



Oregon

Kate Brown, Governor

Department of Environmental Quality

Eastern Region Bend Office

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Bend, OR 97701

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TTY 711

November 3, 2022

Rick & Nan Arnold
1300 NE 16th St
McMinnville, OR 97128

Re: WQ: CAS: Variance Approval: 248-22-000815-VAR: 16790 Casper Drive; T.20S; R.10E; Sec. 26AD; Tax Lot 2900; Lot 10, Block 10 Oregon Water Wonderland Unit No 1, 0.96 Acres; Deschutes County.

Dear Rick & Nan Arnold,

This correspondence verifies that a variance hearing provided for under Oregon Administrative Rules 340-071-0430, was held on the site at 11:30 am on September 21, 2022, for the subject property referenced above on Casper Drive in Deschutes County. The purpose of the hearing was to provide a forum for the presentation of supportive facts to show that strict compliance with certain rules regulating onsite sewage disposal are inappropriate, or that special physical conditions at the site render strict compliance unreasonable, burdensome or impractical. The proposal and associated supporting information you provided with the application was presented during the recorded hearing.

Variance Decision:

Based on review and evaluation of the variance record and observations made during the variance hearing, I am pleased to inform you that the variance from the rules cited above is hereby granted. In my opinion, it would be unreasonable to prohibit this method of wastewater treatment by strictly following the administrative rules at this location at this time. It is my judgement that the proposed system is not likely to present a health hazard risk or have any significant adverse impact to groundwater or surface water quality if properly operated and maintained. The owner of this system will be required to enter into a maintenance contract with a certified maintenance provider for the life of the system.

Justification for this decision:

- The proposed Orenco® AdvanTex AX20N-Mode 3B system is currently approved as a system meeting DEQ's Treatment Standard 2; OAR 340-071-0100(168) "Treatment Standard 2" means a 30-day average of less than 20 mg/L of BOD₅ and 20 mg/L of TSS, a 30-day geometric mean of less than 400 fecal coliform per 100 milliliters and a 30-day average of 30 mg/L of Total Nitrogen. A 30-day average of less than 17 mg/L of CBOD₅ is acceptable in lieu of the BOD₅ value.
- On average, the AX20N-Mode 3B system is one of the best available technologies for Total Nitrogen treatment that has been approved for use in Oregon and is expected to treat residential wastewater to 20mg/L Total Nitrogen, which is about two thirds of a reduction from that of a standard system and about half from a sand filter system in this climate.

- Pre-treated effluent from the AX20N-Mode 3B unit (proposed w/o UV disinfection) discharging into a 250 square foot bottomless sand filter with an additional 18 inches of carbon enhanced sand filter media (embedded 6 inches) placed below the filter to meet or exceed the minimum 24-inch separation requirement for the reduction of fecal coliform, the proposed system will meet or exceed Treatment Standard 2 criteria. Note: The bottomless sand filter is assumed to meet treatment standard 2 criteria independently of the ATT, which is why UV disinfection is not included in the proposal.
- Overall Treatment: Treatment occurs within the AX20N-Mode 3B system (w/o UV) for reductions in TSS, BOD₅ and Total Nitrogen. The elevated bottomless sand filter with carbon enhancement will provide further reduction/treatment of BOD₅, TSS, Fecal Coliform and Total Nitrogen.
- This parcel and the developed parcels in the surrounding area are primarily served by a public water system, thus reducing the overall concern for nitrate contamination of drinking water wells in the immediate vicinity.

Standards found in Oregon Administrative Rules Chapter 340, Division 071 & 073 have been developed to protect public health and the environment in Oregon. The variance officer's duty is to determine if in their professional judgement, the system proposed for this variance consideration is adequate to safeguard the public's health and the environment if variance from the standards noted above are granted. In my opinion, your proposal adequately addresses the limitations present at the site.

Other Considerations:

The effluent from the ATT system discharging through a bottomless sand filter will have a significant reduction in Five Day Biochemical Oxygen Demand, Total Suspended Solids, Total Nitrogen and Fecal Coliform. In this proposal, treated ATT effluent will be discharged into a 250 square foot bottomless sand filter with an additional 18 inches of carbon enhanced sand filter media embedded 6 inches into the native soil that will be used to exceed the 24-inch separation from the shallowest water table depth standard by providing a total separation of 31 inches. The additional media will mitigate the lack of vertical separation from the bottom of the sand filter to the highest level of groundwater on site. Additionally, it is expected that the carbon enhancement of the sand filter media will provide further reductions of total nitrogen before the treated effluent enters the native soil and ultimately the groundwater below.

Specifications for the design and location of the systems approved through this variance authorization are contained in the enclosed schedules. Other system specifications are to be supplied to the Deschutes County Community Development Department, Onsite Wastewater Section, at permit application. This variance approval is being granted on the condition that requirements contained in the enclosed schedules are met. Failure to meet these conditions may cause the variance approval to become null & void.

Should future ATT technologies for treatment of Total Nitrogen be approved for use in Oregon before issuance of a construction-installation permit for this site, Deschutes County may allow installation of equal or better technology instead of the type noted in this approval.

Site History & Variance Proposal:

Deschutes County conducted a site evaluation involving three test pits on June 30, 2022, which resulted in a denial issued July 6, 2022, for use of an onsite wastewater system. The primary reasons for denial were due to the predicted depth to the seasonally high permanent water table being less than 24 inches below the ground surface as well as concerns of nitrate loading to the groundwater. Observed conditions associated with saturation that are used to determine water table levels and site suitability were observed less than 24 inches from the ground surface between 13 and 20 inches below ground surface (bgs). The highest ground in the north-central portion of the parcel, appears to be the best location. The proposed bottomless sand filters are to be located in this area with the appropriate spatial footprint and will meet all horizontal setback requirements.

The proposal is to overcome the site limitations by installing an Orenco® AdvanTex AX20N-Mode 3B Alternative Treatment Technology System followed by a 250 sq. ft. elevated reduced sized Bottomless Sand Filter system constructed on an 18-inch bed of carbon enhanced sand filter media embedded at least 6 inches into the native soil. It is expected that the highest level of groundwater within the lowest point of the sand filter areas will come to 19 inches bgs. The proposal seeks to overcome this limitation by providing additional carbon enhanced sand filter media, thus adding an additional 7 inches of vertical separation and providing a total 31-inch separation to the shallowest predicted groundwater depth. The rest of the sand filter will be “conventional” from there up, consisting of 6 inches of underdrain media, 24 inches of sand filter media, 6 inches of drain media (with the distribution laterals), filter fabric, and 6 to 9 inches deep of final backfill on top. The sand filter is proposed to be contained within a supporting berm with a slope no steeper than 3:1 (3 feet horizontal for every 1 foot vertical).

You are seeking a variance from the following Oregon Administrative Rules:

OAR 340-071-0135(1) – which addresses DEQ approval of new or innovative technologies, materials, or designs for onsite systems. **This rule is being varied from due to deviating from the approved design for the AX20N in Mode 3B by not requiring UV disinfection. Treatment Standard 2 will still be met or exceeded without the UV disinfection by discharging the treated effluent through a bottomless sand filter.**

OAR 340-071-071-0150(4)(a)(B) - which requires all criteria for approving a specific type or types of systems, as described in this division are satisfied;

OAR 340-071-0290(4)(d) which states: Bottomless Sand Filter. Sites may use a conventional bottomless sand filter if the site meets the criteria in this section and section (3) of this rule. (d) The water table is at least 24 inches below the ground surface throughout the year, and a minimum 24-inch separation is maintained between a water table and the bottom of the sand filter.

Conclusion:

The decision to grant your variance request is a Final Order of DEQ. You are entitled to a judicial review of this Order by filing a petition for review within 60 days from the date of certified mailing of this order to the circuit court of Marion County or the circuit court for the county in which you reside or have a principal business office. Judicial review is pursuant to the provisions of Oregon Revised Statute 183.484.

Any person who is adversely affected or aggrieved by this Order is entitled to a contested case hearing before the Environmental Quality Commission. A request for a hearing must be received by DEQ within twenty days from the date of certified mailing of this Order. The request must specifically describe how the Order fails to meet the requirements of ORS 454.657 and 454.660, and include the technical basis that supports the petition. The appeal must be directed to the Environmental Quality Commission, in care of Stephanie Caldera, EQC Assistant, Department of Environmental Quality, 700 NE Multnomah St., Suite 600, Portland, OR 97232-4100.

Deschutes County onsite staff is hereby authorized to issue a construction-installation permit, subject to all of the conditions, upon their receipt of a complete permit application. The application must include a favorable land use compatibility statement issued by Deschutes County, a set of detailed plans and specifications for the onsite wastewater treatment system, a current maintenance service agreement and the appropriate application fee.

Please feel free to contact me if you have any questions concerning this decision. I can be reached by telephone at (541) 633-2036, or by email at sean.rochette@deq.oregon.gov.

Sincerely,



Sean Rochette, WWS, CPSS
Natural Resource Specialist 4
Variance Officer – Onsite Wastewater Program

Encl: Schedule A- Special Conditions
Schedule B- Approved Plans
Approved Drawings / Schematics

cc: Todd Cleveland, REHS; Deschutes County Onsite Wastewater Division, 117 NW Lafayette Ave, Bend OR 97703
Brian T. Rabe, CPSS, WWS; Senior Soil Scientist, Valley Science and Engineering, 3511 Pacific Boulevard SW, Albany OR 97321
Entrust Group Inc FBO Dieter N Muller, 555 12th St #1250, Oakland, CA 94607
Dustin & Michelle Sciaraffo, PO box 4331, Sunriver, OR 97707
Keith & Roseann Andrus, 9461 Harcourt Cir, Huntington Beach, CA 92646
Marsha Gentle & Darus Peake, 55395 Gross Dr, Bend, OR 97707
Eric Richard Cumer Liv Trust et al, 3277 Montebello Ave, Springfield, OR 97477
Kevin & Sharon Greig, 3345 Rosemont Way, Eugene, OR 97401
Philip & Terri Fulton, 1322 Beachmont St, Ventura, CA 93001

Schedule A – Rick & Nan Arnold
Variance Report - Special Conditions
T 20S, R 10E, WM, Sec: 26AD, TL 2900

Special Conditions and requirements for the Orenco® AX20N-Mode 3B Alternative Treatment Technology unit followed by an elevated 250 square foot Bottomless Sand Filter with an additional 18 inches of carbon enhanced sand filter media at 16790 Casper Drive; T.20S; R.10E; Sec. 26AD; Tax Lot 2900; Lot 10, Block 10 Oregon Water Wonderland Unit No 1, 0.96 Acres; Deschutes County.

1. A person or business licensed by the Department of Environmental Quality in accordance with Oregon Revised Statutes, Chapter 454.695, must perform all work construction of this onsite wastewater treatment system.
2. Before starting with the actual construction of this system, the system installer shall submit, through a written statement to the Deschutes County Community Development Department, Onsite Wastewater Division (hereafter referred to as “County”) that acknowledges that they have thoroughly reviewed the conditions of this variance approval with technical staff in that office, and they understand and will comply with all conditions associated with this variance approval.
3. This system incorporates the use of Sand Filter Media and Underdrain media, as defined in Oregon Administrative Rules (OAR) 340-071-0100(124) and OAR 340-071-0100(170). Prior to delivery to the site, a current sieve analysis, using testing requirements required in rule for the respective material, must be submitted for review and approval to the County. Special handling of the respective media is to occur, during transport, site storage, and construction of the sand filter.
4. This onsite wastewater treatment system shall serve a single-family residence with up to four bedrooms. The projected daily sewage flow must not exceed 450 gallons per day, and the average daily flow must not exceed 225 gallons per day. Where practical, low water-use plumbing fixtures and appliances should be used within the dwelling in conjunction with water conservation practices. **Use of a garbage disposal is not recommended.**
5. All construction of this system shall only occur under optimum soil moisture conditions. The soils must be nearly dry and not frozen. Typically, the ideal construction period begins at the end of spring run-off season and ends prior to the onset of winter weather.
6. The setback to all wells from the initial or replacement bottomless sand filters is to be at least 100 feet.
7. The County shall inspect the installation of this system at those stages of construction they identify as appropriate to ensure proper construction.

8. Except as specifically authorized, all requirements of the Oregon Administrative Rules (Chapter 340, Rules 071-0100 through 071-0650) must be met.
9. The permittee shall comply with all local planning, zoning and building ordinances.
10. A Certificate of Satisfactory Completion shall be issued for the completed installation only if all conditions of this variance approval are met.
11. Should the onsite wastewater treatment and disposal system, authorized through this variance fail, County staff may exercise professional discretion in effecting a repair, based upon an analysis of the possible causes of failure. An area next to the initial sand filter is to be designated for future repair or replacement and must be reserved for this use. The replacement system considered in this variance procedure is the installation of another sand filter.

Schedule B – Rick & Nan Arnold
Variance Report – Approved Plans
T 20S, R 10E, WM, Sec: 26AD, TL 2900

Special Conditions and requirements for the Orenco® AX20N-Mode 3B Alternative Treatment Technology unit followed by an elevated 250 square foot Bottomless Sand Filter with an additional 18 inches of carbon enhanced sand filter media at 16790 Casper Drive; T.20S; R.10E; Sec. 26AD; Tax Lot 2900; Lot 10, Block 10 Oregon Water Wonderland Unit No 1, 0.96 Acres; Deschutes County.

Brian Rabe, CPSS, WWS, prepared the tentative construction plans.

Deschutes County staff may request additional construction plan details before issuance of a construction-installation permit.

1. The approved tentative plans are integral to the proposal and were received on or about August 11, 2022, with a revision submitted on September 22, 2022 due to a discovered issue with the assumed property line during the hearing.
2. The septic tank(s) and treatment system will be installed in an area known for high groundwater levels at certain times of the year. Per OAR 340-071-0220(3)(b)(B) tanks must be weighted and provided with an anti-buoyancy device to prevent flotation in accordance with the manufacturer's instructions.
3. Sand Filter Media requirements. The sand filter media and underdrain media must comply with particle size distribution outlined in OAR 340-071-0100(124) & (170), respectively. A current sieve analysis (within 30 days of the date of application) is required and must be submitted with the application for a construction installation permit. The specific batch of sand filter media and underdrain media proposed for use must meet the following requirements:
 - a. Sand filter media means a medium sand or other approved material used in a conventional sand filter. The media must be inert so that it will maintain its integrity, will not collapse or disintegrate with time, and will not be detrimental to the system's performance. The particle size distribution of the media must comply with the following particle size distribution: 100 percent passing the 3/8 inch sieve, 95 percent to 100 percent passing the No. 4 sieve, 80 to 100 percent passing the No. 8 sieve, 45 percent to 85 percent passing the No. 16 sieve, 15 percent to 60 percent passing the No. 30 sieve, 3 percent to 15 percent passing the No. 50 sieve and 4 percent or less passing the No.100 sieve.
 - b. Underdrain media means the material placed under the sand filter media in a sand filter and consists of clean, washed pea gravel with 100 percent passing the ½ inch sieve, 18 percent to 100 percent passing the ¼ inch sieve, 5 percent to 75 percent passing the No. 4 sieve, 24 percent or less passing the No. 10 sieve, 2 percent or less passing the No.16 sieve and 1 percent or less passing the No. 100 sieve.

4. To enhance nitrogen removal, a carbon augmentation source consisting of 25 percent wood (half-coarse chips, half-fine sawdust), must be blended/mixed with the additional sand filter media placed to meet the minimum separation distance to groundwater. The carbon enhanced bottomless sand filter construction must follow the media and lysimeter installation guide as prepared by Brian Rabe in Appendix F of the variance proposal materials. Lysimeters must also be installed as per the approved plans so that samples may be taken to assess nitrogen reduction through the carbon enhanced layer. Sampling shall be allowed by current and future property owners periodically to ensure the performance of the system.
5. Proper cleaning of machinery must be ensured during transportation, handling and storage of these materials onsite to prevent fine particle size contamination.
6. All orifices in the pressure manifold are to have orifice shields. If underdrain media is placed around the pressure manifold layer, downward facing orifices are to be double shielded to prevent orifice obstruction from media intrusion.
7. A sand filter must be dosed at a rate not to exceed ten percent of the projected daily sewage flow or 45 gallons per dose.

*Should future ATT technologies for treatment of Total Nitrogen be approved for use in Oregon before issuance of a construction-installation permit for this site, Deschutes County may allow installation of equal or better technology instead of the type noted in the approval.

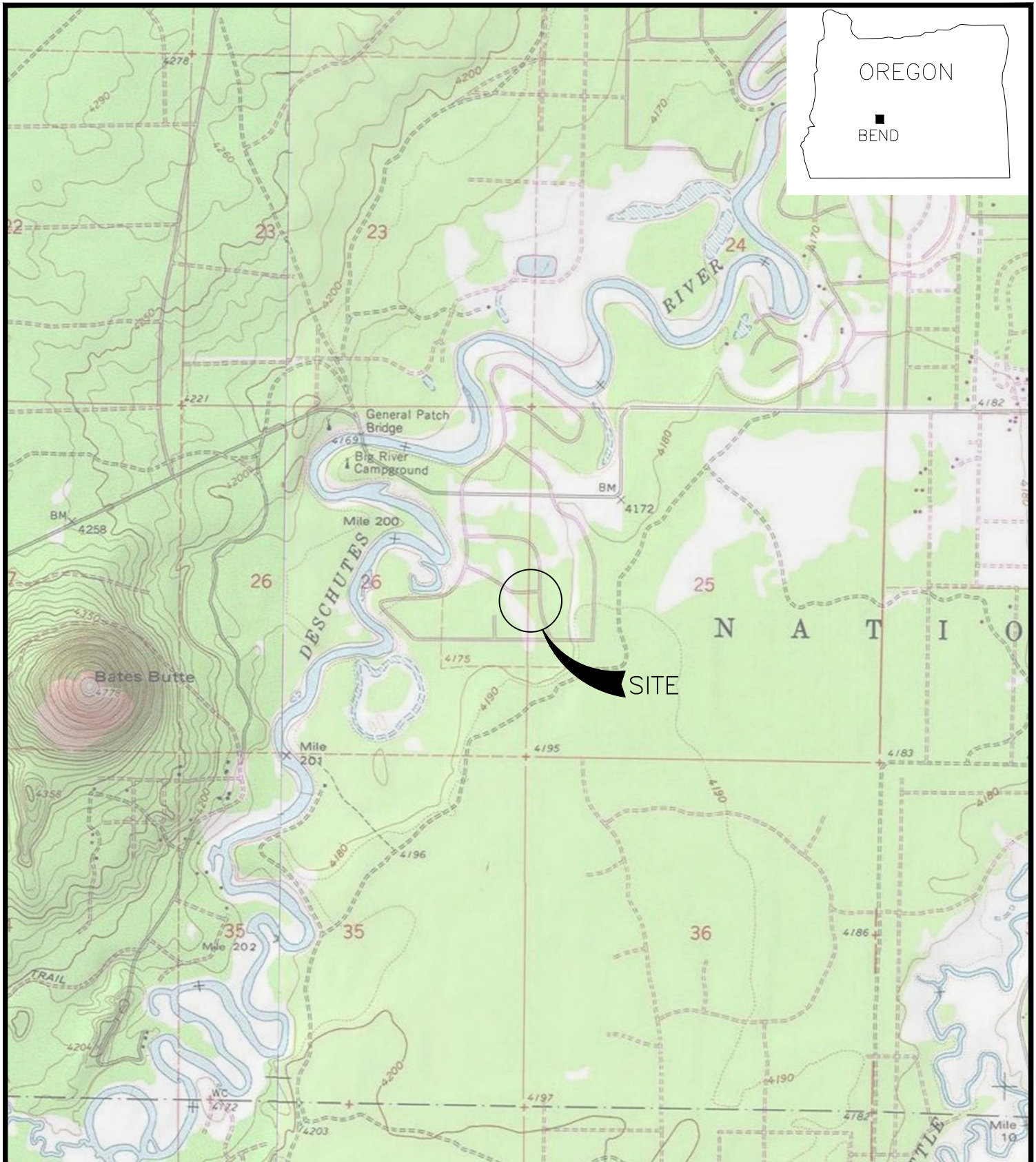
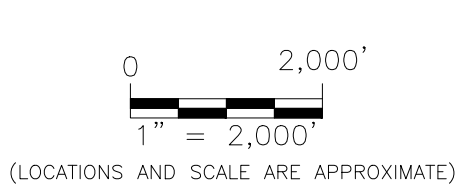


Figure 1. Vicinity Map

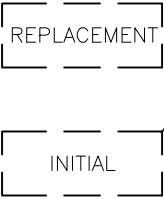


(SOURCE: ©2013 National Geographic Society, i-cubed)

PROJECT: 2022240090		Formal Variance	
NUMBER:		T20S, R10E, Section 26AD, Tax Lot 2900	
DATE: 8/4/2022		Rick and Nan Arnold 16790 Casper Drive Bend, OR 97707	
DWG NO: 2022240090 F1-5.DWG			
DWG BY: PROJECT MANAGER: 6NSG 1BTR			
REVISED:		VALLEY  SCIENCE AND ENGINEERING	

TAX LOT 3000
DENIED (2021
AND 2006)

TAX LOT 2800
VARIANCE APPROVED (2021)



EXISTING
BOTTOMLESS
SAND FILTER

PROPOSED ADVANTEX
AX20N (MODE 3B)
TREATMENT SYSTEM

BLM SURVEY
MARKER

TEST PIT
2 (2022)

TBM — TOP IRON ROD
AT PROPERTY CORNER

120.00'

PROPOSED
SHOP
(40'x60')

CLEANOUTS

PROPOSED
GARAGE
(25'x32')

PROPOSED
HOUSE
(50'x50')

PROPOSED 10'x25'
MODIFIED BOTTOMLESS
SAND FILTER

PROPOSED 10'x25'
REPLACEMENT AREA

15'

10'

128'

120.00'

T20S, R10E, SECTION 26AD, TAX LOT 2900

CASPER DRIVE
(16790)

HEIERMAN DRIVE

TAX LOT 10100
NO RECORDS

TAX LOT 2300
NO RECORDS

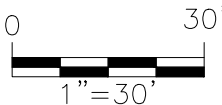
TAX LOT 2400
NO RECORDS

TAX LOT 100
DENIED (1990)

TAX LOT 3000
NO RECORDS

APPROVED

By Sean Rochette at 12:22 pm, Nov 03, 2022



(SCALE AND LOCATIONS ARE APPROXIMATE)

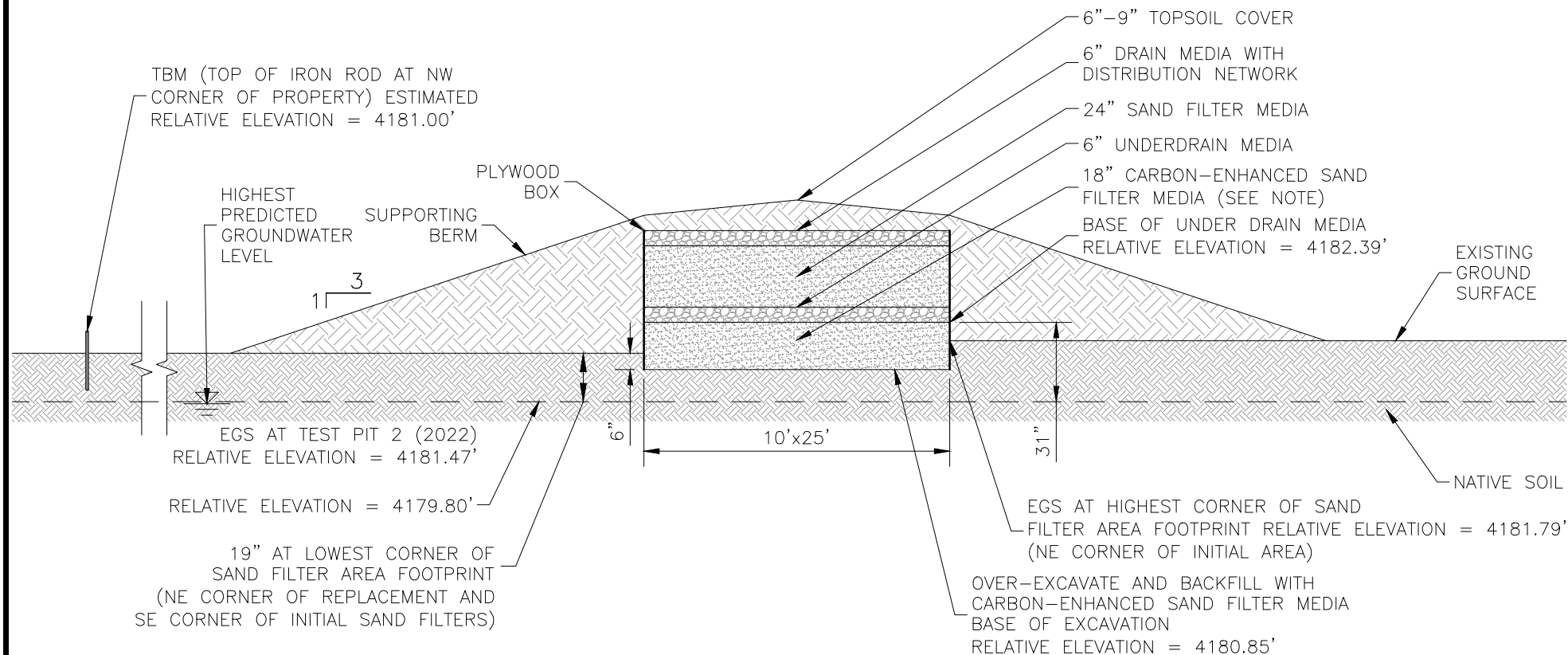
Figure 2. Site Plan

PROJECT NUMBER: 2022240090
DATE: 8/4/2022
DWG NO: 2022240090 F1-5.DWG
DWG BY: PROJECT MANAGER: 6NSG 1BTR
REVISED:

Formal Variance
T20S, R10E, Section 26AD, Tax Lot 2900
Rick and Nan Arnold
16790 Casper Drive
Bend, OR 97707



SCIENCE AND ENGINEERING

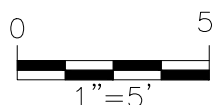


NOTE: CONSTRUCT THE BASEMENT LAYER WITH A CAREFULLY PLACED AND COMPRESSED BLEND OF 75% SAND FILTER MEDIA AND 25% SOLID-PHASE CARBON (50/50 MIX OF COARSE AND FINE WOOD-PLAYGROUND CHIPS AND SAWDUST). THE PURPOSE OF THIS LAYER IS TO ENHANCE NITROGEN REMOVAL.

Figure 3. Modified Bottomless Sand Filter Section

APPROVED

By Sean Rochette at 12:22 pm, Nov 03, 2022



PROJECT NUMBER: 2022240090	Formal Variance
DATE: 8/4/2022	T20S, R10E, Section 26AD, Tax Lot 2900
DWG NO: 2022240090 F1-5.DWG	Rick and Nan Arnold
DWG BY: 6NSG PROJECT MANAGER: 1BTR	16790 Casper Drive
REVISED:	Bend, OR 97707
	VALLEY SCIENCE AND ENGINEERING

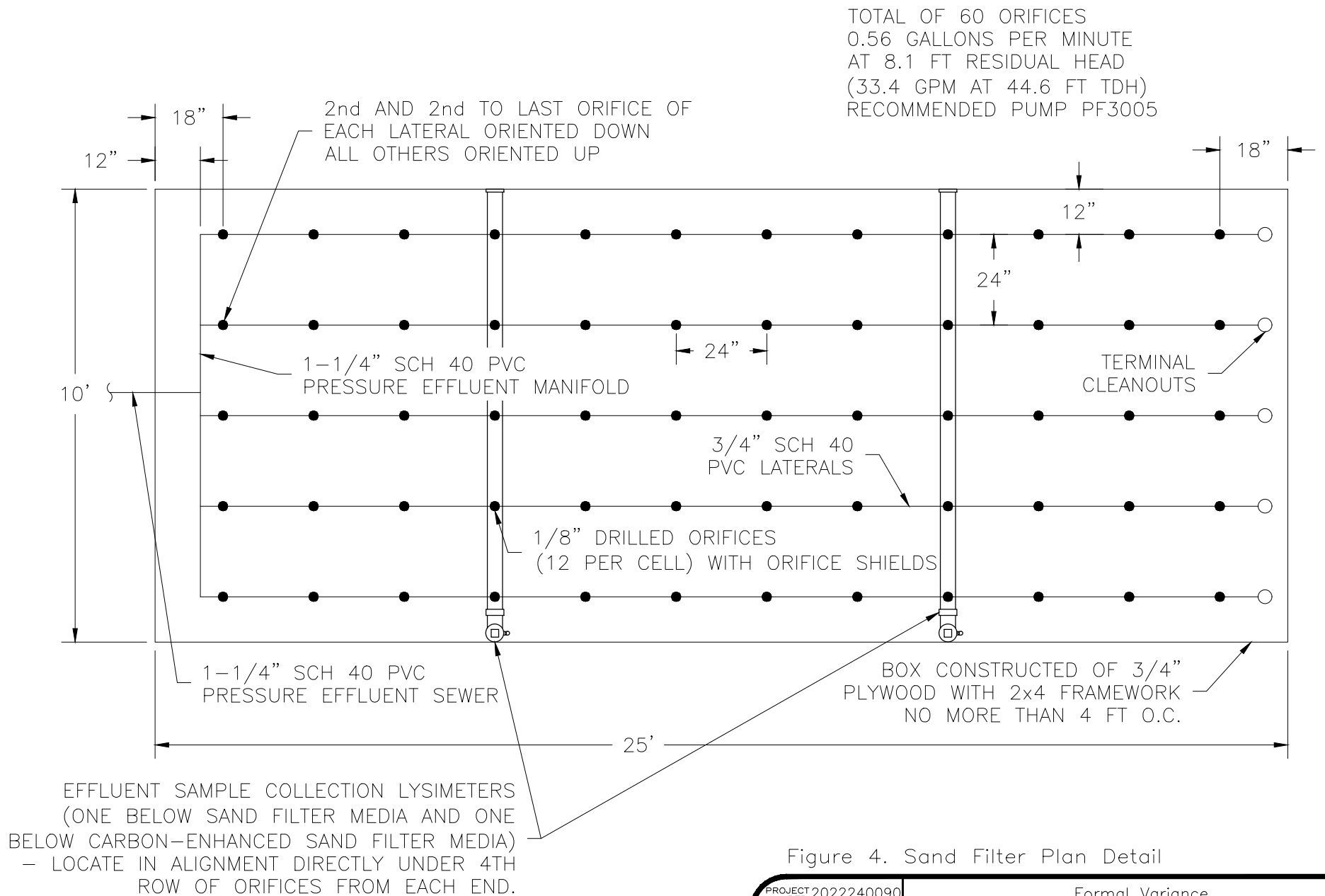
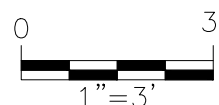


Figure 4. Sand Filter Plan Detail

APPROVED *SR*
By Sean Rochette at 12:22 pm, Nov 03, 2022



PROJECT NUMBER: 2022240090	Formal Variance
DATE: 8/4/2022	T20S, R10E, Section 26AD, Tax Lot 2900
DWG NO: 2022240090 F1-5.DWG	Rick and Nan Arnold
DWG BY: 6NSG PROJECT MANAGER: 1BTR	16790 Casper Drive
REVISED:	Bend, OR 97707

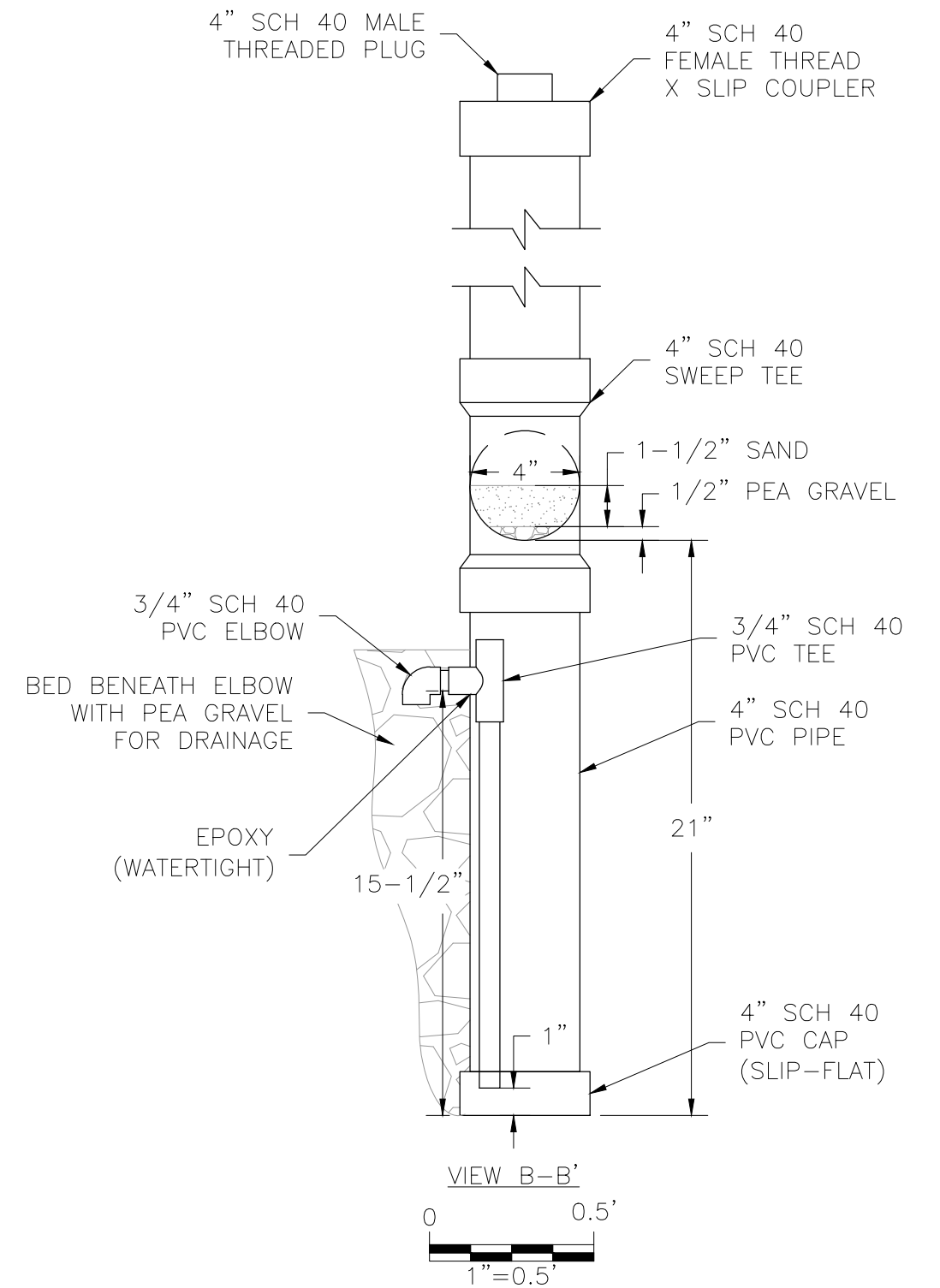
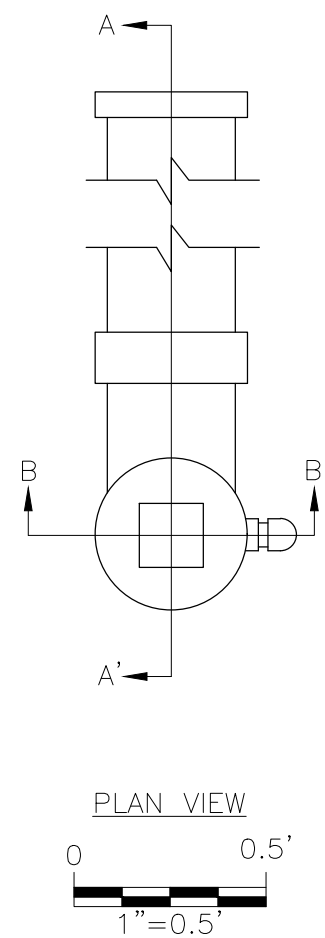
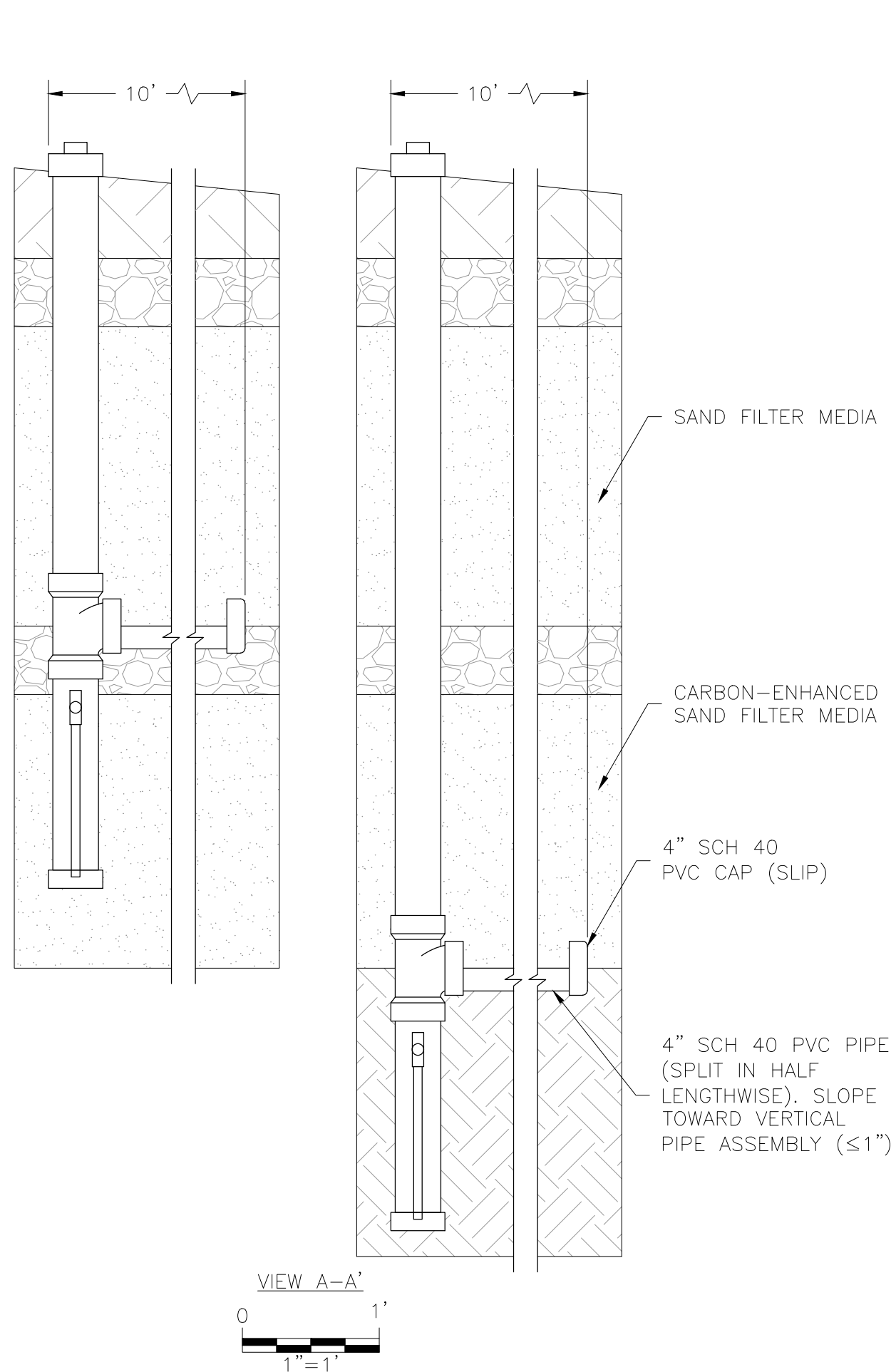


Figure 5. Lysimeter Details

PROJECT NUMBER: 2022240090	Formal Variance
DATE: 8/4/2022	T20S, R10E, Section 26AD, Tax Lot 2900
DWG NO: 2022240090 F1-5.DWG	Rick and Nan Arnold
DWG BY: PROJECT MANAGER: 6NSG 1BTR	16790 Casper Drive
REVISED:	Bend, OR 97707
	VALLEY SCIENCE AND ENGINEERING

APPROVED

By Sean Rochette at 12:22 pm, Nov 03, 2022



A **valmont**  COMPANY

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valleyirrigation.com/se

Carbon Enhanced Bottomless Sand Filter

Media and Lysimeter Installation Guide

- Remove duff and surface soil layer (typically 6 inches) to provide an infiltrative surface free of roots.
- Construct a frame using 2x4's (top and bottom sills with 2x4 studs no more than 4 feet apart) tall enough to extend from the bottom of the carbon-enhanced layer to the top of the distribution media layer (typically 5 feet).
- Install $\frac{3}{4}$ -inch plywood on the interior of the framing to provide a smooth interior surface.
- Line the interior sidewall surfaces with plastic sheeting from the bottom up to the top of the underdrain media (typically 30 inches).
- When installing sampling devices (trough lysimeters), carefully mark the location of the orifice positions on each side of the box (typically 24 inches on center beginning 18 inches in from each end).
- Also mark the target elevations for each layer on the walls.
- Remove enough soil from a 4-inch wide strip (trough) across the bottom aligned with a row of orifices (typically the 4th row from either end).
- With an auger or a tile spade, dig a hole at one end of the trough large enough and deep enough to set the vertical part of the lysimeter against the wall.
- Fine-grade the placement of the body of the lysimeter with the horizontal fitting of the sanitary tee aligned with the trough.
- Bed the half pipe with a slight slope (no more than 1 inch in 10 feet) toward the body of the lysimeter.
- Glue one end of the half pipe into the coupler extending from the sanitary tee with a cap glued at the opposite end.
- Place about a one-half inch of underdrain media (pea gravel) in the bottom of the trough with enough ramped up inside the sanitary tee to cover the drilled holes in the debris cap.
- Backfill around the lysimeter with pea gravel to provide drainage from the self-emptying port.
- Secure the body of the lysimeter to the wall with a metal strap or other device to stabilize it during the placement of the various layers of media.
- Thoroughly mix the wood (50:50 blend of playground chips and sawdust) with the medium sand with 3 parts sand to 1 part wood and place in 6-inch lifts inside the box.
- Use a walk-behind plate compactor to make a single pass over each lift to compress the blend. This is meant to limit pore size and volume to slow the flow rate and limit the diffusion of oxygen into this layer in order to improve denitrification and limit future settling.
- After the final lift of carbon-enhanced media is installed, install the second lysimeter in a similar fashion as the first with the trough installed in the underdrain media layer.
- The rest of the sand filter will be constructed in a customary fashion.



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valleyirrigation.com/se

Carbon Enhanced Bottomless Sand Filter

Lysimeter Sampling Guide

- Label all sample bottles in advance.
- Loosen the square nut plug on each lysimeter.
- Remove the plug from the deeper lysimeter (carbon-enhanced layer) and shine a flashlight down the pipe to confirm the presence of filtrate.
- Use a bailer (disposable or cleaned) on a string to collect sample from the body of the lysimeter.
- Transfer sample into sample bottles.
- Repeat as necessary until all bottles are filled.
- Secure the caps on each bottle and place them immediately in a cooler with ice.
- Replace the square nut plug.
- Repeat this process for the shallower lysimeter (medium sand layer).
- If funding allows, collect a treated effluent sample from the discharge chamber of the AdvanTex unit.
- Deliver samples to the laboratory (nitrate-nitrogen samples need to be analyzed within **48 hours** of sample collection).