Before the Independent Hearings Panel
at Waimakariri District Council

under: the Resource Management Act 1991

in the matter of: Proposed private plan change RCP31 to the Operative Waimakariri District Plan

and: **Rolleston Industrial Developments Limited**
Applicant

Supplementary Statement of Evidence of Gregory Michael Akehurst

Dated: 5 September 2023

Reference: JM Appleyard (jo.appleyard@chapmantripp.com)
LMN Forrester (lucy.forrester@chapmantripp.com)

chapmantripp.com
T +64 4 499 5999
F +64 4 472 7111

PO Box 993
Wellington 6140
New Zealand

Auckland
Wellington
Christchurch

chapman tripp

SUPPLEMENTARY STATEMENT OF EVIDENCE OF GREGORY MICHAEL AKEHURST

1 My full name is Gregory Michael Akehurst. My qualifications and experience are outlined in my evidence in chief.

2 I have been asked to provide this supplementary statement of evidence to respond to Mr Rodney Yeoman's answers to specific questions put to him covering the operation and assumptions that underpin the Waimakariri Capacity for Growth Model 2022 (WCGM22) and the estimates of capacity and residential sufficiency that flow from that model.

3 The questions are contained in; Minute 5: Questions for Mr Yeoman, dated 15 August 2023 issued by the Independent Hearing Panel. Mr Yeoman's response was received on 18 August 2023.

RESPONSE TO MR YEOMAN'S ANSWERS

4 The Applicant (along with the Independent Hearing Panel) has put forward 15 questions to Mr Yeoman to clarify assumptions and outputs from the WCGM22, that drives his advice to Council that PC31 be declined on the basis that the additional capacity it would provide is not needed.

5 I have focused on his answers that relate to the medium term estimates of capacity, because it is in the medium term where the applicant's development has the potential to address any shortfalls in capacity identified. Mr Sexton's memorandum and Mr Walsh's memorandum (the latter being Annexure A to Mr Sexton's) highlights a number of inherent errors in the modelling, and whilst the focus of that analysis is on the medium term, those errors would also affect the validity of the long-term estimates.

6 At stake is WDC's compliance with the NPS-UD. The margins in the medium term as modelled by Mr Yeoman, are very thin. The WCGM22 informed by the HDCA[1] has identified a surplus of just 350 dwellings (capacity of 5,950 versus demand plus margin of 5,600) in the medium term (2022-2032). I do note that Mr Yeoman has revised this margin down in response to the initial round of errors identified.

7 Under the NPS-UD (clause 3.7), if a Council fails to allow for sufficient development capacity, it must:

7.1 Immediately notify the Minister for the Environment, and

[1] Christchurch Housing Development Capacity Assessment", March 2023, Table 1.

7.2 Change any RMA documents where these are wholly or partially responsible for the shortfall as soon as possible, and update any other relevant plan or strategy (such as any future development strategy), and

7.3 Consider other options for:

(a) increasing capacity; and

(b) otherwise enabling development.

8 Given the slim margin of capacity over demand identified in the medium term, it only requires a shift of less than 5% for WDC to be in deficit in terms of providing sufficient capacity to cater for residential growth in the medium term (to 2033).

9 Therefore, the first question put to Mr Yeoman was:

> "*For the Medium Term:*
>
> *Provide a breakdown of the total amount of greenfield capacity (with each subdivision listed, its location and total number of lots/capacity counted for that subdivision). It would assist the hearings panel to have these identified on the relevant planning maps in the operative district plan."*

10 This question asks for more of the detail that sits underneath the raw measures of capacity provided in his evidence in chief.

11 Mr Yeoman, provided a table on Page 3 of his response[2] outlining in more detail, his response to the above question, along with this statement:

> *"I note that for most instances the WCGM22 underestimates capacity compared to developer intentions. In total developer intentions suggest that 136 more dwellings could be built compared to the WCGM22 estimate."*

12 However, as outlined in the memorandum of Mr Chris Sexton attached as **Appendix 1** (and in the memorandum of Mr Walsh which is appended to Mr Sexton's memorandum), the estimates in Mr Yeoman's table are not accurate. As I understand it, every significant development listed in M r Yeoman's table has been visited by Mr Sexton to assess the degree to which identified capacity has already been consumed, and to validate (or otherwise)

[2] Minute 5: Questions for Mr Yeoman – Response, Page 3, Table titled, "*Waimakariri Urban Environment Medium Term Capacity – WCGM22 and Developer Intentions"*

Mr Yeoman's estimates of additional capacity and developer intentions.

13 This has been further supported by a desktop assessment using GIS to remove parcels of land set aside for other purposes that may also have been included as residential capacity (including recreational reserves, council facilities, heritage buildings, pre-schools and churches among other things)[3].

14 Mr Sexton's figures are very different from Mr Yeoman's. As I understand it the differences arise from a combination of:

14.1 Removal of parcels of land that cannot be developed or intensified in a way that provides additional residential capacity (as per the list within Mr Sexton's memo);

14.2 Adopting yields in publicly available and consented subdivisions, masterplans or similar;

14.3 For greenfield land that is not subject to consented subdivision plans (as above), overestimating the capacity by:

(a) Failing to identify and remove sufficient land for stormwater mitigation and for commercial purposes, where 12.5% of gross site area or 'raw land' should be excluded for this purpose as a first step, prior to assessing the capacity of the remaining land;

(b) Underestimating the extent of land required for infrastructure. As detailed in Mr Walsh's memorandum, the amount of land removed that transforms raw land into developed sections varies. Work carried out by Harrison Grierson for the Greater Christchurch Partnership across a number of developments returned an average reduction of just over 40% for infrastructure, which can be compared to Mr Yeoman's allowance of 25%;

(c) Potentially applying incorrect minimum densities to greenfield areas, rather than the 15 households/hectare ratio as per CRPS definition of 'net density' or the 500m^2 average lot size as specified in the HDCA.

15 In infill areas, Mr Sexton's reassessment of potential capacity has removed parcels that have certain attributes meaning that infill is

[3] A full listing of parcel types removed is contained in Mr. Sexton's memo, *Review of Formative WCMG22 Development Model*.

unlikely. This includes for reasons such as existing building position and living space location and requirements.

16 Land where capacity has been understated has also been identified and included.

17 The key finding from Mr Sexton's exercise is that the WCGM22 has overstated residential capacity, realistically realisable and commercially feasible in the medium term by **1,573 dwellings** (Figure 1).

18 This means that instead of providing just sufficient capacity to meet short- and medium-term needs, WDC now finds itself some 1,239 dwellings short (5,934 – 1,573 = **4,361 capacity** compared with 5,600 anticipated growth, plus competitive margin).

19 Instead of having more than 10 years capacity identified, Waimakariri District has less than 8.

Figure 1: Reassessment of WDC Medium Term Residential Capacity, Aug 2023

Location	WCGM 22 Capacity per Mr Yeoman's Minute 5 response	Validated Capacity (Based on subdivision plan)	Validated Capacity (Gross area - 12.5% x 15hh/ha)	Difference in Capacity (Validated vs WCGM22)
Rangiora:				
Bellgrove	**952**		800	**-152**
Townsend Fields	**419**		370	**-49**
Summerset Retirement Village	**211**		182	**-29**
Flaxton Village	**59**		52	**-7**
East Rangiora	**76**		66	**-10**
Kaiapoi:				
Beach Grove	**332**	330		**-2**
Silver Stream	**89**		65	**-24**
Future Silver Stream	**44**		41	**-3**
The Sterling	**137**		90	**-47**
Momentum	**116**		0 (not med term)	**-116**
Woodend/Pegasus:				
Ravenswood	**969**	677		**-292**
Commons Lifestyle Village	**131**		114	**-17**
Woodland Estate	**104**	75		**-29**
Eders	**42**		45	**+3**
Parsonage/Gladstone Road	**148**		119	**-29**
Gladstone South	**18**		73	**+55**
Pegasus	**369**	86		**-283**
Vacant/Infill	**WCGM 22 Capacity per Mr Yeoman's Minute 5 response**	**Validated Capacity (desktop and site inspections)**		**Difference in Capacity (Validated vs WCGM22)**
Rangiora Vacant lots	**379**	248		**-131**
Rangiora infill	**355**	270		**-85**
Kaiapoi Vacant lots	**277**	174		**-103**
Kaiapoi infill	**292**	273		**-19**
Woodend/Pegasus Vacant lots	**413**	209		**-204**
Woodend/Pegasus Infill /intensification	**2**	2		**0**
Total Medium Term Household Capacity	**5934**	**4361**		**-1573**

ROLE OF PC31 – ŌHOKA

20 In light of the shortfall situation that WDC finds itself in, it must (after informing the Minister for the Environment) change RMA documents partially or wholly responsible for the shortfall, and explore options to increase capacity (as per the requirements under the NPS-UD).

21 The findings outlined in Figure 1 are in line with the range of estimates I presented in my evidence in chief. Therefore, the conclusions I reached in that evidence still stand.

22 The main conclusion being that WDC must be responsive to PC31 and particularly so in light of the fact that WDC has not provided sufficient capacity to meet anticipated growth over the next 10 years (4,670 households) – let alone anticipated growth plus a competitive markets margin (an additional 20% or 5,600 in total) as required under the NPS-UD.

23 In response to question 5 of Minute 5 which reads,

Confirm whether or not you have included

a) Commercial Areas

b) Preschools/day-care centres, or,

c) Kainga-Ora, Ngai Tahu or Retirement Villages

24 Mr Sexton's memorandum identifies the (incorrect) inclusion of commercial areas and preschools within the WCGM22.

25 In regards to non-commercial developers such as Kainga-Ora, Ngai Tahu or Retirement Villages, Mr Yeoman responded by saying that, in the main part these providers and the land they control have been excluded from his assessment. In his opinion, this means that the WCGM22 underestimates "*and that total capacity that is actually developable will likely be in the range of 5% - 10% higher than modelled*".

26 It is not entirely clear what Mr Yeoman is referring to with his 5% - 10% additional capacity comment. It may relate to the land controlled by Retirement village developers, Kainga Ora and Ngai Tahu. That is, these non-commercial sector developers may achieve 5% - 10% more on their land than a commercial developer building general dwelling stock.

27 Alternatively, he may be referring to the fact that, in total the model under counts actual capacity by 5% - 10% because of the densities these non-commercial developers may achieve.

28 If the first interpretation holds, then the overall effect on total capacity will be very small. If retirement village operators, Kainga Ora and or Ngai Tahu achieved higher densities on their specific sites the effect overall on WDC capacity would be inconsequential.

29 Secondly, the estimates of difference seem vague and not based on actual researched figures, making the estimates subjective. It

would require knowing how much land is held by the listed entities, and their development plans.

30 If the second interpretation holds, and Mr Yeoman is saying that overall, the WCGM22 under counts capacity by between 5% - 10% based on these specific non-commercial developers achieving higher densities, then regardless of the speculative nature of the estimates – it is not sufficient.

31 Waimakariri District needs close to **30% additional capacity** in the medium term to meet the requirements of the NPS-UD given the issues identified.

32 I also note Mr Sexton's memorandum identifies a number of these sites where development has already been completed and no further capacity exists.

SIGNIFICANCE OF CAPACITY – TRAFFIC ASSESSMENT THRESHOLDS

33 As I understand it, the joint witness statement for traffic experts has identified a number of thresholds beyond which various intersection upgrades may be required.

34 Based on Mr Walsh's further evidence (and the memorandum from Mr Fuller that he refers to), I understand that development of up to 250 dwellings can readily occur, without any notable constraints. Beyond 250 dwellings, a consent process is required that considers the safety and capacity of intersections in the vicinity that may require upgrades in response to traffic from PC31. On this basis, as a minimum, PC31 will provide household capacity for at least 250 dwellings.

35 WDC's Section 42A reporting officer has indicated that this may mean that the development no longer offers significant development capacity, given that there is a degree of uncertainty about reaching the total potential of 850 dwellings.

36 I disagree and consider that 'significance' is relative to the scale of the issue at hand. The greater the shortfall between supply and demand, the greater the amount of significance developments of this scale have.

37 In light of the identified shortfall of 1,239 dwellings (growth plus margin of 5,600 – capacity of 4,361 = 1,239), development capacity of 250 is significant. Capacity of 450 is also significant while the 850 maximum capacity is very significant as it is equivalent to approximately three quarters of the identified shortfall.

38 Even with the full PC31 capacity developed and in the market, WDC will have to find almost half as much supply again on top of what it has already identified in order to simply meet the minimum requirements under the NPS-UD.

39 This means that in spite of Mr Yeoman claiming his assessment presents a conservative picture of capacity, and that there is therefore, no requirement to grant consent to PC31, his numbers once adjusted for errors and oversight, leave WDC significantly short.

CONCLUSIONS

40 Mr Sexton's memorandum (and Mr Walsh's memorandum in Annexure A of Mr Sexton's memorandum) highlights a number of inherent errors in the WCGM22 modelling. Whilst the focus of that analysis is on the medium term, those errors would also affect the validity of the long-term estimates.

41 In my opinion, based on my assessment of both Mr Yeoman's WCGM22 results and responses to Minute #5 and the reanalysis of capacity carried out by Mr Sexton (and Mr Walsh), WDC must be responsive to PC31. Once fully developed, PC31 will bring some 850 dwellings to the market addressing some three quarters of the identified shortfall between demand and supply.

42 In addition, WDC will need to adjust other RMA plans and objectives to facilitate a further 400 or so additional dwellings in order to comply with the NPS-UD.

43 In light of the identified shortfall of almost 1,240 dwellings in the medium term meaning that Waimakariri District is no longer meeting its obligations under the NPS-UD, a development capacity of 250 initially, increasing to 450 following intersection upgrades and on to 850 is significant at each stage.

Dated: 5 September 2023

Gregory Michael Akehurst

APPENDIX 1

30 August 2023

MEMO

TO: Garry Sellars, Greg Akehurst, Tim Walsh

FROM: Chris Sexton, Civil Engineer, B.E.(Hons.), MEngNZ

Review of Formative WCGM22 Development Model

EXECUTIVE SUMMARY

The following memo summarises the findings from our review and validation of the household capacities set out in the WCGM22 model and relied on by Mr Yeoman in his response to Minute #5 on Plan Change 31 (PC31). That review has included desktop / GIS analysis of the WCGM22 and physical inspections of sites.

In summary, this analysis finds that actual capacity in the medium term is approximately 4361 households. This is 1573 households (26.5%) less than the 5934 households anticipated in the WCGM22, and translates into a 1239 household shortfall (rather than 350 surplus[1]) for the medium term. Whilst our analysis does not examine the long term, this shortfall and the inherent errors in the model described below will affect long term calculations of capacity, irrespective of reliance on potentially uncertain areas such as the Kaiapoi NDA.

This conclusion potentially underestimates the shortfall and/or supply, as described in further detail below. However, such variance is unlikely to materially alter the conclusion above that the WCGM22 model overstates household capacity.

METHODOLOGY

Our review of the WCGM22 has entailed desktop analysis and physical inspections of areas and sites in order to confirm or revise the assumed housing capacities, as follows:

Desktop Review

Firstly, GIS was used to identify any of the following areas that cannot be developed or intensified in a way that provides additional residential capacity:

- Recreation Reserve Lots
- Utility Reserve Lots
- Council Owned Facilities (i.e. water treatment plants)
- Parcels featuring heritage buildings or protected trees
- Parcels with community facilities (e.g. Pre-Schools/early learning centres, Churches/Places of Worship)
- Land covenants and/or encumbrances that prevent further subdivision or intensification
- Land where a dwelling or development had been completed therefore removing any potential future capacity in the medium term (e.g. individual homes, Kāinga Ora Multi Lot Developments, etc)

Secondly, the household capacity stated in the WCGM22 for new subdivisions in Greenfield areas was reviewed and validated, by either:

- Adopting yields in publicly available and consented subdivision master plans, or otherwise
- Deducting 12.5% of the gross site area (per exclusions from 'net density' such as stormwater management & commercial areas), and then multiplying the remaining area by 15 houses/hectare applied to determine capacity. This is consistent with the methodology set out in the Canterbury

[1] Per the HDCA2023, medium term supply of 5950 hh, less demand with margin of 5600 = 350hh surplus.

Regional Policy Statement ('CRPS')), Our Space, the HDCA 2021, HDCA2023, and the independent review of greenfield densities commissioned by the Greater Christchurch Partnership and undertaken by Harrison Grierson Limited ('HGL') as detailed in **Appendix A**.

The approach above can be contrasted with Mr Yeoman's calculation of capacity in greenfield areas where he allows only 25% of the gross area for all infrastructure, including stormwater management and commercial areas which is specifically excluded by the statutory and non-statutory documents listed above. Mr Yeoman's allowance of only 25% is also considerably less than the 40.2% average area for all infrastructure in the case studies identified by HGL. Subject to excluding stormwater, etc from gross areas, the 15hh/ha density calculation we have then applied to greenfield areas is otherwise equivalent to Mr Yeoman's approach, and that set out in the HDCA2023, of allowing 25% of the net area for local infrastructure and an average 500m^2 lot size for the balance, to determine capacity. This is explained in further detail in Mr Walsh's memo in **Appendix A**.

Physical Review and 'Ground truthing'

Following the GIS analysis described above, physical inspections of sites and areas were undertaken (in the week of 21 August 2023) in order to validate findings and provide real time / current verification of the potential future capacity of land. In undertaking those site inspections, particular attention was given to:

- Land identified as vacant, that has since been developed and occupied (and cannot provide capacity);
- Land identified as vacant, that has been partially developed and appears incomplete and/or unoccupied (and can therefore provide capacity);
- Land identified as providing capacity by way of infill, that has attributes indicating such infill is unlikely to materialise (e.g. recently completed development where redevelopment is unlikely, building position limiting infill potential, lifestyle properties with areas of open space that appear unlikely to be developed, other site specific or environmental attributes indicating infill unlikely).
- Land where capacity has been underestimated.

Photographic examples of the above are included in **Appendix B**. The maps in **Appendix C** show where some of the differences between our assessment and the WCGM22 model occur and some of the deficiencies within the WCGM22 model. The numbers shown on each area of land/lot on the maps show the difference between the assumed WCGM22 modelled capacity and our validated capacity.

CONCLUSION & RESULTS

The table on the following page summarises the results of the analysis described above. In summary, this analysis finds that:

- Actual household capacity is approximately 4361 households, which is 1573 households (or 26.5%) less than the 5934 households anticipated by the WCGM22 and translates into 1239 household shortfall (rather than 350 surplus) in the medium term based on the HDCA 2023.
- This conclusion potentially:
    - underestimates the shortfall insofar that feasible yield from infill lots (lot shape), economic benefit from the existing dwelling values, ability to develop to the densities in WCGM22 due to downstream constraints (i.e. existing infrastructure network constraints constraining development) has not been considered in my review.
    - underestimates the supply insofar that some developers may achieve higher yields than 15 houses/hectare and the WCGM22 Model may have missed some lots as was found with a very small number missed in Pegasus.

  However, such variance is unlikely to materially alter the conclusion above that the WCGM22 model overstates household capacity.

In our view, Mr Yeoman's response still fails to acknowledge major errors in the WCGM22 which clearly overstates capacity. The appendices provide further detailed information underpinning the summary and conclusions above, as follows:

- **Appendix A | Memo re: Calculation of Greenfield Capacity**
- **Appendix B | Photographic Examples of Sites**
- **Appendix C | WCGM22 Development Area Maps**
- **Appendix D | Detailed Methodology and Findings**
- **Appendix E | Land Covenant Examples**

Location	WCGM 22 Capacity per Mr Yeoman's Minute 5 response	Validated Capacity (Based on subdivision plan)	Validated Capacity (Gross area - 12.5% x 15hh/ha)	Difference in Capacity (Validated vs WCGM22)
Rangiora:				
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Kaiapoi infill	**292**	273		**-19**
Woodend/Pegasus Vacant lots	**413**	209		**-204**
Woodend/Pegasus Infill /intensification	**2**	2		**0**
Total Medium Term Household Capacity	**5934**	**4361**		**-1573**

Appendix A | Memo re: Calculation of Greenfield Capacity

24 August 2023

Novo Group Limited
Level 1, 279 Montreal Street
PO Box 365, Christchurch 8140
O - 03 365 5570
info@novogroup.co.nz

MEMO

TO: Chris Sexton, Inovo Projects

FROM: Tim Walsh, Senior Planner

PRIVATE PLAN CHANGE PC31 ŌHOKA GREENFIELD DENSITY & CAPACITY CALCULATIONS

Executive Summary

1. This memo sets out the correct methodology for determining development capacity for greenfield areas as set out in the Canterbury Regional Policy Statement including Plan Change 1 ('**CRPS**'), Our Space[1], the Greater Christchurch Housing Development Capacity Assessments of July 2021 and March 2023 ('**HDCA 2021**' and '**HDCA 2023**'), and the independent review of greenfield densities commissioned by the Greater Christchurch Partnership and undertaken by Harrison Grierson Limited ('**HGL**')[2].

2. Based on these documents the correct approach to determine household capacity is to:

   i. Define the gross area of the greenfield area being considered (in hectares).

   ii. Deduct areas required for stormwater retention & treatment and local retail/commercial purposes from this gross area, per the definition of 'net density' in the CRPS[3]. Based on the HGL report and the advice of Mr Tim McLeod, we consider 12.5% is an appropriate allowance for stormwater and commercial purposes, recognising that some areas may ultimately require more or less than this.

   iii. Multiply the remaining (net) greenfield area by 15 households/hectare ('**hh/ha**') to determine capacity. This ratio is equivalent to an average 500m^2 residential lot size and an allowance of 25% of net area for community infrastructure including local roads and road corridors, pedestrian and cycleways, and local (neighbourhood) reserves. The latter is the approach adopted by Mr Yeoman, albeit he does not account for the exclusions in the CRPS definition of 'net density' – stormwater in particular.

3. The formula below shows our calculation of capacity (per the CRPS, Our Space, and HDCA 2021) is equivalent to Mr Yeoman's approach (and that set out in the HDCA 2023), provided that for both methods, stormwater should first be deducted from the gross area:

[1] "Our Space – Greater Christchurch Settlement Pattern Update 2019"
[2] Harrison Grierson Greenfield Density Analysis Technical Report – 4 February 2021,
[3] Other exclusions per the definition of 'net density' are not known to be extensive in the greenfield areas in the district and therefore are not considered further here. However, site specific assessment may warrant further reductions to the gross area.

1ha net area x 15 hh/ ha = 15 households

=

(1ha net area– 25% local infrastructure) / 500m^2 avg lot size = 15 households

4. We note that Mr Yeoman's approach and the WCGM22 suggests 25% of the gross area is sufficient for all infrastructure, including stormwater and commercial areas. That is not consistent with the planning documents described above and is at odds with the average area of 40.2% for all infrastructure identified in the HGL report.

5. Mr Yeoman's response to Question 10 in Minute 5 also suggests that the WCGM22 uses variable average lot sizes for different parts of the district. However, that differs from the clear assumption in the HDCA 2023 of a 500m^2 average lot size and 25% allowance for local infrastructure, and a 15hh/ha density in the other planning documents analysed.

Scope

6. This memo reviews, and seeks to confirm, the correct methodology for determining development capacity for greenfield areas as set out in the CRPS, Our Space, the HDCA 2021 and HDCA 2023, and the independent review of greenfield densities commissioned by the Greater Christchurch Partnership and undertaken by HGL.

7. These findings are then contrasted to the approach in the WCGM22 as described by Mr Yeoman in his response to Minute 5 for PC31.

The CRPS

8. CRPS Policy 6.3.7 requires that:

> *development in greenfield priority areas shall achieve at least the following residential **net densities** averaged over the whole of an ODP area (except where subject to an existing operative ODP with specific density provisions):*
>
> *a. 10 household units per hectare in greenfield areas in Selwyn and Waimakariri District;*
>
> *b. 15 household units per hectare in greenfield areas in Christchurch City.*

9. Policy 6.3.12 (Future Development Areas) seeks to "*Enable urban development in the Future Development Areas identified on Map A…"* and the methods described for implementing this policy notes that local authorities will:

> *Undertake an evaluation of the appropriateness of existing minimum densities specified in the Regional Policy Statement and whether any changes to minimum densities are likely to be desirable and achievable across the Future Development Areas.*

10. The CRPS definition of 'net density' is relevant to the policies above (and other provisions in Chapter 6) and this term is defined as set out at Figure 1 below.

Net density	is the number of lots or household units per hectare (whichever is the greater). The area (ha) includes land for: • Residential purposes, including all open space and on-site parking associated with residential development; • Local roads and roading corridors, including pedestrian and cycle ways, but excluding State Highways and major arterial roads; • Local (neighbourhood) reserves. The area (ha) excludes land that is: • Stormwater retention and treatment areas; • Geotechnically constrained (such as land subject to subsidence or inundation); • Set aside to protect significant ecological, cultural, historic heritage or landscape values; • Set aside for esplanade reserves or access strips that form part of a larger regional or sub-regional reserve network; • For local community services and retail facilities, or for schools, hospitals or other district, regional or sub-regional facilities.

Figure 1: CRPS definition of net density

11. In summary, the provisions above show that the CRPS seeks the achievement of minimum densities for greenfield areas and Future Development Areas, where the term 'net density' (used interchangeably with 'density' or 'densities') is specifically defined to include certain land and exclude other land. Relevantly, land required for stormwater retention and treatment is excluded.

Our Space

12. In section 5.3 of Our Space, the description of the Settlement Pattern for Greater Christchurch states that for Selwyn and Waimakariri (with my emphasis in bold):

> *it is expected that new urban housing in Waimakariri and Selwyn will achieve a minimum* ***net density*** *of 12 households per hectare where any Future Development Area is subsequently zoned.* ***For this purpose, net density has the same meaning as set out in the Canterbury Regional Policy Statement. This will also provide strong guidance for the development of District Plans for both Waimakariri and Selwyn districts****.*

13. Table 5 in this section of Our Space (see Figure 2) sets out Selwyn and Waimakariri density scenarios and anticipated yields from future development areas. An associated note expressly states that the density scenarios and anticipated yields from FDAs are ***"derived from a total 'gross' hectare and does not take into account infrastructure requirements and structure planning that may reduce the developable area and total dwelling count".***

14. From the extracts above, it is clear that Our Space also expressly refers to the CRPS definition of 'net density' and that infrastructure requirements and structure planning may reduce development capacity.

Table 5: Selwyn and Waimakariri density scenarios and anticipated yields from future development areas

Selwyn long term shortfall: 5,475
Waimakariri long term shortfall: 7,675

	Density scenarios and anticipated yields from FDAs^					
	Selwyn			Waimakariri		
Theoretical additional capacity enabled in existing urban areas*	Density 10 hh/ha	Density 12 hh/ha	Density 15 hh/ha	Density 10 hh/ha	Density 12 hh/ha	Density 15 hh/ha
0	4,700	5,650	7,050	4,500	5,400	6,750
500	5,200	6,150	7,550	5,000	5,900	7,250
1,000	5,700	6,650	8,050	5,500	6,400	7,750
1,500	6,200	7,150	8,550	6,000	6,900	8,250
2,000	6,700	7,650	9,050	6,500	7,400	8,750
2,500				7,000	7,900	9,250

** Subject to enabling this additional capacity via the District Plan Review and using other mechanisms outside of the District Plan to encourage infill/intensification development. Whilst more theoretical capacity may be enabled through District Plan Reviews, robustly calculating feasibility is also limited by a lack of comparable development that provides data (e.g. house sales) within zoned areas.*

^ This is derived from a total 'gross' hectare and does not take into account infrastructure requirements and structure planning that may reduce the developable area and total dwelling count.

Figure 2: Table 5 from Our Space

HDCA 2021

15. At page 6, the HDCA 2021 sets out the projected 3,100 household shortfall in housing sufficiency for the medium term for Waimakariri District in Table 2. As highlighted in Figure 3, the discussion which follows the table clearly notes that greenfield housing capacities are calculated on the basis of an assumed density of 12hh/ha or 15hh/ha, with reference to the CRPS and Our Space which both rely on the specific definition of 'net density' as described above.

16. To the extent that the HDCA selects a density of 15hh/ha for FUDAs, based on the HGL report, this is addressed below.

HGL review of greenfield densities for the GCP

17. An independent review of greenfield densities was commissioned by the Greater Christchurch Partnership and undertaken by HGL[4].

18. Section 5.3.2 of that report presents a number of case studies to help inform the likely density yield for greenfield areas. Those case studies set out land use coverage for these areas, as summarised in Table 1.

[4] Greater-Christchurch-Partnership-Greenfield-Density-Analysis-Technical-Report-Final_Optimized.pdf (greaterchristchurch.org.nz)

Table 2: Urban Housing Sufficiency within Greater Christchurch in the Medium Term 2021 – 2031 – excluding Selwyn and Waimakariri Future Urban Development Areas

Area	Feasible Capacity	Medium term demand + 20% short term margin	Surplus / Shortfall
Waimakariri	2,273	5,410	-3,137
Christchurch	101,994	18,215	83,779
Selwyn	6,452	8,541	-2,089
Total	110,719	32,166	78,553

In response to the medium term shortfall, Future Urban Development Areas (FUDA's) were identified under "Our Space – Greater Christchurch Settlement Pattern Update 2019". On the 28 July 2021, the Minister for the Environment approved Proposed Change 1 to Chapter 6 of the CRPS which identifies new urban housing development (FUDA) areas in Rolleston (additional capacity of 5,756 at 12.5hh/ha and 7,050 at 15hh/ha), Rangiora and Kaiapoi (combined at 12hh/ha is 5,400 and at 15hh/ha is 6,850). Change 1 also adds associated policy provisions to enable Selwyn and Waimakariri District Councils to consider rezoning land within these areas through their district planning processes to meet shortfalls in housing capacity.

Our Space (2019) provided density scenarios and anticipated yields from the FUDAs at 12hh/ha and 15hh/ha[2]. On the basis that the FUDA's are rezoned within the medium term at density yield of 15hh/ha, Table 3 provides an adjustment (scenario) for the medium term sufficiency calculation. A 15hh/ha density yield has been selected based upon an independent review of greenfield densities commissioned by the Greater Christchurch Partnership and undertaken by Harrison Grierson Limited. This report concluded that any identified constraints and issues can be overcome to enable the minimum net densities to be increased to 15hh/ha to optimise greenfield land and meet the longer term housing demand profile[3].

Figure 3: Table 2 from the HDCA 2021

19. In respect of the examples in Table 1, the following relevant points are noted:

    i. An average of 9% of the (gross) study area was set aside for commercial use and stormwater management (albeit the latter does not account for off-site stormwater facilities[5]). The CRPS requires these areas to be excluded from 'net density' and as set out in previous evidence on PC31, 12.5% has been excluded from gross areas to define a net area upon which density can be determined.

    ii. An average of 31.2% of the (gross) study area was set aside for streets and lanes and local parks. The CRPS requires these areas to be include in 'net density' and this average compares to the 25% figure suggested by Mr Yeoman.

20. The case studies supported a conclusion in the report that a target minimum net density (per the CRPS definition) of 15hh/ha was appropriate.

[5] If the Sovereign Palms and Longhurst are excluded noting they benefit from off site stormwater management, the area required for stormwater management in the case studies accounts for an average area of 10.6%. If added to the 0.9% average commercial area the total amounts to an average of 11.5%.

Table 1: Land use coverage from the HGL report

	Included in 'net density' and hh/ha calculation (per CRPS			Excluded from 'net density' (per CRPS definition)	
	Residential	**Streets & Lanes**	**Parks**	**Commercial**	**Stormwater reserve**
Spring Grove, Belfast, Christchurch	53	29	0.4	0	18
Golden Sands, Papamoa, Tauranga	58	29	3	1	9
Huapai Triangle, Kumeu, Auckland	58	34	1	1	6
Longhurst, Halswell, Christchurch	63	28	3	2	4*
Greenhill Park, Chartwell, Hamilton	53	29	3	0	15
Faringdon, Rolleston	63	28	3	1	5
Sovereign Palms, Kaiapoi, Christchurch	71	24	4	1	0*
Average	**59.9**	**28.7**	**2.5**	**0.9**	**8.1**
*** Note – stormwater facilities provided outside of the defined case study area**					

HDCA 2023

21. The HDCA 2023 does not explicitly reference the term 'net density' but uses the term 'hh/ha' extensively and refers to the 15hh/ha target set out in the documents summarised above[6]. The HDCA 2023 also states that:

> *For both the SCGM and WCGM the following assumptions have been applied:*
>
> - *'Undevelopable' lots have been removed, including roads and railways, hydrological features, vested roads and reserves and designated sites;*
> - *Dwelling typology is assumed to be what the District Plans enable;*
> - *Estimates are rounded down to the nearest whole number;*
> - *Amalgamation of parcels is not accounted for;*
> - ***That 25% of land area is set aside for infrastructure;***
> - *That no commercial buildings will be constructed in residential zones.*

22. The HDCA also sets out the 25% infrastructure assumption and 500m^2 lot size in its residential density assumptions for Waimakariri greenfield areas as shown in Figure 4.

[6] See section 3.2.1

Table 39: Waimakariri Residential Density Assumptions

Assumption	Reasonably Expected to be Realised
Infrastructure	25%
Medium Density Residential Zone Greenfield Sites	Rangiora – 500m² Kaiapoi – 500m² Woodend – 500m² Pegasus – 500m²

Figure 4: Table 39 from the 2023 HDCA

23. The HDCA 2023 does not define what 'infrastructure' means in the context that it is described in Figure 4. However, with reference to the HGL case studies, 'infrastructure' is evidently the local road and reserve network that is expressly included in the CRPS definition of 'net density', noting that the 25% is comparable (albeit less than) the 31.2% average extent of these areas in the HGL report. For the same rationale, it is concluded that the 25% cannot be for all infrastructure, including commercial areas and stormwater management which are excluded in the CRPS definition of net density, noting that the HGL case studies averaged 40.2% for all infrastructure.

24. It is also relevant to note that the 500m^2 average lot size and 25% infrastructure allowance referred to in the table above aligns with the 15hh/ha target density applied in accordance with the exclusions and inclusions in the CRPS definition of 'net density'. For example, a 500m^2 lot size x 15 households = 7,500m^2 of residential area, with the 2,500m^2 area for local infrastructure comprising the balance 25% of the 1 hectare. The counterfactual (of 25% for all infrastructure) would mean that for a 7,500m^2 area of residential lots, 2,500m^2 would remain for local roads, reserves, commercial areas and stormwater retention and treatment – where that is clearly not consistent with the HGL analysis, or the statutory definition of net density.

Mr Yeoman's Response and the WCGM22

Question 9

25. Question 9(c) of the Panel's Minute 5 sought confirmation of the percentage of land subtracted for stormwater, infrastructure and reserves when assessing capacity in NDAs/FDAs.

26. Mr Yeoman's response stated that "*a total of 25% of raw land is removed, which accounts for **all types of non-developable land**, and **there is in the WCGM22 no disaggregation of that 25% aggregate figure**"*.

27. Mr Yeoman's approach is not consistent with that set out in the statutory and non-statutory documents described above, which all exclude stormwater and commercial areas from the gross area of land as a first step. Local road and reserve infrastructure is then accounted for as part of the 15hh/ha density calculation, or the 25% infrastructure ratio.

28. As stated above, the HGL case studies show that an average of approximately 40.2% of the raw land area is required for stormwater, infrastructure, reserves and commercial purposes – which is considerably higher than the 25% ratio adopted by Mr Yeoman.

Question 10

29. Question 10 of the Panel's Minute 5 asked for the assumed lot size or hh/ha yield.

30. Mr Yeoman's response states that "*the average lot sizes applied in the WCGM22 are as follows for South East Rangiora (501m^2), North East Rangiora (543m^2), North West Rangiora (693m^2), South West Rangiora (499m^2), and North Kaiapoi (384m^2)*".

31. It is unclear if Mr Yeoman is stating that variable lot sizes have been applied in different locations in the WCGM22 or the rationale for doing so, however Table 39 of the HDCA 2023 is clear that a 500m^2 lot size is assumed for all of Waimakariri's greenfield areas. As set out above, this is consistent with a 15hh/ha yield applied in accordance with the definition of 'net density'.

Conclusion

32. The following statutory and non-statutory documents provide a clear and consistent approach to the calculation of net density and household capacity for greenfield areas, where stormwater and commercial areas are excluded from the 'gross area':

    i. The CRPS (including Plan Change 1);

    ii. Our Space;

    iii. The HDCA 2021;

    iv. The HDCA 2023 (albeit, it used a 500m^2 average lot size and 25% allowance for local infrastructure)

    v. The independent review of greenfield densities commissioned by the Greater Christchurch Partnership and undertaken by HGL.

33. In contrast, Mr Yeoman's approach and the WCGM22 suggests 25% of the gross area is sufficient for all infrastructure, including stormwater and commercial areas. That is not consistent with the documents described above and is at odds with the average area of 40.2% for all infrastructure identified in the HGL report.

34. Mr Yeoman's response to Question 10 in Minute 5 also suggests that the WCGM22 uses variable average lot sizes for different parts of the district. However, that differs from the clear assumption in the HDCA 2023 of a 500m^2 average lot size and 25% allowance for local infrastructure, and a 15hh/ha density in the other planning documents analysed.

35. Given the above, we consider the correct approach to determine household capacity is to:

    i. Define the gross area of the greenfield area being considered (in hectares).

    ii. Deduct areas required for stormwater retention & treatment and local retail/commercial purposes from this gross area, per the definition of 'net density' in the CRPS. Based on the HGL report and the advice of Mr Tim McLeod, we consider 12.5% is an

appropriate allowance for stormwater and commercial purposes, recognising that some areas may ultimately require more or less than this.

iii. Multiply the remaining (net) greenfield area by 15hh/ha to determine capacity. This ratio is equivalent to an average 500m^2 residential lot size and an allowance of 25% of net area for community infrastructure including local roads and roading corridors, pedestrian and cycle ways, and local (neighbourhood) reserves. The latter is the approach adopted by Mr Yeoman, albeit he fails to account for the exclusions in the CRPS definition of 'net density', and stormwater in particular.

36. The formula below shows our calculation of capacity (per the CRPS, Our Space, and HDCA 2021) is equivalent to Mr Yeoman's approach (and that set out in the HDCA 2023), provided that for both methods stormwater should first be deducted from the gross area:

1ha net area x 15 hh/ ha = 15 households

=

(1ha net area– 25% local infrastructure) / 500m^2 avg lot size = 15 households

Appendix B | Photographic Examples of Sites

[Note: Photos taken week of 21 August 2023]

Figure 1 – Completed Houses in previous stages of Townsend Fields Rangiora - Overcount in WCGM22 of 107 Lots in 'Rangiora Vacant lots'

Figure 2- Completed Rangiora Housing New Zealand Multi Lot Development (High Street) – Overcount in WCGM22 of 6 Lots

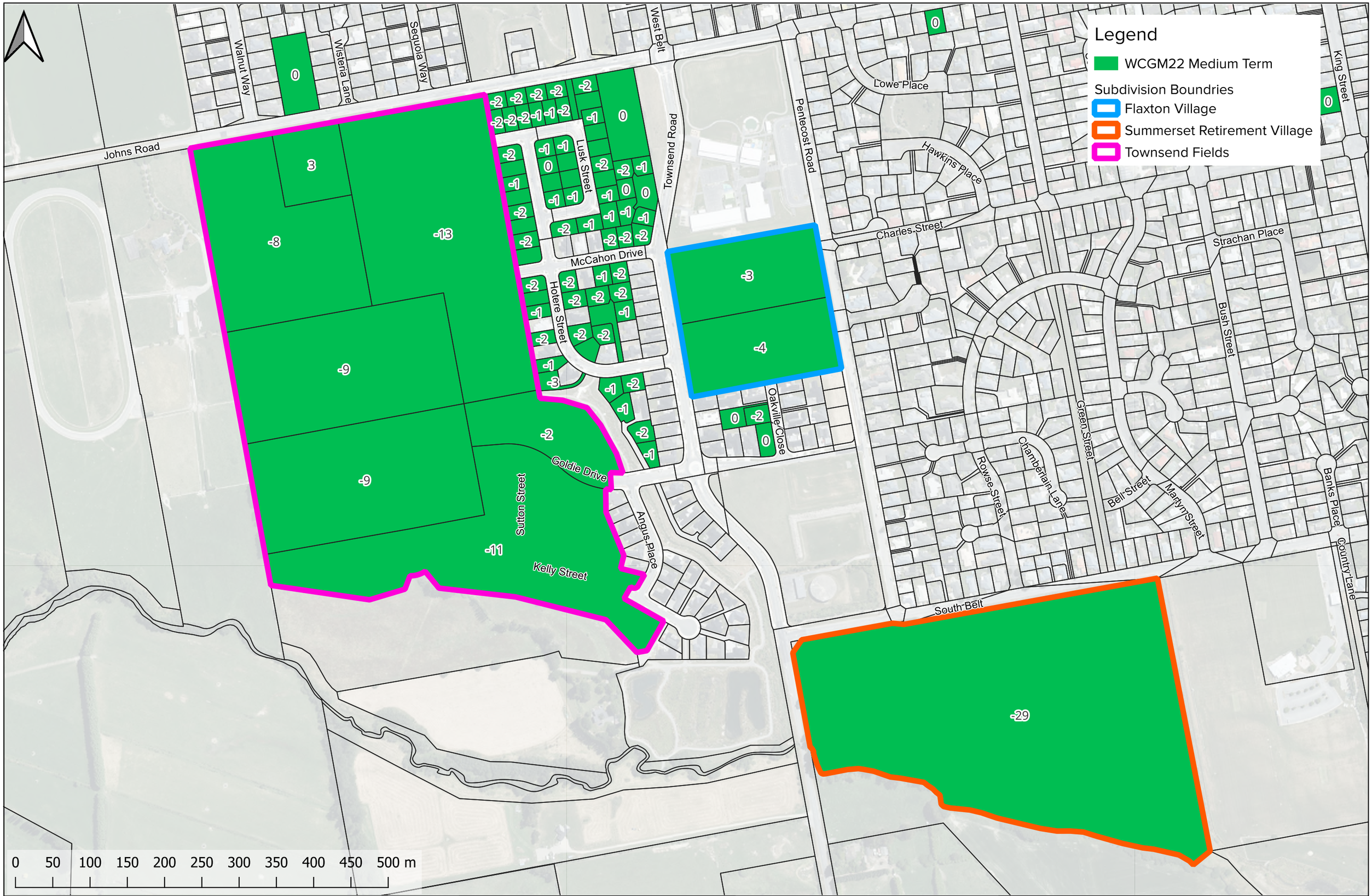
Figure 3 – Completed Houses Built within Mike Greer Development in Pegasus – Overcount in WCGM22 of 53 Lots

Figure 4 - Developed Lots and completed houses within previous stages of Ravenswood – Overcount in WCGM22 of 178 Lots as vacant lots

Figure 5 - Completed Houses within previous stages of Woodland Estate- Overcount in WCGM22 of 71 Lots in 'Woodend/Pegasus Vacant lots'

Figure 6 - Completed Houses in previous stages of Beach Grove Subdivision – Kaiapoi – Overcount in WCGM22 of 98 Lots in 'Kaiapoi Vacant lots'

Appendix C | WCGM22 Development Area Maps



Prepared By: Chris Sexton
Date: 31/08/2023

INOVO PROJECTS
Level 1, 93 Manchester Street, Christchurch
Ph. 03 377 3290 11
Clayton St, Newmarket, Auckland 1149
Ph. 09 600 1099
www.inovo.nz

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Drawing Title
WCGM22 SUBDIVISION AREAS
RANGIORA WEST

Status
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Map No.
14895-M-WCGM22-01

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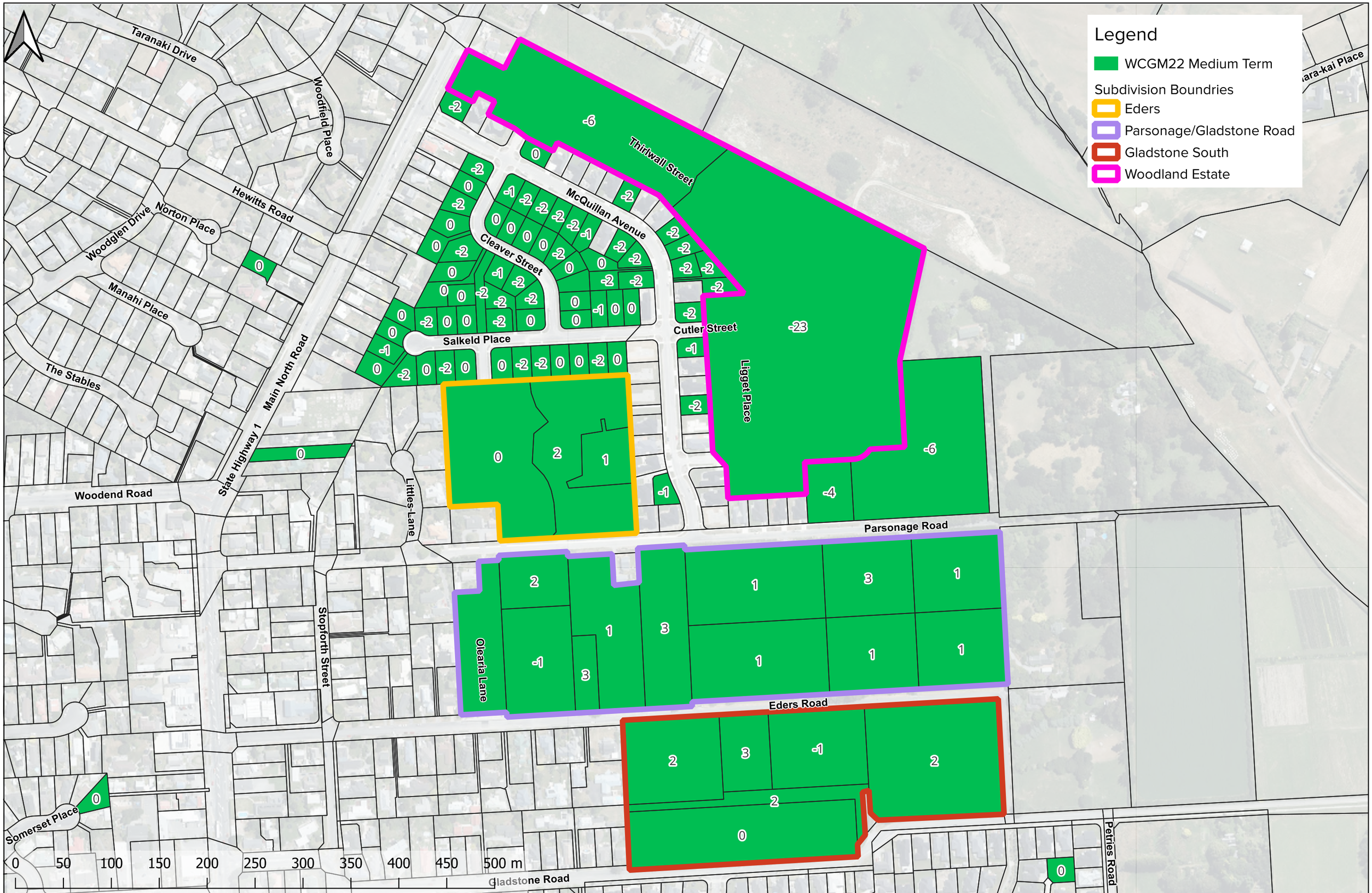

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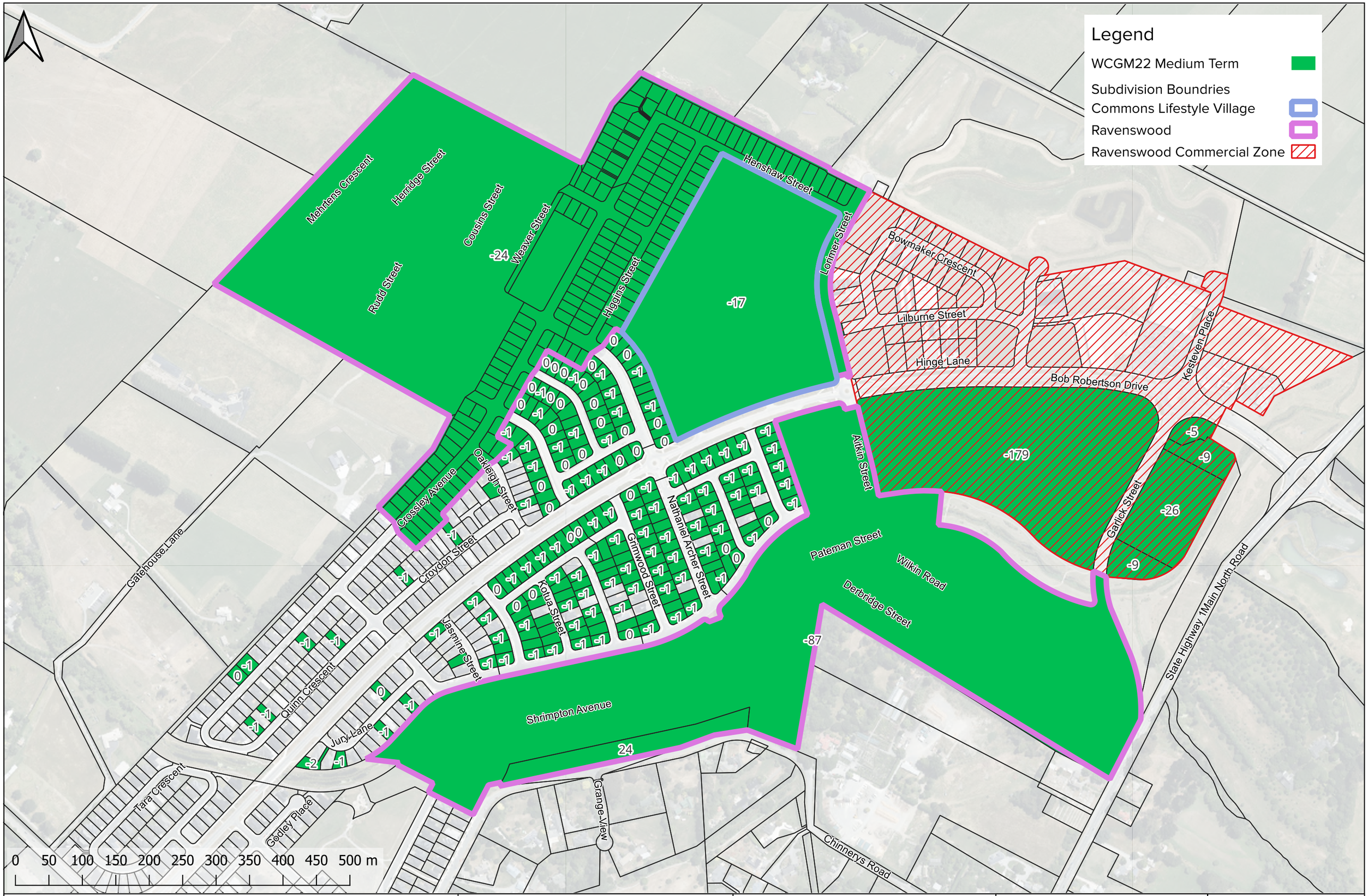

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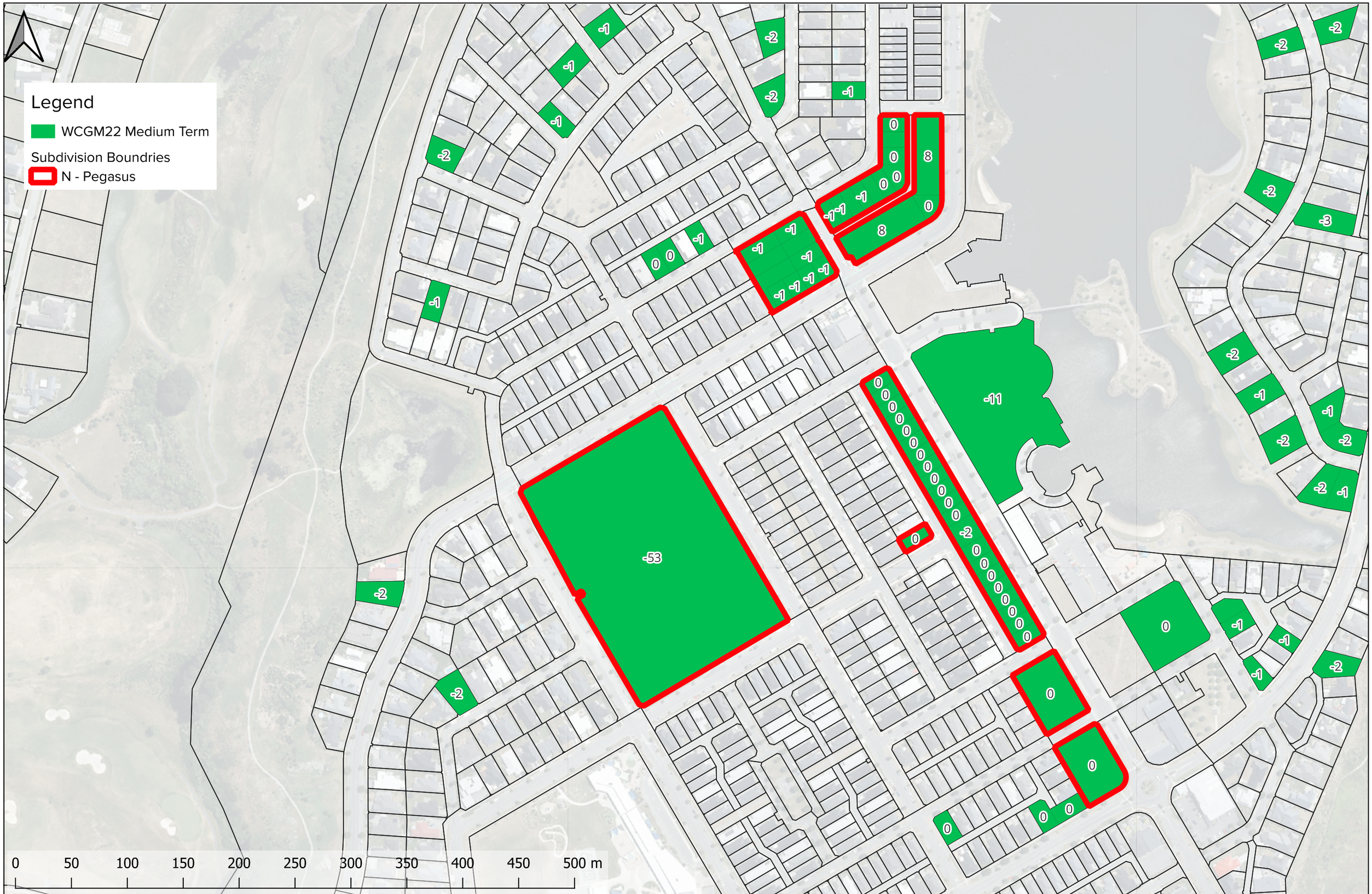

Prepared By: Chris Sexton
Date: 31/08/2023

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Level 1, 93 Manchester Street, Christchurch
Ph. 03 377 3290 11
Clayton St, Newmarket, Auckland 1149
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Date: 05/09/2023

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Level 1, 93 Manchester Street, Christchurch
Ph. 03 377 3290 11
Clayton St, Newmarket, Auckland 1149
Ph. 09 600 1099
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KAIAPOI

Status
FOR INFORMATION

Map No.
14895-M-WCGM22-06

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Appendix D | Detailed Methodology and Findings

1 Introduction

This Appendix outlines the detailed methodology and findings of a further investigation into the WCGM22 model as developed by Formative as part of their economic assessment for the Waimakariri District.

Further investigation of the model has focused only on areas identified in the Medium Term, noting PC31 will provide housing capacity within the medium term.

2 Methodology

The WCGM22 data was analysed in QGIS and combined with other open-source data[2] to provide further information. This included matching the ID's in the WCGM22 with the LINZ Data Service Primary Parcel Dataset allowing further information such as address, parcel appellation, title reference, legal owner etc to be identified.

The WCGM22 data was then analysed to check for the following:

- Recreation Reserve Lots
- Utility Reserve Lots
- Council Owned Facilities (i.e. water treatment plants)
- Parcels featuring heritage buildings
- Parcels featuring protected trees
- Pre-Schools/early learning centres
- Churches/Places of Worship.

A number of areas were then checked for land covenants and/or encumbrances that would prevent further subdivision or intensification. Examples of these can be found in **Appendix E** for Ravenswood, Townsend Fields, Pegasus and Mansfield Drive (Kaiapoi).

Vacant lots were identified in the WCGM22 dataset as lots with 0 buildings on the parcels. These vacant lots were then checked to confirm they are still in fact vacant. This was initially done using the latest aerial imagery flown in early 2023 over the urban areas by Waimakariri District Council/ECan. Vacant lots were then verified by driving the district and confirming if the sites were vacant or if a dwelling had been completed therefore removing any potential future capacity in the medium term.

Sites in areas where there were no restrictive covenants with dwellings under construction were also checked to confirm capacity, and in most cases were assessed as only being able or likely to provide a single housing unit in the medium term on the basis that redevelopment or infill development resulting in additional dwellings on the site was highly unlikely (due to the recent/new establishment of the dwelling).

Greenfield Development was identified by Mr Yeoman as being the following:

A) Bellgrove
B) Townsend Fields
C) Summerset Retirement Village
D) Flaxton Village
E) East Rangiora
F) Beach Grove
G) Silver Stream & Future Silver Stream
H) The Sterling

[2] For example: LINZ Data service, Waimakariri District Council GIS Data, ECan Open Data Portal (Canterbury Maps).

I) Momentum
J) Ravenswood
K) Commons Lifestyle Village
L) Woodland Estate
M) Eders
N) Pegasus

Along with:

Parsonage/Gladstone North
Gladstone South

It is important to note that the extent of these subdivisions as identified in Mr Yeoman's response to Minute 5 by the Commissioners do not necessarily match the extent or naming of the subdivisions as assigned by the developers. For example, greenfield capacity identified within Pegasus by Mr Yeoman (as depicted on his map with the letter "N") related to only a small part of the Pegasus subdivision, with vacant land capacity in other parts of Pegasus then attributed to the Woodend-Pegasus area. Despite this, we have adopted a consistent approach to our review and validation of capacity below to ensure that our findings can be directly correlated with the WCGM22.

For areas A-N above, medium-term household capacity was confirmed by either:

a. Adopting yields in publicly available and consented subdivision master plans; or otherwise

b. Deducting 12.5% of the gross site area for stormwater management, and then multiplying the remaining area by 15 houses/hectare applied to determine capacity. This is consistent with the methodology set out in the Canterbury Regional Policy Statement ('CRPS')), Our Space, the HDCA 2021, HDCA2023, and the independent review of greenfield densities commissioned by the Greater Christchurch Partnership and undertaken by Harrison Grierson Limited ('HGL') as detailed in **Appendix A**.

The approach above can be contrasted with Mr Yeoman's calculation of capacity in greenfield areas where he allows only 25% of the gross area for all infrastructure, including stormwater management areas which is specifically excluded by the statutory and non-statutory documents listed above. Mr Yeoman's allowance of only 25% is also considerably less than the 40.2% average area for all infrastructure in the case studies identified by HGL. Subject to excluding stormwater from gross areas, the 15hh/ha density calculation we have then applied to greenfield areas is otherwise equivalent to Mr Yeoman's approach, and that set out in the HDCA2023, of allowing 25% of the net area for local infrastructure and an average 500m^2 lot size for the balance, to determine capacity. This is explained in further detail in Mr Walsh's memo in **Appendix A**.

3 Results

3.1 Rangiora

3.1.1 Area A – Bellgrove

No master plan for the entire Bellgrove development could be found that was publicly available. The predicted yield for Bellgrove was therefore calculated using the gross site area (61.0 ha), minus a 12.5% allowance for stormwater management and allowing for 15 houses per hectare over the remainder of the site. This resulted in a predicted yield of 800 lots, 152 less than WCGM22 predicted in the medium term.

3.1.2 Area B – Townsend Fields

No master plan for the area identified as Townsend Fields within Mr Yeomans Maps could be found that was publicly available. The predicted yield for the area identified as Townsend Fields was calculated using the gross site area (28.2 ha), minus a 12.5% allowance for stormwater management and allowing for 15 houses per hectare over the remainder of the site. This resulted in a predicted yield of 370 lots, 49 less than WCGM22 predicted in the medium term.

3.1.3 Area C – Summerset Retirement Village

Mr Yeoman clarified within his response to Minute 5 that WCGM22 considered retirement villages, although not at their ultimate yield, but instead as the yield that would be realised under normal development. This approach has been taken when assessing these areas, with the same methodology used as when assessing

greenfield sites with a 12.5% allowance made for stormwater treatment. This resulted in a predicted yield of 182 lots on the Summerset Retirement Village site as identified by Mr Yeoman in his Maps attached to his response to Minute 5. This result is 29 lots less than originally predicted by WCGM22.

3.1.4 Area D – Flaxton Village

Mr Yeoman clarified within his response to Minute 5 that WCGM22 considered retirement villages, although not at their ultimate yield, but instead as the yield that would be realised under normal development. This approach as been taken when assessing these areas, with the same methodology used as when assessing greenfield sites with a 12.5% allowance made for stormwater treatment. This resulted in a predicted yield of 52 lots on the Flaxton Village site as identified by Mr Yeoman in his Maps attached to his response to Minute 5. This result is 7 lots less than originally predicted by WCGM22.

3.1.5 Area E – East Rangiora

No master plan for the area identified as East Rangiora within Mr Yeoman's Maps could be found that was publicly available. The predicted yield for the area identified as East Rangiora was calculated using the gross site area (5.1 ha), minus a 12.5% allowance for stormwater management and allowing for 15 houses per hectare over the remainder of the site. This resulted in a predicted yield of 66 lots, 10 less than WCGM22 predicted in the medium term.

3.1.6 Rangiora Vacant Lots

For the Rangiora area (outside of the Greenfield areas as per Mr Yeoman's maps), Vacant Lots were identified as lots with 0 buildings on them in the WCGM22 dataset.

However, a number of the vacant lots in the WCGM22 were found to have houses or buildings already on them due to buildings being constructed over multiple parcels.

It was also found that a number of vacant lots were subject to restrictive covenants that prevent further subdivision of the land that would preclude intensification beyond one additional dwelling per vacant lot, as otherwise assumed by the WCGM22. The Townsend Fields Development is one such example, with other examples of covenants precluding further capacity being realised on vacant lots provided in **Appendix E**.

WCGM22 also featured multiple utility reserves (stormwater basins) and recreation reserves in the vacant land category, despite such land being unsuitable for residential development in the medium term or otherwise.

Vacant lots were verified by first reviewing aerial imagery flown at the beginning of 2023 by the Waimakariri District Council to identify if a dwelling had been constructed on the remaining viable vacant sites. This was then confirmed by visiting the sites to confirm the buildings had been completed along with checking to see if any additional lots had completed buildings on them since the aerial imagery was flown.

This resulted in a vacant lot yield of 248 lots within Rangiora, 131 lots less than originally predicted by WCGM22.

3.1.7 Rangiora Infill/Intensification

It was assumed that infill/intensification would include lots that had 1 or more building on them within the WCGM22 model and were not included within the identified subdivisions. A number of lots were identified in the WCGM22 model that had been included in error. These lots were identified on the following criteria:

- Pre-Schools
- Lots already intensified or developed with completed buildings, thus precluding further capacity

Examples of lots already developed that cannot provide for further infill or intensification include the Kāinga Ora high-density development built in 2019 on High Street/White Street in Rangiora (assumed as 6 additional/new lots in the WCGM22) (see Figure 2 photo in **Appendix B**) and the existing Holmwood retirement village (assumed as 4 additional/new lots in the medium term in WCGM22) in Rangiora (village built over multiple parcels). The preschool at 62 Percival Street (assumed as 2 additional/new lots in the WCGM22) is another example of a site that is unlikely to yield capacity through infill or intensification in the medium term.

These errors resulted in the total available amount of lots available for infill/intensification within Rangiora being 270, a reduction of 85 lots from the original WCGM22 model.

3.2 Kaiapoi

3.2.1 Area F – Beach Grove

The area identified as Beach Grove in WCGM22 as identified by Mr Yeoman within his response to Minute 5 when referenced back to the master plan for Beach Grove results in a future yield of 330 residential lots. This is 2 lots lower than that predicted by WCGM22. A reason why this difference is smaller than for other areas is that the required area for stormwater management is far smaller due to the works undertaken by Waimakariri District Council to construct a stormwater pump station at the end of Macintosh Drain, removing attenuation requirements for the development.

3.2.2 Area G - Silver Stream

No master plan for the area identified as Silver Stream within Mr Yeoman's Maps could be found that was publicly available. The predicted yield for the area identified as Silver Stream was calculated using the gross site area (5.0 ha), minus a 12.5% allowance for stormwater management and allowing for 15 houses per hectare over the remainder of the site. This resulted in a predicted yield of 65 lots, 24 less than WCGM22 predicted in the medium term.

3.2.3 Future Silver Stream

No master plan for the area identified as Future Silver Stream within Mr Yeomans Maps could be found that was publicly available. The predicted yield for the area identified as Future Silver Stream was calculated using the gross site area (3.13 ha), minus a 12.5% allowance for stormwater management and allowing for 15 houses per hectare over the remainder of the site. This resulted in a predicted yield of 41 lots, 3 less than WCGM22 predicted in the medium term.

3.2.4 Area H – The Sterling

Mr Yeoman clarified within his response to Minute 5 that WCGM22 considered retirement villages, although not at their ultimate yield, but instead as the yield that would be realised under normal development. This approach has been taken when assessing these areas, with the same methodology used as when assessing greenfield sites with a 12.5% allowance made for stormwater treatment. This resulted in a predicted yield of 90 lots on The Sterling site as identified by Mr Yeoman in his Maps attached to his response to Minute 5. This result is 47 lots less than originally predicted by WCGM22.

3.2.5 Area I – Momentum

Mr Yeoman mentioned that Future Development/New Development areas as identified by Waimakariri District Council should not be included in the medium term, and instead be included as long-term yield. We agree.

The Momentum site as identified by Mr Yeoman in his response to Minute 5 and within WCGM22 shows that the site has been identified as proposing medium-term development capacity. This site is zoned as Rural in the current operative district plan, and is also zoned as rural lifestyle zone in the proposed district plan. For these reasons this site has been excluded from the medium term in our analysis. This site also falls within the Airport Noise Contour and is covered by High Flood Hazard, both qualifying matters in regards to the MDRS. This results in an overestimation by WCGM22 of 116 lots within the medium term.

3.2.6 Kaiapoi Vacant Lots

For the Kaiapoi area (outside of the Greenfield areas as per Mr Yeoman's maps), vacant Lots were identified as lots with 0 buildings on them in the WCGM22 dataset.

A number of these lots were found to have houses or buildings already on them. A majority of the vacant lots were found to be within the Beach Grove Subdivision (outside of area "F" as outlined in Mr Yeoman's maps).

WCGM22 featured multiple utility reserves (wastewater pump stations) and recreation reserves in the vacant land category, despite such land being unsuitable for residential development.

Vacant lots were verified by first reviewing aerial imagery flown at the beginning of 2023 by the Waimakariri District Council to identify if a dwelling had been constructed on the remaining viable vacant sites. This was then confirmed by visiting the sites to confirm the buildings had been completed along with checking to see if any additional lots had completed buildings on them since the aerial imagery was flown.

The vacant lot housing capacity was found to be 174 within Kaiapoi, 103 less than predicted by WCGM22.

3.2.7 Kaiapoi Infill/Intensification

It was assumed that infill/intensification would include lots that had 1 or more buildings on them within the WCGM22 model and were not included within the identified subdivisions. A number of lots were identified in the WCGM22 model that had been included in error. These lots were identified on the following criteria:

- Pre-Schools
- Lots already intensified (including completed homes, and multi-unit developments by Kainga Ora)
- Lots with restrictive covenants/encumbrances preventing intensification and/or further subdivision
- Lots featuring buildings with heritage status
- Lots featuring protected trees
- Churches/places of worship
- Council owned utilities (water treatment plants etc.)

Some examples of these errors include the Kaiapoi Congregation of Jehovah's Witnesses (assumed as 3 additional/new lots in the WCGM22), the Church Square Water Supply headworks between Cass St and Sewell Street (assumed as 3 additional/new lots in the WCGM22), Peraki Street Wastewater Pump Station(assumed as 2 additional/new lots in the WCGM22), the preschool at 58 Williams Street (assumed as 2 additional/new lots in the WCGM22) and established houses within the Mansfield Drive development (assumed as 43 additional/new lots in the WCGM22) that feature encumbrances that prevent further subdivision and intensification.

The completed Kainga Ora multi-lot residential development on the corner of Williams Street and Dale Street (assumed as 5 additional/new lots in the WCGM22) is an example of a developed lot, where further infill or intensification in the medium term is unlikely.

These errors resulted in the total available amount of lots available for infill/intensification within Kaiapoi being 273, a reduction of 19 lots from the original WCGM22 model.

3.3 Woodend-Pegasus

3.3.1 Area J – Ravenswood

The area identified as Ravenswood in WCGM22 included the commercial areas of Ravenswood that were rezoned as part of Plan Change 30 that was notified in November 2020 and became operative on 26 June 2023. This resulted in 12.8 hectares of land being rezoned from Residential 6a to Business 1 within the Ravenswood Development. The available yield within area "J" as identified by Mr Yeoman within his response to Minute 5 when referenced back to the master plan for Ravenswood results in a future yield of 703 residential lots. This is 266 lots lower than that predicted by WCGM22 due to the removal of the commercial areas, along with the slightly lower density achieved over Stages 5 and 6 compared to what WCGM22 predicted.

On site validation found that 26 of these lots have since had houses been completed on them, further reducing the available capacity that WCGM22 predicts. This results in a medium-term capacity of 677 households for this area, a reduction of 292 from the original WCGM22 prediction.

3.3.2 Area K – Commons Lifestyle Village

Mr Yeoman clarified within his response to Minute 5 that WCGM22 considered retirement villages, although not at their ultimate yield, but instead as the yield that would be realised under normal development. This approach as been taken when assessing these areas, with the same methodology used as when assessing greenfield sites with a 12.5% allowance made for stormwater treatment. This resulted in a predicted yield of 114 lots on the Commons Lifestyle Village site as identified by Mr Yeoman in his Maps attached to his response to Minute 5. This result is 17 lots less than originally predicted by WCGM22.

3.3.3 Area L – Woodland Estate

The master plan for the Woodland Estate development was available online. Mr Yeoman has identified the Woodland Estate Subdivision as being Stage 3 based upon the map he provided in his response to Minute 5.

The yield from Stage 3 is found to be 75 lots. This is lower than WCGM22 by 29 lots. Woodland Estate Stage 3 will have its stormwater managed in the downstream stormwater management area as constructed as part of the earlier stage. This stormwater management area also makes allowance for Area M – Eders as identified by Mr Yeoman.

3.3.4 Area M – Eders

As mentioned above, this area will have its stormwater managed by the downstream stormwater management area, this means that a density of 15 houses/hectare has been applied over the gross site area (i.e. a 12.5% deduction is not necessary here). This results in a yield of 45 lots, 3 more than predicted by WCGM22.

It should be noted that a dwelling has been constructed on this site and completed at the beginning of 2023. This dwelling has a floor area of 320m² and may impact the potential yield from the site due to the dwelling's location and size. This has not been considered in either assessment.

3.3.5 Parsonage/Gladstone North

This area identified by Mr Yeoman in his maps attached to his response to Minute 5 relates to the lots identified in WCGM22 between Parsonage Road and Eders Road. The WCGM22 model predicted 101 lots within this area (when referring to the mapped area presented in Appendix 1 of Mr Yeoman's response to Minute 5). However, accounting for the gross area of 9.07ha, a 12.5% allowance for stormwater management, and a density of 15 houses/hectare, this results in a predicted yield of 119 lots. This estimated yield is 18 lots more than WCGM22 predicts. When comparing the predicted yield of 119 lots to the listed capacity in Mr Yeoman's table of 148 lots, the estimated yield is 29 lots less. The differing numbers here are a result of what lots are allocated to certain areas in the table and on the maps.

3.3.6 Gladstone South

This area identified by Mr Yeoman in his maps attached to his response to Minute 5 relates to the lots identified in WCGM22 between Eders Road and Gladstone Road. This is a total of 5.57ha, and after a 12.5% allowance for stormwater management and a density of 15 houses/hectare, this results in a predicted yield of 73 lots. The WCGM22 model predicted 65 lots within this area (when referring to the mapped area presented in Appendix 1 of Mr Yeomans response to Minute 5). This estimated yield is 8 lots more than WCGM22 predicts. When comparing the predicted yield of 73 lots to the listed capacity in Mr Yeoman's table of 18 lots, the estimated yield is 55 lots more. The differing numbers here are a result of what lots are allocated to certain areas in the table and on the maps.

The overall result of our assessment to this area (Parsonage/Gladstone North and Gladstone South) is the same either way it is calculated. 18 lots more + 8 lots more = 26 lots more overall. Alternatively, 29 lots less (-29) + 55 lots more = 26 lots more overall.

3.3.7 Area N – Pegasus

The area identified as Pegasus in Mr Yeoman's Map was easily identified in the WCGM22 data. Our assessment found that a number of lots in this area had been developed with houses completed already. There was also a reserve identified in this area (assumed as 2 additional/new lots in the WCGM22). The larger of the areas identified within Pegasus entailed the largely completed Mike Greer Homes development, where the WCGM22 model predicted a yield of 85 lots. However, this development is nearing completion with most of the dwellings already completed and occupied.

The Maps provided by Mr Yeoman identified a number of lots on Lakeside Drive as being included in the "Pegasus" subdivision area N. Reviewing the raw model data and historic parcel ID's (Parcel ID's are updated if a lot is subdivided) there was no match found for these lots within WCGM22. On this basis, we added an additional 16 allotments to the capacity for this area, noting it had otherwise been overlooked in the WCGM22.

Accounting for the above, the total number of available lots to provide household capacity (i.e. lots not already developed with completed houses) was found to be 86 lots. This was found to be significantly lower (by 283 lots) than the 369 lots predicted by WCGM22.

3.3.8 Woodend/Pegasus Vacant Lots

For the Woodend/Pegasus area (outside the Greenfield areas as per Mr Yeoman's maps), vacant Lots were identified as lots with 0 buildings on them in the WCGM22 dataset. A number of these lots were found to have houses or buildings already on them. It was also found that a number of lots had been included that are subject to restrictive covenants that prevent further subdivision of the land. WCGM22 had identified a number of these lots as being able to provide 2 or more additional lots in the medium term. This, along with the fact that many of these parcels now have dwellings completed on them further reduces the capacity available in the medium term as it has already been realised.

WCGM22 featured multiple utility reserves (wastewater pump stations) and recreation reserves in the vacant land category (assumed as 14 additional/new lots in the medium term in WCGM22).

Vacant lots were verified by first reviewing aerial imagery flown at the beginning of 2023 by the Waimakariri District Council to identify if a dwelling had been constructed on the remaining viable vacant sites. This was then confirmed by visiting the sites to confirm the buildings had been completed along with checking to see if any additional lots had completed buildings on them since the aerial imagery was flown.

The yield potential was also checked for multiple developments by checking the restrictive covenants to see if there was anything to prohibit further development. It was found that within Pegasus (inside and outside of Area "N") a number of lots identified by Mr Yeoman in WCGM22 featured restrictive covenants that specified minimum floor area for buildings and prohibited further subdivision of the land. The vacant lots within the Ravenswood development (outside of Area J) are covered by restrictive covenants that prevent further subdivision or sale of the land without improvements. This meant that lots could only have a yield of 1 if there was not a house already completed due to the inability to further subdivide. Examples of the covenants are included in **Appendix E**.

Lots within the existing stages of the Woodland Estate subdivision (inside and outside of Area "L") are subject to covenants however, there are no apparent restrictions on further subdivision based on our review. Lots that had been completed were removed from the capacity assessment, and lots under construction were considered as providing only a single dwelling in the medium term. This assumption that dwellings under construction would only provide a single lot was based on the assumption that a brand-new dwelling would not be demolished to create 2 lots in the medium term.

This resulted in a vacant lot yield of 209 lots within Woodend, Ravenswood and Pegasus, 204 lots less than originally predicted by WCGM22.

3.3.9 Woodend/Pegasus Infill/Intensification

There were only 2 lots identified as providing infill/intensification in WCGM22. Both lots identified could support further subdivision to allow intensification.

4 Mr Yeoman's evidence & response to Minute 5

Mr Walsh's memo in **Appendix A** notes the errors in Mr Yeoman's approach to including stormwater areas within the 25% allowance for local infrastructure and this has been accounted for in our review and analysis above.

We otherwise note that Mr Yeoman has stated multiple times within his summary of evidence and in his response to Minute 5 that he believed in our original evidence we had identified only 53 dwellings in the medium term that had been included in error. We are unsure as to how he came to this conclusion of the number 53, noting we identified the following in our initial examples:

- Recreation Reserves – 39 Lots
- Utility Reserves – 22 Lots
- Streams and Rivers (Northbrook) – 3 Lots
- Council Property (Water treatment plant etc.) – 5 Lots

This accounts for 69 lots before taking into consideration the other factors that were investigated as part of this memo. In our view, Mr Yeoman's response still fails to acknowledge major errors in the WCGM22 which clearly overstates capacity as evident in the table above and analysis which follows.

As a concluding comment, we note that whilst our analysis does not examine the long term, the capacity shortfall and inherent errors in the model described above will affect long term calculations of capacity in the same way. Those calculation errors and reliance on capacity in uncertain areas such as the Kaiapoi NDA risk compounding the overestimation of capacity and the underestimation of any shortfall in supply.

5 Conclusion

In summary, this analysis finds that:

- Actual household capacity is approximately 4361 households, which is 1573 households (or 26.5%) less than the 5934 households anticipated by the WCGM22 and translates into 1239 household shortfall (rather than 350 surplus) in the medium term based on the HDCA 2023.
- This conclusion potentially:
    - underestimates the shortfall insofar that feasible yield from infill lots (lot shape), economic benefit from the existing dwelling values, ability to develop to the densities in WCGM22 due to downstream constraints (i.e. existing infrastructure network constraints constraining development) has not been considered in my review.
    - underestimates the supply insofar that some developers may achieve higher yields than 15 houses/hectare and the WCGM22 Model may have missed some lots as was found with a very small number missed in Pegasus.

  However, such variance is unlikely to materially alter the conclusion above that the WCGM22 model overstates household capacity.

Appendix E | Land Covenant Examples

RAVENSWOOD RESTRICTIVE COVENENTS

Land Use Restrictions

3.36 No Lot shall be used for any form of temporary residential purposes either by the construction of temporary Buildings or by the placement of caravans, modular homes, mobile homes, motor homes, house trailers, buses, tractors, huts, tents and/or vehicles able to be used for human habitation except for a builder's shed at the commencement of, and for the duration of construction, of any dwelling being erected on the Lot.

3.37 Lot Owners must not use any Lot for any primary purpose other than for residential occupation unless previously agreed in writing by a duly authorised representative of Ravenswood. Ancillary purposes are governed by the planning provisions under any regulatory land use controls applicable from time to time.

3.38 No Lot shall be sold, leased, transferred, assigned or otherwise disposed of to any Governmental agency or Territorial Authority for the purposes of public or institutional housing without the prior approval of Ravenswood.

3.39 No inflammable, explosive or noxious materials are to be stored or used on any Lot or in any Building. The Lot Owner must not allow any offensive activity to be conducted or permitted to exist upon any Lot, or in any Building, nor shall anything be done or permitted to exist on any Lot or in any Building that may be or may become an annoyance or private or public nuisance. An annoyance or private or public nuisance includes loud sounds or noises or offensive smells.

3.40 No Lot, driveway or common area shall be used for the purpose of long term vehicle parking, repair or maintenance. No unregistered, non-licensed or expired license or inoperable vehicles of any kind shall be permitted to remain on any Lot (unless parked inside the garage).

3.41 No recreational or commercial vehicles boats or trailers are to be regularly located on the road or in front of the Building line of the main Building constructed or to be constructed on the Lot.

3.42 No Lot may be further subdivided nor shall any further easements be agreed to, granted or registered on any Lot, including rights of way.

TOWNSEND FIELDS RESTRICTIVE COVENENTS:

ANNEXURE SCHEDULE

The Covenantor:

1. **No Subdivision**

   Shall not further subdivide the land either by way of unit plan, cross-lease or fee simple subdivision, but this shall not apply to a boundary adjustment between two lots which does not create any additional record of title.

PEGASUS RESTRICTIVE COVENENTS

(3.44) No Lot may be further subdivided nor shall any further easements be agreed to, granted or registered on any Lot, including rights of way.

MANSFIELD DRIVE RESTRICTIVE ENCUMBRANCE

1. (a) The Grantor shall not cover the surface of any of the said lots with more than 300m2 of any substance impervious to water (including buildings).

(b) The Grantor shall not further subdivide any of the lots by any means whatsoever including Cross-Lease Titles and the Unit Titles Act 1972.

(These covenants shall be called "the secured covenant" provided that the secured covenant shall be enforceable only against the registered proprietors and occupiers for the time being of the said lots and not otherwise against the Grantor and its successors).