BEFORE A HEARINGS PANEL OF THE GREATER WELLINGTON REGIONAL COUNCIL AND MASTERTON DISTRICT COUNCIL

[GWRC Ref: WAR 090066]

In the matter of	a resource consent application to Greater Wellington Regional Council pursuant to section 88 of the Resource Management Act and its Amendments.
&	
In the matter of	a Notice of Requirement to Masterton District Council pursuant to section 168 of the Resource Management Act and its Amendments.
By	Masterton District Council
For	the proposed upgrade of the Masterton Wastewater Plant

SUPPLEMENTARY EVIDENCE OF NEAL BORRIE
ON BEHALF OF MASTERTON DISTRICT COUNCIL

RESPONSE TO OFFICERS' REPORT

Subject Area: Land Treatment System

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1. INTRODUCTION

1.1 Following the circulation of the Greater Wellington Regional Council's Section 42A Officer's report I have been engaged by Masterton District Council (MDC) to provide comments on this report. My evidence will address issues raised about the operation of the land treatment system.

2. COMMENTS ON OFFICERS' SECTION 42A REPORT

Reference: Section 12.4.3 (page 28) and Section 12.4.3(c)(iii) (page 33)

Concern:

The technical report prepared by Duffill Watts concludes that the proposed operation is a land disposal operation. Some treatment will be achieved but the proposed operation is not specifically designed to provide a high degree of land treatment. This is evident by the use of infiltration systems to allow rapid discharge to groundwater.

It has already been noted that the proposed operation should be considered as a land disposal as opposed to a land treatment. This is contrary to the AEE which indicates a desire to optimise land treatment.

Response:

2.1 In land treatment systems the soil acts as a medium to filter, retain and remove particular constituents from the applied wastewater. The degree of renovation will depend on the interaction between the soil processes and water movement and the nutrient uptake by crops. The details of the degree of renovation that is predicted to occur to the applied wastewater is described in Dr S Green's evidence where the predicted uptake of nitrogen and phosphorus and reduction in bacteria due to land treatment are discussed.

2.2 In my opinion MDC's proposed irrigation of wastewater to land is land treatment as there will be further treatment of the applied wastewater. In addition the proposed average hydraulic loading rate of 2.02 m per year is similar to other land treatment systems in New Zealand. For example refer to Table 4 in my evidence where the hydraulic loading rates for the Leeston land treatment site have ranged from 1.76 to 2.73 m per year. (MDC's proposed wastewater irrigation is not a rapid infiltration system as some submitters have suggested.) Of course the treatment system involves a discharge to land and that will occur via the proposed irrigation system. MDC's

objective is to reduce the discharge of wastewater to the Ruamahanga River and to do that by way of a land treatment system.

Reference: Section 12.4.3(c)(i) (page 32)

Concern:

The use of clean water conductance rates (e.g. saturated hydraulic conductivity) are not appropriate for the regular and ongoing discharge of effluent, and loading rates should be limited.

Response:

2.3 As outlined in my evidence the reduction of measured clean water saturated hydraulic conductivity values has been taken account of with the proposed application rates. To allow for the slower subsoil drainage in the clay rich soils the proposed average application rates are lower (an average of zero during the winter months) and these soils will need to be managed to allow them a longer period to drain and re-aerate so that anaerobic conditions are not allowed to develop.

Concern:

The ability to manage application rates to match soil conditions will not be able to be achieved as is suggested in the AEE as application depths cannot be adjusted in an efficient border strip irrigation system.

Response:

2.4 With border strip irrigation the wastewater can move down a border strip and percolate into the soil at the localised rate, as dictated by topsoil moisture content and the underlying drainage characteristics of the soil. This process is inherently self-correcting. The border strips will be re-graded to a consistent slope which will avoid ponding.

2.5 Traditional border strip systems used for farm irrigation use open channel flow headraces to supply the borders with a group of approximately four border strips being watered together. These border strip systems do not have the ability to vary the flow down an individual border strip or to vary the discharge rate to each border. However the border strip system proposed at MDC's Homebush site, with pipelines and individual bubble-up valves (that can be individually opened or closed) to supply each border strip, will allow the discharge volume to be varied to each border strip. In addition the discharge rate to the borders can be varied either by changing the number

of borders being irrigated at the same time, or by changing the pump speed and hence flow rate using the variable speed drive on the pump's electric motor.

Concern:

The consequence of year round application on the heavier soils is that the application rate will be too high for the soils to permit drainage (as drainage is essential at the proposed loading rates using border strip). This will potentially lead to the development of anaerobic conditions which will further reduce infiltration rates.

Response:

2.6 As detailed in Table 23 in the AEE, the average application depth on the clay rich soils during the winter months (i.e. May to October) is zero with a maximum of up to 5 mm/day. For much of the winter months it is not proposed to apply any wastewater to the clay rich soils, however there will be certain periods when it will be possible to apply wastewater and this would be done at a depth of up to 5 mm/day. As discussed in my evidence it is critical that the soil has time to drain and re-aerate between irrigation applications so that anaerobic conditions are not allowed to develop in the soil. The modelling done by Dr S Green and reported in the AEE, was based on a minimum interval between applications of ten days and the amount of wastewater infiltrated was set by the capacity of the soil to accept moisture given antecedent rainfall. The proposed applications rates on both the clay rich and the free draining soils and the management of the irrigation system will ensure anaerobic soil conditions do not develop at the site.

Reference: Section 12.4.3(c)(iii) (page 33)

Concern:

The excess water is then collected in wipe-off drains. It is considered that the wipe-off drains and the designated infiltration areas will be no more than a rapid infiltration system which will effectively provide for 'disposal' with limited treatment within the soil. Given the role of the wipe-off drains 10% to 50% of the flow could pass directly to groundwater with very minimal land treatment.

Response:

2.7 It is proposed to operate the border strip wastewater irrigation system such that there is no run-off into the wipe-off drains. This will be achieved by the operator adjusting the time that wastewater is discharged onto the top of each border strip so that the wetting front just reaches the end of the border and no further. The purpose of the wipe-off drains is to collect any unintentional run-off from the border strips so that any such run-

off can be handled in a controlled manner and also to collect run-off during rainfall when there is no wastewater irrigation. The wipe-off drains will not be used to collect 10% to 50% of the applied wastewater as suggested in the officer's section 42A report.

DNH Borrie
23 February 2009