A New International Cruise Ship Terminal for Wynyard Wharf

Research Project Explanatory Document

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A New International Cruise Ship Terminal for Wynyard Wharf

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ABSTRACT

The aim of this project is to analyse the issues of the current cruise ship terminal site, and design a new relocation site to provide for the current needs and progress, and increase the future demand. My design also acknowledges the importance of focusing on a sustainable scheme to enhance the natural environment for the public and visitors to enjoy. This is a two-level solution that, first, identifies and addresses problems in the existing cruise ship terminal, and relocates the cruise ship terminal over the new development site of Wynyard Wharf while it refines the connections to waterfront Auckland, and as well as resolves the traffic and ferry congestion at downtown. Secondly, it presents a signature infrastructure for a new cruise ship terminal that aims to generate public support for a sustainable design solution.

The proposed new cruise ship terminal for the new development plan of Wynyard Wharf hopes to resolve the congestion and growth issues in the cruise in Queens Wharf. It also creates an international terminal that excites the senses and celebrates our sea-loving Pacific culture and maritime history. The challenge of adding a cruise ship terminal to the Wynyard Wharf neighbourhood is to respect the culture of the existing maritime and fishing industry, and the industrial heritage buildings that are being preserved. This design feature would enhance the industrial site of Wynyard Quarter, and develop the site into a modern urban environment that everyone could enjoy and experience.
ACKNOWLEDGEMENTS

To:

My family – thanks so much for your support over the past 5 years
Maxine – could not have done this without your encouragement
My Supervisor – Graeme McConchie thanks for your help and guidance throughout the whole year
My proof readers – your time and contribution have been invaluable
Felix, Seafa, and Sofia – words cannot describe how much your help and support has meant to me
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1.0 INTRODUCTION
1.1 Research Question
Can a cruise ship terminal be strategically located and designed to provide for Auckland’s current and future international tourism demands and at the same time contribute positively to the city’s proposed urban development?

1.2 Research Objective
The aims of this research are to identify the current issues on the current cruise ship terminal at Queens Wharf. The current main issue is the growth of the cruise industry that has resulted in a higher number of visits, thus, bigger cruise ships are now available to accommodate passengers going to Auckland. The relocation of the primary cruise ship terminal at Auckland waterfront possibly solves the lack of sufficient cruise ship berthing spaces and the expansion of the current cruise ship facilities, and demonstrates a signature infrastructure for the Auckland waterfront. The newly-built cruise ship terminal would need to be capable to accommodate the current biggest cruise ship, Ovation of the Seas. It also allows for the expansion and future growth of the cruise industry.

This research will also focus on designing a sustainable approach and passenger circulation in the cruise ship terminal. At the same time, cruise ship terminal has a green and environmentally-friendly design that promotes energy and water efficiency, ventilation, green roof, natural light, and construction materials. Furthermore, it ensures that the indoor and outdoor environmental quality will go beyond the traditional standards. Lastly, the research will analyse the current passenger circulation at Queen Wharf Cruise Ship Terminal and redevelop it to be more efficient in disembarkation and embarkation so the passenger journey becomes more interesting and more enjoyable especially with attractions like duty free shops, cafes, and outdoor leisure activities. Ultimately, the cruise ship terminal will become alive again.

1.3 Methodology
To achieve the objective of a prosperous cruise ship terminal capable of receiving ‘mega’ cruise ships, we need to make an explicit programme that includes functions required in this cruise ship terminal and other social activities that could happen around here to bring enjoyment to the public, especially visitors.

The ultimate idea is to achieve a balance between productions, investigate the functional requirement before a decision for each location for specific usage. Firstly, a research will be conducted on the current cruise ship terminal and site. And then the current issues of the cruise ship terminal site, together with why the site is being constrained with all these factors will be presented. Lastly, a solution for the expansion and congestion of the current cruise ship terminal will be resolved which to propose a new international cruise ship terminal at the Auckland waterfront.

The case studies of Waterfront Auckland helps to evaluate development of the cruise ship terminal design. A scaled model was used to examine whether the design components are workable in the context of the site. This allowed the design development to be tested and evaluated in a context and design environment.

Methods of Data Collection and Analysis:
- Chronological investigation from written sources and visual observation
- Discussion document on the supporters of a new terminal facility
• Discussion document on the Waterfront Auckland Committee
• Observation, recoding, and analysis of the local architecture and urban fabric of Waterfront Auckland through site visits on land and sea
• Reading relevant literatures which has a sound knowledge in the field

1.4 Definition of Terms
Relocation: The ability to relocate the primary cruise ship terminal onto a new development site. The new development site must satisfy the expansion demands of the function and program of the cruise ship terminal, and must have allowances for future development.

Flexibility – The cruise ship terminal is capable of different physical arrangements, it includes the transformation of the terminal into a sport event centre. As well as, it can handle future structural demands.

Adaptability – The ability of adapting and reusing the existing tanks for the cruise ship terminal design in Wynyard Quarter. The spaces can be used in different social activities which it can be achieved by integrating the terminal’s program and circulation pattern into the tank’s design.

Green Design – The cruise ship terminal needs to be designed to achieve the minimum requirements of 5 Green Star rating. The construction of high performance green building is a critical transformation for Wynyard Quarter to become a low carbon precinct. Therefore, the building needs to be energy efficient and water efficient. As well as, the building needs to have the ability to re-use rainwater and produce renewable energy from solar photovoltaic energy and solar hot water. Lastly, the proposed plan for the site needs to be promoted with sustainable modes of transportation like cycle and pedestrian routes to travel around the precinct, and also promote active travel and public transportation to get around Auckland CBD.
1.5 Scope and Limitations

Despite the fact that there exists many planning documents and tools that have been used by Auckland City Council to control urban development on the Auckland waterfront, and due to the progressive and ever-changing nature of the present situation, the scope of study was limited to five key documents: Wynyard Precinct: Urban Design Framework 2014, The Waterfront Plan 2012, Part 14.9 – Wynyard Quarter 2012, Report of Wynyard Quarter Area 7 IDP – Transportation Assessment 2015, and Wynyard Central Sustainability Standards 2013. The design result would only influence the situation as of the end of 2015, not including further event after that time.

This research is also involved in the analysis of the definition of sustainability design for cruise ship terminal, with regard to the Waterfront Plan 2012 Draft, combined with an analysis of the adaptability of the existing tank farm in Wynyard Quarter. It is also a response to the Wynyard Precinct: Urban Design Framework 2014, and Part 14.9 – Wynyard Quarter 2012 as a blueprint plan to fulfil the design requirements for designing a primary cruise ship terminal in Waterfront Auckland.

The design process is a direct result from a site investigation regarding the current issues of cruise ship terminals at Queens Wharf and Princess Wharf, as well as the future expansion and planning for the primary cruise ship terminal. The design is in response to the local’s needs and visitor’s needs. This is a large mixed-use design scheme which includes the function of cruise ship terminal with mixed facilities like retails, cafes & restaurants, market, observation deck and open green spaces for the locals and visitors to enjoy. As well as, it has the flexible design that can transform the cruise ship terminal into a sport event centre during the non-cruise ship season. Therefore, this cruise ship terminal can be operated throughout the year with range of activities to offer around and inside the building. This project does not seek to solve all of the problems associated with the urban development. However, it will provide possible solutions for a specific site, based on site and case study analysis and application of innovative technologies.

This project does not critique the feasibility of the council plans for the Waterfront Auckland; instead it examines the performance of the cruise ship terminal if the plan was executed. This research aims to demonstrate a feasible solution to enhance the proposed design and improve the quality of the urban development that refines the function of cruise ship terminal for the current needs and improvements in the future demand.
2.0 LITERATURE REVIEW
This chapter discusses some of the reasons why the current cruise ship facilities are no longer appropriate for the sites they have occupied over the last century.
In the 19th to early 20th centuries, Auckland waterfront has reclaimed a total of 162 hectares of land to the Auckland Central Business District. The reclamation of Auckland’s foreshore expands and improves the commercial activities to meet the growth of new settlements to operate trades for kauri timber, wools, and other goods. While many goods are also be imported into the country. The evacuated headland of Point Britomart was used as a landfill for reclaiming the area. The extensive reclamation of lands in the area of Auckland waterfront provides new wharfs and harbour edge which create a new gateway to boost the activities of importing and exporting goods. From 1840 until today, the transformation of Auckland’s shoreline changed from natural harbour edge to modern wharves and reclamations which is illustrated in figure 2.1, the black trace line is the original shoreline illustrating the history of the development of Auckland waterfront.

Figure 2.1: The history of Waterfront Auckland at 1841

2.2 Queens Wharf and Princes Wharf

Shed 10 was built in 1910 and it is the last remaining cargo shed on Queens Wharf. Shed 10 has been refurbished but retains the heritage elements while providing the cruise ship facility, as well as, it has the flexibility to accommodate an event space. According to the report of Queens Wharf – Refurbishment of Shed 10, “the crown and the Auckland Regional Council purchased Queens Wharf in 2009 with three main objectives which are creating a high quality cruise terminal for the economic benefits to Auckland & New Zealand, an impressive public open space reflecting the New Zealand culture and heritage, and a significant building representing the image of Auckland and New Zealand.”

The current Infrastructure seems to be meeting the current demands. However, Queens Wharf would be a disappointment if considered as the primary cruise ship terminal for the next 15 to 20 years. Shed 10 can be only used as a secondary cruise ship terminal at Auckland waterfront, while we find a better site to relocate the new development of primary cruise ship terminal. Queens Wharf has been constrained by its location, size, and the size of the cruise ship terminal. Firstly, the location has constrained the cruise terminal’s operation due to its context with the surrounding urban development. The location of the cruise ship terminal is located at Auckland’s Downtown area which is bottlenecked for numerous activities happening around the area. Quite simply, thousands of visitors, large customs areas, large baggage handling, and passengers’ lounges, plenty of coaches and taxis, and service trucks are going to be a nightmare for the traffic and ferry congestion in the Downtown area.

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Secondly, the infrastructure of Shed 10 is a first class historical building which need to be retained and preserved. Therefore, it would be generated lot of constraints for redevelopment the size of Shed 10 to compete with the growth of cruise tourism in Auckland, since there are many design considerations on preservation of the aesthetic and structure of Shed 10.

<table>
<thead>
<tr>
<th>PORT</th>
<th>AVAILABLE BERTHS</th>
<th>MAXIMUM BERTH LENGTH</th>
<th>MAXIMUM BERTH DEPTH</th>
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<tr>
<td>Bay of Islands</td>
<td>3</td>
<td>330m</td>
<td>10m</td>
</tr>
<tr>
<td>Auckland</td>
<td>3</td>
<td>320m</td>
<td>10m</td>
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<tr>
<td>Tauranga</td>
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<td>300m</td>
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</tr>
<tr>
<td>Napier</td>
<td>1</td>
<td>317m (longer may be possible)</td>
<td>12m</td>
</tr>
<tr>
<td>Wellington</td>
<td>2</td>
<td>Unlimited</td>
<td>9.2m</td>
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<tr>
<td>Picton</td>
<td>2</td>
<td>320m</td>
<td>14.5m</td>
</tr>
<tr>
<td>Christchurch (Lyttelton)</td>
<td>1</td>
<td>200m (longer may be possible)</td>
<td>12.4m</td>
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<tr>
<td>Akaroa</td>
<td>1</td>
<td>350m</td>
<td>10.3m</td>
</tr>
<tr>
<td>Dunedin</td>
<td>2</td>
<td>320m</td>
<td>12.2m</td>
</tr>
</tbody>
</table>

Thirdly, as shown in figure 2.3, Queens Wharf has been severely restricted due to its size in accommodating large vessels, the length of vessels that can dock is up to 320 metres with maximum berth depth of 10 metres which would not satisfy the continuous growth for bigger vessels that beyond the length of 362 metres. The size of Shed 10 is also constrained by the max capacity of 3,000 passengers which would not be able to meet the requirement to disembark a mega cruise ship with 6,360 passengers and 2,100 crews. The Princes Wharf also reaches its limit in handling and processing activities as a secondary cruise ship terminal during cruise season.

**Figure 2.3: The Table of Key New Zealand Cruise Ports and Berths**

The size of the cruise ship terminal in Princes Wharf offers is half of the size of Shed 10 which only accommodates 1,500 people at its max capacity. Meanwhile, according to the international standards, the existing cruise facilities at Queens Wharf and Princes Wharf are very basic and ordinary which may discourage cruise companies to disembark their cruise ships at Auckland, and may negatively affect visitor’s experience.
Lastly, as shown in figure 2.4, the number of passengers and cruises are projected to grow significantly over the cruise season of 2015/16 and 2016/17. However, the number of passengers is projected to decrease in the 2016/17 season. According to the research of Ministry of Business, Innovation and Employment, “the cruise industry is expecting that mega cruise ships of around 350 metres will visit Auckland during the next five years with increasing frequency.” Meanwhile, Auckland's cruise industry is not capable of disembarkation of larger cruise ship which results in the decrease in the number of passengers coming into Auckland. The scoop independent news also stated that “With larger cruise ships this will take passenger numbers to nearly 400,000 or potentially as high as 450,000 by 2030. The fast growth of the cruise sector in Asia offers a fantastic opportunity for Auckland to receive more cruise ship visits from newer cruise ships and to be able to encourage Asian tourists to visit Auckland and take a cruise in New Zealand.” Therefore, the Auckland's cruise ship industry needs to be improved to meet this increasing demand of larger cruise ships while the cruise ship terminal must have the ability for future expansion. As well as, the it needs to have the ability to compete with the other cruise ship terminals within New Zealand and even outside of the country.

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2.3 The Cruise Ship

Leisure of Cruise Ship – From past to present

In the earliest time, vessels were only operated as shipments that transport goods within a country and even between countries. In the year 1844, the new industry of leisure cruise ship began to be popular as people want to travel around the world. During the 1850s and 1860s, cruise industry was expanding and developing lots of quality cruise ships to create a whole new level of cruise’s experience for the passengers. In that time, vessels provide cruise services were offered to passengers, instead of just being cargo vessel for transporting goods. The development of cruise ship added design features like electric lights, more deck spaces, and entertainment to accommodate the passengers with leisure experience. According to Josh Briggs, the first purpose-built cruise ship launched in 1900, the Prinzessin Victoria Luise has a length of 124 meters and width of meters with the weight of 4,409 gross tons.\(^5\) The cruise ship industry thrived at those times which were helped by the push of the new development of the steam engine and the invention of larger cruise ship.

All of these factors increased the number of American immigrants to populate the ocean liners. In the early 20th century, the concept of the superliner was further explored by the Germans, and their goal is to construct a massive and entertaining floating city on the ocean. The design of these superliners are aimed to develop a series of entertainment activities and accommodations to provide enjoyment and comfort for the passengers, as well as, the superliners should be able to withstand the extreme weather conditions in the ocean. Nowadays, cruise ships are bigger than before, the current biggest cruise ship, Allure of the Seas, has a length of 362 meters with max passenger capacity of 6360 passengers. This massive floating city breaks the traditional ocean liners which attempt to enhance their speed, technology, interior features, and entertainments that make the ocean travel a remarkable experience for the passengers.

Auckland’s Cruise Ship

The cruise industry is one of the key elements of Auckland’s strategies to promote tourism in the country. As figure 2.5 shows, Auckland plays a major role in the New Zealand cruise ship industry as it is the primary cruise ship terminal, where a cruise ship ends and starts a cruise, as well as transits through to other places. According to information from Auckland Council, “Cruise ships are expected to bring $250 million to Auckland’s economy in 2015. GDP returns from cruise ships are increasing: last season 2014, cruise ships were worth $190 million to the Auckland economy, up almost a fifth on the previous season.”

This data indicates that cruise industry is the third-biggest market for the tourism industry at Auckland.

**Figure 2.5:** Exchange and Transit visits to Auckland between 1998 and 2014

Auckland’s Cruise Seasonal Period

<table>
<thead>
<tr>
<th></th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
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<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Aug</th>
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<tbody>
<tr>
<td>2014/15</td>
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<td>11</td>
<td>11</td>
<td>16</td>
<td>26</td>
<td>9</td>
<td>8</td>
<td>4</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2013/14</td>
<td>3</td>
<td>10</td>
<td>12</td>
<td>14</td>
<td>17</td>
<td>18</td>
<td>3</td>
<td>5</td>
<td>3</td>
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**Figure 2.6:** Number of cruise ship visiting Auckland each month for 2013/14 and 2014/15.

The information in figure 2.6 shows that during Auckland’s summer is between November and March, is the Cruise Ship Seasonal Period. From April to October is the non-cruise ship seasonal period, therefore, the spaces of the cruise ship terminal need to be flexible so that it could be transformed into another functional activity. As well as, being able to meet the demands of spaces, and operate the space throughout the year.

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Case Study of Cruise Ship: Allure of the Seas

The figure 2.7 shown how massive is the Allure of the Seas, it is almost likes a floating city on the sea. This is the newest and largest cruise ship scheduled to visit New Zealand in the future. Based on the article of Hayley Hannan, she mentioned that the cruise industry is growing and Auckland is struggling to compete with it. Auckland is not capable to accommodate this mega cruise ship which has been constrained by the current size of wharf and infrastructure. Therefore, Auckland needed to urgently develop a scheme for the relocation of the primary cruise ship facility to maximise the industry’s economic potential. Hayley Hannan also mentioned that the recent PriceWaterhouseCoopers report shows each cruise passenger spends an average of $250 per day. In other words, when this floating town is disembarked in Auckland’s port, the 6000 passengers could generate a potential income of $1,500,000 per day. Based on this information, the cruise ship facility needs to be designed to accommodate up to 7000 passengers to be able to satisfy the ongoing demands of cruise industry in the future.

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8 Ibid.
The size of the cruise ship is one of the key influences when a person settles on how to spend his or her holiday. The figure 2.8 shows that the cruise ship industry has significantly developed their cruise ship to be comfortable, luxurious, and technology advanced to dominant the tourism industry over the years. The developments of larger cruise ship are always the cause of excitement for the cruise ship passengers because the larger cruise ship could accommodate, the more activities and entertainments available, such as more swimming pools, bars, restaurants, rock climbing, movie theatre, and much more.
3.0 CASE STUDIES

The following case studies examine in detail the successful examples and precedents that apply contemporary design approach in the ferry terminal while reflect on the environment and context.
3.1 Critical Review of Current Knowledge - Precedents Study

Project Name: Yokohama International Passenger Terminal
Location: Yokohama, Japan
Architect: Foreign office Architects
Project Completion Year: 2002

Site Area: 11 acres
Floor Area: 34,732m²
Total Length of the Terminal Building: 430 metres
Number of Storeys: Two Storeys + Roof Top Plaza

Yokohama International Passenger Terminal is a public infrastructure that illustrates has functional spaces for cruise ship facilities and civic facilities for the locals to enjoy and to be proud of. The platform of Yokohama International Passenger Terminal has a total length of 430 meters with 15 meters in height. The terminal is surrounded by the sea, it features Yokohama’s best views of the Minato Mirai skyline, and the terminal is one of the most creative and successful architectural achievements in Japan.

Figure 3.1: The bird-eye view of Yokohama International Passenger Terminal
The Configuration of Spaces
This cruise ship terminal has two stories above ground level with an accessible green roof top, and a basement level that spreads across the site in a total site approximately 11 acres. Figure 3.3 illustrates that the first floor has parking space, and the second floor has cruise functional spaces that include cruise deck, information centre, passenger hall, ticketing counter, shops, and cafes. Meanwhile, the spaces of cruise deck contain facilities like customs, immigration, and quarantine. Lastly, the roof platform has public square, green space, and observation decks which made of strips of wood with curved shapes to form a pathway for the family or for a romantic date spot.

Figure 3.2: The bird-eye view of Yokohama International Passenger Terminal from the Entrance.

The Advanced Technology

The first precedent is the innovative Yokohama International Passenger Terminal, a hyper-technological design that explored new frontiers of architectural form and simultaneously provoked a powerful discourse on social responsibility of large-scale projects to enrich shared urban spaces. As described on the Arch Daily, a computer-aided design was used to make the astonishing appearance of the terminal possible. The terminal is designed by using a number of complex surfaces through the circulation diagram in the section of the building that forms moderate curve and fold to achieve the idea of continuity within this inhabitable architectural topography. Also, by looking down from the observation deck, the wave-like oscillations can be seen due to the elevation of the floor. This pattern creates passageway and openings into the massive and enclosed spaces below. The principle of this novel architectural language was due to the changes in the elevation of the floor (sometimes subtle, sometimes sharp).

Adam Rohaly states that “the terminal is a shed building measuring 412 meters in length and composed of 27 steel trusses averaging 42.5 meters in span and placed at 16 meter intervals.” As figure 3.3 illustrates, the structure of the cruise ship terminal creates a wide open space that free of beams and pillars to form flexible spaces to correspond with the movement of high foot traffic from cruise passengers. The design of deep open plan also benefits the parking area on the ground floor to allocate extra car parking spaces. This cruise ship terminal was designed in a way that is functional and efficient for the public and workers to welcome countless cruise ships with four berths, and passengers with unmatched Japanese hospitality. Albert Ferre also mentions that “Our first move was to set the circulation diagram as a structure of interlaced loops that allow multiple return paths.” As figure 3.4 shows, that the structure of the cruise ship terminal is resting on top of the concrete pier with repetitive structural units expanding throughout the cruise ship terminal to form a smooth curve surface that creates a sense of continuous cycle, for it could either operate as a cruise ship facility or a civic building for the locals.

Figure 3.4: The Structure of Yokohama International Passenger Terminal

The second design precedent is Proto Cruise Terminal which has a stunning curve form that attracts the visitor’s attention. The cruise ship terminal strategizes to improve the commercial efficiency and better urban integration with the city of Porto.

Figure 3.5: The Exterior Perspective of Proto Cruise Terminal

The Programs

Proto cruise terminal was created to be a public infrastructure which functions as a cruise ship terminal, faculty of science and technology for the University of Porto, as well as a public functional space like restaurant and event room. The form and internal spaces was carefully designed for the special programs. Therefore, there is hardly an external window because all the spaces and laboratories are looking toward the atrium.
The Form

The figure 3.6 shows that the form of the cruise terminal has an oval drum as a main building mass with a spiral centre that eventually stretches out into four tentacles. The Arch Daily mentions that “the curved blades generate and prolong themselves in the form of 3 main exterior tentacles and a fourth falling inwards, in a helical ramp connecting the internal functions with a quadruple height space. The unrolled exterior arms lead the investigators level to the seaside and the departure level to the cruise gangway or to the elevated walkway towards the beach and the city.” As shows that one of the tentacles stretches out in long length to connect with the land and sea, as well as operates as a concourse to lead the cruise passenger into the terminal. Eventually, the flows of all the tentacles would unite together in the central atrium of the terminal to create a sense of connection.

Figure 3.6. The Conceptual Hand Drawings of Proto Cruise Terminal

Figure 3.7: The Sectional View of Proto Cruise Terminal.

The third design precedent is White Bay cruise terminal at Sydney, Australia. The cruise ship terminal showcases a contemporary roof canopy that covered the terminal from a historical gantry crane structure. The design approach is a straightforward, stylish assembly of components and pleasant combination of new and old.

**Figure 3.8:** The Exterior View of Gangway at White Bay Cruise Terminal

**Design for Adaptive Reuse**

The White Bay Cruise Terminal is a replacement for Wharf 8 on Darling Harbour which was closed to make way for the Barangaroo development. The figure 3.8 shows that this new terminal design reuses a degraded industrial site at White Bay Wharf, as well as, utilises the enormous 1960’s crane gantry structure as the primary roof structure to suspend the undulating roof. According to Arch Daily, the remembrance of crane gantry structure reflects the history of previous industrial site which is “a home port for the world’s first regular international containerized shipping service operates between Sydney and Europe in the late 1960’s”. The 1960’s crane gantry structure has a strong story of adaption in this design proposal which makes it unique to the cruise ship terminal design that it cannot be simply reproduced in other countries. The design of adaptive reuse also showcases the success in the integration of sustainable design in using the new and historic structure into this cruise terminal. This new terminal development would help Sydney to reinforce its character as the region’s best cruise destination, as well as to meet the high demand of leisure cruise ship industry in Australia.

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Figure 3.9: The Exterior View of 1960’s Crane Gantry Structure at White Bay Cruise Terminal

Design of Suspended Undulating Roof

The figure 3.9 shows the undulating steel and aluminium roof suspended from the massive steel gantries, while the three sides of the wall enclose with glass clad structure which forms an illusion of giant wave object floating above the ground. This suspended undulating roof create an expanse for the interior to allow light and ventilation into the open space, as well as provide a flexible area suitable for wide range of programs like commercial events, functions and much more. The use of full-height glass walls also opens up harbour sceneries back to the city skyline to the east.

Figure 3.10: The Interior View of White Bay Cruise Terminal
3.2 Critical Review on the Auckland Cruise Ship Terminal – Shed 10

Project Name: Shed 10  
Location: Queens Wharf, Auckland  
Architect: Jasmax  
Former Use: Industrial Warehouse  
Constructed: 1910  
Rehabilitated & Completion Year: 2013

Shed 10 is one of the last remaining examples of industrial warehouses on the Waterfront Auckland which was constructed in 1910. It is also a part of the Queens Wharf Category 1 Historic Place, and results in this project include a strong heritage element. Shed 10 has been refurbished to a high quality urban design which is a dual purpose cruise ship terminal that also provides a multipurpose event venue.

Figure 3.11: Perspective View of Shed 10 Exterior

The Configuration of Terminal Spaces

This terminal building has a max capacity of 3,000 passengers which is twice the size of the cruise facility on Princes Wharf. The configuration of spaces for the programs and functions of cruise facilities and venue worked around the open space plan of the existing site area of Shed 10. According to Justine Harvey, “shed 10 is expected to receive vessels for about 80 days of the cruise season.”14 During the cruise season, the first floor becomes the passenger lounge as shown on figure 3.17, which includes a ticketing area, passenger hall, and customs and quarantine. Meanwhile, the ground floor operates as luggage's scanning area, security, and border agency processing to gain access into the country. Another advantage of locating all these large and portable scanning devices on ground floor would make it convenient for installations and removals to make way for the multipurpose event venue during non-cruise season. According to Christopher Blow, “vertical stacking of arrivals and departures is for the large scale terminal’s configuration.”15 This configuration of spaces between arrivals and departures are located on different levels which is the most efficient, economic, and convenient way for passenger and baggage movement. Therefore, the passengers can smoothly proceeded from cruise ship to Shed 10 through the cruise gangway, figure 3.16, for entering the immigration and customs. As for the luggage, it would directly proceed to the ground floor for large luggage checking which is convenient for the workers to unload, and for pick up by passengers to pick up. This configuration of terminal spaces is efficient for disembarkation and embarkation, resulting in interesting and enjoyable journey for the passengers.

The Structure

The figure 3.12 shows that the original structure of Shed 10 has been refurbished and exposed the steel roof trusses, the diagonally placed timber ceiling, the scratched matai flooring, play a vital part in introducing the locals and visitors in learning Auckland’s Waterfront history as a significant trading wharf both operated before and after European settlement.
The Flexible Design
The design of deep floor plan can be achieved by locating the service cores like toilets, lifts, and staircases on the both end of building. This design intention is to maximise the flexibility of space to transform from cruise ship terminal into a multipurpose event venue during non-cruise ship season. By locating the service cores on the building, it provides easy access for the public, and creates fastest exit route during fire evacuation.
The Innovative Thinking

According to Lynne Richardson, Shed 10 also imported “the multi-million-dollar gangway which is a special piece of equipment similar to an airport airbridge. It will automatically move up and down as the vessel move with the tide and will allow the rapid transfer of passengers between the vessel and Shed 10.”16 This convenient tool has also enhances the experience of leisure travel into the country.

The Adaptive Reuse

This is a very successful project in the design of adaptive reuse on this historical building. Jasmax acknowledged the importance of the originality of Shed 10 aesthetics. Therefore, there is minimal design change on the exterior of Shed 10 to retain the existing form and fabric of the shed, other than creating big openings for natural ventilation and lighting into the building. While the interior of the structure has been refurbished in a way to retain and preserve numerous heritage features, it also creates flexible spaces to accommodate cruise facilities and venue space.

Shed 10 is focused on the design scheme of sustainability to create a great impression of innovative and forward-thinking to the visitors and public. Firstly, in the article of New Zealand Construction News, it mentioned “The solar panel system is consisted of 240 photovoltaic panels, each measuring 165 x 99cm, and covering an area of 400 m²”\(^\text{17}\). The largest solar panel system is capable of producing renewable energy at an estimated value of 84,000 kWh per year. This amount of renewable energy is equivalent to the average annual energy use of 10 households. Secondly, the floor plans of Shed 10 are designed to have enormous open areas that welcome natural day-lighting into the deep floor plan from both sides of the windows. Thirdly, the design of large openings is to enhance the efficiency of natural ventilation and natural day lighting for the building. This innovative movement considers the importance of sustainable design that could generate sustainable energy resource solution to ensure our city to become a greener city. This innovative movement also showcases the benefits of renewable energy and green building techniques which would make Auckland the world’s most sustainable city.

\(^{17}\) Lynne Richardson, "Shed 10 on Auckland’s waterfront goes solar", New Zealand Construction News, April-May 2013, p3.
4.0 SITE ANALYSIS

This chapter assesses and analyses the possible location on Auckland waterfront and selects a suitable candidate for the relocation of primary cruise ship terminal.
4.1 Site selection for the new built primary cruise ship terminal on the Auckland waterfront

The site selection for the relocation of the new primary cruise ship terminal is to be determined by the location and configuration of a site in the area of Auckland waterfront. Auckland waterfront is a location where passengers and cruise companies are favoured about because the site provides diverse of activities for the passengers, and lots of business opportunities for the cruise companies. Most importantly, all the facilities and services are already in place for the expansion and development on Auckland waterfront.

There are a couple solutions that have been made and taken account for in the future expansion of the primary cruise ship terminal based on the analysis in. These site analyses would determine the best solution for the relocation of the new primary cruise ship terminal on Auckland waterfront.

Figure 4.1: The proposal of relocation of the new primary cruise ship
Option 1: Queens Wharf becomes the primary cruise ship terminal, while Princes Wharf becomes the secondary cruise ship terminal that can also accommodate mega cruise ship. This design proposal involves extending the current Queens Wharf and Princes Wharf to the size that could accommodate mega cruise ships. The cruise ship terminal facilities will also need to be redeveloped to accommodate up to 7000 passengers for the disembarking of mega cruise ships. Analysis of option 1: This design movement of extending the Queens and Princes Wharf would raise concerns from the locals, because it was being rejected about the reclamation of site. The reason is the wharf extension would destroy sights from the downtown area overlooking the Rangitoto Island and North Shore City. This would create lots of impacts on the economic, social, and environmental aspects of Auckland Waterfront.

Option 2: Marsden Wharf would be demolished to make way for Bledisloe Wharf to become the primary cruise terminal, while Princes Wharf becomes secondary cruise ship terminal. As for Queens Wharf, it will be returned to the people to use it as a public space. According to the article of Paul Murphy, he wanted Queens Wharf as a “place for all people, an area rich in character and activities that link people to the city and sea”. The locals waited for this opportunity for a long time, finally this proposal considers what the locals need and want. Analysis of option 2: This design proposal has been favoured by the locals because this proposal is the solution to public’s concern. It considers that the waterfront and harbour edge should be designed to create a public space for public access. As the CBD Area begins to extensively develop, the area will be populated with residents and workers. Therefore, the desire to have public space is much wanted for more pleasant walks into a designated open space and promenade to the harbour edge. This proposal also would restrict large and heavy vehicles servicing the port which will somehow free up the traffic flow for the operation of the ferry terminal.

Option 3: This option is looking at the possible extension of Captain Cook Wharf to become the primary cruise ship terminal and berths larger cruise liners on both sides of the Wharf simultaneously while Princes Wharf will be used as secondary cruise ship terminal. This relocation of space transforms Queens Wharf into a public space for the locals and even visitors for stopping and staying, as well as location for hosting major public events. Analysis of option 3: This design movement of extending the Captain Cook Wharf and Bledisloe Wharf would raise the concerns from the locals being rejected because of the reclamation of site. According to Bernard Orsman, the reason is the wharf extension would destroy views from Queens Wharf overlooking to Rangitoto Island and North Shore City. This scale of expansion would also inflict environmental issues such as disturbing marine animals and habitat. Therefore, locals wanted the Auckland Council to set up tougher regulations on the reclamation site at Auckland waterfront to lessen the impacts to economic, social, and environmental aspects.

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18 Paul Murphy, Waterfront dream a case for open city space. (Auckland: New Zealand Herald, 2010), sec A.
19 Paul Murphy, "Waterfront dream a case for open city space.” (Auckland: New Zealand Herald, 2010), sec A.
20 Bernard Orsman, "Crowds protest plans to extend wharf," New Zealand Herald, March 22, 2015, sec A.
Option 4: Queens Wharf becomes the primary cruise ship terminal, while Princes Wharf becomes the secondary cruise ship terminal. However, Marsden Wharf would be demolished to make way for the ferry terminal to resolve the traffic congestion between cruise ships and ferries.

Analysis of option 4: This proposal would resolve the traffic congestion between cruise ships and ferries. However, this would not resolve the traffic congestion at the downtown area. This approach would generate a lot of large vehicles servicing around the area which is not the best solution for the long term plan. Secondly, the demolition of Marsden Wharf is not an economical and sustainable design approach to make way for certain function because it is always a good approach to consider other factors before any demolitions occur.

Option 5: The figure 4.2 is based on the research of The Waterfront Plan 2012 for Wynyard Quarter. Based on the information from The Waterfront Plan 2012, it suggested that cruise facility would be suitable for the headland development at Wynyard Quarter. The reasons were the size of Wynyard Wharf has a length of 480 metres which could easily accommodate mega cruise ships and even the future biggest cruise ship. The location of the cruise ship terminal is located at a prefect orientation based on this proposal plan. The cruise ship terminal would become a signature public building of the Wynyard Headland Park development. In this site selection’s attempt, Wynyard Wharf becomes the primary cruise ship terminal, while Queens Wharf becomes the secondary cruise ship terminal. As for Princes Wharf, it would become temporary cruise facility when the primary and secondary cruise ship terminals are fully occupied.

Figure 4.2: The proposal of primary cruise ship terminal to be relocated at Wynyard Wharf (Option 5)

Analysis of Option 5: This approach would provide additional berthage capacity at the Auckland waterfront. As well as resolve the traffic congestion in the Downtown area whether it is on the road or sea. Secondly, the site can be expanded in the future. Thirdly, the site offers diverse activities that happen year around for the locals and visitors to enjoy. Fourthly, the site is a friendly site with well planned public transportation and easy to access services vehicles. Lastly, the design approach would create a great impression to the passengers since the surrounding site has been carefully planned to meet the requirements of a liveable city with sustainable design approaches.

Evaluation on Site Selection

In this site analysis, Queens Wharf would seem to be the most favourable site for the redevelopment due to the fact that the current cruise ship facilities are already present. However, Queens Wharf seem to be struggling to cope with the on-going growth of industry in cruise ship. Furthermore, Queens Wharf has issues with future demands, and the inability of mega cruise ships to dock there. According to Paul Murphy, the vision for the locals is to redevelop Queens Wharf into a “people’s park”. Therefore, the new built cruise ship terminal is to relieve the issues of berthing numerous cruise ships and mega cruise ship, as well as, returning Queens Wharf to become a public square. After a carefully consideration, Wynyard Wharf is the most favourable site to relocate the primary and signature cruise ship infrastructure among these five options. The reason is Wynyard Wharf has a geographical advantage with the extensive public transport networks, and unlimited potentials to be unleashed that can offer efficiency to operate as an ultimate tourism hub for range of tours either sightseeing or dining or cultural activities in the Auckland CBD. The relocation of the cruise ship terminal to Wynyard Wharf offers bigger berthage space for the future growth of cruise ships and mega cruise ships which would welcome larger cruise liners into Auckland later on. The design intention of relocation of cruise ship facility would also be to reconnecting the site of Wynyard Quarter with the city centre and its waterfront. As for Queens Wharf, Shed 10 will function as a secondary cruise ship terminal when Wynyard Wharf is fully occupied. Therefore, Shed 10 would be untouched for the further cruise ship development. In a result, Queens Wharf would be able to redeveloped into a public square on the northern end of the site while integrates with the current cruise ship facility at Shed 10.

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4.2 Site Analysis

Figure 4.3: Site Analysis of the chosen site in the current plan of Wynyard Point

Wynyard Quarter is located at the Waterfront Auckland which is along the Waitemate Harbour. The site includes roughly 37ha of reclaimed land, and has nearly 3km of harbour edge. As shown in figure 4.3, this reclaimed of land has been primarily used as a site for commercial, industrial, and marine activity which was distinctively designed for these applications. The site has long been habituated to a number of liquid chemical plant storage facilities which has been called as the “Tank Farm”. The industrial wasteland is known for polluting the harbour which has just recently been reclaimed and planned to transform the area to a multi-purpose facility for residential and commercial centres, while it also integrated with lots of green open spaces for the locals and visitors to enjoy which has been shown in figure 4.2. In the Draft Waterfront Plan 2012, it mentioned that the signature public infrastructure could be potentially used as a primary cruise ship terminal at Wynyard Point as part of the Headland Park Development, which will overlook the Waitemate Harbour and proudly display a cleaner and brighter landscape. The chosen site for the development of cruise ship terminal is the coloured area which shown in figure 4.3. The plan is to balance the quality of work in the Quarter and life of the locals. Therefore, the site could be operated throughout the day and night with various activities happening both for the public and visitors to enjoy.

The site of Wynyard Headland is surrounded by ocean on three sides, and the fourth side by Fanshawe Street which create major concerns in terms of accessibility. The main challenge is the impacts on transportation, therefore, the new development plan of this site needs to modify the public transportation services to limit the amount of private vehicles driving into the site. The new development plan would also revitalise the areas by having a combination of commercial, residential, retail, and public space development. As part of the vision for Wynyard Quarter Development, the new development plan would include the priority in preserving and supporting the heritage and character of the site, connecting healthy and safe public transport option, energetic and engaged communities, and better facilities. In this way, it can create a sense of diverse and energetic residential and commercial community while maintaining the current marine and fishing industries.

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4.2.1 The proposed plan of indicative land-use for Wynyard Quarter Development

In figure 4.4, the proposed plan of indicative land-use for Wynyard Quarter Development does not include reusing the existing features, the bulky tanks. The reason was the bulky tanks are an unpleasant feature in the Wynyard Quarter, and they are scattered around the site which makes it difficult to accommodate and utilise. As part of the vision for Wynyard Quarter, they would like the site to be refurbished in an environmentally sustainable way based on the current unitary plan. Therefore, the adaptive reuse of the bulky tanks would become an important requirement to fulfill the vision of the major landowner, Waterfront Auckland. The bulky tanks would become the design driver to be integrated into the designing of cruise ship terminal. The bulky tanks would leave a trace of the tank farm’s history within the cruise ship terminal, as well as, respect the physical and urban properties of tank farm. Therefore, the design of cruise ship terminal would have a strong relationship and meaning with the context of the site.

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In this draft plan for 2040, figure 4.5, the tank farm will be demolished and refurbished into a mixed use buildings surrounded by an expanse for the locals and visitors to enjoy, play, and gather. According to the Unitary Plan, “The Headland represents one of the greatest new open space opportunities that will be available to Auckland.”\textsuperscript{26} As well as, the public space opens up stunning scenery to the city skyline. The site also features a signature public building, ferry terminal, fishing industry water space, mixed use building, and residential apartments to make the site lively and entertaining. Wynyard Quarter will become an innovation hub that represents one of the greatest sites that develop the idea of sustainability design.
The demolishing of all the bulky tanks is an unnecessary for this site because the bulky tanks have a historic heritage value to the site as a memory of industrial tank farm. This would be an interesting challenge in proposing a design because you have to present a memorable and pleasant experience for cruise passengers to walk pass through the modern tank farm at Wynyard Quarter. As a result, the development of tank farm would be an advantage considering the industrial context, and retaining several massive tanks as spaces to accommodate various programs and functions with integration to the cruise ship terminal design would be beneficial in the long run. Therefore, the sustainability and heritage objectives of the Wynyard Quarter will be achieved; and highlighted to become internationally for its redevelopment site.
Figure 4.7 is the current plan of Wynyard Quarter. This plan shows the current layout of the site and context of Wynyard Quarter, as well as the current position of bulky tanks, and heritage buildings that needs to be preserved on this site. This figure 4.7 also indicates the advantages of Wynyard Wharf which are the length of 480 meters and openness to the sea that can accommodate the biggest cruise ship up to the length of 480 meters in the future, and connect with the Waitemata Harbour to allow easy disembarking.

In this design proposal, as shown in figure 4.7, only a few of the biggest bulky tanks are preserved as part of the memory of tank farm and historic heritage value of the site. The decision to the biggest bulky tanks is based on their flexibility and internal floor space, therefore, the internal floor space of tank could be readapted and refurbished to accommodate various functions like markets, community centre, exhibition, venue space and much more for locals and visitors to enjoy.

Figure 4.7: The Current Plan of Wynyard Quarter.
As shown on figure 4.8, this is the proposed plan of Wynyard Quarter based on the information from the readings of Wynyard Precinct: Urban Design Framework, and Part 14.9 – Wynyard Quarter. The relocation site of primary cruise ship terminal is on the edge of the Wynyard Wharf. Therefore, a new gangway would be designed on the Wynyard Wharf to transfer passengers between cruise ships and the terminal. The intention of view shaft openings for the terminal site is to ensure the panoramic view of Waitemata Harbour is not completely obstructed by the terminal design. The planning and design of cruise ship terminal would also integrate the bulky tanks to achieve best contemporary design approach that flexible and creative to harmonize well with the context of industrial character for the site. As well as, the cruise ship terminal would become a landmark, and create an exciting experience for passengers while disembarking at this world class destination that has unique culture and maritime history.

The current operation of Sealink would need to be relocated to the east side of Wynyard Quarter, as shown in figure 4.8, to prevent congestion between cruise ships and ferries. The action of relocating the site of Sealink is also trying to spread out the activities evenly across the site of Wynyard Quarter, therefore, the site is full of activities in different perspectives.
This figure 4.9 indicates the proposed site has created lots of green open space on the key pedestrian and cycle routes for the locals and visitors to enjoy. Firstly, the connection between the buildings and green open spaces has created a high quality and interesting walkway around the site. Secondly, all the key pedestrian and cycle routes, buses and coaches route are built for sustainability purposes as people will no longer rely on public transport. Thirdly, according to the sun study of the site, the precinct of Wynyard Quarter has the advantage of utilising the photovoltaic roof installation to maintain a low carbon community and preserves the earth’s resources by obtaining renewable, clean, and universal power sources. Finally, the proposed street network creates an easy access and circulation between transport modes. It also defines streets and public spaces very clearly to respect the urban structure to create a warm welcome for the locals and visitors to explore around the site.

**Figure 4.9:** The Proposed Plan for Wynyard Quarter Development based on the Information from District Plan
4.3 Examples of Tank Farms and the Case for Rehabilitation

This part discusses some of the reasons why the tank farms’ operations are no longer appropriate for the sites they have occupied over the last century, the general nature of fuel storage and state of the industry at present.

Project Name: The Tank Cultural Space
Location: Santa Cruz de Tenerife, Spain
Architect: AMP Arquitectos, Artengo-Menis-Pastrana
Constructed: 1929
Rehabilitated & Project Completion Year: 1997
Site Area: 5,840m²
Total Constructed Area: 2,295 m²
Enclosed Area: 313.75m²
Former Use: Oil Storage Tank (column supported flat roof)
Current Use: Cultural Exhibition and Performance Venue

This extensive tank farm and oil refinery was one of the glorious places at the downtown and waterfront of Santa Cruz de Tenerife in 1930. As the oil operator modernised their oil operations, the oil operations has been moved elsewhere. Therefore, the tank farm was rehabilitated to an urban space as part of a wider urban development for the area. This is one of the successful attempts in restoring of oil storage tank into a contemporary, open, brilliant, and industrial culture space in Spain; which has been rehabilitated and reprogrammed into a cultural venue and gallery for exhibitions. In the article of David McManus, he mentioned that this tank is a survivor of the past which leave an evocative impression as a memory of the quality of cities’ oil industrial.

Figure 4.10: The exterior view of tank cultural space
The Structure and Materials

Almost all the structures and materials have been retained to achieve a quiet and non-obtrusive manner. The services like entrance, lobby, and restrooms are buried underground to the side of the tank and access from outside and to the interior are connected by a ramp. The design approaches has minimised the possible destruction to the structurally weak steel exterior. As for the interior, it remains largely unchanged, which is simply clean and adapts the interior space. The walls and the construction of the spaces use hard and coarse materials, and the presence of the steel columns also adds an explicit atmosphere of industrial environment. This project utilises the quality of the existing structure and industrial tank to transform the interior space into an ever changing space which is enhanced for the display of art and installations.\textsuperscript{27} 

Figure 4.11: The interior view of tank cultural space

\textsuperscript{27} Daivd McManus, “A Ring for an Old Tank” accessed September 4, 2016, http://www.e-architect.co.uk/spain/espacio-cultural-el-tanque-de-santa-cruz-de-tenerife
The Gasometers are the four former coal gas storage tanks which were used to provide town gas in the Slimmering district of Vienna in 1899. However, town gas was replaced by natural gas which forced the Gasometers to shut down its operation between 1970-1978. Since then, the gas tanks have been forgotten. In 1995, the gas tanks have been revived and rehabilitated for residential and commercial purposes.

Figure 4.12: Southside of Gasometer Vienna.

The Programs
According to Wiener Gasometer, “Gasometers listed as country’s heritage ministry as outstanding examples of industrial architecture”. Therefore, the exterior cladding of the gas tanks has been retained as part of historic monuments for its classical design. While the internal structure and floor plans have been removed to create generous and functional spaces for the shopping mall in the ground floor, office spaces in the middle floors, and apartments in the top floors, they still readapt the existing cladding of gas tanks. The shopping mall in the ground floors is connected with a sky bridge. Each gasometer was individually designed by different architects for different design approaches. However, all the design approaches are based on the same program except gasometer C which was transformed into hotels and facilities for the planned World Expo in Vienna. The programs of Gasometer was successfully transformed the industrial site into a large physical housing community, as well as an active entertainment central to make the space lively and pleasant.

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As shown in figure 4.13, Gasometer A, Jean Nouvel has constructed an enormous indoor square with a translucent glass roof playing with reflections and refractions of natural day lighting into the square. The indoor square also allows natural day lighting reflecting into the apartments.

**Figure 4.13:** Large Indoor Plaza in Gasometer A

As shown in figure 4.14, Gasometer B, Coop Himmelbau has created three new masses to integrate with the existing brick veneer of gas tank. The first volume of the building is designed within of the gas tank. The remaining two volumes of the building are attached on the outer layer of the gas tank to create a striking facade on the street front. The outer layer of the volume is also housed a multifunctional event hall which is located in the base of the Gasometer.

**Figure 4.14:** A Striking Facade for Gasometer B
As shown in figure 4.15, Gasometer C, Manfred Wehdom has created a large indoor garden in the centre of the gas tank to filter natural daylight into the hotel rooms, and an eco-friendly designed terrace. The world expo exhibition space is also allowed natural daylight to filter through the central void of the ground floor to permit natural light to fill through the deep floor plan of exhibition space.

Figure 4.15: A Striking Facade for Gasometer C

As shown in figure 4.16, Gasometer D, “Wilhelm Holzbauer has occupied the center of the existing building with lift and stairs, from which three compact sections were divided by indoor gardens penetrating the perimeter of the existing building”. 29 This design approach has utilised the existing wall of gas tank as an enclosure which somehow developed a village character within its own city.

Figure 4.16: A Striking Facade for Gasometer D

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5.0 FUNCTIONAL REQUIREMENTS

This chapter creates a design strategy with the consideration of the criteria and principles outlined in the previous chapters and apply them to a project for the new international cruise ship terminal at Wynyard Wharf.
5.1 Architecture Response
The first architecture response is the adaptive reuse of the bulky tanks on Wynyard Quarter. As shown in figure 5.1, the existing smaller tanks would be removed, that it creates the voids on the building block that meets the tank. The voids create by the tanks will be part of the memory of industrial character for Wynyard Quarter. As for the existing position of larger tanks, these will be re-habilitated and integrated with the building block to form as a whole to function as part of the cruise facilities. The design idea of adaptive reuse was inspired by the precedent study of White Bay Cruise Terminal, it would make the design project becomes unique while it preserves the meaningful and historical site of Wynyard Quarter.

![Figure 5.1: The Architecture Response for Bulky Tanks](image)
The figure 5.2 illustrates the second architecture response for this design research which is the design idea of form determines by the circulation. The design idea obtains from the precedent study of Proto Cruise Terminal which discussed in the earlier chapter, 3.1. This is an interesting design idea to be implemented in constructing a curved platform around the bulky tank’s site to reconnect the bulky tanks with the new development of cruise ship terminal on Wynyard Quarter. Therefore, the stretched tentacles would fall inwards to the cruise ship terminal, as well as, the tentacles would stretch outward to connect with the bulky tanks and the public square. The stretched tentacles would turn into platforms for locals and visitors to walk on, while exploring the site.
5.2 Programme

The programme of cruise ship facilities are divided into four barriers, either enter or exit between cruise ship terminal and cruise ship. As shown in figure 5.3, the landside barriers create a different degrees of experience and security control over each space. As it enters the inner part of the cruise ship terminal, the security control of the space is restricted to only passengers and employees from customs to operate within the space.

Figure 5.3: The Programme of Cruise Ship Facilities
5.3 Design Guidelines for Urban Waterfront Proposal Master Plan
The new international cruise ship terminal is associated with the urban waterfront development plan at Wynyard Quarter to create a program as a whole to revitalise this industrial site into a lively public space.

5.4 Design Guidelines for Signature Cruise Ship Terminal
This cruise ship terminal needs to be integrated with the contemporary architectural design, and interactive and lively public use. The design guidelines for the cruise ship terminal are provided to ensure a healthy and safe terminal for the public while they are enjoying the high quality network of cruise ship facilities, the activities of retails and restaurants, parks, and community facilities.

Maximum Building Height
The maximum building height of the chosen site is 27m. However, they need to build a terminal with respect to the surrounding building height whilst protecting the view of the Auckland Waterfront. This design proposal would not challenge the limit of maximum building height, rather than, the design of cruise ship terminal would concentrate on the spatial requirements.

Minimum Floor to floor/Ceiling Height
The ground floor of the building needs to adapt to a wide variety of uses over time, and receive adequate sunlight and daylight access to the building. Therefore, the minimum floor to floor height is 4.5m with a minimum depth of 10m should be flexible enough for the future tenants’ use. As for the floor to floor height of building above ground floor, it needs to be at least 3.6m where those floors can accommodate the programs of retail, office, restaurants, and cruise facilities. However, for the terminal to be successfully transformed into a sport event centre during non cruise ship mode, the minimum floor / ceiling height for badminton court, basketball court, and volleyball is 9m.

Verandahs
The verandahs need to be provided along the full extent of the frontage of the building. The verandahs have a minimum height of 3m and a maximum height of 4.5m above the footpath which sets back at least 600mm from the kerb.

Present Land-Use with Potential for Contamination
There are lots of bulky tanks used as storage for petro-chemical at Wynyard Quarter at present time which contaminated soil. Therefore, the contaminated the soil needs to be dredged and deposited in an assigned and controlled environment. Lastly, the site needs to be refilled with soil.

Present Wynyard Wharf
The present Wynyard Wharf is outdated to be a modern wharf. Therefore, it needs to be reinforced to withstand the weight of the new structure of concourse.
Angle of Photovoltaic Panel

According to the study of photovoltaic panel bases on the information from figure 5.4, the appropriate angle for the photovoltaic panels to be placed on the roof top of cruise ship terminal at Auckland is 36 degrees. This angle would benefit the photovoltaic panels from absorbing the natural sunlight during Auckland’s summer and winter on the north area.

<table>
<thead>
<tr>
<th>Place</th>
<th>Latitude</th>
<th>Summer angle</th>
<th>Winter angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whangarei</td>
<td>36° 45'</td>
<td>36°</td>
<td>42°</td>
</tr>
<tr>
<td>Auckland</td>
<td>36° 30'</td>
<td>37°</td>
<td>42°-43°</td>
</tr>
<tr>
<td>Wellington</td>
<td>41° 15'</td>
<td>31°</td>
<td>56°</td>
</tr>
<tr>
<td>Christchurch</td>
<td>42° 30'</td>
<td>32°</td>
<td>57°</td>
</tr>
<tr>
<td>Dunedin</td>
<td>46° 50'</td>
<td>36°</td>
<td>61°</td>
</tr>
<tr>
<td>Invercargill</td>
<td>46° 30'</td>
<td>36°</td>
<td>61°</td>
</tr>
</tbody>
</table>

Figure 5.4: Angle of Photovoltaic Panels.
### 5.5 Cruise Ship Terminal Spatial Requirements for up to 7000 Passengers

The cruise ship terminal spatial requirements for up to 7000 passengers are calculated by the study of current cruise ship terminal at Auckland, Shed 10. Based on the study of the functional spaces for cruise ship facilities in Shed 10 and the future growth in cruise ship’s sizes, the cruise ship facilities would need to accommodate up to 7000 passengers to allow for the future expansion and growth of cruise industry. Therefore, the total spatial requirement which calculated for the cruise ship terminal to operate for up to 7000 passengers is 12,391 m².

#### Table 5.5: Cruise Ship Terminal Spatial Requirements

<table>
<thead>
<tr>
<th>No.</th>
<th>Space</th>
<th>Case Study Derivation</th>
<th>Reason for area derivation</th>
<th>Final Area (SQM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cabinets</td>
<td>Avg 50m² - 80m²</td>
<td></td>
<td>60 m²</td>
</tr>
<tr>
<td>2</td>
<td>Conference Room</td>
<td>Average meetings of 12 people is 22m²</td>
<td>-</td>
<td>22 m²</td>
</tr>
<tr>
<td>3</td>
<td>Video Monitor Rooms</td>
<td>Avg 30 m²</td>
<td></td>
<td>30 m²</td>
</tr>
<tr>
<td>4</td>
<td>Staff Restroom</td>
<td>Avg 5m² per wc</td>
<td>2 wc per ladies and gents washrooms</td>
<td>20 m²</td>
</tr>
<tr>
<td>5</td>
<td>Terminal Security Office</td>
<td>Ranges from 1.2m² - 1.5m² per person</td>
<td>Avg. 1.2m² for 10 Staffs</td>
<td>12 m²</td>
</tr>
<tr>
<td>6</td>
<td>Technical Chief</td>
<td>Ranges from 1.2m² - 1.5m² per person</td>
<td>Avg. 1.2m² for 10 Staffs</td>
<td>12 m²</td>
</tr>
<tr>
<td>7</td>
<td>Maintenance Office</td>
<td>Ranges from 1.2m² - 1.5m² per person</td>
<td>Avg. 1.2m² for 10 Staffs</td>
<td>12 m²</td>
</tr>
<tr>
<td>8</td>
<td>Storage</td>
<td>Study - 250m²</td>
<td></td>
<td>250 m²</td>
</tr>
<tr>
<td>9</td>
<td>First-Aid Room</td>
<td>Avg 20m² - 40m²</td>
<td></td>
<td>30 m²</td>
</tr>
</tbody>
</table>

Sub-Total of Administration Department: **448 m²**

### Arrival and Departure Spaces Requirement

<table>
<thead>
<tr>
<th>No.</th>
<th>Space</th>
<th>Case Study Derivation</th>
<th>Reason for area derivation</th>
<th>Final Area (SQM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Refreshments Area</td>
<td>3000 passengers per 230m²</td>
<td>Taking 7000 passengers into consideration</td>
<td>537 m²</td>
</tr>
<tr>
<td>11</td>
<td>Passenger Hall</td>
<td>3000 passengers per 540m²</td>
<td>Taking 7000 passengers into consideration</td>
<td>1,260 m²</td>
</tr>
<tr>
<td>12</td>
<td>Ticketing Counter</td>
<td>3000 passengers per 285m²</td>
<td>Taking 7000 passengers into consideration</td>
<td>665 m²</td>
</tr>
<tr>
<td>13</td>
<td>Security Screening</td>
<td>3000 passengers per 260m²</td>
<td>Taking 7000 passengers into consideration</td>
<td>607 m²</td>
</tr>
<tr>
<td>14</td>
<td>Immigration and Customs</td>
<td>3000 passengers per 250m²</td>
<td>Taking 7000 passengers into consideration</td>
<td>583 m²</td>
</tr>
<tr>
<td>15</td>
<td>Concourse</td>
<td>3000 passengers per 250m²</td>
<td>Taking 7000 passengers into consideration</td>
<td>583 m²</td>
</tr>
<tr>
<td>16</td>
<td>MAF Screening</td>
<td>3000 passengers per 155m²</td>
<td>Taking 7000 passengers into consideration</td>
<td>362 m²</td>
</tr>
<tr>
<td>17</td>
<td>Large Baggage Screening and Security Baggage Lay-Down with Temporary Screening</td>
<td>3000 passengers per 125m²</td>
<td>Taking 7000 passengers into consideration</td>
<td>292 m²</td>
</tr>
<tr>
<td>18</td>
<td>MAF Desks</td>
<td>3000 passengers per 50m²</td>
<td>Taking 7000 passengers into consideration</td>
<td>117 m²</td>
</tr>
<tr>
<td>19</td>
<td>Customs Desks</td>
<td>3000 passengers per 30m²</td>
<td>Taking 7000 passengers into consideration</td>
<td>117 m²</td>
</tr>
<tr>
<td>20</td>
<td>Security Check</td>
<td>3000 passengers per 50m²</td>
<td>Taking 7000 passengers into consideration</td>
<td>117 m²</td>
</tr>
<tr>
<td>21</td>
<td>Security / Reception</td>
<td>3000 passengers per 30m²</td>
<td>Taking 7000 passengers into consideration</td>
<td>70 m²</td>
</tr>
<tr>
<td>22</td>
<td>Public Toilets nearby Entrance</td>
<td>3000 passengers per 190m²</td>
<td>Taking 7000 passengers into consideration</td>
<td>443 m²</td>
</tr>
<tr>
<td>23</td>
<td>Public Toilets nearby Customs</td>
<td>3000 passengers per 160m²</td>
<td>Taking 7000 passengers into consideration</td>
<td>373 m²</td>
</tr>
<tr>
<td>24</td>
<td>Entry / Foyer</td>
<td>3000 passengers per 75m²</td>
<td>Taking 7000 passengers into consideration</td>
<td>175 m²</td>
</tr>
<tr>
<td>25</td>
<td>Baggage Lost and Found</td>
<td>Avg 40m²</td>
<td>-</td>
<td>40 m²</td>
</tr>
<tr>
<td>26</td>
<td>Trolley Rooms</td>
<td>Avg 50m² - 100m²</td>
<td>-</td>
<td>100 m²</td>
</tr>
<tr>
<td>30</td>
<td>Commercial Kitchen</td>
<td>Study - 50m²</td>
<td>-</td>
<td>50 m²</td>
</tr>
<tr>
<td>31</td>
<td>Tourist Information Centre</td>
<td>Avg 25m²</td>
<td></td>
<td>25 m²</td>
</tr>
</tbody>
</table>

Sub-Total of Arrival and Departure Spaces Requirement: **9,083 m²**

### TOTAL REQUIREMENTS SPACE OF CRUISE TERMINAL

<table>
<thead>
<tr>
<th>Space</th>
<th>Final Area (SQM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIRCULATION SPACE</td>
<td>9,531 m²</td>
</tr>
<tr>
<td>SERVICES SPACE</td>
<td>2,383 m²</td>
</tr>
<tr>
<td>TOTAL BUILT UP AREA</td>
<td>12,391 m²</td>
</tr>
</tbody>
</table>

**Figure 5.5:** The Calculation of Cruise Ship Terminal Spatial Requirements for up to 7000 Passengers
5.6 Technical Requirements for Vessels to Disembarkation

Requirement for Dredging
Dredging is required to disembarking mega cruise ships. The current depth of the seabed is 10 metres. The requirement of depth for disembarking a mega cruise ship based on the information of the current biggest cruise ship, Allure of the Seas, is 22.6 metres. Therefore, the seabed needs to be dredged to a minimum of 25 metres to allow a room for disembarking the future biggest cruise ship.

Tidal Range
Based on the information from Auckland’s tide, figure X, the low tide at the Auckland waterfront is around 0.4 metres and high tide is around 3.5 metres yearly. The sea tides vary from time to time. The tidal range is 3.1 metres which is quite a huge difference. Therefore, the design of concourse needs to be adjustable to the situation of low tide and high tide to allow for rapid transfer between the mega cruise ship and cruise ship terminal.

Figure 5.6: Tides for Auckland

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6.0 DESIGN PROCESS

This chapter takes the criteria and principles outlined in the previous chapters and apply them to the design of a new international cruise ship terminal at Wynyard Wharf.
DESIGN EXPLORATION 1 - To Understand the Scale of Building Mass

The design of this cruise ship terminal is based on the programs and functions from Shed 10. According to Christopher Blow, “vertical stacking of arrivals and departures is for the large scale terminal’s configuration.” 31 This configuration of spaces between arrivals and departures are located on different levels which can be efficient, economic, and convenient for passenger and baggage movement. From the list of spatial requirements, this basic sectional function schematic, figure 6.1, creates an understanding about the building blocks in relation with the public squares and existing bulky tanks, as well as, relating the design element to the architectural response.

Figure 6.1: The Understanding of the Scale of Building Mass

DESIGN EXPLORATION 2 – Breaking Down the Spatial Requirements into Plan

In an alternative approach to massing, the plan is to have a generator to form number of particle spaces to be arranged within the site boundary of cruise ship terminal.

The 1st design attempt constructs on breaking down the spatial requirements from the spatial calculation of cruise ship terminal is illustrated in figure 6.2, and configured spatial requirements of cruise ship terminal within the site boundary of the building based on the precedent study of Shed 10.

The 2nd design attempt is an improvement of the 1st design attempt but with clearer configuration of terminal spaces in three different building blocks. Firstly, the southern building block is designed to be shopping centre with foyer to function for the cruise terminal on the ground floor. Secondly, the middle and northern building blocks are utilised as cruise facilities. Lastly, the spaces of existing bulky tanks would be transformed and used as market space, community space and exhibition space throughout the year.
In the 3rd design attempt, new curved platform and voids are implemented in the design project to illustrate the connection between the bulky tanks and the new build form of cruise terminal. The formation of the curved platform creates an astonishing pathway that connects with to green roof top.

**Figure 6.4:** 3rd Design Attempt

**Figure 6.5:** 3rd Design Attempt in Physical Model

The figure 6.5 illustrates a scaled model (1:1000), this model was used to examine whether the design components are workable in the context of the site. As well as, having the sense of scale with the neighbouring buildings and the mega cruise ships. This scaled model makes the design development simpler to identify the lack of planning with the adaptive reuse of the bulky tanks, and insufficient spaces for storages like large customs checking machines and large sitting benches for sport event centre.
In the 4th design attempt, the plans of the cruise ship terminal are more refined and developed than the previous design attempts because the configuration of spaces are flexible. One of the significant features would be the extension of curved platform that connects the bulky tanks on the western side of Wynyard Headland. The curved platform is designed as a green foot path that connects to the green roof top of the building masses. The biggest central tank becomes the core of the site that stretches its two arms like tentacles that connect the cruise terminal and the preserved bulky tanks into a single design development project. The design of curved platform was inspired by the precedent study of Proto Cruise Terminal that the curved platforms form like tentacles to connect the sea and land, and the public. By doing so, the cruise ship terminal would become a public infrastructure that functions as event venue, market day, sport event, and much more.

Figure 6.6: 4th Design Attempt

The outcome of this exploration is an understanding that the spatial requirements needed to function as cruise facilities and sport event centre within the site boundary. Therefore, every single program of the cruise ship facilities are formed in rigid shapes, either square or rectangular shape is applied accordingly to its calculated area in figure 5.5. Furthermore, as shown in figure 6.7, the rigid shapes would merge into each other perfectly to avoid any dead corners, and form number of massive open spaces to be occupied as basketball courts, badminton courts, and volleyball courts. The development of curved platform also has created places with range of different degrees of enclosure to accommodate a variety of activities from cruise ship facilities to public market spaces.

Figure 6.7: Diagram of Modular Spaces in Cruise Ship Terminal
DESIGN EXPLORATION 3 – Constructing the Building Mass

The building mass demonstrates the relationship with the landscape and the context buildings.

1. The chosen site for the development plan of Wynyard Wharf indicates the position of the existing bulky tanks that have been retained and preserved.

2. The existing bulky tanks located on top of the contaminated soils which shows on red colour, are going to be removed. Therefore, the bulky tanks would settle on the same ground level as the cruise ship terminal. As for the other tanks, the contaminated soil would be removed and filled with uncontaminated soil to flatten the ground.

3. A new volume of cruise ship terminal located on the site would be integrated with the context of the site. The new volume is located on the east side of Wynyard Wharf which acts as a landmark and public infrastructure on Wynyard Quarter.

4. A new form of curved platform is put in place around the bulky tanks which would be integrated with the new cruise ship terminal. It would develop the journey of moving through indoor and outdoor. It also acts as a transition from industrial tank site into the artificial space (the cruise terminal). The result is the construction of the curved platform around the cruise terminal and bulky tanks which would give emphasis on the importance of public accessibility.

Figure 6.8: Building Mass Modelling
DESIGN EXPLORATION 4 – Integrating with the Existing Bulky Tanks

This model demonstrates the formation of the curved platform that merges the building masses and existing bulky tanks to create entertainment space between the existing and the new.

1. The formation of the curved platform creates a new network of route travel into the cruise ship facilities and the rehabilitation of spaces in bulky tanks. Based on the case studies of rehabilitation on bulky tanks in chapter 4.3, the core of the bulky tank’s structure would be reinforced to allow people to walk on it and travel into the tank from the glass opening on top of the tank. The interior of the tanks would be transformed into public space, market space, community space, and even exhibition space and functional event space for the public uses.

2. The building mass opens up a curved opening on the rooftop, which followed by the form of the curved platform into the cruise terminal. An opening allows natural daylight down into the atrium. There is also a shape of glass tube in the atrium which acts as a focal point in the terminal, as well as, creates an identical feature with the bulky tanks on the site.

3. The bulky tanks on the southern end of the cruise ship terminal has a different treatment, which is, the bulky tanks would be removed from the floor area of the building mass to create void in the interior space or a curved facade on the exterior as part of the memory of tank farm in Wynyard Quarter.

Figure 6.9: Integrating with the Existing Bulky Tanks
DESIGN EXPLORATION 5 – Detailing the Building Mass

This design model is much refined and developed than the previous design attempts and has healthier circulation when people are moving around these flexible spaces. The formation of curved platform also enlightens the circulation by creating a continuous journey for people to travel through; the internal of building masses and the outside of bulky tanks enhance the whole spatial experience, as well as, create a sense of liveliness for the visitors and locals.

DESIGN EXPLORATION 6 – Reinforcing the Corner

The southern end of the building mass is a critical point to attract the visitors coming over to the Wynyard Headland. Therefore, the treatment of the facade layers is composed of timber screen with tall panels of glass facade. The cantilevering mass on the top floor also creates a strong built form at the corner of Daldy Street and Wynyard Wharf to create as a sculptural volume at the corner. This cantilevering building mass functions as an observation deck and restaurant for visitors to observe the scenery at Rangitoto Island, as well as, observe the magnificent Auckland City’s landscape.
DESIGN EXPLORATION 7 – Connections

As shown in figure 6.13, the adjustable concourse is attached on the metal frame’s structure which would be adjustable when current and tides change, therefore, it is very convenient for transferring passengers between cruise ship and cruise ship terminal. The adjustable concourse also can be lowered to the ground level of Wynyard Wharf to transform into either a temporary market spaces or event spaces for public uses.

The figure 6.12 illustrates number of connections between retail spaces, cruise ship spaces, and the public square. Each space has different degrees of security control, and operations. Thereby, the number and width of the connections are developed to control the number of people travelling through the spaces. For example, the width of the internal connection becomes narrower when the security control is higher which makes it flexible in terms of controlling the flow of people into the spaces.

Figure 6.12: The Sketch of Paths that connect with the Building Masses
Figure 6.13: The Adjustable Concourse
Drawing from the issues of programmes in cruise facilities discussed in Chapter 5.2, it is evident that cruise facilities take a range of spaces with different degrees of security control. To accommodate such a variety, a complete open space with partition screens would be favourable for this design project. One of the design elements that make this configuration of spaces successful is the three-segment building site which was produced on the information from Auckland Unitary Plan as provided in chapter 4.2.2.
Ground Floor Plan & First Floor Plan
The spatial arrangement of the ground floor accommodates facilities like embarkation in cruise ship facilities, retail spaces, and restaurants. While the concourse of the cruise ship terminal is located on the first floor. As visitors leave the concourse, they will be welcomed into a massive atrium with curved wall and tank-shaped like void to started processing their boarding pass into the country. In figure 6.15, most of the cruise ship facilities are on double height storey, especially that double height stories are more noticeable in large open spaces. Therefore, these large open spaces could be transformed into sport event centre which was discussed in chapter 5.4, the minimum height requirement for the space to operate as badminton court, volleyball court and basketball court is nine metres.

Figure 6.15 Ground Floor Plan

The figure 6.15 also translates the discussion of chapter 5.2, programme, into the design model to illustrate the degrees of security control of embarkation from cruise ship into the cruise ship terminal. Therefore, each space has different visual lookout and experience as you move out from the cruise ship terminal. The retail and restaurants space, and public square are located on the both end of the cruise ship terminal which acts as pause of spaces to allow the locals and visitors to explore and enjoy the area. The cruise ship terminal also was planned to set back two metres from the site boundaries to create generous footpaths for the locals and visitors to walk on.
Second Floor Plan & Third Floor Plan
The spatial arrangements of the second floor include facilities like disembarkation in cruise ship facilities, retail and restaurant spaces. There are also number of glass bridges on this floor to connect up to each building blocks, the glass bridges are used as security gates to transfer passengers from one space to another. As the passengers travel through from the primary security space into the secondary security space, the internal space gradually becomes smaller. Therefore, it creates a simple controlled space to allocate rooms for the custom and security checks before the passengers aboard to the cruise ship.

Figure 6.16: Second Floor Plan & Third Floor Plan
Fourth Floor Plan & Roof Top Floor Plan
The figure 6.17 illustrates the design feature of the green roof top over the building masses which creates a dynamic and vibrant atmosphere for the locals and visitors to stop and relax.

Building Materials
The figure 6.18 illustrates the use of building materials for the building’s facades are mainly timber screen panels, steels, and large glass panels. The structure of the building is constructed in reinforced concrete which would provide the properties of durability and easy maintenance, as well as, it would create large open spaces with long floor spans.

Figure 6.17: The Perspective of the Green Roof Top

Figure 6.18: West Elevation of Cruise Ship Terminal

The figure 6.18 also illustrates the four different building masses design in four different distinctive façades that somehow merged as one single structure. All of these building masses are connected to each other to function as cruise ship terminal. As well as, showcases a new signature public infrastructure on the Wynyard Development Site.
Sport Event Centre

During non-cruise ship season, the internal spaces of cruise facilities would be converted into sport event centre, which enhances the infrastructure of cruise ship terminal to become a true public infrastructure that operates variety of events and activities for the locals and visitors.

Figure 6.19: Information of Non-Cruise Ship Terminal Mode (Sport Event Centre)

Summary

The positive aspect in this exploration is considering the design idea of adaptive reuse of bulky tanks. The cruise ship terminal is connected with the existing bulky tanks on the site which has somehow transform the unhealthy industrials site into a dynamic and vibrant public space that everyone can benefit from it. The program and circulation of the cruise ship terminal also optimises the performance of cruise ship facilities.
Figure 6.20: Master Plan of the Development Site at Wynyard Quarter (Not in Scale)
Figure 6.21: Section A-A of the Cruise Ship Terminal (Not in Scale)
7.0 CONCLUSION

Critical Appraisal of the Finished Work & its Theoretical Framework
This design project is aimed at constructing a cruise ship terminal. However, it also considers the development of the tank farm site at Wynyard Quarter into a healthy and modern waterfront whilst minimising the environmental and social impact and without disregarding the structure’s industrial heritage. Furthermore, this design project seeks to present this as an ever-changing public infrastructure in which the structures and internal spaces can be changed and adapt to future expansion of the cruise ship facilities. This design research can also be a case study for the organisation of Waterfront Auckland, especially in seeking other possibilities for the development plan of Wynyard Quarter. At the same time, it will also benefit more people either through the further study of the development of Wynyard Quarter in terms of the different design approaches to the site or more interest in the idea of adaptive reuse of a tank farm site transformed into a public infrastructure.

Adaptive Reuse
Various issues arise when attempting to apply the idea of adaptive reuse design on the tank farm site at Wynyard Quarter. Contrary to what is in the said facilities, not all the bulky tanks are appropriate for adaptive reuse for the cruise ship development project. Therefore, based on the criteria for adaptive reuse of bulky tanks outlined earlier in chapter 4.2.1 and 4.3, the biggest bulky tanks will be rehabilitated into public spaces, while the smaller tanks that block the complex will be demolished and become a void that is part of the memory of the tank farm site. The formation of various twists and voids caused by the adaptive reuse of bulky tanks creates an interesting circulation to increase the flow of the locals and visitors into the infrastructure. The idea of adaptive reuse provides the cruise ship terminal with a higher heritage status, as well as making it a unique and irreplaceable infrastructure located on the Auckland waterfront.

Respect for the Site and its Context
The building site on Wynyard Quarter has an interesting piece of geography and the picturesque setting is a distinct advantage which made it the obvious choice for the relocation of Auckland’s primary cruise ship terminal. This is a mix-use facilities that is not only operated as cruise ship facilities, but also accommodates other uses, like a sports event centre during non cruise ship season, restaurants and cafes, retails, offices for cruise ship companies, market spaces, and public squares. Such services are designed to respect the surrounding buildings as well as the local context. Therefore, the said services are not in conflict with the surrounding buildings, such as hotel facilities, office spaces, marine spaces, and restaurants. On the other hand, the new international cruise ship terminal is a combination of solutions, a combination of building types to resolve the issues at the tank farm. It also demonstrates a brand-new facility for servicing and berthing cruise ships and providing amenities for the locals and visitors to enjoy. Lastly, it will reconnect the city centre with its waterfront.

The Limitation
The cruise ship terminal project seems to be incomplete in a way that it connects with the context of the site. If there is extra time, this design project will also include the redevelopment of the Wynyard Headland Park as part of the expansion of cruise ship terminal. The enhanced cruise ship facilities are a key component of the strategies of the cruise ship terminal to meet the growing demand of the visitors. However, the cruise ship terminal itself is not enough to present an impressive image of Auckland’s waterfront. It needs to be well engaged with the broader context of the site development of the Wynyard Headland Park, reflecting the culture and heritage of New Zealand.

“We shape our buildings, and afterwards our buildings shape us.”

Orsman, Bernard. “Bold plan offers extra terminal space for more cruise ship visits,” New Zealand Herald, April 7th, 2010, sec A.
Orsman, Bernard. “Crowds protest plans to extend wharf,” New Zealand Herald, March 22, 2015, sec A.
Figure 2.1: The history of Waterfront Auckland at 1841 (Downtown needs a plan change, Auckland, 2014, Auckland, by Reflections of Auckland, Maker unknown.)

Figure 2.2: Current layout plan of Princes Wharf and Queens Wharf to operate as Cruise Ship Terminals at Auckland Waterfront (author)

Figure 2.3: The Table of Key New Zealand Cruise Ports and Berths. Reproduced from, Ministry of Business, Innovation and Employment, Tourism Infrastructure 2016, Waterfront Auckland, Auckland, 2016, 32.

Figure 2.4: The Number of Historical and Projected Passengers and Cruises to New Zealand. Reproduced from, Ministry of Business, Innovation and Employment, Tourism Infrastructure 2016, Waterfront Auckland, Auckland, 2016, 30.

Figure 2.5: Exchange and Transit visits to Auckland between 1998 and 2014. Reproduced from, Waterfront Auckland, Business Case for Queens Wharf Phase 2, Waterfront Auckland: Auckland, 2012, 37.

Figure 2.6: Number of cruise ship visiting Auckland each Month for 2013/14 and 2014/15. Reproduced from, Ministry of Business, Innovation and Employment, Tourism Infrastructure 2016, Waterfront Auckland, Auckland, 2016, 33.

Figure 2.7: Comparison of the World Biggest Cruise Ship with other Transportations and Towers (author)

Figure 2.8: The Trends of Bigger Cruise Ship. Reproduced from http://www.largestships.com/biggest-cruise-ship/(Accessed August, 2016)


Figure 3.3: The Perspective of Split Structure of Yokohama International Passenger Terminal. Reproduced from, Adam Rohaly, Yokohama Port Terminal: Foreign Office Architects, Architecture 489, 2010, 38.


Figure 3.5: The Exterior Perspective of Proto Cruise Terminal. Reproduced from http://www.archdaily.com/779868/porto-cruise-terminal-luis-pedro-silva-arquitecto (Accessed August, 2016)


Figure 3.8: The Exterior View of Gangway at White Bay Cruise Terminal. Reproduced from http://www.archdaily.com/439351/sydney-cruise-terminal-johnson-pilton-walker-architects (Accessed August, 2016)

Figure 3.10: The Interior View of White Bay Cruise Terminal. Reproduced from http://www.archdaily.com/439351/sydney-cruise-terminal-johnson-pilton-walker-architects (Accessed August, 2016)

Figure 3.11: Perspective View of Shed 10 Exterior. Reproduced from http://www.jasmax.com/work/shed-10/ (Assessed September, 2016)

Figure 3.12: Sections of Shed 10. Reproduced from Justine Harvey, “Shed 10,” Architecture NZ Issues 6, November 2013, 43.

Figure 3.13: East Elevation of Shed 10. Reproduced from Justine Harvey, “Shed 10,” Architecture NZ Issues 6, November 2013, 43.

Figure 3.14: West Elevation of Shed 10. Reproduced from Justine Harvey, “Shed 10,” Architecture NZ Issues 6, November 2013, 43.

Figure 3.15: Floor Plans of Shed 10. Reproduced from Justine Harvey, “Shed 10,” Architecture NZ Issues 6, November 2013, 44.

Figure 3.16: Shed 10: Cruise Mode Exchange – Ground Level. Reproduced from Justine Harvey, “Shed 10,” Architecture NZ Issues 6, November 2013, 44.

Figure 3.17: Shed 10: Cruise Mode Exchange – Level 1. Reproduced from Justine Harvey, “Shed 10,” Architecture NZ Issues 6, November 2013, 44.

Figure 3.18: Cruise Gangway for transfer of passengers between the ship and Wharf. Reproduced from http://portsandshipping.blogspot.co.nz/2013/06/gangway-for-ships.html (Assessed August, 2016)


Figure 4.1: The proposal of relocation of the new primary cruise ship. Reproduced from Waterfront Auckland, Business Case for Queens Wharf Phase 2, Waterfront Auckland: Auckland, 2012, 37.

Figure 4.2: The proposal of primary cruise ship terminal to be relocated at Wynyard Wharf (Option 5). (author)

Figure 4.3: Site Analysis of the chosen site in the current plan of Wynyard Point. (author)

Figure 4.4: The proposed plan of indicative land-use for Wynyard Quarter Development. Reproduced from, Auckland Council Organisation, The Waterfront Plan 2012, Waterfront Auckland, Auckland, 2012, 93.


Figure 4.7: The Current Plan of Wynyard Quarter. (author)

Figure 4.8: The Proposed Plan for Wynyard Quarter Development based on the Information from District Plan. (author)

Figure 4.9: The Proposed Plan for Wynyard Quarter Development based on the Information from District Plan. (author)

Figure 4.10: The exterior view of tank cultural space. Reproduced from, http://www.e-architect.co.uk/images/jpgs/spain/the_tank_santa_cruz_de_tenerife_m120212_
Figure 4.11: The interior view of tank cultural space. Reproduced from, http://www.e-architect.co.uk/images/jpgs/spain/the_tank_santa_cruz_de_tenerife_m120212_hs2.jpg (Accesses September 2016)


Figure 4.13: Large Indoor Plaza in Gasometer A. Reproduced from, http://www.wiener-gasometer.at/en/gasometer/a (Accesses September 2016)


Figure 4.15: A Striking Facade for Gasometer C. Reproduced from, http://www.wiener-gasometer.at/en/gasometer/c (Accesses September 2016)

Figure 4.16: A Striking Facade for Gasometer D. Reproduced from, http://www.wiener-gasometer.at/en/gasometer/d (Accesses September 2016)

Figure 5.1: The Architecture Response for Bulky Tanks. (author)

Figure 5.2. The Architecture Response for the Form of Curved Platform. (author)

Figure 5.3: The Programme of Cruise Ship Facilities. (author)


Figure 5.5: The Calculation of Cruise Ship Terminal Spatial Requirements for up to 7000 Passengers. (author)

Figure 5.6: Tides for Auckland. Reproduced from http://www.seatemperature.org/australia-pacific/new-zealand/auckland.htm (Assessed August, 2016)

Figure 6.1: The Understanding of the Scale of Building Mass. (author)

Figure 6.2: 1st Design Attempt. (author)

Figure 6.3: 2nd Design Attempt. (author)

Figure 6.4: 3rd Design Attempt. (author)

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Figure 6.7: Diagram of Modular Spaces in Cruise Ship Terminal. (author)

Figure 6.8: Building Mass Modelling. (author)

Figure 6.9: Integrating with the Existing Bulky Tanks. (author)

Figure 6.10: Detailing the Building Mass. (author)

Figure 6.11: The Southern End of the Building Mass. (author)

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Figure 6.18: West Elevation of Cruise Ship Terminal. (author)

Figure 6.19: Information of Non-Cruise Ship Terminal Mode (Sport Event Centre). (author)

Figure 6.20: Master Plan of the Development Site at Wynyard Quarter (Not in Scale). (author)

Figure 6.21: Section A-A of the Cruise Ship Terminal (Not in Scale). (author)
10.0 APPENDIX A: Final Set of Drawings
The final set of drawings will be included in the later stage.
A NEW INTERNATIONAL CRUISE SHIP TERMINAL FOR WYNYARD WHARF

MASTER PLAN OF WYNYARD WHARF
BIRD-EYE VIEW OF CRUISE SHIP TERMINAL

VIEW FROM CRUISE SHIP
Declaration

Name of candidate: Geoff Law (Kan Kang Law)


Principal Supervisor: Graeme McCardie

Associate Supervisor/s: John Pigot

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Candidate Signature: ................................................. Date: 30/9/2016

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Full name of author: Geoff Low

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Practice Pathway: Architecture
Degree: Master of Architecture (Professional)
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