Oregon
Tina Kotek, Governor

Department of Environmental Quality
Eastern Region Bend Office
475 NE Bellevue Dr., Suite 110
Bend, OR 97701
(541) 388-6146
FAX (541) 388-8283
TTY 711

November 21, 2024

Donald V. Bordelon
24879 Platinum Ln
Wilder, ID 83676

Re: WQ: Variance Approval: 248-24-000340-VAR: 17062 Indio Rd; T.20S; R.10E; Sec. 12D; Tax Lot 15600; Lot 36, Block 35; 0.505 Acres; Deschutes County.

Dear Donald V. Bordelon,

This correspondence verifies that a variance hearing provided for under Oregon Administrative Rules 340-071-0430, was held on the site at 1:30 pm on October 30, 2024, for the subject property referenced above on Indio Road 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 specific location at this time. It is my judgement that the proposed system is not likely to present a public health hazard risk or have any significant adverse impacts to groundwater or surface water quality if properly operated and maintained.

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".
- 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 20 mg/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.
- Treatment Standard 2, for the reduction of fecal coliform, will be met or exceeded with pre-treated effluent from the AX20N-Mode 3B unit (proposed w/o UV disinfection) and the RidNOx™ unit that will discharge into a 250 square foot bottomless sand filter with an additional 9-inches of sand filter media (embedded 6-inches below ground surface) placed below the filter to meet or exceed the minimum 24-inch separation requirement to groundwater below. 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 first occurs within the AX20N-Mode 3B system (w/o UV) for reductions in TSS, BOD_5 and Total Nitrogen (TN). The RidNOx™ unit is expected to further reduce TN (and Nitrate) as the effluent passes through and makes contact with the soluble carbon being released from the wood chip material. Final discharge will occur through the elevated bottomless sand filter, which may provide some additional reduction/treatment of BOD_5, TSS, Fecal Coliform and TN. It is expected that the final effluent being discharged shall meet or exceed that of the similar Nitrex unit, that was tested during the La Pine National Demonstration Project, which averaged a 96% reduction of TN. The final effluent Nitrate concentration is expected to be well under the EPA drinking water standard of 10 mg/L as well as local action levels set at 7 mg/L.
- The proposed system, with innovative technology, shall be required to be maintained by a certified maintenance provider for the life of the system. Additionally, the system shall be monitored and sampled at regular intervals to ensure that the system is performing as expected. The sampling, monitoring, and maintenance of the system shall be reported to Deschutes County on an annual basis.

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 and RidNOx™ system, discharging through a bottomless sand filter, will have a significant reduction in BOD, TSS, TN, and Fecal Coliform. In this proposal, treated ATT to RidNOx™ effluent will be discharged into a 250 square foot bottomless sand filter with an additional 15- inches of 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 27- 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. The RidNOx™ unit is expected to provide a significant reduction of Total Nitrogen (and Nitrate) before the treated effluent enters the bottomless sand filter with a basal area intersecting the native soil and ultimately the groundwater below.

This variance approval is being granted on the condition that requirements contained in the enclosed schedules are met. Schedules A and B (attached) include requirements and specifications for the design and location of the system approved through this variance. Failure to meet these conditions may cause the variance approval to become null & void.

Site History & Variance Proposal:
Deschutes County conducted a site evaluation with 4 test pits within the subject property on July 12, 2024, where a denial was issued for the use of an onsite wastewater system on July 16, 2024 . The primary reason for denial was due to the predicted depth to the seasonally high permanent water table being less than 24- inches below the ground surface. Observed conditions associated with saturation

that are used to determine water table levels and site suitability were observed between 17- inches and 18-inches below ground surface (bgs).

The proposal to overcome the site limitations is by installing an Orenco® AdvanTex AX20N-Mode 3B Alternative Treatment Technology System followed by a RidNOx™ solid-phase carbon flow-through filter before discharging to a 250 sq. ft. elevated Bottomless Sand Filter system constructed on a 15-inch bed of sand filter media embedded 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 18- inches bgs. The proposal overcomes this limitation by providing additional sand filter media with 3- inches of extra vertical separation and providing a total 27-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 6-9 inches deep of final backfill on top. The sand filter will be contained within a supporting berm with a slope no steeper than 3:1.

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.**

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.

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.

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.

Conclusion:

The decision to grant your variance request is a Final Order of DEQ. 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 Oregon Revised Statutes 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 Lindsay Trapp, 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 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) 776-6130, or by email at david.hurley@deq.oregon.gov.

Sincerely,

David Hurley

David Hurley, REHS
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; Principal Soil Scientist, of Elkhorn Consulting LLC, 14833 Goodrich Creek Lane, Baker City, OR 97814
Patricia M. Hutchinson, 17051 Hermosa Road, Bend, OR 97707
Thomas J. & Ruth M. Kinane, 18160 Cottonwood Road #807, Bend, OR 97707
Gary A. & Laura H. Westall, 17081 Indio Road, Bend, OR 97707
William D. Conway Jr., 7906 SE Jennings Ave, Milwaukie, OR 97267
Joel P. & Talisa C. Myers, PO Box 4931, Bend, OR 97707

Schedule A – Donald V. Bordelon
Variance Report - Special Conditions
T 20S, R 10E, Sec: 12D, TL 15600

Special Conditions and requirements for the Orenco® AX20N-Mode 3B Alternative Treatment Technology unit with a RidNOx™ system followed by an elevated 250 square foot Bottomless Sand Filter at 17062 Indio Road; T.20S; R.10E; Sec. 12D; Tax Lot 15600; 0.505 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.

APPROVED

By DEQ Variance Officer 11-20-2024

David Hurley

TAX LOT 16500
NO RECORDS

TAX LOT 16600
DENIED (1978)

TAX LOT 16700
DENIED (2020)

TAX LOT 15700
ATT + BOTTOMLESS
SAND FILTER (2020)

TAX LOT 15500
DENIED (2024)

TAX LOT 12400
STANDARD SYSTEM
(1972), REPAIRED
(1979)

TAX LOT 12600
NO RECORDS

100' SETBACK (SAND FILTER) TYP.

50' SETBACK (TANKS) TYP.

EXISTING WELL

PROPOSED 10'x25' REPLACEMENT AREA

PROPOSED 10'x25' MODIFIED BOTTOMLESS SAND FILTER

10'

20'

15.00'

RidNOx™ UNIT

EXTERNAL PUMP BASIN

5' MIN.

PROPOSED ADVANTEX AX20N (MODE 3B) TREATMENT SYSTEM

PROPOSED 1,500 GAL. SEPTIC TANK

TBM–TOP OF TRANSFORMER

CLEANOUT

15' MIN.

10' MIN.

PROPOSED HOUSE (50'x50')

PROPOSED GARAGE (25'x32')

6'

116'

50' SETBACK (TANKS) TYP.

PROPOSED WELL

100' SETBACK (SAND FILTER) TYP.

187.9'

T20S, R10E, SEC. 12D, TL 15600
17062 INDIO ROAD

0 30'

1"=30'

(SCALE AND LOCATIONS ARE APPROXIMATE)

Figure 2. Site Plan

PROJECT NUMBER: 2024031	Formal Variance T20S, R10E, Section 12D, Tax Lot 15600
DATE: 9/10/2024	
DWG NO: 2024031 F1–5.DWG	Donald V. Bordelon 17062 Indio Road Bend, OR 97707
DWG BY: 6DJR / PROJECT MANAGER: BRIAN RABE	
REVISED:	ELKHORN CONSULTING LLC

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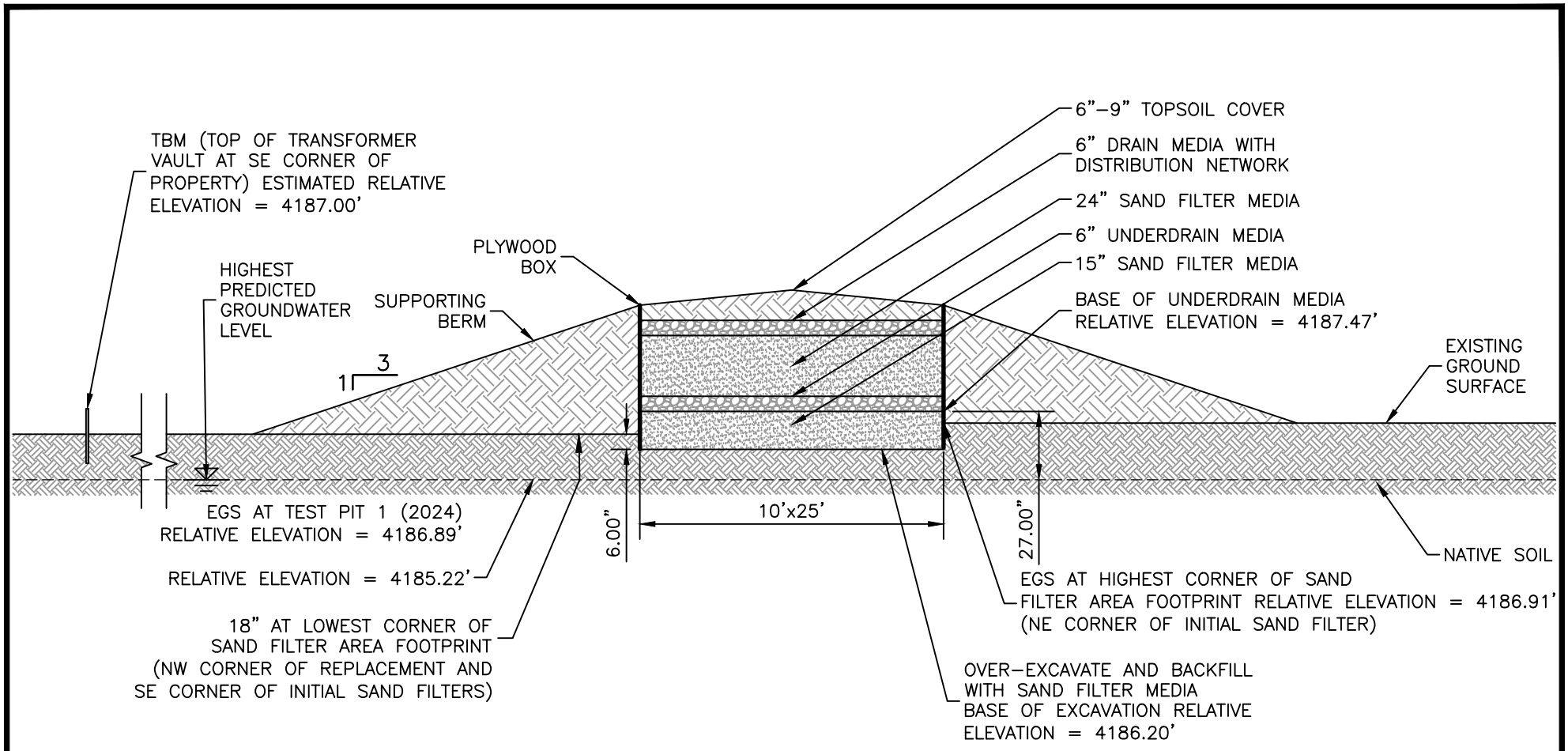

Figure 3. Modified Bottomless Sand Filter Section

PROJECT NUMBER: 2024031	Formal Variance
DATE: 9/10/2024	T20S, R10E, Section 12D, Tax Lot 15600
DWG NO: 2024031 F1–5.DWG	Donald V. Bordelon
DWG BY: 6DJR / PROJECT MANAGER: BRIAN RABE	17062 Indio Road
REVISED:	Bend, OR 97707
	ELKHORN CONSULTING LLC

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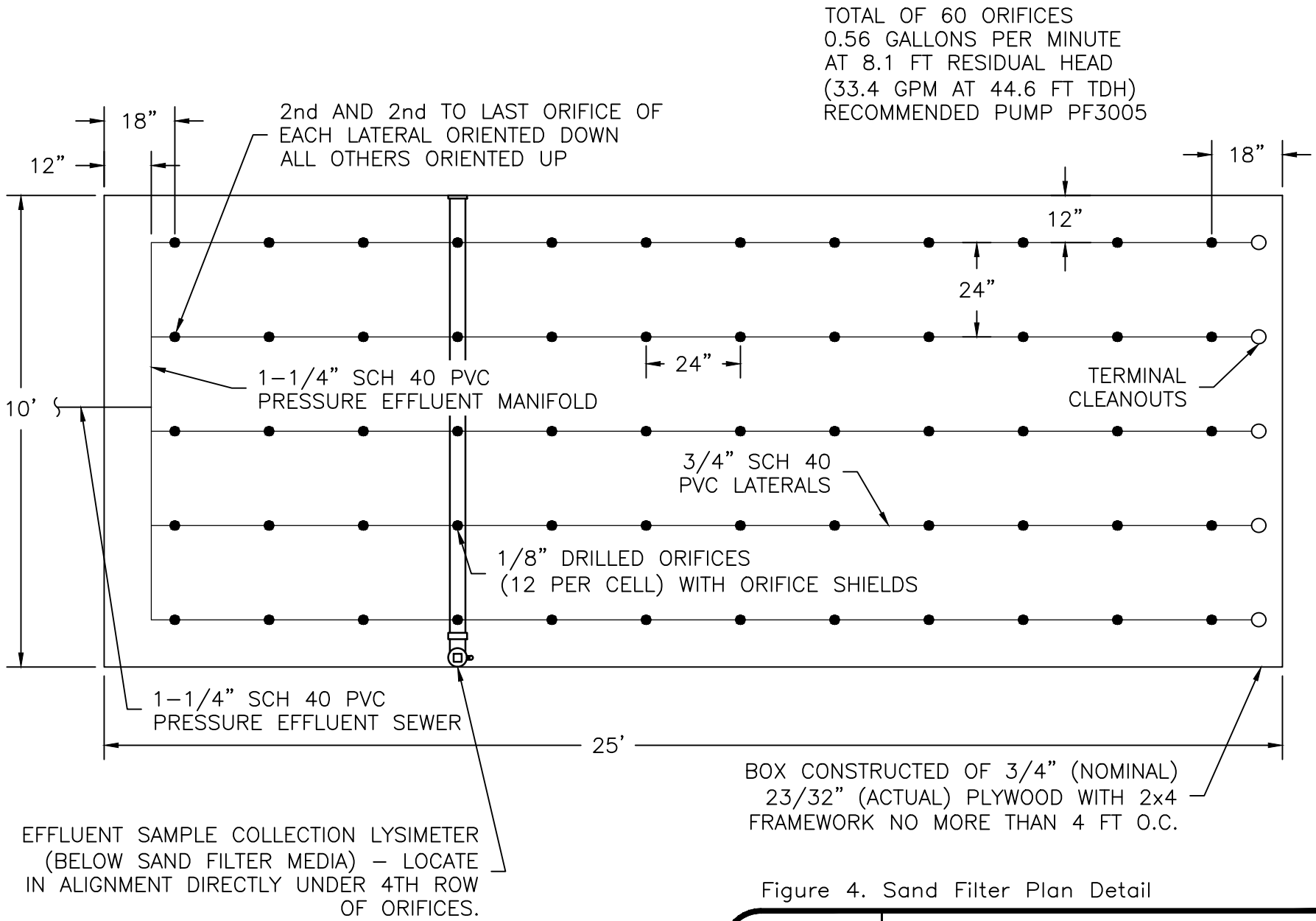

Figure 4. Sand Filter Plan Detail

PROJECT NUMBER: 2024031	Formal Variance
DATE: 9/10/2024	T20S, R10E, Section 12D, Tax Lot 15600
DWG NO: 2024031 F1-5.DWG	Donald V. Bordelon
DWG BY: 6DJR / PROJECT MANAGER: BRIAN RABE	17062 Indio Road
REVISED:	Bend, OR 97707
	ELKHORN CONSULTING LLC

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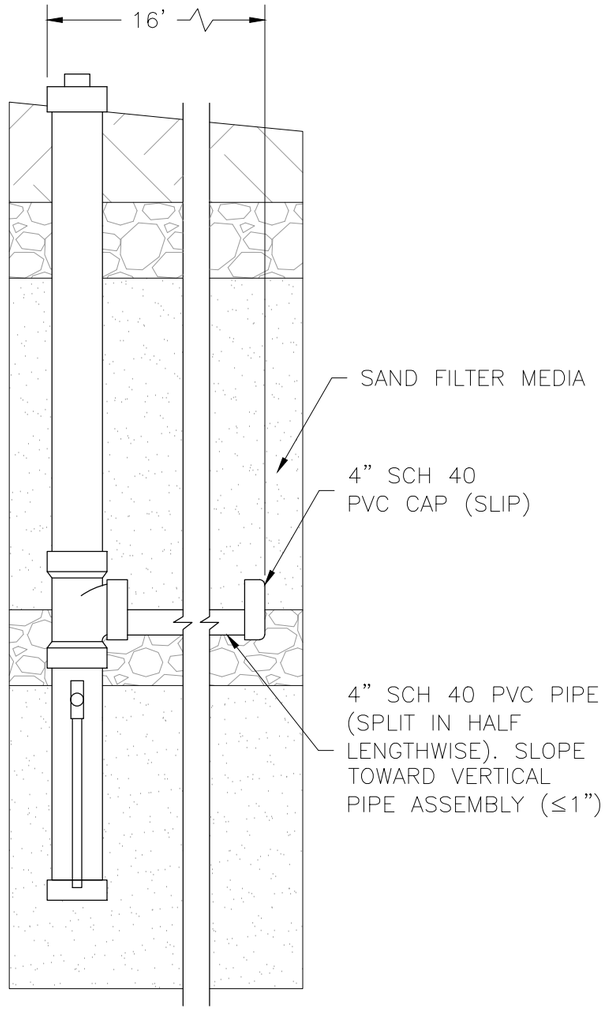
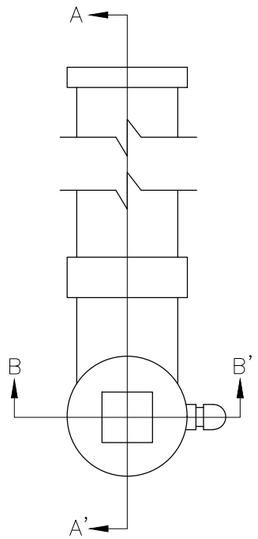


VIEW A–A'

0 1'

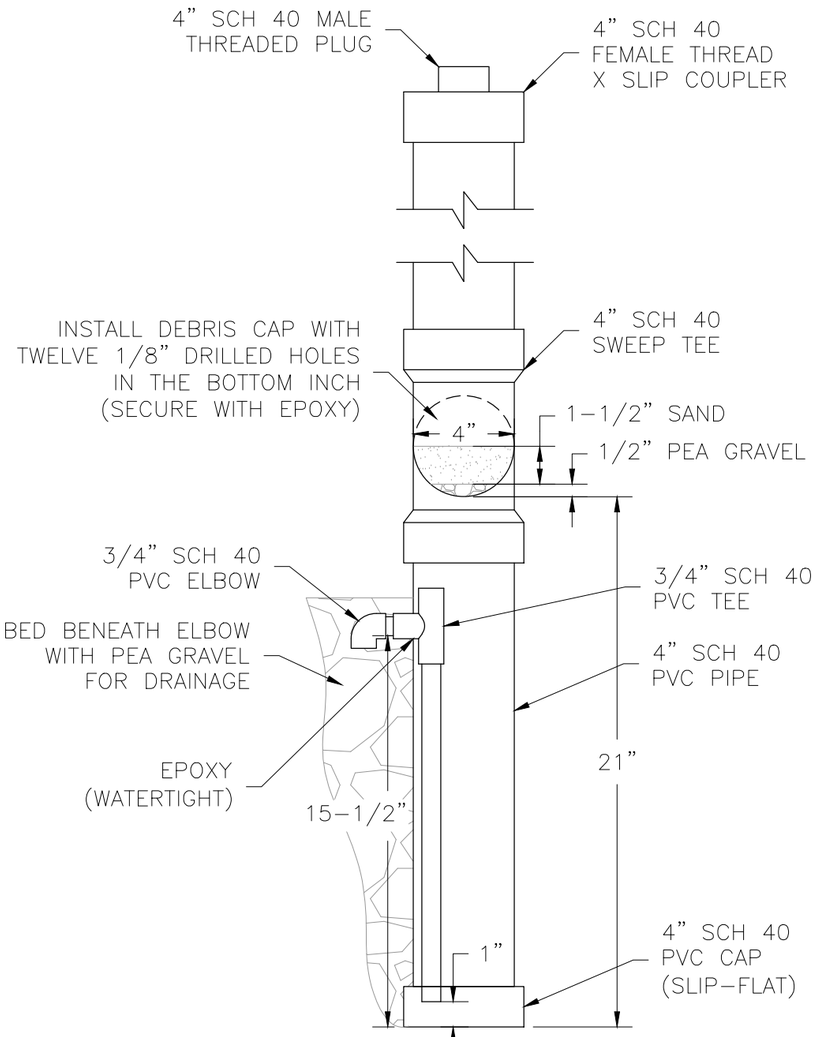
1"=1'



PLAN VIEW

0 0.5'

1"=0.5'



VIEW B–B'

0 0.5'

1"=0.5'

Figure 5. Lysimeter Details

PROJECT NUMBER: 2024031	Formal Variance T20S, R10E, Section 12D, Tax Lot 15600
DATE: 9/10/2024	
DWG NO: 2024031 F1–5.DWG	Donald V. Bordelon 17062 Indio Road Bend, OR 97707
DWG BY: 6DJR PROJECT MANAGER: BRIAN RABE	
REVISED:	ELKHORN CONSULTING LLC

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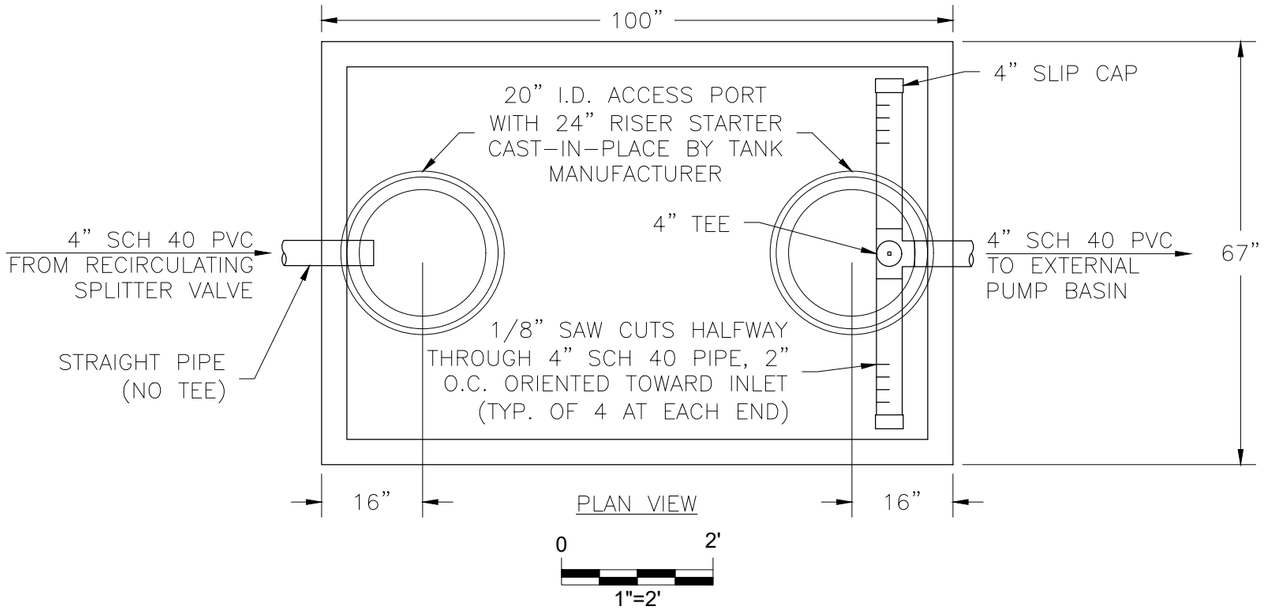

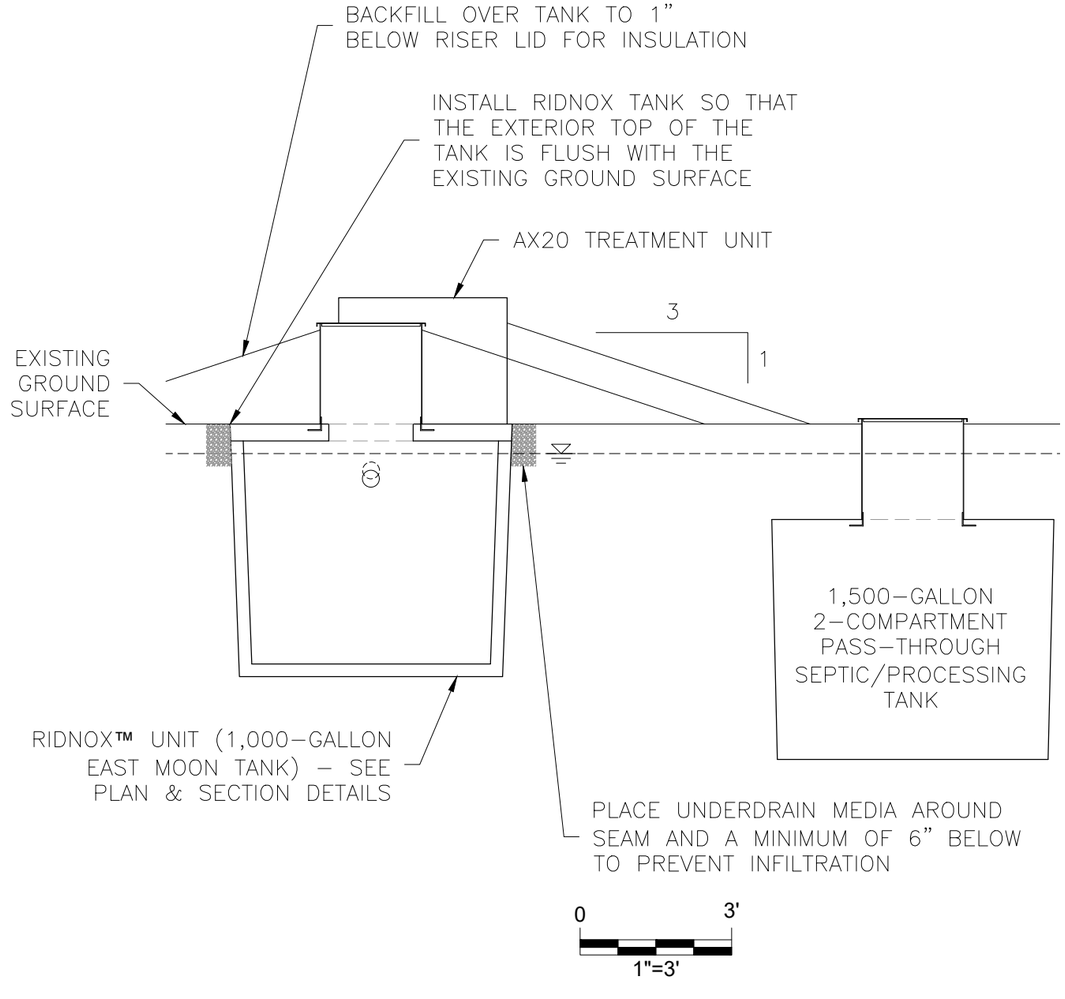

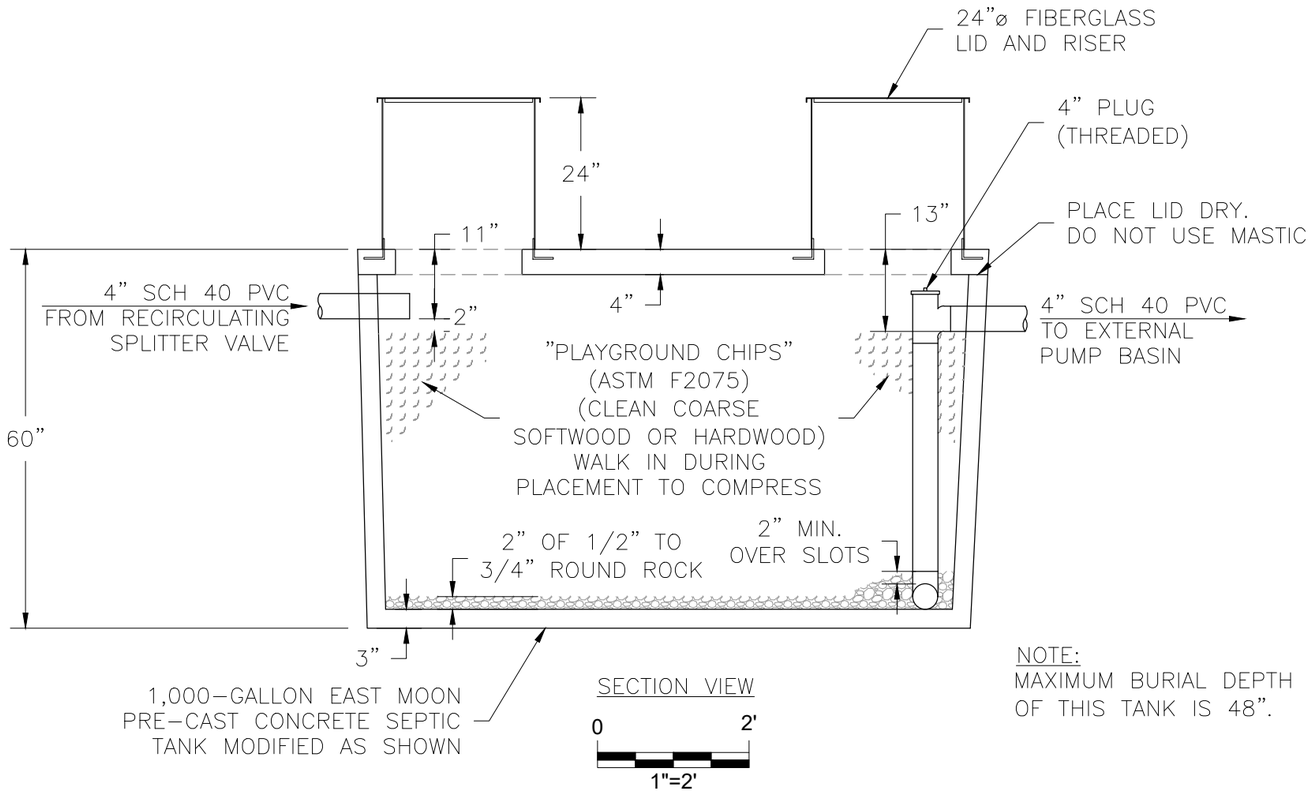

NOTE:
MAXIMUM BURIAL DEPTH OF THIS TANK IS 48".

Figure 6. RidNOx™ Details

PROJECT NUMBER: 2024031	Formal Variance
DATE: 9/10/2024	T20S, R10E, Section 12D, Tax Lot 15600
DWG NO: 2024031 F1–5.DWG	Donald V. Bordelon
DWG BY: 6DJR / PROJECT MANAGER: BRIAN RABE	17062 Indio Road
REVISED:	Bend, OR 97707
	ELKHORN CONSULTING LLC

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COMMUNITY DEVELOPMENT

MEMORANDUM

TO: Oregon Department of Environmental Quality Variance Officer

FROM: Peter Gutowsky, AICP, Director

DATE: October 30, 2024

SUBJECT: Onsite Septic System Variance Application / Groundwater Protection in Southern Deschutes County – 248-24-000340-VAR

I. REQUEST

The Community Development Department (CDD) is concerned about the implications of siting onsite septic systems in Southern Deschutes County through a variance process if future impacts to the aquifer cannot be mitigated. Variance approvals on naturally limited properties that do not meet minimum criteria undermine the goal of protecting a sole source aquifer. It also undercuts our collective efforts and public perception that Deschutes County and the Oregon Department of Environmental Quality (DEQ) are actively protecting the groundwater from nitrate loading.

If DEQ approves an onsite septic system variance for 17062 Indio Rd., CDD respectfully requests documentation describing the basis for it, specifically in relation to Deputy Director Shannon Davis' recent letter to the Deschutes County Board of Commissioners (Board).

II. SITE EVALUATION REPORT

On July 16, 2024, Todd Cleveland, Onsite Wastewater Manager, issued a site evaluation report, denying a septic system proposal at 17062 Indio Road for the following reasons:

- Does not meet minimum separation from permanent water table (OAR 340-071-0220, 0260, 0265, 0275, 0280, 0285, 0290, 0302).
- Installation of an onsite wastewater system in the area evaluated will likely lead to nitrate pollution of public waters. The Nitrate Loading Management Model indicates this area, Management Area 1, cannot sustain added loading from high groundwater lots if nitrate levels are to remain below the action level in groundwater (Morgan, Hinkle, Weick. USGS. 2007). Groundwater shall be protected from pollution that could impair existing and future beneficial uses, including domestic drinking water from wells (OAR 340-040-0020).
- Deschutes County may not authorize installation or use of a system that is likely to pollute public waters or create a public health hazard (OAR 340-071-0130(1)). Nitrogen loading from an onsite wastewater system on this property will likely contribute to the development of a public health

hazard and groundwater contamination. Management area 1 cannot support additional loading without exceeding safe drinking water standards in the groundwater.

III. BACKGROUND

On December 19, 2023, Deputy Director, Shannon Davis provided a letter to the Board discussing groundwater pollution concerns from septic systems in Southern Deschutes County. It acknowledged:

- The Sunriver and La Pine area is vulnerable to nitrate contamination from septic systems and private wells are the primary drinking water source for most properties in this area.

- Conditions documented from past investigations and outlined in a U.S. Geological Survey (USGS) factsheet are still valid.

- Testing and research indicate most of the contamination in this region comes from septic systems. This means nutrients from septic systems are seeping into the area's porous, volcanic soil and the aquifer that is used as a primary drinking water source.

- Continued unrestricted development in the area will reach a tipping point that may be difficult or impossible to recover from due to groundwater contamination which will then require additional regulation and funding to address.

- Even with a septic design capable of producing high quality effluent, the treatment may not sufficiently minimize or eliminate nutrients and pathogens from the wastewater or future impacts to the aquifer system as outlined by a USGS model.

- Some parcels are not suitable for septic systems.

- DEQ still believes that conditions in South Deschutes County are a potential public health and ecological impact issue.

IV. DEQ VARIANCE PROCESS

As noted in a DEQ Fact Sheet, a variance officer will review the proposal and other application materials, conduct a site visit, consider site-specific conditions, and hold a public hearing. The variance hearing is not an opportunity to overturn the county agent's decision. It is an information gathering hearing. The decision to approve or deny a variance application is based on the information presented in the proposal and the requirements and purpose of DEQ's regulations. For this specific application, a variance officer must consider the cumulative impacts to approve a variance in relation to the conditions that exist in Southern Deschutes County, which as noted above, are at risk of contamination from onsite wastewater treatment systems. Factors include:

- Nitrogen loading from onsite wastewater treatment systems is the primary source of contamination; therefore, reducing loading from existing systems and limiting new additional sources is the simplest method to reduce overall loading. New loading from sites that do not meet minimum requirements for any system must be scrutinized to the greatest extent possible.

- Certain management areas have no capacity for additional loading and require the highest level of treatment for existing systems to protect water resources for future beneficial uses. Management areas without additional capacity must be handled extremely carefully due to the lack of additional capacity. Loading from existing systems is sufficient to cause a significant contamination issue and public health hazard; therefore, existing polluting systems must be addressed first to best protect water resources. Additional loading on sites that were never considered to create loading makes addressing the existing loading more difficult while not protecting water resources from pollution.

ELKHORN CONSULTING LLC

14833 Goodrich Creek Lane
Baker City, OR 97814 • 503-881-1604
elkhornconsultingllc@gmail.com

September 13, 2024

Variance Officer
Onsite Variance Program
DEQ - Eastern Region Water Quality
475 NE Bellevue, Ste. 110
Bend, Oregon 97701

SUBJECT: Formal Variance Request – Donald Bordelon – T20S, R10E, Section 12D, Tax Lot 15600 (0.49 acres), Deschutes County, South of Bend, Oregon.

Dear Variance Officer:

A formal variance from selected onsite rules is hereby requested under the provisions of Oregon Administrative Rules, Chapter 340, Division 071, Section 0415 (OAR 340-071-0415).[1] The property is located at 17062 Indio Road, south of Bend in Deschutes County, Oregon (Site) (Figure 1) and consists of 0.505 acres. A Tax Lot map is attached in Appendix A and a copy of the Deed is attached in Appendix B.

Background

The site was first evaluated in 1976 and denied with limited documentation regarding test pit locations, soil characteristics, and water table observations. A site evaluation was conducted on July 12, 2024, and a denial was issued by Deschutes County on July 16, 2024. The evaluation included a total of 4 test pits; one near each of the corners of the parcel. The test pits were described with indications of a seasonally high permanent water table at between 17 and 21 inches below the existing ground surface (bgs). A copy of the site evaluation documentation from Deschutes County is attached in Appendix C. The primary reasons cited for the denial was the predicted depth to the highest level attained by a fluctuating permanent water table. A copy of the site evaluation documentation from Deschutes County is attached in Appendix C.

According to the Deschutes County Property Information website (Dial) Tax Lot 15600 is 0.49 acres, which is slightly smaller than the 0.50 acre minimum for a 4-bedroom system. However, the actual area based on the dimensions of the lot (116 feet by 189.7 feet) is 0.505 acres and therefore meets the minimum lot size for a 450 gallon per day design flow.

Southern Deschutes County has a shallow water table that is typically unconfined in porous pumice soils and is susceptible to contamination from soluble and mobile constituents. The most common constituent of concern is nitrate-nitrogen from septic systems. The onsite rules require a minimum of 24 inches of separation from the upper limit of the water table to the bottom of a bottomless sand filter as well as being 24 inches below the ground surface.

[1] Onsite wastewater treatment systems, 340 OAR § 340.71. (2020).

Soils

The web soil survey shows the location of the Site and a copy of the output from the web soil survey is provided in Appendix D. The entire parcel is shown within a delineation of Map Unit 144A, Sunriver sandy loam 0 to 3 percent slopes. Sunriver soils are described as very deep, somewhat poorly drained soils that formed on pumice mantled stream terraces. The typical profile generally consists of the following:

- Up to 2 inches of organic material underlain by,
- 5 inches of very dark gray ashy sandy loam underlain by,
- 15 inches of dark gray ashy loamy coarse sand underlain by,
- 9 inches of light brownish gray ashy coarse sand underlain by,
- 31 inches of very dark gray sandy loam.

The Sunriver series is described as having a water table that rises to about 2 to 4 feet below the surface from April to June.

The characteristics observed at the Site are reasonably similar to the Sunriver series. The primary differences between the conditions noted in the 2024 soil notes and the conditions typical for the Sunriver series are related primarily to coloration (browner colors) that are more indicative of the Shanahan series.

Preliminary Assessment

The Site was reviewed by Brian Rabe, CPSS, WWS, on August 12, 2024. The purpose was to review the Site conditions and assess the potential to design a modified bottomless sand filter that incorporates additional fill to create adequate separation from the underlying water table following advanced secondary treatment meeting the criteria for Treatment Standard 2 (TS2). The proposed bottomless sand filter area is located on this highest ground, represented by Test Pit 1 in the 2024 site evaluation (southwestern part of the lot - see Figure 2 and Appendix C).

Other Considerations

This parcel and developed parcels in the surrounding area are served by individual private wells. A search of the database of the Oregon Department of Water Resources was conducted for the section that the subject property lies within (Section 12 of Township 20 South, Range 10 East of the Willamette Meridian). There are about 509 records on file for this section. A total of 20 water well records (well logs) were identified in Section 12 that could be tied to specific parcels within about one-eighth of a mile of the subject property (Appendix E). The following is a summary of each of those reports.

The closest existing well is on Tax Lot 15700, about 150 feet northwest of the proposed bottomless sand filter area. This well was completed on August 18, 2020, to a depth of 83 feet. Water was described as being first found at a depth of 10 feet in a layer of “course gravel” but was sealed off. The next water bearing zone was found at a depth of 73 feet in a layer of “course black sand” and had a

static water level of 18 feet bgs on the date of completion with a reported yield of 18 gpm with 5 feet of drawdown after 2 hours.

The next closest existing well is on Tax Lot 12400, is about 170 feet north-northwest of the proposed bottomless sand filter area. This well was completed on July 19, 1996, to a depth of 38 feet. Water was described as being first found at a depth of 30 feet in a layer of "sand + gravel" and had a static water level of 12 feet bgs on the date of completion with a reported yield of 20 gpm with 10 feet of drawdown after 1 hour.

There previously was a well on Tax Lot 16800 that was about 250 feet southeast of the proposed bottomless sand filter area. This well was completed on November 24, 2004 to a depth of 40 feet. Water was described as being first found at a depth of 20 feet in a layer of "blk sand" and had a static water level of 20 feet bgs on the date of completion with a reported yield of 20 gpm with 2 feet of drawdown after 1 hour. This well may have been deepened at some time since the abandonment record from August 19, 2020, indicates that it was 85 feet deep.

The well for Tax Lot 12700 (mislabeled as 2700 on the log) is more than 265 feet northeast of the proposed bottomless sand filter area. This well was completed on June 22, 2018, to a depth of 77 feet. Water was described as being first found at a depth of 68 feet in a layer of "gray sand coarse" and had a static water level of 16 feet bgs on the date of completion with a reported yield of 16 gpm with 4 feet of drawdown after 2 hours.

The well for Tax Lot 15400 is about 310 feet northeast of the proposed bottomless sand filter area. This well was completed on November 19, 2022, to a depth of 68 feet. Water was described as being first found at a depth of 12 feet in a layer of "brown sand course." This layer was sealed off and the next water was described as being found at a depth of 62 feet in a layer of "cinders black" and had a static water level of 18 feet bgs on the date of completion with a reported yield of 14 gpm with 14 feet of drawdown after 2 hours.

The well for Tax Lot 15300 is about 330 feet east-northeast of the proposed bottomless sand filter area. This well was completed on November 22, 2021, to a depth of 69 feet. Water was described as being first found at a depth of 67 feet in a layer of "medium fine gravel" and had a static water level of 18 feet bgs on the date of completion with a reported yield of 20 gpm with 7 feet of drawdown after 1 hour.

The well for Tax Lot 11600, about 350 feet north of the proposed bottomless sand filter area, was completed on March 13, 1992 to a depth of 84 feet. Water was described as being first found at a depth of 8 feet in a layer of "black sand." The well was cased and perforated in a layer of "black sand & med gravel" between 64 and 84 feet bgs. The well had a static water level of 20 feet bgs on the date of completion with a reported yield of 100 gpm (air) after 1 hour.

The replacement well on Tax Lot 16800 is about 375 feet southeast of the proposed bottomless sand filter area. This well was completed on September 13, 2021, to a depth of 80 feet. Water was described as being first found at a depth of 68 feet in a layer of "sand and fine gravel" and had a static water level of 18 feet bgs on the date of completion with a reported yield of 20 gpm with 6 feet of drawdown after 2 hours.

The well for Tax Lot 11400 is more than 420 feet north-northeast of the proposed bottomless sand filter area. This well was completed on June 18, 2002, to a depth of 75 feet. Water was described as being first found at a depth of 8 feet in a layer of "Brn sand & gravel." This layer was sealed off and the next water was described as being found at a depth of 67 feet in a layer of "red & black cinders" and had a static water level of 15 feet bgs on the date of completion with a reported yield of 15 gpm with 25 feet of drawdown after 1 hour.

The well for Tax Lot 20300 is about 520 feet south-southwest of the proposed bottomless sand filter area. This well was completed on May 13, 2022, to a depth of 69 feet. Water was described as being first found at a depth of 67 feet in a layer of "coarse gravel and black sand" and had a static water level of 19 feet bgs on the date of completion with a reported yield of 17 gpm with 13 feet of drawdown after 1 hour.

The well for Tax Lot 20400 is about 530 feet southwest of the proposed bottomless sand filter area. This well was completed on May 27, 2022, to a depth of 73 feet. Water was described as being first found at a depth of 65 feet in a layer of "coarse black sand and cinders" and had a static water level of 21 feet bgs on the date of completion with a reported yield of 20 gpm with 13 feet of drawdown after 1 hour.

The well for Tax Lot 17100 is about 540 feet east-southeast of the proposed bottomless sand filter area. This well was completed on October 6, 2022, to a depth of 69 feet. Water was described as being first found at a depth of 66 feet in a layer of "medium cinders" and had a static water level of 27 feet bgs on the date of completion with a reported yield of 20 gpm with 6 feet of drawdown after 1 hour.

The well for Tax Lot 13000 is more than 580 feet southeast of the proposed bottomless sand filter area. This well was completed on October 26, 1998, to a depth of 85 feet. Water was described as being first found at a depth of 60 feet in a layer of "sand gravel" underlain by a layer of "worm hole lava-basalt" and had a static water level of 12 feet bgs on the date of completion with a reported yield of 25 gpm with 3 feet of drawdown after 1 hour.

The well for Tax Lot 19800 is about 590 feet south-southeast of the proposed bottomless sand filter area. This well was completed on October 2, 2007, to a depth of 73 feet. Water was described as being first found at a depth of 21 feet in a layer of "green diatomite." The well was cased and perforated in a layer of "cinders & black sand" between 66 feet and 71 feet bgs. The well had a static water level of 14 feet bgs on the date of completion with a reported yield of 10 gpm with 10 feet of drawdown after 1 hour.

The well for Tax Lot 8500 is about 645 feet north of the proposed bottomless sand filter area. This well was completed on May 9, 2024 to a depth of 45 feet. Water was described as being first found at a depth of 10 feet in a layer of "brown sand & gravels" and continuing down through layers of "course brown sand" and "black sand." The upper layer was sealed off to a depth of 18.5 feet. The static water level was reported to be 10 feet bgs on the date of completion with a reported yield of 17.5 gpm with 12 feet of drawdown after 1 hour.

The well for Tax Lot 20600 is about 660 feet southwest of the proposed bottomless sand filter area. This well was completed on July 8, 2004, to a depth of 31 feet. Water was described as being first

found at a depth of 19 feet in a layer of "black sand, med. fine" and had a static water level of 9 feet bgs on the date of completion with a reported yield of 20 gpm with 4 feet of drawdown after 1 hour.

The well for Tax Lot 13300 is about 660 feet west-northwest of the proposed bottomless sand filter area. This well was completed on May 12, 1993, to a depth of 40 feet. Water was described as being first found at a depth of 16 feet in a layer of "black sand" and had a static water level of 16 feet bgs on the date of completion with a reported yield of 13 gpm with no drawdown after 1 hour.

The well for Tax Lot 17500 is about 660 feet west-southwest of the proposed bottomless sand filter area. This well was completed on June 22, 1999, to a depth of 35 feet. Water was described as being first found at a depth of 12 feet in a layer of "black sand" and had a static water level of 12 feet bgs on the date of completion with a reported yield of 18 gpm with 2 feet of drawdown after 1 hour.

The regional groundwater gradient, as indicated in a study published by the U.S. Geological Survey, is to the east-northeast toward the Deschutes River.[2] The subject property is located within Management Area 1, which recommends a 79% to 100% reduction from the base scenario loading (standard systems) for existing and future homes. The results of the Nitrate Loading Management Model within the study (Figures 25 and 26) suggest that this area represents a moderate to high risk of adverse impacts to groundwater quality. According to the interactive map for Oregon Domestic Well Testing, this part of Deschutes County has an average nitrate-nitrogen concentration in domestic wells of 0.51 milligrams per liter (mg/L) with 7.58% exceeding 3 mg/L and none exceeding 10 mg/L (based on 211 test results, viewed on September 9, 2024).[3]

Formal Variance Request

Variance is requested from the following rules:

1. OAR 340-071-0135(1) – which addresses Department of Environmental Quality (DEQ) approval of new or innovative technologies, materials, or designs for onsite systems.[1]
2. OAR 340-071-0150(4)(a)(B) – which requires all criteria for approval shall be met.[1]
3. OAR 340-071-0290(4)(d) – which states that the water table is at least 24 inches bgs throughout the year.[1]

This request seeks to overcome the limitations of this Site by treating the sewage using a recirculating textile filter system (AdvanTex® AX20N-Mode 3B) prior to discharge into an elevated bottomless sand filter. AdvanTex units do an effective job of reducing five-day biochemical oxygen demand and total suspended solids to below 10 mg/L. Nitrogen is often fully converted from ammonia-nitrogen to nitrate-nitrogen (greater than 90%). Operating in Mode 3, the AdvanTex unit reduces total nitrogen sufficiently to meet TS2 (less than 30 mg/L). The DEQ approval of the AX20N in Mode 3B includes an ultraviolet light to satisfy the pathogen reduction requirements of TS2. However, this request includes the use of a modified bottomless sand filter to achieve the pathogen reduction requirements of

[2] Morgan, D. S., & Hinkle, R. S. (2007). *Evaluation of approaches for managing nitrate loading from on-site wastewater systems near La Pine, Oregon*, (Scientific Investigations Report 2007-5237). Reston, VA: U.S. Geologic Survey.
[3] ARC GIS Online. (n.d.). Oregon domestic well testing, [Data file]. Retrieved September 9, 2024, from ARC GIS Online: https://www.arcgis.com/apps/MapSeries/index.html?appid=c0d7daea497049c1a686d07dab7106e5

TS2 instead of an ultraviolet light and, therefore, this configuration does not have (or need) an ultraviolet disinfection unit. The "B" designation indicates the AdvanTex unit is configured with the second pump for the final discharge to the modified bottomless sand filter. A post-anoxic treatment process (RidNOx^{TM}) is proposed to reduce the total nitrogen concentration in the final effluent pumped to the modified bottomless sand filter to less than 2 mg/L.

The AX20 systems in the La Pine project produced a effluent with an average total nitrogen (TN) concentration of 17 mg/L. A post-anoxic process similar to the RidNOx unit that is proposed, referred to at the time as Nitrex, was tested following treatment through a lined intermittent sand filter. The Nitrex unit consisted of a 2-compartment concrete tank filled with what was described as a proprietary carbon media (wood chips).

The sand filters in the La Pine project produced an average TN of about 50 mg/L and the final effluent from the Nitrex units had an average TN of 2.4 mg/L, representing a 96% reduction from the 60 mg/L average TN concentration in the septic tank effluent. So long as there is sufficient soluble carbon being released from the wood chips, and the hydraulic loading rate is low enough to allow the dissolved oxygen in the effluent to approach zero, the NO_3-N concentration will typically be below the method detection limit. What nitrogen remains in the effluent will often be organic, as measured by the Total Kjeldahl Nitrogen (TKN) method. The organic nitrogen may be subsequently oxidized in the bottomless sand filter, but is just as likely to be retained or recycled in the biomass that develops in the sand filter media. Therefore, the concentration of nitrogen leaving the bottomless sand filter after treatment through both the AX20 and the RidNOx unit is expected to be even lower than the results from the La Pine project.

The RidNOx unit described in this proposal is configured similar to larger units used on several systems permitted under Water Pollution Control Facilities (WPCF) permits and monitored on a regular basis. Some of these units have been in tanks and some have been in lined basins. Typical results from the post-anoxic process (prior to discharge, typically to a soil absorption system) include NO3-N concentrations near or below the method detection limit and TKN concentrations between 1 and 3 mg/L.

The test results (August 2022) from a similarly configured system (predominantly residential sources using AdvanTex treatment with Mode 3-style pre-anoxic denitrification, followed by post-anoxic treatment in tanks filled with wood chips) produced a TKN concentration of 0.68 mg/L and a NO_3-N concentration of 0.13 mg/L for a TN of 0.81 mg/L.

The test results (July 2022) from a high-nitrogen source (150 mg/L TKN treated by AdvenTex with alkalinity augmentation to support full nitrification, configured in a Mode 3-style pre-anoxic process, followed by post-anoxic treatment in lined wood-chip beds) produced a TKN concentration of 0.99 mg/L and a NO_3-N concentration of 0.05 mg/L for a TN of 1.04 mg/L. Assuming a maximum 65 to 75% reduction from the starting concentration, the NO_3-N concentration entering the post-anoxic process is expected range between 40 and 45 mg/L, similar to the sand filter effluent from the La Pine Project and higher than what is expected from the AX20 in a residential scenario.

Based on the performance of the commercial systems described above, and a typical residential TN concentration of 60 mg/L, an average TN concentration in the AX20 effluent of 17 mg/L, the TN

concentration leaving the RidNOx unit and going to the modified bottomless sand filter the typical reduction from the base scenario presented in the groundwater study cited previously is expected to be approximately 97 percent.

The initial and replacement bottomless sand filter areas are proposed on the highest ground near the southwest corner of the parcel. This represents an area with the appropriate spatial footprint and meets all required horizontal setback requirements.

Test Pit 1 (2024) was described as:

- Very dark grayish brown (10YR 3/2) coarse sandy loam from 0 to 6 inches with weak medium subangular blocky structure; common fine, medium, and coarse roots; underlain by
- Dark brown (10YR 3/3) loamy coarse sand from 6 to (18 to 21) inches structureless (single grain) with common very fine and fine roots; with redoximorphic features (faint stripping and staining) beginning at 18 to 21 inches; underlain by
- Very dark grayish brown (10YR 3/2) sandy loam from (18 to 21) to 42 inches with moderate medium subangular blocky structure; no roots; with redoximorphic features (iron concentrations) throughout; underlain by
- Very dark gray (10YR 3/1) sand from 42 to 53 inches with moderate medium subangular blocky structure; no roots, and redoximorphic features (iron concentrations) throughout.

Relative elevation measurements were made at all 4 corners of both the proposed initial and replacement bottomless sand filters as well as at the existing ground surface adjacent to Test Pit 1 (2024). The highest level of the water table is expected to be just under 18 inches below the existing ground surface at the lowest point within the area proposed for the initial and replacement sand filters based on a depth of 20 inches to the redoximorphic features described in Test Pit 1 (2024).

The proposed system seeks to overcome this limitation by elevating the modified bottomless sand filter in a manner that provides an additional 3 inches of separation (Figure 3). The sod and underlying sandy soil to a depth of 6 inches within the footprint of the sand filter will be excavated and replaced with sand filter media. An additional 9 inches of sand filter media (total of 15 inches) will be used to exceed the minimum 24-inch separation from shallowest water table depth standard by providing a total separation of 27 inches. 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 of backfill.

Deschutes County has noted that the results of the Nitrate Management Loading Model indicated that there was little to no surplus capacity within Management Area 1 to accommodate additional lots that were denied or otherwise not expected to be approved. Approximately 20 parcels have been approved through the formal variance process in this area and concern has been expressed about the cumulative effects of the additional nutrient load on groundwater and surface water quality.

Brian Rabe will need to be involved during the construction of this system to install the lysimeter in the sand filter and oversee the installation of the RidNOx unit. Additional information regarding the installation of the RidNOx unit and the lysimeter, as well as sampling instructions, are described in

Appendix F and shown in Figures 4, 5, and 6. The owner agrees to facilitate sampling of the RidNOx effluent in conjunction with routine service visits (twice per year for the first 2 years and annually thereafter) to monitor the performance. Samples will be collected from the pump basin between the RidNOx unit and the sand filter. When the media begins to show signs of depletion (as indicated by average nitrogen concentrations climbing to above 7 mg/L nitrate-nitrogen or 10 mg/L total nitrogen), the owner will schedule media replacement for the following summer when the water table is at least 30 inches below the top of the tank (to prevent displacement of the empty tank by buoyant forces). If this request is approved, a condition of approval will require access be allowed to the treatment system and sand filter by current and future property owners for periodic sampling.

In addition to the high level of treatment achieved by the AdvanTex treatment system and post-anoxic denitrification process, further treatment of the effluent will occur with predominantly unsaturated flow within the imported sand and native sandy soil beneath the bottomless sand filter (minimum of 24 inches above the highest predicted level of the underlying fluctuating water table). Small doses, coupled with substantial resting periods achieved with pressure distribution (see recommended sand filter plan detail in Figure 4), will ensure unsaturated, thin-film flow through the soils above the water table. This will further reduce pathogens and other residual contaminants. The subsoil found beneath the sandy surface soils include evidence of both oxidation and reduction of iron. Conditions that support the reduction of iron will reduce nitrate-nitrogen to nitrogen gas since nitrate ions are used as electron acceptors preferentially over iron compounds. This will facilitate additional reduction of nitrate-nitrogen as the highly treated effluent is assimilated into the environment.

Additional Considerations for No Net Impact to Groundwater Nitrate Contribution

A letter from the Deputy Director of the Oregon Department of Environmental Quality dated December 19, 2023, to the Deschutes County Commissioners formally focused additional attention on the potential impacts to water quality in southern Deschutes County from onsite sewage treatment systems. It is important to consider a number of very conservative assumptions that were made in the USGS groundwater modeling effort that likely overestimated the potential impacts. The following addresses a few specific examples.

Plant Uptake of Nitrogen

The model specifically assumes no nitrogen removal from plant uptake. This may be appropriate for shallow rooted grasses, forbes, and other understory vegetation (e.g., bitterbrush). However, this is not appropriate for the overstory vegetation which is primarily lodgepole and ponderosa pine. These tree species have deeper root systems that can withstand periodic saturation. The model accounted for the impact of transpiration in the water balance but did not account for the impact of nutrient removal and storage in the nitrogen balance. The study concluded that there would be a concentration effect as a result. However, this is not realistic. Plants do not take up water without taking up nutrients that they need, if they are present.

Although studies of nutrient removal by lodgepole pine are limited, there are data available from peer-reviewed journal articles. One such article titled *The Nitrogen Cycle in Lodgepole Pine Forests, Southeast Wyoming* by T.J. Fahey, et al, published in *Biogeochemistry* in September 1985

documented total nitrogen uptake of 1.25 grams per square meter (g/m^2) with root turnover of 0.37 g/m^2 for a net uptake of 0.88 g/m^2. This corresponds to 7.85 pounds of nitrogen uptake per acre per year.

Another data source is a chapter from a 1992 publication by the United States Forest Service (USFS) titled *Distribution of Biomass and Nutrients in Lodgepole Pine/Bitterbrush Ecosystems in Central Oregon* by Susan N. Little and Laurl J. Shainsky. They stated that the pumice soils in the area are "very severely deficient" in nitrogen. Table 4 of that publication lists the average nitrogen concentrations for several components of the tree. Since yield estimates for in the published soil survey are focused on the volume of merchantable wood produced over the typical rotation of a stand of timber, only the concentrations of the bolewood (0.06% N) and bark (0.25% N) are accounted for (the parts removed during harvest). The crowns, stumps, and roots are not removed during harvest and would contribute to nutrient cycling on site. The estimated yield of lodgepole pine for Shanahan soils in the published soil survey is 65 cubic feet per acre per year ($ft^3/ac/yr$). The dry density of lodgepole pine ranges from 22 to 53 pounds per cubic foot (lb/ft^3). For the purpose of calculation, an average of 37.5 lb/ft^3 will be used.

The smallest lots eligible for development in southern Deschutes County are about 0.5 acres in size. Assuming half the lot is developed (home, outbuildings, driveway, yard, etc.) the other half is typically maintained with native trees (lodgepole and/or ponderosa pine). Assuming half the average annual growth (32.5 $ft^3/ac/yr$), an average density of 37.5 lb/ft^3, and the nitrogen content described previously, the annual amount of N taken up and stored in standing wood biomass on 0.25 acres (half of a half-acre lot) is 1.2 pounds.

As described in the variance proposal, the proposed system represents the best currently available technology (AdvanTex + RidNOx + MBSF), which is expected to be comparable or better than the best system studied in the La Pine Demonstration Project (Sand Filter + Nitrex + Drainfield). Using expected average total nitrogen concentrations in the effluent leaving the bottomless sand filter after secondary treatment through AdvanTex unit in Mode 3B, followed by tertiary treatment through the RidNOx unit, and the data presented in the USGS groundwater loading and modeling study, the annual mass load to groundwater would be 0.7 lb N/yr (2 mg/L x 2.55 people per home x 45 gallons per person per day x 365 days per year). Even the conservative nitrogen uptake and retention from residual trees on this lot is greater than the contribution from the proposed system. Therefore, approval of this lot utilizing this treatment approach is not likely to make an additive contribution of nitrogen to groundwater.

Hydraulic Loading

The annual hydraulic contribution to groundwater (precipitation minus evapotranspiration) is based on the natural condition. As development occurs, the transpiration component is reduced by the amount of area covered in roofs, driveways, and other impervious or non-vegetated areas. Runoff is limited in these soils so a higher proportion of precipitation contributes to recharge on developed lots than was assumed in the model. This would have a slight positive impact on resulting concentrations.

The letter from the Deputy Director states that the credibility of the state and county could be called into question regarding protection of water quality if more variances are approved. I respectfully disagree, based on the data provided in the previous paragraphs. Use of systems that further reduce the contribution to groundwater, with some systems under certain conditions representing a net zero contribution in most situations, and a net negative contribution in areas with slightly elevated (or higher) nitrate concentrations, are protective of groundwater quality and public health. These systems are only currently available through the variance process.

Conclusions

As described, the proposed combination of treatment components is expected to produce a final effluent with very high quality and a low potential to impact water quality, human health, or the environment. Given the unique circumstances at this Site, strict compliance with the rules is considered to be unreasonable.

It is acknowledged that detailed plans and specifications will need to be submitted and approved before any construction can take place. It is also understood that if this request is approved, there will be language included that allows the county to allow or require a prescriptive system that is demonstrated to perform equal to or better than what is described in this proposal.

Directions to the Site as well as a map showing the ownership of adjacent parcels along with a list of names and addresses are attached in Appendix G. If you have any questions or comments, please do not hesitate to contact me directly at (503) 881-1604.

Sincerely,
ELKHORN CONSULTING LLC

Brian T. Rabe, CPSS, WWS
Principal Soil Scientist

BTR/ddr
Enc: Figures 1-6, Appendices A-G
c: Donald Bordelon
Todd Cleveland, REHS – Deschutes County

FIGURES

APPENDICES

Appendix A.	**Tax Lot Map**
Appendix B.	**Deed**
Appendix C.	**Site Evaluation Reports**
Appendix D.	**NRCS Soil Report**
Appendix E.	**Water Well Reports**
Appendix F.	**RidNOx™ and Lysimeter Installation and Sampling Instructions**
Appendix G.	**Directions to Site, List of Names and Addresses for Neighboring Property Owners**

Appendix A.

Tax Lot Map

Appendix B.

Deed

Appendix C.

Site Evaluation Reports

Appendix D.

NRCS Soil Report

Appendix E.

Water Well Reports

Appendix F.

RidNOx™ and Lysimeter Installation, and Sampling Instructions

Appendix G.

Directions to Site, List of Names and Addresses for Neighboring Property Owners

Oregon
Tina Kotek, Governor

Department of Environmental Quality
Eastern Region Bend Office
475 NE Bellevue Dr., Suite 110
Bend, OR 97701
(541) 388-6146
FAX (541) 388-8283
TTY 711

October 18, 2024

Donald Bordelon
24879 Platinum Lane
Wilder, ID 83676

Re: WQ: CAS: Variance Assignment: 248-24-000340-VAR: 17062 Indio Road; T.20S; R.10E; Sec. 12D; Tax Lot 15600; 0.49 Acres; Deschutes County

Dear Donald Bordelon,

The Department of Environmental Quality is in receipt of your onsite wastewater variance application and proposal. The application has been assigned to me for further action. I plan to hold an information gathering hearing (as provided under OAR 340-71-430) regarding your proposal on **Wednesday, October 30, 2024, at 2:30 pm** at the subject property. Your proposal and system plans have been prepared by Brian T. Rabe, CPSS, WWS; Principal Soil Scientist, of Elkhorn Consulting LLC. It is my understanding that Mr. Rabe will be present to answer any questions regarding the proposal.

Deschutes County conducted a site evaluation with four test pits at the subject property on July 12, 2024, where a denial was issued for the use of an onsite wastewater system on July 16, 2024. The primary reason for denial was due to the predicted depth to the seasonally high permanent water table being less than 24 inches below the ground surface. 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 17 and 21 inches below ground surface (bgs).

Southern Deschutes County has a shallow water table that is typically unconfined in porous pumice soils and is susceptible to contamination from soluble and mobile constituents. The most common constituent of concern is nitrate-nitrogen from septic systems.

The proposal is to overcome the site limitations by installing an Orenco® AdvanTex AX20N-Mode 3B Alternative Treatment Technology (ATT) System followed by a reduced sized Bottomless Sand Filter (BSF) system constructed with a reinforced concrete berm. The nitrate-nitrogen is proposed to be further reduced with a post-anoxic RidNOx unit. You are seeking variance from the following Oregon Administrative Rules (OARs):

OAR 340-071-0135(1): which addresses Department of Environmental Quality approval of new or innovative technologies, materials, or designs for onsite systems.

OAR 340-071-0150(4)(a)(B) which states: 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 sand filter without a bottom (BSF) 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.

Sometimes during a hearing, it can be determined that other rules or standards need to be considered in order to finalize a proposal. Should this occur, based on the proposal, site observations, and other considerations, I may or may not proceed with the hearing and my final decision process until further information is provided.

Notice of the hearing will be mailed to the neighboring property owners and to the Deschutes County Onsite Wastewater Division staff, see copy enclosed. However, all persons who wish to attend the hearing are welcome. The hearing will provide an opportunity for you and others to offer additional facts or reasons either in support of or in opposition to the proposal and requested variance to the rules.

Please remember, it is the burden of the applicant to show that strict compliance to the rules or standards are inappropriate, or that special physical conditions render strict compliance with the rules or standards to be unreasonable, burdensome or impractical. Additionally, the applicant needs to provide prudent reasonable justification in how their proposal will still protect both public health and the environment.

Deschutes County Onsite Wastewater Division staff will get a copy of your proposal and will have an opportunity to provide both written and verbal comments on your proposal. Others wishing to review your proposal can contact me.

The Department is committed to accommodating people with disabilities. Please notify DEQ of any special physical or language accommodations needed as far in advance of the hearing date as possible. To make any of these arrangements please contact, David Hurley, at (541) 776-6130 or toll free at (866)-863-6668, or by email at: david.hurley@deq.oregon.gov. People with hearing impairments can call DEQ's TTY at (800)-735-2900.

If you have questions concerning the variance process or hearing arrangements, please give me a call. You may also visit https://ordeq.org/septicvariance for more information about variances.

Sincerely,

David Hurley

David Hurley, REHS
Natural Resource Specialist 4
Variance Officer – Onsite Wastewater Program

cc: Todd Cleveland, REHS; Deschutes County Onsite Wastewater Division, 117 NW Lafayette Ave, Bend OR 97703
Brian T. Rabe, CPSS, WWS; Principal Soil Scientist, of Elkhorn Consulting LLC, 14833 Goodrich Creek Lane, Baker City, OR 97814

In Addition, To The Following Adjacent Property Owners:

Encl. Neighbor Notice
Patricia M. Hutchinson, 17051 Hermosa Road, Bend, OR 97707
Thomas J. & Ruth M. Kinane, 18160 Cottonwood Road #807, Bend, OR 97707
Gary A. & Laura H. 17081 Indio Road, Bend, OR 97707
William D. Conway Jr., 7906 SE Jennings Ave, Milwaukie, OR 97267
Joel P. & Talisa C. Myers, PO Box 4931, Bend, OR 97707

Oregon
Tina Kotek, Governor

Department of Environmental Quality
Eastern Region Bend Office
475 NE Bellevue Dr., Suite 110
Bend, OR 97701
(541) 388-6146
FAX (541) 388-8283
TTY 711

October 18, 2024

Hearing Date/Time is 2:30 PM on October 30, 2024

Re: WQ: CAS: Variance Assignment: 248-24-000340-VAR: 17062 Covina Road; T.20S; R.10E; Sec. 12D; Tax Lot 15600; 0.49 Acres; Deschutes County.

Dear Resident:

Neighbors of yours, Donald Bordelon, own the property referenced above and herein to be referred to as the "Property", has submitted an application to the Oregon Department of Environmental Quality (DEQ) requesting a "For Cause Variance" from Oregon Administrative Rules regulating Onsite Wastewater Treatment Systems. The Property has been denied due to conditions associated with saturation being within 24 inches of the ground surface.

In the variance application, the applicant's proposal is to install an Orenco® AdvanTex AX20N-Mode 3B Alternative Treatment Technology (ATT) System followed by a reduced sized Bottomless Sand Filter (BSF) system with an additional RidNOx unit for nitrate-nitrogen reduction.

For more detail, please review the enclosed variance hearing notice.

A variance to the Oregon Administrative Rules regulating Onsite Wastewater Treatment Systems may be granted if a variance officer finds that:

1. Strict compliance with the rules or standards are inappropriate: or

2. Special physical conditions render strict compliance unreasonable, burdensome or impractical.

Part of the variance process involves an information gathering hearing. In this hearing, information is shared about the site conditions, rule requirements, public health or environmental protection concerns, and how the proposed system design overcomes these concerns. It is also an opportunity for all parties involved, including adjacent property owners, to voice any concerns they might have with the proposal. Department policy requires a variance officer to inform all adjacent property owners of the variance hearing date, time and place. You are not required to attend this hearing, but can, should you desire to do so.

The information gathering hearing for this variance proposal is to begin at **2:30 PM, Wednesday, October 30, 2024,** at the subject property.

The Department is committed to accommodating people with disabilities. Please notify DEQ of any special physical or language accommodations needed as far in advance of the hearing date as possible. To make any of these arrangements please contact, David Hurley, at (541) 776-6130 or toll free at (866)-863-6668, or by email at: david.hurley@deq.oregon.gov. People with hearing impairments can call DEQ's TTY at (800)-735-2900.

If you have any questions concerning this variance process or hearing arrangements, please give me a call.

Sincerely,

David Hurley

David Hurley, REHS
Natural Resource Specialist 4
Variance Officer – Onsite Wastewater Program

cc: Todd Cleveland, REHS; Deschutes County Onsite Wastewater Division, 117 NW Lafayette Ave, Bend OR 97703
Brian T. Rabe, CPSS, WWS; Principal Soil Scientist, of Elkhorn Consulting LLC, 14833 Goodrich Creek Lane, Baker City, OR 97814

In Addition, To The Following Adjacent Property Owners:
Patricia M. Hutchinson, 17051 Hermosa Road, Bend, OR 97707
Thomas J. & Ruth M. Kinane, 18160 Cottonwood Road #807, Bend, OR 97707
Gary A. & Laura H. 17081 Indio Road, Bend, OR 97707
William D. Conway Jr., 7906 SE Jennings Ave, Milwaukie, OR 97267
Joel P. & Talisa C. Myers, PO Box 4931, Bend, OR 97707

Encl. Variance Hearing Notice

ELKHORN CONSULTING LLC

14833 Goodrich Creek Lane
Baker City, OR 97814 • 503-881-1604
elkhornconsultingllc@gmail.com

September 13, 2024

Variance Officer
Onsite Variance Program
DEQ - Eastern Region Water Quality
475 NE Bellevue, Ste. 110
Bend, Oregon 97701

SUBJECT: Formal Variance Request – Donald Bordelon – T20S, R10E, Section 12D, Tax Lot 15600 (0.49 acres), Deschutes County, South of Bend, Oregon.

Dear Variance Officer:

A formal variance from selected onsite rules is hereby requested under the provisions of Oregon Administrative Rules, Chapter 340, Division 071, Section 0415 (OAR 340-071-0415).[1] The property is located at 17062 Indio Road, south of Bend in Deschutes County, Oregon (Site) (Figure 1) and consists of 0.505 acres. A Tax Lot map is attached in Appendix A and a copy of the Deed is attached in Appendix B.

Background

The site was first evaluated in 1976 and denied with limited documentation regarding test pit locations, soil characteristics, and water table observations. A site evaluation was conducted on July 12, 2024, and a denial was issued by Deschutes County on July 16, 2024. The evaluation included a total of 4 test pits; one near each of the corners of the parcel. The test pits were described with indications of a seasonally high permanent water table at between 17 and 21 inches below the existing ground surface (bgs). A copy of the site evaluation documentation from Deschutes County is attached in Appendix C. The primary reasons cited for the denial was the predicted depth to the highest level attained by a fluctuating permanent water table. A copy of the site evaluation documentation from Deschutes County is attached in Appendix C.

According to the Deschutes County Property Information website (Dial) Tax Lot 15600 is 0.49 acres, which is slightly smaller than the 0.50 acre minimum for a 4-bedroom system. However, the actual area based on the dimensions of the lot (116 feet by 189.7 feet) is 0.505 acres and therefore meets the minimum lot size for a 450 gallon per day design flow.

Southern Deschutes County has a shallow water table that is typically unconfined in porous pumice soils and is susceptible to contamination from soluble and mobile constituents. The most common constituent of concern is nitrate-nitrogen from septic systems. The onsite rules require a minimum of 24 inches of separation from the upper limit of the water table to the bottom of a bottomless sand filter as well as being 24 inches below the ground surface.

[1] Onsite wastewater treatment systems, 340 OAR § 340.71. (2020).

Soils

The web soil survey shows the location of the Site and a copy of the output from the web soil survey is provided in Appendix D. The entire parcel is shown within a delineation of Map Unit 144A, Sunriver sandy loam 0 to 3 percent slopes. Sunriver soils are described as very deep, somewhat poorly drained soils that formed on pumice mantled stream terraces. The typical profile generally consists of the following:

- Up to 2 inches of organic material underlain by,
- 5 inches of very dark gray ashy sandy loam underlain by,
- 15 inches of dark gray ashy loamy coarse sand underlain by,
- 9 inches of light brownish gray ashy coarse sand underlain by,
- 31 inches of very dark gray sandy loam.

The Sunriver series is described as having a water table that rises to about 2 to 4 feet below the surface from April to June.

The characteristics observed at the Site are reasonably similar to the Sunriver series. The primary differences between the conditions noted in the 2024 soil notes and the conditions typical for the Sunriver series are related primarily to coloration (browner colors) that are more indicative of the Shanahan series.

Preliminary Assessment

The Site was reviewed by Brian Rabe, CPSS, WWS, on August 12, 2024. The purpose was to review the Site conditions and assess the potential to design a modified bottomless sand filter that incorporates additional fill to create adequate separation from the underlying water table following advanced secondary treatment meeting the criteria for Treatment Standard 2 (TS2). The proposed bottomless sand filter area is located on this highest ground, represented by Test Pit 1 in the 2024 site evaluation (southwestern part of the lot - see Figure 2 and Appendix C).

Other Considerations

This parcel and developed parcels in the surrounding area are served by individual private wells. A search of the database of the Oregon Department of Water Resources was conducted for the section that the subject property lies within (Section 12 of Township 20 South, Range 10 East of the Willamette Meridian). There are about 509 records on file for this section. A total of 20 water well records (well logs) were identified in Section 12 that could be tied to specific parcels within about one-eighth of a mile of the subject property (Appendix E). The following is a summary of each of those reports.

The closest existing well is on Tax Lot 15700, about 150 feet northwest of the proposed bottomless sand filter area. This well was completed on August 18, 2020, to a depth of 83 feet. Water was described as being first found at a depth of 10 feet in a layer of “course gravel” but was sealed off. The next water bearing zone was found at a depth of 73 feet in a layer of “course black sand” and had a

static water level of 18 feet bgs on the date of completion with a reported yield of 18 gpm with 5 feet of drawdown after 2 hours.

The next closest existing well is on Tax Lot 12400, is about 170 feet north-northwest of the proposed bottomless sand filter area. This well was completed on July 19, 1996, to a depth of 38 feet. Water was described as being first found at a depth of 30 feet in a layer of "sand + gravel" and had a static water level of 12 feet bgs on the date of completion with a reported yield of 20 gpm with 10 feet of drawdown after 1 hour.

There previously was a well on Tax Lot 16800 that was about 250 feet southeast of the proposed bottomless sand filter area. This well was completed on November 24, 2004 to a depth of 40 feet. Water was described as being first found at a depth of 20 feet in a layer of "blk sand" and had a static water level of 20 feet bgs on the date of completion with a reported yield of 20 gpm with 2 feet of drawdown after 1 hour. This well may have been deepened at some time since the abandonment record from August 19, 2020, indicates that it was 85 feet deep.

The well for Tax Lot 12700 (mislabeled as 2700 on the log) is more than 265 feet northeast of the proposed bottomless sand filter area. This well was completed on June 22, 2018, to a depth of 77 feet. Water was described as being first found at a depth of 68 feet in a layer of "gray sand coarse" and had a static water level of 16 feet bgs on the date of completion with a reported yield of 16 gpm with 4 feet of drawdown after 2 hours.

The well for Tax Lot 15400 is about 310 feet northeast of the proposed bottomless sand filter area. This well was completed on November 19, 2022, to a depth of 68 feet. Water was described as being first found at a depth of 12 feet in a layer of "brown sand course." This layer was sealed off and the next water was described as being found at a depth of 62 feet in a layer of "cinders black" and had a static water level of 18 feet bgs on the date of completion with a reported yield of 14 gpm with 14 feet of drawdown after 2 hours.

The well for Tax Lot 15300 is about 330 feet east-northeast of the proposed bottomless sand filter area. This well was completed on November 22, 2021, to a depth of 69 feet. Water was described as being first found at a depth of 67 feet in a layer of "medium fine gravel" and had a static water level of 18 feet bgs on the date of completion with a reported yield of 20 gpm with 7 feet of drawdown after 1 hour.

The well for Tax Lot 11600, about 350 feet north of the proposed bottomless sand filter area, was completed on March 13, 1992 to a depth of 84 feet. Water was described as being first found at a depth of 8 feet in a layer of "black sand." The well was cased and perforated in a layer of "black sand & med gravel" between 64 and 84 feet bgs. The well had a static water level of 20 feet bgs on the date of completion with a reported yield of 100 gpm (air) after 1 hour.

The replacement well on Tax Lot 16800 is about 375 feet southeast of the proposed bottomless sand filter area. This well was completed on September 13, 2021, to a depth of 80 feet. Water was described as being first found at a depth of 68 feet in a layer of "sand and fine gravel" and had a static water level of 18 feet bgs on the date of completion with a reported yield of 20 gpm with 6 feet of drawdown after 2 hours.

The well for Tax Lot 11400 is more than 420 feet north-northeast of the proposed bottomless sand filter area. This well was completed on June 18, 2002, to a depth of 75 feet. Water was described as being first found at a depth of 8 feet in a layer of "Brn sand & gravel." This layer was sealed off and the next water was described as being found at a depth of 67 feet in a layer of "red & black cinders" and had a static water level of 15 feet bgs on the date of completion with a reported yield of 15 gpm with 25 feet of drawdown after 1 hour.

The well for Tax Lot 20300 is about 520 feet south-southwest of the proposed bottomless sand filter area. This well was completed on May 13, 2022, to a depth of 69 feet. Water was described as being first found at a depth of 67 feet in a layer of "coarse gravel and black sand" and had a static water level of 19 feet bgs on the date of completion with a reported yield of 17 gpm with 13 feet of drawdown after 1 hour.

The well for Tax Lot 20400 is about 530 feet southwest of the proposed bottomless sand filter area. This well was completed on May 27, 2022, to a depth of 73 feet. Water was described as being first found at a depth of 65 feet in a layer of "coarse black sand and cinders" and had a static water level of 21 feet bgs on the date of completion with a reported yield of 20 gpm with 13 feet of drawdown after 1 hour.

The well for Tax Lot 17100 is about 540 feet east-southeast of the proposed bottomless sand filter area. This well was completed on October 6, 2022, to a depth of 69 feet. Water was described as being first found at a depth of 66 feet in a layer of "medium cinders" and had a static water level of 27 feet bgs on the date of completion with a reported yield of 20 gpm with 6 feet of drawdown after 1 hour.

The well for Tax Lot 13000 is more than 580 feet southeast of the proposed bottomless sand filter area. This well was completed on October 26, 1998, to a depth of 85 feet. Water was described as being first found at a depth of 60 feet in a layer of "sand gravel" underlain by a layer of "worm hole lava-basalt" and had a static water level of 12 feet bgs on the date of completion with a reported yield of 25 gpm with 3 feet of drawdown after 1 hour.

The well for Tax Lot 19800 is about 590 feet south-southeast of the proposed bottomless sand filter area. This well was completed on October 2, 2007, to a depth of 73 feet. Water was described as being first found at a depth of 21 feet in a layer of "green diatomite." The well was cased and perforated in a layer of "cinders & black sand" between 66 feet and 71 feet bgs. The well had a static water level of 14 feet bgs on the date of completion with a reported yield of 10 gpm with 10 feet of drawdown after 1 hour.

The well for Tax Lot 8500 is about 645 feet north of the proposed bottomless sand filter area. This well was completed on May 9, 2024 to a depth of 45 feet. Water was described as being first found at a depth of 10 feet in a layer of "brown sand & gravels" and continuing down through layers of "course brown sand" and "black sand." The upper layer was sealed off to a depth of 18.5 feet. The static water level was reported to be 10 feet bgs on the date of completion with a reported yield of 17.5 gpm with 12 feet of drawdown after 1 hour.

The well for Tax Lot 20600 is about 660 feet southwest of the proposed bottomless sand filter area. This well was completed on July 8, 2004, to a depth of 31 feet. Water was described as being first

found at a depth of 19 feet in a layer of "black sand, med. fine" and had a static water level of 9 feet bgs on the date of completion with a reported yield of 20 gpm with 4 feet of drawdown after 1 hour.

The well for Tax Lot 13300 is about 660 feet west-northwest of the proposed bottomless sand filter area. This well was completed on May 12, 1993, to a depth of 40 feet. Water was described as being first found at a depth of 16 feet in a layer of "black sand" and had a static water level of 16 feet bgs on the date of completion with a reported yield of 13 gpm with no drawdown after 1 hour.

The well for Tax Lot 17500 is about 660 feet west-southwest of the proposed bottomless sand filter area. This well was completed on June 22, 1999, to a depth of 35 feet. Water was described as being first found at a depth of 12 feet in a layer of "black sand" and had a static water level of 12 feet bgs on the date of completion with a reported yield of 18 gpm with 2 feet of drawdown after 1 hour.

The regional groundwater gradient, as indicated in a study published by the U.S. Geological Survey, is to the east-northeast toward the Deschutes River.[2] The subject property is located within Management Area 1, which recommends a 79% to 100% reduction from the base scenario loading (standard systems) for existing and future homes. The results of the Nitrate Loading Management Model within the study (Figures 25 and 26) suggest that this area represents a moderate to high risk of adverse impacts to groundwater quality. According to the interactive map for Oregon Domestic Well Testing, this part of Deschutes County has an average nitrate-nitrogen concentration in domestic wells of 0.51 milligrams per liter (mg/L) with 7.58% exceeding 3 mg/L and none exceeding 10 mg/L (based on 211 test results, viewed on September 9, 2024).[3]

Formal Variance Request

Variance is requested from the following rules:

1. OAR 340-071-0135(1) – which addresses Department of Environmental Quality (DEQ) approval of new or innovative technologies, materials, or designs for onsite systems.[1]
2. OAR 340-071-0150(4)(a)(B) – which requires all criteria for approval shall be met.[1]
3. OAR 340-071-0290(4)(d) – which states that the water table is at least 24 inches bgs throughout the year.[1]

This request seeks to overcome the limitations of this Site by treating the sewage using a recirculating textile filter system (AdvanTex® AX20N-Mode 3B) prior to discharge into an elevated bottomless sand filter. AdvanTex units do an effective job of reducing five-day biochemical oxygen demand and total suspended solids to below 10 mg/L. Nitrogen is often fully converted from ammonia-nitrogen to nitrate-nitrogen (greater than 90%). Operating in Mode 3, the AdvanTex unit reduces total nitrogen sufficiently to meet TS2 (less than 30 mg/L). The DEQ approval of the AX20N in Mode 3B includes an ultraviolet light to satisfy the pathogen reduction requirements of TS2. However, this request includes the use of a modified bottomless sand filter to achieve the pathogen reduction requirements of

[2] Morgan, D. S., & Hinkle, R. S. (2007). *Evaluation of approaches for managing nitrate loading from on-site wastewater systems near La Pine, Oregon*, (Scientific Investigations Report 2007-5237). Reston, VA: U.S. Geologic Survey.
[3] ARC GIS Online. (n.d.). Oregon domestic well testing, [Data file]. Retrieved September 9, 2024, from ARC GIS Online: https://www.arcgis.com/apps/MapSeries/index.html?appid=c0d7daea497049c1a686d07dab7106e5

TS2 instead of an ultraviolet light and, therefore, this configuration does not have (or need) an ultraviolet disinfection unit. The "B" designation indicates the AdvanTex unit is configured with the second pump for the final discharge to the modified bottomless sand filter. A post-anoxic treatment process (RidNOx^{TM}) is proposed to reduce the total nitrogen concentration in the final effluent pumped to the modified bottomless sand filter to less than 2 mg/L.

The AX20 systems in the La Pine project produced a effluent with an average total nitrogen (TN) concentration of 17 mg/L. A post-anoxic process similar to the RidNOx unit that is proposed, referred to at the time as Nitrex, was tested following treatment through a lined intermittent sand filter. The Nitrex unit consisted of a 2-compartment concrete tank filled with what was described as a proprietary carbon media (wood chips).

The sand filters in the La Pine project produced an average TN of about 50 mg/L and the final effluent from the Nitrex units had an average TN of 2.4 mg/L, representing a 96% reduction from the 60 mg/L average TN concentration in the septic tank effluent. So long as there is sufficient soluble carbon being released from the wood chips, and the hydraulic loading rate is low enough to allow the dissolved oxygen in the effluent to approach zero, the NO_3-N concentration will typically be below the method detection limit. What nitrogen remains in the effluent will often be organic, as measured by the Total Kjeldahl Nitrogen (TKN) method. The organic nitrogen may be subsequently oxidized in the bottomless sand filter, but is just as likely to be retained or recycled in the biomass that develops in the sand filter media. Therefore, the concentration of nitrogen leaving the bottomless sand filter after treatment through both the AX20 and the RidNOx unit is expected to be even lower than the results from the La Pine project.

The RidNOx unit described in this proposal is configured similar to larger units used on several systems permitted under Water Pollution Control Facilities (WPCF) permits and monitored on a regular basis. Some of these units have been in tanks and some have been in lined basins. Typical results from the post-anoxic process (prior to discharge, typically to a soil absorption system) include NO3-N concentrations near or below the method detection limit and TKN concentrations between 1 and 3 mg/L.

The test results (August 2022) from a similarly configured system (predominantly residential sources using AdvanTex treatment with Mode 3-style pre-anoxic denitrification, followed by post-anoxic treatment in tanks filled with wood chips) produced a TKN concentration of 0.68 mg/L and a NO_3-N concentration of 0.13 mg/L for a TN of 0.81 mg/L.

The test results (July 2022) from a high-nitrogen source (150 mg/L TKN treated by AdvenTex with alkalinity augmentation to support full nitrification, configured in a Mode 3-style pre-anoxic process, followed by post-anoxic treatment in lined wood-chip beds) produced a TKN concentration of 0.99 mg/L and a NO_3-N concentration of 0.05 mg/L for a TN of 1.04 mg/L. Assuming a maximum 65 to 75% reduction from the starting concentration, the NO_3-N concentration entering the post-anoxic process is expected range between 40 and 45 mg/L, similar to the sand filter effluent from the La Pine Project and higher than what is expected from the AX20 in a residential scenario.

Based on the performance of the commercial systems described above, and a typical residential TN concentration of 60 mg/L, an average TN concentration in the AX20 effluent of 17 mg/L, the TN

concentration leaving the RidNOx unit and going to the modified bottomless sand filter the typical reduction from the base scenario presented in the groundwater study cited previously is expected to be approximately 97 percent.

The initial and replacement bottomless sand filter areas are proposed on the highest ground near the southwest corner of the parcel. This represents an area with the appropriate spatial footprint and meets all required horizontal setback requirements.

Test Pit 1 (2024) was described as:

- Very dark grayish brown (10YR 3/2) coarse sandy loam from 0 to 6 inches with weak medium subangular blocky structure; common fine, medium, and coarse roots; underlain by
- Dark brown (10YR 3/3) loamy coarse sand from 6 to (18 to 21) inches structureless (single grain) with common very fine and fine roots; with redoximorphic features (faint stripping and staining) beginning at 18 to 21 inches; underlain by
- Very dark grayish brown (10YR 3/2) sandy loam from (18 to 21) to 42 inches with moderate medium subangular blocky structure; no roots; with redoximorphic features (iron concentrations) throughout; underlain by
- Very dark gray (10YR 3/1) sand from 42 to 53 inches with moderate medium subangular blocky structure; no roots, and redoximorphic features (iron concentrations) throughout.

Relative elevation measurements were made at all 4 corners of both the proposed initial and replacement bottomless sand filters as well as at the existing ground surface adjacent to Test Pit 1 (2024). The highest level of the water table is expected to be just under 18 inches below the existing ground surface at the lowest point within the area proposed for the initial and replacement sand filters based on a depth of 20 inches to the redoximorphic features described in Test Pit 1 (2024).

The proposed system seeks to overcome this limitation by elevating the modified bottomless sand filter in a manner that provides an additional 3 inches of separation (Figure 3). The sod and underlying sandy soil to a depth of 6 inches within the footprint of the sand filter will be excavated and replaced with sand filter media. An additional 9 inches of sand filter media (total of 15 inches) will be used to exceed the minimum 24-inch separation from shallowest water table depth standard by providing a total separation of 27 inches. 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 of backfill.

Deschutes County has noted that the results of the Nitrate Management Loading Model indicated that there was little to no surplus capacity within Management Area 1 to accommodate additional lots that were denied or otherwise not expected to be approved. Approximately 20 parcels have been approved through the formal variance process in this area and concern has been expressed about the cumulative effects of the additional nutrient load on groundwater and surface water quality.

Brian Rabe will need to be involved during the construction of this system to install the lysimeter in the sand filter and oversee the installation of the RidNOx unit. Additional information regarding the installation of the RidNOx unit and the lysimeter, as well as sampling instructions, are described in

Appendix F and shown in Figures 4, 5, and 6. The owner agrees to facilitate sampling of the RidNOx effluent in conjunction with routine service visits (twice per year for the first 2 years and annually thereafter) to monitor the performance. Samples will be collected from the pump basin between the RidNOx unit and the sand filter. When the media begins to show signs of depletion (as indicated by average nitrogen concentrations climbing to above 7 mg/L nitrate-nitrogen or 10 mg/L total nitrogen), the owner will schedule media replacement for the following summer when the water table is at least 30 inches below the top of the tank (to prevent displacement of the empty tank by buoyant forces). If this request is approved, a condition of approval will require access be allowed to the treatment system and sand filter by current and future property owners for periodic sampling.

In addition to the high level of treatment achieved by the AdvanTex treatment system and post-anoxic denitrification process, further treatment of the effluent will occur with predominantly unsaturated flow within the imported sand and native sandy soil beneath the bottomless sand filter (minimum of 24 inches above the highest predicted level of the underlying fluctuating water table). Small doses, coupled with substantial resting periods achieved with pressure distribution (see recommended sand filter plan detail in Figure 4), will ensure unsaturated, thin-film flow through the soils above the water table. This will further reduce pathogens and other residual contaminants. The subsoil found beneath the sandy surface soils include evidence of both oxidation and reduction of iron. Conditions that support the reduction of iron will reduce nitrate-nitrogen to nitrogen gas since nitrate ions are used as electron acceptors preferentially over iron compounds. This will facilitate additional reduction of nitrate-nitrogen as the highly treated effluent is assimilated into the environment.

Additional Considerations for No Net Impact to Groundwater Nitrate Contribution

A letter from the Deputy Director of the Oregon Department of Environmental Quality dated December 19, 2023, to the Deschutes County Commissioners formally focused additional attention on the potential impacts to water quality in southern Deschutes County from onsite sewage treatment systems. It is important to consider a number of very conservative assumptions that were made in the USGS groundwater modeling effort that likely overestimated the potential impacts. The following addresses a few specific examples.

Plant Uptake of Nitrogen

The model specifically assumes no nitrogen removal from plant uptake. This may be appropriate for shallow rooted grasses, forbes, and other understory vegetation (e.g., bitterbrush). However, this is not appropriate for the overstory vegetation which is primarily lodgepole and ponderosa pine. These tree species have deeper root systems that can withstand periodic saturation. The model accounted for the impact of transpiration in the water balance but did not account for the impact of nutrient removal and storage in the nitrogen balance. The study concluded that there would be a concentration effect as a result. However, this is not realistic. Plants do not take up water without taking up nutrients that they need, if they are present.

Although studies of nutrient removal by lodgepole pine are limited, there are data available from peer-reviewed journal articles. One such article titled *The Nitrogen Cycle in Lodgepole Pine Forests, Southeast Wyoming* by T.J. Fahey, et al, published in *Biogeochemistry* in September 1985

documented total nitrogen uptake of 1.25 grams per square meter (g/m^2) with root turnover of 0.37 g/m^2 for a net uptake of 0.88 g/m^2. This corresponds to 7.85 pounds of nitrogen uptake per acre per year.

Another data source is a chapter from a 1992 publication by the United States Forest Service (USFS) titled *Distribution of Biomass and Nutrients in Lodgepole Pine/Bitterbrush Ecosystems in Central Oregon* by Susan N. Little and Laurl J. Shainsky. They stated that the pumice soils in the area are "very severely deficient" in nitrogen. Table 4 of that publication lists the average nitrogen concentrations for several components of the tree. Since yield estimates for in the published soil survey are focused on the volume of merchantable wood produced over the typical rotation of a stand of timber, only the concentrations of the bolewood (0.06% N) and bark (0.25% N) are accounted for (the parts removed during harvest). The crowns, stumps, and roots are not removed during harvest and would contribute to nutrient cycling on site. The estimated yield of lodgepole pine for Shanahan soils in the published soil survey is 65 cubic feet per acre per year ($ft^3/ac/yr$). The dry density of lodgepole pine ranges from 22 to 53 pounds per cubic foot (lb/ft^3). For the purpose of calculation, an average of 37.5 lb/ft^3 will be used.

The smallest lots eligible for development in southern Deschutes County are about 0.5 acres in size. Assuming half the lot is developed (home, outbuildings, driveway, yard, etc.) the other half is typically maintained with native trees (lodgepole and/or ponderosa pine). Assuming half the average annual growth (32.5 $ft^3/ac/yr$), an average density of 37.5 lb/ft^3, and the nitrogen content described previously, the annual amount of N taken up and stored in standing wood biomass on 0.25 acres (half of a half-acre lot) is 1.2 pounds.

As described in the variance proposal, the proposed system represents the best currently available technology (AdvanTex + RidNOx + MBSF), which is expected to be comparable or better than the best system studied in the La Pine Demonstration Project (Sand Filter + Nitrex + Drainfield). Using expected average total nitrogen concentrations in the effluent leaving the bottomless sand filter after secondary treatment through AdvanTex unit in Mode 3B, followed by tertiary treatment through the RidNOx unit, and the data presented in the USGS groundwater loading and modeling study, the annual mass load to groundwater would be 0.7 lb N/yr (2 mg/L x 2.55 people per home x 45 gallons per person per day x 365 days per year). Even the conservative nitrogen uptake and retention from residual trees on this lot is greater than the contribution from the proposed system. Therefore, approval of this lot utilizing this treatment approach is not likely to make an additive contribution of nitrogen to groundwater.

Hydraulic Loading

The annual hydraulic contribution to groundwater (precipitation minus evapotranspiration) is based on the natural condition. As development occurs, the transpiration component is reduced by the amount of area covered in roofs, driveways, and other impervious or non-vegetated areas. Runoff is limited in these soils so a higher proportion of precipitation contributes to recharge on developed lots than was assumed in the model. This would have a slight positive impact on resulting concentrations.

The letter from the Deputy Director states that the credibility of the state and county could be called into question regarding protection of water quality if more variances are approved. I respectfully disagree, based on the data provided in the previous paragraphs. Use of systems that further reduce the contribution to groundwater, with some systems under certain conditions representing a net zero contribution in most situations, and a net negative contribution in areas with slightly elevated (or higher) nitrate concentrations, are protective of groundwater quality and public health. These systems are only currently available through the variance process.

Conclusions

As described, the proposed combination of treatment components is expected to produce a final effluent with very high quality and a low potential to impact water quality, human health, or the environment. Given the unique circumstances at this Site, strict compliance with the rules is considered to be unreasonable.

It is acknowledged that detailed plans and specifications will need to be submitted and approved before any construction can take place. It is also understood that if this request is approved, there will be language included that allows the county to allow or require a prescriptive system that is demonstrated to perform equal to or better than what is described in this proposal.

Directions to the Site as well as a map showing the ownership of adjacent parcels along with a list of names and addresses are attached in Appendix G. If you have any questions or comments, please do not hesitate to contact me directly at (503) 881-1604.

Sincerely,
ELKHORN CONSULTING LLC

Brian T. Rabe, CPSS, WWS
Principal Soil Scientist

BTR/ddr
Enc: Figures 1-6, Appendices A-G
c: Donald Bordelon
Todd Cleveland, REHS – Deschutes County

CPSS
Certified Professional
Soil Scientist
Brian T. Rabe
15239 Exp. 31DEC24
Registered Wastewater Specialist
No. EH-W-448430 Exp. 30SEP24

FIGURES

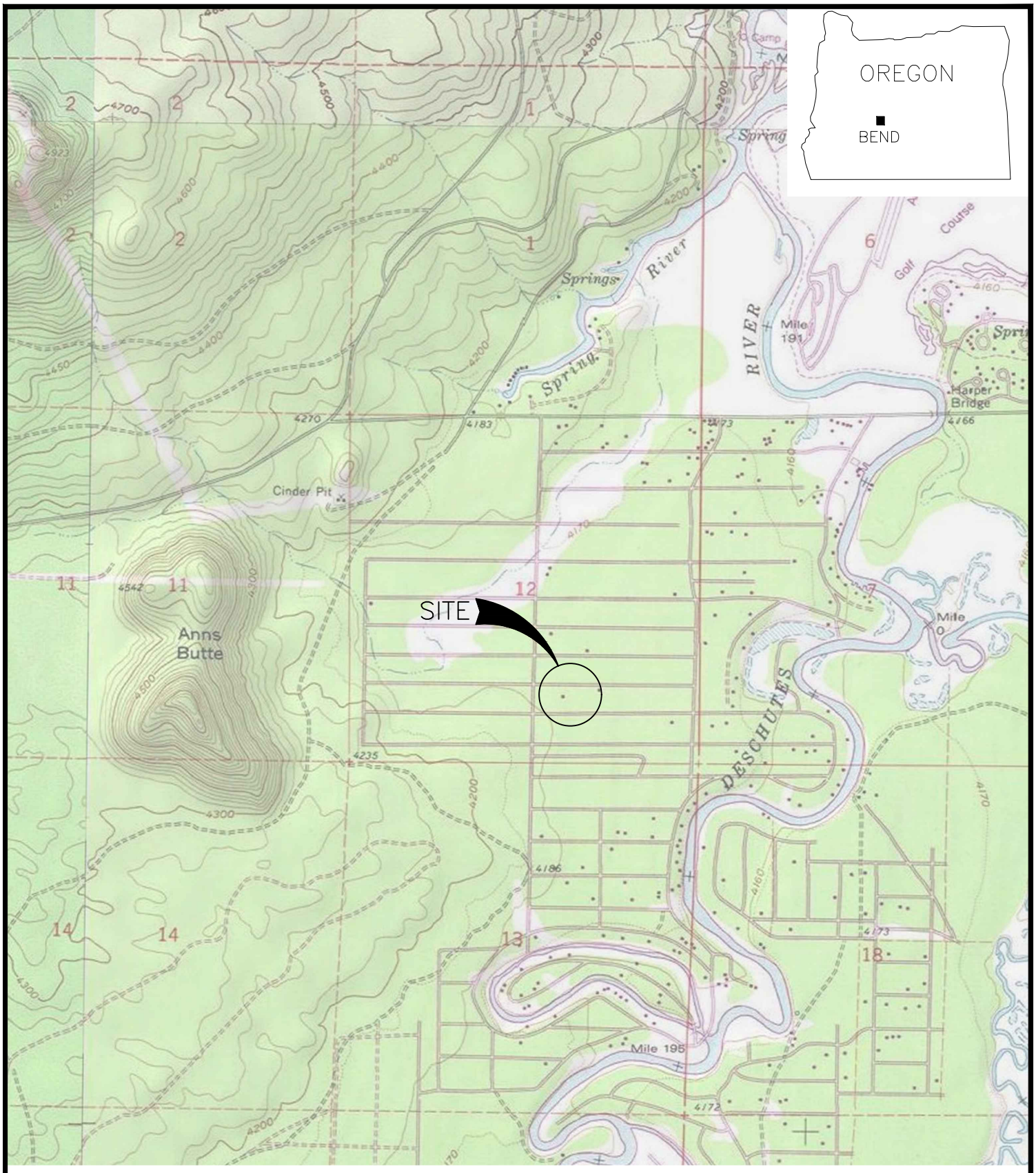

Figure 1. Vicinity Map

0 2,000'

1" = 2,000'

(LOCATIONS AND SCALE ARE APPROXIMATE)

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

PROJECT NUMBER: 2024031	Formal Variance T20S, R10E, Section 12D, Tax Lot 15600
DATE: 9/10/2024	
DWG NO: 2024031 F1-5.DWG	Donald V. Bordelon 17062 Indio Road Bend, OR 97707
DWG BY: 6DJR / PROJECT MANAGER: BRIAN RABE	
REVISED:	ELKHORN CONSULTING LLC

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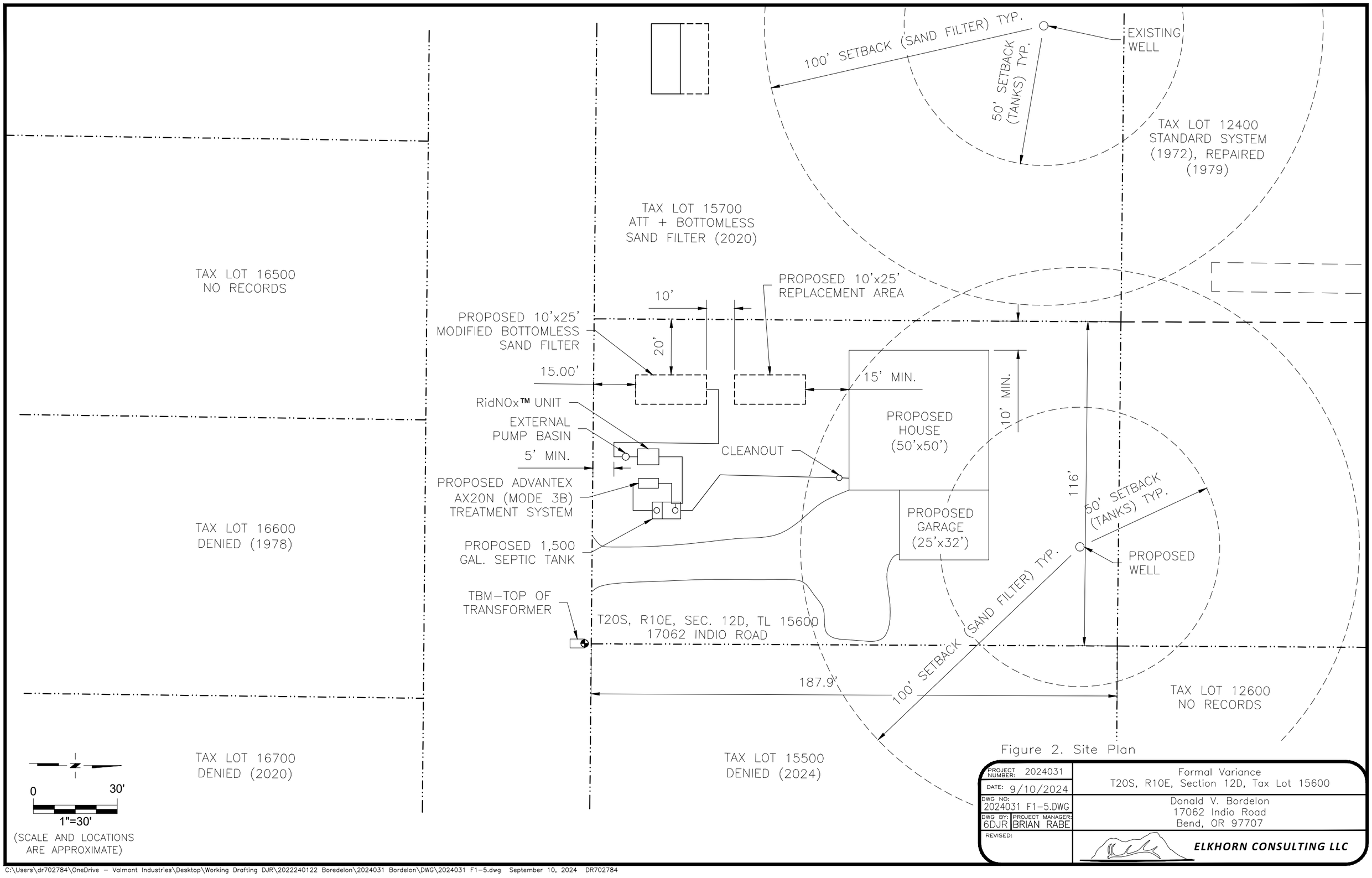

Figure 2. Site Plan

PROJECT NUMBER: 2024031	Formal Variance T20S, R10E, Section 12D, Tax Lot 15600
DATE: 9/10/2024	
DWG NO: 2024031 F1–5.DWG	Donald V. Bordelon 17062 Indio Road Bend, OR 97707
DWG BY: 6DJR / PROJECT MANAGER: BRIAN RABE	
REVISED:	ELKHORN CONSULTING LLC

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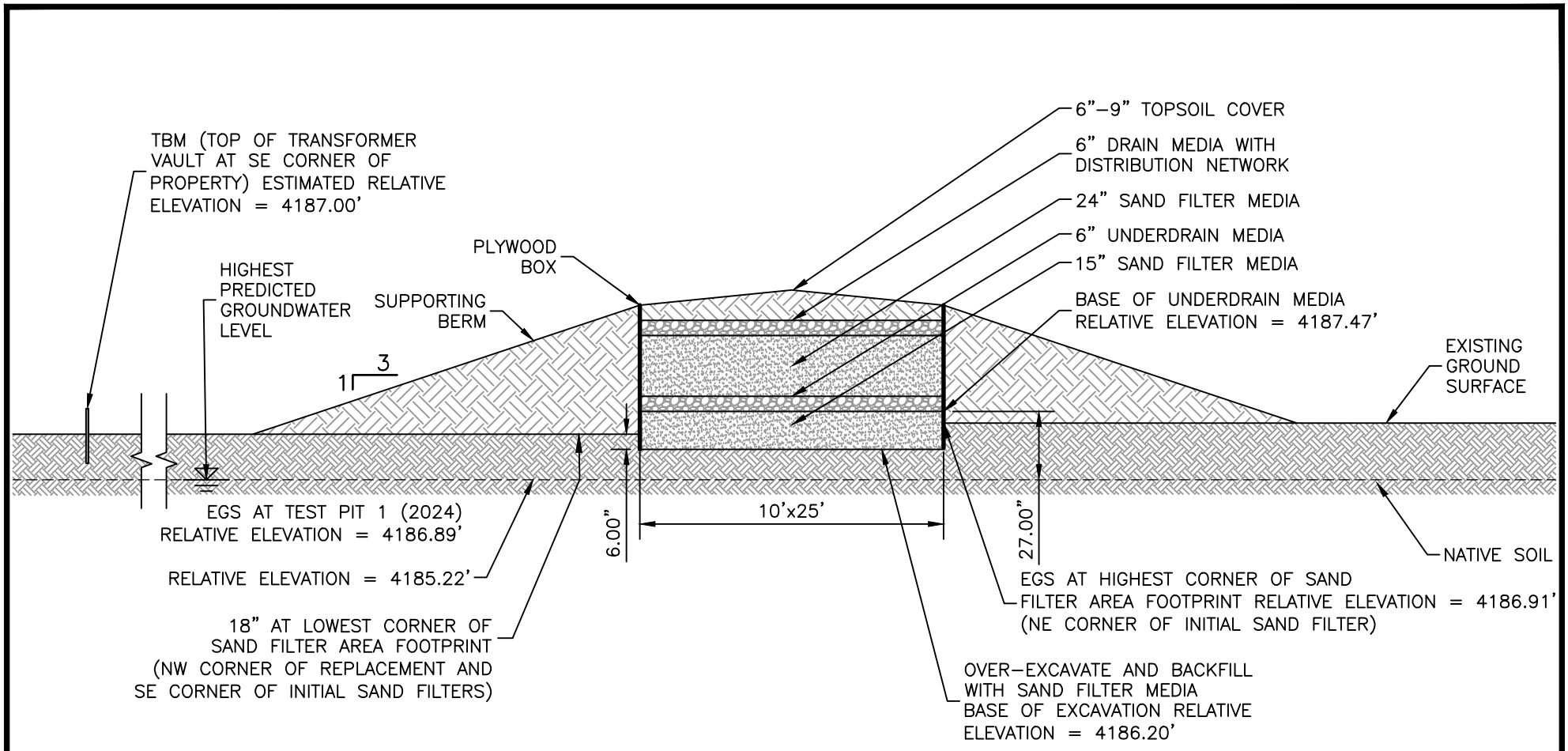

Figure 3. Modified Bottomless Sand Filter Section

PROJECT NUMBER: 2024031	Formal Variance
DATE: 9/10/2024	T20S, R10E, Section 12D, Tax Lot 15600
DWG NO: 2024031 F1–5.DWG	Donald V. Bordelon
DWG BY: 6DJR / PROJECT MANAGER: BRIAN RABE	17062 Indio Road
REVISED:	Bend, OR 97707
	ELKHORN CONSULTING LLC

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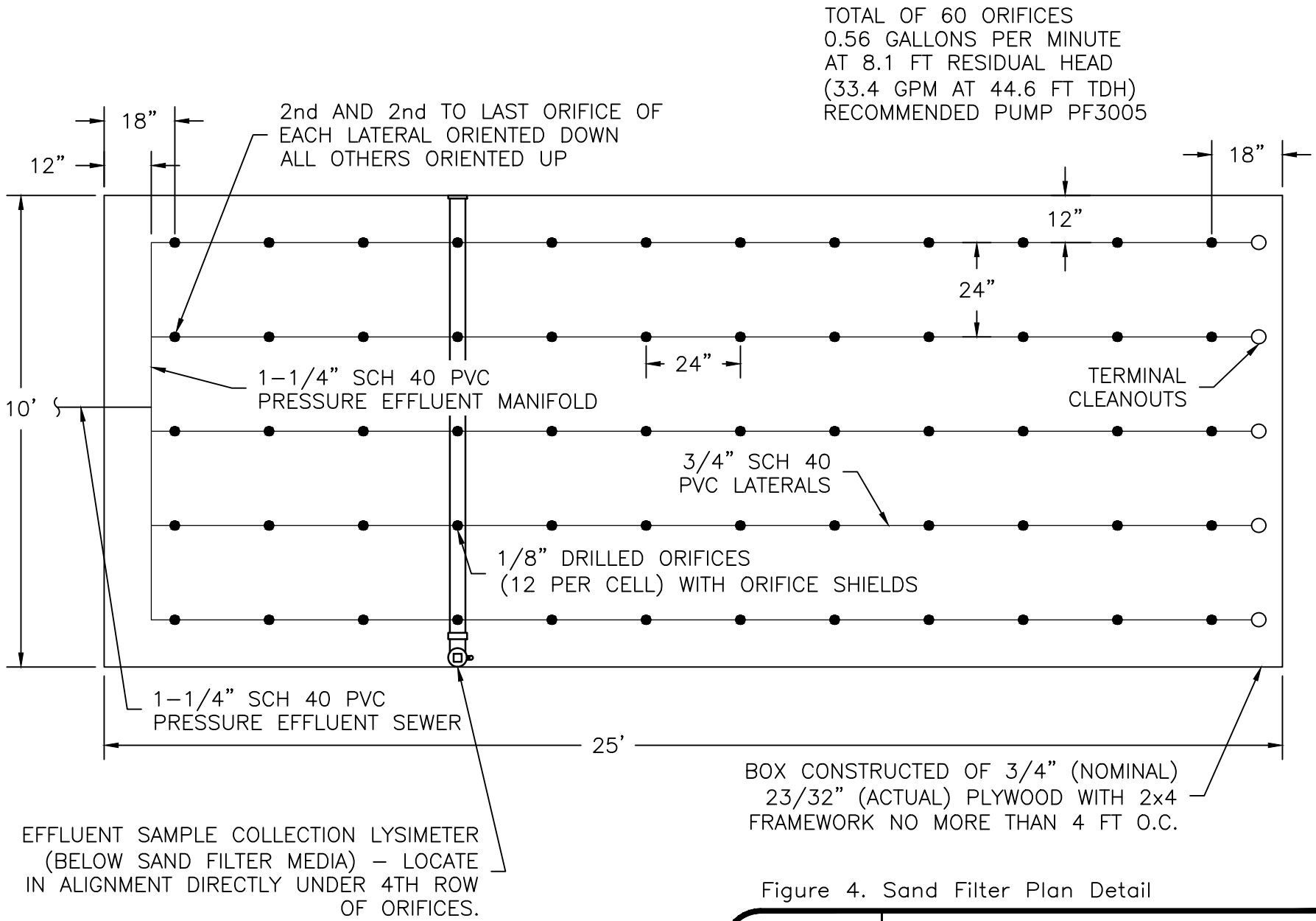

Figure 4. Sand Filter Plan Detail

PROJECT NUMBER: 2024031	Formal Variance
DATE: 9/10/2024	T20S, R10E, Section 12D, Tax Lot 15600
DWG NO: 2024031 F1-5.DWG	Donald V. Bordelon
DWG BY: 6DJR / PROJECT MANAGER: BRIAN RABE	17062 Indio Road
REVISED:	Bend, OR 97707
	ELKHORN CONSULTING LLC

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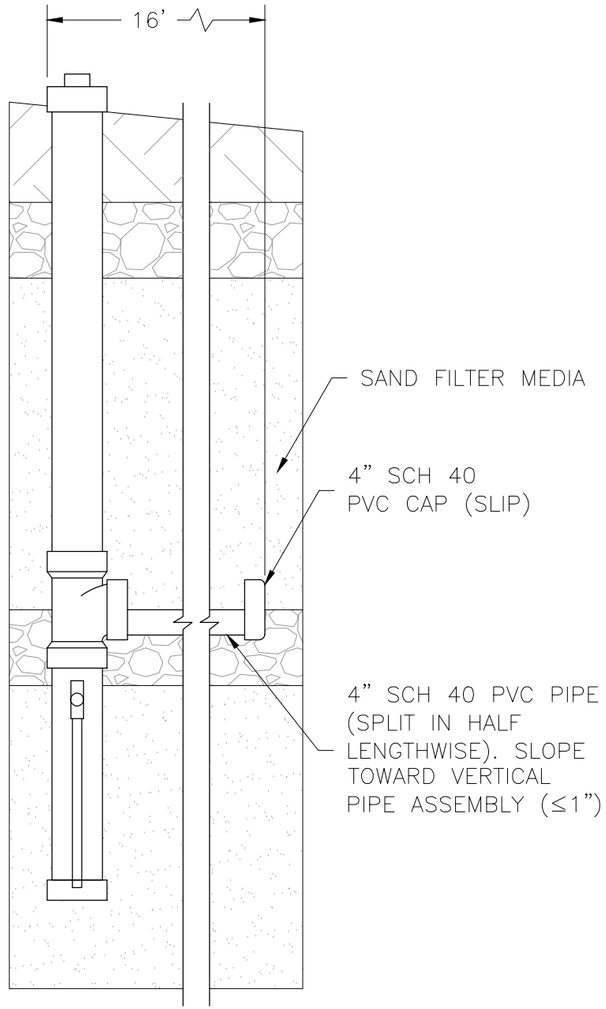
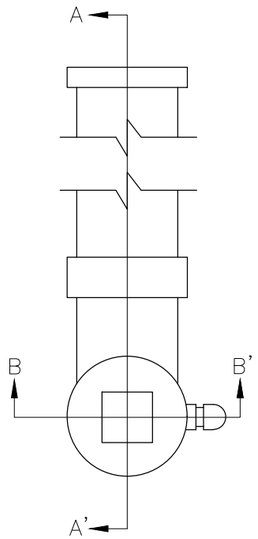


VIEW A–A'

0 1'

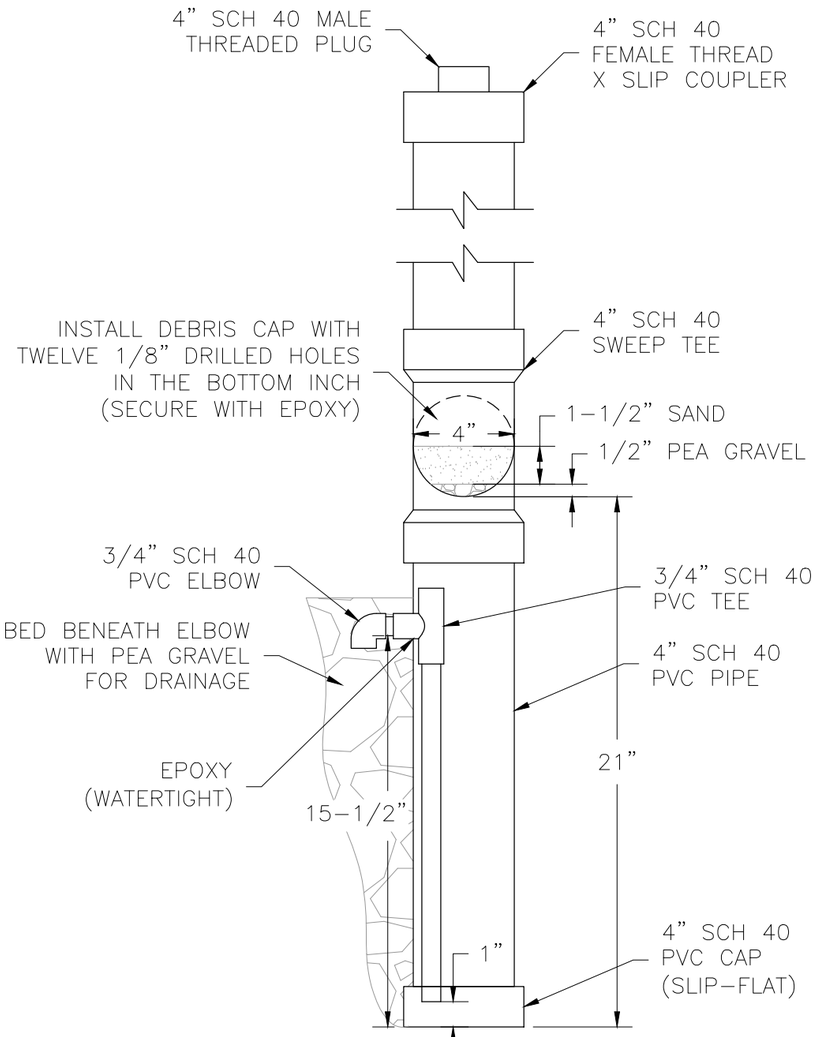
1"=1'



PLAN VIEW

0 0.5'

1"=0.5'



VIEW B–B'

0 0.5'

1"=0.5'

Figure 5. Lysimeter Details

PROJECT NUMBER: 2024031	Formal Variance T20S, R10E, Section 12D, Tax Lot 15600
DATE: 9/10/2024	
DWG NO: 2024031 F1–5.DWG	Donald V. Bordelon 17062 Indio Road Bend, OR 97707
DWG BY: 6DJR PROJECT MANAGER: BRIAN RABE	
REVISED:	ELKHORN CONSULTING LLC

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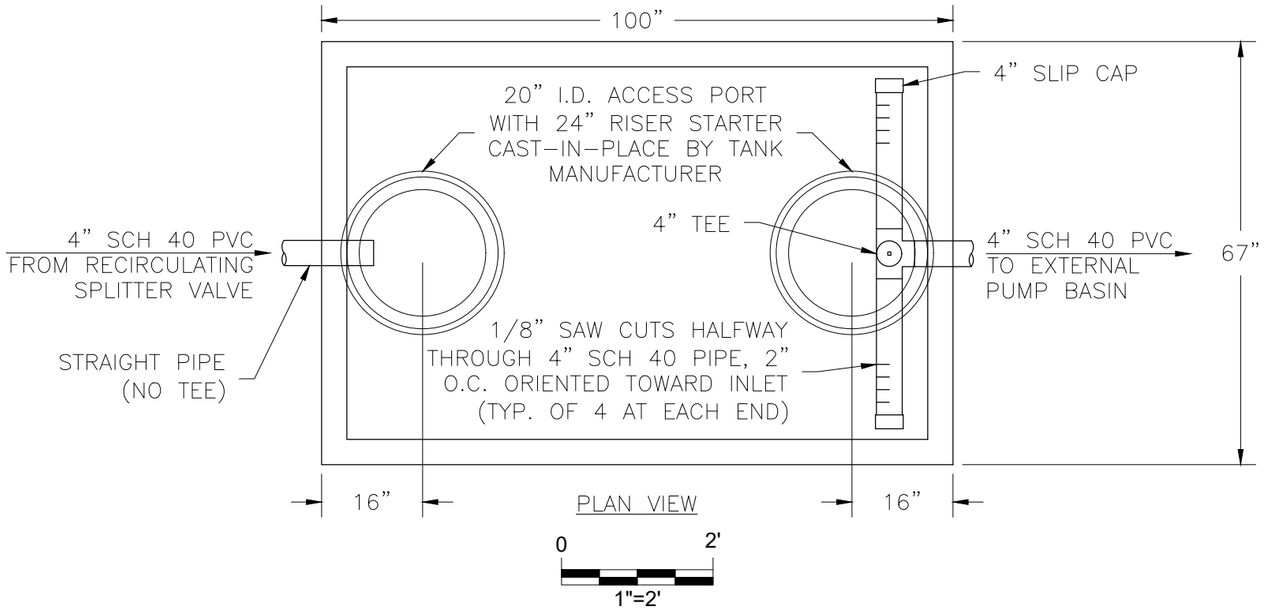

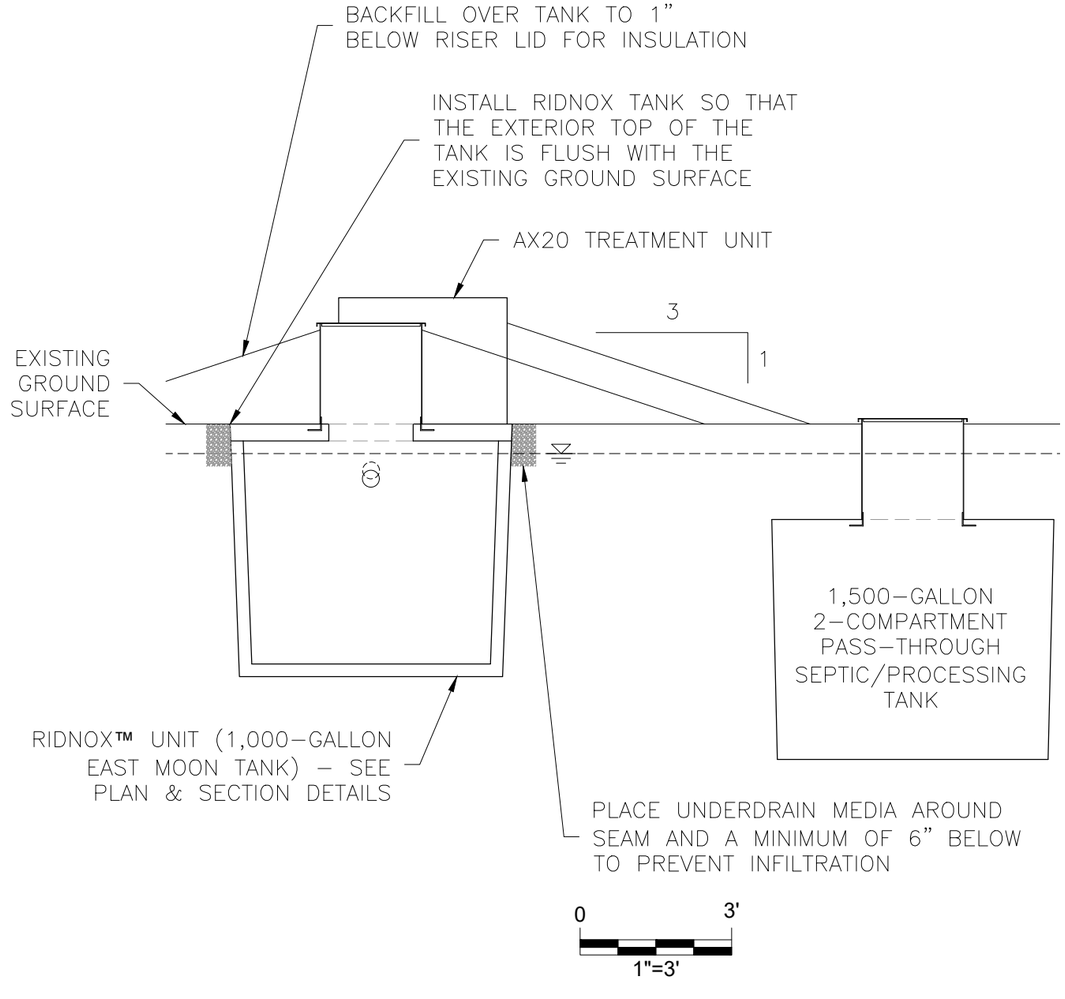

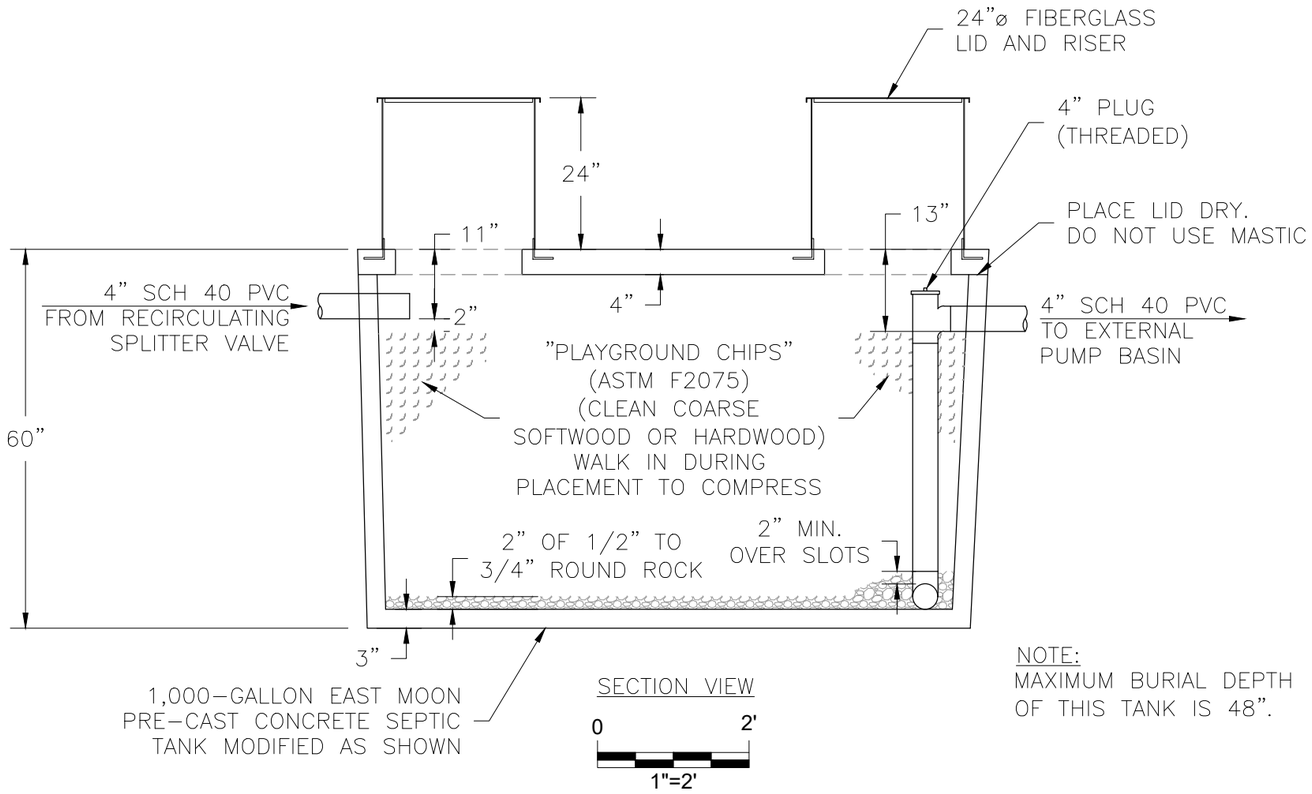

NOTE:
MAXIMUM BURIAL DEPTH OF THIS TANK IS 48".

Figure 6. RidNOx™ Details

PROJECT NUMBER: 2024031	Formal Variance
DATE: 9/10/2024	T20S, R10E, Section 12D, Tax Lot 15600
DWG NO: 2024031 F1–5.DWG	Donald V. Bordelon
DWG BY: 6DJR / PROJECT MANAGER: BRIAN RABE	17062 Indio Road
REVISED:	Bend, OR 97707
	ELKHORN CONSULTING LLC

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APPENDICES

Appendix A.

Tax Lot Map

THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSE ONLY

7/24/2024

S.E.1/4 SEC.12 T.20S. R.10E. W.M.
DESCHUTES COUNTY
1" = 200'

20 10 12D0

Cancelled Nos.
4100
6200
7700
8700
10700
18200
12500
19900

20 10 12D0

Appendix B.

Deed

95-05835

CLAIMING SUCCESSOR'S DEED
ORS 114.545(3)

366 - 2183

Unless a change is requested, all tax statements shall be sent to
Grantee at the following address:
DONALD V BORDELON
23 EMERALD GLEN
LAGUNA NIGUEL CA 92677

After recording, this Deed shall be delivered to:
DANIEL C RE
P O BOX 1151
BEND OR 97709-1151

The true consideration for this transfer is $NONE.

DONALD V. BORDELON, Claiming Successor of James Eskell Boyd, deceased, Grantor, conveys to DONALD V. BORDELON, Grantee, under the provisions of ORS 114.545(3), the following described real property located in Deschutes County, Oregon:

Lots 35 and 36, Block 35, DESCHUTES RIVER RECREATION HOMESITES, together with a 1/1225 interest as tenants in common in the following described parcels:

PARCEL 1: Lot 1, Block 2, Deschutes River Recreation Homesites, Inc., Deschutes County, Oregon, as filed October 11, 1961;

PARCEL 2: Recreation Area, official plat of Block 9, Deschutes River Recreation Homesites, Inc., Deschutes County, Oregon, as filed October 18, 1962;

PARCEL 3: Recreation Area and Boat Docking facilities, corrected plat of Deschutes River Recreation Homesites, Inc., Deschutes County, Oregon, as filed May 16, 1963;

SUBJECT TO Reservations, Restrictions, Easements and Rights of Way of Record.

THIS INSTRUMENT WILL NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE

Holmes Hurley Bryant Lovlien & Lynch
ATTORNEYS AT LAW
40 N.W. Greenwood P.O. Box 1151 Bend, Oregon 97709-1151 (503) 382-4331 Fax (503) 389-3386

PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY APPROVED USES AND TO DETERMINE ANY LIMITS ON LAWSUITS AGAINST FARMING OR FOREST PRACTICES AS DEFINED IN ORS 30.930.

DATED Feb 24, 1994.

Donald V. Bordelon

DONALD V. BORDELON, Claiming
Successor of James Eskell Boyd, deceased

STATE OF CALIFORNIA, County of ORANGE, ss:

The foregoing instrument was acknowledged before me this 24 day of FEB, 1995, by DONALD V. BORDELON, Claiming Successor of James Eskell Boyd, deceased.

NOTARY PUBLIC
STATE OF CALIFORNIA
County of Orange
JOHN E. FAIRBANKS
My Commission Exp. Apr. 7, 1995

Notary Public for California
My Commission Expires: APRIL 7, 1995

STATE OF OREGON)
COUNTY OF DESCHUTES) ss.

I, MARY SUE PENHOLLOW, COUNTY CLERK AND RECORDER OF CONVEYANCES, IN AND FOR SAID COUNTY, DO HEREBY CERTIFY THAT THE WITHIN INSTRUMENT WAS RECORDED THIS DAY:

95 FEB 27 PM 3:22

MARY SUE PENHOLLOW
COUNTY CLERK

BY: _____ DEPUTY

NO. 95-05835 FEE 40-

DESCHUTES COUNTY OFFICIAL RECORDS

Holmes Hurley Bryant Lovlien & Lynch
ATTORNEYS AT LAW
40 N.W. Greenwood P.O. Box 1151 Bend, Oregon 97709-1151 (503) 382-4331 Fax (503) 389-3386

Appendix C.

Site Evaluation Reports

July 16, 2024

BORDELON,DONALD V
24879 PLATINUM LN
WILDER, ID 83676

RE: 247-24-000602-EVAL
17062 Indio Rd, Bend – 201012D015600 Lot 36 Block 35

A site evaluation for an onsite wastewater treatment system for a single-family dwelling was recently completed at the property noted above. Test pits were evaluated on July 12, 2024. Part of the evaluation is to determine the level to which the groundwater rises during the wet season of a normal weather year. Permanent water tables are present throughout the year although they may fluctuate in elevation seasonally. The soil indicators used to determine the level to which the water table rises are gray soils and mottling (discoloration of the soil).

In the test pits on the property the indicators suggest the water table may rise within 17-21 inches of the ground surface. Past observations and site evaluations in the surrounding area also verify the presence of a high-water table. Extensive study and modeling of the groundwater in south Deschutes County has demonstrated that this area is sensitive to added loading from areas that do not meet separation to groundwater. **This site is denied due to high permanent groundwater observed and conditions associated with saturation.**

The site is denied based on the following:

- Does not meet minimum separation from permanent water table (OAR 340-071-0220, 0260, 0265, 0275, 0280, 0285, 0290, 0302).
- Installation of an onsite wastewater system in the area evaluated will likely lead to nitrate pollution of public waters. The Nitrate Loading Management Model indicates this area, Management Area 1, cannot sustain added loading from high groundwater lots if nitrate levels are to remain below the action level in groundwater (Morgan, Hinkle, Weick. USGS. 2007). Groundwater shall be protected from pollution that could impair existing and future beneficial uses, including domestic drinking water from wells (OAR 340-040-0020).
- Deschutes County may not authorize installation or use of a system that is likely to pollute public waters or create a public health hazard (OAR 340-071-0130(1)). Nitrogen loading from an onsite wastewater system on this property likely will contribute to the development of a public health hazard and groundwater contamination. Management area 1 cannot support additional loading without exceeding safe drinking water standards in the groundwater.

You have 90 days from the initial site visit to provide additional test pits for evaluation at no additional fee. However, it appears that other areas on the property would not be suitable due to the lack of topographical changes.

REVIEW AVAILABLE

Pursuant to Oregon Administrative rules (OAR 340-071). You may request a site evaluation report review if you believe this report to be in violation of the rules. The Oregon DEQ conducts report reviews upon submission of the appropriate application materials including: a written request that includes all information you have received

from Deschutes County, the reason the report is in error including the specific Oregon Administrative Rules that conflict with the report, and the application fee. The DEQ will review the county's report and visit the site to determine the report's compliance with the appropriate rules.

Also pursuant to this rule, you may request a variance from these rules. The Oregon DEQ reviews variance requests upon application. This is not an automatic variance. You must provide technical justification that demonstrates your proposed system will operate over an extended period of time, will not degrade the environment, and will provide public health protection.

An application, application fee, justification and exhibits, including this report, a land use compatibility statement and detailed plans of your proposed system are required for the application. Technical advice from a knowledgeable consultant is recommended. A Variance Office from DEQ will review your application and the property and issue a written determination following an informational hearing.

Deschutes County recognizes your right to a variance request. This property, however, has severe limitations for onsite wastewater treatment as noted above. Unless public health and environmental protection can be assured, a variance request cannot be supported by the Deschutes County Onsite Wastewater Division and will not likely be approved by DEQ.

For further information regarding a report review for a variance request, please contact the Oregon Department of Environmental Quality at 471 NE Bellevue Dr., #110, Bend, OR 97701, phone 541-388-6146.

If you have any questions, please do not hesitate to call this office at 541-388-6519.

Sincerely,
Onsite Wastewater Division

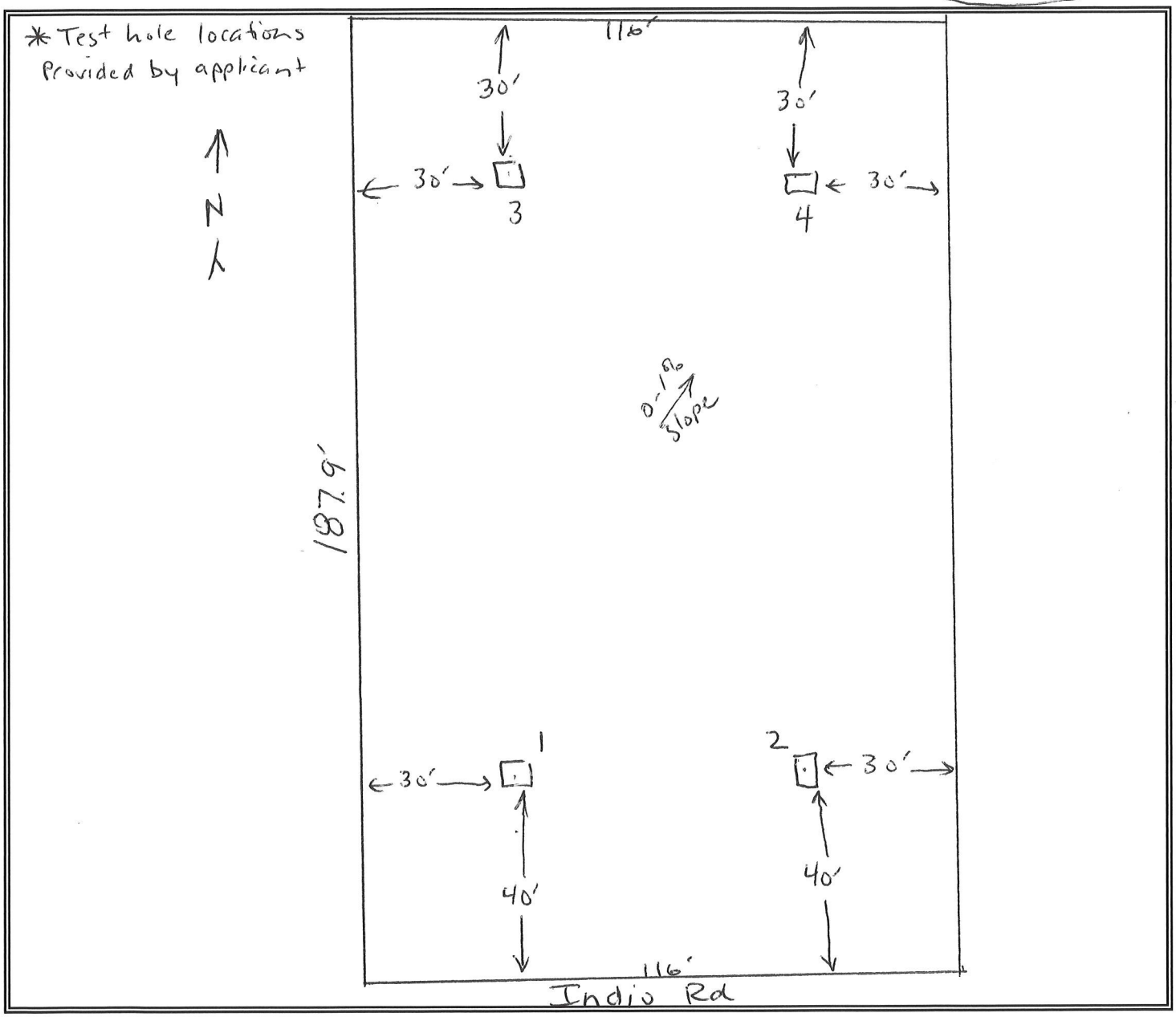
Todd Cleveland

Todd Cleveland, REHS
Onsite Wastewater Manager

SITE EVALUATION FIELD INSPECTION FORM

Applicant: BORDELON,DONALD V Site Evaluation # 247-24-000602-EVAL
Date: 7/12/24 Subdivision: DRRH L 36 B 35 Parcel Size: 0.5
Evaluator: Todd Cleveland T 20 R 10 S 12D0 TL 15600

Suitable **Sketch/Not to Scale** **Unsuitable**✓



systems and parameters approved are the **minimum to meet current DEQ rules*

System type approved: Denied Absorption facility: Denied
Initial _____ Min. Size _____ Max. Depth _____ Min. Depth _____
Replacement _____ Min. Size _____ Max. Depth _____ Min. Depth _____
Tank Size _____ Sewage Flow _____

Special Conditions: This site is denied because soil characteristics indicate the permanent water table rises within 24 inches of the ground surface. No obvious better location appears available on this parcel.

SITE EVALUATION FIELD INSPECTION FORM

Applicant: BORDELON,DONALD V Site Evaluation # 247-24-000602-EVAL

Evaluator: Todd Cleveland Date: 7/12/24 Parcel Size: 0.5

Subdivision: DRRH T 20 R 10 S 12D0 TL 15600 L 36 B 35

	DEPTH	TEXTURE	COLOR	Notes on roots, structure, % loose rock, mottling, layer limiting effective soil depth, etc.
1	0 – 6	coSL	10 YR 3/2	2fmc; 1msbk; loose
	6 – (18-21)	LcoS	10 YR 3/3	2vff; sg; loose; @18-21"+ faint stripping & staining
	(18-21)-42	SL	10 YR 3/2	0 roots; 2msbk; friable; c2d Fe conc.
	42 - 53	S	10 YR 3/1	0 roots; 2msbk; black sand with c2d Fe conc.
2	0 – 7	coSL		Similar; 3fmc; 1msbk>sg; loose
	7 – 25	LcoS	10 YR 3/3	1mc; sg; @19"+ stripping & staining
	25 – 43	SL	10 YR 3/2	0 roots; 2msbk; c2d Fe conc.
	43 - 50	fS	10 YR 3/1	0 roots; black sand; 2msbk; c2d Fe conc.
3	0 – 5	coSL		Similar to other pits
	5 – 24	LcoS		@18"+ stripping
	24 – 43	SL		V1f; c2d Fe conc.
	43 -51	S		Fe conc
4	0 – 5			Similar
	5 – 23			2m; sg; @17"+ stripping
	23 – 40			1m; 2msbk; Fe Conc
	40 - 49			Fe conc.
5				
6				
7				

Landscape Note: terrace 2a; lodgepole, bitterbrush, bunchgrass, currant, few PiPO

Slope: 0-1% Aspect: NE Groundwater: Perm. 17-21"

Other site notes: Property located in Management Area 1; Soil characteristics indicate the water table is more shallow toward an eastern portions of the property.

Comments:

Reason for Unsuitability: (Include Rule Reference)

OAR 340-071- 100(33), 130,0220, 0260, 0265, 0275, 0280, 0285, 0290, 0302

CDD COVER SHEET FOR JMM
03/14/2003 14:00:24

EH
6 PAGES

FILE ID	201012D015500EH20030314140024
TAXMAP	201012D015500
SERIAL	116211
DIVISION	EH
SITUS	17070 INDIO RD
HOUSE#	17070
STREET	INDIO
CONTENT	SITE EVAL
RECORD ID	F5263

Denied 7/6

F 5263

77-76

Application to
DEPARTMENT OF ENVIRONMENTAL QUALITY
FOR
EVALUATION REPORT OF SUITABILITY OF PROPOSED SEWAGE DISPOSAL

DESCRIPTION OF PARCEL *(Attach a Plat or Map Showing All Sites as Exhibit A)*

Section ___ ; *Township* ___ ; *Range* ___ ; *County of* Deschutes, *Oregon; Tax lot* _____

Narrative Description: Lot 36 Block 34 Deschutes River Recreation Homesites

17070 Shadis Rd

PROPOSED USE OF PARCEL *(RESIDENTIAL - OTHER [SPECIFY])*

Residential

PRESENTLY DESIGNATED LAND USE, ZONING, AND NAME OF DESIGNATING AGENCY

RR-1 Deschutes County Planning Commission

PROPOSED METHOD OF SEWAGE DISPOSAL *(Check one and Provide Requested Information)*

[ ] EXISTING SEWERAGE SYSTEM (Fee: $5 for one lot; $10 for two or more lots)

(1) Parcel is located within the boundaries of and can be provided sewerage service by the following entity which owns and operates a sewerage system:

Name of Entity _____

System Identification _____

Address of Entity _____

City, Zip Code _____

(2) Present status of sewers or sewer extensions to serve parcel:

(a) Plans for sewers ( ) have ( ) have not been prepared.
(b) Plans for sewers ( ) have ( ) have not been approved by DEQ.
(c) Sewers ( ) have ( ) have not been installed.

(3) STATEMENT OF CERTIFICATION BY SEWERAGE SYSTEM OWNER (Separate statement may be attached if available).

As representative of the owner of the sewerage system named in (1) above, I hereby certify that sewerage service will be provided for the above described parcel, that said sewerage system has capacity to serve the parcel, and that the above information relative to the status of such sewerage service is correct to the best of my knowledge.

Signature of Representative _____

Title _____

Date _____

[ ] PROPOSED NEW SEWERAGE SYSTEM (Fee: $5 for one lot; $10 for two or more lots)

Has DEQ approved the proposed system previously in writing? ( ) No ( ) Yes, on _____ *(date)*
Has DEQ issued a Waste Discharge Permit for the proposed system? ( ) No ( ) Yes, Permit No. _____

[X] SUBSURFACE SEWAGE DISPOSAL SYSTEM (Fee: $25 per lot)

Show location of proposed subsurface system or systems on the plat plan for each site which is attached as Exhibit A. For a subdivision of four or more sites, attach as Exhibit B:

1. A topographical map 2. Rates of slope data 3. Soils data 4. Water table data 5. Drainage data (surface and subsurface) 6. Water supply source and distribution systems data 7. Existing subsurface sewage disposal systems location

Special Instruction:

DEQ and/or its contract agent must complete a site investigation before a report can be given. To facilitate such investigation, prepare two (2) backhoe test holes at least 4 ft. deep and approximately 75 ft. apart (at the same approximate ground surface elevation) at the site of each proposed system.

Test holes ( ) have been prepared (X) will be prepared by Deschutes County.

I HAVE ATTACHED THE REQUIRED EXHIBITS AND FEE SPECIFIED IN THE INSTRUCTIONS AND ON THIS APPLICATION AND HEREBY REQUEST FROM THE DEPARTMENT OF ENVIRONMENTAL QUALITY A REPORT OF SUITABILITY OF THE ABOVE DESCRIBED METHOD OF SEWAGE DISPOSAL FOR THE ABOVE DESCRIBED PARCEL.

Name of Applicant Elsie M. Berger *Signature of Applicant* Elsie M. Berger

Address of Applicant 337 S. Ave. 52 *Title* - Owner

City, State, Zip Code Los Angeles, Ca. 90042 *Phone:* 213-256-5746 *Date* - Jan. 5, 1976

(FOR DEQ OR AGENT USE ONLY)

Comments and recommendations based on Subsurface Site Investigation by DEQ or Contract Agent:

This lot has been evaluated by a member of this department. Studies including but not limited to soil conditions, water table circumstances and topographical variations were conducted. It is the opinion of this department that it is NOT feasible to install a septic tank and subsurface drainfield on this lot. The water table was determined to be no more than thirty-six (36) inches from ground surface when examined on April 19, 1976.

DESCHUTES COUNTY DEPT. OF HEALTH
Deschutes County Courthouse Annex
BEND, OREGON 97701

Agent/DEQ _____ Signature Jay E. Langley
Jay Langley, R.S. Date April 22, 1976

Statement of DEQ or Agent Relative to Above Application

[ ] The above described method of sewage disposal is approved subject to the following conditions:

[X] The above described method of sewage disposal is not approved for the following reasons:

Chapter 340 Section 71-030, Oregon Administrative Rules, prohibits installation of disposal trenches in an area where the highest level attained by a permanently perched water table will be within four (4) feet of the bottom point of the effective sidewall of the disposal trench.

DESCHUTES COUNTY DEPT. OF HEALTH
Deschutes County Courthouse Annex
BEND, OREGON 97701

Agent/DEQ _____ Signature Jay E. Langley
Jay Langley, R.S.
DEQ Agent Representative Date April 22, 1976
For the Department of Environmental Quality

December 23, 1975

Mr. & Mrs. P. C. Berger
337 S. Avenue 52
Los Angeles, California 90042

Re: Lots 35 & 36, Block 35, Deschutes River Recreation Homesites

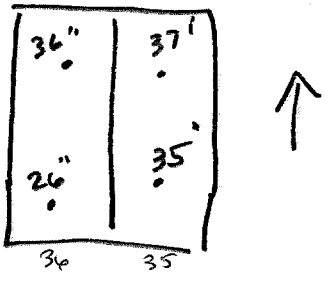
Dear Mr. & Mrs. Berger:

This is in reply to your recent request for feasibility statements on the above lots. This area is located in a seasonal high water table area where the ground water fluctuates several feet from early spring to fall of each year. In order to install a septic tank and drainfield, there must be a five foot separation between the ground surface and the seasonal high water table. This determination cannot be made until March or April of next year.

Enclosed are two applications for feasibility statements. If you desire this service, please complete the enclosed forms and return with the required fee of $25.00 for each lot. If the lots are found acceptable as building sites, this amount would be deducted from the cost of the septic tank permits when applied for. This deductible fee is transferrable to another owner in the event the lot is sold.

Sincerely,

John K. Glover, R.S.
County Sanitarian



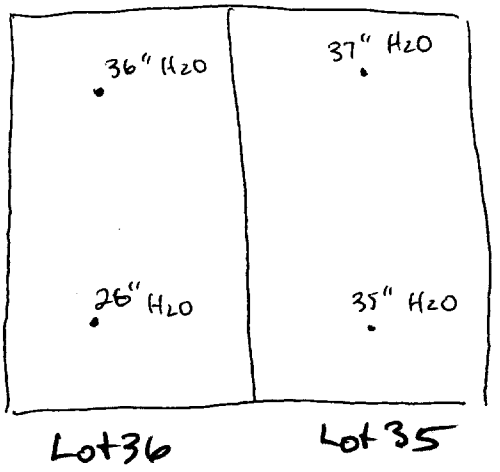
JKG:mr
Enclosures: Applications for Feasibility Statements

Office Memorandum DESCHUTES COUNTY DEPARTMENT OF HEALTH

To : File **Date:** 4-19-76

From : Jay Langley

Subject: DRRH - Blk 35, Lots 35 + 36 - Lots examined - Recommend denial



1/2 acre each - flat
Sandy soil
no restrictive layers

Jay E. Langley

July 28, 1975

Opal M. Riach
560 E. Villa Street
Pasadena, California 91101

Re: Lots 35 & 36, Block 35, Deschutes River Recreation Homesites

Dear Mrs. Riach:

Enclosed are applications for feasibility statements on the above lots. You should complete the forms and return to this office with the required fee of $25.00 per lot prior to March of next year when we will again make seasonal high water table determinations. The water table in that area fluctuates several feet from spring to fall of each year. Present rules require a six foot separation between the ground surface and the seasonal high water table. New rule changes proposed will change this requirement to a four (4) foot separation between the effective sidewall area of the disposal trench and the permanently perched water table. The Oregon State Engineers Office has determined that this area has a permanently perched water table.

Proposed rule changes also include allowing fill material of the same soil type in the area to be used in order to meet the four (4) foot separation requirement between the effective sidewall and water table.

In the event your lots are found to meet requirements for septic tank installation, the $25.00 fee will be deducted from the cost of the septic tank permit at the time of application. This deductible fee is transferable to the new owner in the event the lots are sold after obtaining a feasibility statement.

Please feel free to contact this office if you have further questions in regard to this matter.

Sincerely,

John K. Glover, R.S.
County Sanitarian

JKG:mr
Enclosures

RECEIVED JUL 2 4 1975

560 E. Villa St.
Pasadena, Calif. 91101
July 21, 1975

Deschutes County Health Dept.
Court House Annex
Bend, Oregon 97701

Dear Employee:

I am the owner of Lots 35 & 36, Block 35, on Utah Street in the Deschute River Recreation Homesites Area.

Please send me a Feasibility Statement as to the possibility of getting a permit to install a septic tank on each of these lots.

Thank you for all the information you can send me in regard to the above described property.

Sincerely,

Opal M. Riach

Opal M. Riach

Appendix D.

NRCS Soil Report

United States Department of Agriculture

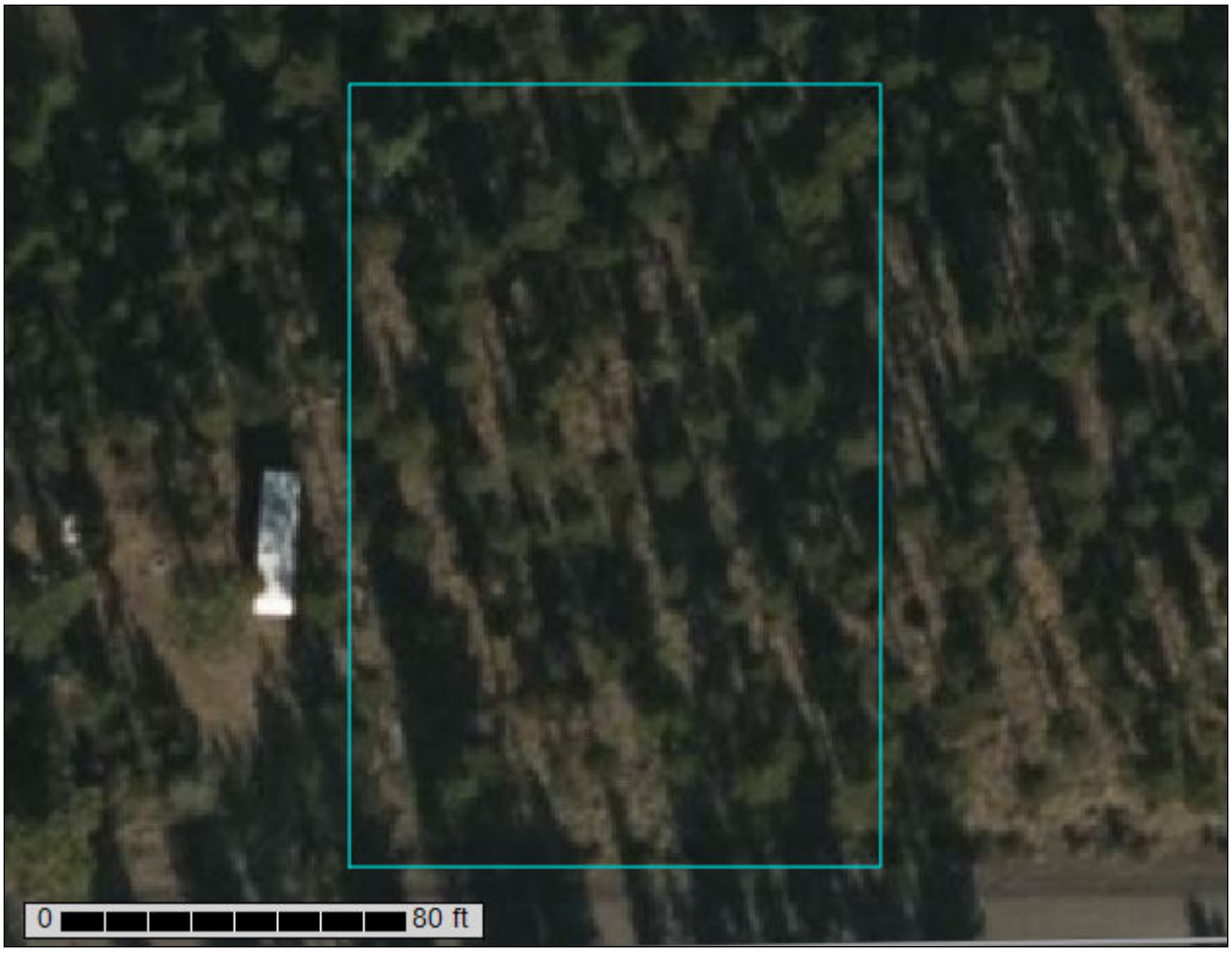
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Upper Deschutes River Area, Oregon, Parts of Deschutes, Jefferson, and Klamath Counties

17062 Indio



September 9, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map (17062 Indio)

Map Scale: 1:323 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 4 9 18 27

Feet
0 15 30 60 90

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Upper Deschutes River Area, Oregon, Parts of Deschutes, Jefferson, and Klamath Counties
Survey Area Data: Version 21, Sep 8, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Nov 1, 2019—Nov 4, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend (17062 Indio)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
144A	Sunriver sandy loam, 0 to 3 percent slopes	0.5	100.0%
Totals for Area of Interest		**0.5**	**100.0%**

Map Unit Descriptions (17062 Indio)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Upper Deschutes River Area, Oregon, Parts of Deschutes, Jefferson, and Klamath Counties

144A—Sunriver sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 241l
Elevation: 4,000 to 4,300 feet
Mean annual precipitation: 18 to 25 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 10 to 50 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Sunriver and similar soils: 85 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sunriver

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Volcanic ash over old alluvium

Typical profile

H1 - 0 to 5 inches: sandy loam
H2 - 5 to 20 inches: loamy coarse sand
H3 - 20 to 29 inches: coarse sand
H4 - 29 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 24 to 48 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6c
Hydrologic Soil Group: B
Ecological site: F006XE807OR - Cryic Aquic Pumice Basins
Hydric soil rating: No

Minor Components

Cryaquolls

Percent of map unit: 8 percent

Landform: Mountains
Ecological site: R006XB102OR - COLD WET MEADOW
Hydric soil rating: Yes

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Appendix E.

Water Well Reports

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765 & OAR 690-205-0210)

DESC 62177

8/19/2020

WELL I.D. LABEL# L 136818
START CARD # 1048531
ORIGINAL LOG #

(1) LAND OWNER

Owner Well I.D.
First Name JOEL Last Name MYERS
Company TALISA MYERS
Address P.O BOX 951
City OAKRIDGE State OR Zip 97463

(2) TYPE OF WORK

☒ New Well ☐ Deepening ☐ Conversion ☐ Alteration (complete 2a & 10) ☐ Abandonment(complete 5a)

(2a) PRE-ALTERATION

	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
Casing:									

	Material	From	To	Amt	sacks/lbs
Seal:					

(3) DRILL METHOD

☐ Rotary Air ☐ Rotary Mud ☒ Cable ☐ Auger ☐ Cable Mud
☐ Reverse Rotary ☐ Other

(4) PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Community
☐ Industrial/ Commericial ☐ Livestock ☐ Dewatering
☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION

Special Standard ☐ (Attach copy)
Depth of Completed Well 83.00 ft.

BORE HOLE

Dia	From	To
10	0	19
6	19	83

SEAL

Material	From	To	Amt	sacks/lbs
Bentonite	0	19	40	S
		Calculated	7.6	
		Calculated		

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☒ Other POURED DRY
Backfill placed from ft. to ft. Material
Filter pack from ft. to ft. Material Size
Explosives used: ☐ Yes Type Amount

(5a) ABANDONMENT USING UNHYDRATED BENTONITE

Proposed Amount Actual Amount

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
●	○	6	☒	2	73	.250	●	○	☒	☐
○	●	4	☐	13	73	sch 40	○	●	☐	☒
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐

Shoe ☐ Inside ☐ Outside ☐ Other Location of shoe(s)
Temp casing ☐ Yes Dia From + ☐ To

(7) PERFORATIONS/SCREENS

Perforations Method
Screens Type factory Material pvc

Perf/ Screen	Casing/ Screen Liner	Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size
Screen	Liner	4	73	83	.013	2	2160	

(8) WELL TESTS: Minimum testing time is 1 hour

◉ Pump ○ Bailer ○ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
18	5	73	2

Temperature 49 °F Lab analysis ☐ Yes By
Water quality concerns? ☐ Yes (describe below) TDS amount 34 ppm

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)

County DESCHUTES Twp 20.00 S N/S Range 10.00 E E/W WM
Sec 12 SW 1/4 of the SE 1/4 Tax Lot 15700
Tax Map Number Lot
Lat ° ' " or 43.85084647 DMS or DD
Long ° ' " or -121.47433742 DMS or DD
◉ Street address of well ○ Nearest address
17054 INDIO RD, BEND OR 97701

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Pre-Alteration			☐	
Completed Well	8/18/2020		☐	18

Flowing Artesian? ☐ Dry Hole? ☐

WATER BEARING ZONES Depth water was first found

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
8/13/2020	10	12	5		☐	10
8/18/2020	73	83	25		☐	18
					☐	
					☐	
					☐	

(11) WELL LOG

Ground Elevation

Material	From	To
Pummice	0	4
Brown Sandy Clay	4	10
Course Gravel	10	12
Sand/Gravel W/ Clay	12	32
Green/Grey Clay	32	67
Fine Black Sand	67	73
Course Black Sand	73	83

Date Started 8/13/2020 Completed 8/18/2020

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

License Number Date

Signed

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

License Number 2035 Date 8/19/2020

Signed JOSHUA LISENBY (E-filed)

Contact Info (optional) Josh Lisenby 541-977-0031

DESC 50418

RECEIVED

JUL 26 1996

WATER RESOURCES DEPT.
SALEM, OREGON

Lo. 3340

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

(START CARD) # 46627

Instructions for completing this report are on the last page of this form.

(1) OWNER: Well Number

Name Rob Lowe

Address 17051 Hermosa

City Bend State Ore Zip 97709

(2) TYPE OF WORK

☒ New Well ☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD:

☐ Rotary Air ☐ Rotary Mud ☒ Cable ☒ Auger

☐ Other

(4) PROPOSED USE:

☒ Domestic ☐ Community ☐ Industrial ☐ Irrigation

☐ Thermal ☐ Injection ☐ Livestock ☐ Other

(5) BORE HOLE CONSTRUCTION:

Special Construction approval ☐ Yes ☒ No Depth of Completed Well 38 ft.

Explosives used ☐ Yes ☒ No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
11 7/8	0	25	Bentonite	0	20	12 Sacks
6"	25	38				

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E

☐ Other Poured

Backfill placed from ft. to ft. Material

Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6"	+1	35	.250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:

☒ Perforations Method Torch

☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
31	35	1/8	16	6"		☒	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☒ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
20 GPM	16'		1 hr.

Temperature of water 51 Depth Artesian Flow Found

Was a water analysis done? ☐ Yes By whom

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other

Depth of strata:

(9) LOCATION OF WELL by legal description:

County Desch Latitude Longitude

Township 20 N or S Range 10 E or W. WM.

Section 12D NW 1/4 SW 1/4

Tax Lot 12400 Lot Block Subdivision

Street Address of Well (or nearest address)

(10) STATIC WATER LEVEL:

12 ft. below land surface. Date 7-20-96

Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:

Depth at which water was first found

From	To	Estimated Flow Rate	SWL
30	39	40 GPM	12'

(12) WELL LOG:

Ground Elevation

Material	From	To	SWL
Soil + Pumice	0	6	
Brown clay	6'	15'	
Pink Ash	15'	21'	
Green Pigtamite	21	30	
Sand + Gravel	30	38	12'

Date started 7-18-96 Completed 7-19-96

(unbonded) Water Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

WWC Number

Signed Date

(bonded) Water Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 1528

Signed Glen Mathis Date 7-24-96

ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER

DESC 56480

DESC 56480

DRAFT

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

Instructions for completing this report are on the last page of this form.

Desc 56480

WELL I.D. # L 46510
START CARD # 165475

(1) LAND OWNER Well Number
Name Anchetta Const.
Address P.O. Box 3711
City Sunriver State Ore Zip 97707

(2) TYPE OF WORK
☒ New Well ☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD:
☐ Rotary Air ☐ Rotary Mud ☐ Cable ☒ Auger
☐ Other

(4) PROPOSED USE:
☒ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☐ Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☐ Yes ☒ No Depth of Completed Well 40 ft.
Explosives used ☐ Yes ☐ No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
12	0	40	Bent.	0	18	12

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☒ Other Poured
Backfill placed from ft. to ft. Material
Gravel placed from 30 ft. to 40 ft. Size of gravel 10-20

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6"	+1	19	250	☒	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:	4"	-4	30	160	☐	☒	☒	☐
					☐	☐	☐	☐

Drive Shoe used ☐ Inside ☐ Outside ☒ None
Final location of shoe(s)

(7) PERFORATIONS/SCREENS:
☐ Perforations Method
☒ Screens Type Material PVC

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
30	40	010	350	4"		☐	☒
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☒ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
20	2'		1 hr.

Temperature of water 50° Depth Artesian Flow Found
Was a water analysis done? ☐ Yes By whom
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other
Depth of strata:

(9) LOCATION OF WELL by legal description:
County Desch Latitude Longitude
Township 20 N or S Range 10 E or W. WM.
Section 12 SW 1/4 SE 1/4
Tax Lot 16800 Lot Block Subdivision
Street Address of Well (or nearest address) 17081 Indio

(10) STATIC WATER LEVEL:
20 ft. below land surface. Date 11-23-04
Artesian pressure lb. per square inch Date

(11) WATER BEARING ZONES:
Depth at which water was first found

From	To	Estimated Flow Rate	SWL
25	40	40	20'

(12) WELL LOG:
Ground Elevation

Material	From	To	SWL
Soil + Pumice	0'	4'	
clay + Gravel	4'	12'	
clay	12	20	
Blk Sand	20	40	

RECEIVED
JAN 14 2005
WATER RESOURCES DEPT
SALEM, OREGON

RECEIVED
MAR 24 2005
WATER RESOURCES DEPT
SALEM OREGON

Date started 11-23-04 Completed 11-24-04

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
WWC Number
Signed Date

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 1528
Signed Glenn Miller Date 12-2-04

ORIGINAL – WATER RESOURCES DEPARTMENT FIRST COPY – CONSTRUCTOR SECOND COPY – CUSTOMER

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765 & OAR 690-205-0210)

DESC 62185

8/19/2020

WELL I.D. LABEL# L 47039
START CARD # 1048619
ORIGINAL LOG # DESCHUTES 54002

(1) LAND OWNER

Owner Well I.D.
First Name DONALD Last Name COX
Company PINE RIVER HOMES
Address PO BOX 3033
City SUNRIVER State OR Zip 97707

(2) TYPE OF WORK

☐ New Well ☐ Deepening ☐ Conversion ☐ Alteration (complete 2a & 10) ☒ Abandonment(complete 5a)

(2a) PRE-ALTERATION

	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
Casing:	6	☒	1	85	250	◉	○	☒	☐

	Material	From	To	Amt	sacks/lbs
Seal:	Bentonite Chips	0	20	12	Sacks

(3) DRILL METHOD

☐ Rotary Air ☐ Rotary Mud ☒ Cable ☐ Auger ☐ Cable Mud
☐ Reverse Rotary ☐ Other

(4) PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Community
☐ Industrial/ Commericial ☐ Livestock ☐ Dewatering
☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION

Special Standard ☐ (Attach copy)
Depth of Completed Well ft.

BORE HOLE

Dia	From	To
10	0	20
6	20	85

SEAL

Material	From	To	Amt	sacks/lbs
Bentonite Chips	0	20	12	S
		Calculated	12	
		Calculated		

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☒ Other POURED
Backfill placed from ft. to ft. Material
Filter pack from ft. to ft. Material Size
Explosives used: ☐ Yes Type Amount

(5a) ABANDONMENT USING UNHYDRATED BENTONITE

Proposed Amount 40.00 Sacks Actual Amount 40.00 Sacks

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐

Shoe ☐ Inside ☐ Outside ☐ Other Location of shoe(s)
Temp casing ☐ Yes Dia From + ☐ To

(7) PERFORATIONS/SCREENS

Perforations Method
Screens Type Material

Perf/ Screen	Casing/ Screen Liner	Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size

(8) WELL TESTS: Minimum testing time is 1 hour

◯ Pump ◯ Bailer ◯ Air ◯ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Temperature °F Lab analysis ☐ Yes By
Water quality concerns? ☐ Yes (describe below) TDS amount 0 ppm

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)

County DESCHUTES Twp 20.00 S N/S Range 10.00 E E/W WM
Sec 12 SE 1/4 of the SW 1/4 Tax Lot 16800
Tax Map Number Lot
Lat ° ' " or DMS or DD
Long ° ' " or DMS or DD
◉ Street address of well ◯ Nearest address
17081 INDIO

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Pre-Alteration				
Completed Well				

Flowing Artesian? ☐ Dry Hole? ☐

WATER BEARING ZONES Depth water was first found

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)

(11) WELL LOG

Ground Elevation

Material	From	To
well abandoned	0	85

Date Started 8/18/2020 Completed 8/19/2020

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

License Number Date

Signed

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

License Number 1528 Date 8/19/2020

Signed STEVE MATHERS (E-filed)

Contact Info (optional) 541 389 0743

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK Form Version:

WATER SUPPLY WELL REPORT - continuation page

DESC 62185

8/19/2020

WELL I.D. LABEL# L 47039

START CARD # 1048619

ORIGINAL LOG # DESCHUTES 54002

(2a) PRE-ALTERATION

Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd

Material	From	To	Amt	sacks/lbs

(5) BORE HOLE CONSTRUCTION

BORE HOLE Dia	From	To

SEAL Material	From	To	Amt	sacks/lbs
		Calculated		
		Calculated		
		Calculated		
		Calculated		

FILTER PACK

From	To	Material	Size

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd

(7) PERFORATIONS/SCREENS

Perf/ Screen	Casing/ Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size

(8) WELL TESTS: Minimum testing time is 1 hour

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Water Quality Concerns

From	To	Description	Amount	Units

(10) STATIC WATER LEVEL

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)

(11) WELL LOG

Material	From	To

Comments/Remarks

pulled casing filled with bentonite

STATE OF OREGON
REVISIONS REQUESTED
(as required by ORS 537.765 & OAR 690-205-0210)

DESC 61265

7/29/2018

WELL I.D. LABEL# L 129512
START CARD # 1039262
ORIGINAL LOG #

(1) LAND OWNER

Owner Well I.D.
First Name BOYLES Last Name LIVING TRUST
Company
Address PMB 256
City SUNRIVER State OR Zip 97707

(2) TYPE OF WORK

☒ New Well ☐ Deepening ☐ Conversion ☐ Alteration (complete 2a & 10) ☐ Abandonment(complete 5a)

(2a) PRE-ALTERATION

	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
Casing:									

	Material	From	To	Amt	sacks/lbs
Seal:					

(3) DRILL METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable ☒ Auger ☐ Cable Mud
☐ Reverse Rotary ☐ Other

(4) PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Community
☐ Industrial/ Commericial ☐ Livestock ☐ Dewatering
☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION

Special Standard ☐ (Attach copy)
Depth of Completed Well 77.00 ft.

BORE HOLE

Dia	From	To
10	0	20
6	20	77

SEAL

Material	From	To	Amt	sacks/lbs
Bentonite Chips	0	20	14	S
		Calculated	9.4	
		Calculated		

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☒ Other 3 MINUTE POUR PER
Backfill placed from ft. to ft. Material
Filter pack from ft. to ft. Material Size
Explosives used: ☐ Yes Type Amount

(5a) ABANDONMENT USING UNHYDRATED BENTONITE

Proposed Amount Actual Amount

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
●	○	6	☒	1	70	.250	●	○	☒	☐
○	●	4.5	☐	17	77	sdr26	○	●	☒	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐

Shoe ☐ Inside ☐ Outside ☐ Other Location of shoe(s)
Temp casing ☐ Yes Dia From + ☐ To

(7) PERFORATIONS/SCREENS

Perforations Method
Screens Type saw cut Material pvc

Perf/ Screen	Casing/ Screen Liner	Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size
Screen	Liner	4.5	70	77	.1	2	1950	4.5

(8) WELL TESTS: Minimum testing time is 1 hour

● Pump ○ Bailer ○ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
16	4	20	2
16	4	20	2

Temperature 42 °F Lab analysis ☐ Yes By
Water quality concerns? ☐ Yes (describe below) TDS amount 52 ppm

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)

County DESCHUTES Twp 20.00 S N/S Range 10.00 E E/W WM
Sec 12 SW 1/4 of the SE 1/4 Tax Lot 2700
Tax Map Number Lot
Lat ° ' " or DMS or DD
Long ° ' " or DMS or DD
● Street address of well ○ Nearest address
17073 HERMOSA, BEND

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Pre-Alteration			☐	
Completed Well	6/22/2018		☐	16

Flowing Artesian? ☐ Dry Hole? ☐

WATER BEARING ZONES Depth water was first found 68.00

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
6/22/2018	68	77	16		☐	16
					☐	
					☐	
					☐	
					☐	

(11) WELL LOG

Ground Elevation

Material	From	To
pummie	0	2
brown sand and gravel	2	6
brown sand course	6	13
gray clay	13	68
gray sand course	68	77

Date Started 6/20/2018 Completed 6/22/2018

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

License Number Date

Signed

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

License Number 1614 Date 7/29/2018

Signed SAM OLSON (E-filed)

Contact Info (optional) 541-536-5339

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK Form Version:

Amended 3/3/2023

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.545 & 537.765 and OAR 690-205-0210)

DESC 63911

12/21/2022

WELL I.D. LABEL# L 145612
START CARD # 1059177
ORIGINAL LOG #

(1) LAND OWNER

Owner Well I.D.
First Name MEGAN Last Name DELUCIA
Company
Address 12411 SE YOAKUM WAY
City HAPPY VALLEY State OR Zip 97086

(2) TYPE OF WORK

☒ New Well ☐ Deepening ☐ Conversion ☐ Alteration (complete 2a & 10) ☐ Abandonment(complete 5a)

(2a) PRE-ALTERATION

	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
Casing:									

	Material	From	To	Amt	sacks/lbs
Seal:					

(3) DRILL METHOD

☐ Rotary Air ☐ Rotary Mud ☒ Cable ☐ Auger ☐ Cable Mud
☐ Reverse Rotary ☐ Other

(4) PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Community
☐ Industrial/ Commericial ☐ Livestock ☐ Dewatering
☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION

Special Standard ☐ (Attach copy)
Depth of Completed Well 68.00 ft.

BORE HOLE

Dia	From	To
10	0	20
6	20	68

SEAL

Material	From	To	Amt	sacks/lbs
Bentonite Chips	0	20	13	S
		Calculated	9.13	
		Calculated		

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☒ Other BENTONITE CHIPS
Backfill placed from ft. to ft. Material
Filter pack from ft. to ft. Material Size
Explosives used: ☐ Yes Type Amount

(5a) ABANDONMENT USING UNHYDRATED BENTONITE

Proposed Amount Actual Amount

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
●	○	6	☒	1	67.5	.250	●	○	☒	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐

Shoe ☐ Inside ☐ Outside ☐ Other Location of shoe(s)
Temp casing ☐ Yes Dia From + ☐ To

(7) PERFORATIONS/SCREENS

Perforations Method
Screens Type Material

Perf/ Screen	Casing/ Screen Liner	Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size

(8) WELL TESTS: Minimum testing time is 1 hour

● Pump ○ Bailer ○ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
14	14	32	2

Temperature 42 °F Lab analysis ☐ Yes By
Water quality concerns? ☐ Yes (describe below) TDS amount 80 ppm

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)

County DESCHUTES Twp 20.00 S N/S Range 10.00 E E/W WM
Sec 12 SW 1/4 of the SE 1/4 Tax Lot 15400
Tax Map Number Lot
Lat ° ' " or 43.85102000 DMS or DD
Long ° ' " or -121.47232000 DMS or DD
● Street address of well ○ Nearest address
17076 INDIO RD

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Pre-Alteration				
Completed Well	11/19/2022			18

Flowing Artesian? ☐ Dry Hole? ☐

WATER BEARING ZONES Depth water was first found 12.00

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
11/19/2022	12	13	14			10
11/19/2022	67	68	14			18

(11) WELL LOG

Ground Elevation

Material	From	To
pummy	0	3
brown sand clay mix	3	12
brown sand course	12	13
clay brown	13	16
clau gray	16	62
cinders black	62	68
Helper: Zane Naylor		

Date Started 11/11/2022 Completed 11/19/2022

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

License Number Date

Signed

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

License Number 1614 Date 12/21/2022

Signed SAM OLSON (E-filed)

Contact Info (optional) 5415365339

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK Form Version:
New exempt use wells must be submitted with a map and recording fee.

WATER SUPPLY WELL REPORT - Map with location identified must be attached and shall include an approximate scale and north arrow

DESC 63911

12/21/2022

Map of Hole

STATE OF OREGON
WELL LOCATION MAP

This map is supplemental to the WATER SUPPLY WELL REPORT

Oregon Water Resources Department
725 Summer St NE, Salem OR 97301
(503)986-0900

LOCATION OF WELL

Latitude: 43.85102000 Datum: WGS84
Longitude: -121.47232000
Township/Range/Section/Quarter-Quarter Section:
WM20.00S10.00E12SWSE
Address of Well:
17076 INDIO RD

Well Label: 145612

Printed: December 21, 2022

DISCLAIMER: This map is intended to represent the approximate location the well. It is not intended to be construed as survey accurate in any manner.

Provided by well constructor

WATER SUPPLY WELL REPORT - continuation page

DESC 63911

12/21/2022

Map of Hole

STATE OF OREGON
WELL LOCATION MAP

This map is supplemental to the WATER SUPPLY WELL REPORT

Oregon Water Resources Department
725 Summer St NE, Salem OR 97301
(503)986-0900

LOCATION OF WELL

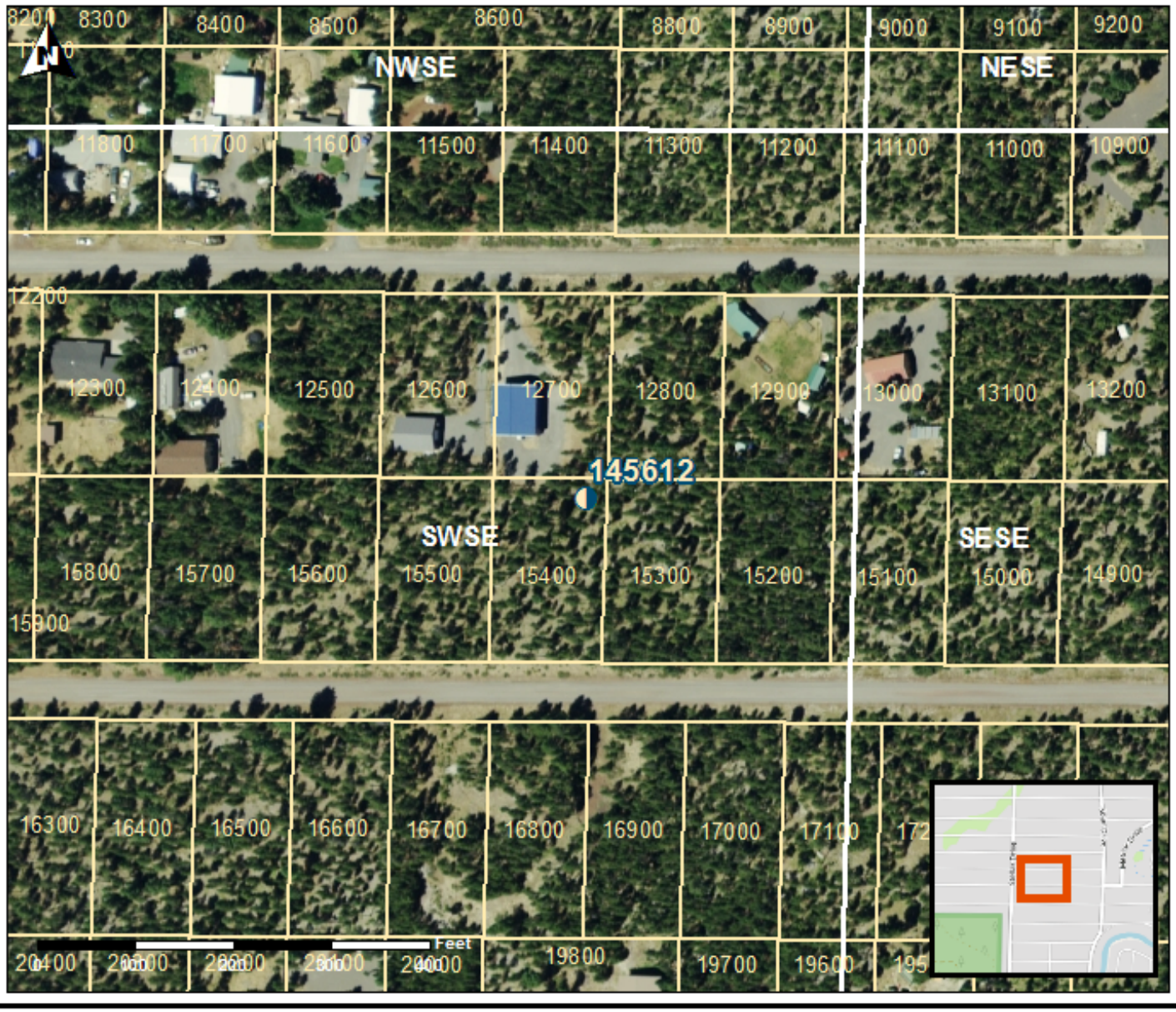
Latitude: 43.85102000 Datum: WGS84
Longitude: -121.47232000
Township/Range/Section/Quarter-Quarter Section:
WM20.00S10.00E12SWSE
Address of Well:
17076 INDIO RD

Well Label: 145612

Printed: December 21, 2022

DISCLAIMER: This map is intended to represent the approximate location the well. It is not intended to be construed as survey accurate in any manner.

Provided by well constructor



STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765 & OAR 690-205-0210)

DESC 63038

11/22/2021

WELL I.D. LABEL# L 145497
START CARD # 1054706
ORIGINAL LOG #

(1) LAND OWNER

Owner Well I.D.
First Name Last Name
Company CASCADE LAKES PROPERTY
Address PO BOX 4872
City BEND State OR Zip 97707

(2) TYPE OF WORK

☒ New Well ☐ Deepening ☐ Conversion ☐ Alteration (complete 2a & 10) ☐ Abandonment(complete 5a)

(2a) PRE-ALTERATION

	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
Casing:						◯	◯	☐	☐

	Material	From	To	Amt	sacks/lbs
Seal:					

(3) DRILL METHOD

☐ Rotary Air ☐ Rotary Mud ☒ Cable ☒ Auger ☐ Cable Mud
☐ Reverse Rotary ☐ Other

(4) PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Community
☐ Industrial/ Commericial ☐ Livestock ☐ Dewatering
☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION

Special Standard ☐ (Attach copy)
Depth of Completed Well 69.00 ft.

BORE HOLE

Dia	From	To
10	0	20
6	20	69

SEAL

Material	From	To	Amt	sacks/lbs
Bentonite Chips	0	20	15	S
		Calculated	12	
		Calculated		

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☒ Other POURED
Backfill placed from ft. to ft. Material
Filter pack from ft. to ft. Material Size
Explosives used: ☐ Yes Type Amount

(5a) ABANDONMENT USING UNHYDRATED BENTONITE

Proposed Amount Actual Amount

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
◉	◯	6	☒	2	69	250	◉	◯	☒	☐
◯	◯		☐				◯	◯	☐	☐
◯	◯		☐				◯	◯	☐	☐
◯	◯		☐				◯	◯	☐	☐
◯	◯		☐				◯	◯	☐	☐

Shoe ☐ Inside ☐ Outside ☐ Other Location of shoe(s)
Temp casing ☐ Yes Dia From + ☐ To

(7) PERFORATIONS/SCREENS

Perforations Method
Screens Type Material

Perf/ Screen	Casing/ Screen Liner	Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size

(8) WELL TESTS: Minimum testing time is 1 hour

◉ Pump ◯ Bailer ◯ Air ◯ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
20	7	35	1

Temperature 51 °F Lab analysis ☐ Yes By
Water quality concerns? ☐ Yes (describe below) TDS amount 65 ppm

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)

County DESCHUTES Twp 20.00 S N/S Range 10.00 E E/W WM
Sec 12 SE 1/4 of the SW 1/4 Tax Lot 15300
Tax Map Number Lot
Lat ° ' " or DMS or DD
Long ° ' " or DMS or DD
◉ Street address of well ◯ Nearest address
17084 INDIO THREE RIVERS

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Pre-Alteration			☐	
Completed Well	11/22/2021		☐	18

Flowing Artesian? ☐ Dry Hole? ☐

WATER BEARING ZONES Depth water was first found 67.00

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
11/22/2021	67	69	40		☒	
					☐	
					☐	
					☐	
					☐	

(11) WELL LOG

Ground Elevation

Material	From	To
soil and pumice	0	3
clay and gravel	3	9
pink ash	9	15
green diatamite	15	67
medium fine gravel	67	69

Date Started 11/17/2021 Completed 11/22/2021

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

License Number Date

Signed

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

License Number 1528 Date 11/22/2021

Signed STEVE MATHERS (E-filed)

Contact Info (optional) 541 389 0743

DESC 1372

DESC 1372

JUL 14 1992

20s/10E/12dd

STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

WATER RESOURCES DEPT. (START CARD) # 33193

SALEM, OREGON

(1) OWNER:

Well Number: 24

Name JIM SELERS & VIVIAN WALTERN

Address 34388 CHRISTMAS TREE LANE

City CRESWELL State OR. Zip 97426

(2) TYPE OF WORK:

☑ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD

☑ Rotary Air ☐ Rotary Mud ☐ Cable

☐ Other

(4) PROPOSED USE:

☑ Domestic ☐ Community ☐ Industrial ☐ Irrigation

☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION:

Special Construction approval Yes ☐ No ☑ Depth of Completed Well 84 ft.

Explosives used Yes ☐ No ☑ Type ____ Amount ____

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
12"	0'	38½'	CEMENT	0	38½'	3 TONS
5"	41½	84'				

How was seal placed: Method ☐ A ☐ B ☑ C ☐ D ☐ E

☐ Other

Backfill placed from ____ ft. to ____ ft. Material ____

Gravel placed from ____ ft. to ____ ft. Size of gravel ____

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	8"	+1½	38½	250	☑	☐	☑	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:	6"	-4	84	160	☐	☑	☑	☐

Final location of shoe(s) ____

(7) PERFORATIONS/SCREENS:

☑ Perforations Method SKILL SAW

☐ Screens Type ____ Material ____

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
64'	84'	1/16"	80	6"		☐	☑
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☐ Pump ☐ Bailer ☑ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
100 G.P.M.		84'	1 hr.

Temperature of water 49° F. Depth Artesian Flow Found ____

Was a water analysis done? ☐ Yes By whom ____

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other ____

Depth of strata: ____

(9) LOCATION OF WELL by legal description:

County DESCHUTES Latitude ____ Longitude ____

Township 20 N or S Range 10 E or W. WM.

Section 12 D. NW ¼ SE ¼

Tax Lot 11600 Lot ____ Block ____ Subdivision ____

Street Address of Well (or nearest address) 17064 HERMOSA BEND, OR. 97702

(10) STATIC WATER LEVEL:

20 ft. below land surface. Date 3-13-92

Artesian pressure ____ lb. per square inch. Date ____

(11) WATER BEARING ZONES:

Depth at which water was first found 8'

From	To	Estimated Flow Rate	SWL
8'	30'	30 G.P.M.	8'
45'	84'	100 G.P.M.	20

(12) WELL LOG:

Ground elevation ____

Material	From	To	SWL
BRN. SOIL	0	3	
BLACK SAND	3	18	8
BLACK SAND & MED GRAVEL	18	30	8
GREEN CLAY CONGLOM.	30	45	
BLACK SAND & MED GRAVEL	45	84	20

RECEIVED

OCT 26 1992

WATER RESOURCES DEPT

SALEM, OREGON

Date started 3-11-92 Completed 3-13-92

(unbonded) Water Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.

WWC Number ____

Signed ____ Date ____

(bonded) Water Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. all work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 1536

Signed Larry M. Raley Date 3-16-92

ORIGINAL & FIRST COPY - WATER RESOURCES DEPARTMENT SECOND COPY - CONSTRUCTOR THIRD COPY - CUSTOMER 9809C 3/88

Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem Oregon 97301
(503) 986-0900
www.wrd.state.or.us

Application for Well ID Number

RECEIVED
MAY 10 2016
WATER RESOURCES DEPT
SALEM, OREGON

Do not complete if the well already has a Well Identification Number.

I. OWNER INFORMATION

Current Owner Name *(please print)*: Jerry & Betty Rockow

Mailing Address: 17064 Hermosa Road

City, State, Zip: Bend, OR 97707

Mail Well ID Tag to: ☒ SAME AS ABOVE ☐ In Care Of (C/O)

Name & Address: _____

City, State, Zip: _____

II. WELL LOCATION INFORMATION *(Please fill out as completely as possible)*

Township: 20 (North / South) Range: 10 (East / West) Section: 12 _____ 1/4 of the D 1/4

Tax Lot (usually last 3-5 numbers of Tax Map #): 201012D11600 County Deschutes

GPS Coordinates: _____

Street Address of Well, City: 17064 Hermosa Road, Bend OR 97707

If the property had a different street address in the past: _____

III. GENERAL WELL INFORMATION *(Please fill out as completely as possible, AND attach copy of Well Log, if available)*

Use of Well (domestic, irrigation, commercial, industrial, monitoring): Domestic

Date Well Constructed (or property built): 03/11/1992 Total Well Depth: 84 Casing Diameter: 8"

Owner at time the well was constructed (if known): Selers Well Log # (if known): DESC1372

Other Information: _____

SUBMITTED BY *(please print)*: Brad Driggers

PHONE: 541-977-2611 **EMAIL &/or FAX:** bdriggers@windermere.com

Send application to: Oregon Water Resources Department 725 Summer St NE, Suite A, Salem, Oregon 97301; or fax to (503) 986-0902. Applications are processed in the order they are received, and Well ID Numbers are mailed within 4-5 business days.

For Official Use Only by the Oregon Water Resources Department:

Received Date:	Well Log Number:	Well Identification #:
5-10-16	DESC 1372	L-122906

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765 & OAR 690-205-0210)

DESC 62902

9/14/2021

WELL I.D. LABEL# L 144549
START CARD # 1053801
ORIGINAL LOG #

(1) LAND OWNER

Owner Well I.D.
First Name Last Name
Company PINE RIVER HOMES
Address PO BOX 3033
City BEND State OR Zip 97707

(2) TYPE OF WORK

☒ New Well ☐ Deepening ☐ Conversion ☐ Alteration (complete 2a & 10) ☐ Abandonment(complete 5a)

(2a) PRE-ALTERATION

	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
Casing:						◯	◯	☐	☐

	Material	From	To	Amt	sacks/lbs
Seal:					

(3) DRILL METHOD

☐ Rotary Air ☐ Rotary Mud ☒ Cable ☒ Auger ☐ Cable Mud
☐ Reverse Rotary ☐ Other

(4) PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Community
☐ Industrial/ Commericial ☐ Livestock ☐ Dewatering
☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION

Special Standard ☐ (Attach copy)
Depth of Completed Well 80.00 ft.

BORE HOLE

Dia	From	To
10	0	18
6	18	80

SEAL

Material	From	To	Amt	sacks/lbs
Bentonite Chips	0	18	12	S
		Calculated	10	
		Calculated		

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☒ Other POURED
Backfill placed from ft. to ft. Material
Filter pack from ft. to ft. Material Size
Explosives used: ☐ Yes Type Amount

(5a) ABANDONMENT USING UNHYDRATED BENTONITE

Proposed Amount Actual Amount

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
◉	◯	6	☒	1	68	250	◉	◯	☒	☐
◯	◉	4	☐	7	68	480	◯	◉	☐	☒
◯	◯		☐				◯	◯	☐	☐
◯	◯		☐				◯	◯	☐	☐
◯	◯		☐				◯	◯	☐	☐

Shoe ☐ Inside ☐ Outside ☐ Other Location of shoe(s)
Temp casing ☐ Yes Dia From + ☐ To

(7) PERFORATIONS/SCREENS

Perforations Method
Screens Type slotted Material pvc

Perf/ Screen	Casing/ Screen Liner	Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size
Screen	Liner	4	68	80	.1		4280	

(8) WELL TESTS: Minimum testing time is 1 hour

◉ Pump ◯ Bailer ◯ Air ◯ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
20	6	40	2

Temperature 51 °F Lab analysis ☐ Yes By
Water quality concerns? ☐ Yes (describe below) TDS amount 42 ppm

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)

County DESCHUTES Twp 20.00 S N/S Range 10.00 E E/W WM
Sec 12 SE 1/4 of the SE 1/4 Tax Lot 16800
Tax Map Number Lot
Lat ° ' " or DMS or DD
Long ° ' " or DMS or DD
◉ Street address of well ◯ Nearest address
17081 INDIO THREE RIVERS

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Pre-Alteration			☐	
Completed Well	9/13/2021		☐	18

Flowing Artesian? ☐ Dry Hole? ☐

WATER BEARING ZONES Depth water was first found 68.00

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
9/13/2021	68	80	50		☐	18
					☐	
					☐	
					☐	
					☐	

(11) WELL LOG

Ground Elevation

Material	From	To
soil and pumice	0	3
clay and gravel	3	9
gray clay and green diatamite	9	58
soft black rock porous	58	68
sand and fine gravel	68	80

Date Started 9/8/2021 Completed 9/13/2021

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

License Number Date

Signed

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

License Number 1528 Date 9/14/2021

Signed STEVE MATHERS (E-filed)

Contact Info (optional) 541 389 0743

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK Form Version:

RECEIVED DESC 54765

JAN 13 2004

WATER RESOURCES DEPT.
SALEM, OREGON

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

Instructions for completing this report are on the last page of this form.

desc 54765

WELL I.D. # L 55424
START CARD # W146650

(1) LAND OWNER Well Number
Name Joe Frye
Address 1753 Aerial way SE,
City Salem State OR. Zip 97302

(2) TYPE OF WORK
☒ New Well ☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD:
☐ Rotary Air ☐ Rotary Mud ☒ Cable ☐ Auger
☐ Other

(4) PROPOSED USE:
☒ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☐ Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☐ Yes ☒ No Depth of Completed Well 72' ft.
Explosives used ☐ Yes ☒ No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
10"	0'	20'	Bentonite	0'	20'	9 sacks
6"	20'	75'				

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☒ Other poured Dry
Backfill placed from ft. to ft. Material
Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6"	+15"	72'	.250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Drive Shoe used ☐ Inside ☐ Outside ☒ None
Final location of shoe(s)

(7) PERFORATIONS/SCREENS:
☒ Perforations Method Torch
☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
67'	72'	5"	14	1/8"	6"	☒	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☒ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
15	25 PSI		1 hr.

Temperature of water 43° Depth Artesian Flow Found
Was a water analysis done? ☐ Yes By whom
Did any strata contain water not suitable for intended use? ☒ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other Surface water
Depth of strata: 8' to 14'

(9) LOCATION OF WELL by legal description:
County Deschutes Latitude Longitude
Township 20 N or (S) Range 10 (E) or W. WM.
Section 12d 1/4 NW 1/4 SE
Tax Lot 1400 Lot Block Subdivision
Street Address of Well (or nearest address) 17076 Hermosa Bend. OR,

(10) STATIC WATER LEVEL:
15 ft. below land surface. Date 6-18-02
Artesian pressure lb. per square inch Date

(11) WATER BEARING ZONES:
Depth at which water was first found 8'

From	To	Estimated Flow Rate	SWL
8'	14'	3 GPM	8'
67'	75'	1.5 GPM	15'

(12) WELL LOG:
Ground Elevation APROX 4300'

Material	From	To	SWL
Pumice Top Soil	0'	4'	
Brn sand & Gravel	4'	14'	
clay & Gravel mix	14'	23'	
Fine Black sand & Ash	23'	67'	
red & Black cinders	67'	75'	15'

RECEIVED
JUN 24 2002
WATER RESOURCES DEPT.
SALEM, OREGON

Date started 6-14-02 Completed 6-18-02

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
WWC Number
Signed Date

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 1761
Signed Richard Brogdon Date 6-21-02

ORIGINAL – WATER RESOURCES DEPARTMENT FIRST COPY – CONSTRUCTOR SECOND COPY – CUSTOMER

DESC 54928

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

Instructions for completing this report are on the last page of this form.

Desc 54928

WELL I.D. # L 50959
START CARD # 142812

(1) OWNER: Well Number _____
Name Frank Blyeth
Address 5084 Keen Rd. NE
City Salem State Ore Zip 97026

(2) TYPE OF WORK
☒ New Well ☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD:
☐ Rotary Air ☐ Rotary Mud ☒ Cable ☐ Auger
☐ Other _____

(4) PROPOSED USE:
☒ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☐ Other _____

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☐ Yes ☒ No Depth of Completed Well 89 ft.
Explosives used ☐ Yes ☐ No Type _____ Amount _____

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
~~12~~	~~0~~	~~18~~	Bent	0	18	8
12	0	20	"	"	"	
6	20	89				

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☒ Other Poured
Backfill placed from _____ ft. to _____ ft. Material _____
Gravel placed from _____ ft. to _____ ft. Size of gravel _____

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6"	+1	89	250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s) _____

(7) PERFORATIONS/SCREENS:
☒ Perforations Method Torch
☐ Screens Type _____ Material _____

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
85	89	1/8	14			☒	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☒ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
15	7'		1 hr.

Temperature of water 48 Depth Artesian Flow Found _____
Was a water analysis done? ☐ Yes By whom _____
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other _____
Depth of strata: _____

(9) LOCATION OF WELL by legal description:
County Desch. Latitude _____ Longitude _____
Township 20 (N) or S Range 10 (E) or W. WM.
Section 120 SE 1/4 SW 1/4
Tax Lot 13203 Lot _____ Block _____ Subdivision _____
Street Address of Well (or nearest address) 17123 Hermosa

(10) STATIC WATER LEVEL:
21 ft. below land surface. Date 6-15-02
Artesian pressure _____ lb. per square inch. Date _____

(11) WATER BEARING ZONES:
Depth at which water was first found 10

From	To	Estimated Flow Rate	SWL
10	15	20	10
85	89	40	21

(12) WELL LOG:
Ground Elevation _____

Material	From	To	SWL
Soil + Pumice	0	2	
Brown clay	2	6	
Gravel + Sand	6	15	12
Pink q & H	15	22	
Green Diatomite	22	80	
Lite Sand & Gravel	80	89	21

RECEIVED
SEP 09 2002
WATER RESOURCES DEPT
SALEM, OREGON

RECEIVED
FEB 04 2004
WATER RESOURCES
SALEM, OREGON

Date started 6-15-02 Completed 6-22-02

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
WWC Number _____
Signed _____ Date _____

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 1528
Signed Steve Mallory Date 6-30-02

ORIGINAL – WATER RESOURCES DEPARTMENT FIRST COPY – CONSTRUCTOR SECOND COPY – CUSTOMER

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.545 & 537.765 and OAR 690-205-0210)

DESC 63367
5/18/2022

WELL I.D. LABEL# L 144531
START CARD # 1056568
ORIGINAL LOG #

(1) LAND OWNER

Owner Well I.D.
First Name MIKE Last Name SHEHADEH
Company
Address 16894 JACINTO
City BEND State OR Zip 97707

(2) TYPE OF WORK

☒ New Well ☐ Deepening ☐ Conversion ☐ Alteration (complete 2a & 10) ☐ Abandonment(complete 5a)

(2a) PRE-ALTERATION

	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
Casing:									

	Material	From	To	Amt	sacks/lbs
Seal:					

(3) DRILL METHOD

☐ Rotary Air ☐ Rotary Mud ☒ Cable ☒ Auger ☐ Cable Mud
☐ Reverse Rotary ☐ Other

(4) PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Community
☐ Industrial/ Commericial ☐ Livestock ☐ Dewatering
☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION

Special Standard ☐ (Attach copy)
Depth of Completed Well 69.00 ft.

BORE HOLE

Dia	From	To
10	0	20
6	20	69

SEAL

Material	From	To	Amt	sacks/lbs
Bentonite Chips	0	20	12	S
		Calculated	12	
		Calculated		

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☒ Other POURED
Backfill placed from ft. to ft. Material
Filter pack from ft. to ft. Material Size
Explosives used: ☐ Yes Type Amount

(5a) ABANDONMENT USING UNHYDRATED BENTONITE

Proposed Amount Actual Amount

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
●	○	6	☒	1	69	.250	●	○	☒	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐

Shoe ☐ Inside ☐ Outside ☐ Other Location of shoe(s)
Temp casing ☐ Yes Dia From + ☐ To

(7) PERFORATIONS/SCREENS

Perforations Method
Screens Type Material

Perf/ Screen	Casing/ Screen Liner	Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size

(8) WELL TESTS: Minimum testing time is 1 hour

◉ Pump ○ Bailer ○ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
17	13	33	1

Temperature 46 °F Lab analysis ☐ Yes By
Water quality concerns? ☐ Yes (describe below) TDS amount 55 ppm

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)

County DESCHUTES Twp 20.00 S N/S Range 10.00 E E/W WM
Sec 12 SW 1/4 of the SE 1/4 Tax Lot 20300
Tax Map Number Lot
Lat ° ' " or 43.84930882 DMS or DD
Long ° ' " or -121.47457298 DMS or DD
◉ Street address of well ○ Nearest address
17048 JACINTO THREE RIVERS

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Pre-Alteration			☐	
Completed Well	5/13/2022		☐	19

Flowing Artesian? ☐ Dry Hole? ☐

WATER BEARING ZONES Depth water was first found 67.00

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
5/13/2022	67	69	20		☐	19
					☐	
					☐	
					☐	
					☐	

(11) WELL LOG

Ground Elevation

Material	From	To
soil and pumice	0	2
gray clay	2	4
brown clay and sand	4	7
cobble	7	14
brown clay	14	34
green diatamite	34	67
coarse gravel and black sand	67	69

Date Started 5/10/2022 Completed 5/13/2022

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

License Number 2078 Date 5/17/2022
Signed RICK KING (E-filed)

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

License Number 1528 Date 5/17/2022
Signed STEVE MATHERS (E-filed)
Contact Info (optional) 5413890743

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK Form Version:
New exempt use wells must be submitted with a map and recording fee.

WATER SUPPLY WELL REPORT - continuation page

DESC 63367

5/18/2022

WELL I.D. LABEL# L 144531

START CARD # 1056568

ORIGINAL LOG #

(2a) PRE-ALTERATION

Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd

Material	From	To	Amt	sacks/lbs

(5) BORE HOLE CONSTRUCTION

BORE HOLE Dia	From	To

SEAL Material	From	To	Amt	sacks/lbs
		Calculated		
		Calculated		
		Calculated		
		Calculated		

FILTER PACK

From	To	Material	Size

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd

(7) PERFORATIONS/SCREENS

Perf/ Screen	Casing/ Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size

(8) WELL TESTS: Minimum testing time is 1 hour

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Water Quality Concerns

From	To	Description	Amount	Units

(10) STATIC WATER LEVEL

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)

(11) WELL LOG

Material	From	To

Comments/Remarks

james king helper

WATER SUPPLY WELL REPORT - Map with location identified must be attached and shall include an approximate scale and north arrow

DESC 63367

5/18/2022

Map of Hole

STATE OF OREGON
WELL LOCATION MAP

This map is supplemental to the WATER SUPPLY WELL REPORT

Oregon Water Resources Department
725 Summer St NE, Salem OR 97301
(503)986-0900

LOCATION OF WELL
Latitude: 43.84930882 Datum: WGS84
Longitude: -121.47457298
Township/Range/Section/Quarter-Quarter Section:
WM20.00S10.00E12SWSE
Address of Well:
17048 JACINTO THREE RIVERS

Well Label: 144531

Printed: May 17, 2022

DISCLAIMER: This map is intended to represent the approximate location the well. It is not intended to be construed as survey accurate in any manner.

Provided by well constructor

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.545 & 537.765 and OAR 690-205-0210)

DESC 63397
6/1/2022

WELL I.D. LABEL# L 146722
START CARD # 1056747
ORIGINAL LOG #

(1) LAND OWNER

Owner Well I.D.
First Name Last Name
Company M AND W DEVELOPMENT
Address 2954 NW CANYON
City REDMOND State OR Zip 97756

(2) TYPE OF WORK

☒ New Well ☐ Deepening ☐ Conversion ☐ Alteration (complete 2a & 10) ☐ Abandonment(complete 5a)

(2a) PRE-ALTERATION

	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
Casing:									

	Material	From	To	Amt	sacks/lbs
Seal:					

(3) DRILL METHOD

☐ Rotary Air ☐ Rotary Mud ☒ Cable ☒ Auger ☐ Cable Mud
☐ Reverse Rotary ☐ Other

(4) PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Community
☐ Industrial/ Commericial ☐ Livestock ☐ Dewatering
☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION

Special Standard ☐ (Attach copy)
Depth of Completed Well 73.00 ft.

BORE HOLE

Dia	From	To
10	0	20
6	20	73

SEAL

Material	From	To	Amt	sacks/lbs
Bentonite Chips	0	20	12	S
		Calculated	9.13	
		Calculated		

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☒ Other POURED
Backfill placed from ft. to ft. Material
Filter pack from ft. to ft. Material Size
Explosives used: ☐ Yes Type Amount

(5a) ABANDONMENT USING UNHYDRATED BENTONITE

Proposed Amount Actual Amount

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
●	○	6	☒	1	73	.250	●	○	☒	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐

Shoe ☐ Inside ☐ Outside ☐ Other Location of shoe(s)
Temp casing ☐ Yes Dia From + ☐ To

(7) PERFORATIONS/SCREENS

Perforations Method
Screens Type Material

Perf/ Screen	Casing/ Screen Liner	Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size

(8) WELL TESTS: Minimum testing time is 1 hour

● Pump ○ Bailer ○ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
20	13	45	1

Temperature 49 °F Lab analysis ☐ Yes By
Water quality concerns? ☐ Yes (describe below) TDS amount 53 ppm

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)

County DESCHUTES Twp 20.00 S N/S Range 10.00 E E/W WM
Sec 12 SW 1/4 of the SE 1/4 Tax Lot 20400
Tax Map Number Lot
Lat ° ' " or 43.84936481 DMS or DD
Long ° ' " or -121.47451445 DMS or DD
● Street address of well ○ Nearest address
17036 JACINTO THREE RIVERS

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Pre-Alteration			☐	
Completed Well	5/27/2022		☐	21

Flowing Artesian? ☐ Dry Hole? ☐

WATER BEARING ZONES Depth water was first found 65.00

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
5/27/2022	65	73	30		☐	21
					☐	
					☐	
					☐	
					☐	

(11) WELL LOG

Ground Elevation

Material	From	To
top soil and pumice	0	3
clay and fine brown sand	3	14
clay	14	35
clay and fine black sand	35	38
clay and medium black sand	38	40
clay and fine black sand	40	55
fine black sand	55	60
grey clay	60	65
course black sand and cinders	65	73

Date Started 5/23/2022 Completed 5/27/2022

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

License Number 2074 Date 5/31/2022
Signed BRIAN STEWART (E-filed)

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

License Number 1528 Date 5/31/2022
Signed STEVE MATHERS (E-filed)
Contact Info (optional) 541-389-0743

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK Form Version:
New exempt use wells must be submitted with a map and recording fee.

WATER SUPPLY WELL REPORT - continuation page

DESC 63397

6/1/2022

WELL I.D. LABEL# L 146722

START CARD # 1056747

ORIGINAL LOG #

(2a) PRE-ALTERATION

Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd

Material	From	To	Amt	sacks/lbs

(5) BORE HOLE CONSTRUCTION

BORE HOLE Dia	From	To

SEAL Material	From	To	Amt	sacks/lbs
		Calculated		
		Calculated		
		Calculated		
		Calculated		

FILTER PACK

From	To	Material	Size

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd

(7) PERFORATIONS/SCREENS

Perf/ Screen	Casing/ Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size

(8) WELL TESTS: Minimum testing time is 1 hour

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Water Quality Concerns

From	To	Description	Amount	Units

(10) STATIC WATER LEVEL

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)

(11) WELL LOG

Material	From	To

Comments/Remarks

Neil Wright was the helper on this well

WATER SUPPLY WELL REPORT - Map with location identified must be attached and shall include an approximate scale and north arrow

DESC 63397

6/1/2022

Map of Hole

STATE OF OREGON
WELL LOCATION MAP

This map is supplemental to the WATER SUPPLY WELL REPORT

Oregon Water Resources Department
725 Summer St NE, Salem OR 97301
(503)986-0900

LOCATION OF WELL

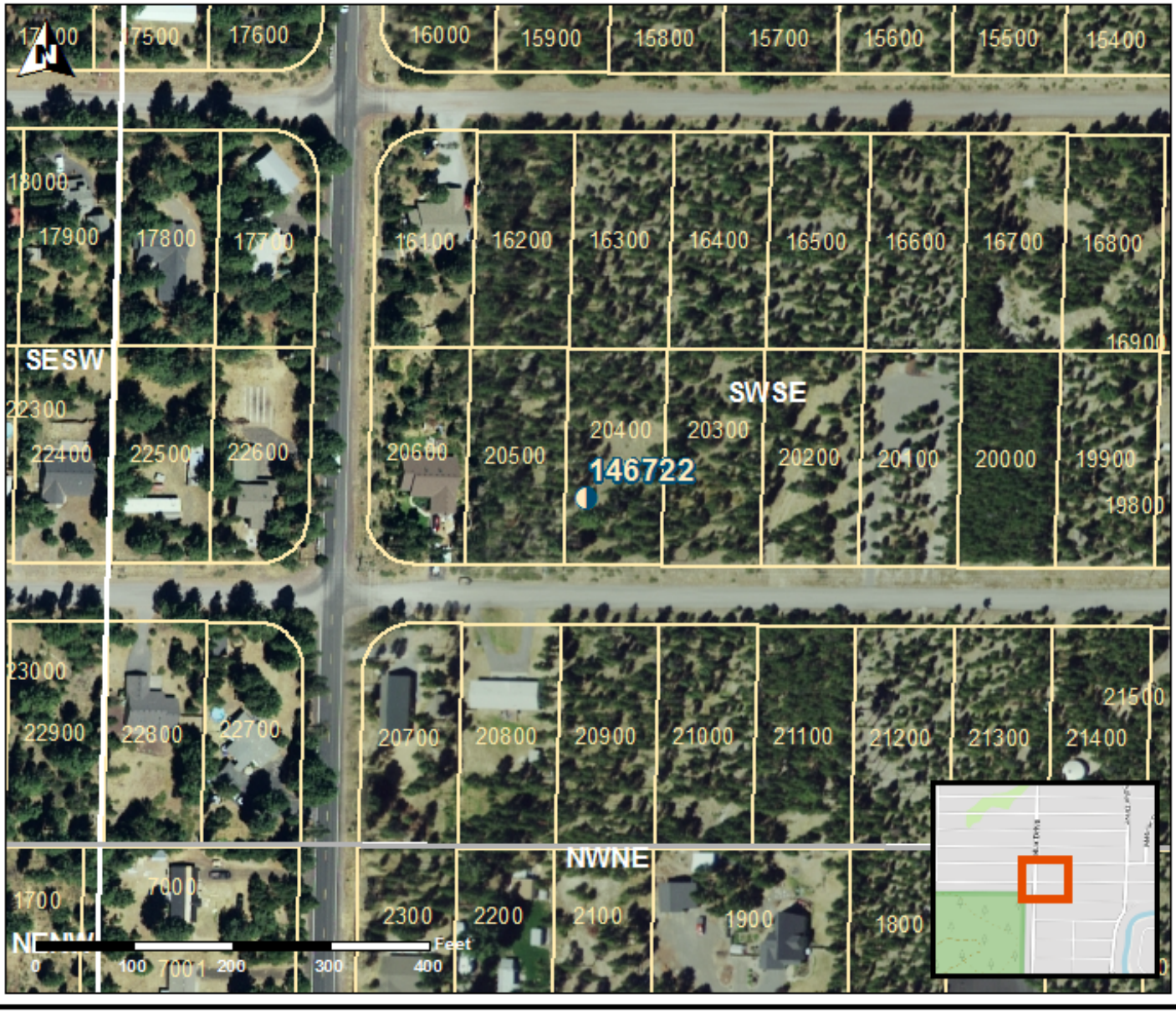
Latitude: 43.84936481 Datum: WGS84
Longitude: -121.47451445
Township/Range/Section/Quarter-Quarter Section:
WM20.00S10.00E12SWSE
Address of Well:
17036 JACINTO THREE RIVERS

Well Label: 146722

Printed: May 31, 2022

DISCLAIMER: This map is intended to represent the approximate location the well. It is not intended to be construed as survey accurate in any manner.

Provided by well constructor



STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.545 & 537.765 and OAR 690-205-0210)

DESC 63723
10/13/2022

WELL I.D. LABEL# L 149495
START CARD # 1058521
ORIGINAL LOG #

(1) LAND OWNER

Owner Well I.D.
First Name ANGY Last Name STOKES
Company
Address 1536 4TH
City ASTORIA State OR Zip 97103

(2) TYPE OF WORK

☒ New Well ☐ Deepening ☐ Conversion ☐ Alteration (complete 2a & 10) ☐ Abandonment(complete 5a)

(2a) PRE-ALTERATION

	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
Casing:									

	Material	From	To	Amt	sacks/lbs
Seal:					

(3) DRILL METHOD

☐ Rotary Air ☐ Rotary Mud ☒ Cable ☒ Auger ☐ Cable Mud
☐ Reverse Rotary ☐ Other

(4) PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Community
☐ Industrial/ Commericial ☐ Livestock ☐ Dewatering
☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION

Special Standard ☐ (Attach copy)
Depth of Completed Well 69.00 ft.

BORE HOLE

Dia	From	To
10	0	20
6	20	69

SEAL

Material	From	To	Amt	sacks/lbs
Bentonite Chips	0	20	16	S
		Calculated	9.13	
		Calculated		

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☒ Other POURED
Backfill placed from ft. to ft. Material
Filter pack from ft. to ft. Material Size
Explosives used: ☐ Yes Type Amount

(5a) ABANDONMENT USING UNHYDRATED BENTONITE

Proposed Amount Actual Amount

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
●	○	6	☒	1	67	.250	●	○	☒	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐

Shoe ☐ Inside ☐ Outside ☐ Other Location of shoe(s)
Temp casing ☐ Yes Dia From + ☐ To

(7) PERFORATIONS/SCREENS

Perforations Method
Screens Type Material

Perf/ Screen	Casing/ Screen Liner	Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size

(8) WELL TESTS: Minimum testing time is 1 hour

● Pump ○ Bailer ○ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
20	6	35	1

Temperature 47 °F Lab analysis ☐ Yes By
Water quality concerns? ☐ Yes (describe below) TDS amount 56 ppm

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)

County DESCHUTES Twp 20.00 S N/S Range 10.00 E E/W WM
Sec 12 SW 1/4 of the SE 1/4 Tax Lot 17100
Tax Map Number Lot
Lat ° ' " or 43.85028166 DMS or DD
Long ° ' " or -121.47157475 DMS or DD
● Street address of well ○ Nearest address
17101 INDIO THREE RIVERS

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Pre-Alteration			☐	
Completed Well	10/6/2022		☐	27

Flowing Artesian? ☐ Dry Hole? ☐

WATER BEARING ZONES Depth water was first found 66.00

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
10/13/2022	66	69	35		☐	27
					☐	
					☐	
					☐	
					☐	

(11) WELL LOG

Ground Elevation

Material	From	To
top soil and pumice	0	3
brown sand and pumice	3	8
brown clay	8	23
pink ash	23	30
grey clay and fine black sand	30	55
fine black sand	55	59
course cinders and fine black sand	59	66
mediun cinders	66	69

Date Started 9/26/2022 Completed 10/6/2022

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

License Number 2074 Date 10/13/2022
Signed BRIAN STEWART (E-filed)

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

License Number 1528 Date 10/13/2022
Signed STEVE MATHERS (E-filed)
Contact Info (optional) 541-389-0743

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK Form Version:
New exempt use wells must be submitted with a map and recording fee.

WATER SUPPLY WELL REPORT - continuation page

DESC 63723

10/13/2022

WELL I.D. LABEL# L 149495
START CARD # 1058521
ORIGINAL LOG #

(2a) PRE-ALTERATION

Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd

Material	From	To	Amt	sacks/lbs

Water Quality Concerns

From	To	Description	Amount	Units

(5) BORE HOLE CONSTRUCTION

BORE HOLE

Dia	From	To

SEAL

Material	From	To	Amt	sacks/lbs
		Calculated		
		Calculated		
		Calculated		
		Calculated		

FILTER PACK

From	To	Material	Size

(10) STATIC WATER LEVEL

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)

(11) WELL LOG

Material	From	To

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd

(7) PERFORATIONS/SCREENS

Perf/ Screen	Casing/ Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size

(8) WELL TESTS: Minimum testing time is 1 hour

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Comments/Remarks

Neil Wright was the helper on this well.

WATER SUPPLY WELL REPORT - Map with location identified must be attached and shall include an approximate scale and north arrow

DESC 63723

10/13/2022

Map of Hole

STATE OF OREGON
WELL LOCATION MAP

This map is supplemental to the WATER SUPPLY WELL REPORT

Oregon Water Resources Department
725 Summer St NE, Salem OR 97301
(503)986-0900

LOCATION OF WELL

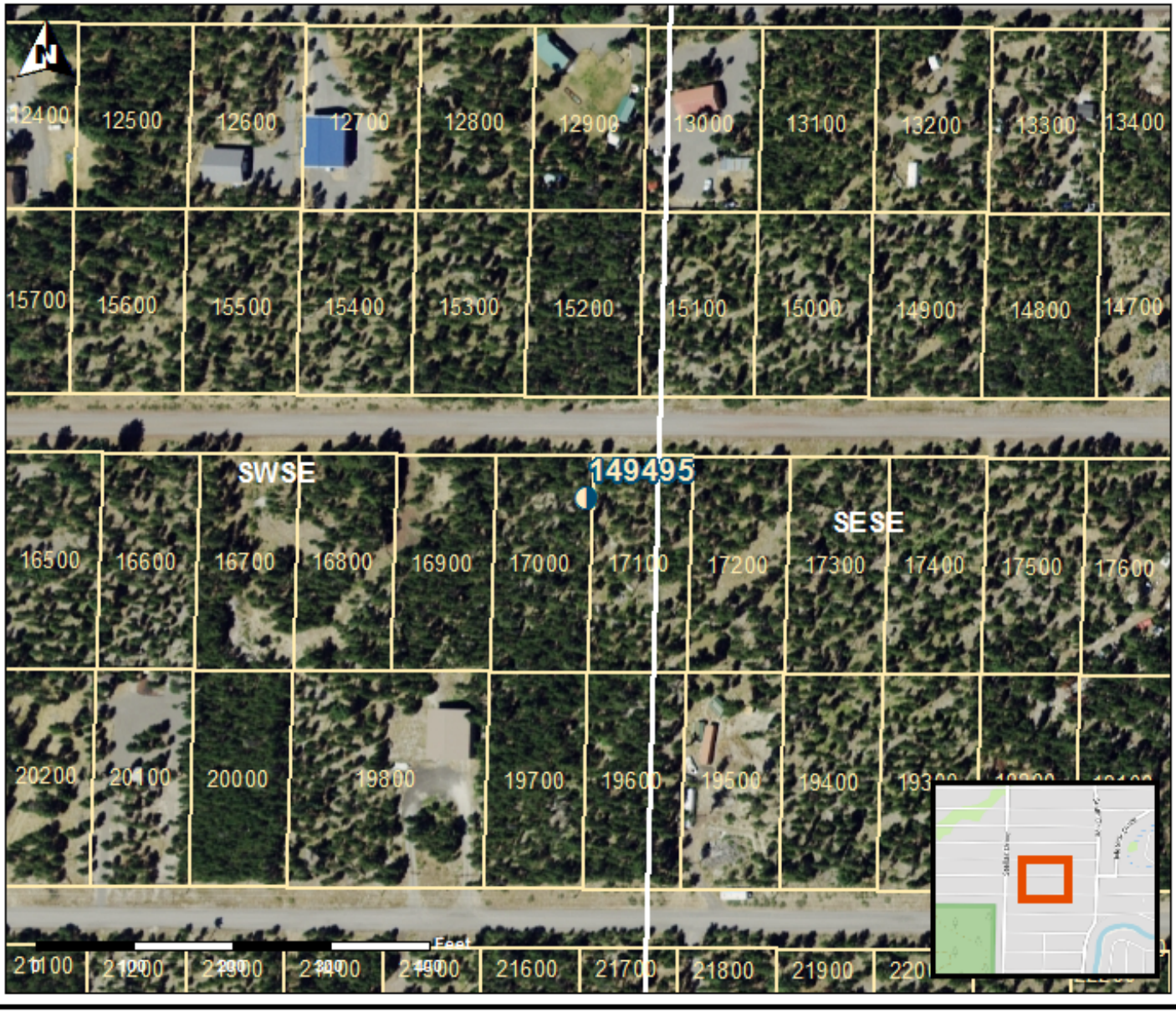
Latitude: 43.85028166 Datum: WGS84
Longitude: -121.47157475
Township/Range/Section/Quarter-Quarter Section:
WM20.00S10.00E12SWSE
Address of Well:
17101 INDIO THREE RIVERS

Well Label: 149495

Printed: October 13, 2022

DISCLAIMER: This map is intended to represent the approximate location the well. It is not intended to be construed as survey accurate in any manner.

Provided by well constructor



desc 52058

RECEIVED

NOV 2 0 1998

WATER RESOURCES DEPT.
SALEM, OREGON

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

Instructions for completing this report are on the last page of this form

WELL I.D. # L27641

START CARD # W119629

(1) OWNER: Well Number

Name PO LEUNG

Address 2400 HOLLY PL. NW.

City ALBANY State OR Zip 97321

(2) TYPE OF WORK

☑ New Well ☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD:

☐ Rotary Air ☐ Rotary Mud ☑ Cable ☐ Auger

☐ Other

(4) PROPOSED USE:

☑ Domestic ☐ Community ☐ Industrial ☐ Irrigation

☐ Thermal ☐ Injection ☐ Livestock ☐ Other

(5) BORE HOLE CONSTRUCTION:

Special Construction approval ☐ Yes ☑ No Depth of Completed Well 85 ft.

Explosives used ☐ Yes ☑ No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
10	0	18	Hole Plug	0	18	350 LB
6	18	85				

How was seal placed: Method ☐ A ☐ B ☑ C ☐ D ☐ E

☐ Other

Backfill placed from ft. to ft. Material

Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6	+1	85	250	☑	☐	☑	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:

☑ Perforations Method torch cut

☐ Screens Type 250 Material Steel

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
80	85	1/4	12	6		☑	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☑ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
25	3		1 hr.

Temperature of water 43 Depth Artesian Flow Found

Was a water analysis done? ☐ Yes By whom

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other No

Depth of strata:

(9) LOCATION OF WELL by legal description:

County DESCHUTES Latitude Longitude

Township 20 N or S Range 10 E or W. WM.

Section 12D SE 1/4 SE 1/4

Tax Lot 13000 Lot Block Subdivision

Street Address of Well (or nearest address) 17107 HERMOSA BEND, OR. 97707

(10) STATIC WATER LEVEL:

12 ft. below land surface. Date 10-26-98

Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:

Depth at which water was first found 7

From	To	Estimated Flow Rate	SWL
60	85	25+	12

(12) WELL LOG:

Ground Elevation

Material	From	To	SWL
Pumice Soil	0	3	12
Clay	3	7	
Sand Gravel	7	11	
Brown Clay	11	40	
Green clay	40	60	
Sand gravel	60	70	
Worm Hole Lava - Basalt	70	85	

Date started 10-26-98 Completed 10-26-98

(unbonded) Water Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

WWC Number

Signed Date

(bonded) Water Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 1559

Signed Date 11-18-98

ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER

DESC 58260

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

WELL I.D. # L 92232
START CARD # W 195391

Instructions for completing this report are on the last page of this form.

(1) LAND OWNER — Well Number
Name MORGAN Reed
Address P.O. Box 4304
City Sun River State OR Zip 97707

(2) TYPE OF WORK
[X] New Well [ ] Deepening [ ] Alteration (repair/recondition) [ ] Abandonment

(3) DRILL METHOD:
[ ] Rotary Air [ ] Rotary Mud [X] Cable [ ] Auger
[ ] Other

(4) PROPOSED USE:
[X] Domestic [ ] Community [ ] Industrial [ ] Irrigation
[ ] Thermal [ ] Injection [ ] Livestock [ ] Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval [ ] Yes [X] No Depth of Completed Well 71 ft.
Explosives used [ ] Yes [X] No Type Amount

BORE HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
10"	0'	26'	Bentonite	0'	26'	100 Sacks
6"	26'	73'				

How was seal placed: Method [ ] A [ ] B [ ] C [ ] D [ ] E
[X] Other poured Dry
Backfill placed from ft. to ft. Material
Gravel placed from 70' ft. to 73' ft. Size of gravel 3/8 X 12

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6"	+1'	71'	.250	[X]	[ ]	[X]	[ ]
					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]
Liner:					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]

Drive Shoe used [ ] Inside [ ] Outside [X] None
Final location of shoe(s)

(7) PERFORATIONS/SCREENS:
[X] Perforations Method Torch cut
[ ] Screens Type Material

From	To	Slot size	Number	Diameter	Telelpipe size	Casing	Liner
66'	71'	6"	18	1/8"	6"	[X]	[ ]
						[ ]	[ ]
						[ ]	[ ]
						[ ]	[ ]

(8) WELL TESTS: Minimum testing time is 1 hour
[X] Pump [ ] Bailer [ ] Air [ ] Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
10	10 FT		1 hr.

Temperature of water 43° Depth Artesian Flow Found
Was a water analysis done? [ ] Yes By whom
Did any strata contain water not suitable for intended use? [ ] Too Little
[ ] Salty [ ] Muddy [ ] Odor [ ] Colored [ ] Other
Depth of strata:

(9) LOCATION OF WELL by legal description:
County Deschutes Latitude Longitude
Township 20 N or S Range 10 E or W WM
Section 12 D 1/4 SW 1/4 SE
Tax Lot 1900 Lot Block Subdivision
Street Address of Well (or nearest address) 17085 Jacinto

(10) STATIC WATER LEVEL:
14 ft. below land surface. Date 10-2-07
Artesian pressure lb. per square inch Date

(11) WATER BEARING ZONES:
Depth at which water was first found 21 FT.

From	To	Estimated Flow Rate	SWL
21 Ft.	73'	10 GPM	14'

(12) WELL LOG:
Ground Elevation 4,000'

Material	From	To	SWL
granite top Soil	0	3'	
Ash & Brn sand	3'	5'	
clay & Brn sand	8'	13'	
Gravel clay & Brn sand	13'	18'	14'
Green Diatomite	18'	54'	
Black sand	54'	65'	14'
Cinders & Black sand	65'	73'	14'

RECEIVED
OCT 12 2007
WATER RESOURCES DEPT
SALEM OREGON

Date started 9-25-07 Completed 10-2-07

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
WWC Number
Signed Date

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 1761
Signed Richard J Brayshaw Date 10-3-07

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.545 & 537.765 and OAR 690-205-0210)

DESC 64776
5/14/2024

WELL I.D. LABEL# L 153888
START CARD # 1073318
ORIGINAL LOG #

(1) LAND OWNER

Owner Well I.D.
First Name AMIRA N Last Name SHWEYK
Company
Address 18873 TUSCARORA LN
City BEND State OR Zip 97702

(2) TYPE OF WORK

☒ New Well ☐ Deepening ☐ Conversion ☐ Alteration (complete 2a & 10) ☐ Abandonment(complete 5a)

(2a) PRE-ALTERATION

	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
Casing:									

	Material	From	To	Amt	sacks/lbs
Seal:					

(3) DRILL METHOD

☐ Rotary Air ☐ Rotary Mud ☒ Cable ☐ Auger ☐ Cable Mud
☐ Reverse Rotary ☐ Other

(4) PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Community
☐ Industrial/ Commericial ☐ Livestock ☐ Dewatering
☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION

Special Standard ☐ (Attach copy)
Depth of Completed Well 39.00 ft.

BORE HOLE

Dia	From	To
10	0	18.5
6	18.5	45

SEAL

Material	From	To	Amt	sacks/lbs
Bentonite	0	28	27	S
		Calculated	7.97	
		Calculated		

Seal placement method ☐ A ☐ B ☐ C ☐ D ☐ E ☒ Other: BENTONITE DRY
Backfill placed from ft. to ft. Material
Filter pack from ft. to ft. Material Size
Explosives used: ☐ Type Amount
Seal Placement Begin Date 5/8/2024 Begin Time 08 00

(5a) ABANDONMENT USING UNHYDRATED BENTONITE

Proposed Amount Actual Amount

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
●	○	6	☒	2	28	.250	●	○	☒	☐
○	●	4.5	☐	2	29	.120	○	●	☐	☒
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐

Shoe ☐ Inside ☐ Outside ☐ Other Location of shoe(s)
Temp casing ☒ Yes Dia 10 From + ☐ 0 To 18

(7) PERFORATIONS/SCREENS

Perforations Method
Screens Type PVC Material PVC

Perf/ Screen	Casing/ Screen Liner	Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size
Screen	Liner	4	29	39	.01	1.5	4800	

(8) WELL TESTS: Minimum testing time is 1 hour

◉ Pump ○ Bailer ○ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
17.5	12	29	1

Temperature 54 °F Lab analysis ☐ Yes By
Water quality concerns? ☐ Yes (describe below) TDS amount 68 ppm

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)

County DESCHUTES Twp 20.00 S N/S Range 10.00 E E/W WM
Sec 12 NW 1/4 of the SE 1/4 Tax Lot 8500
Tax Map Number Lot
Lat ° ' " or 43.85252000 DMS or DD
Long ° ' " or -121.47353000 DMS or DD
◉ Street address of well ○ Nearest address
17059 GLENDALE RD, BEND, OR 9770

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Pre-Alteration			☐	
Completed Well	5/9/2024		☐	10

Flowing Artesian? ☐ Dry Hole? ☐

WATER BEARING ZONES Depth water was first found 10.00

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
5/9/2024	10	39	17.5		☐	10
					☐	
					☐	
					☐	
					☐	

(11) WELL LOG

Ground Elevation

Material	From	To
Brown sand	0	8
Brown sand & gravels	8	11
Course brown sand	11	19
Black sand	19	38
Clay - gray	38	45

Construction
Begin Date 5/7/2024 Begin Time 14 02 End Date 5/9/2024

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

License Number 2069 Date 5/13/2024
Signed MEGAN NOBLITT (E-filed)

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

License Number 1970 Date 5/14/2024
Signed NEIL FAGEN (E-filed)
Contact Info (optional) 541-548-1245

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK Form Version:
New exempt use wells must be submitted with a map and recording fee.

WATER SUPPLY WELL REPORT - Map with location identified must be attached and shall include an approximate scale and north arrow

DESC 64776

5/14/2024

Map of Hole

STATE OF OREGON
WELL LOCATION MAP

This map is supplemental to the WATER SUPPLY WELL REPORT

Oregon Water Resources Department
725 Summer St NE, Salem OR 97301
(503)986-0900

LOCATION OF WELL

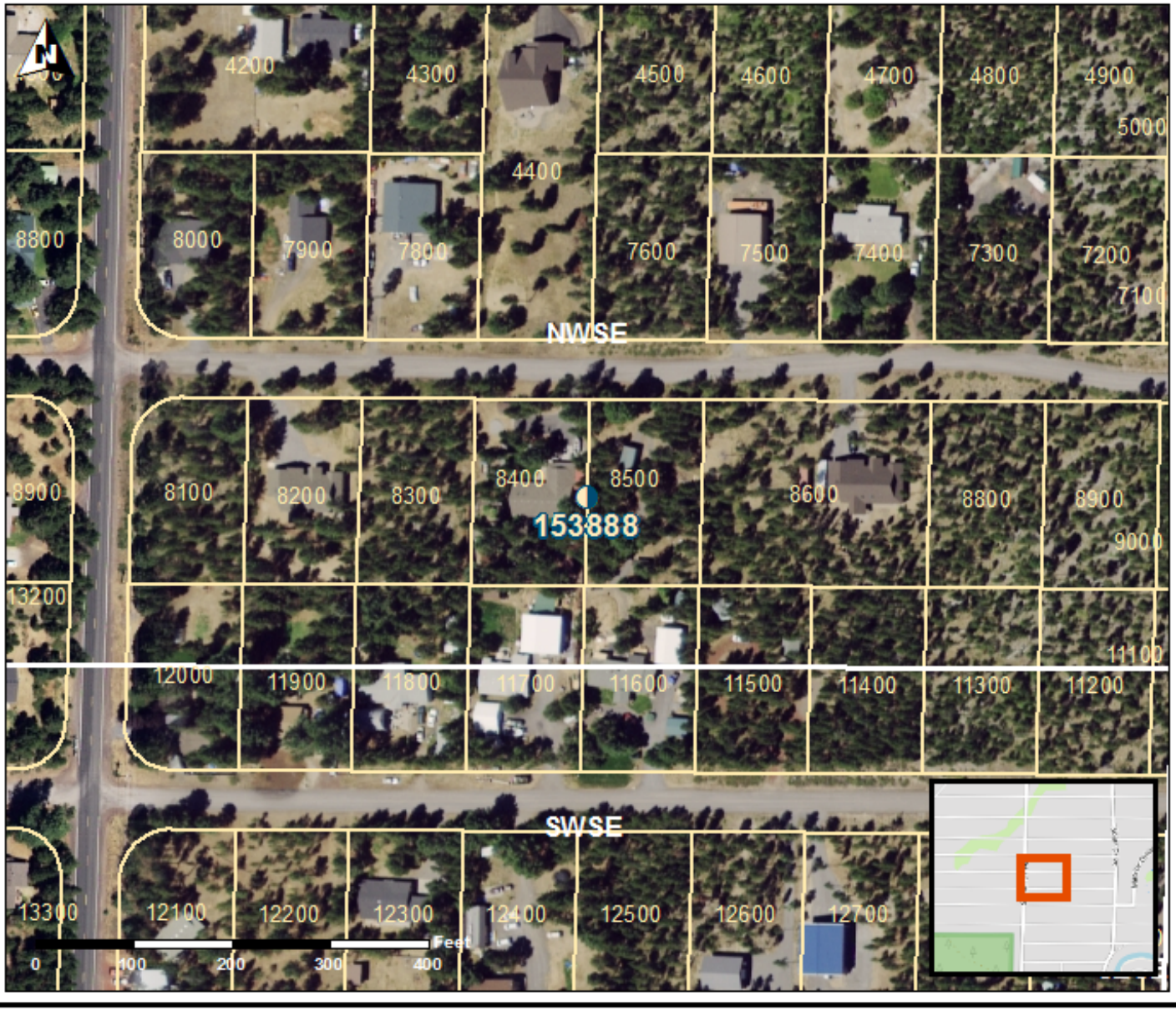
Latitude: 43.85252000 Datum: WGS84
Longitude: -121.47353000
Township/Range/Section/Quarter-Quarter Section:
WM20.00S10.00E12NWSE
Address of Well:
17059 GLENDALE RD, BEND, OR 9770

Well Label: 153888

Printed: May 13, 2024

DISCLAIMER: This map is intended to represent the approximate location the well. It is not intended to be construed as survey accurate in any manner.

Provided by well constructor



DESC 56188

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)
Instructions for completing this report are on the last page of this form.

WELL I.D. # L 69451
START CARD # 166572

(1) LAND OWNER Well Number
Name OREGON CASCADE CONSTRUCTION
Address 62750 POWELL BUTTE HWY
City BEND State OR Zip 97701

(2) TYPE OF WORK
☒ New Well ☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD:
☐ Rotary Air ☐ Rotary Mud ☐ Cable ☒ Auger
☐ Other

(4) PROPOSED USE:
☒ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☐ Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☐ Yes ☒ No Depth of Completed Well 31 ft.
Explosives used ☐ Yes ☒ No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
10"	0	18'	3/4" HOLE PLUG	0	18'	12
6"	18'	31'				

How was seal placed: Method ☐A ☐B ☐C ☐D ☐E
☒ Other 3 MIN. POUR/BAG
Backfill placed from ft. to ft. Material
Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6"	+1-2"	24'	.250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:	4½"	6'	31'	SDR 26	☐	☒	☐	☐
					☐	☐	☐	☐

Drive Shoe used ☐ Inside ☐ Outside ☐ None
Final location of shoe(s)

(7) PERFORATIONS/SCREENS:
☐ Perforations Method
☒ Screens Type SAW CUT Material PVC

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
26'	31'	.010	1950	2"	4½"	☐	☒
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☒ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
20	4'		1 hr.

Temperature of water 46° Depth Artesian Flow Found
Was a water analysis done? ☐ Yes By whom
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☒ Other NONE
Depth of strata:

(9) LOCATION OF WELL by legal description:
County DESCH. Latitude Longitude
Township 20 N or (S) Range 10 (E) or W. WM.
Section 12D SW 1/4 SE 1/4
Tax Lot 20600 Lot Block Subdivision
Street Address of Well (or nearest address) 17015 JACINTO RD BEND

(10) STATIC WATER LEVEL:
9 ft. below land surface. Date 7-8-04
Artesian pressure lb. per square inch Date

(11) WATER BEARING ZONES:
Depth at which water was first found

From	To	Estimated Flow Rate	SWL
19'	31'	20 GPM	9'

(12) WELL LOG:
Ground Elevation

Material	From	To	SWL
PUMMY	0	4'	
BROWN SAND COARSE	4'	12'	
BLACK SAND FINE	12'	19'	
BLACK SAND MED. FINE	19'	31'	9'

RECEIVED AUG 09 2004 WATER RESOURCES DEPT SALEM, OREGON
RECEIVED AUG 09 2004 WATER RESOURCES DEPT SALEM, OREGON

Date started 7-8-04 Completed 7-8-04

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
WWC Number
Signed Date

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 1614
Signed Tom Olson Date 8-4-04

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STATE OF OREGON
WATER WELL REPORT
(as required by ORS 537.765)

DESC 1748

RECEIVED
JUN - 7 1993
WATER RESOURCES DEPT.
SALEM, OREGON

20s/10e/12c

(START CARD) # 46620

(1) OWNER: Well Number DESCH
Name Jim Frank
Address 17009 Hermosa
City Bend State Zip

(2) TYPE OF WORK:
☑ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD:
☐ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Other H S Auger

(4) PROPOSED USE:
☑ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☐ Yes ☑ No Depth of Completed Well 40 ft.
Explosives used ☐ Yes ☑ No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
12"	0	40'	Cement + bentonite			
				0	18	10 Sacks

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☐ Other Bentonite 30'
Backfill placed from 18 ft. to [illegible] ft. Material native
Gravel placed from 30 ft. to 40 ft. Size of gravel Fine

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	4"	+3	40'	160	☐	☑	☑	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:
☐ Perforations Method
☑ Screens Type Johnson Slotted Material PVC

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
30	40	.020		4"		☑	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☑ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
15 GPM	0		1 hr.

Temperature of Water 42 Depth Artesian Flow Found
Was a water analysis done? ☐ Yes By whom
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other
Depth of strata:

(9) LOCATION OF WELL by legal description:
County Desch Latitude Longitude
Township 20 N or S. Range 10 E or W. WM.
Section 12 C ¼ ¼
Tax Lot 13300 Lot Block Subdivision
Street Address of Well (or nearest address) 17009 Hermosa

(10) STATIC WATER LEVEL:
16' ft. below land surface. Date 6-2-93
Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:
Depth at which water was first found

From	To	Estimated Flow Rate	SWL
16'	40'	100 GPM	16'

(12) WELL LOG:
Ground elevation

Material	From	To	SWL
Pumice + Sand	0'	7'	
Clay + Gravel	7	16'	16'
Black Sand	16'	40'	16'

Date started 5-11-93 Completed 5-12-93

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.

WWC Number
Signed Date

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 1528
Signed Steve Markee Date 6-2-93

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RECEIVED

JUL 15 1999

WATER RESOURCES DEPT.
SALEM, OREGON

DESC 52495

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

Instructions for completing this report are on the last page of this form.

WELL I.D. # L 25719

START CARD # ~~116837238 M~~ 116837 4856

(1) OWNER: Well Number _____

Name Dan Lench

Address 3970 nw. Elizabeth St.

City Corvallis State Ore. Zip 97330

(2) TYPE OF WORK

☒ New Well ☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD:

☐ Rotary Air ☐ Rotary Mud ☐ Cable ☒ Auger

☐ Other _____

(4) PROPOSED USE:

☒ Domestic ☐ Community ☐ Industrial ☐ Irrigation

☐ Thermal ☐ Injection ☐ Livestock ☐ Other _____

(5) BORE HOLE CONSTRUCTION:

Special Construction approval ☐ Yes ☒ No Depth of Completed Well 35 ft.

Explosives used ☐ Yes ☒ No Type _____ Amount _____

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
12	0	35	Bentonite	0	18	12

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E

☒ Other Poured

Backfill placed from 18 ft. to 25 ft. Material native

Gravel placed from 25 ft. to 35 ft. Size of gravel 10-20

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	4"	+1	25	160	☐	☒	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s) _____

(7) PERFORATIONS/SCREENS:

☐ Perforations Method _____

☒ Screens Type _____ Material _____

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
25	35	.10	250	4"		☒	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☒ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
18	2'		1 hr.

Temperature of water 47 Depth Artesian Flow Found _____

Was a water analysis done? ☐ Yes By whom _____

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other _____

Depth of strata: _____

(9) LOCATION OF WELL by legal description:

County Desch Latitude 10622515 Longitude 4856

Township 20 N or S Range 10 E or W. WM.

Section 12C _____ 1/4 _____ 1/4

Tax Lot 17500 Lot SE Block SW Subdivision _____

Street Address of Well (or nearest address) 17001 Indio

(10) STATIC WATER LEVEL:

12' ft. below land surface. Date 6-22-99

Artesian pressure _____ lb. per square inch. Date _____

(11) WATER BEARING ZONES:

Depth at which water was first found 12'

From	To	Estimated Flow Rate	SWL
12	35	40	

(12) WELL LOG:

Ground Elevation _____

Material	From	To	SWL
Soil + Pumice	0	3	
gravel	3	5	
Clay	5	12	
Black Sand	12	35	12

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DEC 20 1999
WATER RESOURCES DEPT.
SALEM, OREGON

Date started 6-22-99 Completed 6-22-99

(unbonded) Water Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

WWC Number _____

Signed _____ Date _____

(bonded) Water Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 1528

Signed Glen Moulton Date 6-30-99

ORIGINAL – WATER RESOURCES DEPARTMENT FIRST COPY – CONSTRUCTOR SECOND COPY – CUSTOMER

Appendix F.

RidNOx™ and Lysimeter Installation, and Sampling Instructions

ELKHORN CONSULTING LLC

14833 Goodrich Creek Lane
Baker City, OR 97814 • 503-881-1604
elkhornconsultingllc@gmail.com

RidNOx Installation Instructions

RidNOx Installation

1. Excavate to a depth that will result in the top of the RidNOx tank being at the same elevation as the existing ground surface.
2. Prepare a level, stable base.
3. Set the body of the tank in the hole.
4. Prepare and install inlet and outlet fittings as shown on the approved plans.
5. Place a 2-inch layer of ½ to ¾-inch round rock on the floor of the tank.
6. Cover the slotted outlet pipe with the same rock to a minimum depth of 2 inches.
7. Install the clean wood media (playground chips meeting ASTM F2075) in 6 inch lifts, walking in each lift to compress the media, to the bottom of the outlet fitting.
8. Set the lid on the tank. **Do not use mastic.**
9. Backfill the tank to 6 inches below the seam between the body and the lid.
10. Place underdrain media to the top of the tank.
11. Backfill over the tank with native soil after the risers are attached.

Media Replacement

- Pothole near tank to make sure the water table is at least 30” below the top of the tank to prevent buoyancy during replacement operations.
- Carefully remove the soil cover from over and around the tank to a level below the seam.
- Carefully remove the lid from the tank.
- Use a sump pump to transfer free water from the media to the pump basin.
- Scoop the media from the tank being careful not to damage the inlet and outlet piping or the underdrain media.
- After the excess moisture drains from the spent media, it can be loaded into a dump truck and hauled to a sanitary landfill.
- Install fresh media and re-install the lid as described in steps 7 through 11 above.

ELKHORN CONSULTING LLC

14833 Goodrich Creek Lane
Baker City, OR 97814 • 503-881-1604
elkhornconsultingllc@gmail.com

Lysimeter Installation Instructions

Lysimeter Installation in a Bottomless Sand Filter

- Remove duff and surface soil layer (typically 6 inches) to provide an infiltrative surface free of roots.
- When installing sampling devices (trough lysimeters), carefully mark the location of the orifice positions on each side of the sand filter container.
- Also mark the target elevations for each layer on the walls.
- Install the lower layer of medium sand and the underdrain media.
- Remove enough underdrain media 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 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.
- The rest of the sand filter will be constructed in a customary fashion.

ELKHORN CONSULTING LLC

14833 Goodrich Creek Lane
Baker City, OR 97814 • 503-881-1604
elkhornconsultingllc@gmail.com

RidNOx and Bottomless Sand Filter Sampling Instructions

General

- Contact the laboratory to coordinate scheduling and acquire sample containers,
- Target parameters are total Kjeldahl nitrogen (TKN) and nitrate-nitrogen (NO_3-N).
- Make sure you have the proper sampling equipment, chain-of-custody forms, and a cooler with ice.
- Label all sample bottles in advance.

RidNOx Sampling Procedures

- Remove the lid from the pump basin.
- Use a bailer, peristaltic pump, or other appropriate sampler, to carefully collect a sample from the pump basin without disturbing and attached growth on the surfaces of pipes, floats, etc.
- 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.
- Deliver samples to the laboratory (nitrate-nitrogen samples need to be analyzed within **48 hours** of sample collection).

Lysimeter Sampling Procedures (if/when desired)

- Loosen the square nut plug on the lysimeter.
- 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.
- If funding allows, collect sample of the AdvanTex-treated effluent as it flows into the RidNOx unit at the inlet of the tank.
- Deliver samples to the laboratory (nitrate-nitrogen samples need to be analyzed within **48 hours** of sample collection).

Appendix G.

Directions to Site, List of Names and Addresses for Neighboring Property Owners

Google Maps 475 NE Bellevue Dr, Bend, OR 97701 to 17062 Indio Rd, Bend, OR 97707

You can enter notes here.

475 NE Bellevue Dr
Bend, OR 97701

Take NE Dalton St to US-20

37 sec (463 ft)

1. Head north toward NE Dalton St

79 ft

2. Turn right toward NE Dalton St

148 ft

3. Turn right onto NE Dalton St

236 ft

4. Turn right onto US-20
   Pass by Wells Fargo Bank (on the left in 0.4 mi)

3 min (1.3 mi)

Follow NE 15th St and SE Wilson Ave to US-97 S

6 min (2.3 mi)

5. Turn left onto NE 15th St

0.4 mi

6. At the traffic circle, continue straight onto SE 15th St

0.5 mi

7. At the traffic circle, take the 1st exit onto SE Wilson Ave

0.4 mi

8. At the traffic circle, continue straight to stay on SE Wilson Ave

0.8 mi

9. Turn left onto SW Hill St

486 ft

10. Turn left onto SW Truman Ave

0.1 mi

Follow US-97 S to S Century Dr/Lava Cast Forest Rd/NF-9720. Take exit 153 from US-97 S

13 min (13.5 mi)

11. Merge onto US-97 S

13.3 mi

12. Take exit 153 for S Century Dr toward Sunriver

0.2 mi

Continue on S Century Dr. Take Spring River Rd to Indio Rd in Three Rivers

8 min (4.8 mi)

13. Turn right onto S Century Dr/Lava Cast Forest Rd/NF-9720 (signs for Sunriver/Mt Bachelor)
    Continue to follow S Century Dr

1.5 mi

14. At the traffic circle, take the 2nd exit and stay on S Century Dr

0.6 mi

15. Continue onto Spring River Rd

1.7 mi

16. Turn left onto Stellar Dr

0.9 mi

17. Turn left onto Indio Rd
    Destination will be on the left

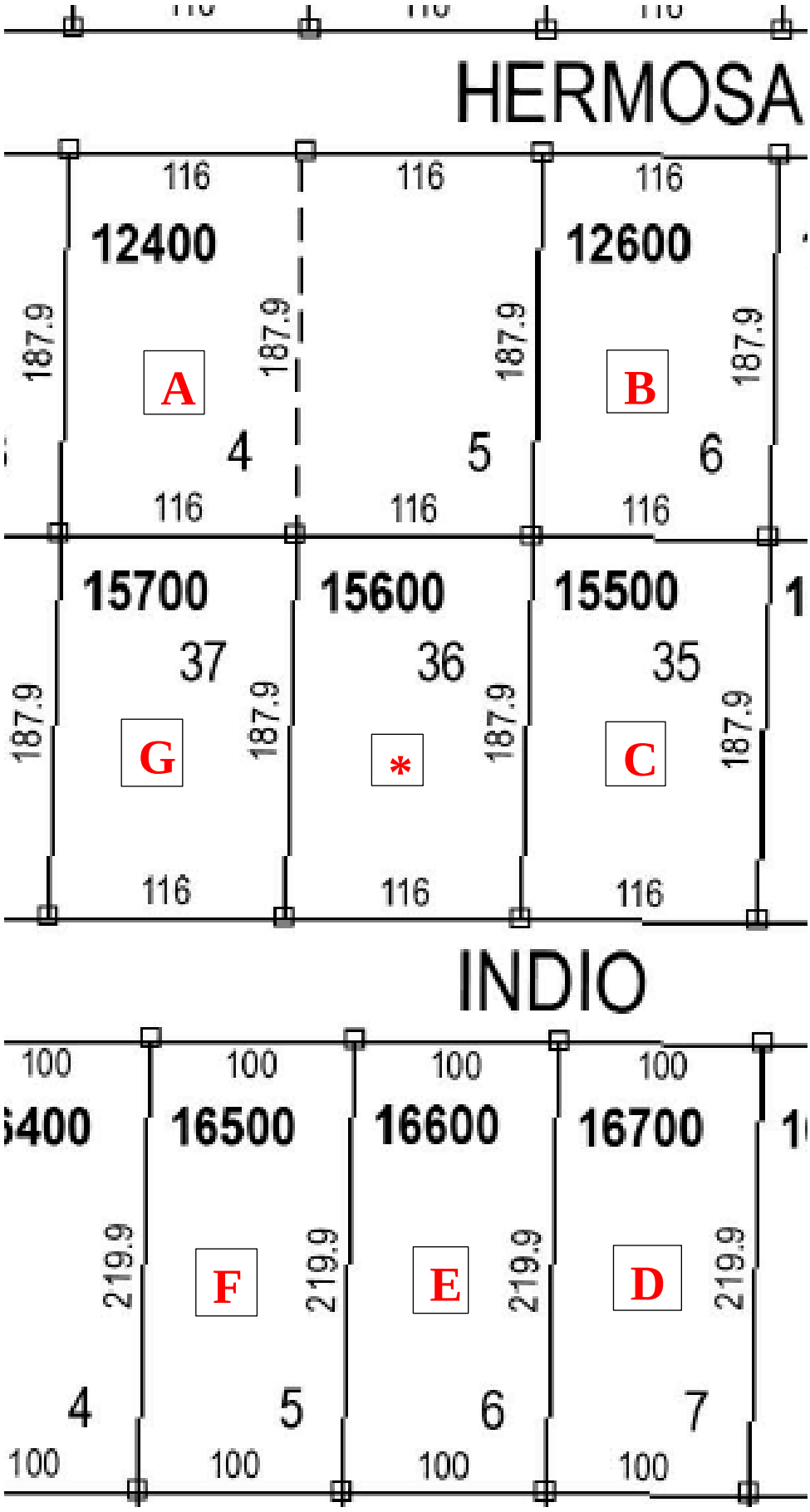
0.1 mi

17062 Indio Rd
Bend, OR 97707

Adjacent Parcels Property Owners

17062 Indio Road, Bend, Oregon
(T20S, R10E, Section 12D, Tax Lot 15600, 0.49 acres

*	Tax Lot	15600	Bordelon, Donald V. 24879 Platinum Lane Wilder, ID 83676
A.	Tax Lot	12400	Hutchinson, Patricia M. 17051 Hermosa Road Bend, OR 97707
B.	Tax Lot	12600	Kinane, Thomas J & Ruth M 18160 Cottonwood Road #807 Bend, OR 97707
C.	Tax Lot	15500	Bordelon, Donald V. 24879 Platinum Lane Wilder, ID 83676
D.	Tax Lot	16800	Westall, Gary A & Laura H 17081 Indio Road Bend, OR 97707
E.	Tax Lot	16600	Conway, William D Jr 7906 SE Jennings Ave Milwaukie, OR 97267
F.	Tax Lot	16500	Conway, William D Jr 7906 SE Jennings Ave Milwaukie, OR 97267
G.	Tax Lot	15700	Myers, Joel P & Talisa C PO Box 4931 Bend, OR 97707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