

Greater Christchurch Urban Development Strategy Forum

Report #4 – ASSESSMENT OF OPTIONS – 13 December 2004

PURPOSE OF REPORT

The purpose of this Assessment of Options report is to provide the UDS Forum with the options and comparison of results, for use during the public consultation phase, for their consideration and endorsement.

BACKGROUND

The UDS Forum adopted a list of Options (Report #2 – Options) and Assessment Criteria (Report #3 - Assessment Criteria) at meetings held on 14 and 27 September 2004. The Forum requested a Business as Usual Option to be included in the consultation. Consequently the four options are:

<i>Business as Usual Option</i>	Continues recent urban development trends.
<i>Concentration Option</i>	Focuses development within Christchurch with limited growth in the townships in the districts.
<i>Consolidation Option</i>	Contains and consolidates future urban development to existing built areas or with limited expansion into immediately adjacent areas.
<i>Dispersal Option</i>	Disperses low-density development, without strong urban activity centers, and a general outward migration of people and land use.

The increases in household numbers by district are included in the table below.

Table 1: Household Projections by Option

District Council	Increase in Households from 2001 to "Endstate population of 500,000"					
	Concentration		Consolidation		Dispersal	
	No.	% incr.	No.	% incr.	No.	% incr.
Christchurch City Total	53,083	85%	44,330	70%	24,980	40%
Waimakariri District Total	5,201	8%	10,380	16%	16,289	26%
Selwyn District Total	3,613	6%	7,040	12%	17,576	28%
Banks Peninsula District Total	553	1%	700	1%	3,605	6%
UDS Total	62,450	100%	62,450	100%	62,450	100%

Please refer to the full 14 September report (Report#2) for further explanation of and detail about these options, including the diagrammatic maps indicating general development patterns.

Assessment Criteria

On 27 September 2004, the UDS Forum adopted 18 Assessment Criteria for use in the assessment of these options. These are outlined below (for further detail refer to the 27 September Report #3).

ECONOMIC WELL-BEING

- Criteria 1: ***Future Economy and Distribution*** - Urban development supports the desired future economy and likely future distribution of economic activity.
- Criteria 2: ***Access to Employment and Commercial Activity*** - Urban development promotes or enables reasonable access to employment/job markets, and commercial activity.
- Criteria 3: ***Public Cost (or Benefit)*** - Public cost or benefit (relative) of transport system, sewage treatment/disposal and water supplies for urban development.
- Criteria 4: ***Private Cost*** - Private costs including building and transport costs (includes cost of traffic congestion, accidents) associated with urban development.

SOCIAL WELL-BEING

- Criteria 5: ***Community Identity and Social Cohesion*** - Urban development promotes or fosters community identity, community focus and social cohesion.
- Criteria 6: ***Residential Quality*** - Urban development maintains/enhances the character, attractiveness and amenity values of living environments and provides choice of housing opportunities and living environments.
- Criteria 7: ***Community Health*** - Urban development promotes or enables access to healthcare and recreation opportunities, reduces traffic accidents, etc.
- Criteria 8: ***Community Education and Learning*** - Urban development promotes or enables reasonable access to education and learning facilities.
- Criteria 9: ***Access to Open Space*** - Urban development promotes or enables access to and provision of quality and diverse open space and landscape.

CULTURAL WELL-BEING

- Criteria 10: ***Cultural Identity*** - Urban development enhances cultural values, including resources of significance to Maori and other cultures.
- Criteria 11: ***Heritage Well-Being*** - Urban development enhances heritage values, including resources of significance to Maori and other cultures.

ENVIRONMENTAL WELL BEING

- Criteria 12: ***Impacts on Energy Use*** - Urban development improves efficient energy use across all sectors, including reducing reliance on and increased consumption of transport fuels.
- Criteria 13: ***Impacts on Air Emissions*** - Urban development enhances and takes into account effects on air quality, including avoiding areas prone to poor air quality and reducing contribution to air pollution.
- Criteria 14: ***Impacts on Water*** - Urban development enhances the quality of and takes into account effects on rivers and river margins, wetlands, aquatic ecosystems, groundwater and the coast.
- Criteria 15: ***Impacts on Land*** - Urban development enhances and takes into account effects on land resources (indigenous vegetation, versatile soils, landscapes and natural features, recreational areas, open space etc), biodiversity and ecosystems.
- Criteria 16: ***Impacts on Strategic Infrastructure*** - Urban development protects and enhances efficient and integrated use of strategic infrastructure such as strategic transport networks,

Christchurch International Airport, the port, regional solid waste disposal (Burwood), sewage treatment and disposal and composting facilities/areas, electricity and telecommunications.

Criteria 17: *Risks from Natural Hazards* - Urban development creates costs/benefits from relative exposure to various natural hazards, and improves risk management, resilience, and recovery to those risks.

OTHER

Criteria 18: *Robustness* - Adaptability of urban development to higher (and lower) rates of population growth, unanticipated socio-economic conditions, technological innovation etc (development pattern of "least regret").

ASSESSMENT OF THE OPTIONS

In the development of the assessment process a number of similar "strategic" planning processes were reviewed including the Auckland Regional Growth Strategy, Tauranga's "Smart Growth" project, and a number of international metropolitan strategies (e.g., Melbourne 2030, Envision Utah, etc.). Overall there is a reasonably consistent approach in applying a mix of quantitative and qualitative assessments for such metropolitan strategic planning exercises.

A range of disciplines participated in how best to assess the options against the adopted criteria. The assessment included both technical/ quantitative modeling (e.g. transport and infrastructure consequences) and qualitative assessment of the options.

In the course of developing the assessment a number of assumptions and information were used as part of the methodology. The "Draft Technical Report" outlines in greater detail the assessment approach including key assumptions and indicators used for each of the criteria (see separate agenda item). Some of the assumptions and information used are below.

Some High-Level Assumptions

Below are the "high-level" assumptions used for the assessment of options. For those criteria that were qualitative rather than quantitative, professional judgment was used.¹

1. All committed infrastructure by Councils in the UDS area is assumed to be completed during the study period e.g. the Northern Motorway, wastewater treatment expansions, etc;
2. Current adopted land use zoning decisions for all District Plans apply;
3. Two constraints were adopted:
 - a) airport noise contours recently adopted by the Environment Court;
 - b) the "aquifer protection zone" outlined in Environment Canterbury's Natural Resources Regional Plan which prohibits intensification to the northwest of Christchurch City;
4. Minimum open space requirements are for 18 ha/1000 people, although detailed analysis on site and location will be done in the "Draft Strategy";
5. Residential water demand is higher in larger sections;

Other Information Used

1. Population and demographic forecasts from Statistics New Zealand were made for the medium case projection of 430,000 people for 2021, and an extended projection of 500,000 people;

¹ Assessments for the more qualitative criteria (e.g. criteria 3) were made using a sequence of professional judgment followed by staff/consultant workshops to peer review these professional assessments. The workshops and peer reviews involved approximately 20 staff from all five councils, Transit NZ and 3-5 consultants.

2. Household and land use projections were based upon assumptions outlined in the Options report 14 September 2004 (with further technical reports provided by Max Barber, Planning Consultant);
3. The NZ Institute of Economic Research (NZIER) provided the job forecasts by job type. Consultant Tim Heath (Property Economics Ltd) provided the break down by geographic area;
4. Transport modeling was done using the Christchurch Transport Study model;
5. Transport mode split assumptions were utilised from the Regional Land Transport Strategy assessment of options;
6. Infrastructure capital and operating cost assessments were developed for residential development for water supply, wastewater and storm water by GHD Consultants;

Scoring the Options

As outlined in detail in the Draft Technical Report (see separate agenda item), quantitative modeling and qualitative analysis show that there are significant costs and benefits for each option.

As a means of summarizing the detail included in the Technical Report, there are two approaches provided:

- 1) a Draft Summary "Score" of the Options against all criteria; and
- 2) a Draft Summary of Key Indicators for the Options.

1) Draft Summary "Score" of the Options Against the Criteria

This section provides the overall "rank score" across all the criteria. It summarises the results from the Technical Report.

As a means of developing a consistent means of comparing options, for each of the criteria a "ranking score" of "high" (5) to "low" (1) was made for each of the options. This ranking was done for the two periods: 2021 (population of 430,000) and 2051 (the "endstate" 500,000 population).

Overall, as shown in Table 1, across all criteria the Consolidation and Concentration options "score" higher than either Business as Usual or Dispersal options. Note the Consolidation and Concentration options score higher for both a simple total of the criteria as well as a weighted total (where certain criteria were given a multiplier of 3, refer table below).

Table 1: Draft Summary "Score" by Option

DRAFT Summary "Score" of the Options (13 Dec 04)									
<i>Scoring: 1=low and 5=high</i>									
Criteria	Bus. As Usual		Concentration		Consolidation		Dispersal		
	YEAR	2021	2051	2021	2051	2021	2051	2021	2051
1 Economic Activity		3.2	3.0	3.0	3.4	3.2	3.2	3.4	2.8
2 Access		3.0	3.0	4.0	4.0	3.0	3.0	2.0	1.7
3 Public Costs		2.8	2.8	3.4	3.4	3.4	3.4	2.5	2.5
4 Private Costs		3.0	3.0	3.3	3.0	3.0	3.0	2.5	2.5
5 Community ID		3.0	3.0	3.7	3.7	3.3	3.3	2.7	2.7
6 Residential Quality		2.5	2.5	3.5	3.5	3.5	3.5	3.0	3.0
7 Community Health		3.0	3.0	4.0	4.0	3.0	3.0	2.0	2.0
8 Community Education		3.0	3.0	3.0	3.0	3.0	3.0	2.0	2.0
9 Open Space		3.0	3.0	3.0	3.0	3.5	3.5	2.5	2.5
10 Cultural		3.0	3.0	3.5	3.5	3.0	3.0	3.0	3.0
11 Heritage		3.0	3.0	2.0	2.0	3.0	3.0	3.0	3.0
12 Energy		3.0	3.0	4.0	4.0	3.0	3.0	2.0	2.0
13 Air Emissions		2.5	2.5	4.0	4.5	3.0	3.0	2.0	1.5
14 Water		3.3	3.3	4.0	4.0	4.0	4.0	3.0	3.0
15 Land		3.0	3.0	3.7	3.7	3.3	3.3	2.7	2.7
16 Strategic Infrastructure		3.5	3.5	3.9	3.9	3.5	3.4	3.0	2.8
17 Hazards		3.0	3.0	2.0	2.0	3.3	3.3	3.0	3.0
18 Robustness		2.6	2.6	3.1	3.1	3.1	3.1	2.3	2.3
Simple Total		53	53	61	62	58	58	46	45
Weighted Total for 3X - Public Costs, Comm ID, Strat Infrs, Energy, Water, Land, Robustness		96	96	112	113	106	105	83	80

The Consolidation and Concentration options also “score” higher across the criteria by group for Economic, Social/Cultural and Environment as shown in the table below.

<i>CRITERIA BY GROUP</i>	<i>Year</i>	<i>Bus. As Usual</i>		<i>Concentration</i>		<i>Consolidation</i>		<i>Dispersal</i>	
		<i>2021</i>	<i>2051</i>	<i>2021</i>	<i>2051</i>	<i>2021</i>	<i>2051</i>	<i>2021</i>	<i>2051</i>
<i>Economic</i>		12	12	14	14	12	12	10	10
<i>Social/Cultural</i>		21	21	23	23	22	22	19	19
<i>Environmental</i>		18	18	22	22	20	20	16	15
<i>Other</i>		3	3	3	3	3	3	2	2
<i>Total</i>		53	53	61	62	58	58	47	45

Overall the Concentration option generally has the highest “score”, particularly as the projection period increases (that is after 2021 and as the UDS population approaches 500,000).

This “strategic” conclusion must be considered only as preliminary and further detailed analysis and more specific “local” planning is required; it is envisioned that it will occur during the development of the Draft UDS.

At this stage, the recommendation is that the comparative results between all options are used during the public consultation.

2) Draft Summary of Key Indicators for the Options

As a means of further understanding the options assessment a number of “key indicators” are presented in Table 3. These provide a simple visual and quantitative/qualitative comparison between the options. All of these results can be found in the Technical Report.

The selected “key indicators” capture some pertinent and publicly understandable criteria that could be used usefully in the public consultation on the options.

The results shown in Table 3 are summarized below:

- A. **Infrastructure Costs** – the Consolidation and Concentration options cost the least, and the Dispersal and Business As Usual options cost the most.
- B. **Private Costs (Transport)** – results from the transport model show highest costs for Dispersal and lowest for Concentration; Private Costs (Development) – assessed as higher for Concentration, and generally equivalent for the other three options.²
- C. **Transport Choice and Access** – much higher congestion in both Dispersal and Business as Usual Options, with lower congestion in both Consolidation and Concentration options; generally more transport choice in Consolidation and Concentration options due to land use-transport integration.
- D. **Community Identity** – Consolidation and Concentration were assessed as having greater opportunity for supporting community identity and social cohesion.
- E. **Housing Choice** – Consolidation and Concentration provided the most housing choice with Dispersal and Business as Usual the least.
- F. **Average Section Size**- Average section sizes were far higher in Dispersal, lowest in Concentration and moderate for Business as Usual and Consolidation.
- G. **Park/Open Space** – Consolidation was judged to have better opportunity for providing quality local and regional open space, followed by Concentration, then Business as Usual and last Dispersal.
- H. **Air Emissions** - assessed for transport air emissions and opportunities for home heating improvements: Concentration option was assessed with the least air emissions, followed by Consolidation, then Business as Usual and worst Dispersal³.

² Note the development cost assessment is based on discussion with valuers although no quantitative assessment has yet been done.

³ Home heating assessments assume a greater level of replacement will occur with those options with higher redevelopment/infill.

- I. **Transport Energy Use** – transport modeling results showed Concentration performed best, followed by Business as Usual and Consolidation, and a distant last was Dispersal.
- J. **Water Demand (Residential)** – Dispersal and Business as Usual have expected high residential water demands, with much less for Consolidation and Concentration (related to smaller section sizes).
- K. **Land Required for Development** – total land required for development is lowest with Concentration (about the equivalent of 11 Hagley Parks), followed by Consolidation, then Business as Usual, and last Dispersal (with the equivalent of 36 Hagley Parks of undeveloped land required).

CONCLUSIONS

Overall, the assessment using the 18 criteria developed by the UDS Forum proved to be a reasonably robust approach for comparing options. For the criteria tested, Consolidation and Concentration “perform” better than either the Business as Usual or the Dispersal options.

Some refinements are required to finalise these draft results, although these will be limited in scope.





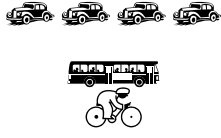
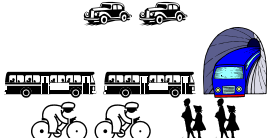
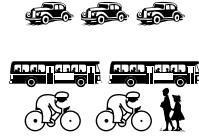





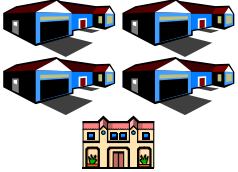

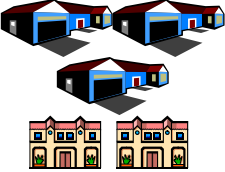
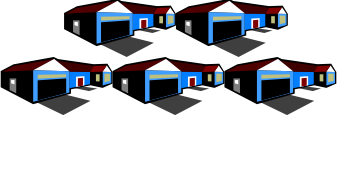





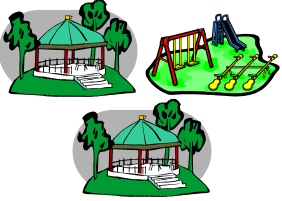
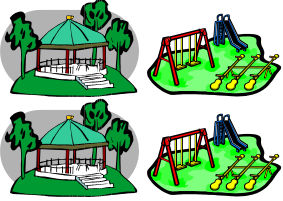

















On balance, the comparison of options will be very useful for public consultation on the Options. At this stage, it is recommended that all of the options assessed and the general approach of assessment which simplifies the summary to key indicators be used for public consultation (with technical reports available upon request).

UDS Staff Project Team

Dr Mark Bachels, Heather Wallis, John Falconer, Kelvin McMillan, David Mountfort, Ivan Thomson (Christchurch City Council), AliceAnn Wetzel, Hamish Barrell, Mike Blyleven (Environment Canterbury); Bert Hofmans (Banks Peninsula DC); Julia Forsyth (Selwyn DC); Mary Sparrow (Waimakariri DC); Richard Shaw (Transit NZ); Max Barber, Jane Whyte, Allan Watson (Consultants)

From the UDS Management Steering Team: Dr Mark Bachels, Carolyn Ingles (Christchurch City Council); Laurie McCallum (Environment Canterbury); Richard Johnson (Waimakariri DC); Dion Douglass (Selwyn DC); Tim Harris (Banks Peninsula DC); Steve Higgs (Transit NZ).

TABLE 3: DRAFT UDS ASSESSMENT OF KEY INDICATORS FOR OPTIONS AT 500,000 PEOPLE

INDICATORS	Business as Usual	Concentration	Consolidation	Dispersal
A. Infrastructure Costs (transport, wastewater, water supply, etc.)	\$561M "Pipes" + \$2025M "Transport" = \$2586M 	\$430M "Pipes" + \$1912M "Transport" = \$2342M 	\$482M "Pipes" + \$2015M "Transport" = \$2497M 	\$582M "Pipes" + \$2157M "Transport" = \$2739M 
B. Transport Choices and Access	 Commute takes 55% longer 320% increase in congestion	 Commute takes 45% longer 190% increase in congestion	 Commute takes 50% longer 290% increase in congestion	 Commute takes 65% longer 630% increase in congestion
C. Private Costs	Private Transport \$3.9B/year \$\$\$ 67% increase above 2001 Development Costs \$\$\$	Private Transport \$3.5B/year \$\$ 49% increase above 2001 Development Costs \$\$\$\$	Private Transport \$3.9B/year \$\$\$ 67% increase above 2001 Development Costs \$\$\$	Private Transport \$4.9B/year \$\$\$\$\$ 102% increase above 2001 Development Costs \$\$\$
D. Community Identity	 LOW (Rank=2)	 MEDIUM (Rank=3)	 HIGH (Rank=4)	 LOWEST (Rank =1 or 2)
E. Housing Type (and Location)	 79% greenfield 21% infill	 40% greenfield 60% infill	 62% greenfield 38% infill	 90% greenfield 10% infill
F. Average Section Size	 MODERATE 910m ²	 SMALLER 708m ²	 MODERATE 867m ²	 LARGE 1523m ²
G. Parks/Open Space – Quality and Access	 Regional Parks – Medium (3) Local Parks – Low (2) LOW (Rank = 2)	 Regional Parks – High (4) Local Parks – Low (2) MEDIUM (Rank = 3)	 Regional Parks – High (4) Local Parks – Medium (3) HIGH (Rank = 4)	 Regional Parks – Medium (3) Local Parks – Low (2) LOW (Rank = 2)
H. Air emissions	Vehicle emissions - 64% increase (Carbon Monoxide 200 T/day)  and Home heating emissions – Poor (Rank = 2)	Vehicle emissions – 49% increase (Carbon Monoxide 180 T/day)  and Home heating emissions – Good (Rank = 4)	Vehicle emissions - 64% increase (Carbon Monoxide 200 T/day)  and Home heating emissions – Medium (Rank = 3)	Vehicle emissions - 103% increase (Carbon Monoxide 260 T/day)  and Home heating emissions – Poor (Rank = 2)
I. Transport Energy Use	 58% increase from 2001 1.53 ML/day	 45% increase from 2001 1.39 ML/day	 57% increase from 2001 1.51 ML/day	 95% increase from 2001 1.87 ML/day
J. Water Demand (Residential increase)	 81,520 m ³ /day	 63,231 m ³ /day	 71,384 m ³ /day	 98,664 m ³ /day
K. Additional Land required for Residential Development	 4,920 ha or 26 Hagley Parks	 2,110 ha or 11 Hagley Parks	 3,900 ha or 21 Hagley Parks	 6,850 ha or 36 Hagley Parks