Wellington City Proposed District Plan

Hearing Stream 1

Appendix C

– Report to Wellington City Councillors on the capacity of the Johnsonville Rail Line for future growth

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Dear Councillors,

On 24 June 2021, as part of decisions on the Wellington City Spatial Plan, you resolved to ask officers to report back within three months on the ability and capacity of the Johnsonville train line to support the planned potential population growth along the Johnsonville/Onslow corridor, taking into account the Regional Council's planned future investment strategy on the line.

Summary

Our analysis finds that the capacity of the Johnsonville line may need to be increased in the 2035 – 2050 period to support the population growth along the line in the Spatial Plan, depending on the rate of future patronage growth. When needed in future decades, this capacity could be increased by 50% by adding two cars per service in peak times, or possibly by adding a passing bay (probably at Simla Crescent station).

This analysis does not consider the increase in bus services to service population growth in these suburbs. Regardless, there are fewer constraints to increasing bus service capacity than Johnsonville Line capacity.

Projected population growth

The table below shows the latest 2051 population projections for the suburbs on the Johnsonville Line (using PM2 Statistics NZ meshblocks), and the upper and lower population estimates of additional residents enabled through the final Spatial Plan within 10 minutes of the rail stations.

Suburb	2021	2051	Change	New residents near train[1]
Crofton Downs	1,894	2,727	833 (44%)	691 – 825
Ngaio	5,976	7,313	1,337 (22%)	2,329 – 2,771
Khandallah	9,247	12,406	3,159 (34%)	3,817 – 4,582
Johnsonville	12,140	16,058	3,918 (32%)	4,246 – 5,301
Total	**29,257**	**38,504**	**9,247 (32%)**	**11,083 – 13,479**

Current capacity and future population growth

GWRC (GWRC) tells us that the weekday morning peak is the capacity constraint. For the peak, Metlink runs 4-car Matangi trains with a capacity of 294 seated passengers, and 492 passengers seated + standing (practical standing capacity). The Johnsonville Line is single track with passing loops that currently permit one train every 15 minutes (each way).

[1] Source is Beca Ltd's estimate using population density for final Spatial Plan areas with housing typologies 2 to 4b (i.e. not low growth typology 1 areas of these suburbs) and historic realisable rates of plan-enabled capacity. The estimate is uses high and low growth scenarios.

The table below calculates the 2051 use of the Johnsonville line.

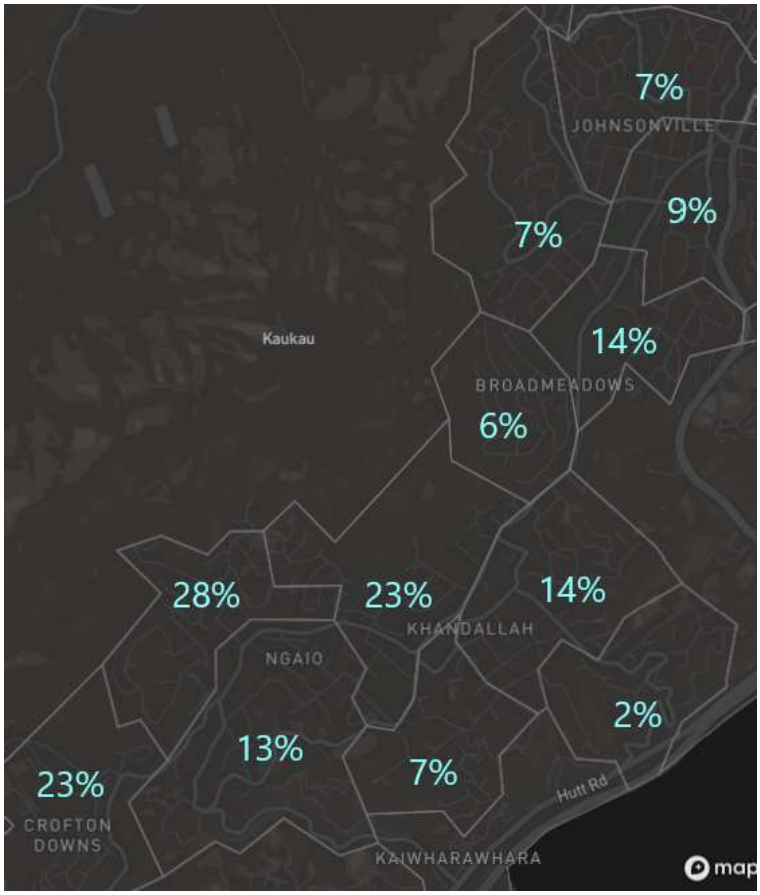
	Peak (8 – 8:23 am)	**7:30 – 8:30 am**	**6:30 – 9:30 am**
Train capacity: seated only / seated + standing	294 / 492	1,176 / 1,968	3,528 / 5,904*
Current use (average May 2021)	299	926	1,618*
Current use % (average May 2021): seated only / seated + standing	102% / 61%	79% / 47%	46% / 27%
2051 use (if the rate of train trips per population stays the same)	395	1,222	2,135
2051 use %: seated only / seated + standing	134% / 80%	104% / 62%	61% / 36%

*This capacity would apply if an extra train is added at 9:15 am to the current schedule. This is easily doable now if needed. To keep the calculations even, I have also applied the 9 am occupancy to a new 9:15 am service.

Increased train use from new residents living near train stations

The amount of extra demand placed on the Johnsonville Line will also be affected by increased population density near the train stations instead of elsewhere serviced by bus routes. We expect a higher percentage of the growth to be near train stations – see right hand column on the first table. This is because of the directions in the Spatial Plan: favourable land use zoning, increased infrastructure investment over time, and access to local services.

To get a high-level estimate of this increased use, we can compare the frequency of train use to get to work and school vs their walking access to the train line, using https://commuter.waka.app (travel data from Stats NZ 2018).



This shows that proximity to the Johnsonville Train Station does not appear to have a significant effect on train usage into Wellington, probably because of bus alternatives that are usually faster.

For the other stations, the use of trains is 2-3 times more for people living close to the train and without an alternative bus service. Train use into Wellington for people living a long way from the train line is almost non-existent, as expected.

For the purposes of this report, the table below figures that people living within 10 minutes' walk of train stations will use the train 3x more than people in the suburb overall now.

	Peak (8 – 8:23 am)	**7:30 – 8:30 am**	**6:30 – 9:30 am**
Train capacity: seated only / seated + standing	294 / 492	1,176 / 1,968	3,528 / 5,904*
2051 use (with new residents in walking catchments 3x more likely to take train)	639 – 712	1,978 – 2,206	3,456 – 3,854
2051 use %: seated only	217%-242%	168%-188%	98%-109%
2051 use %: seated + standing	130%-145%	101%-112%	59%-65%

The rate of population increase over the next 30 years will also depend on 3 waters constraints and the priority of investment in this area. The Spatial Plan currently plans this for 2030-2040. From this and the tables above, the existing Johnsonville Line service can cater for growth anticipated in the Spatial Plan for perhaps the first 15-20 years, but in future decades the train may need more capacity to ensure a more comfortable ride with less crowding – assuming it is acceptable for the busiest peak morning train to have some people standing.

Mode shift to public and active transport

The Wellington Regional Land Transport Plan 2021 has a target to increase the number of trips made by public transport and active travel from 28% (in 2018) to 40% (in 2030). For the western suburbs, investment in this decade is focusing on bus and cycling corridors along Hutt Road, Thorndon Quay,

Ngaio Gorge Road and SH1 Ngauranga Gorge. This is less likely to affect Johnsonville Line patronage. To the extent that train use by existing residents increases, the need for more train capacity would be hit sooner.

Two options are below the summary of existing planned investment.

Existing planned investment on the Johnsonville Line

A significant upgrade to the Johnsonville Line occurred in 2015-16: peak train services every 15 minutes and using new Matangi trains.

Planned investment on the Johnsonville line focuses on maintenance and upgrades to retain a quality, resilient service. Current work includes:

- Replacing wood masts with steel poles
- Renewing the traction power overhead line systems
- Renewing sleepers within all seven tunnels
- Stabilising the slopes above and below the track through the Ngaio Gorge.

Options to expand Johnsonville Line train capacity in the future

When needed, train capacity can be increased by adding carriages, and possibly adding a passing bay to allow increased frequency.

Adding carriages. If the train station platforms were lengthened at some locations, 6-car Matangi trains could be used in the future. This would increase the passenger capacity by 50%.

Adding a passing bay at Simla Crescent Station (a new platform and 150 m track on the northern side) could allow trains every 10 minutes instead of the existing 15 minutes. Trains every 10 minutes would increase the popularity and quality of the service, and would increase the passenger capacity by 50%. However, a 10-minute service would also be less reliable given the single track nature of the Line. Delays to one train would affect the other trains waiting for it to pass. The feasibility of this option would need to be investigated further.

Written by Andrew Wharton, Principal Advisor Planning

Presented to Wellington City Council councillors for the 23 June 2022 Pūroro Āmua Committee Meeting