens theory of serial vision

From the port case studies analysed, nine ports all have main arterial roads that are positioned in ways that they eliminate connections to the waterfront from the port and the town centre. A similar trend identified is the placement of the arterial roads. They have often occurred splitting the land uses into thirds, resulting in industrial, residential and retail (towncentre) zones. These zones are then complemented by the lack of collector roads going towards and in-between the waterfront and the port. In case study Hakodate Japan there is a smaller scale arterial road that services the port and industrial services, but its position creates a “barrier” enclosing the port against the water’s edge disregarding its connections to the town.

Figure 26 : Port case studies showing Arterial routes.

✗ Lack of through movement and access between port and Town.

✓ The input of applying strategic through movement to the arterial road has allowed the Port and town become moreconnected.

Figure 27 : Arterial Route positive and negative design Solutions.

B.

RAIL SEGREGATION

(Barriers to movement)

The rail freight network is not as widely used today, as in the past, due to the increase in road freight has made rail transport untenable. In larger Port cities rail is most commonly used for passenger rail transport, allowing fast and easy commuting into the city from outer suburbs. It is rare to see in larger newer ports rail being shunted onto ro-ro ferries, this is more common in smaller older ferry port operations.

In the case studies there were eight port cities/ townships, that rail was positioned on the inner edge of the Port disconnecting it from the town centre. A common trend that was discovered was that the rail often crossed the arterial road in front of the port area. This meant that congestion would occur when the train would be leaving/arriving into port. A secondary trend was the rail tracks often crossed near connecting streets to the port area creating a backlog of traffic. A solution for these would be allowing the rail to cross the road before it is in the vicinity of the port area. This would allow easier movement from the town to the port, eliminating the backlog of traffic that occurs when a ro-ro ferry docks.

Figure 28 : Port case studies showing rail segregation.

✗ Rail can Create congestion points in key places on access roads. It also limits through movement.

✓ By relocating the point where the rail crosses the road further away from the ports entry and exit creates less congestion.

Figure 29 : Positive and negative design solutions.

C. PUBLIC WATERFRONT PLACEMENT

Urban Public Waterfront rejuvenation is common amongst most seaside towns or cities where old industrial land is developed for public use, enhancing public interaction. This is not so commonly seen near working or current port facilities. This observation was noticed from the port study completed. Out of the thirty-six ports, there were only seven of them that had an urban public waterfront. Although there were such a low number of case studies with waterfronts, a large percentage of the case studies had empty land in-between the port and township that could be developed into a public waterfront area. This development would not only profit the city it would also benefit the residents and public interaction. The development of an urban public waterfront will enhance the connection between port towns providing an interactive space for the public to enjoy.

Figure 30 : Port case studies showing public waterfronts.

Figure 31 : Positive and negative design solutions.

D. PROXIMITY OF PORT (Walkability)

The positioning of the port in relation to the town centre over the years have slowly drifted apart. In most of the smaller ports analysed the township is built around the port, as they often rely on the business and wealth of the industry to develop the towns economy. This heavy importance applied to the port from the town has seen some port townships growth to be sprawled around the outer edge of the port centralizing it. This can be seen in three of the case studies, Lyttleton, Christchurch New Zealand, Tobermory, Ontario Canada and Santa Cruz de la Palma, Spain. These three port townships have integrated the port into the township by allowing for different types of connections to occur between the two key nodes the port and the town centre. These connections can be seen as pathways or journeys, to and from the port to the town centre allowing passengers to easily move/ walk form port to town and vice versa.

This observation will help with the development in designing pathways to and from the terminal, waterfront and the marshalling yards.

Figure 32 : Port case studies showing location of port and town.

Figure 33 : Positive and negative design solutions.

E. CONNECTIVITY

Roads, views and connections.
(Gordon Cullen's theory of Serial Vision)

Gordon Cullen's theory of Serial Vision uses the method of field of sight. It uses the placement of buildings and roads to create a sequence of views to draw you into a space. The technique "Field of vision" was applied to each port case study to see if the port was visible from the township or the main arterial routes. In the port case studies there were eight ports that showed some signs of a visual connection to the port. A trend in these case studies showed that, even though the eight port townships allowed a view, the range would usually only include either the port or the township. It was rare to be able to see both the township and the port at the same time. These sight views may be blocked by landscaping, building placement and size and or road layout. This can create a lot of tourists and visitors driving towards the port/ferry to bypass the town completely. To enforce connectivity via sight, the roads and placement of buildings are to be used to develop views of both the port and townships in most areas.

Figure 34 : Port case studies showing sight lines.

Figure 35 : Positive and negative design solutions.

F. ARCHITECTURE AS MEDIATOR

The placement of the Ferry terminal is to be positioned in a way that it reaches out towards the town, allowing the architecture to act as a mediator between the two nodes. The terminal utilizes its location on the water's edge to shift the infrastructure of the port into a more public space. The buildings positioned between the port and the town interlock the modes of connectivity together allowing people to use the "zone of conflict" space, therefore eliminating the "zone of conflict".

In the port case studies their four key ports, that the terminal created a link towards the town or city centre. A trend among these terminals were that they were positioned in a way that they were connected to the landscape and the town.

The majority of the Port case Studies have land close to the port area that is underutilized, this land would be better used for a waterfront development taking advantage of the seaside land.

Figure 36: Port case studies showing terminal placement and open space.

Figure 37 : Positive and negative design solutions.

By analysing the port case studies and the category study, the six categories have been divided into two separate groups “problematic qualities” and “opportunities”. These two group’s helped to identify the key problems and differences in the spatial layout.

Problematic Qualities

- A. Arterial Roads
- B. Rail Segregating Port and Town
- C. Public Waterfront
- D. Proximity of Port

Opportunities

- E. Connectivity
- F. Architecture as Mediator

These categories were then applied to the design case study Picton to see how the research findings could influence the port and town layout. This mini design exercise helped to inform an iterative design process.

D.2.

PORT ANALYSIS APPLIED TO PICTON

This design exercise uses the results from the port case study analysis, by applying the findings to Picton in the six different categories, using mapping.

Figure 38 : Current Picton 1:12000

A. Arterials

- SH1 rerouted
- More land available for the town centre to spread outwards towards the terminal.
- New placement of the arterial roads, reduces rail crossing the road and dangerous intersections.

Figure 39

B. Rail segregation

- Marshalling yards and stacking yards moved closer to the western side.
- Town centre enlarged
- More room for industrial buildings or the town centre to be developed closer to the waterfront.

Figure 40

Figure 41 : Current Picton 1:12000

C. Waterfront

- marshalling yards are pushed out of the sight from the town centre.
- Green way applied to add to the walkability of the town.
- The second terminal is moved closer to the town.
- shared stacking yards.

Figure 42.

D. Proximity Port-Town

- Adding walkways and small pathways through the town.
- Pedestrian overbridge, to allow for safer movement over the marshalling yards
- Both terminals in easy walking distance to town centre.

Figure 43.

Figure 44 : Current Picton 1:12000

E. Connectivity

- Relocating arterial roads to allow view shafts of the port and town from SH1.
- The terminal is situated/angled to face the town centre.
- More natural curved roads.

Figure 45.

F. Architecture as Mediator

- Moved Port to a neighbouring bay.
- Allowed the waterfront area to expand.
- Rail marshalling yards kept back.
- Room for a new terminal and buildings to be built between port and town.

Figure 46.

D.2.
DESIGN PROPOSAL 1.

The best design proposals from each category were combined and then applied to Picton in the first masterplan design proposal. This masterplan lead to the development of an Urban design Framework, that allows the design specifications to be narrowed.

Figure 47 : Current Picton 1:12000

Figure 48 : First Design Proposal 1:12000

This proposal has introduced a link from the top of the town centre, onto the main arterial route leading to the terminal. The waterfront is extended towards the town. The Rail marshalling yards are moved away from the town, to open up a larger area for the vehicle stacking yards.

Figure 49 : Zoomed in view of the new buildings, and connections.

Figure 50 : Rail moved away from the towns active edge.

Figure 51: Photograph of Pictons edge of town.

Zone 2
URBAN

4. URBAN DESIGN FRAMEWORK

This application of the categories will address the zone of conflict and connections between the port, township and waterfront. An overall design analysis from the port case study framework has been developed by considering the final outcomes from the first masterplan design concept. The design framework is used to guide the design of the masterplan and to evaluate the scheme at the end of the design process. Each development is labelled 1-5 and shows the key features of the design to be developed.

Figure 52 : Zoomed in image of the key Framework area.

1. **Develop main arterial roads**
 - Wider, Safer, New intersections and or roundabouts added.
2. **Relocate Terminal**
 - Terminal to be part of the urban setting.
 - Both Terminals in one place
3. **Reconnect the sea to the Town, Vice Versa**
 - Waterfront developments
4. **Relocate Port Operations**
 - (Out of sight / out of mind)
 - (Easier to negotiate)
5. **Enhance walkability across the Town centre**
 - Through Movement

Figure 53 : Framework diagrammed on top of Picton map. 1:13000

Picton waterfront and harbour

4.0. WATERFRONT

4.1

IDENTITY WITHIN THE WATERFRONT

In the urban city and town center's the success to quality of life is commonly associated with public spaces, and has increasingly become accepted as a guarantee for success (Sijakovic 4). The importance of the role of water with public spaces helps improve the quality of life. Although the waterfront has historically been used mainly for the import and export of goods, the waterfront now provides opportunities to create an environment that reflects the city or town's culture and society (Marshall). Land reclamation in waterfront and port design has been used since the early 1970's to develop and enhance new pieces of the water's edge, to improve urban vitality and provide much needed open space in larger port cities (Sijakovic 4). An example of a large scale land reclamation is at Rotterdam Port in the Netherlands (Figure 55). By being able to expand the size of the port via reclaiming land has enabled the revitalization of Rotterdam's City Centre. Expanding the ports infrastructure towards the water allows the ports operations to move outwards allowing the waterfront zone (once a zone of conflict), to seamlessly infuse and connect the city to the port allowing no distinction to occur between these once three distinct zones. This development regenerated the port city creating an integrated urban-scale project targeted towards enhancing the identity of the port city (Giovianazzi 60). This development along the water's edge freed the space for regeneration and expansion of the waterfront area, resulting in a seamless connection between the working port and the city centre, redefining the relationship of the urban fabric (Giovianazzi 60).

Rotterdam Port

Rotterdam Port, Land Reclamation Expansion

Figure 55: Rotterdam Port expansion comparison.

Urban waterfront developments have helped the water's edge to be more integrated with port and city life. In some cases an urban waterfront development is used to reconstruct old dockland into a new extension of a city or town. For example these urban waterfront developments "Liverpool Waters" and "Wirral Waters" (Figure 56), are a scheme that proposes to completely transform 60 hectares of Liverpool's historic dockland into a mixed use waterfront development revitalizing the water's edge and the central city (Figure 57). The project allows the regeneration of the historic port, preserving its maritime legacy but allowing the space to be utilized by the public (Giovianazzi 60). Wirral Waters, the sister project to Liverpool waters, uses the history of the site to create a dynamic future focused development. The majority of the site is covered in water, so instead of reclaiming land, the scheme uses floating developments to create more land for urban expansion (Figure 58). This development uses the visual contrast of water with pedestrian pathways allowing a dynamic presence that connects the sea to land. It is this design decision that has enhanced the scheme creating connections with the city. Without the floating land developments the space doesn't look complete and some of the key connections to the site are lost (Figure 59).

Figure 56: Overview of both of the schemes, from Peel Group

Figure 58: Wirral Waters scheme with floating footpaths and spaces for activities on the water, From Peel Group.

These waterfront development projects communicate to both the future and the past. They focus on the future by providing dynamic opportunities for the central city to reconnect with the water's edge (Marshall), and to the past by respecting the city's heritage. These waterfront regeneration projects represent an extraordinary opportunity of cohesion and allow the "stitching" of several zones together, recreating the relationship between spaces social and physical connections (Giovianazzi 64).

"If the city port is the expression of change - a change in practical terms translates into methods and tools of city planning, architecture, innovation and modern technologies - on the other it is a place where memory is preserved and the historical legacy is protected." (Giovianazzi 58)

Figure 57: Render of the water's scheme from, Peel Group.

4.2.

NEW WATERFRONT FOR PICTON

Although the design case study Picton, already has a large waterfront development between the port and the town centre, the space is underutilised and out-dated (Figure 60). The mini-golf course, pond and car parking take up the majority of the park, reducing the size of the waterfront area. Large areas of open space and grass are a valuable asset of the foreshore, are used for activities and events (Figure 61). This open space is welcome on the waterfront, although walkability throughout the space is difficult and could be improved. The lack of pathways make it hard to navigate through the spaces (Figure 62). This means that sections of the foreshore are limited seasonally. In the winter, the large areas of grass are often too wet and muddy to cross resulting in difficulty to navigate sections of the waterfront. Currently the water's edge is only interactive along one small portion of the main waterfront (Figure 63). This is due to the other attractions along the water's edge and the port taking up the remainder of the waterfront.

Figure 60: Photographs of Pictons current waterfront and foreshore.

● Open Space Area

1:1000 Picton waterfront ↑

Figure 61: Picton Waterfront open space plan.

● Footpaths

1:1000 Picton waterfront ↑

Figure 62: Picton waterfront and foreshore accessibility : Walkability

● Water access (beach)

● Water access from wharf by waterfront

1:1000 Picton waterfront ↑

Figure 63: Picton waterfront, water access

Figure 64: Photos of London Quay marina in Picton.

Picton’s London quay marina located beside the town centre was developed in 2012 to rejuvenate the town’s main marina and atmosphere. The development reflects notions of Picton’s heritage, character and culture through the use of materiality, layout and atmosphere (Figure 64). The design of the landscape and marina is simple and allows people to explore the space easily all year round, while still providing enough open green spaces for public activity. The space has been developed to welcome “through” movement from the water to the town for both vehicles and pedestrians (Figure 65).

The foreshore however lacks the above qualities that the London quay possesses. This may be because of the ports infrastructure developing towards the town rather than away from it, resulting in the waterfront to become a “zone of conflict”. The current waterfront holds historic values and meaning to Picton, but the character and connections of the waterfront need to be enhanced. By developing the waterfront (foreshore) it will connect all the key elements of the design proposal together allowing connectivity to occur along all pathways. The strategy to develop the waterfront will be focusing on strengthening the connectivity between the port the town centre and the water, while using similar design influences from the already developed London Quay marina.

Figure 65: London Quay marina in Picton.

4.3. WATERFRONT MARINA

The Marlborough District Council's "Picton Foreshore Reserve Management Plan" was addressed for developing the waterfront. By reading this plan it allowed me to have an outlook on what the council wants from the waterfront and future prospects for Picton. With this plan in mind and the information gathered from the port and waterfront precedent case studies (Rotterdam Port, Liverpool Waters and Wirral Waters), the proposed urban design framework has contributed to the development of a series of key principals for the design of the waterfront.

4.4. WATERFRONT PRINCIPALS

A. Connectivity

- Provide multiple pathways, access routes, to move through and around the waterfront easily. A key link is connecting the waterfront with the terminal/ port, whether it be a visual or physical connection.

B. Integration

- The waterfront should be perceived as an integral part of the existing town, contributing to the towns overall vitality. To successfully integrate the waterfront with the town and port would be seen as combining all aspects into one integral whole.

C. Link to Water

- Incorporate water into the design of the park. This will link the town with the water, enhancing the experience of the waterfront.

D. Heritage

- Pay tribute to the town's history by using it to inspire or develop pieces of the waterfront, will commemorate history while expressing local identity.

E. Open Space

- Balanced open green space and paved areas will allow the site to feel open and accessible to the public, freeing up areas for activities and concerts, these spaces need to be balanced with accessibility.

F. Architecture (Built edge)

- The waterfront space should be vibrant and exciting. A place where all sorts of people can spend time play or relax. For the waterfront to be successful there needs to also be some small businesses on site or close to it. A mixed use development is best to allow the waterfront to be used for a variety of uses. This could include housing, cafes, restaurants, retail shops and or recreational activities such as movie theatres.

These waterfront Principals can be applied to any waterfront design. They are basic and broad design principals that I believe will regenerate any town and city.

After developing design concepts and experimenting with waterfront layout, I looked back through Pictons heritage to see if its culture and history could drive a design for the waterfront. It was apparent that Picton as a town is very orientated around the sea and the water, as it was founded due its location on the water’s edge and its unique landscape.

The town is known for its whaling history port operation and has forever been used for sailing, fishing and boating. The sea is such an integral part of Picton and it makes sense to allow the ocean to be integrated with the waterfront.

Figure 67: Word equation that maps the thought process of deciding to develop a Marina.

The development of an inland marina in Picton will provide amenity and value to the waterfront while also revitalizing the waterfront along Pictons foreshore. I believe the marina will provide value to Picton’s foreshore.

The marina will extend the size of the water’s edge and allow the waterfront and the sea to be integrated together. It will encourage more locals and tourists to explore the waterfront where they can launch kayaks, canoes, dock and moor boats and enjoy the water’s edge. I believe that developing the marina is the finishing and final touch that brings the whole urban design scheme together. It draws the coastal line closer towards the town centre and invites tourists and locals to stroll along the many pathways around through and past the waterfront towards the town centre and the terminal.

4.5.

WATERFRONT MARINA PRECEDENTS

To incorporate the design of the marina into the urban scheme a series of precedents were researched to see how subtle connections can be developed throughout the design. The Marina precedents that were collected were based on the waterfront principals that developed for the design. These principals helped to analyse how the precedent waterfronts and marinas were integrated into their urban fabric. This focused on layout, wharf positioning /angle, water entry, waterfront integration and accessibility.

4.5.1.
Fukuoka Waterfront
Japan, 5+ Design

Fukuoka waterfront allows the placement of an internal marina to draw the water's edge closer to the city. The waterfront allows a distinct separation between the ferry port and the recreational marina to be achieved without discontinuing the waterfront. Open areas provide spaces for casual weekend markets and festivals. View shafts, link zones and pathways together, extending the city to the water's edge.

- View Shafts
- Green link between town
- Marina pulled in towards town

Figure 68: Fukuoka marina and accessibility patterns

4.5.2.
Clyde Key Wharf
Wellington, Athfield Architects

Clyde Key wharf uses the architecture on the waterfront as the main connection to the city. The marina is nestled below the wharf allowing the water to feel as though it is incorporated with the city.

- Main pathway along the waterfront
- Marina- waterfront- town connection
- Key Architecture piece linking the marina to waterfront

Figure 69: Clyde Key Wharf aerial maps, showing paths and connections

4.5.3.

Istanbul Seaport Turkey

The Istanbul seaport development has mostly been designed on reclaimed waterfront, allowing a fresh contemporary touch to the city. The development includes a cruise ship terminal, marina, yacht harbour and a mixed use building development located closer to the city. The design shows a sensitivity towards the city's past while celebrating its future. The curves of the marina create a cult-de-sack of activity along the water's edge. This scheme has not yet been built.

- Main pathway along the waterfront
- Marina inner cove

Figure 70: Maps showing proposed design for marina and waterfront in Istanbul.

4.5.4.

Key West's Truman Waterfront Key West, Florida

This large development is focused more on the placement of the open spaces that come associated with the waterfront rather than the design of the marina. Even though the marina is small the development includes a sloping ramp for launching boats and for swimming that protrudes itself into the land.

- Green Space
- Open space
- Marina inner cove

Figure 71: Map showing large amount of open and green space surrounding the marina.

4.6.

PORT AND ABROAD

The design decision to incorporate a marina into the scheme has made me realise just how under-appreciated waterfront developments can be in smaller port cities. The connections that we have with the land and the sea need to be returned to what they use to be; something that is important in large and small port cities. The process that has been used to enhance the waterfront in Picton can be applied to any port waterfront around the world.

D.3.

MARINA FORM EXPLORATION

Figure72: Marina experimentation

DESIGN PROPOSAL 2

The small marina exploration, is a quick design study at applying different layout configurations of the marina, against the plan. The shapes and sizes of these are derived from the boundaries and edges of the design framework. Chosen exploration “F”, although large in size almost mirrors the size of the carpark, but the marinas connections to the sea and the town is the most developed shape. The marina fits in well, due to its size, but looks as though it hinders the connection between the spaces rather than enhancing it. The town end of the marina is too large and almost looks as though it’s bulging over into the town centre.

This design experiment has showed that a marina is the right design choice to place on the waterfront, however the size and shape can be determined through the progression of the design framework.

Figure 73: Marina incorporated into plan.

Figure 74: Photograph of Pictou, Nova Scotia

5.0.
PICTON

5.1. PICKTON, PAST TO PRESENT

Picton was once one of New Zealand's main whaling stations. Its close proximity to the Marlborough sounds allowed easy access to look-out points across the open sea, bringing in whalers from around New Zealand, it is now the home to New Zealand's national whale centre, providing information on endangered species of whales. Picton is also home to the Edwin Fox museum, a ship that arrived in Picton in 1897 and has not left since. The ship had many uses from transporting immigrants to New Zealand from England, shipping convicts and sheep, but was most recently a freezer ship (Edwin Fox Society). The ship had laid derelict in Shakespeare bay for 12 years until 1965 when the Edwin Fox society started preservation on the ship (Edwin Fox Society). The vessel is now placed on a dry berth positioned on Picton's foreshore.

Picton has always been known for its marine agriculture and its connection to the Marlborough and Queen Charlotte sounds. But it is commonly most recognised for the Cook Strait ferry.

Figure76: Map showing the route the ferrys take, and the Mlifford bay proposal.

Figure77: Small photographs of sections of Picton.

Figure 78: panarama of Picton town and port.

5.2.

CLIFFORD BAY

In 2011, the New Zealand Government funded an investigation into the proposal of a new sea freight Ferry Terminal to be located at Clifford Bay (Ministry of Transport) (Figure 79). This new port would in turn replace the current Picton ferry port, making the journey from North to South Island no longer the iconic beautiful voyage it has been since 1875. The proposal for the ferry port relocation, would reduce travel time benefiting cost and freight (Figure 80). The relocation would benefit road freight travelling down the eastern side of the south island to Christchurch, as it is a more direct route. Although it would negatively impact on the top of the South Island as the traffic skips the Blenheim and Picton.

Without the ferry port Picton's township may not survive, resulting in Picton's township becoming a cul-de-sac of inactivity. The proposal was unsuccessful, due to cost restraints, resulting in Picton to continue being the southern end of the Cook Strait voyage for at least the next 30 years.

Figure 79: Ferry Paths.

Figure 80: Faster route to Christchurch.

5.3.

THE GATEWAY

The lack of connectivity between the terminal and Picton fore-shore prevents people to easily move between them. The dilapidated marshalling yards between the two terminals makes the task of navigating the carpark confusing. Currently the ports cannot accommodate larger vessels, due to sea depth and size restrictions. Thus meaning visiting cruise ships are forced to birth in Shakespeare Bay rather than birthing at the main port and terminal.

Figure 81: Photographs of the marshalling and stacking yards.

D.4.

HISTORIC INFLUENCE

Analysing how the water’s edge has transformed Picton over time.

1812- 1862 : Historic Maori settlement placed on edge of water-front.

Figure 82: Map of Picton's shoreline in 1812- 1862.

1947 : The water has receded and the town has developed.

Figure 83: Map of what Picton's shoreline in 1947.

1970 : The water has receded even more and the town has grown. The foreshore is developing.

Figure 84: Map of what Picton's shoreline in 1970.

OVERLAYING LAYERS OF THE PAST ONTO THE PRESENT

The outline of the old shorelines have been placed onto a current map of Picton to show how the land has changed as the town and port have developed.

This design technique links Pictons past landscape to its future design allowing the town's heritage to be appreciated and applied in the design case study.

Figure 85: Outline of the waters edge over the years, overlaid on a map.

DESIGN PROPOSAL 3

This concept is developed from design proposal 1 was combined with the historical influence of Picton's old shore lines. The shorelines were used to map the paths of the new roads developed and the outline of the new estuary implemented into the design.

The waterfront introduces large open spaces near the water's edge. The marina has not been developed into this proposal. There are a series of major design additions that has helped to develop the framework.

1. New arterial road layout and introduction of new round-abouts.
2. Change in the existing park/ playing field. Reduced park size, but the space better utilised.
3. new "gateway" entrance to the new built edge extended from the town.
4. Car park in front of the terminal size is reduced.
5. The vehicle stacking yards have been laid out to try and bring as many people towards the terminal as possible. Positioned next to the built edge allows people to move between the stacking yards and town.
6. Original railway station placed closer to the town centre for easy accessibility.

Figure 86: Design Proposal for Picton.

Figure 87: Photograph of the Gangway for the Interislander

Zone 3 ARCHITECTURE

Figure 88. War memorial leading onto Pictons Foreshore.

6.0. TERMINAL

6. THE TERMINAL

A similar trait that is seen in ferry terminals is that they are often built on top of wharfs. The parameters of the wharf influences the form of the building, resulting in a long rectangular mass. This shape of the building also benefits its functionality, allowing easy passenger circulation on and off the ferry. An example of this type of terminal is the Hamburg Ferry Terminal designed by William Alsop and Jan Stormer built in 1988-92(Figure 90). The Hamburg terminal was designed to help the renewal of the docklands regeneration and enhance the water's edge (All design). Like the Hamburg terminal it is common for the terminal to do something for the land or its location than simply load passengers on and off (Figure 91)(Jones 139). Ferry terminals over time have become extensions of their neighbouring city or town connecting them to the sea. They act now more than ever as gateways to and from a location.

Figure 90: Hamburg Terminal, length and boat like design.
Source: All Design.

Figure 91: Authors line drawing outlining the long rectangle boxes of the Hamburg terminal.

6.1. WHAT MAKES GOOD TRANSPORT ARCHITECTURE?

Good transport architecture celebrates the routine process that comes with travelling, such as the environments in which we wait and through which we move from one transport process to another (Jones 6). Passenger movement and circulation is important to make the building easy to navigate to all users therefore reducing stress and anxiety amongst passengers. All these processes together enrich the spatial experience of the building.

Transport architecture is designed to accept change and often deals with rapid variations in size, technology, processes and passenger movement (Jones 6). Although the building is designed to accept change it also holds a set of constants such as space, light and acoustics. These all remain in place during the lifespan of the building. It is these traits that enhance and excite the user's experience (Jones 6). The terminal, whether its air, sea, bus or train has become a meeting place for modern society and works tightly within a city's context contributing to the sense of place (Jones 6).

6.2. A LOOK AT PICTON'S PAST

The voyage across the Cook Strait from Wellington Harbor to Picton port has always played a vital part in New Zealand's heritage. A diverse range of vessels have transported freight and passengers across the Cook Strait since 1875 (Kiwi Rail, n.d). This voyage is recognised as one of the most beautiful in the world, and is often described as being "breath-taking and stunning" (Kiwi Rail, n.d). The Cook Strait has two main ferry services. The first is the Interislander which was founded in 1962 and currently has three ro-ro(roll-on-roll -off)ferries, the Kaiarahi, Aratere and the Kaitaki(Figure 92). Although all three of these vessels can carry vehicles and trucks only the Aratere can carry rail freight. The rail wagons have to be shunted onto the ferry, it can carry up to 32 wagons.

In 1992 a secondary shipping service called 'Strait Shipping' was developed solely for freight. Later in 2002, due to high demand, Strait Shipping introduced a passenger service called 'Bluebridge' (Bluebridge, n.d.). The Bluebridge has two ro-ro (roll-on-roll off) vessels, the Straitsman and the Strait Feronia.

Figure 92: Picton Port and ferry operations.

6.3.

A NEW FERRY TERMINAL FOR PICTON

The Interislander and the Bluebridge Terminal

The Interislander and the Bluebridge both berth side by side at Waitohi Wharf in Picton, but they each have a separate terminal and vehicle stacking yards (Figure 93).

The Interislander passenger terminal is located at Waitohi wharf, this allows easy accessibility for the walk on passengers to board the ferry and for easy accessibility for tourists. The vehicle check in for the Interislander is located 700m south of the Interislander terminal on Lagoon Road (Figure 94).

Figure 93: Picton Port and ship births.

Figure 94: Interislander stacking yards and terminal.

Figure 95: Bluebridge Stacking yards and terminal.

Figure 96: Photograph showing the entrance to where the Bluebridge ferry's berth.

The Bluebridge terminal and stacking yards are also located on Lagoon Road opposite the Interislanders vehicle stacking yards (Figure 95). The Bluebridge has three stacking yards. Two are located next to the terminal and the third is by Waitohi wharf and is used for cargo. All Bluebridge walk on passengers board a bus and get driven up to the wharf and enter onto the ship via the vehicle loading bay at the back of the ship (Figure 96). This step is necessary as the terminal is located so far away from the wharf.

By having two separate terminals it creates confusion between tourists and passengers, as they expect both companies' terminals to be at the wharf. It makes sense for the two terminals to be combined where the current Interislander terminal is (Figure 97). By combining the two Ferry services into one building it will no longer create confusion amongst passengers as which terminal they have to go to. Airport terminals have already proven that different travel services can work together efficiently in one building. By only having one terminal at the foot of the port it creates a strong singular focal point that has visual connections to the sea and town.

Bluebridge Terminal

Interislander Terminal

Figure 97: Photograph showing the placement of the separate terminals.

6.4. CRUISE SHIPS IN PICTON

Since the 2011 Canterbury earthquakes and the damage to Lyttleton wharf the quantity of cruise ships birthing in Picton has doubled. Currently the Waitohi wharf does not have the facilities to accommodate larger vessels, meaning visiting cruise ships are forced to berth at the Waimahara wharf in Shakespeare bay, used mostly for logging (Figure 98). The passengers are then loaded onto a bus and then driven into Pictons' township. For the cruise ships to be able to berth at the Waitohi wharf the harbour would have to be dredged to allow the larger ships to berth. This is an expensive and large task but one that will benefit the build of a new terminal and connect Picton to the cruise ship line again.

Figure 98: Shakespeare Bay, Logging ship, shares the same dock as the Cruise ships.

6.5.

PRECEDENTS

To gather inspiration and examples of successful ferry and cruise ship terminals a series of precedents have been gathered to analyse, layout, structure and functionality of terminals. A set of design requirements were developed to help determine the precedents selected. They had to either have roll-on roll-off handling methods, cruise ship access and be connected to their neighbouring city or town.

At the end of the study each precedent was placed onto site to see if Picton could host an iconic/successful piece of Architecture. This exercise was helpful in developing an idea of a possible scale for the new combined terminal.

6.5.1.
Yokohama International Passenger Terminal.
By Foreign Office Architects

What makes this building successful is that while operating as a ferry terminal it is an architectural extension of the city (Figure 99). The terminal provides open green space along the waterfront, inviting people to explore the water's edge. The building looks more like a land mass rather than a terminal, with its long length and short stature (Figure 100). The vertical circulation in the building is completely made up of sloping floors or escalators creating the feeling of continuity (Jones 140) (Figure 101).

Figure 99 : Yokohama location map and context analysis.

Figure 100: Terminals length and small height stands out against the cruise ships.

Figure 101: Circulation in and out of the terminal.

Figure 102 : Showing the 3 levels of the terminal.

6.5.2.

Whites Bay Cruise Terminal, Sydney Australia
By Johnston Pilton walker Architects

The Whites Bay Cruise terminal (Figure 103) has been designed to have a flexible free space, floor plan (Figure 104). Its waving roof form connects the sea to the land by visual sight lines. The simple flowing roof enhances the building appearance against the buildings exposed structure (Figure 105). A key design element of this terminal is the seamless execution of the gangways as they ease out of the building connecting to the docked cruise ships (Figure 106).

Figure 103: Whites Bay Terminal location map and context analysis.

Figure 104: Plan and Circulation Diagram of the building showing how open plan design is utilised.

Figure 105 : Aerial view showing the exterior strcuture and the waving roof.

Figure 106: Airport styled gangway leading out to the Cruise ships.

6.5.3.

Vancouver Cruise Terminal and Convention Centre

By Eberhard Zeidler / Barry Downs

The Vancouver Cruise terminal's main structural feature is the sails on top of the cruise terminal (Figure 108). It is the Convention centre that has been designed to integrate the two spaces and buildings together. By allowing the building to appear as a set of green ramps, it allows the eye to follow the paths from ground to roof. The building connects the sea, the cruise terminal and the city together, making the waterfront and the city to be one complete area (Figure 109).

Figure 107: Vancouver cruise terminal and convention centre, location map and context analysis.

Figure 108: The Cruise Terminal showing their dominant rectangular structure underneath the sails.

Figure 109: Connectivity diagram showing the green link along the waterfront from the convention centre.

6.5.4.

Naoshima Ferry Terminal , South Japan

By Sanaa (2006)

The Naoshima ferry terminal is a perfect example of how simplicity can be beautiful in a transportation building (Figure 110). The buildings structural columns seem almost too small to support the flat roof (Figure 111). The columns are hidden by the small mirrored walls and the central café and ticketing office (Figure 112). By the structure having minimal walls it allows the landscape to be intertwined with the interior of the building. Sanaa has designed a terminal that connects the landscape, the town and the infrastructure seamlessly to the sea (Figure 114).

Figure 110 : Naoshima location map and context analysis, shows where the Terminal is in relationship to the town centre.

Figure 111: Elevation, Circulation diagram, and floor plan of the building, Shows the simplistic floor plan.

Figure 112 : Structural mirrored wall. The mirror allows the wall to be less obtrusive.

Figure 113: Enclosed area of the terminal is surrounded by glass walls. This allows passengers to get a coffee while waiting for the ferry.

Figure 114: No exterior walls allow the building to look as though it flows into the landscape. This connects the terminal to the Town and also invites people to explore the terminal.

6.6.

HOW CAN THESE PRECEDENTS BE HELPFUL?

The terminal precedent studies were helpful in analysing the functional layout of ferry terminals and their relationship to their site. Below are the key design features that were identified from the design case studies to design an efficient ferry terminal.

Multi-purpose space

Multi – purpose open space within the building, that can be manipulated for different event functions. This space is generally positioned around waiting areas, to comprehend large amounts of people in a confined area.

Circulation

The circulation has to allow passengers to unload from the ferry as efficiently and as swift as possible, a functional space from when they enter the terminal to when they exit. This study noticed that if the circulation pathway was longer than others then the introduction of a feature in the space makes the journey feel shorter and more enjoyable.

Relationship to Context

Each of the terminals has been integrated into their site context effectively. A key finding from this was that the terminal is viewed as an extension of the town, and provides important connections to other ferry port cities around the world.

The terminal has to have a positive relationship with not only its urban framework, but also its surroundings. This connection can be implied from the buildings form, colour, size and location.

Structure

Large and small structural elements can be used to enhance the aesthetics of the design and develop the atmosphere within the interior of the building.

These key drivers will be applied to the iterative design process of terminal development. The key factors will aid the development of physical concept design models, conceptual drawings, structure, circulation and site relationship.

D.5.

PLACING PRECEDENTS IN PICTON

After developing the key design principles for the terminal based off the precedent case studies a small design exercise focused on using three of the terminal precedents and placing them into Pictons context. This was a helpful design exercise as there were doubts that a large ferry terminal would look out of place against Pictons landscape.

The study shows that the best outcome from this exercise was the Sanaa ferry terminal. It is the simplicity of the design that allows the terminal and the landscape to both work in harmony with each other. The colour of the building provides a freshness to the landscape. The other two precedents seem out of place against the landscape and appear too large and obscure on the small site.

Figure 115: If Whites Bay Cruise terminal was in Picton. The structure stands out against the landscape.

Figure 116 : If the Convention centre was in Picton. The waterfront development links the Town to the building. The Building looks almost too large for Picton's landscape.

Figure 117 : The Naoshima Ferry terminal placed into Picton.

Figure 118 : Photograph of the Bluebridge Terminal.

7.0. DESIGN PROCESS

This section is an exploration into the design process undertaken to develop the ferry terminal. It uses historic narratives, abstraction and physical and digital modelling throughout the iterative design process.

7.1. HISTORIC INSPIRATION

The saddleback is small bird that lives in the Marlborough Sounds just north of Picton. When Captain James Cook first visited the South Island of New Zealand he stayed at Ships Cove in the Marlborough sounds. It was there that he became fascinated with the Saddleback bird and its friendliness.

This story of the saddleback bird and James Cook interested me and inspired the notion of flight and new beginnings to inspire a form for the ferry terminal to be located on the edge of Picton's harbour. Based on an iterative design process abstracting and developing the form and shapes of the saddleback bird.

Fluid Exploration

Angular Abstraction

Figure 119 : Abstract drawings of the Saddleback bird

7.2.

ANGULAR ABSTRACTION

From the angular abstraction of the Saddleback bird, some interesting shapes were developed, that showed potential to help develop a form. Parts of these shapes were then applied onto a map of Picton's current site. The main key connections were extracted and diagrammed in an abstract format.

Each diagram is an iteration of the previous, transforming until a form can be developed.

Figure 120 : Iterative process of developing shapes to be applied into 3d, and site layout.

FORM EXPLORATION

From the abstractions the design method was changed into physical modelling. Using inspiration from the angular and fluid abstractions, 12 form exploration models were made out of paper and cardboard. They followed no design rules, but were made with the intentions of fitting onto site.

From the 12 models that were developed two key forms were developed further by breaking them down into key design elements, sweeping, sharp, angular, stretching and connectivity. These elements help to shape the further development of the buildings form and functionality.

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Figure 121 : Paper model, form explorations x 12

Sweeping + Sharp + Angular + Stretching + Connectivity

Permeability

Figure 122 : Diagram showing that through movement is important in the design of the buildings form.

PHYSICAL MODEL ITERATIONS

Iteration 1

Figure 123 : Photographs of model ,Iteration 1

Iteration 2

Figure 124 : Photographs of model ,Iteration 2

Iteration 3

Figure 125 : Photographs of model ,Iteration 3

Iteration 4

Figure 126 : Photographs of model ,Iteration 4

Iteration 5

Figure 127 : Photographs of model ,Iteration 5

Iteration 6

Figure 128 : Photographs of model ,Iteration 6

FINAL MODEL ITERATIONS

The six card model iterations become slightly more refined and the main sweeping curve was developed and replicated into a larger scale. This was then applied to a scaled site to develop the connections to the wharf and context. A plaster modelled was designed to see if the material could hold the shape of the sweeping form adequately.

This process allowed a net to be created and then input into Rhino (computer programme) to develop a 3d model. After this the model was then put into Revit to allow a more detailed design development.

Figure 129: Photographs of the plaster model developed of the main curve of the building.

Figure 130: Photographs of the final paper model developed, before creating the net to import the model into digital form.

D.6.

COMBINING TERMINAL WITH MASTERPLAN

Once applying the Terminal design onto the urban framework the scheme started to join together. The built edge (Picton Quay) was developed from the town centre all the way up to the back of the terminal. These buildings that are part of Picton Quay but are connected to the terminal are used for ferry operation, offices and also rental car services. The last aspect for this proposal is to develop the marina into the waterfront. As this zone is currently undeveloped. Design proposal 3 needs to be incorporated into the remainder of the framework.

Picton Quay building's linking into the back of the terminal.

Terminal

Figure 131: Zoomed in figure of the connection between Picton Quay and the rear of the Terminal.

Picton Quay

Figure 132: Design proposal showing how the terminal reacts to the site, and relates to the overall context. Also identifies Picton Quay, showing its length.

THE GATEWAY TO THE SOUTH

8.0.

URBAN MASTERPLAN

(Urban Framework)

The urban framework provides a comprehensive scheme that can be applied to ferry ports around the world. The plan is derived from a series of functional requirements for both the processes of the port and also the town. It allows the procedures of a roll-on roll-off ferry to occur within an urban development, without creating segregation between infrastructure and the urban. The plan utilises the roads, pathways, water and architecture to allow people to travel through the scheme.

The primary design principle was to enhance connectivity between the ferry port and township. The urban plan was developed to blend the infrastructure with the public space allowing both mutual hierarchy within the urban fabric. This has resulted in the creation of synergy between all aspects of the design eliminating conflict.

The processes used in developing the urban framework has shown that a ferry port can be successfully integrated with its neighbouring town enhancing connections throughout all aspects of the urban fabric. The framework has been developed to allow it to be applied to similar ferry ports around the world. This task would follow a similar design process, but has key design elements to follow derived from the design case study. These elements are extracted from the most successful parts of the design and are all incorporated within the port, urban and architectural zones. These are a built edge, placement of vehicle marshalling yards, pedestrian access and developing an integrated interface amongst the whole design.

Figure 133 Final design. Masterplan for Picton

8.1.

PATHWAYS

For connectivity to be best achieved and portrayed in the scheme, five key pathways were developed to allow people and vehicles to navigate and explore Picton. Each pathway has its own experience and purpose, but all end up at either Picton’s town centre or ferry port.

- 1. **Picton Quay – entering the gateway.**
This pathway portrays what you expect to see as you venture off S.H.1 towards the town. The road gently curves its way around a large corner exposing different aspects of the design as you move around it, revealing the waterfront and the terminal.
- 2. **Waiting to Explore – vehicle stacking yards.**
This is the new entrance to the vehicle stacking yards for both the Interislander and the Bluebridge ferries. The pathway shows how the yard splits up into two separate yards for each company divided by a park space in the middle. The park space inspires people to get out of their car and move around.
This new layout also encourages people to explore the waterfront or walk to Picton Quay to get coffee and a snack while waiting to board the ferry.
- 3. **Path of the Past – waterfront walk**
This pathway allows people to take a stroll near the water’s edge, while enjoying sights of the harbour and the busy marina. Along the pathway there are several historic nodes such as the Edwin Fox Museum, the Picton Museum and the National Whale Centre.

- 4. **Shopping with a view- town to terminal**
This journey is similar to pathway 1, however it exposes the view range that you would see if you were walking along the footpath of Picton quay. This journey provides a covered walk from the town centre to the terminal. Allowing people to walk safely and happily under a sheltered path.
- 5. **Terminal and Beyond- walk off passengers.**
This journey starts off as two pathways, one exiting from the Interislander gangway and the other coming up out of the Bluebridge passageway. Both pathways enter the terminal on separate levels and then combine together on the ground floor. Once outside the terminal the journey begins.

The pathways that have been developed can be combined together allowing people to experience several journeys through Picton.

- 1. Entering the Gateway
- 2. Vehicle Stacking Yards
- 3. Waterfront walk
- 4. Shopping with a view (Town to Terminal)
- 5. Terminal and Beyond (walk off passengers)

Figure 134: All pathways mapped on proposed masterplan.

Figure 135:

1. Picton Quay – entering the gateway.

Figure 136:

2. Waiting to Explore – vehicle stacking yards.

Figure 137:

3. Path of the Past – waterfront walk

Figure 138:

4. Shopping with a view- town to terminal

Figure 139:

5. Terminal and Beyond- walk off passengers.

8.2.

URBAN PROGRAM

(ZONING AND BUILDING USE)

Figure 141:

1. Mixed Use

Bottom floor retail space, café, shops and bars etc, top floors can be used for housing.

Figure 142:

2. Apartments

Waterfront apartment buildings provide stunning views of Picton's harbour. These buildings are positioned in key statement intersections that accentuate their height and stature.

Figure 143:

3. Museums

These buildings house important parts of Picton's history and knowledge. They are placed near the water's edge and the town centre to enhance this connection to the town's past.

Figure 143:

4. Transit Architecture
 These buildings aesthetically are all different but are all share the same use. The transit buildings consist of the ferry terminal, train station and vehicle check in stations. The position of the train station is positioned close to town and placed between two keys pathways, allowing people to easily walk between the town and terminal.

Figure 144:

5. Activity and Public Buildings
 The largest activity building consists of a movie theatre, an aquatic and wild life centre, offices and a small info centre. The Public buildings mainly consist of bathrooms ,activity rental equipment and shelters.

Figure 145:

6. Ferry / Rail Infrastructure buildings
 These Buildings are specifically used for the rail and ferry services i.e. maintenance, and staff services.

Figure 146:

7. Rental car and Ferry taxi offices
 These offices are deliberately the closest to the Ferry terminal to allow passengers and tourists easy accessibility to the offices. The rental car park is positioned behind these buildings, for both easy access for vehicles disembarking the ferries and vehicle collection.

8.3.

URBAN CONNECTIVITY & ACCESSIBILITY

For the three zones to merge together new arterial and connector roads were developed along with the smaller paths to enforce accessibility between port and town. The placement of the arterial roads have been developed to allow the vehicles to be directed towards the town, terminal and water while still allowing them to withstand the fluctuating traffic from the ferries. These connections were developed from the port case studies and use the same elements.

Figure 147:

Arterial roads

Figure 148:

Car parking, car parks and on street parking.

Figure 149:

Connector roads and paths

Figure 150:

Green space

Figure 151:

Port area and Infrastructure

Figure 152:

Rail marshalling yards

Figure 153:

Vehicle stacking yards

Figure 154:

Terminal

Figure 155:

Town centre

Urban Scheme

Figure 156: final scheme showing the main connections and all aspects of the design integrated together.

ACCESSIBILITY

Figure 157:
Driving into vehicle stacking yards

Figure 158:
Main arterial routes leaving the ferry

Figure 159:
From ferry to Town and terminal

Figure 160:
Freight and long stay stacking yards, vehicle paths

1. Picton Quay : Entering the Gateway

Figure 161: diagram showing the pathway route.

Figure 162: Entering the Gateway on Picton Quay.

Figure 163: View of the town centre and the retail edge, Edwin fox building in background

Figure 164: The terminal comes into sight as you round the corner along Picton Quay.

Figure 165: The historic and the new coming together

Figure 166: Wide roads to allow for ferry traffic, although pedestrians control the space.

Figure 167: Opening up along Picton Quay

Figure 168: Rental car businesses along Picton Quay, also shows the passenger drop off/pick up areas.

Figure 169: The Terminal

3. Path of the Past: Waterfront walk

Figure 170: Map showing the route for the pathway

Figure 170: Infront of the terminal heading along the waterfront.

Figure 171: By the new Edwin Fox Museum, with the marina in the distance.

Figure 172: Walking around the edge of the marina with Picton Quay and the Town Centre in the view.

Figure 174: Walking over the draw bridge towards the town centre. Opens up to allow boats access the marina.

Figure 175: Towards the town

2. Waiting to Explore: Vehicle Stacking Yards

Figure 176: Diagram showing pathway route

Figure 177: New Entrance to the vehicle stacking yards for both ferry companies.

Figure 178: Driving up to check in for the Ferry. Left lane is Bluebridge and right lane is Interislander.

Figure 179: Interacting with Picton Quay, and still being able to see the terminal while driving into the stacking yards.

Figure 181: Walking from the stacking yards towards Picton Quay, the waterfront and the marina.

Figure 182: leaving the stacking yards to explore Picton Quay on foot.

8.4.
TERMINAL

Figure 183: Zoomed in site plan of Terminal

Figure 184: Plan of underground Bluebridge passage way 1:500.

Figure 185: Ground Floor plan 1:500

Figure 186: Mezzanine Floor plan 1:500

Figure 188: Terminal vertical circulation, between levels.

Figure 189: Long Section of Terminal, showing part of Picton Quay and the gangways

Figure 190: Long Section of Terminal 1:200

Figure 191: Overview of the Terminal and port

5. Terminal and Beyond :
Interislander walk off passengers.

Figure 192: Map showing the route for the pathway

Figure 193: Walking off the ferry and down the gangway to the terminal

Figure 194: Rounding the corner, view out the window ahead shows the stacking yards

Figure 195: Entering the terminal

Figure 196: Moving through the terminal to cafe and waiting areas.

Figure 197: Upstairs interior of the terminal. Cafe, waiting areas and viewing platform.

Figure 198: Walking down to mezzanine floor

Figure 199: Viewing the main entrance

Figure 200: Coming down to the baggage collection area.

5. Terminal and Beyond :
Bluebridge walk off passengers.

Figure 201: Map showing the route for the pathway

Figure 202: walking down the passageway from unloading off the Bluebridge ferry.

Figure 203: Exploring the Aquarium while walking towards the terminal .

Figure 204: Making the way up into the Terminal

Figure 205: Ground floor of terminal, where check in is located and baggage claim

Figure 206: Moving towards Picton Quay.

4. Shopping with a view : Town to Terminal

Figure 208: Map showing the route for the pathway

Figure 209: View of Picton Quay from the edge of the town centre

Figure 210: Walking past the built edge development.

Figure 211: Covered walkway

Figure 212: Walking towards Picton Quay

Figure 213: Rounding the edge to see the terminal.

Figure 213: Towards the terminal

Figure 214: Past the rental car and water taxi offices.

Figure 215: Baggage collection entrance

Figure 216: Entrance to the terminal

Figure 217: Inside the terminal

9.0. EXEGESIS AND CONCLUSION

The main intention of this thesis was to examine and re-establish connections between ferry ports and their neighbouring town centers. The basis for this research was my experience and observations while visiting the design case study, Picton. The size of Picton's port has vastly developed with the advance of roll-on roll-off handling methods resulting in the autonomous expansion of the ports infrastructure. This rapid growth combined with the ports expanding monopoly on prime waterfront space, has led to a lack of integration with the neighbouring town and urban waterfront. These observations were reinforced by a discovery of similar trends in ferry port cities and towns around the world. This pattern of unchecked growth has led the port city interface to become a “zone of conflict”, hindering the development of connectivity and integration between the ferry port, the town and the waterfront.

9.1. DESIGN DISCUSSION

The design analysed the port town relationship by applying key theories from Brian Hoyle and James Bird on the port city's interface and the characterization of the “zone of conflict”. These key ideas were then applied to urban models, in particular Gordon Cullen's theory of serial vision.

The design is broken down into three key functioning scales; infrastructure, urban and architectural. Serial Vision was used to analyse how connectivity can be increased amongst all three scales. A key process of this was manipulating the field of sight to allow a journey to occur as you move through the zones along a series of pathways. Although the three scales were initially all separately analysed, as the design developed, the scales started to connect with one another eventually overlapping.

The first successful connection was linking the ports infrastructure with the urban scale. The design decision to merge the two ferry company's vehicle stacking yards led to a long iterative design process of developing the placement, size, scale and shape of the yards. The separation of the two yards allowed the insertion of a small park space to be developed between them, encouraging passengers to walk from the vehicle yards through to the waterfront and vice versa (Figure 218). The separate yards allowed two ferries to load or unload cargo and passengers almost simultaneously. To achieve this two separate departure routes were developed, directing the ferry traffic away from each other, while allowing both roads to be “connected” to the town. This empirical connection to the town was induced by allowing the users to see glimpses of the town and the waterfront through road positioning, water and layout of the urban fabric.

Figure 218: Green space in the middle of the two stacking yards.

The second interaction was infusing the urban with the architecture. The urban design link bonds three different elements with each other, activity nodes, natural elements and architectural elements. The activity nodes refer to the new store frontages of Picton Quay, the playgrounds, park benches and any interactive place. The natural elements are the marina, the pathways, the green spaces and the water's edge. The Architectural elements are the Terminal, Picton Quay buildings and the structures along the waterfront. Included in the architectural element are functional spaces such as the drop off and waiting areas. The parking space positioned in front of the terminal has been developed using all three elements to try and create a seamless link between the waterfront, the terminal and Picton Quay. By connecting all these elements incrementally has allowed the link to be perceptible throughout the development. To aid this connection the use of open-space/water edge connection of the marina complements Picton Quay as a vital link between town and terminal. The marina is influential in the design as it uses the outline of the water to guide people along paths to Picton Quay, the terminal or the town. By positioning the edge of the marina near to the edge of Picton Quay allows the water's edge to be visible from the vehicle stacking yards, Picton Quay and the terminal, encouraging people to explore and interact with the water (Figure 219).

The development of the waterfront has been designed to allow the space to be used all year round. The series of pathways provide enough alternative routes to allow people to inhabit the spaces in the harshest weather conditions. The placement of the marina counteracts the size of the car parking in front of the terminal, allowing a balance to occur between the three modes of open space: the marina, green space and car parking.

Figure 219: view of the waterfront from stacking yards.

Thirdly, the connection between the “terminal” architecture and “conventional” architecture.

The conventional architecture refers to the new buildings developed along Picton Quay and towards the town centre. These buildings are aesthetically a lot simpler than the terminal. The forms of the conventional architecture and the terminal are created to slot into each other allowing the smaller building to tuck itself into the terminal. This tucking of the conventional reaches out to the gangways allowing them to connect to the rear of the terminal. The terminals lean arching form provides a protective cover as the conventional building slips down along the side of the terminal heading towards the town centre. This interaction between the terminal and the conventional architecture allows an almost seamless connection of the two structures. The buildings along Picton Quay have been designed to provide a continuous street edge from terminal to town. This encourages commercial development to occur, enticing locals and tourists to explore the shops, the terminal and the waterfront. This influx of people around Picton Quay and the terminal will in turn slow down the traffic around central Picton allowing pedestrians to become dominant in the space.

The final piece to the connection was allowing all these zones to meet one another seamlessly. The reference to water appearing throughout the design acts as a connector appearing all over/ along the different pathways and zones.

Urban

The placement of the marina in the waterfront transforms the foreshore from a park space to an urban waterfront development, built around an internal marina. The placement of the marina combined with the draw bridge over the marinas entrance connects the sea with Pictons town centre.

Infrastructure

The development of the estuary was an advance of a small river that already existed in Picton. By developing the main section of the river into an estuary means has transformed the main arterial route into the town centre and Picton Quay. The water acts as a type of buffer between the urban the industrial zones, but does not hinder the connection between the two spaces.

Architecture

Water has been incorporated into the design of the terminal in two ways, one is the aquarium in located in the underground passage way for the Bluebridge walk-on passengers and the second is the design of the terminal. The decision to relocate Pictons aquarium into the terminal was to encourage visitors and locals to explore and use the terminal frequently. This passage way although used mainly for the Bluebridge is also used for Cruise ship passengers. This is a unique welcoming experience into Picton and the allowed the terminal to act as the gateway to the south island. The arching design of the terminal has been developed as though the form is reaching out of the water towards the town, while the gangways reach out to connect with the birthing vessels. This design scheme has not only created connectivity between the industrial aspects of the port but also the commercial fabric, invigorating the town's atmosphere and economy. It is this co-presence of these numerous activities surrounding the waterfront that can brings new life to any ferry port township invigorating the public realm.

9.2.

APPLYING THE SCHEME TO OTHER PORTS

The design case study shows that ferry terminals and host towns can be successfully integrated if accessibility can be easily achieved between the infrastructure the urban and the architectural zones. It is the placement of the zones and where they intersect each other, that helps create the synergy across the urban landscape. One of the most successful elements to allow connectivity between the spaces is the urban built edge. The built edge encourages walkability between the port infrastructure and the building programs allowing connectivity to be generated. This was proven when applying the design of Picton Quay to the urban framework of the design case study. The presence of a built edge from the town to terminal should enhance the connections amongst the urban fabric. Some of the solutions that were designed for the Picton case study have the potential to resolve similar issues to other ferry ports around the world. The top four key design solutions are:

1. Develop a built edge
-Using a built edge to connect the port to the town, (mixed use development) such as apartment buildings, shops, travel agencies etc. This may encourage the development of a new street edge resulting in the traffic and access routes to be improved. It is important to link the built edge with the terminal to ensure that the connection is not lost between the conventional architecture and the terminal architecture.
2. Placing vehicle marshalling yards near the built edge.
-By positioning the vehicle marshalling yards next/near to the built edge development encourages passengers to explore the shops the town and the waterfront while waiting before they board the ferry. This will become extremely useful when the ferries are delayed and passengers have to wait in line for hours. They can comfortably leave their cars in line, and be back in time to board.

3. Moving industrial transport away from the town
-Positioning the rail stacking yards further away from the town results in less disruption of pedestrian and vehicular connectivity. The movement of the rail away from the town also allows the ports infrastructure to be less obtrusive against the urban fabric.
-The space where the rail once was can be developed into green open space or applied to the expansion of the built edge.

4. Redeveloping the interface between the waterfront town and the terminal.
-Integrating similar design attributes and aesthetics into each zone of the scheme, connects each different component of the design together. An example of this is the presence of the open-space/water-edge connection that can be used amongst the zones.
-This not only connects the zones together but it allows the infrastructure of the port to not appear as controlling over the land.

The discovery of the above solutions to enhance connectivity and synergy between ports and townships should allow ferry ports around the world to be better connected to their townships.

9.3.

DESIGN ISSUES AND LIMITATIONS

Urban

- The Carpark and drop off/ pick up zone is interfering with the connection between the waterfront and terminal. The robust shape of the parking area stands out from the remainder of the design. There are two areas that are not relating to each other, the first is the water's edge to the car park and the second is the large open space surrounding the front of the terminal leading to the path to walk to the waterfront.
- A risk from the Picton quay development is the amount of new buildings developed may draw businesses away from the town centre ,resulting in the township to no longer thrive.

Infrastructure

- A main design issue is bringing the vehicles disembarking the ferries towards the town centre. This design decision may cause a large backlog of traffic along Picton Quay and towards SH 1. This congestion could result in Picton Quay becoming inaccessible by vehicle when ferries are loading or unloading.
- The single entrance into the vehicle stacking yards might cause some problems with access and confusion for passengers. Two separate roads leading to the entrance of the stacking yards might of resolves this problem.

Architecture

- The decision to build the underground passageway was due to the restrictions of space and infrastructure of both ferry companies. The only safe way for the walk-on passengers to get to the ferry was for them to venture underground. The issue of this design feature is of course the length, cost and practicality vs the reality.
- The last minute decision to place escalators into the terminal has resulted in a strange vertical circulation movement from the ground floor to the first floor. The escalators only allow people to move up them not down them due to space restrictions.

9.4. FUTURE RESEARCH

To progress this project, further research could be done to see how the design would change if the rail marshalling yards were removed. As the port case studies suggested that very little ro-ro ferries still have facilities for rail to be shunted onto the ferries. It would be interesting to see how the design can be enhanced without the presence of the rail marshalling yards, and whether the layout of the port and its infrastructure would change completely.

If roll-on roll-off rail handling methods were no longer used in transporting goods onto ferries, how would the disappearance of rail change the mechanics and relationship between a ferry port and its neighbouring township?

This question would explore how a significant increase in road freight would affect main arterial routes and highways in smaller port townships.

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