SENSE PARTNERS
DATA LOGIC ACTION

Review of economic impacts of Plan Change 28

Purpose

I provide expert evidence on the economic impacts that relate to Private Plan Change 28 (PPC28) and the Maitahi Bayview development. I have been involved in the PPC28 since late July 2021.

Scope

This note addresses the economic impacts of the proposed development. Many submissions on PPCD28 raise issues that relate to councils' Future Development Strategy. So my comments include an assessment of these issues.

Comments relate to both the 2019 Future Nelson-Tasman Future Development Strategy and the draft 2022 Future Nelson-Tasman Future Development Strategy, noting the substantial overlap of approach, content and outcomes across the two strategies. Comments span:

- The economic impact of the proposed development including the use of economic multipliers within the CBA analysis provided by the developer.
- Plausibility of the population projections that form demand for housing in the FDS
- Demographic modelling
- Construction of the FDS itself
- Intensification and sequencing

I do not offer comment on consultation with mana whenua, or on broader consultation processes and iwi and hapū aspirations or engagement.

These issues are outside the scope of my expertise. I limit my comments to sections in the FDS on:

- 1. 2019 Nelson-Tasman Future Development Strategy
- 2. Outcomes
- 4. Legislation and National Policy Statements
- 5. Infrastructure
- 6. Spatial scenarios
- 7. Potential development sites and constraints
- 8. Multi-criteria analysis
- 9. Consultation and engagement

Key findings

1. From an economic perspective, the development of the plan change area would result in significant benefits to Nelson and the region. There is a need for additional housing in Nelson and the region and the proposed development would help meet growing demand.

2. The CBA provided by Property Economics could be improved. In particular, the use of multipliers is far from best practice. This overstates the benefits of the construction phase of the development. The costs and benefits of the construction phase of the project are second order relative to the costs and benefits of using the proposed site for housing.

3. The forecasts used in the Future Development Strategies, which underpin councils' assessment of demand for housing, are reasonable and entirely plausible given recent data. Councils would risk significantly risk underestimating housing demand by using Statistics New Zealand's medium projection as an alternative.

4. Nelson City Council could make improvements to the demographic modelling used to inform estimates of housing demand that underpin the HBA and the draft Future Development Strategy.; however, this is beyond the scope of PPC28.

5. Construction of the draft Future Development Strategy is extremely thorough, robust, and wide ranging and in my view, its projections are sufficiently robust to be a relevant consideration or PPC28. The multi-criteria analysis used to identify future development sites is fit-for-purpose. That analysis rightly promotes intensification and sites that connect well to existing transport networks.

6. Councils are right not to consider timing and sequencing of intensification within the FDS. Advice from the Ministry for the Environment makes clear changes between the NPS-UDC and NPS-UD that remove the direction to consider sequencing of development.

Outcomes from expert conferencing

Expert conference on the economics of PPC28 was conducted on April 27, 2022. On behalf of the applicant, Tim Health (Property Economics) participated in the meeting. I participated in the meeting on the behalf of Nelson City Council.

Both economic experts agreed:

- there are no substantive economic issues between them that would undermine the net cost / benefit assessment of the proposal (PPC 28).
- from an economic perspective the development of the plan change area would result in significant benefits to Nelson and the region.
- there is a need for additional housing in Nelson and the region and the PPC 28 area is a good geospatial location close to the Nelson CBD.
- overall, the economic experts agree that it is an appropriate location for urban residential development from an economic perspective.
- there are substantive benefits (additional to the construction phase) to result from the provision of additional housing to the region from urban residential development in this location.

- the quantification of benefits from the construction phase of the project lie somewhere between the cost of construction and the multiplier number provided by Property Economics (Tim Heath) of $170 million (2019 NZD).
- the growth projections used in the FDS 2019 and draft FDS 2022 are reasonable.
- the proposed development would meet the "significant development capacity" test, in the terms of the NPS-UD, to invoke a plan change under policy 8.
- the development would promote competitiveness across housing markets in the region.

Assessment of any outstanding matters

There are no outstanding matters.

Qualifications and expertise

I have PhD in applied economics from the University of Melbourne. I have drawn on my experience over the past ten years as a consultant, engaged by both local and central government on a wide range of local planning issues, land use regulation policies, demand assessment, population forecasts and recent work on the costs and benefits of the new Enabling Housing Supply and Other Matters Bill.

Report author: Dr Kirdan Lees



Dr Kirdan Lees
Partner
Sense Partners
021 264 7336
kirdan@sense.partners

Contents

Review of economic impacts of Plan Change 28 1
1. Population projections 5
2. Demographic modelling 7
3. Construction of the FPS 8
4. Intensification 13
5. Construction phase 15
References 16

Figures

Figure 1 Nelson's LTP forecast is close to Statistics New Zealand high forecast by 2050 5
Figure 2 Tasman's LTP forecast is very close to Statistics New Zealand's high forecast 6
Figure 3 Tasman's population today outstrips Statistics New Zealand's '17 high projection 7
Figure 4: Weighting of criteria for MCA analysis of candidate development sites 11
Figure 5: Maitahi Valley site scored well relative to other sites 12
Figure 6: Roughly half of the new housing is intensification 13

1. Population projections

Population projections

Some submissions argue that the population data that supports the demand side of the housing and business assessment, is not fit-for-purpose (see Monika Clark-Grill and Serge Crottax for example).

The claim is made that population projections are overstated (see section 17.1) and cannot be relied upon to show the intersection where demand for housing exceeds supply.

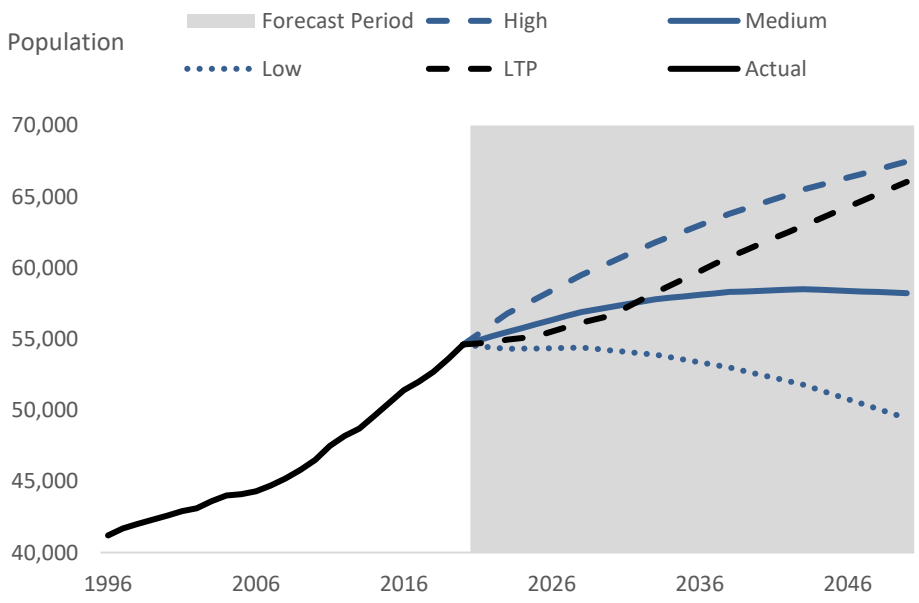
Population projections form a view about the future and are thus inherently uncertain. The question is whether the forecasts form a reasonable basis for planning purposes. The most likely alternative option is Statistics New Zealand's population projections.

Statistics New Zealand released subnational forecasts in the first quarter of 2021 – the first release in four years and projections not available to Nelson or Tasman for the FDS 2019.

Nelson

These projections show the population projection used by Nelson is close to the high projection by the end of the forecast horizon.

Figure 1 Nelson's LTP forecast is close to Statistics New Zealand high forecast by 2050
Population forecast comparison Statistics New Zealand vs Long-term Plan: Nelson

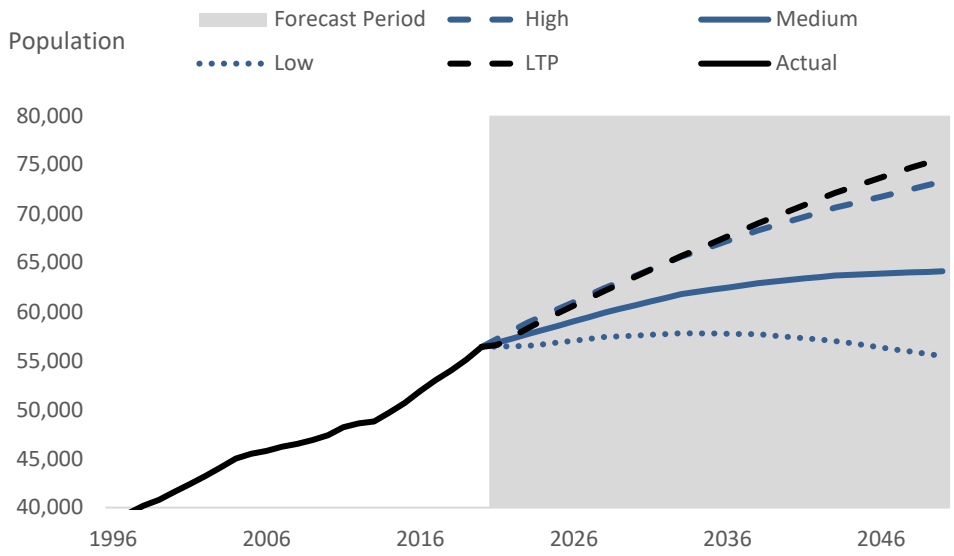


Nelson's population growth was flat between June 2020 and June 2021, consistent with the FDS population projection.

Tasman

Like other councils, Tasman has adopted a forecast close to Statistics New Zealand's high projection (see Figure 2).

Figure 2 Tasman's LTP forecast is very close to Statistics New Zealand's high forecast
Population forecast comparison Statistics New Zealand vs Long-term Plan: Tasman



Recent population data for 2021 shows strong population growth despite border closures that set inward migration essentially to zero. Tasman's population grew 1.58% in 2021 – growth consistent with the FDS forecast.

Recent data suggests the FDS projections are reasonable

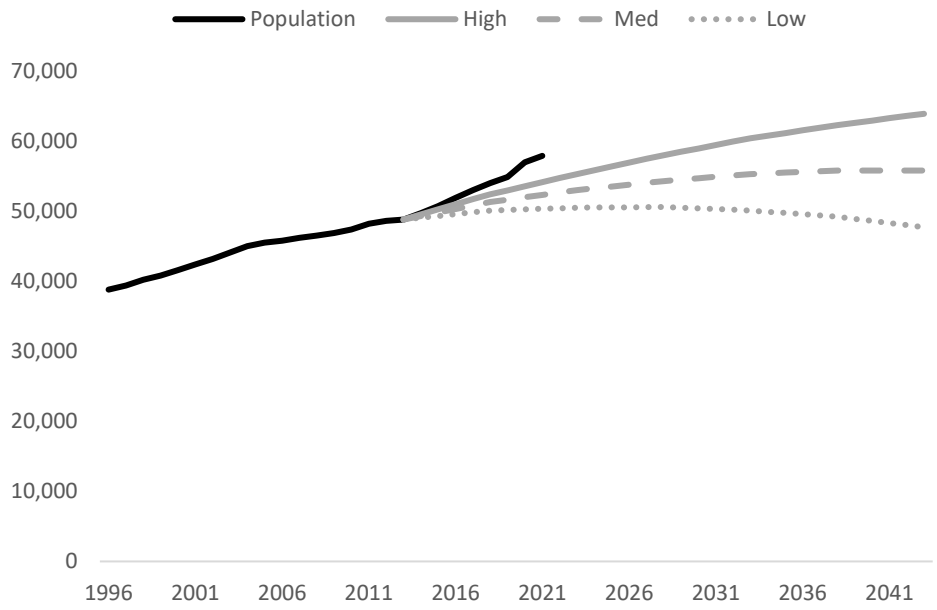
Unfortunately, Statistics New Zealand does not attach a likelihood to each of the low. medium and high population projections. The projections merely reflect choices on underlying parameters that results in low, medium or high population projections.

To test the reasonableness of the FDS population projection it is useful to show actual population relative to recent population growth.

The last set of projections produced by Statistics New Zealand four years prior in 2017 suggested councils should expect low growth. Figure 3 shows Tasman's population today far outstrips Statistics New Zealand's high projection.

Even in 2043, the medium projection does not reach today's population in Tasman. This suggests adopting a forecast close to a medium projection would generate substantial risks to Long-Term Plan.

Figure 3 Tasman's population today outstrips Statistics New Zealand's '17 high projection
Population forecast comparison Statistics New Zealand vs Long-term Plan: Tasman



Population outcomes for Nelson City Council are close to the high projection. So adopting a population projection close to the high option provided by Statistics New Zealand, appears reasonable and unlikely to overstate population growth.

2. Demographic modelling

Adopting a rates-based approach could hold some improvements

Some submissions question the modelling used by councils to construct population forecasts. For example, Natalie Jackson and Geoffrey Hayes note that the methods used to generate the population projection are not consistent with standard demographic methods.

These methods typically use a cohort component equation to map the population for each age group measure by year:

$$P_{t+1} = P_t + B_t - D_t + (I_t - E_t) \quad (1)$$

where P_{t+1} is the population in the next period that depends on births, B_t, deaths D_t, and net migration $(I_t - E_t)$.[1],[2]

Natalie Jackson points that rather than adopt standard practices and work in terms rates, that is, the propensity of a population to die or have a child, Nelson's population forecast often refer to absolute number of births and deaths rather than adopt a rates-based approach.

[1] When combined with cohorts, equation supports the Leslie 1945 matrix provides a complete map of the population by age.
[2] Other approaches are possible (see Burch 2018 for example).

But Statistics New Zealand use a numbers-based approach to forecast net migration rather than establish migration as a propensity for the population.

In recent years, Statistics New Zealand has underestimated net migration to New Zealand. Migration is almost always an economic decision, so a rates-based or propensity approach could be helpful to improve these projections. Likewise, sheeting home the number of births to a fertility rates and modelling deaths in terms of a mortality rate would likely improve the accuracy of the population projection.

However, it is far from clear that the population projection Nelson City Council have adopted is any less accurate that either the medium or high projection from Statistics New Zealand. Indeed, given the speed of population growth across the urban area, adopting a medium growth projection appears very risky.

Stochastic projections

What is really needed are stochastic forecasts that assign likelihoods to each forecast. This then allows planning to be conducted on the risk associated with different population projections.

For some years, Sense Partners have produced population forecasts based on a probabilistic model that is simulated hundreds of times, with each simulation producing a separate population forecast. In each simulation the key assumptions on rates of fertility, mortality and migration are varied randomly but in proportion to observed variation in the values of these parameters.[3]

Probabilistic population forecasts such as these have many benefits. For example, the risk of population growing more strongly than expected can be quantified.[4]

But many of the criticisms levelled at Nelson City Council's population projections by submissions could be raised in regard to Statistics New Zealand's forecasts.

Since there is no stochastic process that sits behind the low, medium and high projections, the likelihood of each of these projections cannot be evaluated. So councils are effectively being held to a higher standard the projections produced by Statistics New Zealand.

Given recent growth outturns for the region have outpaced even the high projection, it's not surprising councils have chosen to adopt a modelling strategy different to Statistics New Zealand and one based on more up-to-date data.

3. Construction of the FPS

Context

[3] Sense Partners modelling includes extensive use of sub-models for estimating population characteristics, due to important gaps in official statistics, particularly regarding households and dwellings. Our forecasts have been peer reviewed by Emeritus Professor Jacques Poot and Associate Professor Michael Cameron. So it is not clear why forecasts from consultancies or council staff are inappropriate *per se*.

[4] See Lee and Tuljapurkar 1994 and Raftery et al. 2012 for example.

The function of the FDS is to assist both Nelson and Tasman councils to establish the vision for the shared urban area at a high level. The purpose of the FDS is to provide a basis for integrated long-term planning including not just district plan and private plan changes, but also funding of long-term infrastructure strategies including regional transport plans.

One of the key tasks is to set out a vision of how and where capacity should respond to demand for housing and business land identified through Housing and Business assessments. This work programme identifies strong rates of population growth that is expected to continue to put pressure on the existing housing stock.

The population of the joint Nelson-Tasman urban area is expanding rapidly placing pressure on the cost of housing.

Tasman District is one of the fastest growing councils. This growth should be expected to continue although there are uncertainties about the pace of growth. The impact of COVID-19 and potential changes to migration policy could lower national population growth and hence population growth in the shared urban area a little. But recent population growth continues to be strong. Internal domestic migration growth favours Tasman and Nelson over other regions.

The community is expected to continue to grow older. On average, this decreases the number of people expected to live within each house. The dual pressures of population growth and ageing suggest the need to provide an additional 21,000 homes under a medium growth scenario and an additional 29,000 homes under a high growth scenario that is robust to strong population growth.

To help the programme of outreach and consultation with the local community decomposing the impact of the twin demographic drivers – ageing and population growth – on the need for additional housing could be useful.

The Nelson-Tasman draft FDS proceeds in 5 clear stages.

Stage 1 – Strategic opportunities and constraints

Stage 1 addresses sites identified as opportunities for development for either housing or business land. These opportunities are sensibly identified from the previous FDS from 2019 and from engagement with the developer community, local landowners and residents who had the opportunity to propose sites.

Some 148 sites in Tasman and 41 in Nelson are identified as potential opportunities. My assessment is that a broad range of sites are identified as candidate sites for development. Looking through the GIS viewer, I cannot identify large sites that are not present.

The FDS process then steps through constraints on development including from natural hazards, landscape, the natural environment, culturally sensitive sites and infrastructure. Gap analysis presented in table 2 on page 24 of the report suggests data supports a more fulsome and up-to-date treatment of some constraints than others. For example, Nelson provides slope instability data across the district while Tasman District Council provides a more limited dataset.

However, given the location of candidate sites for development the paucity of data for some aspects of natural hazards identification appears less material that for other regions.

Accessibility of sites is also thoroughly mapped across different transport modes and to a variety of destinations, spanning access to daily needs, jobs, schools and other amenities, for each candidate location. This information is then summarised to a five-point scale. This data heavy analysis is sophisticated and helps support the FDS assessment.

Stage 2 – Analyse opportunities, develop spatial strategies, test with stakeholders

Stage refined the methodology for site assessment that include the multi-criteria framework that was subsequently applied to many sites.

Multi-criteria analysis is a standard tool used to develop Future Development Strategies across many councils. The analysis within the draft FDS is consistent with approaches taken at other councils. The analysis is transport, clearly setting out:

I. the criteria for assessment,
II. the weighting of each criterion
III. the assessment of each development opportunity.

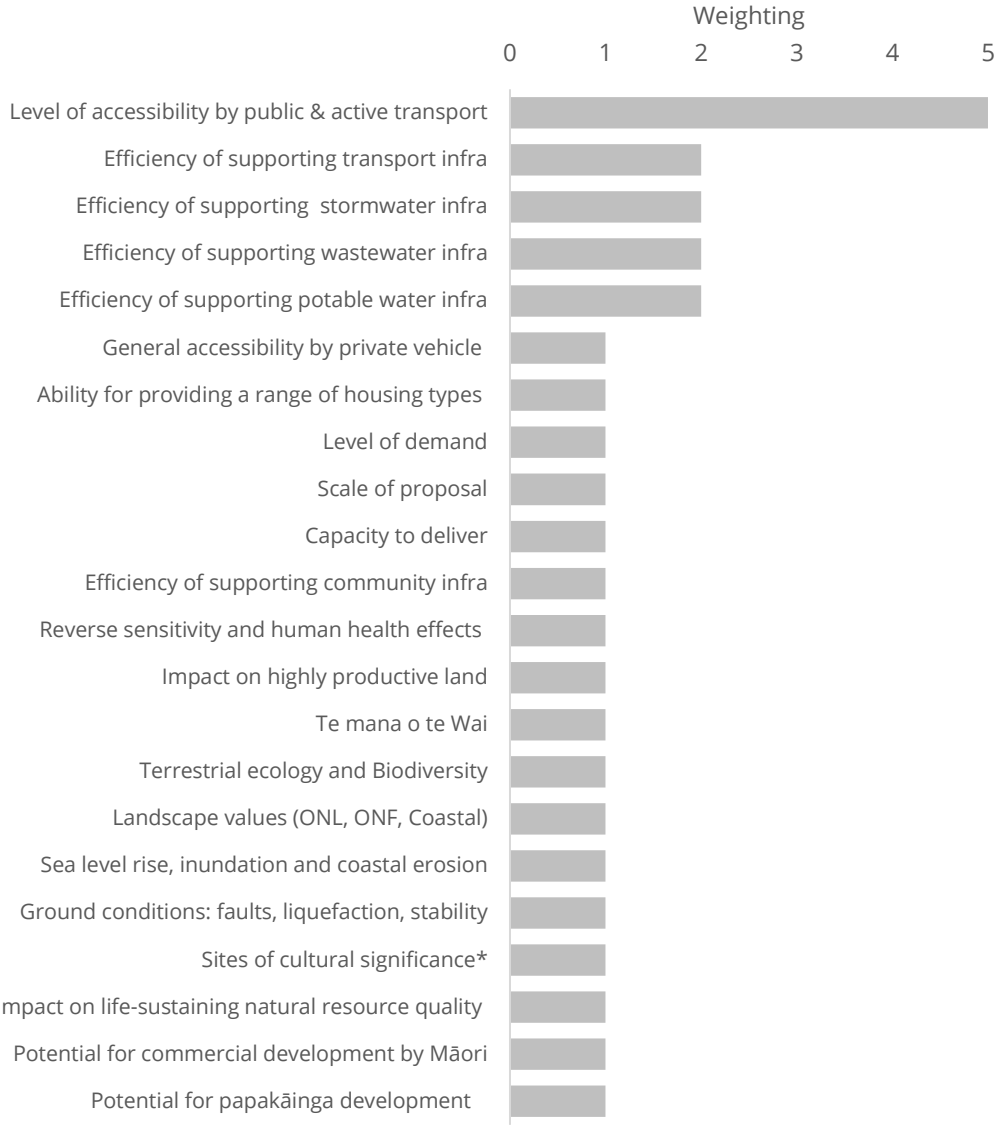
Many submissions point to the lack of access to potential development at the Maitahi Valley candidate sites. But accessibility by public and active transport modes takes the highest weight in the multi-criteria analysis (see Figure 4).

Many submissions also pointed to the lack of existing infrastructure within candidate development sites in the Maitahi Valley. But the multi-criteria analysis contains several measures that capture efficiency of infrastructure including separate criteria for transport, stormwater, wastewater and potable water.

The multi-criteria analysis puts substantive weight on both lack of access to public and active transport modes and efficiency of infrastructure relative to other criteria. It also places higher weights on this criterion than other MCA criteria in place at other councils (see for example the Housing and Business Assessment for Wellington City Council 2019 and Rotorua Lakes Council).[5]

[5] See Wellington City Council 2019 and Market Economics 2021.

Figure 4: Weighting of criteria for MCA analysis of candidate development sites
Stylised representation of private demand, private and social supply cost curves

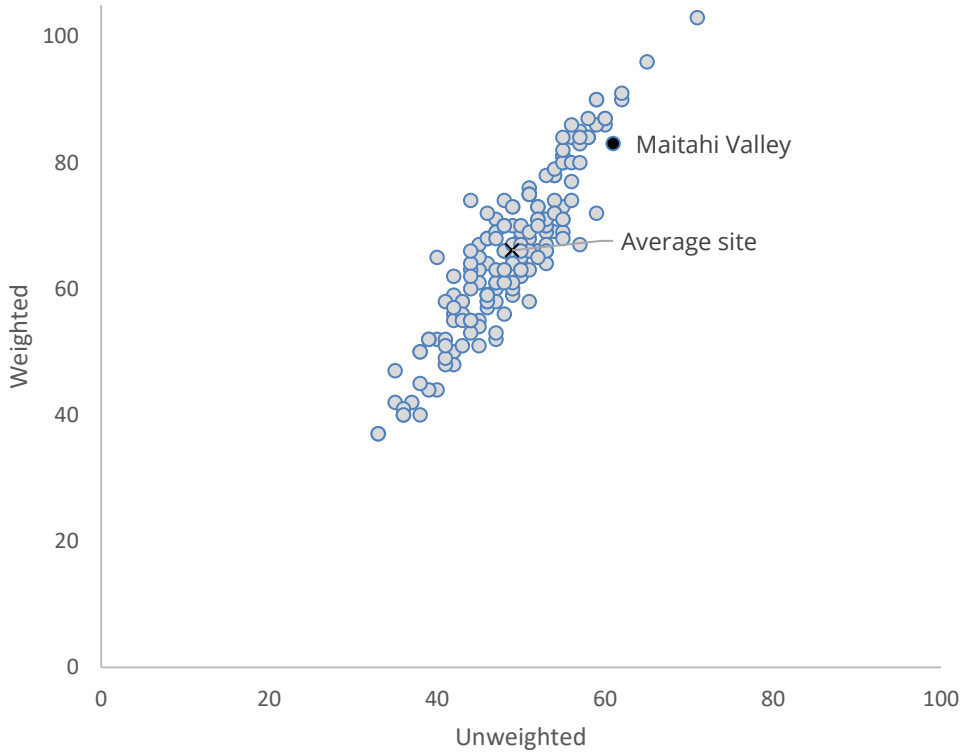


Stage 3 – Assess sites and draft recommended spatial strategies

This stage of the FDS refines site assessments and develops the spatial strategy and where development is expected to occur. With respect to the Maitahi Valley PC 28 scored well relative to range of sites. This was true for both the weighted and unweighted scores.

Figure 5 shows the outcome from Maitahi Valley PC 28 relative to other sites. Maitahi Valley also scores more highly than the average site considered so should be considered to be within reasonable sites for future growth even with medium forecasts of growth. Relative to other sites, Maitahi Valley PC 28 scores well on scale of development and reverse sensitivity.

Figure 5: Maitahi Valley site scored well relative to other sites
Weighted and unweighted MCA scores



Stage 4 – Refine growth areas

Stage 4 of the FDS looks to refine the spatial scenarios. This work includes adding additional details on infrastructure and transport routes. Many submissions point to a lack of detail on transport routes. But active and public transport is included as a key criterion in the MCA analysis. And the draft FDS sets out what is possible to know at this point ahead of take up in development capacity. Indeed, it is a requirement of the NPS-UD that the FDS identifies spatially the infrastructure needed to support future development.

The spatial scenario captured in the core proposal includes additional PT in the existing urban area and to the south and acknowledges the need for significant new infrastructure investment.

Refinements of the spatial scenario can help the FDS mitigate and adapt to climate change. Mitigating greenhouse gas emissions is assisted by locating much new development close to the current urban form and existing transport links. Adaption is addressed via planning for flood risk that re well documented in the draft FDS.

Both councils plan significant public consultation at this stage for the draft FDS.

Stage 5 – Updating the FDS based on submissions

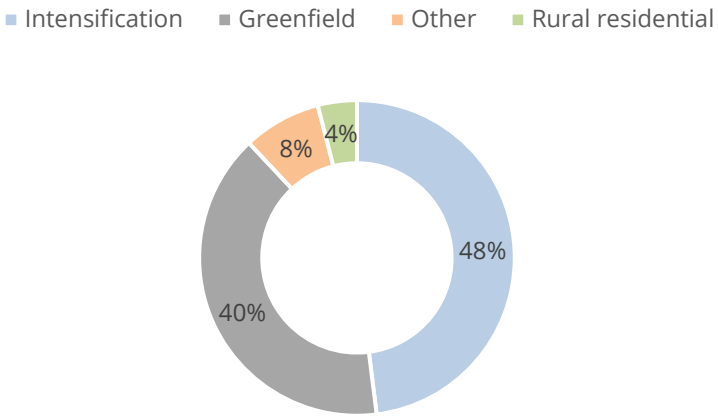
A final stage allows for revision to the FDS based on public submissions.

4. Intensification

The FDS multi-criteria analysis identifies many sites for intensification

Many of the submissions suggested that the Maitahi Valley development should be deferred until intensification takes places closer to established sites with Nelson and Tasman.[6] Figure 6 shows that much of the new capacity identified under the FDS is intensification.

Figure 6: Roughly half of the new housing is intensification



This is not surprising. One of the criteria within the MCA relates to intensification.

Sequencing

But it is also worth noting the FDS cannot consider sequencing and needs to respond to market dynamics, as instructed under the NPS-UD.[7]

Many of the submissions suggested that the Maitahi Valley development should be deferred until intensification takes places closer to established sites with Nelson and Tasman.

But the FDS cannot consider sequencing as outlined in the draft NT-FDS and allows for out-of-sequence private planning changes:

> "The draft NTFPS does not include sequencing of timing for when growth areas will be rolled out over the next 30 years, given the need to be responsive to changing market dynamics in the NPS-UD 2020. This is one of the differences between the NPS-UDC and the NPS-UD."

This is based on policy 8 of the NPS-UD:

---

[6] Section 17.2 of Monika Clark-Grill is one example.
[7] See Ministry for the Environment 2020, Appendix 1 which states that timing and sequencing has been removed in the NPS-UD. The clause PC13: that required the FDS to "balance the certainty regarding the provision of future urban development with the need to be responsivew to demand for such development".

> "Local authority decisions affecting urban environments are responsive to plan changes that would add significantly to development capacity and contribute to well-functioning environments, even if the development capacity is unanticipated by RMA planning documents, or out-of-sequence with planned land release."[8]

Thus the FPS needs to allow for market dynamics, including as instructed under the NPS-UD.

This is different to the NPS-UDC that specifies:

> "Local authorities shall produce a future development strategy which demonstrates that there will be sufficient, feasible development capacity in the medium and long term." – (PC12)

Language on sequencing has been dropped from the NPS-UD. Instead, the NPS-UD increases focus on promoting intensification but not the timing of intensification.

This point is missed by some submitters. For example Waka Kotahi state:

> "The timing of any greenfield development in the Nelson Tasman region is critical to ensure that intensification of existing urban areas is attractive, affordable and the 'first stop' for provision of residential housing. Waka Kotahi acknowledge that intensification alone cannot meet the demand for housing in the region, therefore any greenfield development needs to be timed appropriately, and staged, with priority given to high density residential housing close to existing urban areas and the associated infrastructure and services."

While timing and sequencing may have been considered by councils under the NPS-UDC, this is not possible under the NPS-UD.

[8] This requires councils to form a view on the significance of development capacity that the NTFPS captures within the multi-criteria analysis that weights significance of added capacity.

5. Construction phase

Property Economics 2021 provide a high-level cost-benefit analysis of the project. Property Economics provide their own qualitative score assessment of the costs and benefits.

One aspect that underpins the benefits is the impact on the local economy of the construction phase of the project. Table 5 suggests impacts for the region of $170 million.

But this estimate relies on multiplier analysis that overstates the impact on the local economy. The report shows that these benefits are the sum of:

- Direct construction cost *times* 'Construction multiplier' *plus*
- Direct development cost *times* Development multiplier *plus*
- Direct increased commercial spending x 'Commercial multiplier' *plus*
- Indirect business spend x 'Commercial multiplier' *plus*
- Induced retail spending x 'Retail multiplier'

But multiplier analysis suffers from a key problem. It assumes that extra output can be produced in one part of the economy without taking resources away from another part of the economy: there are only so many resources to use.

By way of analogy, if I spend $150 in Nelson city on Friday night, that money might flow the local economy, through the profits of restaurant and bar owners and the workers they pay. But income is fixed so that $150 represents $150 not spent, either at a different location or at a different time.[9]

Multiplier or input-output analysis has been discredited for serious economic analysis. It is not part of the standard CBA-x tools Treasury provide for conducting CBA analysis for example.

This means the benefits in terms of the construction phase are likely to be overstated and shouldn't be used to support Private Plan Change 28.

[9] See https://www.pc.gov.au/research/supporting/input-output-tables/input-output-tables.pdf for an explanation of the weaknesses of multiplier analysis. It notes "claims that jobs 'gained' directly from the cause being promoted will lead to cascading gains in the wider economy… fail to consider the opportunity cost of both spending measures and alternate uses of resources and may misinform policymakers".

References

Burch, T K 2018 “The Cohort-Component Population Projection: A Strange Attractor for Demographers”. In: Model-Based Demography. Demographic Research Monographs. Springer, Cham. https://doi.org/10.1007/978-3-319-65433-1_10

Future Development Strategies 2020”, Ministry for the Environment: https://environment.govt.nz/assets/Publications/Files/FDS-Fact-sheet-updated.pdf

Lee, R D, S Tuljapurkar, 1994 “Stochastic population forecasts for the United States: Beyond high, medium, and low”, *Journal of the American Statistical Association*, 89 pp. 1175-1189

Leslie, 1945, “On the use of matrices in certain population dynamics”, *Biometrika*, 33 pp.183-212

Market Economics 2021, “Housing and Business Development Capacity Assessment”, Prepared for Rotorua Lakes Council and Kāinga Ora

Ministry for the Environment 2020, “National Policy Statement on Urban Development 2020”, Ministry for the Environment: https://environment.govt.nz/assets/Publications/Files/FDS-Fact-sheet-updated.pdf

Property Economics 2021, “Maitahi Bayview Project No: 51877, Economic Cost Benefit, February, Client: CCKV Maitai Dev Co LP and Bayview Nelson Limited

Raftery, A.E., Li, N., Ševčíková, H., Gerland, P. & Heilig, G.K. 2012. “Bayesian Probabilistic Population Projections for All Countries”, *PNAS*, 109, 13915– 13921.

Wellington City Council 2019, “Housing and Business Development Capacity Assessment” Wellington City Council, November.