



A Guide to Septic System Operation and Maintenance



What is a septic tank system?

It is an underground network of pipes carrying effluent from a household to designated treatment areas using tanks, chambers, pits, trenches or mulched areas to dispose of all wastewater from a household. Septic tank systems are used in areas where reticulated sewerage is not available. A septic tank system generally has 3 main components to it:

- An effluent detaining and settling stage. This occurs in a septic tank and is known as primary treatment. The septic tank must be capable of slowing the flow of approximately 1000L/day that leaves a typical household.
- An effluent treatment stage, known as secondary treatment. Examples include sand filters, treatment plants, and effluent disposal trenches.
- An effluent disposal stage. This stage must be capable of containing the 1000L/day of treated effluent on the property. Examples include effluent disposal trenches, subsurface irrigation systems, and surface irrigation systems.

What is 'sullage' 'WC wastes' 'effluent' and 'stormwater'?

Sullage:

(Also known as grey water) is all wastes from the household except for toilet wastes and stormwater. It includes wastes from baths, basins, showers, kitchen sinks, and laundries. It does not include wastes from toilets, or stormwater.

WC wastes:

Are wastes from water closets (toilets) only. There is no sullage or stormwater in these wastes.

Effluent:

Is all wastes from the household, including toilet wastes and sullage, but not stormwater.

Stormwater:

Is rainwater that is collected by the guttering of a house and paved areas, and directed through piping to the street stormwater drains. The street stormwater drains direct stormwater into our local creeks and the Yarra River, and eventually into Port Phillip Bay. Stormwater should NEVER be directed into a septic tank system.

What is a septic tank and how does it work?

A septic tank (also referred as a settling tank) is usually a concrete, watertight chamber located outside the house. It is buried underground, and solid and liquid wastes from the household flow into it. Heavy solid wastes settle to the bottom of the septic tank (known as sludge), while lighter materials such as grease and oils collect on the top of the wastewater (known as scum). The liquid wastes are also held in the septic tank while bacteria break down many solids to a liquid in an anaerobic environment (no oxygen). This process is known as primary treatment. Some bacteria and viruses are adsorbed (chemically bound) onto solid particles and held in the sludge or scum layers, allowing for limited removal of disease causing organisms at this stage.

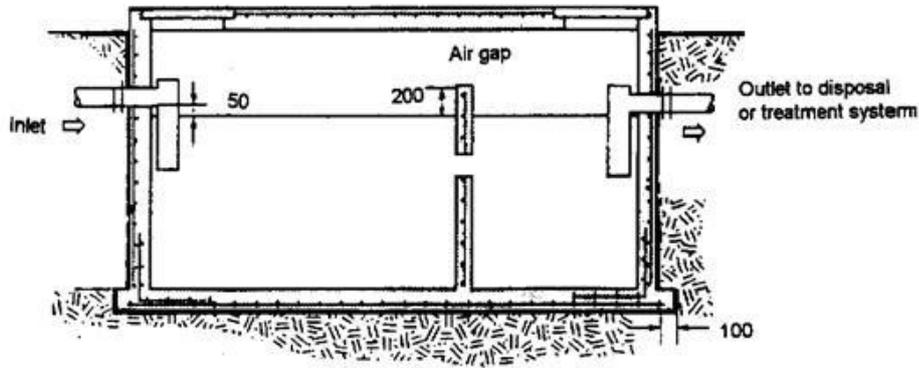
All purpose septic tanks are typically 3200 litres (700 gallons), with a capacity to hold 3000 litres of wastewater. They have a baffle, which effectively splits the tank into two compartments, allowing it to perform the dual role of grease trap and settling tank. The baffle slows down the flow of the liquid, allowing it to cool, which separates the grease / oil from the liquid. Smaller tanks (1800 litres / 400 gallon tanks) exist within the City of Manningham, and are known as 'W.C. wastes only septic tanks', which accept only toilet wastes. These tanks do not have a baffle, and are therefore not suitable for kitchen, laundry, shower or bath wastes that contain high levels of fats / grease / oil. They are also not large enough to accept and detain this volume of waste for an appropriate period of time before it flows out for secondary treatment.

Until the advent of pre-cast septic tanks, septic tanks were manufactured on-site in either concrete or brick. The septic tank was rectangular in shape, and generally held 1800 litres or 400 gallons. Today, pre-cast concrete septic tanks are delivered to a site.

Pre-cast septic tank



Cross section of a septic tank



All dimensions are in millimetres

What is a grease trap?

A grease trap separates fatty wastes and oils from the liquid wastes. It works by slowing the flow of the hot liquid from the kitchen which allows the fat, grease and oil to separate from the liquid. Baffles allow the clear water to flow on to the second compartment of the grease trap, while the fat, grease and oil are detained in the first compartment.

Almost all properties with a W.C. wastes only septic tank will have a grease trap to remove the fats and oils from the kitchen wastes before they leave the property. The grease trap will have a concrete lid, and are located outside the house, within the vicinity of the kitchen sink. With these types of systems, it is very important that you inspect your grease trap regularly, and have it cleaned out as necessary (usually every 6-12 months in a domestic situation and ensure the 3 dividing baffles are fitted).

Grease trap



How often should I have my septic tank & grease trap pumped out?

Every 3 years is the recommended time between septic tank pumpouts for a family of up to 5 people. This will vary depending on how much wastewater enters the system (the more people using the system, the more often pump out is required). If you have a grease trap, you should monitor how full it is every 3 months, and have it pumped out at least every 6 months.

Who pumps my septic tank and grease trap out?

For septic tanks, this task is performed by specialist companies that insert a large hose into the top lid of the septic tank and pump the sludge and scum up and into a temporary storage tank for disposal at an EPA approved site (generally a commercial sewage treatment facility). Your grease trap is pumped out by the same specialist companies. These companies are listed in the Yellow Pages under 'Septic Tank Cleaning Services'.

Why is it important to pump my septic tank out regularly?

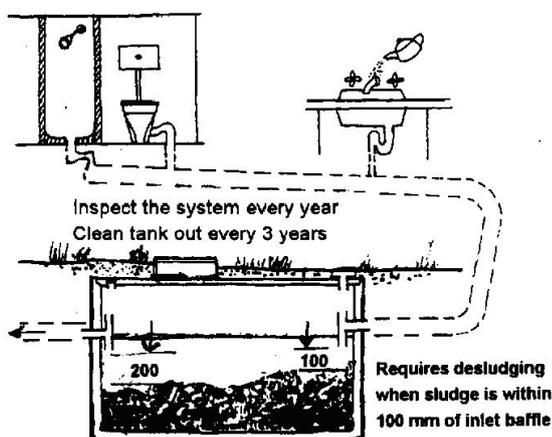
There are several reasons why a septic tank should be pumped out regularly. The scum and sludge layers build up over time, eventually limiting the amount of available liquid area in the tank. This does not allow the septic tank to perform one of its basic functions - to allow for settling of solids / some bacteria and viruses from the effluent.

The waste liquid thus flows directly on to the next part of the system untreated. If this situation persists, parts of the scum and / or sludge can also flow through to the next part of the septic tank system, eventually causing blockages and malfunction - a messy, offensive and costly exercise to repair. The built up concentration of adsorbed pathogens (disease causing organisms) in the sludge and scum layers can also create potential public health issues, and concentrated local soil contamination. Local soil contamination can degrade the groundwater quality, which eventually feeds into our rivers and streams.

Some forms of septic tank systems that include a treatment plant may not have a separate septic tank. These compact treatment plants have the septic tank and treatment plant together in the one large unit. The septic tank still requires pumping out every 3 years, but as these systems must be maintained every 3 months by the manufacturer or a suitably qualified person, septic tank monitoring and pumpout is generally part of the overall contract maintenance program. If you have one of these systems installed, you should confirm this with your contractor at the next maintenance visit.

Can I monitor how full my septic tank is myself?

Yes. You should check your septic tank annually to see if it requires desludging. You can do this by attaching a small lid firmly to the bottom of a long rod or stick, and lowering it down the inlet inspection hole until resistance is felt from the top of the scum or sludge. If this distance is within 100mm of the outlet pipe, pumping out is required.



All dimensions are in millimetres.

Also, if the water leaving the tank is high in solids, this also indicates pumping out is required. In most cases this can be checked in the concrete distribution box at the start of the sand filter or effluent disposal trenches, depending on the type of system you have installed on your property.

Never clean your septic tank out once it has been emptied. You will kill the bacteria that help break down and destroy the pollutants from your house. Once a septic tank has been pumped out, it can be 1/4 refilled with water to reduce odours on start up. Remember that your septic tank lid should be raised to ground level, and accessible at all times.

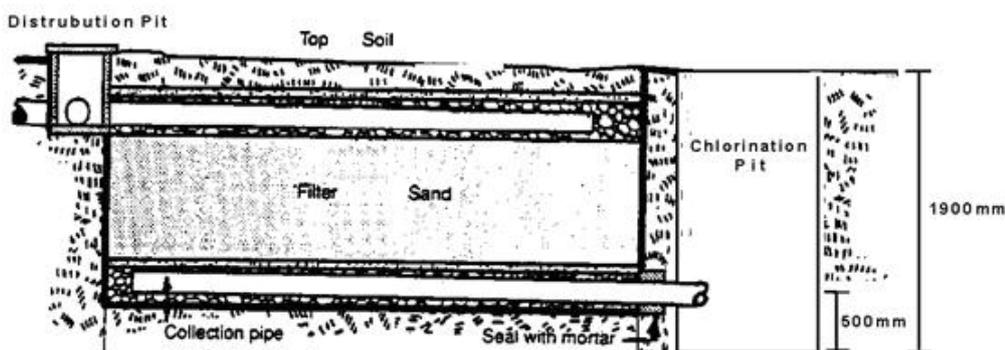
What happens after the septic tank?

From the septic tank, the liquid effluent flows to one of several options for waste disposal. In Manningham, the most common forms of secondary treatment are sand filters, effluent disposal trenches, or treatment plants.

What is a SAND FILTER and how does it work?

The most common type of septic tank system within the City of Manningham is the combination of a septic tank and sand filter. A sand filter, in basic terms, can be likened to a big sandpit under a grassed area, with concrete pits at either end that should be able to be seen at ground level. While the septic tank operates in anaerobic conditions (no oxygen), the sand filter operates in aerobic conditions (in the presence of oxygen).

Cross section of sand filter



Sand filter excavation



Distribution box with over drains



The distribution box

The concrete pit at the start of the sand filter is generally square in shape, and is referred to as the distribution pit or box. If you lift the lid of this pit and look inside, you will see a round opening on each of the four walls of the pit. All of these round openings have pipes connected to them. One pipe comes from the septic tank into the distribution box, while the other three pipes flow out over the top of the sand filter from the distribution box.

Distribution pit



The sand filter bed

Three of the pipes from the distribution box are slotted pipes that sit on top of 750mm of sand (but under some crushed rock, topsoil and grass). These pipes are almost level so that they can distribute the effluent from the septic tank evenly over the sandy area.

The effluent filters through the sand and is treated by organisms that grow on the sand particles. As the treated effluent reaches the bottom of the sand filter, it collects in a large slotted pipe located along the bottom of the sand filter. The bottom of the sand filter is in the shape of a 'V', so that treated effluent can be channelled towards the bottom pipe.

The chlorination pit

Once in the bottom slotted pipe, the treated effluent flows into the concrete pit at the far end of the sand filter, referred to as the chlorination or inspection pit. This pit is generally round in shape, and is very deep, as the depth of the pipe at the bottom of the sand filter is typically 1350mm below the ground, and the chlorination pit must collect the effluent from the bottom pipe.

The chlorination pit also doubles as a sampling pit to test the quality of the effluent being discharged to the storm water drain. When sand filters were first introduced, it was believed that effluent should be dosed with chlorine before being allowed to discharge from the property. However, it is now recognised that chlorine has potentially damaging effects on the local waterways and environment. Today, chlorine is not recommended, provided the sand filter is in good working order.

New chlorination pit



Indication of defective sand filter



How do I look after my sand filter?

Do not concrete over the sand filter or cover with additional earth, as this can stop air from entering. Bacteria present in the sand filter and disposal trenches require aerobic (oxygenated) conditions to digest effluent.

If your septic tank is not pumped out regularly, the sludge and scum (solids) in the tank can flow into the sand filter distribution box. Distribution into the slotted pipes on top of the filter sand can block these pipes, and may result in the effluent backing up into the septic tank and potentially into the house.

Alternatively, the solids can enter and block up the sand media, creating an anaerobic environment in which a black substance can grow known as Bogotar. The sand filter no longer functions properly, and in some cases, the black, smelly mess may surface over the sand filter area. This situation is expensive and messy to fix.

What are TREATMENT PLANTS and how do they work?

Treatment plants are underground concrete chambers containing a variety of mechanical parts. A treatment plant aerates and agitates the effluent as it enters the treatment plant from the septic tank, creating a turbulent, aerobic environment which helps to reduce the number of disease causing organisms. There is also a filter or clogging matt within the treatment plant that traps pathogens onto the filter / matt, performing the same function as the sand of a sand filter or the soil in effluent disposal trenches. These filters must be changed regularly, and this must be conducted by the manufacturer of the treatment plant, or a suitably qualified person.

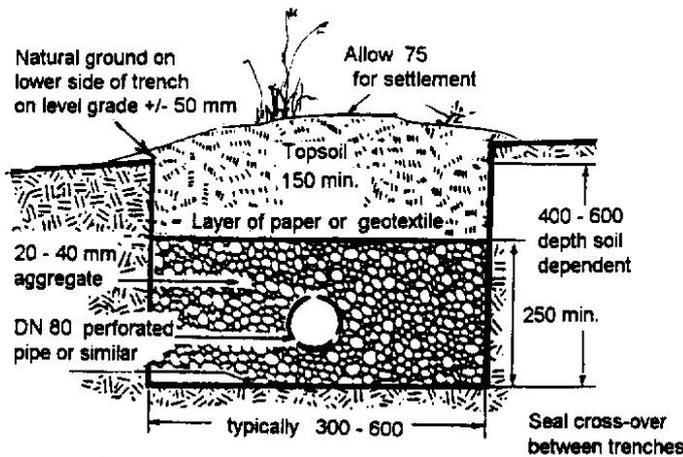
Treatment plants require a constant supply of electricity to operate, and a warning light or alarm that must be visible from habitable rooms in the house. The mechanical parts of a treatment plant (e.g. pumps, agitators, aerators, filters) require regular servicing every three months. This is an EPA condition for the use of all types of treatment plants. The maintenance of a treatment plant must be conducted by the manufacturer, or a suitably qualified person.

If your treatment plant discharges wastewater to the stormwater drain, or is / was installed after February 1999, you (as the owner) must arrange for the effluent discharged from the system to be tested regularly by a NATA (National Association of Testing Laboratories) approved laboratory. Council will notify you in writing when you are due to have your effluent analysed. The results must be forwarded to Council's Environmental Health Unit within 14 days. Refer to section on testing analysis for more details.

Make sure you purchase the treatment plant that best suits your needs, and that you find out about the manufacturers ongoing maintenance conditions, and running costs of the treatment plant.

What are EFFLUENT DISPOSAL TRENCHES and how do they work?

Effluent trenches are also known as absorption trenches, agricultural trenches / lines ('aggy lines'), evaporation / transpiration trenches / lines and disposal fields. They are an underground system, consisting of a series of level trenches buried to a depth of approximately 380 - 400mm that follow the contour of the land. They have a slotted pipe along the bottom of each trench, with screenings (crushed rock) surrounding.

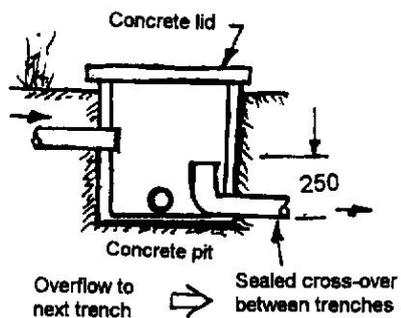


All dimension in millimetres



There is a concrete distribution pit (or 'box') at the start of the first trench (and sometimes at the start of each trench). Effluent is distributed evenly throughout a trench, which must fill to approximately 150mm below ground level before overflowing to the next trench, via a 'weir', or 'overflow'. Trenches are typically a minimum of 10m, and a maximum of 30 meters long.

Disposal trench



All dimensions are in millimetres

How do effluent disposal trenches get rid of wastewater?

Effluent disposal trenches work in three ways;

- Absorption:**
Bacteria build up over time in these trenches and form a 'clogging matt' in which bacteria compete with the effluent "soup mix" of pathogens (disease causing organisms), diluting the mixture as it is absorbed into the soil. Some viruses and bacteria are trapped or adsorbed (chemically bound) onto soil particles, while others pass through and are slowly diluted and / or destroyed by other organisms as they travel down towards the groundwater system.
- Evaporation:**
Through heating of the effluent disposal trenches from sunlight, or through strong or warm winds, evaporation of the wastes occurs through the soil and into the air.
- Transpiration:**
Where the roots of grasses and plants take up and utilise the liquid effluent, and release it to the atmosphere.

Where should effluent disposal trenches be located on my property?

Effluent disposal trenches should be located;

- 15 meters away from any source of water supply or any cutting or escarpment (bank) at which effluent is likely to emerge.
- 2 meters from any underground power line, water supply pipe, gas pipe, telephone cable or storm water drain.
- 2 meters from a high property boundary
- 4 meters from a low boundary of any allotment or the high side of any building
- 6 meters upslope or 3 meters downslope from any swimming pool
- 60 meters from any surface waters, and 100 meters from the Yarra River
- Trenches should not be located near areas subject to vehicular traffic

Depending on the fall of the land, pumps are sometimes required to get the effluent to the disposal trenches.

How do I look after my effluent disposal trenches?

Surface waters must be prevented from entering the effluent disposal area by the use of a cut off drain, where necessary. Protect your effluent trenches by keeping them clear of vehicular traffic, livestock, and heavy machinery. These can compact the soils, and damage the pipes in a trench, which reduces their performance and lifespan. Do not concrete over the effluent disposal trenches or cover with additional earth. This creates anaerobic conditions which supports the growth of pathogens (disease causing organisms). To avoid clogging the disposal system, the septic tank is required to be pumped out every 3 years. Do not build over any part of the septic tank system.

Grasses and plants for planting near or on effluent disposal trenches

Planting the right kind of grasses/plants can help the efficiency of trenches. Take care when locating plants near effluent trenches. You do not want the trenches to be shaded, unless the plants draw water from the trenches. It is best if you plant grasses or small plants near the first few rows of effluent disposal trenches, as you are guaranteed of wastewater in these areas. You should also consider planting in clusters so it is easy to mow grass between the plants.

- **Grasses:**
Couch grass, Salted Water Couch, Perennial Rye Grass, Tall Fesue, Kikuya Grass, Buffalo Grass, Strawberry Clover, White Clover, Prairie Grass.
- **Plants:**
Common Fishbone fern, Common Spike - rush, Geranium, Hydrangeas, Pelargonium, Lavender, Bougainvillea, Salt Paperbark, Sticky Wattle, Crimson Bottlebrush, Scarlet Bottlebrush, Wooley Tea Tree, Cross Leaf Honey Myrtle.

Secondary treatment removes high numbers of disease causing organisms from wastewater making it suitable for various forms of disposal on site such as:

- **Effluent disposal trenches:**

These can be used for secondary treatment (as discussed earlier) or as a disposal field after secondary treatment has occurred via a sand filter or treatment plant. The Environment Protection Authority allows properties to halve the amount of trenches required if secondary treatment has occurred before disposal into the trenches

- **Surface (drip feed) irrigation:**

With this option, treated effluent is pumped under pressure to a permanently designated area on the property that is rotary hoed, mulched, and suitable shrubs / plants are grown in the area to absorb the wastewater. The wastewater drips from raised sprinklers onto a permanently dedicated and mulched garden area. This system has several restrictive conditions for installation and use

- **Subsurface irrigation:**

A combination of the two options above, where effluent is pumped through small flexible plastic piping under pressure in shallow trenches under the surface. Like traditional effluent disposal trenches, this form of wastewater disposal relies on transpiration principles rather than absorption.

Irrigation

The two types of irrigation permitted are Surface (drip feed) irrigation, and sub surface irrigation. Drip feed irrigation systems have strict requirements that must be met for installation and use:

Sub surface irrigation



- Pipes must be buried under mulch to a depth of 100mm with drippers protruding above mulch
- The area chosen for use must be a flat or very gently sloped area, and visible warning signs must be displayed on the irrigation area. Effluent must not be located within 4 meters of a dwelling or boundary
- The effluent must be analysed by a registered NATA laboratory on a regular basis (as nominated in the septic tank system permit conditions) with results submitted to Council within 14 days.

Irrigation filter



Remember, an average household must dispose of approximately 1000 litres of wastewater PER DAY. In effect, this means that you are watering your garden every day with 1000 litres of wastewater, even in the heavy winter months. It is important that a substantial area is set aside for irrigation that can accommodate such a large volume of water in the worst case scenario. There are other EPA approved systems available for installation such as reed bed systems and composting toilets. Manningham has a limited number of these types of systems installed.



Does the internal plumbing need to be inspected by Council?

No. Internal and sub - floor plumbing works are covered by a Certificate of Compliance given to you by your plumber. This is a 10 year guarantee that all works conducted on your property comply with the National Plumbing and Drainage Code, AS 3500. You must submit a copy of this certificate to the Council before permission will be given to use your septic tank system.



When can I use my septic tank system?

Legally, you cannot use your septic tank system until you have obtained a Permit to Use a septic tank system from Council's Environmental Health Unit. This permit cannot be issued until all works on the septic tank system have been inspected and approved, and a Certificate of Compliance has been received from your plumber and submitted to Council. The fine for not obtaining a Permit to Use a septic tank system before you use the septic tank system is a maximum of \$10,000 under the Environment Protection Act.

It is your responsibility as the owner of the property to request a final inspection.

Contact Council's Environmental Health Unit to arrange a final inspection on 9840 9256.

How do I look after my septic tank system?

Your septic tank system operates via a natural biological process, and requires ongoing maintenance and care to ensure that it functions properly, and for many years.

Consider changing all fixtures over to water saving devices such as shower heads, dishwashers, washing machines, taps, and dual flush toilets. This not only cuts the costs of water bills and helps preserve one of our natural resources, but also reduces the amount of wastewater that enters the system which will decrease the amount of wastewater that must be distributed on your property.

You can also reduce the amount of water entering your system by using the washing machine / dishwasher only for full loads, and staggering the loads through the week

Keep a jug of cold water in the fridge instead of waiting for the water from the tap to cool down in summer, and avoid running the water continuously when brushing teeth, rinsing vegetables or dishes, or shaving.

Make sure you are aware of the exact location of the septic tank for future desludging purposes. Do not concrete over the septic tank or cover with more than 150mm of earth. The septic tank and any other pits connected to the system must remain accessible at all times.

Things to avoid

Do not pour waste cooking oils and fats, grease or tea leaves down the sink. They can cause blockages in the system. Let them cool and solidify, or absorb onto paper towel, and place in the rubbish bin.

Food scraps entering the septic tank system should be limited as much as possible by the use of sink strainers. Garbage disposal units are **STRONGLY DISCOURAGED** for use in unsewered areas as the nutrient levels from foods are too high for the bacteria in the septic tank system to adequately treat.

Do not use excessive amounts of disinfectants and cleaners, bleaches, anti-bacterial agents and tree root clearing products. These can kill the bacteria in a septic tank system. Use only biodegradable detergents that state on the label that they are suitable for use through a septic tank system. Products that are low in phosphates and nitrates will also help the groundwater quality.

Do not dispose of nappies, sanitary napkins, medicines and other foreign matter through the septic tank system. These cannot be easily broken down, and can cause blockages in the system.

Planting trees and shrubs over and around a septic tank system must be carefully designed and the correct plant/grass species chosen to avoid root damage to an underground effluent disposal system.

If an odour occurs in the initial stages of use of the system, a handful of lime may be flushed down the toilet every day for approximately one week, or until the odour ceases.

Biodegradable Products

The term biodegradable does not necessarily mean the product is suitable for use through a septic tank system. It means that the original chemical compound is broken down into smaller compounds via biological activity in the environment. However, this does not necessarily mean that the breakdown products are environmentally or septic tank system friendly. Both harmful and beneficial chemicals can be biodegradable.

You should be guided by the manufacturers labels and only choose products that specifically state they are suitable for use on septic tank systems. Products that advertise as 'antibacterial' should also be avoided, as they will kill the bacteria in your septic tank system.

Do I have to get my effluent analysed?

Yes. All systems that discharge effluent from the property boundary must have the effluent analysed regularly, with results submitted to Manningham Council within 14 days of receiving the results. You will receive notification from Council when your system is due to be tested. Effluent must be tested for the following parameters:

Maximum allowable limit for all discharges:

- **Biological Oxygen Demand:**
20mg/L
- **Suspended Solids:**
30mg/L

Maximum allowable limit for all discharges for surface irrigation:

- **Faecal Coliforms:**
200 orgs/100ml
- **Free residual Chlorine:**
0.5mg/L (min) and 2.0mg/l (max)

Maximum allowable limit for discharges to water:

- **Faecal Coliforms:**
200orgs/100ml
- **Total residual Chlorine:**
1.0mg/L

Where do I get my effluent analysed?

At any registered NATA laboratory. These laboratories can be found in the Yellow Pages under "Analysts". Once you receive the results, you must forward a copy to Council's Environmental Health Unit as proof of analysis. You may be able to arrange for the laboratory to fax a copy of the results to Council's Environmental Health Unit directly on FAX: 9840 9221.

What are my legal obligations as an owner of a septic tank system?

Your main legal obligations are listed below:

- To obtain a 'Permit to Install', and a 'Permit to Use' a septic tank system from Council when installing a septic tank system.
- To obtain a 'Permit to Alter' a septic tank system when adding plumbing fixtures or altering / relocating your septic tank system.
- To maintain your septic tank system in a satisfactory working order. This includes regular inspection and maintenance (as necessary) of your septic tank system.
- To have your septic tank pumped out at least once every three years.
- To comply with all the conditions issued with the original Permit To Install the septic tank system, including any EPA Certificate of Approval conditions for the septic tank system installed on your property (e.g. annual analysis of effluent from treatment plants or sand filters installed or altered after 1992 that discharge from site).
- To contain all wastewater (including sullage) within the boundary of your own property wherever possible.
- To stop you septic tank system from creating 'nuisance' conditions as described in the Health Act 1958.
- To convert to mains sewer when it becomes available.

If you have any further questions regarding septic tank systems, contact Council's Environmental Health Unit on 9840 9256. Remember to have your Street Number AND Lot Number handy, as at the time of installation of your septic tank system, your property may have only had a Lot Number, with no Street Number.



MANNINGHAM

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