

Woldwide One Limited (APP-20171445) Request for Further Information Response

This assessment has been prepared to address the issues raised in Environment Southland's Request for Further Information letter dated 8th September 2017.

1. Assessment of Environmental Effects

1.1 Surface water quality

Surface water quality samples have been taken at the applicant's property (site 32650). The results of the samples (downstream and upstream) are shown in Table 1, for the previous 10 years where samples were available.

Table 1: Surface water quality sample results for Woldwide One property – site 32650

Date	Parameter	Electrical Conductivity (µS/cm)	Total Ammoniacal Nitrogen (g/m ³)	Nitrogen (g/m ³)	Dissolved Reactive Phosphorus (g/m ³)	E coli (MPN/100mL)
11/4/2007	Downstream	312	0.015	2.5	0.019	43
	Upstream	311	0.015	2.5	0.024	6
11/10/2007	Downstream	263	0.035	1.5	0.03	2300
	Upstream	239	0.015	1.2	0.018	190
2/04/2008	Downstream	299	0.035	3.3	0.011	10
	Upstream	326	0.025	4.8	0.012	50
14/10/2008	Downstream	344	0.12	9.6	0.0092	2610
	Upstream	342	0.12	9.4	0.01	2760
5/11/2009	Downstream	332	0.73	9.46	0.082	6490
	Upstream	331	0.75	9.62	0.086	2250
7/5/2010	Downstream	381	0.014	17.7	0.024	31
	Upstream	376	0.0188	17.7	0.028	52
18/11/2011	Downstream	277	<0.01	8.7	0.013	8160
	Upstream	283	<0.01	8.6	0.014	8160
14/03/2012	Downstream	331	0.01	7.0	0.038	377
	Upstream	333	0.01	7.2	0.035	31
11/02/2013	Downstream	287	<0.01	0.14	0.009	75
	Upstream	308	0.098	3.7	0.017	52

The surface water quality samples indicate that both Nitrogen and E-coli levels are reducing after peaks in the 2009 – 2011 period. However with only one sample available per year, samples not taken at the same time each year and no recent samples available no trend in the quality of surface water at the property is able to be calculated.

Long term groundwater quality samples have been taken from bores E45/0010 (9.5 m deep) and E45/0330 (15 m deep). As the hydraulic connection between groundwater and surface water was assessed to be a high degree of connection (Section 9.6 of the consent application) it is considered the long term surface water quality is likely to be very similar to the ground water quality results as assessed below. Therefore, the surface water quality has been assessed as part of the assessment on groundwater quality below.

1.2 Groundwater quality

In the vicinity of the Woldwide One property there are two bores with long term water quality samples. Bore E45/0330 (15 m deep) approximately 300 m south of the Woldwide One property and bore E45/0010 (9.5 m deep) approximately 1.2 km west of the Woldwide One property. As both bores are shallow the samples provide an indication of the water quality in the vicinity of the Woldwide One property for the previous 10 years.

Figure 1 shows the Nitrogen results for bore E45/0330 from October 2007 to present. The results indicate there is no apparent trend and that the nitrogen levels in bore E45/0330 are relatively high however they do not appear to have increased with the development of farm land to dairying in the Waimatuku and Central Plains catchments over the previous 10 years.

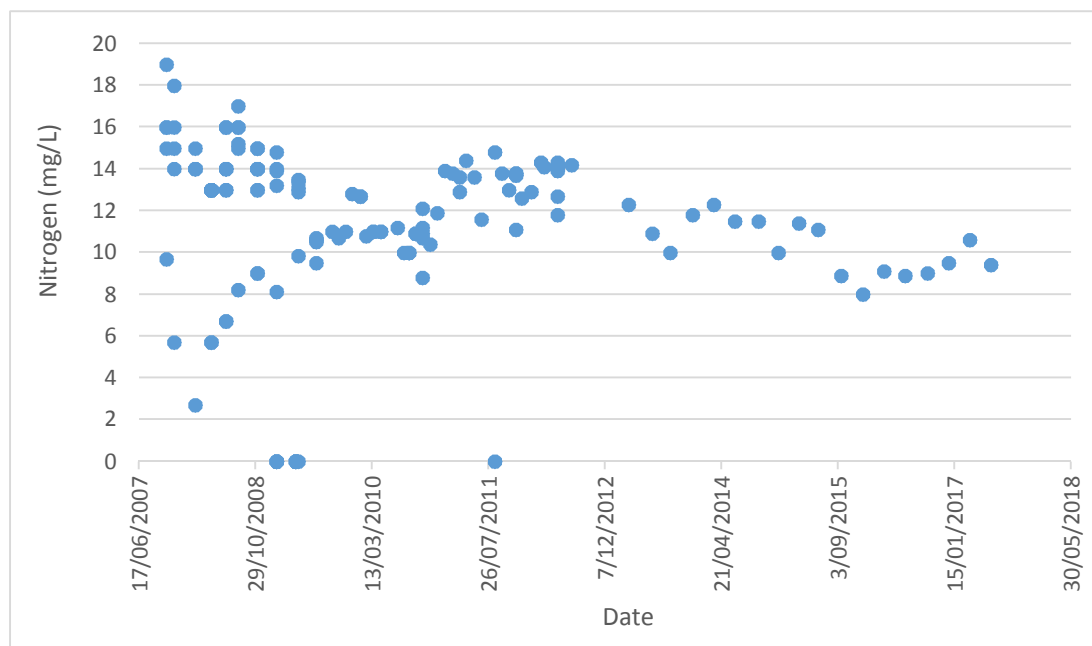


Figure 1: Nitrogen (Nitrate-Nitrite) results from bore E45/0330 (2007-present)

Figure 2 shows the E-Coli results for bore E45/0330 from September 2007 to present. The results indicate there is no apparent trend and that the E-Coli levels in bore E45/0330 are low and do not appear to have increased with the development of farm land to dairying in the Waimatuku and Central Plains catchments over the previous 10 years.

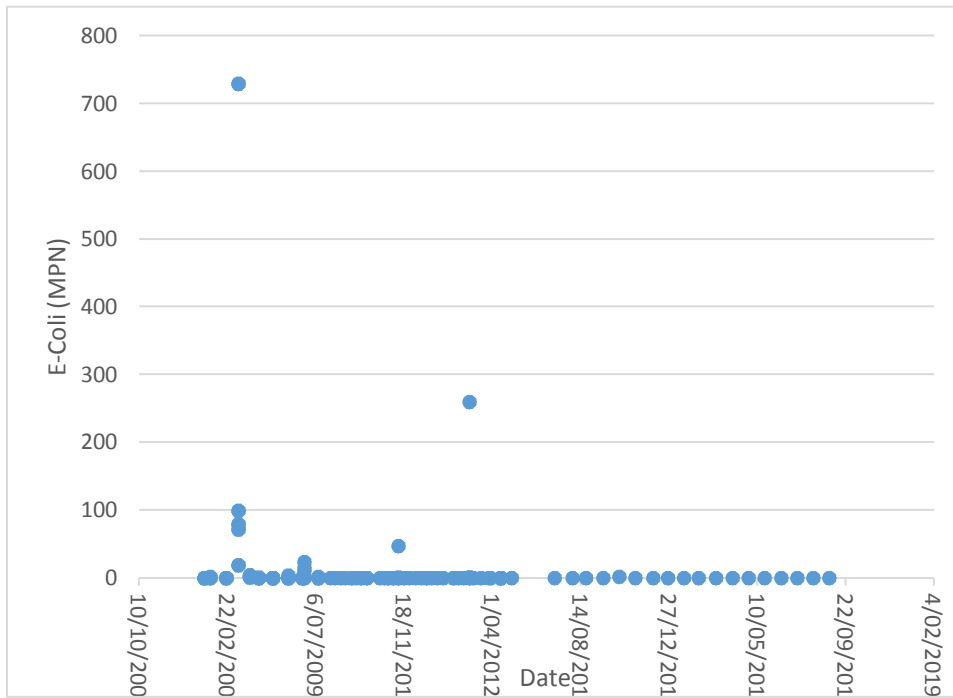


Figure 2: E-Coli results from bore E45/0330 (2007-present)

Figure 3 shows the Nitrogen results for bore E45/0010 from September 2007 to present. The results indicate there is no apparent trend and that the nitrogen levels in bore E45/0010 are relatively high however they do not appear to have increased with the development of farm land to dairying in the Waimatuku and Central Plains catchments over the previous 10 years.

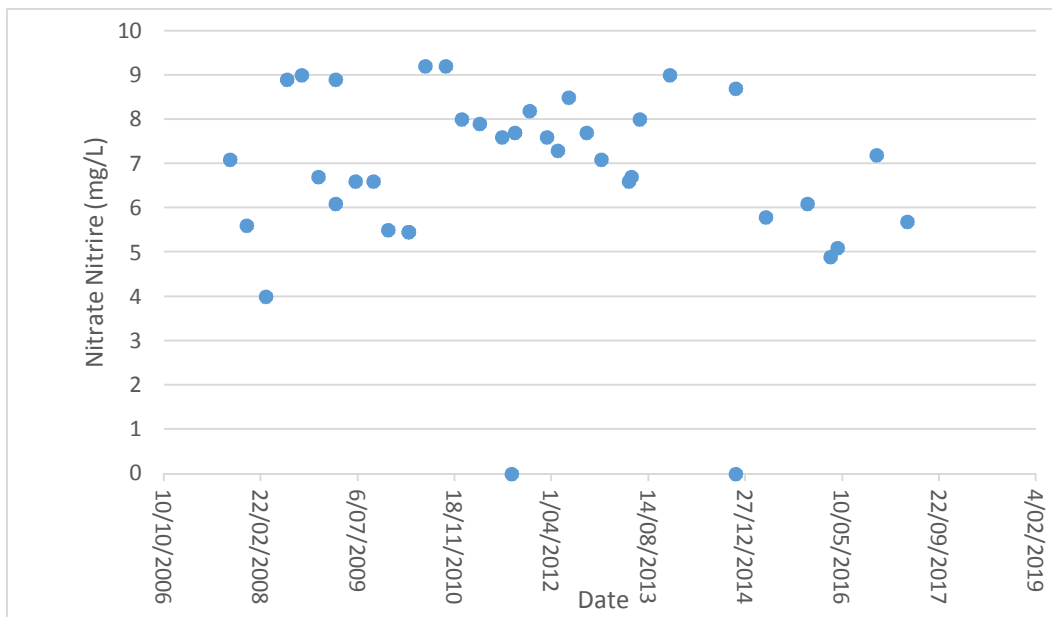


Figure 3: Nitrogen (Nitrate-Nitrite) results from bore E45/0010 (2007-present)

Figure 4 shows the E-Coli results for bore E45/0330 from September 2007 to present. The results indicate there is no apparent trend and that the E-Coli levels in bore E45/0330 are low and do not appear to have increased with the development of farm land to dairying in the Waimatuku and Central Plains catchments over the previous 10 years.

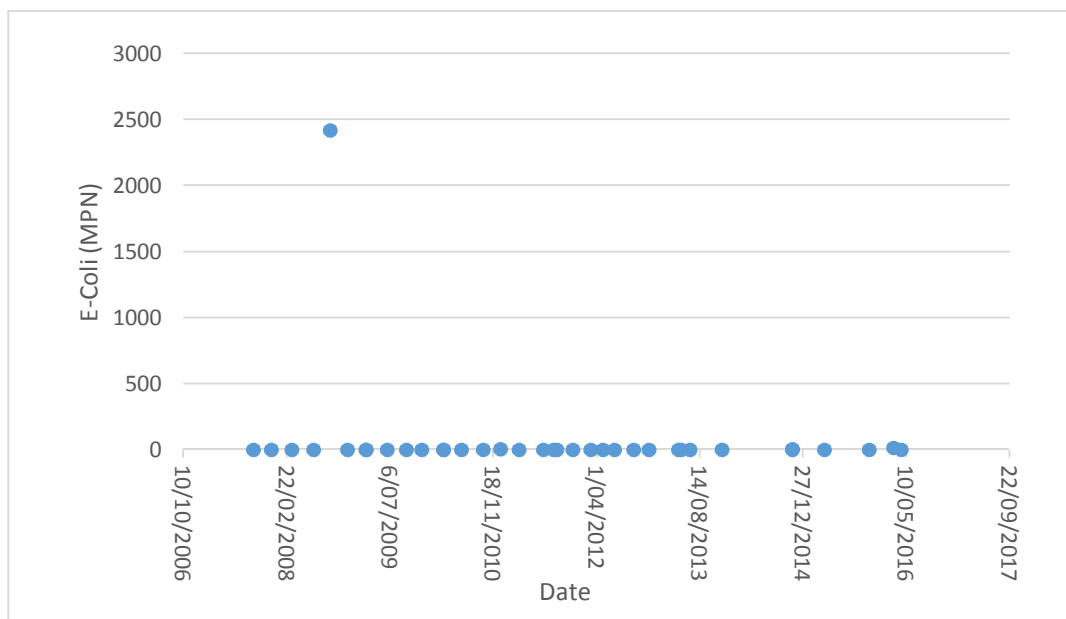


Figure 4: E-Coli results from bore E45/0010 (2007-present)

The nitrogen results in both bores E45/0330 and E45/0010 indicate that the water is currently within the drinking water quality standard (11.3 mg/L).

Overseer modelling calculates the nitrogen loss in drainage water from each block. The range of nitrogen loss in drainage water for the proposed scenario for the Woldwide One property (including the Horner Block) is 1.9 to 6.3 g/m³ with a weighted average of 4.3 g/m³. The average nitrogen loss in drainage water from Overseer modelling is below the current groundwater nitrogen sample values taken from both bores E45/0330 and E45/0010. This Overseer modelling has indicated that the nitrogen loss to water from the applicant's proposed development would be lower than the existing groundwater concentrations in bores E45/0330 and E45/0010. Hence the proposed development is likely to improve the groundwater nitrogen concentration.

The applicant's property overlies both the Waimatuku and Central Plains Aquifers which are both recharged via land surface i.e. rainfall, therefore there is very little dilution able to occur to reduce the high nitrogen levels. Any reductions in the nitrogen levels need to be at a catchment scale with all farmers reducing their nitrogen loss to water in drainage. The Overseer modelling has indicated that this proposal will likely result in a decrease in the nitrogen loss to water, therefore this proposal has the potential to help to reduce the nitrogen levels in the catchment.

1.3 Groundwater flow

Based on the 2014 piezometric survey we agree that the groundwater direction in the vicinity of the Woldwide One property is Southerly.

In May 2017 the Heddon Bush School bore was drilled to a depth of 14.9 m (a copy of the borelog is included in Appendix A). The water supply passes through a Trojan Ultra Violet Water Treatment System before the water enters the school water supply. Given this treatment system the school water supply will be protected from E-coli.

The Principal of Heddon Bush School has also indicated that E-coli and coliforms have been absent from all samples taken in the last 3 years (while she has been Principal). Since the drilling of the new bore water quality sampling of the bore will be carried out quarterly.

Since 2010 the Southern District Health Board has only one nitrogen sample of 1.51 g/m³, unfortunately no date is available for this sample.

2. Farm Effluent Management Plan

2.1 Effluent irrigation decisions

The following effluent decisions are made on farm prior to the discharge of effluent;

Slurry

- Check Heddon Bush soil moisture site to determine if the current soil moisture is suitable for irrigation;
- Ensure ground is dry enough (cannot use tractor with slurry tanker and trailing shoe machine if ground is wet as the slurry tanker weighs over 50 T when full of slurry);
- Check for any cracks in the discharge area – if any cracks present do not discharge slurry where the cracks are, either move to an area with no cracks or do not discharge;
- Check wind direction to ensure the wind direction is not towards neighbouring houses;
- Increase speed of tractor if a smaller application depth is required.

Liquid Effluent:

- Check Heddon Bush soil moisture site to determine if the current soil moisture is suitable for irrigation;
- Check for any cracks in the discharge area – if any cracks present do not discharge slurry where the cracks are, either move to an area with no cracks or do not discharge;
- Check wind direction to ensure the wind direction is towards neighbouring houses;

2.2 Deep drainage of nitrogen – cracking and fissures

To reduce the occurrence of deep drainage of nitrogen the applicant will endeavour to prevent cracks or fissures occurring as much as possible. This will be achieved by keeping a higher pasture cover and discharging effluent little and often to ensure the soil moisture is kept as high as possible to prevent the soil from drying out and cracking. Before each effluent application a visual assessment will be carried out to check for any cracks in the soil. If cracks do occur the applicant will avoid areas with cracking or move to another part of the property where there are no cracks. If there are substantial cracks and no areas suitable to discharge effluent the applicant will store effluent until the soil moisture level improves and cracking disappears. Given the cracks are likely to occur

after prolonged dry periods in the summer the effluent storage facility is likely to provide adequate storage volume for these events.

2.3 Winter grazing

The proposed Southland Water and Land Plan defines intensive winter grazing as;

Intensive winter grazing of stock between May and September (inclusive) on forage crops.

All cows wintered on the property in June and July will be housed in the wintering barn, however during May and August the herd will spend part of the time outside grazing pasture and the remaining time in the wintering barn while during September all cows will be outside grazing pasture. Therefore during May, August and September when the cows are outside grazing pasture intensive winter grazing practices will be implemented.

3. Other information required

3.1 Travelling irrigator application rate test

An applicant rate test was not carried out last season on the travelling irrigator however the applicant proposes to carry out such a test this season by the end of March 2018.

3.2 Appendix N – Farm Environment Management Plan

The Appendix N has been completed as the Farm Environment Management Plan that was submitted with the consent application. This document is called a Farm Environment Management Plan rather than an Appendix N document which will not mean anything to the farmer and staff using the document to manage the property.

3.3 Effluent discharge buffer distances to dwellings

The applicant proposes a buffer distance to neighbouring dwellings of at least 100 m, however currently the closest house is 500 m from the discharge area (owned by Careykin Limited the eastern neighbour).

3.4 Winter grazing on fodder crop

The cows will be not be winter grazed on fodder crop.



BORE LOG DATA SHEET

CLIENTS NAMES:	Heddon Bush School
FULL ADDRESS:	233 Hall Road
RESOURCE CONSENT NO:	20171265
BORE SIZE:	150mm
START DATE:	31 May 2017
FINISH DATE:	1 June 2017
MACHINE:	Schramm T555
RAPID NO:	233
GRID REFERENCE:	E1225283 N4885878
DRILLER:	Shaun Crosland
MEASURED FROM:	Top of casing
300mm UPSTAND:	Yes
TOTAL DEPTH BORE:	14.9m
TOP LEADER:	13.9m
STATIC WATER LEVEL:	4.5m
SCREEN - SLOT:	2.5mm
TYPE	Stainless
PVC SLOTTED:	NA
SCREEN:	700mm
LEADER:	300mm
SUMP:	N/A
TOTAL CASING USED:	14.2m
AT TIME OF PUMPING-BORE DID:	117 lps per min @ 13m
TEST PUMP PERIOD:	Overnight, 14 hours
DRAWDOWN FROM SWI:	8.5m
AIR/PUMP INTAKE:	14m
BACTERIAL WATER TEST:	yes
CHEMICAL WATER TEST:	yes
IMPERVIOUS SEAL AT GROUND LEVEL AROUND CASING	Yes
CASING TOP SEALED TO PREVENT CONTAMINATION	Yes

COMMENTS:

BORE LOG:

0 - 12m	Clay
1.2 - 6m	Clay Bound Gravel
6 - 14.9m	Wet Gravels

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