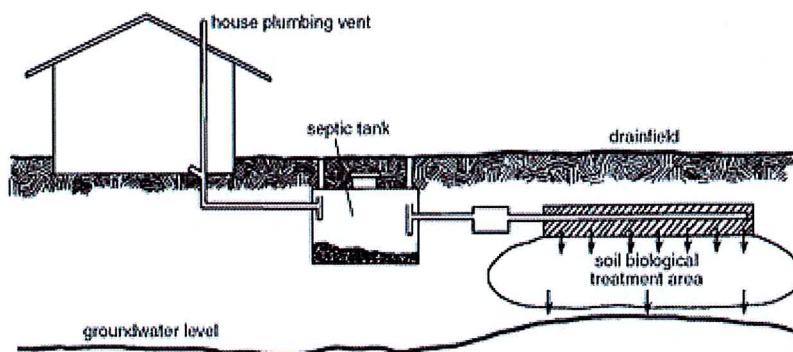


## Advisory Note 8 – May 2021

### Floods and On-site Wastewater Management Systems



The most common on-site wastewater management systems are septic tank (ST) installations (see above diagram) and aerated wastewater treatment system (AWTS) installations:

- a ST or similar primary treatment system such as a septic closet or greywater tank receives and biologically treats sewage by solids separation, scum floatation and sludge digestion. A drain from the ST connects to the drainfield or land (sub-soil) application area also known as an absorption trench. The land application system is typically covered by at least 300 mm of soil. A ST does not decrease the infectiousness of the treated effluent and can increase the number of bacteria by about ten-fold;
- A secondary treatment system, such as an AWTS, which after primary treatment also includes biological treatment, clarification, sludge return, and disinfection. Treated effluent is pumped to a related land application system where disinfected wastewater infiltrates into the sub-surface soil of less than 100 mm depth or an above ground irrigation system.

Other wastewater management systems include waterless composting toilets, wet composting toilets, worm farms and passive

recirculating systems such as reed beds and sand filters.

Personal contact and contact by pets with effluent or untreated wastewater irrespective of whether the system is working or damaged can cause illness and should always be avoided. Both treated and untreated effluent is a source of disease-causing micro-organisms which will cause gastro-intestinal illness and skin infections. After any contact strict personal hygiene should be practiced immediately.

#### System Information

It is important to know the location of the on-site wastewater management system of both the treatment and land application system on the premises. Contact your local council if the location is not known as the local council should have information about the ST or AWTS on their property files. It is important to also have installation and operation manuals especially for those systems with moving parts and which use electricity such as an AWTS. These manuals are often available on-line from the manufacturer depending on the age of the AWTS.

## **System Maintenance**

All on-site wastewater management systems need maintenance. AWTS for example must be serviced at 3 monthly service intervals by a service agent authorised by the manufacturer or supplier. Systems must also be operated and maintained in accordance with an operating permit issued by the local council. The local council may periodically alter the operating permit depending on the level of risk to public health and amenity.

## **Heavy Rain**

Prolonged heavy rain of more than a day can overload the sub-soil land application system and raise the groundwater level preventing wastewater absorption. This in turn can slow the flow of water through the septic system and cause a discharge of sewage from the surcharge gully located on the main drainage line to the ST just outside the house. A surcharge from a gully is infectious and can be treated by a generous application of "Builders Lime" and left to fallow for a week.

In the case of an AWTS with an irrigation system, heavy rain will cause the effluent, which still contains pollutants, such as nitrogen and phosphorus, to flow over the ground, even though diluted, and into adjacent land areas and stormwater drains, causing pollution.

During periods of heavy rain, it is wise to minimise the use of appliances such as dishwashers and clothes washers, and to reduce shower times as this will minimise the impact on the land application system.

## **Flooding**

Flooding will cause the ST and AWTS installation to fill up and where the surcharge gully is also flooded, wastewater could back up into the house, causing major contamination by highly infectious wastewater. The drains in the house may run slowly or not at all, and toilets may not flush properly. Internal wastewater discharges need to be thoroughly removed

and disinfected, and all flooded areas thoroughly cleaned. Carpet cleaning is insufficient to remove infection risk and carpets should be removed and discarded to waste clean-up.

Electricity to an on-site wastewater management system should be turned off at the fuse box in the likely event of flooding. It is likely that all electrical equipment will need to be replaced after a flood and a licensed electrician should be consulted.

Excess water from the septic tank should not be pumped onto the ground as it poses a serious health hazard particularly to children and pets or it can flow into a waterway. Waterborne diseases can be spread from person to person and from a contaminated environment quickly.

When a ST or AWTS is inundated, water can leak in through any opening, such as the access opening, the inlet/outlet pipes or the tank inlet and outlet inspection openings and fill the tank with water that may carry soil and silt. Floating waste already present in the tank in the form of scum will rise and could plug both the inlet and outlet pipes. In addition, water from the flooded land application system may backflow into the septic tank or bubble to the ground surface. In the worst case, plastic pipes and ST or AWTS, if not anchored properly, may float or pop out of the ground.

## **After a flood – Septic Tank Systems**

Be aware that there may be open pits and covers missing from an on-site system after a flood which could pose safety hazards. Small sink holes could form in land application systems.

A ST should not be used except for emergency toilet use. Alternate accommodation or shelter should be sought until the house becomes habitable again. Alternatively, a portable temporary toilet or ablution facility with a storage tank could be hired until the sewage management facility is fully functional. For a ST to be functional the groundwater level needs to



be lower than the land application system as shown in the above diagram.

The ST and land application area should be assessed for visible signs of damage. Holes in the ground or soil settling are the most common indicators. Even if there are no clear signs of damage, the system should be inspected by a licensed and experienced plumber. Heavy machinery should not approach the installation, particularly while the soil is still saturated, as often even worse damage will occur.

Once the flood has receded the ST cannot be used until the land application area has dried out. The ST should be commercially pumped out by a local council authorised tanker and the contents including any sludge removed to a depot authorised by the local council. Removing more than half the contents of the ST, particularly plastic tanks, could cause the tank to float out of the ground and damage the inlet or outlet pipes. While pumping, water may flow into the tank from both the house drains and land application system. It is possible that the ST needs to be pumped out more than once due to backed up household wastewater. Ensure that the ST outlet pipe is not plugged. Also ensure that the surcharge gully located outside the house is not blocked.

A major problem caused by flooding is that the solids are washed out of the ST and into the land application system. This could clog the land application system causing it to fail. The land application system may need to be replaced or refurbished if effluent rises to the ground surface over time as this may take months to diagnose.

If the electrical control box was flooded, make sure power is turned off; the cover should be opened and allowed to dry out. Be aware that snakes and spiders may be found in control boxes and fuse boxes, but before turning it on, a licensed electrician should inspect and test the circuits. If the collection well is separate from the septic tank it should also be pumped out when the septic tank is pumped out.

While the ST and land application system is recovering reduce the number of times the toilet is flushed (only flush solids), wash clothes at a laundromat, reduce the number of showers each day and only wash dishes by hand in a bucket and discharge the greywater to a different dry ground area each day.

If, after the water table has lowered, and problems are still experienced with the household plumbing, some damage or blockage may have occurred to the drainage pipes, ST or the land application system. High groundwater can cause shifting or settling, which can also affect both the septic tank and the land application system. The shifting can cause the ST inlet and outlets to not only be partially blocked but poorly aligned.

#### **After a Flood – AWTS**

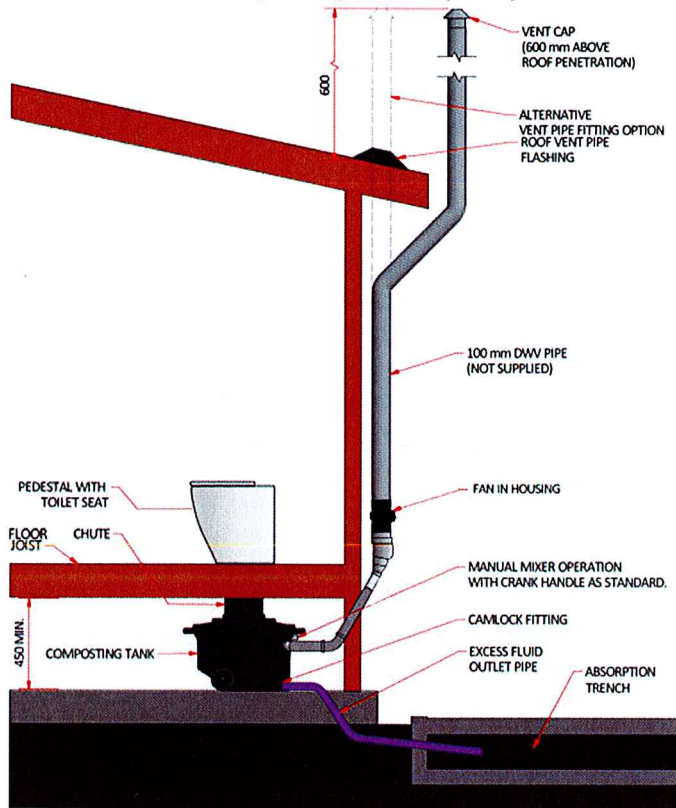
The power to an AWTS should be turned off and the operation manual consulted. A service agent authorised by the manufacturer/supplier should be contacted before the AWTS is used. While there is an emergency capacity of 1000 Liters in a modern AWTS it is insufficient to withstand a flood. The AWTS will need to be thoroughly emptied, cleaned and re-commissioned before it can be safely used. Also, all the spray irrigation nozzles or sub-surface drippers should be checked and replaced as appropriate during re-commissioning and fresh chlorine tablets added as needed. The AWTS may take a few weeks to reach peak operation after re-commissioning and any contact with treated effluent should still be avoided.

#### **Domestic Greywater Treatment Systems (DGTS)**

DGTS treat only household greywater. They are primarily installed in sewered areas so that the treated greywater can be used on the garden instead of drinking water. DGTS are like an AWTS in operation and the same comments apply.

## Waterless Composting Toilets (WCT)

Most waterless composting toilets (WCT) are installed below floor level and are designed to operate aerobically with vented air circulation and a small land application system to absorb urine.



When the composting tank becomes flooded the partially composted contents become septic (anaerobic), very smelly and highly infectious. As the flood recedes and the land application system becomes operative the compost storage container may recover and become aerobic again.

If this does not occur quickly the composting tank should be emptied into a dry prepared hole such that at least 500mm of dry soil covers the compost when buried to prevent rodent attack. The compost tank should be rinsed and put back into service following the manufacturer's instruction in the operating manual. The area of soil surrounding the WCT and perhaps the whole underfloor area

if practicable should be disinfected using a liberal application of "Builder's Lime" (protective clothing should be worn).

### For further information

1. Contact your local council: <https://www.olg.nsw.gov.au/public/find-my-council/>
2. Contact your local Public Health Unit by calling 1300 066 055: <https://www.health.nsw.gov.au/Infectious/Pages/phus.aspx>
3. Refer to the NSW Health Guidelines and Advisory Notes: <https://www.health.nsw.gov.au/environment/domesticwastewater/Pages/default.aspx>