7. FUTURE WATER SUPPLY OPTIONS

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The purpose of this report is to inform Councillors of the potential need for a wellfield within the Selwyn District as the preferred contingency option should an increase in supply capacity be required.

BACKGROUND

A Sustainable Transport and Utilities Committee seminar in April 2002 on the Water Supply Asset Management Plan included consideration of a wellfield within the Selwyn District. This wellfield was proposed as a contingency should Christchurch City's long term groundwater requirements be greater than what is available within the City's boundaries under rules in Environment Canterbury's proposed Regional Plan.

There are five water bearing gravel layers, known as aquifers, beneath Christchurch ranging in depth from 16 to 200 metres. Confining layers of silt and clay, which help to protect the high quality of Christchurch's groundwater, separates these aquifers. The confining layers diminish near the Christchurch's western suburbs, where springs that feed Christchurch rivers mark the transition between the confined aquifer system beneath Christchurch and the unconfined aquifer west of the urban area. The confined aquifers supply all of the City's present water needs.

Supplementary water sources for Christchurch have been mooted since 1986 when the (then) North Canterbury Catchment Board advised that the capacity of Christchurch's groundwater system was likely to be reached within a few decades.

The premise that a finite 'safe yield' is the limiting factor has since been superseded by the concept of constraints in certain areas and increasing risks of contamination with increased yield. Certain wells are likely to have reduced yields imposed during some summers, which could result in restrictions like total hosing bans unless additional infrastructure is provided to bring water from other areas.

Environment Canterbury (ECan) released a draft water chapter of its Natural Resources Regional Plan (NRRP) in December 2001. The City Council in its submission was generally supportive of the proposed minimum stream flows and measures to protect the resource, but noted that additional work was required to develop workable rules and the planned date of July 2002 for release of the proposed plan was unrealistic. ECan has since advised that the water chapter of the Proposed Plan is now due out about July 2003.

Although the Proposed Plan is likely to be significantly different from the draft, the draft water chapter gives some guidance as to how Christchurch's groundwater resources are to be managed. The main constraint arising from the plan that affects the future growth of the City is the supply of water to the Halswell/Wigram growth area, where under the minimum flow proposed in the draft plan, restrictions are likely one year in twenty even without increased demand due to growth. The City Water and Waste Unit engaged URS Consultants in 2001 to investigate potential wellfield locations south of the City boundary, anticipating that in future the total growth likely to occur around Halswell could not be met entirely from groundwater within the development area.

The Water Supply Asset Management Plan 2001 (approved by the Council in May 2002) outlines the infrastructure required for the next twenty years to meet growth, including provision for a new wellfield in the Selwyn District to be constructed from 20016/17 to 2018/2019.

A Water Supply Strategic Management Plan for the City's future water needs will be developed by City Water and Waste once proposed NRRP is notified, that will combine the key elements from the NRRP and the Water Supply Asset Management Plan, and integrate with the City Councils other key strategic plans.

CONSTRAINT MAP

Constraints identified in ECan's draft Water Chapter and other possible future constraints including those arising from investigations south of the City boundary are shown on the attached map, and are summarised below:

Colour code on attached map	Area	Constraint	Aquifers affected
Light blue	Avon Management Area (Fendalton and surrounding suburbs)	Avon River flows	1st and 2nd
Dark Blue	Heathcote Management Area (Halswell to Sydenham)	Heathcote River flows	1st and 2nd
Teal	Belfast (possible future Styx Management Area)	Styx and Otukaikino River flows	1st and 2nd
Lime green	Southern spring-flow area	Halswell River flows, contamination risk	1st and 2nd
Pink	Woolston	Need to maintain sufficient pressure in aquifers to avoid ingress of surface and estuarine water	1st and 2nd
Red hatching	Transition between confined and unconfined aquifers	Increased risk of well contamination, particularly for shallower wells	1st and 2nd
Clear	Unconfined aquifers, west of transition zone	Shallow groundwater unsuitable for public supply, areas where deeper secure groundwater are available are limited	All
Orange	Coastal strip, 1.5 km wide	Need to maintain sufficient pressure in first aquifer to avoid ingress of salt water	1st

The constraints generally only apply to the first and second aquifers, and deeper groundwater is often available with few present constraints. However, overall extraction from the deeper aquifers are also in time likely to encounter limits and it would be prudent to locate new pump-stations outside these areas, reserving the deeper aquifers in the constraint areas for replacements at existing stations. The constraint map shows that growth to the northeast of the City is not likely to be significantly restrained by access to groundwater, but future extraction in the west and southwest is likely to be limited in order to maintain spring flows. The limited growth that is expected in the Northwest can be met from deeper wells. However vacant land in the Southwest could accommodate an additional population of up to 60,000 and it is unlikely that all their water needs can be met locally.

Although constraints are not indicated over most of the eastern side of the City, groundwater resources there are already well utilised with pump-stations about 2 kilometres apart utilising all available aquifers.

STRATEGY TO MEET WATER SUPPLY REQUIREMENTS FOR GROWTH AROUND HALSWELL

A confined aquifer system with similar physical characteristics and water quality to the Christchurch system extends from Lincoln to Lake Ellesmere. A wellfield in the Selwyn District Council emerged from consideration of the NRRP Water Chapter as the City's best option to meet future water supply needs. Options involving using water from the Waimakariri River, either for treatment or to improve stream flows allowing greater groundwater extraction, are more expensive or are less desirable environmentally. The Selwyn District Council was advised of the City's interest in investigating these aquifers as a future source for the City in writing (August 2001) and by addressing its Water and Wastewater Portfolio Meeting (19 February 2002) and have expressed no concerns.

The attached map indicates that the area of unconfined groundwater in Selwyn District closest to Christchurch that is not likely to have constraints on extraction is in the vicinity of Greenpark, south of Lincoln and Taitapu. To take water from this area would involve 15 kilometers of 600mm diameter pipeline from Greenpark to Halswell.

A strategy to provide for growth around Halswell with indicative time frames and costs was provided for in the Water Supply Asset Management Plan (2002) and is summarised below:

Stage	Year ending June	Item	Indicative Cost ($)
1.	2006	Deep Well at Dunbars Pump Station (East Halswell)	200,000
2.	2011	Land Purchase for pump station West Halswell	200,000
3.	2012	Exploratory deep well at new (West Halswell) site	200,000
4.	2013, 2014	Construct new pump station and second well at West Halswell.	1,400,000
5.	2015	Purchase suitable site in Selwyn District	200,000
6.	2017 to 2019	Construct pump station in Selwyn District and pipeline to City	10,000,000
		Total	12,200,000

This scenario is conservative in that plans for the Selwyn District Council wellfield could be delayed for years if not decades depending on:

- Rules in the proposed Regional Plan,
- The yield from the local wells,
- The rate of growth around Halswell, and,
- Trends for private well consents.

A wellfield in the Selwyn District Council area should therefore be regarded as a contingency. It is not possible to apply for Consents to extract water to safeguard the City's interest, as the consents are required to be exercised within two years (although limited extensions can be granted with good reason). The City Water and Waste Unit will continue to take an active interest in any information obtained from Environment Canterbury regarding groundwater investigations and consents in this area. In view of the time frame and the likelihood of extending the time when the wellfield is required considerably beyond 15 years, additional investigations are not considered necessary at this stage.

SUMMARY

A new wellfield in Selwyn District southeast of Lincoln is the most appropriate supplementary source of water for Christchurch City should one be required in future. The development of such a wellfield has been allowed for in the Water Supply Asset Management Plan between 2016 and 2019 as a contingency only. Investigations of the impact of rules in ECan's proposed Natural Resources Regional Plan and the preparation of a Water Strategy over the next two or three years will clarify whether more detailed consideration of a wellfield in Selwyn District is necessary. A contingency plan for this wellfield will be developed in case the need arises.

Staff Recommendation: That the development of a contingency plan for a wellfield within the Selwyn District be supported as the most viable augmentation option for Water supply planning purposes.

Chairman's Recommendation: That the above recommendation be adopted.