

Waterloo Station Sizing & Passenger Forecasting

Waterloo is a strategically significant station for the region, with demand forecast to grow substantially in coming years

- Despite a recent softness in passenger numbers across the rail network, there are a number of factors that will lead to substantial growth in patronage at Waterloo Station in the medium to long term.
- This includes:
 - Significant uplift in housing numbers within the direct catchment of Waterloo Station, with new, denser housing already built or planned
 - Wider growth (e.g. Wainuiomata) increasing patronage on feeder bus routes
 - National Ticketing System is coming – zonal fares (bus + rail) likely to drive increased demand
 - LIMRIM and other planned investment will also increase frequency and reliability, as well as quality of rolling stock
- Understanding this growth is critical to ensure that a rebuilt Waterloo Station is fit for purpose to meet future demand – and to futureproof where required to avoid inefficient investment or oversizing of some station elements (e.g. lifts, stairs, platforms).

Updates since we last spoke – changes to passenger forecasts with growth assumptions to better reflect the impacts of a TOD; and a more pragmatic approach to station sizing methodology

- Access to updated passenger forecast data from WTAU using Sense Partners growth assumptions
- Confirmation of the underlying assumptions within the Sense Partners growth data (which includes wider regional growth, including Wairarapa)
- Confirmation the week chosen for representative snapper data is within the 5% busiest weeks of the year (95th percentile)
- Adjustments to some of the station sizing assumptions, including Snapper flow rate, entrance split (Oxford vs Cambridge Terrace), and the delayed service factor (from 125% to 100%)
- Re-running of station sizing calculations for the new agreed design year – 2046

What are the growth forecasts telling us? Between 2018 and 2052, patronage growth at Waterloo is estimated to be between 30 – 70 per cent

		Hutt Valley Population growth			Waterloo Patronage Growth (from model, rounded)	Waterloo Growth (AM board)	Ratio of Rail to Population growth (greater than 1 --> rail growing faster)	Additional Waterloo Boardings per 100 new residents
		%	per annum	Absolute (000)				
RONs	2018 to 2033 - Stats	9%	0.6%	10,000	20%	400	2.2	40
RONs	2033 Stats to 2053 Stats	4%	0.2%	5,000	10%	150	2.4	30
RONs	2018 to 2053 - Stats	14%	0.4%	15,000	30%	500	2.2	33
Sense (developed 2023)	2018 to 2053 Sense	40%	1.0%	44,000	70%	1400	1.7	32
	Historic pre Covid rail growth -							
	2012/2013	11,300,000		New trains introduced from 2012 onwards				
	2018/2019	14,300,000						
		27%						
	Regional Population							
	2012/2013	490						
	2018/2019	530						
		8%	3.25	Period of higher than average growth Perhaps higher than average due to new trains?				
	Stats NZ - used for NZTA RONS so should use these as part of assessment							
	Sense - developed by Regional TAS, latest forecasts developed 2023, likely to be revised downwards in short / medium term							
	2018 Lower Hutt Population	108,500		2018 Regional Population	526,000			
	2023 Lower Hutt Population	111,500		2018 Regional Population	540,000			
Used for RONS	2033 Lower Hutt Population - Stats	118,500		2033 Regional Population - Stats	575,000			
Used for RONS	2053 Lower Hutt Population - Stats	124,500		2053 Regional Population - Stats	613,000			
Sense (developed 2023)	2053 Lower Hutt Population - Sense	153,000		2053 Regional Population - Sense	741,000			

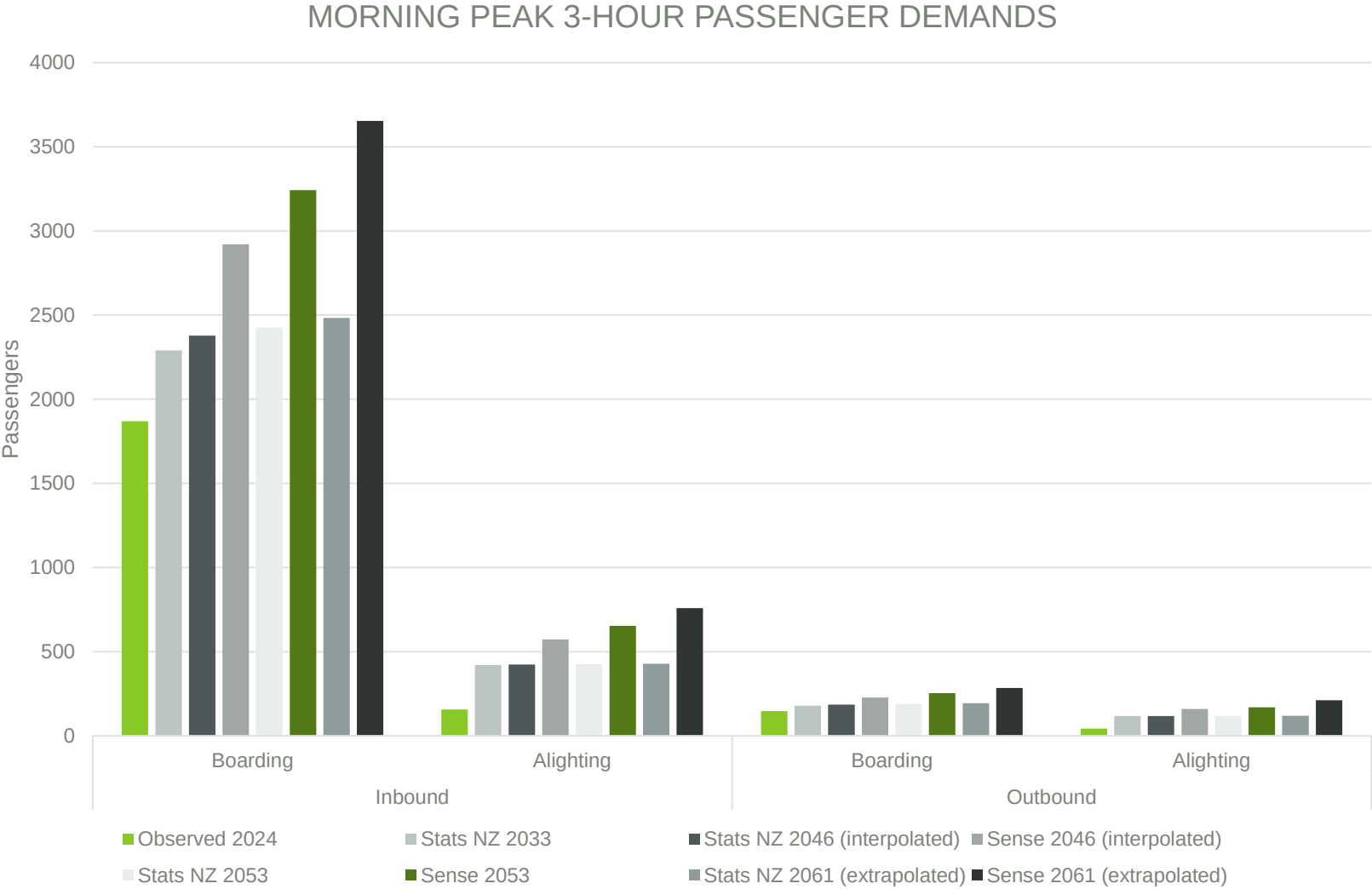
→ For the purposes of sizing the station, we propose to take the upper estimate of the Sense Partners growth scenario to take account of the expected effect of the TOD on both population and employment numbers.

→ Note if NZTA funding will be sought at a future stage, for the purposes of the business case economics, NZTA will expect the Stats NZ projections to be used (as per the RoNS projects, and NLTF-funded projects).

Our revised approach to forecasting and station sizing seeks to strike a balance between efficient infrastructure provision and longevity

- The approach to station sizing is demand led so that provides sufficient capacity, targeting a Level C level of service for rail passengers in the peak 15 minutes in the representative week in the busiest month (excluding disruptions) in 2024 and forecast passenger demand in its planned opening year of 2031 and by 2046.
- This is a standard methodology that is used across the Auckland rail network, as well as in Australia and the UK, and has been refined to meet GWRC and local Kiwirail standards.
- The representative week chosen is 11th to 17th March 2024 which is at the 95th percentile of busyness throughout the year, due to the return to university and prior to easter holidays. GWRC Analytics Unit typically uses March to represent the busiest period on the network.
- For the busiest 15 minute of the day (17:30-17:45), with a delayed train service there may be a lower level of service for a short period of time from the 2040s onwards (with the remainder of the day performing at a LOS C or better).
- The cost of addressing this busiest period in the design now may prohibitive in terms of cost and lead to inefficient provision of infrastructure before it is required. Measures will therefore be explored during the development of the station design to ensure space is held for future expansion of specific elements prone to congestion (e.g. stairs)

PASSENGER DEMANDS – PEAK SUMMARY



- NZ Stats overall passenger demand growth from 2024 to 2046 of 115%
- NZ Stats overall passenger demand growth from 2024 to 2061 of 120%
- Sense Partners overall passenger demand growth from 2024 to 2061 of 180%

(Note growth rates obtained from strategic transport models for 2018, 2033, and 2053)

Revised Station Sizing Outcomes

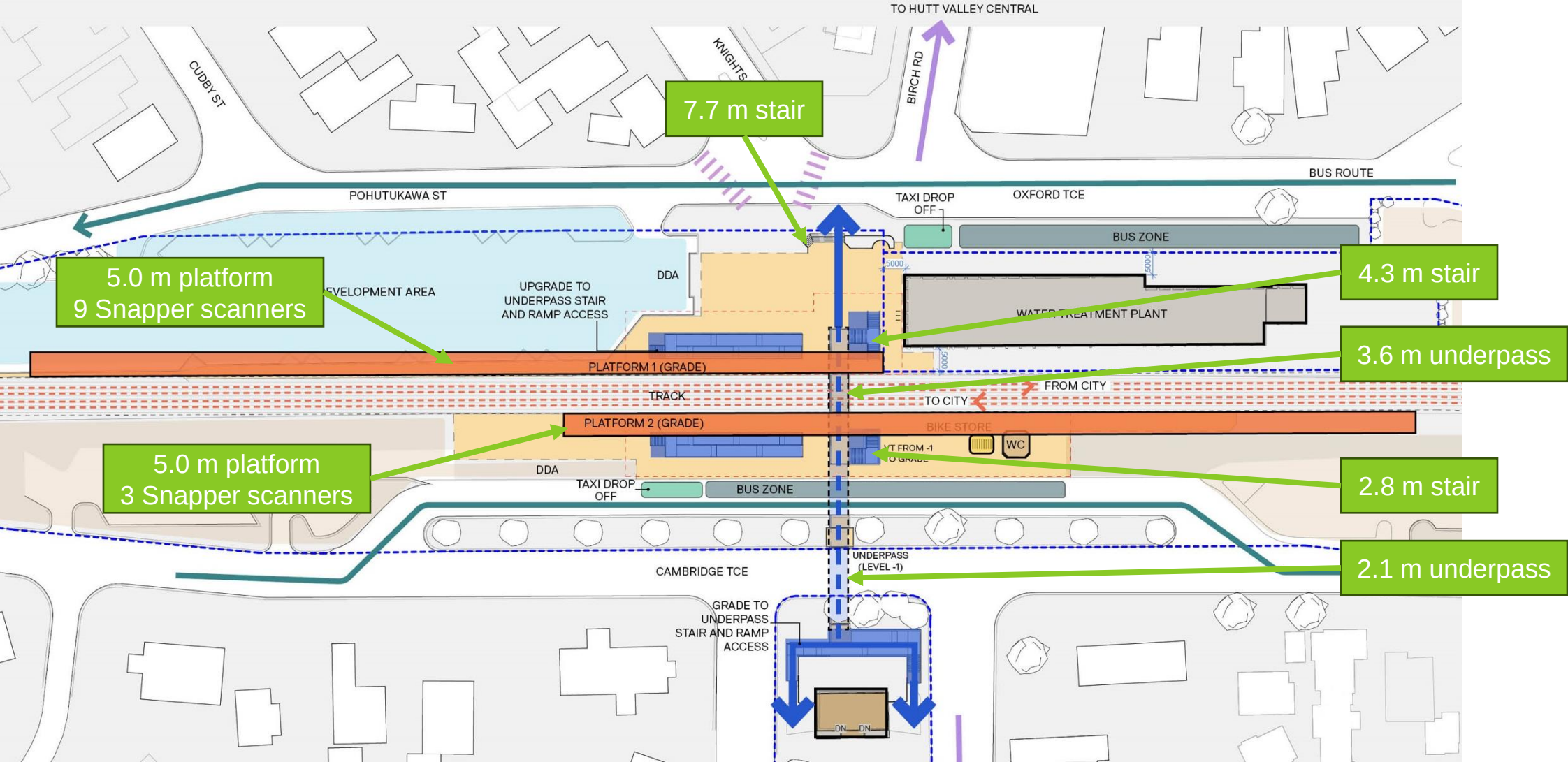
STATION SIZING OUTCOMES (SENSE PARTNERS)

→ The following sizing of specific station elements are required at opening (2031) to cater for expected demand for the next 15 years (2046).

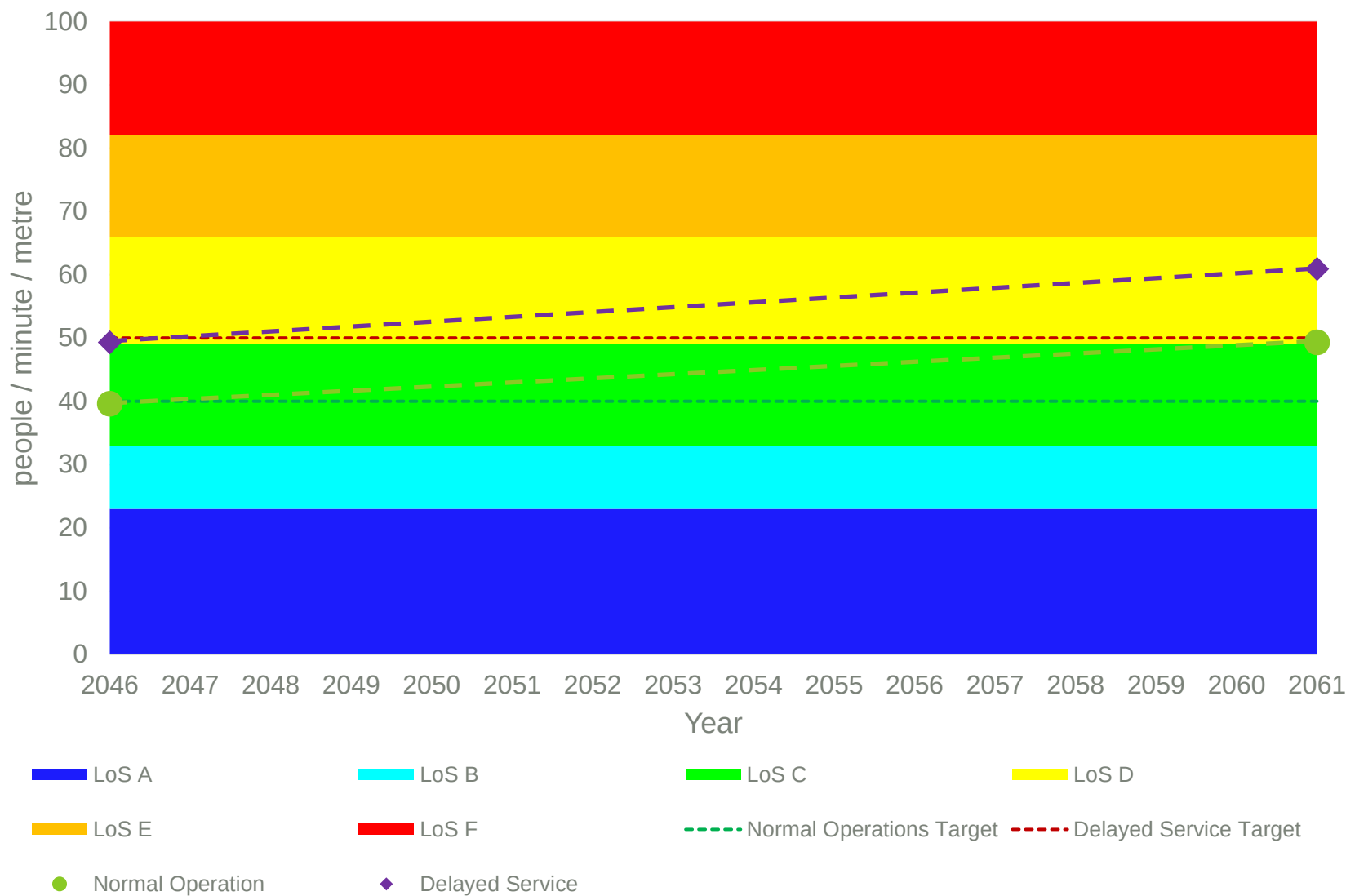
	Design Year ↓	Futureproof Year ↓
STATION ELEMENT	2046 MINIMUM PROVISION	2061 MINIMUM PROVISION
Inbound platform width	5.0 m	5.0 m
Outbound platform width	5.0 m	5.0 m
Inbound platform Snapper card scanners	3 scanners	3 scanners
Outbound platform Snapper card scanners	9 scanners	12 scanners
Inbound platform staircase width	2.8 m	3.5 m
Outbound platform staircase width	4.3 m	5.3 m
Oxford Terrace staircase width (street level exit)	7.7 m	9.7 m
Underpass width (current width 3.6 m)	3.6 m	4.3 m
Cambridge Terrace underpass width	2.1 m	2.4 m
All dimensions are clear widths (i.e. width between handrails)		

Treat 2061 Sense Partners numbers with caution, as the approach applies the high growth rate from the 2018 to 2053 out to 2061.

STATION SIZING OUTCOMES (SENSE PARTNERS)



UNDERPASS (3.6 m WIDTH) LEVEL OF SERVICE PERFORMANCE



SENSE PARTNERS PASSENGER DEMANDS

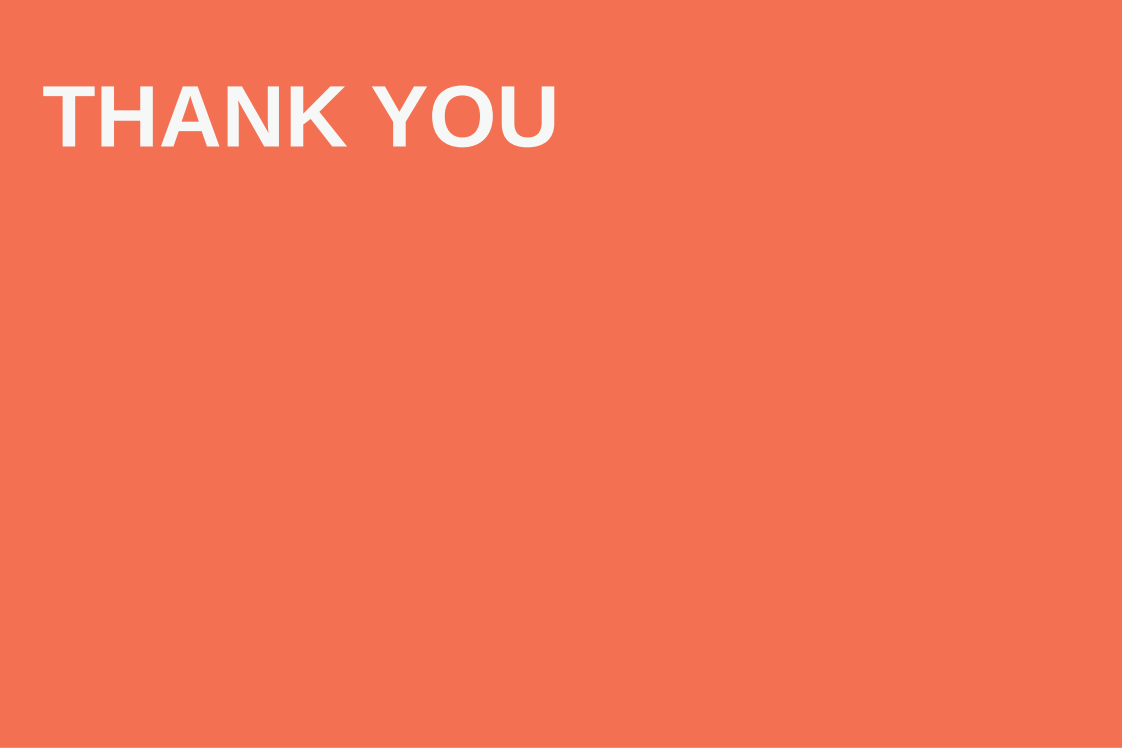
– 2046 DESIGN YEAR

2046 MORNING PEAK	INBOUND		OUTBOUND	
	BOARDING	ALIGHTING	BOARDING	ALIGHTING
Peak 15-minutes	430	15	25	56
Peak train service	215	8	13	27
Peak minute	35	6	2	22

2046 EVENING PEAK	INBOUND		OUTBOUND	
	BOARDING	ALIGHTING	BOARDING	ALIGHTING
Peak 15-minutes	8	52	12	541
Peak train service	4	26	5	271
Peak minute	1	21	1	217

SENSITIVITY TESTING – HIGH GROWTH SCENARIO

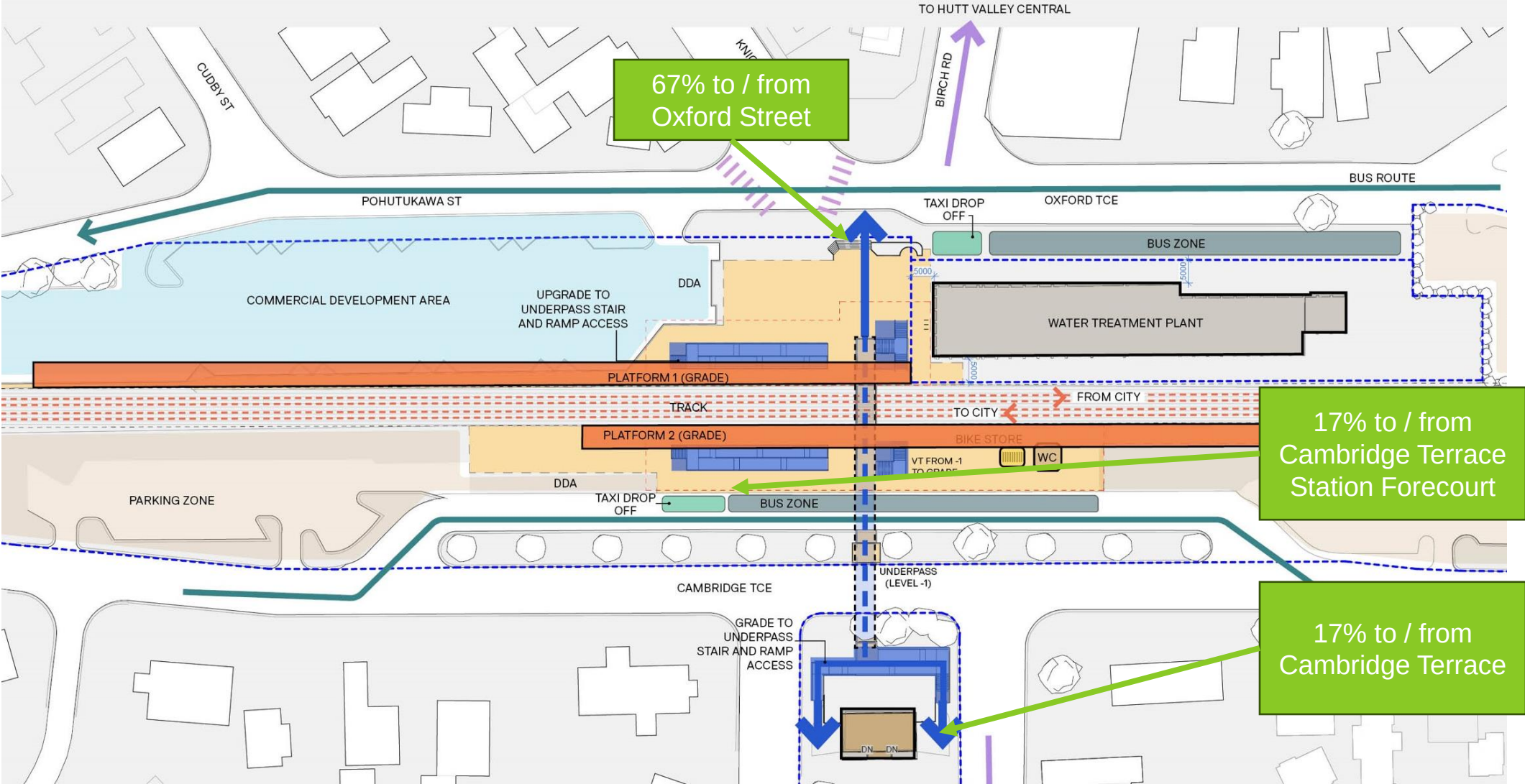
Hutt Valley (HVL, MEL, WRL)							
	Inbound Vols				Inbound Growth		
	2018	Stats 2033	Stats 2053	Sense 2053	% diff Stats 33	% diff Stats 53	% diff Sense 53
AM	8330	9784	10311	12684	17%	24%	52%
IP	1509	1955	2086	2516	30%	38%	67%
PM	733	1375	1351	1711	88%	84%	133%
	Outbound Vols				Outbound Growth		
	2018	Stats 2033	Stats 2053	Sense 2053	% diff Stats 33	% diff Stats 53	% diff Sense 53
AM	268	456	519	704	70%	94%	163%
IP	589	864	985	1145	47%	67%	94%
PM	6698	8009	8669	10315	20%	29%	54%
HVL							
	Vols				Growth		
	2018	Stats 2033	Stats 2053	Sense 2053	% diff Stats 33	% diff Stats 53	% diff Sense 53
AM	8598	10240	10830	13388	19%	26%	56%
IP	2098	2819	3071	3661	34%	46%	74%
PM	7431	9384	10020	12026	26%	35%	62%
	18127	22443	23921	29075	24%	32%	60%



THANK YOU



ASSUMED STATION ENTRY / EXIT SPLITS



NZ STATS STATION SIZING OUTCOMES

SIDE PLATFORM

STATION ELEMENT	2046 MINIMUM PROVISION	2061 MINIMUM PROVISION
Inbound platform width	5.0 m	5.0 m
Outbound platform width	5.0 m	5.0 m
Inbound platform Snapper card scanners	3 scanners	3 scanners
Outbound platform Snapper card scanners	8 scanners	8 scanners
Inbound platform staircase width	2.3 m	2.4 m
Outbound platform staircase width	3.6 m	3.7 m
Oxford Terrace staircase width	6.4 m	6.7 m
Underpass width	3.1 m	3.2 m
Cambridge Terrace underpass width	1.8 m	1.9 m