URBAN RETROFITTING

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2016

What opportunities are there for Landscape Architects to design within Auckland's existing urban transport corridors to better support biological communities?

ABSTRACT

Figure 1 : Auckland City, New Zealand.
Projected Urban Population for 2033 : 2 Million.

The global population is projected to rise to 9.6 billion people by 2050, with upward of 60% expected to move into urban areas (Alberti, 2005). Economic geography further suggests that the pressure to expand and availability of cheap land at the urban fringe will lead to urban sprawl (Taylor, 1996). Like many major urban centres, Auckland faces problems related to urban sprawl, such as acute traffic congestion leading to unsustainable land use. (Jamieson, 2007) Shifting attention from new land development to retrofitting existing marginal spaces within the urban limits holds tremendous potential to rethink Auckland's urban development. With focus on the development of remnant spaces in Auckland city, this project establishes a series of strategies to create a networked infrastructure that supports ecosystem health, thriving social communities, and economic opportunities. Particular attention is given to transport corridors that intersect with major residential, commercial, and industrial sectors of the city. The public transport system is explored as a tool for directing the future growth of Auckland.

DEDICATION

This thesis is dedicated to my parents; Fouad Jawadi and Ayyam Bahjat, my three sisters; Sara, Amina, and Zubaida Jawadi, my baby brother; Bilal Jawadi, my darling husband Ibrahim Al-tiay, and my soon to be born baby girl.

I would like to thank you all from the bottom of my heart for your unconditional love, and encouragement throughout my life. Without your constant support, I would not have reached this far. You are the reason I work hard for what I aspire to achieve.

Lastly, and most importantly, I thank my creator, for his guidance and his endless blessings.

أبدأ بحثي المُتواضع بِحَمد المَولى عَزَّ وَجَل الَّذي الهَمَني القُدرة على كِتابة هذا البحَث والَّذي مَنَّ عليّ بِنِعَمٍ لا تُعَدُ وَ لا تُحصى ؛مِنها أعَزُ الناس واقرَبَهم إلى قَلبي؛

إلى الَّتي حَمَلتني وَهناً على وَهن وتَعِبَت وسَهَرت وناضَلَت مِن
أجلي , إلى مَن رَعَتني بِعَطفِها وحَنانِها
والِدَتي العَزيزة أيام عبد اللطيف بهجت

إلى سَنَدي في الحَياة و إلى مَن أحمِلُ إسمُهُ بِكُلِ فَخر
والِدي الغالي فؤاد الجوادي، كانَ لِدُعائِكُما أثَرٌ عَظيم في تَيسير مسيرة تَعَلُمي

إلى صَديقاتُ العُمر وَإلى مَن بِهُم اكبَر وَعَلَيهِم أعتَمِد، إلى الشُموعُ الَّتي تُنيرُ لي دَربي؛
أخَوَاتي سارة، آمنة، وَ زبيدة الجوادي وَ اخي الحَبيب بلال الجوادي

إلى مَن أَرَى التَفاؤل بِعَينِه وَ مَن بِوُجودِه اكتَسِبُ قُوَةً وَمَوَدةً لا حُدودَ لَها
زَوجي الحَبيب وَرَفيقُ عُمري؛ إبراهيم الطائي

أهدي لَكُمُ هذا البَحث مَعَ جَزيلُ الشُكر وَالإمتِنان، تشجيعَكُمُ المُستَمِر لي وَمَحَبَتُكُمُ هُم سَبَب نَجاحي.

ACKNOWLEDGEMENTS

I would like to express my appreciation to my supervisor, Daniel Irving for his guidance and support throughout the course of this thesis.

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1.0 INTRODUCTION

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1.1 PROJECT SCOPE

Unsustainable land-use as a global issue

This project explores the potential of developing remnant urban space in Auckland City to support the future of biological communities as the city's population continues to grow. The remnant spaces found along rail infrastructure is used as a case study for Auckland City.

In dealing with a global issue, globalization and the rapid increase of population in the urban city increases the demand for accommodation, recreation, and supporting facilities as a process of urban sprawl. The increase of developments leads to problems of diminishing land-cover and increasing CO2 emissions, due to the automobile nature of cities of the 21st century. In an attempt to cater for these growing demands, urban cities may suffer from the loss of balance between development of built infrastructure, and available land for open space and green space within the urban boundary, thereby posing threats to the sustainability of the city.

The extent of housing intensification is seen clearly both in Auckland city's Flat Bush suburb, as well as Daly City in San Francisco - Figures (2 and 3). The demand for accommodation development has left little urban space for recreational and or ecological purposes, and very little space is conserved between each property, leading to neighbourhoods that lack basic facilities such as public spaces.

Figure 3 : Homes in Daly City, Calif, San Francisco.

Although cities cover a relatively small area of the world, they are home to many people and are expanding and intensifying at staggering rates. By the year 2030, it is estimated that more than 60% (4.9 billion) of the estimated world population (8.1 billion) will live in cities. (Alberti,2005).

On a local scale, Auckland's projected population is estimated to reach 2 million by the year 2033. As of 2014, the population has surpassed the 1.5 million people mark, and it is projected that Auckland will account 40 percent of New Zealand's population by the year 2043. (Population and dwellings, 2016)

While Auckland is keen to become "the most liveable city" in the world, it must still contend with a growing population and the subsequent demands on housing, economy and social life, while dealing with uncertainty of future resource availability (Elkin et al, 1991), leading to excessive and unsustainable land consumption. Which, according to Bhatta (2010) is a key outcome of sprawl.

Urban sprawl is a major concern for the accessibility to Auckland's future development centres. Some key reasons for this are (i) the correlation between sprawl and traffic congestion due to commuting distances, refer to (Figure 4), (ii) socioeconomic segregation due to exclusionary housing markets, (iii) increased pollution and the destruction of natural resources. (Arbury, 2005)

Figure 4 : Traffic Congestion in Auckland City.
85% of trips in Auckland are made by private vehicles.

Auckland Council has stated that in order to achieve a sustainable future for Auckland city, priority needs to be placed on the efficient use of natural and physical resources, which includes urban land development. (Unitary Plan, 2016). One such mode that Auckland Council is considering is maximising accessibility and transport efficiency in both rural and urban areas of Auckland city.

As the number of people increases in a sprawling city, pressure is added to road infrastructure. Due to the car-dependant nature of Auckland city, traffic congestion is proving to be one of the main health concerns for people living in Auckland (Ministry of Transport, 2006). Increase in congestion leads to increased stress levels, and a deterioration of air quality, resulting in a general decline in the quality of life. (Sanders, 2012).

In this situation investing in an environmentally friendly public transport system as well as providing other transportation options, like walking and cycling, becomes a method to alleviate the pressure induced by sprawl. A successful public transport system heightens the appeal for a liveable Auckland city, and networked mobility means optimally linking together various modes of transport via an integrated platform (Goulding, 2014).

The aims of heightening the functionality and appeal of public transport are clearly noted in the Auckland plan, and underline the importance of re-visioning critical urban development issues of the 21st century, however, also acknowledge that implementation of such initiatives isn't easy. Many Aucklanders prefer using a vehicle as the main mode of transport, perceiving cars to be a more convenient and cost effective (Statistics NZ,2006). It is also suggested that the low-density development pattern of Auckland makes it difficult for a re-visioning of the current public transport system to be successful.

Internationally, planners have proposed a number of approaches that promote resilience and sustainability when planning for the development of cities with an attempt to mitigate the negative impacts Urban Sprawl can have on city development. Such approaches include the revitalization of existing urban areas, through cleaning up polluted, run-down areas, preserving natural environments, proposing mixed use development methods, which involves combining residential, commercial, and employment areas instead of isolating individual areas, allowing more pedestrian and public transport as opposed to traffic and pollution. In areas where population and employment densities are medium to high, public transport is always cheaper than the car. (Vivier, 2007)

The purpose of this research, aims to respond to the pressures that current urban development puts on the city's existing and future infrastructure by shifting the way developments occur. Through the utilization of existing neglected remnant spaces within Auckland City's urban boundaries. It is expected the utilization of remnant urban space, can contribute towards supporting better lifestyles for surrounding neighbourhoods, improving the environmental conditions of the spaces surrounding transport corridors, potentially improving the city's biodiversity and national economic performance.

1.2 PROJECT GOALS

Supporting biological communities in Auckland by utilising marginal spaces along transport corridors.

To explore the ways in which landscape architecture and planning can work to enhance the well being of biological communities, that make up the city of Auckland, through a focus on existing urban railway corridors and the retrofitting of marginal spaces along them. In focusing on these areas of research, several critical questions arise which direct the literature review for this project, therefore framing the project objectives.

- What opportunities are there for Landscape Architects to design within Auckland's existing urban transport corridors to better support biological communities?
- How can the utilization of marginalized space along Auckland's existing transport corridors promote the social, environmental, economic, and cultural well being of communities?
- How can we use the growth of Auckland city as an opportunity to re-focus our planning strategies?
- How can the utilization of urban marginalized space along transport corridors transform a community?
- How can we enhance the quality of life through utilization of marginalized spaces around the city?

1.3 PROJECT OBJECTIVES AND EXPECTED OUTCOMES

Optimising site performance by balancing economic, social, and environmental parameters.

The areas of literature mentioned above will inform the priorities and actions outlined in this project. The objectives are set out as a set of hypothesises for this project.

- To better support biological communities in Auckland City, by enhancing the natural environment, and promoting healthy lifestyles. Biological communities, which include humans and non-humans, are ultimately and absolutely fundamental to the sustainability of our cities. By enhancing the environments that they exist within, and providing opportunities for sustainable growth, landscape architects can increase the liveability of Auckland City.

- Revitalize Auckland's existing urban rail corridors through retrofitting existing underutilized urban spaces. The rail corridor intersects with major residential, commercial, and industrial sectors of the city, and is therefore used as a driver for the development of new green and open spaces within the boundaries of urban Auckland. This is expected to reduce potential for sprawl, and increase connectivity between communities.

- To Improve the public transport experience to encourage active lifestyles for the local residents, and revitalize neighbourhoods through creating a strong network between communities along transport corridors.

1.4 OUTCOME OF METHODOLOGY

Triple-bottom Line as an overarching framework for the design strategy.

The Triple-bottom Line is a framework for measuring and reporting the performance of a site against economic, social, and environmental parameters. (Elkinton, 1980). Having a key focus on the Triple-bottom Line sustainability model will ensure that equal emphasis is placed on each of the three main parameters, which influence the performance of a site. Though each of these three factors functions separately and in a different way, it is impossible to exclude one from another while expecting successful outcomes.

Sustainability has been defined, as the development that meets the needs of the present generation without comprising the ability of future generations to meet their own needs. (Brundtland Commission,1987). Using the triple-bottom line framework as a tool to help guide the concepts that will be proposed for the sites selected for investigation will ensure that successful self-sustaining communities are created.

By retrofitting development of marginal spaces around transport corridors and creating where possible, connections to local services, existing parks, and other modes of public transport, such as buses, cycle ways, and pedestrian paths. It is expected that the result will be a stronger network of communities, better and more convenient access to public transport and commercial hubs, ideally resulting in a reduction of the need for long distance commuting and vehicle dependency.

Figure 5 : The Triple-Bottom Line of Sustainability.

1.5 SUMMARY OF FINDINGS AND APPLICATION

Activity-based loop connecting homes and businesses to alternative and public transport.

This project investigates Westfield Station (Figure 7) as a model case study, to understand how design interventions that focus on retrofitting existing urban space, could increase the functionality of marginal spaces found along transport corridors. This focus is expected to better support the natural environment, the social engagement opportunities and the overall sustainability of the site.

The remnant spaces mapped within the boundaries of Westfield Station and Mangere Inlet are given new functions that strive to serve benefits to the surrounding human and ecological communities. An investigation of the overall site performance against social, ecological, and economic parameters lead to the decisions on the types of transformations proposed for each of the remnant spaces found along the inlet and around the rail station.

With the main vision for the project being to better support biological communities within Auckland City. The spaces founded to be underutilized are used as a tool which directs a smart growth strategy for the city through providing quality urban spaces for local residents, activating existing abandoned spaces along transport corridors to encourage social engagement opportunities, and promote a healthy lifestyle by providing accessibility to alternative transport, such as walking and cycling. The design interventions and general approach proposed for this particular site will ultimately be easily implemented into various similar sites found along the Auckland transport corridor.

The resulting network of spaces will ideally consist of a diverse ecosystem activated by people, flora, and fauna to resuscitate poorly established neighbourhoods, and offer a network of interweaving wildlife habitats, which is supported in the literature (Wolch, 2014), and is an evident goal of the Auckland and Unitary Plans.

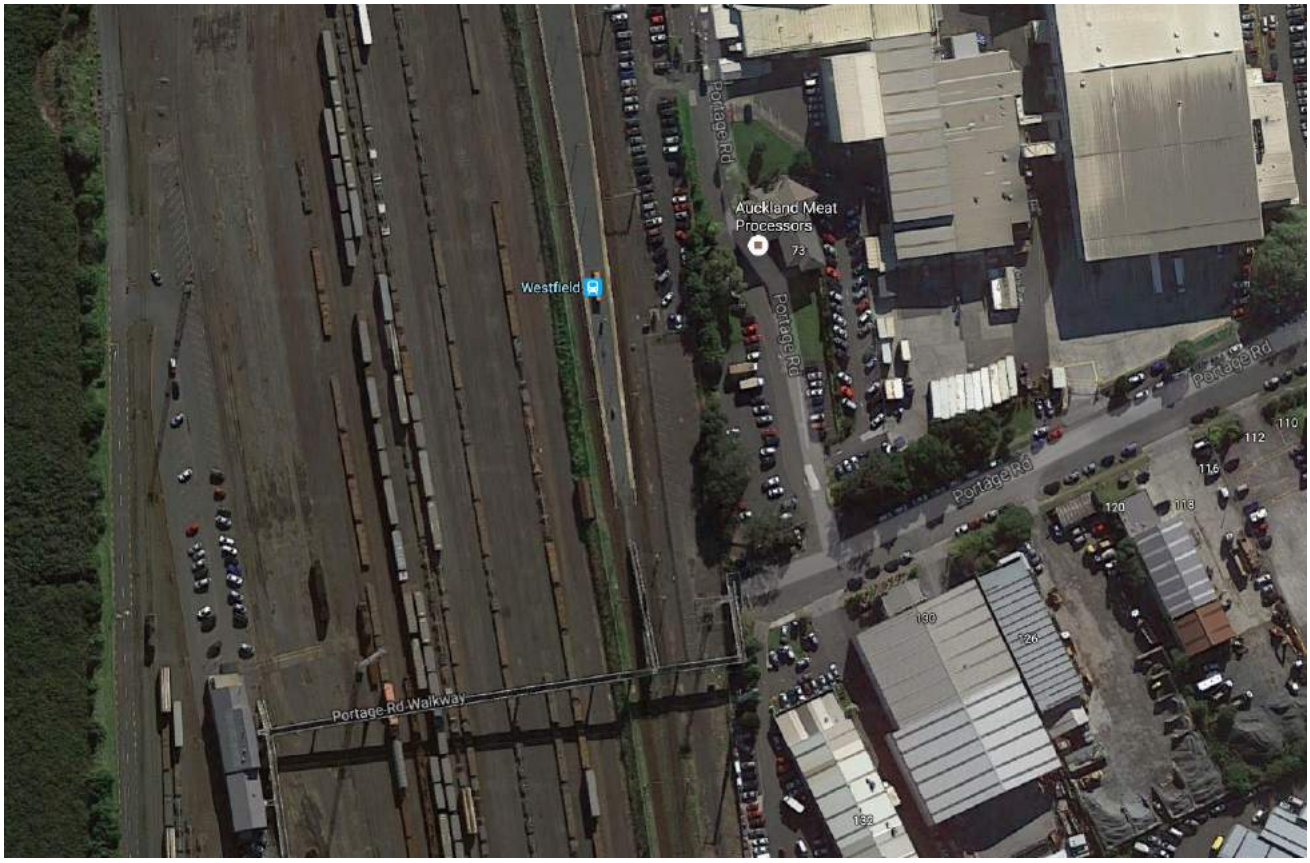

Figure 6 : Westfield Station and Rail yards.

Figure 7 : Mangere Inlet and Westfield Station.

2.0 LITERATURE REVIEW

Figure 8: Green city - by Nick Pedersen


COLLINGSWO

2.1 IMPACT OF URBAN PLANNING ON COMMUNITIES

Desktop research will be supported by digital mapping techniques to locate and evaluate the opportunities and constraints within the areas of research identified. The contextual relationships between spatial, social, economic and environmental conditions at these junctures will then be explored in order to make critical decisions relating to design transformations suitable for the individual site.

Areas surrounding transport corridors will be assessed with accordance to the level of performance of each of the three factors; social, ecological, economic. This involves highlighting existing major parks, open spaces and recreation opportunities, exploring the accessibility of local educational and health services, as well as exiting commercial and industrial developments, within the site chosen, these findings will assist in the selection process of potential sites available for development in the future.

Using a 1km boundary along the rail corridor, opportunities of connectivity based on distance, space, and time show that the width of the boundary will vary in correspondence with the existing topographic character of the land surrounding the corridor.

The second stage of the research will involve Site visits, during which the amount of average time needed for commuters to travel from the local train station to the nearest major park, school, or commercial centre, will be investigated. Notes will be made on physical and non-physical barriers available on each site, as well as where potential connection paths and landscape enhancement opportunities are realized.

2.1.1 THE GOAL OF URBAN PLANNING

As cities continue to grow, pressure is added to both their infrastructure and natural resources, leading to problems such as unsustainable land use. The growth of the population raises the need for more development of residential, commercial and road infrastructure (Figure 9). This puts pressure on people's lifestyles and well being by compromising the quality of the environment that they live in. The way cities are designed has an impact on the way people live, work, participate in leisure activities, and travel within the urban city. (HPHP, 2016)

Over the course of the 20th century, the private vehicle rapidly gained priority, and has become the standard mode of travel in most developed cities. The direction of development of the urban city has become focused on satisfying the demand for more road infrastructure to accommodate the increase in private vehicle usage.

While the introduction of the private vehicle introduced a revolution in the development of cities by improving accessibility and convenience over distance, today the excessive dependency on the private vehicle is proving to be one of the biggest urban planning challenges due to the negative impacts it has on the city and its people. (Litman,2002)

Figure 9: A city model of Shanghai, China; one of the world's most densely populated cities. (Image by Ekrem Canli)

The consequences of being heavily car dependent contribute to the excessive use of non-renewable fuels leading to the deterioration of the natural environment, a dramatic increase in road accidents, and a shift in the way cities are being developed. The impact that private vehicles have had on the way cities are planned, built, and maintained has contributed to the fragmentation of communities and social isolation through urban sprawl. (Frumkin, 2002)

Urban sprawl, is the uncontrolled expansion of development into the outer regions of a city. This leads to increased commuting distance, traffic congestion, and a decrease in the amount of quality public open spaces within the suburbs of the city due to poor planning. This expansion challenges the environmental, societal, and economic sustainability of a city. (Chen, Pendall, & Ewing, 2000)

Mexico City is a living example of urban sprawl and it's consequences (Figure 11). Sprawling development in Mexican cities has resulted in stratified singe-family housing developments , which make up the majority of neighbourhoods in the city. The socio economically challenged neighbourhoods are a consequence of the isolation from businesses, schools, hospitals, and cultural institutions. This pattern of growth has led to inefficiency of land use with the majority of residents being disconnected on the periphery. (Kulpa & Zamorano, 2015)

Figure 10: Urban sprawl poses major challenges to sustainable development in Mexico City, Mexico.

As a response to these concerns, today urban planning is shifting from prioritizing the development of road infrastructure, to preserving more land for the development of public and green space, and creating a more cohesive public transport system to encourage alternate modes of travel. (Litman,2002). This shift occurred due to the realization of the positive impact that quality public spaces have on the health of the city's residents, and the fact that prioritizing people when planning is a much more sustainable development approach. (Moss, 2015)

Planning allows for the accommodation and orientation of growth and development of cities, with a focus on the needs of the people and the places they interact with. Planning also aims to nurture the sustainability of a city and the improvement of its people's quality of life, through creating accessible, equitable, efficient and attractive environments for current and future residents. (Couch, 2016)

For cities to be able to thrive, they must search for ways in which to develop sustainably. To achieve a sustainable future, a balance between social, environmental, and financial parameters must be reached when planning for the city. (Alberti, 1996)

Figure 11: Wynyard Quarter Park, Auckland

2.1.2 IMPACT OF OPEN SPACE ON COMMUNITIES

Public space fosters social cohesion

Public spaces with different typologies and compositions, such as shared spaces, public parks, playgrounds, and multi-functional spaces play a vital role in the social life of communities. They act as a shared resource through which many benefits are reaped by their surrounding communities, as they create opportunities where positive social experiences are instigated, and social cohesion is valued. Shared spaces give the community a sense of belonging, which supports community engagement that can strengthen ties between people, which supports social equality. (Mean and Tims, 2005)

Open space networks negate sprawl

Having a network of open spaces contribute to solving the issue of sprawl. By strengthening and enriching connections between communities and neighbourhoods.

Positive correlation between proximity to parks/open spaces and well being

Community well being is supported by accessibility to quality environments, especially by providing opportunities for physical activity and play, making alternative transport options (i.e. walking and cycling) more attractive, and reducing stress by providing relaxing environments. (Regional Public Health, 2010). Public spaces act as physical and social links for the community, and promote active lifestyles by providing attractive walking and cycling connections.

Proximity to local open spaces also has a positive impact on the physiological health and well being of communities. Open spaces are most beneficial for their surrounding when the needs and desires of the local residents are recognized and addressed. This is achieved through providing a variation in recreational activities both active and passive, ensuring that the design is inclusive of a range of age groups and cultural backgrounds, and connecting people to the natural environment without having a negative influence on the natural systems.

Local economic opportunities

When united with a successful public transport system, public open spaces provide measurable direct and flow-on economic opportunities to local and regional communities. Having high quality network of public places which is well designed and managed, contributes to increasing the land value of adjacent properties, attracting new business investments, opening up new doors of opportunity for local employment, and attracting tourist activity. Therefore, enhancing regional economy. (Porter, 1998)

Reduced crime through pride of place

Public places can deter crime in communities. (Wolf, 2010). Spaces that attract large groups of people and encourage participation and engagement are less likely to contain crime incidents. Public spaces therefore become symbols for the communities they are a part of. Thus, having a sense of belonging and a sense of ownership for these public spaces is crucial for the sustainability of the community and the public space itself. (Queensland, 2007).

People are more likely to appreciate, and feel responsible for the maintenance of their community space when they can identify with it, as was disclosed in the project for public spaces. To promote pride of place for the members of the community, their cultural, and social values must be acknowledged and integrated into the design of the public space. (Project for public spaces, 2016). Crime prevention through environmental design has been used over the centuries as a way to manage and mitigate crime in neighbourhoods. (Design for Security, 2010)

In addition, place making has been used as an urban design tool to promote pride of place through creating and revitalising public spaces. Place-making is a participatory and collaborative process, where the community is involved in the design and implementation of the public space they share. This allows people's creativity to emerge, while designing spaces that they can identify with and benefit from. (Safe Spaces, 2004)

2.1.3 COMMUNITY NETWORKS AND LIVEABILITY

What makes a community liveable?

Several factors contribute towards achieving a liveable community. The main factors include safety, accessibility, and quality social spaces. Having a sense of security when travelling through the city's neighbourhoods, whether through public transport or through walking and cycling can influence the lifestyles of people living within a community. With addition to accessibility to employment hubs, having access to social spaces that provide multiple activities and serve the different needs of the local residents, can greatly benefit people's health both physically and psychologically.

Figure 12 : Warm Springs Community Plan for Perkins + Will in Fremont, California.

Inclusion by design

A series of factors need to be considered when planning for a sustainable urban city. One of the most important, is the quality of people's lives in the city. Having a healthy population is a reflection of the success of the city's planning decisions and the future of the city's liveability.

With that in mind, the quality of the buildings and spaces within the urban city, influences the quality of life for the people making use of these spaces. Thus, the design, management and planning of spaces can enhance or restrict a sense of belonging. Depending on the quality and accessibility of spaces, feelings of security within the city's neighbourhoods, can promote or reduce mobility, and improve or damage health.

Designed spaces can remove real and imagined barriers between communities and foster social inclusion and equality throughout the city. Designing spaces that are convenient, welcoming, and accessible contributes to a more comfortable lifestyle for the people of the city.

An inclusively designed space can accommodate and celebrate the differences between members of the community, through nurturing positive interaction opportunities, removing perceived reputations based on economic backgrounds, in low income neighbourhoods, and taking into account key groups such as elderly, special needs, cultural or religious backgrounds.

Developing new infrastructure requires moving out beyond the existing urban boundary. However, retrofitting within the existing boundaries, provides a more sustainable approach for accommodating the growth of the city which demands more quality spaces for the current and future growing communities.

Figure 13: The High Line as it looked while abandoned -Friends of the High Line

2.2 RETROFITTING OF MARGINAL SPACE VS. NEW DEVELOPMENT

2.2.1 DEFINING MARGINAL SPACE

As the urban population continues to develop and grow, obtaining and preserving urban green space, is becoming increasingly challenging. As a by-product of poor planning and urban design over time, a new layer of urban fabric has been introduced to our cities, that is "Marginal spaces".

Marginal spaces are remnant spaces that are not making any positive contributions to their surroundings. Usually disconnected from functional landscapes, Often fragmented from other parts of the city. Nevertheless, such spaces hold latent value, and offer tremendous opportunities for redesign and the potential to serve as more than abandoned spaces. (Figure 14)

Marginal spaces are assets to a city as they have the potential to be transformed through design to become a positive addition to the surrounding environment by supporting biological communities. Although, they usually go unnoticed in the urban city, marginal spaces are distributed throughout every part of the city. Marginal spaces can be a combination of a variety of different spaces such as the following;

- Spaces beneath highways
- On easements
- Parking lots
- Passage ways
- Steep slopes
- Streets,
- Vacant lots,
- Building rooftops,
- Vertical walls, and
- Transport corridors.

2.2.2 URBAN RETROFITTING FOR SUSTAINABILITY

Enabling communities to develop sustainably and equitably by restoring underutilised properties to productive use.

Auckland is the fastest growing city in Australasia, and is estimated to house over 2 million people by the year 2050. (Winder, 2010). While the growth of the city has had many positive consequences such as a greater diversity of skills and a larger labour force, agglomeration opportunities for businesses, and greater diversity of cultures, and lifestyles, allowing a more vibrant multicultural society to develop. The speed growth has also placed considerable pressure on the physical and social infrastructure, the economy, and the natural environment. (Auckland Council, 2016)

The price of growth in Auckland

Ongoing transport difficulties and traffic congestion : Auckland's transport system produces 1.9 million tonnes of CO2 annually. (Auckland Regional Council, 1999). The sprawling development pattern has led to the need for longer travel distances for people living outside of areas where employment hubs are concentrated, hence contributing towards more traffic congestion and as a result more air pollution due to increase of transport emissions.

Pressure on the environment and reduced accessibility to quality open spaces : land clearance for access, roading and housing sites can lead to the destruction and fragmentation of natural heritage resources such indigenous flora and fauna, wildlife habitats and ecosystems. In the Auckland region only 30 per cent of indigenous terrestrial habitat remain. 56 Animal, and 105 plant species are considered to be threatened.

Overload on the storm water infrastructure: In addition to the sediment contamination generated as a result of urban land use and supporting infrastructure, the demand for further development has resulted in an overload on the existing urban storm water infrastructure leading to detrimental effects on the quality of water in urban streams, wetlands, estuaries, and harbours. (Auckland Council, 2015).

Heavy metals such as zinc and copper are one of the biggest threats to the marine life in Auckland's rivers and harbours. These toxins wash into the marine area from roads, which have residues from tyre and brake wear, and unpainted galvanized roofs causing harmful effects to the existing ecosystems and disrupting natural habitats. (Kelly, 2010). Demand for infrastructure leading to sprawl: Housing demands lead to intensification of development at the hinterlands of agricultural land and natural forest, resulting in a loss of green space and subdivisions that are at a great distance from employment hubs. Over 40,000 new dwellings are promised in the unitary plan, 30 per cent of which are planned to take place outside the urban metropolitan boundary.

Retrofitting the existing infrastructure to mitigate the adverse effects of growth on the city of Auckland becomes essential to the sustainability of the city. Retrofitting involves working with the existing resources to revitalize existing environments and stimulate economic activity.

Urban retrofitting also referred to land recycling involves the reuse of marginal land. End uses of such planning processes may include mixed use, residential, commercial, or industrial development; and/or public open space such as urban civic spaces, community gardens, urban parks, or larger open space reserves such as regional parks.(Lehmann, 2010)

As most of the extra intensification is planned to occur along transport routes and close to town centres, focusing on marginal spaces along transport corridors becomes crucial to revitalizing spaces along the corridors in order to encourage more people to favour public transport over the private vehicle. The Auckland plan aims to utilize a compact city approach directed by transit oriented development. (The Auckland Plan, 2012). The liveable community strategy proposed, can be summarized as building compact, mixed-use town centres that feature walking distances to public transit which link residents to job opportunities and social services in order to reduce dependence on the automobile.

Marginal derelict land which is underutilized and abandoned, usually lies within economically distressed or disadvantaged communities. Hence potential for the stimulation of development investments and revitalization of neighbourhoods exists within such spaces. Marginal spaces can be community eyesores, negatively impacting the health of the natural environment and potentially, the health of people living within surrounding communities.

By putting these spaces to new and productive use, urban retrofitting can restore the value of surrounding properties therefore boosting local economic performance.
Encouraging new businesses to develop, allowing locals to shift their travel habits. Facilitating access to local employment reduces automobile dependence and encourages active lifestyles. Auckland council plans to achieve this in order to protect Auckland city against the negative impacts of the current transport trends.

Transport in Auckland currently contributes towards 39.7 percent of greenhouse gas emissions. This is due to the fact that around 85 percent of trips in Auckland are made by private vehicles, and approximately 15,000 more cars join the Auckland roads annually. (Auckland council,2016). Urban retrofitting aims to reverse the current transport trends in Auckland city, while Re-orienting development into the city core to avoid sprawl by reducing travel distances to employment hubs, leisure activities, and education centres. This is achieved through the transformation of underutilized urban spaces into functional spaces that serve their surrounding environments and communities.

2.2.3 MARGINAL SPACE IN AUCKLAND

In order to provide insight on the scale of existing spaces found underutilized and neglected along rail corridors in particular, a mapping exercise involved selecting five rail stations along the existing southern rail line in Auckland.

A boundary of one square kilometre around each rail station was placed, and the number of square meters of existing marginal spaces were mapped within this boundary. On average, 5.1% of the land area was remnant space. This translates into approximately 5 hectares of potential land for development within walking distance of each train station in Auckland. The average number of square metres of remnant space found around those five rail stations alone, totalled 51,013 m2

As a response to the city's vision of a liveable Auckland city. Public transport is being encouraged as a way to alleviate further pressure on the roads. It is therefore crucial for planners, to focus on improving the public transport experience, in order to encourage more people to favour public transport as their main mode of travel.

Cost, convenience and security are the most important aspects to consider when planning a successful public transport network. Not only do people want their travel trip to be affordable, they also require for it to be accessible, and for them to feel a sense of ease and comfort while traveling from one place to another.

Transit oriented development seeks to accomplish a set of outcomes for the growing urban city, such as revitalising declining town centres and suburbs, integrating land use with balanced transport to reduce automobile dependence. Together, with the idea of retrofitting to create new quality green and social spaces along transport corridors, these approaches lead to a better managed, more sustainable growth for the city.

Having a transit oriented development approach helps achieve an increase in the liveability and sustainability of the city. (Renne, 2007). A sustainable development approach seeks to create an urban environment which maximises economic development and social equity, whilst reducing, and mitigating the negative impact of the development on the natural environment.

From a land use and transport perspective, the priority in this regard is to reduce automobile dependence through development of mixed land use and compact cities with a range of travel alternatives focused on walking, bicycling, and public transport (Banister, 2006).Hence, revitalizing transport stations becomes a vital step towards achieving a better and more appealing public transport experience. The stations not only function as transit stops, but also become community hubs where the character of the neighbourhoods they are found within, can be recognized and celebrated. Thus allowing for members within the community to feel a sense of pride towards their shared spaces.

Figure 14: Outdoor plaza and drop off area at BART station - California

2.3 MEASURING LANDSCAPE PERFORMANCE

2.3.1 INTRODUCING THE TRIPLE-BOTTOM LINE OF SUSTAINABILITY

It is estimated that over 50% of the world's population now lives in urban areas and that this will rise to 70% by 2050. This is a tremendous change, which challenges planners to find ways in which to accommodate the growth that will take place in the near future. This is when urban planning tools such as the triple bottom line of sustainability can contribute to managing this growth.

In order to generate comprehensive plans for the city, certain tools of measuring urban sustainability are used, to allow for the growth being promised for the city. The triple bottom line of sustainability is used in urban planning as a framework in which to measure site performance in relevance to social, environmental, and financial parameters. Because they are inextricably linked, it is impossible for those three factors to be excluded from one another, while expecting successful outcomes for the city. Therefore, having a key focus on the triple-bottom line of sustainability ensures that equal emphasis is placed on each of the three main parameters, which influence the performance of a site, socially, financially, and ecologically. (Alberti, 1996)

2.3.2 USING THE TRIPLE-BOTTOM LINE IN DESIGNING FOR BIOLOGICAL COMMUNITIES

A more liveable city depends on having a well-connected public transport system, better connected neighbourhoods and communities, and quality green and public spaces. Following is an explanation of how each of the three sustainability measures contribute to enhancing the city's liveability, particularly through providing quality environments, and a well-connected public transport system.

Social

As cities are comprised of more than just buildings and roads, where people go and where people meet are at the core of what makes cities work. Therefore, even more important than buildings in a city, are the public spaces between them. Having quality green spaces and social spaces in the urban city has been linked to improving people's quality of life and well being.

Access to attractive open spaces is associated with higher levels of walking and physical activity, and with health benefits such as reduced stress, a lower risk of obesity, and enhanced mental and physical well being. Open spaces also provide places for people to meet and interact, thus increasing social cohesion and social inclusion. Other determinants of public health are factors such as walk-able communities, and accessibility to a well-connected public transport system.

Environmental

The well being of all biological communities is dependent on the quality and accessibility to basic living needs such as water, air, and space. Therefore, a successful city cannot operate efficiently in isolation from its environment. The resilience of the environment determines the success of its sustainability. As population growth can have grave consequences when it comes to the natural environment, protecting and enhancing existing ecologically significant resources becomes vital for the growing city. Maintaining clean air, water, and quality environments for people, and providing habitat for wildlife communities enhances a city's liveability. (Teriman, Mayere, & Yigitcanlar, 2009)

Economic

The environment and the urban economy are inextricably linked, investment in environmental protection helps the economy and reduces city budget expenditure. It is far less costly to avoid environmental degradation than it is to live with its consequences, or to repair its damage. Cities therefore need to acknowledge the fact that environmental resources, such as open space are assets to a city. (Basiago, 1999). Having quality green and social spaces contribute to increasing property values and attracting businesses, therefore contributing to the city's economy.

2.4 CASE STUDIES

2.4.1 OPEN SPACE SEATTLE 2100 - COMMUNITY INVOLVEMENT IN PLANNING FOR A NETWORK OF OPEN SPACES.

Name: Open Space Seattle 2100

Location: Seattle, Washington-USA

Designer: Collaboration between community and professionals

Date: 2006

This initiative is planned to complement Seattle's growth and density by promoting a healthy lifestyle, through the enhancement and preservation of cultural and natural environments.

The need for this type of planning approach was realized due to the population growth guaranteed for the city and the pressure placed on the city's natural and social environments due to the speed urban growth. Taking the consequences of urban growth in consideration encouraged Seattle's citizens to plan and implement an open space plan for the following 100 years for city. The project involved a partnership between communities, and a wide range of environmentalists, Landscape Architects, artists and open space advocates. Design proposals were based over an investigation of the current issues which Seattle was facing due to the urban growth. The following issues, challenged the participants to come up with a comprehensive plan which re-directs the city's future development;

- Social inequality due to lack of accessibility to parks and public spaces.
- Decrease in the quality of the natural environment
- Lack of connectivity between neighbourhoods
- Lack of pleasant social spaces for people
- A decrease in the quality of people's health (Rottle and Maryman, 2007)

Figure 15: Community plans for Seattle's open spaces

The solution responded to the issues mentioned, with a city wide plan which included parks, bike paths, community gardens, storm water mitigation devices, and green infrastructure such as green walls, and green roofs. (Figure 19). The plan aims to revive the city's sustainability through providing people with quality environments and encouraging active, healthy lifestyles by increasing access and connectivity between parks and open spaces.

The plan also aims to Promote social equality through improving safety and sense of pride between neighbourhoods of all socioeconomic statuses. As well as transforming the city's streets through reducing vehicle traffic, and prioritizing pedestrians. The neighbourhood green-ways proposed throughout the city, play an integral part in enhancing transportation options for citizens as new neighbourhood streets and parks promise an Increase in local economic activity, a rise in real estate values and increase in native habitats and biodiversity.

The relevance of this case study to my own project was the fact that Auckland is currently facing similar challenges caused by urban growth and the increase of demand for further development. Thus, one of the main ideas I found to be of value for my project was the preservation of the city's regional resources through transforming under-utilized neighbourhood spaces into valuable social spaces and ecologically functional spaces that contribute to enhancing the city's overall biodiversity. As well as the efficiency of land use in planning towards encouraging a healthier lifestyle for people, by reducing dependency over cars and promoting a better connected system of open spaces.

Since Auckland is also moving towards encouraging use of public transport, the transformation of underutilized spaces within neighbourhoods along transport corridors would promote better accessibility to local services and amenities via alternative transport, as well as increase people's willingness to favour public transport over the private vehicle.

Figure 16: Arbutus green-way - Vancouver

2.4.2 CASE STUDY 2: RE-IMAGINING SINGAPORE'S RAIL CORRIDOR -RETROFITTING ALONG THE RAIL CORRIDOR

Name: Re-imagining the rail corridor

Location: Singapore City, Singapore

Designer: Collaboration of landscape architects

Date: 2011

A design competition run by the Urban Redevelopment Authority in Singapore, chose this project as the winning concept for the revitalization of the city through re-imagining the rail corridor. This project aims to preserve and highlight the history of Singapore's rail corridor through landscape design. Led by a group of landscape architects, the winning design concept's vision was to transform the former remnant land along the Singapore rail corridor into a series of vibrant activity spaces that pass through the heart of the city of Singapore, which are to be shared and utilised by the nearby workers and local residents.

The twenty-four kilometre stretch of rail corridor is surrounded by community spaces, paved cycle paths, rainforest viewing platforms, and lively event spaces. (Liu, 2015). The re-activation of the corridor promises to generate spaces that allow for public engagement and provide opportunities for local employment and recreational activities. The previously underutilized space along the Singapore rail corridor is used as an opportunity to alleviate the constraints of urban growth and reduce the pressure that the growth of population has on the Singapore's residents and natural environments. The types of spaces proposed are an indication of the needs and desires of the local stakeholders of the corridor, such as the surrounding communities.

The growth of population and urban density once again drive the re development of spaces within the urban city in this project. Dedication of a variety of activities along the rail corridor was one of the main ideas I found to be relevant and valuable for my own project. The use of space along rail tracks in serving the surrounding communities inspired me to implement similar ideas into the local site chosen for my project. The focus of my project was very similar in terms of it being revolved around maximising the functionality for spaces along the rail corridors which currently serve little advantages for their surrounding environments and communities. The re- activation of spaces along the rail corridor aim to bring local economic

opportunities, an increase in property values in neighbourhoods surrounding the corridor, as well as promote access to quality environments.

Figure 17: Bukit Timah Station- Singapore Rail Corridor Concept by AZPLM

Figure 18: Concept for Singapore rail corridor - Architecture lead AZPLM

2.4.3 CHATTANOOGA RENAISSANCE PARK - THE VALUE OF TRANSFORMING A FORMER CONTAMINATED "BROWNFIELD SITE" INTO A PUBLIC SPACE.

Name: Chattanooga Renaissance Park

Location: Chattanooga, Tennessee - USA

Designer: Hargreaves Associates

Date: 2013

Completed in 2006, Chattanooga Renaissance Park has been a catalyst for reinvestment in Chattanooga's North shore neighbourhood. For over a century, this site had been one of the most hazardous sites in the city of Tennessee threatening to contaminate the city's storm water system. While it's history of contamination may have meant that it was a difficult site to develop on, Landscape Architecture firm Hargreaves Associates, re-imagined this brownfield site as a potential public urban space that could benefit its surroundings on a local as well as regional scale.

Through a range of landscape architecture and planning design initiatives, this former appliance manufacturing and enamelling facility was transformed into a 23.5-acre public park with local and regional advantages. Elevated pedestrian and cycleway platforms were designed over wetlands and riparian banks throughout the site, offering opportunities for viewing wildlife and providing 9000 feet of sufficient space for exercise and recreation. The storm water mitigation devices installed within the site aim to treat the contamination of the soil on-site while also functioning as aesthetic features in the park.

Figure 19: Chattanooga Renaissance Park

As a result of the land excavation of the contaminated soil, the designed wetland system created by the landscape planners increased floodplain storage and contained and filtered urban runoff generated on-site and around the park, before being released into the Tennessee river. The site's history is incorporated into the site through informative signs which explain the contamination of the site and the storm water treatment process, as well as educate visitors about site use as a strategic river crossing during the American civil war in Chattanooga city. (Thiel, 2016)

This park is an example of how retrofitting existing spaces within our cities using landscape and planning tools, can lead to the enhancement of the natural environment and the revitalization of neighbourhoods within the urban city. Several design aspects used in this project were of significant relevance to my project such as the storm water filtration system created in response to the site's contamination and history of polluted run off. The pedestrian and cycle connections created throughout the site in order to expose the site's history to the public was also seen to be relevant to my site and a similar approach was implemented in order to celebrate the site's historic background and create public awareness of the significance of a storm water mitigation system for the future of the quality of the city's waterways.

Figure 20: Chattanooga Renaissance Park

Figure 21: Chattanooga Renaissance Park

2.4.4 THE UNDERLINE - TRANSFORMING UNDERUTILISED SPACE INTO LINEAR PARK

Name: The Underline

Location: Miami- USA

Designer: James Corner Field Operations

Date: 2015-2017

A 10 mile stretch of land underneath Miami city's rapid transit system lines is transformed into an activated public space journey.

The Underline project aims to connect communities though improving accessibility to pedestrian and cycle pathways. The project also aims to revitalize over a hundred acres of open space with restored natural habitats in order to improve the ecological performance of the city. The transformation of the underutilized land will encourage a healthy lifestyle for the surrounding communities, and provide a chance for local artists to utilize the space as a gallery for art.

The expected outcome is a linear corridor park that integrates transit, biking and walking, provide a 10-mile canvas for artistic expression, attract new development, and generate significant economic impact.

The use of remnant space along the transport corridor in this case study is a relevant theme to my project as similar focus is revolved around making better connections between transport corridors and remnant spaces along them.

Figure 22: Plans for Brickell Station. Courtesy of Friends of The Underline

2.4.5 PUNGGOL WATERWAY PARK – HEIGHTENING THE SUSTAINABILITY OF THE CITY, THROUGH INCREASING CONNECTIVITY BETWEEN EXISTING OPEN SPACES.

Name: Punggol Waterway Park

Location: Singapore

Designer: National Parks Board, Housing Development Board

Date: 2011

A 12-hectare national park, featuring an 8.4 kilometre man made waterway running through the park makes this park one of Singapore's most visited public spaces. Developed in 2011, by a collaboration between the Housing and Development Board, and the National Parks Board of Singapore, the Punggol Waterway Park provides the locals with a variety of activities to cater for the range of age groups and interests of the local residents around the park. The park comprises of a nature zone, a recreation zone, a heritage zone, and a green gallery. Future plans for the development of this park also includes housing developments, a commercial mall, and a future town centre.

Consisting of four different themes, and being one of four main parks that link to the Round Island Route initiative, which is a continuous 150 kilometres green corridor complementing the park connector network initiated in the early 90's by the Singapore Garden City Action Committee. This initiative is aimed for connecting existing natural, cultural, historical, and recreational sites within the city and linking communities together. (National Parks Board, 2016). Punggol Waterway Park, is an ideal example of how development opportunities are initiated through urban retrofitting.

The city of Singapore showcases a successful public space planning approach, by responding to the needs and desires of the local communities and involving them in the design process. This initiative uses the city's existing resources such as the natural landscape, and the existing urban park spaces, to create new public spaces for local communities, and opportunities for public participation, while also enhancing the city's biodiversity, by creating a pedestrian and cycle network between the different parks within the area, and using the city's natural landscape, and cultural values as the drivers for the design of public spaces.

Being positioned along a body of water, creates a dynamic landscape. The colour of the water reflects the changing colour of the sky and surroundings. Similar to the Mangere Inlet, the cycle-way forms a loop around this body of water. Recreational activities at key points around the park increase engagement. Furthermore, communities are connected through a series of cycle-ways; promoting alternative transport and physical well being.

Figure 23: Punggol Waterway Park

3.0 SITE SELECTION AND ASSESSMENT

Figure 24: Westfield Station Platform
Image by: Zara Jawadi


Manukau via Panmure
AMA240

3.1 TOPOGRAPHIC BACKGROUND AND BIOGEOGRAPHY

Westfield rail station and Mangere Inlet

This section will describe a series of scaled typologies relating to the Westfield Railway Station, with focus on land-based geography, life-based biogeography, and development-based urbanisation. Located at the western end of Portage Road, Otahuhu, the Westfield Station marks the narrowest point of the Auckland Isthmus. Westfield Station also falls within two local board areas; Mangere-Otahuhu local board and Maungakiekie Tamaki local board. Both local boards are located on the upper reaches of the Manukau Harbour.

Manukau Harbour is New Zealand's second largest harbour with a total area of 370 km2 and catchment area of 870 km2 (Vant and Williams, 1992). The harbour is a well flushed, meso-tidal, coastal lagoon, with extensive areas of intertidal sand and mud flats.

On the north eastern corner of the Manukau harbour is Mangere Inlet. The inlet lies between the two cities of Auckland City and Manukau City and has an area of 6.6 km2 and a catchment of 34.5km2. (Hume,1979). Since the 1940s, the coastline of the Mangere Inlet has been highly modified by road infrastructure, port activities, and coastal reclamation. This is clearly evident by the straight edged coastline, and the presence of rock revetments along much of its length. During the 1960's, extensive reclamation along the eastern shore of Mangere Inlet took place, in relation to the development of the Westfield rail yards (Matthews et al. 2005).

The southern shore is less modified, with inlets to Harania and Tararata Creeks still largely intact, however the upper reaches of both creeks have been separated by high volume roads. The eastern shore is immediately bordered by the Westfield railway yards. Land along the northern and south eastern shores of the inlet is predominantly industrial and commercial.

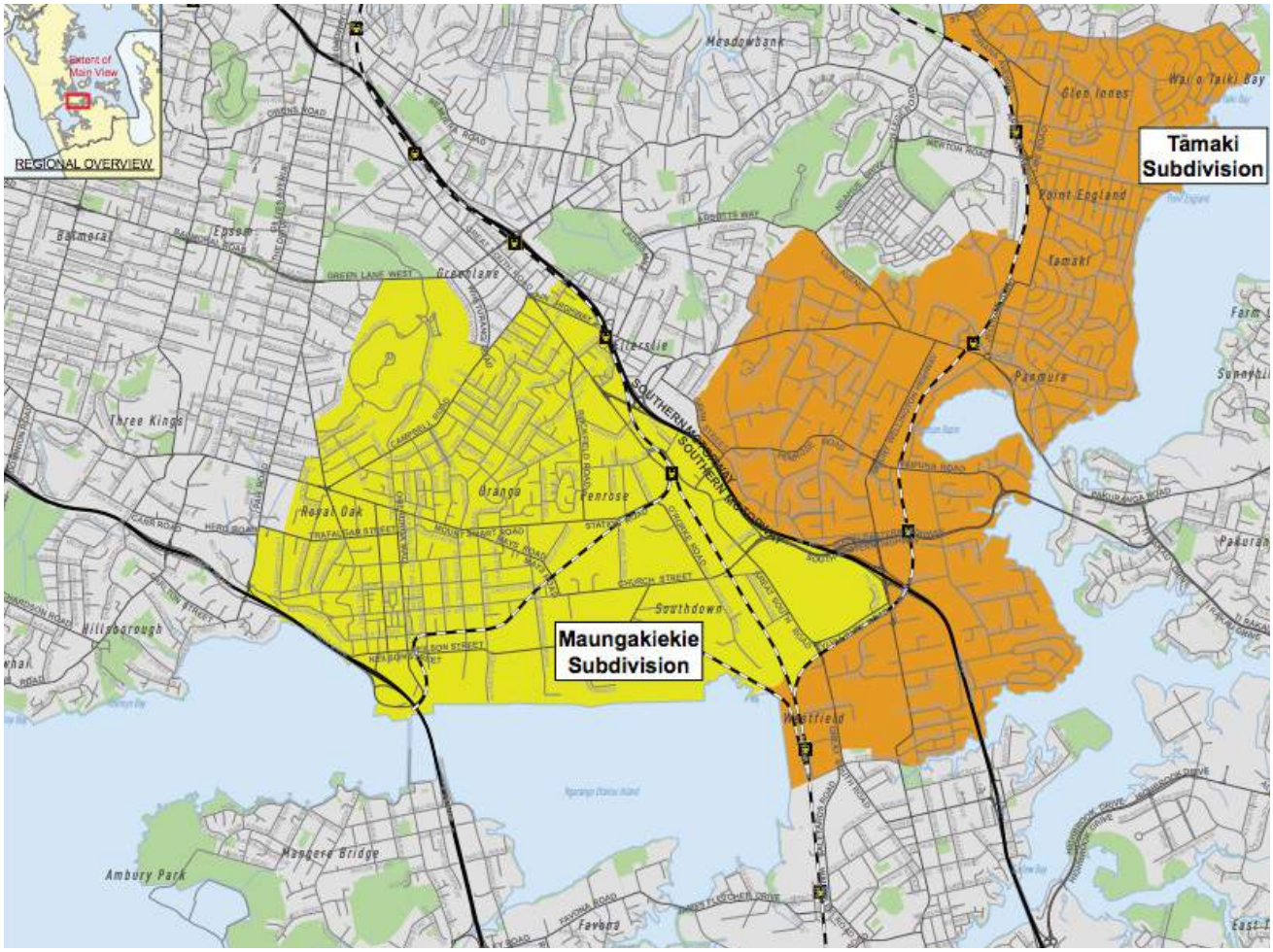

Figure 25: Tamaki Maungakiekie Local Board Area

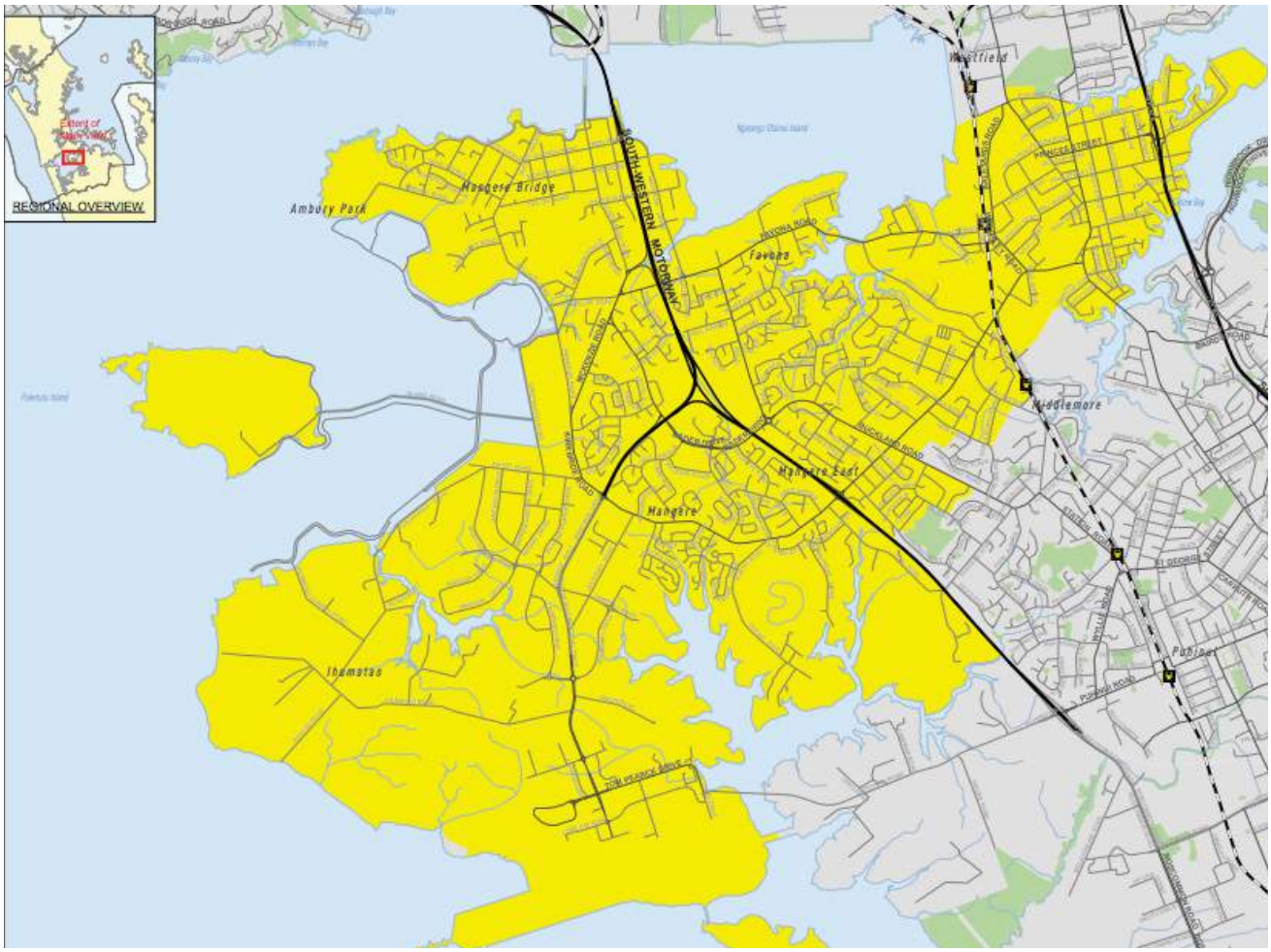

Figure 26: Mangere Otahuhu Local Board Area

The land modification around the inlet has led to the loss of three embayments to historic streams, and also the loss of tidal inundation to the Hopua volcanic crater forming Onehunga Basin. Three main creeks feed into the Mangere Inlet; Ann's creek, Tararata creek, and Harania creek. (Mathews et al, 2005)

Ann's Creek

Identified as a Coastal Protection Area site, the mouth of Ann's creek is known to be the most contaminated of the three creeks leading into the Mangere inlet. The reasons given for this creek being a Coastal Protection Area site, are the eco-tone sequence of the mangroves here with the only significant remaining piece of native shrub-lands on lava flows in the Tamaki Ecological District. Additionally, this general area is the typical ideal habitat for one of the native shrubs still to be found here - coastal coprosma (Coprosma *crassifolia*).

Ann's creek (Figure 27) includes a mosaic of vegetation types in an ecological sequence including basalt lava shrub-land, freshwater wetlands, salt marsh, and mangroves. The freshwater wetland comprises an area of deep aquifer-fed water dominated by raupo and stream (Ann's Creek) which is dominated by grasses and sedges. The salt water wetlands include a range of habitat types distributed along the salinity gradient. These include marsh clubrush, glasswort, oioi, ribbonwood and mangrove communities.

Ann's Creek is the only site in the region where a collection of native herbs remains growing together on lava rock formations, reminiscent of much of the vegetation cover of early Auckland.

Figure 27: Southdown Reserve and Ann's Creek – Westfield

Tararata Creek

The area surrounding Tararata Creek is highly modified, with adjacent land use comprising a mix of industrial and residential infrastructure. Presently, Mahunga Drive, the existing south western motorway, and Walmsley Road cross over Tararata Creek. Upper estuaries, streams and creeks such as Tararata Creek act as retention zones where suspended solids are deposited and where contaminants cumulate. Contaminants commonly found in urban and industrial runoff, storm water and discharges include heavy metals, and polycyclic aromatic hydrocarbons. In addition, Auckland Regional Council's marine sediment monitoring programme has found that copper levels in Tararata Creek sediment is amongst the nine worst-affected waterways in the Auckland region. (Auckland Regional Council, 2008)

Harania Creek

The creek is bound by mangroves in its upper reaches. These mangroves emerged from the 1970s following the end of significant emissions from several large slaughterhouses. The mangrove roots create a tight course for the creek, which has deepened over time. Harania Creek is a shallow estuarine waterway bringing water run off from residential, industrial and park areas in Otahuhu, Mangere east, and Favona. Investigations carried out on the effects of storm water contaminants in the Auckland region found Harania creek to be against the waterways most affected by the polluted runoff and sediment in this area was found to be highly contaminated. (Kelly, 2010)

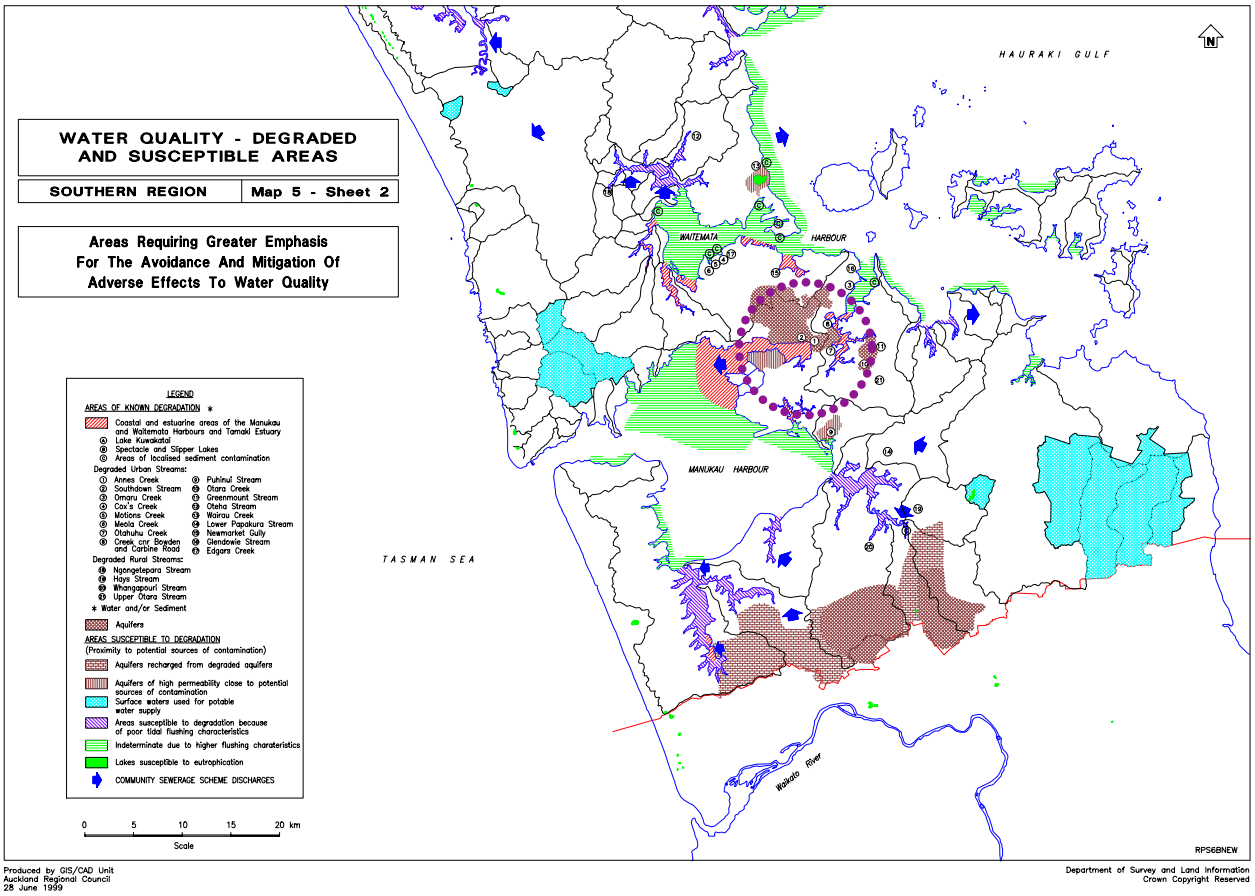

Figure 28: Water quality at Mangere Inlet

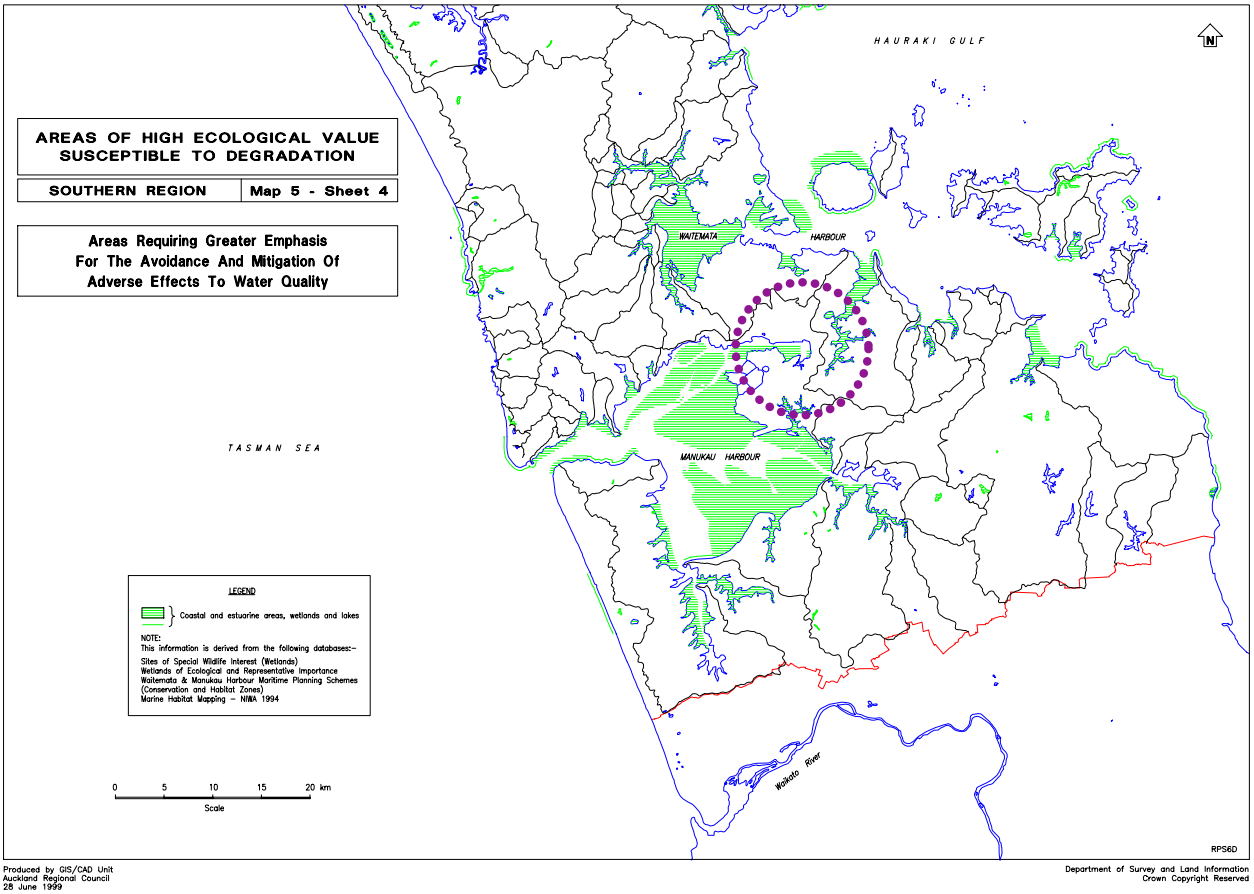

Figure 29: Areas of high ecological value susceptible to degradation

Figure 30: View of Mangere Mountain from fishing bridge
Image by: Zara Jawadi

3.2 COMMUNITY SCALE AND NEIGHBORHOOD PLANNING

The Mangere Otahuhu local board area is made up of a multicultural mix of communities, with Maori and Pasifika being the dominant cultural groups. With a population of over 70,000, this local board area makes up 1.7 per cent of New Zealand's population. (Statistics NZ, 2006)

Local communities include Westfield, Otahuhu, Te Papapa, Southdown, Mangere East, Favona, and Mangere Bridge. The main visions for these communities, as described in the Auckland Plan, includes providing access to a range of recreational opportunities to increase the quality of people's lifestyle. The council and local board, aim to encourage physical activity by creating better pedestrian and cycle connections between neighbourhoods and public spaces.

Further, Auckland Council aims to provide new public spaces where they are lacked, focusing on creating stronger links between neighbourhoods and public transport. (Auckland Council, 2015). collaboration between the local board and the Auckland Council involved a number of outcomes that meet the overall vision for the Mangere Otahuhu local board area. (Auckland Council, 2016)

- Revitalize and celebrate the unique character and history of Mangere and Otahuhu town centres.
- Improve water quality and access to and around the Manukau Harbour by better managing storm water mitigation to increase both environmental and recreational potential.
- Focus on creating better connections with bus and rail routes to the Auckland Airport, and increasing local pedestrian and cycling connections.
- Recognize the kaitiaki role of mana whenua, while conserving, supporting and celebrating Mangere Otahuhu's rich heritage resources and their multicultural communities.
- Develop residential plans for the areas in and around Mangere.

3.3 LOCAL VALUES

Westfield Station is located on what had been one of the first sites for Tangata Whenua to settle in Mangere-Auckland. The inlet and its catchment has a long history of human use and development. Its original fertile volcanic soils, abundant marine life and the narrow corridor of land that separates the Pacific Ocean from the Tasman Sea made it a significant landmark both for Maori and European settlers.

Following the arrival of Maori settlers, forests were cleared to allow space for horticulture. Vegetables such as kumara, yams, taro and other food crops were planted. Together with the abundant marine habitat in the inlet, this area had become the agricultural centre of Auckland and was often referred to as "the food bowl of Auckland". (Mangere Advocacy Plan, 2010)

Mangere Inlet was also strategically important because of the narrow corridor of land that separates it from the upper reaches of Otahuhu Creek on the east coast. This feature was utilized by both Maori and early Europeans as its low elevation and short distance eased the portage of canoes and boats between the Manukau Harbour and the Hauraki Gulf (Figure 31), effectively connecting the Tasman Sea to the Pacific Ocean. Together with the Waiuku portage, it also provided a critical link to the Waikato River. (Auckland Regional Council, 2008)

In the 1860s the Maori Land Wars led to the establishment and growth of the Otahuhu suburb. Development in this area continued to occur at a rapid rate, and numerous small industries began establishing around the inlet. By 1875 the railway line was constructed along the eastern foreshore of the Mangere Inlet. Since then this area has been predominately commercial and industrial. (Kelly, 2008)

Figure 31: War Speech', by Augustus Earle

Unique features

Surrounding the Westfield Station are a number of mountains and open spaces that are of historic and cultural significance including: Sturges Park, Mount Smart, Mangere Mountain, Waikaraka Park, Mutukaroa Hamlins Hill Regional Park, and Mount Richmond. Other key landmarks situated within the local vicinity of Westfield Station and Mangere Inlet include:

- Motorway links (SH1 & SH20)
- Otahuhu bus and rail interchange
- New Zealand's largest airport (Auckland airport)
- Watercare Wastewater Treatment Plant (Figure 32)
- Manukau Harbour
- Onehunga Harbour
- Robertson Hill-Sturges Park volcanic cones

Figure 32: Mangere Wastewater Treatment Plant

Vegetation

The most widely distributed and abundant coastal plant in Mangere Inlet is the Mangrove Avicennia marina. This is due to the inlet being a shallow estuarine area with a very large intertidal area comprised almost exclusively of soft muds, making it an ideal habitat for mangroves to thrive. (Morrisey, D. et al, 2007)

Mangroves line almost the entire coastal fringe of the Inlet, being densest in the sheltered inlets of Harania Creek and Tararata Creek. Along the edge of the rock revetment stretching the length of the northern coastline they form a narrower band, but are still a very visible element of this area. Mangroves extend considerably into the inter-tidal area along the eastern side of the Inlet. Aerial photography shows that mangroves were absent before 1959, however they have grown more extensively over time.

The occasional amenity planting of individual or copses of native trees, such as Pohutukawa, appear infrequently along the inlet. However, apart from these, the only terrestrial habitats present are for the most part dominated by exotic species including weeds such as pampas, woolly nightshade, gorse and a variety of invasive vines and climbers (e.g.. Japanese honeysuckle, ivy and moth plant).

Furthermore, there are small patches of terrestrial vegetation along the shoreline that support typical indigenous coastal species and associations. These are predominantly characterised by salt-marsh ribbonwood and needle grass, together with coastal coprosma and karamu. (Auckland Regional Council, 2008)

Fish

A diverse range of marine life, including fish, are found in the Manukau Harbour and the Mangere inlet. These provide a feeding habitat for a wide range of shore birds and ducks. The main fish commonly found in the Manukau Harbour include anchovy, yellow-eyed mullet, goby, speckled sole, grey mullet, yellow-belly flounder, sand flounder and triple-fin. (Morrison et al, 2002)

Other common fish species present in the harbour include shark (e.g. rig shark, school shark, white shark, seven gilled shark) and pelagic species near the harbour mouth such as king fish, snapper, parore, john dory, kahawai, and a variety of ray species. In addition, the harbour provides a nursery area for other coastal fish species. Recreational fishing, shore based line fishing, netting and spear fishing are popular around the Manukau Harbour. The old Mangere Bridge, in Mangere Inlet, is one of the most popular land-based fishing spots on the harbour, and regularly attracts large numbers of anglers. (Allen, 2006)

Birds

Various spots around the Mangere inlet have been recognized through the designation of coastal protection areas as areas of significant conservation value. A variety of New Zealand resident and migratory shore birds use the Mangere Inlet for roosting, scavenging, and wading. The Atlas of Bird Distribution in New Zealand indicates that up to 48 coastal bird species frequent Mangere Inlet and/or the adjoining area. Of these, 15 species have been classified as threatened, some of the species identified include black stilt, brown teal, grey duck, New Zealand dotterel, Caspian tern, reef heron, and wry bill. (Robertson et al, 2007)

3.4 CURRENT USE AND LANDSCAPE

The Westfield Station platform is accessed from the western end of Portage Road in Otahuhu, through an old pedestrian bridge. Being isolated at the end of an industrial road, the station is not immediately visible to the public.

With the exception of some rail commuters passing through and getting on or off the trains, the train station is mostly underutilised. The station also lacks basic facilities; besides the Auckland Transport HOP card machine, only one poorly maintained sheltered seating exists, which has been subject to vandalism and graffiti.

Four large light towers are distributed around the station and freight yards. Although providing adequate lighting, the light towers' imposing aesthetic add to the uninviting atmosphere at the station. Beneath the pedestrian ramp at the entrance, leading to the station platform, inorganic rubbish and materials have collected through a combination of littering and industrial dumping. (Figure 36)

A lot of underutilised space exists at the entrance of the station, along the rail tracks and along the edge of the rail yards. (Figure 37,38, 42). These spaces have the potential of being transformed in ways that can serve benefit both to their surrounding natural environment and to the public.

There are existing reserves that are currently inaccessible however are performing an ecological role in providing habitat for wildlife. Spaces such as Southdown Reserve at the Eastern end of the Westfield rail yards, and the old canal reserve, which was supposed to be dug up during the second world war potentially to become a canal between the two harbours – Tamaki river and the Manukau Harbour. However, the work was never constructed, and the canal reserve remains in place, midway between Westfield and Otahuhu stations. Such spaces have the potential to be connected through low impact urban design, either visually, or physically in order to become more recognized as historic landmarks for the public, while serving their ecological roles.

Figure 33: Westfield Station. Image by: Zara Jawadi

MARGINAL SPACE WITHIN 1 SQUARE KILOMETRE OF RAIL STATION

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Figure 34:Westfield Railway Station

0 30 60 90
Meters

Scale @ A4
= 1:5,000

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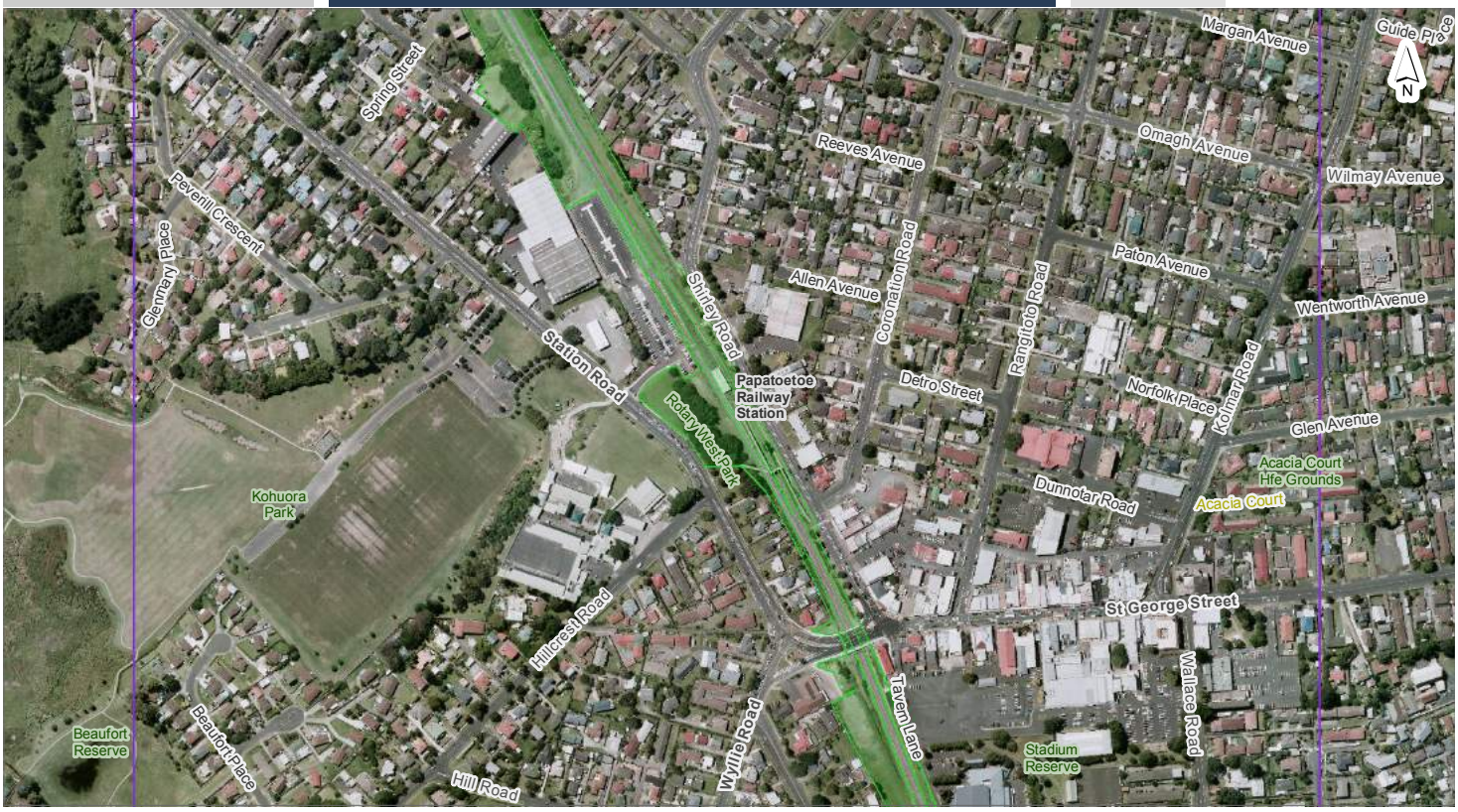

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Figure 35: Papatoetoe Railway Station

0 30 60 90
Meters

Scale @ A4
= 1:5,000

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Figure 36: Puhinui Railway Station

0 30 60 90
Meters

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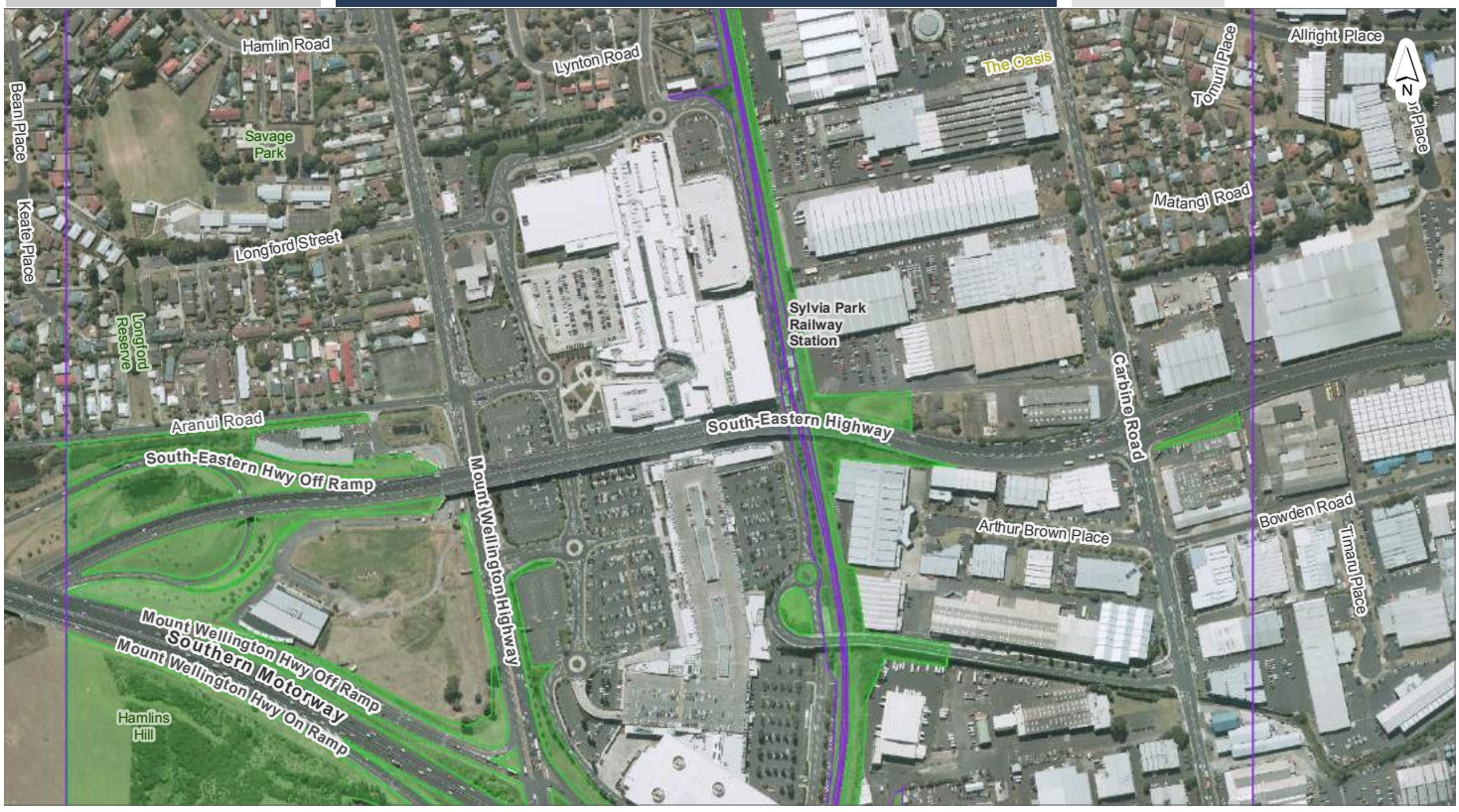

Figure 37: Sylvia Park Railway Station

0 30 60 90
Meters

Scale @ A4
= 1:5,000

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18/08/2016

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Figure 38: Marginal land at Westfield Rail Station, standing between rail tracks at the northern end of the station platform

Figure 39: View from Westfield Rail Station platform looking towards Station entrance

Figure 40: The Mangroves at the western end of the Westfield Rail yards

Figure 41: The Westfield freight rail yards

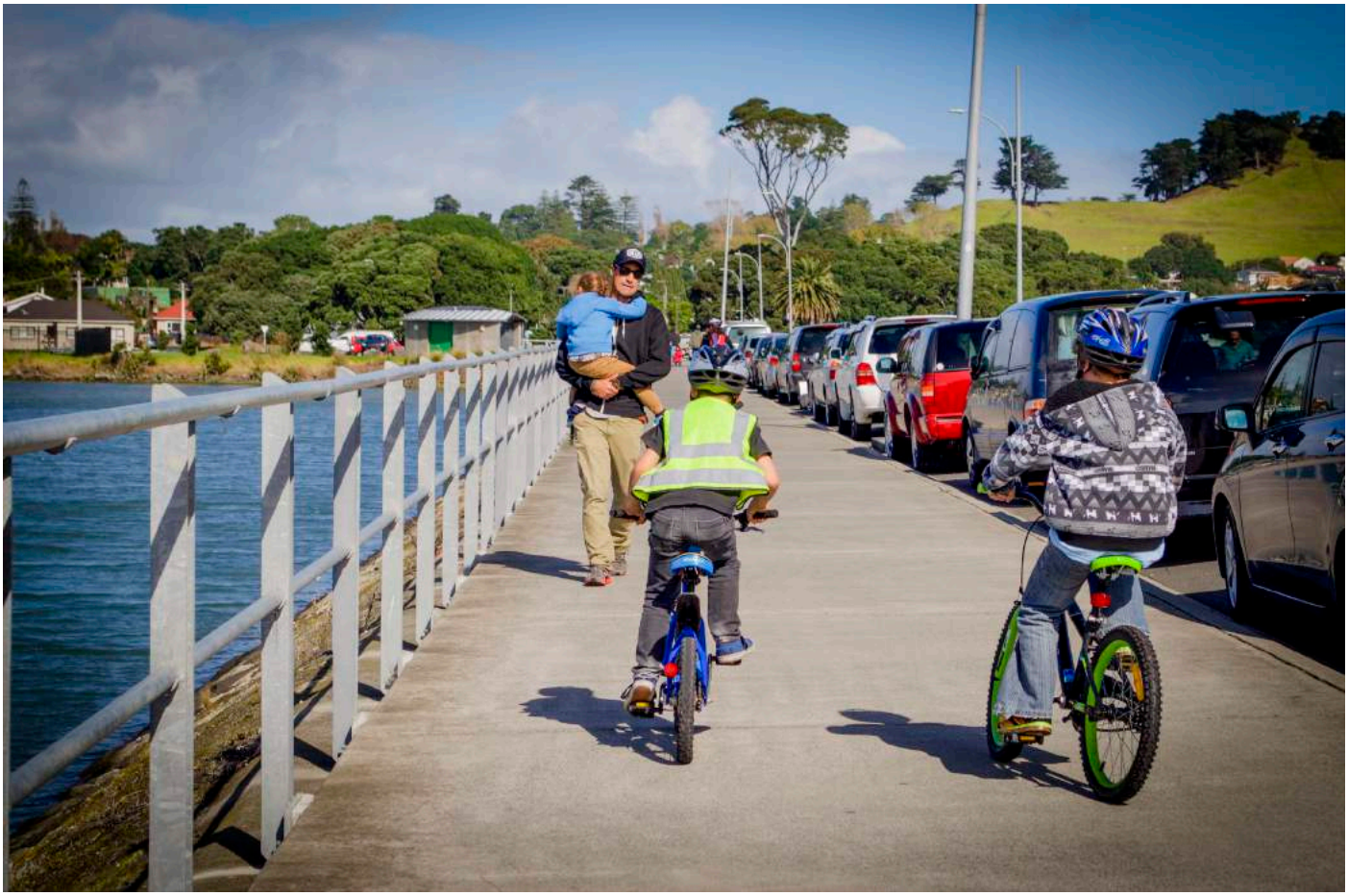

Figure 42: View from existing Mangere Bridge Fishing spot, looking towards Mangere Mountain

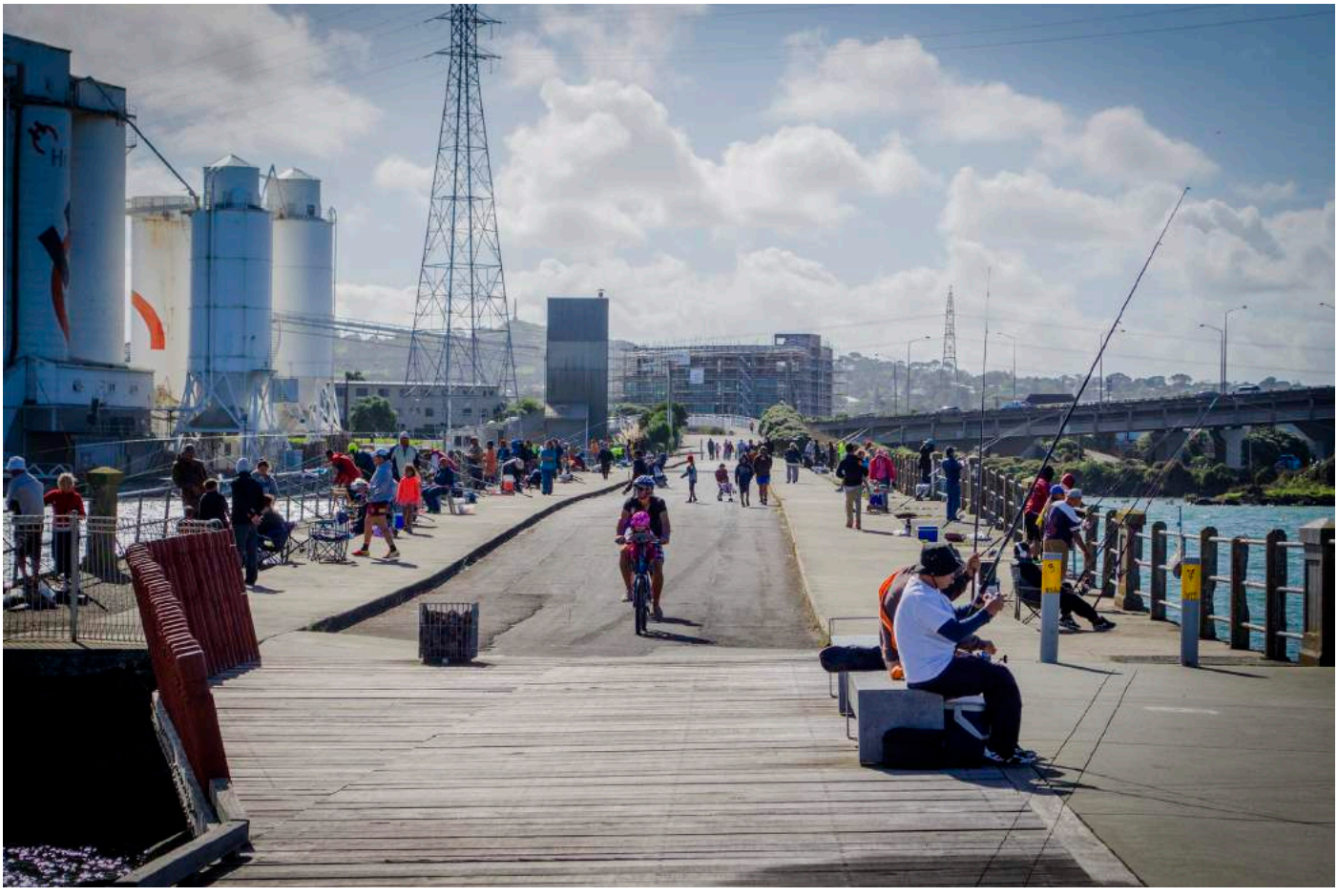

Figure 43: Local using Mangere Bridge Fishing spot

Existing connections

Presently a narrow public pedestrian cycle path exists along the northern coastline of the inlet. The path stretches from the eastern end of the Mangere Inlet at the Southdown Reserve and connects all the way to Waikaraka cemetery park, Mangere bridge, and Ambury farm Regional park.

The northern coastline is heavily urbanized and is dominated by large scale manufacturing, industrial warehouses, and container yards. Further to the west of the Mangere inlet, the former Mangere Bridge has been pedestrianized, and is a popular fishing spot.

Sediment contamination

The Mangere Inlet is sheltered from wave action so suspended sediment has collected in this area, which results in the sediment being comprised predominantly of mud. The stagnant sediment puts the inlet at risk of contamination. Historical industrial activities, land reclamation, discharge of storm water and wastewater and runoff have contributed to the relatively high levels of contaminants contained in the sediment within the Mangere Inlet.
A detailed investigation of heavy metal pollution in Manukau Harbour determined the concentration of copper, lead, zinc, and other heavy metals to be above acceptable levels. (Williamson, Blom, Hume, Glasby, & Larcombe, 1992)

Water quality

Water quality in the Mangere Inlet is strongly influenced by the discharge from the Mangere Wastewater Treatment Plant. Consequently, the concentrations of nitrate, nitrite, ammonia-N, total phosphorus and dissolved reactive phosphorus at the Mangere and Puketutu sites are amongst the highest in the region (Kelly et al. 2006)

Following the time of industrial development, this site became dominated by industrial warehouses and buildings. Many industries – from meat works and slaughterhouses to phosphate fertiliser works and other factories – contributed to the contamination of the Inlet and the loss of marine habitat. Mostly because of the discharge of large amounts of untreated waste into the Manukau Harbour.

By 1950, pollution in the upper Manukau Harbour had become a significant issue. Together with the untreated wastewater and storm water discharging in the inlet, the disposal of industrial and organic waste resulted in severe ecological damage in the inlet. (Jackson, 2011)

Prior to the construction of the Mangere Watercare treatment plant in 1956, the Mangere inlet was receiving approximately 25 million litres of industrial waste and 675,000 litres of untreated wastewater on a daily basis. (Watercare, 2005)

By 1955, the Manukau harbour contamination had reached a point where noxious fumes were smelt by the local residents and the paint of neighbouring houses had blackened. Investigation by the regional council found out that this was due to the consequences of the organic waste disposal by the industrial warehouses and local facilities, which led to the reduction of sulphate and anaerobic conditions in the inlet.

This had a detrimental effect on the ecology of the inlet and its surroundings, which at the turn of the 20th century had been a popular and attractive place to swim, sail, fish and gather shellfish. As of 2008, various coastal protection zones have been established around the shores of the inlet, and sewage works have attempted the removal of industrial waste previously discharged in the inlet. However, the Mangere inlet remains one of the most contaminated sites in Auckland.

4.0 METHODOLOGY

Figure 44: Lower Yonge project in Toronto. Image by Chris Foyd

4.1 GOALS AND ASSUMPTIONS

- Capture and employ the hidden value of marginal lands along transport corridors in the service of local economies. Transform existing marginal land along transport corridors into ecological habitat and community spaces, and make connections to local amenities, i.e. promote local produce by using public spaces as market spaces, and build access to local services.

- Support social engagement opportunities at transport hubs to improve quality of life for the local communities neighbouring transport corridors. Provide quality social spaces which foster social interaction opportunities.

- Transform transport hubs into activated community spaces, and encourage a positive atmosphere to positively influence people's perception of public transport.

- Nurture and seed ecological connections to enhance local and regional resilience. Improve the distribution and condition of existing and future green spaces and significant natural habitats. Support increasing quality ecology and natural environments.

4.2 OBJECTIVES FOR WESTFIELD STATION AND MANGERE INLET

- Revitalize existing marginalized urban spaces found along the Westfield station rail tracks, within the rail yards, and along the Mangere Inlet.

- Promote and support pedestrian and cycle connections between local communities and transport hubs such as; Westfield rail station, Otahuhu bus and rail interchange, Onehunga rail station and local bus stops along the Mangere inlet, to encourage the use of alternate modes of transport, in aims of reducing the dependency on the private vehicle and promoting an active lifestyle.

- Create safe environments and encourage pride of place within the communities of the Mangere-Otahuhu local board that have been proven to reduce crime related incidents. Increases people's sense of ownership and sense of belonging through sharing quality social urban space.

- Preserve and enhance the natural environment within the site, use low impact design tools to improve the quality of the water in the inlet in order to re-introduce healthy marine life habitat.

4.3 SITE SELECTION CRITERIA

In order for this research to be useful as a model case study for Auckland. I have determined criteria of which I based my choice of site on. The purpose of the selection criteria is to provide a framework through which the site can be investigated, in order to justify why the site I choose correlates with the scope of my research project, and how relevant it is in terms of the way the site is currently functioning compared to how it could potentially function with the design interventions I propose for it. Site visits and analysis involved exploring the site in order to find the following;

- Key facilities and services available within 100 m from transport node.
- Economic value that exists within walking distance of the transport node
- Nearest Parks/Ecologically significant spaces
- Places that add value to the site versus what could be eliminated.
- Connection opportunities versus existing connections
- Change influencing current function of the site.
- Safety, convenience, aesthetics, ecology
- Neglected urban land

Following the site selection, I needed to extract the most significant planning tools from the literature review and case studies that I found. The following are tools, and models that I have chosen to use in this project. Each model will be discussed and the relevance of it to my research question will be clarified.

As a result of the literature research and the site analysis, a combination of themes and landscape architecture planning tools were derived from the case studies that best correlated with the scope of my research project. The ideas collected from the case studies found were seen to be fundamental in achieving a solution for this research, and their relevance was then applied to the design objectives proposed to satisfy the outcome desired for the local site of investigation, and the overarching question.

The themes discussed were chosen to be applied as design tools which aim to correlate the findings with design techniques that could satisfy the research question. Each heading was correlated to a design element following. This method ensured that the outcome was specific as to how each design element aims to meet one or more of the objectives set for the particular site being investigated.

Figure 45: Marginal space mapped around Westfield Rail Station and Mangere Inlet.

4.4 PLACE MAKING

- Pride of place
- Lower crime incidents
- Change common Perceptions of local communities

A bottom-up approach to urban design and community development, place making is a process which involves revitalizing neighbourhoods through connecting communities with the public spaces surrounding them. With its main purpose being the creation of spaces that promote people's identity and well being, Place making requires collaboration between local councils and the community to meet the desires and needs of the local community, achieve spaces that celebrate the area's unique identity, and serves the diversity of age groups and cultural groups found within the community.

Application

The goal of place making is to recognize the cultural backgrounds that make up the communities of the Mangere-Otahuhu local board and celebrate the history and character of each community within the design. In this project, Westfield rail station and the marginal spaces mapped around it, are considered as public spaces which can have the potential for serving multiple benefits to the people and the environment. Through place-making I aim to transform the station and surroundings into a focal point for the surrounding communities. The Miami Dade Underline project is an example of how underutilized spaces can be developed through place making to become social assets for the residents of a city. (Figure 42)

Figure 46: Miami Dade Underline Art Project- Aimed to transform underutilized land beneath the Metrorail Line, into a 10 mile linear Park

4.5 LOW IMPACT URBAN DESIGN

- Create attractive spaces while serving ecological systems within the site.

A low impact urban design approach is used as a guide for creating a sustainable ecological environment which is functional and aesthetic at the same time. Low impact design works with nature, using devices such as rain gardens, wetlands, and green roofs to reduce pollution in the area through catching and filtering storm water run-off prior to reaching urban streams and harbours. Minghu Wetland Park in China consists of a series of wetlands and green spaces aimed to filter and remove pollutants from storm water while providing spaces for people's recreational activities. (Figure43)

Low impact design intends to minimise impervious surfaces through using vegetation to trap sediment and pollutants, while also having minimal impact on the land and the ecological systems during the construction phase. (Landcare research,2010)

Application

According to the site analysis undertaken, the site requires solutions for enhancing the quality of its natural environment, such as the quality of the water, and increasing habitat for wildlife, while mitigating further damage.

A series of wetlands and swale devices are included within the design along the proposed pedestrian cycle path surrounding the Westfield site, and along the Mangere inlet. These design features are used within the design to provide aesthetic value to the site, while serving the natural ecosystem by providing ideal living conditions for bird, fish, and insect species within the site. As well as contributing towards a better water quality in the Mangere inlet through filtration of storm water throughout the site.

Figure 47: Minghu Wetland Park - Turenscape

4.6 THE PATCH CORRIDOR MATRIX MODEL

- Habitat fragmentation
- Increase of biodiversity

In this model, the landscape is conceived as a mosaic of three components; Patches, corridors, and matrix. The extent and configuration of these three elements defines the pattern of the landscape. Patches being relatively small non-linear areas that differ in content and composition from their surroundings.

Corridors consisting of strips that are of a consistent patch type which differs from the adjacent land on both sides, and finally the matrix, which is the most dominant component in a landscape and its characterized by extensive cover, high connectivity, and a major control over the dynamics of the landscape.

Forman (1995) suggests that this type of layout of vegetation in an urban environment ensures both the increase of biodiversity, for the variety of habitats created, and the avoidance of habitat fragmentation which can lead to a loss in biodiversity.

In this project the Patch Corridor model is used through the integration of native vegetation cover that is appropriate for the existing habitat of the site selected. Although having continuous, wide corridors of native vegetation is considered the optimal spatial arrangement for the sustainability of biological ecosystems and communities, however it is rather difficult to achieve in an urban area as various boundaries and barriers exist between the environment and built infrastructure.

Therefore, alternative strategies such as the patch corridor matrix model is used in the case of this project, where vegetation patches at marginal spaces found along rail transit lines are treated as a cluster of patches that function as stepping stones which provide alternate routes for movement of wildlife species while forming an overall linear native and exotic planting corridors. (Dramstad et al. 1996)

Application

This tool is used to ensure an equal distribution of planting around the site, to guarantee a series of wildlife habitats to support the overall biodiversity at a local and regional scale. As one of the functions proposed for marginal spaces mapped out along rail corridors, is the vegetation of them so as to allow them to function as wildlife green corridors, this vegetation model approach was seen to be highly effective in contributing towards an increase in biodiversity throughout the local area.

Summary:
The rail corridor is unique in that it intersects a variety of spaces within the city, including industrial, commercial, and residential spaces. Selecting a site with potential for marginal space transformation near the railway corridor can serve to impact a large cross-section of the city's spaces. Ultimately, the goals and vision for the selected site integrate the three parameters; social, ecological, and economic. The tools selected will support in developing a high-performance solution.

Incorporating the concept of Place-making into the final design enables the transformation of the train station into a public space to be utilised by the community. Furthermore, Low Impact Urban Design principles can address the contamination issues present on the site by providing tools for filtering storm water runoff before reaching the Mangere Inlet.

To address in whole the aspect of supporting biological communities, as presented in the research question, the Patch Corridor Matrix provides a model for interconnecting greenspaces to enhance wildlife habitat.

5.0 FINDINGS & ANALYSIS

Figure 48: Marginal space at Westfield Station.
Image by: Zara Jawadi


MAERSK
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MAERSK
KiwiRail

5.1 SUMMARY OF SITE SELECTION & METHODOLOGY

Selection Criteria Questions Answered

- Facilities and services available within 500m from the transport node.

Limited facilities and services exists for public transport commuters or people using the site. Although the site falls within a heavily industrialised area, Mount Richmond Domain exists within walking distance of the Westfield Station. Access to the local park however, is restricted through Great South Road. Heavy vehicle traffic on Great South Road makes pedestrian traffic near impossible due to the lack of crossings. Security on the station platform is limited, Although a security camera is available it is only directed towards one view within the platform. `Lighting is available however the type of lighting infrastructure is outdated and does not serve aesthetic value to the site. Sheltered seating is available on the station platform, however it has been exposed to vandalism which adds to the space's un-inviting atmosphere. Basic Public transport services such as an AT tag and top up machine exist on the station platform however, they have also been exposed to vandalism.

- Type of economic value within walking distance of transport node.

The most obvious contributors towards the local economy within walking distance of the site are the petrol station, and the industrial warehouses along Portage Road and Great South Road.

- Nearest Parks/Ecologically significant spaces

The closest public space is Mount Richmond Domain, however as mentioned above, lack of pedestrian and cycle connections do not exist between the station and the park, and access is restricted by Great South Road.

- Potential changes that add value to the site versus what could be eliminated.

Pedestrian Cycle connections could better integrated within the site to allow connections between neighbourhoods surrounding the Mangere Inlet. A more accessible entrance to the station would also enhance the site's usability as the station becomes more visible to the public Services such as parking, wifi access, and public rest rooms would contribute to a more pleasant experience of public transport.

- Connection opportunities versus existing connections

The existing connection through rail, and the proposed connection developments such as the Otahuhu bus and rail interchange bring new opportunities for the site as more people may use the station. Connections between surrounding communities can be supported through further walkways and cycleways to increase opportunities for interaction between the different communities.

- Safety, convenience, aesthetics, ecology

The site's remote location and lack of activities give people no incentive to visit and use the space more than they currently do. This is due to the difficult access to the station as it is located at the far end of an industrial road and no signage is used on the main road to indicate the presence of a transport station. The station is poorly maintained, lacks vegetation and has been exposed to graffiti and vandalism through various parts such as the rails of the pedestrian bridge leading up to the station platform, as well as the seating located on the station platform. These elements reduce the sense of security for the transport station and could be the reason for the station being under utilized for most of the time.

- Neglected urban land

Much of the adjacent land surrounding the station can be categorised as 'marginalized space' which has potential to become functional space. The station platform can be re designed to make the station look and feel more inviting. Land underneath the overpass Pedestrian bridge can also be transformed to serve

5.2 OPPORTUNITIES AND CHALLENGES

Existing and planned development promises new opportunities for economic growth and community links.

An analysis of the Westfield Station site and the surrounding area presents several opportunities while highlighting a range of challenges that must be addressed in the design.

Opportunities

- Major town centre planned within vicinity (AUP)
- Residential development plans
- Transport links - Otahuhu bus and rail interchange
- Marginal spaces around body of water

The Auckland Unitary Plan has proposed development for the future of the local board. The Plan proposes transformation of Otahuhu into a major town centre. This includes mixed-use zones for light and heavy industry, presenting key employment areas. As a result, the population of the area is expected to grow with development presenting economic opportunities along with some environmental challenges.

In addition, the Plan also proposes residential development, and community infrastructure such as libraries and health services. An increase in the number of residents in the vicinity of the site bring with it a higher demand for open space and accessibility to transport.

Consequently, development has already started on a new transport hub in the form of the Otahuhu Bus and Rail Interchange. Furthermore, Auckland Council have proposed investigation into a possible rail connection to Auckland Airport and a tourist ferry terminal at Mangere Bridge. The site offers a unique setting with an array of remnant spaces along the Mangere Inlet, providing opportunities for developing spaces with attractive coastal views.

Challenges

- Site falls within heavily industrial area
- East West road link along inlet
- Poor visibility from Portage Road
- Site is isolated from the waterfront by private property
- Contamination
- Overgrowth of Mangroves
- Negative public perception of the site

Being a heavily industrialised area, however, introduces challenges. The Inlet and surrounding grounds are at risk of contamination due to storm-water runoff, with many areas already significantly affected by industrial discharge over previous decades.
Sediment collection has provided optimum habitat for overgrowth of mangroves along the coastline of the Inlet. The mangroves obstruct views and access to the Manukau Harbour, creating a barrier for water-based recreation.

Furthermore, the Westfield Station remains isolated from the waterfront by the freight rail yards. Being a private property, public access is restricted. On the opposite end of the station, visibility of the platform from Portage Road is limited. This creates a challenge for security as Portage Road has low foot traffic. Lack of landmarks, recreational space, or public facilities do little to encourage local residents to utilise the site for purposes other than access to rail. Commuters are primarily employees in what is a heavily industrial area.

Proposal of an East West road link across the Northern end of the Mangere Inlet aims to connect SH20 at Onehunga to SH1 at Mt Wellington. This initiative puts pressure on the natural environment at the foreshore of the Mangere Inlet by increasing traffic-emitted air and sound pollution. The site falls within a low socio-economic community. This adds to the negative perception of the Westfield Station and the surrounding area.

6.0 INITIAL DESIGN

Figure 49: Concept render for Westfield Station Platform
Image by: Zara Jawadi

6.1 INITIAL DESIGN EXPLORATION

The initial design strategy involved mapping out the existing marginal space along the Westfield rail station, creating new pedestrian and cycle connections, and treating the storm water on site before it reaches the inlet. These interventions were proposed to be implemented at different stages in order to revitalize the site and its surroundings as a long term phased plan approach. The following diagrams explain what each intervention involves, and the outcome expected from each intervention.

1. Coastal Pathway connecting existing southdown walk and cycle way to the proposed Otahuhu bus and rail interchange and to the Mangere, favona, and Mangere bridge areas.
2. Pedestrian and Cycle pathways through the old canal reserve midway between Westfield and Otahuhu Station, as well as across the Westfield rail yards. This aims to create a connection from the entrance of the station to the water's edge at Mangere Inlet to potentially connect to the main coastal pathway along Mangere inlet. The connection through the canal reserve is proposed to draw people to the reserve which eventually connects through to Sale yards Road.

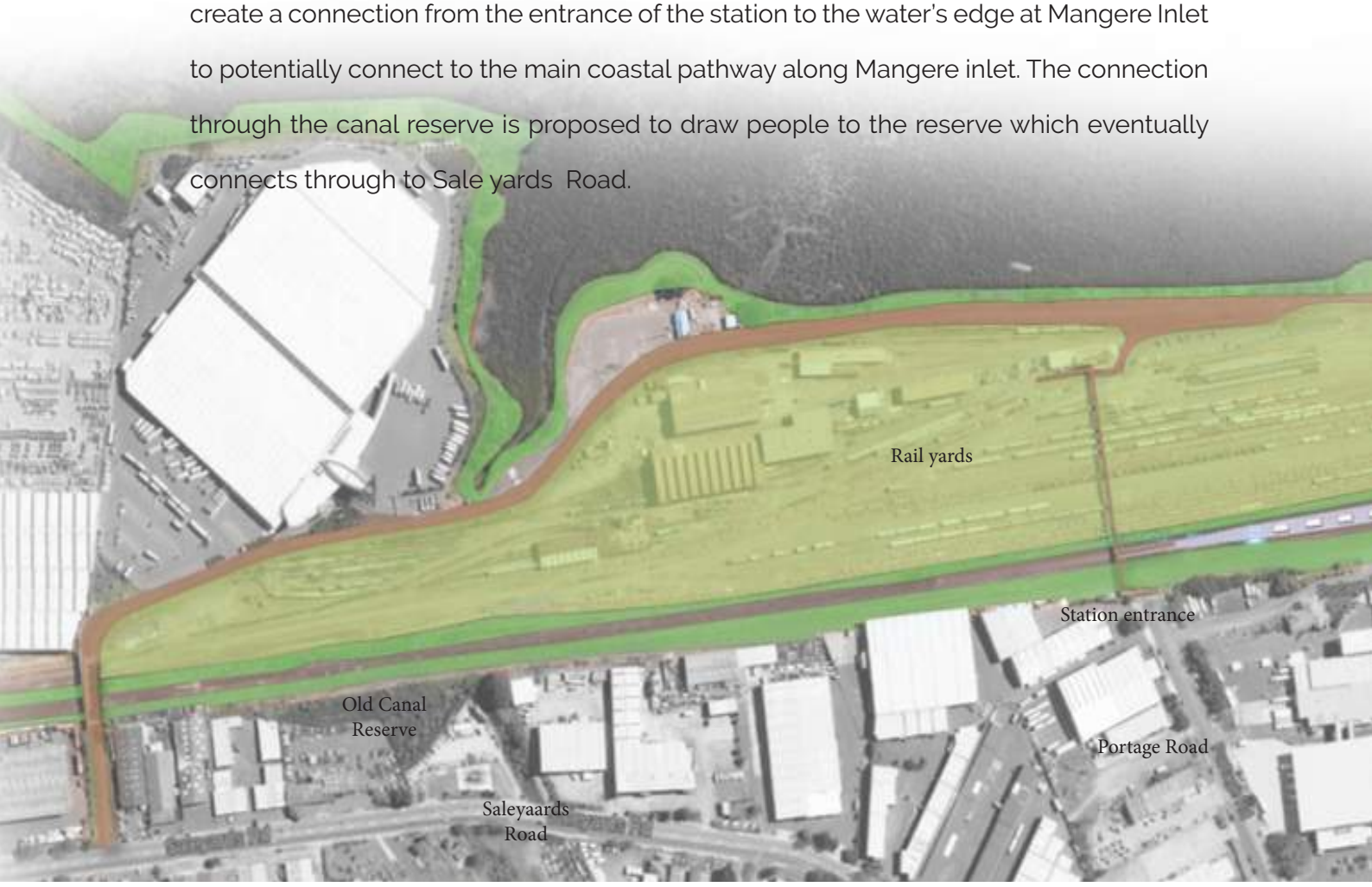


Figure 50: Marginal space mapped at Westfield Rail Station and Freight yards
Image by: Zara Jawadi

3. Pedestrian access from Great South Road to the Westfield rail yards and the Mangere Inlet coastal pathway. This is proposed to create alternative access options to the station , as Great South Road is more accessed and visible than the western end of Portage road which is where the entrance to Westfield station currently is. This connection also supports access from the station to the local park, Mount Richmond Domain.
4. Storm water treatment and riparian planting along Ann's creek and Southdown Reserve. This is proposed to support and preserve the existing plant and insect species as well as provide an ideal habitat and nesting station for the migratory birds which use this space regularly.
5. Restoring native ground cover on remnant spaces mapped along the station and along the Mangere inlet. Giving marginal spaces in this area an ecologically significant role in improving the natural environment at the site.
6. Transforming former Pike's Point Park into a community space.

Coastal pathway connecting to Otahuhu station + Mangere

Figure 51: Increasing productivity of marginal land on-site through implementation of storm water devices

Pedestrian + Cycle pathway through Canal reserve

Figure 52: Restoring the site's heritage through pedestrian connection between water and Portage road

Pedestrian access to the site from Great South Road

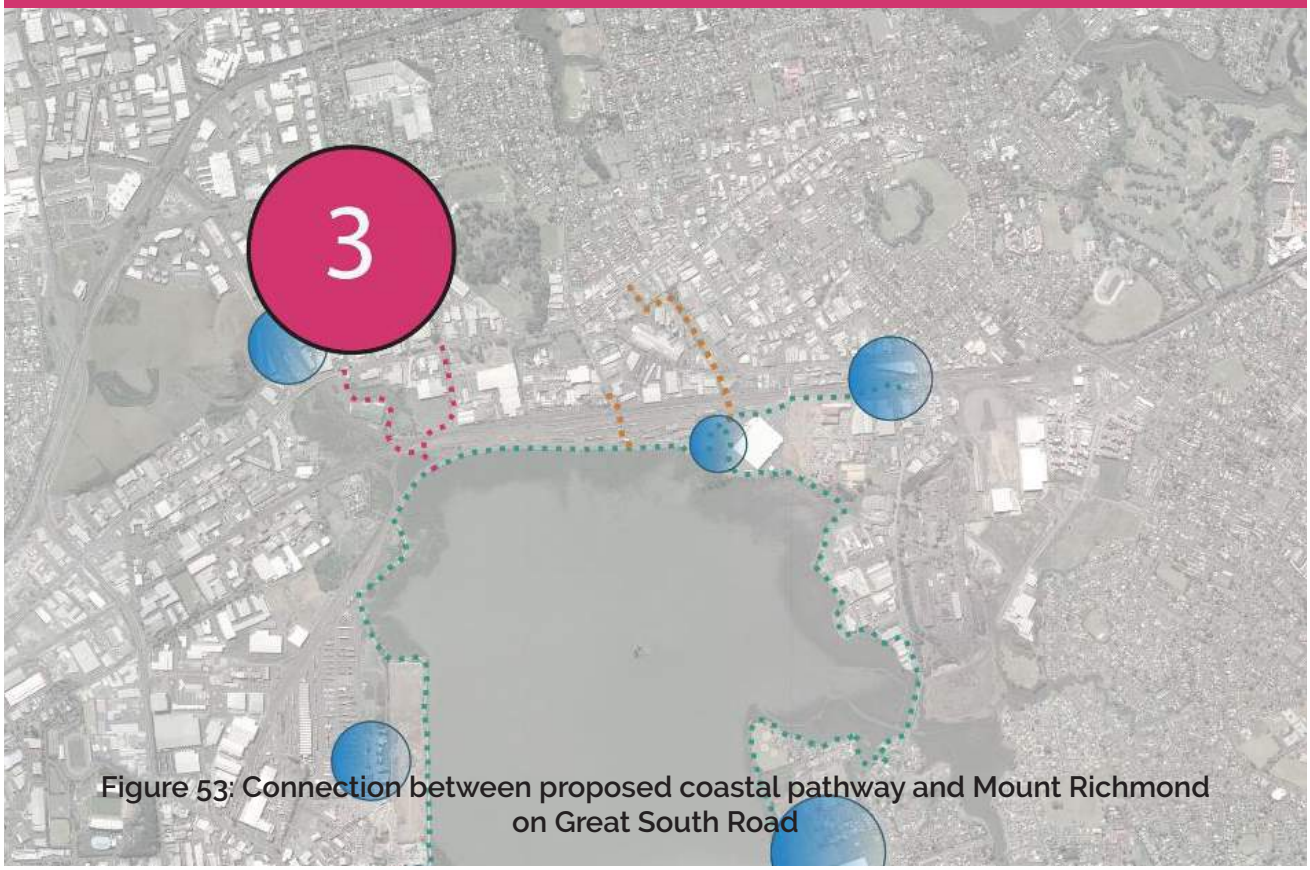


Figure 53: Connection between proposed coastal pathway and Mount Richmond on Great South Road

Stormwater treatment and Riparian planting

Figure 54: The existing Southdown reserve and surrounding marginal land transformed into wetlands

Restoration of Native vegetation on marginal spaces

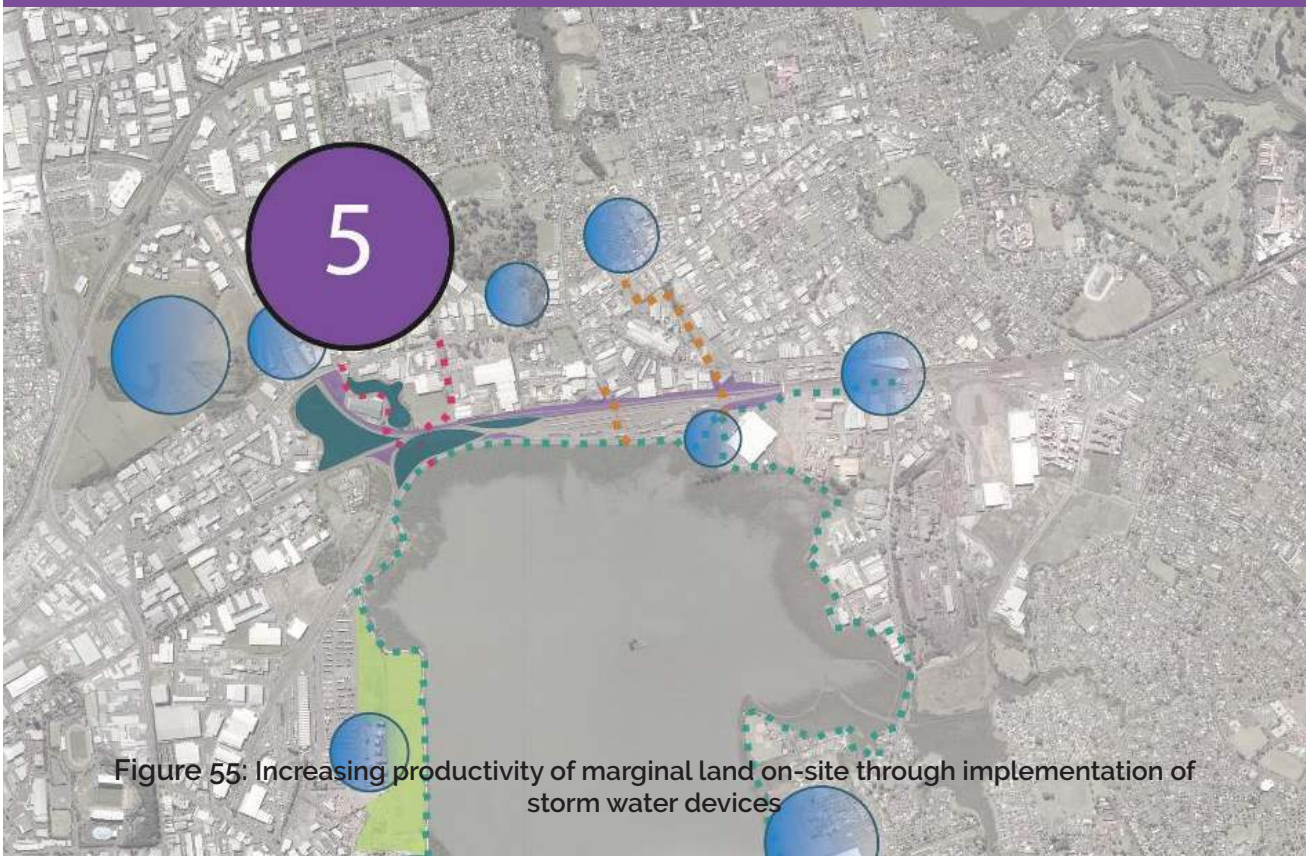


Figure 55: Increasing productivity of marginal land on-site through implementation of storm water devices

New Pike's Point Park

Figure 56: Community park proposed on Pike's Point Park (historically used for recreational aviation)

Figure 57: Board walk through Mangroves at Mangere Inlet

Figure 58: Shipping container pop stores used to maximize function at the station

7.0 REFINED DESIGN

Figure 59: Marginal space mapped at Westfield Rail Station and Freight yards
Image by: Zara Jawadi

7.1 INITIAL DESIGN REVIEW

The complete and final design outcome was a direct result of the research, analysis and earlier design phase. Initially the design was very focused on creating a plan with a holistic approach which aims to link ecology, society, and economy within the site design through a set of phased small design interventions that work coherently to achieve the sustainability of the site in the long term, rather than a proposal which can be implemented at once.

After discussing the draft design with critics, some of the initial design moves were rethought. Such as creating connections across the Westfield rail yards, as it would require passing through private owned land. Every move needed to have some effect on the social aspect of the design or at least increase environmental quality. Some design moves such as creating a pedestrian cycle access through the old Canal Reserve, although it's purpose was to celebrate the history of the reserve, simply creating visual access would serve towards bringing awareness to it while dedicating the reserve as an undisturbed wildlife spot. Other aspects that inspired design changes from the first complete design included the idea of more repetition of design elements throughout the site for cohesiveness, such as using the same vegetation pallet across the entire Mangere Inlet coastal pathway,

The final refined outcome was the design that seemed to be the most appropriate to tackle the site conditions through a strong focus on the environmental deterioration i.e. the contamination of the site, the lack of connectivity, as well as providing an increase in social interaction opportunities through increasing the amount of local public open spaces and a range of activities.

It was also the most visually and physically cohesive design. An additional benefit was that each design element would easily be able to be implemented on the existing site without overly extensive alterations and construction. The plan aims to generate and improve social interaction through a set of design interventions that can be easily implemented with the help of the communities.

Although the site has a few existing pathways, making further connections to and from the main proposed pathway would increase accessibility and make alternative transport a more feasible option for the local communities surrounding Mangere Inlet, while providing them with quality spaces to experience throughout their journey.

It was also important to ensure that existing bus stops and main transport stations such as Otahuhu rail and bus interchange and Onehunga rail station, were better connected with the proposed pedestrian and cycle paths. Creating better alternate travel connections makes traveling through public transport more appealing, which is a key factor in transport preference.

Figure 60: Marginal space at Westfield Rail Station entrance.

Figure 61: Concept render showing potential use of space at Westfield Station entrance.

7.2 PEDESTRIAN NETWORK

The final design consisted of three main themes; Pedestrian network, Storm water management, Social spaces. With Six activity themes that together contribute towards satisfying the research question in relevance to the site. The six main design interventions used to shape the final plan for Westfield station and Mangere Inlet work coherently to increase the site's sustainability through social interactions and ecological improvements.
This is comprised of the main pedestrian and cycle way loop around the Mangere Inlet as well as the sub routes connecting to existing and proposed public spaces throughout the Inlet. The site wide network of footpaths on site aim to prioritize pedestrians while creating opportunities for interaction between people and the environment.

There are three board walks within the main pathway, the largest of which connects to the existing pedestrian and cycle path on the southern end of the Inlet, and extends all the way out into the mangroves to connect back to the northern end of the inlet. The other two smaller board walks also cross the mangroves in two other different areas on the main pathway.

Secondary pathways connect up the existing communities surrounding the Mangere Inlet. Pedestrian connections are important to get people out and using the site while providing safe recreation and access to social spaces. The more people are out walking, the more opportunity for social interaction, and therefore the less neglected the site appears to be, and its value is increased.

7.2 STORM WATER MANAGEMENT

Storm water devices such as swales and wetlands help to catch, clean and slowly release the site' storm water in a more sustainable manner. They are distributed throughout the site, and contain vegetation, which provides visual aesthetics to the site, opportunities for a stronger ecology and prevent erosion near the water's edge.

These storm water mitigation devices were chosen specifically for the scale of this site for their infiltration methods and suitability for narrow and wide spaces found throughout the site. The wetlands are the main devices which work to collect storm water and allow the sediment to settle.

These not only physically improve the environmental sustainability of the site; they also make sustainable techniques obvious to people through becoming aesthetically pleasing landscape features, without sacrificing the environmental condition of the site.

7.3 SOCIAL SPACES

These are key to generating social interactions and experience. Within the main Inlet pedestrian and cycle loop, are previously 'marginalized' spaces that were mapped out during site analysis and were seen to be of latent value to the surrounding environment, which are proposed to be transformed into a series of different spaces each with its own theme providing passers by with activities and spaces to relax throughout the journey around the inlet.

Each of the spaces provides seating, shelter, and a connection to a bus stop or to the main pathway which connects to the main Otahuhu bus and rail interchange. People will have both planned and unplanned social interactions within these social spaces around the Mangere Inlet. This will hopefully create pride in the people present, and encourage care of the site and sustainable choices.

7.4 FINAL PROPOSED CONCEPT

A new urban treasure emerges from around the Mangere Inlet, creating a new quality urban space matrix and connecting six communities together around the edge of the water.

The matrix of urban spaces is spread around the Mangere Inlet, resembling beads on a necklace. It is made up of a series of small, medium, and large 'marginalised spaces' designed to allow the surrounding communities to have a multi-purpose urban space network that they can identify with and benefit from.

It is designed with six major themes laid out along a 15 Km walk/cycleway, to allow residents of all ages to enjoy the facilities available around the edge of the Inlet, spend their leisure time there, and to have a pleasant journey to their jobs, schools, local shopping centres, etc. The walkway starts at the Westfield rail station, and ends at the coronation road fishing promenade.

PROPOSED MANGERE INLET TREASURE PARK

Figure 62: Proposed plan for Mangere Inlet and Westfield Station. Scale: 1:6000


MOUNT
WELLINGTON
SECTION ELEVATION
AA'
SECTION ELEVATION
BB'
OTAHUHU

7.5 THE SIX THEMES

Horticultural exhibition space

The site's history of being a famous spot for fishing and food crops is brought back into the design through community gardens, sculpture galleries and art exhibition spaces.

- Community garden space Sculpture Park
- Local art exhibition space
- Heritage lane

Play/Active Zone

Communities surrounding Mangere Inlet consist of a variety of age groups and cultural backgrounds. For this reason the plan aims to serve a variety of recreational activities to satisfy the different interests of the community groups. This zone also focuses on providing spaces that support physical exercise to promote active lifestyles for the local residents.

- Children's Playground
- Youth Play space
- Skate Park
- Basketball court
- Tennis court
- Climbing structures
- Kayaking Bay

Conference Centre / Venue

- Educational murals
- Bike hire service from Otahuhu train station
- Outdoor gym equipment near Westfield rail station waiting platform

Commercial centre

This is aimed to increase the economic opportunities within the local communities and to encourage locally grown produce, and businesses.

- Market space
- Cafés and restaurants
- Local businesses

Wetlands / Water re-mediation train

The water is a main design driver in this project, access to the water is made through pedestrian and cycle connections along the inlet. The existing fishing spot on the old Mangere Bridge is redeveloped into a proper public space with seating, better lighting and bike racks.

- Board walks through the Mangroves
- Riparian planting / buffering
- Fishing Promenade

Summary

Repetition was used as a tool in the design. This design approach focuses on repeating a site element such as a sculpture, vegetation type, signage or other object that can be strongly identified with the site. Repeating it around the site should create a sense of identity within the Westfield treasure park.

Sense of identity can be linked with pride in a place. In this concept the repeating element is the vegetation, A repetitive linear pattern is used throughout the main pedestrian and cycle path around the Mangere inlet is used to achieve consistency throughout the design.

A focus on connectivity of storm water management features while including social space. Wetlands and the estuary are connected by numerous swales, creating a storm water filtration network. Small social spaces are situated throughout the site. Board walks extend from existing pathways and connect over the water for views, and through the mangroves to function as recreational features and environmental interaction opportunities.

Shared public space provides increased opportunities for social interaction and engagement which results in reduced community segregation and promote social equality.

Overall, the network contributes to social connectivity and encourages sustainable development which in the long term is aimed at changing people's behaviour and perception of public transport through exposure to the natural environment and easier and more appealing alternative transport options.

7.6 SECTIONS

Sections are important and give landscape architects the chance to show how their design relates to people. Sections for this project provide indications of height, changes in elevation, how people would be able to use the proposed interventions and the vegetation species used.

The sections' most important role is to provide an indication of how people use the design elements, making the design more understandable. Each section cuts through a major part of the site where the most dramatic and important changes will be implemented. This includes the cycleway, footpath, and board walk connections, the wetlands, and the vegetation cover.

Section Elevation AA'

Figure 63: This section shows potential vegetation plan for marginal space along rail tracks and near station entrance

Section Elevation BB'

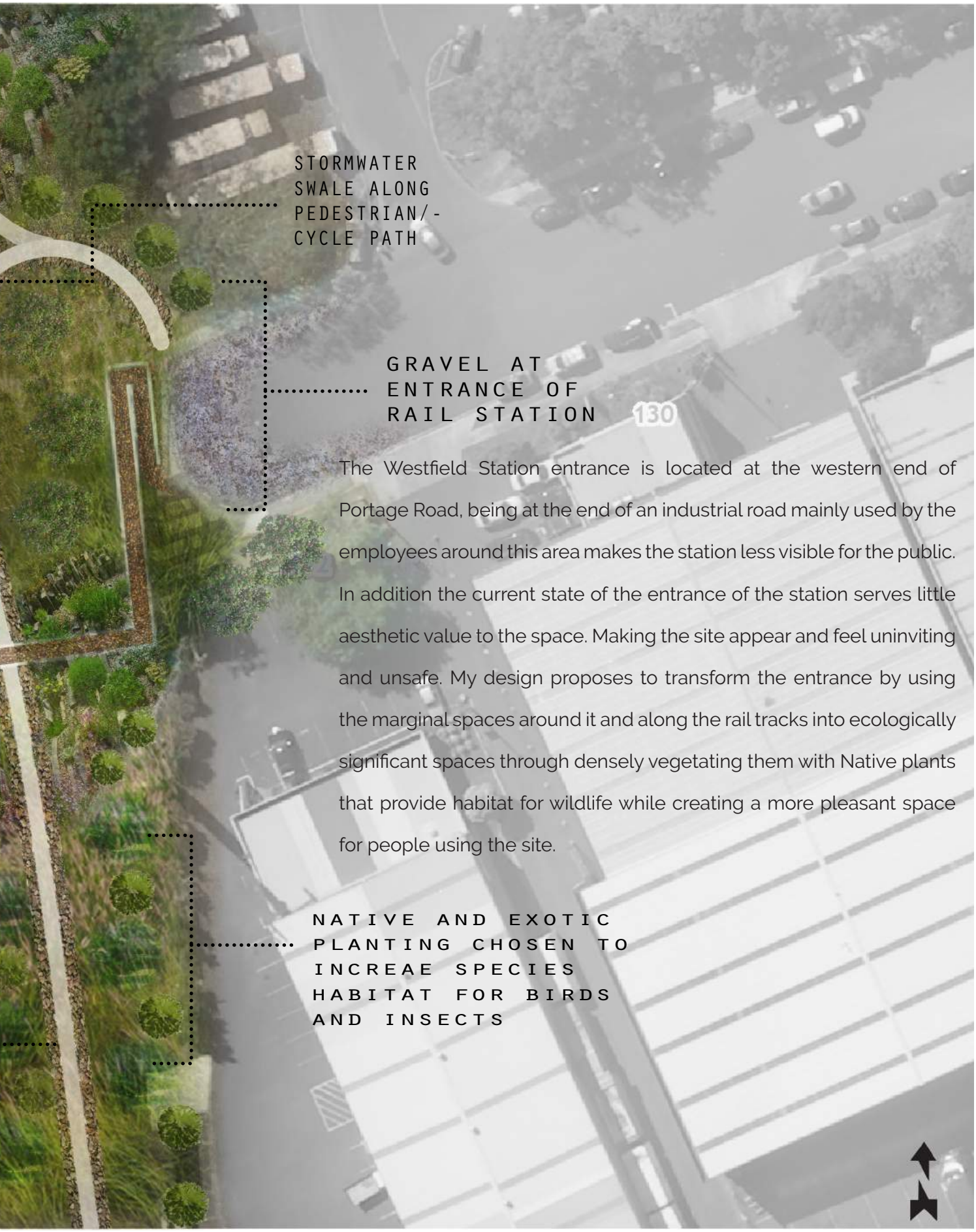
Figure 64: Options for maximising function of marginal space along freight yards, and along inlet. Cycle and pedestrian access is provided along with lighting is added to increase sense of security

Section Elevation CC'

Figure 65: This section shows the potential for increasing the aesthetic quality of the station through low impact design; i.e. green roof over bus stop, native planting, and riparian vegetation

WESTFIELD RAIL STATION ENTRANCE

Figure 66: Concept design Westfield Station entrance.



The Westfield Station entrance is located at the western end of Portage Road, being at the end of an industrial road mainly used by the employees around this area makes the station less visible for the public. In addition the current state of the entrance of the station serves little aesthetic value to the space. Making the site appear and feel uninviting and unsafe. My design proposes to transform the entrance by using the marginal spaces around it and along the rail tracks into ecologically significant spaces through densely vegetating them with Native plants that provide habitat for wildlife while creating a more pleasant space for people using the site.

PROPOSED BOARD WALK AND WETLAND ALONG EXISTING FORESHORE WALKWAY

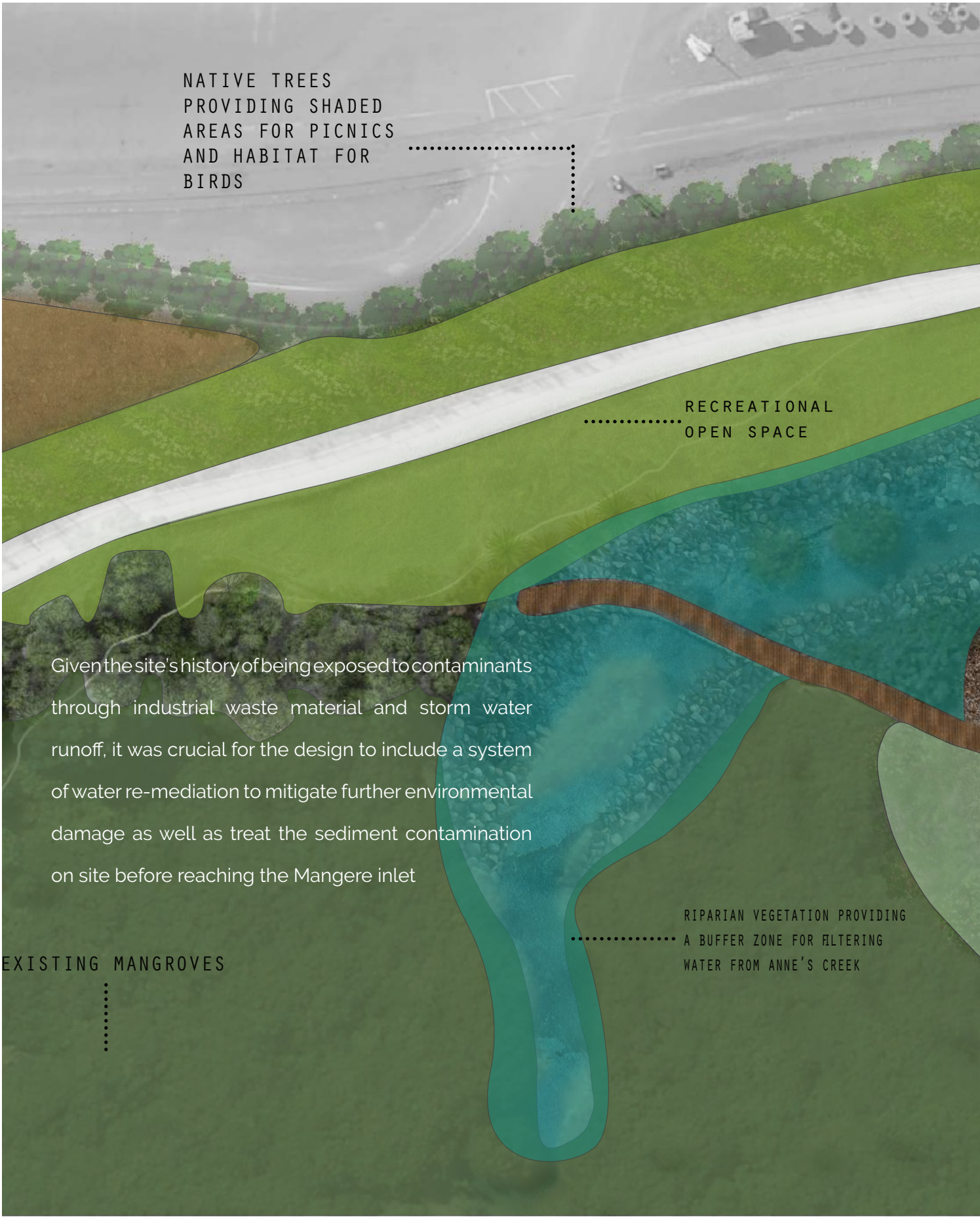
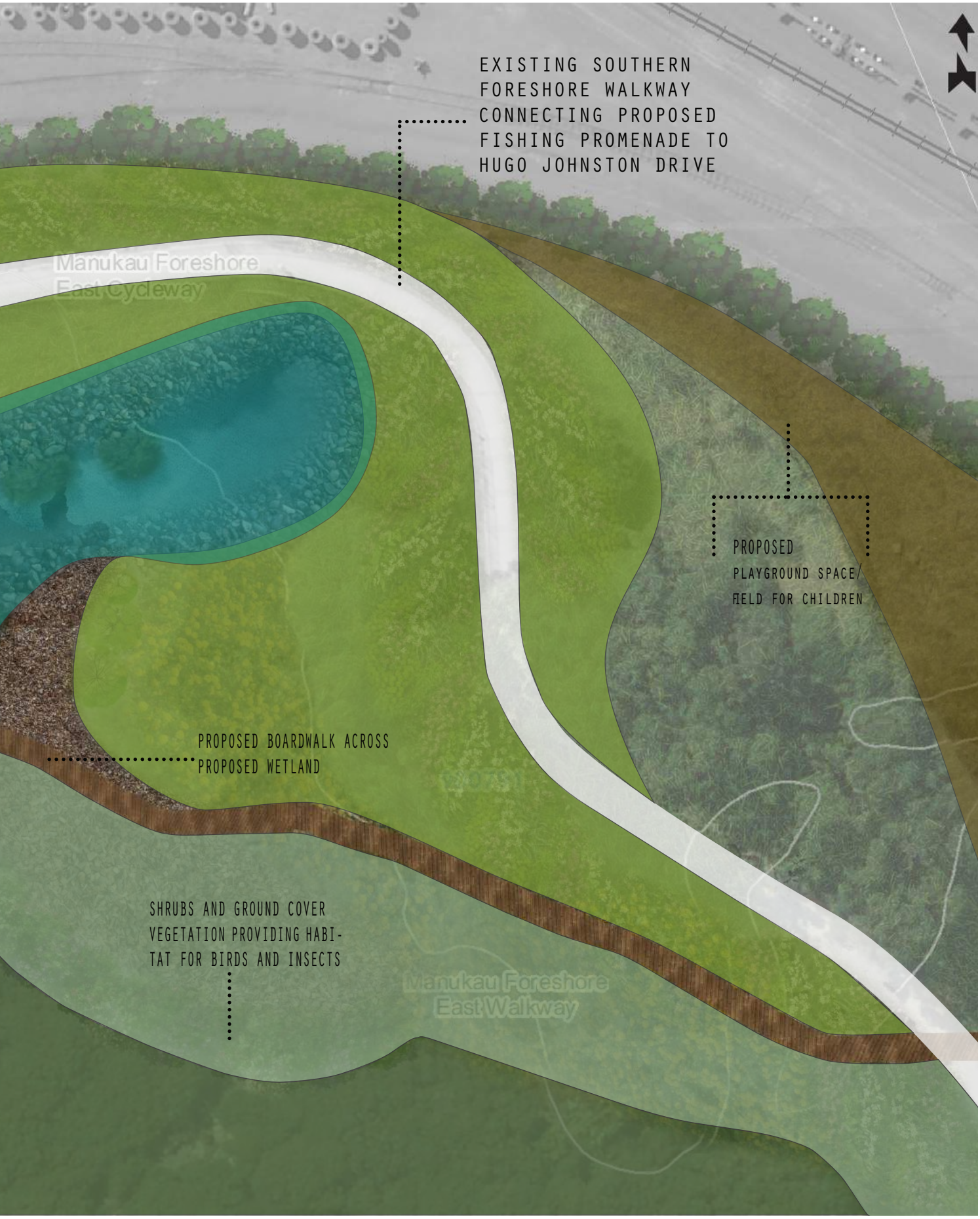


Figure 67: Concept design riparian vegetation near Southdown walkway


EXISTING SOUTHERN FORESHORE WALKWAY CONNECTING PROPOSED FISHING PROMENADE TO HUGO JOHNSTON DRIVE
Manukau Foreshore East Cycleway
PROPOSED PLAYGROUND SPACE/ FIELD FOR CHILDREN
PROPOSED BOARDWALK ACROSS PROPOSED WETLAND
SHRUBS AND GROUND COVER VEGETATION PROVIDING HABITAT FOR BIRDS AND INSECTS
Manukau Foreshore East Walkway

PROPOSED WETLAND + WALK/CYCLEWAY CONNECTING TO OTAHUHU RAIL STATION

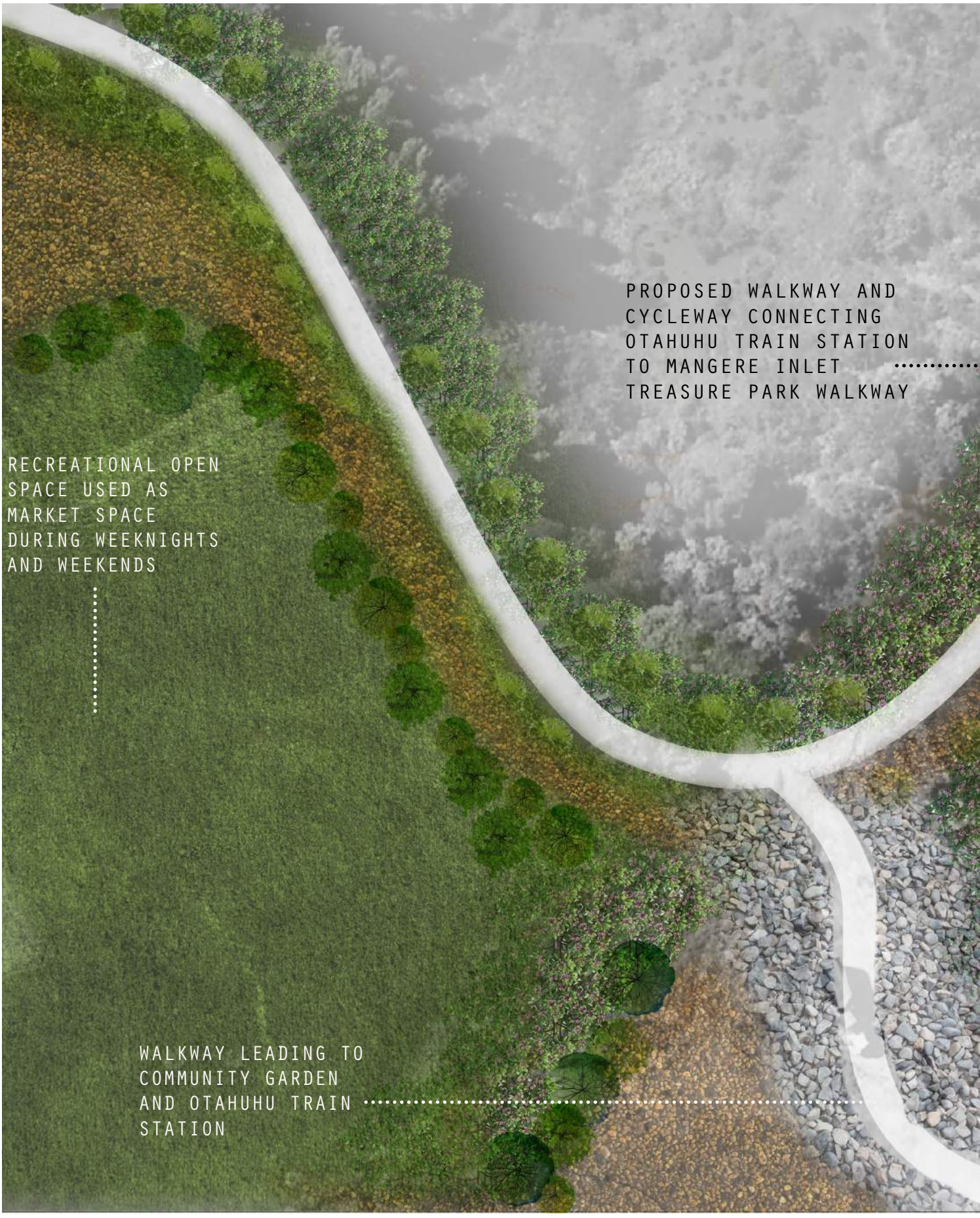
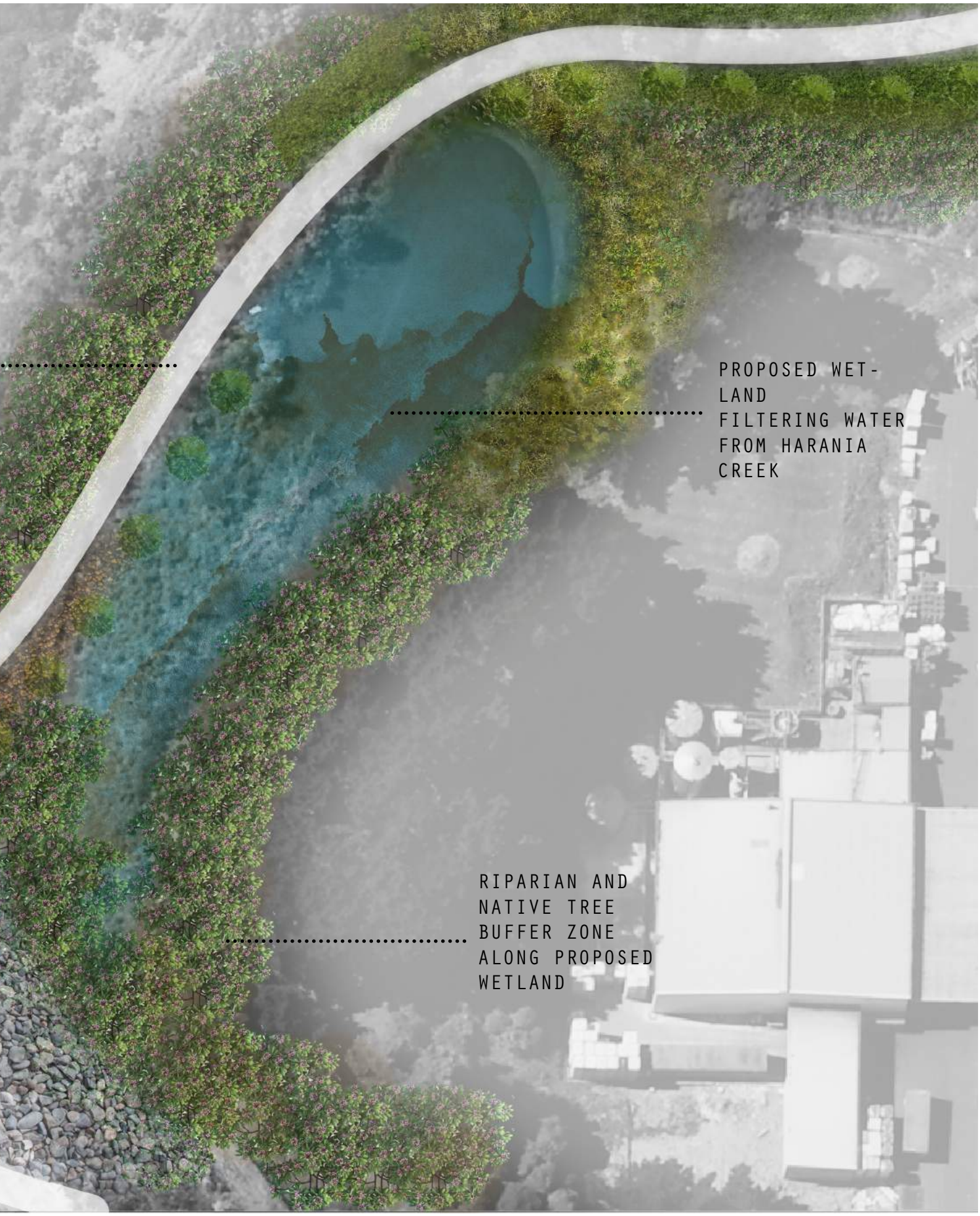


Figure 68: Concept design for wetland and riparian vegetation along Inlet


PROPOSED WET-
LAND
FILTERING WATER
FROM HARANIA
CREEK
RIPARIAN AND
NATIVE TREE
BUFFER ZONE
ALONG PROPOSED
WETLAND

PROPOSED ENTRANCE TO EXISTING FORESHORE WALKWAY

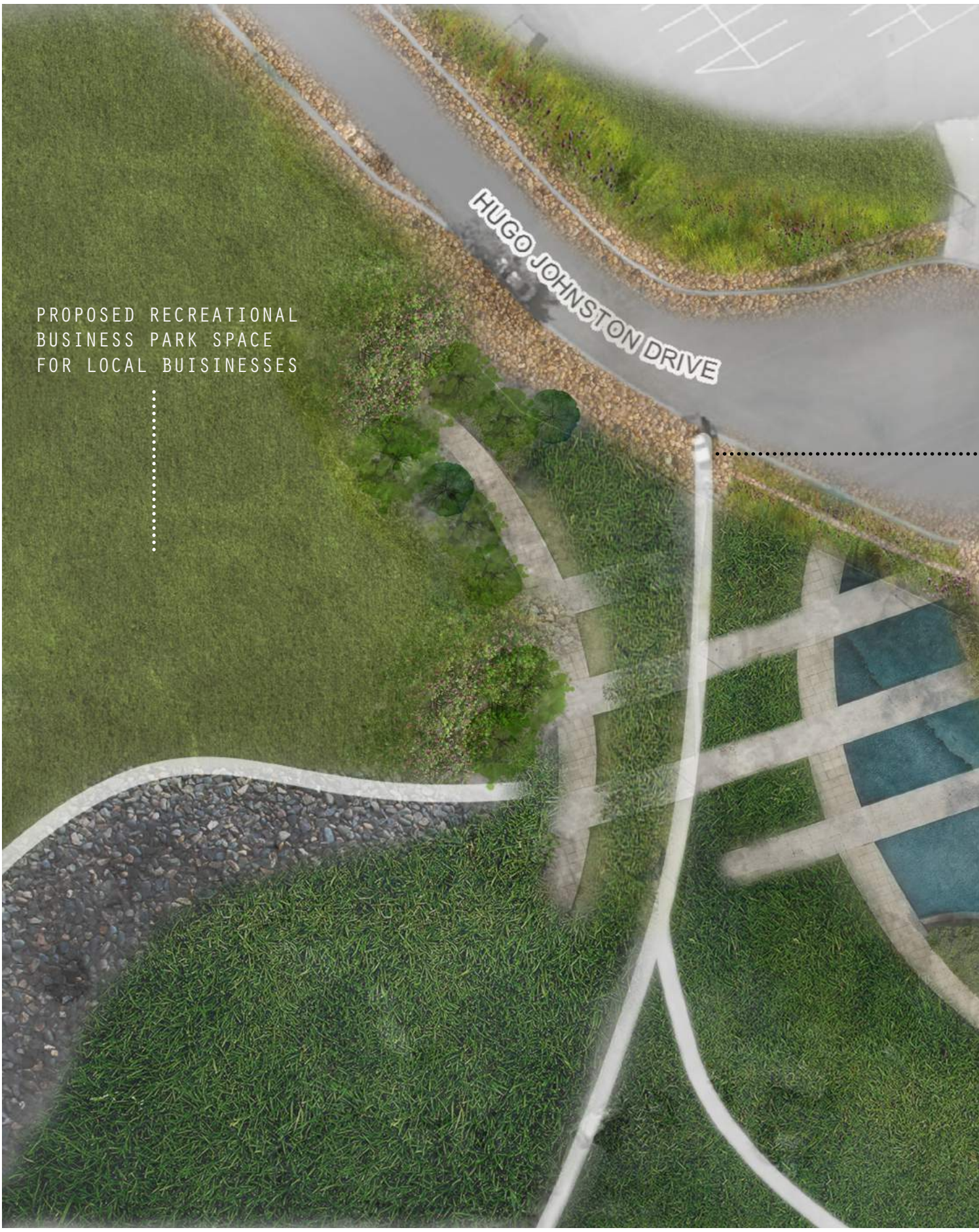
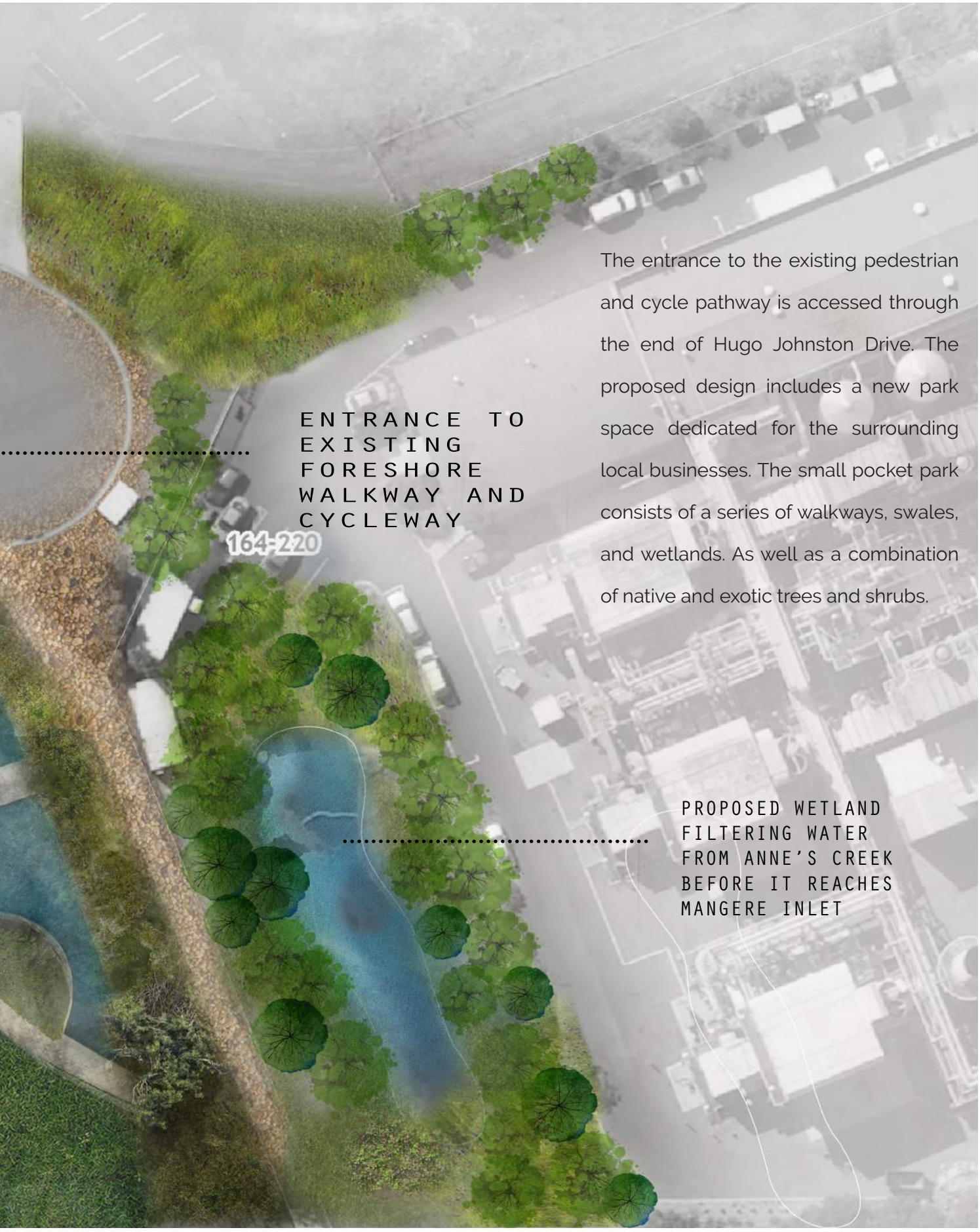


Figure 69: Concept design for industrial park near Hugo Johnston Drive.



The entrance to the existing pedestrian and cycle pathway is accessed through the end of Hugo Johnston Drive. The proposed design includes a new park space dedicated for the surrounding local businesses. The small pocket park consists of a series of walkways, swales, and wetlands. As well as a combination of native and exotic trees and shrubs.

7.7 DESIGN CHANGES

Images show both a before photo of the area and then the site as it might appear after design implementation. This is to give a sense of the experience of the site. This is an important way for landscape architects to enable clients to visualize the outcomes generated from plans and sections.

These are potential outcome suggestions as initially the vegetation will be smaller and changes could be made during the implementation as is often the case with design outcomes. The provided perspectives are an exploration of how the site can function differently with the utilization of marginal space, through change of materials, and vegetation.

The main elements used to convey the significance of remnant spaces once transformed are the native vegetation, the materials used on the Westfield station platform, and the art murals proposed throughout the station.

The space is used regularly by New Zealand migratory birds, which makes transforming those other wise neglected spaces into new habitat for birds to use more often that they currently do. Vegetation also has benefits to the surrounding businesses as it provides a more attractive appearance to the site encouraging more visitors to the station to be able to utilize the spaces around it as a quiet recreational, space away from busy traffic.

The change of materials used on the station platform are also aimed to heighten the appeal of the station while serving to filter storm water through using porous concrete material. The art murals support the idea of using place making on transport stations to promote a sense of belonging to the space for the local residents.

Figure 70: Marginal land along rail tracks at Westfield Station Looking south towards Otahuhu Station

Figure 71: Concept render exploring possible use for marginal land.

Figure 72: Available marginal land between station platform and freight rail yards

Figure 73:Concept render showing potential vegetation cover at marginal land between tracks

Figure 74: Current state of Westfield Rail Station platform

Figure 75: Concept render exploring ways in which to maximise use of space at the platform

8.0 CONCLUSION

Figure 76: Marginal space between rail tracks at Westfield Station.
Image by: Zara Jawadi

8.1 DESIGN REFLECTION

The research question this thesis aimed to answer was 'What opportunities are there for Landscape architects to design within Auckland's existing urban transport corridors to better support biological communities?

A design methodology was developed around the use of the triple bottom line of sustainability, low impact urban design, place making, and crime prevention through environmental design. The major vision of the design was to achieve the following objectives:

- Capture and employ the hidden value of marginal lands along transport corridors in the service of local economies.
- Support social engagement opportunities at transport hubs to improve quality of life for the local communities neighbouring transport corridors.
- Nurture and seed ecological connections to enhance local and regional resilience.

To test the strategy, Westfield rail station was used as a case study site, where the methodology could be assessed at a local scale.

The final design outcome was a result of the research, analysis and early design investigations. Place-making inspires pride of place and provides sense of identity. When used around transport stations, this approach can contribute to a more inclusive community as the station becomes a shared community space which encourages people to come together.

The more people utilizing the spaces the safer and more enjoyable the public transport experience becomes, allowing people to move away from the automobile dependent lifestyle and are encouraged to utilize their local community spaces both for recreational and travel purposes.

8.2 GENERAL REFLECTION

Out of the methodology came four outcomes that demonstrate how landscape architects can use utilize marginal land along transport corridors in Auckland city, to promote social inclusion through social interaction and participation, support the biodiversity of the city, and serve the local and regional economies.

Pedestrian Networks

Pedestrian routes and connections are important to get people out into the wider environment while providing safe recreation and access to social spaces. These networks are primarily based on footpaths and cycle ways and provide an alternative transport option to the traditional vehicle dependence. Pedestrian networks can also play an important role in connecting people to the natural environment by placing them within an ecological context in a safe manner to encourage an ecological and sustainable appreciation.

Social Spaces

Space dedicated to social activities helps to generate social interactions and experience. They need to be suitable for a range of activities and users to improve pride of place and encourage care of a site and sustainable choices. Social space encourages positive experiences which results in a reduction in social segregation, and can also improve landscape aesthetics and appeal. As a consequence, contributing to a rise in the land values and attracting economic opportunities.

Storm Water Management

The storm water devices and wetlands improve the site's visual aesthetics and demonstrate that sustainable and ecologically sound design interventions can be both appealing and functional. Storm water management techniques can physically improve environmental sustainability and make sustainable techniques obvious to people without sacrificing visual aesthetics. In particular, rain gardens, storm water planters, wetlands and green roofs can be utilized. (Ando,2011)

As per Mark Johnson (Thompson, G., & Steiner, F. R., 1997), a designer's role is to bring ecology into the city while meeting and changing aesthetic conventions. Landscape architecture needs to find a balance between common aesthetic tastes, a tokenistic approach to ecology and actual functioning ecological process.

Ecological wildlife corridors

Richard T.T Forman's theories of landscape ecology suggest that linear ecological corridors are environmentally productive. They provide a continuous stretch of broad range of habitats for various plant, animal, and bird species. Ecological corridors have been shown to increase the biodiversity of a city through increasing the range of wildlife habitat through the urban metropolitan area. (Meurk,2006). Case studies such as the Singapore rail re-imagination programme has shown how transport infrastructure can contribute towards a more sustainable city. Through transforming abandoned rail corridors into linear public parks and green corridors. Opportunity therefore exists, to transform working linear transport systems that often bisect and divide neighbourhoods into more responsible actors in urban design. (Drake,2014)

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FIGURE LIST

Figure 23: Punggol Waterway Park
Image source: http://www.blogarama.com/travel-blogs/238195-vivis-random-ramblings-blog

Figure 24: Westfield Station Platform.
Image source: Zara Jawadi

Figure 25: Tamaki-Maungakiekie Local Board Area
http://www.aucklandcouncil.govt.nz/SiteCollectionImages/

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Figure 27: Southdown Reserve and Ann's Creek – Westfield
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Figure 28: Water quality at Mangere Inlet.
Image source: Auckland Regional Council Database

Figure 29: Areas of high ecological value susceptible to degradation
Image source: Auckland Regional Council Database

Figure 30: View of Mangere Mountain from fishing bridge
Image by: Zara Jawadi

Figure 31: 'War Speech' - by Augustus Earle
Image source: http://www.donsmaps.com/images28/maoricanoes.jpg

Figure 32: Mangere Wastewater Treatment Plant
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Figure 33: Westfield rail station
Image source: Zara Jawadi

Figure 34: Westfield Railway Station.
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Figure 35: Papatoetoe
Image source: Auckland Council GIS

Figure 36: Puhinui
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Figure 37: Sylvia Park
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Figure 38: Marginal land at Westfield Rail Station, standing between rail tracks at the northern end of the station
Image source: Zara Jawadi

Figure 39: View from Westfield Rail Station platform looking towards Station entrance Image source: Zara Jawadi

Figure 40: The Mangroves at the western end of the Westfield Railyards
Image source: Zara Jawadi

Figure 41: The Westfield freight railyards
Image source: Zara Jawadi

Figure 42: View from existing Mangere Bridge Fishing spot, looking towards Mangere Mountain
Image source: Zara Jawadi

Figure 43: Local using Mangere Bridge Fishing spot
Image source: Zara Jawadi

Figure 44: Lower Yonge project in Toronto. Image by Chris Foyd.
http://blog.perkinswill.com/wp-content/uploads/2015/05

Figure 45: Marginal space mapped around Westfield Rail Station and Mangere Inlet.

Figure 46: Miami Dade Underline Art Project- Aimed to transform underutilized land beneath the Metrorail Line
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Figure 47: Minghu Wetland Park – Turenscape
Image source: http://www.archdaily.com/590066/minghu-wetland-park-turenscape/54bf1e7ce58ece1abf0001

Figure 48: Marginal space at Westfield Station.
Image by: Zara Jawadi

Figure 49: Concept render for Westfield Station Platform
Image by: Zara Jawadi

Figure 50: Marginal space mapped at Westfield Rail Station and Freight yards
Image by: Zara Jawadi

Figure 51: Increasing productivity of marginal land on-site through implementation of storm water devices
Image by: Zara Jawadi

Figure 52: Restoring the site's heritage through pedestrian connection between water and Portage road
Image by: Zara Jawadi

Figure 53: Connection between proposed coastal pathway and Mount Richmond on Great South Road
Image by: Zara Jawadi

Figure 54: The existing Southdown reserve and surrounding marginal land transformed into wetlands
Image by: Zara Jawadi

Figure 55: Increasing productivity of marginal land on-site through implementation of storm water devices
Image by: Zara Jawadi

Figure 56: Community park proposed on Pike's Point Park (historically used for recreational aviation)
Image by: Zara Jawadi

Figure 57: Boardwalk through Mangroves at Mangere Inlet
Image by: Zara Jawadi

Figure 58: Shipping container pop stores used to maximize function at the station
Image by: Zara Jawadi

Figure 59: Concept render showing potential use of space at Westfield Station entrance.
Image by: Zara Jawadi

Figure 60: Marginal space at Westfield Rail Station entrance
Image by: Zara Jawadi

Figure 61: Concept render showing potential use of space at Westfield Station entrance.
Image by: Zara Jawadi

Figure 62: Proposed plan for Mangere Inlet and Westfield Station
Image by: Zara Jawadi

Figure 63: This section shows potential vegetation plan for marginal space along rail tracks and near station entrance
Image by: Zara Jawadi

Figure 64: Options for maximising function of marginal space along freight yards, and along inlet. Cycle and pedestrian access is provided along with lighting is added to increase sense of security
Image by: Zara Jawadi

Figure 65: This section shows the potential for increasing the aesthetic quality of the station through low impact design; i.e. green roof over bus stop, native planting, and riparian vegetation
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Image by: Zara Jawadi

Figure 67: Concept design riparian vegetation near Southdown walkway
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Figure 68: Concept design for wetland and riparian vegetation along Inlet
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Figure 69: Concept design for industrial park near Hugo Johnston Drive
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Figure 70: Marginal land along rail tracks at Westfield Station Looking south towards Otahuhu Station.
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Figure 71: Concept render exploring possible use for marginal land.
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Figure 72: Available marginal land between station platform and freight railyards
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Figure 73: Concept render showing potential vegetation cover at marginal land between tracks
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Figure 74: Current state of Westfield Rail Station platform
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Figure 75: Concept render exploring ways in which to maximize use of space at the platform Image by: Zara Jawadi

Figure 76: Marginal space between rail tracks at Westfield Station.
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