BEFORE INDEPENDENT HEARING COMMISSIONERS
IN CHRISTCHURCH

TE MAHERE Ā-ROHE I TŪTOHUA MŌ TE TĀONE O ŌTAUTAHI

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of the hearing of submissions on Plan Change 14 (Housing and Business Choice) to the Christchurch District Plan

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STATEMENT OF PRIMARY EVIDENCE OF CHRIS MORAHAN ON BEHALF OF CHRISTCHURCH CITY COUNCIL

TRANSPORT PLANNING

RESIDENTIAL ZONE QUALIFYING MATTER: LOW PUBLIC TRANSPORT ACCESSIBILITY

CITY-WIDE QUALIFYING MATTERS: CITY SPINE CORRIDOR AND AIRPORT NOISE CONTOUR

Dated: 11 August 2023

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EXECUTIVE SUMMARY

1. My full name is **Chris Morahan**. I am employed as a principal advisor in the strategic transport team within Christchurch City Council (the **Council**).

2. I have prepared this statement of evidence on behalf of the Council in respect of the **low public transport accessibility** and **city spine corridor** qualifying matters contained within Plan Change 14 to the Christchurch District Plan (the **District Plan**; **PC14**).

3. My evidence also provides data to support discussion on the **airport noise contour** qualifying matter.

4. The section 42A reports in respect of those three qualifying matters (**QMs**) are authored by:

    (a) **Mr Ike Kleynbos**, in respect of the low public transport accessibility QM; and

    (b) **Ms Sarah Oliver**, in respect of the city spine transport corridor QM and airport noise contour QM.

5. My evidence describes the expected transport-related impacts of PC14, and the expected transport-related impacts if the low public transport accessibility and city spine corridor QMs were to be removed.

6. I conclude the following:

    (a) PC14 is expected to have positive impacts on the transport network, by ensuring future growth is focussed in areas with the greatest accessibility by public transport and active modes. This is expected to reduce the need for car use, which would result in a broad range of environmental, social and financial benefits.

    (b) The low public transport accessibility and city spine corridor QMs are expected to further enhance these benefits.

    (c) Proposed changes to expand the airport noise contour have the potential to impact on spatial and transport planning in the city, especially the mass rapid transit business case. I cannot comment on the quantitative nature of these impacts until more detailed transport modelling is completed, which I understand Waka Kotahi NZ Transport Agency (**Waka Kotahi**) is commissioning.

INTRODUCTION

7. My full name is **Chris Morahan**.

8. I hold a Bachelor of Engineering (civil with honours) from the University of Canterbury. I have 15 years' industry experience working in a range of transportation-related roles for several consultancies in New Zealand and Australia, Christchurch and Nelson City Councils, and Waka Kotahi. My early career had an engineering focus involving detailed design and construction supervision on transport projects. Later my focus shifted to assessment of development proposals through the resource consenting process, and assessment of transport investments through the business case process.

9. For the last two years I have been working in strategic transport planning and policy development. This has included long-term spatial and transport planning and strategy, and parking policy.

10. In preparing this evidence I have:

    (a) reviewed the PC14 maps;

    (b) reviewed the parts of the Section 32 reports pertaining to the city spine and low public transport accessibility QMs (sections 6.31 - 6.32, appendices 45-49);

    (c) reviewed the low public transport accessibility QM submissions overview summarising 243 submission points into 5 themes;

    (d) read in full the submissions from Waka Kotahi and Environment Canterbury (ECan);

    (e) had multiple discussions on the QMs with city planners; and

    (f) drawn on my involvement and knowledge of the Mass Rapid Transit Business Case and draft Greater Christchurch Spatial Plan, the draft Ōtautahi Christchurch Transport Plan and draft Ōtautahi Christchurch Plan, and the Public Transport Futures Business Case.

11. I am authorised to provide this evidence on behalf of the Council.

QUALIFICATIONS AND EXPERIENCE

12. I hold the qualification of Bachelor of Engineering (civil with honours).

13. For the last two years I have been employed as a Principal Advisor in the Strategic Transport team at the Council. This has involved developing the draft Ōtautahi Christchurch Transport Plan, a thirty-year strategic outlook with a ten-year action plan. A key part of this work has been integrating with the Ōtautahi Christchurch Plan. I have also been involved in the Greater Christchurch Spatial Plan and the Mass Rapid Transit Indicative Business Case.

14. For nine years prior to this, I was a transportation engineer with WSP. Early on in these years my role involved construction supervision, and detailed design of intersections, streets, accesses and car parks. Later it came to focus more on writing business cases for transport investments, including the public transport futures business case, Halswell Road bus lanes business case, and various cycleways business cases around the country.

15. Throughout this time I also completed many transport assessments for various developments for the purposes of resource consent applications. These involved supermarkets, schools, kindergartens, windfarms, swimming pools, motels and residential developments. I have also reviewed assessments on behalf of various councils.

16. I am a member of Engineering New Zealand.

CODE OF CONDUCT

17. While this is a Council hearing, I have read the Code of Conduct for Expert Witnesses (contained in the 2023 Practice Note) and agree to comply with it. Except where I state I rely on the evidence of another person, I confirm that the issues addressed in this statement of evidence are within my area of expertise, and I have not omitted to consider material facts known to me that might alter or detract from my expressed opinions.

18. I confirm that, while I am employed by the Council, the Council has agreed to me providing this evidence in accordance with the Code of Conduct.

SCOPE OF EVIDENCE

19. My statement of evidence addresses the following matters:

    (a) how the transport system in Christchurch currently operates;

    (b) what future changes are planned for the transport system;

(c) anticipated transport outcomes of PC14 compared to the pre-existing scenario, to respond to submissions opposing PC14;

(d) anticipated transport outcomes if the low public transport accessibility QM was not included, to respond to submissions seeking the removal of the low public transport accessibility QM;

(e) anticipated transport outcomes if the city spine transport corridor QM was not included, to respond to submissions seeking the removal of the city spine accessibility QM;

(f) anticipated transport outcomes if different bus routes were included in the low public transport accessibility QM, to respond to submissions seeking different bus routes being added in; and

(g) data on the projected future growth assumed in the mass rapid transit business case in areas which would be affected by the proposed new airport noise contour QM.

20. I address each of these points in my evidence below.

HOW THE TRANSPORT SYSTEM IN CHRISTCHURCH CURRENTLY OPERATES

21. A high proportion of Christchurch's travel is undertaken using private vehicles, comparative to other cities in New Zealand. Census 2018 recorded that 82% of Greater Christchurch residents who travelled to work did so in a car, truck or van, compared to 66% in Auckland and 56% in Greater Wellington.[1]

22. Data published by Waka Kotahi using national odometer readings shows that the distance driven by the average resident in the Canterbury region is 14,495 km per annum. In the Wellington region (including Wairarapa and Kāpiti) the figure is 7,417 km per annum, and in Auckland it is 10,112 km per annum.[2]

23. Comparative to other New Zealand cities, a high proportion of trips in Christchurch are undertaken using bicycles. Census 2018 recorded that 5%

[1] Internal analysis using data from Census 2018, https://nzdotstat.stats.govt.nz/
[2] nzta.govt.nz/assets/resources/household-travel-in-our-major-urban-areas/Household-travel-in-our-major-urban-areas.pdf

of Greater Christchurch residents cycle to work compared to 1% in Auckland and 3% in Greater Wellington.[3]

24. A low proportion of trips are undertaken using public transport. Census 2018 recorded that 4% of Greater Christchurch residents ride public transport to work compared to 8% in Auckland and 12% in Greater Wellington.[4]

25. A low proportion of trips are undertaken by walking. Census 2018[5] recorded that 4% of Greater Christchurch residents walk to work compared to 5% in Auckland and 13% in Greater Wellington.[6]

26. These proportions (known as mode share) have arisen due to a complex combination of factors, ranging from conscious investment decisions, to natural conditions like topography and weather.

27. Mode share has changed significantly over time. For most of Christchurch's history it had significantly higher public transport use than it does today, as shown by the graph of annual public transport patronage in **Figure 1** below.[7]

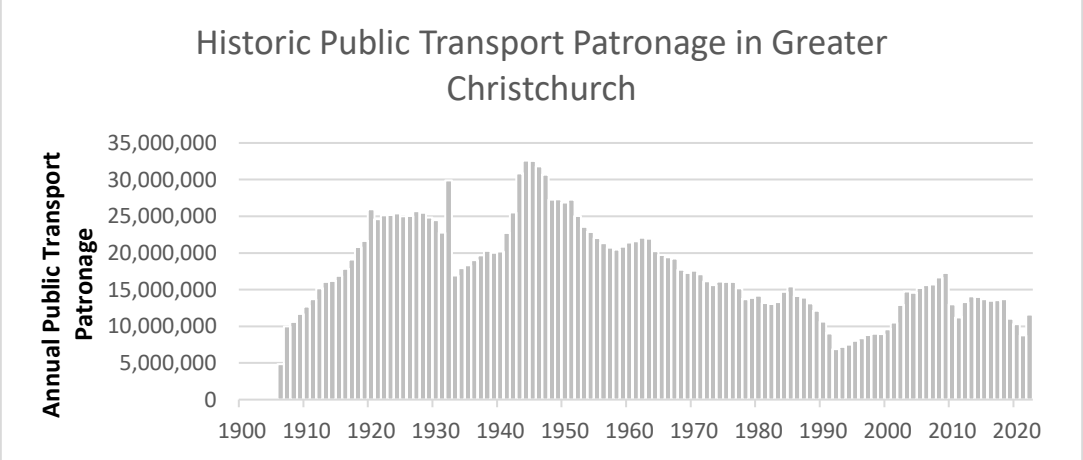

Figure 1

28. This decline is also seen across other cities in New Zealand, but it has been more pronounced in Christchurch.[8]

29. Mode share is not evenly distributed across the city. Again using Census 2018 data, three points can be illustrated. Firstly, **Figure 2** below shows that

[3] Internal analysis using data from Census 2018, https://nzdotstat.stats.govt.nz/
[4] Internal analysis using data from Census 2018, https://nzdotstat.stats.govt.nz/
[5] Internal analysis using data from Census 2018, https://nzdotstat.stats.govt.nz/
[6] Internal analysis using data from Census 2018, https://nzdotstat.stats.govt.nz/
[7] Internal analysis from data provided by Canterbury Regional Council
[8] For example, the equivalent graph for Auckland published here: https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/Pages/transport-emissions-reduction-pathway.aspx

the neighbourhoods with lower private car mode share tend to be the higher density areas located in the central city and inner suburbs.[9]

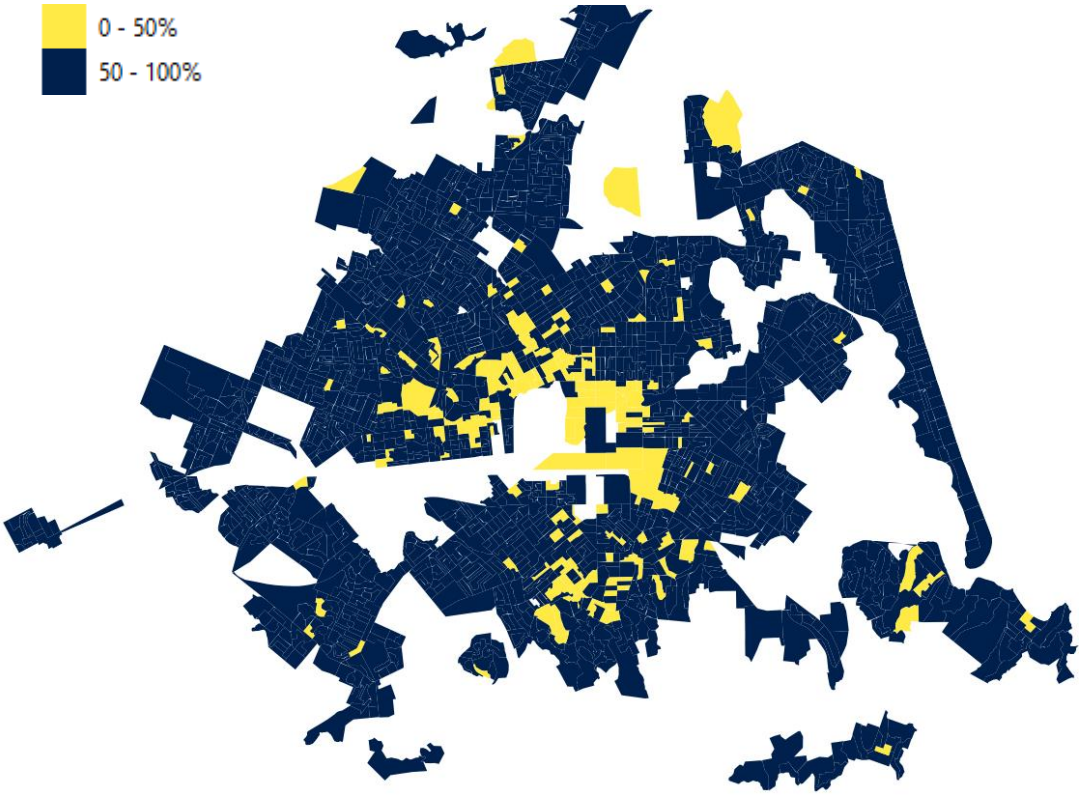

Figure 2

30. Secondly, analysis on the same data can be used to produce the graph below, illustrating that areas within 800m of high frequency bus routes tend to have higher bus mode share than areas further away than 800m from any high frequency bus routes.[10] See **Figure 3** below.

[9] Internal analysis using data from Census 2018, https://nzdotstat.stats.govt.nz/
[10] Internal analysis using data from Census 2018, https://nzdotstat.stats.govt.nz/

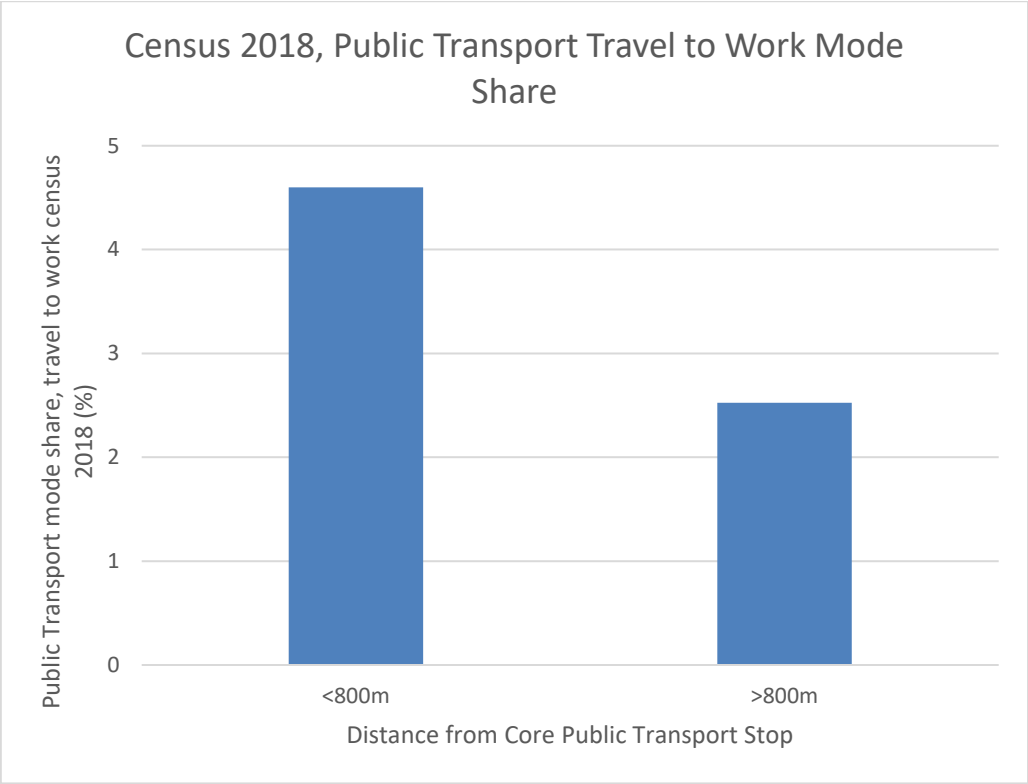

Figure 3

31. Thirdly, the parts of the city with the highest public transport use tend to be the areas with the highest population density. **Figure 4** below shows the proportion of people who normally catch public transport to work in each neighbourhood in Christchurch (statistical area 2) graphed by population density, using census 2018 data.

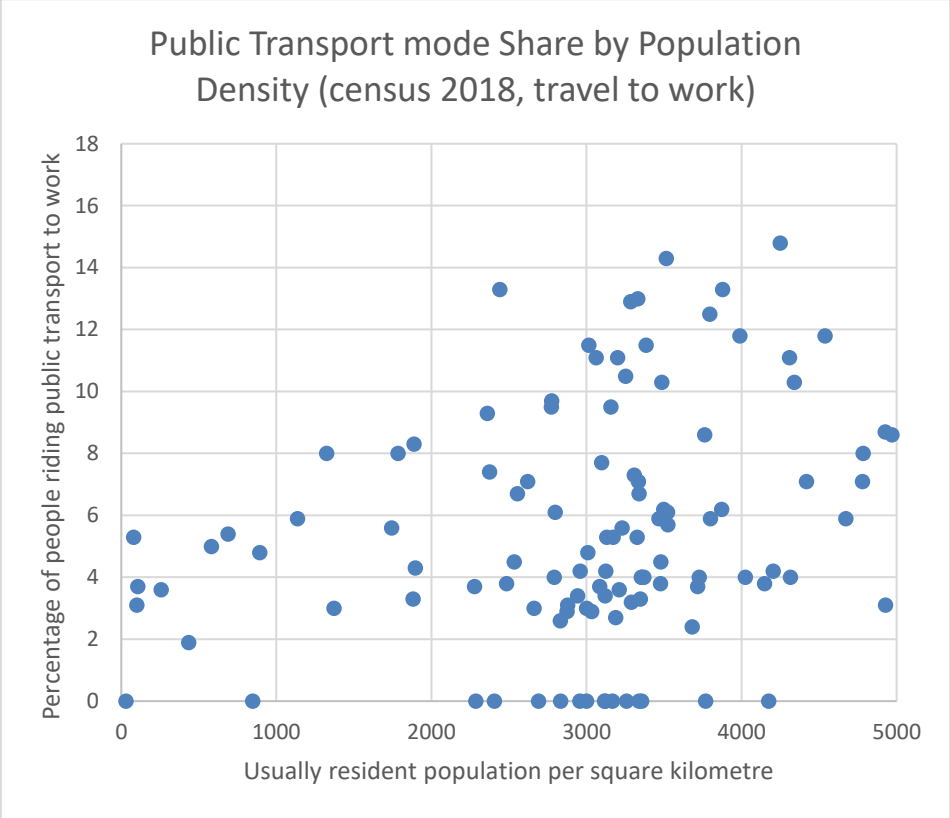

Figure 4

32. This aligns with a wealth of international evidence demonstrating a link between population density and public transport use.[11]

33. Historically Christchurch grew up around its tram network. At its peak in the 1920s, the tram network consisted of 17 routes, mostly radiating out from the central city along arterial roads, as shown in **Figure 5**.[12]

[11] For example Cooke & Behrens 2016, https://www.sciencedirect.com/science/article/pii/S2352146517305343
[12] https://en.wikipedia.org/wiki/Christchurch_tramway_system#/

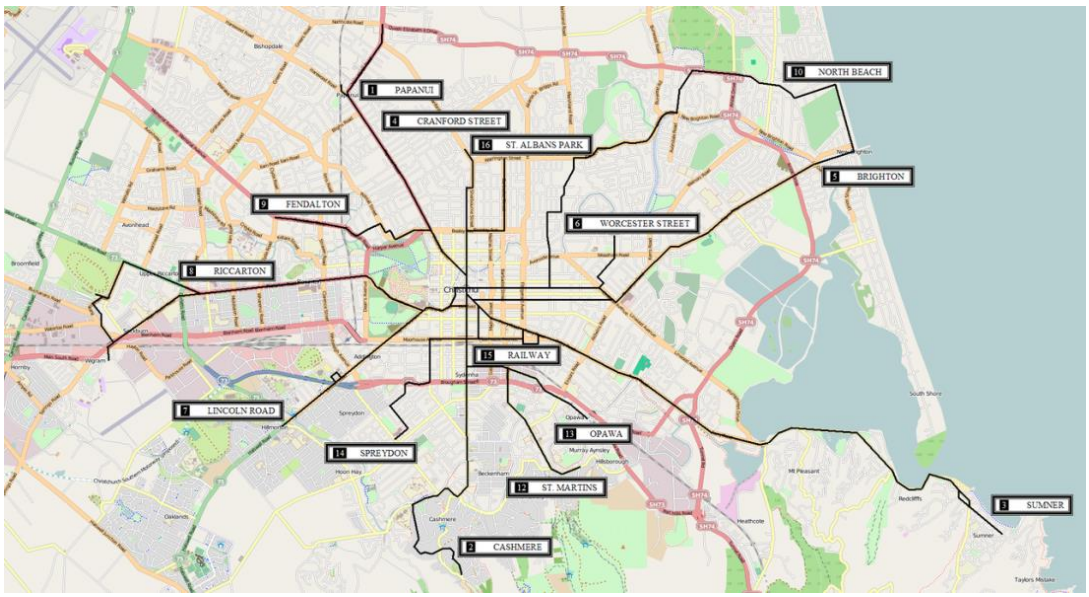

Figure 5

34. A hundred years later these routes still form the core of our public transport system, as shown in the map of current bus routes in **Figure 6** below (the thickest lines denoting the high frequency network)[13]. The most notable change is the addition of an orbital route (in green).

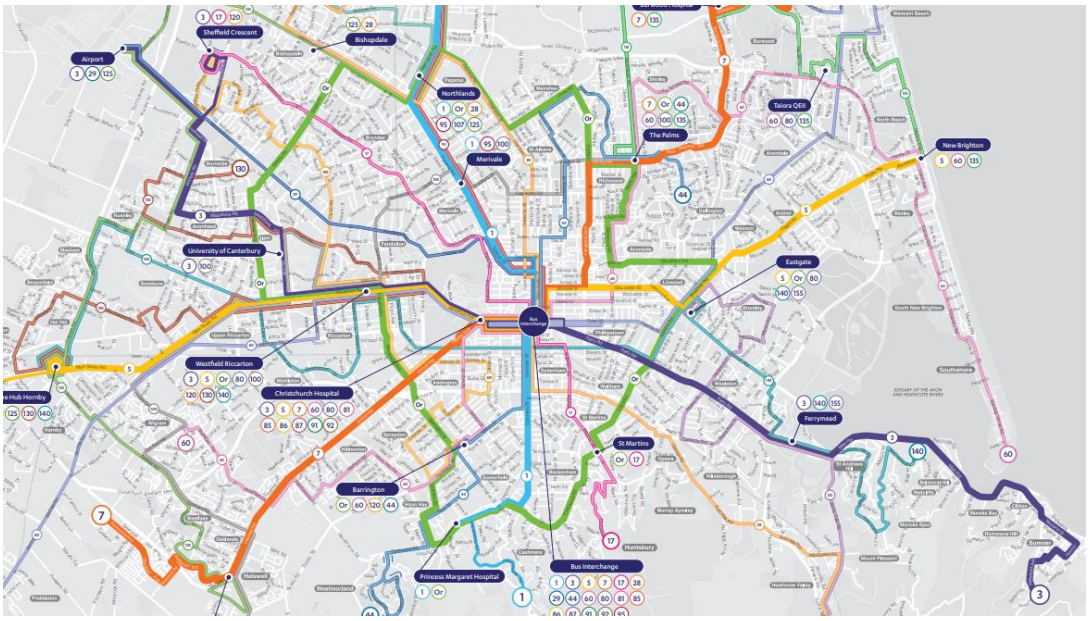

Figure 6

35. The 2016 Christchurch Transit Alternatives Report[14] stated that *"the Metro Lines are likely to be a persistent feature of the city's public transport network – indeed they typically reflect tramway routes established over a century ago*

[13] https://www.metroinfo.co.nz/timetables/
[14] Jarret Walker and Associates & MR Cagney, 2016, Christchurch Transit Alternatives Report, Environment Canterbury

and remain largely unchanged over recent decades. In addition, most suburban interchange locations have been key activity centres on these main corridors for many years and are unlikely to change. There are few opportunities for significantly restructuring the core of the city's PT network."

36. The current public transport system categorises services into four tiers. These are listed below together with their headways (time between subsequent buses, which is one important measure of how useful a bus service is):

    (a) high frequency – typically 15 minute headways (with higher frequency in peak periods);

    (b) city connectors – typically 30 minute headways;

    (c) suburban links – typically 60 minute headways; and

    (d) peak only services – services travelling directly between satellite towns and the city centre.

37. The highest tier is supported by better quality infrastructure such as bus stops with shelters and seating, real-time information displays, and safe crossings and high-quality footpaths surrounding bus stops. Some of the highest-tier routes also have bus lanes, such as Riccarton Road, Papanui Road, Colombo Street, Lincoln Road, Hills Road, Main South Road and Main North Road. These bus lanes speed up the buses and make them more reliable, particularly during peak periods, in some instances making them a faster travel option than driving a car.

38. There is a combination of reasons why the core public transport network has remained largely unchanged for such a long time. There is a two-way relationship between public transport and land-use. Public transport both services land use and also influences it. Throughout the city's history the most intensively developed land has been in the city centre and along the public transport routes to Riccarton, Papanui, Shirley, Linwood etc. This intensive land use development has meant these corridors remain the busiest public transport routes in the city today. Because these routes carry the most passengers, they are the most commercially viable, and they justify the best services and best infrastructure improvements. The improved services and infrastructure in turn increase demand for people to live and work along the corridor. Transport and land use have become a virtuous circle along these corridors.

39. A principle that further accentuates this is that investments in public transport tend to be the most effective if they make the door-to-door travel time of catching the bus comparable to the travel time of driving a car. This is especially true in a car-dominated city like Christchurch where most people have access to a car. Catching the bus can only be comparable to driving a car on routes with high frequencies (low wait times), and some level of bus priority (eg bus lanes).

40. Investing in a low-tier bus route to improve it slightly is unlikely to result in significant patronage uplift if, even following investment, that route is still significantly slower than driving. The biggest patronage uplift tends to come from investing in higher-tier bus routes where the investment means that catching the bus becomes a faster option than driving.

41. Often public transport is discussed in terms of two distinct roles:

    (a) maximising patronage, ie providing an attractive service to the most people; or

    (b) maximising coverage, ie providing a minimal level of service to the broadest possible area.

42. The core network tends to have a focus on the first role, providing a useful and attractive travel option to a focussed area of the city. The lower-tier routes tend to focus more on the second role, covering a broader area but with a lower level of service.

43. The core network in Christchurch has stayed reasonably stable for a long time. In contrast, the lower-tier routes have tended to change around more as they are less intrinsically linked to land use.

44. Of the public transport routes above, the busiest is the corridor from the city centre to Hornby via Riccarton and Main South Roads. Through Riccarton it carries approximately 10,000 passengers per day,[15] on 790[16] buses across 9 routes.

45. The corridor from the city centre to Belfast via Papanui and Main North Roads is Christchurch's second busiest: through Papanui it carries approximately 5,000 passengers per day, on 430 buses across 6 routes.

[15] Taken from Christchurch Transport Model outputs
[16] Taken from metroinfo website: https://www.metroinfo.co.nz/

46. On their inner portions, between Church Corner and the city centre, and Papanui and the city centre, both these corridors have road reserve widths of approximately 20m for most of their length.

47. For streets functioning as the city's busiest public transport corridors, this is narrow.

48. Riccarton and Papanui Roads have a variety of different road cross-sections. On some sections there is no public transport priority, no cycle lanes or cycleway, and footpaths that are narrower than today's best practice guidance. Generally the roads have little landscaping or trees within the road reserve, but significant greenery on adjacent land. See **Figure 7**.

Figure 7

49. Other sections have painted cycle lanes and/or bus lanes, typically in one direction only and peak-period only. See **Figure 8**.

Figure 8

WHAT FUTURE CHANGES ARE PLANNED FOR THE TRANSPORT SYSTEM

50. In 2019, the Council declared a Climate and Ecological Emergency and set a citywide target of achieving net zero greenhouse emissions by 2045 (with separate targets for methane), and to halve our citywide emissions by 2030, from 2016-17 levels.

51. It also adopted *Kia tūroa te Ao Ōtautahi Christchurch Climate Resilience Strategy*,[17] setting out how it was going to achieve these targets. This states: "*Road transport is the biggest single contributor to Christchurch's emission footprint. The transport sector contributes 54% of our district's greenhouse gas emissions, with 36% coming from road transport. Reducing transport emissions is essential to achieve our greenhouse gas emissions targets."*

52. One of the focus areas is to:
"Integrate sustainable transport and land use planning, reducing the need for car trips and creating more 15 minute neighbourhoods."

53. In 2018 the Regional Public Transport Plan was adopted.[18] This identified our two busiest public transport corridors discussed earlier (Riccarton and

[17] https://ccc.govt.nz/the-council/plans-strategies-policies-and-bylaws/strategies/climate-change-strategy
[18] Available here: https://www.ecan.govt.nz/your-region/living-here/transport/public-transport-services/future-public-transport/

Papanui routes) and set out a plan for dedicated right of way and eventually rapid transit. See **Figure 9**.

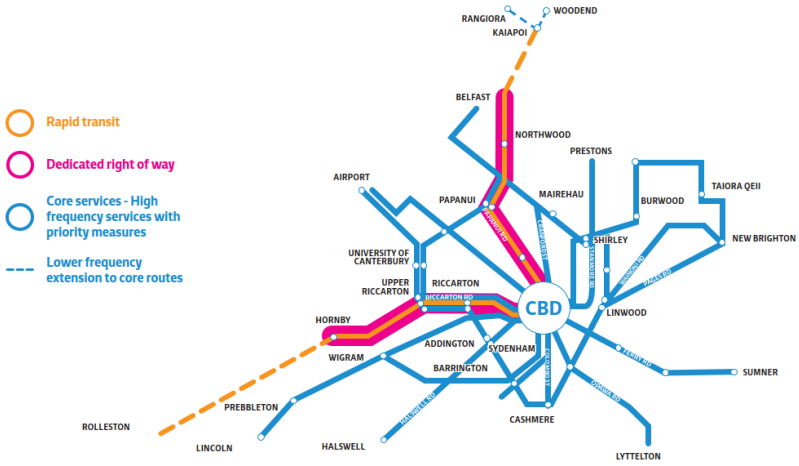

Figure 9

54. One of the actions for the medium-term (2018-2028) was to "*Protect rapid transit corridors and begin construction of infrastructure that will separate public transport from traffic congestion (i.e. rapid public transport systems)*"

55. It also proposed investment in the bus-based public transport system, with an action to develop more detailed business cases for this. This was completed over the next two years by the Greater Christchurch Partnership, which comprises Mana Whenua, ECan, the Council, Selwyn District Council, Waimakariri District Council, Te Whatu Ora – Waitaha, and Waka Kotahi. In 2020, the Greater Christchurch Public Transport Futures Combined Business Case was endorsed by the four councils above and the Waka Kotahi Board.[19]

56. The business case sets out a decade-long programme of investment to improve the existing bus-based public transport system in the city. These improvements are now beginning to be rolled out.

57. Although there are significant improvements to infrastructure and services (eg bus lanes and more frequent buses), the proposed core network is located almost entirely on the same streets as the current core network. The network diagram in **Figure 10** below illustrates this.[20]

[19] Available here: https://www.ecan.govt.nz/your-region/living-here/transport/public-transport-services/future-public-transport/
[20] PT Futures Business Case, Available here: https://www.ecan.govt.nz/your-region/living-here/transport/public-transport-services/future-public-transport/

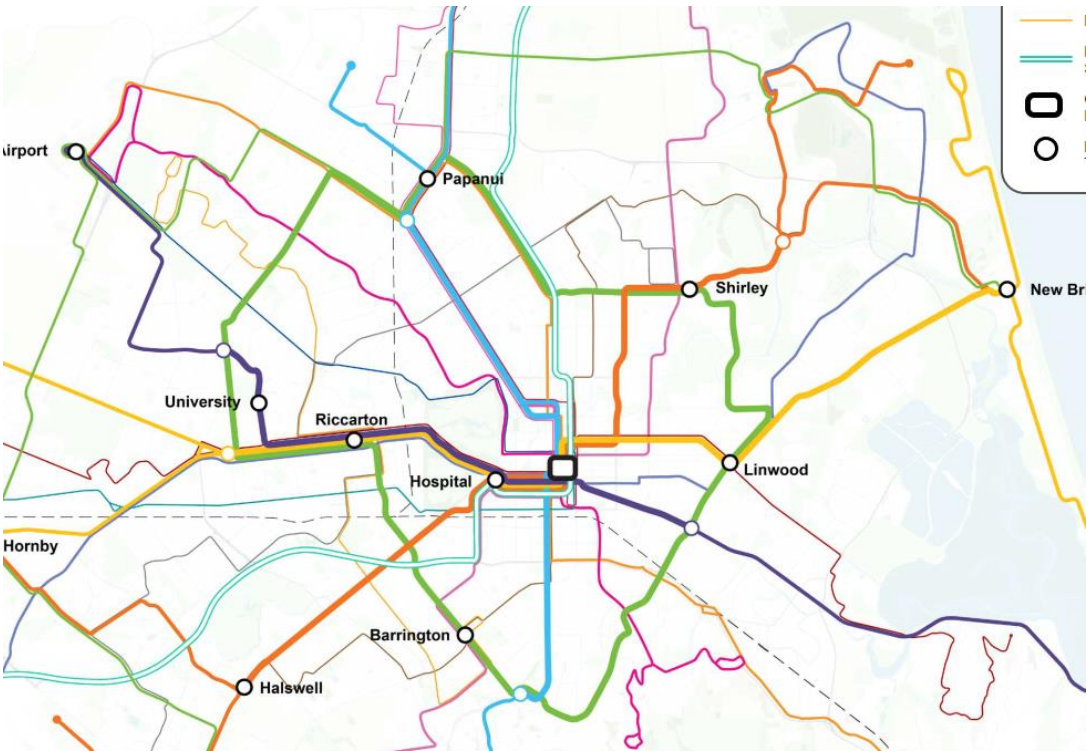

Figure 10

58. Routes are still categorised into four tiers, but the level of service of each is improved:

    (a) Inner Core Routes – 7.5 minute headways – this is a greater level of service than anything operating currently;

    (b) Outer Core and Additional Frequent Routes – 15 minute headways – this is roughly equivalent to the top tier of current bus routes;

    (c) Rest of Network – mostly 30 minute headways – this is roughly equivalent to the second tier of current bus routes; and

    (d) Direct Services – 30 minute headways – this is roughly equivalent to the second tier of current bus routes.

59. One feature of the planned future changes is to improve bus services on the routes which already have the greatest levels of service.

60. This is what the patronage modelling in the business case showed would have the greatest impact. Patronage modelling was completed on a range of interventions, split into an “A-series” which focussed on improvements to the five current top-tier routes, and a “B-series” focussing on improvements to second-tier routes. The graph in **Figure 11** below shows the patronage uplift

modelled for each of these.[21]

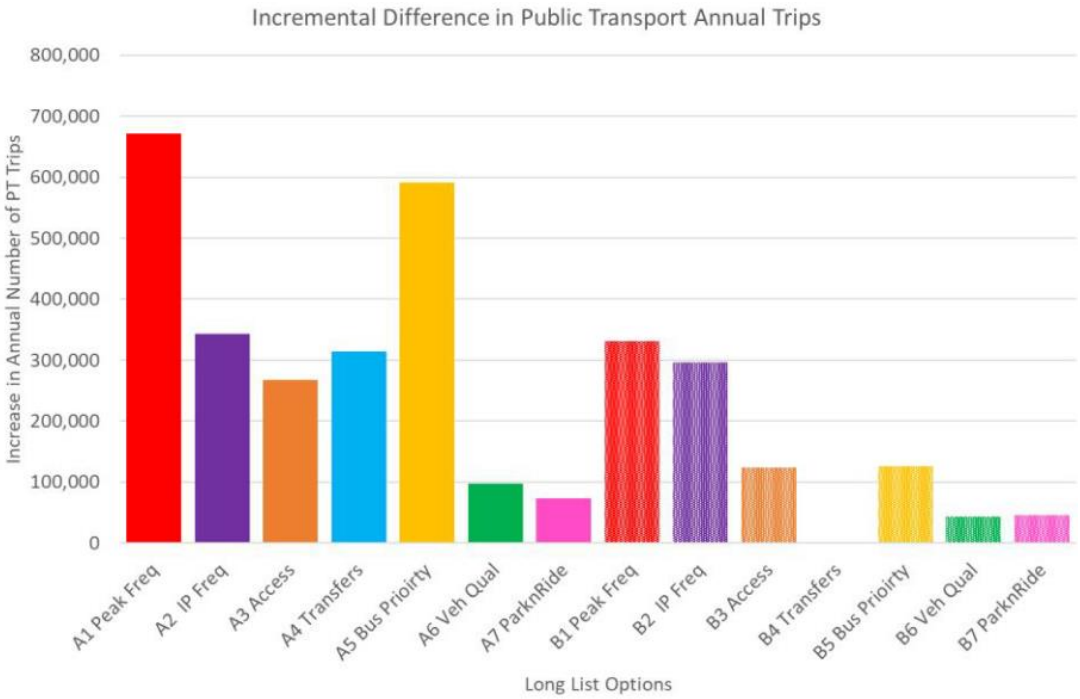

Figure 11

61. It shows that, according to the transport model, the largest patronage uplift would be expected to come from increased peak period bus frequencies on the core routes (A1), followed by installing bus priority on the core routes (A5). Smaller patronage increases could be gained through increased interpeak frequencies on the core routes (A2), increased frequencies on the second-tier routes during peak periods (B1) and interpeak periods (B2).

62. The bus services that currently provide the highest levels of service not only attract greater use than lower-tier routes, but they also have the greatest use *per service-hour* (ie the cost *per passenger* is lowest on the highest-tier routes). This is shown in the graph in **Figure 12** below taken from the 2016 Transit Alternatives Report[22] (note the change in bus route labels; blue, purple, yellow and orange correspond to routes 1, 3, 5 and 7 respectively).

[21] Taken from page 68 of the PT Futures full Business Case, which is available here: https://api.ecan.govt.nz/TrimPublicAPI/documents/download/4106274

[22] Jarret Walker and Associates & MR Cagney, 2016, Christchurch Transit Alternatives Report, Environment Canterbury, page 5

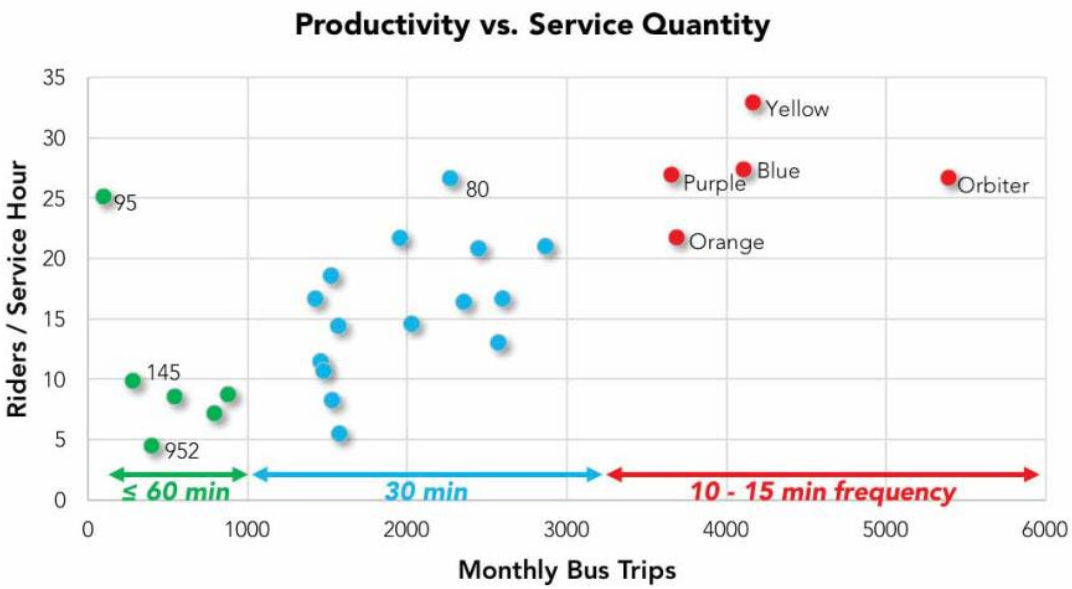

Figure 12

63. The report included this commentary:
"The Metro Lines [top-tier routes] are the top performers, with 20-35 people getting on the bus for every hour a bus is operating… Suburban Links [third-tier routes], by contrast, are delivering disappointing performance, with some attracting fewer than 10 boardings for every hour a bus is in service. This is exactly what should be expected, because these two kinds of service are focused on different purposes. Metro Lines – straight, frequent, and linking many dense areas and attractions – are the kind of service that attracts high patronage all over the world. The Suburban Links – which tend to be circuitous, infrequent, and focused on areas of lower demand – resemble lower-ridership services all over the world."

64. In addition to this, work has also been progressing on the mass rapid transit business case. Similarly to the business case looking at the bus network described above, the mass rapid transit business case was commissioned by the Greater Christchurch Partnership. It commenced in 2020 but was rescheduled to align better with the Greater Christchurch Spatial Plan, also under development by the partnership at the time. The draft Spatial Plan is currently being publicly consulted on.

65. Mass rapid transit is a critical component of the draft Greater Christchurch Spatial Plan, which states:
"The draft Spatial Plan identifies the 'turn up and go route' or Mass Rapid Transit route as a key move in shaping Greater Christchurch. The draft Spatial Plan seeks to focus development along these routes and centres…

A strengthened urban and town centres network in Greater Christchurch will need to have strong connections between centres. This will require more realistic and viable alternatives to private car use. Mass rapid transit will not only be a transport enhancement to Greater Christchurch's infrastructure, but also a 'city shaping' initiative that is fundamental to the shift in urban form required to help achieve a net zero emissions future."

66. The mass rapid transit business case[23] first sets out the strategic case for investment, demonstrating a clear line of sight between the identified problems and the benefits that a proposed scheme would bring. It then went through long-list and short-list processes to determine a preferred option, before making the commercial, financial and management cases for how this option might be implemented. See **Figure 13**.

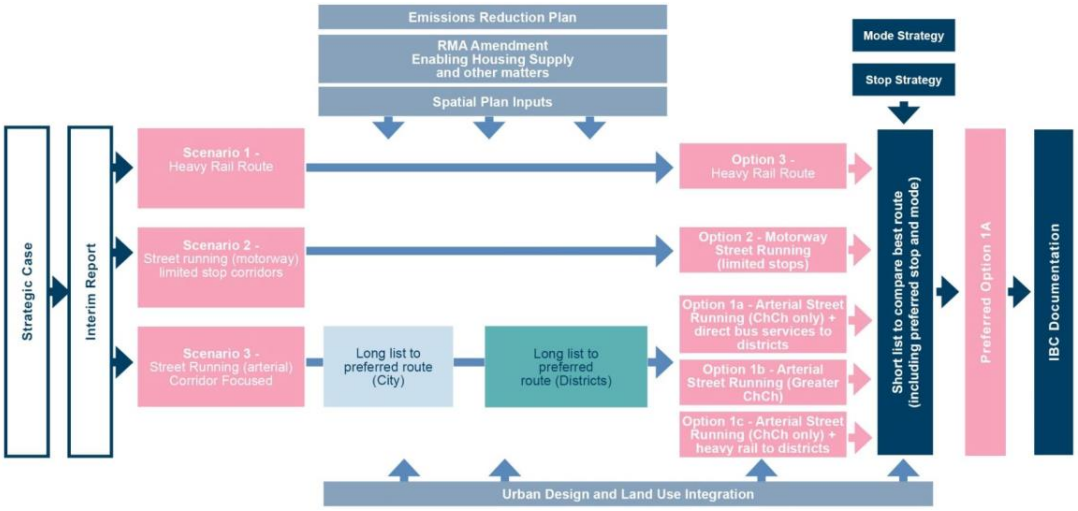

Figure 13

67. The preferred option was a street-running scheme between Hornby and Belfast via the city centre, using Main South Road, Riccarton Road, Papanui Road and Main North Road, as shown in the map in **Figure 14** below.

[23] Available here: https://www.greaterchristchurch.org.nz/governance/

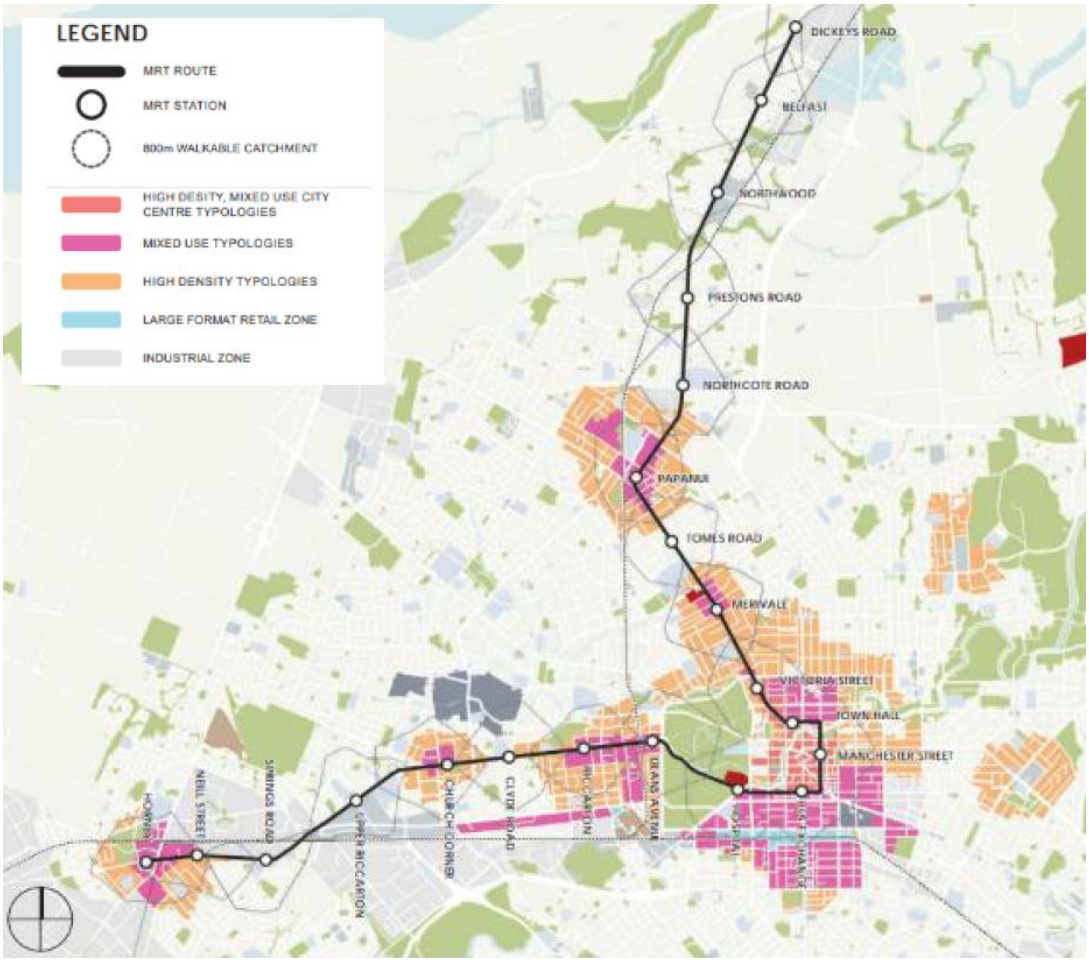

Figure 14

68. This preferred option is to be complemented with increased investment in direct buses between the city centre and the satellite towns (Rolleston, Lincoln, Rangiora and Kaiapoi), utilising the motorway corridors, as shown in the map in **Figure 15** below.

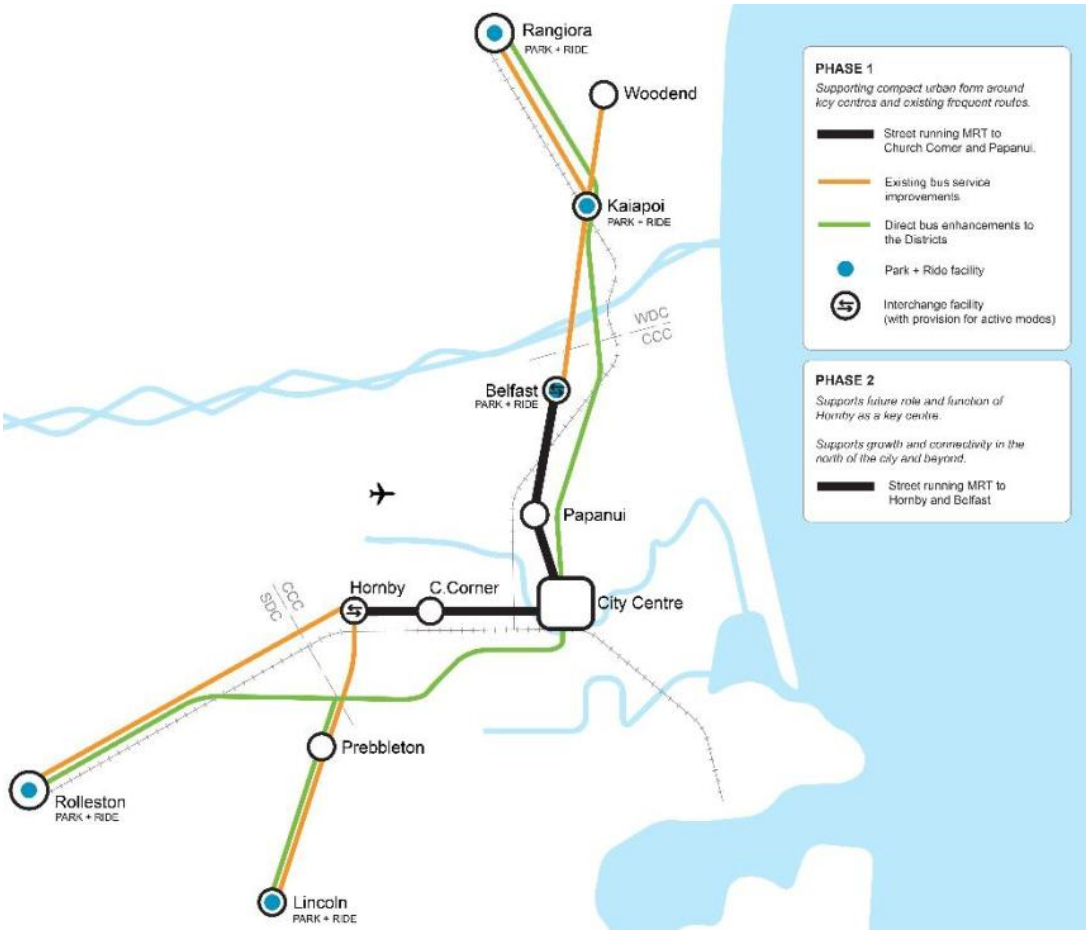

Figure 15

69. Options that made use of the railway and motorway corridors were also investigated. Both of these alternative options had some merit but were assessed as being less effective ways of achieving the investment objectives, part of which was to help shape the city into a more sustainable urban form as set out in the Greater Christchurch Spatial Plan. They would both provide significant benefits to locations further out like Rolleston and Rangiora but have less of an impact in the Christchurch City urban area.

70. The business case does not rule out some sort of future use of the rail corridor for passenger transport, stating:
"Extensions of the MRT corridor to the Districts, creation of an East to Airport corridor, or connection of the MRT corridor to future regional rail services are only some of the possible next steps."

71. The business case included conceptual visualisations of what the corridor could look like. On the outer portions (Main South and Main North Roads), the road reserve is relatively wide, and it is expected that there will be sufficient space for traffic lanes, cycleways, grass and trees. This is shown in

Figure 16 below.

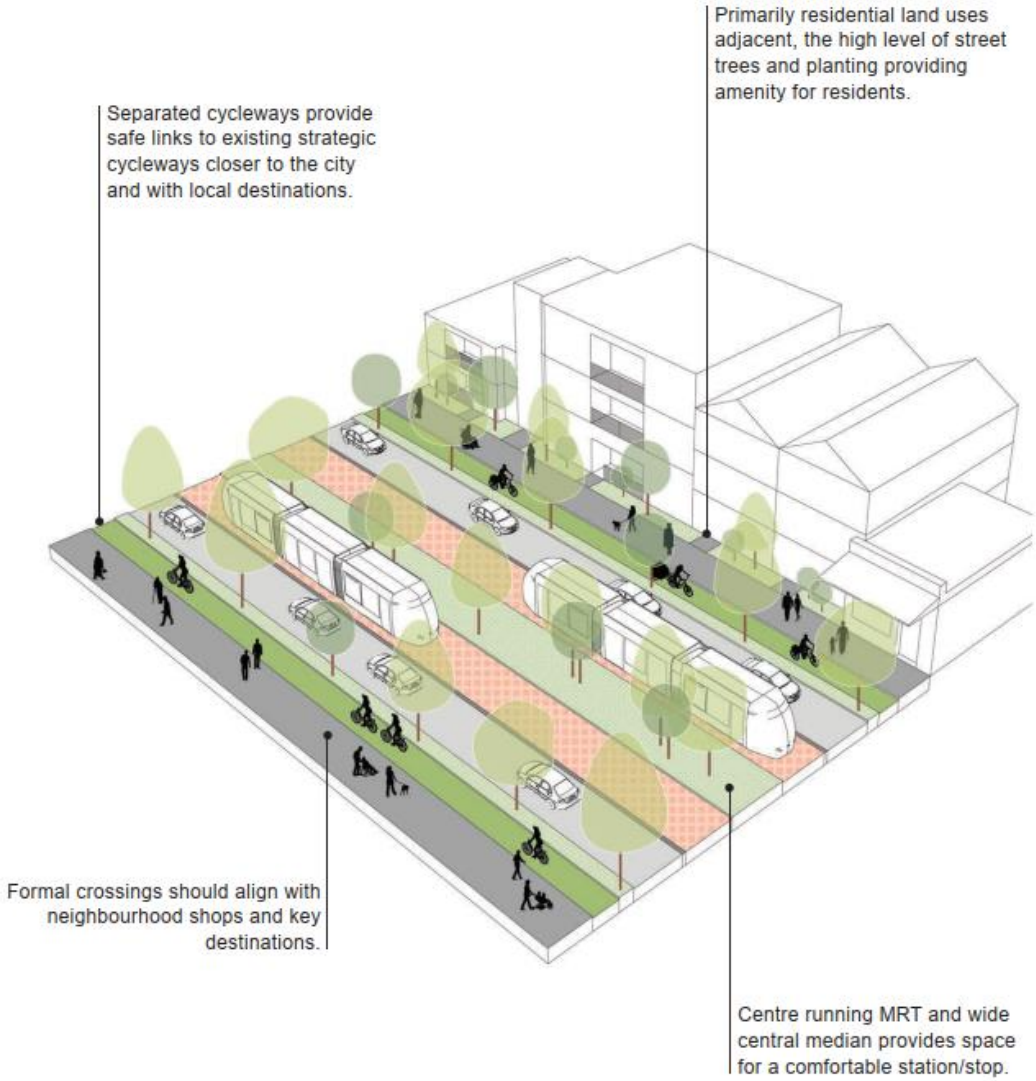

Figure 16

72. However closer in (Riccarton and Papanui Roads), the road reserve is narrower and there is not sufficient space to accommodate all these functions. Through the busier shopping areas of Riccarton, Merivale and Papanui, the business case addresses this by proposing to remove traffic lanes to create transit malls. See **Figure 17**.

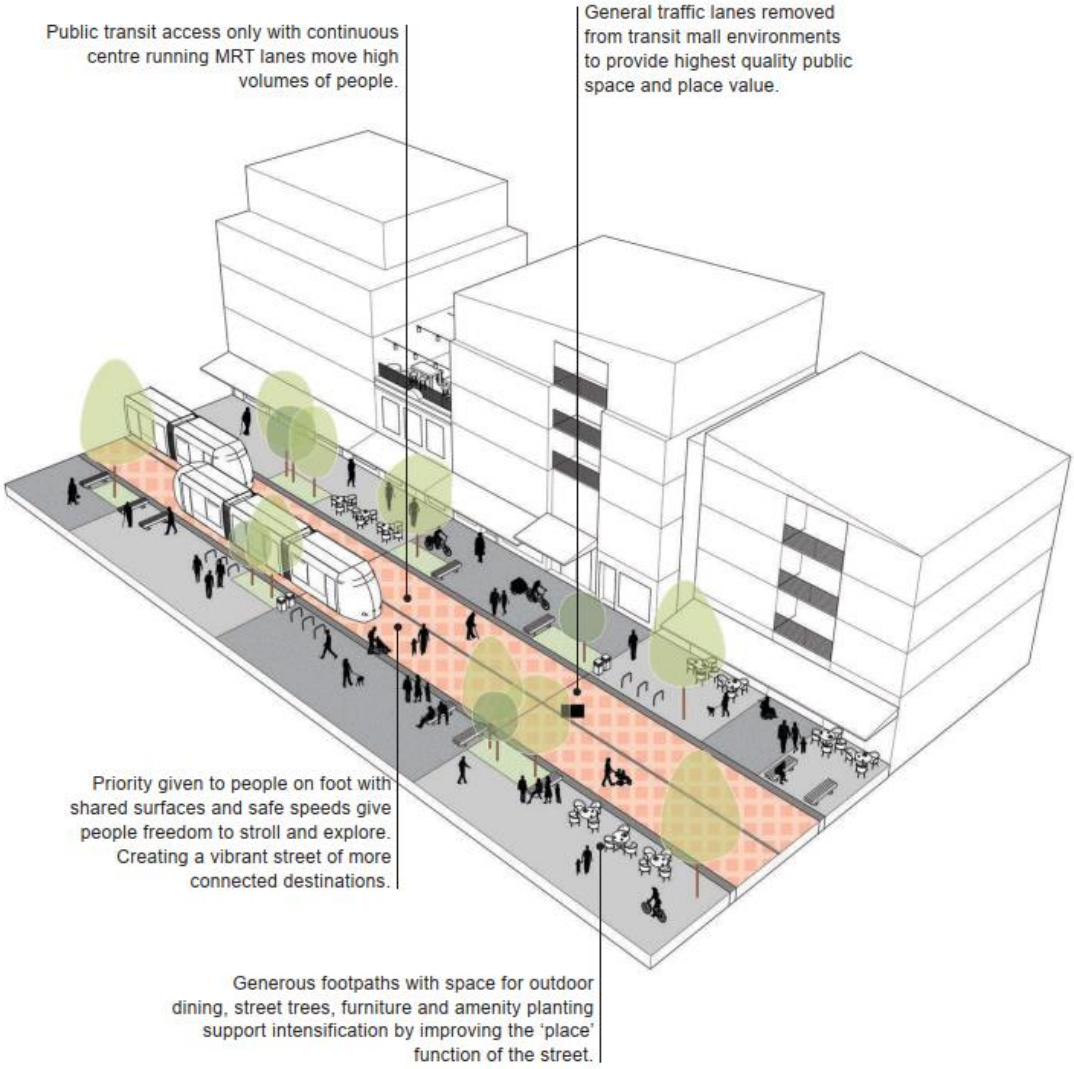

Figure 17

73. Along other sections of Riccarton and Papanui Roads, it proposes central running rapid transit, with shared traffic/cycling lanes outside that, and footpaths outside those. See **Figure 18**.

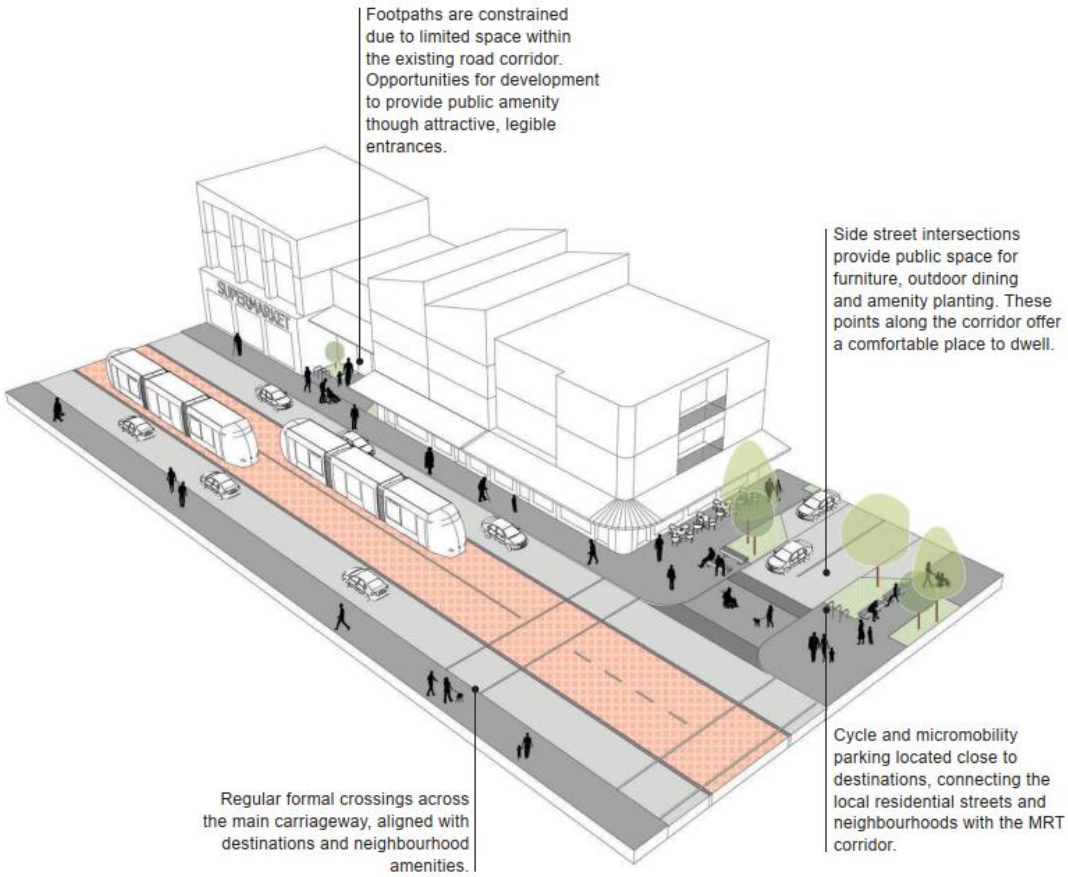

Figure 18

74. The business case acknowledges the limited space available for cyclists, planting, landscaping and amenity, and that footpath widths would be constrained.

75. It proposes to address this through a combination of measures:

    (a) upgrading side streets to provide public space for furniture, outdoor dining and amenity planting;

    (b) upgrading cycling infrastructure on surrounding streets to ensure connectivity between the corridor and adjacent parallel cycleways; and

    (c) targeted land purchase in some locations to provide a quality public realm.

76. The detail of these three measures has not yet been developed; they would be further explored through the next stage of the project (detailed business case).

77. In May-July 2023 the indicative business case for mass rapid transit was endorsed firstly by the Whakawhanake Kāinga Komiti, then each of the four constituent councils (including the Council) and then the Waka Kotahi Board.

78. The next step is to complete a detailed business case, involving more detailed planning, design, costing and assessment of the preferred option. This next stage will determine the best mode for the scheme (metro buses or light rail). It may investigate minor tweaks to the route in some localities but will not revisit substantially different route options. It would not be expected to revisit the motorway or railway corridor options.

79. The likelihood of subsequent planning resulting in the route shifting away from Riccarton is Papanui Roads is slim, in my opinion.

80. The detailed business case is estimated (in the indicative business case, page 215) to take 3-5 years to complete. Following this would be planning approvals, land acquisition and construction. The earliest that construction could begin is estimated to be 2028, and the earliest that services could be operational is estimated to be 2033.

81. This timeframe would mean funding would need to be committed in the 2027-37 long-term plan, and 2027-30 regional and national land transport plans.

82. This is the most optimistic estimate for delivery; in reality, there is a high likelihood that this would be later.

83. The Aotearoa Urban Street Planning and Design Guide[24] published in 2023 by Waka Kotahi includes best practice guidance on conceptual sketches of many different street cross-sections for different types of street.

84. Only one of these cross-sections includes bus priority, cycleways, trees and planting, traffic lanes and footpaths. This cross-section is shown in **Figure 19** below.

[24] https://www.nzta.govt.nz/about-us/about-waka-kotahi-nz-transport-agency/environmental-and-social-responsibility/urban-street-guide/

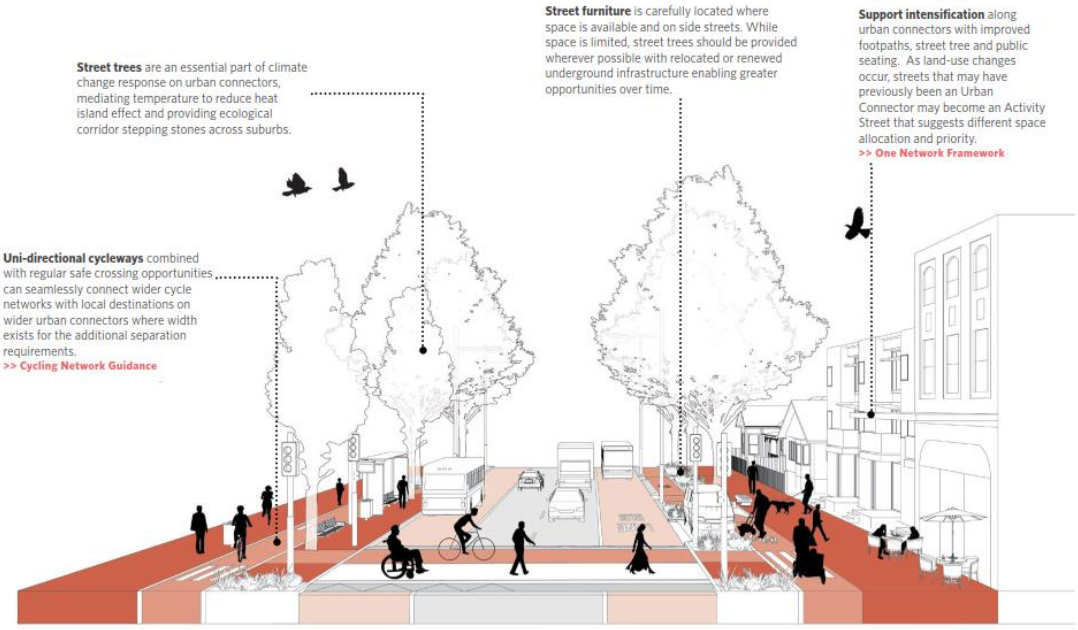

Figure 19

85. However, the guidance states that this cross-section requires a corridor width of 27-30m. If only 20m is available then one or more of the functions above would need to be excluded.

86. The draft Greater Christchurch Spatial Plan was recently publicly released for consultation.[25] As part of this work, transport modelling was completed, calculating the expected vehicle-kilometres-travelled under different urban form scenarios, and the resulting greenhouse gas emissions.[26] It modelled three urban forms, all at a 2051 horizon:

    (a) Compact: *"*focussed *on greater intensification in and around centres and along transit corridors"* (52% of 2021-2051 residential growth located within 400m of high frequency public transport routes);

    (b) Consolidated: *"consistent with current policy direction"* (35% of 2021-2051 residential growth located within 400m of high frequency public transport routes); and

[25] Draft plan available here: https://greaterchristchurch.org.nz/assets/Documents/greaterchristchurch-/Draft-GCSP/Greater-Christchurch-Spatial-Plan.pdf
[26] This modelling is summarised in the document here: https://greaterchristchurch.org.nz/assets/Documents/greaterchristchurch-/HuiHui-Mai/GCSP-Urban-Form-Scenarios-Evaluation-Report-v2.pdf, although the exact numbers come from spreadsheets underlying this summary, they are not included in this reporting (they are from the report "GCSP Evaluation Framework: Summary of input data for the Stage 2 evaluation", pages 24 and 26)

(c) Dispersed: *"places less emphasis on intensification"* (24% of 2021-2051 residential growth located within 400m of high frequency public transport routes).

87. The draft Spatial Plan made assumptions about the future transport network and included planned improvements, mass rapid transit, and broader societal shifts relating to things like electric vehicle uptake and increased working from home.

88. The transport model calculated that a compact urban form would be expected to give rise to somewhere in the order of 5% fewer vehicle-kilometres-travelled than a dispersed urban form (1.5 million fewer km per day), and 4% fewer transport greenhouse gas emissions (59 fewer tonnes per day of CO_2 equivalents).

ANTICIPATED TRANSPORT OUTCOMES OF PC14 COMPARED TO PRE-EXISTING SCENARIO

89. It is assumed that PC14 would result in comparatively more of the sub-region's future population living centrally and along our public transport routes, and comparatively less living in greenfield areas further out and not well-served by public transport.

90. If this occurs, then it would be expected to give rise to a higher public transport mode share than the pre-existing scenario.

91. There would be a corresponding decrease in private vehicle use, with the associated benefits this entails: reduced greenhouse emissions, reduced local air and water pollution, reduced impacts on amenity and noise, reduced space requirements, reduced costs to residents, and improved public health.

92. As described previously in paragraph 88, modelling undertaken as part of the Greater Christchurch Spatial Plan suggested that a future scenario in which more development occurs within public transport corridors could result in reductions in the order of 4-5% in both vehicle-kilometres-travelled and greenhouse gas emissions, compared to a more dispersed scenario.

93. More people wanting to travel in the same amount of road space means there is potential for greater congestion of traffic lanes and demand for on-street parking. To some extent this will be offset by more people travelling in more spatially efficient ways (ie walking, cycling and public transport) but not to its full extent. The negative impacts of traffic congestion are minimised

when people have safe and attractive alternative ways of moving around (eg footpaths, crossings, cycleways and high quality public transport).

ANTICIPATED TRANSPORT OUTCOMES IF THE LOW PUBLIC TRANSPORT ACCESSIBILITY QM WAS NOT INCLUDED

94. It is assumed that removing the low public transport accessibility QM would result in comparatively less of the city's future population living along our public transport routes and more living in areas not well-served by public transport.

95. If this were to occur, then it would be expected to have a lower public transport mode share than a scenario in which the QM is included.

96. There would be a corresponding increase in private vehicle use, with the associated negative impacts this entails: increased greenhouse emissions, increased local air and water pollution, increased impacts on amenity and noise, increased space requirements, increased costs to residents and reduced public health.

97. As noted above, modelling undertaken previously as part of the Greater Christchurch Spatial Plan calculated that a more compact urban form would be expected to result in reductions in both vehicle-kilometres travelled and transport greenhouse gas emission in the order of 4-5%, compared to a more dispersed urban form.

98. When development occurs in poorly serviced areas of the city, not only is it more likely that the residents of that development will drive rather than use public transport, but the foregone development within our public transport corridors means there is less patronage on these services than there would otherwise be. This decreases their commercial viability, making it more difficult to justify service and infrastructure improvements, in turn meaning reduced benefits for everyone in those corridors.

99. There would be a corresponding increase in demand for lower-tier services to poorly serviced areas but, as explained earlier in this evidence, improving these services tends to have a lower return on investment and, even if they are brought up to a moderate level of service, are still unlikely to be attractive enough to result in significant mode shift.

100. I note that the general principle of planning for higher population densities along public transport routes is well established.

101. The National Policy Statement on Urban Development 2020 (**NPS-UD**), Objective 3(b) is that *"Regional policy statements and district plans enable more people to live in, and more businesses and community services to be located in, areas of an urban environment in which one or more of the following apply: the area is well-serviced by existing or planned public transport"*

102. In relation to higher density development, it applies this through Policy 3: "*In relation to tier 1 urban environments, regional policy statements and district plans enable: (c) building heights of at least 6 storeys within at least a walkable catchment of the following: (i) existing and planned rapid transit stops"*

103. Although it does not apply to Christchurch, Policy 5 requires tier 2 and 3 urban areas to enable heights and density of urban form commensurate with "*the level of accessibility by existing or planned active or public transport*"

104. The general principle of enabling greater densities in areas of greater accessibility is clearly contained within the NPS-UD. But it is less clear whether it should be applied to medium density development, or solely higher density development.

105. Observations from Christchurch show that the propensity to travel by car is greater in locations not well served by public transport, and that this is true irrespective of density: even in low and medium density areas it holds.

106. As such, and looking at it solely from a transport perspective, I consider the application of this general principle to be just as valid for low and medium density residential as it is for higher density residential. In my opinion, the low public transport accessibility QM is therefore consistent with the NPS-UD's Objective 3(b), and will result in the same types of benefits as those it is seeking to achieve through Policies 3(c)(i) and 5(a), such as reduced transport greenhouse gas emissions.

ANTICIPATED TRANSPORT OUTCOMES IF THE CITY SPINE CORRIDOR QM WAS NOT INCLUDED

107. If the city spine corridor QM was not included, then buildings could be developed closer to the street boundary (1.5m rather than 4.0m in residential zones, 0m rather than 1.5m in commercial zones).

108. Currently most buildings are positioned further back than this, often with trees or landscaping abutting the road reserve.

109. Allowing buildings closer to the street could result in the removal of these trees and landscaping. This would not affect the transport functions of the streets (traffic, public transport, cycling, walking) but it would affect the amenity of the street.

110. These amenity impacts are discussed in **Mr Fields'** evidence.

111. The mass rapid transit indicative business case has proposed a scheme which would not require wholesale widening of the road. However, in the narrower sections, the scheme proposes a cross-section comprising hard-surfacing from boundary to boundary with no space for landscaping or trees.

112. The city spine corridor QM would have amenity benefits for the corridor through allowing for landscaping and trees to be located on land adjacent to the corridor.

113. The mass rapid transit business case is predicated on there being high levels of development along this corridor, and greater populations than what exists now. If the city spine corridor QM was to reduce development along the corridor, then this would be a concern. However, I understand any impacts on development are expected to be negligible, as **Ms Oliver** details in her section 42A report.

114. It should also be noted that the mass rapid transit project is still in its early phases. It is currently unfunded and there is still a significant amount of work to do before the decision on whether or not to fund this project would be made (eg the detailed business case). The final form of the scheme may look different to the early concepts as further design development and community consultation is progressed in coming years.

115. Whilst not the primary purpose of the setback, it could also provide flexibility in future to adopt different designs than those currently being proposed. If the setback was not included, new buildings would likely be constructed closer to the street boundary, making any future road widening more difficult and expensive.

116. It is also noted that, if the mass rapid transit work progresses to a point where a funding commitment is made, then that would trigger a plan change under NPS-UD Policy 3(c)(i) which states:

"In relation to tier 1 urban environments, regional policy statements and district plans enable: building heights of at least 6 storeys within at least a walkable catchment of the following: (i) existing and planned rapid transit stops."

117. At this point, when there is funding certainty and more developed designs for the corridor, then the necessity of the QM could be reviewed. The indicative business case signalled that the earliest that funding could be committed would be the 2027-30 Regional Land Transport Plan, following completion of a detailed business case.

IMPACTS IF AMENDMENTS WERE MADE TO THE BUS ROUTES INCLUDED IN THE LOW PUBLIC TRANSPORT ACCESSIBILITY QM

118. Several submissions raised issues with the choice of bus routes that had been included or excluded from the low public transport accessibility QM.

119. For clarity, the current approach is based on applying MDRS to:

    (a) the PT routes that have the highest planned future level of service, as per the endorsed Public Transport Futures Business Case. This is the routes shown in thick lines in **Figure 20** below (and highlighted); and

    (b) any routes that service either (a) the airport or (b) town centres being upzoned but are not on any of the routes highlighted above. This equates to the routes highlighted in bright yellow in **Figure 21** below.

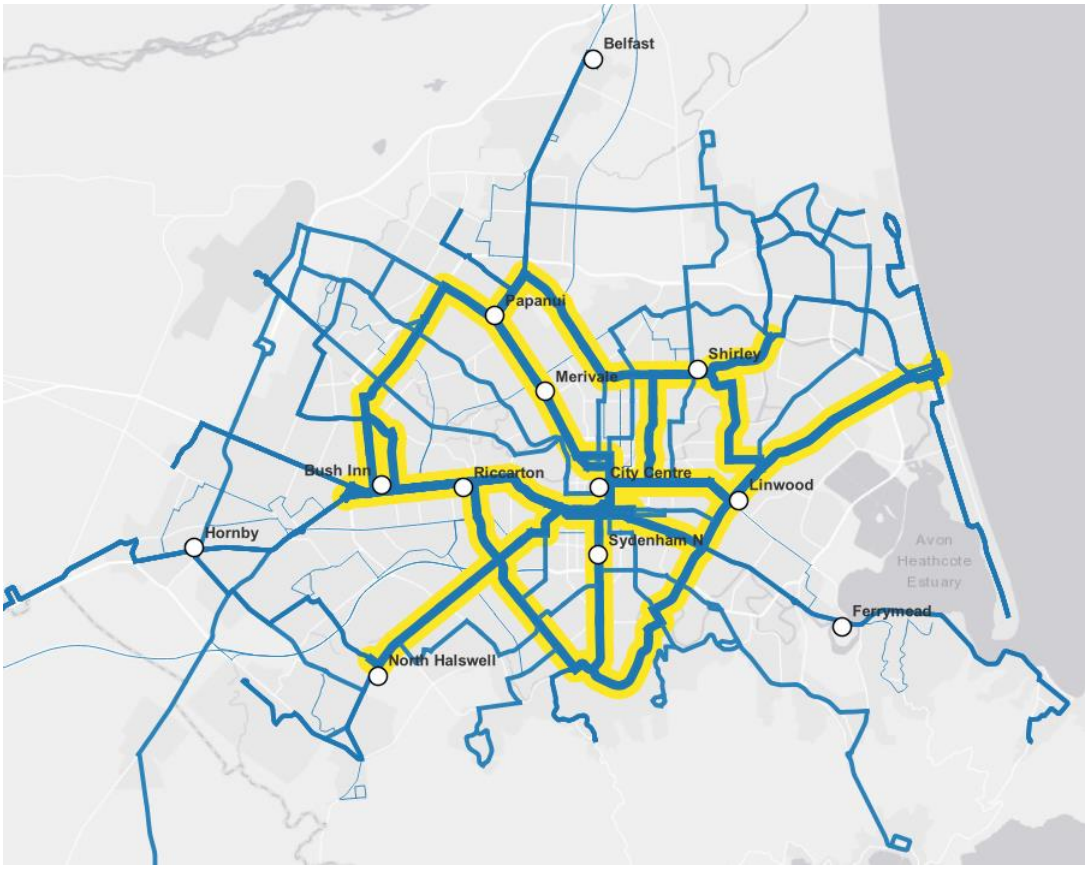

Figure 20

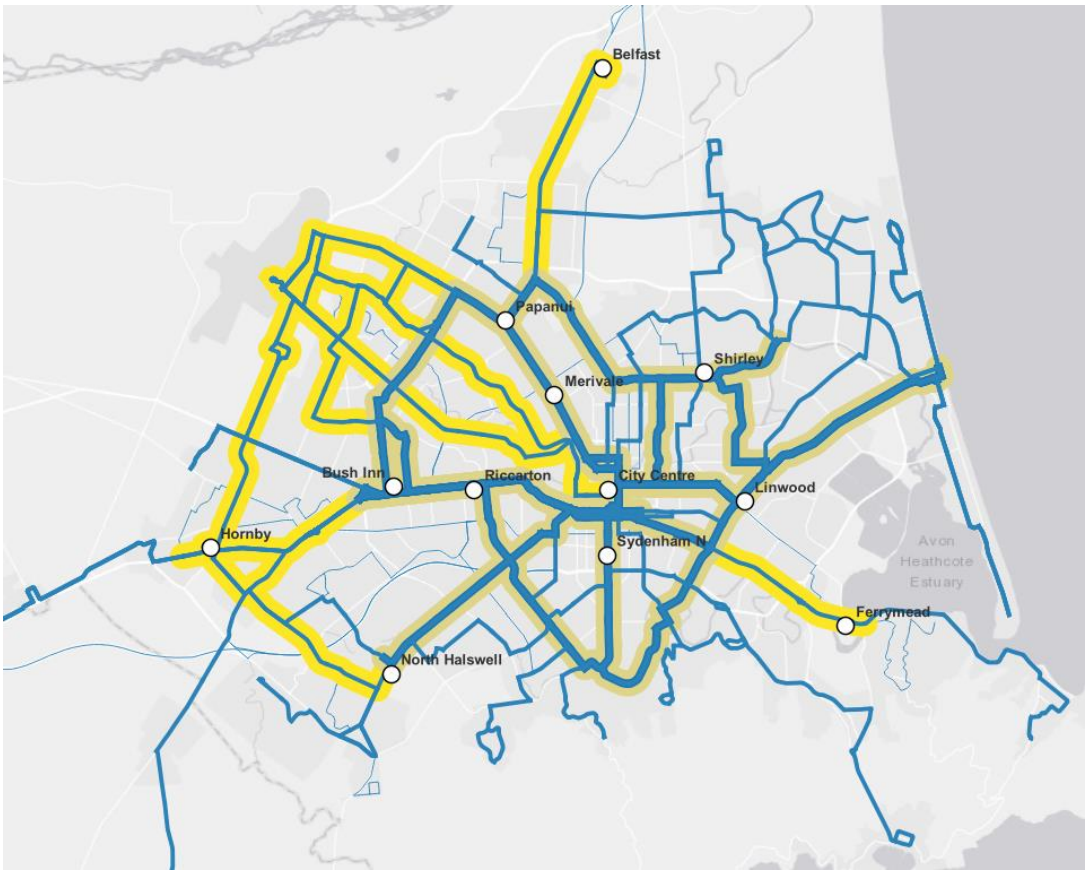

Figure 21

120. One issue raised by submitter #689 was that this approach does not take into account the current public transport network. As a result, some areas currently serviced by the city's highest frequency bus services are not included (eg Sumner). This submitter contends that the route choice should also take into account the existing public transport network.

121. Objective 3(b) of the NPS-UD is to enable more people to live and work in locations where "the area is well-serviced by *existing and planned* public transport".

122. Therefore, I consider the request to be consistent with NPS-UD. There are portions of routes that are in the highest tier in the current network but not in the highest tier of the future network. These routes are highlighted in bright yellow in **Figure 22** below, noting that in some instances they follow slightly different routes to the future network shown in blue.

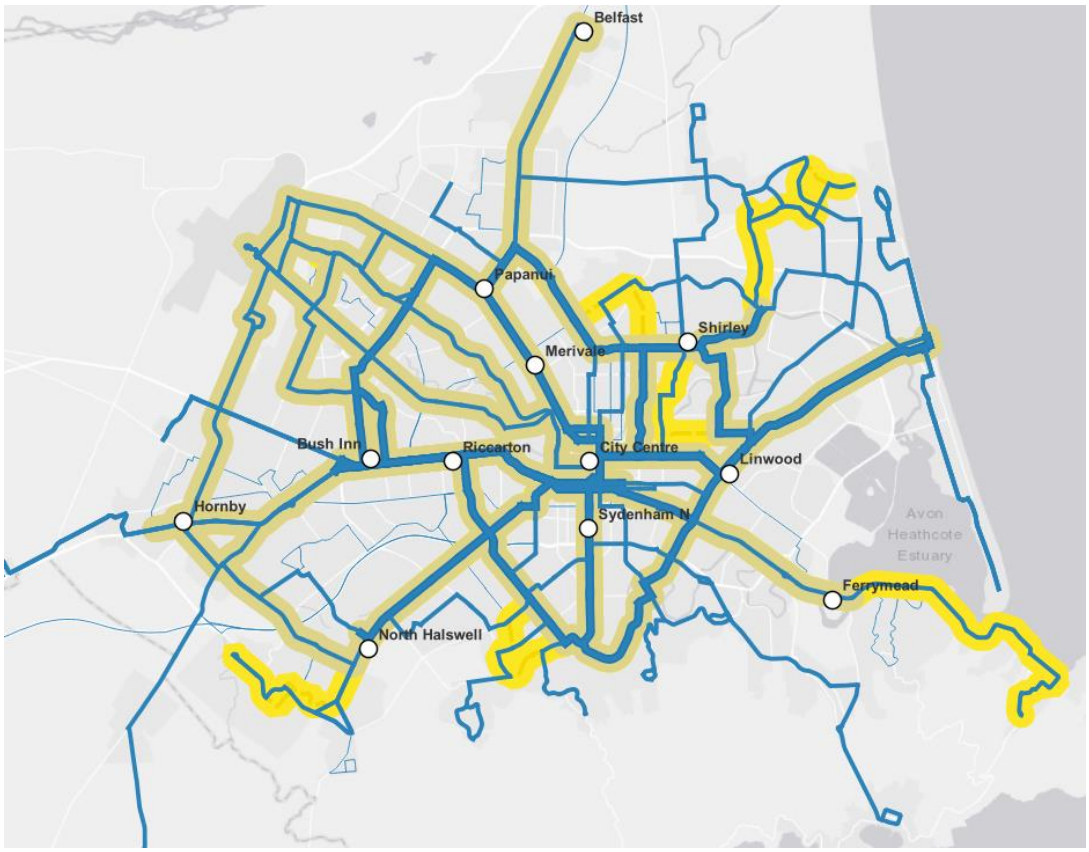

Figure 22

123. The impacts of adding these routes in would be relatively minor in the context of the city's overall travel and emissions, as most of the routes are small lengths. Whilst these routes are not the highest-tier routes in the future network, most will still have a reasonable level of service into the foreseeable

future. Development in these locations would be expected to result in more car travel than development around the core routes, but significantly less than other locations with poorer public transport accessibility.

124. I consider adding these routes to the QM to have merit, from a transport perspective. I note that **Mr Kleynbos'** section 42A report recommends including the full extent of the #7 route between Halswell in the southwest and Parklands in the northeast. However, the report also states that there is little point in including the #3 route to Sumner because of issues that are outside my area of expertise; either these areas are already subject to other QMs (eg coastal hazards) or are subject to infrastructure constraints such as wastewater capacity. The report also states there is little point in including the three short sections of the Orbiter shown in **Figure 22** (north, east and south of the central city) as much of these areas are covered by the walking catchments of other bus routes already included in the QM. I agree with this assessment.

125. Therefore, in summary, I agree that the routes identified in bright yellow in **Figure 22** should be added to the QM, apart from the #3 route (relying on the assessment of Mr Kleynbos); and the three short sections of the Orbiter.

DATA ON PROJECTED FUTURE GROWTH ASSUMED IN THE MASS RAPID TRANSIT BUSINESS CASE IN AREAS WHICH WOULD BE AFFECTED BY THE PROPOSED NEW AIRPORT NOISE CONTOUR QM

126. A key purpose of investing in mass rapid transit is that it unlocks the potential for large-scale growth along the corridor. In turn, the viability of the investment relies on that growth in population and employment along the corridor. As such, a general assumption of the mass rapid transit business case to date has been that as much growth as possible would be enabled within the walking catchments of proposed stations.

127. The business case first estimated the numbers of existing households within station catchments (as of 2021). Some of these households are in areas that also lie under the proposed 50db noise contour. This is shown in **Figure 23** below, with pink dots denoting approximate station locations, pink shapes denoting an 80om walking catchment, red lines denoting the proposed 50db noise contour, and blue numbers showing the existing (2021) number of households in each area.

128. In total, as of 2021, there were 1,304 households within the proposed mass rapid transit station catchments that also lie under the proposed 50db noise contour (the area in white).

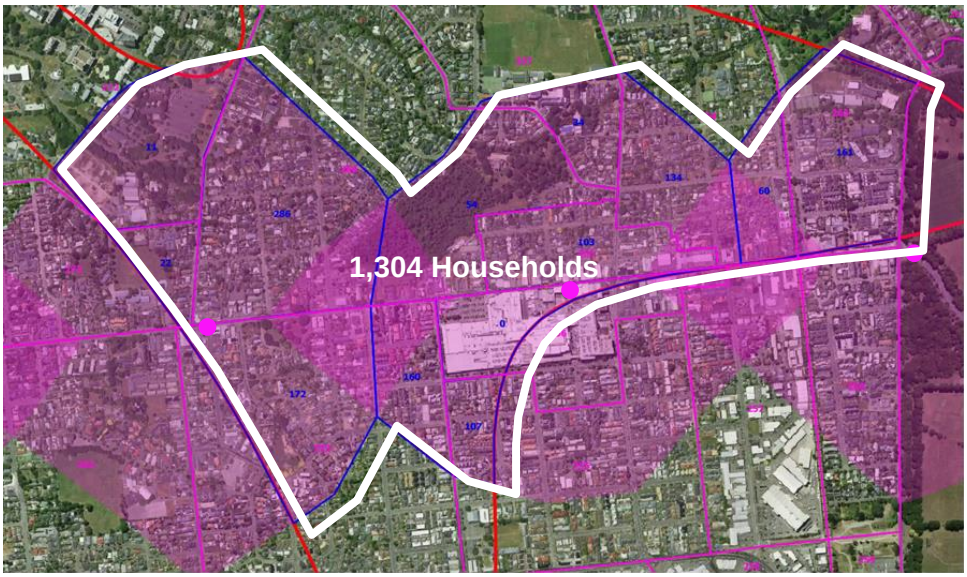

Figure 23

129. The business case modelled the expected usage in 30 years, or 2051. To quantify this future usage, it assumed land use changes would occur around stations, with most station catchments assumed to be developed significantly more intensively.

130. The mass rapid transit business case team is currently interrogating these numbers further and I understand they will present the results of this to the hearings panel through the Waka Kotahi submission.

131. In the interim, I have done some preliminary analysis to estimate the assumed growth that could potentially be affected by the proposed noise contour.

132. This analysis suggests that the number of additional households that would be developed by 2051 in the area in white above (which is the area within 800m walk of a station and also within the 50db noise contour) is somewhere in the order of 1,500-2,000 households (additional to what currently exists).

133. These growth numbers were based on the draft Greater Christchurch Spatial Plan, which identified the area around Riccarton as one of the priority development areas.

134. If the level of growth in these areas does not eventuate due to the airport noise contour, that may have implications for the Spatial Plan, and in turn the mass rapid transit business case.

135. These impacts could be offset by more growth occurring in other parts of the corridor.

136. I cannot comment on the quantum of the impacts at this time as this would require detailed transport modelling to be completed.

137. This is further discussed in **Ms Oliver's** section 42A report.

CONCLUSION

138. The core public transport network in Christchurch has remained on substantially the same streets for over a hundred years. This is unlikely to change substantially in the foreseeable future, and currently endorsed plans do not propose significant changes in this regard.

139. Achieving a higher proportion of the city's development along these corridors is expected to have positive impacts on the city's transport network, by locating growth in the areas with the greatest public and active travel accessibility. This would be expected to reduce the reliance on cars, and therefore reduce greenhouse emissions, local air and water pollution, impacts on amenity and noise, space requirements, costs to residents and impacts on public health. Prior modelling calculated total vehicle-kilometres travelled and greenhouse gas emission reductions in the order of 4-5% for a more compact urban form focussed around public transport routes compared to a more dispersed urban form.

140. If the low public transport accessibility QM was to be removed, I would expect these benefits to be diminished. The extent to which they are diminished depends on the extent to which more enabling zoning in low accessibility areas results in development occurring. It is possible that the demand for medium density residential living in areas with poor public transport accessibility is not high, and so actual effects of a zoning change are relatively small.

141. The city spine corridor QM is expected to result in amenity benefits along the corridor by allowing adjacent landscaping and trees, which the corridor is currently lacking and is unlikely to be able to accommodate in future either. It potentially also keeps options open for alternative options in future. As

investigations into mass rapid transit progress over the next 3-5 years, more certainty will emerge over how this corridor will look in future.

142. Proposed changes to expand the airport noise contour have the potential to impact on spatial and transport planning in the city, especially the mass rapid transit business case. I cannot comment on the quantitative nature of these impacts until more detailed transport modelling is completed, which I understand Waka Kotahi is commissioning.

11 August 2023

Chris Morahan