Analysis of the 2018 Census Results

Travel to work and Travel to Education in Auckland

OCTOBER 2020

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1 Introduction

Travel to work and travel to education are two key components of travel patterns within the Auckland region, accounting for much of the movement at peak periods - especially in the morning peak. The data from the 2018 Census therefore provides an opportunity to examine the current patterns of these movements.

In total, information for over a million journeys was recorded, 750,000 for the journey to work and 325,000 for the journey to education. This provides the opportunity to examine a detailed picture of this travel within the region.

1.1 Data issues

In principle similar data on the journey to work has been collected in previous year's census. However, because of changes in the exact question asked and increased confidentiality constraints in the 2018 data, the scope for examining changes over time is limited and, in many cases, exact comparisons cannot be made. In addition, the detailed areas for which information is provided has changed with the Census Area Units (CAUs) used previously being replaced by Statistical Areas 2 (SA2s) which further limit any spatial analysis. However as far as possible, the analysis undertaken has attempted to overcome the limitations imposed by these changes.

In addition, in the most recent census response rates in some areas were low and administrative data was used to supplement the data provided by respondents. It is not certain as to the extent that this may have biased the responses, but it appears to have had a particular impact on estimates of travel by Other/Not elsewhere included responses.

1.2 Scope of this report

This executive summary considers the broad regional position for the travel to work and travel to education, initially looking at the overall modal split. It then goes on to consider the two journey purposes separately, in line with the detailed reports supporting this analysis.

For the journey to work, this report covers:

- Movement patterns at a broad sectoral level, distinguishing between central, inner and outer areas in the region (including an assessment of growth patterns since the last Census in 2013)
- Analysis at a more disaggregated local board area, highlighting the different trip patterns for each of these board areas
- Analysis at a more detailed level assessing how modal shares and trip lengths vary across the region and also looking in more detail about trip patterns into the central city/City Centre area
- A brief assessment of the linkages between social deprivation and trip patterns across the region

For the journey to education, we have focused on trip patterns by age group, distinguishing between:

- pre-school, primary and intermediate school age students under 13,
- secondary school and college age students aged 13 to 17, and

- those over 17 who are assumed to attending tertiary establishments.

For these education movements, this report covers:

- Modal shares by age group
- Movement patterns by local board area
- Typical distances travelled by detailed area
- The effects of social deprivation on movement patterns.

2 The overall regional position

2.1 The position in 2018

The 2018 modal shares for the journey to work and the journey to education are set out in Figure 2.1 and Figure 2.2.

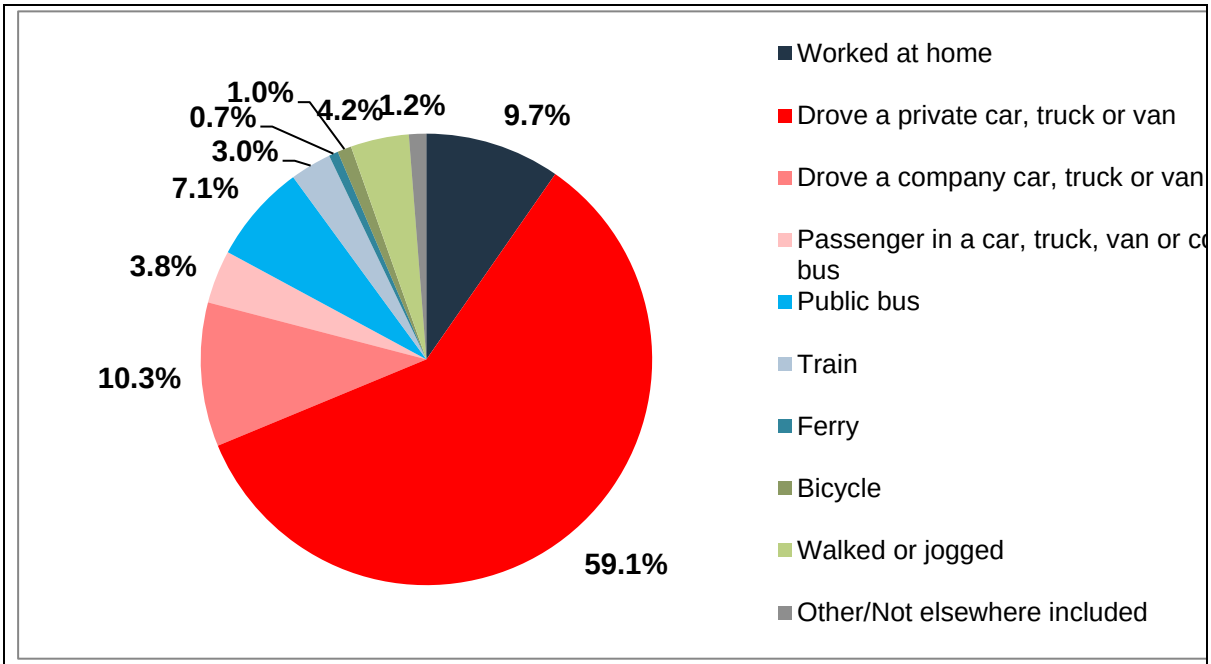


Figure 2.1
2018 Modal shares - Travel to work

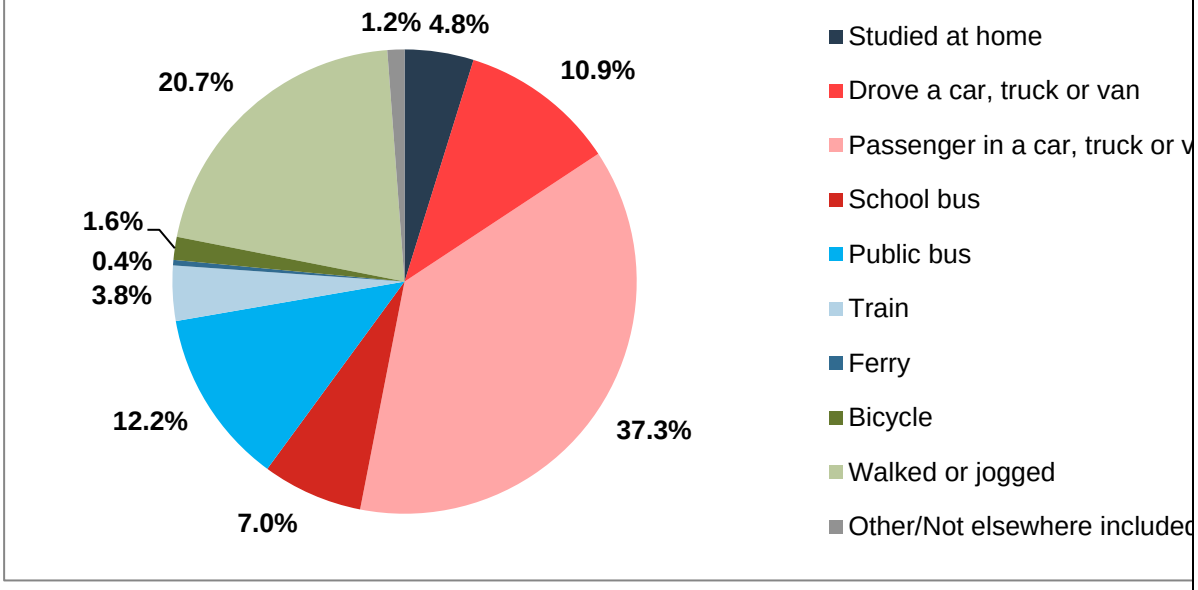


Figure 2.2
2018 Modal shares - Travel to education (all ages combined)

For those who travelled to work, about 73 per cent were in a private or company car, mainly as drivers but with a small share of about 4 per cent as passengers, 11 per cent used public transport and about 5 per cent walked or cycled. Abound 10 per cent of workers worked at home.

For travel to education the position is rather different, with about 48 per cent travelling by car, split between 37 per cent as car passengers, reflecting mainly younger children taken to school by their parents, and 11 per cent driving themselves. 23 per cent travel by public transport, a much higher share than the journey to work, with about a third of these by school buses. A similar share walk or cycle to school, which again is higher than for travel to work. Just 5 per cent study at home.

2.2 Changes from 2013 for travel to work journeys

Information for earlier years is only available for travel to work journeys. The comparison at Figure 2.3 shows substantial growth in the share of trips by bus and rail, which has increased from 7.4 per cent to 10.1 per cent and work at home trips, which have grown from 7.5 per cent to 9.7 per cent. However, while the share of car passengers has decreased slightly, the share of car drivers, which will be the key cause for congestion, remains almost unchanged at 69.4 per cent compared to the previous 69.9 per cent. As discussed below in section 5, this relatively stable average disguises some significant changes within overall car mode share at a local board level. Finally, the largest decrease in travel share has been in the 'other' category, which dropped from 6.5 per cent to 1.8 per cent, likely reflecting the change in questions between the two censuses (with for example ferry trips now being identified separately).

Figure 2.4 provides the longer-term trend, which shows the share of car driving and active modes remaining reasonably constant since 2001, while public transport and work from home have increased and 'other' has declined.

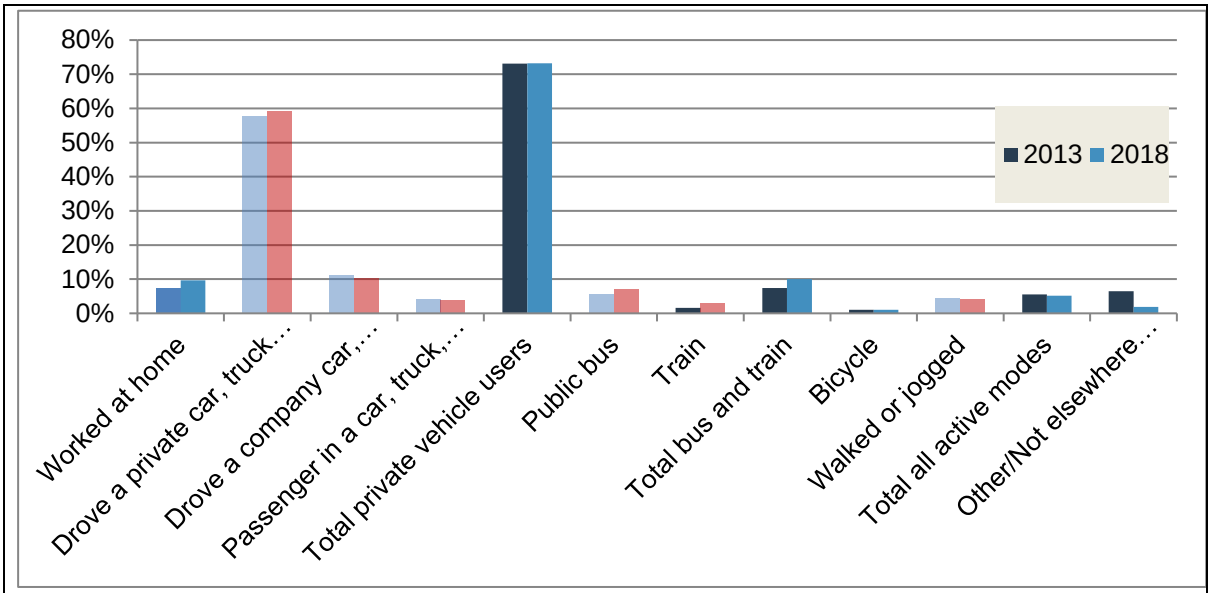


Figure 2.3
Modal splits for the journey to work 2013 and 2018

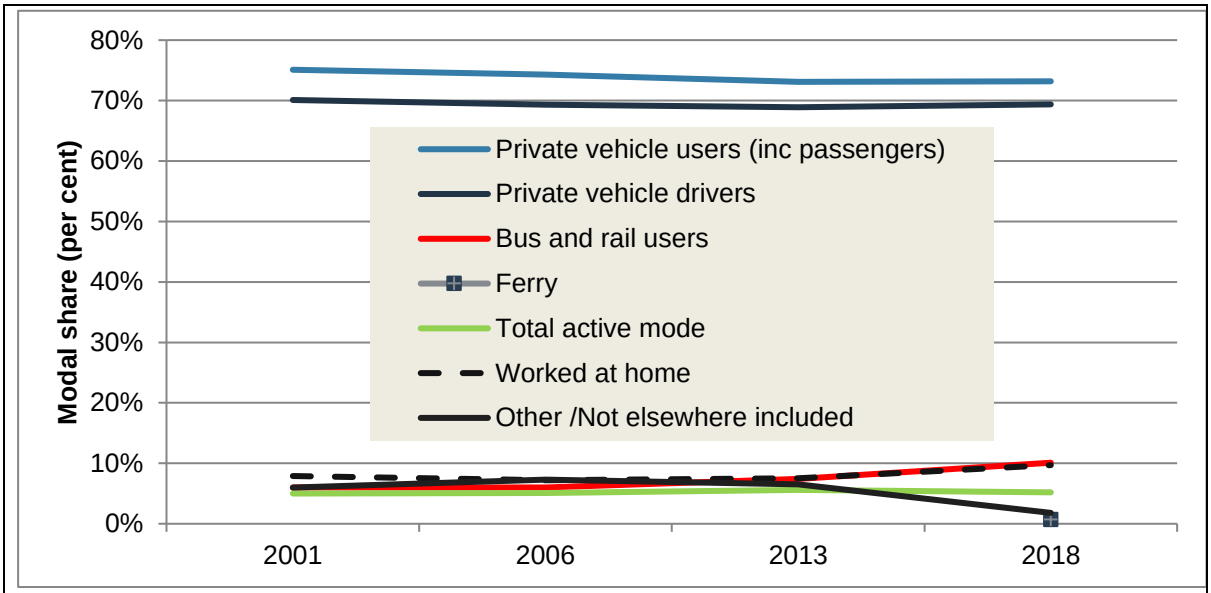


Figure 2.4
Changes in mode shares for journey to work trips 2001-2018 - all modes

3 Broad journey to work patterns across the region

In order to help understand the broad travel patterns, the region has been divided into 5 main sectors as set out in Figure 3.1.

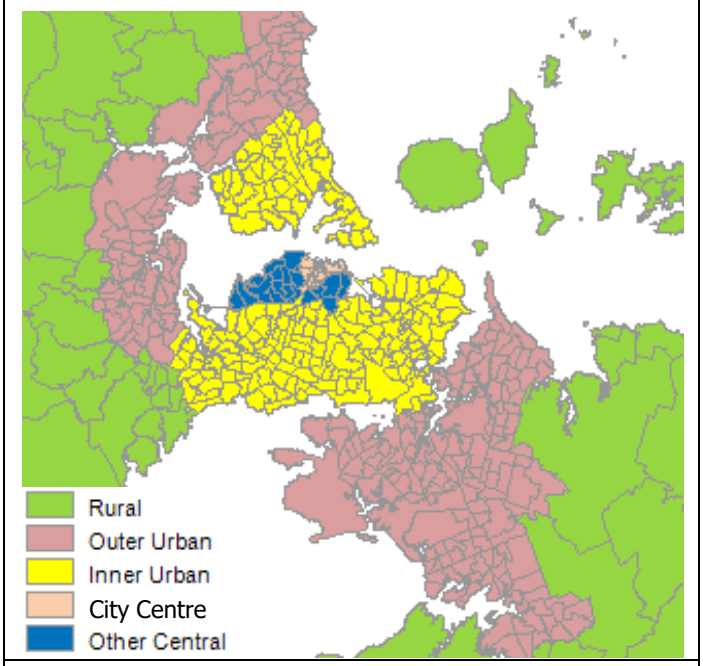


Figure 3.1
Broad sectors for analysis of region-wide travel to work movement patterns

Within the sectors:

- the City Centre accounts for about 13 per cent of total employment but only 2 per cent of total workers by area of residence
- the City Centre and Other Central area combined contain almost a quarter of the total jobs but only 7 per cent of the resident workforce. This therefore requires high levels of inward commuting to match the employment opportunities available.
- The Inner area has a higher share of the total employment at 32 per cent but it also has a higher share of the total workforce at 36 per cent.
- The Outer area, away from the Isthmus and the southern North Shore, is the largest sector with 38 per cent of jobs and 45 per cent of resident workers.
- The rural area has only 7 per cent of the total employment but 12 per cent of the resident workforce.

These figures are set out in Figure 3.2.

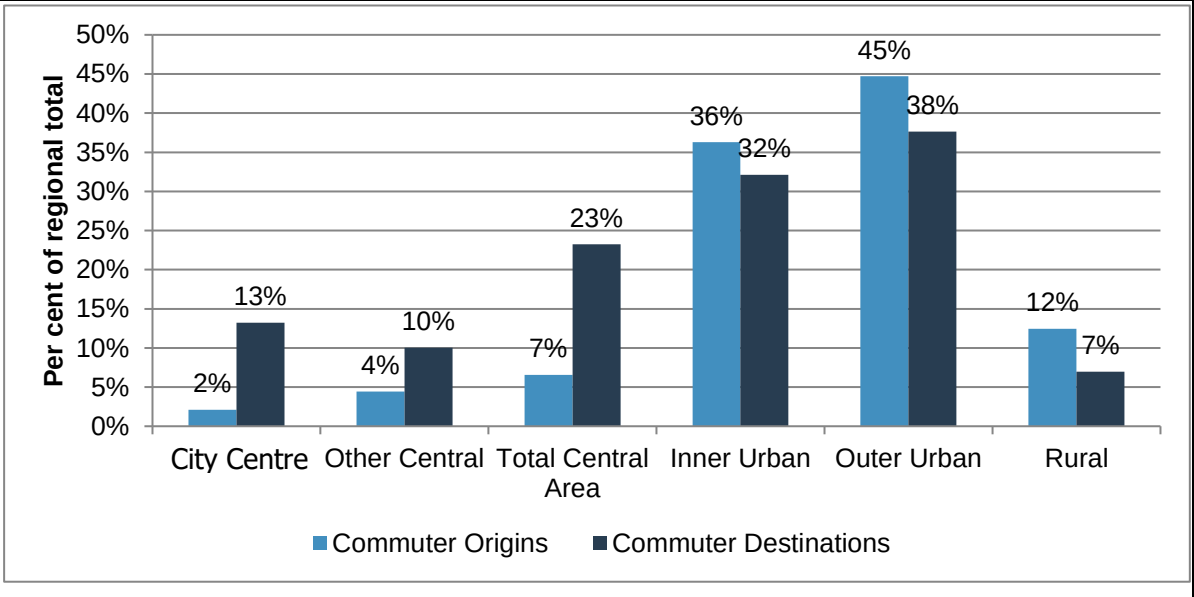


Figure 3.2
Origins and destinations of commuting trips by sector 2018

These employment and residential location patterns - and particularly the imbalance between employment and the resident workforce – shape Auckland's commuting patterns. Within this, City Centre and remainder of the central area have a major influence, attracting over 20 per cent of commuting trips from other parts of Auckland (mostly the Inner area). Overall, as Table 3.1 shows, 37 per cent of trips are inbound between areas, contributing to the major pressure on our transport network and peak-period congestion.

Table 3.1
Commuting flows by direction 2018

Direction of commuting	Percentage of Total
Within Area	52%
Inwards	37%
Outwards	11%

However, while a substantial share of movements are inbound between areas, over half the trips are within the broad areas defined, particularly internal to the Outer areas, and then internal to the Inner areas, reflecting Auckland's overall distributed travel patterns. These trips will also include shorter inbound movements within areas, further contributing to the pressures on the main transport links.

As we saw in 2013, the City Centre and Outer Area present a major contrast – with the City Centre as an intensive employment area relying on inbound commuting, while the Outer Area is a large and growing area with dispersed and largely internal travel movements. These characteristics have a major influence on Auckland's commuting and help explain the key patterns we see within the region.

4 City Centre trip patterns

Although only accounting for 13 per cent of Auckland's commuting destinations and 2 per cent of its residential origins, the City Centre's northern harbour boundary, small area, intensity of employment and attraction to workers from across the region means it has a disproportionate influence on Auckland's travel patterns. Concentration of trips from around the region into a small number of approaches makes for congested corridors, while intensified land use makes for expensive parking. These characteristics deter car commuting but provide ideal conditions for public transport when supported by ongoing investment and encourage walking.

As a result, public transport and active modes account for 55 per cent of the commuting trips made into the City Centre, with 41 per cent by public transport (including ferries) and 14 per cent by active modes. Only 44 per cent of City Centre commuting trips are made by car while, in 2018 at least, working from home was well below average at 2 per cent.

The City Centre and remainder of the central area is therefore a critical market for public transport and active modes. The City Centre attracts 55 per cent of all public transport commuting journeys (64 per cent for the central area) and 37 per cent of active mode commuting (50 per cent for the central area). With this market share, the pattern of trip making and the modal shares for travel to the City Centre, which is illustrated in Figure 19.3, explains much of the pattern of PT and active modes commuting.

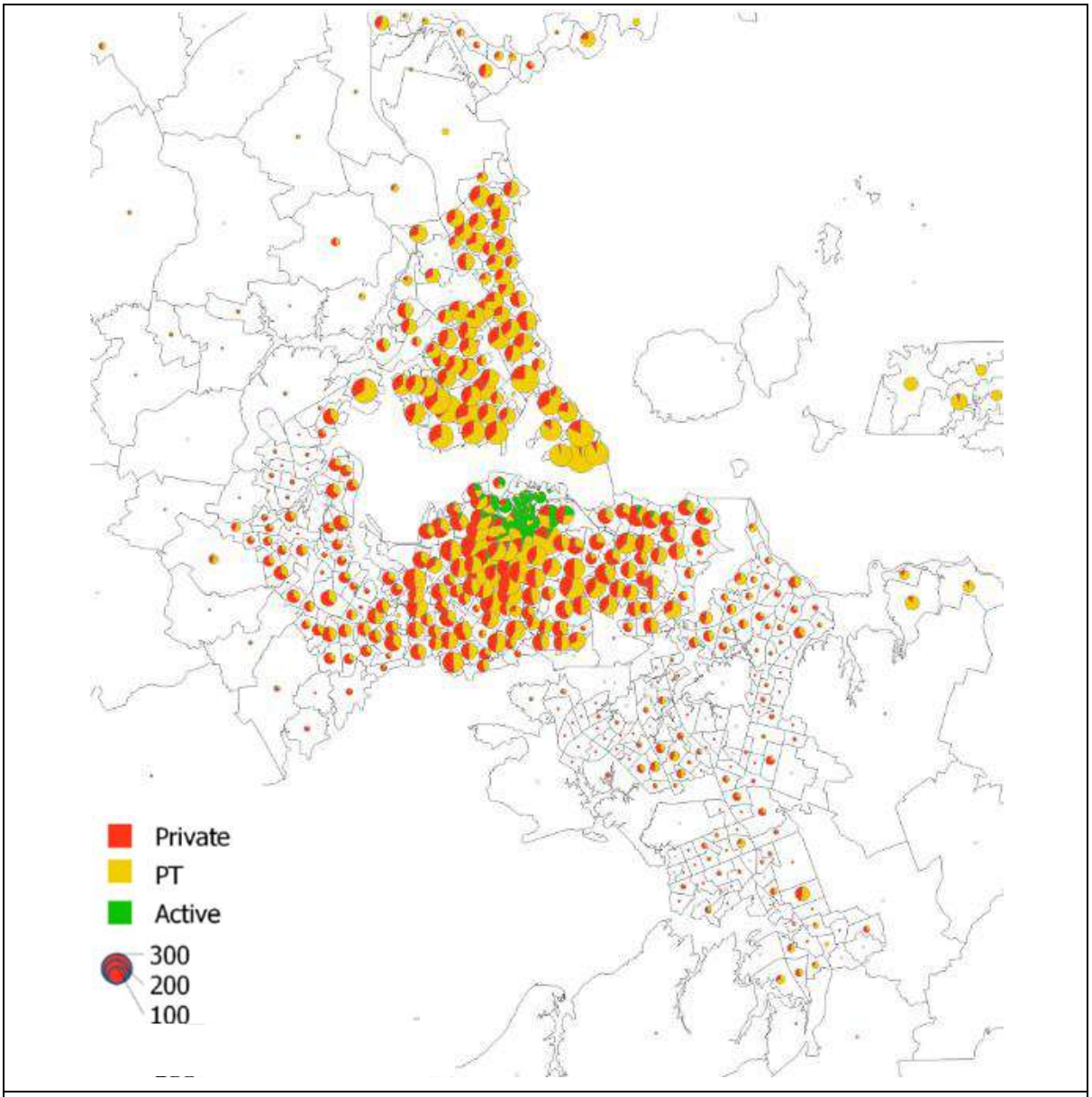


Figure 4.1
Modal shares for trips commuting to the Central City/City Centre

While the City Centre attracts commuters from across the region, the bulk of the workforce is drawn from the Isthmus and the southern North Shore, especially along the coast. In contrast, very few trips are made from the south or southeast, and relatively few from the west.

Walking is the dominant mode from the areas immediately surrounding the City Centre. Outside of walking distance, on much of the North Shore and in the Isthmus south of the City Centre public transport is the major mode. In other directions and further afield car typically becomes more important, although public transport dominates in locations where it provides a competitive trip such as the southern rail stations and ferry terminals including Half Moon Bay, Pine Harbour and Hobsonville.

The Outer Urban area

The outer urban area presents almost a direct contrast to the City Centre. Its share of total employment destinations and residential origins is much larger – accounting for 38 per cent and 45 per cent of Auckland share respectively – and 70 per cent of jobs are filled from within the area. However, these land uses are spread across a much larger space - including a number of important industrial and office areas such as Highbrook, the airport and Manukau central.

The spread of employment around multiple large sites across the Outer area, which are often well served with parking, makes for dispersed trip patterns that are challenging to serve with public transport. Meanwhile, the lower density nature of the employment areas themselves, and the longer average trip distances to access these areas – which is one commonality with the City Centre – counts heavily against active mode use. The result is that the Outer Urban area is heavily dominated by car use, which accounts for 81 and 80 per cent of all trips to and from the area respectively. Although high, these figures are an improvement on 2018, which saw shares of 83 per cent and 82 per cent by destination and origin respectively. The bulk of these reductions occurred in the north, western and eastern parts of the outer area, while the southern parts saw an increase.

Critically, the Outer Area is increasing in importance, with 60 per cent of Auckland's new trips coming from the Outer Area and 50 per cent of new trips going to the Outer Area. As a consequence, the Outer Areas share of trip origins increased from 42 per cent in 2015 to 45 per cent in 2018, while its share of trip destinations increased from 36 per cent to 38 per cent (see Figure 4.2). This increase largely came at the expense of the Inner Area, and to a lesser extent the City Centre and Rural Areas, which saw a drop in their share of travel.

The bulk of travel growth occurring in heavily car dominated areas will be a factor in Auckland's continuing high overall car mode share.

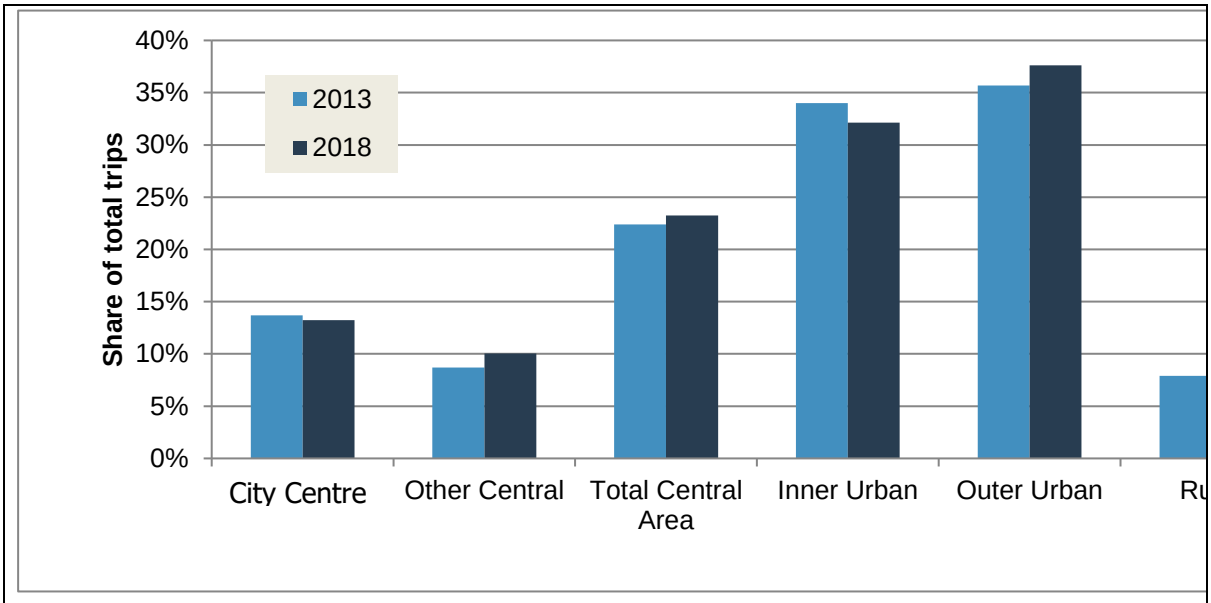


Figure 4.2
Changes in the shares of commuting flows by destination sector 2013-2018

5 Movement patterns at a local board level

Transport patterns vary significantly between local board areas as can be seen in Figure 17.2.

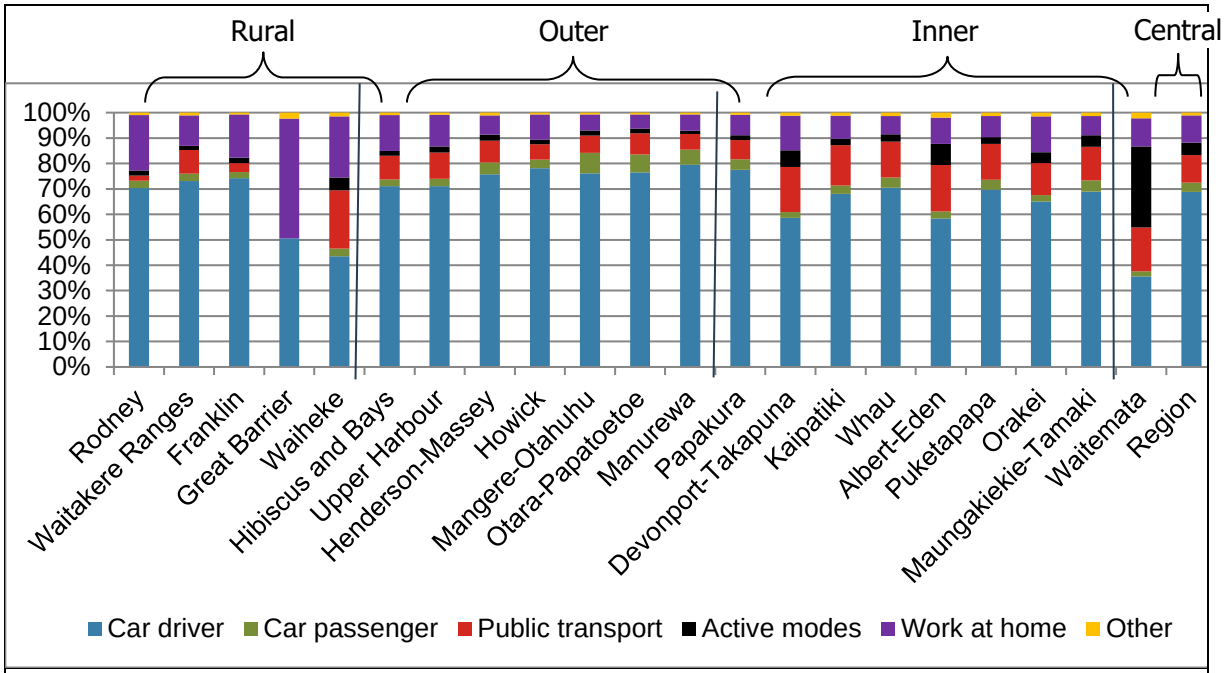


Figure 5.1
Modal shares for journey to work trips by local board area residents sorted by type of area 2018

Away from the island local board areas of Great Barrier and Waiheke, workers living in the central area of Waitematā have the lowest use of cars for commuting followed by the adjacent areas of Albert Eden and Devonport-Takapuna with shares of about 60 per cent. At the other end of the scale the southern local board areas, along with Howick and Henderson-Massey to the west all have high car shares. This is illustrated in Figure 5.2.

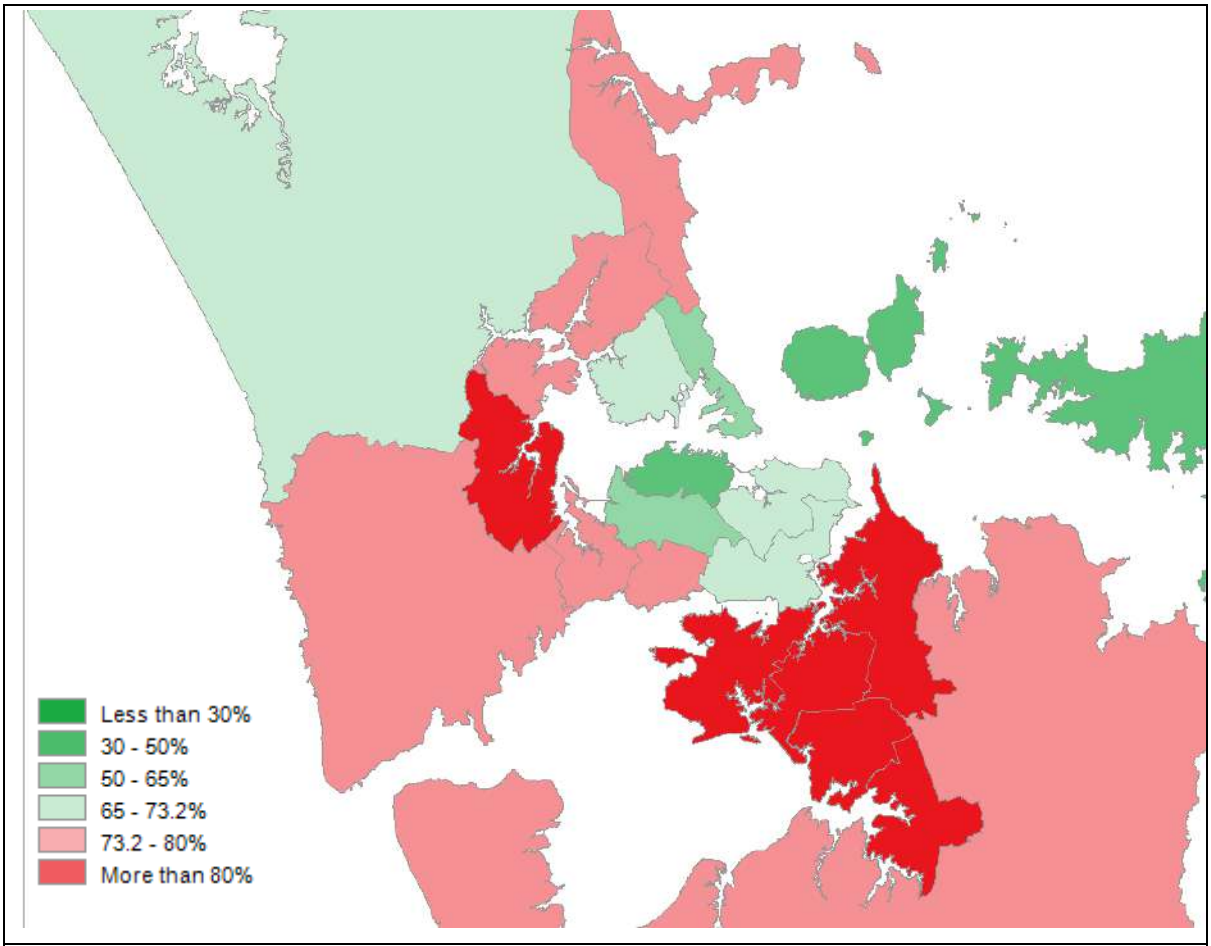


Figure 5.2
Car mode share by Local Board area 2018

This pattern of car use with a low share in the centre and a high share to the south has been accentuated over the recent past. Since 2013, overall car mode share, including passengers, has decreased in most local board areas, particularly the central and northern boards which have seen substantial reductions. However, as can be seen from Figure 5.3, this has been partially offset by increases in the southern local boards, with Māngere-Ōtāhuhu increasing its share from 76 per cent to 84 per cent, largely at the expense of the 'other' category.

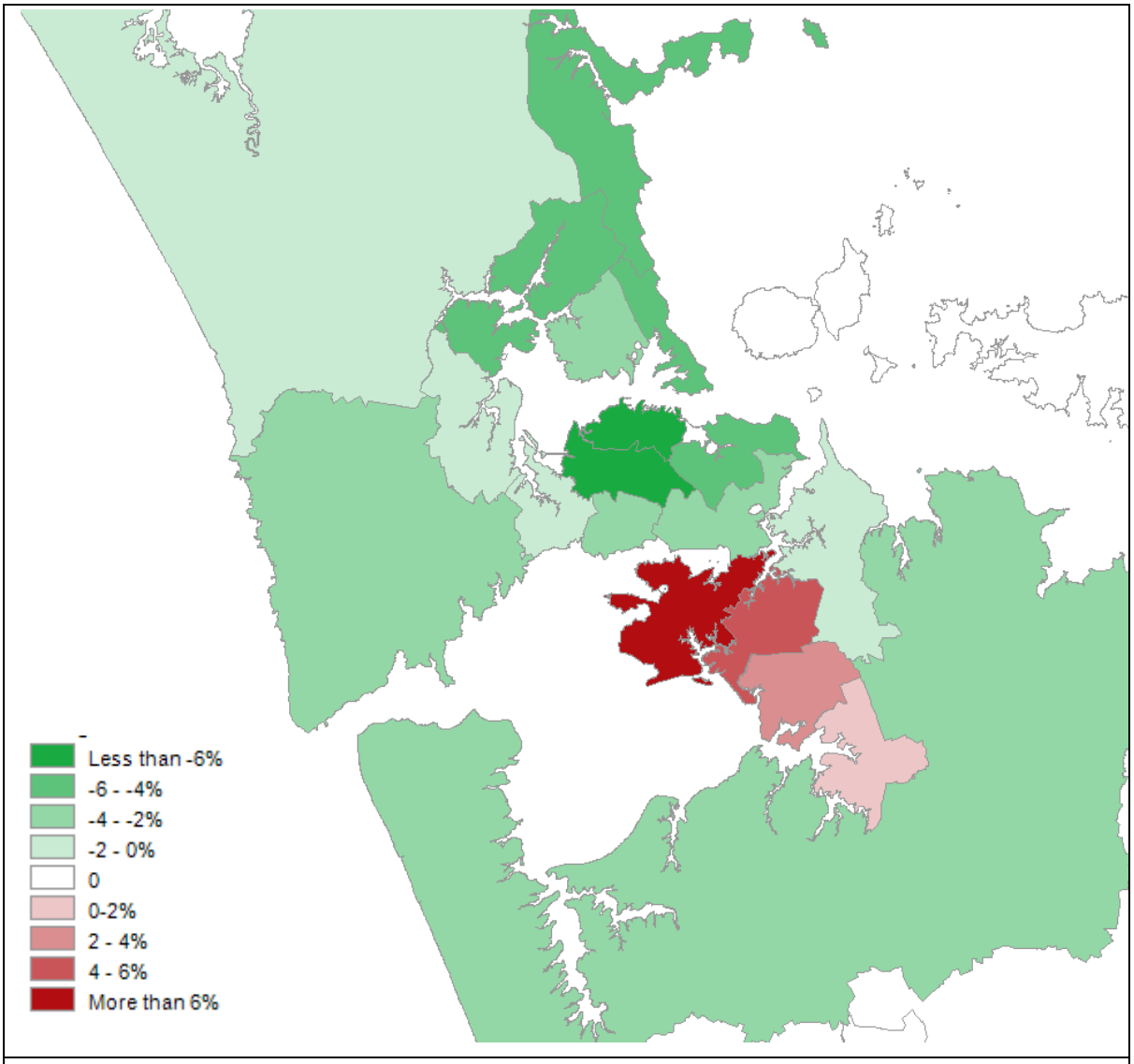


Figure 5.3
Change in total car modal share 2013-2018 by local board origin (percentage points)

In considering the contributors to the changes in car mode share in the south, changes in the shares of car passengers have been examined. However, these have declined in all the areas across the region, including the southern areas where despite this total car use has increased. As a result, the increases in the total car modal share in the southern boards reflect increased car driver trips and not an increase in car passenger movements.

6 Trip lengths

Trip lengths by origin and destination are set out in Figure 6.1. Because of limitations in the data, these should be regarded as illustrative rather than precise, but they nevertheless give a good indication of the patterns across the region.

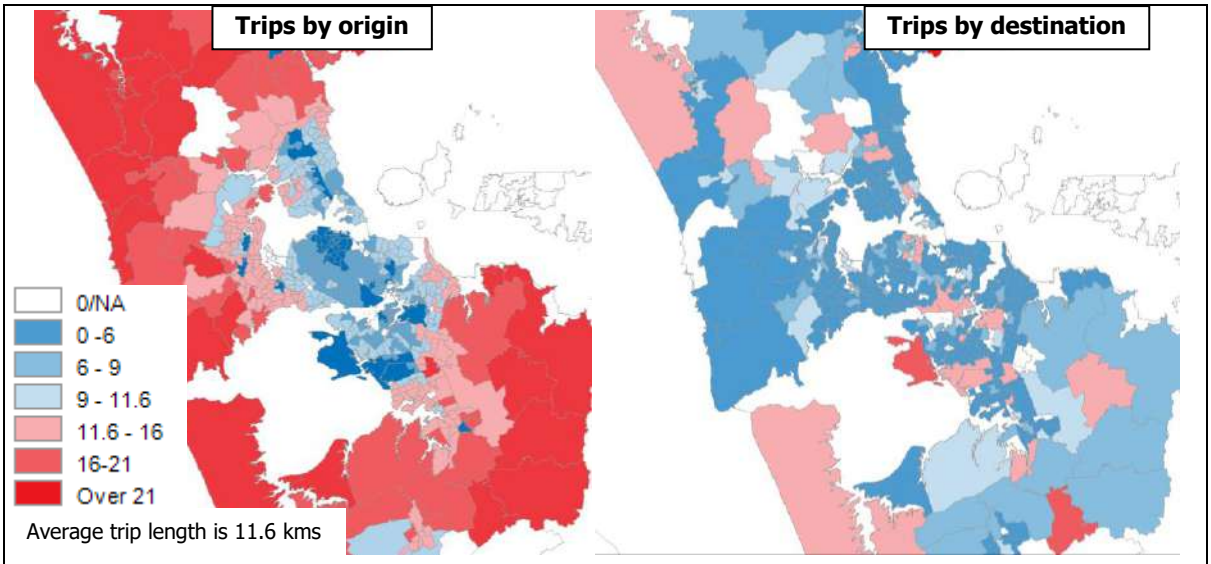


Figure 6.1
Average trip length by origin and destination (kms)

Trip lengths by residents are typically low in the central area and then gradually increase as the distance away from the centre increases. The main exceptions for this are the large industrial areas which have limited numbers of residents a high proportion of whom are associated with the local industries. For trips by destination, the main employment areas drawing workers from wide areas typically have longer trip lengths. These typically offer wages that are sufficient to support longer distance commuting, with the airport offering a prime example of this. Other destinations with longer trip lengths include Highbrook/East Tāmaki, Wiri, Onehunga/Penrose and North Harbour.

7 Trip making and social deprivation

The work has also sought to identify whether there are any linkages between commuting patterns and levels of social deprivation. While there is some evidence of relatively high car use – particularly travel as car passengers from the more socially deprived areas in south Auckland – in general the linkages are limited and may reflect employment patterns as well as socio-economic status.

Part 3 - Journey to education patterns

8 Total journeys to education

For the analysis of travel to education patterns, the student population has been divided into three age groups. Figure 8.1 shows the relative scale of these.

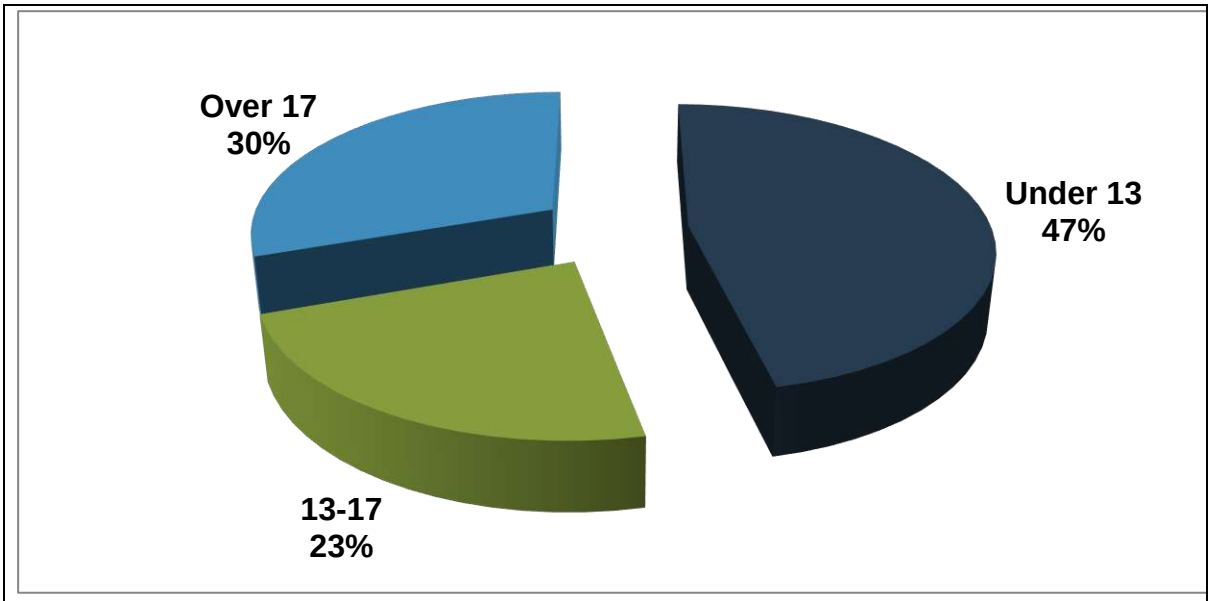


Figure 8.1
Breakdown of journeys to education by age group

Almost half of the students are in the youngest age-group up to 13, attending preschools and primary schools; just under a quarter attend secondary schools and colleges; and 30 per cent are in some form of tertiary education including studying at home.

9 Modal shares

As the students progress from one age group to another their travel patterns change. This is illustrated in Figure 8.1.

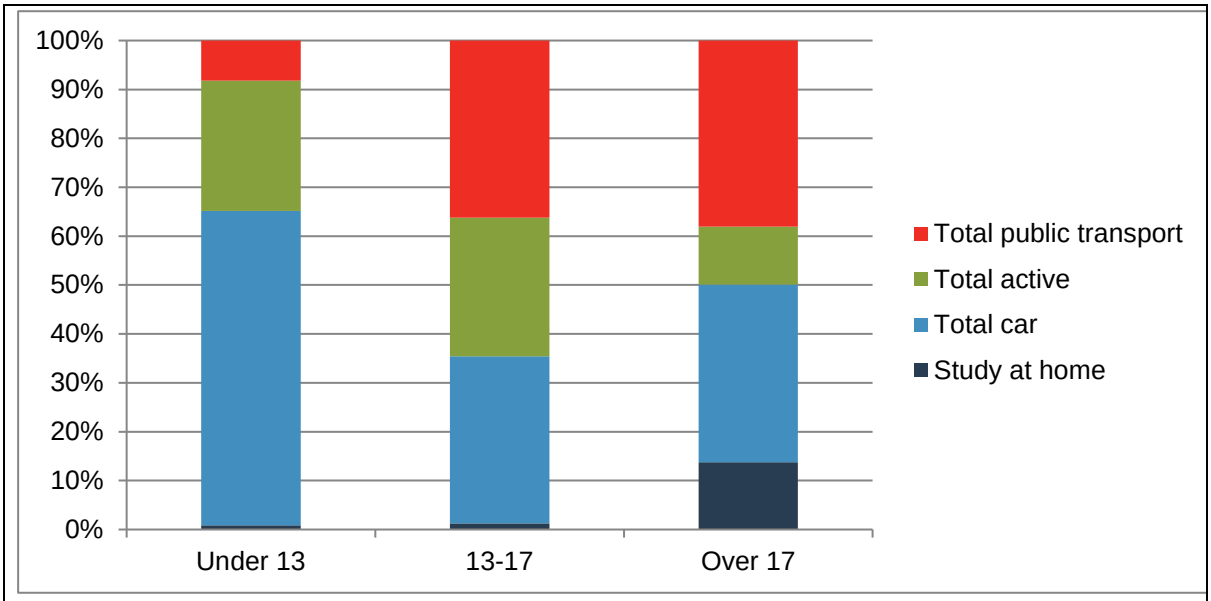


Figure 9.1
Journey to education: broad modal shares by age group

The youngest age group predominantly travel to school or preschool by car, accompanied by their parents or other adults, but with a quarter of the journeys by active modes. As these children typically attend schools close to their homes, the use of public transport – which is more suitable for longer journeys (and possibly older children) – is low.

As the students advance to secondary schools or colleges, journey distances to these larger schools with wider catchment areas become longer and children are increasingly able to travel on their own. The share of private car use falls as a consequence, and the longer distances make public transport a more attractive option. As they grow older, students can walk or cycle to education, but the extent of this is limited by the increased distances to school, and so the share of active mode trips remains largely the same as for the youngest age group.

For the oldest students, who would include significant numbers of students relocating to the region either from overseas or other parts on New Zealand and typically attending larger tertiary establishments with very wide catchment areas, the share of the active modes decreases. However, this age group is increasingly able to drive and as a result the share by car also increases. The greater distances, and focus on a few key locations, encourage the use of public transport and so the share of this remains high. Many of the tertiary establishments are also in locations well served by public transport particular in the Central City and this also contributes to a high share of public transport use. For the oldest age group study at home becomes important and is undertaken by 14 per cent of the students.

These characteristics are reflected in the average distances by age group.

Table 9.1 Journey to education trips - estimated average distance by age group 2018 (1)	
Age group	**Average distance (kms)**
Under 13	3.2
13-17	5.6
Over 17	10.4
All age groups	5.9

Notes (1) Because of data issues these should be regarded as illustrative rather than precise and the approach used possibly overestimates the distance travelled by the youngest age group.

10 Educational trip making by local board area

As in the case of the journey to work, the pattern of education trip making varies by area as is illustrated in Figure 10.1.

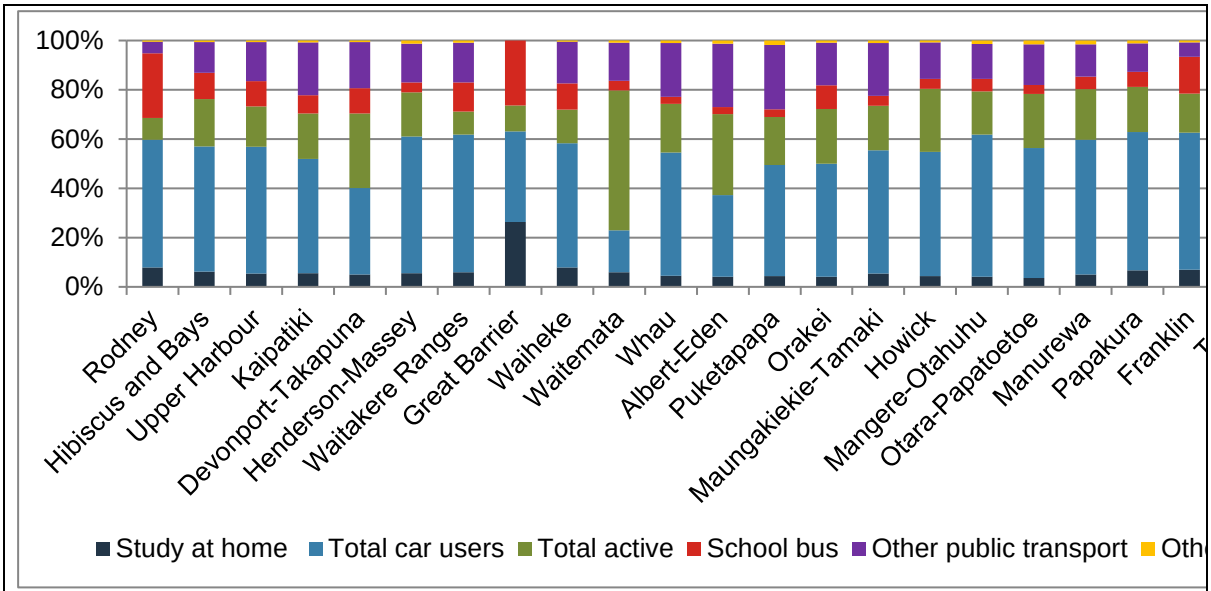


Figure 10.1
Journey to education by local board area 2018 - all age groups

Car use is lowest for students living in the central Waitematā local board area and is also low in the neighbouring Albert-Eden and Devonport-Takapuna areas. This is balanced in part by high active mode use, reflecting the high level of educational places available to the resident student population, and possibly also the difficulty of car travel on the congested roads in these areas. Public transport use and the share of school buses in this also vary widely, with the more rural areas having high shares of both. Public transport use is relatively low in the local board areas to the east and south, and also in Henderson-Massey to the west.

11 Socio-economic deprivation and patterns of educational trip making

The areas identified with low public transport use are also often those with high levels of socio-economic deprivation. While the statistical robustness of the linkages is limited, areas with high social deprivation appeared to have relatively low public transport use for the 13-17 age group, balanced by higher levels of active mode use. This may, however, be the result of the spatial relationship between schools and the students they serve, with typically shorter journey distances, making active mode use more attractive, and public transport less so. This in turn may reflect an acceptance of the local school rather than looking for wider opportunities which itself may be a socio-economic characteristic.

For the younger and older age groups, no particular relationship was observed.

Part 4 – Conclusions

12 Journeys to work and to education: an overall assessment

The data from the 2018 Census – with over a million records covering travel to work and travel to education – and the ability to compare with travel to work data from earlier Censuses provide a valuable resource for examining some of the key journey patterns in the Auckland region. The main findings from this are:

- The predominant mode for both the journey to work and journey to education is the private car.
- While the numbers commuting by public transport have increased substantially since 2013, their share of the total across the region remains low.
- Although the overall public transport share is low, this forms a large and growing share of commuting travel into the City Centre with a mode share of over 40 per cent and accounting for over half of all the commuting trips made by public transport.
- This high public transport mode share is in contrast to areas further away from the centre particularly in South Auckland, Here the extent of commuting to the central area is limited, and the location and nature of employment of residents encourages the use of cars giving a high modal share which is continuing to grow.
- Trip lengths for commuters are lowest for those living in the central city, and then get longer as the distance away from the centre increases. For trips by destination, the major employment areas many of which are dispersed across the region have high demands for labour and relatively high wage rates and are able to attract workers from wide areas. For other areas the average trip length is generally low.
- The high car mode share found in the Outer Urban Sector (approximately 80% for both journey origin and destination) is likely driven by a range of factors; namely the industry of employment, levels of social deprivation, trip distance, and available travel choices. It is due to the high growth of both commuting origins and destinations within this sector that any positive mode shift achieved in other sectors (namely the City Centre) may have been offset by the heavy reliance on cars in the Outer Urban Sector.
- For travel to education there are changes in the patterns of trip making as students get older and are more able to travel independently, but where the distances needed to be travelled increase. The high levels of car trip making by the youngest students decline as they move into the older age groups. The shares of public transport grow as journey distances to schools increase, with the switch from primary to secondary and then tertiary education. Active mode use is highest for secondary students.
- While for both the patterns of travel to work and to education there are some links with the levels of socio-economic deprivation, especially in South Auckland, in general these linkages are not very strong. The main exception to this is in travel to work by car as a passenger, which is relatively high for the more deprived areas in the south.
- It appears that there is no simple 'solution' to the problem of car dependency – it is best to focus on addressing mode shift where it supports trips to work and education (e.g. in the Isthmus and Inner Urban areas).

Part 1 - Journey to Work

13 Introduction

13.1 Purpose of the work

The availability of the journey to work data from the 2018 Census provides the opportunity to look at commuting patterns across Auckland and help identify how these patterns are responding to the changes and investments that have been made over recent years. This will help guide future land transport planning and investment. By providing a snapshot of travel behaviour across the region, it also provides the opportunity to compare the position in different areas and identify whether there are discernibly different patterns in the inner and outer parts of the region.

13.2 Scope of the analysis

Reflecting this, the work this report covers at an increasing level of disaggregation:

- The use of different transport modes for the journey to work for the region as a whole, and the ways in which these have been changing over time
- An analysis of the patterns of commuting movements by broad sector across the region
- The travel to work movements by the more disaggregated Local Board areas
- An analysis of key components of commuting patterns across the region at the more detailed Statistical Area 2 (SA2) level
- The characteristics of trip making to the key employment areas in the region
- The characteristics of trip making from selected residential areas
- The assessment of the patterns of trip making in areas of high social deprivation
- The characteristics of commuting patterns in the areas served by the rail network, the Northern Busway and the Frequent Transit Network (FTN).

The opportunity has also been taken to compare the position in Auckland with that for the four Australian cities of Sydney, Melbourne, Brisbane and Perth, although it should be noted that the Australian data has not been updated since 2006.

13.3 Definitions of Workers, Jobs and Employment

In the detailed analysis set out in this report it should be noted that we have defined "**workers**" to be those for whom Census Journey to Work information is available and shows the mode of travel and specific destination of the journey. For the purposes of this report we have therefore used "**employment**" or "**jobs**" in an area as shorthand for commuting trips with destinations in that area. While this results in employment numbers that are different to those published in alternative sources, such as the Business Demographics Database (BDD) published by Statistics NZ, it remains an appropriate reflection of the destinations and modes used for journeys to work as captured by the Census, and where appropriate their changes over time.

13.4 Data issues

In considering the results set out in this report and considering the changes over time, it should be noted that there are a number of issues with the new data which affect the level of analysis which it is possible to undertake. The main areas identified are:

13.4.1 The question asked in the Census

In the censuses up to and including 2013, the question asked in the census was about the characteristics of the journey to work on the nominated Census day. This resulted in a number of responses being identified as "Did not go to work today" for which no further information was available.

Contrasting to this earlier approach, in the 2018 Census the question asked was about the normal journey to work rather than the actual journey on a particular day. The issue of non-attendance at work of those normally employed on the Census day was therefore avoided. In the 2013 Census about 9.5 per cent of trips were recorded as not going to work and where appropriate an allowance has been made for this change in approach in considering changes over time.

13.4.2 Confidentiality constraints

In the data provided for the 2013 and earlier Censuses, all numbers were randomly rounded to the nearest multiple of three which meant that small flows were included in the data provided. However, in the 2018 Census results all cell totals below 6 were suppressed. Given the wide distribution of commuting trips across the region especially for the lower volume modes, this appears to have led to a substantial loss of information. An analysis of the data for 2013 suggested that applying a similar confidentiality rule would lead to a loss of data amounting to about 25 per cent of the total trips but with much higher reductions for bicycle, car passenger and rail flows. It is also possible to gain an indication of the loss of data in the 2018 results by comparing the aggregated trip totals for which the impact is less with those for greater levels of disaggregation and these effects are considered in the appropriate sections of the report.

13.4.3 Modal definitions

There has been some change in the modes for which information has been collected with the removal of motorbikes as a separate mode and the inclusion of ferries (previously included in the "Other" category in 2013).

13.4.4 Zoning structure

The structure of the zones used for analysis has also changed with the replacement of Census Area Units (CAUs) by Statistical Area 2 zones. These have a different spatial definition to the earlier CAUs and thus make direct comparison of results at a detailed level more difficult. While the new zones can be reconciled reasonably well with the area previously analysed for the Central City/Central City, there are more substantial challenges for other smaller areas.

13.4.5 Use of administrative data

Because of the relatively low response rate to the Census for 2018, there has been considerable use of administrative data (i.e. data separate to the Census) to supplement the responses achieved. While the implications of this have not been investigated in detail, one effect seems to be to have reduced the numbers of journeys with unidentified characteristics, particularly in terms of the modes used. In the 2018 Census, about 1.9 per cent of journeys did not have an identified mode or used ferries which were included in the "Other/Not elsewhere" category included for 2013. For 2013 the comparable figure amounted to a rather larger 6.5 per cent.

13.4.6 Impacts of the data issues

Adjustments have been made in some instances in an attempt to reduce the issues identified above. However, the confidentiality constraints in the 2018 Census pose particular challenges in understanding changes over time, as well as detailed transport patterns, and the consequent distance estimates – all of which are generated at a very disaggregate level. In a number of cases, it has not proved possible to provide reliable estimates of the desired results. These, again, are discussed in the relevant sections.

13.5 City Centre or Central City

City Centre and Central City have been used interchangeably to describe the central area of Auckland, bounded by the motorway or the Waitematā Harbour.

13.6 The impacts of Covid-19

It should be noted that the Census was undertaken before the onset of Covid-19. The changes in journey patterns to this are still evolving with in particular increased working from home and a degree of caution needs to be taken in applying the results of the Census in future situations.

14 Review of available data for 2018

14.1 Introduction

The total trips identified in the data supplied are set out in Table 14.1. Because of the way in which the data has been provided, it is possible to analyse the material in different ways and at different levels. Separate data has been supplied at a Local Board area level and at an individual SA2 zonal level. This section sets out the relationships between the different data totals, taking into account the issues raised in Section 1 and the impacts of these at different levels of analysis and disaggregation.

14.2 Key highlights

The key characteristics of the data are set out in Table 14.1 and summarised in Figure 14.1.

Table 14.1 Total data characteristics		
Trip type	**Aggregate totals**	**Per cent of Auckland-Auckland total**
Total travel to work trips to Auckland from all origins	755,670	101%
Total travel to work trips Auckland-Auckland	744,858	100%
Auckland-Auckland destination not defined at zonal level	124,299	17%
Total trips identified for individual cell matrices	549,996	74%
Trips identified for individual cell matrices - sum of individual modes	435,213	58%
Reduction with analysis by individual modes	114,783	15%
Total trips identified for Local Board analysis	677,055	91%
Trips identified for Local Board analysis - sum of individual modes	666,894	90%
Reduction of LB total with analysis by individual modes	10,161	1%

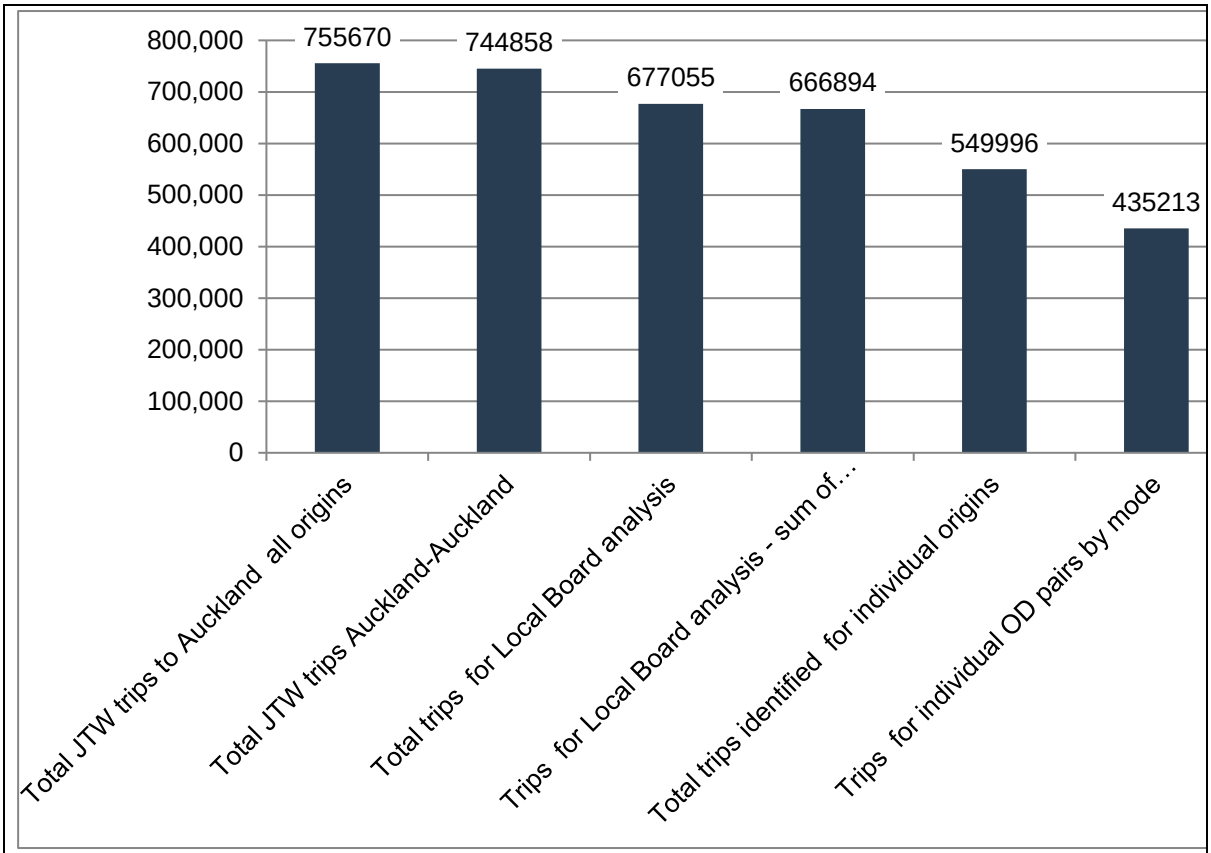


Figure 14.1
2018 Journey to work data totals

Overall from the aggregate data there are 756,000 journey to work trips recorded for destinations in Auckland of which about 745,000 are from origins within the Auckland region. Of these about 125,000 (while travelling to work somewhere in Auckland) do not have a precisely defined destination, leaving just under 620,000 with a precisely defined destination.

The totals identified for Local Board to Local Board movements amount to about 680,000 trips with the reduction in the total from the 745,000 outlined above reflecting the imposition of the confidentiality rules and issues with identifying the destination of the trip at a Local Board level. Because the Local Boards are broadly defined, the reduction with an inexactly defined workplace is smaller than for the individual zones. The disaggregation of the local board totals by individual mode would result in a further reduction of the trips recorded. However, because of the higher level of spatial aggregation and the consequent higher numbers of movements between the broader areas, the loss of information from this, about 10,000, is relatively low. As a consequence, the numbers of trips available for analysis at a Local Board level are about 90 per cent of the full totals for movements within the Auckland region.

At an individual zone-zone level, the total trips identified by the Census data amount to about 550,000. The difference between this figure and the 620,000 reflects the suppression of trips with small cell sizes, with totals of less than 6 excluded from the analysis. A further loss of information occurs if the individual cell matrices are disaggregated by mode, with the totals identified by mode and destination falling to about 435,000, a further reduction of 115,000 trips. In total, therefore, the numbers available for analysis by individual zones at a total trip level are about 75 per cent of the original total of 745,000 for total zone-zone movements, and just less than 60 per cent of the original total for the analysis of zone-zone movements by mode.

The reduction of up to 40 per cent for the most detailed analysis, compares to a reduction of about 25 per cent with the data from the 2013 and 2006 Censuses, and about 30 per cent in the 2001 Census. This loss of information means that care needs to be taken when considering and drawing conclusions about the more detailed results in this analysis.

15 Highlights at a regional level

Key findings

- Of the total commuting trips within Auckland recorded in the 2018 Census, trips by private vehicles had the largest share of the total, accounting for about 73 per cent of total journeys. Of these, 69 per cent were car drivers and 4 per cent car passengers.
- Public transport (bus, train and ferry) accounted for 11 per cent, and active modes 5 per cent. Almost 10 per cent of the workforce worked from home.
- Over the period from 2013, overall traffic flows are estimated to have increased by 14 per cent
- The numbers travelling by bus and train have increased much more rapidly with rail travel increasing by over 110 per cent. Bus, the dominant public transport mode, has increased by 41 per cent. Overall, the share of bus and rail in total movements has increased from 7 per cent to 10 per cent.
- While active mode travel has increased by about 7 per cent, this is less than the overall growth rate and its share of the total has declined slightly.
- The share of private car travel has remained largely unchanged.
- The number of workers working from home has grown by 47 per cent, and its share of the total has increased from 7 to 10 per cent.
- Average trip lengths appear to have increased slightly to 11.6 kms

15.1 Introduction

The main regional highlights considered in this section are the modal splits for 2018 and a comparison as to how these have changed since 2013. In making comparisons over time, there are issues with the data, including differences in the question asked and these are discussed below.

15.2 2018 position

15.2.1 Modal splits

At an aggregate level, the modal splits for the journeys to work recorded in the Census are set out in Table 15.1 and Figure 15.1.

Table 15.1 2018 journeys to work - trips by mode for the Auckland Region		
Mode	**Total trips**	**Modal split (per cent)**
Worked at home	**72,033**	**9.7%**
Drove a private car, truck or van	440,100	59.1%
Drove a company car, truck or van	76,764	10.3%
Passenger in a car, truck, van or company bus	28,416	3.8%
Total all car users	**545,280**	**73.2%**
Public bus	52,683	7.1%
Train	22,029	3.0%
Ferry	4,971	0.7%
Total public transport (PT)	**79,683**	**10.7%**
Bicycle	7,482	1.0%
Walked or jogged	31,113	4.2%
Total all active modes	**38,595**	**5.2%**
Other/Not elsewhere included	**9,267**	**1.2%**
Total	**744,858**	**100.0%**

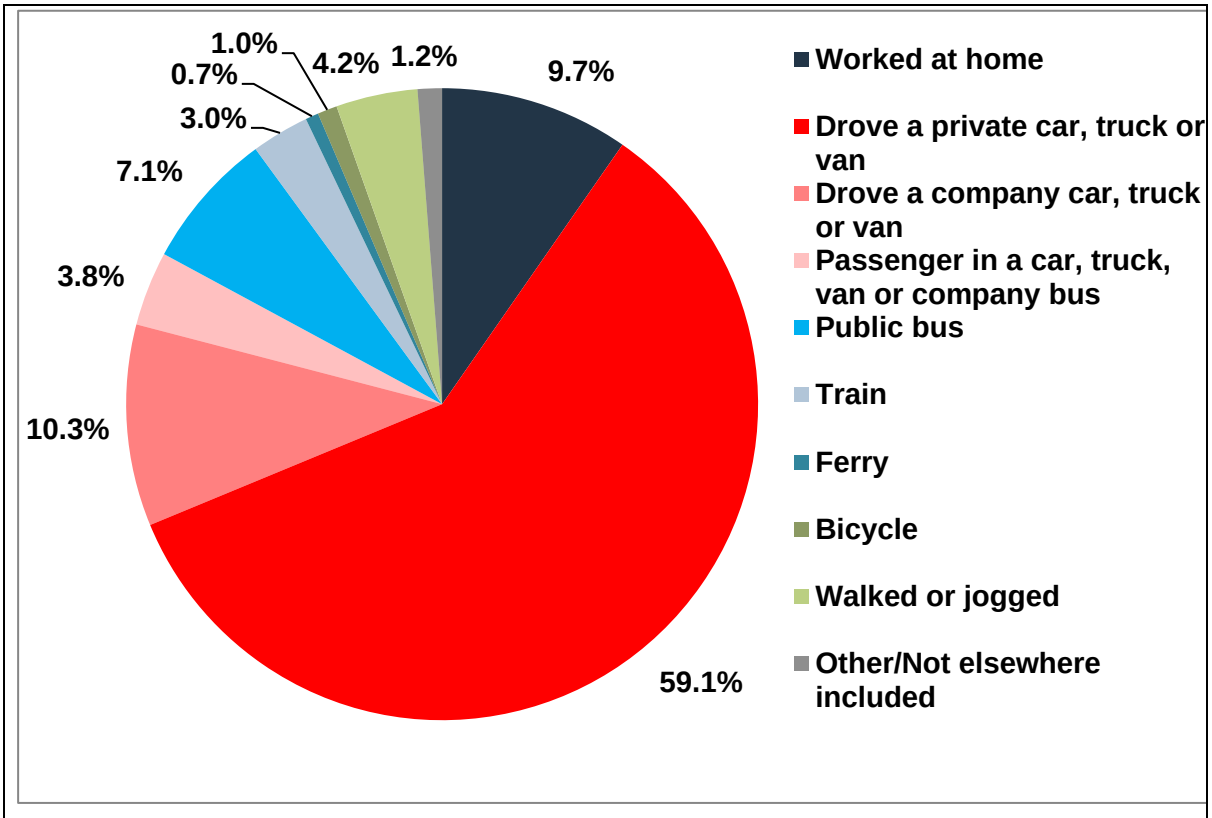


Figure 15.1
2018 journeys to work - modal shares for the Auckland Region

Overall, in 2018 car and van drivers and passengers accounted for 73 per cent of all commuting journeys, with public transport accounting for about 11 per cent. Active modes (walking and cycling) accounted for a further 5 per cent, with "Other" accounting for about 1 per cent. The balance (almost 10 per cent) is made up of people working from home.

Within car and van users, about 80 per cent drove a private vehicle, 14 per cent drove a company vehicle, and just 5 per cent were passengers. This would give an average private vehicle occupancy for travel to work journeys of about 1.05.

Within public transport users, the majority, 66 per cent, used buses, 28 per cent used trains and 6 per cent used ferries. The active mode share was split between walkers (81 per cent) and cyclists (19 per cent).

While the material in Table 15.1 and Figure 15.1 shows the position for the region as a whole, the impacts of the suppression of trips for the individual modes at an individual zonal (SA2) level are substantial, as can be seen in Table 15.2.

Table 15.2
Effects of confidentiality constraints, data rounding and undefined destinations

Mode of journey	Total Auckland as recorded	Sum of individual matrix cells	Individual matrix as per cent of total
Worked at home	**72,033**	**71,973**	**99.9%**
Drove a private car, truck or van	440,100	280,353	63.7%
Drove a company car, truck or van	76,764	25,509	33.2%
Passenger in a car, truck, van or company bus	28,416	4,509	15.9%
Total all car users	**545,280**	**310,371**	**56.9%**
Public bus	52,683	23,325	44.3%
Train	22,029	7,695	34.9%
Ferry	4,971	2,460	49.5%
Total all public transport users	**79,683**	**33,480**	**42.0%**
Walked or jogged	31,113	18,606	59.8%
Bicycle	7,482	783	10.5%
Total all active modes	**38,595**	**19,389**	**50.2%**
Total (exc other and not otherwise specified)	**744,858**	**435,213**	**58.4%**

Overall, at a detailed level, about 42 per cent of trips are lost because of the difficulty in specifying a precise destination or the effects of the suppression of small cell sizes. This effect is particularly marked for cycle trips and for trips as passengers in private cars, which lose 90 per cent and 85 per cent respectively. Even for rail use, about 65 per cent of the total trip data is lost at a zone to zone level. This clearly has implications for the assessment of these smaller modes.

15.2.2 Average distances

The average distances by mode are set out in Table 15.3. However, because the calculation of average distances is based on the detailed individual matrix cells, the results are affected by the impacts of the confidentiality constraints described above, which would have a particular impact for journeys by bicycle and train. In addition, the confidentiality constraints are likely to affect the more dispersed, longer distance trips for each mode which would have a disproportionate effect on the average journey distances estimated. The effect of this on earlier results, where the effects of the new confidentiality constraints have been investigated, is set out later in this section. The results for 2018, therefore, need to be viewed with some caution as they probably underestimate the true position.

Table 15.3 Average estimated trip length by mode 2018	
Mode	**Average trip length (kms)**
Average all trips	**11.6**
Car	12.2
PT	11.4
Bus	10.0
Train	13.9
Active	1.7
Walk	1.6

15.3 Comparison with earlier results

15.3.1 Modal shares

A comparison has been made between the numbers of trips – both in total and by mode – between 2013 and 2018. In making this comparison, an allowance has been made for the change in question between the two censuses. In 2013, the question asked about details of the journey made on the specified census day, and as a result a significant proportion of respondents (62,000 or 9.5 per cent) answered "Did not go to work today". In 2018 the question asked was changed to relate to the normal journey to work, and as a result this category was no longer relevant.

In order to improve the comparability between the two sets of responses, the totals for 2013 have been adjusted by assuming that the trips identified as "Did not go to work today" would be redistributed between the other trip modes using a common adjustment factor for each of these. On this basis the comparison between the trips identified for 2013 and 2018 is set out in Table 15.4.

Table 15.4 Comparison between 2013 and 2018 journey to work trip totals and modal splits			
Mode	**2013 Adjusted**	**2018**	**Increase 2013-2018**
Worked at home	48,900	72,033	47%
Drove a private car, truck or van	376,033	440,100	17%
Drove a company car, truck or van	72,357	76,764	6%
Passenger in a car, truck, van or company bus	27,084	28,416	5%
Total all car users	**475,474**	**545,280**	**15%**
Public bus	37,496	52,683	41%
Train	10,452	22,029	111%
Total bus and train	**47,949**	**74,712**	**56%**
Bicycle	7,008	7,482	7%
Walked or jogged	29,315	31,113	6%
Total all active modes	**36,323**	**38,595**	**6%**
Other/Not elsewhere included	41,965	14,238	-66%
Total	**650,610**	**744,858**	**14%**

The total increase in the number of trips to work between 2013 and 2018 amounts to about 14 per cent. This can be compared to the increase in employment for the Auckland region derived from the Business Demographics Database of about 19 per cent over the same period. Differences between the two totals can arise because of increased numbers of jobs in Auckland being taken up by workers from outside the region, and also because of increasing numbers of workers having multiple jobs. The census question asks only about the main form of employment, and so does not include travel for secondary jobs.

A further issue arises with the reduction in "Other/Not elsewhere included" journeys. In 2013 these consisted of motorcycle or power cycle users (for which information was available), "Other" trips (including ferry users) and "Not elsewhere included". For these last two categories, no detail is available on the major components of these. In 2018, the category includes ferry users, about 5,000 trips, "Other" about 9,000 trips and "Not elsewhere included" for which no numbers or details are available. This overall category of unidentified trips has declined by about 28,000 trips or about 4 per cent of the 2018 totals. This may also reflect the use of administrative data in the 2018 census to reduce the number of unclassifiable results. Because of their relatively small size and the lack of information about the majority of trips included, these trips have been excluded from the detailed modal totals for earlier years which follow, but the changes in these do represent a significant part of the changes between the two Census years.

Following the adjustments for the trips recorded as "Did not go to work in 2013", the percentage changes in the numbers of trips by mode are set out in Figure 15.2. These are based on the totals by mode for each year, which are only affected to a very limited extent by the confidentiality constraints.

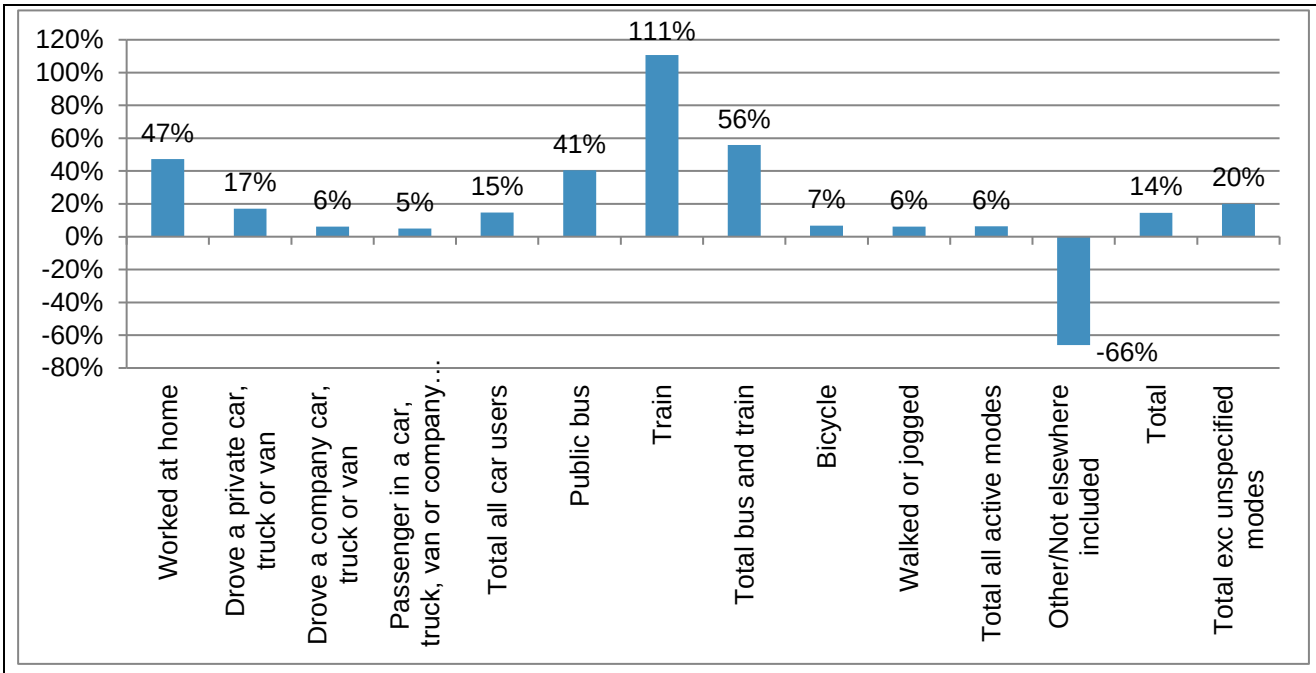


Figure 15.2
Growth in journey to work trips by mode 2013-2018 (per cent)

The highest percentage growth has been recorded for trips by train, working at home and trips by bus which in all cases are substantially above the overall growth rate for all trips of 14 per cent. Trips by cars have grown by approximately the same rate as the overall total. This reflects the balance between a reduced car share for movements into the central area, balanced by increased car use in areas further away from the centre where there has been considerable growth. Within this group, the share of private car drivers has increased while the numbers of company car drivers and passengers has decreased. The latter effect probably reflects both the changing nature of employment, with an increasing emphasis on flexible hours, and improvements to public transport which make it a relatively more attractive alternative. While the numbers of active mode trips have increased, this growth rate is below the average for trips as a whole, and as a consequence their modal share has decreased. The share of "Other" trips has also declined, but this may reflect changes in the way in which these numbers have been determined.

The changes in modal shares are set out in Figure 2.3.

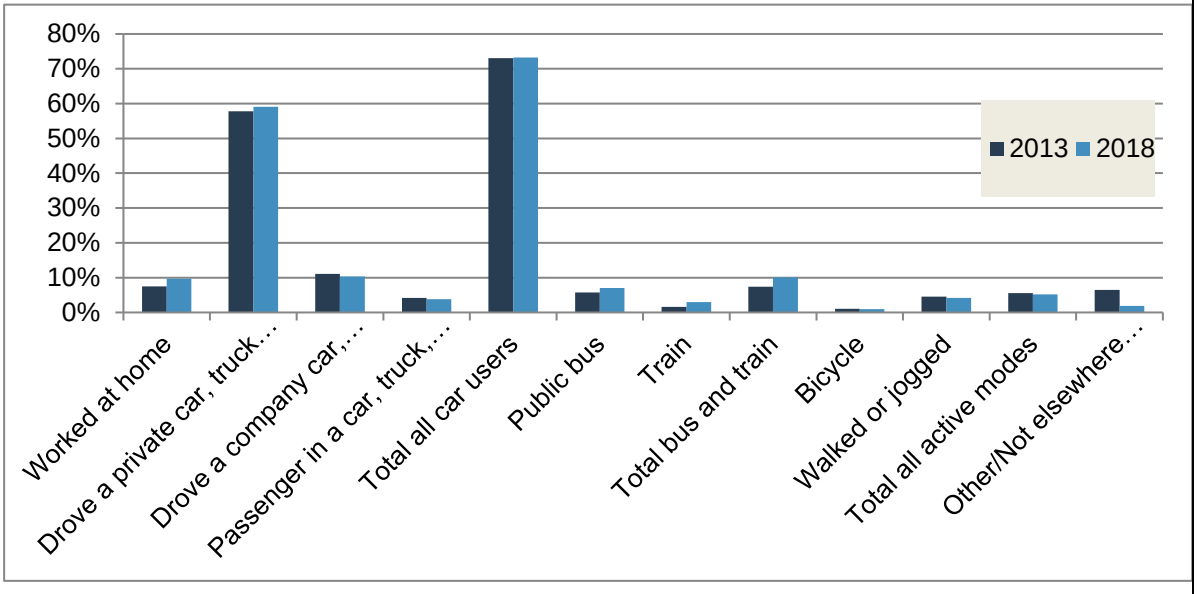


Figure 15.3
Modal splits 2013 and 2018

To summarise the findings above:

- The shares of bus and train trips, and those working at home have increased;
- The share of car users has remained broadly constant, with increases in the share of private car users being offset by reduction in the shares of company cars and car passengers; and
- The shares of active modes have decreased.

Over a longer period, the changes in modal shares are set out in Table 15.5 and Figure 2.4.

Table 15.5 Changes in regional mode share 2001-2018 (per cent of total trips identified)				
	2001	**2006**	**2013**	**2018**
Drove a private car, truck or van	58.3%	57.2%	57.8%	59.1%
Drove a company car, truck or van	11.8%	12.1%	11.1%	10.3%
Total private vehicle drivers	70.1%	69.3%	68.9%	69.4**%**
Passenger in a car, truck, ban or company bus	5.0%	5.0%	4.2%	3.8%
Total private vehicle users	75.1%	74.3%	73.1%	73.2%
Public bus	5.5%	5.0%	5.8%	7.1%
Train	0.5%	1.0%	1.6%	3.0%
Total bus and rail users	6.0%	6.0%	7.4%	10.1%
Bicycle	1.0%	0.9%	1.1%	1.0%
Walked or jogged	3.9%	4.2%	4.5%	4.2%
Total active mode	**5.0%**	**5.1%**	**5.6%**	**5.2%**
Worked at home	**7.9%**	**7.2%**	**7.5%**	**9.7%**
Other /Not elsewhere included	**6.0%**	**7.3%**	**6.5%**	**1.8%**
Total modes considered	**100.0%**	**100.0%**	**100.0%**	**100.0%**

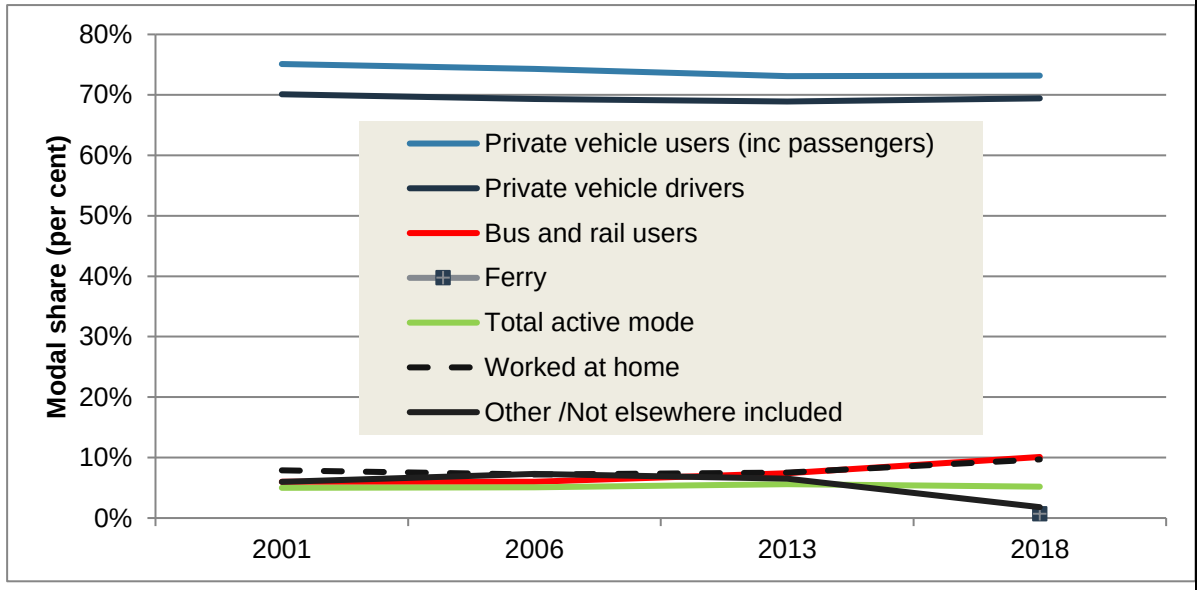


Figure 15.4
Changes in mode shares for journey to work trips 2001-2018 - all modes

More details of the smaller mode shares which are not easy to identify in Figure 2.4 are set out in Figure 15.5.

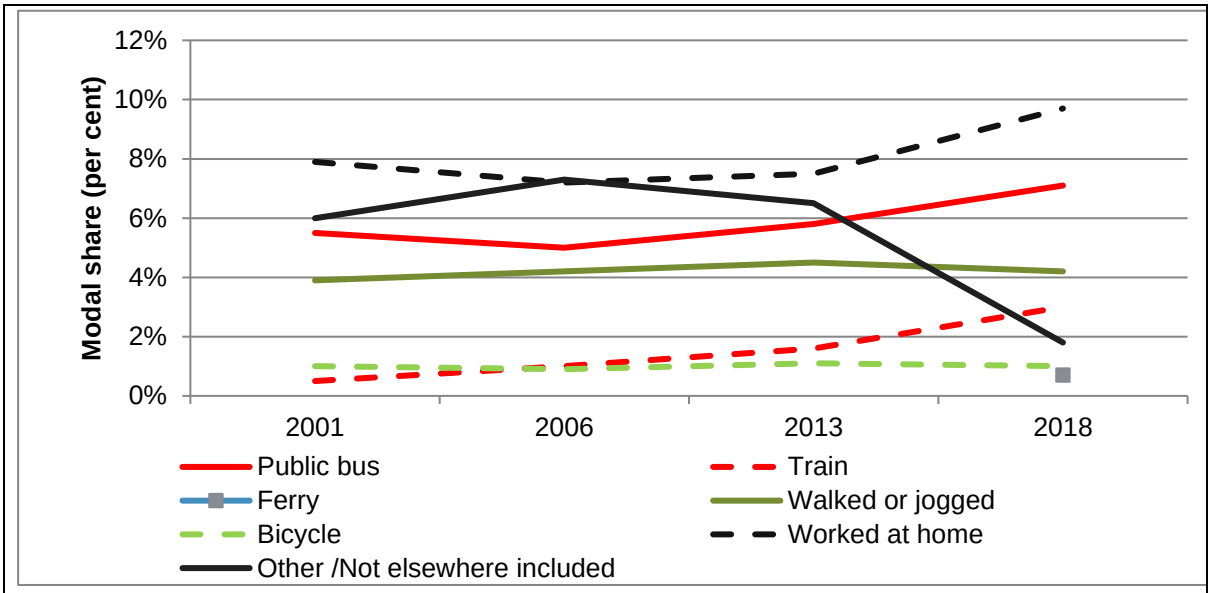


Figure 15.5
Changes in mode shares for journey to work trips 2001-2018 - excluding car trips

The key changes that have been experienced over time are:

- The gradual but slow decline of the share of car trips, driven by the reduction in car passengers for whom the modal share has fallen from 5.0 to 3.8 per cent over the period. However, the share of car driver trips, the key driver of congestion, has remained broadly unchanged, with total car vehicle trips increasing in line with the general increases in commuting movements
- Increases in the share of public transport trips and those working at home.
- The share of active mode trips remaining broadly constant over the period.

15.3.2 Trip distances

Initial calculations suggested that, compared to the figures estimated in the previous report for 2013[1], on a region-wide basis average trip length had fallen. However, further investigation indicated that this result reflected the impact of the confidentiality constraints associated with the most recent data, with the exclusion of large numbers of trips (as discussed in Section 2). To the extent that these constraints affected the numbers of more dispersed but longer distance trips, this would tend to reduce the average trip length estimated for 2018.

While it is not possible to determine the effects of the confidentiality constraints on the estimates of trip distances for 2018 directly, an assessment of the possible impacts of these constraints was undertaken for the earlier 2013 data. By applying the same constraints to this data, these were adjusted to give results which were comparable with those for 2018. The comparison between the results using the full and adjusted datasets for 2013 is set out in Table 15.6.

[1] Journey to work patterns in the Auckland region (2014) Richard Paling Consulting for the Ministry of Transport

Table 15.6 Average distances by mode 2013 (kms)			
Mode	**Based on full data set**	**Based on adjusted data set**	**Reduction with adjusted data**
Total trips	12.8	10.9	-15%
Car	13.5	11.4	-16%
Public Transport (Bus and train only)	12.4	10.8	-13%
Bus	11.4	9.8	-14%
Train	15.9	14.4	-10%
Walk	3.4	1.4	-60%
Cycle	8.1	4.2	-48%

This indicates that the impacts of the confidentiality constraints on the estimates of the average distance travelled are significant, especially for the active modes of walking and cycling.

Because of this difference, the comparison of the distances between 2013 and 2018 has been based on the adjusted 2013 figures as set out above to provide a better indication of the changes over time. This is set out in Table 15.7.

Table 15.7 Average distances by mode (kms) 2018 and 2013 adjusted			
Mode	**2013 adjusted**	**2018**	**Change 2013-2018 (per cent)**
Total trips	10.9	11.6	6%
Car	11.4	12.2	7%
Public Transport (Bus and train only)	10.8	11.0	2%
Bus	9.8	10.0	2%
Train	14.4	13.9	-3%
Walk	1.4	1.6	14%

* Note: The 2013 adjusted numbers in this table need to be viewed with caution. It is also not possible to determine the effects of the confidentiality constraints on the estimates of trip distances for 2018 directly.

In general, after making the adjustments in the 2013 data, average trip distances appear to have increased by about 6 per cent, although as indicated above, these need to be viewed with caution. The figures for car users, which because of the magnitude of the flows are probably the most reliable, indicate a trip length increase over the revised 2013 figures. This is consistent with the total figures, and supports the finding that commuting distances have increased compared to 2013. The resulting change for train is something of an anomaly. It is not clear whether this represents a real change in journey patterns, with increased use by shorter distance commuters from the inner suburbs, attracted by the higher train frequencies and newer rolling stock in 2018, or is a reflection of the underlying data issues.

16 Assessment at a broad sectoral level

Key findings

- For the analysis at a broad sectoral level, the region has been divided into five main sectors:
    - The Central area, in some instances separating out the City Centre
    - an Inner area, comprising the Isthmus and southern North Shore
    - an Outer area, comprising the remainder of the urban area
    - the Rural area
- The City Centre accounts for about 13 per cent of commuting trip destinations within the region and, together with the rest of the Central area, has almost a quarter of the total. The inner area accounts for 32 per cent of the total but the highest share is to the Outer area with 38 per cent. The share of commuting trips to the peripheral Rural areas is small at just 7 per cent.
- In the central area the number of resident workers is equivalent to 28 per cent of the jobs available. In contrast the areas further out have more workers than jobs. In the Inner area the number of workers is 113 per cent of the jobs available and in the Outer area 117 per cent.
- For the region as a whole 52 per cent of workers are employed in the sector in which they live. 37 per cent commute inwards and just 11 per cent commute outwards. The numbers commuting inwards are those most likely to put the greatest pressure on the transport networks in the urban area,
- Car travel accounts for about 55 per cent of travel to destinations within the Central area and public transport 29 per cent of the total. Active modes account for about 11 per cent of the total.
- The car share increases with distance away from the centre increasing from 55 per cent for trips to the Central area to 76 per cent for the Inner area and 81 per cent in the Outer area. In contrast the public transport and active modes shares are highest in the central area and generally decline as distance away from the centre increases.
- The Outer area has generated the highest growth over the period from 2013-2018 accounting for 61 per cent of the increase in workers and 51 per cent of the increase in jobs. This combined with high car modal share for these movements accounts for the continuing high car modal share across the region as a whole.

16.1 Definition of areas

In order to examine movement patterns in more detail, the Auckland Region has been divided into five main zones, in principle forming concentric rings round the central area. In part, this division has been undertaken to facilitate comparison with some of the data for Australian cities presented in the series of reports by the Bureau of Infrastructure, Transport and Regional Economics (BITRE) on the development and transport patterns in Australia's major cities. The BITRE report *Population growth, jobs growth and commuting flows – a comparison of Australia's four largest cities* has been used as a source of comparative data. We have sought to replicate the approach used in the BITRE work in the analysis in this section of the report as it facilitates the assessment of the broader movement patterns within the Auckland region.

The sectors defined have primarily been based on Local Board areas with the Waitematā Local Board area split between the Central City/City Centre, and the Other Central sector. The correspondence of the sectors to the Local Board areas is set out in Table 16.1, and the position illustrated in Figure 16.1.

Table 16.1
Correspondence of sectors for analysis with Local Board areas

Sector	Local Boards
City Centre/Central City	Part of Waitematā
Other Central	Remainder of Waitematā
Inner Urban	Devonport-Takapuna Kaipātiki Whau Albert-Eden Ōrākei Maungakiekie-Tāmaki Puketāpapa
Outer Urban	Hibiscus and Bays Upper Harbour Henderson-Massey Papakura Howick Māngere-Ōtāhuhu Ōtara-Papatoetoe Manurewa
Rural including Islands	Rodney Waitakere Ranges Franklin Waiheke Great Barrier

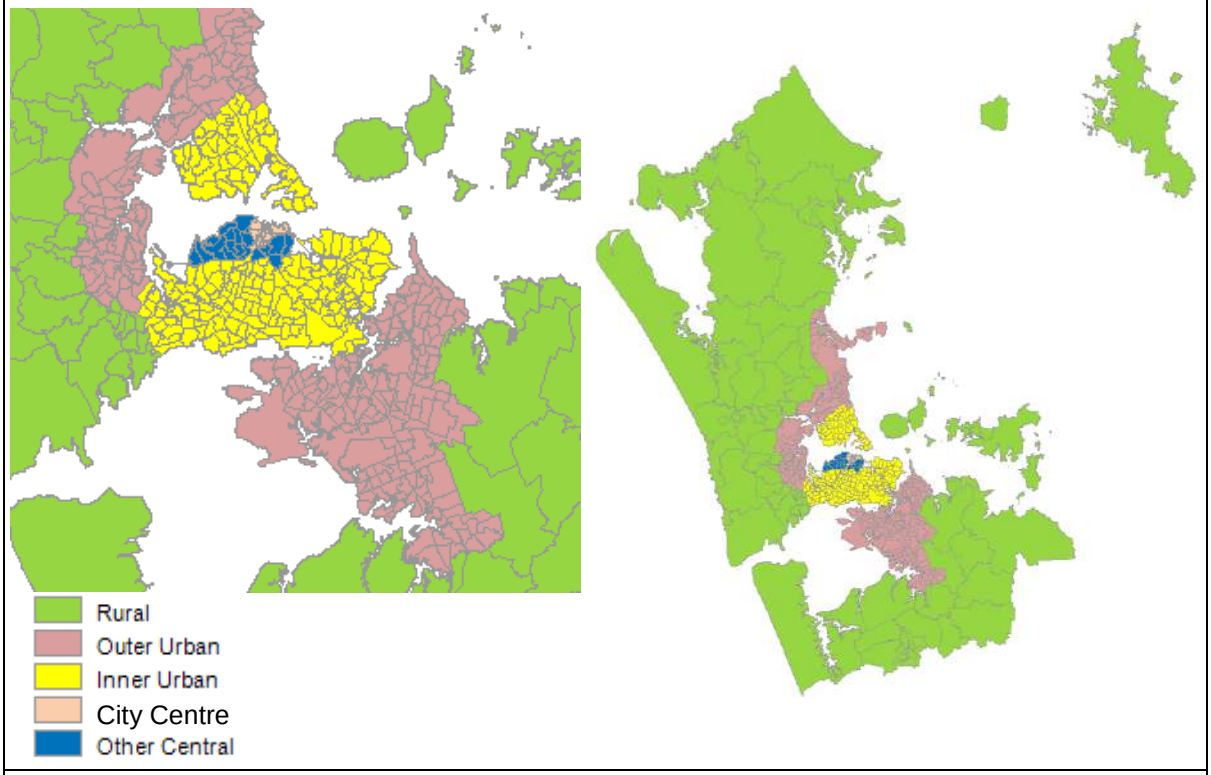


Figure 16.1
Definition of Auckland sectors for analysis

In developing the movement patterns associated with the Central City/City Centre, the data has been built up from data derived from an analysis at an SA2 level, with the totals for the City Centre subtracted from those for the full Waitematā Local Board area to estimate the "Other Central" figure. As discussed above in Section 2, because of the way in which the data has been provided and the impacts of the enhanced confidentiality constraints on individual zonal movements, this may underestimate the total movements to and from these City Centre zones. This, however, would be balanced by higher estimates for the remainder of the Waitematā local board area which have been assessed at a more aggregated level. In making comparisons with earlier years, the most appropriate measure would therefore be the combination of the "City Centre" and "Other Central" areas, and this has been used the subsequent analysis.

16.2 Overall Movement patterns

The overall numbers of commuting trips attracted to, or generated by, the defined sectors are set out in Table 16.2. It should be noted that this analysis is based on the trip data for Local Board areas which, as earlier indicated in Table 14.1, gives slightly lower numbers than the full total.

Table 16.2 Destinations and Origins for Auckland Commuting Trips 2018					
Sector	**Total by Destination**		**Total by Origin**		**Ratio of Resident Workers to Jobs**
	No	**Per cent**	**No**	**Per cent**	
City Centre/Central City	89,553	13.2%	14,304	2.1%	16%
Other Central	67,926	10.0%	30,087	4.4%	44%
Total Central Area	*157,479*	*23.3%*	44,391	*6.6%*	*28%*
Inner Urban	217,539	32.1%	245,610	36.3%	113%
Outer Urban	254,754	37.6%	302,871	44.7%	119%
Rural	47,283	7.0%	84,183	12.4%	178%
Total	**677,055**	100.0%	**677,055**	**100%**	100%

In terms of the destinations of commuting trips:

- The City Centre is estimated to account for about 13 per cent of total jobs and, with the Other Central sector, (essentially the City Centre fringe and comprising the rest of the Waitematā Local Board area) attracts almost a quarter, about 23 per cent, of the total.
- The Inner Urban sector, comprising the rest of the Auckland Isthmus plus the southern part of the North Shore, contains about 32 per cent of workplace destinations.
- The Outer Urban sector, which broadly forms a ring further out, contains slightly more with a share of 38 per cent.
- Workplaces in the rural areas in Rodney, Waitakere Ranges and Franklin and in the islands account for about 7 per cent of the total.
- The Outer Urban and Rural areas combined account for almost half (45 per cent) of the employment as measured by commuting in the region.

In terms of the numbers of resident workers:

- The central sector (City Centre plus Other Central) has a low proportion of the workforce with about 7 per cent of the total.
- Again, the Outer sector has the highest proportion of the total and, together with the Rural area, contains the residential locations of over half (57 per cent) of the regional workforce.

The position is summarised in Figure 3.2.

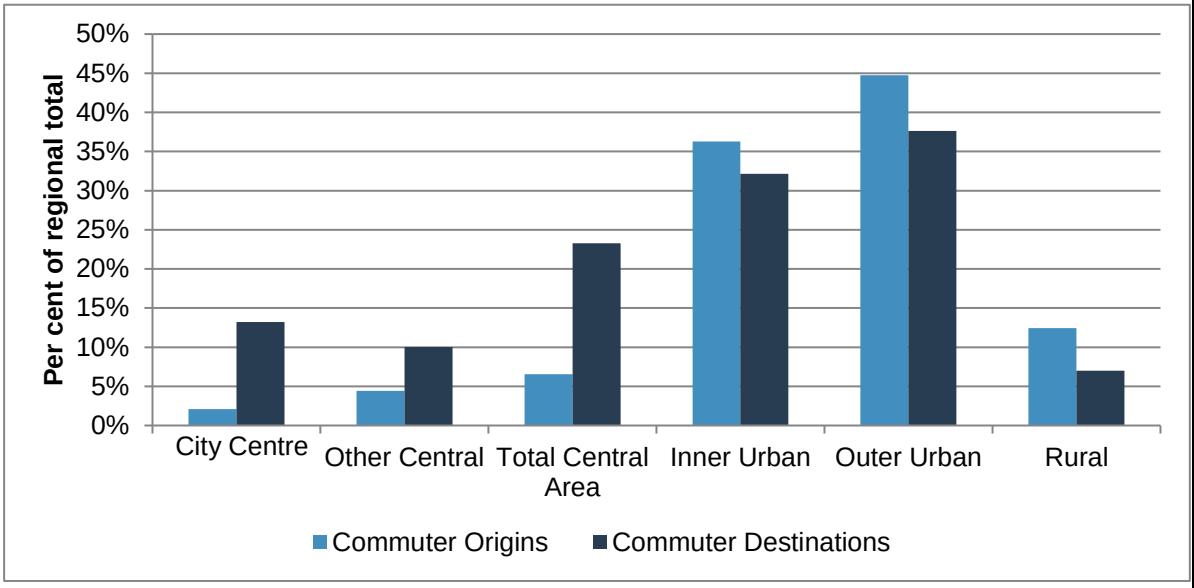


Figure 16.2
Origins and destinations of commuting trips by sector 2018

The two central sectors have considerably more jobs than workers, requiring a substantial inflow to meet the employment opportunities, but for the other sectors the position is reversed. This is particularly the case for the Rural sector, where jobs are available for only 56 per cent of the resident workforce.

The Outer Urban area contains the highest numbers of both the origins and destinations of commuting trips.

16.3 Overall Comparison with Australian Cities

An indicative comparison is possible with the results for the four Australian cities of Sydney, Melbourne, Brisbane and Perth, although it should be noted that these have not been updated since 2006. For Auckland, the Central sector (City Centre plus Other Central) is broadly equivalent to the Inner sector defined for the Australian cities; the Auckland Inner Urban sector, broadly comparable to the Australian Middle sector; and the Auckland Outer Urban and Rural sectors combined, broadly comparable to the Australian Outer sector. On this basis, the general patterns of commuting origins and destinations in Auckland can be compared with those of the four Australian cities, and the results are set out in Table 16.3 and in Figure 16.3 and Figure 16.4.

Table 16.3
Trip Patterns by Sector in Australian Cities and Auckland

NZ Sector	Aust Equi-valent	Trips by Destination					Trips by Origin				
		Auck-land	Sydne y	Mel-bourne	Brisbane	Perth	Auck -land	Sydne y	Mel-bourne	Brisbane	Perth
Central (City Centre+ Other Central)	Inner	**23%**	35%	28%	28%	38%	**7%**	17%	8%	5%	16%
Inner Urban	Middle	**32%**	28%	39%	46%	30%	**36%**	29%	47%	51%	31%
Outer Urban + Rural	Other	**45%**	38%	31%	27%	32%	**57%**	54%	42%	43%	53%

Note: Data for Australian cities is for 2006 and data for Auckland is for 2018

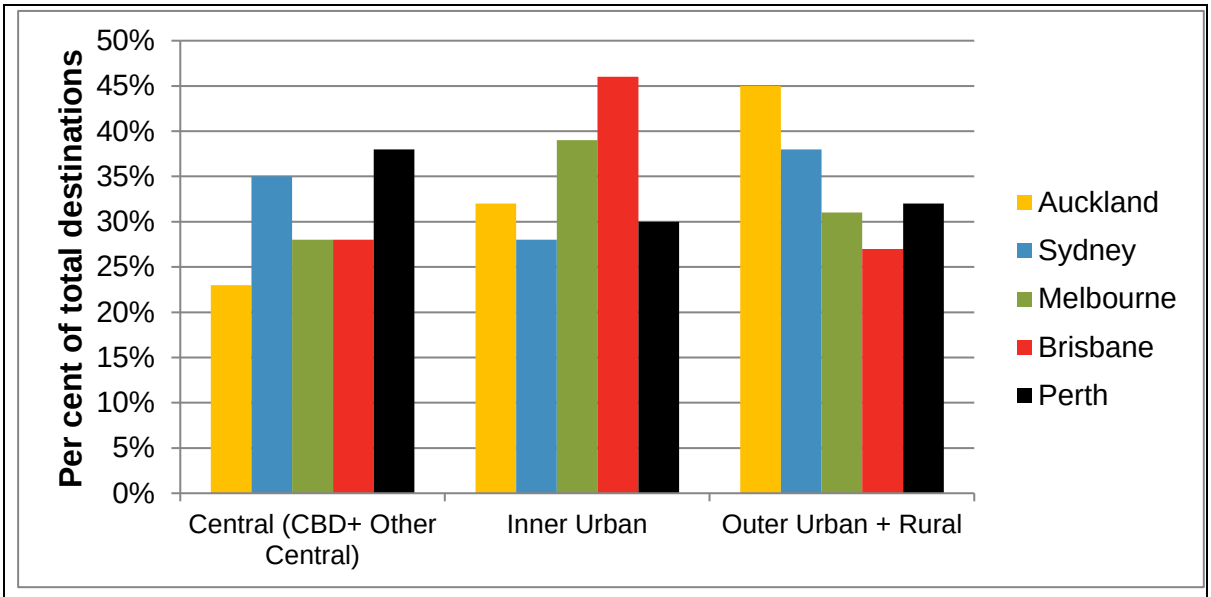


Figure 16.3
Comparison of Australian cities and Auckland - share of trip destinations by sector

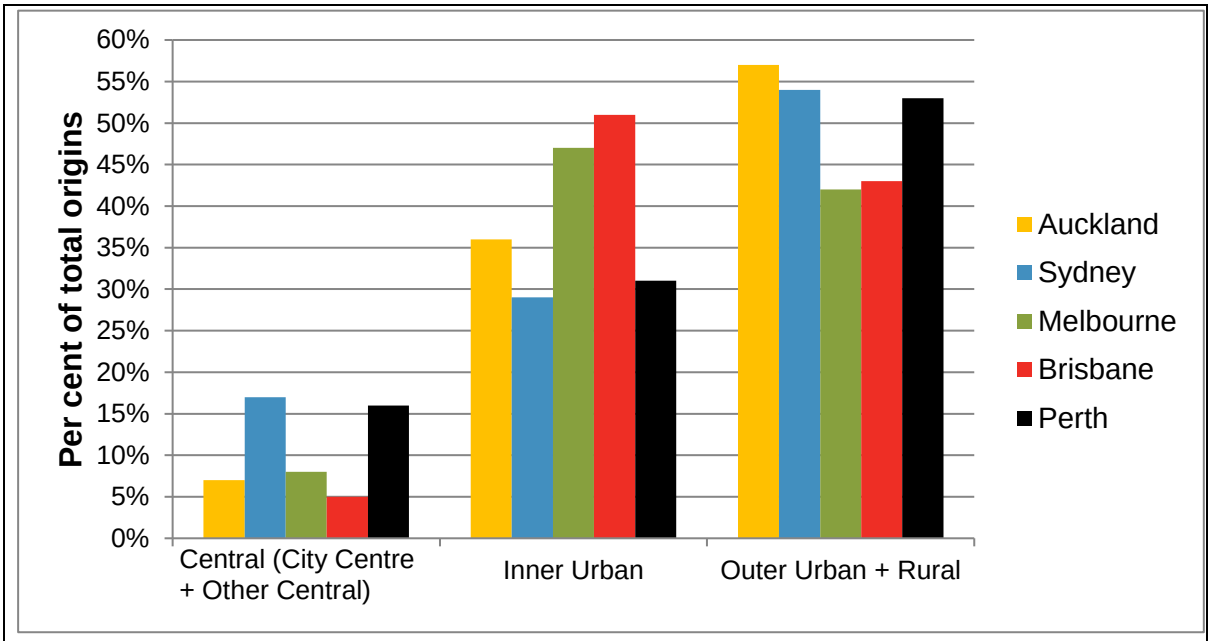


Figure 16.4
Comparison of Australian cities and Auckland - share of trip origins by sector

Compared to the Australian cities, Auckland has a lower proportion of employment in the Inner area balanced by a relatively high proportion in the Outer Urban and Rural areas. In terms of the origins of the workforce, while there are differences between the Australian cities, the position for Auckland is not inconsistent with that for these cities, particularly Perth, although again the Auckland share of the Outer Urban and Rural area is slightly higher.

16.4 Auckland Trip Patterns by Sector 2018

The 2018 pattern of trip movements between the sectors in Auckland is set out in Table 16.4, and the shares of total trips in Table 16.5.

Table 16.4
Commuting journeys by sector 2018: total trips

Origin	Destination					
	City Centre	Other Central	Inner Urban	Outer Urban	Rural	Total
City Centre	9,450	2,265	1,659	930	0	14,304
Other Central	9,111	9,366	7,308	3,918	384	30,087
Inner Urban	42,876	30,639	121,272	47,559	3,264	245,610
Outer Urban	23,403	20,091	72,351	178,329	8,697	302,871
Rural	4,713	5,565	14,949	24,018	34,938	84,183
Total	**89,553**	**67,926**	**217,539**	**254,754**	**47,283**	**677,055**

Table 16.5
Commuting journeys by sector 2018: shares of total trips

Origin	Destination					
	City Centre	Other Central	Inner Urban	Outer Urban	Rural	Total
City Centre	1.4%	0.3%	0.2%	0.1%	0.0%	2.1%
Other Central	1.3%	1.4%	1.1%	0.6%	0.1%	4.4%
Inner Urban	6.3%	4.5%	17.9%	7.0%	0.5%	36.3%
Outer Urban	3.5%	3.0%	10.7%	26.3%	1.3%	44.7%
Rural	0.7%	0.8%	2.2%	3.5%	5.2%	12.4%
Total	**13.2%**	**10.0%**	**32.1%**	**37.6%**	**7.0%**	**100.0%**
Per cent of jobs filled by resident workers	11%	14%	56%	70%	74%	52%

For the region as a whole, 52 per cent of workers have jobs within the sector in which they reside. The City Centre has a very high share of workers commuting from other areas, but this feature declines with distance from the centre. In the Outer Urban and Rural sectors, very high shares of jobs are filled by workers resident in the areas themselves (70 per cent and 74 per cent respectively).

The shares of total trips between each of the sectors are set out in Figure 16.5. This shows reading from front to back the destinations of commuting trips from each of the sectors and from left to right the patterns of origins of trips to the destination sectors. Thus, the City Centre itself is the most important destination for trips from workers resident in the sector, but the largest source of workers for City Centre workplaces is the Inner Urban sector.

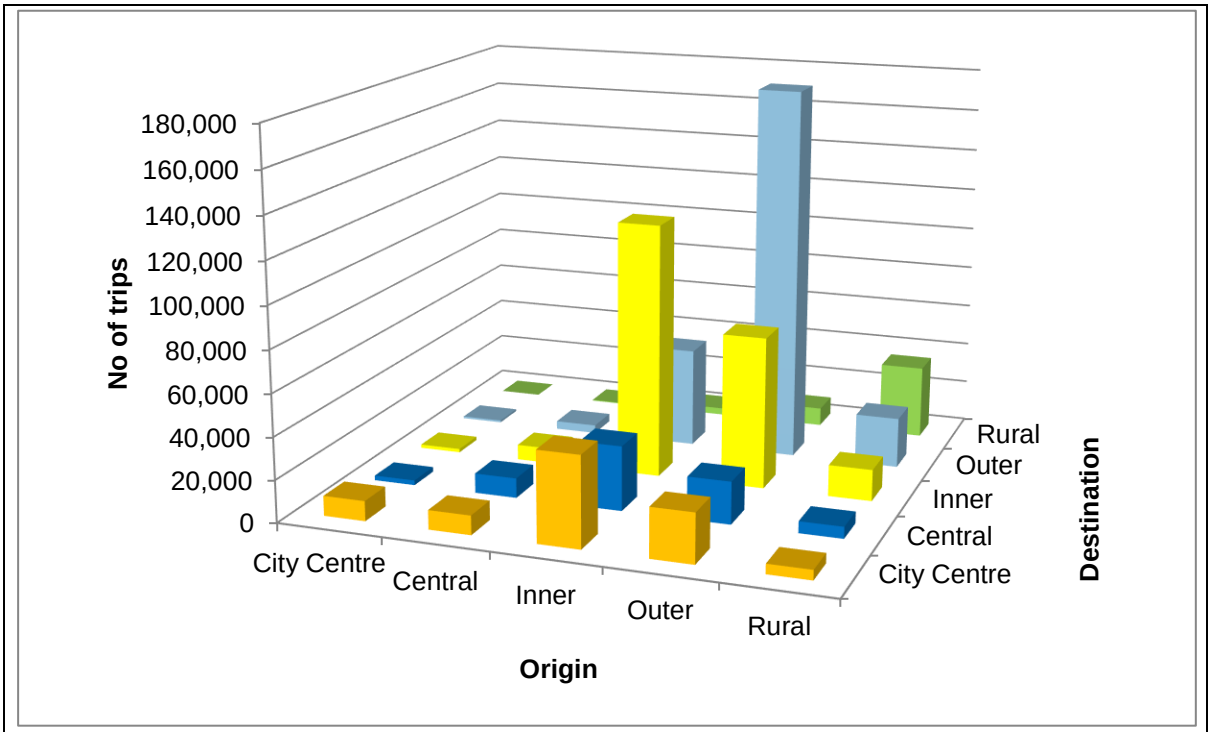


Figure 16.5
Commuting journeys by sector 2018

Figure 16.5 also highlights the large numbers of trips to and from the Inner and Outer areas, as well as the high numbers which commute entirely within each of these areas. As is discussed later, the flows within the Outer sector are focussed on shorter-distance movements, with the numbers commuting between the parts of the Outer sector to the north and south of the Waitematā Harbour being very small.

The sources of workers for each of the sectors are set out in Table 16.6.

Table 16.6
Commuting journeys 2018 : shares of total trips to workplaces by sector

Origin	Destination					
	Central City	Other Central	Inner	Outer	Rural	Total
Central City	10.6%	3.3%	0.8%	0.4%	0.0%	2.1%
Other Central	10.2%	13.8%	3.4%	1.5%	0.8%	4.4%
Inner	47.9%	45.1%	55.7%	18.7%	6.9%	36.3%
Outer	26.1%	29.6%	33.3%	70.0%	18.4%	44.7%
Rural	5.3%	8.2%	6.9%	9.4%	73.9%	12.4%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

For the areas away from the centre, the majority of employment is filled by workers in the same sector, and it is only in the Central areas where there is a high proportion of commuters from outside the sector.

Commuting flows have also been categorised by direction and the results are set out in Table 3.17.

Table 16.7 Commuting flows by direction 2018	
Direction of commuting	**Percentage of Total**
Within area	52%
Inwards	37%
Outwards	11%

In total, just over half the workers have jobs within the sectors in which they live, 37 per cent commute in an inward direction, and just over 10 per cent commute in an outward direction. The numbers commuting inwards are likely to place the most pressure on the key links in the transport network, contributing to the congestion on these. On a spatial basis, about 55 per cent of trips have a destination in the Central or Inner areas, with 23 per cent in the Central area on its own. It is these movements which are generally most affected by congestion or overcrowding on the transport links in the area.

16.5 Modal shares by movement pattern

The modal shares for the total movements to and from each sector are summarised graphically in Figure 16.6 and Figure 16.7. Because of issues with the way in which the results have been generated, using two different datasets, the results for the Central City and Other Central area have been combined to give more robust outcomes. It should be noted that the results presented exclude "Other" trips, and focus on the four main trip movements: by car, PT, active modes, and working at home.

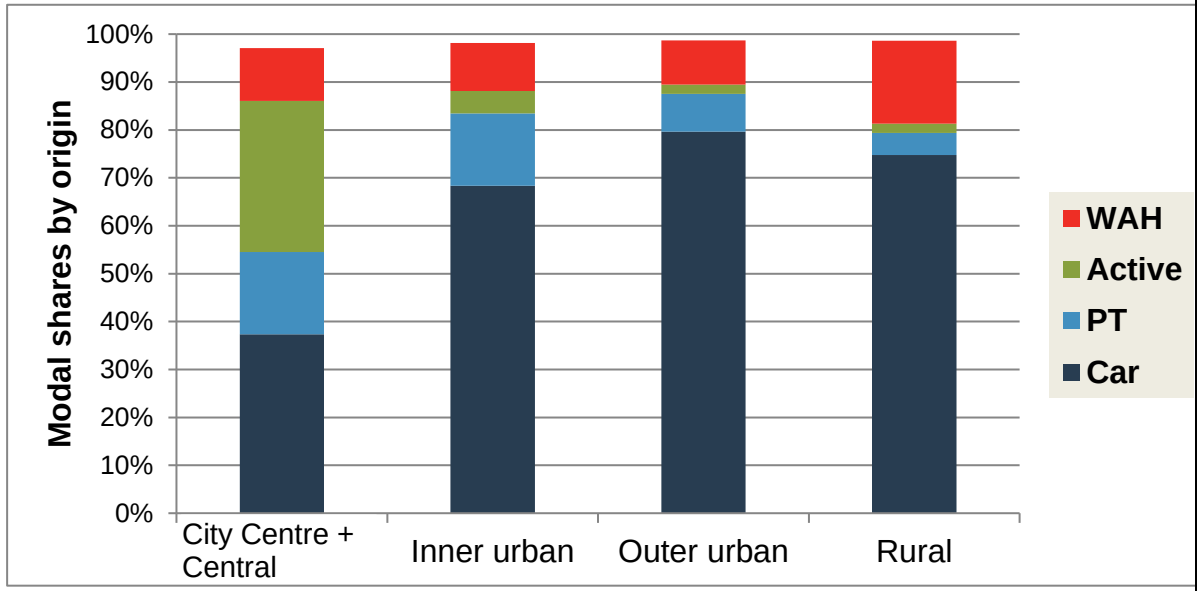


Figure 16.6
Area Analysis 2018 - Modal shares by origin

For the trips by origin, the City Centre and Central area has a high share of active mode trips, reflecting the substantial employment opportunities close to workers' residences and also a relatively high share of public transport, with high frequency services also providing an attractive alternative. The car share is relatively low, but still accounts for 37 per cent of journey to work trips for those living in the central area.

Active mode and public transport shares decline as the trip origins move outwards. For the Outer Area, these represent just 2 per cent and 8 per cent of the total commuting trips by those living in the area, with cars accounting for 80 per cent of journeys. A similar position occurs for trips from the rural areas, although a more substantial proportion of the sector's population work at home. These figures reflect the greater dispersion of activities in these outer areas, and the challenges of providing viable public transport services for these dispersed movements.

The modal shares for trips to workplaces in the four sectors are set out in Figure 16.7.

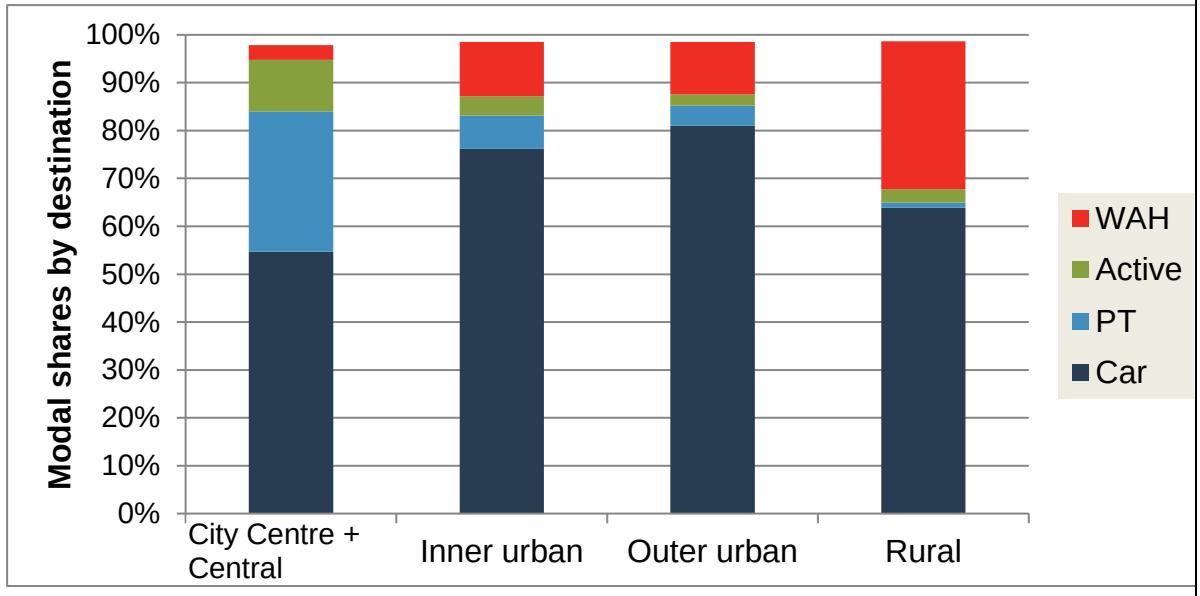


Figure 16.7
Area Analysis 2018 - Modal shares by destination

The analysis by trip destination shows the high focus on the central area for commuting via public transport, with a 29 per cent share of trips. This is substantially higher than for destinations in the Inner area (7 per cent), and Outer area (2 per cent). Similarly the modal share for active trips is again high for the City Centre and Central area at 11 per cent, but declines for workplaces in the Inner area (4 per cent) and Outer area (2 per cent). It increases slightly to 3 per cent in the Rural area.

Information is also available on the modal shares by for the individual sector-sector movements and these are set out in Table 16.8 for private cars, Table 16.9 for public transport and Table 16.10 for active modes.

Table 16.8
Broad area flows 2018 - private car modal shares

		Destination				
		City Centre + Central	Inner urban	Outer	Rural	Total
Origin	City Centre + Central	25%	62%	70%	69%	37%
	Inner urban	58%	66%	89%	95%	68%
	Outer	67%	92%	77%	95%	80%
	Rural	72%	93%	95%	53%	75%
	Total	55%	76%	81%	64%	72%

Table 16.9 Broad area flows 2018 - public transport modal shares						
		Destination				
		City Centre + Central	Inner	Outer	Rural	Total
Origin	City Centre + Central	15%	24%	17%	9%	17%
	Inner	35%	7%	7%	5%	15%
	Outer	30%	6%	3%	2%	8%
	Rural	24%	5%	2%	0%	5%
	Total	29%	7%	4%	1%	11%

Table 16.10 Broad area flows 2018 - active mode modal shares						
		Destination				
		City Centre + Central	Inner	Outer	Rural	Total
Origin	City Centre+ Central	42%	12%	8%	0%	32%
	Inner	5%	6%	1%	0%	5%
	Outer	1%	1%	3%	0%	2%
	Rural	1%	0%	0%	4%	2%
	Total	11%	4%	2%	3%	5%

The key points from this analysis include:

- For trips to and from the City Centre and Central areas, the private car share is typically low. This reflects a number of factors including the high level of public transport provision focussed on this area providing an attractive alternative to private cars and the costs and availability of parking particularly in relation to shorter trips. However, the car share increases with distance away from the centre. For trips within sectors, the car share is lower than the average for the sector reflecting the share of work at home trips, but for movements between sectors again increases with distance away from the centre
- For public transport journeys, the modal share is highest for movements between the Inner and Central areas, and to and from the Central areas in general, reflecting the focus of the public transport network on the City Centre. It is relatively low for movements within the sectors, as a result of the more dispersed trip patterns in these areas.
- There are high shares of active mode trips within the Central City and Central area and, to a lesser extent, between the Inner and Central areas. Away from this, active mode shares are relatively high within each of the areas, but for other inter-area movements the numbers are very small.

16.6 Changes in commuting patterns between 2013 and 2018

16.6.1 Total movement patterns

Because of the differences in the ways in which the data has been collected and analysed, it is difficult to get reliable estimates of the changes in flows at an area-wide level. The estimates of the flows at a local board level (on which the area analysis is based) were built up in 2013 (and earlier census years) from the individual CAU movements. This involved the loss of information for cells where data is not available at a detailed level, primarily because of incomplete information on the trip destination. For 2018, data has been built up from data provided by Statistics NZ defined at a Local Board level and as a result the loss of information is more limited. There is also an issue with the differences in the questions asked, although the main element (the allocation of the trips identified as "Did not go to work today") has been discussed earlier.

Although directly comparable results are not directly available from the data available, an estimate has been made for the trip pattern in 2013, using the growth in total trip numbers of 14 per cent derived from Table 15.4 and the percentage patterns of trip making identified for 2013 and 2018. Using this approach, the estimated changes in trip numbers for the area to area movements are set out in Table 16.11 and Figure 16.8.

Table 16.11
Estimated changes in commuting patterns 2013-2018

Sector		Destination				
		Central	Inner	Outer	Rural	Total
Origin	Central	3,100	300	600	-200	3,700
	Inner	9,700	5,100	7,100	-900	21,000
	Outer	10,100	10,400	32,000	100	52,500
	Rural	1,900	1,000	4,100	1,500	8,400
	Total	24,700	16,700	43,700	500	85,600

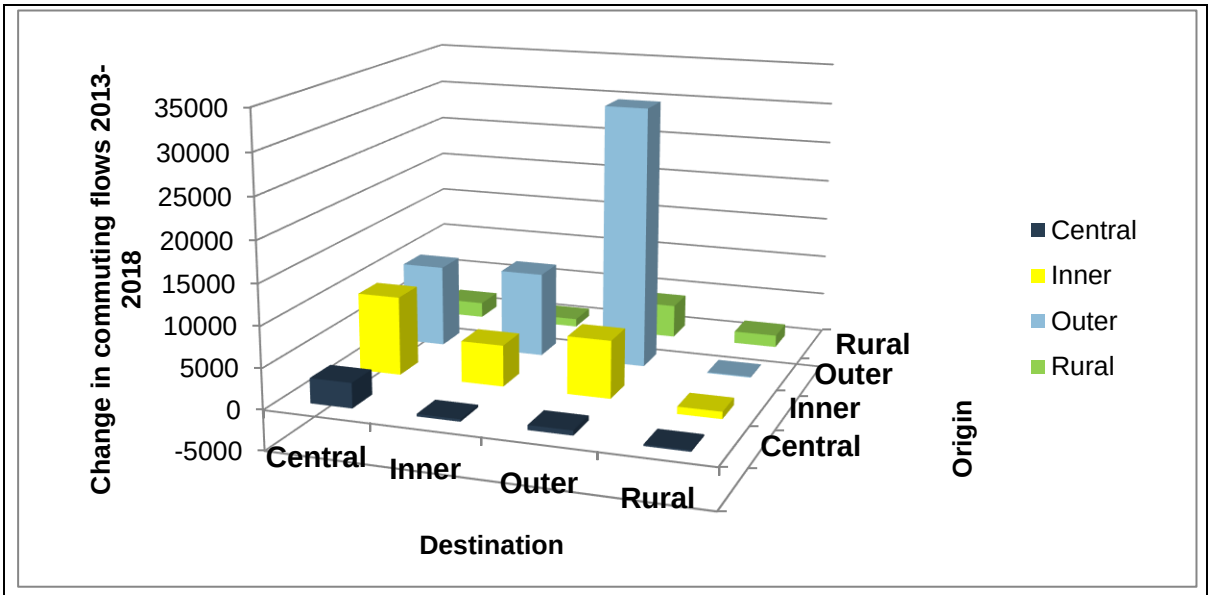


Figure 16.8
Estimated changes in commuting flows by sector 2013-2018

This table highlights the very substantial growth, in both origins and workplaces, in the Outer area and the limited growth in employment in the more peripheral rural areas. The growth in the Outer area, with its more dispersed trip patterns, is more difficult to serve by public transport and this is reflected in the continuing high share of private car travel across the region as a whole.

At a broad level, the changes over time in the balance of trips by destination sector are set out in Figure 16.9

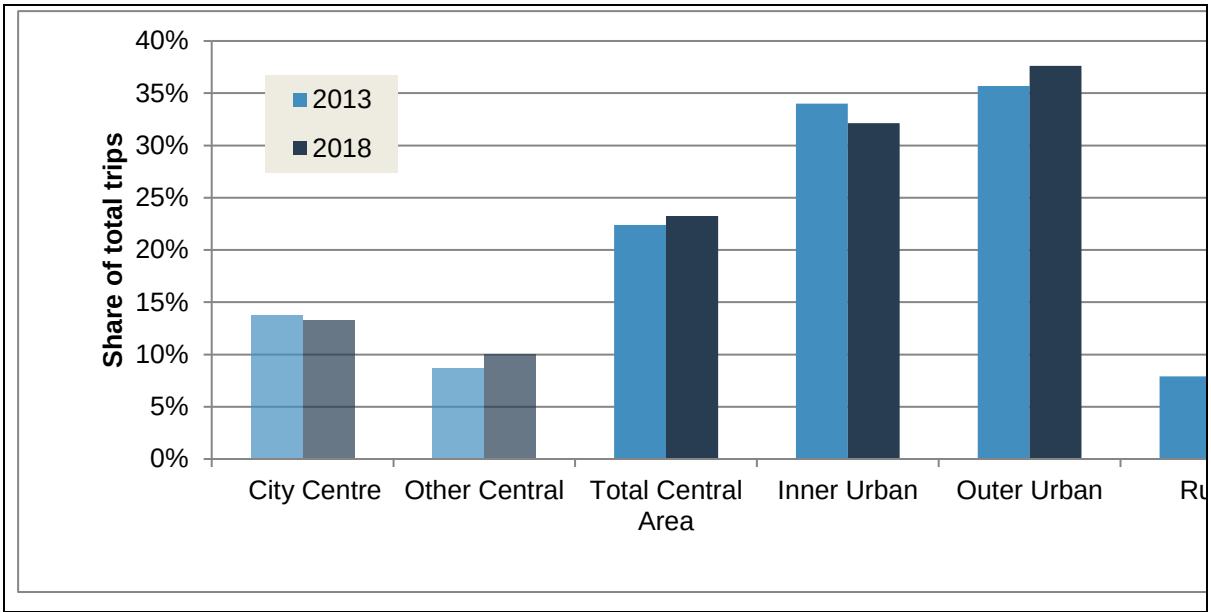


Figure 16.9
Changes in the shares of commuting flows by destination sector 2013-2018

Again, this highlights the growth in workplaces in the Outer Urban area, largely counterbalancing the decreases in the Inner area.

The changes in the pattern of commuting into each of the areas are set out in Table 16.12.

Table 16.12
Estimated changes in commuting patterns 2013-2018
Shares of growth in trips to workplace destinations by origin

Sector		Destination				
		Central	**Inner**	**Outer**	**Rural**	**Total**
Origin	Central	12%	2%	1%	-44%	**4%**
	Inner	39%	30%	16%	-185%	**24%**
	Outer	41%	62%	73%	26%	**61%**
	Rural	8%	6%	9%	303%	**10%**
	Total	100%	100%	100%	100%	**100%**

These tables and Figure 16.8 highlight the very substantial growth in trips from the Outer area which provides the highest share of the total growth in each of the urban areas, including 41 per cent of the growth in commuting to the Central area, and 62 per cent of the growth for the Inner area.

Table 16.13 Estimated changes in commuting patterns 2013-2018 Shares of growth of resident trips by destination						
Sector		**Destination**				
		Central	**Inner**	**Outer**	**Rural**	**Total**
Origin	Central	82%	9%	15%	-6%	100%
	Inner	46%	24%	34%	-4%	100%
	Outer	19%	20%	61%	0%	100%
	Rural	22%	11%	48%	18%	100%
	Total	29%	19%	51%	1%	100%

* Note: Due to rounding, the total may be different to the sum of the individual components.

The Outer area has also provided over half the new trips in the region. The table also indicates that the importance of the Inner area is diminishing, relative to the central and outer areas, with both of these accounting for a higher share of the increased commuting than the Inner area. In total, the Outer area is estimated to account for 51 per cent of the increased employment, the City Centre and Central area 29 per cent and the Inner area just 20 per cent.

The overall picture shows that, while there has been substantial growth in the City Centre and Central area, the majority of growth has occurred in the more dispersed Outer area, containing the major employment growth areas of Albany, North Harbour, Westgate, Highbrook/East Tāmaki, the airport and Manukau/Wiri This area accounts for 61 per cent of the growth in the numbers of workers, and just over half of the growth in employment.

The changes by broad area can be compared with those observed over the previous intercensal period from 2006 to 2013. This is set out in Figure 16.10.

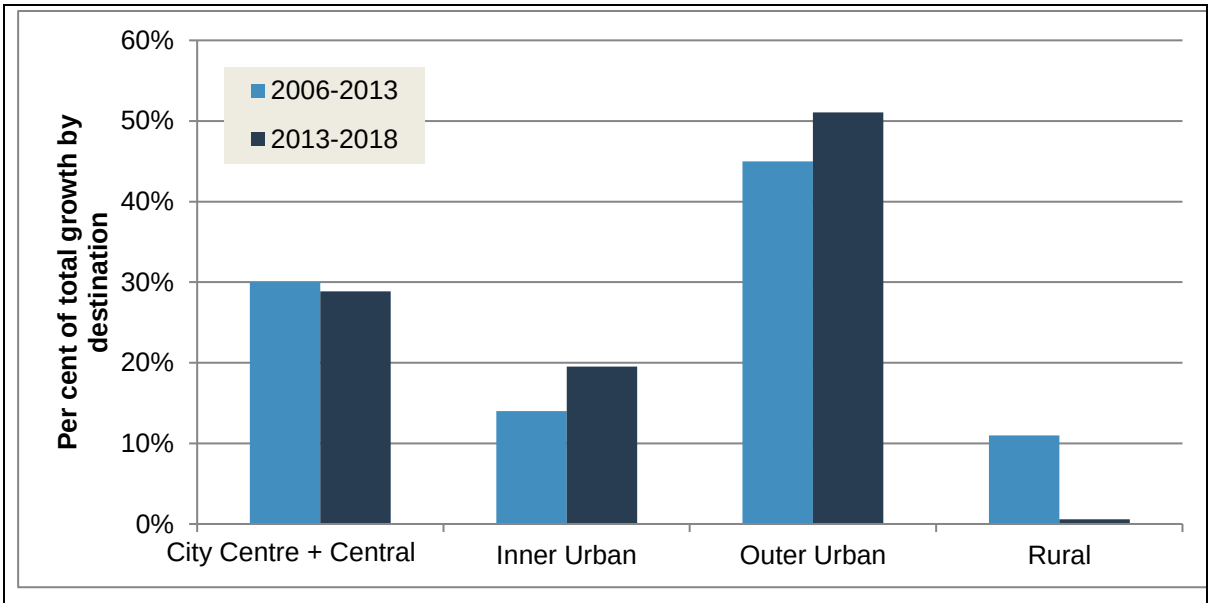


Figure 16.10
Changes in commuting flows by destination sector (per cent of total change)

The changes over the period from 2013 to 2018 follow a broadly similar pattern to that over the earlier period, with the highest commuting growth seen in the Outer area, followed by the Central City and Central area, and then the Inner Area. The share of the growth in employment taking place in the Outer area has, however, increased from about 45 per cent of the total growth between 2006 and 2013, to over 50 per cent in the period up to 2018. The share of the growth accounted for by the Central area has remained broadly unchanged, and the contribution to growth in employment from the peripheral Rural area has declined substantially and is now only very small.

Very low growth has been estimated for the Rural area in the period to 2018, compared to modest growth in the previous period which possibly represents a significant shift. The share of growth in employment in the Inner urban area, though relatively low compared to the Central and Outer areas, has also increased over the period, while growth in the Central area has remained broadly constant.

The changes by origin are summarised in Figure 16.10.

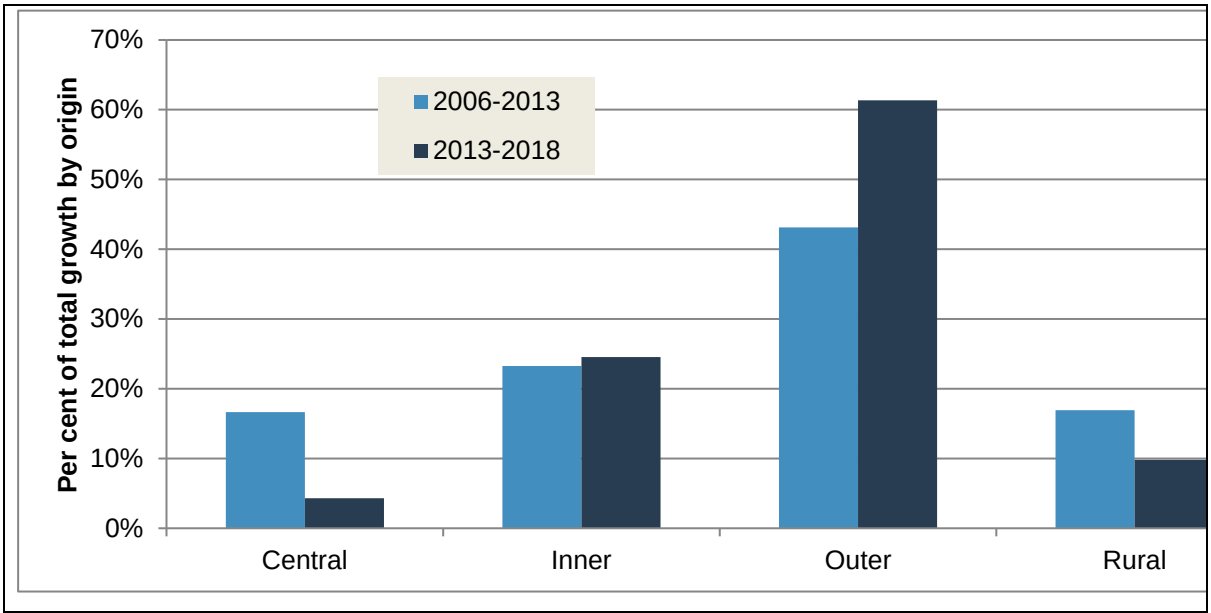


Figure 16.11
Changes in commuting flows by origin sector (per cent of total change)

Again, this shows the importance of the Outer sector in generating increased commuting flows. The share from the Central area has declined, reflecting the relatively low total population growth between 2013 and 2018.

The data also allows an approximate comparison of the patterns of commuting by mode into the Central City/City Centre and this is set out in Table 16.14.

Table 16.14
Changes in patterns of trip making into the City Centre/Central City 2013 and 2018

Mode	2013	2018
Private Car	55%	44%
Public transport (bus and train only) (1)	27%	37%
Active modes	12%	14%
Work at home	2%	2%
Other	5%	4%
Total	**100%**	**100%**

Notes (1) Ferries were not recorded separately in 2013 and so have been included in Other for both years. In 2018 they represented about 4 per cent of journeys into the City Centre and so probably represented a large proportion of the Other trips in 2013.

Over the period from 2013, there has been a substantial reduction in the modal share of car trips to the City Centre, falling from 55 per cent in 2013 to 44 per cent. This has been balanced by an increase in the public transport share, from 27 per cent to 37 per cent, reflecting the improvements made to the bus and rail networks, and a small increase in the share of active trips. Ferries, which were not recorded separately in 2013, accounted for about 4 per cent of trips to the City Centre in 2018. The shares of Work at home and Other trips have remained broadly constant.

The contribution that the Central City makes to trip making in the region as a whole and the changes in this over time are set out in Table 16.15.

Table 16.15
Contribution of Central City commuting in modal use for the journey to work

Mode	Share of total regional commuting trips			
	2013		2018	
	City Centre	Total Central area	City Centre	Total Central area
Private car	10%	18%	9%	18%
Bus	48%	60%	54%	62%
Train	48%	61%	51%	62%
Bus plus train	**48%**	**61%**	**53%**	**62%**
Ferry	NA	NA	83%	89%
Total public transport	**NA**	**NA**	**55%**	**64%**
Walk or jogged	30%	43%	36%	49%
Bicycle	21%	**37%**	40%	54%
Total Active	**NA**	**NA**	**37%**	**50%**
Total	**14%**	**23%**	**13%**	**23%**

Travel to work in the Central City accounts for over half of the total commuting trips taken by public transport, and this share has increased from 2013 for bus and train. Interestingly, the shares of bus and train are broadly similar, at just over half of the total for the region as a whole. If ferry is included, the share of public transport trips to the Central City increases to 55 per cent of the regional total. For the total Central area, the share is almost two-thirds.

The share of the Central City in active mode commuting trips has also increased, with a particularly large increase in the share for cycle trips – possibly reflecting the development of a number of cycling routes into the area. The Central area accounts for about half of all the active mode journeys to work.

Balancing this, the share of total car trips going to the Central City has declined, although for the Central area as a whole, it has remained broadly unchanged.

16.7 An alternative spatial aggregation

An alternative spatial aggregation has been considered, which divides the region into 7 separate areas as follows:

Table 16.16
Alternative sector definitions

Sector	Constituent local boards
Rural North	Rodney
Urban North	Hibiscus Coast, Devonport-Takapuna, Kaipātiki, Upper Harbour
Urban West	Henderson-Massey Whau, Waitakere Ranges
Gulf Islands	Great Barrier. Waiheke
Urban central	Waitematā, Ōrākei, Maungakiekie-Tāmaki, Albert Eden, Puketāpapa
Urban South	Māngere-Ōtāhuhu, Ōtara-Papatoetoe, Howick, Manurewa, Papakura
Rural South	Franklin

The pattern of trip making that results is set out in Table 16.17 for the total trip making, and in Table 16.18 for the distribution of destinations for the residents of the Local Board. In Table 16.17, the highest flows are highlighted.

Table 16.17
Journey to work trip making by the alternative spatial disaggregation 2018 - Total trips

Sector		Destination							
		Rural North	Urban North	Urban West	Islands	Urban Central	Urban South	Rural South	Total
Origin	Rural North	14,280	6,741	2,127	9	4,746	849	51	28,803
	Urban North	2,274	84,189	5,691	45	42,432	6,069	267	140,967
	Urban West	1,614	9,369	40,590	39	42,960	9,477	348	104,397
	Islands	12	84	39	2,997	906	105	9	4,152
	Urban Central	618	10,878	8,040	150	145,896	22,764	774	189,120
	Urban South	366	5,127	3,873	51	56,616	108,159	3,702	177,894
	Rural South	51	432	264	15	5,520	10,419	15,021	31,722
	Total	19,215	116,820	60,624	3,306	299,076	157,842	20,172	677,055

Table 16.18
Journey to work trip making by the alternative spatial disaggregation 2018 - Breakdown of resident trips by destination

Sector		Destination							
		Rural North	Urban North	Urban West	Islands	Urban Central	Urban South	Rural South	Total
Origin	Rural North	50%	23%	7%	0%	16%	3%	0%	100%
	Urban North	2%	60%	4%	0%	30%	4%	0%	100%
	Urban West	2%	9%	39%	0%	41%	9%	0%	100%
	Islands	0%	2%	1%	72%	22%	3%	0%	100%
	Urban Central	0%	6%	4%	0%	77%	12%	0%	100%
	Urban South	0%	3%	2%	0%	32%	61%	2%	100%
	Rural South	0%	1%	1%	0%	17%	33%	47%	100%
	Total	3%	17%	9%	0%	44%	23%	3%	100%

This shows that while there are strong flows within sectors, between neighbouring sectors and into the central area, the volumes of longer distance cross-region flows are small. Only 3 per cent of the journeys from the Urban South region are to the Urban North or Rural North and in the reverse direction, only 4 per cent of the trips from the Urban North travel to areas to the south of the centre.

It is possible to compare this breakdown with the patterns of trip making observed in 2013, and this is set out in Table 16.19. The table shows the changes in terms of percentage point changes and identifies the movements which have grown or declined as a proportion of the total origins from the sector.

Table 16.19
Journey to work trip making by the alternative spatial disaggregation 2013-2018 - Changes in shares of trips by origins

Sector		Destination							
		Rural North	Urban North	Urban West	Islands	Urban Central	Urban South	Rural South	Total
Origin	Rural North	-4%	1%	0%	0%	1%	1%	0%	0%
	Urban North	0%	-3%	0%	0%	2%	0%	0%	-1%
	Urban West	1%	1%	-4%	0%	2%	2%	0%	2%
	Islands	0%	0%	0%	-1%	0%	1%	0%	-1%
	Urban Central	-1%	0%	0%	0%	-1%	1%	0%	0%
	Urban South	0%	0%	0%	0%	1%	0%	2%	1%
	Rural South	0%	-1%	0%	0%	1%	3%	47%	1%

In general, the main findings from this is the reduction in the share of trips internal to each of these areas especially in the centre and north and the increased share of trips from a number of areas to the Urban Central and Urban South sectors.

17 Analysis at a local board level

Key findings

- The 21 local boards represent the next level of disaggregation of the results
- About 33 per cent of workers have jobs in the same local board in which they live. The highest levels of self-sufficiency are in the rural and island local board areas, and also in the central Waitematā board area where there are considerably more jobs than resident workers.
- Modal shares vary significantly across local board areas. While car has the highest share for the trips made by the residents of each of the mainland Boards, this varies significantly with Waitematā having a low share of cars for trips from the area, but with board areas in the south and east of the region and to the west of the Isthmus having high shares.
- Public transport use by residents is very much focussed on the Isthmus and lower North Shore, and its use away from this area is relatively low.
- For trips by destination, cars are again the largest mode for all the mainland board areas, with modal shares ranging from 51 per cent in the Waitakere Ranges (where there is a very high work at home share), and 55 per cent in Waitematā, to 87 per cent in Māngere-Ōtāhuhu. Mirroring the position for residents, car use is generally high for trips to the urban areas in the south of the region, and also in a band to the west of the Waitematā Harbour
- Public transport use by destinations is very strongly focussed on the Waitematā local board area.
- While the share of car use between 2013 and 2018 has declined to some extent across almost all of the local boards in the region, it has increased for residents in the area south of the Māngere Inlet, stretching between Māngere and Papakura, supporting the high use of cars for commuting in the area.
- The use of public transport by residents has increased in all the local board areas, but its use is very much focussed on movements into the central area, where public transport provides high frequency and attractive services, and the mode share by destination has grown strongly. For other destinations, the share has either grown relatively more slowly or, in the case of the rural areas, has declined. This reflects the difficulty in serving the more dispersed, and harder to access employment in these areas.
- The share of active modes has generally declined, except for trips for trips to or from the Waitematā local board area or surrounding areas (Albert-Eden for trip origins; and Ōrākei for trip destinations).
- The work at home share has grown for all local board areas across the region, with the highest increases in the rural areas to the north and south of the region, and in coastal areas in the North Shore, and to the east of the city centre.

17.1 Introduction

The local board areas form the next level of disaggregation of locations within the Auckland Region. In general, the analysis of trip movements at this level does not suffer from the issues resulting from the enhanced confidentiality constraints, and the reduction in the numbers of trips that this causes is relatively small, about 1 per cent of the total. (This is set out in the earlier Table 14.1).

The local board areas are set out in Figure 17.1.

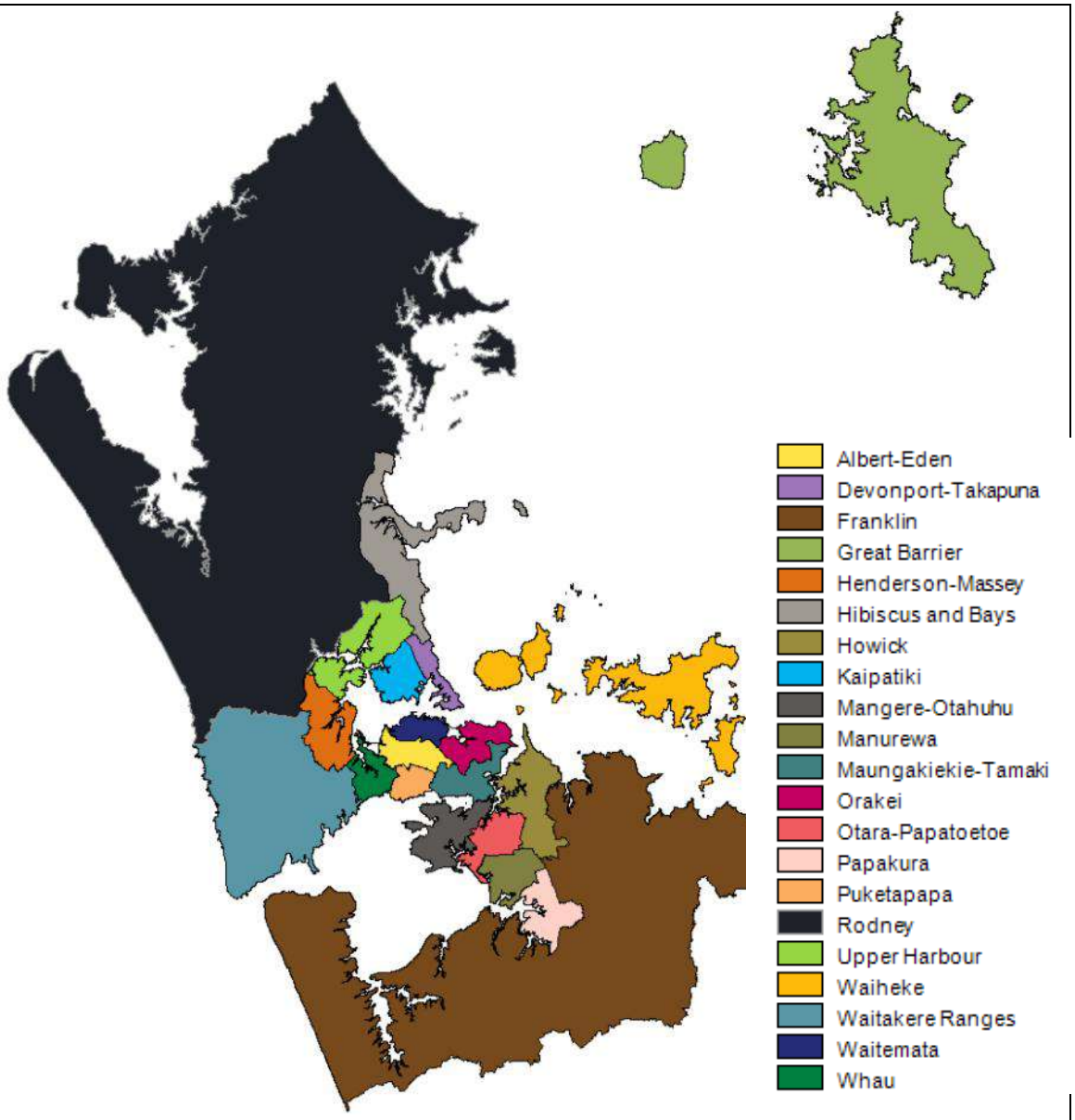


Figure 17.1
Local board areas

17.2 Journey to work patterns in 2018

17.2.1 Patterns of commuting by area of residence

While the detailed journey to work patterns in 2018 are set out in Appendix B, the key highlights for commuting journeys by local board residents are set out in Table 17.1 and Figure 17.2. This covers the modal split for residents of the local boards, and the extent to which local board areas are self-contained, with journey to work trips taking place within them.

Table 17.1
Modal shares for journey to work trips by residents in local board areas 2018

Local Board Area	Mode Share for Travel to Work						Level of self containment (1)
	Total journeys	Car driver	Car pass-enger	Total car	Public transport	Active modes	
Rodney	28,803	70%	3%	73%	2%	2%	50%
Hibiscus and Bays	45,687	71%	3%	73%	9%	2%	34%
Upper Harbour	27,945	71%	3%	73%	10%	2%	38%
Kaipātiki	41,508	68%	3%	71%	16%	3%	28%
Devonport-Takapuna	25,827	58%	2%	60%	18%	7%	36%
Henderson-Massey	47,493	75%	5%	80%	8%	2%	31%
Waitakere Ranges	23,358	73%	3%	76%	9%	2%	20%
Great Barrier	300	43%	0%	43%	0%	0%	94%
Waiheke	3,852	42%	3%	45%	22%	5%	70%
Waitematā	44,391	35%	2%	37%	17%	32%	68%
Whau	33,546	70%	4%	74%	14%	3%	22%
Albert-Eden	47,373	58%	3%	61%	18%	8%	25%
Puketāpapa	25,068	69%	4%	73%	14%	3%	16%
Ōrākei	39,414	65%	2%	67%	13%	4%	26%
Maungakiekie-Tāmaki	32,874	69%	4%	73%	13%	5%	34%
Howick	61,869	78%	3%	81%	6%	2%	38%
Māngere-Ōtāhuhu	27,255	76%	8%	84%	7%	2%	29%
Ōtara-Papatoetoe	31,599	76%	7%	83%	8%	2%	26%
Manurewa	34,581	79%	6%	85%	6%	1%	22%
Papakura	22,590	77%	4%	81%	8%	2%	28%
Franklin	31,722	74%	2%	76%	4%	2%	47%
Region	677,055	68%	4%	72%	11%	5%	33%

Note (1) The level of self-containment is defined as the proportion of the resident workforce who are employed within the same local board area.

The overall modal information is summarised in Figure 17.2. It should be noted that the public transport shares include ferry trips.

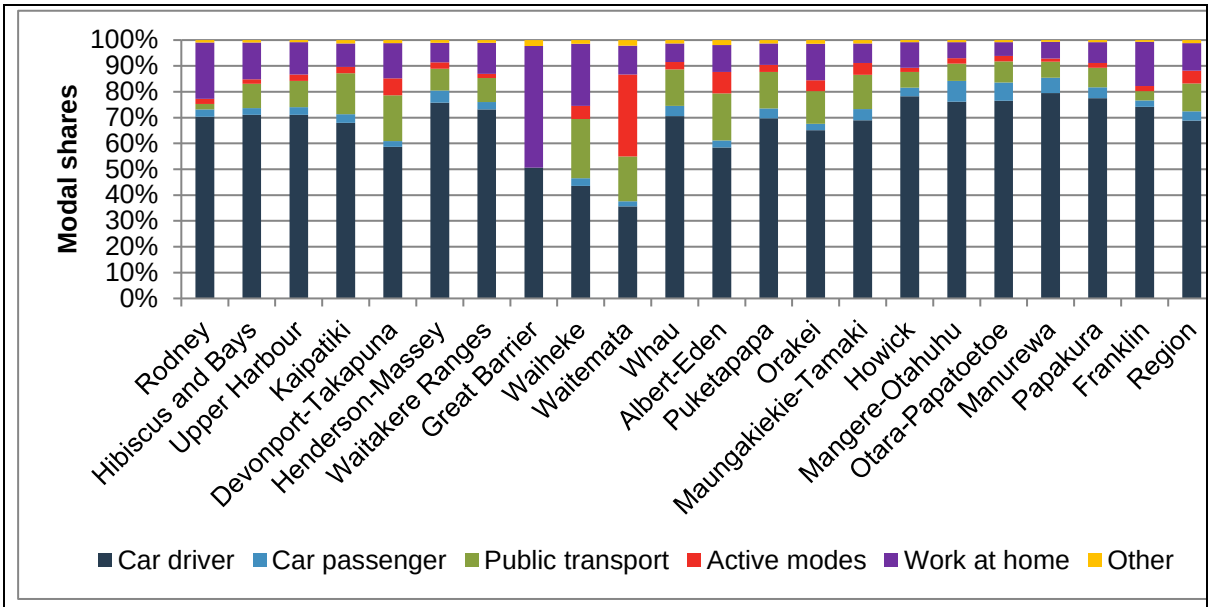


Figure 17.2
Modal shares for journey to work trips by residents in local board areas 2018

With the exception of the islands and the central Waitematā Local Board area, the journey to work is dominated by the use of cars, primarily as the driver. Of the other local boards, Albert-Eden and Devonport-Takapuna have the lowest car shares, sitting at about 60 per cent.

The spatial distribution of the modal shares for all car trips is set out in Figure 5.2. Areas with less than average car shares are displayed in green, and areas with above average shares are shown in shades of red.

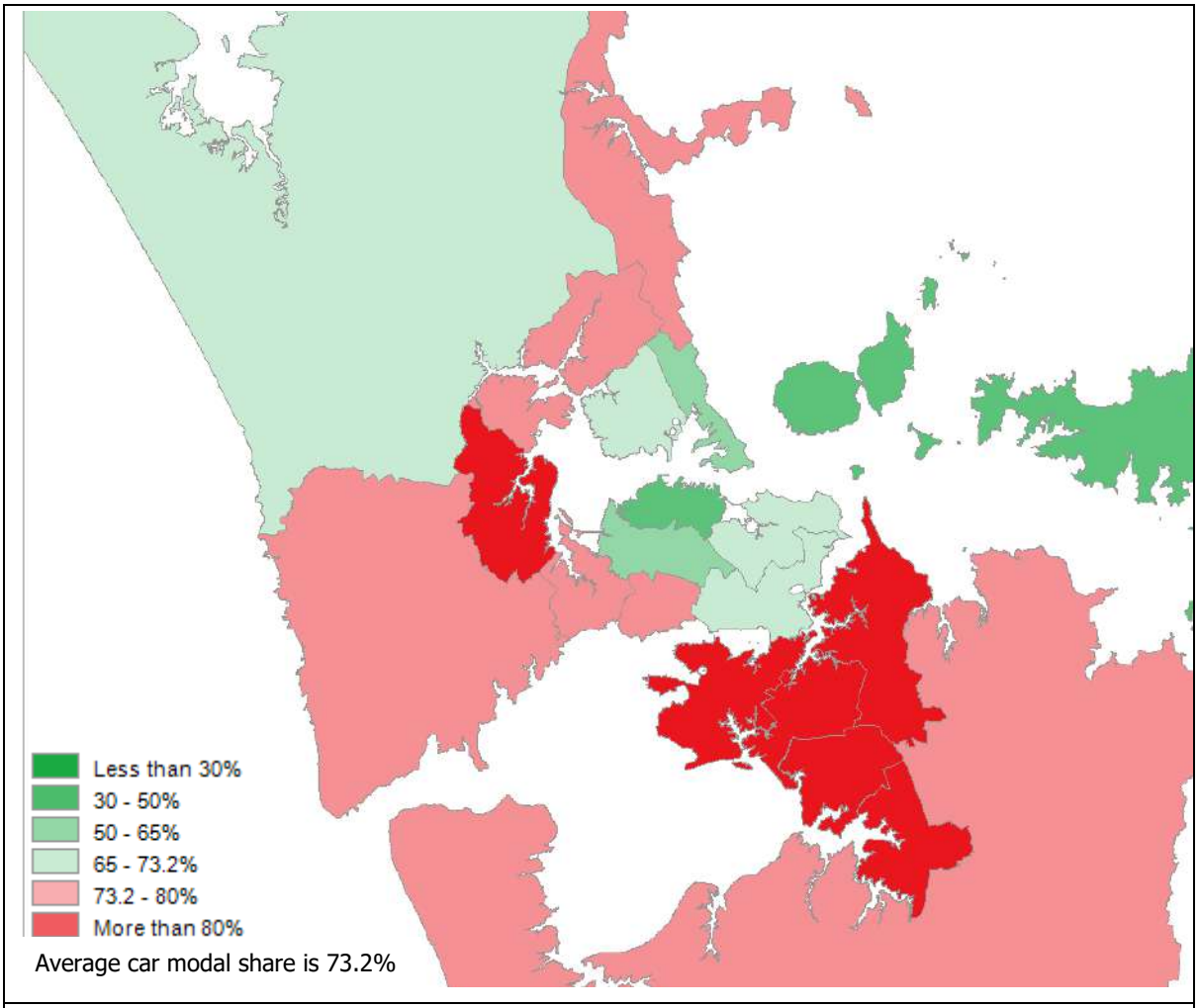


Figure 17.3
Car mode share by Local Board area 2018

For the mainland areas, the share of private transport varies from 37 per cent for workers living in the centrally located Waitematā Board, to 85 per cent for Manurewa. There is a general high level of car use in the area from Howick to Papakura, and also further west in Henderson-Massey. This probably reflects the nature of employment in these areas and the difficulty in providing attractive public transport to meet these commuting needs. Low levels of car use are found in the central Waitematā area and the inner urban areas to the north and south of this, particularly Devonport-Takapuna and Albert-Eden, where public transport provides a much more attractive option.

Relatively high shares of car passenger commuting, above the regional average of 3.7 per cent, are found in a band from Henderson across the south of the Isthmus and down to Papakura. Particularly high levels of car passenger commuting are associated with the high modal shares for overall car use in Māngere-Ōtāhuhu, Ōtara-Papatoetoe and Manurewa, although for these three local boards, travel as car driver is also high. In these areas the level of commuting as car passengers therefore appears to complement the high modal shares for car drivers and adds to the overall high levels of car use.

The position for public transport use is set out in Figure 17.4. Areas with a higher than average public transport share are shaded in green, and those with lower than average shares are shown in red.

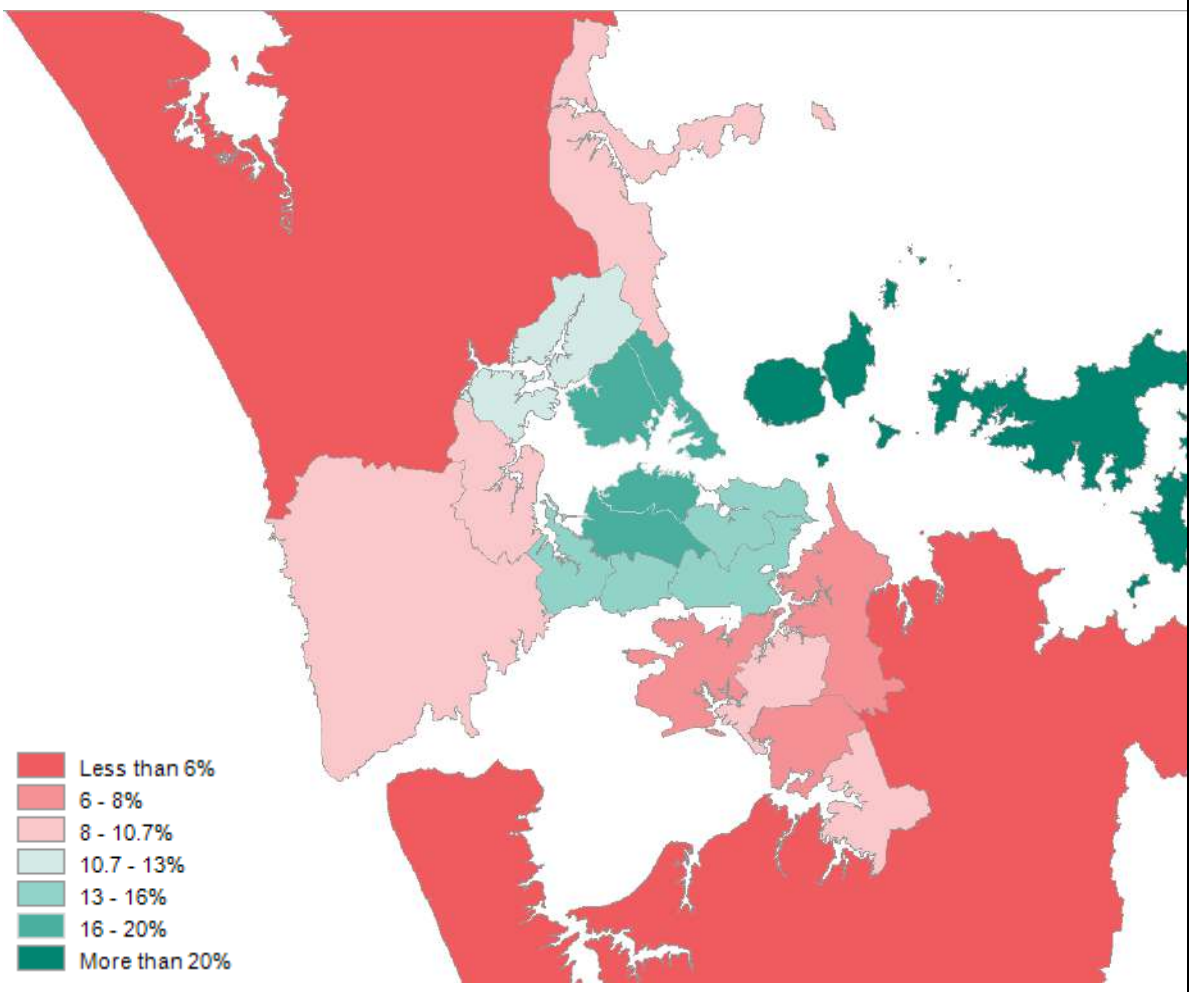


Figure 17.4
Public transport mode share by local board area residents 2018

Apart from Waiheke, where the high public transport use, in part, reflects the reliance on ferries to access employment on the mainland, the highest areas of public transport use are found in the central areas both north and south of the Waitematā Harbour, with Albert-Eden, Kaipātiki and Devonport-Takapuna having the highest shares at 18 per cent of the total. This reflects the high level of public transport serving these areas, providing connections to employment in the Central City and, in the case of Devonport, the role of ferries in supporting that movement and providing a much shorter route to the Central City. For the rest of the Isthmus, the public transport share is also relatively high, possibly reflecting the investment in improved rail and bus services. Public transport use is relatively low in the area from Howick to Manurewa, reflecting the high car use in the area, and is very low in the rural areas on the fringes of the region where services are very limited.

The position for active mode trips is set out in Figure 17.5.

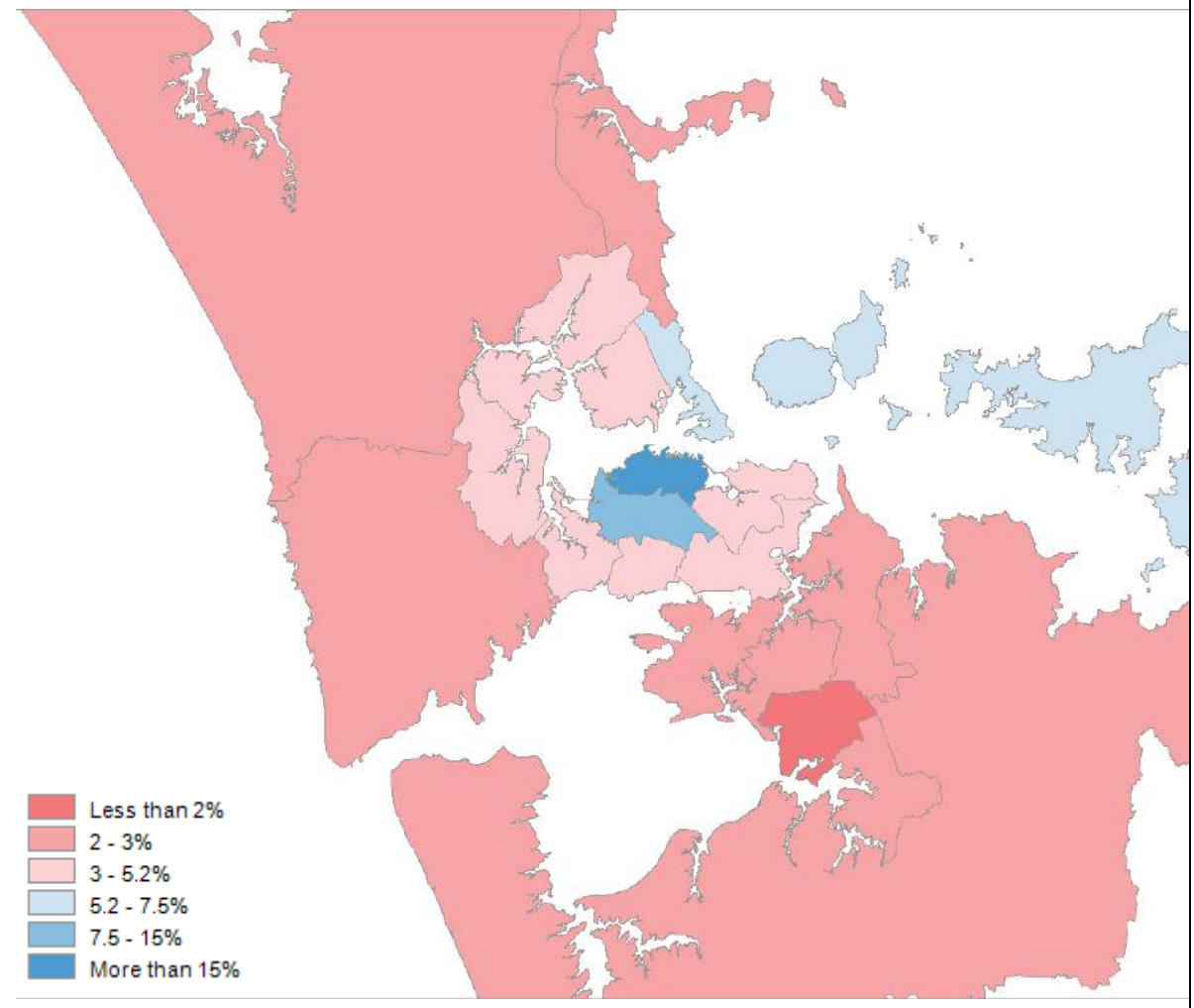


Figure 17.5
Active modes modal share by local board area residents 2018

Active mode shares are highest in the central area. In the Waitematā local board area, these account for a third of all movements by workers residing in the area. Active mode use is also high in Albert-Eden and Devonport-Takapuna and, to a lesser extent, in other areas surrounding the Waitematā Harbour. A particularly low share is found in Manurewa.

The spatial distribution of the share of Work at home trips is set out in Figure 17.6.

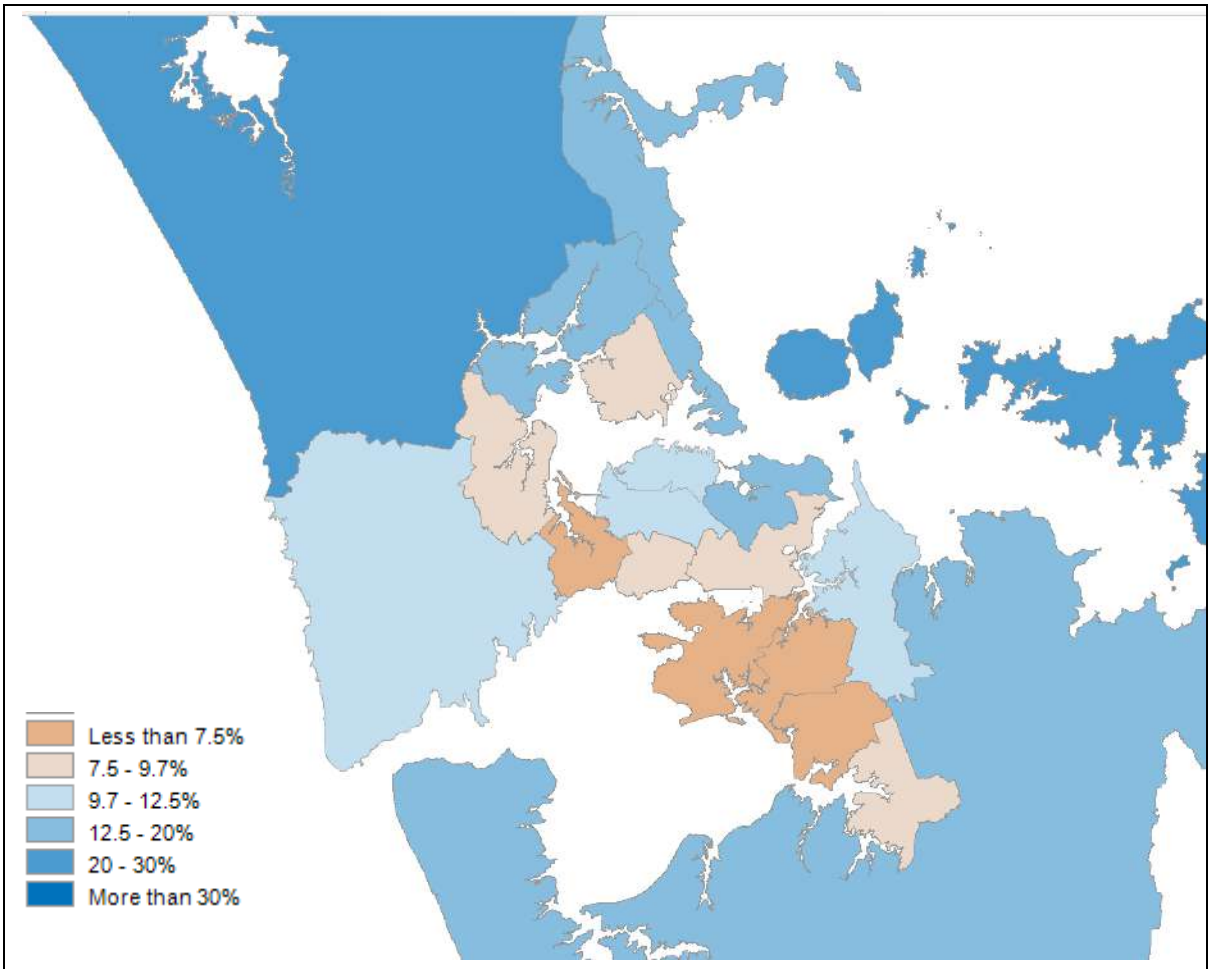


Figure 17.6
Work at home modal share by local board area 2018

For the mainland areas, the highest shares of work at home trips are found along the coast in Hibiscus and Bays, Devonport-Takapuna and Ōrākei, where they represent 14 per cent of the total, and in the rural areas in the north and south of the region. Low levels of work at home residents are found in the area from Papakura in the south, to Henderson-Massey in the north, including the local board areas on the southern edge of the Isthmus.

The level of self-containment, the extent to which jobs in the local board areas are filled by residents, is set out in Figure 17.7.

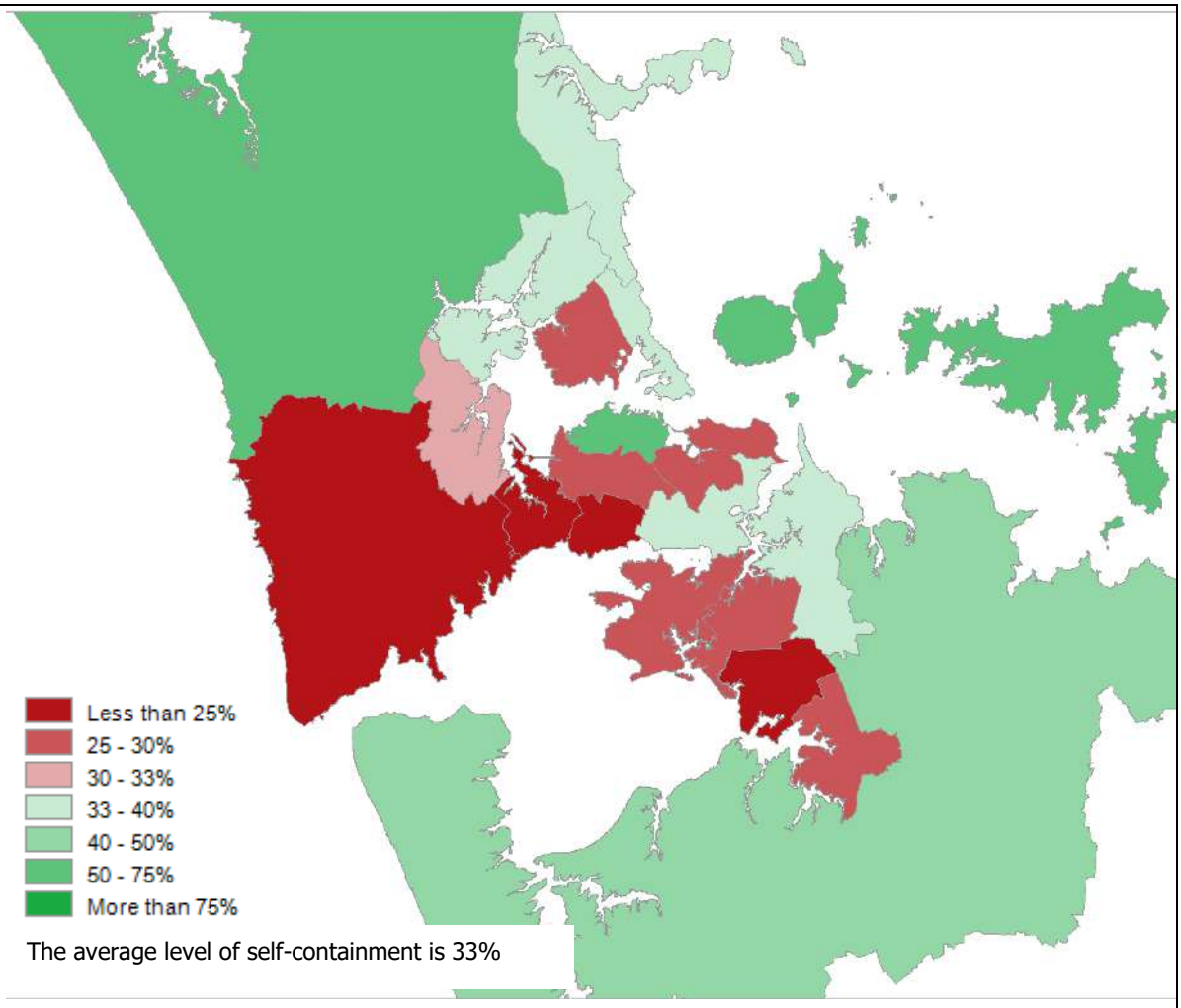


Figure 17.7
Levels of employment self-containment by local board area 2018
(per cent of residents employed in their own local board area)

Levels of self-containment are high in the central Waitematā area, in Waiheke, and in Rodney to the north, and to a lesser extent in Franklin. Low levels of self-containment are found in a band from the Waitakere Ranges, through Whau to Puketāpapa, and also in Manurewa. Although, outside the range of the figure, Great Barrier Island also unsurprisingly has a very high level of self-containment.

17.2.2 Patterns of commuting by workplace area

The way in which commuters travel to workplaces in the Local Board areas is set out in Table 17.2 and Figure 17.8.

Table 17.2
Mode share for the journey to work by local board destination 2018

Local board area	Mode share for travel to work by destination				
	Total journeys	Private transport	Public transport	Active modes	Work at home
Rodney	19,215	62%	1%	3%	33%
Hibiscus and Bays	22,719	65%	3%	3%	28%
Upper Harbour	41,037	84%	4%	2%	8%
Kaipātiki	25,917	75%	6%	3%	14%
Devonport-Takapuna	27,147	71%	8%	6%	13%
Henderson-Massey	30,132	79%	5%	3%	12%
Waitakere Ranges	7,614	57%	2%	2%	37%
Great Barrier	282	43%	0%	0%	43%
Waiheke	3,024	53%	5%	6%	29%
Waitematā	157,479	55%	29%	11%	3%
Whau	22,878	79%	6%	3%	11%
Albert-Eden	38,658	70%	9%	6%	13%
Puketāpapa	10,554	69%	5%	4%	20%
Ōrākei	21,501	62%	6%	4%	26%
Maungakiekie-Tāmaki	70,884	86%	7%	3%	3%
Howick	48,012	81%	3%	2%	13%
Māngere-Ōtāhuhu	39,468	87%	5%	2%	4%
Ōtara-Papatoetoe	34,566	85%	7%	2%	5%
Manurewa	20,949	83%	4%	2%	11%
Papakura	14,847	81%	3%	3%	12%
Franklin	20,172	68%	1%	3%	27%
Region	677,055	62%	11%	5%	11%

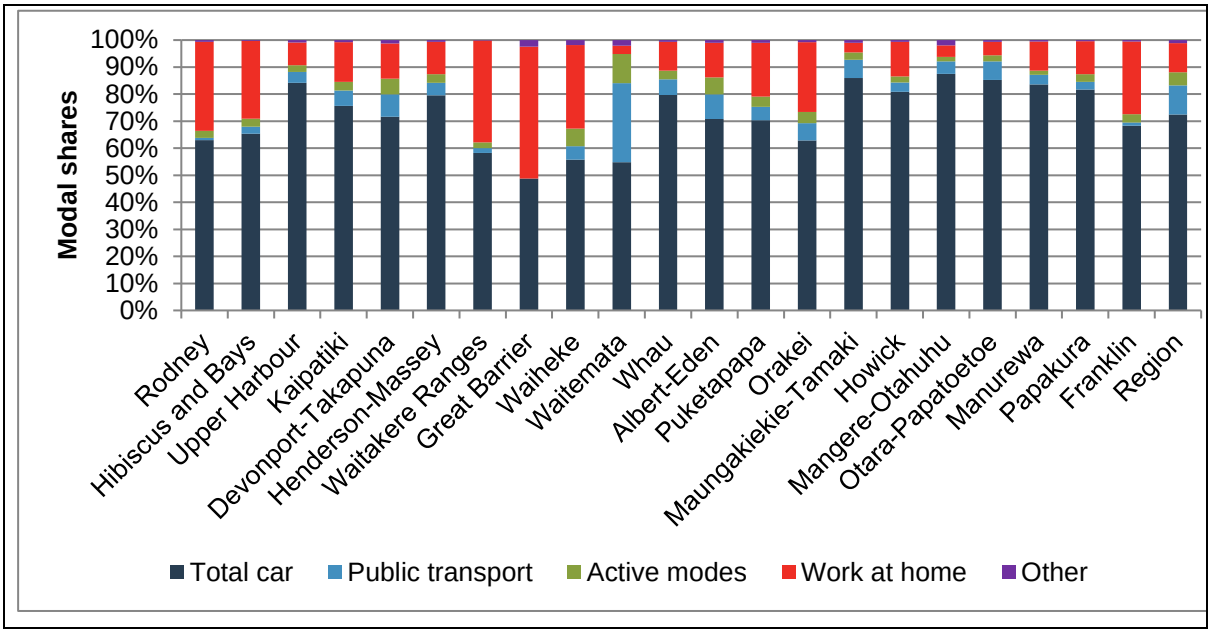


Figure 17.8
Modal Shares for commuting trips by local board destinations 2018

The key points which emerge from the results set out in relation to commuting by workplace above include:

- Employment as measured by commuting at a local board areas level varies considerably from 6,000 in Waitakere Ranges to 157,000 in Waitematā.
- Working at home (as a proportion of total employment by area) is high in the rural areas to the north and south of the region, and the Waitakere Ranges. It is also high in the coastal areas of Ōrākei and Hibiscus and Bays and, to a lesser extent, in Puketāpapa.
- Away from the islands, the share of private transport is relatively low in the central Waitematā local board area and in areas on the periphery of the Region including Waitakere Ranges. In Waitematā, there is a relatively high proportion of public transport and active trips and, in the peripheral areas, a relatively high share of work at home trips but low shares of public transport.
- The Waitematā area has by far the highest proportion of public transport trips by destination and this accounts for 29 per cent of the total trips that have destinations in the area. Public transport shares elsewhere are highest in Albert-Eden (9 per cent), Devonport-Takapuna (8 per cent) and Ōrākei, Maungakiekie-Tāmaki, and Ōtara-Papatoetoe (all 7 per cent). These last three areas are served by the rail network, providing an additional option for workers travelling by public transport into these areas.
- The breakdown of the public transport mode share by the individual components is set out in Figure 17.9.

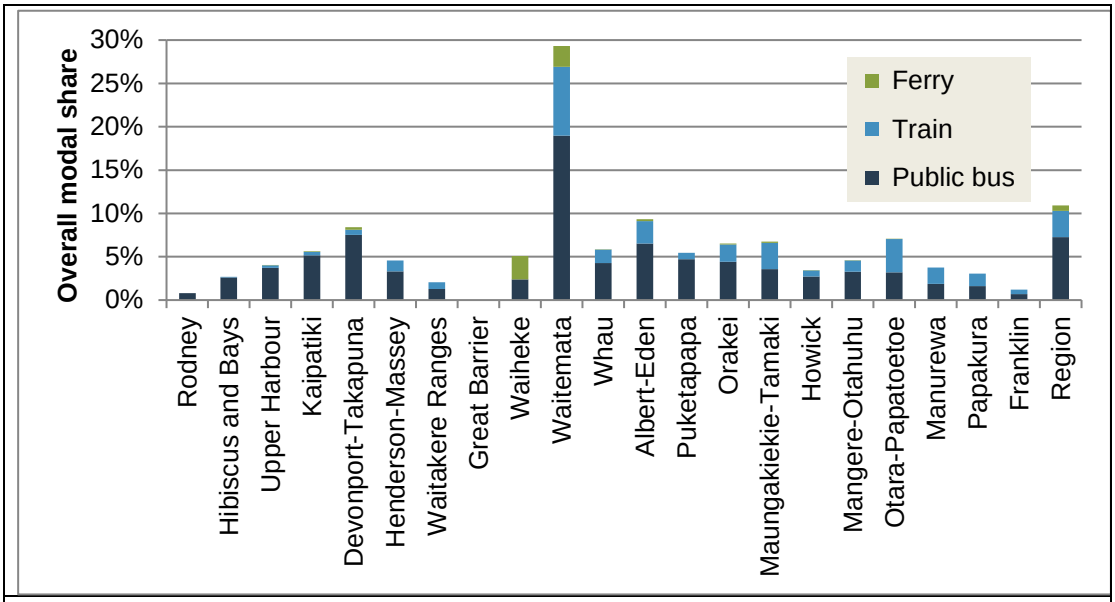


Figure 17.9
Components of the public transport mode share by Local Board destinations 2018
(per cent of total trips)

Private transport use is set out in Figure 17.10 and is high in areas to the south of the Region and exceeds 80 per cent in the area from Maungakiekie-Tāmaki to Papakura. It is also above 80 per cent in Upper Harbour to the west.

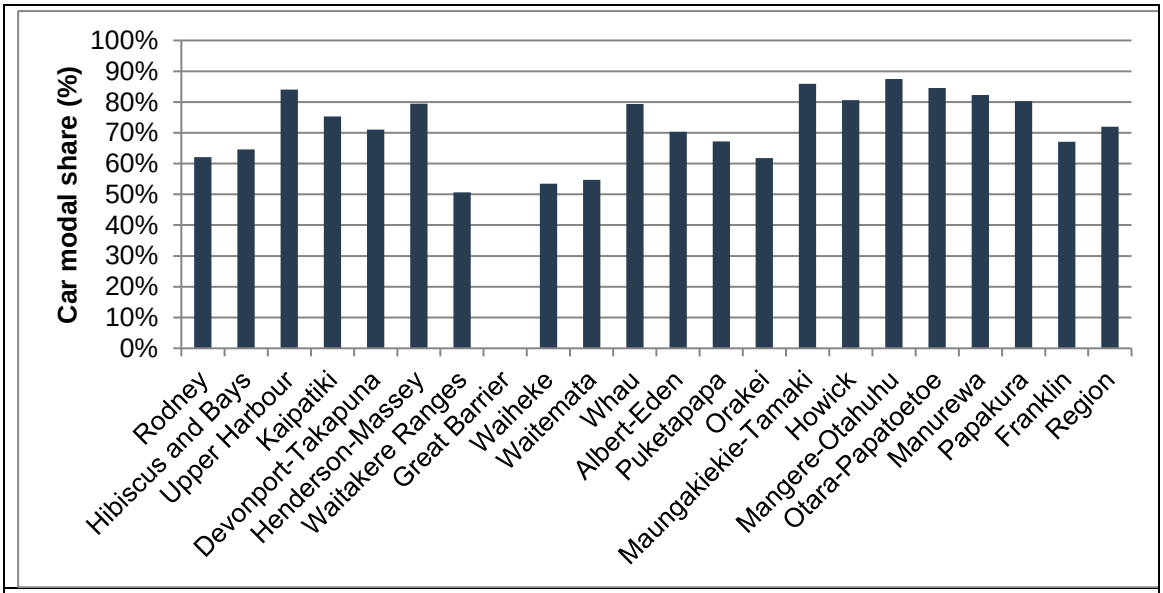


Figure 17.10
Car modal shares by Local Board destinations 2018
(per cent of total trips)

Active mode trips are focussed on the central Waitematā board area, where they represent 11 per cent of total commuting journeys to destinations in the area. Active mode commuting is also relatively high for destinations in Albert-Eden and Devonport -Takapuna but is below the regional average elsewhere.

The car modal shares for commuting trips to destinations in the Local Board areas are set out in Figure 17.11.

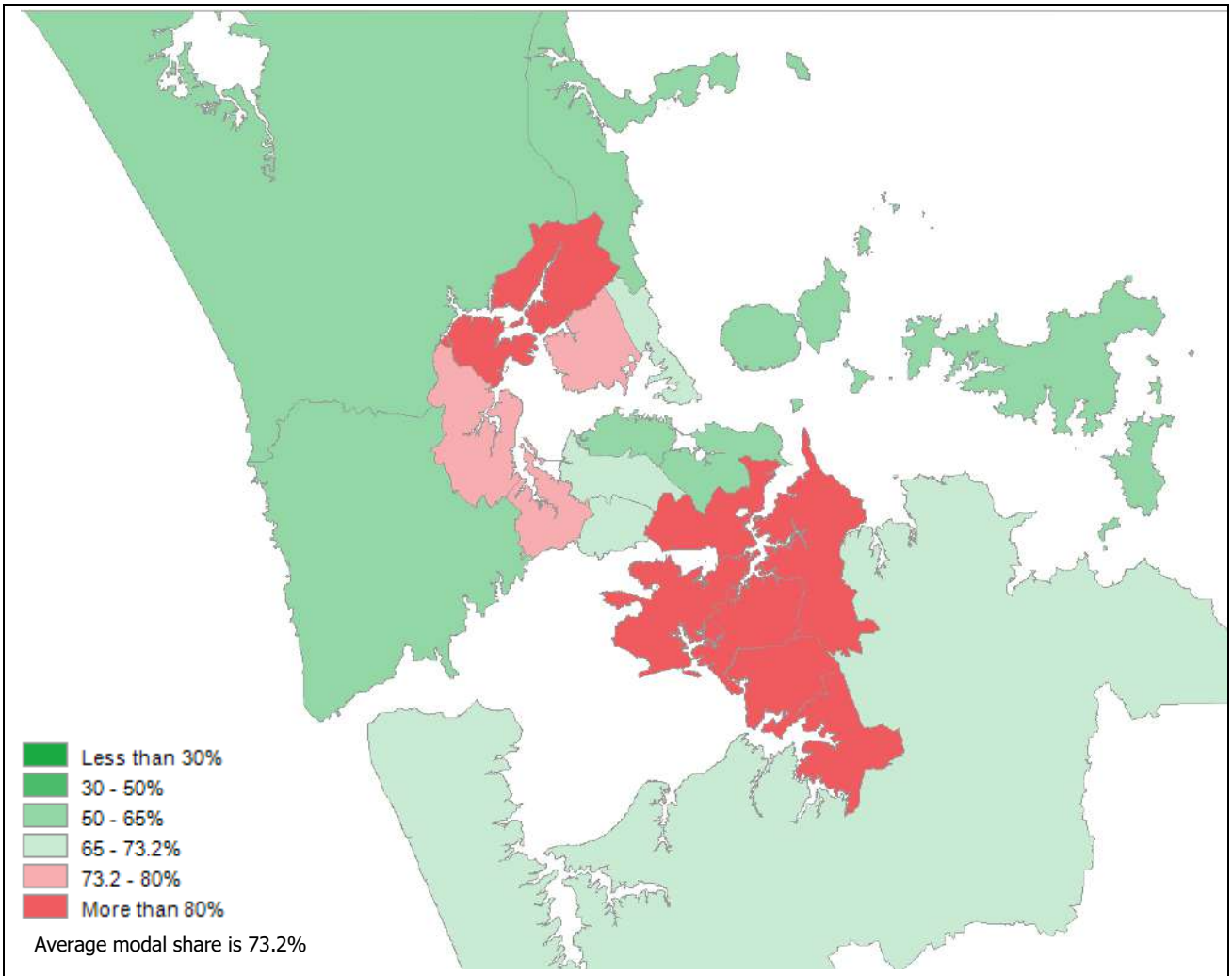


Figure 17.11
Commuting to workplaces in Local Board areas - car modal share

The areas with high car modal shares by destination largely lie in a ring round the central areas and, to some extent, reflect the major industrial areas in Wiri, Highbrook, Onehunga/Penrose/Mt Wellington in the south and North Harbour to the north. The areas of high car shares by destination also largely reflect the areas with high car shares by origin.

The modal shares for public transport trips by destination are set out in Figure 17.12.

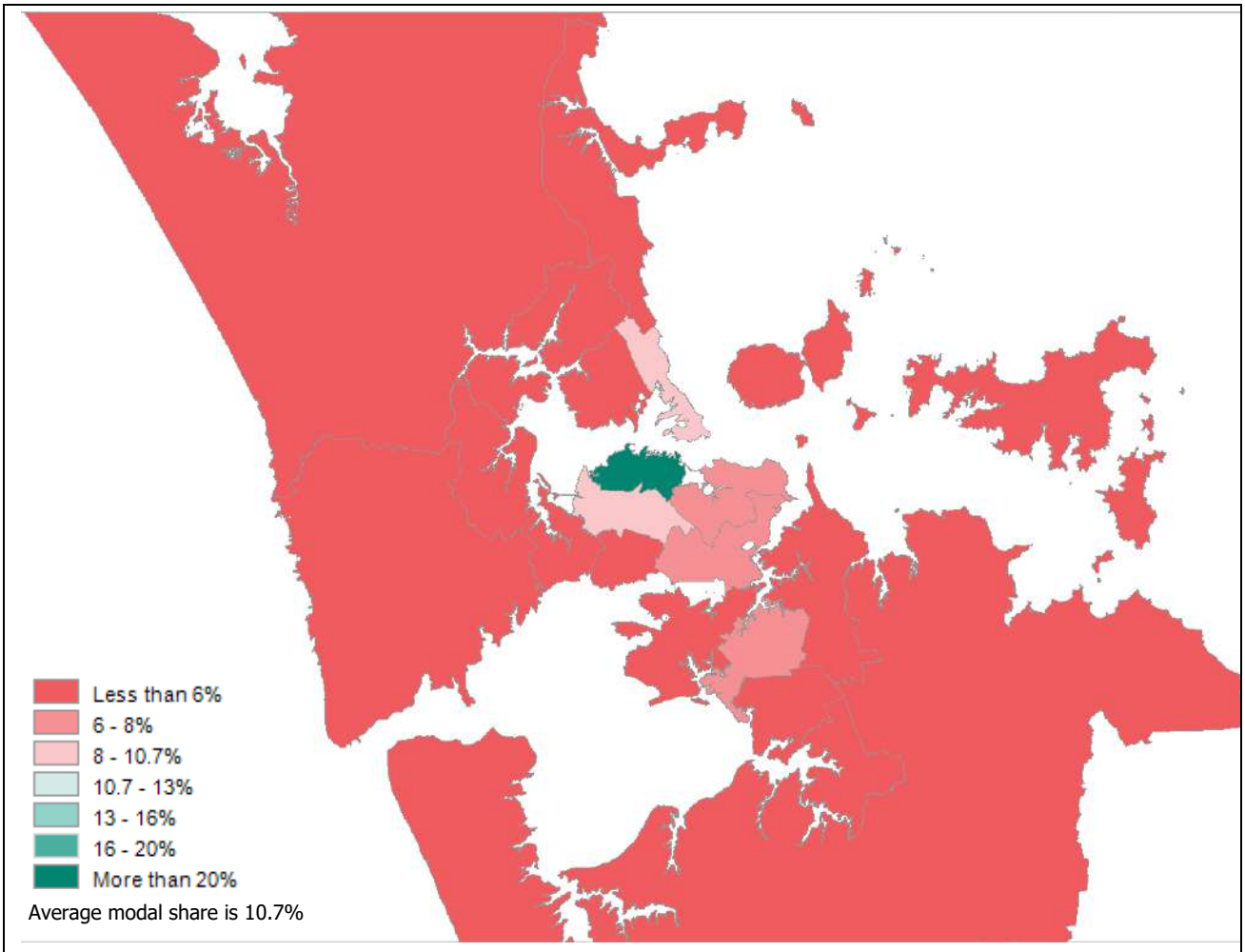


Figure 17.12
Commuting to workplaces in Local Board areas - public transport modal share

Public transport trip making by destination is very much dominated by the central Waitematā Local Board area where the public transport network is focussed, where parking may be difficult and expensive. Public transport to Waitematā workplaces accounts for about 61 per cent all regional public transport commuting trips.

Shares of public transport trip making to other areas are relatively low, below the regional average, although it is highest at 8-10.7 per cent in the inner areas of Devonport-Takapuna and Albert-Eden.

The mode shares for active mode trips by destination are set out in Figure 17.13.

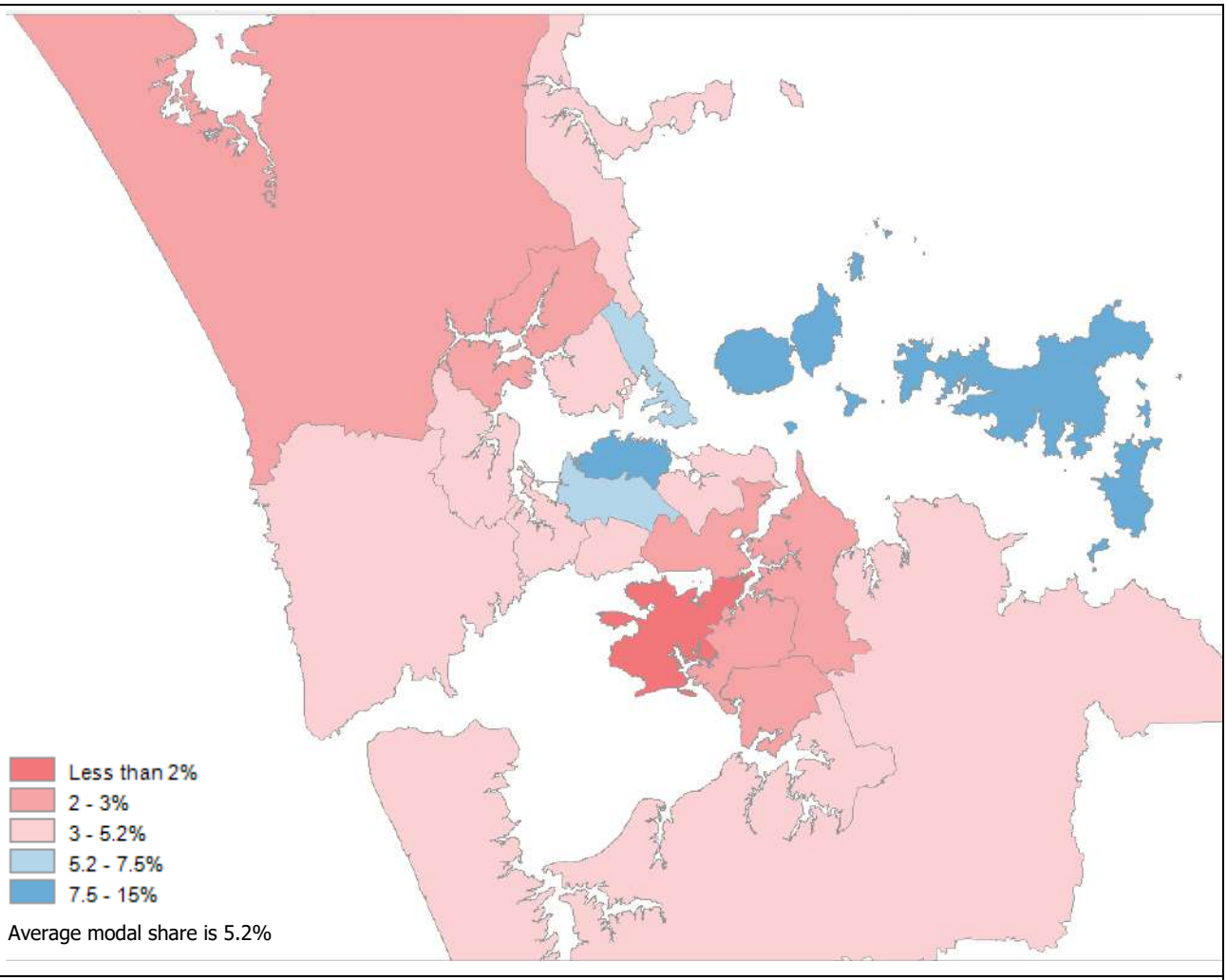


Figure 17.13
Commuting to workplaces in Local Board area - active mode modal share

The shares of active modes are again high for the Waitematā local board area and also for Waiheke, followed, as in the case of public transport, by Devonport-Takapuna and Albert-Eden.

17.3 Changes in trip making by local board area

17.3.1 Overall changes

Because of issues with the data, it is not possible to reliably determine detailed changes in the numbers of trips to and from the local board areas. However, it is possible to consider the changes in the modal shares for each of the areas. These are presented below in Table 17.4 for trips by origin, and Table 17.5 for trips by destination. It should be noted that no analysis was undertaken of the trips to and from the Great Barrier and Waiheke local board areas in 2013, so the analysis that follows excludes these areas.

Table 17.4

Changes in modal shares by origins 2013 and 2018

Local board	Car Driver		Car passenger		Total car		PT		Active		Work at home	
	2013	2018	2013	2018	2013	2018	2013	2018	2013	2018	2013	2018
Rodney	69%	70%	4%	3%	74%	73%	2%	2%	3%	2%	17%	23%
Hibiscus and Bays	74%	71%	4%	3%	78%	73%	7%	9%	3%	2%	10%	14%
Upper Harbour	74%	71%	4%	3%	78%	73%	7%	9%	4%	3%	8%	13%
Kaipātiki	70%	68%	5%	3%	75%	71%	11%	15%	3%	3%	7%	9%
Devonport-Takapuna	61%	58%	4%	2%	65%	60%	8%	12%	8%	7%	10%	14%
Henderson-Massey	74%	75%	6%	5%	81%	80%	6%	8%	4%	3%	5%	8%
Waitakere Ranges	74%	73%	5%	3%	79%	76%	6%	10%	2%	2%	9%	12%
Waitematā	39%	35%	5%	2%	44%	37%	13%	17%	30%	33%	8%	11%
Whau	69%	70%	7%	4%	76%	74%	10%	14%	4%	3%	5%	7%
Albert-Eden	62%	58%	5%	3%	67%	61%	13%	18%	8%	9%	7%	11%
Puketāpapa	69%	69%	7%	4%	76%	73%	11%	14%	3%	3%	6%	8%
Ōrākei	69%	65%	4%	2%	73%	67%	9%	13%	5%	5%	10%	14%
Maungakiekie-Tāmaki	68%	69%	7%	4%	75%	73%	9%	13%	5%	5%	5%	8%
Howick	79%	78%	4%	3%	83%	81%	4%	5%	2%	2%	7%	10%
Māngere-Ōtāhuhu	65%	76%	10%	8%	76%	84%	6%	7%	4%	2%	4%	6%
Ōtara-Papatoetoe	68%	76%	9%	7%	77%	83%	6%	8%	3%	2%	3%	5%
Manurewa	74%	79%	7%	6%	82%	85%	5%	6%	2%	1%	4%	6.5%
Papakura	75%	77%	5%	4%	80%	81%	5%	8%	4%	2%	5%	8%
Franklin	75%	74%	4%	2%	79%	76%	2%	3%	3%	2%	12%	17%
Region	69%	68%	5%	4%	74%	73%	7%	10%	6%	5%	8%	11%

Table 17.5 Changes in modal shares by destinations 2013 and 2018								
Local board	**Cars**		**PT**		**Active**		**Work at home**	
	2013	**2018**	**2013**	**2018**	**2013**	**2018**	**2013**	**2018**
Rodney	64.4%	62.1%	2.1%	0.8%	4.3%	3.0%	26%	34%
Hibiscus and Bays	70.4%	64.6%	2.5%	2.7%	4.3%	3.0%	20%	29%
Upper Harbour	84.2%	84.0%	3.4%	4.0%	3.4%	3.0%	7%	9%
Kaipātiki	76.5%	75.3%	5.0%	5.6%	5.0%	4.0%	11%	15%
Devonport-Takapuna	74.1%	71.0%	6.3%	8.1%	7.0%	6.0%	10%	13%
Henderson-Massey	80.6%	79.4%	3.7%	4.6%	4.7%	3.0%	8%	12%
Waitakere Ranges	66.2%	50.7%	2.5%	2.1%	3.8%	3.0%	24%	44%
Waitematā	61.0%	54.7%	20.7%	26.9%	10.7%	11.0%	3%	3%
Whau	80.1%	79.4%	4.4%	5.8%	4.3%	3.0%	8%	11%
Albert-Eden	73.8%	70.3%	6.3%	9.1%	6.8%	6.0%	10%	13%
Puketāpapa	74.4%	67.2%	4.6%	5.5%	5.7%	4.0%	12%	22%
Ōrākei	72.1%	61.8%	6.1%	6.4%	4.3%	4.0%	14%	26%
Maungakiekie-Tāmaki	87.3%	85.9%	4.2%	6.6%	2.9%	3.0%	3%	3%
Howick	82.6%	80.6%	1.9%	3.4%	3.1%	2.0%	10%	13%
Māngere-Ōtāhuhu	87.3%	87.5%	3.3%	4.6%	3.0%	2.0%	3%	4%
Ōtara-Papatoetoe	87.1%	84.6%	3.7%	7.0%	2.9%	3.0%	3%	5%
Manurewa	80.9%	82.3%	2.8%	3.7%	4.2%	2.0%	8%	11%
Papakura	81.4%	80.3%	2.4%	3.0%	5.0%	3.0%	8%	13%
Franklin	69.8%	67.1%	1.6%	1.2%	5.0%	3.0%	21%	28%
Region	75.0%	72.0%	7.7%	10.3%	5.7%	5.0%	8%	11%

The key features for each of the main modes are set out below.

17.3.2 Changes in car modal shares

The changes in the total car modal shares by origin are illustrated in Figure 5.3.

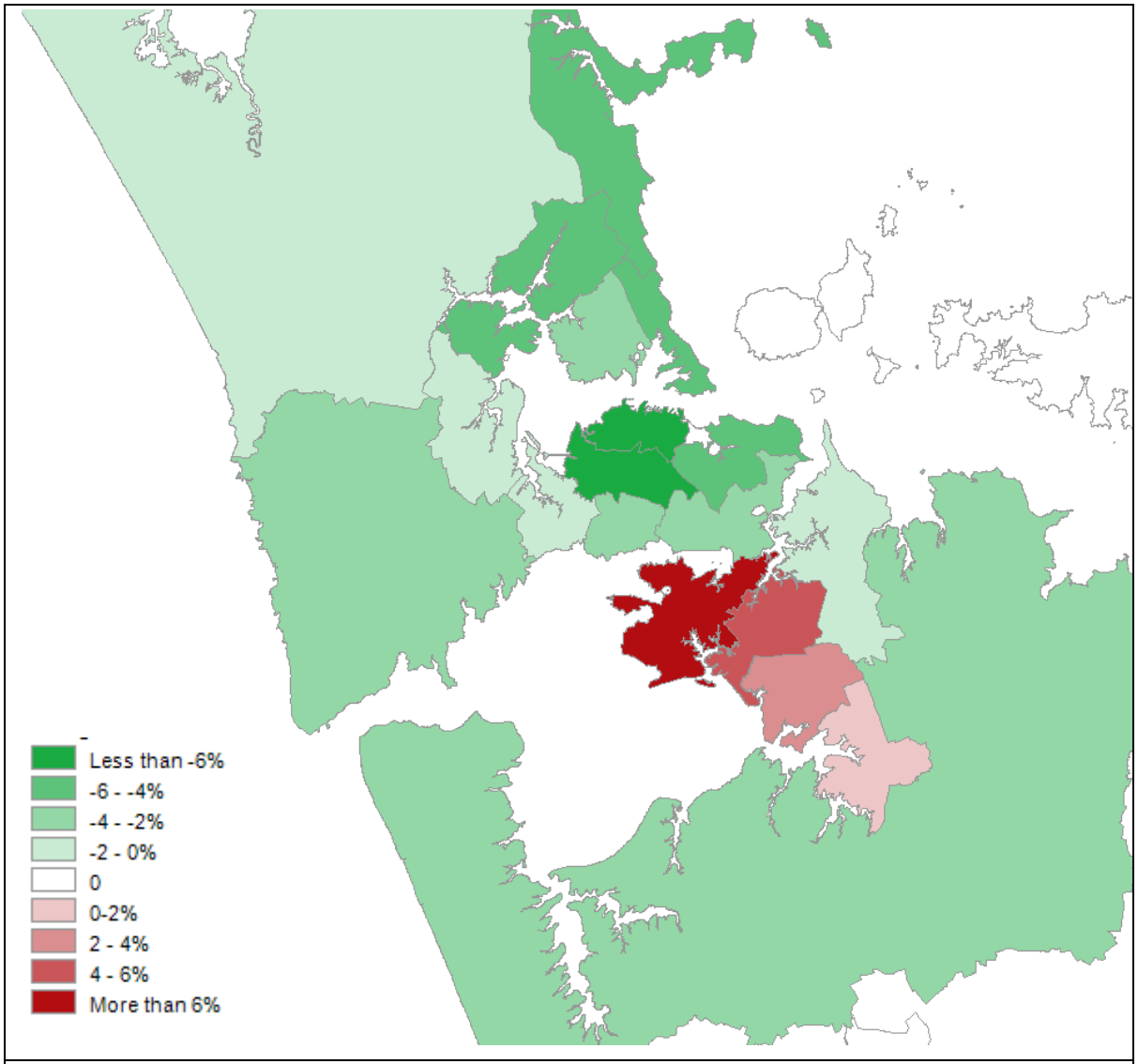


Figure 17.14
Change in total car modal share 2013-2018 by local board origin (percentage points)

Across much of the region, the car modal share by origin has declined slightly, with the largest decreases in the central Waitematā and Albert-Eden local board areas. However, there have been increases in a band to the south of the Māngere inlet from Māngere-Ōtāhuhu to Papakura, reinforcing the already high levels of commuting car use in these areas. This, in turn, reflects the spatial patterns of commuting from these areas, with large numbers working in locations not well served by public transport.

Car use includes passengers as well as drivers and the changes in the share of car passengers are set out in Figure 17.15. To provide comparability with the changes in total car modal share, this figure uses the same scale as Figure 5.3 earlier.

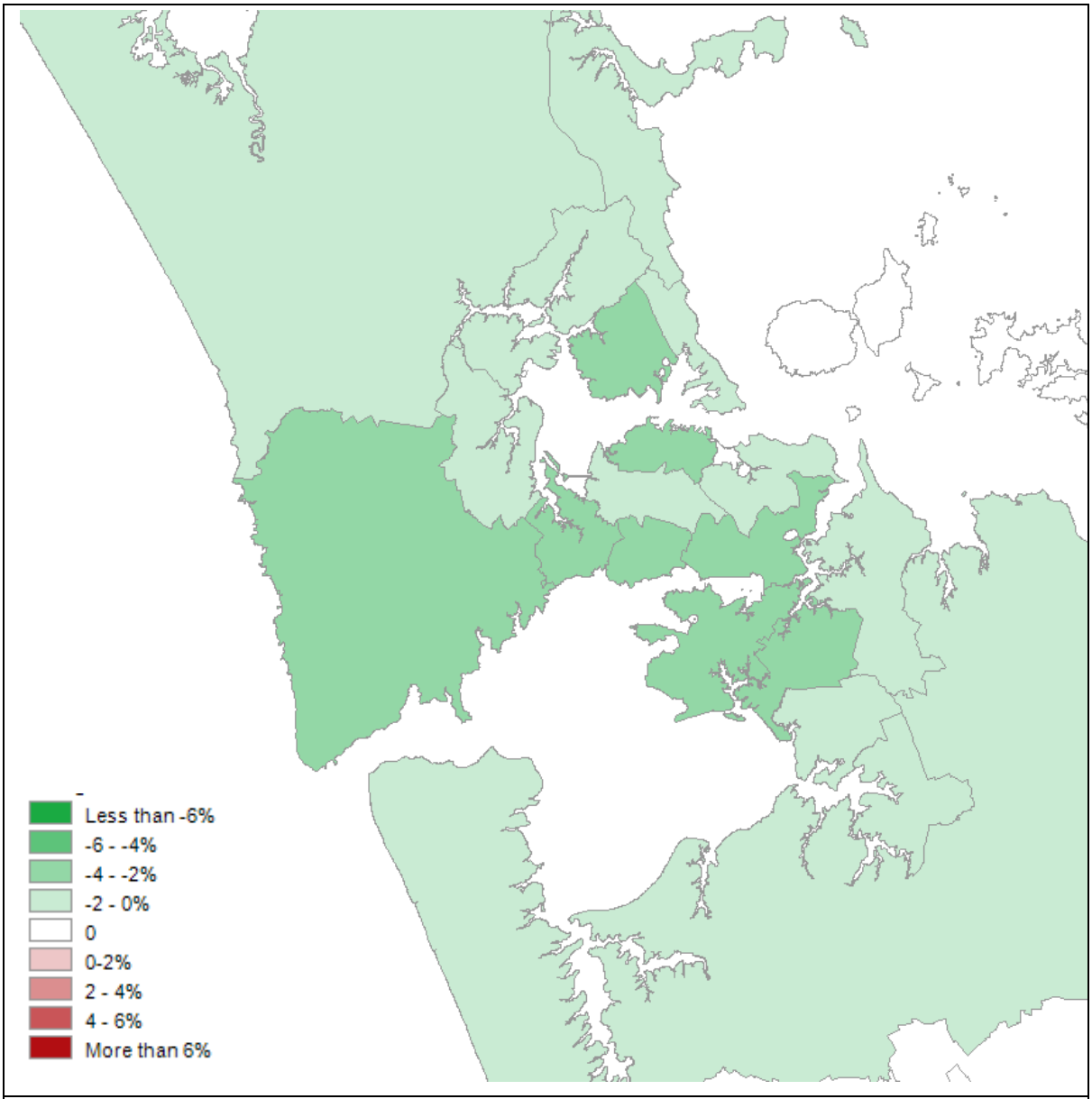


Figure 17.15
Change in total car passenger modal share 2013-2018 by local board origin (percentage points)

The car passenger modal share has declined across all the local board areas in the region with many of the largest increases being for movements from areas with high car ownership. For Māngere-Ōtāhuhu and Ōtara-Papatoetoe these larger declines have been accompanied by relatively large increases in overall car use, indicating greater growth in single car occupant trip making.

The position by destination is illustrated in Figure 17.16.

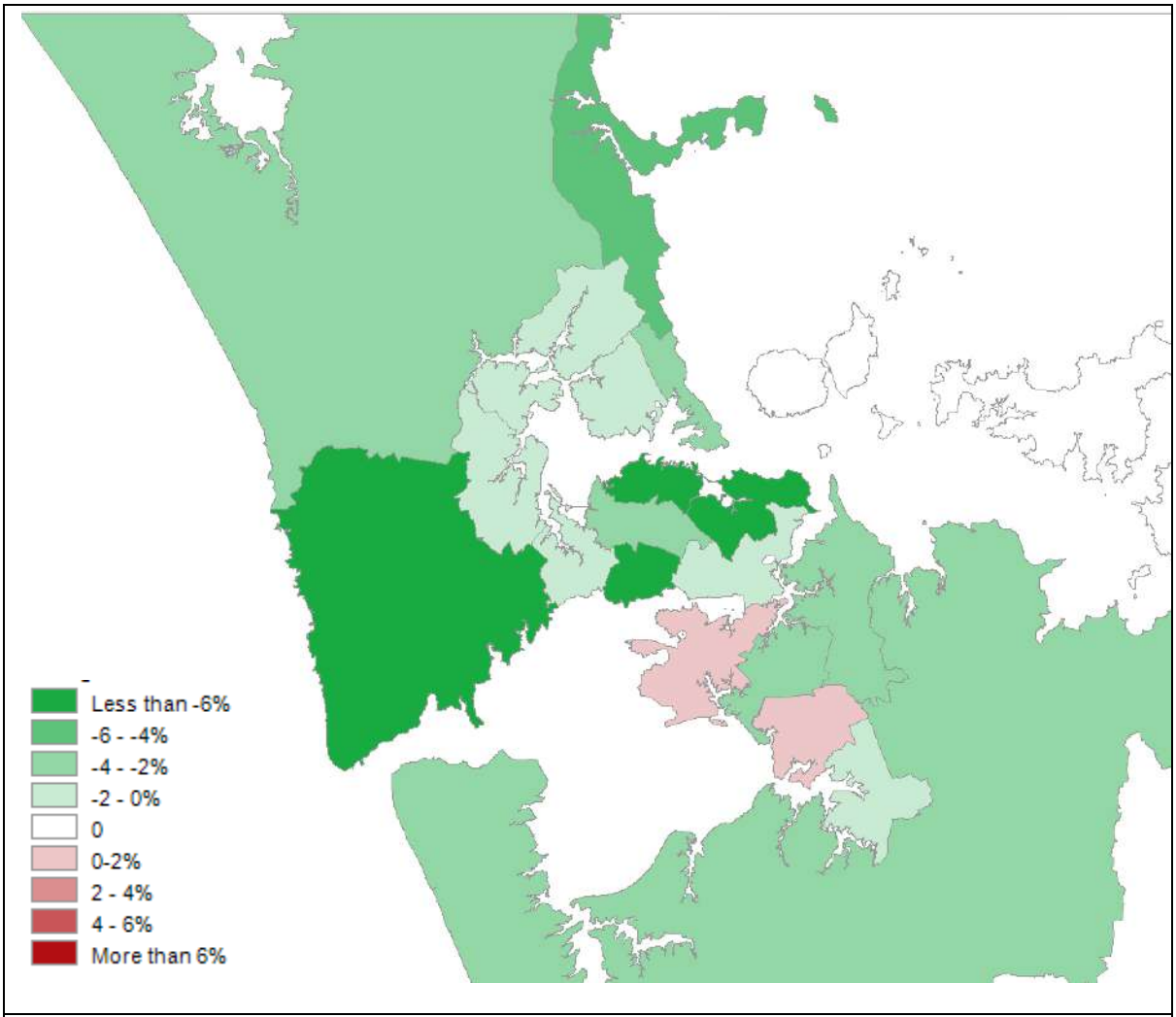


Figure 17.16
Changes in car modal shares 2013-2018 by local board destination (percentage points)

In general, the car mode share by destination has, to a greater or lesser extent, declined across almost all the area – with the exception of Māngere-Ōtāhuhu and Manurewa, where it has increased slightly, reflecting the position for trip origins discussed above.

For movements by cars, the region therefore appears to be split into three main areas:

- the area to the south from Māngere to Papakura, where car use has generally grown between 2013 and 2018;
- the central area, where it has declined substantially both for origins and destinations; and
- the remainder of the region, where it has typically declined less sharply.

17.3.3 Changes in the public transport share

The changes in public transport use by trip origin between 2013 and 2018 are set out in Figure 17.17.

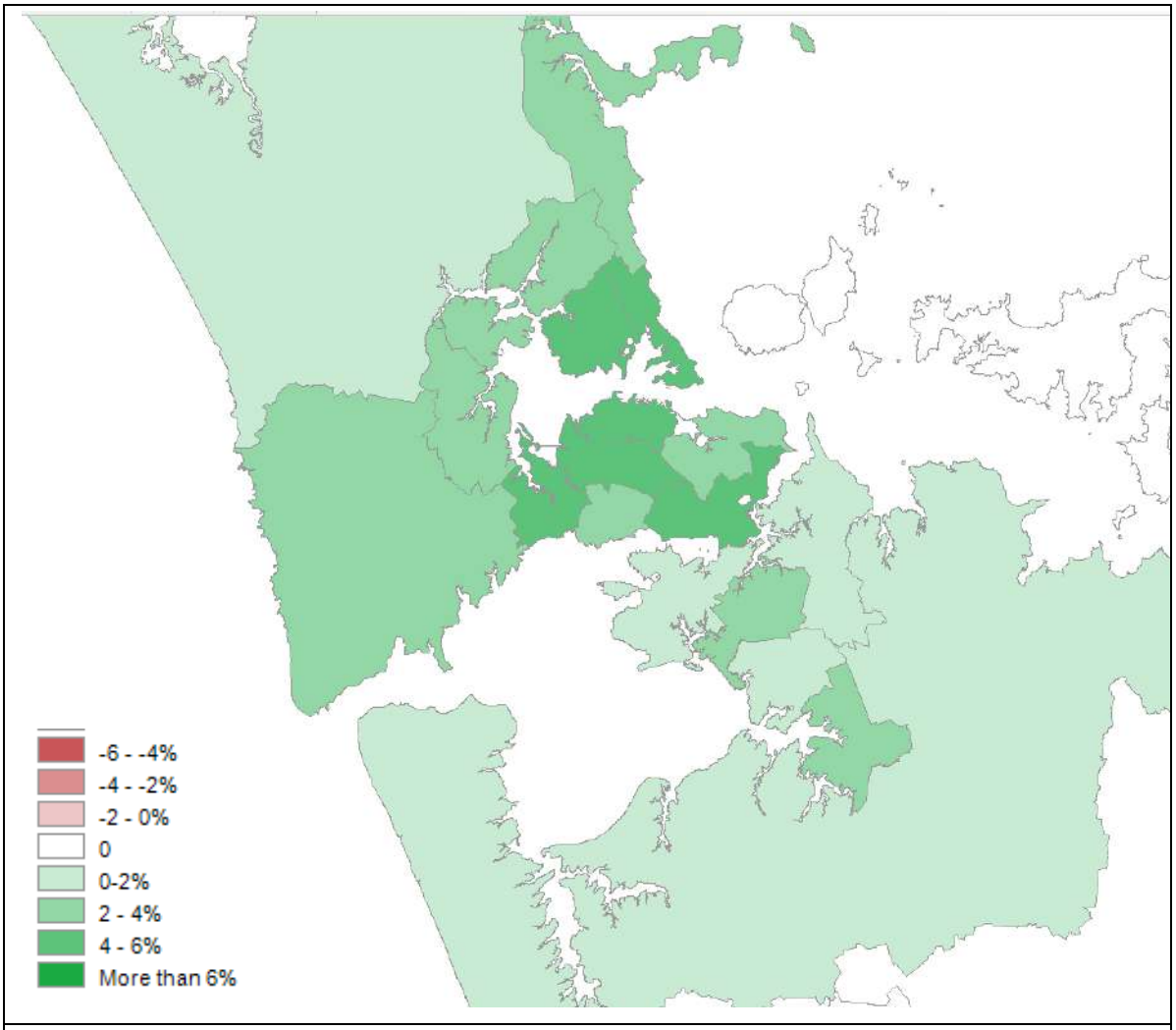


Figure 17.17
Changes in public transport modal shares 2013-2018 by local board origin (percentage points)

The public transport share by origin has increased for all the local board areas, with the highest increases being located in the Isthmus and southern North Shore. South of the Māngere Inlet, the increases have been relatively small.

Changes in the public transport mode share by destination are set out in Figure 17.18.

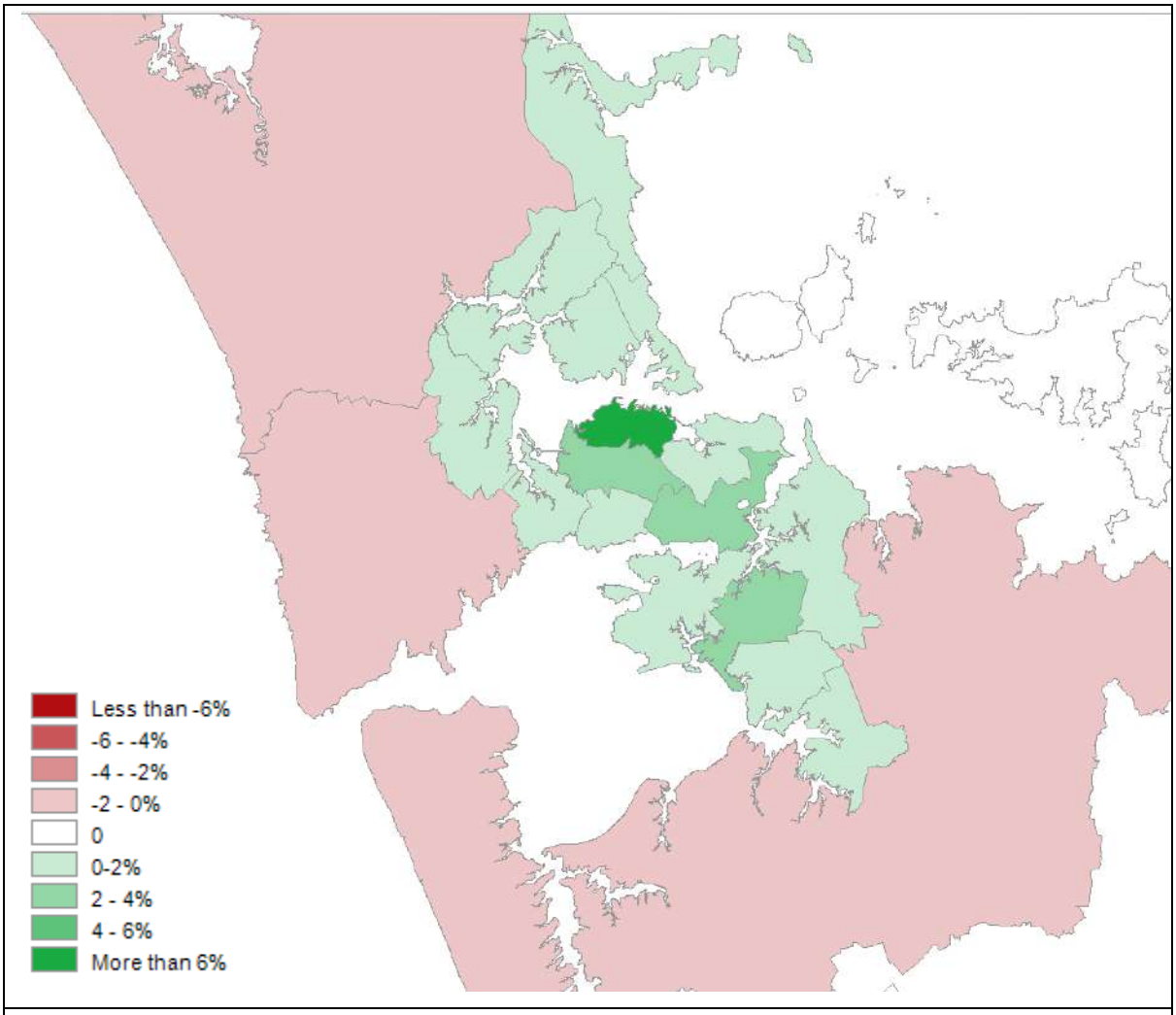


Figure 17.18
Changes in public transport modal shares 2013-2018 by local board origin (percentage points)

The growth in the public transport mode split by destination is very much focussed on the central Waitematā area. Growth elsewhere in the urban area has been more limited, reflecting the nature of employment and the difficulty of serving these often dispersed jobs with an attractive public transport system. In the more peripheral rural areas, the public transport share has declined, again reflecting the difficulty of providing attractive public transport services to the dispersed employment typical in these areas.

17.3.4 Changes in the active mode share

The changes in the active mode share by origin between 2013 and 2018 are set out in Figure 17.19

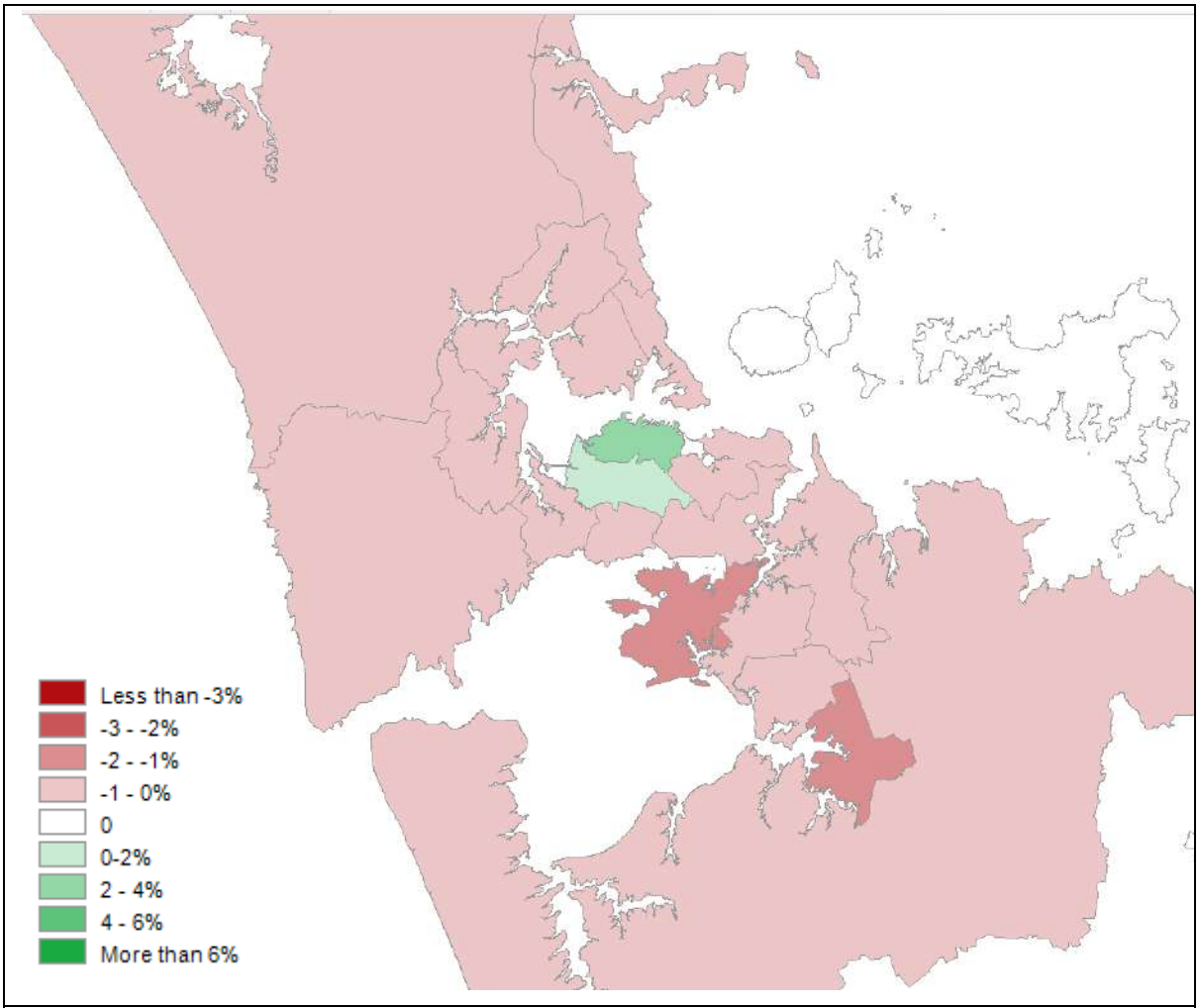


Figure 17.19
Changes in active mode shares 2013-2018 by local board origin (percentage points)

In general, the share of active modes has declined across the region, with only the central areas of Waitematā and Albert-Eden showing any growth. Particularly sharp declines in the modal shares have been experienced in Māngere-Ōtāhuhu and Papakura.

The position by destination is set out in Figure 17.20.

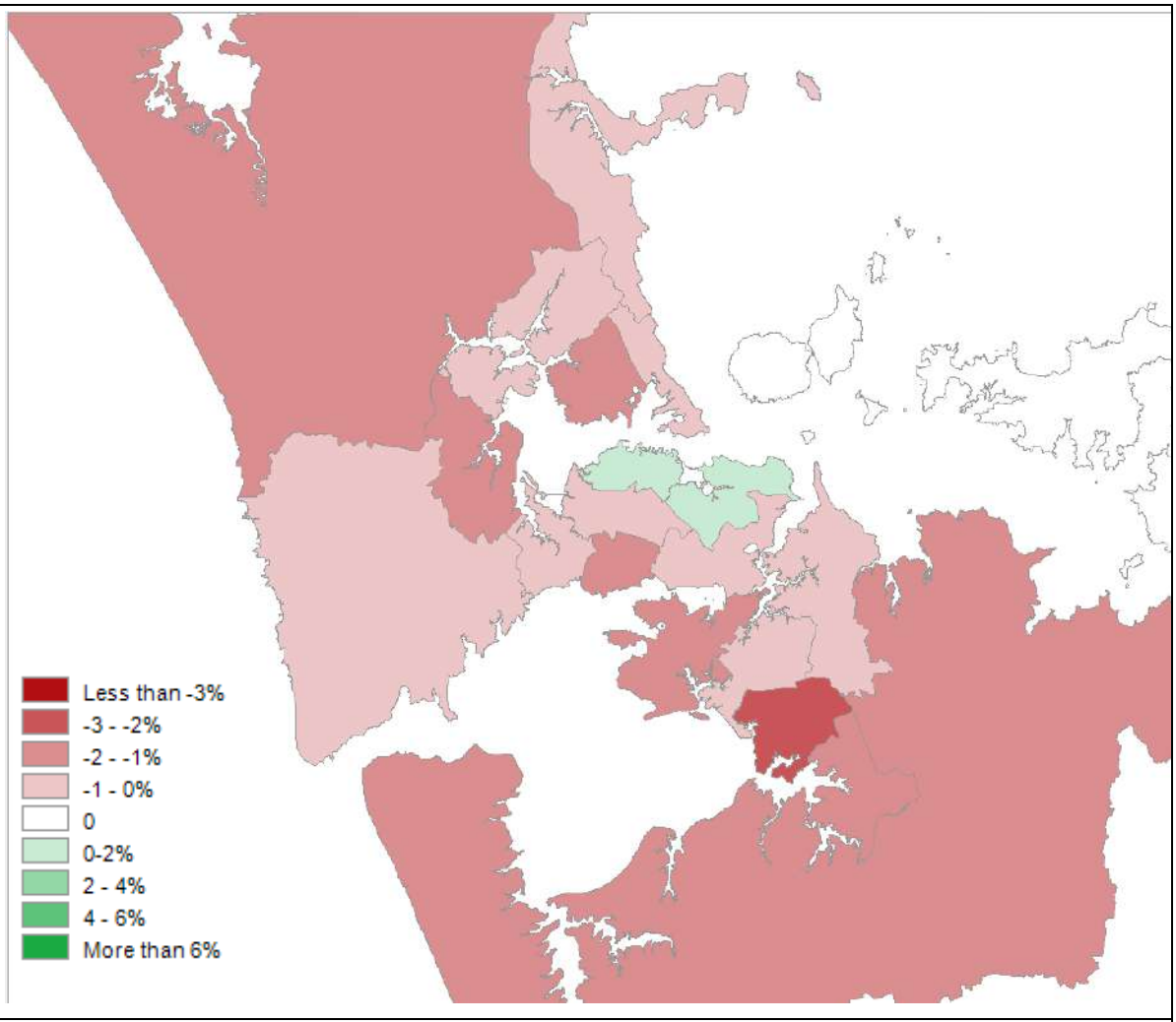


Figure 17.20
Changes in active mode shares 2013-2018 by local board destination (percentage points)

The pattern is broadly similar to that for origins with growth in Waitematā and Ōrākei (itself not a major employment area) and decreases elsewhere across the region.

17.3.5 Changes in the work at home modal share

The changes in the work at home modal share by origin are set out in Figure 17.21.

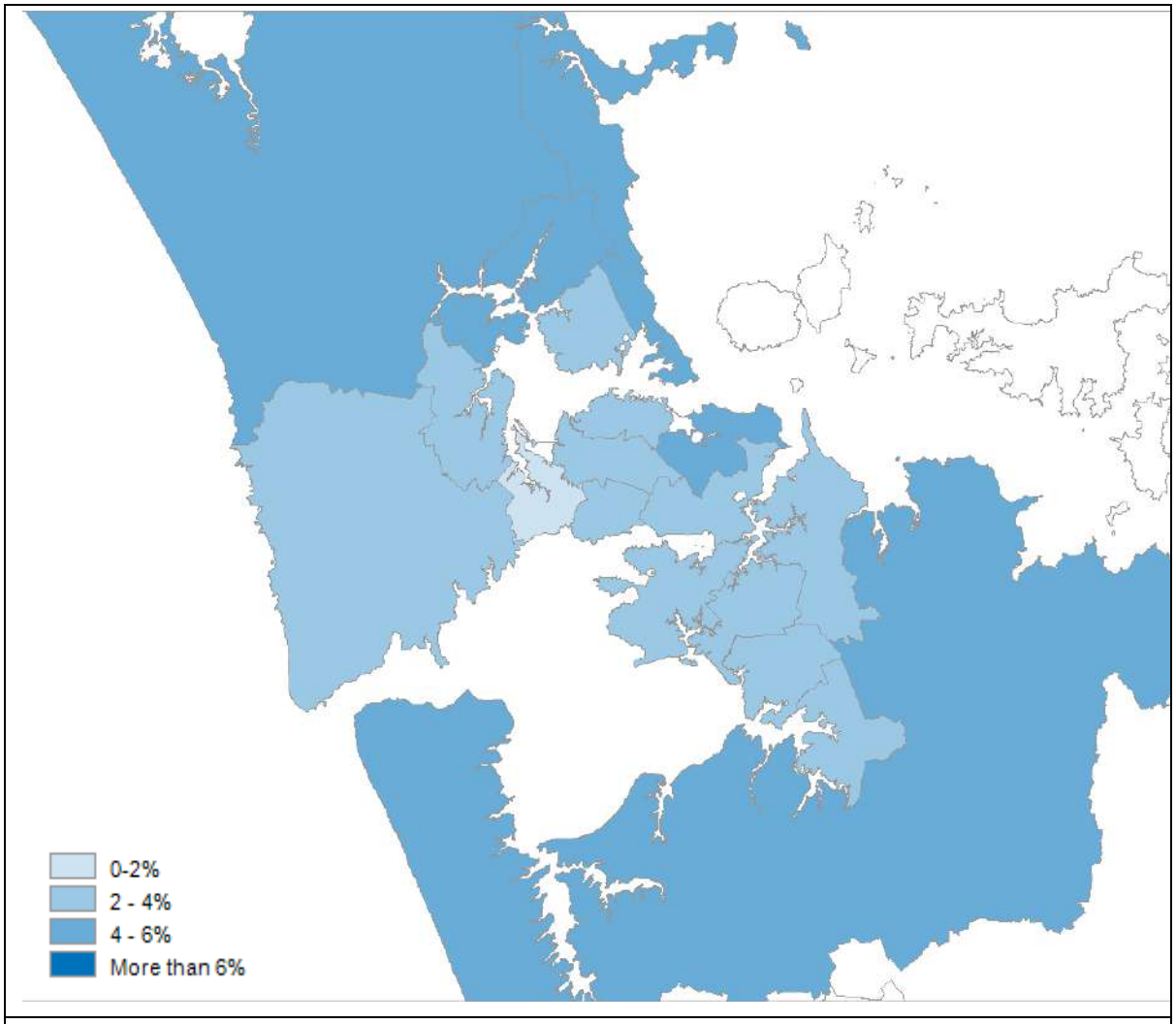


Figure 17.21
Changes in the work at home mode shares 2013-2018 by local board origin

The work at home modal share has increased in all the local board areas, with the largest increases in the rural areas to north and south, and in the coastal areas on the North Shore and Ōrākei, reflecting their attractiveness as places to work.

17.3.6 Overall assessment

The key highlights from the changes in the shares of the different modes between 2013 and 2018 include:

- While the share of car use has declined to some extent across almost all of the local boards in the region, it has increased for residents in the area south of the Māngere Inlet, stretching between Māngere and Papakura, supporting the high use of cars for commuting in the area.

- While the use of public transport by residents has increased in all the local board areas, its use is very much focussed on movements into the central area where public transport provides high frequency and attractive services, and the mode share by destination has grown strongly. For other destinations the share has either grown relatively more slowly or, in the case of the rural areas, its share has declined, hinting at difficulties in serving the more dispersed and harder to access employment in these areas.
- The share of active modes has generally declined, except for trips to or from the Waitematā local board area or surrounding areas – Albert-Eden for trip origins, and Ōrākei for trip destinations).
- The work at home share has grown for all local board areas across the region, with the highest increases in the rural areas to the north and south of the region, and in coastal areas in the North Shore, and to the east of the city centre.

18 Analysis at an SA2 level

Key findings

- Car use is lowest in the central area but is high in areas to the south of the Māngere Inlet and to the west of the Waitematā Harbour.
- Bus use is highest across the Isthmus and on the North Shore.
- While rail use is concentrated along the rail line, there is considerable use of rail from areas further away, particularly to the south of the region.
- Similarly, ferry use is concentrated around the ferry terminals, but again there is considerable use of ferries from residents of areas further away.
- Active mode use is highest in the central area, but also in areas with good cycling connections into this, including areas to the east and west.
- Away from the rural areas, work at home trips are focussed on areas surrounding the Waitematā Harbour and along the coastal areas of the Hauraki Gulf.
- Average trip lengths by residents are lowest in the central areas, and then typically increase with distance away.
- Trips lengths by destination reflect a number of the major employment areas where, because of the scale of the employment and relatively high wages, workers are attracted from wide areas.

18.1 Introduction

Following on from the analysis of trip patterns at the local board level, a further examination has been undertaken at the more disaggregated Statistical Area 2 level (broadly comparable with the CAUs analysed in earlier work). Because of the change in zoning structure it is, however, not possible to undertake any detailed comparisons with the findings from the earlier Censuses. It should also be noted that because of data issues, the numbers for smaller dispersed modes may be underestimated.

18.2 Use of different modes

18.2.1 Use of private cars

The modal shares of private car trips are set out in Figure 18.1.

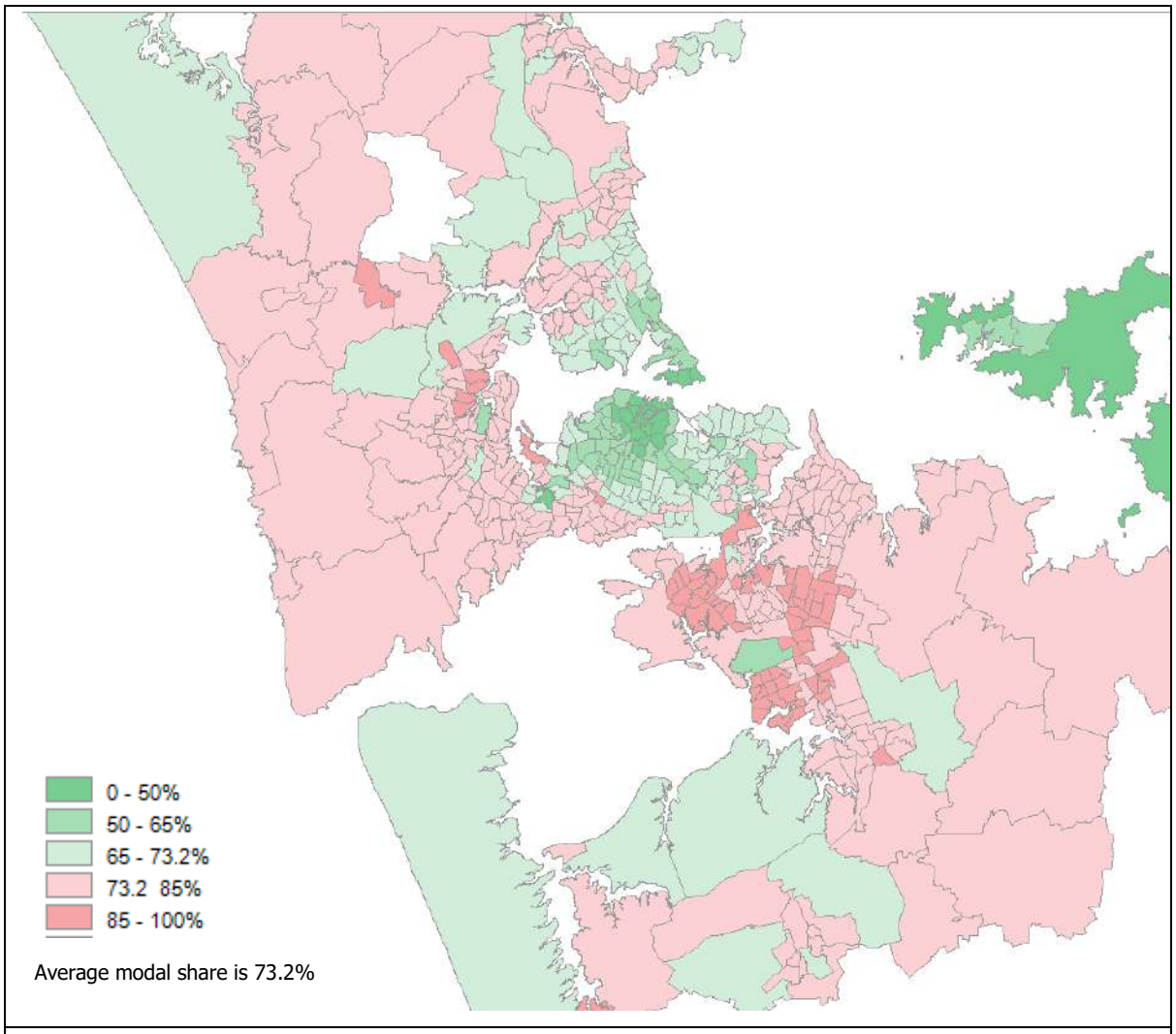


Figure 18.1
Private car mode share by residents 2018 (per cent of total trips)

The shares of private cars by origin are low in the central area and also across the Isthmus to the west in part reflecting high levels of commuting to the central area, where public transport provides a high level of service and the use of cars may be difficult or expensive. There are also areas of relatively low car use along the train lines to south and east. North of the Waitematā Harbour, the car share is low between Devonport and Takapuna, which reflects the availability of ferries to reach the central area, offering shorter and more reliable travel times. New Lynn's low private car share is worth noting, possibly hinting at the high level of public transport provision.

Car use is high south of the Māngere inlet, and also in some areas to the north-west. This is considered in more detail below in Section 9.

18.2.2 Use of bus

Within public transport, the predominant mode is bus. The modal shares for bus transport are set out in Figure 18.2.

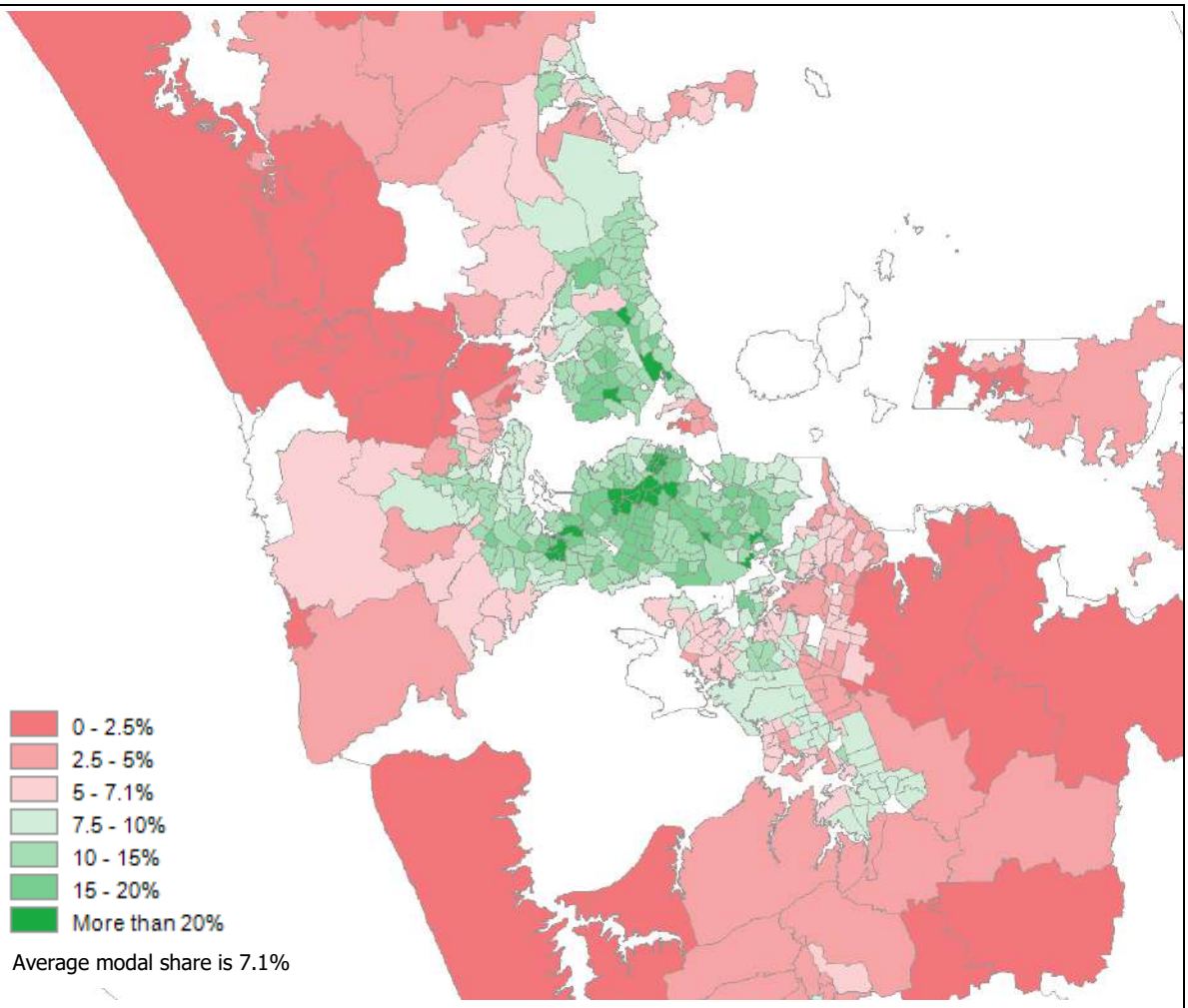


Figure 18.2
Bus mode shares for commuting trips by origin 2018 (per cent of total trips)

The share of commuting by bus is high across the Isthmus, particularly for the areas just to the south of the Central City, where bus frequencies are high, and distances are possibly too long for active mode trips into the centre. It is also high across much of the North Shore, probably reflecting the substantial investments in the Northern Busway and the provision of a high frequency network, which can compete effectively with private cars, especially given the high levels of congestion on the Northern Motorway. In addition, there are no rail services to provide competition in the public transport market. However, in the area between Takapuna and Devonport the bus share falls possibly reflecting the availability of ferry services from Devonport and other locations.

The share of bus passengers is also relatively high just to the west of the Isthmus, indicative of the high numbers travelling into the central area for employment.

18.2.3 Use of rail

The use of rail for commuting is set out in Figure 18.3.

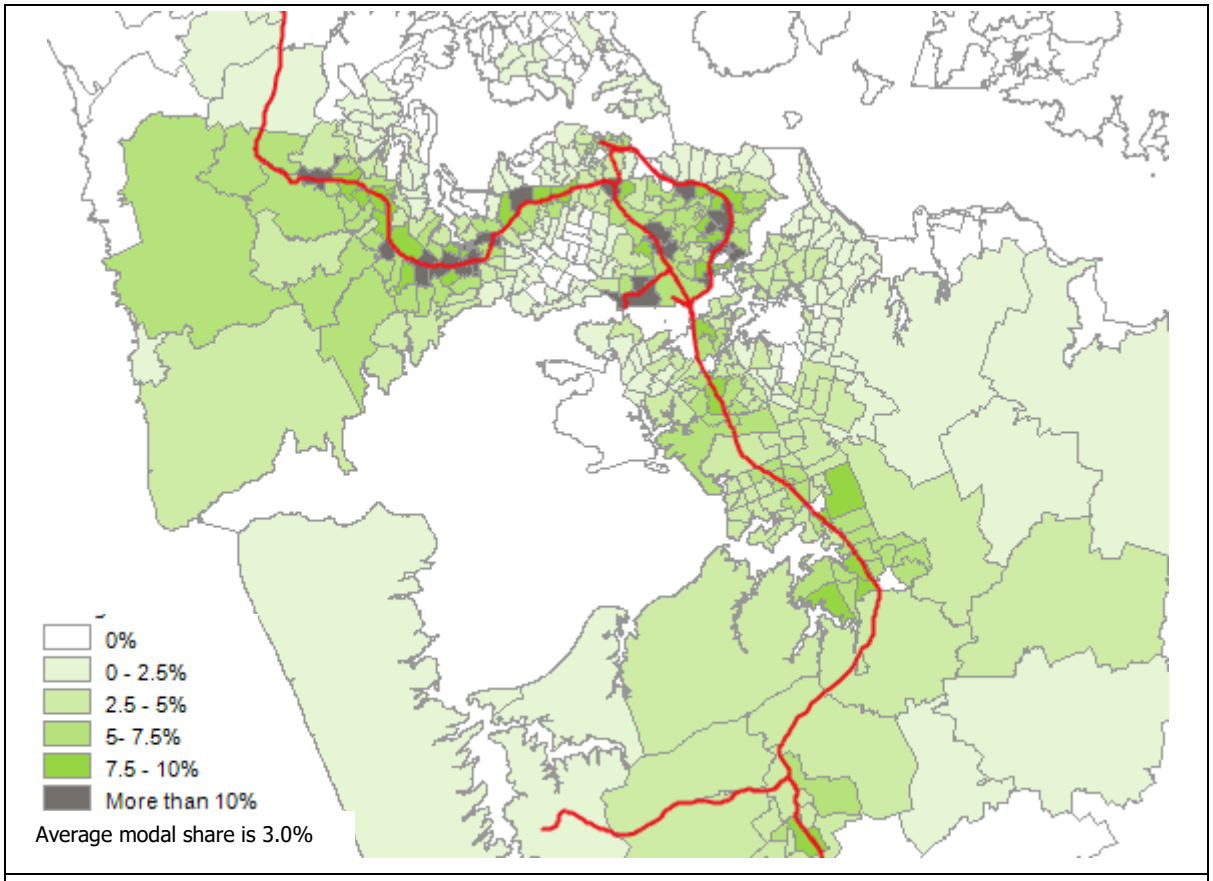


Figure 18.3
Use of rail by origin (per cent of total trips)

The use of rail is not surprisingly focused on the rail line. The catchment area, however, extends beyond the immediate rail corridor, especially in areas further away from the centre in the south and west. For the longer journeys to the centre from these areas, the advantages offered by rail for the main part of the journey, in terms of relatively rapid and reliable travel, are sufficient to support longer distance access movements to the rail stations. This indicates the importance of bus feeder services and park and ride, or kiss and ride movements in these areas.

There is also some use for rail for trips from the southern North Shore, where good connections from the bus and ferry routes make onward movements by rail attractive to a range of destination further south. However, because the numbers of these are relatively small, the constraints of the basic data prevent these from being identified in detail.

18.2.4 Bus/rail shares of public transport

Bus and rail form alternative components of the public transport system and, to some extent, are in competition for travellers. The share of bus in the total of bus and rail trips is set out in Figure 18.4.

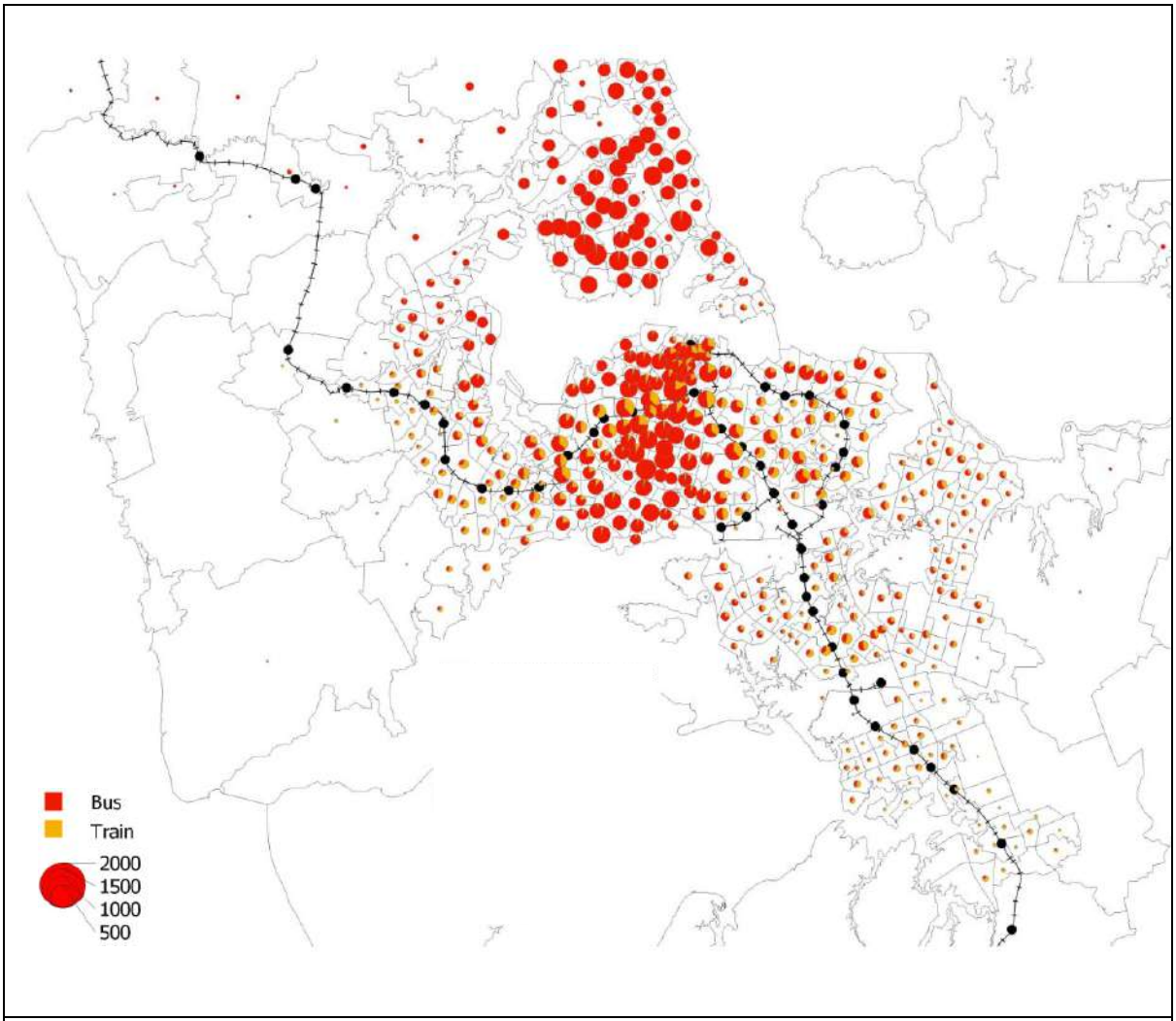


Figure 18.4
Bus share of bus and rail commuting trips by origin 2018

Note: This map includes a number of former stations that are no longer in use.

In general, the bus share is relatively low in the more peripheral areas to west and south, where public transport flows are typically low, and where rail provides an attractive option for the longer journeys from these areas. Bus shares are also low in the immediate vicinity of the rail stations, especially at Onehunga, Ellerslie, Meadowbank, on the southern line south of Ōtāhuhu, and on the Western Line west of New Lynn. The bus share of total rail and bus flows is also low in Stonefields. In the more peripheral areas to the south (where public transport availability is fairly limited, but rail provides relatively good access to destinations further north), the bus share of the combined market is also relatively low. Bus may, however, play an important role in supporting the rail services.

18.2.5 Use of ferry

The patterns of ferry use are set out in Figure 18.5.

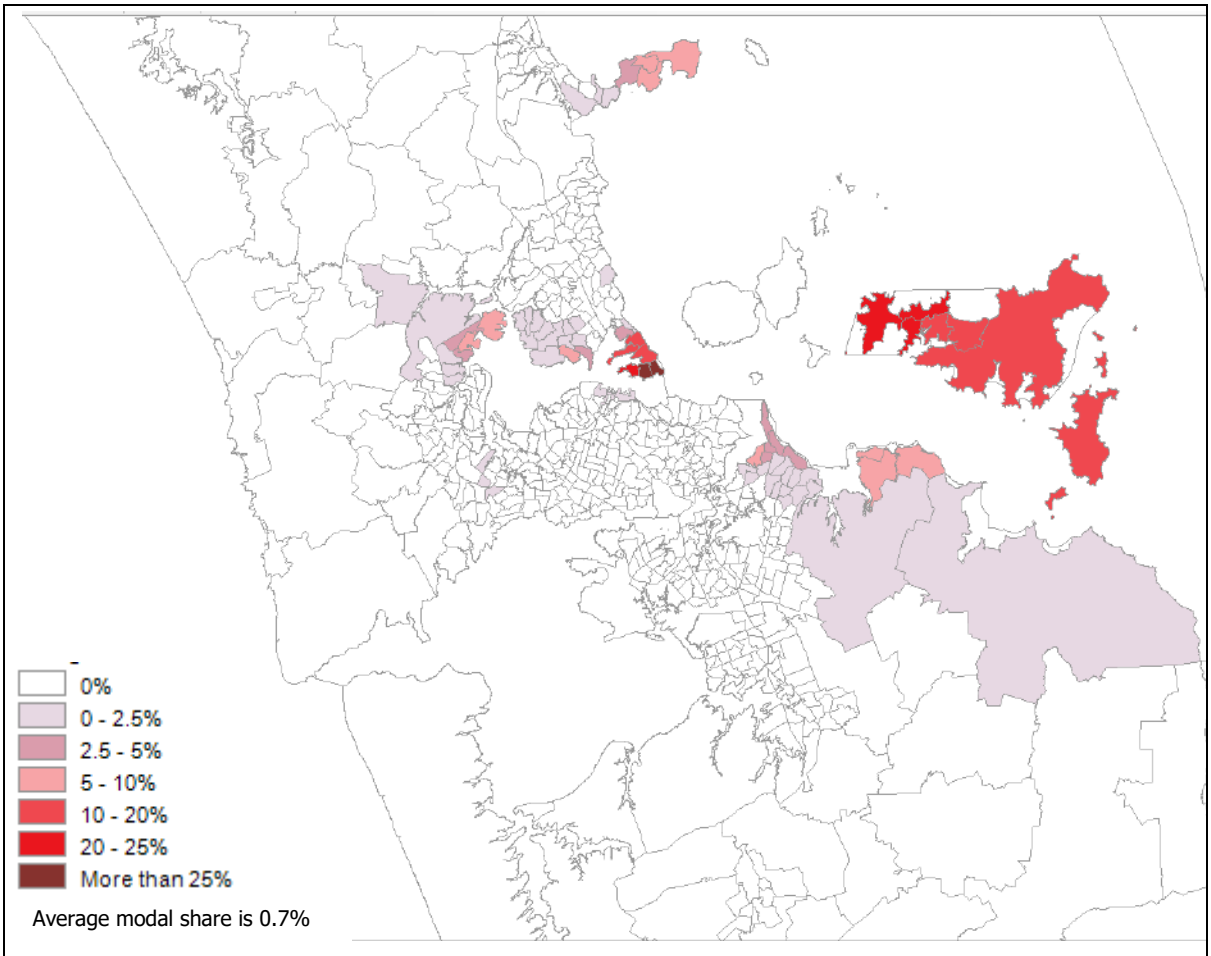


Figure 18.5
Use of ferry (per cent of total trips)

Ferry use is focussed around the ferry terminals, especially Devonport. However, there are also significant inland catchment areas to the north of Devonport which are reflected in low bus flows from the area, and to the west of Hobsonville and Westhaven and across the Howick peninsula.

18.2.6 Overall use of public transport

The total use of public transport is set out in Figure 18.6. The average modal share derived from the analysis by individual zone origins is 10.7 per cent, and the figure distinguishes between areas that have below or above average modal shares.

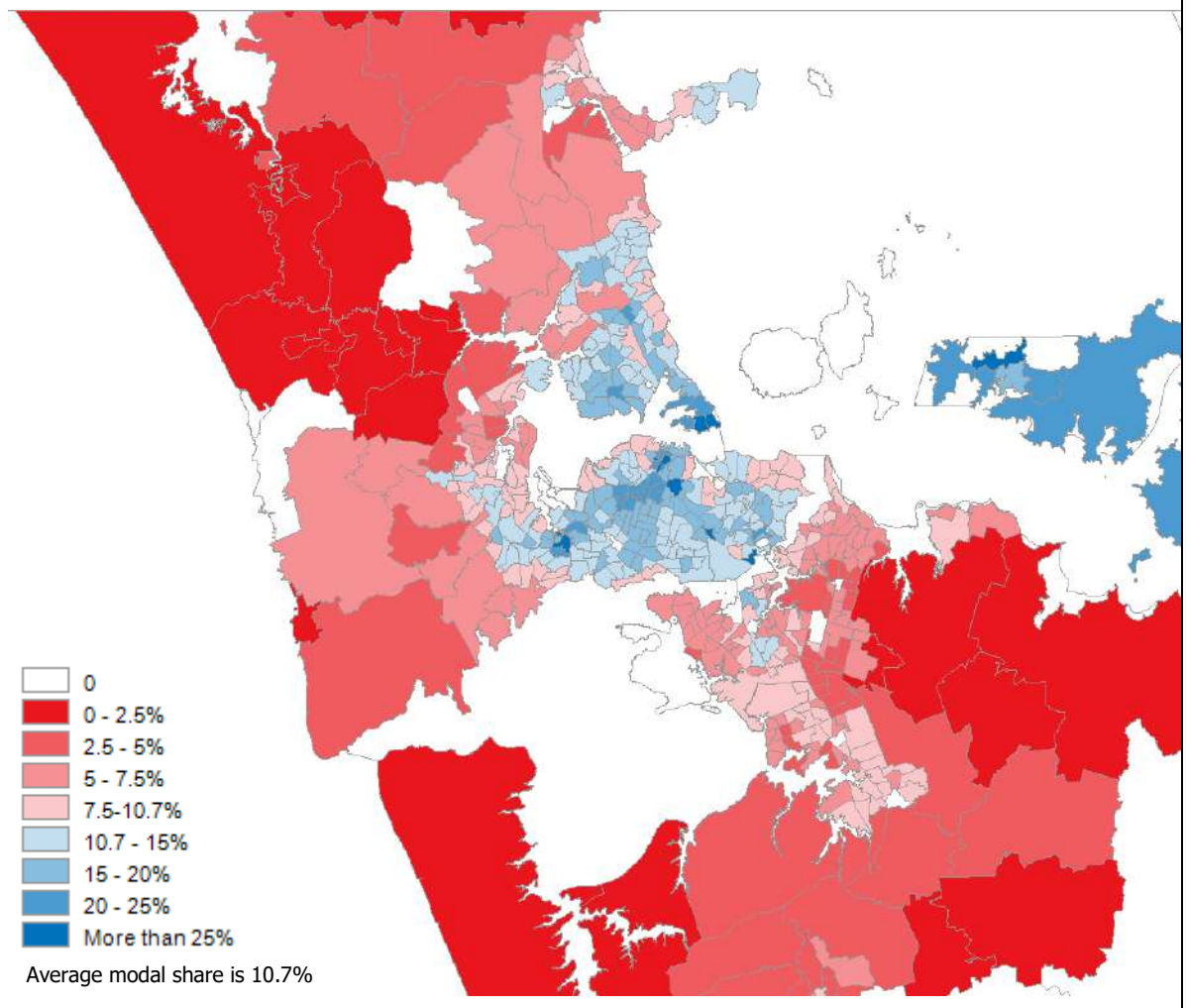


Figure 18.6
Total public transport mode shares for commuting trips by origin 2018 (per cent of total trips)

Public transport use is typically high across the Isthmus, particularly along the routes of the train lines and in the southwest served by the Dominion Road buses. To the west of the Isthmus, public transport use is also relatively high along the rail corridor.

To the north of the harbour, public transport use is high in the corridor between Devonport and Takapuna, reflecting the availability of ferries providing access to central Auckland, and also along the line of the Northern Busway to Albany. It is also high further west in the Birkenhead area, which is served by high frequency buses and ferries. The availability of the ferry service to the central area also contributes to a relatively high public transport mode share for the Gulf Harbour area.

South of the Māngere inlet and in Howick to the east, the share of public transport is relatively low. To some extent, this is indicative of the journey patterns of the workers resident in these areas, with relatively low shares commuting to the central city for which public transport provides attractive routes. It also reflects the relatively high shares commuting to the major employment areas including the airport, Highbrook and Onehunga/Penrose, areas for which it is difficult to provide attractive public transport services.

18.2.7 Active modes

The share of active modes by area is set out in Figure 18.7. It should be noted that, as discussed earlier, issues with the data means that the results should be treated as illustrative, rather than precise.

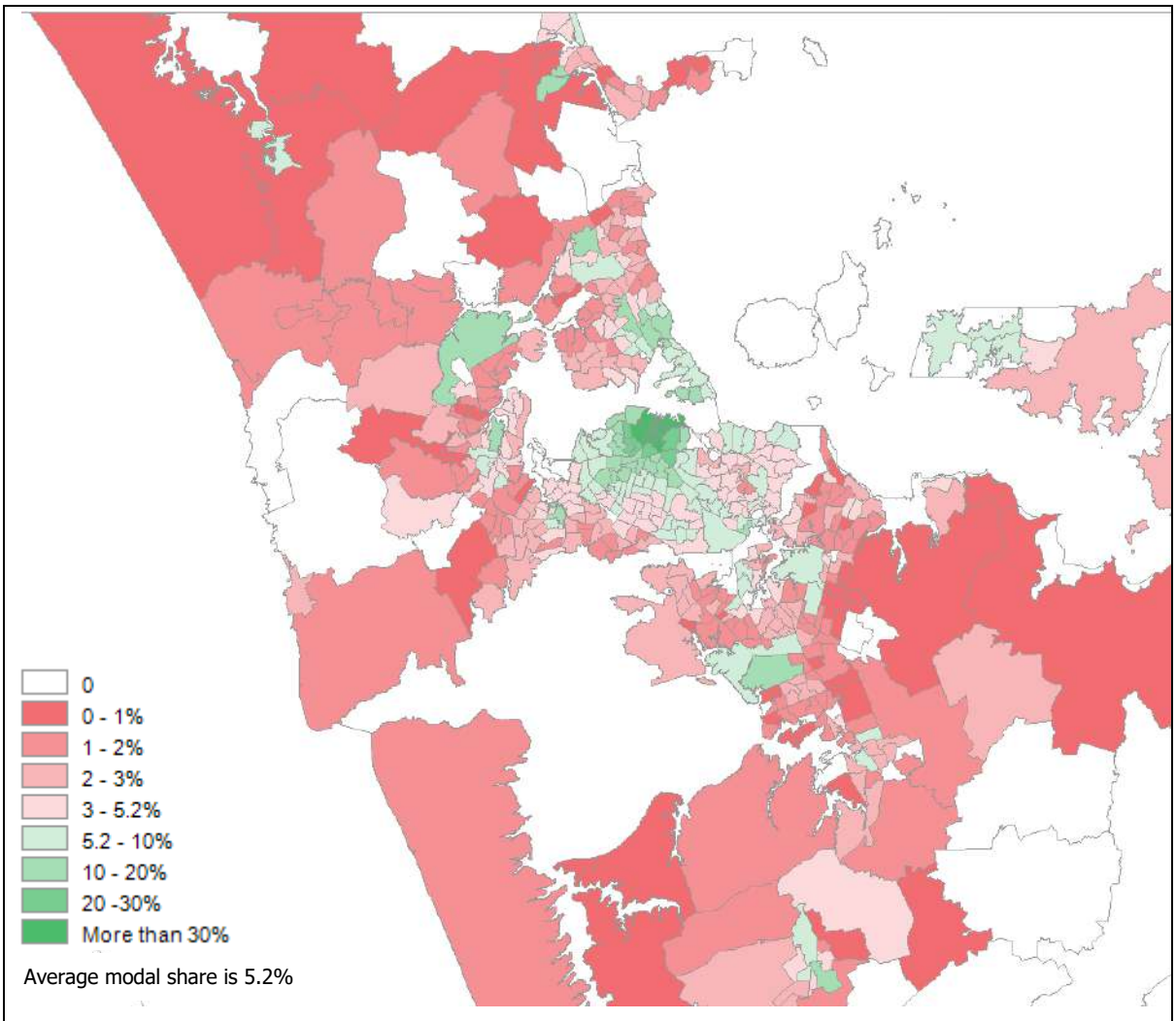


Figure 18.7
Share of active modes by origin 2018 (Per cent of total trips)

Active mode use is relatively high in trips originating in the Central City, highlighting the scale of employment opportunities that are close at hand. It is also high in areas to the west and south-west, the latter possibly reflecting the provision of the Northwestern Cycleway. The use of active modes is also high in Takapuna, Devonport and Albany on the North Shore, in New Lynn and Henderson to the west, and in Pukekohe to the south. These again reflect the availability of a range of employment opportunities close to the origins of the journeys.

The high values at Whenuapai and Wiri West reflect the particular employment types in those areas - the air force base and the prison. In other major employment areas, where the resident population is low (and probably largely works locally), the active mode share may again be high, although the numbers involved are small.

An alternative representation of the position is set out in Figure 18.8.

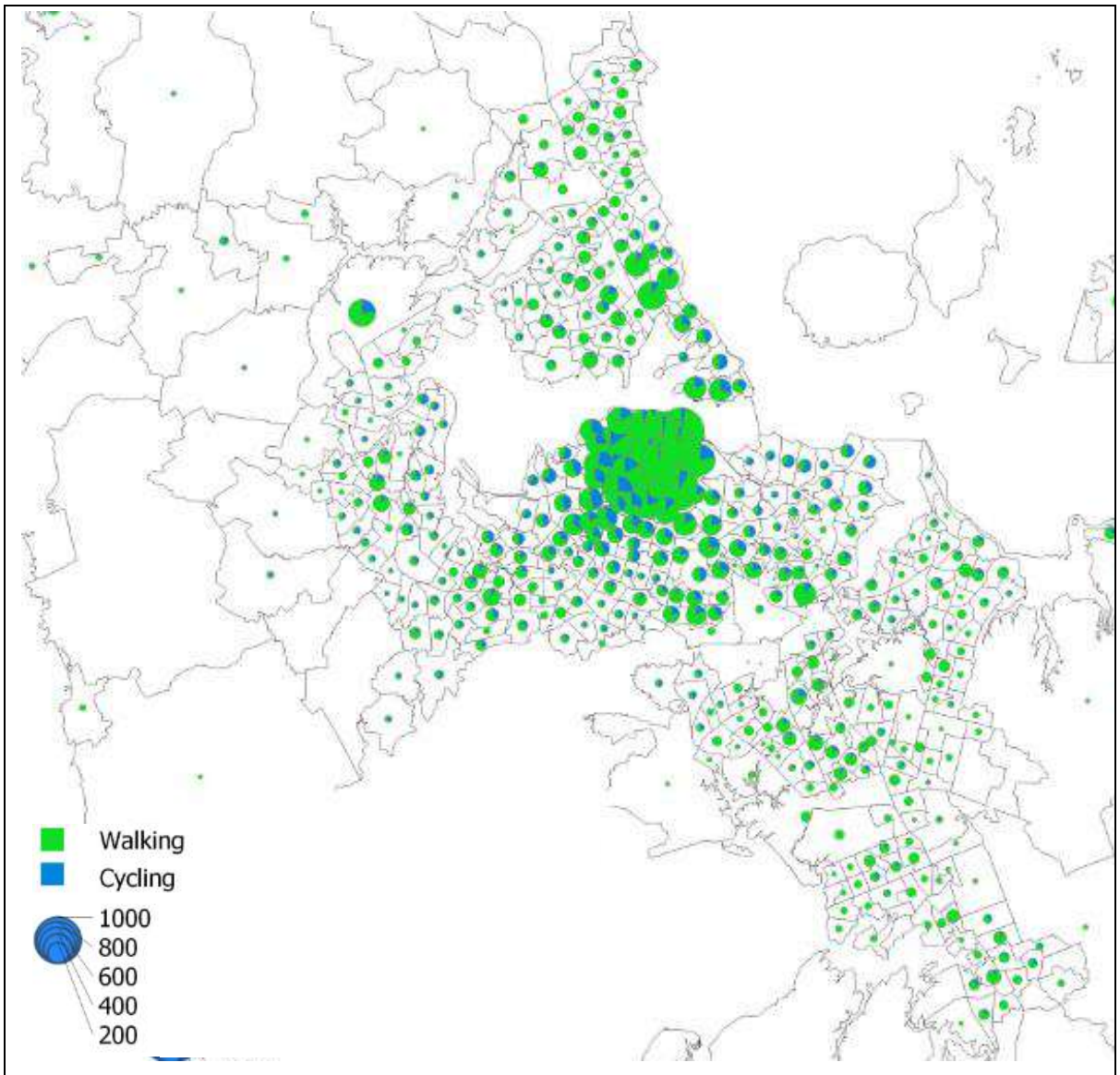


Figure 18.8
Commuting by active modes by origin

The position for cycling is set out in Figure 18.9. It should be noted that because of the issues with the data, no information is available on the smaller cycling movements which may in total be significant.

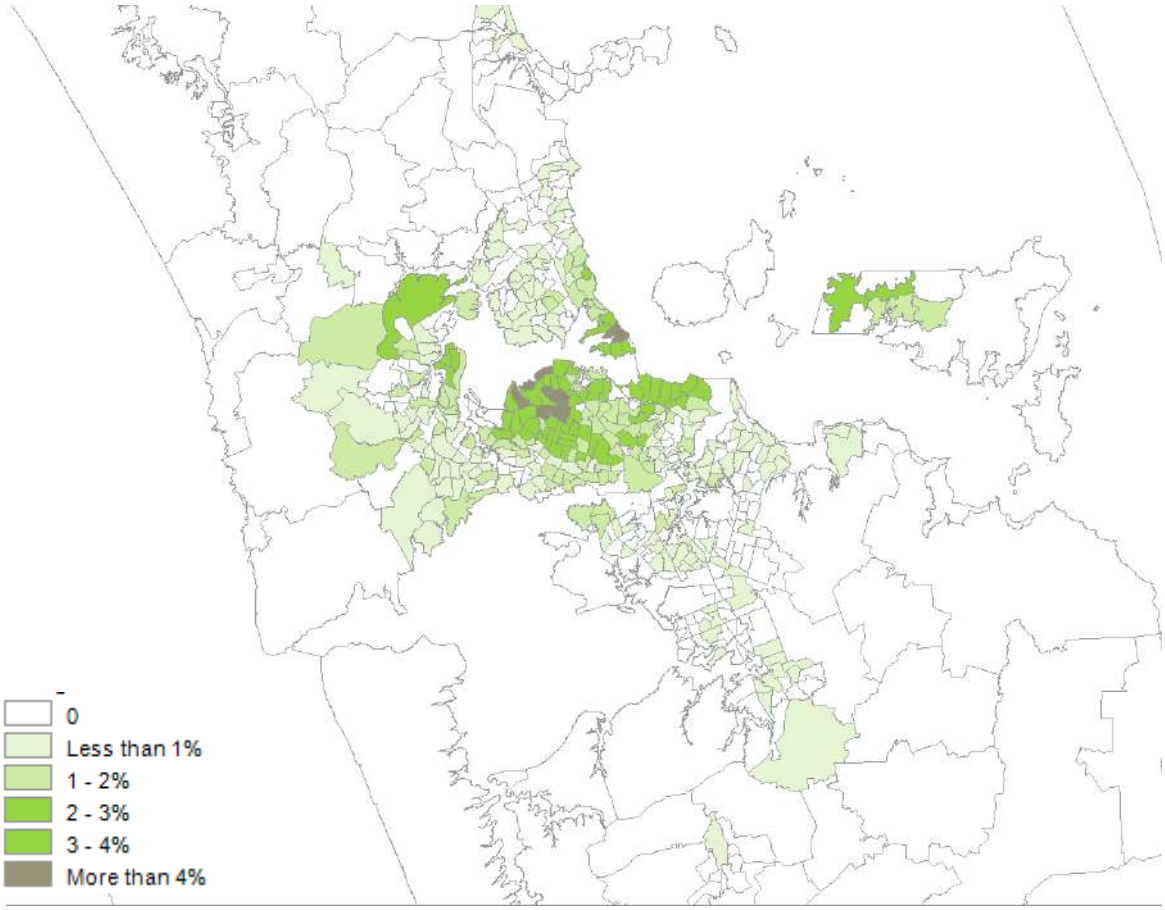


Figure 18.9
Cycling mode shares by origin (per cent of total trips)

The use of cycles, while generally low. is relatively high in central areas and on Isthmus to the south west of central area, again possibly reflecting the Northwestern Cycleway. It is also high in the areas along Tāmaki Drive, a potential testament to the cycling facilities along that route, and in Devonport and the areas immediately to north and also in Whenuapai and Te Atatu.

The use is typically very low to south of Māngere Inlet, although there is some limited use in and around Māngere Bridge.

18.2.8 Work at home

The share of work at home movements is set out in Figure 18.10.

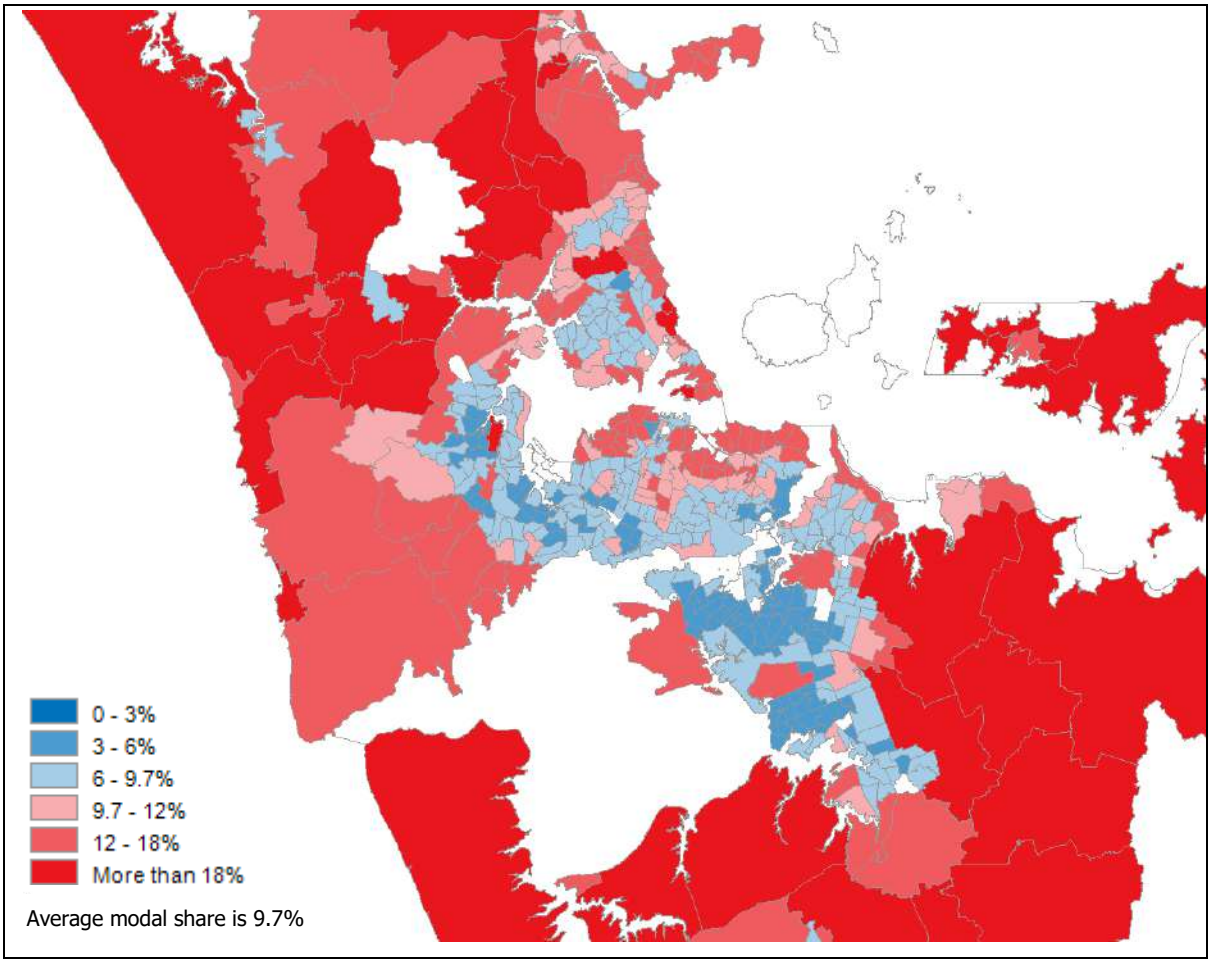


Figure 18.10
Work at home (per cent of total trips)

The key findings about work at home movements include:

- High proportions of those working at home in the more peripheral rural areas
- There are also relatively high proportions in areas bordering the Waitematā Harbour and the Hauraki Gulf, with a clear difference between the coastal zones and more inland areas
- There are low proportions south and west of the Isthmus, particularly in the corridor between Māngere and Papakura. This probably reflects the socio-economic characteristics of those living in the area, with high proportions working in manual or blue-collar occupations, where the opportunities for working at home are very limited.

18.2.9 Overall assessment of movement patterns

The key findings from the assessment of the movement patterns at a detailed level include:

- In general, the private car modal share is low for residents in the central area, where trips lengths are often short reflecting the available and substantial local employment opportunities, and where public transport and active modes provide attractive alternatives. With increasing distance away from the centre, the share of private cars for the journey to work increases as trips become longer and trip patterns become more dispersed. In addition, for journeys from areas further away from the centre, the availability of parking for local movements increases and its costs as a proportion of the total trip cost also falls, making it less of a disincentive for longer movements.
- Private car use is particularly high in areas to the south and west of the Isthmus. The particular patterns of commuting by residents of this area, often towards employment in areas that are often not well served by public transport, means that car travel is the more attractive option.
- Public transport use is typically high across the Isthmus and on the North Shore, reflecting the investment in improved services, particularly in the Northern Busway and in rail services south of the Waitematā Harbour. Patronage is low to the south of the Isthmus and away from the rail corridor to the west,
- As a proportion of the total public transport market including train and ferry, the bus share is relatively low in the more peripheral areas to the west and south. This reflects the availability of rail which typically provides a more attractive option for the longer journeys from these areas. Bus shares are also low in the immediate vicinity of the rail stations across the Isthmus.
- While rail use is concentrated in those areas adjacent to the rail line and stations, there are considerable numbers of rail users travelling from localities away from the rail corridor itself taking advantage of the fast and reliable connections into the central area.
- Similarly, while the users of ferries are focussed on locations adjacent to the ferry terminal, there are substantial numbers of trips coming from further afield to take advantage of the direct and uncongested services into the central area.
- Active mode trips by origin are largely focussed on the central areas, reflecting the number of employment opportunities close at hand. Active mode use is also relatively high for trips from areas to the west and south-west. This possibly reflects in part the availability of the Northwestern Cycleway, providing good and attractive access into the central area. The use of active modes is also high in Takapuna, Devonport and Albany on the North Shore, in New Lynn and Henderson to the west and in Pukekohe to the south. These probably reflect the availability of a range of employment opportunities close to the origins of the journeys.

18.3 Trip lengths

As discussed above there are significant issues with determining reliable trip lengths. However, to give an idea of the possible patterns for commuting journeys across the region, estimates of average trip distances are set out in Figure 6.1 which shows the pattern for total trip making by residential area, and in Figure 18.12 which shows the position by destination. These both exclude the position for Waiheke and the Gulf Islands for which no information is available. It is emphasised that these results should be regarded as illustrations of the general position, rather than precise estimates.

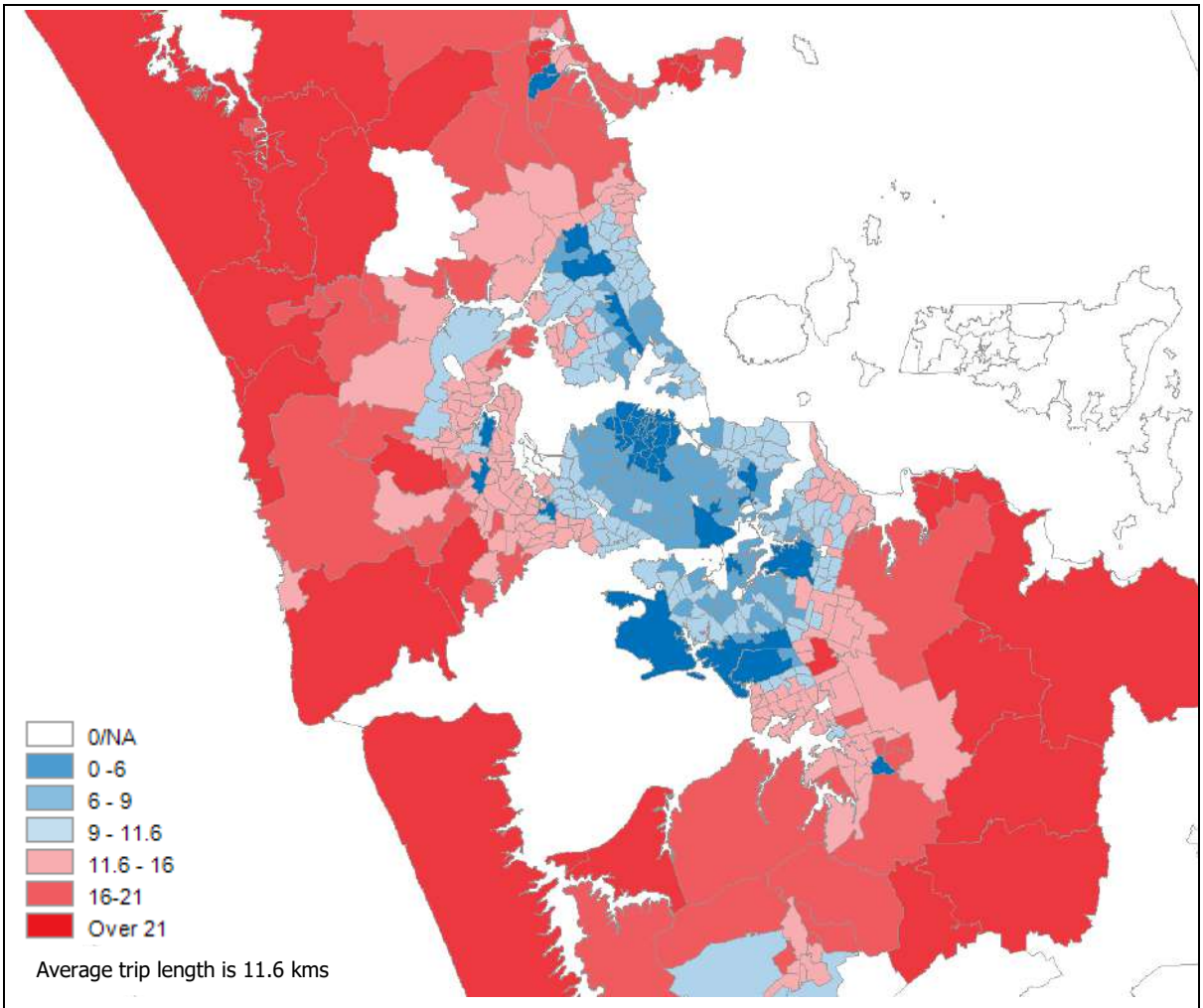


Figure 18.11
Average trip length by origin (kms)

In general, travel distances by trip origin increase with distance away from the central area. However, these are also low for the main industrial areas such as Highbrook/East Tāmaki, North Harbour, Wairau Valley and the airport. For these areas a high proportion of residents would have employment related to the area, giving low average travel distances but, the numbers of these residents would only be very small.

Average trip distances by destination are set out in Figure 18.12. Again, these should be regarded as illustrative rather than precise. It should also be noted that, for a number of areas, there were no trips recorded as having destinations.

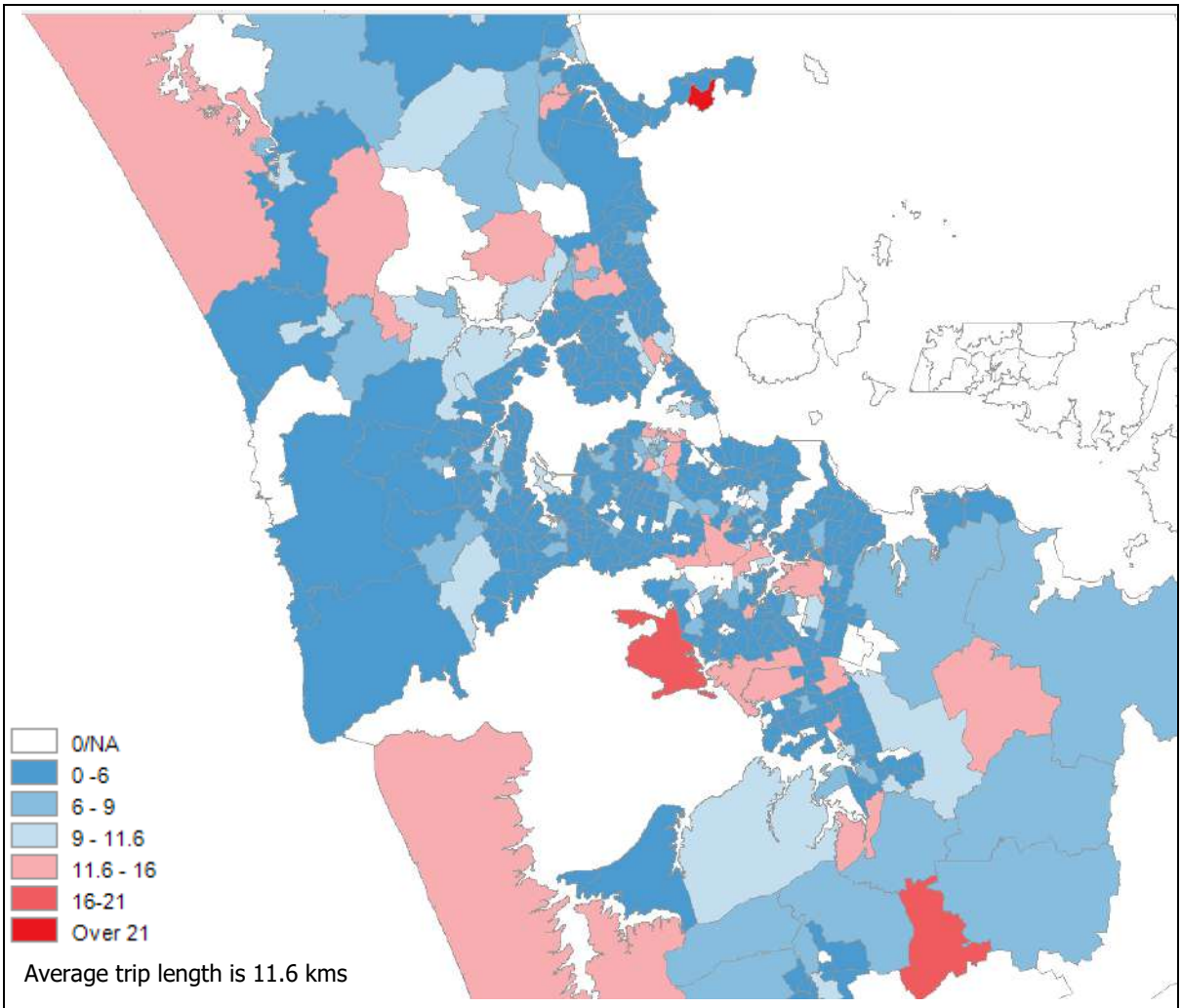


Figure 18.12
Average trip lengths by workplace (kms)

Travel to work distances by destination are typically below the regional average in relation to trips for all but the major centres. For these, the relatively high wages and demands for labour mean that workers are attracted from wider areas. This is the case for example for Albany, North Harbour, Smales Farm, Onehunga/Penrose/Mt Wellington, Highbrook, the airport and Wiri. Within the central core, trip lengths are longest for the areas served by rail, including the northern fringe, and Parnell and Newmarket. Because of the substantial numbers employed in these main centres, their impact on the average trip length is large. This balances out the low average trip lengths for the large number of other areas with small numbers of workers.

19 Journeys to work for selected employment areas

Key findings

- Private cars and public transport have similar modal shares for commuting to the City Centre/Central City at about 44 per cent and 40 per cent respectively. The active mode share is 14 per cent, primarily made up of walking trips
- Although trips to the City Centre come from across the region, their source is very much focussed on the City Centre itself and its fringes. There is also a fairly high level of trip making across the Waitematā Harbour from the southern part of the North Shore
- For the other selected employment areas, the dominant mode for trips to these areas is private car which, in the majority of cases, is over 90 per cent. The main exception to this is Newmarket where the share is 77 per cent (but still above the regional average of 73 per cent)
- The public transport share is typically 4 per cent or less, except for Newmarket (20 per cent), and Takapuna (8 per cent)
- Active mode shares are typically 3 per cent or less, except for Newmarket (6 per cent), and Takapuna (4 per cent)
- Travel distances are typically higher for car users than for users of public transport; in a number of cases, more than twice as long.

19.1 Introduction

In addition to the more area wide analysis described above, the travel patterns to select key employment areas have also been examined. The employment areas considered in this way comprise of:

- Central City/City Centre
- North Harbour
- Takapuna/Westlake
- Henderson
- Newmarket
- Onehunga/Penrose
- Ellerslie West
- Highbrook/East Tāmaki
- Manukau Central
- Airport
- Botany

The locations of these are set out in Figure 19.1

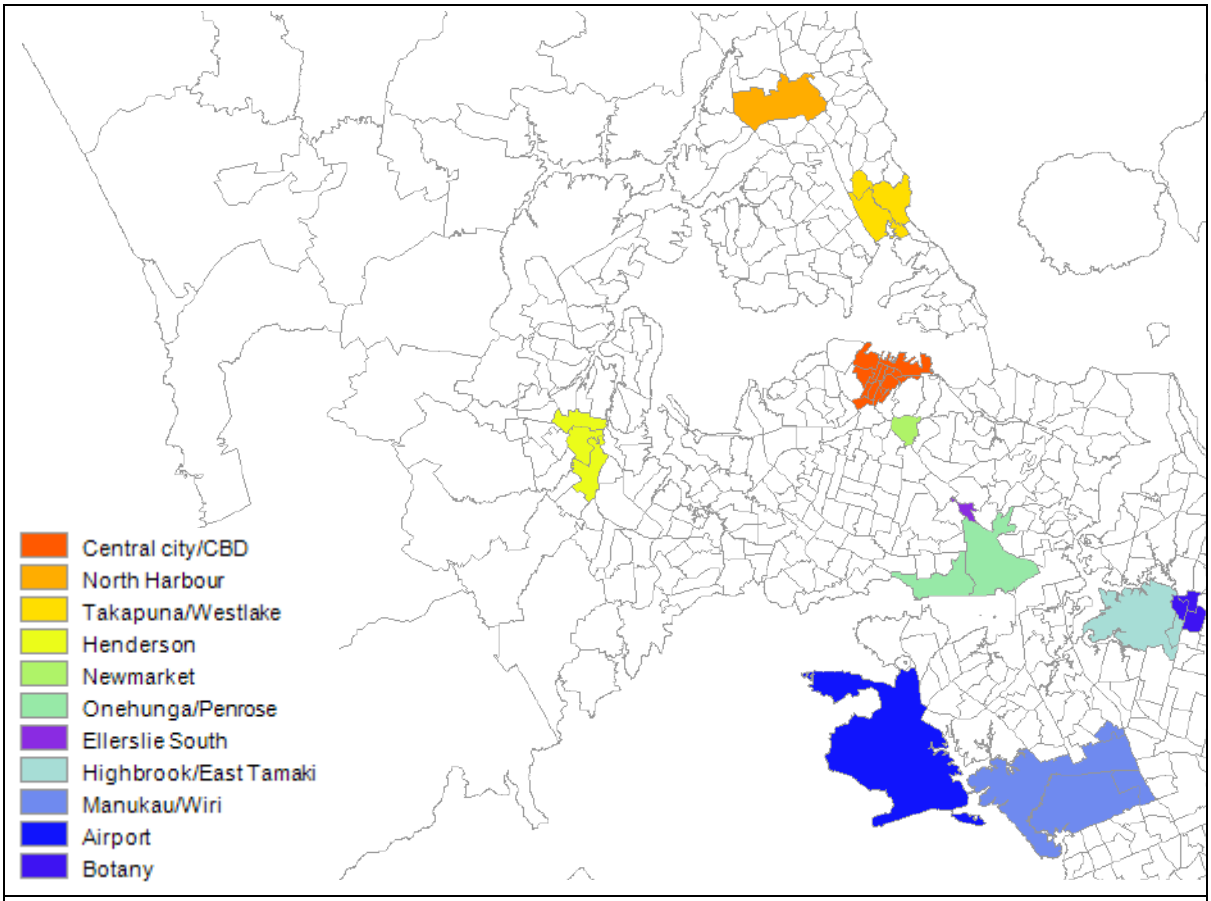


Figure 19.1
Locations of selected employment areas

In total, these account for about 270,000 journeys to work, or 36 per cent of the regional total.

The total journeys for each of these is set out in Table 19.1.

Table 19.1
Total commuting trips to the selected employment centres 2018

Employment area	Total trips	Per cent of regional total
City Centre/Central City	89,553	13.2%
North Harbour	22,692	3.4%
Takapuna/Westlake	16,353	2.4%
Henderson	8,946	1.3%
Newmarket	14,301	2.1%
Onehunga/Penrose	31,236	4.6%
Ellerslie South	8,400	1.2%
Highbrook/East Tāmaki	22,800	3.4%
Manukau Central	25,836	3.8%
Airport	22,410	3.3%
Botany	7,083	1.0%

Total	**269,610**	**36.2%**

It should be noted that, although these areas have been matched as closely as possible to those defined for earlier work, because of the changes in the zoning structure comparisons with earlier results may not be reliable.

19.2 Central City/City Centre

In 2018, employment in the City Centre accounted for about 13 per cent of total journeys to work. The sources of workers commuting to the City Centre measured in terms of the share of workers residing in a zone who commute to the City Centre is set out in Figure 19.2.

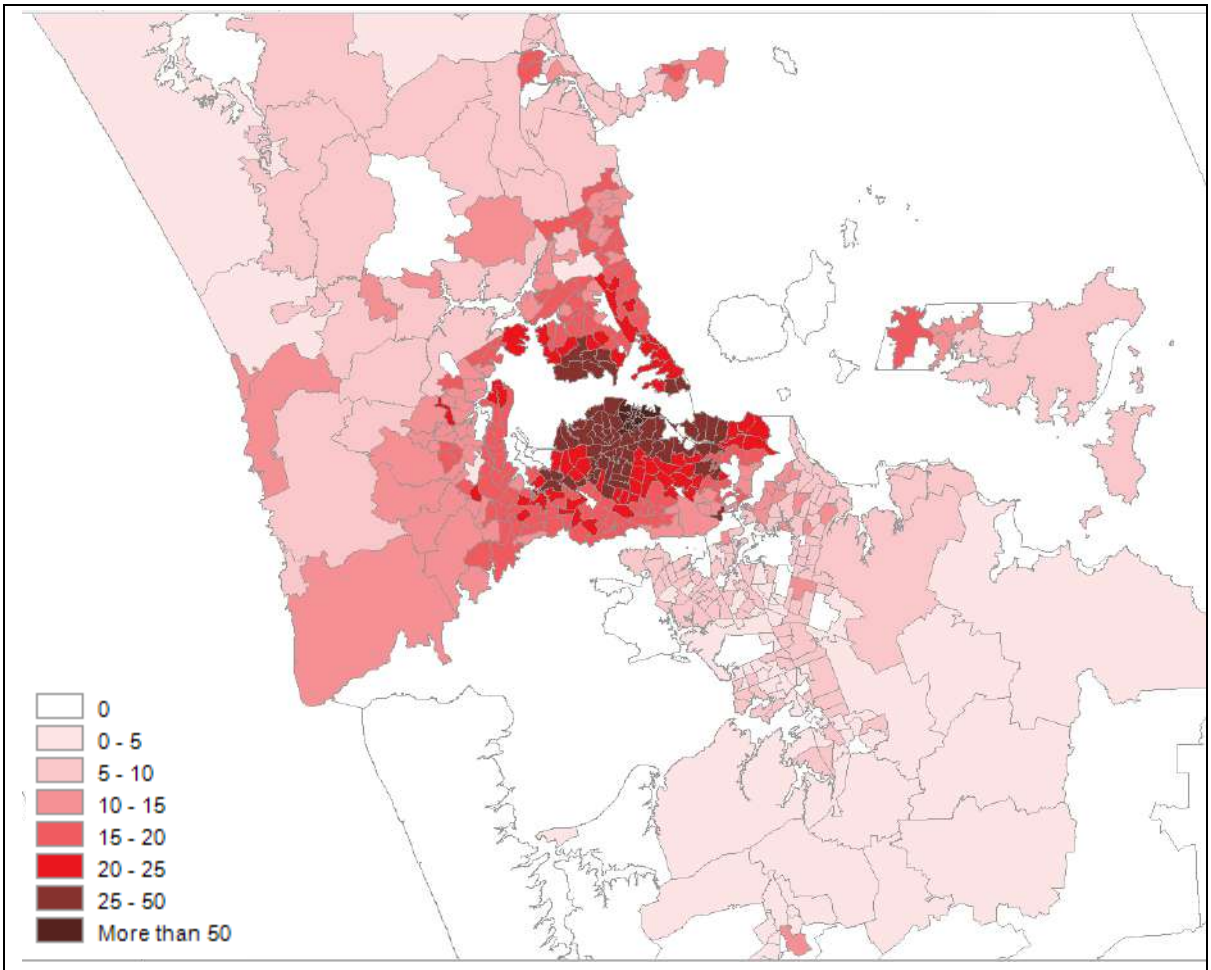


Figure 19.2
Journeys to work to the City Centre 2018 (per cent of area totals)

In general, this shows a pattern of a diminishing share of travel to the Central City/City Centre as distance increases, but with relatively high shares along the coast in the North Shore particularly Birkenhead and Devonport which have good ferry connections and out to the west. South of the Māngere Inlet, the shares commuting to the City Centre are relatively low.

The modal shares for commuting to the Central City are set out in Table 19.2.

Table 19.2
Modal shares for commuting trips to the Central City/City Centre 2018

Mode	Total trips	Per cent of total	Regional modal shares
Work at home	1,347	2.1%	9.7%
Private car driver	27,564	43.4%	59.1%
Company car driver	123	0.2%	10.3%
Car passenger	69	0.1%	3.8%
Total car	**27,756**	**43.7%**	73.2%
Bus	17,679	27.8%	7.1%
Train	5,514	8.7%	3.0%
Ferry	2,259	3.6%	0.7%
Total PT	**25,452**	**40.1%**	10.7%
Walk	8,400	13.2%	4.2%
Cycle	447	0.7%	1.0%
Total active	**8,847**	**13.9%**	**5.2%**
Other	117	0.2%	1.2%
Total included	**63,519**	**100.0%**	**100.0%**
Total not by mode	89,553		

The city centre has very high shares of public transport and active modes, balanced by a lower car share. In total, about 45 per cent of commuters to the Central City use private cars, 40 per cent use PT, and almost 15 per cent walk or cycle. This compares to the regional averages of 75 per cent for cars, 10 per cent for public transport, and 5 per cent for active modes. The shares of company cars and car passengers are also very low. This latter is a possible reflection of the good public transport services to the central city, as well as the prevalence of irregular working hours making car sharing more difficult. The City Centre also has a relatively low share of workers working at home, 2.1 per cent compared to the regional total of 9.7 per cent.

Of the PT users, bus use accounts for about 25 per cent of total journeys to the City Centre and train use for 10 per cent, with the balance of 4 per cent using ferries.

The pattern of trip making to the Central City is set out in Figure 19.3.

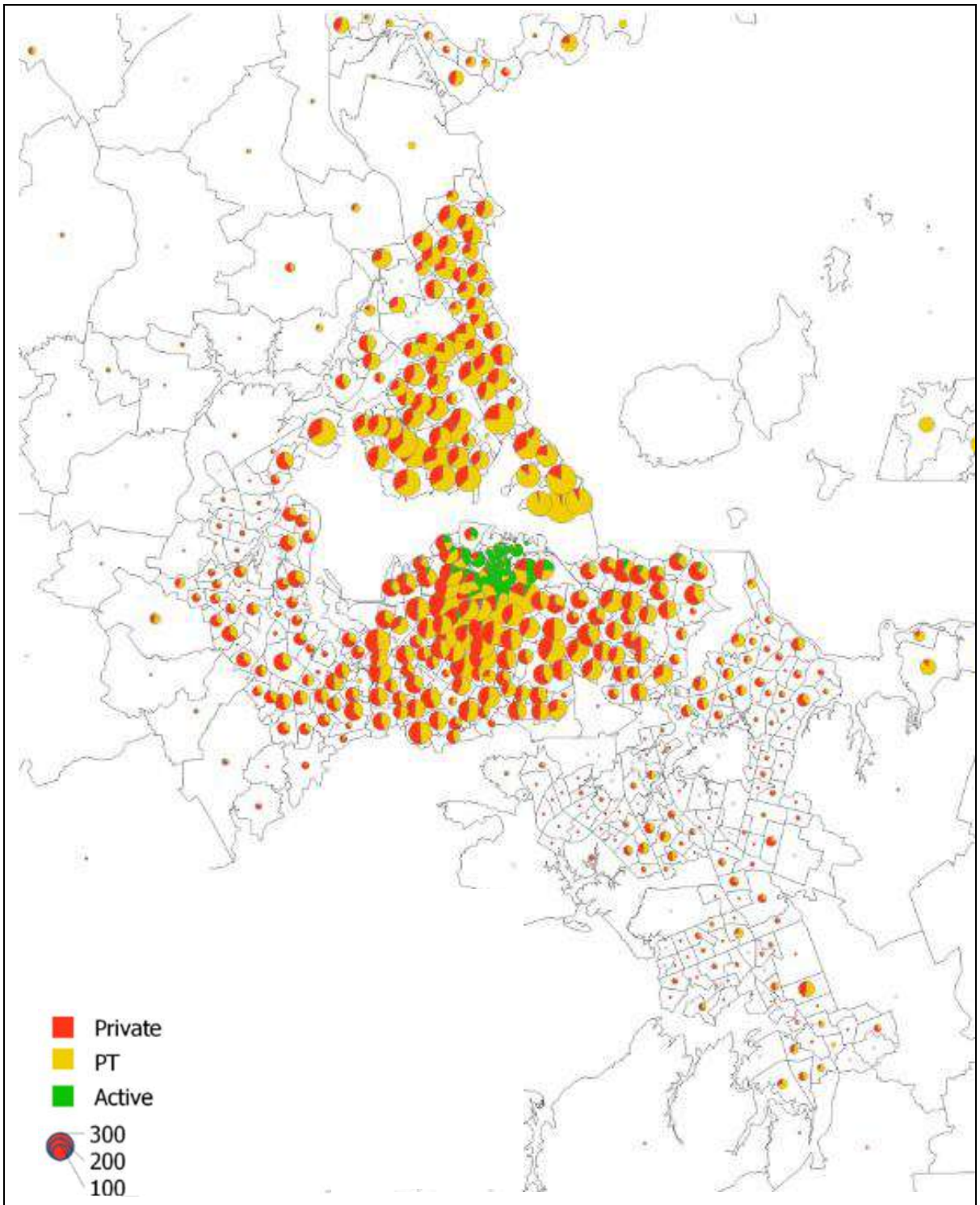


Figure 19.3
Modal shares for trips commuting to the Central City/City Centre

19.3 Trip making to other selected employment areas

19.3.1 Modal shares

In addition to the city centre, travel patterns been examined for commuters to a number of other major employment areas across the region.

The modal shares for these are set out in Table 19.3 for the areas as a whole, and in Table 19.4 and Table 19.5 for each of the areas selected. The modal shares are, however, affected by the confidentiality constraints which result in the exclusion of small movements into the areas being examined. While this affects all modes, from the analysis of the overall position, it is likely to have particular impact on rail and cycling journeys and, as a result, the reliability of the mode shares estimated for these trips. This impact also precludes any reliable comparison with the results for previous years.

Table 19.3
Modal shares for commuting trips to other employment centres (excluding City Centre) 2018

Mode	Total trips	Per cent of total
Work at home	1,734	1%
Private car driver	120,336	82%
Company car driver	15,489	10%
Car passenger	2,871	2%
Total car	**138,696**	**94%**
Bus	3,393	2%
Train	1,500	1%
Total bus and train	4,893	3%
Ferry	51	0%
Total PT	**4,944**	**3%**
Walk	2,034	1%
Cycle	75	0%
Total active	**2,109**	**1%**
Other	57	0%
Total included	**147,540**	**100%**

Table 19.4 Modal shares for commuting trips to individual employment centres 2018 -North and west					
	North Harbour	**Takapuna/ Westlake**	**Henderson**	**Newmarket**	**Onehunga/ Penrose**
Total trips (1)	20,505	13,374	8,946	14,301	31,236
Work at home	0%	4%	3%	2%	0%
Private car driver	77%	83%	84%	69%	78%
Company car driver	18%	1%	7%	2%	18%
Car passenger	1%	0%	3%	0%	1%
Total car	97%	84%	93%	72%	98%
Walked	1%	4%	2%	6%	1%
Cycle	0%	0%	0%	0%	0%
Total active	1%	4%	2%	6%	1%
Bus	2%	8%	1%	11%	0%
Train	0%	0%	1%	8%	1%
Ferry	0%	0%	0%	0%	0%
Total PT	2%	8%	2%	20%	1%
Other	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%

Notes (1) Sum of individual modes

Table 19.5 Modal shares for commuting trips to individual employment centres 2018 -South and east					
	Ellerslie South	**Highbrook/ East Tāmaki**	**Manukau Central**	**Airport**	**Botany**
Total trips (1)	5,823	20,532	21,552	19,377	1,461
Work at home	0%	1%	1%	0%	16%
Private car driver	91%	80%	85%	91%	79%
Company car driver	2%	16%	9%	4%	0%
Car passenger	0%	2%	4%	4%	2%
Total car	93%	99%	97%	98%	81%
Walked	3%	0%	1%	0%	3%
Cycle	0%	0%	0%	0%	0%
Total active	3%	0%	1%	0%	3%
Bus	1%	0%	1%	1%	0%
Train	3%	0%	0%	0%	0%
Ferry	0%	0%	0%	0%	0%
Total PT	4%	0%	1%	1%	0%
Other	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%

Notes (1) Sum of individual modes

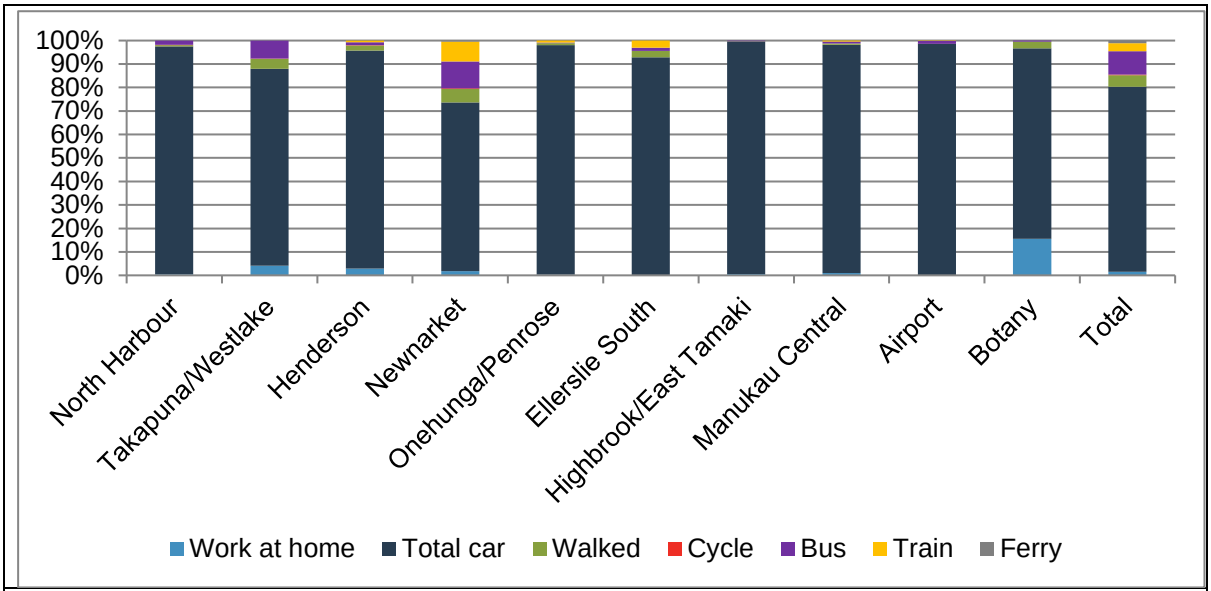


Figure 19.4
Modal shares for journeys to work for selected employment centres

The key findings in respect of the other identified employment areas include:

- With the exception of Newmarket, the private car share of trips to the major employment areas identified is above 80 per cent, and for most of the areas is above 90 per cent.
- The car passenger modal share varies widely, with the highest values for movements to Manukau Central, the airport and Henderson. For the mainly commercial centres of the City Centre, Newmarket, Takapuna and Ellerslie, the share is much lower at about 0 per cent. This possibly reflects the different nature of employment in these areas, with a greater focus on part-time and flexible working hours which makes car sharing more difficult and may also reflect the socio-economic characteristics of the workers in these areas.
- With the exception of Newmarket, Takapuna and Ellerslie, the public transport share is at 2 per cent or less. In many cases, this reflects both the nature of the employment with shift working or early starting and the physical layout of the areas. Public transport often struggles to provide good access to the places of work, often located on rights of way away from the main routes and may also not link well with the areas where commuters live.
- At Newmarket, there is a relatively high share by rail (8 per cent of the total) as well as by bus (11 per cent of the total). Rail accounts for 3 per cent of the journeys to Ellerslie South, but here the bus share is relatively low at just 1 per cent. Rail shares elsewhere are very small.
- The active mode shares are very low, except for Takapuna and Newmarket. Again, this may reflect the nature of employment, as well as the distances over which workers are able to be drawn. The relatively high wages permit longer distance commuting for which active modes are not generally attractive.

- The share of working at home are also very low for all areas except Botany. This reflects the small numbers living in these areas and the relatively low amenity for many of these locations.

19.4 Travel distances

The average distances travelled to each of the selected employment areas are set out in Table 19.6 and Figure 19.5. As noted earlier, these results should be regarded as illustrative rather than precise.

Table 19.6
Travel distances for commuting trips to selected employment areas

Destination	Mode		
	Average all modes	**All car users**	**All PT users**
Central city/City Centre	11.3	14.1	12.2
North Harbour	15.6	15.9	8.4
Takapuna/Westlake	11.9	13.3	8.4
Henderson	8.3	8.8	4.6
Newmarket	11.7	13.3	10.1
Onehunga/Penrose	15.0	15.2	11.5
Ellerslie South	12.8	13.2	11.4
Highbrook/East Tāmaki	13.8	13.9	5.7
Manukau Central	13.2	13.9	10.3
Airport	18.4	18.6	11.5
Botany	9.5	9.9	6.9
Region	**11.6**	**12.2**	**11.4**

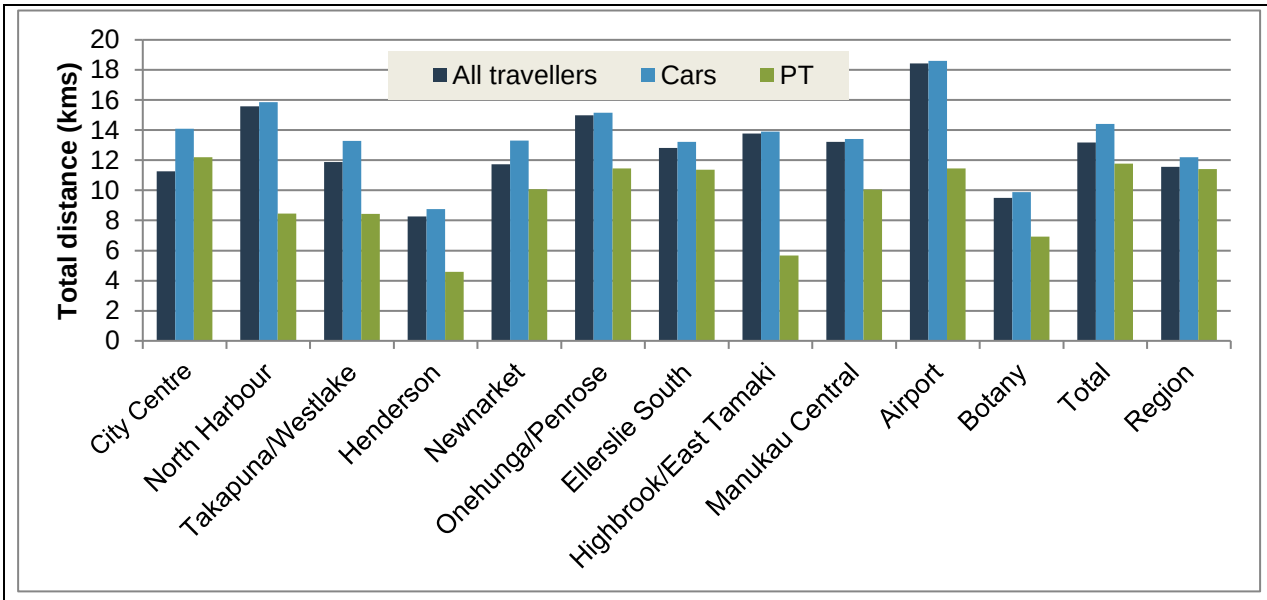


Figure 19.5
Average commuting distances to selected employment areas 2018

Trip distances are typically above those for the region as a whole, demonstrating the ability of these major employment areas to draw workers from wide areas. The longest distances are to the airport, which reflects the distance of the main employment areas from the surrounding residential locations; and to North Harbour which, because of its location on the major routes in the area, is particularly well placed to attract workers from large parts of the north and west.

By contrast, average trip distances to the City Centre are much lower at about 11 kms. While this area, with its well-paid employment, has the potential to draw labour from wider areas, there is a very substantial pool of workers closer at hand within the Isthmus who have relatively short travel distances. The average distance for PT users is, however, higher than for the other employment areas signalling the importance of the relatively high-speed rail and busway network in serving the needs of the area.

20 Journeys to work from selected residential areas

Key findings

- The very high share of active mode trips for journeys from the Central City. The shares for active modes for Newmarket and Westlake/Takapuna are also relatively high.
- The high share of public transport users for trips from Newmarket and, to a lesser extent, from Westlake/Takapuna, New Lynn, Stonefields and the Central City. The recent figure for Stonefields contrasts with the very low figure recorded for 2013 but includes a substantial share by rail. There are particularly low shares of public transport users in the relatively newly developing areas of Westgate and Dannemora, together with Pukekohe and Māngere
- Work at home shares are relatively high for coastal areas such as Orewa, Silverdale/Millwater Takapuna/Devonport and Hingaia/Karaka. They are relatively low in Addison, Māngere and New Lynn.
- Car shares vary from 8 per cent for trips from the Central City, and 35 per cent in Newmarket, to almost 90 per cent in Māngere and over 80 per cent in many of the areas in the south including Dannemora, Addison, Papakura and Pukekohe.
- The share of car passengers is particularly high for Māngere.
- For the trips from the selected areas, the average commuting distance by public transport is often much higher than that for car users. This is particularly the case for areas to the north and south of the region where public transport trip lengths are typically twice those of private car users, reflecting the use of public transport to commute to the more distant central area.

20.1 Introduction and areas considered

In addition to the examination of the movements to the selected employment areas, an analysis has also been undertaken of the movements from a range of locations across the region. This covers a cross-section of different types of residential areas, comprising:

- Central City/City Centre
- Orewa
- Silverdale/Millwater
- Albany
- Westlake/Takapuna
- Hobsonville
- Henderson
- New Lynn
- Westgate
- Stonefields
- Newmarket
- Dannemora
- Hingaia/Karaka
- Papakura
- Pukekohe
- Addison (Takaanini South)

These are set out in Figure 20.1

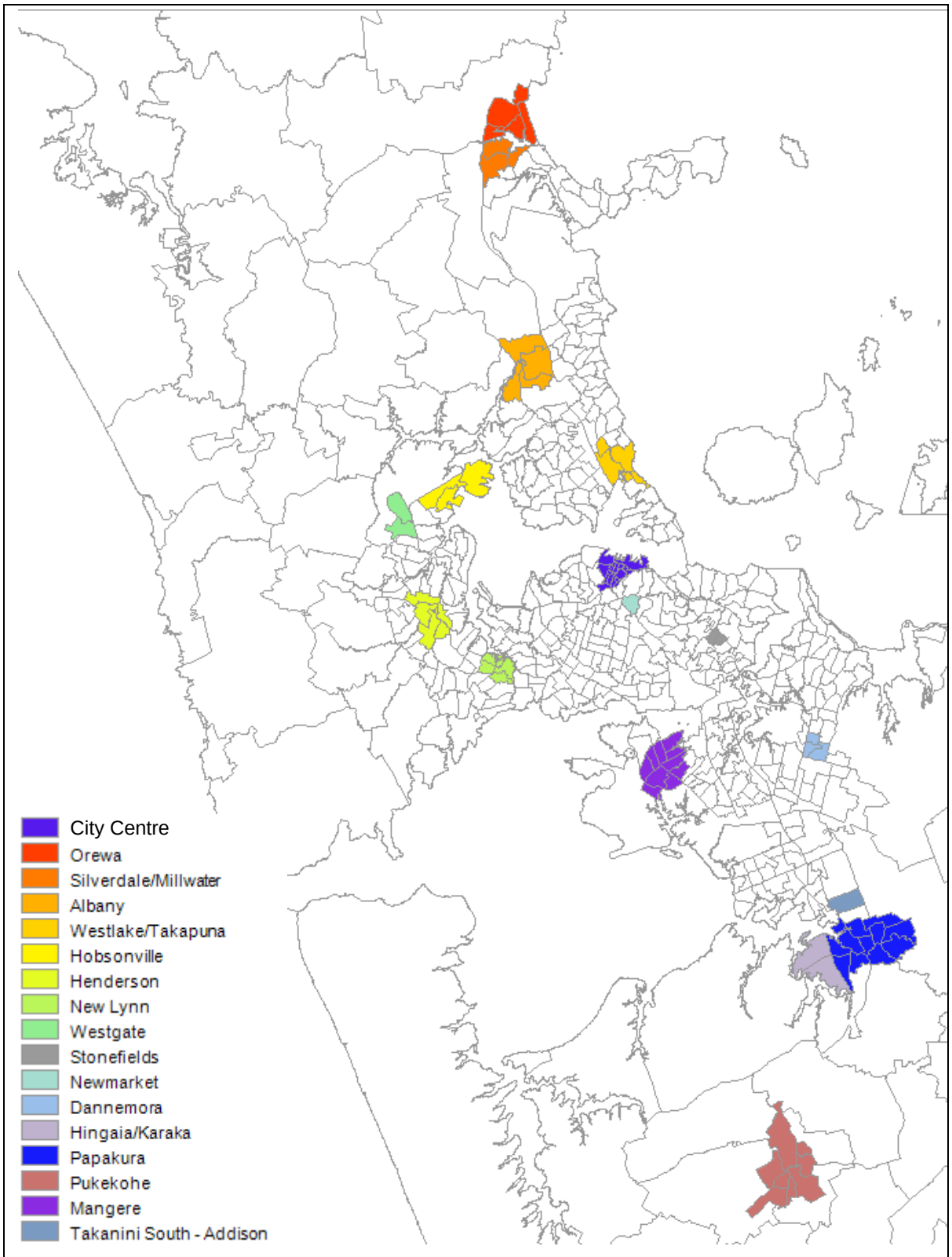


Figure 20.1
Selected residential areas

20.2 Mode shares

The number of trips and modal shares for each of the selected origin areas are set out in Table 20.1, and the modal shares are summarised in Figure 20.2.

Table 20.1
Total trips and modal shares for selected origin areas 2018

Origin area	Total trips identified	Modal shares				
		Worked at home	**Total car user**	**Total PT user**	**Total active mode**	**Other**
Central City	10,710	12.6%	7.9%	13.1%	66.5%	0.0%
Orewa	2,829	22.0%	70.1%	3.5%	4.5%	0.0%
Silverdale/Millwater	2,427	20.1%	71.3%	7.9%	0.6%	0.0%
Albany	2,805	17.3%	70.7%	8.6%	3.4%	0.0%
Westlake/Takapuna	3,309	20.5%	51.3%	15.3%	12.9%	0.0%
Hobsonville	2,844	18.5%	70.5%	10.3%	0.7%	0.0%
Henderson	2,568	14.4%	75.9%	4.3%	5.4%	0.0%
New Lynn	2,163	10.7%	71.0%	13.7%	4.6%	0.0%
Westgate	348	18.1%	78.4%	1.7%	1.7%	0.0%
Stonefields	1,284	18.5%	69.2%	12.4%	0.0%	0.0%
Newmarket	1,332	15.3%	35.4%	26.1%	23.2%	0.0%
Dannemora	2,622	13.3%	85.6%	0.9%	0.2%	0.0%
Hingaia/Karaka	1,152	21.4%	75.0%	3.6%	0.0%	0.0%
Papakura	8,085	12.1%	83.0%	3.6%	1.2%	0.1%
Pukekohe	5,364	13.5%	82.4%	0.5%	3.6%	0.0%
Māngere	6,828	9.0%	89.6%	0.8%	0.6%	0.0%
Addison (Takaanini South)	1,494	9.2%	83.3%	7.0%	0.4%	0.0%
Total selected areas exc City Centre	**47,454**	**14.6%**	**76.1%**	**5.9%**	**3.3%**	**0.0%**
Region (1)	435,492	16.5%	71.3%	7.7%	4.5%	0.1%

Notes (1) To give the best comparison the regional figures are derived from the same analysis as was used to produce the totals for the individual selected areas. This results in a considerable loss of data compared to the full position but provides a better comparator for the numbers in this table. See Section 2 for a discussion of the data issues.

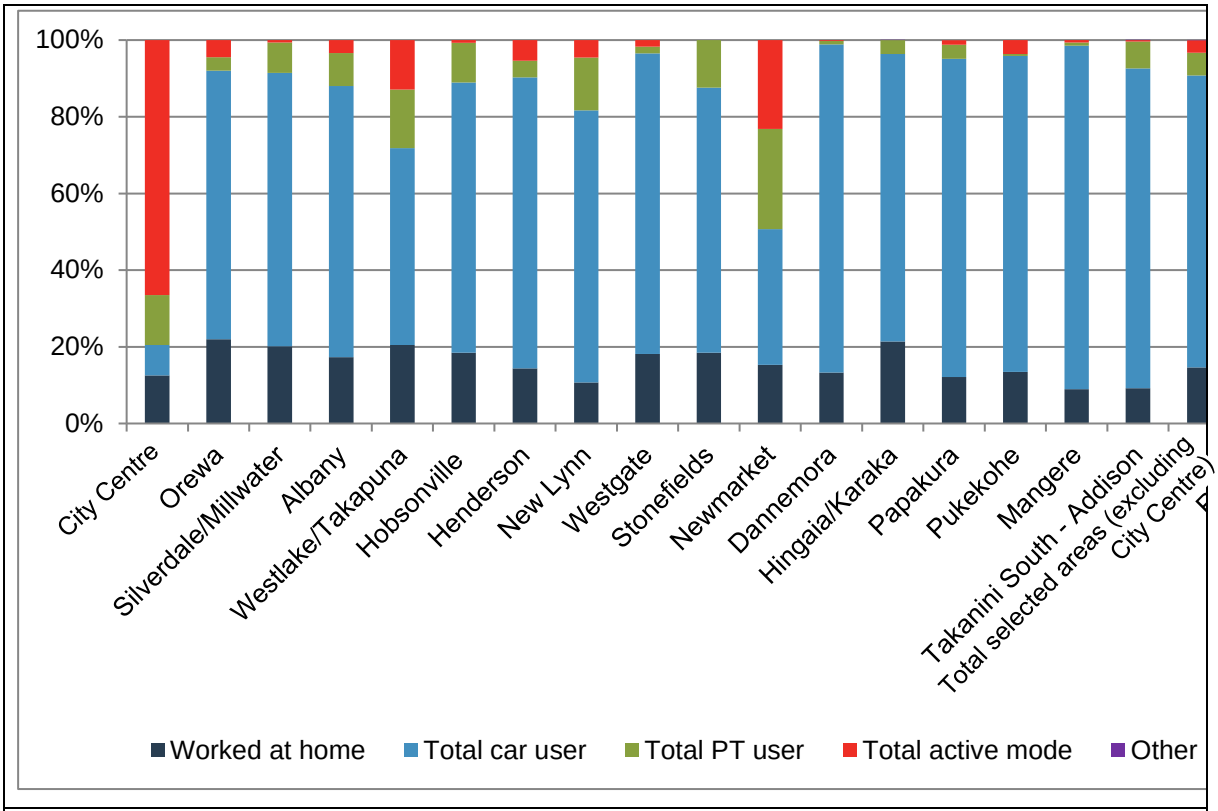


Figure 20.2
Modal shares for selected origin areas 2018

To give a clearer representation of the modal shares, these are set out separately in Figure 20.3 to Figure 20.7.

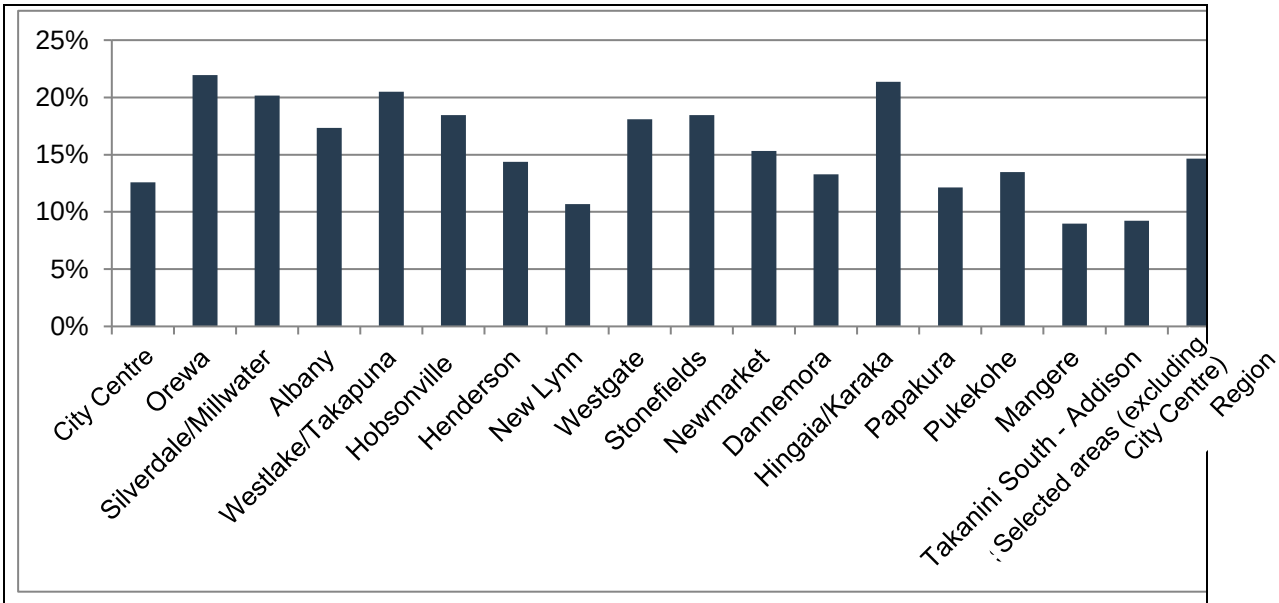


Figure 20.3
Modal shares for selected origin areas - worked at home

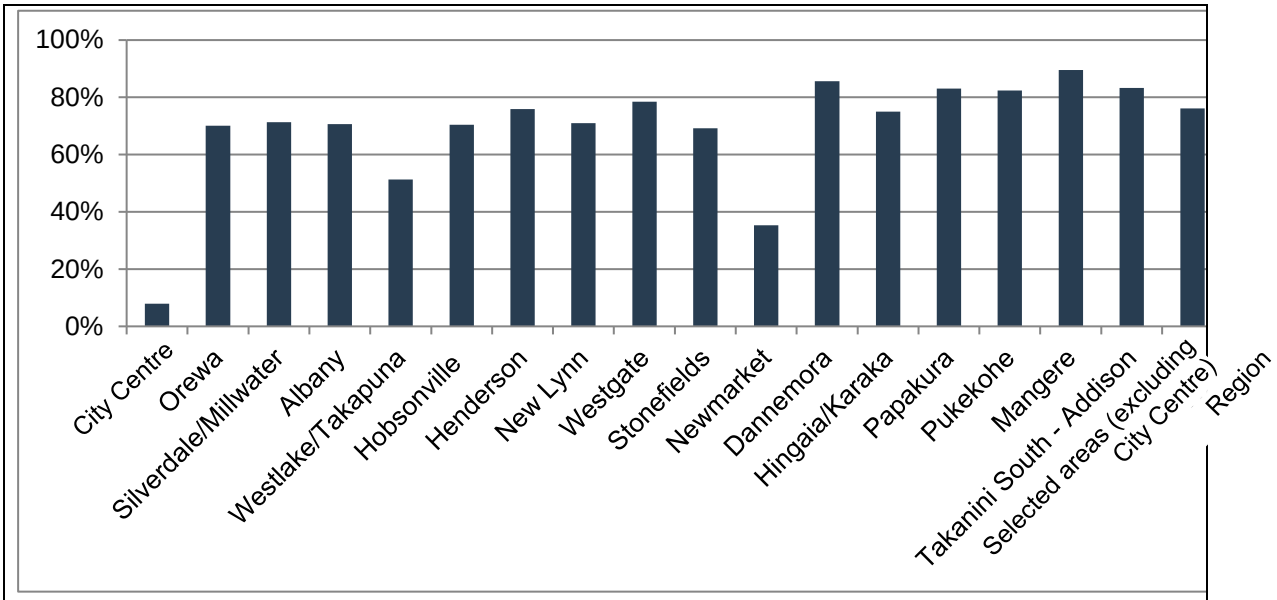


Figure 20.4
Modal shares for selected origin areas - total car users

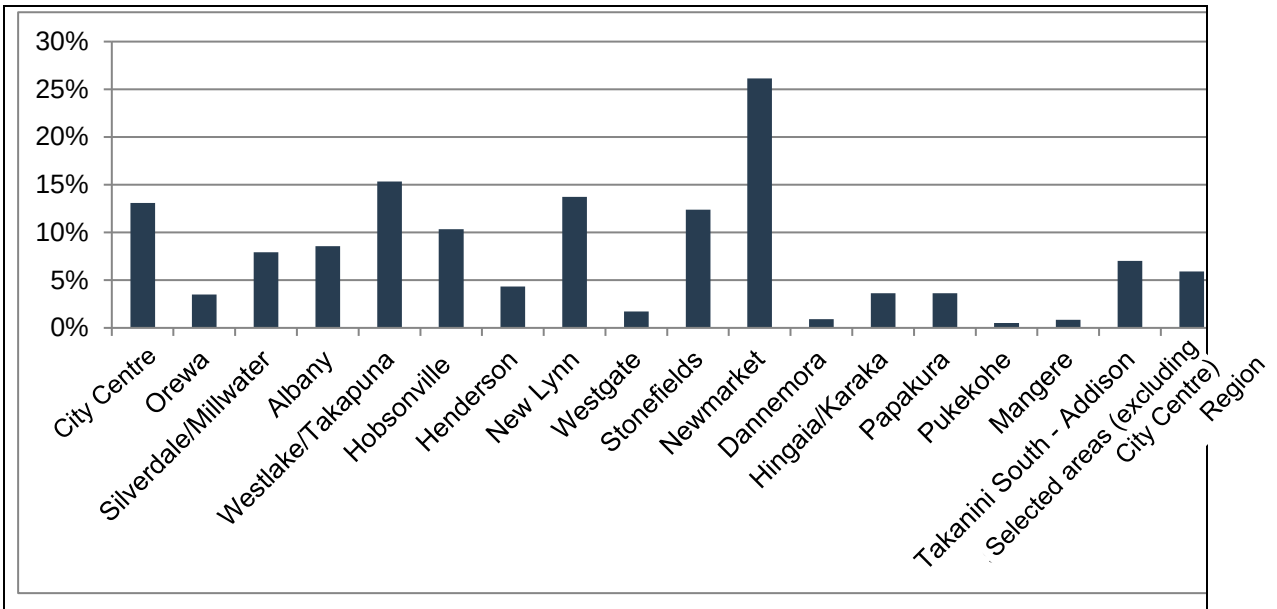


Figure 20.5
Modal shares for selected origin areas - total public transport users

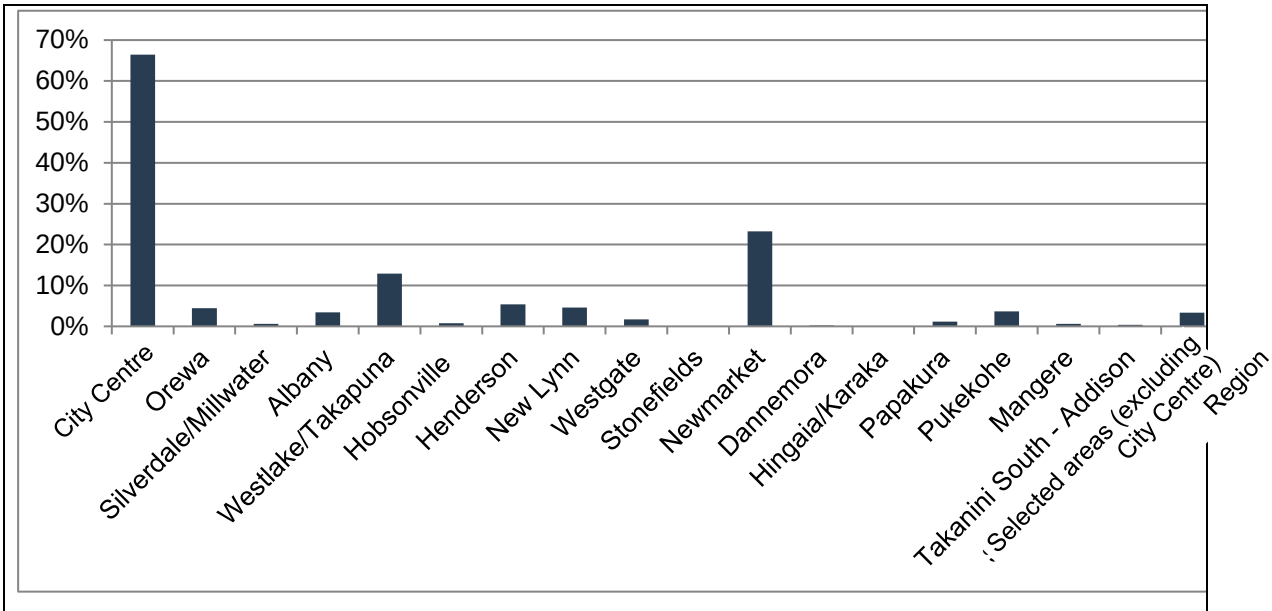


Figure 20.6
Modal shares for selected origin areas - total active mode commuters

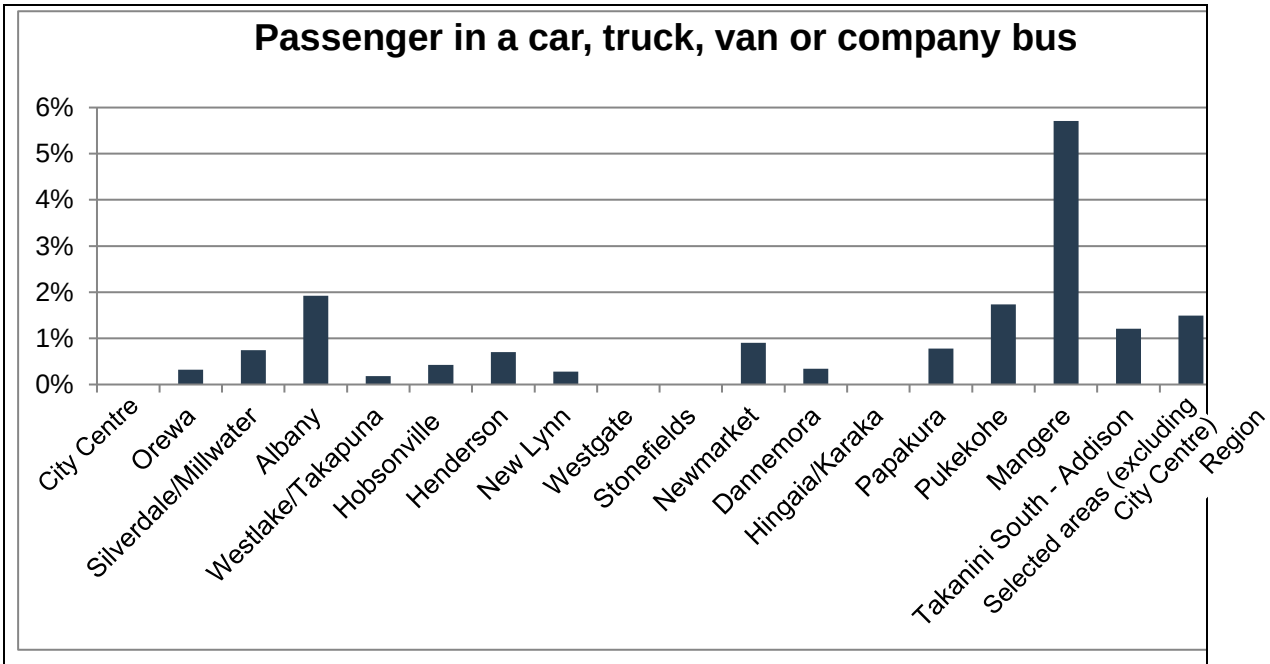


Figure 20.7
Modal shares for selected origin areas - car passengers

The key highlights from these include:

- The very high share of active mode trips for journeys from the Central City. The shares for active modes for Newmarket and Westlake/Takapuna are also relatively high.

- The high share of public transport users for trips from Newmarket and, to a lesser degree, from Westlake/Takapuna, New Lynn, Stonefields and the Central City. The figure for Stonefields contrasts with the very low figure recorded for 2013 but is made up largely of rail users. There are particularly low shares of public transport users in the relatively newly developing areas of Westgate and Dannemora, and also Pukekohe and Māngere
- Work at home shares are relatively high for coastal areas such as Orewa, Silverdale/Millwater, Takapuna/Devonport and Hingaia/Karaka. They are relatively low in Addison, Māngere and New Lynn.
- Car shares vary from 8 per cent for trips from the Central City, and 35 per cent in Newmarket, to almost 90 per cent in Māngere and over 80 per cent in many of the areas in the south including Dannemora, Addison, Papakura and Pukekohe.
- The share of car passengers is particularly high for Māngere.

20.3 Average distances

The average distances travelled on the journey to work by mode are set out in Table 20.2 and Figure 20.8. As noted, earlier these should be regarded as illustrative rather than precise.

Table 20.2
Selected origins - average trip length by mode

Origin	Average trip length (kms)		
	All trips	Car	PT
Orewa	17.0	18.4	33.3
Silverdale/Millwater	18.2	18.4	33.6
Albany	9.7	9.1	17.4
Westlake/Takapuna	7.5	9.3	10.0
Hobsonville	14.9	16.5	22.5
Henderson	12.2	13.4	15.4
New Lynn	11.1	12.2	12.8
Westgate	12.3	12.9	17.8
Stonefields	9.1	10.5	11.9
Newmarket	4.6	7.4	4.3
Dannemora	10.9	11.1	21.4
Hingaia/Karaka	14.8	17.2	31.5
Papakura	14.5	14.9	25.5
Pukekohe	16.3	16.1	40.2
Central City	3.5	9.0	5.2
Māngere	9.2	9.2	9.0
Takaanini South - Addison	15.8	16.5	28.1
Regional average (1)	10.7	12.2	11.4

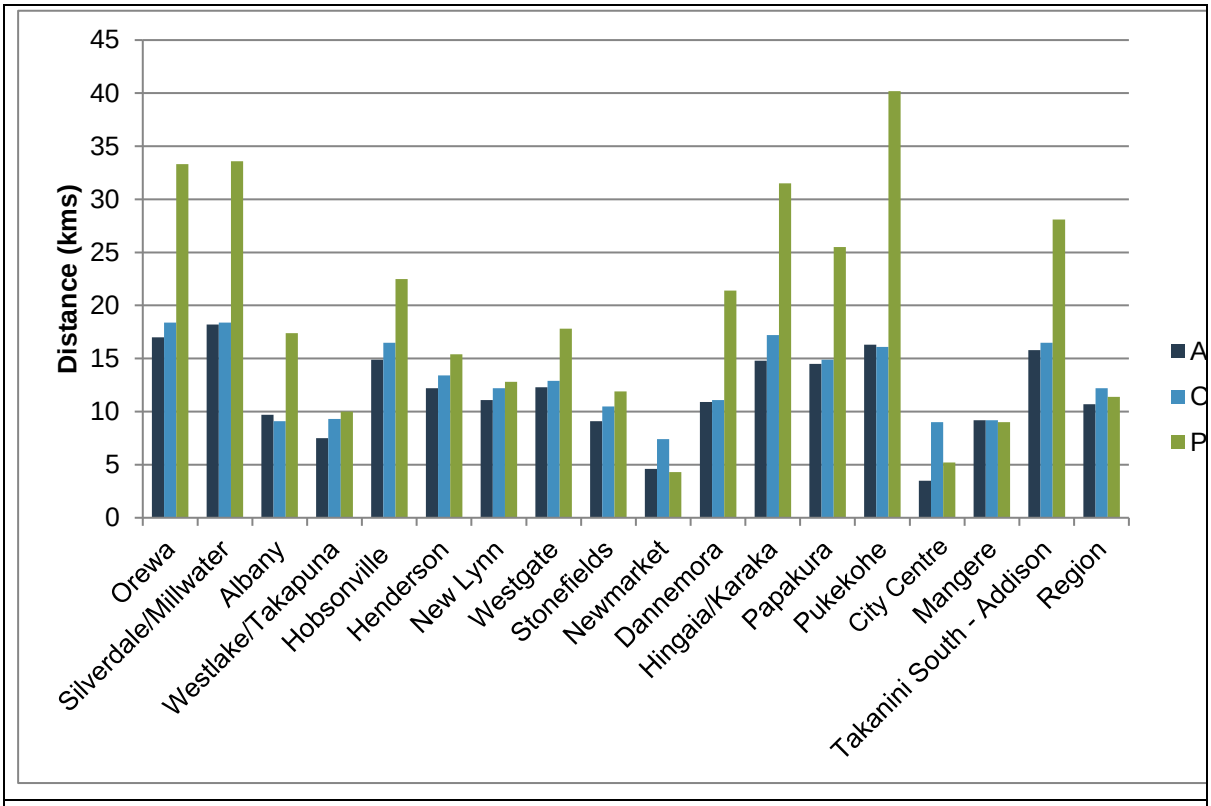


Figure 20.8
Average commuting distances for selected origins 2018 (kms)

This highlights:

- The long-distance trip making by public transport for the areas to the north and south of the region. This is particularly the case for Orewa and Silverdale to the north, and Hingaia and Pukekohe to the south. For these, the average trip lengths are all above 30 kms, compared to the regional average of 11 kms. This reflects to a large degree the distance of these from destinations in the City Centre.
- While the trip lengths by car for the areas away from the centre are also longer than the regional average, the differences in these (which lie between 16 and 18 kms, compared to 12 kms for the region) are smaller. This demonstrates the greater dispersion of trip destinations served by private car, including higher shares to more local centres, rather than the greater focus on the Central City for public transport users. The differences between the average lengths of public transport and car trips, decline with increased proximity to the central area.

21 Trip patterns and social deprivation

Key findings

- There appear to be some general linkages between the level of deprivation, as measured by the Social Deprivation Index developed by the University of Otago.
- The high levels of social deprivation, found in South Auckland and areas to the west of the Waitematā Harbour, are for areas where there is typically a high level of car use.
- However, measures to establish a more precise relationship have not yielded many robust results, although there does appear to be a weak statistical linkage between the level of social deprivation and car use, confirming the previous finding. A rather stronger relationship between the SDI and travel as a car passenger appears to exist. There are no apparent linkages between the level of deprivation and the use of active or public transport modes for commuting trips.
- There appear to be no particular linkages between trip distances and social deprivation.

21.1 Introduction

The journey to work data can be used to compare commuting patterns with levels of social deprivation across the region and identify whether there are any linkages between the two.

21.2 Deprivation indices

Updated deprivation indices have been produced by the University of Otago[2]. These have been converted to an index and these values are displayed in Figure 21.1. The larger the index, which ranges from 1 to 10, the higher the level of social deprivation. More details on the components used to calculate the index are given in Appendix C but these broadly combine measures of income, housing ownership and condition, and education.

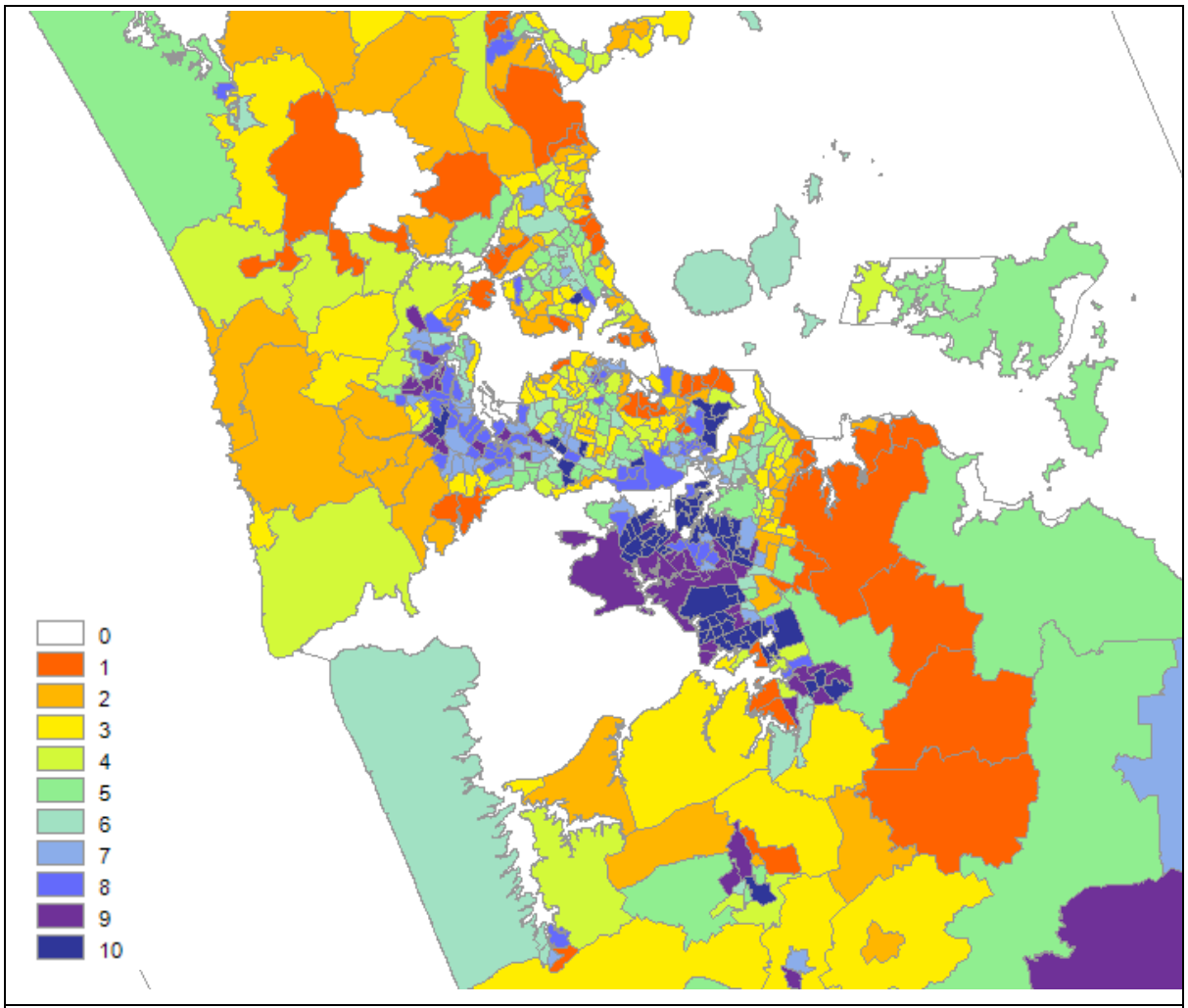


Figure 21.1
Updated 2018 index of deprivation

Social deprivation is high in the areas south of the Māngere Inlet including Māngere, Papatoetoe, Manurewa, down into Papakura. It is also high to the west of the Isthmus, and in a band to the west of the Waitematā Harbour. Other pockets of high social deprivation can also be found to the south and east of the Isthmus in Glen Innes and Onehunga.

[2] Atkinson J, Salmond C, Crampton P (2019). NZDep2018 Index of Deprivation, Interim Research Report, December 2019. Wellington: University of Otago.

21.3 Trip patterns

Trip patterns have been examined in terms of the modal splits and also in terms of the average distances to work. The share of private car travel is set out in Figure 21.2.

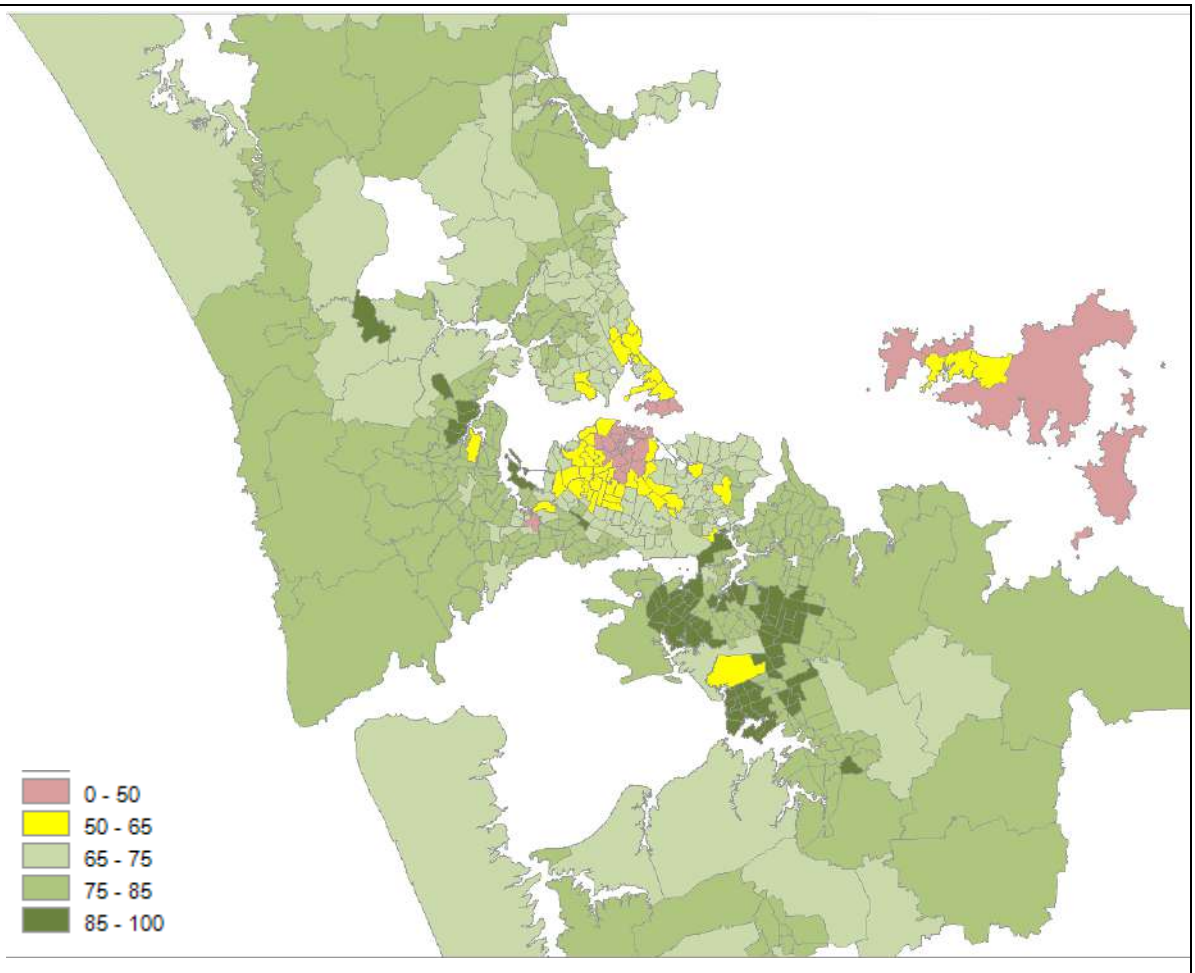


Figure 21.2
Car modal share

The total car modal share appears to be generally relatively high in the areas of high social deprivation to the south of the Māngere Inlet, and also to a lesser extent in the areas to the west of the Isthmus. As a result, there therefore appears to be a something of a link between these two characteristics. This is probably a reflection of the types of jobs which residents of these areas have, which are often in the major industrial areas where public transport accessibility is poor and work often starts before high quality public transport services are available.

Given the high levels of social deprivation and lower incomes, we have also examined the extent to which commuters car-share to help reduce travel costs. The modal share for car passengers alone is set out in Figure 21.3.

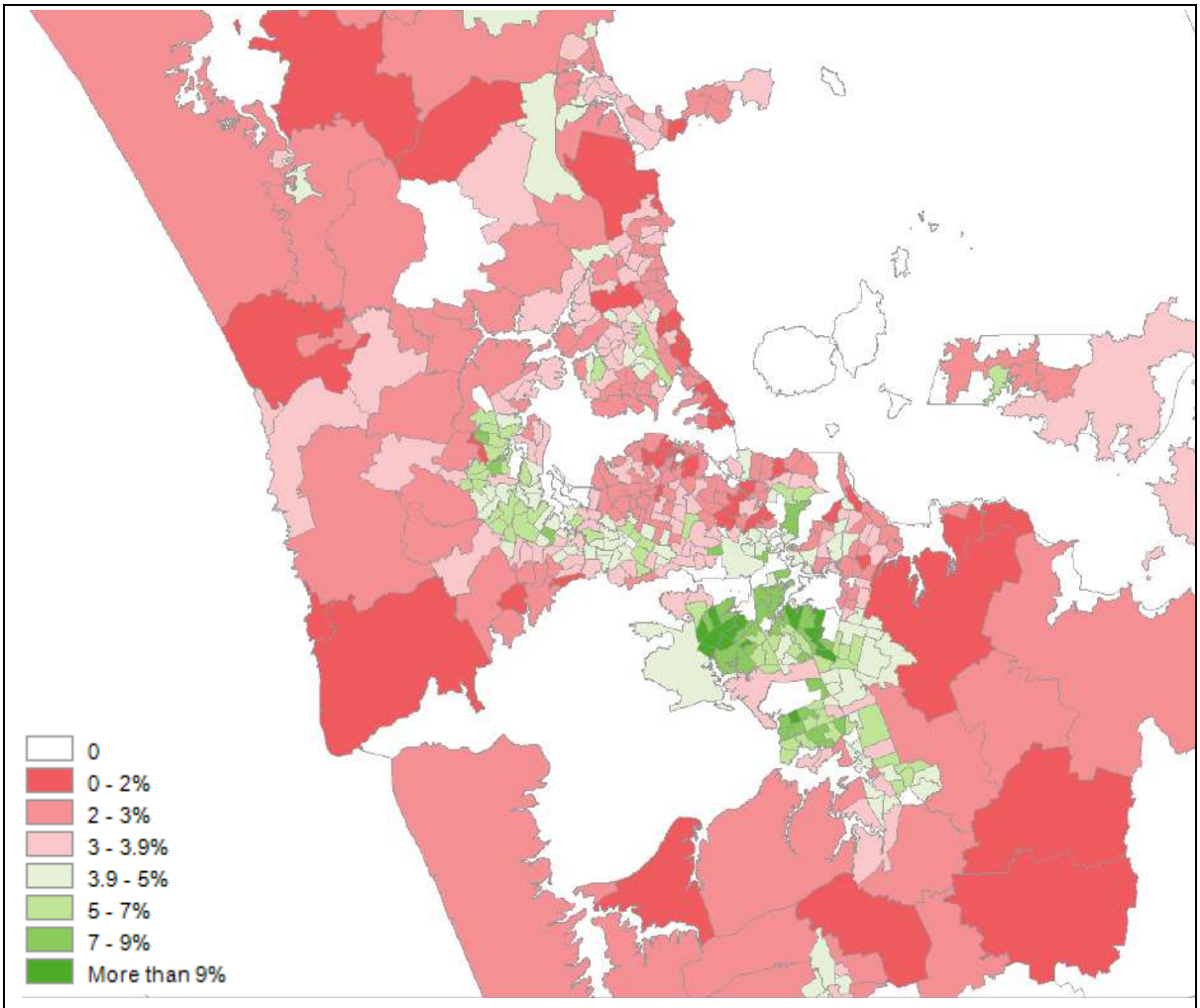


Figure 21.3
Car passenger modal share

Again, the areas of relatively high car passenger use reflect the patterns of social deprivation, with high levels in the areas south of the Māngere Inlet and to the west of the Waitematā Harbour. It is also higher than average in Glen Innes, to the east of the Isthmus.

While high car passenger use might be expected to link to high car use in general, we have examined the extent to which the two differ and this is set out in Figure 21.4.

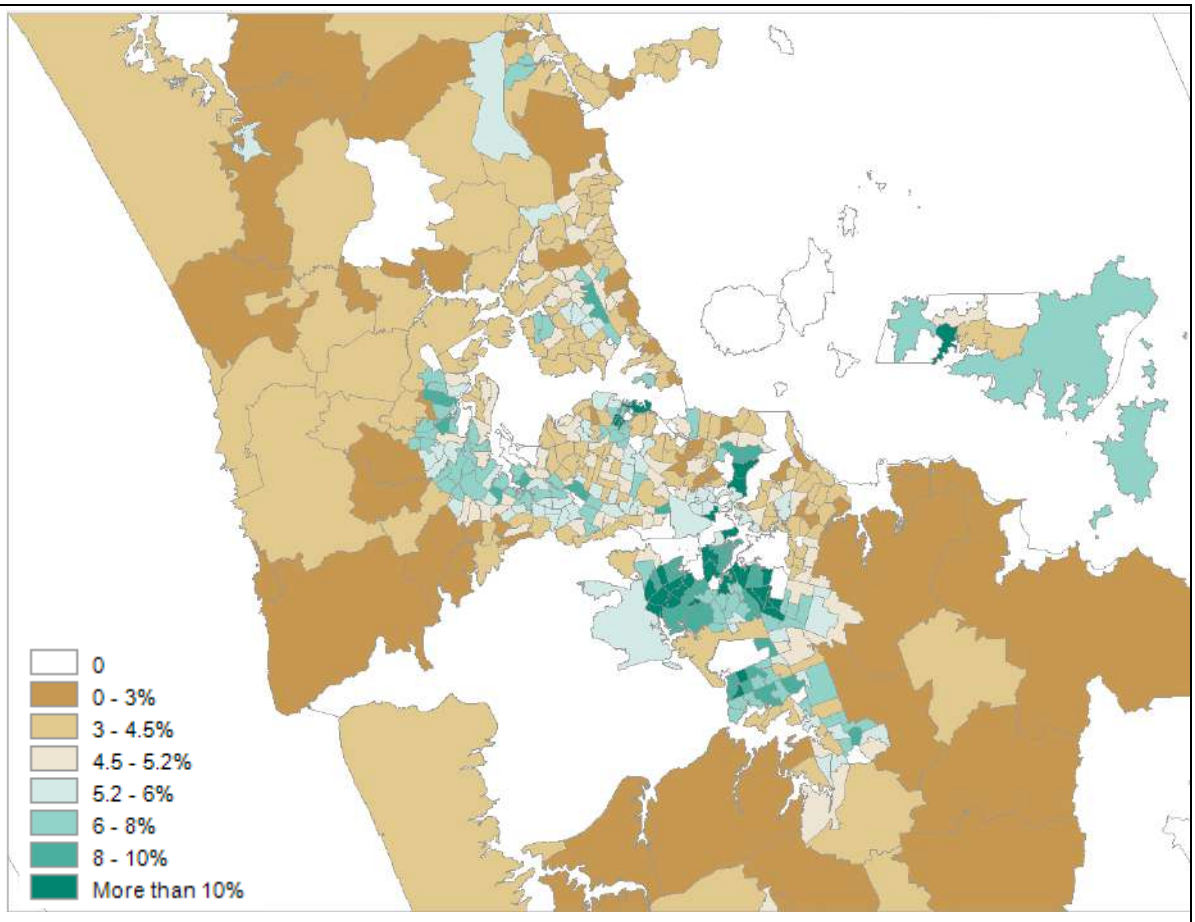


Figure 21.4
Car passengers as per cent of all car trips by origin

This figure indicates that the level of car passenger use, in relation to total car use, is highest in the areas of high social deprivation. This may be a reflection of relatively low incomes and car availability in these areas, and poor public transport services to the main areas in which residents of these areas are employed. It may also reflect the nature of employment available, with more regular starting and finishing times, which facilitates a higher level of car sharing.

21.4 Travel distances

The other area investigated was whether there was any difference in the length of commuting faced by residents of areas with the higher social deprivation levels. The average distance travelled is set out in Figure 21.5, which also includes a circle indicating a distance of about 20kms from the centre of the city.

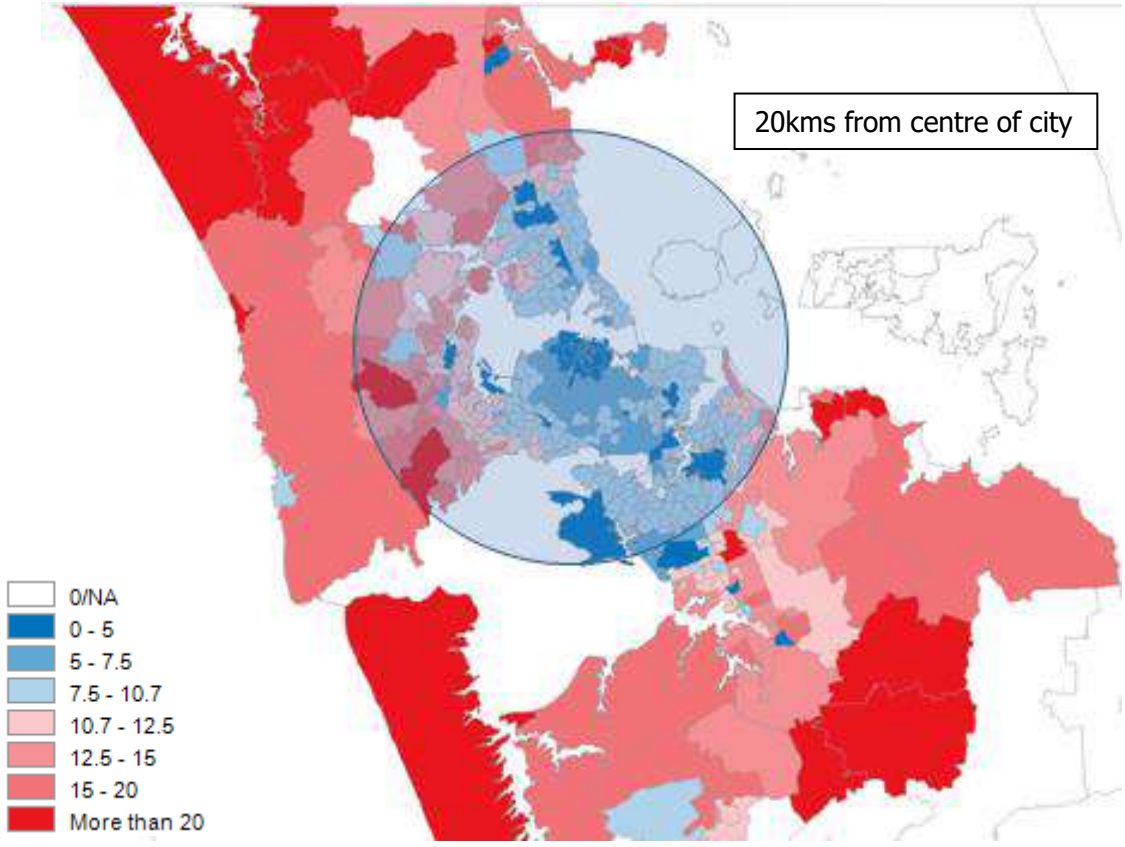


Figure 21.5
Average commuting distances by origin 2018 (kms)

In general, for the areas of social deprivation to the south of the Māngere Inlet, commuting distances are probably in line with what might be expected in comparison, for example, to areas equidistant from the centre on the North Shore, or to the east in Howick. This reflects the availability of employment in areas such as Highbrook/East Tāmaki, Wiri and Onehunga/Penrose/Mt Wellington in relatively close proximity to the areas of high social deprivation.

Workers in areas of higher social deprivation to the west, however, face relatively longer average commuting distances than their counterparts to the south at a similar distance from the centre of the city. This reflects the lower employment opportunities to the west, which requires workers to travel further afield for their jobs.

21.5 Numerical analysis

21.5.1 Introduction

In addition to the visual analysis, an examination has been undertaken to determine whether there is any more rigorous numerical relationship between the patterns of trip making, as expressed in terms of modal shares for various means of transport and the social deprivation (SD) scores for individual zones. These scores are on a continuous scale and underlie the more aggregated indices presented above in Figure 21.1. The examination has also considered whether there is any apparent link with trip distance.

21.5.2 Modal shares

Tests were undertaken, comparing the modal shares for all car users, car passengers, public transport users and active modes trip makers with the SDI. In general, this analysis indicated that the relationship was very limited. The only area where a strong correlation was observed was between trips as car passengers and increasing levels of deprivation and the result for this is set out in Figure 21.6. Other results are set out in Appendix D.

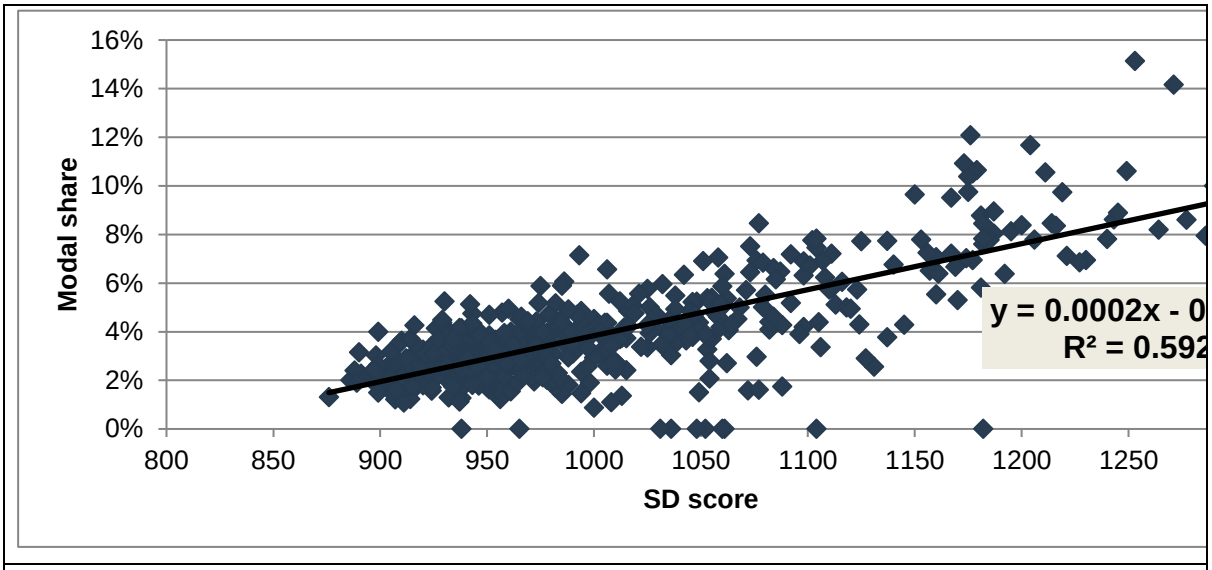


Figure 21.6
Modal shares and SD score - car passengers[3]

For active modes and public transport, there is no evidence of any relationship with the SDI. For total car use there is some evidence of the car modal share increasing with higher levels of deprivation, supporting the findings from the visual analysis discussed earlier, although the relationship is still limited. For car passengers, however, the numerical relationship is stronger, which reflects the findings discussed earlier and the linkage is set out in Figure 21.6. This is an important element in the overall relationship between car use and the SDI.

[3] [3] In considering this graph and those in the Appendix, the R^2 term is a measure of the extent to which variation in the independent variable (in this case the SD score) is correlated with the dependent variable, the modal share. A score of 1 represents a perfect correlation whereas a score of 0 indicates that there is no correlation.

A major component of the SDI is income, and it may be useful to consider the linkage between this and the use of different modes directly.

21.5.3 Distance

The relationship between the average commuting distance for the zone and its SDI is set out in Figure 21.7.

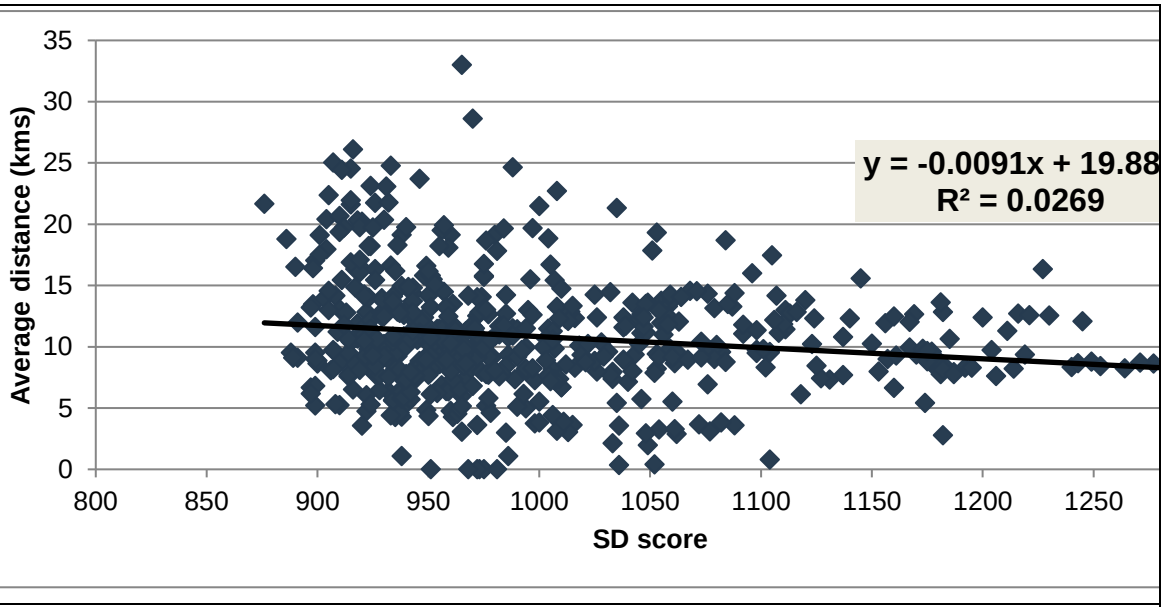


Figure 21.7
Average distance and SD score - all modes

In general, the average commuting distance declines slightly as the SD score increases, although the relationship is very weak. This may indicate the relative proximity of major employment areas to the areas with high SD scores, particularly to the south of the Māngere Inlet.

22 Trip making in the RTN and FTN corridors

Key findings

- The share of rail commuters in the rail corridor at 7.5 per cent is about 150 per cent higher than the regional average.
- Although the bus share in the rail corridor is below the regional average, the combined public transport share at 14 per cent is about a third higher than the regional average of 10.6 per cent.
- The high public transport share is balanced by a lower share of trips by car and those working at home. The active mode share is also relatively high, but this and the work at home share may reflect the sorts of areas served by rail rather than the provision of the rail service itself.
- Over the period from 2013 to 2018, both the rail and bus shares in the rail corridor have increased again; offset in part by a reduction in the private transport share.
- Those living in the area served by the Northern Busway have a public transport mode share that is similar to that experienced in the rail corridor and above the regional average.
- The bus share in the busway corridor has increased from 2013 at a rate similar to the increase in the public transport mode share for the region as a whole. This has been balanced by a similar reduction in the share of car trips.
- Bus modal shares are typically high in the areas served by the FTN, but there are also areas away from this where bus shares are also high.

22.1 Introduction

The journey to work data has also been analysed to consider the patterns of trip making in the corridors served by the Rapid Transit Network. This includes the Northern Busway to the north and the rail network to the south and west. In particular, the modal shares of those living in these corridors have been compared to the regional position to help identify whether the investment in the new or improved facilities has encouraged any change in traveller behaviour from those benefitting most directly.

A broad assessment has also been undertaken of the public transport modal shares in the FTN (frequent transit network).

22.2 Trip making in the rail corridor

22.2.1 The position in 2018

The areas identified as being in the rail corridor are set out in Figure 22.1. While rail also serves the Central City, the travel conditions in this area owe more to its unique conditions with the close proximity of residential areas and employment, rather than to the impact of transport services. As a consequence, following the approach adopted in earlier work, these Central Area zones have been excluded from the analysis. The rail corridor considered for 2018 also excludes the areas west of Swanson, following the cessation of services to Waitakere.

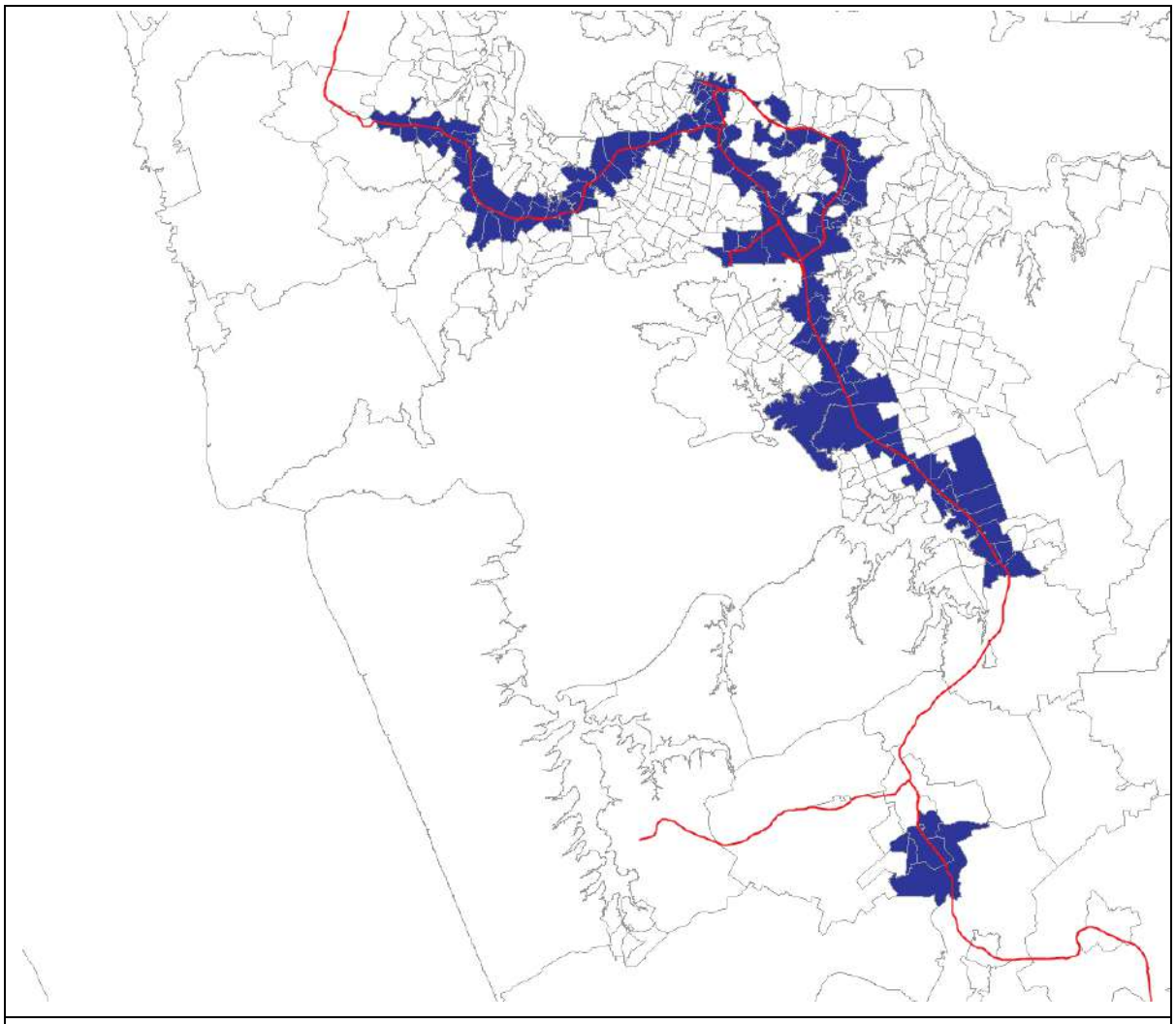


Figure 22.1
Areas included in the rail corridor

Overall, the numbers of commuters from these areas amounts to about 136,000, out of a total for the region as a whole of 745,000 representing about 18 per cent of the total flows.

The modal shares for the commuting trips from the area compared to those for the region as a whole are set out in Table 22.1.

Table 22.1
Commuting mode shares in the rail corridor 2018

Mode	Mode share in rail corridor	Regional mode share
Worked at home	7.4%	9.7%
Car driver	**67.1%**	**69.6%**
Car passenger	**4.1%**	**3.8%**
Total all car users	**71.2%**	**73.4%**
Public bus	6.4%	7.1%
Train	7.5%	2.9%
Ferry	0.0%	0.6%
Total all public transport users	**13.9%**	**10.6%**
Bicycle	1.2%	0.9%
Walked or jogged	4.9%	4.2%
Total all active modes	**6.1%**	**5.1%**
Other	1.3%	1.2%
All modes	**100.0%**	**100.0%**

As might be expected, rail is able to attract a relatively high share of trip making in the rail corridor, accounting for about 7.5 per cent of trips, compared to about 3 per cent for the region as a whole. In part, this is balanced by a slightly lower share for bus 6.4 per cent compared to 7.1 per cent. Interestingly, the share of active modes for trips from the corridor is also higher, for both walking and cycling.

Offsetting these higher mode splits for PT and active mode users, the share of car travellers in the corridor is lower than that for the region as a whole, 71 per cent compared to 73 per cent. In addition, the share of those working at home is also lower than the regional figure, 7.4 per cent compared to 9.7 per cent. This reflects the route of the rail network, away from coastal areas, where the share of work at home trips is typically high.

The findings are summarised in Figure 22.2.

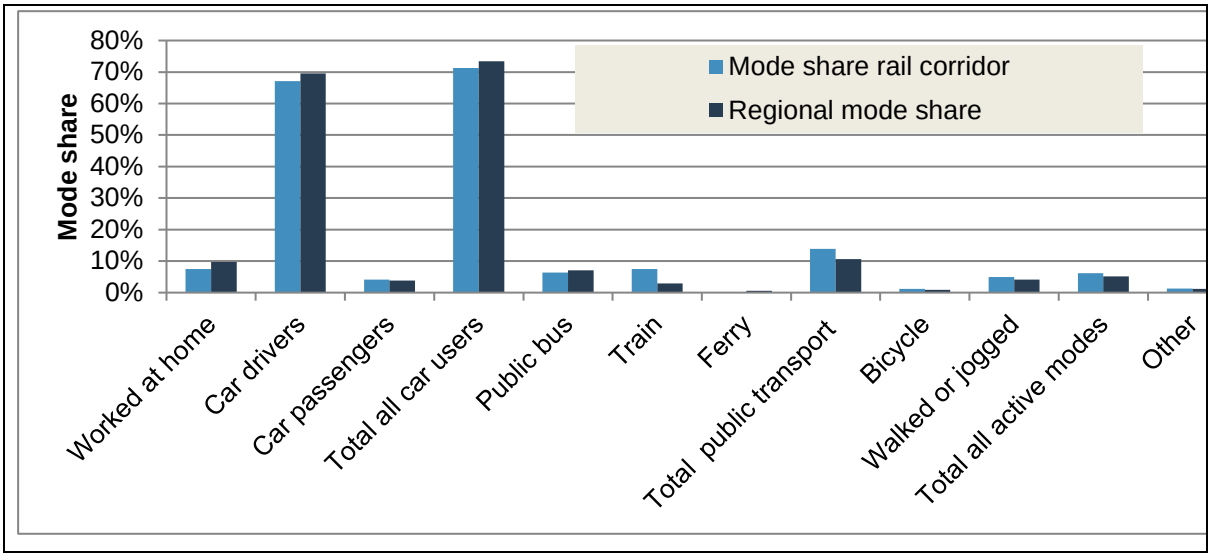


Figure 22.2
Rail corridor and regional commuting mode shares 2018

In addition to considering the modal shares, the share of trips from the rail corridor in the regional totals for each mode has been considered and this is set out in Table 22.2.

Table 22.2
Commuting flows from the rail corridor as per cent of total regional flows 2018

Mode	Regional total	Total in rail corridor	Corridor flows as per cent of region
Worked at home	71,976	9,969	13.9%
Car drivers	516,834	89,856	17.4%
Car passengers	28,383	5,514	19.4%
Total all car users	**545,217**	**95,370**	**17.5%**
Public bus	52,596	8,595	16.3%
Train	21,765	9,975	45.6%
Ferry	4,605	15	0.3%
Total all public transport users	**78,966**	**18,585**	**23.5%**
Bicycle	6,903	1,620	23.5%
Walked or jogged	31,005	6,621	21.4%
Total all active modes	**37,908**	**8,241**	**21.7%**
Other	9,027	1,722	19.1%
All modes	**743,094**	**133,887**	**18.0%**

Although the rail corridor accounts for about 18 per cent of total commuting trips, it accounts for almost half of all rail trips. It also accounts for almost a quarter of active mode trips. In addition, car passengers make up 4.1 per cent of the journeys to work in the rail corridor compared to an average of 3.8 per cent for the region as a whole.

22.2.2 Comparison with earlier results

The trip numbers and modal shares for 2018 can be compared with those reported for 2013 and the comparisons are set out in Table 22.3 and Figure 22.3.

Table 22.3
Changes in modal shares in the rail corridor 2013-2018

Mode	2013 mode share	2018 mode share
Work at home	6.4%	7.5%
Private vehicle	74.9%	71.2%
Rail	4.4%	7.5%
Bus	5.1%	6.4%
Total rail plus bus	9.5%	13.9%
Active	6.1%	6.2%
Other	3.2%	1.3%
Total trips	100%	100.0%

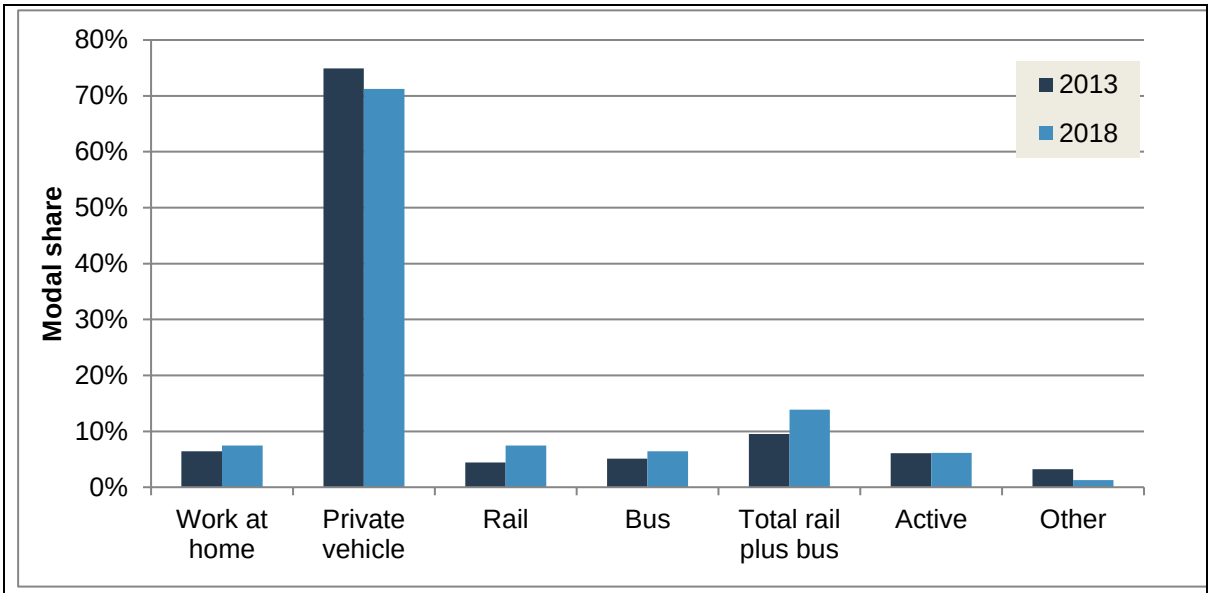


Figure 22.3
Changes in modal share in the rail corridor 2013-2018

Compared to the position in 2013 the rail share in the corridor has grown from 4.4 to 7.5 per cent, an increase of almost two-thirds. This has been also accompanied by an increase in bus use, as well as a slight increase in active mode use.

22.2.3 Overall assessment

The main points from the analysis of the position for commuting from the rail corridor are:

- Rail accounts for 7.5 per cent of commuting trips for those living along the rail corridor, compared to 2.9 per cent for the region as a whole.

- The share of bus is slightly lower than the regional average, but the combined share of bus and rail at 14 per cent is about 40 per cent higher than the regional share of 10 per cent.
- The share of active mode trips is also above the regional average
- The share of those working at home is below the regional average, probably reflecting the nature of the areas served by rail which are away from the coastal areas where the work at home share is high.
- The share of car users is also relatively low at 70 per cent, compared to 73 per cent region-wide.
- Rail users from the rail corridor account for almost half the total rail usage. While this is high, this implies that there is a significant use of rail from areas away from the corridor, accessing rail by car, public transport or active modes.

22.3 Trip making along the Northern Busway

22.3.1 The position in 2018

A similar analysis has been undertaken for trip patterns in the corridor served by the Northern Busway. This corridor is set out in Figure 22.4. It should be noted that this has now been extended to include the Silverdale area.

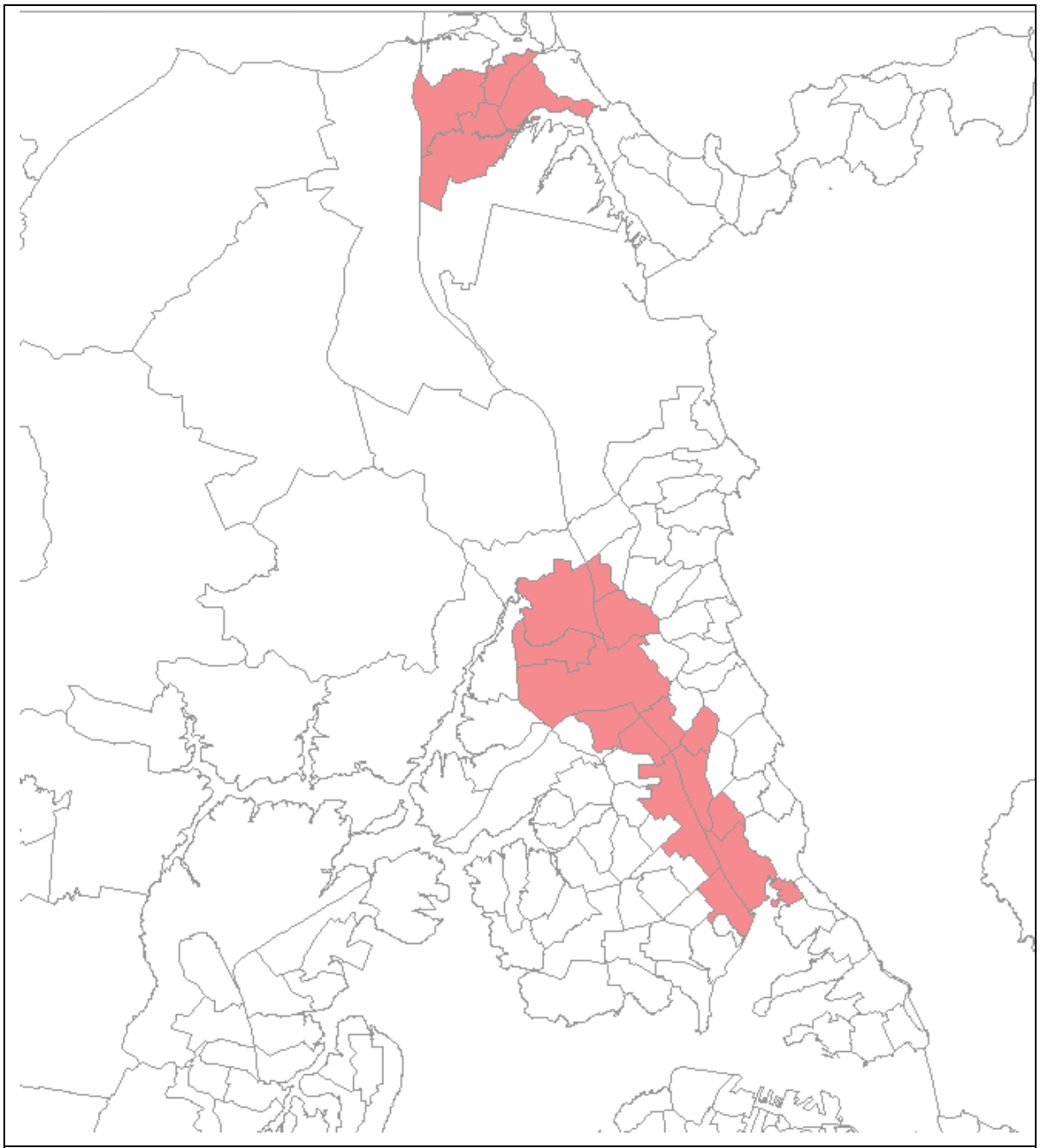


Figure 22.4
Areas included in the Northern Busway corridor

In total, the number of commuters from this area amounts to about 20,000 – about 2.5 per cent of the total for the region as a whole.

The modal shares for the commuting trips from the Northern Busway corridor compared to those for the region as a whole are set out in Table 22.4.

Table 22.4
Commuting mode shares in the Northern Busway corridor 2018

Mode	Mode share in busway corridor	Regional mode share
Worked at home	9.1%	9.7%
Car drivers	67.7%	69.6%
Car passengers	3.3%	3.8%
Total all car users	**71,1%**	**73.4%**
Public bus	14.2%	7.1%
Train	0%	2.9%
Ferry	0%	0.6%
Total all public transport users	**14.2%**	**10.6%**
Bicycle	0.4%	0.9%
Walked or jogged	4.4%	4.2%
Total all active modes	**4.8%**	**5.1%**
Other	0.8%	1.2%
All modes	100.0%	100.0%

Areas in the Northern Busway corridor have a relatively high share of bus use for commuting with buses, attracting 14 per cent of journeys compared to 7 per cent for the region as a whole. In part, this is offset by the absence of any rail or ferry trips, but overall the modal share for public transport at 14 per cent is about a third higher than the regional share. This is a similar position to that described earlier for the rail corridors.

The higher public transport share of 14.2 per cent compared to the regional figure of 10.6 per cent is balanced by lower shares of car trips (71.1 per cent compared to a regional average of 73.4 per cent) and slightly smaller shares for work at home and active mode journeys, particularly those by cycle.

These results are summarised in Figure 22.5.

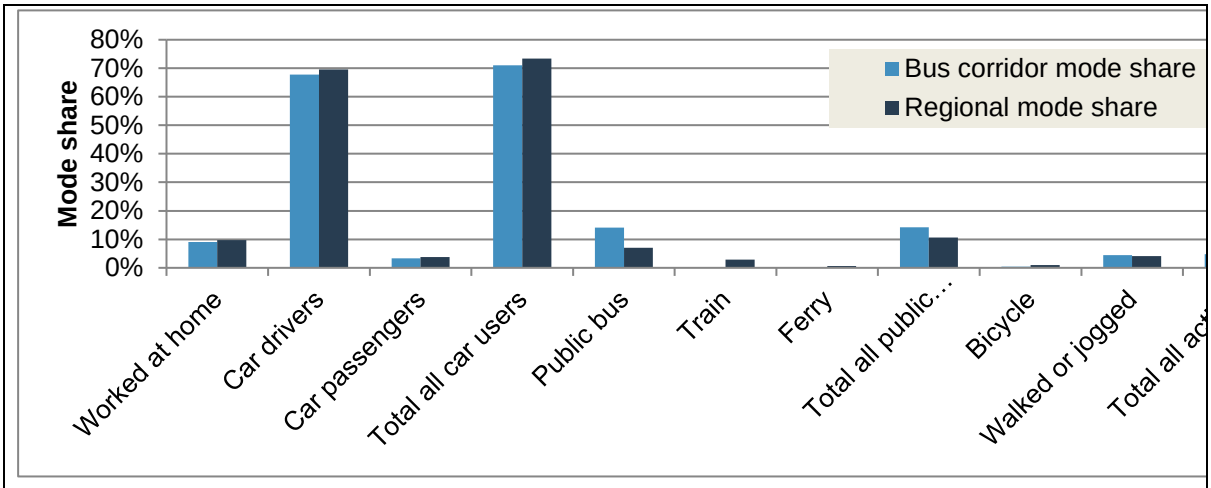


Figure 22.5
Busway corridor and regional commuting mode shares 2018

It is possible to identify broad changes in the patterns of commuting in the busway corridor as defined for 2018 over the period from 2013. In 2013, the share of bus passengers in what were defined as the 'bus station CAUs" amounted to about 11 per cent, with a car share of about 75 per cent. The bus share for a slightly extended corridor to include Silverdale has now increased to about 14 per cent, and the car share has declined to 71 per cent. The increase in the bus share is broadly in line with the region-wide increase in public transport use (bus and train) from 7 per cent in 2013 to 10 per cent in 2018.

22.4 Bus modal shares and the FTN

The position for trip making by bus in relation to the FTN is set out in Figure 22.6.

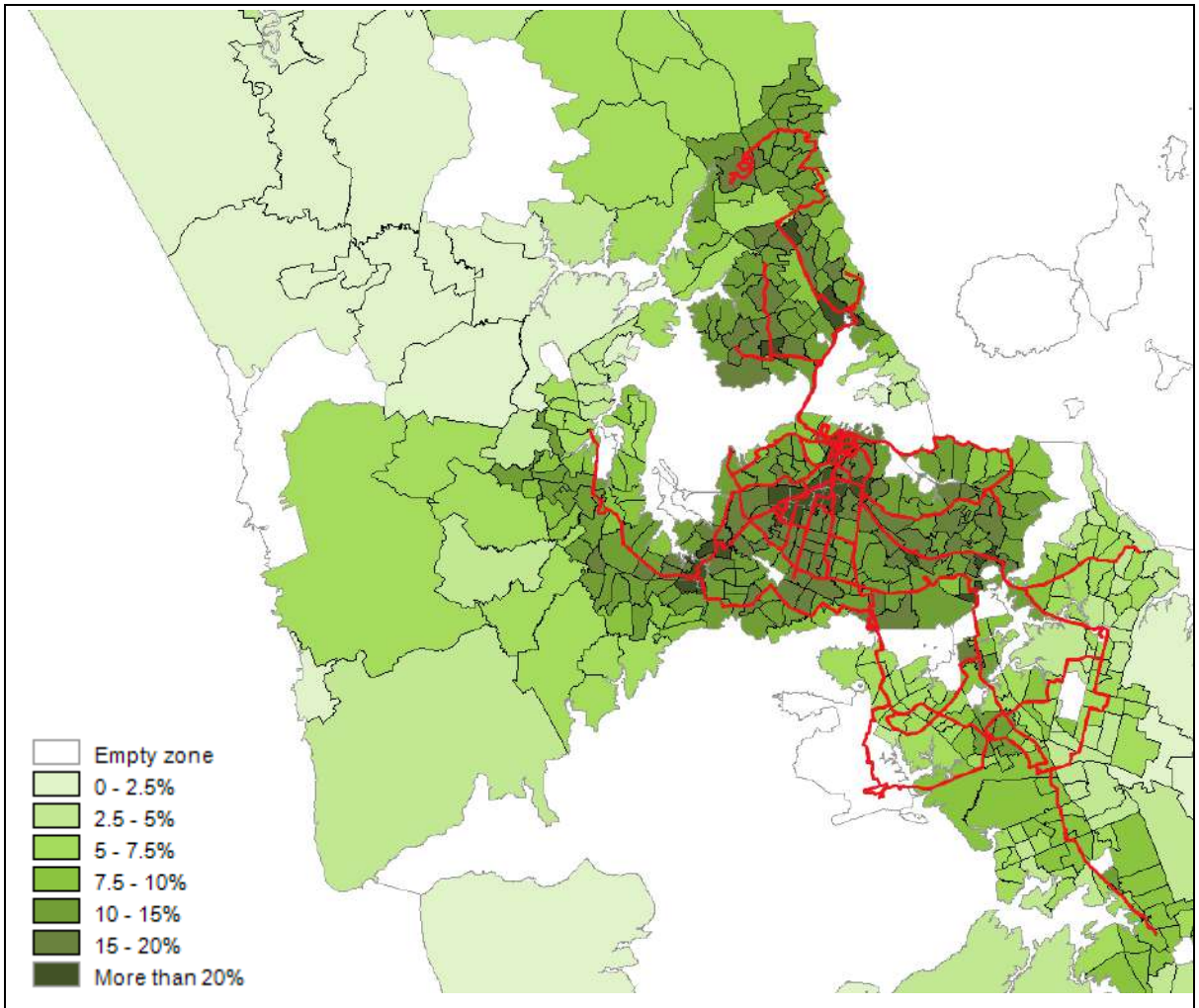
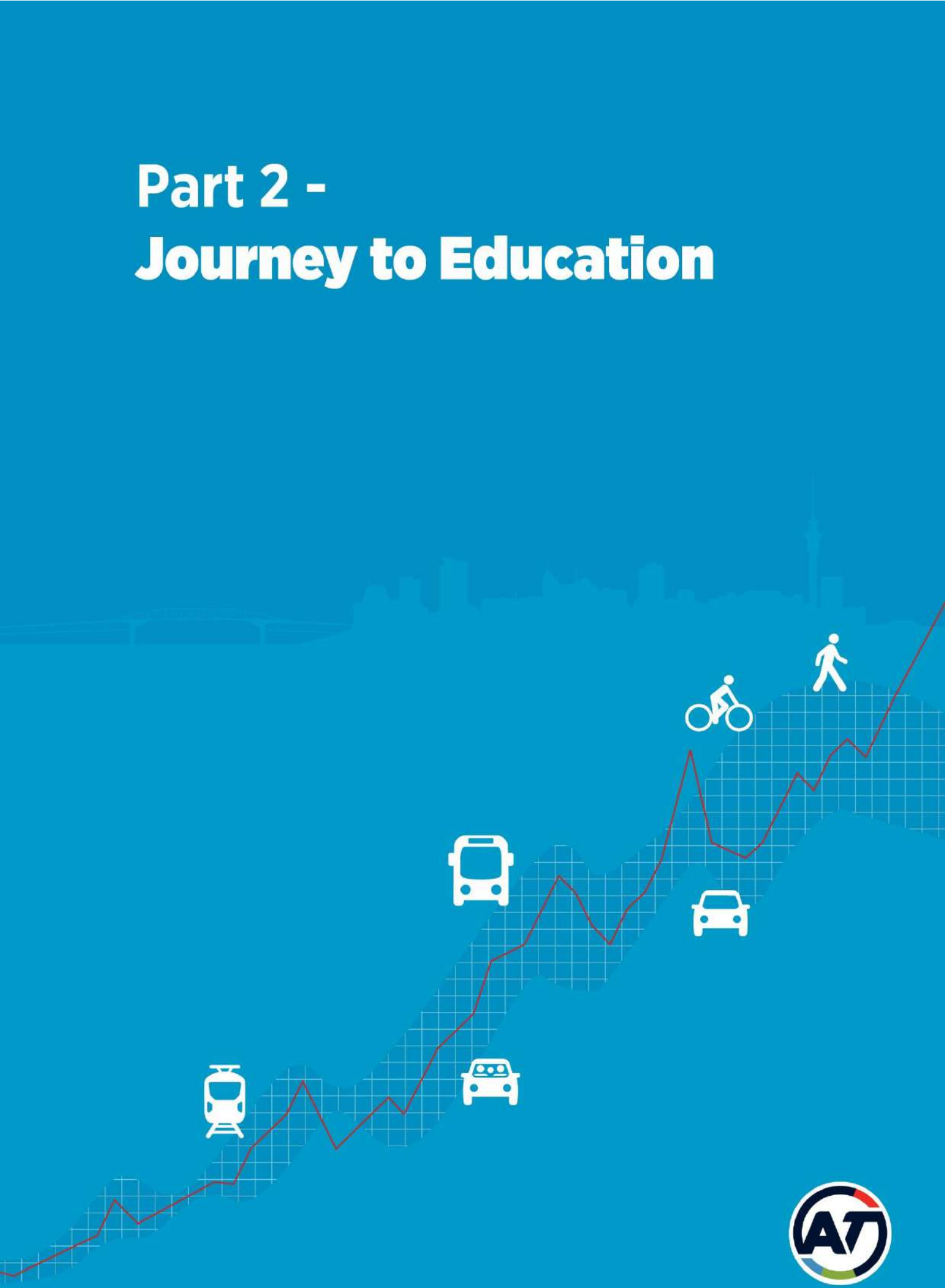


Figure 22.6
Bus modal share and the FTN

To a large extent, the bus modal share in the areas immediately served by the FTN is relatively high – especially across the Isthmus and North Shore, although the position in the latter is influenced by the availability of high quality services offered along the North Busway, part of the RTN. However, it is not clear whether the FTN contributes to a high level of commuting by bus, or if the FTN has been established in areas that already had high bus use. While bus use along the FTN is relatively high compared to areas further away, there are also areas away from the FTN with high levels of bus use, particularly to the west and also areas along the FTN where bus use is relatively low, such as in the east.

Given the role of bus services in serving travel to the central area, it is probably the underlying patterns of demand and the focus of the Isthmus and North Shore as the source of commuters for this area, which determine the demand for bus services. The key impact of the FTN is, therefore, to facilitate these movements, rather than to alter the underlying patterns of demand. This is probably highlighted by relatively low bus share for areas in the south and east of the region despite being served by parts of the FTN.

Part 2 -
Journey to Education



Journey to education trips in Auckland 2018

23 Introduction

The inclusion of questions about the journey to education in the 2018 Census provides the opportunity to examine the movement of students across the Auckland region, considering both the numbers of journeys and the choice of different modes for these journeys. Information is available both on the patterns of movements and on the modes used for these journeys. This has been made available for three age groups of students for this study:

- Under 13
- 13-17s
- Over 17.

Information has been provided both for total trips and for each of these three age groups, allowing comparisons to be made.

In general, the analysis has considered four main types of journey to education:

- **Car** which includes the use of a car or van as driver or passenger
- **Public transport**, which includes the use of public buses, school buses, train and ferry
- **Active modes**, which comprise walking including jogging and cycling
- **Study at home**

The data also includes "**Other**" modes for which no information is available

In addition to the information for the region as a whole, data has been provided at the level of Local Boards[4] and for the more disaggregated individual SA2 census areas (broadly equivalent to the Census Area Units (CAUs) previously used for the provision of data by Statistics NZ). The disaggregation enables the different patterns in the different local board areas and individual zones and also for each of the age groups to be identified.

In line with the general approach of Statistics New Zealand in providing data, trips within individual cells with less than six respondents have been excluded from the material provided. Because of this, a considerable amount of detail is lost. While this is a general concern, where this results in particular issues, most notably in relation to the calculation of average distances, this is noted in the analysis that follows.

The 2018 Census was the first time that this data was gathered about journey to education and as a result no comparisons are possible with earlier Census years.

It should be noted that the Census was undertaken before the onset of Covid-19. The changes in journey patterns to this are still evolving and a degree of caution needs to be taken in applying the results of the Census in future situations.

[4] The report uses the definitions of the local board areas as used by Statistics New Zealand. It is however recognised that the Great Barrier local board area is alternatively described as Aotea/Great Barrier.

24 Overall data analysis

Because of the way in which data on ravel to education is made available by Statistics New Zealand, the total numbers of trips identified at different levels of detail vary. The effects of this are set out in Table 24.1. With increasing disaggregation by mode or area, less information is available and the numbers of trips available for the most detailed spatial and modal analysis represents just under two-thirds of the total trips identified at a region-wide level. As a result of this loss of information the more detailed results need to be recognised as less reliable than those determined at a more aggregated level.

Table 24.1
Total journey to education data characteristics

	Total trips	Per cent of total movements identified at a total level
Total educational trips recorded for movements within the Auckland region	325,140	100%
Total trips within the Auckland region - sum of modal totals	321,279	99%
Total trips identified for local board analysis	300,111	92%
Total trips identified for modal analysis at local board level	300,009	92%
Total trips identified from individual zones - total origins	241,260	74%
Total trips identified from individual zones - total by mode	207,756	64%

With increasing disaggregation more information is lost and the numbers of trips available for the detailed spatial and modal analysis represents just under two-thirds of the total trips identified.

25 The regional position

Key highlights

- About 325,000 daily journey to education trips were recorded in the 2018 Census. About half of these were students under 13, about 25 per cent were between 13 and 17 and 30 per cent over 17.
- Of the total journeys about half are by car, about a quarter each by public transport and active modes and about 5 per cent study at home. Of those using public transport 30 per cent use school buses, just over a half use public buses and 16 per cent use train. Two per cent use ferries.
- The mode split changes significantly by age group. The use of cars is high for the youngest age group but falls for the 13-17 year group but increases slightly for the oldest group as students become able to drive themselves and typical journey lengths increase.
- The use of public transport is highest for the 13-17 year group. The share of active modes is also the highest for this age group.
- The distances travelled increase with age group. The youngest students typically attend local primary schools which are located in most neighbourhoods, the next group (13-17) attend larger establishments with wider catchment areas and the oldest group attend a small number of large tertiary establishments, some with region-wide catchment areas.

25.1 Total journeys

The modal shares of journeys to education for the region as a whole for the three age groups defined are set out in Table 25.1. The youngest age group covers all journeys to education by the under 13s including travel to pre-schools, and primary and intermediate schools.

Table 25.1
Total journey to education trips by age and mode 2018

Mode of travel to education	Student age			
	Under 13	13-17	Over 17	Total
Study at home	**1,296**	**930**	**13,395**	**15,621**
Drive a car, truck or van	0	3,753	31,737	35,490
Passenger in a car, truck or van	96,207	21,567	3,663	121,437
Total car users	**96,207**	**25,320**	**35,400**	**156,927**
Bicycle	3,051	1,260	888	5,199
Walk or jog	36,927	19,785	10,662	67,374
Total active	**39,978**	**21,045**	**11,550**	**72,573**
School bus	8,655	13,113	987	22,755
Public bus	2,796	10,095	26,802	39,693
Train	723	3,489	8,262	12,474
Ferry	63	156	1,017	1,236
Total public transport users	**12,237**	**26,853**	**37,068**	**76,158**
Other/Not elsewhere included	1,848	726	1,281	3,855
Total	**151,566**	**74,874**	**98,694**	**325,134**

Of the total recorded including those studying at home:

- Trips by those under 13 account for just under half the total (152,000 or 47 per cent)
- Trips by those between 13 and 17 account for just under a quarter of the total (75,000 or 23 per cent)
- Trips by those over 17 amount to just under a third of the total ((99,000 or about 30 per cent).

This distribution by age is displayed graphically in Figure 8.1Figure 25.2.

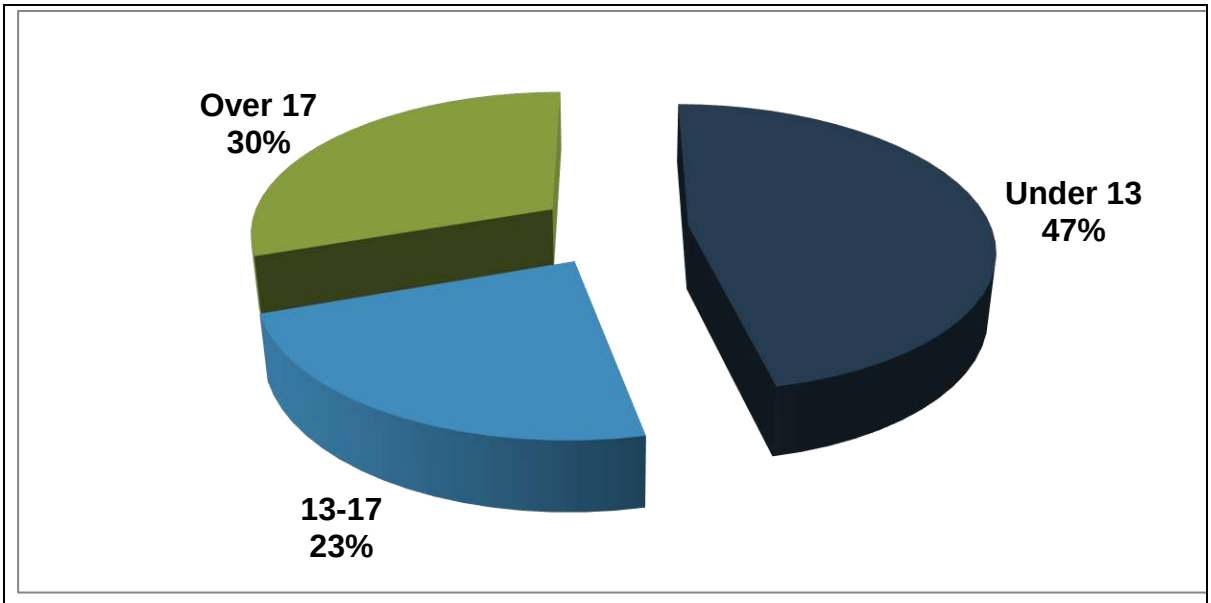


Figure 25.1
Breakdown of journeys to education by age group

25.2 Modal shares

The modal shares for each of the age groups and the total movements are set out in Table 25.2 and Figure 25.2.

Table 25.2
Modal split of journey to education trips by age 2018

Mode of travel to education	Student age			
	Under 13	13-17	Over 17	Total
Study at home	0.9%	1.2%	13.6%	4.9%
Drive a car, truck or van	0.0%	5.0%	32.2%	11.0%
Passenger in a car, truck or van	63.5%	28.8%	3.7%	37.8%
Total car users	63.5%	33.8%	35.9%	48.8%
Bicycle	2.0%	1.7%	0.9%	1.6%
Walk or jog	24.4%	26.4%	10.8%	21.0%
Total active	26.4%	28.1%	11.7%	22.6%
School bus	5.7%	17.5%	1.0%	7.1%
Public bus	1.8%	13.5%	27.2%	12.4%
Train	0.5%	4.7%	8.4%	3.9%
Ferry	0.0%	0.2%	1.0%	0.4%
Total public transport users	8.1%	35.9%	37.6%	23.7%
Not elsewhere included	1.2%	1.0%	1.3%	1.2%
Other	0.0%	0.0%	0.0%	0.0%

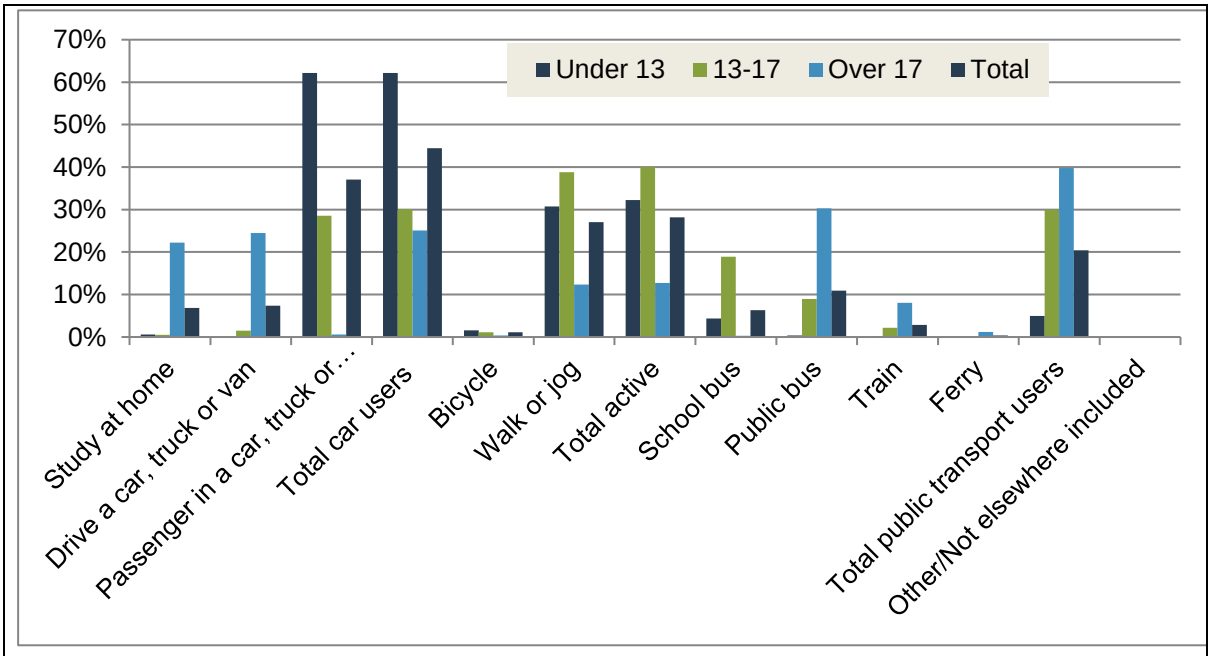


Figure 25.2
Modal split of journey to education trips by age group 2018

The key highlights from the overall regional position include:

- Overall the most popular mode used for journey to education trips is car which accounts for about 49 per cent of all trips. This is followed by public transport which accounts for about 24 per cent of trips, followed closely by active modes (23 per cent), mainly from walking. Studying at home accounts for about 5 per cent.
- The shares, however, vary by age groups. For the **under 13** age group who mainly travel to local schools accompanied by their parents, there is a relatively high share of trips by car (64 per cent), with only limited use of public transport (which accounts for about 8 per cent of total journeys). The active mode share is also slightly higher than average at about 26 per cent, mostly made up of walking trips.
- For the **13-17** age group where students are often accessing larger schools with wider catchment areas, public transport becomes the most utilised mode, accounting for 36 per cent of trips, followed by car with 34 per cent of the total. Active modes account for about 28 per cent of the total, with the lower share possibly reflecting the longer distances travelled.
- For the **over 17** age group, the share of public transport is higher again at about 38 per cent but with a drop in the share of active mode trips, reflecting the longer distances travelled to tertiary education establishments. The share of car is fairly high with much of this travel now being as car driver rather than passenger. For the over 17 age group, there are also larger shares of those reporting that they study at home which accounts for about 14 per cent of the total.

These results are summarised in Figure 9.1.

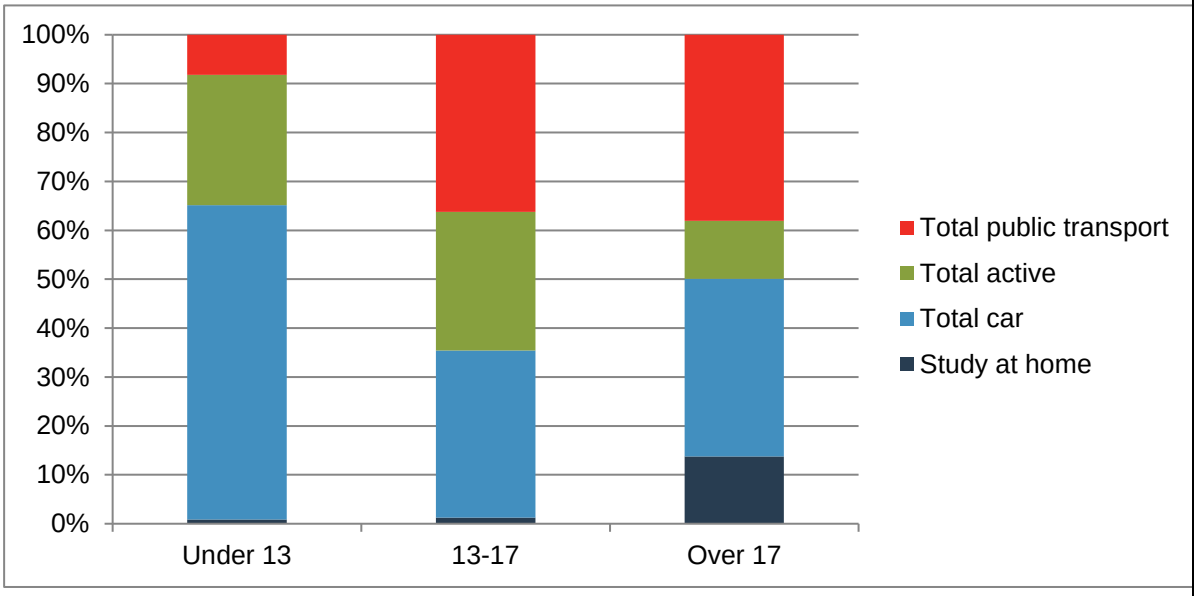


Figure 25.3
Broad modal shares by age group

Considering the patterns of modal use by age group, the share of **cars** is highest for the youngest age range and then declines with the 13-17 age group, as presumably students are more able to travel on their own. It then increases slightly for the over 17s because of the greater availability of cars and the ability of some students to drive themselves, and the longer distances travelled to tertiary establishments.

The share of **active modes** is highest for the 13-17 age group where students may not need to be accompanied to school by their parents but are still travelling to neighbourhood facilities. It is relatively low for those attending tertiary establishments where travel distances are typically longer and, in many cases, would exceed the distances for which travel by active modes, especially walking, is feasible. By contrast, active modes are important for the youngest age group where schools are typically close to the homes of students.

The share of **public transport** increases with increasing age groups forming the largest share of those attending tertiary establishments, where distances are often too far to walk and where the alternative of driving and parking may be difficult or expensive.

25.3 Distances by age group

Estimates of the distances travelled by age group are set out in Table 9.1. These are based on the flows derived from the Census data and distances derived from the AFC regional model. While estimates have been made of the average distances for journey to education trips for the different age groups, because of the way in which the numbers have been calculated and the effects of the loss of data with disaggregation, these should be regarded as illustrative only, especially for the youngest students. These are particularly affected by the assumptions about travel distances within each of the individual zones which may not be reflective of the actual distances travelled to local schools, which in practice may be much shorter.

Table 25.3
Journey to education trips - estimated average distance by age group 2018 (kms)

Age group	Average distance
Under 13	3.2
13-17	5.6
Over 17	10.4
All age groups	5.9

While the estimates of distance should be taken as illustrative only, they do highlight the way in which these grow with the increasing age of the student.

In order to provide a possible check on these figures, preliminary data is available from the Household Travel Survey for Auckland for 2015/18. This suggests that the average travel to education distance is 4.5 kms, about 75 per cent of the average figure in Table 9.1 above. While the Household Travel Survey is based on a relatively small sample of trips which introduces a degree of unreliability in the results, the distances are derived from GPS units carried by the respondents and so should be reasonably accurate. This therefore suggests that the average distances derived from the Census journey to education analysis may be too high, a factor that is especially likely to affect the youngest age group.

26 Analysis by Local Board areas

Key highlights

- For the mainland areas considering all age groups:
  - Active mode trips vary from 10 per cent of the total for the rural boards of Rodney and Waitakere Ranges to up 30 per cent for Devonport/Takapuna an even higher share of 57 per cent for Waitematā.
  - The share of public transport varies from 18 per cent for Papakura and Manurewa to 31 per cent for Rodney, where many of the students travel by school bus. School buses overall account for about a third of public transport use.
  - The use of car varies from 33 per cent for Albert-Eden to 58 per cent for Māngere-Ōtāhuhu
  - Study at home is typically in the range of 4 - 8 per cent
- The patterns of use of the different modes vary substantially between the areas and between the different age groups

26.1 Total journeys by origin

26.1.1 Journeys by age group

The total journeys by age group for journeys from each of the Local Board areas in the Auckland region are set out in Table 26.1 and Figure 26.1.

Table 26.1
Total journeys to education by local board area and age group

Local Board area	Under 13	13-17	Over 17	Total
Rodney	6,468	3,261	2,127	11,856
Hibiscus and Bays	10,776	5,739	5,178	21,693
Upper Harbour	6,042	3,252	4,626	13,920
Kaipātiki	7,959	3,495	5,808	17,262
Devonport-Takapuna	5,655	3,360	3,603	12,618
Henderson-Massey	10,569	4,665	5,541	20,775
Waitakere Ranges	5,553	2,535	2,388	10,476
Great Barrier	42	6	12	60
Waiheke	738	321	225	1,284
Waitematā	4,083	2,136	11,121	17,340
Whau	6,435	3,096	4,608	14,139
Albert-Eden	9,075	5,268	7,806	22,149
Puketāpapa	4,386	2,280	4,095	10,761
Ōrākei	9,087	4,824	4,758	18,669
Maungakiekie-Tāmaki	6,129	2,535	3,969	12,633
Howick	13,572	7,905	7,851	29,328
Māngere-Ōtāhuhu	6,441	3,330	2,970	12,741
Ōtara-Papatoetoe	6,213	3,141	3,597	12,951
Manurewa	7,902	3,753	3,660	15,315
Papakura	5,175	2,145	2,145	9,465
Franklin	7,848	3,756	2,382	13,986
Total	**140,148**	**70,803**	**88,470**	**299,421**

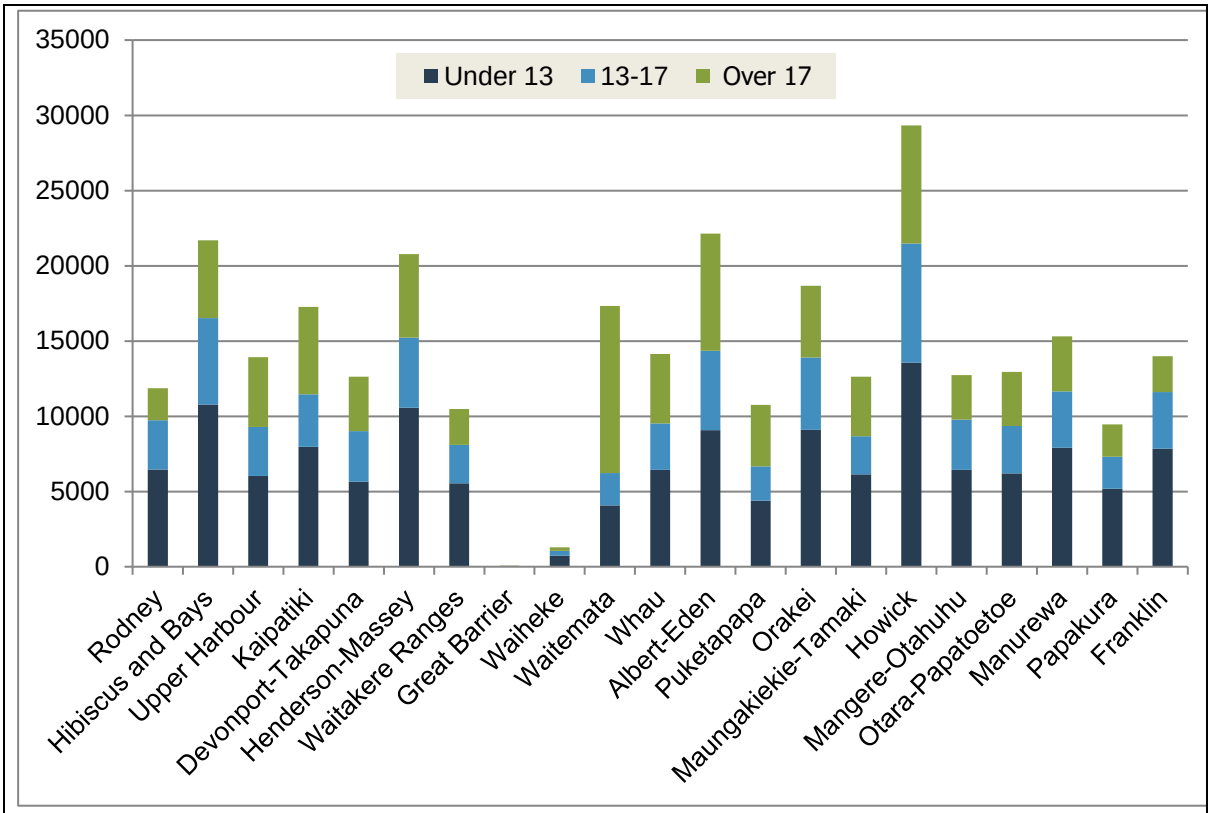


Figure 26.1
Total students by Local Board area and age

For the mainland[5] areas, the number of students identified (including those studying at home) varies from almost 30,000 for the Howick Local Board area down to about 10,000 for Papakura, Waitakere Ranges and Puketāpapa.

[5] The mainland areas comprise all the local boards except Waiheke and Great Barrier.

The proportions by age group are set out in Table 26.2.

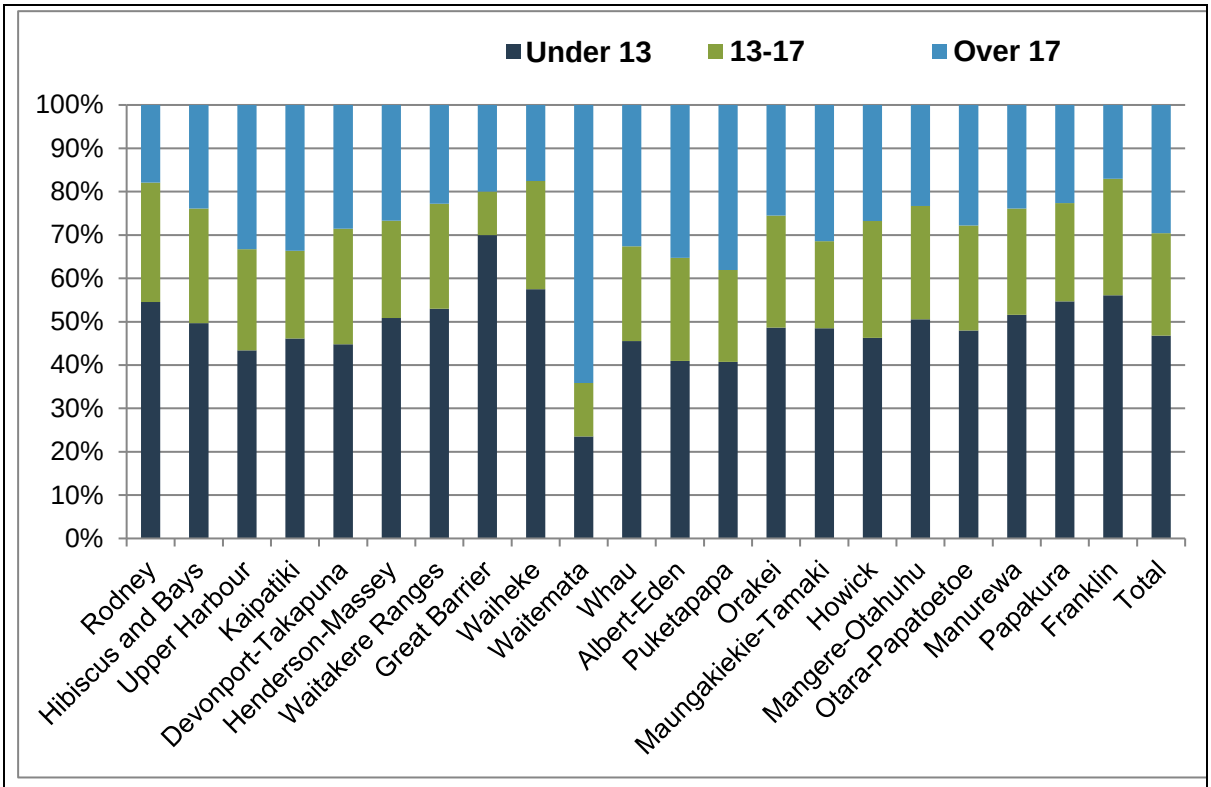


Figure 26.2
Proportions of students by age group

26.1.2 Modal shares

The modal shares for educational trips for all ages from each of the Local Board areas are set out in Table 26.2.

Table 26.2
Modal shares of total journeys to education by Local Board area - all ages

Local Board area	Study at home	Car driver or passenger	Active mode	Public transport	*Of which school bus*	Other
Rodney	7.8%	51.9%	8.9%	30.8%	*26.2%*	0.6%
Hibiscus and Bays	6.2%	50.8%	19.3%	23.1%	*10.7%*	0.6%
Upper Harbour	5.4%	51.5%	16.3%	26.2%	*10.4%*	0.6%
Kaipātiki	5.6%	46.4%	18.4%	28.9%	*7.4%*	0.7%
Devonport-Takapuna	5.1%	35.1%	30.3%	28.9%	*10.2%*	0.6%
Henderson-Massey	5.6%	55.4%	18.0%	19.6%	*4.0%*	1.3%
Waitakere Ranges	6.0%	55.9%	9.3%	28.0%	*11.8%*	0.9%
Great Barrier	26.3%	36.8%	10.5%	26.3%	*26.3%*	0.0%
Waiheke	7.9%	50.5%	13.6%	27.6%	*10.7%*	0.5%
Waitematā	6.0%	16.9%	56.9%	19.3%	*3.9%*	0.9%
Whau	4.6%	50.0%	19.7%	24.7%	*2.8%*	1.1%
Albert-Eden	4.2%	33.1%	32.9%	28.5%	*2.8%*	1.3%
Puketāpapa	4.3%	45.2%	19.4%	29.3%	*3.1%*	1.7%
Ōrākei	4.2%	45.9%	22.2%	26.9%	*9.6%*	0.9%
Maungakiekie-Tāmaki	5.4%	50.1%	18.0%	25.5%	*4.0%*	1.0%
Howick	4.3%	50.4%	25.7%	18.7%	*3.9%*	0.8%
Māngere-Ōtāhuhu	4.2%	57.6%	17.6%	19.2%	*5.0%*	1.3%
Ōtara-Papatoetoe	3.6%	52.8%	21.9%	20.2%	*3.6%*	1.5%
Manurewa	5.0%	54.7%	20.5%	18.2%	*5.1%*	1.5%
Papakura	6.7%	56.1%	18.4%	17.6%	*6.1%*	1.2%
Franklin	6.9%	55.6%	15.9%	20.7%	*15.0%*	0.8%
Total	5.2%	47.5%	22.6%	23.6%	*7.2%*	1.0%

For the mainland areas:

- The share of active mode trips varies from 10 per cent for the rural boards of Rodney and Waitakere Ranges, increasing to up to 57 per cent for Waitematā and 30 per cent for Devonport/Takapuna.
- The public transport share varies from 18 per cent for Papakura and Manurewa to 31 per cent for Rodney, where many of the students travel by school bus. Overall school buses account for about a third of all public transport use by students travelling to their place of education.
- The car share varies from 33 per cent for Albert-Eden to 58 per cent for Māngere-Ōtāhuhu
- Study at home is typically in the range of 4 - 8 per cent

26.2 Journeys by age group

26.2.1 Introduction

The mode splits of the journeys to education by trip origin are set out in the material below. For this we have considered the three age groups separately.

26.2.2 Journeys by Under 13s

The numbers of trips by the Under 13s is set out in Figure 26.3.

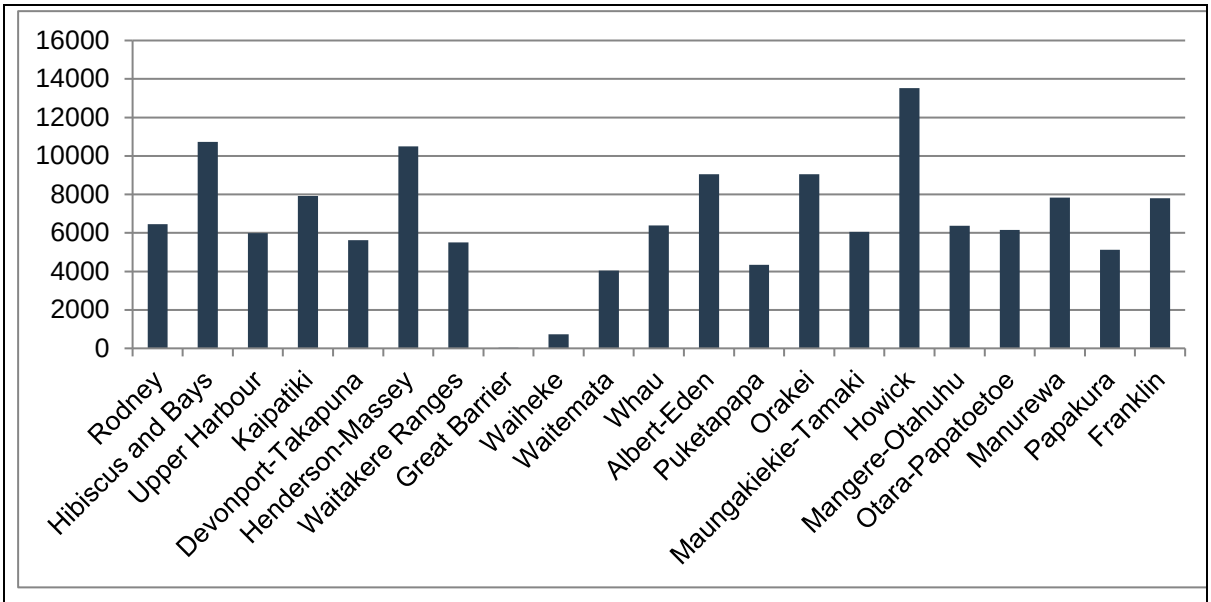


Figure 26.3
Total students by Local Board - Under 13s

For this age group, Howick Local Board has the largest number of educational journeys, followed by Hibiscus and Bays and Henderson-Massey. Waitematā and Puketāpapa have the smallest number of journeys in the mainland Local Board areas.

The modal splits of journey to education trips by the Under 13s are set out in Table 26.3 and Figure 26.4.

Table 26.3 Modal split for journeys to education by Local Board origin - Under 13s						
Board	**Study at home**	**Car driver or passenger**	**Active mode**	**Public transport**	***Of which school bus***	**Other**
Rodney	1.6%	63.7%	11.8%	22.5%	*22.0%*	0.4%
Hibiscus and Bays	0.9%	64.4%	24.9%	9.3%	*8.0%*	0.5%
Upper Harbour	0.7%	65.0%	23.8%	10.1%	*8.7%*	0.4%
Kaipātiki	0.8%	63.5%	26.0%	9.1%	*5.6%*	0.8%
Devonport-Takapuna	0.6%	47.8%	41.2%	9.9%	*7.9%*	0.4%
Henderson-Massey	1.1%	69.2%	23.5%	4.7%	*2.6%*	1.5%
Waitakere Ranges	1.0%	71.7%	14.9%	11.4%	*8.9%*	0.9%
Great Barrier	0.0%	58.3%	0.0%	41.7%	*41.7%*	0.0%
Waiheke	0.0%	72.8%	14.8%	12.3%	*11.1%*	0.0%
Waitematā	0.3%	37.8%	49.3%	12.2%	*6.5%*	0.4%
Whau	0.7%	68.2%	25.3%	4.6%	*1.9%*	1.2%
Albert-Eden	0.5%	47.8%	43.4%	7.2%	*2.2%*	1.2%
Puketāpapa	1.0%	65.0%	26.2%	5.7%	*3.0%*	2.1%
Ōrākei	0.2%	61.2%	30.1%	7.9%	*5.8%*	0.6%
Maungakiekie-Tāmaki	1.0%	67.0%	25.3%	5.8%	*2.1%*	0.8%
Howick	0.6%	64.3%	29.2%	5.0%	*3.5%*	0.9%
Māngere-Ōtāhuhu	1.7%	68.5%	22.9%	5.2%	*3.6%*	1.7%
Ōtara-Papatoetoe	1.2%	63.7%	27.8%	5.3%	*2.9%*	2.1%
Manurewa	1.4%	66.0%	27.0%	3.9%	*2.4%*	1.6%
Papakura	2.1%	69.1%	22.4%	5.0%	*4.2%*	1.5%
Franklin	1.0%	68.7%	17.8%	11.6%	*11.2%*	0.9%
Total	0.9%	63.3%	26.8%	8.0%	*5.8%*	1.0%

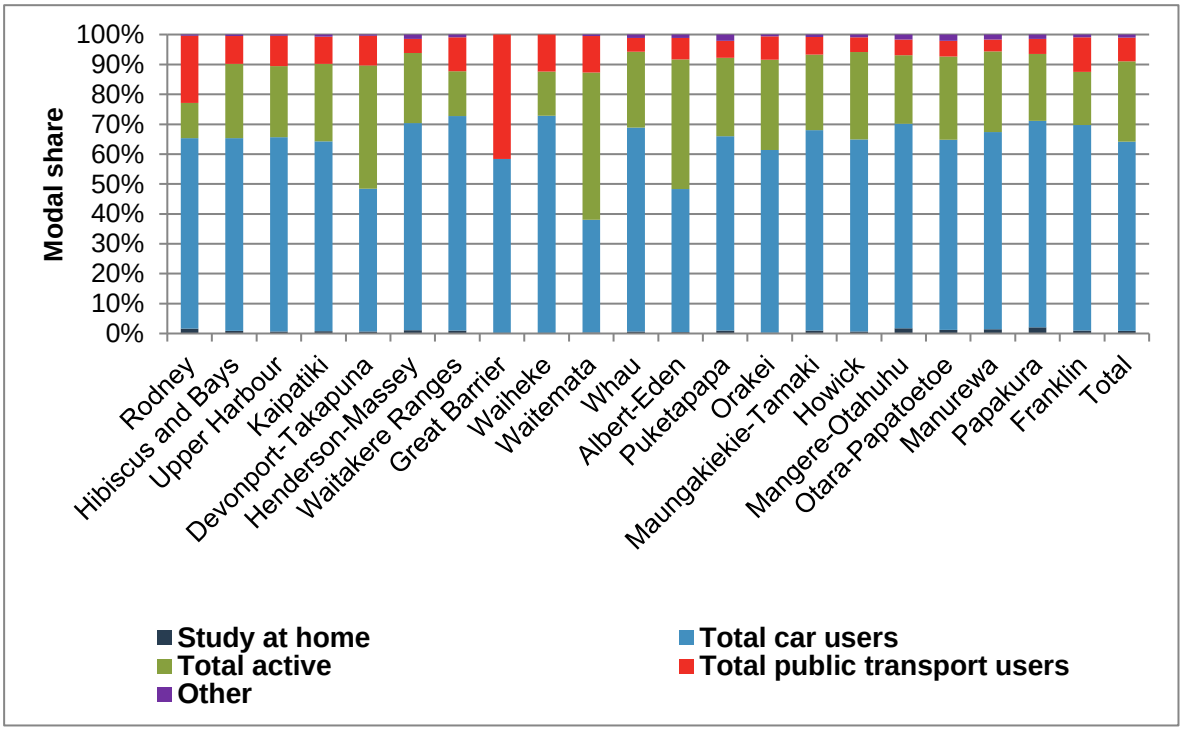


Figure 26.4
Modal shares for education journeys by origin for Local Board areas - Under 13

For the Under 13s, most pupils travel to school by private car. For most areas the range is between 60 and 70 per cent with a regional average of 63 per cent but there are larger differences between some local board areas. The share is lowest in Waitematā (38 per cent) but is also relatively low, below 50 per cent, for the other central areas of Devonport-Takapuna and Albert-Eden. It is highest, above 70 per cent, in Waitakere Ranges, and Waiheke.

The shares by active modes also vary widely, being above 40 per cent in Waitematā, Devonport-Takapuna and Albert-Eden (where the car shares are relatively low) and low, below 15 per cent, in Rodney, Waitakere Ranges and Waiheke (and also Great Barrier).

The low active mode share is balanced by a high public transport mode share in Rodney and Great Barrier. Public transport mode shares are typically low in the urban parts of south Auckland and also in Whau and Henderson-Massey to the west. As the analysis of journey to work travel has identified, these are all areas of relatively high social deprivation and relatively low active mode use for the journey to work. School buses account for about 30 per cent of all public transport use with the highest shares in the more rural local board areas. School bus use in the southern urban areas is low.

26.2.3 Journeys by 13-17s

The numbers of students in the 13-17 age group are set out in Figure 26.5

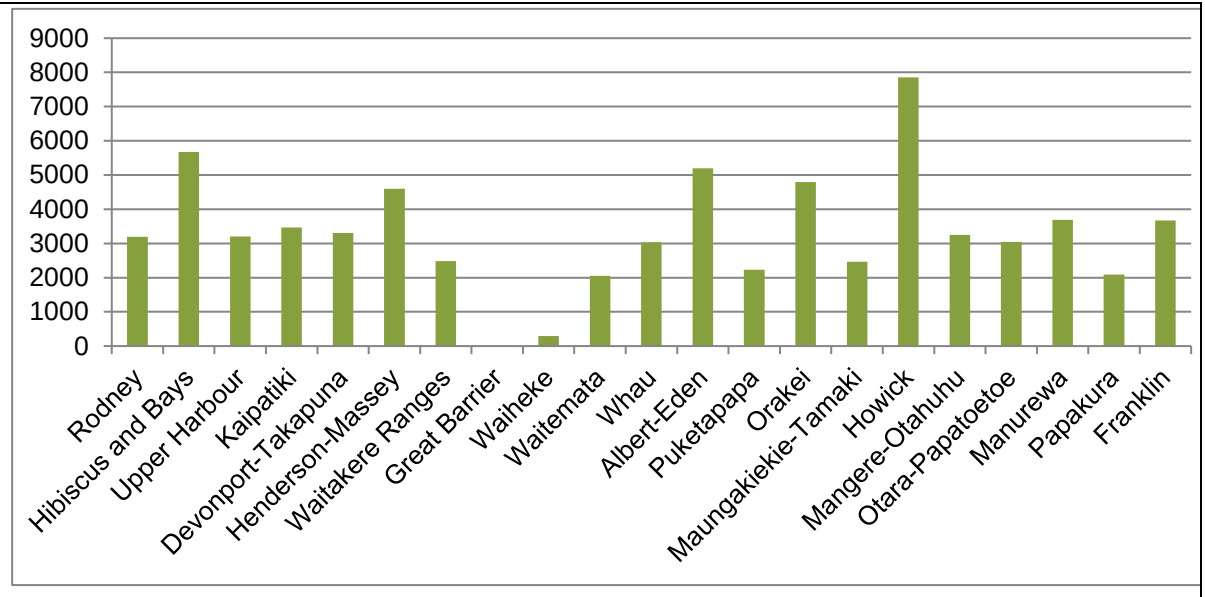


Figure 26.5
Total students by Local Board - 13-17s

Again, Howick has the highest number of students followed by Hibiscus and Bays and Albert-Eden. The lowest numbers for the mainland Local Boards are found in Waitematā, Papakura and Puketāpapa.

The modal shares for students in the 13-17 age group are set out in Table 26.4 and Figure 26.6.

Table 26.4
Modal split for journeys to education by Local Board origin - 13-17 years

Board	Study at home	Car driver or passenger	Active mode	Public transport	*Of which school bus*	Other
Rodney	2.3%	31.0%	8.3%	57.8%	*52.1%*	0.6%
Hibiscus and Bays	1.9%	35.4%	24.9%	37.1%	*24.6%*	0.7%
Upper Harbour	1.0%	38.0%	15.8%	44.6%	*26.9%*	0.6%
Kaipātiki	1.1%	28.6%	24.4%	45.3%	*22.2%*	0.5%
Devonport-Takapuna	0.7%	18.8%	39.9%	40.1%	*24.1%*	0.5%
Henderson-Massey	1.3%	39.9%	24.5%	33.2%	*10.9%*	1.1%
Waitakere Ranges	1.6%	35.0%	4.6%	58.0%	*29.2%*	0.8%
Great Barrier	0.0%	0.0%	100.0%	0.0%	*0.0%*	0.0%
Waiheke	0.0%	35.1%	21.6%	43.3%	*18.6%*	0.0%
Waitematā	0.3%	17.5%	38.7%	43.1%	*15.6%*	0.3%
Whau	1.1%	33.0%	32.2%	33.2%	*7.5%*	0.4%
Albert-Eden	0.8%	20.0%	48.7%	30.0%	*6.9%*	0.5%
Puketāpapa	0.9%	35.0%	37.2%	25.9%	*6.8%*	0.9%
Ōrākei	0.3%	29.9%	24.5%	44.9%	*25.5%*	0.4%
Maungakiekie-Tāmaki	1.2%	35.2%	20.5%	42.9%	*13.5%*	0.2%
Howick	1.2%	35.5%	42.9%	19.7%	*7.5%*	0.7%
Māngere-Ōtāhuhu	1.8%	46.5%	20.8%	29.7%	*11.1%*	1.1%
Ōtara-Papatoetoe	1.0%	40.9%	30.6%	26.3%	*5.8%*	1.2%
Manurewa	2.0%	40.4%	25.2%	31.0%	*13.5%*	1.4%
Papakura	3.2%	40.3%	26.4%	29.2%	*15.2%*	1.0%
Franklin	2.1%	38.5%	20.7%	38.0%	*32.5%*	0.7%
Total	1.3%	33.6%	28.3%	36.0%	*18.0%*	0.7%

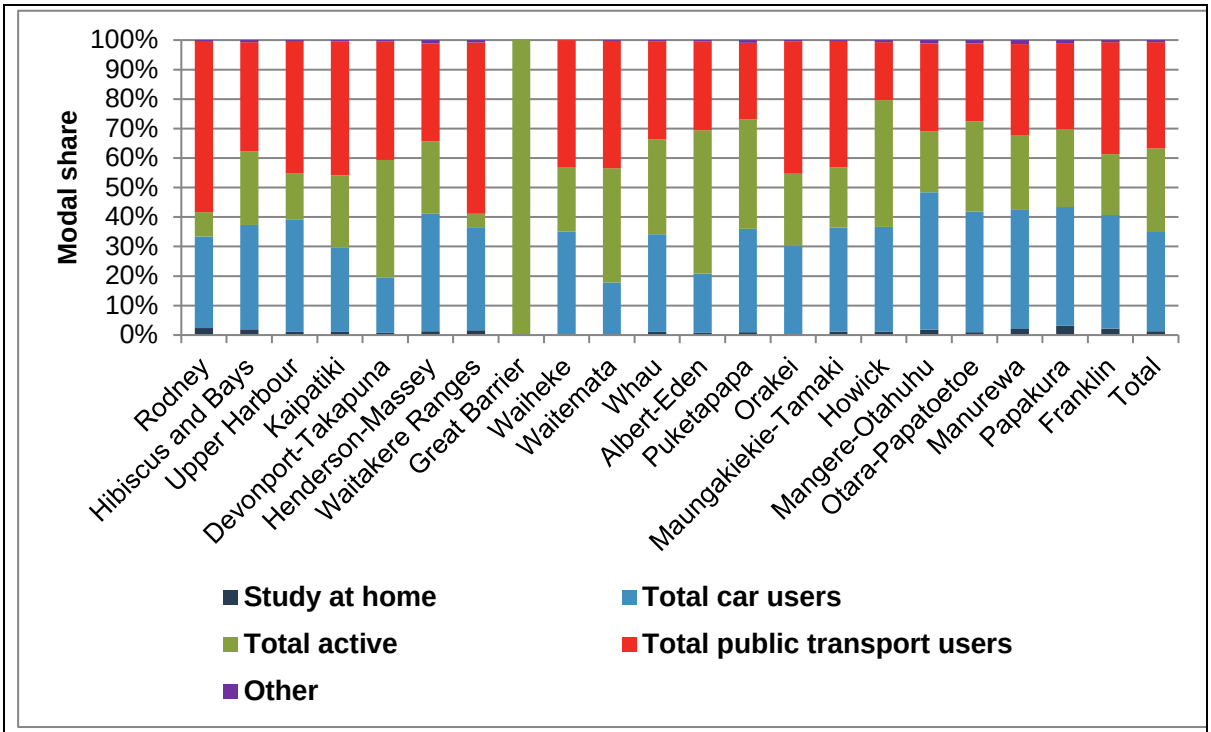


Figure 26.6
Modal shares for education journeys by origin for Local Board areas - 13-17

As discussed in relation to the total position, for the 13-17 year old age group there is a general reduction in the modal share of car trips largely matched by an increase in public transport trips. The key points in relation to the position for the Local Boards are:

- The public transport mode share is highest for the rural areas of Rodney and Waitakere Ranges where it is matched by a low share for active modes of less than 10 per cent reflecting the distances that students have to travel to reach their schools. The use of school buses is high in these areas.
- Overall the use of school buses accounts for about 50 per cent of public transport journeys by students travelling to their place of education.
- The active mode share is highest in Albert-Eden, Howick and Devonport-Takapuna where it is 40 per cent or more. This probably in part reflects the higher density of schools in these areas and possibly the success of measures to encourage students to walk or cycle.
- The car mode share is typically high in the areas to the south, especially Māngere-Ōtāhuhu and also Henderson Massey to the west. This is linked with a general pattern of relatively high car use for the journey to work in these areas and the low level of public transport use.

26.2.4 Journeys by over 17s

The total number of students by Local Board area in the over 17 age group is set out in Figure 26.7.

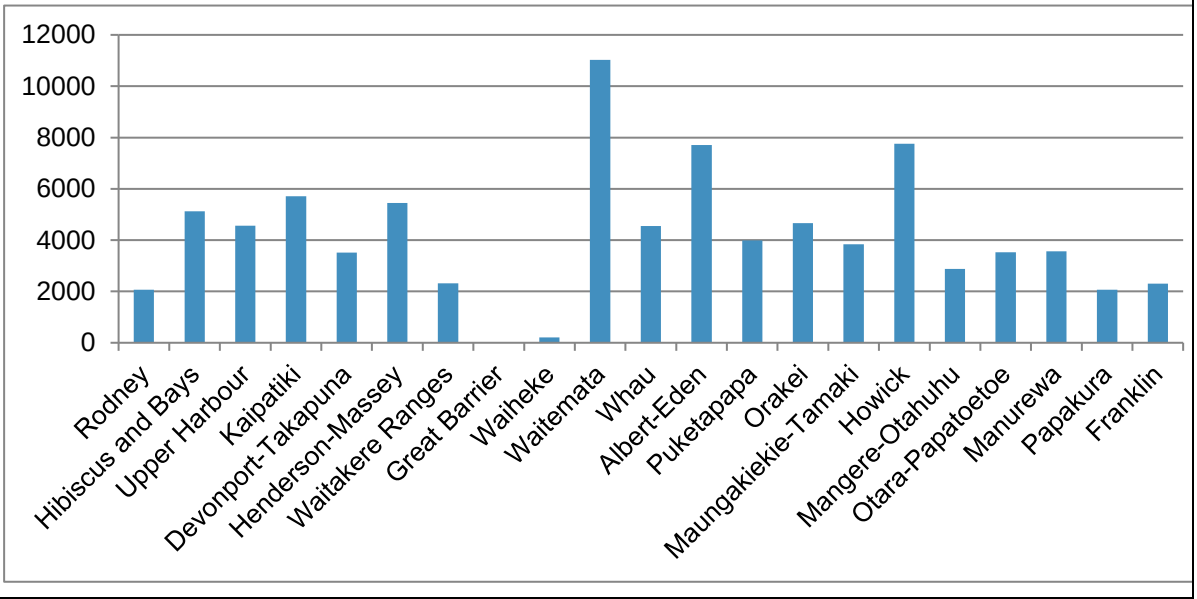


Figure 26.7
Total students by Local Board - Over 17s

The modal shares for travel to education by the over-17s are set out in Table 26.5 and Figure 26.8.

Table 26.5
Modal split for journeys to education by Local Board origin - Over 17s

Board	Study at home	Car driver or passenger	Active mode	Public transport	*Of which school bus*	Other
Rodney	36.0%	47.5%	0.7%	15.4%	*0.4%*	0.4%
Hibiscus and Bays	22.2%	39.9%	1.1%	36.2%	*0.5%*	0.6%
Upper Harbour	14.7%	43.6%	6.9%	34.3%	*0.9%*	0.5%
Kaipātiki	15.0%	33.4%	4.4%	46.5%	*1.1%*	0.7%
Devonport-Takapuna	16.5%	30.0%	4.2%	48.9%	*0.7%*	0.4%
Henderson-Massey	17.9%	43.1%	1.9%	36.0%	*0.6%*	1.0%
Waitakere Ranges	22.5%	41.1%	0.5%	34.8%	*0.0%*	1.0%
Great Barrier	100.0%	0.0%	0.0%	0.0%	*0.0%*	0.0%
Waiheke	45.6%	0.0%	0.0%	54.4%	*0.0%*	0.0%
Waitematā	9.2%	8.9%	63.6%	17.1%	*0.7%*	1.2%
Whau	12.4%	36.3%	3.6%	46.8%	*0.9%*	1.0%
Albert-Eden	10.9%	24.4%	10.1%	52.5%	*0.5%*	2.0%
Puketāpapa	9.9%	30.1%	2.3%	56.3%	*0.5%*	1.5%
Ōrākei	15.9%	32.9%	4.5%	44.9%	*0.5%*	1.8%
Maungakiekie-Tāmaki	15.2%	34.5%	4.1%	45.2%	*0.6%*	0.9%
Howick	14.0%	41.6%	2.4%	41.5%	*0.9%*	0.5%
Māngere-Ōtāhuhu	12.5%	48.2%	2.1%	37.0%	*0.9%*	0.2%
Ōtara-Papatoetoe	10.3%	45.2%	4.4%	39.5%	*2.6%*	0.6%
Manurewa	16.2%	45.8%	1.9%	35.6%	*2.2%*	0.4%
Papakura	22.3%	41.3%	1.2%	34.9%	*1.5%*	0.3%
Franklin	35.2%	40.1%	2.6%	22.1%	*0.0%*	0.0%
Total	15.4%	33.9%	11.4%	38.4%	*0.8%*	0.9%

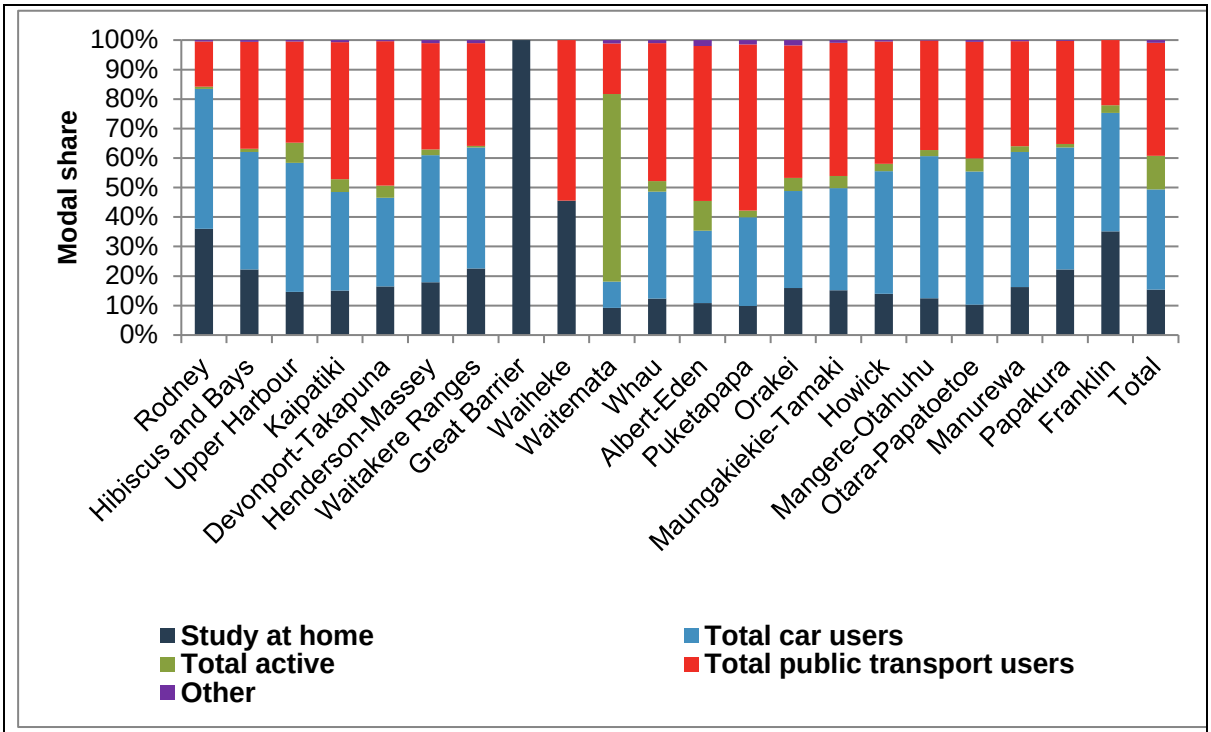


Figure 26.8
Modal shares for education journeys by origin for Local Board areas - over 17

The key highlights for the Over 17 age group are:

- With the larger size of the institutions for educating the over 17-year-old age bracket, typically the active mode share declines as the distances to University or other tertiary facilities increase. However, this is not universally the case, with a very high active mode share being recorded for the Waitematā Local Board area with the large number of students living in reasonably close proximity to the two universities and other tertiary education facilities. The active mode share is also high in Albert-Eden, containing Unitec and Upper Harbour containing the Massey University Albany campus.
- The public transport share, while generally high, is relatively low in the peripheral areas of Rodney and Franklin and is also low for Waitematā where the short distances to the major educational establishments mean that active modes are an attractive alternative. The use of school buses is very low.
- The private car share is high for the rural areas to north south and west and also for the other areas to the south of the Isthmus. It is also high to the west in Henderson-Massey and in Upper Harbour.

27 More detailed analysis at a Statistical Area 2 (SA2) level

Key highlights

- For the Under13s the use of public transport is low except in the more rural areas. It is particularly low in the urban areas to the south of the region. In contrast active mode use is fairly high in the more urban parts of the region
- Average distances for the Under 13s are typically low in the urban areas.
- For the 13-17s the use of public transport is again low in the urban south. This is largely balanced by high active mode use. Travel distances are typically longer although are low for the areas with high active mode use.
- For the over 17s, active mode use is concentrated in a few locations near the major tertiary establishments. Public transport use is typically high across the region. Average trip lengths are long except in the central area and in the neighbourhood of the tertiary establishments located away from the centre.

27.1 Introduction

The analysis at a more detailed level set out below has focussed on the assessment of the pattern of modal shares by age group. For each age group there is an analysis of the modal shares by origin, considering:

- Active modes
- Public transport
- Car

27.2 Under 13s

27.2.1 Modal shares

For the under 13 age group the active mode share is set out in Figure 27.1.

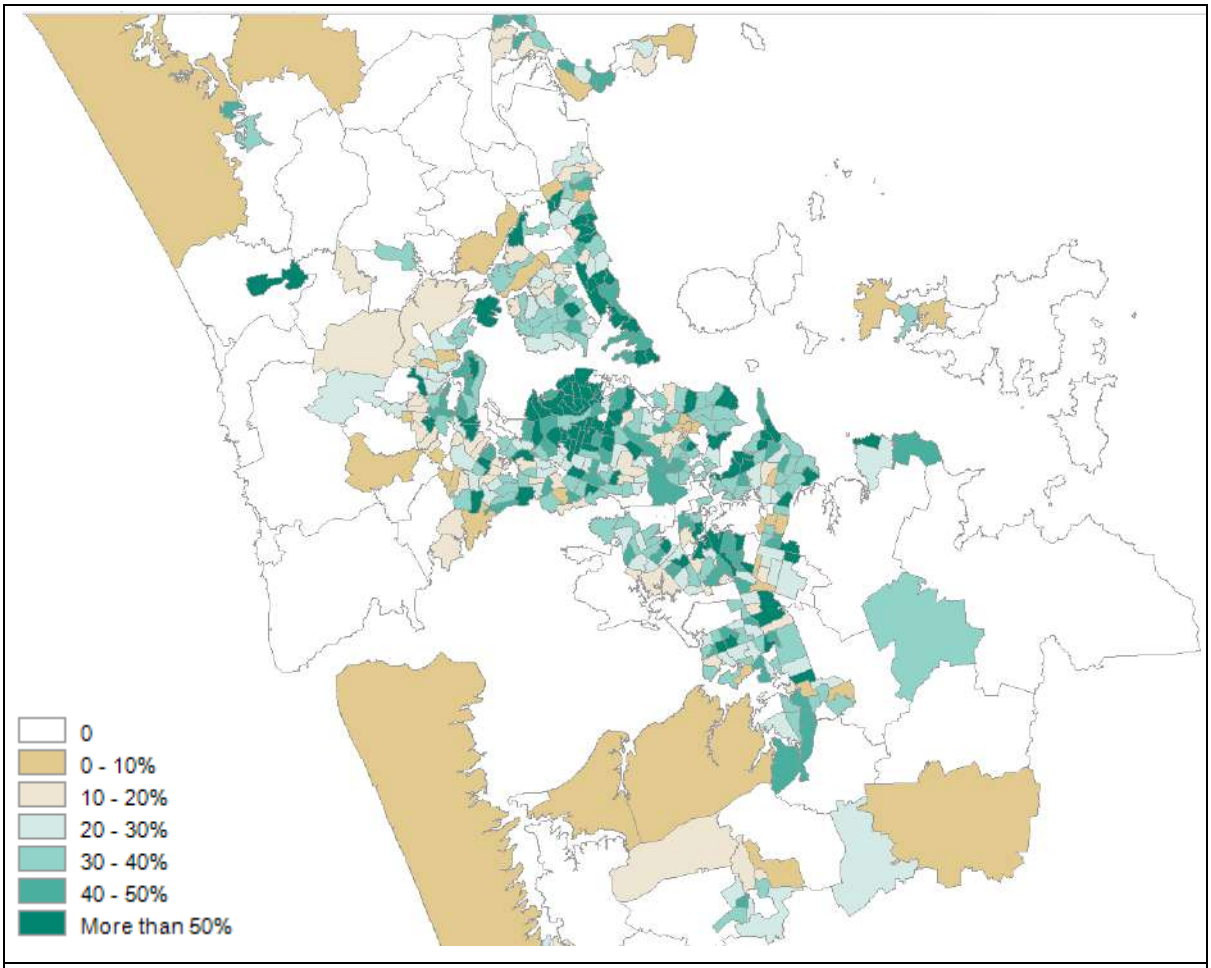


Figure 27.1
Under 13 - Active mode share by origin

There are relatively high active mode shares across the Isthmus, in Devonport/Takapuna and in Māngere and the SH1 corridor south of Ōtāhuhu. It is possible that these findings for the southern areas reflect the low availability of cars in the area rather than the positive choice of an active mode.

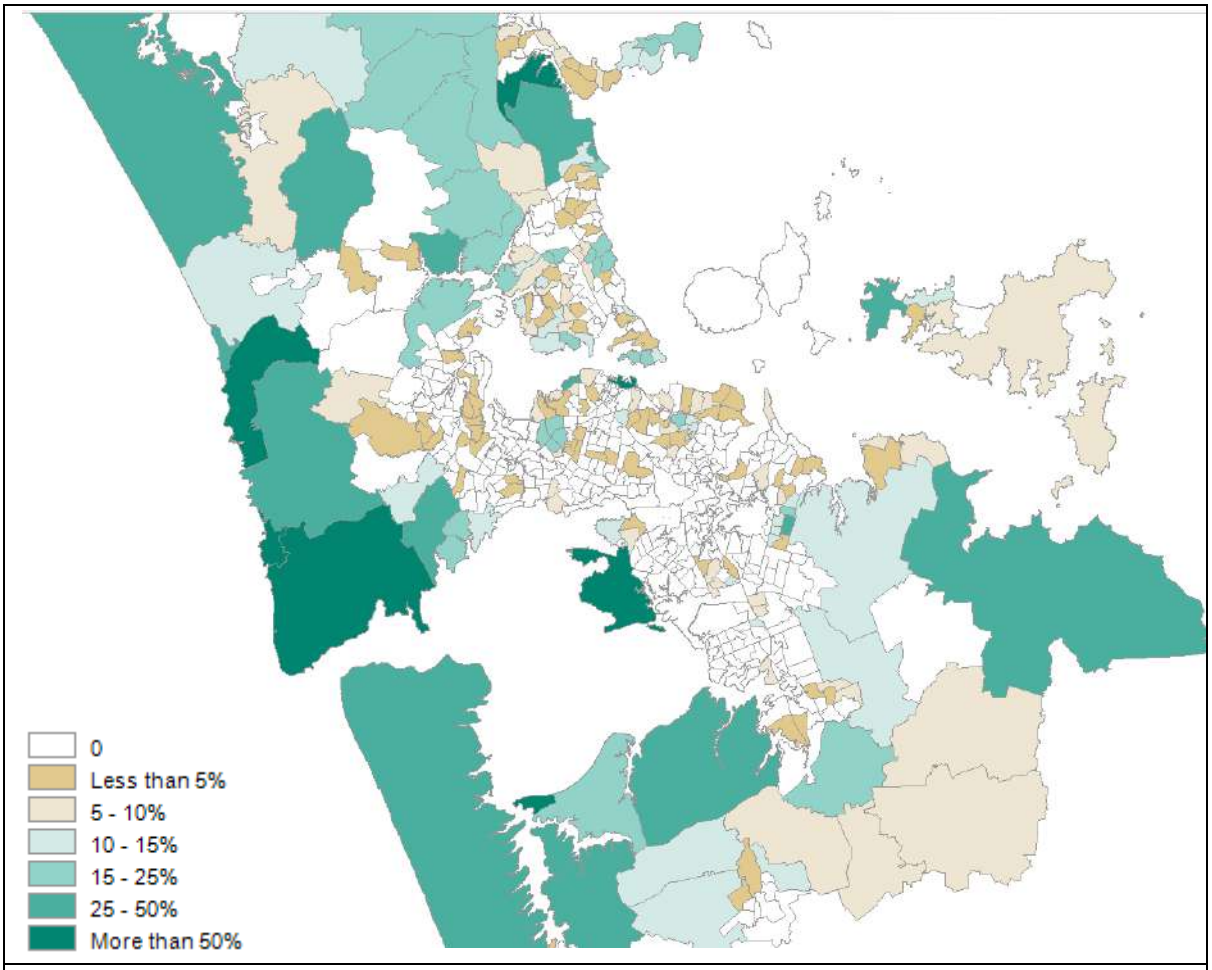


Figure 27.2
Under 13 - PT mode share by origin

The use of public transport for the U13 age group is fairly limited and is very much focussed around the periphery of the region. To some extent this reflects the relatively short distances to be travelled in the main urban and suburban areas, for which the use of public transport would not be particularly attractive. Across the urban area its use is very low especially to the south.

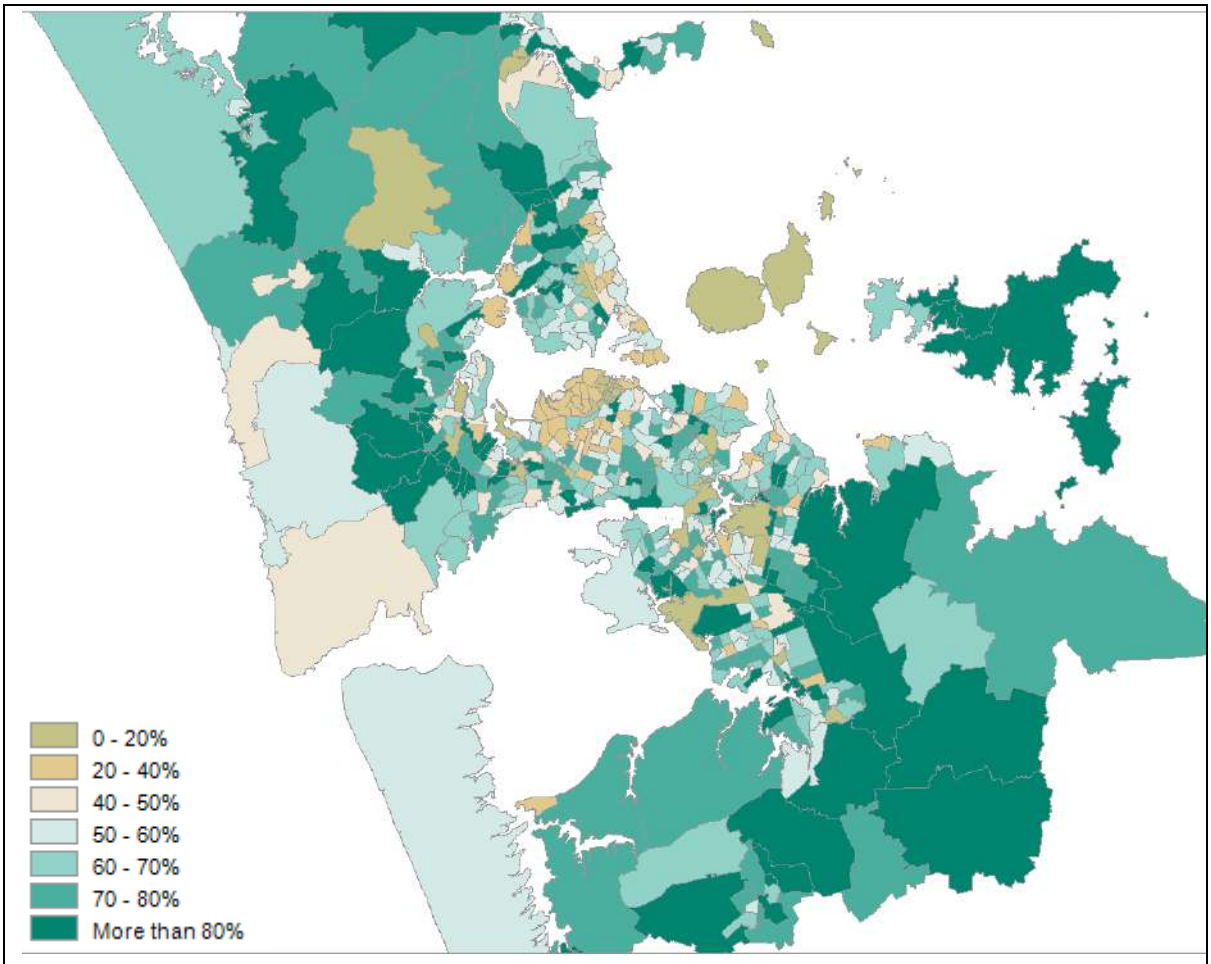


Figure 27.3
Under 13 - car mode share by origin

To some extent the car mode share is the mirror image of the position for the active mode shares, with low shares over much of the Isthmus and North Shore and along the SH1 corridor further south

27.2.2 Distance

An estimate of the average distances travelled by those under 13 is set out in Figure 27.4. Since a high proportion of trips are within the individual SA2 zones, the estimates of distance are very much determined by the assumptions about typical distances for these intra-zonal movements. It is likely, therefore, that in practice a large proportion of the journeys in the 0-3.5 km category will have journey lengths at the lower end of this range.

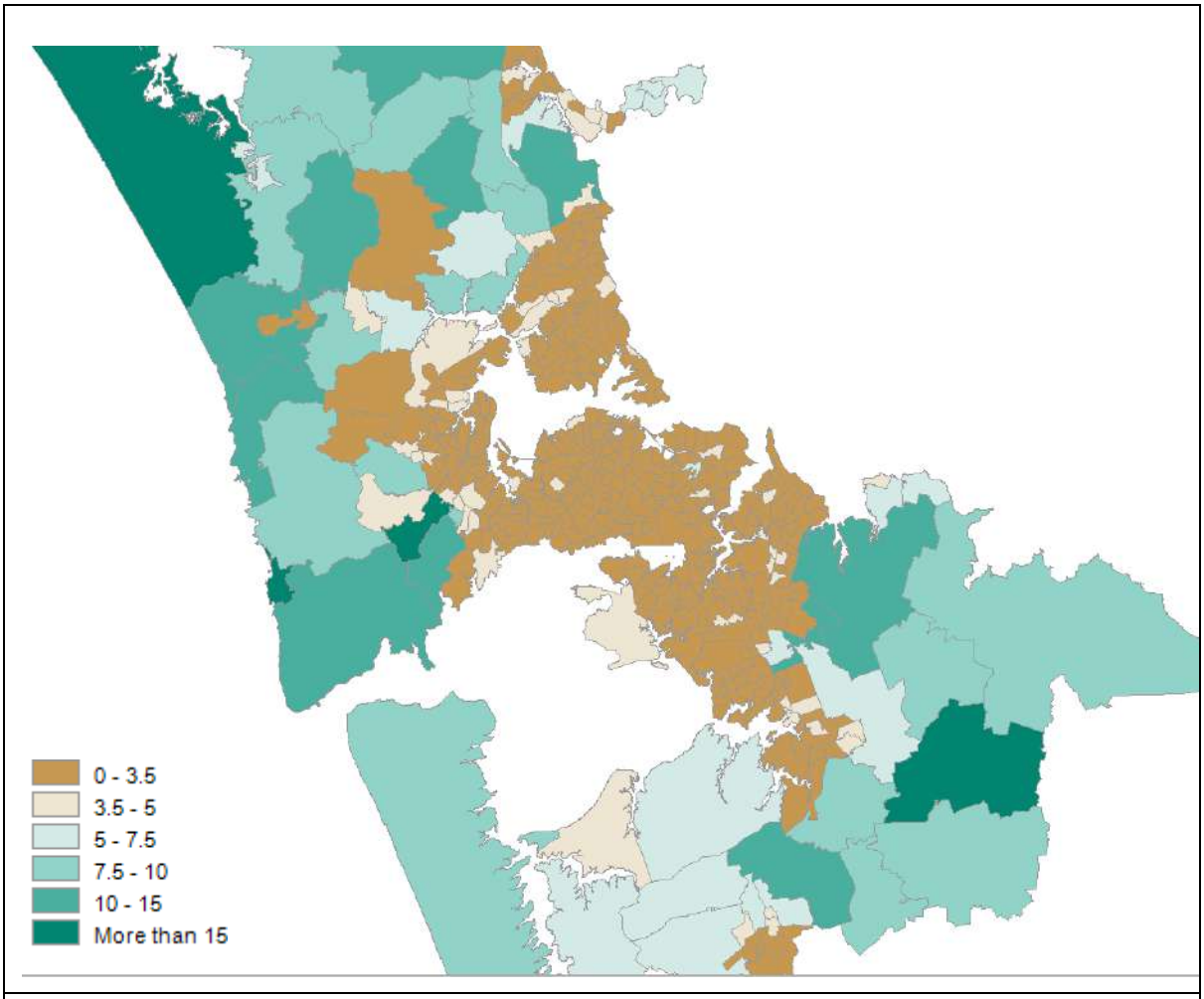


Figure 27.4
Under 13 - Average distance (kms) all modes by origin

Overall, within the region, journey lengths for educational trips are low in the main urban areas but increase in the more peripheral rural areas where population densities are low and students may need to travel substantial distances to their local schools.

27.3 13-17 year olds

27.3.1 Modal shares

For the 13-17 age group, the active mode share is set out in Figure 27.5.

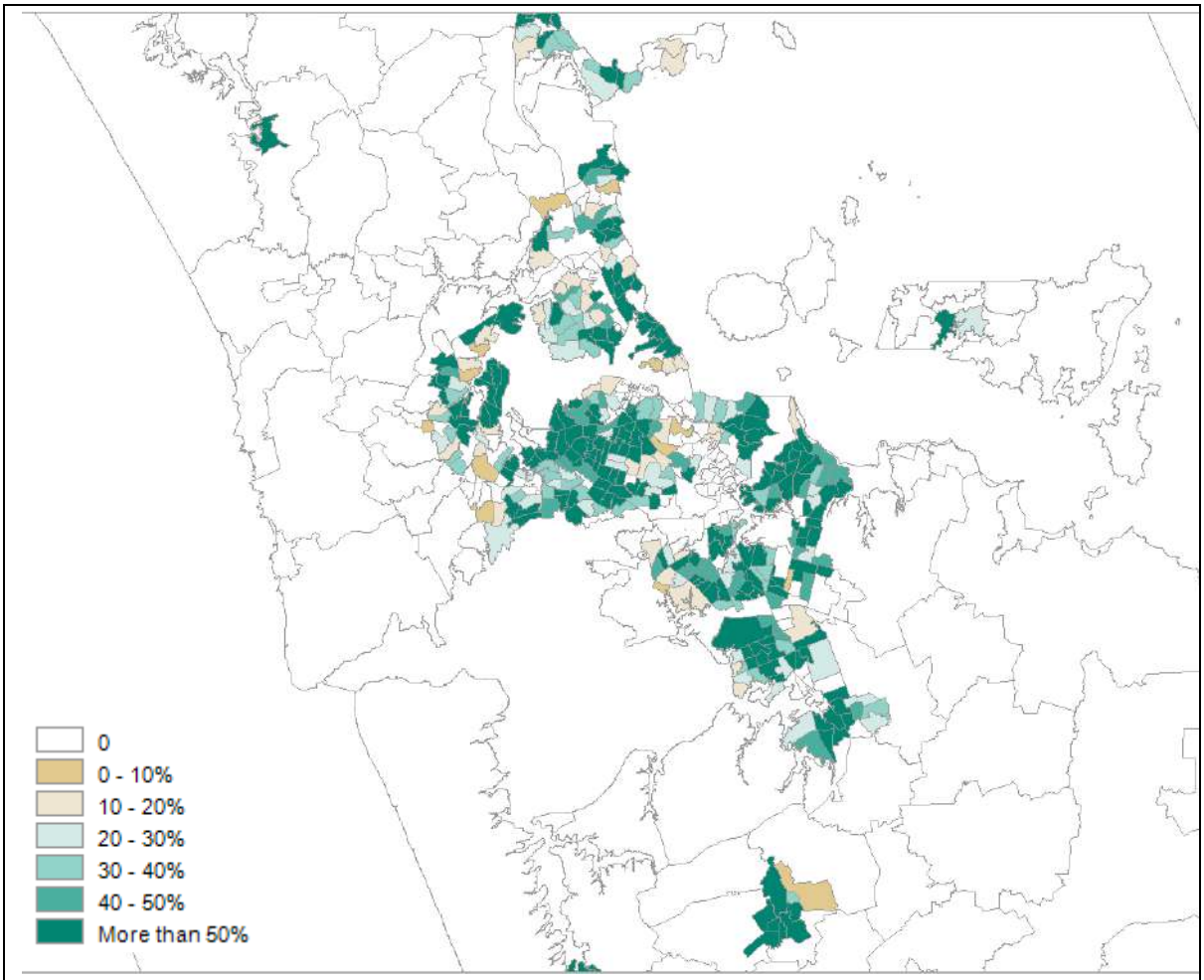


Figure 27.5
13-17 year olds - Active mode share by origin

With the older 13-17 year old students typically travelling further but with less reliance on private cars, the overall active mode share remains broadly unchanged compared to the younger age group. The spatial pattern is broadly similar with a high share across most of the Isthmus around the Harbour and along a spine further north and south from the North Shore to Papakura. There is a relatively low share along the SH1 and rail corridor between Penrose and Newmarket.

The public transport mode share is set out in Figure 27.6.

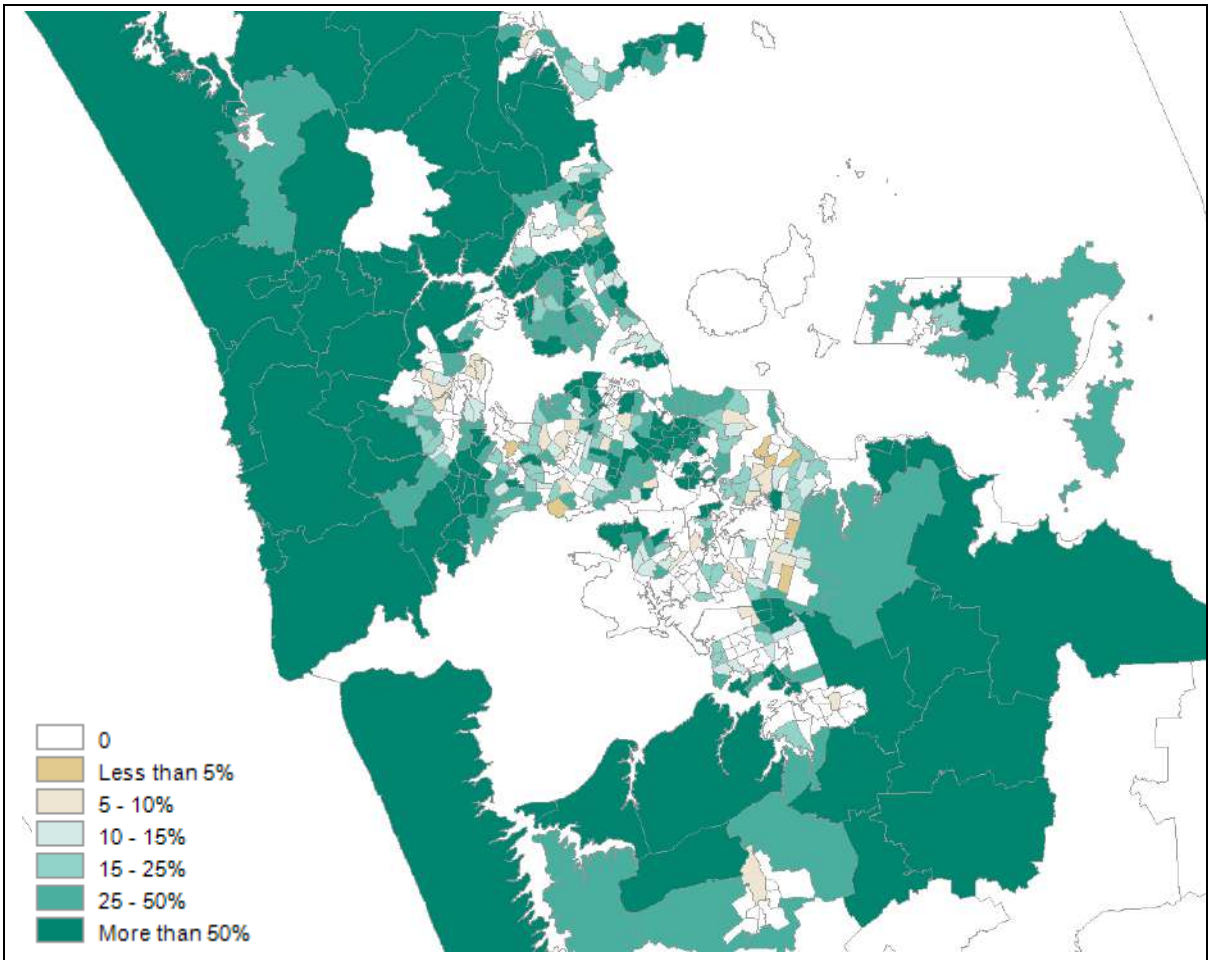


Figure 27.6
13-17 year olds - public transport mode share by origin

The use of public transport for the 13-17 year olds is high in the rural peripheries of the region where the population density is low and secondary schools have wide catchment areas. There are also areas closer in where there is a dense network of public transport routes and the resulting mode shares are high. This is the position across the lower parts of the Isthmus and across the North Shore south of Albany.

The private car modal share for the 13-17 year olds is set out in Figure 27.7.

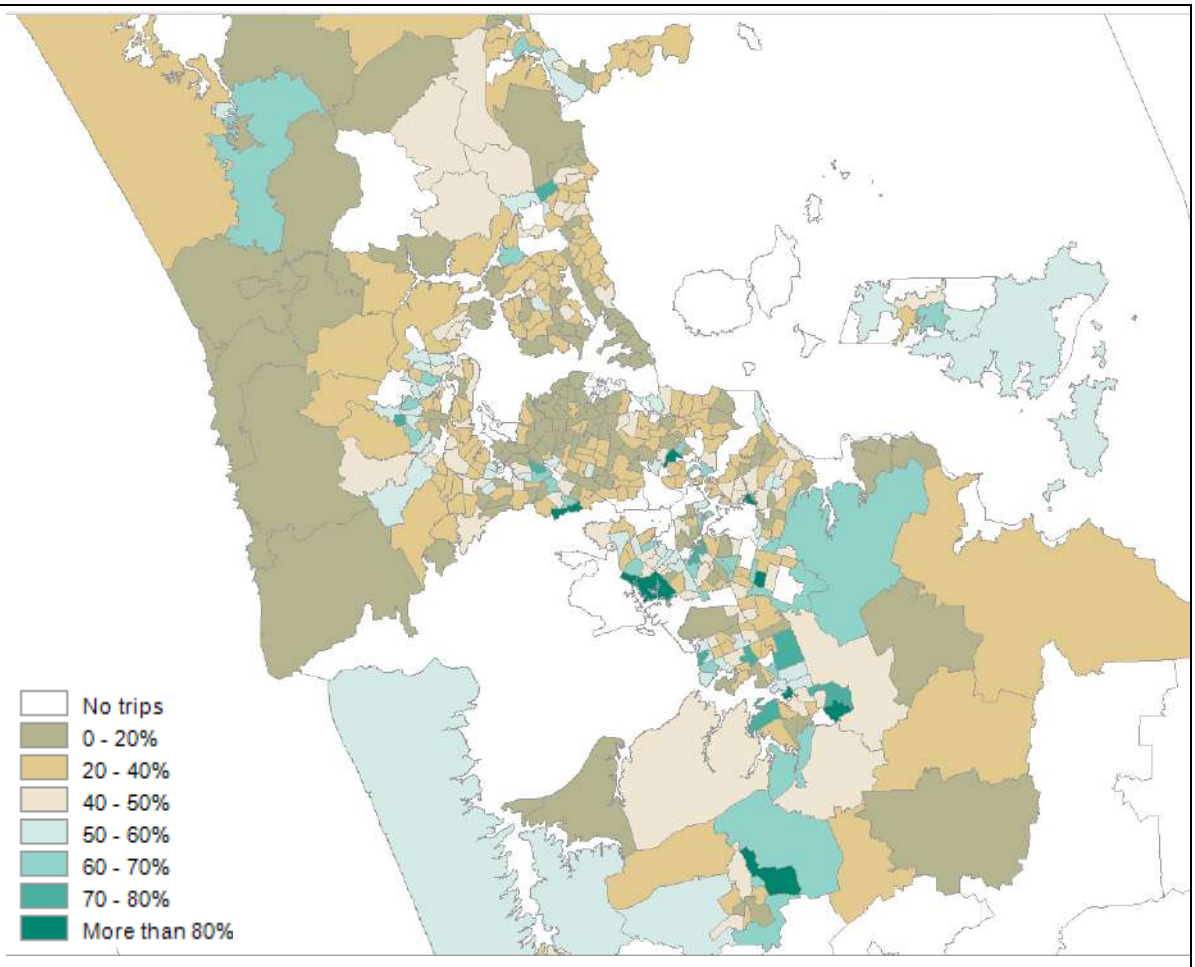


Figure 27.7
13-17 year olds - private car mode share by origin

In general, the private car mode share is low as students seek independent ways of travel to school, although there are scattered areas with a higher share across the area, presumably reflecting particular local conditions and the ability of some of the older students to drive their own vehicles.

27.3.2 Distance

The average distances travelled by 13-17 year old students are set out in Figure 27.8.

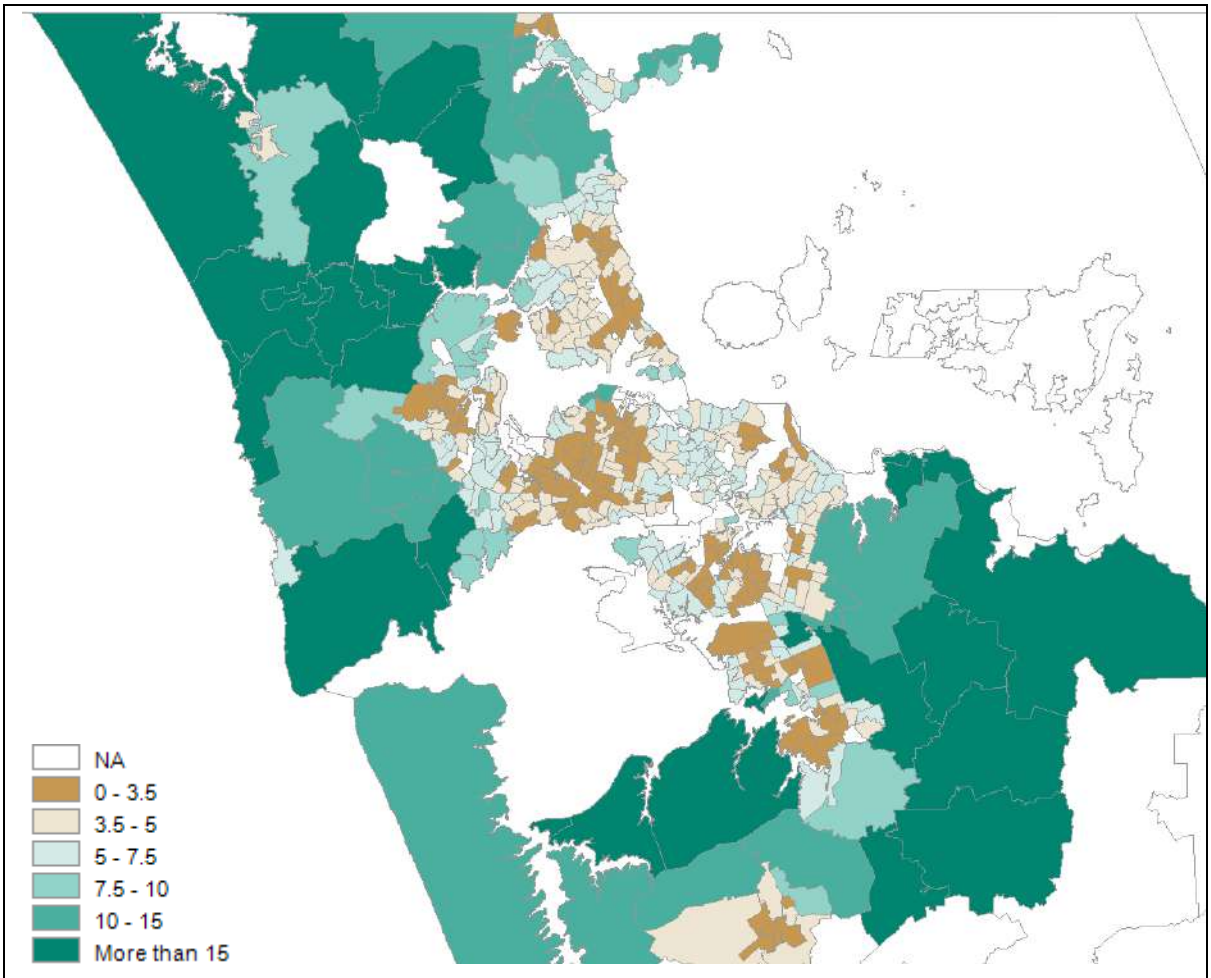


Figure 27.8
13-17 year olds - Average distance (kms) all modes by origin

Distances are typically longer for the areas on the periphery of the region. By contrast they are shorter for the west of the Isthmus, areas south of the Manger Inlet and up along the North Shore. These short distances presumably reflect the locations of schools and the extent to which students attend their neighbourhood school, with the longer distances reflecting students travelling further afield to be able to access alternative facilities.

27.4 Over 17-year olds

27.4.1 Modal shares

For the over 17 age group, the active mode share is set out in Figure 27.9.

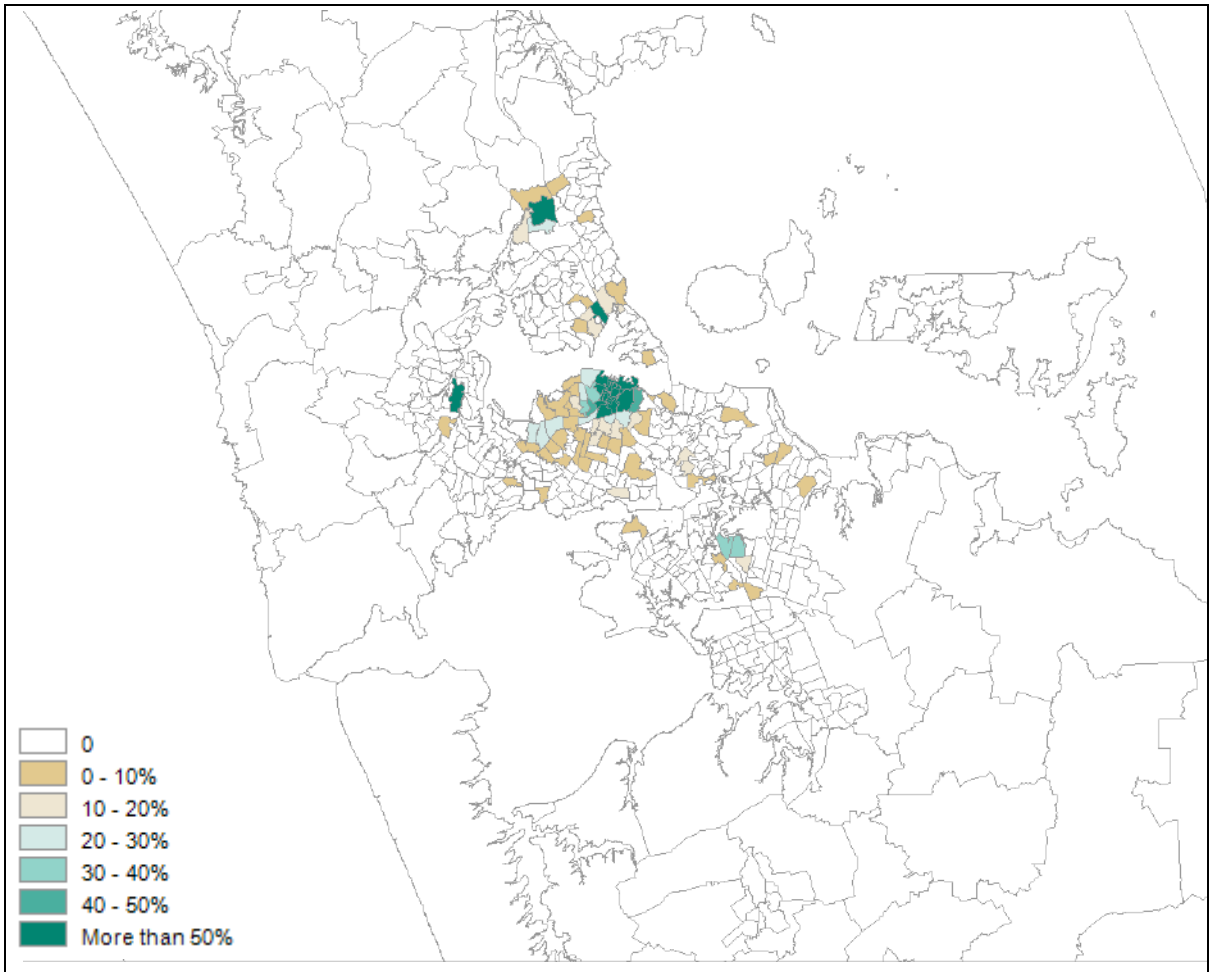


Figure 27.9
Over 17s - active mode share by origin

The use of active modes is very limited away from the central city areas, in general being confined to areas adjacent to the main tertiary establishments.

The use of public transport is set out in Figure 27.10

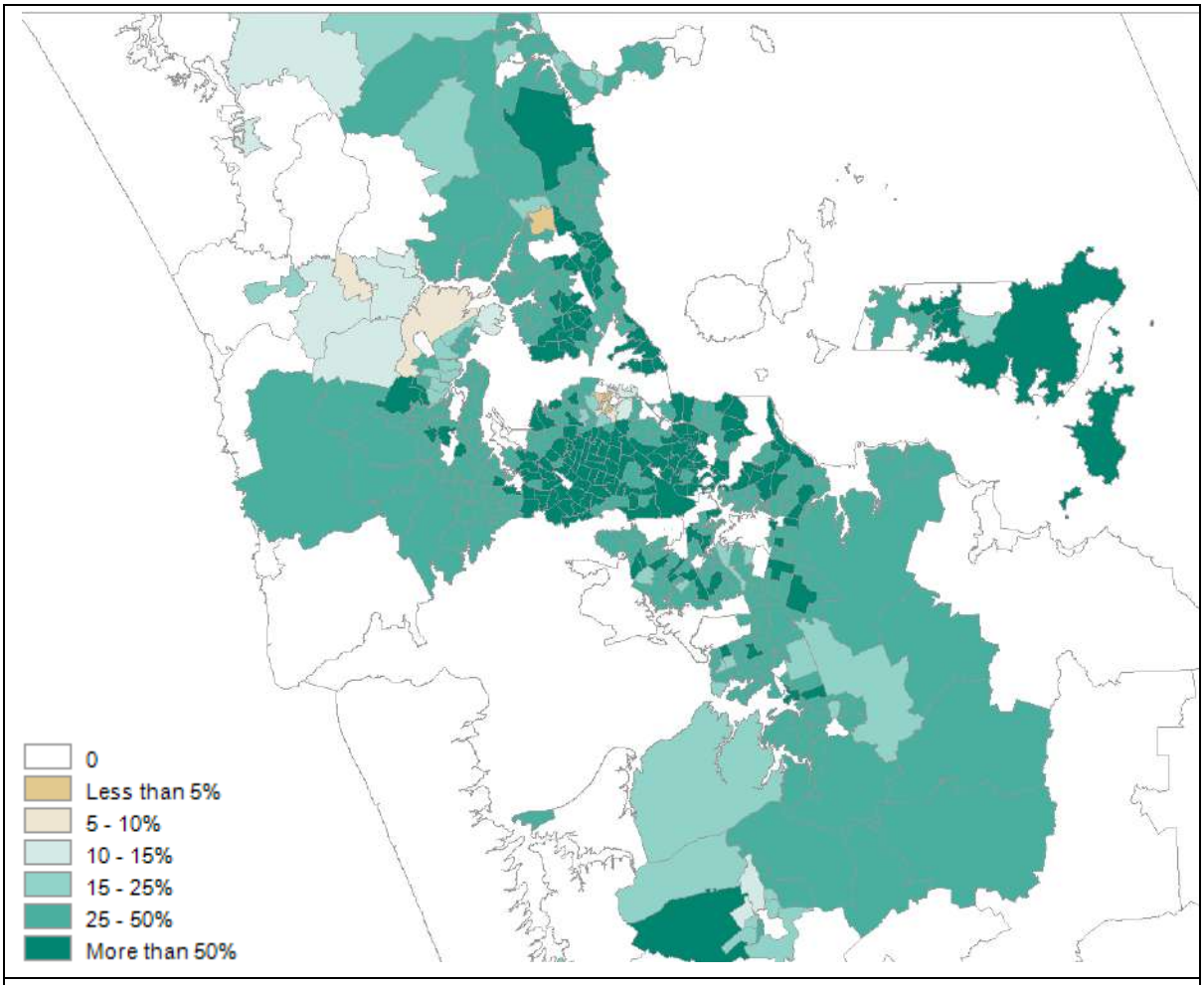


Figure 27.10
Over 17s - public transport mode share by origin

Because of the limited number of tertiary establishments, the distances students have to travel to reach these is long and as a result public transport has a larger share of the total movements, particularly in the Isthmus where the use of private car may be less attractive.

The use of private cars is set out in Figure 27.11.

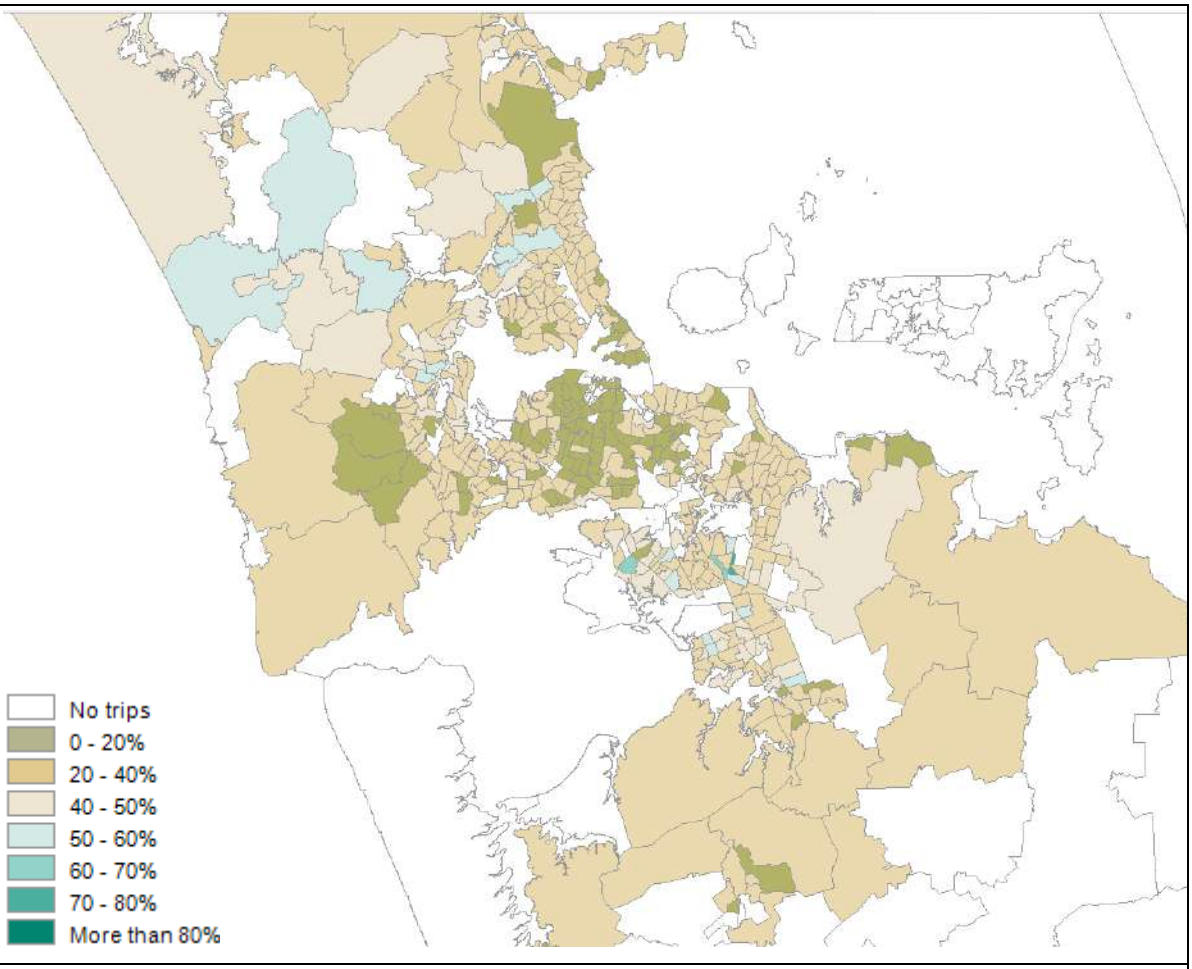


Figure 27.11
Over 17s - private car mode share by origin

The private car share is relatively low across the region as a whole but is particularly low over much of the Isthmus.

27.4.2 Distance

The average distance travelled by the over 17s to education is set out in Figure 27.12

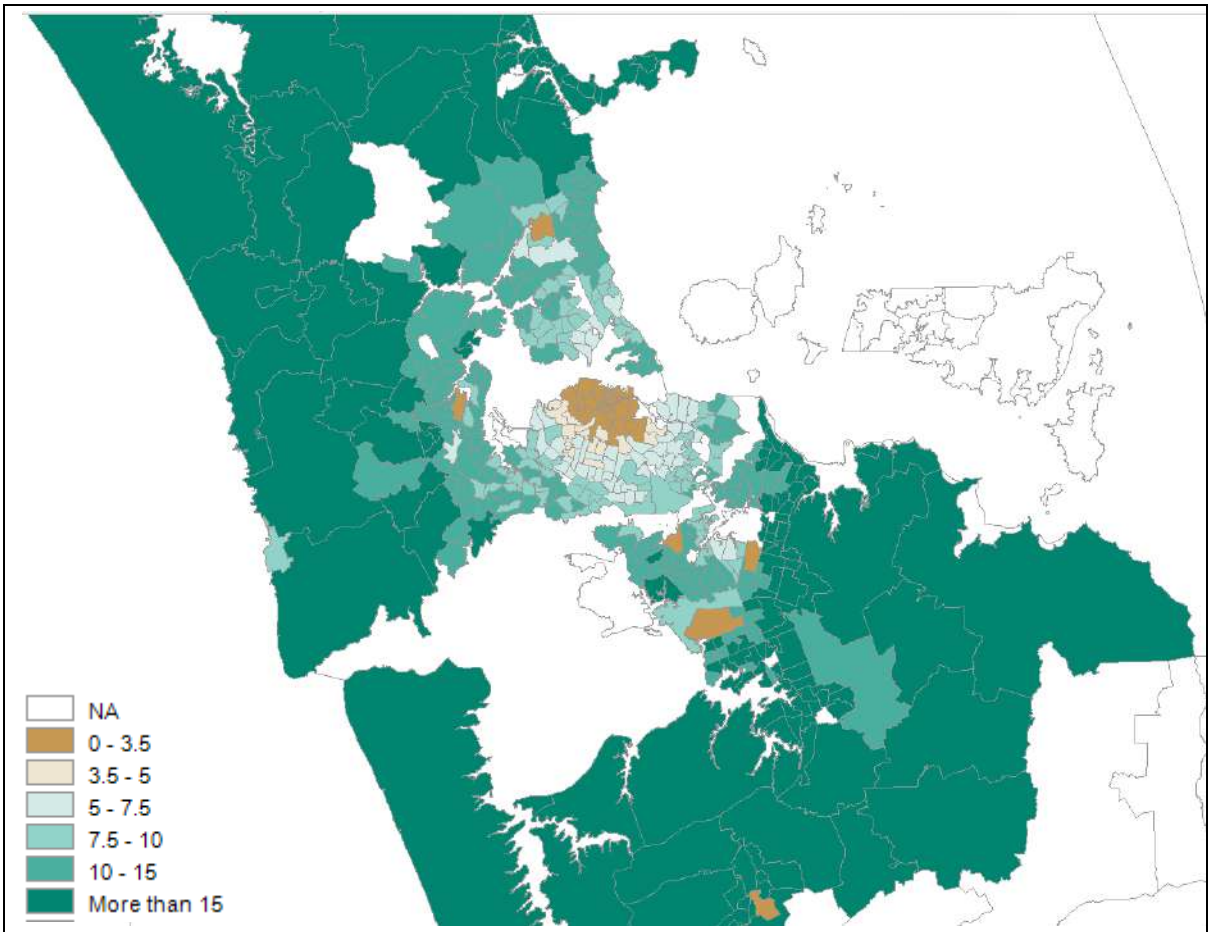


Figure 27.12
Over 17s - Average distance (kms) all modes by origin

In general, the picture is one of short distances in the central city increasing away from the centre, but with areas of relatively low distances around the major tertiary establishments in the suburbs, including Massey and MIT.

28 Journey patterns for selected origins

Key highlights

- **For the under 13s**
  - The car shares are low for the City Centre, Newmarket and Westlake/Takapuna
  - The car shares are relatively high for the newly developing areas of Hingaia/Karaka, Addison, Westgate and Silverdale and also from New Lynn.
  - There are high active mode shares for the City Centre, Newmarket and Westlake/Takapuna and low shares for Hingaia/Karaka, New Lynn, Silverdale, Addison and Westgate.
  - Public transport use is high in the City Centre, Newmarket and Dannemora (which has high school bus use).
- **For the 13-17s**
  - The active mode share is low for the newly developing areas of Hingaia/Karaka, Stonefields and Silverdale. It is also low for New Lynn. It is relatively high for the existing centres of Newmarket, the City Centre, Henderson and Westlake-Takapuna and generally high for other areas to the south
  - The public transport share is high for Stonefields, New Lynn and Silverdale. In contrast it is low for Westgate and the southern areas of Takaanini South-Addison, Papakura and Pukekohe
  - The car share is low for the City Centre, Newmarket and Westlake/Takapuna. It is relatively high for the newly developing areas of Hingaia/Karaka, Westgate, and Addison and also Dannemora
- **For the over 17s**
  - Active mode use is high in the City Centre, Newmarket and Albany, areas close to the major establishments. It is low elsewhere.
  - Public transport use is low in the City Centre and Albany. It is also relatively low in areas furthest away from the centre, especially to the north and west including Hobsonville and Westgate, and in Pukekohe to the south. It is highest in Newmarket and Stonefields.
  - The car mode share is very low for the City Centre and Newmarket. It is highest for Hobsonville and Westgate to the west and in Takaanini South-Addison to the south, all of which are newly developing areas.

28.1 Introduction

As in the case of the analysis of the journey to work movements, the patterns of trip making for journey to education trips have been also been examined for selected origins and destinations. The origins examined are the same as those used for the journey to work analysis and are set out in Figure 20.1. The destinations reported in the following section include the major tertiary educational establishments across the region.

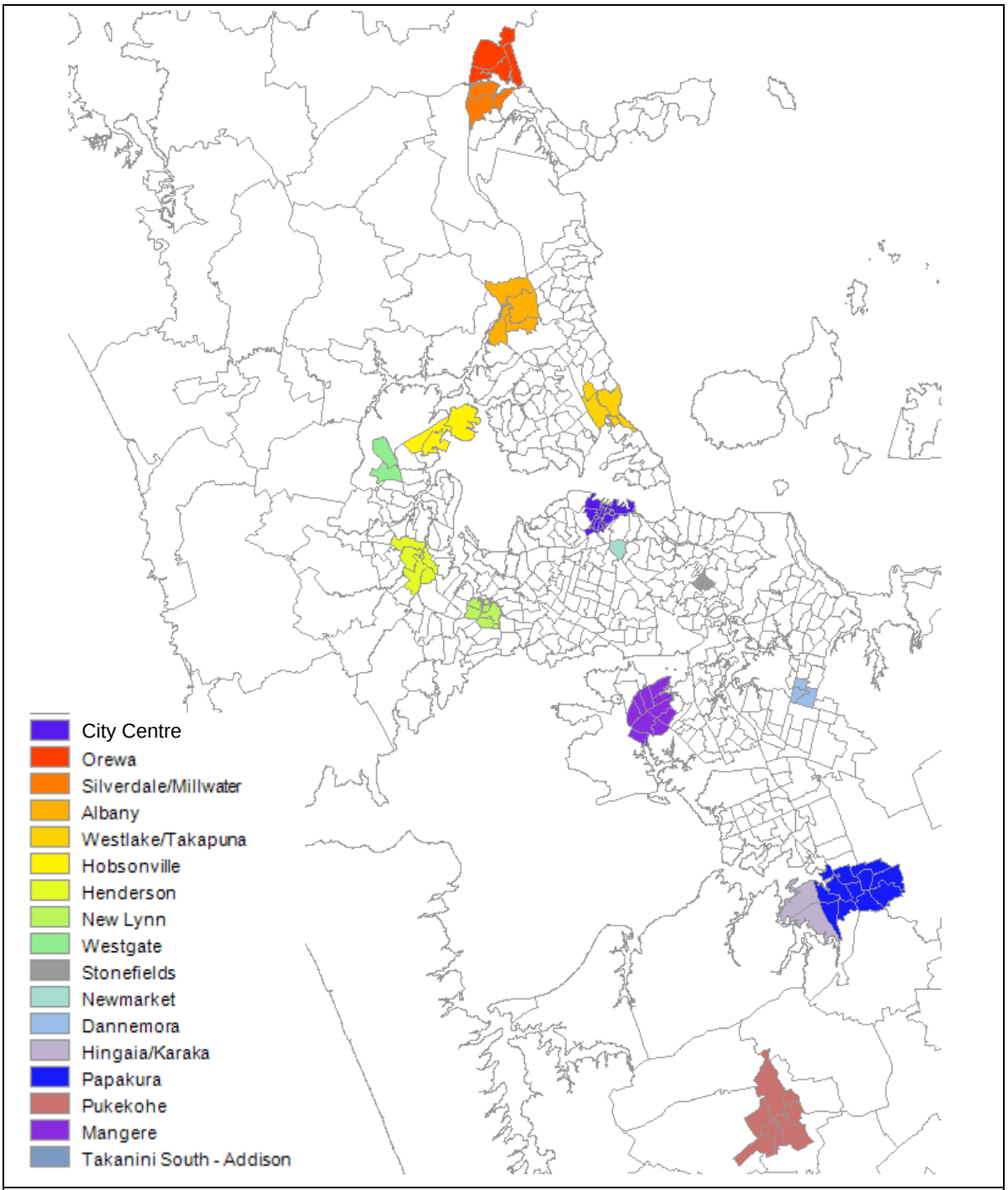


Figure 28.1
Selected residential areas

28.2 Journeys from selected origins - under 13s

The total numbers of educational journeys for the under13s from the selected areas is set out in Figure 28.2.

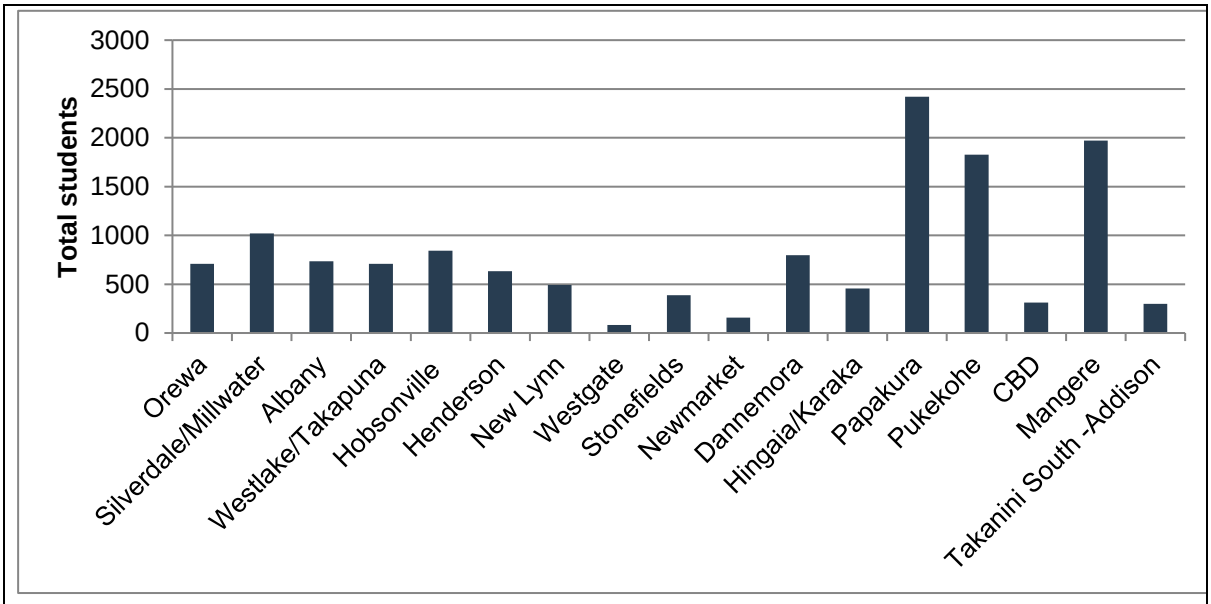


Figure 28.2
Journeys to education from the selected areas - Under 13s

The modal shares for the education trips made by the Under 13s are set out in Table 28.1.

Table 28.1
Modal share of journeys to education from selected origins 2018 - Under 13s

Origin area	Study at home	Total car	Bicycle	Walk or jog	School bus	Public bus	Train	Ferry	Total public transport
Orewa	0.0%	71.0%	3.2%	25.8%	0.0%	0.0%	0.0%	0.0%	0.0%
Silverdale/ Millwater	0.0%	74.6%	3.1%	18.2%	4.1%	0.0%	0.0%	0.0%	4.1%
Albany	0.0%	66.1%	3.9%	27.0%	3.0%	0.0%	0.0%	0.0%	3.0%
Westlake/ Takapuna	0.0%	39.8%	8.1%	50.7%	1.4%	0.0%	0.0%	0.0%	1.4%
Hobsonville	0.0%	50.2%	5.9%	41.9%	2.0%	0.0%	0.0%	0.0%	2.0%
Henderson	3.1%	65.1%	0.0%	30.8%	1.0%	0.0%	0.0%	0.0%	1.0%
New Lynn	0.0%	77.2%	0.0%	21.3%	0.0%	1.5%	0.0%	0.0%	1.5%
Westgate	0.0%	75.0%	0.0%	25.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Stonefields	0.0%	50.4%	3.4%	46.2%	0.0%	0.0%	0.0%	0.0%	0.0%
Newmarket	0.0%	28.3%	0.0%	60.9%	0.0%	10.9%	0.0%	0.0%	10.9%
Dannemora	0.0%	54.7%	0.0%	37.9%	7.3%	0.0%	0.0%	0.0%	7.3%
Hingaia/ Karaka	0.0%	81.4%	2.1%	14.5%	2.1%	0.0%	0.0%	0.0%	2.1%
Papakura	2.8%	66.5%	0.0%	28.6%	2.1%	0.0%	0.0%	0.0%	2.1%
Pukekohe	0.5%	72.0%	0.0%	26.5%	0.9%	0.0%	0.0%	0.0%	0.9%
City Centre	0.0%	9.6%	0.0%	74.0%	0.0%	16.4%	0.0%	0.0%	16.4%
Māngere	0.7%	58.2%	0.3%	36.2%	3.9%	0.3%	0.0%	0.0%	4.2%
Takaanini South-Addison	0.0%	76.9%	0.0%	23.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Total selected areas	**0.8%**	**62.8%**	**1.6%**	**31.9%**	**2.3%**	**0.5%**	**0.0%**	**0.0%**	**2.8%**
Region	**0.6%**	**62.1%**	**1.5%**	**30.7%**	**4.4%**	**0.4%**	**0.2%**	**0.0%**	**5.0%**

The shares of active mode, public transport and car users are set out in Figure 28.3.

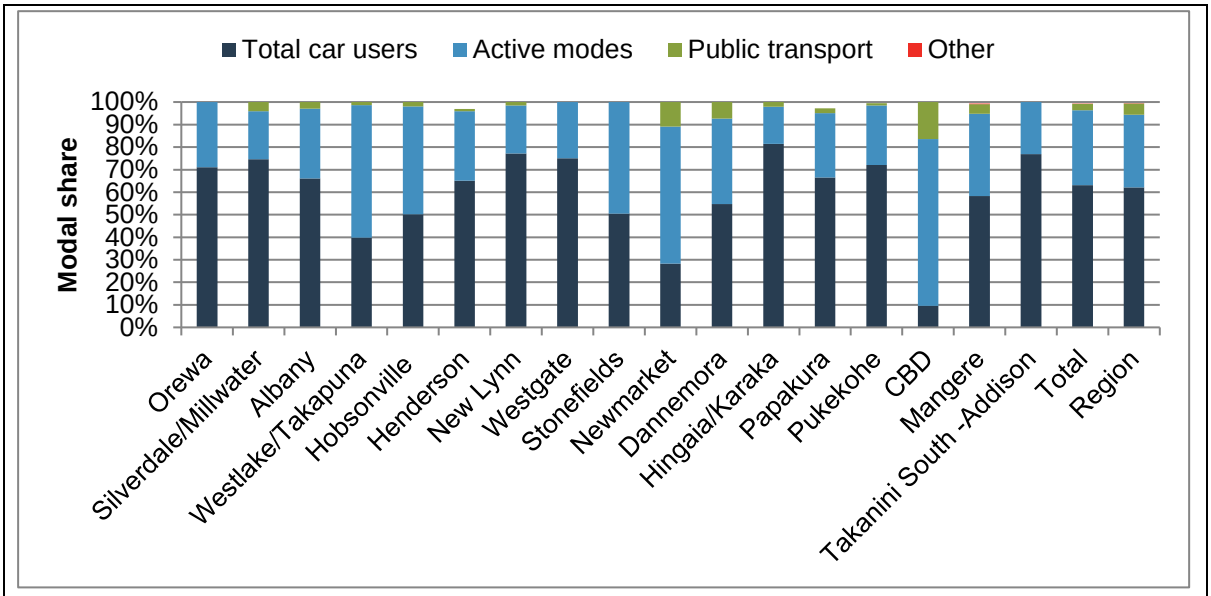


Figure 28.3
Modal shares for education trips from selected areas - Under 13s

The key points from this include:

- Low car shares for trips from the City Centre, Newmarket and Westlake/Takapuna
- Relatively high car shares from the newly developing areas of Hingaia/Karaka, Addison, Westgate and Silverdale and also from New Lynn.
- High active mode shares for the City Centre, Newmarket and Westlake/Takapuna and low shares for Hingaia/Karaka, New Lynn, Silverdale, Addison and Westgate.
- Public transport use is high in the City Centre, Newmarket and Dannemora (which has high school bus use).

28.3 Journeys from selected origins - 13-17 years

The numbers of journeys for education for each of the selected areas are set out in Figure 28.4.

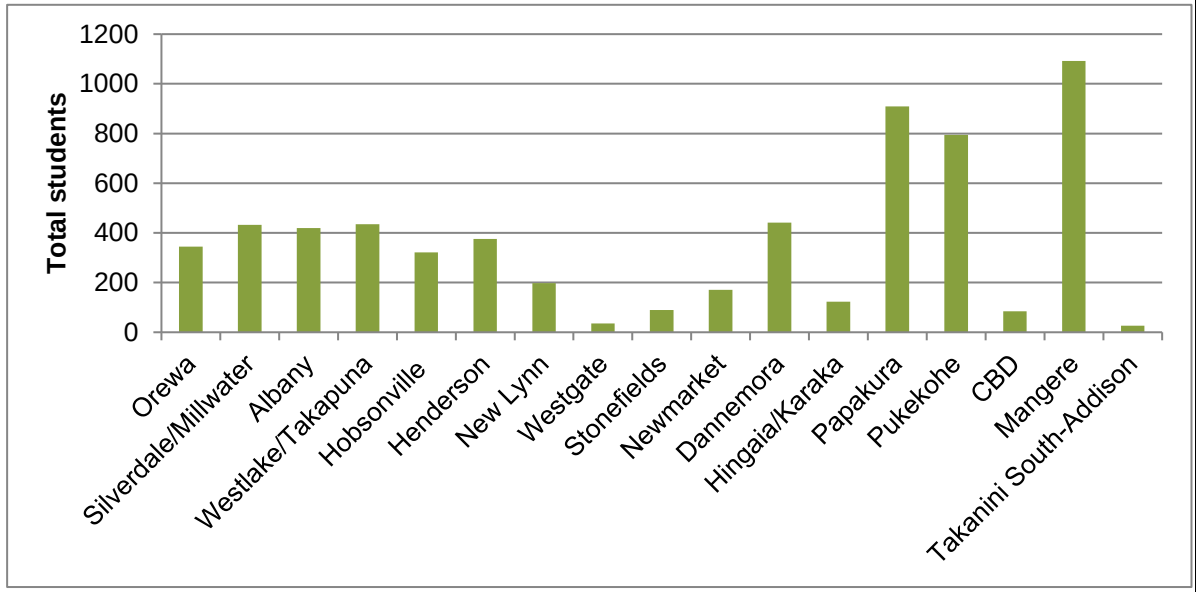


Figure 28.4
Journeys to education from the selected areas - 13-17s

The modal shares for the education trips made by the 13-17 year old students are set out in Table 28.2.

Table 28.2
Modal share of journeys to education from selected origins 2018 - 13-17

Origin area	Study at home	Total car	Bicycle	Walk or jog	School bus	Public bus	Train	Ferry	Total public transport
Orewa	0.0%	42.2%	2.0%	50.0%	2.9%	2.9%	0.0%	0.0%	5.9%
Silverdale/ Millwater	0.0%	32.7%	8.2%	27.3%	22.7%	9.1%	0.0%	0.0%	31.8%
Albany	0.0%	45.0%	1.8%	37.8%	6.3%	9.0%	0.0%	0.0%	15.3%
Westlake/ Takapuna	0.0%	10.4%	7.0%	65.2%	7.8%	9.6%	0.0%	0.0%	17.4%
Hobsonville	0.0%	30.6%	7.1%	36.5%	16.5%	9.4%	0.0%	0.0%	25.9%
Henderson	2.5%	20.3%	0.0%	67.1%	7.6%	2.5%	2.5%	0.0%	12.7%
New Lynn	0.0%	42.9%	0.0%	9.5%	14.3%	23.8%	9.5%	0.0%	47.6%
Westgate	0.0%	50.0%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Stonefields	0.0%	42.9%	0.0%	0.0%	57.1%	0.0%	0.0%	0.0%	57.1%
Newmarket	0.0%	9.4%	0.0%	81.1%	0.0%	5.7%	3.8%	0.0%	9.4%
Dannemora	2.5%	52.9%	1.7%	38.7%	0.0%	6.7%	0.0%	0.0%	6.7%
Hingaia/ Karaka	0.0%	57.1%	10.7%	25.0%	7.1%	0.0%	0.0%	0.0%	7.1%
Papakura	2.1%	37.8%	0.0%	61.4%	0.0%	0.8%	0.0%	0.0%	0.8%
Pukekohe	3.0%	37.7%	0.0%	61.5%	0.9%	0.0%	0.0%	0.0%	0.9%
City Centre	0.0%	0.0%	0.0%	75.0%	0.0%	25.0%	0.0%	0.0%	25.0%
Māngere	0.6%	29.1%	0.6%	57.9%	7.8%	4.5%	0.0%	0.0%	12.3%
Takaanini South-Addison	0.0%	50.0%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	**1.1%**	**33.8%**	**2.1%**	**52.6%**	**6.2%**	**4.9%**	**0.5%**	**0.0%**	**11.5%**
Region	**0.5%**	**30.0%**	**1.1%**	**38.8%**	**18.9%**	**8.9%**	**2.1%**	**0.0%**	**30.0%**

The shares of the individual modes are illustrated in Figure 28.5.

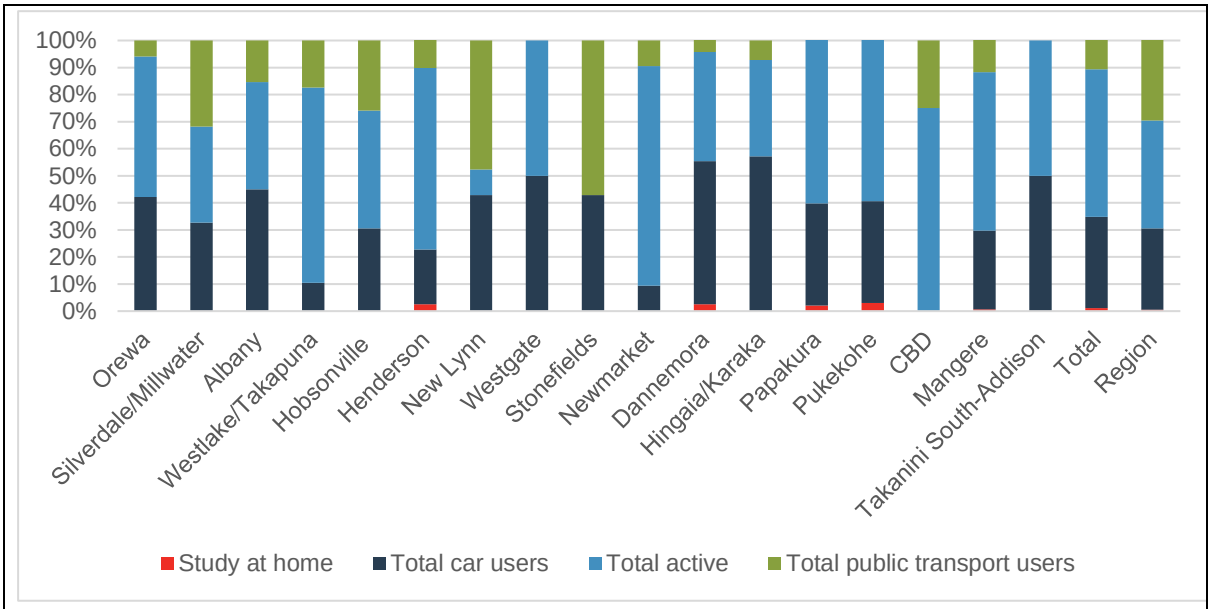


Figure 28.5
Modal shares for education trips from selected areas - 13-17

For the 13-17 year olds travelling to education, the key findings are:

- The active mode share is low for the newly developing areas of Hingaia/Karaka, Stonefields and Silverdale. It is also low for New Lynn. It is relatively high for the existing centres of Newmarket, the City Centre, Henderson and Westlake-Takapuna and generally high for other areas to the south
- The public transport share is high for Stonefields, New Lynn and Silverdale. It is low for Westgate and the southern areas of Takaanini South-Addison, Papakura and Pukekohe.
- The car share is low for the City Centre, Newmarket and Westlake/Takapuna. It is relatively high for the newly developing areas of Hingaia/Karaka, Westgate, and Addison and also Dannemora

28.4 Journeys from selected origins - Over 17 years

The total numbers of journeys to education from the selected areas for the over 17 age group are set out in Figure 28.6.

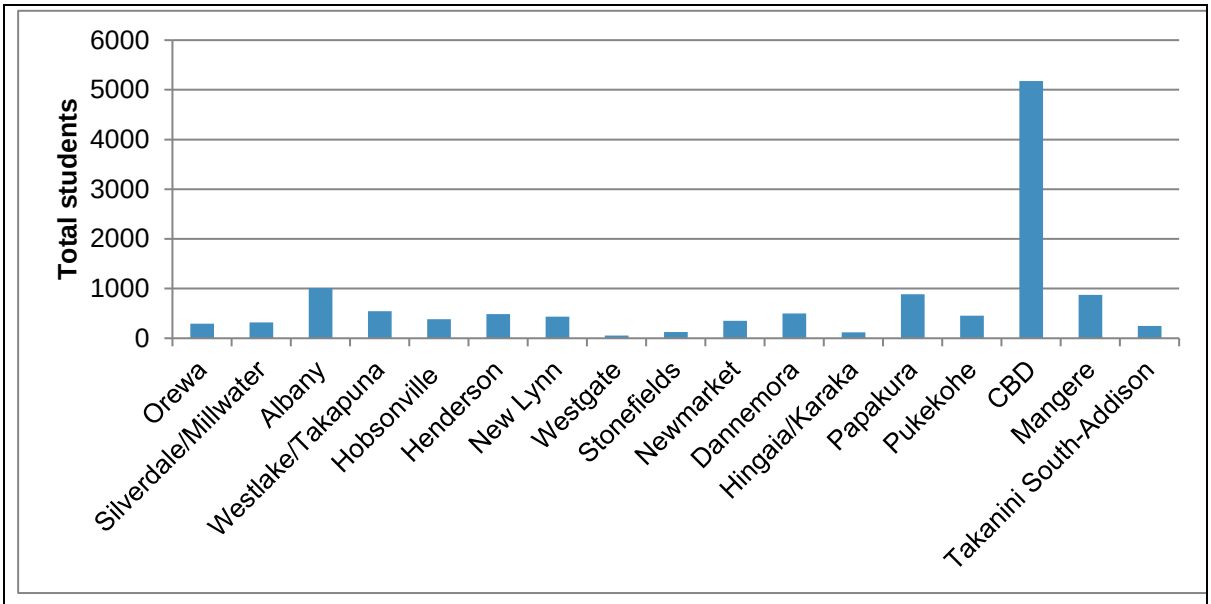


Figure 28.6
Journeys to education from the selected areas - Over 17s

This highlights the very large number of tertiary students living in the City Centre

The modal shares for the education trips made by the 13-17 year old students are set out in Table 28.3.

Table 28.3
Modal share of journeys to education from selected origins 2018 - Over 17

Origin area	Study at home	Total car	Bicycle	Walk or jog	School bus	Public bus	Train	Ferry	Total public transport
Orewa	41.9%	29.1%	0.0%	0.0%	0.0%	29.1%	0.0%	0.0%	29.1%
Silverdale/ Millwater	38.5%	30.8%	0.0%	0.0%	0.0%	30.8%	0.0%	0.0%	30.8%
Albany	12.4%	37.1%	0.0%	26.4%	0.0%	24.1%	0.0%	0.0%	24.1%
Westlake/ Takapuna	20.1%	23.9%	0.0%	7.5%	0.0%	48.4%	0.0%	0.0%	48.4%
Hobsonville	31.1%	44.3%	0.0%	0.0%	0.0%	13.2%	0.0%	11.3%	24.5%
Henderson	23.4%	29.7%	0.0%	1.6%	0.0%	7.0%	38.3%	0.0%	45.3%
New Lynn	23.8%	26.7%	0.0%	2.9%	0.0%	21.9%	24.8%	0.0%	46.7%
Westgate	33.3%	40.0%	0.0%	0.0%	0.0%	26.7%	0.0%	0.0%	26.7%
Stonefields	21.1%	23.7%	0.0%	0.0%	0.0%	31.6%	23.7%	0.0%	55.3%
Newmarket	10.5%	3.8%	3.8%	22.9%	1.9%	48.6%	6.7%	0.0%	57.1%
Dannemora	14.9%	35.8%	0.0%	0.0%	0.0%	44.8%	4.5%	0.0%	49.3%
Hingaia/ Karaka	35.1%	27.0%	0.0%	0.0%	0.0%	0.0%	37.8%	0.0%	37.8%
Papakura	36.8%	29.6%	0.0%	0.0%	0.0%	0.0%	33.6%	0.0%	33.6%
Pukekohe	59.4%	24.2%	0.0%	0.0%	0.0%	0.0%	16.4%	0.0%	16.4%
City Centre	9.0%	0.8%	0.1%	84.7%	0.1%	5.3%	0.0%	0.0%	5.4%
Māngere	25.6%	26.5%	0.0%	0.9%	0.0%	33.3%	11.1%	2.6%	47.0%
Takaanini South-Addison									
Total	**20.0%**	**18.8%**	**0.1%**	**35.5%**	**0.1%**	**16.6%**	**8.1%**	**0.6%**	**25.4%**
Region	**22.2%**	**25.1%**	**0.4%**	**12.3%**	**0.3%**	**30.3%**	**8.1%**	**1.2%**	**39.8%**

The shares of the individual modes are illustrated in **Error! Reference source not found.**.

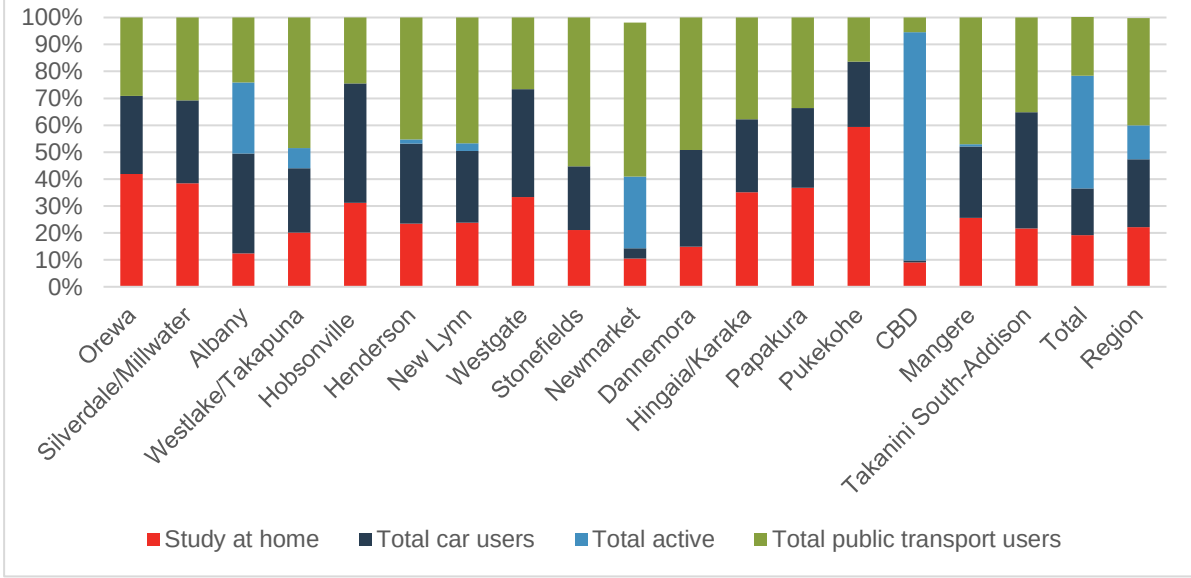


Figure 28.7
Modal shares for education trips from selected areas - Over 17s - active modes

The main points from this are:

- Active mode use is high in the City Centre, Newmarket and Albany, areas which are close to the major tertiary establishments. It is low elsewhere.
- Almost all the recorded active mode trips are by pedestrians. The numbers of cyclists recorded are low although this may be affected by the issues with the data and the exclusions of small trip movements.
- Public transport use is low in the City Centre, reflecting the proximity to a number of the major tertiary establishments and in Albany possibly for similar reasons. It is also relatively low in areas furthest away from the centre, especially to the north and west including Hobsonville and Westgate, and in Pukekohe to the south. It is highest in Newmarket and Stonefields.
- The car mode share is very low for the City Centre and Newmarket where it is less than 1 per cent and 4 per cent respectively. It is highest for Hobsonville and Westgate to the west and in Takaanini South-Addison to the south, all of which are newly developing areas.

29 Journeys to selected destinations for students over 17

Key highlights

- The Auckland University zone (which also includes AUT) accounts for over half the travel to education of tertiary students in the Auckland region.
- For these students, almost half use buses and 15 per cent use other forms of public transport, giving a total public transport share of almost two-thirds. Of the balance about 20 per cent travel by car and 16 per cent travel by active modes.
- Car use is high for Albany Central (Massey), Mount Albert West (Unitec) and Ōtara Central (MIT), facilities away from the central area and where parking is relatively easy
- Active mode use is high for Akoranga - (AUT) and Epsom Central North (UoA Faculty of Education). It is very low for MIT in Ōtara.
- Public transport use is low at Mount Albert West (Unitec)

Trip patterns have also been examined for movements to the main tertiary establishments in the region, which account for about 75 per cent of education journeys by those aged over 17.

These are set out in Table 29.1 and Figure 29.1.

Table 29.1
Students over 17 - Modal shares for education journeys to selected destinations 2018

Trip destination SA2 and educational establishment			Modal shares					
	Total all modes	Sum of individ-ual modes	Study at home	Total car users	Bicycle	Walk or jog	Public and school bus	Other PT
Albany Central -Massey	3,804	3,165	0.3%	81.2%	0.0%	7.3%	11.2%	0.0%
Akoranga AUT	840	384	0.0%	61.7%	0.0%	25.8%	12.5%	0.0%
Mount Albert West - Unitec	1,893	1,098	1.9%	81.1%	0.0%	12.0%	3.3%	1.6%
Queen Street - Various	4,692	2,781	1.2%	57.3%	0.0%	17.3%	20.2%	4.1%
Auckland-University	37,899	34,851	0.0%	19.6%	0.6%	15.5%	48.5%	15.4%
Epsom Central-North UoA Faculty of Education	1,434	549	3.3%	59.6%	0.0%	24.6%	12.6%	0.0%
Ōtara Central - MIT	3,123	2,244	0.4%	82.9%	0.0%	2.7%	11.6%	2.4%
Total selected areas	**53,685**	**45,072**	**0.2%**	**31.7%**	**0.5%**	**14.5 %**	**40.5%**	**12.3 %**
Regional Total	71,004	60,165	22.2%	25.1%	0.4%	12.3%	30.6%	9.2%

* Note: It should be noted that the category "Auckland-University" refers to both the University of Auckland and Auckland University of Technology campuses in the City Centre; and the "Queen Street" category covers many smaller tertiary institutes located along Queen Street.

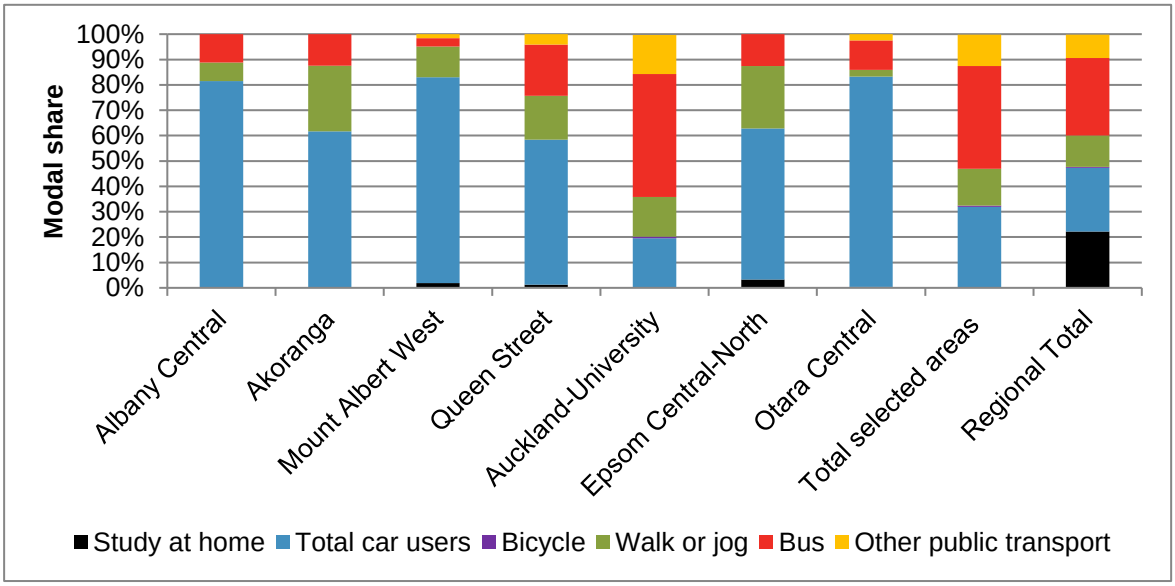


Figure 29.1
Students over 17 - Journeys to education - Modal shares to selected centres

The key points from this analysis are:

- The Auckland University zone (which also includes AUT) accounts for over half the travel to education of tertiary students in the Auckland region.
- For these students, almost half use buses and 15 per cent use other forms of public transport, giving a total public transport share of almost two-thirds. Of the balance about 20 per cent travel by car and 16 per cent travel by active modes.
- Car use is high for Albany Central (Massey), Mount Albert West (Unitec) and Ōtara Central (MIT), facilities away from the central area and where parking is relatively easy
- Active mode use is high for Akoranga (AUT) and Epsom Central North (UoA Faculty of Education). It is very low for MIT in Ōtara
- Public transport use is low at Mount Albert West (Unitec)

30 Impacts of social deprivation

Key highlights

- In general, linkages between the modal shares and the Social Deprivation Index appear to be relatively limited for the Under 13 age group.
- There are stronger linkages for the 13-17 age group. The strongest (albeit still fairly weak) relationship is for the level of public transport use which declines as the level of deprivation increases. This appears to be balanced by a higher level of active mode use.

30.1 Introduction

An analysis has also been undertaken to examine whether there is any linkage between levels of social deprivation as measured by the Social Deprivation Index (SDI) and scores and the patterns of educational trip making. This has been undertaken at two levels, the first looking at the journey patterns for selected areas and the second more detailed statistical analysis of the overall position

30.2 Deprivation indices

Updated deprivation scores have been produced by the University of Otago[6] and converted to the indices displayed in Figure 21.1. The greater the index, which ranges from 1 to 10, the higher is the level of social deprivation. These measures broadly combine measures of income, housing ownership and condition, and education.

[6] Atkinson J, Salmond C, Crampton P (2019). NZDep2018 Index of Deprivation, Interim Research Report, December 2019. Wellington: University of Otago.

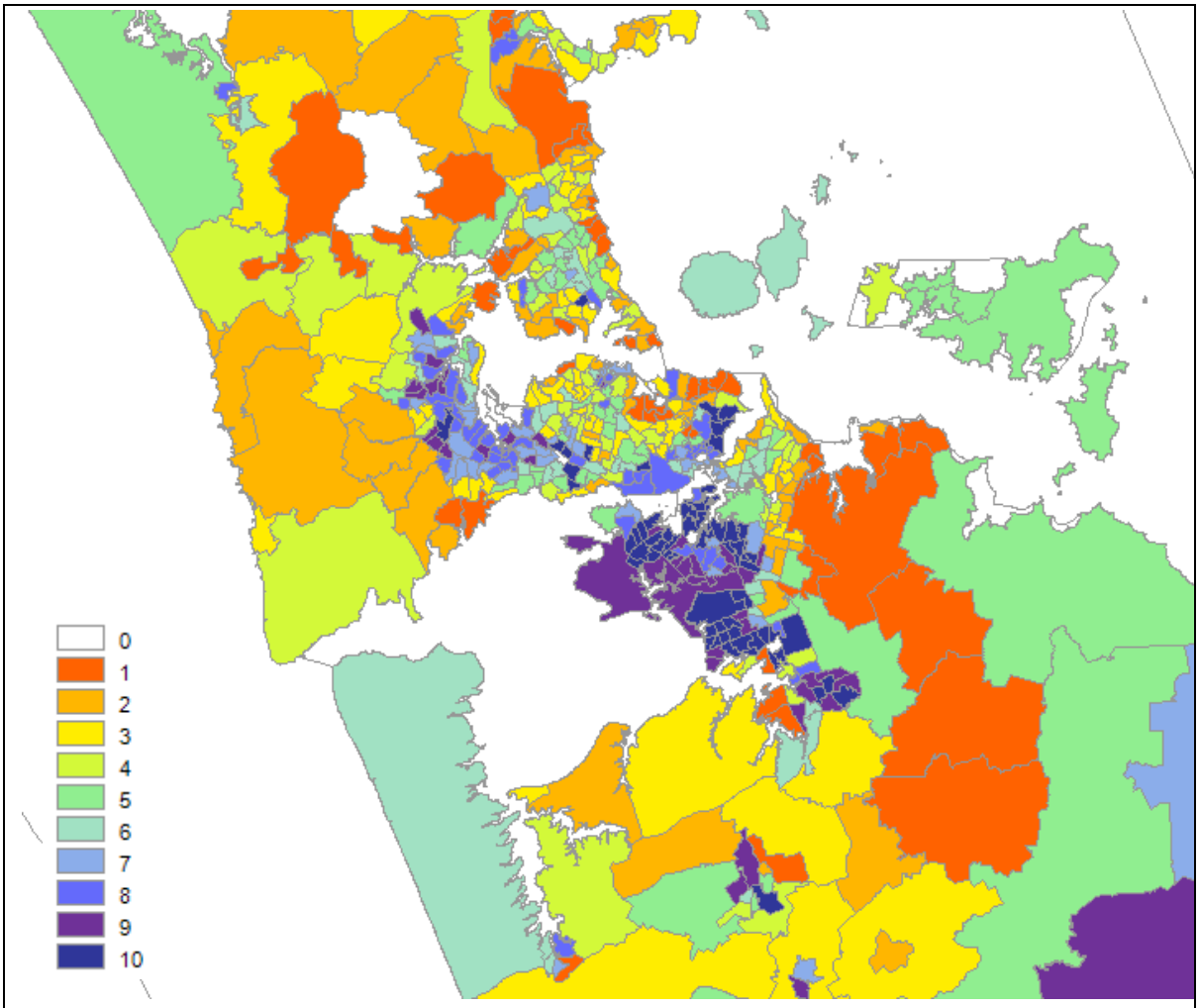


Figure 30.1
Updated 2018 index of deprivation

Social deprivation is high in the areas south of the Māngere Inlet including Māngere, Papatoetoe and Manurewa and down into Papakura. It is also high in the west of the Isthmus and in a band to the west of the Waitematā Harbour. Other pockets of high social deprivation also exist to the south and east of the Isthmus in Glen Innes and Onehunga.

30.3 Issues by age group for selected areas

For the initial analysis of the potential impacts of social deprivation, Māngere and Papakura were chosen as examples of areas with high levels of social deprivation as highlighted in the figure above and then compared against the general regional position.

The modal shares for each of the identified age groups are set out below, in Figure 30.2 for the Under 13s, in Figure 30.3 for the 13-17s and in Figure 30.4 for the Over 17 age group

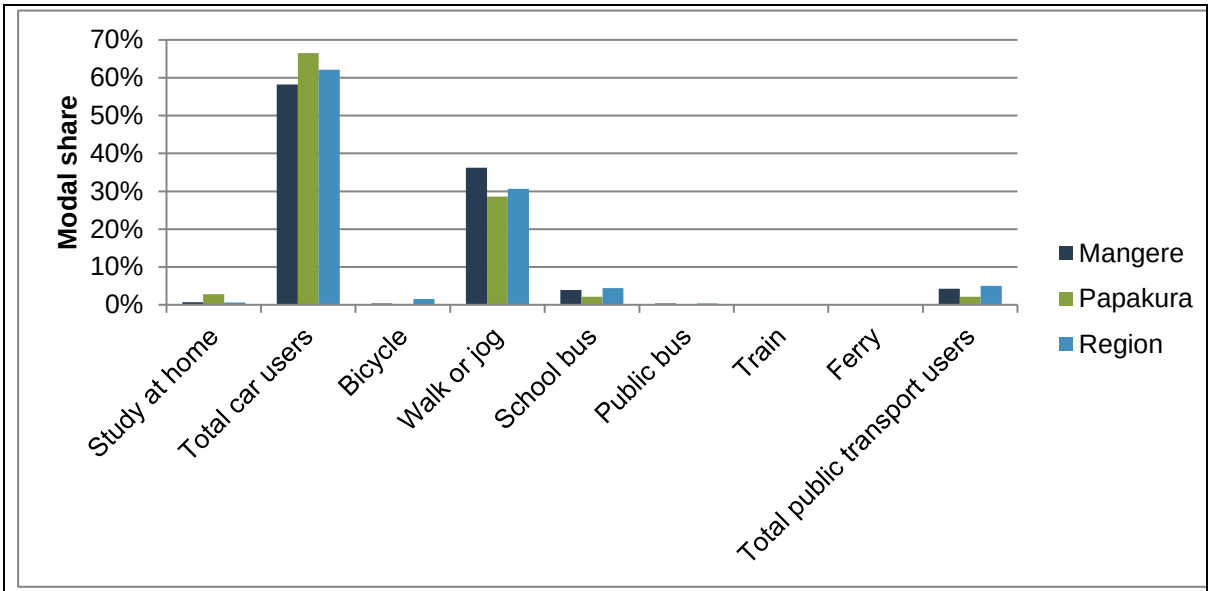


Figure 30.2
Comparison of journey to education mode shares - Under 13s - Māngere, Papakura and regional totals

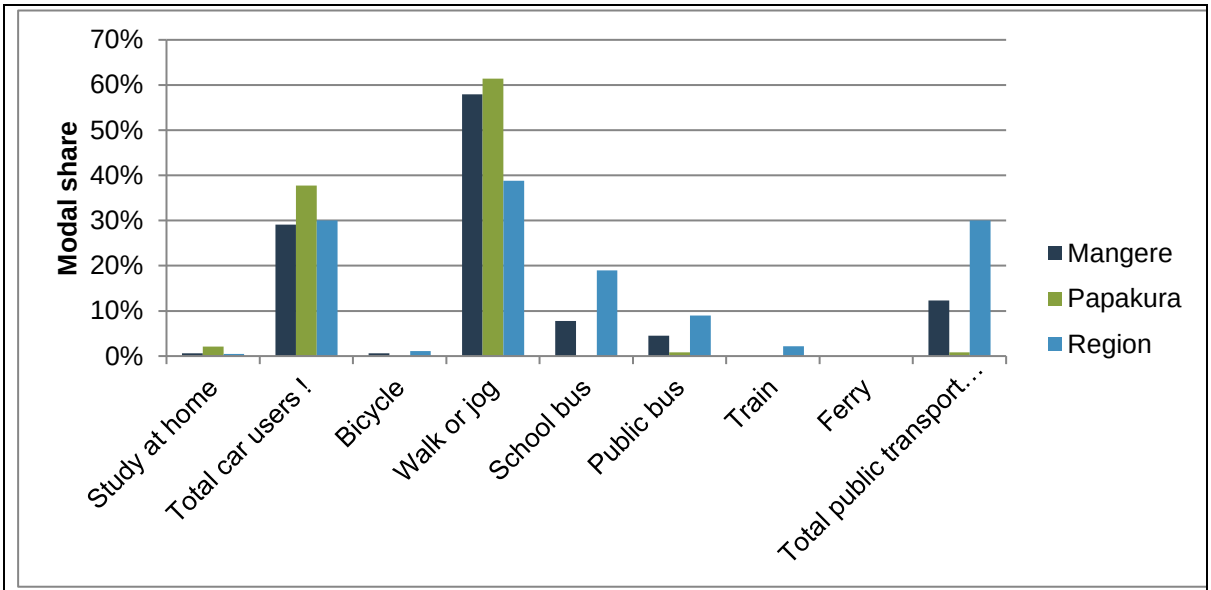


Figure 30.3
Comparison of journey to education mode shares - 13-17s - Māngere, Papakura and regional totals

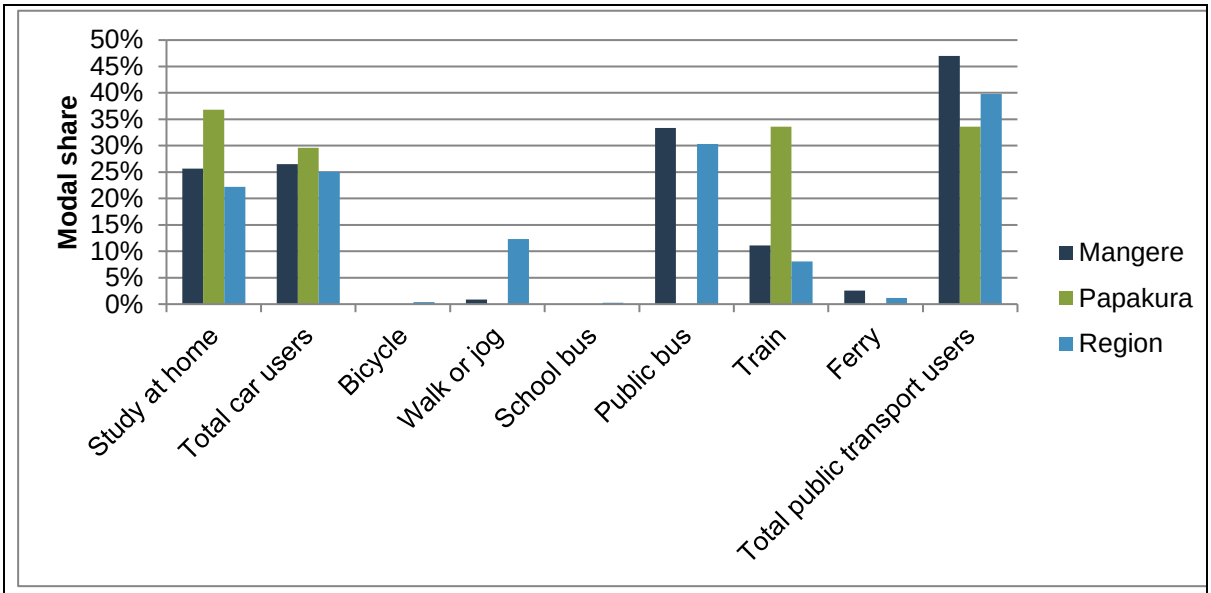


Figure 30.4
Comparison of journey to education mode shares - Over 17s - Māngere, Papakura and regional totals

From the figures above, the main points that emerge include:

- For the under 13s, there is relatively little difference between the position for Māngere and Papakura and the regional totals
- For the 13-17s, there is a relatively high share for active mode users for both Māngere and Papakura, balanced by low public transport shares for both these areas and for both school and public buses. The car shares are similar with that for Māngere being slightly below the regional average and that for Papakura being slightly above.
- For the over 17s, both Māngere and Papakura have higher proportions of Study at home, Papakura particularly so, possibly reflecting the greater distance from the main tertiary establishments. Car use is slightly above the regional average in both locations. Active mode use is relatively small again reflecting the distance from the main establishments. Public transport use in Māngere is above the regional average for both bus and train but in Papakura it is lower with a high dependence on train travel.

30.4 More detailed statistical analysis

30.4.1 Introduction

In order to consider the position more comprehensively the linkages between the SDI score for an SA2 zone and the modal shares for the educational journeys for that area were investigated statistically, and the correlations between the use of particular modes and the detailed SDI score were determined. It should be emphasised that any correlations do not necessarily reflect causal links and other factors may be important.

For the relationships identified, the linkages were estimated with the R^2 term determining the extent to which changes in the independent variable, the SDI score, "explained" changes in the dependent variable, the modal share. An R^2 value of 1 would indicate that changes in the independent variable "explained" all the changes in the dependent variable and an R^2 of 0 that none of the variation was explained. The analysis was undertaken for the three age groups separately. In general, the relationships identified were very weak with very low R^2 scores, but some of the key highlights are set out below.

30.4.2 Under 13s

For the under 13s the strongest relationship was with the PT modal share which declined with increasing social deprivation, although the relationship was not very robust. This is set out in Figure 30.5. It is however noticeable that at the other end of the scale, areas with low deprivation scores appear to have higher levels of public transport use, although as the earlier Figure 27.2 indicates, this relationship is still limited. For the active and car modes the R^2 term was below 0.01, indicating little or no correlation.

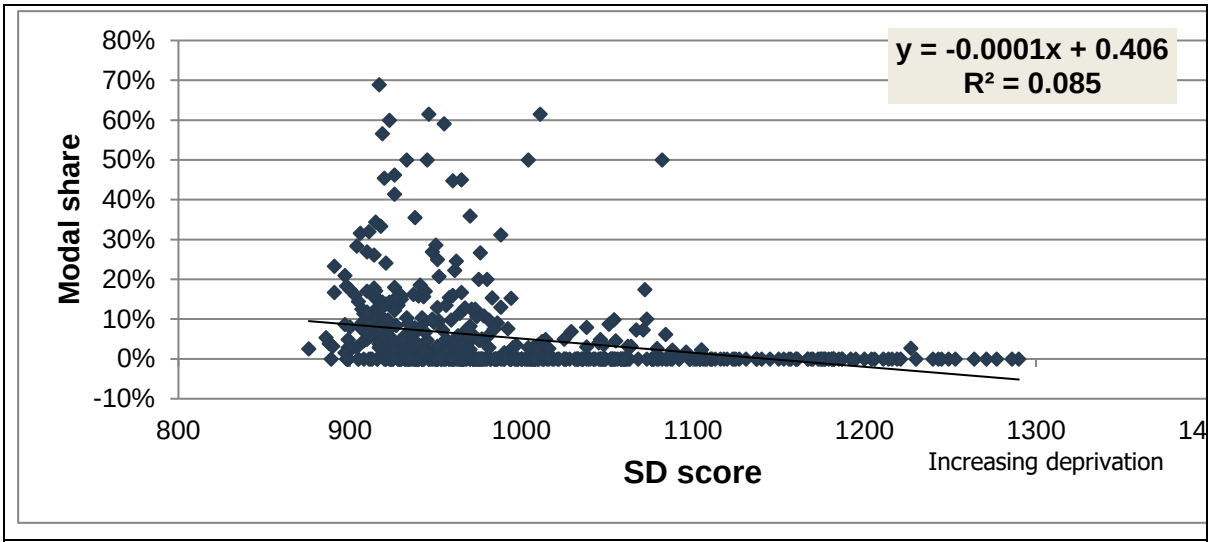


Figure 30.5
Under13s - public transport modal share and SDI score

30.4.3 13-17s

For the 13-17 age group, the relationships were stronger. The strongest relationship was with public transport use which is set out in Figure 30.6.

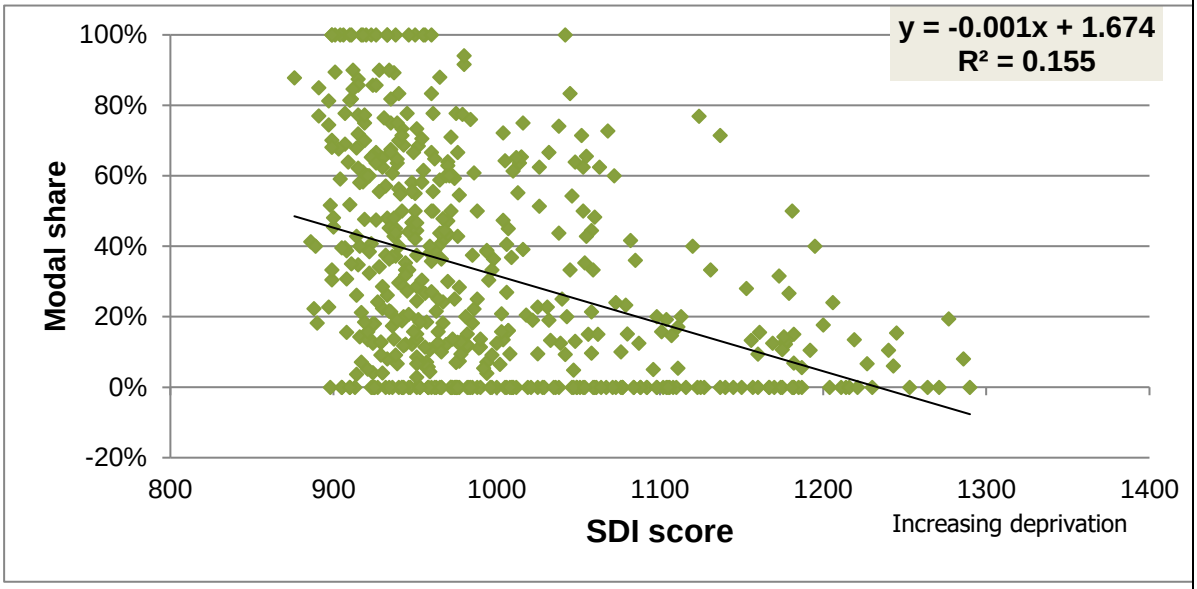


Figure 30.6
13-17s - public transport modal share and SDI score

Again, the public transport share declines with increasing social deprivation, possibly reflecting the availability or affordability of public transport services in the more deprived areas.

For the other modes the relationship was weaker but the results are set out in Figure 30.7 and Figure 30.8.

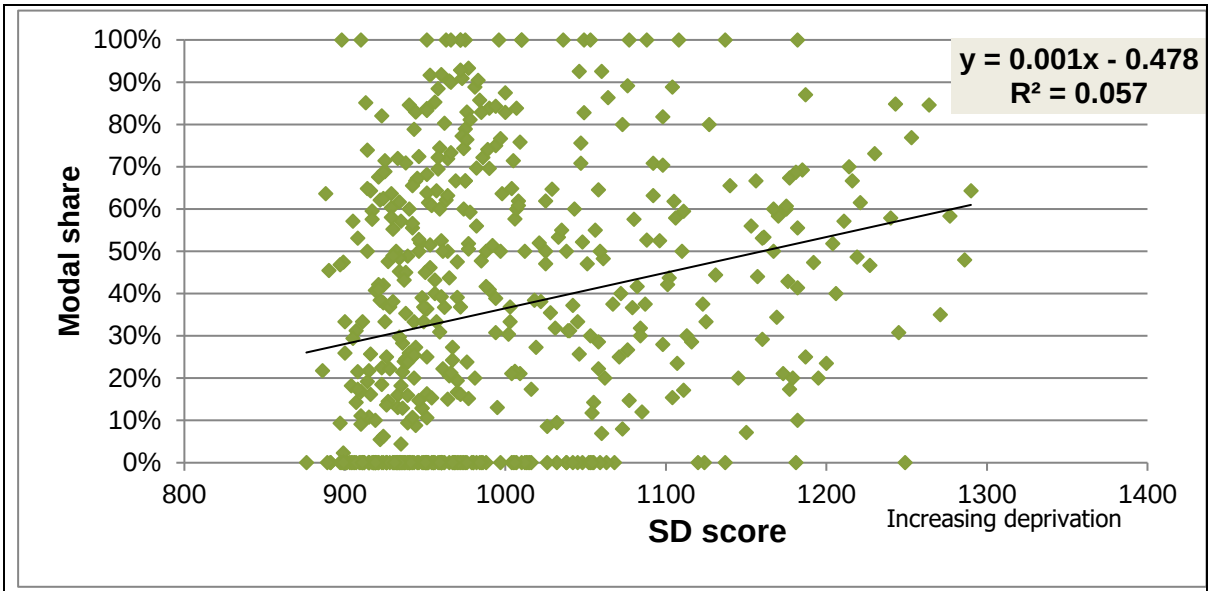


Figure 30.7
13-17s - active mode share and SDI score

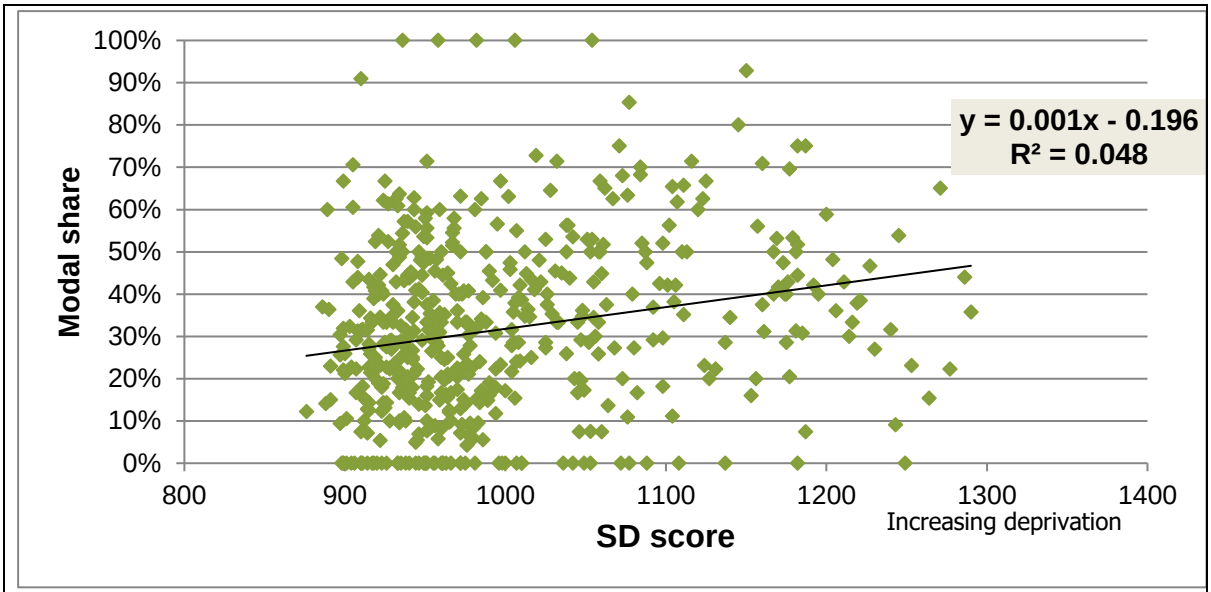


Figure 30.8
13-17s - car modal share and SDI score

For the 13-17s, both the car modal share and the active mode share increase with increasing levels of social deprivation. The increasing car share is in line with the findings from the journey to work analysis.

30.4.4 Over 17s

For the over 17s the relationships between modal shares and the SDI scores are very weak, with only the car modal share having an R^2 term greater than 0.01. This is displayed in Figure 30.9.

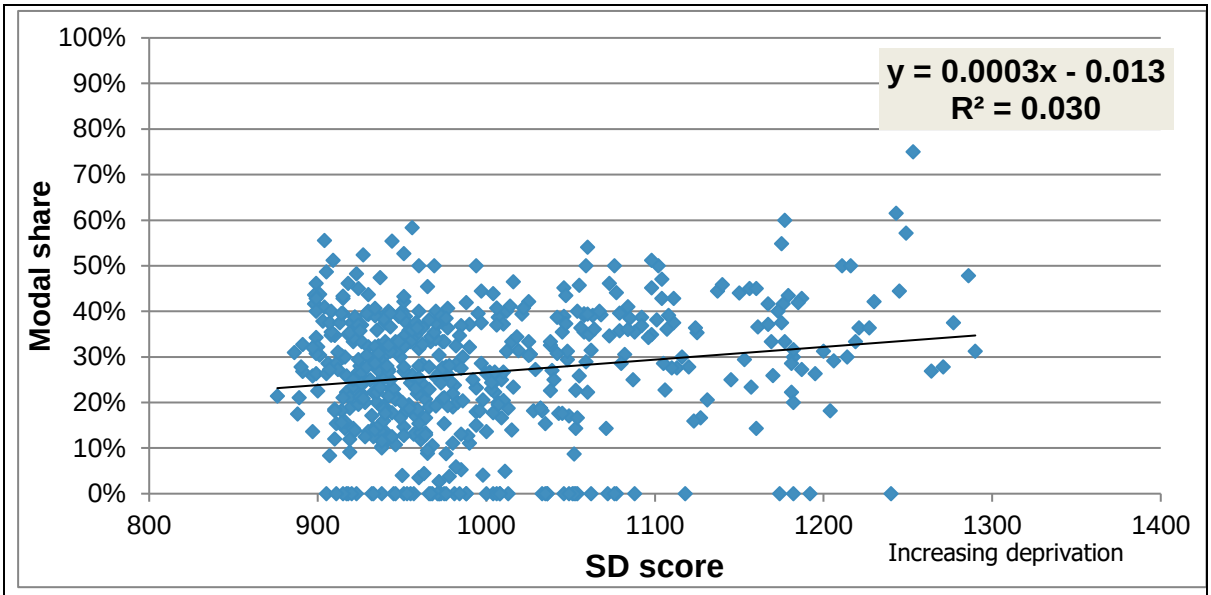


Figure 30.9
Over 17s - car modal share and SDI score

30.4.5 Overall assessment

In general, the detailed comparison of the modal shares and the Social Deprivation Index and scores indicates that the linkages between the two appear to be relatively small. The strongest relationship appears to relate to the level of public transport use which declines as the level of deprivation increases for both under 13s and the 13-17s. This may relate to the level of public transport provision in areas with a high SDI (and mirrors the findings from the analysis of journey to work trips) but could also reflect a high level of local school provision and an acceptance that students go to the nearest school rather than seeking alternatives further afield.

31 Appendices

31.1 Appendix A

Census questions for 2013 and 2018

2013	2018

38 What is the main activity of that business or employer, for example *SHEEP FARMING, SELLING SHOES, MAKING CLOTHES?*

39 In that job, did you mostly?

- work at home → *go to* **40**
- work away from home. Print the full address of the place you mostly worked at. Include, if possible, all of these:
  - name of building
  - street number and street name, or name of shopping centre
  - suburb or rural locality
  - city, town or district

40 How many hours, to the nearest hour, do you usually work each week?

- in the job you have answered questions **34** – **39** about
- in all other jobs (for pay or profit or unpaid in a family business / farm)

41 On Tuesday 5 March, what was the one main way you travelled to work – that is, the one you used for the greatest distance?

- worked at home
- did not go to work on Tuesday 5 March
- public bus
- train
- drove a private car, truck or van
- drove a company car, truck or van
- passenger in a car, truck, van or company bus
- motorbike
- bicycle
- walked or jogged
- other, for example *TAXI, FERRY, PLANE.* Print the main way you travelled to work:

43 In that job, did you mostly:

- work at home? → *go to* **49**
- work away from home?

Print the full address of the place you mostly worked at. Include, if possible, all of these:

name of building

street number and street name, or name of shopping centre

suburb or rural locality

city, town or district

44 What is the **one main way** you usually travel to work - that is, the one you use for the greatest distance?

If you don't have a usual method, select the one you used most recently.

- drive a private car, truck or van
- drive a company car, truck or van
- passenger in a car, truck, van or company bus
- public bus
- train
- ferry
- bicycle
- walk or jog
- other, eg taxi, motorbike

31.2 Appendix B

Detailed local board area flows

Table B1
Total trips

	Destination																					
Origin	Rodney	Hibiscus and Bays	Upper Harbour	Kaipatiki	Devonport-Takapuna	Henderson-Massey	Waitakere Ranges	Great Barrier	Waiheke	Waitemata	Whau	Albert-Eden	Puke-tapapa	Orakei	Maungakiekie-Tamaki	Howick	Mangere-Otahuhu	Otara-Papatoetoe	Manurewa	Papakura	Franklin	Total
Rodney	14280	1833	3063	933	912	1416	147	0	9	3117	564	540	84	141	864	219	375	135	75	45	51	28803
Hibiscus and Bays	1212	15612	8619	2862	3552	831	102	0	9	7518	495	999	135	294	1695	483	702	255	156	81	75	45687
Upper Harbour	543	1080	10602	2271	2103	1458	93	0	6	5472	579	810	138	249	1215	348	501	204	123	93	57	27945
Kaipatiki	348	981	5418	11625	4623	825	75	0	12	10689	549	1398	213	504	2082	576	813	348	225	111	93	41508
Devonport-Takapuna	171	600	2745	2184	9312	372	54	0	18	6927	258	723	99	252	1020	297	402	198	105	48	42	25827
Henderson-Massey	1041	432	2883	1179	1065	14532	1074	0	12	9753	4113	2865	672	591	3390	867	1440	741	480	201	162	47493
Waitakere Ranges	354	105	792	327	348	3222	4650	0	9	5007	2583	1542	363	321	1716	420	888	357	213	63	78	23358
Great Barrier	0	0	0	0	0	0	0	282	0	12	0	0	0	0	0	0	6	0	0	0	0	300
Waiheke	12	12	18	18	36	18	9	0	2715	687	12	66	9	27	105	42	30	12	9	6	9	3852
Waitemata	174	234	969	720	1122	702	96	0	66	30192	699	2574	312	1065	2475	774	1041	684	237	141	114	44391
Whau	219	213	906	567	552	2391	627	0	18	8874	7398	2952	1080	537	3297	852	1587	801	423	144	108	33546
Albert-Eden	183	222	1122	690	993	1095	207	0	33	18543	1491	11844	987	1236	4110	1095	1701	1110	360	174	177	47373
Puketapapa	84	183	573	351	366	660	108	0	15	7056	1140	2646	4065	573	3252	822	1638	855	441	138	102	25068
Orakei	99	114	609	435	612	384	48	0	15	13842	414	2358	270	10056	5379	1569	1353	1116	396	180	165	39414
Maungakiekie-Tamaki	78	165	564	411	423	468	60	0	21	7584	468	1917	543	1860	11157	2208	2220	1473	723	315	216	32874
Howick	111	150	735	456	399	414	60	0	21	8592	552	1851	369	1596	9246	23352	4113	5802	2292	987	771	61869
Mangere-Otahuhu	69	222	366	225	165	414	48	0	6	3303	429	996	396	504	5148	1977	7962	2979	1350	444	252	27255
Otara-Papatoetoe	69	231	342	231	168	366	57	0	9	2928	426	825	318	543	4758	4017	4611	8118	2373	780	429	31599
Manurewa	75	186	342	219	168	318	48	0	6	3132	393	804	267	552	4752	3603	4440	4962	7497	1935	882	34581
Papakura	42	93	180	114	135	147	27	0	9	2109	174	495	126	306	2700	1962	1887	2361	1941	6414	1368	22590
Franklin	51	51	189	99	93	99	24	0	15	2142	141	453	108	294	2523	2529	1758	2055	1530	2547	15021	31722
Total	19215	22719	41037	25917	27147	30132	7614	282	3024	157479	22878	38658	10554	21501	70884	48012	39468	34566	20949	14847	20172	677055

Table B2
Private car driver trips

	Destination																					
Origin	Rodney	Hibiscus and Bays	Upper Harbour	Kaipatiki	Devonport-Takapuna	Henderson-Massey	Waitakere Ranges	Great Barrier	Waiheke	Waitemata	Whau	Albert-Eden	Puke-tapapa	Orakei	Maungakiekie-Tamaki	Howick	Mangere-Otahuhu	Otara-Papatoetoe	Manurewa	Papakura	Franklin	Total
Rodney	5613	1344	2253	651	726	1023	108	0	0	2139	381	420	48	99	507	120	270	78	36	21	39	15876
Hibiscus and Bays	867	6552	6417	2067	2829	573	72	0	0	3486	306	714	96	207	1029	300	483	174	87	51	42	26352
Upper Harbour	375	831	5046	1740	1671	1089	75	0	0	2694	426	621	99	189	789	222	366	144	78	60	39	16554
Kaipatiki	228	738	4062	5340	3528	615	54	0	0	4905	390	1029	150	351	1401	387	573	252	156	69	54	24282
Devonport-Takapuna	117	450	2085	1509	3546	258	45	0	6	2631	168	507	63	174	651	201	276	129	75	30	30	12951
Henderson-Massey	750	306	2211	894	888	7803	843	0	0	5844	3042	2151	504	444	2259	585	1080	555	336	129	111	30735
Waitakere Ranges	255	66	576	222	282	2460	1281	0	6	2826	1914	1137	294	237	1113	285	657	273	147	36	45	14112
Great Barrier	0	0	0	0	0	0	0	99	0	9	0	0	0	0	0	0	0	0	0	0	0	108
Waiheke	0	9	9	9	9	12	0	0	1140	75	6	15	0	9	39	12	15	0	0	0	0	1359
Waitemata	96	123	543	378	573	405	54	0	15	6066	378	1359	174	531	1215	447	606	345	108	78	57	13551
Whau	153	135	657	411	435	1767	471	0	12	4713	3381	2052	813	375	2265	609	1218	627	300	96	66	20556
Albert-Eden	123	156	792	471	738	780	150	0	18	8403	1005	3888	702	864	2763	750	1260	840	252	120	108	24183
Puketapapa	57	120	414	237	282	516	90	0	9	3771	861	1902	1272	447	2343	621	1299	693	324	102	69	15429
Orakei	60	75	429	327	477	261	36	0	9	7542	276	1773	213	3114	3714	1206	1026	759	261	132	105	21795
Maungakiekie-Tamaki	54	102	393	285	306	330	45	0	9	3816	330	1383	399	1347	5631	1632	1656	1098	525	216	150	19707
Howick	66	93	504	324	309	303	45	0	9	5115	390	1461	288	1269	6903	12867	3327	4647	1773	744	558	40995
Mangere-Otahuhu	39	141	246	162	123	291	36	0	6	2109	315	750	309	387	3759	1509	4653	2253	1089	333	180	18690
Otara-Papatoetoe	45	150	231	150	129	270	42	0	9	1719	303	588	219	411	3531	3057	3567	4500	1854	591	312	21678
Manurewa	45	108	234	153	129	234	36	0	6	1908	288	603	201	414	3489	2808	3621	3789	3891	1467	654	24078

Papakura	21	63	102	63	87	96	18	0	0	1116	126	345	96	207	1842	1467	1545	1737	1479	3192	1032	14634
Franklin	30	36	105	60	69	60	15	0	9	1143	93	297	81	201	1536	1734	1359	1461	1104	1836	6903	18132
Total	8994	11598	27309	15453	17136	19146	3516	99	1263	72030	14379	22995	6021	11277	46779	30819	28857	24354	13875	9303	10554	395757

Table B3
Company car driver trips

	Destination																					
Origin	Rodney	Hibiscus and Bays	Upper Harbour	Kaipatiki	Devonport-Takapuna	Henderson-Massey	Waitakere Ranges	Great Barrier	Waiheke	Waitemata	Whau	Albert-Eden	Puke-tapapa	Orakei	Maungakiekie-Tamaki	Howick	Mangere-Otahuhu	Otara-Papatoetoe	Manurewa	Papakura	Franklin	Total
Rodney	1329	375	657	222	114	318	33	0	0	342	150	90	27	36	306	90	81	48	33	21	12	4284
Hibiscus and Bays	267	1239	1446	528	294	201	21	0	0	678	141	180	27	54	531	138	114	60	48	27	21	6015
Upper Harbour	105	153	948	309	123	231	9	0	0	420	123	114	27	33	312	93	66	45	39	18	15	3183
Kaipatiki	75	141	630	795	219	126	12	0	0	624	105	162	30	69	456	111	114	57	45	24	15	3810
Devonport-Takapuna	36	78	336	300	348	66	0	0	0	348	54	78	15	30	222	60	57	33	21	12	0	2094
Henderson-Massey	183	99	426	159	69	1134	111	0	0	681	495	240	84	75	723	192	168	93	102	48	33	5115
Waitakere Ranges	78	27	162	78	24	420	282	0	0	399	372	153	45	45	414	102	138	42	57	24	21	2883
Great Barrier	0	0	0	0	0	0	0	21	0	0	0	0	0	0	0	0	0	0	0	0	0	21
Waiheke	0	0	0	0	0	0	0	0	225	15	0	0	0	0	6	0	0	0	0	0	0	246
Waitemata	33	24	123	48	42	81	6	0	0	828	90	147	21	45	309	114	84	72	36	21	12	2136
Whau	42	33	144	78	33	225	60	0	0	480	489	219	78	51	534	138	162	69	78	27	27	2967
Albert-Eden	30	24	171	93	60	120	30	0	0	843	180	507	84	81	600	174	192	96	51	36	33	3405
Puketapapa	21	21	87	48	18	75	9	0	0	312	108	183	174	33	408	108	141	69	78	18	18	1929
Orakei	27	27	114	69	36	72	9	0	0	921	99	216	39	435	954	261	180	129	96	36	39	3759
Maungakiekie-Tamaki	15	27	102	48	33	60	0	0	0	411	78	162	57	126	936	264	186	126	96	54	36	2817
Howick	39	42	180	90	39	81	12	0	0	669	120	201	48	171	1581	2229	468	609	366	192	141	7278
Mangere-Otahuhu	15	18	66	21	9	42	9	0	0	189	39	63	30	27	489	156	396	174	105	63	39	1950
Otara-Papatoetoe	15	21	54	36	9	48	0	0	0	204	60	75	39	39	465	300	252	432	177	87	42	2355
Manurewa	18	39	72	45	15	48	9	0	0	231	66	75	30	54	651	414	315	357	522	228	123	3312

Papakura	12	15	60	33	12	30	6	0	0	165	33	72	21	39	489	333	180	228	255	573	183	2739
Franklin	21	12	69	27	12	27	6	0	0	273	42	102	27	69	789	672	315	378	315	573	1557	5286
Total	2361	2415	5847	3027	1509	3405	624	21	225	9033	2844	3039	903	1512	11175	5949	3609	3117	2520	2082	2367	67584

Table B4
Car passenger trips

	Destination																					
Origin	Rodney	Hibiscus and Bays	Upper Harbour	Kaipatiki	Devonport-Takapuna	Henderson-Massey	Waitakere Ranges	Great Barrier	Waiheke	Waitemata	Whau	Albert-Eden	Puke-tapapa	Orakei	Maungakiekie-Tamaki	Howick	Mangere-Otahuhu	Otara-Papatoetoe	Manurewa	Papakura	Franklin	Total
Rodney	420	69	78	36	27	36	0	0	0	105	18	0	0	0	18	0	9	0	0	0	0	816
Hibiscus and Bays	36	390	276	90	84	18	0	0	0	180	21	30	0	9	15	9	24	0	6	0	0	1188
Upper Harbour	27	42	276	87	60	63	0	0	0	165	6	21	6	0	24	6	18	0	0	0	0	801
Kaipatiki	18	30	186	399	165	21	0	0	0	372	15	42	6	15	45	15	30	0	0	0	6	1365
Devonport-Takapuna	6	21	69	90	192	6	0	0	0	147	6	12	0	0	15	0	6	0	0	0	0	570
Henderson-Massey	69	12	120	45	39	708	69	0	0	495	192	123	33	21	141	36	60	39	18	9	12	2241
Waitakere Ranges	12	0	21	6	12	120	90	0	0	153	105	39	6	6	48	9	21	9	0	0	0	657
Great Barrier	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waiheke	0	0	0	0	0	0	0	0	111	0	0	0	0	0	0	0	0	0	0	0	0	111
Waitemata	6	0	27	18	27	21	0	0	0	507	21	60	0	27	57	24	60	18	9	0	0	882
Whau	12	12	30	24	12	96	24	0	0	354	270	150	54	21	126	24	66	30	15	9	0	1329
Albert-Eden	9	6	21	18	21	27	0	0	0	639	51	222	33	39	105	27	42	24	12	0	6	1302
Puketapapa	0	6	21	15	12	21	0	0	0	303	54	126	132	21	141	18	63	33	15	0	0	981
Orakei	6	0	9	9	12	9	0	0	0	465	18	72	0	189	135	18	30	12	0	0	0	984
Maungakiekie-Tamaki	0	12	21	15	18	27	0	0	0	291	9	78	27	102	495	111	114	66	30	12	15	1443
Howick	0	9	24	12	0	21	0	0	0	297	21	57	9	60	315	753	138	228	69	24	42	2079
Mangere-Otahuhu	9	39	30	21	9	48	0	0	0	249	33	75	36	39	441	195	597	255	84	18	24	2202
Otara-Papatoetoe	0	24	24	9	9	18	0	0	0	171	33	48	21	39	333	333	345	546	195	48	36	2232
Manurewa	6	18	18	9	9	15	0	0	0	162	18	36	18	36	267	201	297	411	345	120	78	2064

Papakura	0	9	9	9	0	12	0	0	0	57	0	15	0	15	96	81	51	108	84	297	87	930
Franklin	0	0	0	0	0	6	0	0	0	42	0	6	0	9	54	63	30	45	27	72	414	768
Total	636	699	1260	912	708	1293	183	0	111	5154	891	1212	381	648	2871	1923	2001	1824	909	609	720	24945

Table B5
Total car trips

	Destination																					
Origin	Rodney	Hibiscus and Bays	Upper Harbour	Kaipatiki	Devonport-Takapuna	Henderson-Massey	Waitakere Ranges	Great Barrier	Waiheke	Waitemata	Whau	Albert-Eden	Puke-tapapa	Orakei	Maungakiekie-Tamaki	Howick	Mangere-Otahuhu	Otara-Papatoetoe	Manurewa	Papakura	Franklin	Total
Rodney	7362	1788	2988	909	867	1377	141	0	0	2586	549	510	75	135	831	210	360	126	69	42	51	20976
Hibiscus and Bays	1170	8181	8139	2685	3207	792	93	0	0	4344	468	924	123	270	1575	447	621	234	141	78	63	33555
Upper Harbour	507	1026	6270	2136	1854	1383	84	0	0	3279	555	756	132	222	1125	321	450	189	117	78	54	20538
Kaipatiki	321	909	4878	6534	3912	762	66	0	0	5901	510	1233	186	435	1902	513	717	309	201	93	75	29457
Devonport-Takapuna	159	549	2490	1899	4086	330	45	0	6	3126	228	597	78	204	888	261	339	162	96	42	30	15615
Henderson-Massey	1002	417	2757	1098	996	9645	1023	0	0	7020	3729	2514	621	540	3123	813	1308	687	456	186	156	38091
Waitakere Ranges	345	93	759	306	318	3000	1653	0	6	3378	2391	1329	345	288	1575	396	816	324	204	60	66	17652
Great Barrier	0	0	0	0	0	0	0	120	0	9	0	0	0	0	0	0	0	0	0	0	0	129
Waiheke	0	9	9	9	9	12	0	0	1476	90	6	15	0	9	45	12	15	0	0	0	0	1716
Waitemata	135	147	693	444	642	507	60	0	15	7401	489	1566	195	603	1581	585	750	435	153	99	69	16569
Whau	207	180	831	513	480	2088	555	0	12	5547	4140	2421	945	447	2925	771	1446	726	393	132	93	24852
Albert-Eden	162	186	984	582	819	927	180	0	18	9885	1236	4617	819	984	3468	951	1494	960	315	156	147	28890
Puketapapa	78	147	522	300	312	612	99	0	9	4386	1023	2211	1578	501	2892	747	1503	795	417	120	87	18339
Orakei	93	102	552	405	525	342	45	0	9	8928	393	2061	252	3738	4803	1485	1236	900	357	168	144	26538
Maungakiekie-Tamaki	69	141	516	348	357	417	45	0	9	4518	417	1623	483	1575	7062	2007	1956	1290	651	282	201	23967
Howick	105	144	708	426	348	405	57	0	9	6081	531	1719	345	1500	8799	15849	3933	5484	2208	960	741	50352
Mangere-Otahuhu	63	198	342	204	141	381	45	0	6	2547	387	888	375	453	4689	1860	5646	2682	1278	414	243	22842
Otara-Papatoetoe	60	195	309	195	147	336	42	0	9	2094	396	711	279	489	4329	3690	4164	5478	2226	726	390	26265
Manurewa	69	165	324	207	153	297	45	0	6	2301	372	714	249	504	4407	3423	4233	4557	4758	1815	855	29454

Papakura	33	87	171	105	99	138	24	0	0	1338	159	432	117	261	2427	1881	1776	2073	1818	4062	1302	18303
Franklin	51	48	174	87	81	93	21	0	9	1458	135	405	108	279	2379	2469	1704	1884	1446	2481	8874	24186
Total	11991	14712	34416	19392	19353	23844	4323	120	1599	86217	18114	27246	7305	13437	60825	38691	34467	29295	17304	11994	13641	488286

Table B6
Bus trips

	Destination																					
Origin	Rodney	Hibiscus and Bays	Upper Harbour	Kaipatiki	Devonport-Takapuna	Henderson-Massey	Waitakere Ranges	Great Barrier	Waiheke	Waitemata	Whau	Albert-Eden	Puke-tapapa	Orakei	Maungakiekie-Tamaki	Howick	Mangere-Otahuhu	Otara-Papatoetoe	Manurewa	Papakura	Franklin	Total
Rodney	48	18	27	12	27	9	0	0	0	396	0	9	0	0	15	0	0	0	0	0	0	561
Hibiscus and Bays	21	282	300	111	267	24	0	0	0	2709	15	48	0	21	72	21	39	12	6	0	6	3954
Upper Harbour	9	36	219	102	198	45	0	0	0	1716	15	39	0	12	57	18	21	0	0	0	0	2487
Kaipatiki	18	48	384	552	477	39	0	0	0	4155	24	120	18	51	105	39	66	18	12	6	9	6141
Devonport-Takapuna	0	33	138	126	387	15	0	0	0	2031	12	51	9	15	51	21	24	12	0	0	0	2925
Henderson-Massey	18	6	57	39	33	402	15	0	0	1161	144	120	18	15	93	18	39	18	9	0	0	2205
Waitakere Ranges	0	0	9	0	9	72	27	0	0	294	93	30	6	0	33	9	15	0	0	0	0	597
Great Barrier	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waiheke	0	0	0	0	0	0	0	0	66	12	0	0	0	0	0	0	0	0	0	0	0	78
Waitemata	12	39	153	168	309	72	6	0	0	4152	96	486	66	210	270	78	123	45	15	9	15	6324
Whau	6	18	24	33	42	147	27	0	0	1572	267	252	75	27	138	36	48	27	12	0	6	2757
Albert-Eden	15	18	78	72	105	63	6	0	0	5034	138	561	81	108	267	84	87	48	12	9	15	6801
Puketapapa	0	27	39	39	36	36	0	0	0	2238	75	303	111	57	246	45	81	33	12	9	6	3393
Orakei	0	6	27	15	42	15	0	0	0	2079	12	150	6	168	144	30	24	21	0	0	6	2745
Maungakiekie-Tamaki	0	9	12	27	27	21	0	0	0	1200	21	138	18	129	405	111	108	42	15	0	6	2289
Howick	0	0	18	12	21	0	0	0	0	681	9	69	15	57	237	429	60	159	39	15	15	1836
Mangere-Otahuhu	0	12	9	6	6	15	0	0	0	213	27	51	9	21	204	57	207	135	33	12	6	1023
Otara-Papatoetoe	0	21	15	12	0	15	0	0	0	96	12	30	9	18	120	183	252	276	69	24	12	1164
Manurewa	0	6	9	0	6	0	0	0	0	66	0	15	6	15	54	78	81	162	117	57	6	678

Papakura	0	0	0	0	0	0	0	0	0	21	0	0	0	0	9	24	9	54	21	81	0	219
Franklin	0	0	0	0	0	0	0	0	0	9	0	6	0	0	0	9	0	6	0	0	24	54
Total	147	579	1518	1326	1992	990	81	0	66	29835	960	2478	447	924	2520	1290	1284	1068	372	222	132	48231

Table B7
Train trips

	Destination																					
Origin	Rodney	Hibiscus and Bays	Upper Harbour	Kaipatiki	Devonport-Takapuna	Henderson-Massey	Waitakere Ranges	Great Barrier	Waiheke	Waitemata	Whau	Albert-Eden	Puke-tapapa	Orakei	Maungakiekie-Tamaki	Howick	Mangere-Otahuhu	Otara-Papatoetoe	Manurewa	Papakura	Franklin	Total
Rodney	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	0	0	0	24
Hibiscus and Bays	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Upper Harbour	0	0	0	0	0	0	0	0	0	6	0	0	0	0	6	0	0	9	0	0	0	21
Kaipatiki	0	0	0	0	0	0	0	0	0	21	0	9	0	6	24	0	0	9	0	0	0	69
Devonport-Takapuna	0	0	0	0	9	0	0	0	0	21	0	12	0	6	30	0	0	6	0	0	0	84
Henderson-Massey	0	0	12	12	15	108	15	0	0	1107	114	141	15	21	96	9	33	21	9	0	0	1728
Waitakere Ranges	0	0	12	6	12	69	15	0	0	1116	51	138	0	21	78	9	12	21	0	0	0	1560
Great Barrier	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waiheke	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	6
Waitemata	0	0	9	9	12	24	0	0	0	444	30	66	0	78	324	24	33	126	30	9	0	1218
Whau	0	0	21	12	9	81	12	0	0	1308	66	165	12	39	138	18	21	30	12	0	0	1944
Albert-Eden	0	0	9	12	15	42	9	0	0	1197	48	126	12	36	153	18	33	66	15	0	0	1791
Puketapapa	0	0	0	0	0	0	0	0	0	75	0	9	6	0	15	0	0	9	0	0	0	114
Orakei	0	0	12	6	9	18	0	0	0	1701	6	33	0	33	129	12	30	168	18	6	6	2187
Maungakiekie-Tamaki	0	0	12	15	27	9	0	0	0	1419	12	48	0	33	186	30	63	108	39	9	6	2016
Howick	0	0	0	0	9	6	0	0	0	1185	0	12	0	15	66	45	27	33	15	9	0	1422
Mangere-Otahuhu	0	0	6	0	9	9	0	0	0	432	0	33	0	18	126	24	42	51	24	12	0	786
Otara-Papatoetoe	0	6	12	15	9	9	0	0	0	678	12	63	15	27	234	51	69	153	39	21	15	1428
Manurewa	0	9	9	6	6	9	0	0	0	702	9	57	9	27	243	48	69	138	54	33	12	1440

Papakura	0	0	0	9	18	0	0	0	0	702	0	48	0	39	216	27	57	204	69	66	30	1485
Franklin	0	0	0	0	0	0	0	0	0	393	0	33	0	15	96	12	24	135	45	33	36	822
Total	0	15	114	102	159	384	51	0	0	12537	348	993	69	414	2160	327	513	1287	369	198	105	20145

Table B8
Ferry trips

	Destination																					
Origin	Rodney	Hibiscus and Bays	Upper Harbour	Kaipatiki	Devonport-Takapuna	Henderson-Massey	Waitakere Ranges	Great Barrier	Waiheke	Waitemata	Whau	Albert-Eden	Puke-tapapa	Orakei	Maungakiekie-Tamaki	Howick	Mangere-Otahuhu	Otara-Papatoetoe	Manurewa	Papakura	Franklin	Total
Rodney	0	0	0	0	0	0	0	0	0	21	0	0	0	0	0	0	0	0	0	0	0	21
Hibiscus and Bays	0	0	0	0	0	0	0	0	0	282	0	0	0	0	9	0	0	0	0	0	0	291
Upper Harbour	0	0	0	0	0	0	0	0	0	342	0	0	0	0	0	0	0	0	0	0	0	342
Kaipatiki	0	0	0	9	0	0	0	0	0	321	0	0	0	0	0	0	0	0	0	0	0	330
Devonport-Takapuna	0	0	12	12	18	0	0	0	9	1416	6	33	0	6	21	0	9	0	0	0	0	1542
Henderson-Massey	0	0	0	0	0	0	0	0	0	66	0	0	0	0	0	0	0	0	0	0	0	66
Waitakere Ranges	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	9
Great Barrier	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waiheke	0	0	0	0	18	0	0	0	36	564	0	42	0	15	51	15	12	6	0	0	0	759
Waitemata	0	0	0	0	33	0	0	0	21	24	0	0	0	0	0	0	0	0	0	0	0	78
Whau	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	15
Albert-Eden	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Puketapapa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orakei	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Maungakiekie-Tamaki	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Howick	0	0	0	0	0	0	0	0	9	447	0	0	0	0	12	15	0	0	0	0	0	483
Mangere-Otahuhu	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	6
Otara-Papatoetoe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Manurewa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Papakura	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Franklin	0	0	0	0	0	0	0	0	0	240	0	0	0	0	6	0	0	0	0	0	0	246
Total	0	0	12	21	75	0	0	0	75	3753	6	75	0	21	99	30	21	6	0	0	0	4194

Table B9
Total public transport trips

	Destination																					
Origin	Rodney	Hibiscus and Bays	Upper Harbour	Kaipatiki	Devonport-Takapuna	Henderson-Massey	Waitakere Ranges	Great Barrier	Waiheke	Waitemata	Whau	Albert-Eden	Puke-tapapa	Orakei	Maungakiekie-Tamaki	Howick	Mangere-Otahuhu	Otara-Papatoetoe	Manurewa	Papakura	Franklin	Total
Rodney	48	18	27	12	27	9	0	0	0	441	0	9	0	0	15	0	0	0	0	0	0	606
Hibiscus and Bays	21	282	300	111	267	24	0	0	0	2991	15	48	0	21	81	21	39	12	6	0	6	4245
Upper Harbour	9	36	219	102	198	45	0	0	0	2064	15	39	0	12	63	18	21	9	0	0	0	2850
Kaipatiki	18	48	384	561	477	39	0	0	0	4497	24	129	18	57	129	39	66	27	12	6	9	6540
Devonport-Takapuna	0	33	150	138	414	15	0	0	9	3468	18	96	9	27	102	21	33	18	0	0	0	4551
Henderson-Massey	18	6	69	51	48	510	30	0	0	2334	258	261	33	36	189	27	72	39	18	0	0	3999
Waitakere Ranges	0	0	21	6	21	141	42	0	0	1419	144	168	6	21	111	18	27	21	0	0	0	2166
Great Barrier	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waiheke	0	0	0	0	18	0	0	0	102	582	0	42	0	15	51	15	12	6	0	0	0	843
Waitemata	12	39	162	177	354	96	6	0	21	4620	126	552	66	288	594	102	156	171	45	18	15	7620
Whau	6	18	45	45	51	228	39	0	0	2895	333	417	87	66	276	54	69	57	24	0	6	4716
Albert-Eden	15	18	87	84	120	105	15	0	0	6231	186	687	93	144	420	102	120	114	27	9	15	8592
Puketapapa	0	27	39	39	36	36	0	0	0	2313	75	312	117	57	261	45	81	42	12	9	6	3507
Orakei	0	6	39	21	57	33	0	0	0	3780	18	183	6	201	273	42	54	189	18	6	12	4938
Maungakiekie-Tamaki	0	9	24	42	54	30	0	0	0	2619	33	186	18	162	591	141	171	150	54	9	12	4305
Howick	0	0	18	12	30	6	0	0	9	2313	9	81	15	72	315	489	87	192	54	24	15	3741
Mangere-Otahuhu	0	12	15	6	15	24	0	0	0	651	27	84	9	39	330	81	249	186	57	24	6	1815
Otara-Papatoetoe	0	27	27	27	9	24	0	0	0	774	24	93	24	45	354	234	321	429	108	45	27	2592
Manurewa	0	15	18	6	12	9	0	0	0	768	9	72	15	42	297	126	150	300	171	90	18	2118

Papakura	0	0	0	9	18	0	0	0	0	723	0	48	0	39	225	51	66	258	90	147	30	1704
Franklin	0	0	0	0	0	0	0	0	0	642	0	39	0	15	102	21	24	141	45	33	60	1122
Total	147	594	1644	1449	2226	1374	132	0	141	46125	1314	3546	516	1359	4779	1647	1818	2361	741	420	237	72570

Table B10
Walk trips

	Destination																					
Origin	Rodney	Hibiscus and Bays	Upper Harbour	Kaipatiki	Devonport-Takapuna	Henderson-Massey	Waitakere Ranges	Great Barrier	Waiheke	Waitemata	Whau	Albert-Eden	Puke-tapapa	Orakei	Maungakiekie-Tamaki	Howick	Mangere-Otahuhu	Otara-Papatoetoe	Manurewa	Papakura	Franklin	Total
Rodney	471	15	12	0	0	12	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	528
Hibiscus and Bays	6	579	72	18	18	6	0	0	0	33	0	0	0	0	9	0	0	0	6	0	0	747
Upper Harbour	0	12	471	15	24	12	0	0	0	30	0	0	0	0	9	0	0	0	0	0	0	573
Kaipatiki	6	9	42	630	96	15	0	0	0	66	9	12	0	0	12	9	0	0	0	0	0	906
Devonport-Takapuna	0	6	48	84	996	15	0	0	0	111	0	15	0	9	9	6	0	0	0	0	0	1299
Henderson-Massey	0	0	21	0	6	558	6	0	0	42	54	30	0	9	15	9	9	6	6	0	0	771
Waitakere Ranges	0	0	0	0	0	21	141	0	0	21	18	6	0	0	9	0	6	0	0	0	0	222
Great Barrier	0	0	0	0	0	0	0	21	0	0	0	0	0	0	0	0	0	0	0	0	0	21
Waiheke	0	0	0	0	0	0	0	0	147	15	0	0	0	0	0	0	0	0	0	0	0	162
Waitemata	24	30	84	81	90	78	15	0	21	11622	66	309	33	138	204	78	57	66	30	15	18	13059
Whau	0	0	18	0	9	36	24	0	0	120	411	48	18	9	30	12	21	12	0	0	0	768
Albert-Eden	0	9	27	18	21	27	0	0	0	900	21	1329	42	51	90	18	15	18	6	0	0	2592
Puketapapa	0	0	0	0	0	0	0	0	0	69	15	54	243	0	33	9	6	9	0	0	0	438
Orakei	0	0	0	0	0	0	0	0	0	207	0	57	0	498	156	9	0	12	0	0	0	939
Maungakiekie-Tamaki	0	6	15	9	6	12	0	0	0	111	9	60	21	78	816	27	24	12	9	12	0	1227
Howick	0	0	0	0	6	0	0	0	0	42	0	15	0	0	36	672	9	45	9	0	0	834
Mangere-Otahuhu	0	0	0	0	0	0	0	0	0	33	0	9	0	0	48	18	273	69	0	0	0	450
Otara-Papatoetoe	0	0	6	0	0	9	0	0	0	21	0	9	0	0	30	42	42	402	27	6	6	600
Manurewa	0	0	0	0	0	0	0	0	0	12	0	9	0	0	12	18	18	51	267	15	0	402

Papakura	0	0	0	0	0	0	0	0	0	15	0	0	0	0	18	9	6	18	12	321	12	411
Franklin	0	0	0	0	0	0	0	0	0	12	0	0	0	0	9	12	0	12	9	6	567	627
Total	507	666	816	855	1272	801	186	21	168	13500	603	1962	357	792	1545	948	486	732	381	375	603	27576

Table B11
Cycle trips

	Destination																					
Origin	Rodney	Hibiscus and Bays	Upper Harbour	Kaipatiki	Devonport-Takapuna	Henderson-Massey	Waitakere Ranges	Great Barrier	Waiheke	Waitemata	Whau	Albert-Eden	Puke-tapapa	Orakei	Maungakiekie-Tamaki	Howick	Mangere-Otahuhu	Otara-Papatoetoe	Manurewa	Papakura	Franklin	Total
Rodney	39	6	0	0	0	0	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	63
Hibiscus and Bays	0	45	36	9	18	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	123
Upper Harbour	0	0	105	0	9	0	0	0	0	27	0	0	0	0	0	0	0	0	0	0	0	141
Kaipatiki	0	6	39	57	57	0	0	0	0	33	0	0	0	0	0	0	0	0	0	0	0	192
Devonport-Takapuna	0	0	24	27	222	0	0	0	0	111	0	12	0	6	6	0	0	0	0	0	0	408
Henderson-Massey	0	0	12	0	0	120	6	0	0	192	39	33	0	0	9	0	6	0	0	0	0	417
Waitakere Ranges	0	0	0	0	0	30	12	0	0	78	15	18	0	0	6	0	0	0	0	0	0	159
Great Barrier	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waiheke	0	0	0	0	0	0	0	0	39	0	0	0	0	0	0	0	0	0	0	0	0	39
Waitemata	0	0	9	0	18	9	0	0	0	945	15	90	9	24	42	9	9	6	0	0	0	1185
Whau	0	0	0	0	0	15	0	0	0	129	51	24	9	0	15	0	9	0	0	0	0	252
Albert-Eden	0	0	12	0	9	21	0	0	0	945	30	216	18	21	72	6	21	9	0	0	0	1380
Puketapapa	0	0	0	0	0	0	0	0	0	138	6	39	27	0	30	0	12	0	0	0	0	252
Orakei	0	0	0	0	15	0	0	0	0	582	0	33	0	54	75	15	12	0	0	0	0	786
Maungakiekie-Tamaki	0	0	0	0	0	6	0	0	0	156	0	21	0	18	111	15	24	9	0	0	0	360
Howick	0	0	0	0	0	0	0	0	0	39	0	0	0	0	36	111	12	21	9	0	0	228
Mangere-Otahuhu	0	0	0	0	0	0	0	0	0	24	0	0	0	0	33	6	42	12	0	0	0	117
Otara-Papatoetoe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	21	30	42	0	0	0	111
Manurewa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	12	0	15	30	9	0	75

Papakura	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	9	6	0	0	51	0	72
Franklin	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	6	51	63
Total	39	57	237	93	348	201	18	0	39	3444	156	486	63	123	462	204	183	114	39	66	51	6423

Table B12
Total active mode trips

	Destination																					
Origin	Rodney	Hibiscus and Bays	Upper Harbour	Kaipatiki	Devonport-Takapuna	Henderson-Massey	Waitakere Ranges	Great Barrier	Waiheke	Waitemata	Whau	Albert-Eden	Puke-tapapa	Orakei	Maungakiekie-Tamaki	Howick	Mangere-Otahuhu	Otara-Papatoetoe	Manurewa	Papakura	Franklin	Total
Rodney	510	21	0	0	0	0	0	0	0	36	0	0	0	0	0	0	0	0	0	0	0	567
Hibiscus and Bays	0	624	108	27	36	0	0	0	0	48	0	0	0	0	0	0	0	0	0	0	0	843
Upper Harbour	0	0	576	0	33	0	0	0	0	57	0	0	0	0	0	0	0	0	0	0	0	666
Kaipatiki	0	15	81	687	153	0	0	0	0	99	0	0	0	0	0	0	0	0	0	0	0	1035
Devonport-Takapuna	0	0	72	111	1218	0	0	0	0	222	0	27	0	15	15	0	0	0	0	0	0	1680
Henderson-Massey	0	0	33	0	0	678	12	0	0	234	93	63	0	0	24	0	15	0	0	0	0	1152
Waitakere Ranges	0	0	0	0	0	51	153	0	0	99	33	24	0	0	15	0	0	0	0	0	0	375
Great Barrier	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waiheke	0	0	0	0	0	0	0	0	186	0	0	0	0	0	0	0	0	0	0	0	0	186
Waitemata	0	0	93	0	108	87	0	0	0	12567	81	399	42	162	246	87	66	72	0	0	0	14010
Whau	0	0	0	0	0	51	0	0	0	249	462	72	27	0	45	0	30	0	0	0	0	936
Albert-Eden	0	0	39	0	30	48	0	0	0	1845	51	1545	60	72	162	24	36	27	0	0	0	3939
Puketapapa	0	0	0	0	0	0	0	0	0	207	21	93	270	0	63	0	18	0	0	0	0	672
Orakei	0	0	0	0	0	0	0	0	0	789	0	90	0	552	231	24	0	0	0	0	0	1686
Maungakiekie-Tamaki	0	0	0	0	0	18	0	0	0	267	0	81	0	96	927	42	48	21	0	0	0	1500
Howick	0	0	0	0	0	0	0	0	0	81	0	0	0	0	72	783	21	66	18	0	0	1041
Mangere-Otahuhu	0	0	0	0	0	0	0	0	0	57	0	0	0	0	81	24	315	81	0	0	0	558
Otara-Papatoetoe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48	63	72	444	0	0	0	627
Manurewa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	30	0	66	297	24	0	438

Papakura	0	0	0	0	0	0	0	0	0	21	0	0	0	0	0	18	12	0	0	372	0	423
Franklin	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0	0	0	0	12	618	648
Total	510	660	1002	825	1578	933	165	0	186	16896	741	2394	399	897	1950	1095	633	777	315	408	618	32982

Table B13
Work at home trips

	Destination																					
Origin	Rodney	Hibiscus and Bays	Upper Harbour	Kaipatiki	Devonport-Takapuna	Henderson-Massey	Waitakere Ranges	Great Barrier	Waiheke	Waitemata	Whau	Albert-Eden	Puke-tapapa	Orakei	Maungakiekie-Tamaki	Howick	Mangere-Otahuhu	Otara-Papatoetoe	Manurewa	Papakura	Franklin	Total
Rodney	6249	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6249
Hibiscus and Bays	0	6462	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6462
Upper Harbour	18	0	3468	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3486
Kaipatiki	0	0	0	3750	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3750
Devonport-Takapuna	0	0	0	0	3495	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3495
Henderson-Massey	0	0	0	0	0	3600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3600
Waitakere Ranges	0	0	0	0	0	0	2793	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2793
Great Barrier	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	120
Waiheke	0	0	0	0	0	0	0	0	885	0	0	0	0	0	0	0	0	0	0	0	0	885
Waitemata	0	0	0	0	0	0	0	0	0	4893	0	0	0	0	0	0	0	0	0	0	0	4893
Whau	0	0	0	0	0	0	0	0	0	0	2406	0	0	0	0	0	0	0	0	0	0	2406
Albert-Eden	0	0	0	0	0	0	0	0	0	0	0	4905	0	0	0	0	0	0	0	0	0	4905
Puketapapa	0	0	0	0	0	0	0	0	0	0	0	0	2070	0	0	0	0	0	0	0	0	2070
Orakei	0	0	0	0	0	0	0	0	0	0	0	0	0	5517	0	0	0	0	0	0	0	5517
Maungakiekie-Tamaki	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2466	0	0	0	0	0	0	2466
Howick	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6138	0	0	0	0	0	6138
Mangere-Otahuhu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1692	0	0	0	0	1692
Otara-Papatoetoe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1707	0	0	0	1707
Manurewa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2223	0	0	2223

Papakura	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1797	0	1797
Franklin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5385	5385
Total	6267	6462	3468	3750	3495	3600	2793	120	885	4893	2406	4905	2070	5517	2466	6138	1692	1707	2223	1797	5385	72039

31.3 Appendix C

Components of the index of deprivation

Dimension of deprivation	Description of variable (in order of decreasing weight in the index)
Communication	People with no access to the Internet at home
Income	People aged 18-64 receiving a means tested benefit
Income	People living in equivalised* households with income below an income threshold
Employment	People aged 18-64 unemployed
Qualifications	People aged 18-64 without any qualifications
Owned home	People not living in own home
Support	People aged <65 living in a single parent family
Living space	People living in equivalised* households below a bedroom occupancy threshold
Living condition	People living in dwellings that are always damp and/or always have mould greater than A4 size

*Equivalisation: methods used to control for household composition.

Source : Atkinson J, Salmond C, Crampton P (2019). NZDep2018 Index of Deprivation,

Interim Research Report, December 2019. Wellington: University of Otago.

31.4 Appendix D

Linkages between social deprivation and modal shares

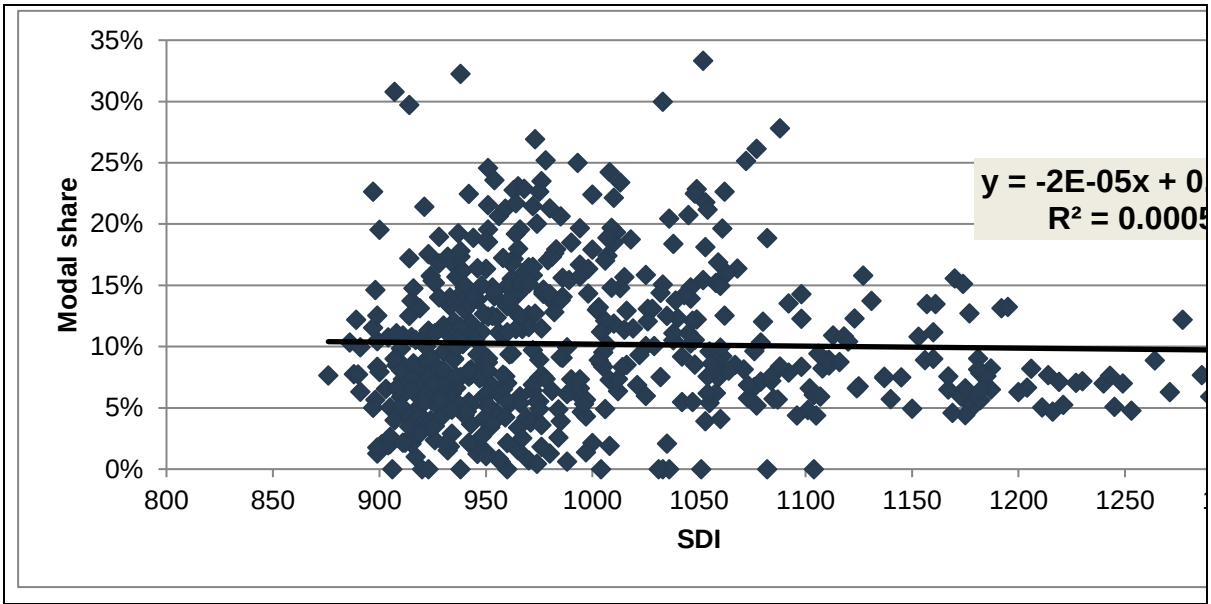


Figure D.0.1
Linkage between modal shares and SDI - public transport

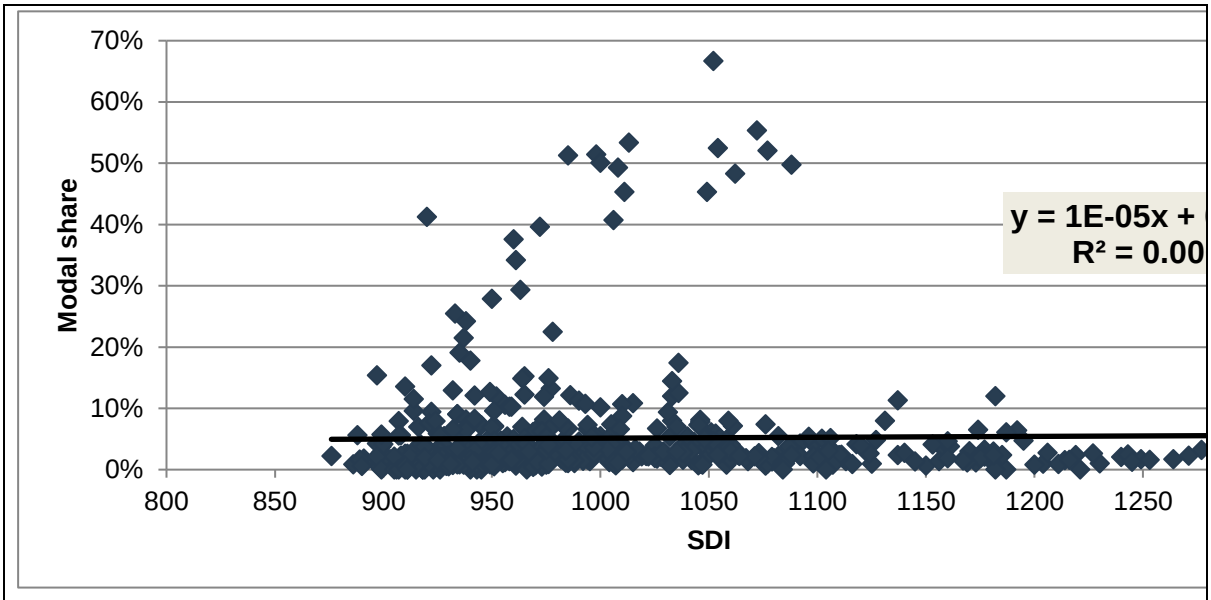


Figure D.0.2
Linkage between modal shares and SDI - active modes

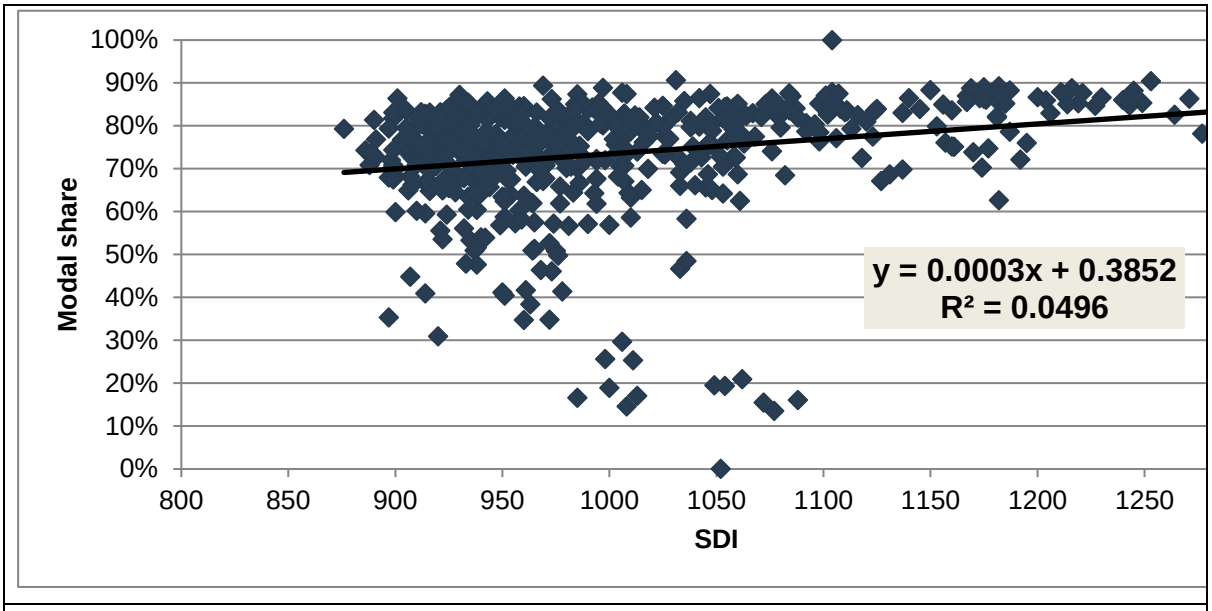
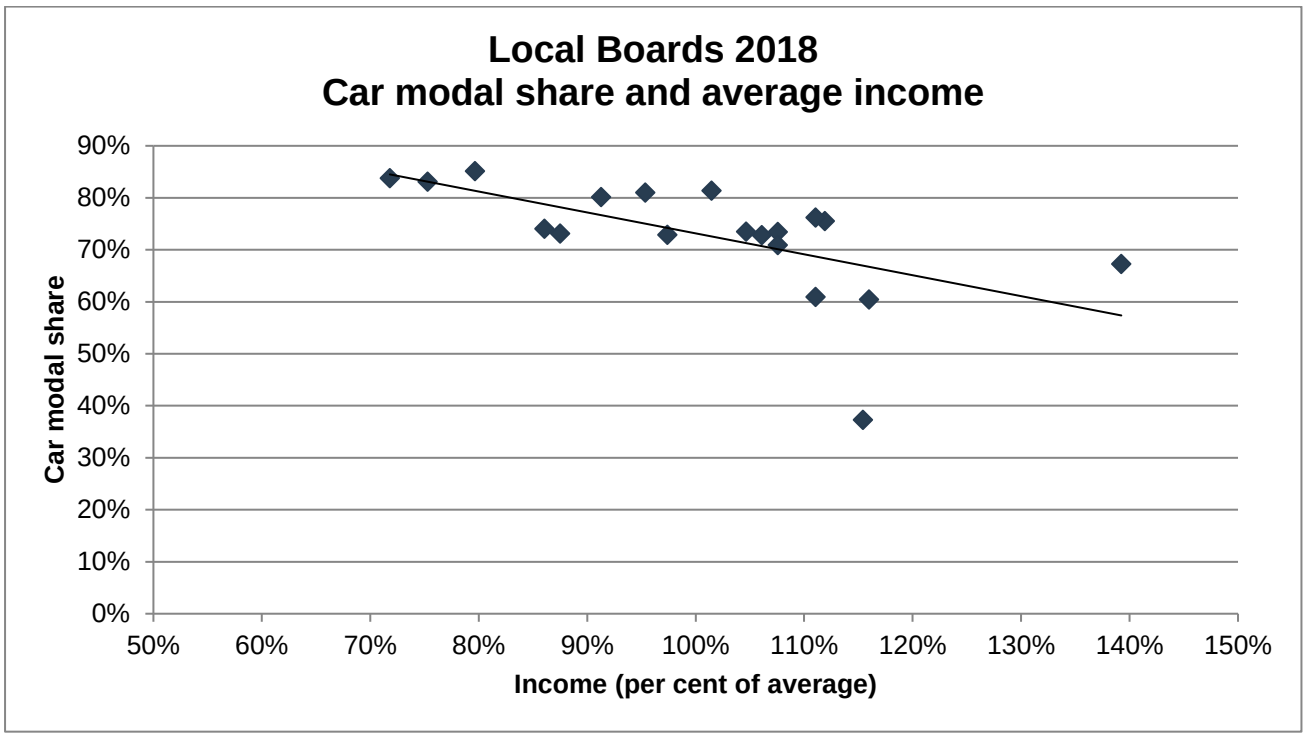
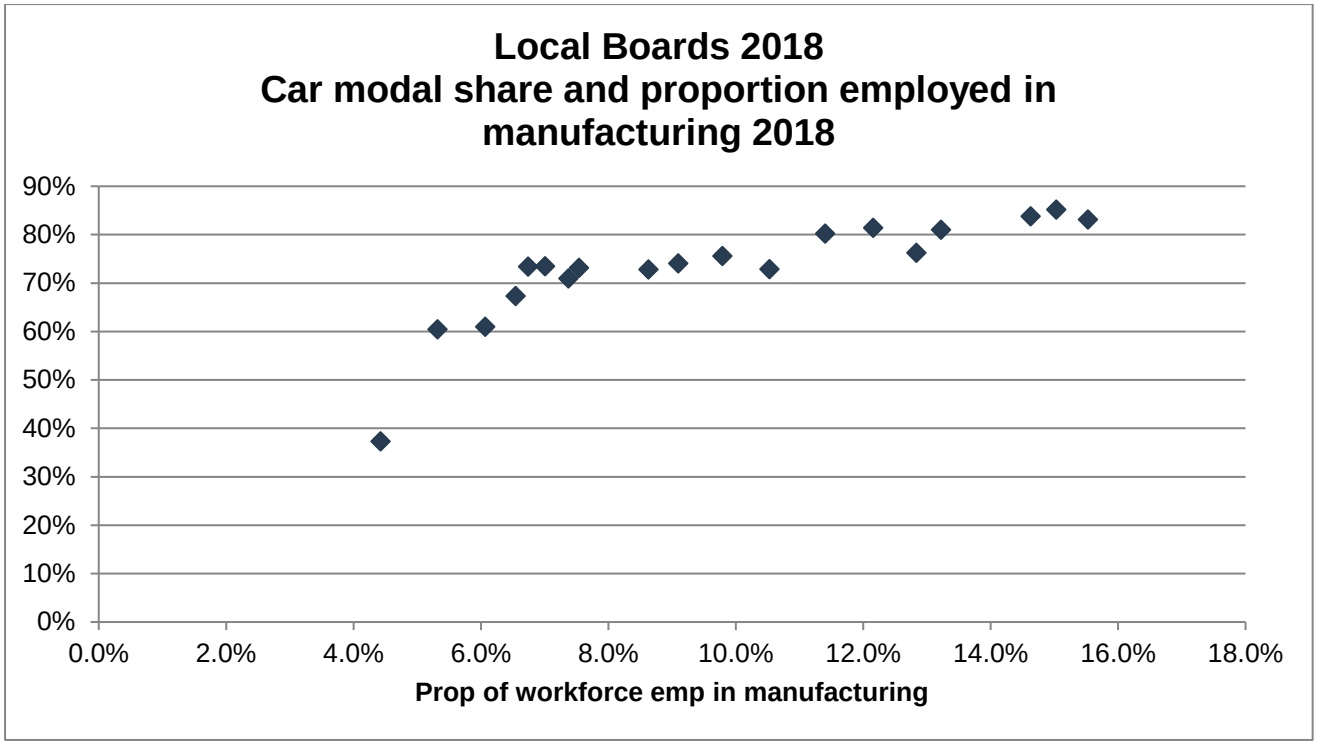
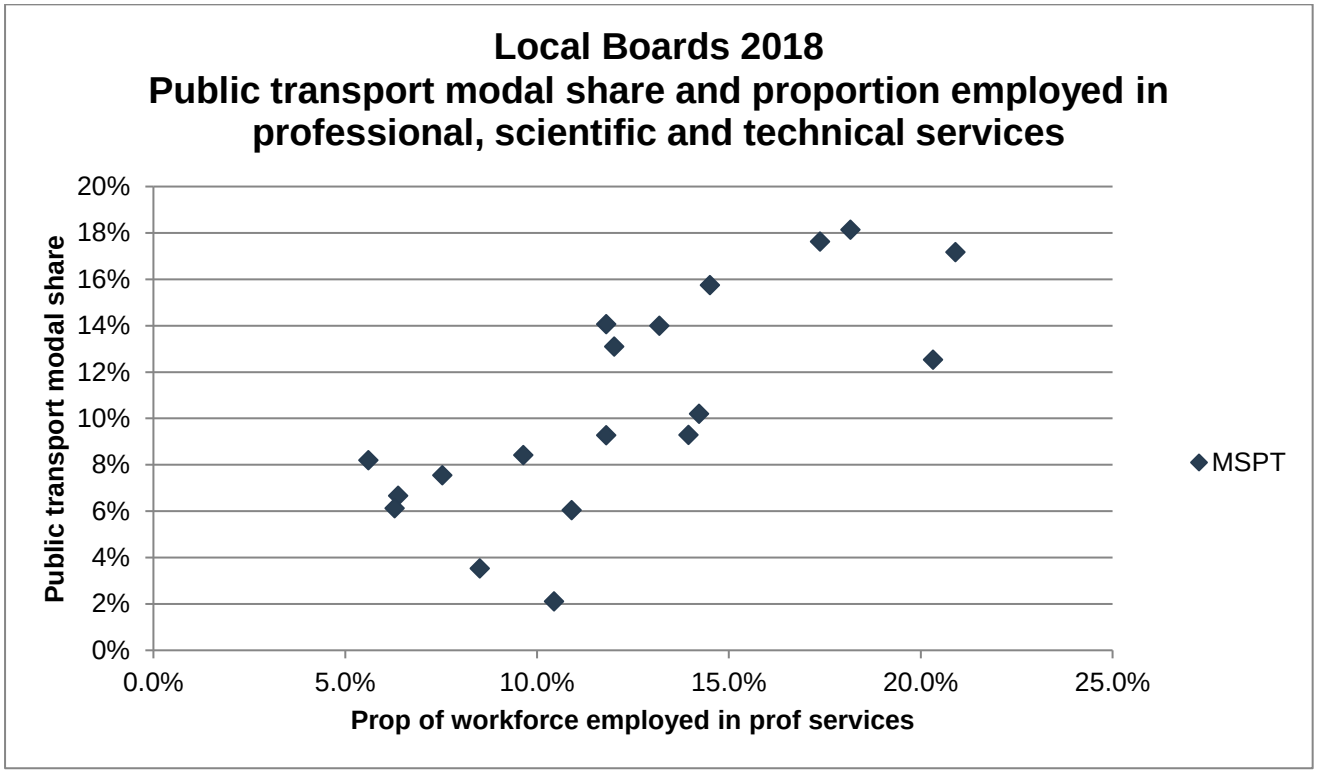


Figure D.0.3
Linkage between modal shares and SDI - all car users




Local Boards 2018
Car modal share and proportion employed in manufacturing 2018
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0.0%
2.0%
4.0%
6.0%
8.0%
10.0%
12.0%
14.0%
16.0%
18.0%
Prop of workforce emp in manufacturing


Local Boards 2018
Public transport modal share and proportion employed in professional, scientific and technical services
Public transport modal share
20%
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
0.0%
5.0%
10.0%
15.0%
20.0%
25.0%
Prop of workforce employed in prof services
MSPT