The Impacts of Minimum Parking Requirements on Land Use Efficiency and the Viability of Alternative Parking Policies in Auckland

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Abstract

Minimum parking requirements are a planning rule that specifies the minimum amount of off-street parking a new land use or a change of land use must provide. While this rule aims to prevent the spillover of excess parking onto on-street car parks, extensive research overseas has demonstrated that it causes negative unintended consequences. These include an oversupply of off-street parking, high opportunity costs and inflated expenses for developers, tenants, homebuyers and consumers. Auckland’s District Plans also adopt minimum parking requirements and their effects on land use should be assessed to see whether similar negative consequences exist.

Therefore, this study aims to determine the impacts of minimum parking requirements on land use efficiency and the viability of alternative parking policies in Auckland. The use of Geographic Information Systems (GIS) analysis calculated the land area used for non-residential off-street surface parking in 1996 and 2006 in West Auckland in comparison with population and vehicle access statistics. Moreover, the interviewing of professionals with parking policy expertise provided specialist opinions on minimum parking requirements’ effects on Auckland’s land use and the alternative policies that could replace them.

The GIS analysis’ findings showed a high quantity of off-street parking in relation to the resident and worker populations and the number of cars available to households in the GIS Study Area. There was also agreement among the parking policy experts that minimum parking requirements inhibited productive land development in Auckland, are costly to comply with and are inadequate at supplying an optimal amount of off-street parking that reflects demand. Given these results, it is necessary to implement other policies that avoid the default provision of parking. It is therefore recommended that Auckland implements a framework of no parking requirements with accessory regulation like maximum parking requirements in its city centre and metropolitan centres. The use of shared parking and fiscal mechanisms may also reduce off-street parking supply and internalise the costs of excess parking. Auckland Council is considering adopting some of these alternatives in their Draft Unitary Plan and future research should assess their effects on land use. Other local authorities in New Zealand could also replicate this study to ascertain whether the impacts of minimum parking requirements in Auckland are present within their jurisdictions.
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<th>Description</th>
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<tbody>
<tr>
<td>CBD</td>
<td>Central Business District</td>
</tr>
<tr>
<td>GIS</td>
<td>Geographic Information Systems</td>
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<tr>
<td>MAUP</td>
<td>Modifiable Areal Unit Problem</td>
</tr>
<tr>
<td>MP</td>
<td>Member of Parliament</td>
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<tr>
<td>RMA</td>
<td>Resource Management Act 1991</td>
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<tr>
<td>UK</td>
<td>United Kingdom</td>
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<td>USA</td>
<td>United States of America</td>
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1 Introduction

Off-street parking has become an essential part of urban living as city dwellers rely on cars for their daily travel. Without a space to park, it would not be practical to own a car and thus off-street parking has become a dominant component of the urban landscape (Davis et al., 2010; Litman, 2011). However, this dominance comes with its negative effects because land dedicated to off-street parking has high opportunity costs (Litman, 2011). The same land could have been used for other purposes such as housing, green space or commercial activities which may be more productive (McDonnell, Madar & Been, 2011). Consequently, even the parking at supermarkets or at office buildings that are purported to be free is not actually free because of the opportunity costs, which will be recouped at the expense of the consumer.

Planning academics have often cited the use of minimum parking requirements as a policy that is responsible for the high costs associated with off-street parking (Shoup, 2005). Minimum parking requirements are rules in a municipality’s planning law (e.g. a District Plan in New Zealand) that stipulate the minimum amount of parking a developer must provide for a particular land use. For example, one car park per 10 m² of a café’s floor space or one car park per employee at an office site. In addition to the opportunity costs of parking, compliance with these regulations also incurs costs because developers may have to provide more parking than necessary or go through a resource consent application in the case of non-compliance (Shoup, 2005). The remainder of this Chapter will outline the overseas historical context of minimum parking requirements, its problems and alternatives to this parking policy. This outline guides the establishment of the research aims and questions for this study in New Zealand, which features in Section 1.2 of this Chapter.
1.1 Research Context

The use of minimum parking requirements in urban areas dates back to the 1930s, which coincided with the proliferation of cars in American cities such as Los Angeles and New York (Ferguson, 2003). Minimum parking requirements arose from a desire by planning officials to provide sufficient free off-street parking to satisfy demand at isolated peak demand events so that parking shortages can be avoided (Shoup, 2005). However, Shoup (1997) and van Ommeren and Wentink (2012) assert that this approach is flawed because a minimum parking requirement is often based on the demand for free parking. The parking demand therefore does not reflect actual demand if the parking came as a cost, as most services do in a market-based economy (Barter, 2010; Shoup, 1995). As such, minimum parking requirements that exist in planning documents are usually artificially inflated, which forces developers to supply a quantity of off-street parking that exceeds demand (Shoup, 2005). Furthermore, studies overseas have shown that because local authorities formulate minimum parking requirements based on exceptional peak demand events, off-street car parks are rarely saturated and represent a waste of urban land (Davis et al., 2010).

With an inflated demand for parking, it is necessary to dedicate large areas of land to off-street parking, which may not be the most productive use of urban land. Overseas, this has led to problems such as elevated housing costs, land scarcity for urban dwellings, urban sprawl and the reduction of urban green space (Litman, 2011). Moreover, the excess provision of subsidised parking promotes car dependence at the expense of alternative transport modes, which further contributes to traffic congestion and parking shortages (Willson, 1995). Planning academics have also highlighted the issue of minimum parking requirements threatening the adaptive reuse of heritage buildings. Many historic buildings were constructed before the era of the car, which means they are usually incapable of adhering to minimum parking requirements (Mukhija & Shoup, 2006). Those buildings that cannot meet the requirements are often left in a state of dilapidation or are demolished to provide space for new buildings (Mukhija & Shoup, 2006).

The problems with minimum parking requirements outlined above have compelled planning officials and academics to devise alternatives to this parking policy. Cities overseas have implemented measures such as maximum parking requirements, the removal of all parking requirements and the promotion of shared public parking.
instead of private car parks (Barter, 2010; Engel-Yan & Passmore, 2010; Willson, 1995). Moreover, they have used fiscal mechanisms such as parking taxation and the opportunity to pay an infrastructure contribution fee instead of complying with a minimum parking requirement (Feitelson & Rotem, 2004; Shoup, 1999a; van Ommeren & Wentink, 2012). These alternative parking policies have the ultimate aim of freeing up more urban land for other uses, unbundling the cost of providing parking from construction and rental costs and ensuring that cities are not dominated by cars and off-street car parks.

The literature on the implications of minimum parking requirements and alternative parking strategies is based on overseas settings and there has been scant research performed in New Zealand cities. This study will therefore aim to ascertain whether the same problems are present in New Zealand and whether the alternative policies in the literature will function effectively in New Zealand. With this in mind, the research aims and questions in the following Section have been developed to fill the literature gap on minimum parking requirements in New Zealand.

1.2 Research Aims and Questions

It is beyond the scope of this thesis to determine whether all the problems associated with minimum parking requirements overseas are applicable to New Zealand cities with the same parking policy. As such, the thesis’ scope will focus on determining the impacts of minimum parking requirements on land use efficiency and the alternative parking policies that can replace them. The author will effectuate the research in Auckland because its population and area are similar to those of the overseas cities in the literature on minimum parking requirements. Moreover, Auckland is undergoing a review of its off-street parking rules in its Draft Unitary Plan, which provides a useful backdrop for the research of alternative parking policies.

One aim of the research will examine the implications of minimum parking requirements on land use efficiency in Auckland. The other aim of the research is to determine the viability of alternative parking strategies used overseas in Auckland. This aim would be particularly pertinent if the first part of the study discovered that minimum parking requirements were responsible for inefficient land use in Auckland. Even if this was not the case, the determination of viable alternative parking strategies could enable Auckland’s planning officials to implement a wider range of parking policies. This permits greater flexibility in terms of altering a
parking policy according to the local context of a particular area of a city. To realise these aims, this study will answer the following questions:

1) What are the impacts of minimum parking requirements on land use efficiency in Auckland and is there an oversupply of off-street parking?
2) What parking policies can be used as alternatives to minimum parking requirements in Auckland and will they be viable?

By answering the first research question, this study will test the underlying proposition in the literature that minimum parking requirements cause the waste of valuable urban land and incur consequent high opportunity costs. If this is the case, parking policies must change to ensure that land is used efficiently by not forcing a supply of off-street parking that is surplus to requirements. As such, the author will also investigate the suitability of alternative parking policies in Auckland to answer the second research question. The responses of the second research question, combined with overseas case studies, will determine the viability of alternative parking policies in Auckland. This study’s findings will contribute to the literature and planning practice in New Zealand by demonstrating the extent to which minimum parking requirements cause inefficient land use and by proposing feasible alternative parking strategies. Auckland Council could heed the findings in this study and use them to reform their parking policy, with the ultimate goal of improving the efficiency of land use and reducing costs for stakeholders such as developers and tenants. Other local authorities could also replicate this study to ascertain whether the land use inefficiency problems that afflict overseas cities because of minimum parking requirements are present within their jurisdictions.

1.3 Thesis Structure

This Chapter has explained the research problem and detailed the research aims and questions that define this study's purpose. The subsequent Chapter contains the Literature Review, which will analyse and critique the current and historic bodies of knowledge on minimum parking requirements and parking policy. In particular, the Literature Review Chapter will provide a historical overview of minimum parking requirements and their justification and examine the land use efficiency implications of this planning rule. It will also evaluate the merits of alternative parking policies that have been implemented overseas and that possess potential applicability to Auckland by using a typology. The mixed methods methodology that this study
utilises will be explained in Chapter Three, with accompanying justifications and limitations. Chapter Four follows the Methodology Chapter and will provide a contextual background to Auckland’s geography, while Chapter Five will critique its legislative and planning frameworks. The impacts of minimum parking requirements on land use efficiency will be assessed in Chapter Six, while Chapter Seven will explore the alternative parking policies that are viable in Auckland. The conclusion of this thesis is in Chapter Eight, which will summarise the totality of this study and suggest opportunities for future research.
2 Literature Review

2.1 Introduction

A critical analysis of the literature on minimum parking requirements and alternative parking policies is essential. This is because it provides a profound insight into the historical and current debates about the merits and disadvantages of various parking policies. As this literature review will show, the historical ubiquitous acceptance of minimum parking requirements has changed considerably to a position where there is a cloud of doubt over the policy. The academic sources used in this Chapter are principally peer-reviewed articles on minimum parking requirements and parking policies in overseas cities. These articles have their origins not only in the domains of land use planning and transport policy, but also in economics, engineering and housing policy. This Chapter will commence with a history of minimum parking requirements and the reasons for its genesis. It will be followed by a review of minimum parking requirements’ effects on land use efficiency and its financial costs. An analysis of parking policies that function as alternatives to minimum parking requirements will conclude this Chapter.

2.2 History of Minimum Parking Requirements

As mentioned in Chapter One, minimum parking requirements are a planning rule that specifies the minimum quantity of parking a developer must supply for specific land uses. They first appeared as part of zoning ordinances in American cities during the 1930s to 1940s to coincide with the expansion of the car as the primary transport mode (Ferguson, 2003). As cars became even more popular with American citizens after World War II, the use of minimum parking requirements in zoning rules became the norm in the United States of America (USA) (Jakle & Sculle, 2004). This American invention inevitably spread to other countries in which driving a vehicle was part of daily life. As Brierley (1972, p. 308) asserts, “[t]raffic is the life blood of a modern city”. Thus, “we must plan for the motor vehicle to be used in our cities, our towns, our villages and in the countryside. It is fundamental to our planning that we accept the motor vehicle as a beneficial invention with an assured future” (Brierley, 1972, p. 22). Even today, the form that minimum parking requirements take remains unchanged. The reasons behind the ubiquitous acceptance of minimum parking
standards in the American context in such a small timeframe need to be elucidated to explain why it was so popular and what has changed since then.

2.2.1 Creation

Minimum parking requirements were initially necessary in the early 20\textsuperscript{th} century because American cities like Chicago and Los Angeles prohibited on-street parking in their city centres as a means to improve traffic flow and road safety (Ferguson, 2003). American cities were plagued by traffic congestion during this time, which caused an exodus of businesses and offices to suburban areas where there was less traffic congestion and more parking (Ferguson, 2003; Jakle & Sculle, 2004). Consequently, the downtown areas of American cities suffered a loss of commercial activity, experienced declines in property values and corresponding decreases in tax revenue for local authorities (Jakle & Sculle, 2004). Thus, off-street parking solutions were popular with planning officials and citizens because they believed the solutions could revitalise American city centres and ease traffic congestion and parking supply problems (Ferguson, 2003; Jakle & Sculle, 2004).

Longstreth (1997) reports that the initial five car parks in Los Angeles’ downtown in 1915 quickly expanded to 40 in 1920 and subsequently to over 100 in 1925. It is therefore no surprise that over 95 per cent of American cities adopted off-street minimum parking requirements into their zoning rules by 1969 (Ferguson, 2004). The use of minimum parking requirements spread beyond the American city centre in the 1950s and was incorporated into a diverse range of land uses. For example, activities such as hotels, cinemas and funeral parlours had to comply with their designated parking standard in New York in 1950 and in Chicago in 1954 (Ferguson, 2003, 2004). Minimum parking requirements from this era had a common form and will be examined in the next Sub-Section.

2.2.2 Historical and Current Form

The most basic minimum parking requirements adopted by American cities in the 20\textsuperscript{th} century were determined spatially and numerically. Ferguson (2004) explains that requirements were mainly based on land use categories and units of measurement so that planning officials could estimate an appropriate amount of parking for each land use. This methodology remains the same today with cities in New Zealand and elsewhere.
The number of land use categories to which minimum parking requirements were applicable was initially small in the 1950s but has expanded to the extent that there are minimum parking requirements for every land use imaginable (Ferguson, 2004; Shoup, 2005). For example, in the USA, not only do typical land uses such as retail, restaurants or offices have a minimum parking requirement, but trivial ones such as pet cemeteries, sex novelty shops and diet clinics are subject to a requirement too (Shoup, 2005). The proliferation of land use categories is evidently unmanageable and may be a reflection of the inaptitude of minimum parking requirements in modern urban environments.

Despite the intractability of minimum parking requirements, they were still promoted outside of the USA in countries such as the United Kingdom (UK). For example, the Town and Country Planning Act 1962 in the UK gave local planning authorities the power to compel developers to make a contribution to the provision of adequate parking in a neighbourhood of new developments (Brierley, 1972). There was a sympathetic attitude to enforced parking supply in the UK as highlighted by these quotes: “[t]raffic which needs to be stationary should as far as possible be provided with off-street parking facilities...” (Brierley, 1972, p. 308) and “[t]he ideal size for a car park is about 500-700 car capacity and if distributed round the central business area in proportion to the demand the walking distance should not be unreasonable” (Brierley, 1972, p. 28). Thus, it is no surprise that minimum parking requirements were a legal requirement in the UK given the favourable stance towards this planning rule.

The other factor that historically determined minimum parking requirements is measurement units. According to Ferguson (2004), there existed three types of units; supply-side, demand-side or spatial, which remain in planning documents today. Minimum parking requirements which focus on supply set the number of parking spaces according to the amount of a product or service a land use can provide (Ferguson, 2004). For example, one car park per hotel room or one car park per four seats in a stadium. Demand-side requirements are determined by the number of people who are likely to frequent a land use (Ferguson, 2004). This could be the number of employees in an office or the number of patients at a medical clinic. Finally, minimum parking requirements based on spatial extents are determined by the area of a land use (Ferguson, 2004). For instance, one car park per 15 m² of gross floor area.
New Zealand’s current planning framework also embodies these three methods of determining minimum parking requirements in its district plans. This reflects an influence from s 79 of the Town and Country Planning Act 1977, New Zealand’s former planning legislation, which gave district schemes the power to stipulate minimum parking requirements. According to Miller (1998) and Miller (2011), the defunct Town and Country Planning Act 1977 drew influence from its British counterparts, which explains why New Zealand’s current and historical parking provisions are similar to those of the aforementioned Town and Country Planning Act 1962.

2.3 Justifications for Minimum Parking Requirements and Counterarguments

Studies undertaken in cities overseas reveal a set of common justifications that local authorities provide when explaining why they use minimum parking requirements. These justifications often relate to a fear of not supplying enough off-street parking and an assumption that a high supply of off-street parking can increase demand for commercial activity (Barter, 2010). Critics of these justifications argue that the fear of too little off-street parking is irrational and that if off-street parking is provided free, there will always be high demand (Shoup, 2005). Thus, opponents of minimum parking requirements argue that the use of this policy creates a self-perpetuating cycle of high demand for parking, which will be illuminated in Sub-Section 2.5.3. The justifications and counterarguments provided in the following paragraphs aim to give a balanced view on minimum parking requirements.

The first common justification for minimum parking requirements is that certain land uses may attract high parking demand and if there was insufficient off-street parking, there would be parking spillover onto nearby residential on-street car parks (Willson, 1995). A spillover of parking would be of nuisance to residents because non-residential car users may exhaust their allocated parking. According to proponents of minimum parking requirements, another negative externality of having insufficient off-street parking is traffic congestion because drivers will have to spend more time roaming streets to locate a car park (Willson, 1995).

However, as van Ommeren and Wentink (2012) highlight, this problem can easily be solved if residential on-street parking near the city centre is priced through metering or permitting. This already occurs in the parts of major cities of New Zealand such as
Dunedin, Wellington and Auckland. Thus, residential on-street parking becomes less attractive for drivers travelling to city centres and the negative externality of parking spillover should theoretically not occur.

Partisans of minimum parking requirements assert that the requirements are necessary to ensure commercial developments are viable. Without a large quantity of off-street parking, retail centres such as malls would not be capable of attracting a sufficient amount of customers (Willson, 1995). Consequently, to engender and maintain vibrancy in retail areas, local authorities will oblige developers to supply a minimum amount of off-street parking that comfortably caters to the number of customers that future businesses could attract.

To counter this argument, opponents of minimum parking requirements argue that without regulation, developers would have no incentive to provide large amounts of parking due to high development and opportunity costs (Willson, 1995). In fact, a wide range of authors such as Shoup (1999b), Cutler and Parfitt (2011) and McDonnell et al. (2011) affirm that minimum parking requirements are such a financial burden for developers that developments have been abandoned due to high compliance costs. This is because a rational developer would only provide an optimal amount of parking that incurs the least cost. Furthermore, if developers are forced to provide too much parking, they could simply pass the extra cost onto tenants and consumers (Shoup, 1999b). From the opponents’ perspective, the argument that providing a large amount of off-street parking is necessary for commercial viability is a fallacy.

The antithesis of the previous argument is that if there were no minimum parking requirements, developers would supply a sub-optimal amount of parking to economise on development costs (Barter, 2010; Feitelson & Rotem, 2004). However, this assertion is also flawed because it would not be economically rational for developers to provide too little parking. If there was a dearth of parking and no other viable transport means, no businesses would rent or purchase properties from the developer because business opportunities would be limited. As such, it is not in a developer’s best interests to provide parking below market demand if no other means of transport are available.

Planning officials in favour of minimum parking requirements insist that they are necessary to deal with peak parking demand events that occur periodically
throughout the year (Davis et al., 2010). These occasions include Christmas, Boxing Day and major cultural and sporting shows. Because these events potentially draw a large number of vehicles to retail areas, local authorities set a minimum parking requirement that is considerably higher than what the typical parking demand requires (Davis et al., 2010). In doing so, the possibility of having insufficient parking for the masses of Christmas and Boxing Day shoppers and sports events and concert attendees is significantly reduced. Moreover, local authorities do not want to be blamed for permitting developments that subsequently produce parking spillover and will therefore encourage the provision of surplus off-street parking (Shoup, 2005).

Despite the good intentions of local authorities to provide adequate parking for extremely busy occasions, the implementation of high minimum parking requirements fails to take into account the lower patronage of car parks during the remainder of the year. As such, it often leads to the sight of empty car parks in urban environments which is neither aesthetically pleasing nor the best use of urban land (Davis et al., 2010). In fact, a study in an urban county in Indiana, USA showed that the spatial coverage of off-street car parks equated to around 83,000 empty car parks even if all the registered cars in the county parked in an off-street car park simultaneously (Davis et al., 2010). The results from this study alone indicate the flaws associated with providing off-street parking based on isolated peak demand events.

The final common reasoning behind the use of minimum parking requirements is that it can accommodate for future changes in land uses that may necessitate more off-street parking than the demand of the current land use (Willson, 1995). Using minimum parking requirements to provide a large amount of parking in the present is deemed to be sensible because it is usually structurally difficult to add more off-street parking after a building is constructed or renovated (Willson, 1995). In essence, minimum parking requirement advocates would claim that this policy future-proofs newly constructed buildings. However, increasing off-street parking provision can also cause the demolition of heritage buildings due to their physical inability to accommodate supplementary off-street parking (Mukhija & Shoup, 2006). Thus, the detraction of a city’s historic character can be a consequence of enforced off-street parking provision, which negates the benefit of future-proofing a building (Mukhija & Shoup, 2006).
2.4 Minimum Parking Requirements Today

The planning and transportation literature on modern parking policy indicates that minimum parking requirements are no longer confined to the American context and that this practice has spread to other parts of North America, Asia as well as New Zealand. Though the setting has changed, it is evident from the literature that the problems that have plagued American cities with minimum parking requirements have transferred themselves across geographic boundaries. The following Sub-Section will critically examine the use of minimum parking requirements in a global context as well as the consequent problems that have emerged.

2.4.1 The Global Use Of Minimum Parking Requirements

The Middle East is a region in which minimum parking requirements are prevalent due to increased car ownership rates and population growth in its biggest cities (Al-Fouzan, 2012; Shathawi, 2010). Al-Fouzan (2012) reports that minimum parking requirements are systemic in Saudi Arabia but they differ from the American model because they do not reflect different land uses or population densities. As such, their parking requirements are not linked to a zoning system and are homogenised for all sizes of cities across Saudi Arabia (Al-Fouzan, 2012). The obvious consequence of this standardised system is that a greater amount of urban land is devoted to off-street parking because there is no mechanism to constrain or vary the quantity of parking provision. It is therefore not surprising to see that in Jeddah, Saudi Arabia’s second largest city, around 40 per cent of land occupied by land uses is dedicated to off-street parking (Al-Fouzan, 2012). The reason behind this excessive use of land by car parks is that there is a lack of coordination between the planning authorities in charge of transport and those responsible for land use (Al-Fouzan, 2012). The disunity between these entities will mean that inefficient land use in Saudi Arabia will be perpetuated. Al-Fouzan (2012) argues alternative parking policies such as maximum parking requirements should be adopted in Saudi Arabia to reverse the trend of high land consumption caused by minimum parking requirements. The merits of this alternative policy will be discussed in Section 2.6 of this literature review.

In Southeast and East Asian cities where car ownership rates are low, it is surprising that minimum parking requirements are quite extensive in the region (Barter, 2012). However, the requirements are heterogeneous across Southeast and East Asia. For
example, the minimum parking requirements of the more affluent cities of Hong Kong, Singapore and Tokyo are the lowest in the region (Barter, 2012). This is possibly because the advanced public transport systems in these cities render driving and parking a less convenient transport mode. There is therefore room to adjust or remove minimum parking requirements according to a site’s proximity to a public transport connection. On the other hand, Southeast Asian cities that are less wealthy such as Bangkok and Jakarta have the highest parking requirements (Barter, 2012). An explanation of this phenomenon is that these cities have the highest car ownership rates per 1000 people across Southeast and East Asia (Barter, 2012). There may therefore be a positive correlation between the provision of off-street parking and car ownership. Reforms of parking policy may consequently have flow-on effects on citizens’ travel behaviour and choice.

In Toronto, where over 1000 office and retail sites were studied, it was found the majority of office and retail sites supplied less parking than the stipulated minimum parking requirement through the issuance of zoning variances (Engel-Yan, Hollingworth & Anderson, 2007). However, most large retail sites such as supermarkets and big box retail stores had car parks that exceeded the minimum parking requirement (Engel-Yan et al., 2007). The fact that developers either supplied parking that was less than or over the local minimum parking requirement suggests adjustments to this mechanism may not necessarily change the amount of space dedicated to parking. Consequently, if it is desirable to reduce parking supply at new developments, Engel-Yan et al. (2007) advise that maximum parking standards may have to be imposed at the same time as minimum parking requirements. The findings from Engel-Yan et al. (2007) also suggest that developers are best placed to determine the appropriate off-street parking quantity for their land uses, rather than by local authorities through minimum parking requirements.

Locally, minimum parking requirements in New Zealand currently exist in cities such as Dunedin, Porirua, Hamilton and Auckland (Cutler & Parfitt, 2011; Hulme-Moir, 2010; MacArthur, 2010). The standards are similar to those described earlier in the American context because they outline the number of car parks required for a certain floor space area. For example, the Auckland City Council Isthmus Plan, which covers most of central Auckland except for the Central Business District (CBD), requires one car park per 10 m² for cafés (Auckland City Council, 1999b; MacArthur, 2010). The views from New Zealand planning practitioners and academics are similar to the arguments against minimum parking requirements from the USA. It is claimed that
minimum parking requirements in New Zealand cities reduce a site’s development potential, promote car dependence, elevate costs for developers, businesses and consumers and waste valuable urban land (Cutler & Parfitt, 2011; MacArthur, 2010). The following Section will review the problems that minimum parking requirements cause in a mainly overseas context. It will consequently enable the author to assess whether the same issues occur in Auckland to address the first research question of this study.

2.5 Problems Linked to Minimum Parking Requirements

2.5.1 Land Use Inefficiency Problems

The overestimation of the off-street parking required for land uses in the cities mentioned previously has obvious implications for land use efficiency. If an excessive amount of urban space is devoted to parking, the space has high opportunity costs because it could have been used for more productive uses such as urban housing, green space or commercial developments (McDonnell et al., 2011). Consequently, an oversupply of parking creates inefficiencies in urban land use. According to Shoup (1995), the fact that minimum parking requirements are based on the demand for free parking also creates land use inefficiencies. This is because free parking makes driving to different land uses more attractive than a user-pays environment and thus, more land is required to provide for an inflated parking demand (Shoup, 1997; van Ommeren & Wentink, 2012). If off-street parking was priced like most services in a market-based economy, then one would expect parking demand to drop, which means less urban land is needed for parking and land use becomes more efficient.

These arguments are supported by studies by Willson (1995), which found that peak parking demand at office sites in California only saturated 56 per cent of the parking capacity. Another study by Davis et al. (2010) showed that off-street car parks created by minimum parking requirements in an urban county in Indiana consumed so much land that the spatial coverage of car parks was 1.7 times the space required by registered vehicles in the county. Furthermore, in Hamilton, New Zealand, it was found that only 20 per cent of the total allowable floor area ratio of the city’s commercial service zone (next to the Central Business District) could be used once the city’s minimum parking requirement was enforced (Cutler & Parfitt, 2011).

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1 The ratio of a building’s gross floor area to the area of the land on which it is constructed.
Although the two previous studies did not assess the value and economic potential of the land for off-street parking scarcely occupied by cars, one can infer that the evident land wastage has high opportunity costs and could have been used for other purposes.

In a study of the effects of London’s abolition of minimum parking requirements in 2004 on off-street residential parking supply, Guo and Ren (2013) discovered that parking supply was reduced by around 40 per cent because of the reform. Their study attributed 98 per cent of the reduction to the removal of the city’s minimum parking requirement, while two per cent of the decline was caused by the implementation of maximum parking requirements that succeeded the former policy (Guo & Ren, 2013). This study infers that in the pre-2004 London scenario of having minimum parking requirements but no maximum requirements, most residential developments did not supply more car parks than the stipulated standard (Guo & Ren, 2013). Conversely, in the post-2004 situation in which there is a maximum parking requirement but no minimum requirement, most residential developments are providing less parking than the maximum standard (Guo & Ren, 2013). One can deduce from these findings that in the case of residential development in London, developers were forced to provide more parking than necessary before 2004 and that the current maximum requirements are not stifling the provision of parking that satisfies actual demand.

Minimum parking requirements are also responsible for increasing land consumption and lowering site density (Cutter & Franco, 2012). These effects have obvious repercussions on urban form because a sprawling form usually typifies a city that uses large amounts of land. Litman (2011) explains that a major contributor to urban sprawl is the construction of big car parks that accompany large developments such as retail parks, supermarkets and industrial parks. By increasing land consumption and allowing sprawl through minimum parking requirements, local authorities are imposing increased costs on themselves because they have to provide utilities and infrastructure to a city’s periphery (Litman, 2011). Furthermore, the land use inefficiency caused by sprawl increases costs for consumers, residents and tenants because they have to spend more money on transport to reach sprawling developments (Litman, 2011).

A lower site density also has negative implications on land value, which should be concerning to landowners. When developers purchase land for developments in an area that has minimum parking requirements, they are aware of the amount of excess
land beyond the actual demand that they must set aside for parking. Consequently, a rational developer would only pay a price to the landowner that corresponds to the land value minus the cost of excess parking provision (Willson, 1995). Thus, it is expected that landowners will receive less money for their land because its value has been reduced by minimum parking requirements (Willson, 1995). Diminutions in land value also affect local authorities because their revenue from rates will decrease (Willson, 1995). The results from a study by Cutter and Franco (2012) appear to support the preceding claims in Willson (1995) because it was found that the value of land parcels decreased after they were converted into off-street car parks.

There is evidence in the literature that indicates some stark contrasts between cities that have and have not realised an appropriate balance when allocating land for development. Bartholomew (1995) compared the neighbouring cities of Portland and Hillsboro in Oregon, USA that pursued different development paths in relation to urban land use density and off-street parking. On the one hand, Portland implemented a policy of dense urban development by allowing the densest developments in its downtown areas and along its public transport corridors (Bartholomew, 1995). Moreover, Portland removed its minimum parking requirements and instead enforced a parking maximum of one car park per 100 m$^2$ of gross floor area in its city centre (Bartholomew, 1995). The combination of these policies allowed Portland to realise its vision for a dense downtown without excessive land being used for off-street parking (Bartholomew, 1995). A tangible consequence of these policies is the creation of over 30,000 jobs in downtown Portland without commensurate increases in the number of off-street car parks or car journeys (Bartholomew, 1995). On the other hand, Hillsboro pursued a development path characterised by numerous big box retail areas, large industrial parks and minimum parking requirements of four to five car parks per 100 m$^2$ of gross floor area for commercial and industrial developments (Bartholomew, 1995). As a consequence, Hillsboro’s land use was quite substantial and sprawling in comparison with that of Portland (Bartholomew, 1995).

Conversely, one could argue that notwithstanding the apparent land use inefficiencies, the provision of off-street parking can increase profits and business opportunities for retail developments because they are made more convenient to access (Hasker & Inci, 2010; Willson, 1995). However, it is important to stress that it is the parking over and beyond what the demand requires that is of no value to developers and landowners because extra parking cannot be used for other purposes.
(Willson, 1995). Thus, as studies by Davis et al. (2010) and Willson (1995) have earlier shown, large amounts of empty car parks are not only a misuse of space but a financial liability to developers, landowners and local authorities.

The cited studies indicate that it is vital to strike a balance between the provision of land for off-street parking and other urban land uses. If too much land is locked up for parking, other significant urban land uses are neglected. Mukhija and Shoup (2006) stress the importance of prioritising quality of parking over quantity of parking, which means making the most of urban land so that it is not wasted on off-street parking. The balance between parking and other urban land uses is manifested in Toronto, Canada, where the use of minimum parking requirements varies across its different districts (Engel-Yan et al., 2007). Thus, areas in which parking is not a priority such as the downtown have no parking requirements while areas that may necessitate more car parks such as big box retail zones have them (Engel-Yan et al., 2007). This arrangement, if transferred to other cities, may give local authorities and developers the flexibility to build an urban environment that enhances a city’s aesthetic character without compromising business opportunities that may require off-street parking.

2.5.2 Financial Implications

In addition to the high opportunity costs and land use efficiencies that stem from minimum parking requirements, it is necessary to consider the direct financial costs that the requirements may impose on urban stakeholders. Shoup (1999b) explains that because developers are compelled to provide parking under a minimum parking requirement, they have to bear all the construction and maintenance costs. In order to recoup these costs, developers or building owners may charge higher rents to tenants and in the case of retail, the higher costs may ultimately be passed to consumers (Cutler & Parfitt, 2011). This is inequitable for developers because the amount of parking they have to supply may be higher than what the actual demand commands. Minimum parking requirements are also unfair for tenants and consumers because regardless of whether they use the provided car parks, their rents and purchases subsidise the cost of parking for those who use the car parks (Cutler & Parfitt, 2011; Shoup, 1999b). Hence, the cost of parking has been bundled into the costs of construction, rents and goods and services (Barter, 2010).
In the New Zealand context, developers could avoid compliance with minimum parking requirements through the successful application for a resource consent. However, there are financial and temporal costs involved with the resource consent application process so irrespective of compliance, the use of minimum parking requirements will impose costs on developers. Furthermore, there exist instances in New Zealand in which developers have sought a legal remedy to amend an unreasonable minimum parking requirement. For example, in Glendore (NZ) Ltd v Christchurch City Council, the applicant had to request the Environment Court to amend a minimum parking requirement for a cinema complex. The legal costs of appearing before the Environment Court are evidently more substantial than those of a resource consent application, which further demonstrates the financial liabilities of minimum parking requirements for developers.

To illustrate the magnitude of the costs that developers incur due to minimum parking requirements, Shoup (1997) reports that the requirements can augment development costs by ten times the cost of infrastructure contribution fees in many American cities. This financial burden may prove too much for some developers because the costs of providing plentiful parking and constructing new buildings simultaneously may be too exorbitant or difficult (Shoup, 2011). Planning practitioners in New Zealand also assert that minimum parking requirements are threatening the economic viability of New Zealand cities because the financial costs of adhering to them are excessive (Cutler & Parfitt, 2011). It is argued that in New Zealand, minimum parking requirements undermine developments that create business and employment opportunities and diminish the development potential of urban sites (Cutler & Parfitt, 2011; MacArthur, 2010). For example, in order to provide for Hamilton, New Zealand’s minimum parking requirement as well as provide more land for development in the city’s Commercial Service Zone, off-street parking would have to be provided underground (Cutler & Parfitt, 2011). Underground parking is costly and often not economically feasible for most businesses, which means lost business and employment opportunities are present in Hamilton, New Zealand (Cutler & Parfitt, 2011).

Despite the evident financial liabilities that minimum parking requirements impose on developers and landowners, there are those who contend that the enforced provision of parking has positive externalities for commercial real estate. In a study on commercial property sales from Los Angeles County, California, USA, Cutter and DeWoody (2010) demonstrated a positive correlation between the availability of
nearby off-street parking and commercial property values. This correlation was present for both private parking mandated under minimum parking requirements and the supply of commercial public parking (Cutter & DeWoody, 2010). However, it also found that commercial public parking facilities had a stronger positive correlation with the marginal value of a commercial property than that of private off-street parking provided by minimum parking requirements (Cutter & DeWoody, 2010). In fact, the stronger correlation equated to a rise in commercial property value that was two times as much as what private off-street parking could contribute (Cutter & DeWoody, 2010).

Therefore, if local authorities are adamant on interventionist parking policies, it may be beneficial to explore the feasibility of the promotion of shared parking because it is open to all types of motorists. It is also necessary to point out that correlation does not equal causation and even Cutter and DeWoody (2010) concede that further research must be done to investigate whether causation was present in their study. An assessment of the benefits from commercial property value increases versus the elevated cost of construction from minimum parking requirements could be done to ascertain any merits in this planning rule.

While minimum parking requirements can be costly to developers, it is necessary to empathise for those who typically possess less wealth than them, such as ordinary city dwellers. Housing should be salubrious and affordable in urban environments, especially for low-income households who may not be able to afford to commute from peripheral suburban areas. However, the use of minimum parking requirements achieves the contrary because it decreases the supply of affordable housing by increasing the sale or rental price to residents as well as land values (Litman, 2009). First, each additional dollar of construction, maintenance and land costs for off-street parking increases the overall house price (Litman, 2009). Second, the land required per unit of housing increases due to increased off-street surface parking. This reduces the development density for developers and landlords and so they may charge higher sale prices and rents to recover their costs (Litman, 2009). Third, parking consumes a proportion of developed land that is often equal to or greater than the land devoted to the house it serves. This parking becomes more expensive for small residential units that are close to city centres because they consume more land relative to the land that the house occupies (Litman, 2009).
Because minimum parking requirements inherently assume that the majority of the urban population own cars and will need parking, they are disproportionately unfair on low-income households as they are less likely to own motor vehicles (Litman, 2009). In the context of housing developments, low-income families and other residents without cars are effectively subsidising wealthier car users because they will not use their provided car parks (Litman, 2009). Evidence from Manville and Shoup (2010) suggests that if minimum parking requirements were non-existent, urban housing could become much more affordable. For instance, Los Angeles abolished minimum parking requirements for office conversions to residential units in its downtown area in 1999 (Manville & Shoup, 2010). This reform seemed to stimulate housing developments in downtown Los Angeles because at least 7300 new residential units were built from 1999 to 2008, which is nearly twice the number of new units in the same area over a longer time period from 1970 to 2000 (Manville & Shoup, 2010). With such a high uptake of housing, one can infer that the parking requirement amendment may have helped to reduce sale and rental prices for low-income households because developers would have been able to construct at a higher density and thus with lower costs. Moreover, a higher supply of housing will satisfy the demand for housing and will also render dwellings more affordable for low-income households.

There are recent studies that show the high financial costs of minimum parking requirements evident in cities overseas are being reflected in New Zealand. Donovan (2009) affirms that as Auckland’s CBD continues its current trend of intensification and land value increase, the cost of off-street parking provision will also increase. For example, an area of land that is set aside for a typical car park in Auckland has a value of $50,000-$100,000, which may be unaffordable for developers (Donovan, 2009). A later study of the Dominion Road, Onehunga and Takapuna areas of Auckland supported these findings by demonstrating that a land use’s provision of each additional off-street car park generated a mean marginal economic impact of $18,995 (Donovan, 2012). The same study modelled that in a situation where there was a 35 per cent oversupply of off-street parking, there would be a 9.2 per cent reduction in the capital improvement value of buildings in the study areas (Donovan, 2012). It is estimated that “the cost of minimum parking requirements for commercial properties in these town centres [Dominion Road, Onehunga and Takapuna] varies from $57-$119 million, with a mid-point estimate of $91 million” (Donovan, 2012, p. 19).
2.5.3 Summary of Problems

Figure 1 below summarises the land use inefficiencies that minimum parking requirements cause, as well as the resultant financial costs that stem from this problem. The imposition of minimum parking requirements has provided a superfluity of off-street parking such that there is too much supply relative to demand. Consequently, land developments become less dense to accommodate for the enforced parking supply, which means developers have to raise sales prices to compensate for the loss of development potential and land value. These increased costs are ultimately transferred to other stakeholders such as tenants and consumers. Concurrently, the plentiful car parks that minimum parking requirements provide render off-street parking inexpensive or free, which makes driving more attractive compared to other transport modes. An increase in car use causes other effects such as traffic congestion, which gives the impression that more off-street parking is needed to service the cars. As such, the use of minimum parking requirements purports to be justified and demonstrates that it engenders an iterative cycle of land use inefficiency and high financial costs. The range of alternative parking policies that the next Section will analyse will aim to sever this iterative cycle into which cities that use minimum parking requirements have entered.

![Figure 1: How minimum parking requirements increase land consumption, impose financial liabilities and promote car dependence. Source: (Willson, 1995)](image-url)
2.6 Alternative Parking Policies

Given the plethora of land use efficiency problems, opportunity costs and financial liabilities associated with the use of minimum parking requirements, it is essential to devise solutions to rectify these deficiencies. Therefore, this Section of the Literature Review will analyse a wide spectrum of alternative parking policies that have been implemented in a global context to assess their merits and drawbacks. These evaluations will provide an insight into their applicability in Auckland and will be useful for the research component of this thesis when the viability of alternative policies will be investigated.

The presentation of the alternative parking policies will be structured in the form of a typology. As Allmendinger (2002, p. 77) elucidates, “[t]ypologies provide heuristics for academics and practitioners that help map the landscape of ideas that influence a particular field”. Thus, the use of a planning typology will allow the consolidation of a multitude of parking policies and theories from disciplines such as economics and planning to facilitate their understanding (Allmendinger, 2002; Tiryakian, 1968; Yiftachel, 1989). The ultimate aims of the parking policy typology in this Literature Review is to “systematically [classify] related concepts”, “effectively [organise] knowledge by clearly defining the parameters of a given subject” and “[facilitate] theorising by delineating major subparts of distinct properties and foci for further research” (Yiftachel, 1989, p. 28). In view of the better understanding of alternative parking policies that a typology can provide, this Section of the Literature Review will espouse a parking policy typology that builds upon the one used in Barter (2010) and is indicated in Figure 2 below.
Before the analysis of alternative parking policies begins, it is interesting to note that minimum parking requirements fall under the ‘Supply-focused’ category of the typology (Barter, 2010). Supply-focused policies are political in nature because local politicians and planners assume by default that there would be insufficient off-street parking in a situation without regulation (Barter, 2010). Thus, decision-makers emphasise the importance of parking supply in order to alleviate any public concerns over excessive parking demand or spillover (Barter, 2010).

2.6.1 Market-based Policies

First, the market-based category in Figure 2 promotes a *laissez-faire* off-street parking market in which there are no minimum parking requirements or any other interventionist policies that may cause disturbance to parking supply and demand.
(Barter, 2010). It is interesting to observe that in an era in which neoliberal theories dominate Western public policymaking, the off-street parking market has remained immune from deregulation with its widespread use of minimum parking requirements (Manville & Shoup, 2005). The premise of a free-market approach to parking is that any form of regulation will cause imbalances in parking supply and demand to the extent that an oversupply or a lack of parking will arise. Therefore, advocates of a deregulated parking market are confident that its implementation will lead to an optimal supply of off-street parking and more efficient and productive urban land use (Guo & Ren, 2013).

One such advocate is Donald Shoup, who is a professor of urban planning at the University of California, Los Angeles. In Shoup (1997), it is surmised that the elimination of minimum parking requirements combined with the pricing of on-street parking will devote more land and capital to other activities that create increased employment opportunities and tax revenue. Similarly, both Cutler and Parfitt (2011) and Donovan (2012) support a laissez-faire approach to parking policy in New Zealand because of the empirical evidence that showed the economic costs of minimum parking requirements in Hamilton and Auckland respectively. They also claim that alternative forms of regulation are unnecessary because they restrict the freedom of developers and that developers and car park users are the best stakeholders to determine an optimal amount of off-street parking (Cutler & Parfitt, 2011; Donovan, 2012).

While the analysis of the market-based theory indicated what might happen once it is effectuated, it would be beneficial to scrutinise examples of cities that have adopted this branch of the parking policy typology to ascertain whether theory translates into practice. The Old Toronto district of Toronto, Canada is an urban area in which no parking requirements are present for general retail uses (Engel-Yan et al., 2007). However, it was found that there were retail sites in Old Toronto that provided quantities of parking that were much higher than equivalent land uses elsewhere in Toronto (Engel-Yan et al., 2007). In fact, around one-fifth of surveyed land uses had over seven car parks per 100 m² of gross floor area, which is even higher than districts in Toronto in which minimum parking requirements are present (Engel-Yan et al., 2007). This result indicates that the laissez-faire parking policy does not necessarily engender the decline in parking supply predicted by Shoup (1997). Moreover, it is theorised that a free-market approach to off-street parking may backfire because developers and businesses may want to build copious amounts of car parks to attract
motorists from a larger population catchment (Barter, 2010). A ‘parking arms race’ may therefore occur between competing businesses, which may cause a proliferation of off-street car parks (Barter, 2010).

McDonnell et al. (2011) also warn that the elimination of minimum parking requirements alone may not increase development density because other planning restrictions such as density controls may serve as a hindrance. Consequently, their abolition without any other policy adjustments may produce vast paved areas in urban centres instead (McDonnell et al., 2011). However, as indicated by the idiom ‘one swallow does not a summer make’, the result in Old Toronto does not mean the same pattern will occur in other cities that choose to espouse a laissez-faire parking policy. Furthermore, local authorities and developers should regard a deregulated parking market as one among a repertoire of tools to achieve efficient land use at the least cost. They should not regard a deregulated parking market as a panacea to the land use inefficiency and financial problems that stem from minimum parking requirements. Hence, the following two Sub-Sections will examine other parking policies that could create synergies with a laissez-faire parking market.

### 2.6.2 Parking Management Policies

To prevent some of the problems of a deregulated off-street parking market from occurring, it is essential to explore the parking management branch of the parking policy typology. Policies that fall into this category aim to provide a sufficient amount of parking without using minimum parking requirements, but do not solely rely on free-market principles to solve parking and land use problems (Barter, 2010; Guo & Ren, 2013). In fact, intervention is encouraged in this type of policy either through car park maximums or the sharing of existing available car parks (Engel-Yan & Passmore, 2010; Guo & Ren, 2013).

Maximum parking requirements are regulations in a local authority’s planning document that stipulate the maximum amount of car parks allowed per unit of floor area, or per employee or patron. The justification of this policy is that without any form of regulation, developers may be inclined to build excessive amounts of parking to attract more customers, despite the high opportunity costs (Barter, 2010; McDonnell et al., 2011). Moreover, the provision of ample amounts of off-street surface parking may be a form of land speculation by developers and landowners because the parking can be temporary until land values rise and it becomes profitable
to build on the land (Jakle & Sculle, 2004). These actions usually result in a sea of paved car parks in cities that cause constant and abrupt breaks in streetscape and detract from a city’s visual amenity (Mukhija & Shoup, 2006). An abundance of off-street car parks can also produce “a depressing effect on surrounding property values” (Jakle & Sculle, 2004, p. 62). An ideal maximum parking requirement will therefore be high enough to provide enough off-street parking for motorists but not so high that it encourages the oversupply of car parks. It should reduce dependence on car trips to urban centres while preventing the hindrance of economic activity (Al-Fouzan, 2012).

There exist best practice examples of maximum parking requirements being used successfully overseas. Davis et al. (2010) report that the implementation of maximum parking requirements in Portland, Oregon, USA combined with its investment in public transport led to a decline in parking ratios from 3.5 spaces per 1000 ft² to 1.95 spaces per 1000 ft². Furthermore, the policy contributed to a saving of US$35 million in parking development costs (Davis et al., 2010). One can also argue that the use of maximum parking requirements in Auckland’s Central Area as outlined in Part 9 of the Auckland City District Plan – Central Area has contributed to its dense urban development and vibrancy (Figure 3) (Auckland City Council, 1999a).
However, MacArthur (2010) contends that Auckland’s Central Area parking maximums are too lenient (one space per 150-200 m² for most of the area) and wants a total parking ban because one can easily walk from one side of the Central Area to another in 20 minutes. The fallacy in the pursuit of a total parking ban in Auckland’s CBD is that it does not cater for people who have a legitimate need for cars, such as those with impaired mobility. It is also an excessive constraint on an individual’s freedom to provide off-street parking on his or her own land.

Given these reported advantages, the policy of maximum parking requirements is prima facie better than minimum parking requirements because they promote the sensible use of land such that there is no oversupply of parking and consequent opportunity and financial costs. For example, it saves developers the cost of providing parking they may not need and the land otherwise reserved for parking can be used for activities that promote business and employment opportunities. Parking maximums allow for better accessibility because they still retain a suitable amount of
parking for motorists who depend on car parks in urban centres. Finally, the policy may be conducive to the development of a high quality urban environment because it will restrict the proliferation of off-street car parks that can be aesthetically unpleasant.

While maximum parking requirements offer many benefits to cities, it is possible that developers may reject them because the policy is another restriction on them. In that sense, parking maximums may be analogous to minimum parking requirements from a developer’s perspective. Additionally, empirical evidence from Cutter and DeWoody (2010) indicated that the use of parking maximums in San Francisco contributed over 50 per cent less of an increase in commercial property values than areas without maximums. These findings, if translated elsewhere, may discourage commercial development or shift development to locations in which there are no maximum parking requirements (Cutter & DeWoody, 2010). It is therefore conceivable that maximum parking requirements may lower urban development density if the policy disincentivises commercial development in central locations (Cutter & DeWoody, 2010). Parking maximums evidently have the potential to work against the realisation of an urban environment that uses land as efficiently as possible. These potential negative consequences of using maximum parking requirements must be considered if local authorities intend on using them as an alternative to minimum parking requirements. Another policy in the parking management branch of the typology that may be more palatable to both developers and urban citizens is shared parking, which will be critiqued in the subsequent paragraph.

Early on in the literature on parking policy, it was noted that “[p]arking control cannot operate successfully if there are numerous privately owned car parks over which the local authority has no control” (Brierley, 1972, p. 28). This means that the car parks that a developer provides of his or her own accord or due to minimum parking requirements are usually private and not available to the general public (Brierley, 1972). Thus, any attempts to provide optimal amounts of off-street parking are hampered by car parks that only serve a limited number of people. Such car parks include employee or supermarket car parks where motorists risk having their cars towed if they are not using the parking space for the land use that the car park serves. Moreover, these car parks may be closed during certain times and days which exacerbates their restriction to the public (Brierley, 1972). For these reasons, academics in parking policy have advocated for the adoption of shared parking,
which opens up parking already available in cities to any type of user (Barter, 2010; Brierley, 1972; Engel-Yan & Passmore, 2010; Guo & Ren, 2013).

This policy is deemed to be the most effective means by which to maintain a sufficient amount of off-street parking while reducing or eliminating minimum parking requirements (Engel-Yan & Passmore, 2010). Private off-street parking in a city is an inefficient mechanism to satisfy parking demand because it can only be used by niche sections of the parking market. It is surmised that if shared parking was more readily available between clustered groups of developments or through the provision of commercial public parking buildings, it would no longer be necessary to require developers to supply off-street parking by default. This is because the peak parking demands for different land uses in cities often do not coincide with each other (Cutler & Parfitt, 2011; Shathawi, 2010). For example a restaurant is more likely to attract parking customers in the evening while offices would need parking during the day. Therefore, shared parking can allay any on-street or off-street parking saturation concerns because it is capable of meeting parking demand from a variety of land uses. Shared parking also has the benefit of allowing a motorist to park once at a car park and then visit multiple nearby sites on foot (Shoup, 2005). This is in contrast with the status quo where drivers have to leave a private car park as soon as possible once they have left the premises and must drive to another site to go about their other affairs (Shoup, 2005).

A study in Indianapolis, Indiana, USA has shown shared parking to work well because its promotion between retail, business and entertainment land uses lowered the number of car parks required to be constructed from 6000 to 2815, saved US$30 million in construction costs and US$1 million per year in operation costs (Davis et al., 2010). Moreover, Milwaukee, Wisconsin, USA lowered a development’s minimum parking requirements if shared parking was available nearby and this policy contributed to Milwaukee having one of the lowest parking ratios in the USA (Davis et al., 2010). It is therefore evident that the adoption of this form of parking management has positive consequences for land use efficiency and economic savings.

In addition to these advantages, Sub-Section 2.5.2 of this literature review has already demonstrated that the availability of commercial public parking buildings correlates positively with a commercial property’s capital value (Cutter & DeWoody, 2010). Given these findings, there is incentive for developers, landowners and local authorities to cooperate with each other to ensure that shared parking becomes a preferred off-street parking supply option.
While there can be no doubt over the benefits of shared parking, it is plausible that businesses, motorists and developers may not be receptive of this policy. This is because in a likely scenario in which all parking stakeholders pursue their own economic self-interest, all parties would want their own parking. For example, an office may be unwilling to share their car park with a business nearby, regardless of the car park's level of saturation. This is despite the fact that their employees and patrons may require parking at different times of the day. Businesses also know that shoppers take comfort in the guarantee of a car park and so may be reluctant to open up their off-street car parks to other users. Due to these likely problems arising from developers' and businesses' economic self-interests, shared parking as a parking management tool may need to be enforced through interventionist policymaking. The alternative option is for local authorities to render shared parking more attractive through the taxation of off-street parking provision. Parking taxation belongs to the fiscal mechanisms branch of the parking policy typology, which will be illuminated in the next Sub-Section.

2.6.3 Fiscal Mechanisms

A fiscal mechanism that has attracted attention from economic geographers and economists is the implementation of the flat surface parking tax. Feitelson and Rotem (2004) argue that it is impossible to determine the optimal supply of parking in cities in every possible situation through the use of minimum or maximum parking requirements because they are rather arbitrary. Moreover, a laissez-faire approach to off-street parking is ineffectual because developers are able to build profuse quantities of parking if they wish. Consequently, a free-market parking policy does not compel developers to internalise off-street parking externalities such as land use inefficiency, urban sprawl, traffic congestion and the deterioration of urban aesthetics (Feitelson & Rotem, 2004). Such externalities are likely to be present in cities with high parking coverage such as Sacramento, California, USA, where off-street parking covered 11 per cent of its city centre and 30-57 per cent of the studied commercial areas in Akbari, Rose and Taha (2003).

To rectify the inadequacies of the market-based and parking management branches of the parking policy typology, Feitelson and Rotem (2004) proclaim that the flat surface parking tax is the best parking policy for the following reasons. First, combined with a framework of no parking requirements, a uniform flat tax per unit of land area on all urban land used for off-street parking allows developers to decide the
quantity of parking they want to supply, but there is a financial deterrent of providing too much parking. Second, it is an efficient means to internalise off-street parking externalities fiscally because it is too cumbersome to individually monetise each off-street parking externality. Third, because this fiscal mechanism only taxes surface parking, there is an incentive for developers to build multi-tiered parking buildings, which will lower the tax per parking space and free up urban land for other land uses. Fourth, because off-street parking will become more expensive due to this tax, developers will be encouraged to share existing parking resources more effectively, which makes shared parking more attractive.

The genesis of the idea of the flat surface parking tax is in line with recent discourse from economists and economic geographers that the pricing of parking is the best way to compel developers and motorists to internalise parking externalities (Anderson & de Palma, 2004; Button, 2006; Hensher & King, 2001; Verhoef, Nijkamp & Rietveld, 1995). While this idea is admirable, one wonders whether this tax is politically acceptable given increased taxes are not usually very popular with voters. Feitelson and Rotem (2004) suggest that the proposed tax may be acceptable by the majority of the public because it primarily affects developers who are the main providers of off-street parking. This is a rather naïve view of voter behaviour because if developers’ expenses are raised, they can pass on the costs to those who use the off-street car parks. As such, every member of the public who drives in cities will be affected by the tax. Thus, rather than trying to claim the majority will not be impacted by the tax, local authorities that decide to use this tax should extol its benefits. Feitelson and Rotem (2004) also claim that developers have reason to support the tax because development costs may be lower in a regime that uses the tax and has no parking requirements than in an environment in which minimum parking requirements exist. To convince developers of this argument, cost-benefit analyses will need to be carried out to prove that this is actually true.

2.7 Conclusion

This Chapter has reviewed the historical context of minimum parking requirements, scrutinised the justifications for them, analysed their effects on land use efficiency and assessed the feasibility of parking policies that can be used instead of them. Minimum parking requirements were born in an era where the proliferation of cars exhausted the supply of on-street parking, which had consequent effects on traffic congestion and made city centres undesirable for development. Thus, minimum
parking requirements became an accepted way to solve traffic congestion issues. The perceived ability of minimum parking requirements to alleviate traffic jams is often used as a justification for their implementation. Furthermore, it is claimed that this policy is necessary to ensure that businesses remain viable because parking ensures customers come through their doors. However, local authorities were oblivious to its negative consequences on land use efficiency and consequent adverse effects on land values, property values, affordability and costs to all parking stakeholders.

Once academics from disciplines such as planning and economics became aware of the negative consequences of adopting minimum parking requirements, they proposed alternative parking policies that could be used instead of the status quo. Such policies fit neatly into a typology that is commonly used in the planning discipline and the four main branches of it are supply-focused, market-based, parking management and fiscal mechanisms. Market-based policies promote a deregulated parking market in which developers are not constrained by restrictions on the quantity of parking they would like to provide. Parking management policies support the removal of minimum parking requirements but agree with intervention. Thus, partisans of this branch want to see the enforcement of parking maximums, the liberation of existing private car parks to the public and the construction of public parking buildings. Fiscal mechanisms are tax policies that aim to disincentivise the supply of excess off-street surface parking. Finally, it is worth noting that minimum parking requirements belong to the supply-focused branch because local authorities desire a large supply of off-street parking to avoid the risk of excessive parking demand causing parking spillover.

The elucidation of all the intricacies and consequences of minimum parking requirements and alternative parking policies provides a strong foundation upon which to develop a methodology for the field research. Furthermore, the wide range of sources in this Literature Review will provide innovative ideas on how to assess the impacts of minimum parking requirements on land use efficiency in Auckland as well as the viability of alternative parking policies. Consequently, the subsequent Methodology Chapter will illuminate the range of methods that the author used to address this study’s research questions.
3 Methodology

3.1 Introduction

To assess the impacts of minimum parking requirements on land use efficiency and the viability of alternative parking policies in Auckland, this study employed a mixed methods approach that combined quantitative geographic information systems (GIS) analysis with a qualitative study based on interviews with key informants. Mixed methods research, also known as triangulation, has a distinct advantage over using a unique methodological approach because the results from each method can complement each other, which enhances the validity of the overall study (Fielding & Fielding, 2008). While triangulation hitherto attempted to reach a similar result with different research methods in a process called convergent validation, contemporary triangulation has shifted to a new paradigm (Fielding & Fielding, 2008). Thus, triangulation now involves coalescing the findings from various qualitative and quantitative methods to engender synergies in the final results (Bazeley, 2006). The creation of synergies in the research results is the main justification of why this thesis espoused a mixed methods methodology. It was predicted that using GIS analysis to assess minimum parking requirements’ effects on land use efficiency in conjunction with employing interviews to ascertain expert opinions on parking policies would produce findings that can guide policymaking. For example, the adoption of parking policies that considers stakeholders’ concerns about car parking and empirical results simultaneously.

This study’s triangulation methodology also resulted in an integration of deductive and inductive research philosophies. The quantitative GIS analysis espoused a deductive research philosophy because it tested whether the existing knowledge about minimum parking requirements is valid in the Auckland context (Tolich & Davidson, 2011). Conversely, the qualitative interviewing of key informants generated theories about viable alternative parking policies that are suitable for Auckland, which represented an inductive research philosophy (Tolich & Davidson, 2011). As such, both research philosophies underlay this study’s mixed methods methodology.

Furthermore, Auckland was the case study area for this thesis for a number of reasons. First, Auckland acted as a good representation of cities overseas that have featured in the literature on minimum parking requirements due to its geographic
and population sizes. Thus, it is theorised that the effects of minimum parking requirements in Auckland could be similar to those documented in the overseas literature. Second, the GIS Study Area in Auckland’s West, which will be illuminated in the subsequent Section, is also a microcosm of Auckland’s urban areas because of its mixture of commercial, residential, industrial, transportation and recreational land uses. Hence, it served as an ideal case study location for a detailed GIS analysis of the impacts of minimum parking requirements on land use efficiency.

The remainder of this Chapter will describe the research designs, the data sources and the data transformation and analysis methods of this study's qualitative and quantitative methodologies. It will also examine the limitations of these research approaches.

### 3.2 Geographic Information Systems (GIS) Analysis

#### 3.2.1 Research Design

The quantitative component of the methodology used GIS analysis to measure the impacts of minimum parking requirements on land use efficiency. The advantage of GIS analysis is that it facilitates the assessment of spatial phenomena and patterns at a large geographic scale that would otherwise be difficult to survey on-site. According to Janelle and Goodchild (2011), GIS allow researchers to integrate empirical analyses and theories when identifying transformations in spatial phenomena and patterns. GIS was therefore a suitable tool for this thesis because the author utilised historical aerial images of Auckland from 1996 and 2006 and census data from the same years to calculate whether minimum parking requirements have caused changes in land use efficiency over the ten-year period. The use of census data was also advantageous in a practical sense because it provided demographic information derived from a large population base. These data were consequently more reliable than data that originated from a smaller population sample. Moreover, using census data that was already publically available economises time significantly.

The GIS analysis method is based on that used in McCahill and Garrick (2010), McCahill and Garrick (2012) and McCahill (2012), which analysed the effects of minimum parking requirements on land use in various cities in the USA. This thesis expanded on the method in McCahill and Garrick (2012) by adopting a longitudinal approach to ascertain whether minimum parking requirements have increased land
use inefficiency insidiously in Auckland over time. Longitudinal studies allow a researcher to compare data from multiple situations at their respective points in time (Taris, 2000). The benefit of this approach was that it facilitated the identification of change at a wide scale and was thus useful in the detection of land use inefficiency transformations in Auckland as a consequence of minimum parking requirements (Taris, 2000).

Another aspect of this thesis’ GIS research design that was dissimilar to McCahill and Garrick (2010) and McCahill (2012) was the use of a case study within a city. The GIS analysis focused on several suburbs in West Auckland as shown in Figure 4 below. While an Auckland-wide GIS analysis would have been ideal, it was not pragmatic to study such a wide area due to the costs and time involved with obtaining aerial imagery and locating car parks at such a large geographic scale. One advantage of using a case study is that it is a straightforward way of determining the local phenomena and processes that have engendered the characteristics of the research subject (Thomas, 2003). Thus, in the case of West Auckland, the GIS analysis was able to determine the relationship between the use of minimum parking requirements and land use efficiency cost-effectively and quickly due to the use of a smaller scale case study. Moreover, census statistics were available for smaller geographic scales, which meant that the spatial boundaries to which the census statistics belonged coincided with the spatial extent of the GIS Study Area.

In summary, the GIS analysis consisted of the following components:

1. The acquisition of census data on population and car access for 11 census area units in West Auckland from 1996 and 2006. Census area units are small-scale geographic boundaries defined by Statistics New Zealand that provide local demographic information. The combination of census area units in this study represented a balance of various land uses.
2. The manual digitisation of non-residential off-street surface car parks in the chosen census area units, using aerial photographs of West Auckland from 1996 and 2006 as visual aids.
3. The calculation of the area in the selected census area units dedicated to non-residential off-street surface car parks.
4. The determination of the effects of minimum parking requirements on land use efficiency by calculating the area of surface car parks per person, per
worker and per car in the chosen census area units. Afterwards, the identification of any changes from 1996 to 2006 took place.

Figure 4: Map of GIS Study Area in West Auckland. The map was created based on data from Statistics New Zealand (2006)

The subsequent Sub-Sections will illuminate the components of the GIS analysis by exploring the GIS data sources and the data transformation and analysis techniques.
3.2.2 Data Sources

First, the aerial photographs of West Auckland from 1996 and 2006 were obtained from Auckland Council, which possesses imagery of Auckland that dates back to 1940. As mentioned previously, these photographs enabled the identification of surface car parks that must be digitised manually, a technique that will be discussed in Sub-Section 3.2.3.

Second, census data for area units in West Auckland came from Statistics New Zealand, which is the New Zealand government’s statistics department. The boundaries of each area unit were downloaded from their website in the shapefile format, which was used in the ESRI ArcGIS 10 GIS software. The GIS analysis based its GIS Study Area upon 11 area units that lie in West Auckland. The logic behind choosing 11 area units is that their spatial extent is large enough to incorporate a diverse range of urban land uses such as residential, commercial, parking and roads. Thus, the GIS Study Area was deemed to be representative of a typical urban environment in the Auckland and wider New Zealand contexts. Furthermore, population and car access data relating to the area units in the GIS Study Area were acquired from the Statistics New Zealand website.

3.2.3 Data Transformation

New geospatial data must be created that represent the spatial extent of non-residential off-street surface car parks. To create these data, the author manually digitised polygons over areas of the aerial photographs in the GIS Study Area that appeared to be surface car parks in ArcGIS 10. The result of employing this technique was the creation of a GIS dataset that depicts all the non-residential off-street surface car parks in the GIS Study Area in West Auckland. The GIS analysis avoided the digitisation of residential car parks, underground car parks and parking within a building due to the complexity involved with visually identifying these structures. Therefore, those types of car parks were beyond the scope of this study.

The manual digitisation technique was preferred over automated techniques in GIS software such as supervised image classification. This alternative method can categorise components of an image by identifying its spectral bands. For example, all the areas in the aerial photographs that belong to a grey colour spectral band can be identified and a GIS user could assign this band to built-up areas in a city. The
problem with using this technique to identify car parks is that other structures in an aerial photograph such as buildings and roads would also have been included. It would have been extremely difficult to demarcate car parks from other urban infrastructure in an aerial photograph with the automated technique and thus this method was avoided.

Once the digitisation of the surface car parks was complete, the calculation of the area of land dedicated to surface parking proceeded. This was a straightforward process in ArcGIS 10 and involved using the ‘Calculate Field’ tool to calculate the areas of all the surface car park polygons in the shapefiles. The result of this calculation gave the total area of non-residential off-street surface car parks in the GIS Study Area in 1996 and 2006.

3.2.4 Data Analysis

The data analysis component of the GIS analysis entailed the integration of the surface car park area calculations, the census data on resident and worker populations and car access in the GIS Study Area and the recommended dimensions of car parks from Land Transport New Zealand (now New Zealand Transport Agency). This combination of data gave statistics on the surface parking area per resident and per worker as well as the potential number of car parks per resident and worker. It was possible to estimate the potential number of car parks in the GIS Study Area by dividing the area allocated for off-street surface parking by the recommended car park size of 5.4 m by 2.4 m (13.5 m²) from Land Transport New Zealand (Land Transport New Zealand, 2007). The data analysis equally indicated the area of surface parking relative to the number of cars available to residents in the GIS Study Area. Moreover, the results from 2006 were compared longitudinally with those from 1996 to ascertain whether there were changes in the surface car park area, the resident and worker populations and car access over the ten-year period.

The use of the aforementioned statistics as proxies for the impacts of minimum parking requirements on land use efficiency was appropriate because they indicated whether there was a superfluity of parking in the GIS Study Area. For instance, a large area of surface car parks per resident or per worker would indicate that there was an oversupply of parking because the population was simply not large enough to justify a large amount of parking. Conversely, a small area of surface car parks per resident or worker would signify that despite the use of minimum parking
requirements, the supply of parking was optimal and met the parking demand. Furthermore, the author analysed the relationship between surface parking area and resident and worker populations to assess whether there were commensurate changes in surface parking area as the resident and worker populations changed between 1996 and 2006.

This analytical approach appeared to be less time-consuming than approaches used in other studies such as Hulme-Moir (2010), which studied car parks individually to assess their occupancy rates on-site as a measure of land use efficiency. The relative ease with which land use efficiency was measured using GIS is a manifestation of the analytical power of GIS software. There still existed however, limitations to the GIS analysis methodology and these will be discussed in the next Sub-Section.

3.2.5 Limitations of the GIS Analysis

There were a number of limitations associated with the GIS analysis’ research design and data transformation and analysis techniques. These must be explained because they have potential bearing on the consequent findings of the GIS analysis. The limitations specifically related to the use of a case study, the surface car parking digitisation technique, the aggregation of census data on resident and worker populations and the use of census area unit boundaries.

Thomas (2003) asserts that the major flaw of using case studies is that it is difficult to make generalisations from their findings because there would be a significant risk of error if one extrapolated the findings from one case and applied it to a different location. This assertion is rife in the social sciences and is often used as a reason to discredit the findings from case studies, or to subject their use to pilot studies only (Flyvbjerg, 2006; Yin, 1981). As a consequence, one could argue that it would be naïve to try to apply the results from this GIS analysis of West Auckland to elsewhere in Auckland or to another city in New Zealand.

In spite of this argument, there is an opposing discourse that suggests the argument of Thomas (2003) and others is invalid. Flyvbjerg (2006) endorses the use of a single case study in academia by drawing from historical cases that demonstrated generalisations from single case studies are as valid as those from any other kind of research. Flyvbjerg (2006) explains that Galileo discounted the previously universally accepted Aristotelian theory of gravitation with only one experiment by
demonstrating that gravitation accelerates all objects at the same rate, regardless of their weight. Galileo’s findings from this sole study was consequently a catalyst for a paradigm shift in thinking on gravitation (Flyvbjerg, 2006). Furthermore, Yin (1981) contends that if the claim that generalisations cannot be made from case studies is true, then all social science would need decades of work for it to be deemed valid.

Thus, this common claim is spurious because it ignores the fact that each individual case study on a particular research problem builds upon previous similar case studies to form synergies in knowledge. With regard to this study’s GIS analysis, it is indubitable that its results represent the GIS Study Area only. However, because the rest of Auckland and other New Zealand cities implement minimum parking requirements in places that are similar to the GIS Study Area, one can infer that the GIS Study Area’s off-street parking phenomena may be similar to those elsewhere in New Zealand too. This study can therefore act as a catalyst for further research in other localities by using the same GIS analysis methodology to test this inference.

Another limitation related to the manual digitisation of surface car parks using aerial photographs as visual indicators of these car parks’ locations. This digitisation technique was quite laborious and one cannot guarantee that all non-residential off-street surface car parks in the GIS Study Area were included in the resultant shapefiles. McCahill (2012) attempted to attenuate this shortcoming by employing a team of 12 researchers to do the same digitisation task in order to assess any variations in digitisation outcomes. The variation in the researchers’ output was deemed to possess a satisfactory range of error (McCahill, 2012). Unfortunately, because the necessary resources to employ 12 researchers were not afforded to the author, this limitation mitigation technique was not feasible for this thesis.

The aggregation of census data from 1996 and 2006 from census area units into a larger study area in West Auckland posed a limitation known as the Modifiable Areal Unit Problem (MAUP) (Fotheringham & Wong, 1991). The MAUP states that when areal data is aggregated into a larger geographic scale, an analysis that relies on these data will produce results that vary according to the chosen geographic scale. In other words, the analytical results are sensitive to the scale of aggregation that a researcher uses. Moreover, “[t]here appears to be no way of predicting a priori which parameters will be susceptible to scale changes and which will not” (Fotheringham & Rogerson, 1993, p. 6). This thesis’ use of a wider study area comprised of 11 census area units whose boundaries are defined by Statistics New Zealand could therefore
have been problematic because the same GIS analysis on a smaller or a larger number of area units could have produced findings that could be different to those of the current study. However, the potential of variation in results offers the opportunity for further research on the same research problems but at different geographic scales in order to ascertain any discrepancies in results.

Finally, the reliance on the area unit boundaries from Statistics New Zealand to form the GIS Study Area was also a limitation. These boundaries appear to be arbitrary and do not seem to reflect any demarcations in, *inter alia*, topography, demographics, land use and socio-economic conditions. Hence, the integration of these arbitrary area unit boundaries to form the GIS Study Area may have been problematic because phenomena and processes outside of it could have influenced the GIS analysis’ results, but were not considered (Fotheringham & Rogerson, 1993). Despite this shortcoming, the fact that Statistics New Zealand area unit boundaries contain robust data on car access and resident and worker populations from previous censuses meant it was difficult to eschew this method of establishing a case study area.

### 3.3 Qualitative Methodology

#### 3.3.1 Research Design

The other half of this thesis’ methodology used a qualitative research design composed of one data collection and one data analysis technique. Interviewing was the mechanism for data collection while coding was used for data analysis. The purpose of employing a qualitative methodology in conjunction with the quantitative methodology was to gauge the views of stakeholders such as planners working for local authorities and experts on parking policy. Their opinions were essential to finding out whether social perspectives towards parking are in accord with the empirical findings that resulted from the quantitative GIS methodology. For example, local authority planners could have desired large quantities of off-street parking, even if this thesis’ findings showed that there was already an oversupply of car parks. Any incongruity between the empirical results and the social views would have implications on the future development of local authorities’ parking policies and thus, both aspects were considered equally. The apparent complexity of the issue of minimum parking requirements and its effects on land use efficiency therefore justified the use of qualitative research.
The qualitative methodology followed a simple route that began with the acquisition of data from interviews and concluded with the analysis of the data using the coding method. These techniques that formed this qualitative research route will be elucidated in the subsequent Sub-Sections.

3.3.2 Data Collection

The author employed interviewing as the method with which to seek the opinions of local authority planners and parking policy experts on minimum parking requirements and alternative parking policies. Interviews were ideal for obtaining qualitative data from these stakeholders because their knowledge of parking policy was profound. Thus, much time was devoted to recording their expert opinions. Moreover, Thomas (2003) contends that interviews are beneficial because they offer the opportunity for the researcher to ask for clarification; something which was essential when seeking expert opinions from planners and parking policy experts. Another advantage of conducting interviews is that a one-on-one talk gives a positive impression to the interviewee that the interviewer is sincere and interested in their answers, which can lead to more effective and pertinent responses (Thomas, 2003).

The specific type of interview that this qualitative methodology employed is the semi-structured interview. According to Mason (2004), a semi-structured interview has a fluid structure and consists of a series of themes or topics to be covered during the interview as opposed to a list of predetermined questions. The main advantage of this form of interview is that it allows the interview to be shaped by the interviewee's knowledge so that unexpected findings can emerge (Mason, 2004). In this way, both the researcher and the interviewee have active roles in the construction of qualitative knowledge and it is the interaction between the two parties that produces the data relevant to the research topic (Mason, 2004). The list of key informants who participated in the interviews is indicated in Table 1 below. Furthermore, the list of themes that were covered in the interviews is located in Appendix C.
Table 1: List of Key Informants who participated in this study's interviews

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Organisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Council Planner</td>
<td>Auckland Council</td>
</tr>
<tr>
<td>Economist</td>
<td>Auckland Council</td>
</tr>
<tr>
<td>Member of Parliament (former Transport Planner)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Traffic Engineer</td>
<td>Auckland Transport ²</td>
</tr>
<tr>
<td>Transport Engineer</td>
<td>Private Practice</td>
</tr>
<tr>
<td>Parking Designer 1</td>
<td>Auckland Transport</td>
</tr>
<tr>
<td>Parking Designer 2</td>
<td>Auckland Transport</td>
</tr>
</tbody>
</table>

3.3.3 Data Analysis

Coding is the technique that was used to interpret the qualitative information from the interviews. According to Corbin and Strauss (2008, p. 159), coding is about “[e]xtracting concepts from raw data and developing them in terms of their properties and dimensions”. It also entails “[b]reaking data apart and delineating concepts to stand for blocks of raw data” (Corbin & Strauss, 2008, p. 195). The specific coding technique that the qualitative methodology employed is called open coding. It involves the interpretation of interview data without predetermined codes and instead, conceptual labels are placed on the data after the interviews (Corbin & Strauss, 2008). The benefit of this approach was that it took into account unexpected findings that emerged from interviews, which may not have been possible if conceptual codes were predetermined. After the qualitative data from the interviews were coded, these codes were used in the production of this thesis’ findings.

3.3.4 Limitations of the Qualitative Methodology

The small sample size of interviewees was a limitation because the information gathered from them may not be entirely representative of the views of the wider planning and parking policymaking community in Auckland. Ideally, other stakeholders in Auckland such as developers would have been recruited for interviews to assess whether opinions changed depending on personal backgrounds. However, this task was difficult due to a large amount of time being dedicated to other components of the primary research. To alleviate this problem, the author

² Auckland Transport is a council-controlled organisation of Auckland Council.
ensured that the backgrounds of the key informants for this study were as diverse as possible.

### 3.4 Conclusion

This thesis’ methodology consisted of a mixed methods approach that combined quantitative GIS analysis with qualitative interviewing and coding. The GIS analysis measured the effects of minimum parking requirements on land use efficiency in a case study of West Auckland through the use of historical aerial photographs, census data and digitisation in GIS software. The qualitative methodology gathered social perspectives towards parking provision from planners and parking policy experts to ascertain whether they were congruous with the empirical findings from the GIS analysis. It also found out which alternative parking policies that feature in the overseas literature were viable in Auckland. Limitations existed in the methodology but they typically stemmed from the lack of available resources that could have potentially made it more robust. The subsequent Chapter will explain the geographic contexts of Auckland and the smaller GIS Study Area that featured in this Chapter, while Chapter Five will provide a critique of Auckland’s planning frameworks. An understanding of this study’s research locations and the frameworks within which planning operates in Auckland will aid the interpretation of the findings in Chapters Six and Seven.
4 Geographic Context

4.1 Introduction

The provision of off-street car parking in Auckland is a response to a perceived demand from its population that uses car parks such as motorists, consumers, tenants and residents. Furthermore, it is a function of planning documents that determine the quantity of parking that is deemed appropriate for a land use. This study's findings would consequently be difficult to interpret without an understanding of the contextual information that defines the Auckland Study Area and influences the supply of parking. To provide this important background, this Chapter will examine relevant geographic, population and transport statistics at the scales of Auckland and the smaller GIS Study Area.

4.2 Geography, Population and Transport

Auckland is New Zealand’s largest city with an estimated population of 1.5 million inhabitants (Statistics New Zealand, 2012). For this study, Auckland is defined by the boundaries of Auckland Council, which incorporated the defunct local authorities that comprised Auckland’s metropolitan area (Figure 5). These include Auckland Regional Council, Auckland City, Manukau City, North Shore City, Waitakere City, Franklin District, Papakura District and Rodney District. With so many former local authorities, it is not surprising that Auckland consists of many urban population centres across its geographic extent. For example, Waitakere City, in Auckland’s West, which contains the GIS Study Area, had a population of 186,444 in 2006 (Statistics New Zealand, 2006). Auckland’s population is most dense at its city centre and at the urban centres that surround it but beyond this dense core, the population becomes sparse as it coincides with Auckland’s rural areas (Figure 6). Consequently, one can surmise the minimum parking requirements that are pervasive across Auckland’s polycentric and sprawling urban form, as shown in Figure 6, may produce similar impacts on land use efficiency across its urban areas.
Figure 5: Diagram of Auckland Region. Source: (Auckland Council, 2013a)
Figure 6: Population density in Auckland in 2006. The map was created based on data from Statistics New Zealand (2006)
Furthermore, the GIS Study Area consists of 11 census area units in the West of Auckland that fall under the jurisdiction of the former Waitakere City Council (Figures 7 and 8). Its total population was 35,943 in 1996 and 42,126 in 2006, with densities of 1908 people per km$^2$ and 2236 people per km$^2$ respectively. Thus, this level of density is similar to that of Auckland’s CBD as shown in Figures 6 and 7. It also features similar land uses compared to other urban centres in Auckland, which reinforces the argument that the land use inefficiency problems caused by minimum parking requirements there may be similar across urban Auckland. The GIS Study Area can therefore be considered as a microcosm of urban Auckland.

![Location of GIS Study Area in Auckland](image)

**Figure 7:** Location of GIS Study Area in Auckland. The map was created based on data from Statistics New Zealand (2006)
Figure 8: Map of GIS Study Area and the Census Area Units it contains. The map was created based on data from Statistics New Zealand (2006)
With regard to transport, the dispersion of Auckland’s population across a large geographic extent, as shown in Figure 6 is a consequence of urban sprawl. To accommodate this expansive form of urban development, motor vehicles have become the preferred transport mode, with 85 per cent of trips made by a private car in Auckland in 2012 (Auckland Council, 2012). In contrast, Aucklanders on average only made one public transport trip per week in that same year (Auckland Council, 2012). The prevalence of minimum parking requirements in Auckland has contributed to this urban form and transport behaviour because the proliferation of car parks increases a development’s land consumption and incentivises driving over other transport modes. Hence, Auckland has also entered into Willson (1995)’s iterative cycle of car dependence and excess land consumption that featured in Chapter Two as a result of using minimum parking requirements (Figure 1).

The subsequent Chapter on Auckland’s Planning Framework will critique the legislative and planning mechanisms that have engendered a culture of minimum parking requirements and consequent inefficient land use. It will reveal the ways in which the current planning system has contributed to a superfluous supply of off-street parking, which ultimately incentivises driving in the absence of convenient public transport. Auckland’s potential future planning regime will also be scrutinised in the next Chapter, because it includes some mechanisms that can break the aforementioned iterative cycle into which Auckland has entered.
5 Critique of Planning Framework

5.1 Background

The planning framework in Auckland is especially complex due to the formation of the Auckland Council in 2010. This Unitary Authority dissolved Auckland Regional Council and the territorial authorities that previously made up the Auckland Region. As such, Auckland Council currently uses the statutory and non-statutory planning documents that it inherited from Auckland’s former local authorities. However, it has also produced the Auckland Plan, which is a spatial plan that is guiding the development of its Unitary Plan. Once operative in around three years’ time, the Unitary Plan will replace the statutory planning documents of the defunct local authorities (Auckland Council, 2013c). A Draft Unitary Plan was released to the public for consultation in early 2013 and Auckland Council’s elected councillors have reviewed the submissions (Auckland Council, 2013c). They will release a Proposed Unitary Plan with amendments for further consultation in late September 2013, which will have considered the earlier submissions (Auckland Council, 2013c).

This dichotomous planning framework necessitates the analysis of one set of planning documents that influences parking policies and rules at present and another set that may affect parking regulation in the future. The purpose of this analysis is to elucidate the contextual background upon which planning for parking in Auckland takes place. Furthermore, it will critique the two frameworks’ ability to allocate land for off-street parking efficiently.

5.2 Current Planning Framework

Figure 9 below shows the current set of statutory and non-statutory planning documents that regulate off-street parking in Auckland. The remainder of this Section will critically analyse each component of the diagram and the relationships between these components.
Figure 9: Diagram of the relationships within Auckland's Current Planning Framework in relation to parking policy. Source: Author's Research (2013)
5.2.1 Resource Management Act 1991

The Resource Management Act 1991 (RMA) is the principal planning legislation in New Zealand that regulates the use of land, air and water. Its purpose, defined in s 5(1), is “to promote the sustainable management of natural and physical resources”. Because the supply of off-street parking consumes land, this land use falls under its governance. The RMA aims to regulate the land used for off-street parking provision in Auckland and the rest of New Zealand through a toolbox of statutory planning documents. These are regional policy statements and district plans, which are established through ss 60 and 73 of the RMA respectively.

In terms of off-street parking, regional policy statements provide an overview of the land use and transportation issues that affect parking supply and vice versa. They also provide a series of policies and methods that the relevant local authorities can use to address parking-related land use issues. Moreover, district plans specify rules that complement the relevant regional policy statement’s policies and methods to solve the land use issues that arise from off-street parking. Section 75(3)(c) of the RMA is responsible for this complementary relationship because it states that “[a] district plan must give effect to any regional policy statement”.

Currently, the Auckland Council Regional Policy Statement and Auckland’s seven District Plans are the statutory planning documents that address off-street parking and land use in Auckland. This study will now examine parts of the Auckland Council Regional Policy Statement that affect off-street parking supply, as well as the parking provisions in the Waitakere City District Plan because of the location of the GIS Study Area. The critical analysis of these documents will explain the ways in which the current planning paradigm in Auckland has influenced off-street parking supply.

5.2.2 Auckland Council Regional Policy Statement

Chapter Four of the Auckland Council Regional Policy Statement sets out the thrust of Auckland’s transport policy (Auckland Council, 1999). It recognises the intrinsic relationship between transport infrastructure such as parking and land use and accordingly, it offers guidance to protect and enhance that bond through a series of policies and methods. For example, Policy 4.4.1.1 advocates for the integration of land use and transport planning that would reduce trip lengths and numbers while Policy 4.4.1.2 will develop a transport system that avoids, remedies or mitigates
transport’s adverse effects on the environment. To implement these Policies, the Auckland Council Regional Policy Statement advises that District Plans should adopt provisions that reflect these goals (Methods 4.4.2.1 and 4.4.2.8). These Methods evidently offer a lack of prescription, which has afforded Auckland’s former territorial authorities and now Auckland Council wide discretion in their application of the aforementioned Policies and Methods. The subsequent Sub-Section will explore the ways in which the former Waitakere City Council has applied the Auckland Council Regional Policy Statement to the management of off-street parking in its District Plan.

5.2.3 Waitakere City District Plan

Objective Zero of the Waitakere City District Plan has a vision for the City to become compact and for its growth to occur in town centres and along significant transport corridors (Waitakere City Council, 2003). To support this goal, Policy 0.7 recognises that an excess of off-street car parks is incompatible with the desire for a compact city because the land for these parking spaces can be used for larger and denser developments (Waitakere City Council, 2003). In other words, Policy 0.7 acknowledges the opportunity costs of off-street parking.

Furthermore, Policy 10.8 supports flexible parking standards in town centres and encourages the efficient use of existing off-street and on-street parking resources (Waitakere City Council, 2003). Policies 10.11 and 11.21 build upon Policy 10.8 by specifying that New Lynn Town Centre and the core of Henderson should enjoy adaptable parking requirements that reflect the urban surroundings as well as the opportunity to share existing off-street car parks (Waitakere City Council, 2003). The object of these Policies is to enhance urban amenity values and to uphold the character of town centres throughout Waitakere City.

Given that s 75(1)(c) of the RMA stipulates that a district plan must provide rules to implement its policies, one would reasonably expect that there would be a complementary relationship between rules and policies. This is especially significant because district plan rules regulate land use and this regulation should embody the overall approach of a district plan’s policies. However, the analysis of the Waitakere City District Plan indicates that there is disjuncture between some of its Policies and Rules that regulate off-street parking supply.
For instance, in the Community Environments of Henderson and New Lynn, which are commercial and retail zones, there exist minimum parking requirements of one car park per 25 m\(^2\) of gross floor area at ground or mezzanine level (Rule 14.1 (a)(i), Community Environment Chapter) (Waitakere City Council, 2003). In other Community Environments, the minimum parking requirements become more stringent at one car park per 16 m\(^2\) of gross floor area for retail activities (Rule 14.1 (b)(i), Community Environment Chapter) (Waitakere City Council, 2003). These Rules are applicable whenever the relevant activity requires the construction or alteration of a building or a development of a site (Rule 14.0, Community Environment Chapter) (Waitakere City Council, 2003). In addition to Waitakere City’s commercial and retail zones, its urban industrial zone (‘Working Environment’) also adopts minimum parking requirements. For example, Rule 9.1 of the Working Environment Chapter requires one off-street car park per 20 m\(^2\) of gross floor area for retail activities, while other non-residential activities must have one parking space per 35 m\(^2\) of gross floor area (Waitakere City Council, 2003).

With every new land use or change in land use requiring a minimum amount of parking, the aforementioned Rules contradict Objective Zero and Policy 0.7 of the Waitakere City District Plan because they may unnecessarily increase land consumption. Consequently, town centres cannot become compact and the opportunity costs of providing the car parks rise because there is less space for other productive developments. Additionally, these minimum parking requirements are a financial liability for developers because their contravention makes a development either a controlled activity or a restricted discretionary activity, which requires a resource consent (Waitakere City Council, 2003).

Despite this evident detachment between Rules and Policies, there are other Rules that support the Waitakere City District Plan’s aim to enhance the amenity of its built environment as well as its compact vision. For example, Rule 14A.1 (a) stipulates that there are no minimum parking requirements for certain sites in New Lynn Town Centre’s main streets (Waitakere City Council, 2003). Furthermore, Rule 9.1 provides for a maximum parking requirement for non-residential activities that adjoin street frontages in the New Lynn Community Environment (Waitakere City Council, 2003). These two Rules evidently support the call for flexible parking regulations in Policies 10.8, 10.11 and 11.21, which can engender a pleasant urban environment that is free from the expanse of off-street car parks. They also reflect the District Plan’s desire for more compactness because less land could be dedicated to off-street parking when no
minimums are in place. However, none of the District Plan’s Rules provide a means to share existing parking infrastructure, which makes Waitakere City’s compact development ideology difficult to implement because the proliferation of private off-street car parks can continue. The absence of such rules also demonstrates that Policies 10.11 and 11.21 have not been completely fulfilled.

5.2.4 Auckland Regional Land Transport Strategy and Auckland Regional Parking Strategy

The chasms between the Waitakere City District Plan’s Rules, Objectives and Policies reflect the lack of prescription that the Auckland Council Regional Policy Statement provides. Before June 2013, s 73 of the Land Transport Management Act 2003 required a regional council to develop a regional land transport strategy to define the transport policies in its regional policy statement. The defunct Auckland Regional Council launched their Regional Land Transport Strategy in April 2010, which included progressive measures such as the minimisation of land used for non-residential off-street parking and the revision of parking requirements in high density centres (Policies 2.3.4 and 2.3.6) (Auckland Regional Council, 2010). Furthermore, the Auckland Regional Land Transport Strategy advocated for the investigation of fiscal mechanisms such as parking levies, which would help to fund public transport and disincentivise the superfluous supply of off-street car parks (Policy 8.3) (Auckland Regional Council, 2010).

These reformist policies were the product of the Auckland Regional Parking Strategy that the former Auckland Regional Council published in 2009 (Auckland Regional Council, 2009). This non-statutory document recognises that “the existing regulatory framework has encouraged an oversupply of parking in town centres and growth corridors” and that “the economic, social and environmental costs of an excessive supply of parking in such areas can be high” (Auckland Regional Council, 2009, p. 16). As such, it makes recommendations that translated themselves into the aforementioned Policies of the Auckland Regional Land Transport Strategy.

Unfortunately, the dissolution of Auckland’s former local authorities did not allow sufficient time for the Regional Land Transport Strategy to effect change in the Auckland Council Regional Policy Statement and ultimately, in Auckland’s District Plans. Additionally, the Land Transport Management Amendment Act 2013 repealed s 73 of the Land Transport Management Act 2003 on June 13 2013, which means the
Auckland Regional Land Transport Strategy can no longer influence Auckland Council’s future Regional Policy Statements. These legislative changes have exacerbated the lack of guidance from the Auckland Council Regional Policy Statement and highlights the fact that there will be scant parking regulation reform until an operative Auckland Unitary Plan exists. It is therefore important to examine the parking provisions in the Draft Unitary Plan and predict their implications on land use, especially if they remain in their current form in the future operative version of the Plan.

5.3 Potential Future Planning Framework

Arguably, the future planning framework that may come into effect in Auckland is simpler compared to what exists currently. Figure 10 below supports this assertion because there are fewer statutory and non-statutory planning documents that regulate off-street parking supply.
Figure 10: Diagram of the relationships within Auckland's Potential Future Planning Framework in relation to parking policy. Source: Author's Research (2013)
5.3.1 Auckland Plan

Section 79(1) of the Local Government (Auckland Council) Act 2009 required Auckland Council to produce a spatial plan that provides a long-term development strategy to enhance Auckland’s social, economic, environmental and cultural well-being. As a consequence, Auckland Council adopted the Auckland Plan in March 2012 to meet this legislative obligation. In terms of parking supply, Paragraph 576 of the Auckland Plan recognises that minimum parking requirements are a hindrance to intensive housing, mixed developments and housing affordability and a blight to urban design (Auckland Council, 2012). Moreover, Directive 10.6 recommends that the Auckland Council should review its parking policies and rules in its development of the Auckland Unitary Plan to achieve the reduction of development costs and the facilitation of intensive, mixed-use developments (Auckland Council, 2012).

As well as a reform of parking regulations, Directive 13.11 of the Auckland Plan proposes the investigation and implementation of car parking charges to finance transport projects such as the City Rail Link (Auckland Council, 2012). Table 14.1 of the Auckland Plan mentions that “it is possible under current legislation to tax car parks using a targeted rate” (Auckland Council, 2012, p. 347). Thus, it appears that Auckland Council are interested in applying a parking levy similar to that mentioned in the Literature Review Chapter, which will fund its transport projects and internalise the costs of excess off-street parking provision.

A comparison between the aforementioned components of the Auckland Plan and the Auckland Regional Land Transport Strategy reveals some similarities. Both advocate for a change to the current use of minimum parking requirements and the taxation of off-street parking. It is therefore apparent that the Auckland Plan has heeded some of the advice from the previous non-statutory planning documents, which should be manifested in the Draft Unitary Plan that was released in March 2013. An analysis of the Draft Unitary Plan follows in the next Sub-Section to understand whether its provisions embody the direction of the Auckland Plan.

5.3.2 Draft Auckland Unitary Plan

The Draft Auckland Unitary Plan consists of a Regional Policy Statement as well as Regional and District Objectives, Policies and Rules. Each part describes numerous mechanisms that can regulate parking supply with the goal of improving land use
efficiency. Chapter 2.3.1 of the Regional Policy Statement describes how providing alternative car parking arrangements can concentrate commercial developments in growth corridors and mixed-use zones (Auckland Council, 2013b). This ensures that commercial developments use land efficiently, which consequently will not compromise the ability of other developments to arise in the same area. The Regional Policy Statement also recognises that too much parking is an inefficient land use because it decreases the attractiveness and effectiveness of nearby public transport options (Chapter 2.3.3) (Auckland Council, 2013b). As such, it requests the restriction of parking spaces in locations that have access to frequent public transport such as the city centre and other urban centres (Auckland Council, 2013b).

The District Plan’s Auckland-wide Objectives, Policies and Rules that follow the Regional Policy Statement in the Draft Unitary Plan answers the call for parking supply constraints and alternative car parking strategies. In Part 3.1.1.2, Policies 1 and 3 restrict off-street parking provision in the city centre and in metropolitan, town and local centres as well as office developments to support intensification, reduce land consumption and enhance the use of public transport (Auckland Council, 2013b). These types of centres are part of a ‘centres hierarchy’ that Auckland Council uses to classify areas that have a wide range of commercial, community, tourist and residential activities, a high population density and good public transport (Auckland Council, 2013b). Furthermore, Policy 4 offers examples of alternative parking arrangements that Auckland Council could use such as shared parking, which provides more parking with less land and uses existing car parks more efficiently (Auckland Council, 2013b). Notwithstanding these reformist Policies, Policy 2 still supports minimum parking requirements in areas outside of the ‘centres hierarchy’ (Auckland Council, 2013b).

The Rules in Part 4.2.1.2 reflect the approach for more restrictions because maximum parking requirements have replaced minimums for activities in the ‘centres hierarchy’, mixed-use, terraced housing and apartment building zones (Auckland Council, 2013b). In the absence of minimum parking requirements, it may become easier for neighbouring businesses to share their existing car parks because they will not be bound by an obligation to provide a certain amount of parking spaces. Conversely, the retention of minimum parking requirements in areas outside of the ‘centres hierarchy’, mixed-use, terraced housing and apartment building zones means that sharing parking may still remain difficult there. Moreover, the removal of minimum parking requirements, if implemented in the operative version of the
Unitary Plan, may also lead to the better allocation of land for off-street parking. These assertions were tested through the interviewing of the key informants and their expert views on the alternative parking policies that the Draft Unitary Plan proposes will be analysed in Chapter Seven.

5.4 Conclusion

Auckland’s planning framework clearly shows a dualism. The current framework understands that an excessive quantity of off-street parking undermines intensification and compactness and consumes too much land. This comprehension is reflected in several statutory and non-statutory planning documents such as the Auckland Regional Land Transport Strategy, Auckland Regional Parking Strategy and the Objectives and Policies of the Waitakere City District Plan. However, in the case of Waitakere City, there are no Rules in its District Plan that reflect these Strategies and thus, they do not fully address the identified problems. As such, there is an apparent confusion over the direction that the current framework intends to take, which has caused the retention of minimum parking requirements. On the other hand, the potential future planning framework limits off-street parking supply and encourages the use of existing off-street parking infrastructure by replacing minimum parking requirements with maximums.

The current planning framework has defined the present off-street parking supply in Auckland and the future framework has the potential to change it. Thus, Chapter Six that follows will quantitatively and qualitatively demonstrate the land use inefficiency consequences of the current planning paradigm. Moreover, Chapter Seven will examine the viability of alternative parking policies such as maximum parking requirements that the future framework proposes in Auckland.
6 Minimum Parking Requirements’ Impacts on Land Use Efficiency

6.1 Introduction

This Chapter will explain the results of this study pertaining to the impacts of minimum parking requirements on land use efficiency. The GIS analysis has produced the land use efficiency findings in Section 6.2, while the key informants’ professional opinions on minimum parking requirements’ effects on land use in Auckland feature in Section 6.3. Finally, Section 6.4 will discuss the significance of the quantitative and qualitative results within the theoretical and analytical frameworks established in the Literature Review Chapter as well as within Auckland’s planning framework.

6.2 GIS Analysis of Off-street Parking’s Land Consumption

The GIS analysis has determined the spatial coverage of non-residential off-street surface car parks from 1996 and 2006 in the GIS Study Area in West Auckland (Figures 11 and 12). As outlined in the Methodology Chapter, this enabled the calculation of the total land area, the area of land dedicated to non-residential off-street surface parking and the potential number of off-street car parks in the GIS Study Area. The integration of these calculations with census data from 1996 and 2006 revealed the findings on the surface parking area per resident, per worker and per available car within the GIS Study Area in Table 2. Moreover, the potential number of car parks was divided by the values for the resident population, worker population and the number of available cars to obtain the findings in Table 3.
Figure 11: Non-residential off-street surface parking coverage in 1996. Source: Author’s Research (2013)
Figure 12: Non-residential off-street surface car park coverage in 2006, with the 2006 additions highlighted in pink. Source: Author’s Research (2013)
Table 2: Area of off-street surface parking in relation to population and vehicle statistics. Source: Author’s Research (2013)

<table>
<thead>
<tr>
<th></th>
<th>1996</th>
<th>2006</th>
<th>Percentage Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total land area (m²)</td>
<td>18837770.7</td>
<td>18837770.7</td>
<td></td>
</tr>
<tr>
<td>Total parking area (m²)</td>
<td>674542.9</td>
<td>884074.6</td>
<td>+31%</td>
</tr>
<tr>
<td>Parking land coverage (%)</td>
<td>3.6</td>
<td>4.7</td>
<td></td>
</tr>
<tr>
<td>Resident population</td>
<td>35943</td>
<td>42126</td>
<td>+17%</td>
</tr>
<tr>
<td>Parking area per resident (m²)</td>
<td>18.8</td>
<td>21</td>
<td>+12%</td>
</tr>
<tr>
<td>Worker population</td>
<td>16527</td>
<td>16917</td>
<td>+2%</td>
</tr>
<tr>
<td>Parking area per worker (m²)</td>
<td>40.8</td>
<td>52.3</td>
<td>+28%</td>
</tr>
<tr>
<td>Parking area per resident and worker (m²)</td>
<td>12.9</td>
<td>15</td>
<td>+16%</td>
</tr>
<tr>
<td>Total number of cars available to households</td>
<td>17049</td>
<td>21561</td>
<td>+26%</td>
</tr>
<tr>
<td>Parking area per car (m²)</td>
<td>39.6</td>
<td>41</td>
<td>+4%</td>
</tr>
</tbody>
</table>

Table 3: Potential number of parking spaces by assuming all car parks adhere to the Land Transport New Zealand guidelines of 13.5 m² per parking space. Source: Author’s Research (2013)

<table>
<thead>
<tr>
<th></th>
<th>1996</th>
<th>2006</th>
<th>Percentage Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential parking spaces</td>
<td>49966</td>
<td>65487</td>
<td>+31%</td>
</tr>
<tr>
<td>Potential parking spaces per resident</td>
<td>1.4</td>
<td>1.6</td>
<td>+12%</td>
</tr>
<tr>
<td>Potential parking spaces per worker</td>
<td>3</td>
<td>3.9</td>
<td>+28%</td>
</tr>
<tr>
<td>Potential parking spaces per resident and worker</td>
<td>1</td>
<td>1.1</td>
<td>+16%</td>
</tr>
<tr>
<td>Potential parking spaces per car</td>
<td>2.9</td>
<td>3</td>
<td>+4%</td>
</tr>
</tbody>
</table>
Figures 4, 11 and 12 show that non-residential off-street surface car parks are situated primarily in the centres of New Lynn and Henderson, with significant clusters also appearing in the suburbs of Glendene and Glen Eden. These car parks support the wide range of retail, commercial, industrial and transportation land uses that are nearby. Examples of such land uses and their accompanying car parks are shown in Figures 13 to 17. Figures 11 and 12 and Table 2 also indicate that there was a noticeable 31 per cent increase in the quantity of off-street surface car parks in the GIS Study Area from 1996 (674542.9 m$^2$) to 2006 (884074.6 m$^2$). This increase was incommensurate with changes in the resident and worker populations, which only increased 17 per cent and two per cent respectively.

Because the parking supply increases were disproportionate, it is no surprise that there was also a high amount of land dedicated to parking in relation to the local resident and worker populations and the number of cars to which households have access. Moreover, this high off-street parking provision increased longitudinally between the 1996 and 2006 census years. For example, in 2006, there was 21 m$^2$ of off-street surface parking per resident, 52.3 m$^2$ per worker and 15 m$^2$ per resident and worker. These calculations represent a 12 per cent, 28 per cent and 16 per cent increase in surface parking area respectively compared to 1996.

Finally, the estimates on the parking spaces per resident, worker and car provide an interesting insight. Table 3 demonstrates that there were almost two car parks per resident and four car parks per worker in 2006. These ratios are similar to those from 1996. Interestingly, there was also approximately one car park per person in the GIS Study Area in 1996 and 2006 when the resident and worker populations are combined. These results reinforce the fact that there was a high off-street parking supply relative to the local population and to the number of cars available to the resident population in 1996 and 2006. In fact, Table 3 gives a clearer understanding of the quantity of non-residential off-street surface parking relative to the population and available cars in the GIS Study Area because it is arguably easier to identify with a quantity of parking spaces as opposed to car park area. The subsequent Section 6.3 will build upon this Section’s quantitative results by detailing the key informants’ perspectives towards minimum parking requirements’ impacts on off-street parking provision.
Figure 13: Off-street surface parking for commercial land uses in New Lynn. Source: Author's Research (2013)
Figure 14: Off-street surface parking for retail and restaurant activities in New Lynn. Source: Author’s Research (2013)

Figure 15: Off-street surface parking for offices in Henderson. Source: Author’s Research (2013)
Figure 16: Off-street surface parking for nearby commercial activities and train station in New Lynn. Source: Author’s Research (2013)

Figure 17: Off-street surface parking for commercial activities in New Lynn. Source: Author’s Research (2013)
6.3 Expert Views on Minimum Parking Requirements

The key informants who participated in this study's primary research offered professional insights into their dealings with minimum parking requirements. Their experiences explained the impacts of the requirements on land use efficiency in Auckland and other cities through examples of land developments with which they are familiar. Despite the key informants' diverse backgrounds and occupations, their views on minimum parking requirements shared many attributes. Recurring themes from the interviews with the key informants included the inadequacy of minimum parking requirements and the increased costs and the hindrance to other land developments that they cause.

6.3.1 The Inadequacy of Minimum Parking Requirements

There was consensus among the key informants that minimum parking requirements are inadequate at supplying an optimal amount of off-street parking to land uses. Both the Economist and Parking Designer 2 cite the issue of granularity as one that besets the implementation of minimum parking requirements. In relation to planning, granularity means it is unrealistic to expect a rule to address a land use problem in detail, but a level of detail is necessary for the problem to be solved. For example, the Economist asserts that “the extent to which minimum parking regulations can accommodate the granularity required for each business depending on what type of business and their locality, is really, really limited”. The Economist further states that parking regulation is “simply too complicated. And not only is it too complicated but the markets are changing on a yearly, monthly, weekly basis, so the requirements for car parking last week might be different for what they [local authority] need in a year’s time or two years’ time”. Parking Designer 2 affirms these ideas by stating that “it’s pointless to predict demand using minimum parking requirements. To do that, you have to get down to a granular level for each site, which isn’t feasible...the factors involved are too complex for a council to look on an individual basis to come up with the right amount of parking”.

Hence, the overall thrust of the Economist and Parking Designer 2’s arguments is that minimum parking requirements will always cause an imbalance in parking supply and demand because they cannot accurately reflect the unpredictable parking needs of different land uses. To do so would necessitate a minimum parking requirement for each individual land use, which is patently intractable. Thus, the
continued use of minimum parking requirements will only provide an inaccurate and superfluous parking quantity, as evidenced by the GIS analysis’ findings.

According to a number of the key informants, minimum parking requirements are also inadequate because they have not only failed to address the parking spillover issue that they were meant to solve, but have in fact exacerbated this problem considerably. For example, the Economist said: “[minimum parking requirements] are trying to create enough car parking to reduce congestion costs and you’re actually getting the opposite, you’re inducing more people to come out onto the streets, more people to drive their cars...it actually increases congestion”. Similarly, the Council Planner contends that minimum parking requirements are counterproductive because they hinder developers who wish to ease traffic congestion: “A developer says hey but I’m trying to do a good thing, I’m trying to build apartments in an area well-served by public transport and people can walk to work...and then you’re [Auckland Council] saying I need to assume everyone has two cars? And go build an underground car park at $45,000 per space or whatever it costs”. Minimum parking requirements also worsen traffic congestion by necessitating more car trips between land uses “because parking is provided exclusively for a site under a resource consent, [and as such], parking can’t be used efficiently” (Parking Designer 2). “This has an impact on the [traffic] network because if there are three different off-street parking areas then that’s three trips to go to different sites” (Parking Designer 2).

6.3.2 Side Effects of Minimum Parking Requirements

Another commonality in the key informants’ views is that minimum parking requirements are a failure because of the multitudinous unintended negative consequences that they cause. They justify their opinions by positing a number of examples in which minimum parking requirements have unnecessarily elevated costs for parking stakeholders or hindered the development of other land uses. The Member of Parliament (MP) (and formerly a transport planner) recounted the case of the Crystal Palace Theatre’s restoration in Mount Eden, Auckland. It required a resource consent because “it was a heritage building but the plan required a ridiculous amount of car parks” (MP). This theatre’s physical characteristics prevented it from supplying a sufficient amount of car parks to adhere to the District Plan’s requirements. Consequently, the building owner, who wanted to preserve a heritage building, had to devote time and money into the resource consent fees and processes to obtain a dispensation from meeting the parking requirements. Such an
example illustrates the perceived unnecessary high bureaucratic costs that minimum parking requirements impose on those involved with land developments.

In addition to the previous example, minimum parking requirements also increase the cost of mixed-use developments. Parking Designer 2 cites a development composed of six apartments, cafés and stores in Saint Heliers, “one of the most expensive suburbs in Auckland”. The apartments sold for $1.2 million to $2 million, even though over half the site is dedicated to parking. Parking Designer 2 contends that “it’s not an efficient use of land at all” because the developer could have built more units by reducing parking supply if minimum parking requirements were not in effect. If the developer was able to do so, Parking Designer 2 argues that the apartments would have become more affordable because he or she could have constructed more units with the same area of land. Parking Designer 1 agrees with the statements of Parking Designer 2 by offering this example:

[I]f you’ve got a plot of land that a developer wants to build offices on...if he’s required to put in 20 car parks, that’s less office space you can put on that land. He has to charge more for that office space to get his return because there’s (sic) less of them. So the opportunity cost of providing all that parking means less of any of the land uses really. It’s pushing up the price, the cost of development and it’s reducing supply.

The Economist summarises Parking Designer 1 and 2’s arguments with a hypothetical retail example: “if a retail outlet has more car parking than otherwise would be the case, they lift their prices to accommodate that increase in cost and they spread that cost over all of their retail customers. So the cost of minimum car parking is spread over all people regardless of the [transport] mode that they have chosen”.

There is clear unanimity among the key informants that a by-product of minimum parking requirements is the elevation of costs for developers, tenants and consumers through increased development, consumption and opportunity costs. The other side effect of minimum parking requirements on which a number of the key informants agreed was the hindrance of the establishment of productive land uses. The Council Planner recounted a personal experience while walking around Wairau Park, on Auckland’s North Shore: “This is a big box retail area and everywhere, every shop along that place has its own 20 car parks or whatever. So you go to this place and you gotta (sic) drive into this one store, do your shopping there, drive out of that, drive along to the next one that’s down the road”. The Council Planner questions the logic of having off-street car parks outside every retail store and wonders “why haven’t
they [the developers] just done one big shared car park and then everyone leverages off that”? By having an urban form dominated by car parks such as that of Wairau Park, the Council Planner suggests that this site has wasted valuable land that could have been used to improve the walking environment or for more retail sites.

Similarly, the MP builds upon the Council Planner’s remarks by offering the example of an early childhood education centre in Point Chevalier, Auckland, which took over a house for expansion. Although this land use change seemed straightforward, the early childhood education centre was obliged by the minimum parking requirements to buy another adjacent house to convert it into a car park so that it could obtain a resource consent. The Council Planner is also aware of this case and contends that it is contrary to Auckland’s desire for intensification because of the example’s excessive land consumption: “And this is when we’re trying to get intensification. This is on Great North Road...one of Auckland’s best bus routes. This is where most people probably walk there [early childhood education centre] because it serves the local Point Chevalier community. It’s just insane”!

The fact that these examples demonstrated the hindrance of other potential land uses reiterated the previous statements from Parking Designer 2, who said “the opportunity cost of providing all that parking means less of any of the land uses really”. The Economist concurs with this statement by reasoning:

[i]f it was left up to a business, they might provide less car parking. And if they were to provide less car parking, they’d use that space for something more productive. So that might be more retail floor space...And if you had more floor space for your shop, it seems reasonable that you might be able to sell more, you might be able to employ more people, you might have higher turnover. So one of the opportunity costs of minimum car parks...is a sort of constraint on the economy, a constraint on employment.

It is clear from the key informants’ perspectives and the results of the GIS analysis that the high land consumption caused by minimum parking requirements triggers a multitude of adverse consequences such as elevated costs for developers, tenants and consumers as well as the impediment of productive land development. The next Section will elucidate these findings within the body of knowledge established in the Literature Review Chapter as well as within Auckland’s planning frameworks.
6.4 Significance of GIS Analysis and Expert Views

The first research question seeks to investigate how minimum parking requirements affect land use efficiency in Auckland and whether there has been an oversupply of parking as a result of this planning regulation. Hence, the purpose of this Section is to address this research question with reference to the results from the GIS analysis and the key informants’ expert views and to Auckland’s planning frameworks. It will also respond to this research question with guidance from the examples in the Literature Review Chapter that assessed minimum parking requirements’ effects on land consumption and off-street parking supply.

6.4.1 Oversupply of Off-street Parking Relative to Population

The GIS analysis showed that a surplus of non-residential off-street surface parking exists in the GIS Study Area. This excess was present in all calculations derived from the GIS analysis such as the number of off-street car parks per resident and worker and the parking area per car available to households in the GIS Study Area. Given that the recommended area for a car park in New Zealand from the New Zealand Transport Agency is 13.5 m², it is plausible that there was up to one car park for every person living and/or working in the GIS Study Area and up to three car parks per every car available to households in the same area in 2006 (Land Transport New Zealand, 2007). While there is no universally accepted definition of parking oversupply, the fact that there was one parking space for every man, woman and child supports the contention that there was a superfluity of parking in the GIS Study Area. This argument has substance given that not every person who lives or works there uses a car or is capable of driving.

There also appears to be a positive longitudinal trend in the provision of parking because all non-residential off-street surface parking calculations experienced increases since 1996. In fact, the positive rate of off-street parking provision change exceeded the rate at which the resident and worker populations of the GIS Study Area increased between 1996 and 2006. These results indicate that land is not being used efficiently in the GIS Study Area because there are neither enough people nor cars to justify the amount of non-residential off-street surface car parks. Additionally, the accelerated parking supply is unwarranted because the local population did not increase sufficiently to be on par with the off-street parking provision.
It is important to note that the GIS analysis did not include residential off-street car parks or off-street car parks that are underground or within buildings that are concealed in the aerial photographs. Thus, the actual off-street parking quantity in the GIS Study Area will actually be larger than that indicated by Table 2. One could argue that it is necessary to have a quantity of off-street parking that is substantially larger than the number of people and cars present at any location to accommodate for those who drive into a locality such as tourists and visitors. Although this study did not consider the number of cars that enter the GIS Study Area due to a lack of readily available statistics, it is surmised that visiting cars did not warrant the amount of parking that was present in 1996 and 2006 because the goods and services in the GIS Study Area were also available elsewhere in Auckland. As such, it is unlikely that the GIS Study Area experiences a sizeable regular influx of cars belonging to people who neither live nor work there and thus the quantity of parking available in both 1996 and 2006 was surplus to requirements.

6.4.2 The Responsibility of Minimum Parking Requirements for Inefficient Land Use

In terms of spatial distribution, the non-residential off-street surface car parks are situated primarily in centres of commercial activity such as Henderson and New Lynn in the northwest and southeast of the GIS Study Area respectively. As a consequence, there is undoubtedly potential for land that is allocated for off-street parking to be used more efficiently through shared parking schemes, given the high concentration of people and vehicles that frequent these centres. Yet, this is not occurring extensively as there are sprawling swathes of surface parking in Figures 4, 11 and 12 in Henderson and New Lynn because of the obligation to supply off-street parking for individual land uses under a regime of minimum parking requirements. The consequence of such an urban form is the excess consumption of valuable urban land that could have been allocated for other land uses, which has consequent effects on opportunity costs, consumption costs and visual amenity. Thus, not only is off-street parking’s land use inefficient in the GIS Study Area, but economic inefficiencies also occur from the high costs that it imposes. These inefficiencies have been evidenced by the professional experiences of the key informants, ranging from the high cost of heritage restoration in Mount Eden, to the expensive development and sales costs of a mixed-use development in Saint Heliers because of the obligation to provide parking.
Figures 13 to 17 show large tracts of off-street surface parking in Henderson and New Lynn that are underused in the weekend because they normally serve offices in the weekdays. Indeed, this phenomenon occurs across the GIS Study Area as shown by Figures 11 and 12 because minimum parking requirements stipulate that new or altered land uses must provide for this urban form. Such an outcome further demonstrates that land is consumed inefficiently in the GIS Study Area because instead of maximising the number of cars that have access to an off-street car park through shared parking, the quantity of land available for off-street surface parking has been enlarged by minimum parking requirements. Thus, it is evident that off-street parking has been allowed to proliferate since 1996, irrespective of the fact that parking demand can oscillate according to land use type, time and day. Off-street parking provision has also burgeoned in the GIS Study Area despite the fact that regular public transport connects the centres within the GIS Study Area together, in addition to linking them with Auckland’s city centre.

Minimum parking requirements that are in effect in Waitakere City have undoubtedly caused the aforementioned superfluous parking provision and inefficient land use in the GIS Study Area. Furthermore, based on the consensus of the key informants regarding the impacts of minimum parking requirements on Auckland’s land use, it is likely that the inefficient land use in the GIS Study Area is present elsewhere in Auckland too. Rules that force the supply of one car park per 16 to 25 m² of gross floor area for retail land uses in various locations of the former Waitakere City can only increase the land consumption for non-residential off-street surface parking. Instead of promoting the prudent use of urban land, minimum parking requirements appear to have engendered a culture of land consumption that is inconsistent with the compact development direction that Auckland’s current and future planning frameworks provide. The shortcomings of minimum parking requirements reflect the granularity problem that a number of key informants cited because their inability to predict the optimal amount of required parking has resulted in an oversupply of off-street parking. It is therefore unrealistic to expect minimum parking requirements to be able to supply a quantity of parking that meets a variable demand.

The land use inefficiency and off-street parking oversupply problems that beset Auckland are comparable to those that the literature on parking policy has documented in cities overseas. For example, Davis et al. (2010) demonstrated that an urban county in Indiana, USA consumed so much land for off-street parking because
of minimum parking requirements that there were sufficient parking spaces for 1.7 times the space needed by the county’s registered cars. Similarly, an intractable supply of off-street parking caused nearly three-fifths of the commercial study areas in Akbari et al. (2003) to be covered by car parks. Such a surplus of off-street parking often leads to the underuse of parking at peak times as evidenced by Willson (1995), which found on average almost half of office car parks were empty in Southern California.

These findings in the American context bear resemblance to this study’s evidence of superfluous non-residential off-street surface parking provision in the GIS Study Area. One can therefore infer that minimum parking requirements are capable of oversupplying parking, irrespective of the geographic context, because they are inept at predicting an optimal quantity of parking for varying land uses. The issue of granularity, as cited by the Economist and Parking Designer 2, must therefore be pervasive in localities that implement minimum parking requirements. When this problem becomes uncontrollable, extreme examples arise such as in Jeddah, Saudi Arabia, where almost half of the land occupied by land uses is used for off-street car parks (Al-Fouzan, 2012).

6.4.3 The Costs of Inefficient Land Use

Based on the experiences of the key informants, it appears that the parking oversupply and land use inefficiency that minimum parking requirements cause in Auckland are concomitant with high opportunity costs. As alluded to in the previous Sub-Section, they arise when excessive off-street parking consumes land that could have been used for other purposes, which ultimately reduces a site’s development potential and wastes valuable urban land (e.g. the early childhood education centre in Point Chevalier) (Cutler & Parfitt, 2011; MacArthur, 2010). Evidence from the parking policy literature corroborates this assertion because Cutter and Franco (2012) demonstrated that in Los Angeles County, USA, the value of a land parcel decreased after it was converted into a car park. The decrease in land value is a function of parking’s ‘stickiness’, to which the Economist attributes as a cause of high opportunity costs, because once parking is built, it can be difficult to remove and the land on which it sits can no longer be used for other purposes. The devaluation of land also occurs because a rational developer would only pay a price for land that reflects the cost of the land less the area for parking because the land for parking does not generate as much income as the remainder of the land that can be developed.
(Willson, 1995). It is consequently reasonable to infer that the incurrence of high opportunity costs in Auckland has led to a loss of income and land value for developers and landowners.

Developers and landowners who are financially worse off because of the high opportunity costs that minimum parking requirements impose will understandably pass these costs onto tenants and consumers. Parking Designer 2’s example of the high selling price of mixed-use apartments in Saint Heliers typifies the transfer of losses to a consumer because the developer is compelled to raise the selling price to compensate for the reduced density at which he or she could build. This case reflects the argument from Litman (2009), which posited that minimum parking requirements render inner city housing unaffordable due to a reduced development density. The costs are exacerbated if a resident does not own a car because he or she effectively subsidises others who possess a vehicle (Litman, 2009; Shoup, 1999b). It is therefore clear that minimum parking requirements also have negative implications on issues of urban equality, in addition to those that adversely affect land use efficiency.

From some of the key informants’ experiences with minimum parking requirements, it was apparent that this planning rule also made development more expensive for developers through higher construction and compliance costs. The examples of the heritage restoration of the theatre in Mount Eden and the expansion of the early childhood education centre in Point Chevalier incurred expenses that are unnecessary to the developer and the site occupants because the quantity of off-street parking provided was surplus to requirements. In fact, adherence to minimum parking requirements can become so cumbersome that court action may be necessary, as evidenced by Glendore (NZ) Ltd v Christchurch City Council. The perceived financial burden associated with compliance is best described by the Council Planner, who asserted that forcing minimum parking requirements on developers in Auckland’s dense urban areas may necessitate underground parking because it may be physically challenging to provide parking with any other means. As Cutler and Parfitt (2011) affirms, this is financially unfeasible for most businesses in cities like Hamilton, New Zealand, which deters development activity and destabilises the economic viability of New Zealand cities.

These impractical compliance and construction costs also feature in the USA because minimum parking requirements can increase development expenses by ten times the
infrastructure contribution fees in American cities (Shoup, 1997). As with the high opportunity costs from lost development potential and urban land wastage, such examples will also undoubtedly compel developers to pass their elevated expenses onto tenants and consumers. These lower order stakeholders will hence suffer financially because of minimum parking requirements, regardless of whether they use off-street car parks.

6.5 Conclusion

The myriad land use inefficiency problems discussed in the Sections are representative of the iterative cycle of minimum parking requirements in Willson (1995) that features in the Literature Review Chapter (Figure 1). Auckland’s high minimum parking requirements such as those in the Waitakere City District Plan have supplied a quantity of off-street parking that well exceeds demand because of the issue of granularity. Consequently, the plethora of off-street parking that often has no market price reduces the development density of Auckland’s urban areas, the cost of which is passed onto consumers. The surplus of off-street parking creates a sprawling urban form as shown in Figures 11 and 12 that is conducive to travelling by car and undermines the local public transport network, according to the Council Planner. The resultant traffic congestion that the Economist attributes to the superfluity of off-street parking in Auckland will engender a perception among Aucklanders that more parking is needed to accommodate the congestion and spillover, which will reinforce the minimum parking requirement status quo and exacerbate parking oversupply.

By adopting minimum parking requirements and entering into the aforementioned iterative cycle, Auckland has demonstrated an inefficient use of land. This planning rule has generated pervasive unintended consequences that affect every person who lives in or visits Auckland, no matter whether they are a developer, a resident or a consumer. Although the GIS analysis showed that the most apparent externalities of minimum parking requirements are excess land consumption with high opportunity costs, the information in the literature and the key informants’ experiences suggest that the finances of all urban stakeholders are afflicted too. Moreover, a closer examination of the impacts of minimum parking requirements in Auckland reveals issues of inequality; those who do not own a car subsidise the construction of a car park that they cannot use. It is challenging to remedy these negative effects without a paradigm shift in parking policy. Thus, it is encouraging to see that Auckland Council
is committed to severing the iterative cycle in which it finds itself by proposing to replace minimum parking requirements with maximum parking requirements in large tracts of Auckland in its Draft Unitary Plan. The next Chapter addresses the implications of this new policy, as well as those of other mechanisms that featured in the Literature Review Chapter within the context of Auckland.
7 The Viability of Alternative Parking Policies

7.1 Introduction

It is futile to identify the negative effects of minimum parking requirements in Auckland without devising credible solutions to tackle the problems. With this in mind, the key informants informed this thesis of alternative policies that could replace the status quo of minimum parking requirements. The questioning that elicited their advice was based on the alternative policies from the parking policy typology in Chapter Two and the interview themes in Appendix C. Their professional views on the viability of maximum parking requirements, no parking requirements, shared parking and a range of fiscal mechanisms feature in the subsequent Section. The ways in which potentially viable alternative parking policies can be applied in Auckland, with reference to the professional views and the parking policy typology, appear in Section 7.3. Section 7.3 will also illuminate the reasons why certain alternative parking policies are more viable and applicable than others within Auckland’s planning framework.

7.2 Professional Views on the Viability of Alternative Parking Policies in Auckland

7.2.1 Maximum Parking Requirements

Maximum parking requirements are especially pertinent to the planning of parking provision in Auckland because the Draft Unitary Plan proposes that they replace minimum parking requirements in large tracts of urban Auckland. Some key informants had reservations about this policy because although it shifted away from minimum parking requirements, there are still inherent problems with the application of maximum parking requirements that remain unsolved.

The Council Planner contends that a major goal of maximum parking requirements is to reduce car trips through the restriction of parking provision: “let’s say someone wants to build a 5000 space car park building in the middle of the city...but then you
say can the streets really cope with 5000 more peak time vehicle movements?...you can run a model analysis of that and say ah no and I think that has to become an argument in favour of maximums”. Parking Designer 2 concurs with the Council Planner’s view that maximum parking requirements’ purpose is to restrict vehicle movements. However, “it’s also quite difficult to work out how the car park spaces are going to be used. For a residential car park space, you might only get two trips a week whereas...a work from home type of person that does multiple site visits...may generate 40 or 50 trips a week” (Parking Designer 2). From this statement, it is clear that the issue of granularity affects maximum parking requirements too with regard to traffic control.

In addition to reducing car trips, maximum parking requirements can mitigate parking’s land use ‘stickiness’, according to the Economist and the Council Planner. The Economist illuminates this by stating: “car parking is very sticky because once you create car parking, it’s quite difficult to get rid of”. This is especially true for large parking facilities because “people think that the best use of that land will be a parking building and that may be true for the next three or five years, but that building is going to be around for decades and whereas it may be very useful now, it may be a millstone around our necks in 20 or 30 years’ time” (Council Planner). As such, maximum parking requirements are effective at stopping “those decisions which look great in the short term but end up being really crap in the long term” (Council Planner).

Parking Designer 1 expressed doubts as to the contextual suitability of maximum parking requirements beyond dense areas such as the CBD or metropolitan centres:

It’s effective in somewhere like the CBD because there’s good public transport and we only want a limited amount of traffic coming into the CBD...the Unitary Plan is proposing maximums everywhere in all town centres and that’s a little hard to justify because there are town centres where there is poor public transport and businesses want to provide more parking and they’re saying you’re [Auckland Council] not letting me.

Therefore, granularity may not be an issue when maximum parking requirements are applied to city centres or other dense urban localities but it may arise elsewhere. There exist other problems with maximum parking requirements that may occur if they were applied as extensively as proposed in the Draft Unitary Plan. For instance, the Transport Engineer and the Economist both warned that maximum parking requirements could be seen as targets to which developers should meet, rather than
as an absolute maximum. The Economist illustrates this issue by giving this hypothetical example: “you’ve got a centre of five businesses, there are eight car parks [each] and then the council sets a maximum of ten, and all of a sudden people will know that car parking’s going to be scarce, there’s going to be two left and they scramble to get them and they put them in place as fast as they can”. Consequently, the implementation of maximum parking requirements may “increase the supply of car parking in the short run, thereby compromising your public transport network” (Economist). Maximum parking requirements may therefore work against the economisation of land consumption, which likens it with minimum parking requirements. However, when asked to give examples of maximum parking requirements acting as targets in the Auckland CBD (an area that currently adopts this rule), the Economist says: “I don’t know, I’m not sure”.

Negative agglomeration is another adverse consequence that may result from the use of maximum parking requirements. According to the Transport Engineer, this phenomenon involves the displacement of economic activity to locations in a city’s periphery in which maximum parking requirements are absent. It happens when maximum parking requirements in an urban centre are so restrictive that they stifle development opportunities and thus developers take their projects elsewhere. As the Council Planner posits: “if your employment, retail, offices or whatever feels that they need X amount of parking to make their business stack up and you say no you can’t provide for that, then either you don’t get that development...[or] you may find that development ends up where you don’t want it”. Consequently, the Council Planner is “hesitant about maximums, particularly in the lower order centres” because one may witness more “retail setting up in industrial zones, which is the story of Auckland’s pattern of planning in the last 15 years”. Similarly, the Economist challenges the logic of maximum parking requirements by questioning: “why is it that a business who is saying we want to have an additional car park here because it’ll make us more profitable, which means we can have more employment and we get more customers...why that’s a bad thing for society for that to occur”?

In relation to the Transport Engineer and the Council Planner’s concerns about negative agglomeration, one can assume that businesses and developers who share the Economist’s disquiet about maximum parking requirements are likely to relocate away from urban centres. As such, the Economist contends that maximum parking requirements become “a real policy issue because it’s just not clear how you would identify what the maximums would be” to avoid the negative agglomeration problem.
In summary, while maximum parking requirements have the potential to mitigate the ‘stickiness’ of car parks and to reduce car trips to city centres, they also engender unintended consequences such as negative agglomeration and the creation of targets. Furthermore, local authorities may have difficulty implementing this regulation due to the issue of granularity, which prevents the accurate identification of an appropriate location-dependent maximum.

### 7.2.2 No parking requirements

The adoption of a deregulated parking market in Auckland devoid of any supply requirements would represent a significant shift in parking policymaking from the status quo. There was unanimous support from the key informants for such a change because they believed that it would reduce off-street parking supply to a level that is advantageous to parking suppliers and users. This is especially true if a framework of no parking requirements included accessory policies such as shared parking and fiscal mechanisms, which will be illuminated in Sub-Sections 7.2.3 and 7.2.4 respectively.

A deregulated parking market finds favour with the Council Planner because it avoids the aforementioned unintended consequences associated with minimum and maximum parking requirements. As the Council Planner states:

> The assumption should be we don’t regulate parking. And then we need to say, what are the costs and benefits [of deregulation]? What is the argument in favour of regulating parking, either minimums or maximums?...if we can’t justify regulation...[then] be really careful of regulation because you can make things worse rather than making things better incredibly easily.

The Council Planner’s argument is therefore to take an initial non-interventionist approach and then apply regulatory measures such as maximum parking requirements if necessary. Similarly, Parking Designer 2 asserts that regulation such as maximum parking requirements “goes against the principles that we advocate in our parking management team. We’ll manage the on-street parking according to the overall Auckland Transport objectives and then it’s up to each business to provide what they need”. Moreover, the Economist and the Council Planner state that there definitely exist situations where neither minimum nor maximum parking requirements are appropriate and thus there should be no regulation at all. For example, the Economist says: “I think maximums and minimums are not the opposite of each other…I think they’ve got completely different policy objectives and
it’s quite plausible to say we don’t want a minimum and we don’t want a maximum either. I don’t think that minimums necessarily need to be replaced by maximums”. Equally, the Council Planner asserts:

There’s a big middle ground area that says, we can’t really justify either [minimum or maximum parking requirements]. We can’t really say there should be a minimum because of all the costs...but it might be that you only have maximums in the major centres, the city centre...for all the congestion and sticky market reasons. So there’s actually a big area in between where you say, you don’t have either.

The justification to which the Council Planner refers is in fact governed statutorily “because the RMA requires a good justification for a particular control [s 32 of the RMA]. It doesn’t require a justification for not doing something” (Council Planner). It is for this reason that the Council Planner has a preference for an initial deregulated parking market in situations where neither minimum nor maximum parking requirements are appropriate.

When asked whether a framework with no parking requirements would induce developers to provide copious quantities of parking, the MP responds as follows: “I don’t think that would be an economically rational conclusion that anyone would come to”. In other words, the MP implies that although a developer may have the freedom to provide an excessive amount of parking, he or she will have to bear that extra cost, which is economically irrational. The Council Planner answers the same question by saying: “Yea, certainly....[but] you have to bear the cost of that”, which reiterates the MP’s argument. Moreover, the MP stresses: “I don’t think it’s enough to say oh let’s just not regulate anything anymore...they’re [developers] gonna (sic) have to show how to provide for people to get there [the land use concerned]”. The MP elaborates by saying:

Instead of the Councils having to put down a number [a requirement] in a plan, they would be better requiring large developments to develop a travel management plan to identify how people will come to the area and the onus is on them to say how they are going to meet the demand. That provides some incentive to the developer to really assess the costs and benefits of providing access through car parking or any other ways.

Consequently, such an accessory to deregulation may ensure that developers refrain from the superfluous provision of parking but still retain the freedom to supply enough parking to meet their needs.
The key informants’ preference for parking deregulation is not merely a predilection but in fact one posited on reasonable opinions. Arguments in favour of no parking requirements from the key informants cite the fact that often neither maximum nor minimum parking requirements are suitable for a certain location and thus deregulation is the best choice. Furthermore, key informants such as the Council Planner stress that having no parking requirements should be the default policy and regulatory measures should only be pursued if necessary. Justification of any rule is of extreme importance under s 32 of the RMA and if one cannot validate the regulation of off-street parking provision, it is better to eschew it to avoid the unintended negative consequences of minimum and maximum parking requirements. As the MP suggests, the deregulation of parking supply may dovetail well with accessory measures. Following on from the MP’s reasoning, the subsequent Sub-Sections will illuminate shared parking and fiscal mechanisms as policies that may complement a framework of no parking requirements.

7.2.3 Shared Parking

The dominant themes in the key informants’ opinions on shared parking are that it is only feasible without minimum parking requirements and that it represents a thrifty way to use existing off-street parking. This Sub-Section will explain the barriers to the efficient allocation of existing off-street parking such as minimum parking requirements and the contribution that shared parking can make to a deregulated parking supply market.

According to Parking Designer 2, the sharing of off-street parking is currently extremely difficult “because it’s a regulatory obligation [of a resource consent] that they [resource consent applicants] have to provide parking. They can’t share it with others”. Under a framework of minimum parking requirements, “there’s not a lot that we [Auckland Transport] can do to encourage it because it’s against the law really” (Parking Designer 2). Additionally, it is problematic for developers or businesses to use shared parking to address parking spillover, which is “an adverse effect that must be mitigated or avoided under the RMA” (Traffic Engineer). For instance, Parking Designer 1 states that:

There’s discretion that could allow it [shared parking]. That in theory sounds good, but it requires a contract between both businesses. The other business will be limited in what they can do with the land for parking because it’s
linked to a resource consent. It means if they wanted to change their site, it puts a spanner in the works if they wanted to do something else with it.

Moreover, “the consent authority can’t actually impose a condition on the third party” (Traffic Engineer). Thus, if the business that supplies the parking wanted to terminate the contract for shared parking by using the car park for other purposes, the other business would contravene its resource consent. Consequently, the consent authority “will chase them up in order for the developer to demonstrate how they will meet the condition under the new situation” (Traffic Engineer). The Council Planner recognises the administrative and legal hurdles of adopting shared parking at present by acknowledging: “because the District Plan forces them to provide for parking, people can look into alternatives and in certain cases people will do that [shared parking]. [However], it can be quite difficult from a legal perspective”. Despite the current barriers to implementing shared parking, an example exists in Auckland where this has occurred successfully. The MP explains that “Takapuna is suffering from a perceived parking problem...there’s too much parking and not enough people...But the guys from the Business Association were really proactive and lobbied the new Hoyts Cinema and local offices so that cinema patrons could use the office parking at night”.

Conversely, the Council Planner asserts that “if you don’t have minimum parking requirements...they’ll [businesses] naturally come to some agreement, it doesn’t have to be legal because no one has to provide any parking”. In that regard, the removal of minimum parking requirements will facilitate the sharing of existing off-street parking. Parking Designer 2 agrees with the Council Planner and explains that the “Unitary Plan is trying to encourage that [shared parking]. [By] removing minimum parking requirements, you can start doing that”. This is because the Draft Unitary Plan proposes to replace minimum parking requirements with maximum parking requirements and thus, without a legal obligation to provide parking, businesses and developers are free to share existing parking if they wish.

Once minimum parking requirements are abolished, the MP contends that developers and local authorities can examine the “different peak demand profiles for different land uses and consolidate them so that car parks can be shared between uses that have different profiles. Car park supply can be reduced by 20 to 30 per cent. Saves on the cost of land”. In other words, land uses that attract cars at different times of the day are ideal shared parking partners. The aforementioned example between the cinema and the offices is one example of the consolidation of land uses
with different peak demand profiles. Building upon this example, the Council Planner also offers the following hypothetical scenario:

The classic example is an office block and a church. The church might have a crapload of people there on a Sunday morning so its car park is full...completely empty for the rest of the day except for a couple of evenings where there might be community events or something. The office building is jam-packed during the week, completely empty on a Sunday. They're natural partners to come together and share that resource.

Given the land use efficiency and cost savings that shared parking can create in a deregulated parking market, one would expect the private sector to be receptive of this policy. However, the Economist doubts the validity of this assumption because of the extra effort and administrative costs associated with the management of a shared car park: “The problem probably would be enforcement I would imagine. What happens if I park in that spot to visit business A and then go off to business B [that is not a party to a shared parking arrangement]? So I suspect it’s because businesses don’t want to get into the business of car parking”. As such, the Economist asserts that there should theoretically be a shared parking market niche for private operators such as Wilson’s or Tournament to fill. However, the Economist suspects that minimum parking requirements are undermining the shared parking industry:

What’s stopping Wilson’s and Tournament car parking from setting up a car parking thing over there?...it might well be because of minimums. Because every business is being forced to have all these car parks, there’s no market for it. So as a result, you don’t get a Tournament, you don’t get a Wilson’s. They’ve been undercut, the market’s been taken out from under their feet.

The Economist comprehends that a way to solve Auckland’s excessive off-street parking supply problem is “centralising car parking, [but it] is actually not a viable thing at all because of the regulation. And that’s not a good thing because it means that we are using our very scarce space very inefficiently”. When questioned why Auckland Council does not increase the provision of public parking buildings in the absence of the private operators for the sake of improving land use efficiency, the Economist retorts: “if we then were to say why doesn’t Council come in and do that car parking? Well, you’ve just gone round in a circle you know? Council’s created the need for Council intervention because of a Council intervention [minimum parking requirements]. Why not just get rid of the initial Council intervention”?

It is evident from the key informants’ views that minimum parking requirements must be removed before shared parking becomes viable. The majority of the key
informants believed that once minimum parking requirements were abolished, shared parking would flourish because the regulatory hindrances would disappear. However, the Economist was sceptical about the increased sharing of existing off-street car parks because of the necessary additional effort and cost to manage and enforce shared parking. Consequently, the Economist views shared parking as part of the private operators’ domain in a deregulated parking supply market.

7.2.4 Fiscal Mechanisms

A number of the fiscal mechanisms that the key informants recommended shared similarities with those in the Literature Review Chapter. Interestingly, they also proposed other mechanisms that they contend would be viable in Auckland because of their past successes overseas. Regardless of the proposed fiscal mechanisms’ intricacies, their common objectives are to regulate against the superfluous provision of off-street parking and its negative effects as well as fund alternative transport modes.

Numerous key informants stressed the indispensability of the removal of minimum parking requirements before the implementation of fiscal mechanisms that tax off-street parking spaces. This is because any fiscal mechanism in addition to minimum parking requirements “would be a double tax because you’ve already taxed them by forcing them to produce more car parking than they want to and now you’re taxing them again for having that car parking, so that would not be a good thing” (Economist). Equally, the Council Planner explains: “you can’t have that [fiscal mechanism] and a minimum [parking requirement]. It’s like we’re going to force you to pay us at least this amount of parking [levy] per year”. The Council Planner adds that maximum parking requirements do not complement fiscal mechanisms either because “[i]ronically, a maximum clearly limits your revenue stream”.

In a situation without minimum parking requirements, the object of fiscal mechanisms that regulate off-street parking supply is threefold. According to the Transport Engineer and Parking Designer 1, not only do they reduce the supply of off-street parking, but they also ensure that car users internalise the congestion effects that they cause as well as finance public transport. One type of mechanism that has worked successfully in Australia is the parking levy:
All the Australian capital cities have a parking levy and what that is is that every business or entity that provides parking needs to provide...an annual levy per space...It’s saying there’s a cost to society having all those parking spaces because every parking space causes a trip or multiple trips coming in. So the purpose of the levy is to reduce the congestion (Parking Designer 1).

Parking Designer 1 considers the parking levy to be “a very effective tool because if a business is going to provide 100 car parks, there’s an annual cost for each one of those and that in turn will make them consider and decrease the amount of parking that they may need”. Asides from improving the land use efficiency of off-street parking supply, the parking levy has become a major funder of public transport in Sydney, Australia: “Sydney gets $100 million a year [from the parking levy] and they ring-fence it and put it all on public transport so they’re trying to reduce congestion with the levy and fund public transport [simultaneously]” (Parking Designer 1).

It is worth noting that there is variation in the mechanics of the parking levy that affects its main purpose. The Transport Engineer prefers a comprehensive parking levy that not only taxes off-street surface car parks, but also off-street car parks in multi-level parking buildings. According to the Transport Engineer, this type of parking levy, in effect, focuses on internalising the cost of congestion as opposed to decreasing the amount of land used for parking because even shared parking operators are targeted. For this reason, the Economist is opposed to a comprehensive parking levy:

You want to tax the car parking industry and is it fair for the car parking industry to bear the burden of that tax? It’s not clear to me that it is. We just talked about the fact that having car parking buildings is actually a good thing and that they're performing a function in society by centralising car parking and making an efficient use of space; why would you want to tax them?

Similarly, the Council Planner is hesitant about a comprehensive parking levy because “it [Auckland’s CBD] still feels fragile in terms of, that if you did something too major, you could really send it hurtling in the wrong direction...it may be you keep it [comprehensive parking levy] low enough that it’s a disincentive for the provision of parking, but not a disincentive for people to locate in the city centre”. The Economist argues that if mitigating traffic congestion is the main objective, a congestion charge would be more effective: “Road pricing would be a tax on people’s use of the roads, not their use of car parks and paying a price every time you go across a particular cordon or every time you go on the motorway may well be one way to internalise that cost [of congestion] without putting that cost on car parking
businesses”. From the reasoning of the Council Planner and the Economist, a parking levy that solely targets off-street surface parking may be a better tool to deter the excess provision of parking. Mechanisms that internalise congestion costs such as a congestion charge are beyond this study’s scope.

In addition to the parking levy, the key informants also suggested other fiscal mechanisms that would complement a parking supply market without minimum parking requirements. First, the MP argues that the rates system in New Zealand’s cities is flawed because it currently does not reflect the effect of commercial properties on the road network:

At the moment we assess rates...[that are] based on property values. Actually, a significant proportion of rates goes on transport and a majority of that usually goes on roads and road maintenance...if we were to do a fair assessment of the contribution to the road network by a given development, it’s not based on the value of the property, it’s based on the amount of free parking they provide.

Consequently, the MP mooted a revamp of the rates system to better account for the traffic congestion effects that off-street parking imposes on the road network and to disincentivise the superfluous supply of off-street parking: “if you assess your transport component of your rates based on the amount of free commercial car parks provided by the developer at a given place...it’s a fairer way of assessing rates because the highest value properties are in the city centre and they tend to generate fewer vehicle trips relative to suburban or outlying developments”. The MP gives an example of the current rates system behaving unfairly in Hamilton that was based on her previous work:

The Hamilton CBD was paying around 95 per cent of the rates and they were only receiving about 63 per cent of the transport spending. A big portion of transport spending was going on upgrading roads and putting in intersections at the Base [an outlying commercial development]....so really the city centre was subsidising their competitors out at the Base who were able to provide shops with a beautiful pedestrian environment and with acres of free parking around it and all that transport infrastructure was paid for in part by the city centre.

The MP advocates for the proposed rates reform “so that there’s a more equal playing field between the city centre and suburban developments”. Additionally, “people have the opportunity to say, actually, I don’t want to have to pay for these car parks so I can reduce my rates by reducing the number of car parks I will provide. I can use this land for something else” (MP).
The other fiscal mechanism that some of the key informants cited in addition to the parking levy was the fringe benefit tax on employer-provided parking. This tax was topical at the time of the interviews because the New Zealand central government had just rejected a proposal to adopt it. As Parking Designer 2 describes, “[a]t the moment if you’re an employer and you want to give someone a public transport pass so they don’t have to rely on a car, you get taxed on that. If you want to provide them with a free car park, you don’t get taxed, so there’s a tax incentive to provide free parking but there isn’t one to encourage alternative [transport] modes”. The Economist labels the absence of a fringe benefit tax as a “tax loophole and it distorts modal choice by making car parking look more attractive than it otherwise would be because of the tax system”.

Moreover, it is in one’s economic self-interest “to take the car park [instead of a public transport pass] because the car park’s not taxed and the other one would be considered a fringe benefit” (Economist). As such, the MP states “the idea in principle is very sound policy”. The Economist believes that “it got shut down for other reasons because it didn’t raise much revenue and people looked at it, you know, why put a tax in place if it’s not going to raise any revenue”? However, the Economist asserts that the narrow tax base is not a reason to discredit this fiscal mechanism because “not having that tax in place is going to be meaning that we have to invest more in roading infrastructure [such as off-street car parks and roads], which is increasingly expensive...particularly where space is so expensive”. The arguments that Parking Designer 2 and the Economist have put forward suggest a fringe benefit tax will place employer-provided parking and other transport benefits on an equal fiscal footing. Thus, this allows employers or developers to weigh up the full cost of providing a car park against the alternatives.

The goals of the fiscal mechanisms that the key informants have discussed are to provide a financial disincentive to supplying large amounts of off-street parking, to mitigate traffic congestion, to fund public transport and to ensure that parking provision is not incentivised over other transport modes. Furthermore, fiscal mechanisms may serve as an effective companion to a framework of no parking requirements but may also adversely affect efficient land users such as parking building operators if they are applied too comprehensively. The next Section will explore the ways in which the fiscal mechanisms as well the other parking policies that the key informants addressed can be viably applied in Auckland.
7.3 Application of Alternative Parking Policies in Auckland

7.3.1 Introduction

Based on the key informants’ professional views and the literature on parking policy, this Section will justify why certain alternative parking policies may be more successfully applied and more viable in Auckland over others. It also assumes their implementation occurs in an environment where minimum parking requirements have been abolished because of the Draft Unitary Plan’s approach and the fact that the key informants have affirmed many alternative parking policies cannot function in conjunction with them. Equally, it will elucidate the reasons that make some alternative parking policies unviable in Auckland, despite their successful adoption in examples cited in the literature. The purpose of this Section is therefore to provide and illuminate a repertoire of alternative parking policies that will form the policy recommendations in Section 7.4.

7.3.2 Integration of No Parking Requirements and Maximum Parking Requirements

From the accounts of the key informants, there appears to be a dualism between having a laissez-faire parking market without parking regulation and the application of maximum parking requirements in Auckland. The Council Planner, the Economist and Parking Designer 2 favour deregulation because it allows developers to provide a quantity of off-street parking that they need and regulation should not be used unless it can be justified according to s 32 of the RMA. These views are congruous with those who support the abolition of minimum parking requirements because they believe developers and car park users are best placed to assess the appropriate amount of parking that meets their needs and as such, regulation is unnecessary (Cutler & Parfitt, 2011; Donovan, 2012). Moreover, these advocates also posit that the absence of parking regulation will not perturb parking supply and demand, which will devote more land to other activities that provide employment and income (Barter, 2010; Guo & Ren, 2013; Shoup, 2005). This is also a view with which the key informants agree because they know that developers have to bear the cost of parking. Thus, the key informants are confident that developers will not oversupply parking to the extent that a site’s development potential is diminished.
Conversely, Parking Designer 1, Parking Designer 2 and the Council Planner agree that maximum parking requirements are only suitable in dense urban centres such as Auckland’s CBD for the purposes of reducing car trips and congestion. Additionally, they assert that maximum parking requirements are inappropriate elsewhere because they hamper the optimal provision of off-street parking in less dense localities where driving is necessary, which may cause negative agglomeration. Cutter and DeWoody (2010) identified in San Francisco the same negative agglomeration problem, which discouraged commercial development in city centres and displaced development to peripheral areas without maximum parking requirements. In fact, areas with maximum parking requirements had lower commercial property values in comparison to areas without them, which contributed to negative agglomeration because some areas were rendered less desirable than others (Cutter & DeWoody, 2010). This phenomenon that may occur in Auckland if maximum parking requirements are applied extensively is reminiscent of Chicago and Los Angeles in the early 20th century, where the interdiction of on-street parking in their city centres drove businesses and offices to the suburbs (Ferguson, 2003; Jakle & Sculle, 2004).

Auckland therefore faces a dilemma of whether to implement maximum parking requirements or to use no requirements. Based on the key informants’ views and the evidence in the literature, there is potential for both policies to coexist to create a synergy in the provision and management of off-street parking in Auckland. This policy combination is sound given that the Economist states maximum and minimum parking requirements are not the opposite of each other and have different policy objectives. Thus, in a situation without minimum parking requirements, maximum parking requirements can remain in Auckland’s CBD as well as extend to its busy metropolitan centres to prevent the copious supply of off-street parking, which attracts an excessive quantity of traffic that their roads cannot withstand. They will also mitigate the ‘stickiness’ of parking in Auckland’s dense centres, which could arise if developers enter a ‘parking arms race’ with each other to attract tenants and customers or use parking as a means to speculate land (Barter, 2010; Jakle & Sculle, 2004). Simultaneously, there should be an absence of parking requirements in areas outside of the CBD and metropolitan centres so that developers have the freedom to supply an amount of off-street parking that satisfies demand without providing a surplus of parking.

The combination of a laissez-faire parking market with no parking requirements and the parking management policy of maximum parking requirements in Auckland is
therefore a suitable policy approach for Auckland Council to adopt. It could substantially reduce the high quantity of non-residential off-street surface parking that exists in the GIS Study Area because evidence from London demonstrated that the abolition of minimum parking requirements caused a 40 per cent reduction in its residential parking supply (Guo & Ren, 2013). Equally, the implementation of maximum parking requirements may reduce parking supply in Auckland’s dense centres, as shown in Portland, Oregon, USA where they decreased parking ratios from 3.5 spaces per 1000 ft² to 1.95 spaces per 1000 ft² (Davis et al., 2010).

The flexible amalgamation of no parking requirements and maximum parking requirements has already been successfully used in Toronto and Portland, Oregon, USA, which managed to increase economic activity despite the resultant reduction in off-street car parks (Bartholomew, 1995; Engel-Yan et al., 2007). Their successes may consequently augur well for Auckland if Auckland Council decides to implement the two policies concurrently. While Auckland’s CBD already uses maximum parking requirements, the next step will be to identify which of its metropolitan centres are suitable to use the same approach without the occurrence of negative agglomeration or parking supply targets. The next Sub-Section will contend that shared parking can complement a parking policy framework without minimum parking requirements, and hence may function well with the duo of parking policies for which this Sub-Section has advocated.

## 7.3.3 Shared Parking as an Accessory Policy

Without the administrative and legal hurdles of minimum parking requirements, shared parking may be viable in Auckland through the consolidation of existing off-street parking and via the centralisation of off-street parking in the form of public parking buildings. It is a policy that developers and Auckland Council could pursue because of the savings it generates from not having to build a car park for each individual land use and from increasing parking supply with multiple stories without the need to increase land consumption. The example that the MP cited in Takapuna reflects a benefit of shared parking because the cinema and the offices that entered into a shared parking arrangement have economised money and land through their cooperation. Takapuna’s shared parking also supports Engel-Yan and Passmore (2010)’s assertion that it is an effective tool to maintain an optimal supply of parking in the absence of minimum parking requirements because no extra off-street parking was necessary to meet the parking demand of the cinema and the offices.
Thus, the Takapuna example and Engel-Yan and Passmore (2010)’s argument suggest that the non-residential off-street surface parking in the GIS Study Area can be used more economically. Moreover, the promotion of shared parking not only in the GIS Study Area but also across Auckland may diminish the rate at which new off-street parking is provided, with concomitant cost reductions. This prediction is in line with the findings in Davis et al. (2010), which demonstrated that the consolidation of car parks between retail, business and entertainment land uses in Indianapolis, Indiana, USA generated millions of dollars of cost savings due to the reduced necessity to build new car parks.

In the light of the exemplars in Takapuna and Indianapolis, Indiana, USA, it is appropriate to devise a method to implement and incentivise shared parking in Auckland. Milwaukee, Wisconsin, USA has a policy to reduce a land use’s minimum parking requirements if existing off-street parking that can be shared is available nearby (Davis et al., 2010). However, such a mechanism would no longer be relevant to Auckland if minimum parking requirements were abolished according to its Draft Unitary Plan. It is also challenging to use shared parking to mitigate the adverse effect of parking spillover for a land use consent application because if it was linked to a resource consent, its conditions would be breached if the third party parking supplier decided to use the parking spaces for another purpose. Thus, the enforcement of shared parking in the private domain, which Brierley (1972) and Engel-Yan and Passmore (2010) extol, is not practical in New Zealand’s planning framework because it provides resource consent applicants with legal and administrative burdens that are difficult to overcome.

In view of the aforementioned advantages and barriers of implementing shared parking in Auckland, the best way to propagate this policy is therefore through promotion. If developers realised the cost savings that shared parking could provide, it would be rational for them to share nearby off-street parking to reduce their development expenses. Furthermore, those who support a deregulated parking market such as the Council Planner contend that shared parking will naturally arise if it is symbiotic for developers and businesses to enter a shared parking arrangement. Consequently, the promotion of shared parking may not even be necessary.

Additionally, enforced shared parking’s impracticality raises the question of whether local authorities should intervene in the parking market by constructing public parking buildings as a form of shared parking. The Economist stated that public
intervention in the parking building industry is futile under a regime of minimum parking requirements because this rule undermined parking centralisation. By the same logic, private parking operators will be able to construct paid communal parking facilities without being undercut by vast quantities of off-street parking in a framework devoid of minimum parking requirements. Hence, it is better to allow private operators to fill the centralised communal parking market niche because there is no obvious need for a local authority to provide the off-street parking.

The benefit of increased parking centralisation was clear in Cutter and DeWoody (2010), which showed a strong positive correlation between the availability of paid communal parking buildings and the marginal value of a commercial property. Whether the same correlation would occur in Auckland is unknown, but the construction of centralised parking instead of proliferating private off-street car parks could have avoided the sprawling distribution of non-residential off-street surface car parks that exists in the GIS Study Area. This is premised on the fact that a driver can park once at a parking building and visit multiple land uses, which negates the need for a private car park for each land use (Shoup, 2005).

However, there are undoubtedly locations in which a surplus of parking buildings is inappropriate. One such location is Auckland’s CBD, whose roads will not be able to withstand the increase in vehicular traffic that is concomitant with more parking spaces. The previously discussed maximum parking requirement policy as well as a parking levy may prevent such a phenomenon from occurring. The next Sub-Section will assert that parking taxation such as that proposed by the Transport Engineer is not a viable option in Auckland due to its potential unpopularity and discouragement of centralised parking infrastructure. It will therefore illuminate and recommend the rates reform that was proposed by the MP, which may be more publically acceptable.

7.3.4 Unpopular Parking Taxation, Opportunity for Rates Reform?

The fiscal mechanisms that the key informants addressed aim to reduce off-street parking supply, internalise congestion costs and finance public transport projects. There exist conflicting views from the key informants about their viability and appropriateness in Auckland due to the tripartite nature of their goals. The Transport Engineer’s proposed comprehensive parking levy broadens the surface parking tax proposed by Feitelson and Rotem (2004) by extending the concept to include off-street car parks in parking buildings. While this comprehensive tax could achieve the
three aforementioned aims, its wide scope excessively regulates parking because it unfairly targets parking building operators who use land efficiently by maximising the number of car parks for a given land area. It consequently sends a signal to the market that shared parking facilities are undesirable, when in fact they help to avoid the plethora of off-street parking in the GIS Study Area and in developments such as Wairau Park.

Where extra parking, irrespective of its structure, may have adverse effects on urban form and traffic congestion such as in Auckland’s CBD, maximum parking requirements will likely possess the same regulatory function as the comprehensive parking levy and should be adopted instead. Thus, it appears that this comprehensive tax may be redundant unless the principal goal of it is to mitigate traffic congestion or fund public transport. It is undisputed that parking taxation, regardless of its mechanics, has the potential to achieve these goals because it has been evidenced in Australia’s capital cities. However, there are other fiscal mechanisms that can attenuate traffic congestion without afflicting shared parking such as the congestion charge mentioned by the Economist. Therefore, the comprehensive parking levy is unnecessarily broad in its scope and may not be viable in Auckland.

Although the comprehensive parking levy may not be suitable for Auckland, Feitelson and Rotem (2004)’s flat surface parking tax could be viable in Auckland because it focuses on reducing excessive parking supply without disincentivising efficient shared parking. Indeed, Feitelson and Rotem (2004)’s claim that a flat surface parking tax can financially discourage the provision of large quantities of off-street surface parking is congruous with Parking Designer 1’s support for a narrower parking levy. Hence, there is potential for the flat surface parking tax to function well in areas of Auckland without maximum parking requirements because as stated by the Council Planner, a ceiling on parking restricts the tax’s revenue stream.

However, the only factor that detracts from a flat surface parking tax’s viability is public opposition. As manifested by opposition to the fringe benefit tax on employer-provided parking in Auckland in early 2013, New Zealanders are generally opposed to parking taxation (Gibson, 2013). Thus, it would be highly unlikely that the populace in Auckland and the rest of New Zealand would change their attitudes towards a parking levy of any description. This disapproval contradicts Feitelson and Rotem (2004)’s assertion that parking taxation would receive positive public reception and may reflect the different cultural and political landscapes in New Zealand. It may
therefore be better to allow the parking market to function without overt fiscal intervention because developers will still pay the price for excessive parking provision through increased construction and maintenance expenses. Moreover, alternative interventionist measures like maximum parking requirements would also deter surplus off-street parking supply in Auckland’s dense centres without the use of parking taxation.

The potential unviability of the two previous fiscal mechanisms arises because they appear as new taxes, which is understandable because it is an axiom that taxes are unpopular. However, given the ability of the parking levies to internalise the costs of excessive off-street parking supply and traffic congestion, it is unsatisfactory to completely abandon them because of their unpopularity. Therefore, the rates reform that the MP proposed could be more viable because it could achieve the same goals as the parking levies without appearing as a new tax. This is because it involves a recalculation of the funding of a local authority’s transport expenditure so that it is based on the quantity of off-street parking provision, instead of being based on a property's capital value. The reform may not necessarily raise rates because a business has the opportunity to lower it through reducing parking supply in a situation without minimum parking requirements. Consequently, if Auckland Council was determined to make developers pay their fair share of the traffic congestion and high land consumption costs that they cause from excessive parking provision, a reassessment of the rates structure would be an appropriate and publically acceptable option to pursue.
7.4 Policy Recommendations

The previous Sections of this Chapter have critically analysed the viability of the application of alternative parking policies to Auckland’s planning framework. They have illuminated the policies that could be effective replacements for minimum parking requirements and the ways in which they can be integrated to realise efficient land use. In particular, Sub-Section 7.3.4 has also explained why parking taxation, although a potentially effectual mechanism to discourage excessive off-street parking provision, is most likely unviable in New Zealand because of recent public opposition to the fringe benefit tax. To overcome the potential unpopularity of taxation, Sub-Section 7.3.4 has proposed a restructure of the rates system in Auckland, which achieves the same goals as parking taxation and thus may be more publically acceptable.

Table 4 below summarises the complex combination of alternative policies that this Chapter has addressed and offers an assessment of their viability in Auckland based on this study’s research. It also acts as a series of policy recommendations that could assist Auckland Council to achieve more efficient land use and lower costs for those living in or visiting Auckland. The application of the recommended policies will also represent a departure from the iterative cycle of minimum parking requirements into which Auckland has entered, which may lead to an optimal off-street parking supply and more land being available for other land uses. Auckland could become the beacon of parking policy in New Zealand if it considered these recommendations because few places have removed minimum parking requirements and adopted no parking requirements at such a wide spatial scale.
Table 4: Summary of the viability of alternative parking policies and policy recommendations

<table>
<thead>
<tr>
<th>Alternative Policy</th>
<th>Viability/Recommendation</th>
<th>Justification/Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Parking Requirements</td>
<td>Yes</td>
<td>Developers are best placed to assess the appropriate quantity of parking. It is economically irrational for them to provide an excessive quantity so this policy will not cause a surplus supply of off-street parking.</td>
</tr>
<tr>
<td>Maximum Parking Requirements</td>
<td>Yes</td>
<td>Only suitable in locations where extra parking will cause unmanageable traffic congestion. E.g. CBD and dense metropolitan centres.</td>
</tr>
<tr>
<td>Shared Parking</td>
<td>Yes</td>
<td>Allows developers to share existing off-street parking without the need to provide new facilities. Parking buildings also use land efficiently by centralising car parks.</td>
</tr>
<tr>
<td>Comprehensive Parking Levy</td>
<td>No</td>
<td>Unfairly afflicts efficient private parking operators who centralise car parks. Its focus on mitigating traffic congestion can be achieved by other means such as a congestion charge.</td>
</tr>
<tr>
<td>Flat Surface Parking Tax</td>
<td>No</td>
<td>Although it only targets superfluous parking provision, a new tax on parking is politically unacceptable in New Zealand.</td>
</tr>
<tr>
<td>Rates Reform</td>
<td>Yes</td>
<td>It realises the goals of the comprehensive parking levy and the flat surface parking tax without appearing as a new tax. Thus, it may be more palatable to the New Zealand public.</td>
</tr>
</tbody>
</table>
8 Conclusion

There existed a persistent notion in planning practice and the literature on parking policy that minimum parking requirements were an essential planning regulation to ensure land uses possessed sufficient off-street parking. Partisans of minimum parking requirements contended that compelling developers to supply off-street parking was necessary to prevent the cars that they attracted from spilling over onto on-street car parks, on which many urban residents relied. As such, minimum parking requirements became the norm in planning practice across countries in North America, Asia and in New Zealand and were pervasive in the majority of cities in these regions. Despite minimum parking requirements’ purported ability to avoid parking spillover, they generated a plethora of unintended negative consequences in overseas cities that afflicted efficient land use and caused financial liabilities to parking suppliers and users. These problems include an oversupply of off-street parking relative to demand, high land consumption and elevated opportunity costs because the land used for parking could have been dedicated to other productive land uses.

In the light of these problems that minimum parking requirements have caused overseas, the aims of this study were consequently twofold. First, it aimed to assess the impacts of minimum parking requirements on land use efficiency in Auckland. Second, it sought to investigate the viability of alternative parking policies in Auckland that have successfully replaced minimum parking requirements overseas. The following research questions were devised to achieve this study’s aims.

1) What are the impacts of minimum parking requirements on land use efficiency in Auckland and is there an oversupply of off-street parking?

2) What parking policies can be used as alternatives to minimum parking requirements in Auckland and will they be viable?

To answer these research questions and to realise the aims of this study, a mixed methods research methodology was employed that consisted of the quantitative GIS analysis and the qualitative interviewing of key informants with parking policy expertise. The GIS analysis determined the spatial coverage of non-residential off-street surface parking in a study area in West Auckland in 1996 and 2006 in relation to census data on population and access to cars from the same years. Furthermore,
the interviewing of key informants elicited their professional views on minimum parking requirements as well as their expert opinions on the alternative parking policies that could function viably in Auckland.

The application of the methodology produced results that indicated land was being used inefficiently and that there was a superfluity of off-street parking in the GIS Study Area and in the wider urban Auckland area. For example, there was around one non-residential off-street surface car park for every man, woman and child who lived or worked in the GIS Study Area in 1996 and 2006, regardless of whether they had access to a car or were capable of driving. Moreover, the non-residential off-street surface parking area increased by 31 per cent from 1996 to 2006, which was incommensurate with the resident and worker population increases over the same period. Thus, these empirical findings demonstrated that the availability of off-street parking was surplus to requirements and disproportionate to the number of potential car park users in the GIS Study Area. The key informants’ professional experiences gave credence to the GIS analysis’ results by positing examples in which minimum parking requirements have caused excessive land consumption in Auckland. A number of them contended that minimum parking requirements’ inability to account for the granularity of individual land uses’ parking demand is a principal cause of this inefficient land use. According to the key informants, these examples hindered the development potential of urban sites, incurred high opportunity costs and imposed financial liabilities on car park suppliers and users.

The minimum parking requirements in Auckland, for example of one car park per 16 to 25 m² of gross floor area for retail activities in the former Waitakere City, are undoubtedly responsible for the high quantity of off-street parking relative to parking demand in Auckland. Such a regulation can only proliferate off-street parking’s land consumption because it obliges developers to provide a quantity of parking that they may not require. Consequently, this planning rule acts as an antithesis of the compact development vision of the statutory and non-statutory planning documents that currently exist in Auckland. The pervasive spatial coverage of off-street car parks in the GIS Study Area is congruous with similar studies done in North America. Moreover, the diminution of development potential and the financial costs that minimum parking requirements have caused in the examples provided by the key informants echo the findings of the same North American studies.
To address the land use inefficiency and off-street parking oversupply in Auckland, the key informants recommended the abolition of minimum parking requirements and the promotion of the shared parking. They were hesitant about maximum parking requirements in areas beyond the city centre and metropolitan centres because this type of requirement may displace development to peripheral areas instead of in established urban centres. Maximum parking requirements may also be regarded as a target to reach instead of an absolute maximum, which may ultimately cause a supply of off-street parking that significantly exceeds demand. Fiscal mechanisms were also endorsed by the key informants, which took the form of taxation on off-street parking. One proposed mechanism involved the reform of the rates system, so that the transport component of a business’ rates is based on its supply of off-street car parks instead of its property value, as is the case currently. This reform may disincentivise the surplus supply of off-street parking as well as internalise the cost of traffic congestion for which businesses are responsible.

With reference to the key informants’ advice about alternative parking policies and the outcomes of their application in the literature on parking policy, the author has advocated for a series of policy recommendations that may improve off-street parking’s land use efficiency in Auckland. These include the removal of minimum parking requirements because the author considered developers are best placed to determine the quantity of parking that is appropriate for their land uses. In line with the key informants’ views, maximum parking requirements should not be used outside of Auckland’s CBD and metropolitan centres, but more research is necessary to ascertain which metropolitan centres are suitable for this alternative regulation.

The promotion of shared parking should occur more extensively in view of the cost savings and more efficient use of land that it can generate. However, it should not be enforced as part of a resource consent because if the supplier of a shared car park decided to do something else with the land on which the car park sits, the developer would breach the resource consent’s conditions. Thus, enforced shared parking could produce unwelcome legal hurdles for resource consent applicants. Although a parking levy was a fiscal mechanism that some key informants supported, the author did not consider it pragmatic in New Zealand given recent public opposition to the proposed fringe benefit tax on employer-provided parking. Hence, the aforementioned rates reform may be the better choice because it does not seem like a new tax on off-street parking, but instead appears as a recalculation of the rates system.
8.1 Reflections on Research and Future Research

This study has discovered the spatial coverage of non-residential off-street surface parking in a West Auckland study area, the extent to which minimum parking requirements are responsible for this coverage and a set of alternative parking policies that may ameliorate land use efficiency in Auckland. These findings contribute to the body of knowledge about minimum parking requirements by offering quantitative and qualitative perspectives on this planning issue in a New Zealand context. Indeed, this study’s results and recommendations could be applied to other New Zealand cities because they also use minimum parking requirements in their district plans. This study therefore serves as an indicator of the likely impacts of minimum parking requirements on land use efficiency in other New Zealand centres and as a repository of knowledge about alternative parking policies that may function well in the local context.

If Auckland Council adopted the Draft Unitary Plan in its current form, there would be potential for longitudinal research on the effects of the replacement of minimum parking requirements with maximum parking requirements in Auckland’s ‘centres hierarchy’ and mixed-use, terraced housing and apartment building zones. The future study would examine the change in off-street parking quantity a number of years after the enactment of the Unitary Plan and ascertain the extent to which the Draft Unitary Plan’s provisions are responsible for the change. Similarly, if there were amendments to the parking provisions of the Draft Unitary Plan, the future study would effectuate the same longitudinal research on these modified planning rules. Thus, the future research will be similar to Guo and Ren (2013), which analysed the effects of the abolition of residential minimum parking requirements on off-street parking quantity in London over a six year period. The purpose of the future study is to determine the effectiveness of the Draft Unitary Plan’s parking reform and whether there may be a need to change its approach given that it is different to the policy recommendations of this present study.

With sufficient resources and personnel, there is also potential to expand on the scope of the current study by extending the GIS analysis to all the urban areas of Auckland to obtain a complete understanding of minimum parking requirements’ impacts on Auckland’s land use efficiency. Such a holistic approach would provide greater credence to this study’s results and present a stronger argument for the reform of Auckland’s parking policies. Finally, the methodology that this study
employed could also be used by other local authorities in New Zealand and overseas to address the same research questions in different geographic contexts. This future research could provide impetus for parking policy reform in other locations if it was shown that minimum parking requirements were responsible for the same land use inefficiency problems that were identified in this study.
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### 9.1 Case Law

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### 9.2 Legislation

Land Transport Management Act 2003

Land Transport Management Amendment Act 2013

Local Government (Auckland Council) Act 2009
Resource Management Act 1991

Town and Country Planning Act 1962 (UK)

Town and Country Planning Act 1977
Appendices

Appendix A: Information Sheet for Participants

The impacts of minimum parking requirements on land use efficiency and the viability of alternative parking policies in Auckland: Information Sheet for Participants

Thank you for showing an interest in this project. Please read this information sheet carefully before deciding whether or not to participate.

What is the aim of the project?
The aim of this project is to assess the impacts of the implementation of minimum parking requirements on land use efficiency and the viability of alternative parking policies in Auckland.

What types of participants are being sought?
Participants for this project will all be over eighteen years old. They will generally be planners and engineers working for local authorities and for private companies in Auckland.

What will participants be asked to do?
Participants will be asked to consent to being involved in individual interviews (approximately 30 minutes). These interviews will be audio recorded and will relate to participants’ opinions on the use of minimum parking requirements and alternative parking policies. The interviews will be semi-structured and will involve an open-questioning technique. The precise nature of the questions that will be asked have not been determined in advance, but will depend on the way in which the interview develops. Participants will be briefed on anonymity and on their right to withdraw at any time. Participants will also be asked to sign the consent form.

What data or information will be collected and what use will be made of it?
Personal information including name and occupation will be recorded. The identity of participants will be kept anonymous within the report. It is up to the participants if they wish to be audio-recorded or not. The audio files and any other data collected will be securely stored and only the researchers and their immediate supervisor will be able to access the data. Once the project has been completed all personal information will be destroyed. As required by the University’s research policy, raw data will be retained in secure storage for five years, after which it will be destroyed.
What if Participants have any Questions?
If you have any questions about our project, either now or in the future, please feel free to contact:

<table>
<thead>
<tr>
<th>Anthony Leung, Master of Planning Candidate</th>
<th>Rosalind Day, Professional Practice Fellow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department of Geography, University of Otago, PO Box 56, Dunedin</td>
<td>Department of Geography, University of Otago, PO Box 56, Dunedin</td>
</tr>
<tr>
<td><a href="mailto:leuho154@student.otago.ac.nz">leuho154@student.otago.ac.nz</a></td>
<td><a href="mailto:rhd@geography.otago.ac.nz">rhd@geography.otago.ac.nz</a></td>
</tr>
</tbody>
</table>

This study has been approved by the Department of Geography, University of Otago. If you have any concerns about the ethical conduct of the research you may contact the Committee through the Human Ethics Committee Administrator (Phone 03 479 8256). Any issues you raise will be treated in confidence and investigated and you will be informed of the outcome.
Appendix B: Consent Form for Participants

The impacts of minimum parking requirements on land use efficiency and the viability of alternative parking policies in Auckland: Consent Form for Participants

I have read the Information Sheet concerning this project and understand what it is about. All my questions have been answered to my satisfaction. I understand that I am free to request further information at any stage.

1. My participation in the project is entirely voluntary;
2. I am free to withdraw from the project at any time without any disadvantage;
3. Personal identifying information such as audiotapes of recorded interviews or handwritten interview notes will be destroyed at the conclusion of the project but any raw data on which the results of the project depend will be retained in secure storage for at least five years;
4. This project involves an open-questioning technique. The general line of questioning includes talking about minimum parking requirements, plan provisions, local politics and alternative parking policies. The precise nature of the questions which will be asked have not been determined in advance, but will depend on the way in which the interview develops. In the event that the line of questioning develops in such a way that I feel hesitant or uncomfortable, I may decline to answer any particular question(s) and/or may withdraw from the project without any disadvantage of any kind.
5. There will be minimal discomfort for the participant due to the design of the project. However, if there is any feeling of discomfort I acknowledge that I can withdraw at any time without any disadvantage. There is no physical or health risk from being involved in this project.
6. There will be no remuneration or compensation for being involved in this project - participation is voluntary.
7. The results of the project will be used in the writing of the researcher’s thesis, but every attempt will be made to preserve anonymity.
8. The raw data and personal information will not be provided to an external group.
9. I grant/do not grant* permission to allow the researchers to audio record my interview.
10. I grant/do not grant* permission to allow the researchers to use my identity.
*Please indicate by circling

I agree to take part in this project.

.............................................................. ..............................................................
(Signature of participant) (Date)

‘This Project has been reviewed and approved by the Department of Geography, University of Otago’
Appendix C: Themes Covered in the Interviews

1. Interviewee’s professional background and experience with minimum parking requirements
2. Quantity of off-street parking as a consequence of minimum parking requirements
3. The hindrance of other productive land developments because of minimum parking requirements
4. The financial costs of minimum parking requirements
5. Deregulated off-street parking market
6. Maximum parking requirements
7. Shared parking
8. Fiscal mechanisms such as the flat surface parking tax