Troubleshooting Your Prelos or Orenco Sewer

Orenco Systems, Inc.

Our Presenter

Devan Ewing

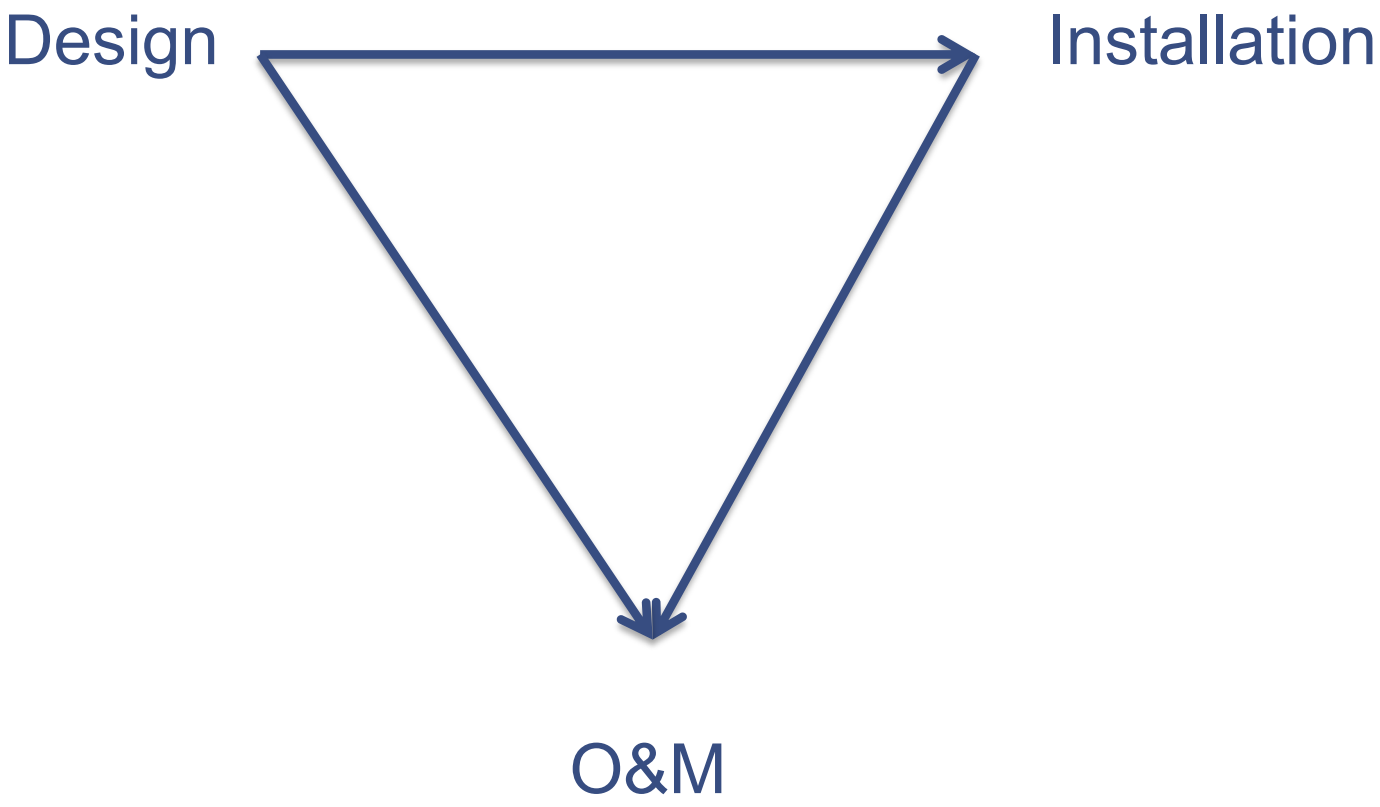
Devan Ewing, is a Systems Engineer with Orenco Systems, a company based in Sutherlin, Oregon, that engineers and manufactures innovative infrastructure solutions. In this role, he provides assistance, customer service, and support to commercial wastewater engineers and wastewater system designers in the south central United States.

Devan holds an Associate of Science engineering degree from Umpqua Community College and is pursuing an ME from Oregon State University. In his spare time, he enjoys hunting, camping, and being with his wife and toddler.

Outline

- Design and Equipment
- Installation Considerations
- Defining Troubleshooting and Identifying the Problem
- Tools
- Reasons for Callouts
- Before Leaving the Site

Troubleshooting Is Dependent Upon:



Design

- Quality design
- Quality equipment
- Standardized equipment
- Proper access

Quality Design

- Meeting or exceeding customer expectations
  - Simple
  - Efficient/cost effective
  - Does the job required
    - Meet regulation requirements

Quality Equipment

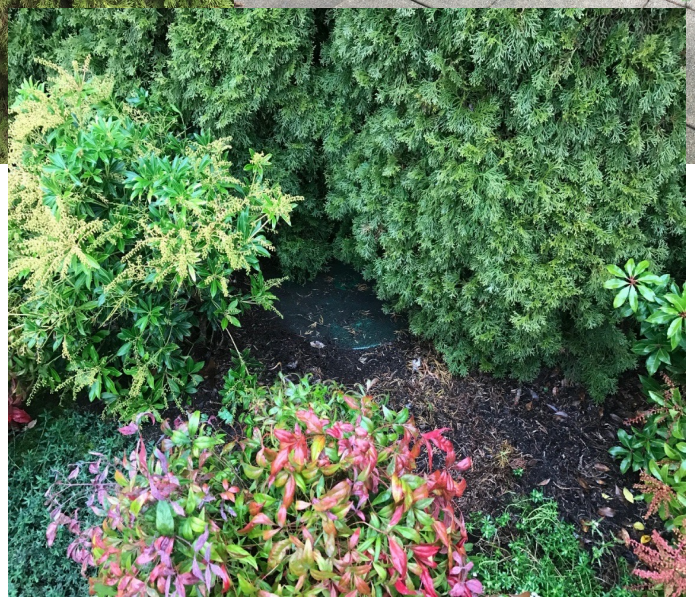
- Performance
- Features
- Reliability
- Conformance – incidence of defects
- Durability
- Serviceability
- Aesthetics
- Perceived quality

Standardized Equipment

- Compatible
- Interchangeable
- Cost effective
- Operator friendly

Proper Access

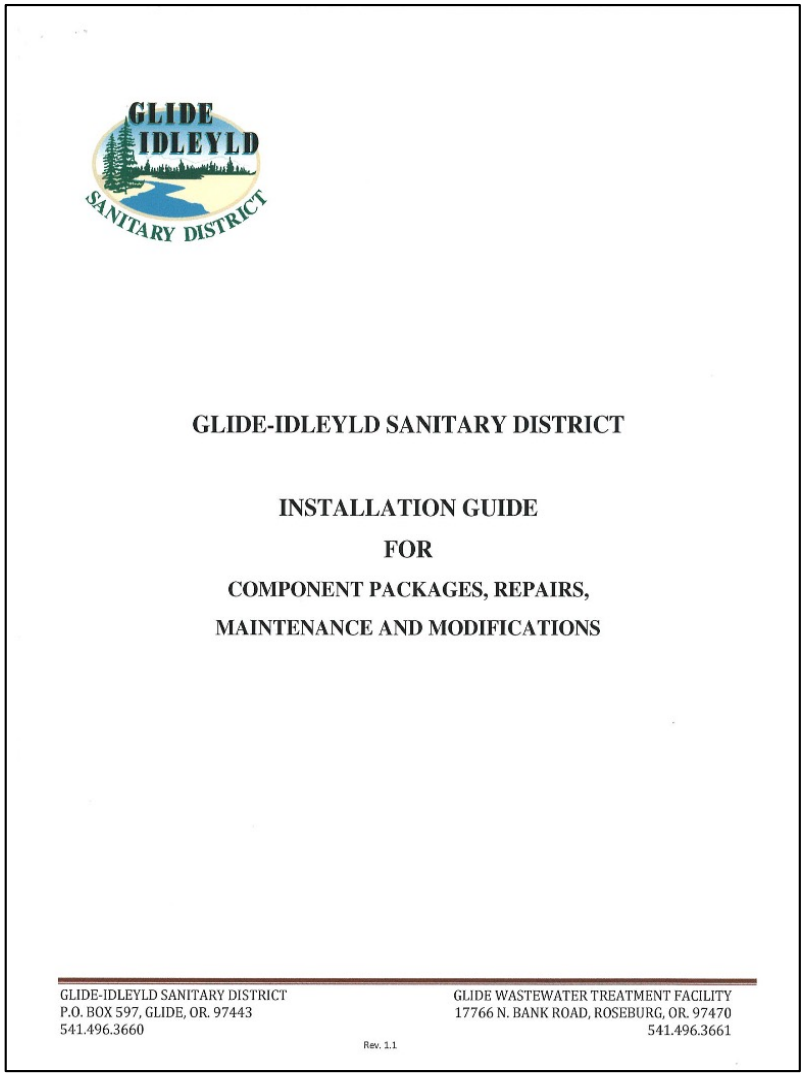
- Trees
- Decks
- Driveway
- Landscaping
- Panel location
- Owner/Renter



Installation

- Inspections
  - Installation oversight: Who?
  - Installation guide
  - Installation checklist

Installation: Guide & Checklist



GLIDE-IDLEYLD SANITARY DISTRICT

INSTALLATION GUIDE

FOR

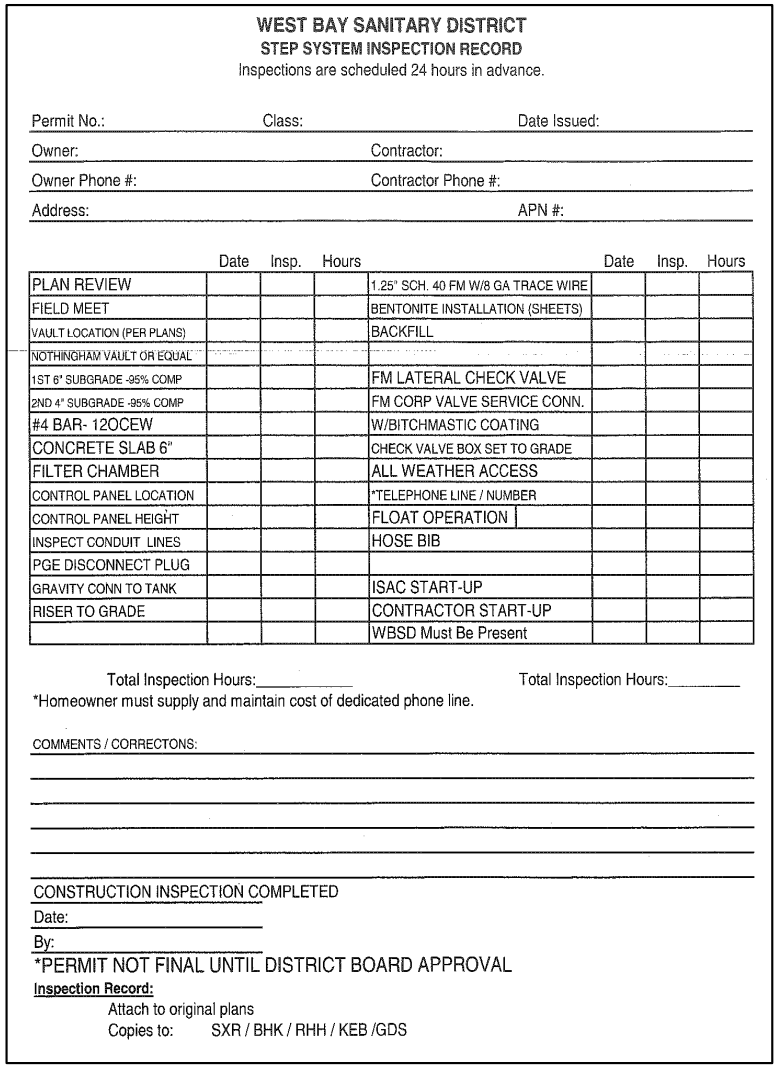
COMPONENT PACKAGES, REPAIRS,

MAINTENANCE AND MODIFICATIONS

GLIDE-IDLEYLD SANITARY DISTRICT
P.O. BOX 597, GLIDE, OR. 97443
541.496.3660

GLIDE WASTEWATER TREATMENT FACILITY
17766 N. BANK ROAD, ROSEBURG, OR. 97470
541.496.3661

Rev. 1.1



WEST BAY SANITARY DISTRICT
STEP SYSTEM INSPECTION RECORD
Inspections are scheduled 24 hours in advance.

Permit No.: Class: Date Issued:

Owner: Contractor:

Owner Phone #: Contractor Phone #:

Address: APN #:

	Date	Insp.	Hours		Date	Insp.	Hours
PLAN REVIEW				1.25" SCH. 40 FM W/8 GA TRACE WIRE			
FIELD MEET				BENTONITE INSTALLATION (SHEETS)			
VAULT LOCATION (PER PLANS)				BACKFILL			
NOTHINGHAM VAULT OR EQUAL							
1ST 6" SUBGRADE -95% COMP				FM LATERAL CHECK VALVE			
2ND 4" SUBGRADE -95% COMP				FM CORP VALVE SERVICE CONN.			
#4 BAR- 12OCEW				W/BITCHMASTIC COATING			
CONCRETE SLAB 6"				CHECK VALVE BOX SET TO GRADE			
FILTER CHAMBER				ALL WEATHER ACCESS			
CONTROL PANEL LOCATION				*TELEPHONE LINE / NUMBER			
CONTROL PANEL HEIGHT				FLOAT OPERATION			
INSPECT CONDUIT LINES				HOSE BIB			
PGE DISCONNECT PLUG							
GRAVITY CONN TO TANK				ISAC START-UP			
RISER TO GRADE				CONTRACTOR START-UP			
				WBSD Must Be Present			

Total Inspection Hours:_____ Total Inspection Hours:_____

*Homeowner must supply and maintain cost of dedicated phone line.

COMMENTS / CORRECTONS:

CONSTRUCTION INSPECTION COMPLETED

Date:

By:

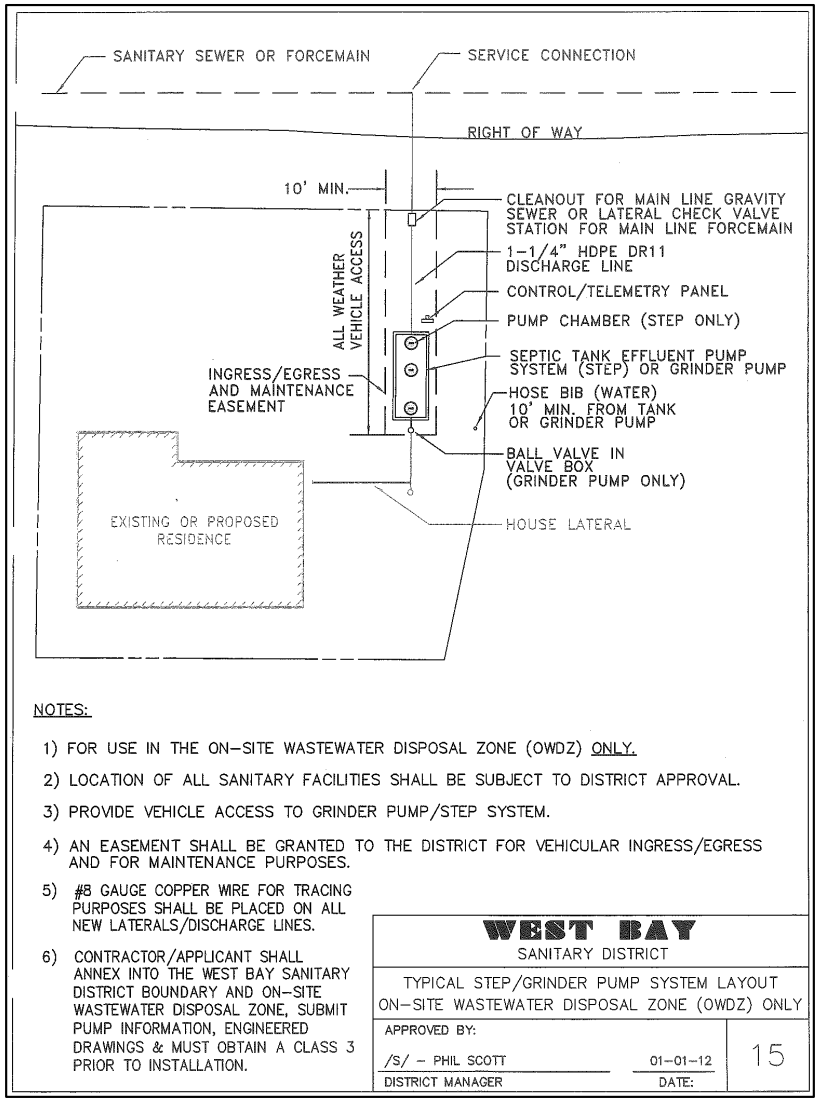
*PERMIT NOT FINAL UNTIL DISTRICT BOARD APPROVAL

Inspection Record:

Attach to original plans

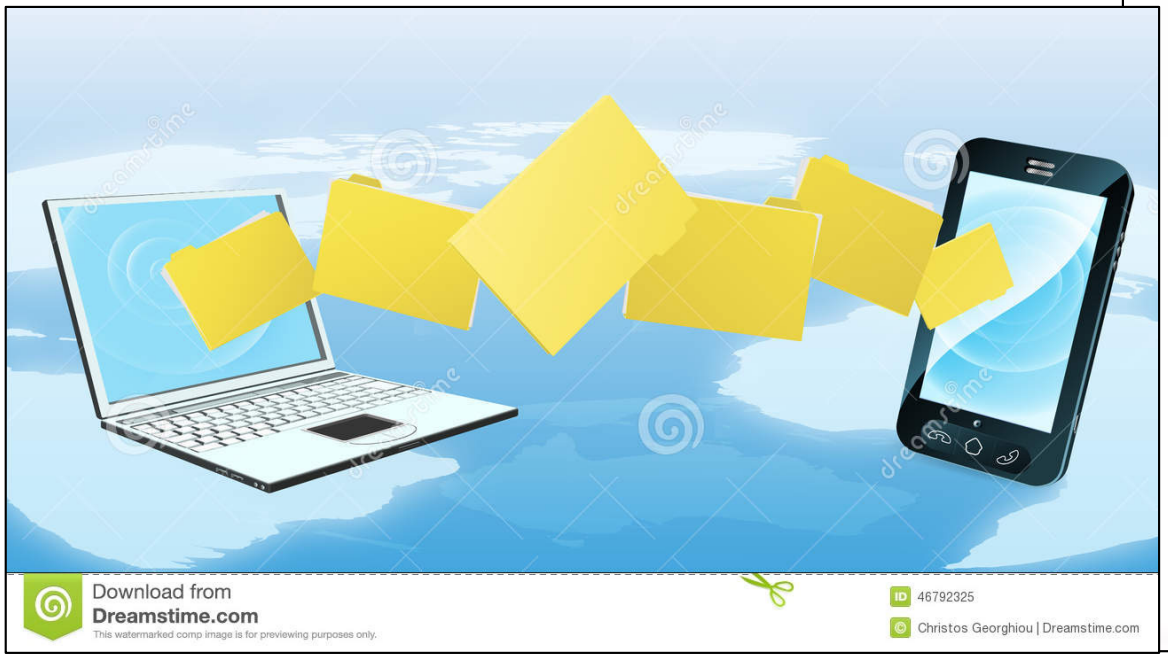
Copies to: SXR / BHK / RHH / KEB /GDS

Installation Requirements: Layout/As-Built

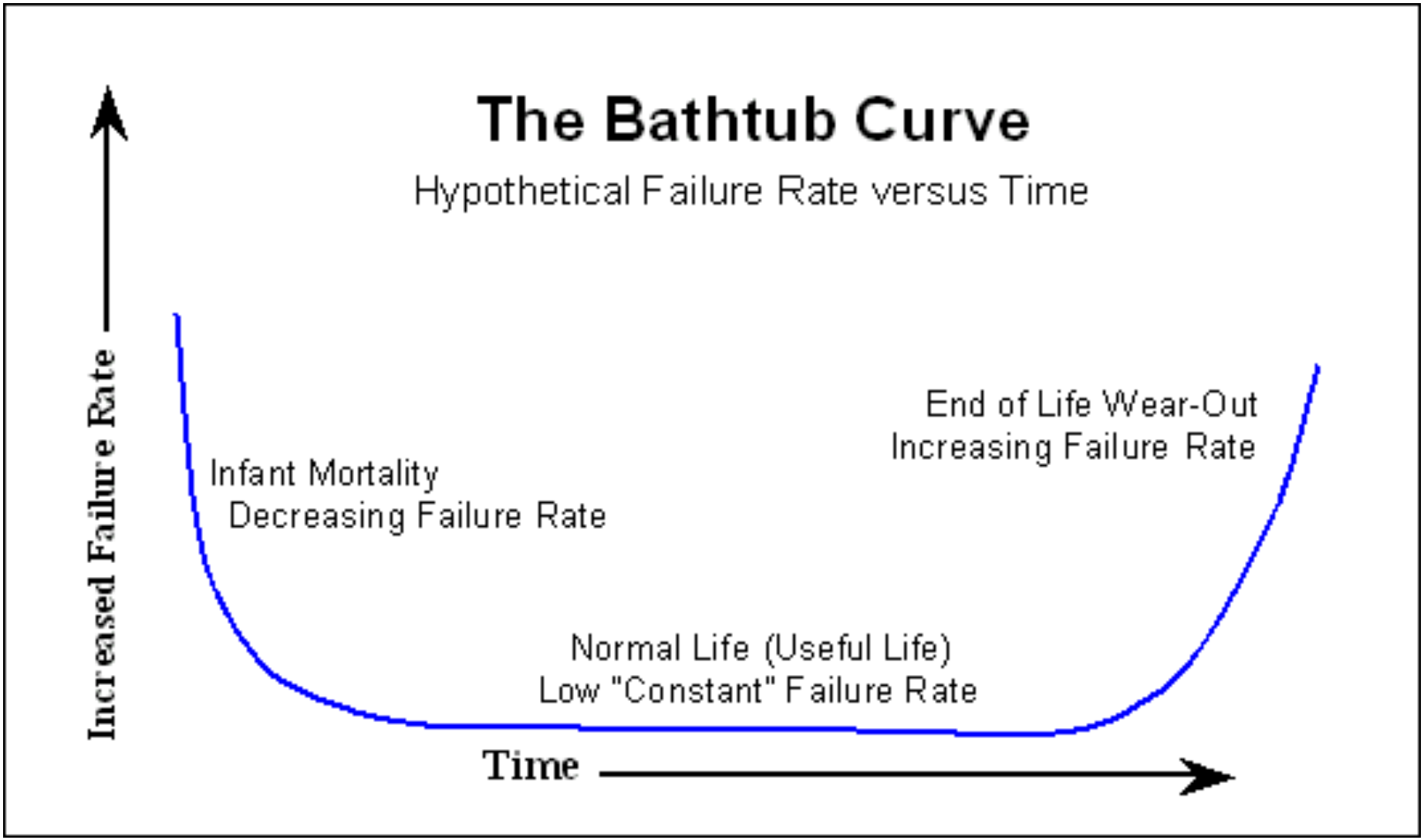


Documentation

- As-built
- Pictures
- File address or lot number



Bathtub Curve



Definition of Troubleshooting

- Form of problem solving
- Logical – based on reason and sound ideas
- Systematic – has order, has a plan, methodical
- Requires identifying or isolating the malfunction or symptoms

Identifying the Problem

- Isolate the specific cause of symptoms
  - Basic principle – start with the most simple and easily tested
  - Use a checklist, chart, or table
- Intermittent symptoms
  - Difficult to troubleshooting due to difficulty to reproduce
- Multiple failures
  - May require adjustments rather than replacements

You Need to Know:

- Systems configuration and components
- How the system operates for peak performance
- Knowing the systems capabilities and capacities
- Knowing the proper troubleshooting process
- Regulatory requirements

Tools for Troubleshooting

- Drill
- Multi-meter
- Screwdrivers
- Channel locks
- Sludge judge
- SMUG
- Spare parts
- PPE
- Field Maintenance Report
- Troubleshooting charts

Field Maintenance Report Form

Date: _____ **Project name:** _____ **Address:** _____ **Operator:** _____

Maintenance Activity	Activity Check-Off/Notes
A) Inspect Control/Alarm Panel	
1) Check pump operations in manual mode	☐ _____
2) Check/record pump amperage and voltage	☐ _____
Pump #1: Voltage at breaker: _____ Amps while pumping: _____	If applicable:
Pump #2: Voltage at breaker: _____ Amps while pumping: _____	Fan voltage at breaker: _____
Pump #3: Voltage at breaker: _____ Amps while pumping: _____	Fan heater voltage at breaker: _____
Pump #4: Voltage at breaker: _____ Amps while pumping: _____	
3) Check timer settings	☐ _____
Recirc: Normal On_____ Off _____ Override On _____ Off_____	
Dosing: Normal On_____ Off _____ Override On _____ Off_____	
4) Record elapsed time meter and counter readings (if applicable)	☐ _____
5) Confirm operation of audible and visual alarms	☐ _____
6) Typical average daily flow _____	
7) Typical average weekly peak flow _____	
B) Inspect/Test Pumping System	
1) Verify no leaks in riser	☐ _____
2) Inspect splice box for moisture and secure connections	☐ _____
3) Verify condition of and correct operation of all floats	☐ _____
4) Verify neat wrap of float cords	☐ _____
5) Pull pump and clean intake screen if necessary	☐ _____
6) Visually inspect recirculating splitter valve and liquid level	☐ _____
C) Inspect Effluent Filters/Pump Screens	
1) Clean as needed	☐ _____
2) Visually inspect and comment on biomat growth	☐ _____
D) Inspect Primary Tank	
1) Inspect liquid depth, odor, scum color, effluent characteristics	☐ _____
3) Measure sludge and scum; recommend tank pumping, if necessary	☐ _____
E) Inspect AdvanTex Filter	
1) Inspect for ponding; assess character and color of biomat	☐ _____
2) Check inlet pressure: _____	☐ _____
3) Verify proper nozzle position, equal spray under nozzles, no clogs	☐ _____
4) Check for odors; adjust recirculating time if necessary	☐ _____
Normal: ☐ Musty ☐ Earthy ☐ Moldy	
Pungent: ☐ Sulfide ☐ Cabbage ☐ Decay	
5) Clean and flush manifold (if necessary)	☐ _____
6) Re-check spray pattern	☐ _____
7) Flush underdrain	☐ _____
8) Inspect vent fan assembly to verify operation of fan	☐ _____
F) Miscellaneous	
1) Exercise all valves	☐ _____
2) Return valves, control panel to proper settings	☐ _____
3) Submit required documentation	☐ _____

Copies of inspection and maintenance reports and additional comments/documentation are to be forwarded to the AdvanTex Dealer, or if no Dealer, to Orenco Systems, 814 Airway Avenue, Sutherlin, OR 97479.

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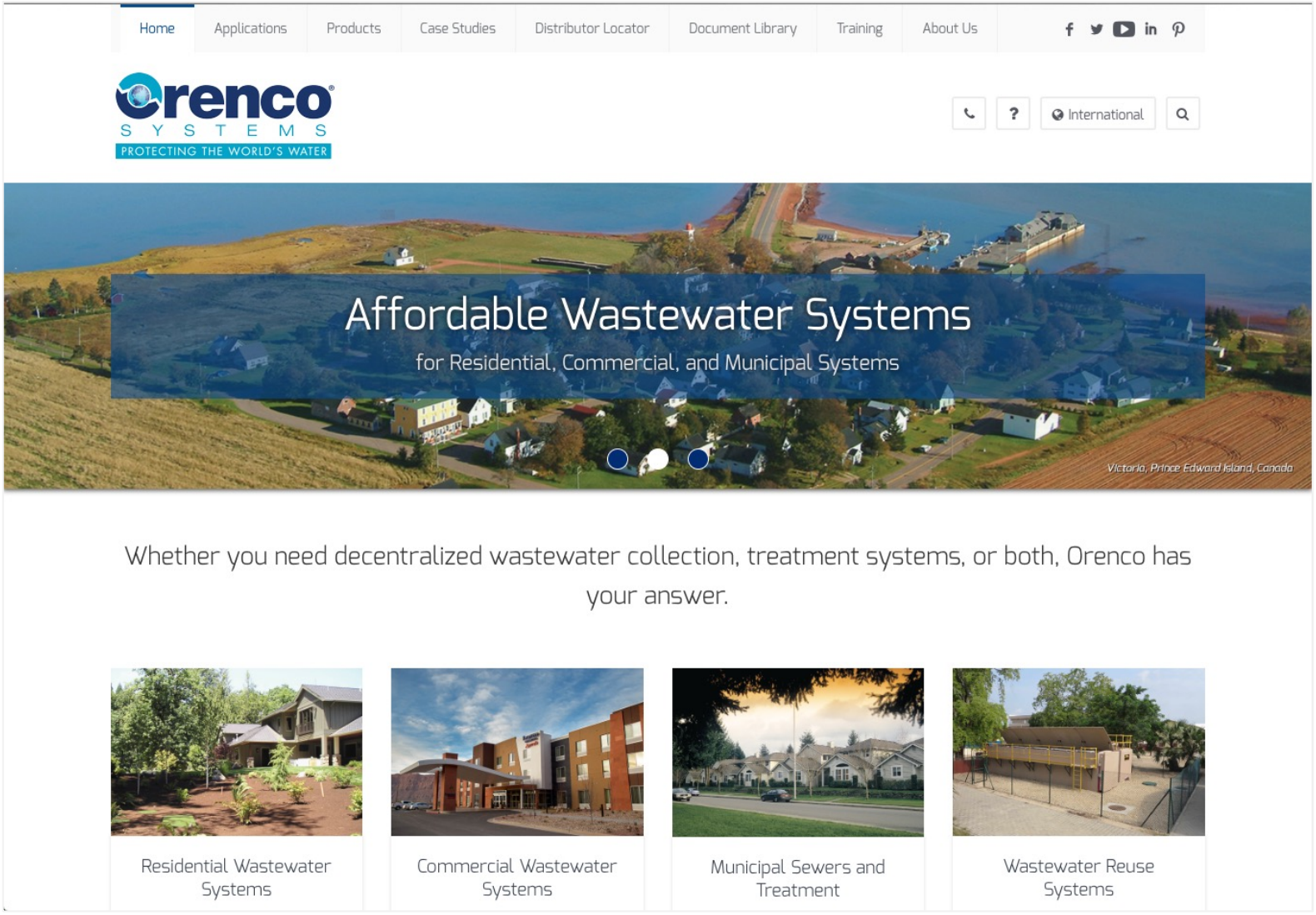
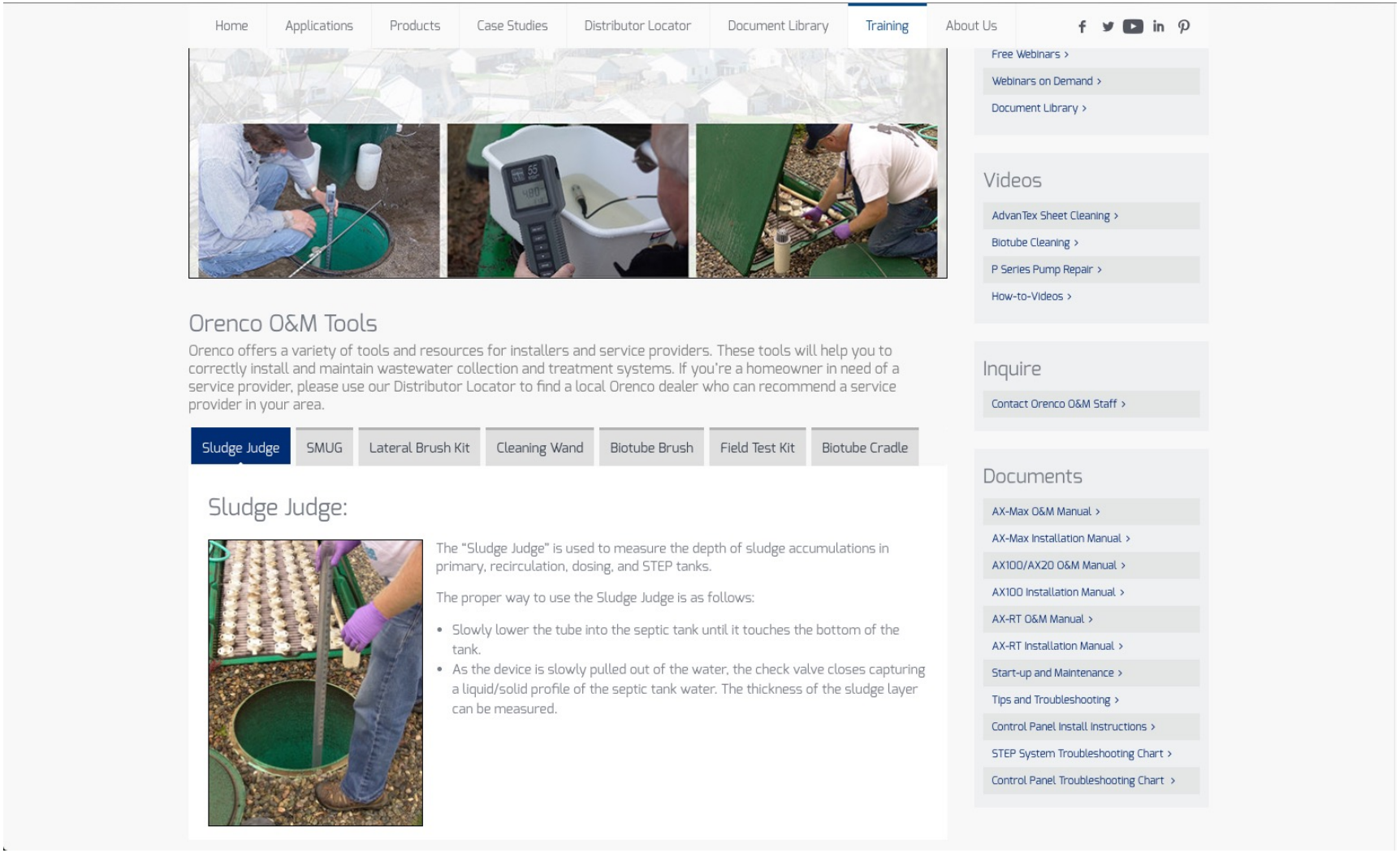
Orenco Webpage – Main Page



Orenco Webpage - Documents



STEP System Troubleshooting

Orenco® Chart

STEP System Troubleshooting

This chart will help you troubleshoot problems with STEP (Septic Tank Effluent Pumping) systems. To use this chart, look for the symptom or symptoms you are experiencing in the left-hand column. Check the row to the right of the symptom for causes. Causes are numbered in order of likelihood, with "1" being the most likely cause of the symptom. Address each cause in order of importance beginning with "1" until the causes have been corrected and the symptom is gone.

Symptom / Cause	Main Circuit Breaker Tripped Off	MOA Switch OFF	Pump Circuit Breaker OFF	Poor Electrical Connections	Tangled or Inoperative Floats	Water in Junction Box	Improper Wiring	Inoperative Pump	Broken Discharge Plumbing	Pump Inlet Fouled	Improper Float Settings	Worn Pump Impellers	Valve Shut Off (Discharge Assembly or Service Connection)	Mainline Valve Closed	Vault Screen in Need of Cleaning	Siphoning	Mainline Pressure Exceeds Pump Capability	Exfiltration (Leaky Tank)	Infiltration (Leaky Tank)	Check Valve Installed Backwards	Inlet Tee Plugged	House Plumbing Plugged
Sewage Backed up in Home	1							5		4				6			7				2	3
Alarm Light On (High Level)	3	1	2	4	5		12	8	11	6		7	9	14			13		10			
Alarm Light On (Low Level)					1						4					2		3				
Alarm Light Dim						1																
Alarm Sounds Intermittently				1	3	2	4				5	6										
Pump Does Not Run	3	1	2	4	5		7	6														
Pump Runs, Does Not Pump								5	4	2		3	1	8			9		6	7		
Short Pump Cycles				2							3				1							
Excessive Pump Counts										2	4				3				1			
Control Box Breaker Trips				1		4	3	2														

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Control Panel Troubleshooting

Orenco Chart

Orenco Control Panel Troubleshooting

Symptom	Check For
Pump does not operate with control panel toggle switch in "MANUAL" or "AUTO" position	• Pump circuit breaker off/fuse blown • Low-level alarm condition in tank • High-level alarm condition at discharge pump (residential ASF or SSF control panels only) • Inadequate power supply to control panel • Incorrect float switch wiring • Incorrect pump wiring • Incorrect model of "Redundant Off" float switch • Failed "Redundant Off" float switch • Failed connection in the pump wiring circuit • Failed motor contactor
Pump operates with control panel toggle switch in "MANUAL" position, but does not operate with switch in "AUTO" position	**Demand-Dose or Timed-Dose Panels:** • Low-level alarm condition in tank (VCOM and TCOM panels only) • High-level alarm condition at discharge pump (MVP and TCOM panels only) • Incorrect float switch wiring • Incorrect float switch model(s) • Failed "On" float switch **Timed-Dose Panels Only:** • "Off" time has not elapsed (the pump will start when the "Off" cycle is complete) • Failed float switch
Audible alarm activated	**Low-Level Alarm** • Control panel toggle switch in "Manual," position, pump left running • Tank pumped out with no refill • Siphoning condition in tank • Leaking tank (exfiltration) • Clogged filter • Incorrect float switch wiring • Incorrect float switch settings • Incorrect model of "Redundant Off" float switch • Failed "Off" or "Redundant Off" float switch • Water in splice box (low-decibel alarm) **High-Level Alarm** • Control panel toggle switch in "Off" position • Pump circuit breaker in "Off" position • Closed discharge ball valve • Failed pump • Clogged pump • Incorrect float switch settings • Incorrect float switch wiring • Incorrect model of "High-Level Alarm" float switch • Failed "On" or "High-Level Alarm" float switch • Power outage • Leaking tank or fixures (infiltration) • Water in splice box (low-decibel alarm)
Circuit breaker trips repeatedly or fuse blows repeatedly	• Water in splice box • Inadequate power supply to circuit breaker • Loose wiring connections • Corroded wires or wiring connections • Bound pump • Incorrect pump wiring • Incorrect capacitor pack wiring • Incorrect float switch wiring
Motor contactor "chatters"	• Corroded contacts • Inadequate voltage supply to motor contactor • Failed "On" or "Off" float switch • Incorrect float switch model(s)

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Reason For Call Out…

- Power Problem
  - Homeowner shut off power
  - Check incoming power to panel
  - Control panel problem
  - Water in splice box (waterproof wire nuts?)

Reason For Call Out

- Alarm in sounding
  - Tank level
    - High
      - ~ Float Problem
      - ~ Plugged Biotube cartridge
      - ~ Pump problem
      - ~ Leaking tank
      - ~ Leaky plumbing fixture
      - ~ Broken discharge line
      - ~ Closed valve
      - ~ Line pressure (air bind)

Reason For Call Out

- Alarm in sounding
  - Tank level
    - Low
      - ~ Stuck float
      - ~ Siphoning
      - ~ Leaking tank
      - ~ Improper float setting

False Alarm

- Low audible alarm / Dimly lit light
  - Water in splice box
  - Poor connections in splice box
- Intermittent Alarm
  - Plugged screen
  - Poor electrical connection
  - Tangled or inoperative floats
  - Improper wiring

Before Leaving the Site

- Verify that valves are back to proper operating positions
- Place control panel switch back to “automatic”
- Make sure all points have been inspected and recorded on the FMR
- Secure all lids and panels, check breakers

Call Out's - Reactive

ST	System	Connections	Annual Serv Calls	Calls per 100 connections
CA	Eagle Lake	580	20	3
WA	Lacey	2921	195	7
MT	Missoula	1300	120	9
MI	SW Barry County	1439	195	14
WA	Holmes Harbor	280	17	6

Summary

- Design
  - Standardize equipment
  - Use quality equipment
- Installation
  - Certify installers
  - Inspect and document each installation
- Utilize the charts
  - STEP Troubleshooting
  - Control Panel Troubleshooting
- Document service calls and repairs
- Develop a repeatable process that fits your needs

Your Careful Work Matters

- Protecting public health
- Protecting the environment

North Umpqua River, Steamboat, Oregon

Solutions for Decentralized Wastewater Treatment

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