

Designing, Constructing and Installing On-Site Sewage Management Systems

Approvals

Before the commencement of works on your on-site sewage management system (OSSMS), you must first seek approval under Section 68 of the *Local Government Act 1993*. An approval is required to either install, construct or alter an OSSMS. You will be required to submit plans for approval to ensure the system will meet environmental and public health requirements.

Following installation of your new OSSMS and final inspection by Council officers, you will be issued an Approval to Operate. Council will then inspect your system on intervals determined by the risk rating of the system to ensure it is being operated and maintained effectively.

Choosing the right OSSMS

There are many varieties of systems available. The two main types are the conventional (septic) systems and aerated wastewater treatment systems (AWTS). To help you decide which system will meet your requirements, you should discuss with your local plumber and/or a Geotechnical Soil Consultant who can inform you the suitability of your soil for the various types of systems available.

The type of system you choose will impact on what you can do with the effluent. More advanced treatment system will give you more options in regards to disposal. See the table below for more information.

It should be noted that a system for on-site sewage management should not be installed unless it is accredited by NSW Health. Council will also not approve new installations if not accredited. A list of accredited systems and suppliers can be found at: www.health.nsw.gov.au/environment/domesticwastewater/

Effluent Land Application Area Considerations

The method of effluent disposal to land, the size and location of the land application area are also

important factors which contribute to the effectiveness and longevity of a system.

The design of the land application area will be determined by soil type, slope of the land, evaporation, transpiration and the number of bedrooms and occupants in the dwelling. As such a suitably qualified Geotechnical Soil Consultant should be engaged to determine any site limitations and carry out soil testing to determine the ideal location and size for the land application area.

Subsurface land application systems are preferred as they minimise the potential for human contact and rapid release to the environment. The type of system chosen and the level of effluent treatment will determine how the effluent can be disposed of, refer to the table below.

It is important to discuss with your Geotechnical Soil Consultant the type of system you would like and the area you would like to designate for your disposal area so they can determine if the property can suitably support this.

Land application areas can get overloaded and fail over time. Some will only have a lifespan of 15-25 years, particularly for primary treatment systems (i.e. septic), so it's also important to identify an alternative or reserve land application area within your property with your Geotechnical Soil Consultant.

Some existing properties do not have sufficient room for an alternative or reserve land application area. In these cases it is important that a higher level of effluent treatment be performed, and effluent is alternated into a different section of the disposal area after each pump cycle (if possible, using an indexing valve), thereby allowing each area to have a 'rest' in an unsaturated state for significant periods each day.

Types of Land Application

Absorption trenches:

Absorption trenches rely on infiltration into the soil beneath the trench. They do not provide substantial

re-use as the effluent is concentrated below the root zone, forcing most of water downwards to potentially pollute underlying groundwater. They are also prone to failure in clay soils.

Evapo-transpiration absorption beds:

ETA beds are wider and shallower than traditional absorption trenches, thereby providing a much greater opportunity for effluent uptake by plants and reduce the dependence on infiltration and soil assimilation capacities to treat the effluent. ETA beds are quite robust and need relatively little maintenance when properly designed and installed.

Winconsin sand mound systems:

Sand mound systems are effluent dispersal devices constructed above the ground from imported specific sand material and capped with appropriate loam to clay-loam soil. They are often used in situations where drainage of the natural soil is restricted or where the underlying groundwater seasonally reaches a height of less than 1.2m below ground level, or areas where periodic flooding occurs. They must be carefully designed and constructed by specialists to ensure they will work effectively.

Sub-surface irrigation:

Sub-surface drip irrigation is a good method of distributing treated effluent because it can distribute small, measured doses to evenly spaced outlets in relatively undisturbed soil. This ensures a very reliable distribution available for rapid root uptake, and minimises the risk of the irrigation field becoming saturated during extended rainfall.

Uses of Effluent Based on Type of Treatment

NSW Health has published a guideline for the acceptable uses of effluent based on the type of treatment it has undergone. The more sophisticated the treatment is, the more flexibility you will have with disposal. Refer to the table below or visit NSW Health’s website at:

<http://www.health.nsw.gov.au/environment/domesticwastewater/Pages/default.aspx>

Treatment	Standard	Recommended Final Use / Application
Primary treatment (e.g. septic tank)	<ul style="list-style-type: none"> • Solids separation and digestion – no effluent standard 	<ul style="list-style-type: none"> • Sub-soil at greater than 300mm depth below finished ground level (e.g. trenches or beds).
Secondary treatment without disinfection	<ul style="list-style-type: none"> • BOD <20mg/L • TSS <30mg/L • Service person performs compliance inspection • Local council development risk monitoring strategy 	<ul style="list-style-type: none"> • Sub-soil >300mm depth • Low pressure effluent distribution irrigation lines • Sub-surface (300mm to 150mm) • Shallow sub-surface drip irrigation
Secondary Treatment with disinfection (e.g. AWTS)	<ul style="list-style-type: none"> • BOD <20mg/L • TSS <30mg/L • <i>E.coli</i> <30 cfu/100mL 	<ul style="list-style-type: none"> • Sub-soil >300mm depth • Low pressure effluent distribution irrigation lines • Sub-surface (300mm to 150mm) • Shallow sub-surface drip irrigation • Surface and spray irrigation (100mm to above GL)
Advanced secondary treatment without disinfection	<ul style="list-style-type: none"> • BOD <10mg/L • TSS <10mg/L • Service person performs compliance inspection • Local council development risk monitoring strategy 	<ul style="list-style-type: none"> • Sub-soil >300mm depth • Low pressure effluent distribution irrigation lines • Sub-surface (300mm to 150mm) • Shallow sub-surface drip irrigation
Advanced secondary treatment with disinfection	<ul style="list-style-type: none"> • BOD <10mg/L • TSS <10mg/L • <i>E.coli</i> <10 cfu/100mL 	<ul style="list-style-type: none"> • Sub-soil >300mm depth • Low pressure effluent distribution irrigation lines • Sub-surface (300mm to 150mm) • Shallow sub-surface drip irrigation • Surface and spray irrigation (100mm to above GL) • Greywater may be used for toilet flushing and washing machines

Note - Low pressure effluent distribution irrigation lines and shallow sub-surface drip irrigation must be installed in accordance with AS/NZS1547.

Conventional / Septic Systems

The most common land application method for conventional systems (i.e. septic tanks) is usually via absorption trenches or evapotranspiration beds. The total length required of the trenches or beds is determined by the Geotechnical Soil Consultant based on the testing undertaken. It is recommended that the length of individual trenches or beds is no longer than 20m. If the total length of the trench or bed required exceeds 20m, then multiple trenches or beds will be required. For example if a total of 60m length is required, then 3 x 20m trenches or beds will be required.

Ensure:

- The base of each trench or bed is level.
- There are inspection openings installed to facilitate the monitoring of the wastewater level in each trench or bed.
- Surface water is diverted around or away from the land application area.
- Distribution aggregate is carefully placed on the trench or bed, avoiding damage to the base of the side walls. A less permeable soil is then placed on the trenches or beds.
- The top of the bed is grassed with suitable shrubs and plants. See below for more information.
- Vegetation is maintained to allow a balance of sunlight and plant uptake.
- The land application area is fenced from children, stock and vehicles.

AWTS

AWTS can be discharged via subsurface or surface irrigation, depending on the sophistication of the treatment system, refer to above table for more information.

Ensure:

- All irrigation areas are appropriately sized and designed for the wastewater generated. Ensure wastewater disposal rates do not exceed the absorption capacity of the soil.
- The AWTS is regularly serviced.
- The irrigation area is maintained and planted with suitable plant species and not for human consumption.

- The irrigation system complies with AS1547 and fittings comply with AS1477 and AS2698.2. Lines and sprinklers should be lilac in colour and sprinkler are not to produce aerosols or mist and evenly distribute water.
- No runoff, seepage or surface ponding occurs from irrigation areas.
- Surface sprinklers are regularly moved within the irrigation area to allow for even distribution of wastewater.
- The land application area is fenced from children, stock and vehicles.
- There are warning signs displayed at the boundaries of the designated irrigation area stating that reclaimed effluent is in use, to avoid contact and do not drink.

Setback Distances for Disposal Areas

The *Environment & Health Protection Guidelines 1998* provides the below recommended setback distances for land application areas to reduce environmental and public health risks.

System	Recommended distances
All land application areas	<ul style="list-style-type: none"> • 100m to permanent surface waters • 250m to domestic ground water well • 40m to other waters
Surface spray irrigation	<ul style="list-style-type: none"> • 6m if area up-gradient and 3m if area down-gradient of driveways and property boundaries • 15m to dwellings • 3m to paths and walkways • 6m to swimming pools
Surface drip and trickle irrigation	<ul style="list-style-type: none"> • 6m if area up-gradient and 3m if area down-gradient of swimming pools, property boundaries, driveways and buildings
Subsurface drip and trickle irrigation	<ul style="list-style-type: none"> • 6m if area up-gradient and 3m if area down-gradient of swimming pools, property boundaries, driveways and buildings
Absorption system	<ul style="list-style-type: none"> • 12m if area up-gradient and 6m if area down-gradient of property boundaries • 6m if area up-gradient and 3m if area down-gradient of swimming pools, driveways and buildings

Vegetation Suitable for Disposal and Irrigation Areas

The *Environment & Health Protection Guidelines 1998* provides a list of types of vegetation suitable for land application areas and buffer zones. It is important to select the right vegetation and planting to increase uptake of nutrients from effluent. Plants not suitable to high nutrient levels will not survive. The list is too extensive to provide here. A copy of the guidelines can be accessed from:

<https://www.olg.nsw.gov.au/public/my-home/onsite-sewage-management-septic-tanks>

You can also contact the Australian Plant Society or speak with a local nursery for further information. Vegetation and plantings needs to be able to cope with the increase in nutrients. Soil type, availability of sunlight and your preference should also be considered when choosing suitable vegetation.

More information

Visit Council's website at www.federationcouncil.nsw.gov.au. Alternatively, contact Council on (02) 6033 8999 and ask to speak to the Environmental Health Officer (EHO).