CONDITIONS 3 AND 11 OF DISCHARGE PERMIT 6010

Preliminary Comments

- The following conditions have been prepared by the following planning and water quality experts:

Name	For	Expertise	Abbreviation
Andrew Bashford	Horizons	Planning	AB
Logan Brown	Horizons	Water Quality	LB
Greg Carlyon	Various Submitters	Planning	GC
Kate McArthur	Various Submitters	Water Quality	KA
Hywel Edwards	Horowhenua District Council	Planning	HE
Dr. Olivier Ausseil	Horowhenua District Council	Water Quality	OA
Stephen Douglass	Horowhenua District Council	Groundwater	SD

- The conditions have been developed on the basis that the Tatana Drain is deemed to be an artificial watercourse and that monitoring of the drain is for background information purposes only. If deemed to be a modified watercourse, then the monitoring site for the Tatana Drain needs to be included in a more intensive monitoring regime as indicated in various comments below. It is not intended that this approach to developing these conditions detracts from the differing points of view expressed in written evidence and at the hearing as to the status of the Tatana Drain. Specifically, it is recognised that Dr Ausseil considers the Tatana Drain to be an artificial watercourse and that Mr Brown considers the Tatana Drain to be a modified watercourse.

- The conditions also assume that leachate is currently entering the Hokio Stream via groundwater.

- The base document from which the changes have been tracked is the current 'operative' wording from Discharge Permit 6010.

- Proposed wording is in the column on the left and disagreements and any alternative wording is expressed in the comments column on the right. If there are no comments it is agreed between the experts.

CONDITION 3

<table>
<tr><th>Proposed Condition Wording</th><th>Comments and Alternative Wording</th></tr>
<tr><td>
3. The Permit Holder shall commence the following monitoring programme:

Table A: Landfill Groundwater Monitoring Locations, Parameters, and Frequency – Deep Aquifer Wells

<table>
<tr><th>Location</th><th>Parameters and frequency</th></tr>
<tr><td>C2dd, E1d, E2d and any other future deep monitoring well unless installed for background monitoring purposes.</td><td>Quarterly comprehensive for 2 years.
Subsequently, conditional
Annual comprehensive
Quarterly indicator.</td></tr>
<tr><td>G1d, Xd1 and any other future deep monitoring well installed for background monitoring purposes.</td><td>Quarterly comprehensive for 1 year
Subsequently
Annual comprehensive
Quarterly indicator</td></tr>
<tr><td>All monitoring wells. ~~where indicator parameters show leachate influence over 3 consecutive sampling rounds.~~</td><td>Annual pesticide / semi VOC</td></tr>
</table>
Table B: Summary of Landfill Groundwater Monitoring Locations, Parameters, and Frequency – Shallow Aquifer Wells
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</table>

Location	Parameters and frequency
C1, C2, C2ds, D4 B1, B2, B3s, E1s, E2s and any other shallow **Compliance** monitoring well installed in the future.	Six monthly comprehensive for 2 years Quarterly indicator *Subsequently, conditional* Annual comprehensive Quarterly indicator
D5, F1, F2, F3 and any other shallow monitoring well installed to monitor **leachate irrigation areas** in the future.	Six monthly comprehensive for 2 years Quarterly indicator *Conditional* Annual comprehensive Quarterly indicator
G1s and any other shallow **Background** monitoring well installed in the future.	Quarterly comprehensive for 1 year *Subsequently, conditional* Quarterly indicator
D1, D2, D3r, D6, Xs1, Xs2 and any other **Early Detection** wells installed in the future.	Quarterly comprehensive for 2 years *Subsequently, conditional* Annual comprehensive Quarterly indicator
All monitoring wells. ~~where indicator parameters show leachate influence over 3 consecutive sampling rounds.~~	Annual pesticide/ semi VOC

Groundwater levels are to be measured and recorded during each sampling procedure.

Conditions: A reduction in sampling frequency at any groundwater monitoring point is conditional on: A. Completion of the initial monitoring program; B. Good consistency of groundwater sample analysis results, or a clearly identified reason for inconsistent results that excludes the contaminant source being landfill operations, stored waste or leachate; C. No decline in groundwater quality as determined from indicator parameter trends over a period of four consecutive sampling rounds; D. If a well being monitored on a conditional frequency becomes non-compliant with condition C, the monitoring frequency for that well should return to the initial monitoring frequency until conditions B and C are again being fulfilled. Sampling frequency for the shallow monitoring wells installed to monitor proposed leachate irrigation areas as defined in Table B may begin on the conditional basis, however the frequency is to revert to the unconditional frequency if leachate irrigation begins and continues from that date as if the monitoring well had been newly installed. If site management planning indicates any early detection monitoring well is likely to become buried or otherwise destroyed within the following year as a result of normal operations: E. This must be communicated to the regional council as soon as practicable;	

F. A replacement well is to be constructed in a position agreed upon with the Environmental Protection Manager at Horizons Regional Council;

G. The replacement well should be installed in a position suitable to act as an early detection well and be classed as an early detection well; and

H. The replacement well should be constructed as a nested well (or two separate wells) with screens positioned in both shallow and deep aquifers.

Table C: Other Water Monitoring Locations, Frequencies and Parameters

Location	Parameters and frequency
HS1	Monthly comprehensive for comparison purposes with HS1A. Monitoring to be discontinued after 2 years
~~HS1~~HS1A, HS2, HS3	~~Quarterly~~ Monthly comprehensive for 2 years *Subsequently, conditional* Six monthly comprehensive Quarterly indicator
TD1	Quarterly Indicator
Leachate Pond Outlet	Quarterly comprehensive for 2 years Six monthly pesticide / semi VOC *Subsequently, conditional* Six monthly comprehensive Quarterly indicator Annual pesticide / semi VOC

Conditions: A reduction in sampling frequency ~~at~~ for the Hokio Stream monitoring

AB - Should the Tatana Drain be considered a modified watercourse it should be subject to the same "subsequent" monitoring as the Hokio Stream, i.e. six monthly comprehensive and quarterly indicator monitoring.

OA and HE - note the conditions as drafted would not be able to be applied to Tatana Drain as they rely on upstream and downstream monitoring and only one monitoring site is proposed

locations (HS1A, HS2 and HS3) is conditional on:

I. No significant increases in the concentrations between monitoring sites HS1A and HS3, for parameters exceeding the Trigger values contained in Table C1 at Site HS3;~~Completion of the initial two year monitoring program;~~

J. To determine whether there is a significant increase in contaminant levels the consent holder shall engage a suitably qualified freshwater scientist to assess the 24 month water quality monitoring results obtained for the Hokio Stream against the trigger values specified in Table C1, after 24 months of monthly data collection. Should any of the trigger values be exceeded at the downstream monitoring site (HS3 as per Fig. X) the consent holder shall propose a statistical analysis approach to the Regional Council for certification. The analysis shall be run, for the parameter(s) exceeding the relevant trigger value, on the last 24 consecutive samples to determine if there are any significant increases in concentrations between upstream and downstream. This analysis shall be provided to the Regional Council within 3 months following the completion of the 24 month monitoring period~~Good consistency of water sample analysis results, or a clearly identified reason for inconsistent results that excludes the contaminant source being landfill operations, stored waste or leachate~~;

Table C1: Trigger Values

Parameter	**Measure**	**Value**
Total ammoniacal nitrogen	Maximum (g/m^3)	2.1
Total ammoniacal nitrogen	Average (g/m^3)	0.400
$ScBOD_5$	Monthly average (g/m^3)	2

Aluminium	Dissolved, median concentration (g/m^3)	0.055
Arsenic	Dissolved, median concentration (g/m^3)	0.024
Cadmium	Dissolved, median concentration (g/m^3)	0.0002
Chromium (Total)	Dissolved, median concentration (g/m^3)	
Copper	Dissolved, median concentration (g/m^3)	0.0014
Lead	Dissolved, median concentration (g/m^3)	0.0034
Nickel	Dissolved, median concentration (g/m^3)	0.011
Zinc	Dissolved, median concentration (g/m^3)	0.008
Mercury	Dissolved, median concentration (g/m^3)	0.0006

K. Following the initial 24 month monitoring period, there shall be no significant increases in concentrations between monitoring sites HS1A and HS3 for parameters exceeding the Trigger values contained in Table C1 at Site HS3. The consent holder shall use a statistical approach certified by the Regional Council to determine whether there has been a significant increase in concentrations, based on samples collected over the previous 36 month period~~No decline in water quality between monitoring sites HS1 and HS3 as determined from indicator parameter trends over a period of four consecutive sampling rounds~~.

L. If the Hokio Stream monitoring locations are being sampled on a conditional frequency and do not meet ~~become non-compliant with~~ condition K, the monitoring frequency for all three monitoring locations (HS1A, HS2 and HS3) should return to the base case intensive monitoring until conditions J and K are again being fulfilled.

Conditions: A reduction in sampling frequency at the leachate pond outlet is conditional on:

M. Completion of the initial 2 year monitoring program;

N. Good consistency of water sample analysis results, or a clearly identified reason for inconsistent results;

O. No decline in water quality over a period of four consecutive sampling rounds.

P. If the leachate pond outlet is being sampled on a conditional frequency and becomes non-compliant with condition O, the monitoring frequency should return to the base case intensive monitoring until conditions N and O are again being fulfilled.

If existing analysis records indicate that the water quality at a monitoring location complies with the requirements permitting a shift to a conditional sampling schedule, this may be done immediately. If the site complies, sampling for these parameters can be instigated following the base schedule while sampling for the other parameters can be continued based on the conditional schedule.

Locations: (Unless otherwise stated, locations are described on Figure 4, attached to and forming part of this consent).

Table D: Monitoring Point Locations

Monitoring group	Monitoring point	Location
Shallow groundwater	B1	
	B2	
	B3s	

	C1	
	C2	
	C2ds	
	D1	
	D2	
	D3r	
	D4	
	D5	Lined landfill area groundwater bore
	D6	Lined landfill area groundwater bore
	E1s	
	E2s	
	F1	Groundwater bore downflow from irrigation area
	F2	Groundwater bore downflow from irrigation area
	F3	Groundwater bore downflow from irrigation area
	G1s	South Eastern boundary of the site (proposed location)
	Xs1	Adjacent to Hokio Stream, opposite the landfill access road
	Xs2	Adjacent to the Hokio Stream, near the HS2 monitoring site
Deep groundwater	C2dd	
	E1d	
	E2d	

	G1d	South Eastern boundary of the site (proposed location)
	Xd1	
Hokio Stream	HS1A	Hokio Stream – upstream site up-gradient of landfill groundwater plume (Refer Fig. X)
~~Stream~~	HS1	Hokio Stream – opposite landfill access road (refer Fig. X)~~upstream of landfill (Refer Fig. 2)~~
	HS2	Hokio Stream – alongside landfill (Refer Fig. ~~2~~X)
	HS3	Hokio Stream at or about 50 metres downstream of landfill property boundary(Refer Fig. ~~2~~X)
Tatana Drain	TD1	Southwestern corner of Tatana Drain
Soils	Refer Condition 5	In land disposal area
Leachate		Pond outlet

Parameters: The comprehensive and indicator parameter lists referenced in Tables A, B and C are presented in Tables E and F.

Table E: Comprehensive Analysis List

Type	Parameters
Characterising	pH, electrical conductivity (EC), alkalinity,

	total hardness, suspended solids
Oxygen demand	COD, ~~BOD~~ scBOD$_5$
Nutrients*	NO3-N, NH4-N, DRP, SO_4
Metals*	Al, As, Cd, Cr, Cu, Fe, Mg, Mn, Ni, Pb, Zn, Hg
Other elements	B, Ca, Cl, K, Na
Organics	Total organic carbon, total phenols, volatile acids
Biological	~~Faecal coliforms~~E. coli

* Analyses performed for nutrients and metals are for dissolved rather than total concentrations.

Table F: Indicator Analysis List

Type	**Parameters**
Characterising	pH, EC
Oxygen demand	COD, scBOD$_5$
*Nutrients	NO3-N, NH4-N
*Metals	Al, Mn, Ni, Pb, Hg
Other elements	B, Cl

* Analyses performed for nutrients and metals are for dissolved rather than total concentrations.

Schedule: The sampling regime defined in Tables A to C shall be undertaken based on the following schedule:

Q. The first samples for all parameters shall be taken in July 2010.

R.	Quarterly monitoring referred to in Tables A and B shall be carried out in January, April, July and October.	
S.	Six monthly monitoring referred to in Tables A and B shall be carried out in April and October.	
T.	Annual monitoring referred to in Table A shall be carried out in April.	

CONDITION 11

		Proposed Condition Wording	Comments and Alternative Wording
11.	(a)	Should any shallow aquifer groundwater ~~and surface water~~ parameters tested for under Condition 3 of this consent exceed the Australian and New Zealand Environment and Conservation Council Water Quality Guidelines (2000) for Livestock Watering, the Permit Holder shall report to the Regional Council as soon as practicable on the significance of the result and, where the change can be attributed to landfill leachate, consult with the Regional Council to determine if further investigation or remedial measures are required.	
	(b)	In the event that the statistical analysis completed under Condition 3J shows a significant increase between upstream and downstream results in the Hokio Stream for any parameter exceeding the trigger exceeding the Trigger values contained in Table C1 at Site HS3 (except for $ScBOD_5$), an investigation into the risk of toxic effects due to the parameter(s) exceeding the water quality targets or trigger values at the HS3 monitoring site shall be undertaken. This investigation shall be consistent with the ANZECC	AB – Condition 11(b) and 11(c)(i) - I consider that the exception for $ScBOD_5$ and the word "toxic" should be removed from this condition. It should focus on all of the parameters in Table C1 including those parameters that might not produce toxicity type effects.

	guidelines framework and should consider, but not be limited to, water chemistry aspects (such as pH, water hardness, dissolved versus total concentrations etc.), and biological aspects. The Permit Holder shall report to the Regional Council, within 3 months of the date the report under condition 3J was submitted to the Regional Council, on the significance of the result and, where the change can be attributed to landfill leachate, determine what measures are required to remedy the significant increase~~Should any surface water parameters tested for under Condition 3 of this consent indicate a decline in water quality between monitoring points HS1 and HS3, as referred to in Table E, the Permit Holder shall report to the Regional Council as soon as practicable on the significance of the result and, where the change can be attributed to landfill leachate, consult with the Regional Council to determine if further investigation or remedial measures are required~~. (c) In the event that a report is submitted to the Regional Council pursuant to Conditions 11(a) or 11(b) ~~and the Regional Council has determined~~that determines that ~~further investigation or~~ remediation measures are required, then: (i) The ~~Regional Council may require the~~ Permit Holder ~~to~~ must develop a ~~mitigation or~~ remediation plan to remediate any toxic effects attributable to the Landfill, and avoid future toxic effects. The remediation plan shall be submitted to the Regional Council for certification within 3 months of submission of the report under condition 11(b). ~~(ii) In the event that the Regional Council determines that a mitigation or remediation plan is required, the Regional Council shall advise the Permit Holder of this requirement in writing within two months of~~	OA - I think condition 11(b), and a few others would need to be significantly modified to be able to apply to the Tatana Drain. Things you would want to consider include: • There is only one proposed monitoring site on the Tatana Drain, so one will not be able to compare upstream/downstream (one could not define an upstream site in any case) • A number of the Trigger values are likely to be exceeded in Tatana Drain even in the absence of leachate, as a result of land use – how would you deal with this situation? AB – I agree with OA above in that the conditions would need to be modified to apply the proposed monitoring regime to the Tatana Drain. I am of the view that it is already known that the Tatana Drain is compromised, and if deemed to be a 'modified watercourse' then the Consent Holder ought to be moving straight on to developing a remediation plan to remedy the effects on the Drain. HE – Suggest the following condition to mitigate effects on the Tatana Drain, if required: *"In order to reduce the flow of leachate influenced groundwater to the Tatana Drain and through neighbouring land to the north of the landfill, within 12 months of the commencement date of the decision of the 2015 review of conditions, the consent holder shall design, construct, operate and maintain a cut off drain (or another suitable*

	~~receiving the Condition 11(a) or 11(b) report.~~ ~~(iii) Within six months of receipt of advice in writing from the Regional Council pursuant to Condition 11(c) (ii), the Permit Holder shall submit a mitigation or remediation plan to the Regional Council for approval.~~ (~~iv~~ii) Any ~~mitigation or~~ remediation plan prepared in accordance with Condition 11(c)(i) shall include ~~a~~ an indicative timetable for its implementation. (~~v~~iii) The consent holder must implement the actions specified in the remediation plan in accordance with the timetable agreed with the Regional~~Following approval of a mitigation or remediation plan prepared in accordance with Condition 11(c) (iii), if the Regional Council determines that the adverse effects of the landfill activity itself on the shallow groundwater aquifer or surface water will be more than minor, the Regional Council shall require the Permit Holder to implement the plan within the timeframe specified in the timetable for implementation required by Condition 11(c) (iv)~~. (d) The Permit Holder shall annually review the data derived from the groundwater monitoring program and evaluate contaminant mass load projections for discharges from the landfill to the Hokio Stream. The contaminant mass load projections shall be based primarily, but not exclusively, on the monitoring data obtained for the "B", ~~and~~ "C" and "X" series bores indicated in Table D of this discharge permit. The annual report required under Condition 5 shall include the following information:	*method such as a series of shallow bores) on the northern boundary of the landfill site between the closed landfill and the boundary with Lot 1, DP 40743 that:* · *is designed by a suitably qualified engineer;* · *is to a maximum depth of [1.5m] and a maximum length of [150m];* · *contains a sump (or similar system) to collect the captured groundwater, including leachate; and* · *connects the sump (or similar system) to an irrigation system enabling the captured groundwater, including leachate, to be irrigated onto the landfill site."* SD – Condition 11(c)(i) - Suggest a 6 month design timeframe with construction timetable to be agreed under condition 11(c)(ii).

(i) A summary of the methodology used to calculate the mass load projections. (ii) The calculated mass loads transported in the groundwater and comparable mass loads in the Hokio Stream. (iii) An analysis of the implications of the mass load calculations with respect to ensuring discharges from the landfill would not result in a decline in the water quality in the Hokio Stream under Condition 3. (e) Should the groundwater parameters tested for under Condition 3 of this consent, and subsequent evaluation and indicative assessment of contaminant mass loads under Condition 11(d) of this consent indicate that contaminants sourced from either the closed or active areas of the Levin Landfill are likely to result in a future decline in the water quality of the Hokio Stream, as defined under Condition 3, then: (i) The Permit Holder shall include in the annual report required by Condition 5 an analysis of the significance of the result. (ii) The Regional Council may at any time require the Permit Holder to undertake further investigations and/or conduct a detailed assessment of mass loads to evaluate the actual likelihood of a future decline in water quality of the Hokio Stream as a result of landfill activities as measured under Condition 3. The Permit Holder shall provide a report to the Environmental Protection Manager at the Regional Council documenting the further investigations	

undertaken or the methodology, procedure and outcomes of the detailed assessment. (iii) If the work required under Condition 11(e) (ii) discloses an actual likelihood of a future water quality decline of the Hokio Stream as a result of landfill activities, and the Regional Council determines that this decline in water quality would constitute a more than minor effect on the water quality of the Hokio Stream, the Regional Council shall require the Permit Holder to develop a mitigation or remediation plan. (iv) For the purposes of quantifying whether the adverse effects of the landfill activity itself on the water quality of the Hokio Stream will be more than minor, any determination made by the Regional Council may be independently peer reviewed, at the request of either the NLG or the Permit Holder, by an appropriately qualified and experienced person. The request for a peer review must be lodged with the Regional Council within a period of one month following the determination by the Regional Council. The peer reviewer shall prepare a detailed report which analyses the determination of adverse effects made by the Regional Council, and provide clear recommendations as to whether implementation of a mitigation or remediation plan is required for the purposes of adopting the best practicable option to remove or reduce the more than minor adverse effect on the water quality of the Hokio Stream. This report shall be completed within a period of three months of the request for a peer review.	

	Should a peer review of the determination be undertaken, the Regional Council shall take into account the outcome of the review in again determining whether this decline in the water quality of the Hokio Stream would constitute a more than minor effect on the water quality of that stream. (v) In the event that the Environmental Protection Manager at the Regional Council determines that a mitigation or remediation plan is required, the Regional Council shall advise the Permit Holder of this requirement in writing within two months of receiving the annual report. (vi) Within six months of receipt of advice in writing from the Regional Council pursuant to Condition 11(e) (v) the Permit Holder shall submit a mitigation or remediation plan to the Regional Council for approval. (vii) Any mitigation or remediation plan prepared in accordance with ~~Condition 11(c) or~~ Condition 11(e) (v) shall include a timeframe or threshold for implementation. (viii) Following the completion of the mitigation or remediation plan, if the Regional Council determines that the potential adverse effects of the landfill activity itself on the water quality of the Hokio Stream, as monitored under Condition 3, continue to be more than minor, the Regional Council shall require the Permit Holder to implement the plan within the timeframe specified in the timetable for implementation required by Condition 11(c) (~~viiiii~~) or alternatively	

when the threshold identified is triggered . [Advice Note: Condition 11 may be subject to a review pursuant to s 128 (1)(a) of the Resource Management Act 1991 (see condition 31) and it is anticipated such a review will occur in the event of disagreement by either the Permit Holder or NLG with any determination of the Regional Council in relation to condition 11 (a) – (e)]	