

**Urban Development
Strategy Working Paper 6:**

The Social and Environmental
Effects of Residential Infill
Development in New Zealand

A Literature Review

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Executive Summary

Definition of infill

Residential infill development is the establishment of new dwellings within an existing suburb. It is facilitated by the division of existing residential properties into smaller sections. This is usually done by way of cross-leasing, or subdivision into fee-simple or unit titles.

Context and Reason for Research

Infill is a contentious subject in New Zealand, particularly in the Christchurch, Wellington and Auckland regions. It is promoted at a local authority level due to the broad scale benefits identified in international research. At a community level in New Zealand, however, many neighbours and residents of infill have been dissatisfied with their experiences. Wellington City Council has identified infill as a key issue for its Urban Development Strategy (UDS). It has been commissioning research into infill development since 2003.

Method

This report surveyed the New Zealand literature on infill housing. It included research from government agencies and local authorities, as well as academic research and reports in the print media. As the environmental and social implications of infill are closely interlinked, findings were simply grouped in terms of costs or benefits.

Key Benefits

Many of the benefits of infill are shared with those of increased population intensities in general. These can include reduced crime, improved local businesses and facilities, and enhanced public transport. Improved public transport can generate many other levels of benefits, stemming from a reduction in vehicle dependence.

Well designed infill can also introduce a greater range of housing options to an area. This is particularly significant as household demographics have grown increasingly diverse in New Zealand over the past few decades.

Finally, increasing population densities within the existing urban boundaries reduce the demand for greenfield development. This reduces the negative environmental and social impacts associated with urban sprawl.

Key Costs

Infill development can reduce open space, trees and vegetation. This can damage the amenity values of an area. It can also have environmental impacts such as increased run off, increased erosion, and removal of wind protection.

Poorly designed and built infill housing can deteriorate quickly. It may attract low income, or short term tenants, who cannot afford other options. When combined with other social and economic factors, this can have a negative impact on community relationships.

If infill is not well integrated with the existing houses in an area, it can reduce privacy and sunlight for neighbours, and increase noise levels. It can also damage the character of an area, reducing amenity values, and thus property values.

Increased population densities can also have downsides. Increased traffic and curbside parking alters the character of a neighbourhood and compromises safety, accessibility, and environmental quality. Other local infrastructure systems are also at risk of being overloaded.

Infill housing is often built on cross-leased properties, the legal implications of which are poorly understood. It is also common for parts of infill properties to be shared between dwellings, which can introduce maintenance or development issues for residents.

Key Findings

The balance of costs and benefits generated by infill housing depend on the quality of the infill development (design, materials and construction), and the degree of population density increase generated by the development.

Due to changing household demographics in New Zealand, population density has not been increasing proportionately to dwelling density. This could mean that many of the benefits of infill housing are not realised.

Literature discussing the benefits of infill development tends to focus on the broad scale effects, and is largely based on international research. In contrast much of the negative coverage of the issue focuses on the first hand, local level experiences of New Zealand neighbours and residents of infill.

Conclusions and Recommendations

It is recommended that Wellington City Council develop a strategic plan for maximising the benefits of infill. This should include addressing issues of public and private transport, design quality, infrastructure provision, and housing diversity.

Wellington City Council also needs to establish definitions of infill housing, and density measurements, to be used consistently within the council.

One valuable area for future research is population density thresholds. These thresholds or “critical mass” are often referred to in the literature. They are the points at which the benefits of increased population densities begin to be felt. Little, however, is known about when they are actually reached.

Another area for future research is the broad scale benefits of infill housing in New Zealand. At this point, most planning is based on research conducted internationally rather than within New Zealand.

Finally, issues that could be further explored within the Wellington context include vegetation loss, traffic and public transport impacts, and community costs and benefits.

Section 1: Introduction

Residential Infill Development in New Zealand

The Resource Management Act 1991 was designed to “promote the sustainable management of natural and physical resources” including the built environment (Ministry for the Environment, 1999: 2). It is now widely recognised, nationally and internationally, that constantly expanding, low density cities do not represent a sustainable settlement model. They are inefficient in terms of infrastructure, energy and the environment (Ministry for the Environment, 2005:10).

As New Zealand’s cities have grown at an accelerating rate, local authorities have sought to curb peripheral expansion by intensifying the existing urban area. One way of achieving this goal of intensification has been through policies which support residential infill development. At the same time, the market has been motivated by consumer desire for affordable housing in particular areas, and of a variety of home and section sizes. As a result, infill housing has been a part of suburban New Zealand since the 1970’s. In some regions, such as Auckland, a third generation of infill is now becoming established (Auckland Regional Growth Forum, 1998:19).

The issue of infill is particularly contentious in New Zealand. Since the affluent post war era, much value has been placed on low density settlements, consisting of detached homes on generous sections. While many of New Zealand’s earliest settlements were of a relatively high density; low density settlements have been considered part of New Zealand’s culture ever since private vehicle ownership became commonplace, enabling the rapid expansion of cities beyond the established public transport infrastructure (Hoque, 2000: 27).

Major stakeholders involved in the issue of infill include central government; local authorities; property developers and investors; current residents of suburbs; and potential and current owners or tenants of infill properties. Each of these groups has different and often conflicting values and priorities. As a result they experience different benefits or costs at varying stages in any development (Christchurch City Council, 2002:42).

Residential Infill Development in Wellington

Since the introduction of the RMA in 1991 many local authorities, including the Wellington City Council, have formalised their support of infill and other methods of intensification in their District Plans. Most Wellingtonians have experienced some aspect of residential infill

development. They may live within it, near it, or notice it as they travel around the city. They may also have read about it in the media, where it receives ongoing attention.

Wellington City Council is currently developing an Urban Development Strategy (UDS). Improving the management of residential infill has been identified as one of its top three priorities over the next triennium. One way that this is being achieved is through changes to the District Plan. These are designed to better protect areas considered to have character worth retaining.

Previous Wellington City Council Research

Wellington City Council has been aware for some time that infill development requires careful management. While part of high level objectives, infill often generates controversy and negative media attention. Several pieces of research have been commissioned in order to build on Council knowledge of the issue. These projects have identified the historical and current context for infill development in Wellington. They have also defined the future potential for infill in the region.

A 2003 Hames Sharley Residential Intensification Review, commissioned by the council, reviewed Wellington's housing market trends for the last 10 years by mapping and analysing household statistics. This report found that household demographics have changed significantly over the past 10 years, and terraces/units and apartments have become a much more acceptable housing option.

In 2004, another council-commissioned Spencer Holmes Infill Development Project considered areas of infill development in the city, with a particular focus on Kilbirnie. It considered the factors enabling or constraining infill, and looked at the risks associated with infill. It gave a very broad definition of infill. It found that most of Wellington's population growth was concentrated within the CBD area, but infill was also taking place from the fringes of the CBD, around the harbour, and through the northern suburbs.

The August 2005 Wellington City Council Resident Satisfaction survey conducted by AC Nielsen asked several questions specifically targeted towards infill. Half of its respondents had noticed new townhouses being constructed in their neighbourhood in the past two years. Concerns about these developments were mainly related to traffic safety, character, and population densities. Overall, however, more residents felt that the developments had improved their neighbourhood rather than damaged it.

Purpose of this Report

This literature review will consider two questions:

1. How is residential infill development defined?
2. What are the potential social and environmental effects of residential infill development?

It will complement the Council's existing Wellington-specific research by drawing together knowledge of, and experiences with, infill from around New Zealand. It will inform Wellington City Council's strategic approach to infill, by identifying key themes and areas where comprehensive research and information already exists. By creating a better understanding of the effects of infill, it will assist the development of policy that will maximise positive effects and address negative effects. It will also highlight areas where further research is necessary.

Method

Resources used to source information included Wellington City Council files and publications, local and central government websites, electronic databases, Wellington City Library, and reference lists from relevant publications.

Literature reviewed included academic journals, periodicals, newspapers, and central and local government reports and plans. Scope was restricted to information published in New Zealand from 1990 onwards.

Section 2: Review and Discussion of the Literature

What is residential infill development?

There is a high proliferation of recent newspaper and journal articles discussing the reasons for, and implications of, infill. Many provide examples of forms of infill common to a particular area, or of specific cases. Few, however, actually attempt to define this contentious concept. Within government, local authority, and university research reports infill is defined in a variety of ways, from broad to narrow.

Types of Infill

Typical infill in Christchurch consists of a garage placed in front of an existing house, and a new townhouse, or houses constructed behind it (Nixon, 1997:23). In Auckland, an initial phase of multiunit flat construction on subdivided sections has been superseded by townhouse style homes (Auckland Regional Growth Forum, 1998:19). A similar trend in Hamilton saw infill consisting of two-storeyed flats built in the 1970's, giving way to detached homes in the 80's (Porteous, 1991:265). Plew (2001:1,5) describes the various types of infill. It can consist of one or more new houses built on the same section as an existing house; or two or more houses built where an old house has been demolished. New 'townhouses' can be detached or attached, and tend to occur on sites of up to 500m² (Hill Young Cooper and Urban Partnerships, 2004). Sections for infill are created by either cross leasing or subdividing a large existing section (Auckland City Council, 2003:5.1; Vallance et al, 2002:41; Plew, 2001:1; Auckland Regional Council, 2000: 32)

Definitions of Infill

A Wellington City Council report describes infill as any new dwellings constructed "within the existing defined area of the city" (Spencer Holmes Ltd, 2004:2), and the Auckland Regional Growth Forum (1998:14,18) describes it as simply "increasing density over large suburban areas."

More specifically, Jill Boyd's Christchurch based study classified it as only the construction of a new unit "added to the section of an existing house" (1996:2). This is similar to the definition given by Auckland City Council of "additional dwellings on an individual residential site in an existing built up area" (2003:5.1; 2000:32). The Parliamentary Commissioner for the Environment gave a definition akin to this, that of "adding another house or houses to a site with an existing house" (1996:3). Plew developed a comprehensive definition for the Christchurch City Council:

"Infill occurs when new development takes place within an existing suburb of older houses. It includes one or more townhouses built behind, in front of or beside an

existing older house. It also includes developments of two or more townhouses where the original older house has been demolished. Infill townhouses are built on cross-lease sections or small (subdivided) freehold sections.” (2001:1)

Drawing together the key themes that emerged from the definitions given in the literature, it can be said that infill is: **The establishment of new dwellings within an existing suburb, facilitated by the division of existing residential properties into smaller sections by way of cross-leasing, or subdivision into fee-simple or unit titles.**

The development of large apartment buildings (over three storeys), redevelopment of industrial areas, and conversion of existing commercial buildings to residential, are features of intensification in general, and were not defined as infill in the majority of literature surveyed.

Densities and Infill

Increased population densities were a very strong theme within the literature. However, just how these densities were measured, or categorised, was very unclear.

The terms low, medium, and high density were commonly used within the literature. These terms are used in two different ways. New housing developments are often described as being low, medium or high density in style. The difference between these is generally quite distinct. Low density style housing is detached, and usually on a generous section. Medium density style is semi detached, and up to three storeys in height, while any housing four storeys and over is classified as high density. Settlement levels across a large suburban area are also often described as being of low, medium or high density. Sometimes, a correlating dwelling density is also given, but overall, definitions of density levels are rarely provided. Importantly, it was observed that these can also be relative rather than fixed concepts, for example “...what is considered to be medium density in the Christchurch context is currently lower than in Auckland” (Ansell, 2004:31).

Dwelling per hectare was the most commonly used form of measurement; however this can be misleading as it does not necessarily reflect the population in a given area. It can also refer to either gross or net density. Gross density includes roads and other open spaces. This distinction was not made in any of the literature surveyed.

Typical densities in Auckland are currently ‘low’, at between ten and twenty dwellings per hectare. Auckland’s intensification plans are aiming for areas of between 50 and 70 dwellings per hectare (‘medium’). Infill, however, remains much closer to traditional suburban density levels (NZ Herald, 2005).

Trends in the Literature

The literature surveyed included local and central government reports, academic research and published papers, and general print media. One clear issue that emerged is that many potential benefits of residential infill are indirect. They occur at a very broad and thus difficult to define scale, such as region or country. In contrast, negative effects are often felt at the very personal level of site or suburb. These costs are often very direct, and can be clearly associated with infill. This distinction was strongly evident in the literature. While reports written or contracted by councils concentrated on the broader effects of infill, the media concentrated on more direct, local scale effects. This trend was also noted in a recent literature review on the “social implications of housing intensification” (Synchro Consulting and Hill Young Cooper, 2005:1). This distinction could have important implications, as the media tends to have more of an impact on the perceptions of the public (Turner et al, 2004:13).

Another important disparity was that many of the assumptions made in the council and academic literature as to the wide scale benefits of increased intensities were based on research conducted internationally. In contrast, most discussions of the local scale effects of infill were based on several comprehensive surveys of people living in or around infill in New Zealand. Most media articles also drew on the opinions of local housing or planning experts. A similar trend was noticed in Turner et al's review of 'best practice in medium density housing design' (2004:13).

Finally, almost all the literature, both research and media coverage, came from Auckland, Wellington or Christchurch, and focussed on issues in these areas.

What are the potential social and environmental effects of residential infill development?

Social and Environmental Effects

The urban environment includes the physical character of a street or suburb; the ecology of the area; and the infrastructure that supports it. Closely associated with this is the “social infrastructure” of a residential area. Aspects of this include the safety and privacy of residents, diversity of housing available, and sense of community. They also include the availability of, and accessibility to facilities (Auckland Regional Growth Forum, 1998:2).

The social and environmental features of an area are known individually, or cumulatively, as “amenity values”. These are defined in the RMA as “...those natural or physical qualities and characteristics of an area that contribute to people's appreciation of its pleasantness, aesthetic coherence, and cultural and recreational attributes...”. These are culturally defined, and can vary between individuals, between types of stakeholders, and over time

(Parliamentary Commissioner for the Environment, 1996:1). Importantly, this means that different groups of stakeholders will have different experiences of infill. Two key groups, who often have quite divergent experiences of infill, are the neighbours of infill and the residents of infill.

It is often very difficult to separate the environmental effects of infill from the social effects, as they are closely interlinked. As any single change in the dynamic of a street or suburb can have implications at a variety of scales, it can encompass both the social and environmental aspects of urban living (Hoque, 2001:22). Accordingly, this review of the literature will be divided simply into positive effects and negative effects.

As well as being interlinked, effects can be cumulative. This means that infill may have limited impacts until certain thresholds within the community are reached (Parliamentary Commissioner for the Environment, 1996:viii). At this point amenity values are impacted on, and effects escalate from the site or street level to a suburb or city wide issue. This can be the case for either positive or negative impacts.

The effects of infill housing are directly and indirectly associated with two key aspects of any development – the degree to which it increases the average population density of the area, and the quality of the design.

While this literature review attempts to concentrate on the effects of infill as defined earlier, many of the effects of infill are those associated with intensification in general. For this reason, some research has been included even if it did not refer to infill specifically.

Benefits of infill housing

Increased population densities

Increased population densities can result from increased dwelling densities, and are widely agreed to have both ecological and social benefits. As one of the key benefits of the “compact city” concept, increasing population densities were discussed, or at least referred to, in almost all the literature that was reviewed.

Improved personal safety

Firstly, an increased population concentration can improve personal safety as “natural” or “informal” surveillance is generated (Vallance et al, 2002:7). Improved personal security has been identified as one of the attractions of higher density living for residents of newly intensified areas in Auckland (Research Solutions, 2000:6). The potential for increased foot traffic to improve safety from crime in homes and public spaces has been discussed in council

reports and surveys (Synchro Consulting and Hill Young Cooper Ltd, 2005:3; Auckland Regional Growth Forum, 1998:18).

Research and evidence supporting the concept of natural surveillance and crime reduction also counters the traditional association of high density housing with “crime and anti social behaviour”. An investigation into the “social infrastructure impacts of urban growth” found that economic conditions, rather than density, are the key factors in generating such undesirable situations, and “much of the research that purports to show a relationship between high density and stressful and unhealthy living is flawed, and the relationship is uncertain...” (Auckland Regional Growth Forum, 1998:8). This evidence was supported by a 2005 literature review that found that while the public associate “intensive developments and future social problems...most literature acknowledges that social problems...are the result of a wide range of economic and social forces, with the built environment having only a marginal influence on those forces.”

Better local businesses and facilities

Secondly, a more concentrated population provides a wider range of people with convenient access to local businesses and facilities. This enhances support for existing amenities, as well as attracting more to the area. This can increase the vitality of communities (Vallance et al, 2002:7). The benefits of “accessibility” have been discussed internationally, and as a result are widely accepted at both a local and central government level in New Zealand (Synchro Consulting and Hill Young Cooper Ltd, 2005:5; Auckland City Council, 2003:S2.5; Auckland Regional Council, 2000:5; Auckland Regional Growth Forum, 1998:15; Parliamentary Commissioner for the Environment, 1996:18). Case studies of recent medium density developments in various parts of Auckland found that “the business community has benefited from having more people in the area...”, while residents have enjoyed the convenience of having schools and shops in close proximity to their homes (Research Solutions, 2000:8). Dupuis and Dixon’s paper found that resident’s of another medium density development in Auckland, Ambrico Place “particularly liked (it) because of its convenience and proximity to facilities” (2002:420). The Press referred to the “vibrant streetlife” such accessibility can generate (2004:D1). This was also the subject of a 2004 feature in the Cook Strait News (p12).

Enhanced public transport

Finally, if “well located and designed”, an intensified population can generate the “critical mass” necessary to support improved public transport systems. This was the consensus amongst much of the Council based literature (Synchro Consulting and Hill Young Cooper, 2005:5; Auckland City Council, 2003:S2.5; Hill Young Cooper Ltd, 2002:1; Auckland Regional Council, 2000:7; Auckland Regional Growth Forum, 1998:2). In some surveys, residents

reported marginally lower car use and increased public transport use within their intensified communities (Synchro Consulting and Hill Young Cooper, 2005:5; Ancell, 2004:138).

Improved public transport reduces vehicle dependence. Less vehicle dependent communities can be more socially equitable due to increased accessibility to facilities, for instance health care (Auckland Regional Growth Forum, 1998:2). They can also generate reduced travel times at a local level, and contribute to reducing national levels of vehicle emissions and use of non renewable resources (Auckland Regional Council, 2000:7). These broader scale outcomes were often implied in the planning literature. However, they were barely elaborated on, beyond reference to reduced travel times or general sustainability (Synchro Consulting and Hill Young Cooper, 2005:5; Watkin and Hoby, 2003).

Diverse range of housing options

Council research found that introducing a greater range of well designed housing options in existing suburbs can enhance social equity in a region and contribute towards a reduction in social problems. (Synchro Consulting and Hill Young Cooper, 2005:1; Auckland Regional Growth Forum, 1998:12). This is particularly important as household demographics in New Zealand have changed significantly over the past few decades. Statistics and residential surveys show that households have grown smaller and more diverse, due to the aging population, and changing family structures (Ancell, 2004:47; Hames Sharley, 2003:7; Plew, 2001, 1; Boyd, 1996:11). For many people, lifestyle preferences have also changed. This has increased the demand for more compact, low maintenance homes and sections at affordable prices (Plew, 2001:1,12; Research Solutions, 2000:6; Boyd, 1996:16). Changing household demographics due to increased immigration, more single and couple households, and longer working hours are widely recognised amongst planners, architects, and property experts consulted by the media (Gamble, 2004:D1; Cook, 2001; Killick, 1996). It has been acknowledged that infill housing has gone some way towards offering more affordable housing (Synchro Consulting and Hill Young Cooper, 2005:6).

Conservation of resources

Well designed infill development can also lead to the conservation of resources, as it reduces the demand for greenfield development and associated urban sprawl (Spencer Holmes Ltd, 2004:2,15; Parliamentary Commissioner for the Environment, 1996:18). It slows the encroachment of urban areas onto green belt and recreational areas, wildlife habitats and agricultural land (Auckland City Council, 2003:S2.5; Hill Young Cooper Ltd, 2002; 1). Consequently, it reduces the demand for construction of new infrastructure (Vallance et al, 2002:7). This is one of the major arguments in support of intensification (Cayford, 2004; Killick, 1996).

Costs of infill housing

Loss of open space

Infill housing tends to be built in spaces formerly used as gardens. This can have serious repercussions for the physical environment. A reduction in public and private open green space can affect the amenity of an area (Ancell, 2004:27; Dixon and Dupuis, 2002:421; Vallance et al, 2002:41; Boyd, 1996:3,4; Miller, 1996:24; Parliamentary Commissioner for the Environment, 1996:v).

Increased hard surfaces

Hard surfaces tend to replace open space and vegetation when infill is constructed. As a result, the ability for surfaces to absorb water is reduced. This increases runoff, which can cause flooding, erosion and pollution. One of Auckland's key causes of water pollution is stormwater running off hard surfaces into the sea (Stanley, 1996:5). This has been a problem for the North Shore area in particular (Ledbury, undated).

Loss of established trees and vegetation

As well as having ecological value, old trees or established vegetation add character and heritage value to an area. Unfortunately, they are often casualties of infill housing construction. Loss of individual trees, particularly along boundaries, can reduce the privacy of existing houses, and the amenity value of character. Over a broader area, the effects of the loss can accumulate, as important parts of the area's ecology are lost, and wildlife corridors dislocated, affecting birdlife and seed distribution (Molloy, 2000:31; Parliamentary Commissioner for the Environment, 1996: iv,27). In Christchurch there are fears that loss of vegetation and old trees due to widespread infilling could also harm the image of the 'Garden City' (Killick, 1997). Their loss also leaves the Christchurch hillsides at risk of erosion, and the plains exposed to strong nor'wester winds (The Press, 1998:4).

Poor quality dwellings

Expert research, residents' experiences, and public perception all indicate that infill housing – particularly multiunit housing – is often built and designed poorly. This can have negative impacts on both its residents, neighbours, and the overall area. According to Vallance et al "The Hunn report acknowledges that the highly competitive nature of multi unit and condominium development has led in some cases to cost cutting that was having a severe adverse effect on building quality" (2002:41). This phenomenon is often referred to as the "leaky" building syndrome (Ancell, 2004:48). There is a strong perception amongst the general public that infill housing is often of a low quality in terms of design, materials, and construction (Synchro Consulting and Hill Young Cooper Ltd, 2005:2; Turner, 2001). This perception is supported by the experiences of some residents of infill in Auckland and Christchurch, as well as the Hunn Report (Dixon and Dupuis, 2002:422; Boyd, 1996:4).

As well as introducing many negative effects, both social and physical, poor quality dwellings may only have a brief life, thus preventing the more indirect, long term effects of infill from occurring. They also generate a negative perception amongst the public which may lead to communities resisting infill developments in the future, regardless of how high quality they may be.

Loss of community

If low quality dwellings are uncomfortable to live in, they may also attract low income tenants, or only retain tenants for the short term (Ancell, 2004:48,137; NZ Local Government, 2003:23). These tenants may not get the opportunity to become involved with the community, or form relationships with their neighbours (Vallance, 2002:5; Ancell, 2004:137). There is a strong perception amongst neighbours of such infill developments that a concentration of such substandard housing could create future social problems (Scanlon, 2004:A5; Darling, 2003:A11; Dixon and Dupuis, 2002:422; Turner, 2001).

This perception most likely stems from the 1970's trend of infilling areas with "sausage block" social housing (Turner et al, 2004:7). This concern was also expressed in an investigation into the "social implications of housing intensification" which noted that "...it is possible that intensification could indirectly have negative crime and health effects, through the process of social segregation rather than because of any direct link" (Synchro Consulting and Hill Young Cooper, 2005:6). Again, this is more likely to apply to large scale developments, but could possibly extend to medium density housing.

This concern is validated by survey results which found that some residents of infill were frustrated that it was the only type of housing they could afford (Plew, 2001:23). Research also suggests that there is a limited range of infill designs being built, meaning that infill is not actually creating the range of housing options it was anticipated to (Ancell, 2004:49 citing Dixon and Dupuis, 2003). It has been noted that "...while making housing more affordable for some groups in society, intensification has not reduced housing costs for those most in need" (Synchro Consulting and Hill Young Cooper, 2005:6)

Lack of integration with the existing streetscape

Another common concern expressed by neighbours of infill development is the lack of integration of infill housing with the existing streetscape. (Auckland Regional Council, 2000:7; Parliamentary Commissioner for the Environment, 1996:27) The scale and style of developments are often particularly concerning. Neighbours can be frustrated that they do not get more of an influence over what is built (Research Solutions, 2000:7). Visual impact was often a key cause for concern (Miller, 1996:24). In many cases, existing residents have had their views or sunlight compromised by large scale developments, or buildings constructed

right against boundaries (Vallance et al, 2002:5; Harhoff, 2003; Boyd, 1996:3,4; Parliamentary Commissioner for the Environment, 1996:36). These types of design can compromise the character of a street or suburb, particularly in more historical suburbs (Synchro Consulting and Hill Young Cooper, 2005:2; Auckland Regional Growth Forum, 1998:15). Wellington residents expressed concern about this loss of character in a recent survey (AC Nielsen, 2005:24, 26). Existing residents often find their privacy compromised, while new residents found a lack of privacy to be one of the least desirable aspects of their new homes (Scanlon, 2004:A5; Vallance et al, 2002:23; Plew, 2001:12; Turner, 2001; Boyd, 1996:3,4). For existing residents, the cumulative effects of these factors can be an imposition on their way of life (Christchurch City Council, 2002: 42).

Issues of amenity loss are not only created by large scale developments. Few people in New Zealand have experience in the design of medium density development. As a result, much of the infill designed here is simply a smaller version of a typical detached suburban home, on a smaller site. Many of these in one area can create a “miniaturised” or “compacted” suburbia (Turner et al, 2004:3; Jackson, 1997:15). Areas like this can offer all the downside of suburbia, without any of the associated amenities, or significantly increased densities.

As well as having an influence on the health and well-being of residents, amenity values can have impacts on property values. A 1998 report by the Auckland Regional Growth Forum cites various aspects of environmental quality, as having an impact on property values.

No population increase

An average household today is smaller than that of the past. As a result, increased dwelling densities may not necessarily result in a proportionate increase in population densities, particularly when dwelling densities are increased at the relatively low rates created by infill housing (Haarhoff, 2003). This has been observed in several suburbs in Wellington (Spencer Holmes Ltd, 2004:4). Due to this, the potential benefits of infill associated with population increase may not be realised, but the negative impacts may still be suffered.

A related issue is that while much reference was made to the “critical mass” necessary to enhance public transport, service and business facilities, just what this mass was remained undefined.

Increased traffic

Increased populations can increase traffic, and demand for curbside parking (Scanlon, 2004:A5; NZ Local Government, 2003:23; Dixon and Dupuis, 2002:421,423; Vallance et al, 2002: 5; Auckland Regional Council, 2000:7; Research Solutions, 2000:7;Parliamentary Commissioner for the Environment, 1996:v). Both of these factors are known to reduce community safety levels, and for children in particular...”high numbers of curbside parking is

also associated with a greater risk of injury” (Vallance et al, 2002:26; Auckland Regional Growth Forum, 1998:17). “Reduced traffic safety due to increased traffic” was one of the greatest concerns expressed by Wellingtonians in response to a recent survey question on infill housing (AC Nielsen, 2005:27). The congestion generated by increased traffic can lengthen travel times, and concentrate vehicle emissions, causing environmental degradation, and reducing amenity values. Increased traffic levels also generate additional noise in a neighbourhood, as does a more concentrated population (Scanlon, 2004:A5; Vallance et al, 2002: 5; Research Solutions, 2000:7; Parliamentary Commissioner for the Environment, 1996:v).

Pressure on existing infrastructure

While increased intensities in already developed areas can reduce the need for infrastructure at the periphery, there are concerns that the additional population will overload local infrastructure – such as water supply, drainage, sewerage and roads – and place too much pressure on community facilities (NZ Local Government, 2003:23; Auckland Regional Council, 2000: 7; Research Solutions, 2000: 7; Boyd, 1996:3-4; Bucknell, undated:85;). In Auckland and Christchurch, communities have opposed infill development due to these concerns (Auckland Regional Growth Forum, 1998: 15; Bruce, 1998:7). Surveyed neighbours of new infill in Christchurch have “reported actually experiencing problems with sewers, storm water drains and parking in their areas” (Vallance et al, 2002:33). In a recent Wellington residents’ survey, residents cited overcrowding as the worst problem with infill housing (AC Nielsen, 2005:24,26).

Legal Issues

Finally, property issues and disputes can be created by infill development. Traditionally, many infill housing developments employed cross-leases, which exploited a loophole in subdivision law (Morrison, 1999:12). Unfortunately, the legalities and rights inferred by a cross-lease are often poorly understood by the owner of the cross-lease. Alternatively, houses may share driveways or other access ways, which can lead to disputes or miscommunications over maintenance or property development (Auckland Regional Growth Forum, 2003:3; Dixon, 2001:10,11). Residents of infill townhouses in Christchurch identified shared driveways as one of the worst features of their homes (Plew, 2001:12).

Section 3: Conclusions and Implications for Wellington City

The key to successful infill housing is to balance the effects on local amenity values – both social and environmental, and the way they impact on the lives of individuals, with the wider strategic goals of local and central government. Market demand needs to be balanced against community need.

Several key issues emerged from the literature. A key theme was the importance of an overall strategic approach to the development of infill for any city. Key gaps included definitions of, and research into, density levels in New Zealand, as well as research into the broader scale effects of infill in New Zealand.

Importance of strategic context for infill development

A clear message from the literature is that infill housing generated by the market alone is likely to create many negative impacts, but will not necessarily enable all the potential benefits of infill housing to be realised. However, if carefully managed, it can create favourable conditions for any local authority to take advantage of. A strategic approach to such conditions needs to encompass infrastructure provision, particularly transport systems (both public and private), as well as design and quality controls on new developments, and housing diversity.

Definition of Infill Housing

Most of the literature gave a fairly consistent definition of infill housing. However, two of the existing Wellington City Council research documents gave quite different descriptions of what infill consisted of. This could cause problems for research and communication within the council, as well as for communication with the public. Wellington City Council should adopt a definition of infill which is aligned with national perceptions of what infill housing consists of. It should be used consistently throughout research and planning,

Clarification of Density Measurements

Definitions of settlement densities in the literature were vague and varied. Due to changing household population structures, density measurements based on dwelling densities can be misleading. This means they are an inefficient tool for research. Before further research is conducted, Wellington City Council needs to establish a density measurement system based on population densities rather than dwelling densities. This form of measurement should be clearly stated within all Wellington City Council research and planning documents on the issue. Ideally this system could be adopted by planning bodies nationwide. This consistency would be beneficial for both planning and research.

Research into density thresholds

There is much discussion in the literature of the benefits of increased population densities. These include reduced crime, and increased patronage for amenities and public transport. The term “critical mass” is often referred to in terms of the benefits of population increase, particularly in reference to public transport. Just what level can be considered critical mass was not defined in any of the literature, however. This is a very important area for further research, because if those population thresholds aren’t reached, then the negative impacts of population or dwelling increase from infill may be experienced without the positive ones to balance them out. There may be international research into this which could be explored, and related to the New Zealand context. It could then be complemented by primary, New Zealand based research.

New Zealand based research into the broad scale effects of infill

The New Zealand literature based most of its claims about the broad scale benefits of infill and intensification on international literature. Although these benefits are widely agreed upon, and supported by a significant body of literature, it would be beneficial to have some New Zealand based research carried out to complement this.

Wellington based research into local effects

Finally, there were some effects of infill that had been discussed in other regions, but not investigated in Wellington in particular. These were vegetation loss, traffic issues, and community impacts.

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Appendix: Quotes from key resources

<p>Bibliographic Details: Ancell, S. (2004). <i>Medium Density Housing in the Central Area of Christchurch: Socially Sustainable? Thesis</i>. Dunedin: University of Otago.</p>
<p>Type of Publication & Description: Research including a literature review and a survey.</p>
<p>Definitions:</p> <p>P30 – “One can refer to density figures such as the ratio of dwellings per hectare, but without referring to the built form, the concept may fail when attempts are made to evaluate impacts and sustainability.”</p> <p>“(Christchurch City Council) refers to moderate densities as housing up to four storeys.”</p> <p>“(Dixon and Dupuis, 2002,2003) describe medium density housing as ‘two to three-storeyed terraced housing and low rise apartments, up to four storeys’.”</p> <p>“(Auckland Regional Growth Strategy) includes three urban housing forms in its definition of medium density housing, namely terraced housing, low rise apartments, and mixed use development within urban areas.”</p> <p>P31 – “...very few areas in Christchurch have reached these levels of density yet...so what is considered to be medium density in the Christchurch context is currently lower than in Auckland.”</p> <p>“In the NZ context, medium density housing fills the gap between lower density suburban forms of housing and the more high rise housing...”</p> <p>P32 – “As there can be a range of possible site densities within every kind of housing form, this makes these thresholds which are based on design elements somewhat arbitrary.”</p> <p>Effects:</p> <p>P29 – “...negative effects of unfettered urban sprawl such as increasing infrastructure costs, loss of natural habitats, and the possibility of decreased social equity through poorer access to resources...”</p> <p>“...while the environmental benefits of intensifying land uses have been covered in great detail, does the compact city promote social sustainability?”</p> <p>P32 – Dixon and Dupuis, 2003: NZ “has yet to build a significant body of work on MDH.”</p> <p>P33 – Sustainable housing includes individual choice, flexibility and durability.</p> <p>“...if (urban compaction) creates living environments that do not meet the needs of residents...it cannot be considered sustainable.”</p> <p>P47 – “Households are smaller...housing types are becoming more varied.”</p> <p>P48 – The recent “leaky house” problem has confirmed suspicions of poor quality buildings being constructed.”</p> <p>“In Auckland there is a concern that low income houses may be forced into medium density housing as the price for house sections rise beyond the means of many.”</p> <p>P49 – Dixon and Dupuis, 2003: “...much of the current medium density housing has “considerable homogeneity of ...internal design...reflecting a particular form of MDH that does</p>

not provide for a wide range of family types"...the choice of housing types for families may actually be reduced."

P50 – "In terms of planning MDH...there are many parties involved, all with different and sometimes competing interests."

P54 – "The compact city is one possible ideal of sustainable urban form, but although social equity is often ascribed to it, very little empirical research has been undertaken into such claims."

P137 – "MDH in the central city may therefore be meeting short term needs...implications for the formation of relationships within the community..."

Christchurch: "The development of MDH in the central city is causing some gentrification as lower income groups are displaced..."

"...in terms of housing quality...some of the newly constructed MDH is unlikely to survive more than a few decades."

P138 – "...some of the households interviewed had reduced or done away with private car ownership."

P139 – "The exclusion of renters from neighbourhood groups and the like by the owner-occupiers has implications for the ability of renters to become involved in their communities."

Bibliographic Details:

Auckland City Council. (2003). *Auckland City: Growth Management Strategy*. Auckland: Auckland City Council.

Type of Publication & Description:

Auckland City Council Strategy Document

Planning document – sets out where, when and how Auckland will grow.

Definitions:

5.1 Glossary – Infill = “the development of additional dwelling(s) on individual residential sites, such as through cross leasing. Usually the original house is retained.”

Intensification = “the creation of higher residential densities in urban areas through infill development, redevelopment, and more compact new development.”

Effects:

Section 2.5 – “people in the Auckland region do not want unlimited suburban sprawl that will spoil the bush, beaches and farmland surrounding the city. To make sure this doesn’t happen... ‘compact city’ approach to growth. This means reducing suburban sprawl (and the traffic congestion sprawl creates) by limiting growth outwards and accommodating people and jobs within urban limits.”

“Concentrating people and activities around transport provides enough population density to support improved passenger transport and local services such as shops. ...in turn reduces the need for car travel.”

“These principles were used in cities throughout the world until the car took over in the 1950’s. “

Bibliographic Details:

Auckland Regional Council. (2000). *Urban Area Intensification: Regional Practice and Resource Guide*. Auckland: Auckland Regional Council.

Type of Publication & Description:

Council Report

Definitions:

P32 – “Infill Housing: The development of additional dwellings on an individual residential site in an existing built up area such as through cross-leasing.”

Effects:

P5 – Reasons for intensification include “resource and environmental quality protection, transport and infrastructure efficiency, improved accessibility, housing diversity and market demand...”

****“In contrast to past residential intensification the strategy places less emphasis on general suburban infill as a means of accommodating growth.”

P7 – “disadvantages (of intensification) include more traffic, increased pressure on urban physical and social infrastructure and in some cases, poorly designed developments which do not fit well into existing neighbourhoods.”

“With strategically located higher density areas, the regional benefits of more intensive development can be maximised and the disadvantages minimised. Well located and designed higher density areas can help support better forms of passenger transport. Increased use of passenger transport and walking/cycling modes and decreased use of cars will contribute to a reduction in vehicle emissions, use of non-renewable resources and traffic accidents and help avoid growing road congestion.”

“Structured intensification...needs to be carefully co-ordinated with transport and other infrastructure provision as well as with good urban design, civic amenity and community consultation programs.”

P22 – (with suburban infill) “the main planning objective is to ensure integration with the overall character of the surrounding area regarding scale and type of development, infrastructure capacity, streetscape and resulting sense of place.”

<p>Bibliographic Details: Auckland Regional Growth Forum. (1998). <i>Social Infrastructure Impacts of Urban Growth</i>. Auckland: Regional Growth Forum.</p>
<p>Type of Publication & Description: Council Report</p>
<p>Definitions: P14 – “Incremental intensification across suburban areas is infill.” P18 – “increasing density over large suburban areas (suburban infill)” P14 – “Intensification: This includes selective intensification (an increase in density) concentrated within centres (growth nodes) and along transport corridors, including mixed use in employment areas. It can occur in both existing built-up areas or Greenfield urban residential areas.”</p>
<p>Effects: P2 – “Social infrastructure is...a system of social services, networks and facilities that support people and communities.” “Key principles for achieving quality social infrastructure” include: “affordable, accessible, appropriate, diverse and high quality housing and accommodation; safe environments...” “Higher density growth nodes and transport corridors can create a critical mass which supports a wide range of services and public transport. However...must be carefully planned to create a safe and well designed environment with good amenity and services, and a diverse range of employment and housing choices.”</p> <p>P3 – “Growth focused on the infill of suburban areas may result in community reaction if natural and physical amenity is adversely affected. However, opportunities do exist for some redevelopment of residential and employment areas which could enhance the overall urban amenity.”</p> <p>“Greenfield development, at current densities, will lead to a dependence on the private motorcar.”</p> <p>“Social infrastructure should be monitored to ensure that adverse effects of growth can be identified and mitigated.”</p> <p>P4 – “Growth has also brought with it challenges, relating primarily to protection of the environment and development of appropriate physical and social infrastructure.”</p> <p>P5 – Safety includes: “safe city design, road safety, crime and violence, personal safety, eg community support services, emergency services.”</p> <p>P6 – Compact City: “There would be more apartments and less private open space. Public transport and pedestrian access would be improved.”</p> <p>P8 - ...problems associated with Greenfield development persist...women living in outer suburban Melbourne spoke of concern for their own social isolation as well as the safety, mobility, employment and entertainment of themselves and their children.”</p> <p>“...much of the research that purports to show a relationship between high density and stressful and unhealthy living is flawed, and the relationship is uncertain...density per se is often not the most important factor...crime and anti social behaviour is more closely associated with economic conditions...than with urban conditions...medium density development can bring many advantages such as greater accessibility to work, shops and closer contact with neighbours.”</p> <p>PRINCIPLES FOR THE PROVISION OF SOCIAL INFRASTRUCTURE: P12 – “Growth in the region must be supported by housing and accommodation which is affordable, accessible, appropriate, diverse in character, and of a high quality. “ P13 – “Health-promoting physical environments which offer physical and other recreational</p>

activities.”

“Opportunities for a wide range of indoor and outdoor recreation and leisure pursuits; availability of and access to public open spaces...”

P14 – “...within metropolitan areas, property values are affected by a variety of urban amenities including greenbelts and open space, water access. ... property values diminish as a result of environmental factors such as air pollution, airport noise, groundwater contamination, traffic and traffic noise, flood risk, high-voltage transmission lines and other undesirable land uses (Nemec 1998).”

“...subsidised and affordable housing does not appear to impact on property values.”

P15 – “Growth nodes will have much higher densities (75 people and more per hectare) than current regional averages (20-30 persons per ha). ...suburban infill areas which have moderate densities that are much closer to current levels.”

“The major question from this is whether the differences in population density and living conditions will also translate to differences in the quality of the living environment and in property values.”

“The Auckland experience of infill housing has resulted in major community reactions against infill which affects the amenity of the area through the loss of views, trees and the pressures on infrastructure, particularly transport.”

“Higher intensity housing was not seen by the public to be a desirable development approach because the region did not have the infrastructure and transport systems to support higher densities.”

“Given appropriate planning and design, re-development of suburban areas can offer opportunities to improve the general amenity and therefore should not be discounted. ...infill...has the potential to reduce amenity if not properly manage...it could enhance a community...increasing population densities and hence reinforcing the viability of local services, retailing and public transport. “

P16 - “...the provision of affordable housing is considered by central government to be mainly a function of the market.”

P17 – “...there is a strong association between increasing risk of injury of child pedestrians and increasing traffic volumes...high numbers of curbside parking is also associated with a greater risk of injury.”

P18 – “a higher density living environment requires careful transport planning and urban design to prevent accidents and street crime...also has the potential to improve personal safety by supporting the greater use of public transport...higher density centres with increased levels of amenity and greater pedestrian access can help reduce the potential for street crime.”

“Living within a more compact city will require people to be more sensitive to the needs of their neighbours especially in relation to noise and other potential causes of conflict.”

“...(suburban infill) may not necessarily support an efficient public transport system and therefore have limited potential to reduce traffic accidents.:

“reliance on the private motorcar...has the potential to increase traffic accidents...peripheral areas are also susceptible to an increased risk of crime. “

P20 – “Health services will tend to be more accessible with greater levels of intensification, particularly with improved public transport systems. ...population concentrations can facilitate the efficient use of facilities. However, increasing density can impact on environmental factors such as air, water, noise and soil, which can in turn affect the health of a community.”

Bibliographic Details:

Boyd, Jill. (1996). *Who Lives in Townhouses and Similar Units? A Market Analysis in Ilam/Avonhead*. Christchurch: Lincoln University.

Type of Publication & Description:

Report in partial fulfilment of the subject Property Market Analysis, Master of Property Studies.

Primary – quantitative survey of residents of townhouses

Definitions:

P1- “number of fairly large, modern, up-market homes that had been built in the backyard of some very ordinary and often down-at-heel houses.”

“I have used ‘infill’ housing to describe the situation where a new home is built on a site which already contains an existing home.”

P2 – “Unit development falls into three major categories: Units built on new sites, units built on sites where a house may have been demolished or removed (ie redevelopment), units added to a section with an existing house (ie infill).

P6, 14 – issues of subdivision/cross-lease/unit title

Effects:

P3-4 – “criticisms included houses being built too close together and too close to boundaries, too many properties on one site, overloading of existing infrastructure and community facilities, lack of privacy, loss of views and outdoor space, subdivided sections too small, two storeyed houses being constructed on back sections and general criticism of the increasing population density...”

P4 – “...lack of character and poor quality of some new housing... placement of garages on street frontages...”

P6 – “often it is possible to cross-lease a section where, because of its size, it would not be possible to subdivide it and create a freehold section.” “unfortunately...cross-lease... is not always fully understood by a townhouse purchaser.”

P11 – “statistics tend to show a downsizing in residences... it is not only older citizens who are opting for – if not smaller homes – smaller sections.”

P16 – survey responses: desirable features of units: top three = compactness, modernity, low maintenance. “advantages of a small section and a low maintenance home, making for less gardening and less housework.” Least desirable features: top three = lack of privacy, smallness, issues with cross-lease eg maintenance.

<p>Bibliographic Details: Hames Sharley (2003). <i>Wellington Residential Intensification Review</i>. Wellington City Council</p>
<p>Type of Publication & Description: WCC Document Primary research, review of the trends occurring in the residential market over the past 10 years.</p>
<p>Definitions: References to terrace/units, apartments or stand alone houses. No reference to infill.</p>
<p>Effects:</p>
<p>Other notes: Good overview of the Wellington Context: P1 – “The current housing composition in Wellington City comprises around two thirds stand alone dwellings, and one third terrace/unit or apartment dwellings...of those new houses entering the market, around one third are stand alone dwellings and two thirds are terraces/units or apartments. ...a reflection of ...the decreasing availability of land...growing demand for smaller affordable housing, and...an increasing acceptance of this form of housing. “ P7 – “Of critical importance is the aging population...This is of critical concern for Wellington City as it may be attributable in part to the unavailability of affordable housing for first home buyers or renters in the 39 year and below age brackets...”</p>

<p>Bibliographic Details: Hill Young Cooper Ltd. (2002) <i>Residential Intensification: Draft Policy Paper</i>. Tauranga: Tauranga District Council.</p>
<p>Type of Publication & Description: Draft Policy Paper</p>
<p>Definitions: P1 – "...intensification means townhouse, terrace and low-rise apartment styles of development, commonly referred to as medium-density development." "Previous work ...on amenity issues and intensification recommended that the council shift from a policy of accommodating growth within the built-up areas of the city through 'across-the-board' infill to a policy which encourages intensification around selected centres and along selected main routes."</p>
<p>Effects: P1 -"Well planned intensification can ...reduce pressure for continued urban expansion...slow the conversion of rural land to urban activities, help protect catchments from urban development, promote energy efficiency and, over time, develop land use patterns that are supportive of greater use of passenger transport, walking and cycling, and less use of cars...therefore plays an important role in making settlements more sustainable." P2 – "It has been the experience of places like Auckland that without a robust regional growth management framework, intensification can occur in the wrong location." "It is expected that the share of the housing market associated with intensive housing will grow in the next twenty years, from the current share of 10% of the market, to at least 25% or 30% of the total market." "...need to balance local amenity issues with wider strategic growth management issues." P67 – "Intensification is currently happening through the form of infill development across the City and terrace and apartment developments around Mount Maunganui." "Medium to high density forms of intensification will, for the foreseeable future, be one form of growth amongst a range of growth options. There will also be demand for further infill..."</p>

<p>Bibliographic Details: Hoque, A. (2000). <i>Applicability of Increased Density for Housing: A Case Study of the Auckland Region. Thesis.</i> Auckland: The University of Auckland.</p>
<p>Type of Publication & Description: Thesis</p>
<p>Definitions:</p>
<p>Effects: P2 – “Intensive urbanisation of certain parts of the city may reduce the amenity values and quality of life in and around those areas.”</p> <p>“Attitudes to the amenity of such [medium density] developments, and whether they actually influence attitudes to, say, vehicle use, are relatively untested.”</p> <p>“Low density subdivisions, car and roading networks, have strongly influenced these urban/suburban environments in developing a particular housing style and character.”</p> <p>P5 “Most of the medium density housing developments in Waitakere are very recent additions to the market. Therefore, the residents of these developments...have not yet established a particular lifestyle based on a long-term association with intensive housing. “</p> <p>P27 in the 1970’s “a new type of housing was introduced in the residential neighbourhoods as a result of policy makers’ concern for urban consolidation and the changed socio-economic pattern of society. ...medium density housing which includes flats, town houses, terraces and semi-detached houses on small lots.”</p> <p>P28 – GF Gair - Minister of Housing and Deputy Minister of Finance, 1976: “inner city living has many advantages...closer to jobs, shopping, entertainment, health services, educational and cultural institutions, and transport bills should be smaller than for those living at the periphery of urban sprawl...We New Zealanders...place a premium on privacy. We must retain this too, through thoughtful design inside and out...if we don’t do this sort of thing, people generally, and especially families will just not accept inner-city living as an attractive alternative.”</p> <p>P33 – “...housing intensification to make more efficient transport and infrastructure operation has been an objective of regional consolidation strategies since the 70’s.”</p> <p>P34 – Warren, NZ Herald, 2000: “The simple fact is that it [medium density housing] is happening not through any council conspiracy, but because that is what some people want...don’t want to spend time on gardens and household maintenance. They value security and convenience to shops, schools and public transport.”</p> <p>In Auckland, Council is promoting intensive housing, and the market is providing it; however “the reality is that there is strong opposition among the city dwellers against” it.</p> <p>NZ Herald, 2000: “...overloads services, damages the environment and pushes up rates and city debts to pay for infrastructure.”</p>

<p>Bibliographic Details: Parliamentary Commissioner for the Environment. (1996). <i>The Management of Suburban Amenity Values. Administration by Auckland, Christchurch and Waitakere City Councils.</i> Wellington: Parliamentary Commissioner for the Environment.</p>
<p>Type of Publication & Description: Government Research Document In depth investigation into the way Auckland, Christchurch and Waitakere Cities have addressed issues of amenity values and intensification.</p>
<p>Definitions: P3 – “The changing housing densities are usually the result of – suburban infill (ie adding another house or houses to a site with an existing house); suburban infill on vacant or reserve land; and redevelopment (ie replacing an existing house with multiple townhouses).</p>
<p>Effects: Piii – “There is no doubt that amenity values will change as a result of intensification.” Piv – “The balance between providing for intensification and maintaining or enhancing amenity values does not seem to have been achieved.” “... have not been able to mitigate the effects of the loss of mature trees and vegetation...particularly important to the overall ecological health of a city and is much more than a simple protection of individual trees.” Pv – “Suburban intensification can affect a city’s infrastructure, transportation network, the natural environment, heritage places and areas, and amenity values.” Effects: “changes to the streetscape and the combination of the natural and built environment; the loss of vegetation, special character and public and private open space; increased traffic, noise levels, on-street car parking and the effects of increased traffic levels on safety.” Pvi – “Describing amenity values is difficult as there are subjective aspects to be considered. However, there are aspects that are measurable and that can be identified.” Aspects that affect amenity values: building design, relationship to other buildings, and open space, siting, configuration and aesthetic quality (all universal values). Pvii – “...cumulative effects on the amenity values of an area is a critical issue in terms of the medium to longer-term changes to amenity values. There are examples where there has been inadequate consideration of the cumulative effects of a series of individual housing developments in a street or neighbourhood...” P1 – RMA definition of amenity values: “those natural or physical qualities and characteristics of an area that contribute to people’s appreciation of its pleasantness, aesthetic coherence, and cultural and recreational attributes.” P2 – see below diagram etc P8 – “the proximity of buildings and the relationships between buildings and open space can have an impact on health and safety. The well being of people and communities...affect and are affected by amenity values.” “Amenity values may also conflict with each other... need for privacy may conflict with neighbour’s view or sunlight.” “Important components of amenity values are historic and cultural heritage values...and landscape values.” P14-15 – Amenity values “are not static and because of their dynamic nature they will change with time and with cultural preferences and socio-economic status.”</p>

P15 – “Amenity values can be defined at a range of spatial levels such as city-wide, suburb, neighbourhood, street, and site...”

“general themes that contribute to the amenity values...scale and dominance... aesthetic coherence: the visual relationship between built and natural elements; environmental factors such as wind speed, sunlight, daylight and outlook; noise levels, vibration and odour; heritage features and continuity with the inclusion of both natural and built elements from the past in an environment for the present; safety and accessibility of places.”

P16 – See table below

P17 – “A community may accept a certain level of intensification before the rate and scale of change and associated effects become unacceptable...after a threshold is reached, each additional development will compound the effects on the existing amenity values. “

P18 – “Positive effects (of intensification) can include the development of a more sustainable urban form through halting or slowing urban sprawl, better access to services and facilities with increased population densities and greater levels of demand and supply of services, and provision of a public transport system.”

- also see diagram

P26 – “The addition of a second house to a large section with an existing house has been a traditional method of increasing housing densities ...often...through the use of a cross-lease...used extensively in Christchurch.” Also used in Auckland.

P27 – “There is the potential for development of cross-lease sites with designs compatible with the existing house but the amenity values of a street can be changed by placing houses at the back of sections down long driveways or by building a house that is incompatible with the existing house. The removal of mature trees and gardens is sometimes the only way to construct a suitably sized second dwelling.”

P35 – From Auckland CC, 1990: “...impact of intensive housing development on the overall character and amenity of established communities and residential neighbourhoods...physical change (more housing, fewer large trees, loss of privacy) and also social change (younger more mobile and affluent households apparently “replacing” older residents)”

P36 –Christchurch CC, 1995: “houses being built too closely together, too many properties on one site, a lack of privacy, and loss of views and outdoor space. The lack of character and poor quality of some new housing was also an issue.”

“Many new developments are not in sympathy with the design and form of existing houses, vegetation cover is being replaced with dwellings and hard surfaces, and in many narrow streets there’s no space to offset these effects. “

P37 – Waitakere CC: “Residents wish to retain those amenity values that are associated with their own private amenity...public amenity values...are also important.”

Effects identified include “...a reduction of planting on private sections with infill housing, a reduction of open space...possible dominance of surrounding sites by large buildings; feeling of openness and greenness undermined; and loss of relative quiet.”

Bibliographic Details:

Plew, E. (2001). *Townhouse Survey Report: A Survey of Households Living in Modern Infill Housing in Christchurch City*. Christchurch: Christchurch City Council.

Type of Publication & Description:

Christchurch City Council Research Document
Surveys residents of infill, and discusses CCC's land use policies.

Definitions:

P1 – “Infill occurs when new development takes place within an existing suburb of older houses. It includes one or more townhouses built behind, in front of or beside an existing older house. It also includes developments of two or more townhouses where the original older house has been demolished. Infill townhouses are built on cross-lease sections or small (subdivided) freehold sections.”

Effects:

P1 – Increases range of housing styles. Small sections can be a lifestyle choice, particularly due to the aging population and declining household sizes.

P12 – top three benefits of townhouses: Low maintenance, compact, well designed. Costs: too small, lack of privacy, shared driveway and parking issues.

P13 – “satisfaction levels declined as the number of houses built increased.”

P23 – “These decisions [over housing type] are based on a number of factors ranging from intangibles such as personal likes and wants to more tangible reasons such as affordability and access to facilities or services. Much of this decision making can be considered an intuitive process rather than a conscious, quantitative one.”

The small proportion of residents who were dissatisfied with their dwelling “seemed to have ended up living in infill development due to a lack of choice of other housing types within their price or rental range.”

P24 – “...some of the older housing stock in the City may not be meeting people's housing needs in a price or rental range that is realistic. ...infill development in recent years has tended to provide a fairly limited range of housing types. As a result, not all lifestyles and households are being adequately catered for within the newly built housing stock.”

“The diverse nature of contemporary living has resulted in the need for a greater variety of housing types than was required in the past.”

<p>Bibliographic Details: Research Solutions. (2000). <i>Building a Better Future. Intensification Review: ARC Residential Research & Monitoring Programme. Stage 1: Community Perceptions and Attitudes. Executive Summary and Overview.</i> Auckland: Auckland Regional Council.</p>
<p>Type of Publication & Description: Council Report</p>
<p>Definitions: No definition of infill – studied larger townhouse developments.</p>
<p>Effects: P6 – Demand for medium to high density housing can be due to: affordability, low maintenance, sense of community, and security.</p> <p>P7 – “Intensified housing provides positive impacts on surrounding businesses.” But raised “concerns about the load that higher density housing places on the infrastructure – particularly additional traffic.”</p> <p>“Neighbours area strongly of the view they should have more say in what is built in the area.” “Some accept that there is a market for this type of housing, provided it is done well. They are particularly concerned about the stress placed on infrastructure, including traffic and storm water systems.” “...the strongest objections to medium to higher density housing are philosophical, based on the belief that everyone should live in a standalone house, ideally on a full section.”</p> <p>P8 – “There is significant variation in the types of people (MDH developments) have attracted, and the impact on the surrounding community.”</p> <p>Findings from different developments: Birkenhead: “... the business community has benefited from having more people in the area, but the additional traffic is a major concern to both neighbours and businesses.” Epsom “train and traffic noise” for residents, but also “security and convenience...proximity (to schools and shops)”</p> <p>P9 – “The community attitudes and perceptions about medium to higher density housing are lagging behind market demand.”</p> <p>“Rational objections can be addressed by ensuring that there is sufficient infrastructure in place to service the increased population that will result.”</p>

<p>Bibliographic Details: Spencer Holmes Limited (2004). <i>Infill Development Project</i>. Wellington City Council</p>
<p>Type of Publication & Description: WCC document Primary research, identifies the status of infill in various areas of Wellington City.</p>
<p>Definitions: P2 – “infill...the establishment of new housing units within the established urban periphery. The development or redevelopment of new dwellings on land that is within the existing defined area of the city is ‘infill development’.” “Infill development can be any one of the following types of developments:- a subdivision of a vacant large allotment within the established margin of the city; the construction of an inner city apartment block; an industrial building being converted into a residential apartment; the construction of a second or more dwellings at the rear of an existing residential allotment. “ “these types of development are done without requiring large scale development of roading, services and facilities. ...links into or connects to existing networks. “</p>
<p>Effects: P2 – “vital strategic importance in terms of being able to achieve sustainable development of cities throughout the world by urban development professionals.” “presumption that the infill development results in a lessening of quality and standard of housing that may exist in a particular area.” P4 – increases in dwelling numbers in the city have not led to corresponding increases in population numbers in a number of suburbs. “...accounted for by a decline in the number of persons per household that has occurred over the last few decades.” P15 – “While development is occurring [in Wellington], the level of population being accommodated in the outer suburbs shows modest increases or minor declines. “ “...infill development is at least in part, meeting the objectives and policies of the District Plan in terms of limiting urban Sprawl.” P16 – “The level of development that has occurred in the outer residential areas is relatively low in terms of accommodating city growth and in terms of the percentage increase in population within those suburbs. The level of concern expressed to Council regarding the level of infill housing would indicate that these communities have a relatively low threshold for this type of development.”</p>

<p>Bibliographic Details: Synchro Consulting and Hill Young Cooper Ltd. (2005). <i>Social Implications of Housing Intensification in the Auckland Region: Analysis and Review of Media Reports, Surveys and Literature</i>. Auckland: Auckland Regional Council.</p>
<p>Type of Publication & Description: Council Report Reviews community surveys, media articles and research literature.</p>
<p>Definitions: Discusses intensification in general, no specific mention of infill.</p>
<p>Effects: P1 – “The surveys and media articles tend to concentrate on perceived connections between the design of intensive developments and future social problems, yet most literature acknowledges that social problems...are the result of a wide range of economic and social forces, with the built environment having only a marginal influence on these forces.”</p> <p>“Most surveys and media articles concentrate on people’s attitudes to their immediate, day to day living environments, while the literature tends to concentrate on whether particular planning approaches...are better or worse in terms of different ideas about what constitutes good cities.”</p> <p>P2 – “...social problems are likely to be minimised if intensive housing is: well designed...well located...meets the needs of a diverse range of households.”</p> <p>“...significant concerns that intensified housing is associated with poor quality design and low amenity...poor quality construction; concern about long term maintenance; poor layout; insufficient space; and a lack of integration with surroundings.”</p> <p>“...many residents appreciating aspects such as communal facilities and common open spaces.”</p> <p>“Intensification is often seen as a threat to preserving the character and heritage of neighbourhoods.”</p> <p>P3 – “adherence to high quality design standards, appropriate to the local context, will be critical in gaining community acceptance to intensified housing.”</p> <p>“In some cases intensification appears to result in increased contact with neighbours, but this does not necessarily translate into a strong sense of community.”</p> <p>“Intensification is often argued to have safety benefits because of better surveillance of homes and public spaces.”</p> <p>P4 – “International research on health and intensive housing...includes research linking obesity with urban sprawl, as well as research noting the potential disbenefits from noise and air pollution when people live close to busy areas.”</p> <p>P5 – “Intensification is argued to improve access to services, facilities and jobs, reducing car dependency and travel time, and placing people within walking distance of many of their needs.”</p> <p>“...surveys indicate marginally higher use of passenger transport by residents of intensive housing developments, and lower rates of car ownership.”</p> <p>“...more people in areas subject to intensification is leading to a wider range of commercial services locating there.”</p>

P6 – “...it is possible that intensification could indirectly have negative crime and health effects, through the process of social segregation rather than because of any direct link.”

“...while making housing more affordable for some groups in society, intensification has not reduced housing costs for those most in need.”

“...many residents felt that intensified living had given them the opportunity to afford their own home...(but)...many developments appeared cheap and of lower quality than surrounding housing.”

“...some evidence that compact cities can reduce travel costs.”

Bibliographic Details:

Vallance, S., Perkins, K., and Moore, K. (2002?). *The Effects of Infill Housing on Neighbours in Christchurch*. Christchurch: Environment Society and Design Division, Lincoln University for Christchurch City Council.

Type of Publication & Description:

Christchurch City Council Research Document
Surveys neighbours of infill, and reviews literature.

Definitions:

Quotes E. Plew's definition of infill (see above).

P41 – “Most infill housing occurs on cross leased or subdivided sections, and its development sometimes requires the removal of the original house.”

Effects:

P5 – “Those already living in infill housing were more inclined to see infill housing in positive terms, while those living on residential quarter acre type sections were quite reliably opposed.”

“...more regulation of infill housing would suit at least some neighbours...”

“Infill housing was perceived to be built to low building standards...”slums of the future...”

“seen by some as having a negative impact on neighbourly interactions and community spirit...”

“...over two thirds also believed ... (it)... would bring social problems later.”

“Many neighbours of infill housing are not experiencing the strategic benefits that are believed to be the result of a compact city form. ...most commonly experienced effects...reduced privacy and sunlight...increased levels of traffic and noise...strain on the neighbourhood infrastructure.

“Some residents, because of what they believed to be the adverse bio-physical and socio-cultural effects of higher housing densities, did not support infill housing even if it was of good quality. These views strongly reflect New Zealand's culture and history...”

P6 – “In Christchurch anti-infill sentiment has been expressed in both the media and in submissions to the Council...”

P7 – “Infill housing is often seen as one way of creating a more compact urban form”

Compact form is good as: makes better use of public transport, reduces vehicle emissions, takes “advantage of a compact building design to maximise energy efficiency”, increases “informal surveillance”, reduces sprawl and infrastructure costs at the periphery, gives neighbourhoods greater vitality and vibrancy.

Plew's research: “for a ‘niche market’ infill housing was a popular choice because of its low maintenance aspects, its newness and its warmth.”

Jenks, Burton and Williams, 2000: “while intensification could be acceptable to residents, the process had to be managed properly so as to avoid potential negative effects... the majority of residents believed that only public transport and the number of shops had improved with intensification.”

P8 – Gow, 2000: “...urban planning should encompass not only environmental but also social and economic considerations.”

P9 – “...peri-urban, low-density development is still a popular choice for a significant part of Christchurch's population.”

P20 – “a clear dislike of a certain type of housing...” 6 3 storey attached townhouses (P21)
“...which least resembles the traditional New Zealand detached house with pitched roof.”

P20 – most preferred was a new townhouse behind an original older house (47%), followed by 3 new townhouses (25.3%), then 2 detached townhouses next to an original house (14.2%) then 6 3 storey (0.4%)

P22 – “any new infill housing development is likely to be understood in negative terms if it is seen to adversely affect access to sunlight, privacy, the quality of housing or the amount of

greenery around existing resident's sections."

P23 – "The invasion of privacy was resented enormously...roused feelings of hostility and anger..." Many had to make changes to their daily routines/habits. "...lack of control...negative impact on ...established habits and freedoms."
Sometimes trees planted to maintain privacy resulted in reduced sunlight.

P25 – "The potential for improvements to the neighbourhood is...one of the basic arguments for urban consolidation.

P26 – "...safety of the streets was generally seen as being compromised by the increased number of vehicles that accompanied higher residential densities."

"...firm belief that modern infill housing developments are often substandard."

P27 – "...believed there was a link between poor quality housing and poor quality neighbours...infill housing of inferior quality degenerated very quickly and soon became cheap rental accommodation...perpetuating a cycle of gradual decay... consequences for the appearance of the neighbourhood and street maintenance. "

"Neighbourly relations were also affected as the high turnover of occupants precluded the development of any meaningful relationships."

"residents living on traditional...sections tended to see open spaces and greenery as more important than those living in infill housing...infilling was seen as having a significant, detrimental effect on neighbourhood open spaces..." - tangible (shade, pollution reduction) and intangible values (emotional response)

P33 – "...some interviewees reported actually experiencing problems with sewers, storm water drains and parking in their areas."

P34 – "These results strongly suggest that while residents of infill housing may be experiencing the advantages of such housing (Plew,1999), many neighbours have not yet experienced the potential benefits..."

P35 – "Other aspects ...were also affected...including the ill-defined but very important neighbourhood character which ultimately contributes to the resident's sense of place. "

P41 – "...(infill) can substantially alter the character of the neighbourhood...loss of open spaces and greenery."

P41 – "The Hunn report acknowledges that the highly competitive nature of multi-unit and condominium development had led in some cases to cost cutting that was having a severe adverse effect on building quality."

P42 – "(It is important) to place interpretations of infill housing in the context of New Zealand's urban history where, until recently, successive governments have emphasised the moral and physical benefits of detached "family" homes on sizeable sections."

P43 – "...for many residents, consolidated urban living is not presenting them with any benefits...has had a significant negative impact on their house and section, neighbourhood and even the Garden City image."

"...simply manipulating the built form of urban areas will not necessarily promote a more sustainable city if these socio-cultural aspects of the environment are neglected."

"The careful management of infill housing must be balanced against the provision of a range of housing choices..."