Piney Mountain Wastewater System

Introduction

The **Piney Mountain (PM)** subdivision has both a community wastewater system and individual homeowner on-site wastewater systems. Most PM homes are connected to the community wastewater collection system. Red Wolf lots have individual on-site septic systems that discharge to private drainfields.

The wastewater disposal arrangements for the community system are unique and have evolved from litigation initiated in the mid-1990s when the original North State Utilities (NSU) designed community septic fields failed.

Since the mid-1990s, community wastewater has been pumped by the **Orange Water and Sewage Authority (OWASA)** from the neighborhood pump station to the City of Durham sewer main at the intersection of Kerley and Mt. Sinai Roads. OWASA owns, operates, and maintains the PM pump station and force main to which individual homeowner systems and the City of Durham are connected. The City of Durham bills OWASA for treating PM wastewater. Durham's fee is based on the total gallons of wastewater discharged into their system through the OWASA connection. OWASA adds their service fees to the charges from the City of Durham and apportions these costs equally to PM connected homeowners on a monthly basis.

The following sections provide detailed information relevant to the PM community system.

PART I
A Summary of the Elements of the PM Wastewater System
and the Working Relationship between PM and OWASA

PART II
Frequently Asked Questions (FAQs)

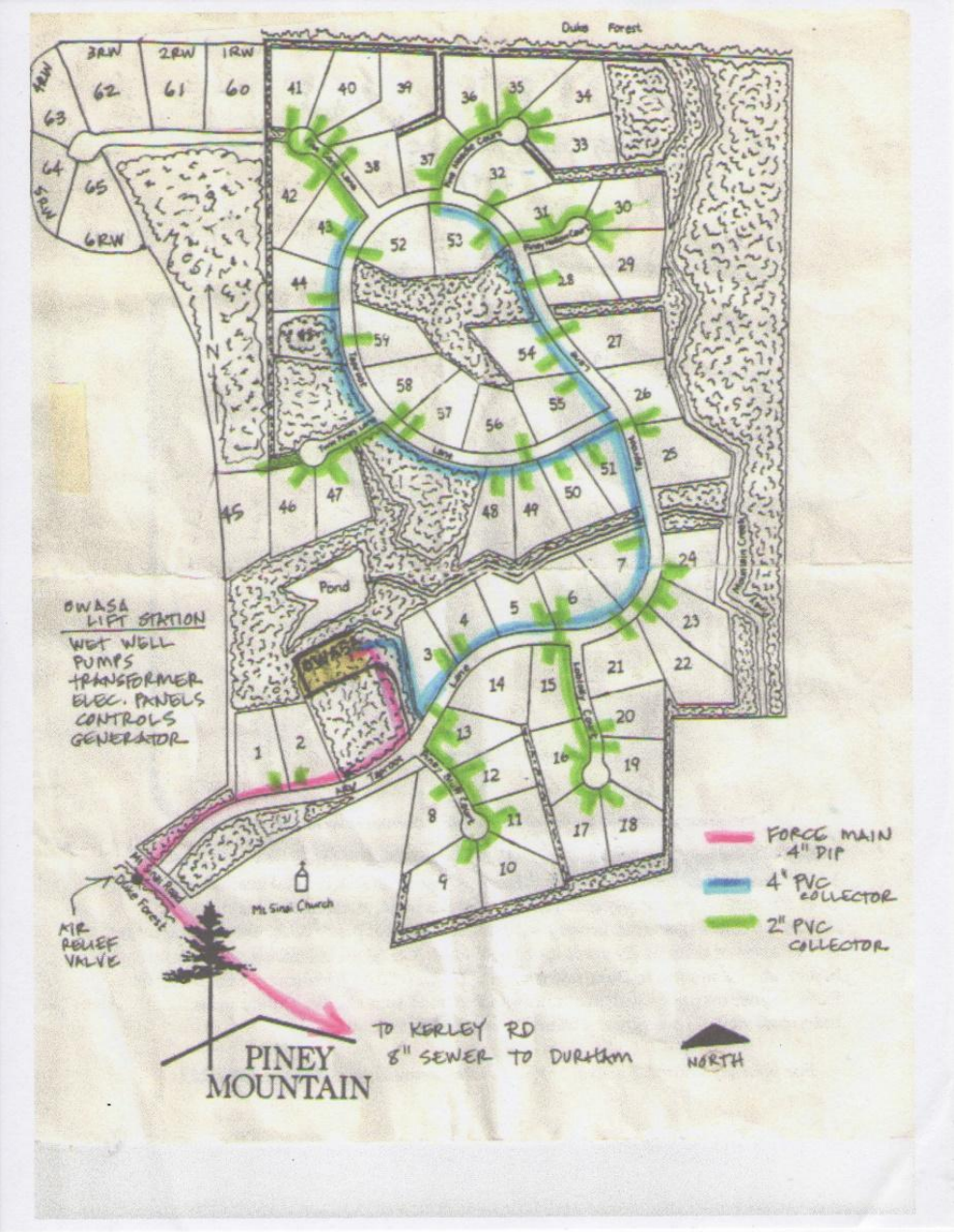
PART III
Defined Terms

PART I
A Summary of Elements of the PM Wastewater System

Components of the PM community wastewater system include the following:

Piney Mountain Wastewater System

- Individual wastewater systems. The majority are connected to the OWASA system (this includes 31 **STEP (septic tank effluent pump)** systems and 25 **GP (grinder pump)** systems).
- Private service lines running from pump tanks (STEP and GP) to system valve boxes.
- System check (“gate”) valve boxes connecting private service lines to collector lines.
- Collector lines running from system check valve boxes to pump station.
- Pump station is located at the end of the OWASA access road off of Taproot Lane south of the PM pond.
- Force main connecting pump station to Durham sewer line at the intersection of Kerley Rd. and Mt. Sinai Rd.



Piney Mountain Wastewater System

A profile schematic of the PM system (with STEP) is presented below. Note that a GP system profile is identical to the STEP diagram below except that a GP has only one collection tank between the house and the check ("gate") valve.

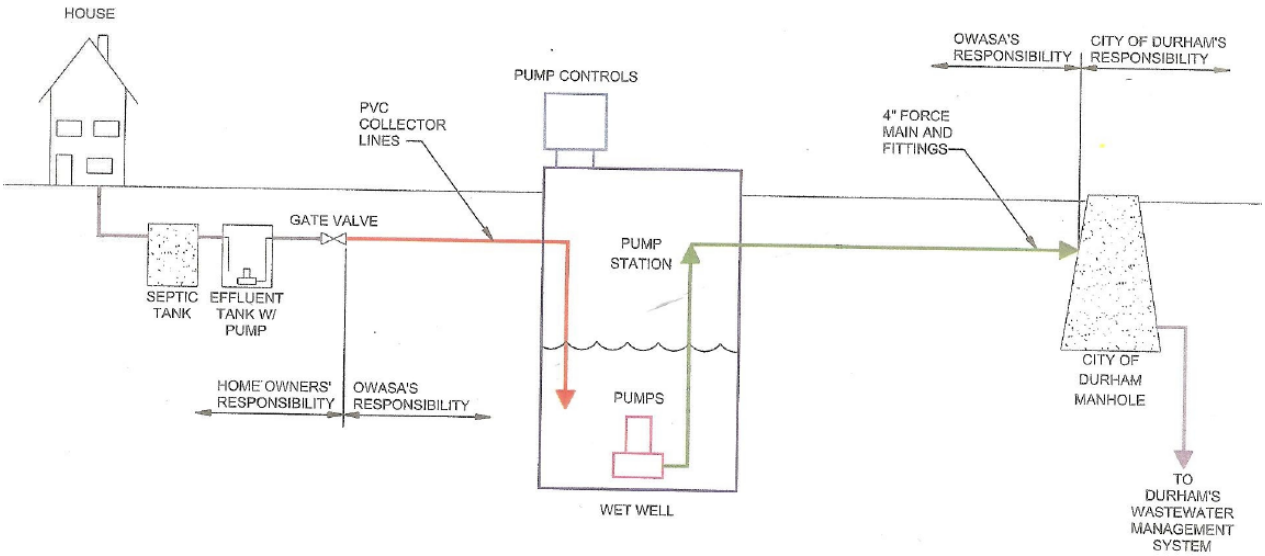
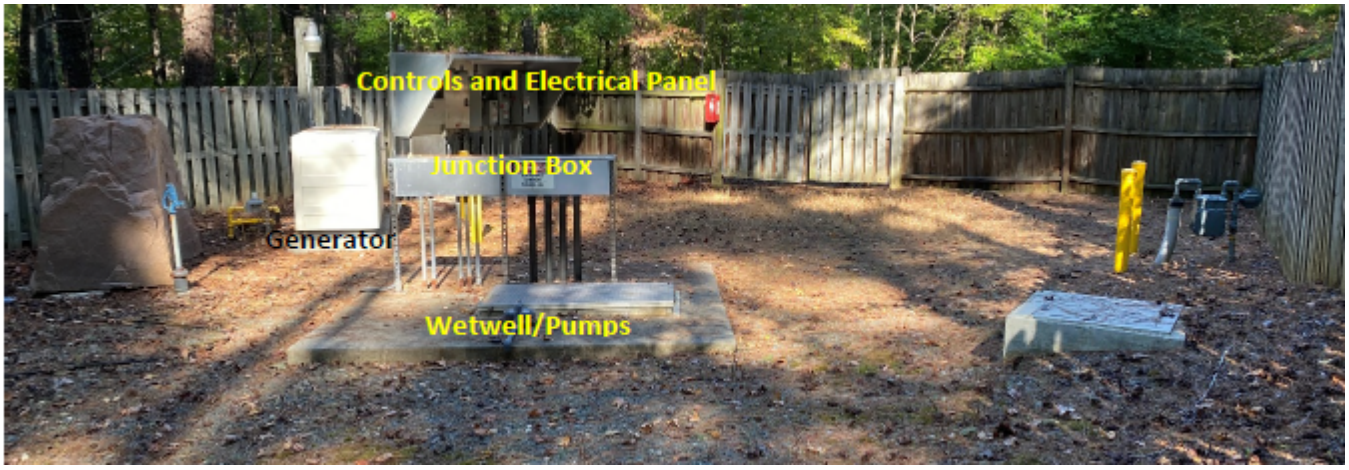


Photo of the PM Pump Station (Located at the end of the OWASA access road off of Tap Root Lane across from Piney Bluff Court)



Piney Mountain Wastewater System

Working Relationship between PM OWASA Committee and OWASA

- OWASA staff and members of the PMHOA OWASA Committee videoconference at least once a year.
- The PMHOA OWASA Committee is chaired by the current President of the PMHOA
- 2023 members of the PMHOA OWASA Committee are President Mark Stevenson, Susan Turbak, Janet Bailey, Deb Christie and Mark Bailey
- Key members of the PMHOA OWASA Committee regularly exchange information with Key OWASA staff as well as the Orange County Director of Environmental Health (who often refers to research by NC State University), and make recommendations to the PMHOA board and to the PMHOA community at annual meetings of the PMHOA.

PART II
Frequently Asked Questions

1) Are all PM lots connected to the PM wastewater system?
There are 65 lots in PM – 59 in the original section of PM plus 6 lots in the Red Wolf section. As of 2022, 56 lots are connected to the PM wastewater system. Lot 14 has an individual on-site septic system that is not connected. Lots 9 and 10 have been permanently combined to form one lot that is connected. Lot 13 is not developed and remains unconnected; however, the owner is responsible for CRA (capital reserve account) payments. All 6 lots in the Red Wolf section have individual on-site septic systems.

2) **What FAQ information is relevant to Red Wolf lot owners?**
The 6 owners of Red Wolf lots on Pine Cone Lane, and lot 14, who have on-site septic systems, will find helpful the following FAQs:
Authorized dischargers (septic pumpers) [see **FAQ 12**],
Level IV certified wastewater inspectors and installers [see **FAQ 13**],
Garbage disposal use [see **FAQ 15**]
Septic tank additives [see **FAQ 16**]

Contact information for the Orange County Director of Environmental Health:
Tel: **(919) 245-2365** (Victoria Hudson, in 2023).

3) I get a monthly bill from OWASA. What is included?
Regardless of personal usage, all connected PM lot owners pay identical monthly fees to OWASA to maintain and operate the PM wastewater system.

The OWASA monthly fee consists of two elements:

O&M (Operation and Maintenance) service fees
PM **Capital Reserve Account (CRA)** fees

O&M service fees are divided equally and billed to 56 connected lots, derived from:

- the charges to OWASA by the City of Durham for wastewater treatment (based on volume of wastewater metered at the connection to the Durham main)
- costs related to pump station operation (electrical power, natural gas, phone lines)
- an overhead charge by OWASA for administrative and maintenance services.

The monthly CRA fee is charged to 56 connected lots plus lot 13 (which is eligible to be connected) to pay for major rehabilitation, replacement, or upgrade of system components:

- the CRA monthly contribution/lot was increased to $60 in early 2022.
- the CRA is currently projected to increase every 3 years by $10 per month
- if the CRA cannot support essential capital improvements, 57 PM lots are eligible for additional CRA assessment by OWASA.

4) **How do I report a wastewater issue to OWASA?**
PM owners are asked to report any evidence of leaks, spills or wastewater system concerns BOTH to:
OWASA at **919-968-4421** and **customerinquiries@owasa.org**
AND to the PMHOA board

5) **Why do some connected lots have STEP systems and some have GP systems?**
Thirty-one (31) lots have STEPs consisting of a two-tank septic system and 25 lots have a single tank with a GP.

The PM wastewater disposal system as originally designed and constructed by North State Utilities (NSU) consisted of three community drainfields sited within PM. Discharge from individual homeowners' septic tanks was pumped by means of STEPs to the drainfields. Thirty-two homes were built in PM using a STEP system. The NSU drainfields began to fail in 1992. In the settlement of subsequent legal action in 1994, 58 PM lots were permitted to connect to the City of Durham sewer by means of a central pump station to be installed and maintained by OWASA. Formal agreements were signed by the PMHOA, OWASA, Orange County and the City of Durham. GP systems were specified for all <u>new construction</u>. (NOTE: One of the original 32 STEP systems has been replaced with a GP).

6) **How do I get my STEP, GP or on-site septic system inspected?**

In 2007, a comprehensive inspection form for STEPs and GPs was developed by the PMHOA OWASA Committee, in consultation with the Orange County Director of Environmental Health and Wayne McFarland of McFarland Septic (https://mcfarlandseptic.com/)

The PMHOA OWASA Committee periodically arranges with McFarland Septic to offer group rates to PM owners for inspections of STEPs, GPs and individual septic systems. Participating owners receive an individualized written inspection report.

7) **Why are individual STEP and GP systems on connected lots inspected?**
PM STEP and GP systems are inspected:
   - To detect FOGs (fats, oils, and grease). The build-up of these materials can lead to failure of the pump and/or alarm mechanisms, and result in blockages
   - To detect malfunctioning control panels and alarms. A malfunctioning control panel can go undetected for long periods, since control panels do not have battery backup. When an electrical component in the control panel fails, the alarm does not function.
   - To assist connected lot owners in understanding the state of their individual systems
   - To encourage lot owners to repair and maintain their systems
   - To gather information that will benefit all connected lot owners

8) **What have past STEP and GP inspections found?**
   - Faulty alarm or an alarm that did not sound when float arm was raised
   - Low delivery rate from pump or pump malfunction
   - Control panel issues, leaks, eroded part(s)
   - Septic & pump tanks in need of solids (accumulated sludge) removal
   - Pump tank lid broken. Grading needed to prevent rain infiltration
   - Unable to check levels of STEP system through 6-inch access. Risers needed.

9) **The inspection report notifies the homeowner of leaks in the GP or STEP. Is the homeowner required to make the recommended repairs?**
Absent a situation constituting a public health concern, it is the policy of the PMHOA and OWASA not to require or mandate individual system repairs. Repairs are the homeowner's responsibility.

10) **The inspection report notifies the homeowner that the septic tank of the STEP system needs to be pumped out. What should happen next?**
The decision to arrange for solids removal rests with the homeowner. However, the OCEHD recommends that owners have their STEP systems pumped out when the solids level exceeds one-half of the liquid capacity of the tank in the inlet chamber.

OWASA has a list of “Authorized Dischargers.” Authorized Dischargers are allowed to pump, haul, and dispose of septic tank materials at the Mason Farm facility in Chapel Hill. Septic tank material can also be disposed of at the two City of Durham water reclamation facilities. See FAQ 16 below for how to find a list of Authorized Dischargers to pump out a STEP solids tank or a septic tank.

The advantage of having the STEP systems pumped is to prevent solids from clogging the gravity line from the house to the septic tank. In addition, the overflow of solids from the septic tank to the effluent tank can impact pump performance and longevity.

11) How Will I Know When to Pump My STEP solids or septic tank?

Absent an inspection recommendation by a certified wastewater inspector/installer, a rule of thumb is to pump out your STEP or septic tank every 5 years.

From NC State Extension Services:
https://content.ces.ncsu.edu/septic-systems-and-their-maintenance
The frequency with which you will need to pump depends on three variables:

- the tank size,
- the amount of water used by your family, and
- the solids content of your wastewater.

If you are unsure about when to have the tank pumped, have a professional operator observe the rate of solids accumulation in the tank each year. He or she can clean and replace the effluent filter cartridge in the tank at the same time. The tank should be pumped if the sludge layer at the bottom of the septic tank has built up to within 25 to 33 percent of the tank’s liquid capacity or if the scum layer in the tank is more than 4 to 6 inches thick. Therefore, a typical 1,000-gallon tank with a 4-foot liquid capacity should be pumped when the solids reach 1-foot thick in the tank bottom. If the tank is not easily accessible and the rate of solids accumulation cannot be checked yearly, then you may wish to inspect and pump it according to the frequency guidelines in Table 1. Your local health department should be able to tell you the size of your tank. When inspecting the tank, check the effluent filter (or for older systems check the sanitary tee or the outlet baffle to be sure that it has not broken off and dropped into the tank). Also, be sure to have both compartments of the tank pumped (note the two compartments shown earlier in Figure 2).

12) How do I find an “Authorized Discharger” to pump my STEP or septic tank?

To find an authorized pumper of solids from your STEP or septic tank, the Orange County Department of Environmental Health has a link to the NC State Dept of Environmental Quality (NCDEQ) list of “septage firms”):

https://deq.nc.gov/about/divisions/waste-management/solid-waste-section/solid-waste-permitted-facility-information-and-guidance/solid-waste-facility-lists

Click on “septage firms” which is a list of septic pumpers by NC county in Excel format.

In 2023, the following are included as authorized septic pumpers for Orange County:

Double Deuce Septic Service, Inc. – 919 698 2630 – Rougemont
L&E Septic Service LLC – 919 323 0865 – Mebane
McBroom's Septic – 919 869-4601 – Hillsborough
Summey Portable Restrooms – 919 259-6266 – Hillsborough
The Water Specialist – 919 732-1578 – Hillsborough
Joel Lloyd Septic Service – 919 969 1499 – Chapel Hill
Central Septic Tank Service – 919 667-9491 - Hillsborough
McFarland Septic Services LLC - 919.383-1015 - Durham
John E. Byrd Jr. – 919 383-1816 – Hillsborough
Ivey's Septic Tank Service – 919 732-5592 - Efland

By having your STEP or on-site septic tank pumped, you will ensure that solids do not stop up the gravity line from your house to the septic tank and from the septic tank to the effluent tank, and do not shorten the life of your effluent pump. Since a STEP effluent pump is not a grinder pump, it may not pump solids efficiently. Keeping the solids at the level recommended by the Orange County Department of Environmental Health will ensure the best functioning of your individual sewer system.

13) **The inspection report informs the homeowner that the pump needs to be replaced. Who provides this type of service (Level IV certified wastewater inspectors)?**
The Orange County Department of Environmental Health informs that a **level IV certified** wastewater installer is best qualified to recommend and install a replacement pump for your system.

The **NC On-site Wastewater Contractors and Inspectors Certification Board (NCOWCICB)** provides wastewater **installer and inspector** licenses.

For a list of installer and inspector certification holders by county see:

See **https://ncowcicb.info/faqs/**

As of 2023, Level IV installers and inspectors include
Waylon McFarland of McFarland Septic (919-383-1015),
Michael Justin Bunn of David Brantley & Sons Inc. (252-478-3721)

14) When, if ever, does my STEP or GP system need to be replaced?
Although unlikely to occur, a tank would need to be replaced in the event of severe structural decay. Pumps and other system parts may need to be replaced over time.

STEP owners may wish to consult their inspectors and installers about installing a GP to eliminate periodic pumping out of solids as well as lengthen the life of their pump by reducing inflow and infiltration of groundwater into their pump system.

15) How does the use of a garbage disposal affect an on-site septic tank or connected STEP or GP? What is FOG?

PMHOA members are strongly encouraged to use their sink garbage disposals for washing water only and to put no **solids or fats, oil or grease (FOG)** (including coffee grounds) down drains through garbage disposals, sinks or toilets.

Putting solids or FOG down drains to a garbage disposal can clog household plumbing, STEP and GP systems, private service lines, community collector lines, **pump station** and force main.

The use of a garbage disposal may encourage a homeowner to introduce types of waste that can result in higher solids, reduce the clarifying capability, and load the septic or grinder tank with FOGs. FOGs can accumulate in the pump tank, coating the float control switches that turn the pump on and off. FOG build-up can also "glue" the alarm float to the support making it inoperable. Garbage disposal use may result in more frequent need for solids removal in STEP systems.

To keep FOGs out of your wastewater, pour cooking oil into a container and put in the trash (or recycle), rather than pouring it down the sink or toilet. Scrape and wipe cooking pots and pans to remove all grease with paper towels and place the paper towels in the trash.

For owners in Red Wolf and lot 14 who have on-site septic systems, having a disposal and using it to get rid of solids and waste scraps is strongly discouraged by the both Orange County Director of Environmental Health and NC State Extension Service in regard to soil-based septic systems. A disposer often encourages homeowners to introduce the types of waste that can result in higher waste strength in the tank, reduce the clarifying capability of the tank, and load the tank with fats-oils-greases that can travel from the tank to the drainfield and eventually clog soil pores and reduce soil absorption.

In the case of PMHOA GP and STEP pumping systems, FOG accumulates in the pump tank coating the float control switches. It can affect the float controls that turn the pump on and off. It can "glue" the alarm float to the support, making it inoperable.

On a collection sewer, the FOG that leaves the tanks eventually line the pipes in the sewer system with grease causing clogs, reduced efficiency, and interference with the valves and air release systems.

From NC State Extension Service:

https://content.ces.ncsu.edu/septic-systems-and-their-maintenance

Do not pour cooking greases, oils, and fats down the drain. Grease hardens in the septic tank and accumulates until it clogs the inlet or outlet. Grease poured down the drain with

hot water may flow through the septic tank, but then it can clog soil pores completely and ruin the drainfield.

Pesticides, paints, paint thinners, solvents, disinfectants, poisons, and other household chemicals should not be dumped down the drain into a septic system because they may kill beneficial bacteria in the septic tank and soil microorganisms that help purify the sewage. Also, some organic chemicals will flow untreated through the septic tank and the soil, thus contaminating the underlying groundwater.

If your home has a water treatment system, such as a water softener, the discharge pipe from the backwash should ideally discharge to your lot rather than to the waste plumbing system or septic tank.

16) Will additives (e.g., Rid-X Septic Treatment or similar products) enhance the performance of an on-site septic tank or connected STEP?

Based on research by NC State University scientists, the Orange County Director of Environmental Health does not recommend any additives for STEPs or septic tanks. The bacteria needed for decomposition of the tank solids are naturally present in wastewater. **The addition of septic system treatment products does not eliminate the need for periodic pumping to remove solids.** See excerpt below from NC State Extension Services below.

https://content.ces.ncsu.edu/septic-systems-and-their-maintenance

Are Septic-Tank Additives Necessary?

No. These products include biologically based materials (bacteria, enzymes, and yeast), inorganic chemicals (acids and bases), or organic chemicals (including solvents). Research conducted to date on three of these types of bacterial additives has not shown any reduction in the rate of solids buildup nor increases in bacterial activity in the septic tank. Therefore, they do not seem to reduce the need for regular pumping of the septic tank. Some additive products contain organic chemicals and may even damage the drainfield or contaminate the groundwater and nearby wells.

17) What about "I&I" in the PM wastewater system?

The term "I&I" refers to inflow and infiltration of water into the non-pressurized parts of the wastewater system. By grading around risers and openings to STEP and GP systems, and sealing leaks, the inflow of surface rainwater can be reduced. PM has experienced higher wastewater flows during periods of higher precipitation and this correlation has been attributed to I&I. Homeowners are encouraged to correct any conditions on their properties

that may be contributing to I&I. I&I has a direct impact on operating charges apportioned by OWASA and, therefore, to all PM homes connected to the wastewater system.

18) Why do pumps fail sooner than expected?

The life expectancy of a STEP or GP can be from 10 to 20 years. If a pump fails within the first few years after installation, the most probable cause is an undersized pump or excessive pump run-time due to a leak in the system.

A level IV wastewater Installer (certified by the NCOWCICB – see **FAQ 13 above and definitions below**) is best qualified to recommend and install a replacement pump of the correct size for your system.

19) What is the best way to ensure optimal performance of individual PM wastewater systems?

- Have your system inspected and, if applicable, your septic tank pumped periodically.
- Do not dispose of FOGs (Fats, Oil and Grease) into your septic system (i.e., via toilets or sinks).
- Do not put fibrous products like Q-tips, tampons, tampon holders, dental floss, etc. down the toilet.
- Do not put bleach into a STEP system since the bleach will kill bacterial beneficial to the waste degradation process.
- Do not put solids in a garbage disposal – see **FAQ 15**.
- Check your control panel for moisture and improper sealing.

20) Who regulates or has jurisdiction/responsibility over the various elements of the PM wastewater system?

Pursuant to agreements signed in 1994, OWASA ensures the operation and maintenance of the check valves, collector lines, pump station, and force main to the Kerley Road connection to the Durham City sewer line.

Although OWASA has the technical authority (by written agreement with the PMHOA signed in 1994) to require repairs to private service lines, STEPs and GPs, OWASA

- limits its service to the check valve connection to the private service line of each lot, and
- does not inspect, repair, replace or service connected private service lines, private pumps or control boxes; or monitor the periodic pumping of STEPs.

21) What is a reasonable capital reserve contribution plan to build up money to replace parts (excluding individual systems) of the PM wastewater system?

In 2021 and 2022, the PMHOA and OWASA conducted extensive asset evaluation and analysis of the PM Wastewater System, with the goal of ascertaining a realistic depreciation

schedule and corresponding contribution plan for the capital reserve account (CRA). The current plan assumes a collection rate of $60 per month per connected or eligible to be connected PM lot, which will increase by $10 per month at 3-year intervals. The goal is to avoid future lot special assessments which will be necessary if the CRA is not sufficient to cover actual costs.

Part III
Defined Terms

CRA: Capital Reserve Account, the monthly fee paid by each PM lot owner to OWASA for major repairs to the PM wastewater system

Collector Lines: The 4-inch and 2-inch PVC pipes that generally run along roads in PM from the system check valve box at each connected lot to the pump station (refer to the system plan in Part I).

Private Service Lines: The PVC pipes running from the system valve box to individual effluent pump tank (STEP) or GP system (refer to profile schematic in Part I).

Effluent: Liquid wastewater that flows from a treatment or containment unit.

FOGs: Fats, oils, and grease that can contribute to blockages in pipes and build-up in tanks. FOGs can impact pump operations, requiring additional maintenance.

Force Main: The 4-inch concrete-lined ductile iron pipe running from pump station along Mt. Sinai Road to connection with Durham sewer main at the intersection of Mt. Sinai and Kerley Roads (refer to system plan and profile schematic in Part I).

GP: Grinder Pump. An on-site wastewater conveyance system consisting of a collection tank ("wet well") and grinder pump installed within the tank. Solids are ground and discharged with the liquid wastewater into the homeowner's private service line.

I&I: Inflow and infiltration

NCOWCICB: NC On-site Wastewater Contractors and Inspectors Certification Board, an occupational licensing board created by NC Statute which provides wastewater installer/inspector licenses, with **four levels of installer certification, the highest of which is Level IV. For a list of Level IV installers by NC county see: https://ncowcicb.info/faqs/**

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OCEHD: Orange County Environmental Health Division, headed by the Orange County Director of Environmental Health, Tel: (919) 245-2365 (Victoria Hudson, in 2023)

OWASA: Orange Water and Sewer Authority is a quasi-governmental utility serving Chapel Hill and Carrboro.

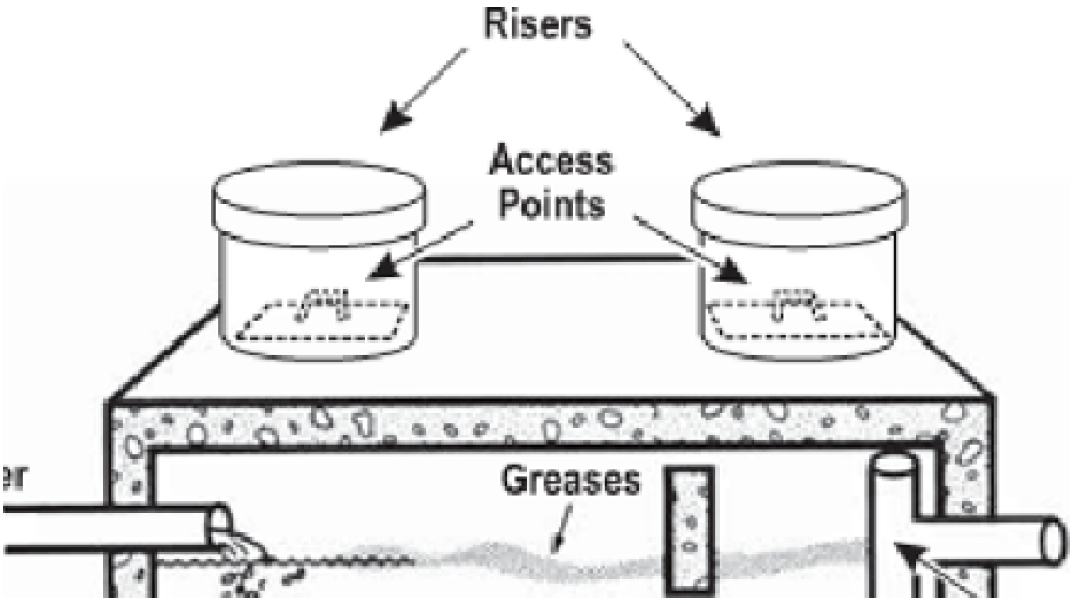
OWASA Committee: a group of PM residents who advise the PMHOA board of directors on all matters relating the PM wastewater system and are chaired by the current President of the PMHOA

PM: Piney Mountain subdivision

PMHOA: Piney Mountain Homeowners Association

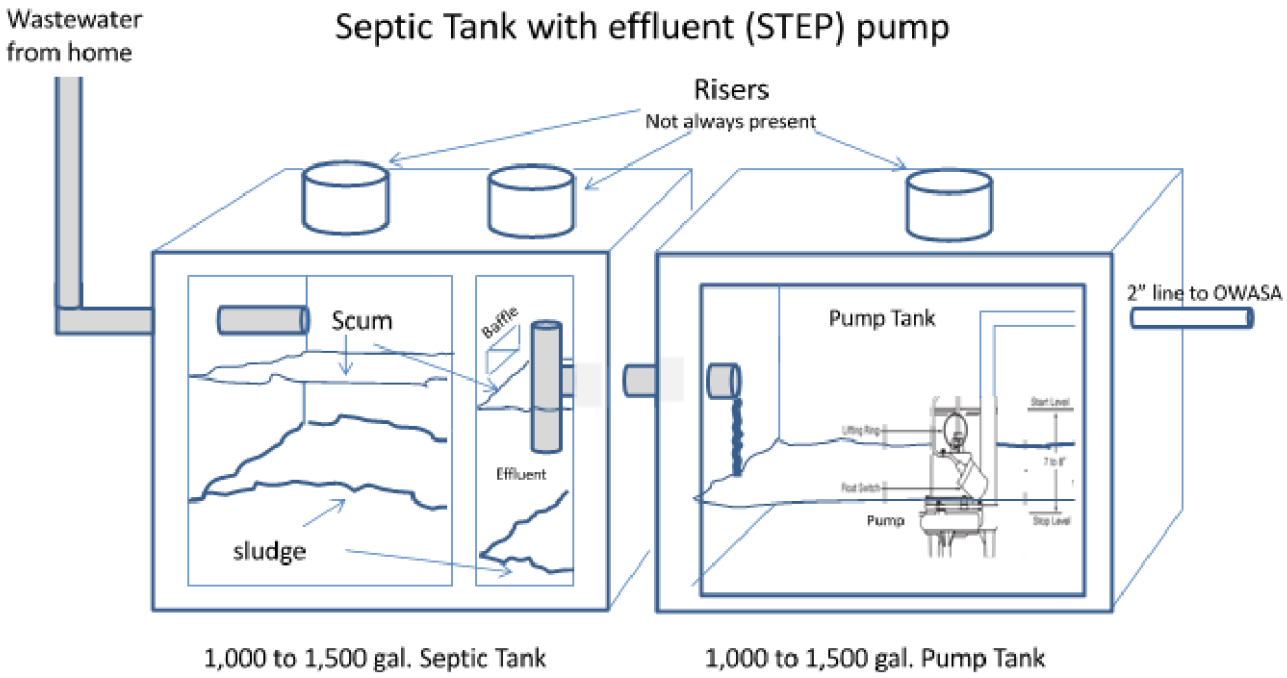
Pump Station: Station where wastewater is collected from all collector lines and pumped into the force main (refer to photo in Part I).

Riser: A riser is an access point at the top of the septic tank. Two are needed, one for each tank section. If a tank does not have one, a riser can be installed (see diagram below).



STEP: Septic Tank Effluent Pump. The STEP systems installed in PM consist of two pre-cast concrete tanks placed in a connected series; the first tank is a typical septic tank, divided by a baffle into two chambers connected by a “Tee.” Fluids travel through the Tee to the other side of

the baffle and then by gravity through a pipe to the second tank containing an effluent pump (STEP). Solids remain in the sedimentation chamber of the septic tank but can migrate to the other chamber and can clog the effluent pump if the septic tank becomes too full (see diagram below).



System Check Valve Box: The housing enclosing the check (“gate”) valve which connects the private service lines on lots to the collector lines running along Taproot and in the cul-de-sacs (refer to profile schematic in Part I).

System Check Valves: Valves connecting the discharge piping from STEPs and GPs to OWASA’s streetside collection pipes (refer to profile schematic in Part I).