ONSITE WASTEWATER REPORT

PROPOSED RURAL RESIDENTIAL DEVELOPMENT AT 29, PERU LANE, GULGONG

GSL Environmental
Authored by: Simon Doberer B.Sc. (ENV)
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GSL Environmental
Environmental Consultants

Limitations

This report has been developed based on agreed requirements between the client and GSL Environmental as understood by GSL Environmental at the time of investigation. This report only applies to the subject scope of works undertaken at the subject site. Other interpretations should not be made, including changes of scope or application to other projects. The contents of this report are based on a professional appraisal of the conditions that existed onsite at the time of this investigation. Where a subsurface soil investigation has been undertaken the results are only applicable to the specific sampling locations and the depths undertaken. Because of natural geological variability and possible anthropogenic influences, the subsurface conditions reported can change abruptly. Such changes can also occur after the site investigation has been undertaken. The accuracy of the results provided in this assessment is limited by these possible variations along with limitations by budget constraints imposed by others and by inadequate site accessibility.

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Simon Doberer
Principle Environmental Scientist
B.Sc. (ENV)

Contents

1. Introduction

GSL Environmental has been commissioned by Sydney Geotech Consultancy on behalf of Manor Living to assess the suitability of an on-site sewage management system for the proposed residence at 29 Peru Lane, GULGONG NSW. This report will be submitted to The Mid-Western Regional Council in accordance with the relevant details in the 'Mid-Western Regional Council Onsite Sewage Management Plan 2008'. Other guiding documents include

- Australian Standard AS1547: 2012"On-site Domestic Wastewater Management"
- Dept. Local Government 1998, On-site Sewage Management for Single Households
- Water NSW, "Designing and Installing Onsite Wastewater Systems", 2012

This assessment is required to show that treated wastewater generated by the proposed residence can be sustainably managed on the site.

2. Site Description

The subject allotment is rectangular in shape and is approximately 2 hectares in size. The proposed development area however is within a small area within the western portion of the allotment. The proposed EDA is within a very gently inclined waning lower slope area. The closest significant water body, Three Mile Creek flows approximately 1.4km to the south of the site. There are no water bodies onsite.

According to the Dubbo 1:100 000 Soil Map the proposed dispersal area onsite is underlain by "Gulgong" residual soils. The Gulgong soil landscape unit usually consists of Undulating low hills with elevations between 460 - 560 m above sea level. Slope gradients are generally between 5 - 15%. Underlying soils mostly consist of dark brown/reddish sandy loams traversing to dark reddish brown clays.

The proposal is for a four habitable room residence, proposed plans in Appendix B.

Figure 1: Subject Site, care of six maps showing property boundaries.

3. Site Information

Site Address: 29 Peru Lane, GULGONG

Water Supply: Tank

Proposed Development: Residence

Equivalent Population: Up to 8 persons/day – 4 habitable room residence

Wastewater Flow Allowance: 120L per person per day

Design Flowrate: 960L per day

Proposed Effluent Dispersal Type: Absorption Bed

System Design: Biological Filter System

Most restrictive Soil Texture: Reddish Brown Clays

Minimum Dispersal Area: 192m2

Buffer Distances: All required buffer distances can be achieved without any variation required.

4. Physical Site Assessment

A site inspection was undertaken on the 21st July 2021. The fieldwork included an assessment of the site's physical parameters as well as hand excavation of boreholes to determine the underlying soil structures. This was undertaken to delineate the most suitable location for the proposed dispersal area. Potential onsite limitations have been investigated and are discussed below.

4.1 Landform

Varying landforms pose differing potential limitations to an effluent dispersal area. Risk of run-on and runoff may be enhanced dependent on the site's landform.

The proposed EDA is within a very gently inclined waning lower slope area.

Limitation: **LOW**

4.2 Slope Gradient

Excessive slope within an EDA can potentially lead to effluent leaching away from the EDA.

The proposed EDA is within a very gently inclined waning lower slope area. The slope percentage within the proposed EDA is approximately 3%.

Limitation: **LOW**

4.3 Exposure

Providing the EDA with maximum wind and sun exposure is preferable. This will enhance the evapotranspiration properties of the EDA and should add to the life of the EDA.

The proposed EDA is within an open area with very high levels of exposure.

Limitation: **LOW**

4.4 Flood Potential

All effluent dispersal areas are to be above the 1:20 flood level. In addition, all electrical components, vents and inspection holes form the treatment system should be located above the 1:100-year flood level. Effluent dispersal areas being inundated via flood waters can become a public health issue during times of high rain.

The proposed septic tank is to be above the 1:100 flood level. The proposed EDA is above the 1:20 flood level.

The subject allotment is not subject to any flood controls.

Limitation: **LOW**

4.5 Vegetation

All effluent dispersal areas should be covered with vegetation or mulch-based covers. A vegetated EDA provides the possibility of that area in enhancing nutrient uptake and evapotranspiration. Low vegetation cover can cause effluent runoff and low nutrient and evapotranspiration uptake rates.

A good cover of grassland vegetation is currently within the proposed EDA. Once installed it is proposed that a dense grassland be maintained within the proposed EDA.

Limitation: **LOW**

4.6 Stormwater Run-on

Stormwater runoff through the EDA has the potential to transport effluent away from the EDA to more sensitive receivers.

The proposed EDA is within a very gently inclined flat area. The slope percentage within the proposed EDA is approximately 2%.

There were no visible signs of stormwater entering the proposed EDA. The proposed EDA is within a very gently inclined waning lower slope area. The slope percentage within the proposed EDA is approximately 3%.

Limitation: **LOW**

4.7 Site Drainage

Damp and wet areas should be avoided for EDAs. These areas indicate seepage of waters and could become a transport option for effluent if placed in these areas.

Site appears to be well drained with semi-permeable soils. No visible signs of wet/damp areas in the proposed EDA. The soil profile did not show evidence of water logging.

Limitation: **LOW**

4.8 Erosion Potential

Areas of visible soil movement and erosion should be avoided.

No visible signs of erosion within the EDA. Proposed EDA area is very gently inclined and a well vegetated area.

Limitation: **LOW**

4.9 Evidence of Fill

No evidence of fill was seen within the proposed EDA or in the excavated boreholes. Soil logs are consistent of the description for underlying soils within the Gulgong soil area.

Limitation: **LOW**

4.10 Groundwater Depth

Groundwater not observed in bore holes.

Limitation: **LOW**

4.11 Surface Rock

No surface rock was observed within the proposed EDA. Boreholes were excavated to 1m.

Limitation: **MODERATE**

4.12 Groundwater Bores

A search of Water's all groundwater mapping was undertaken to determine the proximity of any bores to the EDA. There are no domestic bores within 50m of the proposed EDA on the applicant's property and 200m from neighboring properties.

Limitation: **LOW**

4.13 Watercourse Proximity

The closest significant water body, Three Mile Creek flows approximately 1.4km to the south of the site. There are no water bodies onsite.

Limitation: **LOW**

4.14 Stock Present

Stock can cause damage to effluent dispersal systems and must be kept out of the EDA by fencing or other physical barrier.

4.15 Buffer Distances

All buffer distances in accordance with the required buffer distances within AS 1547 and the Mid-Western Regional Council Onsite Sewage Management Plan 2008 will be achieved.

Limitation: **LOW**

Buffer distances from the EDA are required to minimise risk to public health, maintain public amenity and protect sensitive environments. Table below from Mid-Western Regional Council Onsite Sewage Management Plan 2008.

System	Recommended Buffer Distances
All land application systems	• 80m to permanent surface waters (eg river, streams, lakes, etc) • 50m to domestic groundwater well on applicant's property and 200m to any groundwater well located on a neighbouring property • 40m to other waters (eg farm dams, intermittent waterways and drainage channels, etc)
Surface spray irrigation	• 6m if area up-gradient and 3m if area down-gradient of driveways and property boundaries • 15m to dwellings • 3m to paths & walkways • 6m to swimming pools
Surface drip & trickle irrigation	• 6m if area up-gradient and 3m if area down-gradient of swimming pools, property boundaries, driveways and buildings
Subsurface irrigation	• 6m if area up-gradient and 3m if area down-gradient of swimming pools, property boundaries, driveways and buildings
Absorption systems	• 12m if area up-gradient and 6m if area down-gradient of property boundary • 6m if are up-gradient and 3m if area down-gradient of swimming pools, driveways and buildings
Absorption Systems Designs	• Trench lengths may vary depending on the number of bedrooms. However, the width will be 2m and the depth 400mm unless otherwise determined by the Council

Figure 2: Proposed EDA onsite.

5. Onsite Soil Assessment

During the site inspection 2 boreholes were hand excavated with a 100mm auger within the proposed EDA. The following are the results from the excavation. The auger holes were used to determine the underlying soil properties. No groundwater was observed in the excavated boreholes.

According to the Dubbo 1:100 000 Soil Map the proposed dispersal area onsite is underlain by "Gulgong" residual soils. The Gulgong soil landscape unit usually consists of Undulating low hills with elevations between 460 - 560 m above sea level. Slope gradients are generally between 5 - 15%. Underlying soils mostly consist of dark brown/reddish sandy loams traversing to dark reddish brown clays.

Borehole 1

0 – 600mm – brown/reddish sandy loams
600 – 1000mm – dark reddish brown clays.

Figure 3: Borehole 1, excavated onsite.

Borehole 2

0 – 500mm – brown/reddish sandy loams
500 – 1000mm – dark reddish brown clays.

An insitu probe, tested the soil layers for pH and EC, results as below.

Borehole 1

Depth	pH	EC_e (µS/cm)
0 – 600mm	5.8	1087
600 – 1000mm	5.5	1134

Borehole 2

Depth	pH	EC_e (µS/cm)
0 – 500mm	5.9	1318
500 – 1000mm	5.7	987

The pH of a soil influences its ability to supply nutrients to vegetation. If the soil is too acidic vegetative growth is inhibited. The electrical conductivity of the soil relates to the amount of salts present. A high salt concentration inhibits vegetative growth.

The electrical conductivity of the soils is less than 4 dS/m. This will not inhibit vegetative growth. The pH of the soil is between 5.5 and 5.9. A regular application of lime/gypsum is recommended to maintain healthy vegetation growth and keep soils neutralized.

Coarse fragments

Coarse fragments are those over 2 mm in diameter. They can pose limitations to vegetative growth by lowering the soil's ability to supply water and nutrients.

Less than 2% course fragments present. . There were some peds which could be crushed easily using fingers.

Limitation: **LOW**

Emerson Aggregate Test

The combination of slaking and dispersion caused a reduction in macroporosity and, therefore, lower infiltration rates and hydraulic conductivities as well as an increase in soil strength and other undesirable soil physical properties. This test classifies the behavior of soil aggregates, when immersed, on their coherence in water. This test was competed inhouse. Soils are divided into seven classes on the basis of their coherence in water, with one further class being distinguished by the presence of calcium-rich minerals.'

EAT Class = 2(2). Some slight dispersion potential within underlying soils.

6. System Design/Selection

Proposed Treatment Node

The proposal is to install a NSW Health Accredited Biological Filter System onsite. A Biological Filter System uses microorganisms, worms and beetles to break up the organic material into wastewater. A Biological Filter System generally consists of several layers of organisms on a finely structured humus, coco-peat and geotextile fabric. Aerobic processes occur in the system that produce very little or no odour. Effluent is commonly treated close to a secondary standard. These systems generally do not include disinfection, so they can only be irrigated via subsoil methods

Proposed Effluent Dispersal

The proposal is to install an absorption bed onsite. The effluent is typically distributed along the length of the trench or bed through slotted or drilled 100 millimetre distribution pipes, and then filtered through the gravel and sand to the underlying soil. A clogging layer or biomat develops along the bottom and sides of the trench and acts as a further filter. This filtering process helps remove pathogens, toxins and other pollutants. Nutrients in the effluent are taken up by vegetation (normally grass) planted across the absorption trench area, incorporated in the biomat, and, in the case of phosphorus, adsorbed onto clay particles in the soil.

The following calculation was undertaken to determine the minimize sizing required for effluent dispersal.

Minimum Dispersal Size Calculation

Dark reddish brown clays: Loading rate of 5mm/day. (AS1547:2012 – Table L1)

Total flowrate dispersing into adsorption beds 960L/day.

Area of bed(s): 960/5 = 192m2

As such an 192m2 absorption bed(s) is to be constructed as per appendix D.

7. Recommendations

- Installation of NSW Health Accredited Biological Filter System onsite to treat the calculated flowrate of 960L/day.
- The proposed effluent dispersal is to be an absorption dispersal field of a minimum 192m2.
- Stock must be kept out of the EDA by fencing or other physical barrier.
- This design assumes at least three-star rated plumbing fixtures are used in any new development.
- Once installed it is proposed that a dense grassland be maintained within the proposed EDA.

Simon Doberer
Principle Environmental Scientist
B.Sc. (ENV)

Appendix A – Site Plans


1
2
12000
4000
24000
14700
192m2
Absorption
Area
Proposed Biological
Filter System
(Approx Position Only)
Proposed
Residence
Proposed
Shed
RWT

Appendix B – Proposed Plans

Appendix C – Operation and Maintenance Guideline

ON-SITE SEWAGE MANAGEMENT SYSTEMS

If you live in or rent a house that is not connected to the main sewer then chances are that your yard contains an on-site sewage management system. If this is the case then you have a special responsibility to ensure that it is working as well as it can.

The aim of this pamphlet is to introduce you to some of the most popular types of on-site sewage management systems and provide some general information to help you maintain your system effectively. You should find out what type of system you have and how it works.

More information can be obtained from the pamphlets:

Your Septic System
Your Aerated Wastewater Treatment System
Your Composting Toilet
Your Land Application Area

You can get a copy of these pamphlets from your local council or the address marked on the back of this pamphlet.

It is important to keep in mind that maintenance needs to be performed properly and regularly. Poorly maintained on-site sewage management systems can significantly affect you and your family's health as well as the local environment.

What is an on-site sewage management system?

A domestic on-site sewage management system is made up of various components which - if properly designed, installed and maintained - allow the treatment and utilisation of wastewater from a house, completely within the boundary of the property.

Wastewater may be blackwater (toilet waste), or greywater (water from showers, sinks, and washing machines), or a combination of both.

Partial on-site systems - eg. pump out and common effluent systems (CES) - also exist. These usually involve the preliminary on-site treatment of wastewater in a septic tank, followed by collection and transport of the treated wastewater to an off-site management facility. Pump out systems use road tankers to transport the effluent, and CES use a network of small diameter pipes.

How does an on-site sewage management system work?

For complete on-site systems there are two main processes:

1. treatment of wastewater to a certain standard
2. its application to a dedicated area of land.

The type of application permitted depends on the quality of treatment, although you should try to avoid contact with all treated and untreated wastewater, and thoroughly wash affected areas if contact does occur.

Treatment and application can be carried out using various methods:

Septic Tank
Septic tanks treat both greywater and blackwater, but they provide only limited treatment through the settling of solids and the flotation of fats and greases. Bacteria in the tank break down the solids over a period of time. Wastewater that has been treated in a septic tank can only be applied to land through a covered soil absorption system, as the effluent is still too contaminated for above ground or near surface irrigation.

AWTS
Aerated wastewater treatment systems (AWTS) treat all household wastewater and have several treatment compartments. The first is like a septic tank, but in the second compartment air is mixed with the wastewater to assist bacteria to break down solids. A third compartment allows settling of more solids and a final chlorination contact chamber allows disinfection. Some AWTS are constructed with all the compartments inside a single tank. The effluent produced may be surface or sub-surface irrigated in a dedicated area.

Composting Toilets
Composting toilets collect and treat toilet waste only. Water from the shower, sinks and the washing machine needs to be treated separately (for example in a septic tank or AWTS as above). The compost produced by a composting toilet has special requirements but is usually buried on-site.

These are just some of the treatment and application methods available, and there are many other types such as sand filter beds, wetlands, and amended earth mounds. Your local council or the NSW Department of Health have more information on these systems if you need it.

Regulations and recommendations

The NSW Department of Health determines the design and structural requirements for treatment systems for single households. Local councils are primarily responsible for approving the installation of smaller domestic septic tank systems, composting toilets and AWTSs in their area, and are also responsible for approving land application areas. The NSW Environment Protection Authority approves larger systems.

The design and installation of on-site sewage management systems, including plumbing and drainage, should only be carried out by suitably qualified or experienced people. Care is needed to ensure correct sizing of the treatment system and application area.

Heavy fines may be imposed under the Clean Waters Act if wastewater is not managed properly.

Keeping your on-site sewage management system operating well

What you put down your drains and toilets has a lot to do with how well your system performs. Maintenance of your sewage management system also needs to be done well and on-time. The following is a guide to the types of things you should and should not do with your system.

DO

- ✓ Learn how your sewage management system works and its operational and maintenance requirements.
- ✓ Learn the location and layout of your sewage management system.
- ✓ Have your AWTS (if installed) inspected and serviced four times per year by an approved contractor. Other systems should be inspected at least once every year. Assessment should be applicable to the system design.
- ✓ Keep a record of desludgings, inspections, and other maintenance.
- ✓ Have your septic tank or AWTS desludged every three years to prevent sludge build up, which may 'clog' the pipes.
- ✓ Conserve water. Conservative water use around the house will reduce the amount of wastewater which is produced and needs to be treated.
- ✓ Discuss with your local council the adequacy of your existing sewage management system if you are considering house extensions for increased occupancy.

DON'T

- ✗ Don't let children or pets play on land application areas.
- ✗ Don't water fruit and vegetables with effluent.
- ✗ Don't extract untreated groundwater for cooking and drinking.
- ✗ Don't put large quantities of bleaches, disinfectants, whiteners, nappy soakers and spot removers into your system via the sink, washing machine or toilet.
- ✗ Don't allow any foreign materials such as nappies, sanitary napkins, condoms and 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.

Reducing water usage

Reducing water usage will lessen the likelihood of problems such as overloading with your septic system. Overloading may result in wastewater backing up into your house, contamination of your yard with improperly treated effluent, and effluent from your system contaminating groundwater or a nearby waterway.

Your sewage management system is also unable to cope with large volumes of water such as several showers or loads of washing over a short period of time. You should try to avoid these 'shock loads' by ensuring water use is spread more evenly throughout the day and week.

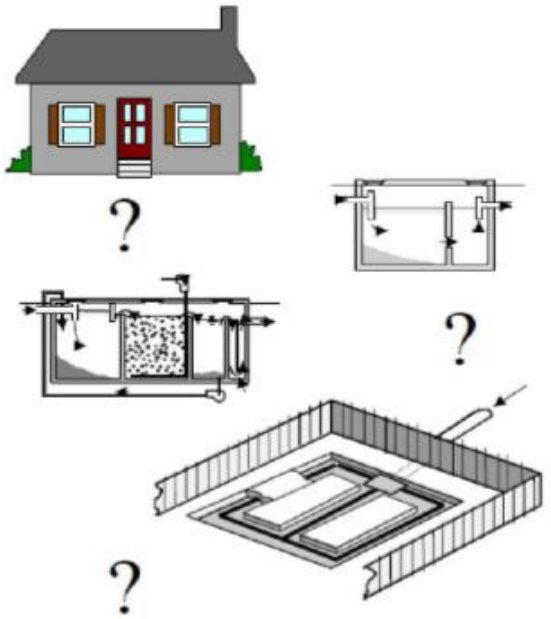
HELP PROTECT YOUR HEALTH AND THE ENVIRONMENT

Poorly maintained sewage management systems are a serious source of water pollution and may present health risks, cause odours and attract vermin and insects.

By looking after your management system you can do your part in helping to protect the environment and the health of you and your community.

For more information please contact:

Managing Wastewater In Your Backyard



LAND APPLICATION AREAS

The reuse of domestic wastewater on-site can be an economical and environmentally sound use of resources.

What are land application areas?

These are areas that allow treated domestic wastewater to be managed entirely on-site.

The area must be able to utilise the wastewater and treat any organic matter and wastes it may contain. The wastewater is rich in nutrients, and can provide excellent nourishment for flower gardens, lawns, certain shrubs and trees. The vegetation should be suitably tolerant of high water and nutrient loads.

How does a land application area work?

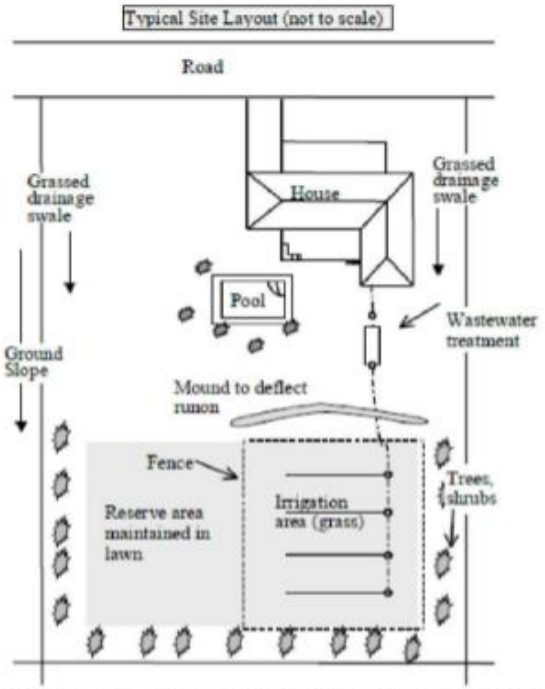
Treated wastewater applied to a land application area may be utilised or simply disposed, depending on the type of application system that is used. The application of the wastewater can be through a soil absorption system (based on disposal) or through an irrigation system (based on utilisation).

Soil absorption systems do not require highly treated effluent, and wastewater treated by a septic tank is reasonable as the solids content in the effluent has been reduced. Absorption systems release the effluent into the soil at a depth that cannot be reached by the roots of most small shrubs and grasses. They rely mainly on the processes of soil treatment and then transmission to the water table, with minimal evaporation and up-take by plants. **These systems are not recommended in sensitive areas as they may lead to contamination of surface water and groundwater.**

Irrigation systems may be classed as either subsurface or surface irrigation. If an irrigation system is to be used, wastewater needs to be pre-treated to at least the quality produced by an aerated wastewater treatment system (AWTS).

Subsurface irrigation requires highly treated effluent that is introduced into the soil close to the surface. The effluent is utilised mainly by plants and evaporation.

Surface irrigation requires highly treated effluent that has undergone aeration and disinfection treatments, so as to reduce the possibility of bacteria and virus contamination.



The effluent is then applied to the land area through a series of drip, trickle, or spray points which are designed to eliminate airborne drift and run-off into neighbouring properties.

There are some public health and environmental concerns about surface irrigation. There is the risk of contact with treated effluent and the potential for surface run-off. Given these problems, subsurface irrigation is arguably the safest, most efficient and effective method of effluent utilisation.

Regulations and recommendations

The design and installation of land application areas should only be carried out by suitably qualified or experienced people, and only after a site and soil evaluation is done by a soil scientist. Care should be taken to ensure correct buffer distances are left between the application area and bores, waterways, buildings, and neighbouring properties.

Heavy fines may be imposed under the Clean Waters Act if effluent is managed improperly.

At least two warning signs should be installed along the boundary of a land application area. The signs should comprise of 20mm high Series C lettering in black or white on a green background with the words:

RECLAIMED EFFLUENT
NOT FOR DRINKING
AVOID CONTACT

Depending on the requirements of your local council, wet weather storage and soil moisture sensors may need to be installed to ensure that effluent is only irrigated when the soil is not saturated.

Regular checks should be undertaken of any mechanical equipment to ensure that it is operating correctly. Local councils may require periodic analysis of soil or groundwater characteristics

Humans and animals should be excluded from land application areas during and immediately after the application of treated wastewater. The longer the period of exclusion from an area, the lower the risk to public health.

The householder is required to enter into a service contract with the installation company, its agent or the manufacturer of their sewage management system, this will ensure that the system operates efficiently.

Location of the application area

Treated wastewater has the potential to have negative impacts on public health and the environment. For this reason the application area must be located in accordance with the results of a site evaluation, and approved landscaping must be completed prior to occupation of the building. Sandy soil and clayey soils may present special problems.

The system must allow even distribution of treated wastewater over the land application area.

Maintaining your land application area

The effectiveness of the application area is governed by the activities of the owner.

DO

- ✓ Construct and maintain diversion drains around the top side of the application area to divert surface water.
- ✓ Ensure that your application area is kept level by filling any depressions with good quality top soil (not clay).
- ✓ Keep the grass regularly mowed and plant small trees around the perimeter to aid absorption and transpiration of the effluent.
- ✓ Ensure that any run off from the roof, driveway and other impermeable surfaces is directed away from the application area.
- ✓ Fence irrigation areas.
- ✓ Ensure appropriate warning signs are visible at all times in the vicinity of a spray irrigation area.
- ✓ Have your irrigation system checked by the service agent when they are carrying out service on the treatment system.

DON'T

- ✗ Don't erect any structures, construct paths, graze animals or drive over the land application area.
- ✗ Don't plant large trees that shade the land application area, as the area needs sunlight to aid in the evaporation and transpiration of the effluent.
- ✗ Don't plant trees or shrubs near or on house drains.
- ✗ Don't alter stormwater lines to discharge into or near the land application area.
- ✗ Don't flood the land application area through the use of hoses or sprinklers.
- ✗ Don't let children or pets play on land application areas.
- ✗ Don't water fruit and vegetables with the effluent.
- ✗ Don't extract untreated groundwater for potable use.

Warning signs

Regular visual checking of the system will ensure that problems are located and fixed early.

The visual signs of system failure include:

- ⚠ surface ponding and run-off of treated wastewater
- ⚠ soil quality deterioration
- ⚠ poor vegetation growth
- ⚠ unusual odours

Volume of water

Land application areas and systems for on-site application are designed and constructed in anticipation of the volume of waste to be discharged. Uncontrolled use of water may lead to poorly treated effluent being released from the system.

If the land application area is waterlogged and soggy the following are possible reasons:

- ⚠ Overloading the treatment system with wastewater.
- ⚠ The clogging of the trench with solids not trapped by the septic tank. The tank may require desludging.
- ⚠ The application area has been poorly designed.
- ⚠ Stormwater is running onto the area.

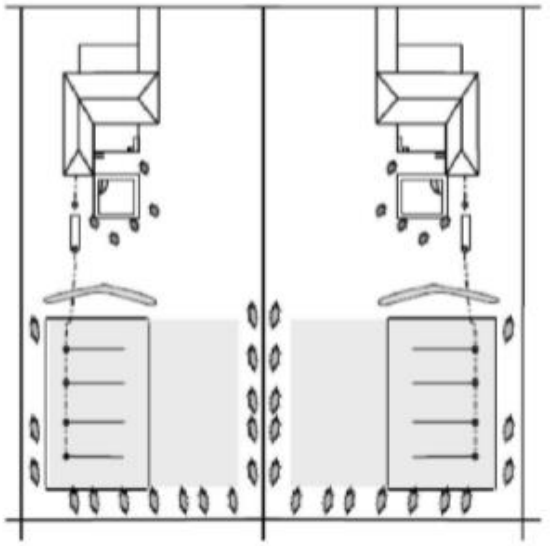
HELP PROTECT YOUR HEALTH AND THE ENVIRONMENT

Poorly maintained land application areas are a serious source of water pollution and may present health risks, cause odours and attract vermin and insects.

By looking after your sewage management system you can do your part in helping to protect the environment and the health of you and your family.

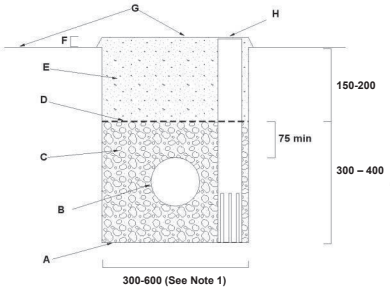
For more information please contact:

Your Land Application Area

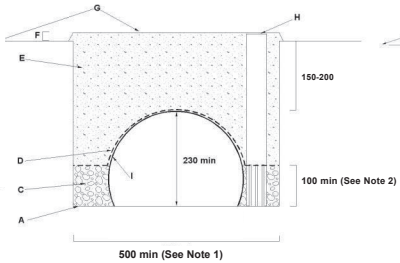


Appendix D – Absorption Bed

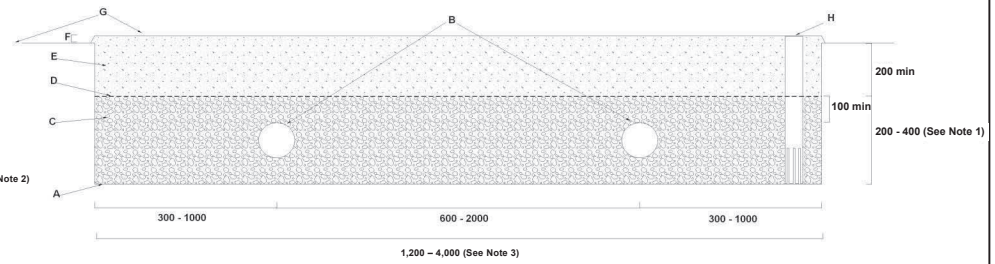
Cross Section: Piped Trench



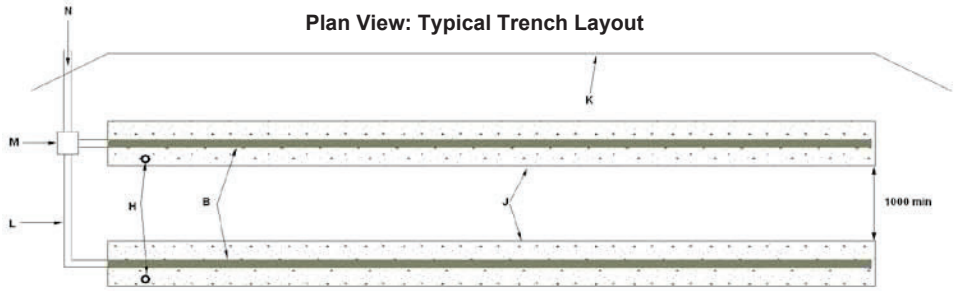
Cross Section: Arch



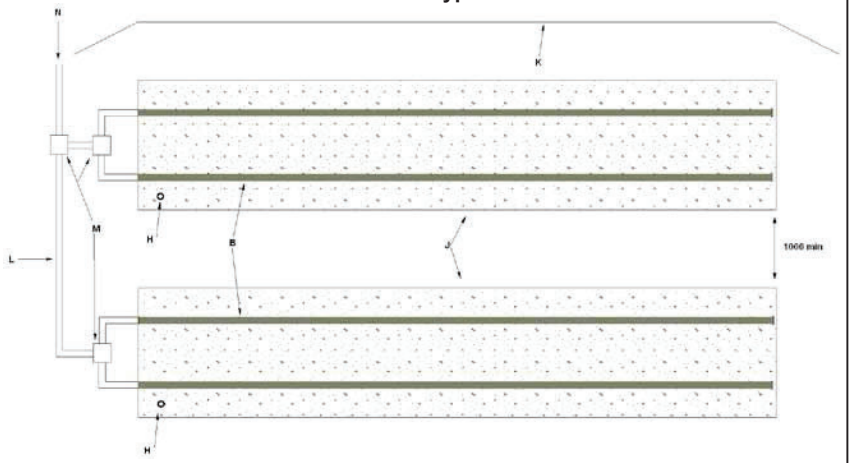
Cross Section: Conventional Piped Bed



Plan View: Typical Trench Layout



Plan View: Typical Bed



Absorption Trench / Bed

A The base of the trench must be level to ensure even distribution of effluent. Base levels should be checked with a dumpy / laser level.

B 90-100 mm slotted PVC pipe.

C 20-40 mm distribution aggregate.

D Geotextile filter cloth.

E Clean local or imported topsoil (sandy loam to clay loam).

F Allowance for settling after backfilling.

G Grass must be established across the construction area as soon as possible. Trench / bed surface must be slightly mounded.

H Inspection port on downhill side of trench / bed. Made from 50 mm PVC pipe with perforations in the aggregate level of the trench / bed.

I Self supporting arch trench that complies with AS/NZS1547:2012.

J Trench / bed dimensions are an example only. The basal area of the land application area must be determined according to the procedures set out in AS/NZS1547:2012 and this document. The location and orientation of the area should be based on a site and soil assessment by a suitably qualified person. The system may comprise a single trench / bed or multiple smaller trenches / beds. It is essential that effluent is distributed evenly to all units on a daily basis.

K Upslope stormwater diversion drain (see Standard Drawing No.9A for design detail). Subsoil drainage may be necessary on particular sites.

L 90-100 mm PVC gravity dosing pipe.

M Gravity splitter box to distribute effluent evenly between two to four separate trenches / beds. Should also be used to evenly dose multiple pipework within a single trench / bed.

N Gravity or pump fed effluent from treatment system.

Notes

1 Trenches should be a maximum of 600 mm (piped trench) or 1,000 mm (arch trench) wide. Optimum width will balance storage requirements against footprint and required trench length.

2 100 mm of aggregate is the minimum depth. Depth can be increased to provide more storage if required, however, a minimum 150-200 mm of topsoil must exist above the top of the arch trench material. Alternative proprietary void / support materials are available to provide a substitute for both aggregate and arch trench.

3 Consideration should be given to maintaining a level base when determining an appropriate width.

Gravity-fed beds are generally not suitable for sites with highly permeable soils due to difficulties in maintaining even distribution. Primary-treated effluent should not be dosed; effluent should at least be secondary-treated. Pressure dosing should be used in such soils.

Standard Drawing 10B - Absorption Trench / Bed

(not to scale)