Appendix B

Industrial and housing land forecast

NEIZ Industrial Land Forecasting Methodology

FRESH INFO

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1 Approach

Analysis conducted at the beginning of the project revealed a consistent long-term relationship between population and employee counts in industrial areas in Palmerston North. This is demonstrated in the graph below which shows that the employee count in industrial areas per capita has remained stable at around 0.14 since 2004.

Figure 1 Employee count in industrial areas per capita in Palmerston North
Source: Stats NZ
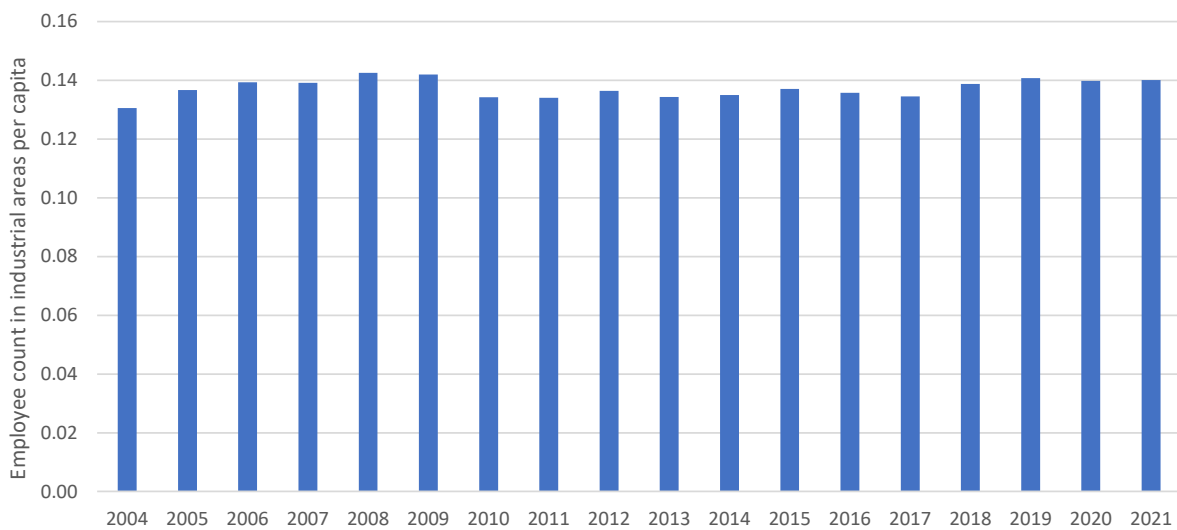
This stability indicates that there is an underlying structural relationship between employee counts in industrial areas and population, although the direction of causality is uncertain. The key implication is that growth in employment in industrial areas is likely to be accompanied by growth in other parts of the economy, such that the long-term employee count in industrial areas per capita of 0.14 is sustained over time. However, it is acknowledged that new developments could create short-term deviations from the long-term average.

What this means from a forecasting perspective is that long-term employment forecasts for industrial areas can be driven off population forecasts, and vice versa.

We have used Palmerston North population projections prepared by Infometrics to forecast employee counts in industrial areas at a city-wide level. The rationale for driving the analysis off population projections is threefold:

1. Population projections tell a broader story about the growth and development of Palmerston North. In our view growth in employment in industrial areas must be considered within this broader growth context, rather than being modelled in isolation.
2. This top-down approach allows us to avoid issues of incrementality and double-counting which are often present in bottom-up approaches. For example, if we were forecasting employment in industrial areas in isolation there is a risk of counting every new industrial employee as a new employee in Palmerston North, even though some of these employees may be moving internally within the employment system. Starting at the system-wide level removes the possibility of this occurring.

3. This approach ensures that our analysis aligns with existing projections, rather than creating a new set of projections that compete with existing ones.

Infometrics provides PNCC with low, medium, and high population projections which have a 2018 base and extend to 2052 in five-year increments. Each scenario represents a particular growth story for Palmerston North, both at an aggregate level and in terms of industrial activity and employment. We have assumed for the purposes of our modelling that:

*   The low population projection is representative of a low-growth future for industrial activity and employment in Palmerston North.
*   The medium population projection is representative of a medium-growth future for industrial activity and employment in Palmerston North.
*   The high population projection is representative of a high-growth future for industrial activity and employment in Palmerston North

We consider it unlikely that Palmerston North could achieve a high-growth future for industrial activity and employment while only achieving low or medium growth in population. This would imply a major structural shift in the economic system that we find no previous evidence of.

Figure 2 Palmerston North population projections
Source: Infometrics
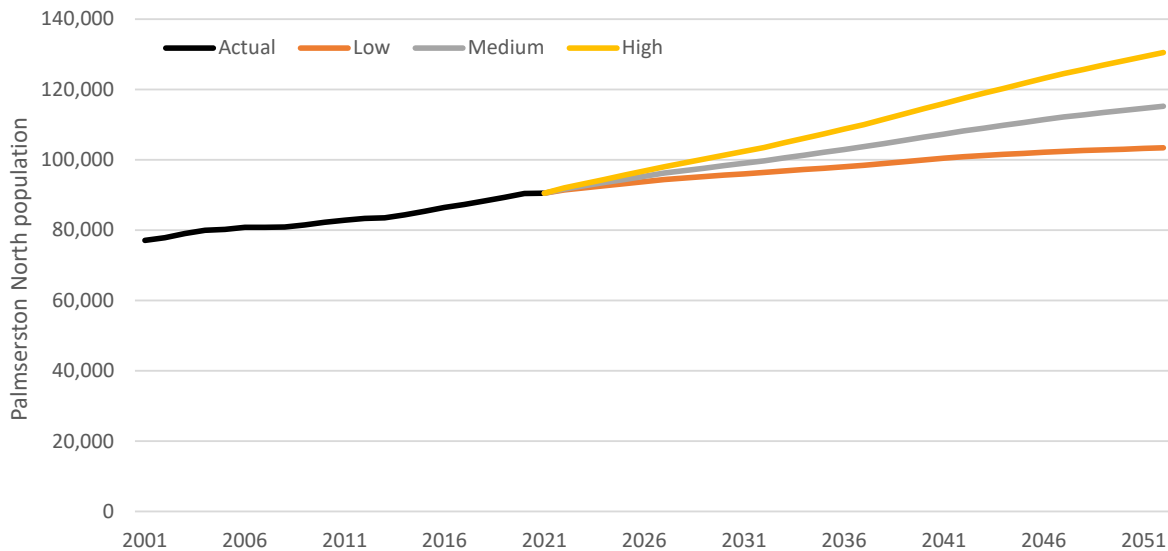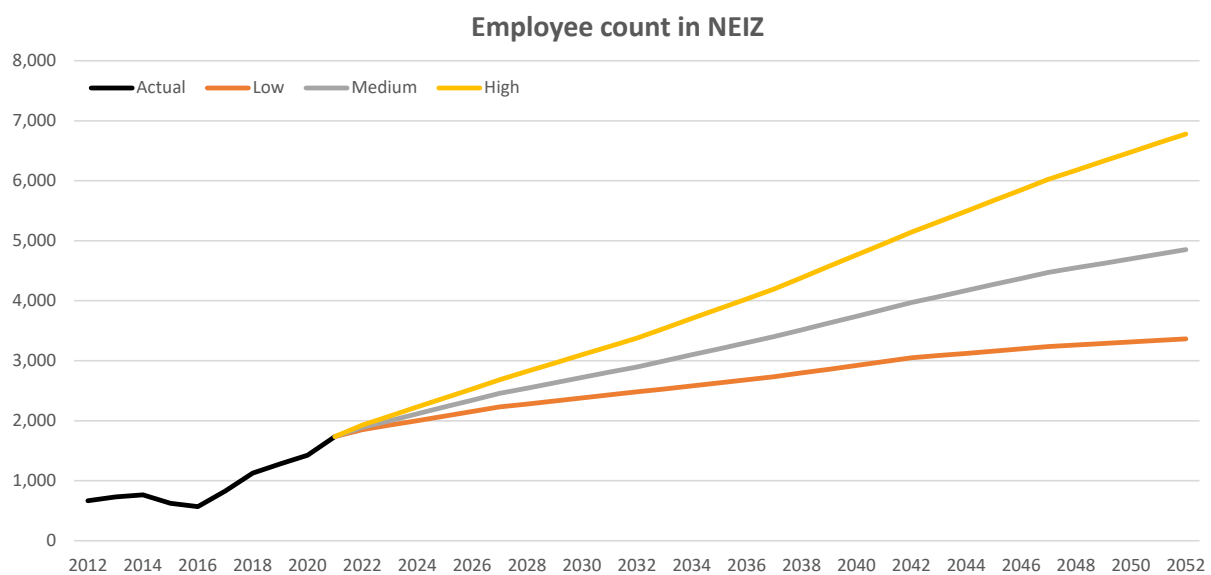
2   Land demand in the NEIZ

The first stage of the forecasting process involved forecasting the demand for land in the NEIZ. The main steps involved in projecting industrial land demand in the NEIZ were:

- Converting the population projections into projections of employee counts in industrial areas based on the long-term relationship described above.
- Allocating 90% of projected growth in employment in industrial areas to the NEIZ. 90% was chosen because the NEIZ is expected to absorb most, but not all, of the growth in industrial employment in Palmerston North. The remaining growth would occur in existing and/or potential industrial zoned areas. Historical employee counts for the NEIZ were sourced from Stats NZ.
- Dividing the resulting employee count projections by the current NEIZ employment density (number of employees per hectare of occupied land) to produce occupied land area projections. The current NEIZ employment density was derived by dividing Stats NZ employee count estimates for the NEIZ by the combined land area of occupied NEIZ land parcels.

The graph below shows the resulting forecasts of NEIZ employee counts under each growth scenario.

Figure 3 NEIZ employee count forecasts
Source: Fresh Info

The graph below shows the resulting forecasts of demand for private land parcels in the NEIZ under each growth scenario. Private land parcels are privately owned pieces of land within the NEIZ that can be used for productive purposes. The remaining NEIZ land will be publicly owned and/or communal e.g. roads, stormwater treatment, greenspaces, public amenity.

Figure 4 NEIZ land demand forecasts (ha)
Source: Fresh Info

NEIZ private occupied land area (ha)
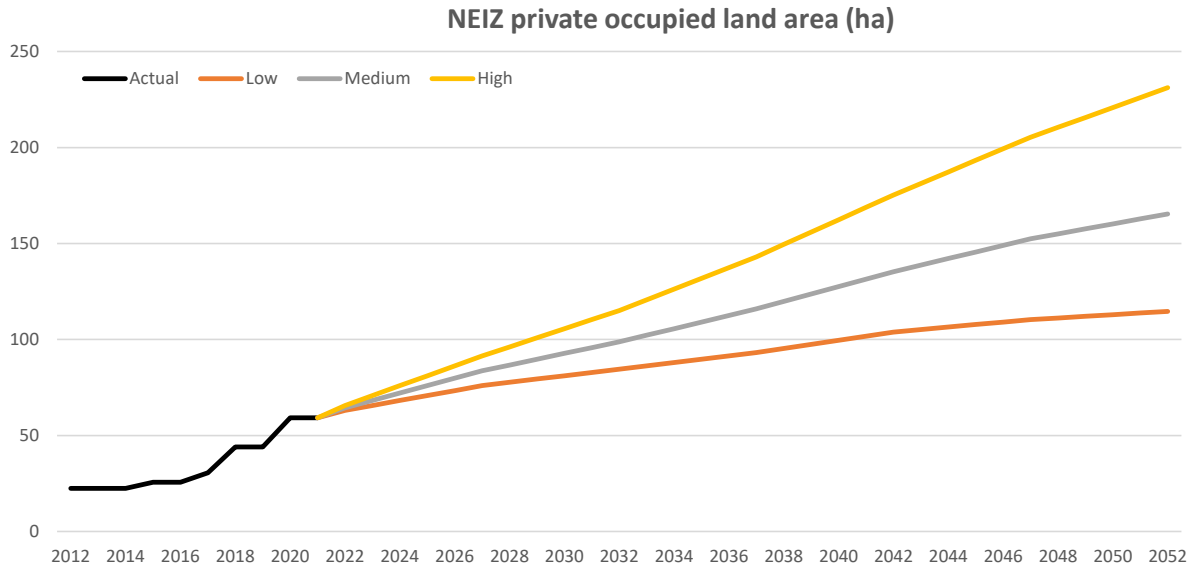
3 Land supply in the NEIZ

The second stage of the forecasting process involved the development of a land release model to predict when, and how much, new industrial land would need to be released to accommodate future growth. The main steps involved in projecting industrial land supply in the NEIZ were:

- Determining an appropriate "trigger" for when new industrial land should be released. Note that "pulling the trigger" represents the actual release of the new land. The planning process that precedes this is likely to take 5-10 years. Land release is triggered in the model when the existing NEIZ supply can only absorb 10 more years of demand, based on the demand scenario selected. 10 years was chosen to retain a sufficient buffer from a planning perspective and limit the impact of scarcity on land prices. This threshold can be changed in the model, if required. Note that the concentration of land ownership in the NEIZ could influence pricing even if land scarcity wasn't an issue. Ownership concentration is beyond the scope of our analysis.
- Determining the quantum of land that should be released when the trigger is pulled. The model defaults to releasing enough land to absorb 20 additional years of NEIZ demand, based on the demand scenario selected. This means that there will be 30 years of land supply in the year the trigger is pulled – the 10-year buffer plus the 20 years of new supply. The 20-year period can be changed in the model, if required.
- Estimating the impact of KiwiRail's freight hub on land supply in the NEIZ. Current estimates indicate that KiwiRail will acquire ~50ha of NEIZ land. However, KiwiRail intends to lease ~15ha of this land to commercial operators, so the net loss of industrial land in the existing NEIZ area is only 35ha. All scenarios remove 35ha of land from the NEIZ in 2022, but alternative scenarios can be run in the model, including the scenario that no land is removed from the NEIZ (i.e. the KiwiRail development does not proceed).

The modelling is based on demand for, and supply of, private land parcels. However, the private land forecasts are then scaled up to gross land area forecasts based on the assumption that 20% of the gross land area will be devoted to public infrastructure and amenity. This results in the gross land area (private and public land parcels combined) being around 25% higher than the private land area.

The graph below shows the resulting forecasts of gross land supply in the NEIZ in hectares under each growth scenario and provides a clear signal of when new NEIZ land will be required.

Figure 5 NEIZ land supply forecasts
Source: Fresh Info

NEIZ gross land area (ha)
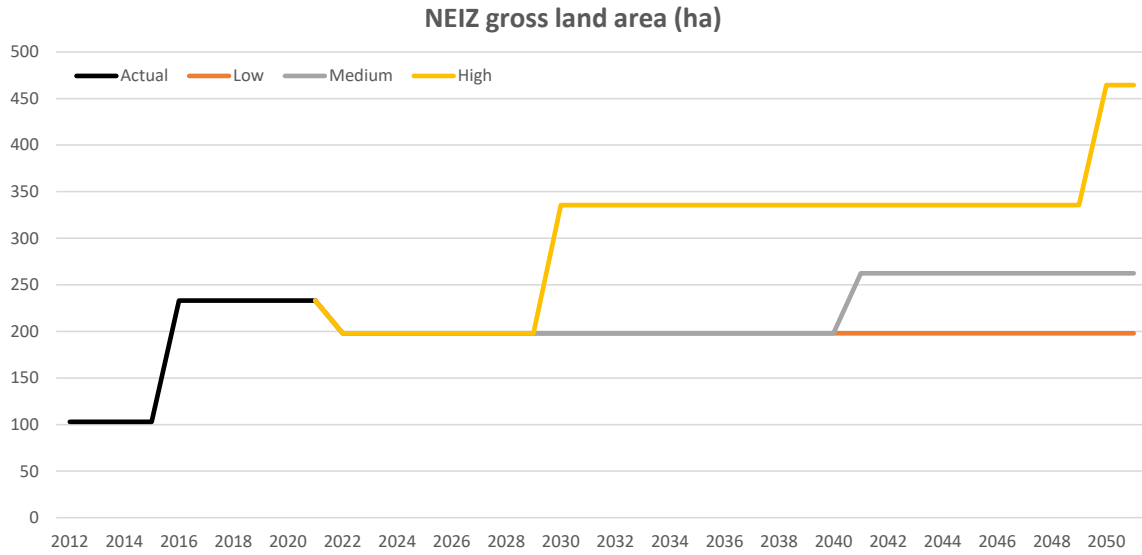
4 Other forecasts

The third stage of the forecasting process involved the development of two derivative measures:

- Site coverage on private land parcels
- Employment composition in the NEIZ

## 4.1 Site coverage on private NEIZ land parcels

The main steps involved in forecasting site coverage on private land parcels were:

- Estimating site coverage on existing occupied private land parcels in the NEIZ using data sourced from PNCC and LINZ. This analysis indicated that 76% of occupied private land parcels were covered in buildings and impermeable surfaces.
- Assuming that average site coverage in the future will be the same as current levels (76%).
- Multiplying the NEIZ private occupied land area forecasts by the average site coverage rate to estimate site coverage on private land parcels in hectares.

The graph below shows the resulting forecasts of site coverage on private land parcels under each growth scenario.

Figure 6 Site coverage on private NEIZ land parcels
Source: Fresh Info
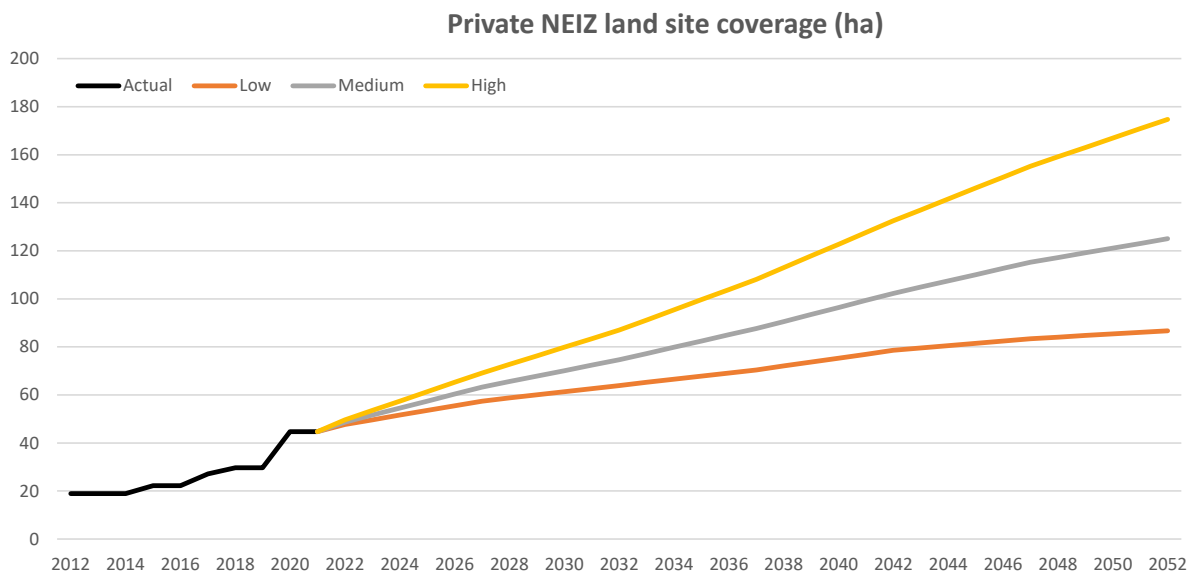
4.2   Employment composition in the NEIZ

The main steps involved in forecasting the employment composition in the NEIZ were:

- Sourcing industry-level employment data from Stats NZ to understand the current composition of employment in the NEIZ.
- Assuming that the future employment composition in the NEIZ will have the same structure as the current composition. This is based on PNCC's current view that the NEIZ should remain a large format industrial area with a strong focus on distribution.
- Imposing the current employment composition in the NEIZ on the employee count forecasts to allocate future growth to specific industries.

The graph below shows the resulting forecasts of employment composition for the medium growth scenario.

Figure 7 Composition of employee count in NEIZ (medium scenario)
Source: Fresh Info
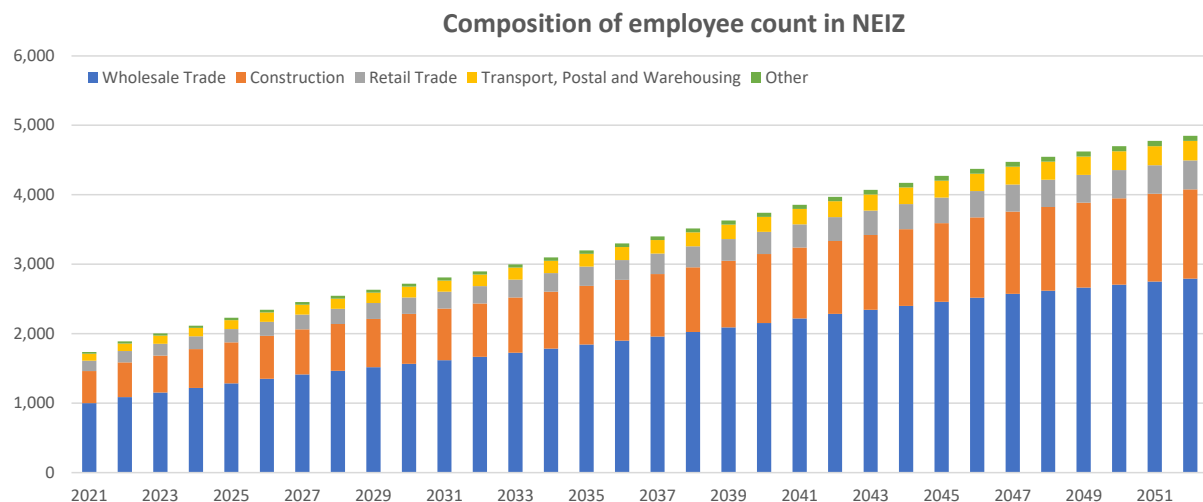
4.3   Palmerston North households

The main steps involved in forecasting the number of households in Palmerston North were:

- Obtaining the latest low, medium, and high household projections produced by Infometrics for PNCC. These aligned directly with the latest population forecasts produced by Infometrics.
- Calculating the average number of occupants per household for each year (population divided by number of households).
- Dividing the selected population scenario by the average number of occupants per household to produce estimates of the number of households required.

The graph below shows the resulting forecasts of Palmerston North households under each growth scenario.

Figure 8 Palmerston North household projections
Source: Infometrics and Fresh Info

Palmerston North households
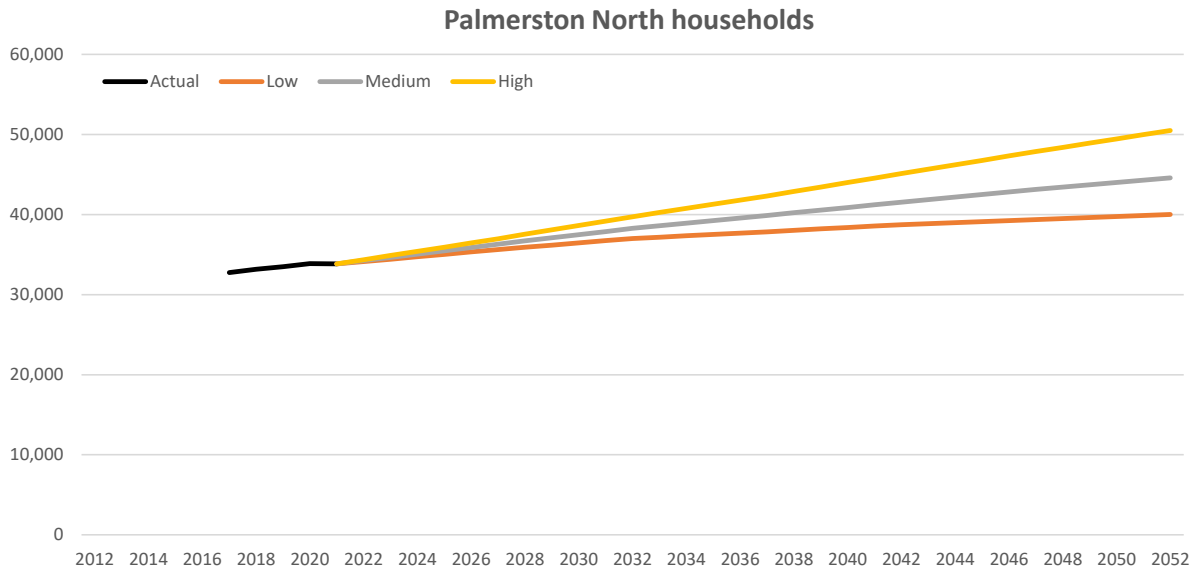
A key benefit of this approach is that it estimates the city-wide housing stock that would be required under each growth scenario. For example, under the low growth scenario around 40,000 households would be required within Palmerston North in 2052, compared with 44,600 under the medium growth scenario and 50,500 under the high growth scenario. This represents an additional 6,200 households under the low growth scenario relative to 2021, 10,700 under the medium growth scenario, and 16,600 under the high growth scenario.

Housing supply analysis contained in PNCC's latest Housing Capacity Assessment Report (June 2021) indicates that around 13,000 new households could be delivered over the next 30 years through various greenfield, infill, and rural/residential developments. This would comfortably accommodate the low and medium growth scenarios of 6,200 new households and 10,700 new households respectively but would fall short of accommodating the high growth scenario of 16,600 new households. PNCC would therefore need to make additional land available for residential development if Palmerston North achieved the high growth scenario.