

The Architectural Impact of Urban Intensification

A study of medium density housing in the Auckland region

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Abstract

This thesis explores the challenges faced by architects when designing medium density housing in the Auckland region. It investigates the impact of urban intensification on architecture and the counter-effect of architecture on policies for intensification. The lasting impacts of Auckland's historic urban growth patterns are discussed, and consideration is given to the way in which increasing population and infrastructure pressures caused by low urban density have led to urban designers to seek to consolidate the city, following the principles of 'compact city' planning strategies. In the theories of compact city planning medium housing offers sustainable social, spatial, and technological benefits to future growth. It is argued that architecture can interpret and represent these principles through design prioritised to address the affective dimensions of density, but at the same time needs to focus on the implications of higher density to ensure social continuity and thus acceptance in the community.

The study reviews the history of suburban development and the planning systems that have directed it to discuss how existing planning controls and regulations can be improved upon to increase the quality of housing being produced in Auckland. The conclusion summarises the study with a discussion of the importance of the architect's role in the development of an intensified city form, and the necessity to further educate and support designers with adequate regulations and guides.

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Introduction

Urban development systems in many western societies have adopted concepts of integrated planning over the last 100 years. Changes in urban form have historically been made in response to dissatisfaction with the efficiency and social arrangements of previous practices. In the 19th century, mass industrialisation had created a practice of working class exploitation resulting in much criticism from socialists and urban thinkers, health and education specialists, and from political factions. Evolution of urban forms during the nineteenth century often had little regard for environmental impact. This was particularly true of ‘urban sprawl’ as it became the dominant form of urban development. Recently, sprawl is being viewed with increasing dissatisfaction, particularly as studies exploring the negative social, environmental and economic effects are associated with its form. These concerns coincide with a growing awareness of human impact on the global environment and the responsibility of designers for ‘sustainability’.

The Auckland region has a historic growth pattern of doubling in population approximately every 30 years and there is no reason to believe that growth over the next 30 years will not continue this pattern. With a population expected to reach two million people within the next two decades¹, and with increasing demands on existing infrastructure, high private vehicle dependency and a shortage of available land in the region, urban planners face growth challenges beyond those that can be effectively and sustainably contained within its existing form. As a result, the Auckland Regional Council plans to control urban expansion and aims to house 70% of all population growth over the next 40 years within the existing metropolitan limits.²

Residential intensification contradicts traditional residential design practice which has long been based on privately owned, detached dwellings on ¼ acre sections. As such, intensification faces opposition when

¹ Auckland Regional Council, *Auckland's Growth*, http://www.arc.govt.nz/economy/aucklands-growth/aucklands-growth_home.cfm (accessed September 29, 2010).

² Auckland Regional Council, *Auckland's Growth: Residential Intensification*, <http://www.arc.govt.nz/auckland/aucklands-growth/residential-intensification.cfm> (accessed September 25, 2010).

introduced into existing neighbourhoods with many residents concerned about diminished amenity and perceived effects on property values. Criticism in Auckland over medium density housing is not unsubstantiated, with a negative media focus tending to examine design, construction, technology and sustainability flaws in many built examples around the region. Housing at higher densities is thus conflicted in the public view by both social and technical objections, many of which are justified.

However, three further issues enter the argument at this point. Firstly, a planning strategy adopted and implemented is extremely difficult to reverse, for reasons of equity, economic impacts, and 'work in progress'. Secondly, policies to increase densities to accommodate growth have been put in place after extensive research into alternatives. No other growth strategies have emerged from international experience to suggest that a more compact city form is one of a number of options for this purpose; on the contrary, in comparable cities in Europe, Australia and North America similar strategies have been used to achieve the same sustainable objectives. Thirdly, overseas examples have shown that well planned and designed medium density housing can be highly acceptable and can have a positive impact on the surrounding neighbourhood, in addition to contributing to reductions of the urban environmental impact of growth.

The study reviews historical urban development in the region and compares traditional dwelling forms and medium density housing developments of the future. A methodology for approaching this area of design is proposed. The thesis then explores the impact on architecture of the changes in urban forms, particularly the growing demands placed on designing residential developments at medium densities. It analyses the various social, spatial, technical and sustainable design considerations associated with medium density housing, and their architectural implications. Concepts of density emerge as the primary issue in design, and are identified in discussion of other developments as the catalyst for environmental quality. Current planning regulations are examined, and suggestions for improvements are discussed in conclusions.

History of Urban Growth and Patterns of Ownership in Auckland

The Auckland region is called home by approximately one third of all New Zealanders and is the largest urban district in the country.³ While Auckland's population grew rapidly throughout the 19th century, limited transport options confined much of the early growth to the port settlements of Commercial Bay and Onehunga.⁴ Auckland grew in its early years in a compact manner due to a dependency on the limited range of its transport networks. In 1870, a railway from Onehunga to Helensville was constructed allowing a wider spread of settlements along the line, which eased increasing inner city congestion. The arrival of the electric tramway systems in 1901 serviced the developing suburbs along New North, Dominion, Mt Eden and Manukau Roads, and regular ferry services across Waitemata Harbour encouraged growth on the North Shore.⁵ As growth continued into the 20th century, further public transport networks, mainly using buses, served as the main tool for Auckland's urban development.⁶

However, private transport also expanded rapidly to become the dominant means of moving people and goods. In the period leading up to the Second World War, New Zealand car ownership expanded to become the second highest per capita in the world, behind the United States⁷. This transport system had two distinct effects on Auckland; a steady withdrawal in public transport usage, and a wider area of urban development as private transport made it practical to live a distance from the place of work. It meant that urban development was no longer restricted to railway networks or tram routes. Suburban development also expanded with an increase in state provided housing. A lack of private development during the 1930s and the deteriorating condition of inner

³ Statistics New Zealand, *2006 Census: QuickStats About Auckland Region*, <http://www.stats.govt.nz/Census/2006CensusHomePage/QuickStats/AboutAPlace/> (accessed 22 July, 2010).

⁴ Auckland Regional Council, *A Brief History of Auckland's Urban Form* (2010), <http://www.arc.govt.nz/auckland/built-environment-and-land-use/a-brief-history-of-aucklands-urban-form.cfm> (accessed September 29, 2010), p5.

⁵ Auckland Regional Council, *A Brief History of Auckland's Urban Form* (2010), <http://www.arc.govt.nz/auckland/built-environment-and-land-use/a-brief-history-of-aucklands-urban-form.cfm> (accessed September 29, 2010), p 11.

⁶ Watson, J. *Links: A History of Transport and New Zealand Society*. Wellington: GP Publications (1996).

⁷ G. Bloomfield, "Urban Tramways in New Zealand." *New Zealand Geographer* 31, (1975): p99-123.

city apartments saw the local government invest in housing in an attempt to improve living conditions. These developments particularly took place in Orakei, Meadowbank, Waterview and Mount Roskill, illustrate the preference for single-unit suburban homes, which were considered to be the ideal form of housing for twentieth century families.¹⁰

During the 1950s, major decisions were made regarding Auckland's future development. In the first publication of Auckland's planning documents, the *Outline Development Plan* produced by the Auckland Metropolitan Planning Organisation in 1951, Auckland prepared its commitment towards being a big city. This plan included the development objective of providing several motorways based on typical American models, and the construction of the Auckland Harbour Bridge which provided vehicle only access to the North Shore for development.

*“Such connectedness meant that all sectors of the urban area experienced significant suburban development including Te Atatu, Otara and Manurewa. The rapid expansion of the motorway network, combined with a lack of emphasis placed on public transport, was the beginning of a soon-to-be-dispersed urban area.”*⁸

Auckland's transport orientation was decided, and “the balance between public and private transport was tipped in favour of the car.”⁹ With a 1951 population of 328,479, the *Outline Development Plan* proposed an optimum city size of about 600,000,¹⁰ a population that was reached by 1966. Despite the overloading of the existing infrastructure, growth was normally considered economically positive and encouraged. Concerns over the urban expansion of Auckland were met with plans to limit population growth. Periodically, Wellington's

⁸ Auckland Regional Council, *A Brief History of Auckland's Urban Form* (Auckland: Auckland Regional Council, 2010), <http://www.arc.govt.nz/auckland/built-environment-and-land-use/a-brief-history-of-aucklands-urban-form.cfm> (accessed September 29, 2010), p 15.

⁹ Auckland Regional Growth Forum, *A Place Sought by Many: a brief history of regional planning for Auckland's growth* (Auckland: Auckland Regional Council, 1997), p5.

¹⁰ *ibid.*, p5.

politicians expressed some concern over Auckland's size relative to the capital: New Zealand's largest city - the 'place sought by many' - should not be encouraged to out-weigh the actual centre of national decision-making. In 1951 the concept of an 'urban fence' was discussed, defined as the boundary between rural and potential urban areas. In the 1970s, national concerns over Auckland's population percentage and growth rates, and a heightened awareness of the costs of growth resulted in planning attempts to limit population increases in the region. Limiting migration into Auckland, with labour-intensive industries redirected elsewhere in the country, and increasing emphasis on family planning were considered in the belief that population growth could be restricted. As expressed by the summary study produced by the Auckland Regional Council (ARC) in 1997:

“Optimum city size, population ceilings and probable natural limits to ceiling growth were concepts in early regional strategic plans. Based on almost utopian ideals that rates of growth could be controlled and the population growth would slow once certain undefined natural, economic and social constraints were reached, these concepts were superseded in strategic planning after the late 1970s by more open ended models of growth.”¹¹

Opposition to the growth-curbing ideas proposed that neither large size nor ongoing growth was harmful, as long as it was properly managed and directed; conversely, actual policies that could be effective for growth control in a liberal democracy were not readily discernable.

Earlier stages of intensification in Auckland

Although originally used for staging growth so that infrastructure could be provided efficiently, continual population growth through the 50s and 60s had little regard for the designated metropolitan limit. Intensified housing was encouraged by policy, but poorly designed higher density infill developments built

¹¹ Auckland Regional Growth Forum, *A Place Sought by Many: a brief history of regional planning for Auckland's growth* (Auckland: Auckland Regional Council, 1997), p16.

during the 1960s, including those known as ‘sausage flats’¹², incurred much criticism and produced negative reactions towards residential consolidation. These concerns involved monotony, privacy, parking, noise and general urban degradation including loss of vegetation and amenity.¹³ Despite the public unpopularity of these results of urban intensification, planning policies continued to support the containment of urban growth, attempting to promote more pedestrian traffic and reducing dependence on motor vehicles to enhance the community focus of suburbs.

Until the 1990s, few disputed the negative impacts of urban sprawl, but opposition to intensification again advocated limiting or even negating population growth as a solution. In submissions on the Resource Management Strategy in 1991, several low-growth proposals were dismissed by the ARC (previously the Auckland Regional Authority) who claimed limiting growth would likely harm local economies.¹⁴ In the position taken by the ARC through its growth strategy committee:

*“The current trend in planning policy is to shift the focus away from the issue of city size to managing the effects of growth. As a result, the consistent strategic planning theme since the late 1970s has not been to promote limiting growth, but to focus on the quality, sequencing, and direction of growth – the where and how, not if and when.”*¹⁵

In 1999 the Auckland Regional Council revised the 50 year regional growth strategy which addressed issues relating to the sustainability of the region. Growth projections suggested that Auckland’s population could reach 2,000,000 as early as the year 2036, requiring an additional 300,000 homes in the region. Having previously dismissed the proposal of population limiting, the growth options that remain for the ARC are either

¹² The name ‘sausage flats’ refers to single story flats on cross leased sections with shared driveways, common in the 1960s.

¹³ Joy Grant, Auckland Regional Authority, *Residential Consolidation: Policy implications for the Auckland Region* (1989), p7.

¹⁴ Auckland Regional Growth Forum, *A Place Sought by Many: a brief history of regional planning for Auckland’s growth* (Auckland: Auckland Regional Council, 1997), p17.

¹⁵ Auckland Regional Growth Forum, *A Place Sought by Many: a brief history of regional planning for Auckland’s growth* (Auckland: Auckland Regional Council, 1997), p17.

to entirely relax the boundaries of urban development, or increase the urban density. As outlined in the strategy, the ARC has concluded that a mixture of the two options will best suit Auckland although a greater emphasis is placed on intensification; the long-term plan proposes that 70% of all new residential growth will be within the current urban limits, achieved by infilling, redevelopment and consolidation.¹⁶

Home Ownership in New Zealand

Home ownership has long been an integral part of life for many New Zealanders. Since early immigration by European settlers, housing in New Zealand has offered its owners a way to express individuality and independence. In 1919, the national census indicated that 53% of all homes in New Zealand were owner occupied, in contrast to around 10% of homes in the UK at the same time.¹⁷ The importance placed on property ownership is also echoed in past government initiatives, including the 1950's policy which allowed tenants of state housing to purchase their homes. Believing that private ownership allowed people to experience a greater degree of freedom, financial incentives and publications promoted the benefits of home ownership to the public.¹⁸ High home ownership rates in much of the developed world are an indication of value placed on home and family life, privacy, outdoor space and a separation between home and work. Priority in New Zealand is placed on home ownership in recognition of personal financial success, social independence and individuality. Traditionally stand alone low density housing has been most commonly sought after to represent the average

¹⁶ Auckland Regional Council, *Auckland's Growth: Residential Intensification*, <http://www.arc.govt.nz/auckland/aucklands-growth/residential-intensification.cfm> (accessed September 25, 2010).

¹⁷ Statistics New Zealand, *Housing Profiles: Owner-Occupied Households*, http://www.stats.govt.nz/browse_for_stats/people_and_communities/households/housing-profiles-owner-occupied.aspx, (accessed 20 September, 2010).

¹⁸ New Zealand History Online, *The State steps in (and out)*, <http://www.nzhistory.net.nz/culture/we-call-it-home/the-state-steps-in-and-out>, (accessed 20 September, 2010).

working class family, made particularly popular with the introduction of state housing in the 1930s, characterised by a community and family focus, and high quality of construction. However, private ownership has been promoted as the first preference and state rental housing has constantly been less than 10% of all housing, and is now less than 7%. In recent decades, owner occupier rates have fallen throughout New Zealand from a national average of 73.8% in 1991 to 67.8% in 2001 and 65% in 2004. In Auckland this figure has fallen lower than the nation average with a rate of 59% measured in 2004.¹⁹

Declining home ownership rates are predominantly caused by demographic and social changes. These changes include different relational and family structures from those of previous generations, for example many couples choosing to delay and even forgo marriage. The median age of couples at marriage has steadily risen since the 1970s, increasing from 23.5 for men and 21.2 for women in 1971 to 32.5 for men and 30.2 for women in 2008.²⁰ Rising divorce rates has led to an increase of single parent families, which may have also impacted home ownership rates as households live off lower, single parent incomes.

In the Auckland region, higher than average house prices and a greater proportion of cultural diversity within in the region (whose living habits and home ownership rates may differ) are other causes of decline. Despite these trends, home ownership is still considered an ultimate goal by most New Zealanders. Achieving ownership is commonly viewed with a sense of accomplishment and pride. A 2009 survey asked New Zealanders where they would like to live and showed that 39% of would prefer to live in a suburb, 26% in a rural area, 22% a small town, and only 11% said they would like to live in a city centre.²¹

¹⁹ Housing New Zealand, *Area 3: Homeownership* (2006), <http://www.hnzc.co.nz/hnzc/web/research-&-policy/strategy-publications/nzhs/online-version/area-3---homeownership.htm> (accessed September 30, 2010).

²⁰ Statistics New Zealand, *Demographic Trends: 2009*, http://www.stats.govt.nz/browse_for_stats/population/estimates_and_projections/demographic-trends-2009/chapter3.aspx (accessed 20 September, 2010).

²¹ UMR Research, *Are You Happy Where You Live?* (March 2009).

Methodology and Definitions

The approach to the design project in this thesis is based on two research methodologies, both used to inform the research-by-design process in the project itself. Firstly, a literature review is used to provide a general design platform for the project, by defining criteria for housing at higher than suburban densities. The literature review aims to set out the parameters for housing in the context of smaller, denser layout, noting the significance of density as an influence on social factors such as privacy, identity and social affairs.

Secondly, selected recent examples of MDH are visited to establish, through a critical review, a summary of the problems that such schemes have generated in the widespread public criticism of this housing type. Density is defined as a physical and social factor in MDH, in which comparative levels of development intensity vary from one culture to another. It is argued that the variations of density in several projects in Auckland are part of the problem of public and market dislike for MDH.

Literature sources are referenced in the analysis rather than listed separately. The review of examples is outlined in the section of this thesis sub-titled discussion.

Definitions for Density in Auckland

The benchmark net residential density for suburban housing in New Zealand, measured in dwellings per hectare (dph) is approximately 10-12 units. Comparatively, this figure is lower than early 20thC. inner city suburbs such as Grey Lynn (between 16-20 dph) but is the standard density for suburbs such as New Lynn and others developed between 1925 and 1960; it reflects the '1/4 acre section' or 1,018m² per unit of housing. In more recent suburbs this figure has increased to approximately 15 dph., or about 700m² per section. 'Medium density' is defined in official reports as housing development between 30 and 66 dwellings per hectare, in low

rise buildings with ground level access.²²

For comparisons, it is noted in this study that early 20thC. inner city development in Sydney and Melbourne, using two-storey terraced house types (for instance, Surry Hills, Richmond and Paddington) reached densities of 50-60 dph²³, and average densities in new housing in the UK are between 30 and 45 dph.²⁴ Density is controlled through District Plans in Auckland except on redevelopment sites (known as Business 4 sites), where rules are not applied and on discretionary 'innovative' developments, where density levels are relaxed to allow for higher densities and greater intensification. The site selected for this thesis is a B4 site similar to Ambrico Place (see Figure 1, p 40).

²² Housing New Zealand Corporation, & Architectus.. *Housing Design Guide*. (Wellington: HNZC. 2001)

²³ New South Wales Urban Design Advisory Service. *Residential Densities*. (Sydney: New South Wales Department of Urban Affairs and Planning, 1998).

²⁴ Commission for Architecture and the Built Environment.. *Better Neighbourhoods: Making higher densities work*. (London: author. 2005)

What is Housing?

There are distinct differences between houses and housing. “Houses”, procured individually, are usually designed and planned for the actual occupier of the building, allowing the architect an intimate knowledge of how the house will be used. “Housing” on the other hand is almost always designed with little participation by the future occupiers. Towers describes this distinction as follows:

“Externally the house has to address all directions, making the most of relationships between indoors and outdoors while at the same time creating a visual impact that reflects the prestige of its owner and the aspirations of its designer. What it does not have to do is pay much attention to its neighbours. In the design of housing, on the other hand, neighbourliness is the first principle.”²⁵

As housing always incorporates multiple dwellings on one site, usually connected to each other, a number of relational problems that do not influence the architect’s approach to design in the process of one-off houses must be considered. Privacy issues of sound, visual intrusion, odour transmittance, relationships to services and amenities, quality of private and public space are the principal design issues that determine the success of a housing project.

Housing at higher than suburban densities also introduces a social potential: inhabitants of housing developments live in closer proximity and are thus more likely to interact with their neighbours than if in a stand alone house. Inhabitants should not be forced to relate to each other, but a community focus can be encouraged. Collectively, housing also has the potential to define and organise space. As Towers explains, “... the complexity of housing design lies not in the planning of individual houses, flats and maisonettes, but in the way they interact.”²⁶ These observations refer to a broad recognition in housing literature of the connections between

²⁵ Graham Towers, *Introduction to Urban Housing Design*, (Oxford: Architectural Press, 2005), p1.

²⁶ Graham Towers, *Introduction to Urban Housing Design*, (Oxford: Architectural Press, 2005), p2.

planning at site level and the social objectives of sustainable housing design, reflecting a significant step from socially disconnected suburban housing to more intense development.

The Importance of Medium Density Housing in Urban Intensification

In its historic growth pattern Auckland's population has approximately doubled in each 30 year period since 1881. Even at its current population, Auckland has reached a point where continued lateral expansion can no longer be considered as a viable and sustainable form of growth, leading to current policies to intensify the city's urban form. This intensification is to be achieved by further small-scale infilling, by intensified redevelopment, and by permitting 30% of growth on perimeter sites.²⁷

Infilling, particularly the subdividing the rear of an existing site, has been used commonly over the past few decades as property demand increased. This effectively doubles the density of the site, but infilling predominantly only increases the density and does not address any sustainable outcomes that housing can achieve. Most of this type of development occurs within existing suburbs, with new houses reliant on existing infrastructure. Infill development increases the number of houses in an area, without contributing to a planned development of a community, and spatial relationships with surrounding buildings are often ignored.

There are also significant environmental effects of infill developments. Increased impervious surfaces such as driveways and roofs collect particulate matter from the atmosphere and other pollutants including rubber particles from tyres, spilled oil and antifreeze; instead of being absorbed and broken down in the soil, these pollutants are washed off the surfaces and discharge into the stormwater system, thus requiring filtration and treatment before discharge to the sea.²⁸ In addition, as Syme MacGregor and Mead observe, infilling offers a

²⁷ Auckland Regional Council, *Auckland's Growth: Residential Intensification*, <http://www.arc.govt.nz/auckland/aucklands-growth/residential-intensification.cfm> (accessed September 29, 2010).

²⁸ Lance Frazer, "Paving Paradise: the peril of impervious surfaces," *Environmental Health Perspectives*, June 2005, http://findarticles.com/p/articles/mi_m0CYP/is_7_113/ai_n14924799/, (accessed September 23, 2010).

declining resource for the consolidation strategy, since the 'easy to do' sites are now mostly developed²⁹; the ARC proposal that 20-25% of the city's growth can be accommodated by infilling is thus an ambitious target.

Other areas with growth potential are a limited number of vacant sites within the city limits, and also sites that can be potentially rezoned and redeveloped, for example disused industrial and commercial land, and "loft" apartments, in which existing structures are converted.

Medium density housing is identified by the Regional Growth Strategy as being a major contributor to urban intensification over the next 40 years, with a vision of 30% of the population living in multi unit developments by 2050 compared to 12% in 1996.³⁰ MDH is the most sustainable method of residential intensification, due to the potential for lower car dependency and better access to services and amenities, along with social benefits such as the reestablishment of a community which can encourage increased safety. MDH also addresses an increased demand for smaller houses as the baby-boomer generation retires and younger generations face social and demographic changes. Since the 1950s, there has been a steady decline in the average number of people per household (3.7 people in 1951, 3.0 people in 1981, 2.6 people in 2006)³¹, due to couples delaying or forgoing having children in favour of establishing a working career.

There has been a negative reputation attached to high density housing in New Zealand mainly due to poor local examples, such as multi-unit residential blocks in Auckland which were subject to complaints relating to the 'leaky-building' saga. Seeking to defend its own policies for intensification, the ARC commissioned studies focused on the public response to high density developments. A community survey analysis was completed between 1995 and 2004 in the Auckland Region and commented on in the report, *Social Implications*

²⁹ Catherine Syme, Victoria McGregor and David Mead, *Social Implications of Housing Intensification in the Auckland Region: Analysis and Review of Media Reports, Surveys and Literature* (2005), p26.

³⁰ Auckland Regional Growth Forum, *A Vision for Managing Growth in the Auckland Region: Auckland Regional Growth Strategy, 2050* (Auckland: Auckland Regional Council, 1996), p38.

³¹ Statistics New Zealand, *National Family and Household Projections: 2006 – 2031 update* (July 2010), p7. It is acknowledged that these are nationally-averaged figures, & that Auckland's figures are higher.

of Housing Intensification in the Auckland Region, in 2005. Similar studies have been conducted in Christchurch and Wellington. These surveys found that social issues that respondents thought to be a positive effect of high density developments were: location/accessibility to services, safety and security, community identity and cohesion, and the low-maintenance lifestyle offered by smaller properties. Negative responses focussed on: transmittance of noise, parking facilities, design and amenity, and privacy.

It is notable that each of the most common problems can be solved with an appropriate architectural and planning response. Thus, developments that are perceived as poor can in many instances be attributed to inadequate planning and architecture. This implies that the quality of the architectural response to high density developments is crucial in the success of the community, and the future of urban development in the Auckland region.

Community Cohesion

A good sense of community adds many positive benefits to a development. Research indicates that developments with high levels of social connectedness tend to have higher residential satisfaction than those without.³² Research in London has found that a developed sense of community significantly impacts the success of higher density developments, noting that social interaction increases the likelihood of good communication, improved feelings of safety and security, and tolerance when resolving conflict.³³

Good neighbourly relations is said to be even more important in higher density developments due to the proximity of neighbours. David Helpern states,

³² Hazel Easthope and Sarah Judd, *Living Well in Greater Density* (Sydney: Shelter NSW, 2010), p21-23.

³³ Mulholland Research & Consulting, *Perceptions of Privacy and Density in Housing: Report on Research Findings prepared for the Popular Housing Group* (London: 2003), p17-18.

“If a person is in frequent social contact with his or her neighbours, then the objective quality of the dwelling makes only a small difference to the level of residential satisfaction. If, however, a person (in the same area) is not in frequent social contact with neighbours, then the objective quality of the dwelling makes a very large difference to residential satisfaction.”³⁴

This indicates that people who get on well with their community tend to feel happier with their house or apartment without regard to the visual appeal or physical quality of their home beyond a basic threshold of acceptability.

Whether MDH positively or negatively affects the sense of community is a topic of widespread debate over recent decades. MDH critics claim the close proximity of neighbours in medium density housing schemes increases potentially conflict-causing issues such as noise, parking and maintenance of common public areas, while overcrowding can lead to social exclusion and isolation, and increased transience.³⁵ The ability for communities to socially bond is also very dependant on the people living there. Neighbourhoods that are made up of people of similar age and backgrounds are found to be more likely to establish connectedness than those with a diverse population.³⁶ Lifestyle differences, families with children, older people, and cultural differences are a few of the factors by which problem potential is amplified due to the proximity of neighbours.³⁷

Of course, it is possible for neighbours to live next to each other for a number of years and never really get to know one another. This can be due to a lack of opportunity, but some residents may not desire a high level of connectedness with their community. Due to the social diversity in MDH developments it is most likely that a number of residents enjoy neighbourhood interaction and desire greater participation from the development,

³⁴ David Halpern, *Mental Health and the Built Environment: More Than Bricks and Mortar?*, (London: Taylor and Francis, 1995), p113.

³⁵ Hazel Easthope and Sarah Judd, *Living Well in Greater Density*, (Sydney: Shelter NSW, 2010), p17-20.

³⁶ Mulholland Research & Consulting, *Perceptions of Privacy and Density in Housing: Report on Research Findings prepared for the Popular Housing Group* (London: 2003), p17-18.

³⁷ Hazel Easthope and Sarah Judd, *Living Well in Greater Density* (Sydney: Shelter NSW, 2010), p21-23.

while others are not interested in partaking in community activities and would consider being a good neighbour involves nothing more than courteousness and consideration towards others.³⁸

What MDH does offer is a greater chance for a social interaction due to there being more people in a smaller space, where common areas are frequented by inhabitants. Urban sprawl has often been criticised for social segregation, the weakening of social ties and encouraging inhabitants to spend less time socialising with their neighbours.³⁹ However, the lack of available quality public space in most suburban developments is not an indication that most inhabitants prefer to remain detached from the community, as there are great examples of American suburban community activities such as combined yard sales and block parties. Instead, it means that the cultivation of community is less likely to occur naturally, and more likely born from the inspired efforts of a few individuals. MDH on the other hand is more likely to incorporate shared public space and facilities as an integral part of the development, improving the likelihood of neighbours interacting informally and spontaneously. This concept springs from Jane Jacobs' proposition that a sense of community, and also its actual existence can be enhanced with built forms that increase social interactions.⁴⁰

That planning, spatial arrangements and built forms can encourage social interactions is undeniable, however the impact these interactions have on a 'sense of community' is debatable. Residents surveyed as part of a social analysis of a new urbanist development on Ambrico Place, New Lynn commented that while interactions with neighbours were common, the vast majority of residents said these generally consisted of no more than casual greetings,⁴¹ understood amongst social researchers as the most basic form of relationship.⁴²

³⁸ Hazel Easthope and Sarah Judd, *Living Well in Greater Density* (Sydney: Shelter NSW, 2010), p21.

³⁹ Catherine Syme, Victoria McGregor and David Mead, *Social Implications of Housing Intensification in the Auckland Region: Analysis and Review of Media Reports, Surveys and Literature* (2005), p26.

⁴⁰ Jacobs, J.. *The Death and Life of Great American Cities*. New York, USA.: Random House (1961).

⁴¹ Jennifer Dixon and Ann Dupuis, "Urban Intensification in Auckland, New Zealand: A Challenge for New Urbanism," *Housing Studies* 18, no.3 (May 2003): p362-363.

⁴² Stone, W., & Hulse, K.. *Housing and Social Cohesion: an empirical exploration*. (AHURI: Australian Housing and Urban Research Institute Swinburne-Monash Research Centre 2007).

This was discussed as not having a major impact on the strength of the community, despite 78% of survey respondents claiming they placed importance on being part of a community.

Any design move that has the potential to increase positive social interactions should be encouraged in an effort to enhance residential satisfaction which contributes directly to the success of the scheme. Design intents are often seen in the form of a community activity spot such as a swimming pool, gym or recreational hall. Such facilities, however, should only be developed in response to existing local demand. Communal facilities that require active participation also only target those prepared to use them and offer nothing to others, which can lead to exclusion of some inhabitants. Better design solutions include passive facilities which can be appreciated by all residents, and allow anonymity or interaction as desired.

Safety and Security

In MDH, safety and security are often considered by residents to be positives of such developments, particularly in those with an established sense of community. However, in many parts of Auckland crime and theft are always concerns and much can be achieved in housing design to help reinforce resident's safety and security through passive design techniques known as Crime Prevention through Environmental Design (CPTED).⁴³ CPTED focuses on evaluating spaces using the Three-D's approach: designation, definition and design. Designation refers to establishing a clear purpose and intent for a space and being aware of how surrounding forms can reinforce that purpose. Definition refers to how the borders of a space are established, along with who has clear ownership of the space and how well the purpose of the space is defined. The design of the space should always support and encourage the desired behaviours.

⁴³ Wendy Sarkissian and others, "What is Crime Prevention Through Environmental Design?", (2002), in *Social Issues and Trends Associated with Medium- to High-Density Urban Living: Final Report For the Land Management Corporation*, by Sarkissian Associates Planners (2004), <http://www.sarkissian.com.au/downloads/> (accessed September 25, 2010), p118-122.

Of particular use to MDH are design outcomes which target opportunistic crime. Territoriality is a concept by which spaces are designed with clear delineation of private, communal and public use. Spatial definition can be achieved through separation such as fencing, hedges and walls, changes in texture such as paving and landscaping and its location. A space that is clearly defined helps inhabitants develop ownership, along with a desire to protect what is yours and respect for what is someone else's. Well defined spaces and ownership also make it easier to identify strangers and possible intruders.

Natural surveillance is one of the simpler CPTED design techniques and involved creating environments where occupants are able to observe what is going on around them. Usually, criminals do not wish to be seen as they go about their deeds; thus, forming sight lines around the site and planning into the site layout overlooking opportunities such as from a kitchen window provide deterrence. Particular attention should be paid towards how residents go about their day to day activities, and how the location of those activities can be used to increase surveillance. Locations of clothes lines, rubbish bins, car parking, entrances and exits all offer opportunities for observation of the neighbourhood. Minimum levels of lighting should be established along all communal and public areas at night to promote a safe environment.

Access control aims at restricting or preventing intruder access to a development. This can be by use of physical restrictors such as fences and gates, or by security hardware such as locks and alarms. Landscaping and fences can also be used to direct public traffic away from unobserved areas. Gated communities offer a degree of security to a community, and are becoming reasonably popular. However there are a number of concerns regarding the degree to which they achieve their objectives, as well as their social influences on the neighbourhood.⁴⁴ Gated communities appear secure to residents, who may develop a false sense of security, even lapsing in the protection of their homes and property by relying too heavily on the gate. Of greater concern

⁴⁴ Wendy Sarkissian and others, "What is Crime Prevention Through Environmental Design?", (2002), in *Social Issues and Trends Associated with Medium- to High-Density Urban Living: Final Report For the Land Management Corporation*, by Sarkissian Associates Planners (2004), <http://www.sarkissian.com.au/downloads/> (accessed September 25, 2010), p48-49.

though is the likelihood for the physical barrier separating residents from the wider community to cause increased isolation and social exclusion. The inward-focused nature of a gated development detracts from the spirit of community both inside and outside the fence, and this form of development, while contributing to intensification, may be more focussed on protecting property values than on encouraging community development.

Identity

Houses offer their owners one of the best ways to express individuality. The ability to personalise one's home is a declaration of ownership, encouraging an attachment to the building which reciprocates in residential satisfaction and better care been taken of the property, and a greater likelihood of long-term stay. Typically, housing developments haven't offered residents much opportunity to express their individuality, with building forms instead often consisting of expressionless mono-faceted facades and rhythmic similarity. It is important that the architecture of housing should encourage personalisation, while not relying on an expressive individualistic architectural form which can detract from the cohesiveness of the development. Similarly, the architecture should not have to rely solely on the residents to distinguish individuality. Housing should remain true to its architectural form, but not attempt to smother residents' creativity, the usual result of which tends to be 'un-architectural' additions such as superficial awnings, screens, colour changes, etc. Successful housing architecture accomplishes three elements of identity: 1) individual units are distinguishable within the main form of the development, 2) units avoid monotonous repetition and include some variation in form and 3) allowances are made for residents to further express their individuality if desired.

The distinguishing of individual units, particularly when housing is arranged in large blocks such as

apartments or terraces, is an appropriate formal definition of identity as it breaks down the overall form of the development into recognisable, identifiable portions. This definition allows residents to feel as though their unit is an important part of the larger building, and provides a degree of separation between units which helps designate ownership. Units can be distinguished by as much as full formal separations, or as simple as the definition of each entry door, chimney or pitched roof which, although minor, still helps observers to gain an understanding of where one unit starts and ends.

Variations along extended facade lengths are a vital step for the architecture to encourage individuality. Alterations to colour, material finishes, window positions, roof forms, etc are minor effects which play a big role in diversifying the form of the building and invite further personal expression from the occupier. Variations can also be non-rigid solutions such as moveable shutters, or folding screens which offer a more passive approach.

Finally, inhabitants will continue to express their individuality and ownership over a property, even if it is built distinctively from its surroundings (as done in typical low density suburbs). Upon visiting any housing scheme around Auckland, these expressions can be readily seen as residents look to define ownership and establish their territory. This often takes the form of personal landscaping, signs, ornaments, furniture, etc and is common when the architecture offers no formal distinction between units. Auckland's suburban housing tradition has a long history of home-made 'DIY' interventions. To continue this habit, the design of private areas in higher density development needs to ensure that individuality can be expressed as much as possible. Front garden spaces and entrance foyers offer a good area for residents to define themselves, as well as to bring guests through a transitional space into their homes.

Privacy

Good privacy in higher density developments is crucial to the success of the scheme and has a major impact on the levels of residential satisfaction. In MDH, indoor and outdoor space can be divided into three main categories: private space (the house and private outdoor living areas), communal space (shared driveways, courtyards, etc) and public space (parks, amenities, roads).⁴⁵ Within each category, some spaces are required to be more private than others; for example, bathrooms are more private spaces than dining rooms which are more private than balconies. Other spaces are transitional such as a front garden leading towards the entry and the degree of required privacy varies. The most common concerns with privacy relate to sound transmittance and visual privacy, looking in and looking out.⁴⁶

Sound is one of the most contentious areas of privacy and as research indicates is one of the highest areas of concern and most common privacy problem between neighbours and can result in conflict.⁴⁷ Obviously, the main issue with sound is having it pass through inter-tenancy walls and invading the privacy of the neighbours. Alternatively, sound transfer issues can also affect the other party whose normal activities may be interrupted due to the perceived risk of being overheard.

The New Zealand Building Code has nominated minimum levels of noise insulation between inter-tenancy walls and floors⁴⁸. Some infrequent low-level noise from neighbours is usually considered tolerable by most neighbours and even appreciated by some who enjoy the minor level of connectedness and security knowing someone is next door offers.⁴⁹ Aside from the sound insulation ratings of external and party walls,

⁴⁵ Mulholland Research & Consulting, *Perceptions of Privacy and Density in Housing: Report on Research Findings prepared for the Popular Housing Group* (London: 2003), p6.

⁴⁶ Mulholland Research & Consulting, *Perceptions of Privacy and Density in Housing: Report on Research Findings prepared for the Popular Housing Group* (London: 2003), p7.

⁴⁷ Hazel Easthope and Sarah Judd, *Living Well in Greater Density* (Sydney: Shelter NSW, 2010), p17-20.

⁴⁸ New Zealand Building Code clause G6/VM1 lists a minimum sound transmittance (STR) rating of 55 is outlined for inter-tenancy walls, floors and ceilings. *Gib Noise Control Systems* (2006), by Winstone Wallboards estimates that in today's modern environment, noise tolerances are much lower and that only 50% of residents would be satisfied with a STC 55 rating. They suggest a superior minimum of STC 65 to ensure that neighbours would be seldom disturbed by noise.

⁴⁹ Healy, E., & Birrell, B.. *Housing and Community in the compact city* (No. 89). (AHURI: Australian Housing and Urban Research Institute Swinburne-Monash Research Centre, 2006).

successful sound insulation can also be employed by building layout and spatial arrangement. High noise areas such as living areas should remain grouped together and separated from neighbours and other low noise areas such as sleeping quarters using buffers formed by service areas and hallways.⁵⁰

Privacy invasion caused by sight relates to bad planning allowing for both looking out of a residence and looking into it. Commonly, visual privacy is weakened by the size and location of windows. Large windows are usually included into a design for aesthetic purposes, or functional purposes such as natural lighting and capturing a view. The importance of privacy however tends to outweigh any aesthetic or functional purpose of windows however, often resulting in residents forced to draw blinds. Windows should always be positioned in a way that allows maximum outlook and functionality while minimising the ability to look inward. Ideally, this would be achieved by use of horizontal separation between conflicting spaces and buffer zones such as landscaping, fences, screens, balustrades, etc.

Visual privacy is most commonly achieved through minimum separation distances to public and/or other habitable spaces. Due to a near complete lack of planning documents in New Zealand regulating the effects of privacy and overlooking, much has been left up to the common sense of the designer in the past, more often than not with terrible results. It is not uncommon to see developments in Auckland with units a stones throw apart and large windows directly opposed to each other. Levitt's UK research however, claims that it is the overlooking and relationships between spaces rather than physical separation that has a greater negative impact on visual privacy. Levitt states that all perceptions of privacy are relevant and the idea of adequacy varies between individuals.⁵¹ His research has shown that residents of a MDH community are likely to accept less horizontal separation than their suburban counterparts, providing adequate overlooking protection is in place. It is Levitt's suggestion that the ideal form of privacy is one that is responsive to the desires of the resident and is

⁵⁰ North Shore City Council, *Good Solutions Guide for Apartments* (Auckland: North Shore City Council, 2006), <http://www.northshorecity.govt.nz/YourCouncil/Planning/UrbanDesign/Pages/UrbanDesignApartmentDevelopments.aspx> (accessed September 25, 2010), p81-83.

⁵¹ David Levitt, *Housing Design Handbook: A Guide to Good Practice* (New York: Taylor and Francis, 2010), p138-141.

controlled by the user. The control of overlooking can be achieved through defining the space each window on a facade is associated to and pairing compatible outlooks to suit. For example, kitchens and bedrooms facilitate two different kinds of activities and are both used relatively rarely and typically at different times. Therefore, a kitchen and bathroom window facing each other could be achieved with less physical separation than a living room and a bedroom.

Spatial Size and Arrangement

Quantity, quality and design of private spaces associated with a single dwelling are among some of the leading causes of residential conflict and dissatisfaction in MDH.⁵² Minimum space dimensions and guidelines tend to be aimed towards developments at the lower end of the market, typically what is known as affordable housing. At the upper end, residential units typically contain spaces in excess of what is required as a means of conveying luxury. Given the opportunity, most people will purchase as much space as they can afford for increased comfort. This relates to research which shows that Australians are buying bigger homes than they need, due to factors such as working from home, and a desire for personal space, and other modern life requirements.⁵³ However, just because the overall floor space of a unit is kept to a minimum is no indication of how well the internal layouts are designed. A low amount of floor space does imply that a unit has to be well designed in order to maximise the use of the space, particularly by limiting circulation space. Successful internal layout designs always involve a detailed understanding of the designated activities, combined with activity, furniture and circulation space requirements.

⁵² Hazel Easthope and Sarah Judd, *Living Well in Greater Density* (Sydney: Shelter NSW, 2010), p41.

⁵³ Wendy Sarkissian and others, "What is Crime Prevention Through Environmental Design?", (2002), in *Social Issues and Trends Associated with Medium- to High-Density Urban Living: Final Report For the Land Management Corporation*, by Sarkissian Associates Planners (2004), <http://www.sarkissian.com.au/downloads/> (accessed September 25, 2010), p51.

In 2005, the Auckland City Council deemed it necessary to pass a modification to the district plan with detailed minimum spatial areas for apartments after a series of unrealistically small units in Auckland's CBD attracted heavy criticism.⁵⁴ These standards were an attempt to regain some degree of liveability in apartments by offering precise minimum floor areas for all rooms in new apartments along with fresh air, daylight and ceiling height requirements. Such standards of quality were necessary at the time, and although not offering any suggestions for spatial planning (arguably more important in determining the success of a residential unit), the modification did present the council's desire to raise the quality of its built environment. There are no such standards governing MDH. This has led to many developments containing spaces insufficient for the activity requirements, as well as such aberrations as internal bedroom spaces. A common complaint in the design of medium density housing is the lack of storage: storage considerations should include both indoor and outdoor facilities as part of an effort to increase general liveability and residential satisfaction. Internal storage areas should allow for a minimum space large enough to store linen, cleaning equipment and seasonal appliances such as heaters or fans.

MDH usually offers residents the opportunity to decrease their dependence on vehicle transport by way of proximity to public systems and a greater focus on pedestrian and cycle access. Private storage for bicycles and other bulky equipment are an excellent addition to units, however their location, access and security often problematic. Independent lockable storage areas in carpark areas are common solution, but can be susceptible to vandalism and theft and tend to be unsightly even for a carpark. A good solution is to group several storage areas together into one space with direct access for owners provided from the carpark area. This increases the opportunity for passive surveillance around the area and provides more options for an aesthetically pleasing result.

⁵⁴ Auckland City Council, "District Plan – Central Area Section – Operative 2004, Appendix 12: Minimum Residential Apartment Standards"

Despite the many adequate guides available to designers depicting quality space sizes and layouts, MDH often is criticised by its inhabitants for poor design and/or a lack of space. Kitchens, laundries, bathrooms and storage spaces are most often the least likely to meet daily usage requirements. Laundries in particular are often nothing more than a cupboard with just enough space to house the equipment, and often located at some point along a narrow hallway indicating that not enough thought has gone into how the user can complete the activity in that space. Spatial planning of housing tends to be more problematic than houses due to typically smaller spaces, and the speculative designing forced by not knowing who the inhabitant will be. This requires the designer to generalise and make assumptions about the average resident's needs.

Private Outdoor Space

Private outdoor space for developments of such high densities presents a number of challenges to designers.⁵⁵ Virtually all residents are likely to desire some form of outdoor space. The type and amount of private outdoor space required varies according to the user, as does the degree of privacy required. Families that include young children are more likely to require larger areas of open grass to enjoy, while a working couple may only require a barbeque space, and an elderly resident may need an easily maintained space to sit and watch their surroundings, gaining connectedness. Some design considerations for private outdoor space are as follows:

- the form must be a usable extension of the living area,
- secondary access for maintenance and care, i.e. not through the house,
- use of the space may vary from child's play to clothes drying,
- designed so that a lack of maintenance will not negatively impact on a neighbour's views.

⁵⁵ David Levitt, *Housing Design Handbook: A Guide to Good Practice* (New York: Taylor and Francis, 2010), p97.

Front gardens are not purely private, but something more of a transitional space providing a privacy buffer between the private and public activities.⁵⁶ One typical layout consists of planting in front of the unit, with a path leading to the front door and at lower points on the medium density scale a parking space to one side. With no substantial territorial definition this form relies mainly on horizontal separation and setback from a public area. Very little emphasis is necessary to reinforce the entry, and with no clear ownership attached to the space, less care is often shown towards the garden. An alternative layout separates the private and public spaces with a physical barrier so ownership and responsibility for the care of the space is clearly defined. This approach improves privacy and security for the unit, but if the buffer becomes too excluding, the defined separation has the potential to reduce natural surveillance of the rest of the development.

Rear gardens are traditionally considered and provided as private spaces, offering an opportunity for owners to express their individual tastes. Paved patios enhance the indoor-outdoor transition, particularly when linked to indoor living areas. Unless the rear garden is of a size that the external storage area can be incorporated, access for maintenance should be provided by way of an internally accessed gate or similar. Access through the house can be acceptable if the rear garden is small and designed for low maintenance, such as a paved patio.

While access to private outdoor space from upper level housing units is usually diminished (or occasionally not provided at all), connection to the outside is just as important as on the ground floor levels. The depth of balconies has a major impact of the usability of the space. Balconies to a 2-3 bedroom unit should be able to comfortably fit a dining table and 4 chairs, along with a barbeque, in order to encourage maximum use of the space. Access should be from the indoor living area, and semi-recessed balconies should be used where possible as they provide better privacy and protection from the elements.

⁵⁶ David Levitt, *Housing Design Handbook: A Guide to Good Practice* (New York: Taylor and Francis, 2010), p97-98.

Shared Outdoor Space and Parking

Some form of common outdoor space is included in all higher density developments. This includes parking areas, footpaths, rubbish collection areas, entrances, grouped mailboxes, and shared outdoor space. Shared outdoor space refers to areas specifically designed for outdoor activities, and is designed in two distinct forms; communal space such as a shared garden, courtyard or park for use by the residents only, and public space which is open to anyone. Well designed outdoor communal areas encourage greater physical activity, increases opportunity for social interaction and positively impacts residential satisfaction. Research indicates that developments with good communal areas, particularly those that can be used for entertaining usually generate higher levels of social interaction and a stronger sense of community.⁵⁷

Due to overwhelming vehicle dominance in most of Auckland's MDH, quality, usable communal outdoor space is rare. In some cases, it is acceptable to forgo supplying shared outdoor space within the development if it is adjacent and well connected to a shared public space. Most as built examples, however, show a greater preference to provide physical separation for security than encourage residents to make use of the outdoor space. Minimum sizes of shared space is sometimes regulated by local authorities, however as Levitt mentions such requirements can lead to designers a 'tick the box' approach instead of focusing on quality planning and arrangement.⁵⁸

Outdoor activities and the desired use of communal space varies between residents which can result in conflicts. Family households need somewhere for children to play together in a space that can be easily monitored and which may include a playground. Younger singles and couples may prefer an outdoor space that can be used for weekend socialising and entertaining, while older residents often desire a quiet space for

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Hazel Easthope and Sarah Judd, *Living Well in Greater Density* (Sydney: Shelter NSW, 2010), p29.

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David Levitt, *Housing Design Handbook: A Guide to Good Practice* (New York: Taylor and Francis, 2010), p110-111.

walking, sitting and socialising.⁵⁹ Generally, conflicting activities can be avoided by providing separate spaces focussed on different user groups. It is essential that common outdoor areas are designed in such a manner that the intended activity is easily identifiable. This helps the target group of residents establish a degree of ownership over the space leading to better care. In smaller developments where outdoor space is a premium, separation of spaces may not be possible however facilities for entertaining, quiet socialising, dog walking and children play areas should all be provided.

Vehicle Access and Parking

Vehicle dependency in Auckland is a well recognised problem. In principle, MDH is intended to increase the potential for increased public and alternative transport usage, especially when located next to or near public transport corridors. Higher density developments also tend to be located closer to amenities than typical suburban neighbourhoods meaning that walking and cycling become more viable options for short trips. However, Auckland's public transport system is not established enough to provide most residents with the option of being car-free. Some developments attempt to restrict vehicle use by providing limited parking, but this tends not to be a popular solution with residents.⁶⁰ Private ownership of a vehicle is a socially liberating fact of twenty-first century living. Use of public transport is encouraged by higher density housing, but vehicle access and parking should still be addressed on site.

The storage of private vehicles in an aesthetically pleasing way, while addressing concerns such as security and access, is particularly problematic in MDH where available space is limited. Built-in garages are a common feature in housing, and although favoured by residents, rows of internal garages are most often

⁵⁹ Judd, B. *Designed for Urban Living: Recent Medium Density Group Housing in Australia*. (Canberra: The Royal Australian Institute of Architects, 1993).

⁶⁰ Hazel Easthope and Sarah Judd, *Living Well in Greater Density* (Sydney: Shelter NSW, 2010), p17-20.

recognised for their ability to destroy a streetscape and diminish the relationship between residents and the street. Internal garages are used to store everything except private vehicles, resulting in most cases with cars being parked in front of the garage and often over footpaths. Despite the prejudice, garages are able to successfully compliment housing, particularly in lower density developments and where the visual impacts are reduced by either being set back or set down from the street.⁶¹

Several forms of outdoor parking are also used in MDH with varying degrees of success and visual appeal. On street parking, off street parking and parking courts are all common forms of vehicle storage, however they tend to be unsightly and overly pronounce the communities vehicle dependence. Development density dictates the parking strategy in most instances: at higher densities, and typically for larger developments, underground parking becomes a viable solution. Historically, underground parking has negatively been associated with burglary, loitering and other undesirable behaviours due to poor security and monitoring. The success of underground parking depends largely on the control of vehicle and pedestrian accessibility, surveillance monitoring and security systems. Being underground, natural light and ventilation can improve the quality of the space.

Environmental Sustainability

Of the many aspects of sustainable design, environmental sustainability has received the most attention as the impact of human occupation, population growth and industrialisation on the planet becomes clearer. Environmentally sustainable design techniques, theories and practices act together in an attempt to build responsibility and protect the future health of the planet. Conservation of resources by designing energy efficient buildings is one of the most common, and easy methods of reducing the environmental impact a development

⁶¹ North Shore City Council, *Good Solutions Guide for Medium Density Housing* (2007), p9-12.

has. Much of energy efficient design is based of passive design principles making them relatively easy to accomplish, leaving few excuses to not design in a sustainable manner.

Building orientation is best directed for optimum solar access, typically either with a north facing aspect which makes use of the midday sun, or an east-west aspect which provides dual aspect apartments with natural light throughout the day. Good solar access helps reduce heating costs and also minimises dark, undesirable rooms. Horizontal separation between neighbouring and adjacent buildings should be proportionate to their height to prevent shadowing.⁶² Despite the benefits, Levitt warns against designers being too uncompromising in the pursuit of solar gain, at the cost of other design considerations such as relationships to the street and outdoor spaces.⁶³ Frey notes that solar orientation becomes increasingly difficult as densities rise.⁶⁴ While an important part of sustainable design, optimised solar orientation should only be used in conjunction with other design considerations when determining site layout.

Developments of higher density design tend to have large expanses of roofs, driveways, roads, parking courtyards and other impermeable surfaces. High volumes of excess stormwater can place heavy loads on existing infrastructure, and increase the amount of pollutants discharged into the stormwater system. Control of stormwater runoff should maximise the amount of stormwater that can be retained and disposed of on site and is recognised as having the potential to significantly reduce the environmental impact of the development. Good stormwater management practices include minimising impermeable areas, water retention for possible reuse such as irrigation, flow control of stormwater with vegetated flow paths and collection areas, and green roofs.⁶⁵

⁶² North Shore City Council, *Good Solutions Guide for Apartments* (Auckland: North Shore City Council, 2006), <http://www.northshorecity.govt.nz/YourCouncil/Planning/UrbanDesign/Pages/UrbanDesignApartmentDevelopments.aspx> (accessed September 25, 2010), p14-16.

⁶³ David Levitt, *Housing Design Handbook: A Guide to Good Practice* (New York: Taylor and Francis, 2010), p204-205.

⁶⁴ Frey, H. *Designing the City: Towards a More Sustainable Urban Form*. (London: Spon Press, 1999).

⁶⁵ North Shore City Council, *Good Solutions Guide for Apartments* (Auckland: North Shore City Council, 2006), <http://www.northshorecity.govt.nz/YourCouncil/Planning/UrbanDesign/Pages/UrbanDesignApartmentDevelopments.aspx> (accessed September 25, 2010), p40-41.

Planting on roofs is an ancient building technique, but with few applications in New Zealand's house building tradition. Continual research and development over the last 50 years has evolved the technology into a popular addition to the sustainable design movement, usually known as a 'green roof'. The primary benefit of the green roof is the reduction in impermeable surfaces and stormwater collection. All forms of green roofs fall into one of two categories which designate the structural, planting, accessibility and maintenance requirements of the roof. 'Extensive' roofs generally comprise of low level planting, low maintenance, non-accessibility, and pitches of up to 30°. 'Intensive' roofs provide roof gardens and typically comprise of larger scale planting, higher maintenance and flat roofs forms, although they are also usually designed for recreational activities. Although high in initial cost, the potential for future savings in addition to the significant environmental benefits suggest that green roofs should be considered for MDH developments.

Urban Sustainability

The success of a medium density housing development cannot be judged until it is proven to be valued by the community, both through social activity, and in respect earned in the housing market. Establishing a place that is valued by both residents and the surrounding community takes time and can only occur once a sense of belonging and attachment has grown. Thus, if a development is to be properly established in the long term, the durability of all aspects of the project must be a consideration for design. As Levitt notes,

“Architects tend to build reputations on recent achievements, publishing their latest built schemes. However, in terms of creating a lasting sense of place there is much to be learned from a close and often painful scrutiny of what has undergone the test of time.”⁶⁶

⁶⁶ David Levitt, *Housing Design Handbook: A Guide to Good Practice* (New York: Taylor and Francis, 2010), p4.

Contemporary standards of construction, however, appear to be opposed to notions of long-term durability. The life of any modern dwelling is established as 50 years from the point of conception; after 50 years the material life of the buildings is considered to be irrelevant. Popular housing schemes overseas have shown, however, that the sense of value often extends well past this point. If the sustainability of the neighbourhood is to be valued, long term success needs to be planned for by the use of higher standards of construction. An example of durable building is provided by the recent redevelopment of the state housing corporation's Star blocks, where apartments, once regarded as the worst housing alternative in the city are now being restored; their original robust construction is an important element of their revival and their popularity in the housing market.

A sense of community is one of the strongest influences on the association of value to residential space. As discussed previously, few researchers have been able to positively relate architectural design to the strength of a community in New Zealand social studies. However, as Stone and Hulse suggest friendly, safe and shared circulation between private and public spaces can increase residential interactions and help people feel more connected.⁶⁷ Greater consideration should be made for pedestrian access and travel, and less importance focused on vehicles as they tend to compete for, and may visually dominate space in MDH.

The lifespan of 50 years for housing is given as a timeframe for the durability of the materials used in construction. To increase longevity, more durable materials, designs and details should be established. Finally, the form and material palette of the building should reflect consideration for how the building will age, both in terms of weathering and appropriateness of visual style. A building which matures over its lifetime improves the sense of place, particularly for those that witness the change through continued residential occupation.

⁶⁷ Stone, W., & Hulse, K.. *Housing and Social Cohesion: an empirical exploration*. (AHURI: Australian Housing and Urban Research Institute Swinburne-Monash Research Centre 2007).

Analysis of Current Planning Documents

Residential intensification is being implemented in the Auckland region as a response to issues of suburban sprawl and its impact on sustainable communities, existing infrastructure and vehicle dependence in the region. The New Zealand Urban Design Protocol states:

*"Although there is strong evidence about some of the benefits inherent in high urban density, it is clear that density alone does not deliver benefits unless other important design issues are addressed too. Successful intensification and higher density in cities requires good design that also meets other needs – for instance, adequate open space and pedestrian friendly streets."*⁶⁸

Currently, there are very limited local and national planning regulations for higher density developments. This means that all forms of housing are mostly assessed for compliance against rules designed for individual homes. There are a number of problems with this approach, including the entrenched system in which building consents are assessed and granted on a house by house basis rather than as an entire project. This results in large amounts of wasted time and resources. Standards covering structure and technology are also the same as used for stand-alone dwellings, despite the construction of a housing project at higher density usually being more akin to a commercial building than a residential one.

Of the most concern is the lack planning regulations that govern privacy, visual form and spatial sizes and orientation. Having standards to govern these design problems is not an ideal situation as designers tend to aim for the minimum if anything is specified. Quality controls such as these, if applied 20 years ago, would have had a big impact in reducing the amount of poor quality developments that have harmed the reputation of medium density housing. What has been provided by local councils around the Auckland region are good

⁶⁸ New Zealand Urban Design Protocol, *Summary of the Value of Urban Design* (Wellington: Ministry for the Environment, 2005), p12.

planning and design guidelines which have been freely available for a number of years. Unfortunately, as built evidence indicates, these guidelines are largely misinterpreted, or ignored in the development process. As Auckland attempts to realise its vision of up to 30% of residents living in well planned medium density communities, these guidelines need to be adapted into actual planning regulations in order to maintain quality of life standards comparable to those overseas.

The Department of Building and Housing has only very recently begun to recognise the need greater planning control.⁶⁹ Suggestions for ways to improve planning legislation are as follows:

1. The New Zealand Building Code, clause G6 *Airborne and Impact Sound* should be updated to increase the minimum requirements of sound transmittance ratings between habitable spaces to that more in line with the recommendations made by Winstone Wallboards.
2. Changes to the New Zealand Building Code to implement housing design and planning regulations (complimenting the current guidelines), based on Australian and other overseas current documents. Particular attention should be paid to minimum space sizes, horizontal separation between private spaces and visual/audio privacy.
3. Extensive support and education provided to architects and designers to raise awareness of the challenges involved in MDH, and the best ways to solve them.
4. Involve more specialised input into the assessment of large housing schemes, for example urban planners and development specialists.

⁶⁹ Department of Building and Housing, *Proposed Acceptable Solution for Medium Density Housing (Protection from Fire and Noise)* (Wellington: DBH, 2010), <http://www.dbh.govt.nz/UserFiles/File/Consulting/> (accessed September 25, 2010).

Discussion and Design Brief

The analysis above has combined an outline of the primary design criteria for medium density housing with discussion of social functions, to suggest that a focus on social aspects of density is necessary. Thus, privacy, identity, and security are prominent in the analysis, alongside the physical-spatial design issues of parking, external private and public space, and the need to recognise the realities of community. Social habits formed through generations of living at low density in the suburban developments typical of New Zealand's cities are transformed by the compromises that occur; for the architecture of housing, design decisions become choices between several competing and equally desirable features. Compromises introduced by smaller external spaces affect social relationships as well as domestic functions such as refuse storage and disposal, washing and drying, children's play space, the keeping of pets, car maintenance, and habits formed around house maintenance and alteration. They form a part of the amenity values attached to customary concepts of what constitutes a New Zealand 'house'.

For architects these compromises become increasingly difficult to manipulate as density rises, and some levels of amenity that are assumed in housing environments are seen to decline, or to become inaccessible. Density affects these design choices by observed "steps" on the density scale which relate to variations in parking arrangements and house types.

The steps in density are illustrated by the variations between the 8 developments within the Ambrico Place housing project which is located in New Lynn on the same block as the site chosen for this thesis, and built between 1997 and 2001 (Fig. 1). Ambrico Place was also initiated by Waitakere City Council's desire to direct higher densities in housing developments close to local centres and transport hubs.



Figure 1: recent medium density housing in New Lynn and site for design project.
(Google Earth image; accessed 22/2/11).

All units are variations of terraced house types in two and three-storeys, and in three variations of parking arrangements: (1) integral with the unit, (2) separated from the unit on common roadway space and (3) integral with the unit in the 3 storey house type. Densities that relate to these layout variations step up from 40-45 dph (1), to 60-65 dph (2), and to 75-85 dph (3).

The largest single parcel at Ambrico Place is the new urbanist-styled “Tuscany Towers” site of 97 units, the majority in two-storey front-access terraces with integral garages for one car developed at a density of 42

dph. [see figure 2: site marked A] At this density all units have direct attached car access, small front and rear gardens, and minimum 12.0m distances between habitable rooms in different titles. The layout has full service access for refuse and emergency vehicles, and has shared public open spaces in the form of tennis courts, small park spaces, and a landscaped footpath system within the site. Sites B, and C are other two-storey terraced developments on the Ambrico Place project, with similar densities of 40-44dph., but omit front gardens to increase vehicular manoeuvring areas on the access/public side of the unit. The result is a less pedestrian-friendly environment with less similarity to the low-density suburban model.



Figure 2: Ambrico Place, New Lynn: housing sites + density analysis.

(Google Earth image accessed 22/2/11).

Sites marked D are three-storey terraced houses at densities between 70dph and 85dph. In these parcels garages occupy the ground floor, with living rooms at first floor level, all with balconies providing external space rather than ground level gardens. At street level the residential environment is dominated by garage doors, bins, and paving, with occasional areas of planting to off-set the hard surfaces of roads and parking spaces. The layouts do not provide for public open space within the sites, or for service access: refuse is wheeled out to the individual site entrance for collections. First floor balconies overlook neighbours ground level patios, and each other. The higher density achieved with this parking strategy imposes a reduced level of residential amenity, and a minimal sense of community.

A third parking variation is shown on the two-storey terraced housing on site E, where garages are not provided, but cars are stored in front of the unit in open semi-public space adjoining the access road. Density is approximately 85 dph. Service access and public spaces are not included, but units have small private rear gardens accessed through the house. The car parking dominates the public side of the terrace and blocks views out of the ground floor living rooms. The environment produced resembles a shopping mall car park, without offering secure car parking or private external service or storage amenity. Other recent developments in the district using this layout type are Soljak Place, Mt. Albert, and Holly Street, Avondale, where densities of 60-65 dph are achieved.

Placing cars in underground parking garages is a solution to the otherwise car-intense environments seen in these schemes in Auckland, and is commonly adopted in MDH overseas, for instance, Sydney and Melbourne, and in larger European cities. Underground garages fully separate the car from the house, and illustrate a further step in a density gradient related to parking and access convenience, or amenity. However, this solution provides complete security for the car, and can usually be combined with external storage to extend

the function of the garage for domestic uses (workshop, machinery, small boats, bikes, large toys, spare furniture, and so on). The expense of construction militates against underground garaging at lower densities, except in high-value projects, such as the Beaumont Quarter development in Victoria Park, Auckland. Sydney, however, has numerous examples of this layout type, at various levels of property values, where development densities rise above about 65 dph.

The brief developed for the design project therefore proposes to include underground parking to improve the residential environment. Similar to Beaumont Quarter, the site density needs to be at least 65dph to justify this expense of construction, meaning that the total housing accommodation will be a minimum of 130 housing units. The slope of the site assists in this strategy, minimising the excavation required to house cars in small, efficiently planned garages below the housing blocks. The advantage from this is that open space at ground level is freed up to form social areas and landscaping that will reduce the visual impact of the density, and will also provide the view from within houses with a pleasant outlook, rather than car parking.

Conclusion

Auckland's population will overtake the mark of 2 million inhabitants within the next two decades. Because of the city's low density morphology, Auckland's transport systems and existing infrastructure are already stretched and there is minimal room for further expansion. The ARC has determined that 70% of all future population growth will occur within the existing metropolitan limits; at least until the regional growth strategy is revised. The impact of providing an additional 300,000 homes,⁷⁰ mostly within the existing built area,

⁷⁰ Auckland Regional Council, *Auckland's Growth: Residential Intensification*, <http://www.arc.govt.nz/auckland/aucklands-growth/residential-intensification.cfm> (accessed September 29, 2010).

compels designers to think beyond traditional residential solutions. Suburbs in Auckland face massive changes over the next few decades, with much of the onus for the success of these changes being placed on architects. Increasing residential satisfaction, creating or enhancing a sense of community, developing a place of value and forming a durable and environmentally sustainable development are achievable goals for medium density architecture, making it an ideal solution for intensifying suburbs. As has been discussed earlier in this study, there are no obvious alternatives to this strategy.

The Auckland Regional Council has identified several forms of residential development with which it proposes will be used to increase the density of existing suburbs. These different forms include infill, reuse, development of existing empty spaces, and the new medium density developments. There are strong social, spatial, technical and sustainable design benefits to medium density design; the ARC recognises these design benefits, and proposes that by 2050 as much as 30% of the population will be living in this housing typology.⁷¹

MDH is not without its critics, however, and the task of encouraging neighbourhoods to accept and eventually value the MDH for its positive contributions to their community is not an easy one. The negative values associated with MDH is not unjustified and is due in part to a large number of a low quality, mediocre developments built since 1991.⁷² The design, construction and appearance of these schemes has been heavily criticised as they rarely offer the benefit of any good design principles to their residents or their neighbours.

It is the purpose of this paper to highlight to the architectural community how Auckland's growth has, and continues to affect urban planning throughout the region. It has discussed the benefits of MDH and explored the major design challenges faced when striving for sustainable urban forms. The shift from suburban one-off housing design to thinking about the design of housing in large groups is the basic challenge for architects in this field.

⁷¹ Auckland Regional Growth Forum, *A Vision for Managing Growth in the Auckland Region: Auckland Regional Growth Strategy, 2050* (Auckland: Auckland Regional Council, 1996), p38.

⁷² Auckland Regional Council, *Auckland's Growth: Residential Intensification*, <http://www.arc.govt.nz/auckland/aucklands-growth/residential-intensification.cfm> (accessed September 29, 2010).

Finally, this paper has looked at how changes in legislation and planning documents can be used in conjunction with further education for architects and designers to generate thriving, successful communities. It is hoped that the research presented in this paper can contribute to the growing body of work relating to Auckland's future development. The struggle for good housing design in Auckland may be long, but it is a battle worth fighting.

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