



ETHERIDGE SHIRE COUNCIL

ONSITE SEWERAGE ASSESSMENT

**LOT 16 MARLOW COURT
GEORGETOWN**

REPORT No. GT19-253-002R REV 2

SEPTEMBER 2019

REVISION NO. 2



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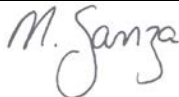
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APPENDIX A

1.0 INTRODUCTION

ETS Geo Pty Ltd (ETS) have been engaged by Etheridge Shire Council to prepare an Onsite Sewerage Assessment (OSA) to assess the suitability of installing a wastewater treatment system to serve proposed residence to be constructed at Lot 16 Marlow Court, Georgetown.

The purpose of this assessment is to determine the wastewater treatment system type and land disposal area for a proposed four (4) bedroom dwelling. Each bedroom has a one (1) person capacity, as indicated by the customer.

The property is in the local government area of the Etheridge Shire Council. This OSA addresses the requirements under AS/NZS1547:2012 for the proposed accommodation on the site.

2.0 LEGISLATIVE REQUIREMENTS

The Queensland Plumbing and Wastewater Code (the Code) specifies the requirements for onsite sewerage disposal and treatment systems that have a peak design capacity of 20 equivalent persons (EP) or less. The Code defines performance criteria for the following:

- ◆ Onsite Wastewater Management Systems
- ◆ Greywater Use Facilities
- ◆ Land Application Systems (including setback distances)
- ◆ Water Meters for New Premises
- ◆ Chief Executive Approvals (of treatment systems)

In consideration of an application for on-site treatment and disposal facilities, the local government is required to assess whether the application triggers referral for an Environmentally Relevant Activity under the Environmental Protection Act 1994. Disposal of on-site wastes becomes the Environmentally Relevant Activity (ERA) of sewage treatment when daily flows exceed 4,000 litres. Environmentally Relevant Activities require approvals from the Environmental Protection Agency, either as a concurrence agency or assessment manager.

This proposal does not exceed the daily flow limit therefore will not require referral to the Environmental Protection Agency.

Under Sections 440ZG of the EP Act, which relates to depositing prescribed contaminants in waters, it is an offence to deposit or release sewage and sewage residues, whether treated or untreated, and any other matter containing faecal coliforms or faecal streptococci, including: for example:

- waste water pumped out from a septic tank, or
- solid or liquid waste from an on-site sewerage facility;

into waters, or a roadside gutter or stormwater drainage, or at another place, and in a way, so that the contaminant could reasonably be expected to wash, blow, fall or otherwise move into waters, a roadside gutter or stormwater drainage.

Relevant Australian Standards for the treatment of on-site effluent include the following:

- ◆ AS/NZS1547:2012 'On-site domestic-wastewater management'.
- ◆ AS1546.1 – 2008 'On-site domestic wastewater treatment units – Septic tanks'
- ◆ AS1546.1 – 2008 'On-site domestic wastewater treatment units – Waterless composting toilets'
- ◆ AS1546.1 – 2008 'On-site domestic wastewater treatment units – Aerated wastewater treatment systems'
- ◆ AS3500 – National Plumbing and Drainage Code
- ◆ Department of Infrastructure and Planning 'Queensland Plumbing and Wastewater Code' April 2010 (the Code)

This report was prepared in accordance with the requirements of the standards set in these documents.

3.0 SITE AND SOIL EVALUATION

3.1 Site Assessment

The property is located on the northern-eastern side of Marlow Court and is described as Sandy Clay soil with 'few' (2 to 10%) fine gravel fragments. The site was inspected on the 27th August 2019 by ETS. At the time of inspection, the vegetation at the proposed land disposal area consisted of short grass.

SITE FACTOR	RESULT
Property Description	Lot 16 Marlow Court Georgetown
Area	1,320m ²
Slope	Sloping up to 5 degrees at the land disposal site.
Drainage Pattern	Waxing divergent.
Exposure	Full Exposure
Erosion and Land Slip	N/A
Boulders and Rock Outcrops	No
Vegetation	Short grass
Water Course	None within 50 m of land application area.
Water Bore	None within 50 m of land application area.
Water Table	N/A
Cut and Fill	Not encountered at the proposed land disposal area.
Flooding	N/A
Channelled Runoff	N/A
Soil Surface Condition	Dry
Other Site Specific Factors	None

3.2 Soil Assessment

SOIL PROPERTY	RESULT
Colour	Yellow brown
Texture	Sandy Clay
Structure	Weak
Permeability	<0.06 m/d*
Soil Category	5*
Design Loading Rate (DLR) (mm/day)	5 – Advanced Secondary, AES Bed*

* From AS1547:2012 Table L1

4.0 SYSTEM SIZING FACTORS

4.1 Potable Water Supply

It was unable to be confirmed where the water supply comes from. It has been assumed that water supply will be from a reticulated town water supply.

4.2 Separation Distances

Table T7 from the “Queensland Plumbing and Wastewater Code” recommends the following horizontal separation distances for subsurface land application areas.

Feature	Recommended Separation Distance	Measured Distance
Top of bank of permanent water course; Top of bank of intermittent water course; Top of bank of a lake, bay or estuary Top water level of a surface water source used for agriculture, aquaculture or stock purposes; Easement boundary of unlined open stormwater drainage channel or drain.	Primary effluent: 50 metres (horizontal) Secondary effluent: 30 metres (horizontal). Advanced secondary effluent: 10 metres (horizontal).	>50m to watercourse from land disposal area
Bore or a dam used or likely to be used for human and or domestic consumption	Primary Effluent: 50 metres (horizontal). Secondary Effluent: 30 metres (horizontal). Advanced Secondary Effluent: 10 metres (horizontal).	>50m to water bore from land disposal area.
Unsaturated soil depth to a permanent water table or weathered rock.	Primary Effluent: 1.2 metres (vertical). Secondary Effluent: 0.6 metres (vertical). Advanced Secondary Effluent: 0.3 metres (vertical).	>1.2m

In accordance with Table T7 of the Code, the vertical separation requirement for an advanced secondary treated effluent is 0.3 metres. The required vertical separation can be achieved at the land disposal areas.

The horizontal separation distances as recommended in the Code can be achieved for an advanced secondary treated effluent on the sites.

Table T4 of the Code recommends the following horizontal separation distances for subsurface land application areas measured from the edge of the trench/bed excavation or any subsurface irrigation distribution pipework to the feature. These separation distances will be readily achieved on-site.

Feature	Separation Distance Down slope	Separation Distance Up slope	Separation Distance Level
Property boundaries, pedestrian paths and walkways, recreation areas, footings of buildings, retaining wall footings.	2 metres	4 metres	2 metres
In ground swimming pools	6 metres	6 metres	6 metres
In ground potable water tank*	6 metres	6 metres	6 metres

***Note:** For primary effluent the separation distance from an in-ground potable water tank must be 15 metres.

Stormwater shall be diverted away from the land application areas.

The land application area shown on Figure 1, Appendix A meets all recommended horizontal separation distances for advanced secondary effluent quality.

4.3 Estimation of Daily Flows

The following typical wastewater flow design allowance is given in AS/NZS1547:2012 for a four (4) bedroom dwelling.

Classification	No.	Flow (L/person/day)	Total Flow (L/day)
Persons in a four (4) bedroom dwelling	4*	150	600

*Customer has advised that each bedroom is limited to a one (1) person capacity.

For the design of a wastewater treatment system, the design daily flow rate should be taken as 600 litres per day.

To ensure the integrity of any treatment system standard water reducing fixtures should be incorporated to further reduce water consumption. These should include:-

- Shower flow restrictors
- Dual flush 6/3 litre water closet
- Aerator faucets
- Water conserving washing machines

4.4 Wastewater Treatment Options

Appendix 1 of the Code specifies the following effluent quality standards for the different standards of wastewater treatment.

Parameter	Primary Effluent (g/m ³)	Secondary Effluent (g/m ³)	Advanced Secondary Effluent (g/m ³)
Biological Oxygen Demand	120-240	20	10
Total Suspended Solids	65-180	30	10
Thermo-tolerant Organisms (org/100ml)	N/A	200	10
Suitable treatment system	Septic tank with outlet filter	Aerated wastewater treatment system.	Aerated wastewater treatment plant with sand filter

The Customer has advised their preference to use an AES system which will treat effluent to an advanced secondary standard.

Advanced Secondary Wastewater Treatment System: A wastewater treatment system with the capacity to treat at least 600 litres of wastewater per day would be required to serve the proposed residence on the site. The advanced secondary standard effluent from the wastewater treatment system can then be disposed of to land.

4.5 Method of Disposal

Table K1 of AS/NZS1547:2012 identifies Land Application systems that are considered suitable for different site, soil and climatic factors. The land application system that could be used on this site is an AES bed for advanced secondary standard effluent.

4.6 Required Disposal Area for Effluent Disposal

As per AS/NZS 1547:2012 Section L4.2 *Sizing*. - $L = Q / (DLR * W)$

AES Bed

Q = design daily flow in L/day	600
DLR = Design Loading Rate mm/day	5 (advanced secondary)
W = Width (m)	9.52
L = length (m)	12.6
Total Area (m²)	120

The required effluent disposal area for the wastewater treatment system could be provided by one (1) AES bed with a system extension of 12.6 metres long by 9.52 metres wide.

It is recommended that:

- Stormwater is diverted away from the land disposal areas by bunding or diversion drains,
- Effluent is distributed uniformly over the land disposal area
- The land disposal areas are planted with suitable species where no established vegetation exists,
- Loadings should be alternated to rest sections of the land application areas and minimise the risk of clogging.
- Gypsum be applied to the base of any effluent disposal area at a rate of 1kg per square metre and mixed to a depth of 300mm via the use of a rotary hoe to prevent the clay from dispersing.
- An outlet filter should not be fitted to the primary tank.

A cross section of the recommended land disposal option is shown in the attached Drawings in Appendix A.

5.0 SYSTEM INSTALLATION REQUIREMENTS

5.1 General

The systems and all of their components shall be designed and installed by a licensed Plumber in accordance with the manufacturer's recommendations and the relevant Australian Standards.

5.2 Wastewater Treatment Systems

In accordance with the requirements of AS/NZS1547:2012 Table J1, a septic tank with a minimum capacity of 3,000L is required to service the proposed four (4) bedroom residence on the site. No outlet filter is to be fitted.

5.3 Available Reserve Area

AS/NZS1547:2012 C5.5.3.4 stated requirement for a reserve area may be reduced or eliminated if an approved wastewater treatment and improved land application system is installed. A reserve area has **not** been nominated for this allotment.

5.4 Earthworks and Stormwater

The effluent land disposal areas shall be graded to minimise contact between stormwater and the disposal area. All excess roof stormwater shall be collected and piped to a suitable discharge point away from any land disposal area.

6.0 SUMMARY & RECOMMENDATIONS

Date of Inspection	27 August 2019
Location of Site:	Lot 16 Marlow Court, Georgetown.
Owner's Name:	Etheridge Shire Council
Local Government:	Etheridge Shire Council
Proposed Dwelling Type:	Four (4) bedroom residence
Land Area:	1,320m ²
Referral to EPA required:	No
Assumed Design Daily Flow:	Advanced Secondary Wastewater Treatment System – 600 litres/day
Assumed Soil Category:	Category 5 – Sandy Clay
Assumed Design Loading Rate:	5 mm/day – AES bed, Advanced Secondary Effluent
Wastewater Treatment Options:	Advanced Secondary Wastewater Treatment System – 600 litres/day
Dimensions of Land Application Facility:	1 x AES bed of 12.6 metres long by 9.52 metres wide (including system extension)
Method of Calculations:	AS/NZS 1547:2012 & AES Design Calculator
Horizontal Separation Distances:	Achieved
Vertical Separation Distances:	Achieved
Potable Water Supply:	Reticulated
Reserve Area:	N/A



The installation of the treatment and disposal system shall be inspected by ETS Geo Pty Ltd to ensure the intent of the design is met.

This report is based on the information provided by the client. If any aspect of the site preparation or proposed construction changes from that originally advised, the Engineer shall be notified so that any amendments can be made. Should soil or environmental conditions encountered on the site differ significantly from those indicated, the Engineer shall be notified before proceeding, as modifications to the design may be required.

Pollution Exclusion

ETS Geo Pty Ltd, its employees and sub-consultants shall not be liable in respect of any claim for Personal Injury or Damage to Property including costs and expenses incurred in preventing, removing, nullifying or clean-up caused by or arising directly or indirectly out of actual, alleged or threatened discharge, dispersal, release or escape of smoke, vapour, soot, fumes, acids, alkalis, toxic chemical, liquids or gases, waste materials or other irritants, contaminants or pollutants into or upon any property, land, the atmosphere or any water course or body of water (including groundwater).

ETHERIDGE SHIRE COUNCIL

**LOT 16 MARLOW COURT
GEORGETOWN
QUEENSLAND**

APPENDIX A

PLANS & DRAWINGS



Legend

 OSA Test Location

Subject Site

Minimum 3,000 litre septic tank



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Redlynch QLD 4870

Telephone: (07) 4047 8600
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E-mail: admin@etsgeo.com.au

TITLE:
INDICATIVE LAND DISPOSAL AREA
LOT 16 MARLOW COURT
GEORGETOWN QLD 4871

PROJECT NO.:
GT19-253-002

SCALE:
NTS

DRAWN BY:
RR

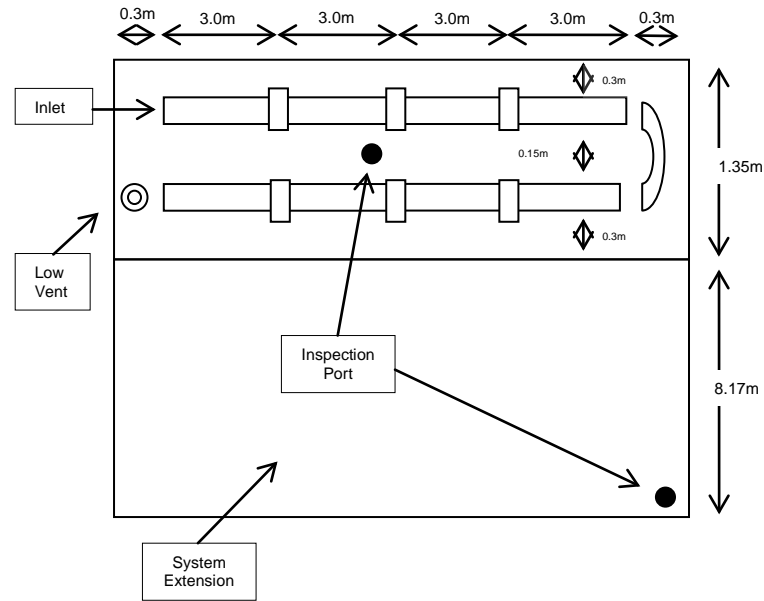
DATE:
29/08/19

OFFICE:
CNS

APPROVED BY:
LJ

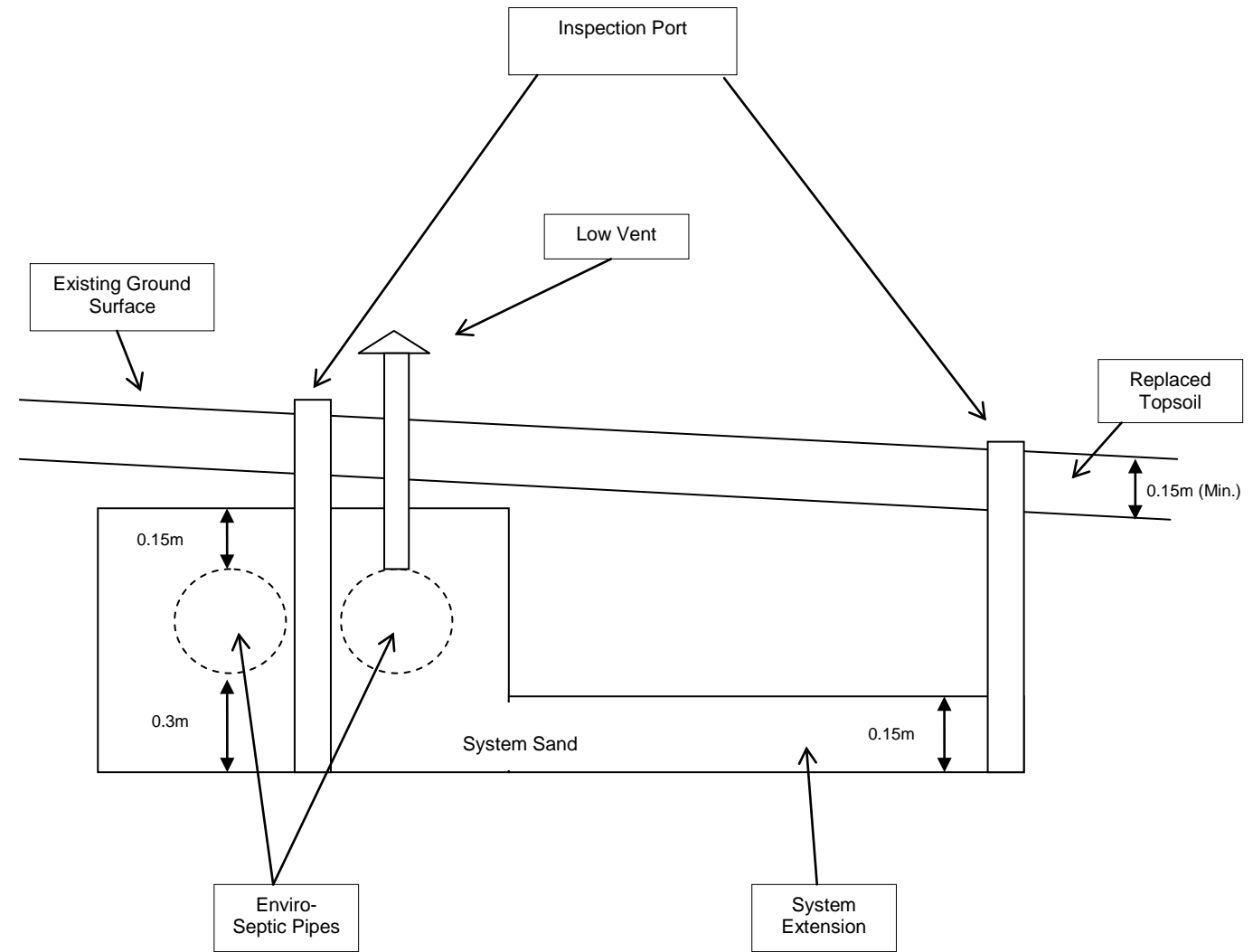
CLIENT: ETHERIDGE SHIRE COUNCIL

DRAWING NO.: GT19-253-002 OSA Locality Plan Rev 1



NOTES

1. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH THE LOCAL GOVERNMENT REQUIREMENTS AND THE FOLLOWING CODES:
 - AS 3500 NATIONAL PLUMBING & DRAINAGE CODE
 - AS 1546.1 – 2008 ONSITE DOMESTIC WASTEWATER TREATMENT UNITS – SEPTIC TANKS
 - AS 1547 – 2012 ONSITE DOMESTIC WASTEWATER MANAGEMENT
 - DEPARTMENT OF INFRASTRUCTURE AND PLANNING QUEENSLAND PLUMBING & DRAINAGE CODE APRIL 2010
2. SURFACE WATER SHALL BE DIVERTED AROUND THE PERIMETER AND UPSLOPE OF THE LAND APPLICATION AREA
3. GYPSUM SHALL BE APPLIED AT A RATE OF 1kg/m² TO THE BASE OF THE BED
4. THE BASE OF THE ENTIRE EXCAVATION IS TO BE LIGHTLY SCARIFIED / RIPPED ALONG THE CONTOUR, PARALLEL TO THE LAY OF THE AES PIPING / TRENCHING
5. SYSTEM SAND REQUIREMENTS – CLEAN WASHED SAND IS TO BE COARSE TO VERY COARSE, WITH NO MORE THAN 2% PASSING THROUGH A 75µm SIEVE
6. ALL DRAINAGE WASTEWATER LEVELS ARE TO BE CONFIRMED BY A LICENSED PLUMBER ONSITE PRIOR TO COMMENCING CONSTRUCTION



DISPOSAL AREA IS TO BE LOCATED A MINIMUM OF 4m FROM ANY BUILDING, 4m OR 2m FROM BOUNDARIES AS SHOWN AND 10m FROM ANY WATER COURSES OR BORES.



TITLE: TYPICAL CROSS SECTION OF AES BED DETAILS LOT 16 MARLOW COURT GEORGETOWN QLD 4871	PROJECT NO.: GT19-253	SCALE: NTS	DRAWN BY: RR
	DATE: 05/09/2019	OFFICE: Cairns	APPROVED BY: LJ
CLIENT: ETHERIDGE SHIRE COUNCIL	DRAWING NO.:GT19-253 OSA AES Bed		

Leader in Passive Solutions

Site Address	Lot 16 Marlow Court, Georgetown		State	QLD	Post Code	4871
Client Name	Etheridge Shire Council			Date of Site Visit	27/08/2019	
Designers Name	ETS Geo Pty Ltd - Leigh Jones	Designers Ph Number	(07) 4047 8600		Designer Lic Number (as QBCC)	1057712
Lic Plumber Name	TBA	Plumber Ph Number	TBA		Plumb / Drainer Lic Number	TBA
Council Area	Etheridge Shire Council	Designers AES Cert Number	792		Date	5/09/2019

This Calculator is a guide only, receiving soil classification, surface water, water tables and all other site constraints addressed by the qualified designer.

System Designers site and soil calculation data entry	IMPORTANT NOTES	
Enter AESL/m loading rate, "30" for ADV Secondary or "38" Secondary	30	>> This design is for an ADVANCED SECONDARY system
Is this a new installation Y or N	y	>> Minimum single vent size is 80mm or 2 x 50mm house vents
Number of person	4	a septic tank outlet filter is NOT RECOMMENDED
Daily Design Flow Allowance Litre/Person/Day	150	
Number of rows required to suit site constraints	2	>> The maximum length of a single AES pipe run is 30 meters
Infiltration surface Soil Cat as est by site/soil evaluation. CATEGORY	5	>> Category may require design considerations. Ref AS1547
Design Loading Rate based on site & soil evaluation DLR (mm/day)	5	>> Soil conditioning may be necessary. Ref AS1547 & Comments
Bore log depth below system Basal area	2.2	>> Min depth below basal area 600mm check water table/restrictive layer
Enter System footprint Slope in % for std AES systems to calc extension	3.8	>> Consideration reqd for Sloping sites. Ref AS1547. refer comment.
Is this design a gravity system with no outlet filter? Y or N	y	>> A House Vent & LOW VENT required on this system
PLEASE CHECK YOU HAVE FALL FROM TANK TO AES SYSTEM PIPES		

COMMENTS :- " The outcome must be important to everyone. "

- Ripping of receiving surface required in clay soil structures in Cat 4,5,6. In addition refer to AS 1547. Always excavate & rip parallel to the site slope/AES pipe.
- Specialist soils advice & special design techniques will be required for clay dominated soil having dispersive or shrink/swell behaviour. Refer AS1547
- Designers need to be familiar with special requirements of Local Authorities. IE - Minimum falls from Septic tank outlets to Land application areas. etc
- All Sloping sites require special consideration and management through design of slope percentage, surface water and construction methods as per AS1547.
- Plumber are reminded that good construction techniques as per AS1547 are especially important in these soil types. Refer AS1547 & AES installation Instructions

AES System Calculator Outcomes				AES dimensions		
Total System load - litres/ day (Q).	600	l/d			AES System	System Extension
Min Length of AES pipe rows to treat loading	10.0	lm		Lth m : (L)	12.6	12.6
Number of FULL AES Pipe lengths per row	4	lths		Width m: (W)	1.35	8.17
Total Capacity of AES System pipe in Litres	1696	ltr.		Sand Depth	0.75	0.15
				Area m2	17.0	103.0
USE CUT LENGTHS OF PIPE IN THIS DESIGN? (ENTER Y)	N					
IF YOU WISH TO USE A TRENCH EXTENSION DESIGN OPTION ENTER "Y"			N	Enter Custom Width in metre		
AES INFILTRATION FOOT PRINT AREA - $L = Q / (DLR \times W)$	Length	Width	Minimum AES foot print required .			
	12.6	x 9.52	=	120.0	m2 total	

Code	AES System Bill of Materials				Chankar Environmental Use Only
AES-PIPE	AES 3 mtr Lths required	8	lths		
AESC	AESC Couplings required	6	ea		
AESO	AESO Offset adaptors	4	ea		
AESODV	AES Oxygen demand vent	1	ea		
AES-IPB	AES 100mm Inspection point base	2	ea		
AES Equ	AES Speed Flow Equaliser		ea		
AESDESC	Double Offset Adaptors		ea		
	TOTAL SYSTEM SAND REQUIRED (Guide Only)	34	m3		

PLEASE email your AES CALC and Drawings to
DESIGNREVIEW@ENVIRO-SEPTIC.COM.AU

Designreview@enviro-septic.com.au

> The AES Calculator is a design aid to allow checking of the AES components and configuration and is a guide only. Site and soil conditions referencing the AS 1547 standard are calculated and designed by a Qualified Designer.

> Chankar Environmental has no responsibility for the soil evaluation, loading calculations or DLR entered by the designer for this calculator.

> AES pipes can be cut to length on site. They are supplied in 3 meter lths only.



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UNDERSTAND THE LIMITATIONS OF YOUR GEOTECHNICAL REPORT

This report has been based on project details as provided to us at the time of the commission. It therefore applies only to the site investigated and to a specific set of project requirements as understood by ETS Geo Pty Ltd.

If there are changes to the project, you need to advise us in order that the effect of the changes on the report recommendations can be adequately assessed. ETS Geo Pty Ltd cannot take responsibility for problems that may occur due to project changes if they are not consulted.

It is important to remember that the subsurface conditions described in the report represent the state of the site at the time of investigation. Natural processes and the activities of man can result in changes to site conditions. For example, ground water levels can change or fill can be placed on a site after the investigation is completed. If there is a possibility that conditions may have changed with time, ETS Geo Pty Ltd should be consulted to assess the impact on the recommendations of the report.

The site investigation only identifies the actual subsurface conditions at the location and time when the samples were taken. Geologists and engineers then extrapolate between the investigation points to provide an assumed three-dimensional picture of the site conditions. The report is based on the assumption that the site conditions as identified at the investigation locations are representative of the actual conditions throughout an area. This may not be the case and actual conditions may differ from those inferred to exist. This will not be known until

construction has commenced. Your geotechnical report and the recommendations contained within it can therefore only be regarded as preliminary.

In the event that conditions encountered during construction are different to those described in the report, ETS Geo Pty Ltd should be consulted immediately. Nothing can be done to change the actual site conditions which exist but steps can be taken to reduce the impact of unexpected conditions. For this reason, the services of ETS Geo Pty Ltd should be retained through the development stage of a project.

Problems can occur when other design professionals misinterpret a report. To help avoid this, ETS Geo Pty Ltd should be retained for work with other design professionals to explain the implications of the report.

This report should be retained as a complete document and should not be copied in part, divided or altered in any way.

It is recommended that ETS Geo Pty Ltd is retained during the construction phase to confirm that conditions encountered are consistent with design assumptions. For example, this may involve assessment of bearing capacity for footings, stability of natural slopes or excavations or advice on temporary construction conditions.

This document has been produced to help all parties involve recognise their individual responsibilities.