GLENN HAIG & PARTNERS

Our Ref: 213427 Waste Water Report

08 June 2021

The General Manager
Pittwater Council
PO Box 882
Mona Vale NSW 1660

Dear Sir

**Report on Required Sewage Management Facility for**

**Proposed Residence 41 Coasters Retreat, Ku-Ring-Gai Chase**

A wastewater treatment system is required for on-site effluent disposal at 34 Coasters Retreat, Ku-Ring-Gai Chase.

## The Site

The site consists of a new 3 bedroom dwelling with 5 persons in occupancy. The dwelling has a combined greywater/blackwater drainage system which conveys waste by gravity to a waste water treatment system located external to the building. The waste water treatment system discharges to 48m$^2$ of discharge control trenching as shown on the site plan.

The site has an area of 2229m² and has a north west aspect. It is located on the moderate to steeply graded lower reaches of a hill slope. The natural slope rises from the downhill boundary of the property at an angle of 14° before increasing in grade to a maximum angle of 33° near the uphill boundary of the property. The slope above and below the property increase in grade.

A moderately sloping lawn is located on the downhill side of the property. Detached sandstone joint blocks that originate from the slope above are embedded in the lawn.

Soil tests carried out on the site have identified the subsurface conditions consist of sandy dark brown top soil, fine to medium grained, moist with fine trace organic matter to a depth of 0 to 0.7m. Underlying these soils rock was encountered to the depth of auger refusal at 0.7m. there was no water table encountered.


**Proposed Dwelling**

This report is based on these figures and the allowances outlined in Table H1 – AS1547:2012 “Typical domestic wastewater flow design allowances - Australia”, recommends an allowance of 120 litres/person/day for households with on-site roof water tank supply.

The occupants will be issued with information regarding water conservation and the use of products which are low in phosphorus to minimize the amount of wastewater generated. A site assessment in shown in Table 1 below:

**Table One: Site Assessment**

| Site Feature | Assessment |
|---|---|
| Flood Potential | Nil |
| Soil Type | Sandy soil, dark brown, fine to medium grained |
| Exposure | Northwest facing, high sun & wind exposure |
| Slope % | 14° to 30° |
| Land Form | Linear divergent slope |
| Erosion Potential | No signs of erosion potential present |
| Run-on and up slope seepage | Possible, not evident |
| Site Drainage | Good – site stormwater easily diverted from proposed absorption area |
| Land filling | Nil |

| | |
|---|---|
| Land available for application areas and buffers | Sufficient area available |
| Rocks and rock outcrops | <10% of land surface contains rock >200mm diameter |
| Buffers | >50 metres buffer distance to water source |

## The system

1. 'Fujiclean' CE-1500 EX on-site waste water treatment system and 45m² of discharge control trenching.

## The Disposal Area

The disposal area consists of 48m$^2$ total of discharge control trenching with a width of 500mm distributed between 4 trenches 1000mm apart.

## Sizing

L = Length in m
Q = Design daily flow in L/day
DLR = Design loading rate in mm/day
W = Width in m

L = 600 / (30x0.5)

L = 40 metres required

## Proposed Dwelling

For a 3 bedroom house with up to 5 users, a design combined wastewater flow rate of 600litres/day is adopted.

Table L1, "Recommended Design Loading Rates for Trenches and Beds" from AS 1547-2012, indicates a DLR of 50mm/day for sandy loam soils weakly structured for secondary treated effluent, but due to the slope of the land we have adopted a more conservative figure of 30mm/day.

## Expected Quality of Wastewater

### Effluent Quality

The expected quality of wastewater after partial treatment in a waste water treatment system is shown in Table Two below:

**Table 2 Expected Quality of Wastewater after Treatment in a Waste Water Treatment System**

| Parameter | Concentration |
|---|---|
| Biochemical Oxygen Demand BOD | <10 mg/L |
| Suspended solids | <10 mg/L |
| Total Nitrogen (TN) | 18.11 mg/L |
| Total Phosphorous | 1.33 mg/L |
| Faecal Coliforms | <10 cfu/100ml |

Source: NSW Health 2014

**Maintenance:**

**DO**
Have your system serviced once a year

Learn the location and layout of your on-site waste water treatment system and land application area.

Use biodegradable liquid detergents such as concentrates wit low sodium and phosphorus levels.

Conserve water.

**DON'T**
Don't put bleaches, disinfectants, whiteners, nappy soakers and spot removers in large quantities into your septic tank via the sink, Washing machine or toilet.

Don't allow any foreign materials such as nappies, sanitary napkins, condom's and other hygiene products to enter the system.

Don't use more than the recommended amounts of detergents.

Don't put fats and oils down the drain and keep food waste out of your system.

## APPENDIX

- Table L1 – AS1547:2012, “Recommended Design Loading Rates For Trenches and Beds”
- Table H1 – AS1547:2012, “Typical domestic wastewater flow design allowances-Australia”
- Table L2 – AS1547:2012 ”Typical Dimensions of Conventional Trenches and Beds”
- Figure L4 – AS1547:2012 Discharge Control Trench

**TABLE L1**
**RECOMMENDED DESIGN LOADING RATES FOR TRENCHES AND BEDS**

| Soil category | Soil texture | Structure | Indicative permeability ($K_{sat}$)(m/d) | Design loading rate (DLR) (mm/d) | | | |
|---|---|---|---|---|---|---|---|
| | | | | Trenches and beds | | | ETA/ETS beds and trenches |
| | | | | Primary treated effluent | | Secondary treated effluent | |
| | | | | Conservative rate | Maximum rate | | |
| 1 | Gravels and sands | Structureless (massive) | > 3.0 | 20 (see Note 1) | 35 (see Note 1) | 50 (see Note 1) | (see Note 4) |
| 2 | Sandy loams | Weakly structured | > 3.0 | 20 (see Note 1) | 30 (see Note 1) | 50 (see Note 1) | |
| | | Massive | 1.4 – 3.0 | 15 | 25 | 50 | |
| 3 | Loams | High/ moderate structured | 1.5 – 3.0 | 15 | 25 | 50 | |
| | | Weakly structured or massive | 0.5 – 1.5 | 10 | 15 | 30 | |
| 4 | Clay loams | High/ moderate structured | 0.5 – 1.5 | 10 | 15 | 30 | 12 |
| | | Weakly structured | 0.12 – 0.5 | 6 | 10 | 20 | 8 |
| | | Massive | 0.06 – 0.12 | 4 | 5 | 10 | 5 |
| 5 | Light clays | Strongly structured | 0.12 – 0.5 | 5 | 8 | 12 | 8 |
| | | Moderately structured | 0.06 – 0.12 | (see Notes 2 & 3) | 5 | 10 | (see Notes 2, 3, & 5) |
| | | Weakly structured or massive | < 0.06 | | | 8 | |
| 6 | Medium to heavy clays | Strongly structured | 0.06 – 0.5 | | | | |
| | | Moderately structured | < 0.06 | | | | |
| | | Weakly structured or massive | < 0.06 | | | | |

NOTES:
1 The treatment capacity of the soil and not the hydraulic capacity of the soil or the growth of the clogging layer govern the effluent loading rate in Category 1 and weakly structured Category 2 soils. Land application systems in these soils require design by a suitably qualified and experienced person, and distribution techniques to help achieve even distribution of effluent over the full design surface (see L6.2 and Figure L4 for recommended discharge method by discharge control trench). These soils have low nutrient retention capacities, often allowing accession of nutrients to groundwater.
2 To enable use of such soils for on-site wastewater land application systems, special design requirements and distribution techniques or soil modification procedures will be necessary. For any system designed for these soils, the effluent absorption rate shall be based upon soil permeability testing. Specialist soils advice and special design techniques will be required for clay dominated soils having dispersive (sodic) or shrink/swell behaviour. Such soils shall be treated as Category 6 soils. In most situations, the design will need to rely on more processes than just absorption by the soil.
3 If $K_{sat}$ < 0.06 m/d, a full water balance for the land application can be used to calculate trench/bed size (see Appendix Q).
4 ETA/ETS systems are not normally used on soil Categories 1 to 3.
5 For Category 6 soils ETA/ETS systems are suitable only for use with secondary treated effluent.

Table L1 – AS1547: 2012

**TABLE H1**
**TYPICAL DOMESTIC WASTEWATER DESIGN FLOW ALLOWANCES – AUSTRALIA**

| Source | Typical wastewater design flows (L/person/day) | |
|---|---|---|
| Residential premises | On-site roof water tank supply | Reticulated water supply |
| | 120 | 150 |
| Source: Australian Bureau of Statistics. Water Account 2004/2005. Chapter 7 Figure 7.3 | | |

Table H1 – AS1547:2012, “Typical domestic wastewater flow design allowances- Australia”

**TABLE L2**
**TYPICAL DIMENSIONS OF CONVENTIONAL TRENCHES AND BEDS**

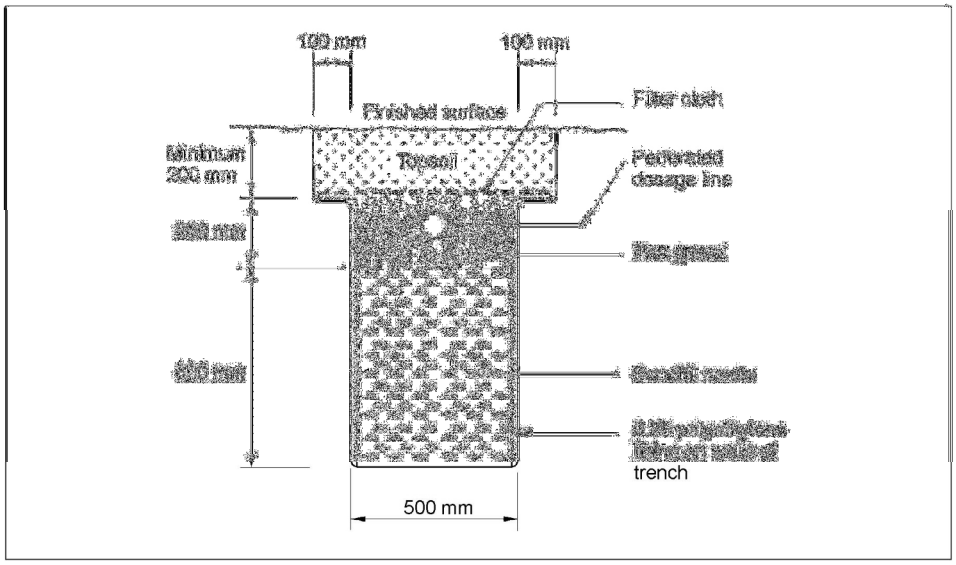
| | Typical dimensions (mm) | Maximum (mm) | Minimum (mm) |
|---|---|---|---|
| **Trench dimensions** | | | |
| Width | 300 – 450 | 600 | 200 |
| Depth of aggregate | 200 – 400 | 400 | 200 |
| Depth of topsoil | 100 – 150 | 150 | 100 |
| Spacing between adjacent trenches (sidewall to sidewall) | – | N/A | 1000 |
| **Bed dimensions** | | | |
| Width | 1000 – 4000 | 4000 | 1000 |
| Depth of aggregate | 300 – 600 | 600 | 300 |
| Depth of topsoil | 100 – 150 | 150 | 100 |
| Spacing between adjacent beds (sidewall to sidewall) | – | N/A | 1000 |

### L5.3 Construction details

Typical details of construction are shown in:

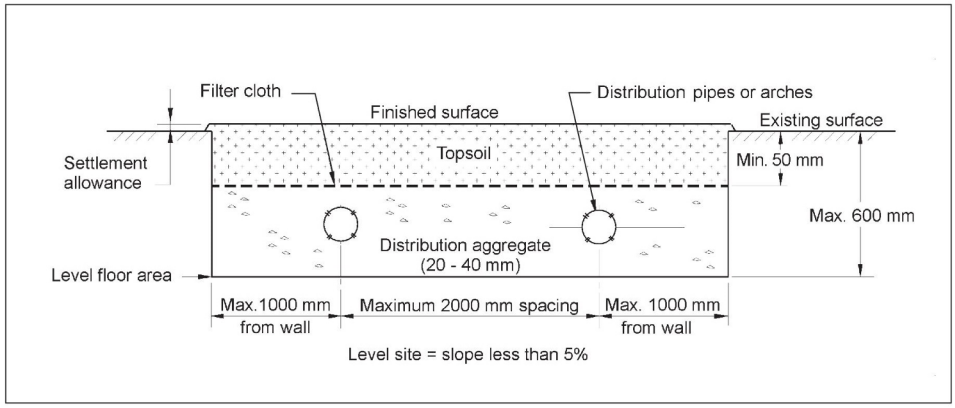
| | |
|---|---|
| Trenches | Figure L1 Conventional piped trench |
| | Figure L2 Self-supporting arch trench (two versions) |
| | Figure L3 Boxed trench |
| | Figure L4 Discharge control trench |
| Beds | Figure L5 Conventional bed |
| ETA/ETS trenches and beds | Figure L6 ETA/ETS bed details |
| | Figure L7 ETA/ETS trenches |

Table L2 – AS1547:2012 ”Typical Dimensions of Conventional Trenches and Beds”




NOTE: An LPED line can be used for dose loading instead of the perforated line.

**FIGURE L4 DISCHARGE CONTROL TRENCH**




NOTE: LPED lines can be used instead of distribution pipes when dose loading effluent into beds.

**FIGURE L5 CONVENTIONAL BED**