



May 2, 2022

Routt County
Environmental Health Department
PO Box 770087
Steamboat Springs, CO 80477

**RE: Colette & Gerald Burris 25325 Paradise Valley Ln- Routt County,
Design Report and Site Plan, Onsite Wastewater Treatment System**

Dear RCEHD:

On behalf of the owners Colette & Gerald Burris, herein included are this design letter and permit drawings for the proposed onsite wastewater treatment system (OWTS). The proposed system is designed to treat and dispose of domestic waste from a bathroom and sink facilities located in the owner's existing barn. The proposed system (system) has been designed in accordance Routt County Regulations (RCR), which are essentially the Colorado Department of Public Health and Environment Water Quality Control Commission (CDPHE/WQCC) Regulations 43. Note that the design calculations reference Regulation 43. The drainfield will be located to the south and above the barn in elevation. Site constraints, including shallow groundwater downhill of the barn dictated that the proposed drainfield will be located above the proposed septic tank. As such, the drainfield will be pressure dosed. The nearest surface water is pond located over 250 feet from the drainfield.

Preliminary Investigation


I conducted the preliminary site investigation May 19, 2021. A soil investigation for the proposed drainfield location was conducted October 30, 2021, by the owners based on my instruction. Two soil profile pits (SPP) were excavated near the proposed drainfield location. The owners collected measurements and soil samples and took numerous photos of the investigation. Based on a review of the owner's data and my evaluation of the soil sample visually and tactilely based on texture, structure and the ribbon test as required for the septic system in accordance with CDPHE/WQCC, Regulation #43 Section 43.5.D.2., I was able to classify the soil as silty to sandy loam for sizing the drainfield. Based on the photos and measurements, neither bedrock, nor groundwater nor other limiting layers were encountered.

Design

Based on the results of the soil classification, the drainfield was sized using the methods outlined in CDPHE/WQCC, Regulation #43. Since the proposed drainfield is located above the septic tank elevation the effluent shall be pumped to the drainfield, i.e., will be pressure dosed. The system has been designed for cold weather provision to drain back to the septic tank; weep holes are also provided in the laterals. While a reduction in drainfield area was assumed based on the use of chambers, no reduction was used for pressure distribution of the effluent. The design calculations are presented in the attachments to this report. The design calculation cite pertinent sections of Regulation 43. Other design considerations such as float switch position, reference Regulation 43 or the EPA's onsite wastewater treatment manual. Product specifications are either called out on the plan set or are provide in the quantities list provide on Sheet 2 of the plan set. Likewise, product sheets for the effluent pumping system are included as attachments to this design letter.

Please let me know if you have any questions or comments about the design of this OWTS.

Best regards,

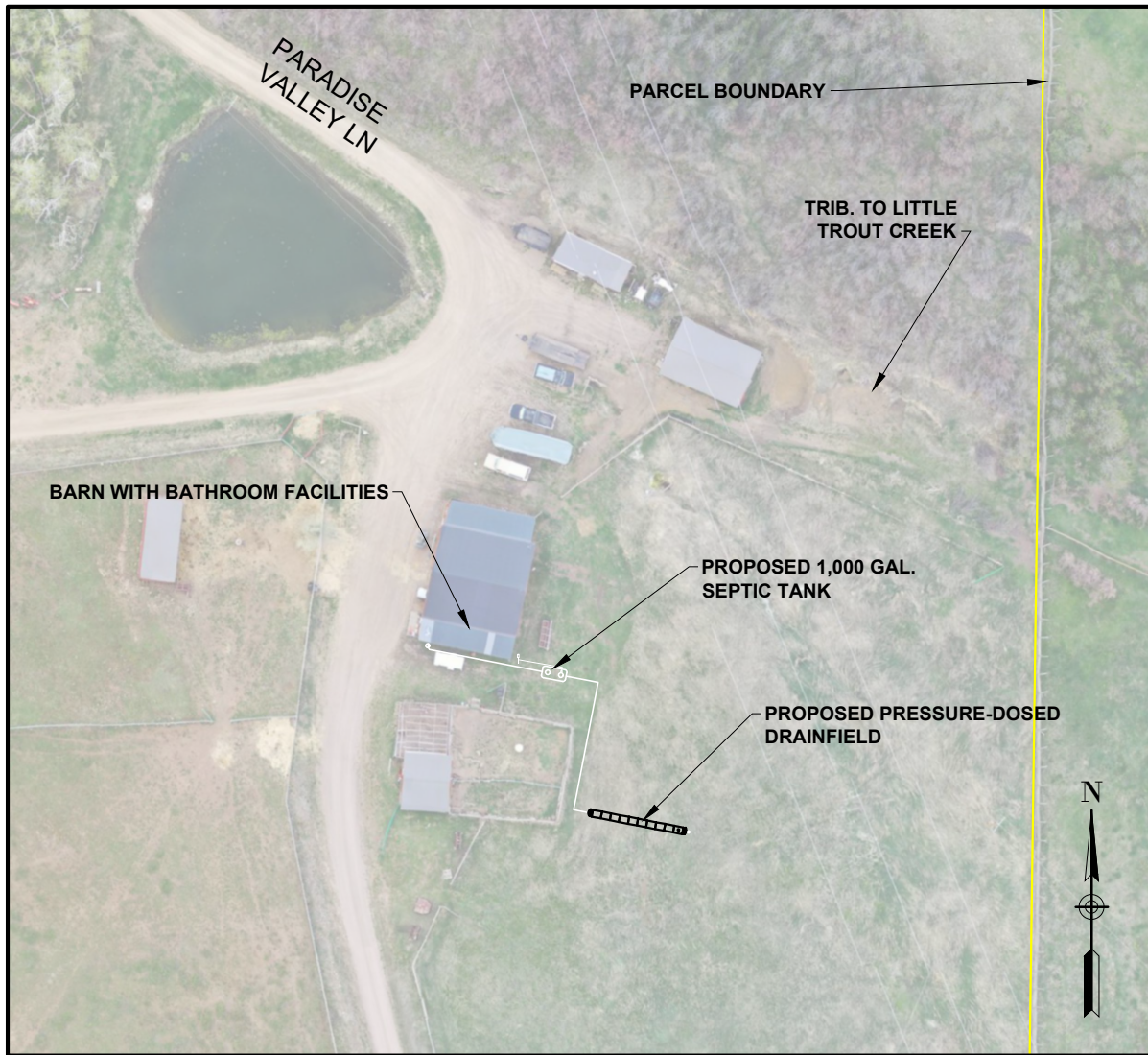
A handwritten signature in blue ink, appearing to read "Will A. Myers", with a horizontal line extending to the right.

Will A. Myers, P.E.

encl: as noted

Appendix A

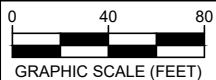
Permit Plan Set



LEGAL LOCATION: SESW SECTION 25, T.4N.; R86W.

SITE NOTES:

1. THERE ARE NO WATER FEATURES WITHIN 100 FEET OF THE PROPOSED OWTS.
2. AERIAL IMAGE AND GROUND TOPO COLLECTED BY DRONE 5/19/21



By:
Headwater Engineering
P.O. BOX 1293
Craig, CO 81626

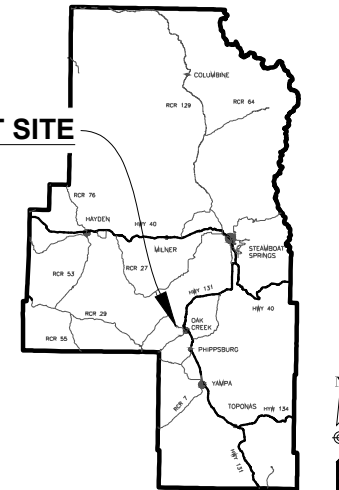


For:
Colette & Gerald Burris
25325 Paradise Valley Ln
Oak Creek, CO 80467

**ROUTT COUNTY OWTS DESIGN
LOCATION & SITE PLAN**

SITE ADDRESS:
25325 Paradise Valley Ln
Oak Creek, CO 80467

PROJECT SITE



Scale: 1" = 30 Miles

COUNTY OF ROUTT
STATE OF COLORADO

INDEX OF SHEETS

SHEET NO.	SHEET TITLE
1	LOCATION & SITE PLAN
2	NOTES & QUANTITIES
3	SYSTEM PLAN
4	PROFILE & DETAILS
5	DETAILS OFFSET DISTANCES



05/02/22

File:	Revised:
Drawn By: WAM	Checked By: WAM
Date: 5/2/22	Revised:

**SHEET
1 OF 4**

GENERAL NOTES:

- ENGINEER SHALL INSPECT SYSTEM INSTALLATION PRIOR TO BACKFILL. PLEASE NOTIFY ENGINEER AT LEAST 24 HOURS PRIOR TO REQUIRING INSPECTION.
- IN ADDITION TO INSPECTING THE PIPE ALIGNMENTS, GRADES AND AND GENERAL INSTALLATION OF THE SYSTEM, ENGINEER SHALL INSPECT THE OPERATION OF THE PUMP SYSTEM AND ENSURE THAT THE HEAD (SQUIRT HEIGHT) OF THE LAST ORIFICE IS BETWEEN 2.5' AND 6.0'
- BACKSLOPE EXCAVATION FOR TANK INSTALLATION IN ACCORDANCE WITH OSHA REGULATIONS (29 CFR PART 1926, SUBPART P, SECTIONS 1926.650 THROUGH 1926.652).
- BRUSH AND VEGETATION SHALL BE CLEARED FROM DRAINFIELD AREA PRIOR TO CONSTRUCTION.
- NEITHER BEDROCK, GROUNDWATER NOR OTHER RESTRICTIVE LAYERS WERE ENCOUNTERED IN THE SOIL PROFILE PITS.
- INSTALL ALL PIPE, DRAINFIELD CHAMBERS, SEPTIC TANK, AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURES' RECOMMENDATIONS AND LOCAL CODES.
- ALL ELECTRICAL WORK SHALL BE PERFORMED BY A LICENSED ELECTRICIAN UNLESS ALLOWED BY THE LOCAL AUTHORITY (COUNTY). OWNER SHALL BE RESPONSIBLE FOR VERIFYING THIS WITH THE COUNTY AND PROCURING ALL NECESSARY PERMITS.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE EXISTING UTILITIES. UTILITIES WERE NOT VERIFIED WITH THIS PROJECT.
- ACTUAL FIELD LENGTHS AND DEPTHS OF THE CONSTRUCTED SYSTEM ARE EXPECTED TO VARY, BUT SHOULD BE WITHIN THE MINIMUMS AND MAXIMUMS AS SPECIFIED WITHIN THESE PLANS.
- ALTHOUGH THE SYSTEM HAS BEEN DESIGNED TO LIMIT FREEZING OF THE DRAINFIELD AND/OR THE SEPTIC TANK, THE SYSTEM SHOULD BE USED REGULARLY IN THE WINTER OR SHOULD BE DECOMMISSIONED IN THE WINTER. SINCE THE SEPTIC TANK PROVIDES MORE CAPACITY THAN REQUIRED FOR THE THE MINIMUM DETENTION TIME OF 48 HOURS, A SEPTIC TANK HEATER MAY ULTIMATELY BE REQUIRED TO PREVENT FREEZING OF SYSTEM COMPONENTS. HEADWATER ENGINEERING MAKES NO WARRANTIES OR GUARANTEES AGAINST THE SYSTEM FREEZING OR OTHER SYSTEM PERFORMANCE.
- TANK IS ASSUMED TO VENT THOUGH THE PLUMBING VENTS IN THE BARN. TANK MAY NEED TO BE VENTED BY OTHER MEANS IF THIS IS NOT THE CASE.

DESIGN NOTES:

- SCH 40 SEWER PIPE SHALL BE USED UNDER DRIVEWAYS AND PARKING AREAS. SDR 35 CAN BE USED ELSEWHERE ALTHOUGH SCH 40 IS RECOMMENDED.
- ALL FITTINGS PRIOR TO THE PUMPING SYSTEM SHALL BE SANITARY DRAIN FITTINGS. WHERE POSSIBLE IN THE PUMPING SYSTEM, SANITARY DRAIN FITTINGS SHALL BE USED TO PROVIDE DRAINBACK TO THE SEPTIC TANK.
- SCH 40 ELECTRICAL CONDUIT FITTINGS CAN BE USED IN THE PRESSURE SYSTEM IF SANITARY FITTINGS ARE UNAVAILABLE.
- BENDS IN THE SEWER LINE SHALL NOT EXCEED A 45° BEND AND WILL BE INSTALLED WITH A CLEANOUT.
- SEPTIC TANK SHALL BE TWO COMPARTMENT UNLESS OTHERWISE SPECIFIED. INSTALL TANK IN ACCORDANCE WITH MANUFACTURE'S RECOMMENDATIONS.
- MESH SCREEN CAN BE INSTALLED IN THE TRENCH BENEATH THE DRAINFIELD CHAMBERS TO PREVENT ANIMAL ENTRANCE, BUT IS NOT REQUIRED.

Bill of Materials

Item	Unit	Quantity	Specification/ Notes
Septic Tank & Pump Assembly			
1000 Gal. Septic Tank	EA	1	Infiltrator Water Technologies IM 1060 O.E.
Access Lid Risers	EA	2	Infiltrator Water Technologies 24" Tall
Effluent Pump	EA	1	Orenco PFEF 40 11 B
Screened Effluent Vault	EA	1	Orenco 54-inch SV 15 54-22
Pump Control Panel w/ Floats and Alarm	EA	1	Orenco S1-MF3A-Y,B,R-KIT
External Splice Box	EA	1	Orenco SBEX
1 1/2" Discharge Assembly	EA	1	See Plans For Parts
Effluent Transport Pipe			
1 1/2" SCH 40 PVC Pipe	LF	80	
1 1/2" TO 1 1/4" Bushing	EA	1	
1 1/2" Sanitary 90° ELL	EA	2	Alt. use two 45° ELLs for each 90
Drainfield & Laterals			
48" Drainfield Chambers	EA	10	Infiltrator Water Technologies Quick 4, O.E.
Drainfield Chamber End Caps	EA	2	
Stell Mesh (Bottom of Trench) OPTIONAL	SF	120	Optional
1 1/4" SCH 40 PVC Pipe	LF	50	
Nylon Staps to attached Laterals	EA	30	Heavy Duty
1 1/4" Ball Valve	EA	1	
1 1/4" Threaded Coupler	EA	0	
1 1/4" Threaded Cap	EA	1	
Valve Box	EA	1	Spinkler Box O.E.
4" Threaded Coupler (Inspection Pipes)			
4" Coupler (Inspection Pipes)	EA	1	
4" Threaded Cap (Inspection Pipes)	EA	1	
Sprinkler Valve Control Box (For Inspection Caps)	EA	1	Optional

Sources/Notes:

1. All quantities are approximate and based on design measurements; field measurements and quantities may vary. Estimates are for planning purposes only.

Abbreviations: EA= Each, LF= Linear feet, SF= Square feet, O.E. = Or Equal



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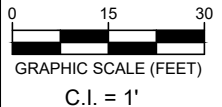
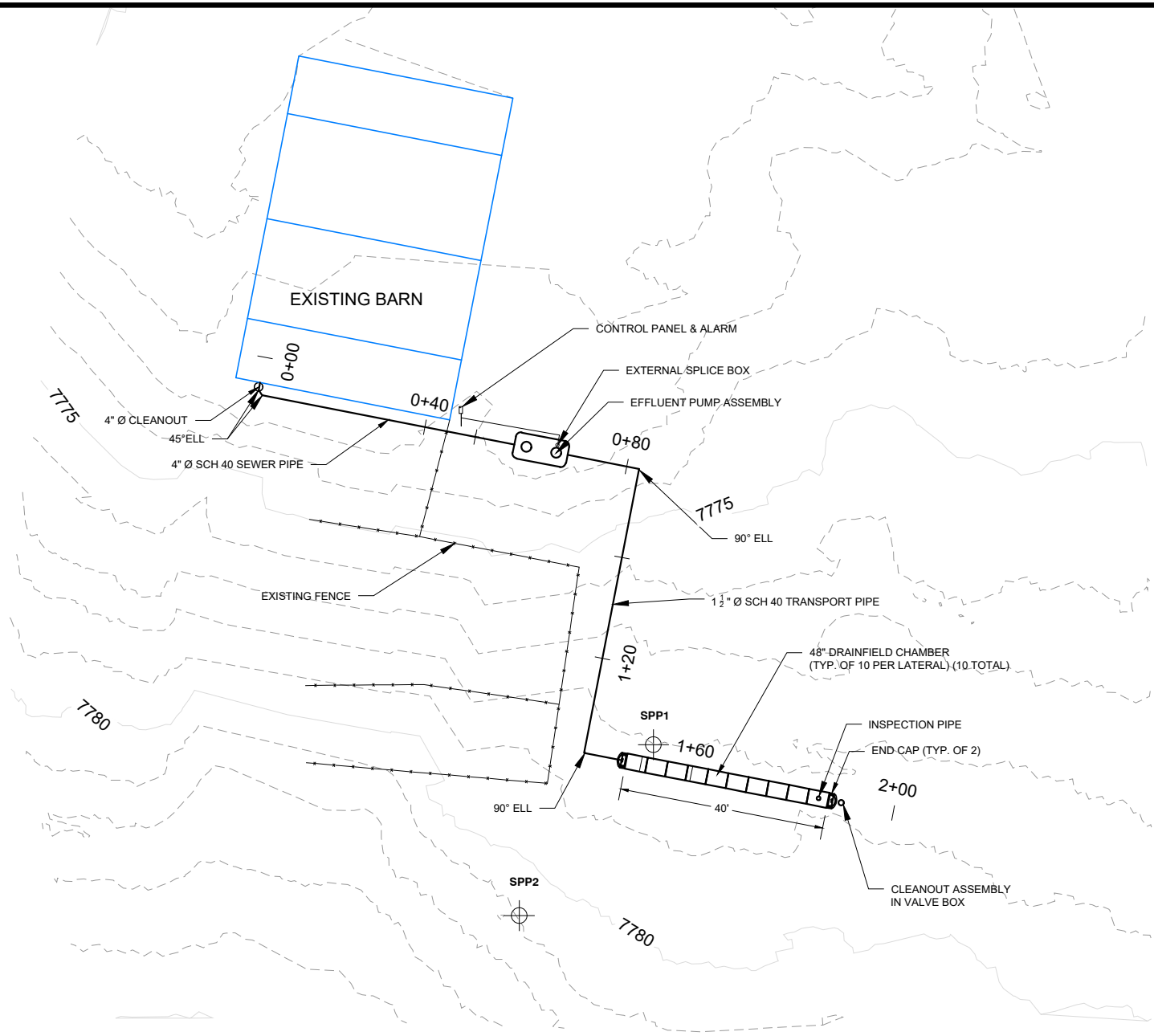
For:
Colette & Gerald Burris
25325 Paradise Valley Ln
Oak Creek, CO 80467

ROUTT COUNTY OWTS DESIGN NOTES & QUANTITIES

SITE ADDRESS:
25325 Paradise Valley Ln
Oak Creek, CO 80467

SHEET
2 OF 5

File:	Revised:
Drawn By: WAM	Checked By: WAM
Date: 5/2/22	Revised:



LEGEND
 SOIL PROFILE PIT

By:
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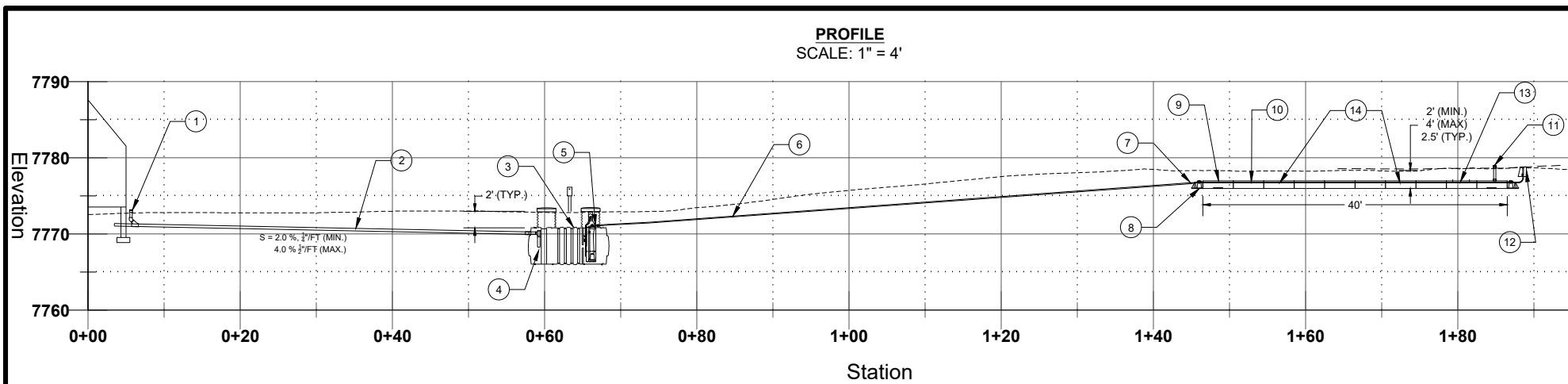


For:
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 25325 Paradise Valley Ln
 Oak Creek, CO 80467

ROUTT COUNTY OWTS DESIGN SYSTEM PLAN

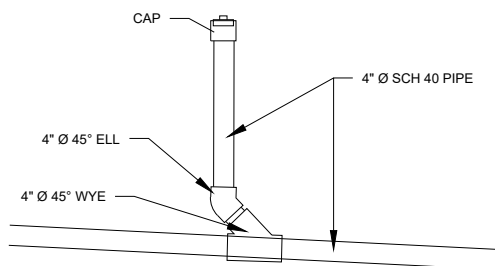
SITE ADDRESS:
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Drawn By: WAM	Checked By: WAM
Date: 5/2/22	Revised:



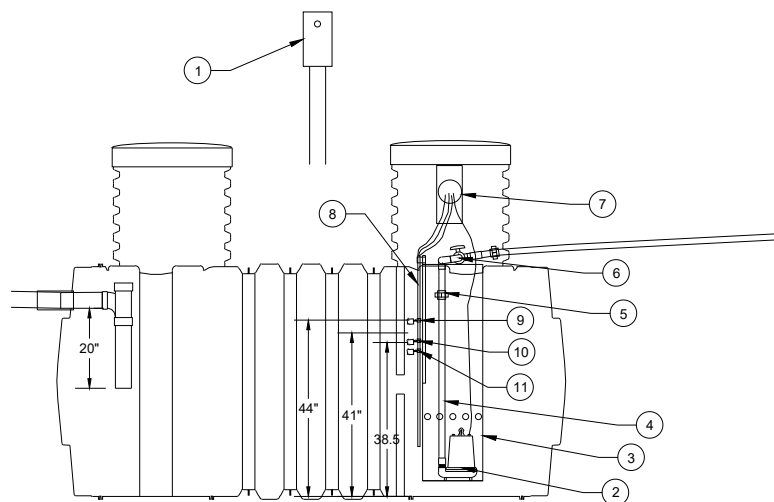
PROFILE CALLOUT NOTES

- | | | | |
|---------------------------------------|--|--|---|
| ① 4" Ø CLEANOUT WITHIN 5' OF BUILDING | ④ DROP PIPE 14" BELOW INLET | ⑦ 1 ½" Ø TO 1 ¼" Ø TRANSITION FITTING | ⑪ 4" Ø INSPECTION PIPE (TYP. OF 1) |
| ② 4" Ø SCH 40 SEWER PIPE L= ±60' | ⑤ PUMP AND DISCHARGE ASSEMBLY | ⑧ END CAP (TYP. OF 2) | ⑫ CLEANOUT/FLUSH ASSEMBLY |
| ③ 1,000 GALLON SEPTIC TANK | ⑥ 1 ½" Ø SCH 40 TRANSPORT PIPE L=± 80'
MAINTAIN GRADE BACK TO SEPTIC TANK | ⑨ 48" DRAINFIELD CHAMBER OF (TYP. OF 10) | ⑬ ¼" ORIFICE @ TOP OF PIPE (TYP. OF 8) |
| | | ⑩ 1 ¼" Ø LATERAL PIPE | ⑭ ¼" ORIFICE @ BOTTOM OF PIPE (TYP. OF 2) |




TYPICAL CLEANOUT DETAIL

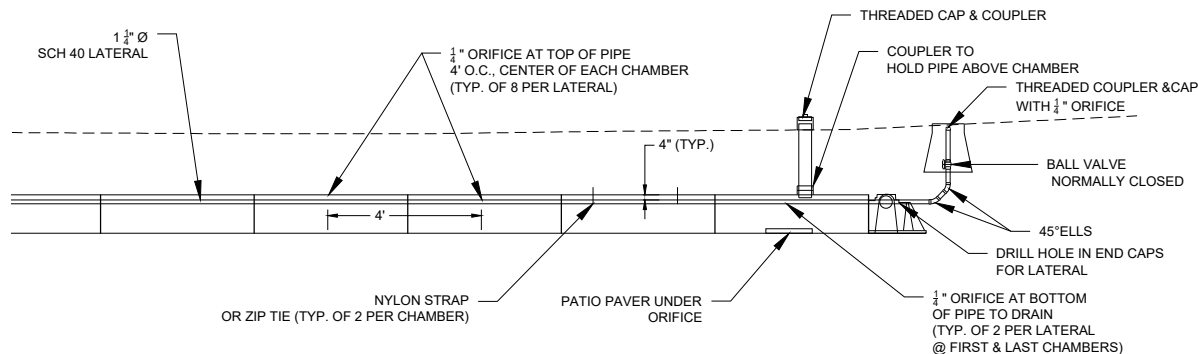
SCALE: 5/16" = 1"



PUMP & DISCHARGE ASSEMBLY DETAIL

SCALE: 1" = 4'

		By: Headwater Engineering P.O. BOX 1293 Craig, CO 81626	For: Colette & Gerald Burris 25325 Paradise Valley Ln Oak Creek, CO 80467	ROUTT COUNTY OWTS DESIGN PROFILE & DETAILS	SHEET 4 OF 5
File:	Revised:			SITE ADDRESS: 25325 Paradise Valley Ln Oak Creek, CO 80467	
Drawn By: WAM	Checked By: WAM	Date: 5/2/22	Revised:		



DRAINFIELD DETAIL

1" = 5'

OFFSET DISTANCES

Table 7-1 Minimum Horizontal Distances in Feet Between Components of an On-Site Wastewater Treatment System Installed After November 15, 1973 and Water, Physical and Health Impact Features

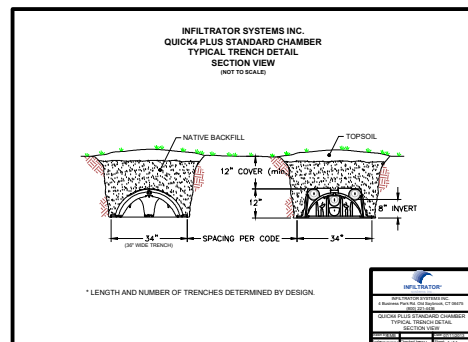
	Spring, Well, Suction Line	Potable Water Supply Line	Potable Water Supply Cistern	Dwelling Occupied Building	Property Lines, Piped or Lined Irrigation Ditch	Subsurface Drain, Intermittent Irrigation Lateral, Drywell, Stormwater Infiltration Structure	Lake, Water Course, Irrigation Ditch, Stream, Wetland	Dry Gulch, Cul, Bank, Fill Area (from Crest)	Septic Tank
Septic Tank, Higher Level Treatment Unit, Dosing Tank, Vault	50'	10'	25'	5'	10'	10'	50'	10'	—
Building Sewer or Effluent Lines	50'	10'	25'	0'	10'	10'	50'	10'	—
STA Trench, STA Bed, Unlined Sand Filter, Sub-surface Disposal System, Seepage Pit	100'	25'	25'	20'	10'	25'	50'	25'	5'
Lined Sand Filter	60'	10'	25'	15'	10'	10'	25'	10'	5'
Lined Evapo-transpiration Field or Outside of Berm of Lined Wastewater Pond	60'	10'	25'	15'	10'	10'	25'	10'	5'
Unlined Sand Filter in Soil With a Percolation Rate Slower than 60 Minutes per Inch, Unlined or Partially Lined Evapo-transpiration System, Outside of Berm of Unlined Wastewater Pond, or System Not Relying on STA for Treatment Other than Aeration	100'	25'	25'	15'	10'	25'	25'	15'	10'

Table 7-2 On-site Wastewater Treatment System Design Consideration and Treatment Requirements – Separation Distances from Soil Treatment Area

Requirements – Separation Distances from Soil Treatment Area		PRESSURE DOSING REQUIRED			
ITEM	OWTS DESIGN CONSIDERATION	Treatment Levels 1 and 2	Treatment Level 2N	Treatment Level 3	Treatment Level 3N
	<u>Horizontal Separation Distances</u>				
1	Distance from soil treatment area to on-site well	Greater than or equal to 100 feet	Greater than or equal to 100 feet	Greater than or equal to 100 feet	Greater than or equal to 75 feet ¹
2	Distance from soil treatment area to pond, creek, lake, or other surface water feature	Greater than or equal to 50 feet	Greater than or equal to 25 feet	Greater than or equal to 25 feet	Greater than or equal to 25 feet
3	Distance from soil treatment area to dry gulch or cut bank	Greater than or equal to 25 feet	Greater than or equal to 10 feet	Greater than or equal to 10 feet	Greater than or equal to 10 feet
	<u>Vertical Separation Distances</u>				
4	Depth in feet from soil treatment area infiltrative surface to restrictive layer or ground water	4 feet (3 feet with pressure dosing)	Greater than or equal to 2 feet	Greater than or equal to 2 feet	Greater than or equal to 2 feet

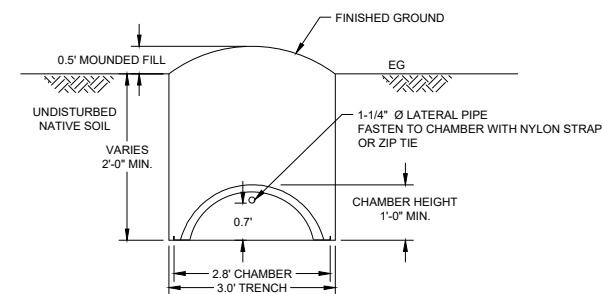
NOTE: Treatment levels are defined in Table 6-3. Reductions in separation distances with higher level treatment may be granted only if the local public health agency regulations have included provisions for operation and maintenance.

1. Prior to approval, all setback distance reductions to the 100 foot requirement for wells and soil treatment areas must be in full compliance with the minimum standards and variance requirements of the State of Colorado Division of Water Resources: Rules and Regulations for Water Well Construction, Pump Installation, Cistern Installation, and Monitoring and Observation Hole/Well Construction.



TYPICAL DRAINFIELD CHAMBER SECTION

NTS



TRENCH & LATERAL SECTION

NTS

0 - 8" TOPSOIL, LT BROWN, LOAM

8" - 6.5' SILTY LOAM, TAN BROWN, DRY, GRANULAR

6.5' - 8' SANDY LOAM, TAN BROWN, DRY, GRANULAR

SPP 2 SOIL PROFILE LOG

N.T.S.

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For:
Colette & Gerald Burris
25325 Paradise Valley Ln
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ROUTT COUNTY OWTS DESIGN DETAILS

SITE ADDRESS:
25325 Paradise Valley Ln
Oak Creek, CO 80467

SHEET
5 OF 5

File: _____ Revised: _____
Drawn By: WAM Checked By: WAM Date: 5/2/22 Revised: _____

Appendix B

Design Calculations

I. Design Flow Rate			
Design Component			Notes/Information Source
<i>Barn with Bathroom</i>			
Sink (Lavatory) Flow:	8.4	gpd	Table 6-2
Sink (Utility) Flow:	5.8	gpd	Table 6-2
Shower Flow:	14.7	gpd	
Toilet Flow:	24.8	gpd	
Daily Design Flow Rate:	54	gpd	
II. Septic Tank Design			
Design Component			Notes/Information Source
<i>Barn with Bathroom</i>			
Min. Detention Time:	48	hr	Section 43.9.B.b
Min. Tank Size Required:	107	gal	
Design Septic Tank Capacity	1,000	gal	

Sources/Notes:

All sources of information and design requirements are CDPHE/WQCC, Regulation #43

III. Drainfield Design			
Design Component			Notes/Information Source
Peak daily design flow rate:	54	gpd	
Soil texture within/near drainfield:	Silty Loam		
Soil Type:	2A		Table 10-1
Treatment Level:	1		Table 10-1
Long-Term Acceptance Rate (LTAR) ¹ :	0.5	gal/day/sq ft	Table 10-1
Required drainfield absorption area:	108	sq ft	
Adjustment factor for chambers:	0.7		Table 10-3
Adjusted drainfield absorption area:	76.0	sq ft	
Width of drainfield chamber	3.0	ft	Standard Size
Total required length of drainfield:	25.0		
Length of drainfield chamber:	4.0	ft	5 foot also standard
Min. required number of drainfield chambers:	7.00		
Number of drainfield chambers in proposed design:	10	chambers	
Number of zones:	1		
Number of laterals per zone:	1		
Number of chambers per lateral:	10.00		Varies, 12-13 per lateral
Lateral length:	40	ft	
Total lateral length:	40	ft	
Min. distance between trenches:	4	ft	Section 43.10.F.1
Min. trench CL spacing:	7	ft	
Design trench CL spacing:	9	ft	

Sources/Notes:

All sources of information and design requirements are CDPHE/WQCC, Regulation #43 unless otherwise noted.

¹ Determined from a field soil evaluation.

IV. Distribution Lateral Pipe Design

Reg. 43 Criteria:

- head at farthest downstream orifice of <2.5ft <6.0 ft
- maximum 10% difference in orifice flow between upstream and downstream ends of lateral

Lateral pipe nominal diameter (inches):	1
Orifice diameter (inches):	0.250 (1/4 in)
Distance between orifices (feet):	4
Desired minimum orifice head (feet):	6
Lateral pipe inside diameter - Sch 40 PVC (inches):	1.36
Lateral pipe cross sectional area (sq ft):	0.01
Hazen-Williams pipe coefficient, PVC pipe:	130
Orifice discharge coefficient:	0.61

Orifice flow equation:

$$Q = 448.83 C_d A \sqrt{2gH}$$

Q = orifice flow, gpm

448.83 = conversion from cu-ft/s to gpm

C_d = orifice coefficient = 0.61

A = orifice area (sq-ft)

g = gravitational constant = 32.2 ft/s²

H = desired head at orifice, ft

Headloss equation per segment:

$$h_L = L \left(\frac{V}{0.115 C d^{0.63}} \right)^{1.852}$$

h_L = headloss, ft

L = distance between lateral orifices, ft

V = lateral flow velocity, ft/s

d = lateral inside diameter, in

C = Hazen-Williams pipe coefficient

Orifice Location on Lateral	Orifice No.	Orifice Head (ft)	Orifice Flow (gpm)	Cumulative Flow (gpm)	Lateral Flow Velocity (ft/s)	Segment h _L (ft)	Lateral Length (ft)	Cumulative h _L (ft)	Percent Change in Orifice Flow
DS End	1	6.0000	1.8346	1.8346	0.4052	0.0035	2.00	0.0035	0.00%
	2	6.0035	1.8351	3.6697	0.8105	0.0126	6.00	0.0161	0.03%
	3	6.0161	1.8371	5.5068	1.2162	0.0268	10.00	0.0430	0.13%
	4	6.0430	1.8411	7.3479	1.6228	0.0457	14.00	0.0887	0.36%
	5	6.0887	1.8481	9.1960	2.0310	0.0693	18.00	0.1580	0.74%
	6	6.1580	1.8586	11.0546	2.4415	0.0974	22.00	0.2554	1.31%
	7	6.2554	1.8732	12.9278	2.8552	0.1302	26.00	0.3856	2.11%
	8	6.3856	1.8926	14.8204	3.2732	0.1677	30.00	0.5533	3.16%
	9	6.5533	1.9173	16.7377	3.6967	0.2101	34.00	0.7634	4.51%
US End	10	6.7634	1.9478	18.6855	4.1268	0.2576	38.00	1.0210	6.17%

Total flow rate per lateral:	18.69
Number of laterals per zone:	1.0
Total flow rate per zone:	18.7 gpm
Number of zones:	1.0
Total flow rate:	18.69 gpm

Pump Selection for a Pressurized System - Single Family Residence Project

Burris

Parameters

Discharge Assembly Size	1.50	inches
Transport Length	80	feet
Transport Pipe Class	40	
Transport Line Size	1.50	inches
Distributing Valve Model	None	
Max Elevation Lift	10	feet
Manifold Length	0	feet
Manifold Pipe Class	40	
Manifold Pipe Size	1.25	inches
Number of Laterals per Cell	1	
Lateral Length	40	feet
Lateral Pipe Class	40	
Lateral Pipe Size	1.25	inches
Orifice Size	1/4	inches
Orifice Spacing	4	feet
Residual Head	5	feet
Flow Meter	None	inches
'Add-on' Friction Losses	1	feet

Calculations

Minimum Flow Rate per Orifice	1.73	gpm
Number of Orifices per Zone	11	
Total Flow Rate per Zone	19.4	gpm
Number of Laterals per Zone	1	
% Flow Differential 1st/Last Orifice	6.3	%
Transport Velocity	3.1	fps

Frictional Head Losses

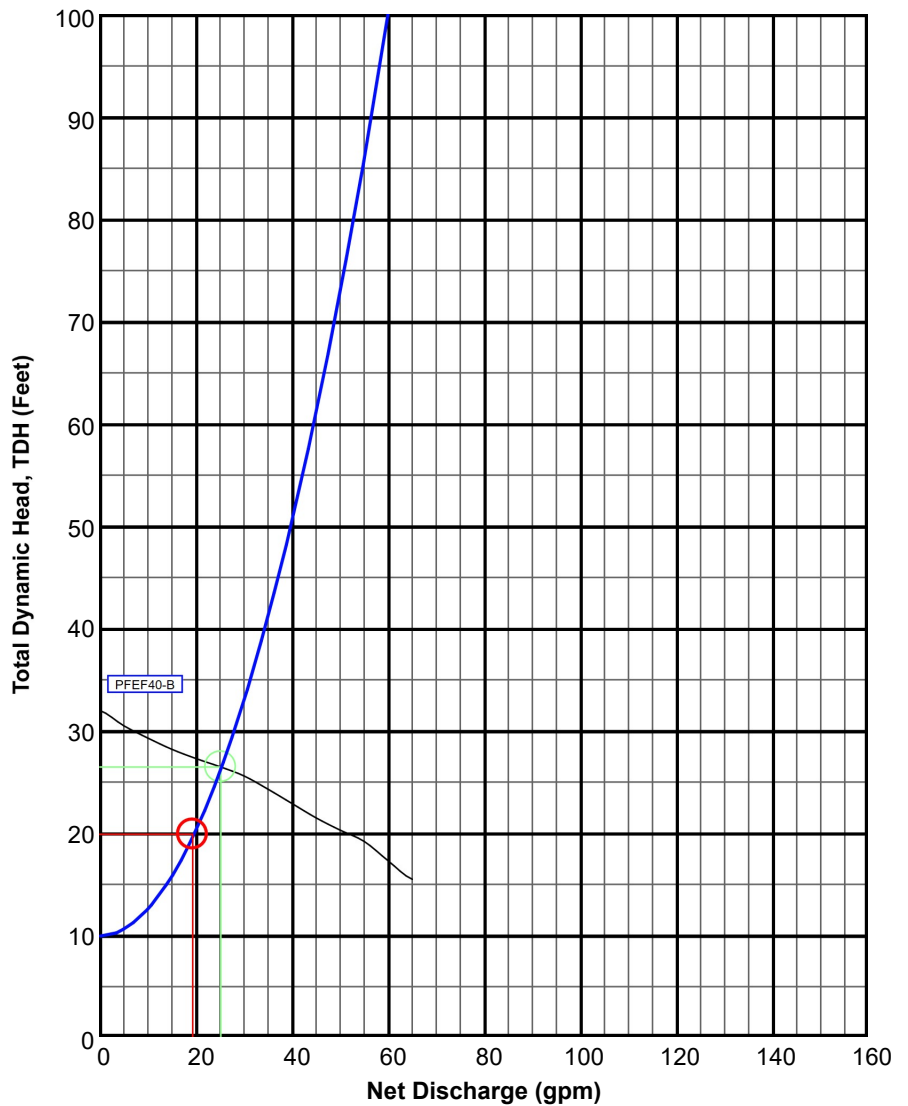
Loss through Discharge	1.1	feet
Loss in Transport	1.9	feet
Loss through Valve	0.0	feet
Loss in Manifold	0.0	feet
Loss in Laterals	0.9	feet
Loss through Flowmeter	0.0	feet
'Add-on' Friction Losses	1.0	feet

Pipe Volumes

Vol of Transport Line	8.5	gals
Vol of Manifold	0.0	gals
Vol of Laterals per Zone	3.1	gals
Total Volume	11.6	gals

Minimum Pump Requirements

Design Flow Rate	19.4	gpm
Total Dynamic Head	19.8	feet



PumpData

PFEF40 Effluent Pump
4/10HP, 115/230V 1Ø

Legend

System Curve:	—
Pump Curve:	—
Pump Optimal Range:	—
Operating Point:	○
Design Point:	○



V. Dosing Volume & Float Levels			
<u>Volume of piping that may drain between doses</u>			
Max. transport length:	80	ft	
Transport pipe diameter:	1.5	in	(1.5-in Sch 40 PVC)
Max. transport volume:	7.3	gal	
Manifold pipe length:	0	ft	
Manifold pipe diameter:	3	in	(3-in Sch 40 PVC)
Manifold pipe volume:	0.0	gal	
Lateral pipe length:	40	ft	
Lateral pipe diameter:	1.25	in	(1.25-in Sch 40 PVC)
Lateral pipe volume:	2.5	gal	
Max. total volume:	9.9	gal	
Total drain back volume	9.9	gal	
Recommended dosing volume ¹			
5 x lateral volume	12.7	gal	use 5x lateral lateral
20 % Design Flow	10.7	gal	
<u>Septic Tank /Float Levels</u>			
Septic Tank	Infiltrator Water Technologies IM 1060 Septic Tank.		
Nominal Septic Tank Liquid Capacity:	1094.0	gal	
First Compartment:	733.0	gal	
Second Compartment:	361	gal	
Detention Time in First Compartment > 48 hrs.	328	hrs.	Section 43.9.I.3.b
Capacity per foot:	298.4	gal/ft	
Top of Baffle Hole Height	30.5	in	
Set "Timer On/Off" Float 8" Above²	38.5	in	EPA On-site wastewater manual
Set "Timer Override" Float 2.5" or DF Above	41.0	in	
Height of Design Flow (DF)	2.2	in	
Use 2.5"			
Set "High Water Alarm" Float @ Outlet	44	in	
<u>Dosing frequency</u>			
Doses/day ²	4		
Design daily flow:	54	gal/day	
Max dose volume	13	gal	
Timed dose interval:	2	hours	
Design pump flow rate:	18.7	gpm	
Design pump run time:	0.7	min	

Notes:

¹ Wisconsin Mound Soil Absorption System, Siting, Design and Construction Manual System suggests that the dose is 5X the lateral volume, but less than 20 percent of the design flow.

² Set to 8" above baffel hole to ensure scum remains in first compartment.

³ Determine within dosing volume and to not short-cycle pump.

Bill of Materials

<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Specification/ Notes</u>
<u>Septic Tank & Pump Assembly</u>			
1000 Gal. Septic Tank	EA	1	Infiltrator Water Technologies IM 1060 O.E.
Access Lid Risers	EA	2	Infiltrator Water Technologies 24" Tall
Effluent Pump	EA	1	Orenco PFEF 40 11 B
Screened Effluent Vault	EA	1	Orenco 54-inch SV 15 54-22
Pump Control Panel w/ Floats and Alarm	EA	1	Orenco S1-MF3A-Y,B,R-KIT
External Splice Box	EA	1	Orenco SBEX
1 1/2" Discharge Assembly	EA	1	See Plans For Parts
<u>Effluent Transport Pipe</u>			
1 1/2" SCH 40 PVC Pipe	LF	80	
1 1/2" TO 1 1/4" Bushing	EA	1	
1 1/2" Sanitary 90° ELL	EA	2	Alt. use two 45° ELLs for each 90
<u>Drainfield & Laterals</u>			
48" Drainfield Chambers	EA	10	Infiltrator Water Technologies Quick 4, O.E.
Drainfield Chamber End Caps	EA	2	
Stell Mesh (Bottom of Trench) OPTIONAL	SF	120	Optional
1 1/4" SCH 40 PVC Pipe	LF	50	
Nylon Staps to attached Laterals	EA	30	Heavy Duty
1 1/4" Ball Valve	EA	1	
1 1/4" Threaded Coupler	EA	0	
1 1/4" Threaded Cap	EA	1	
Valve Box	EA	1	Spinkler Box O.E.
4" Threaded Coupler (Inspection Pipes)			
4" Coupler (Inspection Pipes)	EA	1	
4" Threaded Cap (Inspection Pipes)	EA	1	
Sprinkler Valve Control Box (For Inspection Caps)	EA	1	Optional

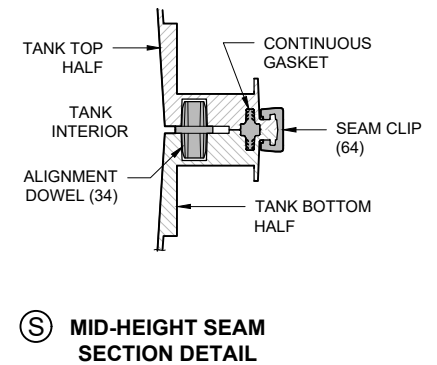
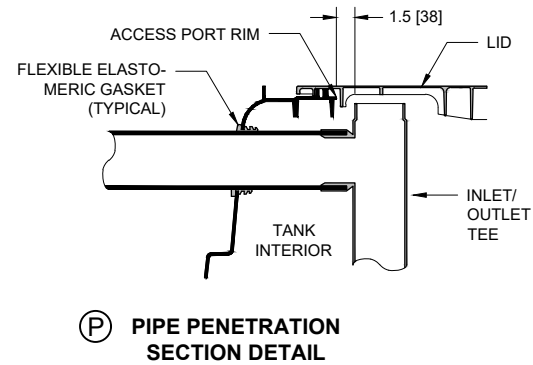
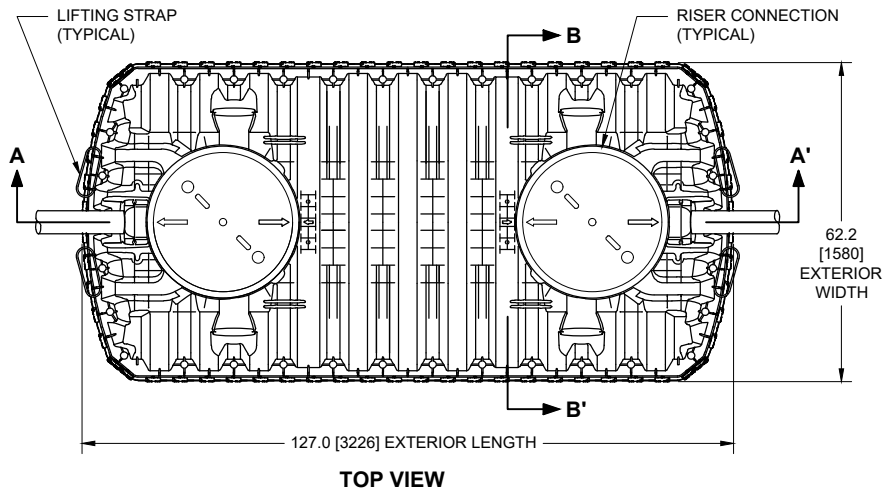
Sources/Notes:

1. All quantities are approximate and based on design measurements; field measurements and quantities may vary. Estimates are for planning purposes only.

Abbreviations: EA= Each, LF= Linear feet, SF= Square feet, O.E. = Or Equal

Appendix C

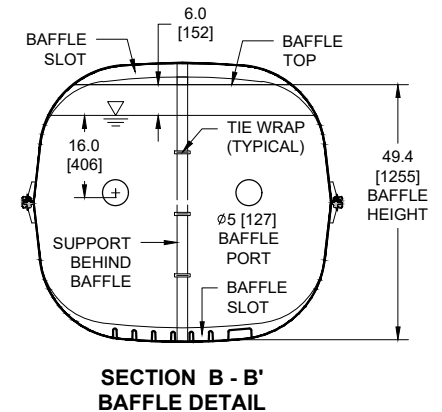
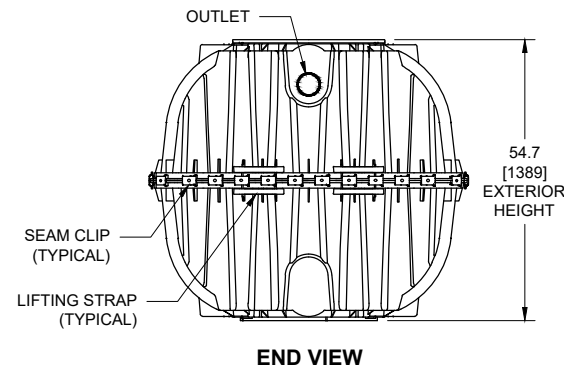
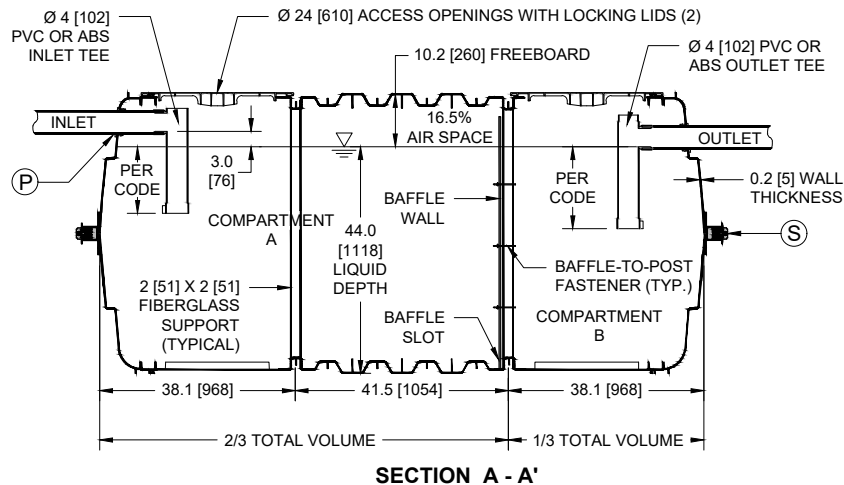
Product Sheets



TANK EXTERIOR	
LENGTH	127.0 [3226]
WIDTH	62.2 [1580]
HEIGHT	54.7 [1389]

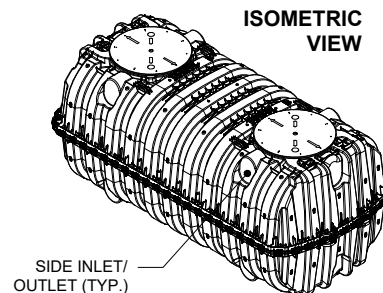
LIQUID DEPTH	44.0 [1118]
INVERT DROP	3.0 [76]
FREEBOARD	10.2 [260]

TOTAL CAPACITY	1287 GAL [4872 L]
WORKING VOLUME	1094 GAL [4141 L]
COMPARTMENT A VOL.	733 GAL [2775 L]
COMPARTMENT B VOL.	361 GAL [1366 L]



NOTES:

- ALL DRAWING DIMENSIONS IN INCHES [MILLIMETERS] OR AS NOTED.
- EXTERIOR OF ACCESS OPENING LID INCLUDES THE FOLLOWING WARNING IN ENGLISH, FRENCH & SPANISH: "DANGER DO NOT ENTER: POISON GASES."
- TANK MARKINGS WILL INCLUDE: MANUFACTURER NAME, MODEL NUMBER, LIQUID CAPACITY, DATE OF MANUFACTURE, MAXIMUM BURIAL DEPTH, INLET, AND OUTLET.
- MAXIMUM BURIAL DEPTH IS 48 in [1219 mm].
- MINIMUM BURIAL DEPTH IS 6 in [152 mm].
- TANK IS FOR NON-TRAFFIC APPLICATIONS.
- AIRSPACE IS 16.5%.
- OUTLET TEE IS COMPATIBLE WITH AN EFFLUENT FILTER.
- INTERIOR LENGTH TO WIDTH RATIO IS 2.3:1 (118.8-INCH LENGTH / 51.7-INCH WIDTH = 2.3).
- FREE VENT AREA BETWEEN TOP OF BAFFLE WALL AND BOTTOM OF TOP BAFFLE SLOT IS 39.7 in².
- BAFFLE WALL THICKNESS IS 0.31 in [8 mm].



INFILTRATOR WATER TECHNOLOGIES
4 Business Park Rd. Old Saybrook, CT 06475
(800) 221-4436

INFILTRATOR IM-1060 TANK
2-COMPARTMENT CONFIGURATION

Drawn by: EMB	Date: 08/05/2013
Scale: NOT TO SCALE	Sheet: 1 of 1

PFEF Submersible Effluent Pumps

Applications

PFEF Effluent Pumps are used primarily for pumping effluent to low-pressure (gravity) dispersal areas. They can handle solids up to ¾-inch (19-mm) in diameter, and their corrosion-resistant construction makes them highly durable in wastewater applications. All PFEF units are CSA and UL listed. Manufactured by Franklin Electric.



PFEF4011-B



PFEF4012



PFEF5011-B and PFEF10012-B



Powered by

Franklin Electric

Features/Specifications

To specify this product, require the following:

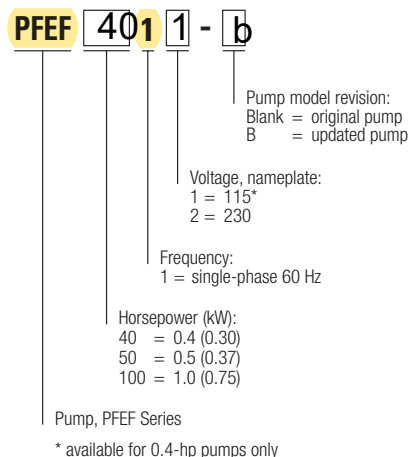
- Ability to handle liquids and solid waste materials up to ¾-inch (19-mm) in diameter
- Cast iron pump housing and cover with epoxy coating for corrosion resistance
- Oil-filled motor housing for lifetime lubrication and rapid heat dissipation
- Stainless steel screws, bolts, handle, and seal assembly
- Mechanical seals made of corrosion-resistant materials including stainless steel springs, nitrile parts, and carbon and ceramic faces
- Thermal overload protection for motor
- Rated for continuous duty
- Three-year warranty from date of manufacture

Standard Models

PFEF4011-B, PFEF4012, PFEF5011-B, PFEF5012-B, PFEF10012-B

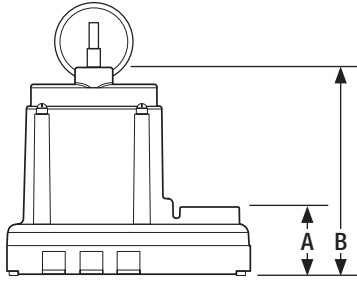
(Additional configurations available.)

Product Code Diagram

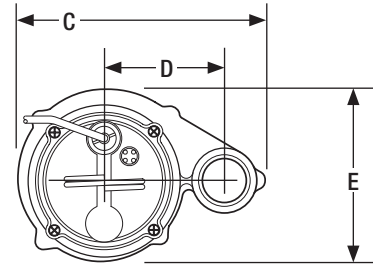


Materials of Construction

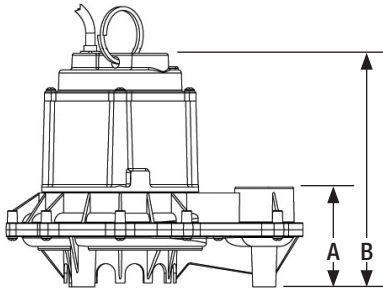
Component	PFEF4011-B	PFEF4012	PFEF50XX-B	PFEF10012-B
Motor Housing	Epoxy-coated cast iron	Epoxy-coated cast iron	Epoxy-coated cast iron	Epoxy-coated cast iron
Impeller	Thermoplastic elastomer	Polycarbonate	Epoxy-coated cast iron	Epoxy-coated cast iron
Volute	Epoxy-coated cast iron	ABS	Epoxy-coated cast iron	Epoxy-coated cast iron
Power cord	18/3, SJTW	16/3, SJTW	14/3, SJOOW	16/3, SJOOW
Mechanical shaft seal	Carbon/ceramic-faced nitrile	Carbon/ceramic-faced nitrile	Carbon/ceramic-faced nitrile	Carbon/ceramic-faced nitrile
Upper bearings	Sintered sleeve	Sintered sleeve	Ball	Ball
Lower bearings	Ball	Ball	Ball	Ball
Shaft	High-strength steel	416 stainless steel	416 stainless steel	416 stainless steel
Fasteners	Stainless steel	Stainless steel	Stainless steel	Stainless steel



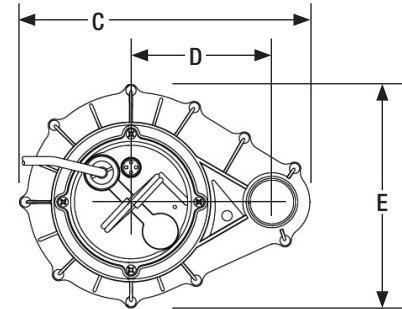
PFEF4011-B, side view



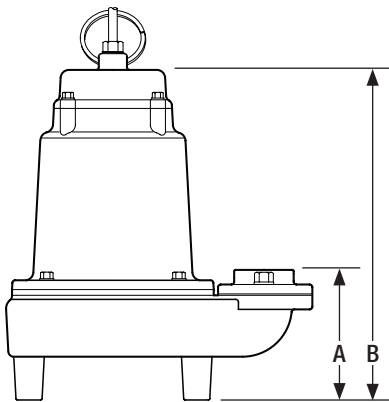
PFEF4011-B, top view



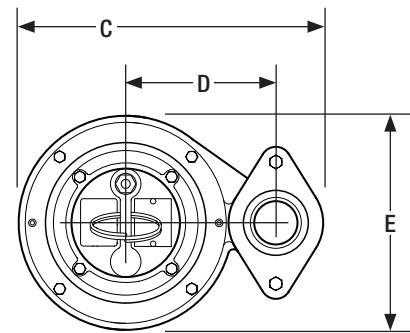
PFEF4012, side view



PFEF4012, top view



PFEF5011-B and PFEF10012-B, side view



PFEF5011-B and PFEF10012-B, top view

Specifications

Dimensions, in. (mm)	PFEF4011-B	PFEF4012	PFEF5011-B	PFEF5012-B	PFEF10012-B
A	2.9 (73)	3.9 (99)	3.8 (97)	3.8 (97)	3.8 (97)
B	9.2 (234)	9.3 (236)	13.8 (351)	13.8 (351)	13.8 (351)
C	9.6 (244)	11.7 (297)	12.3 (312)	12.3 (312)	12.3 (312)
D	4.6 (117)	5.7 (145)	5.8 (147)	5.8 (147)	5.8 (147)
E	6.8 (173)	9.0 (229)	9.5 (241)	9.5 (241)	9.5 (241)
Discharge size*	1½-inch FNPT	1½-inch FNPT	2-inch FNPT	2-inch FNPT	2-inch FNPT
Cord length, ft (m)	20.0 (6.1)	20.0 (6.1)	20.0 (6.1)	20.0 (6.1)	20.0 (6.1)
Weight, lb (kg)	26.5 (12.0)	24.0 (10.9)	56.0 (25.4)	56.0 (25.4)	57.0 (25.8)

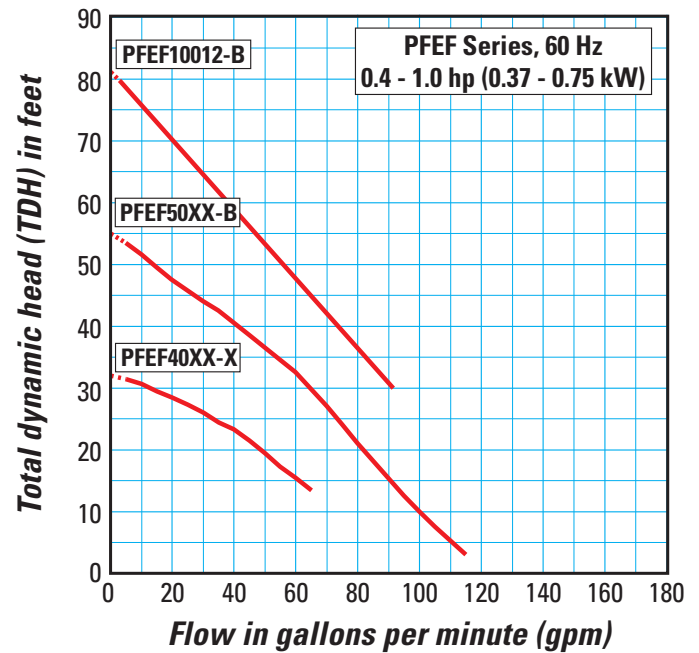
* Discharge is female NPT threaded, U.S. nominal size, to accommodate Orenco® discharge hose and valve assemblies. Consult your Orenco Distributor about fittings to connect discharge assemblies to metric-sized piping.

Performance

	PFEF4011-B	PFEF4012	PFEF5011-B	PFEF5012-B	PFEF10012-B
Horsepower (kW)	0.4 (0.30)	0.4 (0.30)	0.5 (0.37)	0.5 (0.37)	1.0 (0.75)
Nameplate voltage	115	230	115	230	230
Maximum amps	8.1	7.2	14.7	10.8	15.1
Minimum liquid level, in. (mm)	9.0 (230)	9.0 (230)	13.8 (351)	13.8 (351)	13.8 (351)
Maximum starts per day	100	100	100	100	100
Minimum off-time, minutes	1	1	1	1	1
Impeller type	Non-clog	Closed vane	Non-clog	Non-clog	Non-clog

Using a Pump Curve

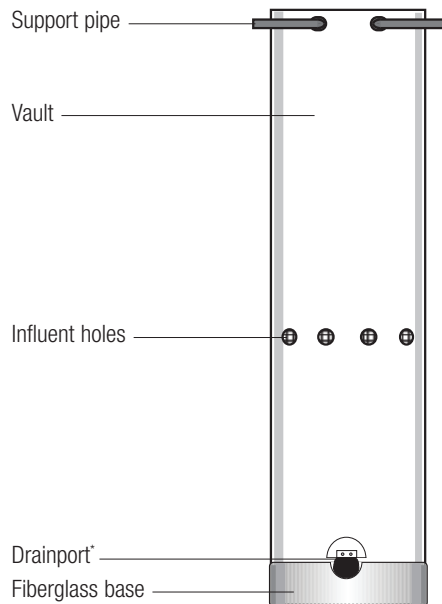
A *pump curve* helps you determine the best pump for your system. Pump curves show the relationship between flow (gpm or L/sec) and pressure (total dynamic head, or TDH), providing a graphical representation of a pump's optimal performance range. At low flow rates, TDH varies from pump to pump, so it is represented as a dashed line in the pump curves. For the most accurate pump specification, use Orenco's PumpSelect™ software.



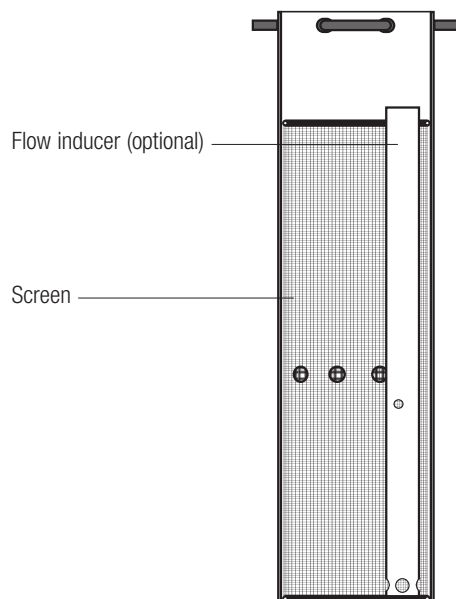
Screened Vaults

Applications

Orenco Screened Vaults are used to screen effluent being pumped from septic tanks in STEP systems and in on-site wastewater disposal systems.



Side View



Cutaway View

*Screened Vaults that are taller than 60 inches (1524 mm) and have inlet holes higher than 12 inches (305 mm) from the bottom are equipped with two drainports.

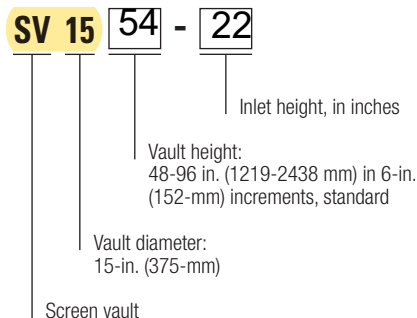
General

Orenco Screened Vaults are composed of a rigid cylindrical vault with a fiberglass base, a polyethylene screen and two support pipes. Effluent enters through eight influent holes around the perimeter of the vault and flows through the screen to the effluent pump. Orenco Screened Vaults are covered by US patent #4439323.

Standard Models

SV1548-16, SV1548FI-16, SV1554-22, SV1554FI-22, SV1560-28, SV1560FI-28, SV1560FIFI-18

Product Code Diagram

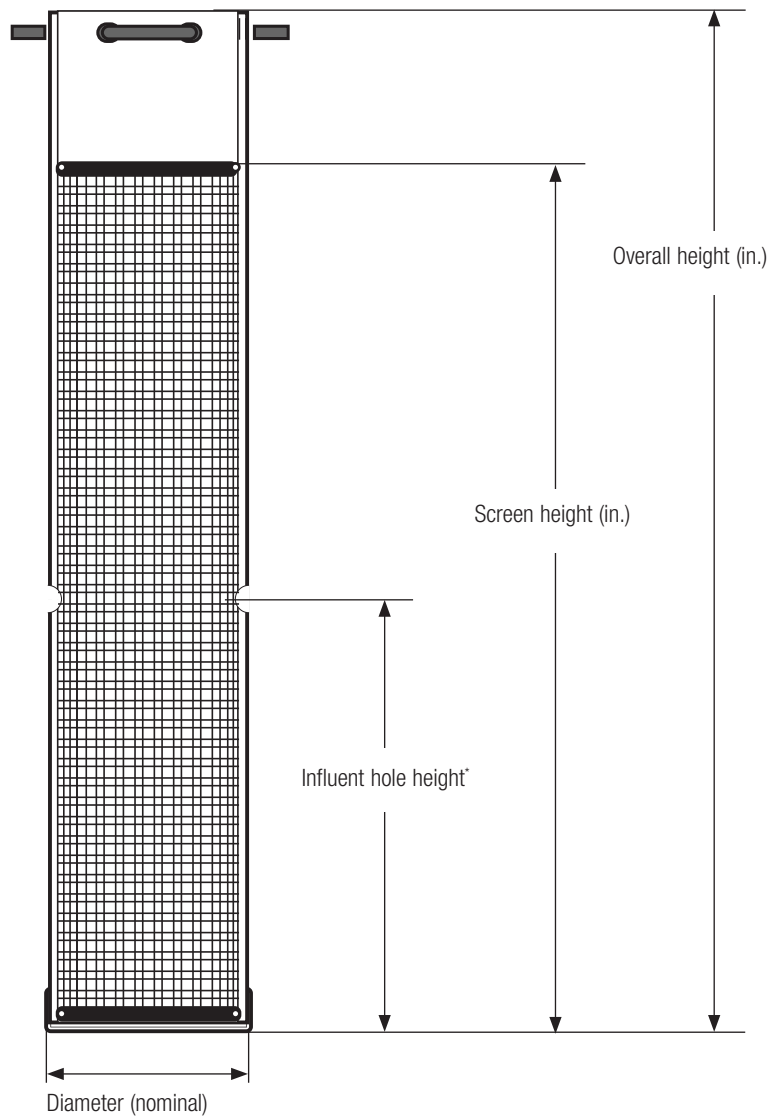


Materials of Construction

Vault	PVC irrigation pipe per SCS 432E
Screen top	Blue low-viscosity polyurethane
Screen body	Black medium-density polyethylene with a UV stabilizer
Fiberglass base	Injection molded fiberglass
Resin	UV stabilized chemical resistant polymer
Fiberglass:	Continuous strand E-glass mat
Support Pipe:	PVC per sch. 80 specification

Specifications

The screen mesh contains holes 1/8-inch (3-mm) square and has a nominal open area of 50%. Flow inducers are required in screened vaults when using high head turbine pumps. A flow inducer consists of a section of 4-inch (100-mm) PVC pipe with four 1 3/8-inch (35-mm) holes drilled around the perimeter at the base and two 1/2-inch (13-mm) orifices drilled near the center of the flow inducer. When pumping from a single compartment septic tank the discharge rate should not exceed 30 gpm (1.9 L/sec). Higher flow rates require a multiple tank arrangement, typically with an effluent filter in the primary tank.



Dimensions

Model	SV1548-16	SV1554-22	SV1560-28
Diameter, nominal, in. (mm)	15 (375)	15 (375)	15 (375)
Overall height, in. (mm)	48 (1219)	54 (1372)	60 (1524)
Mesh screen height, in. (mm)	39 (990)	45 (1143)	51 (1295)
Influent hole height*, in. (mm)	16 (406)	22 (559)	28 (711)

* Influent hole height may vary depending upon the configuration of the tank. Optimum hole height is at 70% of the minimum liquid level for single compartment tanks.

External Splice Box (SBEX)

Installation Instructions

Step 1: Drill Hole in Riser (if Necessary)

If the access riser has a pre-drilled and prepped splice box hole, go to Step 2.

Step 1a: Measure and mark the inside of the riser for the splice box pilot hole — 6.25 inches (159 mm) down from the top of the riser or riser-lid adapter.

- Choose the side of the riser closest to the panel.

Step 1b: Drill a 1/4-inch (6-mm) pilot hole through the riser from the inside.

Step 1c: Use a hole saw to cut a 5-inch (127-mm) hole through the riser, centered on the pilot hole, from the inside.

Step 1d: Clean and deburr the hole.

- Be careful not to enlarge the hole.

Step 2: Attach Riser Adapter

Step 2a: Press the riser adapter into the hole, as shown in image 2a.

Step 2b: Use the riser adapter as a template and drill four 1/8-in. (3.2-mm) holes through the riser, from the inside.

- Remove the adapter when done.

Step 2c: Apply a continuous bead of ADH200 sealant/adhesive or methacrylate adhesive to the groove at the riser adapter's base.

Step 2d: Press the riser adapter into the hole, as shown in image 2a.

- Make sure it fully seats against the riser.

Step 2e: Secure the riser adapter to the riser with the four included #8 × 1/2 screws.

Step 2f: Secure the #8 × 5/8 screw/washer/hook-and-loop assembly to the riser adapter.

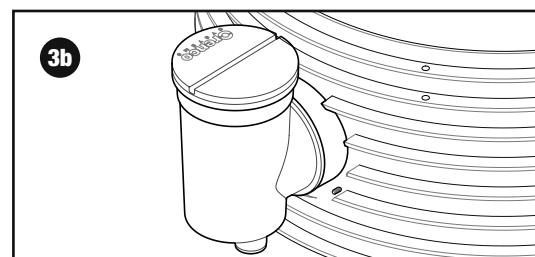
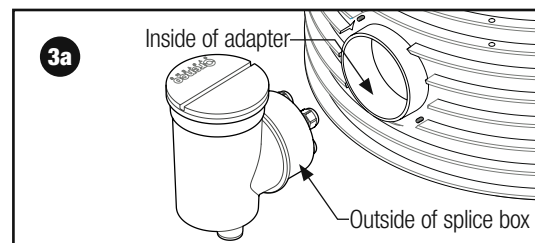
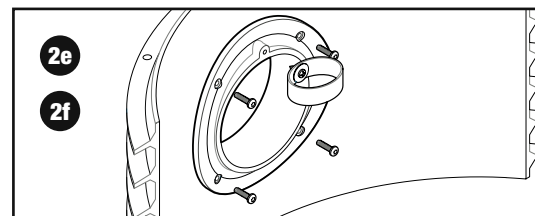
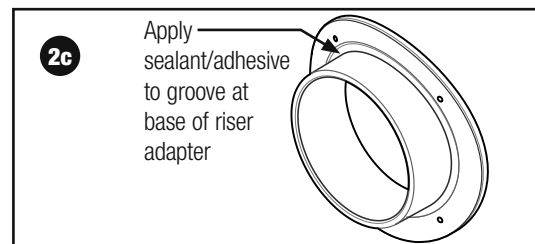
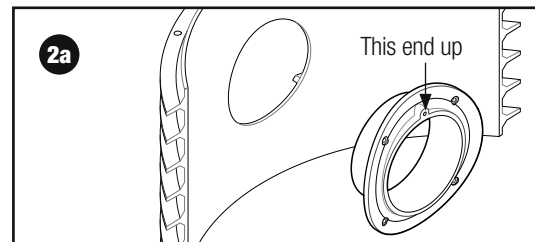
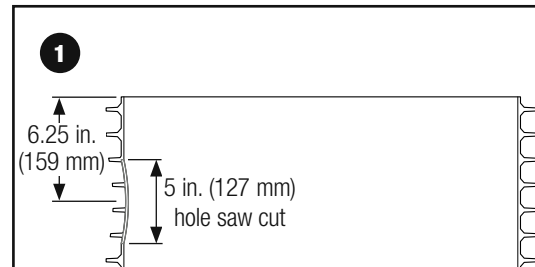
Step 3: Attach SBEX

Step 3a: Apply ABS-to-PVC transition glue to the bonding surfaces in the riser adapter and on the splice box.

Step 3b: Press the splice box fully into the riser adapter.

- The splice box lid goes up toward the top of the riser.
- Make sure the splice box is vertically straight and level as you press it in.
- Leave the supplied conduit caps and waterproof wire nuts inside of the splice box.

NOTE: For routing and connecting wires inside the splice box, see "Orenco Control Panels: General Installation and Wiring Instructions," EIN-CP-GEN-1.



Standard Control Panel Kits

Applications

Orenco® Standard Panel Kits are ideal for electromechanical control of a single pump in on-demand septic systems. Standard Control Panel Kits include the following:

- Orenco® S-series control panel
- Signal-rated float switches
- Float collars

The panel features a durable motor controller, which increases system life by reducing the load requirements on the float switches.

The float switches are signal-rated and color-coded for easy installation.

The float collars quickly secure floats to a 1-inch-diameter float stem (ordered separately).



Orenco's Standard Panel Kits are a high-quality but affordable solution for on-demand pumping in water and wastewater applications.

Standard Features & Benefits

- Complete package including panel, floats and collars
- Single pump controls
- UV-resistant fiberglass panel enclosure
- Touch-safe terminals
- Resettable circuit breakers
- Durable motor controllers (2.5 million cycles at FLA)
- Audible and visual alarms
- "Push-to-silence" audible alarm relay
- Color-coded float switches
- UL 508 listed in the U.S. and Canada
- Complete documentation and technical support provided by Orenco
- Three-year limited warranty on control panel

Optional Features & Benefits

- Kits available with non-mercury floats for areas that require them
- Self-regulating, anti-condensation heater (radiates additional wattage as temperature drops)
- Electromechanical timer
- Redundant off relay

To Order

Call your nearest Orenco Systems®, Inc. Distributor. For nearest Distributor, call Orenco at 800-348-9843, or visit www.orenco.com and click on "Where to Buy."

Specifications

Materials of Construction

Panel Enclosure	UV-resistant fiberglass, Type 4X
Panel Hinges	Stainless Steel
Float housing	Impact-resistant, noncorrosive PVC
Float cord	Flexible 2-conductor SJOW, water-resistant (CPE), neoprene coating
Float collar	ABS

Dimensions

Height, in. (mm)	11.5 (292)
Width, in. (mm)	9.5 (241)
Depth, in. (mm)	5.4 (137)

Performance

Panel ratings	120 V, 1 hp (0.75 kW), 16 A, single-phase, 60 Hz
Motor-start contactor	16 FLA, 1 hp (0.75 kW), 60 Hz; 2.5 million cycles at FLA (10 million at 50% of FLA)
Pump circuit breaker	120 V, 20 A, OFF/ON switch, single-pole
Control circuit breaker	120 V, 10 A, OFF/ON switch, single-pole
Toggle switch	20 A, Single-pole, double-throw HOA switch
Audible alarm	95 dB at 24 in. (610 mm), warble-tone, Type 4X
Visual alarm	7/8 in. (22 mm) red lens, "Push-to-silence," 120 V LED, Type 4X

Models*

S1-MFAB-Y,G-KIT

Panel	S panel
Power	120 VAC
Floats	High level alarm (yellow), pump on/off (green)

S1-MF3A-Y,B,R-KIT

Panel	S panel
Power	120 VAC
Floats	High level alarm (yellow), pump on (blue), pump off (red)

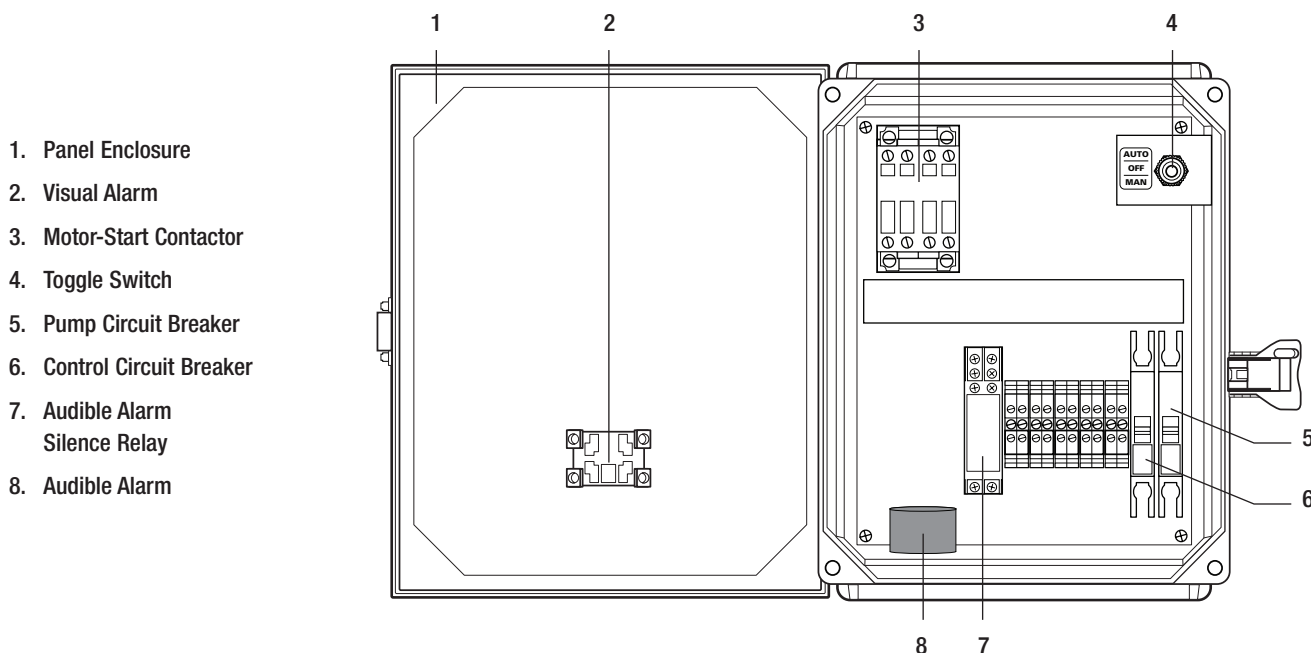
S1-MF3V-Y,B,R-KIT (Non-Mercury Floats)

Panel	S panel
Power	120 VAC
Floats	Non-mercury high level alarm (yellow), pump on (blue), pump off (red)

S1R0-MFABT-Y,G,W-KIT

Panel	S panel with redundant off
Power	120 VAC
Floats	High level alarm (yellow), pump on/off (green), redundant off (white)

* Additional models available - Contact your Distributor for more details

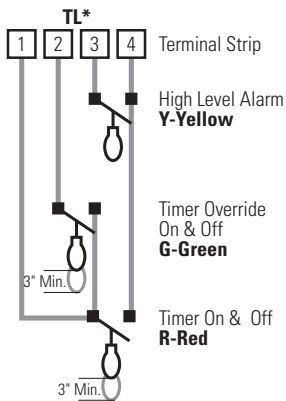


Distributed By:

Float Arrangement Diagram

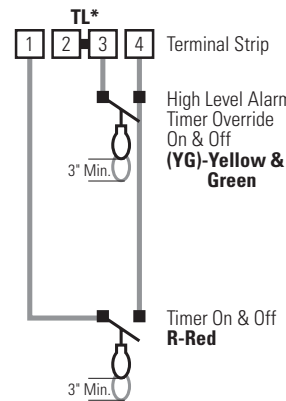
Check the appropriate box for the float function (color code) used in your system.

☐ **YGR** • Factory Standard •



For a wire splicing illustration of the above diagram, request Splice Box Wiring Diagram: **EDW-SB-S-7**

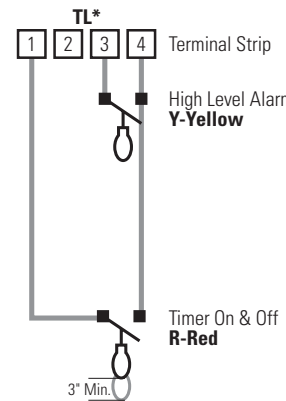
☐ **(YG)R**



***Install Terminal Link. See Panel Wiring Diagram for instructions.**

For a wire splicing illustration of the above diagram, request Splice Box Wiring Diagram: **EDW-SB-S-6**

☐ **YR**



For a wire splicing illustration of the above diagram, request Splice Box Wiring Diagram: **EDW-SB-S-5**

Float Types

■ **Typical Orenco float model: A**
Specs: contact - normally open
differential - no minimum
power rating - signal
Possible substitutions: B,C,D

■ **Typical Orenco float model: B**
Specs: contact - normally open
differential - 3\" data-bbox="660 415 820 490"/>

■ **Typical Orenco float model: T**
Specs: contact - normally closed
differential - no minimum
power rating - signal

814 AIRWAY AVENUE
SUTHERLIN, OREGON
97479-9012

TELEPHONE:
(541) 459-4449

FACSIMILE:
(541) 459-2884

Control Panel Series

S PT

Drawing No.

EDW-FA-S-27

EDW-FA-S-27
Rev 1.0 © 04/15/13

Float Switch Settings and Adjustments

Before You Begin

Part 1 of these instructions provides basic information on how to make initial float switch settings in the absence of guidance from site plans, specifications, or applicable regulations regarding dosing, surge, and reserve volumes. These instructions are specific to pump vaults and tanks of 1000gal (3758L) or greater volume, both single-compartment and two-compartment with shared liquid levels.

Part 2 of these instructions explains how to physically adjust the position of float switches on an Orenco float switch assembly. For information on float switch settings and adjustments for AdvanTex® systems ("recirc" float switch settings), see NIN-ATX-DA-1, [Float Switch and RSV Settings for Residential AdvanTex Systems Instructions](#).

All product and performance assertions are based on proper design, installation, operation, and maintenance according to Orenco's current published documentation.

Part 1. Guidelines for Initial Float Switch Settings

Float switch settings are the vertical distances from a common point of reference on the tank's outside top to the set screw on the collar of individual float switches. They are used to control alarms and pump operations. Float switch settings are typically based on the needed or required volumes for the corresponding functions operated by the control panel, such as initiating a pumping event, engaging a timer, or triggering an alarm.

In the absence of guidance from site plans, specifications, or applicable regulations, Orenco recommends the following initial float switch settings for the systems listed in these instructions. Once you've determined the dose volume or timer settings, it is important to assess the necessary volumes between the float switches and adjust them accordingly.

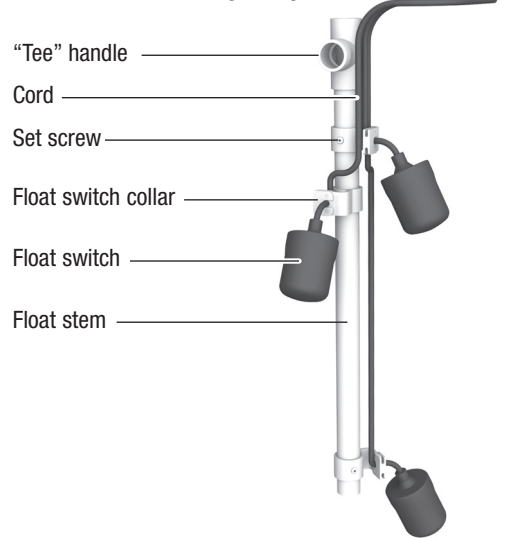
Single-Pump (Simplex) Systems, Demand-Dose

- ❶ **High-Level Alarm:** Set at the same elevation as the tank inlet's invert.
- ❷ **Pump On or Pump On/Off:** Set 2in (51mm) below the High-Level Alarm.
- ❸ **Pump Off (if used):** Set 2½in (64mm) below the switch above it.
 - Set this switch at least 5in (127mm) above the top of the filter cartridge if a Redundant Off/Low-Level Alarm (R/O) is used. If an R/O float switch is not used, set this switch at least 3in (76mm) above the top of the filter cartridge.
- ❹ **Redundant Off/Low-Level Alarm (if used):** Set at least 2in (51mm) below the switch above it.
 - Set this switch at least 3in (76mm) above the top of the filter cartridge.
 - Make sure this float switch is above the pump's minimum liquid level.

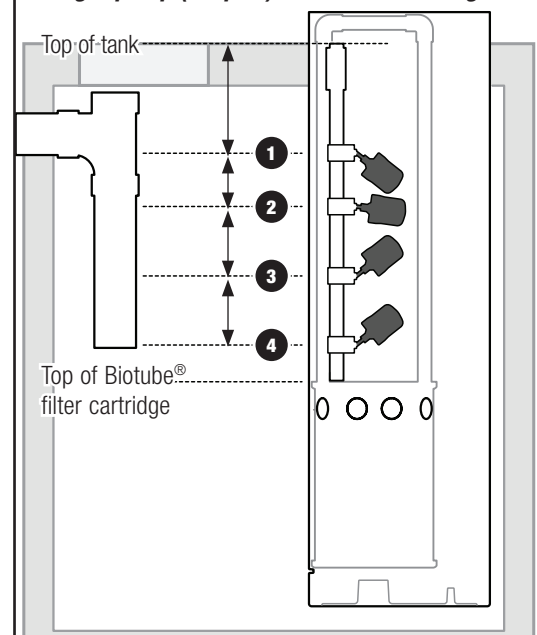
Single-Pump (Simplex) Systems, Timed-Dose

- ❶ **High-Level Alarm or High-Level Alarm/Timer Override:** Set at the same elevation as the tank inlet's invert.
- ❷ **Timer Override or Timer On/Off (if used):** Set 2in (51mm) below the High-Level Alarm.

Float switch assembly components



Single-pump (simplex) float switch settings



Single-Pump (Simplex) Systems, Timed-Dose, cont.

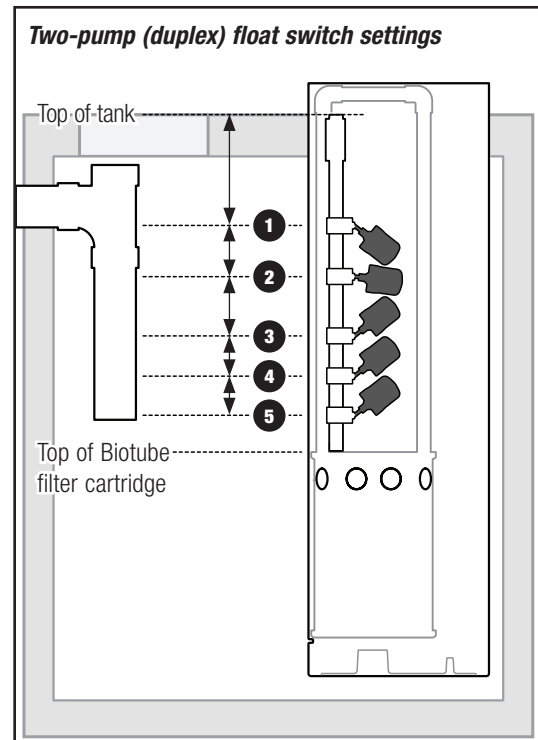
- ③ **Timer On/Off:** Set at the distance below the override float switch that equals the average daily flow for the system.
 - Determine the average day flow for the system.
 - Determine the gallons per inch (liters per mm) for the tank or basin.
 - Divide the average daily flow by gallons per inch or liters per mm of the tank chamber or basin to determine the necessary distance from the Timer On/Off to the float switch above it.
 - Set this switch at least 4½in (114mm) above the top of the filter cartridge if a Redundant Off/Low-Level Alarm (R/O) is used. If an R/O float switch is not used, set this at least 3in (76mm) above the top of the filter cartridge.
- ④ **Redundant Off/Low-Level Alarm (if used):** Set 3in (76mm) below the switch above it.
 - Set this switch at least 3in (76mm) above the top of the filter cartridge.
 - Make sure this float switch is above the pump's minimum liquid level.

Two-Pump (Duplex) Systems, Demand-Dose

- ① **High-Level Alarm or High-Level Alarm/Lag Pump Enable:** Set at the same elevation as the tank inlet's invert.
- ② **Lag Pump Enable (if used):** Set 2in (51mm) below the switch above it.
- ③ **Lead Pump On:** Set 2in (51mm) below the switch above it.
- ④ **Pumps Off:** Set 1½in (38mm) below the switch above it.
 - Set this switch at least 5in above the top of the filter cartridge if a Redundant Off/Low-Level Alarm (R/O) is used. If an R/O float switch is not used, set this switch at least 3in (76mm) above the top of the filter cartridge.
- ⑤ **Redundant Off/Low-Level Alarm (if used):** Set 3in (76mm) below the switch above it.
 - Set this switch at least 3in (76mm) above the top of the filter cartridge.
 - Make sure this float switch is above the pump's minimum liquid level.

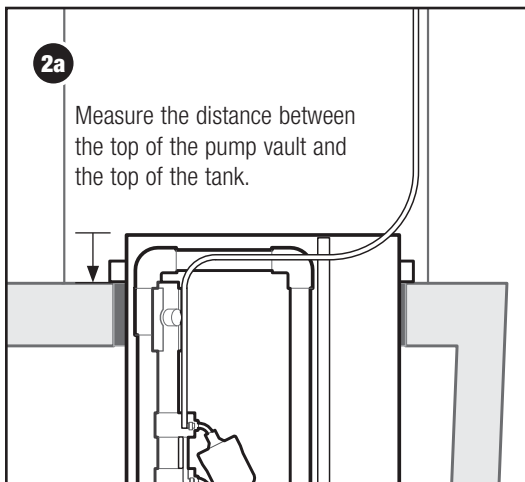
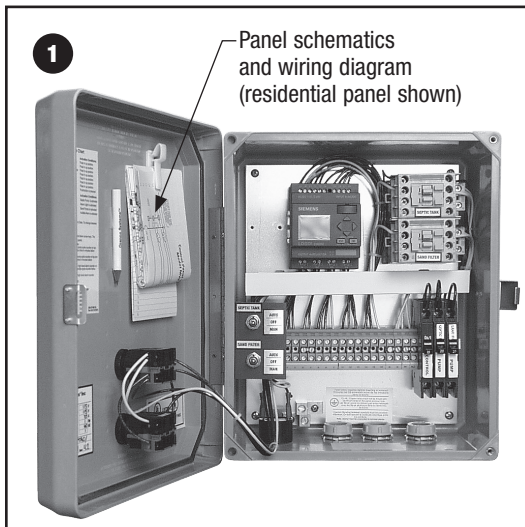
Two-Pump (Duplex) Systems, Timed-Dose

- ① **High-Level Alarm or High-Level Alarm/Lag Pump Enable:** Set at the same elevation as the tank inlet's invert.
- ② **Lag Pump Enable (if used):** Set 2in (51mm) below the switch above it.
- ③ **Timer Override:** Set 2in (51mm) below the switch above it.



Two-Pump (Duplex) Systems, Timed-Dose, cont.

- 4 **Timer On/Off:** Set at the distance below the override float switch that equals the average daily flow for the system.
 - Determine the average day flow for the system.
 - Determine the gallons per inch (liters per millimeter) for the tank or basin.
 - Divide the average daily flow by gallons per inch or liters per millimeter of the tank chamber or basin to determine the necessary distance from the Timer On/Off to the float switch above it.
 - Set this switch at least 4½in (114mm) above the top of the filter cartridge if a Redundant Off/Low-Level Alarm (R/O) is used. If an R/O float switch is not used, set this switch at least 3in (76mm) above the top of the filter cartridge.
- 5 **Redundant Off/Low-Level Alarm (in 4-switch systems):** Set 2½in (64mm) below the switch above it.
 - Set this switch at least 3in (76mm) above the top of the filter cartridge.
 - Make sure this float switch is above the pump's minimum liquid level.



Part 2. Adjusting Float Switch Settings

Step 1. Check Float Switch Assembly

Check the assembly against the system's wiring diagram (located in the control panel).

- If you can't locate the wiring diagram, contact Orenco for a replacement.
- For information on 3-pump or 4-pump systems, contact your distributor or Orenco.

Step 2. Verify Float Switch Settings

Step 2a: Measure the distance between the top of the pump vault and the top of the tank. Note this distance for use in the following steps.

- Use the top of the tank as the common reference point for setting float switches.

Step 2b: Starting at the top of the pump vault, measure down along the stem of the float switch assembly the same distance measured in the previous step.

Step 2c: Mark that distance on the float switch assembly stem.

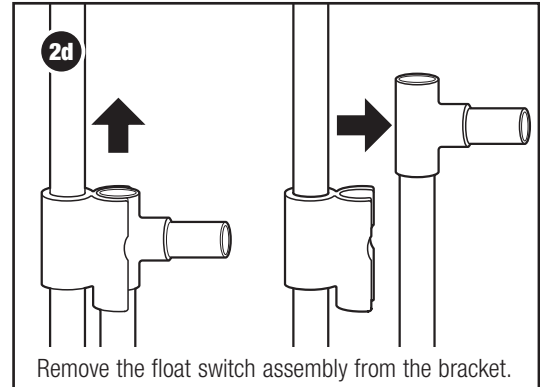
- If measured and marked correctly, this mark should be level with the outside top of the tank, and you can use it to measure float switch settings with the float switch assembly removed.

Step 2. Verify Float Switch Settings, cont.

Step 2d: Remove the float switch assembly from the bracket.

Step 2e: Use the plans/specifications or applicable regulations and the reference mark on the stem to make sure the float switches are set correctly.

- If the settings don't match the plans, specifications, or applicable regulations, adjust the settings accordingly.
- If there are no plans, specifications, or applicable regulations, use the general guidelines in this document to determine initial float switch settings for the system.
- For further assistance, call your distributor or Orenco.



Step 3. Adjust Float Switch Settings

Step 3a: Loosen the set screw(s) on the float switch collar(s).

- Don't back the set screws completely out of the float switch collars.

Step 3b: Adjust the float switch collar(s) vertically to match the settings provided on the plans or in applicable regulations.

- For existing systems, vertically adjust the collar as necessary to meet discharge volume needs as described in the plans/specifications or applicable regulations.

Step 3c: Check for vertical and horizontal clearance between the float switches and between the float switches and the walls of the vault or basin.

- Move each float switch through its range of vertical motion.
- The float switches shouldn't interfere with one another during this check.

Step 3d: If the float switches interfere with another, adjust the collar horizontally until the float switch is clear of the float switch(es) above or below it.

Step 3e: When the float switch(es) are adjusted and have vertical and horizontal clearance, tighten the set screw(s).

Step 3f: Reinstall the float switch assembly back into the float switch bracket and use the reference mark to set the float switch assembly at the correct distance from the outside top of the tank.

- Make sure that the walls of the vault or basin don't interfere with the movements of the float switches. If they do, remove the float switches, and readjust their horizontal clearances.

