Vertical Village
In the Heart of Auckland CBD

Master Thesis Explanatory Document
by

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ABSTRACT

Auckland’s population continues to increase every year, shown as the fastest growth in New Zealand. People from everywhere in the world come to Auckland to travel, work and study, making Auckland their new home. However, the current public transport will not be able to cater this growth as people nowadays prefer to live close to the central city that offers more opportunities for employment and education. Therefore, the City Rail Link is delivering a new train station to maintain the accessibility between Auckland CBD and other parts of the city. Aotea, described as the busiest station within 10 minutes walk to anywhere in the central city, will allow more than 13,000 people to access the CBD per hour. Thus, the new station will not only lead more people to access to the core of the city, but it also stimulates many further developments around the railway station to provide more housing and employment within the area. As a city that must grow to adapt the rapid growth of population and infrastructure development, it is an opportunity for architects to rethink the design of the future dwelling, office space and a well-functioning community. This is in response to the demand for living, working and studying in close proximity to the Auckland CBD, since the urban sprawl is no longer a solution due to the Auckland housing crisis and traffic congestion. This project proposes a vertical mixed-use development that incorporates with the new railway station, which will achieve a higher density architecture, and offers a sustainable lifestyle and community within the building and surrounding areas. The programmes in this mixed-use development reflect the predominant patterns of the surrounding uses in four significant areas – Victoria Quarter, Learning Quarter, Engine Room Quarter and Aotea Quarter. Vertical mixed-use development in condition of public transport will create a unique transition at the junction of horizontal and vertical movement. This research project will promote the viability of the public transport, enhance the surrounding infrastructure, and provide a unique experience to live and work in the heart of Auckland CBD.
ACKNOWLEDGEMENT

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CONTENTS

1.0 INTRODUCTION ............................................................................................................................................. 6
   1.1 Background
   1.2 Research Question
   1.3 Aim and Objective

2.0 METHODOLOGY ............................................................................................................................................. 8

3.0 LITERATURE REVIEW .................................................................................................................................. 10
   3.1 Critique of Auckland City’s Context ............................................................................................................ 11
   3.2 Introduction towards Mixed-use Development .......................................................................................... 12
       3.2.1 Sustainability in Mixed-use Development
       3.2.2 Advantages of High Density and Safety in Mixed-use Development
   3.3 Introduction towards New Urbanism ........................................................................................................... 16
       3.3.1 New Urbanism Principles

4.0 PROJECT DEVELOPMENT ............................................................................................................................... 18
   4.1 The Quarters .................................................................................................................................................. 20
       4.1.1 Learning Quarter
       4.1.2 Engine Room Quarter
       4.1.3 Victoria Quarter
       4.1.4 Aotea Quarter
INTRODUCTION
1.1 Background

Auckland was ranked the world’s eighth most liveable city in 2016 by the Economist Intelligence Unit. According to Maré from Moto Research (2016), Auckland has thirty-three percent higher labour productivity than outside the central Auckland region. The study states that people are willing to pay higher accommodation rent, but their wage is so low. Also, many firms are willing to locate in Auckland CBD with a higher cost, as Auckland is more productive than other places. This scenario invites a significant number of local people, immigrants and students moving to Auckland to live, work, and study. In such a situation, this gives rise to several problems such as environmental impacts, traffic congestion and housing crisis.

In this research, the project proposes to produce a multi-use spaces within a building located on the corner of Mayoral Drive and Wellesley Street. The selected location links to the City Rail Link’s Aotea Station, which is under construction, which is estimated to be completed in five and a half years. The Aotea Station is an important key in this thesis, not only to ease the pressure of traffic congestion, but it also creates higher density communities to provide sustainable neighbourhoods around the site. The society’s needs and the urban context will also be taken into account in order to find appropriate programmes and establish several activities offered within the same building.

1.2 Research Question

How can mixed-use development be integrated with the new transportation development to achieve various aspects of sustainability to provide a better lifestyle of working and living in Auckland CBD?

1.3 Aims and Objective

Key Objectives: This research project adapts the principles of mixed-use development and New Urbanism to create a vertical mixed-use complex integrated into the proposed Aotea Station in the Auckland CBD. The main objective of this project is to propose a mixture of different programmes based on the urban context to create a liveable and sustainable community within a building. The project also aims to ensure that both mixed-use development and the proposed transportation are supportive of the same strategic objectives through the integrated decision.
2.0  METHODOLOGY
• **Research Process**
  Resource: Any related books including ebooks, databases, websites, journals and magazines.
  - **Literature Review**: it helps to build up the knowledge of relevant design techniques and develop strategies that support the design process. The review accentuates the principles of the urban design including mixed-use development and New Urbanism, as a tool to guide the design process.
  - **Site Analysis and Case Studies**: Information gathered from site analysis, including characteristics of the existing site and the society’s needs, will be utilised to select the architectural examples that contain similarity factors with regard to the conditions of the urban context, transport development and community structure.

• **Design Process**: The design process is crucial to support the answer of the architectural question. The mixed-use programmes of the project are defined through the critical site analysis, case studies and fundamental principles of urban design from the literature review. All the relevant information gathered is used to finalise the final design concept.

• **Design Tools**: A digital model of the site and the proposed building is made to give a better understanding of the project. AutoCAD, Sketch-Up, Photoshop, and 3Ds Max are used to produce and achieve the design outcome. Some sketches are created to visualise the initial ideas of the design concept.

• **Design Outcome**: The knowledge gained throughout the research process is translated into an architectural design. The final design outcome will consist of plans, sections and 3D interior visualisation which will be presented in the final examination.
3.0 | LITERATURE REVIEW
3.1 Critique of Auckland City’s Context

According to Statistics New Zealand (2009), the population density in the Auckland CBD, which shows the largest increase, will keep rising from 4600 people per square kilometre in 2006 to approximately 13,300 people per square kilometre by 2031. The number of people working in the centre every day is 90,000, and this will continue to grow rapidly in the future (Auckland Master Plan, 2012). The current public transport, such as bus and train will not have enough capacity to serve this expeditious growth (Auckland Transport, 2016). Traffic congestion, therefore, becomes a high burden on residents who must commute to work from other regions to central Auckland, and it is not only affecting the employee’s commuting, but also their productivity. One of the implications of this rapid growth is the increasing demand for living and working in proximity to the central area, which is causing the lack of affordable rental accommodation and commercial spaces. “Shoebox” is mostly used to describe those apartments which are less than 40 square meters for those who want to live and work proximately and centrally. However, the pressure of finding accommodation and increasing scarcity of land cannot stop people and investors moving to Auckland, as this place has more productivity and opportunities.

Due to high net migration flows and blooming of business activities in the Auckland CBD, the commercial and residential building projects rapidly appear to be essential in order not only to capture the development of business and economy, but also to adapt to the population’s growth. The apartment and office buildings are single-use only, which is the leading cause of urban sprawl. Juliet Yates (Watkin, 2003), chair of Auckland City Council's City Development Committee wrote in the New Zealand Herald that “Sprawling suburbs are yesterday's solution to growth” and “Today we have to design our cities to accommodate more people.” (para. 10).
3.2 Introduction towards Mixed-use Development

In recent years, the concept of mixed-used development was presented as an important architectural solution to ease the pressure of urban development in the city. There are many reasons for mixed-use development’s resurgence: traffic congestion affecting commuting time, rapid growth of population density, the rise of rental housing and workplace due to the scarcity of residential and commercial area in high-density cities, and the impact of technology on employment. According to Coupland (1997), mixed-use fundamentally took its form from a living space used as a home, a base for business and other purposes in British cities. After that, the purpose-built office building displaced the residential areas and created a commercial business district, due to the rise of trade and commerce, which “led to single, or much simpler, patterns of land use” (Coupland, 1997, p.18). The effect also resulted in greater reliance on private vehicles and longer commute time, as population density increased steadily until the mid-nineteenth century. The concern about sustainability and the need to reduce private vehicles has raised the awareness of urban sprawl in both the United Kingdom (UK) and the United States of America (USA). This matter caused pressure that has led to seeking new ways of drawing people back to living in existing centres in which the concept of “compact city” ideally became a solution.

Due to the concern about increasing car use, many proposals for out-of-town shopping were rejected by the government, while mixed-use development was encouraged. (Coupland, 1997). In fact, the concept of mixed-use or “work, play, live” was founded in an ancient market such as Trajan’s Market built in 100-110 AD by Apollodorus of Damascus in Rome, which was the early example of live and work concept (Vreeland, 2006). In addition, the mixed-use development has been contributed as an important principle in urban planning paradigms such as New Urbanism and Transit-oriented development. Due to the evolution of construction technology that the buildings were constructed in a greater number of floors, as well as higher floor spans, the mixed-use development was able to extend the function in the vertical dimension. A decision among the alternative mixed-use types is determined from the existing urban condition and urban development progress. For example, for the high density of urban are where land cost is expensive, vertical mixed-use is more appropriate to restrain the increasing urban sprawl and financing. The mixed-use developments in this project may prefer vertical rather than horizontal dimensions, in which the project aims to design a complex building.
McLaughlin (as cited in Huston & Mateo-Babiano, 2013) defined that vertical mixed-use development is the preferred option due to the scarcity and high cost of the developable urban land, and the demand for commercial and residential development. Amarasekera (1996) defined that the interior programmes created by vertical mixed-use should be an extension of the existing urban context. He also described the vertical mixed-use as a tool to rejuvenate the city as it creates different activities on different floors at different times, giving a continued life to the city.

Mixed-use development can be found in many forms, but are mostly seen as vertical mixed-use buildings, horizontal mixed-use or a combination of the two (Figure 2.5.1). In this type of land use, the commercial uses such as retail stores, bars or restaurants are mostly located on the ground floor with the residential floors above. Therefore, the acoustic design may be required to eliminate the noise between the two zones. The noise may be controlled by adding one or more floors of office space above the commercial use to act as a noise control buffer (North Shore, 2005). Robert Cervero (Hass, 2008) elaborated that the vertical mixed-use development poses various difficulties in terms of design, as he described that “vertical mixing is particularly problematic” due to the parking policies (p.126). He suggested that the ground-floor retail level should open onto the busy pedestrian street with convenient car access. Additionally, the ceiling of the ground floor needed a greater floor to floor height, but this consideration increases the building cost.

Figure 2.5.1: Examples of horizontal and vertical mixed-use development. (North Shore, 2005 p.16)
3.2.1 Sustainability in Mixed-use Development:

The term “sustainability” is defined by World Commission on Environment and Development (as cited in Coupland, 1997), as the development that “meets the needs of the present without compromising the ability of future generations to meet their own needs” (p.64). Other definition stated by World Conservation Union (as cited in Coupland, 1997) that the sustainable development means “improving the quality of life while living within the carrying capacity of supporting ecosystems” (p.64).

Mixed-use development offers various activities, uses, and services which are integrated into a single block or building. Blowers (as cited in Coupland, 1997) states in the book “Planning for a Sustainable Environment” in 1993 that sustainability is an “integrating concept”, and he also considered that “the resource conservation requires patterns of development that minimize energy consumption, maintain the productivity of land, end encourage the re-use of building” (p.70). The benefits of integrating land uses can be elaborated from the book Reclaiming the City: Mixed Use Development that Andy Coupland (1997) quotes the statement of John Gummer, the Secretary of State for the Environment, to explain why the mixed-use development is increasingly supported by the UK government:

“The emerging consensus is that development is more sustainable if it produces a mixture of uses. Segregation of land uses, encouraged in the past, is not relevant now. The trend back to mixed usage brings a number of potential benefits. It ensures vitality through activity and diversity. It makes areas safer. It also reduces the need to travel, making people less reliant on cars, bringing welcome environmental benefits. Diversity of uses adds to the vitality and interest of town centres. Different but complementary uses, during the day and in the evening can reinforce each other, making town centres more attractive to residents, businesses, shoppers and visitors (DoE, 1995a)” (as cited in Coupland, 1997, p.3).

The explanation of the government is translated into a diagram to illustrate the benefits of mixed-use development (Coupland, 1997):

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<table>
<thead>
<tr>
<th>Concentration and diversity of activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitality</td>
</tr>
<tr>
<td>Less need to travel</td>
</tr>
<tr>
<td>A more secure environment</td>
</tr>
<tr>
<td>Less reliance on the car</td>
</tr>
<tr>
<td>More attractive and better quality town centres</td>
</tr>
<tr>
<td>More use of and opportunity for public transport</td>
</tr>
<tr>
<td>Economic, social and environmental benefits</td>
</tr>
</tbody>
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3.2.2 Advantages of High Density and Safety in Mixed-use Development

This is one of the crucial conditions for flourishing city diversity and for the future development as people is “the source of immense vitality”, according to Jane Jacobs (1993) (p.288). It is obvious that the high density offered in the mixed-use complex can bring many benefits to the viable public transportation, economic development, and sustainable neighbourhood. Gorden Cullen (as cited in Amarasekera,1996) expresses the advantages of high density living:

“There are advantages to be gained from gathering together of people to form a town... single family can scarcely hope to drop in to a theatre...A city has the power to generate a surplus of amenity, which is one reason people like to live in communities rather than in isolation”. (p.33)

Many central districts contain a concentration of business and social activities with very high density of people during the daytime. At nights, when all the shops close and people go home, the city centre appear to be empty and unsafe. Coupland (1997) provides a key for contributing a safer district, in which it is necessary to maintain diversity of activities and retains the high densities of people during the working hours as well as throughout the evening. In study of the University of Westminster (Coupland,1997), the interview survey shows that people living in mixed-use areas would feel safer out alone after dark than people who live in predominantly housing areas. Due to the complexity of use and users, the mixed-use development provides a natural surveillance as people watch over each other (Jacobs ,1993).

Jane Jacobs (1993) defines the high density as “large numbers of dwellings per acre of land” while “overcrowding” means “too many people in a dwelling for the number of rooms it contains” (p.268). As a city continues to grow, the overcrowding may occur in high density area as they are often being found one without the other. (Jacobs, 1993). To maintain vitality in city, Jacobs suggests that greater densities, which is more than 200 dwelling unit to the net acre, can be possibly achieved with multi-storey building that requires “monotonous, standardized forms of construction” (as cited in Coupland, 1997, p. 161).
3.3 Introduction towards New Urbanism

Jill Grant (Haas, 2008) states that “New Urbanism has become closely associated with mixed-use development...in recent decades” as it “promises to allow New Urbanism to achieve many of its social objectives, including affordability and diversity” (p. 80). Mixed use development is supported by New Urbanism principles that work together to create communities that provide opportunities for people to meet their daily needs without relying on private vehicles. Tigran Haas (2008), the New Urbanist, concludes that:

Movements like New Urbanism conceive communities that are balanced in function (housing and services), create inclusive housing that supports home-based business (in vogue with information technology and the demands of the mobile society we live in), spatially define the public realm as a key element, facilitate pedestrian accessibility and “walkability,” minimize and put into perspective automobile use, and support public transportation and the promotion and increased use of trains and light rail, instead of more highways and roads. (p.10)

3.3.1 New Urbanism Principles

The principles of New Urbanism provide the valuable criteria, which will be considered for the mixed-use development in this project. The design outcome is intended to achieve the same objectives such as walkable places, housing, shopping, working in close proximity, accessible public places and integrated public transport; Though the final design outcome in this project may be on a smaller scale and be formed vertically. There are eight essential principles of urbanism explained by Kemp and Stephani (2015) that can be applied to this project:
**Increased Density:** Coupland (1997) wrote in his book: “The intensity of activity in the street is clearly dependent on the numbers of users as well as the mix of uses” (p.161). Therefore, the New Urbanism aims to make walking more convenient and accessible by accommodating a variety of uses and activities within walking distance.

**Traditional Neighbourhood Structure:** The structure emphasises the integration of the environmental methodology in the design of human habitat by vanishing the boundary between man-made and nature. The importance of quality of public realm and public space designed as civic art is also considered.

**Sustainability:** This principle promotes the sustainable society and urban development that applies eco-friendly technologies and natural systems to reduce environmental impacts and maximise the comfort of its inhabitants.

**Green Transportation:** The network of high-quality public transport provides a strong connection between cities, towns and neighbourhoods. The New Urbanist streets are designed to encourage walking and bicycling, rather than just driving.

**Walkability:** It is important to create a walkable community between different types of users within a building, a building within an urban context. A walkable place is to encourage people to reach their daily needs such as school, offices, shopping by foot within a 10-minute walking distance. The safety, comfort zone and building accessibility, among others, should be considered in designing successful walkability.

**Connectivity:** The interconnection of a street grid network should encourage pedestrian walking and reduce the traffic. This can be a hierarchy of narrow streets, boulevards and alleys. Also, the street architecture should provide a high-quality pedestrian network and public realm that makes a comfortable and pleasurable walk.

**Mixed-use & Diversity:** The principle consists of mixing uses of shops, offices, and apartments for the diversity of users of ages, income levels, cultures, and races in the community within neighbourhoods, within blocks and within buildings.

**Quality Architecture & Urban Design:** This tool is used to create high quality comfortable public and private spaces by emphasis on the beauty and aesthetics of the buildings that creates a sense of place within community.
40  PROJECT DEVELOPMENT
4.1 THE QUARTERS

The City Centre Master Plan (2012) described the central Auckland city as “a cluster of distinct areas” in which each area has its own characteristics and uses. According to the Master Plan (2012), the city centre was divided into seven quarters, but only four urban quarters related to the site will be investigated in this project: the Engine Room, Aotea, Victoria, and Learning quarters.
4.1.1 Learning Quarter

The Learning Quarter contains the largest number of local and international students, and staff. The 63-hecta Learning Quarter is covered not only by the campuses of Auckland University (AU) and Auckland University of Technology (AUT), but also contains a total of 53 heritage listed sites that are significant to Maori (“Heritage Trail Learning Quarter”, 2010).

The CBD Master Plan (2012) states that the Learning Quarter is “a world-class centre for education, research and commercialisation, and is key to fuelling Auckland’s future success” (p.133). Shannon from Warren and Mahoney (2014) points out that “cities need students.” (para.16). He also points out how importantly the students impact the city as they are contributing a significant number of retail transactions and becoming valued workers and residents after their study. However, the shortage of student accommodation in the Auckland CBD is always the problem that forces the students to move out to the other suburbs around the Learning Quarter such as Mt. Eden and Ponsonby.

That also causes an increase of rental price in the suburbs due to the scarcity of accommodation in the inner-city region. Shannon elaborates that losing students to the city is like losing “that movement and heart within the city centre” (para.17).

Beside the desperation of finding a roof to cover their heads, Auckland students are also looking for a cross-sector learning environment as communal study and social spaces. In recent research, Statistics New Zealand (2012) shows that Auckland city centre attracts more than 60,000 students to study and live, in which mainly international students prefer to live proximally to the universities. Auckland Central Library seems to be overcrowded as the public library exceeds its capacity of seating and spaces to accommodate both students within the Learning Quarter and Auckland CBD residents. Students are unable to find quality seating as they must compete with others, especially during the exam period when university libraries are also busy.
Learning is not only from school, but it is also from the community that students can learn from each other, share common ideas and exchange cultures. Oblinger et al. (2006) defines the learning community, as the place which “has the power to motivate its members to exceptional performance”. To achieve this, the Learning Quarter requires creating a variety of learning centres to meet different student’s demands for learning, researching and sharing knowledge. The cross-sector facilities as learning communities are essential to appear in this quarter as they create the connections between universities and interaction between students and residents.

Figure 4.1.1.2 (Above): photo of Auckland Central Library taken before the new semester started by the author. Library lacks available tables and seats.

Figure 4.1.1.3 (Below): photo of Auckland Central Library taken before the new semester started by author. People are waiting to use the internet and computer facility.
The Engine Room Quarter critically reflects the Auckland and New Zealand economy as it is the best-chosen location for many head offices and famous brand retails. This area is centred on Queen Street where it is the most significant concentration of commercial and retail activities and is one of the busiest streets where pedestrians are the primary users of the street. These activities are also offered on some of the secondary streets, such as High Street to Victoria Street, and Lorne Street. A wide range of pedestrian users including students, employees and tourists are attracted to the experience of walking and shopping on High Street with low traffic speed. With its unique historical characters of streetscape and boutique retails, shopping and restaurants, High Street provides a complement of vibrant and pleasant lifestyle in the core of commercial hub. Similar characters are offered at Britomart precinct. This mix of commercial office and retail land use is next to the Auckland’s main transport hub, which lies on the eastern side of lower part of Queen Street. With multiple transport options such as train, ferry and bus available in the heart of the CBD, the traffic congestion still occurs at peak hours (figure 4.1.2.2). The photo of the figure 4.1.2.3 shows that the parking on the corner of Victoria and High Street managed by Auckland Transport is empty at night time, but it is very crowded during the office hours. Victor Gruen (as cited in Charles, 2010), known as “father of the modern shopping mall”, believes that the single-function creates transportation problems, after work with shopping centres. He says that when shopping centres close for the evening, "it has been found that drivers of about 60% of all parked cars wish to leave simultaneously." (p.40). Charles (2010) also concludes that the car park in the centre is used wastefully, as it must be built big enough to serve a large number of employees for approximately more than eight hours per day and it will be underused in the evening, and the rest of the night (p.40).

From Monday to Friday, from eight to six, about 90,000 people come to work in the city centre on the same schedule (CBD Master Plan,2012). As most of the workers and students will leave the CBD after office hours, the restaurants and shops are packed during the break hours (between noon and 2 P.M) and then they are deserted almost for the rest of the day. The buildings on Queen Street, which are mostly only one “primary use” as offices or commercial retails, has caused the problem on supporting the neighbourhood (figure 4.1.2.1). Jane Jacobs (1961), the author of the book “The death and life of great American cities” and best known for her influence on urban studies, uses the phrase “blight of dullness” to describe the problems of transport congestion and supporting the urban neighbourhoods caused by single-function land use. She states, “The district must serve more than one primary function, preferably more than two” and she also states, “On successful city streets, people must appear at different times” (p.198). Jacobs gives some examples of the time spread on Wall Street where about 400,000 people come to work every day. Both the New York Public Library and restaurants in downtown Manhattan suffer from “extreme time unbalance among its users”. Customers come “like a tide” from noon to 2 P.M and leave the shop “dullness” at other times (p.202).
To actively generate diversity in an urban district, Jane Jacobs (1993) accentuated four conditions that helped to develop a livable and diverse city (p.196-197):

1. The district must serve more than one primary use, and preferably more than two.
2. Most blocks must be short; that is, streets and opportunities to turn corners must be frequent.
3. The district must mingle buildings that vary in age and condition, including a good proportion of old ones.
4. They must be a sufficiently dense concentration of people.

Thus, the primary use, as Jacobs suggests, must be “combined, effectively, with another that puts people on the street at different times, then the effect can be economically stimulating: a fertile environment for secondary diversity”, which should be applied to create effectiveness of primary mixture in the Engine Room Quarter (p.211).

Figure 4.1.2.2 (Top left): Traffic congestion blocks Queen Street as redevelopment squeezes traffic to one lane in places. 14 March 2007 New Zealand Herald Photograph by Dean Purcell

Figure 4.1.2.3 (Bottom right): Photo of AT Car Park on the corner of Victoria and High Street at night by the author.
Figure 4.1.2.4: The maps show different land use in the Auckland CBD. Single function as office and commercial uses occupy most of the site. Data is collected from Geomaps of Auckland Council.
4.1.3 Victoria Quarter

Victoria Quarter sits next to the core of the Auckland CBD, containing the main streets such as Hobson, Fanshawe and Nelson Street, including Victoria Park and the motorways, in which the Southern and Northern Motorways can be accessed directly from Hobson and Nelson Street. In a recent study, the graph (figure 4.1.3.2) from Auckland Transport (as cited in Donovan, 2013) shows the great number of vehicles using these two streets at different times in 2005. Approximately 2000 vehicles per hour are running on one street, and each street has four to six one-way lanes.

Once the traffic gets off the Southern Motorway to enter Victoria Quarter, it immediately reaches a mix of residential and commercial activities in which the residential buildings are mainly occupied in this area. The Zest apartment building on Nelson Street will be the best example of living in the city offered in Victoria Quarter, as its characteristics such as location and surrounding factors are significant to understand in order to support the design stage in this research project.

Figure 4.1.3.1: the map showing the traffic flows of the on-ramps and off-ramps from the Northern and Southern Motorways.

Figure 4.1.3.2: number of vehicles using Hobson (red column) and Nelson (blue column) Streets at different times in 2005.
The Zest is notorious as an ideal apartment for students and employees who want to live and work in proximity but pay an affordable price. The main entrance of this building is located near the end of the off-ramp from the Northern Motorway where the traffic all heads to one direction with a faster speed than their allowance. Walkability is important in a high-density area as walking is the preferred mode of travel to reach most destinations within a short distance. As the figure 4.1.3.4 shows, the vehicles are moving very close to the footpath, which makes it unfriendly and unpleasant to walk along this street. The figure 4.1.3.3 also shows that not only is Zest Apartment surrounded by car parks, and one-way streets with high-speed traffic flows, but also many of the residential buildings in this area face similar issues that could affect the quality of life. These buildings lack communal spaces such as green space, and well-designed friendly pedestrian streets.

A fear of harmful effect to the health caused by vehicle emissions and noise could make this part of Auckland an undesirable place to live. According to Census data in 2013 (cited as Polkinghorne, 2014), Auckland Central has a deprivation level of 10. Pryor (2014) explains that the central part of Auckland is deprived due to the overcrowded apartments, as they soon turn to into slums. The size of each unit in the building is not the reason to turn the building into slum, but the layout of the apartment itself. Auckland City Mission chief executive Diane Robertson (Pryor, 2014) says "In this particular area there's not even a piece of green park" and "some of the high-rise apartment blocks have no sense of community". To achieve the goal of making Auckland the world’s most liveable city, the design of apartment buildings needs to be planned in an appropriate way for higher density and to allow the city to grow bigger in the future.

Figure 4.1.3.3: Apartment blocks including Zest (blue blocks surrounded by car parks (yellow blocks))

Figure 4.1.3.4: Zest Apartment building sitting very close to Nelson street
4.1.4 The Aotea Quarter

Aotea Quarter is the last quarter to be analysed, but it is also the most prominent one within the Auckland CBD. It is located on Queen Street and bounded by Mayoral Drive, Wellesley Street and Lorne Street. The quarter houses many significant historical, civic and cultural activities and infrastructures, including Aotea Square, Auckland Art Gallery, Auckland Central Library, Town Hall and Aotea Centre. Aotea Quarter is centrally located between the other quarters, acting as a bridge that let people walk to another.

Lennard (Haas, 2008) described the square as “a place for communication” that “provides the basis for bridging social capital” according to Robert Putman’s words. She also described the square as “where inhabitants offer mutual assistance and cooperation, exchange information and are engaged in a wide array of activities that demand their participation” and a place for young people and immigrants “to learn about the society and become acculturated and accepted as members of the community” (Haas, 2008. p.112). By the means of benefits offered within the square, the potential development sites surrounding the Aotea Square could take advantage to inherit the rich diversity of use such as education, offices, commercial and residential as the square “is the main crossing point of pedestrian routes through the city” and people also “walking through the square on their way to work, school, shops, or other errands, cross paths with greetings and meetings take place.” (Haas, 2008. p.112). However, Aotea Quarter fails to carry on the unique characteristic from the other quarters.

Auckland Council (CBD Master Plan, 2012) suggests that the development around this node should comply with the quarter structure and function to support the education and culture sector and also to conserve the heritage buildings.
4.2 SITE ANALYSIS

The chosen site is on the corner of Wellesley Street and Mayoral Drive, which is located in the heart of Aotea Quarter. The site has a strong connection to Aotea Square via a pedestrian walkway through the Aotea Centre building and Bledisloe building.

The total land area of the site in this project is approximately 2,480 square metres with nearly 80 metres long and 31 metres wide. The existing site has two parts in which the first part was used to be the Griffiths building, and the second part is currently used as a public carpark. The 80-year-old Griffiths building was demolished as part of the City Rail Link (CRL)’s Aotea station work. The new station will make a big change by inviting more people to get to the city centre, which will also become the best-connected and busiest spot in the Auckland CBD.

Figure 4.2.1: Aerial view of selected site plan (red block) with significant buildings around (orange block) and directions to the quarters
Figure 4.2.2: Site from the corner of Wellesley and Mayoral Drive. The Bledisloe House is right next to the site. (Taken by Author, 2017)

Figure 4.2.3: The alleyway between the site and Bledisloe House. The existing site is a public carpark. (Taken by Author, 2017)

Figure 4.2.4: The alleyway between the site and Bledisloe House. Looking out to Wellesley Street. The project site on the left. (Taken by Author, 2017)
Figure 4.2.5: The connection under the glass canopy between Aotea Center and Bledisloe House that connects the site to Aotea Square. (Taken by Author, 2016)

Figure 4.2.6: View looking out to the Aotea Square (Taken by Author, 2016)

Figure 4.2.6: Pedestrian walking from Wellesley Street (Taken by Author, 2016)
Figure 4.2.7: The existing bus stop on Mayoral Drive, next to the site. (Taken by Author, 2016). See figure 4.2.10 for the bus stop location.

Figure 4.2.8: The existing bus stop on Mayoral Drive with poor visibility and difficult to identify. (Taken by Author, 2016)

Figure 4.2.9: The Access from Mayoral Drive to the site. The road has a slope of about 9.5 degree. (Taken by Author, 2016)
Figure 4.2.10: The Site Plan.
4.2.1 Topography

Figure 4.2.1.1 (left) : The site is steep and has a slope of about 9.5 degrees which is a drop of 5 metres from top to bottom. Slope will impact the placement of access, entrances, and outdoor activities.
4.2.2 Transportation Integration – Aotea Station

Tom Martineu (Haas, 2008) wrote that “As more mixed-use development grows in the area, public transportation will become increasingly more reliable and frequent due to increased density and demand” (p.100). At the moment, the Auckland public transport system is poorly integrated in terms of modes and routes, and it has not been designed to adapt to population growth, according to AECOM Global Cities Institute (2012).

Therefore, the new proposed Aotea station is under construction to improve accessibility to the central of Auckland city. The Aotea station promises to be the busiest station in Auckland.
There is limitation of availability of Aotea station final detailed information. The floor plan of the Aotea station retrieved from Auckland Transport (2017) is modified in order to be compatible with the objective of this project. The research outcome will engage with the original design strategies of the station such as the design of circulation and connectivity.

Figure 4.2.3.2: The facades of Aotea Station at the early stage. (Auckland Transport, 2017)
4.2.3 Traffic Analysis

Figure 4.2.2.1: The travelling time by bus or train from other suburbs to Auckland central will be effectively improved. Once the commuters arrive at Aotea Station, they could easily walk to other quarters within five to ten minutes. Students could walk to both universities within minutes or use the public bus services that run regularly along Wellesley Street and Mayoral Drive. Therefore, Aotea station is the important key to ease the pressure of traffic congestion and to reduce the demand for carparks, as it will change the way people go to work and travel within CBD.
4.2.4 Sun study

Solar and natural daylight access are very important for designing a sustainable building that could help to reduce the artificial lights and heat. The sun movement and sunlight phases are easily shown via the website Suncalc (2009). The website is a tool to study the sun positions at sunrise, sunset or within a specified time set. The thin orange curve is the current sun trajectory, and the yellow area around is the variation of sun trajectories during the year. The closer a point is to the centre, the higher is the sun above the horizon. The casting shadow images from three-dimensional views of buildings around the site are also gathered from the website Arcgis (2017) to illustrate the shadow directions in the winter and summer.

Figure 4.2.4.1(Above): Screenshot of SunCalc illustrates the sun movement and sunlight phases at 2:00 PM in the winter.

Figure 4.2.4.2: Screenshot of ArcGIS illustrates the shadow from the building around the site at 2:00 PM in the winter.
Summer 15/02/2017: The selected could not capture the morning sun as the east side is affected by the Bledisloe building. However, the north-west facing side will capture most of the afternoon sun.
Winter 15/06/2017: From the east face, the shade may not be necessary in the winter morning as the obstruction such as Bledisloe building next to the site will block the sunlight access. However, in the afternoon, the site will receive a low angle of the sun, which means the west face will get more penetrating sun. Also, the site is surrounded by Bledisloe building and ASB Tower from the North and East sides that contribute a significant shadow cast to the site.
5|0  PRECEDENTS
The following precedents are examples of vertical mixed-use developments integrated with transportation. These developments are located above the underground station that creates a strong civic identity, and also demonstrates the city’s vitality. Although the scales of these precedents are larger than the site in this project, they may well be the best examples that relate to this research project in terms of the building’s functionality and programme, and how the mixed-use complex interconnects with the transport infrastructure to cope the urban development.

The following criteria will be mentioned and analysed:

**Connectivity:** How does the building integrate with the transport infrastructure? Does that mixed-use development help to enhance the urban habitat by integrating the building itself with multiple travel modes?

**Circulation:** How does the circulation of the building become part of the journey of passengers (train station users) and pedestrians within the city? How does the building integrate the horizontal path and vertical core into one mixed-use structure?

**Programme:** Within the urban context, what sort of programmes are appropriate? How do these programmes help to complement the existing land use?

**Sustainability:** How is sustainability defined and delivered in the mixed-use development? What strategies does the mixed-use building utilise to reduce environmental impacts and maximise the comfort of its inhabitants?
5.1 THE SHARD - LONDON

Connectivity:
More than 120,000 people daily arriving underground at London Bridge Station will immediately encounter the Shard, the tallest mixed-use tower in the United Kingdom designed by architect Renzo Piano. According to the developer, Irvine Sellar, the idea of the mixed-use development originally came from the poor use of the former office complex, Southwark Tower, and it was on “a very good site” with “the London Bridge station next door, with mainline, underground and bus stations” (The Shard, 2013, p.15). Piano also stated: “I foresee London Bridge Quarter as a vertical city, for thousands of people to work in and enjoy, for hundreds of thousands more to commute to from all over the region, and for millions to take to their hearts” (Sellar Property Group, 2008, p. 36). The Shard successfully creates its own destination and journey and contributes improvements to the main transport hub, leading passengers from the underground station all the way through the retail frontage to the street and other public transport.

Mixed-use Programme
Piano believes that “successful cities have a 24-hour life” which still maintains operating after office hours (The Shard, 2013, p.19). Following the “Vertical City” vision, the structure of the Shard reflects the same typical mix of use offered in the central city of London: office, hotel, medical, tourist attraction, apartment, retail, restaurant and observation. The 16-track terminal leads the passengers into the busy retail plaza at the foot of the tower. As the tower’s form gets smaller towards the top, 24 storeys of offices occupy the lower section of the building, as they require a larger floor plan. Bars and restaurants are continually placed above the office levels, but below the hotel function. The apartments occupy the higher level in, which they enjoy not only views of four sides, but at this level, they also can avoid the noise from the heavy use of public transportation. Both residents in apartments and the hotel could easily access the restaurants and bars on level 31 to 33 and other facilities within the Shard. An observatory is situated at the top, serving spectacular views across London for the public and residents in the apartments. With different users, many of its functions will operate 24 hours a day which maintains the building as a lively, dynamic and vibrant place to work, play and live all day and night.

Figure 5.1.1: Sectional view showing the integration of tower and transport hub (The Architecture Review, 2012)
Circulation

Transportation integration is the critical key to designing a mixed-use complex that creates a walkable city and contributes benefits to surrounding commercial and economic development. Therefore, the transition from the station to the entrance and other functions inside the building played an important part in designing the Shard. Different users will use different entrances which are located in appropriate and easy access. The office entrance on the public level has direct access to most of the transport services including the mainline station, bus stops and Jubilee and Northern Lines. The residents who stay in the hotel and apartments have individual access via St. Thomas Street. For the public access to the observatory level, the visitors could enter directly from the station concourse without crossing over any other entrances. All vertical transitions are served by 44 lifts to take the passengers to their required floors (The Shard, 2013).

Sustainability

Piano is very interested in the sustainability of London and the building itself. The Shard is clad using a triple-skin glass façade that contains computer-controlled venetian blinds to reduce the heat from the sun, and also to decrease the energy used for air conditioning. The computers in the offices create the amount of heat that will be recycled to reheat the hotel and apartment above. By applying these techniques, the Shard uses around 30% less energy than other buildings (Sellar Property Group, 2008). Another finding, according to the Sellar Property Group (2008), was that the “greatest contribution to the sustainability of London is due to its location” (p. 15). The Shard is designed without an underground car-park beneath it, as the building is sitting above the London Bridge Station. The architect assures that his work could “provide a life in a city without increasing the traffic – by using public transportation” (Sellar Property Group, 2008, p.15).
5.2 ABENO HARUKAS – JAPAN

Connectivity: According to Harada and Yonezu (2015), the trend of development that connecting the train station and housing has increased during the period of population growth after World War II. Abeno Harukas is a 300-metre-tall skyscraper, making it the tallest building in Japan and also the tallest railway station in the world, as it is planned above the terminal station Abenobashi, the terminus of the Kintetsu Railway in Osaka. In a recent study, Safarik (2016) showed that the station serves more than 70,000 commuters per day, and the Abano tower additionally welcomes 34,000 people per day visiting the department store or entering the subway entrance by accessing through the building.

Figure 5.2.1: Programmes of Abeno Harukas-Supertall Compact City (Harada & Yonezu, 2015)
Mixed-use Programme and Circulation: A wide range of activities above the station such as retail stores, museum, university, hospital, office, hotel, observatory and sky garden, are integrated into 60 storeys with five basement levels, in which these activities are reflected from the city context in Osaka (Harada & Yonezu 2015). There are three architectural keys that the architects used to convert “the possibilities inherent in the innumerable encounters in supertall compact cities into effects” (Harada & Yonezu 2015, p.14):

- Three-dimensional routes affording various choices: To create different options for pedestrians to encourage explorations in both horizontal and vertical directions, when moving through the building. The car-park is located at the base of the building to avoid the disruption of pedestrian flow. The department stores allow pedestrians to access from multiple directions, once they arrive at the station.

- Networks of voids: To help people relax and locate themselves by connecting the interior spaces in three dimensions via the voids. The architects used the network of voids to separate the programmes, but also to connect them depending on their functions.

- Three-dimensional networks of greenery: By cascading green roofs, the Abeno building will help to create a pleasant urban landscape in Osaka, which has a shortage of green spaces. The rooftop gardens on specific floors act as open lobbies that provide segues between the programmes in the building.
**Sustainability:**

By incorporating the railway-based structure into the vertical mixed-use complex, the building helps reduce energy consumption and the carbon emission impact of travellers by saving them multiple trips, as they have opportunities to pass through many functions within one building (Safarik, 2016). In the research of the environmental design of the Abeno Harukas tower, Harada and Yonezu (2015) explored that the building is using active and passive technologies to reduce environmental impacts, in which the “active technologies include incorporating leading-edge building equipment and performing energy management that uses the building's multi-functionality to the greatest advantage” (p.18). The passive technology uses the voids to create connections with nature. They provide ventilation and heat exchange, while using little energy.

Figure 5.2.3: Functions of the voids in Abeno Haruskas Tower (Harada & Yonezu, 2015)
5.3 Precedent Overview

The studies of two vertical mixed-use precedents have helped to define the significant architectural elements in designing “vertical city”, and also to determine the appropriate way to incorporate multiple functions into one building. The precedents also illustrated the importance of integrated public transportation in mixed-use development within a city. The design combined internal and external connectivity that created an opportunity to develop a stronger community and enhanced the pedestrian experience in both horizontal and vertical directions, from outside to inside and from the public to private section. Moreover, the studies have helped to understand what programmes and components are necessary for a mixed-use development in which the programmes integrated into the building reflected different activities that are found throughout the city. It is important to comprehend the formulation and arrangement of each programme in a single complex, in order to achieve sustainability in designing and making our lives healthier and more convenient.
6|0 DESIGN PROCESS
### INITIAL DESIGN

#### 6.1.1 PROGRAMME AND CIRCULATION PLANNING

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>PROGRAMME</th>
<th>OPERATION HOUR</th>
<th>TYPE OF USERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Use</td>
<td>Retail Spaces, Lobby, Help Desk, I-site Center, Learning Center, Community Center, Cafe/ Restaurant, Indoor Waiting Area</td>
<td>7AM – 10 AM</td>
<td>Students, train passengers, bus passengers, pedestrians, workers, residents</td>
</tr>
<tr>
<td>Semi-Public Use</td>
<td>Open Offices, Private Offices, Cafe, Parking</td>
<td>6AM-6PM (after hour accessible)</td>
<td>Workers, office visitors, residents (who work and live in the same building)</td>
</tr>
<tr>
<td>Semi-Private Use</td>
<td>Gym/ Sauna, Skygarden, Swimming Pool</td>
<td>6AM – 11AM</td>
<td>Resident, Workers</td>
</tr>
<tr>
<td>Private Use</td>
<td>One- bedroom apartments, Two- bedroom apartments, Parking</td>
<td>24/7</td>
<td>Residents only</td>
</tr>
</tbody>
</table>
Circulation in the building is a pedestrian’s movement journey to explore the programmes and experience the sense of spaces. To successfully design circulation routes without feeling lost, Sophie Hamer (2016) pointed out some important components in designing a circulation within a building including: directions of movement (horizontal, vertical or both), type of spaces used as public or private, frequency of movement and timing. In this project, the mixed-use design offers a vibrant and dynamic movement, due to the integration between the building and Aotea Station, which will accommodate different type of users and various activities that could affect the pedestrian flows. The users need to be identified as well as their possible duration of staying and using the facilities in the building to determine a planning concept.

Figure 6.1.2: Sketched diagram for initial idea of planning programmes (by author)
Figure 6.1.3: Sketched diagram for initial concepts based on the sun study and functional placement. The apartment form is separated into two towers in order to take the advantage of natural daylighting from the North in both summer and winter. The Concept 3 is a final concept as its best solar orientation that allows more sunlight to enter to the apartment levels.
Locating Entrance: Transportation needs to extend into the building; The ease and experience of the transition from station to lobby to escalators and lift often plays a critical part in their design. Visible from the proposed station, the mixed-use development in this project will act as the public terminal above the ground that makes the bottom part of the building suitable for retail, restaurants, cafés and waiting areas, as the station entrance is planned to connect to the building at its base. The Entrance 1, as showed in figure 6.1.2, connects the station and building that lead the passengers to the groundfloor on the Mayoral Drive side of the building. The Entrance 2 is necessary to attract and encourage pedestrians, using the alleyway that connects the Square and Mayoral Drive following under the canopy of Aotea Center. The Entrance 3 is located prior on Mayoral Drive as it is clearly visible and accessible for pedestrian walking from Mayoral Drive towards Wellesley Street and also people arriving at the bus stop in front of the building.

Figure 6.1.1 (top): Illustrating pedestrian flows to define the potential entrance locations (by author)

Figure 6.1.2: The potential flows among three entrances (by author)
6.2 DESIGN OUTCOME

6.2.1 PROGRAMMES

Retail Level (Level 1 – 3): The ground floor of this mixed-use complex attracts people from the exit of the station into a mixed-use spaces. This level serves not only as a retail spaces, but also provides a large waiting area with a variety of public services, such as bus waiting area, I-site desk, and cafes. A transition from the station to the building starts at the entrance and the exit of Aotea station that leads people to another function of the space, which is indicated by the change of materials and level change. This level intends to cater a great number of people who work, study and live within the CBD, creating a diversity of communities, promoting multi-cultural activities and supporting a longer shopping hours.
Figure 6.2.1.1: The interior view of ground floor looking towards the station entrance and main entrance from Mayoral Drive with waiting areas (by author).
Figure 6.2.1.2: The 3D view visualises the activities occurred on the level 1 (Retail Level) (by Author)
Figure 6.2.1.3: People arrived station immediately encounters the retail level of the mixed-use building before reaching to the other mode of transportation such as public bus. (by Author)
Figure 6.2.1.4: The 3D view visualises the activities occurred on the level 2 of retail spaces. (by Author)
Learning Centre (Level 4-5): The learning centre aims to promote sociability and provide opportunities to expand new knowledge. Students from nearby universities can use this facility, as a communal space that offers an environment to study, research and collaborate, and provide computers with free access to internet and academic services. This facility welcomes the occupants of the building, and people who work in the city centre to use the space as a culture hub and public research centre. This learning centre is an extension of Auckland Central Library, allowing people to reach out to a larger community.
Figure 6.2.1.5: The 3D view visualises the activities occurred in Learning Center. (by Author)
Figure 6.2.1.6: The 3D view visualises the activities occurred in Library. (by Author)
Office (Level 6-8): Each floor plan of office spaces is designed to accommodate not only an open workplace with flexible tables and rooms for a group of freelancers or start-up companies, but also to serve the private offices for individual companies if they want to work without distraction. By creating more interactions between workers such as socialising, brainstorming and collaborating, the employee’s productivity will increase higher. A coffee bar and green space are incorporated in every open office with shared workspaces that encourage communication among the employees, keep them happier and healthier, and stimulate interesting encounters between people of cross-disciplines. The office levels are reached by lifts with unrestricted access during the daytime and remained closed at night for security, unless accessed by swipe card.
Amenities (Level 9): The ninth level is considered as a buffer zone to ease a transition between public and private areas, and between commercial and residential spaces. It also reduces the noise from the dynamic activities of the public spaces. The amenities such as swimming pool, gym and sky garden can be used by the employees and residents only. This level is designed as an open plan floor to allow the natural ventilation moving through the apartments to reduce the need for air conditioning (See figure 6.2.1.5).
Figure 6.2.1.7: The 3D view visualises the activities occurred on the level 9 (Amenity Level), which promotes a sustainable community within the building (by Author)
Apartments (Level 10-19): Apartment towers provides two types of spatial layouts that cater for a single person and young families. A single room apartment is suitable for students who study in nearby universities, and the two-bedroom apartment is pertinent for young families who prefer to stay close to the central city.
Figure 6.2.1.8: The 3D view visualises two-bedroom apartment. (by Author)
Figure 6.2.1.9: The 3D view visualises two-bedroom apartment. (by Author)
**Carpark (Basement 1-4):** Limited carparks are located in underground levels that are occupied by residents and employees who work and live in the building. By limiting parking, it may cause inconvenience for customers who travel by car, and it also affects the number of people come to the shops and use the facilities in the building. However, the decision to limit on automobiles will make the city more livable and sustainable in the long term.
Figure 6.2.1.10: Longitudinal Section of the mixed-use building (by Author)

Figure 6.2.1.11: Cross Section of the mixed-use building
6.2.2 Circulation

**Horizontal circulation**: is also planned as a public circulation, which is easy to access during the certain hours of the day. The movement from the public space of the street is extended into the interior of the building and continued through the ground level up to the fifth level. The train users will immediately encounter the mixed-use complex and other public services within a single structure. By changing the floor level, the horizontal traveller will be aware of the change in space, which has a different function and atmosphere.

**Vertical circulation**: is usually designed as a core of the building to allow people travelling up and down to another level mostly by lifts or escalators. This type of movement often leads people directly to the private spaces, such as offices and apartments. Residents who live and work in the building will rely more on the lifts, as it is expected as the primary mode of traveling.

**Sky bridge**: The main purpose of the sky bridge in this project is to connect two apartment structures that contribute to create a residential community. The bridge also act as the additional emergency escape access to reduce the vertical movement, in case of fire.

Figure 6.2.2.1: Vertical and Horizontal circulation throughout the building (by Author)
6.2.3 Connectivity

The building in this project appears to provide not only a vertical mixed-use development, but it also creates a strong and supportive connection among the surrounding buildings and the urban context. The canopy from Aotea Centre is efficiently extended to maximize its functionality, as it will improve the pedestrian flow from the Aotea Quarter and encourage them to walk through the building. Moreover, the external function of the building on Mayoral Drive is designed to provide a public waiting area for bus and train users. This links to the existing bus stop, making it more dynamic on the open street frontages. Moreover, the building certainly provides safer streets for pedestrians to walk on Mayoral Drive as well as the alleyway of Aotea Square at night time.

Figure 6.2.3.1: View looking to the extension of the canopy from Aotea Centre to the building. (by Author)
Figure 6.2.3.2: View looking from Entrance 1- the entrance between Aotea Station and mixed-use building, looking toward the retail space, lobby and waiting area. The public bus stop is placed outside the building (by Author)
Figure 6.2.3.3: View looking from Entrance 3 (by Author)
6.2.4 Sustainability

In this project, the sustainable design can be achieved by various means. Natural cross ventilation is achieved in the podium amenity level by incorporating with the void between two apartment towers. The fresh air is brought through the open plan floor at level ninth, carrying the hot air through the space and escaping out via the gap between the apartment towers. As a result, the natural cross ventilation can be energy efficient passive cooling strategy, when the natural wind is available. However, all the levels of the building require the mechanical ventilation to ensure there is regular ventilation and cooling throughout the building when the wind is unavailable.

Due to the complex functions and diverse activities offered in mixed-use building, energy consumption can be reduced overall by regenerating the waste heat gained from the office and commercial activity, where computers, air conditioners and lights are used all year round. The heat from commercial level and office, mainly gained during daylight time, is utilised to re-heat the water in the apartments to be consumed at night time.

Figure 6.2.4.1: Natural ventilation movement throughout the building. (by Author)
CONCLUSION
The aims of this project is to answer the question “*How can mixed-use development be integrated with the new transportation development to achieve a various aspects of sustainabilty to provide a better lifestyle of working and living in Auckland CBD?*”. By investigating the demand of Auckland residents, workers and students and researching the future development of the city, the project design is shaped to create a “vertical village” that continue to carry on the unique characteristics from surrounding area into the single building. Critical analysis of the site has played an important role in forming appropriate programmes to adapt the existing value and structure of the site and enable to grow with the future urban development. Four objectives established through the research and design process will be utilised to answer the architectural question following by:

- **Connectivity:** The connectivity of the site has successfully improved by extending the existing canopy from Aotea Centre to the mixed-use building, which encourages people to walk through alleyway between Aotea Square and the project site. It also improves the visual connection between the Aotea Square and Queen Street by leading people to walk through the square, as it is a shortcut to access the station and Mayoral Drive. By integrating the Aotea station into the vertical mixed-use complex, the project has created a vibrant rhythm of movement that enhance the accessibility between Auckland CBD and city fringes.

- **Circulation:** Different space user will approach to a different type of circulation. In this project, the pedestrian will encounter various activities occurred during their walking journey before reaching their destination. For example, the train passengers arrived the station will encounter the retail activities and waiting area in the lobby before reaching the bus stop to continue their journey. By interrupting their direct journey, the pedestrian flow will be slow down as people are attracted by many activities occurred on their way. The horizontal movement, therefore, is effectively established at street level as well as public spaces to create a sense of place and community within the building. A vertical movement through the use of stairs, escalators or lifts is also promoted as the core of the building, as it defines the transition between public and private spaces, taking people directly to the specific functional level, while the private space is still ensured. However, these buildings lack communal spaces such as green space, and well-designed friendly pedestrian streets.
- **Programme:** The programmes has achieved the aims of high density architecture and a walkable neighbourhood. The mixed-use building has also successfully carried on the predominant characteristic of the Auckland’s urban context. Each programme has reflected the society’s needs as well as the existing urban structure. Due to the complexity of the building, people have found it as part of their daily journey. Students, employees, visitors, and residents who perform some sort of unique activities that can meet at one place. The building in condition of public transportation will appears as an extension of the terminal to support the new Aotea railway station.

- **Sustainability:** The building has achieved the aim of integrating a mixed-use development into a new transportation, in order to reduce reliance on private cars, which also reduces the impact on the environment (environment sustainability). This type of urban living has built a strong sense of community throughout the building as well as the urban neighbourhoods, as people get to know each other by walking pass everyday (social sustainability). It also allows business to establish and grow stably, as that is where the customers are, providing more opportunities of employment within the building as well as the surrounding area (economic sustainability).

At the end, the result of this thesis has successfully satisfied the requirement to provide a higher quality and sustainable lifestyle for all type of people who are desirable to live, work and study in the heart of Auckland CBD. Even so, the problem remains of the nuisance and noise due to the mixture of uses in the building is likely to bother the residents at late-night. For Auckland residents to benefit fully from the vividity and diversity of mixed-use development, the specific design and structure of housing need to be discussed further in order to strengthen the relationship between uses and users.

Further study will explore the structure system of the building that requires a deep understanding of earthquake engineering and the building façade, which is influenced by the existing heritage building around the site.
REFERENCES
Websites:


Books:


**List of Figures:**


9.1 The proposed Aotea Station

Figure 9.1.1: Aotea Station – Street Level Plan South (Source: Auckland Transport, 2017)
Figure 9.1.2: Aotea Station – Longitudinal section and elevation (Source: Auckland Transport, 2017)
10|0 FINAL PRESENTATION
VERTICAL VILLAGE
in the Heart of Auckland CBD
Declaration

Name of candidate: ...Catherine...Nguyen... (Ngan...Thuan...Nguyen)...

This Thesis/Dissertation/Research Project entitled: Vertical Village in the heart of Auckland CBD is submitted in partial fulfillment for the requirements for the Unitec degree of Master of Architecture (By Project).

Principal Supervisor: Cesar Wagner.

Associate Supervisor(s):

CANDIDATE'S DECLARATION

I confirm that:

- This Thesis/Dissertation/Research Project represents my own work;
- The contribution of supervisors and others to this work was consistent with the Unitec Regulations and Policies.
- Research for this work has been conducted in accordance with the Unitec Research Ethics Committee Policy and Procedures, and has fulfilled any requirements set for this project by the Unitec Research Ethics Committee.

Research Ethics Committee Approval Number: 

Candidate Signature: ........................................ Date: 01 June 2017

Student number: A469 215
Full name of author: Catherine Nguyen

Full title of thesis/dissertation/research project ('the work'): Vertical Village in the Heart of Auckland CBD

Practice Pathway: Architecture

Degree: Master of Architecture (By Project)

Year of presentation: 2017

Principal Supervisor: Asan Wagner

Associate Supervisor:

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