

ONSITE WASTEWATER TREATMENT SYSTEM DESIGN

LOT 4, NW $\frac{1}{4}$ SEC. 5 & NE $\frac{1}{4}$, SEC. 6, T7S, R70W, 6TH P.M. JEFFERSON COUNTY, COLORADO

DESIGN CRITERIA

The system is designed to serve a proposed 5 bedroom single family residence.

Flows:

$$Q_1 = 3\text{bedrooms} \times 2\text{persons} \times 75 \text{ GPD} = 450 \text{ GPD}$$

$$Q_2 = 2\text{bedrooms} \times 1\text{persons} \times 75 \text{ GPD} = 150 \text{ GPD}$$

$$Q_{\text{total}} = 600 \text{ GPD}$$

Septic Tank Requirements:

Install a Valley Precast 1,500 gallon, 3 compartment concrete septic tank Valley Precast (model number 1500T-3CP-HH), equipped with an Orenco screened vault pump system (model BPP50DD-CW-SX-ETMCT).

Alternative Tank:

Install an Infiltrator 1,500 gallon, 2 compartment septic tank (model number IM-1530), followed by an Infiltrator 500 gallon, single compartment septic tank (model number IM-540) equipped with an Orenco screened vault pump system (model BPP50DD-CW-SX-ETMCT).

Soil treatment area:

The soil treatment area has been calculated based upon the soil analysis and the design flows:

INFILTRATIVE SURFACE #1

$$A = (Q/\text{Secondary Sand Filter Application Rate}) \times \text{Application Adjustment Factor}$$

$$A = 600/0.80 \text{ (TL1)} \times 1.0 \text{ (Pressure Dosed bed)}$$

$$A = 750 \text{ sq. ft.}$$

INFILTRATIVE SURFACE #2

$$A = (Q/\text{Long Term Acceptance Rate}) \times \text{Application Adjustment Factor}$$

$$A = 600/0.65 \text{ (TL3)} \times 1.0 \text{ (Pressure Dosed bed)}$$

$$A = 924 \text{ sq. ft.}$$

We propose one 12' x 77' soil treatment area bed.

INSTALLATION OBSERVATION REQUIREMENTS

This office is to observe the installation of the system at the following intervals:

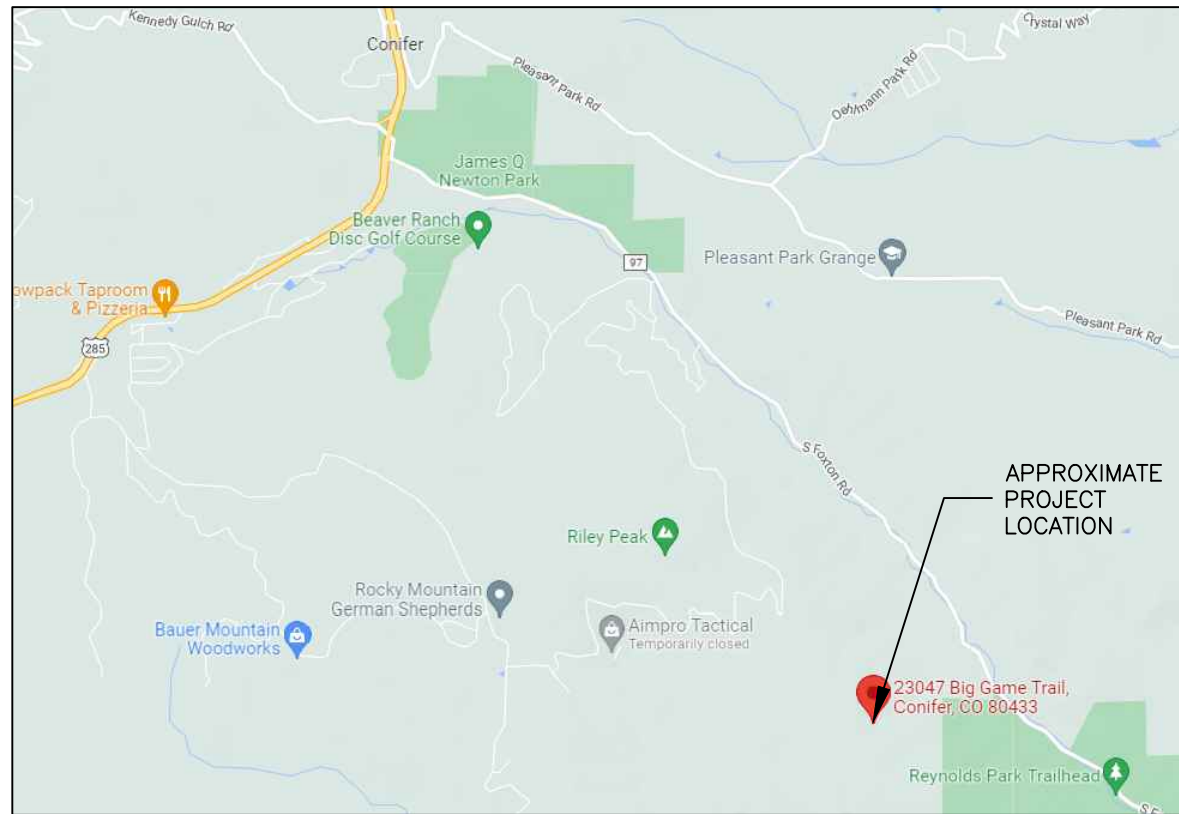
- (1) STA Open Hole Observation
- (2) Final Pre-Burial Observation
- (3) Final Grade Observation

INDEX OF DRAWINGS

SHEET NO.	TITLE
1.	Design Criteria
2.	Site and Soil Evaluation
3.	Site Plan(s)
4.	Soil Treatment Area/Piping Details
5.	Design Profile
6.	Septic Tank Details
7.	Pump and System Curves

WATER SUPPLY REQUIREMENTS

The residence is to be served by a proposed well to be located greater than 200 feet from the proposed soil treatment area. A well location has been depicted on Sheet 3.



LOCATION MAP

GENERAL NOTES

This plan set and the information contained herein has been prepared to fulfill the "Report and Site Plan" and the "Design Document" sections of the OWTS Regulations. The locations of wells and OWTS components shown on this site plan, and staked in the field are not the result of a property survey, and are to be considered approximate. It is the property owner's responsibility to ensure all construction is located within the property boundaries. All separation distances are to be verified prior to excavation.

Design criteria has been created based upon information submitted. If conditions differ from the information presented, this office should be contacted to verify and observe the conditions.

Locate all utilities prior to construction. Contractor shall have one set of county approved plans, on the jobsite, at all times during the construction and observation period. Deviation from these plans must be approved by the engineer.

All onsite wastewater treatment system construction, and any requirements not specified within this design, must meet county requirements and the requirements of local OWTS regulations. The contractor should have documented, and demonstrated, knowledge of the requirements and regulation of the county in which they are working.

All components of the OWTS (septic tank, piping, pump tanks, valves, proprietary units, etc.) are to be installed in accordance with the manufacturer recommendations.

The system is designed and intended to be used only for the wastewater load specified.

285 ENGINEERING
P.O. BOX 1048
CONIFER, CO
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PROJECT: 2022358 - OWTS DESIGN

LOCATION:
23047 BIG GAME TRAIL
CONIFER, CO 80433

CLIENT: JOE & DIANNE RUNDELL

TITLE: DESIGN CRITERIA

DATE: 10/28/2022

SCALE: NONE

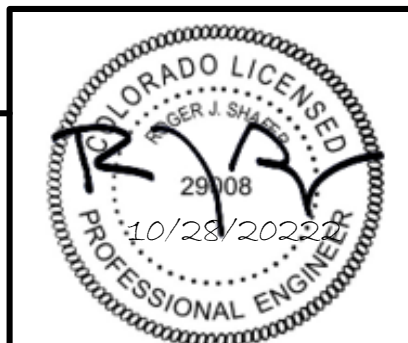
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REVISIONS:



SHEET:

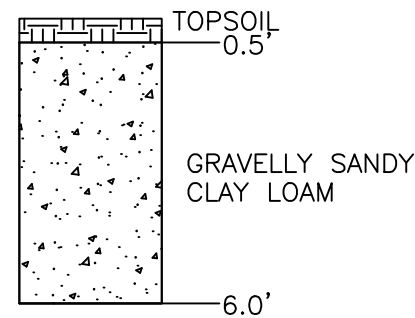
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SOILS INFORMATION

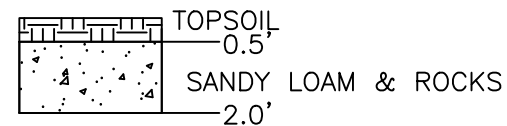
DATE TESTING COMPLETED: 10/04/2022
 EQUIPMENT USED: MINI-EXCAVATOR
 DEPTH TO BEDROCK REFUSAL: 2 FEET
 DEPTH TO STANDING WATER: NOT PRESENT
 REDOXIMORPHIC FEATURES: NOT PRESENT
 LTAR: 0.65 SOIL TYPE 3, TL3

PROFILE #1



SOIL TYPE, TEXTURE AND STRUCTURE				
DEPTH	SOIL TYPE	TEXTURE	STRUCTURE/SHAPE	STRUCTURE/GRADE
0.5'-6.0'	R-1	TYPE 3 SOIL WITH 35-65% LARGER THAN 2MM	GR	2(MODERATE)

PROFILE #2



SOIL TYPE, TEXTURE AND STRUCTURE				
DEPTH	SOIL TYPE	TEXTURE	STRUCTURE/SHAPE	STRUCTURE/GRADE
0.5'-2.0'	R-1	TYPE 3 SOIL WITH 35-65% LARGER THAN 2MM	GR	2(MODERATE)

SCALE: 1/4" = 1'

SITE AND SOIL EVALUATION

A site and soil evaluation was conducted by 285 Engineering in accordance with the OWTS Regulations, and the results of that evaluation is presented herein.

ANTICIPATED CONSTRUCTION RELATED ISSUES

DEPTH OF TEST PITS LIMITED DUE TO THE SIZE OF EXCAVATION EQUIPMENT USED. DUE TO THE SHALLOW DEPTH OF BEDROCK ENCOUNTERED WITHIN THE TEST PITS, BLASTING MAY BE NECESSARY TO INSTALL THE SEPTIC TANK AND/OR SOIL TREATMENT AREA. IF THE INSTALLER DETERMINES BLASTING IS NECESSARY, THEN A LICENSED BLASTER SHOULD BE CONTACTED TO DEVELOP AN APPROPRIATE BLAST PLAN.

POTENTIAL LAND USE CHANGES

There are no known or foreseeable land use changes that would affect system performance.

DIFFICULTIES ENCOUNTERED DURING SITE VISIT

There were no difficulties encountered during the site visit that prevented a complete evaluation of the property.

SITE EVALUATOR

TYLER SHAFER
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 CONIFER, CO. 80433
 720-576-3572
 tyler@285engineering.com

BS Civil Engineering

Credentials: CPOW Soils Characterization Class 2017

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PROJECT: 2022358 - OWTS DESIGN

LOCATION:
 23047 BIG GAME TRAIL
 CONIFER, CO 80433

CLIENT: JOE & DIANNE RUNDELL

TITLE: SITE AND SOIL EVALUATION

DATE: 10/28/2022

SCALE: SHOWN

DRAWN BY: TS

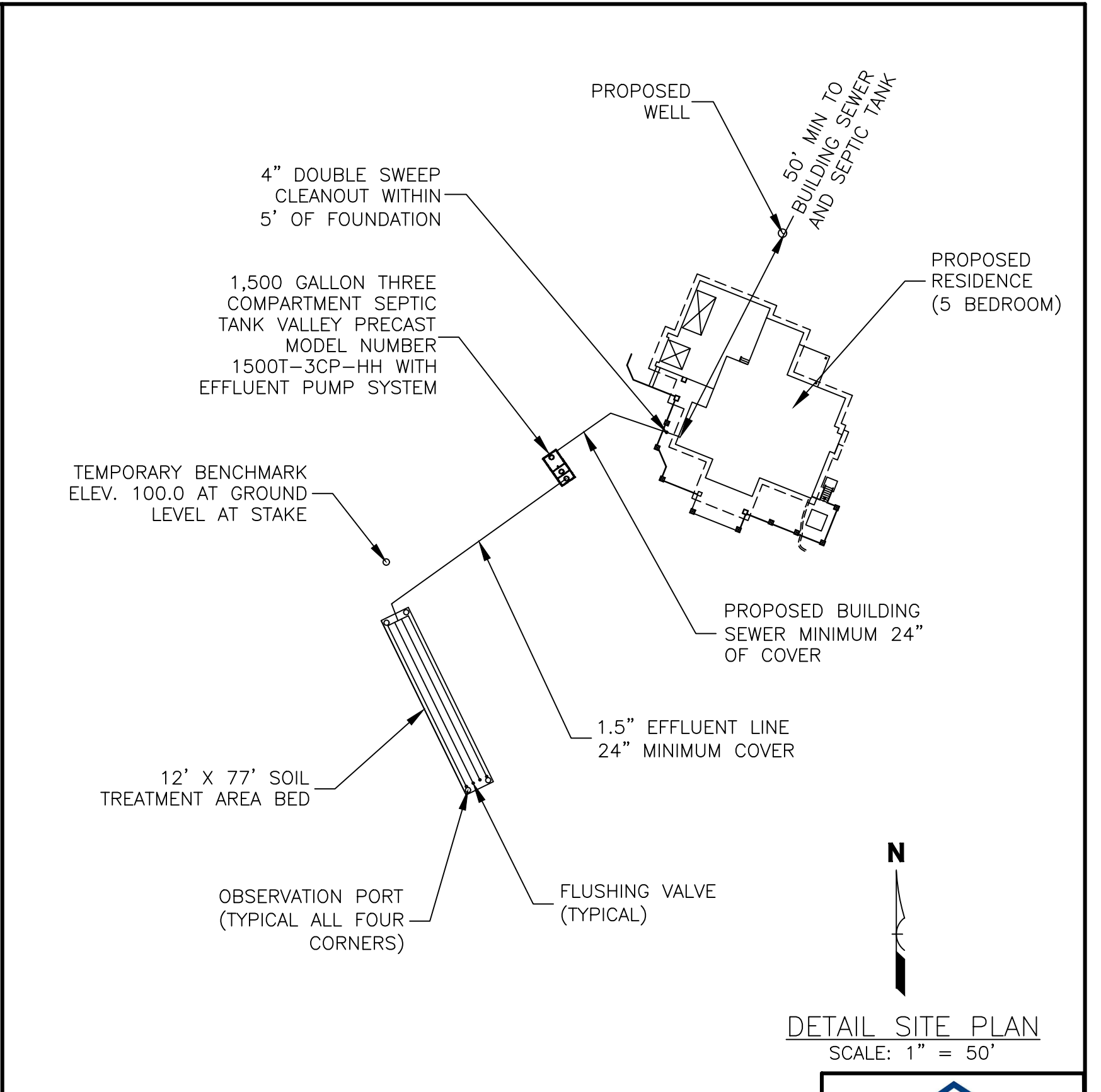
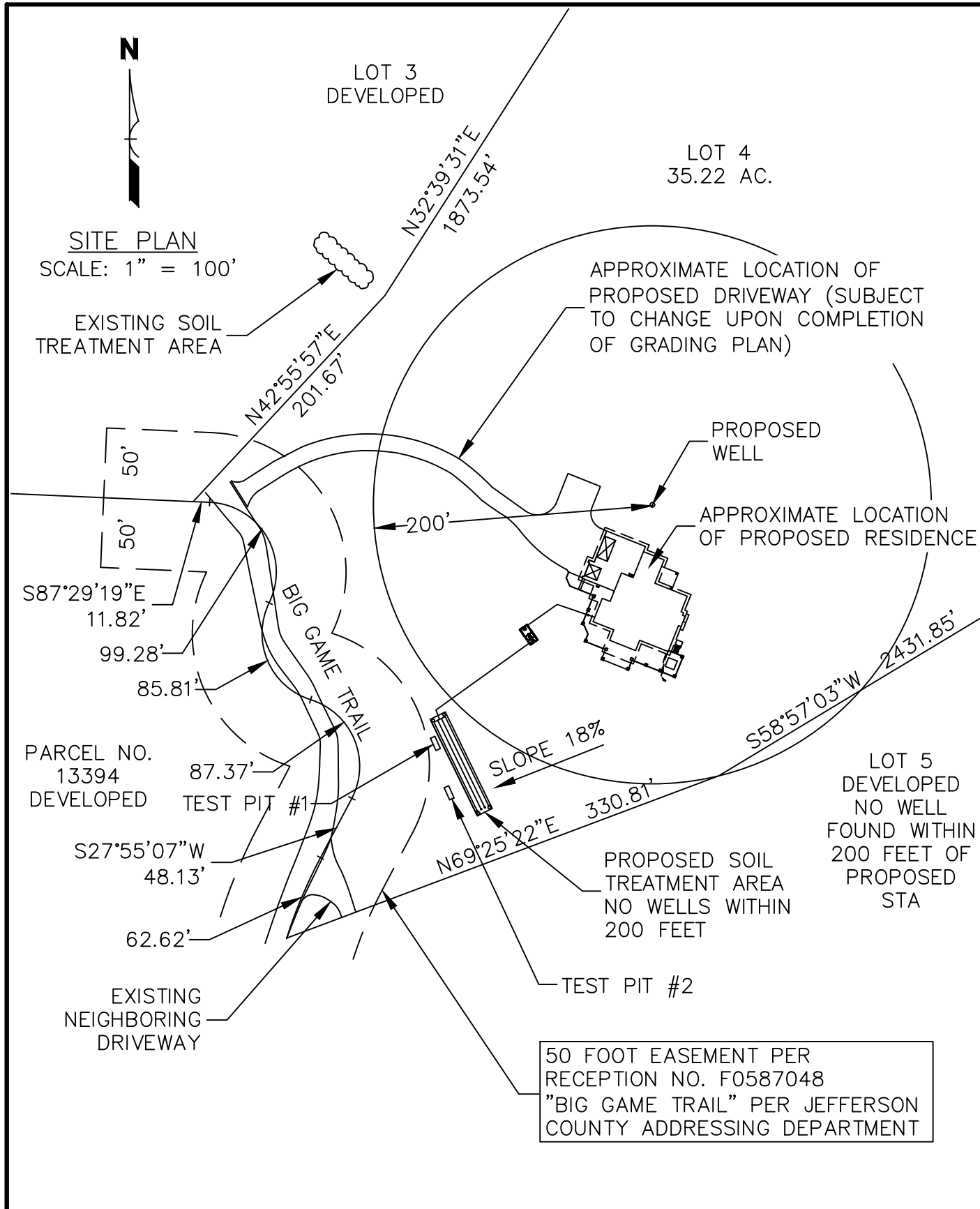
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SHEET:

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PROJECT: 2022358 - OWTS DESIGN

LOCATION:
 23047 BIG GAME TRAIL
 CONIFER, CO 80433

CLIENT: JOE & DIANNE RUNDELL

TITLE: SITE PLAN

DATE: 10/28/2022

SCALE: SHOWN

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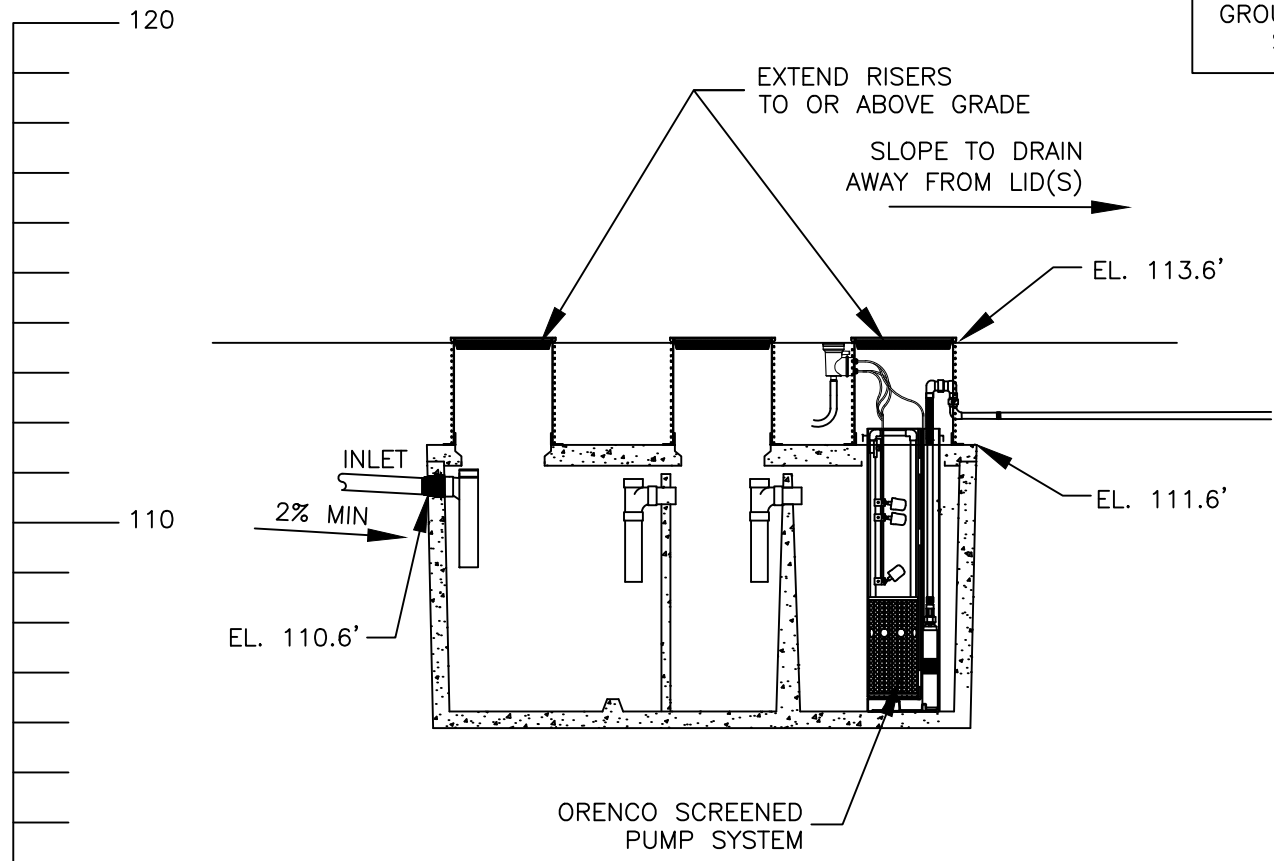
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SHEET:
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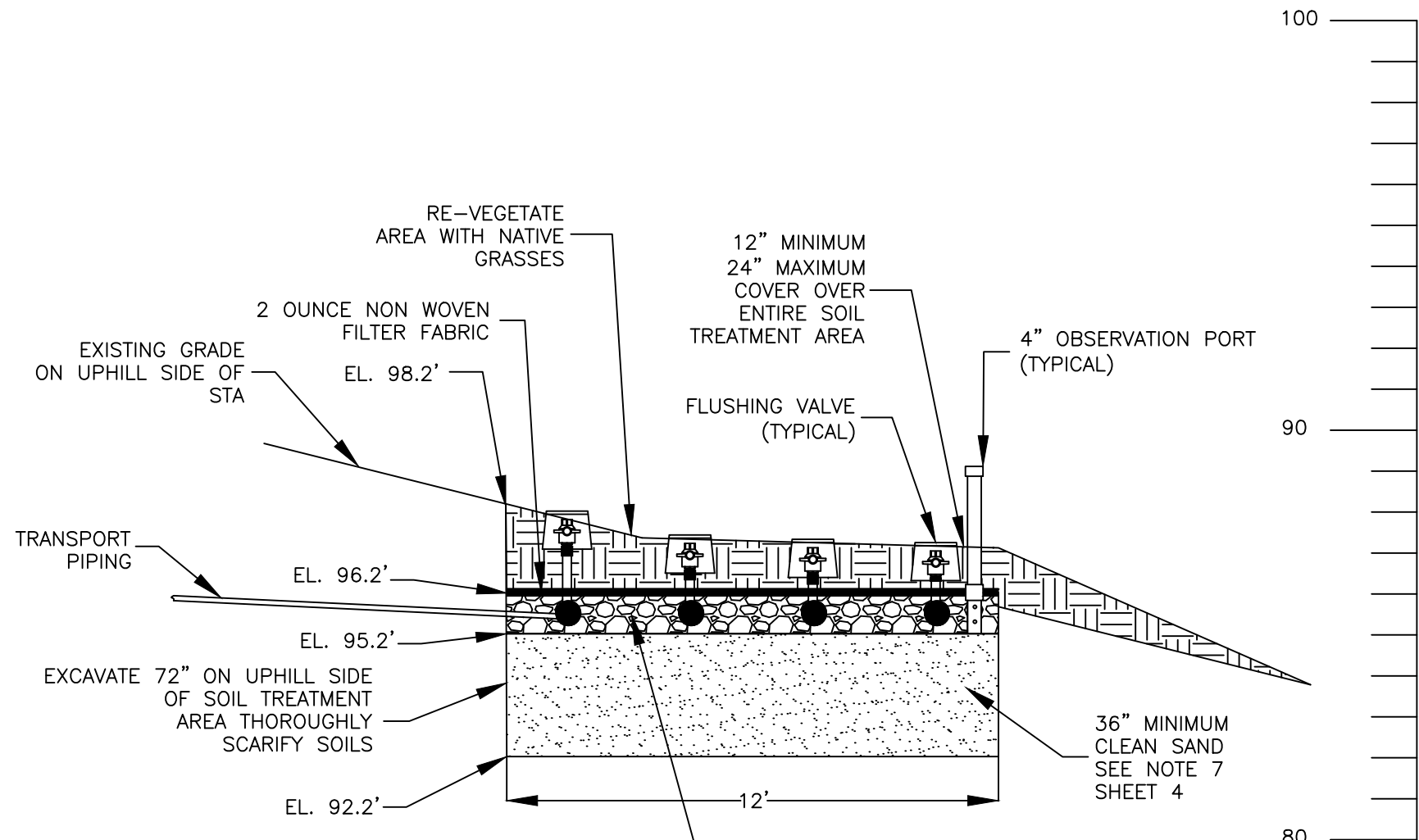
TEMPORARY BENCHMARK = 100.0' AT GROUND LEVEL AT STAKED LOCATION. SEE SHEET 3 FOR LOCATION.



MAINTENANCE OF THE OWTS:

Maintenance of the OWTS is the responsibility of the property owner. Maintenance is to be in accordance with county recommendations and is to include, at a minimum, periodic septic tank pumping and soil treatment area valve flushing (if applicable).

The installer of the system is to provide the property owner with all product Operation & Maintenance manuals. Maintenance of each component is to be in accordance with the manufacturer recommendations.



PLACING THE OWTS INTO OPERATION:

Prior to placing the system into operation, we recommend all components be observed and tested for proper operation. This includes, but is not limited to, verifying the septic tank is watertight, the effluent screen is accessible and serviceable, and all observation ports in the soil treatment area exist.

When applicable, pump system amperage is to be checked, and the float functions verified. Automatic distributing valves are to be tested to verify proper rotation. A pressure test is to be performed on pressure distribution systems to verify the minimum 5-foot squirt height at the flushing valves, and all valves are to be flushed.

OWTS PROFILE
1/4" = 1'

INSTALL A MINIMUM OF 12 INCHES OF DISPERSAL GRAVEL. A MINIMUM OF 6 INCHES OF 0.5 INCH TO 2.5 INCH CLEAN, GRADED DISPERSAL GRAVEL TO BE INSTALLED UNDER DISTRIBUTION PIPING.

285 ENGINEERING P.O. BOX 1048 CONIFER, CO 80433 (720)-515-1781	PROJECT: 2022358 - OWTS DESIGN	TITLE: DESIGN PROFILE		SHEET: 5/7		
	LOCATION: 23047 BIG GAME TRAIL CONIFER, CO 80433	DATE: 10/28/2022	REVISIONS:			
	CLIENT: JOE & DIANNE RUNDELL	SCALE: NONE	1 2 3			
		DRAWN BY: TS				

SEPTIC TANK NOTES:

Access risers shall be sealed to prevent the intrusion of ground water and surface water into the system.

Install all access risers to grade.

Install a maximum of 4 feet of cover or a minimum of 2 foot of cover on the septic tank.

The septic tank shall be constructed to withstand earth and hydrostatic pressures at the installed depth, when full and empty.

Install septic tank and associated equipment per manufacturer's recommendations.

Drill one 1/8" diameter hole in the pump line within the septic tank to facilitate drainback.

The discharge assembly for the pumping system is to have a disconnect union accessible from grade to allow for pump replacement.

All electrical connections must be housed in a UL approved waterproof splice box.

The pump control panel is to be mounted in a manner allowing alarms to be seen and heard, as well as for easy access.

An electrical disconnect must be provided within the line of sight of the pump chamber.

APPROVED EQUALS:

If the installer seeks approval of a product other than the brand or brands specified within these documents, the installer shall furnish written evidence that such product conforms in all respects to the specified requirements, and that it has been used successfully elsewhere under similar conditions.

Effluent Pumping System for Cold Weather Applications (cw style)



Oreco Systems®
Incorporated

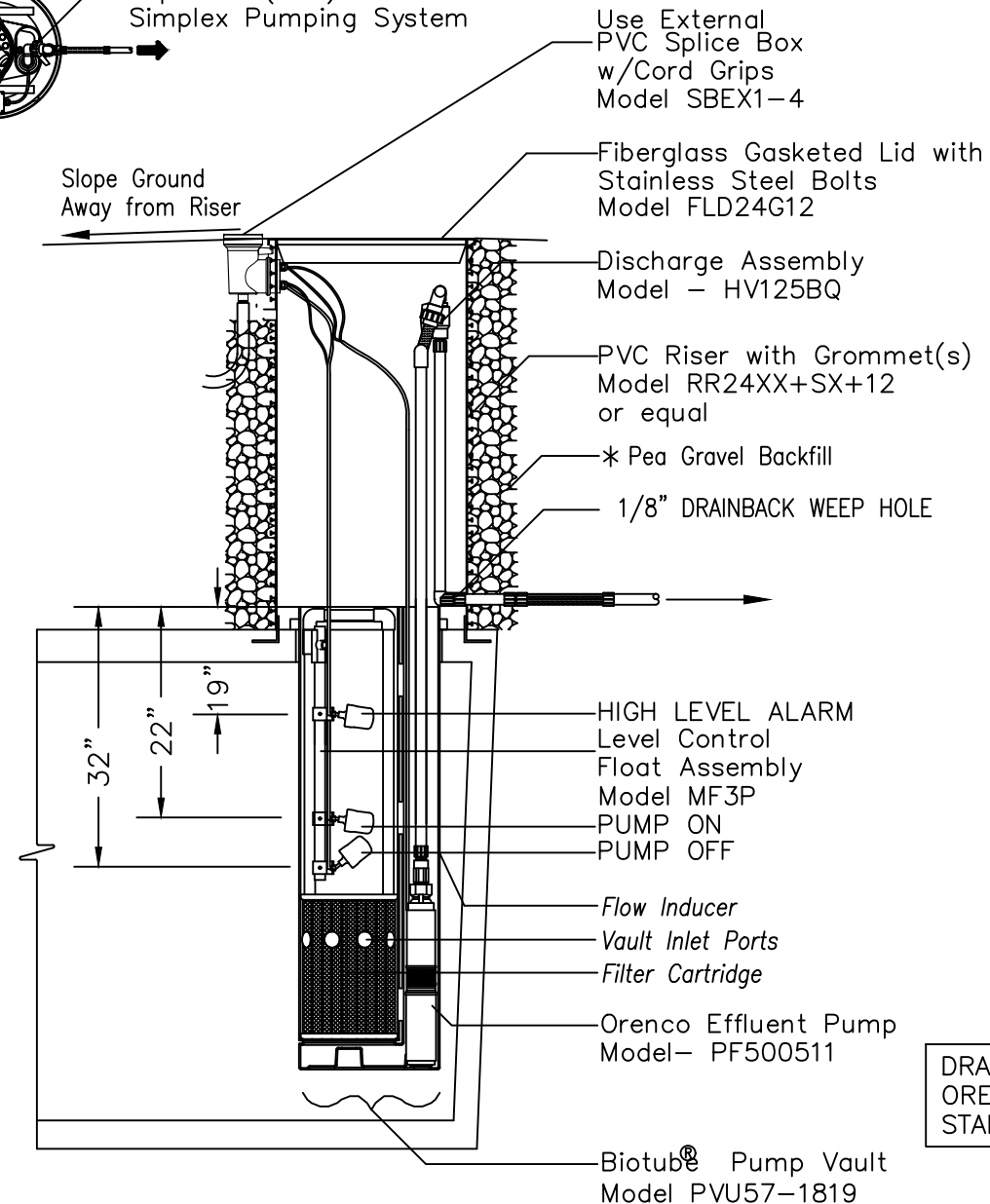
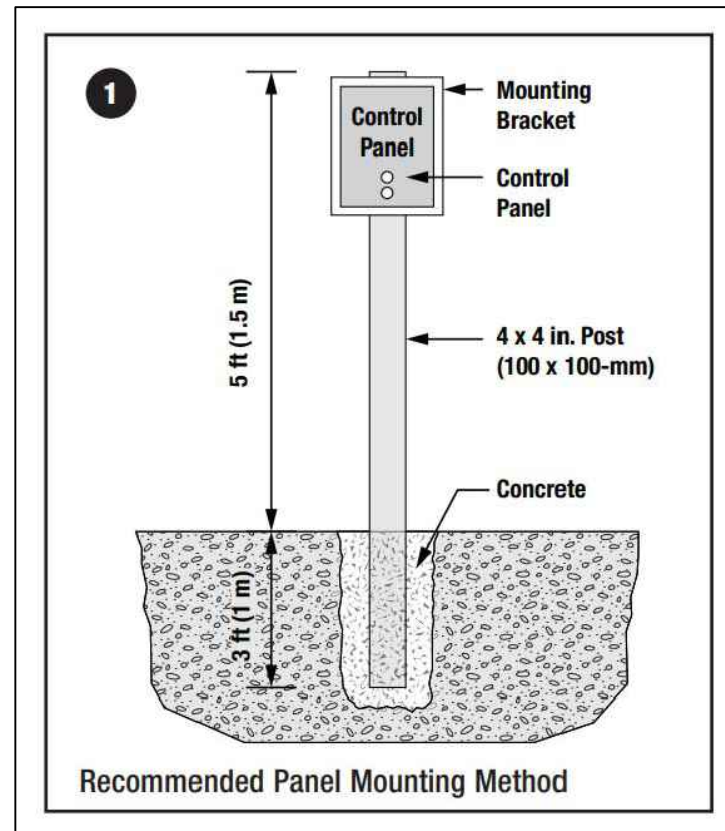
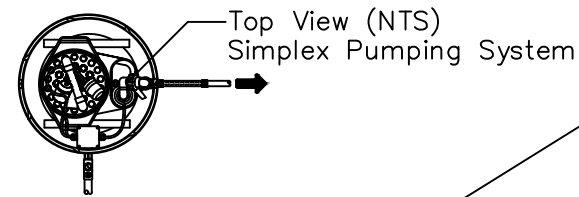
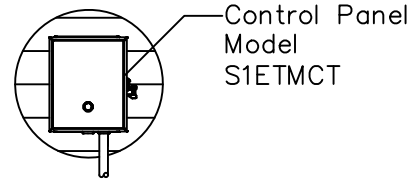
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(541) 459-2884

Scale: NONE



Patents # 4,439,323 & 5,492,635
Foreign Patents May Apply
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* Pea Gravel Backfill Recommended to Help Prevent Frost Heave

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Rev. 3.0 (03/06)

285 ENGINEERING P.O. BOX 1048 CONIFER, CO 80433 (720)-515-1781	PROJECT: 2022358 - OWTS DESIGN		TITLE: SEPTIC TANK DETAILS		SHEET: 6/7
	LOCATION: 23047 BIG GAME TRAIL CONIFER, CO 80433		DATE: 10/28/2022	REVISIONS: ① ② ③	
	CLIENT: JOE & DIANNE RUNDELL		SCALE: NONE		
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PUMP AND SYSTEM CURVES:

Pump Selection for a Pressurized System - Single Family Residence Project
2022358



Parameters

Discharge Assembly Size	1.25	inches
Transport Length	98	feet
Transport Pipe Class	40	
Transport Line Size	1.50	inches
Distributing Valve Model	None	
Max Elevation Lift	-15	feet
Manifold Length	9	feet
Manifold Pipe Class	40	
Manifold Pipe Size	1.50	inches
Number of Laterals per Cell	4	
Lateral Length	74	feet
Lateral Pipe Class	40	
Lateral Pipe Size	1.50	inches
Orifice Size	1/8	inches
Orifice Spacing	3	feet
Residual Head	5	feet
Flow Meter	None	
'Add-on' Friction Losses	0	feet

Calculations

Minimum Flow Rate per Orifice	0.43	gpm
Number of Orifices per Zone	100	
Total Flow Rate per Zone	43.5	gpm
Number of Laterals per Zone	4	
% Flow Differential 1st/Last Orifice	1.9	%
Transport Velocity	6.9	fps

Frictional Head Losses

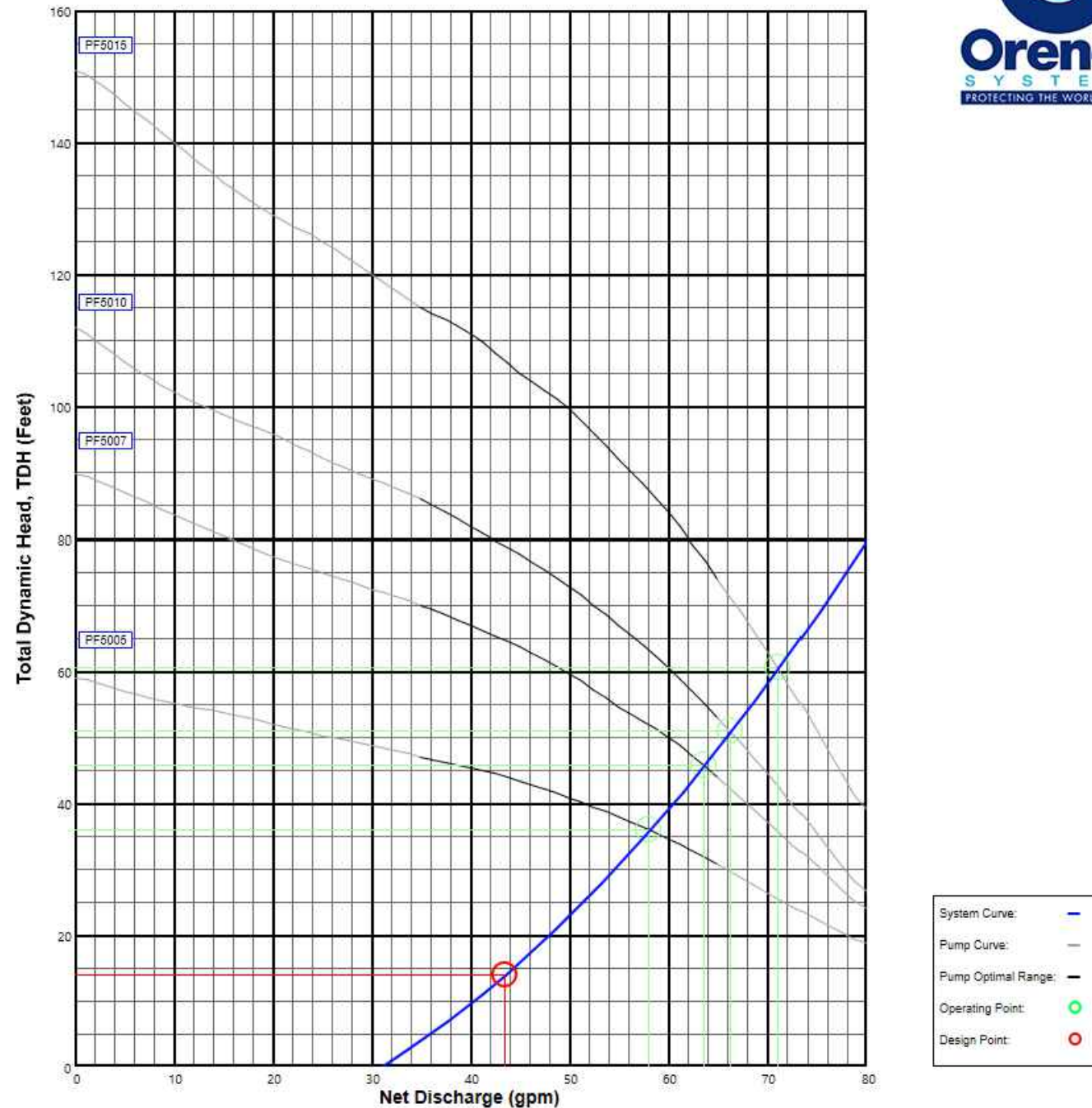
Loss through Discharge	13.2	feet
Loss in Transport	10.2	feet
Loss through Valve	0.0	feet
Loss in Manifold	0.3	feet
Loss in Laterals	0.2	feet
Loss through Flowmeter	0.0	feet
'Add-on' Friction Losses	0.0	feet

Pipe Volumes

Vol of Transport Line	10.4	gals
Vol of Manifold	0.9	gals
Vol of Laterals per Zone	31.3	gals
Total Volume	42.6	gals

Minimum Pump Requirements

Design Flow Rate	43.5	gpm
Total Dynamic Head	13.9	feet



NOTE:

USE 1.25 INCH DISCHARGE ASSEMBLY.
SET PUMP FLOATS TO DISCHARGE A MINIMUM OF 101 GALLONS PER PUMP CYCLE.

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PROJECT: 2022358 - OWTS DESIGN

LOCATION:
23047 BIG GAME TRAIL
CONIFER, CO 80433

CLIENT: JOE & DIANNE RUNDELL

TITLE: PUMP AND SYSTEM CURVES

DATE: 10/28/2022

SCALE: NONE

DRAWN BY: TS

REVISIONS:

- 1
- 2
- 3

SHEET:

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