

TECHNICAL REPORT ACCOMPANYING THE

GREATER CHRISTCHURCH URBAN DEVELOPMENT STRATEGY

FOR THE PROJECT PARTNERS

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MARCH 2007

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URBANISPLUS LTD

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executive summary

EXECUTIVE SUMMARY

The Greater Christchurch Urban Development Strategy (“UDS”) is one of the largest-scale, integrated strategic planning exercises undertaken in New Zealand.

It seeks to help manage up to 75,000 households of new population growth within the identified Urban Development Strategy area over the next 40 years. In addition to just understanding where the optimal places to provide for this exist, the UDS seeks to understand the infrastructure, services, choices, support systems, and type / location of jobs that will be needed to best support this additional population.

Without consideration of these issues the strategy would fail. Most important for the growth, prosperity, and sustainability of any town are the networks that let people conveniently connect with other places they can work, rest, grow, play, and socialise.

This document records the spatial planning undertaken to deliver the preferred UDS option for growth management as expressed by the community through consultation with its representatives.

It will briefly outline the context for this spatial planning to help show the progression of thinking throughout the process, but the very detailed ‘ground work’ that has been undertaken leading up to the spatial planning process will not otherwise be repeated.

It will then present the methodology and approach taken to achieve integration between the many voices and interests involved in long term planning - including those for transportation through to those seeking greater employment opportunities or those preferring more open space or recreational choice. This is a key approach taken by the UDS process and distinguishes it from more conventional approaches to planning. These can be more homogenous in their perspective and often fail to take into account a balanced evaluation of potentially competing interests.

The document will then present the main options developed and ultimately the favoured way to deliver the preferred growth option. Concluding the report will be an outline of implementation issues and key actions that are considered critical if the vision is to be realised. This will have a particular emphasis on how to achieve the intensive, compact centres-based outcomes sought.

This report is a record of the Inquiry by Design (IBD) workshops, held 1- 4 August and 29 August – 1 September 2006. The work is not the Urban Development Strategy but it is acknowledged that this document was used as an important tool to inform strategy development. In some areas there may be discrepancies in the data and technical work between the IBD report and the Strategy. Both the data and technical work were further refined into the Draft Strategy. Any mention of facilitating development will occur at appropriate times in the development process, not at the outset of the Strategy.

This technical document should be read in conjunction with the adopted Greater Christchurch Urban Development Strategy.





introduction 1

1.0 INTRODUCTION

The UDS comprises an urban area and hinterland within the jurisdictions of the Christchurch City, Waimakariri District, and Selwyn District Territorial Local Authorities. The area is within the Canterbury Region and acts as the clear economic centre of the South Island.

The combination of available, suitable land and transportation ease has allowed a less restrained pattern of growth to occur over time. This approach is reaching its capacity, indicated by such factors as:

- traffic network failures and congestion are becoming commonplace;
- urban areas are losing their distinct identity due to the spreading of one town into another in a repetitive manner and the loss of unique characteristics at the local level;
- The inefficiencies of poorly planned lifestyle choices are amplified by the scale of population size to the point where they are resulting in significant losses of economic productivity and environmental quality;
- The scale of population and size of urban areas means that design or infrastructure improvements / upgrades increasingly cost vast sums - meaning more competition between communities to get less physical or 'workable' product.

These and other observable realities led to the UDS project being initiated.

The UDS is intended to provide a comprehensive, integrated approach to growth from which to guide strategic investment

decisions by Councils, individuals, and other groups.

While the strategy has been formulated and released, this document presents a more detailed record of the spatial planning outcomes intended to deliver the strategy.

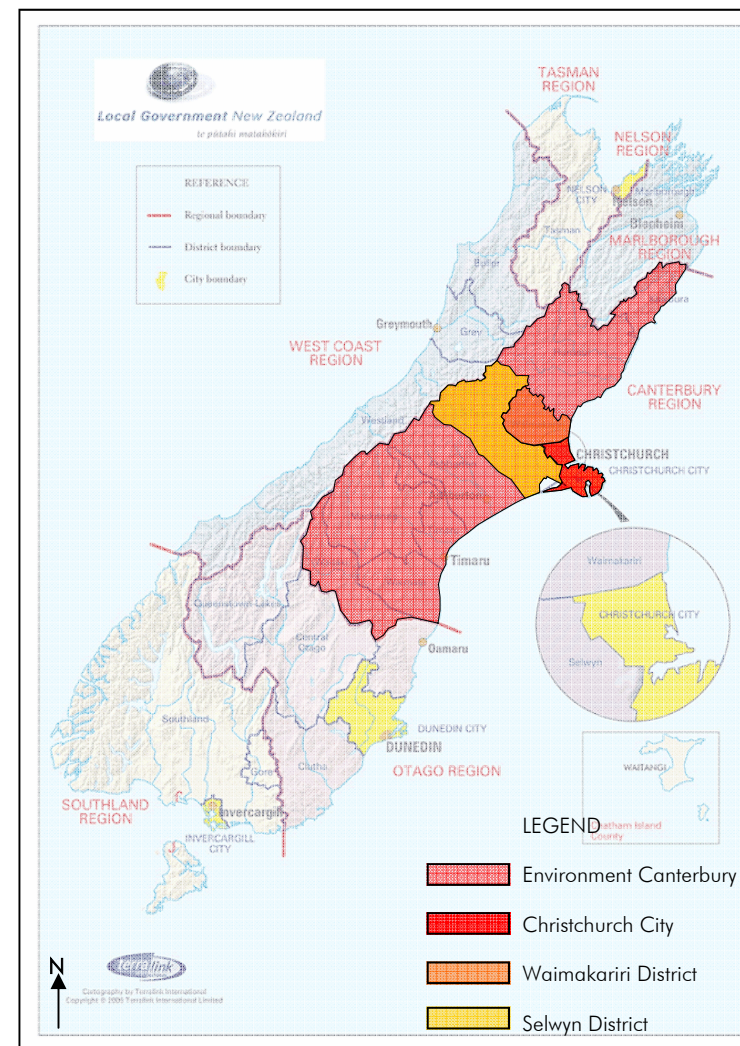
It will examine the individual component aspects of the strategy, as well as the overall options that were tested in reaching a preferred urban form and its subsequent implementation approach.

1.1 consultant team

This document includes material provided from Environment Canterbury; Christchurch City; Selwyn and Waimakariri Districts; Transit New Zealand, and/or their consultant specialists.

In addition, the following key consultants were involved in developing the work contained herein:

- **TTM Consulting Ltd** (transportation).
- **Prosperous Places Ltd** (land economics).
- **Patrick Partners Ltd** (activity centre specialists).
- **Design Urban Ltd** (urban designers).
- **RA Skidmore Urban Design Ltd** (urban designers).
- **Traffic Design Group Ltd** (transportation).
- **Parsons Brinkerhoff Ltd** (public transport).
- **Pokock Design:Environment Ltd** (landscape architects and sustainable design specialists).
- **David Johns**, Transport Planner
- **Zac Cvitkovic**, Urban Designer



ABOVE FIG. 1-1: The UDS area in its South Island administrative context (not to scale). Base map source: Local Government New Zealand www.lgnz.co.nz, 2006.



context 2

2.0 THE CONTEXT

2.1 collaboration and the UDS

The UDS is a strategic planning exercise based on collaboration and integration between stakeholders. This approach is considered fundamental to its successful implementation and without this approach the strategy - no matter how good - would fail.

This consistent emphasis on “deliverability” distinguishes the UDS from other approaches. Often large-scale planning exercises can instead focus just on “process” (where the quality of outcomes can be undermined) or “outcome” (where the idealism of ‘wish lists’ can be unrealistic).

Bringing these different elements together and being mindful of each will help to ensure the UDS is as robust as possible.

There are five key institutional stakeholders (and many other groups including Iwi) underpinning the strategy:

Transit New Zealand

“Transit” is empowered to manage the New Zealand strategic road network of motorways and highways. It has a critical role in facilitating the exchange of goods, services, and ideas across space via transportation infrastructure. As populations grow and traffic volumes increase, the network can become more sensitive to flaws and overloading.

A core component of maintaining a satisfactorily functional network is in the degree of integration achieved with land

use development and coordinated management along routes over time.

Environment Canterbury

“ECan” is a regional council established (like all local government in NZ) under the Local Government Act as a part of the Local Government Amalgamation enacted in 1989. It has a range of responsibilities under that Act, the Resource Management Act, and other Acts of Parliament. It is the largest regional council in the Country, being some 4.22 million hectares in extent. There are 9 District Councils and 1 City Council within the Region.

Waimakariri District Council

“Waimakariri” means river of cold rushing water, after which the District is named. It is a rural district of some 225,500ha dotted with a number of small towns. The main towns are Rangiora, Kaiapoi, Woodend and Oxford (although Oxford lies outside the UDS area).

Population growth (including a notable number of Christchurch City workers happy to commute each day) has been accelerating over the past 15 years. A new significant town at Pegasus Bay has been recently approved by the Environment Court and is currently in its initial construction period.

Selwyn District Council

Like Waimakariri, Selwyn is a rural district named after a river. Main towns are

Rolleston, Lincoln, Leeston, Darfield, and Burnham (associated with a military camp) and overall just under 50% of the total population live in these or other small towns. The remainder live in rural or rural-lifestyle homes.

The area of the District is 649,200ha. Its openness and proximity to Christchurch (and relative affordability of land) has seen its appeal to young families increase dramatically in recent years.

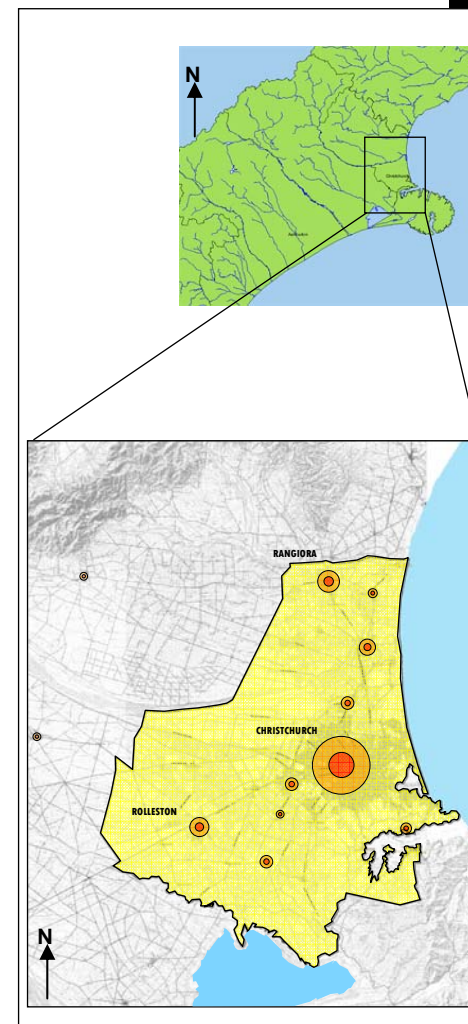
Christchurch City Council

Christchurch City (named after Christchurch College at Oxford University, England) is the largest centre of the South Island and acts as the main gateway into the remainder of the South Island. It is a focal point for trade, industry, education (especially tertiary) and migration.

The City is comprised of around 45,240ha and was the first official City of New Zealand by way of a Royal Charter in 1856. It has and still retains a strong English heritage, reflected in both its dominant ethnic groups and in particular its traditional civic and educational architecture.

Maori know Christchurch as Otautahi, derived from a Ngai Tahu Chief who established a settlement on the banks of the Otakaro (Avon) River.

Information on these five organisations has been sourced from their respective websites, publications, and staff briefings given to the Inquiry by Design process.



ABOVE: FIG 2-1: The UDS area in yellow, with some key settlements identified to help provide orientation (not to scale).



2.2 population today

GENERAL POPULATION STATISTICS

The total population of Christchurch City at the 2001 Census was 316,224 with the total population of the Selwyn District 27,312 and Waimakariri District 36,903 persons respectively.

The estimated total population located within the UDS area in 2006 has been calculated as 413,500 persons living in 164,100 households.

By 2026 the number of people living in Greater Christchurch is projected to grow up to 501,300 (21% increase) reaching a possible 548,520 persons by 2041.

CHRISTCHURCH CITY

19.3% of residents in Christchurch City (2001) are within the 0-14 year age bracket, 67.0% 15-64 years of age and 13.7% aged 65 years and above.

The total residential population in Christchurch City is expected to grow to 388,800 persons by 2026, representing an additional 72,600 persons over a 25 year period (2001-2026).

SELWYN DISTRICT

Of the total residential population of Selwyn District (2001) 23.6% of residents are within the 0-14 year age bracket, 68.1% 15-64 years of age and 8.3% aged 65 years and above.

The total residential population in the area of Selwyn District located within the UDS in 2001 was 14,052 persons with the majority located in the following major centres: Lincoln - 2,142 persons; and Rolleston, 1,974 persons.

The projected population of Selwyn District as a whole (including rural areas excluded in the UDS) is estimated as 34,200 and expected to grow to 38,300 by 2016, and 44,600 by 2026 representing a 17,300 population increase over 25 years (2001-2026).

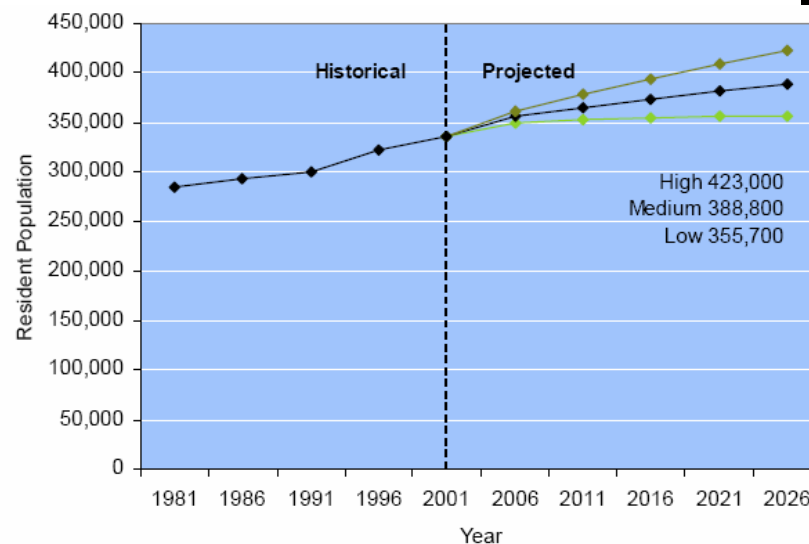
WAIMAKARIRI DISTRICT

The total residential population in the area of Waimakariri District located within the UDS in 2001 was 29,871 persons with the majority of the population located in the following major centres: Rangiora - 10,800 persons; Kaiapoi - 9,258 persons; and Woodend - 2,241 persons. Oxford is another important centre, lying beyond the UDS area.

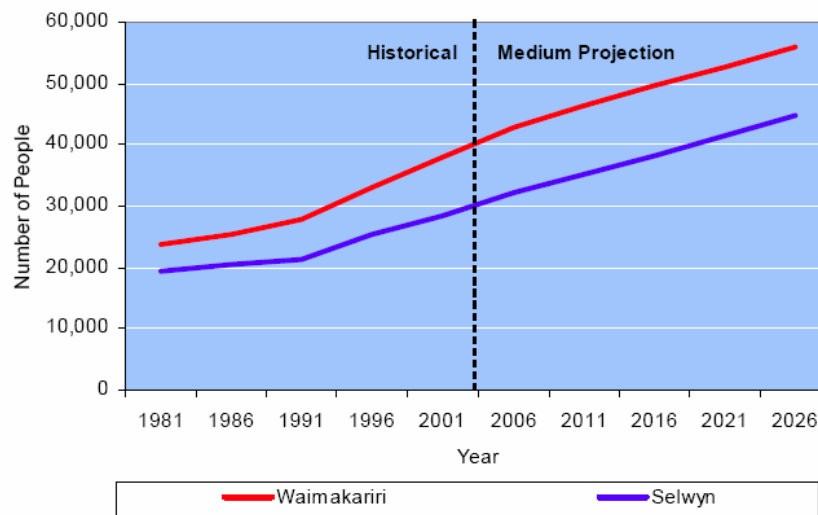
Of the total residential population of Waimakariri District (2001) 23.6% of residents are within the 0-14 year age bracket, 64.1% 15-64 years of age and 12.2% aged 65 years and above.

The projected population of Waimakariri District as a whole (including areas outside the UDS) in 2006 has been estimated as 43,100 and is expected to grow to 48,900 by 2016 and 55,900 by 2026 representing a 13,000 population increase over 20 years (2006-2026).

Across all three local authorities, notable population ageing is predicted to accompany growth over time. This means that while built environments and lifestyles may be suitable for today's needs, they may not be suitable for tomorrow's. A particular question mark over the ongoing suitability of rural-residential as a 'mainstream' lifestyle choice needs to be considered given the potential for this to create a large stock of buildings and supporting networks that are not compatible with the needs of an increasing portion of the population.



ABOVE: FIG 2-2: Historic and projected residential population in Christchurch City 1981 - 2026 (Source: Christchurch City Council, March 2006 & Statistics New Zealand, 2001 Census data)



ABOVE: FIG 2-3: Historic and projected residential population in Selwyn and Waimakariri Districts 1981 - 2026 (Source: Christchurch City Council, May 2005 & Statistics New Zealand, 2001 Census)

2.3 waimakariri district snapshot

Rangiora acts as the strategic centre of the District, being the highest-order service centre for an area far beyond that of the UDS. This is a key role that must be maintained into the future.

While the District has a strong primary agricultural base to its economy there are two notable potentials that could swing this towards secondary and even tertiary uses. These are the combination of a wider transition into more 'new economy' knowledge based businesses and the natural shift of larger industries out of Christchurch towards the periphery as land values increase. Each of these presents the opportunity (if captured) to underpin growth for this District.

Although unknown at this point, the eventual outcome realised at Pegasus may contribute a significant boost to the quality of social and public amenities / services available in the District. Current indications from the site's developers are that many high-profile amenities are to be provided, offering potential advantages to the District and Woodend in particular (due to immediate proximity).

The attractiveness of small holdings averaging around 4 hectares per lot presents potential challenges to the long-term economic viability of land as a productive resource. While it has been shown that they can be economic, this has not been the case in a majority of instances. The fragmentation of land may require innovative management measures in the future should it be needed for productive use.

KEY GROWTH ISSUES INCLUDE:

- How to retain a 'rural' or 'village' character for the district and its towns;
- Managing rural-residential areas where they do not help the viability of local centres, public transport or social services but remain very popular especially to Christchurch commuters;
- Encouraging residents to work and just as importantly spend and recreate within the District rather than commute to Christchurch;
- Due to underlying built character and town intensity, intensification into higher-density residential may only be suitable to a very limited degree. This may mean that most growth will need to be infill, medium density, or require new green-field expansion;
- Maintaining an efficient transportation connection to Christchurch;
- Large parts of the UDS lie within flood-plains that create practical difficulties for development;
- The relatively small rating and capital base of the Council may limit the amount of resources that can be invested in promoting 'good' growth through public/private partnerships, Council demonstrations, Guidelines, and so on;
- Oxford is an important town for the District but lies outside of the UDS area.



ABOVE: FIG 2-4: The part of Waimakariri District within the UDS area (not to scale). The boundary between Waimakariri and Christchurch City is the centreline of the Waimakariri River.



ABOVE: FIG 2-5: Images from the Waimakariri District within the UDS area.

2.4 selwyn district snapshot

Selwyn has a significant regional advantage in that Lincoln University and several Crown Research Institutes are located in Lincoln. This gives the District a major boost in terms of the diversity of business activities and skills present in what is otherwise a more agriculturally-based economy. This helps to attract students from all over the country and even internationally and allow leading technological and intellectual ventures to be undertaken.

The growth opportunity here is that higher skilled workers attract higher wages. If these workers can be attracted to live and recreate within the District, this will increase local spending and help the viability of centres, a major flow-on that does not always accompany lower-skilled employment.

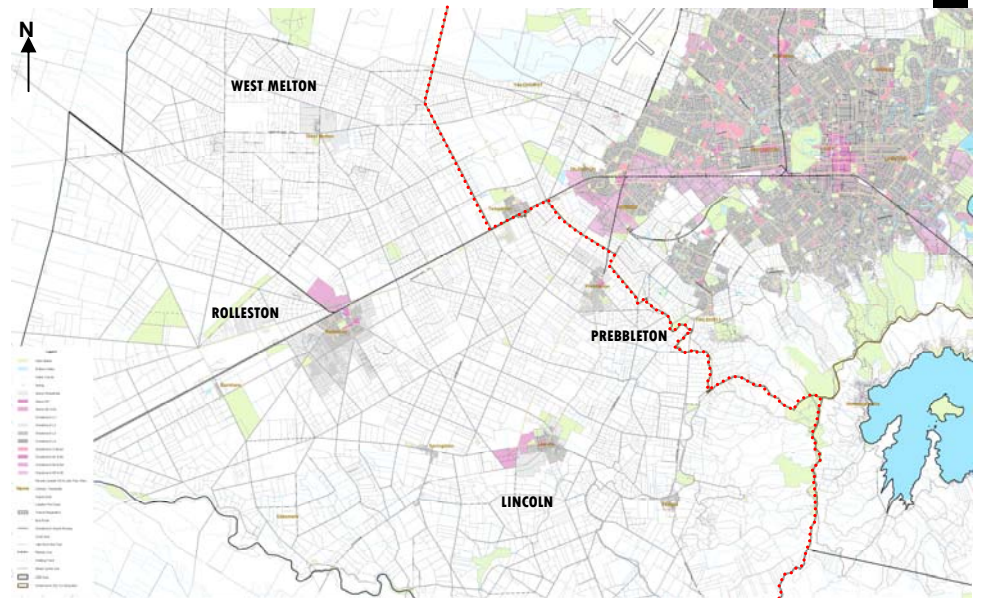
The recent emergence of the “I Zone” industrial area will also help ensure a strong market for large scale operations.

KEY GROWTH ISSUES INCLUDE:

- How to retain a ‘rural’ or ‘village’ character for the district and its towns;
- Managing rural-residential areas where they do not help the viability of public transport or social services but remain very popular especially to Christchurch commuters;
- Retaining the distinct identity of towns given their proximity to Christchurch

and vulnerability to being engulfed by growth over time;

- Managing the growing roll of Lincoln University in particular the student population commuting from Christchurch City;
- Providing and otherwise coordinating accessible services for dispersed populations - this may mean that in future more mobile services (health, library etc.) may be employed rather than fixed civic assets;
- West Melton is not as strategically connected as the other main towns and growth may be more costly here to facilitate necessary infrastructure;
- Darfield and Burnham are important towns that lie beyond the UDS area but which also need careful growth planning;
- Burnham in particular has an association with the Army, and could either significantly increase or decline depending on strategic military decisions. It is likely that at least in the short and medium term, the Army presence will if anything increase;
- Lincoln University and the CRI presence create the potential for high value-adding enterprises (needing high skilled employees) to become a key part of the local economy.



ABOVE: FIG 2-6: The part of Selwyn District within the UDS area (not to scale). The boundary between Selwyn and Christchurch City is the red dotted line.



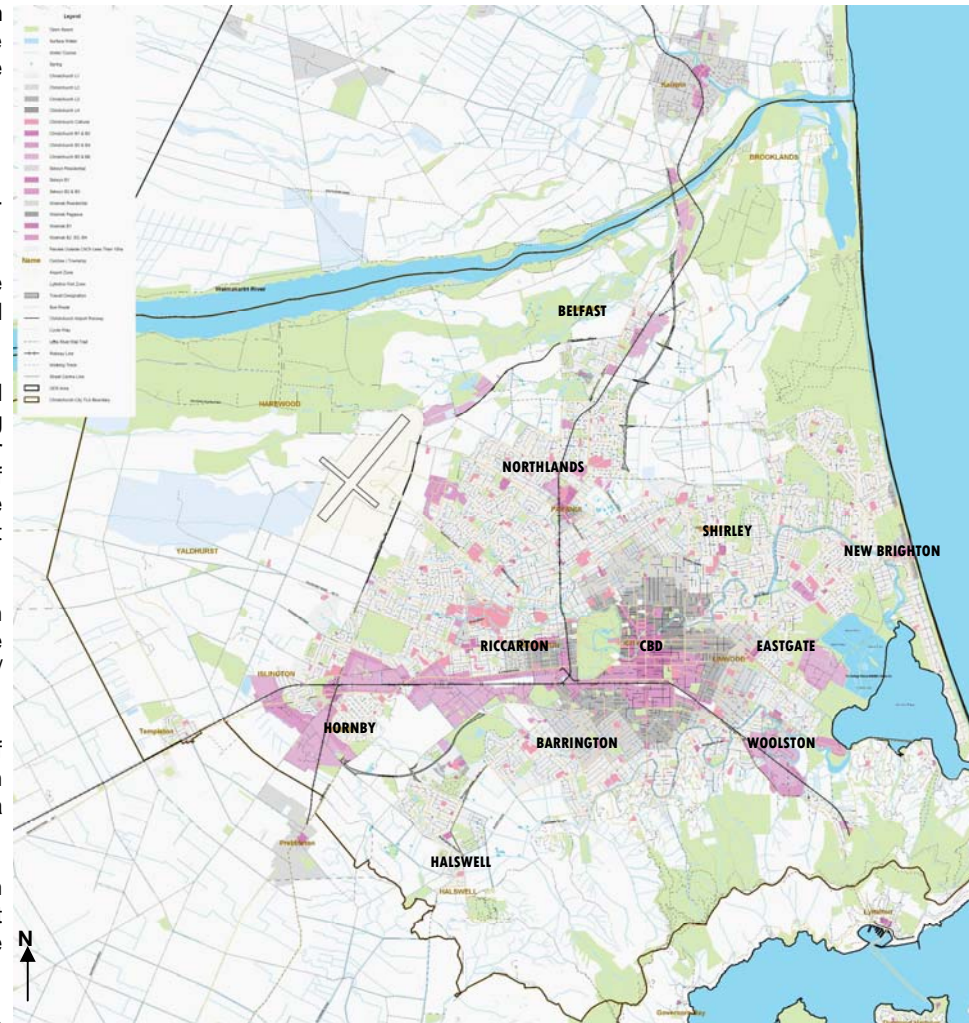
ABOVE: FIG 2-7: Images from the Selwyn District.

2.5 christchurch city snapshot

Christchurch City will face different growth challenges to the two rural districts. There will be a much greater focus on intensification in the City.

KEY GROWTH ISSUES INCLUDE:

- How to make intensive 'inner city' or town-centre living appealing and 'mainstream';
- Addressing inequalities and managing the risks of gentrification that can be associated with intensification of inner-urban areas;
- Maintaining effective commercial and mixed business uses in the face of increasing residential intensity and the potential for reverse sensitivity to reduce the range of activities that can feasibly function. While often 'championed', mixed-use development has a number of practical limitations;
- How to manage the costs of intensification, in particular those relating to earthquake strengthening and other 'pre-requisite' / infrastructural costs;
- Communities can be resistant to change if they perceive they are being asked to take an unfair 'lions share' of a burden, such as a concentration of new growth;
- How to encourage growth in Christchurch City if Local Government Act Development Contributions (to pay for infrastructure) are notably higher here than in the rural Districts;
- Ensuring that intensification does not equate to just small, tight housing units - a full range of quality household sizes, cultural and ethnic preferences need to be accommodated;
- Managing the 'highest order' regional amenities that will act as magnets to users from across the UDS area and beyond.



ABOVE: FIG 2-8: The urban area of Christchurch City lies within the UDS area (not to scale).



ABOVE: FIG 2-9: Images from within Christchurch City.

2.6 existing urban structure of the UDS area

The flat river-plain setting for the Christchurch area has meant that development has occurred in a relatively well-connected grid-pattern.

In a very general way, as growth has occurred over time a clear pattern of concentricity has occurred, with growth following a generally radial pattern of 'ripples in a pond' outward from the CBD. This can be described as the "all roads lead to Rome" effect.

The pattern has been distorted to follow the accessibility advantages that accompany incremental strategic road network improvements over time. While these are undertaken to improve region-wide movements, they have traditionally served to open up immediately peripheral greenfields for development. Settlements and 'focal points' of business then establish at key points and junctions along these larger routes, often later reinforced by intensification of residential uses. This distortion has tended to follow a north-south spine.

It has forged in many instances a key dependence by the local urban form on the state highway network to access daily needs and can be considered 'normative' in environments that grew in a private vehicle-based movement system.

A basic example is the proportion of employees living in Selwyn and Waimakariri that work or send children to schools in Christchurch, made viable by the effective strategic routes.

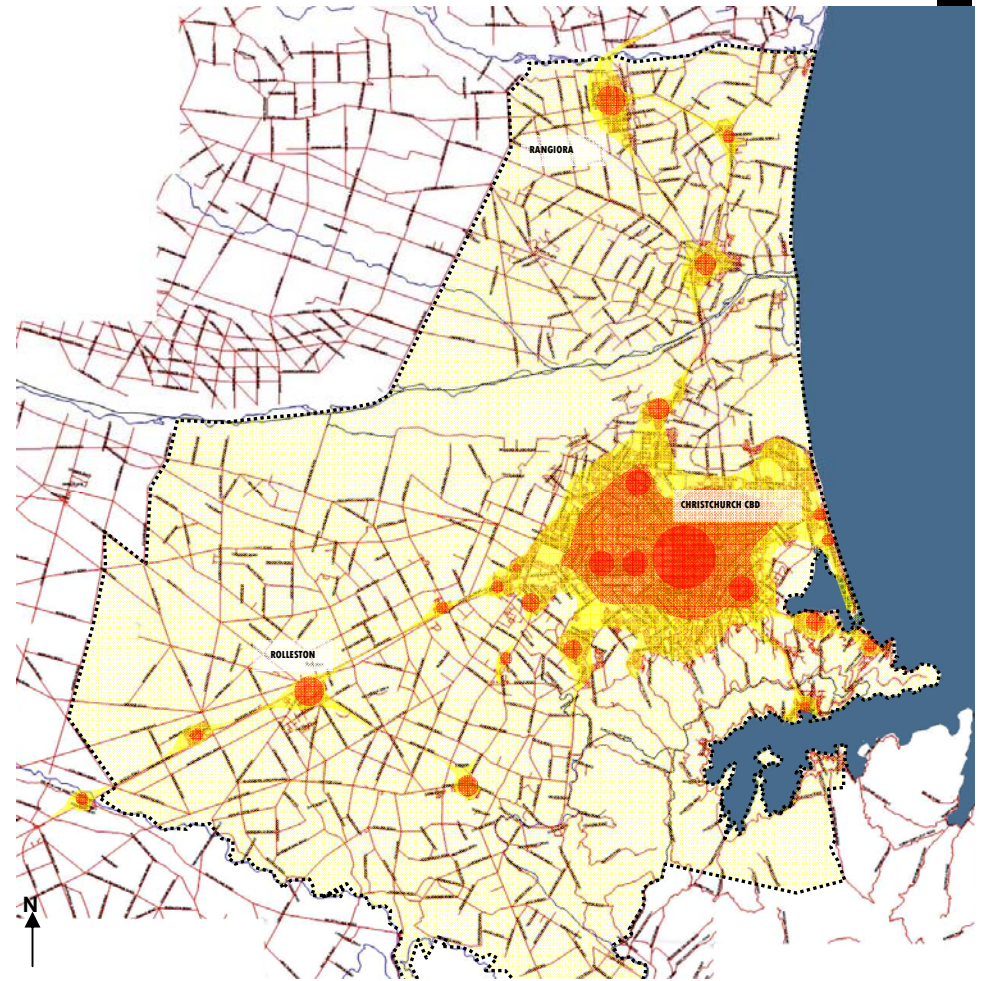
The clear exception to this pattern is to the south-east of Christchurch City, where the

coastline and Port Hills have resulted in a less-connected linear urban form.

Another boundary has been the Christchurch International Airport's noise contour which in conjunction with the Aquifer has restricted growth to the west and northwest of Christchurch City.

KEY GROWTH ISSUES INCLUDE:

- How to channel growth into identified areas of potential without 'suffocating' the strategic network. This will require effective strategies to encourage local self sufficiency and a change to the mindset that using the motorway to access basic necessary services is normal and that private motor vehicles are the only way to travel;
- How to balance the 'gravity' of the CBD and in particular provide opportunities to remove unnecessary trips from the system as it gets busier;
- As an urban form grows, many large industrial and institutional uses (including prisons) originally on the distant outskirts become engulfed, needing to either change use or re-locate outwards. Their large sites can offer excellent 'brown field' opportunities for re-development (often the best available for comprehensively planned outcomes given the fragmented pattern of residential land ownership that has accompanied New Zealand's freehold tenure tradition);
- How to ensure the growing population remains well connected to key environmental and cultural amenities without undermining them.



ABOVE: FIG 2-10: The broad urban structure of the greater Christchurch area (not to scale). The CBD acts as a core with development radiating outwards, distorted along the main strategic movement corridors into satellite towns and by environmental constraint to the south-east. Development has likewise extended to the west as much as is practical given the presence of the airport and aquifer system. Base map source: ECan website GIS viewer,

2.7 recent growth context

Growth in recent decades has accelerated in conjunction with distinct policy directions and market preferences. By the early 1990's new household growth in Christchurch City was generally occurring in a 70% / 30% split favouring denser, intensified housing types focussing around centres and existing built areas over greenfield development.

Changes to the City Plan under the RMA provided amongst other things a large amount of new Greenfield areas for residential development (particularly in the north and north-east of the City). Since this time the pattern of new household growth has switched so that now an approximate 30% / 70% split exists in favour of Greenfield development.

Apartment development within the CBD is occurring at a relatively slow pace (proportionate to the total amount of households being provided for). The majority of apartments being delivered seem to be oriented towards the upper end of the market, having the consequence that much of the stock within the CBD is of good to high quality (both in terms of external design and appearance, and internal layout and space). This bodes well for market acceptance of more of this typology in the future.

Medium density living types have also been increasing in the CBD and town centres although with less success or acceptance. Being often aimed at the low to medium-affordability ends of the market, the quality of these units has not always met community expectations. Given that this type of living is not yet in the market 'mainstream', there is a risk that communities may resist this as a viable solution to growth pressures on the

perception and connotations that can arise from having lower quality local examples available.

In the rural Districts, there has been a marked increase in the supply of 'rural residential' areas of typically 4ha lifestyle blocks. More traditionally this option was realistic only to a very small proportion of the population. Greater levels of affluence and strategic road network improvements have made this type of living available to a wider audience.

Development of more conventional freehold detached residential has also been occurring around the main service centres of the rural districts. Numerous pricing signals and accessibility / mobility assumptions have resulted in the 'commuter suburb' effect where an increasing amount of households are choosing to commute into Christchurch City in return for a larger section (and sometimes also unit) than they could obtain within Christchurch City.

This approach is not as dependent on private vehicle use as rural-residential but due to the lack of high-quality public transport systems between the towns and city vehicle use is still a necessity for many.

The viability of this lifestyle is therefore highly dependent on the price of private vehicle fuel remaining stable - prices of up to \$5.00 or more per litre* or more could result in difficulty for many of these householders (often young families seeking open spaces and secure gardens).

*This price point is estimated, and indicative only; inadequate research exists on the exact price point that would accomplish this.



ABOVE: FIG 2-11: Typical examples of the greenfield, detached unit development that has dominated residential growth in the UDS since the 1990's.



ABOVE: FIG 2-12: Examples of medium density housing within Christchurch City that have not resulted in a quality that may not help communities 'buy into' the concept of intensified growth within their areas using this approach. These can also introduce connotations or perceptions of them being associated with 'undesirable' social groups. Image source: Briefing presentation from Christchurch City Council to Inquiry by Design Workshop, 2006.



ABOVE: FIG 2-13: Examples of medium density from elsewhere that demonstrate superior attention to detailing, design, orientation, and integration with local surroundings. These can enhance the perceived quality of the communities they are in as well as offering a greater range of living choices to people and reinforcing local character.

2.8 future growth pressures

Predicting future growth patterns is uncertain given the unpredictable events that will occur over time.

However depending on the assumptions made, process for on-going refinement or correction, and contingency planning undertaken, reliable estimates can nonetheless be made on which to base sound planning. Not 'over planning' is also an important part of this mix as inflexibility can undermine rapid responses to changing circumstances.

There is a relationship between the quantum of growth and the timeframe taken to achieve it - rapid increase before planning strategies can be implemented undermines those strategies. Slower increase lagging 'behind' a strategy's intervention can result in built environments that are in a perpetual half-established transition, hinting at but never delivering the quality living environments promised.

It is important to understand the occurrence of growth with its timeframe. If coupled with a system of local implementation that can respond to the specific variations as they occur over time this approach can help to coordinate growth planning over several decades while at the same time focusing on delivering high quality places for 'today'.

The chief source of statistical data for future growth is from Statistics New Zealand. This government agency undertakes detailed statistical analysis of census data from which trends and 'scenarios' of population size, household numbers, ethnicity and age / gender can be assembled.

But this information has no relationship to where this growth would most efficiently or effectively go (for the community as a whole), meaning that even with this predictive tool there are still questions including those of:

- How to coordinate infrastructure investment while imposing the lowest burden on existing and future populations (i.e. growth can make an urban form more or less efficient and expensive to run, with many costs simply beyond the ability of most market systems to price);
- How to ensure that economic growth and productivity is maximised to maintain the sub-region's competitiveness (i.e. growth can either help to make things better but could also slow things down)

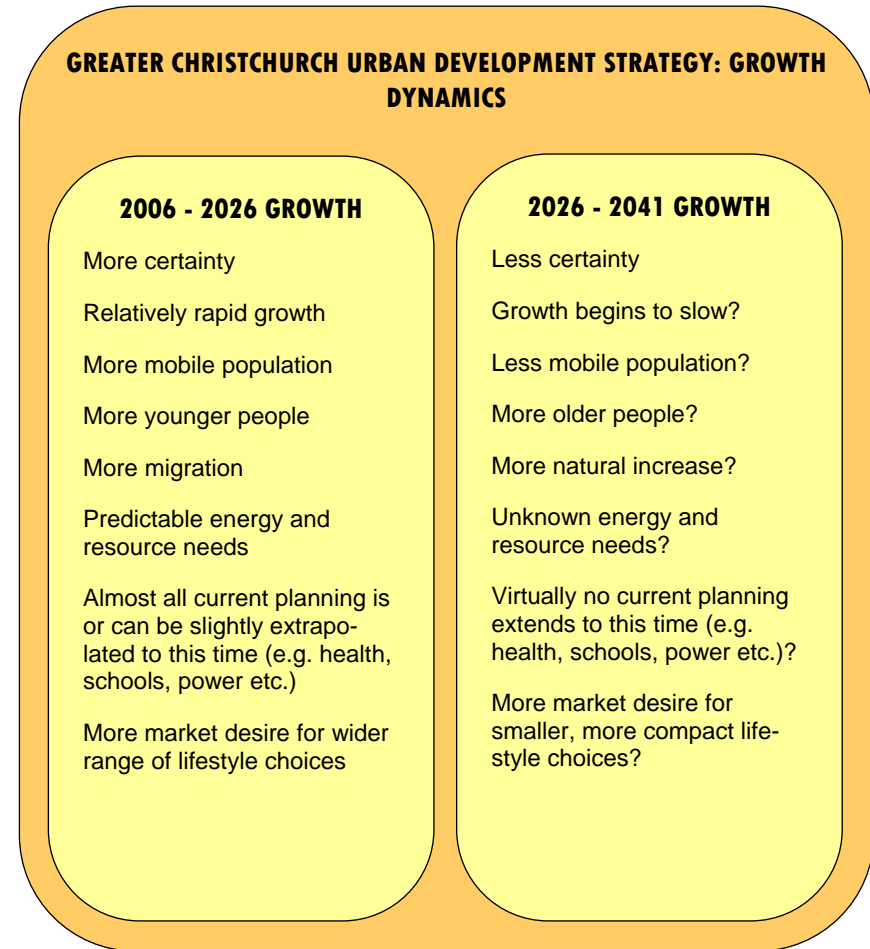
There were 3 main scenarios tested in the IBD workshop process:

- Statistics NZ Medium
- Statistics NZ Medium-High
- Extrapolated from current Building Consents issued

Of these, the Medium-High projection was adopted due to current trends of growth and a desire to have a suitably conservative 'worst case' base.

This was then expanded into a 'two step' approach of growth - households to 2026, and again to 2041. The former has been chosen as a 20 year horizon from today; the latter as it is approximately when the UDS target population of 500,000 people is anticipated to be achieved.

The 'two step' approach was used because it is envisaged that the growth issues (and the responses needed) will likely be different between now to 2026, and between 2026-2041.



ABOVE: FIG 2-14: Diagram outlining some of the many contextual differences between the periods 2006-2026 and 2026-2041 that will have a bearing on the way in which growth occurs within the UDS area.

2.9 how much growth?

Total population growth is in its raw form unhelpful, needing to be converted into household numbers to be of use in growth planning. This is in itself challenging as average household sizes will change over time meaning that as growth occurs in coming decades, so will the number of households that need to be delivered per head of that new population - making it something of a moving target. The projections are extrapolations of existing patterns (including migration), which may not actually occur.

The UDS partners have calculated that to 2026, a total of 49,500 new households will be required in the total UDS area. Based on existing population numbers, this figure is comprised of 7,400 households in Waimakariri, 8,000 in Selwyn, and the remaining 34,100 in Christchurch.

Between 2026 to 2041, a total of 29,340 further households will be required in the UDS area, comprised of 4,600 in Waimakariri, 4,800 in Selwyn, and 17,800 in Christchurch.

While this need for household growth has been attributed to individual local authority boundaries, they are by no means fixed, and for instance it would be possible to spread the total growth between authority boundaries. According to a more desirable outcome any of the Councils could actually receive more or less than the 'allocations' above.

In total between 2006 - 2041 it is anticipated that 76,700 new households will be required in the UDS area.

A further complication is that depending on the settings growth is planned to occur in, it may be realised to greater or lesser

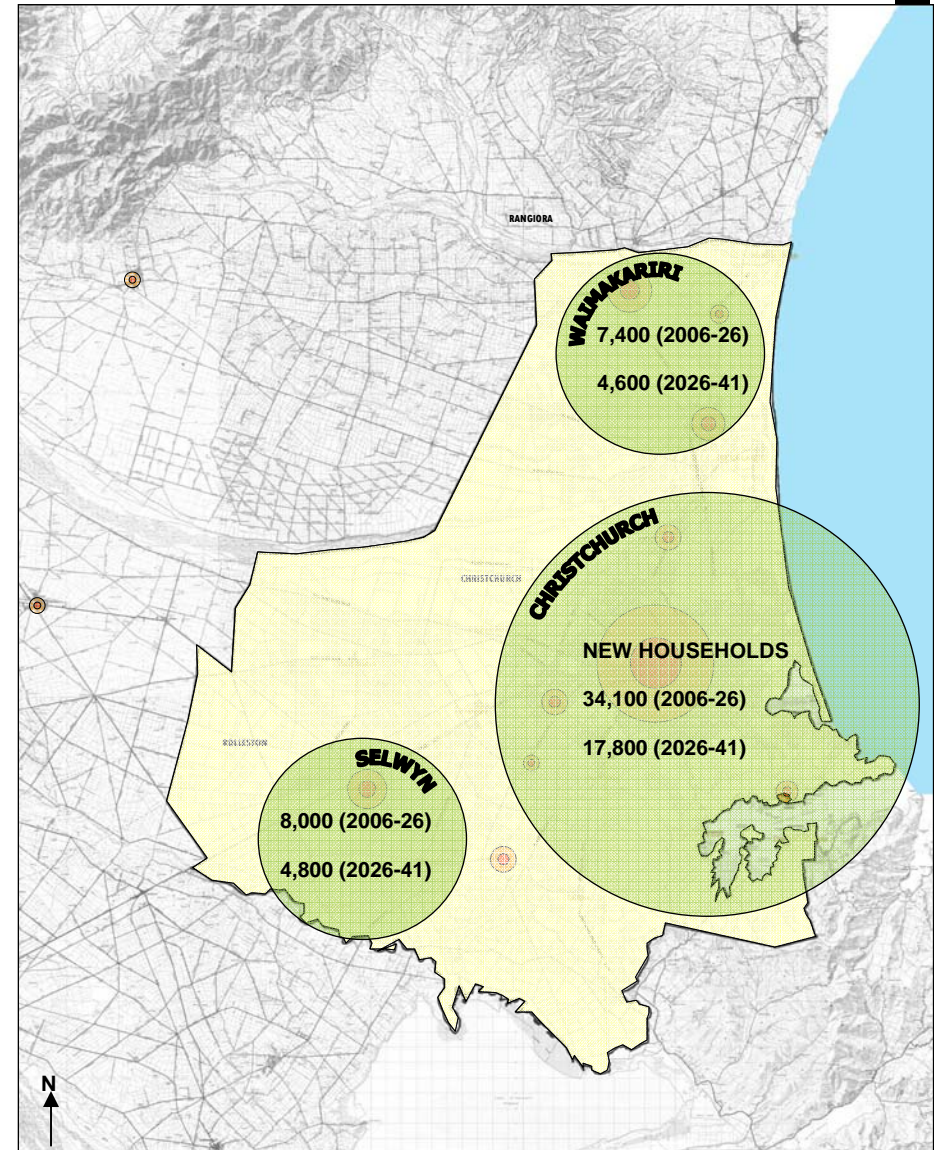
extents. The reality of what occurs over time is comprised of the actions and interactions of society, not the provisions within a strategy or statutory plan. For example, the Councils could re-zone land immediately to encourage greater intensification within centres and less greenfield growth, including a package of incentives to help any cost differential.

But given the lack of community and general market acceptance of intensified housing types in the UDS area due to both their relative scarcity and variable quality, there is no guarantee that the desired outcome would actually occur.

Similarly any move to suddenly reduce greenfield growth could inequitably affect the capital of investors and developers who may have made medium-term investment decisions based on the apparent certainty existing detailed planning provisions provide (although the UDS itself will provide a realigned long-term basis for secure investment). This could reduce their ability to invest in alternative intensive types.

The consequence is that the strategy will need to include suitable lead-in and lead-out times in relation to the allocation and distribution of household types. Hence the period 2006 - 2016 could be used to allow growth in the forms of 'A', 'B', and 'C' while preparations and necessary enabling mechanisms set up for types 'D', 'E', and 'F', which could then come on-line after that time until 2026, at which time a further package could be rolled out (as an example).

This approach will give the strategy the greatest chance of being deliverable and achieving its targets on the basis of needing realistic community and market buy-in to the outcomes sought.



ABOVE: FIG 2-15: Growth anticipated (new households) under a medium-high population projection (not to scale).

2.10 sustainability and futures

A focus of contemporary public interest is increasingly on the accepted phenomenon of climate change and its likely root cause of fossil fuel or 'carbon-based' economies. The way in which this issue continues to emerge over time will have a significant effect on the way in which growth is delivered (irrespective of whether climate change itself provides to be 'man made' or natural):

- Extreme weather events and in particular flooding aggravated by climate change pose several challenges to towns within the UDS area and the continued viability of large areas of development that are essentially constructed within a flood plain;
- Market pricing instruments may make outwards sprawl and towns based on isolated land uses facilitated by long vehicle-based trips either more or less viable. Oil shortages, petrol price increases, or carbon-taxing could limit market interest in sprawl; Alternative fuels (fuel cells, hybrid powered vehicles, or biofuels) may make it even more appealing than today;
- Environmental or war-based refugees from areas of rising sea levels (of which much of the UDS area is also vulnerable), wars, or terrorism, could significantly increase over time;
- Climate and precipitation pattern changes may influence the quality and quantity of waters within the aquifers over time;
- Changes in energy supply and the increasing viability of every home (or town / community area) becoming its own power generator as opposed to the traditional reliance on large scale generation projects may change issues of affordability per dwelling unit, changing the demand curve for different

dwelling types. Technologies based on numerous small scale 'trickle' generators mean that within 30 years it may be possible to deliver self-sufficient homes as a mainstream product.

- The transition away from a physical to a 'virtual' (i.e. internet-based) marketplace will have significant implications for the way in which towns function. While this could facilitate sprawling, less intense towns, it could just as likely reinforce demand for compact, tight towns that provide alternative choices for social interaction.
- Agricultural production and the dynamics between locally-grown or shipped-in food (including issues of transportation costs) could have significant implications for large urban towns, meaning that provision for a productive 'green-belt' may once again become necessary.

Overall it seems certain that within the lifetime of the UDS the current energy paradigm will change and with it the way in which we live, work, rest, and move. What is not certain is the degree to which this will result in large scale changes to the way in which society and the economy functions, and hence how towns are planned. If there are large-scale changes, another question is of whether it will be permanent or just a short or medium term temporary lag between the current and a viable alternative technology system that can support equivalent lifestyle habits.

The best way of managing this uncertainty is to plan for a 'balanced' approach allowing opportunities to both intensify and cluster towns, while at the same time improving large-scale transportation linkages and maintaining other lifestyle choices. Within a framework of supporting local economy and self-sufficiency, this will create the most robust urban form possible.



ABOVE: FIG 2-16: A successful economic transition to 'oil supplementation' from 'oil dependence' based on technological and social change (to help overcome the sheer energy density advantages of oil and coal) may maintain current lifestyles and even make current habits cheaper than today. A core component of this change will be continued improvements in renewable energy sources such as solar and wind generation.



ABOVE: FIG 2-17: Continued economic (and arguably also social) reliance on oil will make growth and prosperity subject to the continued cheap or at least reliable supply of this resource. Human activity-induced climate change and the increasing global scarcity of accessible potable water supplies (each a significant challenge individually) are direct outcomes from the 'oil paradigm' and our perception of the environment. Current trends suggest many lifestyles that are affordable today will not be possible in the medium and possibly even



ABOVE: FIG 2-18: Changes in energy supply over time will have impacts on the viability of different types of housing to different socio-economic and cultural groups - on low density larger sites (left) food production and waste (including human waste) treatment can occur directly on-site without the need for any network infrastructure or transportation. Alternatively, multi-unit dwellings at high densities (right) can utilise their greater building mass to provide effective passive energy efficiencies (solar gain, water heating, minimising impervious

2.11 opportunity costs

Delivering the UDS will need to include considerations of 'how much' different lifestyle / household types are required and where these are located. The basic types available are:

- Small holdings (typically 4ha+ per unit)
- Rural-residential (typically 1 - 2ha per unit)
- Large lot residential detached (typically 1:800sqm - 1:1200sqm per unit)
- Residential detached (typically 1:400sqm - 1:800sqm per unit)
- Residential 'compact' detached (typically 1:300sqm - 1:400sqm per unit)
- Infill on existing residential property (typically 1:300sqm - 1:400sqm per unit)
- Medium density types (greater than 1:300sqm per unit)
- High density apartments and mixed-use (greater than 1:100sqm per unit)

There are implications for the type of intensification sought and its ideal delivery mechanism.

Greenfield residential developments on lots between 300sqm - 800sqm are often attractive in part because they offer more opportunity for individuals to buy and build 'their dream' on their own property. Not only is this a part of the romantic 'kiwi psyche', it is also at a scale where middle income individuals are able to raise the capital necessary to pursue construction.

Denser forms of housing inevitably require greater capital and security, moving from the grasp of individuals into those of progressively bigger companies. The largest-scale apartment buildings in New

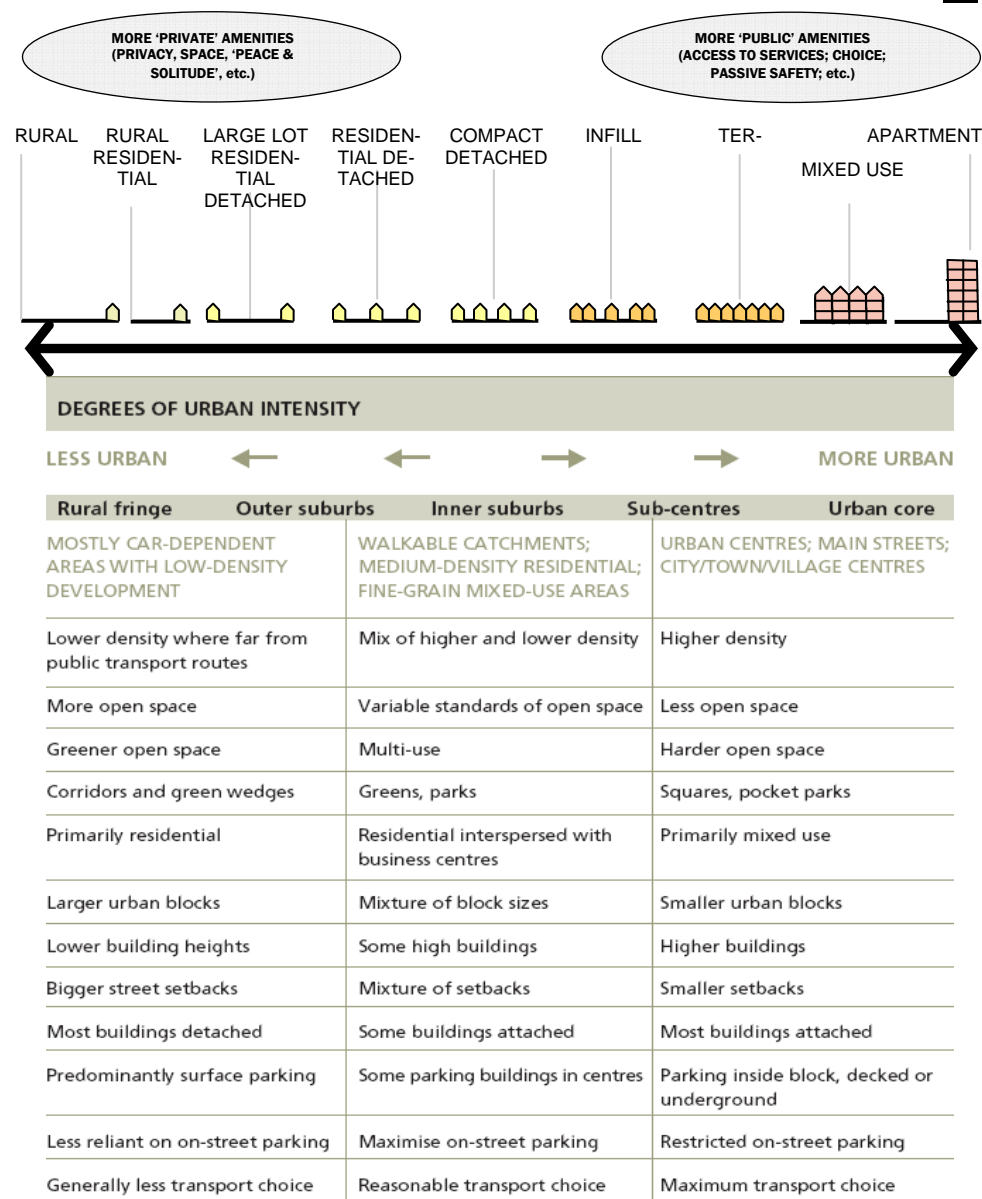
Zealand are now commonly built either by or in partnership with foreign companies and shareholders.

Conversely, larger lot sections above 800sqm also incur higher purchase costs unless their location is remote enough that a lack of demand allows land prices to decrease per square metre. This basic demand-value principle underlies the normative location of rural-residential away from centres of intensity.

A simplistic argument seeking to help manage these pricing issues in relation to developments is to provide more land supply, on the theory that more supply lowers demand forcing more competition between producers and resulting in a 'buyer's market' of competitive pricing.

But this argument does not translate entirely into the realities of three-dimensional space where not everything can locate next to everything else. Depending on scale and other geographical and socio-economic factors eventually the costs of servicing and facilitating necessary movement between places (over the design life) can negate or even exceed the theoretical savings provided to consumers through greater initial supply of the resource.

The implications of these dynamics mean that there is no easy way to provide for a wide range of accessible housing choices. It is likely that the Councils will need to become active, rather than passive, participants in delivering quality housing for future growth given the increasing pressure that is already occurring for land.



ABOVE: FIG 2-19: The residential amenity index, supplemented by descriptive data from MfE's People+Places+Spaces Urban Design guide.

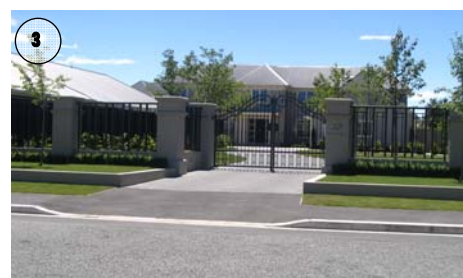
2.12 lifestyle choice

The following images are designed to represent a range of some of the residential lifestyle choices which are available in the Greater Christchurch sub-region. It is important that the UDS provides for a wide range of these choices in a manner that will adequately 'future proof' the lower mobility that will be possible with an ageing population and other societal changes to overall mobility - accessibility.

These range from rural residential properties in remote peripheral locations to lower density housing types in commuter suburbs, to medium density housing, mixed use, and high density apartments in centres and the Christchurch CBD.

Representative examples are:

- Rural Residential (typically 4ha+ per unit) (1);
- Small Rural Residential (typically 1 - 2ha per unit) (2);
- Large lot residential detached (typically 1:800sqm - 1:1200sqm per unit) (3);
- Residential detached (typically 1:400sqm - 1:800sqm per unit) (4);
- Residential 'compact' detached (typically 1:300sqm - 1:400sqm per unit) (5);
- Infill on existing residential property (typically 1:300sqm - 1:400sqm per unit) (6);
- Medium density types (greater than 1:300sqm per unit) (7);
- High density apartments and mixed-use (greater than 1:100sqm per unit) (8).



2.13 affordability, mobility, and type

While a range of strategies exist to help manage issues of affordability and accessibility with housing, the market and environmental factors will also play a wider role in influencing the popularity of different housing types with different socio-economic groups of society.

This is because the total life-cycle cost of a lifestyle is a combination of initial capital investment (a house) plus ongoing operational costs (including vehicular movement, access to daily services and higher order needs etc.). Relatively cheaper overall lifestyles may incur expensive up-front capital for a unit, making it inaccessible for those of low capital or income. Relatively more expensive lifestyles may include a lower initial capital (house) cost, making it accessible for those of low means but incurring higher on-going costs that perpetually disadvantage them further.

This has important implications on the wider urban form as over time this can play-out in ways that planned services are unable to respond to.

Current patterns (1) can be summarised as:

- **Low-density types:**
Appeal to medium to high incomes.
- **Conventional detached dwelling types:**
Appeal to low and medium incomes.
- **Medium density types:**
Appeal to low and medium incomes.
- **High density types:**
Appeal to medium to high incomes.

A less likely but possible pattern (2) that was based on the existing urban form and distribution of housing types but saw significant improvements in cost and ease

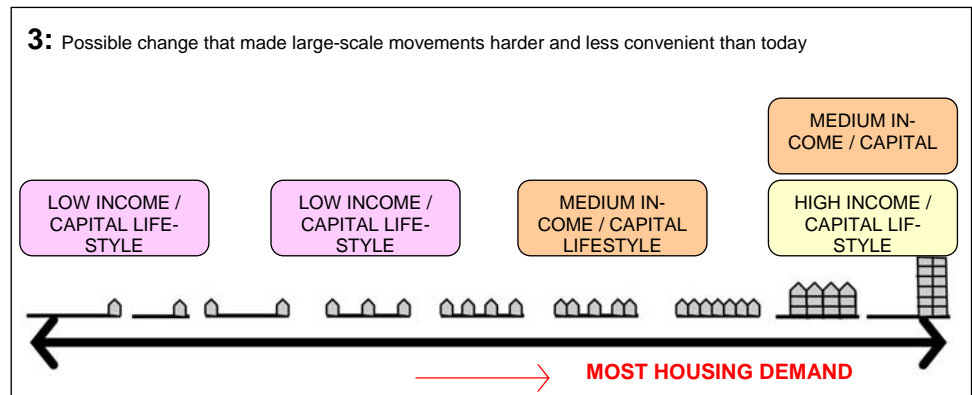
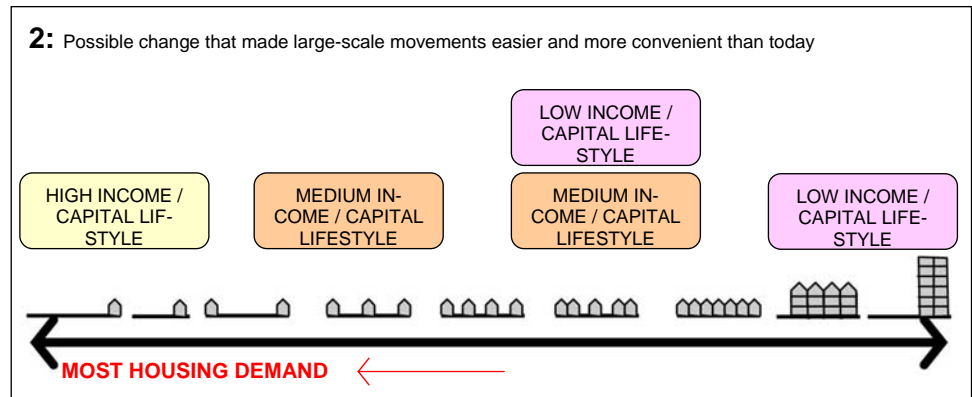
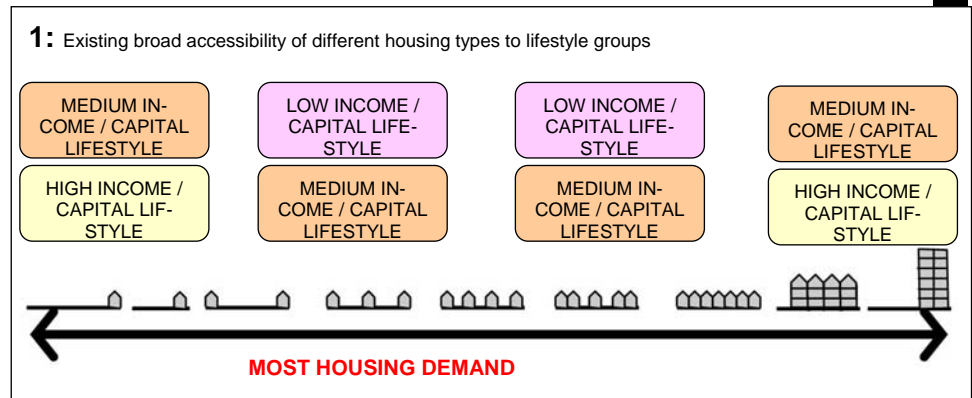
of accessibility, mobility, and movement (especially large-scale movements), would likely see this distribution change (indeed this pattern occurred and was famously described as ‘white flight’ in American Cities in the first half of the 20th century):

- **Low-density types:**
Appeal to higher incomes.
- **Conventional detached dwelling types:**
Appeal to medium incomes.
- **Medium density types:**
Appeal to low and medium incomes.
- **High density types:**
Appeal more to low incomes, with some very high earners remaining in small exclusive, luxury enclaves in the CBD.

Finally, a possible future pattern (3) that instead saw significant reductions in the cost / ease of accessibility, mobility, and movement (for example if fuel prices rose above \$5.00 per litre) could alternatively encourage:

- **Low-density types:**
Appeal to lower incomes with some very high earners remaining in exclusive areas of the periphery.
- **Conventional detached dwelling types:**
Appeal to low and medium incomes.
- **Medium density types:**
Appeal to medium incomes.
- **High density types:**
Appeal to high and medium incomes.

While this is a generalisation (there will always be a mixture of all lifestyle types within all living types), it represents important possible directions for social policy based on the physical built environment.



2.14 employment

GENERAL

Overall the Canterbury region has more wealth generated by manufacturing and less wealth generated by business services. In 2001, 22% of the Canterbury Region's wealth creation came from 'manufacturing'. Only 45 jobs per 1,000 (in 2006) were within business services compared to 51 business service jobs per 1,000 for New Zealand. Business services and other 'new economy' (or knowledge economy) employment are considered to represent the peak of tertiary level economic systems and where many of the developed 'western' economies have been increasingly moving toward.

Over the last 5 years (from 2000 to 2005), only 31% of all of the Greater Christchurch Region's urban employment growth came from activities requiring 'industrial' land with most growth being generated within the 'service sector' (68%).

→ Waimakariri District

In 2001 49.5% of the usually resident population 15 years and over were in full time employment. 3.0% were unemployed. The percentages of people 15 years and over working either full-time or part-time in the Waimakariri District in 2001 were higher than for the Canterbury Region as a whole.

Between 1996 and 2001 the percentage of the district's labour force involved with agriculture declined and the percentage involved with community and personnel services increased.

Between 1996 and 2001, the number of people who lived in the Waimakariri District and worked in Christchurch City increased by 13.1% and the proportion of the usually resident labour force living and working in the district has declined from 53.1% to 41.7% in the last ten years.

→ Selwyn District

The unemployment rate for Selwyn in 2001 was 3.3%, with a majority of the economy dedicated to agricultural production and a steady proportion involved in institutional employment (government, education, crown research institutes and so on).

→ Christchurch City

In 2001, the total labour force of Christchurch was 64% of the total working age population with 70% in full time employment and less than 7% unemployed or actively seeking work. The areas with the highest concentration of employment are in the business and central city zones.

TYPES OF EMPLOYMENT SETTINGS & GROWTH IMPLICATIONS

→ Types of employment settings

Some of the major types of employment settings in the Greater Christchurch Region are:

- Agricultural production;
- Heavy industry / warehousing;
- Light industry;
- Clean production industry;

- Office parks;
- Big box retail;
- Commercial;
- Studio / showroom areas;
- Small offices;
- Fine grain retail;
- Mixed use;
- Local retail / commercial;
- Live / work home occupations.

→ Growth implications

Each of these employment settings have their own set of implications on growth. Some of the key relationships are outlined below:

Industry needs good transport and servicing connections (without requiring heavy vehicles to pass through residential or high quality business areas or the mixing of heavy industrial land uses with residential and sensitive land uses / environments).

Mixed business and industry are best located out of sight and away from any residential areas but within a convenient distance to labour force and suppliers and also within walking distance of local 'activity centres' which are able to provide basic business and employment services.

Studio / showroom areas & office parks need to be in high amenity areas located on major routes, close to the heart of local activity centres to provide quality personal, business and employment services. Office

parks are best located conveniently close to recreational areas and services.

Smaller commercial activities are best on highly trafficked routes, located close to customers and target markets. These uses are usually semi residential compatible or at least mixed use compatible.

BUSINESS & EMPLOYMENT OUTCOMES

To realise strong, sustainable, broad based employment outcomes the UDS needs to:

- Attract and grow 'new economy' businesses and industries;
- Recognise peak industrial land demand will decrease but still provide sufficient land for large unsightly industries;
- Provide 'superior business settings' with a suitable range of good quality and affordable office premises;
- Retain residents and workers and their expenditure within local areas;
- Retain successful local business people and skilled workers as residents.

The implications of these are high-quality, high-amenity settings, often that are residential compatible. This reflects that highly mobile intellectual capital is increasingly caught more by lifestyle and environmental incentives than the more traditional tax relief or other financially-based tools.

2.15 infrastructure

Network infrastructure will be an essential component of growth in particular its timing, staging and funding. Most common is the dual approach whereby (depending on the particular circumstances of each location) a combination of public (taxes, rates, grants, levies, and debt) and private (development contributions, developer funding and/or building, or debt serviced by levies on future users) will be used in the UDS.

While there are needs for different types of infrastructure across the UDS area, the Inquiry by Design process concluded that there were no headline “go / no-go” infrastructural limitation that could play a significant part in the way in which the UDS was planned. For example, if the issues and associated costs of servicing the southern part of Christchurch City were substantially higher than in the north, this may have had an impact on the way in which growth was planned.

It is accepted that there will be instances where infrastructure provision is challenging either in the provision of new networks or the upgrading of existing ones (to cater in particular for consolidation).

Notwithstanding this, the process adopted a ‘risk management’ approach that sought to additionally:

→ Avoid providing for growth in areas of obvious physical constraints;

→ Obtaining information on the suitability of areas identified as having the potential to accommodate growth. This was in terms of whether infrastructural issues could be of such an extent that they played a major role in the feasibility of development within that area. This contributed to wider decisions that saw numerous potential growth areas removed from further consideration. While the areas identified for growth were not ranked against each other to identify an ‘ideal’ staging sequence (due to the importance of other matters aside from merely infrastructural provision including particularly transportation, social, and employment issues), those that presented larger challenges were used in a ‘secondary’ capacity, that essentially translates to a tier of areas kept for use only when necessary.

→ Promote the use of low-impact approaches that focus on dealing with issues ‘at the source’ rather than the conventional approach of moving issues ‘off site’ as fast as possible. This will present many challenges for growth:

→ Greenfield developments that include raintanks and water re-use systems may be hard to regulate through enabling structure-plan approaches

→ Redevelopment and higher-density developments may allow for comprehensive outcomes (communal water heating systems etc.)

Each of these may require a pro-active approach from the project partners including subsidisation.



ABOVE: FIG 2-20: The use of low-impact approaches (left) can not only offer visual and ecological benefits - the value benefits of these amenities for developers and property owners is becoming increasingly marketable. More conventional approaches (right) typically offer few amenity benefits and can contribute to flash flooding, estuarine sedimentation, diminished water quality, or the disruption of flora / fauna patterns (i.e. preventing fish species from being able to travel to spawning areas).



ABOVE: FIG 2-21: Provision for on-site water capture and re-use can help to improve the efficiency of each site. It can be cheaper and easier to establish on lower density sites via a stand-alone tank in the garden; with higher densities the premium for space can mean that they need to be accommodated underground or otherwise integrated into the design (as with the

ABOVE: FIG 2-22: In denser areas using larger, communal buildings, the potential to use the roof for open space and ecological amenity is conventionally under-utilised (typically due to cost issues of providing stronger structures). Roof gardens can also act as highly effective insulation (for both heat and noise transfer), and as an outlet to help clean detained rain water prior to piping.

2.16 heritage

The UDS area is rich in built and natural heritage. Much of the prominent or civic architecture in Christchurch City is fundamental to the sense of identity and character of the place. The same is true for other towns within the strategy area such as Rangiora.

Growth in other urban areas of New Zealand has not always respected heritage elements, with many outstanding and historically relevant icons being lost or severely undermined since 1980. In some areas entire suburbs have been redeveloped and gentrified to the point that the original stories and 'purpose' of the place has been either lost entirely or reduced to 'stylish' architectural gimmickry. This issue will become increasingly important in the UDS area over time, and will be particularly dependent on the degree of intensification / redevelopment ultimately pursued by the strategy.

While there are many significant heritage assets within the strategy area, sensitive new and re-development will in most cases be appropriate. The newer 'outer' towns within Christchurch City are all in particular suitable for comprehensive development, while the CBD may require a more considered heritage-based development focus.

It was determined during the IBD workshop process that the existing provisions for maintaining heritage including the District Plan, deliberate Council purchases of key 'landmarks' or council-led redevelopment approaches including public design competitions, NZ

Historic Places Trust and other similar organisations, and various civil mechanisms (covenants) were satisfactory to conserve heritage values.

Given that a core approach of the UDS is to use new growth to enhance the quality of life within existing centres (in itself requiring that intensification must respond to existing character and identity issues), no specific heritage limitations were placed on the UDS area.

An issue of providing for greater future cultural heritage exists across the UDS area. While the established 'English' heritage is strong, other cultural groups are now important both socially and economically but there is a lack of key built components within the built form. Such things as focussed open spaces using materials, design philosophies, and land use interfaces are essential to help reflect the role of these groups in society over and above any specific forms that may be erected (such as mosques, temples, cultural centres or meeting places).

In terms of natural heritage, a key approach of the UDS will be in integrating as much as possible of the 'open space network' into the built form. This will help make these assets as accessible and visible as possible while (through design and management) still allowing 'no-go' exclusionary conservation areas where necessary for ecological habitat.



ABOVE: FIG 2-23: An example of an unsuccessful response (LEFT) to recognised important built heritage (RIGHT). In this environment an important node declined over time in response to major strategic transportation initiatives. Redevelopment has often paid only lip service to the originals; in this example reducing them to a one-level retail strip with a gimmicky roofline between pre-fab buildings, and unsympathetically massed / treated apartments set back behind. This has weakened the heritage value of the entire street.



ABOVE: FIG 2-24: An example of contemporary design based on form and material cues from adjoining buildings. This helps to sensitively juxtapose older buildings and create a rich, diverse built form.

ABOVE: FIG 2-25: The towns within the UDS area are particularly rich in built heritage, which can be used as the basis to create a high-quality, international-standard intensive built environment.

2.17 towards a vision

The project partners prepared 4 broad approaches to manage future growth, including calculations of some of the likely costs and benefits that could be associated with each one.

These were critical tools in communicating the issues facing the UDS area to the community, allowing more informed consultation to occur than may otherwise have been the case.

The four options developed and released for consultation were:

BUSINESS AS USUAL:

This settlement pattern would continue with the current trends of development spreading out around the Greater Christchurch area in new subdivisions (79%), with some housing in urban renewal developments (21%). Councils would continue to pursue independent growth strategies. Development would occur between Christchurch and rural towns, and southwest to Rolleston and Lincoln, around Lyttelton Harbour and north of the Waimakariri River.

OPTION A:

This option concentrates development within Christchurch City and the larger towns in the surrounding districts. Development focuses on central Christchurch and inner suburbs, also Rangiora, Kaiapoi and Rolleston with 60% of new housing in urban renewal

developments and 40% in new subdivisions.

OPTION B:

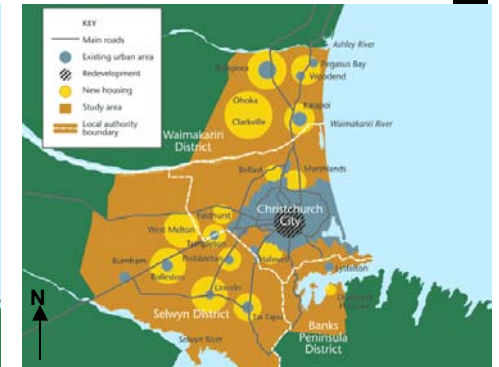
This option seeks to balance future urban development between existing built areas with some expansion into adjacent areas. 38% of new housing would be urban renewal in locations such as Rangiora, Lincoln and Christchurch and 62% in new subdivisions.

OPTION C:

This option disperses development out around the Greater Christchurch area away from established urban areas. Development would be concentrated in areas outside Christchurch and rural towns (90%) including southwest to Halswell, Lincoln and Rolleston, around Lyttelton Harbour, between Rangiora and Kaiapoi and at Pegasus Bay and the remaining 10% in urban renewal developments.



ABOVE: FIG 2-26: Graphic representation of the "Business as Usual Option", as released by the UDS for consultation with the public (not to scale).



ABOVE: FIG 2-27: Graphic representation of "Option A", as released by the UDS for consultation with the public (not to scale).



ABOVE: FIG 2-28: Graphic representation of "Option B", as released by the UDS for consultation with the public (not to scale).



ABOVE: FIG 2-29: Graphic representation of "Option C", as released by the UDS for consultation with the public (not to scale).

2.18 preferred option

Community feedback endorsed ‘**Option A**’ as the preferred approach to manage future growth, with 63% of the 3,200 submissions of respondents supporting this approach, and in numerous cases calling for an even ‘stronger’ version of this approach.

Option A seeks to concentrate development within Christchurch City and other larger towns in surrounding districts.

Key features of Option A are:

- Development focuses on central Christchurch and inner suburbs, also Rangiora, Kaiapoi and Rolleston;
- 60% of new housing is urban renewal (37,470 townhouses and apartments) and the remaining 40% in new subdivisions around the edge of towns and Christchurch (24,980 houses on small sections);
- Farmland / open space required for housing 120,000 additional people is 2,110 hectares (equivalent to 11 Hagley Parks). This option uses 43% less land than the ‘Business as Usual’ option;
- Infrastructure for new subdivisions and urban renewal costs \$430 million by 2041 but majority of existing infrastructure can be reused and upgraded where necessary;
- 190% increase in congestion by 2041 / 500,000 people, commute takes 45% longer (a 30 minute trip today takes 44 minutes);

- To avoid congestion increasing, road widening / maintenance costs estimated as \$1.9 billion by 2041 (\$195 per household annually);
- Walking, cycling and public transport are significantly improved;
- Social networks retained and good range of facilities provided to communities in easy access for residents of central and inner suburbs.
- Existing shopping and retail centres are likely to expand.
- Urban design guidelines to play a critical role to ensure high quality development;
- Opportunity to protect natural landscapes, and create open spaces around City and towns including regional parks;
- Rural-residential is nominal.

An immediate disparity exists in that Option A was consulted on the basis of needing to accommodate an additional 62,450 households whereas the medium-high projection used to underpin the Inquiry by Design workshops was 76,700; a difference of 14,250 households.

This skewed the comparison between IBD options as while they may have delivered the same number of households through ‘consolidation’, the proportion of total households accommodated via this would diminish i.e. 37,470 households is 60% of 62,450, but is 49% of the IBD target of 76,700 households.



ABOVE: FIG 2-30: Enlarged image of Option A, the preferred option endorsed through consultation and that which formed the basis of Inquiry by Design testing to deliver the strategy (not to scale).

2.19 Health Impact Assessment

The Canterbury DHB undertook a 'rapid' (based on readily available existing evidence and experts rather than detailed collection and analysis of new data) health impact assessment (HIA) of the 'Business as Usual' and 'Option A' concepts, concluding with a number of recommendations that would help support it. A health impact assessment aims to assess the effects of policies on the health and wellbeing of populations.

The HIA found that the consolidated, compact urban form sought under Option A would be more likely to promote healthy communities than the 'business as usual' option.

The analysis was based on six chosen determinants of health:

- **Water quality**
- **Air quality**
- **Waste management**
- **Social connectedness**
- **Housing**
- **Transport**

Key recommendations included:

→ AIR QUALITY

- Sponsor energy efficient housing

- Sponsor active and public transport

- Advocate to upgrade the building code

→ WATER QUALITY

- Protect aquifer catchment zones
- Integrate water management with urban planning

→ SOCIAL CONNECTEDNESS

- Incorporate universal design principles when planning and designing public spaces
- Facilitate the development of community spirit within neighbourhoods e.g. by thoughtful location of schools

→ HOUSING

- Ensure affordable housing options for all

→ TRANSPORT

- Reduce reliance on private cars - particularly in the centre of Christchurch and towns
- Incorporate road, footpath, and cycleway design strategies that maximise road safety

→ ENGAGEMENT WITH MAORI

- Incorporate findings from Maori research on low impact Maori urban design in the UDS

The recommendations contained within the HIA are all consistent with those pursued by best-practice urban design, or 'sustainable urbanism'.

Delivering the recommendations will require a number of actions across all levels of society. But just as important as any actions that can be undertaken by the project partners for each recommendation will be the participation of the community.

While urban design can maximise the *opportunities* to achieve healthier lifestyle choices, it cannot compel or force people to take them.

This tension can be described by using the economic concept of supply and demand.

Good urban design can provide the 'supply' for healthier lifestyles in the form of choices, and viable and safe environments to live in. But without the equivalent demand for them from 'consumers' (users), they will be poorly or under-used. Often education, advocacy, and the removal of reverse incentives can significantly assist in improving the 'demand' for health-supportive environments. Markets can struggle to provide these outcomes without public-sector support given the tension between whether the 'supply' or the 'demand' should come first.

Pursuing this genuine buy-in and 'demand' from communities will need to have an equal emphasis from the project partners as delivering the 'supply' if the HIA recommendations are to be meaningfully implemented.



urban design framework 3

3.0 URBAN DESIGN FRAME-

The urban design framework sets out the key assumptions, priorities, and goals of development for the UDS. Its purpose is to provide a rationale and focus for what development should achieve. The use of a framework will ensure that a comprehensive view of the UDS area's potential is taken.

The framework is based on the following considerations:

An Integrated Approach

- Ensuring that design is undertaken in a holistic, manner to avoid the risks associated with 'tunnel vision' or artificial separation of intrinsically interrelated elements. This applies to both:
 - The core qualities of the environment (the 'quadruple bottom line') (1); and
 - The intellectual disciplines and specialisations that society uses to apply knowledge. (2)

Urban Design Principles

- The design fundamentals that must guide development of the built environment;
- The essential qualities that are necessary to create the optimal physical settings to facilitate social and economic exchange.

Local Priorities

- The long-term goals set out by communities in their Community Outcomes;
- The UDS charter prepared as a part of the project to crystallise the partnership and collaboration.

Key Development Issues

→ The primary issues that would need to be considered in order to create a successful community.

3.1 an integrated approach

An integrated approach will be applied to the UDS spatial planning to ensure benefits are achieved from more than one 'sphere'. Typical examples include:

Economic

→ A connected street network that offers economic benefits through the efficiency of traffic movement as well as social benefits by providing greater personal safety as a result of the wide-spread presence of motorists offering surveillance.

Ecological

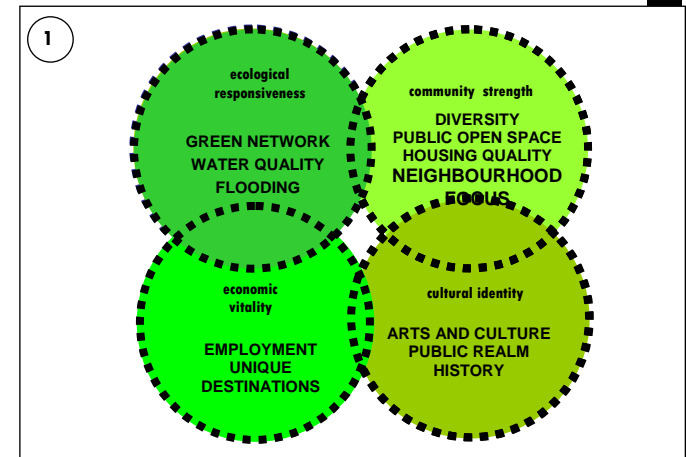
→ Features that are celebrated and integrated into urban environments rather than closed off or destroyed can enhance the recognition and identity of those towns, as well as adding value to the built form through better visual and aesthetic amenity.

Social

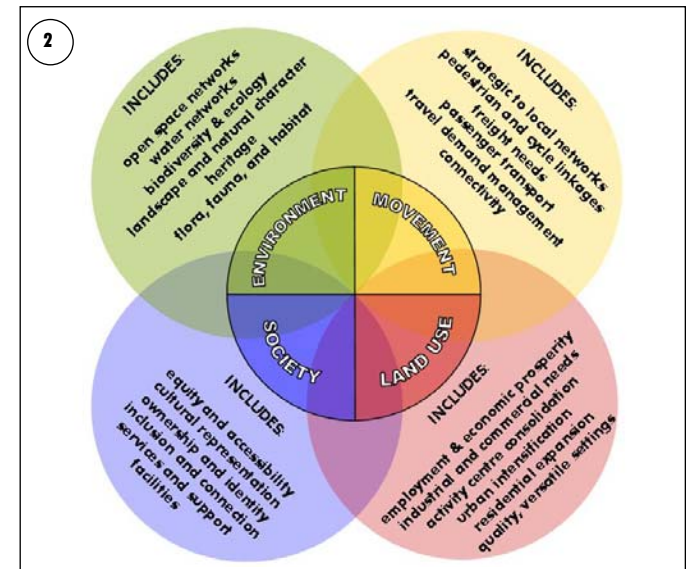
→ Coordinated residential land uses provide the greatest potential for social services to be accessible and relevant to their users. Employment opportunities are also a critical component of engendering social pride and well-being.

Cultural

→ The growth strategy must be relevant to all cultural and ethnic groups, providing them with ownership and identity in the built form. If the strategy focuses solely on the mechanical task of providing 'X' houses for 'Y' population it will exacerbate existing and create new cultural suppressions.



ABOVE: FIG 3-1: The quadruple bottom-line approach that ensures a balanced view of the 'environment' in its totality underpins an integrated approach.



ABOVE: FIG 3-2: The UDS must integrate the technical specialities that each partially manage spatial planning and the built environment if the strategy is to be robust, grounded, and deliverable.

3.2 urban design principles

A 'Principled' approach should be used to drive the process, based on key urban design concepts that can best embed and deliver sustainability into a built outcome.

This allows a robust, defensible 'bottom line' to be established against which the potential of the UDS area can be explored. It also acts as a 'safety net' in that it ensures the framework will address a broad range of issues, not be biased or hijacked by one or two main interests, for example stormwater management, ecological protection, household density maximisation, or traffic efficiency.

The sustainable urban design principles that shall underpin the Development Framework, in line with the Ministry for the Environment's "People Places Spaces", are illustrated on this page. In addition, two further principles have particular relevance to the UDS area:

→ Economic exchange and well-being;

→ Social & cultural reinforcement.

These are relevant given the need for this strategic-level strategy to be both realistic and relevant to the communities that will use the built environment over the next decades.

Principle	Elements	Purpose
consolidation and dispersal	DEVELOPMENT PATTERNS AND INTENSITY	To promote higher intensity development around new nodes and lower density around the periphery. This allows local communities, businesses and public transport to be strengthened, and resource efficiencies to be achieved, whilst reducing environmental impacts on peripheral areas. For the UDS this is fundamental to "Option A" including consideration of where stimulated intensification will have the greatest overall benefit - it may be more beneficial to provide medium density development at the periphery of one particular town centre than high density development in the core of another due to the overall urban 'logic' of how people will move around and use each respective environment.
integration and connectivity	MOVEMENT NETWORKS; BUILDING INTERFACES	To promote development that is integrated and connected with its surrounding environment and other existing or future communities. This facilitates ease of access, economy of movement, and improved social interaction. For the UDS this has a particular relevance to the way in which the three local authorities connect and interact with each other through the strategic and local movement networks, as well as the public transport network. The potential role of rail, either as freight-biased or passenger-freight balanced (or possibly even passenger biased) must also be examined in terms of supporting the establishment of "Option A".
diversity and adaptability	RANGE OF DENSITIES; MIX OF USES; FLEXIBILITY OF BUILDINGS	To promote choice through the provision of a diverse mix of compatible activities and uses. These built environments can better adapt over time. This facilitates the ability to respond efficiently to social needs, provides a range of market demands, and allows for changes in lifestyle. For the UDS this has relevance to the type and nature of intensification that is delivered. An emphasis on 'mixed use' can limit the range of business activities that can occur in a town centre, having flow-on impacts for the local employment and social heterogeneity of that environment. Likewise, uniformity in the types of households delivered through intensification can undermine the range of social groups that can viably use them.
legibility and identity	TOWN FORM; VISUAL CHARACTER; SPECIAL PLACES	To promote environments that are easily understood by their users, display a strong local identity, and create appropriate visual character. This facilitates an enhanced usage, enjoyment, and pride in local place. For the UDS this means that several layers of identity and legibility must be retained. At the highest order, living in the Rural districts (particularly in the towns) must remain experientially distinct from living within Christchurch City. Secondly, each town centre must also be embedded with its own unique sub-character. For example, the use of generic or formulaic 'main street' treatments repeated in each town centre would be a negative outcome.
environmental responsiveness	ECO SYSTEMS; GREEN NETWORK; URBAN WATER; WASTE; ENERGY	To promote urban environments that are responsive to natural features, eco systems, water quality issues, reduced energy usage and waste production, and balance the spatial needs to achieve this with that required for urbanisation. This facilitates improved ecological outcomes. For the UDS this means having particular regard to the unique ecological and biodiversity context of the landform and ecosystem. Despite the globally small City population, Christchurch has already had to take action to limit air pollution. Increasing the population within urban areas will present on-going challenges that need to be managed at the same pace as growth.
economic exchange and well-being	URBAN ECONOMICS; EMPLOYMENT	To promote 'deliverable' built outcomes that maximise benefits for the local economy and condition. This stimulates employment and economic vitality for communities (a key in prosperous social conditions) as well as recognising the need for all development to be organised and structured to create rather than reduce or undermine opportunities for economic advantage. For the UDS this means understanding the relationship between growth, employment opportunities, and the accessibility / movement connections between the two that can best stimulate economic transactions in space for the overall benefit to communities within the UDS area
social & cultural reinforcement	OWNERSHIP; INVOLVEMENT; PRIDE	To promote equitable cultural representation in the built environment, enhanced expressions of ownership and genuine participation in each 'place', and the provision of targeted built environment amenities where relevant to support communities of interest. For the UDS this means responding to areas of ethnic and cultural interest, as well as particular care in the management of movement networks, support services, and connections for different groups based on their unique needs.

3.3 NZ urban design protocol

The New Zealand Urban Design Protocol is a coordinated attempt to improve the processes used as well as the outcomes achieved using urban design-led approaches.

The Protocol focuses around seven essential qualities, referred to as the 'Seven C's'.

For the UDS, an eighth essential quality has been identified, that of 'celebration'. This has a specific emphasis on using the natural qualities and characteristics of a place as the basis for all new or redevelopment within it (drawing from but building on context, character, connections, and creativity). Given that "Option A" will be the basis of the UDS, the implications of a strategy of large-scale intensification on established places needs to be kept in mind.

There is a possibility that intensification could dramatically transform the appearance, nature, and functioning of a place. The 'celebration' initiative used in the UDS spatial design process is aimed at ensuring that the identity of each place is maintained and the many 'stories' of towns, social, environmental, economic, and cultural change that have been building since before the land was ever settled are continued. This requires more than a response to context and the maintenance of built character.

Of the UDS partners, Transit New Zealand, Environment Canterbury, and Christchurch City Council are signatories to the protocol, committing to advancing the standards of the built environment through sound urban design approaches.

Quality	Features	Spatial Implications for the UDS
celebration	STORIES; MYTHS; DELIGHT; HISTORY	<i>To ensure that all growth and development is fundamentally based on celebrating the history, stories, and features that make each local setting a source of inspiration and motivation to users. This means that care must be taken when planning for intensification or expansion to ensure that these traditions are properly integrated into design as the basis for moving into the future; not seen as a divisive segment to be simply 'ring-barked' and placed in a vacuum of conservation or protection.</i>
context	SPATIAL AND SOCIAL RELATIONSHIPS	<i>To realise a dynamic and responsive approach that can evolve and change over time in response to changes in economic, social, cultural, or ecological setting. It requires implementation mechanisms and ultimately physical environments that are robust, flexible, and adaptable, responding to their environment.</i>
character	DISTINCTIVENESS, IDENTITY, RESPONSIVENESS	<i>To realise development outcomes that reinforce 'place' at the local, district, and sub-regional levels. At the same time change and variety must be recognised as important factors contributing to richness, diversity, and ultimately also character. This has key relevance to the way in which intensification is managed.</i>
choice	DEMOCRACY IN SPACE, USES, MOVEMENT	<i>To realise diverse living, working, playing, learning, and resting environments that cater to the widest possible range of interest groups and users. The UDS will need to develop a range of intensification approaches that to this point have not been seen in New Zealand which can achieve this and satisfy the needs of different socio-economic, ethnic, and cultural groups.</i>
connections	LINKAGES, ACCESSIBILITY, EQUITY	<i>The UDS must place equal emphasis on facilitating both physical and social connections. This has implications for the delivery of intensification, land use integration with the public realm, legibility, and permeability across a range of movement and communication modes (including electronic and the internet).</i>
creativity	ORIGINALITY; PROBLEM-SOLVING; ARTISTIC	<i>Intensification on the scale sought under "Option A" is new to the UDS area and its communities. To realise it, an equally distinct and unique approach to managing growth within the UDS area including custom-designed implementation techniques is required.</i>
custodianship	RESPONSIBLE; INTER-GENERATIONAL EQUITY	<i>The strategy and its various benefits and costs need to be equitably shared across stakeholders today and also those who will benefit from sound planning tomorrow. It also demands that a sensitive approach be made to the recognition and maintenance of ecosystems, biodiversity and other non-renewable resources.</i>
collaboration	CO-ORDINATION; GOOD-WILL; OPEN MINDEDNESS	<i>This is embedded into the UDS process through the way in which the partner organisations have come together and designed the process. This partnership will need to be maintained during the implementation of the strategy, including possible considerations of equitable distributions of the costs and benefits of the chosen approach.</i>

3.4 urban development strategy community charter

The Community Charter is the founding document for the UDS which introduces the vision, principles and goals of the Strategy. It seeks to ensure the expectations of the community, business sector and Partners are met and the legislative framework fulfilled.

The Charter consolidates the collaborative, partnership approach inherent in the Strategy and essentially acts as a statement of intent that describes what the partners intend the Strategy will do both now and looking towards 2041.

GUIDING PRINCIPLES

The overarching principle of the Charter is 'sustainable prosperity' which seeks to adopt a holistic approach in the UDS and balance environmental, social, cultural and economic objectives within the community.

Achieving sustainable prosperity is recognised as being dependant on the following sub-principles:

- Leadership - good governance, decision making and management;
- Partnership - working collaboratively and co-operatively ;
- Responsibility - progressively working towards achieving goals and actions;
- Resilience - managing risk and uncertainty through strategy and implementation frameworks;

- Adaptability - recognising the past and responding to the future and change;
- Innovation - thinking outside the square and taking a creative, cultural and resourceful approach;
- Integration - integrating all goals into decision making, plans and policies; and
- Restoration - protecting, restoring and valuing the natural environment.

STRATEGIC DIRECTIONS

The strategic aim of the Charter is to "improve the liveability and quality of life for the people of Greater Christchurch while focusing growth within existing urban centres".

The Charter recognises that the strategic direction can be achieved through staged policies, initiatives and programmes and a strong framework of the following desired outcomes:

- Good governance and leadership;
- Better management of urban growth;
- Better management of the environment; and
- Supporting a prosperous economy.



ABOVE: FIG 3-3: The sustainable prosperity approach that recognises that day to day activities can simultaneously affect the economy, environment and



ABOVE: FIG 3-4: The strategic directions needed to achieve sustainable prosperity.

3.5 environment canterbury community outcomes

The Local Government Act (LGA) requires Councils to identify with their constituents "Community Outcomes". These are important immediate to long-term goals that are intended to help guide the present and future actions of district and regional Councils in their Long Term Council Community Plans. They should form the local basis for place-based strategic planning and the way in which the UDS should be delivered locally.

Each of the three Territorial Local Authorities and Environment Canterbury the Regional Council identify community outcomes at least once every six years.

The identification of community outcomes provides for local community engagement and participation within the planning process and allows communities to discuss the importance and priorities of outcomes.

They are intended to ensure a greater local authority commitment to community priorities and co-ordination of community resources. Community outcomes inform other planning functions which are undertaken by the local authority and guide the setting of priorities and activities.

Community outcomes enable desired high priority environmental, economic, social and cultural objectives of all sectors of the community to be determined and promoted. They are therefore an important provision under the LGA which should inform TLA and Regional Council development, planning, and actions.

This page presents the Environment Canterbury's Community Plan 2006-2016.

Outcomes (Priority)

Social well-being

- Good healthcare for all
- Everyone has access to good education
- People feel safe at all times
- Community services that meet people's needs
- Everyone has access to acceptable standards of housing
- Transport and travel needs are met
- Easy to travel around cities and towns and easy access

Economic well-being

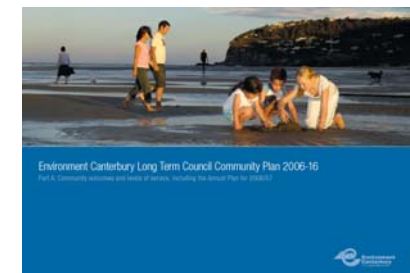
- Incomes provide good standard of living
- People in work
- A strong economy
- Alternatives for moving people and freight

Cultural well-being

- A good place to live for all cultures
- Opportunity to participate in sport and recreation
- Public parks and reserves are plentiful
- Access to open spaces and wilderness areas
- Recreational needs are met
- Opportunity to participate in arts and cultural activities
- Canterbury has attractive places to live in
- Heritage buildings and sites are protected

Environmental well-being

- Water is in a healthy condition, clean and plentiful enough to support life
- Air, beaches and ocean are all in a healthy condition
- Business and farming activities do not harm the environment
- Environment, in general, is to be looked after
- Rural land is mainly for farming and agriculture
- Native plants and animals can thrive
- Easy to travel around cities and towns and easy access to shops and other community services



3.6 waimakariri district community outcomes

In achieving its obligations under the Local Government Act, Waimakariri District Council has undertaken a comprehensive exercise with the community to identify key desired outcomes that reflect the 'goals' of the city's long-term development. These community outcomes are identified in 'Waimakariri LTCCP 2006-2016' and are presented to the right.

Outcomes (Priority)

There is a safe environment for all

- Harm to people from natural and manmade hazards is minimised.
- Crime, injury, and road accidents are minimised
- Our district is well served by emergency services and volunteers are encouraged.

Transport is accessible, convenient, reliable, affordable and sustainable

- The standard of our District's roads is keeping pace with increasing traffic numbers
- Christchurch is readily accessible by cycle, car, truck, bus, or train
- The District is well served by public transport,

There is sufficient clean water to meet the needs of communities and ecosystems

- The demand for water is kept to a sustainable level
- Harm to the environment from the spread of contaminants into ground and surface water is minimised

Businesses in the District are diverse, adaptable, and growing

- There are growing numbers of business and employment opportunities in our District
- There are sufficient and appropriate places where new businesses are able to set up in our District
- There are opportunities for our young people to enter employment and gain skills in our District

Core utility services are provided in a timely, sustainable and affordable manner

- Harm to the environment from sewerage and stormwater discharges is minimised
- Energy and telecommunication services have sufficient capacity
- Solid waste is minimised and residues do not cause harm to the environment
- Water supplies to communities are of a high quality

The community's needs for health and social services are met

- Our people are supported by a wide range of health services that are available in our District
- Participation in community based support services is acknowledged and discovered

Outcomes (Important)

The air is clean

The land is healthy

There are areas of significant indigenous vegetation and habitats for indigenous fauna

effective and efficient infrastructure

The community's cultures, arts and heritage are conserved and celebrated

Public spaces and facilities are plentiful, accessible and high quality

The distinctive character of our towns and rural areas is maintained

People have wide ranging opportunities for learning and being informed

People are friendly and caring, creating a strong sense of community in our District

Public organisations give effect to the spirit to the Treaty of Waitangi

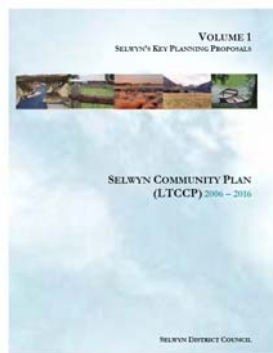
There are wide ranging opportunities for people to contribute to the decision making by public organisations that affects our District



3.7 selwyn district community outcomes

The community outcomes which are presented to the right provide an invaluable local set of local priorities for the Selwyn District.

These community outcomes are identified in 'Selwyn Community Plan (LTCCP) 2006-2016' and are presented to the right.



Key Community Outcomes

Air, land, water and general environment to be kept in a healthy condition

- Advocate to ensure organisations responsible for protecting the environment have appropriate policies and strategies to achieve this outcome.
- Provide water and sewerage systems that minimise the negative effects of their activity

A living environment where the rural theme of Selwyn is maintained

- Provide a district plan which recognises and protects the core values that maintain a working rural environment

Access to community and public health services

- Advocate to ensure appropriate organisations provide the services needed by Selwyn residents

Co-ordination of community / social services

- Advocate to ensure governmental and social organisations have an appropriate presence in the District
- Facilitate initiatives that keep Selwyn people healthy and active
- Support community halls and reserves to allow for physical and passive recreational opportunities

A safe living environment

- Identify and where appropriate provide or advocate for solutions to community safety problems (e.g. road improvements, public space and reserve design, walking and cycleway designs)
- Implement bylaws as necessary

Educated community

- Advocate for improvements to the education opportunities within the District

Business friendly environment

- Encourage increasing skills and knowledge in Selwyn people of every age
- Implement policies and practices that where appropriate minimise the effect of the Council on the business community
- Advocate for improvements to telecommunications (e.g. broadband and other internet access options)
- Work with farming groups and like organisations to maintain and enhance land based industries which are the base of the Selwyn District's economy

Effective and accessible transport system

- Provide a well maintained, integrated, sustainable and safe District transportation network
- Advocate for improvements to Transit State Highways and Passenger Transport services where community concerns are noted

An ability to experience cultural activities

- Provide libraries at Darfield, Lincoln, Leeston, Rolleston, Glentunnel, Tai Tapu and the mobile library
- Continue with Christchurch City Council services for Paparua Library users
- Encourage other cultural activities and events

3.8 christchurch city community outcomes

In achieving its obligations under the Local Government Act, Christchurch City Council has undertaken a comprehensive exercise with the community to identify key desired outcomes that reflect the 'goals' of the city's long-term development. These community outcomes are identified in 'Christchurch City Our Community Plan LTCCP 2006-2016 - Christchurch O-Tautahi'.

These community outcomes which are identified to the right provide an invaluable local set of local priorities.

Key Community Outcomes

A safe city

→ *We live free from crime, violation, abuse and injury. We are safe at home and in the community. Risks from hazards are managed and mitigated*

A city of inclusive and diverse communities

→ *Our diversity is seen, heard, valued and celebrated. All people feel a sense of belonging and participate in the community*

A city of people who value and protect the natural environment

→ *Our lifestyles reflect our commitment to guardianship of the natural environment in and around Christchurch. We actively work to protect, enhance and restore our environment for future generations.*

A well governed city

→ *Our values and ideas are reflected in the actions of our decision makers.*
 → *Our decision makers manage public funds responsibly, respond to current needs and plan for the future*

A prosperous city

→ *We have a strong economy that is based on a range of successful and innovative businesses*
 → *We value sustainable wealth creation, invest in ourselves and in our future*

A healthy city

→ *We live long, healthy and happy lives*

A city of lifelong learning

→ *Our learning opportunities help us to participate in the community and the economy*
 → *Quality education is available for people of all ages*

An attractive and well designed city

→ *Christchurch has a vibrant centre, attractive neighbourhoods and well designed transportation networks*
 → *Our lifestyles and heritage are enhanced by our urban environment*



3.9 inquiry by design

The spatial outcomes of this integrated place based strategy are anchored around a series of highly interactive multi disciplinary technical workshops, Inquiry-by-Design (IBD) workshops and consultation sessions run by a specialist project team in conjunction with institutional stakeholders, and the public.

GROWTH PRINCIPLES

The process was informed by key spatial principles that guided the design process. These included:

- the need for compact centres;
- robust and legible urban form;
- walkable neighbourhoods;
- encouraging employment opportunities;
- developing a comprehensive strategy;
- high quality urban places;
- environmental responsiveness;
- promoting sustained vibrant town centres;
- ensuring the full economic potential is captured;
- efficient integrated movement networks;
- street network connectivity;
- streets for all patrons;
- liveable streets;
- promoting a range of residential densities;
- a diverse range of household types; and
- appropriate dwelling and land use types.

CONSTRAINT IDENTIFICATION

Two IBD workshops in 2006 established a sub-regional and local area framework urban

structure and strategy to identify where growth and consolidation would be most beneficial. A 'top down' and 'bottom up' approach was adopted to provide both a macro and micro level of spatial analysis. Each of the following constraints within the UDS area and in each sub-regional centre were identified and considered:

- Infrastructure - Water supply, Sewerage, Electricity, Gas, telecommunications, Broadband.
- Environment - Landform, Natural Resources, Biodiversity, Land Capability, Natural Hazards, Waterways, Air and Noise, Contaminated land, Waste.
- Population - Existing and Forecasts.
- Social - Housing Preferences, Social Infrastructure.
- Cultural - Tangata Whenua considerations (waahi tapu, consultation).
- Economic - Economic Development, Employment, Industrial Development, Activity Centres, Commercial Retail and Tourism.
- Land Use and Built Form - DP provisions, Heritage, Densities, Existing Capacity.
- Movement - Public Transport, Freight, Traffic, Cycle, Walking.

OPTION TESTING

Fundamental to the IBD process was the comprehensive testing of growth and consolidation scenarios for all UDS centres. This allowed the constraints and opportunities relevant to each local area to be evaluated and a preferred urban structure to be formulated.



ABOVE: FIG 3-5: During the second IBD workshop

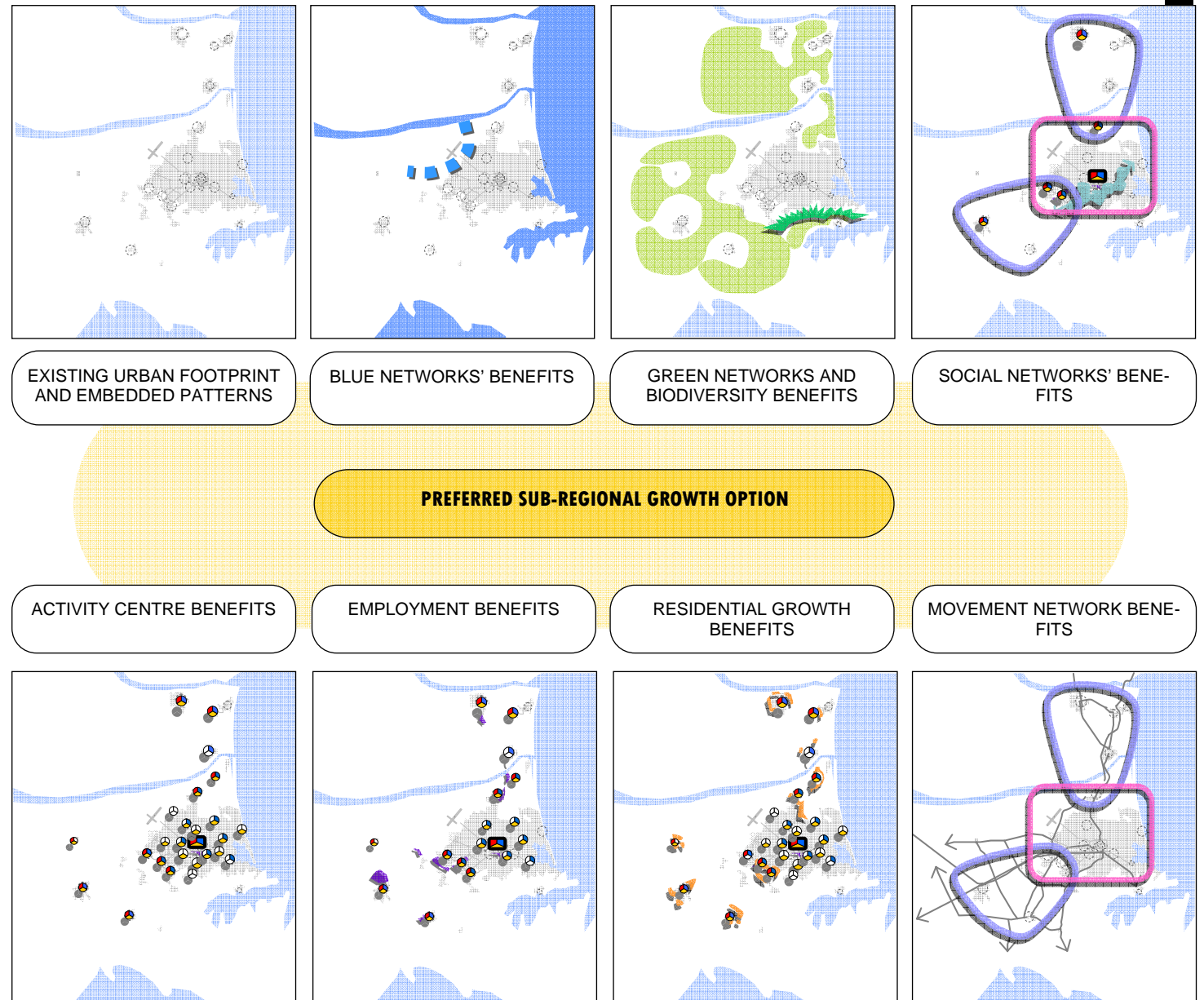
3.10 a multi-layered process

The conceptualisation presented to the right illustrates the broad process that led to the preferred spatial structure to deliver “Option A” and the UDS.

It is based on allowing individual discipline ‘interest’ groups to reach their own preference on how the UDS should be delivered specific to their objectives.

The robust process allowed the advantages and disadvantages of competing interests to be openly compared, with all implications of one action on other issues understood.

The composite UDS structure overlays several distinct layers of analysis, making this approach a clearer method of communicating where different priorities came from and how they fit into a wider framework of benefits for individuals and communities within the UDS area.



EXISTING URBAN FOOTPRINT AND EMBEDDED PATTERNS

BLUE NETWORKS' BENEFITS

GREEN NETWORKS AND BIODIVERSITY BENEFITS

SOCIAL NETWORKS' BENEFITS

PREFERRED SUB-REGIONAL GROWTH OPTION

ACTIVITY CENTRE BENEFITS

EMPLOYMENT BENEFITS

RESIDENTIAL GROWTH BENEFITS

MOVEMENT NETWORK BENEFITS



blue network 4

4.0 BLUE NETWORK

4.1 blue networks

The blue network relates to water management, typically integrating stormwater, and the consideration of water quality and quantity issues.

A successful blue network provides visual amenity value in addition to ecological servicing and additional safety to buildings through reduced flood risk.

The blue network has a unique significance to the UDS area due to the presence of the aquifers and rivers draining from the Southern Alps into the Pacific Ocean.

4.2 blue network aims

The key aim of the blue network for the UDS should be to maintain water quality and quantity and in particular respect of the aquifers. A second should be to provide a high amenity interface between land use and the Waimakariri River. Others include:

- to manage the three urban waters and in particular stormwater associated with development in a sensitive manner that respects the water quality and quantity in the aquifers and coastal water systems;
- to manage the urban footprint in a way that minimises threats to the aquifers. Theoretically well-designed low-impact dwellings can still have major impacts on the aquifers, such as runoff from people washing cars or paint brushes cumulatively penetrating into water supplies;

- to integrate green and movement networks into the blue network - particularly the many streams and creeks lacing over the UDS area. This maximises amenity and efficiency opportunities.

4.3 blue network issues

- maintain natural and potable water source quality, not inefficiently allowing it to be spoiled irrespective of technologies that may still allow it to be re-cleaned for consumption;
- managing flooding risks associated with the Waimakariri and other river systems, including sea-based tsunami and other natural hazards;
- effectively incorporating waterways with urban form and stormwater management to maximise local treatment trains and avoid infrastructure 'dead zones' caused by uses backing onto them (1);
- coherently integrating infrastructure into development so that it reinforces local amenity and identity (2);
- providing for ecological enhancement and restoration where possible;
- while rural intensification will reduce agricultural runoff into water system, this land use change also has the potential to overload local infrastructure systems, lead to coastal discharge or increased concentrations of undesirable heavy metals and pollutants.



ABOVE FIG. 4-1: Examples of 'conventional' responses to blue network issues at the local level. These often poorly relate with their settings and create risks of flash flooding and result in the lowering of property values and safety levels.



ABOVE FIG. 4-2: Examples of blue network responses that focus on improving local settings. These often result in increased levels of amenity and property value, greater surveillance and hence greater safety levels. Approaches that focus on slowing the movement of water also help reduce the risks of flash flooding and erosion / coastal degradation.

4.4 the river plain

Christchurch City is located in the path of the Waimakariri River, protected only through the deliberate re-routing of the river northwards to its current mouth. The City has had a history of regular flooding and although engineered stop-banks protect it indeed parts are still subject to regular flooding events. This issue also affects parts of Waimakariri and Selwyn Districts and creates a paradoxical issue for growth management:

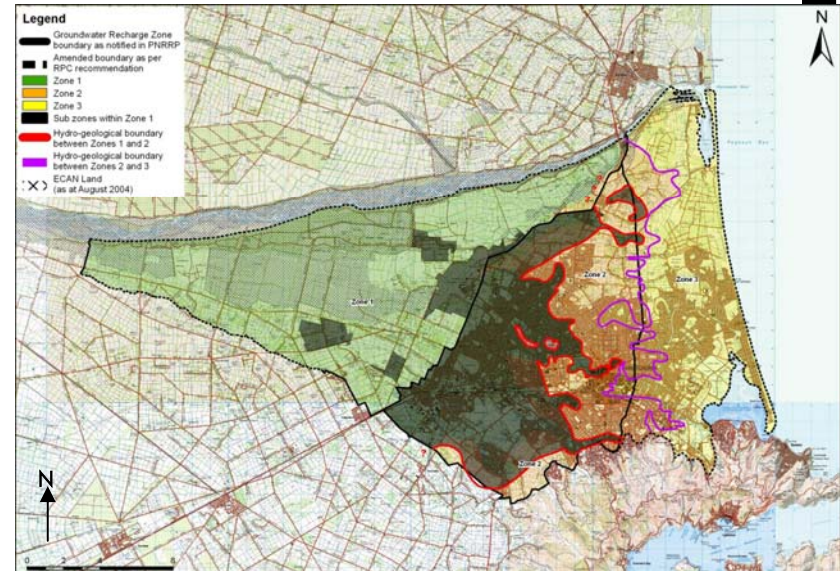
- Intensification can concentrate the amount of people at risk from major flooding, heightening the potential severity of flooding events;
- Outward growth can lead to problems of isolation and disconnection during major hazard events, limiting access by emergency services and preventing assistance being provided to those in need.

Given the real risks of flooding within the UDS area, this must be treated as amongst the highest order of factors influencing the distribution and pattern of growth adopted. While intensification of existing logical focal points that are at risk of flooding can only be managed through best-practice engineering standards (where intensification is seen as necessary for broader goals and cannot be accommodated in other focal points); greenfield development areas that present regular flooding risks should be avoided from development.

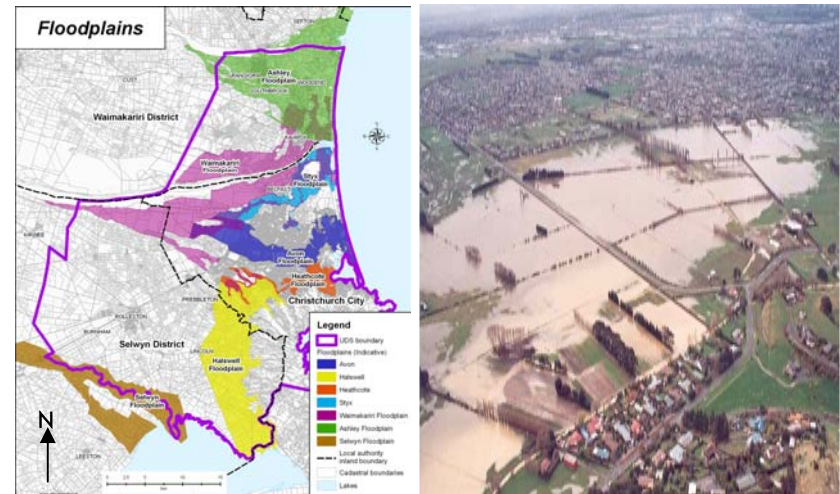
Contrasting with these risks, the movement of water and sediment deposition it enables have in part led to the location of Christchurch City and its surrounding hinterland of fertile, rich soils. Over time Christchurch then gave rise to towns in Waimakariri and Selwyn.

While the rivers, climate, water table, and topography combine to bring a threat of flooding in conjunction with heavy weather events, they also offer an extraordinary water supply for residents to enjoy. The filtration afforded to water on its journey down the Southern Alps and across the Canterbury Plains is to such a standard that most drinking water can be directly extracted from aquifers without any treatment - a remarkable occurrence almost unparalleled for an urban area of this scale.

This system is one of the most important natural assets within the UDS area and in effect helps subsidise the costs of urbanisation many other towns need to pay (obtaining and treating suitable water supplies).



ABOVE FIG. 4-3: Groundwater recharge zones for Christchurch City (image source: ECan).



ABOVE FIG. 4-4: Floodplains within the UDS area (left) and example of Christchurch flooding (right). Source: ECan).

4.5 aquifers

A complex system of subterranean aquifers fed by runoff from the Southern Alps forms the overwhelming bulk of water consumed for drinking and also industry / agriculture. It is a critical economic resource made more valuable by its high quality.

As the urban form of Christchurch has spread outwards to the west, it has begun encroaching on the unconfined aquifers. This in conjunction with increasing industrial use and discharge and in particular agricultural runoffs (high in phosphorus and nitrates from animal effluent and chemicals), presents a mounting challenge to the on-going viability of the aquifers as a reliably safe source of water. As more 'dirty' water penetrates into the water cycle and infiltrates into the aquifers themselves, the quality and safety of water will decrease.

There are two main types of aquifer: confined and unconfined.

CONFINED AQUIFERS

Confined aquifers comprise of permeable rock areas that are usually (but not always) deeper under the ground than unconfined aquifers. They are overlain by relatively impermeable rock or clay that limits groundwater movement into, or out of the confined aquifer.

Groundwater in a confined aquifer is

therefore under pressure (caused by gravitational movement as more water is being pushed into it than can move out of it) and will rise up inside a borehole drilled into the aquifer. The level to which the water rises is called the "potentiometric" surface.

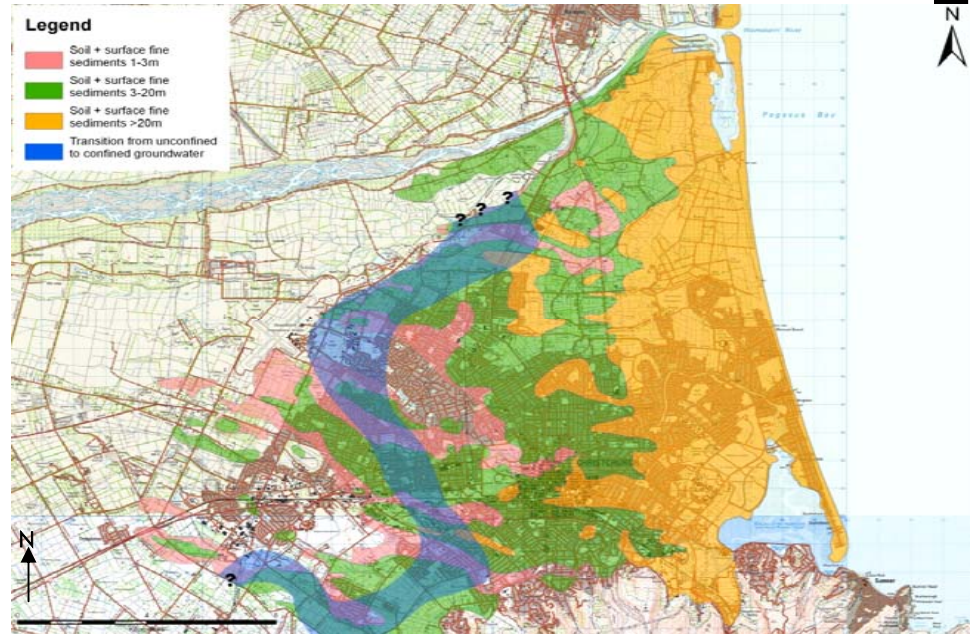
An artesian flow is the name used to describe where water flows out of a borehole under natural pressure.

Confined aquifers may be replenished, or recharged, by rain or stream water infiltrating the rock at some considerable distance away from the confined aquifer. Groundwater in these aquifers can sometimes be thousands of years old, as is the case with much of the water in the UDS area aquifers.

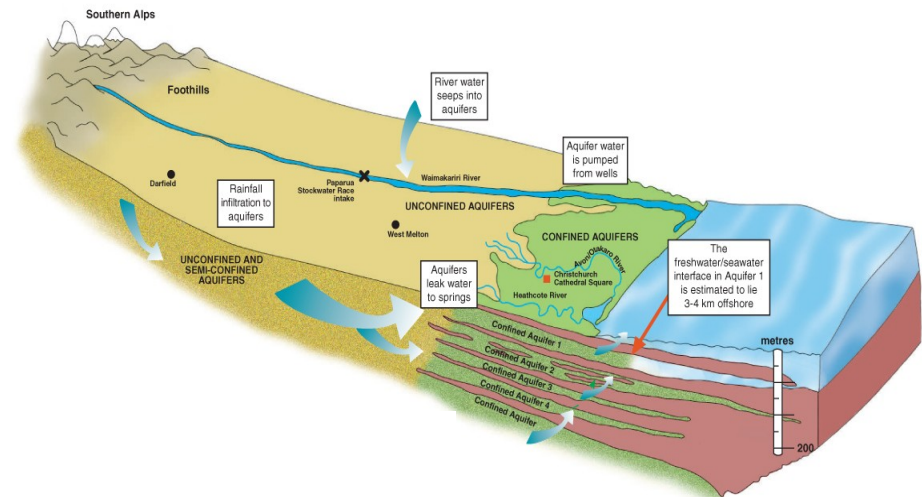
UNCONFINED AQUIFERS

When groundwater is in direct contact with the atmosphere through the open pore spaces in the overlying soil or rock, then it is defined as an unconfined aquifer. The upper groundwater surface in an unconfined aquifer is called the water table. The depth to the water table varies according to factors such as the topography, geology, season and tidal effects, and the quantities of water being pumped from the aquifer.

Unconfined aquifers are usually recharged by rain or stream water infiltrating directly through the overlying soil. Typical examples of unconfined aquifers include many areas of coastal sands and alluvial deposits in river valleys.



ABOVE FIG. 4-5: Transition of confined and unconfined aquifers within the UDS area (image source: ECan).



ABOVE FIG. 4-6: Cross section through part of the Canterbury Plains groundwater system (image source: ECan).

4.6 growth and water supplies

The way in which growth occurs will have an impact on the water system. Intensification will inevitably require upgrades of existing infrastructural systems that reach and exceed capacity. New growth will require new systems and an overall extension of the network.

It is generally accepted that longer networks inherently have less integrity through unavoidable leaks, ruptures, and damage multiplied across the length of even the best system. Compact, intense urban forms can therefore be more reliable at conserving scarce resources. Current charging systems tend to be based on water used as measured 'at destination', meaning that as distance from source increases, so too does the difference between gross water supplied and net water received. The value of this difference is in effect a subsidy that the remainder of a settlement pays to support the most distant users (in the establishment and maintenance of total required water supply). A further loss is that piped systems under pressure (allowing the water to instantaneously flow when a tap is opened) will leak all of the time, irrespective of whether people are using the supply.

Access to fresh water is taken for granted in New Zealand however globally water is predicted to become a major source of resource-driven conflict in the 21st Century. While markets and governments are currently unable to viably price the value of wasted or 'lost' water, this may change over time (for instance a rating system that charges more on the basis of distance from the source, to factor in the

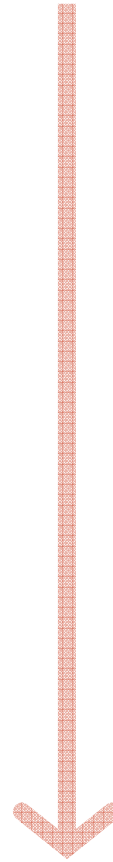
value of lost water as a direct user charge along with actual water used). It is also possible that water commoditisation and in particular exports to water-starved areas may become a notable economic 'industry' in its own right, placing further pressure on efficient water use.

Activities in the upper UDS catchment impact on the water quality in river systems including the Avon, Heathcote, Halswell, Otukaikino and Styx Rivers, and the estuarine receiving waters of Te Waihora (Ellesmere) and Te Wairewa (Forsyth) in addition to the system of aquifers and springs.

This significantly restricts the range and scale of land use (including new development) that can suitably locate here. Of particular note are the risks posed by 'dirtier' land uses such as manufacturing. Growth should only occur here where this a demonstrated superiority to this location over other less sensitive ones within the UDS area.

The conventional channelisation and piping of natural waters associated with subdivision and urbanisation creates non natural detention and discharge that retards natural aquifer replenishment and water cleansing. It tends to increase coastal sedimentation pollution and discharge. These are increasingly becoming associated with algal blooms that can adversely affect marine life forms (and humans) and the proliferation of mangroves in harbours and estuaries.

Overall this makes a strong case for the requirement of low impact, efficient infrastructure networks to accompany growth.



ABOVE FIG. 4-7: From the manmade activities in the upper catchment through to natural and urban water systems to receiving waters.

4.7 blue network summary

The recommended UDS blue network is essentially based around taking the existing situation and conserving this as much as possible.

Particular emphasis is given to the aquifer system and confirming the de-facto growth boundary of the airport noise contour. This is important to prevent or heavily restrict westward growth of the urban area (although some logical growth between the existing urban area and airport is still encouraged in the interests of wider efficiencies, namely employment uses that can benefit from close proximity to the airport and limited residential if necessary).

The challenge of existing high and / or increasing nitrate levels (partially attributable to agricultural uses) is of note and should be monitored.

Areas of highest flood risk will require careful flood planning and any redevelopment will require engineering assessment to ensure any flood risk is mitigated by location and design. Approaches that rely on piping or diverting water should be discouraged as they will simply contribute to greater problems elsewhere rather than provide a solution.

The stopbanks of the Waimakariri River, if maintained and possibly supported, will allow greater use of the Christchurch City - Waimakariri District interface between Belfast and Kaiapoi. Opportunities for greater ecological interpretation and amenity to be derived from this area should also be pursued.

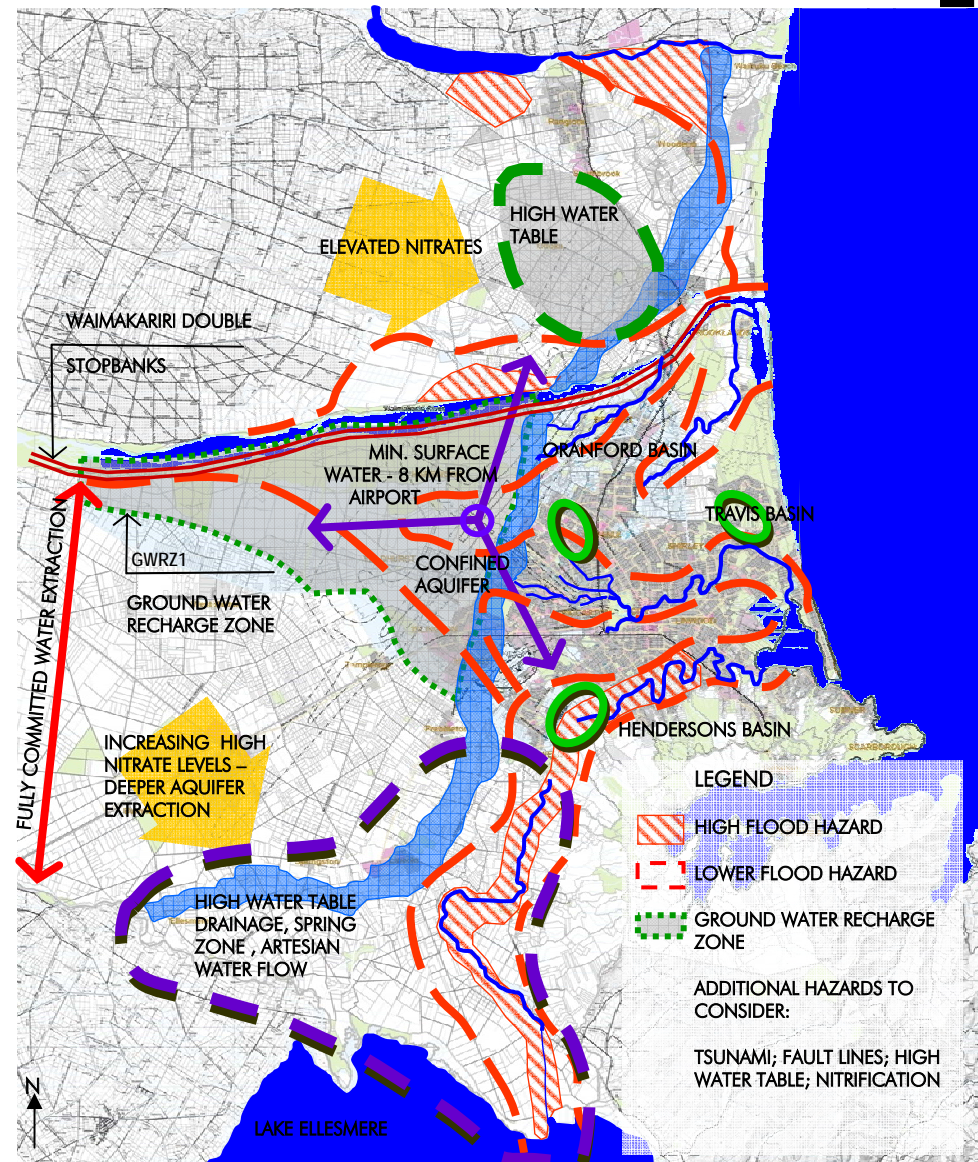
Intensification and greenfield growth will both increase impervious surface

coverage within the urban area, water demand, and sewer outflows. While low-impact approaches can be installed easily as a part of greenfield growth, they can be harder to retro-fit in existing built areas. A range of approaches at all levels of the 'treatment train' process are readily available and comparatively, generally do not cost more than conventional approaches to install (although on-going maintenance costs do often exist).

These alternative opportunities should be pursued, and a goal of the UDS could be that net water quality / quantity indicators for all of the three urban waters remain at or as close to 2006 levels throughout the life of the UDS.

This could be supported by a greater and more institutionalised program of urban water conservation advocacy, possibly including an awards scheme or other incentives (rates rebates for composting toilets as an example).

Annual rates could be considered to consist of internalised costs for necessary maintenance and capital expenditure (50%), and for externality management (cleaning up vehicle-caused air pollution etc.) (50%). In principle the Councils could philosophically look to align total rates approaches so that a base rate of 50% applied 'across the board', with people's remaining rates made up essentially as a response to their own lifestyle choices, subject to discounts, rebates, or awards for sustainable living practices. This would be operationally difficult 'today' but could become in the coming decades one of the most compelling methods available to encourage sustainability and better resource management.



ABOVE FIG. 4-8: Recommended UDS blue network, not to scale.



green network

5.0 GREEN NETWORK

5.1 green networks

The green network refers to the system of parks, pedestrian walkways, recreational spaces, and facilities that interact with the movement network and land use mix. A key to a successful green network is in providing a range of experiences that correspond to logical movement patterns and provide choice and amenity to users.

5.2 green network aims

Establishing a successful green network will require the prioritisation of space towards enhancing experiences and pedestrian choice. The following should be key aims of the green network:

- providing an integrated series of spaces providing a high degree of appeal, amenity, and usability;
- identify and connect the site's key features into a network of local and cultural significance, and include ecological enhancement where possible;
- develop a network that provides the greatest possible range of experiences and sensations while integrating into land use activities across the site.

5.3 green network issues

- coherently incorporating and connecting the history, stories, and heritage of the site into a network of high quality open spaces;
- coherently contributing to the wider green networks and linkages of the area;
- the maintenance and where possible enhancement of sensitive ecological values in the site;
- a series of high quality public neighbourhood parks should be provided. Pedestrian connections between these should be emphasised to enhance the amenity experience of the area;
- no local park should be smaller than 2000sqm (although 'pocket' parks and linkages can be smaller), and they should be of usable shape. Parks should also front a street with inhabited buildings on the remaining sides;
- public parks are to be favoured over privately held 'common open spaces' for simpler management and greater community benefit;
- responding to amenity opportunities provided by open spaces with appropriate land uses to maximise efficiencies.



ABOVE FIG. 5-1: Incorporating key amenity and ecological features into a good green network can greatly improve its popularity and overall quality.



ABOVE FIG. 5-2: Locating activities around green spaces such as medium density housing, can provide benefits for both - in this case amenity for the houses, and greater passive safety for the park.

5.4 the garden city

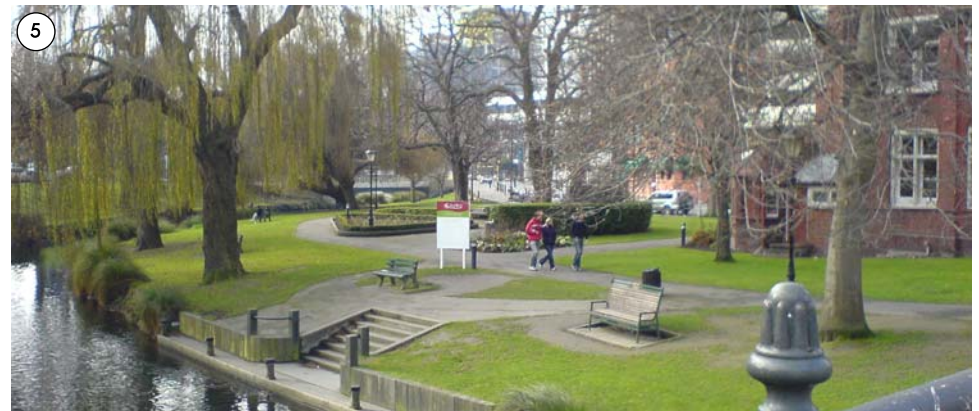
Christchurch City is known as the 'garden city', although it is not strictly speaking consistent with the 'Garden City' movement of the 19th century.

The flat terrain, numerous parks and civic monuments, and the Avon river winding through the CBD contribute with the agricultural 'green' belt to establish a particularly strong sense of urban place and character. This should be maintained if the UDS is to enhance the existing strengths of the sub-region.

The association with agriculture permeates the New Zealand psyche. Whilst New Zealand is far from being a 'natural' state of landscape (increasingly from destructive agricultural practices over the 20th century with the mass use of pesticides and herbicides to boost productivity), it remains an endearingly 'kiwi' vision. This has been amplified in the region by the dramatic backdrop of the Southern Alps behind the Canterbury Plains.

The retention of as much of this sense of openness and a de-facto agricultural greenbelt (even if operationally there is none) will help maintain the 'Garden City' character of the City, and the rural character of the Districts' towns.

The Port Hills are another significant landform, and one that presents little logic for development other than sweeping views that would be undoubtedly attractive. Accordingly development of the hills should be avoided unless absolutely necessary (i.e. no other suitable capacity is available).



ABOVE FIG. 5-3: The UDS area is framed by the Port Hills (1) and Canterbury Plains (2), setting up a green, agricultural backdrop. This is made intensely personal by the high accessibility to a range of spaces, both 'soft' (3), and 'hard' (4) that in conjunction with architectural style helps reinforce the 'English garden' character the City in particular is renowned for. Integrating the parks and squares with the green hinterland are the many river and stream systems that wind towards the coast (5). The green backdrop to the UDS area is as central to the garden city character as the actual 'gardens' within the urban footprint.

5.5 biodiversity

The UDS area is a rich biodiversity hub although overall biodiversity is in a state of decline through loss and disruption of natural areas and ecosystems and the effects of an increasing number and variety of introduced plant and animal pests. There are 49 threatened species including plants and birds within the sub-region.

The area is also suffering from habitat loss and fragmentation from the attrition of dry land systems and eco-system breakdown particularly in the Waihora and Wairewa areas.

Some reasons for this include:

- Lack of information / understanding / priority;
- Ecosystem complexity;
- Inability to price ecology into the economic system.

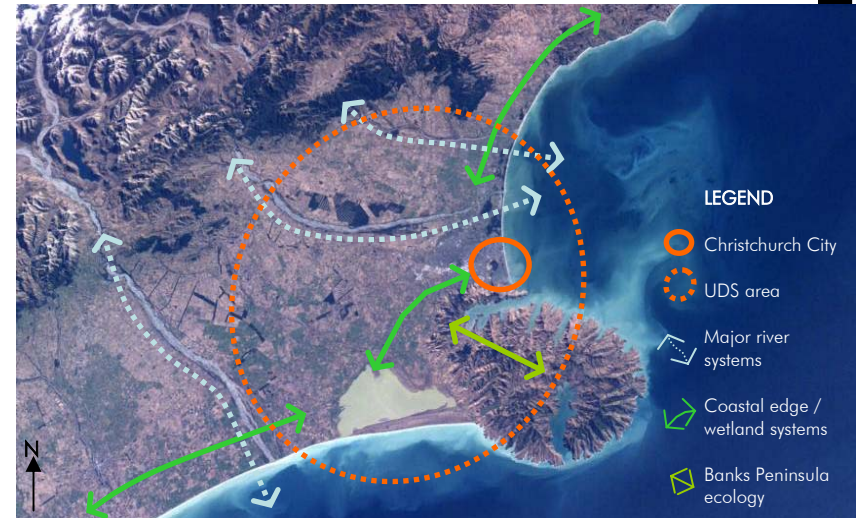
Biodiversity is maximised by creating, enhancing and protecting major corridors and edges of the coast, harbours and river margins. It is only through active conservation and strategic natural resource management that this can occur.

Key target areas include:

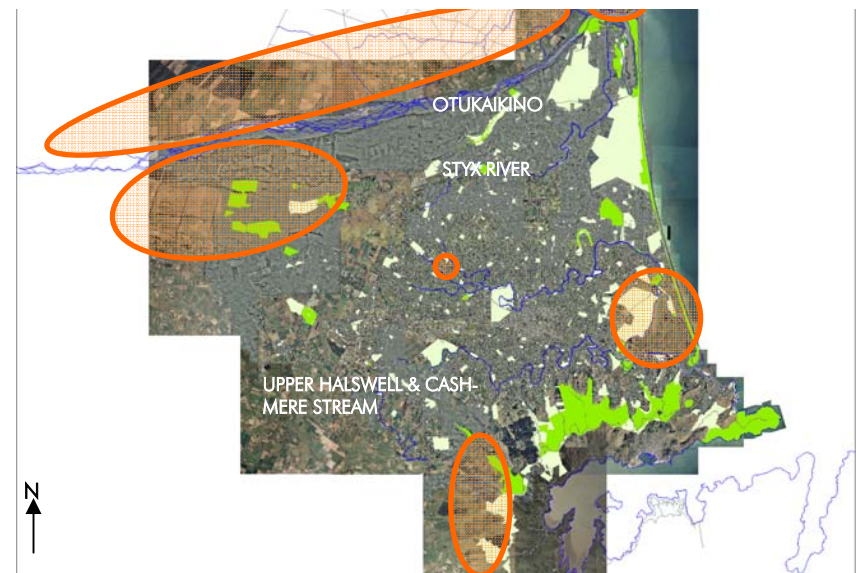
- Pegasus Bay coastline;
- Waimakariri River;
- The Ashley River – Te Waihora (Lake Ellesmere) as a important habitat environment for coastal and wetland birds;
- Coastal estuaries and lagoons are a continuous feature running along the eastern landward boundary of the UDS;
- Lyttelton Harbour;
- Estuaries;
- Corridors: State Highways, roads, electricity, rivers, streams, creeks, drainage channels, contiguous links of land in fragmented ownership;
- Patches: parks, reserves, quarries, lifestyle blocks, forestry.



ABOVE FIG. 5-4: The UDS area is home to a rich array of flora, fauna, and habitat. (Image source: CCC)



ABOVE FIG. 5-5: the UDS biodiversity hub, a coming together of riverine, coastal, wetland, oceanic, and land-based habitats (not to scale).



ABOVE FIG. 5-6: A range of factors (negative habitat change or loss; human habitation; predatory pets etc.) create biodiversity 'challenge areas' where specific strategies or interventions may be required to improve or retain biodiversity (not to scale).

5.6 open spaces

Examination of the type of open space provided within the UDS area makes it clear that while there are many open spaces of high quality, there is no connected network. Linkages and connections (particularly north/south) are lacking. In addition to this, a number of issues are affecting the existing supply of open space.

Urban Infill - the Garden City image can be undermined as a lack of careful planning (especially incremental 'rear lot' developments of individual sites) can see mature vegetation removed with almost none replanted or allowed to reach full mature size.

Loss of open areas - the increasing trend for peripheral subdivisions comprising of 4ha blocks is affecting the openness of the urban-rural fringe and in particular its future potential productive use.

Lack of diversity / cultural representation - There is a notable lack of cultural representation in the design and furnishing of open spaces for Maori, Pacific Island, and Asian groups.

Operational dysfunction - Many open spaces have been provided purely on the basis of a land quantum, with poorly integrated land uses. This creates less-safe environments and undermines their usability.

Rapidly rising land prices / lack of funds - Future land acquisitions of open space are becoming increasingly strategic due to increasing land prices. This may necessitate a change in policy towards

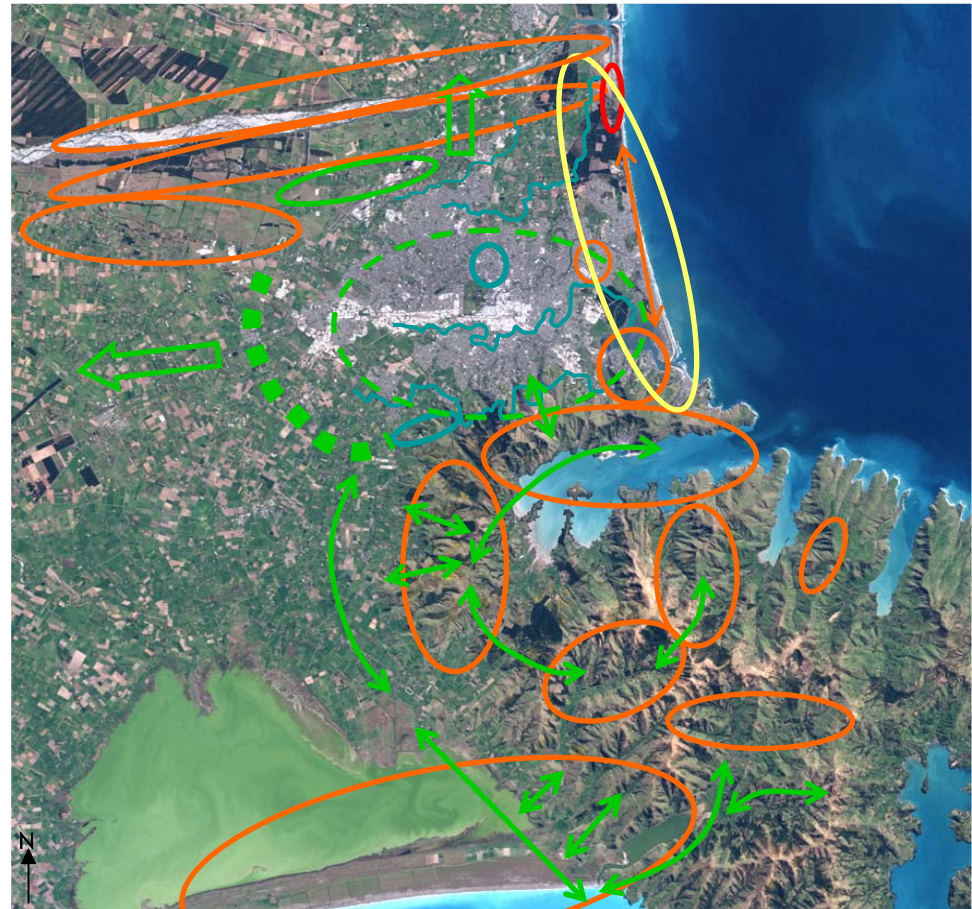
qualitative provision (i.e. fewer, better and more accessible open spaces) in the future.

Other key challenges include:

- Preventing road reserves from becoming totally vehicle dominated;
- Managing social withdrawal by total reliance on private open space e.g. private gardens, yards etc;
- Changing focus with changing lifestyles;
- Equity / distribution / access;
- High public expectations for quality and furniture.

key benefits of a good open space network are:

- Health and activity - including recreation, sport and access;
- Amenity and aesthetic;
- Partially mitigate built environment sterility;
- Improving the look of the city & protecting landscapes;
- Protecting biodiversity through coherent corridors (especially helpful for migratory species);
- Contribute to the Garden City image;
- Many are linked to waterways & support biodiversity.



LEGEND

- | | |
|---|--|
| ○ Key biodiversity hubs | ○ Waimakariri River Park |
| ○ Coastal Environment | - - - 'Garden City' |
| - - - Green Edge | ○ Flood Retention Basins |
| ↔ Key Local Recreation Links | ↔ Recreation Connection to Alps |
| ○ Waimakariri Mouth | |

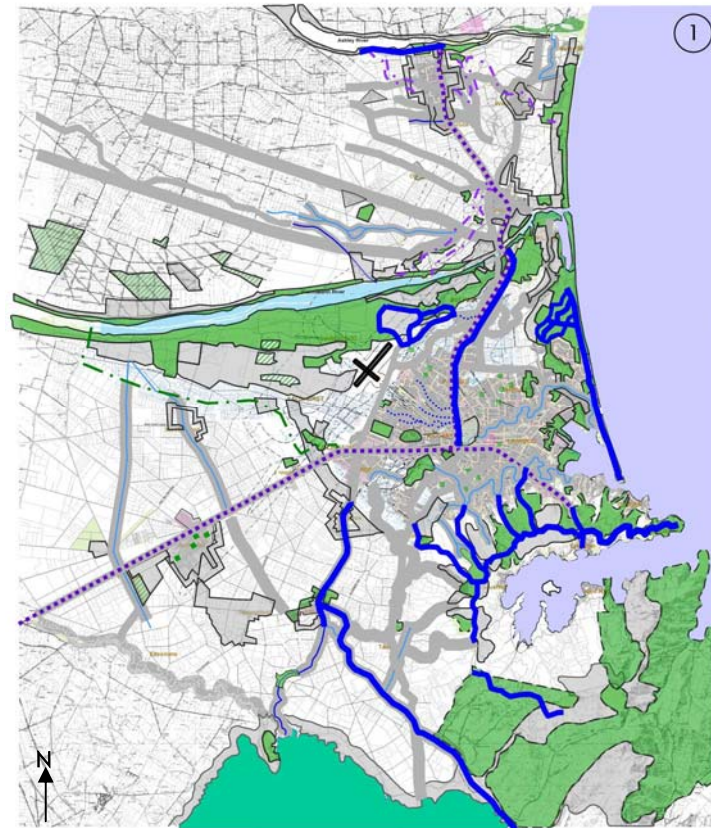
ABOVE FIG. 5-7: Key open space issues / challenges in the UDS area, not to scale.

5.7 walking and cycling corridors

The green network will contribute to the movement network making up a large part of the UDS cycling and pedestrian networks will be in the form of biking or hiking / nature trails in addition to those provided 'on road' via dedicated lanes and footpaths.

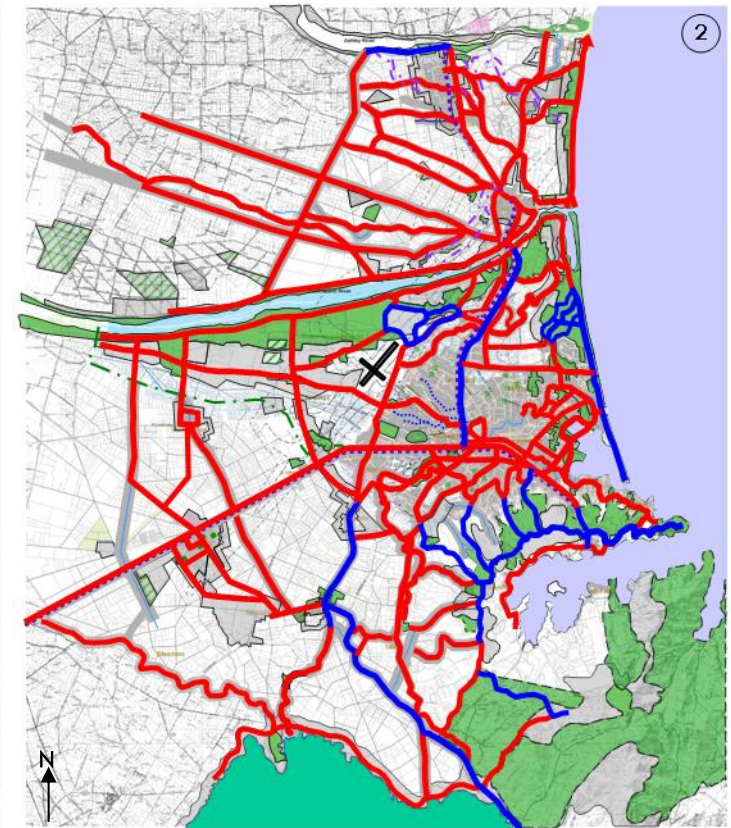
For several road / rail assets that overlap with the green network key treatments to differentiate them will be necessary. Higher-order landscaping (the same will apply at the micro-level connecting individual parks together), greater attention to detail and material quality (for example patterned paving stones rather than plain concrete etc.), and regular opportunities to rest, experience or interpret the landscape will all help to encourage greater use of these assets.

Analysis of the UDS area to identify the desirable walking / cycling corridors identifies (1) that the existing provision of quality treatments is disconnected and incomplete. A greater provision (2) of both north-south and east-west linkages are recommended to fully open the UDS area up for pedestrian and cycle users. Many of these are on existing roadways / rail lines, where a better consideration of non-vehicular modes could have significant benefit.



LEGEND

Existing walking and cycling networks



LEGEND

Existing walking and cycling networks
Desirable new walking and cycling networks

ABOVE FIG. 5-8: Existing walking and cycling corridors in the Greater Christchurch UDS (not to scale)

ABOVE FIG. 5-9: Existing walking and cycling corridors in the Greater Christchurch UDS (not to scale)

5.8 Interpretation and gateways

While strategic roads will have a key role for moving traffic and freight, they will also play an important landscape and interpretation role for the UDS area as for passing traffic these routes will intersect with the main gateways and create distinct areas. An example is the way in which the State Highway dramatically crosses the Waimakariri River and enters Christchurch City's urban footprint at Belfast.

While signage and other small-scale features are common when approaching and departing small towns that lie on highways, the opportunity to comprehensively distinguish areas is rarely taken. This can involve changes to the layout and design of the road surface and environment, landscaping, or land use as well as signage.

A particularly efficient gateway opportunity would exist adjacent to the Christchurch International Airport for a singular and substantial gateway treatment to benefit international visitors and passing motorists alike.

This approach is consistent with the psychology of breaking up longer trips into a series of smaller journeys based around landmarks or 'places' (including individual buildings). This principle applies across all scales of space from highways down to a pedestrian trip along a retail street.

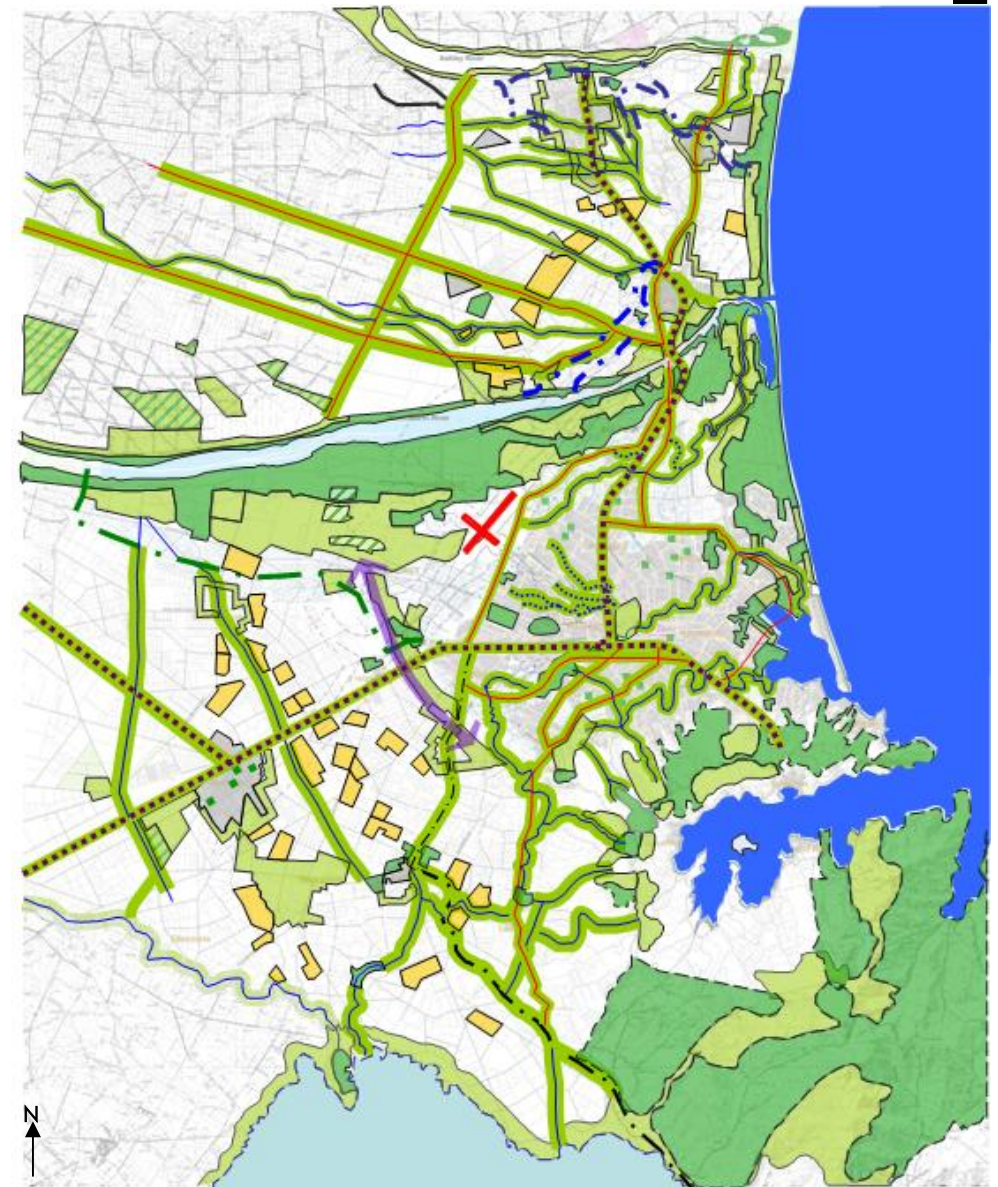
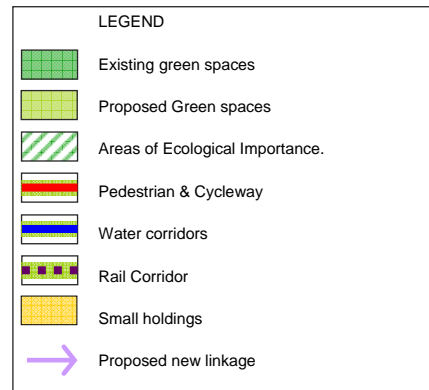


ABOVE FIG. 5-10: Existing walking and cycling corridors in the Greater Christchurch UDS (not to scale)

5.9 green network summary

The recommended UDS green network is based around three primary outcomes:

- Increasing the supply of open space 'destinations', including strategic increase of reserve areas such as around the Waimakariri River and the base of the Port Hills. This will help ensure comprehensive expanses of contiguous open space will exist for the enjoyment of future generations, as well as allow viable habitat areas;
- Increasing the quality of open space 'destinations' (particularly those directly associated with urban settlements: squares, village greens etc.). This will help increase community use, appreciation, and awareness of open space and help to improve the 'demand' for open space;
- Increasing the accessibility of open spaces through the formulation of coherent and legible comprehensive linkages (including the possible use of covenanted private land) that allow connection for cyclists, pedestrians, and to support animal habitat / migration. The use of private land would help to confirm an 'outer' or perimeter linkage. This also includes the use of improved road reserves and rail corridors.



ABOVE FIG. 5-11: Recommended UDS green network, excluding the use of private land, not to scale.

5.10 specific actions and policy - action flow diagrams

North-South Corridors

1. Protect the existing railway corridor from Rangiora to Kaiapoi as a corridor forming a critical future circulation link between the Christchurch and Waimakariri districts.
2. Scrutinise all proposed land developments in towns that may impact upon the cycleway railway link especially in Kaiapoi.
3. Use every available stream edge opportunity to connect western towns such as Rangiora to the coastal towns and environs.
4. Emphasise creating circulation connections along the Ashley River southern stop bank to the coast.
5. Develop a cycleway green corridor along Lineside Road between Rangiora and Woodend.
6. Main Drain Road, Tram Road and the two Chain Roads are all important opportunities to make links.

Central

1. Complete the rail cycle trail through Christchurch and onto the Waimakariri Rail Bridge to encourage cycle connections between the Waimakariri District and Christchurch as well as to coastal recreational zones.
2. Connect the southern edge of the Waimakariri River Park with Christchurch

linking the urban environment to the river's edge and strengthening east-west circulation along an open space edge.

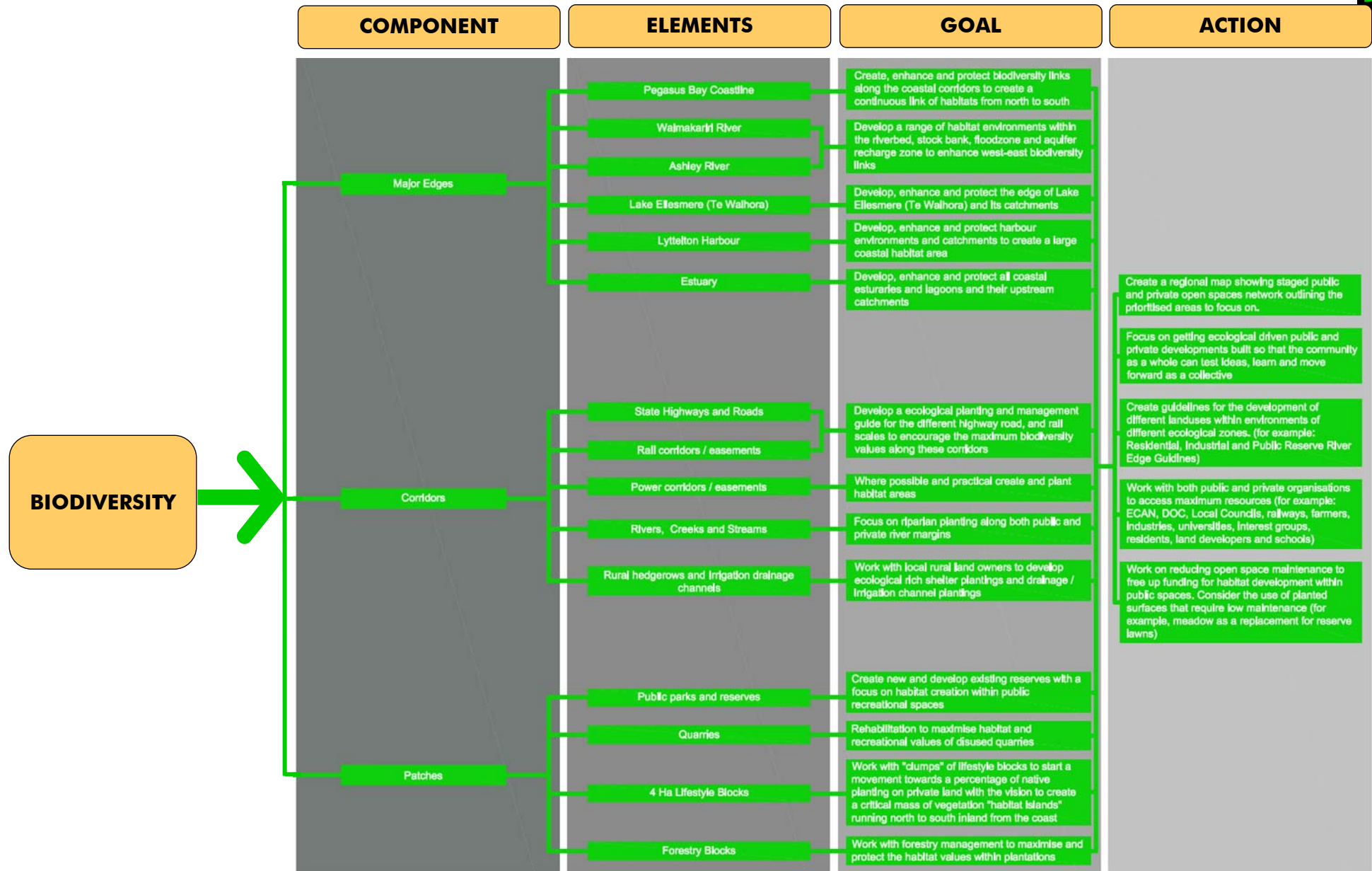
3. Set landscape standards for the gateways into Christchurch such as Johns Road-Russell Road, Memorial Ave Johns road intersection, SH1, from Halswell Junction to Prebbleton.

West-East Corridors

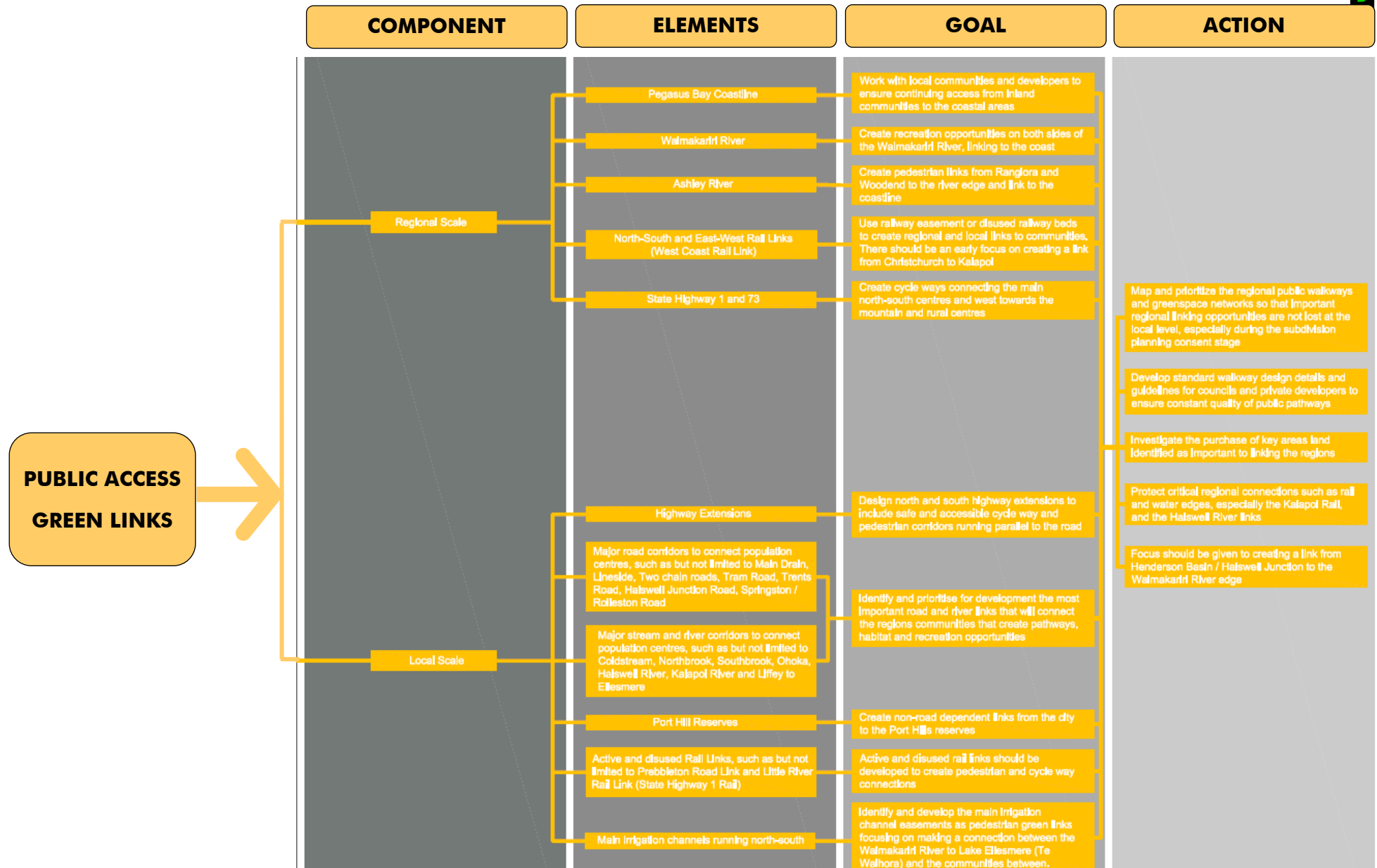
1. Prioritise open space and biodiversity provision on the western urban fringe e.g. Hornby – Hei Hei especially around the Halswell Junction roundabout and the western edge of the Hornby industrial area to link the Port Hills to the Waimakariri River Park.
2. Create usable open space & biodiversity corridors within the rural Halswell River zone allowing for circulation access across the proposed southern bypass extension.
3. Form circulation corridors linking Lincoln, Prebbleton, Rolleston, Tai Tapu and the Little River Rail trail.

Figures 5-13 (biodiversity) and 5-14 (public access & green linkages) (next 2 pages) illustrate how strategic actions were tied into a matrix of 'place-based' issues and sustainable outcomes.

This highly communicative approach allows a transparent connection between 'vision' and 'action' and could be adapted for use in other UDS networks or UDS partner policies.



ABOVE FIG. 5-12: UDS biodiversity action matrix; Pocock Design:Environment 2006.



ABOVE FIG. 5-13: UDS public access & green linkages action matrix; Pocock Design:Environment 2006.
 GREATER CHRISTCHURCH URBAN DEVELOPMENT STRATEGY - TECHNICAL DOCUMENT 5 - 11