Onsite Wastewater Treatment System Operation & Maintenance Plan

For the installation serving the residence at

985 Choke Cherry Lane, Anyplace, BC

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Owner's Responsibilities:

Overview:

The majority of BC homes outside of major urban areas use onsite systems (commonly called septic systems) to treat and disperse their wastewater. These systems can be efficient, cost effective and can protect health and the environment. However, they must be properly planned, installed and, maintained.

Section 10 of the Sewerage System Regulation requires that the owner of a sewerage system:

- Must ensure that a sewerage system on the owner's land is maintained in accordance with the operation and maintenance plan provided by the system planner.
- Must keep records of all maintenance service performed on the system.
- Must ensure that he or she follows all other requirements under the SSR and with local government by-laws.

Record keeping:

Please retain your records including the Health Authority forms, site investigation report, record of design, specifications, the drawings, this owner's manual, and the maintenance plan. Copies of these documents have been filed with the local Health Authority as required. Note that you are responsible to provide these documents to successive owners if you sell the property.

System Owner Safety

Do's:

- Know the location of all access lids and don't bury them or build structures over top, including sheds, sidewalks or driveways.

- If lids are damaged or not secure, immediately call an ROWP Maintenance Provider to replace them.

- Prevent children and pets from tampering with system access lids and other components.

- Follow all safety precautions included within this Operation & Maintenance Plan for your system.

Don'ts:

- Do not attempt to carry out any system maintenance or modifications yourself. It can result in damage to components, cause a malfunction, and possibly create a health hazard.

- Do not allow non-ROWPs or non-Professionals to tamper with or modify the system.

- Do not touch any of the electrical components (other than the alarm silence switch) unless directed to by a ROWP.

- Never climb into, or even put your head into, any portion of the system. Toxic gasses, which are colourless and often odourless, can cause dizziness, shortness of breath, fainting, respiratory damage and even death. There are also other dangers which only experienced professionals are trained to handle.

Monitoring and Maintenance:

The Sewerage System Regulation requires that owners ensure their systems are maintained by authorized persons according to the maintenance plan provided.

The recommendation in the Ministry of Health Services Sewerage System Standard Practice Manual for monitoring and maintenance of your Type 1 treatment system with pressure distribution is **6 months after start up and every 2 years thereafter.** This will include:

- assessing all components of the system for safe, leak free, and efficient operation
- testing of the pumps, float switches, high level alarms
- testing the control panel and comparing the recorded data with the design requirements
- assessing the tanks to check for plugging of the inlet or outlet baffle; checking for excessive fats, oils, and grease; and to determine whether pumping out of solids is required, structural integrity
- cleaning the effluent filter at the outlet of the septic tank
- flushing the forcemain and pressure laterals
- assessing the treatment and dispersal efficiency of the dispersal area including "squirt testing" and pump cycles
- and other maintenance and monitoring tasks as required

This maintenance can be done by any Professional or Registered Onsite Wastewater Practitioner Maintenance Provider or the property owner under their supervision. The maintenance provider will need the maintenance plan and the as-built drawing.

Overview of the System:

An overview of the system is included here to ensure your familiarity with the system. 'Keeping an eye out' for leaks or other problems, knowing what to do if the pump fails, and how to protect the system - all depend on your knowledge of the system. Please refer to the drawings included in your package of documents, and take the time to familiarize yourself with the system. Please don't hesitate to contact me (the Planner) or your Maintenance Provider if you have questions.

The septic tank:

Wastewater from the plumbing system of your house flows into a concrete septic tank with two compartments. Heavier solids settle to the bottom of the first compartment. Lighter materials including fats, oils, and grease, form a layer at the surface. The wall separating the two compartments has an opening approximately 1/3 of the height below the liquid surface to allow flow only from the 'clear zone'. This prevents most of the material of the bottom and top layers from entering the second compartment.

Monitoring the buildup of these layers is an important part of maintenance. Solids must be pumped out before increased levels cause solids to 'carryover' to the second compartment and the following components of the system as they are not intended to treat or disperse solids. Another side effect of not pumping out the tank is that the increased solid layers reduce the liquid capacity and retention time in the tank severely reducing the treatment abilities of the septic tank. Measuring these layers during maintenance ensures you only pay for tank cleaning services when required. **Typically, pumping of solids is required every three years.**

The outlet pipe baffle of the septic tank is fitted with an effluent filter screen to further reduce the quantity of solid materials leaving the tank. **Assessing and cleaning the effluent filter** (without allowing solids to flow into the pump chamber while the filter is removed) is an important part of the scheduled maintenance. **A clogged filter will cause sewage to back up into the house.**

The pump chamber:

The second tank is a pump chamber with a ½ Horse Power 115 Volt effluent pump controlled by float switches and a programmable control panel. As the level of liquid rises, the "on" float activates the pump to send the wastewater under pressure to the dispersal field. The pump cycle lasts for approximately one minute, after which the "off" float switch turns off the pump until the level rises again. A control panel is located on the post adjacent to the pump chamber, with wiring to the floats and electrical supply to the pump.

The pump chamber is also equipped with a float that activates a high level alarm to indicate failure of the pump or other problem causing the liquid level within the pump chamber to rise excessively. The audible and visual alarm is part of the control panel.

If the alarm is activated, be aware of the limited reserve volume and stop flows to the system before exceeding the reserve volume to avoid sewage backing up into the house, … and call the emergency contact or any maintenance provider. The pump chamber has a reserve volume of 682 Liters (150 imperial gallons) to allow for limited use in the event of a power failure, or malfunction of the pump. **The alarm can be silenced by a switch mounted to the control panel (outer left side).**

Note that in the event of a power failure, neither the effluent pump or the high level alarm will operate, but the community water system will continue to supply water to your house and any water you use will continue to flow to the wastewater system. **Sewage will back up into the house if you exceed the reserve capacity in the pump chamber**. Also note that when power service returns, the high level alarm may sound until the effluent pump lowers the liquid level in the pump chamber. This may take a few minutes.

The dispersal field:

(located approx 22m west of the house. See drawing.)
Onsite wastewater systems are intended to evenly distribute wastewater to soil, where biological activity and the filtering effects of soil provide treatment. Adequate depth of dry, permeable soil is required to ensure proper treatment. This lot has limited soil depth, therefore the system is built in a raised sand mound that increases the depth to an appropriate height. Wastewater is evenly distributed to the sand mound by a shallow system of pressurized pipes.

There are three pressurized, 1 ¼ inch lines, approximately 1m apart in a drain rock dispersal bed (2.7m x 13m). Effluent is pumped through small holes drilled in these lines (approx 63 holes) to evenly distribute the effluent over the entire area of the dispersal field.

A 2" pressurized force main from the pump chamber feeds a 2" manifold at the centre of the dispersal field. This manifold includes 6 ball valves leading to the 1 ¼" pressure laterals. Each lateral can be shut off independently in the event of leaks or to facilitate flushing for maintenance. Each of these valves is enclosed in a 6" round plastic access "box" installed flush with the surface.

Each of the pressurized dispersal laterals are fitted with a threaded cleanout cap at the far ends of the dispersal field. Each of these cleanouts are enclosed in a 6" round plastic access "box" installed flush with the surface. Pressure testing these lines for even distribution, and flushing to reduce solids build up is part of the bi-annual monitoring and maintenance.

Note that greener grass "strips" on the top surface of the dispersal area are normal. This is caused by increased water and nutrients dispersed to the soil from the pressure distribution pipes, but unusually green and active growth in other areas or if the growth if very uneven, could indicate a leak in the piping system or several other issues. Unusual grass growth at the edges of the mound, or over the forcemain trench from tank to mound, or in the vicinity of the tanks - could indicate a leak or other problem. Wet or "spongy" grass anywhere in the system generally indicates a problem. **Leaks or any sign of effluent pose a serious health risk and must be immediately reported and repaired.**

Do's and Don'ts

The long lifespan of the system, prevention of health hazards, and minimization of impact on the environment depend on your proper use and maintenance of the system. Generally, proper use of the system involves:

1. promoting bacteria growth by avoiding products and chemicals that will reduce or eliminate bacteria growth
2. minimizing non biodegradable material
3. minimizing fats, oils, and grease
4. not overloading the system beyond its capacity to treat the sewage.
5. **Ensuring that maintenance is carried out every 2 years or sooner.**

Here's a list of tips to ensure proper treatment and the long life of your system:

- Avoid, reduce, and control the use of disinfectants, bleach, and anything that kills bacteria. Limited quantities of these products are generally OK, but avoid excessive use.

- Do not use Drano or Liquid Plumber style products to clear clogged plumbing – they are very damaging to bacteria.

- Do not put into the system: lubricating oils, greases, other petroleum products, antifreeze or other automotive fluids, chemical wastes, toxins, paints, solvents, thinners, caustic cleaners, pesticides, herbicides

- Avoid, reduce, and **control the quantities of fats, oils, and grease** from food preparation that enter the septic system. They are difficult to break down in the septic tank, cause effluent filter clogging, and can drastically shorten the life of the system by clogging the sand and soil in the dispersal system. Limited quantities are OK, but it is important to use strategies to reduce - like collecting fat from fried foods, oil from deep frying, etc., in coffee cans or similar – and disposing in garbage.

- Avoid putting non-biodegradable material into the system, or other materials that decompose slowly. Quicker buildup of solids in the tank will increase the required frequency of pumping out the system.

- Objects like the following should not be put into the system: bandages, strings, rags, cotton balls, coffee grounds, paper towels, condoms, disposable diapers, cigarette butts, plastics, metals, kitty litter, and other materials that do not decompose easily.

- Hair can cause thickening and matting of the scum in the tank by entangling other solids, and can cause clogging of the effluent filter. Laundry lint poses a similar problem. Some hair and lint is unavoidable, but minimizing the amount of hair and lint entering the system is advisable. Dispose of hair and laundry dryer lint in the garbage to the degree that is practical.

- In-sink garbage disposal units increase the organic matter entering the system and should not be used unless the system is designed and sized to accommodate the increased organic loading. Composting or disposal of waste food in the garbage is preferable to disposal in the sewage system.

- Be aware of the volume of wastewater going into the system. Try to "even out" the flows when feasible. Doing the entire week's laundry for a large household all in one day, for example, can overload the system, negatively affecting it's treatment ability for that day and some time to come. If other uses are also high, the level of treatment can be greatly reduced. Failure of the distribution system to safely disperse effluent can also result.

- **Septic tank additives can do more harm than good. The experts consistently advise <u>AGAINST their use….</u>** Enzymes work by breaking up the solids in a septic tank. These solids then become suspended in the wastewater and then build up in the soil. Soil clogging and drastically reduced life of the soil dispersal system will result. Septic tanks are intended to promote settling and retention of solids to avoid soil clogging – additives work against this. Bacterial additives contain insufficient quantities of the correct bacterial to affect the operation of a system.

- Keep traffic and heavy loads off the distribution area, and the tanks.

- Don't build any structures over any part of the system.

- Don't allow heavy farm animals on the system – they compact soil and can damage components.

- Keep surface flows of water away from dispersal field and tanks.

- Remember that maintenance, troubleshooting, and repairs require quick and easy access to tank lids, distribution system valves and cleanouts. Keep these readily accessible.

- Grow vegetation with shallow root systems (grass is good – trees are bad!).

<u>Do not overload the system:</u>

Your system is designed for peak flow volume of 1363L (300gallons) per day of residential sewage. Average flows in any given week should not exceed 50% of the peak volume design flow, average of 681L (150G) per day. These design flows are a conservative allowance for the expected flow under normal residential use of your 3 bedroom home and are also based on the information you provided in your usage form.

Prolonged flows in excess of this design capacity, or peak flow events that significantly exceed the design flow will "overload" the system. This can cause premature malfunction of the system, breakout of sewage to the surface, can create hazards to health and harm

the environment. Health regulation violations and liability can result - with the responsibility on the property owner.

Although you are not expected to accurately determine and monitor these flows, as the owner, you are advised to use a common sense approach to avoid overloading the system. The control panel includes features to measure flow, and your Maintenance Provider will determine if your actual flow volume and strength is appropriate for the system as designed and installed. If you make changes to the house or other buildings that will increase the sewage flows, the design must be reviewed and the system improved and/or enlarged to accommodate the changes. Examples include: additional bedrooms or washrooms, starting a B and B operation, or other home based business with increases to the number of people using the system or to the size of the building.

Introducing "high strength" sewage, industrial or commercial sewage, or generally causing materials and chemicals harmful to bacteria to enter the system can severely reduce the treatment ability of the system, with potential impacts to health and the environment, and malfunction or reduced life of the system. If you use the system in ways that cause significant changes to the "strength" and characteristics of the sewage, the design must be reviewed and the system improved and/or enlarged to accommodate the changes. Examples include: adding water softener systems, adding in-sink garbage disposal units, commercial or industrial uses with discharge to the septic system, some hobbies like photographic darkrooms, wine and beer making, etc …anything that will alter the sewage flow anticipated by the original design.

See the attached Source Control Policy for detailed information on effluent quality and quantity requirements.

Emergency Actions

The following is a list of problems with advice on how to deal with them.

Yard floods can clog filters, damage components, and push organic matter from the septic tank into the dispersal area or cause sewage to backup into the home.

- If there is a risk of flooding, go to the electrical panel and turn off the circuit breaker that provides power to the pumps and treatment plant. *Do not* turn the power back on until the risk of flooding is over.

- If flooding does occur, contact the Maintenance Provider immediately. The MP may require an electrician be brought in to verify all electrical components are safe and pose no risk of electrocution.

Power outage lasting more than a half-day: Some onsite systems have components that require electricity to operate, such as pumps, treatment plants and control panels. If a municipal water supply serves the property and occupants continue to use toilets, bathing or otherwise generate a wastewater, the onsite system will not reality handle it.

Newer onsite systems have a reserve capacity to allow limited use in the home that can range from ½ to a full day, but older systems may be much less.

Since the system's key components will not be operating, this can result in clogging of filters, damage to components, back-up into the home, or flooding of the dispersal area when power is restored.

- Turn the power off to the pumps and treatment plant by tripping the circuit breaker on the panel and do not turn them on until power has been restored and no dimming or surges are evident. Power fluctuations can damage electrical components in the system.
- Limit the use of water to essential needs only.
- If the system has a high-level alarm installed, it may sound once the power is restored and the pumps are activated, but the alarm should turn off after several minutes.
- Contact the Maintenance Provider immediately for advice on how to prevent or limit damage, or if the high-level alarm does not silence after several minutes.

Sewage backup: Sewage can be a health hazard. If sewage backs up into your home:

- Stop using water immediately.
- Prevent wastewater from spreading further into the home by using towels to create a dam.
- Keep children and pets away from sewage and use rubber gloves and rubber boots when in the area.
- Contact your insurance company immediately to determine if they want a restoration company to perform the cleanup. If you perform the cleanup, use bleach to disinfect the area.
- Contact your local Health Authority for more information.
- Contact the Maintenance Provider immediately. The MP will advise you on matters such as cleaning the components.

Alarm on the control panel sounds:

- Press the alarm silence button on the control panel and note which warning lights are displayed (usually red or amber coloured).
- Contact the Maintenance Provider immediately. Provide details so the MP can diagnose what the likely problem is and can bring the appropriate equipment or replacement parts.
- Follow Maintenance Provider instructions for the time between your first call and their arrival.

Alarm on the box beside the control panel sounds:

- Push alarm silence button on the box.
- Contact the Maintenance Provider immediately and follow their instructions.
- Do not silence the alarm and ignore. The alarm is intended to warn of a problem developing in order for further action to be taken quickly.

Emergency Contact:

Contact myself or any Maintenance Provider for any other concerns including leaks, effluent observed on the ground or in ditches etc., or regarding anything you see that could cause a health hazard. Feel free to contact me with any questions or concerns.

Your name home office: 250 123 4567, cell: 250 123 4567

Tank cleaning services will be able to remove wastewater during an emergency. One local company is **Your City Septic Tank Service 604 723 8513**.

Be sure to have your system maintained every 2 years or sooner.

For The Maintenance Provider

Prepared April 13, 2009
Recommended frequency of monitoring and maintenance for this system is 6 months after start up, and then every 2 years.

Please see the drawings, specifications and design rationale attached.

Feel free to contact me for copies of drawings, documents, digital pictures, or if you have any questions.

Summary of Relevant Information:

- tanks are approx 6m west of southwest corner of house – see drawings
- dispersal bed on sand mound is approx 22m west of house – see drawings
- type 1, pressure distribution to a sand mound with a 2.7m x 13m drain rock dispersal bed, centre feed manifold, with valves (6) at proximal end, and cleanouts (6) at distal ends of 1 ¼" laterals, all in 6" plastic lawn boxes
- pre cast tanks: ABC PreCast 1000G two compartment septic tank with effluent filter, and 275G pump chamber with control panel, weighted floats on float hanger, valve, union.
- ---------- series control panel mounted at pump chamber… is simplex, demand dosing, with high level alarm, and flow monitoring by elapsed pump run time and cycle count
- Flow monitoring should compare to DDF of 1363L/day, average flow not to exceed 681L/day
- Effluent pump is ---------- (115V, 1/2 hp), warranty by ------, installed April10, 2009.
- Required flow to ensure even distribution is 47 usgpm, total dynamic head is 20'

Commissioning Details: (MP to ensure these settings are maintained)

- dispersal field squirt height was approx 178cm (70") measured from the threaded test cap at the lateral cleanout (approx 200cm, 79" from lateral) at commissioning
- float settings and volumes (measured as height of liquid from bottom):
    - Volume of liquid in the tank is approx 12L per cm of liquid height, total internal height is 137cm, total volume is approx. 1585L (350G), the entire tank (to underside of lid) is used for design calculation of reserve since the installed height of lid is below the septic tank outlet.
    - alarm on liquid height is 80cm (31") … providing at least 682L (150G) of reserve above alarm on position to top of tank
    - pump on at 63cm (25") … providing dose of approx 170L (55G)
    - pump off at 49cm (19") …providing permanent minimum liquid height of 49cm (19")
- pump run time is approx 55 seconds, run amperage is 9 amps
- at commissioning the control panel pump run cycle count was 3 and alarm count was 2

Planned Maintenance and Inspection: (6 months after start up and then every 2 years)

Maintenance Provider to include the following checks:

- confirm continued protection of field and tanks: no structures, no heavy traffic, appropriate vegetation and landscaping, no groundwater or surface flows that could interfere with proper operation of dispersal field
- confirm leak free conditions of all components, and confirm no breakout of effluent
- check security and safety of tank accesses
- confirm limited solids carryover to 2nd compartment and little or no solids to pump chamber
- check condition and proper operation of inlet and outlet baffles
- clean fats, oil, and grease from inlet baffle
- inspect and clean the effluent filter at outflow of septic tank
- measure to confirm that tank solids combined volume of sludge plus scum is one third or less of total first compartment volume – pump out only if required
- look for signs of exceeding recommended flows, excessive household use of materials harmful to bacteria, unusual solids build up/non biodegradable materials, assess fats, oils and grease … discuss with owner as indicated/ required
- inspect electrical connections/components for corrosion/condition/safety
- check pump chamber float settings for minimum permanent liquid height, dosing volume, alarm on position, reserve volume as listed on previous page
- check flows recorded at control panel with cycle count multiplied by dose volume of 170L, not to exceed average daily flow of 681L/day
- confirm proper operation of alarm
- inspect pump chamber effluent for color and suspended solids, perform sampling if indicated/required to confirm type 1 standard
- flush out manifold and then each lateral individually
- install temporary threaded caps with 3/16” orifice at cleanouts and check to ensure that squirt height is similar to height at commissioning of 178cm (70”) plume height from elevation of threaded cap at lateral cleanout.
- inspect monitoring wells in dispersal bed at infiltrative surface for biomat and effluent mounding/saturation.

Source Control Policy:

Your system is designed to adequately treat sewage with strength and constituents typical of residential use – not commercial or industrial uses. The volume is also a key factor since the system is designed for a specified maximum flow. It defines acceptable parameters for residential strength sewage. If these parameters are exceeded, potential liability will result for the owner.

The residence is permitted to discharge up to a design flow rate 300 Imperial Gallons per day of effluent into the system at a peak flow; however, the average flow to the system over any week period must not exceed 150 Imperial Gallons per day (50% of design flow rate).

The system is intended for use with normal residential effluent. There are various quality requirements for the effluent discharged from the home to the system, and it is the owner's responsibility to ensure that these are complied with. It is recommended that owners ensure that their liability insurance covers them for liability associated with discharge of effluent that causes damage to the environment. The following should not be discharged:

1. Any sewage in a volume or flow rate greater than shown above;
2. Any sewage in flow rate exceeding 15.4 Imp. Gallons per minute;
3. Any sewage in flow rate exceeding 100 Imp. Gallons per hour (8 times daily design flow rate per hour, *e.g., 300/24 x 8 = 100 IG/hr*);
4. Any liquid or vapor having an average temperature higher than 50°C;
5. Any flammable or explosive material;
6. Any garbage;
7. Any metal, plastic, wood or other solid or viscous substance capable of causing obstruction or interference with the proper operation of the sewerage system or treatment process;
8. Any sewage or industrial waste having a pH limit less than six (6.0) or greater than nine and a half (9.5);
9. Any sewage or industrial waste containing any of the following materials in excess of the indicated concentrations:

B.O.D.5	300 mg/L
Suspended solids	350 mg/L
Total sulfide expressed as H2	5 mg/L
Phenolic compounds	2 mg/L
Oil and grease	100 mg/L
Total cyanide expressed as HCN	0.2 mg/L
Total copper expressed as Cu	1.0 mg/L
Total chromium expressed as Cr	1.0 mg/L
Total nickel expressed as Ni	1.0 mg/L
Total lead expressed as Pb	1.0 mg/L
Total zinc expressed as Zn	1.0 mg/L

Total cadmium expressed as Cd	.05 mg/L
Total phosphorus expressed as P	15.0 mg/L
Total arsenic	0.5 mg/L
Total mercury	.006 mg/L
Total silver	1.0 mg/L

"B.O.D.5" (denoting biochemical oxygen demand) means the quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedure in five (5) days at 20°C, expressed in milligrams per liter.
"pH" means the logarithm of the reciprocal of the weight of hydrogen ions in grams per liter of solution and denotes alkalinity or acidity.

10. Any water or waste containing a toxic or poisonous substance capable of constituting a hazard to humans or animals, or any water or waste containing substances in such concentrations that are not amenable to treatment or reduction by the sewage treatment process employed, or are amenable to treatment only to such a degree that the sewage treatment plant effluent and sludge cannot meet the requirements of any other agency having jurisdiction over discharges from the system, or which would damage the dispersal field soils (this would include such items as excess chlorine bleach, excess sodium, disinfectant cleaners, drain cleaner, photochemicals etc);

11. Any substance that when concentrated in sewage treatment plant, effluent disposal fields, or in sludge, could result in a contaminated site (this would include paints and solvents);

12. Rainwater runoff from the surface or from roofs etc, storm or surface water, water from swimming pools or hot tubs;

13. Grease, oil, solvents etc;

14. Flushing water from water softeners;

15. Waste from Garburators.

Declaration

This onsite sewerage treatment system and operation and maintenance plan are consistent with Standard Practice as set out in the Sewerage System Regulation and BC Standard Practice Manual version 2.

File #:

Planned by:
Name
Company Name
Mailing Address
Contact Numbers

Installed by:
Name
Company Name
Mailing Address
Contact Numbers