

IN THE MATTER OF The Resource Management Act 1991

AND

IN THE MATTER OF Resource Consent Applications by Central
Plains Water Trust to take and use water
and undertake other activities for the
construction and operation of the Central
Plains Water Enhancement Scheme

**EVIDENCE OF PETER FRANCIS CALLANDER
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INTRODUCTION

1. My name is Peter Francis Callander.
2. My qualifications and experience have been set out in my original brief of evidence. I have prepared this current evidence to comment on the revisions to the Central Plains Water (CPW) scheme with regard to impacts on the gravel extractors operating in the Yaldhurst and McLeans Island areas, just to the west of urban Christchurch.
3. The revisions to the CPW scheme are due to the removal of their proposed storage reservoir, which means that less surface water will be introduced into their 60,000 ha irrigation area each year and more groundwater will be pumped to supplement the irrigation supply during times of low river flow restrictions. These changes will mean that the rise in groundwater levels caused by the CPW scheme will be less than would have occurred under the original scheme.
4. CPW's reassessment of the groundwater level changes caused by their scheme is presented in the evidence of Julian Weir. Figure 1 attached to this evidence shows the location of wells in which he has simulated the potential effects. The area of the Yaldhurst quarries is represented by well M35/1080.
5. Mr Weir has carried out two types of simulations:
 - one using a numerical groundwater flow model that he used in his original assessment for the scheme;

- a different approach called an Eigenmodel to provide a comparison with his numerical model.
6. The results of these models are attached to this evidence, labelled as page 53 for the Eigenmodel output and page 56 for the numerical model output. The numerical model has only been run for the first few years of the simulation record due to time constraints. Well M35/1080 which represents the Yaldhurst quarry area is shown in the top left hand quadrant of these pages.
7. For each of the plots the following lines are presented:
- a blue line labelled “SQ”, representing the Status Quo. This is the predicted water level if there was no CPW scheme;
 - a green line labelled “CPWES”, which is the originally predicted water level if the full CPW proposal was consented;
 - a brown line labelled “CPWES:No Dam”, which is the current prediction of what the water level will do if the CPW proposal without the storage dam is implemented.
8. These first three lines relate to values on the left hand vertical axis of the graphs. There are two other lines on the graphs which show the mounding of water levels that are predicted to occur and these relate to the right hand vertical axis of the graphs. They are:
- a yellow dashed line labelled “Mounding:CPWES-SQ”. This is the difference in water levels between the original CPW scheme and the situation with no CPW scheme (i.e. the difference between the green and blue lines)
 - a red dashed line labelled “Mounding:CPWES_NoDam-SQ”. This is the difference in water levels between the modified CPW proposal with no dam and the situation with no CPW scheme (i.e. the difference between the brown and blue lines)
9. These results indicate that even with the revised scheme the predicted water level rise in groundwater levels is still on the order of 1.0-1.5 m at times of high water levels. Therefore irrespective of the relative merits of the different modelling approaches, the issue of a raised water table is still of concern to the quarry owners, even with the revised scheme.

10. The policies, rules and consents that control the excavation and backfilling of the quarries require that excavations maintain a buffer between the base of the excavation and the highest groundwater level. If the highest groundwater level is raised due to the granting of consents for the CPW scheme, then the implications for the quarry owners include:
- a loss of available resource by not being allowed to excavate down to depths that are currently permitted;
 - a potential change to the current infrastructure, including roading, stockpiling processing facilities and other built structures which is located on the quarry floors at present
 - a requirement to backfill their pits with invert gravels to raise the floor level to above the new highest groundwater level;
 - a potential liability issue if historical solid waste materials at the base of the pits become inundated with groundwater. The nature and extent of this liability has not been quantified but the groundwater is protected at present by consents allowing the deposition of fill material but only to an RL level which is consistent with a buffer level being maintained between the highest recorded groundwater and the deposition.
11. The historical nature of many of these quarries is that the deposit of material has occurred long before consents were required for cleanfill material. The quality of the early deposits is unknown.
12. All these events create a potential financial loss for the quarry owners due to the effects of the CPW scheme. However, the Quarry Owners' principal concern is with the loss of the overall resource at times when the areas available for gravel extraction are limited – and particularly so in an area where the quality of the gravel for all types of aggregates can be met from this source.
13. Furthermore, unlike high water table issues at the land surface that can be addressed by the construction of a drainage network, such mitigation is not feasible when the water table rise occurs in the base of a highly permeable gravel pit, around 10 m below the ground surface.

CONCLUSION

14. The issue of water table rise and its effect on gravel pits still remains, even with the revised CPW scheme.
15. The estimates from the evidence of Mr Weir indicates that the highest groundwater level rise could be on the order of 1.0-1.5 m.
16. Such a rise creates a potential loss of gravel resource and a liability risk for the quarry owners.