Under	the Resource Management Act 1991 (**RMA**)
In the matter of	an application by **Dunedin City Council** for resource consents for the operation, closure and aftercare of the Green Island Landfill, Dunedin.

Statement of evidence of Mary Wood

4 March 2025

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Qualifications and experience

1 My name is Mary Wood.

2 I am an Associate of GHD Limited and my role within the business is a Technical Lead.

3 I have 24 years' experience as a consulting engineer, based within Auckland and Tauranga but working on projects throughout New Zealand. I have a Bachelors Degree in Engineering from Canterbury University and a Masters in Civil Engineering from the University of Auckland.

4 My experience includes stormwater assessment and design to support consenting, stormwater quality management for road and industrial sites, as well as broader infrastructure planning and analysis.

5 I have performed key roles in a number of stormwater projects including:

(a) Stormwater technical reviewer for Dunedin City Council's Resource Recovery Park – this project occupies part of the Green Island landfill site;

(b) Technical reviewer for stormwater works on the closed Waitakere Landfill;

(c) Stormwater lead for the Technical Advisory team to Waka Kotaki on the Puhoi to Warkworth Motorway;

(d) Technical advisor to Auckland Transport on proposed Unitary Plan stormwater provisions; and

(e) Lead Stormwater Engineer for Waihoehoe Road Widening, Cameron Road Stage 2, and Gate Pa/Avenues and CBD Stormwater Management Plans.

6 I have read the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2023. This evidence has been prepared in accordance with it, and I agree to comply with it. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

Scope of evidence

7 I have been asked to prepare evidence in relation to surface water effects of the proposal.

8 My assessment is based on the Stormwater Water Report submitted as part of the Assessment of Environmental Effects (AEE).

9 As per the directions set out in the Commissioner's minute[1], this evidence is focused on potential areas of contention and as such does not include wider evidence on stormwater quantity, treatment and flooding as outlined in the AEE.

10 This includes:

(a) Consideration of water quality

(b) Monitoring and proposed conditions

Executive summary

11 I have provided a brief overview of the site context and I have responded to matters raised by the surface water technical review completed by Dr Conwell and subsequent evidence of Dr Wilson, and evidence from Mr Elliott.

12 I consider that there are no outstanding items relating to the proposed approach for managing stormwater flows or treatment within the site.

13 The main areas requiring further input relate to the approach to surface water monitoring at the site and the ability to discern any potential effects of the landfill as distinct from the wider catchment issues on the receiving environment.

14 While the current monitoring data has not identified any discernible impact from the landfill on the receiving environment, I agree with the reviewers that some additional monitoring is undertaken for surface water discharges from the site, compared to that proposed at lodgement. I am supportive of a targeted suite of parameters.

15 The landfill management approach is well designed and implemented and closure will further reduce the risk of water quality impacts associated with stormwater runoff. The risk of impacts to surface water quality from groundwater discharge is considered to be low and is supported by the monitoring data collected over a long period of time. However, I agree that some additional monitoring may enable any direct adverse effects from the landfill to be appropriately identified and managed. I support the proposed updates to the monitoring and management discussed by Ms Mains, and my recommendations for additional monitoring are consistent with her recommendations.

[1] RM23.185 Directions of the Commissioner, Minute 1. 21 January 2025.

16 I have recommended changes to the monitoring proposed for sedimentation ponds and the trigger values used. I consider that these changes will enable efficient use of the data to assess risks from site discharges.

Current Site Description

17 The overall Green Island Landfill site is bounded by the Kaikorai Stream to the north and west, and the wastewater treatment plant to the south. The existing waste minimisation and transfer facilities (and the site of the future Resource Recovery Park (RRP)) occupies part of the site. Refer to Figure 1 on the following page.

18 The landfill is located in the Kaikorai Estuary. The estuary sits at the downstream end of the Kaikorai Stream catchment, which extends approximately 49km^2 from the Brighton Road Bridge (upstream of the northeastern boundary with the overall site).

19 From a stormwater perspective, key site features are shown in Figure 1 and include:

(a) Eastern Sediment Pond and Eastern Constructed Wetland;

(b) South Eastern Sedimentation Pond and Constructed Wetland;

(c) Western Sedimentation Pond;

(d) Northern Leachate/Sediment Pond; and

(e) Northern access road and perimeter swale drain.

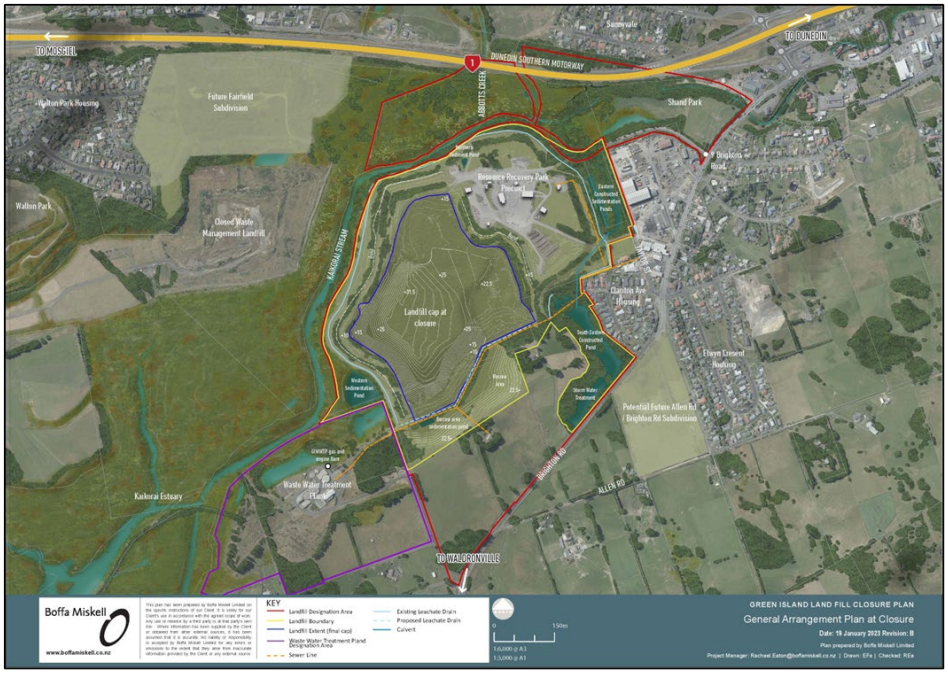

Figure 1 Overview

Receiving Environment

20 The Kaikorai Stream flows from the Chain Hills upstream of the landfill to the northeast, through Green Island and discharges into the Kaikorai Estuary in the general vicinity of the landfill, downstream of the confluence of Abbots Creek and Kaikorai Stream.

21 Ultimately, surface water from the Green Island Landfill site drains into the Kaikorai Stream and Kaikorai Estuary.

22 The Kaikorai Estuary catchment includes the Green Island Landfill but also the Green Island industrial land and wider catchment activities. The historical and existing land use within the catchment is impacting water quality.

Proposed Stormwater Management Overview

23 At a high level, the risk to surface water quality from the site is expected to reduce from the current situation, as waste handling activities and the associated risk of contamination of stormwater runoff with waste material is reduced and eventually stopped.

24 The landfill capping will include a low permeability soil layer overlaid with topsoil and revegetation. The resulting runoff characteristics from the site will be consistent with those of a more pervious site.

25 The low permeability layer placed for capping of the landfill will reduce infiltration into the placed waste material. This is expected to reduce leachate volumes reporting to the leachate interception trench over time (and is discussed further in Ms Mains' evidence).

26 During the operational life of the site, where there is the potential for stormwater to be contaminated with waste material then this stormwater is intentionally directed to the leachate system so that it can be captured and treated at the Green Island wastewater treatment plant.

27 The potential risk of stormwater contaminated with waste material is expected to reduce over time as the landfill progresses to closure. Once the landfill is capped, all runoff will be directed to the stormwater system (ie ponds and wetlands) prior to discharge.

28 Following closure, runoff will continue to drain to sedimentation ponds and constructed wetlands to provide retention and settling prior to discharge to the Kaikorai Stream.

Matters raised by ORC technical review

29 I have reviewed the ORC Section 42 report (prepared by Ms Shay McDonald) and associated technical reviews. In particular, I have reviewed the matters raised in the

(a) Landfill Design and Management Technical Review Memorandums prepared by Mr Elliott;

(b) Surface Water Quality Technical Memorandums prepared by Dr Conwell.

(c) Evidence prepared by Dr Wilson in regard to stormwater quality discharging to the Kaikorai Stream.

30 Mr Elliott identified inconsistencies between the stormwater report as submitted with the AEE and the LDMP in terms of how runoff from the intermediate cap is managed. I consider that inconsistencies between the two documents can be addressed as part of the updates required under the submitted conditions 4, 12 and 15.

31 It has been proposed by Mr Elliott that the runoff from the intermediate cap is to be directed to the leachate system. I agree that this should occur *if* the runoff is at risk from contamination from waste material. If the risk of contamination is only from sediment from the intermediate cap, however, then runoff this should be able to be directed to the sedimentation ponds

for treatment. I do not agree with a requirement for runoff from the intermediate cap to always be directed to the leachate system.

32 With regard to the works for the eastern culvert noted in Mr Elliot's evidence, remedial works proposed for the leachate seepage from the eastern culvert are planned to commence before June 30 2025. There have been delays due to a lack of response from a potential direct-appoint contractor – DCC are now reaching out to Tier 1 contractors to undertake the work with an aim of works starting (and possibly completed) by June 2025.

33 Mr Elliot's evidence also questions the functionality of the Northern Leachate Pond in large rainfall events. It is important to note that the Northern Leachate Pond receives runoff that may have been contaminated with waste material on site. This flow is conservatively directed to the leachate system but is not actually leachate. The highest concentration of contaminants in this potentially waste contaminated runoff would be typically contained within in the first flush of a rainfall event and this would discharge into the leachate system.

34 In larger events, flow will continue to be directed to the leachate system from the Northern Leachate Pond but as runoff increases then the pond water level will rise and eventually overtopping would occur. In these larger events then remaining concentrations of any contaminants entrained with the runoff are expected to be very low and would likely coincide with increased flows in the receiving environment. I do not consider that there is a benefit in additional assessment in relation to the potential frequency of overflows and associated impacts on the receiving environment.

35 Mr Elliott recommends additional monitoring of the Northern Leachate Pond for the purpose of characterisation of the runoff. I do not believe there is benefit in sampling of the Northern Water Leachate Pond while it is connected to the leachate system. Post closure, runoff directed to this pond will not be at risk of contact with waste material and will be representative of more typical stormwater runoff. Monitoring from this time onwards (functioning as the Northern Sedimentation Pond) should occur in conjunction with monitoring of the other ponds on the site. I have proposed amendments to the proposed conditions of consent to reflect this.

36 Mr Elliott also suggests that the water level in the leachate pond be managed to reduce the likelihood of overflow in large events. The pond water level is managed with a floating decant system, connected to the leachate system. Between events, the pond will continue to drain down to a low level and pond capacity will be restored. This is considered to be an

effective method of managing water level within the pond and I do not believe further active management needs to be specified in the conditions of consent.

37 Dr Conwell has recommended that sampling is retained at quarterly intervals and that copper and zinc is added to the sampling suite. At a catchment level, copper and zinc can be associated with vehicle movements and can enter stormwater runoff during rainfall events. This is commonly addressed through treatment of sediments using measures such as ponds and wetlands (as is the case on this site). While surface water runoff from the site is treated through ponds prior to discharge, and the current monitoring data has not identified any discernible impact from the landfill on the receiving environment, I agree that some additional monitoring of copper and zinc in surface water discharges from sedimentation ponds could enable any direct adverse effects from the landfill to be appropriately identified and managed.

38 Dr Wilson has proposed additional surface water sampling (highlighted in Table 1 of his evidence) in regard to metals (zinc and copper), total suspended solids (TSS) and *E. coli*/enterococci. I have discussed metals in my response above and consider that this, along with TSS sampling could be beneficial. I do not support the addition of *E. coli*/enterococci to the sampling from the surface water bodies on site – these can be impacted by birds and animal activities in and around the ponds and would not be conclusive in assessing the performance of the stormwater system.

39 I support the proposed adaptive monitoring approach proposed by Ms Mains: to avoid unnecessary monitoring or costly actions that do not achieve a meaningful outcome for the wider environment. In this context, I have some concerns with the tabulated list of contaminants and trigger levels identified in the proposed conditions (Table A1). In particular, the table includes:

(a) Parameters that would not typically be considered to be contaminants (for example, calcium, bicarbonate, sodium, sulphate) – therefore there is no need for triggers

(b) Parameters that will be difficult to differentiate from background / non-landfill related activities (chloride, *E.coli*/Enterococci)

(c) Parameters where trigger values are likely to be exceeded upstream the site (TSS, *E.coli*/Enterococci) and copper.

40 I recommend that Table A1 could be removed from the draft conditions of consent and instead be captured in the monitoring required in the Landfill

Development Management Plan and Landfill Closure Plan. This plan requires approval by ORC and will provide a mechanism for the monitoring to be tailored to the receiving environment and the changing operating conditions of the landfill over the next 30 years.

41 There could also be benefits though this process in separating surface water monitoring requirements (for the sedimentation ponds) from the groundwater monitoring to provide for more tailored monitoring on the site.

Submissions

42 Te Rūnanga o Ōtākou submission highlights the importance of the stream and estuary to mana whenua. While they do not support or oppose the application they have requested (and I have paraphrased) investigation to assess the potential migration of leachate, the cumulative impacts that this might have on the stream and estuary, and development of measures to mitigate the impact from leachate on this environment.

43 In my opinion, an improved monitoring programme will support the outcomes requested in Te Rūnanga o Ōtākou's submission.

Conditions of consent

44 I have reviewed the proposed Conditions of Consent. I support future sampling at the Northern Sediment Pond but, as described above, I do not support the need for sampling at the Northern Leachate Pond as proposed in Table 1 in the proposed conditions.

45 I consider Table 1 has a broad suite of parameters that will offer limited benefit in assessing the potential risk of contamination associated with the landfill and there are some parameters that will be more relevant to stormwater rather than groundwater (and vice versa). I would recommend that sampling for sedimentation ponds and groundwater/receiving environment are tabulated separately and that sampling proposed is focused more on contaminants of concern to the receiving environment, rather than the broad suite currently proposed (as noted in item 39 above).

46 For sampling at the sedimentation ponds, I recommend that this be targeted at possible higher risk indicators such as PFOA/PFOS and VOC/Semi VOC that would not typically be associated with stormwater runoff as well as TSS, copper and zinc.

47 In terms of trigger values, I have proposed a change to the development of trigger levels. This change includes the use of previous sampling results to establish trigger levels (based on three standard deviations from mean) to

better align with a cumulative assessment of site discharges. While surface water quality can be more variable than groundwater, this allows for alignment in the analysis and provides long-term context for monitoring results. We have proposed using the previous 5-years dataset for this assessment.

Conclusions

48 Overall, the main area of contention relates to the scale, frequency and nature of monitoring to assess the risk from contaminants reaching surface water bodies.

Further sampling is supported to better define this risk, where this is targeted and can be clearly linked to outcomes in the adaptive management plan for the site.

Mary Wood

4 March 2025