



PLANS AND DOCUMENTS
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27 NOV 2015

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Onsite Effluent Assessment

**Existing Telstra Site
Cnr Pub Lane & Teviot Road
Greenbank**

**for
Charters Keck Cramer**

Version 1

Project No: BC-15081

November 2015

Document Control

Report Title: Onsite Effluent Assessment
Existing Telstra Site – Cnr Pub Lane & Teviot Road, Greenbank

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1 Introduction

This Onsite Effluent Assessment has been prepared so as to be considered as part of a Reconfiguration of a Lot (ROL) application for a Development Approval over Lot 1 RP52978, located at 1-9 Pub Lane, Greenbank (the subject site).

The site currently accommodates a Telstra operated telephone exchange facility which is serviced by an existing effluent disposal system. The current system, which is located to the north of the building comprises a septic tank and effluent disposal trenches.

As the alignment of the proposed lot reconfiguration will dissect the existing effluent disposal area it will be decommissioned and a replacement effluent area constructed with suitable boundary setbacks.

This report has been prepared on behalf of Charter Keck Cramer and presents an assessment of the adequacy of the proposed site to support on-site effluent disposal based on; site soil types, the available area for effluent disposal, any identified site constraints, and local and state requirements. This report will be submitted as part of a development application to be assessed by State Government as part of the Greater Flagstone PDA.

The level of detail provided within this report is suitable for development assessment only and should not be relied upon for effluent system installation purposes. Detailed design documentation of the effluent disposal system will need to be lodged for approval with Council as part of a subsequent Plumbing and Drainage Application.

1.1 Objectives & Scope

The objectives of this report are to:

- Estimate daily effluent flows;
- Calculate soil infiltration rates based on site permeability testing of the proposed land application area;
- Identify demand and system constraints for effluent disposal on the site;
- Determine the most appropriate size for on-site effluent treatment and disposal in accordance with AS1547:2012 and Queensland Plumbing and Wastewater Code (Published 15 January 2013); and
- Demonstrate that minimum setbacks and buffer distances to sensitive features can be achieved within the confines of the newly created allotment.

The scope of this report is to determine the requirements for on-site effluent disposal based on existing site conditions and ensure effluent is handled and treated to an appropriate level to minimise impacts to receiving environments.

2 Site Location

The subject site is located within the Logan City Council local area, at 1-9 Pub Lane, Greenbank. The site is located on the corner of Pub Lane and Teviot Road and is currently accessed from Pub Lane. The site is square in shape and has a total area of 4,075 m².

The site currently houses a building which is occupied by Telstra located centrally along the western boundary of the site along with a small disused shed on the northern boundary. Refer to Figure 2.1 below which presents an image (Queensland Globe), depicting the site's location and surrounding land uses.

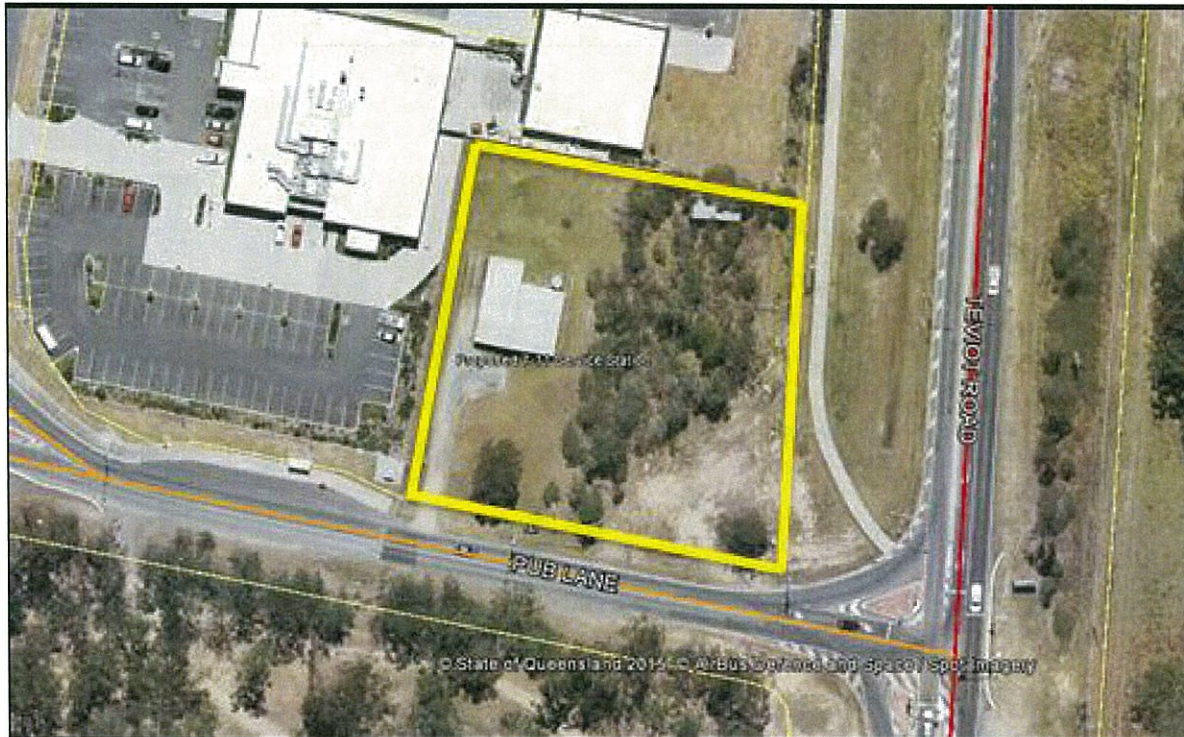


Figure 2.1 Site Location

2.1 Vegetation

Aerial photography and a site visit confirm the presence of a central strip of vegetation primarily consisting of ground cover and a mix of exotic and native non-remnant regrowth vegetation. The remaining area of the site consists of grassed areas.

2.2 Topography and Stormwater Conveyance

A site topographic survey of the site has been undertaken by DTS Urban Planning, Surveying and Development (March 2014). Based on this survey, the site can be described as relatively flat with a peak elevation of RL 73.45 m AHD at the site's southern boundary along the Pub Lane frontage. The site grades from this high point generally to the north east and southwest. The lowest point on the site is RL 72.13 m AHD in the site's north-western corner.

3 Description of Development

The development proposes:

- the subdivision of Lot 1 RP52978 into two (2) parcels;
- the existing Telstra premises will be retained on the newly created western allotment;
- a service station is proposed on the newly created eastern allotment (subject to a separate MCU application); and
- the creation of an reciprocal access easement to provide dual access and egress for both allotments off Pub Lane.

The proposed lot reconfiguration is illustrated in Figure 3.1 below.

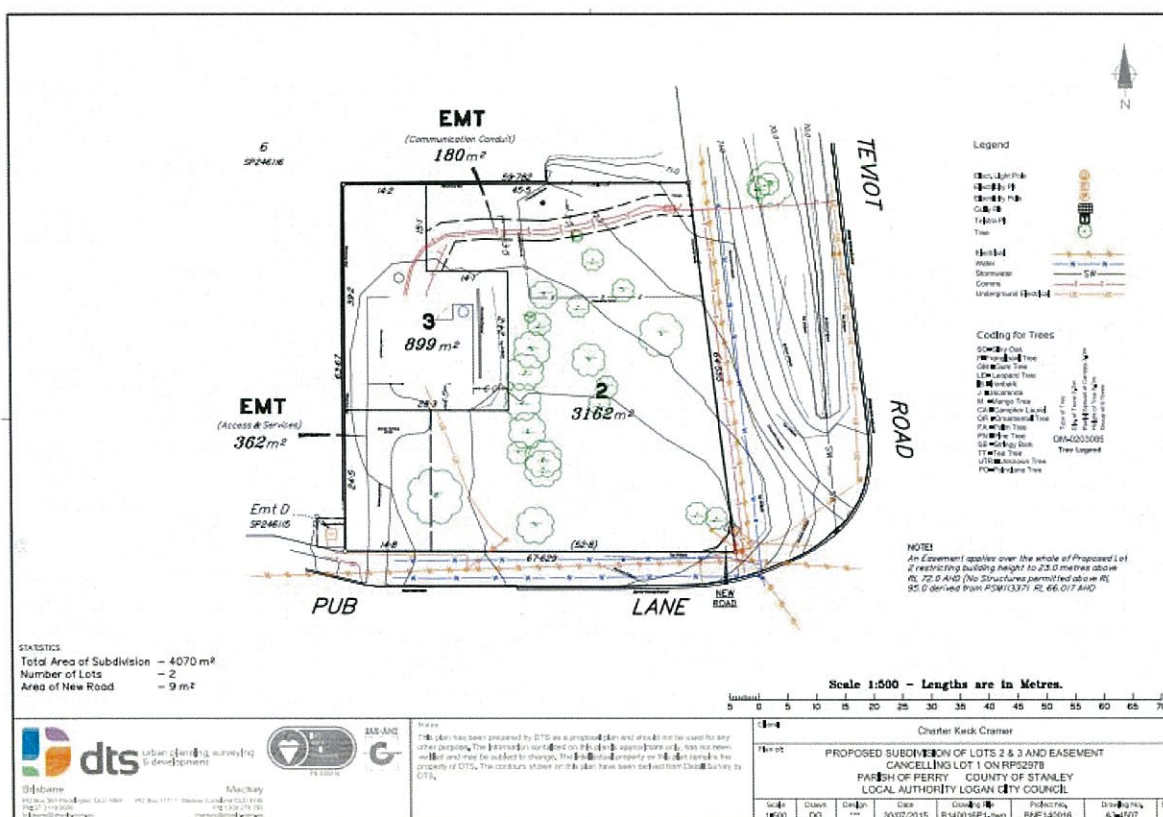


Figure 3.1 Proposed Development Layout

3.1 Wastewater Generation

In order to determine wastewater generation rates, conservative assumptions were made in accordance with the Planning Guidelines for Water Supply and Sewerage (DEHP, 2010). Based on an average sewage flow rate of 225 L/day/100 m² GFA, for a commercial premises and applying a GFA of 190 m², it is estimated that the existing facility would have a maximum sewage generation rate of 427.5 L/day.

3.2 Wastewater Treatment Plant

It is proposed that the existing septic system be retained and used as the primary treatment measure for all effluent generated from the site.

4 Land Application Requirements

The following sections identify the statutory requirements for on-site effluent disposal, determine the expected wastewater generation rates, and estimate the required size of the land application area based on soil types and wastewater generation rates.

4.1 Statutory Requirements

Under the Qld Environmental Protection Act 2008 (EP Act) and its subordinate legislation Environmental Protection Policy (EPP) Water and EPP Waste, onsite sewage treatment systems with a peak design capacity > 20 equivalent persons (EP) are classified as a Level 1, Environmentally Relevant Activity (ERA) 63 and require licensing.

Sewage treatment systems with a peak design capacity < 20 EP require an on-site effluent disposal permit from local government. On-site systems are required to be designed in accordance with the Queensland Plumbing and Wastewater Code (QPW Code), in order to meet the statutory requirements of the *Plumbing and Drainage Act 2002*.

The Australian Standard AS/NZS1547:2012 – Onsite Domestic Wastewater Management outlines design parameters for domestic on-site wastewater systems with an EP of up to 10 persons.

Sewage treatment and disposal for the proposed development is not expected to trigger an ERA or requirements of the *Environmental Protection Act 2008* and will not require licensing by DEHP; however, will need to comply with AS/NZS 1547:2012 – Onsite Domestic Wastewater Management, the QPW Code as well as local regulatory requirements.

4.2 Field Assessment

In accordance with the requirements of AS/NZS 1547:2012, a site and soil investigation was undertaken to establish the existing conditions and identify any unfavourable areas for effluent disposal.

On 22 July 2015, a field assessment was conducted by BIOME Consulting, which involved visual inspection of the site to identify any unfavourable areas for effluent disposal, as well as the auguring of investigation boreholes.

Two (2) boreholes were augured within the proposed effluent irrigation area to establish the existing soil properties and to determine the likely permeability. Permeability tests were performed using the 'Constant-Head' infiltration test. Figure 4.1 illustrates the testing locations.

The field assessment revealed similar soil types at each investigation borehole (Table 4.1). Soil textures encountered were generally consistent with highly permeable and weak structured sandy silt (identified as Soil Category 2, in accordance with AS/NZS 1547:2012). Figures 4.2 and Figure 4.3 (below) show soil samples from Horizons A, B and C for TP1 and TP2.



Figure 4.1 Test Pit Locations

Table 4.1 Soil Horizons

Test Pit ID	Horizon	Lower Depth (mm)	Soil Description	Moisture Condition	Colour	Soil Category No.
1	A	150	Weakly structured Sandy Silt	Dry	Dark grey-brown	2
	B	250	Weakly structured Sandy Silt	Dry	Light grey-brown	2
	C	100	Weakly structured Sandy Silt	Dry	Brown	2
2	A	150	Weakly structured Sandy Silt	Slightly moist	Dark grey-brown	2
	B	250	Weakly structured Sandy Silt	Slightly moist	Light grey-brown	2
	C	100	Weakly structured Sandy Silt	Slightly moist	Brown	2



Figure 4.2 Soil Profile from TP1

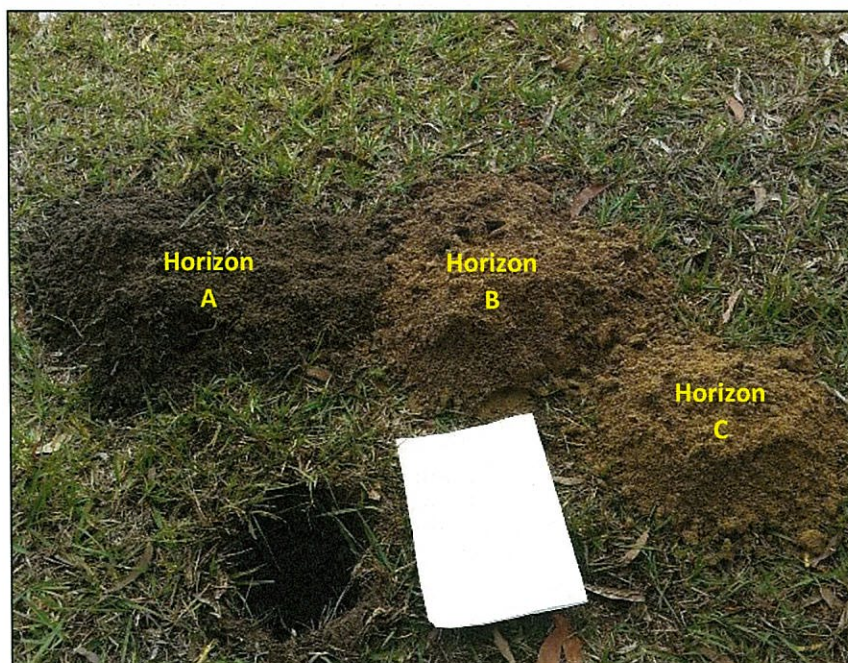


Figure 4.3 Soil Profile from TP2

Infiltration investigations were conducted in accordance with the methodology stipulated within Appendix G of AS/NZS 1547:2012 using a Constant-Head permeameter. See Figure 4.4 below for the Constant-Head permeameter, assembled and used on site in accordance with AS/NZS 1547:2012.

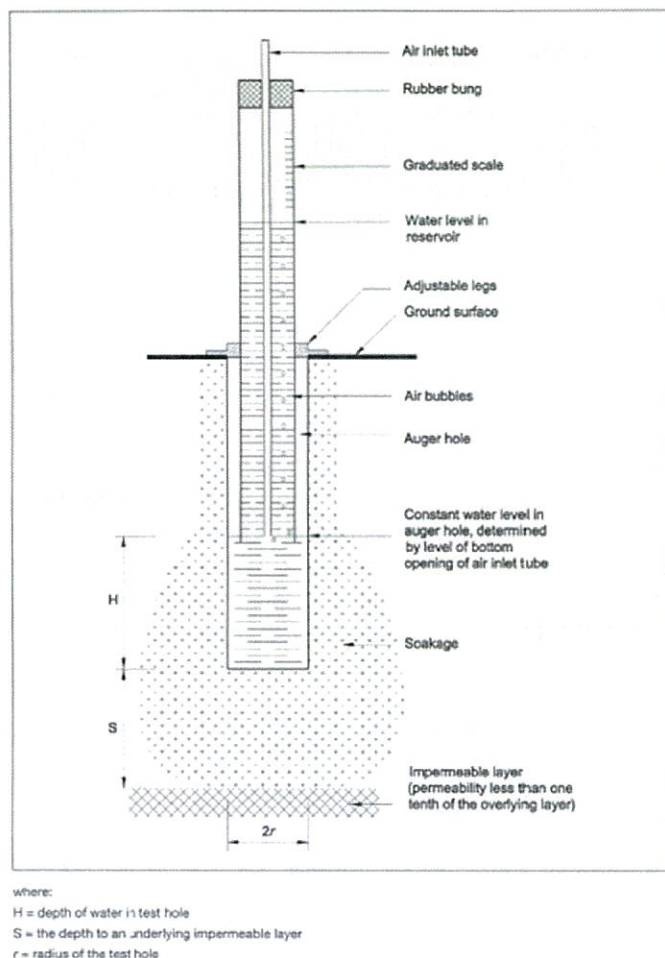


Figure 4.4 Permeameter Assembly from AS/NZS 1547:2012

4.3 Land Application Area Calculations

Land application areas have been sized based on the formula below which has derived from Appendix L, Section L4.2 of AS1547:2012 (see below). The relevant Design Loading Rate (DLR) has been taken from Table 5.2 of AS1547:2012.

$$A = \frac{Q}{DLR}$$

Where
A = Area m²
Q = Design daily flow rate (L/day)
DLR = Design loading rate (mm/day)

Soils encountered on site during the site investigation have been designated to belong to Soil Category 2. Design loading rates (DLR) between 20 and 35 mm/week (dependent on the irrigation system chosen) have been assumed for the site. The required land application areas are listed in Table 4.2 below.

Table 4.2 Required Land Application Areas

Required Irrigation Area (m ²)					
Surface/Subsurface Irrigation		Mound		Evapotranspiration Absorption (ETA)	
Area (m ²)	DLR* (mm/week)	Area (m ²)	DLR* (mm/week)	Area (m ²)	DLR * (mm/week)
50	35	24	24	18.75 increased from 12.5 to reduce risks of ground water quality due to Category 2 soils.	20

Due to site constraints, it is recommended that Evapotranspiration Absorption (ETA) trenches/beds be installed for the disposal/land application of treated effluent from the existing septic tank. Given the soils on site are classified as Category 2 and as such have a very high k_{sat} value in accordance with AS/NZS 1547:2012 Table K2, it is recommended that treated effluent be distributed over a larger application area in order to reduce ground water quality risks. It is therefore recommended that the ETA bed area be increased by 50% to a minimum of 18.75 m².

A schematic of the effluent treatment and disposal system is shown on Drawings PET01 and ETA01 within Appendix A.

4.3.1 Separation/Setback Distances

The following site setbacks have been based on provision of an onsite identified in accordance with QPW Code and ASNZ 1547:2012:

- A horizontal separation distance of 50 m is recommended between the on-site effluent treatment and disposal facility and;
 - The top of bank of any permanent/intermittent watercourses on the site;
 - The top of bank of a lake, bay or estuary;
 - The 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; and
 - Bore or dam used or likely to be used for human or domestic consumption.
- A vertical separation distance of 1.2 m of unsaturated soil depth from the on-site effluent treatment and disposal area to a permanent water table;
- For sub-surface land application the following setbacks apply;
 - A distance of 4 m downslope and 2 m upslope between the irrigation distribution pipework to property boundaries, pedestrian footpaths, footings of buildings, walkways, recreation areas, and retaining wall footings; and
 - A setback of 6 m from swimming pools and in-ground potable water tanks to the subsurface irrigation distribution pipework.
- Shaping of disposal areas to a maximum slope of 6%; and
- All irrigation areas are to be located above any flood prone land.

5 Conclusions

The requirements for sustainable effluent disposal for the subject site are as follows:

- The existing septic system will be relied upon for primary treatment of effluent;
- Treated effluent from the existing facility is to be disposed of within an onsite disposal/irrigation system comprising of approx. 18.75 m² of ETA trenches;
- Given the soils on site are classified as Category 2 and as such have a very high ksat value in accordance with AS/NZS 1547:2012 Table K2, it is recommended that treated effluent be distributed over a larger application area in order to reduce ground water quality risks.
- It has been recommended that the ETA bed area be increased by 50% to a minimum of 18.75 m².
- A distance of 4 m is required to buffer the effluent disposal area and all down-slope property boundaries and 2 m buffer to all upslope boundaries; and
- All irrigation areas to be located above any flood prone or flood management areas.

6 References

The information presented herein has been prepared with reference to the following:

1. AS/NZS 1547:1994 Disposal systems for effluent from domestic premises.
2. AS/NZS 1547:2012 On-site domestic-wastewater management.
3. Department of Natural Resources and Mines 2002 Onsite Sewerage Facilities Guidelines for Vertical and Horizontal Separation Distance.
4. Queensland Plumbing and Wastewater Code – Housing and Public Works, 15 January 2013.
5. Kuczera George, Coombes P, April 2001 Rainwater Tank Design for water supply and stormwater management.
6. QLD Department of Environment and Resource Management MEDLI Manual.
7. Department of Environment and Resource Management, Planning Guidelines for Water Supply and Sewerage (March 2005).
8. Gold Coast Water (2002), Pimpama – Coomera Integrated Urban Master Plan, Discussion Paper.
9. QLD Sustainable Planning Act 2009.

Appendix A



VERSION: A

DATE: 06.11.15

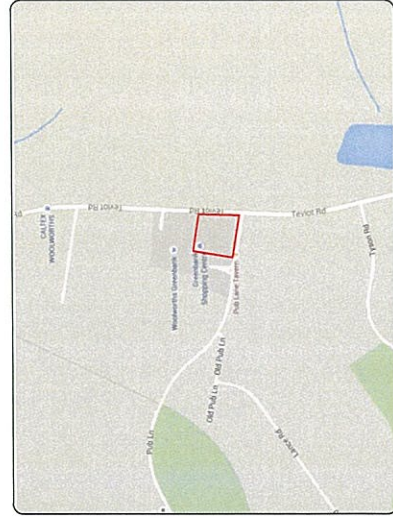
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for
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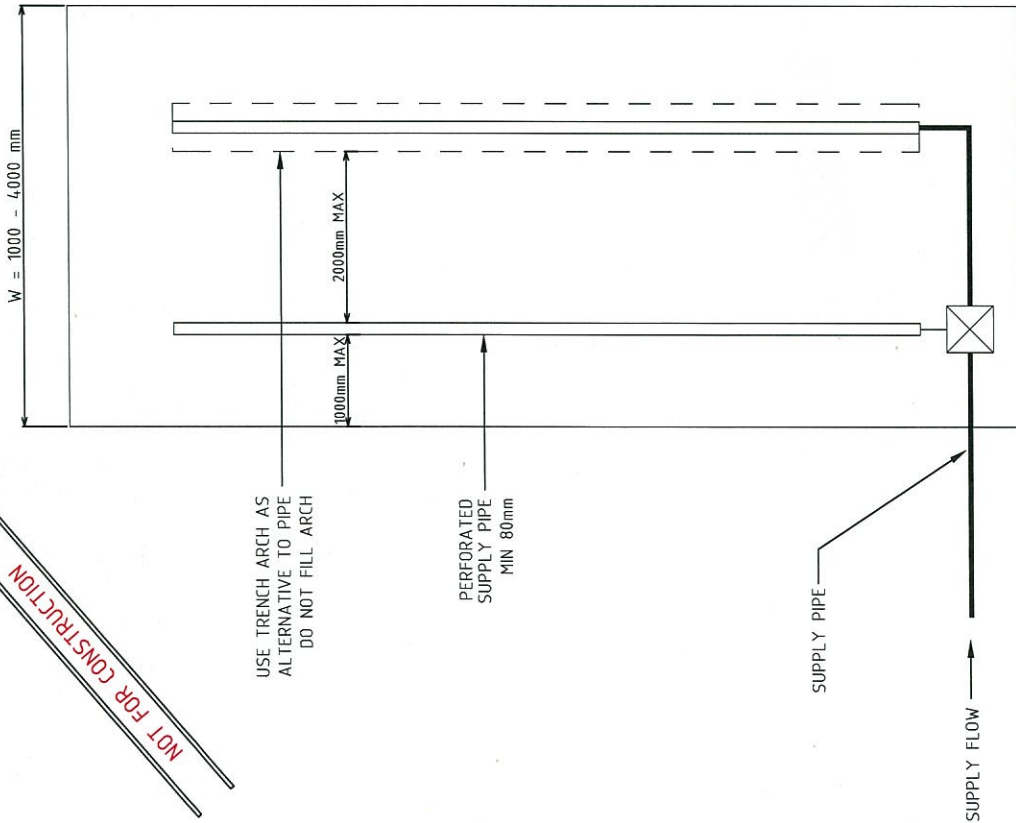


Site Location

SCHEDULE OF DRAWINGS	
Drawing No.	Drawing Title
LP 01	LOCALITY AND DRAWING INDEX PLAN
PE101	PROPOSED ONSITE EFFLUENT DISPOSAL SYSTEM
ETA 01	EVAPOTRANSPIRATION AREA TYPICAL DETAILS

BIOME Consulting Pty Ltd
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ABN 86 166 087 476

ETA BEDS 18.75 m²



TYPICAL PLAN LAYOUT

ETA BED DESIGN STEPS:

1. OBTAIN HYDRAULIC LOAD (Q, L/s).
2. OBTAIN DESIGN LOADING RATE (DLR, mm/d).
3. OBTAIN BED DESIGN FACTORS:
 - a. LENGTH/WIDTH RATIO (R)
 - b. AGGREGATE DISTRIBUTION BED THICKNESS (T1, mm - 500mm MAX)
 - c. TOPSOIL COVER THICKNESS (T2, mm - 50mm MIN)
4. DETERMINE BED SURFACE AREA (A, m²):

$$A = \frac{Q}{DLR}$$
5. DETERMINE BED WIDTH (W):

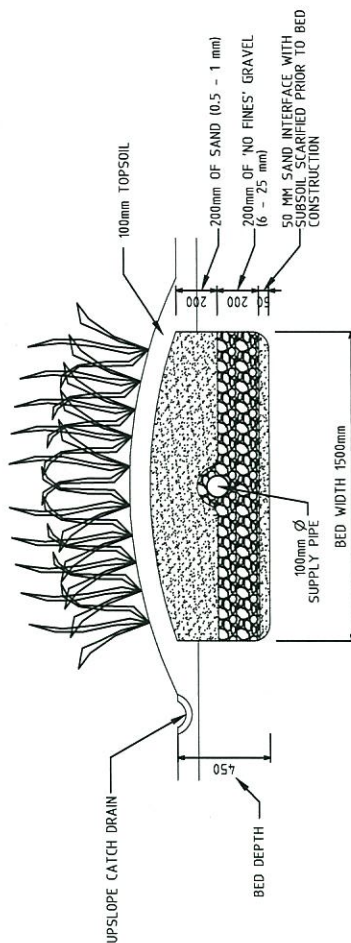
$$W = \sqrt{\frac{A}{R}}$$
6. DETERMINE BED LENGTH (L):

$$L = WR$$
7. DETERMINE TOTAL BED DEPTH (T, mm):

$$T = T1 + T2$$

GENERAL NOTES:

1. EFFLUENT DISTRIBUTION PIPES ARE TO BE EVENLY DISTRIBUTED SO AS THAT EFFLUENT IS DISPERSED THROUGHOUT THE BED AREA.
2. FLOW SPLITTERS SHOULD BE INSTALLED TO ENSURE SUITABLE FLOW DISTRIBUTION.
3. BED LENGTHS SHALL NOT EXCEED 20 m.
4. BEDS SHALL BE CONSTRUCTED ALONG THE CONTOUR.
5. VEGETATION COVER SHALL BE GRASS OR ALTERNATIVELY SPECIES THAT CAN TOLERATE WET SUB-SOILS AND HAVE A HIGH EVAPOTRANSPIRATION CAPACITY.
6. BEDS ARE TO BE LOCATED WHERE THERE IS GOOD EXPOSURE TO SUNLIGHT & WIND.
7. BEDS PLACEMENT SHALL AVOID CONCAVE SLOPES WHERE FLOODING MAY OCCUR.
8. BEDS IN CLAY SOILS SHALL HAVE BASE AND SIDEWALLS SCARIFIED TO PROMOTE INFILTRATION.
9. BEDS IN DISPERSIVE SOILS SHALL HAVE GYPSUM APPLIED TO THE BASE AT A RATE OF 1 kg/m² THE NEED FOR FURTHER GYPSUM APPLICATION OR BED RENEWAL SHALL BE REVIEWED AT A MINIMUM 10 YEAR CYCLE.
10. IF SOIL HYDRAULIC CONDUCTIVITY (KSA) IS < 0.06 m/d, A WATER BALANCE SHALL BE UNDERTAKEN TO DETERMINE THE POTENTIAL FOR SURFACE SURCHARGE.
11. IN MEDIUM TO HEAVY CLAYS, ONLY SECONDARY TREATED EFFLUENT CAN BE APPLIED TO THE BED.
12. ETA SET-BACKS AS REQUIRED BY THE DPM CODE ARE TO BE ACHIEVED
13. ETA TRENCH / BED SHOULD ONLY BE DESIGNED AND CONSTRUCTED BY SUITABLY QUALIFIED AND EXPERIENCED PERSONS.
14. BASE OF TRENCH / BED IS TO BE A MINIMUM OF 600mm ABOVE THE EXISTING WATER TABLE.
15. GRAVITY BEDS / TRENCHES ARE GENERALLY NOT SUITABLE FOR SITES WITH HIGHLY PERMEABLE SOILS, DUE TO DIFFICULTY IN MAINTAINING EVEN DISTRIBUTION. PRESSURISED BEDS/TRENCHES SHOULD BE CONSIDERED IN SUCH SOILS.
16. SURFACE STORMWATER IS TO BE DIVERTED USING UPSLOPE CATCH DRAINS.



ETA/ETS BED DETAILS
(AS/NZS 1547:2012)

APPROVED FOR AND ON BEHALF OF BIOME CONSULTING PTY LTD			
VER.	DESCRIPTION	APPR.	DATE
A	ORIGINAL ISSUE		06.11.15

PROJECT			
DATE	PROJECT No.	DRAWING TITLE	SCALE
06.11.15	BC - 15081	ON SITE EFFLUENT ASSESSMENT	NAT 1:5
		EVAPOTRANSPIRATION AREA TYPICAL DETAILS	
		CHARTERS KECK CRAMER	
		EXISTING TELSTRA SITE CNR PUB LANE & TEVIOT ROAD GREENBANK	

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		EVAPOTRANSPIRATION AREA TYPICAL DETAILS	
		CHARTERS KECK CRAMER	
		EXISTING TELSTRA SITE CNR PUB LANE & TEVIOT ROAD GREENBANK	

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ORIGINAL SCALE BEFORE REDUCTION	
CERTIFIED BY	