

20. KIBBLEWHITE STREET RESERVE SALINITY

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Corporate Plan Output: 9.3.51 Asset Improvements (Waterways and Wetlands)	

The purpose of this report is to advise the Board of the Parks Unit's proposed programme of shelter tree planting in the Kibblewhite Street Reserve.

INTRODUCTION

Following granting of resource consent number CRC981898 in August 1997 for development of Kibblewhite Street Reserve, New Brighton, there has been concern by some submitters that increasingly saline groundwater is adversely affecting trees in the reserve. The Board has requested a report on groundwater salinity and consent conditions, and a tree replacement programme.

GROUNDWATER AND SALINITY

Summary

- (a) No increasing trend in groundwater levels beneath the site was observed.
- (b) Chloride concentrations in groundwater has trended upward in the boreholes outside the stopbank. This is not unexpected and may well be related to the increased area of land that is inundated by river water.
- (c) It is recommended that monthly monitoring of water levels and water quality should continue for another 12 months.
- (d) Note: Chloride in groundwater does not necessarily affect trees, whose roots occupy the unsaturated zone above groundwater level.

Monitoring

Groundwater has been monitored for depth and salinity for 14 months from April 1999 in accordance with condition 3(a) of the resource consent (*Annex A - see [attachment](#)*). The full consent conditions are in Annex B (*see [attachment](#)*).

Chloride concentrations were monitored by Pattle Delamore Partners Ltd in seven boreholes, located as shown on Figure 1. The results for the first year are in Table 1. (*Chloride Monitoring of Groundwater at Kibblewhite Street Reserve, PDP, June 2000*). The recommendations and conclusions from Pattle Delamore's report are copied below:

“Conclusion and Recommendations

Following the completion of the monitoring program conducted by PDP on a monthly basis from April 1999 to March 2000 at Kibblewhite Street Reserve, South Brighton, Christchurch, no increasing trend in groundwater levels beneath the site was observed. All the bores measured generally showed groundwater levels that were within the range of results gathered prior to the stopbank relocation.

Groundwater samples showed chloride concentrations beneath the reserve to have had an increasing trend in borehole 5 and, since August 1999, in boreholes 6 and 7. Borehole 4 showed a slight decrease and boreholes 1, 2 and 3 showed no compelling evidence of either trend.

*[Note: boreholes 6, 7 on the river side of the stopbank;
borehole 5 near the stopbank, residential side - affected by salt water leak in culvert, now repaired;
boreholes 1, 2, 3, 4, 8 on the residential side of the stopbank; see Figure 1.]*

Although borehole 1 showed no evidence of any changing trend, the results gathered were the highest of all monitored bores on the landward side of the relocated stopbank. Other bores located on the landward side showed chloride concentrations at levels lower than 2,600 mg/L. Reasons for the elevated concentration in borehole 1 are unknown, however a localised permeable groundwater flow path connected to the Avon River could cause the results that were found.

The increasing trend that has been suggested in boreholes 5, 6 and 7 may well be related to the relocation of the stopbank and the increased area of land that is inundated by river water.

An increasing chloride concentration in boreholes 6 and 7 is not unexpected due to their location on the river side of the relocated stopbank. Borehole 5 is located on the landward side of the stopbank and its maximum measured concentration of 2,500 mg/L is within the range previously experienced in the general reserve area. Consequently it is not expected that any remedial measures are required to be undertaken based on the available groundwater monitoring data. However, due to the suggested increasing trend in boreholes 5, 6 and 7 it is recommended that monthly monitoring of water levels and water quality should continue for 12 months, with conductivity measurements replacing chloride analyses as the water quality indicator.

Recommendation: That the information be received.

Chairperson’s

Recommendation: That the Board support a further 12 months of monthly monitoring of boreholes 5, 6 and 7.