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Manatū Mō Te Taiao



National Policy Statement on Urban Development Capacity

Price efficiency indicators technical report: Land concentration control indicators

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1. Introduction

This technical report sets out the approach to developing an experimental set of indicators of land concentration for urban places in New Zealand. It also presents the results of this analysis for Christchurch, Hamilton, Queenstown and Tauranga.

These results, along with results for other areas, are available on the Urban Development Capacity dashboard on the Ministry of Business, Innovation and Employment's website: <http://urban-development-capacity.mbie.govt.nz>

This technical report should be read alongside part six of the *Guide to evidence and monitoring* on the Ministry for the Environment's website, which explains how to interpret the indicators: <http://www.mfe.govt.nz/publications/towns-and-cities/national-policy-statement-urban-development-capacity-guide-evidence>

The land concentration control indicators provide information about how concentrated the ownership of undeveloped residentially zoned land is in different urban places. They indicate whether the decisions of a few individual land owners have the potential to significantly affect the supply and price of land for residential development, and hence affect housing supply.

Land concentration control indicators do not directly measure the competitiveness of urban land markets, or indicate the presence of "land banking". Even if land ownership is concentrated, major land owners may prefer to promote development rather than holding land off the market. However, the *potential* for land banking is higher when ownership is more concentrated. Where a small number of people or institutions own a significant share of land in a given urban area, then it will be especially important to understand their development intentions.

The indicators complement other price efficiency indicators available on the Ministry of Business, Innovation and Employment's website, which provide information about the impact of land use regulation on the supply and price of urban land and housing.

2. Description of indicators

Three sets of information are provided for each extended urban area (and will also be provided for urban zones within the Auckland and Wellington urban areas):¹

¹ The land concentration indicators were calculated for areas zoned for urban residential development within:

- a) Extended urban areas, which are the areas of territorial authorities that have jurisdiction over an urban area (as defined by Statistics New Zealand in 2017). In some circumstances this is one territorial authority area (eg Auckland). In others it is the combined areas of several territorial authorities (eg the urban residentially zoned land within Christchurch City, Waimakariri and Selwyn Districts has been combined to produce indicators for the Christchurch extended urban area). In the case of Queenstown, the indicators are focused on the urban residentially zoned land around Queenstown and exclude Wanaka.

and

- b) The urban zones within the Auckland and Wellington urban areas defined by Statistics New Zealand in 2017.

1. A table showing the total area of land zoned in the relevant district plan/s for urban residential development and the proportion of this that is “undeveloped”². Statistics New Zealand estimates of population for urban areas and zones are also provided alongside this information.
2. An index of land concentration control of undeveloped land that is zoned for urban residential development. This index produces a single number from close to zero (highly distributed ownership where each parcel is the same size and is owned by a different entity) and 10,000 (where all of the land would be owned by one entity). A bar chart is provided comparing the results of different urban areas and zones.
3. A table identifying the largest owners of undeveloped land zoned for residential development, the number of titles and total area of land that they each own, and their share of the market; and a map of where the parcels are located.

The indicators focus on undeveloped land that was zoned for urban residential development in district plans at the time of the most recent valuation.

These indicators are designed to be used as a package. Together they indicate:

- how much space for residential development is available within the constraints of geography and district plans
- how concentrated or distributed the ownership of these development opportunities is
- whether there are single land-owning entities with enough of a market share to materially affect the supply and price of land for development; who these entities are, and where their titles are located.

3. Method

Land concentration control indicators use three sources of data:

- CoreLogic’s rating valuation data, which provides information on the zoning of individual sites within urban areas, existing land use, building floor area and property valuations, which are used to estimate capital/land value ratios
- Land Information New Zealand’s (LINZ) land parcels and titles database, which provides information on parcel sizes and the names of people and/or companies listed as owners on the title
- Companies Office data on companies and their shareholders and holding companies, which can be matched to land title data to identify owners that are related via company structures.

The following steps were taken to develop the indicators:

First, the extent of the market for residential-zoned land was defined to include all undeveloped land within an extended urban area or Statistics New Zealand urban zone that

² Land is defined as “undeveloped” where any existing buildings fall beneath a very low capital value/land value ratio and site coverage threshold – see section 3.1.3.

was zoned in district plans for residential development at the date of the most recent valuation. Filters were applied to identify undeveloped land parcels with potential for further development.

Next, within this subset of land, land titles were grouped by matching the names of people and/or companies listed on the titles, and their significant shareholders and holding companies. Such a grouping was defined as a single land controlling entity. There are three main types of land-controlling entities:

- **individual entities**, ie individual people or organisations that own one or more undeveloped residential-zoned sites
- **related entities**, ie groups of companies that are ultimately owned by the same person (or people) and hence which can exercise control over multiple sites
- **ownership consortia**, ie groups of people who are all listed on the title of one or more sites and who have to cooperate in order to exercise control over those sites.

3.1. Calculating the land concentration index of control

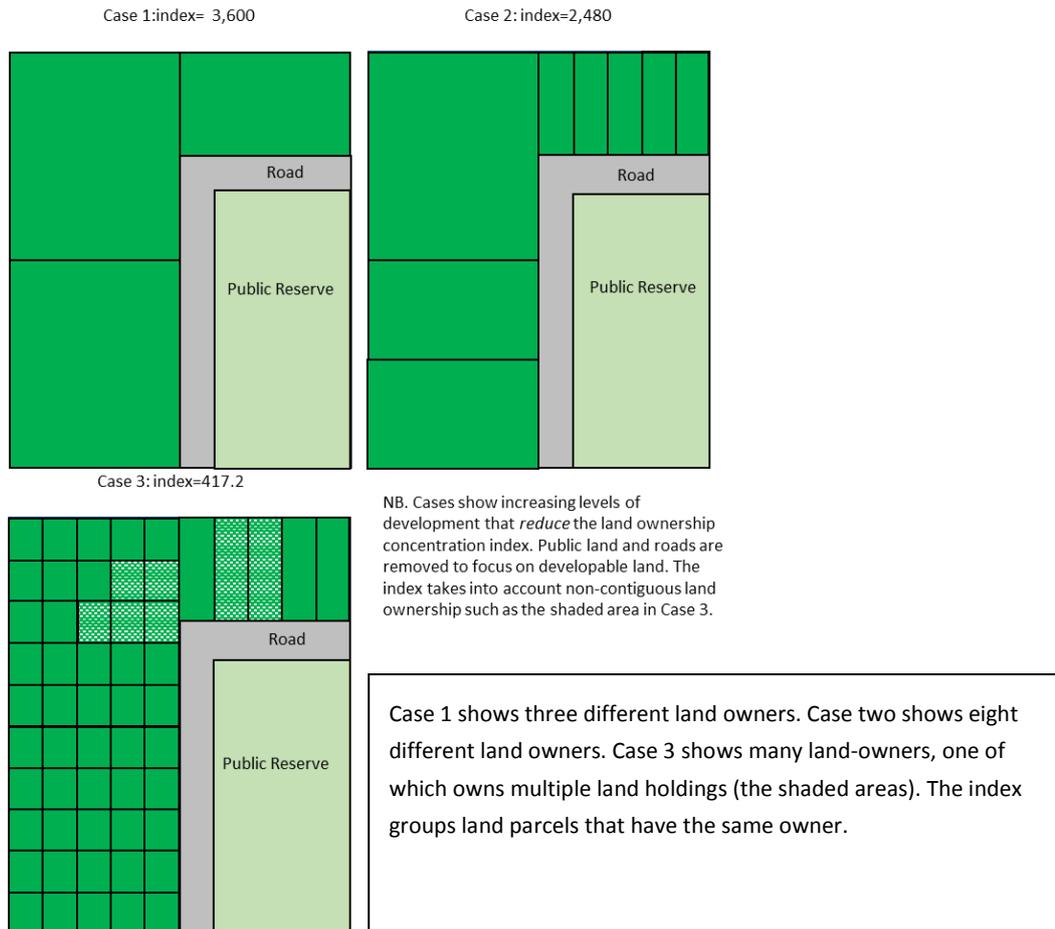
The land concentration index of control was produced after defining the amount of developable urban residential land, and grouping related individuals and companies. The index was calculated by:

- adding together the total area of undeveloped residentially zoned land in each urban area or urban zone within a city.
- squaring the percentage shares of this land market held by each individual land-owning entity, to derive an index.³ This index ranges from near zero⁴ (where each land parcel is the same size and is owned by a separate land-owner) to 10,000 (where all land is held by one land-owner).

³ In the competition economics literature, this is often referred to as a Herfindahl-Hirschman index.

⁴ The index was not normalised as a small number of firms is itself an indicator of concentration. The non-normalised index ranges from $(10,000/\text{number of owners})$ to 10,000. See Craacu et. al 2016.

Figure 1: Stylised case studies of the land market concentration index



The concept is illustrated in Figure 1, which provides three case studies that show how land ownership at the edge of cities often becomes less concentrated as large rural sites are subdivided and urbanised. In case 1, land holdings are relatively concentrated across three owners and the index has a high value. Case 2 shows less concentrated land holdings. The second landowner split their land in half and the third landowner created five plots from their land, and both sold these to several different owners. Case 3 shows many smaller land-owners and the index has the lowest value.

3.2. Defining the land market of focus

The demand for and supply of land with particular attributes is what determines its price. Each land parcel does have unique attributes. However land parcels in the same location, which are zoned for the same use and that are developed to a similar level, can be considered comparable or even substitutable – it is possible to define a distinct market for such land.

The land concentration indicators are focused on land that can be newly developed with urban homes. In other words: undeveloped land that is zoned for residential development within

each extended urban area. In most cases it is predominantly what would be called “greenfield” land.

This is the land where local authority plans and infrastructure currently enable most of the development capacity for housing.

Land concentration indicators could also be developed for other land markets, using the methods outlined in this paper, eg:

- Residential re-development opportunities within already settled urban areas (eg where zoning enables intensification)
- Business land
- Rural areas

3.2.1. Defining the urban place

The geographic starting point for these indicators was the “extended urban area”. This is the largest geographic unit of analysis used for the market indicators and other price efficiency indicators on the Urban Development Capacity.

An extended urban area comprises the full area of territorial authorities that have jurisdiction over an urban area as defined by Statistics New Zealand in 2017. In some cases a Statistics New Zealand urban area might cover part of the areas of several territorial authorities and so all of them are included in the extended urban area. For example, the greater Christchurch extended urban area includes the areas of Christchurch city and Selwyn and Waimakariri districts. This reflects that fact that urban settlement has created a single housing and labour market crossing the boundaries of these local authorities.

The land concentration indicators focused on land within these extended urban areas zoned for residential development consistent with those used in the rural-urban differentials, another price efficiency indicator available on the Urban Development Capacity⁵.

For Auckland and Wellington, land concentration indicators will be provided for subsets of these urban areas – acknowledging that land in these smaller areas will have more similar locational attributes and might comprise distinct sub-markets.

Table 1 lists the extended urban areas and zones used for these indicators, and related territorial authority areas.

⁵ For more information on this method see the rural-urban boundaries technical report – Section 2.2.

Table 1: Extended urban areas and Statistics New Zealand urban zones used for the land concentration indicators, and related territorial authority areas

Extended urban area	Statistics New Zealand urban zone	Territorial authority area
Whangarei		Whangarei District
Auckland	Northern Auckland Zone Western Auckland Zone Central Auckland Zone Southern Auckland Zone	Auckland Council
Hamilton		Hamilton City, Waikato District, Waipa District
Tauranga		Tauranga City, Western Bay of Plenty District
Rotorua		Rotorua District
Gisborne		Gisborne
Napier-Hastings		Napier City, Hastings District
New Plymouth		New Plymouth District
Palmerston North		Palmerston North City
Greater Wellington	Wellington Zone Lower Hutt Zone Upper Hutt Zone Porirua Zone Kapiti	Wellington City, Hutt City, Upper Hutt City, Porirua City, Kapiti District
Blenheim		Marlborough District
Nelson		Nelson City, Tasman District
Christchurch		Christchurch City, Selwyn District, Waimakariri District
Queenstown		Queenstown-Lakes District
Dunedin		Dunedin City

3.2.2. Defining land with residential zoning

Within the extended urban areas and zones, only land parcels zoned in district plans for urban residential development (at the time of the most recent valuation) were selected⁶. In the CoreLogic data⁷ these are parcels with the “Land_Zoning_Code” = “5” field.

All of the rural land was discarded, along with urban land zoned for other purposes such as roads, reserves or hydro, and land with no associated owner, by applying the following Land Information New Zealand (LINZ) filters:

⁶ Land available for Special Housing Areas but not zoned residential, or which has been zoned residential since the most recent valuation date, is not included in these indicators.

⁷ The Corelogic data is derived from the district valuation roll which councils are required to maintain to minimum standards (Rating Valuations Act). As such, the base unit is the rateable unit. Data was linked to LINZ parcel data using a Corelogic matching table.

- Parcel intent is one of “DCDB”, “Fee Simple Title”, “Maori”, “Lease”, “Lease 20 years or More” (LINZ primary parcels “parcel_int” field)
- Parcel was not described as road (LINZ primary parcel “statutory_” field)
- Title type was not “Supplementary Record Sheet” (LINZ title “type” field for land that typically has no associated owner).

For multi-zone parcels, if one of the zones were residential then it was included.

Some land used for public infrastructure or reserves may in fact be zoned in district plans as residential (potentially with a designation over it). Local authorities are often the primary owners of such sites. It was not possible to identify these sites using the data base coding. Separate land concentration indicators are therefore also provided that exclude undeveloped residential land owned by local authorities.

3.2.3. Defining undeveloped land

The land concentration indicators focus on land available for *new* development (ie zoned land that is mostly undeveloped).

Urban land zoned for residential development was defined as mostly “undeveloped” where it was large enough to be developed, and any existing built structures comprised a small percent of the land area and value. The data was filtered to include only land parcels:

- with an area > 300m² (LINZ parcel “survey_area” or “calc_area” field) because most District Plans still prohibit development on sites smaller than this,
- where (Building_Floor_Area / Area) < 0.2 (Corelogic floor area and LINZ area), and
- where CV/LV < 1.1 (Corelogic CV and LV fields).

The effect of these filters is to include sites that might have a farmhouse on them (for example) but plenty of other room for development.

This undeveloped land includes greenfields land, both raw and subdivided, and infill sites in existing urban settlements⁸: However the concentration index is dominated by the large greenfield sites, and hardly affected by the small infill sites. This is where most development is focused in most New Zealand cities, rather than on redevelopment sites which is becoming more common in places like Auckland.

3.3. Grouping land-owning entities with the same name, shareholding or ultimate ownership

There are several ways of defining a land owning entity. It is a complex subject as people and companies structure various arrangements to directly or indirectly own land, benefit from it and/or make decisions about it. All of these arrangements could contribute to a situation

⁸ It would theoretically be possible to attempt to separate greenfields and infill sites into separate markets, using land parcel sizes as a proxy. However this would require careful judgement as the data suggests that “typical” subdivided or infill parcel sizes vary by urban area.

where some individuals and/or companies are in a position to significantly impact the supply and price of land that is brought to market for development.

The land concentration indicators used a conservative approach based on exact name matching and the Companies Act definition of a “related company”⁹ to group land owning entities. It is conservative in that it would be more likely to underestimate than overstate the concentration of land control (and decision-making) in local land markets.

The index was calculated after identifying undeveloped urban residential land parcels controlled by the same entity for each area. Such a grouping was defined as a single land controlling entity. There are three main types of land-controlling entities:

- **individual entities**, ie individual people or organisations that own one or more undeveloped residential-zoned sites
- **related entities**, ie groups of companies that are ultimately owned by the same person (or people) and hence which can exercise control over multiple sites
- **ownership consortia**, ie groups of people who are all listed on the title of one or more sites and who have to cooperate in order to exercise control over those sites.

In practice, this means that entities were grouped together where:

- The name of the individual person or company listed on the title were exactly the same
- The name of the individual or company listed was exactly the same as the name of an individual or company that owns over 50 percent of shares in a company that was also a landowner
- The company listed on the title was a holding company of another company or had the same ultimate holding company.

A range of other approaches were also tested but discarded (including linking company directors and their other directorships). The chosen method is consistent with the Companies Act definition and produces a conservative definition of a land owning entity.

3.3.1. Matching names on land titles

Titles with the exact same names listed on them were grouped, on the assumption that the land was owned by the exact same person or company. This same-name matching method was the primary definer of a single land owning entity.

⁹ In the Companies Act, a company is related to another company if—

- (a) the other company is its holding company or subsidiary; or
 - (b) more than half of the issued shares of the company, other than shares that carry no right to participate beyond a specified amount in a distribution of either profits or capital, are held by the other company and companies related to that other company (whether directly or indirectly, but other than in a fiduciary capacity); or
 - (c) more than half of the issued shares, other than shares that carry no right to participate beyond a specified amount in a distribution of either profits or capital, of each of them are held by members of the other (whether directly or indirectly, but other than in a fiduciary capacity); or
 - (d) the businesses of the companies have been so carried on that the separate business of each company, or a substantial part of it, is not readily identifiable; or
 - (e) there is another company to which both companies are related;—
- and **related company** has a corresponding meaning.

Titles with similar but not identical names were not grouped.

There are two risks associated with the same-name matching method:

- “False positives” where for example there are two “Jane Smiths” and each is listed on a separate title that are wrongly grouped
- “False negatives”, where for example the same person’s name is listed on one title as “Jane Smith” and on another as “J. Smith”, the two titles are not grouped.

The risk of false positives occurring is much reduced by the restriction of the land market to the urban area and undeveloped land. False negatives remain a risk. The lists of largest landowners in each extended urban area were checked for these risks, and corrections were made to address a few false negative situations where large land owners were listed as “City Council” on some titles and “The City Council” on others¹⁰. Titles indicating ownership by the Crown (“Her Majesty the Queen”) were grouped with that of the Crown agency Housing New Zealand.

3.3.2. Matching with company shareholder names

The Companies Act defines companies as related when one has over 50 percent shares in the other. This threshold means that the shareholder is not only a beneficial owner of the company but also controls shareholders’ votes and is in a position to direct its significant decisions. This is a conservative threshold signalling when links between people and companies listed on land titles would be likely to result in aligned decision-making about that land.

Three alternatives to this were also tested but discarded:

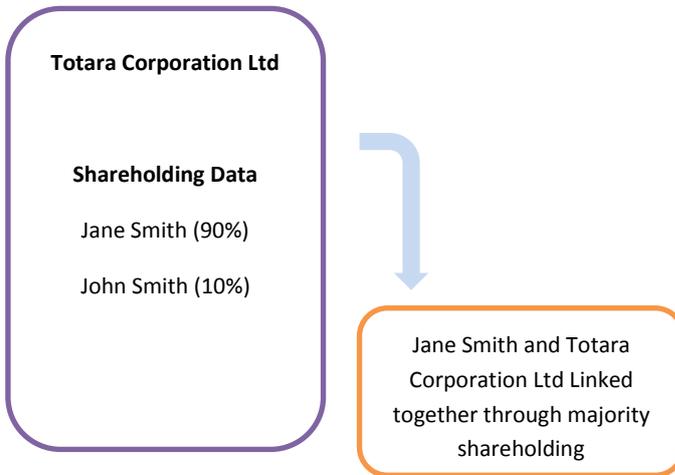
- Grouping where the name of an individual is the same as a director of a company
- Grouping together all the companies a director may be a director of
- Grouping entities where the names of an individual or company is the same as any shareholder of a company on another title (ie without the >50 percent shares threshold)
- Grouping entities using both shareholders and directors.

These alternatives produced higher land concentration indices, but for most local areas this was not significant.

Figure 2 shows of an example of grouping entities by the shareholder rule. Jane Smith is the majority shareholder of Totara Corporation Ltd so the two entities are related together.

¹⁰ Note that LINZ title ownership information is used. These may include owners that no longer exist. For example, titles listed as owned by borough councils, these will show under the listed name e.g. “LYTTELTON BOROUGH COUNCIL.”

Figure 2: Majority company shareholding



3.3.3. Holding companies as the ultimate land owning entity

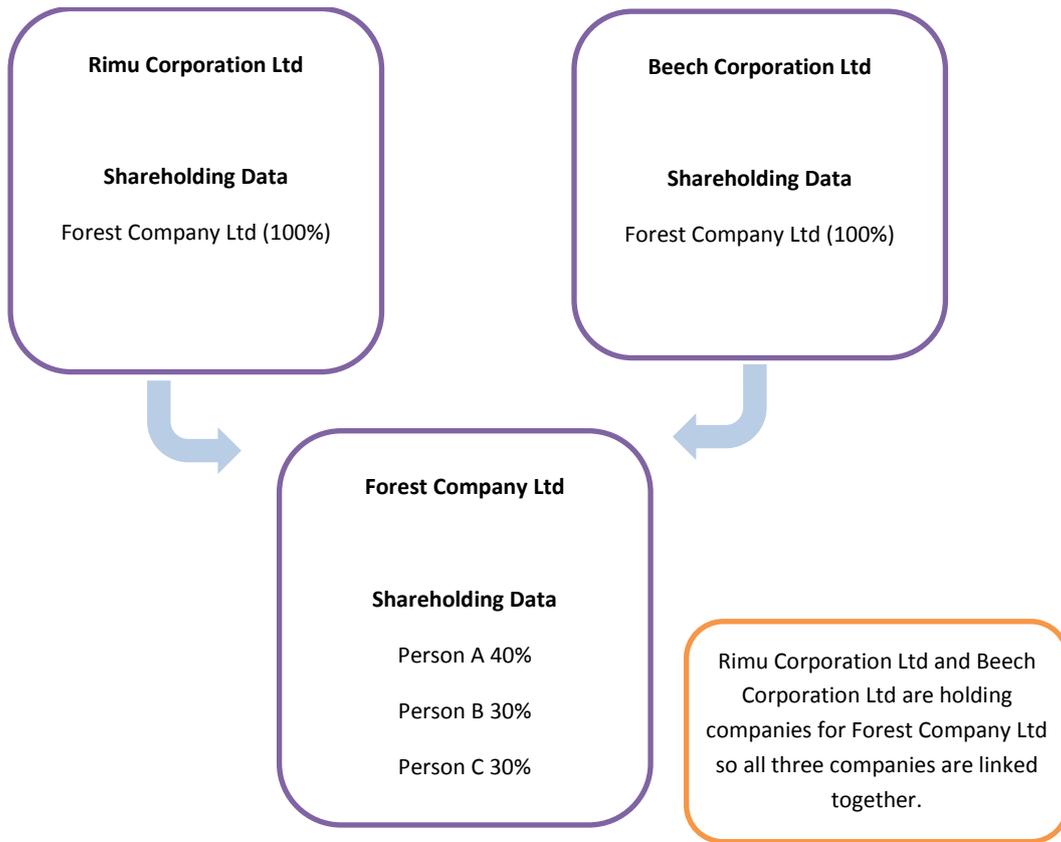
The land concentration indicators define a holding company of separate companies listed on land titles as the ultimate land owning entity (where information about this is available¹¹). This approach is consistent with the Companies Act definition of a related company and:

- identifies the ultimate beneficial owner
- appropriately groups together different companies listed on titles that are set up to undertake individual developments on behalf of a common parent company.

This approach is illustrated in Figure 3, which shows how the holding company rule can relate companies. Rimu Corporation Ltd and Beech Corporation Ltd are both holding companies of Forest Company Ltd. Forest Company Ltd is the ultimate holding company. Rimu Corporation Ltd, Beech Corporation Ltd and Forest Company Ltd are related together. Note if the ultimate holding company does not own land in our developable market subset it can still be used to tie the child holding companies together.

¹¹Companies were required to enter the information the first time they either filed their annual return or updated their company information after 1st May 2015. Any new companies incorporated from this date also had to record details of their Ultimate Holding Company (if they had one).

Figure 3: Holding company relations



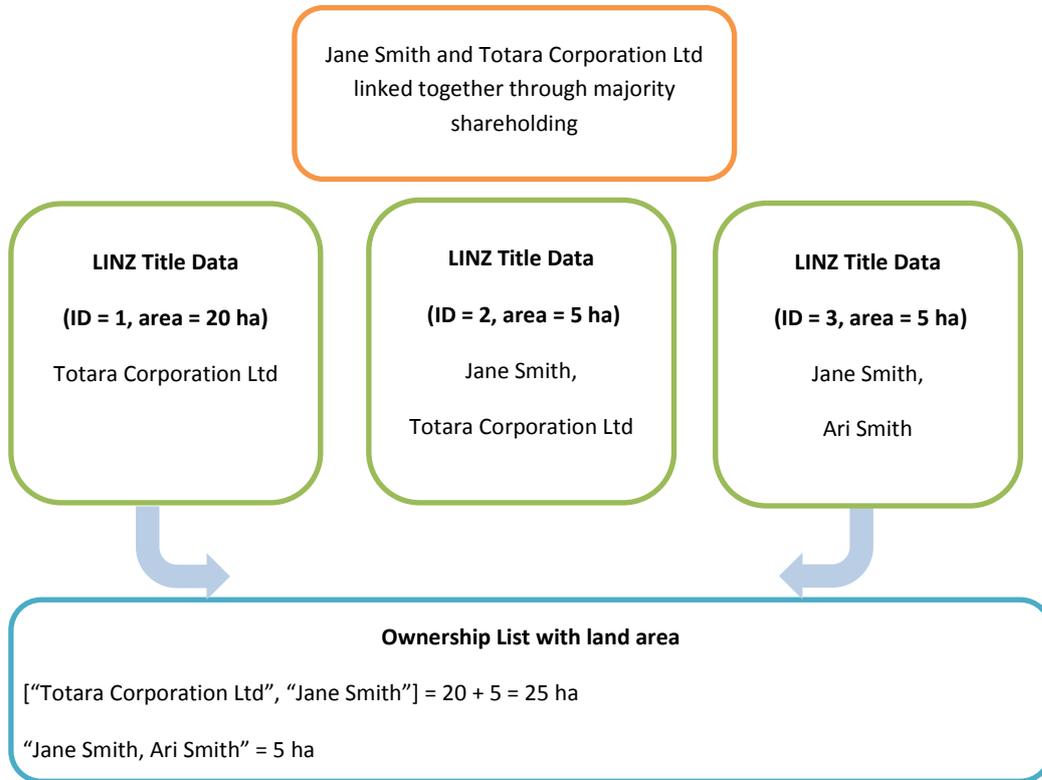
3.3.4. Applying matching to titles

About 53 percent of all titles in our extended urban areas have only one owner. These single title owners account for 62 percent of all developable land area¹². Multiple owners on the title make up the remainder. About 24 percent of the land area is held by two owners, and the remaining 14 percent owned by three or more owners. In multiple owner situations there can be mix of company and individual ownership. When there is more than one owner we don't know how much control any single owner exerts over the sale of the property. The matching using shareholder and holding companies was not applied to multiple owner situations. The exception was in the cases where all the title owners have been related together using holding company or majority shareholder rules and these are the only owners on the title.

¹² Supporting tables and figures

Table 7 in the Appendix shows the percentage for other numbers of title owners.

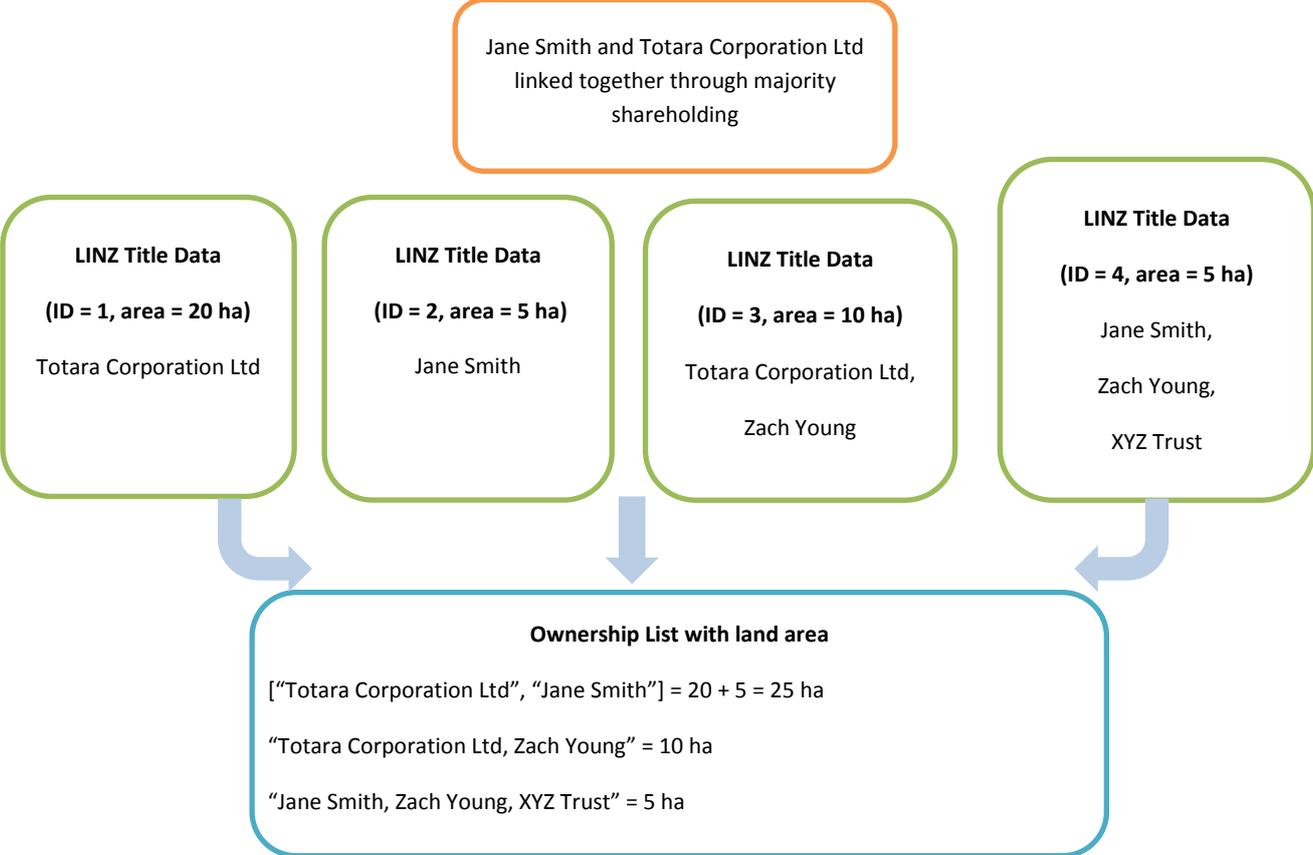
Figure 4: Example 1 of title grouping



In Figure 4, three residential undeveloped land sections are owned by three different owners. Jane Smith is a majority shareholder of Totara Corporation Ltd so these two entities are linked together by the shareholder matching rule. The second title has multiple owners with an individual (Jane Smith) and company (Totara Corporation Ltd) on the title. Even though there is more than one owner, all owners have been related together; hence they are treated as one controlling entity, a related entity, in the ownership list.

In the third title Jane Smith and Ari are owners together, and may be partners, but we don't know who has control. They have not been related using shareholder or holding company rules, so are considered separate entities. The third title is listed separately in the ownership list as a consortium. The total area is the sum of the area for each title held by each owner. Where there has been a grouping this is indicated through brackets. These groups are then used to calculate ownership share.

Figure 5: Example 2 of title grouping



In Figure 5, there are a number of undeveloped land sections owned by various different owners. As before, Jane Smith is a majority shareholder of Totara Corporation Ltd. The titles owned only by Totara Corporation Ltd is grouped with the title owned only by Jane Smith since these two owners on the title have been related together. If there were any other titles with only these exact names on the title they would also be included.

In the third title Totara Corporation Ltd and Zach Young are owners together. There is no grouping because there is more than one owner on the title and there is no evidence for a relation between Totara Corporation Ltd and Zach Young. In the fourth title there are three owners with one of them being Jane Smith. As there is more than one owner, and not all the owners are controlled by Jane, they are not linked with other any titles.

In the ownership table the grouped titles are listed together and Totara Corporation Ltd and Jane Smith appear multiple times. The consortium of owners in title 4 are listed together, but have not been linked together.

An alternative method considered was to list each entity separately and apportion land in the cases of multiple owners (e.g. two owners would be apportioned half the land each). This was tested and had a small reduction effect on the index (see Table 5 and discussion in section 7.1.1) but was not used in the final indicators as it does not provide information who controls the land.

4. Results

The following tables present the first land concentration indicator results for Hamilton, Tauranga, Christchurch and Queenstown.

Table 2 shows the total amount of land zoned as residential in District Plans at the latest valuation date, and the proportion of this which was still undeveloped, and compares this information to the urban area population.

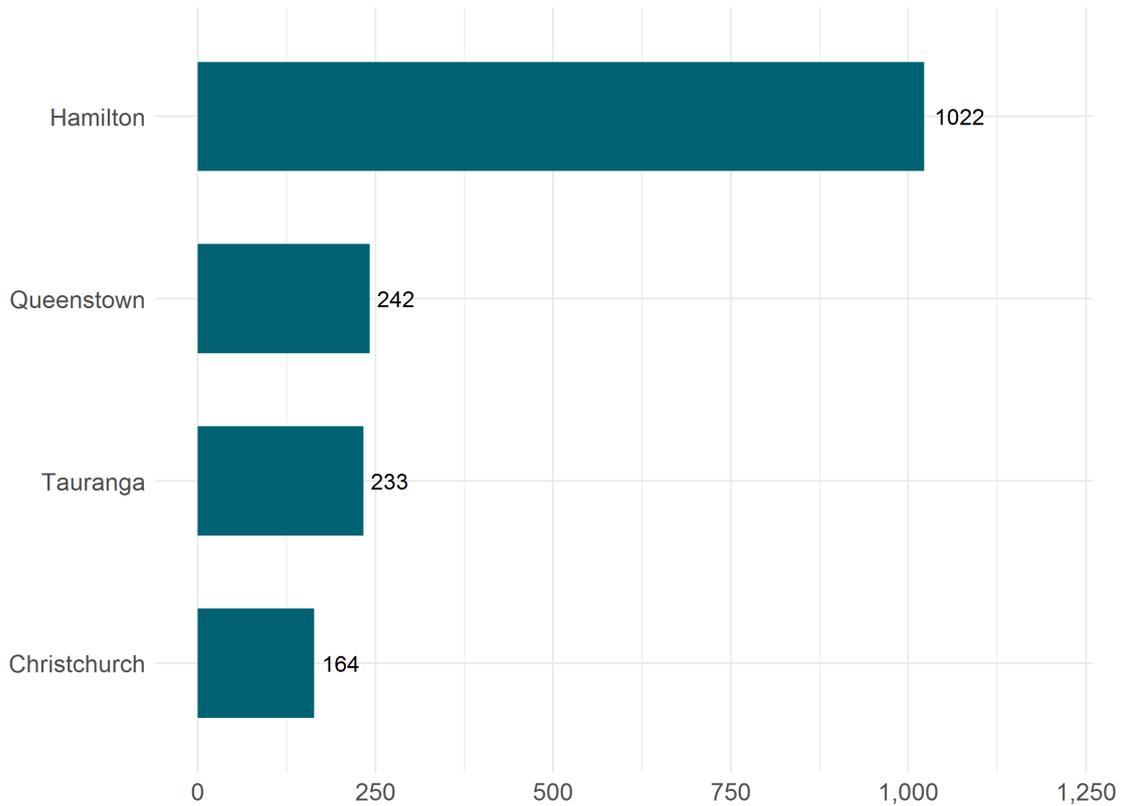
Table 2: Total urban developable residential land

Extended urban area	Valuation date	Total residential land (ha)	Undeveloped residential land (ha)	Percentage of undeveloped residential	Urban area population (2017)	Population density (pop per residential ha)
Hamilton	2015-2017	4,250	408	10%	235,900	55.5
Tauranga	2015-2016	4,838	777	16%	137,900	28.5
Christchurch	2015-2016	15,131	2,515	17%	396,700	26.2
Queenstown	2017	1,234	343	28%	15,300	12.4

The size and density of urban areas varies with their geography and past settlement patterns (and point in their District Planning cycle). Hamilton, Tauranga and Christchurch are all relatively large flat areas but Hamilton is noticeably more densely settled. Queenstown still has a predominance of large residential parcels. Hamilton and Tauranga have signaled their intention to further rezone land for new residential development.

Figure 6 shows the degree of land concentration of control in these urban areas, calculated for land that was zoned for urban residential development at the time of the most recent valuation.

Figure 6: Land concentration index (undeveloped land zoned residential at latest valuation)



This shows that Hamilton has the greatest degree of land concentration control, with an index of 1,022. Corresponding to this, 25 percent of its undeveloped land currently zoned for residential development is owned by one landowning entity which contributes 625 points to the index (see Table 3). In many markets this percentage share would be considered competitive. However, in land markets that are already constrained by zoning and the availability of infrastructure, it may represent the potential for one landowner to prevent development of enough capacity to meet demand¹³.

¹³ Indeed it may suggest that Hamilton needs to provide a significant margin of additional development capacity on its District Plan over and above projected demand, to meet policies PC1 and PC2 in the National Policy Statement on Urban Development Capacity:

PC1: To factor in the proportion of feasible development capacity that may not be developed, in addition to the requirement to ensure sufficient, feasible development capacity as outlined in policy PA1, local authorities shall also provide an additional margin of feasible development capacity over and above projected demand of at least:

- 20% in the short and medium term, and
- 15% in the long term.

PC2: If evidence from the assessment under policy PB1, including information about the rate of take-up of development capacity, indicates a higher margin is more appropriate, this higher margin should be used.

Hamilton could somewhat reduce the market power of its largest landowner by zoning additional land for urban residential development (so long as this rezoned land was held competitively).

Table 3 lists the largest five landowners in each extended urban area, the number of titles and total area of land that they hold, and their market share. It shows this for undeveloped land zoned for urban residential development in current District Plans (including land owned by local authorities and the Crown).

The location of these owners' landholdings is also shown on maps on the Urban Development Capacity dashboard.

Table 3: Largest five owners of undeveloped residentially zoned land in each extended urban area and zone

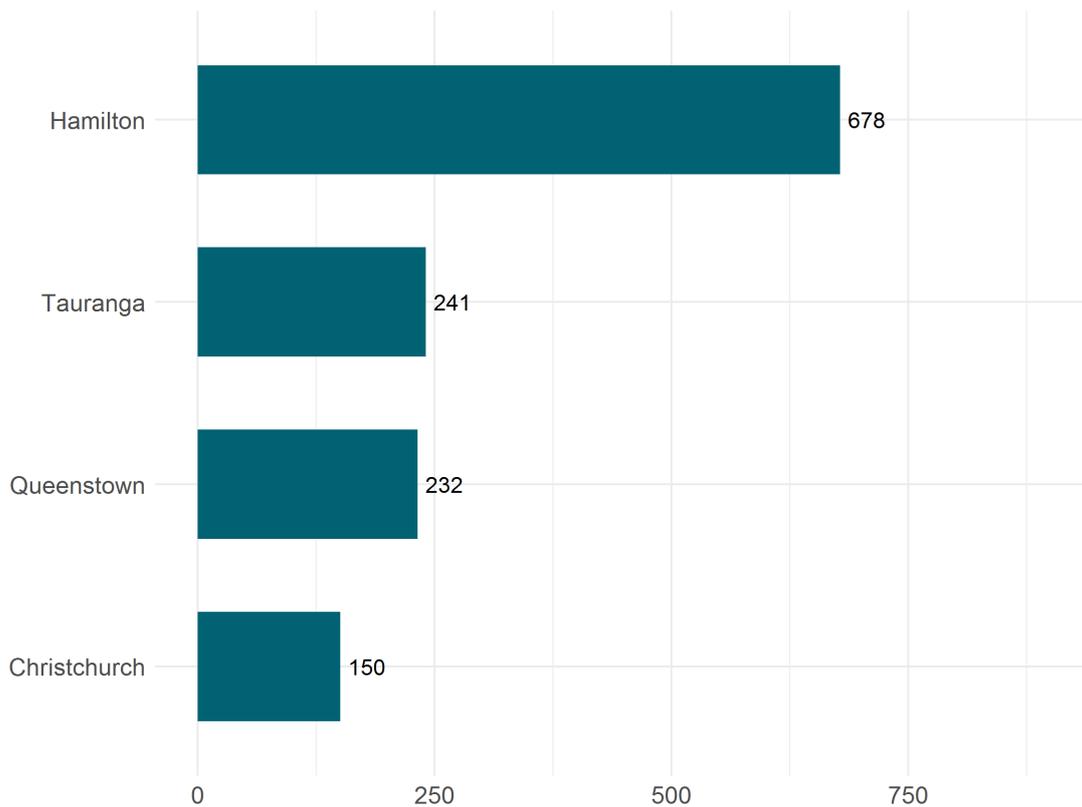
Urban area	#	Area (ha)	Title count	Controlling Entity	Type of entity	Market share
Hamilton	1	104	12	("KIRKDALE INVESTMENTS LIMITED", "KIMBRAE FARMS LIMITED")	Related Entities	25%
	2	53	11	("CHEDWORTH PROPERTIES LIMITED", "PCL LIMITED")	Related Entities	13%
	3	39	70	("THE HAMILTON CITY COUNCIL", "HAMILTON CITY COUNCIL")	Related Entities	10%
	4	35	4	PETER MAY FARMS LIMITED	Individual Entity	9%
	5	10	22	CDL LAND NEW ZEALAND LIMITED	Individual Entity	3%
Tauranga	1	64	6	CLM TRUSTEES LIMITED, DULCIE MAY TAYLOR, L B D TRUSTEES LIMITED	Consortium	8%
	2	44	27	BLUEHAVEN HOLDINGS LIMITED	Individual Entity	6%
	3	39	40	("TAURANGA CITY COUNCIL", "THE TAURANGA CITY COUNCIL")	Related Entities	5%
	4	33	5	PORT CONTRACTORS LIMITED	Individual Entity	4%
	5	32	2	THE PROPRIETORS OF MANGATAWA PAPAMOA	Individual Entity	4%
Christchurch	1	160	4	WHITE GOLD LIMITED	Individual Entity	6%

	2	133	7	RAVENSWOOD DEVELOPMENTS LIMITED	Individual Entity	5%
	3	120	1012	("HER MAJESTY THE QUEEN UNDER SECTION 53(1) OF THE CANTERBURY EARTHQUAKE RECOVERY ACT 2011", "HER MAJESTY THE QUEEN UNDER SECTION 91(1) OF THE GREATER CHRISTCHURCH REGENERATION ACT 2016", "HOUSING NEW ZEALAND LIMITED", "HER MAJESTY THE QUEEN", "HER MAJESTY THE QUEEN UNDER SECTION 53(1) CANTERBURY EARTHQUAKE RECOVERY ACT 2011")	Related Entities	5%
	4	112	163	CHRISTCHURCH CITY COUNCIL	Individual Entity	4%
	5	71	3	DENWOODS TRUSTEE LIMITED	Individual Entity	3%
Queenstown	1	34	1	ARNOLD ANDREW MIDDLETON, ISABELLE GLADYS MIDDLETON	Consortium	10%
	2	27	2	F.S. MEE DEVELOPMENT COMPANY LIMITED	Individual Entity	8%
	3	20	65	("QUEENSTOWN LAKES-DISTRICT COUNCIL", "QUEENSTOWN LAKES DISTRICT COUNCIL", "QUEENSTOWN-LAKES DISTRICT COUNCIL", "THE QUEENSTOWN LAKES DISTRICT COUNCIL")	Related Entities	6%
	4	12	16	SUBURBAN ESTATES LIMITED	Individual Entity	3%
	5	8	3	GRANT HYLTON HENSMAN, PHILLIP JOHN HENSMAN, SOUTHERN LAKES HOLDINGS LIMITED	Consortium	2%

Table 3 identifies local authorities, and sometimes the Crown, as amongst the most significant land owners of undeveloped residentially zoned land. However, despite the District Plan zoning a proportion of this land may well be designated for reserves or infrastructure, making it unsuitable for residential development¹⁴.

It was not possible to identify such sites from the database. Accordingly, Figure 7 shows the land concentration index for these urban areas excluding undeveloped residentially zoned land held by local authorities and the Crown. Further details are provided in Table 8.

Figure 7: Land concentration index (excluding councils and crown)



5. Future Work

The indicators could be calculated to include future urban residential zones. These areas are not zoned for urban residential development in district plans, but earmarked for future urban residential zoning in other documents (such as spatial plans or future development strategies).

These areas have not been included in the existing indicators, due to lack of consistency across the country. However, they could provide useful information to guide future planning decisions, and their inclusion will be considered in future development of these indicators.

¹⁴ A designation is a planning technique used by Ministers of the Crown, local authorities and network utility operators approved as requiring authorities under section 167 of the RMA.

6. References

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7. Appendix

7.1. Sensitivity Analysis

Sensitivity analysis was conducted to show how the land concentration index and the amount of undeveloped land change if underlying assumptions are changed. Table 4 shows the scenarios that were considered.

Table 4: Scenarios description

Scenario	Assumption varied	Base
High minimum size	Area > 2,000m ²	Area > 300m ²
Low building footprint	(Floor Area / Area) < 5 %	(Floor Area / Area) < 20 %
High improvements	CV/LV < 1.1	CV/LV < 1.3
No ownership matching	No entity matching only entities of exact same name are grouped	Companies definition matching
Separate entity grouping	Land is proportionally allocated to each owner (Section 7.1.1)	Land is allocated to the owners

Table 5 compares the land concentration index under the base case with the index under each scenario. The table also shows the percentage difference between the base case and each scenario. Increasing the minimum lot size to 2,000 metres squared has a material effect on the index for all areas. Table 6 shows the same comparison, but for hectares of undeveloped land.

If we look at Table 5 the effect of ownership matching is largest in Hamilton. If ownership is not matched, the ownership concentration index falls by 41 percent. Under the base case the two largest land owners have ownership ties, and are combined into one controlling entity. This combined entity holds 25 percent of all land, and contributes 650 points to the index under the base case.

Looking at Table 5, the effect of the higher minimum size reduces total undeveloped area by 18 to 24 percent across all areas.

The distribution of land sizes in the developable land market is skewed towards a small number of large parcels that account for most of the total area (see Table 9). The market share of these large parcels is what dominates the index, as the index is calculated from the squared sum of market shares. One result of this is that a small reduction in developable land area can cause a large increase in the index.

In the high minimum size scenario for Hamilton the total developable area was reduced by 73 ha (18 percent) from the base scenario. The new market share for the largest controlling entity was 31 percent and it contributed 961 points to the index, raising the total index by 45 percent to 1,479.

Table 5: Sensitivity analysis on the land concentration index (control)

Scenario	Hamilton		Tauranga		Christchurch		Queenstown	
	Value	% Change	Value	% Change	Value	% Change	Value	% Change
Base	1,022	-	233	-	242	-	164	-
High minimum size	1,479	45%	345	48%	389	61%	232	41%
Low footprint	1,039	2%	240	3%	261	8%	170	4%
High Improvements	820	-20%	184	-21%	297	23%	128	-22%
No ownership matching	608	-41%	229	-2%	231	-4%	150	-8%
Separate entity	1,022	0%	173	-26%	187	-23%	158	-3%

Table 6: Sensitivity analysis on the amount of undeveloped land (ha)

Scenario	Hamilton		Tauranga		Christchurch		Queenstown	
	Value	% Change	Value	% Change	Value	% Change	Value	% Change
Base	408	-	777	-	2515	-	343	-
High minimum size	335	-18%	626	-19%	1936	-23%	261	-24%
Low footprint	403	-1%	765	-1%	2454	-2%	329	-4%
High improvements	463	14%	961	24%	3117	24%	421	23%

7.1.1. Separate entity grouping

In the separate entity grouping scenario, the area of land for titles with multiple owners is apportioned equally among them and each single owner is listed. Figure 8 and Figure 9 use the same scenarios presented in Figure 4 and Figure 5 but reworked to show the ownership table if this alternative method to apportion land to each owner was used. In Figure 8, rather than listing “Jane Smith, Ari Smith” as a separate entity owning 5 ha, the land area is divided and 2.5 ha are apportioned to each owner on the title.

Figure 8: Applying separate entity grouping to Figure 4

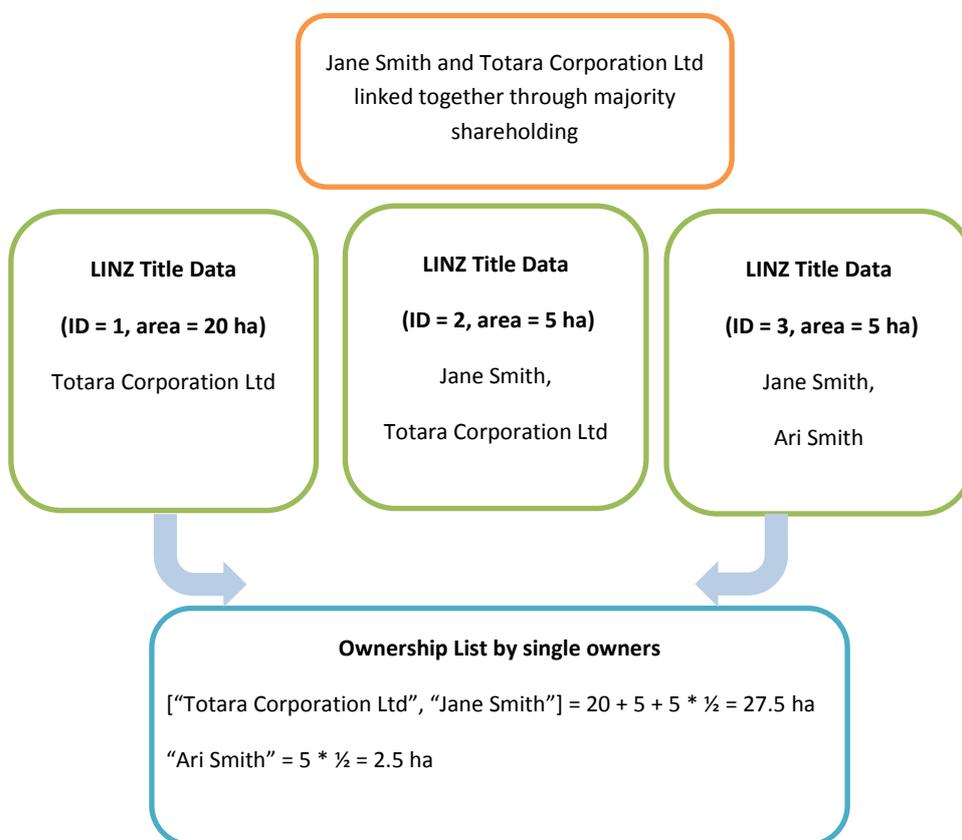
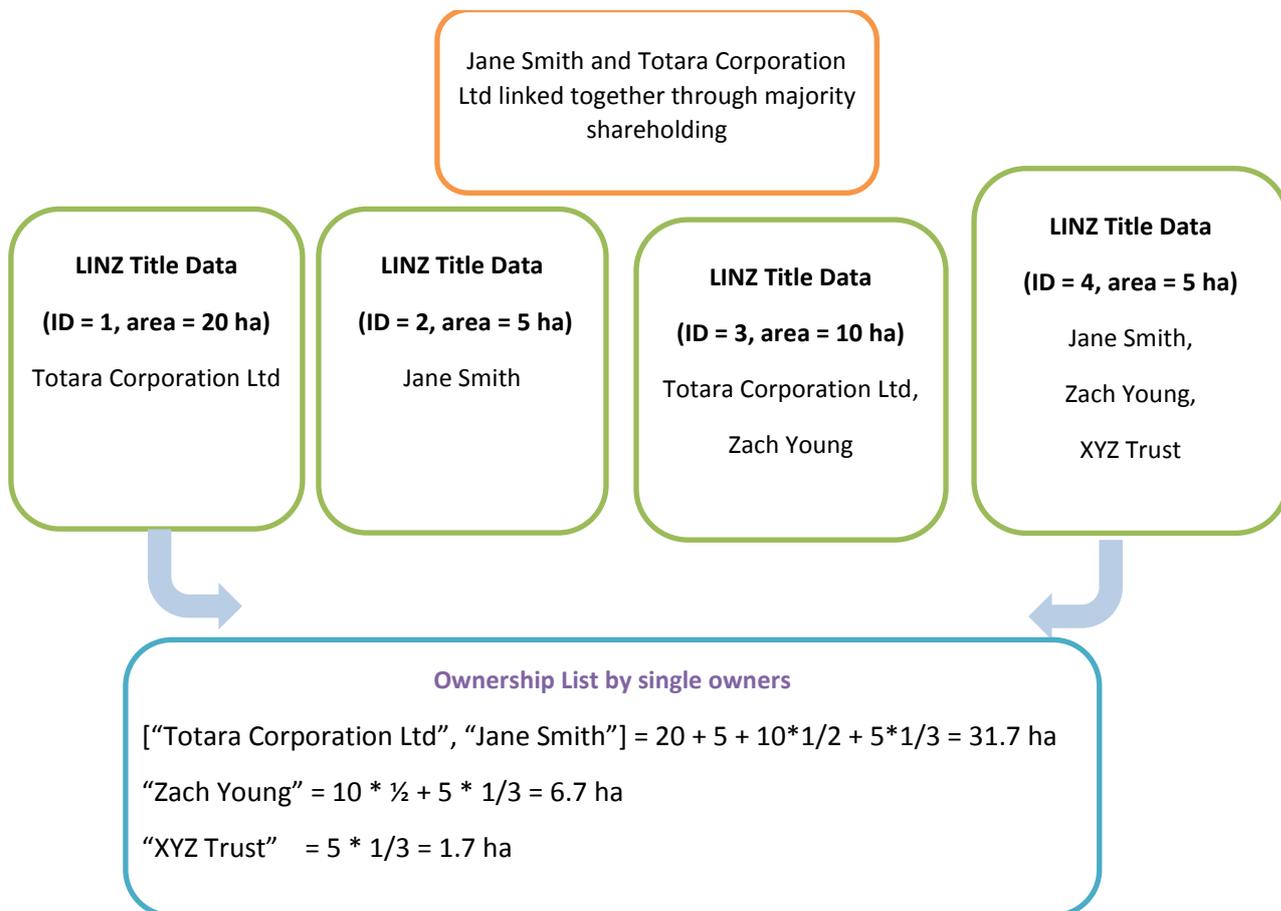


Figure 9: Applying separate entity grouping to Figure 5



Separate entity grouping in all cases reduces the index. In the cases where multiple owners owned the largest undeveloped parcels the largest reduction occurs. For example, in Tauranga the largest parcel is owned by 3 owners. When one third is assigned to each owner and all of those owners other parcels added, it's no longer the largest parcel and the new largest parcel has lower market share than in the original method. Hence, since the market shares are squared, the index reduces by 29 percent.

7.2. Supporting tables and figures

Table 7: Number of owners on title of developable land (urban areas studied)

Number of owners	Titles	Area
1	53%	62%
2	36%	24%
3	9%	9%
4+	2%	5%

Table 8: Results excluding authority landowners (councils and crown)

Extended urban area or zone	Undeveloped residential land (ha)	Total residential land (ha)	Percentage of undeveloped residential	Urban area population (2017)	Population density (pop per residential ha)
Hamilton	4,207	364	9%	235,900	56.1
Tauranga	4,773	712	15%	137,900	28.9
Christchurch	14,824	2,209	15%	396,700	26.8
Queenstown	1,217	326	27%	15,300	12.6

Table 9: Distribution of land size (Hamilton, Tauranga, Christchurch, and Queenstown)

Urban Area	Category (m ²)	Total area (ha)	Count	Percentage of area
Hamilton	0-1,000	65	1094	3%
Hamilton	1,000-5,000	59	264	3%
Hamilton	5,000-10,000	52	78	3%
Hamilton	10,000+	1834	194	91%
Tauranga	0-1,000	129	2348	11%
Tauranga	1,000-5,000	77	362	6%
Tauranga	5,000-10,000	31	41	3%
Tauranga	10,000 +	980	139	80%
Queenstown	0-1,000	53	777	14%
Queenstown	1,000-5,000	78	380	21%
Queenstown	5,000-10,000	40	60	11%
Queenstown	10,000 +	196	61	53%
Christchurch	0-1,00	406	6075	16%
Christchurch	1,000-5,000	380	2065	15%
Christchurch	5,000-10,000	126	190	5%
Christchurch	10,000 +	1695	343	65%