Taïsa Baars | Environmental Health Scientist

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ON-SITE WASTEWATER MANAGEMENT REPORT

Local Government Act Section 68

Four cabins
1 x 2-bedroom and 3 x 1-bedroom

At
Lot 3 DP 115913 & Lot 14 DP 755722 at 18 Alidenes Road, Wilsons Creek, NSW 2482

For:
Ricky Sing

Site and Soil Evaluation
+
Design of New OSMS

Date
22th May 2024

Report No:
18AlidenesRoad/WilsonsCreek/OSMS/CabinsNewAmendments

ABSTRACT / EXECUTIVE SUMMARY

Development: Proposed four cabins, 3 x 1-bedroom and 1 x 2-bedroom (plus 3 bedroom). This wastewater report is for the proposed cabins, a separate wastewater assessment for the 4-bedroom house has been conducted and proposed in a separate wastewater section 68 report.
Site: Lot 3 DP 115913 & 14 DP 755722, at 18 Alidenes Road, Wilsons Creek.
Owners/ Developer: Ricky Singh.
Property size: approximately 19ha
Soil Type/ Structure: Clay Loam.
Drinking water bores: Not present on or near site.
Limitations: hardsetting, erodible soils of low fertility. Steep slopes. Intermittent water courses.
Bedrooms/ equivalent persons for OSMS system for the four cabins: Collecting wastewater from four cabins, two are 1-bedroom and two are 2-bedroom. Full occupancy has been calculated as a safety factor therefore hydraulic load is calculated for 16.e.p.
Wastewater Load: 16 E.P. in total. The Total Daily Flow is calculated at 1840L/day.
Conclusion: Site is suitable for wastewater disposal; no major environmental constraints and a suitable system is designed to treat the wastewater from the four cabins.
Treatment System: Water saving devices installed in all cabins. Passive **treatment of the wastewater is proposed through collecting the wastewater in a 4500 litre NSW Health approved septic tank and then treated using 2 x Graham Concrete Reedbed cells** with 50% nitrogen reduction.
Land Application: 3 x ETA beds 18.60 m L x 2m W x 0.45m D.

Byron Environmental Consulting has been engaged by Ricky Singh to provide an On-Site Wastewater Management Report to accompany a DA for the prosed four cabins, of which two cabins are 1-bedroom and two cabin are 2-bedrooms. An additional wastewater assessment by Byron Environmental Consulting has been prepared for the proposed 4-bedroom dwelling on this large lot on the southern site of the lot and a rural shed. 18 Alidenes Road is a large 19-hectare site and is predominantly and historically used for the grazing of cattle. The site has six intermittent water courses including arms and two permanent creeks being Yankee creek on the southern section of the lot and Mullumbimby Creek along the northern boundary. The property is elevated at 20m and predominantly sloping down to the east with the main house (south facing) and the cabins (north facing) both being located on a ridge. The wastewater load of the cabins will treated and disposed into proposed wastewater system.

Wastewater will be collected by NSW Health approved 4500L septic tank with effluent filter installed on the outlet. Secondary treatment for the wastewater is proposed by 2 x Graham Concrete Reedbed Cells followed by disposal via three ETA beds of 18.6m L X 2m W x 0.45m D. Exposure to wind and the sun on the land application area is excellent being directly north facing and is located 200m away from the intermittent watercourses.

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1.0 Introduction

Byron Environmental Consulting has carried out a site and soil evaluation at the subject site in order to provide a suitable design for the safe and environmentally sustainable on-site disposal of sewage effluent. The site is not connected to a centralized sewerage treatment system and will require approval for an on-site wastewater treatment system to service four Rural Tourist Cabins, 2 x 2-bedroom and 2 x 1-bedroom cabins. The site inspection, field work and system inspection was completed by Taïsa Baars of Byron Environmental Consulting on the 23th of March 2022. A meeting was held on site with the owner to discuss the development. Discussions included appropriate wastewater systems and application areas for the new proposal and on-site wastewater management options. This assessment has been conducted to design a suitable system for the cabins and a separate wastewater report for the proposed 4-bedroom main house has been prepared. The purpose of this report is to demonstrate to Byron Shire Council that an appropriate wastewater system is designed and will be in place. Further investigation was undertaken to determine the soil profile of the site to accommodate the hydraulic load for the development. The investigation and on-site sewage system has been prepared in accordance with Byron Shire Councils requirements and Australian Standards AS/NZS1547:2012- *On-site domestic wastewater management.*

2.0 Desktop Research

The site is an approximately 19ha rural lot. The cabins are proposed on the northern side of the ridgeline and are accessible by Yankee Creek road. The sites elevation is approximately 40m at the highest point. Mullumbimby Creek runs along the northern boundary with a setback of approximately 200m away from the proposal. Setbacks from boundaries can all easily be met on this large rural property. It was also assessed as to whether the best outcome was to dispose of the wastewater via sub surface irrigation or ETA beds, ETA beds were chosen as subsurface irrigation fields can become blocked or damaged and require regular maintenance and service agreements. Furthermore, the northern rivers with high rainfall, and this site with its

elevated sloping landscape facing north, allows for the perfect opportunity for the wind and the sun to help in the evapotranspiration process of the absorption beds.

Figure 1: Satellite image with contours and watercourses (Source: SiX Maps, 2022).

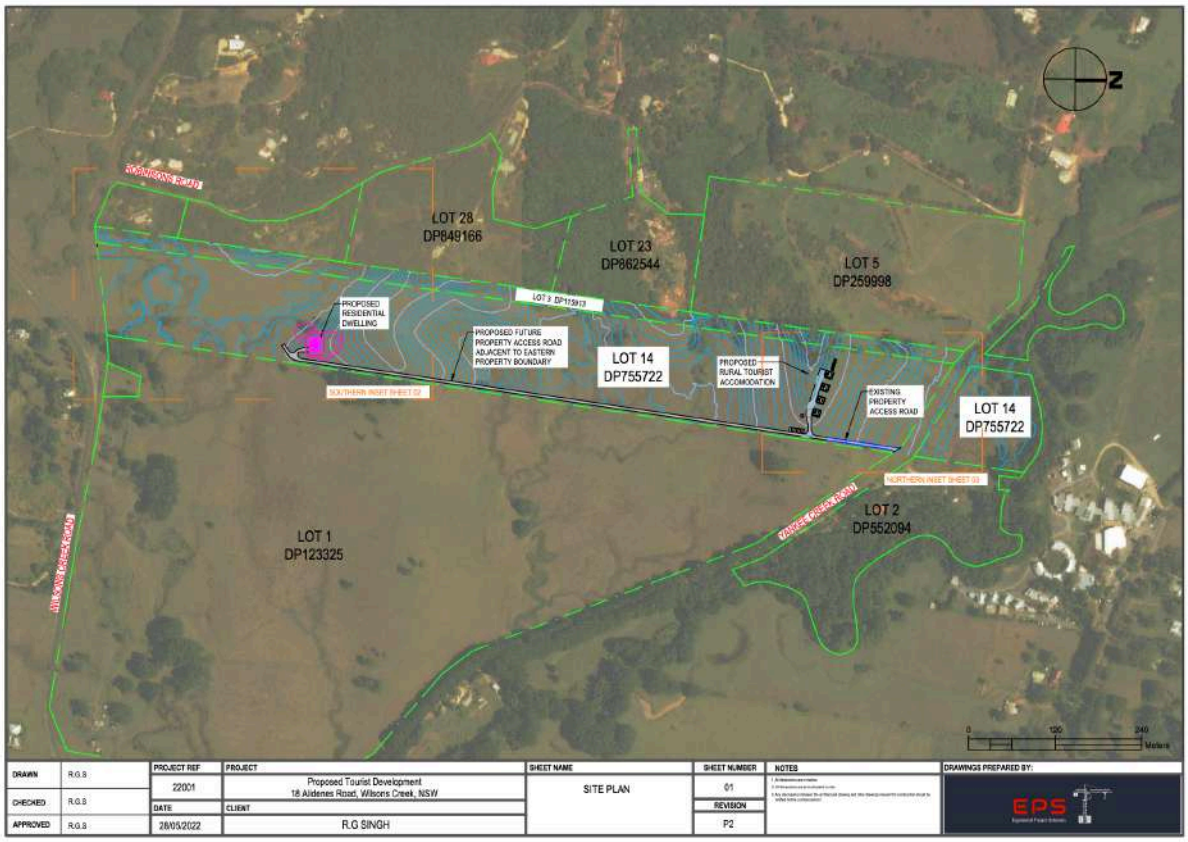

Figure 2: Proposed locations for cabins

3.0 Site Investigation

Fieldwork investigations were carried out by Byron Environmental Consultant, Taïsa Baars. The site investigation included the digging of two investigative holes to a depth of 1000mm at the proposed land application area. These soil samples have been used to conduct permeability testing on the soil. A soil sample was taken at 450mm (LAA disposal point) of depth and analysed for wastewater disposal. A visual inspection of the site and soil was also undertaken. Vegetation consists of open north facing down sloping grass lands at the proposed wastewater land application area. Table 1 shows findings during site inspection.

Table 1: Summary of site evaluation

Land Application Area Site Parameters	Description
Size	19ha
Vegetation	Open current grazing field at proposed LAA.
Slope	5 to 8% down to the north
Slope type (convex/ concave)	Concave
Aspect	Northern.
Exposure	Excellent sunlight with good wind exposure, around LAA mostly open field makes for excellent exposure.
Boulders /floaters/ rock out	Some boulders have been observed during site inspection.
Flooding potential	No
Run on and upslope seepage	Diversion swale recommended
Distance from water	Approximately 200m away from Mullumbimby Creek.
Site drainage	Due to sites elevated position, soil, aspect and exposure, good site drainage.
Surface Condition	Grass cover.
Fill	Nil apparent.
Erosion	Nil apparent.
Depth to groundwater	>1.0m no groundwater found during soil sampling as expected on elevated site.

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4.0 Soil Landscape

The site is classified as part of the Billinudgel soil landscape in Morland (1994). Collected soil samples were analysed and were found to have similar properties to the Billinudgel soil landscape.

The following is a summary of the soil landscape descriptions.

Soil Landscape:	Billinudgel.
Landscape:	low rolling hills on metamorphics of the Nernleigh-Fernvale Group. Relief is 50-100m, slopes 10-20%. Partly cleared open eucalypt forest.
Soils:	Shallow to moderately deep (100cm), moderately well-drained Yellow Podzolic Soils and Yellow Podzolic Soil on crest and slopes.
Limitations:	hard setting, shallow, stony and erodible soils of low fertility. Steep slopes and localized mass movement.

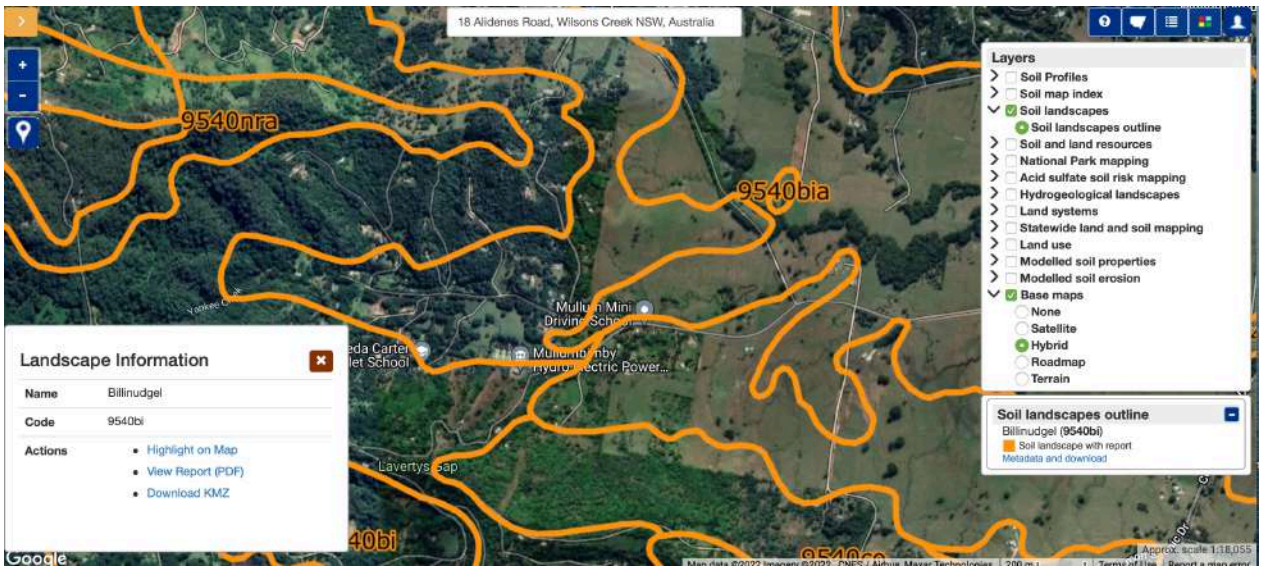

Figure 3: Soil profile mapping (eSPADE, 2022).

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5.0 Soil Assessment

The soils consist of olive brown clay loam of strong structure.

Table 2: Summary of soil evaluation

Soil Parameter	Borehole 1	Borehole 2
Sample Depth	**± 450mm**	**same**
pH	**5.0**	**5.5**
Ribbon length	**60mm**	**65mm**
Soil Type	**Clay Loam**	**Clay Loam**
Colour	**Olive Brown**	**Olive Brown**
Structure	**Moderate**	**Moderate**
Dispersive	**Class 2**	**Class 2**
Slake	**Class 2**	**Class 2**

As shown, the soil comprised of an Olive Brown clay loam of moderate structure. This soil type is considered suitable for wastewater disposal and is classed as a soil category 4 according to AS/NZS 1547:2012.

Table 3: Borehole log

Soil Assessment				Soil Landscape: Billindugel (Morand 1994)	
Borehole 1 & 2					
Depth (cm)	**Graphic Section**	**Colour**	**Soil pH**	**Course Fragments**	**Texture and Soil description**
0-20cm		Olive Brown	5.0	Topsoil, grass cover.	Moderate to clay loam (5-20cm)
20-40cm		Olive Brown		Smooth to manipulate	Clay loam
40-60cm		Olive Brown		Smooth bolus	Clay loam
60-80cm		Dark Reddish		Smooth, stiffer to manipulate	Clay loam
80-100cm		Dark Brown		Smooth, stiff, sandy	Sandy Light Clay
100-120cm		Dark Brown		Stiff more clay content	Sandy Light Clay

6.0 Design Flows and hydraulic load

All four cabins have a toilet, handbasin, shower, kitchen and laundry.

All four cabins have a toilet, handbasin, shower, kitchen and laundry.

Wastewater Load for the 4 cabins is calculated for 10 E.P. in total. Full occupancy has been assumed as a conservative measure and a daily effluent flow of 115L per person is used. The Total Daily Flow is calculated at 1150L/day (See Byron OSMS model). The total design flow rate is 1150 litres per day to cater for the 4 cabins of 2 x 1-bedroom and 2 x 2-bedroom.

7.0 On-Site Wastewater Management System & Treatment of wastewater

The wastewater will be collected in a NSW Health approved septic tank and then treated by 2 x 7.2m^2 Graham Concrete reedbed cells (see specifications attached)

- Removes phosphates and nitrogen from wastewater.
- Improves water quality markers in the areas of biochemical oxygen demand, total suspended solids, dissolved oxygen levels and E coli counts
- Gravity fed ensures no ongoing power costs
- Requires no quarterly services by external agent

Two x two Graham Concrete reedbed cells treat the wastewater to secondary quality.

Site photograph: Proposed land application area.

8.0 Sizing of land application area

Sizing of ETA beds with Australian Standards AS/NZS 1547:2012.

L = 1150 / 12 x 2

L = 48

Three 16m L ETA beds would be sufficient as per Australian Standards AS/NZS 1547:2012. The Byron OSMS model calculated 3 X 18.60m L. The Byron Model is proposed due to the conservative nature of the proposal.

It is proposed to install a land application area of 3 x 18.60m L x 2m w x 0.45m D ETA beds (find Byron OSMS model outcome attached).

9.0 Setback distance for Land Application Area

The land application area on the lot needs to meet the following buffer distances to minimize environmental health impact.

Table 4: Setback distances

Site Feature	Available	Requirement	Requirement met if not how solved?
Permanent waters including rivers, creeks, wetlands, dams or lakes.	200m	100m	secondary treatment of wastewater by reedbed cells
Buffer from the centre-line of ephemeral water course (e.g. intermittent waterways, drainage channels and dry gullies).	200m	40m	√
Domestic ground water well	None observed	250m	√
Buildings	Yes	6m	√
Swimming pools	n/a	6m	√
Boundary	Yes	6m	√
Other sensitive environments or contaminated land e.g cattle tick dip sites	None observed nearby	100m	√

10.0 Planting of reeds

Bacteria, both aerobic and anaerobic, are among the most plentiful microorganisms in wetlands and are thought to provide the majority of the wastewater treatment. Aquatic plants used in constructed wetland systems can be divided in two general groups: microscopic and macroscopic. Most of the microscopic plants are algae, which can be either single cell (such as *Chlorella* or *Euglena*) or filamentous (such as *Spirulina* or *Spyrogyra*). These will naturally occur in the reed bed. Macroscopic (larger) plants can grow under water (submergent) or above water (emergent). Some grow partially submerged and some partially emerged. Aquatic plants can take up and sometimes metabolize water contaminants such as insecticides, benzene, fecal coliforms and heavy metals.

11.0 Planting of buffer

The planting of a vegetation buffer below the ETA beds is advised. See planting list below. The planting of native trees are encouraged.

Small trees	Trees	Ferns	Small plants	Reeds
Health Banksia	Blackwood	Bungwall	Cunjevoi Lily	Jointed Twigrush
Swamp Banksia	Lilly Pilly	Gristle Fern	Native Ginger	Rush
White Bottlebrush	Bangalow Palm	Binung	Wallum bottlebrush	Club Rush
Weeping Bottlebrush	Brown Kurrajong	Tree Fern	Palm Lilies	Sedges
Little Evodia	Umbrella Cheese Tree		River & Stream Lily	Tassel Sedge & Sedge
Creek Sandpaper Fig	Cottonwood Hibiscus		Blue Tongue	Cattails
Swamp Hibiscus	Cabbage Palm		Knotweeds	
Common Ti Tree	Swamp Box		Frogsmouth	Spike Rush
Lemon Ti Tree	Broad-leaved Paperbark		White Nettle	Sawsedge
Paperbark	Pink Euodia		Warrigal Greens	Reed
Prickly-leaved paperbark	Scrub Cherry			Salt Rush
Mangrove Boobialla	Water Gum			Grey Sedge
Bleeding Heart	Weeping Lilly Pilly			Creek & long Leaf Mat Rush

Native plants suitable for land application areas and buffers (Byron Shire Council, 2004).

12.0 Improvements to the soil

Acidic soil can be inhibiting for plant growth. Lime can be applied in the ETA bed to countereffect the acidity of the wastewater.

Gypsum is sometimes advised and often promoted as a 'clay breaker'. It does little to improve the structure of clays that are not sodic, soils where there is little or no clay dispersion, or the structure of soils containing only small amounts of clay. Sodic clay surface soils disperse in water. Dispersion of surface soil causes crusting. Sodicity also causes excessive swelling with water. The excessive swelling of a sodic subsoil closes large pores and reduces infiltration and drainage. Waterlogging may result.

Sodicity is most obvious in the soil surface, when clay dispersion leads to crusting. If your soil is prone to crusting, it could be dispersive, and could respond to gypsum. (Department of primary industries, 2021).

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13.0 Responsibilities of developer/owner/ resident

On-site wastewater systems can have adverse impacts on the health of the environment and your family (including pets). They can spread disease by bacteria, viruses, parasites and other organisms. Wastewater can contaminate ground, surface waters and oceans. Everything that is disposed of into the drains will enter the environment. This system is designed to safely dispose of human waste (poo and urine) and grey water. However, wastewater is getting contaminated with a more complex cocktail of household chemicals, some of these chemicals do biodegrade, others bio-accumulate like heavy metals in tuna fish, some chemically react together, and others photodegrade like microbeads in some cosmetics and micro plastics in laundry waste water. It does not matter if your waste is getting disposed on site or into a sewerage treatment plant, these chemicals do enter our environment if entered into the drain. **This pollution can be reduced by keeping all toxic chemicals out of your drains as possible.** For longevity of the on-site sewage management system the following maintenance regime should be employed by the owner/ occupier of the dwelling.

Maintenance requirement for sub-surface flow wetland

- Quarterly maintenance checks by owner of the wetland area by checking water level, cleaning of drains and the elimination of weeds.
- Wetland plantings should be thinned or harvested annually to maintain the nutrient removal capacity of the system.

Maintenance requirements for ETA Beds

- Check for system failures which are generally indicated by:
  a) Plumbing fixtures and fittings not draining properly indicate a damaged or blocked pipe or possible septic tank failure.
  b) Surcharge of effluent at ground level either around the tank, or down the slope at the land application area/s.
  c) Foul odour emanating from the tank or land application area/s.

Problem solving

All on-site systems need to be maintained in order to function well. If problems are found, such as:

- Slow-draining wastewater:
- Unusual odours:
- Surcharging effluent from ETA beds (land application system):
- Poor vegetation growth on and around ETA bed.

These symptoms should be investigated by a licensed plumber.

14.0 Recommendation

- Installation of an NSW Health approved 4500L NSW Health approved septic tank with effluent filter installed on outlet collecting wastewater from all 4 cabins.
- Installation of water saving features in all the cabins.
- The installation of 2 Graham Concrete Reedbed Cells.
- The installation of a distribution box.
- The installation of a land application areas of 3 x 18.6m L x 2.0 W x 0.45m D ETA beds

Specifications:

1. System is gravity fed.
2. Two-metre (2m) separation between beds.
3. All wastewater to be treated on-site.
4. ETA trench width 2m (double pipe)
5. System needs to be installed by a suitably qualified plumber.
6. Upslope run-on diversion swale to be installed to drain storm water run-off away from LAA.
7. Installation to comply with AS3500 & AS1547:2012.
8. >6m from all boundaries, >6 m from dwellings and driveways, >200m away from Mullumbimby Creek.
9. The ETA beds are to be constructed in accordance with AS1547:2012. The construction of the bed will involve the excavation of the natural soil to a depth of 450mm. Soil will be scarified and sand placed on this interface for a covering of about 50mm thick. Aggregate of 6-25mm diameter is placed on this to a depth of 200mm. One central distribution pipe is placed on this layer. Topsoil consisting of sandy loam is to cover the aggregate to a depth of 200mm. Geotextile fabric is to be placed between the aggregate and the topsoil. An inspection point of (being slotted and capped PVC pipe) will be installed in each bed. The ETA beds will allow the wastewater to be available to the root zone of plants where the majority of activity takes place, therefore allowing water and nutrient uptake.
10. Planting of a buffer below ETA bed.
11. Improvement to the soil by lime application

References

Australian Standard AS/NZS 1547- 2012 On-site domestic wastewater management.

Byron Shire Council (December, 2004). Design Guidelines for On-site Sewage Management for Single Households. Protecting the Environment and Health of Byron Shire.

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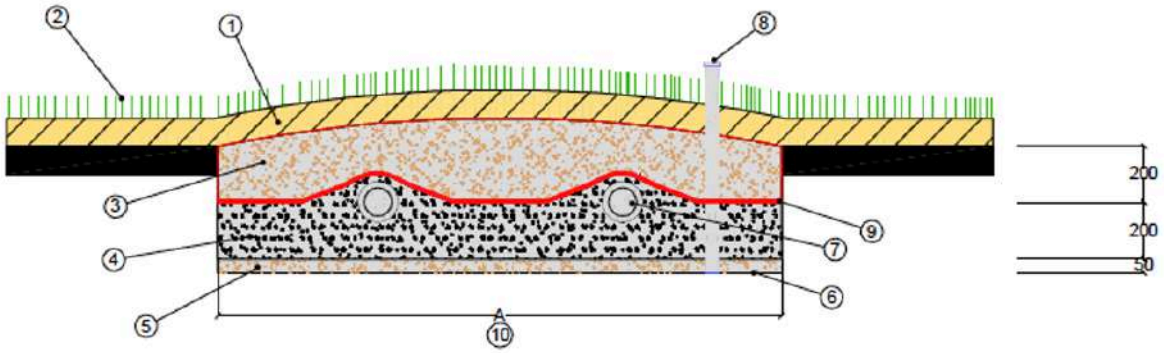
Sydney Catchment Authority and NSW Government (2012). Designing and installing Onsite Wastewater Systems, A Sydney Catchment Authority Current Recommended Practice.

EPA NSW (1998) Environment & Health Protection Guidelines On-site sewage management for single households.

Appendix A: AUSTRALIAN STANDARD AS/NZS 1547:2012 ETA BED

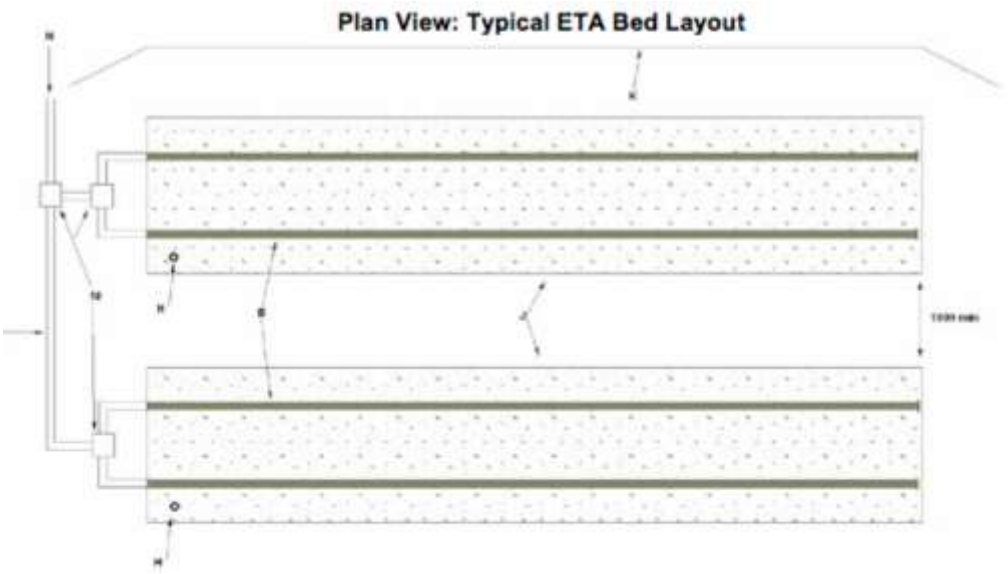
ETA Trench (Two distribution pipes) - SECTION VIEW

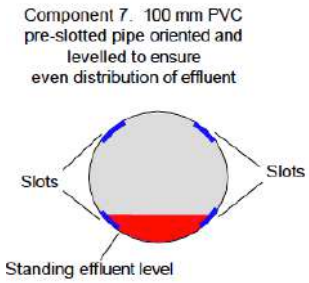


ETA BEDS- Minimum Components and Design Requirements

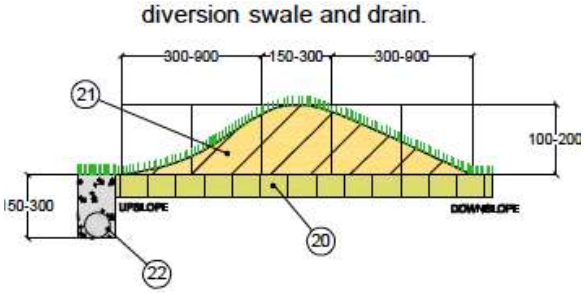
1. 100mm of topsoil or backfilled local soils, mounded to reduce surface water infiltration.
2. Grass or other suitable cover.
3. 100-200 mm of coarse packed sand.
4. 100-200 mm thick layer of 10-20 mm aggregate.
5. 50 mm thick sand cushion. Interface by raking existing soils prior to placing sand.
6. Flat base ETA bed to ensure equal distribution of effluent.
7. 90-100 mm pre-slotted sewer grade PVC pipe.
8. Inspection port to be placed on downhill side of each trench. Typically, a 50 mm PVC piezometer perforated in gravel and sand zone. Inspection ports must be kept visible, accessible and suitably protected to prevent damage by mover or other maintenance.
9. Geotextile filter cloth.
10. ETA trench width 2000mm.

Appendix B: AUSTRALIAN STANDARD AS/NZS 1547:2012 ETA BED continued





1. Spacing between ETA trenches (spacing between trenches should be at least 1000 mm).
2. Trench dispersal area (m^2). If greater than 1 m between trenches, calculate dispersal area as trench basal area plus 500 mm each side.
3. Downslope surface runoff collection drain. May be required if close to sensitive feature downstream.
4. Upslope run-on diversion and/or drain, required on all sloped sites.
5. Manifold distribution box, to be built from moulded PVC or pre-cast concrete, housed within 600mm x 600mm stormwater pit with solid pit. Distribution box must be placed and levelled on 1000mm x 1000mm pre-cast slab or bedded in concrete.
6. Feeder pipe, typically 100 mm PVC pipe. Effluent should be intermittently dosed, either by gravity through dosing siphon or by pumped application.
7. Splitter box, to be built from moulded PVC or pre-cast concrete. Box must be placed and levelled on 600mm x 600mm pre-cast slab or bedded in concrete.
8. End caps.
9. Existing soil.
20. Imported clean fill or local soil.
21. Agricultural distribution pipe in 100-150mm wide diversion drain, filled with 10-20mm gravel.



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Attachments: Detailed Site Plan

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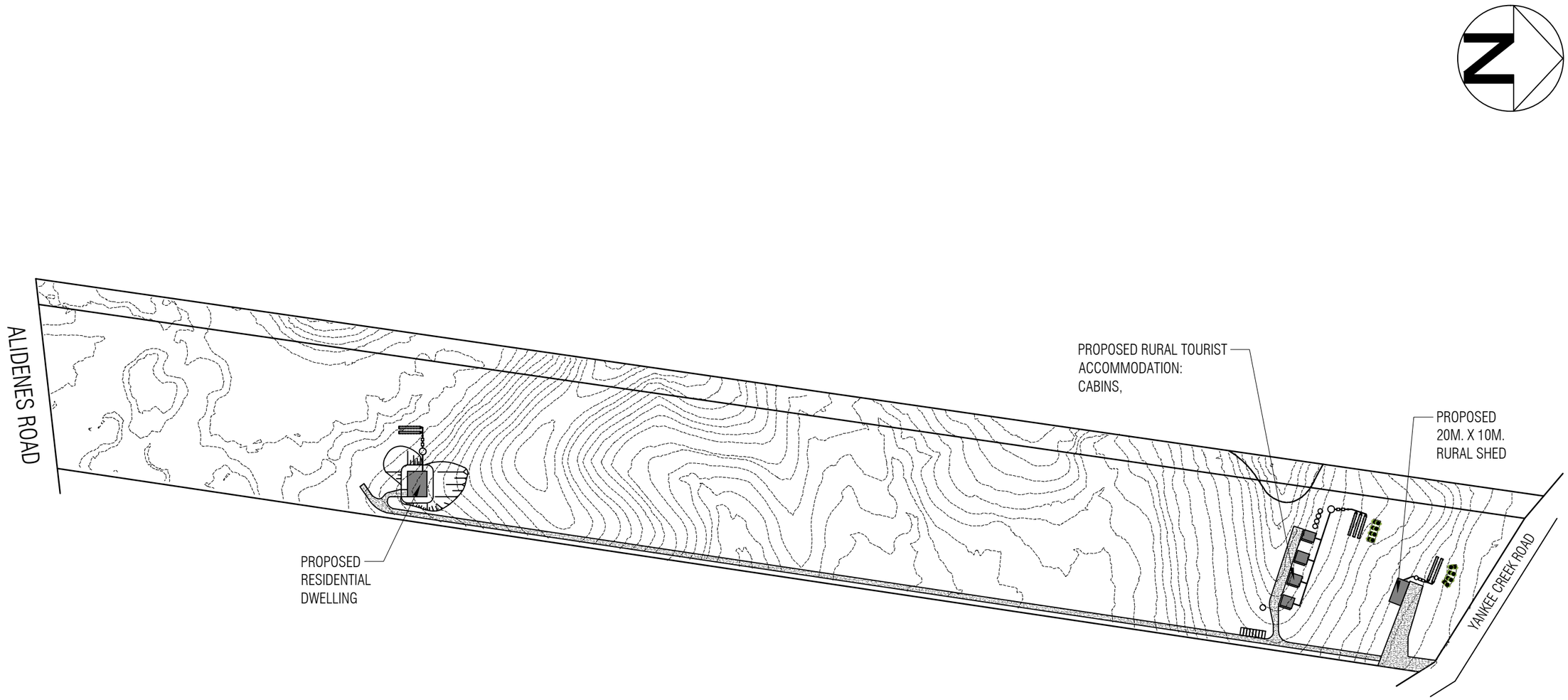

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Date : 24-05-2024 Drawn by : CCS
Scale : 1:3500
Amendment :

LOT 14 DP 755722
18 Alidenes Road, Wilsons Creek, NSW 2482

ON-SITE WASTEWATER LAYOUT (11-07-2022)

Drawing No.
(of: 1)

Drawing Size : A3

- : Wastewater Notes : -

OSMS FOR CABINS

- Installation of an NSW Health approved 5000L NSW Health approved septic tank with effluent filter installed on outlet collecting wastewater from all cabins.
- Installation of water saving features in all the cabins.
- The installation of 2 Graham Concrete Reedbed Cells.
- The installation of a distribution box.
- The installation of a land application areas of 3 x 18.6m L x 2.0 W x 0.45m D ETA beds.

SPECIFICATIONS

1. The system is gravity fed.
2. Two-metre (2m) separation between beds.
3. All wastewater to be treated on-site.
4. ETA trench width 2m (double pipe)
5. System needs to be installed by a suitably qualified plumber.
6. Upslope run-on diversion swale to be installed to drain storm water run-off away from LAA.
7. Installation to comply with AS3500 & AS1547:2012.
8. >6m from all boundaries, >6 m from dwellings and driveways, >200m away from Mullumbimby Creek.
9. The ETA beds are to be constructed in accordance with AS1547:2012. The construction of the bed will involve the excavation of the natural soil to a depth of 450mm.Soil will be scarified and sand placed on this interface for a covering of about 50mm thick. Aggregate of 6-25mm diameter is placed on this to a depth of 200mm. One central distribution pipe is placed on this layer. Topsoil consisting of sandy loam is to cover the aggregate to a depth of 200mm. Geotextile fabric is to be placed between the aggregate and the topsoil. An inspection point of (being slotted and capped PVC pipe) will be installed in each bed. The ETA beds will allow the wastewater to be available to the root zone of plants where the majority of activity takes place, therefore allowing water and nutrient uptake.
10. Planting of a buffer below ETA bed.
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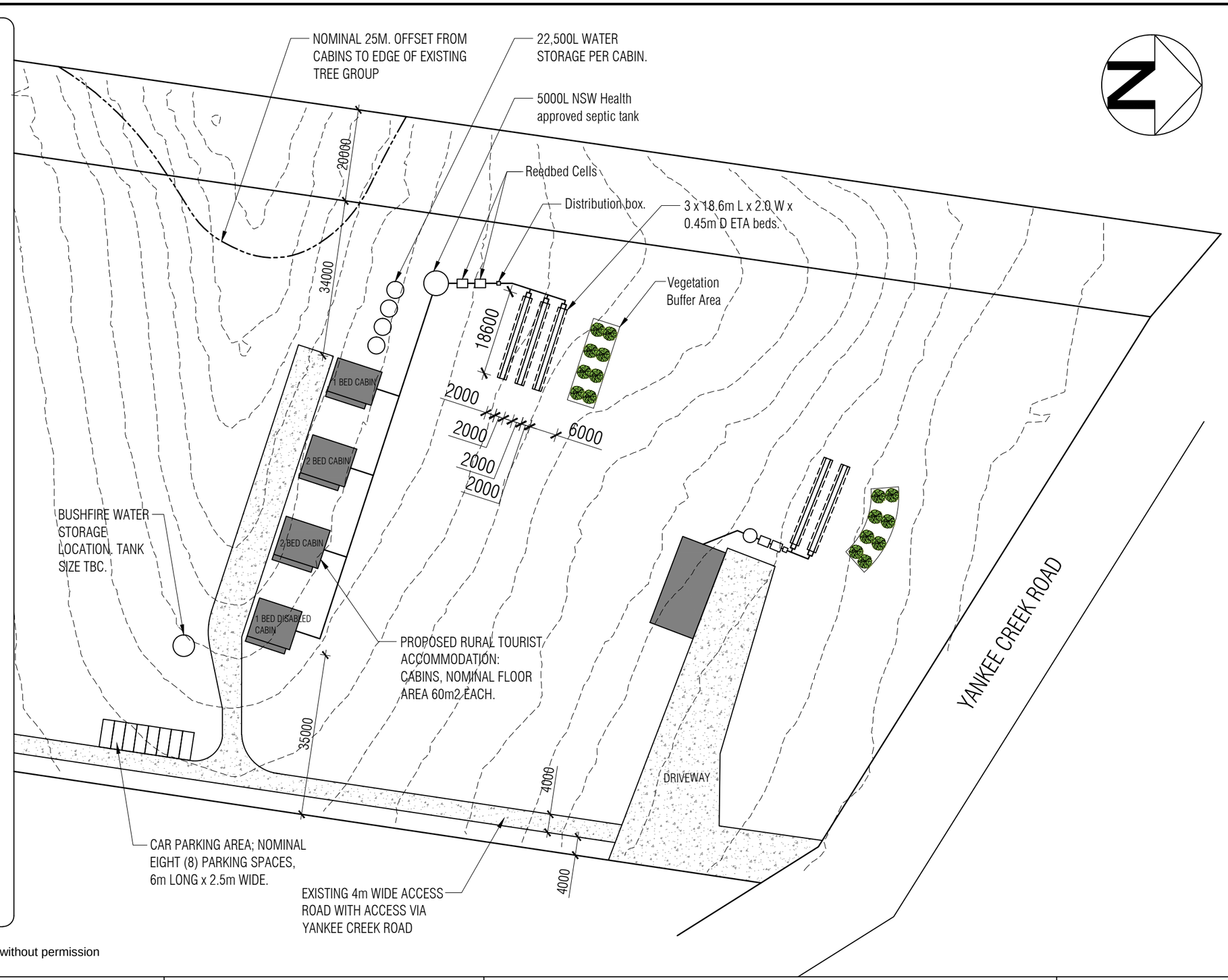

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7. Installation to comply with AS3500 & AS1547:2012.
8. >6m from all boundaries, >6 m from dwellings and driveways, >200m away from Mullumbimby Creek.
9. The ETA beds are to be constructed in accordance with AS1547:2012. The construction of the bed will involve the excavation of the natural soil to a depth of 450mm.Soil will be scarified and sand placed on this interface for a covering of about 50mm thick. Aggregate of 6-25mm diameter is placed on this to a depth of 200mm. One central distribution pipe is placed on this layer. Topsoil consisting of sandy loam is to cover the aggregate to a depth of 200mm. Geotextile fabric is to be placed between the aggregate and the topsoil. An inspection point of (being slotted and capped PVC pipe) will be installed in each bed. The ETA beds will allow the wastewater to be available to the root zone of plants where the majority of activity takes place, therefore allowing water and nutrient uptake.
10. Planting of a buffer below ETA bed.
11. Improvement to the soil by lime application.

Taisa Baars | Environmental Health Consultant

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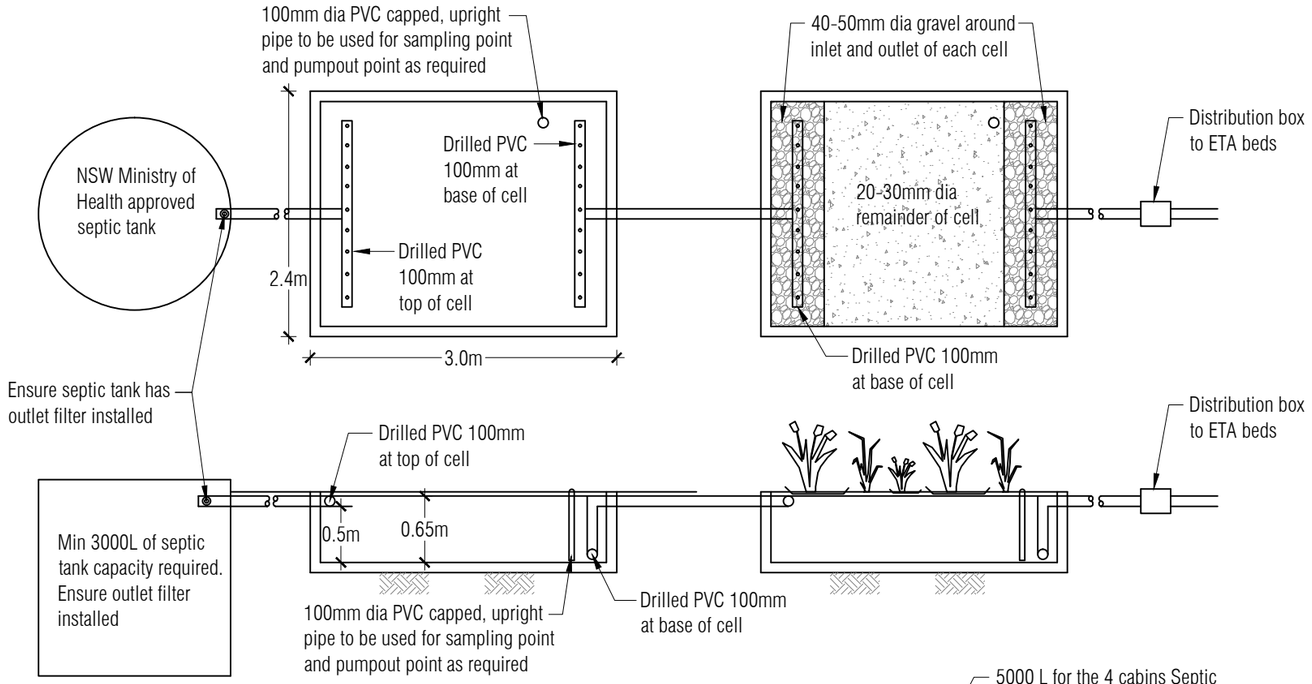
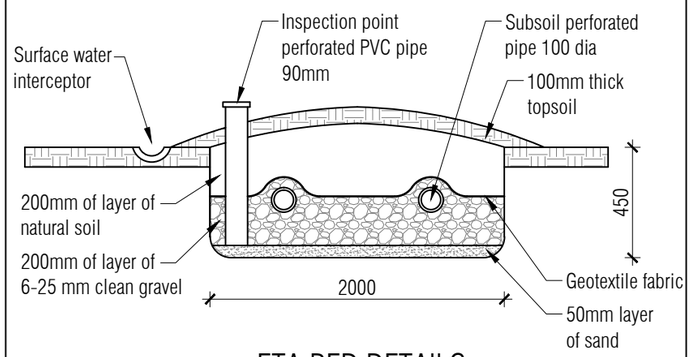
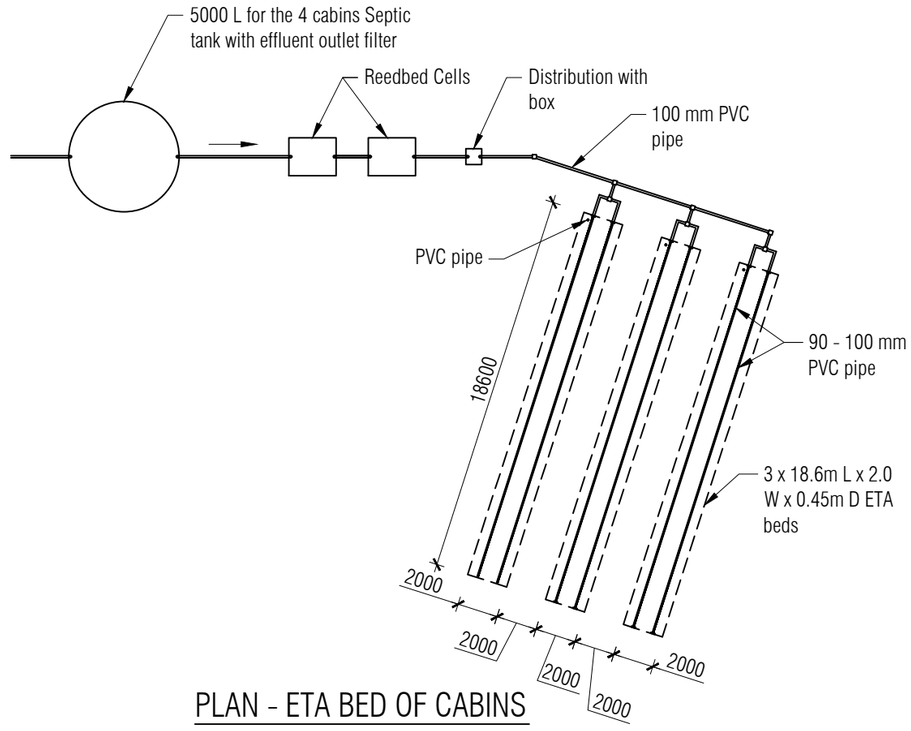


REEDBED CELLS DETAILS

Note, it is recommended that the ETA beds slope with the natural slope of the land, with a slight mound to allow some settlement of soil. This should provide run-off of stormwater, and a catch drain must be installed.



ETA BED DETAILS



PLAN - ETA BED OF CABINS

BYRON ENVIRONMENTAL CONSULTING
ABN: 31 322 380 628
E: taisa@byronenvironmental.com.au
W: www.byronenvironmental.com.au
Ph: 0428 480511

Date : 24-05-2024 Drawn by : CCS
Scale : 1:300
Amendment :

LOT 14 DP 755722
18 Alidenes Road, Wilsons Creek, NSW 2482

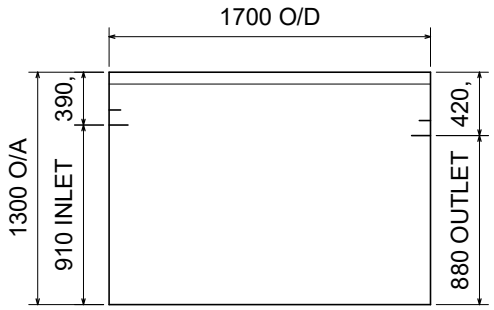
ON-SITE WASTEWATER LAYOUT (17-08-2021)

Drawing No.
(of: 1)
Drawing Size : A3

A/NZ STANDARD
1546.1:2008
LICENCE NO.
1421

A/NZ STANDARD
1546.1:2008
LICENCE NO.
1421

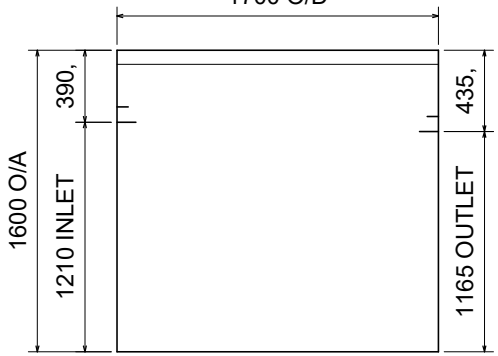
1500 LTS GREY WATER TANK



HOLE SIZE

2000 WIDE & 1220 DEEP

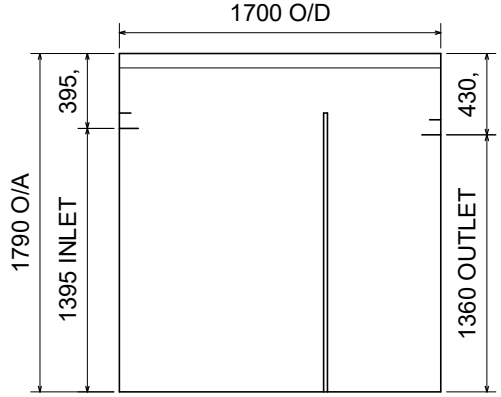
2050 LTS



HOLE SIZE

2000 WIDE & 1520 DEEP

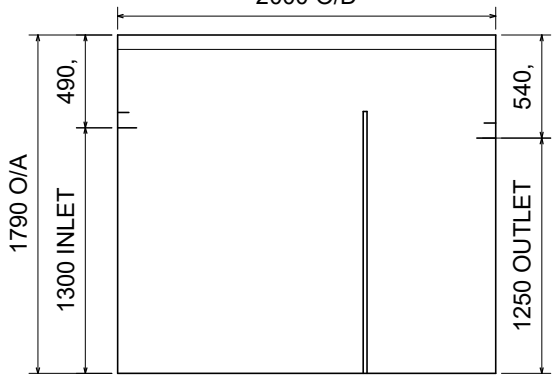
2300 LTS



HOLE SIZE

2000 WIDE & 1710 DEEP

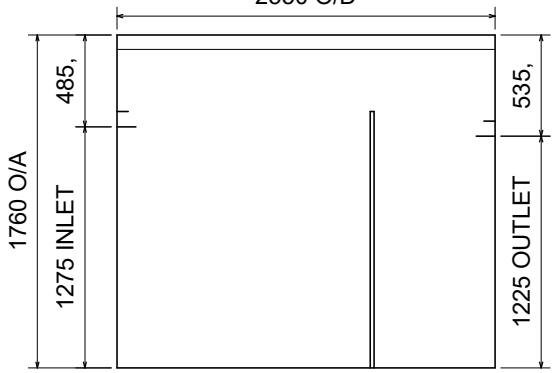
3000 LTS



HOLE SIZE

2400 WIDE & 1710 DEEP

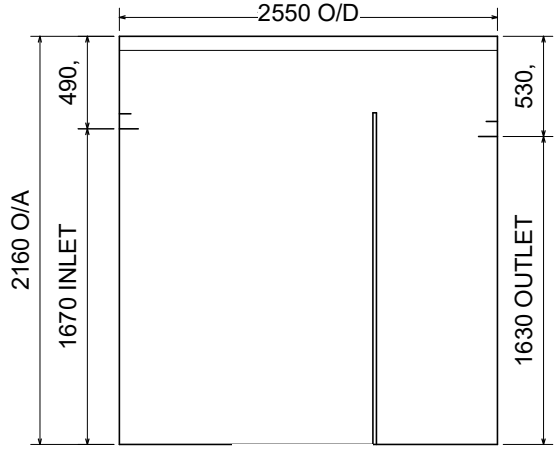
5000 LTS



HOLE SIZE

3000 WIDE & 1680 DEEP

7000 LTS



HOLE SIZE

3000 WIDE & 2080 DEEP

GRAHAM'S PRECAST

4-8 CRAIG ST
KYOGLE NSW 2480
Phone 02 66322978

admin@grahamsprecast.com.au

No	Description	Date
	Project Status	03/11/21

No	Description	Date

SEPTIC TANK SIZES

PETER GRAHAM

SEPTIC TANKS

Project number	AOO1	S.1	Approver
Date	11/03/2021		
Drawn by	JJD		
Checked by	PJG		

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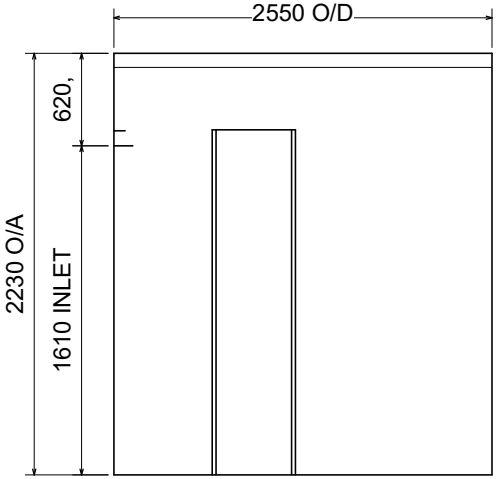
A/NZ STANDARD
1546.1:2008
LICENCE NO.
1421

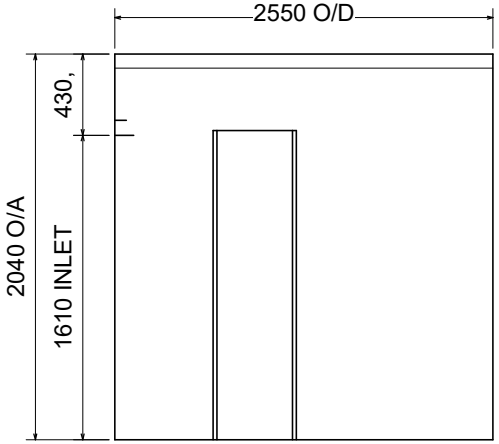
A/NZ STANDARD
1546.1:2008
LICENCE NO.
1421

ECONOCYCLE TALL TANK



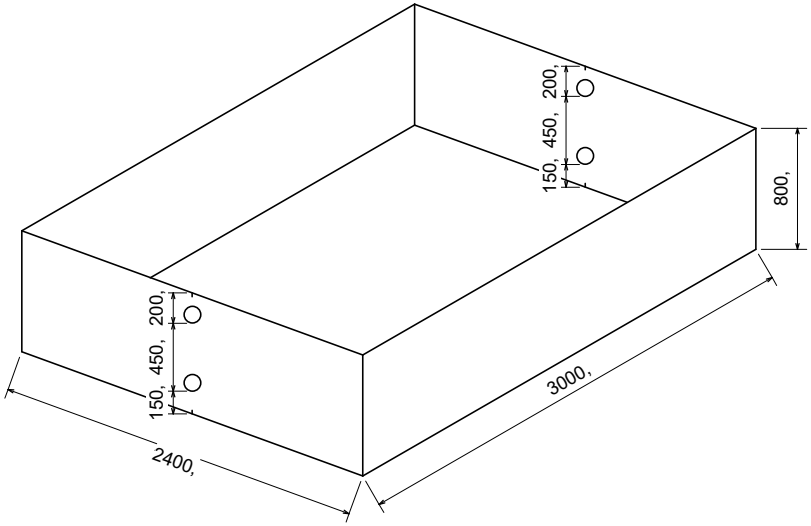
HOLE SIZE
3000 WIDE & 2150 DEEP

ECONOCYCLE SHORT TANK

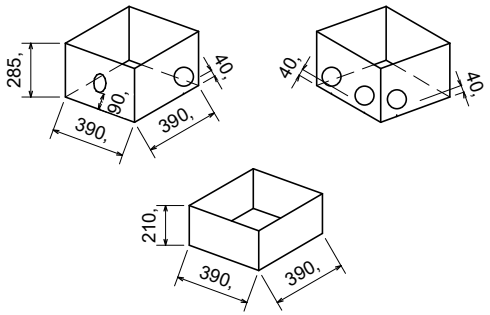


HOLE SIZE
3000 WIDE & 1960 DEEP

REED BEDS



DISTRIBUTION BOXES & RISER



OTHER QUALITY PRODUCTS INCLUDE:

CATTLE TROUGHS - SHEEP TROUGHS -
CATTLE GRIDS - FEED TROUGHS
HEAD WALLS - AND MORE.

ALL PRODUCTS ARE DELIVERED
BY OUR TOP OF THE RANGE
CRANE TRUCKS AND PLACED INTO
POSITION.

GRAHAM'S PRECAST
4-8 CRAIG ST
KYOGLE NSW 2480
Phone 02 66322978
admin@grahamsprecast.com.au

No	Description	Date
	Project Status	03/11/21

No	Description	Date

SEPTIC TANK SIZES

PETER GRAHAM

SEPTIC TANKS AND REED BEDS

Project number	AOO1	S.2	Approver
Date	11/03/2021		
Drawn by	Author		
Checked by	Checker		

12/03/2021 11:33:22 AM

Byron Shire Council

Septic Safe

Fact Sheet 1

What is an On-Site Sewage Management System?

If you own or rent a house that is not connected to Council's sewage system, you will have some type of on-site sewage management system (septic system) on the property.

Different types of systems

Typically the systems listed below provide storage, treatment and disposal of household wastewater in a way that the likelihood of adverse impacts to public and environment health are minimised.

These systems are all classified as on-site sewage management systems (OSMS) and require approval to install, owners require an approval to operate. Council will carry out operational inspections on these systems:

- Septic Tank
- Aerated Wastewater Treatment System
- Holding tank with pump out
- Wet composting toilet
- Recirculating sand filter system
- Grey water treatment system
- Waterless composting system

On-site sewage management includes any activity carried out for the purpose of holding or processing or reusing or otherwise disposing of sewage or by-products of sewage

The Australian/New Zealand Standard 1547 On-Site Domestic Wastewater Management and Department of Local Government's Environmental and Health Protection Guidelines: On-site Sewage Management for Single Households provide general advice/ guidelines on householder's responsibilities for managing an on-site sewage management system.

On-site sewage management is the management of untreated wastewater generated within a household and the application of the treated effluent to the land completely within the boundary of the premises. Wastewater includes all wastewater arising from household activities, including wastewater from kitchens, bathrooms and laundries. Accordingly, where the Council centralised sewer- age system is not available to a premises, an on-site sewage management is required.

General Notes

The type of system proposed for a particular site requires careful consideration by an experienced wastewater consultant and/or licensed plumber and drainer. All systems have limitations dependent on a wide range of factors inclusive of how they are used, operated and maintained. Time spent on making the right selection will pay dividends in the future.

Further Information

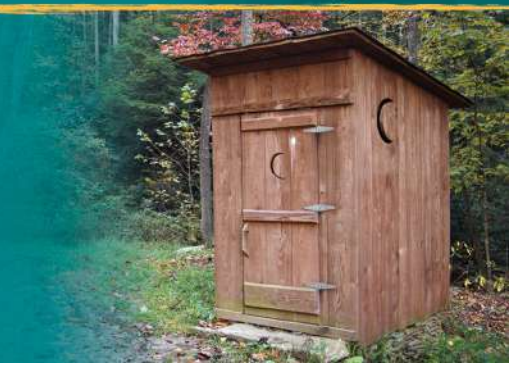
Environment and Health

E2017/3660 Jan 2017

Byron Shire Council

Septic Safe

Fact Sheet 2

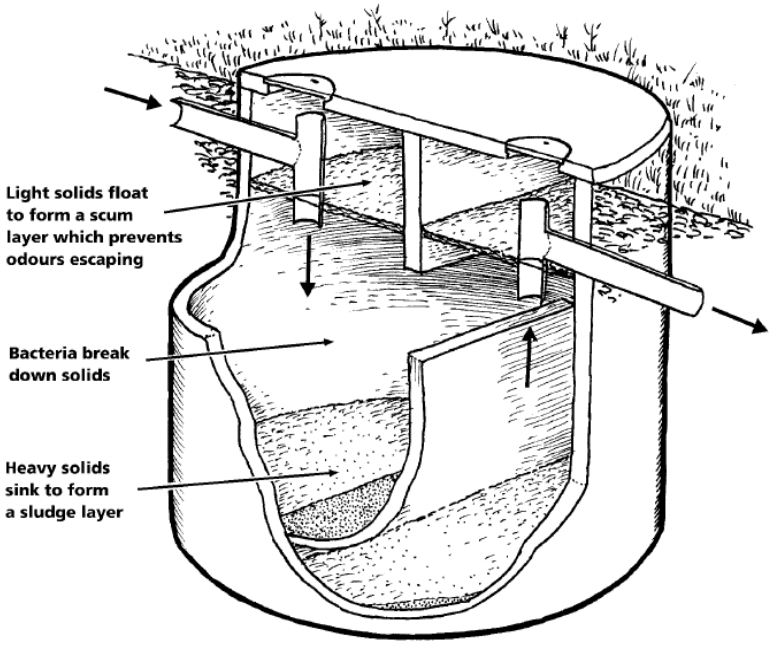


How a basic septic tank works

The major function of a septic tank is to separate solids, grease and oils out of the wastewater before it enters the drainage beds/trenches.

Septic Tank Function

When wastewater passes through the septic tank, heavier solids sink to the bottom and undergo bacterial digestion. This reduces the quantity of solids and also changes its composition to sludge, which builds up in the bottom of the tank. Materials such as grease and oil float to the surface in the tank to form a crust over the liquid, called scum. The remaining liquid, called effluent, flows from the tank into the drainage beds/trenches to soak into the surrounding soil where it may undergo further natural treatment processes.



When a septic tank system is correctly installed and maintained, it should work effectively for many years

If the septic tank accumulates too much sludge and scum, the effective volume of the tank is reduced which in turn reduces the time for separation to take place. This means not all the solids, grease and oils will separate and will pass out of the septic tank and into the drainage beds/trenches. This will clog the soil surrounding the drainage beds/trenches and should be avoided. To prevent this from happening, it is necessary to have the septic tank desludged (pumped out) regularly e.g. 5 yearly intervals. Desludging requires that a licensed liquid waste contractor be engaged to open the septic tank and pump out the contents.

A healthy septic tank is a living ecosystem where the right bugs (bacteria) thrive in the right proportions to digest human waste and prepare the liquid (effluent) for treatment.

Health Caution

Septic tanks do not kill pathogenic bacteria, viruses or parasites. Septic tank effluent must be treated with extreme caution and contact with people, food, clothing and pets must be prevented! Do wash your hands!!

Further Information

Environment and Health Division

E2017/5274 Jan 2017

www.byron.nsw.gov.au

Septic Safe

Fact Sheet 3

Management of your septic tank

The effective operation of the septic tank and disposal area will, in part, depend on how it is managed and maintained. A small amount of maintenance work performed regularly can prevent your system from failing. The following is a guide on how to achieve the most from your system.

Things to do

- ✓ Ensure your wastewater system is the appropriate design for the area. Inappropriate systems can pollute the natural environment and pose health risks to humans
- ✓ Regularly maintain the disposal area. Long grass and weeds reduce the evapotranspiration efficiency. Cut and remove grass clippings from the disposal area
- ✓ Have your septic tank de-sludged every three to five years to prevent sludge build up, which may 'clog' the pipes and absorption trenches
- ✓ Prevent the entry of stormwater onto the disposal area by constructing a diversion drain upslope. Direct the stormwater around the disposal area, but not into neighbouring properties
- ✓ Ensure your tank is well sealed. This prevents the entry of vermin and mosquitoes
- ✓ Conserve Water. The less water you use the drier the disposal area will be, especially through the cooler months
- ✓ Check household products for suitability for use with a septic tank. Use biodegradable liquid detergents, with low phosphorous and low sodium
- ✓ Have your grease trap (if installed) cleaned out regularly ie 3 monthly
- ✓ Know the location and layout of your septic system and disposal area
- ✓ Keep a record of pumping, inspections, and other maintenance.

Things **NOT** to do

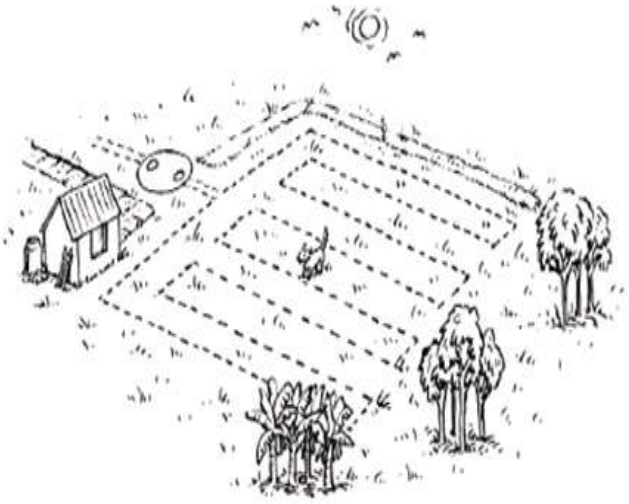
- ☒ Don't allow livestock to graze on the absorption/transpiration area. This can lead to compaction and collapse of the area
- ☒ Don't put large quantities of bleaches, disinfectants, whiteners, nappy soakers and spot removers into your septic tank via the sink, washing machine or toilet. These products can kill off the good bacteria needed to breakdown wastewater solids
- ☒ Don't allow any foreign materials such as nappies, sanitary napkins, condoms or other hygiene products to enter the system
- ☒ Don't put fats and oils down the drain and keep food waste out of your system
- ☒ Don't install or use a garbage grinder or spa bath if your system is not designed for it.

What to do if there is a problem with your septic tank or disposal area

If there is a problem with your septic tank or disposal area that has potential to impact on the environment or public health then you **must** by law do something about it. Indications of a problem include foul smells from the tank or disposal area, toilets and drains that back up or drain slowly, high water level in the septic tank, no de-sludging of tank in the last 5 years or a wet/soggy disposal area. Do not ignore the problem, it will only get worse and could cost you more money in the long term. Further Information

For regulatory advice prior to carrying out any alterations/modifications to existing systems or the installation of a new system you should contact Councils Environmental Health Unit.

For operational problems with an existing system you should contact a licensed plumber.



This is a well-maintained absorption area

Don't treat your absorption area like this

Further Information

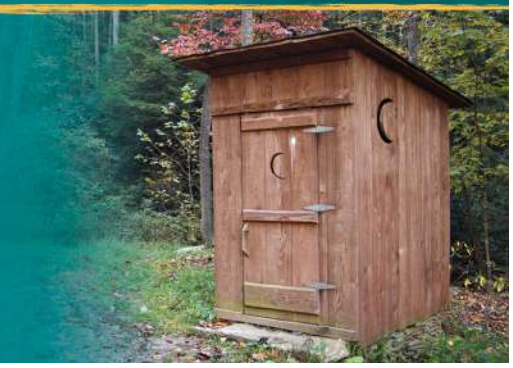
Environment and Health Unit

E2017/5277 Jan 2017

Byron Shire Council

Septic Safe

Fact Sheet 4



Care and maintenance of your on-site sewage management system

Products that affect your system

- Bleach, bleach based products, whiteners, nappy soakers and spot removers - Don't put them into your septic tank or aerated wastewater treatment system via the sink, washing machine or toilet. Dispose these products on an unused area of your garden, well away from any absorption trench.
- Hygiene products, condoms, tampons, sanitary napkins, disposable nappies and cotton buds - Don't put these items down the toilet, dispose safely, into the rubbish bin in sealed plastic bags.
- Disinfectants and detergents - Don't use more than the recommended amounts, try to use detergents with a low phosphorus or biodegradable products.

Water Usage

Reducing water usage will lessen the likelihood of problems with the septic system. The system is unable to effectively cope with large amounts of water such as numerous consecutive showers or loads of washing carried out in a short period. Try to spread out your washing and showers throughout the day and week. Reducing water usage and planning when showers and washing are done will help keep your septic system functioning efficiently for years to come.

Water Usage Facts

- Showers use 10-30 litres per minute, 200 litres in 10 minutes. Try using water saving heads or flow restrictors.
- Baths use an average of 120 litres.
- Toilets may use up to 11 litres per flush. Installing a dual flush system or low flush system saves water.
- Washing Machines may use 100-200 litres per load. Fully load your machine and if possible use the suds saver option as some types of washing machines and dishwashers use less water than others. Consider purchasing a front loading washing machine. Use low phosphorus detergents and recommended amounts.
- Leaking taps can contribute up to 5 litres per hour.
- Dishwashers use approximately 50 litres per cycle. Use low or no phosphorus detergents and don't use the washer until there is a full load.
- Try to spread the washing and showers throughout the day and week.
- When buying new appliances that use water, look for the 'AAA' rating which indicates reduced water usage.

Conclusion

High volumes of water introduced into the on-site sewage management systems reduce the effectiveness of treatment and may contribute to premature failure of the land application area necessitating costly repairs or replacement. Attention to water conservation will pay long term dividends.

TROUBLE SHOOTING SEPTIC SMELLS		
Is the grease trap full or blocked?	Yes	Clean and re-check for smells/blockage later.
	No	Problems may be within your septic tank - contact your plumber.
Is the absorption trench wet or soggy?	Yes	Check for increase in water usage - reduce.
	No	Problem may be with your septic tank or grease trap.
Is there any surface water around the absorption trench?	Yes	Check for any increase in water usage and/or upstream surface water infiltration.
	No	Problem with septic tank or grease trap.
Has there been recent heavy rain?	Yes	Divert stormwater away from the absorption area by building an earth bank or grassed swale (but do not divert into your neighbouring property).
	No	Contact your plumber - your trenches may need to be replaced. Desludging the septic tank provides only a temporary solution.
Is there water flowing from the absorption trench?	Yes	Contact your plumber - your trenches may need to be replaced. Desludging your tank provides only a temporary solution.
	No	If the problem is not listed here contact your plumber.

Further Information

Environment and Health Division

E2017/5274 Jan 2017

Byron Shire Council

Septic Safe

Fact Sheet 8

On-site Sewage Management Complaints

The Local Government Act 1993 requires Councils to regulate the installation, monitor the operation and keep a register of all on-site sewage management systems within the local government area.

On site sewage management involves the collection and treatment of human waste and wastewater, followed by the release of liquid (treated wastewater) and solid (sludge, sewage and compost) products into the environment.

Risks to public health and the environment

The inappropriate use or disposal of wastewater can have harmful impacts to public health and to the environment.

Untreated wastewater may lead to:

- the spread of disease by bacteria, viruses, parasites and other organism in the wastewater
- contamination of ground water and surface water
- degradation of soil and vegetation
- loss of amenity caused by odour and insects.

After pumpout/cleanout, tank(s) are to be treated with Ag lime or hydrated lime to disinfect and The local government regulations prescribe the responsibilities of all stakeholders to ensure that on-site sewage management systems comply with performance standards and do not pose a risk to public health and the environment.

Making a complaint about On-Site Sewage Management Systems

If you are experiencing problems with the operation of an on-site sewage management system on a property within Ballina local government area, you are encouraged to approach Council for a remedy.

Please contact Council and provide the following information:

- your contact details, including name, address and phone number
- the address details where the problem is occurring
- specific details of the problem
- any other relevant information.

Council will quickly respond to your complaint, keeping your details confidential.

Complaints about contamination of surface water or spray drift should be reported to Council urgently. Complaints about odour problems are also investigated, since this may be an early sign of mismanagement or system failure.

Further Information

Environment and Health Unit

E2017/5411 Jan 2017

Byron Shire Council

Septic Safe

Fact Sheet 5

Water conservation and your OSMS

The quantity and composition of waste generated in the home varies according to the number of residents, their personal water usage, and the water-utilizing appliances in the home.

All household waste is disposed of through the septic system – it is broken down in the septic tank and the treated effluent flows into the soil via absorption and/or evapotranspiration. Septic seepage poses human health risks by releasing harmful pathogens into the water table and nearby watercourses.

Tips on Saving Water

Laundry

The laundry is a place where you not only use a lot of water but you also use energy and detergents. The best way to save water in the laundry is to make sure that you select the right washing machine, one that has a water rating of 4 stars or more. This will usually mean a front-loading washing machine. On average, front-loading washing machines use up to 50 per cent less water, 35 per cent less detergent and 30 per cent less energy than top loaders.

Here are some other changes you can make to your laundry habits

- only use the washing machine when you have a full load; you can sort and wash bigger loads more efficiently over the week
- pre-treat stains before you wash to reduce the chances of having to rewash
- make sure that everyone picks up and sorts the clothes they wear each day. That way, clean clothes won't get washed just because they are left lying on the floor
- if you are washing clothes by hand, use only as much water as you need in the sink or bucket. Reuse this water in your garden.

Kitchen

A 5-star water-efficient dishwasher uses as little as 7 litres of water - so a water-efficient dishwasher will use less water than washing dishes by hand.

Make sure you

- only use the dishwasher when you have a full load
- scrape plates instead of pre-rinsing under the tap
- non-water efficient dishwashers can use up to 25 litres of water a cycle. If you have this type of dishwasher, you will save more water if you wash your dishes by hand. If you hand-wash your dishes, don't rinse them under running water. A running kitchen tap can use up to 15 litres of water a minute
- if you have two sinks, half-fill the second with rinsing water. If you only have one sink, rinse the washed dishes in a pan of hot water
- don't use running water to wash your vegetables or to defrost food. Instead, wash vegetables in a bowl and place your frozen food in the fridge to thaw overnight
- scrape your dishes and soak pots and pans to remove food rather than rinsing them under running water.

Bathroom

Toilet

Up to 16 per cent of household water is flushed down the toilet:

- don't flush needlessly, and only flush toilet paper down the toilet
- use the half-flush option on dual-flush toilets
- replace your older-style toilet with a 4-star dual-flush system. This can save you up to 8 litres of water with every flush
- if this is not practical, try reducing the volume of water you use with each flush. You can do this by in stalling a flow restrictor or by putting a bottle filled with water in the cistern.

Showers, baths and basins

- A standard shower can use 20 litres of water per minute. To use less water in the shower, try the following:
- install a water-efficient shower head. A 3-star rated shower head will use no more than 9 litres of water per minute
- take a shorter shower. Shorter showers will not only save water but will help to save on the energy associated with heating the water
- insulate your hot water pipes. This means you will not need to wait as long for the hot water to flow through -saving you both water and energy
- make sure your hot water system thermostat is not set too high. Adding cold water to reduce the temperature of very hot water wastes both water and energy
- use a bucket to catch water while the shower warms up. You can then reuse this water on your garden.

For baths and basins

- use a plug when washing your hands and face
- turn off the tap while cleaning your teeth or shaving
- use as little water as possible in the bath. Put the plug in before you turn on the tap and fill the bath to less than a third. You may also like to bath small children together.

Check for leaks

- a lot of water around the home can be lost because of leaking pipes and dripping taps. Just one slowly dripping tap can waste 9,000 litres of water a year, while a visibly leaking toilet can waste more than 60,000 litres. Make sure that you turn all your taps off properly, check for leaks, repair leaking taps, and check washers for wear and tear
- you can check if your toilet is leaking by putting a little food colouring in the tank. If the food colouring appears in the bowl without flushing, have the cistern repaired immediately
- to find out if you have a leak in your pipes and you are on mains water, turn off all taps and make sure that nobody will be using any water. Check your water meter and make a note of the reading. Recheck the meter after at least one hour. If the reading has changed, you may have a leak. This needs to be found and fixed

By saving water you will also save

- energy — It takes energy to treat, transfer and heat water. The less water you use, the less energy you use and the less greenhouse gases you create
- the environment — the less wastewater you generate, the less contaminants and detergents you release into our rivers and oceans.

Further Information

Environment and Health Unit

#E2017/5386 Jan 2017

Byron Shire Council

Septic Safe

Fact Sheet 9

On-site Sewage Management Fee

Properties that have an on site sewage management system (eg septic tank, AWTS) pay an annual management fee. This fee will be listed on your Rates & Charges Notice as a single bill.

The on-site sewage management fee covers

- Part of the cost of conducting a survey of on site sewer management facilities to identify defective systems that threaten public or environmental health
- general advice that we provide to owners
- replacement of the need for periodic renewal of approval fees.

Background Information

Following the Wallis Lake hepatitis outbreak 1997, the State Government introduced amendments to the Local Government Act making it an obligation for councils to better supervise septic installations and other on- site sewage management facilities. Council has been obliged to require the owners of non-sewered parcels of land with toilets or other improvements to seek an "approval to operate" sewage management facilities whereas previously only an initial approval was required.

A program was commenced in Byron Shire that has included registering all systems, inspecting them to verify correct operation, requiring correction of defective systems, and determining a risk factor for each installation.

Council has introduced a small on-site sew- age management fee to be charged to the owners of un-sewered land to more equitably spread the cost of meeting the continuing obligations under the Local Government Act (General Regulation) 2005.The fee covers in part the cost of carrying out an initial survey of on-site sewage management facilities commenced in 2002 and expected to take around 10-12 years to complete. A desk-top risk assessment undertaken early in the program is guiding field officers to review systems on the basis of the potential risk to health and the environment of poorly per- forming or defective on-site sewage management facilities.

The fee paid enables the initial field survey and advice to be provided to the owners of systems without further charge. It will also cover renewals of on-site sewage management approvals to operate.

Recent amendments to the Local Government Act permit a charge to be levied with rate assessments for work associated with on-site sewage management.

The charge outlined above does not cover the initial approval to install or operate a sewage management system, transfer of approval to operate - when a new owner takes over a system, reinspection fees required if a system requires a review, consulting fees, or administration fees applicable to any notices that may have been issued.

It should be noted that the program is still being subsidised from the general rate, on the basis of it being recognised that some benefits of the program accrue to the wider community.

Further Information

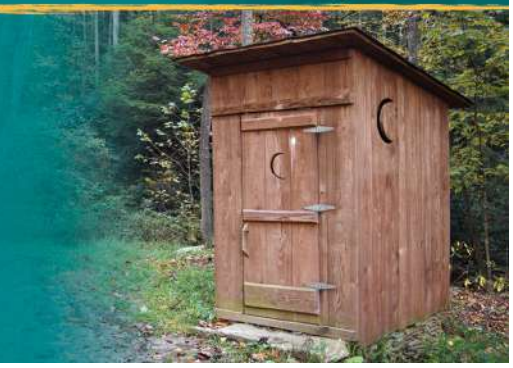
Environment and Health Unit

E2017/5435 Jan 2017

Byron Shire Council

Septic Safe

Factsheet 6



OSMS Roles and Responsibilities

The design, installation and operation of domestic on-site sewage management systems are regulated under the Local Government Act 1993.

The Role of Local Government

An approval is required for:

- the installation, construction or alteration of a human waste treatment device or storage facility and connected drains, and
- the ongoing operation of an on-site management system.

Council monitors the operation of all domestic on-site sewage management systems within the local government area to ensure that those systems comply with relevant performance standards.

Council has powers to issue Orders requiring a person:

- to comply with an approval
- to take action to maintain premises in a healthy condition
- to store, treat or dispose of waste
- not to use or permit a human waste storage facility to be used, and/or
- to connect premises to a public sewer when the sewer is within 75 metres
- Orders may be given to the owner or occupier of the premises or to the person responsible for the waste or the container in which the waste is stored.

The Role of NSW Health

NSW Health provides accreditation for human waste treatment devices or human waste storage facilities that are intended to receive domestic wastewater or human waste.

Accreditation is mandatory for commercially manufactured units and standard designs.

The accreditation provides a centralised assessment and testing procedure. A certificate of accreditation may include specific requirements for the installation, operation and maintenance of the tested system. Such conditions become conditions of Council approval.

Further information about on-site sewage management systems and accreditation can be sourced from NSW Ministry of Health.

Responsibilities of Owners or Occupiers with On-site Sewage Management Systems

It is the responsibility of the owner or occupier of the premises that has an on-site waste water system to ensure that:

- on-site systems are designed, installed and managed so that pollution of groundwater or surface waters does not occur, and
- there is no risk to public health, safety and the environment from the operation of an on-site sewage management system.

Householders must take an active role in the operation of on-site sewage management systems. Householders should have a broad knowledge of on-site sewage

management principles and be able to apply that knowledge responsibly.

Householders should have a sound understanding of the operating requirements of the system they are using and should be aware of the need to adjust household activities accordingly (e.g. by using low phosphorus detergents, minimising use of household chemicals, avoiding 'shock loading' and conserving water).

Correct operation involves regular supervision and system maintenance. Householders also need to ensure that the necessary service and maintenance contracts are in place.

If a system is defective and cannot be corrected by proper operation and maintenance, householders should report this to Council in order to discuss possible system replacement.

Particular consideration should be given to the educational needs of new owners and tenants when a property with an on-site sewage management system is sold or leased.

Responsibilities of Owners upon Sale of the Premises

Vendors (the owners who sell the property) should make sure that the new householder receives an operating manual and that additional copies are available upon request.

The manual should cover the following matters:

- system operation and capabilities
- operating requirements - system capacity, the importance of spreading the hydraulic load and actions to be avoided
- troubleshooting and signs of system failure - such as odours and surface ponding of wastewater
- maintenance and servicing requirements
- management of health risks
- occupational health and safety, first aid and chemical handling
- warranty and service life
- emergency telephone numbers.

Responsibilities of OSMS Service Providers (where the installation incorporates an aerated wastewater treatment system - AWTS)

All service providers who carry out inspections and / or work on on-site sewage management systems must have appropriate training. Service providers should ensure that advice and education on system operation & maintenance are provided to customers and householders at every available opportunity.

Service agents should produce a report, in triplicate, of each service call. This report should certify compliance with operating requirements and specify repairs undertaken and test results. The service agent should provide the householder with the original of this report and then a copy to Council and a copy for their own records.

If a service provider observes that a system failure has been caused by improper use of the system, the service provider should consult with the owner. If the problem continues, then the matter should be reported to Council for appropriate action. When effluent causes pollution, the service provider is required to notify Council.

Service agents should be able to carry out temporary repairs and to correct any immediate risks to public health.

Service agents should ensure that any residual materials removed from an on-site sewage management system are handled and dealt with in accordance with environmental and public health standards and Council's requirements.

Further Information

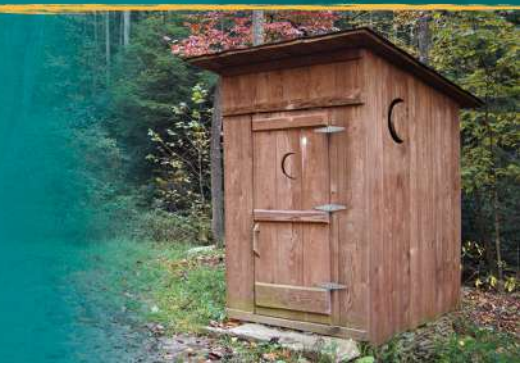
Environment and Health Unit

E2017/5399 Jan 2017

Byron Shire Council

Septic Safe

Fact Sheet 7



Septic Tank Decommissioning Procedure & Pump Out Contractors

When a new septic system is installed existing or premises are connected to the sewer, all redundant septic tank(s) are to be decommissioned using the procedure detailed below. This is to ensure that the redundant tank(s) do not cause any future public or environmental health impacts

Procedure

- All effluent and sludge is to be removed from the redundant septic tank(s) by an approved contractor. A copy of the pump out receipt must be forwarded to council.
- The pumps, blowers and internal components of an AWTS may be either collapsed into the AWTS or selectively removed by the owner/occupier, an AWTS manufacturer or service agent for proper disposal to landfill. The owner/occupier, manufacturer or service agent must remove such parts in a manner which will not contaminate the environment or compromise the health and safety of themselves or others. Un-retrieved components must be left in the AWTS.
- After pumpout/cleanout of thank the , tank(s) are to be treated with Ag lime or hydrated lime to disinfect and neutralise the tanks. Care should be taken when using lime. It is recommended that appropriate precautionary steps be taken such as using personal protective equipment (skin protection, eye protection and respiratory protection). A copy of the MSDS for lime should be on hand. Only properly qualified persons should be employed to perform any procedures using chemicals.
- After treatment with lime, a hole or holes adequate for drainage are to be punctured in the bottom of the tank(s).
- The concrete lids and portion of the tank walls are to be broken up to below ground level.
- The tank(s) are to be filled with solid, non-putrescible fill; with the ground surface made good. If settling of the fill material occurs over time it may be necessary to make good the ground surface with further fill.

Further Information

Environment and Health Services Team

E2017/5411 Jan 2017#