

Auckland Transport Alignment Project

Update to reflect faster growth

August 2017



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Executive Summary

- a) The Auckland Transport Alignment Project (ATAP) report of September 2016 set out an agreed strategic approach for the development of Auckland's transport system over the next 30 years, including an indicative \$24 billion investment package for the 10 years from 2018. It also identified that funding in current central and local government statutory plans projected a \$4 billion shortfall (the funding gap).
- b) New information has become available since ATAP was completed, in particular higher than expected population growth and revised forecasts, as well as more clarity about the likely location of future growth. ATAP's overall strategic approach remains valid, but these changes impact on the likely quantum, timing and sequencing of investments required to accommodate and fully realise the benefits from this growth.
- c) As requested by the Minister of Finance, Minister of Transport and the Auckland Mayor, the ATAP agencies have updated the indicative package and estimate for the first decade funding gap to reflect higher growth.
- d) This report identifies investments over and above the original ATAP indicative package. Around \$2.9 billion (\$2.65 billion of capital expenditure and \$250 million operational expenditure) of additional investment is likely to be required over the next decade to address the impacts of faster growth. Additional investment is mainly targeted to enabling and supporting faster greenfield growth and addressing network constraints in existing urban areas exacerbated by faster overall population growth.
- e) The \$2.9 billion is partly offset by around \$1 billion from additional forecast revenue and reallocating renewals savings to accelerated projects. This does not take into account the funding implications from the recently announced Crown Infrastructure Partners Special Purpose Vehicle, which could provide a source of revenue to help address the funding gap.
- f) Taking into account the updated revenue and expenditure estimates, the first decade funding gap has increased to \$5.9 billion (an increase of \$1.9 billion to ATAP's original estimate).
- g) The updated indicative package also includes \$770 million for below track rail projects which would provide for increased freight and passenger services. While this investment does not contribute to the ATAP funding gap (as Crown funding is assumed to be available, subject to business case assessment) under current funding arrangements it would require specific funding approval from the Government.
- h) Sequencing of the indicative package over the next decade has been updated to enable planned growth and support the efficient delivery of key investments. This suggests the funding gap for the first three years increases from \$380 million to \$1.3 billion.
- i) This information has been prepared in a short period of time without detailed modelling. Because of this, there is an inherent level of uncertainty and need for ongoing work to ensure all investments deliver value for money.

Purpose

1. This report responds to a request by Ministers and the Mayor to update the ATAP indicative package to reflect higher population growth projections.
2. The report provides an updated indicative package and funding gap that has been agreed by the ATAP agencies¹. This is to inform upcoming funding decisions and development of Auckland's Regional Land Transport Plan.

Background

3. ATAP set out an agreed strategic approach for the development of Auckland's transport system over the next 30 years, as well as an indicative package that illustrates the type and quantum of investment likely to be required to deliver this strategic approach. The indicative package included all operational and capital expenditure by the New Zealand Transport Agency (NZTA), Auckland Transport, and KiwiRail in Auckland over the next 10 years and is now guiding the development of 2018 statutory transport planning and funding documents.
4. The package was a mixture of committed and uncommitted investments and totalled around \$24 billion over the 2018-28 period. Compared to around \$20 billion projected to be available under current funding plans, this left a \$4 billion funding gap.²
5. ATAP recommended the Government and Auckland Council work together to consider options and agree on an approach to address the funding gap by mid-2017, to inform statutory funding documents.
6. An update on progress was provided in June 2017. This update highlighted the potentially significant impact on the funding gap of faster than expected population growth. In response to this, the Mayor and Ministers requested an update to the ATAP indicative package to help inform upcoming funding decisions.

¹ Auckland Council, the Ministry of Transport, Auckland Transport, the New Zealand Transport Agency, the Treasury and the State Services Commission.

² ATAP's estimate of \$20 billion being available in "current funding plans" was based on planned investment out to 2025 in the 2015 Regional Land Transport Plan (RLTP), the Council's 2015 Long-term Plan (LTP) and NZTA's 2015 National Land Transport Programme. The 2025-28 period was an extrapolation of these plans.

Updating the ATAP Indicative Package

New growth information

7. Combining new Stats NZ population projections from February 2017 with recent planning work undertaken by Auckland Council, we now have an updated estimate of the timing, location and scale of population and employment growth over the next decade.
8. Auckland's population has grown rapidly in recent years and new population projections³ have around 100,000 more people living in Auckland at the end of the first decade than what was anticipated by ATAP. A breakdown of the new projections is shown below⁴:

Area	2013 population	2013-2026 Growth		
		Old Projections	New Projections	Change
Northern Greenfields	32,265	13,000	27,100	14,100
Northwest Greenfields	33,245	27,600	26,600	(1,000)
Southern Greenfields	10,161	28,900	35,800	6,900
Rural Areas & Towns	73,637	9,300	16,700	7,300
Existing Urban Area	1,247,278	331,700	396,800	65,100
Total	1,396,586	410,500	503,100	92,600

9. Broadly, 70% of the extra growth is anticipated to be located in the existing urban area and 30% outside it. Of the growth in newly urbanising (greenfield) areas, the greatest increase from previous projections is in the north (+14,000 people) and the south (+7,000). The northwest greenfield area is expected to grow slightly more slowly than previously expected, but still substantially.
10. Overall more land has now been 'opened up' for greenfield development.

Process

11. To update the indicative package, we focused on how the changes to growth projections will affect key ATAP outcomes: to support growth, improve access, address congestion and increase public transport modes share on congested corridors.
12. Growth is a key driver of transport investment in two ways. Firstly, there is the need to provide infrastructure that enables housing and business development, especially in new greenfield growth areas. Secondly, to fully realise the benefits of growth through increasing access to opportunities, there is the need to address capacity constraints on existing corridors created by higher travel demand. Modelling indicates that, without

³ These projections are based on a medium population growth scenario, consistent with ATAP. This scenario assumes Auckland's growth rate returns to historic averages over time. If growth continues at a faster rate, further additional investment is likely to be required.

⁴ 2026 is used because the ART3 regional transport model is set up to model the years 2026, 2036 and 2046.

additional investment, the benefits of faster growth will be largely offset by growing congestion.

13. We have undertaken this analysis using tools and information we have access to in the limited time available. This included:
 - a. Collating and analysing information from the *Supporting Growth* programme business case, a strategic plan for Auckland's major growth areas developed by Auckland Council, Auckland Transport and NZTA,⁵ on necessary infrastructure to enable and support greenfield growth
 - b. Modelling the performance of ATAP's original indicative package against updated population projections to understand where projected demand and congestion has changed
 - c. Collating and analysing information from investment prioritisation undertaken by Auckland Transport and NZTA to develop the RLTP, in particular Auckland Transport's internal prioritisation tool for capital projects (this has been developed to broadly reflect the ATAP approach and priorities).
14. We used the ATAP indicative package as a foundation for identifying further investments that could be accelerated from the second decade.
15. This information has been prepared in a short period of time without detailed modelling. Because of this, there is an inherent level of uncertainty and need for ongoing work to ensure all investments deliver value for money. As with ATAP, the revised indicative package is not intended to be an investment programme, as all transport investments need to go through business case approval to proceed.

Enabling and supporting faster greenfield growth

16. As outlined in the ATAP report, greenfield growth areas need substantial investment before significant development can occur. Some of this investment is required to open up land for development, alongside larger scale improvements needed to better connect these areas to the rest of Auckland.

Northern Greenfields

17. Planning decisions made since ATAP's completion mean the timing of greenfield growth in parts of north Auckland (Wainui/Silverdale) has been brought forward into the first decade.
18. Enabling accelerated greenfield growth in this area will require local arterial road networks to be completed faster than originally anticipated. Furthermore, transport modelling suggests the faster growth will create a number of transport challenges, including:
 - a. Increased traffic flows on the Northern Motorway between Silverdale and Albany, increasing congestion in the peak direction (between Albany and the central city, the motorway is predicted to be already at capacity).

⁵ Supporting Growth Business Case <https://at.govt.nz/projects-roadworks/supporting-growth-delivering-transport-networks/>

- b. Increased local traffic, particularly around the Silverdale motorway interchange that is already highly congested.
- c. Increased bus passengers on the Northern Busway (from Silverdale to the city centre), contributing to higher bus volumes in the city centre.

19. Accelerating the investments outlined in the table below into the first decade would address these challenges:

Accelerated Investment	Cost Impact ⁶	Explanation
Penlink (two-lane road future-proofed for widening)	\$240m	- Penlink eases pressure on the Silverdale interchange by providing an alternative route for trips to/from the Whangaparaoa Peninsula. - The project's business case suggests it is well suited to a toll.⁷
Arterial roads to enable growth (including Warkworth)	\$300m	- Very few arterial roads in this area were originally identified in ATAP. - These roads are essential to enabling greenfield development around Silverdale West/Wainui and in Warkworth - Some of these roads have been identified for investment through the recently announced Special Purpose Vehicle (SPV), Crown Infrastructure Partners.
State highway 1 Albany-Grand Drive throughput improvements (e.g. bus shoulder lanes & associated infrastructure, northbound capacity etc.)	\$300m	- Would increase throughput between Albany and Grand Drive (near Orewa) without adding to congestion south of Albany. This could include: - Bus shoulder lanes and associated infrastructure between Grand Drive and Albany. - Providing an additional northbound lane up to the future Penlink exit to reduce afternoon peak congestion. - Exploring opportunities to advance sections of a full busway between Silverdale and Grand Drive where development occurs next to the motorway.
Total	\$840 million	

⁶ The 'cost impact' figure reflects the increase relative to the costs assumed in the ATAP Indicative Package.

⁷ Penlink business case (2015): <https://at.govt.nz/media/981789/Penlink-Business-Case-2015-Draft.pdf>

Southern Greenfields

20. The pace of greenfield growth in the south is expected to be faster than previously anticipated, especially in Drury West.
21. Similar to the north, enabling this growth will require building or upgrading local arterial roads earlier, while transport modelling suggests the following additional transport challenges:
- Increased congestion on the Southern Motorway, in the peak direction and interpeak in both directions, particularly between Drury and Papakura
 - Increased local traffic, particularly around the Drury motorway interchange.
22. Accelerated growth in the Drury area, and more broadly across Auckland and in the northern Waikato, combine to increase congestion along the southern part of the Southern Motorway. This is in spite of the widening between Papakura and Drury included in ATAP's first decade priorities.
23. Growing interpeak congestion is a significant issue as the Southern Motorway is the key inter-regional connection between Auckland, the Waikato and most of the rest of New Zealand. This part of the motorway is a key resilience risk, with very few alternative routes to the south. Travel delays and poor reliability also risk undermining the benefits from the Waikato Expressway.
24. Accelerating the investments outlined in the table below into the first decade would address these challenges:

Accelerated Investment	Cost Impact	Explanation
Completing the Mill Road corridor to provide a major new route east of State highway 1 from Drury to Manukau	\$500m	- The northern section between Takanini and Manukau is already within the ATAP first decade indicative package. - Constructing the whole corridor, around \$1 billion, is key to addressing southern motorway congestion and resilience issues. - An additional \$500 million would accelerate progress towards completing the entire corridor over the next ten years. This investment would also improve local connections and support growth between Papakura and Drury.
Arterial roads to enable growth and new train stations	\$150m	- A number of local arterial roading projects that enable greenfield growth in the south were already included in the ATAP indicative package. - Faster growth in Drury West is estimated to bring forward the need for around \$150 million of additional investment over the next decade.

Accelerated Investment	Cost Impact	Explanation
		Some of these projects have been identified for investment through the recently announced SPV, Crown Infrastructure Partners.
Total	\$650 million	

Northwest Greenfields

25. While substantial greenfield growth is projected to take place in the northwest part of Auckland over the next decade, recent decisions on the timing of this growth suggest faster population growth in some parts of the northwest (Red Hills/Massey North) will be slightly more than offset by slower growth in Hobsonville and Whenuapai (a 1% decrease in total).
26. These changes mean that growth in the northwest is now focused closer to existing urban areas, meaning fewer new arterial roads will be required to enable urbanisation. Around \$150 million of investment, largely arterial roads around Whenuapai, can now be deferred to the second decade.

Addressing pressure on core transport networks

27. High population growth since 2013 has generally increased congestion and reduced travel speeds. While the full effects of the recently opened Waterview Tunnel have yet to be fully understood, early indications are that the tunnel is delivering benefits to congestion at a system-wide level and resulting in more efficient operation of the roading system overall. Nevertheless, ATAP projected a rise in congestion from 2013 to 2026⁸, despite substantial investment. Faster growth is bringing this forward.
28. Around 70% of the extra growth is projected to occur in existing urban areas, meaning the additional travel demand is broadly spread throughout the city. Because many parts of the core transport network are already under significant strain, even relatively small increases in demand may lead to more congestion and slower travel times.
29. A number of major improvements to Auckland's core transport networks⁹ are either committed (City Rail Link, East West Link, accelerated motorway package including the Northern Busway extension to Albany etc.) or already included in the ATAP indicative package (Northwestern Busway, AMETI, Eastern Airport Access (SH20B), Southern Motorway widening between Papakura and Drury etc.).
30. Further major investments identified as medium term priorities in ATAP were considered for acceleration, with particular regard given to corridors seeing the greatest increases in demand and those serving the fast growing and strategically important city centre and airport.

⁸ See ATAP Recommended Strategic Approach page 39. After 2026 congestion under the indicative package reduces as smarter transport pricing takes effect.

⁹ The report uses the phrase "core transport networks" to refer to high volume transport infrastructure (e.g. major roads, rail and public transport corridors) in existing urban areas

Network Optimisation and Influencing Travel Demand

31. ATAP identified major challenges with adding capacity to many parts of Auckland's core transport networks, due to its challenging physical geography and the high costs of providing new infrastructure. This means faster growth further emphasises the need to make better use of existing networks and influence travel demand, key parts of the ATAP strategic approach.
32. ATAP envisaged implementation of "whole of network" road pricing in the second decade, which significantly improved transport network performance by varying the cost of travel by time and location. Separate to this funding work, the Auckland Smarter Transport Pricing Project will be exploring a range of pricing options and implementation timeframes. Faster growth means there are likely to be benefits from earlier implementation of pricing, but given this work is still at the early stages of development, pricing has not been included in this revised package.
33. Funding targeted to network optimisation (i.e. increasing throughput of people on key routes) has already been increased and work is progressing to identify key movement routes and develop an updated framework for making difficult trade-offs along these corridors. ATAP signalled the need to progress these operational decisions and increase funding for interventions. Progress in this area has not yet occurred at the pace or scale required to make a significant difference to network performance.
34. Faster growth means further investment and effort in network optimisation (over and above what was signalled in ATAP) is likely to be required, including efforts to accelerate the uptake of current and developing technologies. There also appears to be a need for a greater focus on improvements in South Auckland where traffic volumes are projected to increase the most under the new growth projections. This is detailed below:

Accelerated Investment	Cost Impact	Explanation
Network optimisation (including digital technology), with an initial focus in the south	\$300m	• Optimisation activities should include interventions to improve the productivity on key arterial routes such as intersection upgrades, minor road layout changes, street space reallocation, traffic light optimisation improvements and more active traffic management. • Additional investment to accelerate the uptake of Mobility as a Service, autonomous and connected vehicle trials, and other developing technologies will help make a substantial contribution to optimising existing networks over time.

City Centre Access

35. Since 2010, the number of jobs in the city centre has increased from 88,000 to 116,000 and the population has grown from 30,000 to nearly 53,000.¹⁰ Tertiary student numbers, a major contributor to travel demand, have also grown. This rapid growth is projected to continue, increasing pressure on transport networks serving New Zealand's largest employment area. Constrained access to the city centre and high competition for street space means growing demand needs to be accommodated through an ongoing modal shift to public transport, walking and cycling.
36. The City Rail Link and associated further rail improvements will cater for a substantial proportion of increased trip demand into the city for the parts of Auckland served by rail. However major catchment areas, particularly parts of the isthmus and the North Shore, are not served by rail and continue to be reliant on bus services to meet growing travel demand.
37. Modelling outputs indicate bus ridership on corridors accessing the city centre is now projected to grow more rapidly. These increases combine on the two highest volume access routes: Symonds Street and Fanshawe Street, which are already under significant strain at peak times. Faster population and employment growth means bus ridership on Symonds Street, Auckland's busiest bus corridor, is tracking 3-4 years ahead of previous projections.
38. ATAP highlighted the challenge of meet growing demand on Symonds Street beyond the mid-2020s through bus efficiency improvements including double-decker buses, route optimisation, bus priority measures and bus terminus facilities. Business case analysis of this issue undertaken by Auckland Transport and NZTA highlights that as the corridor's capacity is reached and exceeded, major delays and poor reliability will be experienced across large parts of Auckland's bus network, ultimately making the city centre harder to access.
39. A mass transit solution (advanced bus or light rail) costing up to \$1.2 billion was therefore identified by ATAP as being necessary early in the second decade. \$500 million was allocated in the first decade to fund route protection and early stages of construction. Faster bus ridership growth on this corridor now indicates completion of this investment should be brought forward by 3-4 years into the first decade, as detailed below:

Accelerated Investment	Cost Impact	Explanation
Completion of isthmus mass transit (city to Mt Roskill) within first decade. Mode and detailed timing to be determined through business case process.	\$700m	- Mass transit provides substantial additional capacity for public transport services into the city centre, through a shift to much larger vehicles that can carry many more people. - Utilising Queen Street as a city centre mass transit corridor takes substantial pressure off the highly constrained Symonds Street and Wellesley Street

¹⁰ <http://nzdotstat.stats.govt.nz/wbos/Index.aspx>, from the Business Demography Statistics and Population Estimates sections, respectively. 2017 "current" numbers extrapolated from 2015-16 growth level.

Accelerated Investment	Cost Impact	Explanation
		corridors, benefiting the remaining buses and general traffic.

40. Since ATAP's completion further work has been undertaken into the preferred mode for this investment. The Boards of Auckland Transport and NZTA agreed in February this year to progress route protection and undertake further work on a proposed 'staged transition' from bus to light rail to further assess key operational elements, required trade-offs, flow on effects, transition impacts, and resilience issues.

41. By the end of 2018 this work will have been completed, giving a more complete picture of the likely timing and costs for this investment. Work to progress isthmus mass transit needs to be developed in a way that future proofs for integration with a longer-term extension to the airport

Airport Access

42. Travel to and from Auckland Airport is limited to just two corridors - one from the north (State highway 20A) and one from the east and south (State highway 20B). Air passenger volumes and job numbers in the broader airport precinct are growing quickly and projected to drive an increase in peak time trips to the airport from 9,000 to 15,000 over the next decade. This will continue to place substantial pressure on the networks accessing New Zealand's international gateway.

43. Major upgrades to State highway 20A are nearly complete and a range of short to medium term measures are being progressed, including improvements to State highway 20B, upgrades and grade separations at key intersections and the introduction of bus shoulder lanes. ATAP included a major upgrade of State highway 20B in its indicative package - but allocated bus improvements from the Airport to Manukau as a second decade priority. Fast growth and construction efficiency opportunities mean this should be brought forward.

Accelerated Investment	Cost Impact	Explanation
Airport-Manukau bus priority, including Puhinui interchange	\$50m	• Rapid growth in travel demand to and from the Airport is accelerating the need to provide reliable, congestion free travel options to and from the airport. • There are likely to be major construction efficiencies from bringing forward bus improvements to align with the upgrade of State highway 20B. • The fastest and most efficient way of providing a high quality rapid transit connection between the city centre and Airport is through improved bus infrastructure between the Airport and Puhinui train station (with connection to Southern line trains) and an upgrade of

Accelerated Investment	Cost Impact	Explanation
		that station to a key bus/rail interchange.

Rail Ridership Growth

44. Auckland's rail ridership continues to grow strongly and is expected to reach 20 million annual boardings this month, up 17% over the past year. The ATAP indicative package identified the need for a tranche of three-car electric trains over the first decade.
45. The purchase of additional trains to address the immediate impact of rapid patronage growth is being brought forward into the 2018-2021 period (subject to NZ Transport Agency approval). This will provide for an uninterrupted train services to Pukekohe, aiding development south of Papakura and easing road congestion.
46. However, modelling of the updated growth projections suggests substantial additional rail passenger demand along the Southern Line, from Pukekohe right through to the city centre. This impact, on top of the increase in patronage expected from the City Rail Link highlights the likelihood of further new trains being required over the next decade.
47. Maximising the benefits from these new trains and enabling passenger and freight services to operate reliably depends upon completion of key below-track rail improvements in the original ATAP Indicative Package. This includes extra tracks between Westfield and Wiri¹¹, a train control centre, resilience improvements and extending rail electrification to Pukekohe.

Accelerated Investment	Cost Impact	Explanation
Second tranche of new electric trains	\$260m	Faster ridership growth means that once City Rail Link opens in 2023/24, a second tranche of new trains and associated infrastructure is likely to be required.

Operating costs

48. Approximately \$250 million of additional operating expenditure is estimated as being required to meet the needs of a larger population (an average of \$25m per year), a 5% increase from ATAP in line with faster growth. This is comprised of:
- Increased net public transport operating costs to provide extra services to meet higher demand. Modelling indicates public transport ridership will reach approximately 150 million annual trips (compared to 142 million under the previous growth projections) by 2026.
 - Additional operational investment in network optimisation, targeted to more active traffic management.

¹¹ This report includes the costs required to deliver a 3rd track from Westfield to Wiri. As part of further developing this investment and in line with the project's business case, consideration should be given to optimal timing and integration with a 4th track.

Revised funding gap

49. Taking into account updated revenue and expenditure information, the revised funding gap is estimated to be around \$5.9 billion. This is an increase of \$1.9 billion from the original ATAP funding gap estimate of \$4 billion.

50. The key components of this change are summarised in the table and detailed further in the following section.

	Net impact	Comment
Additional proposed investment (as per previous section)	\$2.9 billion	\$2.65 billion of capital expenditure and \$250m of operational expenditure
Reconciliation with ATAP package refinement, cost changes and renewals savings	(\$500m)	Net impact of cost increases, RLTP reprioritisation and renewals savings.
Additional projected NLTF and Council revenue from faster population growth	(\$506m)	\$490m of extra NLTF revenue \$16m of extra Council rates revenue
Housing Infrastructure Fund (HIF) and Crown Infrastructure Partners (CIP)		HIF funding has no impact within the first decade. CIP could reduce the first decade funding gap once final proposals are confirmed.
Total impact on funding gap	\$1.9 billion	

Approach

51. The \$2.9 billion of investment proposed to be brought forward from the second decade into the first decade is comprised of \$2.65 billion of capital expenditure and \$250 million of operating expenditure.

52. To identify the updated funding gap we have incorporated a variety of updated information since ATAP was completed in September last year:

- Refinement and reprioritisation of the original ATAP indicative package, including new project cost information and further work done on refining renewals costs¹²
- Additional estimated revenue from a larger population base
- Impact of Housing Infrastructure Fund and Crown Infrastructure Partners announcements.

53. All numbers are reported in \$2016 to maintain consistency with ATAP.

¹² Since ATAP was completed the City Rail Link project's costs have changed. However, decisions by Council and Government earlier this year have provided additional funding to cover these costs changes, meaning there is no material impact on the funding gap.

Refining the original ATAP indicative package

54. Auckland Transport and NZTA are developing their detailed future transport programmes as part of preparing the 2018 Regional Land Transport Plan (RLTP).
55. This has involved more detailed analysis of smaller projects within the ATAP indicative package than was possible during ATAP, as well as reflecting cost and scope changes that have emerged over the past year.
56. ATAP recommended NZTA and Auckland Transport undertake further work to agree appropriate asset management levels of service and associated funding requirements. This work has concluded around \$2.6 billion of investment is required in road renewals over the next decade, rather than the previous estimate of \$3.1 billion. This level of investment would still deliver acceptable levels of service and reflects a slower increase in the level of investment from current levels, not a reduction.
57. Overall the key impact is that an estimated \$500 million reduction in road renewals expenditure has allowed a number of the high priority new investments identified earlier in this report (e.g. additional new electric trains, Airport access improvements, parts of Mill road) to already be earmarked for inclusion within the original \$24 billion ATAP funding level. A reconciliation exercise has been undertaken to avoid double-counting.
58. The net impact of this reconciliation has the potential to reduce the additional funding required from \$2.9 billion to around \$2.4 billion, with the specific amount depending on the final RLTP.

Additional NLTF and Auckland Council revenue

59. National Land Transport Fund (NLTF) revenue is projected to increase by \$490 million as a result of private vehicle travel resulting from higher than expected population growth. We have assumed the share of NLTF revenue for Auckland is based on historic funding trends and that overall revenue increases in line with projected increases to vehicle travel.
60. Growth in Auckland Council's key revenue sources is not driven directly by either population increases or GDP growth but rather by development growth (increases in the size of the rating base) and political decisions to increase rates or development contribution prices.
61. Auckland's population growth in recent years has far outpaced dwelling growth, leading to an increase in household size and around 25,000 fewer dwellings in 2016 than the land-use scenario underpinning ATAP had anticipated.

		Old Projections	New Projections
2016	Population	1,574,000	1,580,000
	Dwellings	550,000	525,000
	Household Size	2.86	3.01
2028	Population	1,854,000	1,949,000
	Dwellings	682,000	673,000
	Household Size	2.72	2.90

62. This shortfall is anticipated to be reduced in the longer term, partly through the initiatives identified in this report. However, modelling undertaken by Auckland Council indicates that Auckland's increased population growth is expected to be accommodated in broadly the same number of dwellings. This means the faster growth does not directly translate into a major increase in rates and development contributions from what was previously forecast. Auckland Council have advised that faster business growth will create a minor \$16 million anticipated increase to rates revenue.

Housing Infrastructure Fund and Crown Infrastructure Partners

63. The Housing Infrastructure Fund (HIF) has no net effect on the first decade funding gap as it must be repaid within the decade from existing revenue sources.
64. In July 2017 around \$364 million of transport investment was announced for likely funding through Crown Infrastructure Partners. This is focused on enabling growth in the northern and southern greenfield areas. This amount, and ultimate decisions around how the money is eventually repaid, are still early in their development and may change over time. Therefore we have not assumed any impact on the funding gap at this time.

Rail infrastructure funding

65. Around \$770 million¹³ of first decade investment in "below-track" rail infrastructure was identified in the Rail Development Plan that informed ATAP. This includes electrification to Pukekohe, an additional track from Wiri to Westfield and a number of other network improvements. These costs were included in the original ATAP indicative package, but were assumed to be funded by the Crown (subject to business cases) and are therefore not included in the original or revised funding gap. Under current funding arrangements, specific funding decisions by the Crown are required for these projects to proceed.
66. The ATAP agencies, KiwiRail and Greater Wellington Regional Council are currently developing terms of reference for a review of the metro rail operating model which may have implications for future rail funding arrangements.

¹³ This differs from the original estimate in ATAP of \$470 million, primarily due to mis-categorisation of the Pukekohe electrification project.

First Three Years (2018-2021)

67. Major statutory funding plans are developed on three-year cycles, making it particularly important to understanding funding requirements for the 2018-2021 period.
68. ATAP assumed approximately \$6.5 billion of total investment (capital and operational expenditure) over the first three years for a mix of committed and uncommitted projects but did not set out to provide a detailed view of sequencing within the first three years.
69. In response to current rapid population growth and better information about project sequencing and cost, Auckland Transport and NZTA have developed a revised three year programme. This programme increases investment from \$6.5 billion to \$8.3 billion over 2018-2021. The increase is comprised of:
- a. Approximately \$300 million of cost changes for committed NZTA projects and accelerating development of further key initiatives. This is offset by lower NZTA expenditure later in the decade.
 - b. Around \$720 million of accelerated Auckland Transport capital expenditure focused on addressing the transport impacts of rapid recent growth and providing capacity for future development
 - c. An extra \$800 million for City Rail Link, which already has funding arrangements in place.
70. There is already a significant existing State highway investment programme for 2018-2021. This includes the Northern Corridor, Southern Corridor, Puhoi-Warkworth and East West Link. The current stage of project development, alongside buildability constraints, mean there are limited opportunities to further expand delivery of the State highway programme over the next three years. Extra efforts should therefore focus on advancing planning, design, consenting and land acquisition for later projects.
71. Key initiatives from the first decade package that would be brought forward into the next three years with this extra funding include:
- a. Advancing development of the “next generation” of State highway projects, including the SH16/SH18 interchange, Southern Motorway widening between Papakura and Drury, improved Eastern Airport Access (SH20B) and the Northwestern Busway¹⁴. Major construction on these initiatives is likely to occur after 2021 as further consenting, property acquisition and design work is required.
 - b. Accelerating Auckland Transport’s programme, targeting high priority and well developed investments including the AMETI Eastern Busway and associated Reeves Road flyover, Mill Road, the earlier purchase of new electric trains, along with earlier completion of key city centre bus lanes and interchanges.
 - c. Completing approximately \$250 million of rail network infrastructure upgrades to cater for ongoing rapid growth in rail ridership and increasing freight volumes,

¹⁴ ATAP had the Westgate to Te Atatu section of the Northwestern Busway in the first decade, and the Pt Chevalier to Newton section in the second decade. Subsequent business case work suggests focusing on the Newton to Pt Chevalier and Te Atatu to Lincoln Rd sections first to maximise value for money.

including an additional track from Westfield to Wiri and a variety of key network resilience and performance upgrades.

72. Developing a programme to respond to rapid changes in growth is challenging due to the lead times associated with funding approval, land acquisition and Resource Management Act requirements. This provisional programme has been developed to provide for a steady increase in construction activity over the first three years, reaching a steady state that is maintained afterwards. This is intended to give the market time to respond, while providing confidence that activity level will be sustained for some time.
73. Auckland Transport has advised delivering this level of investment is achievable as a number of key large projects, such as AMETI and Mill Road, are well advanced. However, this depends on certainty over long-term funding, flexibility within the overall programme and early decisions to proceed. This is particularly important for land acquisition, which is usually the 'critical path' element of project development that determines delivery timeframes.
74. The financial implications of these changes increase the funding gap for 2018 - 2021 from the \$380 million to \$1.3 billion (excluding below track rail infrastructure).

Appendix 1: Cost Benefit Ratios for Major Additional Investments

Auckland Transport has collated benefit-cost ratios (BCR) as part of the 2018 LTP/RLTP prioritisation process. This memorandum provides BCRs for projects which are considered to be accelerated under ATAP 1.1. BCRs are subject to change as new information becomes available.

Project Name	BCR	Source
Penlink	- Government BCR 5.7 - National BCR 3.5	Penlink Transport Analysis update – interim report Prepared by Beca, 2016
Arterial roads in the North to enable growth (including Warkworth)	- Programme BCR (North) 3.2 to 3.7 - Programme BCR (Warkworth) 1.1	Transport for Future Urban Growth – Dairy Flat & Wainui East – Short List & Economic Evaluation Prepared by Beca, 2016 Transport for Future Urban Growth – Warkworth Long list and Short List Prepared by Jacobs, 2016
Mill Road Corridor	- Mill Road Northern Section 3.7 - Programme BCR (South) 3.6 to 3.7. Includes southern sections of Mill Road.	Transport for Future Urban Growth – South Area: Long list and Short List Prepared by Flow Transportation Specialists, 2016
Arterial roads to enable growth and additional train stations, in the South	Programme BCR (South) 3.6 to 3.7	Transport for Future Urban Growth – South Area: Long list and Short List Prepared by Flow Transportation Specialists, 2016
Arterial roads in the Northwest to enable growth	Programme BCR (Northwest) 2.2 to 3.4	Transport for Future Urban Growth – North West Area: Long list and Short List Prepared by Flow Transportation Specialists, 2016
Network optimisation (including digital technology), with a particular focus in the south	- Network optimisation ranges between 4 to 14 - Intelligent transport system ranges between 5.2 to 9.1	ITP Consolidated response template - Network optimisation programme has multiple projects with varying BCR from 4 (Whangaparaoa Road Dynamic Lane) to 14 (City Centre Signal Optimisation) ITP Consolidated response template - Intelligent transport system considered for AMETI has varying BCR from 5.2 to 9.1
Mass Rapid Transit	Programme BCR 0.7 – 1.9	Central Access Plan Programme Business Case. Note that this figure also includes the cost of other elements no longer intended to be progressed (e.g. a heavy rail spur to Mt Roskill), meaning further analysis is likely to result in a higher BCR.
Airport-Manukau bus priority, including Puhinui interchange	Programme BCR (Airport PBC) 0.6 - 3	Airport PBC has a BCR of: 0.6 - 3.0. Specific Puhinui interchange BCR is yet to be developed Prepared by Aurecon, 2017
Second tranche of new electric trains	BCR range between 2.8 to 3.2	Based on Auckland metro train capacity DBC (2017)

Appendix 2: Map of first decade major investments

ATAP revised Indicative Package Major Interventions, first decade (2018/19 to 2027/28)

