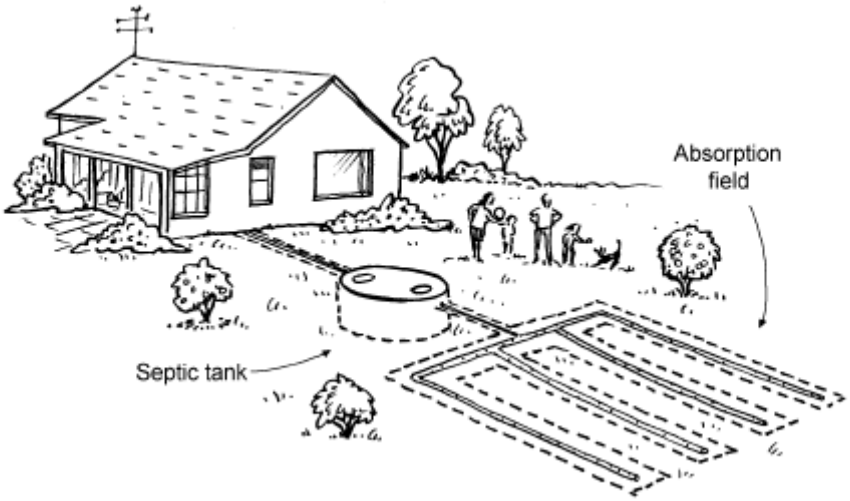
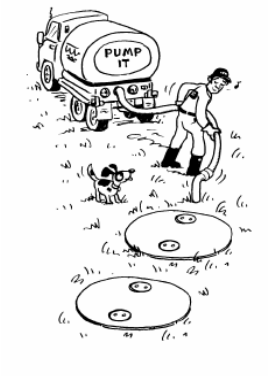
Information and Assessment Guide for owners of On-site Sewage Systems



Part 1



Part 2

Part 3

Part 1

Introduction

If you own or rent a house that is not connected to the main sewer, you will have an on-site sewage management system (OSMS). By definition, an on-site system includes the wastewater treatment device as well as the land area in which the treated effluent is disposed. This type of sewage management system provides sewage treatment, and disposal, within the allotment on which the dwelling is built. Treatment and disposal of sewage must be carried out in a way which minimises the impact on public or environmental health.

On-site sewage management is regulated according to the Local Government Act 1993 ("the Act") and the Local Government (General) Regulation 2005 ("the Regulations"). The Act and Regulations require that Councils in NSW assess, regulate and manage on-site systems to ensure that good OSMS operational standards are maintained.

About the information and assessment guide

This guide has been designed to help you understand the operation and maintenance requirements of your OSMS. You are only required to complete the OSMS assessment, described in this guide, if you have been requested to do so. This is often the case if the property has recently changed hands. The assessment is designed to provide you with an opportunity to better understand your on-site system, and the importance of maintaining a well functioning system.

The guide consists of three parts. Part 1, this part, provides some background to the operation and maintenance requirements of on-site sewage management systems. Part 2 deals with system components & location, and Part 3 is the assessment checklist: that part will help you to assess your on-site system and the environment in which it operates.

Council OSMS inspections

If you did not request this guide from council, you will have received a copy where council records indicate that your on-site sewage system is due for an inspection by a member of council staff or you have recently purchased the property. An inspection may be required for a number reasons including:

- Your approval to operate (ATO) has expired
- You are the new owner of the property (you will also need a new ATO)
- Our data-base shows that your OSMS is in a high priority inspection area

Is the inspection program a new Byron Council requirement?

No it isn't....under "the Act", all on-site domestic sewage systems in NSW must be inspected, and Councils are required to keep a database of all on-site systems. Owners are required to maintain their OSMS, either through a self maintenance programme or by engaging a specialist service agent. Owners must also have a current Approval to Operate their sewage management system.

The importance of good wastewater treatment

Modern on-site wastewater treatment systems are designed to treat wastewater for a specific site, and for a given load on the system. The load is an estimate of the daily wastewater flow produced by the activities of all occupants of the dwelling. Good wastewater treatment systems reduce health risks to humans and protect the surrounding environment.

Unfortunately, most of the on-site systems operating in the Shire today were not designed for our modern lifestyles. Easy access to unlimited potable water, combined with modern domestic technology, has led to an increase in the volume of wastewater produced. This increased load on treatment systems was not anticipated during the design and installation of older systems - particularly in the case of 'septic tank & trench' systems. In some cases this has led to poor treatment and, in the worst cases, complete system failure.

In addition to modern lifestyles creating more 'natural' wastes, other wastes released into our sewage treatment systems can be toxic to humans and the environment e.g. synthetic cleaning products. If these are discharged from a failing treatment system, these products may reach underground water, nearby surface water, including creeks and streams.

Our mutual obligation

Byron Shire Council's On-site Sewage Management policies have been developed so that Council can work with landholders to ensure the effective operation and maintenance of on-site sewage management systems. The environment must be protected from sewage pollution, and on-site systems should be designed to remove human pathogens in the treatment process or to prevent the possibility of human contact with pathogens in the disposal system.

Council and property owners must ensure that:

- surface and ground water resources are protected from all likely sources of pollution;
- complex land and aquatic ecosystems are protected;
- public health risks are avoided by preventing human contact with sewage;
- scarce natural resources are reused where possible (wastewater, nutrients, biosolids,)
- Ecologically Sustainable Development is promoted,
- activities that are dependent on waterways are not adversely impacted (eg swimming, tourism and oyster growing).

Council has a responsibility under local government legislation to:

- maintain a register of approvals granted for on-site sewage management systems;
- Approve all alterations, conditions and construction of OSMS;
- issue an Approval to Operate to property owners;
- prepare annual State of the Environment reports providing details of on-site sewage management policies, performance of on-site sewage management systems and the cumulative impacts of those systems on catchments within our Shire.
- investigate pollution complaints and act to restore safe operating conditions fro wastewater treatment.

Information regarding the original OSMS approval for your property might be available from Council's records division. In most cases advice regarding current operating status and maintenance requirements would require a site inspection by Council.

What is an Approval to Operate and why do you need one?

An "Approval to Operate" is mandatory under "the Act" for all owners of on-site sewage management systems. The Approval to Operate establishes a relationship between council and the property owner, and hopefully improves awareness of environmental and public health risks, as well as maintenance and operating requirements for the on-site system.

An approval to operate applies to new as well as existing systems. It is issued to the property owner, and owners require one approval per OSMS. Additional systems servicing sheds, or studios or the like, used in conjunction with a dwelling or occupancy, are assessed as separate systems.

Do you have an Approval to Operate?

Approvals to Operate are valid for residents holding an existing Approval at June 2006. New Approvals will be issued automatically following a) final inspections of new dwellings or b) new on-site sewage management system, or c) where change of property ownership arises. In the latter circumstance, Approvals will be issued when the Approval to Operate application form is returned to Council with a completed self assessment form or when Council has concluded a satisfactory inspection.

Requirements for new property owners

Within two months of the date of property transfer, new owners must apply to Council for an Approval to Operate the existing OSMS.

When lodging this application, new owners need to specify details of the existing system and likely usage patterns eg. number of persons using system. Owners need to be aware of the limitations and operating capacity of their system.

Who is responsible for rental properties?

It is the responsibility of the property owner to nominate a system 'operator '(either the owner or the tenant) to be responsible for the system operation. Owners of rented property should ensure that occupiers of the premises are aware of the requirements for safe operation and maintenance of the OSMS.

What are the problems with on-site systems?

Although on-site systems are theoretically capable of operating in a safe and hygienic manner, many fail to do so and as a consequence pose an environmental or a public health risk. The main pollutants of concern are pathogens and nutrients.

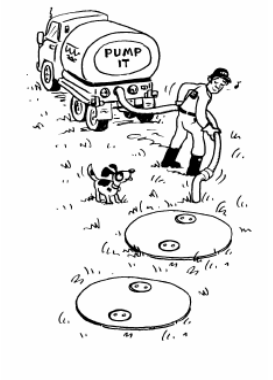
Pathogens are micro-organisms that have the potential to cause disease, they include viruses, bacteria, protozoa and helminths.
Nutrients can cause nuisance growth of algae and aquatic plants, and blooms of toxic blue-green algae can affect aquatic ecosystem health. Phosphorus and nitrogen are the main nutrients in household effluent.

Do I need to 'assess' my OSMS and what are the benefits?

Unless Council has requested that you assess your OSMS, it's your choice. However, if you do, you will gather useful information about your OSMS and possibly answer questions that you are already asking. The assessment guide covers many of the issues which would be addressed by council staff during an inspection. Once you have completed the assessment you might find that your on-site system is:

a) functioning well
b) requires minor maintenance
c) requires major repair or replacement

If major repair or replacement is being considered, then council recommends that you seek advice from a qualified and experienced consultant.



Modification or replacement of the existing OSMS will require council approval. Application forms to repair or replace an OSMS can be obtained from Council.

What will happen next?

If you are a new owner or you have been asked to carry out an OSMS assessment, read the following information and then complete the brief assessment form and return it to Council.

If you are the new owner of the property an application form has been included with the cover letter. You should complete this form and return it to council with the appropriate fee. An ATO will be issued if the information that you provide clearly indicates that your OSMS is functioning well.

Part 2

Components of an on-site system

There are many different systems which treat and dispose of domestic wastewater: the more typical ones are described below. However, most of the on-site sewage treatment systems in Byron Shire are septic tanks, which dispose of the wastewater via a sub-surface trench. Approximately 70% of our Shire's on-site sewage treatment and disposal systems are septic tank & trench.

Other technologies are selected because they provide improved treatment and partial reuse of the wastewater. Some of the different types of treatment systems are listed below (this is not an exhaustive list!):

- Septic tanks & trenches
- Wet or dry composting toilets
- Aerated wastewater treatment systems (AWTS);
- Sandfilters
- Constructed wetlands / reedbed systems
- Wisconsin mounds (treatment and disposal)
- Worm systems
- Greywater treatment systems (do not treat toilet waste)
- Sub-surface irrigation (disposal not treatment)
- Absorption/ evaporation beds (disposal not treatment)

Some of the above devices commonly include a 'septic tank' as part of the treatment process: AWTS have an 'internal' septic tank. Sandfilters and wetlands have septic tanks immediately before them in the treatment process i.e. between them and the dwelling. Dwellings with dry composting toilets will have a septic tank to treat the greywater from the laundry, bathroom and kitchen sources.

Importantly, if you have a more advanced OSMS (something more than just a septic tank & trench) then there are two issues which make your situation a little different to the 'septic & trench' system:

1. Your OSMS was likely to have been designed and installed more recently (typically less than 10 years ago)

2. All of the advanced OSMS technologies (including those on the above list) require a higher level of maintenance. [This is generally carried out by a qualified service agent - particularly where there are electrical pumps, disinfection equipment and irrigation lines to service.]

So, if you already use an advanced OSMS, then you are probably aware of 'what it is', 'where it is', 'how it works' 'what & when servicing is required' and 'how it's currently performing'.

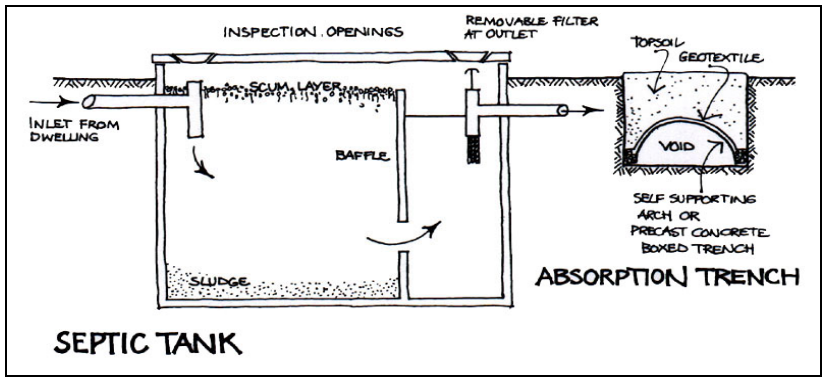
Identifying & locating your OSMS components

Only the most common OSMS components are described below……

Septic tank / trench systems

A septic tank is a simple cylindrical tank designed to treat sewage beneath your backyard. The system provides very basic treatment by using bacteria present in the tank. Solids, sink to the bottom of the tank, and grease and oils float on the surface. This step is referred to as ***primary treatment***. Pathogens in the wastewater are NOT destroyed in the septic tank.

Further treatment of wastewater, from a septic tank, occurs in the soil. The soil disposal system is usually a single sub-surface trench or a series of trenches, and this is the final stage of the sewage treatment process. Soil treatment reduces pathogens in the wastewater and also removes nutrients - vegetation growing in the soil above and around the trench utilises some of the water and nutrients. Septic tanks should be pumped out at least every three to five years to remove accumulated solids. ***Septic tanks do not require electricity to operate.***



Side view of a septic tank and trench

Location of the tank & trench

Septic tanks are installed below ground - there is usually a small concrete lip protruding above the ground surface (modern tanks might be plastic). They should not be buried or level to the ground surface as this can allow rainwater into the tank following heavy rainfall. Tanks are generally within 3 metres of the house, and always down slope from the house. A sewage pipe connects the house to the septic tank.

In some cases **'split systems'** are installed: these are comprised of ***two tanks*** - one receiving wastewater from the toilet, and the other receiving wastewater from the combined laundry, shower & kitchen. Some older systems included a 'grease-trap' in the plumbing between the kitchen and the septic tank, to limit the amount of fats and oils going to the tank.

Trenches usually have no above ground components to guide you to their location. The trench will be down slope from the septic tank, and will run along the contour of the land i.e. it will be flat and is often distinguishable because its flatness does not 'fit in' with the surrounding ground. Also, the grass or vegetation surrounding the trench is often lush and green. Once you have an idea where the trench could be, identifying the trench location can be done by using a metal 'probe' (a large screwdriver might work) and prodding the ground to feel for the trench gravel.

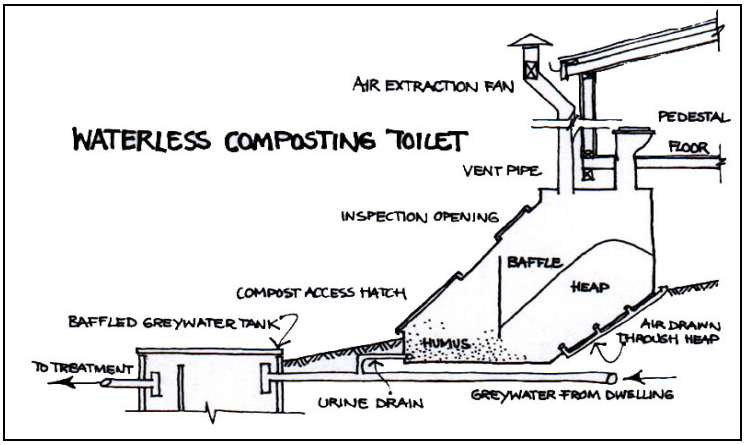
Waterless composting toilet (WCT)

A WCT collects blackwater (from the toilet) but not greywater (from the bathroom, laundry and kitchen). This reduces the solids, nitrogen and pathogens going to the septic tank. A greywater system, usually a septic tank, is also required with a WCT, so that the greywater from the bathroom, laundry and kitchen can be collected and treated, prior to disposal.

WCT's are dry systems. They use no water, but instead sawdust or a similar material is used to facilitate the process of decomposing the waste solids into a 'compost like' material. Wet compost toilets special types of compost toilet that do use water and can also be used to breakdown kitchen vegetable scraps, paper and some garden waste. Other, more advanced wet composting systems might actively use 'worms' to breakdown solids in the waste stream. ***Composting toilets may require electricity to drive the small air circulation fan***.

WCT's require routine removal of the 'composted' waste. You should ensure that you avoid contacting the waste material when carrying out this activity.

Composting toilet location - you'll know if you have one! These units are usually located on an external wall of the building, and with a large storage area below the pedestal, for carrying out maintenance.

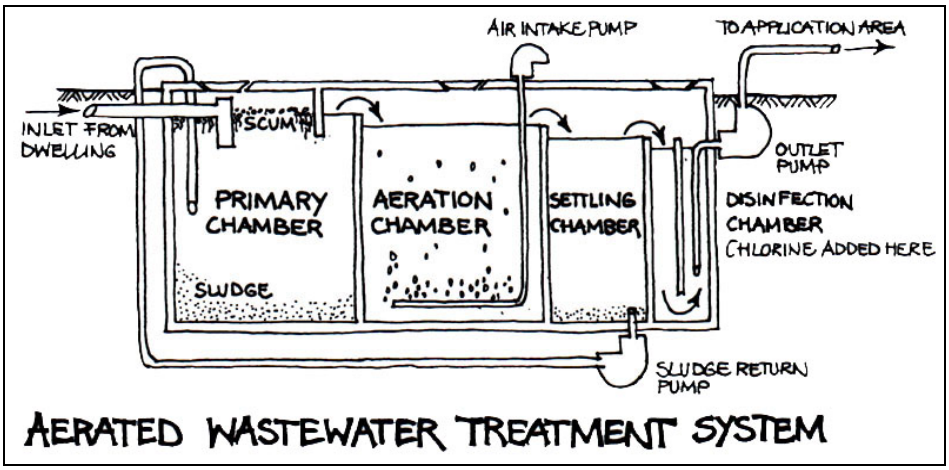


Side view of a waterless composting toilet

Aerated Wastewater Treatment Systems (AWTS)

AWTS settle solids, reduce nitrogen and are generally fitted with a disinfection chamber for reduction of pathogens. They are different to septic tanks in that they use oxygen to improve the treatment efficiency and, as a consequence, produce a cleaner wastewater flow. This is referred to as ***primary & secondary treatment***. As with septic tanks, solids must be removed every three to five years.

AWTS generally provide a further level of treatment - disinfection i.e. pathogen reduction. This is usually done with the addition of chlorine in the final treatment stage, although some AWTS use ultra-violet radiation as a disinfection step. ***AWTS require electricity to operate***.



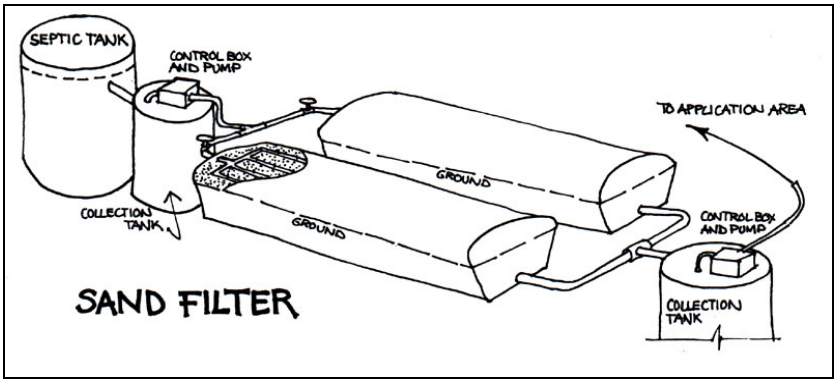
Side view of an AWTS

Location of the AWTS

AWTS are generally installed in the ground and can appear much like a septic tank from the surface. An AWTS may be a series of tanks or just one tank. A round 'lid' (concrete or plastic) will be slightly raised above the ground-surface and have a number of removable inspection 'ports'. AWTS usually have 'pump boxes' installed, either on top of the lid or close to it. Water pipes and power cables will be attached to the pump box. There may be a warning light on the pump box to warn of pump or aerator failure.

Sandfilters

Sandfilters can be installed as secondary treatment systems to reduce the suspended solids, nitrogen and pathogens that may still be present after treatment through the primary systems. ***Sandfilters may require electricity depending on the system design.***



Typical sandfilter design (includes septic tank and two pump wells)

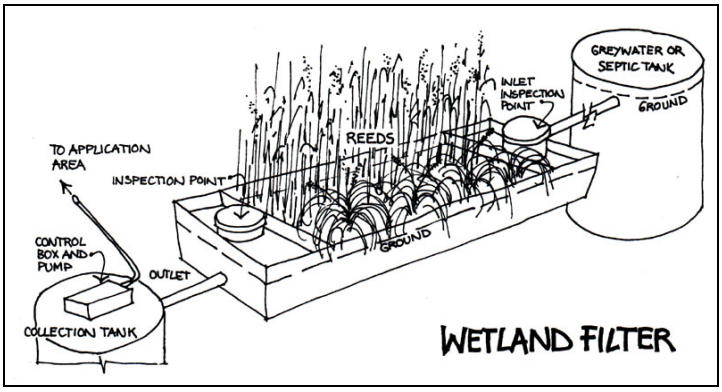
Location of the sandfilter

Sandfilters can be installed above or below ground and are usually used in conjunction with septic tanks. A sandfilter might be the only treatment device - if it is only treating greywater for example.

As with the septic tank, the sandfilter will be located close to the house, and down slope from the septic tank. If the sandfilter has been installed with a 'grass bed' at the surface it might be hard to locate. The best method of locating the sandfilter is to follow the discharge pipe from the septic tank (you can do this by prodding the ground with a metal probe).

Constructed wetlands (reed-beds)

Wetlands provide secondary treatment following primary treatment in the septic tank. A constructed wetland system is designed to mimic some of the functions of a natural wetland: the wastewater flows through a gravel/ soil substrate into which reeds, rushes or sedges have been planted. Wetland systems filter the effluent - primarily to reduce the solids load in the wastewater. To some extent they also remove nutrients from the wastewater - particularly nitrogen.



Typical reedbed wetland (includes septic tank and pump well)

Location of the wetland

Constructed wetlands are hard to miss! If you have a constructed wetland it will probably be located down slope from the septic tank. The exception to this is where the discharge from the septic tank is pumped to the constructed wetland (some blocks shapes or sizes may require some creative design & installation). Wetlands are usually constructed as 'cells' or 'tubs' and are usually made from a moulded plastic, fibreglass or stainless steel.

Locating the land application area (if it isn't a trench)

The land application area in most cases will simply be a trench. However with an increasing number of AWTS, or other secondary treatment devices, more and more land application areas will either be sub-surface irrigation systems (SSI) or evapotranspiration beds (ETA). Both types will cover a considerably larger area than the traditional trench. SSI, with its requirement for pumps, along with an assortment of delivery valves, scour valves, and vacuum breaks, requires regular servicing and you should refer to your service agent for further information. ETA beds can be located in much the same way as trenches (see septic tank & trench systems P9).

Tips for assessing OSMS maintenance requirements

Signs of a failing system may include:

For a septic tank:

- Bad odours around the tank or the disposal area.
- Tank overflowing to ground surface
- Water drains too slowly from the toilet
- High sludge levels within the primary tank (within about 150mm of the inlet pipe or obstructing the flow through the mid baffle).
- Scum blocking the outflow
- Surface ponding of wastes or water around the tank or disposal area.

For an AWTS:

- Water drains too slowly from the toilet
- Bad smells
- Silence – the pump is not working
- There is black effluent in the aerated tank
- Water backs up into the sink, shower, basin or laundry
- Pipes gurgle when air bubbles are forced back through the system

Application area:

- Bad odours
- Pools of effluent at ground surface
- Collapsed trenching with ponded water in hollows
- Where effluent discharges, from trench or broken pipe, a patch of lush green vegetation will often form, extending downhill, or
- Vegetation may be dead or dying

If the system is not working well……

If major repairs or replacement are to be considered, council recommends that you seek advice from a qualified and experienced consultant. Before you install, construct or repair a system you must submit an application to council.

If it's working well, keep it working well....

You've run through the checklist above and all seems ok and the effluent application areas or trenches have a good cover of vegetation and there is no surface ponding of effluent or stormwater even during extended wet weather.

The continued effectiveness of an on-site sewage system will depend on how well it is operated and maintained. Regular maintenance, with reduced water use, can extend the life of an OSMS and minimise contamination of our environment.

Suggestions for improved maintenance:

- √ Understand the basic maintenance requirements of your system.
- √ Budget for routine maintenance and repairs required for your system.
- √ Employ a qualified person to undertake regular maintenance.
- √ Keep records of events such as pump outs and inspections.
- √ Conserve water – by reducing the load on the system, problems such as overloading, backup and environmental contamination are reduced.

Water saving suggestions

- √ Spread heavy water use activities such as clothes washing, over the week.
- √ Replace single flush pan and cistern with dual flush pan and cistern.
- √ Install low flow internal taps.
- √ Use a front loading washing machine.
- √ Repair leaking fittings

Suggestions to reduce inputs:

- √ Reduce nutrient input by using low phosphorus detergents
- √ Reduce sodium input by using low salt detergents.
- √ Minimise the use of harsh cleaning agents.
- √ Do not empty paint, petrol, pesticides etc down sinks.
- √ Do not empty fats and oils etc down sinks.
- √ Do not put food waste etc down sinks.
- √ Nappies, sanitary napkins, paper towels etc block treatment systems, dispose of these separately.

Space to make notes

Part 3

The checklists

The checklists are provided to help you to describe your on-site system and its maintenance requirements. These pages can be removed and submitted to Council if required. Most of the information can be gathered through simple observation. You are not expected to complete the more detailed 'checklist 4' as part of Council requirements, but you are encouraged to add as much information as you can.

You can make a record of your OSMS treatment components in checklist 1 below.

Checklist 1 - note treatment components

Treatment system components	✓
Septic (Sullage) Tank	
Aerated Wastewater Treatment System (AWTS)	
Wet composting toilet	
Waterless Compost or Desiccating Toilet	
Sandfilter	
Wetland or Reedbed	
Greywater treatment	
Other system…… ……	

You can select the OSMS land application type in checklist 2.

Checklist 2 - land application type

Land Application Area	√
Trench System	
Surface Irrigation	
Evapotranspiration Bed	
Subsurface Irrigation	
Other method…… …….	

You can add any maintenance details below in checklist 3

Checklist 3 - service and maintenance details

Operation, Maintenance and Servicing	√ χ
Does the house drainage work? i.e. toilets, basins, shower drains properly with no gurgling sounds or smells.	
Does the treatment system produce bad odours?	
Is there any evidence of system overloading or overflowing?	
Has the treatment system been de-sludged in the last 3 years?	
Is it likely your system will require upgrading or major repairs in the next five years?	
Do you have a service or maintenance contract?	
What is the name of your service agent? …….	

Does the land application area smell?	
Does the land application area (trench) appear wet or boggy?	
Are you able to commit to a timetable for upgrading the system?	

Checklist 4 requires a bit more work to complete but it is not absolutely necessary to do this if you are completing the assessment for Council.

Environmental Assessment of land application area (LAA)	√ χ
Flooding - is your LAA located on land not likely to be flooded?	
Exposure - is the LAA well exposed to sun and wind?	
Slope - is the LAA located on flat land i.e. are slopes less than 15% (7 degrees)?	
Erosion Potential - is the LAA free from erosion or soil movement?	
Subsoil Drainage - is the LAA well drained? [If poorly drained, it is likely to have sedges growing, or be soggy]	
Surface Drainage - Is stormwater, from the house, rainwater tanks, or paved areas, directed away from the LAA?	
Land Filling - has the area been filled?	
Rock outcropping - is there any rock outcropping?	

Soils Characteristics Soil Depth - is there more than 500mm of soil depth at the LAA?	
Soil Type - is the soil sand or clay……	
Buffer Distance - measured from LAA (trench) Is the down slope distance to bore or water supply over 250m?	
Is the down slope distance to permanent waterway over 100m?	
Is the down slope distance to Seasonal waterway over 40m?	
Is the down slope distance to property Boundary over 6m?	
Is the down slope distance to a swimming pool or building over 3m?	
Environmental Sensitivity - Is your property located next to an environmentally sensitive area? e.g. adjacent to a National Park, nature reserve, natural wetland, marine park, or water supply catchment.	

If returning the completed assessment to Council, please send to:

Environmental Services
Byron Shire Council
PO Box 219
Mullumbimby NSW 2482

Where to get more information?

Council has two other booklets:

- *Byron Shire Council Design Guidelines For On-site Sewage Management for Single Households* - which provides technical information for system designers.

- *On-Site Sewage Management Strategy* - which is the long term plan for Council and the community for on-site sewage management.

These booklets are available from Byron Shire Council or our web site

www.byron,nsw,gov.au/policy_on_site_sewage.shtml