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<td>Author</td>
<td>LT</td>
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# TABLE OF CONTENTS

1 Introduction ............................................................................................................. 4

2 Site Assessment ....................................................................................................... 5
   2.1 Existing System and Development ..................................................................... 5
   2.2 Proposed System and Development ................................................................... 6
   2.3 Site Assessment Factors .................................................................................... 6

3 Effluent Disposal System Design ......................................................................... 8
   3.1 Septic Tank ........................................................................................................ 8
   3.2 Buffer Distances ............................................................................................... 8
   3.3 Design Calculations ......................................................................................... 8
      3.3.1 Introduction ............................................................................................... 8
      3.3.2 Wastewater Flows .................................................................................... 8
      3.3.3 Sizing the absorption Trench .................................................................... 8

4 Summary ................................................................................................................... 9

5 References ............................................................................................................... 10

Appendix A: Survey Plan ......................................................................................... 11

Appendix B: Proposed Site Layout & Disposal Area ............................................... 12
1 Introduction

Barker Ryan Stewart has been engaged to investigate and if possible, to design an Effluent Disposal system on land within the property to reduce the volume of effluent required to be disposed.

The subject site is located at 452 Greggs Road, Kurrajong and also known as Lot E of DP 373372. A subdivision of the lot into two lots has been proposed for the site. The site currently has a total area of 0.8316 hectares subdivided into two lots which is lot 11 and 12 with areas of 0.4316 hectare and 0.4 hectare respectively. The land generally slopes to the rear which is north of the site. The two dwellings on the site each drain to separate septic tanks and then discharge to their own respective absorption trenches.

The OSSM system is to be installed in accordance with:

- Treat effluent on-site using a certified method in accordance with Environmental Health Protection Guidelines (DLG 1998) and AS/NZS 1547:2012 (SAI & NZS 2012).
- Comply with the requirements/objectives of the Environmental Health Protection Guidelines (DLG 1998).
2 Site Assessment

2.1 Existing System and Development

There are two existing dwellings on the site. Each dwelling drains into a septic tank and the treated water from the septic tanks get discharged to an absorption trench. A visual inspection of the existing absorption trenches has shown that they appear to be functioning and well maintained. Approximate locations of the septic tanks and absorption trenches are shown in figure 2.1 below.
2.2 Proposed System and Development

It is proposed to retain the existing septic systems and the infiltration trench servicing the dwelling located on Lot 11. However, the proposed subdivision will result in the absorption trenches servicing the house located on Lot 12 to be relocated as it will be located in Lot 11. This has resulted in new calculations being prepared for the absorption system to resize it based on the required standards and on the land available. It is proposed to construct a new infiltration trench to service the septic tank on Lot 12 and via gravity feed as the site has adequate fall to direct the effluent across to the disposal area as shown on Appendix B.

2.3 Site Assessment Factors

A Site assessment rating for the on-site system has been undertaken in accordance with Table 4 of the OSMSH and is shown below in Table 3.1. According to Bannerman and Hazeltone and publication Soil landscapes of the Penrith 1:100000 sheet, the soil landscape of the area is that of the Luddenham (Lu) soil type.

<table>
<thead>
<tr>
<th>Site Feature</th>
<th>Limitation</th>
<th>Rating</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flood Potential</td>
<td>Above 1 in 100 year flood</td>
<td>Minor</td>
<td></td>
</tr>
<tr>
<td>Exposure</td>
<td>Exposure – High sun and wind exposure.</td>
<td>Minor</td>
<td></td>
</tr>
<tr>
<td>Slope %</td>
<td>Absorption system</td>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td>Landform</td>
<td>Hill Crest, convex side slopes and plains</td>
<td>Minor</td>
<td></td>
</tr>
<tr>
<td>Run On and U/S Seepage</td>
<td>Minimal catchment located above</td>
<td>Minor</td>
<td></td>
</tr>
<tr>
<td>Erosion Potential</td>
<td>No visible signs of erosion</td>
<td>Minor</td>
<td></td>
</tr>
<tr>
<td>Site Drainage</td>
<td>No visible sign of surface dampness</td>
<td>Minor</td>
<td></td>
</tr>
<tr>
<td>Fill</td>
<td>No Fill</td>
<td>Minor</td>
<td></td>
</tr>
<tr>
<td>Buffer Distance</td>
<td>Refer section 3.3</td>
<td>Minor</td>
<td></td>
</tr>
<tr>
<td>Land Area</td>
<td>Refer section 3.3</td>
<td>Minor</td>
<td></td>
</tr>
<tr>
<td>Rock Outcrops</td>
<td>No rock outcrops / floaters are visible</td>
<td>Minor</td>
<td></td>
</tr>
<tr>
<td>Geology</td>
<td>Land appears homogeneous</td>
<td>Minor</td>
<td></td>
</tr>
</tbody>
</table>

A Soil assessment rating for on-site systems in accordance with Table 6 of the OSMSH document has been undertaken in Table 3.2 below. There are no major limitations that have been encountered in either the site assessment or the soil assessment.

The following information was found to occur within the effluent disposal area.

- Soil classification – clay loam to sandy clay loam
- DIR from limiting lower profile – 15
- pH – 6.5
- Permeability is high across all soil layers
- Depth to bedrock 1.0m plus
- Phosphorus absorption index assumed high absorbance of phosphorus
- No water table was sighted.

### Table 3.2 – Soil Assessment – Rating for On-Site Systems

<table>
<thead>
<tr>
<th>Soil Feature</th>
<th>Limitation</th>
<th>Rating</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth to Bedrock</td>
<td>&gt;1.5m plus</td>
<td>Minor</td>
<td></td>
</tr>
<tr>
<td>Depth to watertable</td>
<td>No visible water table</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Soil Permeability</td>
<td>Sandy Clay Loam</td>
<td>minor</td>
<td></td>
</tr>
<tr>
<td>Course Fragment</td>
<td>2-10</td>
<td>Minor</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>&gt;6</td>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td>Electrical Conductivity</td>
<td>&lt;4</td>
<td>Minor</td>
<td></td>
</tr>
<tr>
<td>Sodicity</td>
<td>Low (assumed)</td>
<td>Minor</td>
<td></td>
</tr>
<tr>
<td>Phosphorous Sorption</td>
<td>High (assumed)</td>
<td>Minor</td>
<td></td>
</tr>
<tr>
<td>Emerson Aggregate Test</td>
<td>Class 1 (assumed)</td>
<td>moderate</td>
<td></td>
</tr>
</tbody>
</table>

The site is considered to be suitable for onsite disposal of the effluent generated from the facility by means of an absorption trench after treatment from the existing septic system. The current site has two existing absorption trench which takes treated flows from the existing septic tanks and they both appear to be working and show no sign of failure.
3  Effluent Disposal System Design

3.1  Septic Tank

The front dwelling has three bedrooms and has a population equivalent of 4 persons which equates to a design flow of 1000 L/day. It is assumed that the existing septic tank has a capacity of 3000L tank as per AS/NZS 1547:2012.

3.2  Buffer Distances

The allowable buffer distances provided doe an absorption system are listed below together with the provided distances.

- 12 metres if area up-gradient and 6 metres if area down-gradient of property boundary – 12m, achieved.
- 6 metres if area up-gradient and 3 metres if area down-gradient of swimming pools, driveways and buildings, 6m up-gradient and 3 metres down-gradient.

3.3  Design Calculations

3.3.1  Introduction

The following design calculations are based on Appendix L of AS/NZS 1547:2012 and Councils On Site Sewage Management Policy and have been included to demonstrate the feasibility of providing an absorption trench.

In accordance with the OSMVH guidelines calculations for the irrigation area were undertaken with consideration given to the nutrient loading capacity, phosphorous loading capacity and hydraulic loading capacity for the site.

3.3.2  Wastewater Flows

It is assumed that the proposed dwellings could contain three bedrooms and is capable of accommodating four people.

The daily flow rate per person has been determined using Appendix H of AS/NZS 1547:2000. This was found to be 150 Litres/Person/day.

Therefore the daily design wastewater flows are:

\[ Q_{wastewater} = 150 \times EP = 150 \times 4 = 600 \text{ Litres/day} \]

3.3.3  Sizing the absorption Trench

\[ L = \frac{Q_{wastewater}}{(DLR \times W)} \]

L = length in m
Q = design daily flow in L/day
DLR = design loading rate in mm/d
W = width in m

\[ L = \frac{600}{(10 \times 4)} = 15 \text{ m} \]

This value is conservative and based on the worst soil conditions.
4 Summary

This report has considered the suitability of the onsite sewerage management systems to replace the existing system at 452 Greggs Road, Kurrajong. In theory only the absorption trench on lot 12 will need to be replaced.

An assessment of the site was undertaken in accordance with the requirements of AS/NZS 1547:2000 – On-site domestic wastewater management. As a result of this assessment and based on existing systems on the site, the lots were found to be suitable to support the installation of a conventional absorption trench, without having detrimental impact on the environment.

The systems will need to be installed, operated and maintained in accordance with the manufacturer’s instructions and the Council conditions of approval.
5 References


Bannerman, SM & Hazelton PA (1990), Soil Landscapes of the Penrith 1:100,000 Sheet, Soil Conservation Service of NSW, Sydney

Hawkesbury Council (June 2004), Development Control Plan Chapter 7.

The Department of Primary Industries (1968), http://allwaterdata.water.nsw.gov.au/water.stm
Appendix A: Survey Plan
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Appendix B: Proposed Site Layout & Disposal Area
Section Detail for Trench as per Figure 5 AS/NZS 1547: 2012

- Filter cloth
- Finished surface
- Distribution pipes or arches
- Topsoil
- Distribution aggregate (20 - 40 mm)
- Level floor area
- Max. 1000 mm from wall
- Max. 2000 mm spacing
- Min. 50 mm
- Max. 600 mm
- Level site = slope less than 5%

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