
MAMAKU WASTEWATER INVESTIGATIONS

POTENTIAL HEALTH AND ENVIRONMENTAL RISK FROM ON-SITE EFFLUENT
TREATMENT SYSTEMS

Bay of Plenty Regional Council



Photo: J Mackle

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1.0 SCOPE OF REPORT

This report looks at whether current on-site wastewater treatment (OSET) and land application is causing potential public health risks and environmental effects in Mamaku.

Analysis of water quality data and compliance information held by Bay of Plenty Regional Council builds on recent work undertaken into whether the environment and operation of OSET systems in Mamaku currently provide for the appropriate treatment and land application of on-site effluent. These investigations will inform discussions into new wastewater rules for Mamaku, which are required to ensure people's health and the environment, are protected while a long term wastewater solution is developed.

2.0 EXECUTIVE SUMMARY

Mamaku village relies on the use of on-site wastewater treatment systems (OSETs) to manage the treatment and discharge of wastewater.

This report examines whether current wastewater treatment (OSET) and land application is causing potential public health risk and environmental effects in Mamaku, as indicated through water quality sample data and the regulatory compliance complaint history of OSET discharges.

A work programme is currently underway to address both the wastewater issues at Mamaku Village and in response to Mamaku Village being identified as a Maintenance Zone in Draft Plan Change 14. The work programme seeks to both understand what the best interim OSET rules are for Mamaku, and identify the best long term wastewater solution. Regional catchment boundaries are near the village, therefore both Bay of Plenty and Waikato regional council's rules may need to be considered in any future waste water options.

Phase 1 led by Bay of Plenty Regional Council (BOPRC) includes two parts. Part one completed in September 2019 involved Ormiston Associates undertaking soil and water table investigations and an assessment of existing individual wastewater treatment and disposal systems to understand the extent of non-compliance and determination of whether current wastewater systems are causing health and environmental concerns.

Part two of Phase 1 looks at whether current wastewater treatment and disposal is causing potential public health risks and environmental effects in Mamaku. Water quality sample data from 2016 showed that the quality of the water in open drains are above the recreational contact bacterial guideline and indicated some instances of elevated nutrient levels including E.coli. Human faecal source tracking indicated that at least some of the E. coli was linked to septic tank effluent, indicating that wastewater is unable to be adequately treated in soil, entering waterbodies and creating a further risk to water quality and human health. Bay of Plenty Regional Council compliance records also indicate a relatively high percentage of complaints have been received from OSET systems in Mamaku, considering that not all wastewater issues are reported. This data seems to support historical operational observations on OSET limitations from drain layers in Mamaku. The Ormiston Associates work undertaken in June 2019 confirmed that geological barriers, high groundwater and inadequate treatment of wastewater prior to discharge has the potential to create adverse effects on water quality and a risk to public health.

Mamaku village straddles groundwater catchment boundary between Lake Rotorua and the Waikato Region (Hauraki Aquifer). The Lake Rotorua catchment is mostly in the Bay of Plenty and the Hauraki Aquifer is in the Waikato Region. The boundary between the two catchments was determined by GNS - Science and NIWA. In a report entitled Lake Rotorua catchment boundary relevant to Bay of Plenty Regional Council's water and land management policies (August 2014). NIWA used rainfall data to match observed stream flows in each of the catchments and adjusted the catchments by moving land parcels in and out of the catchments.

This results in some uncertainty in the actual location of the Lake Rotorua groundwater catchment boundary in the Mamaku Plateau. This boundary has been used in Plan Change 10 - Lake Rotorua Nutrient Management, to inform nutrient management decisions. Despite this uncertainty, there is potential for a range of wastewater solutions for Mamaku, both inside and outside the Lake Rotorua groundwater catchment.

Mamaku village has the potential for further development to occur as there are both vacant sections and it is located in close proximity to Rotorua.

Phase 1 of Part 2 includes the identification of potential sewerage reticulation options for Mamaku by Rotorua Lakes Council and the development of interim OSET rules for Mamaku to be included in PC14. In developing PC 14, consideration must be had to a range of options for sustainably managing wastewater from Mamaku Village. Policy development for Plan Change 14 will take into account an agreed work programme between Rotorua Lakes Council and Bay of Plenty Regional Council to develop a long-term solution for wastewater in Mamaku. For PC 14, temporary rules may be developed for Mamaku with less restrictive Maintenance Zone requirements based on the expected timing and implementation of a long term solution for Mamaku and outcome of any resource consent towards achieving reticulation.

The results of these investigations will be presented to the Mamaku community through community engagement and consideration of options in early 2020.

The Central Government's Essential Freshwater policy package released in September 2019 will likely impact the way council's manage freshwater and discharges to water. Further national guidance on management of wastewater discharges, will inform the appropriate timing of notification of Plan Change 14 – OSET.

3.0 BACKGROUND

Mamaku village was established on the Mamaku plateau in the 1880's and celebrated its 125th anniversary in 2019. The village was founded on timber extraction and milling and for a time there was a railway line through the town. The population in 2013 was 690 people. The town is set out in a rectangular pattern with most of the properties being around 1000 m².

There is an opportunity for further development in Mamaku village due to the number of vacant sections and its close proximity to Rotorua. Rotorua is a medium growth area and there is potential for development of Mamaku as a rural lifestyle option and due to its proximity to the city centre. Further a public transport bus link from Mamaku to Rotorua is currently being trialled to provide for increased transport links between the centre and Mamaku.

Around Rotorua, there has been a program of reticulating rural and lakeside communities. Priority was given to those communities close to the most degraded lakes. As a result, the first community reticulated was Lake Okareka. Subsequently, other communities have been reticulated. Mamaku was always on this list and there was an understanding between BoPRC and RLC that when the other communities higher on the list were complete that there would be a discussion about a solution for Mamaku. There are one or two communities which follow after Mamaku.

3.1 CATCHMENT BOUNDARIES

Mamaku village straddles the groundwater catchment boundary between Lake Rotorua and the Hauraki Aquifer. The Lake Rotorua catchment is mostly in the Bay of Plenty Region with small portions being in the Hauraki Aquifer which is in the Waikato Region (see Figure 1). The boundary between the two catchments was determined by GNS. In their 2014 report they established a 'best guess' catchment boundary. LIDAR (Light Detection and Ranging), data from 2011 was used to establish the boundary. In locations where land slope permits this can be a relatively simple process.

However, where the land is flat it is not always clear in which direction groundwater will flow. This applies to the section of the Mamaku Plateau where the township has been constructed. GNS used rainfall data to match observed stream flows in each of the catchments and adjusted the catchments by moving land parcels in and out of the catchments until the catchments matched the observed flows. The use of a best guess method results in some uncertainty in the actual location of the Lake Rotorua groundwater catchment boundary in the Mamaku Plateau. This boundary has been used in Plan Change 10 - Lake Rotorua Nutrient Management, to inform nutrient management decisions.

Where the data is used to inform decisions about the ultimate destination of nutrients from farming activities the use of a best guess method to establish a catchment boundary is appropriate. The area where the best guess method was used to establish the catchment boundary is mostly used for housing and so the impact on nutrient budgets is limited and of lesser importance.

The direction of flow of nutrients from on-site wastewater systems in Mamaku Village in the vicinity of the catchment boundary is uncertain. There is a similar level of uncertainty around the fate of those nutrients. It is understood that some of the nutrients may be bound to the soils or be broken down before reaching the lake, An attenuation factor is applied to farm nutrients and it is not clear what attenuation factor (if any) should be applied to wastewater nutrients.

Given the uncertainty in the location of the actual boundary it seems desirable for all dwellings in the Mamaku township to be dealt with in the same way. In other words, the Rules which are developed should ignore the best guess boundary and apply to all of Mamaku.

In a considerable number of Mamaku properties primary treated wastewater is discharged into soak holes. Discharging of wastewater at depth limits the amount of renovation can take place. Wastewater nutrients which are discharged at depth cannot be correlated with farm dairy effluent which is discharged onto surface soils. In the absence of this information, it is not possible to estimate the attenuation of nutrients between the point of discharge and the lake.



Figure 1: Regional and groundwater catchment boundaries – proximity to Mamaku

There is potential for a range of wastewater solutions for Mamaku. This could range from limited upgrading of systems, full upgrades to AWTs+NR, reticulation with local treatment and reticulation back to the Rotorua WWTP. A system with local treatment could be located either inside or outside the Lake Rotorua groundwater catchment. Whichever system is chosen will need to be evaluated in the context of both the Bay of Plenty and Waikato Regional Rules.

3.2 THE ON-SITE EFFLUENT TREATMENT REGIONAL PLAN

The original On-site Effluent Treatment Regional Plan (OSET Plan) was adopted in 1996 and has been reviewed and amended at intervals since. Bay of Plenty Regional Council is currently preparing a Plan Change (PC 14) to develop appropriate policies and rules for the sustainable treatment and discharge of on-site effluent treatment systems and will amend the OSET Plan.

A copy of the wording of Rule 2 is included as Appendix 1 to this report. The rule refers to existing septic tank based systems in Rotorua lakes catchments. The rule sets some dates by which upgrades are to be completed and defines localities where septic tanks need to be maintained.

The Maintenance Zone requirements are set out in Rule 2 and include regular pump-outs of septic tanks, installation of an outlet filter and also specify a minimum septic tank size. Mamaku is identified as a Maintenance Zone in Schedule 10 and Map 18 and a Future Reticulation Zone in Schedule 11 and Map 38. Despite Mamaku Village being identified as a Maintenance Zone in the Schedules, Rule 2(c)(a) does not specify Mamaku. It has therefore been considered that the maintenance zone provisions of the Rule could not be implemented. As a result, Mamaku residents have not been included in the septic tank database and asked at intervals to maintain their septic tanks.

As mentioned above, Mamaku is included as a Future Reticulation Zone. Rule 2 also requires all existing wastewater systems in Mamaku to be upgraded to an AWTs+NR by 1 December 2018. This results in a tension within the Rules. Rule 2 requires upgrading of wastewater treatment systems while at the same time placing Mamaku in a Reticulation Zone. It is not appropriate to require both of these things. The wastewater systems should either be upgraded or properties reticulated. This conflict needs to be resolved through Proposed Plan Change 14, which will include appropriate rules to manage Mamaku's on-site wastewater until a long term solution is developed. Rotorua Lakes Council is investigating costs of different reticulation options for Mamaku to inform future wastewater planning.

4.0 MAMAKU WASTEWATER WORK PROGRAMME

Efforts to include Mamaku as a Maintenance Zone in Plan Change 2 (2015) were not entirely successful. As part of the current review the inclusion of Mamaku as a Maintenance Zone has been considered again. This was raised with the Community Board and in turn a meeting was held with the community. An overall work programme was outlined to the Mamaku community at the meeting in November 2018. The work programme covers Phase 1 site and soil investigation work, and an assessment of existing systems to understand the extent of non-compliance and determination of whether current wastewater systems are causing health and environmental concerns.

4.1 PHASE ONE: PART 1 - ORMISTON REPORT

In May 2019, Ormiston Associates undertook the first phase of a programme directed by Bay of Plenty Regional Council to understand what the best rules are for Mamaku and determine the best long term solution for wastewater in the village.

Part one of the first phase of the work programme comprised of the undertaking of soil investigations in Mamaku Village. The soils are described as Mamaku loamy sand and as an Orthic Podzol.

This work involved the drilling hand auger boreholes, within the road reserve to investigate the soil profile, determine the depth to shallow groundwater and the depth to a known impermeable ignimbrite layer. The ignimbrite layer has previously been highlighted by drain layers installing OSET systems in the village. The soil data obtained by these boreholes also supplemented bore log records held by Bay of Plenty Regional Council. As part of the phase one part one work undertaken, 30 properties with OSET systems were visited to determine the current type of systems used and their operation and maintenance.

The conclusion of the part one report indicated that the presence of the impermeable ignimbrite layer is remarkably consistent across the village and presents a significant environmental constraint to the effective and sustainable OSET discharges in the village. Shallow groundwater perches on the ignimbrite layer and may rise to the surface following heavy rainfall. Additionally, poorly drained soils may only partially treat wastewater before it merges with the groundwater. This poses an environmental and public health risk due to the potential for groundwater to be contaminated and may eventually impact groundwater quality with nutrients and pathogens reaching Lake Rotorua.

The poor soils appear to have contributed to a high rate of failure of OSET systems visited in the village. Deprivation in the community and the development of available vacant land in Mamaku will only worsen the cumulative effects of OSET discharges. Further work suggested may include additional site visits, groundwater quality testing to check for contamination or further checks to bore holes during the late winter/early spring period to ascertain the highest winter groundwater level.

4.2 PHASE ONE: PART 2 SCOPE OF THIS REPORT

This report covers the second part of the work programme and further addresses the risks to public health and the environment from OSET systems in Mamaku as indicated through water quality sample data and the regulatory compliance complaint history of OSET discharges.

4.2.1 WATER QUALITY DATA

To further understand the environmental and health risk of OSET systems in Mamaku, it is valuable to look at previous monitoring, science and research work. In 2018 Bay of Plenty Regional Council published *Monitoring the impacts of on-site wastewater treatment systems, Bay of Plenty*² Water quality reports were published in 2007 and 2011, but did not include Mamaku. However Mamaku was included in the 2018 report due to the OSET problems that were evident in 2016, the water quality sample data and the regulatory compliance complaint history of OSET discharges.

In 2016 water quality samples were taken from 3 drains in the Mamaku village see Figure 2 below.

²Bay of Plenty Regional Council, Environmental Publication 2018/01 – Monitoring the impacts of On-site Wastewater Treatment Systems, Bay of Plenty



Figure 2: Mamaku monitoring locations in 2016

Figure 3 below shows the results of the water quality samples where elevated E.coli and nutrient levels were recorded in drains in March, July and October 2016.

Human faecal source tracking indicated that at least some of the e. coli were linked to septic tank effluent. Agricultural sources may also contribute to these levels but were not identified in the source tracking.

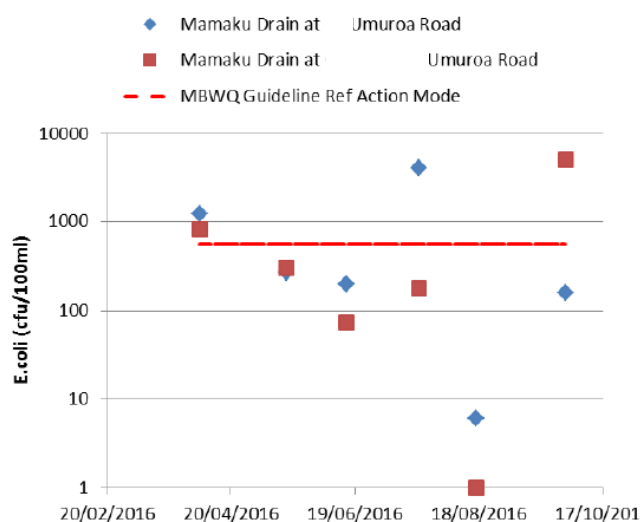


Figure 3: E.coli and nutrient levels in drains

The 2018 report outlines that the potential effects of OSET systems in Mamaku, stating that drain water quality can be above recreational contact guideline therefore contact may be a health risk to the community. The report recommended further examination of soil structure was undertaken, and the result was the bore hole investigations undertaken in Phase one part one as discussed in the Ormiston Report.

4.2.2 BAY OF PLENTY REGIONAL COUNCIL COMPLAINT HISTORY

A review of complaints received since June 2017 relating to OSET systems in Mamaku was undertaken. Complaints were excluded where it could not be confirmed that the source of the problem was an OSET system. There were a total of 7 complaints during those 2 years however it is important to put this in the context of Bay of Plenty Regional Council only ever getting complaints about a small portion of the problems. Further there are approximately 250 properties (with OSET systems) in Mamaku therefore this is a quite a high failure or incident rate. In other localities, it is expected that around 1% of septic tanks are failing at any given time. Based on the complaint database information around 3% of Mamaku septic tanks are causing problems. In other words the incidence of failing septic tanks in Mamaku is about 3x that in other communities.

As identified in site and soil investigations unsuitable environmental conditions do not provide favourable conditions for wastewater to be treated in near surface soils. Further, partially treated wastewater may be transported through perched and rising groundwater, creating a risk to public health through human contact.

4.2.3 OTHER COMMUNITIES AS AN INDICATOR

One function of the Maintenance Zone provisions is to collect data about the size and configuration of wastewater systems. This helps to inform decisions about possible upgrades. Unfortunately, this is not available for Mamaku. However, there is information about other communities in the Rotorua District and which have houses of a similar age to those found at Mamaku.

The following data has been taken from the BOPRC septic tank database and relates to the localities of Rotoiti and Rotomā. It has been gathered by the pump out contractors who have visited each of the properties and pumped out and inspected the septic tanks. The inspection considers capacity, structural integrity, effectiveness and depth. All the certifiers have been trained by and hold a warrant issued by BOPRC. This data is independent of the suitability of the soils to accept and renovate wastewater.

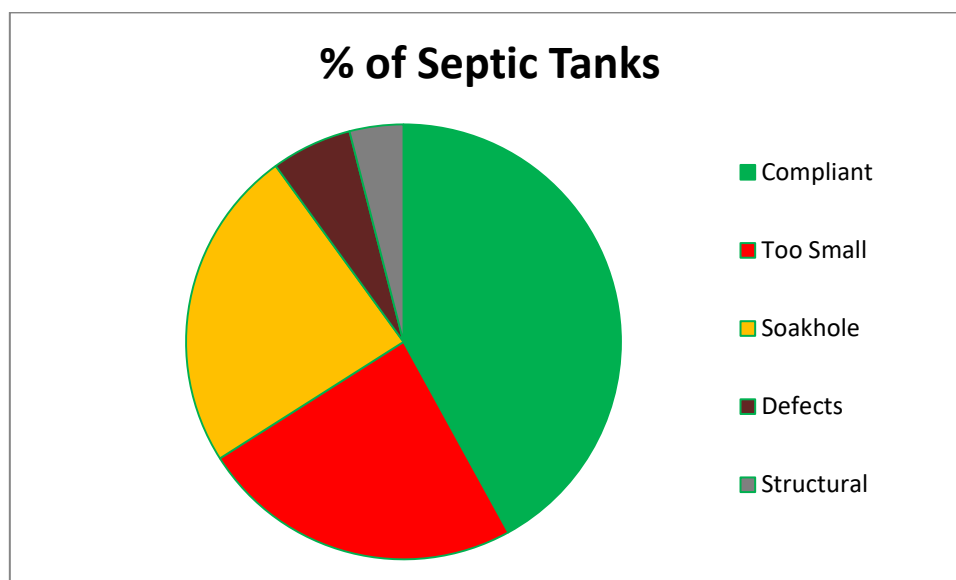


Figure 4: Septic tank information on comparable communities of Rotoiti and Rotomā

Rule 2 sets out the minimum standards for septic tanks in Maintenance Zones. In simple terms it should be expected that around 60% of properties will need to upgrade their septic tank. This will range from minor repair work through to a complete replacement. Most properties in Mamaku are of a size that should be able to accommodate an upgraded system. There could be some disruption to lawns, gardens and driveways.

There are some properties which are less than 1000 m² and others where there are two dwellings on properties of this size. These properties are likely to find it difficult to upgrade their wastewater system and in particular the land application area. The use of Aerated Wastewater Treatment Systems (AWTS) can reduce the area required for the land application area and may be a solution for those properties with limited space.

4.2.4 ADDITIONAL INFORMATION

Not all readers of this report will be familiar with wastewater treatment systems. To provide some information for these readers, two pamphlets are attached at Appendix 2 and 3. It is important to understand that there is always a treatment component and a land application component. Both are important.

The preferred method of land application is always to apply treated wastewater to the biologically active near surface soils. In some cases effluent is directed to soak holes which is beneath the active area. This reduces the opportunity for further renovation of the wastewater and also places the effluent in the proximity of groundwater from where it will flow to the lake.

5.0 CROSS REGIONAL BOUNDARY GROUNDWATER CATCHMENT

OPPORTUNITIES AND IMPLICATIONS

Mamaku village is located in close proximity to the Waikato region, with the majority of the area located inside the Lake Rotorua groundwater catchment boundary (see Figure 1). However, a smaller portion of the town is in theory in the adjacent catchment which is in Waikato Region.

As the Lake Rotorua catchment is identified as a catchment at risk, including the requirement for nutrient reduction under PC 10, discussion occurred in mid-2019 between both Bay of Plenty and Waikato Regional councils about potential cross boundary issues. The discussion included an option for the discharge of Mamaku's wastewater to be located inside Waikato region and therefore outside the Lake Rotorua groundwater catchment.

Potential locations include a forested area to the west of Mamaku village where treated wastewater could be treated discharged outside the Lake Rotorua catchment. Alternatively, Mamaku's wastewater could be directed the 22 km by a sewer to the Rotorua Lakes Council wastewater treatment plant. Because of the level of treatment which is available at the WWTP, nitrogen concentrations in wastewater could be reduced significantly and thereby reduce the nutrients reaching the lake.

Plan Change 10 includes a strategy to remove nutrients from the Rotorua Lake and Draft Proposed Plan Change 14 – OSET needs to compliment this. This could be achieved by improving the wastewater treatment to include nutrient removal.

There a range of wastewater solutions to be explored for Mamaku, located both inside and outside the Lake Rotorua groundwater catchment. Additional to a potential discharge in the Waikato region to further manage the discharge of nutrients in the sensitive Lake Rotorua catchment, other options include piping Mamaku's waste to the Rotorua Wastewater Treatment Plant or a community scheme located on land adjacent to the Mamaku township. Options will need to be pursued by Rotorua Lakes Council in consultation with iwi and the community to determine the best option to provide a high quality wastewater solution for Mamaku to replace the current unsustainable OSET systems. In terms of whether the wastewater solution must be nitrogen reducing, Bay of Plenty Regional Council expects a high treatment of wastewater will be required though best practice. Further discussions will occur between council's through the design stage.

6.0 PHASE TWO – PROPOSED RULES FOR PLAN CHANGE 14 AND LONG TERM

WASTEWATER SOLUTIONS

Phase 2 includes the development of proposed rules for Mamaku under Plan Change 14, while also looking at potential long term solutions for Mamaku wastewater. Both Rotorua Lakes Council and Bay of Plenty Regional Council will present back to community and provide an update on work to date in early to mid-2020.

Any solution requires an informed and transparent consultation process between the Mamaku community, iwi and hapū, Bay of Plenty Regional Council and Rotorua Lakes Council. The consultation needs to be supported by factual information that can be considered by all those involved in making the decision. That information has been assembled in two reports. This is the second of the two reports.

6.1 PROPOSED PLAN CHANGE 14 – OSET RULES FOR MAMAKU

A region wide plan change is being developed to ensure the safe management of OSET discharges, Draft Proposed Plan Change 14 – OSET (PPC 14). PPC 14 includes Mamaku as a Maintenance Zone. Maintenance Zones are used as an opportunity to optimise the performance of on-site effluent treatment systems in areas where those discharges are contributing to the degradation of surface or ground waterbodies, or the marine environment, or causing a risk to public health.

This potential risk is identified in Phase 1 of the Mamaku wastewater investigations (see Section 3.1). Ormiston Associates (2019) note the ignimbrite rock layer which was commonly encountered at about 2 metres depth across the Mamaku village area. Groundwater and wastewater perches on the ignimbrite layer which impedes the ability for discharged water to reach the ground and be treated effectively through soils. When contaminants enter groundwater there is potential for adverse effects to occur when mobilising groundwater surfaces in springs, streams or lakes or reaches water bore.

Due to the potential risk to water quality and public health from the continued use of OSET systems in Mamaku, including the community as a Maintenance Zone is the best approach until a long term solution is developed. All on-site effluent treatment systems within a Maintenance Zone are subject to a maintenance and performance inspections.

It is anticipated that there will be permanent Maintenance Zones and also interim Maintenance Zones. Permanent Maintenance Zones are used where regular maintenance of septic tanks can resolve the public health and environmental problems. As part of a permanent Maintenance Zone septic tanks will need to be upgraded so that they are of the correct size and discharge effluent into near surface soils where there can be further renovation of the wastewater. Interim Maintenance Zones can be used to limit off site health and environmental effects of septic tanks while reticulation of a community is planned, designed, funded and constructed. No decision has been made as to which category Mamaku and other communities should be placed in. This will be a key function of the community consultation.

Options for PC 14 include:

Option	Comment
Do nothing	The evidence is that wastewater systems are old, undersized, poorly maintained and subject to regular failure. Further, the environment in Mamaku does not support the effective or safe treatment of wastewater given the risk to water quality and human health. This option is not acceptable
Permanent Maintenance Zone	In some locations the use of Maintenance Zone provisions has improved the performance of systems and the environmental indicators have improved. The evidence from the Ormiston report is that soil types are unsuitable for onsite effluent disposal. This option is not suitable.

Interim Maintenance Zone	This may serve to improve the public health and environmental indicators while reticulation is planned. Not a permanent solution.
Upgrade to AWTs+NR systems	The cost of this option is expected to be around \$20,000 per property. This cost would need to be borne by each individual property owner. It is unlikely that this would be acceptable to property owners. Further this OSET option would not effectively treat onsite effluent given the environmental barriers identified in the Ormiston Report.

7.0 ROTORUA LAKES COUNCIL WASTEWATER OPTIONS INVESTIGATIONS

Rotorua Lakes Council is currently investigating potential long term options for the appropriate treatment and disposal of wastewater for Mamaku. Until designs are completed it is not possible to estimate the cost. Such a scheme would attract subsidies which would reduce the cost for each property owner. There also would be payment options which would allow property owners to pay the cost of reticulation over time. This option would support any future development or growth in Mamaku as it will allow wastewater to be treated to a very high standard thereby reducing nutrients discharging to the lake. It may also allow a discharge outside of the catchment. The options will be discussed with the Mamaku community in the near future. The process to develop, secure funding, undertake consultation, obtain resource consent and construct a long term solution will take some time.

8.0 SUMMARY

Phase 1 Part 1 findings;

- The presence of an ignimbrite layer beneath the town presents serious to severe constraints to the use of on-site wastewater
- 50% of septic tanks surveyed have had problems
- Some systems are unlawful and others are less than ideal

Phase 1 Part 2 findings;

- Water sampling shows that some drains are contaminated with human wastewater
- Mamaku has a comparatively high level of wastewater related complaints
- Wastewater systems are old and probably perform poorly

It seems clear from this that the Mamaku township should be reticulated. It is accepted that there are some minor questions that have not yet been investigated and answered. It is not expected that any of these questions have sufficient import that they would affect the overall thrust of the findings above. Clearly Mamaku needs to be reticulated.

The question of nutrient reductions has not been determined at this stage. Once decisions are made about the location of the land application area for a local treatment facility this question can be investigated and an answer provided.

9.0 CONCLUSION

Bay of Plenty Regional Council will continue to develop potential rule options for Mamaku, while undertaking communication and engagement with Mamaku residents and iwi on what the rules may mean for them. It is anticipated that Rotorua Lakes Council will also discuss possible reticulation options at a combined district and regional council hosted community meeting in early to mid-2020.

In terms of timing for the Schedule 1 Plan Change Process, due to the central Government's Essential Freshwater policy package released in September 2019 changes are proposed to the way councils manage both freshwater and discharges to water. Further national guidance on management of wastewater discharges will inform the work programme for this plan change and other current plan changes and provides uncertainty on the timing of notification of Plan Change 14 - OSET.

10.0 REFERENCES

Bay of Plenty Regional Council, Environmental Publication 2018/01 – Monitoring the impacts of On-site Wastewater Treatment Systems, Bay of Plenty

GNS Science Consultancy Report Lake Rotorua catchment boundary relevant to Bay of Plenty Regional Council's water and land management policies. August, 2014

Ormiston Associates Ltd Mamaku On-site Wastewater Treatment System Study for Bay of Plenty Regional Council - November 2019

11.0 APPENDIX 1 - OSET PLAN RULE 2

Rule 2 Permitted – Discharge of Treated Domestic Wastewater into land from an Existing Septic Tank On-Site Effluent Treatment System Located within the Rotorua Lakes Catchments and outside an Operating Reticulation Zone.

The discharge of up to 2 cubic metres per day of treated domestic wastewater into land from a septic tank on-site effluent treatment system located within the Rotorua Lakes Catchments and outside an Operating Reticulation Zone defined in Schedule 11, that was installed and commissioned before 1 December 2012 is a permitted activity subject to the following conditions:

- (a) The system shall comply with the requirements of Schedule 1.
- (b) Solids in a septic tank do not exceed one third of the liquid volume of the tank at any time.
- (c) All existing septic tank effluent treatment systems located:
 - a. within the Maintenance Zones specified in Schedule 10 for the communities of, **Gisborne Point, Hinehopu, Rotoma, and Tarawera**, or
 - b. within **200 metres** from the lake edge landward (measured horizontally) of any of the Rotorua Lakes (See the maps in Schedule 9)

must also comply with the following:

Every on-site effluent treatment system within a Maintenance Zone or within 200 metres from the lake edge landward (measured horizontally) of any of the Rotorua Lakes is subject to a maintenance and performance inspection and OSET Approval programme.

This begins with an initial septic tank pump out and an inspection of the whole on-site effluent treatment system (septic tank and land application system) carried out by a Bay of Plenty Regional Council Approved Certifier. This is followed at three (3) yearly intervals by further (subsequent) inspections. At each subsequent inspection the Approved Certifier will assess the septic tank and will require it to be pumped out if the combined sludge and scum levels exceed one third of the depth of the tank. Where an outlet filter is fitted, it must be cleaned and inspected at the same time. After each inspection the Approved Certifier will complete a report on the system and provide one copy to the owner and one copy to Bay of Plenty Regional Council.

If the Approved Certifier finds that the system is compliant, the Bay of Plenty Regional Council will issue the owner with an OSET Approval that will note the date for the next inspection. A copy of this approval will be sent to the district council.

OSET Approval cannot be issued if the system (septic tank and land application system) fails to meet the standards and requirements of this regional plan, in particular Schedule 1.

If the Approved Certifier finds that the system is not compliant with the required standards, the Bay of Plenty Regional Council will notify the owner outlining the repairs or upgrades required for their system to comply with this permitted activity Rule. When the repairs or upgrades have been completed the owner will advise the Bay of Plenty Regional Council and a further inspection will be made. The system shall be deemed to remain a permitted activity until the repairs or upgrades have been completed or for a period of three months whichever is the lesser.

If an on-site effluent treatment system in a Maintenance Zone:

- 1 Has a septic tank fitted with an approved outlet filter that is compliant at all times with the provisions of Appendix D of NZS 1546.1:2008 and is regularly cleaned and maintained to a high sanitary standard; and

- 2 The tank has a liquid volume greater than 2,700 litres; and
- 3 The tank lid is easily accessible and can be raised without the need of lifting equipment so that the sludge level in the tank can be assessed, Then at the discretion of the Approved Certifier, the period between inspections may be extended for up to six (6) years and this will be noted on the Approved Certifier's report.

By agreement with Bay of Plenty Regional Council, the Rotorua District Council may administer all or part of the maintenance and performance inspection programme for a Maintenance Zone in their district.

- (d) Unless decommissioned and connected to a Rotorua District Council or approved community sewerage reticulation system, each existing septic tank on-site effluent treatment system located within the Maintenance Zones specified in Schedule 10, and permitted by (c) above, will only be a permitted activity until the following dates, or three months after connection to sewerage reticulation becomes available, whichever is the sooner, after which the discharge from the system will become a discretionary activity administered under Rule 6:

- a. Hinehopu, Gisborne Point and Rotoma; 1 December 2016;
- b. Tarawera; 1 December 2017.

In the context of this condition, 'decommissioned' means that drain pipes into and out of a septic tank have been physically disconnected and the septic tank pumped out to ensure no discharge can occur from it.

- (e) Existing septic tank on-site effluent treatment systems that are:

- located within **200 metres** from the lake edge (measured horizontally) or within an existing lake edge community (See the maps in Schedule 9), and
- not connected to a Rotorua District Council sewerage reticulation system or an approved community sewerage reticulation system, and
- are outside a Maintenance Zone.

must, by **1 December 2014** be capable, after a settling in period, of reducing the total nitrogen (TN) in the discharge, to a concentration not exceeding 15 grams per cubic metre, measured as nitrogen, prior to discharge to the land application system. The Aerated Wastewater Treatment System must be approved by Bay of Plenty Regional Council.

- (f) All existing septic tank on-site effluent treatment systems that are located distances greater than **200 metres** from the lake edge and therefore not considered under condition (e) but are located within the catchments of **Lakes Rotoiti, Rotoehu, Okaro, Rotorua and Okareka**, within a property title having a land area of 2 hectares or less where there is one or more systems within that property title must, by the following dates, be capable, after a settling in period, of reducing the total nitrogen (TN) in the discharge, to a concentration not exceeding 15 grams per cubic metre, measured as nitrogen, prior to discharge to the land application system. The Aerated Wastewater Treatment System must be approved by Bay of Plenty Regional Council:

- a. Lakes Okaro, Rotorua (except the sewerage reticulated area of Mamaku township) and Okareka; 1 December 2014
- b. The sewerage reticulated area of Mamaku township shown on Map 18 of Schedule 9, 1 December 2018

c. Lake Rotoehu, Lake Rotoiti; 1 December 2016

- (g) For the purpose of Rule 2 conditions (e) and (f), a settling in period shall not exceed six months from the date on which the system is first commissioned.
- (h) Discharge from systems that are not upgraded in accordance with Rule 2 will become a discretionary activity under Rule 5 of this regional plan.
- (i) Subject to compliance with the other conditions of Rule 2, the discharge of primary treated effluent from a septic tank into a soak hole constructed, installed or replaced before 1 December 1996 shall only be permitted if:
 - (i) The septic tank connected to the soak hole has been installed and maintained to the standards required by this regional plan at all times;
 - (ii) There is no direct discharge of effluent from the soak hole into groundwater;
 - (iii) There is not less than 2 metres between the base of the soak hole and the highest seasonal groundwater level (highest water table) at all times;
 - (iv) There is no discharge to surface water or overland flow from the soak hole at all times.
- (j) When a septic tank on-site effluent treatment system is in a Confirmed Reticulation Zone, it is exempt from the requirements of this Rule in regards system upgrades and shall instead:
 - A. Comply with Schedule 1, or
 - B. have an existing septic tank with a liquid volume of 2000 litres or more, that:
 - (i) is fitted with an approved outlet filter that is operating effectively and is regularly cleaned and maintained to a high sanitary standard, and
 - (ii) has an easily accessible tank lid that can be raised without the need of lifting equipment so that the sludge level in the tank can be assessed, and
 - (iii) has combined sludge and scum levels that do not exceed one third of the liquid volume of the tank, and
 - (iv) the land application system is functioning effectively, with no effluent discharge directly into surface water or onto the land surface, and
 - (v) if in a Maintenance Zone, complies with the maintenance and performance inspection and OSET Approval programme requirements specified for the zone.

A septic tank on-site effluent treatment system in a Confirmed Reticulation Zone within the catchment of any Rotorua lake is not required to comply with the requirements for nitrogen reduction.

When a Confirmed Reticulation Zone is designated as an Operating Reticulation Zone, the exemption provided by this condition and the permitted activity authorisation of this Rule shall cease.

Advisory Note:

- 1 Refer to Flow Diagram 1 to assist reading of this rule. Please note that the flow diagram is to assist working out which rules apply but does not constitute a part of the rules. If there is any inconsistency between the flow diagram and the rules in the regional plan it refers to, the criteria in the rules prevail.
- 2 Schedule 1, 2(i) requires that in a Maintenance Zone the access points for pump out of tank and for cleaning of the outlet filter shall be raised to ground level.
- 3 In order to clean out a septic tank the middle lid needs to be lifted not the end lid. Septic tanks that have outlet filters installed must have easy access for cleaning, and be easily located and identifiable. It is advisable to install a man hole for access

to septic tank on-site effluent treatment systems for ease of maintenance, where the lid is not at ground level.

- 4 'Property title' is defined in Definition of Terms.
- 5 Bay of Plenty Regional Council has information on aerated wastewater treatment systems that comply with the discharge requirements of the regional plan. Please contact Bay of Plenty Regional Council for a listing of approved systems.
- 6 Under Policy 27, the nitrogen component in an on-site effluent discharge from a property over 2 ha in the catchment of a Rotorua Lake that has been identified and included in the nutrient management benchmark for that property under the requirements of the Bay of Plenty Regional Water and Land Plan will be managed under that regional plan.
- 7 Policy 31 applies to effluent discharge from properties in a Reticulation Zone. Within an Operating Reticulation Zone the permitted activity authorisation for a property under this rule will cease on the date that connection to the sewerage reticulation system at the property boundary and connection to the reticulation system can be completed. Operating Reticulation Zone maps are shown in Schedule 11.
- 8 A decommissioned septic tank is a safety hazard. When decommissioning a septic tank it is advisable to remove or collapse the tank and back fill the hole to prevent anyone falling into it and to stop it from floating up on groundwater.
- 9 The discharge of effluent from a soak hole constructed, installed or replaced before 1 December 1996 that does not comply with this condition is a **discretionary activity** administered under Rule 5.
- 10 The discharge of effluent from a soak hole constructed, installed or replaced (including the replacement of a failed soak hole) after 1 December 1996, is a **discretionary activity** administered under Rule 7.
- 11 The discharge of effluent from septic tank on-site effluent treatment systems or AWTS's servicing places of assembly where many people will regularly gather is a Discretionary Activity requiring resource consent. For example, this includes rural factories, camp grounds, schools, sports clubs and Marae. For one-off events where a crowd is expected and the capacities of the septic tank on-site effluent treatment systems or AWTS's are likely to be exceeded, the use of temporary facilities such as port-a-loos should be arranged.
- 12 The discharge of effluent from new septic tank on-site effluent treatment systems or AWTS systems from any development which result in more than 4 dwellings on a property is a Discretionary Activity.
- 13 Contact Bay of Plenty Regional Council for a list of Approved Certifiers in your area.

12.0 APPENDIX 2 MAINTAINING YOUR SEPTIC TANK

Why it's important to maintain your septic tank



Unless your property is connected to the main sewage network, it is likely you will have an on-site wastewater disposal system called a septic tank.

This septic tank will be buried somewhere on your property and will process all wastewater from your toilet, kitchen, bathroom and laundry.

Unless properly maintained a septic tank can become a serious health hazard, by spreading disease and contaminating water.

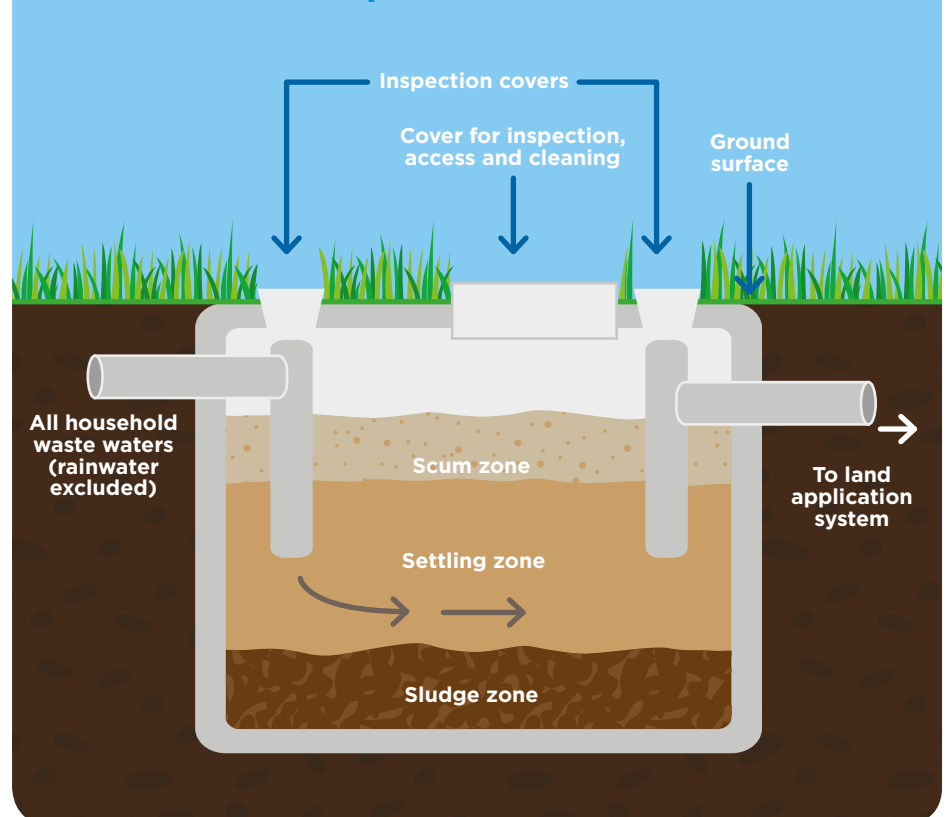
To ensure this doesn't happen, septic tanks need to be regularly maintained by an approved contractor.

How do they work?

Wastewater discharges into the septic tank and the heavier solids (sludge) settle to the bottom of the tank, while fats (scum) float to the top. This sludge and scum decomposes in the tank.

The remaining liquid flows out of the tank and discharges into a soakage area. There are also other materials, like sand, soil and minerals, that are not able

A traditional septic tank



to be broken down and are retained within the tank.

Why do I need to maintain our septic tank?

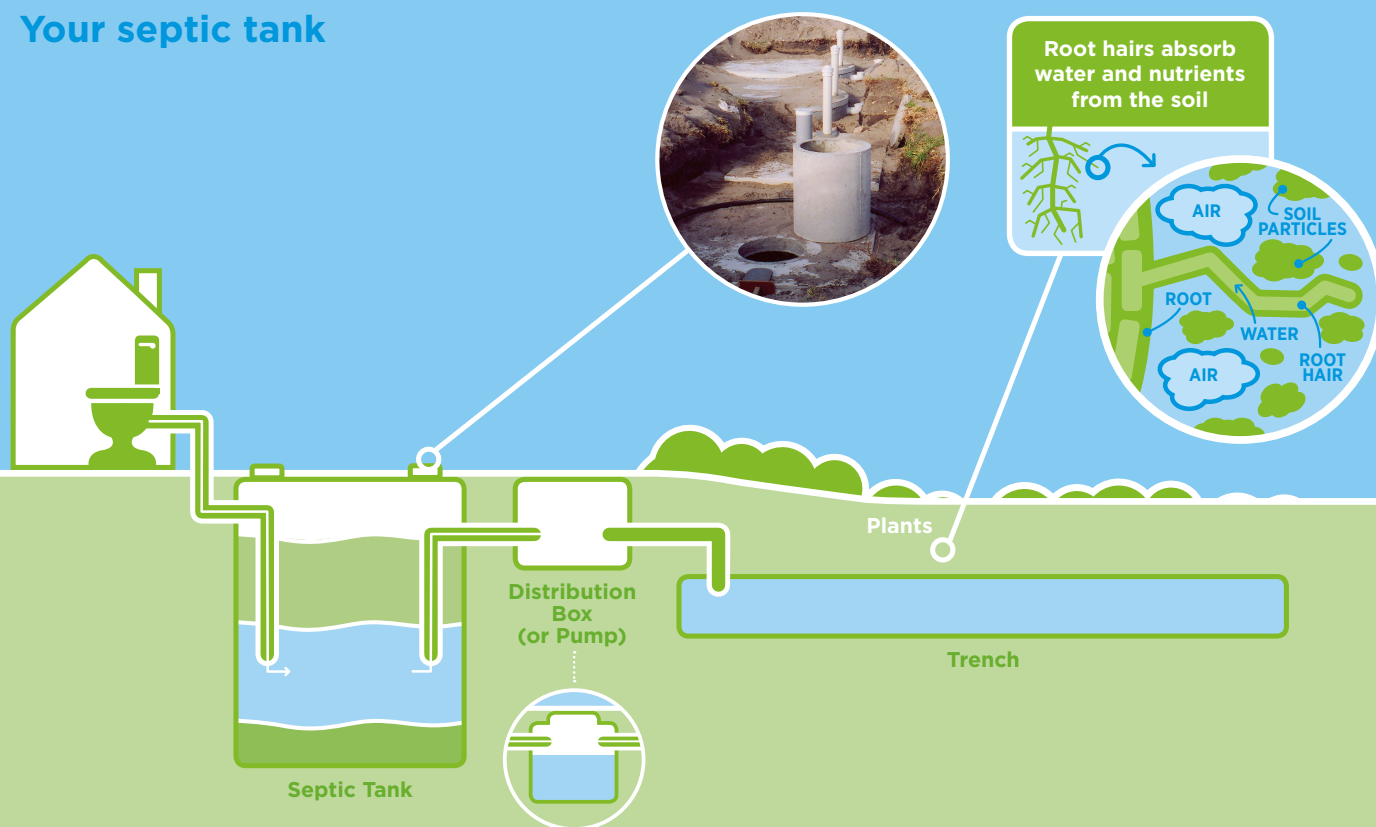
Over time the volume of sludge and scum in a septic tank starts to build up. Because of this

build up, the operating volume and overall effectiveness of the septic tank is reduced.

When do I need to maintain my tank?

Tanks need to be regularly inspected by an approved contractor to ensure they are

Your septic tank



operating effectively. When the volume of sludge and scum reaches about one third of the total volume of the tank the septic tank should be regarded as “full”. Under normal circumstances, with four or five occupants in a dwelling, a tank will require emptying after three years of use. A small tank of less than 3000 litres will require emptying more frequently.

By measuring sludge and scum at the time the tank is being emptied, the contractor can determine when the next service is likely to be required.

How do I maintain my septic tank?

When a septic tank is full

it needs to be pumped out (emptied) by an approved contractor and removed to an authorised disposal facility (see our website for a list of approved contractors).

Where the property is in a Maintenance Zone, the contractor must send confirmation of the pump-out and the inspection report to the Regional Council.

We also encourage the installation of outlet filters. They operate by screening the discharge and prevent larger particles being carried over into the land application area. The filter will need to be installed by your drain layer (see our website for a list of approved

contractors) and cleaned at the same time as when the tank is pumped out. Regular blocking of the filter may indicate the tank needs pumping.

Other things you can do to improve the performance of your septic tank:

- Minimise water use
- Divert stormwater away from your land treatment area.
- Don't over-use powerful bleaches and disinfectants, or put chemicals or paint down the drain.

For further information contact
Bay of Plenty Regional Council
on 0800 884 880 and ask for
Sam Weiss or Terry Long or
visit www.boprc.govt.nz



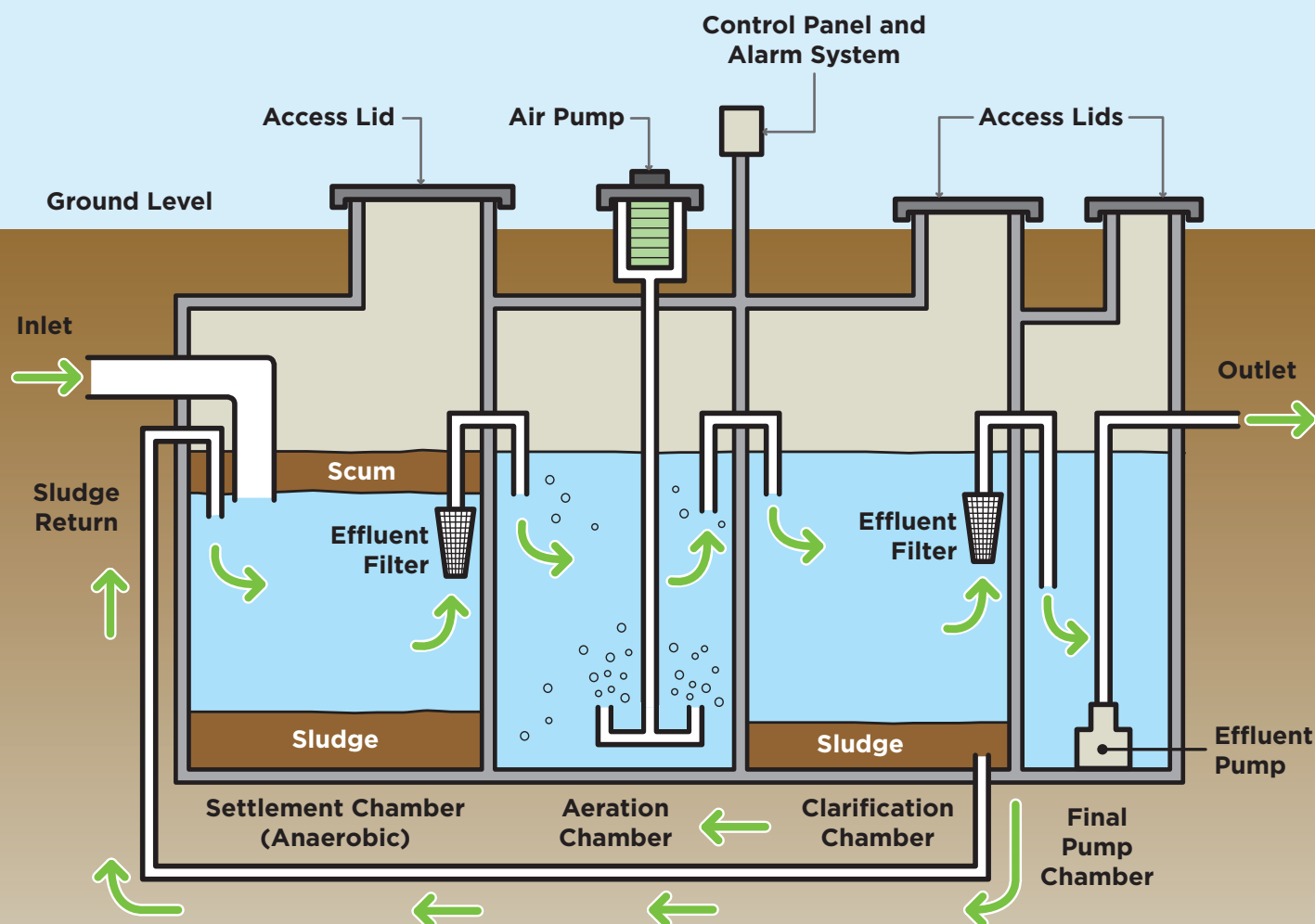
13.0 APPENDIX 3 LOOKING AFTER YOUR AWTS

Looking after your Aerated Wastewater Treatment System

The water you flush down the toilet and have a shower with needs to be disposed of carefully. If your property can't access the main sewer system you may need a septic tank or Aerated Wastewater Treatment System (AWTS).

An AWTS is a system of underground tanks, filters and a blower that has the potential to treat wastewater to a very high standard before it is returned to the land. On land you generally only see the lids.

Underground it looks something like this



To effectively process wastewater, and to avoid odours and 'ponding', your AWTS needs regular maintenance by a trained technician every six months.

If your system doesn't work properly you risk your family getting sick, or contaminating the environment.

What you need to do

- Keep your operating instructions and the suppliers name and number on hand
- Call the installer as soon as the alarm is activated. The issue will not resolve itself and only get worse and more expensive to fix.
- Call the installer if there are odours, overflows or ponding on the land application area
- Make sure the system is serviced at the required intervals which is usually every six months
- If you sell your property, pass these details on to the next owner
- Care for the land application area by regularly mowing the grass or maintaining the planting and mulch. Make sure all the driplines are covered.
- Do not cover any portion of the land application area. Do not drive over or allow stock on the disposal area.

What does a service include?

The service technician will;

- Make sure all electrical components are operating correctly - including alarms, pumps and controllers.
- Clean the blower air filter and adjust the valves

- Ensure the filters and aerators are working correctly
- Reduce the volume of any accumulated sludge
- Clean the final filter
- Flush driplines
- Inspect driplines for leaks, holes or effluent ponding

Don't want to have a service?

The system warranty may be voided if the system is not serviced.

Most AWTS are installed as a permitted activity, which means as long as you comply with the conditions you do not need resource consent. Regular maintenance is one of these conditions, because a well maintained system is considered low risk to the environment.

If you do not maintain your AWTS, you will be required to apply for resource consent. There is a cost to apply for resource consent, and also an annual consent monitoring fee. A resource consent will include requirements to make sure the AWTS continues to work well and not cause a nuisance.

How to care for your AWTS

DO!

- ✓ Scrape dishes before washing
- ✓ Only flush number ones, twos and toilet paper. Nothing else should go down the toilet
- ✓ Install water-saving devices, such as dual/low flush toilets
- ✓ Reduce water usage
- ✓ Divert stormwater away from your land application area
- ✓ Make sure the technician can access the AWTS lids
- ✓ Keep non-biodegradables (eg. dirt or sand) out of your system

DON'T!

- ✗ Don't use a waste disposal
- ✗ Don't put sanitary napkins, disposable nappies and/or baby wipes in the system
- ✗ Don't put bleaches, disinfectants, chemicals or paint down the drain
- ✗ Don't allow vehicles or stock on the land application area
- ✗ Don't grow deep rooting plants over soakage trenches or pipes
- ✗ Don't empty chemical toilet waste into your system
- ✗ Don't build on your reserve land application area