FINAL REPORT

The Economic Impacts of Minimum Apartment and Balcony Rules

Auckland Council

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1. Introduction

Auckland Council (AC) commissioned MRCagney to research the economic impacts of proposed Unitary Plan rules on minimum apartment and balcony areas.

Rules on minimum apartment/balcony areas are detailed in AC's proposed Auckland Unitary Plan (PAUP). These rules stipulate that apartments shall have internal floor areas and balconies that are not less than certain thresholds. The minimum floor area for studio apartments, for example, varies from 30–40sqm depending on the zone, whereas the minimum balcony area varies from 8-10sqm.

From our discussions with AC, we understand that the purpose of these rules is to improve residential amenity and well-being. On the other hand, AC is concerned that the rules on minimum floor and balcony areas will make it more difficult for apartments to be developed.

This in turn will have two negative economic impacts:

First, people who would have chosen to live in small apartments will be negatively affected by of the reduced availability of this housing type. Second, the reduction in the availability of housing will in turn increase demand for other types of housing, causing prices to rise across the board.

In this context, there is a need to investigate the nature and relative size of the economic impacts of rules on minimum apartment and balcony rules to ensure the PAUP has found an appropriate balance.

The following sections of this report are structure as follows:

- *Background* – in this section we review a range of background documents and data that is relevant to the proposed rules on minimum apartment and balcony areas.
- *Economic Analysis* – in this section we present a framework for understanding the positive and negative economic impacts of the rules. Data is then used to estimate the relative size of these impacts, and finally to draw inferences on the relative merits of the rules.
- *Other Policy Considerations* – in this section we discuss some wider policy considerations, including the link between the rules and their intended outcomes, and the potential for the policies to have unintended consequences.
- *Conclusions and Recommendations* – based on the results of previous sections, we will draw conclusions and make recommendations on how the minimum apartment/balcony rules may be improved so as to maximise their economic benefits while minimising their economic costs. We also discuss assumptions, limitations, and areas for further research.

2. Background Research

2.1 Proposed Auckland Unitary Plan (PAUP)

2.1.1 Minimum Dwelling Size and Room Dimensions:

Minimum dwelling sizes and dimensions for principal living and bedrooms are applied through development controls in centres, mixed use, and residential zones (except single house, large lot and rural and coastal settlements zones). Proposals that do not meet the minimum dwelling/room size are classified as restricted discretionary activities[1], and require resource consent on this basis.

The fact that proposals of this nature are classified as restricted discretionary activities implies that the Council anticipates a proportion of 'sub-standard' development that would otherwise have occurred will be prevented by the control. This would either occur at the initial design and consideration stage (i.e. the concept would not proceed to resource/building consent stage), or occur as a result of developers seeking consent for 'sub-standard' developments and having their applications declined.

It follows that if the Council saw issues with small dwellings being simply a design issue, able to be adequately addressed through good design whilst working within the requirements of the Building Act (which is discussed in Appendix A), one would expect the activity classification to be "controlled", rather than "restricted discretionary".

The purpose for the controls on dwelling and room size vary between the zones, but can be summarised as follows:

1. Ensure dwellings are of a sufficient size to provide a reasonable standard of amenity.
2. Dwellings are of a sufficient size to provide for the day-to-day needs of residents.

The main matters of discretion for 'sub-standard' applications are: *"Effects of reduced living and circulation space, sunlight/daylight access and storage on residential amenity".* In light of the observations made in relation to the Building Act and Building Code in Appendix A, it is evident that the PAUP controls are intended to provide for the same matters as the interior environment aspects of the Building Code.

Sunlight/daylight access is addressed by a separate control of the PAUP with a common matter of discretion, so is not necessarily relevant to the consideration of dwelling/room sizes per se. Notably the assessment matters do not specifically mention health and safety matters, but are instead limited to amenity and circulation space.

2.1.2 Minimum Balcony / Outdoor Living Space

The minimum size of balconies is controlled in generally the same manner as restrictions on dwellings and room sizes; i.e. applications that do not meet the development controls are restricted discretionary activities. The purpose of the controls on balcony size can be summarised as follows:

[1] Restricted discretionary activities require resource consent and the consent authority's power to decline a consent, or to grant a consent with conditions, is restricted to the matters over which discretion is restricted. This is distinct from a controlled activity, which requires a resource consent but the consent authority must grant a resource consent (subject to specific exceptions) and the consent authority's power to impose conditions on the resource consent is restricted to the matters over which control is reserved.

1. Terrace & Apartment, Mixed Housing Urban & Suburban Zones: Provide dwellings with outdoor living space that is of a usable size and dimension for the type of dwelling and is accessible from the principal living room.
2. Single House & Rural and Coastal Settlement Zones: Provide dwellings with outdoor living space that is of a usable size and dimension and is consistent with the spacious qualities of the zone and is accessible from the principal living room.
3. City Centre Zone: Provide dwellings with an outdoor living space that is:
    - Usable
    - Accessible
    - Able to accommodate the number of occupants the dwelling is designed for.
4. Other Centres and Mixed Use Zones: Ensure a good standard of amenity within and between dwellings and visitor accommodation dwellings.

The minimum dwelling size and balcony controls have been summarised below in relation to the PAUP zones in the table below, which has been mapped in the following figure.

Table 1: Summary of PAUP Dwelling Size & Balcony Controls

Zone	Internal (m2)	Min dimension of Principal Rooms (m)	Balcony - living Room only above ground (m2)	Minimum dimension - depth (m)	Balcony - dwelling above ground (m2)	Minimum dimension - depth (m)	Outdoor Living Space - Dwellings / Living Room at Ground Level
City Centre	Studio - 30 1+ Bed - 40	Liv 3m Bed 3x3.5	N/A	N/A	8	2.4	8m2, min dimension 2.4m
Metro Centre	Studio - 30 1+ Bed - 40	Liv 3m Bed 3x3.5	N/A	N/A	8	2.4	8m2, min dimension 2.4m
Other Centres & Mixed Use	Studio - 40 1 Bed - 45	Liv 3m Bed 3x3.5	N/A	N/A	8	2.4	Min 20m2 OLS, min 4m dimension in any direction, max 1:20 gradient
Terrace & Apartment	Studio - 40 1 Bed - 45	Liv 3m Bed 3x3.5	N/A	N/A	8	2.4	Min 20m2 OLS, min 4m dimension in any direction, max 1:20 gradient
Mix Housing Urban	Studio - 40 1 Bed - 45	Liv 3m Bed 3x3.5	8	2.4	10	2.4	Min 40m2 OLS incl. 20m2 area with min 4m dimension in any direction, max 1:20 gradient
Mix Housing Suburb	Studio - 40 1 Bed - 45	Liv 3m Bed 3x3.5	8	2.4	10	2.4	Min 40m2 OLS incl. 20m2 area with min 4m dimension in any direction, max 1:20 gradient
Single House	N/A	N/A	8	2.4	N/A	N/A	Min 80m2 OLS incl. 20m2 area with min 4m dimension in any direction, max 1:20 gradient
Large Lot	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Rural & Coastal Settlement	N/A	N/A	8	2.4	N/A	N/A	Min 80m2 OLS incl. 20m2 area with min 4m dimension in any direction, max 1:20 gradient
General Business, Business Park & Industrial Zones	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Rural & Future Urban	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Special Purpose - Retirement Village Zone	45	N/A	8	2.4	10	2.4	Min 20m2 OLS, min 3m dimension in any direction, max 1:20 gradient

Specific Precinct Rules

Precinct	Studio (m2)	1 bed (m2)	1 bed + St	2 Bed (m2)	3+ Bed (m2	Balcony (m	Comment
Orakei Point	N/A	45	55	70	90	8	
Orewa 2 (2 or more dwellings on site)	40	45					Minimum principal room sizes apply - Liv 3m, Bed 3x3.5
St Lukes	35	45	N/A	70	90		Min area for studio and 1 bed can be reduced by 5m2, and for 2 bed+ by 8m2, if 8m2 balcony is provided
Warkworth 2	40	45				8 (2.4m min depth)	Minimum principal room sizes apply - Liv 3m, Bed 3x3.5

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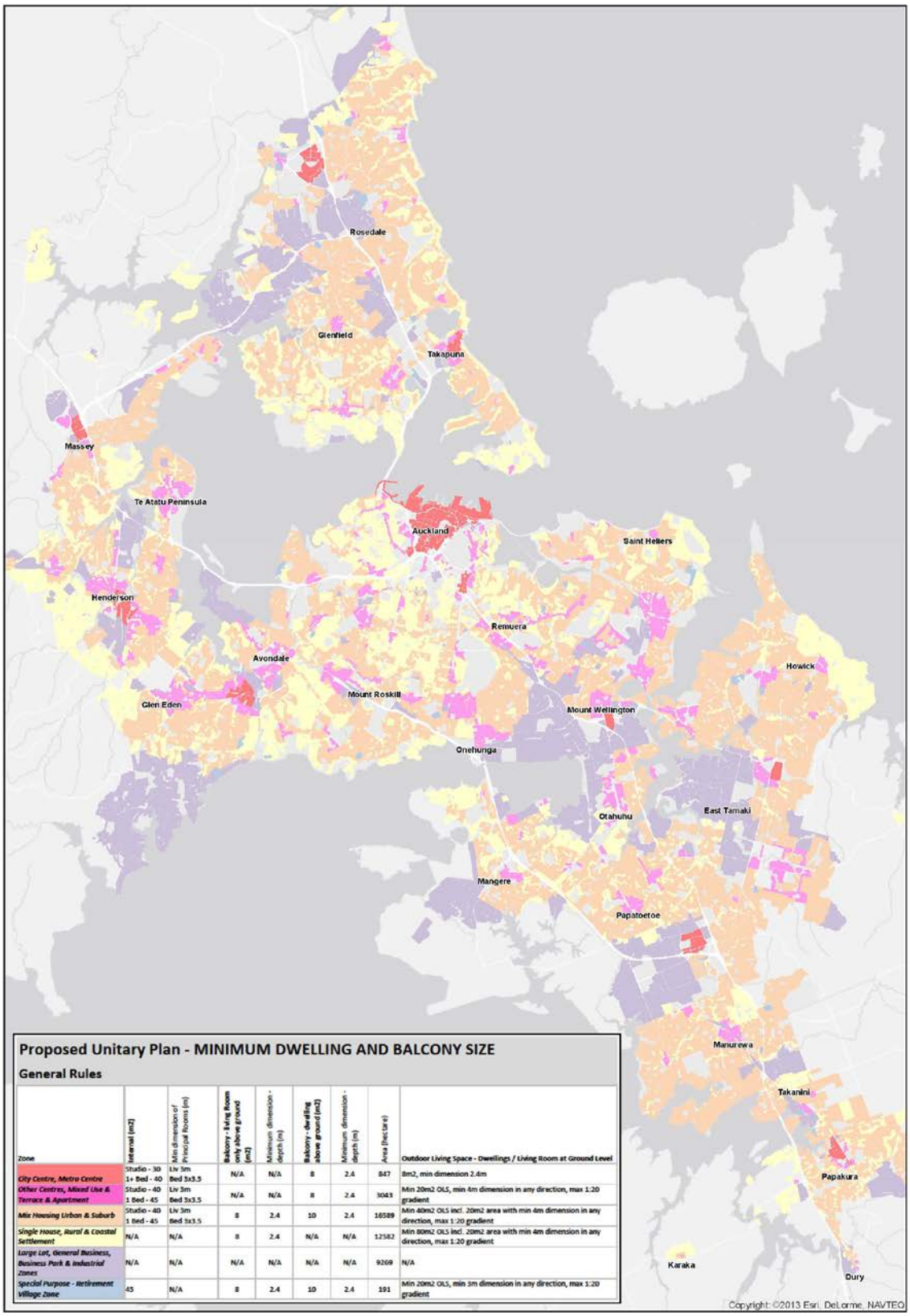
Figure 1: PAUP minimum apartment and balcony size provisions



Proposed Unitary Plan - MINIMUM DWELLING AND BALCONY SIZE

General Rules

Zone	Internal (m2)	Min dimension of Principal Rooms (m)	Balcony - Living Room only above ground (m2)	Minimum dimension - depth (m)	Balcony - dwelling above ground (m2)	Minimum dimension - depth (m)	Area (hectare)	Outdoor Living Space - Dwellings / Living Room at Ground Level
City Centre, Metro Centre	Studio - 30 1+ Bed - 40	Liv 3m Bed 3x3.5	N/A	N/A	8	2.4	847	8m2, min dimension 2.4m
Other Centres, Mixed Use & Terrace & Apartment	Studio - 40 1 Bed - 45	Liv 3m Bed 3x3.5	N/A	N/A	8	2.4	3043	Min 20m2 OLS, min 4m dimension in any direction, max 1:20 gradient
Mix Housing Urban & Suburb	Studio - 40 1 Bed - 45	Liv 3m Bed 3x3.5	8	2.4	10	2.4	16589	Min 40m2 OLS incl. 20m2 area with min 4m dimension in any direction, max 1:20 gradient
Single House, Rural & Coastal Settlement	N/A	N/A	8	2.4	N/A	N/A	12582	Min 80m2 OLS incl. 20m2 area with min 4m dimension in any direction, max 1:20 gradient
Large Lot, General Business, Business Park & Industrial Zones	N/A	N/A	N/A	N/A	N/A	N/A	9269	N/A
Special Purpose - Retirement Village Zone	45	N/A	8	2.4	10	2.4	191	Min 20m2 OLS, min 3m dimension in any direction, max 1:20 gradient

S32 analysis of the minimum apartment size and balcony rules are summarised in Appendix B, along with feedback from submitters.

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2.2 Literature Review

2.2.1 Local Research

We reviewed local research pertaining to the issue of minimum apartment and balcony sizes. The results of our review are discussed in detail in Appendix C; here we summarise the key findings.

Our review drew on two key studies, specifically:

- *Minimum Standards for Residential Apartments in Central Auckland (2005).* This study was commissioned by Auckland City Council (ACC) and undertaken by Bird Architects. Its findings informed the rules on minimum apartment and balcony sizes included in ACC's District Plan; and
- *Auckland Council Unitary Plan: Apartment Area Standards (2013).* This study was commissioned by Auckland Council and undertaken by Urbanism +. The findings of this study were used as an input in formulating the rules contained in the PAUP.

Research undertaken locally on the matter of minimum dwelling sizes seems to consider three distinct scenarios, all of which could comply with the Building Act:

1. What might be described as the **baseline scenario or ergonomics based scenario**, where the spatial and functional needs of each dwelling component, based on established architectural standards, human dimensions and established industry norms has been provided for discretely. The generally accepted minimum size for a studio or 1 bedroom dwelling developed within these parameters is around 32m^2.
2. The **compact scenario**, where the ergonomic basis is maintained (i.e. in order to comply with the Building Code), but innovative design achieves a usable dwelling at a smaller size than the baseline scenario; for example, by way of overlapping the activity areas within the dwelling so that dining, living and sleeping could occur in the same area, facilitated by fold-down or pull-out furniture, or through movable walls etc.
3. The **up-sized scenario**, where space is included that is in excess of the minimum required to achieve the spatial and functional needs of each dwelling component discretely, based on established architectural standards, human dimensions and established industry norms. This scenario would provide occupants with discretionary space that they could use as they chose to without interfering with the basic functioning of the dwelling.

The PAUP has included the up-sized scenario as a minimum size for the Auckland Region, supposedly because it contributes to enhance "liveability". However, as acknowledged in both the two local studies that we reviewed, there are down sides to such an approach. These include higher housing costs and/or lower quality developments due to developers trying to compensate for the higher costs of providing greater floor areas. The approach also limits variety in the housing market and is likely to result in higher prices for all types of dwellings.

Moreover, in general the underlying relationship between dwelling size and liveability are not well substantiated in a New Zealand context. While both of the two local studies that we reviewed seem to presume this relationship to hold, none of them present quantitative or qualitative research to this effect. For example, neither study consults the actual inhabitants of small apartments to ascertain their relative levels of well-being. In general, the two local studies discussed above are not, in our opinion, sufficiently robust to support the rules on minimum apartment and balcony sizes that have been specified in the PAUP. In the following section we turn our attention to the general literature on this topic.

2.2.2 General Literature

As part of this study we undertook a review of general literature on the topic of minimum apartment and balcony rules. Our review is contained in Appendix D; here we present a summary of key findings.

A wide body of literature establishes a clear link between the satisfaction and wellbeing of residents of medium and high density housing, and architectural design factors. These factors include access to natural light, views, greenery, the visual design of building elements, and architectural factors such as ceiling heights and building orientation. Numerous studies also demonstrate a clear relationship between satisfaction, wellbeing, and ergonomic factors – such as the functional design of kitchens and bathrooms, the usability of living spaces, the availability of sufficient storage, and cupboard space etc.

The consistent conclusion drawn from these studies is that the primary built-form influences on the satisfaction and wellbeing of apartment dwellers are design and ergonomics. Concurrently, no clear link is demonstrated between residential floor area and satisfaction/wellbeing. Where such a link is initially suggested, closer inspection reveals that other factors, such as crowding, small space or insufficient area, were in fact acting as proxies for more specific design or usability issues that were unrelated to floor area. For example, individuals reported the desire for 'more space' because of insufficient kitchen storage capacity, or needing a 'bigger apartment' due to limited natural light.

In that regard the common concepts of having enough space or being crowded appear not to be directly related to floor area, but rather are a composite construct indicative of the functional usability of a dwelling relative to its occupants' activities and desires.

We also find no evidence in the literature to suggest that larger floor area obviates the negative effects of poor design and ergonomics. However there is evidence to show that addressing design and ergonomic issues, independent of floor area, does reduce perceptions of crowding and improve residents' satisfaction with medium and high density accommodations.

Indeed, it could be argued that increasing the size (and hence the cost) of small apartments might actually lead to lower quality apartments. This might eventuate because developers would attempt to reduce costs elsewhere so as to deliver the apartments at a price point that the submarket for small apartments was able to bear. Hence, it is possible that the PAUP rules on apartments and balconies may result in apartments that are larger, but more poorly designed and/or with lower quality fit-out. For this reason it is not clear that the PAUP rules will have the desired effect.

2.3 Developer Interviews

As part of the background for this project, we interviewed several established developers with experience in the Auckland apartment market. The reason for undertaking the interviews was to better understand how the PAUP rules might impact on future development of apartments in Auckland, and how the rules could be improved from a developer's perspective.

The following developers were interviewed either over the phone or in person:

- *Mark Todd*, Ockham Investments Limited
- *Martin Udale,* Cranleigh Investment Banking
- *Brady Nixon,* Progressive Enterprises Limited
- *John Dare,* Development Consultant

We were also provided with comments from other people involved in the apartment development sector via the developers we interviewed in person.

2.3.1 Structured Questions

A series of prepared questions were put to the developers so a degree of consistency was achieved during the interview process. Notwithstanding these questions, developers were encouraged to provide their views on the general issues to do with dwelling size, regulation, and the apartment market in general. We have summarised the responses to the structured questions below.

1. *How long have you been involved in the development of multi-unit residential buildings in Auckland? Do you expect there to be more or less apartments developed in the next 5-10 years when compared to the last 5-10 years? Why?*
    - All the developers we spoke to had been involved with the property development industry, either commercial or residential development for at least 15 years; although specific experience with developing apartment/multi-unit typologies varied between the developers, with some being involved for 15 years or more and others being involved only for the last four to five years.
    - The interviewees all felt there would be increased demand for apartments to be developed in the next five years; although this was contingent on the regulatory environment being made more conducive to apartments in general. Height limits in areas outside the central city were identified as a significant constraint to development in these areas, and there was a view that apartment development might be focused more on the central city area. It was felt that smaller-scale, self-funded developments, e.g. subdivisions consisting of detached dwellings, were able to be developed more easily due to lower regulatory barriers and limited depth in New Zealand's capital markets (high cost of capital). Hence, there was a sense expressed by the participants that apartments were not on a level playing field.

2. *Are you aware that the PAUP specifies minimum areas for apartments and their balconies?*
    - Most of the developers were generally aware that the PAUP included rules on minimum dwelling sizes, but there was some uncertainty on specific details, e.g. whether the balconies were included in the minimum size of a dwelling or not.
    - One of the developers was not aware of the minimum dwelling sizes.

3. *Are you aware that the floor area and balcony requirements specified in the PAUP are more stringent than the draft version, and more stringent than the Building Act requirements?*
    - Most of the developers were generally aware that the PAUP minimum sizes had changed from the draft version, but there was uncertainty as to the direction and scale of change; one developer thought the sizes had decreased, whilst another expressed surprise at the scale of increase from the draft to the proposed versions.
    - One developer commented that because they are so busy, it is difficult to stay on top of what is happening with the unitary plan. Another commented that he did not want to "get up councils nose", in case it compromised his ability to get consents in the future. For this reason he tended to avoid engaging with and submitting on the PAUP.
    - All were aware that the PAUP standards were more stringent than the Building Act requirements.

4. *What size of apartment is viable or in demand? Is there demand for say 25 to 30sqm apartments? What would you do in the absence of the regulation? What are the most regulatory constraints on apartment development?*

   - The general consensus was that there is always demand for smaller apartments of 25m^2-30m^2 in area. A lack of supply was seen in terms of the smaller apartment market and the mid-sized market for owner-occupiers. It was noted that recently there has been a lack of small apartments on the market, and that two bedroom units have been marketed as shared accommodation as an alternative.
   - One developer noted that they probably would not build apartments smaller than 30m^2 in any case, because they preferred to focus on the high end of market.
   - Several developers commented that in the absence of regulation they would focus on low/medium rise multi-unit development in the city fringe area and in areas with good proximity and amenity. The wider isthmus area was seen as being the area with most potential – provided that regulations were relaxed. Others indicated that they would try and meet the demand for smaller dwellings in the city centre.
   - The greatest regulatory constraint on apartment development was identified by some developers as being the limits on building height, particularly outside the main centres; noting that there are typically high fixed costs involved with development, and if this can be spread across a greater number of units then the cost per unit is reduced. Floor area ratios were also singled out as being particularly problematic, especially with respect to developing useful balcony areas that add value. Other developers identified the number of rules and regulations in combination as being the constraint, commenting that 'the consumer should decide what they want in an apartment, not urban designers and other professionals'. There was a strong preference for the focus of regulations to be on the external aesthetic qualities of the building, e.g. how it engaged with the public realm, rather than how space was allocated internally within the building.

5. *With respect to the restricted discretionary status of non-conforming developments; in this case of a 'sub-standard' development, how likely would you be to progress the design to the resource/building consent stage?*

   - There was a divergence of views on this point.
   - Some developers stated that the uncertainty around the broad/nebulous wording of the discretionary criteria would be a significant deterrent to proceeding with a proposal.
   - Other developers stated that it was not a significant concern to them, as they were confident that if the proposed a quality development it would be approved eventually, even if they needed to rely on the "more rational approach" of the Environment Court.
   - Interestingly we noted that those developers who typical deal with larger scale developments (i.e. 100s of units for the investment market) tended to be more risk averse and would prefer to submit a complying design to avoid delays (significant additional holding costs), whereas those developers who typically deal with smaller developments targeted at owner-occupiers perceived less of a risk, and would be confident that a quality development would eventually be approved.

6. *How will the PAUP floor area and balcony requirements affect the development of apartments in terms of the following attributes:*

   a. *Cost (higher/lower).* All developers thought that the PAUP rules add costs to development/apartments. One made the comment that lost value was more significant than the additional cost; e.g. including open balconies that add no value instead of semi-enclosed spaces that add value (but also add to the calculation of FAR).

   b. *Residential amenity of occupants, and of non-occupants (higher/lower).* Answers to this question diverged in terms of occupants; one developer thought the rules would result in higher amenity, one thought it depended on the quality of the other aspects of the development, one thought the amenity levels may be a little better but not proportional to the cost, and one thought it would not result in greater amenity because occupants would need to spend more on housing that would otherwise be spent on other things – hence their overall amenity would be lower. No developers thought non-occupants amenity would be affected. The view was expressed by several developers that it 'has nothing to do with the people on the street'.

   c. *Health and wellbeing of occupants, and of non-occupants (more/less).* Answers to this question also diverged in terms of occupants; two developers thought the rules would have no effect on health and wellbeing of the occupants, one thought that there would be a positive effect, and one thought there would be a negative effect on the occupants due to having less money to spend on other things; e.g. going out, food etc. No developers thought that non-occupants' health and wellbeing would be affected.

   d. *Overall desirability (more/less).* Three developers indicated that they thought overall desirability was less, and comments were made that consumers may not perceive the difference, and the added cost may discourage potential occupants from apartment living. One developer thought there would be more overall desirability.

   e. *Marketability/viability (more/less).* Several developers indicated that they were not convinced that larger apartments are more marketable, and that quality is more important. The comment was made that the minimum dwelling size should be the absolute minimum practicable size rather than the most 'desirable' size for "the 99% of people who have never been in a small apartment". Also, it would be more difficult for developers as they would need to work with a reduced yield.

   f. *Supply, i.e. per development and number of developments (more/less).* Comments were made that the PAUP rules would increase the price point and hence reduce the supply of apartments.

2.3.2 General Comments/Observations

General comments from the developers tended to split the apartment market into two general demand segments: 1) owner occupied and 2) investment property. The developers we spoke to were generally working (or had worked) in one of the two segments, but not both.

It was noted that over the last five years there had been activity in the owner occupier segment, but little activity in the investment property segment. We understand from our interviews that the latter can be primarily attributed to the global financial crisis, with its ensuing impacts on the availability of finance. This caused significant numbers of developers in the investment property market to fold. One of the interviewees also identified the introduction of minimum apartment sizes via Plan Change 12 to the

Auckland City District Plan as being a factor in the lack of activity in the investment property segment over the last five years. Characteristics of these two general market segments are noted in the table below.

Table 2: Characteristics of a segmented apartment market

Owner Occupied Market	Investment Market
Larger dwelling size	Smaller dwelling size
Smaller scale developments (e.g. 10-15 units)	Larger scale developments (e.g. 100s of units)
Self-funding, low cost of capital	At the mercy of financing structures (e.g. rely on being sold off the plans), high cost of capital
Less capital involved = smaller risk	More capital involved = larger risk
Less averse to proposing non-complying development (faith in quality developments)	More averse to proposing non-complying development (risk management)

Other general comments from developers are summarised as follows:

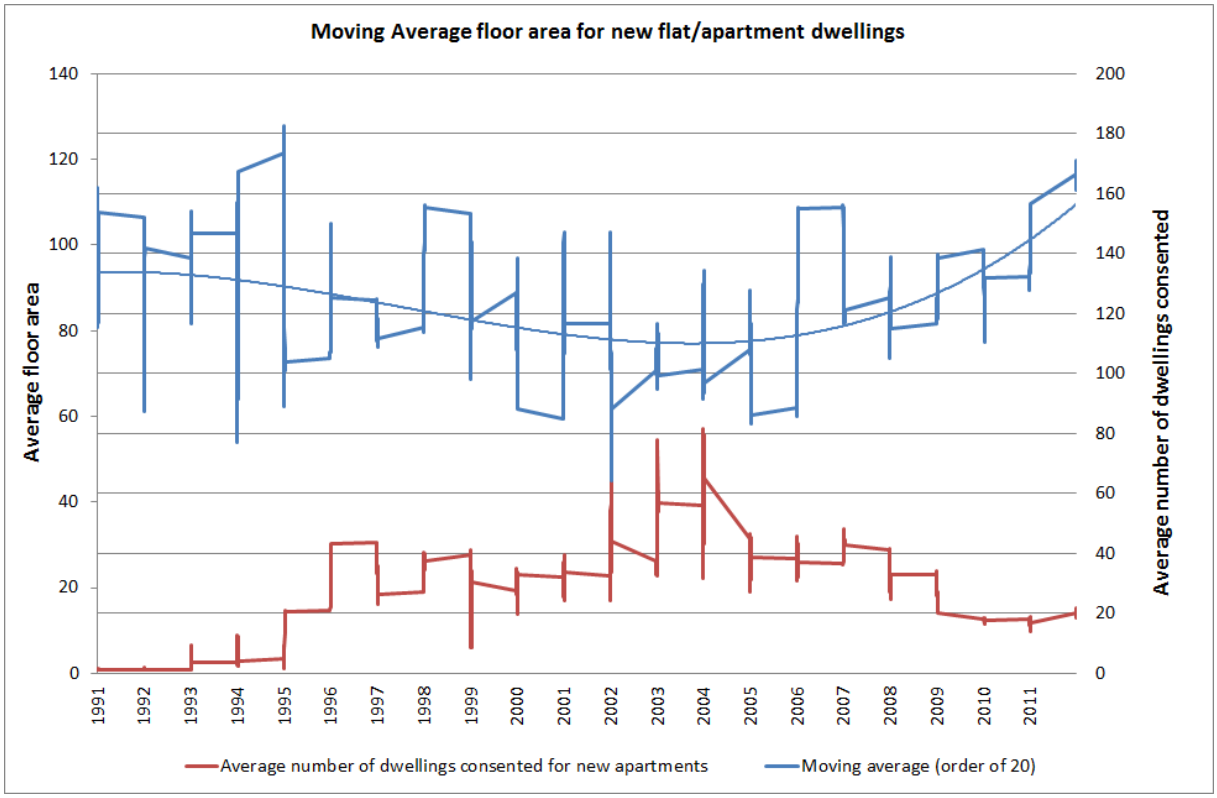
- Beyond a minimum practical size the quality of the apartment design is far more important than the additional size.
- Developers don't want to get off-side with the Council, so can be reluctant to engage with the submissions process and oppose rules in the district plan.
- Opinions on the adequacy of the Building Act were split. Some of the developers thought that all internal requirements for dwellings should be left up to the Building Act to regulate, and some felt that the Building Act in its current form was a bit lax and there were some bad developers out there, and therefore some additional rules in the PAUP were justified.
- Pricing of apartments will be based on type rather than size; i.e. small studios now rent out at the same price as larger studios, as with 1 bedroom units, rather than paying per square metre. Rules that increase floor area will increase the cost of developing apartments, but not increase the revenue. This in turn squeezes margins (i.e. the difference between price and costs) and ultimately reduces the likelihood that apartments are a viable investment.
- The unitary plan should be less 'rules' based and more 'design' based. There is a need to allow individual apartment developments to be assessed on their merits.
- Floor and balcony size regulations are just another hurdle, and are seen to be in direct tension with other PAUP rules such as FAR and height limits. The cumulative impact of these rules is to greatly reduce the number of sites where apartment development is viable.
- "99% of the people who complain about small apartments have never stepped foot inside one." This view was expressed by several developers in different ways.
- External architectural qualities of buildings get confused with the smaller dwellings that they contain – urban design rules can and should address the former.
- Apartment development is marginal to begin with nature of NZ capital markets (and banks systematic preference to lending on detached housing which have a larger land component). Therefore it is crucial that PAUP rules do not further reduce the viability of apartment projects.
- PAUP rules need to be presented in the right way so as to send the right signals to developers. Controlled activity status would provide greater certainty for developers.

- It is important to allow flexibility around the design of balconies so that they add value to a dwelling. For example; conservatories and sun-rooms could be included in both 1) the minimum apartment size and 2) the minimum balcony size.
- The desired outcome should be able to be expressed more clearly in the PAUP, rather than relying on broad and nebulous assessment criteria.

2.4 Building Consents Data

We analysed Auckland Council's building consents database to identify trends in Auckland's apartment market. The figure below illustrates the average floor area (blue) and average number of consented dwellings (red) in Auckland from 1991 – 2011.

Figure 2: Trends in building consents for apartment buildings in Auckland 1991-2011



The following trends emerge from this analysis:

- We can see the average number of apartment buildings consented increased until around 2004, after which it flattened off. Circa 2008 and 2009, the average number of dwellings per consent dropped by almost 50%. This could reflect either the effects of the GFC and/or Auckland City Council's Plan Change 12.
- We can see that the average floor area for consented apartments tended to decline in the period from 1991 to 2004. Since this time there has been a sharp increase in the average floor area of apartments, to the point where the average apartment consented now is considerably larger than at any point in the past (at least for which we have data).

We stress that this data reflects only the supply-side of the market and that without additional information on either demand or price we cannot make concrete inferences about overall trends in the apartment market.

There are a number of potential factors that may explain the observed trends in apartment size and consent numbers. In terms of apartment size, a drop in tertiary student numbers, especially international students, during this period could, for example, have impacted on the market for small apartments.

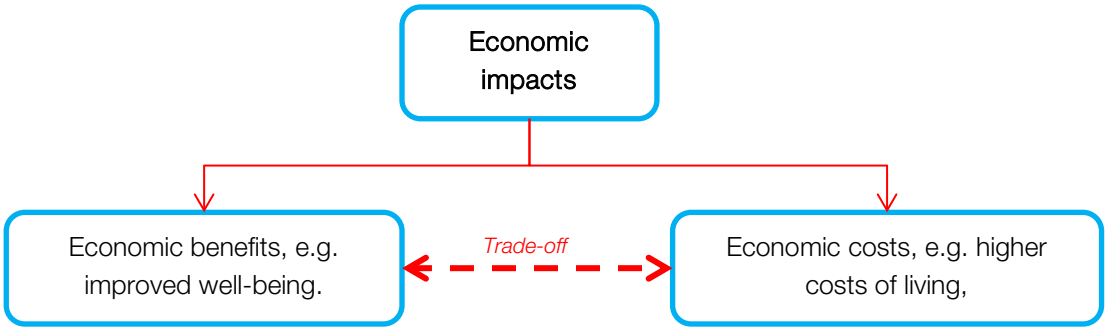
Honing in on explanatory factors for trends in apartment consent data is also difficult because the timing of the GFC coincided with the implementation of ACC's Plan Change 12. Further economic research work could seek to analyse changes in the distribution of apartment sizes and identify whether the increase in average floor area is due to either 1) fewer apartments with floor areas less than 30sqm or 2) a general reduction in the supply of smaller apartments (i.e. approximately 100 sqm). The first finding would seem to imply that Plan Change 12 – and its rules on minimum apartment size – were the most probably explanation, whereas the second finding would suggest that the GFC is the primary cause.

Nonetheless, one thing is fairly clear: All other factors – such as demand – being equal, we would expect an increase in average floor area and a reduction in supply to cause prices to rise – especially for small apartments. Anecdotally, this indeed seems to be the case, with prices/rents for small apartments rising quicker than those for larger units.

3. Economic Analysis

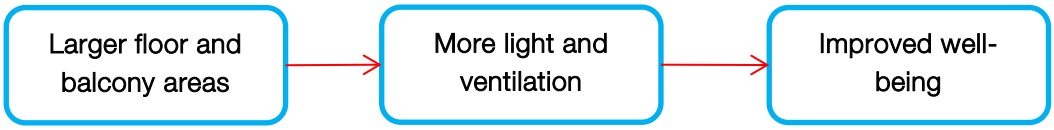
3.1 General Approach

The basic economic framework used in this study is illustrated below.



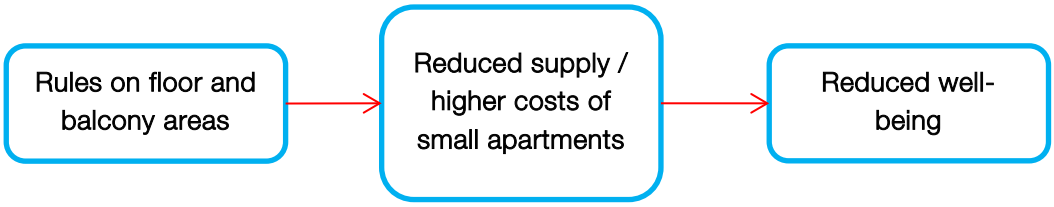
The key relationship we are trying to understand is the relative size of the expected economic benefits of PAUP rules versus their expected economic costs. We proceed by considering the benefits and costs of the regulation separately, before comparing them to each other and finally considering the merits, or otherwise, of the PAUP rules on minimum floor/balcony sizes.

The benefits of the propose PAUP rules seem to rest on the following causal linkages:



Improvements to health can be assigned monetary values using so-called "disability adjusted life years" (DALY). New Zealand's Ministry of Health describes a DALY as "the loss of one year of healthy life". The DALY is considered to be a "standardised 'quality adjusted life year' (QALY) measure" that can be "applied directly to the cost utility analysis of specific interventions." (MoH, 2001). Put simply, this means that we can use DALYs to estimate the economic value of improved well-being.

On the other side of the economic ledger, the primary costs of the proposed rules arise from the following causal linkages:



The costs of the proposed rules thus depend on the degree to which they reduce the supply – and hence increase the cost – of small apartments. There is an additional economic cost insofar as the PAUP rules impose additional compliance costs of development proposals. These compliance costs reflect the additional costs incurred by applicants and Council to assess compliance with the PAUP rules.

Assessing the economic costs of the PAUP rules requires that we consider their restricted discretionary status and – in particular – three distinct outcomes that may arise, specifically:

- *Outcome 1.* Proposals for small apartments do not proceed to consent application.
- *Outcome 2.* Proposals for small apartments make it to the consent application stage, but are subsequently declined by Council
- *Outcome 3.* Proposals for small apartments make it to consent application stage, and are subsequently approved by Council.

These three potential outcomes, and their associated economic costs, are summarised below.

Table 3: Potential outcomes of restricted discretionary applications and their associated economic costs

Outcome		Reduced supply?	Compliance costs?
1	Do not proceed to consent application	Yes	No
2	Proceed to consent application but are declined	Yes	Yes
3	Proceed to consent and are approved	No	Yes

Outcome 2 is actually the most "costly" from an economic perspective, because 1) society incurs the cost of fewer apartments and 2) the developer and Council incur compliance costs. Outcome 3 is likely to be the least costly, because the PAUP rules on minimum apartment and balcony sizes are expected to have only marginal additional compliance costs

3.2 Quantifying Economic Impacts

In the following section we seek to quantify the economic benefits and costs of the proposed rules on apartment floor/balcony areas.

3.2.1 Economic costs of the proposed PAUP rules

Here we quantify the economic costs of the proposed PAUP rules. To do so, we were required to form an opinion on the proportion of potential small apartment developments that would fit into the three potential outcomes discussed above. The outcomes, and their assumed probability of occurring, are summarised in the following table.

Table 4: Estimated likelihood of the outcomes of restricted discretionary applications

Outcome		Reduced supply?	Compliance costs?	% of total
1	Do not proceed to consent application	Yes	No	45%
2	Proceed to consent application but are declined	Yes	Yes	5%
3	Proceed to consent and are approved	No	Yes	50%

These percentages are necessarily "rubbery". We simply do not know, for example, how future developers may respond to the PAUP of rules on floor and balcony area.

Nonetheless, with regards to Outcome 1 our discussions with developers suggested that many developers would respond to the rules by choosing to not develop small apartments. This would effectively remove some small apartments from the market that would have otherwise been built in the

absence of the rules. Here we have assumed 45% of potential small apartment developments are not brought to market as a result of the rules.

In terms of Outcome 2, our discussions with Council planners indicated that few consent applications that did not comply with restricted discretionary rules were ultimately rejected. For this reason we have assumed only 5% of possible small apartment developments would be subject to this outcome.

In terms of Outcome 3, many of the developers we spoke to indicated they would not be discouraged by the restricted discretionary rules, i.e. they would simply take their application through to the Environment Court. We have assumed that 50% of potential small apartment developments fall into this category.

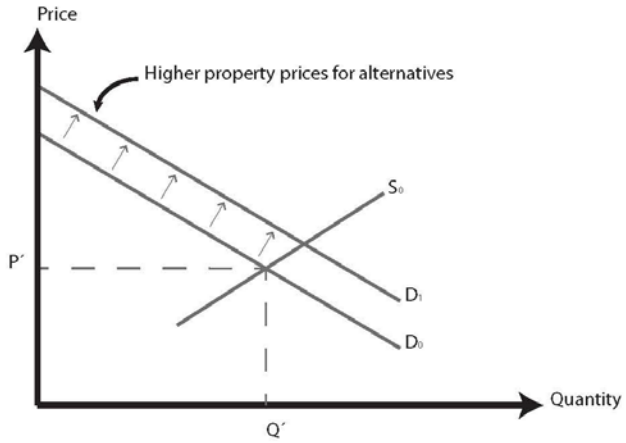
Outcome 1. Small apartment proposals do not proceed to consent application

In the event that the proposed Unitary Plan rules prevent apartments below a certain floor area (and any other requirements, such as minimum balcony size) from proceeding to consent application, then this will reduce the supply of these products from the (legal) market.

We can estimate the economic impacts of doing this using standard demand and cost (supply) curve analysis, as on Figure 1. This shows the competitive equilibrium in an unregulated market for small apartments, as would be observed if there were no restrictions on apartment floor and balcony areas.

The intersection of supply and demand determines the number of small apartments that would be built and the price they would be sold at (obviously, we are abstracting here from differences in size and quality of the small apartments – this could be handled analytically, with added complexity).

Figure 3: Supply and demand curves for small apartments



Note also that we do not have to know what their next best alternative is to measure the cost of being forced to take it up. People denied the opportunity to purchase a small new apartment could resort to many second-best alternatives, such as switching to an existing older small apartment or switching to a larger – probably more expensive – apartment. If they are first-time buyers, they could instead elect to stay at home longer with their parents; continue to rent or share a flat; or arrange other temporary living arrangements, such as boarding or “sleeping van”.

Ultimately, people could do all sorts of things. But all we need to know to estimate the economic impacts of the rules is how much these various best alternatives fall below the value to them of the (prohibited)

small new apartments.[2] All this information on alternatives is encapsulated within the demand curve for small apartments.[3]

How large might be the lost surplus associated with the removal of these apartments from the market?

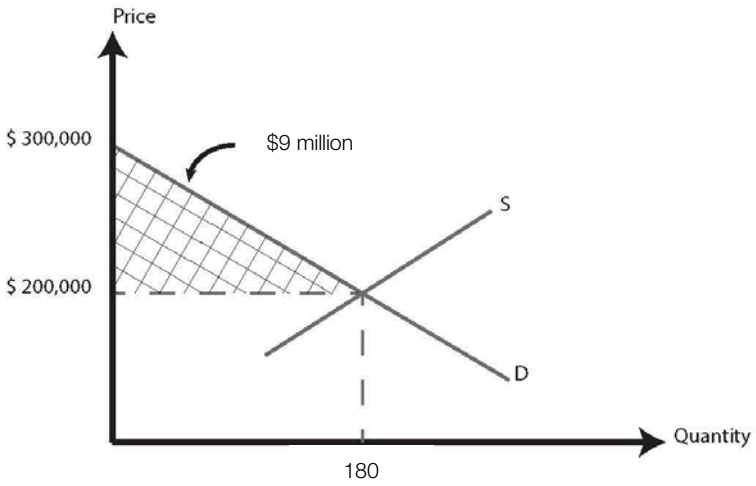
In previous research for the NZTA we studied 12,400 house or apartment sales in the former Auckland City over the five years to 2007. Of these sales, 245 were for units of less than 30sq. That's about 2% of the total. So what percentage of the total dwelling stock would these units take up if now and in the future they could be freely built?

With higher land values and trends towards smaller household sizes it seems reasonable to suppose that approximately 4% of the total dwelling stock added per annum would comprise of small apartments. If Auckland adds 10,000 new dwellings p.a. then this equates to 400 small apartments p.a. Outcome 1 relates to 45% of potential small apartments, or 180 small apartments p.a. that would not be brought to market because of these rules.

The average sale price of the 245 small units in our observation period was $140,000. After allowing for inflation, recent growth in (especially) CBD land and apartment prices, and the fact that the new units would indeed be new (and hence not have depreciated), it seems reasonable to suggest an average price of approximately $200,000.

Finally, we need to conjure up a number for the intercept of the demand curve – i.e. what would the keenest consumer of these small apartments be willing to pay? A reasonable "guesstimate" might be that an intercept of $300,000, or 50% above the average actual sale price. In the figure below we have added these values to the conceptual economic framework illustrated earlier.

Figure 4: Calculating lost consumer surplus for Outcome 1



[2] Of course, there may be negative external and/or distributional impacts from people being denied access to small apartments and instead having to take up their next best alternative, but these are considered separately from the direct economic impacts of the regulation itself.

[3] It will, however, be relevant that the majority of the people denied small apartments will switch to another dwelling type.[3] The reason this is relevant is that (unlike manufactured products), housing requires land, and the total supply of land is fixed. So, if small apartments on average use less land than do the other housing alternatives that people would turn to, then the net effect will be the bidding up of land and thus property prices. This adds to the welfare losses of would-be small apartment owners (because their best alternative has become more costly) and indeed is a cost to all property buyers. However, the losses here are again not efficiency costs (deadweight losses), because sellers will gain – the price changes are another distributional issue, which may or may not be of interest to policy makers.

Based on these numbers the deadweight consumer surplus loss comes out at: 0.5 x 180 x ($300,000 - $200,000) = $9 million p.a. (i.e. this is an annual cost or flow).

Outcome 2. Small apartment proposals proceed to consent application, but are declined

The economic costs of Outcome 2 are very similar to Outcome 1, except that additional compliance costs are incurred due to the fact that the consent application is first lodged before being declined.

First we calculate the cost due to the apartments not being brought to market. The number of affected apartments is estimated to be 5% x 4% x 10,000 = 20 p.a. In the same way as Outcome 1, we estimate the economic costs of this as 0.5 x 20 x ($300,000 - $200,000) = $1 million p.a.

Second, compliance costs are notoriously difficult to assess. If we presume that the average development would supply 20 small apartments, then we can expect approximately one application to be declined p.a. We have assumed that the total private costs of developing the consent application are related to the marginal costs of complying with the PAUP rules, i.e. approximately $2,000 per consent. We have also assumed that the public compliance costs are equivalent to the private costs, i.e. an additional $2,000 per consent. This yields total compliance costs (private and public) of $4,000 per consent that is declined.

Compliance costs are, however, not simply related to consent preparation and processing. There is also the additional holding cost incurred by the developer due to the project taking longer to proceed than it otherwise would. We assume that an apartment building would require a site of 1,000 sqm for a cost of $2,000 per sqm, i.e. a total of $2.0 million. If also assume that the total time taken from beginning the preparation of the resource consent through to the decision to decline the application is 12 months and that the average cost of capital is 10%, then this yields additional holding costs of $200,000 p.a. Hence the total annual cost associated with outcome 2 = $1 million + $4,000 + $200,000 = $1.204 million p.a.

Outcome 3. Small apartment proposals proceed to consent application and are approved

In this outcome, the only costs incurred are compliance costs. We expect that Outcome 3 represents 200 apartments p.a., which at an average number of apartments per building of 20 relates to 10 consent applications p.a.

The direct compliance costs for these can be estimated in a similar way to Outcome 2, i.e. 10 x $4,000 = $40,000 p.a.

Holding costs, however, must be calculated differently because they relate only to the marginal holding costs imposed by these rules. We assume the presence of these rules incurs additional delays of 2 weeks compared to would have otherwise occurred. Based on similar assumptions used previously for Outcome 2, we estimate holding costs to be $73,000 p.a. for Outcome 3.

The yields total costs for the latter of $40,000 + $73,000 = $113,000 p.a.

3.2.2 Economic benefits of the proposed rules

Previous sections of this report could identify no clear, robust quantitative link between floor/balcony area and well-being. In the absence of this link, we cannot readily quantify the benefits of regulations on apartments/balconies. We suggest this is an important area of further research; evidence of this link is, we think, essential to the case for imposing these rules.

The absence of quantitative evidence, however, does not mean that we are unable to proceed. Instead, we can still quantify the economic benefits that would need to be generated in order to off-set their economic costs (which were estimated in the previous section).

More specifically, we know that the economic costs of the PAUP rules are equal to $9 million + $1.204 million + $0.113 million p.a. = $10.317 million p.a. Thus, in order to be worthwhile the rules need to generate at least this order of economic benefits by virtue of their impacts on well-being. Fortunately the economic value of improved well-being is an area that has been well-studied.

For example, in their study "Report on New Zealand Cost-of-Illness Studies on Long-term Conditions", the Ministry of Health surveyed studies of illness in New Zealand, many of which quantified the effects of illness in terms of their impacts on disability adjusted life years (DALY) of the New Zealand population.

A sub-set of these studies also identified the economic costs of the diseases from which we were able to derive a value per DALY, as summarised below (NB: This table lists multiple studies).

Illness / Risk factor	$/DALY
Arthritis	$165,000
Dementia	$398,000
Smoking[4]	$246,750
Average	$264,000

The variation in results for the value of a DALY is to be expected; as the different studies consider the impacts on people's well-being of a range of different illnesses. The average value of a DALY from these studies is $264,000, which is the value we will use in our subsequent analysis.

Given the absence of robust evidence linking large apartments/balconies to reductions in the prevalence of specific diseases we propose to use a process of inductive reasoning. This involves beginning from the assumption that the rules generate benefits that are equivalent to their costs. We can then work backwards from the (assumed) benefits to ascertain whether they are likely given their relative impacts on people's overall well-being. This is investigated in more detail in the following section.

3.3 Comparing Costs and Benefits

Previous sections have established the proposed rules are associated with the following economic costs:

Outcome		Estimated costs [$ p.a.]
1	Do not proceed to consent application	$9 million
2	Proceed to consent application but are declined	$1.204 million
3	Proceed to consent and are approved	$0.113 million
Total		$10.3 million

We can now turn our focus to examining whether the benefits of the proposed rules are likely to justify these costs. First, we divide the total costs by the average DALY value established previously, i.e. $10.3 million p.a. / $264,000 per DALY = 39 DALY p.a.

[4] This is the average of two studies into smoking.

How many people would be affected by small apartments in the absence of the regulations? If we assume that the population of the city centre is 44,000 and that 23,000 of these reside in 1-2 bedroom apartments, of which 20% would have otherwise violated the minimum floor/balcony area rules, then this leaves an affected population of 4,600.

Thus, the reduction in DALY per capita is equal to 39 / 4,600 = 0.008 DALY per capita p.a. We also know that the average DALY per capita for the city centre population is equal to 0.095 DALY per capita p.a. Hence, for the PAUP rules to be worthwhile (in the sense that their positive effects on wellbeing would outweigh their costs) then they would have to reduce the burden of illness on the affected population by 0.008/0.095 = 9% compared to the baseline situation.

A 9% reduction in the burden of illness is relatively high in the sense that many of these diseases will be either untreatable or unaffected by general wellbeing. Put simply, it seems implausible to suggest that the PAUP rules on minimum floor/balcony areas will deliver such a large reduction in the burden of disease.

In conclusions, this analysis suggests that the economic benefits of the proposed PAUP rules are likely to be outweighed by their economic costs. We note that the majority of the costs of the PAUP rules are associated with the degree to which they discourage applications for apartment proposals to being submitted, and hence cause a contraction in the supply of small apartments.

Hence, efforts to mitigate the economic costs of the rules should focus their attention on reducing the degree to which they discourage proposals for small apartment developments from being submitted in the first instance. This could foreseeably be through either 1) lowering the minimum floor/balcony areas and/or 2) changing the activity status from “restricted discretionary” to “controlled”.

4. Other Policy Considerations

In the previous section we considered the economic benefits and costs of PAUP rules on minimum apartment/balcony sizes and concluded that the former are likely to outweigh the latter. In this section we now consider a number of other policy considerations that are relevant to the PAUP rules.

4.1 Unintended Consequences for Well-being

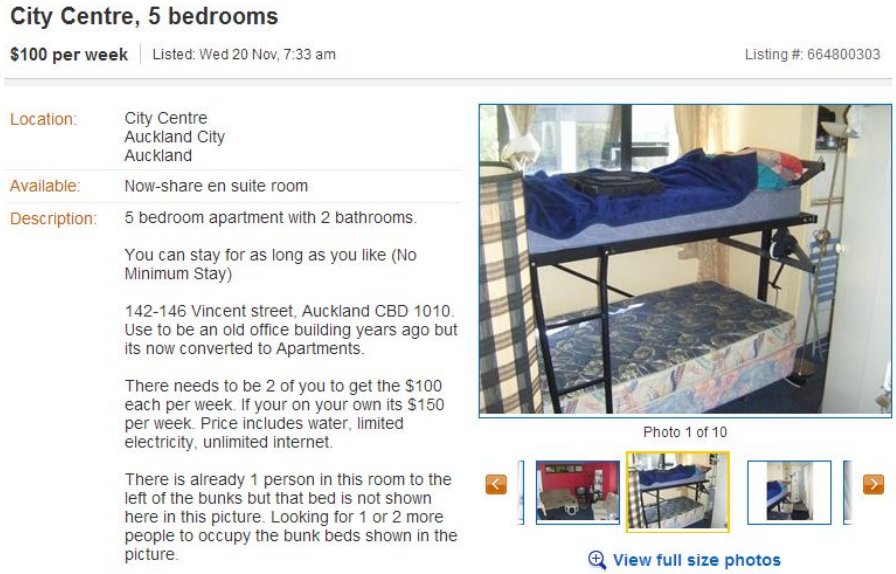
People who are adversely impacted by the proposed rules may choose alternative accommodation arrangements that has unintended negative impacts on their well-being. Such alternative accommodation arrangements include, such as:

- *Staying at home*, in which people reside at home with their parents for longer.
- *Sharing rooms*, in which a larger apartment/room is shared between multiple adults.
- *Boarding houses*, which are not subject to the PAUP rules on floor/balcony sizes.
- *"Temporary" accommodation,* such as garages, caravans, and "sleeping vans".

Not only are these alternative accommodation options "sub-optimal" from an individual perspective (insofar as they are less preferable than owning their own, albeit small, apartment) but they may also likely to have negative impacts on people's well-being.

This is particularly true in situations where people resort to sharing rooms and/or making use of temporary accommodation options. A quick search of TradeMe's "flatmate" section, for example, identifies a large number of shared accommodation listings, one of which is illustrated below.

Figure 5: Example of shared accommodation



Such arrangements could have negative implications for wellbeing, especially in terms of safety and security. It is not clear to us that the negative implications of alternative accommodation arrangements have been adequately considered by Council when formulating the PAUP rules on minimum apartment/balcony areas. For this reason it is not clear that increasing the size of apartments/balconies will necessarily lead to an overall improvement in well-being.

4.2 Potential Implications for International Students

During the course of this study it became clear that international students were the primary target market for small apartments in Auckland.

A recent study[5] estimated that international students contribute $1.65 billion p.a. to Auckland's economy, which is approximately 2.5% of regional GDP[6]. Given the importance of this industry, there is merit in considering how the proposed rules – and in particular their effects on the cost of accommodation – may impact on the competitiveness of Auckland as a destination for international students.

For existing international students, we expect the impacts of the proposed rules are limited to higher accommodation costs. This arises for a number of reasons including:

- In many cases the students will have begun a course of study that requires them to stay in Auckland for moderately long periods of time. Course credits are not readily transferable;
- They are less likely to have a New Zealand drivers' license and/or access to a vehicle, i.e. they are more reliant on public transport and walking/cycling – which increases the relative attractiveness of the city centre compared to the suburbs; and
- They have more limited informal support networks outside of the city centre, which would in turn be likely to reduce their ability to avoid higher rents for apartments by moving to the suburbs.

In short, these three factors constrain the mobility of existing international students and hence reduce their ability to respond to higher rents in the city centre. Hence, the higher rents that result from the imposition of minimum apartment/balcony rules is expected to have only relatively limited impacts on international students who are already in New Zealand. The primary impact will be that they spend more on rent and less in other areas, i.e. there will be a transfer of spending from the wider economy to residential property sector, and in particular the owners of existing small apartments. Put simply, spending elsewhere in the economy is likely to be curtailed in order to pay higher rents.

The effects on potential international students who are considering coming to Auckland, however, may be quite different. In this case, potential students will be weighing up a number of possible study destinations, of which Auckland will be only one. These students are likely to be more price-sensitive and more likely to respond to the increased rents by choosing to study elsewhere, either in New Zealand or overseas. This represents a loss of economic activity for the Auckland region and possibly New Zealand.

For this reason we suggest that rules on minimum apartment/balcony sizes seem to pose a long-term risk to Auckland's attractiveness as a destination for international students. The global market for such students appears to be relatively competitive, in which case an increase in apartment rents – as is anticipated in response to these rules – could undermine the regional economy, especially in the city centre. This threat may be especially relevant in light of the recent strength of the New Zealand Dollar relative to other English-speaking countries, such as Australia and the U.S.

In our professional opinion, the potential negative effects of the proposed minimum apartment/balcony size rules on Auckland's attractiveness as a destination for international students, and hence on the economic performance of the city centre, is sufficiently important to warrant further research.

[5] http://www.educationnz.govt.nz/markets-research/general-research
[6] http://www.stats.govt.nz/browse_for_stats/economic_indicators/NationalAccounts/RegionalGDP_MRYeMar0710.aspx

5. Conclusions and Recommendations

5.1 Conclusions

We conclude:

- Rules on minimum floor and balcony areas are likely to have a material upwards effect on the costs of small apartments. We expect they will cause the price of small apartments to rise by approximately $50,000-100,000 per apartment, or 25-50%. This represents a substantial increase in the price of small apartments and may effectively price them out of the market.
- Our analysis suggests that the economic costs of the proposed rules on minimum floor and balcony areas are likely to exceed their economic benefits. More specifically, the PAUP rules are expected to be associated with economic costs of approximately $10 million p.a.
- We find no evidence to support the contention that the PAUP rules will result in material improvements in the well-being of affected residents. Such assertions seem to ignore the potential costs of the regulations (outlined above) as well as the potential unintended consequences.
- Nevertheless, even if we assume that the proposed rules will result in improved well-being, our analysis indicates that the PAUP rules would need to bring about a relatively large improvement in well-being in order to be warranted.
- More specifically, we estimate that the PAUP rules would need to reduce the total burden of illness in the affected population by approximately 9% in order to generate economic benefits that exceeded their costs. Such an improvement in well-being is unlikely.
- Given the absence of evidence linking increased floor area and balcony size to the well-being of the occupants, we consider it unlikely that the PAUP rules will have positive economic impacts.

5.2 Recommendations

We recommend:

- The rules stipulating minimum floor and balcony areas for apartments are removed from the Unitary Plan. This recommendation holds at least until such time as the case for their inclusion is supported by research. This is our preferred approach.
- Alternatively, a “second-best” option would be to modify the rules so they are less of a barrier to the development of small apartments. Such changes should aim to minimum the number of small apartment developments that are not brought to market. We see two potential pathways for achieving this outcome, which could be adopted together or independently, specifically:
  - The minimum apartment/balcony areas could be reduced. The PAUP limits of 30-40sqm and 8-10 sqm for apartments and balconies, which our research indicates is relatively high; and/or
  - “Sub-standard” applications are assigned the more lenient “controlled” activity status, rather than “restricted discretionary” activity status.
- Finally, some aspects of the current rules are difficult to justify based on the evidence we have reviewed. Most notably, we find no justification for the rules on minimum floor and balcony area to be higher for apartments located outside of the city and metropolitan centres. Instead, we suggest that *if* rules on minimum apartment floor and balcony areas are applied, *then* they should be applied consistently across the city. The current zone based distinction on minimum apartment/balcony sizes is not supported.

5.3 Assumptions, Limitations, and Future Research

These findings are, as far as we know, the first effort to quantify the economic benefits and costs of rules on minimum apartment/balcony sizes, either in New Zealand or overseas. For this reason we suggest our findings are treated as preliminary until such time as further, independent research is able to corroborate our key findings, or otherwise.

During the course of this study we noted considerable opportunities for further work, specifically:

- Our analysis of the economic costs of the proposed Unitary Plan rules rests on the following important assumptions:
  - We have assumed an annual "flow" of new apartments that would be affected by the proposed rules. Future work could refine this assumption in light of expected changes in household composition across Auckland, and consider how these relate to the zones in the Unitary Plan.
  - We have assumed a demand/supply curve for small apartments. Further work could seek to calibrate these curves more precisely, through detailed analysis of property transactions.
  - We have assumed how the proposed rules would affect developer behaviour and more specifically the compliance costs that might result. Further research could seek to refine these assumptions based on analysis of consent data and/or surveys of developers.
  - We have derived a DALY value from epidemiological studies into diseases that may not be representative of the health impacts associated with improved wellbeing. Further research could seek to develop a bespoke DALY value that was linked more strongly to such impacts.
- Our analysis of the economic benefits of the proposed Unitary Plan rules has the following limitations:
  - We know little about the well-being of those people who actually inhabit existing small apartments in Auckland. This would seem to be an important area for further work, which could involve detailed qualitative surveys and/or longitudinal studies of occupants' wellbeing. We suggest that such research is a pre-requisite for any further deliberation on this topic.
  - We do not know how the higher accommodation costs that result from imposing these rules might subsequently impact on the economic welfare of the people who are directly affected. We suspect these people are of relatively constrained financial means, which in turn will limit their ability to increase their outlay on accommodation.
  - We do not know how the directly affected people will respond, in terms of their "next best" accommodation option. As indicated in the previous section, such options might be associated with negative effects on well-being that should be considered on the "cost" side of this analysis.
- We also suggest there is a need for future work on the distributional impacts of the proposed rules. In particular, we note that the primary economic burden of the proposed rules is likely to fall on households who are both smaller and younger. On the other hand, the primary beneficiaries of the proposed rules are likely to be the owners of small apartments, who will earn higher rents from their properties. In our professional opinion, the distributional impacts of the proposed rules are likely to result in a transfer of wealth from low to high income households.

We note, however, that the need for further research should not be interpreted as justification for the status quo, i.e. persisting with the application of minimum apartment/balcony rules. Indeed, the onus of responsibility for undertaking this research falls to the advocates of such rules. In the absence of such research, we suggest that the case for including rules on minimum apartment/balcony sizes in the Unitary Plan has not yet been made.

Appendices

Appendix A – Review of Building Act

The construction of dwellings and other buildings in New Zealand is controlled by the Building Act 2004. The purpose of the Building Act 2004 is:

> *(a) to provide for the regulation of building work, the establishment of a licensing regime for building practitioners, and the setting of performance standards for buildings to ensure that—*
>
> *(i) people who use buildings can do so safely and without endangering their health; and*
>
> *(ii) buildings have attributes that contribute appropriately to the health, physical independence, and well-being of the people who use them; and*
>
> *(iii) people who use a building can escape from the building if it is on fire; and*
>
> *(iv) buildings are designed, constructed, and able to be used in ways that promote sustainable development:*
>
> *(b) to promote the accountability of owners, designers, builders, and building consent authorities who have responsibilities for ensuring that building work complies with the building code.*

AC is a building consent authority, and amongst other things issues building consents, inspects building work for which it has granted a building consent, and issues code compliance certificates.

The Building Code is the first schedule to the Building Regulations 1992. The Code sets out performance standards that building work must meet, and covers aspects such as structural stability, fire safety, access, moisture control, durability, services and facilities. The objectives of the Building Code related to safety are generally 'to safeguard people from injury or illness', which is expressed in relation to a number of different aspects; e.g. the specific objective related to hazardous agents on the site is *"The objective of this provision is to safeguard people from injury or illness caused by hazardous agents or contaminants on a site".*

The objectives for **'internal environment'** are included in the 'services and facilities' aspect, and the generally applicable objectives are to:

> *"(a) safeguard people from illness caused by low air temperature,* [e.g. where spaces are too large to heat]
> *(b) safeguard people from injury or loss of amenity caused by inadequate activity space,*
> *(c) safeguard people from injury caused by unsafe installations, and ..."*

The effect of this is that to comply with the requirements of the Building Act, all buildings need to provide adequate activity space to safeguard people from injury or loss of amenity.

Compliance Documents are published by the Department of Building and Housing (DBH). They contain prescriptive design solutions known as "Acceptable Solutions", which are intended to assist people in complying with the Building Code. The Compliance Documents are not mandatory – alternatives can be used provided these meet the required performance standards stipulated in the Building Code.

Whilst the Compliance Documents do not go as far as prescribing specific minimum dwelling sizes or room dimensions, they do define an acceptable solution for meeting the functional requirements for 'adequate activity space' within the context of an old people's home[7]. The acceptable dimensions are as follows:

Table 5: Acceptable activity space dimensions

Type of Space	Width (m)	Floor Area (m^2)
Living room	2.75	10 + 1 for each resident over 3 in number
Dining room	2.75	8 + 1 for each resident over 3 in number
Bedroom	2.2	6 for each resident (see note 1)
Note: Floor area for bedrooms shall exclude built-in wardrobes. In the absence of built-in wardrobe, an additional 0.75m^2 shall be provided for each resident.		

It is noted that the minimum dimensions for principal bedrooms for example from the PAUP require 10.5m^2 floor area, substantially larger (around 40%) than the acceptable solution for bedrooms in old people's homes. It is expected that this difference, at least in part, is able to be attributed to the sizing of principal bedrooms in the PAUP to cater for a queen size bed rather than a single bed.

Notably the 10.5m^2 minimum bedroom size requirement does not apply to the retirement village zone under the PAUP, which is the only room dimension / size circumstance that is specifically covered by a Compliance Document.

[7] See New Zealand Building Code Clause G5 Interior Environment – Acceptable Solution G5/AS1

Appendix B – Review of PAUP s32 Analysis and Feedback

Section 32 Analysis

At the time of undertaking this work we found relatively little analysis on the costs and benefits of the proposed minimum dwelling size and balcony rules in the Section 32 (s32) analysis provided in support of the PAUP.

We noted that reference to the specific dwelling size rules was omitted in several sections (e.g. s.2.6.1 & s.2.7.1). Only a high-level link was drawn between residential amenities, housing quality, and – in turn – the suite of development control rules that have been proposed.

AC staff have commented to us that the s32 analysis is effectively 'live' up until the hearings, with information being updated and added as it comes to light. We are therefore conscious that our work may contribute to the broader body of information constituting the final s32 analysis.

Within this context, and for the purpose of identifying areas where the existing s32 analysis could be improved, the following sections comment on what specific analysis was currently included.

2.3 Residential Zones - Section 32 Evaluation for the Proposed Auckland Unitary Plan

Section 2.7 of this part of the evaluation report addresses the Terrace Housing and Apartment Building Zone (THAB). It outlines that the Council contracted Graeme Scott, architect, to provide design advice on this zone, the development controls, and interface issues between this zone and adjoining zones. However, we were unable to locate any associated reports in the s32 appendices at this time.

The THAB zone is characterised as being the '*key residential zone where change is anticipated and encouraged*', and it is outlined that virtually all activities in the zone require restricted discretionary consent (except for single dwellings). A range of built outcomes are anticipated, and the analysis states that:

> *"Housing is essential to sustain community well-being. It is important that new housing is functional and well designed. Housing diversity and choice is important to provide for sustainable management of Auckland's urban land."*

Reference is made to experience with apartment development in the 1990s, noting that feedback from the public in relation to this development has been focused on quality, height and interface issues. The analysis states that [subsequently] North Shore and Waitakere district plans developed good policy on apartments, and the Urban Design Panel was created to consider complex applications in Auckland City. The following is a quote taken from the analysis:

> *"Virtually all legacy plans have bulk and location provisions for apartments, although they vary considerably in their scope and discretion. Some parts of Auckland had good provisions but few applications took up the opportunities afforded."*

Our interpretation of this is that the analysis assumes that some of the legacy district plans have good provisions for apartments, but subsequently observes that the 'opportunities' were not taken up by the market. The question then arises, in our view, as to whether the provisions were in fact 'good', or if in reality they were/are actually constraining to the extent that potential developers were/are discouraged

from this development typology. We were unable to find any substantiation of the assumed "goodness" of the provisions in the legacy plans in the s32 analysis.

The analysis also notes the following in Section 2.7.2 of this part:

> *"Much of the discussion around minimum dwelling size was highlighted through this zone and the changes to increasing the sizes of studios and one bedroom dwellings has had a flow-on effect for other zones that are likely to experience multi-unit development. The proposed minimum net floor areas should mean that people living in this form of accommodation do not need to leave it within six months because they cannot adequately store belongings or find that it has insufficient space for day to day living."*

This statement appears to assume that in the absence of the minimum dwelling size rules people will move into small dwellings without giving consideration to the availability of space, and then be forced to move out shortly thereafter once they discover that they have less storage space than larger dwellings may offer, or once they discover that there is not enough space to live in. In our view further research is required to substantiate these assumptions.

In terms of the analysis specific to other residential zones, we note that the minimum dwelling size is not specifically mentioned under these other headings (e.g. the Mixed Housing Zones in Section 2.5 and 2.6). The assessment in these other sections generally focuses on the density of development (i.e. units/ha) and subdivision potential, the spacious character of the neighbourhoods, or ensuring sunlight reaches the adjacent site, rather than the finer points to do with the policy of *'being of a size and providing the amenities necessary to meet the day to day needs of the residents'*.

2.4 Business - Section 32 evaluation for the Proposed Auckland Unitary Plan

In terms of the City Centre Zone, Metro, Town, Local, & Neighbourhood Centre Zones; there is no specific reference to the residential development controls in these sections of the s32 analysis. The analysis is more focused on the relative distribution and type of business activities in the region, or the built form of commercial buildings. Presumably the analysis provided under the residential headings applies to the centres as well.

Appendix 3.6.1 – business building form and design *'City Centre Issue Paper – Technical Report'*

This report, found in the appendices to the s32 analysis, addresses the external architectural elements in the city centre (quality building design), but does not discuss dwelling sizes – instead referencing the Clinton Bird report on minimum apartment standards (which we discuss in more detail in Section 2.2.1).

The report does comment on private open space and balconies as follows:

> *4.3 Private Open Space*
>
> *Strategic Outcome*
>
> *The Council's vision is for a city centre that is internationally renowned for business and is a great place to live. Meeting the demands of businesses and a growing residential population will require high quality on-site amenities, including open spaces.*
>
> *Issue*
>
> *1. There is limited land available for new public open spaces to service a growing residential and business population. Therefore, private open spaces need to complement public open space to meet the community's recreational and amenity requirements.*

Broad Approaches

In determining whether regulatory mechanisms are the most appropriate means to address this issue, research will be required to determine whether the market will provide the private open space required by residents and businesses.

Should it be found that a regulatory approach is appropriate, close liaison with the development contributions team will be required to ensure that the contributions payable for public open space reflect the open space provided within developments.

Notwithstanding this, the following broad approaches may be used to address the issue:

1. Introducing regulatory mechanisms to require and/or incentivise the provision of private open space in all new developments that are sufficiently flexible to meet the needs of the proposed activity. This could include introducing a minimum requirement for private open space in new residential developments that enables the space to be provided in a variety of forms (e.g. pools, gyms, balconies, shared outdoor areas / green roofs).

2. Allow the market to provide private open space within developments as the District Plan currently does.

3. Introducing mechanisms to offset a lack of private open space in a new development through investment in public spaces where appropriate (e.g. contribute to the upgrade of existing public open spaces where no private open space can be provided).

Further research will be required to identify the appropriate regulatory mechanisms to achieve high quality private open space in the city centre."

We were unable to locate reference to any further research being undertaken on this issue within the s32 analysis.

In light of the above, it is our view that the s32 analysis would benefit from research into the way people who chose to live in small dwellings actually behave, and how living in a small dwelling affects their lives, whether positively or negatively.

We remain unconvinced, for example, that a direct relationship exists between occupants' amenity and wellbeing and additional floor area within ones house and/or the presence of a balcony. And we suspect that whilst people living in small dwellings may face some physical constraints on their lifestyle, there are other potential payoffs, e.g. cost savings, which could well outweigh the negative effects of these physical constraints. Research of this type could be undertaken in areas of Auckland where there is perceived to be a problem with small dwellings and/or in areas where balconies have been required via rules in the district plan.

Feedback on the DAUP

A review of a sample of the most relevant feedback received on the Draft Auckland Unitary Plan (dUP) was undertaken as part of our background research. The main points are outlined below.

It should be noted that the minimum floor area and minimum dimension for principal rooms' requirements changed between the dUP and the PAUP versions. The dUP requirements were less stringent than those of the PAUP; that is:

1. In the Mixed Housing, Terraced Housing and Apartment, Town Centre, Local Centre, Neighbourhood Centre, and Mixed Use Zones, the minimum dwelling size increased from 30m^2 across the board to 40m^2 for studios and 45m^2 for 1 bedroom (or more) dwellings. The minimum

principal bedroom dimensions also increased from 'no less than 3.0m' to 3.0m x 3.5m in these zones.

2. In the City Centre Zone, the minimum dwelling size increased from 30m^2 across the board to 30m^2 for studios and 40m^2 for 1 bedroom (or more) dwellings. The minimum principal bedroom dimensions also increased from 'no less than 3.0m' to 3.0m x 3.5m in this zone.

Therefore the feedback cannot be seen as being representative of how those giving feedback view the relevant requirements of the PAUP, although it is considered that the feedback does provide an indication of the general level of interest in provisions of this nature.

The balcony requirements did not change between the dUP and the PAUP versions of the Unitary Plan.

Fletcher Building, Fletcher Developments Division Feedback

Feedback on the Draft Unitary Plan was received from Fletcher Developments, which is a new division established to promote apartment housing typologies in Auckland.

Their feedback included discussion on the following matters:

1. The height limits were seen as a significant issue, making apartment typology uneconomic outside the city centre due to high fixed costs from significant floor space being dedicated to lifts, lobbies, and emergency stairwells; and the compounding factor of requiring car parking was also identified as a constraint to the economic viability of apartment development. The point was made that apartment buildings require at least five stories to be economically viable.
2. The need for a range of apartment typologies.
3. People should not have to pay a price penalty for living in apartment compared to other types of housing in an area.
4. Apartments have developed a bad name in part due to poor quality materials being used in their construction, and in part due to poor design of the buildings themselves.
5. Quality apartments rely on light and outlook around the apartment structure to create amenity.

No comments were made regarding the minimum dwelling floor area or minimum room dimension rules in the dUP.

General Feedback

Apart from the more detailed feedback received from Fletcher Building; a sample of the more general feedback was reviewed. Within this sample around 60 general items of feedback were received that specifically raised concerns with the minimum dwelling size and/or minimum principal room dimensions.

Of this feedback, a number of these simply supported having minimum dwelling sizes, although the vast majority sought that the minimum size be increased. Of those seeking larger minimum sizes, some specifically stated the size they considered to be appropriate, and these ranged from 35m^2 to 50m^2 for studios or 1 bedroom dwellings.

Where reasons were given, recurring themes were:

1. Wanting to retain a family oriented neighbourhood, and small apartments were not seen to promote this aim.
2. People saw small apartment as being 'student focused', and they didn't want this type of development in their neighbourhoods (Point Chevalier area in particular).

3. Avoiding the creation of future slums by allowing small apartments to be developed.

Although not strictly related to the minimum apartment size issue, there was a number of items of feedback that were concerned that there needed to be a greater variety of apartment sizes available within the Auckland market. Suggestions were that the proportion of studio or 1 bedroom dwellings allowed within a development be decreased (i.e. from 70% in the dUP), and that the apartment typology was not considered as an option for families or larger household units because of the relative scarcity within the market of larger apartments.

Appendix C – Review of Local Research

Minimum Standards for Residential Apartments in Central Auckland, 2005

This report (Bird Report) was produced by Clinton Bird Urban Design Limited. The introduction notes that it was commissioned as a result of concerns arising within various organisations over the *'very small size of some of the more recently built* [1990s and early 2000s] *residential apartments in Auckland Central'*.

The recommendations of the report are based on a consideration of the following:

1. The **personal experience** and research carried out by the author into virtually every CBD apartment development constructed and offered for sale in the last ten years.
2. **Feedback on the draft report** dated 13 October, 2004, at the meeting of stakeholders convened by the Auckland City Council on 8 November 2004 to discuss the draft report, input from additional workshops, and in various separate written submissions received from some of the participants subsequently.
3. A spreadsheet of information downloaded from **an internet-based survey of recommended apartment minimum space standards** in various parts of the western world, 10 September 2004. Note that this spreadsheet was not available to us at the time of this review.
4. **'Living the Highlife?: A review of apartment living in inner city Auckland'**, a report prepared for the Building Industry Authority (BIA) through Auckland UniServices Limited, 7 April 2004. Note that the full document was not available to us at the time of this review, although the Bird report summarises it in Appendix 3.
5. Pages 1-3 and 136-146 of **the AJ Metric Handbook**, showing recommended minimum dimensions for residential fixtures, fittings, furniture, circulation, and storage facilities. The book refers to the Parker and Morris Standards.
6. The **Parker Morris Standards**, developed in the United Kingdom. These are architectural / design standards based on ergonomic analysis.
7. **Housing New Zealand Corporation (HNZC) housing briefs/requirements**. These are housing development guides that require buildings to be built to standards above those required by the building code. For example, the guides recommend *'bedrooms to be large enough to accommodate either a queen size bed (2100mm x 1500mm) (sic) or two single beds (2100mm x 1000mm), and two chests of drawers and allow easy movement about the room...'*
8. The **downloads identified in the Reference Section**, at the end of this report, from an internet-based survey of various recommended apartment minimum space standards in various parts of the western world on 10 September, 2004

The referenced AJ Metric Handbook and Parker and Morris Standards (included in the AJ Metric Handbook) are UK architectural/design standards for buildings developed between 1967 and 1981. These standards include minimum house and room sizes for publicly funded housing. The standards have been based on ergonomic analysis and assume a variety of activities needed to be undertaken within dwellings (e.g. dinning, sleeping, laundry etc), then allocates discrete floor areas to each of the activities and sums the total floor area required. The author of the report considers these represent an absolute minimum acceptable standard, and comments that they may be out-of-date with respect to 21st Century lifestyles. Key Parker and Morris Standards are summarised in the table below.

Table 6: Parker & Morris Standards for Flats and 1 Bedroom Dwellings

Dwelling Type	Floor Area (excl. storage)	Storage
Flat	$30m^2$	$2.5m^2$
1 Bedroom	$30m^2$	$3.0m^2$
Living Room	1 Resident = $11m^2$ 2 Residents = $12m^2$	
Main Bedroom	1 Resident = $9m^2$ 2 Residents = $12m^2$	

The Bird report notes that feedback on a draft version raised concern that applying minimum space standards could adversely impact on equity of access to a home, affordability and the demographics of first home buyer, and that suburban values and space standards (particularly with regard to minimum storage space requirements) may be being applied to urban living. In response to these comments the recommended minimum floor areas were reduced.

The most relevant size recommendations from the Bird Report are summarised and compared with the PAUP standards below. Note that the Bird Report also makes size recommendations for 2 and 3+ bedroom apartments, but these have not been reproduced here.

Table 7: Bird Report Studio Recommendations v's PAUP Standards

Variable	Bird Report Recommends	PAUP Rule	PAUP vs Bird
Gross floor area	$35m^2$	$30m^2$ in city/Metro centres $40m^2$ in other affected areas	Comparable
Living area	$11m^2$ with a minimum dimension of 3.0m	minimum dimension of 3.0m	Comparable
Balcony	$5m^2$ with minimum dimension of 1.25m.	$8m^2$ (or $10m^2$ in MH above ground dwelling) with minimum dimension of 2.4m	60% more area, almost 100% more dimension.

Table 8: Bird Report 1 Bedroom Recommendations v's PAUP Standards

Variable	Bird Report Recommends	PAUP Rule	PAUP vs Bird
Gross floor area	$45m^2$	$40m^2$ in City/Metro Centres $45m^2$ in other affected areas	Comparable
Living area	$15m^2$ with a minimum dimension of 3.3m	Minimum dimension $3m^2$	10% Less
Bedrooms	$9m^2$ with a minimum dimension of 2.9m plus a 2.2 m high x 1.8m long x 0.6m deep wardrobe, for each bedroom.	$10.5m^2$ with minimum dimensions of 3m x 3.5m, principal bedroom only.	Comparable (taking account of wardrobe)
Balcony	$5m^2$ with minimum dimension of 1.25m.	$8m^2$ (or $10m^2$ in MH above ground dwelling) with minimum dimension of 2.4m	60% more area, almost 100% more dimension.

The Bird report also recommends that any study or home office should have the same dimensions as a bedroom, to prevent sub-standard bedrooms being developed.

How the recommended standards compare with standards in other cities around the world has been investigated and is summarised in the following table.

Table 9: Bird Report Proposed Standards v's Other Cities[8]

	STUDIO	1 BEDROOM	2 BEDROOM	3+ BEDROOM
Auckland Proposed	35m²	45m²	70m² (2 double bedrms with one bathroom)	90m² (3 double bedrms with two bathrooms)
Sydney	40m²	55m²	80m²	100m²
Toronto	N/A	48m²	65m²	74m²
Illinois	27m²	50m²	63 (1 bathrm) 68m² (1.5/2 bathrms)	81m² (1 bathrm) 86m² (1.5/2 bathrms)
Dublin	N/A	38m²	55m²	70m²
Vienna	32m² (1 or 2 persons)	32m² (1 or 2 persons)	50m² (3 persons)	60m² (5 persons)

In summary, the Bird Report considers a range of matters, but appears to us to place a high weighting on the UK based Parker and Morris standards due to their ergonomic foundation. The recommended standards exceed these so called absolute minimum standards, and this excess appears to be a response to general public concerns regarding smaller apartments, an assumed correlation between additional space and additional amenity, and may also be an attempt to update the standards to match 21st century lifestyles, although the reasons for this are not made clear in the report.

Auckland Council Unitary Plan: Apartment Area Standards, July 2012

This report (Urbanism+ Report) considers the appropriateness of applying minimum sizes to apartments through rules in the Auckland Unitary Plan. The stated objective of the associated research is to achieve a minimum apartment standard that '*guarantees comfort, amenity, and usability'*. This has been done in the context of the unitary plan needing to give effect to the Auckland Plan.

The work outlines the assumptions that have been made with respect to the unitary plan framework. These include the following:

1. *Apartments must demonstrably contribute towards Auckland becoming the world's most liveable city.*
2. *Apartments are to become an attractive and competitive lifestyle choice for all household types rather than appealing only to limited household or demographic profiles.*
3. *Apartments and their component spaces must be assuredly fit for purpose and allow both comfortable and convenient use by occupants and guests including for periods of prolonged continuous habitation (such as during convalescence).*
4. *Apartments must be designed to be flexible and meet the reasonably foreseeable needs of future residents for the life of apartment buildings (at least 50 to 100 years).*
5. *Apartments need to contribute to Auckland's housing affordability issues but this cannot compromise bottom line habitability, health and safety, and liveability requirements.*

[8] Note that the Bird Report was completed in 2005, and the requirements in the respective cities may be different today.

6. *Apartments need to be provided for recognising that unnecessary space is extremely expensive, and additionally that the diversity of sites and opportunities will require a flexible approach to be taken.*
7. *The individual rooms or activity areas within apartments need to be designed so as to be fit for simultaneous use without obstructing each other or restricting ready circulation or movement.*

On the face of it, these assumptions are somewhat difficult to reconcile. It appears to us that there are inherent tensions between each assumption. In situations where not all the assumptions are able to be satisfied, a value judgement would need to be made to prioritise one over another. For example, apartments are to become a competitive lifestyle choice for all household types, but liveability [assumed to mean minimum space] is not to be compromised for affordability; in other words, if the household is unable to afford the relatively large apartments that provide the requisite standard of liveability, then they will be excluded from this so called 'lifestyle choice'.

We also consider that the assumptions are not necessarily robust. For example, in our view the activity areas within an apartment do not necessarily need to be able to be used simultaneously, particularly in the case of studios and one bedroom units. It is difficult to envisage that one or two occupants would need to sleep, eat, do laundry, use the bathroom, and sit on the sofa and watch TV simultaneously. Once one accepts that such activities do not need to be undertaken simultaneously, then it does not follow that the area that they require is additive; it may well be possible – in space constrained circumstances – to design space in a way that it can, at different times, support multiple activities.

We also consider that, notwithstanding the use of words like 'must', some of the assumptions are ambiguous. For example, it is not clear what type of flexibility is referred to when '*meeting the reasonably foreseeable needs of future residents for the life of apartment buildings (at least 50 to 100 years)'.* What general changes in lifestyle are envisaged to occur within the next 100 years that would require a different design of apartment? Is there evidence of such a change occurring in the last 100 years?

The report outlines a number of management options for consideration. These consist of 10 options ranging from:

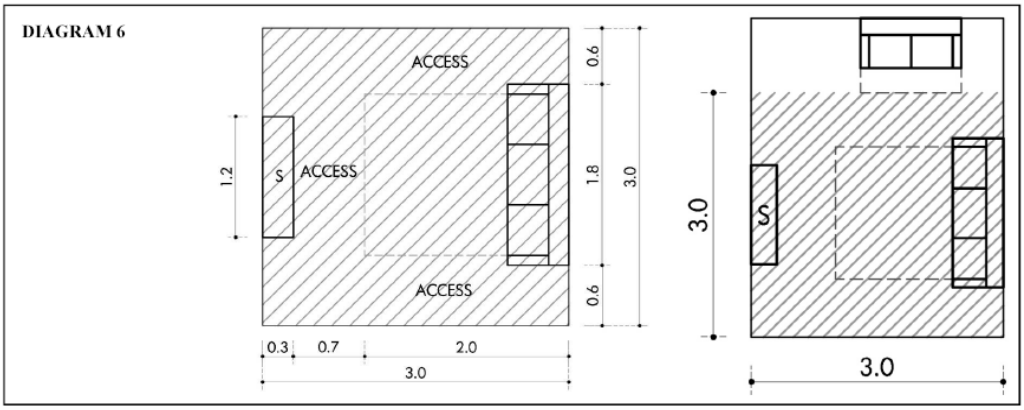
1. '*leave the matter entirely to the market to resolve'; through to*
10. *'provide objectives, policies and rules to primarily manage apartments based on the needs of each individual room / activity zone, including additional non-statutory advocacy and guidance such as design guidelines / Auckland Design Manual, an urban design panel, awards schemes recognising best practice.'*

A fundamental premise outlined in the work is that minimum overall unit area rules are too blunt, and that while minimum total areas are very simple, they are often unable to take into account the variability caused by design and layout. We agree with this statement.

Instead, the performance requirements for different activities (including balconies) as well as circulation between them have been proposed, and it is stated that this allows designers the greatest possible flexibility in responding to site opportunities. The line of reasoning presented is that by applying fixed dimensions, the variety of good or better options for particular circumstances will be constrained. Therefore rules dictating the minimum dimensions for particular rooms are not considered the best option. An example of the performance based approach is summarised in Figure 6: below, which shows the living/sleeping area for a studio apartment, with all required elements and activity areas.

The point is also made in the report that performance recommendations have been developed by examining the spatial and functional needs of each apartment component, based on established architectural standards, human dimensions and established industry norms (such as 600mm x 600mm kitchen modules). Therefore is no justifiable basis on which to vary those requirements across the region.

Figure 6: Performance Based Diagram - Studio Living/Sleeping



Whilst not recommending a minimum area for other types of apartments, the work does recommend a minimum studio apartment area. The reason for this is that it recognises the '*very small and potentially boxed-in nature of these apartments for any extended period of forced habitation (such as convalescing). In this instance the liveability benefits of requiring a larger outcome are considered to clearly outweigh the costs of those occasions where a slightly smaller outcome could be possible.'*

The report acknowledges that the approach of applying performance standards for different components within an apartment results in a significantly greater number of rules than would be the case if a blunt minimum dwelling size was recommended.

The design tests for studios showed that a minimum apartment layout can be achieved in 31m^2 (excluding balcony) under optimal circumstances. This appears to be consistent with the UK Parker and Morris Standards discussed above. However, based on the 'overriding liveability imperatives' the recommended minimum studio size is 40m^2, and this figure is purported to be based on *'best practice literature'*. Comparisons with similar rules in other jurisdictions were included in the Urbanism+ report. In other words, the minimum practical size for a studio is around 31m^2 (assuming all activity components are laid out independently), but Auckland needs a higher standard to achieve a higher level of 'liveability'.

The implicit logic underlying this line of reasoning is that the liveability of a city increases when people are able to occupy larger dwellings. As we have argued elsewhere in this report, this is a highly questionable assumption especially in a situation where the larger dwelling imposes a greater financial burden (in the form of higher rents) on the occupants. In that case, the net effect on liveability will depend on the relative benefits of larger dwellings versus the relative costs imposed on occupants.

Appendix D – Review of General Literature

Health Impacts of Interior Architecture

It is commonly assumed that interior architecture has the potential to cause psychological stress and eventually affect human health and wellbeing. However, our review of the literature suggests that, at present, relatively little is actually known about the potential role of interior design elements in human health. Researchers have noted that the relationship is not scientifically supported due to a lack of empirical evidence or an established body of knowledge (Evans & McCoy, 1998).

Researchers have proposed a taxonomy that consists of five factors of interior design that may influence stress; these were *stimulation* (intensity and complexity of the interior environment), *coherence* (legibility, distinctiveness and structural theme), *affordance* (architectural ambiguity and perceptual cues), *contro*l over the interior environment (crowding, establishment of boundaries, privacy, depth) and *restorative* (minimum distraction and solitude).

Little of the discussion of these factors refers to spatial area in either the home or workplace. The authors note that small spaces could be correlated with overcrowding, a lack of privacy and a lack of control over the layout and use of a space. Nonetheless they do not assume a causal relationship, that is to say limited floor area does not necessarily cause crowding, privacy or usage issues, and indeed these problems could readily result from other design factors.

Overall the authors identify forty-four interior design elements that may influence health, of which only a few appear to be linked with floor area. They conclude that any relationship between the architecture of interior spaces and health is, as yet, not scientifically established.

Room Dimensions, Crowding and Personal Space

Discussions of minimum apartment sizes are frequently framed in terms of what constitutes a crowded or insufficient area for human habitation. Although it may seem intuitively obvious, it is important to demonstrate that reductions in room size do, in fact, create feelings of increased spatial restriction. Smaller room size can cause the perception of crowding (Sundstrom, 1978), although some research has found slight or no effects of reduced room size on behaviour (Freedman, 1975; see Evans & Eichelman, 1976, for a discussion of this controversy in the literature).

Both room size and the degree of enclosure also affect personal space behaviours. Savinar (1975) reduced ceiling height and found that males had concomitantly greater need for space when approached by an experimenter. Daves and Swaffer (1971) determined the distance at which subjects would move away from an approaching experimenter in a large (12 feet x 29 feet), a small (4 feet x 6 feet), and a long and wide space (7.5 feet x 65 feet), tested at both wide and narrow wall. They found the greatest distances in the large and long spaces followed by the wide and small spaces, respectively.

More recently White (1975) reported significant increases in personal space with reductions in room size. The variance of personal space behaviour was also significantly affected by room size in that greater variability was found in large rooms. Further inspection of the data indicated a sizable minority of persons whose personal space was larger in the large room, thus creating a somewhat bimodal distribution of scores. Nevertheless, overall subjects interacted more closely in the larger room (Evans, 1979). It should be noted that these types of experiments represent a somewhat contrived situation, undertaken between strangers in a formalised laboratory or university setting. Therefore they may not be representative of intimate interactions between family and friends within the private home.

The conclusion of this line of research is that the feeling of crowding or restriction is a personal response that varies greatly across individuals and circumstances. This indicates that there is no hard and fast rule for when a space feels crowded or inadequately sized, and that the perception of adequate area is influenced by more variables than simple shape or volume. In that regard area is not a simple determinant of crowding, but rather it interacts with the level of occupation, use and design of the space.

Light, Air and Views

A further element of discussion of dwelling sizes is the relationship with windows and access to light, air and viewscapes.

Numerous studies have shown that persons deprived of adequate light experience changes in their internal clocks that may lead to clinical depression. Additionally, too bright a light or overexposure to light can lead to irritability and disruptiveness. Thus, appropriate lighting improves the physical and social environment and promotes better morale, safety, and security (Chism, 1988).

Authors have investigated the influence of windows on performance, mood, and satisfaction for different task types in an office environment. Contrary to expectation, windowed offices did not affect higher work performance, positive mood, or satisfaction (Stone & Irvine, 1993). This may be because adequate artificial task lighting was provided in the absence of natural light, and it should be noted that this study focussed on an occupational rather than residential environment.

Literature indicates the value of a view for wellbeing and satisfaction depends largely on what is in the view. Looking out the window may provide numerous opportunities for restoration, unlike other restorative opportunities, however, window viewing is more frequent and for brief moments at a time. A study conducted at six low-rise apartment communities, using a survey with both verbal and visual material, provides considerable support for the premise that having natural elements or settings in the view from the window contributes substantially to residents' satisfaction with their neighborhood and with diverse aspects of their sense of well-being. Views of built elements, by contrast, affected satisfaction but not well-being. Views of the sky and weather did not have a substantial effect on either outcome. This suggests that views of 'something' from the home are valued, and that views of natural elements are particularly valued (Kaplan, 2001).

The body of literature on this topic is supportive of the relationship between natural light, pleasant views, and feelings of satisfaction and wellbeing. This relationship is intuitive and commonly understood in the residential context, with window size, views and solar access having clear impacts on the desirability and market value of real estate in Auckland. However the link between *apartment size* and light, air and views is tenuous to say the least. No data could be found to indicate that smaller dwelling sizes correlate to smaller relative window area, reduced solar gain, or lesser views or outlook. This is not surprising, as at a logical level the floor area of an apartment has no direct impact upon the position of the building, the provision of windows, or the view afforded from a particular apartment.

There is also nothing in the literature to indicate that mandating larger apartments leads to greater access to sun, air and views. At a conceptual level, the opposite relationship may in fact be the case. The potential to have windows admitting light, air and views into the interior of an apartment can be described as the relationship between its floor area and its external perimeter, given that only windows in the external walls can supply natural light and views. The greater the ratio between the apartment perimeter and the floor area, the more window space can be provided for each square metre of floor space.

Assuming a generally rectangular and even floorplan, this relationship is quadratic: The larger the floor area the smaller the relative perimeter per square metre. For example, a 25m^2 rectangle has a 20m perimeter, giving the potential for up to 0.8 lineal metres of window per square metre of floor area. However a 64m^2 rectangle has a perimeter of only 32m^2, giving the potential for only 0.5 lineal metres of window per square metre of floor area. At a geometric level and with all other things being equal, smaller area apartments have a greater potential for admitting light and views to each metre of floor area than larger apartments. The primary dimension, however, is the depth of the apartment relative to where the natural light enters the apartment.

Another area that does not receive much attention in the literature is the impact of balcony size upon light and views. It is conceivable that a requirement to provide a large balcony that is accessible from the main living area of a dwelling could result in reduced solar gain to the living space and/or limitations on views or window position. This would be particularly so in multi-story apartments with consistent floorplans. In this case a living room with balcony could be overshadowed by the equivalent balcony of the apartment above, which in turn was shaded by the next balcony above, and so forth. A requirement to extend substantially sized balconies from the front of all units in a building (or conversely, to inset living rooms behind a loggia style balcony) could, in practice, shade the principal living areas of all units lower down.

Access to Greenery and Open Space

A further discussion point often tied to apartment sizes is the ability to access open space and parks and other 'green' areas.

Alternative patterns of residential development, going by names such as cluster housing and conservation subdivisions, opt to preserve large areas of shared outdoor space by increasing housing density on portions of the parcel. These alternative approaches arguably help preserve environmental quality, but the question remains: How do shared outdoor spaces affect the people who live there?

One study explored the impacts of residential density and nature areas on residents' satisfaction with their neighbourhood. Survey results from 361 participants in nine different residential subdivisions showed that density and proximity to shared nature areas did not have a large impact on neighbourhood satisfaction. More important were opportunities to visit nearby shared space and having views of nature from the home (Kearney, 2006).

Residents living in relatively barren buildings reported more aggression and violence than did their counterparts in greener buildings. Moreover, levels of mental fatigue were higher in barren buildings, and aggression accompanied mental fatigue. Tests for the proposed mechanism and for alternative mechanisms indicated that the relationship between nearby nature and aggression was fully mediated through attentional functioning (Kuo & Sullivan, 2001).

These two papers indicate that good access to outdoors spaces and the ability to view or engage in green spaces were positively correlated with satisfaction and wellbeing. Again this is not a surprising finding, however once more the relationship of these design elements to dwelling floor area remains unexplored.

Resident Views of Interior Space

In discourse and planning of minimum dwelling sizes it was surprisingly uncommon to seek the views of the people who actually live in smaller dwellings. The following are a series of studies based residential surveys, interviews, and/or other qualitative data.

One survey of residents of high density housing in Hong Kong focussed on perceptions of space, adequate privacy and satisfaction with living conditions relative to a measure of crowding. The overarching result was that residents of spatially limited dwellings did not necessarily feel crowded and the simple quantity of space did not impact upon satisfaction. Rather, the major cause of feelings of crowdedness was dissatisfaction with the form and quality of the physical environment. The authors concluded that architectural designs which met the expectations of occupants would alleviate feelings of crowdedness, even in situations of spatial constraint (Chan, 1999).

A survey conducted of residents living in more intensive areas of Christchurch had similar results. While many residents reported 'lack of space' as a major issue, detailed analysis of their responses revealed a more nuanced evaluation of spatial requirements. Specific examples of insufficient space were given as: inadequate kitchen and cupboard spaces; a lack of storage for household items; hot water cylinders occupying laundry cupboards; doors that swung into living rooms rather than sliding out of the way; and pedestal style bathroom sinks without drawers or bench space (Lilley, 2006). In each of these examples the concern appears to actually be over the utility, function and liveability of the space, rather than the specific size of the room or dwelling. In other words, while respondents initially seemed to show a desire for a larger dwelling it appears their dissatisfaction actually stems from poor ergonomic consideration, in particular limited storage and inefficient layout.

A third study assessed the satisfaction of residents of medium and high density living in cities across Australia through a series of workshops and surveys (Sarkassian, 2004).

These researchers identified six themes of built-form factors influencing the reported satisfaction of Australian apartment dwellers. These included the following factors: *privacy*, particularly the ability to retire from the outside world and other household members to have time alone; the *orientation* of living spaces to natural light and open spaces, rather than walls or other apartments; *access to open space* particularly common areas within a residential complex; the *furnishability* of a dwelling, particularly designs that do not preclude certain types and placements of furniture; *personalisation,* the scope to create a 'home' with personal effects, and *universal design*: housing designs that were accessible and usable by all ages and abilities, including children, the elderly and the less abled.

Again these primary factors of resident's satisfaction with high density housing are not related to floor area, at least not directly. Rather they are more representative of design and ergonomics, factors that can vary considerably independent of apartment size. The factors of the orientation of living spaces and access to open space outdoors are macro level design features, determined by the architecture and urban design of a housing complex as a whole. For example, there is nothing to say that a large apartment will avoid facing a blank wall any more than a studio.

The ability to furnish properly and personalise are fine scale design factors. These are determined by things such as the height of window sills (e.g. to allow furnishing to be placed under them), the availability of wall space (on which to hang art or set a sofa against) and the position of doors (to not swing into a space that would suit furnishing or active use). These factors are largely independent of floor area. Similarly, universal design is a factor of design standards and detail, rather that size. This is clearly illustrated by the fact that retirement complexes tend to feature exacting accessibility standards despite the limited area of the individual units.

The remaining factor of privacy is one that has a more complex interaction with internal area. Sarkassian cites a UK study that found households to be "more concerned about getting away from each other

within their homes than they are about having space between them and their neighbours" (Winkley, 2003), a position they suggest is supported by the continuing trend for decreasing household size even as average house floor areas increase. This trend was explained as being at least in part due to increased prevalence of working from home, older children living at home longer, shared housing arrangements, blended families, and a societal preference for increased personal space. They proposed that large dwellings with higher ceilings, greater windows and other treatments to increase the perception of space would be concomitant with this trend, effectively noting that both actual area and architectural design are factors influencing the perception of space and privacy.

While these trends may be true across all of Auckland households as a whole, the relevance of these points to the submarket for compact apartments is not firmly established. In particular, demands for larger family homes for children and mixed families are irrelevant where, as a rule, households comprised of one or two people self-select to live in small apartments. Naturally the needs and desires of one housing submarket do not necessarily hold true for another housing submarket. Furthermore these researchers appear to focus on one side of the trend equation, increasing house sizes, without addressing the corresponding trend for smaller households. This trend is especially prevalent in Auckland, with the 2006 census showing that 49% of Auckland dwellings having only one or two people living in them (Auckland Council, 2013).

The demand for increased personal space may actually be indicative of an increased need for small personal-sized apartments and units, which are affordable for a single person to purchase or rent. Naturally when living alone one does not have demands for privacy within the household, and indeed living alone may be a very effective means to achieve personal space. Furthermore the suggested increase in demand for shared housing and increase prevalence of older children living at home for longer may in fact be a symptom rather than cause. The relative lack of affordable, quality housing designed for long term occupation by one individual could drive younger adults and singles into shared occupation of larger dwellings for economic reasons, even if their preference was not to live with family or flatmates.

In conclusion, the general literature does not lend much support to PAUP rules on minimum apartment/balcony sizes.

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