

ONSITE WASTEWATER TREATMENT SYSTEM DESIGN

LOT 33, FILING 7, INDIAN MOUNTAIN PARK COUNTY, COLORADO

DESIGN CRITERIA

The system is designed to serve a proposed RV dump station. Assuming a typical RV unit has 50 gallons of wastewater holding capacity, this design capacity will allow for 40 RV units to dump per day.

Flows:

$$Q_{\text{design}} = 2000 \text{ GPD}$$

Septic Tank Requirements:

Install a Valley Precast 2,500 gallon, single compartment concrete septic tank (Valley Precast model number 2500T-1CP), followed by a Valley Precast 2,500 gallon, two compartment concrete septic tank/flow equalization tank (Valley Precast model number 2500T-2CP), equipped with an Orenco effluent screened vault pump (model PF10011 with 1" flow control disc) on the outlet.

Following the septic tank and flow equalization tank install a Wieser W5000 4.5 Bio Ready, single compartment concrete aeration Tank (Wieser model number W5000), equipped with an Bio-Microbics HighStrengthFAST 4.5.

Following the first three tanks, install a Valley Precast 1,500 gallon, two compartment concrete clarifier/discharge tank (Valley Precast model number 1500T-2CP-HH), equipped with an Orenco screened duplex pump system in the second compartment. The purpose of the HighStrength FAST treatment system is to reduce the anticipated high-strength waste to a Treatment Level 1 (TL1) standard.

Soil treatment area:

INFILTRATIVE SURFACE #1

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

$$A = 2000/0.80 \text{ TL1} \times 1.0 \text{ (Pressure Dosed Bed)}$$

$$A = 2,500 \text{ sq. ft.}$$

INFILTRATIVE SURFACE #2

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

$$A = 2000/0.9 \text{ TL1} \times 1.0 \text{ (Pressure Dosed Bed)}$$

$$A = 2,222.22 \text{ sq. ft.}$$

We propose two 12' x 105' soil treatment area beds.

INDEX OF DRAWINGS

SHEET NO.	TITLE
1.	Design Criteria
2.	Site and Soil Evaluation
3.	Site Plan
4.	Detail Site Plan
5.	Soil Treatment Area/Piping Details
6.	Septic Tank/Flow Equalization/Treatment System Profile
7.	Soil Treatment Area Profile
8.	Flow Equalization Pump Details
9.	Flow Equalization Pump and System Curves
10.	HighStrength FAST Details
11.	Discharge Tank Details
12.	Discharge Pump and System Curves
13.	Mound Sizing Criteria
14.	RV Dump Station Connection Details

 **REVISED CONTROL PANEL MODEL
& ADDED RV DUMP DETAILS**

INSTALLATION OBSERVATION REQUIREMENTS

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

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

WATER SUPPLY REQUIREMENTS

The proposed RV dump is to be served by a proposed well to be located greater than 280 feet from the proposed soil treatment areas.

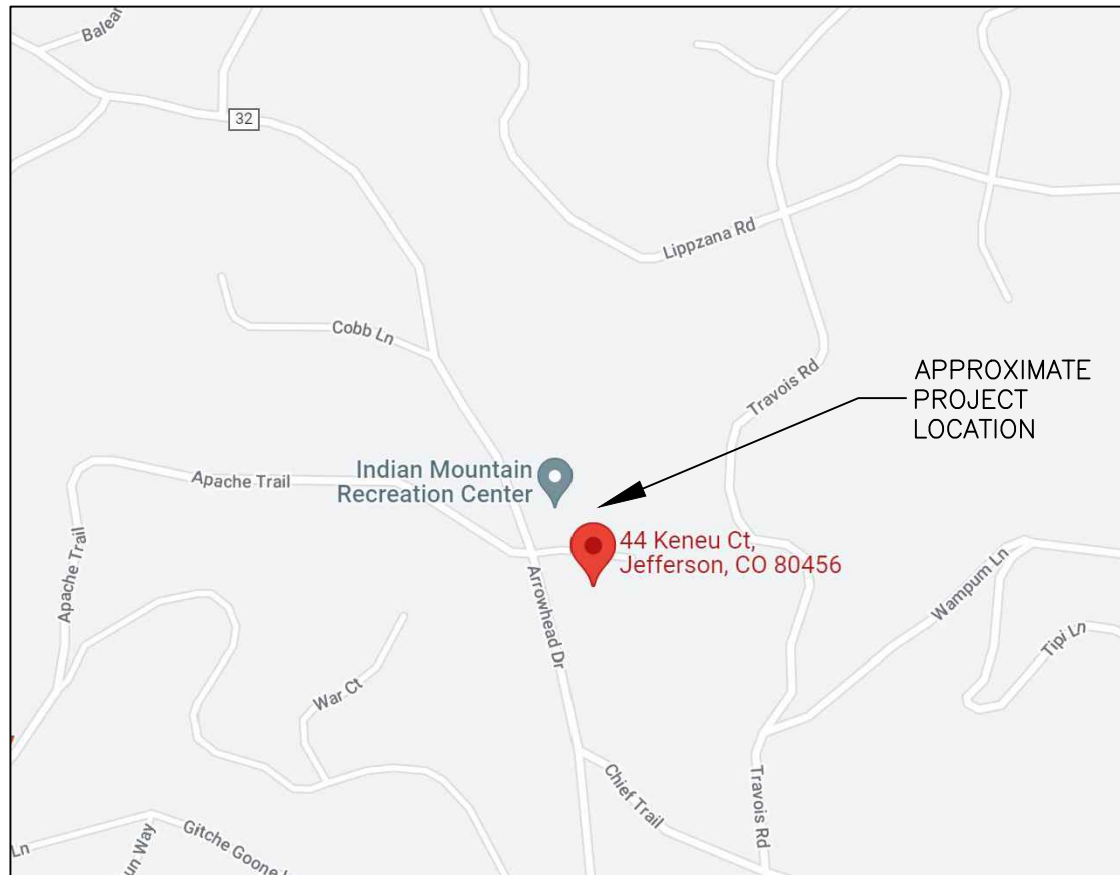
Calculations Per Park County OWTS Regulations

Table 7-1, Note 2:

$$2000 - 1000 = 1000$$

$$1000 / 100 = 10$$

$$10 * 8 = 80 \text{ (80 additional feet)}$$



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
80433
(720)-515-1781

PROJECT: 2022502 - OWTS DESIGN

LOCATION:
44 KENEU COURT
COMO, CO 80432

CLIENT: INDIAN MOUNTAIN METRO DISTRICT

TITLE: DESIGN CRITERIA

DATE: 01/11/2022

SCALE: NONE

DRAWN BY: JDM

REVISIONS:
1 03/27/2023

2

3

SHEET:

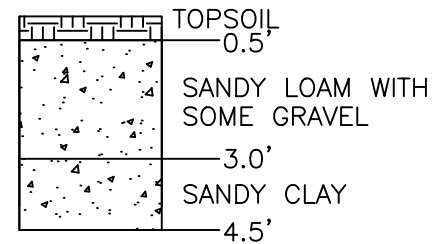
1/14



SOILS INFORMATION

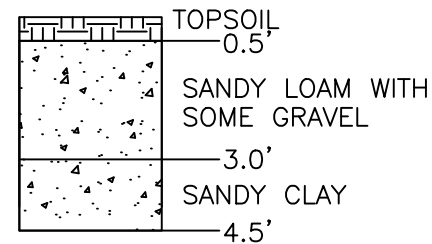
DATE TESTING COMPLETED: 10/06/2022
 EQUIPMENT USED: EXCAVATOR
 DEPTH TO BEDROCK REFUSAL: 4.5 FEET
 DEPTH TO STANDING WATER: NOT PRESENT
 REDOXIMORPHIC FEATURES: NOT PRESENT
 LTAR: 0.80, SECONDARY SAND FILTER APPLICATION RATE, TL1

PROFILE #1



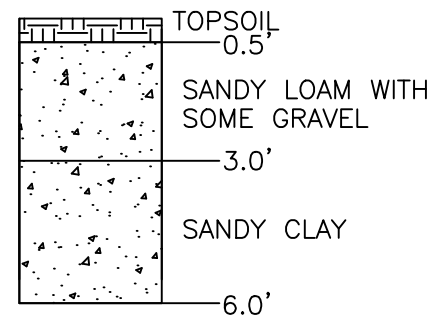
SOIL TYPE, TEXTURE AND STRUCTURE				
DEPTH	SOIL TYPE	TEXTURE	STRUCTURE/SHAPE	STRUCTURE/GRADE
0.5'-3.0'	2	SANDY LOAM	GR	2(MODERATE)
3.0'-4.5'	4	SANDY CLAY	GR	2(MODERATE)

PROFILE #2



SOIL TYPE, TEXTURE AND STRUCTURE				
DEPTH	SOIL TYPE	TEXTURE	STRUCTURE/SHAPE	STRUCTURE/GRADE
0.5'-3.0'	2	SANDY LOAM	GR	2(MODERATE)
3.0'-4.5'	4	SANDY CLAY	GR	2(MODERATE)

PROFILE #3



SOIL TYPE, TEXTURE AND STRUCTURE				
DEPTH	SOIL TYPE	TEXTURE	STRUCTURE/SHAPE	STRUCTURE/GRADE
0.5'-3.0'	2	SANDY LOAM	GR	2(MODERATE)
3.0'-6.0'	4	SANDY CLAY	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

The proximity of the proposed well is close to wetlands. An alternative option to move the well closer to the onsite soil treatment area exists with the use of well grouting to where the 280' setback can be obtained diagonally to the grout point on the well.

POTENTIAL LAND USE CHANGES

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

DIFFICULTIES ENCOUNTERED DURING SITE VISIT

Preliminary staking of the OWTS components was performed at the site visit. The OWTS components and the western property line are to be staked by surveyor prior to construction.

SITE EVALUATOR

JENNIFER MIGLIORATO
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 CONIFER, CO. 80433
 719-839-1382
 ebwbjennifer@gmail.com

BS Environmental Science
 MS Civil Engineering

Credentials: CPOW Soils Characterization Class 2012

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 80433
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PROJECT: 2022502 - OWTS DESIGN

LOCATION:
 44 KENEU COURT
 COMO, CO 80432

CLIENT: INDIAN MOUNTAIN METRO DISTRICT

TITLE: SITE AND SOIL EVALUATION

DATE: 01/11/2022

SCALE: SHOWN

DRAWN BY: JDM

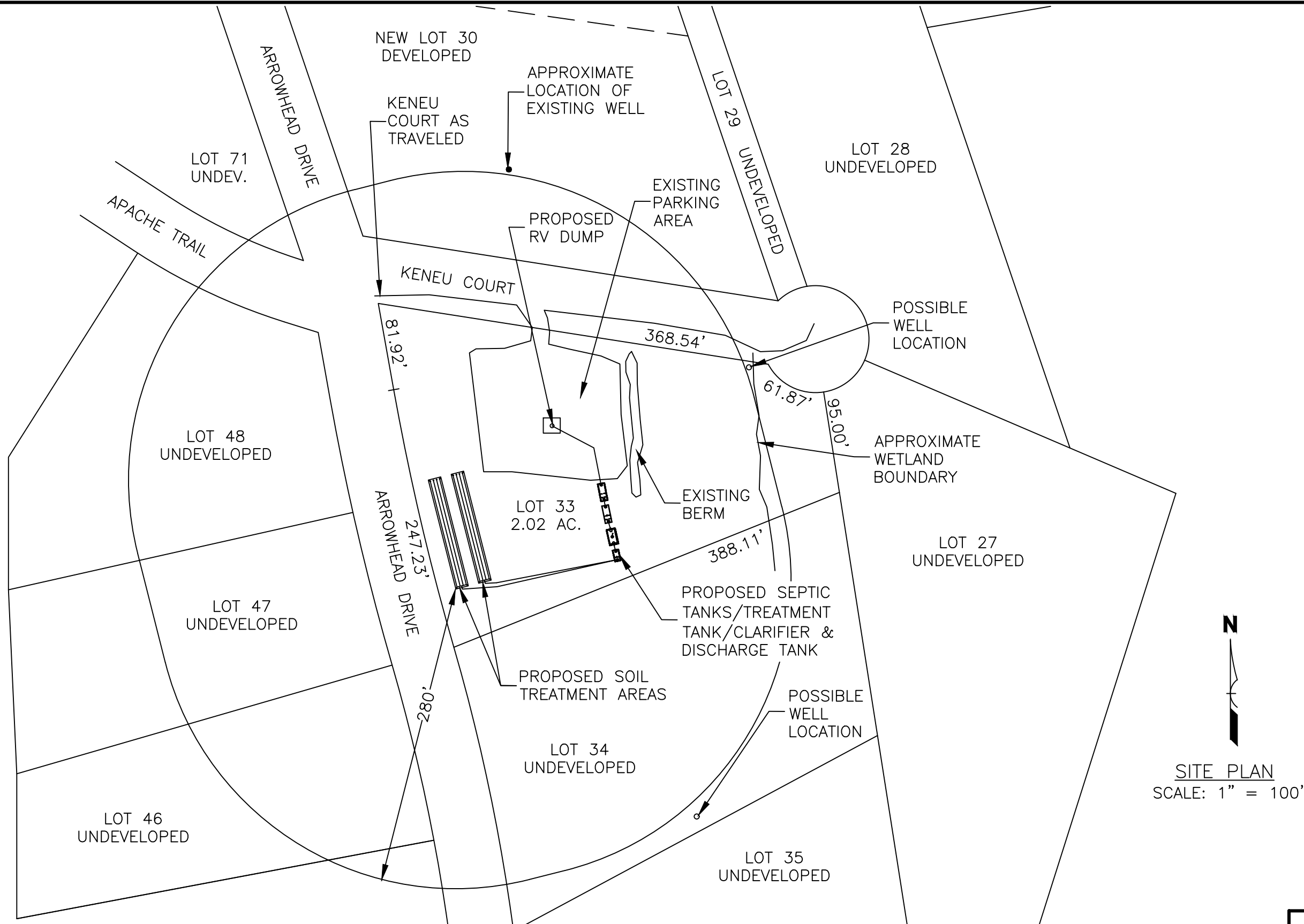
REVISIONS:



SHEET:

2/14





SITE PLAN
SCALE: 1" = 100'

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PROJECT: 2022502 - OWTS DESIGN

LOCATION:
44 KENEU COURT
COMO, CO 80432

CLIENT: INDIAN MOUNTAIN METRO DISTRICT

TITLE: SITE PLAN

DATE: 01/11/2022

SCALE: SHOWN

DRAWN BY: JDM

REVISIONS:

- 1
- 2
- 3

SHEET:
3/14



PRELIMINARY OWTS STAKING PLACED ON THE PROPERTY. ALL STAKING TO BE RE-STAKED BY SURVEY PRIOR TO CONSTRUCTION

PROPOSED WELL LOCATION TO BE OUTSIDE OF WETLANDS. MAINTAIN 50 FEET FROM SEWER LINES, SEPTIC TANK(S), TREATMENT TANK AND DOSE TANK.

PROPERTY LINE TO BE LOCATED BY P.O.L SURVEY PRIOR TO CONSTRUCTION

PROPOSED 12' X 105' SOIL TREATMENT AREAS

SOIL TREATMENT AREAS TO BE LOCATED A MINIMUM OF 10 FEET FROM PROPERTY LINES

PROPOSED RV DUMP LOCATION

EXISTING PARKING AREA

KENEU COURT

POSSIBLE WELL LOCATION

PROPOSED 4" DIAMETER SCHEDULE 40 PVC SEWER 24" MINIMUM COVER (TYPICAL)

ADD 2" DIRECT BURIAL POLYSTYRENE INSULATION ON ALL SEWER LINES

2,500 GALLON SINGLE COMPARTMENT SEPTIC TANK VALLEY PRECAST MODEL NUMBER 2500T-1CP

2,500 GALLON TWO COMPARTMENT SEPTIC TANK/FLOW EQUALIZATION TANK VALLEY PRECAST MODEL NUMBER 2500T-1CP-HH WITH EFFLUENT PUMP SYSTEM

5,000 GALLON SINGLE COMPARTMENT AERATION TANK WIESER PRECAST MODEL NUMBER W5000 4.5 BIO TANK WITH BIOMICROBICS HIGH STRENGTH FAST

1,500 GALLON TWO COMPARTMENT CLARIFIER & DISCHARGE TANK VALLEY PRECAST MODEL NUMBER 1500T-2CP-HH WITH SCREENED DUPLEX EFFLUENT PUMP SYSTEM

TRANSPORT PIPING TO DRAIN BACK TO SEPTIC TANK AFTER PUMP CYCLE (TYPICAL)

1.5" EFFLUENT LINE 24" MINIMUM COVER (TYPICAL)

OBSERVATION PORT (TYPICAL, ALL 4 CORNERS, EACH STA)

BENCHMARK ELEV. = 100.0 AT GROUND LEVEL AT STAKE

INSTALL A MINIMUM OF 2" OF DIRECT BURIAL POLYSTYRENE INSULATION OVER ALL PIPING UNDER DRIVE SURFACES

LOCATION OF THE CONTROL PANELS IS AT THE DISCRETION OF THE OWNER AND INSTALLATION CONTRACTOR

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PROJECT: 2022502 - OWTS DESIGN

LOCATION:
44 KENEU COURT
COMO, CO 80432

CLIENT: INDIAN MOUNTAIN METRO DISTRICT

TITLE: DETAIL SITE PLAN

DATE: 01/11/2022

SCALE: SHOWN

DRAWN BY: JDM

REVISIONS:

- 1
- 2
- 3

SHEET:
4/14



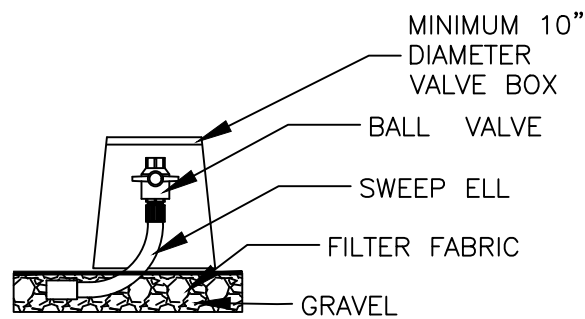
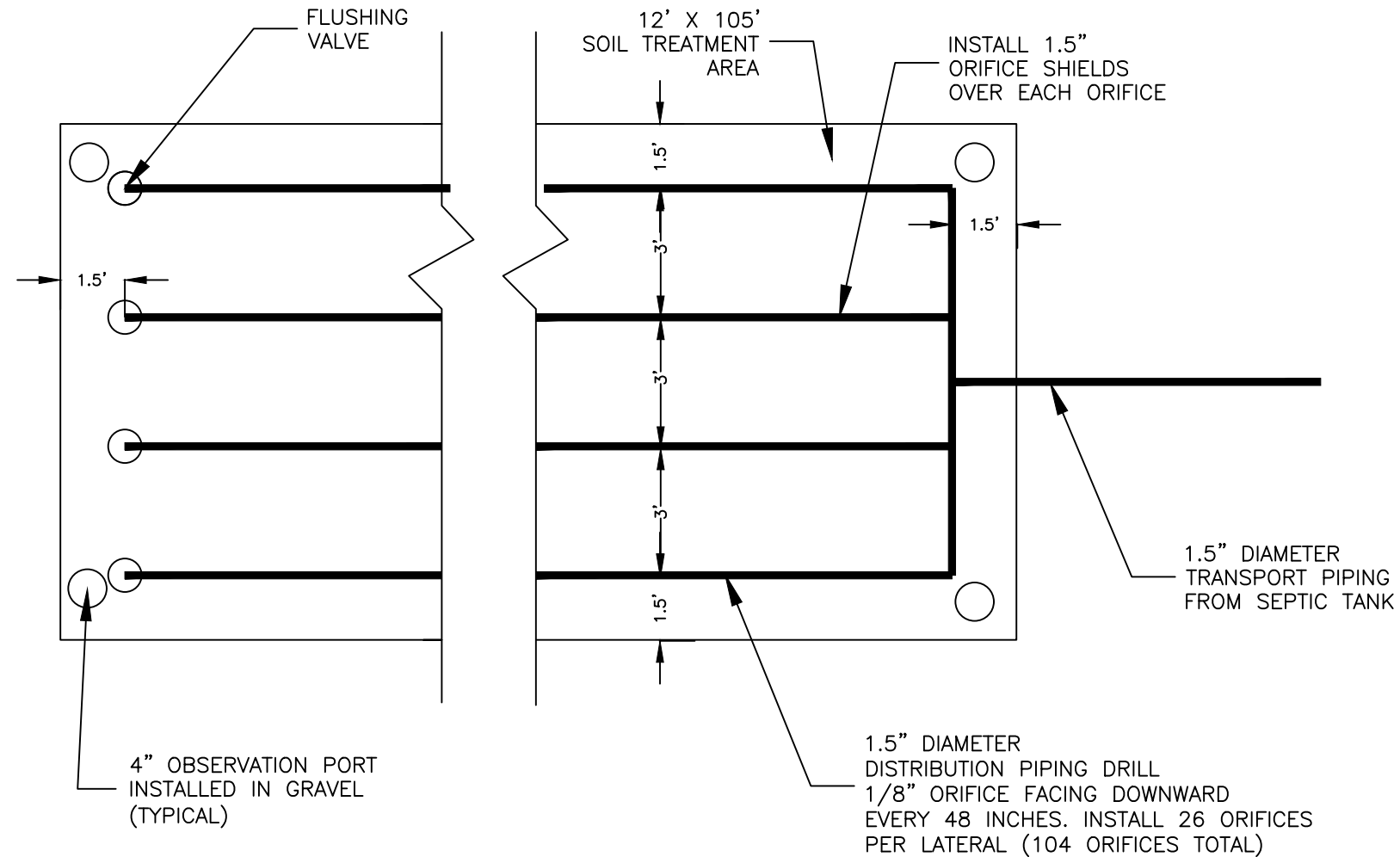
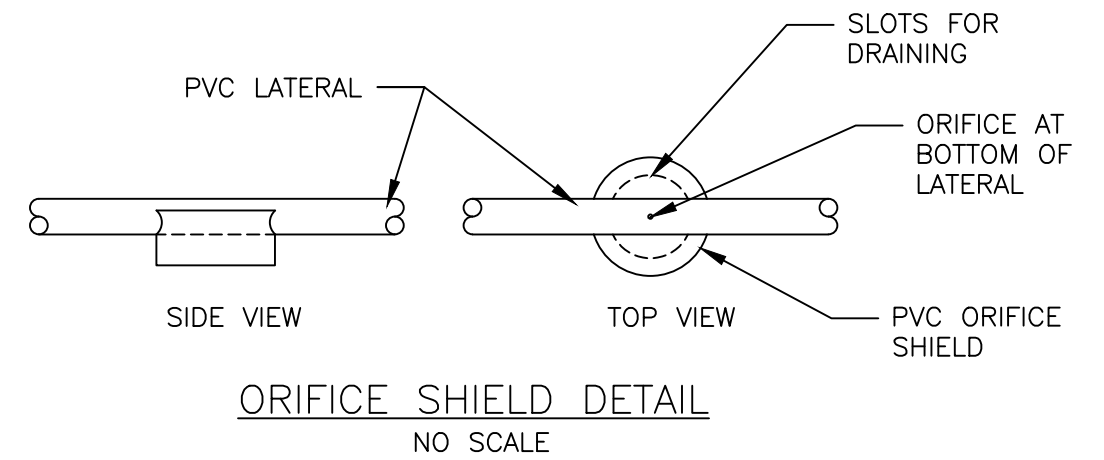
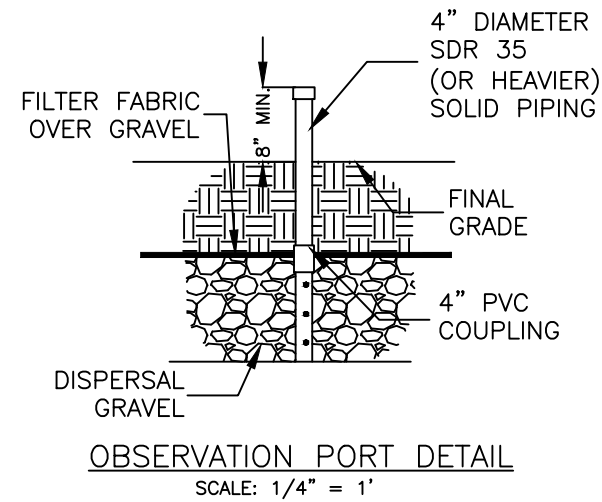
SOIL TREATMENT AREA

NOTES:

1. Construct soil treatment area in location depicted on the site plan.
2. Excavate soil treatment area level, scarify the infiltrative surface, and avoid compaction. Soil treatment area is to be installed along the contour.
3. All piping connections shall be securely fastened to avoid water infiltration into the system.
4. Direct surface water away from the soil treatment area by grading to divert water away from the treatment area.
5. Re-vegetate the excavated area with only native species. Contact 285 Engineering, Inc. for recommendations.
6. Snow storage is not recommended on the soil treatment area.
7. If off-site material is specified in this design; Off-site filtering material is to meet the OWTS Regulations for "Secondary" Sand.

Effective size = 0.15 - 0.60
 Uniformity Coefficient < 7.0
 Percent Passing 200 Sieve < 3.0

A gradation of the sand media used must be provided. The gradation must be dated no more than one month prior to the installation date. This office is to review the gradation PRIOR to construction.



VALVES SHOULD BE FLUSHED EVERY TWO YEARS FOR PROPER PERFORMANCE

VALVE DETAIL
 NO SCALE

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PROJECT: 2022502 - OWTS DESIGN
 LOCATION:
 44 KENEU COURT
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 CLIENT: INDIAN MOUNTAIN METRO DISTRICT

TITLE: STA/PIPING DETAILS
 DATE: 01/11/2022
 SCALE: SHOWN
 DRAWN BY: JDM

REVISIONS:
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 3

SHEET:
 5/14



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.

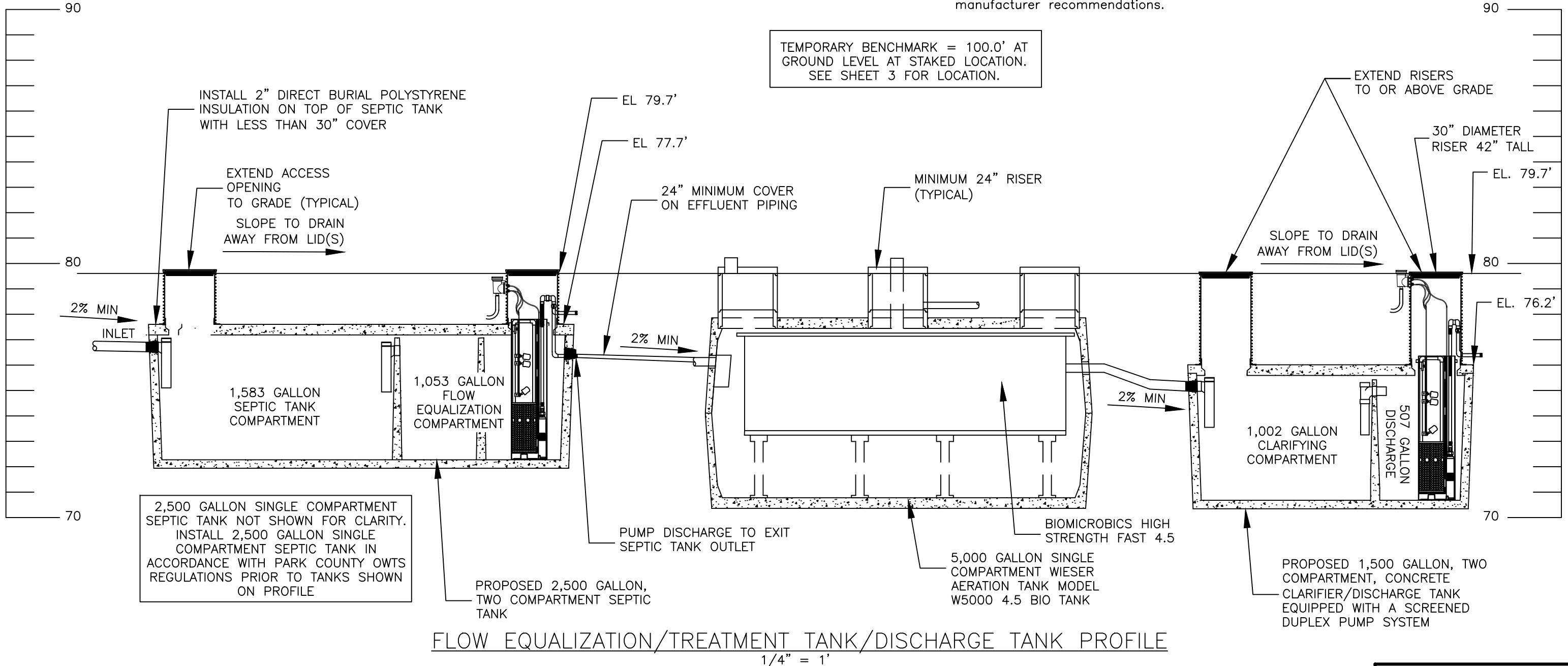
The installer of the system is to provide the property owner with all product Operation & Maintenance manuals. Maintenance of each component is to be in accordance with the manufacturer recommendations.

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).

We recommend a Service Agreement, with a qualified service company, be in effect at all times. System components are to be maintained in accordance with manufacturer recommendations.

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.



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PROJECT: 2022502 - OWTS DESIGN

LOCATION:
 44 KENEU COURT
 COMO, CO 80432

CLIENT: INDIAN MOUNTAIN METRO DISTRICT

TITLE: SEPTIC TANKS PROFILE

DATE: 01/11/2022

SCALE: NONE

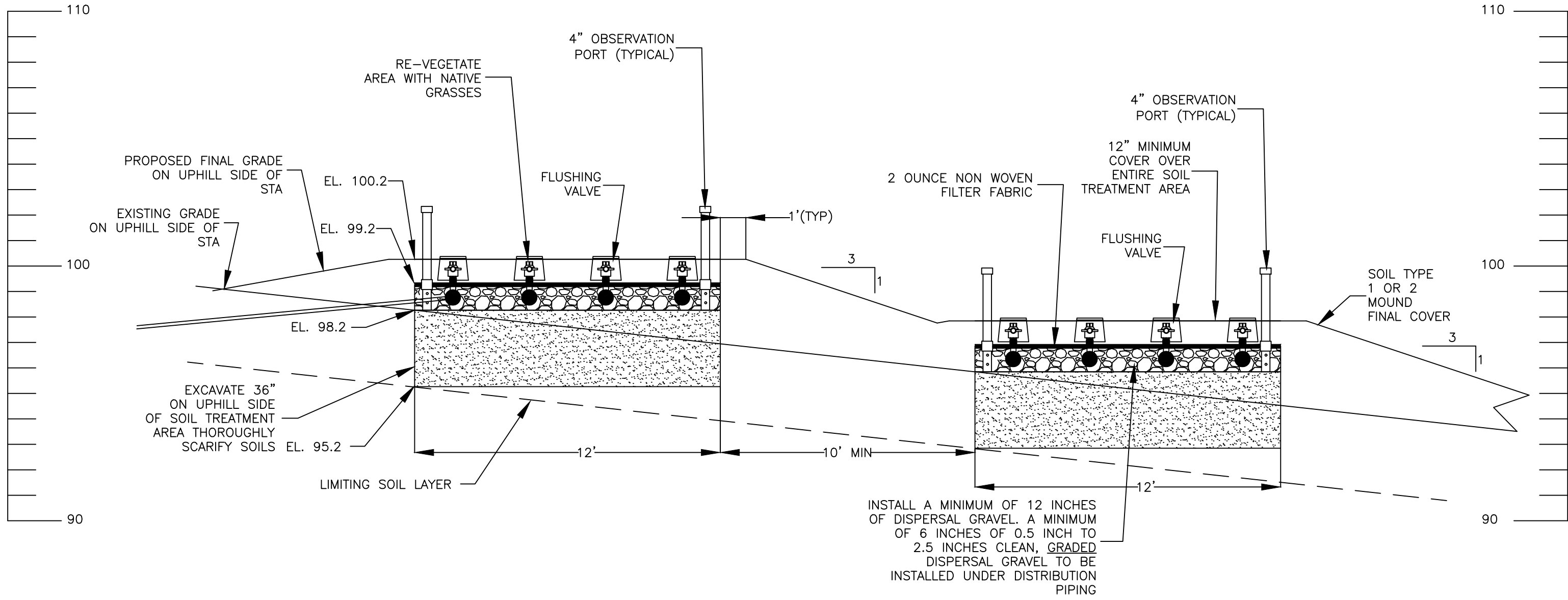
DRAWN BY: JDM

REVISIONS:
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SHEET:
 6/14



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



SOIL TREATMENT AREA PROFILE

1/4" = 1'

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PROJECT: 2022502 - OWTS DESIGN
LOCATION:
44 KENEU COURT
COMO, CO 80432
CLIENT: INDIAN MOUNTAIN METRO DISTRICT

TITLE: SOIL TREATMENT AREA PROFILE
DATE: 01/11/2022
SCALE: NONE
DRAWN BY: JDM

SHEET:
7/14



SEPTIC TANK/ FLOW EQUALIZATION 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 minimum of 2 feet of cover with 2" of direct burial insulation on the septic/flow equalization tank.

The septic/flow equalization 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.

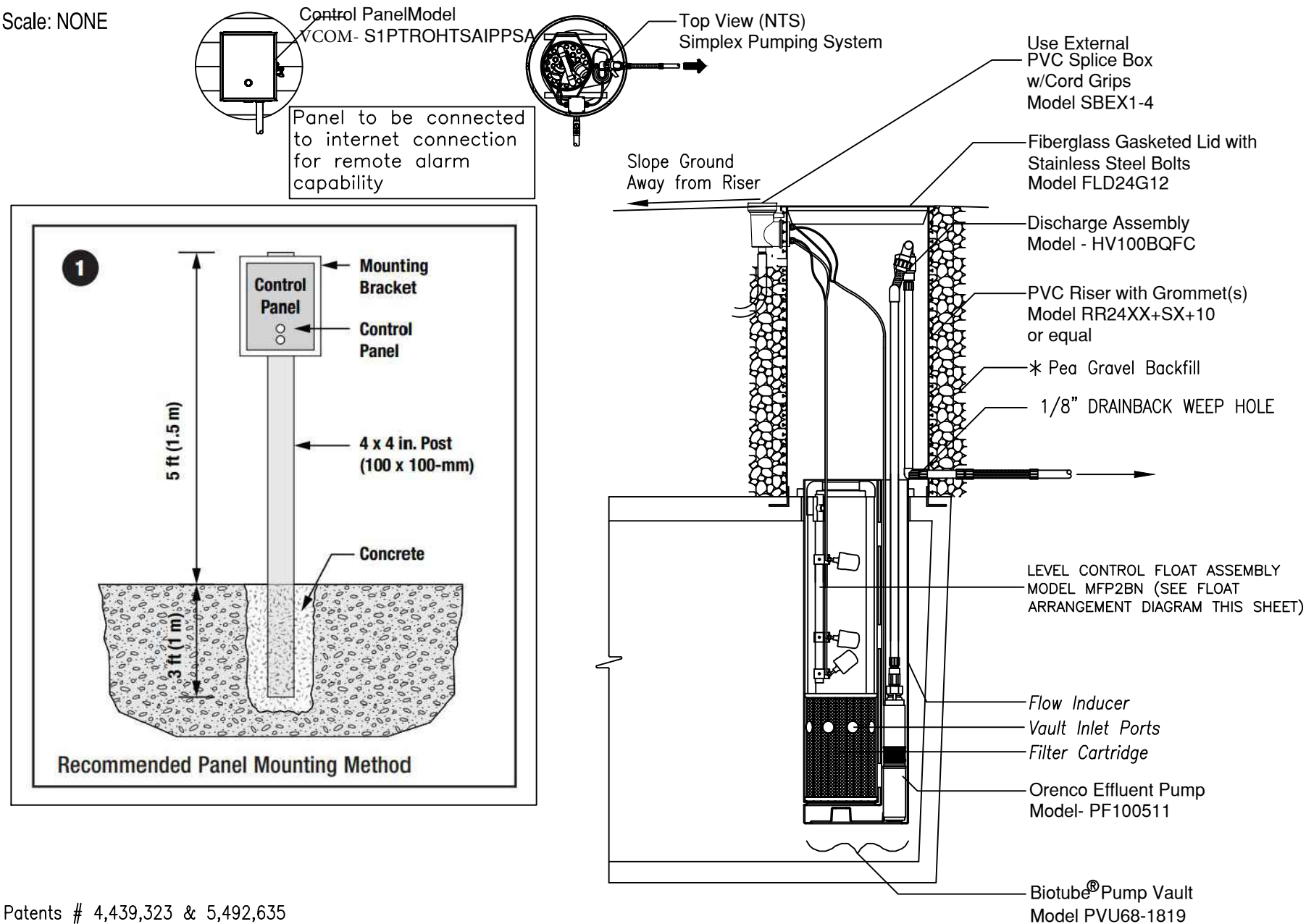
APPROVED EQUALS:

Throughout this document the term "approved equal" may be used when specifying equipment. The term "approved equal" means equal in the judgement of the engineer.

If the bidder seeks approval of a product other than the brand or brands specified within these documents, the bidder 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)

Scale: NONE

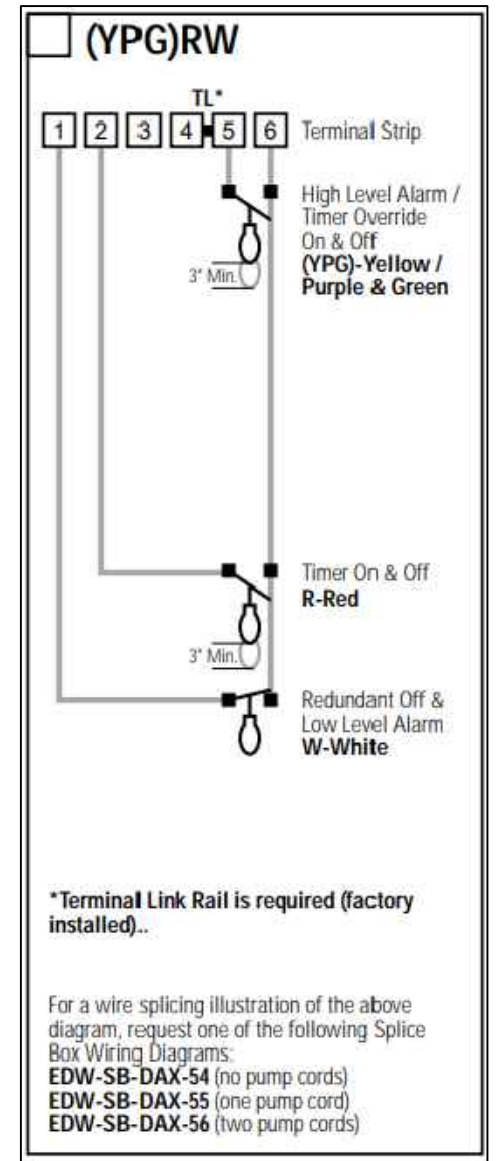


Patents # 4,439,323 & 5,492,635
Foreign Patents May Apply
© 2006, Orenco Systems, Inc.

* Pea Gravel Backfill Recommended to Help Prevent Frost Heave

DRAWING MODIFIED FROM
ORENCO PROVIDED
STANDARD DETAIL

▲ REVISED CONTROL PANEL MODEL



FIELD SET BY
MANUFACTURER
REPRESENTATIVE.
SET TIME 2 MIN.
ON 60 MIN. OFF

285 ENGINEERING P.O. BOX 1048 CONIFER, CO 80433 (720)-515-1781	PROJECT: 2022502 - OWTS DESIGN	TITLE: FLOW EQUAL. TANK DETAILS		SHEET: 8/14	
	LOCATION: 44 KENEU COURT COMO, CO 80432	DATE: 01/11/2022	REVISIONS: ▲ 03/27/2023		
	CLIENT: INDIAN MOUNTAIN METRO DISTRICT	SCALE: NONE	▲ 2 ▲ 3		
		DRAWN BY: JDM			

FLOW EQUALIZATION PUMP AND SYSTEM CURVES:

Pump Selection for a Non-Pressurized System - Commercial Project

2022502 / Flow Equalization Pump



Parameters

Discharge Assembly Size	1.0FC	inches
Transport Length	5	feet
Transport Pipe Class	40	
Transport Line Size	1.50	inches
Distributing Valve Model	None	
Max Elevation Lift	5	feet
Design Flow Rate	10	gpm
Flow Meter	None	inches
'Add-on' Friction Losses	0	feet

Calculations

Transport Velocity	1.6	fps
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Frictional Head Losses

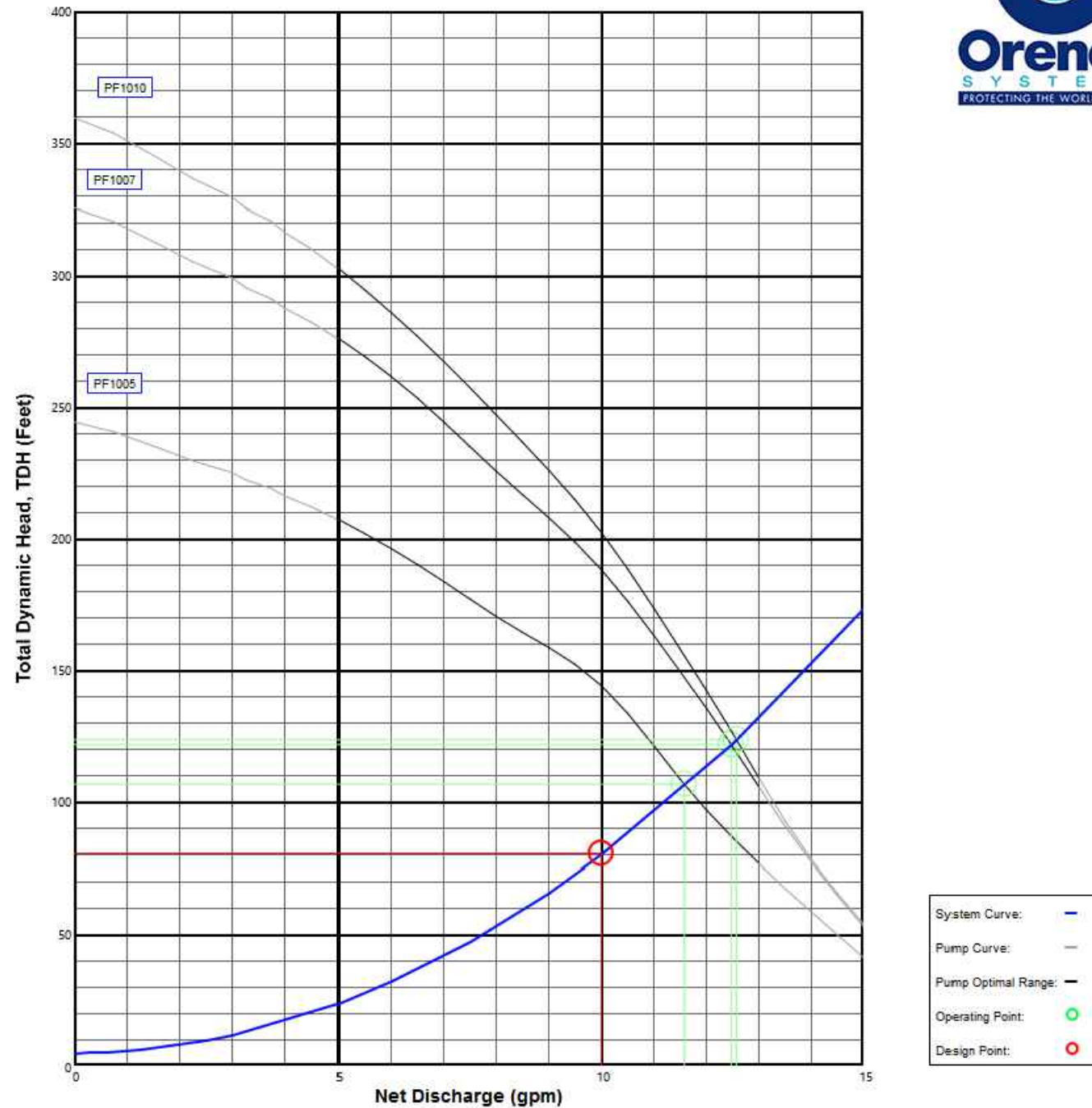
Loss through Discharge	75.0	feet
Loss in Transport	0.0	feet
Loss through Valve	0.0	feet
Loss through Flowmeter	0.0	feet
'Add-on' Friction Losses	0.0	feet

Pipe Volumes

Vol of Transport Line	0.5	gals
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Minimum Pump Requirements

Design Flow Rate	10.0	gpm
Total Dynamic Head	80.0	feet



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PROJECT: 2022502 - OWTS DESIGN

LOCATION:
44 KENEU COURT
COMO, CO 80432

CLIENT: INDIAN MOUNTAIN METRO DISTRICT

TITLE: PUMP AND SYSTEM CURVES

DATE: 01/11/2022

SCALE: NONE

DRAWN BY: JDM

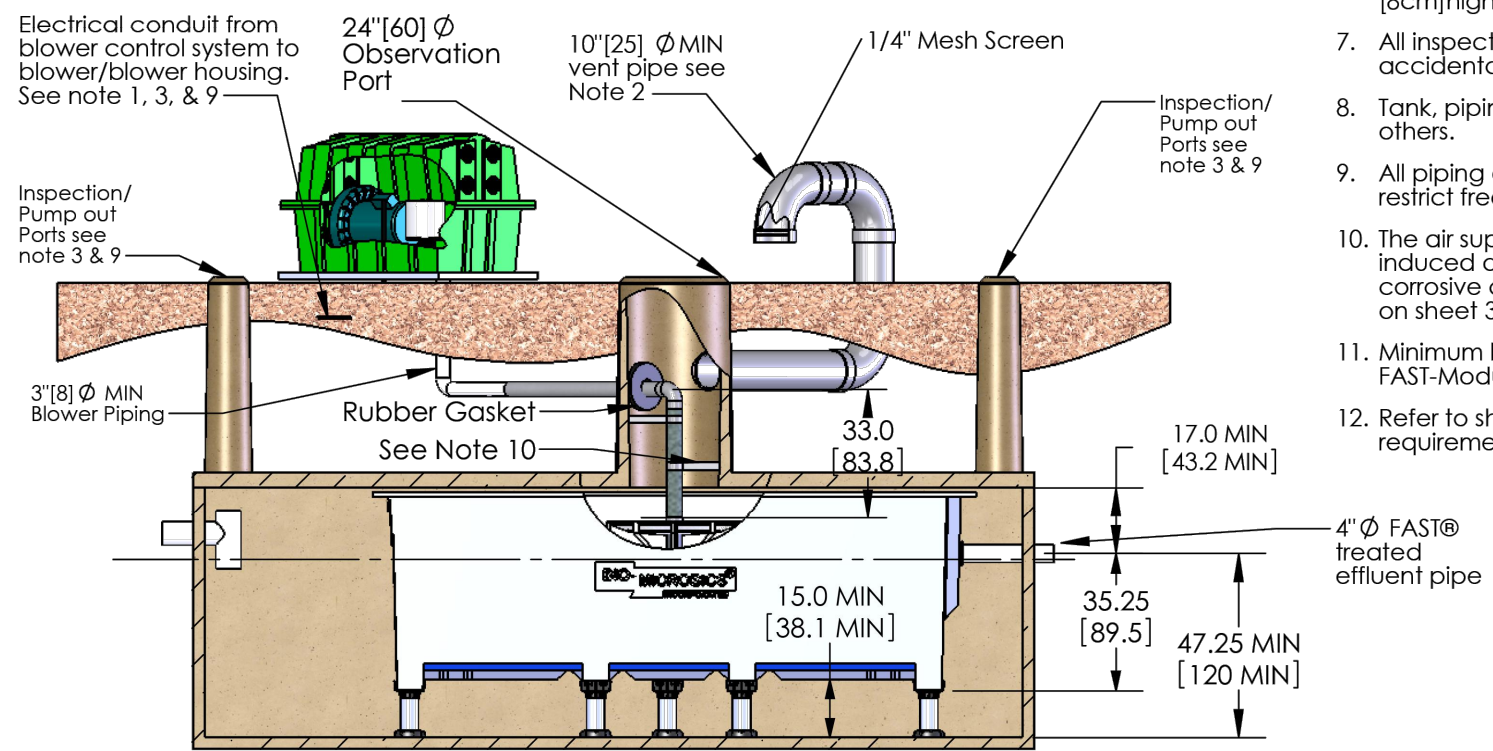
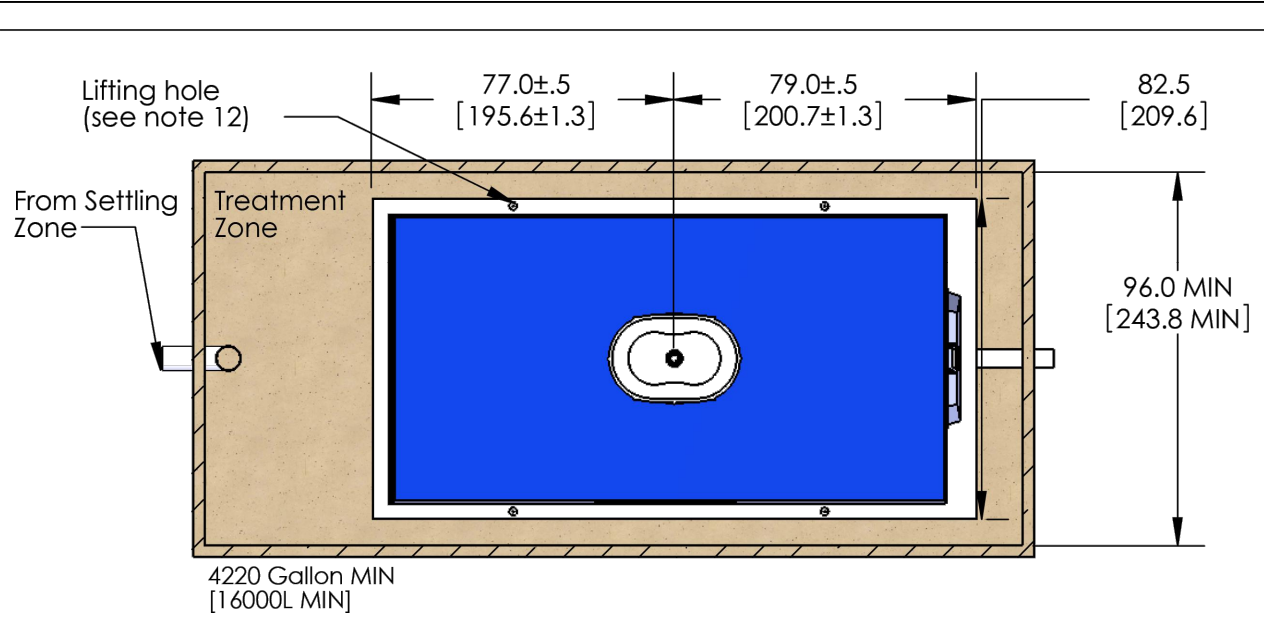
REVISIONS:



SHEET:
9/14



HighStrengthFAST 4.5:



- NOTES**
- Blower piping to FAST® may not exceed 100 FT [30.5m] total length and use a maximum of 4 elbows in the piping system (@ 100FT [30m]). For distances greater than 100 FT [30m] consult factory. Blower must be located above flood levels on a concrete base 56.8" X 35.8" X 2.5" [144 X 91 X 6.35 cm] minimum.
 - Vent to be located above finish grade or higher to avoid infiltration. Cap with a vent grate with at least 39 sq in. [252 sq. cm] open surface area. Secure with stainless steel screws (see sheet 3 of 3 *HSFAST@ 4.50 Details*).
or
Run Vent to desired location and cover opening with a vent grate with at least 39 sq in. [252 sq. cm] open surface area. Secure with stainless steel screws. Vent piping must not allow excess moisture build up or back pressure.
 - All appurtenances to FAST® (e.g. tank pump outs, etc.) must conform to all applicable country, state, province, and local plumbing and electrical codes. Blower control system by Bio-Microbics, Inc.
 - Must increase tank size by 20% if the minimum of 15 inches [25.5cm] is used between the unit and the base of tank. Consult factory for approval.
 - The primary compartment may be a separate tank.
 - Either the influent pipe tee shall be fitted with a pipe cap or the baffle separating the two zones shall be extended all the way to the top of the tank. If choosing to use the pipe cap. Then the baffle shall be at least 3" [8cm] higher than the water level as shown on the drawing.
 - All inspection, viewing and pump out ports must be secured to prevent accidental or unauthorized access.
 - Tank, piping, conduit, blower housing pad and vents are provided by others.
 - All piping and ancillary equipment installed after FAST must not impede or restrict free flow of effluent.
 - The air supply line into the FAST® unit must be secured to prevent vibration induced damage. The air supply line should be secured with a non-corrosive clamp every 2' [0.6m] minimum. See Alternate Air Supply Option on sheet 3 of 3 *HSFAST@ 4.50 Details*.
 - Minimum height may be reduced, consult factory and reference "Short-FAST-Module-Procedure.pdf".
 - Refer to sheet 3 of 3 *HSFAST@ 4.50 Details* drawing for leg extensions requirements.

Control panel to have Internet connection for remote alarm capabilities.

DO NOT SCALE
UNLESS NOTED DIMENSIONS ARE IN INCHES [CENTIMETERS]
TOLERANCES
± 0.02 IN/IN
[± 0.05 CM/CM]

HighStrengthFAST 4.5

WEIGHT	lb	SIZE	DRAWING NUMBER	SHEET 1 OF 3
NAME	DATE	A	HSFAST 4.50 with feet	
DRAWN	CTC 5/10/2006			
CHECKED	PF 1/13/2010	REVISED 1/13/2010	REV. INI-04-F	

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285 ENGINEERING P.O. BOX 1048 CONIFER, CO 80433 (720)-515-1781	PROJECT: 2022502 - OWTS DESIGN	TITLE: HIGH STRENGTH FAST DETAILS		SHEET: 10/14	
	LOCATION: 44 KENEU COURT COMO, CO 80432	DATE: 01/11/2022	REVISIONS:		
	CLIENT: INDIAN MOUNTAIN METRO DISTRICT	SCALE: NONE	1 2 3		
		DRAWN BY: JDM			

DISCHARGE 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 minimum of 4 feet of cover or 2 feet of cover with 2" of direct burial insulation on the discharge tank.

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

Install discharge 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.

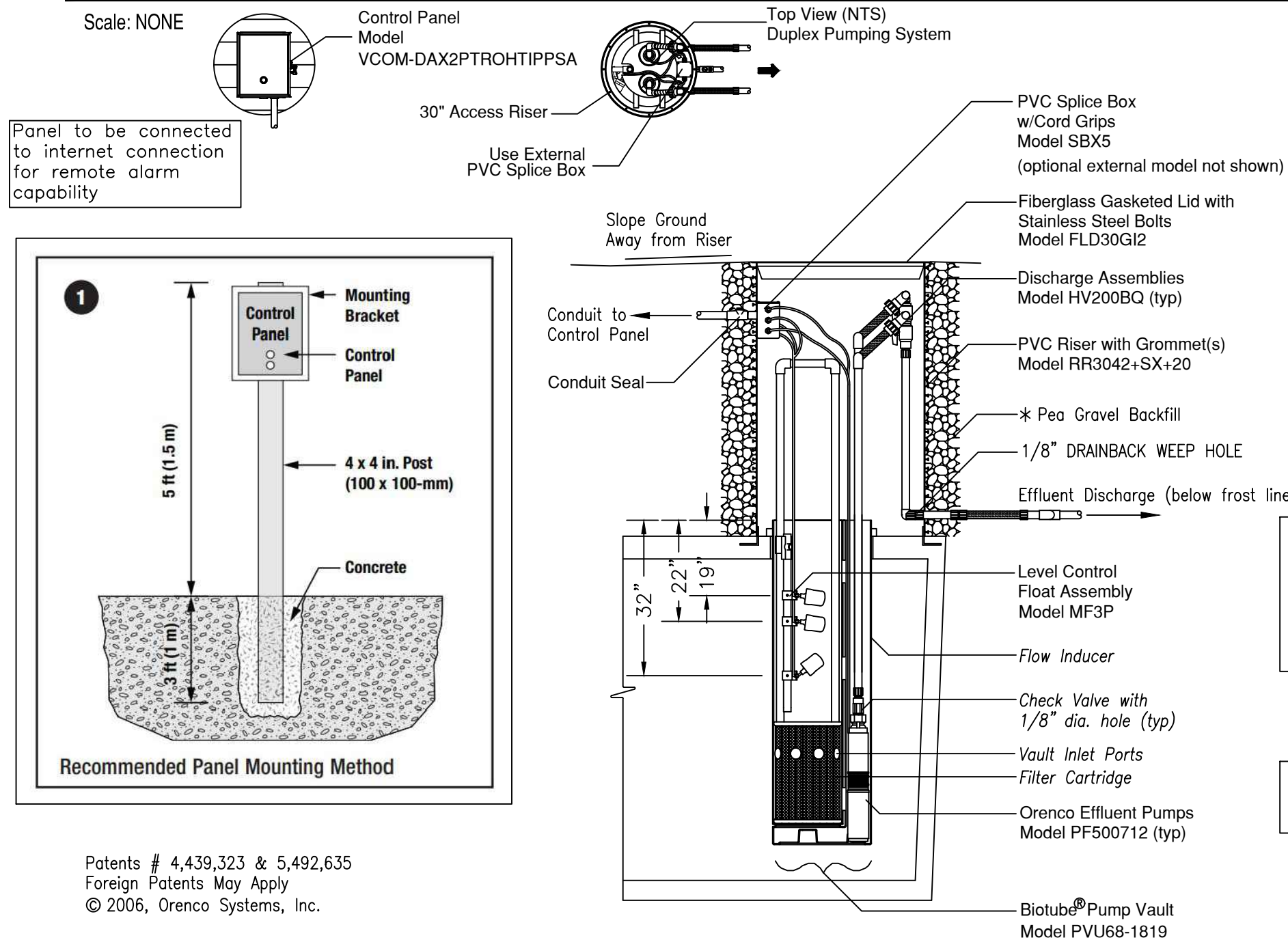
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Effluent Pumping System for Cold Weather Applications (cw style)



Orenco Systems®
Incorporated

814 AIRWAY AVENUE
SUTHERLIN, OREGON
97479-9012

TOLL FREE:
(800) 348-9843

TELEPHONE:
(541) 459-4449

FACSIMILE:
(541) 459-2884

NOTE:
ONE PUMP TO SERVE EACH SOIL TREATMENT AREA. PROVIDE 2 TOTAL DISCHARGES THROUGH RISER

DRAWING MODIFIED FROM ORENCO PROVIDED STANDARD DETAIL

* Pea Gravel Backfill Recommended to Help Prevent Frost Heave

▲ REVISED CONTROL PANEL MODEL

285 ENGINEERING P.O. BOX 1048 CONIFER, CO 80433 (720)-515-1781	PROJECT: 2022502 - OWTS DESIGN	TITLE: DISCHARGE TANK DETAILS		SHEET: 11/14	
	LOCATION: 44 KENEU COURT COMO, CO 80432	DATE: 01/11/2022	REVISIONS: ▲ 03/27/2023		
	CLIENT: INDIAN MOUNTAIN METRO DISTRICT	SCALE: NONE	▲ 2 ▲ 3		
		DRAWN BY: JDM			

DISCHARGE PUMP AND SYSTEM CURVES:

Pump Selection for a Pressurized System - Commercial Project

2022502 / Discharge Pump #1

Parameters

Discharge Assembly Size	2.00	inches
Transport Length	128	feet
Transport Pipe Class	40	
Transport Line Size	1.50	inches
Distributing Valve Model	None	
Max Elevation Lift	23.5	feet
Manifold Length	9	feet
Manifold Pipe Class	40	
Manifold Pipe Size	1.50	inches
Number of Laterals per Cell	4	
Lateral Length	102	feet
Lateral Pipe Class	40	
Lateral Pipe Size	1.50	inches
Orifice Size	1/8	inches
Orifice Spacing	4	feet
Residual Head	5	feet
Flow Meter	None	inches
'Add-on' Friction Losses	0	feet

Calculations

Minimum Flow Rate per Orifice	0.43	gpm
Number of Orifices per Zone	104	
Total Flow Rate per Zone	45.3	gpm
Number of Laterals per Zone	4	
% Flow Differential 1st/Last Orifice	2.9	%
Transport Velocity	7.2	fps

Frictional Head Losses

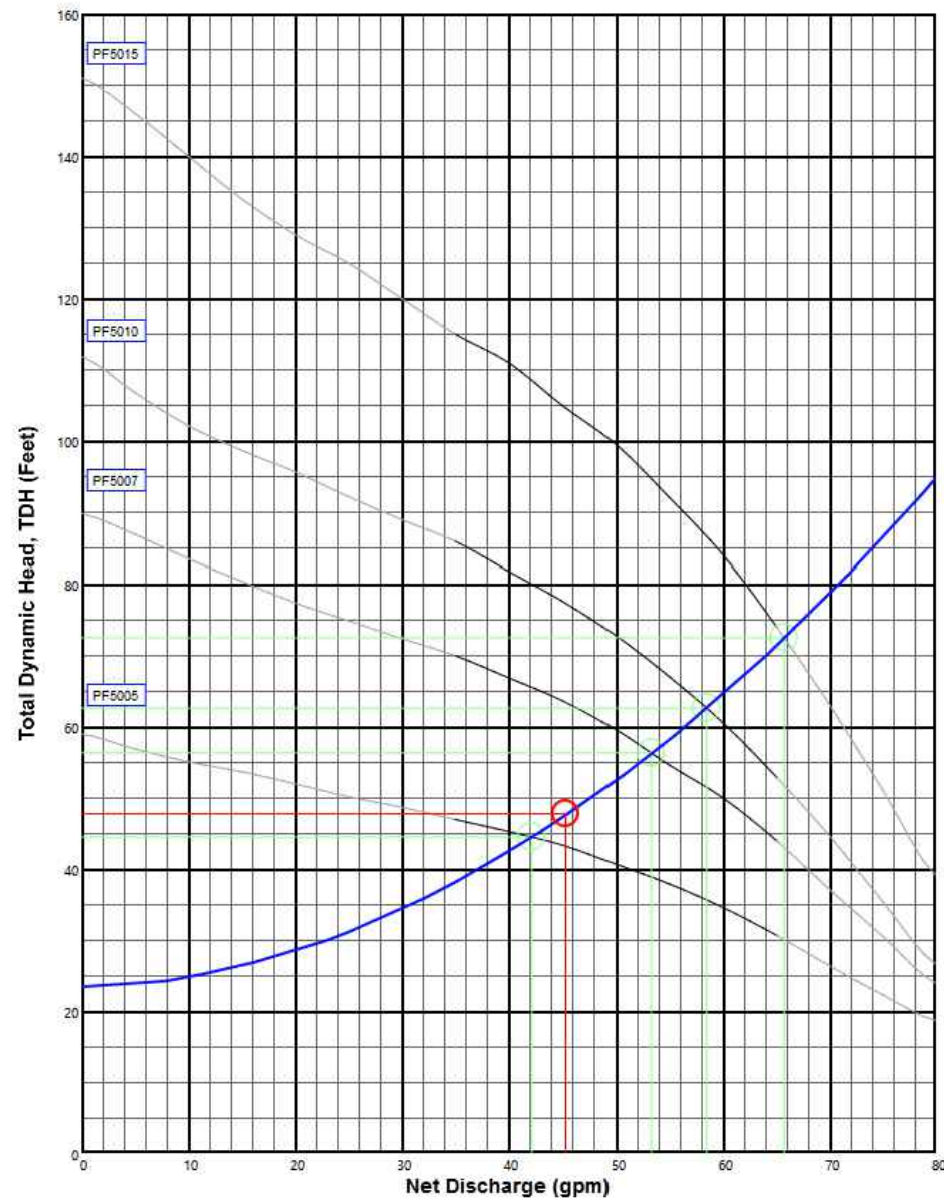
Loss through Discharge	4.1	feet
Loss in Transport	14.4	feet
Loss through Valve	0.0	feet
Loss in Manifold	0.3	feet
Loss in Laterals	0.3	feet
Loss through Flowmeter	0.0	feet
'Add-on' Friction Losses	0.0	feet

Pipe Volumes

Vol of Transport Line	13.5	gals
Vol of Manifold	0.9	gals
Vol of Laterals per Zone	43.1	gals
Total Volume	57.6	gals

Minimum Pump Requirements

Design Flow Rate	45.3	gpm
Total Dynamic Head	47.6	feet



Pump Selection for a Pressurized System - Commercial Project

2022502 / Discharge Pump #1

Parameters

Discharge Assembly Size	2.00	inches
Transport Length	148	feet
Transport Pipe Class	40	
Transport Line Size	1.50	inches
Distributing Valve Model	None	
Max Elevation Lift	23.5	feet
Manifold Length	9	feet
Manifold Pipe Class	40	
Manifold Pipe Size	1.50	inches
Number of Laterals per Cell	4	
Lateral Length	102	feet
Lateral Pipe Class	40	
Lateral Pipe Size	1.50	inches
Orifice Size	1/8	inches
Orifice Spacing	4	feet
Residual Head	5	feet
Flow Meter	None	inches
'Add-on' Friction Losses	0	feet

Calculations

Minimum Flow Rate per Orifice	0.43	gpm
Number of Orifices per Zone	104	
Total Flow Rate per Zone	45.3	gpm
Number of Laterals per Zone	4	
% Flow Differential 1st/Last Orifice	2.9	%
Transport Velocity	7.2	fps

Frictional Head Losses

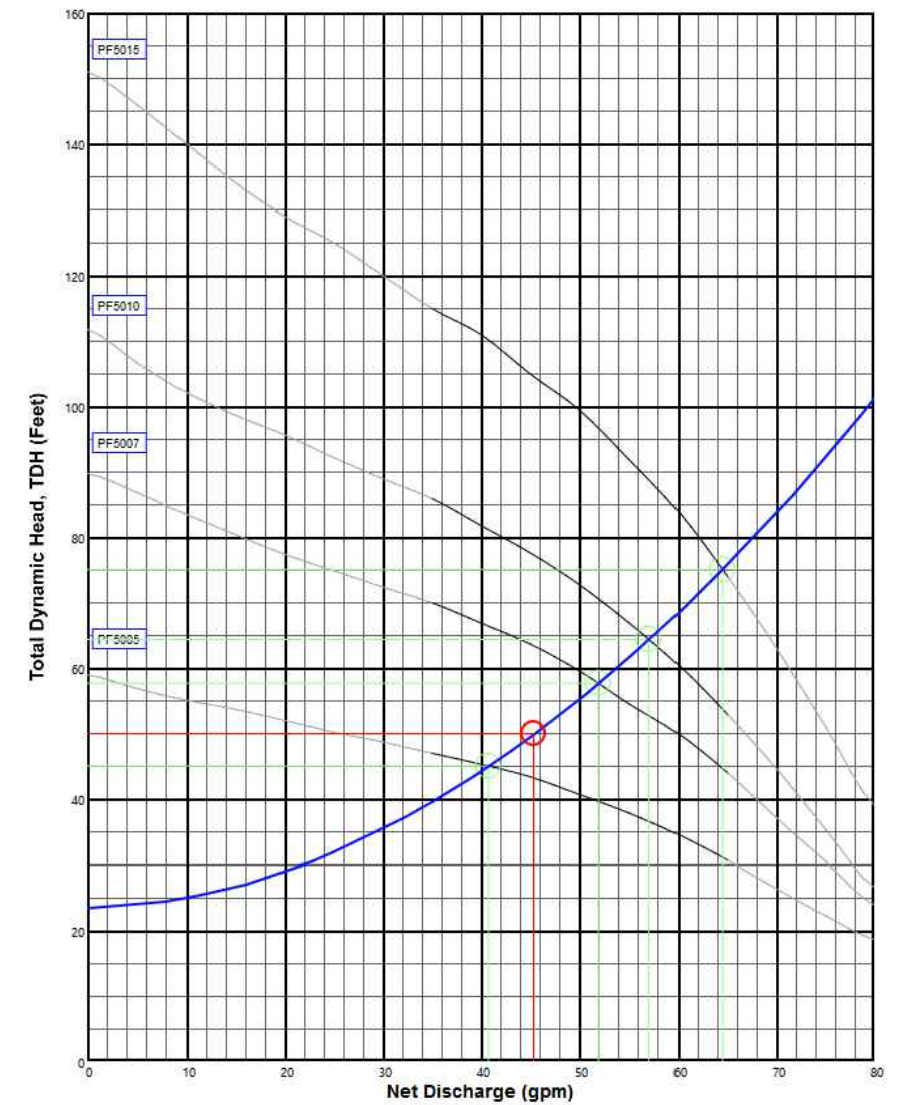
Loss through Discharge	4.1	feet
Loss in Transport	16.6	feet
Loss through Valve	0.0	feet
Loss in Manifold	0.3	feet
Loss in Laterals	0.3	feet
Loss through Flowmeter	0.0	feet
'Add-on' Friction Losses	0.0	feet

Pipe Volumes

Vol of Transport Line	15.7	gals
Vol of Manifold	0.9	gals
Vol of Laterals per Zone	43.1	gals
Total Volume	59.8	gals

Minimum Pump Requirements

Design Flow Rate	45.3	gpm
Total Dynamic Head	49.9	feet



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

NOTE:

SET PUMP FLOATS TO DISCHARGE 198 GALLONS PER PUMP CYCLE

285 ENGINEERING
P.O. BOX 1048
CONIFER, CO
80433
(720)-515-1781

PROJECT: 2022502 - OWTS DESIGN

LOCATION:
44 KENEU COURT
COMO, CO 80432

CLIENT: INDIAN MOUNTAIN METRO DISTRICT

TITLE: PUMP AND SYSTEM CURVES

DATE: 01/11/2022

SCALE: NONE

DRAWN BY: JDM

REVISIONS:



SHEET:

12/14



MOUND SIZING CRITERIA:

Calculation: OWTS - Mound System Design

Revised:
4/18/2022

Site Identification: **44 KENEU COURT**
 County: **PARK**
 Date: **1/3/2023**
 Engineer/Designer: **285 ENGINEERING**
 Add'l site information: **STA #1**

- Notes:
- The calculation is based on the Mounded Wastewater Treatment Systems Technical Guidance for Site Suitability, Design, Construction, Operation and Maintenance, dated August, 2020.
 - Highlighted Yellow Cells / Red Text indicates User to Input Data.
 - Once calculation inputs are finalized, click ctrl + P to print.

NOTE: If an "Error w/calc" message pops up, this means that you have selected certain values that exceed the calculated minimums or maximums

1. User Input and Calculated Values:

Parameters	Values	Units
Design Flow	1,000	GPD
% Slope	12.0	Percent
Soil LTAR (SLR)	1.1	Unitless
Linear Loading Rate (LLR)	12	Unitless
Sand Fill Loading Rate	0.8	Gal./sq.ft./d
Min. upslope sand depth above grade (C)	0	Feet
Distribution Media Depth (E)	1	Feet
Soil Cover Depth (F)	1	Feet
Downslope correction	1.57	Unitless
Upslope correction	0.73	Unitless
Total depth of imported sand	3	Feet

Parameters	Auto-Calculated Values	Manually Input Values	Units
Max. Distribution Cell Width (A)	15	12.00	Feet
Min. Distribution Cell Lenth (B)	83.33333333	105.00	Feet
Min. Distribution Cell Area	1250	1260	Sq. Feet
Min. Basal Area (sand) Width (I)	10.91	10.91	Feet
Min. Downslope mound fill depth (D)	1.92	1.56	Feet
Actual width to toe of slope (H)	18.46	17.00	Feet
Upslope width (J)	4.38	4.38	Feet
End slope length (K)	8.88	8.34	Feet
Overall width (W)	39.84	35.50	Feet
Overall length (L)	103.09	124.00	Feet

Calculation: OWTS - Mound System Design

Revised:
4/18/2022

Site Identification: **44 KENEU COURT**
 County: **PARK**
 Date: **1/3/2023**
 Engineer/Designer: **285 ENGINEERING**
 Add'l site information: **STA #2**

- Notes:
- The calculation is based on the Mounded Wastewater Treatment Systems Technical Guidance for Site Suitability, Design, Construction, Operation and Maintenance, dated August, 2020.
 - Highlighted Yellow Cells / Red Text indicates User to Input Data.
 - Once calculation inputs are finalized, click ctrl + P to print.

NOTE: If an "Error w/calc" message pops up, this means that you have selected certain values that exceed the calculated minimums or maximums

1. User Input and Calculated Values:

Parameters	Values	Units
Design Flow	1,000	GPD
% Slope	12.0	Percent
Soil LTAR (SLR)	1.1	Unitless
Linear Loading Rate (LLR)	12	Unitless
Sand Fill Loading Rate	0.8	Gal./sq.ft./d
Min. upslope sand depth above grade (C)	0	Feet
Distribution Media Depth (E)	1	Feet
Soil Cover Depth (F)	1	Feet
Downslope correction	1.57	Unitless
Upslope correction	0.73	Unitless
Total depth of imported sand	3	Feet

Parameters	Auto-Calculated Values	Manually Input Values	Units
Max. Distribution Cell Width (A)	15	12.00	Feet
Min. Distribution Cell Lenth (B)	83.33333333	105.00	Feet
Min. Distribution Cell Area	1250	1260	Sq. Feet
Min. Basal Area (sand) Width (I)	10.91	10.91	Feet
Min. Downslope mound fill depth (D)	1.92	1.56	Feet
Actual width to toe of slope (H)	18.46	17.00	Feet
Upslope width (J)	4.38	4.38	Feet
End slope length (K)	8.88	8.34	Feet
Overall width (W)	39.84	35.50	Feet
Overall length (L)	103.09	124.00	Feet

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 CONIFER, CO
 80433
 (720)-515-1781

PROJECT: 2022502 - OWTS DESIGN

LOCATION:
 44 KENEU COURT
 COMO, CO 80432

CLIENT: INDIAN MOUNTAIN METRO DISTRICT

TITLE: MOUND SIZING CRITERIA

DATE: 01/11/2022

SCALE: NONE

DRAWN BY: JDM

- REVISIONS:
- 1
 - 2
 - 3

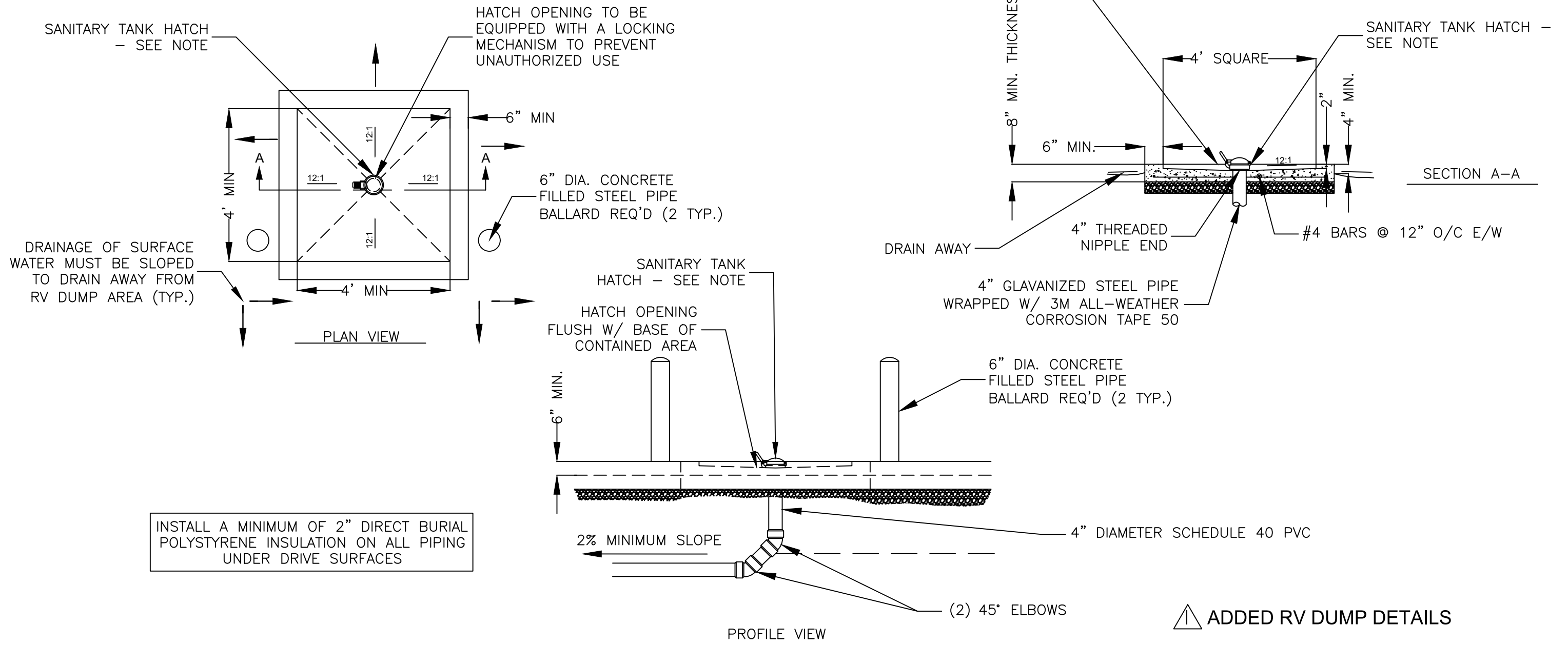
SHEET:

13/14



NOTE:

SANITARY TANK HATCH SHALL BE OPW 269 4" DIA. SELF CLOSING, FOOT OPERATIONAL AND/OR SPRING/WEIGHTED COVER. OR APPROVED EQUAL. OPENING SHALL BE FLUSH WITH TO BASE/GRADE OF CONTAINED AREA.



INSTALL A MINIMUM OF 2" DIRECT BURIAL POLYSTYRENE INSULATION ON ALL PIPING UNDER DRIVE SURFACES

RV DUMP STATION CONNECTION DETAILS
3/8" = 1'

285 ENGINEERING P.O. BOX 1048 CONIFER, CO 80433 (720)-515-1781	PROJECT: 2022502 - OWTS DESIGN	TITLE: DUMP STATION CONNECT DETAILS		SHEET: 14/14	
	LOCATION: 44 KENEU COURT COMO, CO 80432	DATE: 01/11/2022	REVISIONS: 1 03/27/2023 2 3		
	CLIENT: INDIAN MOUNTAIN METRO DISTRICT	SCALE: NONE	DRAWN BY: JDM		