Rick's Copy
2017

MEMORANDUM OF UNDERSTANDING

NITROGEN ACCOUNTING APPROACH FOR ROTORUA WASTE WATER TREATMENT PLANT DISCHARGE

between

ROTORUA LAKES COUNCIL

and

BAY OF PLENTY REGIONAL COUNCIL

and

TE ARAWA LAKES TRUST

Dated 2017

PARTIES

1 **BAY OF PLENTY REGIONAL COUNCIL**

2 **ROTORUA LAKES COUNCIL**

3 **TE ARAWA LAKES TRUST**

BACKGROUND

1. Te Arawa Lakes Trust (TALT), Rotorua Lakes Council (RLC) and Bay of Plenty Regional Council (BOPRC) are the partners that make up the Rotorua Te Arawa Lakes Programme ("the Programme"). The Programme seeks to ensure sustainable outcomes for the twelve Rotorua Te Arawa lakes.

2. The Regional Policy Statement (RPS) for the Bay of Plenty (operative 1 October 2014) includes policies to manage contaminants entering catchments at risk, including Lake Rotorua. Policy WL 3B sets out the need to establish limits for contaminants entering catchments at risk and includes c) For Lake Rotorua the total amount of nitrogen that enters the lake shall not exceed 435 tonnes per annum.

3. In order to achieve the RPS 435 tonnes nitrogen target the BOPRC adopted an Integrated Framework which includes the introduction of rules via Proposed Plan Change 10 (PPC10) to the Regional Water and Land Plan (RWLP). The Integrated Framework provides the basis for the proportional nitrogen reductions being implemented through the rules. The Integrated Framework assumes a nitrogen load from urban sewage of 30 tonnes

4. The Programme wishes to allow for the urban sector and commercial activity such as tourism to grow, and to consider the potential to reticulate out-of-catchment loads (in order to benefit other at risk catchments), in order to meet the aspirations of iwi, hapuu, whanau of Te Arawa and the Rotorua community while at the same time not compromising the RPS 435 tonnes nitrogen target. On this basis staff from both BOPRC and RLC worked closely together to develop the nitrogen accounting approach recorded in this Memorandum of Understanding (MoU). It is based on there being no net increase in nitrogen entering Lake Rotorua.

5. This MoU is designed to accurately reflect the accounting of nitrogen loss that occurs when rural land within the Lake Rotorua Groundwater Catchment becomes urban land connected to Rotorua's reticulated sewerage system, and when existing point source loads of nitrogen to the lake are connected to the sewer e.g. geothermal. The approach, described in this MoU, is a method to ensure that this nitrogen is recognised as part of the discharge of waste water into Lake Rotorua.

6. This MoU is an operational policy but on a matter that is of significance to the Rotorua Te Arawa Lakes community. For this reason it has been created as a formalised position between the three Parties.

AGREEMENT

Purpose

7. To describe the agreed nutrient accounting approach to integrate the potential WWTP nitrogen mass discharge limit with catchment nitrogen accounting when rural land changes to urban use or when any existing discharges to Lake Rotorua become discharges to sewer.

8. This MoU assumes nitrogen allocation to land is implemented through the RWLP via PPC10 in a form similar to the notified version of PPC10. If significant subsequent changes to PPC10 and the RWLP occur this MoU will be reviewed and amended as necessary and unanimously agreed by the three Parties.

Principles

9. It is acknowledged that there are sewage-derived nutrient discharge loads via the WWTP discharge from the rural area following expansion of sewerage reticulation into the rural area.

10. This accounting approach enables increasing gross nitrogen loads from the WWTP as a result of this expansion while maintaining the net 30 tonne limit and therefore not compromising the 435 tonnes nitrogen sustainable load target.

11. RLC will consider discharging to sewer where practicable, any point source discharges to the lake or tributaries with a higher concentration of nitrogen than the WWTP discharge, because treating this water will reduce the load of nitrogen to Lake Rotorua.

12. The WWTP will use best practicable technology and operational procedures to maximise nutrient reductions rather than focus on the mass discharge limit.

13. This accounting approach does not pre-determine the resource consent process for the WWTP or any consent conditions that may be imposed through that process.

14. This accounting approach does not pre-empt the upgrade design solution for the WWTP. This approach is required and will be applicable regardless of which design solution proceeds.

Approach

15. The 2001–2004 Urban Reticulation Area[1] has been defined. During the 2001-2004 benchmarking period, the WWTP was consented to discharge 30 tonnes of nitrogen per year. This figure is used as the baseline WWTP mass discharge limit.

16. The WWTP mass discharge limit can increase from the baseline with no increase in the overall load of nitrogen to Lake Rotorua if loads discharged to sewer since the 2001-2004 benchmarking period are tracked and accounted for as follows:

    a. Septic tanks loads that were discharges to Lake Rotorua in 2001-2004, and have since been connected to sewer as part of the lakeside settlement reticulation programme (which represents a 10 tonne reduction in nitrogen into Lake Rotorua[2]), have a residual nitrogen load that is recognised in the WWTP mass discharge limit.

[1] Urban Reticulation Area is a defined spatial polygon that closely represents the reticulated area during the 2001-2004 period.
[2] Reticulation of Lake Rotoiti and Lake Okareka has reduced nitrogen to these catchments by a separate 10 tonnes with no increase in mass discharge limit at the WWTP for the residuals from these loads.

b. Other nitrogen loads that are currently discharged to Lake Rotorua or tributaries (e.g. geothermal), and are subsequently discharged to sewer (excluding septic tank loads that were connected to sewer as part of the lakeside settlement reticulation programme above), are recognised in the WWTP mass discharge limit.

c. As sewerage reticulation extends into new subdivisions in the Rural Area[3] within the catchment, at the time the land is subdivided, the full potential Household Unit Equivalents (HUEs) per hectare in the applicable zone are allowed for when BOPRC calculates the allocation for the new land use with a sewage allowance of 1.4 kg/HUE[4] recognised in the WWTP mass discharge limit (refer to Table 1). The accounting basis for this is:

   i. Land in the Rural Area has a Nitrogen Discharge Allocation (NDA[5]) based on rural land use activity. Subsequent urban expansion into the Rural Area will result in the rural land use discharges being replaced by sewage-derived nitrogen losses via the WWTP and urban land use background discharges.

   ii. If the sewage-derived nitrogen losses via the WWTP and urban land use discharges are equal or less than the NDA there will be no increase in nitrogen load to Lake Rotorua. Any remaining NDA remains with the land.

   iii. If the sewage derived nitrogen losses via the WWTP and urban land use discharges are greater than the NDA an offset or purchase will be required to ensure no increase in nitrogen load to the lake[6].

   iv. PC10 nitrogen accounting allows for transfers to and from the parent block that is being subdivided.

d. Discharges to sewer from new builds within the 2001-2004 urban area (urban infill) will be an additional load to the WWTP with no allowance recognised in the baseline WWTP mass discharge limit unless offset through reductions in the Rural Area discharge.

e. Additional nitrogen arising from possible future reticulation outside the Lake Rotorua catchment is not recognised in the WWTP mass discharge limit without Programme agreement. These connections may need to be offset from within the Lake Rotorua Groundwater catchment.

17. A measured WWTP discharge that is lower than the WWTP mass discharge limit is a reduction in the overall load to the lake and a benefit to the Lakes Programme. A concentration-based target, as well as reduced sewage volumes, will help realise these reductions, and will provide headspace for urban infill and potentially out-of-catchment loads.

18. For BOPRC nitrogen accounting purposes additional residual loads resulting from new connections to the WWTP since 2001-2004 remain on the land of origin but are also recognised in the WWTP mass discharge limit. Land-losses (see Table 1) remain associated with the land.

[3] Rural Area is all land within the Lake Rotorua Groundwater Catchment that is not Urban Reticulation Area.
[4] See Annex 1: Sewage allocation per household unit.
[5] Note that the term "provisional NDA" or "pNDA" is used to describe NDA until it is confirmed under the Lake Rotorua Nutrient Management provisions.
[6] Exemption to this requirement may be made if the amount is minor or there are exceptional circumstances. Exemptions will occur through an agreed process.

Changes between the 2001-2004 benchmark and current

19. Accounting for changes that have already occurred since the baseline 2001-2004 period, a WWTP mass discharge limit of 32.4 tonne represents no increase in the load to Lake Rotorua and will be considered the starting point for the available mass discharge limit from January 2017.

Calculation of nitrogen required for land proposed to be subdivided

20. For subdivisions on properties within the Rural Area[7], Table 1 includes the figures to be used when assessing the minimum nitrogen required at time of subdivision. This is based on the area of land proposed for the various land use activities. This minimum requirement will then be compared with the property/farming enterprise NDA to ensure the accounting of nitrogen associated with the sewage losses in reticulated areas to the WWTP mass discharge limit does not increase the overall nitrogen load to Lake Rotorua.

21. The estimated average nitrogen required under different zoning scenarios is presented in Table 2. Table 2 is indicative as it includes assumptions around area of land in roads etc. Individual subdivisions will need to use Table 1 to calculate actual nitrogen loss requirements.

22. The projected nitrogen loss required depends on the land restrictions, zoning, land use and land use area. The estimated required nitrogen has been compared to NDAs for polygons of land in zones RD1, RD4 and RD5 excluding land in the old urban sector, forest, wetlands, bush and scrub. With the exception of these exclusions, and based on assumptions around area of land in roads etc, all farmed land in RD4 and RD5 has sufficient provisional NDA and all land (except one parcel of land) in RD1 was within 3% of the required provisional NDA.

Calculation of nitrogen required for other intensification that includes reticulation

23. For other calculations for intensification, such as Papakāinga, the three partners will discuss and assess the nitrogen calculation based on the particular circumstances of the intensification.

[7] Where land within the Urban Area has been given a pastoral allocation this will be recognised in any subdivision process.

Table 1: Nitrogen allocation required for subdivision

	Land Use and Activity	Residential zones where no grazing is allowed	Rural zones with potential for grazing
N required for non-house-lot land losses	Sealed roads and other impermeable surfaces not available for house lots.	Area of land at 0.5 kg N/ha/yr	
	Restricted or specified land use and reserves not available for house lots	Area of land at applicable N loss rate	
N required for house-lot land loss	Impermeable surfaces based on 350 m2/potential house.	Area of land at 0.5 kg N/ha/yr	N/A
	Restricted or specified use land available for house lots	Area of land at covenented loss rate	
	Garden losses	Area of cultivated garden at 138% of the house block reference file (in 6.2.0 108 kg N/ha/yr)	N/A
	Background losses	Remaining land at background losses for OVERSEER houseblocks specified as a % of the Drystock reference file	Remaining land at permitted activity level for pastoral Drystock specified as a % of the Drystock reference file
N required for sewage losses	Sewage losses	Sewage allocation per potential house (based on zone)	
N required for other losses	Other losses	Other losses	
Total N required for subdivision		**Sum of above**	**Sum of above**

Table 1 Definitions:

Potential house numbers	Total number of houses that can be built under relevant district plan rules or through consent (whichever is greater) on the land available for house lots (excludes roads, reserves outside of house lots eg in RD1 zone divide the house lot area (ha)/0.045).
Potential pastoral land use	The area of the lot that is permitted to be used for pastoral grazing (where there are no restrictions on the title the potential pastoral area is the area of the lot. This includes any house sites and unformed roads).
Restricted or specified land use	The area of the lot where there are legal constraints on land use. In most cases this will be an area of trees where there is a covenant on the title (e.g. through a BOPRC environmental programme, a QEII covenant, a designated SNA or a consent notice). For these areas an appropriate nitrogen discharge for the land use should be used otherwise the nitrogen required must default to at least the appropriate background losses.
Sewage allocation per potential house	13.5 kg Non-reticulated - septic tank 3.0 kg Non-reticulated - advanced OSET that discharges 15 mg/l nitrogen or less 1.4 kg Reticulated to Rotorua WWTP (refer to Annex 1)

Cultivation allocation per potential house	RD1 (0.045ha mean minimum lot) is 25 m^2 per house RD4 (0.1 ha mean minimum lot) is 50 m^2 per house RD5 (0.2 ha mean minimum lot) is 100 m^2 per house Rural zones is permitted activity level for pastoral Drystock specified as a % of the Drystock reference file.
Table 1 represents the minimum requirements. Any consented use and allocations need to be allowed for. If restricted non-pastoral land uses are being included, measure the area on each lot. Alternatively higher land losses (e.g. as for pasture) could be assigned to negate the need to identify the exact area of restricted land use.	

Table 2: Estimated nitrogen requirements per ha by zone (relative to OVERSEER 6.2.0)

	Residential low-density	Residential lifestyle lakeside	Residential lifestyle	Rural Lifestyle (reticulated)	Rural Lifestyle (Osets)	Rural Working (Osets)
Zone	RD1	RD4	RD5	RR2	RR2	RR1
Sewage	Reticulated	Reticulated	Reticulated	Reticulated	Oset	Oset
Average lot size (minimum m2)	450	1000	2000	8000	8000	152500
Potential number of houses per lot	1	1	1	2	2	2
Garden area allocation per potential house (m2)	22.5	50	100	background	background	background
Impermeable surface allocation per potential house (m2)	350	350	350	background	background	background
Potential to graze based on zoning	no	no	no	yes	yes	yes
Lost rates						
Land not available for house lots (kg/ha)	5.9	5.9	5.9	5.9	5.9	5.9
Roads (kg/ha)	0.5	0.5	0.5	0.5	0.5	0.5
Impermeable surfaces rainfall (kg/ha)	0.5	0.5	0.5	0.5	0.5	0.5
Garden losses (kg/ha)	108.0	108.0	108.0			
Background grass (with/without grazing) (kg/ha)	5.9	5.9	5.9	18.0	18.0	18.0
Allocation for sewage losses (kg/ potential house)	1.4	1.4	1.4	1.4	3.0	3.0
Non-houselotland (% of total area)	35.00%	35.00%	35.00%	35.00%	35.00%	35.00%
Roads (estimated % of total area)	18.00%	18.00%	18.00%	18.00%	18.00%	18.00%
Other (estimated % of total area)	17.00%	17.00%	17.00%	17.00%	17.00%	17.00%
Estimated N for non-houselot land losses (kg/ha)	1.1	1.1	1.1	1.1	1.1	1.1
Houselot land (% of total area)	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%
Potential number of houses per ha (on land available for house lots)	14.4	6.5	3.3	1.6	1.6	0.1
Impermeable surfaces	50.56%	22.75%	11.38%			
Garden	3.25%	3.25%	3.25%			
Remaining area	11.19%	39.00%	50.38%	65.0%	65.0%	65.0%
Estimated N for houselot land losses (kg/ha)	4.4	5.9	6.5	11.7	11.7	11.7
N required for sewage (kg/ha)	20.2	9.1	4.6	2.3	4.8	0.3
Estimated total N required per ha (includes land that will be roads and reserves with a lower allocation)	25.7	16.1	12.2	15.1	17.7	13.0
Estimated N/ha on houselot land following subdivision, including sewage allocation (ie available for future subdivision of this land)		23.1	17.1	21.5	25.5	18.4

Projected WWTP discharge

24. The current WWTP discharge is around 5.5 mg/l of nitrogen. Figure 1 (red line) shows the load of nitrogen to Lake Rotorua if the WWTP were to continue to discharge at this concentration.

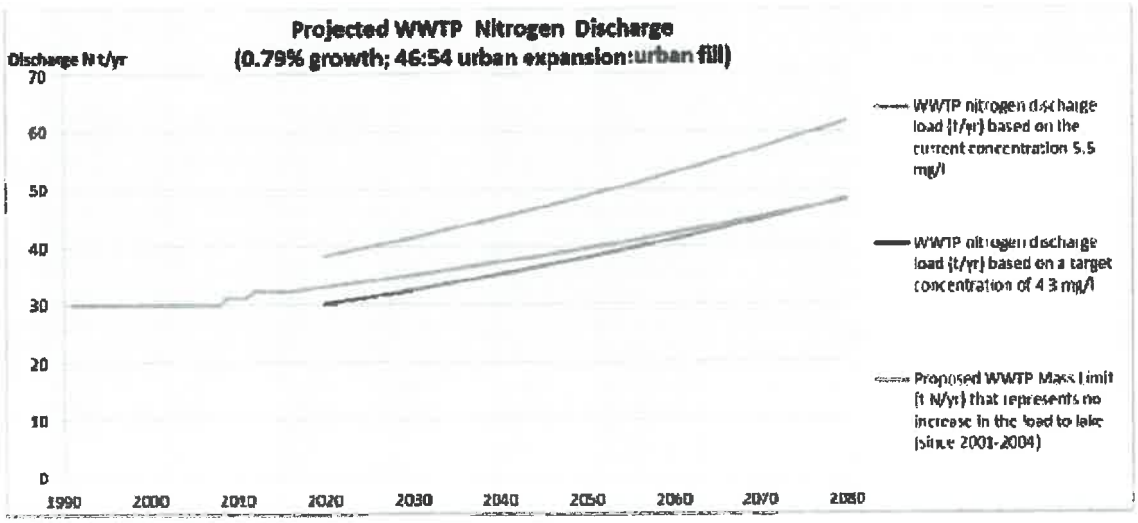
25. Figure 1 also shows the projected WWTP mass discharge limit based on the proposed approach to ensure no overall increase in nitrogen to Lake Rotorua (blue line). The approach assumes a sewage allocation of 1.4 kg per potential house (refer to definitions in Table 1) for all reticulated subdivision outside the Urban Reticulation Area.

26. A WWTP discharge concentration of around 4.3 mg/l would allow for both urban expansion into the Rural Area and urban infill, with a low chance of increasing the load to Lake Rotorua, i.e. is unlikely to exceed the WWTP mass discharge limit before 2070 (Figure 1, green line).

27. Beyond 2070 further technological advancement and investment in reducing either the discharge concentration or the volume of discharge water, or a lower rate of urban infill relative to expansion will be required to remain within the mass discharge limit that meets the RPS 435 tonnes nitrogen target.

Figure 1: The projected WWTP mass discharge loads, assuming 'best guess' growth assumptions (0.79% catchment growth rate; 46:54 ratio for expansion:urban infill) with three WWTP discharge scenarios:

- *If WWTP is not upgraded and continues to discharge nitrogen at 5.5 mg/l (red/top line)*
- *If WWTP discharges nitrogen at 4.3 mg/l (green/bottom line)*
- *If WWTP nitrogen mass discharge limit is based on the proposed approach to allow for urban expansion into the Rural Area (blue/middle line)*



Implementation

28. The Incentives Committee will be advised of this MoU and the implications for properties considering subdivision connecting to reticulation.

29. TALT, BOPRC and RLC will jointly determine the processes for: allocation of NDA at time of subdivision; process for accounting for the nitrogen losses at the WWTP; and process for accounting for other loads to sewer.

30. RLC will provide an advice note on Rural Area LIMs and refer all subdivisions to BOPRC for assessment.

31. RLC will register a consent notice requiring the applicant to obtain BOPRC's approval of the nitrogen allocations for the new parcels created through the subdivision consent process.

32. RLC will advise BOPRC when a subdivision consent has been enacted to allow BOPRC to update and record the revised nitrogen allocations.

33. RLC will consider a plan change to its District Plan to give effect to this MOU.

Review and changes to this MoU

34. Over time there may be a need to update this MoU to ensure that the accounting methodology remains accurate and robust.

35. Review and updating this MoU will occur by unanimous agreement of the Chief Executives of the three Parties. Input from technical staff involved in the establishment of this approach is highly recommended where possible.

SIGNED for and on behalf of **BAY OF PLENTY REGIONAL COUNCIL**)

.....
[Authorised signatory]

SIGNED for and on behalf of **ROTORUA LAKES COUNCIL**)

.....
[Authorised signatory]

SIGNED for and on behalf of **TE ARAWA LAKES TRUST**)

.....
[Authorised signatory]

ANNEX 1: Sewage allocation per household unit

The transfer of 1.4 kg per potential household unit was based on looking at the sewage nitrogen from a number of different approaches outlined below.

Household N Loads	Raw sewage load kg/p/yr	Raw sewage load kg/hse/yr (3 people/hse)	Septic Tank Discharge kg/yr (3 people/hse)	Septic Tank Load to lake kg/yr (3 people/hse)	WWTP N removal rate	Residual after WWTP treatment (3 people/hse)	Residual after WWTP treatment (2.5 people/hse)
Overseer' load from septic tank 13.44 kg/yr to land		14.8	13.44	10.75	0.89	1.63	1.36
Septic tank discharge at 10 g/p/d		14.6	13	11	0.89	1.59	1.32
Mott McDonald design for Rotorua (14 g/cap.d)	5.1	15.3			0.89	1.69	1.41
Design raw sewage load (3-5 kg/cap.yr)	5.0	15.0			0.89	1.65	1.38