Technical Comment

To: Tayla Carson (Consents Officer)

Fax No:

From: Ewen Rodway (Environmental Scientist)

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Subject: ***Braggs Bay Landfill, Stewart Island***

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Te Taiao Tonga

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Comment:

Hi Tayla

I have reviewed the consent application to continue to discharge clean fill and green waste to the landfill site at Braggs Bay on Stewart Island. For aspects relating to marine health, particularly shellfish testing, I have relied on the opinion of Nick Ward (Team Leader – Ecosystem Response).

The assessment of the effects on the environment is adequate for most aspects given the risk of the landfill to water quality.

I agree with the conclusions made in the Land and Water Science report with regards to water quality. These are bulleted below:

- There has been a general improvement in water quality since the closure of the municipal landfill at the site. This is inclusive of the switch to clean fill and green waste deposition.
- The only groundwater sample available (from 1998) shows that the landfill has had a significant impact on groundwater quality. This may have improved but it is unknown.

Some further observations are:

- There is an increasing trend in ammoniacal nitrogen and oxidised nitrogen concentrations at the downstream site during the period after the 2009 change to clean fill and green waste deposition. The cause of this is uncertain but given there is no significant increase in total nitrogen between the upstream and downstream sites this may be due to natural ammonification and nitrification reactions.
- A peak runoff control structure could be used to control sediment loss and discharge to the marine environment.

- Groundwater quality monitoring would be useful to assess the current impact of the landfill and evaluate if groundwater quality has improved since 1998.
- The evaluation of the shellfish data is very minimal and no comparisons are made of the results to actual thresholds nor is there an attempt to assess the level of risk posed or at what point shellfish consumption will be compromised.
- There are no direct samples of the actual landfill leachate (these would likely be difficult to obtain).
- There is a lack of information on the amount/volume of waste being deposited at the site which makes it very difficult to assess of the potential and future risk of the activity.

My recommendations are:

- Surface water quality monitoring should be continued at the same frequency and for the same parameters. One sample should be collected in winter and one in summer. Given the increasing trend in ammoniacal nitrogen and oxidised nitrogen trigger values for investigation should be used. Rather than putting trigger values on these parameters specifically it would be more appropriate to apply a trigger value to the downstream total nitrogen concentration value to provide a warning if the leaching of nitrogen from the landfill were to increase. This should be set as per table 1 below.

Table 1

Parameter	Annual mean trigger level	Individual Sample trigger value
Total nitrogen	1.0 mg/L	2.0 mg/L

Therefore if the annual mean concentration of TN at the downstream site exceeds 1.0 mg/L this triggers further action and if any sample take exceeds 2.0 mg/L this triggers further action.

The action taken if these are breached should be notification of ES by the consent holder and a review of the monitoring data by council to assess possible causes of the exceedance and if further investigation is required.

- Groundwater monitoring should be reinstated. Groundwater from the bore where samples were previously collected (not in our system so details need to be collected and added to WELLS) should be tested for EC, pH, total ammoniacal N, total oxidised N, total nitrogen, E.coli, sulfate, dissolved iron, dissolved manganese, total alkalinity biannually at the same time as surface water sampling. Please get the applicant to advise on the location of this bore as soon as possible.

- Further shellfish flesh monitoring should be undertaken both at a site near the discharge of the drain at Braggs Bay and at a location representing "natural state" with no obvious or perceivable anthropogenic contamination inputs. Flesh should be analysed for heavy metals as per historic sampling. This needs only be conducted annually and reviewed after three years.

- A management plan should be developed to address the issue of potential sediment loss from the site. While it does not appear to be an issue currently it may become one if expansion were to occur. This would likely require minimisation of areas of bare soil and buffer areas of vegetation between any bare soil and the drain at all times and control of drainage water from areas those areas. A peak flow control structure downstream of the

landfill area could be considered however effort should be made to cause as little disruption of the natural form of the stream as possible so installation of a peak flow control structure should only be undertaken if necessary.

Kind regards

Ewen Rodway