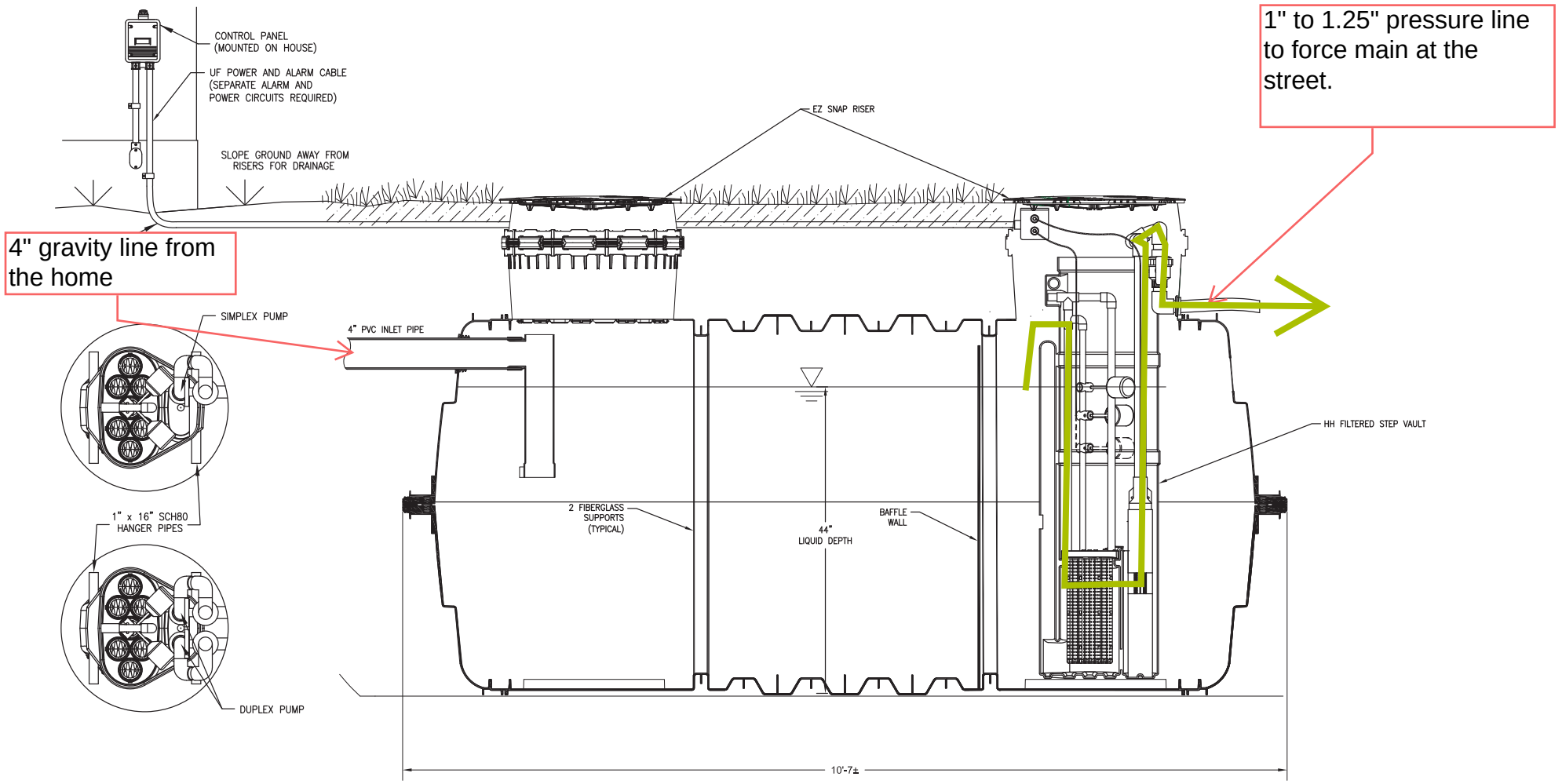
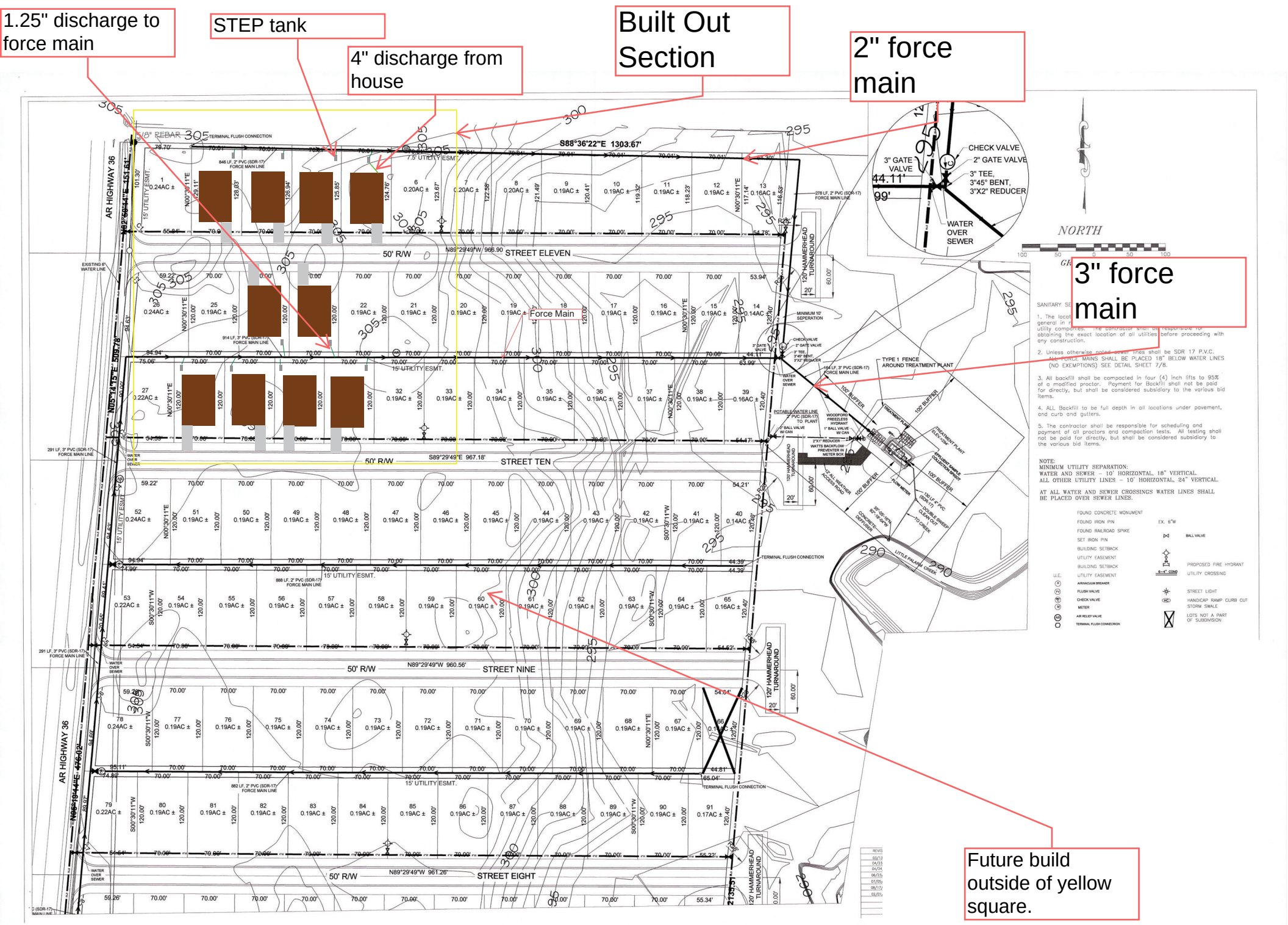
DRAWING REVISIONS				
LTR	BY	DATE	ECO #	DESCRIPTION
A	JTM	06/26/23		RELEASE

Single Family STEP (septic tank effluent pump) Unit



DRAWING DESCRIPTION: HH STEP IN W/RISER	NUMBERS ENCLOSED IN A CIRCLE, Ⓘ, ARE CRITICAL TO QUALITY (CTQ) ITEMS. THIS INDICATES A CRUCIAL SPECIFICATION THAT MUST BE ROUTINELY VERIFIED.		
TOLERANCES: X ±~ XXX±~ XX ±~ ANGLES ± ~ XXX ±~ FRACTIONS ± ~	© COPYRIGHT 2023	ELECTRONIC SCALE: 1X DO NOT SCALE PRINT	PART NUMBER: ~ / PART REVISION: ~
DRAFTER: J.MCFARLAND / DATE: 06/26/23	APPROVED / DATE:	EXCEPT AS NOTED DIMENSIONS ARE IN INCHES. SHEET: 1 OF 1	DRAWING NUMBER: SK3416


1.25" discharge to force main
STEP tank
4" discharge from house
Built Out Section
2" force main
3" force main
Future build outside of yellow square.
Force Main
AR HIGHWAY 36
STREET ELEVEN
STREET TEN
STREET NINE
STREET EIGHT
S88°36'22"E 1303.67'
N89°29'49"W 966.90
S89°29'49"E 967.18'
N89°29'49"W 960.56'
N89°29'49"W 961.26'
50' R/W
15' UTILITY ESMT.
7.5' UTILITY ESMT.
TERMINAL FLUSH CONNECTION
120' HAMMERHEAD TURNAROUND
CHECK VALVE
2" GATE VALVE
3" GATE VALVE
3" TEE, 3"45° BENT, 3"X2" REDUCER
WATER OVER SEWER
TYPE 1 FENCE AROUND TREATMENT PLANT
NORTH
SANITARY SE
NOTE:
MINIMUM UTILITY SEPARATION:
WATER AND SEWER – 10' HORIZONTAL, 18" VERTICAL.
ALL OTHER UTILITY LINES – 10' HORIZONTAL, 24" VERTICAL.
AT ALL WATER AND SEWER CROSSINGS WATER LINES SHALL BE PLACED OVER SEWER LINES.


94,000 gpd
sewer plant
3” PVC
trunk line
2” PVC force
main
W Bower Blvd
Oxford Bend
Hwy 45
Brookwater Ln
Waterford Dr
Riverwater Ln
Riverfront Ln

COMPARATIVE ANALYSIS STEP SYSTEMS VS GRINDER PUMPS

It is important to understand that each home produces raw waste. The effluent from both allows the collection system to be designed the same way as a water system. Small diameter PVC pipe is laid in shallow trenches. Infiltration problems are eliminated, and hence, treatment plants can be smaller; lift stations and manholes are not required.

A STEP system begins its processes by separating raw waste into solids and liquids. STEP effluent quality (average TSS 29, BOD5 129 is much better than grinder pump sewage, reducing the biological load on the treatment plant. The STEP design utilizes a simple water pump and low water pressure to move the effluent. An electrical control box, mounted outside the home, monitors a set of sealed floats (switches) which triggers the pumps to turn on. When the effluent tank reaches its capacity, the control panel turns the pump on and then off again when the pump out is complete. Because only liquids are being moved, the simple water pump used is less costly and relatively maintenance free. The normal life of a STEP pump is 7-10 years with a replacement cost of $750.

In a grinder pump system a cutting mechanism chops the solids into smaller pieces and mixes it with the liquid waste, creating fine slurry that passes thru the pipes. The effluent quality of the slurry is much higher than that in a STEP system because there is no removal of solid and hard waste. A grinder pump operates in a highly corrosive raw waste environment with no separation of solid waste or liquids. For this reason, grinder pumps tend to use more power and are more expensive. The average life of a grinder pump is 3-5 years with a replacement cost of $1800-$2000

In the event of a power outage, your STEP system will store wastewater up to five days if you limit your water use. The reserve capacity varies depending on the size of the tank and the water usage. The STEP tank is typically 1000 to 1250 gallons. Several check valves placed at strategic points within each STEP system prevent effluent from reentering the system or home.

A grinder pump system consists of a small tank capable of holding approximately 70 - 250 gallons (capacity varies with models) of water and sewage. For the average home, this is 8 to 24 hours of capacity of waste and water Grinders use a submersible grinder pumps. While the grinder does not run constantly, the small capacity and the lack of override on the pump means you may not know how much capacity you have when the power goes off. The design requires continuous use and requires a cleanout action and filling of water when left unattended for long periods of time such as vacation or seasonal use.

COLLECTION SYSTEM	UP FRONT COST	OPERATIONS AND MAINTENANCE	RESERVE CAPACITY	PUMP REPLACEMENT AND LIFE
STEP System	$4404.00	Tank pumped every 5-7 years average cost $350.00 Suitable for seasonal use	Up to 5 days	$650 5-10 years
Grinder Pump	Aprox: $6000	No tank to be pumped. Not suitable for seasonal use	1 day	$1800-$2000 3-5 years

AquaTechSystems
DECENTRALIZED WASTEWATER SYSTEMS

Residential STEP System Manual

Operation & Maintenance

October 2024

Section 2: Maintenance Schedule

STEP Systems require periodic maintenance to remain in operational condition. A qualified service technician should carry out the required maintenance. These technicians will not only service the pump unit but can assess the health of the septic tank.

The system contains an effluent filter. This filter will prevent solids larger than 1/16″ from entering the pump compartment. The filter will require cleaning. The cleaning interval is determined by household use patterns. For example, a low water use household with no children may need a filter cleaning and inspection on yearly intervals, but a larger family may require filter maintenance every six months, or sooner. The pump tank and pump should be serviced at a minimum each time the septic tank is pumped. Annual inspections by trained professionals are recommended.

Continual alarm indicator activation between service intervals is a clear indicator that the system is not being serviced often enough. **The alarm indicates a high liquid level and service is required immediately to avoid flooding and back up into the house.**

During filter maintenance, the service technician must perform the following:

- Check the sludge level of the septic tank. The septic tank needs to be pumped if the sludge level approaches 50% of the pump basin inlet height.
- The pump should be removed, cleaned, and inspected. Any defective components should be replaced. Inspect and remove any sand, debris, or mud present in the pump vault.
- Inspect the panel for any presence of moisture in enclosure, loose connections, and general component condition.
- Check for proper location and unobstructed float operation.

Section 3: Standard Maintenance Procedures

These residential pumping systems have been designed to require relatively little attention once all components have been calibrated properly.

NOTE: It is recommended that a small notebook be kept as a log in each panel box to record pertinent information during the maintenance and/or troubleshooting visits.

All components in the residential pumping systems are designed to operate on 115V.

Inspect the levels of sludge and scum accumulation

Note: Proper tank inspection requires the use of a sludge sampling stick common in the septic maintenance and pumping industry. Many manufacturers make such a tool, but a common product name is Sludge Judge.

1. Visually inspect the surface of the water in the septic tank. A normal healthy tank will typically have a layer of scum floating above the effluent surface.
2. Clear a hole in the scum layer. With a sludge sampling device, sample the septic tank near the STEP vault to determine the sludge depth, being careful not to stir the sediment layer on the bottom of the tank.
3. If the sludge level in the bottom of the septic tank near the STEP vault is 18" or more, schedule a service visit for the tank to be pumped, and discuss proper usage habits with the homeowner. Sludge depths may be greater near the inlet side of the tank.

Remove and inspect the pump

1. Disconnect power to both the pumps and alarms.
2. Remove the septic tank riser lid(s) to reveal the pumping equipment.
3. Break loose and unscrew the union connecting the pump discharge line with the rest of the system. Use caution when pulling the two halves of the union apart, as the O-ring seal can become dislodged and fall into the tank.
4. Ensure that there is enough free cord to successfully lift out the pump.
5. Carefully lift the pump and discharge pipe up and out of the pit.
6. Visually inspect the inlet of the pump to ensure that it is free of debris or biological growth. If necessary, spray the pump and inlet down if soiled.
7. After inspection/cleaning, carefully lower the pump back into the pit.
8. Reconnect the union, making sure the sealing O-ring is in place. Tighten hand tight only.
9. Secure all riser lids.
10. Reconnect power to both the pumps and alarms.

Inspect and clean the pump vault filters

1. Disconnect power to both the pumps and alarms.
2. Remove the septic tank riser lid(s).
3. Identify the float tree, carefully dislodge it from the filter handle, and lift out of the pit.
4. Grab the top of the filter handle and shift it toward the center of the pump vault so that the handle is free and clear of the locking notch in the vault.
5. Firmly but slowly pull the filter holder assembly upward until the filters are clear of the vault.
6. Rinse the filters with clean water back into the inlet side of the septic tank. DO NOT rinse the filter debris back into the pump vault.
7. After the filters have been cleaned, reinstall the filter cartridge into the pump vault using firm even pressure until the cartridge is seated completely and the locking knob on the handle can be reinserted into the notch in the vault.

8. Reinstall the float tree, insuring that float movement within the vault is clear.
9. Secure all riser lids.
10. Reconnect power to both the pumps and alarms.

Remove and clean the pump vaults

1. Disconnect power to both the pumps and alarms.
2. Remove the septic tank riser lid(s).
3. Remove and inspect the pump as listed on the previous page. Do not reinstall.
4. Identify the float tree, carefully dislodge it from the filter handle, and lift out of the pit.
5. Grab the top of the filter handle and shift it toward the center of the pump vault so that the handle is free and clear of the locking notch in the vault.
6. Firmly but slowly pull the filter holder assembly upward until the filters are clear of the vault.
7. Slowly lift the pump vault out of the pit. A check valve in the bottom of the vault will allow the contained liquid to vacate the vault.
8. Rinse the pump vault inside and out, then reinstall the pump vault into the tank.
9. Rinse the filters with clean water back into the inlet side of the septic tank. DO NOT rinse the filter debris back into the pump vault.
10. After the filters have been cleaned, reinstall the filter cartridge into the pump vault using firm even pressure until the cartridge is seated completely and the locking knob on the handle can be reinserted into the notch in the vault.
11. Reinstall the float tree, insuring that float movement within the vault is clear.
12. Reinstall and reconnect the pump as explained on the previous page.
13. Secure all riser lids.
14. Reconnect power to both the pumps and alarms.

Check for proper float and sensor operation

1. The high water alarm float should be located approximately 13.5 inches below the top of the tank, and tethered from the float tree in the pump vault approximately 3.5”.
2. The float should be directed toward the edge of the pump vault at 30- 45 degree angles.
3. The On/Off float should be located approximately 12” below the alarm float.
4. The floats should be able to rise and fall without rubbing the edge of the vault.