AQUALINC RESEARCH LIMITED

Our Ref: C11146

23 May 2014

Project Manager, Wairarapa Water Use Project (WWUP)
Greater Wellington Regional Council
PO Box 11646, Manners St, Wellington 6142
WELLINGTON

Via Email to: Bruce Geden <Bruce.Geden@gw.govt.nz>

Dear Bruce,

REVIEW OF WWUP COMMAND AREA

Objective

To review, and potentially to refine and prioritise, the target area for receipt of irrigation water in the Wairarapa Valley, to enable the outcome to be incorporated into the Project Review Point 1 and to guide subsequent investigation of storages and distribution systems options.

Scope

1. Review the work undertaken to-date
2. Facilitate and participate in a workshop with members of the WWUP Project Team on March 28th to:
    - Discuss and agree on key factors that would influence the selection of priority areas.
    - Reach a decision on whether the current indicative priority irrigable area should continue to be adopted for the pre-feasibility phase or amended. If the latter, determine a priority irrigable area.

Interpretation of the Brief

The WWUP is a strategic water study whose purpose is to determine a viable plan for meeting long-term rural water use needs in the Wairarapa Valley.

As such, it is concerned about what the water use requirements are likely to be in 30 to 50 years' time, in order to define an "End Point", what will be an initial feasible development, as a "Start Point", and what might the stages between the Start and the End, that is, "the Middle".

An End Point needs to be defined to provide overall direction of travel, and to help avoid Start and Middle decisions that foreclose on better long-term options.

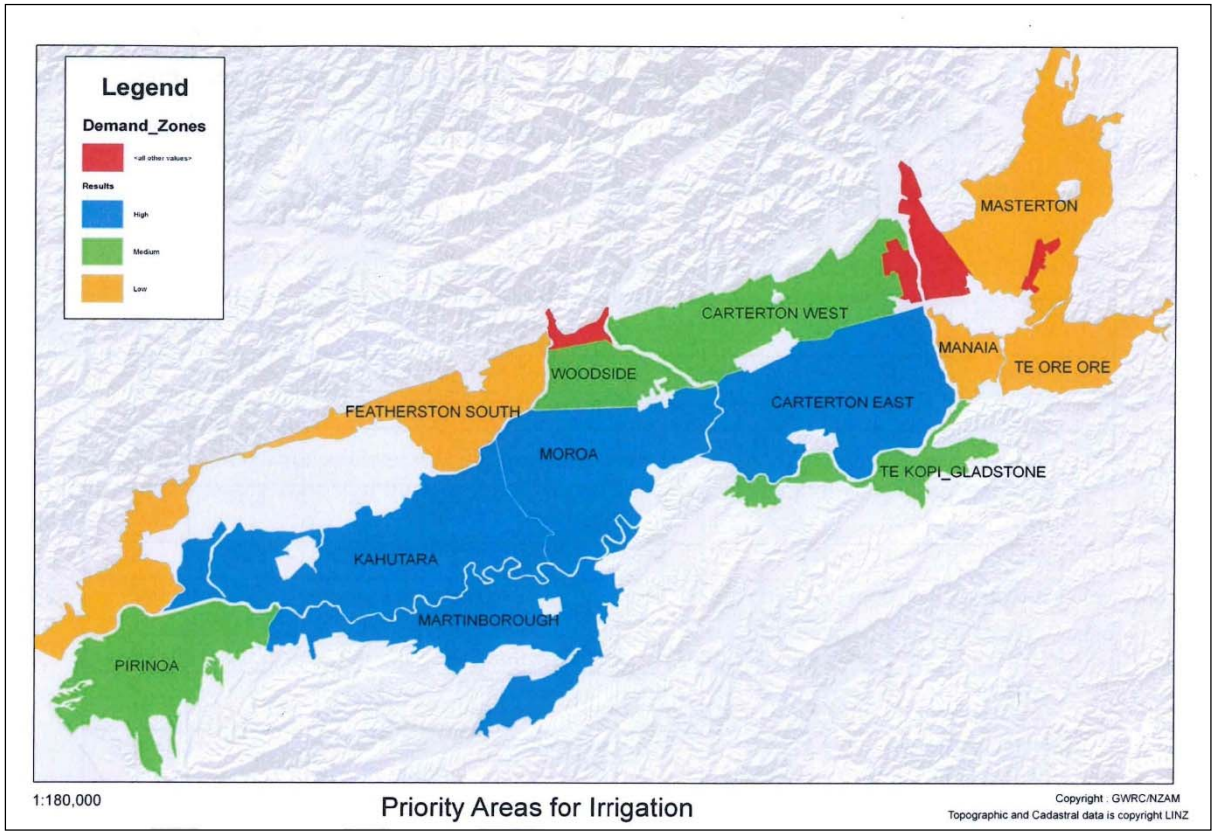
A successful Start is needed to build confidence in the strategy, broaden understanding beyond the initial enthusiasts of what is achievable with water and how to do it, and to build support for the Middle.

A credible Middle is needed to map out pathways to meeting the water needs of those outside of the Start scheme(s). It needs to be flexible to accommodate changes that will arise as a consequence of successful Start scheme(s). Without an acceptable and practical Middle, the

WWUP risks being seen as exclusively for the Start set of scheme(s) and having no credible plan for reaching an End that serves the community at large.
At present, two maps prioritise areas within the Wairarapa Valley according to expected levels of rural water demand and use.
The GWRC report "Identification of Priority Areas for Irrigation Version 3" (16th May 2013) is focussed on a 30 to 50 year End Point as it is based on formative face-to-face farmer discussions and interest group opinions, as well as being focused on areas categorised as Land Use Capability class 1 or 2. However, in reality a scheme will take some time to implement and to establish uptake, therefore a starting point is necessary.
In order to identify where the project should at least initially focus its efforts (and resources), the T&T memo dated 16 May 2013 on the subject "Application of irrigation area prioritisation work for valley-wide combined scheme" (T&T Ref 28063.401) combined Landcare's theoretical water demand with the above 16th May longer term perspective to establish where the project should focus its investigations
Both documents map High priority areas (refer below) and thus express a view on the general vicinity where the Start schemes may be located, from the perspective of demand potential, and, in general terms, how the water usage pattern is likely to develop from there.
The High priority areas in each document differ. They both agree on Carterton East and Martinborough as priority areas, but the scale of each area differs. The GWRC map also ranks Moroa and Kahutara as High Priority areas. The prioritisation processes used required subjective judgements to be made and this is the most likely reason for the differences in the mapping.
Given the above, I have interpreted my brief to be to provide an independent review of the current maps of water demand area prioritisation and to recommend adjustments or further work where justified.

Review of current maps of irrigation area prioritisation

Both maps are based on similar datasets. These are: Soil moisture deficit map, information on existing consents, further potentially 'consentable' water, uptake risk (deduced from a survey of farmer interest in using water and the nature of land-use change and intensification), maps of farm size and type, land-use capability maps and community views (obtained by interviewing key sector groups.
Both maps are the product of prioritisation processes that involved subjective judgements. The T&T prioritisation process gave greater weight to modelled potential irrigation demand than to other factors while the GWRC map is weighted towards farm demand and community views.
To derive the "Priority Areas for Irrigation" map, shown below, GWRC divided the potentially irrigable area (based on land slope of < 7 degrees) into demand zones and ranked the zones for each of the above datasets. The ranks for each zone were averaged and the lowest average rank was assigned priority 1 (highest priority). The four zones assigned priority 1 through 4 were assigned High Priority status, the next four Medium Priority and the remainder Low Priority. While this prioritisation method is very subjective, the result is still a useful indicator.



The T&T priority irrigation areas map is derived primarily from modelled annual irrigation water demand, with some judgement applied regarding the influence of other more subjective factors such as potential water uptake. The resulting map is presented below.

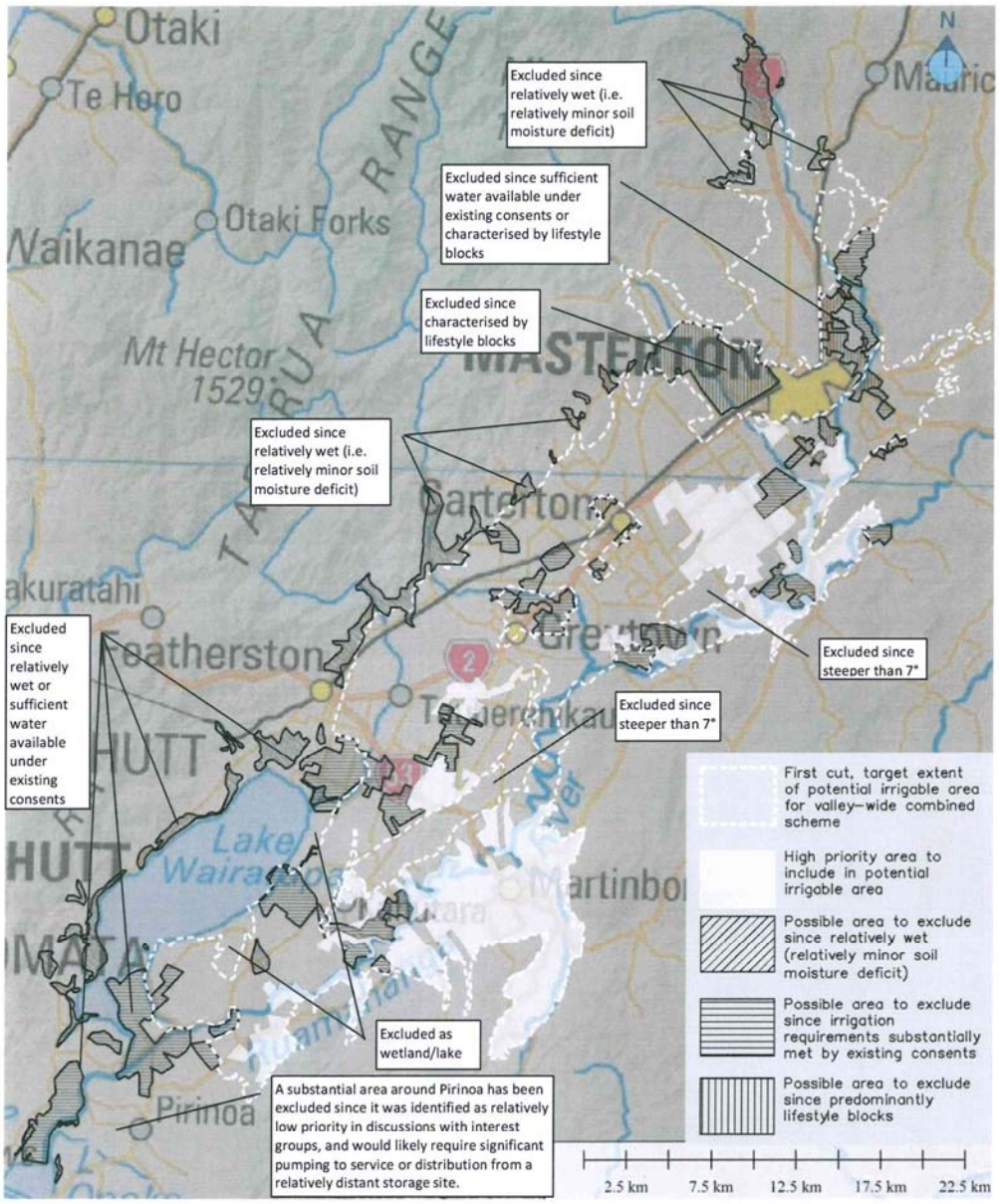


Figure 1 Potential irrigable area for valley-wide combined scheme based on identified possible areas for exclusion and high priority areas

Tonkin & Taylor Ltd – Environmental and Engineering Consultants

I have reviewed the data sources and the manner in which each party has used the data. In my opinion, the processes applied are appropriate for this stage of the investigation. As noted above, the differences in the priority area maps are primarily due to differences in the subjective

weightings applied by the T&T and the GWRC teams to the various factors that influence the uptake of water for irrigation.
Additional information on two factors could usefully assist the identification of priority areas. These are water supply reliability, particularly groundwater supply reliability, and farm financial performance data, particularly the spatial pattern of disposable surplus after irrigation development, as a measure of ability to pay for water.
Knowing that a farm has a consent to take a specified amount of water and use it for irrigation isn't sufficient for ruling out that farm, in part or in whole, as a potential user of scheme water. Take and use consents aren't created equal, some are not worth much in practical terms. Furthermore, what was originally a good consent in the sense of allowing a reliable supply of water to be taken can lose its value through changes in the Regional Plan. Among other Regional Plan matters, GWRC is in the process of revising the basis of groundwater allocation management to integrate it with surface water allocation management. The basis for the approach under consideration is reported in "Wairarapa Valley groundwater resource investigations: Proposed framework for conjunctive water management (May, 2011)", for example. The approach is to link a class of groundwater takes (Class A takes) to river flow rates such that the reliability of supply from the groundwater bores is the same as the reliability of surface water takes from the relevant river. The land areas in the East Carterton and Martinborough zones that are mapped as Class A take areas are relatively small. However, there are large areas in the East Carterton zone that are mapped as Class B take areas. In Class B areas part of the groundwater take would become subject to river take restriction conditions and thus very likely to experience a drop in reliability. Depending on the magnitude of the change, this may create more immediate demand for scheme water than the current mapping process has allowed for.
If the reliability of supply from river and from groundwater takes is reduced by upcoming changes to the Regional Plan, and I understand that is a distinct possibility, then it is likely that the spatial extent of the areas that would benefit from scheme water through its higher supply reliability will be higher than shown in the T&T map as their High priority area. This is more likely to affect the boundary of the East Carterton zone than the Martinborough zone. I have not conducted any numerical analysis to quantify the potential benefits of scheme water in comparison to reduced reliability from existing consents.

Summary

I confirm the view I expressed at the workshop on March 28th 2014 that the methods used to generate the maps of priority areas are logical and that, if anything, the T&T map is likely to be under-reporting the size of the high priority area in the East Carterton zone. I base this last point on my expectation that few people understand the implications to water supply reliability of the likely changes in groundwater take management. Water supply reliability will deteriorate for the groundwater takes that go onto surface water take restrictions. Thus the benefits of reliable scheme supplied water will be greater than I suspect is realised at present. The modified boundary of the High priority scheme in the Carterton area that I recommend further investigations be based on is shown outlined in red in the following figure.

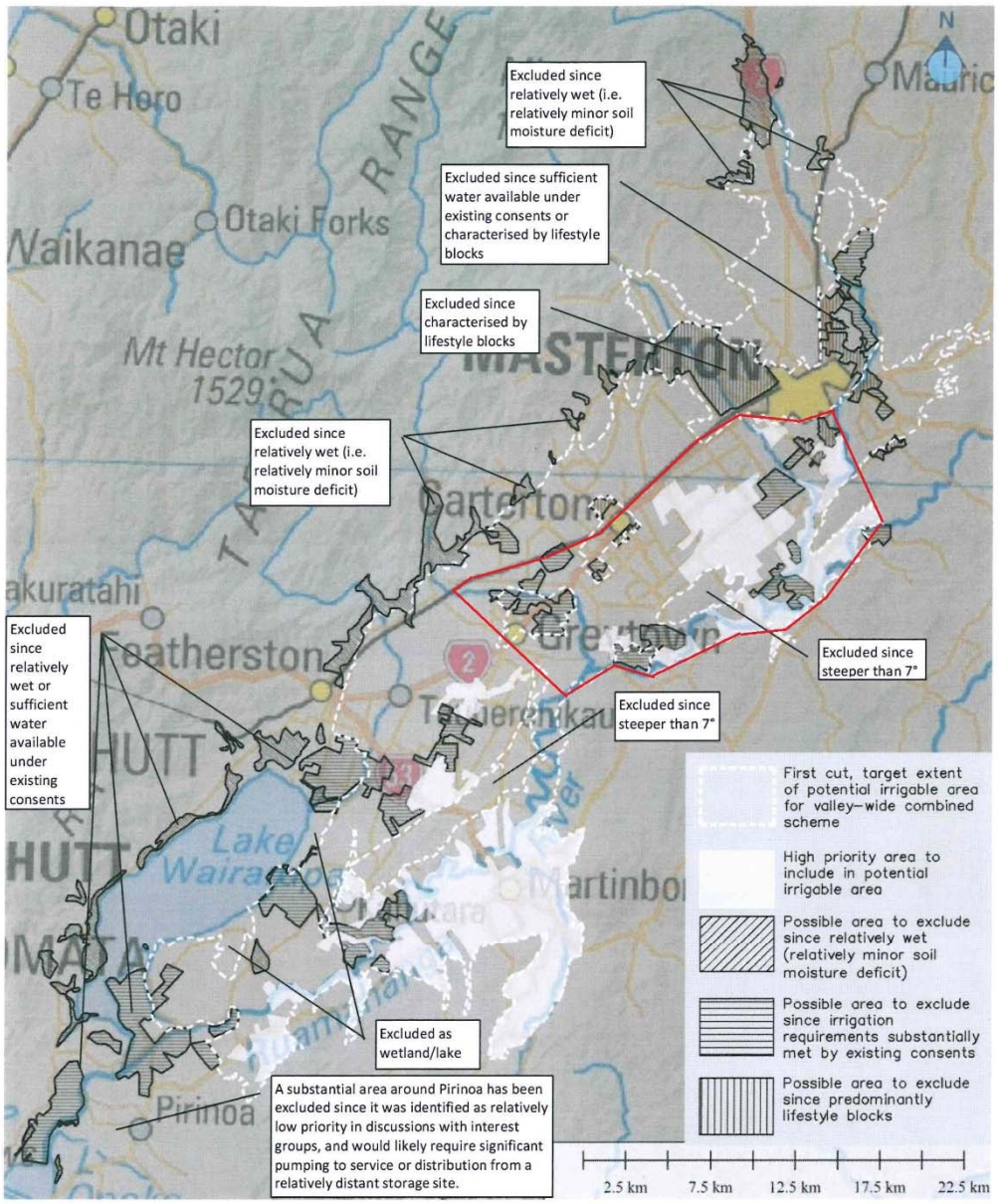


Figure 1 Potential irrigable area for valley-wide combined scheme based on identified possible areas for exclusion and high priority areas

The size of successful "Start schemes" will be determined primarily by the farmers' ability to pay for scheme water, in comparison to the cost of scheme water. This is evident from the history of irrigation schemes that have got off the ground since the mid-1980's.

If further refinement of the priority areas is desired it should, in my view, focus on a robust analysis of farmers' ability to pay for Scheme water, based on a thorough understanding of farmers' land use change and intensification intentions over the first five years of Scheme operation. An important pre-requisite to this work is developing a sound quantitative understanding of the effects of the likely plan changes on the reliability of supply from existing surface and groundwater takes and the consequential effects on production of both a reduction in reliability from consented water takes and the higher reliability of scheme water. When this information is available GWRC need to make sure farmers know about it and understand it.

The focus of the prioritisation has been to identify High priority areas to form the basis of successful Start schemes. It should not be concluded that Low priority areas should be dropped from consideration as the prioritisation is primarily to do with the potential rate of uptake and not whether uptake would ever occur or not.

Yours sincerely

Managing Director
Aqualinc Research Ltd.