Under	the Resource Management Act 1991 (**RMA**)
In the matter of	an application by **Dunedin City Council** to develop a Resource Recovery Park Precinct at Green Island, Dunedin.

Statement of evidence of Mary Wood

6 November 2024

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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 the country. 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 been involved in a number of stormwater projects including:

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

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

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

(d) 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 effects of the resource recovery park precinct (RRPP) on stormwater. This includes:

(a) Description of the current site features from a stormwater perspective;

(b) Overview of the proposed stormwater management approach;

(c) Stormwater quantity;

(d) Stormwater quality; and

(e) Conclusion

Executive summary

8 The site currently discharges flow to the Kaikorai Stream, through the Eastern Sedimentation Pond and Eastern Constructed Wetland as well as from culverts that pass underneath the perimeter road.

9 The landfill and the site is largely surrounded by a leachate collection trench and pump stations that collect and pump leachate to the wastewater treatment plant. The northern leachate pond is currently connected to the leachate system.

10 With development of the resource recovery park precinct, there is the potential for stormwater to become contaminated and runoff rates to increase.

11 Where areas of high risk for stormwater contamination cannot be undertaken in buildings then runoff is directed to the leachate trench pump stations. Additional buffer storage will be provided for the organics maturation area, and can be emptied by tanker if pump station capacity isn't available. There will also be a reduction in leachate generation beneath the site within the historical landfill due to increased site coverage of hardstand areas and an associated reduced rainfall infiltration.

12 Stormwater runoff from remaining areas will be treated using sedimentation ponds. Once it is no longer receiving waste-impacted runoff, the northern leachate pond will be reconfigured to receive stormwater and drain towards swales adjacent to the perimeter road.

13 I consider that the quality of the discharge to the Kaikorai Stream from operation of the RRPP will broadly be the same (or slightly better) from the current site.

14 Peak flows will be managed through directing flows to sedimentation ponds. The flood levels in Kaikorai Stream will remain unchanged.

15 Sediment generated by construction will need to be managed on site. This will be best addressed through the development and implementation of an Erosion and Sediment Control Plan, with the appointed Contractor and approved by Otago Regional Council.

Current Site Description

16 The RRPP site is generally bound by the Kaikorai Stream to the north, the operational landfill to the west, Brighton Road to the south, and the Clariton Ave residential area and Brighton Road industrial area to the east.

17 East of the site is the existing Eastern Sedimentation Pond (ESP) and Eastern Constructed Wetland. Flow from the wetland discharges into the Kaikorai Stream.

18 The existing Northern Leachate Pond (NLP) is located within the site to the north. This is not connected to the stormwater system.

19 There are existing swale drains that run alongside the perimeter road and these discharge into culverts underneath the road. Flows from these culverts discharge to the north and eventually discharge into the Kaikorai Stream.

Current Interface with the Leachate System

20 At present, the landfill and resource recovery area are almost completely encircled by a leachate collection system including a trench that creates a hydraulic barrier which collects and impedes groundwater and leachate migration offsite.

21 The trench is continuously dewatered with a series of pump stations, which pump through a rising main to direct flow to the Green Island Wastewater Treatment Plant (GIWWTP).

22 The NLP is located in the northwest corner of the site and is currently acting as a leachate pond as it receives a small amount of runoff from open swales either side of the main landfill haul road. Whilst the majority of this catchment is now capped and grassed, there is a remaining risk that contamination can occur from the main landfill haul road.

23 Water from the NLP passes through the T-bar decant system (which floats and enables allows water to be taken near the water surface and away from settled material at the base of the pond) and is discharged directly to Pump Station (PS) 5 associated with the leachate collection trench system and to the GIWWTP.

24 In prolonged high rainfall events, water from this pond will eventually overflow to the perimeter swales and discharge to the Kaikorai Stream.

Proposed Stormwater Management Overview

25 The proposed development will result in new buildings / impervious coverage and site activities associated with the new facilities.

26 The main catchments identified are:

(a) Catchment A discharging to the north;

(b) Catchment B discharging east to the western end of the ESP; and

(c) Catchment C discharging to the south-east and ties into the eastern end of the ESP.

27 Refer to **Figure 1** appended to this document for an overview of catchments within the proposed development.

28 There is a risk of contamination of stormwater where site materials and handling activities can interact with rainfall.

29 Where practicable, areas within the RRPP where higher risk materials are placed or handled will be isolated from rainfall (ie, undertaken in buildings) to avoid contamination of runoff. For areas with higher risk materials are placed or handled (for example, compost and maturation areas) and that cannot be isolated from rainfall, then runoff is directed to the leachate system.

30 Runoff from remaining areas of the proposed development with a lower risk of contamination are directed to the stormwater system and into a sedimentation pond for treatment.

31 While pervious areas will be maintained as much as practicable, the percentage of impervious coverage of the RRPP area will increase due to hardstand areas under the organics bunkers and maturation pads. This will result in an increase in stormwater runoff.

32 To manage increased flow rates, runoff will be directed to existing sedimentation ponds. Sedimentation ponds include the ESP and the NLP.

33 These ponds will be used to provide attenuation of flows.

Proposed interface with the Leachate system

34 In the short-term, the NLP continues to receive runoff from open swales from the access road as well as possibly sediment laden waters from the areas of grassed cap. This will be directed to PS 5 as described earlier. The capacity of PS5 is considered to be sufficient for this additional flow.

35 In the long-term, the NLP will no longer receive waste impacted runoff. Areas draining to it will either no longer be generating leachate or have surfaces where no waste or waste vehicles are present.

36 Once the NLP is only receiving stormwater, the pond will be cleaned, the liner retained, and the pond repurposed for stormwater management. Refer to **Figure 2** appended to this document.

37 Runoff from the OPF bunkers and maturation area and potential extension areas will be managed as leachate and is proposed to be directed to the sump of PS 6 of the existing leachate collection trench.

38 During high rain fall events, there is the potential for the sump at PS6 to be unable to manage the combined flow from the existing trench and OPF bunkers/maturation area and leachate could backflow into the existing trench pipe and gravel around the sump. To manage this risk, leachate flows will be pumped to three 30,000L tanks. Flow from these tanks can drain to PS6 when capacity is available in the sump or be retained for removal using tankers to the GIWWTP.

39 Overall, the RRPP development is expected to result in less leachate generation through reducing infiltration through the underlying waste. This is due to:

(a) Increase in hardstand and building areas resulting in less rainfall infiltration through the ground surface into the waste material.

(b) Relocation of the existing green waste processing area to the covered organics receivals building (ORB) and hardstand maturation bunkers/maturation area.

40 While less leachate will be generated by infiltration of stormwater through the underlying waste, runoff from some areas will be managed as leachate and directed to one of existing PS5, PS6 or PS7 for treatment as follows:

(a) Truck wash and glass bunkers stockpile area - to leachate pump station PS5;

(b) Haul road - to leachate PS5 via NLP until waste disposal at the landfill ceases – then, once all sources of leachate are removed, the haul road will be directed to the stormwater system;

(c) OPF bunkers and maturation - to leachate PS6; and

(d) construction +demolition slab - to leachate PS7.

41 In addition to the above stormwater derived leachate, small quantities of leachate will also be generated within the Materials Recovery Facility (MRF) and Bulk Waste Transfer Station (BWTS) buildings and piped directly to PS7. The capacity of PS7 is considered to be sufficient for this additional flow.

Proposed stormwater quality management

42 There is the potential for stormwater discharges to become contaminated with more 'typical' contaminant sources such as sediments, hydrocarbons and heavy metals associated with vehicles moving around the RRPP area.

43 Contaminant loadings in rainfall runoff from entrance, accessway and carparking areas are expected to be typical of those associated with relatively low volume roads.

44 Metals and hydrocarbons associated with vehicles are predominantly bound to sediments. Swales and ponds are accepted methods for settling sediments.

45 Pre-treatment will be provided via:

(a) Enviro-pods (fine filter bags) will be installed in proposed catchpit sumps at the paved areas of all catchments;

(b) Shallow coarse sediment forebay for the transport compound and ORB areas with 45 truck parking bays; and

(c) A vegetated swale to provide pre-treatment for some areas on the Catchment C.

46 Catchment B flows will be diverted into the ESP rather than directly into the Constructed Eastern Wetland to provide an additional opportunity for settlement of sediment.

47 Flow from the ESP (catchment B and C) will discharge into the Constructed Eastern Wetland before discharging to the Kaikorai Stream.

48 Stormwater runoff from the remaining areas of Catchment A will be intercepted and discharged to the NLP. Short and long-term discharges from the NLP will be managed as described earlier.

49 The above outlines stormwater management during operation of the RRPP. There may be short-term sediment generated as part of construction activities associated with the RRPP. We note the peer reviewer comments in regard to the Construction Environmental Management Plan (CEMP)

submitted with the RRPP application. Erosion and sediment control measures will be developed in conjunction with the appointed Contractor as part of a final CEMP and submitted to ORC for approval, prior to works proceeding. For works of this nature, Contractor involvement on the Erosion and Sediment Control Plan (ESCP) methodology will be critical to develop effective measures that can be implemented and aligned with the construction methodology and sequencing of activities on site. In my opinion, providing this detail later for approval, as a required condition of consent before works can progress, is a pragmatic approach and appropriate for this site.

Proposed stormwater quantity management

50 With site development, there is an anticipated increase in runoff because of increased paved/hard surfaced areas. This is being managed through:

(a) Maintaining pervious/permeable surfaces where appropriate;

(b) In the longer term, providing a low flow outlet in the NLP (once it is no longer receiving leachate) to allow the pond to drain down between events; and

(c) Routing of flow (Catchment B and C) to the existing ESP and utilising the volume in that pond to provide flow attenuation.

51 The proposed works will maintain the existing overall secondary flowpaths:

(a) For Catchment A in extreme events (i.e., in a 50-year event or more), overland flow will continue to occur to the north to the Kaikorai Stream. This is unchanged from the current situation; and

(b) Catchment B and C secondary flow will continue to discharge to the ESP and will overflow to the associated Constructed Eastern Wetland prior to discharging into the Kaikorai Stream.

52 Post-development runoff increases are expected to be greatest in discharges from Catchment B and C. The capacity of the ESP is large however, and can accommodate these additional flows.

Conclusion

53 Due to the nature of materials being handled in the RRRP there is a potential for contamination of runoff to occur. The proposed management of stormwater quality is achieved through undertaking higher risk activities within buildings where practicable to avoid contamination with runoff.

54 Where this is not possible then runoff from higher risk materials/activities will be directed to leachate pump stations ansd pumped to the GIWWTP for treatment. PS 5 and PS7 are expected to have capacity for the runoff. Additional buffer storage will be used to manage flows PS6 during high flow events. This will be used to avoid the PS sump from backflowing into the leachate collection trench and beyond.

55 Runoff from remaining areas will be relatively low risk and would have contaminants more commonly expected with vehicle usage from a low volume road. Stormwater runoff from these areas will be managed with pretreatment using enviropods and swales and then sediment ponds.

56 Overall, given the proposed stormwater management approach, the quality of the runoff from the operation of the developed RRRP site is anticipated to be of a similar or better quality than the current situation and may be improved.

57 Development of a final ESCP and CEMP with the appointed Contractor and approval by ORC will be required to enable site-specific erosion and sediment control measures to be planned and implemented during construction phase activities.

58 While the development of the RRPP will result in additional runoff being generated, sediment retention ponds will be used to manage peak flows from the site. Flood levels within the Kaikorai Stream will not be impacted by the proposed RRPP development.

59 Based on the above approach, my assessment is that the effects on the receiving environment from surface water runoff will be less than minor.

Mary Wood

6 November 2024

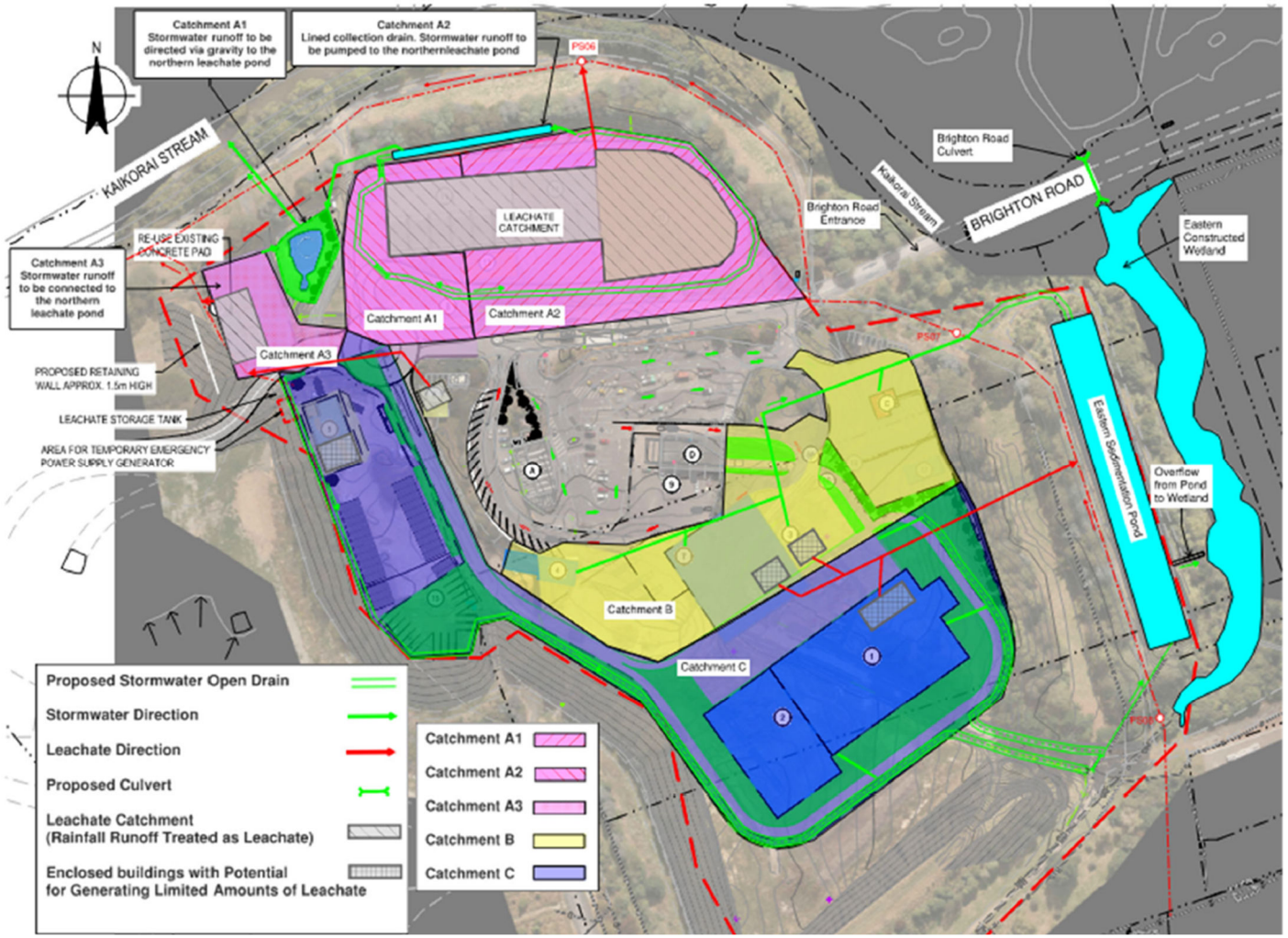

Figure 1 - Overview of key stormwater and leachate system components

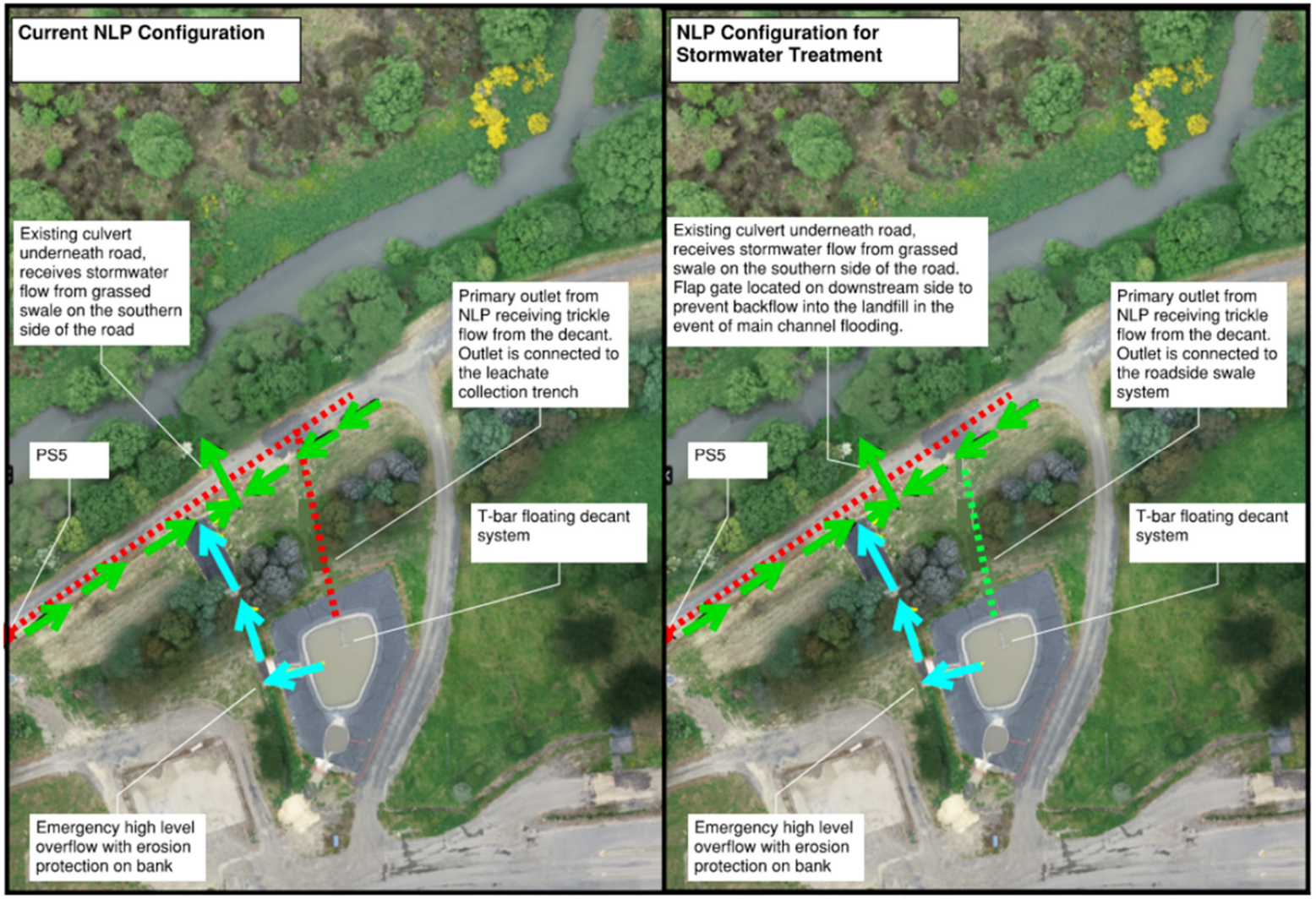

Figure 2 – NLP reconfiguration