## MASTERS (PROFESSIONAL) IN ARCHITECTURE

# Edge of the Grid:

Defining Wellington's edge through intensification



## Edge of the Grid: Defining the Edge of Wellington through Intensification

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Thanks to everyone who has been supportive over the last year.

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## 0|0.00 Introduction:

#### **Problem Statement:** 0|1.00

The concept of growth limits is reoccurring within city theory. If city growth is constrained, then denser development patterns must be used. Contemporary theory on city form is centred on arguments for more sustainable cities, so methods of densification must be sustainable.

Very little work in the field of architecture or urban design has been done to investigate the potential of defining the edge to the city through built form. None has been found that translates the edge of a green-belted city into a built form.

Therefore, this thesis suggests that in some cases, defining the edge of a green-belted city through built form is a logical step to take in the evolution of these cities.

The greenbelt is a widely used tool in cities around the world and has been implemented in various ways. In order to produce a site-specific response to the edge condition created by greenbelt and city, the design is located in Wellington. Wellington is highlighted as an unusual case for the relationship between city and greenbelt for two reasons.

The first is that the Wellington Outer Green Belt, formally established in 2004, has grown from a public desire to have a continuous network of recreational tracks running the length of the western edge of the city and protecting the highly valued visual amenity of ridgelines and hilltops. This is opposed to cities which have implemented greenbelts primarily to constrict growth.

The second, closely connected to the first, is that the greenbelt boundary has largely been influenced by topographical constraints on settlement patterns and is not an arbitrary planning gesture.

Wellington is also unusual because of the inclusion of a town belt in the original colonial layout of the city in 1841. The belt has survived largely intact, and can provide insight into the nature of city growth up against a green edge.

This thesis aims to draw together two aspects of city form; the relationship between greenbelt and city and the understanding that denser, intensified settlement patterns provide a more ecological form and therefore poses the hypothesis that defining the edge of the city through intensification can contribute to an ecological city form.

#### 0|2.00 **Research Approach:**

## **Chapter 2: Literature Review**

In order to investigate whether defining the city edge of Wellington's Outer Green Belt through intensification is an ecological approach to city form, both the planning tool of the greenbelt and the intensification theory have to be researched. Accordingly, the literature review has two parts; Greenbelts and Intensification.

## Part 1: Greenbelts

The overall aim of this section is to provide an understanding of the relationship between greenbelt and the city; specifically Wellington, in order to develop a design response to the edge condition.

This section researches:

- The historical relationship between city and countryside and its evolution in developing ٠ the greenbelt planning tool.
- The use of the greenbelt in the colonial layout of Wellington.
- The recent addition of the Wellington Outer Green Belt and its implications for the city.

## Part 2: Intensification

Current theory on city form has the over-arching motive of sustainability. This section of the literature review critiques intensification with respect to sustainable and ecological city form.

A common direction towards sustainable city form advocated by some contemporary theorists is decentralisation and the intensification of suburbs. Summarising this theory forms a significant section of Part 2 of the literature review because of the clear implications for intensification on the suburban edge of the city.

Part 2 of the Literature Review then examines the acceptability of suburban intensification within the host community, noting that if new development is widely rejected by the community after implementation then it is inherently unsustainable.

This leads to discussing decision-making policies for suburban intensification, emphasising that having an easily accessible central aim adopted by the community, such as sustainability, most increases the chances of development being accepted into the existing built fabric.

Contemporary theory on the form of suburban intensification are critiqued against their applicability to a Wellington context.

Part 2 of the literature review concludes with a section on how New Zealand cities have moved towards sustainable form through intensification policies.

### **Chapter 3: Case Studies**

Five case studies are used to understand the use of Wellington's Inner Town Belt and Outer Green Belt with regard to public green space, visual amenity, built form and topography. These are analysed at regional, community and site specific scale because intensification on the edge as a part of the city will have to function at these three scales.

## Case Study 1: Wellington Outer Green Belt

This study analyses the types of land-use on each side of the Wellington Outer Green Belt city/ rural boundary. This enables the outer edge of the Green Belt to be understood at regional scale but also identifies potential development sites.

## **Case Study 2: Figure-Ground Study**

Figure-ground case studies taken along the city edge of the greenbelt provide an analysis of the existing edge condition relating to density of built fabric and the relationship between topography and infrastructure/ built fabric.

## Case Study 3: Transect Study

A figure-ground study of a section of central Wellington and part of the Inner Town Belt allows the relationship between built form and the Inner Town Belt to be examined. Six sections are taken through the area and are examined in conjunction with the relevant area of figure ground. The transects show a number of existing edge conditions and also how built form or planning zones respond to topographical features.

## Case Study 4: Topography Case Studies

Selecting 15 buildings or groups of buildings, situated on steep sites in Wellington, forms a database of building approaches to steep sites to be employed on the steep edge sites of the greenbelt.

## Case Study 5: Edge of the Grid- Collaborative Installation

A collaborative installation between photographer James Voller and the author explores qualities of a specific edge site and engages with public opinion on building on the edge.

## **Chapter 4: Site Analysis**

This chapter takes the two most suitable development sites identified by the Wellington Green Belt Case Study and looks for suitability of each site for intensification. Suitability is argued for each site at regional, community and site specific scales.

## **Chapter 5: Design**

## Methodology:

As a considered piece of the city, the design must function at regional, community and site specific scale. The design methodology identifies programmes that will have the most positive impact on the edge site across these scales. Positive impacts are seen as promoting recreational use of the edge site, promoting the maintenance of facilities and amenities and fitting in with the ecological aims of the project.

## **Concepts and Form Generators:**

These are discussed and justified within the central aim of successfully intensifying the edge sites and integrating the development within the city.

## Chapter 6: Methodology and Design Critique

Suggestions for future work are made.

## **Chapter 7: Conclusions**

The success of defining the edge through intensification on regional, community and site specific scale is measured against contemporary theory on ecological city form discussed within the literature review. The success of the design is also measured against information gathered from case studies.

# 00.00 Literature Review

## 1|0.00 Literature Review: Introduction

This thesis examines whether defining the edge of Wellington through intensification would be successful within current theory on ecological city form and the literature review corresponds to the two central issues of the thesis question.

Part one of the literature review examines the effective use of the green belt to contain a city. Part two firstly summarises current theory on sustainable city form and then evaluates the contributions of densification and intensification to the city.

Whether defining the edge of the city through intensification is an ecological approach to city form will be examined through design.

## 1|1.00 Literature Review Part 1: Greenbelts

This section examines the reasons for the evolution of the greenbelt planning tools so that Wellington's Inner Town Belt and Outer Green Belt can be placed in a historical and global context. Doing this has established that Wellington's belts are unusual because they have not been used primarily to restrict the growth of the city but to provide recreational and visual amenity. The natural shape of the city, encircled by hills has provided a natural constraint to growth and in the case of the Wellington Outer Green Belt, this natural boundary has been overlaid with a greenbelt zone. The success of Wellington's belts is found to be based on land within the belts being largely owned by local council and unanimous public support for the visual and recreational amenities that the belts provide. Council ownership of greenbelt land removes market pressure to develop that land which can arise when only a zoning change is implemented.

These findings guide the form of the design away from visually constraining the edge of the city through built form to heightening the importance of the design to function as a release point into the greenbelt for public recreation.

## 1|1.01 19th and early 20th solutions to the problems of urbanisation

Most cities of the world have grown organically over hundreds of years and with the radical changes that have taken place because of the industrial revolution and mass migration to cities, the structure of cities has been forced to change (Simmie 1992, p. 37). Solutions to the unhealthy city of the 19th century had to be found and a new discipline combining architecture, science and sociology was formed in town planning.

The 19th century saw the start of the mass migration of people from the country to the city and because Britain led the world into the industrial age, its cities were the first in the world to experience the transformation. By 1901, 80 percent of the British population lived in urban areas (Simmie 1992, p. 40).

Two main points of view emerged on the rapid urban growth. One was that the city itself was a problem, with overpopulation and new and degraded living conditions associated with it. The second was that the countryside was in a state of crisis, being consumed by the urban growth. Rapid expansion into the countryside broke down the clear distinction between city and countryside and the city's historical dependence on its rural hinterland. These two views critique the city from inside and from out, which is a key concept when considering the implementation of a green belt and the edge condition.

Ebenezer Howard, an English town planner whose ideas in the 1890's sought to find a solution to these problems, suggested that existing centres should be constrained by restricting urban expansion by implementing a belt around them. Growth could be focused at new satellite centres exhibiting new planning ideals. Transport was key to the idea and new centres would link in with the existing centre by way of arterial transport routes. He suggests that a social city is a marriage of town and country (Welter 2002, p. 56), and the boundaries of the city were blurred as the countryside was not specific to agricultural production any longer.



Figure 1: Ebenezer Howard's "City Cluster" diagram(Frey 2000, p. 14)

Other contemporaries of Howard such as the Russian social theorist Peter Kropotkin and Scottish urban theorist Patrick Geddes argued that the self-sufficient relationship between industry within the city and agriculture should still be central to good city form. In the imagination of nineteenth century geography, Europe was a landscape of city regions, in which surpluses from rural areas flowed to towns and cities, to be processed into wealth generating products and traded, both externally and back to the rural areas (Healy 2002, p. 331). This conception promotes a positive view of cities, as opposed to the negative view of cities as containers of problems such as poverty, crime, pollution and congestion.

Necessary co-operation and unwritten behavioural codes is a subject common to both Geddes and Kropotkin and one that was fuelled by their contemporary, the German sociologist Ferdinand Tonnies who outlined the difference between community and society. Both types of association are based on shared values but because of the larger scale of a society, it becomes necessary to construct relevant values which are agreed upon by individuals. The smaller scale of the community meant that people were closer to the decision making process. After the publication of his book in 1887, the idea of community caught the public imagination as a counter-model against contemporary states of cities (Welter 2002, p. 139).

Society or community is dependent on the scale of settlement and its direct or indirect relationship between production and consumption. The implications for urban design is this link between type of social organisation and scale. If form is driven by self-sufficiency and autonomy, then the development must function at the scale of the community.

Neither Kropotkin or Geddes define specific urban form but Kropotkin sees that a revolutionary change from society, which was seen as centralised and distanced from production, could be re-formed back into communities. Both theorists highlight the ideals of small communities, which moves away from the popular Darwinist notions of society as a permanent and individualistic struggle for existence. Kropotkin used the medieval community as an example of an ideal form of human co-operation where goods were produced for the local market and there was no centralisation (Welter 2002, p. 57). Both emphasise the need for contemporary cities to reference man's roots in rural life.



Figure 2: Patrick Geddes' Valley Section, first published in 1909 (Welter 2002, p. 60)

Geddes explores an idealised city with strong inter-relationships between development and geographical features in his Valley Section diagram which was first published in 1909. An urban core and industrial centre is located on the waterfront. Density decreases in proportion to distance from the centre as agriculture increases. The boundary to agriculture is influenced by the geographical formation of the valley where the highest points have lowest levels of human inhabitation and nature is in its purest form (Welter 2002, pp. 60-61).

Geddes largely ignores the concept of containing a city other than within natural or geographical regions and does not take an anti-urban position like many of his contemporaries. His emphasis on the urban core allows him to focus on immediate urban renewal in existing cities rather than their containment. To Geddes even a metropolis like London, described as in the 19th century as a 'tumour, an elephantisis sucking into its gorged system half the life and the blood and the bone of the rural districts'(Welter 2002, p. 56), continues to display its origins in villages.

The Valley Section is based on a symbiotic relationship between urban areas and agriculture, with the form of the settlement strongly influenced by the geographical nature of site. It provides a natural centre where the centripetal forces attracting people to the city and forming a dense urbanised core overlay with the gravitational pull of the valley sloping downwards towards the coast.

Geddes and Kropotkin's theories on settlement form did not have the same level of immediate application and tangible results that Howard's garden cities had. Howard's solutions to rapid urbanisation provided results, securing their central place in post war planning (Healy 2002, p. 333), and even in new cities on green-field sites. This raises the argument that for cities that primarily want to support healthy settlement patterns not to restrict growth, other theories for form and development should be explored, perhaps alongside the application of a greenbelt.

## 1|1.02 Colonial Experiments with Greenbelts

In some respects nineteenth century colonial cities were opportunities to correct the deficiencies becoming apparent in European cities. The greenbelt was one response, however the ideal of a band of un-built land surrounding a town, firmly demarking its outer boundary and limits to growth, is a pre-modern arrangement with a lineage stretching back to ancient civilisations. The parkland belt was a foundational element of colonial settlement and town planning, but for reasons other than a pre-emptive solution to the problems of rapid urbanisation and loss of green-space.

The benefits of the model colonial town template of a rectilinear settlement surrounded by a park-belt with a depth of one or two miles was three-fold. The belt would contribute to the health and the pleasure of the inhabitants, it would beautify the town and it could take on a defensive function (Freestone 2002, p. 70), both as a moat against attacks and as a repellent against indigenous culture. The park-belt assured the most distilled version of colonial culture within its boundaries, so that settlers could feel at home, and also to ensure against cultural dilution.

Adelaide was a show-piece of systematic colonisation. In 1837, the layout of Adelaide, conventionally attributed to William Light, the first surveyor general of South Australia, is a site specific adaptation to the formula decided in London before the site was selected. Light kept the river floodplain free of development, adjusted edges to fit to topography, and encircled the town with a park-belt (Freestone 2002, p. 71).

The Colonisation Commisioners for South Australia issued instructions to Light in 1836 "to make the necessary reserves for squares, public walks and quays" (Garnaut 2008, p. 109) in the South Australian capital, suggesting their directives were influenced by contemporary thought about the need for public space in urban environments and emphasising both the green edge and the water's edge to have a public emphasis.

#### The success of the Greenbelt 20th century planning tool 1|1.03

A long-standing, clear-cut division between town and country in the traditional European landscape has led to black and white definitions of what should constitute urban and rural in planning. However modern landscapes do not lend themselves easily to such distinctions (Bengs 2002, p. 273), which brings problems to the implementation of greenbelts.

The historical developments of cities in the 19th century influenced planners' perceptions; strong anti-urban beliefs that cities were poor living conditions and that urban sprawl was neither a practical or aesthetically satisfactory answer skewed planning principles in favour of urban containment (Simmie 1992, p. 36), idealising the countryside. This resulted in post war policy focussing on the twin objectives of preventing further expansion of poor urban environments and to create healthy new ones in smaller garden cities.

Four examples of the implementation of twentieth century greenbelts are considered below; Adelaide, Sydney, Melbourne and Tokyo in order to analyse the success, or otherwise, of the greenbelt planning tool. These examples are compared to the belts of Wellington, which are found to function extremely well with respect to visual and recreational amenity.

After the Second World War, the metropolis of Adelaide, which had been founded as a planned city to include a belt of parklands continued its suburban expansion to the north and south of its centre. When British planner Patrick Abercrombie visited in 1948, he praised the amazing circle of parks around Adelaide, commenting that 'wedges of open space radiating outwards from the...parklands, linking the inner belt with the outer one, and separating suburbs into a number of self contained communities would have been a lovely idea." (Simmie 1992, p. 36)

In 1955, a development plan for Adelaide was prepared and included a hierarchy of open spaces and the creation of a system of regional parks. This evolved into the Metropolitan Open Space System (MOSS), realised in 1994, which identified and protected a linked system of public and privately owned land, injecting a strong visual component into the built environment and be available for recreational pursuits. (Garnaut 2008, p. 122)

MOSS builds on Adelaide's parkland heritage and achieves a way in which the present can repay the past and leave a worthy inheritance for the future.

In contrast, Sydney is an important example of the failed implementation of a greenbelt. The





Figure 3: Plan of Adelaide, 2006, showing the encircling parklands (dark grey) and parts of the original belt that have been lost for other uses (light grey) (Amati 2008, p

Figure 4: Adelaide Metropolitan Open Space System (MOSS) study area, (Amati 2008, p.123)

greenbelt was conceived as 'a girdle of rural open space encircling the open districts and penetrating towards the centre between the outer districts to ensure the urban population's access to open space,'(Freestone 1992, p. 71) but primarily to contain urbanisation.

The belt was likened to an unaccustomed new garment designed to change the form of peripheral expansion (Freestone 1992, p. 73), and when it was put on in 1945, something had to give. The greenbelt may have been doomed from the beginning because little was understood about the land use it encompassed. Much of the greenbelt zone was open grassland and rough timber with little economic viability for agricultural use or recreation, in contrast to the countryside protected by British greenbelts (Simmie 1992, p. 40). The fact that it was not in public ownership placed huge pressure on its preservation and in 1959 the minister for local government excised nearly a third of the original greenbelt for urban development (Fishman 1991, p. 232).

The greenbelt troubles generally point to the fundamental inability of an outmoded town-country planning concept to cope with the rising tide of metropolitan growth in the post-war era (Fishman 1991, p. 232). The preferred metropolitan form became the corridor plan, providing for continuous urban expansion between wedges of green, thus avoiding the inflexibility and servicing difficulties of the green-belt satellite town concept (Freestone 1992, p. 73), and it was incorporated into the Sydney Region Outline Plan in 1968.

For forty years strategic planning for Melbourne has been based around the twin spatial principles of radial urban growth corridors serviced by heavy rail infrastructure, and green wedges between the corridors. Recently the green wedges have expanded into an extended green belt (Garnaut 2008, p. 62). Melbourne's corridor wedge model might have been the 1948 Copenhagen Finger Plan, however Melbourne planner Frank Heath's argument for linear parks along streams radiating from the city centre (Garnaut 2008, p. 28) may have been the origin.

The implementation of Tokyo's greenbelt is a famous case of an attempt to impose an international planning ideal on a reluctant society. Put in place in 1956, the greenbelt failed because the suburban belt did not provide any system to compensate land owners who lost their right to develop and landowners were not opposed to urbanisation anyway (Garnaut 2008, p. 28). The failure of the greenbelt did promote awareness of the importance of preserving farmland and marked the first step towards the promotion of urban agriculture in Japanese planning. This case shows that the distinction between country and urban areas is by no means black and white, and the fabric of the city region can be a mix of both in the right circumstances.

In summary, these four greenbelt cases show that the implementation of a growth boundary to restrict urbanisation, and provide agricultural or recreational zoning must have support from landowners affected. It also highlights that the distinction between urbanisation and country cannot always be black and white. The concept has worked well in Britain to stop urban areas from growing together and protecting high amenity and productive rural land but not where greenbelts are not required to stop amorphous urban sprawl and where new growth is a necessity. In this case, the form of new growth should be focussed on, not necessarily how to constrict it.

In the case of Melbourne and Adelaide, which seem to have the most successful open-space strategy, green-space zoning to guide growth is influenced by natural features and high amenity land that the public desire access to.

The successful elements of greenbelt planning in these case studies are evident in both the Wellington Inner Town Belt and Outer Green Belt. Greenbelt boundaries are largely influenced by topography and secure high amenity land for public recreation and visual amenity. The land within the belts is largely owned by the Wellington City Council, removing market-driven pressures to develop what would be prime real-estate.





**Figure 5:** Proposed park system for metropolitan Melbourne 1944 (Amati 2008, p.63)

**Figure 6,** Projected metropolitan countryside, Melbourne 2002, (Amati 2008, p 67)

## <u>1|1.04 The Current City-Country Relationship:</u>

To design for the edge condition between city and greenbelt, the relationship between the two must be examined.

Considerable problems have begun to emerge from planning based on the notion that city and countryside are best kept separate. Areas close to the city are being protected which have little ecological value or uniqueness and development is forced to jump the greenbelt, sometimes using land with greater ecological value than the greenbelt (Freeman 2003, p. 231). Also restricting sprawl by encircling the city with a greenbelt can lead to the development of valuable green-space and wildlife habitats within the city (Freeman 2003, p. 231) This calls for a more sophisticated understanding of the inter-relationships of city and country.

The dialogue between nature and society also plays a large part in the city and country relationship. Planners are increasingly seeing nature as a social construct (Freeman 2003, p. 229), meaning that how we view and value nature is selective, exacerbated by the fact that recreation is the primary use of open space around cities and towns (Abercrombie 1946, p. 131), and today there is no longer any strong mutually supportive relationship between the city and the country surrounding it. Residents may lobby to protect their low-density suburb from intensification in the name of protecting natural amenity and, as a result, an important piece of green space in the city centre is developed. In this light, it may be more useful to think of nature and society as being intertwined and reliant on each other instead of in opposition.

Within New Urbanist theory, key protagonists are in disagreement regarding the relationship between city and country. Leon Krier and Andres Duany argue that each threatens the other. The city must be distinctly urban, with natural elements formalised and specified. Natural elements within the city require formal treatment, not natural stands of wild plants. Boundaries are important to contain growth and protect the countryside. Peter Calthorpe is in agreement with Krier on the importance of growth boundaries, however Andres Duany and Elizabeth Plater Zybeck are sceptical, saying they are artificial.

Calthorpe breaks away from Krier, Duany and Plater-Zyberk in seeking to reconcile nature and culture within cities.

Outside New Urbanism, Richard Rogers has analysed urban case studies and emphasises how deeply quality of urban life is affected by good design. "By weaving together the natural with the man-made, architecture, landscape and urban design establish a peace between people and their environment." (Rogers 1999, p. 50)

Duany's position on the relationship between town and country, and open space has been crystallised in a new approach to implementing New Urbanist and smart growth principles, grounded in the 19th century work of Patrick Geddes and his Valley Section. The approach is termed Transect Planning and is based on a range of environments along the rural- urban continuum which vary in their intensity and level of urbanity.

It is a geographical cross-section of a region used to show a sequence of environments. In transect planning, this range of environments is the basis for organising the components of the built world (Duany 2002, p.246).

Transect planning seeks to create immersive environments, which means specifying different urban intensities that fit in with their surroundings. It is not unlike natural ecological systems in which plant and animal species coexist within habitats that best support them. In transect planning, urban development is distributed so that it strengthens rather than stresses the integrity of each immersive environment.



Figure 7: Diagram of Duany and Plater-Zyberk's transect system, (Duany 2002, p 245)

When rural environments are permitted to be urbanised or urban elements are permitted to be ruralised then the immersive environment is compromised, creating a mix of elements that is unable to satisfy human preferences (Duany 2002, p. 256).

Transect planning is a departure from the usual view that cities and nature are in opposition and searches for a proper balance between human-made and natural environments across a number of different scales. For example, both the regional and neighbourhood scales require a centre, a circulation system, and a civic realm and these functions should be provided in the most urban part of the transect. Rural gualities should be given priority at the rural end of the transect. Instead of looking to explain the loss of natural amenity from invasive acts of human aggression, transect planning "could eventually produce a seamless, non-hostile integration between natural and human ecologies." (Duany 2002, p. 264) 'The great design challenge of the twenty-first century remains what Ebenezer Howard proclaimed more than a hundred years ago: "Town and Country must be married, and out of this joyous union will spring a new hope, a new life, a new civilisation." (Fishman 2002, p. 66)

Transect planning is at odds with the concept of intensification on the greenbelt boundary, which will result in an increased contrast between green-space and built fabric. However, the transect continuum is between productive rural land and urbanisation, not recreational, high amenity public space.

Intensification on the edge of high amenity public space can be justified to increase the levels of facilities and accommodation, and therefore users of the amenity. This thesis does not suggest that intensification on the edge is a uniform trait around the edge of the city, which also steps away from transect planning as the transect aims at providing universally applicable densities and land uses along any transect between the centre and periphery.

It is suggested that intensification will take place in concentrated nodes in suitable sites along the boundary, and be strongly associated with existing suburban centres. Frey notes that the expansion of the city is largely the result of a diffusion of the population into less densely populated development clusters in the city region, instead of urbanisation, holding the concept of the greenbelt as partly responsible for this decentralisation. Ebenezer Howard's City Cluster concept, and forerunner to the Greenbelt concept, suggests an unlimited number of spatially separated cities of limited size accommodate all essential functions that allow them to be independent from one another.

This concept has influenced planning ever since, but in complete betrayal of Howard's idea, Frey argues. Modern planning has transformed it from an ecological concept where each city is surrounded by sufficient agricultural land to be self-sufficient, to garden suburbs, which are functionally, socio-economically and locationally dependent upon the services, facilities and work places of a larger central city or metropolis (Frey 2000, p. 16). Modern planning, or functional zoning, which imposes mechanical separation instead of organic integration, "guarantees the maximum consumption of units of time, energy, hardware, and land for the execution of daily functions of the whole society" (Krier 2009, p. 101). This is a relic of the nineteenth century and goes against urbanity and ecological principles, however it is the form that most modern cities have used.

Peter Calthorpe argues that Howard's vision was that of a luddite and unsuited to the task at hand. He argues that it would have been better to focus on building stronger and better cities and agrees with Frey, saying the garden city movement has lead to suburban expansion and parasitic garden suburbs (Grant 2006, p. 46).

The idea that each city is surrounded by a belt of agricultural land which allows it to produce what it needs to survive is the pivotal idea to Howard's City Cluster diagram, and one that is founded from the idea of the bounded city. Howard's Garden city as Lewis Mumford, the influential early 20th century American critic of urban theory, pointed out, "was a return to the Aristotelian concept that the city, like any other organism, had its proper size, and that any expansion beyond its natural limits was a self-destructive recession" (Fishman 2002, p. 59). Boundedness was therefore asserting rational and humane control against the forces threatening to destroy the city. Howard's concept was a reaction to the crushing densities of the 19th century metropolis, whereas the current challenge is to escape the sprawling low densities or anti-city. With the current trend of working and living patterns being fragmented, there is a vearning for human-scaled, pedestrian friendly community, a place with a real centre and a real edge (Fishman 2002, p. 63).

It was Lewis Mumford who was the first to understand that the movement which stemmed from Howard's Garden City model must shift its emphasis from de-concentrating the central city and focus on creating real places within the sameness of low-density sprawl. In 1945, Mumford cautioned against "those who mistake Howard's program for one of breaking down the distinction of town and country and turning them into an amorphous suburban mass...For the Garden City, as conceived by Howard, is not a loose indefinite sprawl of individual houses with immense open spaces over the whole landscape; it is rather a compact, rigorously confined urban grouping"(Fishman 2002, pp 64).

#### The Greenbelt Concept in New Zealand 1|1.05

In the 1950's New Zealand developed a huge interest in Green Belts, not predominantly as a solution to sprawl but out of concern for the loss of market gardening land around cities (Garnaut 2008, p. 93). Having said this, uncontrolled urban expansion particularly in Christchurch and Auckland was happening along with a growing awareness of the issue. As early as the 1920's, it was suggested that the 'subdivision mania' on the fringes of Auckland was the creation of speculators rather than being the normal expansion of a town (Garnaut 2008, p. 88) and resulted in the premature intrusion of urban development into agricultural land (Putt 1937, p. 4). This suggested that the small town planning community in New Zealand was increasingly becoming aware of the conditions which encouraged urban sprawl and the necessity for a planning response.

New Zealand was seen as 'a land in the making, still in the process of growth, and that growth should be planned as far as it is humanly possible to do so'(Bloodworth 1938, pp 4). Despite awareness within the public and the town planning society, the New Zealand planning association was reluctant to restrict the growth of cities with green belts and the district of Christchurch is the only example where its implementation has been primarily to restrict growth.

A Green Belt was implemented in Christchurch after the Second World War and was seen as a means to restrain growth as well as to pull together the fragmented nature of the various local councils in the area. Greater Christchurch became one single social and economic unit and building within the rural district was highly restricted, preserving it for farming and market gardening. In the 1950's even planners in Wellington, where growth was limited by steep hills, were concerned to implement a greenbelt to protect market gardens(Amati 2006, pp 10). It is interesting to think that if the implementation of a greenbelt in Wellington was based on this concern then the Hutt Valley, which was Wellington's market gardens, would have been zoned Greenbelt. This strong emphasis on the green belt being able to provide the city with fresh produce was peculiar to New Zealand and aligns itself with the non-alienated form of production and consumption that is so important to the 19th century social theorists such as Peter Kropotkin.

Christchurch's greenbelt ultimately failed in the late 1990's when the council became preoccupied with emerging issues such as water allocation and quality and was involved with expensive legal challenges regarding land use.

The city of Auckland, which has a population of almost 1.2 million and has a projected population of 2 million by 2050 has a conventional style of low density urban expansion which has come under scrutiny. The Auckland Regional Growth Strategy 2050 provides a strategy that emphasises containment of the urban area, compact development and intensification of existing centres but uses growth boundaries and zoning to contain (A.R.G.F 1999, p. 2), not an established greenbelt.

In New Zealand planning policy, urban renewal has gone hand in hand with constraining the city. In the 1950's there was worry that with rapid population growth and subdivision associated with it, city centres were 'rotting'(Cox 1953,p. 52), but it was widely seen as better to promote urban intensification rather than urban containment(Jones 1949, p.49). While the greenbelt's existence and uses were well understood, it was often viewed as a tool seeking a problem. This highlights that for intensification on the edge of the city to be successful within the context of an ecological city form, it cannot happen in isolation but must be closely associated with growth within the city centre.

## <u>1|1.06 The Wellington Inner Town Belt</u>

The town plan for Wellington was conceived by the Surveyor General, Captain William Mein-Smith, in 1840. Instruction from the Directors of the New Zealand Company stressed that the beautiful appearance of Wellington was to be secured, providing for the future rather than the immediate profit of the company. This was achieved by separating the whole of the town from the country sections by a broad town belt, which also served to protect the value of the inner town lots by separating them from rural lots beyond the town belt. The Town Belt was laid over the circle of hills that Wellington's town centre was surrounded by and the land contained within the belt was to be 'public property, on condition that no building ever be built upon it'(Quinn 1966, p1).

The New Zealand Company's pragmatic and aesthetic reasons for including the town belt in

Wellington's layout were the same as their reasons to include town belts in other colonial cities such as Adelaide. Adelaide was used as a case study for the theories of visionary 19th century town planner, Ebenezer Howard, which resulted in the Garden City, his remedy to the overpopulation of cities in Europe.

The New Zealand Company did not, however, intend for this separation of town and country to restrict the urban growth of Wellington, as was the intent of Howard's use of the green belt. Howard undoubtedly would have wanted the parklands surrounding Adelaide to contain growth and for future growth outside the belt to lead to a polycentric configuration similar to Howard's "Social City". However, the parklands have informed the growth of a dense city centre and surrounding suburbs beyond the belt and have not fulfilled the function of separating urban and rural areas (Garnaut 2008, p. 107).

The growth of these new colonial cities was essential for their economic development as well as that of the country to which they belonged and the planners were responding more to a responsibility for ensuring orderly development. The tension between essential expansion and restriction would become an underlying theme to much of New Zealand's planning history (Garnaut 2008, p. 86).

As early as the 1960's, Wellington, together with Adelaide was highly regarded by town planners throughout the world as an historic planned settlement demonstrating the importance of a system of parklands in the urban development of a region'(Quinn 1966, p 18). This came at a time when green belts were at the fore of town planning policy. In 1915, the town belts of Wellington and Dunedin were considered by British town planner William Davidge superior to those of Adelaide because they privileged prominent topographical features and protected them from built form.

Acknowledging the topographical amenities of the land and integrating its future potential into the master plan of the city has given these New Zealand cases a different aspect which appeals to Davidges more than a flat landscape with town planning directly overlaid. In town planning's purest and most scientific response, existing to demonstrate universally applicable ideals, it would be situated on a flat site. However, through its application on a flat site, the town misses out on interacting with the landscape through which it gains its site-specific form and character.

The nature of Colonial Wellington as it was laid out closely represents a more compact version of the biologist and town planner Patrick Geddes' best known contribution to resolving the town and country conflict, the Valley Section. Similarly, Wellington has a compact centre located on an historically industrial waterfront, with the size and form of the surrounding suburbs and hinterland being contained and influenced by the geographic nature of site.

Wellington had a city form that predated the green belt mania of the 1950's by over one hundred years, and had for the most part, successfully retained its town belt. The form of the original town belt of Wellington, or Inner Town Belt as it is now referred to with the inclusion of an Outer Green Belt into the city's structure, has been fragmented over its 170 years of existence. The belt had reduced in size from 1519 acres at its inception in 1841, to 970 acres by 1937(Quinn 1966, p. 44). Various parts have been taken away, mainly for public use and roads connecting the city side of the belt to the outer suburbs, but occasionally for residential areas.

The belt has been internalised by the expansion of the city so it could now be more accurately

defined as a parkland belt or 'green wedge' (Quinn 1966, p.18) separating the central city from the outer suburbs. This concept, as noted by Quinn, bears similarities to Howard's concept of the Grand Avenue, which was also an internal belt and sought to separate the functional elements of the city(Quinn 1966, p. 18). The containing nature that Wellington's Town Belt once had has diminished and its external edge has now become an internal one.

Even though it is now internalised, the Inner Town Belt has served a clear purpose in defining the importance of green space within and around central Wellington. The right of the public to retain this green space as well as their entitlement to use it as a recreation amenity has been strongly defended. Essentially, the circle of hills that the New Zealand Company sought to preserve from built form have been translated into a firmly established amenity and one that has worked with the natural landscape to consolidate a new town into a cohesive and relatively dense form. It can be speculated that the Wellington Central Business District may have been contained by the bowl-like nature of the landscape regardless of whether a town belt existed or not. Undoubtedly, though, the economic advantages of developing close to the city would have seen the surrounding open hillsides disappear with subdivisions for private housing, especially with the value placed on views of the harbour.

The belt plays a significant role in the city's character, helping to give the city 'an environment that is not just simply well organised, but poetic and symbolic as well'(Lynch 1960, p. 60). The city's town belt has successfully survived, despite its economic suitability to intensive development, and has become an integral part in the city's image.

As the concept of the Green Belt developed into a global phenomenon of town planning in the 1950's, it was widely seen as a tool that contained the city through the retention of productive agricultural land that was zoned to restrict building. This system has intrinsic problems with landowners losing the right to develop, however as Wellington's inner town belt was drawn into the planning of the city from its conception, it was always public land held by the Crown. This avoided the conflict created by imposing a zoning restriction on private land-owners.

Land use within the belt was still contended, as it was used for grazing, which conflicted with its visual but not economic purpose to separate town and country, and provide recreation for the public.

As Wellington shifted its dependence from horse-power to electrical and petrol, the need for grazing became obsolete, so the belt began to function purely as a recreational and visual amenity as it was intended. It was gradually replanted with native and introduced trees and although fragmented into green wedges and no longer containing the city as it once did, the belt retained enough of its original form to be a consistent attribute in almost all panoramic views in Wellington. The city set amongst the hills and a city which is symbiotic with its landscape is a concept which has taken root in this city and is carried through into the conception of the Wellington Outer Green Belt.



Figure 8: Area included in the Wellington Inner Town Belt (WCC 1998, pp55)

## Robin Aitken 300085196

Legend	
	Wellington Town Belt
	Land managed as Town Be
	Northern Walkway
_	City to Sea Walkway
	Southern Walkway
•	Viewpoints

## 1|1.07 The Wellington Outer Green Belt:

Since its conception in 1840, the presence of the Inner Town Belt around the city has given Wellington a green backdrop of hills free of built form and proximity to recreation. The growth of the outer suburbs which have internalised the town belt have been contained by the topography in a similar way to the city centre. The reason that the outer hilltops that are now included in the Wellington Outer Green Belt have been left bare is either because of rural zoning or the lack of suburban expansion. It is suggested that through geographical constraints and organic growth, Wellington has come close to its ideal organic size. This has been reinforced by overlaying an outer greenbelt as opposed to a greenbelt being implemented to restrict growth.

Wellington's approach to a green belt has been years in the planning and although it will have the effect of containing urban growth, the primary motivation for its implementation has been 'a community with a growing interest in the environment and increasing demand for access to the city's rural fringes' (WCC 2003, p.8). Wellingtonians have unanimously supported the protection of a continuous belt of hilltops and ridgelines around the outer suburbs for visual amenity and also to provide a continuous network of recreation tracks.

This has enabled the use of Council reserves to obtain large tracts of land in the Wellington Outer Green Belt Concept Zone over the last 40 years. Yet Wellingtonians are largely unaware that the city has been constrained and urban growth directed.

The Outer Green Belt is a 'continuous green belt following the ridges to the west of the city from the south coast to Colonial Knob, in which indigenous vegetation is restored and informal recreation network is widely accessible' (WCC 1998, p.36). It is also one of the best examples of an urban belt in the world (WCC 2003, p.12), being a key part in the city's ecosystem and also providing the western edge to the built environment. As stated in the Green Belt Plan, providing an edge to the urban environment on the western side of Wellington does not mean that the council is implying a no growth policy on the other side of the green belt in the rural zones. If intensification does happen, then it will be particularly important to maintain the integrity of the Western edge of the green belt. This approach qualifies the unique position the Wellington green belt has when compared to international green belt theory where the belt is in place to protect the integrity of the agricultural land beyond the green belt as well as containing the city. Wellington's green belt seeks to contain the older suburbs and prevent sprawl and dilution of character but acknowledges that the belt serves more for aesthetic, recreational and ecological purposes than to contain the city and preserve productive agricultural land beyond it.

A large amount of growth is not anticipated beyond the green belt but the majority of green field growth will take place in the northern suburbs, for example Stebbings Valley in Churton Park(WCC 2003, p12). The steep topography and difficulty of building as well as the farming of land near to the central city has kept land free of buildings and has enabled the green belt concept to develop.

A wealthy and involved city council has enabled land to be bought, with the support of Wellington's residents. The majority of the remaining privately owned land in the green belt concept zone either has a covenant implemented by the WCC with the backing of the owners to restrict building and support replanting schemes and public access or is in the process of establishing one. This highlights another vital difference between the Wellington Outer Green Belt and other green belts which would normally rely on zoning and the restrictions associated with the zone to regulate building and preserve the existing amenities of that land.

Wellington's Outer Green Belt has and will undoubtedly strengthen the specific character of the city. Although the Green Belt by default assumes a role of containing the city, this is not its primary function. Typical of the implementation of green belts within New Zealand, its primary function is seen as an area for recreation, forestry (in Wellington's case, regenerative bush) and agriculture. This is a substantial variation between Britain, where the green belt has become linked with preventing urban sprawl(Amati 2008, p.93) and protecting the existing countryside made up of villages, hamlets and towns.

The council identifies that a large part of the belt's future development relies on community support. Different communities along the edge of the belt can direct ways to restore the natural environment and develop walking tracks and access points. Community activity is becoming increasingly sophisticated and the level of co-ordination between the council and these groups is increasing. Part of the Wellington Outer Green Belt Concept Plan will help provide a reference point between the council and these communities and function to provide a broad but detailed vision to which the individual projects can contribute(WCC 2003, p.44).

This large reliance on community support means that the council's green belt strategy is dependent to some extent on enthusiasm of the communities on the edge of the green belt and their desire to partake. Working with these specific objectives in mind is essential for the viability of development on the edge.

The use of the greenbelt concept in Wellington is based on amenity and ecology rather than merely a growth boundary. Therefore engagement and interaction are important both to develop the amenity and to experience it. Intensified settlement patterns on the edge of Wellington will enable more people to experience the high amenity edge condition and the high amenity within the greenbelt. Intensification on suitable edge sites can provide opportunities for Wellington City Council and local community groups or councils to work together and provide better public access points to the greenbelt and facilities on the edge. Intensification is also an opportunity to drive localised schemes to increase the amenity and ecology of sections of greenbelt with planting schemes and track maintenance supported by a heightened awareness and increased user group.



Figure 9: Wellington Outer Green Belt zone (WCC 2003, p 24)

## 1|2.00 Part II: Intensification as a Sustainable Urban Form

As Section 1|1.00 concludes, both Wellington's Inner Town Belt and Outer Green Belt provide a wealth of visual and recreational amenity. The intent of the design is to provide an outer edge condition to Wellington which takes advantage of this high amenity edge which will only increase in amenity over time and argues that intensification of suitable edge sites will benefit both the greenbelt and the city. Increasing the number of people that inhabit edge sites will create opportunities to improve facilities for both private and public use and provide attraction points for the public to enjoy the amenity of the edge. Defining the edge through built form will also encourage people to consider the city footprint as finite and help form strong arguments for further intensification.

Having established that there are opportunities for intensification on Wellington's edge that will have a number of benefits to the city, the following section discusses how intensification fits within contemporary city theory and theory for ecological city form.

The section concludes that intensification is a natural step within the evolution of the suburb, transforming suburbs into autonomous towns which reduces the need to travel to a city centre.

The section discusses the form of intensified settlement patterns, examining New Urbanist theory alongside other forms of intensified settlement and concludes that intensification of edge sites can be successful if associated with the growth of existing suburban centres. The literature also discusses the importance of community awareness and involvement for successful intensification of suburbs.

The realisation that suburban sprawl consumes more fossil fuels than a denser more compact city form has led to urban planning re-establishing itself as a solution, based on a set of principles accepted globally and endorsed in national policy. Many of these principles relate to the natural environment, but for planners the most important thing is to determine urban forms for the future, which are sustainable and achievable (Welbank 1996, p. 76). The city as a whole must be seen as a project in itself. Intensification of lower density areas around cities, increasing land-use and transport efficiency, has become a focus.

The suburb, which has manifested itself as the most common fabric around cities promotes inefficient land use and has fragmented the traditional form of community. The second part of this chapter will examine current theory of intensification of cities, specifically the suburbs within and critique it with specific regard to community benefits and sustainability.

## <u>1|2.01 Sustainability:</u>

Sustainable development has become widely understood from its definition in the report by the Brundtland Commission (1987) as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs and aspirations" (Cousins 1996, p. 53). The important aspect of this definition when applied to urban development is that what we build today must continue to be relevant and workable in the future. The built form must provide long term flexibility and adaptability. Lifestyles are constantly changing and the city fabric must be capable of sustaining change.

Residential fabric must be arranged in relation to its needs, which are schools, shops, recreation, transportation and work (Scoffham 1996, p. 69).

The concept of cost-transference; avoiding acknowledging responsibilities and transferring them to future generations, other social groups, other sectors of the economy, other species and other parts of the world, is also linked to unsustainable behaviour (Freeman 2003, p. 227). Settlement patterns can address some of these issues.

Planning for sustainability needs to consider ecological limits and environmental impacts at every step of community development and design, from individual buildings, regional transportation systems and the organisation of businesses, reorganising the "social, physical, and political-economic landscape in fundamental ways" (Beatley 1995, p. 384). This shift is taking place and hybrids between the traditionally adversarial disciplines of developers and preservationists are forming as a result (Eichblatt 2010, p.26).

Planning as an academic discipline and as an applied field can contribute a great deal to the vision and implementation of more sustainable human settlements and working at both regional and local scales may offer planners the greatest opportunity to incorporate sustainability into their work (Beatley 1995, p. 384). The American urban planner Timothy Beatley builds up an argument of nested scales of settlements, where sustainability works at the level of towns, countries and metropolitan areas which he collectively calls sustainable communities. It is at this local or regional realm where a new professional planning paradigm can take shape, building on the familiar slogan "think globally, act locally", which points out that no community or region is an island; each will contribute to the global scale problems, or solutions.

Small-scale local successes in implementing sustainable practices may have greater success than larger gestures (Dumreicher 2000, p. 288). Urban planning and community planning activities present fundamental opportunities to rethink and reshape the way we use land, energy, and out of this, invent the kind of places that will sustain the planet and the human spirit. It is the scale of the city or region that is the largest scale capable of addressing the many urban, social, economic, political and other imbalances that counter sustainable development globally and at the same time the smallest scale to resolve such problems in an integrated and holistic fashion (Dumreicher 2000, p. 288). The scale of smaller communities within the city is just as important, but how these communities fit in as a piece of the larger city with respect to infrastructure and function must be considered.

Beatley argues that for a community to be sustainable, it must acknowledge fundamental ecological limits; the finite limits on land, water, air and biological diversity. Cities provide enormous, untapped opportunities to solve environmental challenges (Roseland 1992, p. 22). Once the city looks at its development patterns and growth strategies whilst treating these limits as finite, local governments can pioneer new approaches to sustainable development and urban management. Sustainability is a process by which a local community can decide how it will afford to live within its natural budget and its own creativity (Dumreicher 2000, p. 291).

When growth boundaries are identified, greater attention is directed towards making the existing urban fabric more efficient. A large part of the city's future population can be accommodated within the identified growth boundary by infill housing, increases in density, renewal and renovation or reuse of older existing structures. Athough Beatley argues that down-town development should take place before consuming or destroying important natural and open land on the periphery, if the intent of the development on the edge is to contain the city form then this can be seen as supportive to his vision of the sustainable city.

An important area to highlight is how local and regional councils can have a large influence on how public money is spent on public space. There is huge potential for council supported and funded public space to be collaborating with residential and commercial development, if a holistic approach is taken towards direction and public involvement in decision making.

A community that seeks to develop and promote an economic base that has a minimal impact on the environment and is ideally restorative of it can also guide new growth in the direction of sustainability. With regard to the sites highlighted as suitable for development along the edge of the Wellington Green Belt by this study, the Wellington City Council can be seen as a main collaborator and potential investor in the site, alongside the specific community of the edge site. Opportunities for Wellington City Council Offices for Green belt management within the new development can be seen as forming a symbiotic relationship between city and greenbelt, with new development as the catalyst. Better city form will result from policy that guides market driven development, and joint ventures with the council.

Real progress towards community sustainability may require new social institutions, and Beatley argues that political jurisdiction boundaries should match the boundaries of important natural systems or functions. Communities organised along watershed or topographical units makes considerable sense. He notes that New Zealand, which has perhaps made the furthest strides to incorporate sustainability into its planning has completely restructured its government by creating a series of regional councils with boundaries that correspond to water catchments (Beatley 1995, p. 386).

Within Wellington, the boundaries of smaller units of influence such as local councils could be dependent on areas defined by topographical features. In the case of the edge site in Karori, which has been identified as suitable for development in this study, it can be seen as an area defined by topography. With two considerable hills either side of it and a direct route to the centre of Karori along the gently sloping valley between, its boundaries can be influenced through topography. When boundaries are formed from physical qualities of the land, then there is a visible reason for those boundaries being where they are. When the boundary is overlaid and reinforced by a built form, then people can readily visualise and understand these zones, helping them form distinct community and identity. The different scales of zones of influence, nested within each other are supportive of Beatley's argument that understanding an area at regional and local scales gives planners the greatest opportunity for sustainable communities. Co-ordination and co-operation between zones is imperative and at the level of neighbourhoods and districts the local communities need to be involved shaping both the built and natural environment (Frey 2000, p. 25). The series of nested zones within Wellington and with respect to development along the edge of the Greenbelt can be seen as the Wellington Region (Wellington City Council), the Greenbelt, and the nodes along the Greenbelt edge.

A strong social component is equally important to the idea of sustainability as ecological issues. This is about creating and supporting liveable places and communities that offer a high quality of life. Key ingredients include an emphasis on pedestrian friendliness, mixed land uses and the importance placed on the social unification functions of public buildings and spaces (Beatley 1995, p. 387). There is a density of people and commerce required to create a critical mass of activity, and pedestrian and public spaces that encourage this activity to occur. A community which nurtures a settlement pattern that is uplifting, inspirational, memorable and engenders a feeling of attachment and belonging is sustainable. It also must nurture a sense of place by understanding and respecting its bioregional context, and the unique aspects of this.

Wellington is particularly well situated to take advantage of its natural context, being framed on one side by the harbour, and on the other side its growth being restricted by the topography. These two framing conditions enable the city to be constantly seen within its natural context and Wellingtonians have a particular sense of place because of how the city intertwines with its context; partly out of design and partly because there is no other alternative. The downtown city, or CBD, is built on the flat along the harbour edge and the harbour front is being developed as a high amenity public space with many key buildings located along its length.

Through this, the focus of Wellington's development has shifted away from materialistic guantity and towards more abstract measures of quality, which fit closely with definitions of sustainable society. With the available sites for public buildings and space along the waterfront slowly reducing as final pieces of design are woven into place, perhaps the next emphasis for the Wellington City Council in terms of high quality public space should be along Wellington's outer edge, its green edge or periphery.

Theories of post-modernism have led to a reassessment of the urban periphery and its significance for an understanding of contemporary urban development. In addition, these regions are the sites for a new type of development project where planners and urban designers have attempted to create truly urban spaces in spite of their peripheral location (Ludger 2004, p. 89). The city needs to be seen as a whole, the centre and the periphery. The urban periphery has come under particular scrutiny when trying to discover new city forms as it is generally the part of the city least inhibited by older forms.

Traditional forms of expansion on the periphery of cities have generally been suburban, based on modernist principles. However, since the late 1980's, urban planners in Germany and North America have departed from traditional forms because either high density satellite towns or low density suburbs seem to lack urban qualities. The new forms of development aim to create good urban development. There is a clear understanding that urbanity is linked to community, to social processes amongst residents and other users of those spaces and can be attributed to human social behaviour and well-being (Ludger 2004, p. 90).

With a number of specific sites identified for development along Wellington's greenbelt edge, release points into the greenbelt for recreational users can be established along side intensification. The sites also can function as receptors on the edge; users of the site will be aware of the city's conscious relationship with its hinterland.

#### 1|2.02 **Decentralisation. Intensification of the Suburbs**

Most of the problems of our settlements have a single root cause, theorises Leon Krier, Urban theorist and Urban Village advocate. This problem is that instead of growing organically by means of multiplication or duplication of autonomous guarters, twentieth century cities suffer from various forms of monofunctional over-expansion, which creates chaos in terms of their structure, use and appearance. Monofunctional expansion can be seen as directly related to the modernist view of the city as a machine for living. Krier refers to the city as an organism, which represents a significant transformation in thinking from the modernist view.





VERTICAL & HORIZONTAL "OVER EXPANSION"



Organic EXPANSION through DUPLICATION

GROWTH MAKES SENSE ONLY WHEN IT HAS A PREDETERMINED GOAL. MATURITY IS THE END goal of all growth. Overexpansion signifies a loss of limits. All excessive expansion and growth lead to the exhaustion of the generative process.

Figure 10: Leon Krier, Organic Growth and Expansion through Duplication (Krier 2009, p106)

ABBAA AABABAA

Monofunctional expansion can also cause the critical imbalance between centre and periphery (Krier 2009, p. 99). This is formed from buildings at the centre being excessively dense along with activities and users, exploding land values and rents. This trait emerged after the Second World War and continued until the 1980's resulting in a built fabric that largely lacked its natural counterpart (Fulton 2002, p. 159). Unless restrained, peripheral expansion will continue in the form of low-density buildings, uses and activities. The two extremes are interdependent and cannot be solved in isolation. The modern urban theorists who find fault in today's city form almost unanimously accept this theory.

Krier argues that "the authority and legitimacy of architecture and urbanism can be regained today only by offering practical solutions within an ecological context." (Krier 2009, p. 99) The ecological solution to today's highly industrialised and car-dependent society needs to transcend single buildings and the challenge is to re-organise the territorial relationships within society's daily routines which means addressing the loose, sprawling suburban typology that has surrounded cities. One way in which this can be achieved is by intensifying suitable edge sites.

The current city form that has emerged needs to be made to work and the form that may help it do so is based on compact neighbourhoods, districts and towns as micro-structural elements of the city region and a mutually supportive, symbiotic relationship between built-up areas and open land (Frey 2000, p. 13). The compact city is beneficial with respect to its environmental, social and economic sustainability. In the UK, government planning has agreed on this and consequently urban intensification as a means of achieving higher densities is now advocated in numerous land-use planning policy and guidance documents (Williams 2000, p. 30).

Contrary to dispersed British cities, the twin historical conditions of apartment living and outdoor public activity in continental Europe has given their cities a compact and innately sustainable form (Scoffham 1996, p. 70).

The compact city theory advocates a high-density, mixed-use city, where growth is encouraged within the boundaries of existing urban areas, but with no development beyond its periphery (Cousins 1996, p. 54). The aim is to avoid escaping the problems of the city by extending its boundary but to solve its problems within existing boundaries. Theorists concede, however, that even with higher urban densities, development will have to continue outside existing urban boundaries (Breheney 1996, p. 25). Within the Greater Wellington Region, new growth will take place within the greenbelt boundary alongside the North-South Urban Motorway.

The redevelopment, maturing, completion, and internal growth of the suburbs can be the goal of a truly ecological civilisation (Krier 2009, p. 108). In order for this to be done, however, significant redrafting of land use plans and the revision of urban development programmes will have to take place. Ecological development plans have the ability to transform the suburbs, permitting the establishment of structure and functions that they do not have and which are necessary to provide their own economy, community life, and autonomy (Krier 2009, p. 100). A successful compact city should give the same amount of importance to environmental concerns as social and economic development and development on the edge would be visual confirmation of this intent.

Intensification and compaction can also lead to the polycentric city model where through the combined processes of accumulative population density and local interactions, stable sub-centres can form. Such sub-centres are first established through clusters of local developments and thereafter clusters continue to capture development opportunities through reinforced local

interactions (Wu 1998, p. 732). With the evolution, however, problems such as congestion can occur if not designed for and development may be driven to other locations. It has been found, however, that a subcentre does not function properly until the size of the city has reached some threshold level (Wu 1998, p. 734). For a true polycentric city to form through self-organisation, centripetal forces attracting people to the city centre must be less than centrifugal forces attracting people to peripheral areas (Wu 1998, p. 735).

Stable sub-centres are formed from the departure of the mono-centre because of intimate local interactions, where local businesses play an important part. The formation of a sub-centre is seen as a "niche" which continues to capture further development opportunities. The information age has revolutionised communication and therefore businesses do not have to be centrally located. Quality of life is increasingly becoming an important factor; this means proximity to an appropriate (suburban) workforce to reduce travel times and high amenity locations (Cousins 1996, p. 56).

True polycentricity is not desired in Wellington because of its successful, compact centre and geography, so suburban intensification must co-ordinate its growth with that of the city centre. In this case, the centripetal forces are greater, and are consciously kept this way to emphasise a central point for business, culture and governance, providing more than individual sub-centres. This model aligns itself with Calthorpe's TOD's.

A contradiction in the compact city model is the desire to use the existing land within the city more intensively as well as providing more green space within the city. Again, the planning history and topographical features of Wellington lend themselves to solving this problem whilst supporting the vision of Wellington successfully applying compact city theory to its planning. The city has an Inner Town Belt providing green space encircling the city centre, the Outer Green belt providing green space on the periphery and the protection of hilltops, ridgelines and also streams adds to the wealth of recreational space. Most sites within the city centre are extremely close to recreational open space and also constantly aware of the visual presence of this open space. Densification and intensification of suburban centres can therefore take place without encroaching on natural amenity.

A key document strongly advocating urban compaction is the UK's Planning Policy Guidance 13: Transport. The document calls specifically for urban compaction in general and particularly around transport nodes. The policy, which intends to reduce transport and therefore generate a more sustainable city form, promotes much stronger urban containment and the compact city(D.C.L.G 2011, p.6). The logic behind this document is simple; stricter urban containment will reduce the need to travel, which is the fastest growing and hardest to control contributor to global warming.

Even though the argument for compaction is clear when considering the environmental benefits, people still argue for decentralisation. Advocates of decentralisation can generally be divided into two groups: (Breheney 1996, p. 13)

- Free-marketeers, who claim that the optimum city form will be provided by market solutions.
- People who argue for a decentralised lifestyle, both geographically and locally.

Other theorists such as Louise Thomas, Brenda Vale, Will Cousins and Michael Breheny, fa-

vour neither decentralisation or centralisation solutions and believe in a compromise position. They advocate a decentralised urban form that is physically and virtually compact; where local compactness is complemented by regional compactness and where the routes between settlements are so efficient that travel times and distances are reduced (Breheney 1996, p. 12).

The notion of a city only becomes a meaningful reality when urban communities are formed (Krier 2009, p. 107). Intensification of existing suburban centres could lead to a return to Howard's vision of independent nodes surrounding a central city, although this adaptation would still step away from his original vision of enough agricultural land either to be self-sufficient. In the case of Wellington, most suburbs have ready access to open land within the inner town belt and outer green belt. Intensification of suburban centres is motivated by the same goals as Leon Krier, who argues for a city of urban communities, or a polycentric federation with an emphasis on walkability (Krier 2009, p. 107). This view is partly founded by observing that while functional zoning of cities ensure maximum wastage, the traditional form of the city is instead organised into smaller or larger families of pedestrian sized quarters and the understanding that urbanity is desirable for a rich and varied built fabric. If urbanity is to survive in the highly decentralised modern city, then it must be present at many points within the region (Krier 2009, p. 107). Mumford's "compact, rigorously confined urban grouping" might be achieved at many points in the region in places that combine the pedestrian scale and vitality of the best urban neighbourhoods with rapid efficient transport ties to the core. An intensified node on the greenbelt edge but associated with a suburban centre would be one step further again.

The low-density suburb has been proven by the market to be the most appealing living condition in the Western ideology, and a suburb in the right conditions can be an uplifting place to be a part of. There is no need to take intensification policy to mean that the suburban fabric would change beyond recognition. In fact, as Leon Krier argues, the redevelopment, maturing, completion, and internal growth of the suburbs can be the goal of a truly ecological civilisation (Krier 2009, p.108).

New Zealand cities are identifying intensification of suburban centres as part of their growth plan. Auckland's growth policy identifies compact development and intensification of existing areas. Centres chosen for densification are spread throughout the urban area and along key transport routes and the development of each centre is guided by a plan drawn up in partnership with the local community concerned and the council (Freeman 2003, p. 197).

Tauranga, one of the fastest growing provincial regions in New Zealand, has identified five growth areas situated on the urban edge of the city; Bethlehem, Pyes Pa, Ohauiti, Waikite and Papamoa, giving residents amenities such as being close to the countryside, being part of distinct neighbourhoods with a high level of accessible facilities, and having an efficient transport networks connecting the peripheral settlements to central Tauranga (Freeman 2003, p. 207).

Freeman considers that "New Zealand towns and cities are in a particularly strong position to move towards more sustainable layouts, providing they catch a glimpse of the potential" (Freeman 2003, p. 217).

#### The Acceptability of Suburban Intensification 1|2.03

Intensification policies in the UK are driven both by environmental objectives and objectives concerning quality of life. As summarised by Katie Williams (Williams 2000, p. 33), three planning objectives concerning environmental objectives are stated throughout planning policy, as well as three regarding quality of life.

## Environmental policy:

- To reduce greenhouse gas emissions by reducing the number and length of trips by modes; walking, cycling and public transport.
- To use land in the most sustainable way by protecting the countryside, valuable rural land and greenbelt and concentrating development in urban areas.
- ٠ To reduce energy consumption by providing building densities capable of supporting district heating and combined heat and power systems.
- To ensure housing needs are met in the most sustainable way and improve quality of life.
- ٠ community spirit and safety.
- ٠ residents.

One of the main problems in advancing the debate about the compact development model is that there is a lack of empirical evidence to support either claims or counter-claims (Phan 2009, p. 83). However, recent case studies carried out by Williams on the intensification of the London Boroughs of Camden, Harrow and Bromley have yielded the following summarised results on whether intensification is a sustainable form of growth.

### Environmental policy:

- ٠ duced. Reasons may be that change in the built form is slow, development patterns are inherited from the past and growth in car ownership and diffuse life patterns are trends that cannot be influenced by planning alone.
- Processes outside land use planning such as education and cultural changes will be required to maximise the potential that compact urban forms can offer.

## Quality of Life:

- ٠ a positive effect on the quality of life.
- If there was increased noise and traffic or the development was deemed unattractive . then intensification was seen to have a negative effect.
- ٠ loss of light, loss of amenity, a dislike of new people in the area or loss of character.

carbon fuelled modes of transport primarily the car, and increasing trips made by other

To upgrade and improve towns and cities and therefore foster civic pride, local identity,

To improve social equity by making services and facilities more accessible to all urban

The major failure of intensification policies is that transport by private vehicles is not re

Residents found the general effects of intensification, such as new facilities, as having

Almost any new development in the suburbs was met with residents complaining of

Williams concludes that opinions on intensification and quality of life are a reflection of how intensification affects the existing assets which people value within a neighbourhood. If residents valued social vibrancy, and intensification appears to add to them, then they will see it as positive. If people value the quietness of a residential neighbourhood and intensification changes that then it will be seen as negative. Residents almost always wanted to retain the existing social profiles of their neighbourhoods, not diversify them.

Overall, intensification did lead to land being managed in a sustainable way and also contributed to improved economic conditions at local centres. It helped make them more viable, lively and attractive, contributing to improving the quality of life near by. It seems that intensification measures with reference to the sustainability debate can be seen as necessary but not sufficient. According to Williams' study it can be said that most benefits claimed for intensification are at the strategic level yet most of the impacts are local and most likely to be negative. However Mike Jenks (Urban Planner and theorist, UK) has shown that although intensification can have positive and negative impacts, if understood and managed well, the process can be acceptable and provide more sustainable urban areas (Jenks 2000, p. 244). Jenks' research into the acceptability of intensification to locals shows that increases in development is seen in a more positive light than increase in activity. Perceived benefits were better public transport and shopping facilities, and improvement to an area through well designed buildings and public spaces.

Intensification that is well-designed and predominantly residential will generally be viewed positively and there is a strong preference for development that is in keeping with the local character. Perhaps the preference for development in keeping with local character could be overcome by a shared community vision for suburban centres being transformed into autonomous towns.

Intensification is less well-received in suburban or primarily residential areas than in mixeduse, or urban areas. This is because suburban residents often seek to protect the peace, quiet and space of their area, their primary concern being environmental quality. For intensification to be a convincing argument, suburban residents will need assurance that environmental quality will not be reduced. Coupling intensification with clear goals for improving recreation and providing high-quality public open space into a single vision for the community may be an answer. A collective desire for autonomy within a suburban community will also contribute to successful implementation of intensification. Forming a collective vision for autonomy and approach towards realising this goal will be the most challenging step, but through a collective community approach driven by a common vision, "definitions, proposals, plans, scenarios and solutions [will no longer be] starting points in planning; but results of the decision making process" (de Roo 2000, p. 233). Providing master-planning showing zones for intensification and zones affected by proposed intensification will also be visualising tools for residents.

## 1|2.04 Decision Making Policies for Intensification

Since the Brundtland Commission popularised the term, the mainstream understanding of sustainable development has moved on from one with primarily an environmental focus to one which emphasises the need to integrate the three legs of sustainable development - the economic, social and environmental (Freeman 2003, p. 227). Policy makers increasingly emphasise the need for integration and win-win-win solutions instead of trade-offs between economic, social and environmental. This can lead to avoiding the need to make difficult decisions, which in turn may not yield optimum results for sustainable form. What is needed to overcome this problem are communities that have a vision strong enough to over-ride relatively temporary sacrifices that have to be made for an optimum city form.

For the city to adopt a policy leading to a sustainable urban form, it needs to give its parts (suburbs) more localised power, more autonomy and more ability for these parts to be able to make decisions and secure funds. This will enable each part to achieve its own long-term interests that will make it unique. As a result the city will be made up of parts with their own characteristics and peculiarities but operating with common goals that unify them as a city. "This is a compaction of control, not of physical size or form. The better word to describe it would be autonomy" (Scoffham 1996, p. 73).

To make a suburb an autonomous part of a city, it will need to have all the resources of a town and this process involves changing the typical land-use of suburbs into a more urban form. This process can happen gradually but will have to be supported by residents living within that community.

For the new urbanists, planners must go beyond management roles in development to take positions of leadership within the community and with their expertise, help form good communities through design (Grant 2006, p. 19). New Urbanists have a clear belief in the ability of the built environment to create a sense of community (Grant 2006, p. 71).

Leading with a vision might be a problem at a time where there is a "Nimbyesque public" (from NIMBY: Not in My Back Yard), a hypercritical press, and a consequently nervous political generation (Welbank 1996, p. 74). This has made anything other than ad-hoc and short term planning or developer driven projects extremely difficult. Theory and implementation capability need to go hand in hand (Welbank 1996, p. 76).

Another argument for the compact city is social cohesion, which people in general claimed they desired and sought, however, our society has never been more motivated by the goals of the individual. It is possible that until social cohesion is achieved, forcing people into tight proximity will not help at all. The enormous voluntary exodus from cities demonstrates the desire for social cohesion and does not override the desire to live in suburbs and low density urban areas, given the benefits of mobility and technology (Welbank 1996, p. 80). It is possible, however, that given a unifying goal such as a sustainable vision, a suburban community will be formed.

Mumford observes that "only in a city can a full cast of characters be assembled; hence only in a city is there sufficient diversity and competition to enliven the plot and bring the performers up to the highest pitch of skilled, intensely conscious participation." (Fishman 2002, p.65). Sufficient diversity and conscious participation are intertwined in building up momentum for arguments towards intensification.

It is essential that, for the compact city debate to be acceptable to residents, the strategic objectives deliver some of the local advantages such as better facilities, better public transport and a more vibrant social life. More important is that these benefits are not outweighed by the problems of more compact living such as congestion and overcrowding (Williams 1996, p. 84). Social equity is another argument for compaction, where most residents will be within a 10 minute walk of facilities and services.

The following will show that changing the typology of a suburb is not an easy task to undertake but can be successful if approached in the right way.

Kate Williams makes two important points that are relevant to planning approaches with suburban intensification in mind when concluding the results of her case studies in London. Firstly that residents almost always will want to retain the existing social profiles of their neighbourhoods, and secondly that processes outside land use planning such as education and cultural changes will be required to maximise the potential that compact urban forms can offer.

The implications of these two findings are that a planning approach that educates and involves communities is required to intensify suburbs. Urban planning and community planning activities present fundamental opportunities to rethink and reshape the way we use land, energy, and out of this, invent the kind of places that will sustain the planet and the human spirit. The community needs to partake in developing and realising the unifying vision of a more ecological form of settlement and this unifying vision may well overcome the perception that intensification of suburbs may have detrimental effects on individual properties and lifestyles. In other words, sustainability can be the unifying goal to a consensus approach and that all stakeholders must agree that the health, equity and viability of the city system is the precondition to any decision (Dumreicher 2000, p. 291). Stakeholders aim to satisfy their personal interests within a collective direction.

There is huge potential for communities to be integrated with councils in terms of a planning vision for the community. Working at both regional and local scales may offer planners the greatest opportunity to incorporate sustainability into their work (Beatley 1995, p. 384). When considering decision-making policies on a regional and local scale, different approaches will be required.

The consensus approach which is based on participation and more or less equal interactions between people involved is seen as a way to define conflicts, to acknowledge different interests, and to generate commitment to the decision making process (de Roo 2000, p. 232). This process becomes important when the number of relevant actors with different interests is relatively high. Processes are needed which develop a mutual understanding of the present situation, shared visions of a better society, realistic strategies to achieve these visions, and comprehensive practical activities. This planning approach is what would be necessary to build up an understanding within a community of how intensification of suburbs is a necessary and ecological vision, and then to act on this vision.

The forces driving the evolution of urban structure are inherently microscopic, meaning local. Self-organisation and complexity theories also suggest that insignificant local behaviour can lead eventually to a qualitatively different global structure (Wu 1998, p. 732).

Identifying areas suitable for intensification at a regional scale would be more suited to a hierarchy approach, where a specific and objective outcome is desired and decisions can be made by referencing Regional Council criteria.

In Graham Haughton's paper on sustainable city models within Australia (Haughton 1999, p. 1894), he defines the most ecological and sustainable approach to city form as the self-reliant city. The emphasis is on combining a more sensitive approach to nature with decentralised, grass-roots politics, where community activism is preferred over state-lead bureaucracy. This

means self-regulation, or decentralised control based on participation and collective decisionmaking. The self-reliant city model will only work however if the majority of the community is ecocentric - a "deep green" moral sanction (Haughton 1999, p. 1894).

How to treat the site once it has been identified must involve a consensus and objectives based approach so they can be judged by their importance within the context of the city, site specific qualities such as topography, biodiversity and visual amenity, and local community goals.

This is an approach that has been successfully implemented already in New Zealand planning policy and the merit of enabling informed interaction on the issue of layout management has been emphasised. New Zealand Policy recognises the need to examine options, devise preferred outcomes, and in the process make attitudinal and behavioural shifts. Elements of such processes have been used with good results in Auckland and Tauranga (Freeman 2003, p. 217). The debate regarding peripheral development in both of those regions is in part a response to effective community involvement in the decision making process (Freeman 2003, p. 217).

As the average settlement or suburb size is relatively small when compared to their counterparts elsewhere, New Zealand communities have a distinct advantage when it comes to collaboration. The possibility of successful integrated management and the endorsement of a shared future vision is therefore greatly enhanced (Freeman 2003, p. 216).

## 1|2.05 The Form of Suburban Intensification

Within New Urbansim, new forms of sustainable settlement patterns are being developed centred around public transport and walkability with an emphasis on easy application of the schemes into existing built fabric and community. Christopher Alexander has commented on Transit Oriented Development and Traditional Neighbourhood Design, speaking of them as highly practical solutions. He likens them to an appliance which can be plugged into existing the existing power grid anywhere. Duany and Calthorpe both understand the need to design a variety of different 'plugs' because for urban development to be sustainable, it must fit into the existing fabric and compliment it (Fainstein 2006, p. 376).

"Fitness", which is derived from Charles Darwin's The Origin of Species, when used as an urban design term, describes the appropriateness and adaptability of the new organism to fit into the host (Neuman 2005, p. 18). Planners, architects and builders should treat buildings and developments in the context of the city as organic pieces which belong together as a whole. Resilience is another term derived from biology which measures the sustainability of a design proposal. It asks how well the host community absorbs the effect of the introduced activity. It asks the question: what is the range to which the host can absorb the effects of the foreign or new and retain health and integrity? This is based on accommodation between the two (Neuman 2005, p. 18).

Richard Rogers also argues that "excellence in the design of buildings and spaces cannot exist in isolation from a clear understanding of what makes the most sustainable urban form(Rogers 1999, p.41). It is the neighbourhood which forms the basic building block of the town and the

city, and new urban design should strengthen the neighbourhood block if it exists, or, in the case of sprawl, should help identify new neighbourhood centres.

## 1|2.06 Plug-In Parts to the City: how to design for Compatibility whilst retaining ecological ideals

The use of both formal and informal design to guide form for intensified sites on the edge of Wellington is relevant because edge sites are topographically constrained, meaning that organic forms will may be necessary to situate buildings on steep sites. Making a clear distinction between formal and informal forms within the design is a way of articulating the fusion, or edge condition between suburb and hinterland.

Within the New Urbanist theory, there is an on-going debate between formal and informal design and this debate has revived the reputation of John Nolen, a prolific planning consultant of the late nineteenth and early twentieth century. Andres Duany who is a key figure in the New Urbanist movement frequently points to Nolen's formalistic designs, his focus on prominent civic spaces and creative use of modified street grid systems. Nolen learned from his professor, Frederick Law Olmstead Jr at Harvard, about the importance of using both informal and formal traditions in landscape design.

The informal approach tended to follow the lines of topogrpahy with asymmetrical and curvilinear patterns; the formal approach derived from Baroque-era ideas of axis, symmetry and rational progression imposed on site. According to William Fulton (New Urbanist and American urban theorist), it is tempting to conclude that this melding of traditions was the real strength of community planning in the pre- World War Two era (Fulton 2002, p. 167). This approach has particular importance to sites which have topographical features as well as proximity to a town grid. Using the formalist grid to reference the existing fabric whilst taking site-specific responses into the design is a holistic approach. Because formalist design meant civic spaces such as town squares, which did not accommodate vehicle infrastructure particularly well, informalism prevailed after the 1930's. Its form accommodated low-density housing more efficiently as well. The formal realm can be seen civic public spaces and streetscapes as opposed to the informal realm which implies social gathering spaces through greenbelts and other informal open space. One of the most important contributions of the New Urbanists has been to re-emphasise the importance of the public realm and formal gathering spaces. The lesson they take from informalist design is that community identity cannot be created entirely through social organisation but also needs centered, physical space (Fulton 2002, p. 167). However it is the combination of both informal and formal spaces that creates a rich community and site specific design that creates a sense of place.

This combination of formal and informal design can be put to use to "compress history" (Fainstein 2006, p. 369), as Andres Duany describes the action of achieving in a short time what would happen over a longer period. This could be seen as organic growth around formal planning gestures such as transport infrastructure and community spaces.

When New Zealand towns were being planned in the mid to late nineteenth century, Europe and the USA were looked to for guidance on open space planning and design, particularly in-

fluential planners such as Olmstead.

Olmstead laid out three design imperatives his 1870's address, "Public Parks and the Enlargement of Towns"; public health, social well-being and provision of urban amenities for all. The combination of formal and informal design must also have been valued for the design of New Zealand towns, with early town planners recognising that "in New Zealand we enjoy exceptional opportunities for creating cities of ideal beauty." (Freeman 2003, p. 148)

## 1|3.00 Literature Review: Conclusions

The land included in the Wellington Outer Green Belt has not been built upon because suburban growth has been constrained by topography and productive farmland along the city's western edge. The precedent of the extremely successful Inner Town Belt providing visual and recreational amenity coupled with the public desire to protect hill tops and ridgelines from built form and for a continuous network of recreational tracks along the city's western edge has allowed the Wellington City Council to purchase and put covenants over a large part of the land within the Outer Green Belt zone.

The Wellington Outer Green Belt differs from many other examples of greenbelts because it does not function primarily to restrict growth but to provide visual and recreational amenity. The high amenity edge between greenbelt and suburb poses a strong argument for intensification, so more people can be close to this amenity and contribute to improving facilities, resources and access points.

An increase of permanent residents on suitable edge sites provides reason to have a small number of shops and cafes on the edge which would contribute to attracting visitors to the greenbelt. Intensification also provides opportunities for Wellington City Council and local communities to collaborate over mutual objectives. A collaboration could involve funding and support from council to adjust the greenbelt boundary to accommodate suitable development while providing better access points and facilities for recreational uses of the greenbelt.

Wellington's growth is defined by two edges; the greenbelt edge and the waterfront. Intensification on the greenbelt edge will strengthen the ties between the two edges; the waterfront has high amenity and therefore intensification and this thesis argues that the because of the high amenity, the greenbelt edge should also intensify.

The council acknowledges that initial adjustment of the greenbelt boundary is expected, but this thesis argues that the boundary must then become fixed to provide a finite edge to the city, and as irrefutable as the waterfront edge. Well-designed and planned intensification provides the means to define the edge of the city visually whilst increasing the number of people using the site.

Intensification on the edge must be associated with an existing and well established suburban centre for it to fit within the existing fabric and complement an ecological city form. The increased autonomy of the suburb through intensification is a common theme in ecological city form. New settlements on the edge must be well connected to public transport systems and promote sustainable modes of transport but to be successful must also provide adequate parking for residents and visitors.

Combining formal and informal elements to help visualise the fusion between city and hinterland is a logical design approach and one which lends itself to public green spaces and tracks and efficient accommodation for business, retail and residential.

The literature review highlights that although intensification of suburbs is encouraged within contemporary city theory, suburban residents are resistant to change. This can be overcome through collaborative decision making processes and community awareness and involvement. Perhaps the concept of defining the edge of the city will allow suburban residents to visualise the necessity of intensification within a finite city footprint and specifically an edge site where immediate benefits for residents will be seen.

Various models for city growth have been explored within the literature review but it is clear that Wellington has a successful, vibrant and compact centre which shouldn't be detracted from by suburban intensification. This means that suburban intensification must not take place in isolation of growth within the city centre as it may encourage a 'rotten core'.

Defining the edge of the city through intensification explores two common ideas in ecological city form; intensification and defining city growth limits but intensification has not been explored in order to define the edge of the city. The challenge of the design is to fit into the existing suburb and contribute to the overall health of the city region. Although intensification within suburbs is seen as the next step in their evolution towards a sustainable form, the most exciting and potentially successful ideas this thesis explores is heightening awareness of the edge of the city by defining it through built form, increasing contrast between inside the city and its surrounding environment, generating a higher number of recreational users of the greenbelt with better access to facilities and amenities, and commenting on the nature of the relationship between the city and the environment which surrounds it.

The edge of the greenbelt can be compared to a permeable membrane. The design will provide for the recreational activities that can permeate this membrane whilst simultaneously restraining built form and infrastructure gathered on the edge.

# 20.00 Case Studies

#### Introduction 2|0.00

Five case studies are used to understand the use of Wellington's Inner Town Belt and Outer Green Belt with regard to public green space, visual amenity, built form and topography. The use of multiple case studies allow these qualities to be explored at regional, community and site specific scale.

#### **Greenbelt Case Studies** 2|1.00

#### <u>2|1.01</u> **Diagrammatic Representation of the Wellington Outer** Greenbelt

## Aim:

Wellington's Outer Greenbelt is a continuous greenbelt following the ridges west of the city from the South Coast to Colonial Knob. The Wellington City Council's intentions are to restore indigenous vegetation and make accessible an informal network of recreation tracks (Nicholson 1998).

Land on each side of the greenbelt boundary is varied in use. Each land use can be measured by either assessing it's quality or intensity. This case study will:

Develop a diagrammatic representation of Wellington's Outer Green Belt, in order to:

Act as a rationale for identifying sites along the boundary which are suitable for intensification through analysis of land use and quality on each side of the boundary.

Identify critical edge conditions along the greenbelt edge.

## Methodology:

For analysing land quality and land use, almost all the information can be found from aerial photography (Whitford 2001, p. 92), so Google Earth imagery was used.

The land-use on the greenbelt side of the boundary can be put in the following categories:

Note: these categories apply specifically to land-use along the Greenbelt edge in Wellington.

- Regenerative bush. 1.
- Land fill 2.
- 3. Coastal scrub
- 4. Established bush
- 5. Farmland

On the diagram these categories are shown above the greenbelt boundary line.

Land use on the suburb side of the Greenbelt boundary can be put into the following categories with respect to future development:

- 1. Steep (inhibiting future development)
- 2. Undeveloped
- 3. Undesirable (proximity to landfill)
- Recent development (suburban sprawl) 4.
- 5. Established suburb

On the diagram these categories are shown below the greenbelt boundary line.

To allow the quality and intensity of each category to be mapped within the diagram, the colour coded regions along the greenbelt edge vary in height with respect to the vertical axis, or Y axis. The two terms quality and intensity with respect to land use are used to generate Y values.

Quality is a variable used to measure both negative and positive land uses. For example:

- Proximity to land-fill is measured as having low guality, generating a high Y value. ٠ Land which is further away from the land-fill generates a lower Y value
- High quality established bush is high in amenity, generating a high Y value. Established bush of a lower quality generates a lower Y value.

Intensity is a variable which relates to built form and measures the amount of built form against the greenbelt boundary. For example:

- If suburban fabric is particularly dense against the greenbelt boundary then this will generate a high Y Value.
- If suburban lots are lower in density along the greenbelt boundary this will generate a low level of intensity and low Y value.

The diagrammatic representation of the greenbelt allows land-use to be analysed in conjunction with intensity and guality to provide a framework for identifying sites for intensification.

## **Observations:**

The diagrammatic representation of Wellington's Outer Green Belt has identified a two important boundary conditions that are important to this study, as well as identifying possible sites for intensification. These are:

• The land uses of high quality established bush and established suburb provide a privileged and sought after edge condition.

• Low quality farm land and a high intensity of recent development generates an edge condition which visually appears speculative. Without high amenity land use on the greenbelt side of the boundary, suburban sprawl is not visually contained.

Eight sites where there was undeveloped land on the city side of the greenbelt boundary were found and these can be treated as potential development sites.

The sites, identified as yellow on the diagram, are numbered starting at the south coast as follows:

- 1. Southern Happy Valley Road, Owhiro Bay
- 2. Mitchell Street, Brooklyn Heights
- 3. George Denton Park, Highbury
- 4. Parkvale Road, Karori
- 5. Spencer Street, Croften Downs
- 6. Awarau Street, Croften Downs
- 7. Between Vasanta Avenue and Satara Crescent, Khandallah
- 8. Between the suburbs of Churton Park and Tawa

## **Conclusions:**

- Three critical boundary conditions are identified and each has the following implications:
- Undeveloped land has potential to be intensified.
- Recent suburban sprawl against low-quality farmland creates an edge condition which visually may require containing where the intensity of the sprawl is at its highest.
- Established bush and suburb create an ideal edge condition which does not require change, or defining further.
- Therefore, two edge conditions have the potential to be intensified. The latter, recent suburban sprawl against low-quality farmland may require a linear form of intensification that visually restrains the sprawl.

## **Comments:**

• Edge conditions which require containing are identified but not explored through design.



**Figure 11:** Wellington region showing the Inner Town Belt (blue) and Outer Green Belt (Green)

## LAND-USE GREENBELT SIDE LAND-USE SUBURB SIDE





**Figure 12:** Plan of the Wellington region showing land-use types on each side of the Outer Green Belt's eastern (suburban) boundary







Figure 13: Diagrams examining land-use on each side of the greenbelt boundary (Scale-1:10,000@ A1 original)



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## 2|2.00 Figure Ground Case Studies and preliminary greenbelt analysis

Note that chronologically this study predates the Wellington Greenbelt analysis.

## <u>Aim:</u>

To examine the existing edge condition of the Wellington Outer Green Belt:

• To establish what influence topography has had on settlement patterns.

• To establish whether settlement patterns acknowledge the existence of the greenbelt edge by changing their form.

## Methodology:

- Assemble an aerial representation of the length of the Wellington Outer Green Belt from Google Earth imagery and overlay the existing concept zone of the greenbelt, (WOGBMP, pp 23) to establish the boundary line in relation to satellite imagery.
- Contours, at 10 meter intervals are overlayed.
- Identify sites along the suburban (eastern) edge of the greenbelt for figure ground studies. Sites start from the southern end of the greenbelt and work north and were selected because of their expected suitability to development but also to investigate density and the built fabric's response to topography.

## **Observations/Conclusions:**

- Density on the edge of the green belt is more or less uniform. Buildings are small scale detached residential on suburban sections. The only exception to this are some larger scale warehouses in Owhiro Bay.
- The built-form is greatly influenced by topography:
- Roads follow contours where they can and therefore
- Sections follow contours where they can
- Building is inhibited by steep topography

## **Comments:**

- This case study is not objective enough and confuses the directives of finding suitable sites for development and providing an unbiased analysis of the edge condition.
- If the study was done again methodology would specify sites to be chosen at intervals along the edge, for example 5 kilometre intervals.
- Note that the boundary condition was extensively analysed through examination of satellite imagery.
- However, the study has succeeded in its purpose to provide preliminary analysis of the edge condition and identified the need of an objective method for identifying suitable sites for intensification. This evolved into the diagrammatic representation of the W.O.G.B.



Fig. 14: George Denton Park



Fig. 16: Owhiro Bay(I)



Fig.18: Owhiro Bay(II)



Fig. 15: Crofton Downs



Fig. 17: Parkvale Road, Karori

#### 2|3.0 0 Case Study: Transects across central Wellington and Inner **Town Belt**

## Aim:

Wellington's Inner Town Belt, implemented in the original layout of Wellington in 1841, has for the most part been retained for public use, with only small areas taken away for other uses, such as the site of the Victoria University Kelburn campus. The belt separates the city centre from the suburbs.

The study investigates a number of elements which will provide information that can be applied to the edge condition of the Outer Green Belt.

The relationship between the suburban edge of the town belt and the city edge are of interest because the built fabric is over 150 years old and has had time to grow and adjust against the town belt, providing clues as to what the edge condition to the Outer Green Belt may be like in the future.

The city edge of the town belt is also relevant because of its higher density and application to intensification.

Victoria University provides another example of density against the town belt, which is relevant because of the contrast between suburb and dense university form. This can be seen as an example of what intensification could be like on the edge of the Outer Green Belt.

This case study investigates:

- Density and whether the built fabric has responded to proximity to the Inner Town Belt ٠ because of its amenity.
- The effect of high density within a suburban setting.
- The edge condition between built form and public green space.
- The edge condition created between green space or built form and the motorway. ٠
- The effect of topography on the built form and the influence it has had on the Town • Belt Boundary.







### Figure 20: Sections corresponding to Fig. 19

## Methodology:

- An area of Wellington is chosen so that it includes areas of interest. Areas of interest are:
- A section of Tinakori Hill, including its summit.
- A section of the Wellington Botanic Gardens.
- A section of the suburb of Kelburn.
- Victoria University Kelburn Campus.
- A section of Aro Valley.
- The Terrace.
- Part of the Central Business District.
- Parliament and grounds.
- Part of the public waterfront.
- A section of the Wellington Inner Town Belt.
- A figure-ground diagram of the area is constructed, colour-coding Inner Town Belt, CBD, Waterfront, University and residential.
- Contours, at one meter intervals are overlayed.
- Six sections cutting through points of interest are constructed. •
- Section and relevant area of plan are analysed and observations are made under the following headings; Density, Edge Conditions and Public Open Space. Each of these is discussed in relation to topography as necessary.

This method of analysis can also be likened to Geddes' Valley Section and Andres Duany's Transect Diagrams. Duany also uses the plan and section simultaneously to construct Transect Diagrams, so for the purpose of this study each separate analysis of section and plan will be called a Transect.

## **Observations:**

Note: for observations relating to individual transects, see 8|1.0 Appendix: Case Studies

## Density:

- the relationship of dense central city surrounded by lower density residential fabric. The university's relationship with the central city is strong because its buildings are
- The density of residential fabric does not change along the town belt edge.
- Building, private and public has been allowed within the town belt. The three main places where built form has been permitted on the town belt within the study area are around Glenmore Street, Salamanca Road and Aro Valley. These are all major connecting roads.

The dense form of the university is the only group of buildings which breaks away from aligned to the city grid, whereas surrounding residential lots are adjusted to topography.

## **Edge Conditions:**

- The Urban Motorway provides an abrupt and finite edge between the higher density of the CBD and residential fabric.
- The edge to the Botanical Gardens along Salamanca Road is made public because of the road.
- In a similar way, some of the edge between residential fabric and Tinakori Hill has a road . running along it, which makes this edge public and allows access to amenities.
- Most of the Tinakori Hill edge included in the figure ground has residential lots backed up to it, which privatises it.
- The waterfront is an undisputed edge and because of its amenity, there is a strong ٠ emphasis on public space.
- The edge of the town belt and Aro Valley is subtle and shifting because of the seemingly organic protrusions of residential fabric following gullies, and residential lots off roads which were built to link either side of the town belt such as Devon Street and Mortimer Terrace.

## Public Open Space:

- Rhythm of public open space in each transect.
- Highly maintained public open space around the parliament end of the CBD including Botanical Gardens, Bolton Street Cemetery and Victoria University Cricket Grounds.
- Green-space comprised of regenerative/established bush in the outer parts of the . Inner Town Belt.

## **Conclusions:**

- Using a grid system which is already established within existing built fabric will visually ٠ bind new development to existing.
- Built fabric has not changed in density to take advantage of the amenity of the town belt.
- Roads provide a good approach to providing public access to the edge as well as defining it.
- Topography legitimises the edge instead of it being an artificial planning boundary.
- Where there is a connecting road that passes through the belt, development around it is justified and has a higher chance of being permitted.
- Topographical features that lend themselves to roads and building lots such as flatter sites and valleys provide a good argument for adjusting planning boundaries and providing a more organic fit.
- High levels of maintained public space close to high use areas.
- High level of low maintenance public space on outlying areas of the town belt.

## **Comments:**

Ebenezer Howard shaped the ideal centre of his Garden Cities as a central public park, and in his opinion, open space is seen as the middle of the social community (Kuhn 2003, p. 22). Wellington, with its public waterfront framing the dense and vibrant CBD, would have been seen by Howard as an ideal city form.

Transects through Wellington and Duany's ideal transect show similarities.

- Both are centred around a compact centre with a focus on high guality civic or public open space.
- Wellington centre is encircled by inner city residential fabric, showing higher density than outer residential, another parallel to Duany's transect.
- The three outer layers of Duany's transect; Suburban, Rural Reserve, and Rural ٠ Preserve are parallel with Wellington's outer three layers.

#### 2|4.00 **Topography Case Studies**

## Aim:

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The greenbelt edge is uniformly topographically challenged, therefore design to intensify the edge will need to respond to steep sites.

The case study aims to establish a language of design approaches which respond to steep sites for both residential and larger buildings.

The study also selects buildings that respond to an edge condition. Most buildings are located on the edge of either the Outer Green Belt or the Inner Town Belt, however Te Puni Village, Kelburn and Philosophy House, Aro Valley create contrast between large scale and residential fabric and this edge is observed.

## Methodology:

Drawing analysis of 15 buildings or groups of buildings chosen primarily for their • design response to topography but also for their location on an edge.

## **Overall Observations:**

Note: for observations relating to individual buildings, see Appendix

## General:

- Pedestrian paths can be used to service sections on steep sites where road access is not possible. If a number of houses are connected to the path, then it increases privacy and creates a small community of houses.
- Houses which back onto reserve are privileged because of privacy and amenity. They also have security against change.



Figure 21: Elevations of Karori Wildlife Sanctuary visitor's centre



Figure 22: Melling- Morse house on steep site in Highbury





Figure 23: Te Puni Village, Victoria University Kelburn Campus

## Large Scale Buildings:

- Identifying a main level which translates to RL.0.00 on the slope is an important step. Building volume can then be adjusted around the main level to be above or below RL0.00. The main level should be positioned to suit the highest level of use, for example communal/public space and the main entrance, and connect to the most important arrival route.
- Large building volumes can be broken apart into smaller forms to mesh with ٠ residential fabric. Heights can be adjusted to respond to slope, context and visual impact.

## **Structural Strategies:**

## Three structural strategies are observed:

- Cutting into the slope and using a system of retaining wall and concrete pad to accommodate the building footprint.
- Using a pole structure.
- Cutting into the slope and using a system of retaining wall and concrete pad to provide ٠ an anchor, and accommodating the rest of the building footprint on poles.
- Buildings can step into the landscape to reduce excavations.

## **Retaining Walls:**

Where possible, separate retaining walls and exterior walls of the building. The gap between retaining wall and building provides ventilation and room for maintenance and external moisture problems are reduced. Services can also be routed along this space and a lid can be put over the gap.

## Garages:

- Three approaches to garages are observed:
- Parking pad on stilts
- Dug into slope
- Accommodation located above or below to suit the slope and road access.
- Garages can be used to retain and stabilise the slope and provide building platforms as ٠ external moisture is not a critical issue. Access can be located to run along one of the sides of the garage or from inside.

## Aesthetics:

- Building height can be used as a 'measuring tape' against the hillside Using a number of different levels relating to the slope translates the landscape into built form. These levels can be concrete pads which are directly in contact with the
- ground, or can be interior levels. Slopes can be translated into stairs or ramps to provide contrast between topography and built response.
  - If an RL0.00 is identified then this can be visually given importance through design. This also is an approach which allows viewers to 'measure' the height of the hillside with built form, gauging it against this main level.

## **Conclusions:**

- While visually there are many architectural responses to topography, the pragmatic strategies to steep sites observed in the case studies can be summarised, providing a compact database of responses.
- The most common approach to building on extremely steep sites is cutting into the slope • and using a system of retaining wall and concrete pad to provide an anchor, and accommodating the rest of the building footprint on poles.

## Comments:

At the time this case study was conducted, the size of the buildings for intensifying the edge site had not been confirmed, so the study predominately uses residential scale buildings. This is also because the majority of the buildings are located on the edge of either the Inner Town Belt or the Outer Green Belt.

## 2|5.00 Edge of the Grid

James Voller and Robin Aitken; Collaborative Installation, Mygalaxi Gallery Basement of 39 Dixon Street, Wellington

10-24 July 2010

The installation has been treated as an opportunity to:

- Explore a specific site which has been identified through the Wellington Outer Greenbelt analysis.
- Engage with public opinion with regard to building on the edge
- Collaborate with photographic artist James Voller and his work on displacement and growth.

The installation was a collaboration between Wellington photographic artist James Voller and the author. James's work for his Masters Thesis in Photographic Installation looked at the effects of displacing well-known typographies by placing them in foreign contexts through photographic installation. James has experimented widely with pasting up large-scale photographs of buildings or landscapes within an environment that creates juxtaposition. This encourages the viewer to critique normal relationships within built form and between built form and the land-scape. An underlying theme to James' work is the effects of growth within and around the city. An example of this can be viewed at James' blog site http://www.lunchroomtakeout.com, with the body of work titled 7mm of Growth. James critiques the demolition process associated with new growth and also interrogates the idea of new growth on otherwise untouched landscape.

My own interest on growth specifically on the edge of the city allowed us to focus our common interests within a collaborative piece of work titled Edge of the Grid.

We focused the installation on the idea of the edge of the city being undefined, with some parts of the edge also being unnoticed and undervalued as a result. This means that parts of the city that can be perceived as high-quality natural environments are susceptible to growth of the built fabric of the city.

The edge site which James photographed was the Crofton-Downs site, which had been identified by the Wellington Outer Greenbelt land-use study. The site was chosen from other potential development sites along the edge because of the untouched agricultural nature of the site. This heightened the contrast between built fabric and the land that may be consumed by it, and also allowed the viewer to form an attachment to a stereo- typical farmscape.

A floor to ceiling paste-up of this landscape was installed to two walls of the Migalaxi gallery space and a triangulated cardboard representation of the landscape was constructed out of the photograph by suspending it from the ceiling.

Triangulating the landscape and constructing it from 2mm recycled grey cardboard explored the ideas of surveying and topographical mapping to understand the site interms of construction. The decision to suspend the topography from the ceiling materialised interdependence or tension between the built form on the edge and built form within the centre of the city, represented by the concrete basement gallery. Ensuring the topography had no contact with the ground reinforced the idea that this was a possibility of built form on the edge, not a more immediate threat.

The public reacted strongly to the large built form in the space with many people feeling like it needed to be released from its basement confines. One person went so far as to say it needed to be bigger, maybe ten times the size, in a huge gallery, and needed the possibility of being viewed from the top. Many people also felt they were looking at a three-dimensional model generated by computer.

Most people formed an attraction to the edge site, asking whether the black and white photograph was taken in the early 20th century or whether the site was even in Wellington. This shows people's awareness of these edge sites is low, and the future of the sites are fragile because of it.

Most people agreed that there was a synergy created between the photographed landscape and the sculptural representation of the landscape, which highlights the possibility of triangulation and mimicry within built form to allow the same kind of synergy between built form and landscape to occur.



Figure 24: Edge of the Grid Installation



Figure 25: Edge of the Grid Installation


## 30.00 Site Analysis

## 3|1.00 Preliminary Site Analysis

## Aim:

Eight undeveloped sites along the edge of the Outer Green Belt have been identified through analysis. The aim is to identify the site(s) which are most suitable for intensification and defining the edge through built form.

## Methodology:

Preliminary assessment of each of the eight sites' suitability for intensification and defining the edge is against the following criteria:

- Proximity to an existing suburban centre.
- Reasonably low amenity land use as intensification will require clearing and excavation.

## **Conclusions:**

The followings sites are found suitable:

Site 4: Parkvale Road, Karori

- Site 5: Spencer Street, Crofton Downs
- Site 6: Awarau Street, Crofton Downs

Because of their proximity to each other, site 5 and 6 can be considered as a single site.

## 3|2.00 Site Analysis: Comparisons

Note: Refer to Appendix for Detailed Site Analysis of the two sites at Community and Site Specific Scale.

The site needs to have strong existing connections between land uses on both sides of the Greenbelt boundary which can be explored or strengthened through design, as well as being suited to intensification.

It is argued that Crofton Downs has the strongest connection between the site and the city centre and waterfront, because of the geographical feature of the Ngaio Gorge that links them. A design for this site would be more focused on making visible these connections between edge and city centre, and although that is a sub theme to the thesis, it is not central to the argument. The Parkvale Road site on the other hand has a strong existing dialogue between the suburb and the greenbelt because of the high-quality established bush within the Johnston Hill Reserve, giving amenity to the area, but mainly because of the farm.

The farm gives a succinct and well-understood boundary relationship between itself and the edge of the suburb. This is argued to be better understood and more finite than the relationship between suburb and bush, which can be seen as prospective, or the boundary shifting subject to market desires, if the Greenbelt zoning is not fully understood.

The Parkvale Road site lends itself better topographically to intensification, with a clear existing, direct route to Karori Centre, amenities, facilities and transport hubs. The valley it is located within will naturally contain intensification and provide possible zoning boundaries for intensification.

As well as the farmhouse providing the start of a proposed road connecting Parkvale Road and Alanbrook Place, it can also provide a starting point for phased development and possible clues as to the programme within the intensification.

**Figure 27:** Contour map of a section of Wellington showing the location of the three possible intensification sites and transport routes to town. Preliminary massing studies are being conducted and shown in orange/green. These preliminary studies are exploring containing forms





**Figure 28/29:** 3D investigation of Parkvale Road site, looking at topography and influence on built form. Note greenbelt boundary is shown in dark green and Karori Mall is at the bottom of the images. Massing studies are shown in brown/green.





**Figure 30/31:** 3D investigation of Spencer Street and Awarau Street, Croften Downs. Note the main road in red and train track in grey. Large volumes at the centre of the image are Croften Downs mall and train station. Greenbelt boundary is shown in dark green and massing studies shown in orange and brown/green.





## 40.00 Design Methodology

## 4|1.00 Concepts:

## 4|1.01 Wellington's Green and Blue Edges:

Wellington's growth is essentially defined by its two edges; the harbour and the Outer Green Belt.

The edges are similar in that they are both high in recreational and visual amenity and different because the waterfront edge is undisputed whereas the greenbelt edge is a planning constraint. Also density on the water front is high whereas density on the greenbelt edge is low.

Similarities and differences between the two edges and also the potential of linking them together through design are explored by displacing a fishing boat from the harbour and using sections of it to define a length of the greenbelt boundary.

The boat is cut into six sections, which are spaced out and installed into the landscape to create a journey along the edge of the greenbelt with specific destination points. By doing this, an immediate and rudimentary connection between the greenbelt edge and waterfront is formed.

Boat sections provide shelter, points of interest, playground structures and most importantly destination points that do not involve commerce, in a similar way to recreation and amenities on the waterfront.

Permeability is investigated through the spaces between boat sections and also the concept of a series of public spaces, forming destination points which are linked by tracks and pathways.

A number of sections of the boat would be associated with their own public open space, which in turn could be associated with a specific built form within the development.

This concept of a series of public green-spaces, each associated with a specific building group and linked by a network of tracks and public spaces has helped generate the form of the design.

The importance of the section and its relationship to the topography and to the whole is another key concept evident in the design.

A conceptual question which is raised by displacing the boat into the greenbelt edge is what does the greenbelt give to the waterfront in return.

Water could be an answer. Water from catchments within the site travels to the waterfront and this relationship can be explored by emphasising these regional connections.

## 4|1.02 The city as a single-celled organism:

The city is frequently compared to an organism to describe ideal size, growth, its relation to the environment and health. By comparing the city to a single-celled organism, the relationship between its outer boundary, in Wellington's case the Outer Green Belt, is seen as the membrane around the organism.

To ensure the health of the organism, its outer membrane must be permeable, allowing it to absorb the nutrients and gases it needs to survive, whilst the external environment absorbs toxins and unhealthy gases.

In the case of the city, there are obvious parallels with sustainability, carbon emission, ecological corridors as the city's lungs. However the most interesting parallel is where the city's inhabitants are forming this exchange that permeates the membrane.

As with substances that can permeate through the organism's membrane, the inhabitant of the city is subject to criteria which allows permeability. These criteria in the case of the green-belt are essentially recreational uses, promoting health and well-being of the inhabitant, and bringing the values they place on recreational space back into the city.

It is the intent of the design that the development will act to promote this healthy exchange between city and environment through architecturalising this permeable boundary and attracting exchange through intensification.



**Figure 32:** Defining the edge of Wellington with a boat; investigating the parallels between the greenbelt edge and the waterfront edge

#### 4|2.00 Working at three scales:

As the Greenbelt is a regional phenomenon, development on its edge must make fit within the regional strategy for the greenbelt and city as well as plugging in to the specific communities attached to development sites. The developments must then respond to site specific qualities such as land-use, existing built fabric and topography.

The various programmes supported by the design are chosen specifically to support the development's success at these three scales as well as maximising the intensification of the area, and supporting the host suburb's autonomy.

#### Plugging in to the existing city at three scales: 4|2.01

- (a) **Regional Scale:**
- Intensification, built form and green-space must support the existing network of tracks within the Greenbelt and help define the its edge visually.
- (b) **Community Scale**

Intensification, built form and green-space must:

- Attract people to the edge as both visitors and users of the amenities and facilities and ٠ as permanent residents of the edge site.
- support community autonomy.
- attract people to the site as both visitors and users of the amenities and facilities and permanent residents.
- Add amenity and facilities to the community.
- Site specific scale (C)

Intensification, built form and green-spaces must:

- Have enough facilities, amenities, infrastructure and public transport to function as a . Transport Oriented Development.
- Encourage users to notice the edge of the city.
- Use topography to their advantage.
- Increase permeability.
- Fit in to existing built fabric.

#### 4|3.00 **Programme:**

The two central aims of proposed built form and green space within the chosen site of Parkvale Road, Karori is to define the edge of the city through built form and support intensification of the suburb.

Key user groups to target within the design programme are:

- Recreational users of the site, attracted mainly to public green-space, walking and mountain-biking tracks
- Permanent residents of the site, providing a stable core of users .
- Temporary residents of the site, providing high turn-over and exposure
- Users attracted to the facilities of the site which could be shops and cafes
- People who might want offices to rent for small businesses
- Wellington City Council, for greenbelt management and conservation offices
- People working to maintain or extend green-space, tracks or planting

A number of the programmes that the development will accommodate already exist on the site. The inclusion of farming and recreational tracks within the design allow it to be grafted into the existing fabric. Introduced programmes will provide facilities and accommodation that intensify the site and infrastructure that links the development to the existing suburban centre. To become an ecologically successful piece of Wellington, the introduced programmes will be selective and value-laden.

Intensification means a wide variety of users being attracted to the site for a wide variety of reasons. These reasons are the facilities and amenities provided within the community and specifically on the site chosen for intensification.

Behind the central aim of defining the edge of the city through built form is the motive of bringing the edge phenomenon to the attention of as many people as possible so they are able to contemplate living in a city with a finite footprint. A deterministic view point would assert that making the edge visible so that it attracts people and is considered finite in people's minds and would be an important part of forming the ecological vision of Wellington through public awareness and backing.

In turn this may importantly lead to overcoming Nimbyesque attitudes preventing intensification within suburban areas because of a larger goal. High quality public space, accessibility, permeability, services and a design that minimises the effects of intensification to suburban residents will be essential in realising this vision.

For the purpose of designing to define the edge between greenbelt and suburb, these amenities and facilities can be thought about with respect to which side of the edge boundary they belong.

As Wellington City Council's objectives are that the greenbelt should be a recreational area for the public, and this is backed by unanimous public consent, activities on the greenbelt side of the boundary must be directly related to this. The design resolve is to interpret recreational

activity as transient activity, which requires a base and main access points. Activities such as camping and backpacking, which are not currently part of the activities offered within the greenbelt could be a new direction for the council to investigate, and one that will be investigated within this design.

Transient accommodation for backpackers is seen as an important opportunity for the edge site because of how a backpackers could sit perfectly within the design's emphasis on public transport, pedestrian permeability, recreation and an ecological vision of the city region as a whole. The high turn over rate of the backpackers will give the site high exposure from people all over the world. The backpackers could be aimed at a specific eco-tourism market, where people are not prioritising the central city and its amenities but may prefer proximity to green-space and a more relaxing atmosphere in general.

On the suburb side of the boundary, the programme can lend itself to permanent accommodation for residents and businesses, and also the facilities associated with intensified areas such as shops and public toilets.

As discussed previously, even within an ecological design framework, a proportion of all of the above user groups will travel by car and adequate parking space is central to the success of the scheme.

The existing relationship between each side of the boundary to the edge of the city, which is recreation on the greenbelt side and accommodation on the suburb side, can become explicit through built form on these chosen edge sites. What will hold the success of this relationship is permeability, so the edge becomes an exchange between city and surrounds and which is not hindered in any way by the process of intensification. Therefore, permeability becomes the underlying emphasis to all design work.

Programme within the edge site can now be thought of within three central elements:

- Transient accommodation Greenbelt side of the edge
- Permanent Accommodation- Suburb side of the edge (Residential, Business and Retail)
- Public Open Space- both sides of the edge

The design explores the seemingly opposing concepts of permeability and constraint. Permeability refers to the ease which a user can pass through the site from city side to greenbelt or vice verse. Constraint refers to the city limit defined by the greenbelt edge.

The link between the two is explored through design is transport. The pedestrian or mountain biker experiences a high degree of permeability, whereas the vehicle user is constrained to the city side of the boundary.

### 4|3.01 Hierarchy:

In terms of land use within the chosen site, a hierarchy is needed to decide where to place each of the above elements. Recreation is considered the most important programme to the site as it is what makes the nodal development unique. It is also the essential meshing between suburb and greenbelt. With respect to the above categories, Public Open Space is therefore at the top of the hierarchy.

Within Public Open Space there are two sub-sets; Public Green Space and Public Space connected to built form.

Of these, Public Green Space is prioritised, meaning that flatter sites will be prioritised for green-space, not buildings.

## 4|3.02 Transient accommodation - Greenbelt side of the edge

### Backpackers

A backpackers with an emphasis on outdoor space and communal cooking and gathering. The backpackers will also function as a keystone for public walking tracks because of its pedestrian access from the road. It is therefore important that the design allows the public to walk past the backpackers but some threshold is created, letting public know that open space within the backpackers is for people staying there.

The backpackers will form the closest relationship with the landscape and greenbelt out of any of the other buildings as the activities that occur within and around it are seen as transitory, allying themselves with the recreational and transient nature of the greenbelt.

Because of this intent, the building will be separated from the road and only accessible by pedestrian steps and pathways. The backpackers will have a large, secure car-parking building attached to it and to design the car-parking building so it fits into the edge condition without seeming displaced in its largely natural setting is one of the challenges of the design.

## 4|3.03 Permanent Accommodation - Suburb side of the edge

### Apartments:

High-quality units attracting families and couples who want proximity to green space and high quality open space. One car-park is allocated to each dwelling

### Cafes

Cafes should service permanent residents, people staying at the backpackers and visitors.

### Shops

Shops should be focused on heightening the recreational focus of the site. The following would be suitable:

- Bike shop, for new bikes, servicing and hire.
- Outdoor Shop for walking gear.
- Small supermarket for essentials.
- Wellington City Council and DOC information centre
- Other retail

## Offices

- Accommodation for small boutique businesses
- Accommodation for Wellington City Council offices
- Accommodation for DOC offices
- Accommodation for Local Governing Body

## Public Car-parking

Sufficient on-street and covered parking to service accommodation, facilities and visitor needs.

#### Public Open Space - both sides of the edge 4|3.04

Designed public open spaces will come in two forms. Public open space connected to buildings and public green space placed in the landscape.

#### 4|3.05 Permeability

Permeability refers to a hierarchy of pedestrian and bike-oriented infrastructure linking buildings and open spaces within the site, and linking the site with existing tracks and suburban fabric.

The hierarchy is intended to help the site's overall legibility and is listed in order from infrastructure associated with buildings to recreational tracks.

- Lit footpaths and public decks
- Lit pedestrian steps and paths
- Main walking and biking tracks
- Walking trails

#### 4|4.00 Form Generators:

Design intentions to define the edge of the city through intensification does not necessarily mean dense land use. On this edge site, where a meshing of Greenbelt and suburb is required, instead of a City Wall effect, it is the intention of the design to allow for large areas of bush to surround intensified nodes along the edge. Within these nodes are the mixed-use activities and facilities to promote intensification.

The design needs to succeed in many areas, and each of these areas can be considered a form generator. The eleven main form generators are listed below.

#### 4|4.01 **Topography:**

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- As previously discussed, there is a hierarchy within the programmatic types of the development, with Public Open Space being the most important as it is the meshing element between greenbelt and suburb.
- Out of the two sub-sets of Public Open Space, (Public Green Space and Public Space designed in conjunction with buildings), sites for Public Green Space will be prioritised.
- This is because Public Green Space requires relatively flat sites to function at an optimum level, and buildings can create flat spaces within them while on steep sites. This also allows for a more direct application for the Topography Case Studies to be taken within building design.
- The site is topographically intricate, with hills, gullies, streams, ridgelines, spurs and existing farm-tracks all needing to be acknowledged by the design, the approach taken for choosing appropriate sites for public open space is based on topographical analysis and suitability.
- Relatively flat sites will be identified for Public Green Space through site analysis in plan and in section.

#### 4|4.02 Formal and Informal Design

- A fusion between formal and informal design can be applied to design for the edge condition between suburb and greenbelt, where design within the greenbelt (Public Green-space and Backpackers) is inherently informal and design on the suburb side (permanent accommodation and shops) assumes a more formal nature.
- Informal design will take cues from topography and natural features and
- Formal design will focus on rectilinear forms and more formal Public Space.

#### **Relationship between Public Green Space and Built Form** 4|4.03

- To fuse formal and informal form within the design, built form on the suburban side of the edge will be associated with a Public Green Space on the greenbelt side of the edge.
- Two sites for Public Green Space have been identified through site analysis, and there ٠ will be one node of built form associated with each space.
- Built nodes and Public Green Space will be connected through pedestrian paths and

steps

Public Green Space will be connected through recreation tracks.

#### A Linked Series of Public Green Spaces 4|4.04

- Public Green Space will be connected through recreation tracks.
- It is intended that some sections of the boat will be associated with individual greenspaces, so that the five sections of the boat will form the linked series of spaces specific to the Parkvale Road site.
- A section of the boat will be associated with the backpackers as well. This strengthens the backpackers function as almost a public space. Recreational users of the tracks and visitors to the boat section will be aware of the high-intensity site adjoining the path and seemingly surrounded by bush.

#### 4|4.05 Infrastructure:

To service the buildings and Greenbelt access points, a new road is proposed to link the end of Parkvale Road and the top of Alanbrooke Place.

- The new road fits into the existing infrastructure, with Parkvale Road being the primary access point to the extension, not Alanbrook Place.
- The road forms an important aspect of public space and design measures are taken to ٠ slow traffic and ensure the new road does not prioritise vehicle use.
- The road is designed to minimise the amount that is sloped. This means it follows a ٠ contour line along the hill which is the same height (above sea level) as the top of Alanbrooke Place.
- The difference in height will be obtained at the section of road which climbs up the existing farm driveway. The graded section then climbs further until the height of Alanbrooke Place is achieved, levelling off at this point.
- The Datum level (RL0.00) for the project is set at this height.

#### Relationship between Public Space linked to buildings 4|4.06 and Built Form

As public open space is the most important element within the project, the majority of Public Space linked to built form will be designed to be at RL0.00

This Public Space will:

- Give pedestrian access to shops, cafes and public facilities, also located at RL0.00
- Provide outdoor space for shops and cafes.
- Create spaces for visitors and residents alike to relax and enjoy their surroundings.
- Connect the shared vehicle and pedestrian surface to the public space.

With regard to other programmes within the built form it follows that:

Apartment living is located above RL0.00, and above shops, cafes and public space to take advantage of views and sun.

the ground.

#### 4|4.07 **Topography Case Studies and Design Implications**

Topography case studies have specific implications for designing buildings on a steep site. These are:

- are other options.
- of dampness and water run-off
- . be used to route services and this can be advantageous, giving easy access for main tenance and changes.
- Building footprint can be accommodated by a combination of a cut into the slope and pole foundations/ piles.

The main design implication for built form on the suburban side of the edge is that the buildings should be located on the suburban side of the road, to minimise the depth of the cut.

#### **Parking:** 4|4.08

All covered parking apart from parking servicing the backpackers is provided on the floor underneath RL0.00. The reasons for doing this are to hide parked cars from view and to prioritise the pedestrian. Parking is accessed by ramps from RL0.00.

#### Site Capacity: 4|4.09

Throughout the design process a push and pull relationship was formed between building capacity (relating to the number of permanent residents and visitors) and car-parking. These are critically linked (Rogers 1999, p. 105).

The 'right' size and capacity of the building was found by adjusting these two variables against a best-fit policy of how the buildings should look and feel in terms of size in plan and in section with respect to the topography, new infrastructure and existing built fabric.

#### 4|4.10 **Building Height:**

Building form should be horizontally oriented rather than vertically oriented to align with the concept of city edge and enclosure.

Business accommodation is located below RL0.00, and below the parking level to form an active edge with the ground and increase safety and intensity of pedestrian paths on

Large cuts into the hillside to accommodate a building footprint are undesirable if there

Car-parking is the most suitable programme for space against a retaining wall because

If possible it is desirable to have a gap between building and retaining wall. This gap can



**Figure 33:** Sections taken through the Parkvale Road site to understand topographical constraints. Note identification of flat site for public green space shown in green. Section numbers correspond to **Figure 34**.



#### 4|4.11 Sun:

- Buildings are aligned to perpendicular axes orienting north-west and north-east to tool to design within a formal structure on the suburb side.
- The living spaces of the apartment units (kitchen, lounge, dining) are located on the sun and lounge gets evening sun.
- greenbelt edge and kitchens are oriented towards the suburb.

## 4|5.00 Four Distinct Clusters of Buildings and **Greenspace**:

As discussed in the previous section, two main Public Green Spaces are proposed, and each green space is associated with a building cluster.

The backpackers and car-park associated with it makes up the third building cluster and although its design has large amounts of landscaped terraces, this space is privatised within the backpackers. It is therefore proposed that the roof of the car-parking building is a green roof, providing the third public open space.

The fourth cluster of buildings is the existing farmhouse and associated farm-buildings, which are intended for over-haul to accommodate permanent track maintenance and green-belt management facilities and to house a DOC and WCC visitors centre.

Figure 34: Early plan of Parkvale Road identifying flat sites for public green spaces starting to identify buildings with each green space. Existing farm buildings are indicated in yellow.

maximise the amount of morning and afternoon sun to the buildings. This is used as a

same floor and designed aligned on the north-west axis so that the kitchen gets morning

Due to the nature of the site, this also means that living spaces are oriented towards the



Figure 35/36: Site Model at 1:1000 exploring main greenspaces identified by section study and developing the building clusters associated with each green space. The existing Parkvale Road is indicated with white and the proposed road connecting Parkvale with Alanbrooke is shown in blue. Recreational tracks are shown in red.



#### 4|6.00 **Capacity:**

#### 4|6.01 Building Cluster 1: Residential, business accomodation, shops and cafes

### **Apartment Building 1:**

- 18 two-bedroom apartments:
- Accommodation for cafes/ shops:
- Accommodation for small business offices:

### **Apartment Building 2:**

- 16 two-bedroom apartments:
- Accommodation for cafes/ shops:
- Accommodation for small business offices:

### **Undercover Parking servicing Cluster 1:**

- 34 private car-parks for residents
- 34 car-parks for businesses

#### 4|6.02 Building Cluster 2: Business accommodation, shops and cafes

- Accommodation for cafes and shops:
- Accommodation for small business offices:

## **Undercover Parking servicing Cluster 2:**

60 parks for businesses and visitors

#### 4|6.03 **Building Cluster 3: Backpackers**

28 rooms providing a mix of double-rooms, single rooms and bunk rooms.

## **Undercover Parking servicing Cluster 3:**

3 levels @ 24 car-parks per level = 72 car-parks (public and backpacker use).

#### **Building Cluster 4: Existing Farmhouse and buildings:** 4|6.04

- Accommodation for DOC and WCC visitor centre.
- Accommodation for track maintenance and greenbelt management facilities and equipment.

110 sq m each 200 sq m 1010 sq m

110 sq m each 100 sq m 640 sq m

540 sq m 900 sq m





Figure 39: Master Plan of Parkvale Road site indicating building uses, amenities and facilites.

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**Figure 40:** Plan showing extent of proposed road, location of parking buildings and accommodation.

**Figure 41:** Plan showing location and direction of **Figure 37 and 38**, and location and direction of subsequent model photos.



















**Figure 42:** Plans and Sections of the backpackers using topography, levels and greenbelt edge to generate form.











RL27,000





RL24,000





RL21,000





RL18,000





RL15,000





RL12,000





RL9,000





RL6,000



# Level 1




Robin Aitken 300085196

# Level **O**

### RL0.000





RL-3,000



Robin Aitken 300085196



RL-6,000



Robin Aitken 300085196



RL-9,000





RL-12,000

NO SCALE

# Apartment Call-out, Level 1



Robin Aitken 300085196

RL3,000

# Apartment Call-out, Level **2**



Robin Aitken 300085196

RL6,000

#### 50.0 Critique

#### 5|1.0 **Methodology Critique:**

- Topography case studies should have been focused on larger scale buildings at the point the case studies were conducted the design outcome of large-scale buildings was not known. Having said this, however, there are numerous lessons learnt from the smaller scale residential buildings studied in Wellington which can be applied to larger scale buildings.
- Edge conditions are an important aspect of the design and although these are investigated through Transect Case Studies, it is at a macro scale. Edge conditions could have been investigated at site specific scale instead of at neighbourhood scale and existing urban design projects dealing with edges could have been investigated. Parts that might be focussed on in a study of this nature could be treatment of planting, paving, curbs and street furniture.

#### 5|2.0 **Design Critique**

The Wellington Outer Green Belt case study identified three conditions on which the design on the greenbelt edge would be dependent. These were:

- Land appropriate for development and because of its context within existing built fabric and natural landscape, suited to nodal town centre development.
- Land appropriate for development and because of its context within existing built fabric and natural landscape, suited to development which seeks in form and infrastructure to contain suburban development.
- Land not appropriate for built development but appropriate for recreational tracks and planting schemes.

Only the first condition was thoroughly explored through design in this study, and for the edge of the greenbelt to manifest itself through built form along its entire edge, albeit at sites identified for this purpose not continuously, then the second condition needs to be explored through design.

The third condition is well understood and it is not essential for this to be explored further. However, recreational tracks will perform linking roles between built development on the edge and

#### 6|1.0 Conclusions

The use of the greenbelt tool in Wellington is different from many other implementations of greenbelts. It has been widely used foremost to contain a city's growth but in Wellington its primary function is to provide a regional network of recreational tracks and to protect hilltops, ridgelines and the associated ecological qualities. Even though the Wellington Outer Greenbelt is not primarily to restrict the city's growth, of course it has this effect. The implications of this are that for the city to grow in population without consuming existing green-space within the greenbelt boundary, new growth must be in a densified form, which is markedly different from traditional suburban growth. For vitality and an ecological urban fabric, new and denser growth needs to take the form of intensification.

As Duany's transect diagrams argue, the best place for intensification is in areas which have urban qualities, such as town centres, in order to best fit into the existing urban fabric. With these arguments in mind, there is a tension between the idea of intensification on the suburban edge because, as case studies show, this edge in Wellington has uniform low density.

However, the two suburban edge sites of Parkvale Road and Crofton Downs are close enough to an established centre (within Duany's Transect methodology Parkvale Road is considered as a small town centre with urban gualities and Crofton Downs is defined as a suburban centre). To allow Duany's transect planning policies to function, the edge site would have to function as part of the existing centres to justify intensification within best fit policy.

The Parkvale Road edge site has a strong visual and infrastructure connection to Karori Town Centre and is 1100 meters away from Karori Mall. This is about 15 minutes walk and just outside the recommended 750 meters or 10 minute walk for a compact centre.

To make intensification on this site viable it must have public transport connections by bus and adequate parking for residents and visitors. This means that the design will function as a small scale Transit-Oriented Development, with a strong pedestrian and vehicular connection to Karori Town Centre. The development is therefore nested within a city scale and a community scale, meaning it does not seek to compete with the identified community centre or city centre with respect to scale and facilities, but it does have a large degree of self-sufficiency. In this context, it will help densify and intensify Karori towards the goal of increased autonomy and new densified (sub)urban fabric.

As stated by Wellington City Council with regard to the Green Belt boundary, "there are some instances where in some places, further adjustment seems logical in order to achieve the best overall fit, shape or meaningful width. Further adjustment is anticipated" (WCC 2003, p.49).

Strong arguments for adjusting the Green Belt boundary will be formed with the council's in-

tentions for the Green Belt in mind, such as providing better access points and recreational amenities and facilities. As the council specifies that development must be community driven and largely community funded, then development submissions should be founded with a community's clear intent to support these local and regional goals.

The council also acknowledges the opportunity for eco-tourism within the Green Belt and on edge sites(WCC 2003, p.49). If the development proposed in this thesis was backed by Karori residents, then it would have a strong case with the council.

In light of intensification's perceived implications for residents, unanimous community support is the hardest battle for the proposed development even though its form is argued to be inherently sustainable on a site specific, community and regional scale in this thesis.

Residents in the vicinity of the proposed development might perceive that intensification of the edge site in the manner proposed would bring negative impacts such as increased noise, loss of privacy, increased traffic and potentially even increased crime. Urban planners and architects can argue that good design will mitigate these negative impacts or even claim that loss of privacy and increased crime will not happen at all with careful design. They would also argue that the benefits to the site, community and region would far outweigh negative impacts on residents and the impacts themselves would only be observed within the time that the development takes to mesh with existing fabric.

As discussed in the literature review, for the proposed development to be supported and even ideally to form out of new ecological directives for development patterns within the community, then radical attitude shifts need to take place. This will involve acknowledging that the suburb is not the most ecological development pattern. Even though the amenities its form brings to individual properties is high, density is low and civic space and the public realm needs attention. New development patterns that sit within an ecological framework do not need to completely undermine the suburb's integrity. The most ecological approach to addressing city form within existing and established growth limits is to work with the existing fabric; the suburb, seeking out a best fit policy towards intensification and transport-oriented design.

Within the Wellington Outer Green Belt Management Plan, the council provides a clear directive for "communities to have involvement in planning for their own future."(WCC 2003, p.26) Ideas, momentum and support must come from within the community and if proposals have positive regional implications to the city and the greenbelt there is a high chance they will be supported by council.

As the Council own or have covenants over a large part of the Green Belt zone, the boundary can be adjusted to best fit the proposed edge condition. The edge cannot be understood by the public as speculative. It must, after necessary initial adjustment, become fixed, and a finite edge to the city.

The edge becomes a political hot-spot. Within the ecological framework of creating a vibrant city and sustainable communities through controlling sprawl, intensification, high quality public space and directing growth towards transport-oriented design, the edge of the city becomes one of the most visible elements that can show the city's attitude towards growth.

Wellington has two edges to its growth, the Outer Green Belt and the waterfront. Both are high

in visual and recreational amenity, but the waterfront boundary is irrefutable because of its nature. Making the Green Belt boundary as irrefutable as the waterfront through design is a logical step to take.

The constraining nature of Wellington's topography has already established and legitimised the Green Belt boundary; it is not an arbitrary line on a planning document. The recreational amenities of walkways, bush, hilltops and ridgelines give this city limit the potential to become as the waterfront. A finite edge formed from natural constraints with a high level of intrinsic amenity that design can take advantage of for the benefit of the general public and also residents within the community.

One of the key roles that architecture and urban design must play is to visualise this boundary, giving as much of a site specific response as is given by the buildings, quays and open spaces that form the waterfront, with the aim of attracting people to the edge.

As is identified in the Wellington Outer Green Belt Case Study, this edge condition does not need to be a continuous built form like a medieval city wall. Aligning with best-fit policy, there are specific sites which lend themselves to being a gateway to recreation within the green belt and an intensified land use. Other existing edge conditions such as rich suburban fabric intertwining with establishing or regenerating bush is just as valid.

As with the waterfront, the highest degree of public spaces and new buildings along the green belt edge should be close to where the highest degree of existing density and intensity occur. This promotes the maximum accessibility to the site and the highest chance of the new form being accepted into and supported by the existing fabric.

Intensification on edge sites close to established suburban centres should not distort the natural and designed centripetal forces that give Wellington a compact, vibrant city centre. Suburban autonomy and intensification should grow in partnership with growth in central Wellington.

The role of the green belt as a fusing zone between suburban and rural fabric should be acknowledged. "An interesting and important aspect of the Outer Green Belt is the very different perceptions of the particular sections from eastern and western perspectives. Most Wellingtonians will view the Outer Green Belt from the eastern side." (WCC 2003, p.26). However, treatment of the greenbelt and greenbelt edge condition must ensure that the Makara and Ohariu Valley communities are well understood and reflected in management decisions. For example, exclusive revegetation of farmland on the western side would not be seen as a reflection of rural values.

Because the Karori and Crofton Downs sites are closely connected, if not part of farmland, then the acknowledgement of both rural and suburban edges can be explored. The design for Parkvale Road successfully acknowledges rural land use into the design because of the retention and integration of farmland and farm buildings into the programme. It is all the more valued as an edge site because of its proximity and inclusion of rural hinterland, as well as the high amenity established bush of Johnston Hill.

#### 6|1.01 Positive Implications of Intensification for Residents:

There are positive implications for residents living near edge sites identified as suitable for development that will only come with intensification. Enhancing recreational amenities and facilities will be a central advantage for both local and regional interest. Protecting and diversifying natural amenity and agricultural function will be another.

Defining the edge of the city through urban design is an easily accessible idea to Wellington's rate payers, having unanimously agreed that a region-wide length of tracks and bush protecting the visual amenity of hilltops and ridgelines was a top priority for Council funds.

From this it can be extrapolated that the most immediately successful parts of the Parkvale Road development in the current public eye are the linked series of public green spaces and parking/public toilet facilities, the parts which embody the positive implications above.

The public's argument is, therefore, overwhelmingly favouring the potential of the greenbelt side of the edge, whilst ignoring, for the large part, the suburban side of the edge. This means that the first stages of development are realistically achievable without requiring major shifts in current public opinion.

Further intensification on the site in the form of backpacking facilities, shops, cafes and apartments is dependent on a gradual shift in thought within the community towards increased autonomy and a more ecological city form. Its success is dependent on the design mitigating or solving associated negative impacts from the development.

One of these potential impacts is a reduction in sunlight to residential properties. The design solves this problem by keeping the form of the buildings low and horizontal. New forms will not block sunlight from existing properties because the relative height of the ridge and hilltops to the west will block out evening sunlight before the built form does. Reductions in privacy is mitigated through leaving a generous gap between new form and existing properties. It is anticipated that within this gap, existing regenerative bush will mature to a height which largely conceals the new forms when viewed from neighbouring properties.

A similar but more extreme relationship between larger building and residential fabric is observed in the Te Puni Village Case Study and also Transect Case Studies cutting through the Victoria University Kelburn Campus. The larger volume of the students' residence and dense nature of the campus overall contrasts with the surrounding low density residential fabric. The relationship between the main bulk of the university and lower density residential fabric is extreme and sudden, but is well understood by the general public. The inclusion of green spaces located on the city side of the university, help mesh the low and high densities together. These green spaces are located on the lower side of the hill giving a generous set back in a similar way to the Parkvale Road development.

The location of the backpackers negates any sunlight or privacy effects because of its location away from any residential properties.

#### 6|1.02 Fitness of the Organism

The development strengthens the neighbourhood because it is making it a destination point for many people to enjoy high amenity spaces and facilities. It brings vitality to the area. As emphasised by Richard Rogers, the neighbourhood forms the building block of cities. It cannot be seen as being part of Karori Town Centre, as the distance between the two is 1100m. The success of the development with respect to the existing town centre is dependent on whether it will have a positive or negative impact on the centre. This poses the question: what is the range to which the host (Karori Town Centre) can absorb the effects of the new and retain health and integrity.

If the population of Karori stays the same then either the new development will not secure enough patronage to survive or will take patronage from the existing town centre. In both cases the development would fail.

The proposed development would only be successful if there is a market-driven need to provide new accommodation for residents and businesses within Karori. To be sustainable, this need for new accommodation should be coupled with a community supported drive for autonomy, densification and intensification which takes place in Karori Town Centre, as well as within the edge site.

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### Appendix A:

**Topogrpahy Case Studies** 

#### 1 Upper Epuni Street, Aro Valley

Epuni Street in Aro Valley borders the Inner Town Belt, so the edge condition between sections and reserve can be looked at. This specific area is very steep, but the 19th century town lots are divided so they step back from the street. The only way the houses can be accessed, apart from the ones directly on the street, is by a steep pedestrian path. This path services seven houses.

The result of the steep pedestrian path servicing these seven houses is that the houses step back off the road in their own pocket of space. Access to each house is generally through a gate which coincides with a landing in the steps. Each house steps back from the path, probably for privacy reasons and the result is that the path has garden planting up to its edge on both sides, contributing to the well maintained, residential atmosphere.

The house at the top of the path enjoys a completely private position and is backed onto the Inner Town Belt on three sides. Recreational paths do not service this part of the town belt. The property's relationship with the green space is an active one, keeping the bush from overtaking the garden by maintaining garden plants and shrubs on the edge.

#### 2 Lower Epuni Street, Aro Valley

This sequence of four dwellings; two houses and two semi-detached houses (to the left) near the bottom of Epuni Street are of interest because of their responses to the steep sites sloping up from the road. Firstly, all three have main floor plans of typical early 20th century timber houses and the site specific design happens below this main floor, when the building and access comes into contact with the slope. The front of each house has a room below, cut into the bank, which may have happened as later alterations.

The street entrances to the semi-detached house are of interest. There is two sets private steps, one servicing each house, instead of having a shared access and the concrete retaining walls used to retain the cut from the road have been elaborately expressed by making them designed parts of each access way. Flat garden space was a design priority with the semi-detached houses sharing two retaining walls placed perpendicular to the slope so the land in front of the house is terraced.

The neighbouring two houses both have dug into the slope at the street edge to cut away room

for a garage, which has been built from insitu concrete. Note that the garages are located next to each other on the boundary line to minimise concrete; they share the central wall and only one cut needs to take place for construction. The retaining wall at street frontage is formed from the same concrete as the garages, and allows space for each house's access steps behind it. The concrete roofs of the garages have been planted over, which gives opportunity for flat garden space.



#### 3 Philosophy House, Aro Valley

Philosophy House on Aro Street is an ornate institution built in the early part of the 20th century. The sloped site does not encumber the formal classical façade, but almost enhances it. On a flat site a classical building such as this would have a linear approach to the entrance as does Philosophy House, but because of the slope, the linear approach must be up three flights of steps. This gives the person approaching the building a heightened sense of its size, having to view it from below. The entrance to the building is in-fact on the first floor of the building not the ground floor, so the steps continue past ground level of the building. The landing at the bottom of the final ascent to the entrance is terraced out into a sweeping path to each side of the building, giving access to the ground floor rooms and also to access ways around the side of the house.

Apart from the designs classical origins, the reason for having the entrance on the first floor is because the ground floor does not go back the entire depth of the building but stops at the depth of the first roof (when viewed in the plan opposite).

#### 4 Glenburvie Terrace, Tinakori

Of mid-nineteenth century origin, with renovations and additions by the owner and heritage architect Chris Cochran, this building sits between a pedestrian path which cuts back on itself to descend the slope. As a result, the building footprint is wedge-shaped and placed on a steep site. The slope of the pedestrian path allows the building to descend the height of one storey from the gate at the top to the main entrance at roughly mid-point along the Glenburvie Terrace façade. The building then gains an extra floor underneath the entrance level, again because of the slope, but this has had to be cut in. This floor was an addition by Chris Cochran. **5 Te Puni Village, Victoria University, Kelburn** 





Te Puni Village is a recent addition to Victoria Univeristy's Kelburn Campus and is designed by New Zealand firm Architectus. The Kelburn Campus is located on land which was originally part of the Inner Town Belt, which served to separate the city centre from the surrounding lower density lots. As a result, the Kelburn Campus plays a part in the meshing of city and suburb. As is observed from the earlier case study where sections are taken through the figure ground map of a part of Wellington including the Kelburn Campus, it can be seen that smaller scale buildings surround the campus on both the city and suburb sides. Because of the campus's height and density, there is a large level of contrast.

Te Puni successfully addresses the steep site and change in urban fabric in numerous ways.

A gesture which serves both is the communal floor, labelled in the section opposite as Zero. The floor level is that of the main entrance level to the building and is defined visually by floor to ceiling glazing through which can be seen expressed trusses. The language spans the two main towers via the linking bridge. What this achieves is a visual translation of the steep slope, because the viewer is aware of the number of floors below this communal level. From the side, especially at night when viewed from Aro Valley, the illuminated bridge appears to float out from the hill. With respect to the change from residential Kelburn to larger scale buildings in the city centre, the bridge can be seen as acting as the transition itself, from the smaller scale post-graduate accommodation building on Fairley Terrace, to the tall first year student accommodation buildings on the city side. The height of these buildings is emphasised because of the location of the Boyd-Wilson playing field at their foot.

The site plan of Te Puni Village has been designed to incorporate numerous pedestrian paths into the built form. These include old routes such as the pedestrian path from Devon Street in to the university, and new routes such as the new path leading from the music campus up to the entrance level of Te Puni. The site around the building is extremely permeable for pedestrians as a result.

Breaking the built form into three separate blocks has allowed for the integration of complex new and existing programmes on the ground to be sown seamlessly into the design, whilst integrating the different typologies of city and suburb.

The new buildings also accommodate new parking on the ground between the two main towers. Flat parking space is created through cutting, filling and retaining. Cuts are mainly retained by spraycrete, even when there is a building infront of them, allowing a small amount of access space between the building and the retaining wall. This minimises the issue of external moisture entering the building.

### 6 Sar Street, Wadestown



This small dwelling has been built over the original concrete garage, on the left, and a second garage, on the right has been added. The second garage has been excavated into the bank; retained by its concrete walls. It is assumed that there is internal access from the garage via stairs to the house. Note that it is more acceptable for walls of garage accommodation to act as retaining walls as moisture in the internal garage space is not critical in the same way as with a dwelling. It is ideal that in the case of a dwelling, there is adequate space between the external wall and retaining wall for services, external moisture and ventilation. This is more expensive, however and cannot always be achieved so external moisture must be thoroughly considered in water run-off and waterproofing design.

Pathways from the garage to the existing house have been connected to the new dwelling's main entrance as shown on the plan to the right. The height of the slope is used to gain access to the first floor. In a similar way, the path is further extended up the bank to gain external access to the second floor of the dwelling. Therefore the slope is used to provide access to all levels of the house, giving the house a strong connection with the site and an inter-relationship. The bank between the paths has been planted with trees and shrubs, heightening the use of levels around the house.

A two-meter high concrete block wall is used to retain the bank at first floor level where necessary, providing external access around the side of the house for maintenance and also access to the deck on top of the new garage. The retaining wall also stops the external envelope of the house from being in direct contact with the bank.

#### 7 Bernard Street, Wadestown

This dwelling employs a dual strategy to cling to this steep bank. Firstly, two ledges, each one storey high are cut into the bank, and then retained with thick concrete pads and walls. The two level steps of pad and wall act as a single unit to resist overturning and retain the bank at the same time. The second strategy is gaining floor area by projecting the floor plate outwards from the bank and supporting this with steel pole structure. To gain further floor area, two triangular decks are cantilevered outwards.

The main entrance to the dwelling is at street level, giving access to the top floor. The garage is accessed by driving down a ramp from street level and presumed internal access to the middle floor. Note that the garage separates accommodation from direct contact with the retaining wall at this level. It is assumed the lower level is accessed internally, and this is the only internal space to have direct contact with a retaining wall. A triangular form in plan allows parts of the building to be closer to the bank for engineering purposes, while giving a larger floor plate. Note that the access for the driveway is seamlessly integrated with public steps accessing the driveway below. This is done by a continuous design language used in the handrail and extends the influence of the building to well beyond its footprint, locking it into the hillside and into the pedestrian and vehicular infrastructure around it.





#### 8 Weld Street, Wadestown, A

In a similar way to the case study above, this two-storey house uses a step cut into the hillside with a concrete block retaining wall and insitu concrete slab as an anchor. The majority of the accommodation is supported by a steel pole structure anchored into the ground with large concrete piles.

The garage and carport form the large part of the street frontage, with only the main entrance to the left of the garage showing any accommodation. The result is a private dwelling which can and does open itself up to the view and sun on the east and north elevations.

A car-deck adjoining the garage is built outwards from road level and is supported on a timber pole structure. The space below the car-deck is not internalised, but acts as an out-door, undercover storage space.

#### 9 Weld Street, Wadestown, B

The singularly interesting thing about this house is its response to a steep (on all elevations) and damp site. It is located in the middle of a gully and directly over a small stream. The way the design solves these site constraints is by building the house on a timber platform, lifting it around four meters above the ground at the highest point. This allows all services to be easily accessible as they are hung underneath the house. Note that the pedestrian steps shown at the bottom of the plan of Weld Street, A are the access to this dwelling. Also note that the plan below has been rotated 180 degrees.

10 Owhiro Bay A







Where the Outer Greenbelt meets the sea on the western side of Owhiro Bay (Wellington's south coast), houses are backed up on to rugged and rocky banks although the footprint of the houses themselves are on flat ground. This early 20th century bungalow responds to the proximity of the steep slope by stepping around it in plan, leaving enough room between itself and the bank so that foliage can grow and stabilise the rock.

#### 11 Owhiro Bay B

This three-storey dwelling built within the last ten years stands tall against the slope and gives a visual reference to gauge the slope's steep nature and height. An external timber staircase attaches itself to the bank to access a viewing platform and small relatively flat area on the bank which has been landscaped. The staircase can be accessed via a door at the back of the house.

Visually in both front and side elevations, the external stair is an important element which links the building to the site and compliments the simple building form to make it more than a simple box shape. The stair also shows that if there is a flat part of the site, then it is important to be able to utilise it. This is especially relevant on a site where 90 percent of the flat part of the section is taken up by building footprint and the rest of the site is steep bank.

The timber stair functions as the link between building and greenbelt.

#### 12 Highbury Crescent, Highbury

This house by architects Melling-Morse was built in the 1970's on an extremely steep site which needed considerable engineering to be achieved. As well as the engineering feats to allow this house to sit into the hill, the house almost becomes part of the hill with seven interior levels and almost every room being on a slightly different level.

The house is seated in a cut which steps down from the access road and this cut acts as the house's anchor into the slope. As shown in the sectional elevation, there are large reinforced concrete fins which have been poured insitu to resist the overturning motion of the retaining wall and also to provide adequately deep foundations for the weight of the house. At the bottom of the fin is a 'T' shaped concrete footing. A concrete retaining wall spans between the uprights. This incredibly well-engineered anchor-cut allows the house to sit within it and exterior walls have breathing space as can be seen in the sectional elevation. Also note that the entrance takes the form of a short bridge which spans the gap between house and retaining wall. In plan, appreciation for the gap between the retaining wall, shown in orange, and the house can be observed.

The house is of timber construction and sits on the concrete fins at the cut end of the house. At the front, the house is supported by large timber posts. The garage, which has been added at a later stage is also a timber pole structure. At the same time as the garage was added, a large deck structure connecting to the original deck was added as well. Note that the angles used to form the shape of the garage and deck are taken to fit into the curve of the hill





The ground-condition underneath the house has largely been influenced by structure as it



comes into contact with the ground. As can be seen, where the line of timber posts are grounded, there is a cut into the slope. This forms a garden terrace underneath the house. The ground from this point onwards is extensively terraced to allow for maximum garden space.

A combination of the multiplicity of levels on which the house is planned and also the complex and varied pitched roofs combine to form a house which effectively becomes part of the hill it sits on.

#### 13 Karori Santuary Visitors Centre

The Karori Wildlife Sanctuary Visitors Centre by Jazmax has three main functions. The first is to be the gateway into Zelandia, or the wildlife sanctuary. Access into the sanctuary must be strictly controlled because of the predator free environment within which is ensured by the predator proof fence around the perimeter of the sanctuary. The second is to act as an education centre, with displays and film/ conference facilities. The third is to host a café.

All three of these functions are achieved within a building that has been placed on a topographically challenging site. From the entrance and side elevations this is not immediately apparent, but the building is in fact built up against an almost vertical cut which has allowed the building to be accommodated on the site. This cut has been retained with steel anchors into the hill, mesh and spraycrete. Jazmax have stepped the building from the first floor upwards back into the slope but have left adequate space between building and retaining wall to accommodate all the building's services which are left exposed for easy access in the future. Services are split over two levels with plumbing and electrical services on the lower level and HVAC services on the upper level. Also generators and fans are located on this upper level. Metal grated decks span between the building and the slope to provide access to services. This approach has three advantages:

• The exterior walls of the building do not have to double as retaining walls or deal with moisture from the bank.

- Services are easily accessible for installation and maintenance.
- Important interior space is not used by bulky services.

The two public elevations can approach the landscape in a much more subtle way as there is a gentle slope rising a floor height (about three meters) from the entrance level to where visitors are released into the sanctuary at the back of the building. To minimise the cut into the slope and the amount of building underground, the ground floor is smaller in plan than the two floors above. An interior entrance stair from the ground floor up to the first rises more sharply than the gentle concrete ramp on the outside of the building giving a visible contrast between the interior condition of the stair and exterior ground condition of the slope.

#### 14 Montogomery Avenue, Karori



A highly modernist approach has been taken to this house's site works. The new house is built on a subdivided property with the original property at the bottom of the slope. The brief regarding the site works was quite possibly to give the owner the largest amount of flat useable lawn space possible on a reasonably steep site. This is achieved through the implementation of three retaining walls. The lower wall, which is a timber post and horizontal half-post construction system, attaches itself to the original property and then to the long set of timber steps. The original property now has a large, flat back lawn space.

The other two retaining walls are concrete block construction and each are one storey (2.5m) in height. The wall nearest the original house retains the new dwelling's flat lawn space whilst the top wall retains the slope above, which is part of the Outer Greenbelt. The new two-storey dwelling spans these two concrete block retaining walls and at the back boundary of the property, the upper storey is built on top of the back retaining wall. The wall is extended beyond the length of the house in both directions as can be seen from the elevation to the right. It extends beyond on the right-hand side and then turns 90 degrees as can be seen in plan, to create space for a sheltered and private entrance way, with foliage from above hanging over. This gives a forceful yet intimate relationship with the Greenbelt.

#### 15 Alanbrooke Place, Karori

The footprint for this small dwelling is built on a subtle slope which gets steep enough to become a bank just past the edge of the footprint as can be seen in elevation; note the dotted line showing the slope of the bank beyond and deck jutting out over. When most designs for a house on this sort of slope would use only one level with probably a post foundation system, the design for this house uses a series of concrete pads which are stepped to follow the contours. The result is a subtle shifting of levels and an intimate relationship with the ground, which the user would be very aware of whilst inside the building.

The building is further grounded within the landscape with subtle site works comprising of low concrete retaining walls, insitu concrete steps where needed to negotiate the different levels, and patios of concrete pavers on aggregate. The outside levels do not in all places match the level of the interior, so the building employs the use of concrete nib walls to allow for this. Being inside the dwelling, the user would be aware of being surrounded by the playful difference in external levels. This is put to good design use with things like an inside bench seat being a similar level as an exterior patio.

The user is able to walk around the building footprint because of the use of retaining walls, again stopping exterior walls of the dwelling from unnecessary water problems that may occur as a result.





### Appendix B: Site Analysis

#### Parkvale Road, Karori, Community Scale

Karori is bounded on all sides by topography and with the main road running down the valley, the suburb does not stretch more than a 15minute walk away from the road. This environmental containment lends itself to an ideal transport oriented form. This is in stark contrast to a suburb such as Botany Downs in Manukau City, Auckland, a New Zealand example of Transit Oriented Development, which doesn't have defined topographical limits but must rely on planning jurisdiction for constraint. It seems that with regard to the ecological vision of the city, in the right circumstances topography is a layer of urban planning which can enhance planning because of its' restrictive nature.

In Transect Planning, the centre of Karori can be considered as having the potential to be an Urban Centre, which has the following characteristics:

- the denser fully mixed-use habitat of a community. ٠
- Buildings consist of row-houses, flex-houses, apartment houses, and offices above shops.
- Office and retail buildings and lodgings are permitted.
- Buildings are a maximum of 5 storeys.
- Open space consists of squares and plazas.
- Parkvale Road is also within fifteen minutes walk of these key services and facilities . that should be able to be accessed locally:
- Doctor/GP
- Post Office
- Chemist
- Supermarket
- Bank/building society
- Corner shop
- Primary school
- Restaurant/café/takeaway
- Pub
- Library
- Sport/recreation facility
- Community centre
- Facility for children

Karori has a good public transport system based on bus services and also has a direct and efficient route to the CBD, Kelburn, Aro Valley and the Terrace. With Karori Town Centre having the potential to be an Urban Centre, the case for Karori as an autonomous suburb is strong. The suburb of Newlands' recent intentions to make itself more independent of Wellington City Council further validates this case. A 10 year plan unveiled by the Newlands Paparangi Association in February 2011 is aimed at not having to go to the council for publicly funded projects and increased local decision-making.

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#### Parkvale Road, Karori, Site Specific Scale

- The end of Parkvale Road is already a well-used access point to the Outer Greenbelt and the site of the farmhouse taking care of the adjacent farm and considerable part of the Skyline walkway to Mt Kaukau. Both of these present exiting design opportunities.
- Site topography is supportive of proposing a connecting road from the end of Parkvale Road, following the route of the existing farmhouse driveway, and linking to Alanbrooke Place.
- The site of possible development is currently farmland or regenerative scrub, not high-quality established bush.

#### Spencer and Awarau Streets, Croften Downs, Community Scale

Croften Downs has a much smaller and more compact centre than Karori and doesn't have all the key services and facilities on the list. Intensification could bring the rest of these key facilities to the site. however.

Croften Downs centre would not be categorised as an Urban Centre within Transect Planning as it lacks civic open space and does not have any apartment housing. It would be categorised as a Suburban Centre.

This site has very direct public and private transport links with the city centre because it is located at the top of the Ngio Gorge. Croften Downs is also serviced by a railway line which is highly supportive of Transit Oriented Design.

The Ngio Gorge could be used as an important visual linkage between City Edge and City Centre or Harbour, because of the Kaiwharawhara Stream. This has interesting design implications for the site.

#### Spencer and Awarau Streets, Croften Downs, Site Specific Scale

- There are a number of existing well-used access points to the Greenbelt within these sites.
- Proximity to the electricity sub-station near Spencer Street lessens the desirability of developing the site.
- Topography of the site is not inhibiting.
- The Spencer Street site would be hidden from most suburban view shafts, located in a ٠ topographical basin. This basin is also the start of a tributary which feeds the Kaiwharawhara Stream.
- The Awarau Street site is in a prominent position on the hillside, and it would be important for proposed development to fit carefully into the existing fabric.