James Allan Jones, Ryan Greenaway-McGrevy and Chris Crow

# Using Council Valuation Records to Estimate Auckland's housing stock

## Abstract

New Zealand lacks timely estimates of its total and regional dwelling stocks. Such estimates would be useful for evaluating various policies to encourage housing supply. To address this deficiency, we propose and implement a method for estimating Auckland's dwelling stock based on its district valuation roll (DVR). The district valuation roll is an administrative dataset maintained by all local councils for the purpose of levying property taxes. The estimates imply that there were 609,055 dwellings in Auckland as of August 2024, an increase of about 91,000 units – or 18% – since the Auckland Unitary Plan became operative in November 2016. We anticipate that DVR-based estimates can be constructed for other regions.

**Keywords** housing, dwelling stocks, measurement, valuation rolls, zoning reform

Timely estimates of regional residential dwelling stocks are unavailable in New Zealand. Estimates of dwelling stocks are included in the census, but these occur on a five-year cycle. Statistics New Zealand published experimental estimates on a quarterly basis until March 2017, after which the series was discontinued.

Regularly updated estimates of dwelling stocks would be helpful for a variety of reasons, including the evaluation of policies intended to encourage housing supply. For example, Auckland upzoned approximately three quarters of its residential land in November 2016 under the Auckland Unitary Plan to support medium- and high-density housing in residential areas. While this zoning reform preceded a significant increase in new dwelling consents (Greenaway-McGrevy, 2023), it also enabled the tearing down or removal of existing dwellings, meaning that the effect on the city's housing stock is difficult to infer on the basis of consent data alone. Demolition of buildings under three storeys does not require a consent, meaning there is no direct administrative record of gross reductions in the dwelling stock from redevelopment. In addition, a consent does not necessarily result in a completed dwelling.

In this article we use Auckland Council's district valuation roll (DVR) to estimate the region's dwelling stock. This administrative data is kept for the purposes of levying municipal taxes. Because separate inhabited dwellings are recorded as different units, the DVR can be repurposed to produce dwelling stock estimates.

We produce estimates for the 2013–24 period. Our DVR-based estimates are very close to discontinued experimental estimates provided by Statistics New Zealand over the period that the two time series overlap (2013–17). The Statistics New Zealand experimental estimates also align with census-based estimates for the relevant quarter. DVR-based estimates are

**James Jones** is a research fellow at the Economic Policy Centre at the University of Auckland and senior data scientist at Auckland Council. **Ryan Greenaway-McGrevy** is an associate professor at the University of Auckland and the director of the Economic Policy Centre. Corresponding author: r.mcgrevy@auckland.ac.nz. **Chris Crow** is a research associate at the Economic Policy Centre at the University of Auckland and the founding consultant at Crow Advisory.

consistently 1.5–1.8% smaller than the experimental estimates, suggesting that the two measures differ by a small and stable relative factor. Potential reasons for the discrepancy are the time lag associated with updates to the DVR, and the tax incentive for owners to not correct undercounts.

The DVR-based estimate of Auckland's housing stock was 609,055 units as of August 2024. This implies a net addition of approximately 91,000 dwellings since the Auckland Unitary Plan became operative in November 2016, an increase of approximately 17.6%.

DVR-based measures would also prove useful in other districts that have implemented housing supply policies. Beginning in 2017, Lower Hutt implemented a sequence of zoning changes to encourage medium- and high-density housing, and Wellington, Upper Hutt and Porirua have recently followed suit. DVR-based measures for these authorities would assist in assessing the impact on the local housing stock. Because all authorities must maintain a district valuation roll, this article provides guidance on how such measures could be developed.

In the next section we describe the institutional features of administrative data collection and how the estimates are constructed. The following section presents the results, and compares the totals to census and other discontinued measures of the dwelling stock.

## Methodology

### *Rating valuations*

Section 5 of the Rating Valuations Act 1998 requires territorial authorities to maintain property valuation records for every property in their jurisdiction in a district valuation roll. These datasets are collected and kept according to a set of implementation rules (the rating valuations rules) drafted by the valuer-general and published by Land Information New Zealand (LINZ, 2010).

The primary purpose of the district valuation roll is to enable municipal taxes, referred to as council rates. These are applied to properties, or 'rating units', within the council's jurisdiction.[1] A rating unit generally refers to a portion of a property with an individual 'record of title', which is a legal record held by LINZ which describes the legal owner(s), boundaries, rights and restrictions applied to a property. A record of title can encompass multiple properties: for example, one legal property which contains multiple, separate dwellings. These are generally entered as one rating unit on the DVR and assigned multiple 'units of use'.

> … the total number of residential [separately used or inhabited parts] is a better reflection of the total number of dwellings than the count of rateable units because it addresses the circumstances where multiple dwellings are covered by the same title.

The salient information on the DVR for dwelling estimates are the 'units of use' and 'actual property use' fields, which are defined below.

#### *Units of use*

The Rating Valuations Act allows for multiple units of use under an individual rating unit. This accords with local councils generally needing to provide services on a per unit of use basis, rather than per legal property or per entry on the DVR.

Auckland Council classifies units of use based on the 'separately used or inhabited parts' (SUIPs) of a property. An SUIP is defined as 'any part of a rating unit that is separately used or inhabited by the ratepayer, or by any other person having a right to use or inhabit that part by virtue of a tenancy, lease, license or any other agreement'.[2] Under this definition, parts of a rating unit will be treated as 'separately used' if they have different use categories – for example, a shop with accommodation above will be treated as two SUIPs. Similarly, multiple instances of the same use category will also be classified as separately used, for example if a property contains multiple commercial outlets, such as a food court or shopping centre. In the same vein, a residential property with a separate dwelling, such as a self-contained 'granny flat', will be classified as having two SUIPs. For the purposes of the district valuation roll, vacant land is also defined as a type of use.

If the separate parts of a rateable unit are contiguous[3] and used by the same owner(s) as a single unit, then they are classified as one SUIP. For example, a residential property with a self-contained granny flat will count as one SUIP if the flat is internally accessible from the main residence, and both parts are used together as a single family home.

Commercial accommodation, such as motels, hotels and some rest homes, are treated as having one SUIP, regardless of the number of rooms. If there are multiple businesses within the unit – for example, if the accommodation has a commercial cafe – then it would be treated as having two SUIPs. Retirement villages or rest homes that have 'licence to occupy' titles are treated as having an SUIP for each part of the property covered by a separate licence to occupy.[4]

Thus, the total number of residential SUIPs is a better reflection of the total number of dwellings than the count of rateable units because it addresses the circumstances where multiple dwellings are covered by the same title. However, this is still potentially an undercount of total dwellings in a region due to the incentives for property owners to minimise their tax liabilities. Rates are charged per unit of use, and, to maintain low rates bills, individual owners may not be forthcoming if the council has undercounted the number of separate dwellings on their property. Similarly, owners may structure their property so that it technically counts as one dwelling, despite having multiple units of use.

It is also possible that units of use overstate the number of dwellings. This

would occur, for example, if a property used to comprise multiple units, and was rated as such, but is now being used as one contiguous dwelling. However, the property owner can object to their valuation and reduce their rates bill to accord with their actual units of use. Hence, for units of use to overcount the number of dwellings, the current owners would need to be either unaware that they are overpaying, or be indifferent to overpaying.[5] The recent roll-out of green food-waste bins in Auckland provides insight into this issue. These bins were provided on a per unit of use basis, so owners may have found that they had more bins than they expected. Anecdotal reports suggest that this may be the case. However, while no record has been kept of the number of owners who objected to their valuation specifically on the basis of paying for too many units, the total number of requests for review of a property's rates (for any reason) over the period of the green bin roll out (1 June 2023–1 March 2024) was approximately 450 out of about 540,000 residential rating units. This represents a miniscule proportion of all residential dwellings.

Based on the incentives for property owners to leave undercounting of units of use uncorrected, and the relatively small number of overcounted units of use indicated by the roll-out of the green bins in Auckland, it is reasonable to conclude that units of use are likely undercounted in the DVR data. Unfortunately, this is a limitation of the DVR, although there is no reason to believe that this undercount will vary systematically over time, and hence it should not undermine the usefulness of changes in the estimates.

*Actual property use*

Each record within the DVR is assigned an 'actual property use'. This field allows us to distinguish residential units from units used for other purposes. The DVR implementation rules produced by the valuer-general contain prescriptive categories to describe the actual property use of a rating unit. This is defined as 'the activity, or group of interdependent activities having a common purpose, performed on land or building floor space at the date of inspection'. This is captured through a two-character numerical code referring to the primary and secondary level. The primary code refers to the broad classification, such as rural, industrial, commercial or residential. The secondary codes are subcategories within the broad classification. For example, within the primary level code 9, which denotes 'residential', there are secondary codes referring to whether the property is a single unit or part of a multi-unit complex.[6] Table 1 presents the actual property use codes and their descriptions.

... in this study, the individual units within a rest home would be considered residential dwellings, while the rooms of a hotel or motel would not, since the former represents long-term residences, and the latter generally temporary accommodation.

Specific codes exist to capture situations of 'multi-use', where the multiple uses for a rating unit do not fall within the same use category. When multi-use occurs within a broad use category, such as commercial or residential, the secondary code will indicate multi-use. For example, a commercial property with two separate commercial uses, such as retail and offices, would be classified as code 80: this is made up of primary code 8 for 'commercial' and secondary code 0 for 'multi-use within commercial'.

Primary code 0 refers to the situation where multiple uses occur at the broad classification level: for example, commercial shops on the ground floor of a building with residential accommodation above. In these cases, the secondary code refers to 'major-use', which is the broad use category which contributes the greatest proportion of assessed rental.[7] If assessed rents are equal, the use with the greatest floor area is determined to be the major use. For example, in the case of shops with accommodation, the code would be 08 for commercial or 09 for residential, depending on which category – commercial or residential – represented the major use.

Although the categories are prescriptive, the rating valuations rules provide no specific definitions for how to classify a property use into each category. This lack of guidance is arguably less relevant for the primary level categories, such as commercial or residential, which have self-evident definitions. But it is relevant for the secondary classification code. In practice, classification is generally left to the ratings valuers, who have typically taken a 'common sense' approach to determining the appropriate use category. For Auckland Council, various internal guidance documents have been produced over the years to assist valuers in determining a property's use. These have informed the examples of each use category we list in Table 1 and which we use to base our classification of non-vacant residential dwellings on the DVR roll on. For example, in this study, the individual units within a rest home would be considered residential dwellings, while the rooms of a hotel or motel would not, since the former represents long-term residences, and the latter generally temporary accommodation.

*Timing and triggers for updates to the district valuation roll*

The Rating Valuations Act obligates local councils to undertake mass revaluations of all properties on their district valuation roll every three years. Significant revaluations and updates to the roll occur on this cycle. However, local councils also require their DVRs to be up-to-date with new construction or changes to existing properties. Hence, a number of events can trigger an update of the DVR at any point in time. For example, entries on the DVR may be created or updated when LINZ registers a property transfer, such as a sale; when an owner objects to their

**Table 1: Rating units categories**

| Primary Category | | Secondary Category Example | | Example | NVR* |
|---|---|---|---|---|---|
| Code | Description | Code | Description | | |
| 0 | Multi-use at the primary level | 0 | Vacant or intermediate | | No |
| | | 1 | Rural industry | | No |
| | | 2 | Lifestyle | | Yes |
| | | 3 | Transport | | No |
| | | 4 | Community services | | No |
| | | 5 | Recreational | | No |
| | | 6 | Utility services | | No |
| | | 7 | Industrial | | No |
| | | 8 | Commercial | | No |
| | | 9 | Residential | | Yes |
| 1 | Rural Industry | | All categories | | No |
| 2 | Lifestyle | 0 | Multi-use within lifestyle | | Yes |
| | | 1 | Single unit | Single dwelling on lifestyle property over 1ha | Yes |
| | | 2 | Multi-unit | More than one dwelling on lifestyle property over 1ha | Yes |
| | | 9 | Vacant | Vacant land | No |
| 3 | Transport | | All categories | | No |
| 4 | Community services | | All categories | | No |
| 5 | Recreational | | All categories | | No |
| 6 | Utility services | | All categories | | No |
| 7 | Industrial | | All categories | | No |
| 8 | Commercial | | All categories | | No |
| 9 | Residential | 0 | Multi-use within residential | | Yes |
| | | 1 | Single unit excluding bach | Standalone dwelling on single lot | Yes |
| | | 2 | Multi-unit | Cross-leased properties, units, flats, town-houses, multiple houses | Yes |
| | | 3 | Public communal unlicensed | Motels, Holiday parks, Camp grounds, Guest houses | No |
| | | 4 | Public communal licensed | Restaurant & Func. Centre, Hotel | No |
| | | 5 | Special accommodation | Retirement Villages, Rest homes, Accommodation for the disabled, Council housing for elderly | Yes |
| | | 6 | Communal residence dependent on other use | Convent, Presbytery | No |
| | | 7 | Bach | Single dwelling, inferior quality or for part-time usage | Yes |
| | | 8 | Car parking | Car parking | No |
| | | 9 | Vacant | Vacant land | No |

* NVR is 'non-vacant residential' and refers to categories that have been determined to reflect residential uses for the purpose of counting total dwellings in this study. Vacant land is excluded. For more details on the use codes, see LINZ, 2010, section C.3 of the ratings valuation rules.

valuation or notifies the council of some change in their circumstances; or when mandatory council inspections reveal that various stages of consented building work are completed, including the final inspection, or the issuance of a code of compliance certificate (which signifies completion).

Local councils have annual rating periods for the purpose of levying taxes. For Auckland Council this runs from 1 July to 30 June. This annual cycle results in significant updates to the Auckland DVR between April and June each year, in time for the new ratings period beginning 1 July. Generally, no matter when in the year a new property is added to the roll, the owner does not begin to be charged until the start of the following rates year. Thus, new properties completed in July or August might not receive their first rates invoice until the following July.

There is no set period for a recently created property to appear on the DVR. Factors can include how much detail is needed to ascertain a valuation for that specific property, and the current workload of the valuations team and corresponding subcontractors. A new property may show up relatively quickly, particularly if it is part of a sale of a number of similar properties, which could aid in desk valuations. However, the entry may still take some time to appear on the roll. New entries are more likely to be added during the next April–June updating cycle.

When an entry on the DVR is created or updated, the ratings valuers are required to check and review all valuation data. Hence, any valuation review of a property should include a review of the fields relevant to this study, such as actual property use and the units of use. These may also be reviewed as part of the general revaluation or in other specific instances where necessary, such as following changes to rating policy.

### *Data*

*Auckland's district valuation roll*

Data is historical extracts of Auckland's DVR at a specific point in time between 2013 and 2024. From August 2017 this data is available at a monthly frequency. Prior to this, only one extract for the roll is available in each year, namely July 2013, September 2014, January 2015 and August 2016.

As noted, while the roll can be updated at any time, a large number of updates are likely to occur between April and June in order to meet the 1 July start date for the rating year. Thus, the January 2015 extract is likely to undercount additional properties created since the September 2014 extract; the other three extracts occur soon after the 1 July deadline. From August 2017 onwards, when

extracts are available for any month, we select annual extracts from August for two reasons. First, this matches the month of the one extract available for 2016. Second, August is immediately after the start of the ratings cycle, and thus it will include all the updates to the DVR between April and June. Using August also ensures that we capture any updates that may have just missed the 1 July deadline.[8]

Extracts provided to us from before 2013 are not in a format consistent with subsequent extracts, and are formatted in a way that makes it impossible to produce accurate estimates of the total number of SUIPs. For example, there is an extract from 2012 that has over 550,000 rateable units, which is far in excess of the 520,000 rateable units from the July 2013 extract, suggesting that there are duplicate entries. However, unlike subsequent extracts, the 2012 data does not have legal property descriptions or unit numbers for multiple addresses at the same street number, making it impossible to tell whether multiple entries at the same street address are duplicates or not.

As discussed above, ratings units contain properties that are used for a variety of purposes in addition to residential dwellings. Our estimate of the number of dwellings is comprised of codes 02, 09, 20, 21, 22, 90, 91, 92, 95 and 97. The estimate of residential dwellings is comprised of the SUIPs in these codes. (See Table 1.)

### Residential dwelling estimates

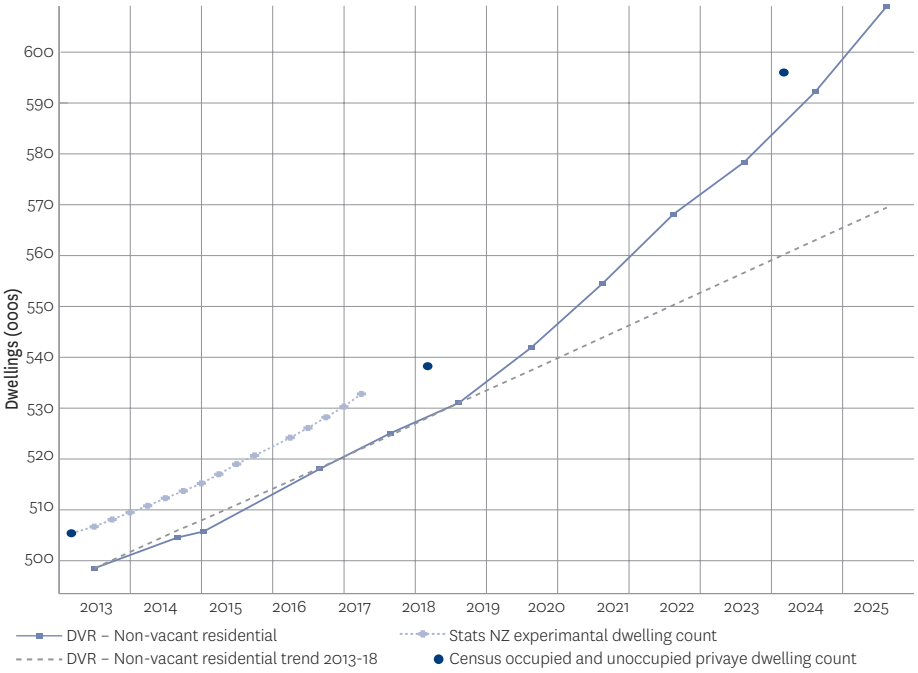
Table 2 shows the DVR-based estimates. We include counts of all rateable units alongside counts of units classified as residential. The DVR-based measure is in the final column, which is the sum of all SUIPs classified as non-vacant residential units. In August 2016, three months prior to the Auckland Unitary Plan becoming operative, the dwelling count was 518,045.[9] By August 2024 it had reached 609,055, an increase of approximately 91,000 dwellings.[10]

Figure 1 plots the dwelling stock estimates. For comparison, we also include experimental and census estimates from Statistics New Zealand. Census estimates are every five years, while the experimental estimates were quarterly, from 2001 to Q1 2017. We also superimpose a trend on the DVR-based estimates that passes through the July 2013 and August 2018 observations.

**Table 2: Auckland's rateable units, 2013-2024**

| Year | Month of extract | All rateable units | | Non-vacant residential units | |
|---|---|---|---|---|---|
| | | count | sum of SUIPs | count | sum of SUIPs |
| 2013 | July | 521,661 | 592,922 | 453,241 | 498,516 |
| 2014 | September | 528,413 | 600,956 | 458,680 | 504,575 |
| 2015 | January | 529,651 | 602,252 | 459,807 | 505,744 |
| 2016 | August | 541,216 | 617,012 | 470,177 | 518,045 |
| 2017 | August | 548,799 | 626,277 | 475,461 | 525,091 |
| 2018 | August | 559,716 | 636,929 | 483,346 | 531,048 |
| 2019 | August | 569,023 | 649,630 | 491,976 | 541,924 |
| 2020 | August | 578,576 | 662,137 | 501,813 | 554,461 |
| 2021 | August | 590,607 | 675,459 | 513,421 | 568,088 |
| 2022 | August | 601,243 | 687,669 | 522,754 | 578,400 |
| 2023 | August | 616,063 | 704,077 | 535,266 | 592,257 |
| 2024 | August | 630,596 | 720,668 | 550,114 | 609,055 |

**Figure 1: Estimates of dwellings in Auckland, July 2013 to February 2024**




Notes: DVR-based estimates are the sum of separately used or inhabited parts (SUIPs) of all non-vacant rating units that are used for residential purposes. DVR-based estimates for September 2014 and January 2015 are likely to be biased downwards as these observations are not taken immediately after the beginning of the annual ratings cycle on 1 July. Statistics New Zealand dwelling counts are the experimental estimates that ended in March 2017. The DVR trend line is fit to the July 2013 and August 2018 observations. Years on the x-axis correspond to January of each year.

DVR estimates are slightly lower than Statistics New Zealand experimental estimates, but the difference is rather consistent, ranging from 1.53% to 1.84%. The Statistics New Zealand estimate for the end of Q2 2013 is 506,700, while the DVR estimate for July 2013 is 1.62% smaller, at 498,516. The Statistics New Zealand estimate for Q3 2014 is 513,700, while the DVR estimate for September 2014 is 1.78% smaller, at 504,575. The Statistics New Zealand estimate for the end of Q4 2014 is 515,200, while the DVR estimate for January 2015 is 1.84% smaller, at 505,744. Finally, the Statistics New Zealand estimate for Q2 2016 is 526,100, while the DVR estimate for August 2016 is 1.53% smaller, at 518,045. Notably, the differences are larger for measurements taken later in the ratings year, namely September and January. As noted earlier, measurements taken right after the 1 July start of the ratings period are likely to be the most accurate, given the substantial updates to the roll between April and June.

The March 2023 census provides a much more recent official dwelling count to which to compare the DVR estimate. The census dwelling count was 596,007 in March, compared to 592,257 in the August DVR estimate, which is just 0.63% smaller.

The discrepancy between the DVR estimates and the census-based estimates may be due to the financial incentive for

property owners to not correct undercounts (see the discussion above). It may also be an artefact of the delay in new properties being added to the DVR, whereas census counts are a direct, up-to-date measure at a point in time. Because the number of dwellings in Auckland is growing over the sample period, a delayed measure will always lag behind an up-to-date count.

The potential drawback of using extracts from early in the calendar year is apparent when comparing the estimates to the 2013–18 trend: the January 2015 extract is below trend, whereas the July and August measurements are remarkably close to trend. The September extract is also slightly below trend. This accords with the premise that extracts from soon after the beginning of the valuation cycle on 1 July are likely to be more accurate.

There is a notable change in trend from August 2018 onwards. Apart from the September 2014 and January 2015 measurements, estimates between 2013 and 2018 almost exactly fit a linear trend that corresponds to an increase of about 6,400 dwellings added per year. After 2018 there is an abrupt shift in the trend, as the increase almost doubles to about 12,200 dwellings added per year. This is likely to reflect the impact of the Auckland Unitary Plan becoming operative in November 2016. As of July 2024, the median time to dwelling completion ranges between 1.27 and 1.53 years (Greenaway-McGrevy and Jones, 2023). However, the completed dwelling may not show up on the DVR until April, May or June following completion. Thus, consents issued after the Auckland Unitary Plan became operative are likely to start showing up in our dwelling stock estimates on or after the August 2018 extract date. The break in trend from this point onwards accords with the timing of the full implementation of the unitary plan. Using the 2013–18 trend as a crude counterfactual implies that the zoning reform almost doubled the rate to which the housing stock was being added. This accords with results from Greenaway-McGrevy (2023), who found that the reform increased the number of consents issued by over 80% between 2017 and 2022.

### *Comparison with consents*

It would be useful to match additions to the DVR to building consents in order to assess how much of the increase in the dwelling stock occurred under the more relaxed regulations of the Auckland Unitary Plan. Unfortunately, matching the data is exceedingly difficult because there is no identifier linking consents to unit records on the valuation roll.

As discussed above, consented dwellings issued soon after November 2016 (when the Auckland Unitary Plan became operative) are likely to start showing up on the DVR-based dwelling stock estimates on or after the August 2018 observation date. Assuming a two-year lag between consent and a dwelling appearing on the DVR provides a very rough indication of how many consents result in additions to the estimated dwelling stock. Between August 2018 and August 2024, the dwelling stock estimate increased by 78,007 (= 609,055 – 531,048) units. This compares to a total of 93,840 dwellings consented between September 2016 and August 2022.[11] Assuming a 93% completion rate on consented dwellings implies that one dwelling was demolished for every nine completed, on average.[12]

## Conclusion

We propose and implement a method for estimating Auckland's dwelling stock using the district valuation roll. The estimates indicate that, as of August 2024, the region's dwelling stock has increased by about 91,000 dwellings since a widespread zoning reform was passed in 2016. This is equivalent to a 17.6% increase in the dwelling stock to date.

We anticipate that district valuation rolls can be used to produce regular estimates of the dwelling stock for any territorial authority in the country. The data is feasibly available at any frequency, although the annual tax cycle suggests that the measure will be most accurate immediately after the beginning of the tax period on 1 July each year.

1 Some properties are exempt from rates, such as universities, schools, public hospitals and churches.
2 Auckland Council's definition of an SUIP differs slightly from a unit of use under section C.4(b) of the rating valuations rules, which state: 'Each physical component within a rating unit, which is capable of separate use, constitutes a single unit of use.' The units of use field in Auckland Council's DVR roll follows the SUIP classification, and as such, 'SUIP' and 'units of use' are used interchangeably throughout this article. Other districts may employ a slightly different definition of a unit of use.
3 The Rating Valuations Act classifies land that is part of the same title and 'separated only by a road, railway, drain, water race, river, or stream' as contiguous.
4 For additional details, see page 92 of Auckland Council's annual budget for 2023–04: https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/budget-plans/Documents/annual-budget-2023-24-volume-1.pdf.
5 Cases where owners are aware that they are overpaying their property taxes, but choose not to reduce their bill, are considered unlikely.
6 For more details, see LINZ, 2008, section C.3.
7 Rental refers to the estimated market value to rent that part of the unit for its current usage.
8 The dates are 01/07/2013, 12/01/2015, 29/08/2016, 28/08/2017, 13/08/2018, 19/08/2019, 17/08/2020, 15/08/2021, 15/08/2022, 15/08/2023 and 15/08/2024. The date for the September 2014 extract was not recorded.
9 Unfortunately, there is no historical extract closer to November 2016, when the Auckland Unitary Plan became operative. The zoning reform had a limited impact from September 2013 under the Auckland housing accord, which allowed developers to build under the relaxed regulations of the proposed unitary plan in exchange for a 10% affordable housing provision. (See Greenaway-McGrevy and Jones, 2023 for details.)
10 Many of these additional dwellings would have been consented prior to the Auckland Unitary Plan becoming operative, but after the Auckland housing accord that enabled limited upzoning under the proposed plan.
11 Source: author's calculations from Statistics New Zealand's data on monthly building consents by territorial authority, available at https://infoshare.stats.govt.nz/.
12 Greenaway-McGrevy and Jones (2023) provide completion rates by year of consent in Auckland. We use 93% because approximately this percentage of dwellings consented in 2018 and 2019 had a final inspection by July 2024. Meanwhile, over 95% of dwellings consented between 2018 and 2021 had a first inspection. Estimated demolition ratios are higher if a lower completion rate is assumed, and vice versa.

## Acknowledgements

We thank Auckland Council for providing extracts from their district valuation roll. This research was funded in part by the Royal Society of New Zealand under Marsden Fund Grant UOA2013.

## References

Greenaway-McGrevy, R. (2023) 'Can zoning reform increase housing construction? Evidence from Auckland', working paper 017, Economic Policy Centre, University of Auckland

Greenaway-McGrevy, R. and J.A. Jones (2023) 'Can zoning reform change urban development patterns? Evidence from Auckland', working paper 012, Economic Policy Centre, University of Auckland

LINZ (2010) 'Rating Valuations Rules 2008: version date 1 October 2010 – LINZS30300', https://www.linz.govt.nz/resources/regulatory/rating-valuations-rules-2008-version-date-1-october-2010-linzs30300