

**Technical Memorandum No.1**

**To:** Auckland Council  
**From:** Gareth Williams and Patrick O’Riordan  
**Date:** 16 June 2017  
**Subject:** 117a First View Avenue, Beachlands – Onsite Greywater Treatment

## 1. Section 92 Queries and Responses

### **1. Assessment of the site soil morphology in accordance with TP58 or AS/NZS 1547 to confirm soil category and recommended maximum discharge rates.**

A site investigation was undertaken by a GWE Consulting Ltd. wastewater engineer on 25<sup>th</sup> of May 2017. The site visit comprised of a walkover inspection and drilling of 2 hand augurs as detailed in Table 1. This investigation was undertaken in accordance with Auckland Council TP 58 (2004).

The site is generally flat with a slight slope from west to east. There is an in-ground swimming pool located on the eastern boundary of the site. Groundwater from the swimming pool is collected and pumped away to stormwater periodically by the owners.

The soils at the site were found to be Category 6 CLAY as defined by TP 58 (2004). Table 1 below summarises the findings of the boreholes.

**Table 1: Summary of Soil Profile Descriptions for 117a First View Avenue, Beachlands**

Horizon	Description – SOIL TEXTURE	Drainage	CATEGORY
AH1			
0.0 – 0.8m	CLAY, light brown/orange w mottled grey, mod plasticity, damp	Slow draining	6
0.8 – 1.2m	CLAY, grey with light brown/orange mottles, mod plasticity, damp	Slow draining	6
1.2 - 1.5m	CLAY, greyish purple/pink, mod plasticity, damp	Slow draining	6
1.5m	No groundwater encountered.		
AH2			
0.0 – 1.1m	CLAY, light brown/orange w mottled grey, mod plasticity, damp	Slow draining	6
1.1 – 1.6m	CLAY, grey with light brown/orange mottles, mod plasticity, damp	Slow draining	6
1.6 – 1.8m	CLAY, greyish purple, mod plasticity, damp	Slow draining	6
1.8m	No groundwater encountered.		

The soils are conservatively categorised as Category 6. Based on the PEAK design flow rate of 800Litres/day for the dwelling, and the 74m<sup>2</sup> of ETS beds, the loading rate is 11mm/day. However, on the basis that FULL water saving devices (WELS accredited) are to be installed and BW will be zero due to the composting toilet (which means as per table 6.2 of TP58 2004 the BW contributes up to 200litres/day – 8 ppl @ 25 litres/person), the actual PEAK flow volume, assuming maximum occupancy, will be closer to around 400 to 600 litres/day. The flows will be monitored on a ‘real time’ basis via a telemetry flow meter and it is anticipated that the water use within the dwelling will be between 200 to 400 litres/day. Therefore, the ETS beds will see a daily loading rate of between 2.7 and 8.1 mm/day. Within

Table 10.1 of TP58 (2004), an ETS bed loading rate of 5mm/day is allowable. However, this accounts for loading of primary effluent and not primary treated grey water – the concentration of contaminants will be significantly lower.

It should also be noted that the ETS beds are not being loaded with primary effluent, but with primary treated grey water (where the BOD/TSS/FC load will be considerably less), and therefore the beds are not expected “to work as hard”.

We would recommend that a PEAK daily discharge volume is conditioned and also a monthly average flow of say 400litres/day. We also recommend that daily flow monitoring is carried out via a telemetry flow meter.

**NOTE – in the event that there are any issues with the treatment and disposal system (e.g. exceedance of design flow volumes, groundwater contamination, odour, breakout, etc), the applicant will decommission the proposed treatment and disposal system and connect to the Watercare public sewer.**

## **2. Assessment of peak groundwater levels and water chemistry.**

A sample of groundwater was collected from the sump in the swimming pool area of the site (approximately 2-3m deep). The sample analysis is summarised in Table 2 below. This sample reflects the baseline groundwater for the site pre-development and will act as a useful marker for on going monitoring of the soils at depth.

**Table 1:Ground Water Sample Analysis**

<b>Groundwater Sample Analysis</b>	
Ammoniacal Nitrogen	0.01mg/L
CBOD <sub>5</sub>	<2mg/L
COD (as O <sub>2</sub> )	20mg/L
TKN	0.59 mg/L
Nitrate and Nitrite	0.78mg/L
Total Nitrogen	1.37mg/L
Total Phosphorous	110mg/L
Total Suspended Solids	<3

There are no contaminants within the sample of significant concern. Nitrogen is low, but TP values do appear to be high. We can offer no reason for this.

## **3. Assessment of the effluent movement through the soils following discharge and likely effluent plumes.**

The disposal of primary treated greywater will be carried out through the soils via evapotranspiration (ETS) beds. It is anticipated that the ETS beds will be densely planted with species from TP58 Appendix G (at a planting density of approximately 2 plants/m<sup>2</sup>) will allow for near full evaporation and transpiration of the applied primary treated grey water. The anticipated low water use and therefore lower loading rates will assist with this.

Additionally, it is unlikely that residual cations/anions will readily pass through clay soils due to their inherent cation exchange capacity. Similarly, the soil medium and ETS beds will retain TSS, etc.

The sample collected from the pool drainage sump will be used as baseline marker for in going monitoring of groundwater from the site. We would recommend sampling the groundwater from the pool sump again approximately 6 months from start up and then on an annual basis. We would recommend that a condition

is allowed for in the consent to require additional upstream and downstream monitoring of groundwater in the event that any values are found to be significantly elevated.

In general, it is anticipated that groundwater flow would be in a general north to north east direction to the sea. The dwelling is approximately 160m from the coast.

**4. Recommended design amendments to ensure effluent plumes do not intersect subsurface drainage structures or confirmation that soil residence times (i.e. in ground treatment) before intersection are such that any effects on groundwater collected by these structures will be less than minor.**

All ETS beds will be located a minimum of 1.5m from the southern and western boundaries and a minimum of 1.5m from the dwelling. The ETS beds will be evenly loaded to ensure that all the bed area is utilised. It is also prudent to time dose the primary treated greywater onto the ETS beds. This will reduce the diurnal effect and improve the performance of the ETS beds.

From the Council GIS system, there are no subsurface pipes e.g. public sewers/water/stormwater lines located within the property. Additionally, all tank overflows (together with the pool sump and any retaining wall drainage coil) will be managed separately with discharges well away from the ETS bed areas.

**5. Recommendations as to monitoring of site soils, groundwater and downstream surface waters to confirm effects (if proposal proceeds) are less than minor.**

GWE Consulting propose the following monitoring programme for the development. GWE will prepare a Management Plan for approval by Auckland Council prior to the discharge commencing.

- (i) Daily water (from water tanks) flow monitoring via a telemetry system e.g. Outpost Central unit on water tank;
- (ii) 6-monthly system servicing to include inspection of septic tank/grease trap, delivery pump/pipework and ETS beds;
- (iii) Provide a register to account for odour and breakout;
- (iv) Ensure that plant health is maintained and that the ETS beds are maintained to ensure that there is a dense covering of suitable species;
- (v) Sample the pool sump groundwater within 6 months of the system becoming operational and then annually thereafter. A recommendation on what mitigation will be required if the values are significantly different from the base line sample. This will include upstream and downstream monitoring of groundwater via the installation of monitoring wells;
- (vi) All flows/monitoring results will be forwarded to Auckland Council on an annual basis.