

APPENDIX A –SUMMARISED METRO DEMAND ANALYSIS

Auckland's passenger rail system consists of four service lines as summarised in Table A1, and Figure A1.

Table A1: Current (2022) passenger services in Auckland

NAME	TERMINI	ROUTE	LENGTH	STATIONS	TRACKS	SERVICES PER DAY ¹
Western Line	Britomart	Swanson	NAL, NBL, NIMT	18	2	69 (Henderson)
Eastern Line	Britomart	Manukau	NIMT, MBL	11	2	72 (Sylvia Park)
Onehunga Line	Britomart	Onehunga	OBL, NAL, NBL, NIMT	6-8 ²	2 <i>Britomart–Penrose</i> 1 <i>Penrose–Onehunga</i>	33 (Onehunga)
Southern Line	Britomart	Papakura	NIMT, NAL, NBL	17	2	70 (Takanini)
	Papakura	Pukekohe	NIMT (diesel shuttle)			42 (Pukekohe)



Figure A1: Auckland Passenger Train Network and Northern Busway

Early analysis on the PBC was undertaken to assess the potential demand for metro rail services and the extent to which this demand would be constrained by existing service capacity (in turn constrained by existing infrastructure, systems and equipment). This was achieved by running 'unconstrained' demand modelling using the Auckland Forecasting Centre Macro Strategic Model in which vehicle capacity limits are essentially turned off in the model. Further information on the settings of the model can be found in the Economic Case Do Min section.

The full analysis is provided in Appendix B which contains detailed inputs and assumptions of the analysis and a range of outputs from the mode. Note that some of the inputs of this analysis were refined over the course of the PBC, but the early unconstrained analysis still presents a realistic

¹ On a typical weekday

² Eight stations after 8pm - Trains only stop at Greenlane and Remuera in evenings.

picture of metro demand potential, which has been validated against later demand modelling on the final preferred programme and other phases of the optioneering process.

Outputs of the analysis include total annual patronage forecasts, mode share and mode split data, service-by-service capacity analysis along each line for 2031 and 2051 horizon years, during morning peak, and volume vs. capacity analysis, showing where demand exceeds capacity of the do min train services.

An example service capacity analysis is provided in Figure A2 below, for the Southern Line all stops service. Both directions are shown on the plot, with the inbound direction (towards the city centre) moving left to right and patronage depicted as positive values. The outbound direction (away from the city centre) moves right to left and has patronage depicted as negative values (to allow both directions to be shown on the same plot).

Demands along line by service

(Pukekohe to Otahuhu - via Newmarket, Grafton, CRL, Parnell)
(All stops, both directions)

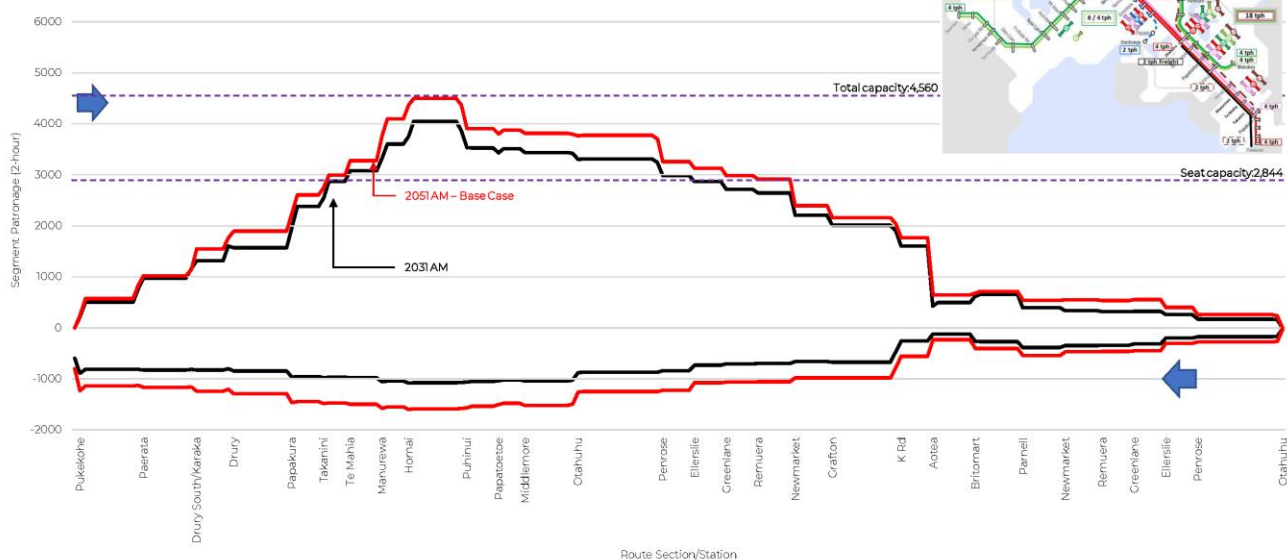


Figure A2: Southern Line service capacity analysis

The full set of these charts is provided in Appendix B and is summarised in Table A2 below. The main conclusion to draw from this analysis is that without further investment to improve service capacity beyond the CRL Day 1 timetable:

- All lines will run out of seating capacity by 2031, resulting in some cases in long standing times, particularly on the Southern Line, where standing on express services starts at Paerata (68min from the city centre) and Te Mahia / Takanini on all stops services (52-54 min from city centre)
- By 2051, demand on all lines will exceed total capacity with passengers being left behind on platforms in peak periods as far out as Morningside on the Western Line, Dury on Southern Line limited stops services, Homai on Southern Line all-stops services, and Panmure on the Eastern Line.

Between 2031 and 2051, increasing levels of crowding will make metro services less attractive to customers, likely resulting in stagnated demand.

Table A2: Service-by-service capacity analysis summary (inbound direction unless otherwise noted)

SERVICE/LINE	YEAR	SEATED CAPACITY EXCEEDED	TOTAL CAPACITY EXCEEDED
Western line (Swanson to Britomart (then Eastern line), all stops, via CRL)	2031	New Lynn	-
	2051	New Lynn	Morningside
Western line (Swanson to Britomart, all stops, peak overlay , via CRL)	2031	New Lynn	-
	2051	New Lynn	Morningside
Southern line (to/from Pukekohe, all stops, via Newmarket and CRL) Shown in Figure	2031	Te Mahia	-
	2051	Takanini	Homai
Southern line (to/from Papakura, peak overlay , via Newmarket and CRL)	2031	Manurewa	-
	2051	Manurewa	-
Southern line (to/from Pukekohe, peak overlay, limited stops , via Eastern line and CRL)	2031	Paerata	Drury
	2051	Paerata	Drury
Eastern line (Manukau to Britomart (then Western line), all stops, via CRL)	2031	Panmure	Orakei
	2051	Otahuhu	Panmure
Eastern line (Manukau to Britomart (then Western line), all stops, peak overlay , via CRL)	2031	Panmure	-
	2051	Sylvia Park	Meadowbank
Onehunga Line	2031 / 2051	Not exceeded	Not exceeded

IMPACTS OF COVID ON RAIL PATRONAGE

COVID has had a significant impact on patronage, with annual rail patronage currently about 33% of the peak in early 2020. This is noticeably lower than overall public transport patronage (all modes), of around 45% of pre-COVID levels³. The reasons for this disproportionate reduction in rail patronage are likely two-fold:

- The sustained disruptions, line closures and reduction in level of service because of the catch up renewals
- Rail trips are heavily commuter focused (~60% pre-COVID), particularly to the city centre, the area with the greatest level of sustained travel behaviour change (i.e. ability and propensity to work from home).

³ As of June 2022

Research from mid-2021 commissioned by Waka Kotahi explores the impacts of the COVID-19 pandemic on the propensity to travel by public transport and provides validation of these observations. The research also provides some insights into what it could mean for the future in terms of recovery for public patronage transport. The key points from the research are summarised below:

- The COVID-19 pandemic generated diverse impacts that either suppressed travel demand (i.e. by forcing a shift to remote work, commute trips) or spurred a change in travel mode in response to the public health risks of shared or public transport.
- In most cities, the net impacts were a reduction in the public transport mode share and an increase in private car travel. This effect is more pronounced in cities with higher levels of car ownership (such as Auckland) and indicates a longer-term impact of COVID-19 beyond the lockdown measures for public transport activity.
- There is a strong indication that more car-dependent cities cannot take for granted that public transport activity will revert to previous levels.
- Stronger measures will most likely be required to rebuild and increase public transport patronage, such as upgraded services, affordable fares, and stronger disincentives for driving. This is expected to be amplified by the urgency of the climate crisis that will spur cities to take bolder measures to drive radical mode shift away from private vehicle travel.
- A shift towards partial or full remote work is evident in some sectors, with professionals and management roles having the highest propensity for remote working. A survey conducted in Sydney shows a significant shift in remote working behaviour (across a range of occupations), replicated below in Figure A3.

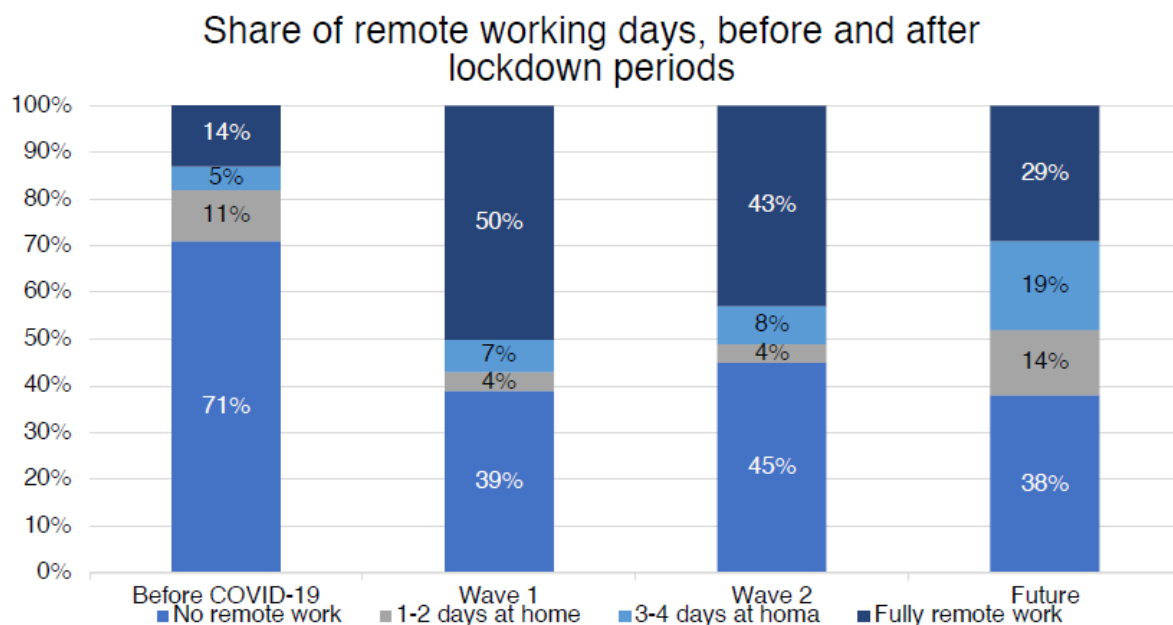


Figure A3. Share of days worked remotely, before and after COVID-19 lockdowns in Australia⁴

⁴ Source: International Review for CC2M Strategic Business Case, Europium Consulting, July 2021

- The concept of working from home, which during the pandemic became the norm for the majority in professional industries and in education, will no doubt be moderated in the future but will not disappear. All expectations are for a return to city centre working at a scale between 60 and 100%. However, at present there is no hard evidence that that expectation is to be realised and no indicative timescale either.

For the AR-PBC this could mean that patronage recovery is slower than anticipated and the capacity issues expected soon after CRL opening do not materialise until later. This could help to ameliorate the expected demand spillage that will otherwise result as the programme otherwise lags demand by 8-10 years but is unlikely to delay investment needs. However, that is from a pure capacity perspective, and as the research above notes, other drivers of change such as policies related to climate change could accelerate the recovery and need for investment, effectively counteracting some of the behavioural changes that are expected to remain.