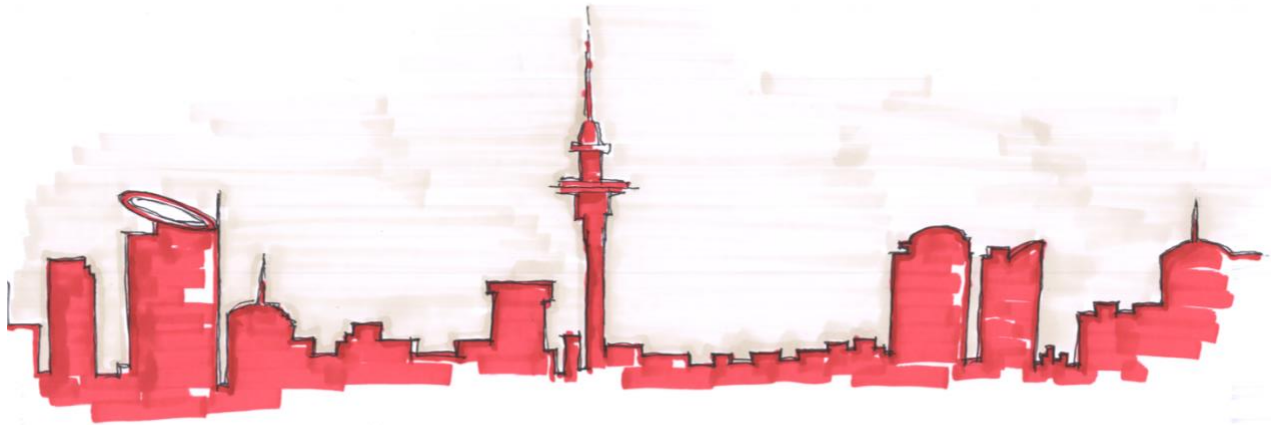


# DISCOVERING THE HINDRANCE OF WALKING AND CYCLING IN AUCKLAND'S URBAN FORM.

MEYER NEESON

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## Abstract

Active transport is a fundamental element in a city's movement network that promotes a sustainable and resilient urban future, yet can only be viable in an urban setting that supports small-scale infrastructure with appropriate street environments. The 1950's planning regimes have been dominant within Auckland's transport development with perpetuated traditional aims of increased efficiency and high level infrastructure which enables travel in the comfort of a private vehicle. Attitudes have formulated the urban fabric through funding and investment intervention which resulted in a strong motorway network and low density, sprawling residential suburbs. Psychological public response to this environment is reflected in the heavy reliance on the private vehicle and low rates of walking and cycling. Although Auckland's transport framework identifies the need for walking and cycling to actively form a strand of Auckland's transport network, institutional and intellectual embedded ideas of the 1950's prevent implementation on the ground. The failure of Auckland's urban form was highlighted in the period of the Covid-19; post lockdown the public reverted back to old transport habits when restrictions were lifted. This pandemic put our city in the spotlight to identify its shortfalls and the urgent need to support a resilient future. Therefore, this research aims to discover the inherent infrastructure and funding barriers that hinder the growth of walking and cycling as a transport method in Auckland.

For the purpose of this research, a two stage strategy was adopted. The first dimension of desktop research is included to provide the base knowledge for this paper. Desktop research comprised Auckland's transport framework, current funding, investment trends and movement patterns during the Covid-19 pandemic lockdown periods. This phase seeks to identify the barriers within Auckland's current transport trajectories, which hinder walking and cycling as an active strand of Auckland's transport system. The second phase is a case study of Hobsonville Point, which demonstrates realities of developing a resilient community in Auckland's current regulatory framework and urban form.

The need to provide a resilient future is identified through Auckland's strategic documents and regulations. However, this need has been unsuccessful in application on the ground. Findings present funding and investment as inherent barriers to walking and cycling in Auckland's transport system guided by intellectual and institutional ideas embedded in the attitudes of organisational power. Realignment of attitudes and way of thinking at the decision making level will provide substance for the development of an urban form that will support walking and cycling in Auckland. Development will include adjustments to land use patterns, densities, diversity, distances and accessibility.

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## 1.0 Introduction

Walking and cycling are forms of active transport fundamental to the creation of a resilient and sustainable urban future. There is a wide range of literature that establishes active transport and its relationship with increased health benefits, reduction in traffic congestion, increased urban liveability and an effective response in targeting climate change. At a time of increasing traffic congestion, forecasted population growth, climate change and now a public health crisis, walking and cycling is becoming highly regarded as a critical tool to targeting these complex, yet urgent, urban issues.

The recent Covid-19 pandemic has tested our nation in a multitude of ways; economically, socially and physically. During the lockdown periods, walking and cycling were at an all-time high as people escaped the confines of their homes to enjoy the outdoors in their local backyards. However, when Auckland reached level one restrictions, people reverted back to old travel habits which, in part, can be blamed on lowered restrictions and the need to commute. More notably, it brings to light our reliance on private vehicles; as a city we provide for recreational walking and cycling but, adversely, we do not adequately support active transport options to serve our travel needs. This is not new knowledge; but rather, another perspective that stimulates the need for active transport options within the Auckland region.

Transport planning regimes are embedded in 1950's plans and policy which is reflected through today's transport patterns and ultimately; our urban form. These plans and policies were primarily focused on private vehicles which are a reflection on the significance of efficiency and making our lives easier within the post world-war era. This frame of mind has been transferred into modern day policy, plans, funding ventures and public attitudes. With 2.3% of road funding allocated to active transport, opportunities per annum are minimal. The physical environment is a reflection of the past, constituted by an extensive motorway network fed by wide arterials, sleeved with narrow pedestrian paths. Pedestrians and cyclists are demoralised through the car-centric environment that they are required to contend with. Patterns of the like are continued through modern planning and design initiatives. Car-oriented thinking and unsustainable transport methods are institutionally and intellectually entrenched.

Auckland's physical urban form presents blanket low-density, residential areas with dispersed services, facilities and amenities. Travel distances are longer to destinations and experiential

values are minimal; Auckland has effectively developed a physical state that active modes are not compatible with. Working under a framework that acknowledges transport planning regimes, demographics, social attitudes and infrastructure programs of the post war era means Auckland's transition to a more sustainable network is slow-going. Essentially, Auckland is grappling with a resistant, well-established urban form and strong institutional beliefs and attitudes which all require radical change.

Auckland must now start looking toward long-term interventions that will support the development of a liveable and resilient future. A liveable future

*“directly benefits people who live in, work in or visit an area, increases property values and business activity, and can improve public health and safety. Liveability is largely affected by conditions in the public realm, places where people naturally interact with each other and their community, including streets, parks, transportation terminals and other public facilities, and so is affected by public policy and planning decisions”*  
(Ministry of Transport, 2008).

Changes need to be made that will provide a foundation for sustainable and resilient city goals to be assisted toward delivery on the ground. These are changes that present similar outcomes to a compact city; integrated and intensified community centres. Outcomes go beyond quick-fix, small-scale initiatives; instead, they are long-term processes that involve institutions to stray from traditional thinking and develop alongside a new set of criteria. We must create awareness of the harm that traditional thinking is doing to our city; Auckland is in need of more than just a face lift.

Implications of these embedded traditions are their unconscious impact on funding and investment decisions that give motorways the energy to grow and continually promote low-density dispersed development. Currently, this implication is the ultimate barrier hindering active modes within Auckland. Therefore, the forces behind Auckland's investment and funding strategies need to be reassessed and re-evaluated in terms of what they provide for walking and cycling. Firstly, they provide no walking and cycling opportunities, but more importantly, they are hindering the development of active modes through prioritising inter-regional travel and unconsciously distorting public decision making. In the developing world, we will need to think differently in the way we are going to deliver sustainable and resilient transport methods. Therefore, this dissertation will enrich the academic database of the influence funding has on urban form and consequently its ability to inform the success of walking and cycling in Auckland.

## 1.1 Purpose of Research

The purpose of this research is to enrich the academic database of the impact that traditional planning regimes have had on Auckland's urban form and currently still do. It intends to challenge the status quo and investigate why active modes cannot thrive within our current urban form. The purpose of this report is not to find a solution; but rather open the discussion of the pressing need for active transport amidst a population increase, climate change and a global pandemic.

## 1.2 Research Question

What are the inherent infrastructure and funding barriers that hinder the growth of walking and cycling as a transport method in Auckland, Tamaki Makaurau?

## 1.3 Aim

As our nation comes out of a global pandemic, we have experienced what life is like in our local areas. It was a general trend over Aotearoa that walking and cycling were popular recreational outdoor activities. According to personal observation, news articles and reports, traffic has gradually increased back to pre-lockdown levels, which perhaps is a reflection on the effectiveness of active modes as a transport method in Auckland. This research aims to assess Auckland's walking and cycling opportunities in our current urban form and identify the barriers that are hindering better support. It is important to realise that this research is focusing on infrastructure and funding barriers to walking and cycling under Auckland's Transport Framework.

This research acknowledges that walking and cycling is a travel mode that presents benefits that are, but not limited to, health, environmental and transport; however, this is not the focus of this research. The broad aim of this research is to delve into the comprehension behind the inadequacy of active modes due to monetary prioritisation of high speed, inter-regional travel through 'big-ticket' infrastructure.

## 1.4 Objectives

1. Identify the benefits of walking and cycling during the COVID-19 lockdown period and outline the reasons for the influx of active modes in local areas.
2. Identify the infrastructure and funding barriers for maintaining the high user rate of active modes in Auckland's transport planning framework and highlight methods to better integrate walking and cycling into Auckland's built form.
3. Evaluate the potential success of local level investment on walking and cycling, highlighting the impact of different urban design approaches and investment strategies have on the built form outcomes and behavioural response.

## 1.5 Dissertation Outline

This dissertation constitutes seven chapters. The first chapter introduces the topic along with the purpose of the research, the aim and objectives. Chapter two is an overview of literature that is tailored to active transport modes and the idea of a compact, resilient future in light of the Covid-19 pandemic lockdowns. The third chapter will develop the methodological approach taken to collect information and its associated limitations. Following this, the strategies of planning and design institutions will be evaluated along with Auckland's funding trends and allocations forming Chapter four. Chapter five discusses the case study of Hobsonville Point as the single case study that is contextually appropriate for this research. Chapter six will simultaneously discuss implications of the findings, identifying barriers that hinder walking and cycling with following recommendations of appropriate changes to enable walking and cycling in Auckland's urban form. The potential outcomes of these changes will be discussed in the final chapter being the conclusion.



## 2.0 Literature Review

### 2.1 Literature Review Structure

In investigation of the literature, it is evident that the literature search content can be broken into four distinct sections. The first section will provide an overview that will confirm the benefits and viability of active transport modes in the Auckland context. The second section will provide insight into the thinking and consequently the response of motorway development and historical vehicle-oriented plans and policies. The third section will develop the idea of compact resilient cities and their role in achieving a sustainable future. The final section will provide a statistical platform and support for the following discussion of this research in regards to Auckland's commuting patterns and Covid-19 walking and cycling trends. The literature review conclusion will bring the previous sections together to inform Auckland's current travel patterns and what the COVID-19 lockdown has enlightened in terms of the built form and experience of local environments.

### 2.2 Active Transport Literature

#### 2.2.1 Definition of Active Transport

The New Zealand Transport Agency (NZTA) defines active transport in its broadest sense as a movement to a destination that involves physical exercise and human energy rather than motorised forms (NZTA, 2020; Burke & Brown, 2007; Mandic, Jackson, Lieswyn, Mindell, Bengoechea, Spence, Wooliscroft, Wade-Brown, Coppell & Hinckson, 2019). This can include walking, cycling, running, skateboarding, scooters and rollerblading; however, for the purpose of this research, only walking and cycling modes will be considered.

#### 2.2.2 Benefits of Active Transport

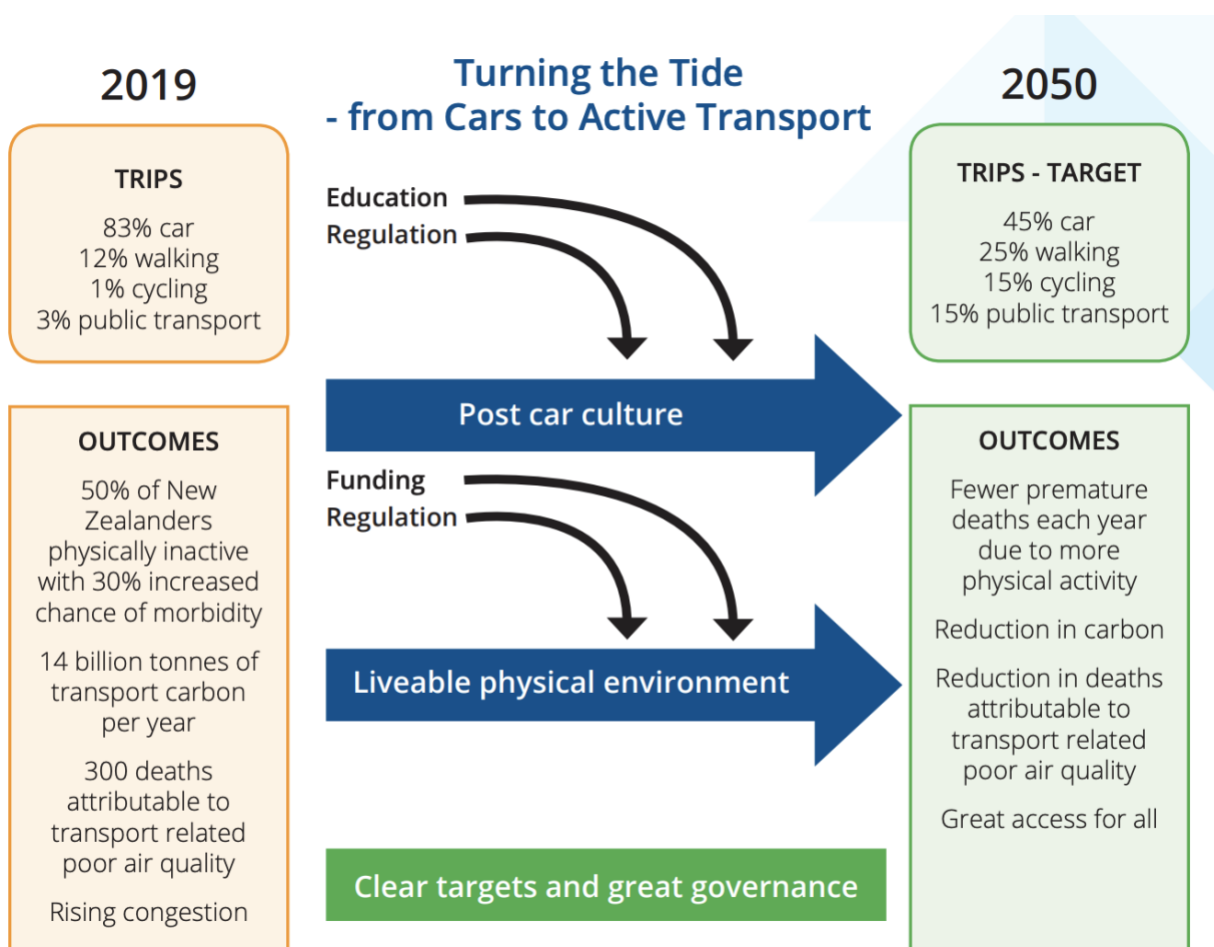
Active transport contributes to overall better health outcomes of humans, the environment, the economy and positively relates to social equity (Mandic et al, 2019). In a report by NZTA, there is consensus among OECD countries of the strong positive correlation between significant population health and greater use of active modes (Genter, Donovan & Petrenas, 2008). A 2013

review of this relationship found active modes have a strong association with improved cardiovascular health and lower body weight (Wen, Rissel & Fu, 2013). Litman's recently published report identifies that active modes benefit society overall, including those who do not actively walk and cycle. Affordability and social equity are increased with active modes as indicated by reported cost savings (Litman, 2020). Qualitative impacts which lack the ability to be monetised should be described, yet do not hold quantitative evidence. These include user enjoyment, option value, compact and accessible land use development, economic development, improved community livability, and environmental benefits (Litman, 2020). The authors of the Mandic et al (2019) paper discuss that while active transport presents an abundance of benefits, the increase in active transport would also trigger an increase in available opportunities within the urban form. Active transport benefits are not the focus of this report; however, broad explanation is required to support further discussion and the position of advocating for active modes.

### 2.2.3 Active Transport in the current Transport System

In cities of advancing economies, the private car has dominance over the more active modes of walking and cycling. As private travel has escalated in the past decades, there has been environmental implications of degraded urban air quality, increasing carbon emissions and reduction in more active forms of travel (Faherty & Morrissey, 2014). Planning policy trends in Auckland have been oriented toward the separation of urban functions and 'auto-oriented design' resulting in low density, segregated land use and car-focused developments (Newman & Kenworthy, 1996; Chapman, 2007; Handy, Cao & Mokhtarian, 2006). Promotion of active modes proves to be a challenging policy and design issue in Auckland as a car-dominated city where safety, environmental and cultural factors present as barriers to the uptake of walking and cycling (Pooley, Horton, Scheldeman, Tight, Jones, Chisholm & Jopson, 2011). In response, New Zealand lifestyles have become walking and cycling marginalised due to the ease of the private car (Jones, 2012). Mandic et al (2019) discusses the minimal use of active transport in Auckland and corresponding requirements to assist a shift to a more liveable resilient community. Within this report is the emphasis of 'education', 'funding' and 'regulation' which are all key to the implementation of a future that involves active modes (figure 1)(Mandic et al, 2019).

### **Figure 1: Turning the Tide - from Cars to Active Transport**



Source: Mandic et al, 2019.

## 2.2.4 Challenges of Active Transport

Historical evolution of some cities have resulted in low-density, segregated-use designed for auto-oriented transport methods rather than walking and cycling, leading people into their private vehicles (Handy, 2006; Yeung, 2008). Faherty & Morrissey (2014) identify that the highest area of interest in terms of challenges of active mode use in Auckland is the urban form and its ability to shape travel behaviour and future choices. Following this, recommendations were made in regard to the need to better understand the way urban form reduces liveability and adequate active transport connections. *“The reality is there is a better way to deliver better urban form for Auckland, it’s not about huge Greenfield development, because all that does is isolate people and make expensive transport connections, which is not what people want...they want a liveable city which has easy access by means of... housing choice, you know, affordable housing and good public transport and cycling links”* (Faherty & Morrissey, 2014). Within this paper, barriers to

achieving this urban ideal are categorised as urban design and planning issues, infrastructure provisions and behavioral and education aspects (Faherty & Morrissey, 2014)

## 2.3 Successful Streets

A street can be determined of its success through a myriad of interdisciplinary aspects. A successful street is one that presents a balance of efficient traffic movement while providing spaces for pedestrians (Haarhoff & Aitken Rose, 2016); which urban vitality and economies also depend. This definition was sought by the two views of Ewing and Clemente (2013) and Ehrenfeucht and Loukaitou-Sideris (2009) which describe a successful street as one that facilitates necessary movement but prioritises pedestrians and the measurement of how the street provides a quality public urban space. This balance was severed with the growth of car ownership and consequent traffic solutions which favoured the public mindset prioritising vehicle movement. Jones, Marshall & Boujenko (2008) recognise the crucial role of streets as places to target policy issues of social inclusion, economic vitality, a high quality urban realm and urban sustainability. More importantly, the paper produced shows how the principles of 'link and place' successfully define the functionality and street performance in a comprehensive manner. The authors of this paper develop these principles as a tool to guide investment decisions and to prioritise problems.

## 2.4 The Rise of the Motor Vehicle

A general trend in society is humans creating tools based on rationale of making lives easier (Mandic et al, 2019). The motorcar was the pinnacle of this development in the transport sector which continues to provide for our demanding, ever-changing needs by developing and adapting in ways to increase efficiency and transport standards (Mandic et al, 2019). Subconsciously, our mindsets dig down into 20th century concepts of the industrial revolution. This was when technology was looked to, to add value into society. Vehicular transportation has grown exponentially since the rise of technology in the 1960's to assist in raising quality of life and our standard of living (Boulter, 2004; Jones, Marshall & Boujenko, 2008; Gunn, 2011). Standard of living has successfully been raised with comfortable private vehicles to operate on our own terms on an extensive movement network (Mandic et al, 2019). Although Mandic et al (2019) recognise the superb automobile access and convenience; more importantly, they discuss the associated costs of the private vehicle in urban spaces.

In support of the 1955 Master Transportation Plan, an enabler of the car as a dominator of the city was the transition from a minority middle-class luxury into a mass transport mode (Boulter, 2004). Gunn (2011) identified the mounting anxiety of the rising car ownership and consequence traffic congestion that led to the creation of the 1964 Buchanan Report. Buchanan foresaw the dangers of mass car growth but simultaneously embraced it as just another concept of time (Boulter, 2004). Cities had to start providing infrastructural assets and a hike in road budgets to support the use of the new demand; priorities of the successful street shifted from pedestrians to the motor vehicle which relocated traditional street activities and the modes of movement that were too humble and 'ordinary' to compete with the motor vehicle (Jones, Marshall & Boujenko, 2008; Gunn, 2011).

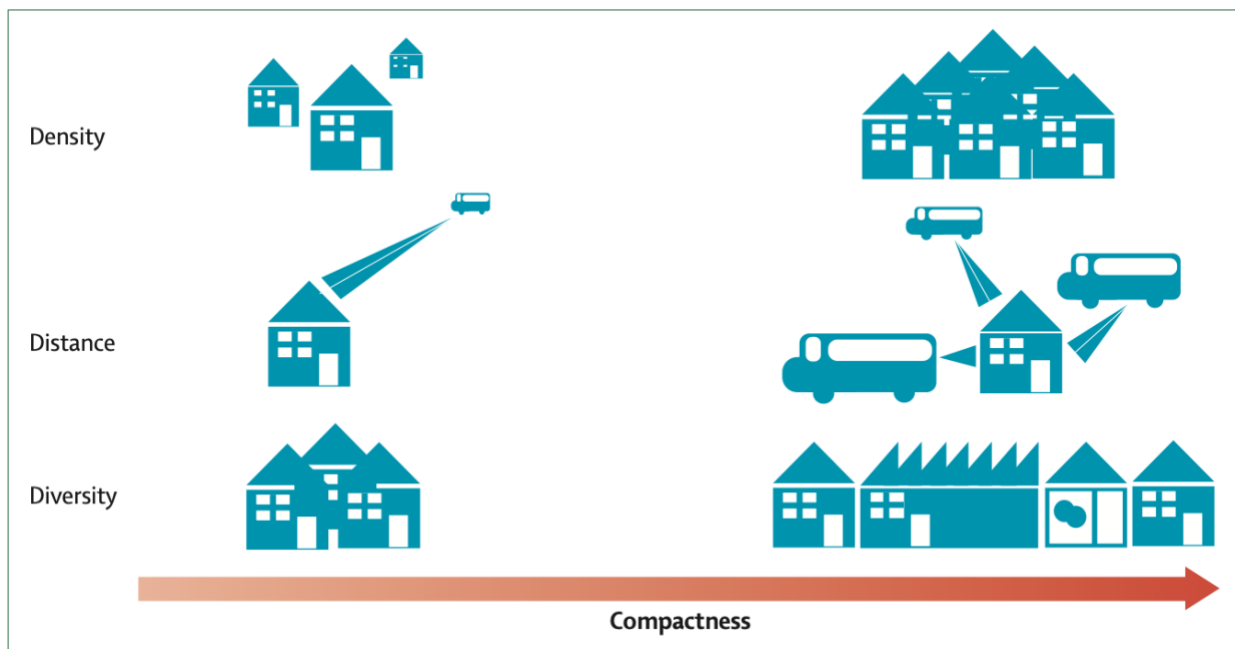
The 1955 Master Transportation Plan and Buchanan's ideas are now the forefront of our physical environment today. Jones, Marshall and Boujenko (2008) formulate these ideas to showcase that the structure of a city is influenced by the conflict between motorised modes and high quality local environments (Jones, Marshall & Boujenko, 2008). Consequently a decision was made in regard to road classification which involved separation; those for movement and traffic distribution and others for local access. Remaining today are the physical implications of Buchanan's work; but also, the question of the sustainability of the system in the longer term (Gunn, 2011). Auckland transport, Auckland Council, NZTA & Kiwirail (2015) discusses how the Auckland Regional Land Transport Plan 2015-2025 will substantially raise living standards for Aucklanders.

## 2.5 Compact Development

Auckland faces challenges as our population increases and demographics change. Stevenson, Thompson, Herick de Sa, Ewing, Mohan, McClure, Roberts, Tiwari, Giles-Corti, Sun, Wallace & Cockwood (2016) identified these as global trends which policies have been ineffective in managing the association between population growth, land use and population health. Past trends prove Auckland to be known for potential urban sprawl which is no longer considered viable. Low density sprawling residential only developments dominate Auckland's suburban area (Stevenson et al, 2016; Haarhoff, Allen, Austin, Beattie & Boarin, 2019). The requirement of higher density has been promoted for some time (Haarhoff, Allen, Austin, Beattie & Boarin, 2019). Pressures of urban growth and its impact on infrastructure is a major challenge (Stevenson, 2016). Sallis, Frank, Saelens & Kraft (2003) discusses Auckland's current urban fabric as a limitation to the

ability of walking and cycling as an option for daily travel requirements. In support of this Stevenson develops a key message that explains “*considerable health gains are observed by city planning that encourages a compact city - namely, a city of short distances that promotes increased residential density, mixed land use, proximate and enhanced public transport, an an urban form that encourages cycling and walking*” (Stevenson, 2016, p. 2925). In conjunction with this, Stevenson also acknowledges that literature on the relationships between land use, population growth and population health are not well described as they are based on a complex set of interacting and dynamic environmental, technological and population conditions over extensive periods of time.

**Figure 2: Density Distance and Diversity - Tools for a Compact City**



Source: Stevenson et al, 2016.

Auckland Council has presented their intentions with updates of the Auckland Unitary and the urban growth vision exerted within Auckland Plan 2050 (Haarhoff, Allen, Austin, Beattie & Boarin, 2019). Dodge’s analysis draws to a conclusion that there is growing preference and demand in New Zealand for a variety of typologies, sizes and densities (Dodge, 2017). The Regional Growth Forum is concerned with the city’s growth and has favoured a compact city model that restricts all development to within the urban city limits. Ellder (2018) confirms the compact city as the leading contemporary planning concept to achieve sustainability. Justification for this ranking is due to the expected decrease of car dependency in a compact

area where distances are shorter (Elder, 2018). The fundamental concept of findings is the effect that land use planning and design has on travel modes (Ewing & Cervero, 2001; Stevenson et al, 2016; Sallis, Frank, Saelens & Kraft, 2003). Findings of Stevenson et al's (2016) titled 'land use, transport, and population health: estimating the health benefits of compact cities' reveal that government policies need to actively pursue this kind of compact land-use development and design interventions that encourage an active modal shift.

### 2.5.1 The Effect of Land Use Decisions.

Buchanan's concepts within Auckland have resulted in busier arterials becoming high capacity routes. A high capacity route entails limited parking and loading space, wide carriageways, narrow pedestrian paths, pedestrian railing on the sidewalks and often unattractive public spaces (Jones, Marshall & Boujenko, 2008). New housing developments and suburbs have somewhat followed similar rationale (Ministry for the Environment, 2002). In simple terms, this is a development where active transport modes are consciously discouraged through physical urban design and therefore encouraging high levels of car use. Blanket zoned areas with large travel distances encourage or enable only motorised travel options. New Urbanists, Calthorpe and Fulton, encourage a new model of metropolitan development that calls for the return of compact, gridlike neighbourhoods with mixed land uses to flourish pedestrian amenity, community, connection and equity (Calthorpe & Fulton, 2001; Cervero & Radisch, 1996). There have been several cities that have adopted community development design guidelines based on New Urbanism that hopes to take the place of the automobile oriented sprawl that covers our landscapes (Calthorpe & Fulton, 2001). Namely these are Portland, Oregon and San Diego, California (Cervero & Radisch, 1996).

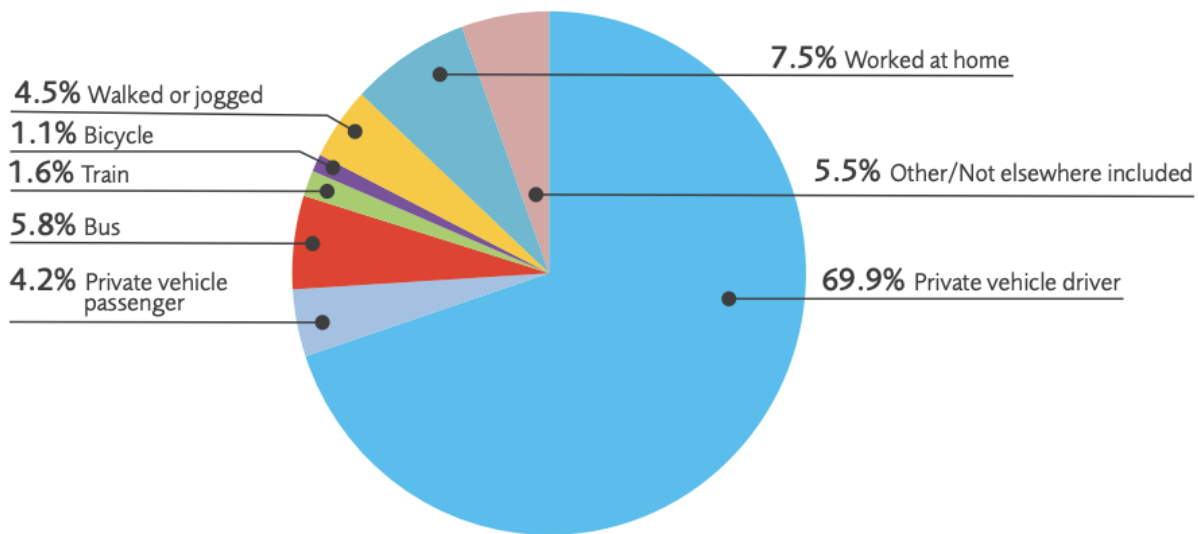
Research by Cervero and Radisch (1996) conducted a study to determine what type of environment would increase the amount of trips by active modes. It was concluded that those living in more compact, mixed use and pedestrian oriented development exerted more active trips than those in automobile oriented sprawl. Therefore these findings lend some legitimacy to New Urbanism design concepts (Haarhoff & Aitken Rose, 2016). Cervero & Radisch (1996) also determine that higher densities, diverse land uses and pedestrian oriented designs must coexist for meaningful benefits to accrue. Nice sidewalks and attractive landscaping in a low-density residential-only neighbourhood will not effectively prompt residents to walk and cycle to the nearby shops. Synergy of the five dimensions of the built environment can therefore be regarded as necessary to yield significant impacts of active travel; these being, density, diversity, design,

destination accessibility and distance to transit (Ewing & Cervero, 2010; Cervero & Radisch, 1996). These five dimensions support the holistic approach to urban streets which Jones, Marshall & Boujenko (2008) suggest due to the intricacy of a realm that it requires multiple professions and not one more than another.

## 2.6 Auckland's commuting patterns

Richard Paling Consulting produced a report in 2014 assessing the journey to work patterns in Auckland from 2001-2013. In a broad Auckland-wide sense, 72.1% of Auckland's population commute by private car with 5.2% walking or cycling (Richard Paling Consulting, 2014). Greater Auckland's analysis of Auckland's trends indicate that Auckland sits above the national average of private vehicle use, and similarly to Richard Paling Consulting, a decrease in active modes.

**Figure 3: Commuting by mode**



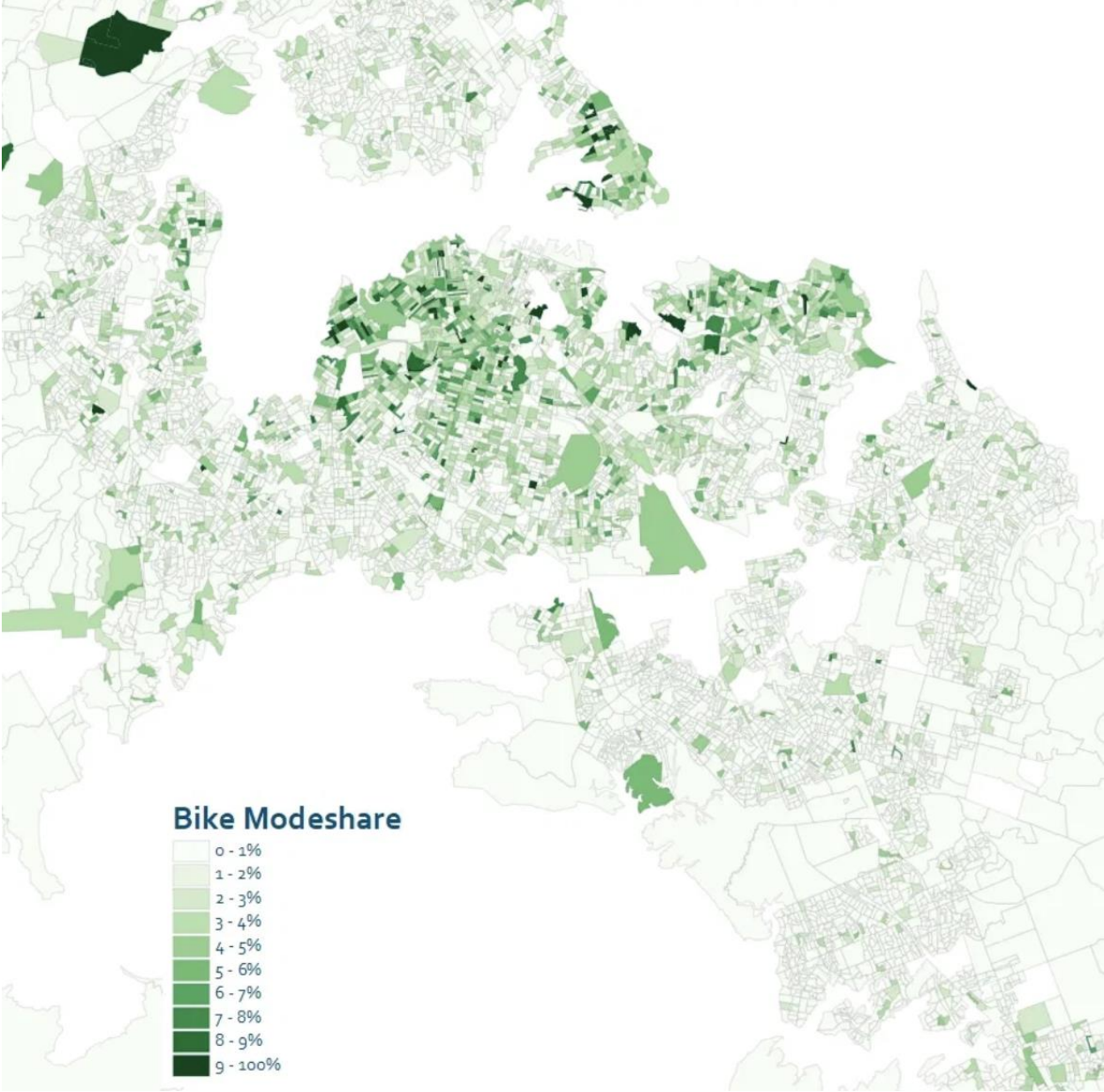
Source: Richard Paling Consulting, 2014

The 1.1% of cyclists in Auckland live in the wealthier areas of Auckland which is a reverse of what it used to be (Greater Auckland, 2020). Or to reframe, the more well off areas are where we currently have adequate cycling infrastructure and distances are shorter to Auckland's CBD; the demographic this market captures are higher income earners. Outside of the main centres, car use is extremely prominent. There have been an increase in people commuting longer distances



for work purposes from 2006 to 2013 for a combination of reasons, which unfortunately, many are good and valid (Statistics New Zealand, 2014).

**Figure 4: Bike Mode Share Distribution**



Source: Greater Auckland, 2020.

## 2.7 Covid-19 Pandemic

Internationally multiple studies report the walking and cycling boom throughout the last six months (NZTA, 2020b ; Dunning & Nurse, 2020; Sheldon, 2020). Commuting modal share largely stopped in Auckland during the higher levels of Covid-19 responses (NZTA, 2020b). In the lower levels of restriction, active modal share was consistent at 6%; however, private vehicle usage was up 5% from pre-Covid levels at 75% (NZTA, 2020b). At the higher levels, less commuters meant less people on the road which made private vehicles a more attractive mode. Private vehicle trips also rose by 5% when children were back to school (NZTA, 2020b). The walking and cycling boom in Auckland was classified as recreational activity in local areas. Cycle counts in the city, for commuting and recreational purposes, decreased due to the majority of the population working from home. In saying that, walking and cycling in residential areas increased which is perhaps a reflection of local area activity enforced by the Covid-19 restrictions. NZTA (2020b) revealed the overall trend of cycling which was reduced by over 50% after covid-19 restrictions were lifted. This trend positively correlates to the increase in people going back to work and associated commutes. People have been quick to return to their cars, which is just one illustration of clear underlying attitudes and behaviours within society (Sheldon, 2020). Coming out of the Covid-19 restrictions, private vehicles still remain dominant in people's transport habits.

Identified by many, Covid-19 was a test on our urban environments and how they coped and provided for a local life. The National Association of City Transportation Officials published a document soon after New Zealand's lockdown that presented guidelines for the design of streets through the perspective of a pandemic response. The document acknowledges the radical change to how people went about their daily life; it focuses on the small-scale, temporary quick-fixes that cities needed to assist recovery from the economic and social impacts that lockdown had on communities (NACTO, 2020). Despite this document being about surface level intervention, it is appropriate in indicating that as we recover we need to align with design responses that represent a resilient future. "As we recover, we must continue to align street design and recovery strategies to ensure that the existing inequalities and challenges that this virus is magnifying are not exacerbated in the world we build in the months and years to come" (NACTO, 2020, p. 3). NACTO also identifies that cities may need to re-evaluate their walking and cycling networks as there has been a global increase in active ridership (NACTO, 2020). From a public health perspective, NACTO (2020) discusses the need for safe outdoor spaces and amenities to

provide healthy, sustainable and resilient communities under city leaders and organisational power to embrace the need for lasting change during this unprecedented time.

## 2.8 Literature review conclusion

The literature review covers four areas of discussion that will provide a theoretical platform for the rest of this research. Firstly, the literature acknowledges active modes as an increasingly important transport method in an urban future. In support of this, the benefits are identified as well as the current status of walking and cycling in Auckland's urban form. Thereafter, looks at the rise of the automobile and the impact that this has had on urban development and commuting patterns in Auckland. Contrary to this, compact cities are discussed as an effective method of incorporating and stimulating the public to walk and cycle through physical environments. The application of a Covid-19 response is then discussed in terms of movement patterns and the ability to 'live local' which preempted the growing need to plan and design for resilient and sustainable futures.

## 3.0 Methodology

### 3.1 Research Design

In support of the research question, a two-phase research strategy was adopted. Phase one consists of a desktop evaluation of historical transport policy, statistical funding and investment information and supporting theoretical ideas that sets foundations for the report (Chapter 2). This chapter sought to identify the platform that Auckland's transport planning sits on and provide understanding into the creation of the urban form we have today. The second phase will comprise a case study within the Auckland context being Hobsonville Point. The inclusion of this case study will provide understanding of Auckland's intentions to develop resilient communities yet present different urban outcomes (Chapter 6). The research will undertake a qualitative analysis which will be supported and understood through deeper analysis of quantitative data.

### 3.2 Secondary Desktop Research

This dimension will contribute significantly to expand the knowledge of Auckland's challenges of active transport and its relation to urban form. The information gathered within this dimension is

generally collected and summarised for other purposes. Andranovich & Riposa (1993) identify that evaluation of the findings, followed by a configuration of ways for the research to answer your research questions, is required in a secondary desktop research methodology. The secondary research gathered can be categorised into scholarly literature and in a more raw and recent form, websites and forums. The purpose of this is to grasp the theories within scholarly literature and apply them to current projects and practices to create a live body of work. Main findings from desktop research will be urban design aspects and qualities that will be of relevance to active transport in Auckland and the influence that historical plans and policies had on today's current urban form.

### 3.3 Auckland's Regulatory Framework

An assessment was undertaken of relevant transport documents within Auckland's framework to evaluate if current planning and design processes and strategies provide support or hinder the access to walking and cycling as a transport method. Within these documents, it was not just the position of walking and cycling, but also, the conditions of the urban form and whether documents support aspects that will provide increased walking and cycling opportunities.

### 3.4 Case Study Selection Criteria

Case studies as a theoretical framework have been verified by Yin (1981) to be a valid method of research for innovative and ambitious projects. Case studies will serve in this research to shift the project from a descriptive fantasy to be a descriptive and well-rounded report. Within this phase of the dissertation, there were challenges in terms of finding adequate cases. Due to the nature of the research, the discussion is around a city-wide issue (Rowley, 2002). Therefore, case studies that provide understanding of a resilient community which support walking and cycling have not been undertaken under Auckland's planning and design frameworks. The focus of this selection was then shifted from providing a case study that exhibits resilience to one that intended to provide these outcomes yet has not been effective in achieving them.

This approach is able to provide a case study in the Auckland region that can directly inform the reader of contextual issues and bring the theoretical concepts discussed to the ground. It is

important to note that communities and urban outcomes are heavily inspired by local conditions which are undertaken in.

### 3.5 Limitations

Although the methodology aims to combat any limitations, there are some limitations within this research as a partially qualitative body. It is important to note that there are several limitations to this research. In regard to the limited time frame and scope of this research, it does not allow for an in-depth analysis on the funding and expenditure details within Auckland's transportation framework. For the purpose of this research, approximate categorised costs are appropriate and will be sufficient in providing for the purpose of this research to establish the main points and be an asset to discussion.

Additionally, there were limitations in the search for supportive case studies for this research. Although there are many international examples of cities of resilience and sustainability, this research discusses Auckland's inability to provide resilience due to embedded historical frameworks. Auckland was the only city to follow such initiative so intently and therefore other cities do not face the same challenges that Auckland City does. If international case studies of resilient communities were presented, it would provide examples that do not experience the same tensions and therefore impact the legitimacy of this report and its recommendations.

## 4.0 Auckland's Transportation Framework

### 4.1 1955 Master Transportation Plan

Auckland now finds itself in a difficult transport situation. A number of reports discuss Auckland as being a city with early automobile response by both building an urban motorway and improving inner city road movements (Haarhoff & Aitken Rose, 2016). The contention is that current Auckland transport debates are embedded in paradigms and proposals that have been inherited from the past (Mees & Dodson, 2001). Decisions to invest in the Auckland motorway system was one of the most extreme automobile oriented policies pursued by any major city between the 1950's to the 1980's (Haarhoff & Aitken Rose, 2016; Mees & Dodson, 2006). A Technical Committee constituted by predominantly the traffic engineer profession developed the 1955

Master Transportation Plan as a directional guide for future investment which since then has been the indicator of all development.

Gunder (2002) discusses the theoretical grounding of the 1955 Master Transportation Plan and its ties to a complex set of values embedded in American liberal material progress. This concept was based on the unquestioned value of growth being that unlimited land is only of worth if it is developed upon and 'materialised'. The personal car and motorways are exemplifications of American value-goals of material progress as well as the development of the engineering expertise. Mees and Dodson (2001) point to pictorial solutions within the 1955 Master Transportation Plan of clear freeways sleeved with car parking buildings in American cities as a powerful impression of policy intentions. In short, the Plan was adopting overseas responses and expertise into a local Auckland context; a global post world-war response promoted motorways as an alternative to rail (Gunder, 2002). In support of Gunder's identification of the Plan being a materialistic approach, he also indicates the intended high expenditure approach as a recommended \$14.7 million towards motorway and road related costs within the 1955 economic climate (Gunder, 2002).

The 1955 Master Transportation Plan was a pivot point in Auckland's approach to transport policy (Greater Auckland, 2011). Ideas of a balanced transport network were retracted and redirected towards a focus of building roads. The 1955 Master Transportation Plan is an influential policy that has since impacted the way our transport system has developed. The 1955 Master Transportation Plan has carried through to the modern day which pre-automobile policies were embodied, both institutionally and intellectually, to present pro-automobile dominance as 'normal' policy and a balanced transport option as the 'radical' alternative (Mees & Dodson, 2001). Drawing from author findings, the 1955 Master Transportation Plan presents intentions that have impacted and somewhat determined our transport planning and design motives. We now live in the shadows of the 1955 Master Transportation Plan; politically and personally with high levels of car reliance and ownership. Implications of these motives are social equity, low-density, urban sprawl, job distribution, dispersion and congestion, low-level amenity and most significant to this research, redundancy of active modes.

## 4.2 Auckland Regional Land Transport Plan (2018 - 2028)

The Regional Land Transport Plan is a 10-year plan that was created under the strategic direction of the Land Transport Management Act (2003) and Government Policy Statement on Land Transport (2019). As part of its intent, it provides an investment programme for transport in Auckland. The Plan is the legislative body that sets the region's land transport objectives, priorities and measures to achieve an overall vision of a *“move away from single-occupant vehicles as the dominant mode of travel, enabling public transport, walking and cycling to play a significant role in the transport system”* (Auckland Transport, Auckland Council, NZTA & Kiwirail, 2015, p. 6). Opportunities of active transport within Auckland are to manage population growth, improve prosperity and wellbeing, create greater diversity of social, cultural and economic opportunities and reduce negative impacts on the environment. It was announced within the document that these objectives would be supported by a \$28 billion package of transport investment. Guidelines of investment are categorised as *“significant improvement to be made public transport, including rapid transit, walking and cycling, network initiative to help address congestion, and support for greenfield and urban redevelopment”* (Auckland Transport, Auckland Council, NZTA & Kiwirail, 2015, p. 6). The plan will lead our city to growth without traffic congestion, easy access to employment and services, safe use of cars, walking and cycling, where there are travel choices which will not be of harm to our people or our environment.

## 4.3 Auckland Transport Design Manual and Road and Streets Framework.

The Auckland Transport Design Manual is a document developed through an integrated approach; to provide design guidance and engineering requirements that support the delivery and operation of transport projects (Auckland Transport, 2020). The Auckland Council document collates non-statutory documents through a principle based approach that provides design principles, engineering standards and specifications. The aim of this document is to manage our street networks to better reflect a range of *“modes, activities and functions on them”* (Auckland Transport, 2020a, p. 1). The Auckland Transport Design Manual combined with the Roads and Streets Framework provide guidance about Auckland Transport's requirements, design, construction and management of all road and street networks. The Transport Design Manual's flexible nature as a living document allows for continual updates that creates a document fit for

purpose reflecting best practice and an increased likelihood of being able to respond to current issues.

#### 4.4 Urban Streets and Road Design Guide

Additional to the previously discussed transport documents, the Urban Streets and Road Design Guide is another tier of the transport framework that focuses on planning and design at the street level. It is best described as a 21st century approach to assist design of communities that are more resilient, safer, greener and more enjoyable; responding to Auckland Transport's adoption of the Sustainability Framework and Roads and Streets Framework (Auckland Transport, 2020). This plan establishes that the *“goal in neighbourhood planning should be to create a network that makes walking, cycling and public transport the easiest and most appealing choices”* (Auckland Transport, 2019, p. 38). Supporting principles of neighbourhood design consider aspects of street network, walking as a priority, transport choice, integrated networks, networks of natural systems and the consideration of existing natural and built environments. This document provides information of differing transport catchments, neighbourhood structure and land use composition. Throughout the presented information are aspects that constitute urban resilience without explicit reference; these being, reduced travel distances, appropriate mix of land use, increased accessibility, increased densities and local employment.



**Figure 5: Acceptable Travel Times**



Source: Auckland Transport, 2019.

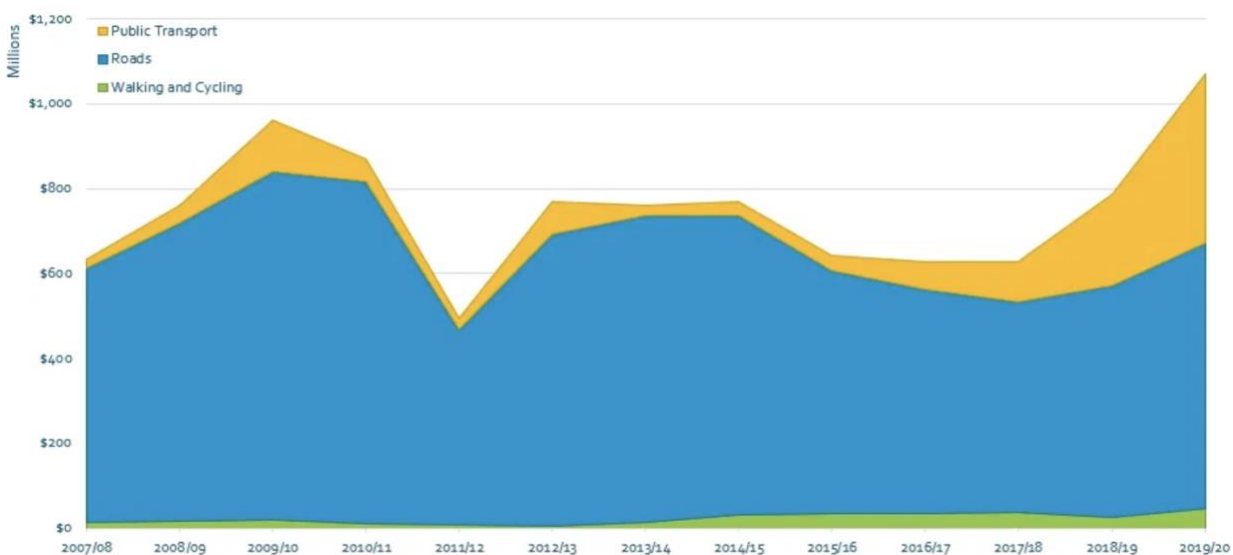
#### 4.5 Auckland's funding allocation

Motorways are strong arterials that are currently being used for short trips rather than long, occasional trips - in fact, we are now driving for everything. Modelling by Uber Newsroom (2001) highlights the true implication of high private vehicle ownership reporting trips at peak hour being up to 48% longer. Roads and transport infrastructure have a capacity which when at its saturation point there is no space for additional travel movements (Boulter, 2004). Boulter (2004) initiates the debate of the past which constitutes the argument of whether building roads helps to meet the demand or fuels it.

Funding allocation in this space is an indicator of the result of the past debate and the true weight of car-oriented beliefs in the transport sector. NZTA reveals the extent of this mindset with \$1.98

billion (excluding CRL) being allocated in the year of 2019/20 (Greater Auckland, 2020a). Just 2.3% of this is expenditure being allocated to walking and cycling construction and implementation of new and improved facilities. This equates to \$45,228,387 allocated to walking and cycling facilities (NZTA, 2020a). Over the last five financial years, the same conclusion can be made of road funding being considerably larger than walking and cycling funding. The funding shortfall means active methods cannot be delivered which interestingly Greater Auckland describes as the biggest disappointment in the Regional Land Transport Plan (Greater Auckland, 2018).

**Figure 6: New and Improved Infrastructure Spending in Auckland**



Source: Greater Auckland, 2020a

The automobile is now fundamentally embedded in the consciousness of the public and our social relations bringing about many benefits (Bean, Kearns & Collins, 2008). This statement is particularly accurate in the Auckland context with extremely high and rising rates of vehicle ownership and use, driving an all-time high in traffic congestion levels. Auckland is predominantly a car and motorway transport system with other transport modes being just ancillary to the extensive, high-speed network. Bean, Kearns & Collins (2008) note limitations within what Auckland can provide in terms of transport due to sprawling land uses meaning car ownership in Auckland is inevitable. The lengthy and monotonous motorways have created public perception of ‘driving places’ often experienced as ‘non-places’, yet there are particular meanings deeply woven into social relations and facilitation of social life (Auge, 1995; Arefi, 2004; Bean, Kearns & Collins, 2008).

## 4.6 Summary

The analysis of Auckland's appropriate planning and design documents develops the intention to support active transport across the region and promote sustainable transport methods as accessible options. The 21st century approach of the Urban Streets and Road Design Guide establishes clear areas that should be prioritised in Auckland's transport network. Currently, these principles and key moves are only conceptual; they require additional support and financial guidance to be implemented on the ground. Despite Auckland's strategic will, there are inconsistencies in the alignment of planning visions and urban form outcomes. It is clear from this analysis that funding allocations do not align with the intent of attractive road and street networks that support multi-modal transport for all users.

## 5.0 Case Study of Hobsonville Point

Hobsonville Point is a government-led housing initiative situated in Auckland on the former Hobsonville Airforce base at the western urban fringe of Auckland, neighbouring South Highway 18 (Haarhoff, Allen, Austin, Beattie & Boarin, 2019; Opit & Kearns, 2014). The site had a projected population of 10,000 people with 2000 jobs predominantly within the marine precinct. The original master plan was for 3000 dwellings which was then increased to a 4500 target. Hobsonville intended to provide services and amenity through establishment of schools, preschools, community facilities and services, recreational spaces and reserves. Opit & Kearns (2014) discuss that although other Auckland developments offer development density, Hobsonville's point of difference was its emphasis on sustainability and community. A sustainable community that went further than environmental considerations but to also encompass social, cultural and economic sustainability too. This community was about increasing housing density in the case of ever-increasing urban sprawl (Mehdi, 2017). Despite higher density living within Hobsonville Point of around two to three times a typical Auckland suburb, respondents of the area are satisfied with the amenity derived from the public spaces and facilities (Haarhoff, Allen, Austin, Beattie & Boarin, 2019). The satisfaction of Hobsonville was closely associated with the quality of the public realm and its concern with community well-being. Hobsonville Point development had intentions to prompt 2000 employment opportunities in the adjoining marine industrial facilities. Overall, this community promoted a vision that was 'a place to; live, learn, work, play and grow' (Mehdi, 2017).

Hobsonville Point's ambition to achieve resilience and sustainability is closely monitored and an annual report is produced by Homes Land Community. In 2018/19, 34% of residents in Hobsonville Point were employed locally or within 10km of their home and 47% of residents travel to work or study by private vehicle (Homes Land Community, 2018). These figures do not provide substance to support the case that Hobsonville is a sustainable and resilient community. Their current year goals are to promote active transport within Hobsonville (Homes Land Community, 2018). However, if Hobsonville provided the physical grounding of a resilient community through land-use options and concentration of services facilities and amenities, there should be no need to promote the use of active transport. The physical form should promote active transport as the most efficient transport option to the public. Being situated on the edge of the motorway, Hobsonville is a community that more effectively supports the use of the private vehicle due to its location and increased access opportunities. These statistics speak for the public willingness to use public or active modes. Perhaps, if Hobsonville Point development was delivered in a more resilient way, there would be less need to travel to the city and less demand for the private car due to proximity.

## 6.0 Discussion

Auckland's post world war urban growth has been characterised by chronic traffic congestion, widespread low-density development, automobile dependency, degrading air quality and spiraling infrastructure costs. These unsustainable urban qualities are set to have an increasing effect on Auckland in the future with a population projection of 1.66 million by the Auckland Plan 2050 (Auckland Council, 2018). In simple terms, the physical environment we live in cannot respond sustainably to growth measures; therefore, this report aims to seek changes to the fundamental aspects that will unlock the potential of walking and cycling in Auckland as part of a resilient future.

The transition from the Covid-19 lockdown back to what we now consider normal life has people reverting back to their usual, unsustainable transport habits. Within this transition, the inadequacy of active modes as a transport method is realised. During the lockdown periods, active modes occupied the streets due to reduced vehicle trips and traffic on the roads. Availability of transport infrastructure was increased during these periods for reasons that were enforced under Covid-19 lockdown guidelines; however, fall outside the scope of this report. Increased safety due to absence of large-scale transport modes meant active modes were able to operate without competition. This research appreciates the differentiation in nature of active mode use; Covid-19 promoted recreational use rather than transportation use. Covid-19 walking and cycling boom was solely recreational; however forms the point of discussion. The significance lies in the underlying attitudes of humanity; attitudes that are influenced by the physical environment. The public experience of recreational active modes in Auckland is much more attractive than those experiences provided by active modes as a transport method.

Within the weeks of Covid-19 lockdown, much of the world as we know it changed. Life was back to basics and movement patterns were only determined by the 'essentials'; the nation was encouraged to 'live local'. Auckland's response to this is bound by the NACTO document named 'Streets for Pandemic Response and Recovery' (NACTO, 2020). This document entails temporary small interventions and urban changes that are an integral part of our public health response. Although these are necessary for our continuing battle with Covid-19, these are provided to bridge the gap until a long-term response is found. Such response will entail an understanding of the foundations of Auckland's development and investigation into the more resistant aspects of the city, which successfully frames the intentions of this report.

In short, Auckland's issue is the conscious attention that plan and policy makers give to large-scale, 'big-ticket' infrastructural items. The attention is evidenced through the government's \$1.98 billion funding venture in 2019/20 towards new and improved infrastructure (Greater Auckland, 2020a). This raises the question of why are we investing this way if the result is an urban form that cannot support our changing needs? There is no simple answer for this; but rather, a complex theoretical and historical background of the 1950's that has influenced a way of thinking which has been fundamental to many planning decisions and design outcomes.

The 1955 Master Transportation Plan was developed to align with ideas of the American Liberal Material Progress which set intentions of high expenditure; generous budgets were recommended. This plan has become the pivot point in Auckland's approach to transportation policy. In fact, it has been ingrained into modern day attitudes with the continuation of pro-automobile policies which are institutionally and intellectually entrenched. Normal transport being car-oriented and balanced transport options as the radical alternative. The favour toward private vehicles has perpetuated into our way of thinking and is fed into governmental aspects being formulation of plans, policy and financial allocation which, in turn, has impacted our urban design. The concept of local living has been skewed and our localities contained within a regional scale requiring travel that only the private car can serve. This point goes further to discuss not just the plan as the pivot point of Auckland's approach; but rather, the set of ideas that formed the plan as the knowledge platform that all development is based off. This is attitudes that prioritise high expenditure, large-scale, big-ticket items.

Our current urban form presents us with low density housing which continues for approximately 1000km<sup>2</sup>. This outcome is a response to our expansive motorway network which only the private car is compatible with. If our urban fabric encourages the use of private vehicles, the public is not to blame. As established, our attitudes are still engrained in efficiency which in this environment, the most efficient transport form is the private car. Due to the accessibility provided by the motorways, services, amenities and facilities are not centralised and instead located sporadically throughout the region. Considering this, we now are reliant on the whole region to serve our needs. As Boulter (2004) suggested, this highly expensive and wasteful way of conducting our lives requires intervention.

The historically stimulated focus on large-scale infrastructure has dominated local level investment and funding resulting in communities that cannot provide a platform for sustainable

and resilient outcomes. Walking and cycling is unable to compete with motorways and their role in the region. Responses entail more than providing walking and cycling infrastructure; but rather, providing destinations of services and facilities, locally. If we are serious about moving toward a city that is resilient, 'living locally' should not just be a concept adopted at a time of a global pandemic but be an active part of our developing urban environment. In order to achieve this, Auckland must alter planning regimes and allow the monetary capacity for urban design to be present within local communities just as much as Auckland's CBD.

It is unreasonable to assume that the issue is solved and the public can serve their needs in the current urban form if interventions only provide walking and cycling infrastructure. Distances are too long, and human-powered modes cannot circumvent the same access opportunities that the private vehicle provides in Auckland's current urban fabric. Therefore, land-use, density and amenity outcomes should also be captured in the intent to support walking and cycling opportunities. Centralisation of land uses such as schools, services, facilities and more are just as significant as walkways and cycle lanes and therefore these constitute supporting infrastructure of walking and cycling. It is important to note that organisational power has informed our urban form through funding directions, therefore we note the potential opportunities that sit behind the decision makers. However, this issue requires prior steps before changing the approach of an investment strategy. The heart of the issue is the attitudes and way of thinking influenced by historical foundations.

This dissertation aims to be a reference for future development that supports decision making and funding allocation that will target long-term transport sustainability rather than 'quick-fix', small-scale, temporary investments. Auckland's future needs to strive for communities where 'living local' is not a Covid-specific phenomenon, but instead, a concept that becomes part of our daily lives. Therefore, this report raises the issue of funding and investment intentions and suggests a realignment of priorities in Auckland's agendas, from big-ticket infrastructure items to local communities, to support the city's vision of future resilience and create environments that will allow walking and cycling to adequately serve as a transport method. If funding were to shift to local environments, residents can rely on their own communities to serve their needs rather than the entire Auckland region. As a result, trip generation will be lower, traffic congestion will decrease, environmental impact will decrease, social equity and access opportunities will increase and we will be prepared and resilient against future change.

This research does not aim to inform plan, policy and regulatory recommendations; the intent of this report sits at the source of the problem and indicates the need to deviate from traditional transport planning and design agendas as they are detrimental to our progress into a resilient city and walking and cycling opportunities in Auckland. Thereafter, further research would be beneficial to discuss the guidelines and frameworks of expenditure into local communities and explore methods that will be of best practice to produce satisfactory urban outcomes that achieve urban resilience. There is also opportunity in researching how we can implement compact resilience communities on the existing, resistant urban form that we currently have.

## 7.0 Conclusion

This research aims to enrich academic data of the need to develop, livable, resilient communities as we are preparing for a future of increasing population growth, climate change, traffic congestion and greater health risk. Drawing from an extensive literature review, the case study of Hobsonville Point and Auckland's current transportation patterns, it is clear that for Auckland to transition into a resilient city to support walking and cycling, there are strong traditional attitudes to shift and overcome. Considering Auckland's current transportation regimes, approaches to assist the goals of a resilient city will have to stray from our ordinary planning and design methods which we are historically tied and accustomed to.

As discussed, the intention of this research is not to find a solution or design intervention that will enable Auckland to be a resilient city, but instead explore the current inherent barriers of walking and cycling in Auckland. This research has provided a historical, theoretical and conceptual platform to understanding the logic behind current transport regimes and the impact that these have had on Auckland's travel patterns.

Active transport and the need for a resilient future is not a new concept but one that has been brought back to life in light of the COVID-19 pandemic. 'Living local' was a phenomenon that Auckland adopted during the recent global public health crisis; a concept that we were not at all familiar with. Despite being a term attached to Covid-19, the appropriateness of the underlying aspects extends beyond just health benefits; these being, shorter travel distance, condensed public amenities, increased access, social equity, many of which would support walking and cycling. Auckland's past transportation trajectories have recognised the elements of local living as aspects they need to respond to, however, these have not been successful in being transferred into Auckland's physical urban form.



Amidst the small-scale, quick-fix initiatives that encourage walking and cycling, there needs to be foundational transitions and adjustments to Auckland's transport planning framework that will allow an urban form to support resilient liveable communities. The one inherent barrier to walking and cycling in Auckland is funding allocation; money is the enabler of change and if it is not provided, change is not possible. It is worth studying the extraordinary minimal active transport usage before embarking on another cycle of financially and environmentally expensive road building. If the city is serious about providing a resilient future, funding strategies need to be adjusted to provide for not just walking and cycling infrastructure, but also local investment, to establish elements that will support an active modal shift. The catalyst of this change lies within challenging intellectually and institutionally embedded ideas of the past to make room for the acceptance of proposed ideas and for them to be better facilitated. Organisational leaders must be open to innovation, change and challenge the status quo. This is the primary step in breaking down the inherent funding barriers to achieving a resilient urban form that will unlock the full potential of walking and cycling in Auckland, Tamaki Makaurau.

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