

Central Plains Water

Steering Committee Report on Feasibility Study

****Embargoed until 10:30 am, Thursday
7 February****

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1 Executive Summary

- 1.1 Central Plains Water was established to assess the feasibility of water enhancement schemes for the Central Plains area. Members of the Central Plains Water Enhancement Steering Committee believe the technical feasibility, affordability and consentability of a scheme has been established to a level of confidence that justifies taking further steps.
- 1.2 Canterbury has sufficient water to meet the environmental, social, recreational and economic demands that this feasibility study was established to assess. However, this water is not always in the right place at the right time. The rationale behind all proposals considered by Central Plains Water is to overcome this problem – and to provide water where and when it is most needed. ‘Harvesting’ a fraction of the abundant quantities of water that flow to sea from the Waimakariri and Rakaia Rivers during the winter and spring is the key. The water would then be stored in a reservoir to be created in the foothills for release when most needed to irrigate Central Canterbury’s rich – but otherwise frequently dry – soils, and in the process provide other benefits to the community and the environment.
- 1.3 A water storage facility – which would also have potential for recreational use – would ensure the reliability of a large-scale environmentally sustainable community water enhancement scheme. Taking water for storage when available will enable irrigation and other uses of the water to continue when minimum river flows demand restrictions be placed on surface water extraction during dry summers.
- 1.4 Regulatory instruments, established through public consultative processes to ensure the protection of in-stream values, set specific limits on the abstraction of water from both the Rakaia and the Waimakariri rivers. Although the Central Plains Water enhancement scheme proposes to take large quantities of water from each river, these proposed quantities are within the set limits.
- 1.5 Recommended further steps now the feasibility stage of the project is completed include refinement of the scheme concept, followed by Consenting, then Establishment and finally Implementation. The Concept Refinement stage is expected to take until March 2003. Consenting, Establishment and Implementation

may then be scheduled for completion by 2008. A continuation of the open, inclusive approach to community stakeholder consultation will be pursued through all steps.

- 1.6 Concept Refinement will involve completion of investigations leading to the final definition of the physical shape of the scheme, development of resource consents, assessment of likely water utilisation and community opportunities, and determination of long term ownership options.
- 1.7 The base scheme under consideration involves a level headrace at the 235 metre contour between the Rakaia and the Waimakariri rivers. It has a significant storage reservoir supplying the headrace and the scheme during periods of low river flows.
- 1.8 Extensive economic and social benefits and environmental and recreational enhancements have been identified. There has been wide consultation and detailed investigation of the issues that may have an adverse impact on the community or the environment. Central Plains Water believes each potential issue can be effectively resolved.
- 1.9 Central Plains Water seeks further funding from the Christchurch City and Selwyn District Councils, totalling \$1.43 million to March 2003. This will enable completion of the Concept Refinement phase of the scheme, enabling the two Councils to make a further decision on the merits of lodging resource consent applications.

2 Recommendations in Summary

- 2.1 A staged process is recommended to progress the project so as to obtain maximum flexibility with minimum risk to public funds. A number of very important questions are still to be answered, as outlined later in this report. A staged process offers the most effective way to resolve this uncertainty and engage Council decision-making input at each critical milestone.
- 2.2 The first Concept Refinement phase would consist of four components, undertaken throughout with appropriate public and stakeholder consultation. This would culminate in March 2003 in an opportunity for the Councils to again assess their ongoing support for and involvement with the project.
- 2.3 The four components of this Concept Refinement phase are:
- To develop an assessment of environmental effects in preparation for the lodgement of applications for the resource consents necessary before construction of the works for a scheme can commence.
 - To provide information support to landowners and community interests in the scheme area so that any land use change that will follow the ultimate development of a scheme has maximum opportunity to be market driven, vertically integrated with downstream processing and focused on value added principles, rather than commodity based. This component will seek an accurate measure of likely water utilisation by increasing awareness of the value of irrigation and the other opportunities that a scheme will unlock.
 - To determine the most appropriate ownership structure for a water enhancement scheme that will best meet the needs of the wider community.
 - To prepare a policy that will ensure the most effective means of acquiring the land that will be necessary to construct a scheme, taking all community interests into account.

- 2.4 Indicative budgets associated with these activities suggest that \$1.43 million will be required up to 30 June 2003. Additional funds from sources external to the two Councils will continue to be sought to offset the cost of this work.
- 2.5 Extension of the Constitution and Terms of Reference of the Central Plains Water Enhancement Joint Steering Committee until June 2003 is recommended to oversee this work, with the addition of a clause enabling the Steering Committee to co-opt specialised expertise as and when required.
- 2.6 Assuming successful completion of the Concept Refinement phase, a Consenting phase is proposed, estimated for completion by 31 March 2005, followed by Establishment and Implementation phases, scheduled for completion by 30 September 2008. Each phase would only proceed following favourable review by both Councils. Under this scenario, the best case is for water to be available for irrigation subsequent to the Implementation phase, by the start of the 2008/09 irrigation season.
- 2.7 These recommendations and the associated funding and decision making programmes are covered in more detail below.

3 Overview

- 3.1 In March 2000, when they established the Central Plains Water Enhancement Steering Committee, the Christchurch City and Selwyn District Councils provided it with terms of reference that included the following purpose:

“to improve the security and prosperity of the Central Canterbury region through water management schemes that enhance ecological and recreational values while providing opportunity for agricultural and horticultural diversity.”

and the following specific objective:

“to undertake feasibility studies for the Central Plains area sufficiently detailed to allow decisions on the advisability of proceeding to resource consent applications and eventual scheme implementation.”

- 3.2 The Steering Committee believes both purpose and specific objective have been met to a satisfactory degree, as detailed in the accompanying technical report.
- 3.3 As outlined in ‘In the Shadow of the Alps – A History of Malvern County 1853-1989’ (Selwyn District Council, 1998), using surface water for irrigation to promote the economic enhancement of Canterbury was first mooted in 1883. There has been serious consideration of community water enhancement proposals at least every generation since. In that time, the proposal outlined in the accompanying technical report is the best resourced, the most focused and the first to include a storage component.
- 3.4 Extensive irrigation developments to the north of the Waimakariri and the south of the Rakaia are already bringing economic and social benefit through intensification of land use. A future without a community water enhancement scheme in the district under consideration will leave farmers in the upper Central Plains the prospect of continuing with a dryland existence. The Steering Committee has been informed that future agricultural production on a viable commercial basis is considered by all professional farm advisors to be unsustainable without irrigation. One probable

consequence of this will be the further conversion to lifestyle blocks of some of the potentially most productive farming land in the country – productivity further enhanced by its proximity to Lyttelton and Christchurch International Airport. It should be noted that in the Selwyn District the rate of expansion of dairying over the past five years, at 5,000 hectares of new dairy units, is close to being matched by the expansion of lifestyle properties, at 4,900 hectares. A community supplied surface water scheme would retard the conversion of productive agricultural land to lifestyle blocks.

- 3.5 If a community water enhancement project does not proceed, it is likely to be the last time in the foreseeable future that such a scheme will be considered. Within a short time, the water the proposed scheme has identified for use on the Central Plains is likely to be used for other purposes or taken up by organisations that do not have the broad community interest of the Selwyn District and Christchurch City Councils. A specific limit on water for irrigation is set by the Rakaia River National Water Conservation Order. Guidelines in the Proposed Waimakariri River Regional Plan have established similar restrictions on that river. If the Central Plains community does not access the water left within these statutory resource management regimes, interests outside the district are likely to secure it instead.
- 3.6 An alternative for Central Plains farmers wishing to sustain profitability in their farming practices would be to seek access to groundwater. This is an increasingly expensive option. Until definitive work to quantify the aquifers under the Central Plains has been completed, it is prudent management to treat this as a finite resource with definite limitations. To continue to access such a resource without limit is to risk disastrous and irreversible consequences, consequences that would be felt not just on the Central Plains but possibly on the Christchurch water supply as well.
- 3.7 Recent work undertaken for the Canterbury Strategic Water Study suggests that one of the most important impacts of this growth in groundwater abstraction is a reduction in median flow of the spring-fed streams in the Selwyn District. It is becoming apparent that these streams are very closely connected to the aquifer system. The study indicates that the amount of further abstraction that can occur without unduly interfering with the flow of lowland streams may well be less than has been commonly accepted.

4 Scheme Outline

4.1 In total, the scheme would be one of the largest technical design and construction projects ever undertaken in Canterbury. It would become one of the most important features on the Central Plains scenery. Expansive canals and water races following the natural contours and flowing down the plains. A large, landscaped earth dam holding a body of water that will attract many different recreational users. Designed and built in harmony with the topographical features of the district and planted wherever possible to reflect the natural heritage, these will potentially have considerable aesthetic appeal.

4.2 The base scheme under consideration to date is outlined in the accompanying technical report. Briefly, this is as follows:

- Construction of a dam across the eastern mouth of the Wairiri Valley to provide a storage reservoir capable of holding 290 million cubic metres.
- Intake on the Rakaia and Waimakariri Rivers.
- A pump station adjacent to the Rakaia River to pump water onto the higher terraces.
- A feeder canal from the top of the terraces to the head of the Wairiri Valley at Glenroy to fill the reservoir.
- A discharge canal from the reservoir adjacent to the Selwyn River, feeding into the main headrace.
- A 56 km level headrace canal at 235 metres above mean sea level between the Rakaia and Waimakariri Rivers.
- An intake and pump station adjacent to the Kowai River to provide water to the Springfield/Sheffield area.
- An open race reticulation network to supply up to 84,000 ha of land for irrigation.

- Run of river water would be supplied via the headrace system when water is available in the rivers, with the shortfall being made up from storage. During periods when supply exceeds demand, surplus water will be delivered to the Wairiri Reservoir to replenish storage.

- 4.3 While using the Wairiri Valley is the base option, other variations on this may be viable. These may include alternative reservoir locations, such as in the Waianiwaniwa Valley. Storage is a critical element to the scheme concept. Having alternatives such as this makes the feasibility of the scheme more robust. Further work needs to be done before the Steering Committee can be certain about the precise definition of a scheme, but on the basis of investigations of the base scheme, it can be said a scheme is feasible.
- 4.4 Storage is the key difference between this and historical community water enhancement schemes or proposals. The storage capacity has been established to provide a supply of water at levels of reliability that will completely change the mindset for agricultural production in this area. In the past the inability to control the moisture environment has been the single biggest constraint to unlocking Canterbury's vast potential for wealth creation. Achieving reliability of supply will overcome that constraint. So long as any associated social or environmental effects can be satisfactorily mitigated, as the Resource Management Act requires, this opportunity can be extended to the primary producers of the Central Plains – but it will come at a cost to the users.
- 4.5 The scheme option outlined above has a total capital cost of \$235 million with annual operating and maintenance costs of \$6.7 million.
- 4.6 Analysis of these costs, applying user pays principles on a per hectare basis for the area that would be served, and assuming a 50-50 mix of debt to equity to fund construction, has given an indicative on-farm price for water. This would consist of an approximate up-front capital contribution of \$1,576 per hectare, plus annual charges of around \$229 per hectare per year for the first 20 years of the scheme. After that the annual cost would reduce to approximately \$70 per hectare. On-farm costs, assumed to be roughly equivalent, will need to be added to these figures by landowners seeking to maximise the opportunities that irrigation offers.

- 4.7 These costs are considered to be at the upper end of affordability. In order to be able to pay them, farmers will have to adopt a significant change in land use or achieve well above average production to cover the additional costs of irrigation conversion and also achieve sufficient profits. At the farm gate, cash farm surpluses to achieve this can be derived from a range of farming activities. These include dairy, high end arable, above average beef and deer and dairy support. Undertaken effectively, all these land uses would generate levels of surplus to justify taking water from a community scheme at the estimated price. Although the investment required will be considerable – both off-farm to access the water and on-farm to maximise the potential it offers – the compelling business case for primary producers and the wider community is that this scheme will provide the means of introducing more profitable land use in a sustainable way.
- 4.8 It must also be observed that widespread land use change is likely to result in considerable alteration to the make-up of the communities that currently farm the area under consideration.
- 4.9 The type of land use adopted is likely to vary across the Central Plains area and will evolve over time in response to changing markets. Irrespective of these variations, the scheme proposals represent the creation of infrastructure that has an immeasurable, perpetual and sustainable contribution to make to the economy, not just at the rural level in Selwyn but to the whole Canterbury region, on a scope and scale that will be nationally important.

5 Social and Economic Benefits

- 5.1 Productivity levels for the agricultural sector are four per cent, compared to two per cent across the rest of the New Zealand economy. Primary producers have demonstrated the ability to adopt new technology and rapidly develop innovative solutions as market circumstances demand. Since deregulation in the 1980s, the farming sector has created an enterprise culture within New Zealand agriculture that is the envy of the world. Canterbury was built on agricultural production and continues to rely heavily on its primary producers. It makes great sense for the community to investigate any opportunity to augment the region's capacity to create wealth.
- 5.2 Central Plains Water was tasked to investigate the feasibility of water enhancement schemes for the Central Canterbury Plains. Within its terms of reference, 'water enhancement' is defined as "Opportunities for multi-purpose use of water including but not limited to irrigation, recreational, landscape, aesthetic and ecological benefits and hydro electric power generation" and 'Central Canterbury' as "that area approximately described as lying between the Rakaia and Waimakariri Rivers, the Main Divide to the west and the Coast to the east."
- 5.3 Irrigation – and the economic benefits consequential from it – is, of course, an important facet of the concept of water enhancement. In November 2000 Central Plains Water received a social and economic impact report outlining these benefits. According to this report, they will be considerable. The report examined four different possible scenarios for development following the construction of an 84,000 hectare scheme. The figures quoted below and referred to elsewhere through this report are taken from the shorter term, more conservative of these scenarios. The more optimistic projections foresaw longer term regional growth in the \$1 billion per annum range, with the creation of as many as 6,000 jobs.
- 5.4 The more conservative, shorter term figures are as follows:
- An increase in the annual net output at the farm gate of \$153 million.
 - An increase in the total annual regional output of Canterbury of \$647 million.

- An increase in the total value added on-farm of \$76 million per annum.
- An increase in the total regional value added of \$241 million per annum.
- An increase in employment on farm of 477 full time equivalents.
- An increase in the total regional employment of 2,630 full time equivalents.

5.5 The increased tax take would amount to around \$200 million per annum.

5.6 Employment deriving from such a scheme would cover a diverse skill range. Agricultural labouring would form part of the additional workforce required, as would management of dairying enterprises and the other sophisticated agricultural and horticultural opportunities that land use intensification can lead to. As a general rule, intensification of land use requires a larger and more sophisticated range of skills among those working the land. In addition, the opportunities for employment in industries providing infrastructural support to those diversifying their land use options are also usually associated with an increased skill base.

5.7 Two thirds of the economic benefit and a proportionate quantity of the employment opportunities would be created off farm. This would range from production and processing enterprises to rural contracting and construction to additional teaching posts in local schools to the specialised development of highly technical irrigation systems. The latter is one example of the need for a greater skill base. The design and construction of on-farm water reticulation and irrigation systems to standards of acceptable efficiency has become increasingly complex with the growing realisation of the importance of irrigation as an integral part of agricultural production practices.

5.8 Jobs will therefore be created across the whole spectrum, neither exclusively in rural areas nor disproportionately within the high or low skilled sectors of the employment market. Employment creation will occur in the trades, skilled, professional, technical and small to medium enterprise categories.

5.9 Christchurch City Council has contributed to the funding of the feasibility study undertaken by Central Plains Water. The city was founded on the back of its rural hinterland and continues to be the most important agricultural service centre in New

Zealand. If a scheme ultimately proceeds, the return on the investment made by Christchurch ratepayers will be considerable. A MAF study on the spending patterns of farmers within Canterbury found that 39 per cent of the farm expenditure from within the Central Plains region was spent in Christchurch. If a scheme proceeds, these figures suggest that one consequence would be a total increase in annual expenditure in Christchurch of between \$55 and \$76 million from farm working expenses and personal expenditure by farming families. This is a substantial increase on the current \$58 million per annum spent by the rural community of the upper Central Plains on goods and services provided by Christchurch businesses.

5.10 The Council's infrastructural businesses Christchurch International Airport Ltd, Lyttelton Port Company Ltd and Orion Ltd would all accrue ongoing benefit, achieve increased profitability and return higher dividends as a consequence of greater demand for their services occurring through this regional economic development.

5.11 In addition to these permanent annual gains, there would be the gain of the one off expenditure from the on farm development necessary to access the opportunity to irrigate. This is predicted to add \$131 million to the Christchurch economy and \$156 million to the smaller servicing towns, including Darfield, Hororata, Leeston, Southbridge and Dunsandel.

5.12 It is worth observing that, when examined retrospectively against the actual growth achieved, economic forecasts associated with water enhancement schemes built to provide irrigation in the past, are characterised by grave under-estimation. Put simply, schemes providing irrigation generally far outstrip the predictions made for them. As noted above, this is because the advent of irrigation in an area opens previously unforeseen opportunities that only become apparent to farmers when access to water becomes reality, giving them the opportunity to experiment and innovate in their land use practices.

5.13 In this context it should also be noted that a number of other large scale community water enhancement opportunities are under investigation throughout much of the east of the South Island. In particular in Mid Canterbury. In total these schemes would irrigate some 300,000 hectares. If they come to fruition there is the likelihood of a cumulative economic impact, much of which will focus on Christchurch,

especially in relation to transport, processing and export. Projections for the Mid-Canterbury and Central Plains proposals combined, which represent around two thirds of the total of the 300,000 hectares under consideration for water enhancement in the South Island, are for regional economic benefit for Canterbury in the \$1.1 – 1.7 billion per annum range, with the creation of between 6,000 and 12,000 full time equivalent jobs.

- 5.14 Central Plains Water understands that one of these other investigations is partially motivated by the threat of closure for the particular community's local hospital. The rationale in this case being that if a large community water enhancement project can proceed, it will bring economic development, jobs and therefore new families into this particular district, making it easier to justify the retention of healthcare and other community services.
- 5.15 These social aspects bring the economic benefits associated with water enhancement into clear focus. The view has been expressed through Central Plains Water's stakeholder consultation programme that if a scheme goes ahead it will increase the chances of young people finding worthwhile jobs locally and therefore remaining in the region, rather than leaving for the North Island or overseas to further their careers. For agriculturally based communities, traditionally fostering strong family ties, this is a compelling prospect.
- 5.16 As outlined in the social impact report associated with this feasibility study, increases in rural population following land use intensification and employment growth can be expected to result in increased rural school rolls, revitalised sports clubs in rural service towns and a generally increased rural social infrastructure. There are numerous examples of this wherever water enhancement schemes providing irrigation have been commissioned.
- 5.17 In general, the age profile of a rural community will drop considerably when the opportunity to irrigate arrives. When the Lower Waitaki scheme became operational in the late 1970s the average age of farmers in the district fell from the mid 50s to 38. This, in part, is what drives growth into schools as young families move into a district. After the advent of the Amuri scheme, which was commissioned in the early 1980s, the roll of the local school grew by 150 per cent, increasing from two teachers to five

teachers plus secretarial support. When growth of this magnitude occurs in a previously declining rural school, the social impact is profound with the school tending to resume its traditional position at the hub of educational, recreational and social activities.

- 5.18 The Lower Waitaki irrigation scheme was commissioned in 1976. There has been significant economic growth since then and considerable social change. Over 60 per cent of farms changed hands in the first few years. From a single veterinary practice when the scheme was commissioned, by 1998 there were eight. Servicing this scheme area, the settlement of Papakaio now boasts a large multi-facility centre, heated swimming pool and squash courts. There is an active play centre and Plunket, tennis club, golf course and garden club. To thank the local community for the quantity of irrigation installation work, contractors with large earthmoving equipment voluntarily laid out the Papakaio golf course. Previously in dryland pastoral production, the predominant land use is now dairying, but also includes horticulture and a large forestry nursery. This has followed a transition phase that included cropping and process vegetable production.
- 5.19 Before the mid 1990s the Te Pirita area, north of the Rakaia River and west of State Highway One, was known as among the least productive farm land in Canterbury. The locals joked that even the rabbits in the area had to carry a cut lunch. In 1995 the first 278 hectare dryland sheep farm, which at the time supported just one family, was converted to dairying with three wells drilled on the property to access groundwater. This particular dairy unit now stocks some 680 cows and employs four additional full-time farm workers. It has also started a trend, with 18 other local farms converting to dairy and from no more than a handful of house cows, the area now boasts a total herd of at least 10,000 dairy stock. The human population has also expanded – a recent community get-together, which a few years ago might have attracted half a dozen, crammed 89 locals into the Mead Community Hall.
- 5.20 Similarly a 2001 farmer survey by Waimakariri Irrigation Ltd shows some 105 jobs have been created on irrigated farms after two seasons of the scheme that operates between the Waimakariri and Ashley Rivers. Off-farm – in processing, production and support industries – up to 350 new jobs will be created as a result of the scheme, which can irrigate 14,000 hectares. On-farm developments to access the

opportunity to irrigate have seen \$85 million invested in the district over the past two years. Around 43 per cent of the water expected to be used in the 2001/02 irrigation season will be for dairying, while 28 per cent will be split between large scale fattening or finishing properties, intensive arable farming and horticulture. Some 17 farms have converted or are in the process of converting to dairying, totalling a gross annual income of about \$24 million. Two major animal fattening projects are also in development, plus others focused on intensive arable production. The five or six larger arable properties are estimated to gross approximately \$17 million this season.

5.21 There is a greater or lesser degree of reliability associated with irrigation schemes that have been developed in the past. The Waimakariri scheme, for example, has no storage and was turned off for around five weeks during the 2000/01 irrigation season because there was not sufficient water to be taken from the river under the statutory management regime. With its storage component, the proposed Central Plains scheme would have a very high level of reliability of supply and therefore reliability of benefit. Neither the primary producers nor the townships that service them – Darfield, Dunsandel, Sheffield, Kirwee, Hororata, Christchurch – would be subject to the fluctuations that characterise traditional dryland pastoral farming and its associated communities in drought prone country.

6 Environmental and Physical Enhancements

- 6.1 As distinct from the economic and social benefits of the proposed scheme, the accompanying technical report on the feasibility study also explains in more detail how a number of environmental and recreational enhancements can be expected to eventuate from the implementation of a scheme.
- 6.2 Application of 60 cubic metres of water per second during the irrigation season will have a considerable impact on the region's groundwater system. One consequence of this is expected to be an increase in the base flow of many lowland streams, which are fed from aquifers that will contain more water than is presently the case. Streams where this is likely to occur include Waitatari/Harts Creek, Boggy Creek, the Irwell River, the LII and the Halswell River. This can be expected to benefit the instream values of these water bodies, including their suitability for fish species, therefore enhancing their potential as recreational fisheries.
- 6.3 The Selwyn River is one that should experience an increased base flow, partly as a result of the cessation of abstraction from its riparian margins— replaced by takes from the community scheme. Further downstream, increased groundwater levels feeding through into the river will enhance the Selwyn.
- 6.4 In Christchurch, the Avon and Heathcote Rivers are expected to experience increased flows. While not directly fed from the groundwater systems recharged by scheme water used for irrigation, the latter systems do interact with the Christchurch-West Melton groundwater system. It is expected that a consequence of the scheme would be to increase base flows in the Avon and Heathcote by as much as 20 per cent. Spring-fed tributaries of the two rivers will carry water for longer periods each year. Further, because the flows in the two rivers are proposed as the indicator of how much water can be extracted from groundwater (Environment Canterbury's draft Natural Resources Regional Plan, chapter 5), strengthening these flows will enable greater extraction for water supply purposes.
- 6.5 Land-owners already irrigating from wells in the area to the east of the proposed community scheme will experience an increase in groundwater levels. This will result

in their requiring less energy to pump and reticulate water around their farms, with consequential improvements in farming efficiency and profitability.

- 6.6 Enhanced access to these groundwater resources down-plains from the scheme area will increase the reliability and availability of water for those parts of this area already under irrigation, helping to guarantee the economic and social benefits associated with irrigation for the communities in the eastern section of Selwyn.
- 6.7 Initial analysis of the in-stream consequences of taking water from the Rakaia and Waimakariri Rivers suggest that these could have a benefit for the endangered Wrybilled Plover, a species numbering less than 4,000 and declining, for which the Rakaia is the most important breeding habitat. Previous studies indicate that available habitat for the Wrybilled Plover decreases markedly as rates of flow in the river increase. Expert opinion suggests that the slight decrease in flow levels in the Rakaia may therefore result in an increase in the habitat area where this species can feed. Further study is required to clarify this issue and put it into a broader context, but at present members of the Steering Committee believe it could be a potential enhancement.
- 6.8 Protection of the whole groundwater resource has been expressed to Central Plains Water as one of the most profound environmental enhancements associated with the proposed scheme. Groundwater between the Waimakariri and Rakaia consented by Environment Canterbury to be taken for irrigation has increased by 50 per cent since 1995 to around 33 cubic metres per second. This is via a total of more than 1,650 different consents. Improved technology and economic imperatives are encouraging farmers further and further up the Plains to drill, pump and irrigate. The consented 33 cubic metres per second supplies around 70,000 hectares. Precise quantification of the aquifers from which this groundwater is taken is not easy. Environment Canterbury uses a series of monitoring wells throughout the district. Varying restrictions are imposed if these monitoring wells indicate decreased aquifer levels. If a community scheme using surface water proceeds, applications for groundwater consents are likely to decrease rapidly, rather than increasing at an exponential rate, as has been the case over the last ten years. Monitoring of the impact of a single community scheme will be a much more straightforward exercise than monitoring the effect of an increasing proliferation of individual groundwater takes.

- 6.9 A Central Plains Water environmental trust, funded by an appropriate levy on water users and other interested parties, has been proposed as one of the opportunities a community water enhancement scheme might be able to instigate. This would be established to pursue agreed environmental objectives that are beyond the scope or resources of individual land owners. Such objectives might include the planting of riparian margins, re-stocking fisheries on the lowland streams, the creation or restoration of wetlands and developing indigenous forest reserves within the scheme area.
- 6.10 Initial study suggests that the storage reservoir will provide considerable opportunities for water-based recreation for most of the time during most years. Jet-skiing, kayaking, windsurfing, power boating, water-skiing and even swimming should be possible – once the organic matter at the bottom of the reservoir has decomposed, which is expected to take two or three years. Further study is still required to ascertain what impact lowered reservoir levels during the irrigation season will have on these activities. Early indications, however, are that the facility will only drop below half full during March and April of any year, and even then, most recreation activities will still be feasible. Establishing the reservoir as a fishery may be more difficult, but once the period of organic decomposition and low oxygen levels is over, experimenting with the reservoir as a trout fishery has been suggested as a possibility. There may be options to provide a separate permanent water body during construction of the scheme by establishing a quarry down stream of the reservoir dam. On completion of the reservoir, this might be filled with water and landscaped for recreational use. This would require more land than might otherwise be necessary, but is likely to be justified on the basis of wider community support and benefit for a more diverse group of stakeholders.
- 6.11 Recreational activities not directly associated with water will also be increased as a consequence of a scheme. These include tramping along the canal banks, picnicking and photography. The canals would also become an important water source for fire fighting.

7 Issues of Concern

- 7.1 It would be naïve to expect that the benefits and enhancements outlined above can be accessed without major cost. First there is considerable uncertainty associated with many of them, which requires further detailed study to resolve. Additionally, while the financial costs of scheme construction – \$235 million – are outlined in the technical report, measures necessary to safeguard social, environmental and cultural values also need to be assessed to a more precise level of certainty. Only when this process has been completed can a balanced decision be taken on whether to proceed further with the development of a scheme.
- 7.2 The feasibility study and associated stakeholder consultation programme has identified a number of very important issues that require careful resolution. These are outlined in more detail in the technical report.
- 7.3 In short, while these are all vitally important, based on the information presently available to it, the Steering Committee believes all can be successfully resolved.
- 7.4 They can be summarised into six overall categories:
- The effects of abstracting significant takes of water from the Rakaia and Waimakariri Rivers. There is concern on the effects of the proposed level of abstraction from the Waimakariri River on fish passage, fishability, natural character, amenity and the biodiversity of the river, including the habitat of the Wrybilled Plover. Taking water from either river is permitted under statutory regulations – the National Water Conservation Order for the Rakaia and the Proposed Regional River Plan for the Waimakariri. The proposed scheme intends to work within the allocation rules established by both of these.
 - The logistical effects on the community and the environment of transporting and storing these large quantities of water, including land acquisition.
 - The impact of a scheme on the host community, defined as the community that ‘hosts’ the physical structures of the scheme, particularly where there is a perception that there will be no direct benefit. Issues include the risk of dam

failure, the effects on the local transport network, the impact of fluctuating reservoir levels during the irrigation season and the effect of scheme construction on the natural character of the area. This has been exacerbated for many within these communities because of the uncertainty associated with the fact that Central Plains Water has been dealing with proposals and concepts – not yet anything definite: a negative aspect of undertaking an open, inclusive process.

- The secondary impact of the intensification of land use on the wider region, including on the quality and quantity of groundwater and surface water, specifically on rivers, lowland streams and Te Waihora. This includes the effects of the proposal on the level of nitrates in ground and surface water and the effect of increased groundwater levels on farming activity in the springs zone surrounding the lake and on the number of lake openings required. Suggestions to address this have included that an environmental audit should be carried out on all farms seeking to irrigate from the proposed community scheme – those who do not exhibit sustainable environmental practices in their land use would not be supplied.
- The cost of water from the scheme to those who wish to use it and whether it can be adequately demonstrated to these farmers that the potential economic benefits made possible from irrigation are sufficiently compelling to persuade individual landowners to buy into a scheme.
- Tangata whenua concerns, including the artificial mixing of water, and the amount of sediment in the scheme water, the impact on taonga and mahinga kai species, and fish migration, important cultural sites, impact on the Selwyn River and the potential impact on Te Waihora

7.5 Each of these issues is of varying concern to different sectors of the community of interest. Each must be adequately addressed in applications for resource consents. Their importance is not able to be over-stated. However, although there is no certainty in relation to applying for resource consents, based on the information that has come through the feasibility study, it is apparent that each of these potential effects can be resolved. This will require close consultation with any potentially affected parties to seek solutions that meet the needs of all. How easily this can be

achieved, and at what cost, has not been precisely determined – that will be a matter for the assessment of environmental effects recommended within the Concept Refinement phase of the project, prior to lodgement of resource consent applications.

- 7.6 The assessment of effects and resource consent process will thoroughly test each of these issues, and most likely set demanding conditions in relation to them. Indications at present, however, are that, while crucial, each of these hurdles can be satisfactorily overcome.
- 7.7 When considering resource consent issues, a balanced judgement is required to weigh the benefits and opportunities that a proposed development would create against the potential adverse effects that might arise. Members of the Steering Committee believe that, on the balance of information available at present, the proposal does represent a sustainable use of the natural and physical resources of Canterbury, as required by the Resource Management Act. However, a greater or lesser degree of uncertainty is still present in relation to a number of critical issues. By undertaking more detailed investigations during the Concept Refinement phase of the project, this uncertainty will be resolved to a level where a conclusive case can be made for resource consents to be granted. On this basis the members of the Steering Committee believe the proposals are consentable.

8 Conclusion

- 8.1 In conclusion, Central Plains Water was established to assess the feasibility of water enhancement schemes for the Central Plains area. Members of the Central Plains Water Enhancement Joint Steering Committee believe the affordability, bankability and consentability of the proposed scheme has been proved to a degree sufficient to give the Selwyn District and Christchurch City Councils confidence to proceed with the project to the next stage. This view is based on comprehensive feasibility investigations undertaken to standards of technology that comply with international best practice in terms of sustainable land use and environmental protection, as validated by independent professional peer assessment.
- 8.2 The scheme option prepared reflects the extensive community consultation undertaken. This has been inclusive, open and driven from the bottom up. Details of the enhancement proposals have been developed and taken on major refinements incorporating substantial input from concerned communities of interest through this consultation.
- 8.3 To make a scheme affordable to farmers in the command area will require extensive land use change. Experience of similar community schemes elsewhere in the country indicates that this process will take some time and will involve considerable change, but that the social and economic benefits to the wider communities concerned will be profound.
- 8.4 Although a number of serious cautions have been raised, based on the knowledge they have at present, members of the Steering Committee believe these can be resolved.
- 8.5 Further, if the surface water identified in this study is not secured now, it is highly likely that the consents to use it will be used for other purposes or taken up by organisations that do not have the broad community interest of the Selwyn District and Christchurch City Councils. If so, this is the one and only chance for the Central Plains community to take this opportunity.

- 8.6 In addition, the economic factors that motivate farmers to develop their businesses will not change: new opportunities to irrigate will continue to be taken whether or not a scheme proceeds. It has been predicted that the current rate of increase in applications for consent to take groundwater may be detrimental to the region's groundwater resource. If so, the consequences are likely to be much more difficult to monitor, mitigate and manage than will be the case if a community scheme proceeds, and without many of the potential community benefits.
- 8.7 For these reasons the members of the Steering Committee recommend that Christchurch City and Selwyn District Councils proceed with this project to the next stage, as outlined in the detailed recommendations below.

9 Budgetary Considerations

- 9.1 In proposing to continue the project and requesting the funds to do so, the members of the Steering Committee acknowledge that the opportunity exists for those funds to be capitalised within the project. They note that the Selwyn District Council has already decided on this course and encourages the Christchurch City Council to also consider it. As an alternative, it would equally be possible to repatriate these funds by way of a loan to be ultimately repaid by whatever entity is eventually established to operate the scheme. Either way, the investments proposed and those already made could be returned to the respective parent Councils, if and when a scheme proceeds. Alternatively the capitalisation could take the form of a permanent ownership stake.
- 9.2 While the project budget for the Concept Refinement phase is estimated at \$1.43 million, an application has been made to Industry New Zealand that, if successful, would offset the contribution requested of the two parent Councils for this phase. Central Plains Water has been successful in obtaining external funding of \$633,000 during the feasibility study from a total budget of \$1.556 million to complete this phase.
- 9.3 While costs are projected through to the ultimate land acquisition and construction of a scheme, it has been signalled that a new entity or entities, based on user pays principles, will likely be established to fund, commission, construct and operate the scheme, assuming all projected phases are successfully completed. At present it is anticipated that this will occur in 2005, on completion of the Consenting phase. Involvement of the Selwyn District and Christchurch City Councils beyond this point is yet to be determined. In the view of the Steering Committee it is most unlikely that extensive Council funding will be required beyond this point.

10 The Way Forward

- 10.1 As the Steering Committee moves towards completion of its brief, members wish to acknowledge and thank the members of the Central Plains Water Consultative Working Party for their vital assistance, advice and input into the feasibility study. This group represents a wide cross section of those who have an interest in water use on the Central Plains. Their commitment to the consultative process undertaken through the feasibility study has provided balance, creativity, objectivity and a broad range of different perspectives that have greatly enhanced the quality of the feasibility study.
- 10.2 The attached Schematic Plan, Preliminary Programme, Indicative Expenditure Programme, Decision Tree and Draft Amended Constitution and Terms of Reference illustrate the thinking of the Steering Committee on how the project should proceed from here.
- 10.3 These recommendations provide the mandate necessary to allow work to proceed with the Concept Refinement phase, as per the Decision Tree, towards a point where resource consent applications can be lodged. They also describe, in an indicative way, the further three phases required to see completion of scheme construction. It is the intent of the Steering Committee that the Selwyn District and Christchurch City Councils can reach consensus at their joint 11 February 2002 meeting on final wording of these recommendations, which can then be referred to each Council for ratification.
- 10.4 The Central Plains Water Enhancement Joint Steering Committee has undertaken a detailed multi-disciplinary assessment and believes a case is proven to justify taking further steps in this project on the grounds of:
- Technical feasibility
 - Potential for significant regional economic growth
 - Job creation
 - Community added value
 - Financial feasibility in terms of demand-supply estimation, probable affordability, estimated take-up and bankability

- Scheme consentability
- Public stakeholder consultation.

10.5 On these grounds, the members of the Steering Committee make the following recommendations to Christchurch City and Selwyn District Councils.

11 Detailed Recommendations

11.1 That a phased four step process be adopted for the continuation of the Central Plains Water Enhancement project, with the opportunity for a review of continuation of the project on completion of each phase. The four phases, Concept Refinement, Consenting, Establishment and Implementation, as set out in the attached Decision Tree, to be as follows:

(A) The Concept Refinement phase will have four strands, each of which will continue the comprehensive consultation with the various stakeholders concerned. The four strands to consist of:

- **Technical** – to complete necessary investigations to enable final physical definition of the scheme and to make that physical definition. To undertake all the additional work necessary to prepare resource consent applications, this to include the preliminary design of engineering works, assessment of environmental effects and measures of mitigation for the environmental, social, cultural and host community issues identified through the consultation process.
- **Marketing information and support** – to increase the general level of understanding of primary producers and other interested parties within the proposed scheme area of the potential benefits of irrigation and the modifications to land use that will be required to access those benefits. This will include an ongoing and more detailed assessment of the likely utilisation of water and other community enhancement and market driven economic opportunities from the scheme.
- **Structural** – to determine an ownership structure that best meets the diverse needs of the community of interest within the Central Plains.
- **Land acquisition policy** – development of a policy to effectively acquire the land necessary to construct a scheme, consistent with all community interests.

(B) The Consenting phase will seek to obtain the resource consents necessary for the project to proceed beyond this point and prepare a land acquisition strategy.

(C) The Establishment phase would establish the entity or entities to operate the scheme and acquire the land identified as necessary for the scheme to proceed.

(D) The Implementation phase would complete the detailed technical design, construct and commission the scheme.

11.2 That the Constitution and Terms of Reference for the Steering Committee be redrafted for parent Council approval to undertake the management of the Concept Refinement and Consenting phases of the project, expected to be in March 2005.

11.3 That each Council provides a supplementary amount of \$185,000 in their 2001/02 budgets to allow work on the studies, investigations and consultation described for the Concept Refinement phase of the project through to 30 June 2002, and that each provides a further \$530,000 to cover the works programme required to complete the Concept Refinement phase during 2002/03.

11.4 That for the following years, each Council provides an indicative budget in its annual plan as follows:

2003/04	\$530,000
2004/05	\$407,500
2005/06	\$157,500
2006/07	\$145,000
2007/08	\$145,000
2008/09	\$85,000

12 Appendices

- Schematic Plan
- Preliminary Programme
- Indicative Expenditure Programme
- Decision Tree
- Draft Amended Constitution and Terms of Reference for Central Plains Water Enhancement Joint Steering Committee (this document to be distributed separately)