Professional Consultants Inc.
Unmatched Experience. Uncompromising Standards.
3115 S Russell St. • Missoula, Montana 59801 • 406-728-1880 • fax 406-728-0276

December 31, 2024

Angela Pugh, P.E.
Montana Department of Environmental Quality
Public Water and Subdivision Section
Engineering Bureau

Re: EQ#24-2665 Seventh Day Adventist Subdivision Review
EQ#24-2506 Seventh Day Adventist Public Wastewater Review
EQ#24-2444 Seventh Day Adventist Public Water System Review

Dear Angela,

This letter is in response to your review letter for the subdivision, public wastewater, and public water review. Below you will find individual responses to each of your presented deficiencies. Attached you can find supporting materials with the requested updates.

General

1. Please provide a legible copy of the COS with the date clearly shown, ARM 17.36.103(1).

   - *The attached COS shows the survey date as December 1974 and the purpose is to create a five-acre tract as an "occasional sale."*

2. Consider changing Note (c) on site layout that says, "no known sources of contamination within 500'of the proposed water source." The proposed drainfield is currently shown 200' upgradient of the proposed public well.

   - *Note has been changed stating all known sources are shown.*

3. Please show the following on the Lot Layout, ARM 17.36.104 Table1
   a) Percent and direction of slope across the drainfield.
   b) Location sizes and design details of existing and proposed stormwater facilities.

   - *See updates on attached layout.*

4. ARM 17.36.323, Table 2, Setbacks. The sewer service does not meet the 100' setback to public drainfield see footnote (1), "components addressed in chapters 4 and 5 in Department Circular DEQ-4," and therefore a waiver to setbacks is required. Will Sanders County require a variance? If so, this must be submitted before a waiver to these facilities is considered. This waiver is in addition to the DEQ-3, deviation requests. We will waive the waiver fee. Please remove note B on the lot layout as all setbacks in ARM 17.36.323 are not met.

- *The adjusted drainfield location and proposed public well location no longer require these waivers.*

Stormwater

5. The 2-year, 24-hour storm for Trout Creek via NOAA is 1.72 inches and the DEQ IDF curve shows 1.79 inches. The submitted Appendix G sheet lists 1.2 inches. With your impervious surfaces and 1.72 inches for the 2-year, 24-hour storm I calculate 2501 ft3 of storage is required.

   - *The NOAA sheet is provided that shows a 2-year, 24-hour storm of 1.74 inches and a 100-year, 24-hour storm of 3.34 inches. Impervious surface area was recalculated.*

6. Please indicate the direction of surface runoff flow across the property with either topography or stormwater runoff arrows. DEQ-8, Standard 2.2.C.1. As currently shown, I cannot determine if the stormwater swale will retain the stormwater runoff.

   - *See attached Site Layout 2 that shows specific stormwater details.*

7. As noted in 3.b), please include the design details of the stormwater facilities on the lot layout.
   a) Trapezoidal swale (depth, width, side slopes and base). How does the channel retain the stormwater onsite, rather than letting it flow offsite? Please include a swale detail that retains the stormwater or check dams.
   b) Lawn and landscape is a stormwater facility and the location and square footage must be labeled on the lot layout.

*There may be additional stormwater comments pending the direction of stormwater flow onsite.

- *There is no longer landscaping proposed. The existing and proposed impervious areas are graded toward the conveyance swale that will direct stormwater to a single retention pond. See updated report, calculation sheets, and details.*

Public Subsurface Wastewater System & Non-degradation: Updates have been made to primary treatment. The existing 1,000 gallon tank that was installed within the last year and will serve the church (daily flow of 200 gpd) and a new 1,500 septic tank will serve the school (daily flow of 525 gpd). This will allow for short raw sewage lines and easier maintenance.

8. DEQ-4, Standard 4.1.1.7 requires Schedule 40 PVC sewer pipe leading into and out of the septic tank.

   - *See updated details that show the proposed and existing septic tanks. The existing tank was installed in 2023 and is a pre-cast concrete tank from Montana Precast.*

9. Please add a note to the plans showing the sewer service connection must be placed at a minimum slope of ¼ inch per foot toward the point of discharge, DEQ-4, Standard 4.1.2.1.

    - *The notes have been added for both septic tanks. The existing tank already meets this requirement.*

10. Please add notes to the distribution box detail to meet the requirements of DEQ-4, Standard 4.3.3.1.

    - *Note has been added.*

11. Per DEQ-4, Appendix D, Operation and Maintenance Manual please add items meeting Owner's Manual D, "The name and telephone number of a service representative, pumpers, and the local health department to be contacted in the event that the system experiences a problem."

    - *See updated manual.*

Public Water System : A new well is proposed to ensure public health and safety. This will also avoid the required deviations.

4. If fire flow is provided, please provide documentation as required in DEQ-3, Standard 1.1.5.b. Comment: The letter from the fire marshal states fire protection is covered by Sanders County Subdivision Regulations. How are Sanders County requirements bung met? Is the public water well providing fire protection for the church and school?

    - *Section VII-P "Fire Protection" does not apply to this project because Sanders County Subdivision Regulations only apply to divisions of land and buildings for lease or rent. However, the regulations are being met per the section because of proximity to the fire department and access to all structures. The Trout Creek Fire Station is 4 minutes away (3 miles).*
    - *The public water well is not proposed to provide any fire suppression assistance.*

6. Please show the elevations and designations of geologic formations on the typical well profile, DEQ-3, Standard 1.2.2.b

    - *The well profile has been updated to show what is expected of the new well.*

7. There are no stormwater facilities shown on the public water site layout sheet 1, DEQ - 3, Standard 1.1.6.d, Standard 1.2.2.d.

    - *See updated stormwater details.*

8. The following deviations are required:
    a. Well Location

b. Continued Protection
c. General Construction

- *The existing well is proposed to only be used as irrigation. A new well will be drilled to serve the public water system.*

12. PWS-6 has been reviewed and the SWPP recommends approval with some recommendations.

    - *The PWS-6 Report has been updated for the proposed well and with the recommendations.*

I hope that the items addressed are found to be complete and satisfactory as per your requirements for the Trout Creek Seventh Day Adventist Church Subdivision and Public Water/Sewer Reviews. If you have any questions, or require additional information, please feel free to contact me.

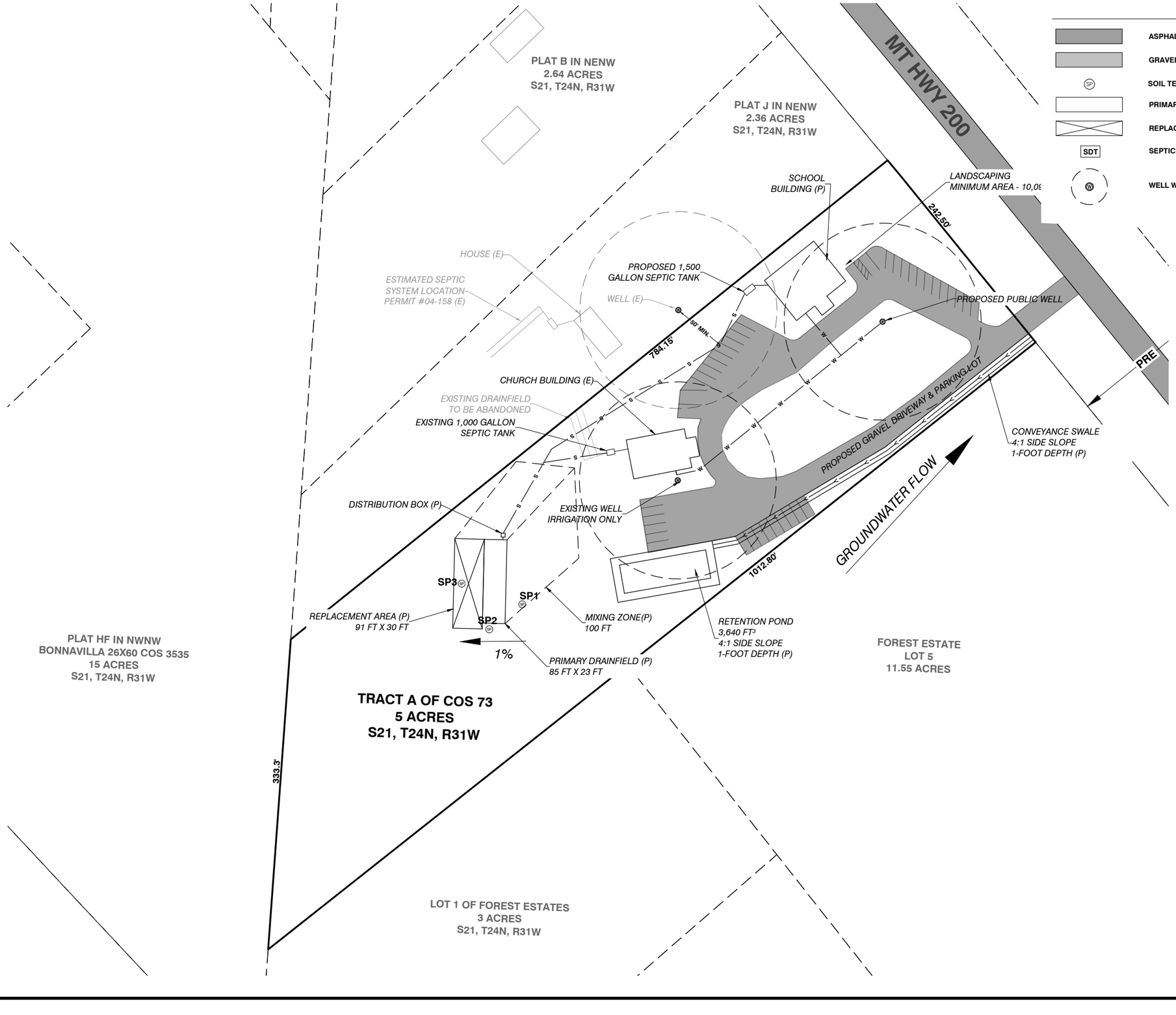
Sincerely,

Kane Leithead, EIT
kane@lmcwyoming.com
(307)461-3858

GENERAL

COS

SITE LAYOUT



LEGEND

- ASPHALT ROAD
- GRAVEL DRIVEWAY AND PARKING AREA
- SP — SOIL TEST PIT
- PRIMARY DRAINFIELD (85 FT X 23 FT)
- REPLACEMENT AREA (91 FT X 30 FT)
- SDT — SEPTIC TANK
- W — WELL WITH 100-FT RADIUS ISOLATION ZONE
- (P) — PROPOSED FACILITIES
- (E) — EXISTING FACILITIES
- PRE — PUBLIC ROAD EASEMENT
- BUILDING FOOTPRINT
- 100 SOURCE SPECIFIC MIXING ZONE

MDEQ LOT LAYOUT NOTES:

(A) KNOWN EXISTING, PREVIOUSLY APPROVED, OR PROPOSED WELLS, WASTEWATER SYSTEMS AND MIXING ZONES ON OR WITHIN 100' OF THE SUBDIVISION HAVE BEEN SHOWN ON THIS LOT LAYOUT.

(B) ALL SETBACKS PURSUANT TO ARM 17.36.323 ARE MET.

(C) ALL KNOWN SOURCES OF CONTAMINATION WITHIN 500' OF THE PROPOSED WATER SOURCE ARE SHOWN.

(D) LAKES, STREAMS, IRRIGATION DITCHES, WETLANDS AND SPRINGS PRESENT WITHIN 100' OF THE SUBDIVISION PERIMETER ARE SHOWN ON THIS LOT LAYOUT.

(E) ARM 17.30.518 SOURCE SPECIFIC MIXING ZONES OF 100 FT ARE REQUESTED FOR PROPOSED WASTEWATER TREATMENT SYSTEM ON THIS LOT LAYOUT.

MONTANA — ANDY MEFFORD — No. 16206PE — LICENSED PROFESSIONAL ENGINEER

PROJECT #: 9522-24
DRAWN: OLIVIA ALLEN
CHECKED: ANDY MEFFORD, PE
REVISION:
REVISION:
REVISION:
REVISION:
REVISION:

7TH DAY ADVENTIST CHURCH
PUBLIC WASTEWATER SYSTEM

S21, T24N, R31W TROUT CREEK, SANDERS CO., MT

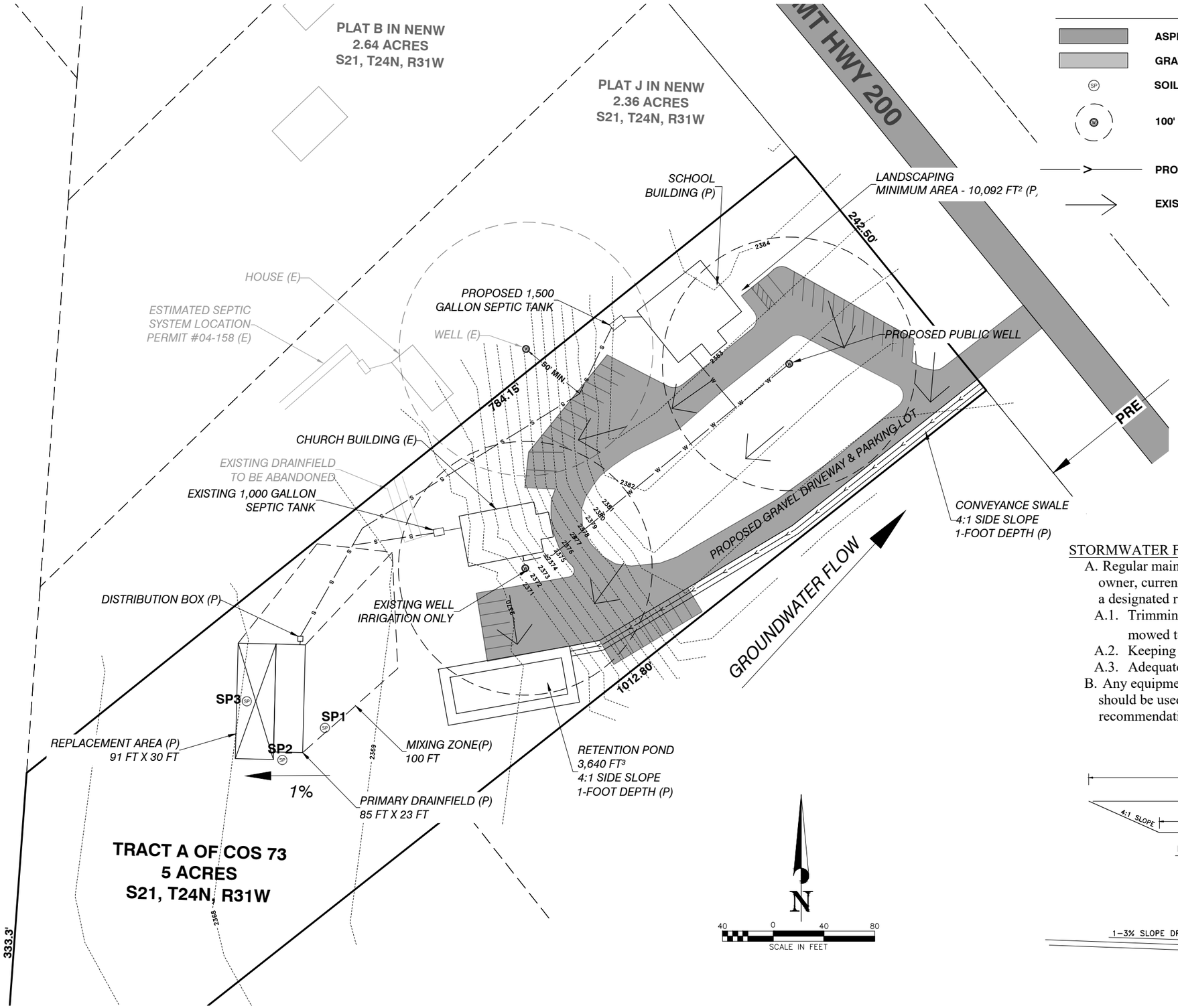
Professional Consultants Inc.
Engineers, Surveyors, Planners, Mappers
3115 RUSSELL ST P.O BOX 1750
MISSOULA, MONTANA 59801
PHONE (406) 728-4611
EMAIL PCI@PCIMONTANA.COM

DEC. 31, 2024

SITE LAYOUT

1

F:\2024\9522-24 Trout Creek 7th Day Adventist\Drafting & GIS\9522-24 DESIGN.dwg 12/31/24



LEGEND

- ASPHALT ROAD
- GRAVEL AREA
- SOIL TEST PIT
- 100' WELL ISOLATION ZONE
- (P) PROPOSED FACILITIES
- (E) EXISTING FACILITIES
- PRE PUBLIC ROAD EASEMENT
- BUILDING FOOTPRINT
- PROPOSED CONVEYANCE (4:1 SLOPE, 12" DEPTH)
- EXISTING/PROPOSED GRADING ~2%

MDEQ LOT LAYOUT NOTES:

(A) KNOWN EXISTING, PREVIOUSLY APPROVED, OR PROPOSED WELLS, WASTEWATER SYSTEMS AND MIXING ZONES ON OR WITHIN 100' OF THE SUBDIVISION HAVE BEEN SHOWN ON THIS LOT LAYOUT.

(B) ALL SETBACKS PURSUANT TO ARM 17.36.323 ARE MET.

(C) NO KNOWN SOURCES OF CONTAMINATION WITHIN 500' OF THE PROPOSED WATER SOURCE.

(D) LAKES, STREAMS, IRRIGATION DITCHES, WETLANDS AND SPRINGS PRESENT WITHIN 100' OF THE SUBDIVISION PERIMETER ARE SHOWN ON THIS LOT LAYOUT.

(E) ARM 17.30.518 SOURCE SPECIFIC MIXING ZONES OF 100 FT ARE REQUESTED FOR PROPOSED WASTEWATER TREATMENT SYSTEM ON THIS LOT LAYOUT.

STORMWATER FACILITIES' OPERATIONS AND MAINTANENCE:

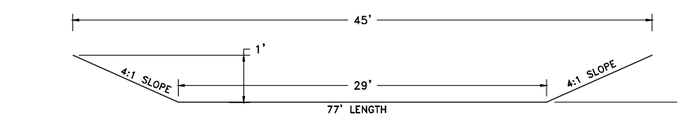
A. Regular maintenance will be the responsibility of the property owner, currently the Trout Creek Seventh-Day Adventist Church, or a designated representative. This will require:

A.1. Trimming of vegetation, as needed - Grass should be regularly mowed to a height of 2"-2 ½"

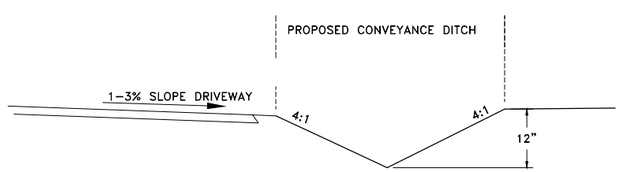
A.2. Keeping the facilities free of debris

A.3. Adequate watering and sun exposure for vegetative growth

B. Any equipment required for maintenance of the stormwater facilities should be used in accordance with the equipment manufacturer's recommendations.



UPPER RETENTION BASIN SECTION



SWALE DETAIL

MONTANA ANDY MEFFORD No. 16206PE LICENSED PROFESSIONAL ENGINEER

PROJECT #: 9522-24
DRAWN: OLIVIA ALLEN
CHECKED: ANDY MEFFORD, PE
REVISION: REVISION: REVISION: REVISION: REVISION:

7TH DAY ADVENTIST CHURCH
PUBLIC WASTEWATER SYSTEM

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EMAIL: PCI@PCIMONTANA.COM

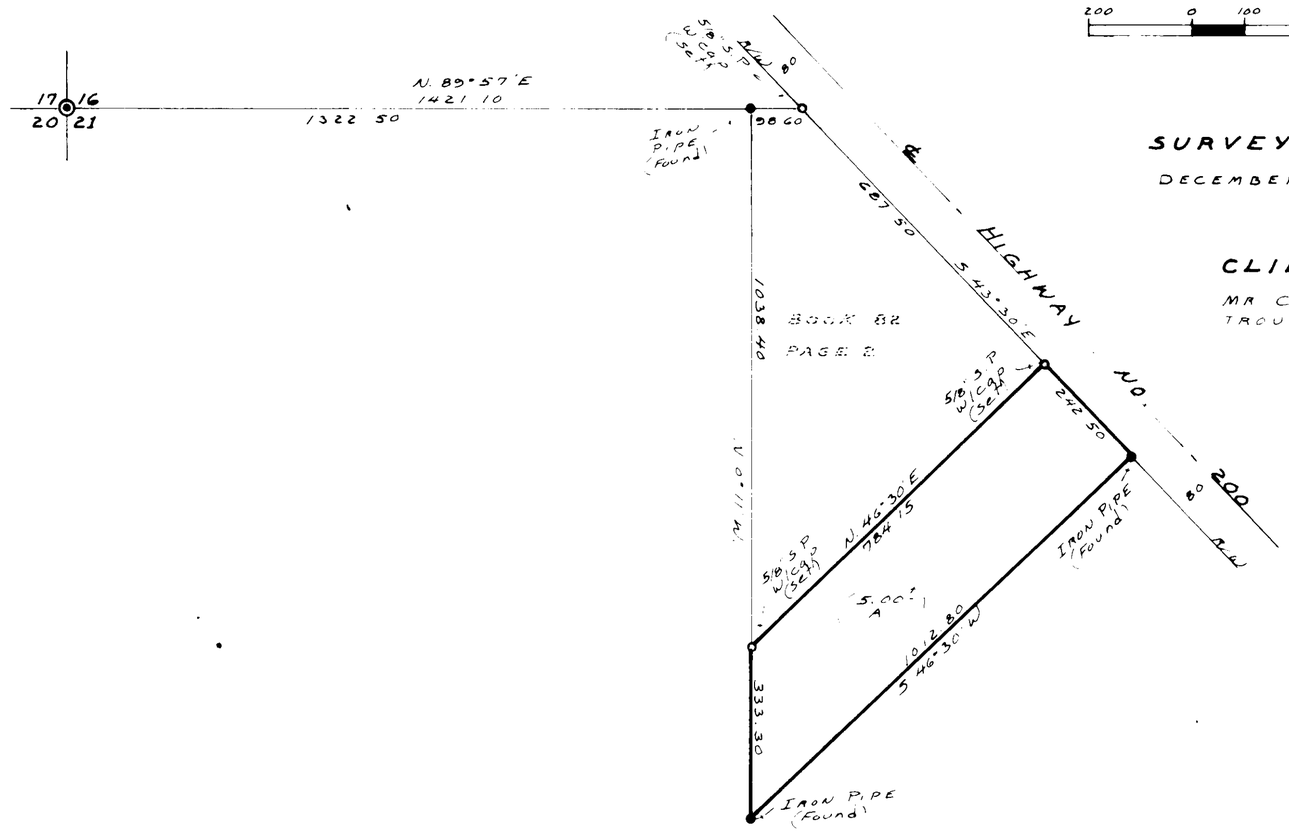
DEC. 31, 2024

SITE LAYOUT

2

CERTIFICATE OF SURVEY NO. #73

NW¼, SECTION 21, T. 24N., R. 31 W., M. P. M.
COUNTY OF SANDERS, MONTANA



N

SCALE

200 0 100 200 400 600

SURVEYED

DECEMBER, 1974

CLIENT

MR CLAYTON SMITH
TROUT CREEK, MONTANA

PURPOSE OF SURVEY

To create a five acre tract that the ownership will be transfered as an "occasional sale", pursuant to Section 11-3862 R.C.M. Revised.

DESCRIPTION

A portion of the NW¼, Section 21, T. 24N, R. 31 W., M. P. M., SANDERS Co., MONTANA Beginning at a point that bears N. 89°-57' E 1421.10 feet and S. 43°-30' E. 687.50 feet from the NW. Corner of said Section 21, Thence S. 43°-30' E. 242.50 feet, thence S. 46°-30' W. 1012.80 feet, thence N. 0°-11' W. 333.30 feet, thence N. 46°-30' E. 784.15 feet to the point of beginning.

SURVEYOR'S CERTIFICATION

I, HARRY P. MEDLAND, Montana R.L.S. No. 2229S do hereby certify this plat which is a true representation of a survey made by me and the information shown hereon is true and correct to the best of my knowledge and belief.

Harry P. Medland

REGISTERED LAND SURVEYOR

HARRY P. MEDLAND
Box 663
POLSON, MONT.

APPROVED

_____, 1975

EXAMINING MONT. R.L.S. NO. _____

1/4 1/4	1/4	SEC.	T-N.	R-W.
NE	NW	21	24	31
SE	"	"	"	"

CERTIFICATE OF SURVEY NO. #73

3rd January 75 1:36
P
Lizzie Vaught
#2.00

STORMWATER

Professional Consultants, Inc.
3115 S Russell St, Missoula, MT 59801 (406) 728-1880

GRADING AND DRAINAGE REPORT

SITE INFORMATION

Slopes on the site are relatively flat (~1% - 3%) with forestland vegetation of large trees, grasses, and light underbrush. Hydrologic patterns are observed as shallow woodland flows with sheet flows across the short grassed. There are low points on the property that act as natural swales and retention facilities. The surrounding land is sparse residential and commercial area.

INITIAL STORM WATER FACILITY

There are no pre-development impervious areas considered. Post development facilities include the gravel driveway, school, and church. All impervious areas were calculated using the survey data, aerial imagining and conservative estimate from Civil 3D. Total post-development impervious area for the lot is 40,770 ft^2, making almost exactly 19% of the lot impervious area, a professional engineered design and as-builts are not required. Initial Stormwater Facility must thusly be sized:

$$V[ft^3] = 0.5" \text{ X } 40{,}770 \text{ } ft^2 / 12 = \mathbf{1699 \text{ } ft^3}$$

Runoff calculations are made using the rational method. See attached spreadsheet for more details. The change in post-development volume runoff for the 2yr-24hr storm, per DEQ8 Section 3.3, is about **3,640 ft^3**. This is more than the initial stormwater facility, a facility that can retain **3,640 ft^3** of water will satisfy the requirements.

STORM WATER FACILITIES

The natural grading of the upper bench area, nearest the highway, is to the southeast and south. Whereas closer to the church and behind the church it is more southwest draining. This natural grading will allow the proposed gravel roads to be built to drain toward a single conveyance swale that flows to a retention pond.

The proposed swale has 4:1 slopes and a depth of 1 ft. It will run along the southeast property boundary to capture the runoff and convey it to the proposed pond. This will allow 4 cubic feet per linear foot of conveyance which will handle the 100yr-24hr storm per the standard plan sheet.

The swale will lead to a retention pond that is proposed to be 3,640 ft^3 to meet requirements. It will have 4:1 slopes and be 1 ft deep. Basal dimensions are 29' x 89' and upper dimensions are 45' x 105'.

During the 10-year storm event, the gravel driveways grading and sheetflows will not allow roadways to be overtopped.

The buildings or drainfield will not be inundated by the 100-year storm because the low flows and lack of distinct shallow flows or natural flow paths through the draifnield. In the case of the

100 year storm, the retention swale may fill up but will over flow onto shallow graded woodland area.

The maintenance of the native grasses will promote stabilization. The proposed drainfield, pond, and conveyance structures should be seeded to re-establish vegetation.

The stormwater facilities are located in loose, gravelly sandy loam soils with a conservatively estimated percolation rate of 10 minutes per inch. With a wide and shallow pond as proposed, stormwater can infiltrate within one hour of storm end and will infiltrate sooner than 72 hours.

Prepared by:
Landmark Consulting LLC.

Kane Leithead, EIT

Date: 12/27/2024

NOAA Atlas 14, Volume 12, Version 2 TROUT CREEK RS
Station ID: 24-8380
Location name: Trout Creek, Montana, USA*
Latitude: 47.8669°, Longitude: -115.6278°
Elevation:
Elevation (station metadata): 2356 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Carl Trypaluk, Dale Unruh, Michael St.Laurent, Austin Jordan, Rama Sesha Sridhar Mantripragada, Sandra Pavlovic, Greg Fall, Fernando Salas

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.107 (0.092-0.123)	0.162 (0.140-0.190)	0.248 (0.211-0.299)	0.317 (0.264-0.390)	0.406 (0.321-0.515)	0.472 (0.356-0.611)	0.534 (0.376-0.710)	0.594 (0.394-0.820)	0.668 (0.415-0.977)	0.720 (0.435-1.10)
10-min	0.148 (0.128-0.171)	0.224 (0.195-0.263)	0.344 (0.293-0.415)	0.439 (0.366-0.541)	0.563 (0.445-0.715)	0.654 (0.493-0.847)	0.741 (0.521-0.985)	0.824 (0.547-1.14)	0.926 (0.575-1.36)	0.998 (0.603-1.53)
15-min	0.172 (0.148-0.198)	0.260 (0.226-0.306)	0.400 (0.340-0.482)	0.510 (0.425-0.628)	0.655 (0.518-0.830)	0.760 (0.573-0.984)	0.861 (0.605-1.14)	0.957 (0.635-1.32)	1.08 (0.668-1.57)	1.16 (0.701-1.78)
30-min	0.209 (0.181-0.242)	0.317 (0.276-0.373)	0.487 (0.414-0.587)	0.622 (0.518-0.766)	0.798 (0.631-1.01)	0.926 (0.699-1.20)	1.05 (0.738-1.40)	1.17 (0.774-1.61)	1.31 (0.814-1.92)	1.41 (0.854-2.17)
60-min	0.252 (0.218-0.292)	0.380 (0.331-0.447)	0.582 (0.495-0.701)	0.741 (0.617-0.913)	0.950 (0.751-1.20)	1.10 (0.832-1.43)	1.25 (0.878-1.66)	1.39 (0.921-1.92)	1.56 (0.969-2.28)	1.68 (1.02-2.58)
2-hr	0.383 (0.338-0.434)	0.519 (0.460-0.599)	0.733 (0.636-0.867)	0.904 (0.767-1.09)	1.13 (0.915-1.40)	1.30 (1.00-1.64)	1.45 (1.07-1.89)	1.61 (1.12-2.18)	1.80 (1.18-2.59)	1.94 (1.24-2.92)
3-hr	0.505 (0.454-0.567)	0.640 (0.575-0.728)	0.854 (0.749-0.991)	1.02 (0.881-1.21)	1.25 (1.03-1.52)	1.42 (1.13-1.77)	1.59 (1.20-2.03)	1.75 (1.26-2.33)	1.95 (1.33-2.76)	2.10 (1.39-3.12)
6-hr	0.761 (0.692-0.839)	0.897 (0.813-0.997)	1.12 (0.993-1.26)	1.29 (1.13-1.48)	1.54 (1.30-1.80)	1.72 (1.42-2.06)	1.90 (1.51-2.35)	2.08 (1.60-2.68)	2.31 (1.70-3.17)	2.48 (1.78-3.58)
12-hr	1.11 (1.02-1.21)	1.27 (1.16-1.38)	1.52 (1.38-1.68)	1.74 (1.56-1.94)	2.04 (1.79-2.31)	2.27 (1.95-2.61)	2.50 (2.11-2.96)	2.73 (2.26-3.36)	3.04 (2.44-3.97)	3.28 (2.57-4.49)
24-hr	1.54 (1.42-1.67)	1.74 (1.60-1.89)	2.06 (1.89-2.26)	2.34 (2.12-2.57)	2.73 (2.44-3.03)	3.04 (2.69-3.41)	3.34 (2.92-3.84)	3.66 (3.15-4.36)	4.10 (3.44-5.14)	4.43 (3.66-5.82)
2-day	1.97 (1.82-2.15)	2.23 (2.05-2.43)	2.66 (2.42-2.92)	3.02 (2.72-3.34)	3.53 (3.14-3.94)	3.92 (3.45-4.44)	4.32 (3.75-5.00)	4.74 (4.04-5.67)	5.30 (4.41-6.70)	5.73 (4.68-7.59)
3-day	2.27 (2.08-2.48)	2.57 (2.35-2.82)	3.07 (2.78-3.39)	3.49 (3.14-3.88)	4.08 (3.61-4.59)	4.54 (3.96-5.17)	5.00 (4.31-5.83)	5.47 (4.64-6.61)	6.11 (5.05-7.82)	6.60 (5.35-8.84)
4-day	2.52 (2.31-2.76)	2.86 (2.61-3.13)	3.42 (3.09-3.77)	3.88 (3.48-4.32)	4.53 (4.00-5.11)	5.03 (4.39-5.75)	5.54 (4.76-6.48)	6.05 (5.12-7.34)	6.74 (5.57-8.65)	7.27 (5.90-9.77)
7-day	3.18 (2.92-3.48)	3.60 (3.29-3.95)	4.28 (3.87-4.72)	4.83 (4.33-5.36)	5.59 (4.96-6.30)	6.18 (5.42-7.06)	6.75 (5.86-7.91)	7.33 (6.29-8.90)	8.09 (6.82-10.4)	8.66 (7.20-11.6)
10-day	3.75 (3.44-4.10)	4.24 (3.87-4.64)	5.01 (4.53-5.52)	5.65 (5.06-6.25)	6.50 (5.76-7.30)	7.15 (6.28-8.16)	7.79 (6.78-9.11)	8.42 (7.26-10.2)	9.24 (7.85-11.8)	9.84 (8.28-13.1)
20-day	5.32 (4.87-5.85)	6.00 (5.46-6.60)	7.08 (6.36-7.82)	7.96 (7.09-8.84)	9.13 (8.05-10.3)	10.0 (8.76-11.5)	10.9 (9.42-12.8)	11.7 (10.1-14.2)	12.8 (10.8-16.4)	13.6 (11.4-18.2)
30-day	6.58 (6.01-7.24)	7.40 (6.71-8.15)	8.71 (7.80-9.62)	9.76 (8.67-10.8)	11.2 (9.81-12.6)	12.2 (10.6-14.0)	13.2 (11.4-15.5)	14.2 (12.2-17.2)	15.4 (13.1-19.8)	16.3 (13.8-21.9)
45-day	8.35 (7.61-9.19)	9.32 (8.44-10.2)	10.9 (9.72-12.0)	12.1 (10.7-13.4)	13.7 (12.1-15.4)	14.8 (13.0-17.0)	16.0 (13.9-18.7)	17.0 (14.8-20.7)	18.4 (15.8-23.5)	19.3 (16.6-25.9)
60-day	9.90 (9.03-10.9)	11.0 (9.95-12.1)	12.7 (11.4-14.0)	14.0 (12.5-15.5)	15.8 (14.0-17.7)	17.0 (15.0-19.5)	18.2 (16.0-21.3)	19.3 (16.9-23.4)	20.7 (18.1-26.4)	21.7 (19.0-28.9)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

Appendix G: Standard Storm Drainage Plan

DEQ Montana Department of Environmental Quali

Sudivision Name	7th Day Adventist Church
EQ#	24-2444
County	Sanders County
Location	Trout Creek
Lot/Area No.	CS 73 Parcel A

Rational Method Co-Efficients (C)	
0.9	Paved/hard surfaces
0.8	Gravel surfaces
0.1	Lawn/landscaping
0.2	Unimproved areas

Q=C*i*A

Intensity Values

2-year, T_c	0.91	inches/hour
2-year, 24-hour	1.74	inches
10-year, T_c	1.52	inches/hour
100-year, T_c	2.4	inches/hour
100-year, 24-hour	3.34	inches

Total Area/Lot Size 5 acres = 217800 ft^2

Initial Stormwater Facility Volume (0.5" x Impervious Area) = 1698.8 ft^3

Pre-Development Characteristics			**2-year, T_c (flow rate)**	**2-year, 24-hour (volume)**	**10-year, T_c (flow rate)**	**100-year, T_c (flow rate)**
Paved/House Area	0 acres	0 ft^2	Q= 0.000 ft^3/sec	V= 0.000 ft^3	Q= 0.000 ft^3/sec	Q= 0.000 ft^3/sec
Gravel Area	0 acres	0 ft^2	Q= 0.000 ft^3/sec	V= 0.000 ft^3	Q= 0.000 ft^3/sec	Q= 0.000 ft^3/sec
Lawn/Landscaping	0 acres	0 ft^2	Q= 0.000 ft^3/sec	V= 0.000 ft^3	Q= 0.000 ft^3/sec	Q= 0.000 ft^3/sec
Unimproved Area	5 acres	217800 ft^2	Q= 0.918 ft^3/sec	V= 6316.200 ft^3	Q= 1.533 ft^3/sec	Q= 2.420 ft^3/sec
Total	5 acres	217800 ft^2	Q_{Total}= **0.918** ft^3/sec	V_{Total}= **6316.200** ft^3	Q_{Total}= **1.533** ft^3/sec	Q_{Total}= **2.420** ft^3/sec

Post-Development Characteristics			**2-year, T_c (flow rate)**	**2-year, 24-hour volume)**	**10-year, T_c (flow rate)**	**100-year, T_c (flow rate)**
Paved/House Area	0.140725436 acres	6130 ft^2	Q= 0.116 ft^3/sec	V= 799.965 ft^3	Q= 0.194 ft^3/sec	Q= 0.307 ft^3/sec
Gravel Area	0.795224977 acres	34640 ft^2	Q= 0.584 ft^3/sec	V= 4018.240 ft^3	Q= 0.975 ft^3/sec	Q= 1.540 ft^3/sec
Lawn/Landscaping	0 acres	0 ft^2	Q= 0.000 ft^3/sec	V= 0.000 ft^3	Q= 0.000 ft^3/sec	Q= 0.000 ft^3/sec
Unimproved Area	4.064049587 acres	177030 ft^2	Q= 0.746 ft^3/sec	V= 5133.870 ft^3	Q= 1.246 ft^3/sec	Q= 1.967 ft^3/sec
Total	5 acres	217800 ft^2	Q_{Total}= **1.446** ft^3/sec	V_{Total}= **9952.075** ft^3	Q_{Total}= **2.415** ft^3/sec	Q_{Total}= **3.813** ft^3/sec

Runoff Flow/Volume Change	ΔQ= **0.528** ft^3/sec	ΔV= **3635.875** ft^3	ΔQ= **0.882** ft^3/sec	ΔQ= **1.393** ft^3/sec

Required Minimum Facility Volume: **3635.9** ft^3

= input field

Summary - DEQ 8

1. Enter Intensity Data

Click here to enter data

Location Data	OK
Pre-development data	OK
Post-development data	OK

1. Enter Flow Data

Click here to enter data

Drainage area	OK
Pre-development data	OK
Post-development data	OK

Summary of Results

Closest Meteorological Station	TROUT CREEK 2 W
Total 2 year storm event, 24 hour rainfall (inches)	1.74
Post Development Time of Concentration (min)	17.34
2 year event Change in Q (cfs)	0.83

	2 year	10 year	100 year
Post - Pre Volume (cf)	2971.38	4975.22	7842.06

Initial Stormwater Facility Size (cf)	1,698.75
DEQ 8 Final Minimum Pond Size (cf)	2971.38
Exempt Storm Water Plan Minimum Pond Size (cf)	7789.21

Return to Summary

Rainfall Intensity for DEQ 8

1. Location Data:

Latitude:	47.8302778
Longitude:	-115.5819444
Distance to closest station (km)	3.85
Closest meteorological station	TROUT CREEK 2 W
2-hour, 24-hour precipitation (in)	1.74

2. Pre-development Hydraulic Path:

Flow Type	Surface Description	Flow Length (ft)	Land Slope (ft/ft)	Culvert Diameter (in)	Depth of Flow in Channel (in) or Culvert (in)	Channel - Top Width (ft.)	Channel - Bottom Width (ft.)	Cross Sectional Flow Area (ft^2)	Wetted Perimeter (ft)	n	Average Velocity (ft/s)	Tt (hr)	Tt (min)
Sheet	Short Grass Prairie	300	0.02							0.15	n/a	0.53	32.00
Shallow	Woodlands	150	0.02							0.101	0.69	0.06	3.64

Appendix F: http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1044171.pdf

3. Post-development Hydraulic Path:

Flow Type	Surface Description	Flow Length (ft)	Land Slope (ft/ft)	Culvert Diameter (in)	Depth of Flow in Channel (in) or Culvert (in)	Channel - Top Width (ft.)	Channel - Bottom Width (ft.)	Cross Sectional Flow Area (ft^2)	Wetted Perimeter (ft)	n	Average Velocity (ft/s)	Tt (hr)	Tt (min)
Sheet	Short Grass Prairie	50	0.02							0.15	n/a	0.13	7.63
Shallow	Unpaved	160	0.02							0.025	2.77	0.02	0.96
Sheet	Dense Grasses	20	0.02							0.24	n/a	0.09	5.34
Channel_Triangular	Vegetation	200	0.02		12	8		4.00	16.12	0.085	0.98	0.06	3.41

Appendix F: http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1044171.pdf

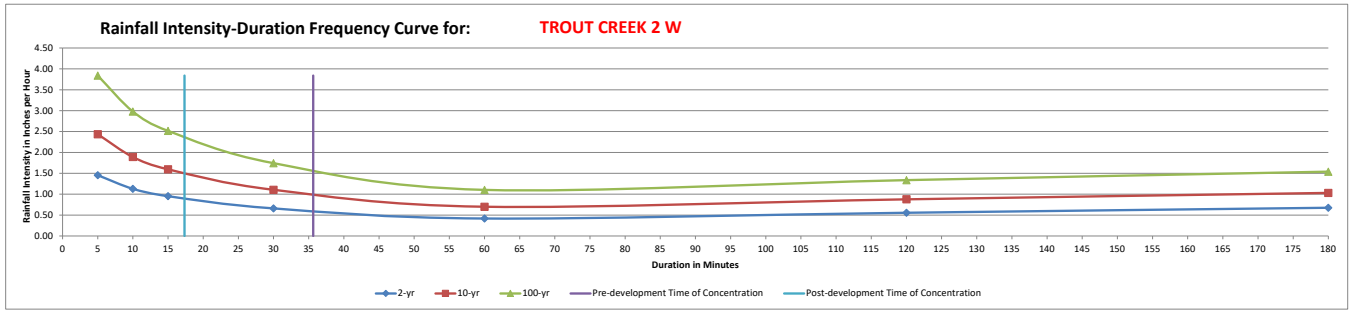
4. Time of Concentration and Rainfall Intensity (24-hour storm event):

Pre-development Path

Total Time of Concentration (min)	35.64
Rainfall Intensity (in/hr), 2 Year	0.61
Rainfall Intensity (in/hr), 10 Year	1.02
Rainfall Intensity (in/hr), 100 Year	1.61

Post-development Path

Total Time of Concentration (min)	17.34
Rainfall Intensity (in/hr), 2 Year	0.91
Rainfall Intensity (in/hr), 10 Year	1.52
Rainfall Intensity (in/hr), 100 Year	2.40



Flow Data for DEQ 8

1. Total Drainage Area Size

Drainage Area Size (sq. ft.)	217,800.00

2. Pre-development Drainage Area Characteristics:

Surface Type	Square Footage	Acres
Paved Areas	0.00	0.00
Structures	0.00	0.00
Graveled Area	0.00	0.00
Landscape	0.00	0.00
Unimproved	217,800.00	5.00
Total lot size	217,800.00	5.00

3. Post-development Drainage Area Characteristics:

Surface Type	Square Footage	Acres
Paved Areas	0.00	0.00
Structures	6,130.00	0.14
Graveled Area	34,640.00	0.80
Landscape	0.00	0.00
Unimproved	177,030.00	4.06
Total lot size	217,800.00	5.00

4. Required Initial Stormwater Facility Volume (Retained on Site)

	Cubic Feet	Acre-Feet
Retained First 0.5 inch runoff volume	1,698.75	0.04

5. Weighted Coefficient

Surface Type	Pre-Development	Post-Development
Paved Areas	0.00	0.00
Structures	0.00	0.13
Graveled Area	0.00	0.64
Landscape	0.00	0.00
Unimproved	1.00	0.81
Total Weighted Coef.	1.00	1.58
Cw	0.20	0.315

6. Flow Calculation (cfs)

Frequency of Storm Event	Pre-Development	Post-Development	Change (Post-Pre)
2-year	0.61	1.43	0.83
10-year	1.02	2.40	
100-year	1.61	3.79	

7. Volume Calculation (cf)

Frequency of Storm Event	Pre-Development	Post-Development	Change (Post-Pre)
2-year	2,193.90	5,165.29	2,971.38
10-year	3,673.43	8,648.65	4,975.22
100-year	5,790.14	13,632.21	7,842.06

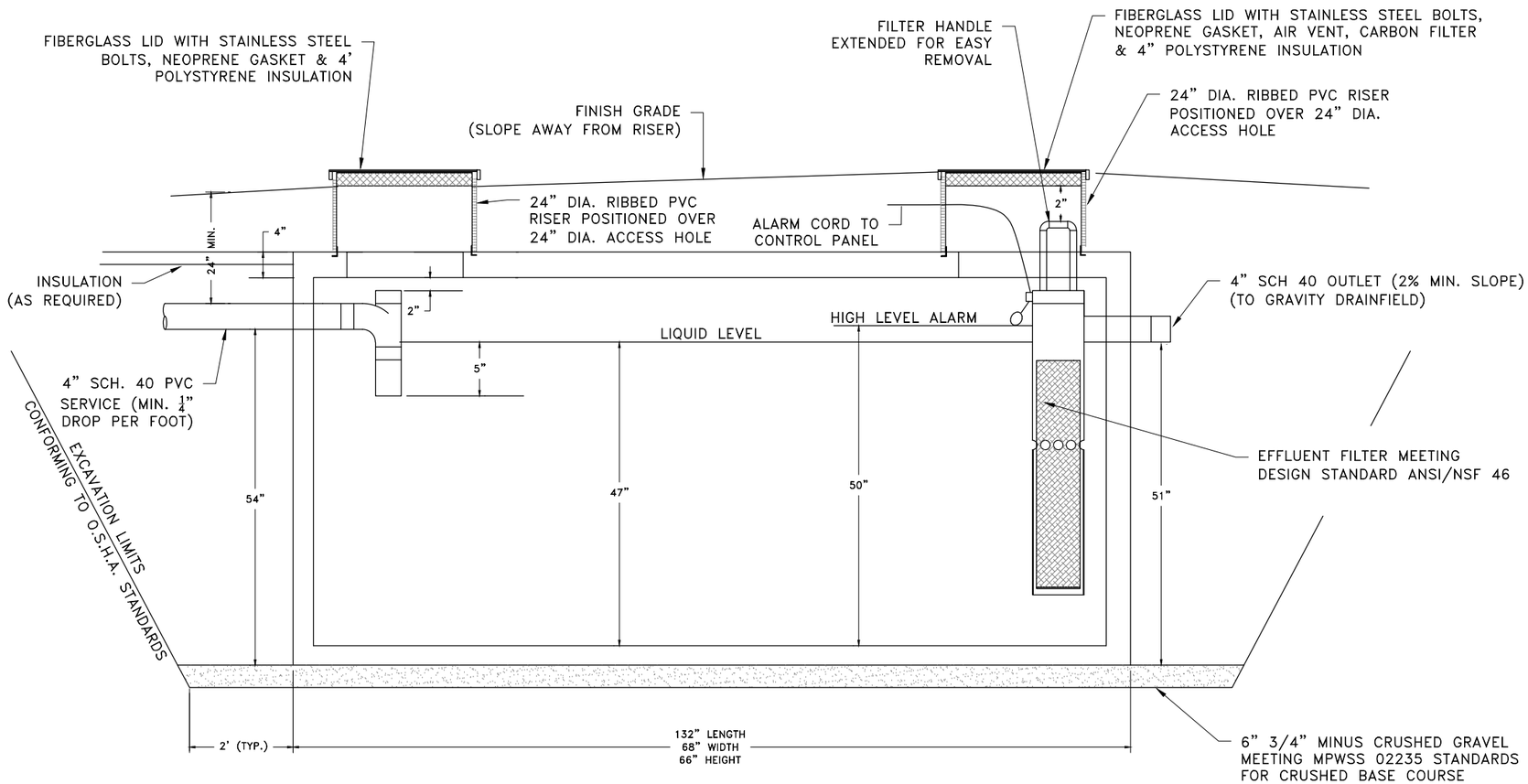
8. Final Required Volume

DEQ 8 Final Minimum Pond Size (cf)	2,971.38
Simplified Storm Water Plan Minimum Pond Size (cf)	7,789.21

PUBLIC WASTEWATER

UPDATED PLANS

O&M MANUAL



1500 GALLON SEPTIC TANK

BASED ON HUNTON PRE-CAST CONCRETE PRODUCT NO. 103

CONSTRUCTION NOTES:

1. SYSTEM DESIGNED FOR COMPONENT LOCATION(S) AS SHOWN ON SITE LAYOUT DRAWING. MOVEMENT OF SYSTEM COMPONENTS OR SUBSTITUTIONS MAY REQUIRE THE DESIGN TO BE ALTERED. CONTACT QUALIFIED INDIVIDUAL FOR MODIFICATIONS TO THE SYSTEM.
2. LATERALS SHALL BE INSTALLED WITH FIRST AND LAST ORIFICES AND 1 ORIFICE EVERY 24 FEET FACING DOWNWARD. ALL OTHER ORIFICES ARE TO BE FACING UPWARD.
3. INSULATION REQUIREMENTS ARE AS FOLLOWS: IF LINE IS 6' OR DEEPER NO INSULATION IS REQUIRED; IF THE SEWER LINE IS >4' BUT <6' INSULATION IS REQUIRED; IF BUILDING SEWER IS LESS THAN 4' INSULATION IS REQUIRED. WHEN INSULATION IS REQUIRED IT SHALL BE 2" CLOSED CELL INSULATION BOARD MEETING AASHTO M230-70 SPECIFICATIONS.
4. GRADE DRAINFIELD AREA TO PREVENT PONDING. SEED OR SOD AREA AS DESIRED BY OWNER. VEHICULAR ACCESS TO AREA IS PROHIBITED.
5. NATIVE BACKFILL SHALL BE FREE DRAINING MATERIAL 3" MINUS IN SIZE. MATERIAL SHALL BE FREE OF CINDERS, ASH, REFUSE, ORGANIC OR FROZEN MATERIAL.
6. ALL ELECTRICAL COMPONENTS SHALL MEET ALL APPLICABLE ELECTRICAL CODES AT THE LOCAL, STATE AND NATIONAL LEVELS.
7. CONTROLS AND WIRING MUST BE CORROSION-RESISTANT AND LISTED BY UNDERWRITERS LABORATORIES, CANADIAN STANDARDS ASSOCIATION, OR OTHER APPROVED TESTING AND/OR ACCREDITING AGENCY AS MEETING THE REQUIREMENTS FOR NATIONAL ELECTRIC CODE (NEC) CLASS I DIVISION 2 LOCATIONS.
8. ALL PLUMBING SHALL BE IN ACCORDANCE TO THE MOST CURRENT UNIFORM PLUMBING CODE.
9. SEPTIC TANK AND ASSOCIATED APPURTENANCES MUST BE TRAFFIC BEARING WITH CAST IRON RING AND COVER IF LOCATED IN DRIVEWAY OR OTHER AREA WITH VEHICULAR TRAFFIC.

INSPECTIONS FOR SYSTEM

1. CONTACT PROFESSIONAL CONSULTANTS, INC (406) 728-1880 AT LEAST 48 HOURS IN ADVANCE FOR INSPECTIONS.
2. TANKS MUST BE LEAK TESTED USING ONE OF THE FOLLOWING METHODS:
A. VACUUM TESTING: SEAL THE EMPTY TANK AND APPLY A VACUUM TO 4 INCHES (100 MM) MERCURY. THE TANK IS APPROVED IF 90 PERCENT OF VACUUM IS HELD FOR 2 MINUTES; OR
B. WATER PRESSURE TESTING: SEAL THE TANK, FILL WITH WATER, AND LET STAND FOR AT LEAST 24 HOURS. REFILL THE TANK. THE TANK IS APPROVABLE IF IT HOLDS WATER.
4. THE INSTALLATION OF THE SYSTEM SHALL BE INSPECTED BY PROFESSIONAL CONSULTANTS, INC.

CONTROL PANEL (RECOMMENDED)

TO BE LOCATED WITH OWNER INPUT, HOWEVER, CONTROL PANEL MUST BE READILY ACCESSIBLE AND ALARM MUST BE ACKNOWLEDGEABLE. PANEL SHOULD BE EQUIPPED TO HANDLE THE FOLLOWING FLOAT:
SEPTIC CHAMBER - ONE (1) REMOTE HIGH WATER LEVEL ALARM.
ALARM LIGHTS ARE TO BE LOCATED IN A VISIBLE LOCATION WITH AN AUDIBLE ALARM.

MONTANA ANDY MEFFORD No. 16208PE LICENSED PROFESSIONAL ENGINEER

PROJECT #: 9522-24
DRAWN: DA | CHECKED: JM
REVISION: | REVISION: | REVISION: | REVISION: | REVISION:

7TH DAY ADVENTIST CHURCH
PUBLIC WASTEWATER SYSTEM
S21, T24N, R31W TROUT CREEK, SANDERS CO.

Professional Consultants Inc.
Engineers, Surveyors, Planners, Mappers
315 RUSSELL ST. PO BOX 1750
MISSOULA, MONTANA 59801
PHONE (406) 728-1880
EMAIL PCI@PCIMONTANA.COM

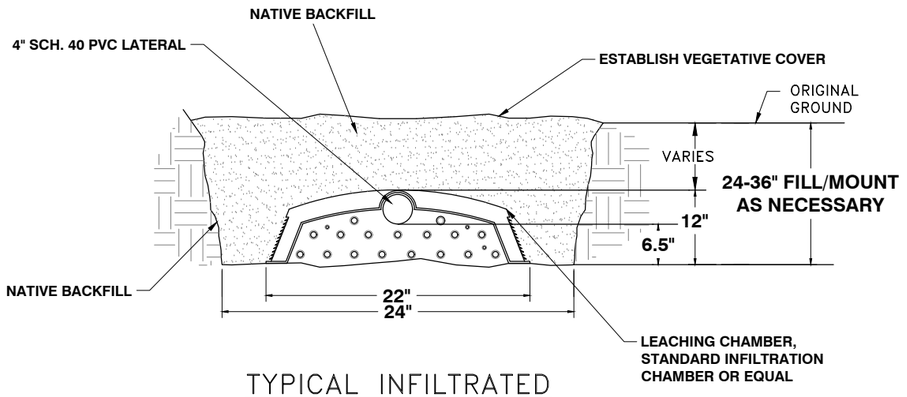
DEC. 31, 2024

SEPTIC DETAILS

3

DEQ SUBMITTAL

F:\2024\9522-24 Trout Creek 7th Day Adventist\Drafting & GIS\9522-24 DESIGN.dwg 12/31/24

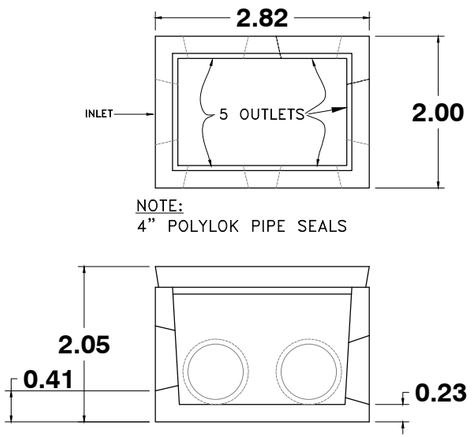


TYPICAL INFILTRATED TRENCH DETAIL

NOT TO SCALE

DISTRIBUTION BOX MUST:

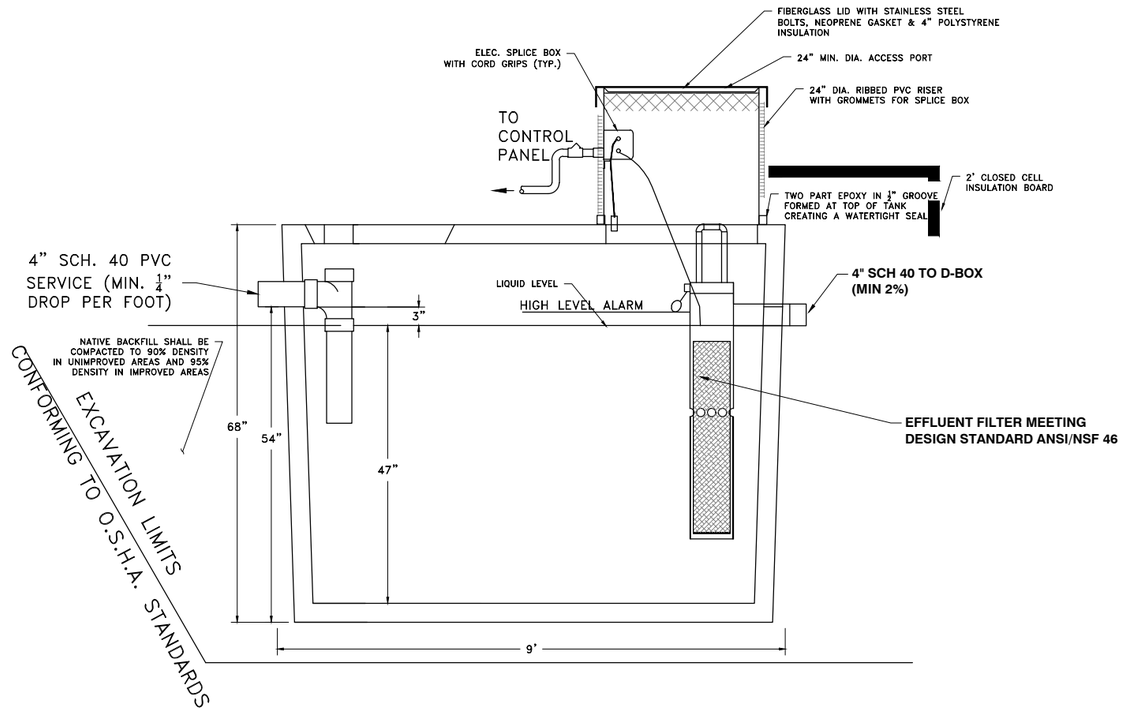
1) BE SET LEVEL AND BEDDED
2) USE FLOW CONTROL OR BAFFLING DEVICES TO ENSURE EQUAL DISTRIBUTION
3) BE WATER TESTED FOR EQUAL DISTRIBUTION
4) HAVE EACH OUTLET SERVE AN EQUAL LENGTH OF ABSORPTION TRENCH
5) IF CONCRETE, MEET SAME REQUIREMENTS AS SEPTIC TANKS AND HAVE MINIMUM 2-INCH WALL THICKNESS
6) HAVE AN ACCESS FOR INSPECTION



NOTE:
4" POLYLOK PIPE SEALS

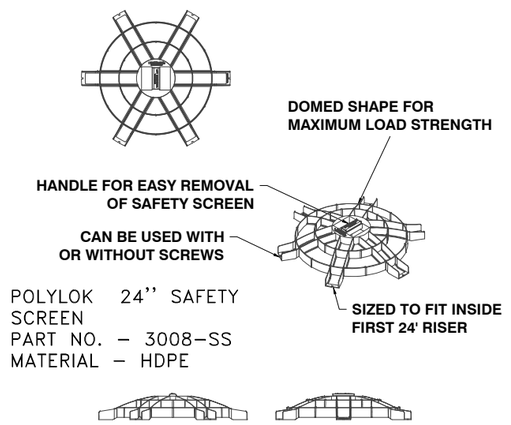
DISTRIBUTION BOX DETAIL

NOT TO SCALE



EXISTING 1,000 SEPTIC TANK

INSTALLED IN 2023



POLYLOK 24'' SAFETY SCREEN
PART NO. – 3008–SS
MATERIAL – HDPE

CHILD CATCHER BASKET DETAIL

NOT TO SCALE

ANDY MEFFORD
No. 16208PE
LICENSED PROFESSIONAL ENGINEER
MONTANA

PROJECT #: 9522-24
DRAWN: KANE L. CHECKED: JM
REVISION:
REVISION:
REVISION:
REVISION:
REVISION:

7TH DAY ADVENTIST CHURCH
PUBLIC WASTEWATER SYSTEM
S21, T24N, R31W TROUT CREEK, SANDERS CO.

Professional Consultants Inc.
Engineers, Surveyors, Planners, Mappers
315 RUSSELL ST. PO BOX 1750
MISSOULA, MONTANA 59801
PHONE (406) 728-3760
EMAIL PCI@PCINMT.COM

DEC. 31, 2024

SEPTIC DETAILS

4

DEQ SUBMITTAL

Operation and Maintenance Manual

Seventh Day Adventist Church
Located near Trout Creek, Sanders County, Montana
May 2024

Introduction

This wastewater treatment system is to be operated and maintained in accordance with the manufacturer's instructions, unless otherwise outlined in this document.

The property owner of Tract A of COS 73, Seventh Day Adventist Church, is responsible for the maintenance and operation of the system's components (septic tank, sewer service lines, etc) or retain qualified person(s) to conduct all necessary maintenance and operation of the system.

For more information refer to the documentation below:

Contact Information

Service Representative: Andrey Bokav (425) 208-5894
Septic Tank Pumper: Sorlie Septic Services (406) 827-0888
Local Sanitarian: Jeremy Leavitt (406) 827-6909

System Summary

The system will have a 1,000 gallon and a 1,500 gallon septic tank to serve the individual buildings primary treatment needs. The effluent outfalls from these tanks will Y together before flowing to a distribution box. The drainfield will be gravity-fed; therefore, there will be a distribution box to distribute effluent throughout the entire drainfield area.

For a detailed summary of the system, refer to ENGINEERING DESIGN REPORT.

Operation and Maintenance

Maintenance Schedule

Monthly

- Visually inspect drainfield and tank for problems
- Inspect high water level float and alarm settings and operation

Annually

- Effluent filters should be inspected and replaced as recommended by a manufacturer

Every three to five years

- Inspect and pump septic tank
- The cleanouts on the drainfield laterals should be exposed, inspected and flushed

Maintenance Guide

Refer to “A Montana Homeowner’s Guide to Septic Systems” by the Montana Department of Environmental Quality, Solid Waste Section, Septic Tank Pumper Program and manufacturer’s instructions for operation and maintenance procedures.

Owner’s Manual and O&M Manual

- Routine maintenance responsibilities will include the following:
    - The tank must be inspected every year and be pumped every four years at a minimum.
    - Effluent filters must be cleaned according to the manufacturer’s specifications.
- Intermittent use and extended periods of no-use are not anticipated. In the event of non-use, the routine maintenance must be completed before continuing the use of the system.
- Visual inspections of the absorption field are recommended regularly.
- Safety concerns can be found in the manufacturer’s documents attached.

Installation Manual

- The attached manufacturers installation manuals include the following:
  - Standard system components
  - Specifications for the systems' components
  - Schematics
  - Sequential installation instructions that identify and explain each installed component.
  - Instructions to call the service provider to go through the start up with them. This procedure is outlined in the attached O&M Manual

As-built Plans

- The contractor or owner must call Professional Consultants, Inc within 48 hours of construction completion to conduct inspections of the facilities. PCI will provide As-Built plans to Montana Department of Environmental Quality to be added to this document.

PUBLIC WATER

DEQ 1 REPORT

PWS-5/PWS-6

DETAILS

Non-Transient Non-Community Water Supply Well Engineering Design Report

For

Trout Creek 7th Day Adventist Church

Sanders County, Montana

Prepared by:

Professional Consultants Inc.
Unmatched Experience. Uncompromising Standards.

3115 Russell St/ P.O. Box 1750
Missoula, MT 59806
(406) 728-1880

December 2024

PCI Project No. 9522-24

TABLE OF CONTENTS

Contents

INTRODUCTION

The Seventh Day Adventist Church owns the property legally described as Plat 7A in NENW which is approximately a mile southeast of Trout Creek, MT. The property is in the NE ¼ NW ¼ of Section 21, Township 24 North, Range 31 West, Sanders County, Montana. The lot is approximately 5 acres in size. Currently, there is a church with a septic system, a functioning well and a driveway. The client wishes to add a school that will serve 20-30 students plus 1-3 faculty.

The current well does not meet construction requirements, a new one is proposed that will serve the school and church. The well will be classified as a Non-Transient Non-Community (NTNC) public water system because it will serve twenty-five (25) or more people at least sixty (60) days per year.

DEQ 3 – STANDARDS FOR WATER WORKS

Chapter 1 – Submission of Plans

1.1 Engineer's Report

1.1.1 General Information

a. Existing Water Works and Sewer Facilities

There is one existing, public water supply that serves the church. The well log shows that the well was completed on 9/1/1977. It was drilled to a total depth of 104 feet. The well showed static water level at 36 feet with a sustained yield of 50 gpm for 2 hours. This well will be used only for irrigation.

There is an existing wastewater treatment system that serves the church. The system consists of a septic tank and a subsurface drainfield. The existing septic system does not meet requirements and is proposed to be abandoned and replaced by the new wastewater treatment system that will serve both the school and the church.

b. Identification of the area to be served.

The NTNC public well is proposed to serve the church and school which will have 30-40 people attending church once a week and 20-30 students with 1-3 faculty four days per week. The school is anticipated to have (6) toilets, (1) urinal, (1) dishwashers, (5) sinks, (1) utility sink, (2) water fountains and (1) kitchen sink. The church has (5) toilets, (1) urinal on the wall, (1) shower with single head, (4) sinks, (1) kitchen sink and (1) ½" hose connection.

c. Name and address of the owner, developer, and official custodian.

Owner: Montana Conference Seventh Day Adventist
175 Canyon View Road
Bozeman, MT 59715

The Trout Creek 7th Day Adventist Church will be the property owner. The developer for this project will be the church building committee. The owner intends to fund and operate the system and will adhere to the operation and maintenance procedures.

1.1.2 Extent of water system

a. Description and Nature of the extent of the area to be served.

The water system will provide water for the church and the proposed school both including bathrooms and a kitchen. The church has approximately 30-40 people who attend service once a week. The school is proposed to have 20-30 students with 1-3 faculty members. The school is anticipated to have (6) toilets, (1) urinal, (1) dishwashers, (5) sinks, (1) utility sink, (2) water fountains and (1) kitchen sink. The church has (5) toilets, (1) urinal on the wall, (1) shower with single head, (4) sinks, (1) kitchen sink and (1) ½" hose connection.

b. Provisions for extending the water works system to include additional areas.

No extensions are planned for this proposed water supply system.

c. Appraisal of the future requirements for service, including existing and potential water supply needs.

Possible future expansion plans include a gymnasium for the school with no locker rooms.

1.1.3 Alternate plans

The wells in this area are the only available water supply.

1.1.4 Water Use Data

a. The estimated Population which will be served by the proposed water supply or expanded system.

At capacity, the system will serve approximately 75 people. There will be a maximum of 40 people attending church, 30 students and 5 faculty. The people that will be attending church only do so once a week. School will be in session 4 days a week for 9-10 months out of the year.

b. Present water consumption and the projected average and maximum daily demands or peak instant demand, where appropriate, used as the basis of design.

The basis of design is estimated from DNRC Planning Guide for Water Use for persons at a school and attending church. The system will have a projected future average daily demand of 1.36 gpm or 2.19 acre-feet per year with a maximum daily demand of 2.72 gpm or 4.39 acre-feet/year.

To determine the peak instant demand, the water supply fixture count was used from the AWWA M22. For the system, it is determined that the peak instantaneous water demand is estimated to be 37.7 gpm.

c. Present and/or estimated yield of the sources of supply.

The existing onsite well has a yield of 50 GPM. The proposed well is expected to have a yield of around 35 GPM. This is be verified with a pump test.

1.1.6 Groundwater sources of supply

a. Sites considered

The proposed well location is in the preferred location for the church so they may utilize a gravity drainfield.

b. Advantages of the site selected.

The site meets all the minimum setbacks required for a public well. It is in a location that does not have shallow surface water flows. It is in good proximity to the church and school to allow easy maintenance observation. This is the furthest location from the active train tracks that run neat the southwest corner of the property.

c. Elevations with respect to surroundings.

The well site is located on high, flat terrain.

d. Sources of possible contamination

There are very few sources of possible contamination near the well. The primary one is the proposed public drainfield that is about 440 feet southwest. The proposed well is slightly removed from a direct down gradient flow path to the proposed drainfield. Highway 200 is approximately 180 feet northeast of the well. The Noxon Reservoir is the nearest surface water, which at its closest distance is approximately 1,670 feet northeast of the well.

1.1.7 Sewage system available

There is an existing system that currently serves the church. It includes a septic tank and gravity-fed drainfield. Due to the existing septic systems non-compliance the system is proposed to be abandoned. The proposed sewage system will serve the school and the church. The sewage system will consist of a gravity-fed drainfield.

Chapter 3 – Source Development

3.2.3.1 Well Location

The proposed public well location is at least 100 feet from structures used to convey or retain industrial, storm or sanitary waste and state and federal highway rights of way. There is one existing septic system within the property's boundaries. The well is at least over 50 feet from all proposed septic tanks and sewer lines. Highway 200 is the closest federal Right of Way which is approximately 110 feet northeast**.**

3.2.3.2 Continued Protection

As a public well, a 100 ft isolation zone will be established around the exterior of the well. The well isolation zone remains entirely within the property's boundaries. Continued protection of the well site from potential sources of contamination will be provided through ownership.

Water Demand Estimate Using Fixture Values

(Based on AWWA M22 Manual, Second Edition)

Facility Name	7th Day Adventist Church
Building address or number	3020 MT Highway 200, Trout Creek, MT
Residential or Non-Residential	Non-Residential
Minimum Pressure (psi)	35

** this is typically 35 psi

Fixture or Appliance	Fixture Value (at 60 psi)	Number of Fixtures	Subtotal Fixture Value
Toilet (tank)	4	11	44
Toilet (flush valve)	35		0
Urinal (wall or stall)	16	2	32
Urinal (flush valve)	35		0
Bidet	2		0
Shower (single head)	2.5	1	2.5
Sink (lavatory)	1.5	9	13.5
Kitchen Sink	2.2	2	4.4
Utility Sink	4	1	4
Dishwasher	2	1	2
Bathtub	8		0
Clothes Washer	6		0
Hose connections (with 50 ft of hose)			
1/2 in.	5	1	5
5/8 in.	9		0
3/4 in.	12		0
Miscellaneous			
Bedpan washers	10		0
Drinking fountains	2	2	4
Dental units	2		0
Combined Fixture Value			111.4
Demand (gpm)			51
Pressure Adjustment Factor			0.74
Total Adjusted demand (gpm)			**37.7**

WELL SPECIFICATIONS DETAILS

NON-COMMUNITY PUBLIC WATER SUPPLY - TC 7TH DAY ADVENTIST CHURCH

LOCATED IN SECTION 21, T.24N., R.31W., P.M.M.,
SANDERS COUNTY, MONTANA

WELL CONSTRUCTION NOTES & SPECIFICATIONS

1. DEQ 3.2 - WELL SHALL BE CONSTRUCTED BY A WATER WELL CONTRACTOR LICENSED IN THE STATE OF MONTANA, WELL SHALL BE CONSTRUCTED IN ACCORDANCE WITH TITLE 37, CHAPTER 43, MCA AND TITLE 36, CHAPTER 21, ARM.

2. DEQ 3.2.2.1 - THE WELL SHALL BE DISINFECTED IN ACCORDANCE WITH ARM 36.21.662(1) PRIOR TO AND AFTER PLACEMENT OF PERMANENT PUMPING EQUIPMENT. MORE THAN 72 HOURS AFTER DISINFECTION, TWO OR MORE WATER SAMPLES MUST BE SUBMITTED TO A LABORATORY CERTIFIED BY THE DEPT OF PUBLIC HEALTH AND HUMAN SERVICES FOR MICROBIOLOGICAL ANALYSIS WITH SATISFACTORY RESULTS REPORTED TO MDEQ PRIOR TO PLACING THE WELL INTO SERVICE.

3. DEQ 3.2.2.2 - THE WELL SHALL BE EXAMINED FOR APPLICABLE PHYSICAL AND CHEMICAL CHARACTERISTICS BY TESTS OF A REPRESENTATIVE SAMPLE IN A LABORATORY CERTIFIED BY THE DEPT OF PUBLIC HEALTH AND HUMAN SERVICES FOR MICROBIOLOGICAL ANALYSIS WITH SATISFACTORY RESULTS REPORTED TO MDEQ. SAMPLES MUST BE COLLECTED AT THE CONCLUSION OF THE TEST PUMPING PROCEDURE PRIOR TO DISINFECTION AND EXAMINED AS SOON AS PRACTICAL. SAMPLE RESULTS FOR CONSTITUENTS OF ARM 17.38.216, INCLUDING NITRATE/NITRATE AND TDS OR CONDUCTIVITY SAMPLING, MUST BE SUBMITTED TO MDEQ FOR REVIEW AND APPROVAL TO DEMONSTRATE COMPLIANCE WITH TITLE 17, CHAPTER 38, SUB-CHAPTER 2, ARM, PRIOR TO PLACING THE WELL INTO SERVICE. FIELD DETERMINATIONS OF PHYSICAL AND CHEMICAL CONSTITUENTS OR SPECIAL SAMPLING PROCEDURES MAY BE REQUIRED BY MDEQ.

4. DEQ 3.2.4.1 - YIELD AND DRAWDOWN TESTS MUST BE PERFORMED ON THE WELL AFTER CONSTRUCTION OR SUBSEQUENT TREATMENT AND PRIOR TO PLACEMENT OF THE PERMANENT PUMP. TEST PUMP CAPACITY AT MAXIMUM ANTICIPATED DRAWDOWN, MUST BE AT LEAST 1.5 TIMES THE QUANTITY ANTICIPATED AND PROVIDE A CONTINUOUS CONSTANT RATE OF PUMPING 1.5 TIMES THE DESIGN PUMP CAPACITY FOR AT LEAST 24 HOURS. THE CONTRACTOR SHALL NOTIFY THE ENGINEER WHEN HE IS READY TO PROCEED WITH TESTING, AND SHALL FURNISH AND INSTALL ALL NECESSARY EQUIPMENT CAPABLE OF PUMPING THE WELL AND MEASURING THE PUMP RATE AT A MINIMUM FLOW RATE TO BE SPECIFIED BY THE ENGINEER (1.5 X DESIGN RATE) FOR A PERIOD OF 24 HOURS, OR UNTIL A STABILIZED DRAWDOWN HAS BEEN MAINTAINED FOR AT LEAST SIX (6) HOURS. PUMP TEST PERIOD MAY NEED TO BE AS LONG AS 72 HOURS, AS REQUIRED BE DNRC. DATA OF THE FOLLOWING AT ONE-HOUR INTERVALS OR LESS AS MAY BE REQUIRED BY MDEQ: PUMPING RATE, PUMPING WATER LEVELS, STATIC WATER LEVEL, WATER RECOVERY RATE AND LEVELS, AND TIME OF STARTING AND ENDING EACH TEST CYCLE. CONSULT ENGINEER PRIOR TO BIDDING. DATA COLLECTION MUST BEGIN AT TIME ZERO. THE TEST MAY BE TERMINATED IF STABILIZED DRAWDOWN OCCURS FOR AT LEAST EIGHT HOURS DURING THE TEST. STABILIZED DRAWDOWN IS DEFINED AS A WATER LEVEL THAT DOES NOT FLUCTUATE PLUS OR MINUS 0.5 FEET FOR EVERY 100 FEET OF DRAWDOWN AT THE DESIGN PUMPING RATE. WHEN SUFFICIENT HISTORIAL INFORMATION IS AVAILABLE, A STEP DRAWDOWN TEST MAY BE APPROVED BY MDEQ.

5. DEQ 3.2.4.2 - TEST RESULTS WILL BE SUBMITTED TO MDEQ. IN ADDITION, THE AQUIFER PUMP TESTING RESULTS SHALL BE SUBMITTED TO THE MONTANA BUREAU OF MINES AND GEOLOGY (MBMG) ON THE MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION FORM 633 AS CAN BE FOUND ON THE DNRC WEBSITE.

6. DEQ 3.2.4.3 - GEOLOGICAL DATA MUST BE DETERMINED IN ACCORDANCE WITH ARM 36.21.667. SAMPLES MUST BE TAKEN AT 5 INTERVALS AND AS SPECIFIED IN THE ARM. DRILLER SHALL COORDINATE SAMPLING WITH THE ENGINEER. UPON COMPLETION, A COPY OF THE WELL LOG MUST BE SUBMITTED TO THE ENGINEER AND MDEQ., AS APPLICABLE, AND BE SUPPLEMENTED WITH A DRILLER'S LOG, AND ACCURATE GEOLOGICAL LOCATION SUCH AS LATITUDE AND LONGITUDE OR GIS COORDINATES AS DETERMINED BY GPS TO AN ACCURACY OF +/- 25 FEET.

7. DEQ 3.2.5.2 - THE MINIMUM PROTECTED DEPTHS OF DRILLED WELLS MUST PROVIDE WATERTIGHT CONSTRUCTION TO SUCH DEPTH AS MAY BE REQUIRED BY MDEQ, TO EXCLUDE CONTAMINATION AND SEAL OFF FORMATIONS THAT ARE OR MAY BE CONTAMINATED OR YIELD UNDESIRABLE WATER. WELLS SHALL HAVE UNPERFORATED CASING TO A MINIMUM DEPTH OF 25 FEET OR CONTINUOUS DISINFECTION MUST BE PROVIDED. IF THE WELL IS DETERMINED TO BE DRAWING FROM A WATER TABLE AQUIFER WITHIN 25 FEET OF THE GROUND SURFACE, THE CONTRACTOR SHALL NOTIFY THE DESIGN ENGINEER IMMEDIATELY.

8. DEQ 3.2.5.3 - PERMANENT STEEL CASING SHALL BE IN ACCORDANCE WITH ARM 36.21.640 EQUIPPED WITH A DRIVE SHOE IN ACCORDANCE WITH ARM 36.21.644 WHEN DRIVEN, AND HAVE WELDED JOINTS IN ACCORDANCE WITH ARM 36.21.642.

9. DEQ 3.2.5.4 - PLASTIC WELL CASING MUST BE IN ACCORDANCE WITH ARM 36.21.645 AND ARM 36.21.646.

10. 3.2.5.5 - PACKERS MUST BE OF MATERIAL THAT WILL NOT IMPART TASTE, ODOR, TOXIC SUBSTANCE OR BACTERIAL CONTAMINATION TO THE WELL WATER. PACKERS SHALL NOT BE USED ON ANY WELL UNLESS APPROVED BY THE ENGINEER.

11. DEQ 3.2.5.7 - THE PERMANENT WELL CASING SHALL BE SEALED IN ACCORDANCE WITH ARM 36.21.654 THOUGH 36.21.660 TO A DEPTH OF 25 FEET WITH HEAVY BENTONITE WATER SLURRY OR CEMENT GROUT TO PREVENT SURFACE CONTAMINATION. THE HEAVY BENTONITE WATER SLURRY METHOD IS PREFERRED. THE CASING SHALL BE PROVIDED WITH CENTRALIZERS IN ACCORDANCE WITH ARM 36.21.648. THE TEMPORARY CASING SHALL BE WITHDRAWN AS GROUT IS APPLIED.

12. DEQ 3.2.5.8 - THE UPPER TERMINAL PERMANENT WELL CASING SHALL BE IN ACCORDANCE WITH ARM 36.21.647. THE WELL MUST NOT BE CONSTRUCTED IN AN AREA SUBJECT TO FLOODING. PROVISIONS SHALL BE MADE TO PREVENT DAMAGE OR TAMPERING TO THE WELL. TO PREVENT TAMPERING, SECURE THE WELL CAP WITH A CHAIN AND PAD LOCK. TO PREVENT DAMAGE, INSTALL 4" STEEL BOLLARDS FILLED WITH CONCRETE AND PLACE WITHIN 6' CONCRETE CURBED TRAFFIC ISLAND.

13. DEQ 3.2.5.9 - THE WELL SHALL BE DEVELOPED IN ACCORDANCE WITH ARM 36.21.653.

14. DEQ 3.2.5.10 - TEMPORARY CAPPING REQUIREMENTS MUST BE IN ACCORDANCE WITH ARM 36.21.661.

15. DEQ 3.2.6.1 - IN DRILLED WELLS THAT PENETRATE AN AQUIFER EITHER WITHIN A CONSOLIDATED OR CONFINING FORMATION, SEALING OF THE CASING MUST CONFORM WITH ONE OF THE PROCEDURES DESCRIBED IN DEQ CIRCULAR 3 SECTION 3.2.6.1.

16. DEQ 3.2.6.2 - FLOWING WELLS. WHEN FLOWING WATER IS ENCOUNTERED IN THE WELL, AN UNPERFORATED WELL CASING MUST EXTEND INTO THE CONFINING STRATUM OVERLYING THE ARTESIAN ZONE. THE CASING MUST BE ADEQUATELY SEALED INTO THE CONFINING STRATUM SO AS TO PREVENT SURFACE AND SUBSURFACE LEAKAGE FROM THE ARTESIAN ZONE. IF THE WELL FLOWS AT LAND SURFACE, IT MUST BE EQUIPPED WITH A CONTROL VALVE SO THAT THE FLOW CAN BE COMPLETELY STOPPED. THE WELL MUST BE COMPLETED WITH PACKERS OR APPROPROATE SEALING MATERIAL THAT WILL ELIMINATE LEAKAGE AROUND THE WELL CASING.

17. DEQ 3.2.6.5 - GRAVEL PACK WELLS. GRAVEL PACK MUST BE WELL ROUNDED PARTICLES, 95 PERCENT SILICEOUS MATERIAL, THAT ARE SMOOTH AND UNIFORM, FREE OF FOREIGN MATERIAL, PROPERLY SIZED, WASHED AND THEN DISINFECTED IMMEDIATELY PRIOR TO OR DURING PLACEMENT. GRAVEL PACK MUST BE PLACED IN ON UNIFORM CONTINUOUS OPERATION, AND PROTECTION FROM LEAKAGE OF GROUT INTO THE GRAVEL PACK OR SCREEN MUST BE PROVIDED. PERMANENT INNER AND OUTER CASINGS MUST MEET REQUIREMENTS OF SECTION 3.2.5.3 AND 3.2.5.4.

ADDITIONAL WELL CONSTRUCTION NOTES & SPECIFICATIONS

1. SCREENS MUST BE CONSTRUCTED OF MATERIALS RESISTANT TO DAMAGE BY CHEMICAL ACTION OF GROUNDWATER OR CLEANING OPERATIONS, HAVE SIZE OF OPENINGS BASED ON SIEVE ANALYSIS OF FORMATION AND/OR GRAVEL PACK MATERIALS, HAVE SUFFICIENT LENGTH AND DIAMETER TO PROVIDE ADEQUATE SPECIFIC CAPACITY AND LOW APERTURE ENTRANCE VELOCITY WHICH MAY NOT EXCEED 0.1 FEET PER SECOND. SCREENS MUST ALSO BE INSTALLED SO THAT THE PUMPING WATER LEVEL REMAINS ABOVE THE SCREEN UNDER ALL OPERATING CONDITIONS. WHERE APPLICABLE, SCREENS MUST BE DESIGNED AND INSTALLED TO PERMIT REMOVAL OR REPLACEMENT WITHOUT ADVERSELY AFFECTING WATER-TIGHT CONSTRUCTION OF THE WELL, AND MUST BE PROVIDED WITH A BOTTOM PLATE OR WASHDOWN BOTTOM FITTING OF THE SAME MATERIAL AS THE SCREEN.

2. HEAVY BENTONITE WATER SLURRY SHALL BE A MIXTURE OF 1/2 POUND BENTONITE PER GALLON OF CLEAR WATER, CEMENT GROUT SHALL BE A MIXTURE OF ONE BAG OF CEMENT CONFORMING TO ASTM C-150 (94 LBS) AND 5-6 GALLONS OF WATER. IF CEMENT GROUT IS USED, A HOLE PLUG SHALL BE USED. HOLE PLUG METHOD SHALL BE SUBMITTED AND APPROVED BY THE ENGINEER PRIOR TO USE ON-SITE. THE MIXTURE, METHOD OF MIXING AND CONSISTENCY OF GROUT SHALL BE APPROVED BY THE ENGINEER.

3. A SUITABLE RETAINER, PACKER OR PLUG SHALL BE PROVIDED AT THE BOTTOM OF THE GROUTED SECTION SO THAT GROUT WILL NOT LEAK THROUGH INTO THE BOTTOM OF THE WELL. THE GROUTING SHALL BE DONE CONTINUOUSLY AND IN SUCH A MANNER AS WILL ENSURE THE ENTIRE FILLING OF THE ANNULAR SPACE IN ONE OPERATION. THE CASING MUST BE PROVIDED WITH SUFFICIENT GUIDES WELDED TO THE CASING TO PERMIT UNOBSTRUCTED FLOW AND UNIFORM THICKNESS OF GROUT.

4. THE CONTRACTOR SHALL TAKE PRECAUTIONS AS ARE NECESSARY OR AS MAY BE REQUIRED PERMANENTLY TO PREVENT CONTAMINATED WATER OR WATER HAVING UNDESIRABLE PHYSICAL OR CHEMICAL CHARACTERISTICS FROM ENTERING THROUGH THE OPENING MADE BY THE CONTRACTOR IN DRILLING THE WELL OR THROUGH THE STRATUM FROM WHICH THE WELL IS TO DRAW ITS SUPPLY. HE SHALL ALSO TAKE ALL NECESSARY PRECAUTIONS DURING THE CONSTRUCTION PERIOD TO PREVENT CONTAMINATED WATER, GASOLINE, ETC., FROM ENTERING THE WELL EITHER THROUGH THE OPENING OR BY SEEPAGE THROUGH THE GROUND SURFACE. IN THE EVENT THAT THE WELL BECOMES CONTAMINATED OR THAT WATER HAVING UNDESIRABLE PHYSICAL OR CHEMICAL CHARACTERISTICS ENTERS THE WELL HE SHALL, AT HIS EXPENSE, PERFORM SUCH WORK OR SUPPLY SUCH CASINGS, SEALS, STERILIZING AGENTS OR OTHER MATERIAL AS MAY BE NECESSARY TO ELIMINATE THE CONTAMINATION OR SHUT OFF THE UNDESIRABLE WATER.

5. SLOPE GROUND AWAY FROM WELL HEAD TO PREVENT PONDING AND POSSIBLE CONTAMINATION.

6. CLEAN POTABLE WATER SHALL BE USED IN ALL DRILLING FLUIDS AND ADDITIVES USED IN DRILLING OPERATIONS SHALL BE APPROVED BY THE NATIONAL SANITATION FOUNDATION (NSF) OR A SIMILAR ANSI ACCREDITED LABORATORY/ORGINIZATION.

7. UPON COMPLETION OF THE WELL, BEFORE CONDUCTING THE YIELD AND DRAWDOWN TESTS, THE CONTRACTOR SHALL DEVELOP THE WELL BY SUCH METHODS AS WILL EFFECTIVELY EXTRACT FROM THE WATER-BEARING FORMATION THE MAXIMUM PRACTICAL QUANTITY OF SAND, DRILLING MUD AND OTHER FINE MATERIALS IN ORDER TO BRING THE WELL TO MAXIMUM YIELD PER FOOT OF DRAWDOWN AND TO A SAND-FREE CONDITION. COMPRESSED AIR, SURGE PLUNGERS, HIGH-VELOCITY JETTING EQUIPMENT AND PUMPS MAY BE USED FOR THE DEVELOPMENT WORK. THIS WORK MUST BE DONE IN SUCH A MANNER THAT DOES NOT CAUSE UNDUE SETTLEMENT AND DISTURBANCE OF THE STRATA ABOVE THE WATER-BEARING FORMATION NOR DISTURB THE SEAL AROUND THE WELL CASING AND THEREBY REDUCE THE SANITARY PROTECTION OTHERWISE AFFORDED BY SUCH SEAL. DEVELOPMENT OF THE WELL SHALL BE CONTINUED UNTIL WATER PUMPED FROM THE WELL AT THE MAXIMUM TEST PUMPING RATE IS CLEAR AND FREE OF SAND. THE WATER SHALL BE CONSIDERED SAND-FREE WHEN NO SAMPLES CONTAIN MORE THAN 2 PPM OF SAND BY WEIGHT.

8. IN DRILLED WELLS THAT PENETRATE AN AQUIFER OVERLAIN BY UNCONSOLIDATED FORMATIONS SUCH AS SAND AND GRAVEL WITHOUT SIGNIFICANT CLAY BEDS, AN UNPERFORATED WELL CASING MUST EXTEND TO AT LEAST THREE INCHES GREATER THAN THE NOMINAL SIZE OF THE PERMANENT CASING MUST EXCEED TO AT LEAST 25 FEET BELOW LAND SURFACE. THE ANNULAR SPACE BETWEEN THE UPPER DRILL HOLE AND THE WELL CASING MUST BE KEPT AT LEAST ONE-HALF FULL WITH BENTONITE SLURRY THROUGHOUT THE DRIVING OF THE PERMANENT CASING INTO THE AQUIFER. AFTER THE PERMANENT CASING IS SET IN ITS FINAL POSITION, THE REMAINING ANNULAR SPACE MUST BE FILLED TO LAND SURFACE WITH APPROPIATE SEALING MATERIAL. IF THE OVERSIZED DRILL HOLE IS EXTENDED TO THE SAME DEPTH AS THE PERMANENT CASING, A SUITABLE BRIDGE MUST BE INSTALLED BETWEEN CASING AND THE DRILL HOLE AT A POSITION DIRECTLY ABOVE THE PRODUCTION QUIFER. THE REMAINING ANNULAR SPACE MUST BE COMPLETELY FILLED AND SEALED TO LAND SURFACE WITH APPROPRIATE SEALING MATERIAL. IF TEMPORARY CASING IS USED TO MAINTAIN THE OVERSIZED DRILL HOLE, THE ANNULAR SPACE MUST BE KEPT FULL WITH APPROPRIATE SEALING MATERIAL AS THE TEMPORARY CASING IS BEING WITHDRAWN.

9. IN DRILLED WELLS THAT PENETRATE AN AQUIFER OVERLAIN BY CLAY OR OTHER UNCONSOLIDATED DEPOSITS SUCH AS SAND AND GRAVEL IN WHICH SIGNIFICANT (AT LEAST 6 FEET THICK) INTERBEDS OF CLAY ARE PRESENT, THE WELL CASING MUST BE TERMINATED IN SUCH CLAY STRATA, PROVIDED THAT THE CASING BE SEALED IN SUBSTANTIALLY THE SAME MANNER AS IS REQUIRED IN THE CASE OF CONSOLIDATED FORMATIONS.

GENERAL NOTES

1. THE WORK TO BE DONE INCLUDES THE FURNISHING OF ALL LABOR, MATERIAL, TRANSPORTATION, TOOLS, SUPPLIES, EQUIPMENT AND APPURTENANCES, UNLESS SPECIFICALLY EXCEPTED, NECESSARY FOR THE COMPLETE AND SATISFACTORY CONSTRUCTION, SANITARY PROTECTION, AND TESTING OF THE PROPOSED WELL.

2. THE OWNER HAS DESIGNATED PCI AS HIS REPRESENTATIVE. THE ENGINEER MAY DESIGNATE A SUB-CONSULTANT, TO BE IDENTIFIED AT THE START OF CONSTRUCTION.

3. DURING CONSTRUCTION IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ACQUIRE NECESSARY UTILITY LOCATES TWO BUSINESS DAYS PRIOR TO CONSTRUCTION AND PROTECT EXISTING UNDERGROUND AND OVERHEAD UTILITY LINES.

4. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY SHOULD ANY CONFLICTS EXIST BETWEEN THE PLANS AND WHAT IS FOUND IN THE FIELD.

5. THE CONTRACTOR SHALL OBTAIN ALL THE NECESSARY PERMITS, AT HIS EXPENSE, TO COMPLETE THE PROPOSED WORK AND SHALL COMPLY WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS.

6. CONTRACTOR SHALL PROTECT ALL ADJACENT IMPROVEMENTS (SIGNS, DRAINFIELDS, ROADWAYS, PARKING LOTS, UTILITIES, ETC) FROM DAMAGE AND EROSION. ALL DISTURBED AREAS SHALL BE RESTORED TO THEIR ORIGINAL CONDITION.

7. ALL COMPONENTS OF THIS WATER SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS' RECOMMENDED INSTALLATION PROCEDURES, UNLESS OTHERWISE SPECIFIED IN THESE PLANS OR BY THE ENGINEER.

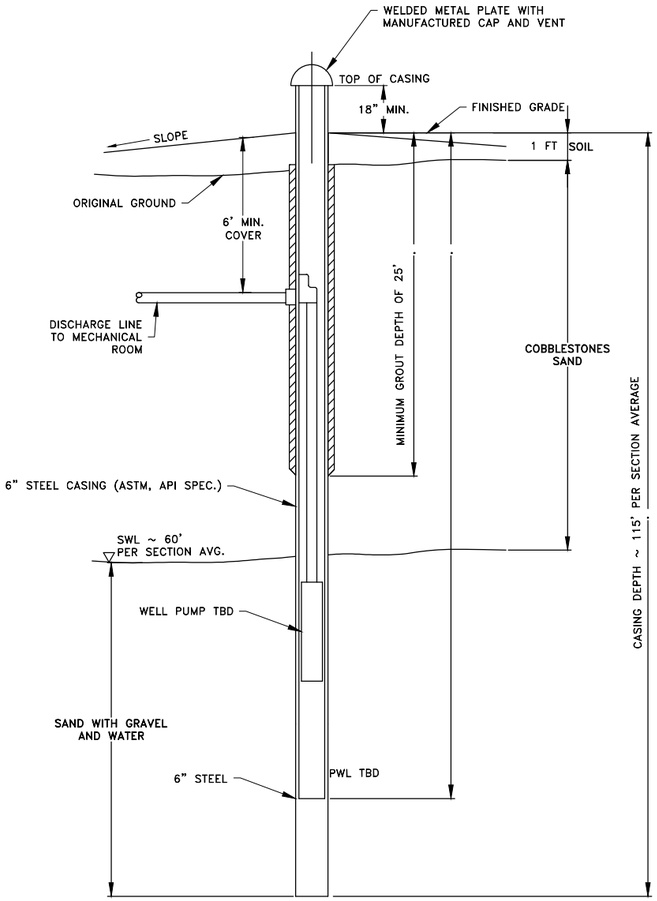
8. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS, MATERIAL CERTIFICATIONS, O&M AND WARRANTY DOCUMENTS TO THE OWNERS FOR ALL PARTS INSTALLED.

WELL TESTING & RECORD REQUIREMENTS

1. THE WELL CONTRACTOR SHALL PROVIDE THE FOLLOWING: TEST PUMP, POWER SOURCE, FUEL, FLOW MEASURING METER, PUMP CAPACITY-HEAD CHARACTERISTICS, AND DEPTH OF TEST PUMP SETTING. THE CONTRACTOR SHALL BE RESPONSIBLE TO ENSURE SMOOTH OPERATION OF PUMP THROUGHOUT ALL TESTING.

2. THE ENGINEER SHALL PROVIDE AN ELECTRONIC WATER LEVEL MEASURING DEVICE, AND SHALL BE RESPONSIBLE FOR COLLECTING DATA AS FOLLOWS: STATIC WATER LEVEL, WATER RECOVERY RATE AND LEVEL AND STARTING AND ENDING TIME OF EACH TEST CYCLE. WATER LEVEL MEASUREMENTS SHALL BE TAKEN SO AS TO PROVIDE TEN EVENLY SPACED DATA POINTS PER LOG CYCLE OF TIME, BUT IN NO CASE SHALL IT BE LESS THAN ONE-HOUR INTERVALS. DATA COLLECTION MUST BEGIN AT TIME ZERO. THE TEST MAY BE TERMINATED IF STABILIZED DRAWDOWN OCCURS FOR AT LEAST EIGHT HOURS DURING THE TEST. AS STEP DOWN TEST SHALL NOT BE SUED UNLESS SPECIALLY APPROVED BY DESIGN ENGINEER.

3. TEST RESULTS MUST BE REPORTED TO MDEQ.



TYPICAL WELL PROFILE

NO SCALE

MONTANA
ANDY MEFFORD
No. 16206PE
LICENSED PROFESSIONAL ENGINEER

PROJECT #: 9522-24
DRAWN: OLIVIA ALLEN
CHECKED: ANDY MEFFORD, PE
REVISION:
REVISION:
REVISION:
REVISION:
REVISION:

7TH DAY ADVENTIST CHURCH
PUBLIC WATER SYSTEM
S21, T24N, R31W TROUT CREEK, SANDERS CO., MT

Professional Consultants Inc.
Engineers, Surveyors, Planners, Mappers
315 RUSSELL ST PO BOX 1750
MISSOULA, MONTANA 59801
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EMAIL PC@PCMONTANA.COM

DEC. 13, 2024

WELL SPECS

3

Table of Preliminary Assessment Questions, Responses and Scores

Question	Responses	Score (points)
1. Type of subsurface water source.	**Well**	**0**
	Horizontal Well †	**40**
	Spring	**40**
† For purposes of the PA, "horizontal wells" includes infiltrations galleries.		
2. History or suspected outbreak of *Giardia* or other pathogenic organisms associated with surface water with the current system configuration.	**No**	**0**
	Yes	**40**
3. Number of *E. coli*-positive distribution samples in the last three years.	**None**	**0**
	One	**5**
	Two or more	**10**
4. Number of *E. coli*-positive source samples in the last three years	**None**	**0**
	One	**20**
	Two or more	**30**
5. Number of DEQ-verified complaints about turbidity.	**None**	**0**
	One or more	**5**
6. Hydrogeological Features: horizontal distance between source and the closest surface water.	**>250 feet**	**0**
	175-250 feet	**10**
	100-174 feet	**20**
	<100 feet	**40**
7. Does the well construction meet all three criteria? The well is (1) cased to at least top of the water bearing unit; (2) annular seal extends from ground level to a minimum of 25 feet in depth; and (3) the borehole diameter is at least three inches greater than the casing outside diameter from ground level to 25 feet depth.	**Yes**	**0**
	No	**15**
	Unknown	**15**
8. Well intake construction: depth below ground surface to the top of the well screen or open bottom casing.	**>100 feet**	**0**
	50-100 feet	**5**
	25-49 feet	**10**
	0-24 feet	**15**
	Unknown	**15**
9. Static water level depth below ground surface.	**>100 feet**	**0**
	50-100 feet	**5**
	25-49 feet	**10**
	0-24 feet	**15**
	Unknown	**15**

Total = 15

Public Water Supply System
PWS-6 Report
Source Water Delineation

Non-Community Non-Transient Public Water Supply

For

7th Day Adventist Church
Water System

Trout Creek, Sanders County, Montana

Prepared by:

Professional Consultants Inc.
Unmatched Experience. Uncompromising Standards.

3115 Russell Street/P.O Box 1750
Missoula, MT 59806
(406) 728-1880

December 2024

PCI Project No. 9522-24

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INTRODUCTION

Delineation and assessment of Source Water Protection (SWP) areas is defined in the 1996 Federal Safe Drinking Water Act Amendments. This delineation and assessment report is intended to meet the technical requirements of the Montana Source Water Protection Program (DEQ 1999) and the Federal Safe Drinking Water Act (SDWA) Amendments of 1996 (P.L. 104-182). This Source Water Protection Delineation report has been prepared in support of permitting the non-transient non-community public water supply (PWS) system supplied by groundwater. The property is located off Highway 200, in Sanders County, Montana, and is owned by Montana Conference of Seventh Day Adventist.

Water system owner:

Trout Creek 7th Day Adventist Church
3020 MT Highway 200
Trout Creek, MT 59874

The report author and contact person:

Kane Leithead
Landmark Consulting LLC
PO Box 7233
Sheridan, Wy, 82801
307-461-3858

1.0 PURPOSE

The purpose of this delineation and assessment report is to assess potential threats to the water supply for Trout Creek's Seventh Day Adventist Church using information obtained from published reports of nearby existing site conditions. Source water protection areas are areas that contribute water to the aquifer through recharge which are delineated or identified on a map. Assessment involves identifying locations or regions in source water protection areas where contaminants may be generated, stored, or transported and then determining the potential for contamination of drinking water by these sources.

2.0 BACKGROUND INFORMATION

2.1 The Community

The church is off Highway 200 in Trout Creek. The property is in Section 21, Township 24 North, Range 31 West, Sanders County, Montana. The parcel is owned by Montana Conference of Seventh Day Adventist.

The property has an existing church that has 30-40 attendees once a week. A school is proposed to have 20-30 students and 1-3 faculty members that will attend school four days a week. There is currently a septic system and well that serves the church which is proposed to be abandoned due to its noncompliance. A new well and public sewer system is proposed that will serve both the school and church.

2.2 Geographic Setting

The property is located approximately 1,850 feet southwest of Noxon Reservior. The USGS Hydrologic Units code for the surface water sources near the property is 17010213; however, the well will be groundwater sourced. The neighboring single-family homes and commercial buildings in the area are on their own water and septic systems.

The land cover in the area consists primarily of residential and commercial development with coniferous trees. Based on the NRCS soil report, the property consists primarily of Bonnash gravelly ashy silt loam. Annual precipitation in Trout Creek, MT is approximately 26.8 inches per year, most of which falls as snowfall.

The location of the proposed public water supply well is in the front of the property.

2.3 Public Water Supply

This assessment is for the proposed public water supply well that has not obtained official approval from DEQ. The population served is estimated at a maximum of 75 individuals based on the church and school's occupancy. The system will serve the church and proposed school which both include restrooms and a kitchen. There will be a total of 2 service connections. It is assumed that a 35-gpm source will be adequate since the maximum daily demand was calculated to be 2.08 gpm for the system. The existing well was drilled to a total depth of 104 feet, static water level of 36 feet, pump water level of 41 feet, and yield of 50 gpm. This allows for an accurate estimation of the proposed wells characteristics.

2.4 Water Quality

There have been multiple water samples collected at the existing well. The well (GWIC ID 78745) resulted in a background nitrate/nitrite concentration of 0.68 mg/L. Water quality samples include chemical and bacterial analysis. The proposed well will be tested once complete.

3.0 DELINEATION OF GROUND WATER SOURCES

3.1 Hydrogeologic Conditions

The public water supply well is assumed to be in an unconfined or semi-confined aquifer if completed above the limiting bedrock layer. Most of the well logs in the area show water bearing sand and clay at depths greater than 50 feet. Based on MBMG Ground-Water Assessment Map, ground water in the shallow aquifers is under unconfined conditions and is characterized by local flow systems where ground water moves from local drainage divides toward adjacent valley bottoms. The well is located within the shallow basin in the Quaternary sediments (alluvium, outwash, and alluvial fan sediments). These aquifers are highly permeable and reportedly have high yield ranging between 5 to 100 gpm. Infiltration of irrigation and precipitation and losses from streams along the base of the Cabinet Mountain Range are significant sources of recharge to the shallow aquifers. Furthermore, the source water for the well is classified as High Source Water Sensitivity based on Table 2: Source Water (Aquifer) Sensitivity Table criteria. See attached soil map in **Appendix B**.

3.2 Conceptual Model & Assumptions

Groundwater flow in this area is to the northeast running perpendicular with Noxon Reservoir and down from the higher elevations to the southwest. It is assumed that the reservoir is a gaining waterway in this area due to the surrounding creeks on both sides of the river upgradient from the property. Therefore, the well will not be hydraulically connected to surface water. The following methods will be used to delineate the different regions:

Control Zone – A 100-foot radius control zone is delineated around the wellhead. See attached Site Layout – **Appendix A**.

Inventory Region – The inventory region is generally the area that is expected to contribute to the water supply over three years; this is sometimes referred to as a three-year capture zone. The inventory region for the PWS was delineated based on a one-mile radius. See attached Inventory Region Map – **Appendix B**.

3.3 Well Information

Final well information will be reports. The existing well was dug to a total depth of 104 feet, static water level of 36 feet, pump water level of 41 feet, and yield of 50 gpm for 2 hours.

3.4 Aquifer Properties

Due to the small number of wells in the area little is known about the aquifer properties in the area. The well will be pump tested after completion to determine aquifer properties. The static water level from the source aquifer is greater than 25 feet of the surface per the existing well log; therefore, the water source should not require full-time disinfection.

4.0 INVENTORY

Montana Natural Resource Information System Digital Atlas of Montana was used to determine inventory and potential sources of contamination.

4.1 Control Zone

The well location can be seen in **Appendix A.** The 100-foot control zone for the public water supply well contains part of the school building and the parking area. The new septic system will be located outside of the control zone closer toward the back of the property. This drainfield will be upgradient but not directly upgradient of the proposed well. The area is contained within the property boundary. The area immediately outside the property is a residential development with single-family houses served by individual wells and septic systems. No contamination is foreseen. This control zone will be owned by Trout Creek Seventh Day Adventist Church.

4.2 Inventory Region

The 1-mile radius is shown in **Appendix A.** The 1-mile inventory region contains much of the landscape that is within the control zone. In **Appendix B**, NRIS data shows a mix of land use surrounding the property that includes evergreen forest, open grassland, mixed forest, and a residential and commercial development. Highway 200 with local roadways run through this region. NRIS did not identify any other major sources of contamination such as abandoned mine sites, remediation response sites, landfills, federal superfund sites, crude oil pipelines, or RV dump sites.

4.3 Recharge Region

The recharge region includes all area upstream of the property in the Belgian Gulch-Noxon Reservoir. The area includes about 8.4 square miles of mostly agriculture, forested and residential land with little development and low risk of contamination.

5.0 SUSCEPTIBILITY

Susceptibility is the degree of likelihood for a public water supply to be impacted by inventoried contaminant sources. Susceptibility is determined in accordance with the *Instructions for Completing a PWS-6 Report for Community or Non-Community Non-Transient Public Water Supplies* (DEQ, 2007). Susceptibility is determined by considering the *hazard* that a significant potential contaminant source presents to the PWS source water, relative to any *barriers* to the contaminant. Hazard is determined by the proximity or density of significant potential contaminant sources. Barriers to contamination are anything that decreases the likelihood of contaminants reaching a water source.

Table 1 – Significant Potential Contaminant Sources for New Well

Potential Contaminant Source	Potential Contaminants	Hazard	Hazard Rating	Barriers	Susceptibility
Septic Systems	Nitrate, Pathogens	Leakage of sewage into groundwater	**Moderate (50-300 per sq. mile)**	Well construction; well pump and intake placement; proper maintenance of facilities;	**Low**
On-Site Septic Systems	Nitrate, Pathogens	Leakage of Sewage into groundwater	**High (currently within control zone)**	Well construction; well pump and intake placement; abandoned existing system; proposed location downgradient of well	**Low**
Land use – Agricultural/irrigated land	Pesticides, fertilizer being applied to surrounding land	Routine application of fertilizer and pesticides, storm water runoff. Infiltration to groundwater	**Low (less than 20 percent of the region)**	Well construction; well pump and intake placement; emergency response plan; proper application rates	**Low**
Active USTs	VOCs, petroleum hydrocarbons	Contaminants leaching into groundwater	**High**	Compliance with 1998 upgrades, spill prevention, groundwater monitoring, down gradient of PWS	**Moderate**

These ratings are derived from the procedures established by the *Instructions for Completing a PWS-6 Report for Community or Non-Community Non-Transient Public Water Supplies* (DEQ,

2007). In general, the hazard posed by the septic systems in the area is moderate (50-300 septic systems/restroom facilities per square mile). The hazard posed by on-site septic system is high due to existing septic system being in the control zone. The hazard posed by agricultural land use is low (less than 20% of land use within the inventory region). The hazard posed by active USTs is moderate after barriers are implemented. An average rating of "low susceptibility" is given for the new well.

6.0 LIMITATIONS

This Source Water Delineation and Assessment Report is intended to meet the technical requirements for delineation and assessment of the proposed well field as required by the Montana Department of Environmental Quality and the federal Safe Drinking Water Act (SDWA) Amendments of 1996 [U.S. Code Title 42, Chapter 6A, Subchapter XII, Part E, § 300j-13-(a) Source Water Assessment]. The following limitations should be noted:

- Not every potential or existing source contamination in the proposed area has been identified. Consideration was limited to potential sources of contamination that are within the inventory region and of a type determined by the DEQ to be significant.

- Potential sources of contamination were identified using online databases and available overhead and map imagery. Field surveys and inspections of the inventory region were not conducted.

- Delineation of the recharge region is considered a first-order approximation, and may not be accurate. In order to accurately delineate a truly representative recharge region, a detailed field study would be required. Such a study is beyond the scope of this report.

- The potential contaminant sources described in the inventory are identified from readily available information. Consequently, unregulated activities or unreported contaminant releases may have been overlooked. Multiple data sources are used to increase the likelihood that major threats to the source water are identified. The inventory is not exhaustive. Absence of a potential contaminant in the inventory or susceptibility assessment of this report does not mean that the potential for contamination does not exist, or that there is no threat.

- This report is not, and should not be construed as, a guarantee, warranty or certification that the PWS (well field) will not be impacted by potential contaminant sources given a low susceptibility.

7.0 REFERENCES

1. Montana Department of Environmental Quality. (2022, June 02). Instructions for Completing a PWS-6 Report For Transient Public Water Supplies.

2. Montana Department of Environmental Quality. (1999). *PWS 6 - Source Water Protection Delineation.*

3. Montana State Library Natural Resources Information System. https://nris.msl.mt.gov/

Prepared by:
Landmark Consulting LLC

Kane Leithead, EIT

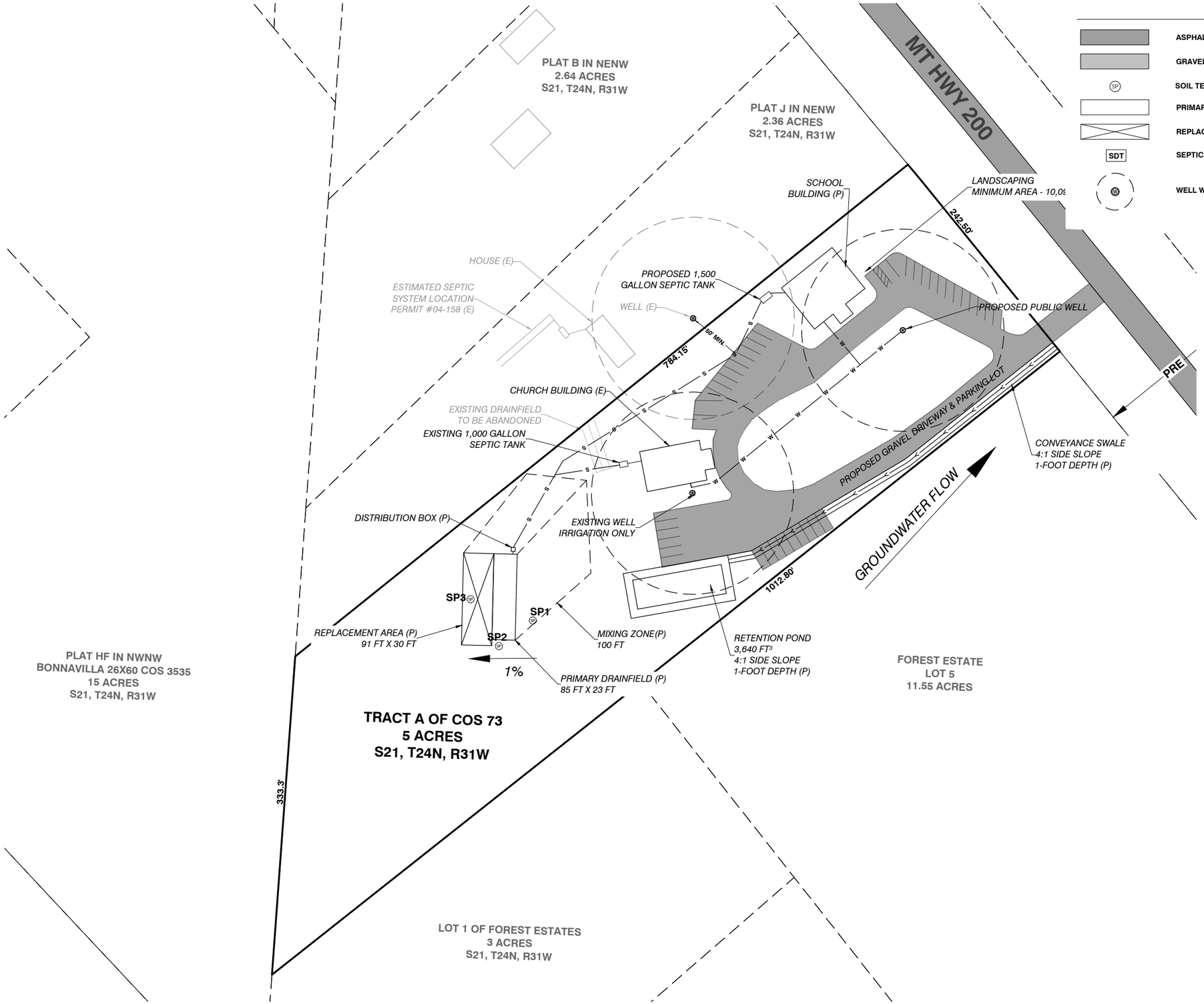
Checked by:

Andy Mefford, PE

Date 12/31/2024

APPENDIX A:

Site Layout – Well Location, Control Region



LEGEND

- ASPHALT ROAD
- GRAVEL DRIVEWAY AND PARKING AREA
- SP — SOIL TEST PIT
- PRIMARY DRAINFIELD (85 FT X 23 FT)
- REPLACEMENT AREA (91 FT X 30 FT)
- SDT — SEPTIC TANK
- W — WELL WITH 100-FT RADIUS ISOLATION ZONE
- (P) — PROPOSED FACILITIES
- (E) — EXISTING FACILITIES
- PRE — PUBLIC ROAD EASEMENT
- BUILDING FOOTPRINT
- 100 SOURCE SPECIFIC MIXING ZONE

MDEQ LOT LAYOUT NOTES:

(A) KNOWN EXISTING, PREVIOUSLY APPROVED, OR PROPOSED WELLS, WASTEWATER SYSTEMS AND MIXING ZONES ON OR WITHIN 100' OF THE SUBDIVISION HAVE BEEN SHOWN ON THIS LOT LAYOUT.

(B) ALL SETBACKS PURSUANT TO ARM 17.36.323 ARE MET.

(C) ALL KNOWN SOURCES OF CONTAMINATION WITHIN 500' OF THE PROPOSED WATER SOURCE ARE SHOWN.

(D) LAKES, STREAMS, IRRIGATION DITCHES, WETLANDS AND SPRINGS PRESENT WITHIN 100' OF THE SUBDIVISION PERIMETER ARE SHOWN ON THIS LOT LAYOUT.

(E) ARM 17.30.518 SOURCE SPECIFIC MIXING ZONES OF 100 FT ARE REQUESTED FOR PROPOSED WASTEWATER TREATMENT SYSTEM ON THIS LOT LAYOUT.

MONTANA ANDY MEFFORD No. 16206PE LICENSED PROFESSIONAL ENGINEER

PROJECT #: 9522-24
DRAWN: DIANA ALLEN
CHECKED: ANDY MEFFORD, PE
REVISION:
REVISION:
REVISION:
REVISION:
REVISION:

7TH DAY ADVENTIST CHURCH
PUBLIC WASTEWATER SYSTEM

S21, T24N, R31W TROUT CREEK, SANDERS CO., MT

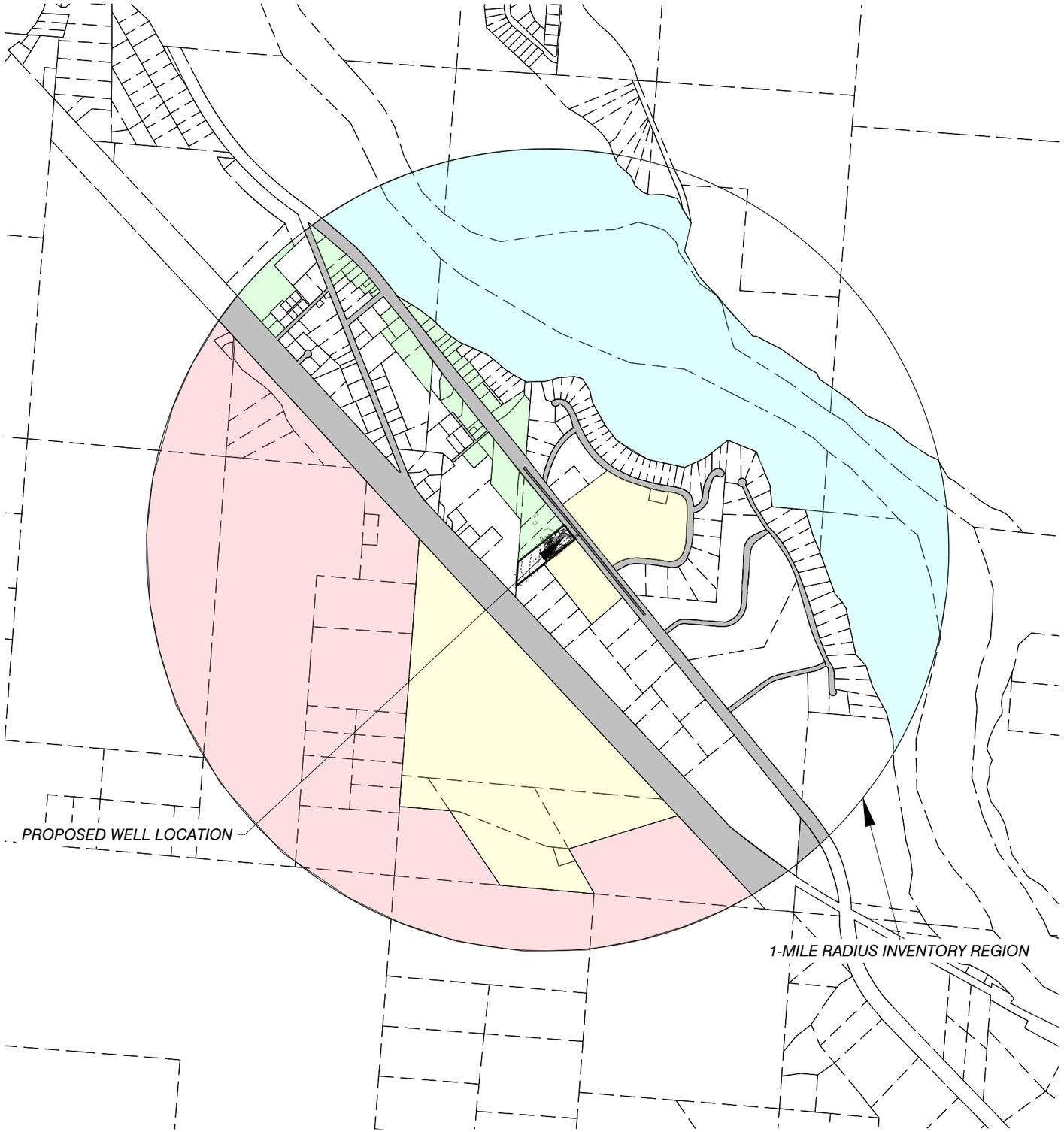
Professional Consultants Inc.
Engineers, Surveyors, Planners, Mappers
3115 RUSSELL ST PO BOX 7750
MISSOULA, MONTANA 59807
PHONE (406) 728-4611
EMAIL PCI@PCIMONTANA.COM

DEC. 31, 2024

SITE LAYOUT

1

F:\2024\9522-24 Trout Creek 7th Day Adventist\Drafting & GIS\9522-24 DESIGN.dwg 12/31/24



LEGEND

- RRW & HRW (ROADWAYS AND RAILROAD)
- STATE SURFACE WATER (NOXON RESERVOIR)
- F (FOREST AREA)
- ADP & SR MIXTURE (AGRICULTURAL DRYLAND PASTURE AND SEWERED RESIDENTIAL)
- SC (SEWERED COMMERCIAL)
- UNSHADED - SR (SEWERED RESIDENTIAL)

N

750 0 750 1500

SCALE IN FEET

MONTANA ANDY MEFFORD No. 15206PE LICENSED PROFESSIONAL ENGINEER

PROJECT #: 9522-24

DRAWN: OLIVIA ALLEN
CHECKED: ANDY MEFFORD
REVISION:
REVISION:
REVISION:
REVISION:
REVISION:

7TH DAY ADVENTIST CHURCH
PWS 6 - INVENTORY MAP

S21, T24N, R31W TROUT CREEK, SANDERS CO., MT

Professional Consultants Inc.
Engineers, Surveyors, Planners, Mappers
3115 RUSSELL ST PO BOX 7750
MISSOULA, MONTANA 59807
PHONE (406) 728-4611
EMAIL PCI@PCIMONTANA.COM

DEC. 31, 2024

INVENT. MAP

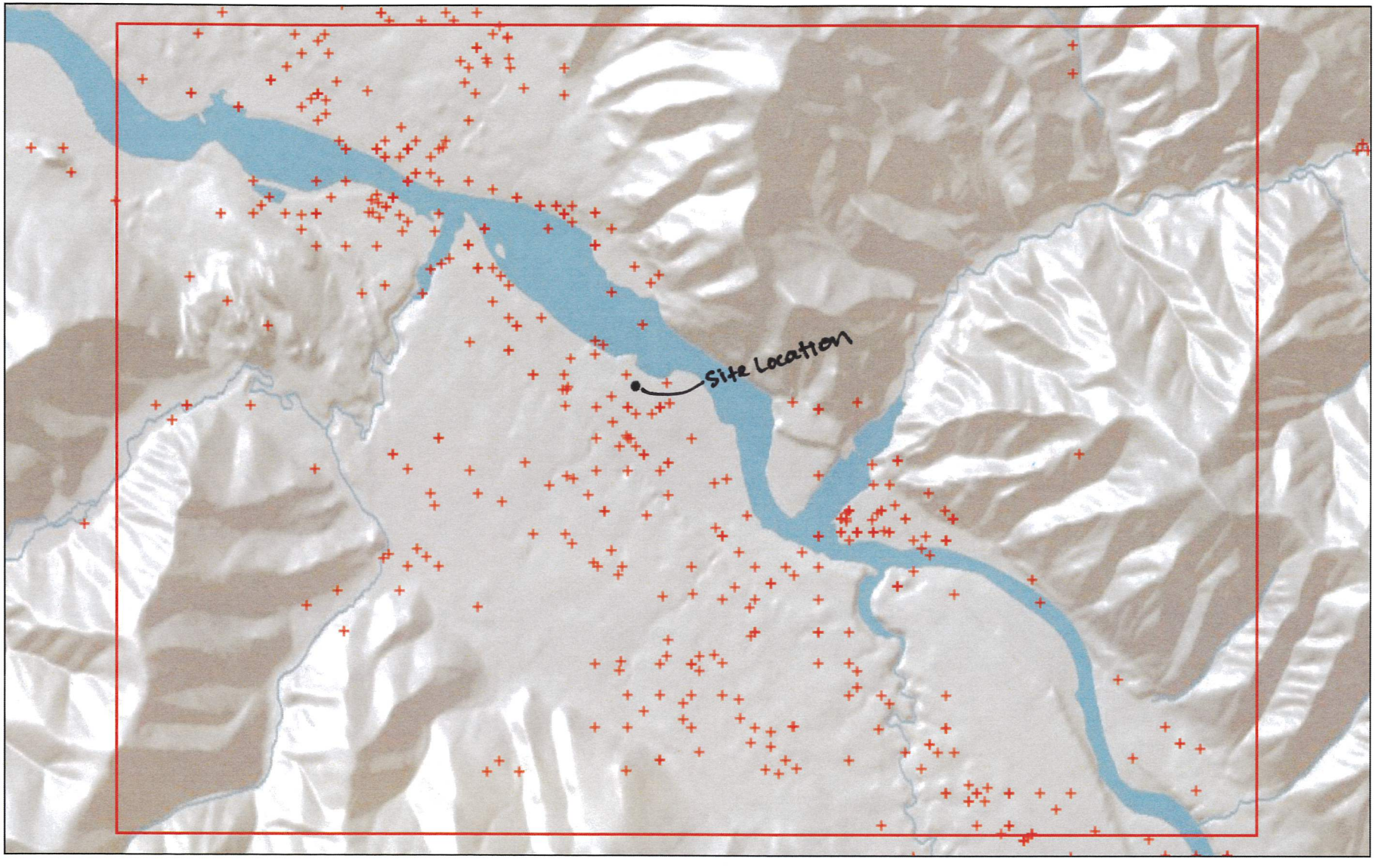
2

F:\2024\9522-24 Trout Creek 7th Day Adventist\Drafting & GIS\9522-24 DESIGN.dwg 12/31/24

APPENDIX B:

Natural Resource Information System – Inventory Region

GWIC Well Location Map

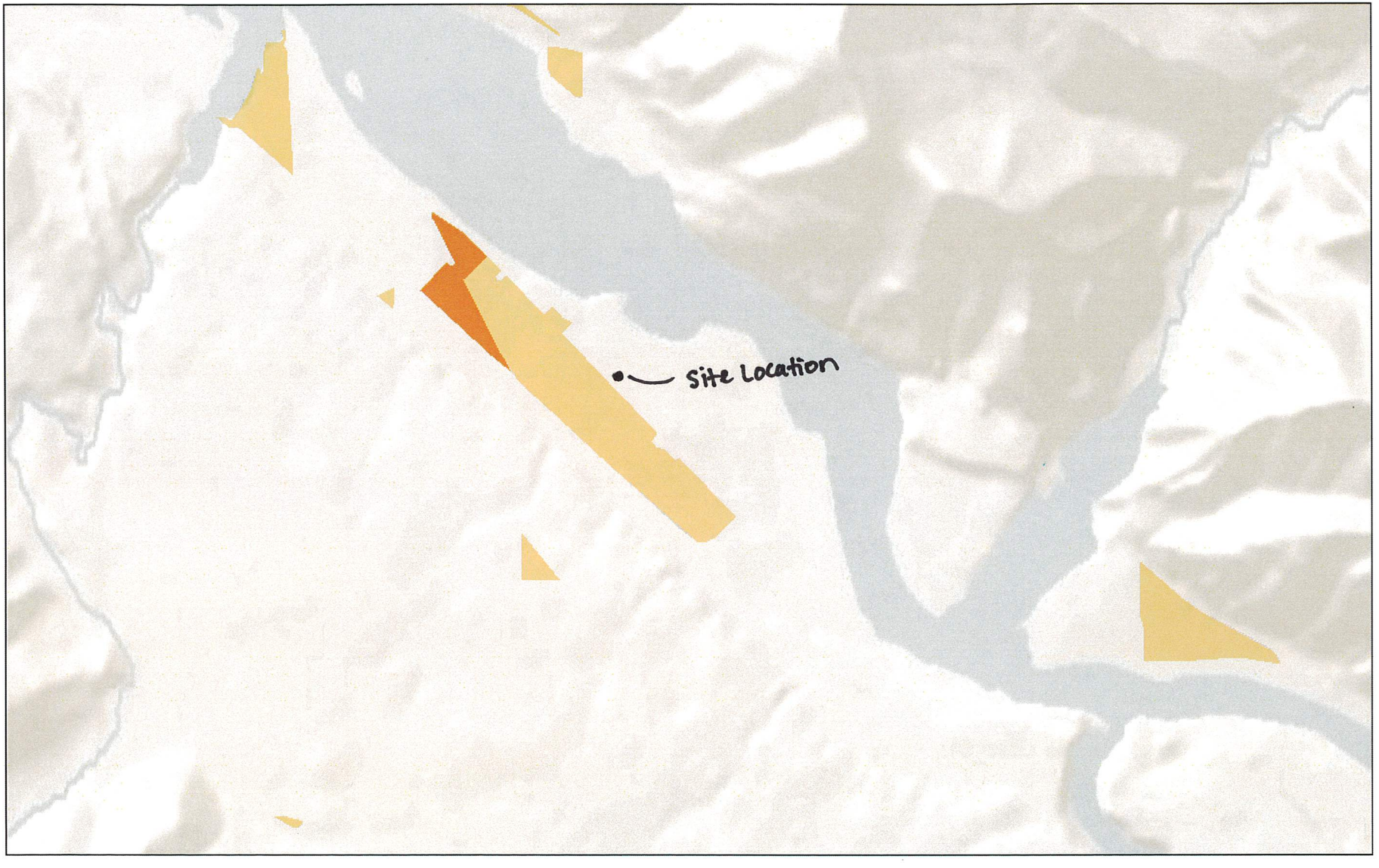


+ GWWELLS

Map created using the Digtal Atlas May 6, 2024
http://msl.mt.gov/GIS/Atlas

Montana State Libary - Digital Library
(406) 444-5354 | geoinfo@mt.gov | http://msl.mt.gov

Septic System Density Map



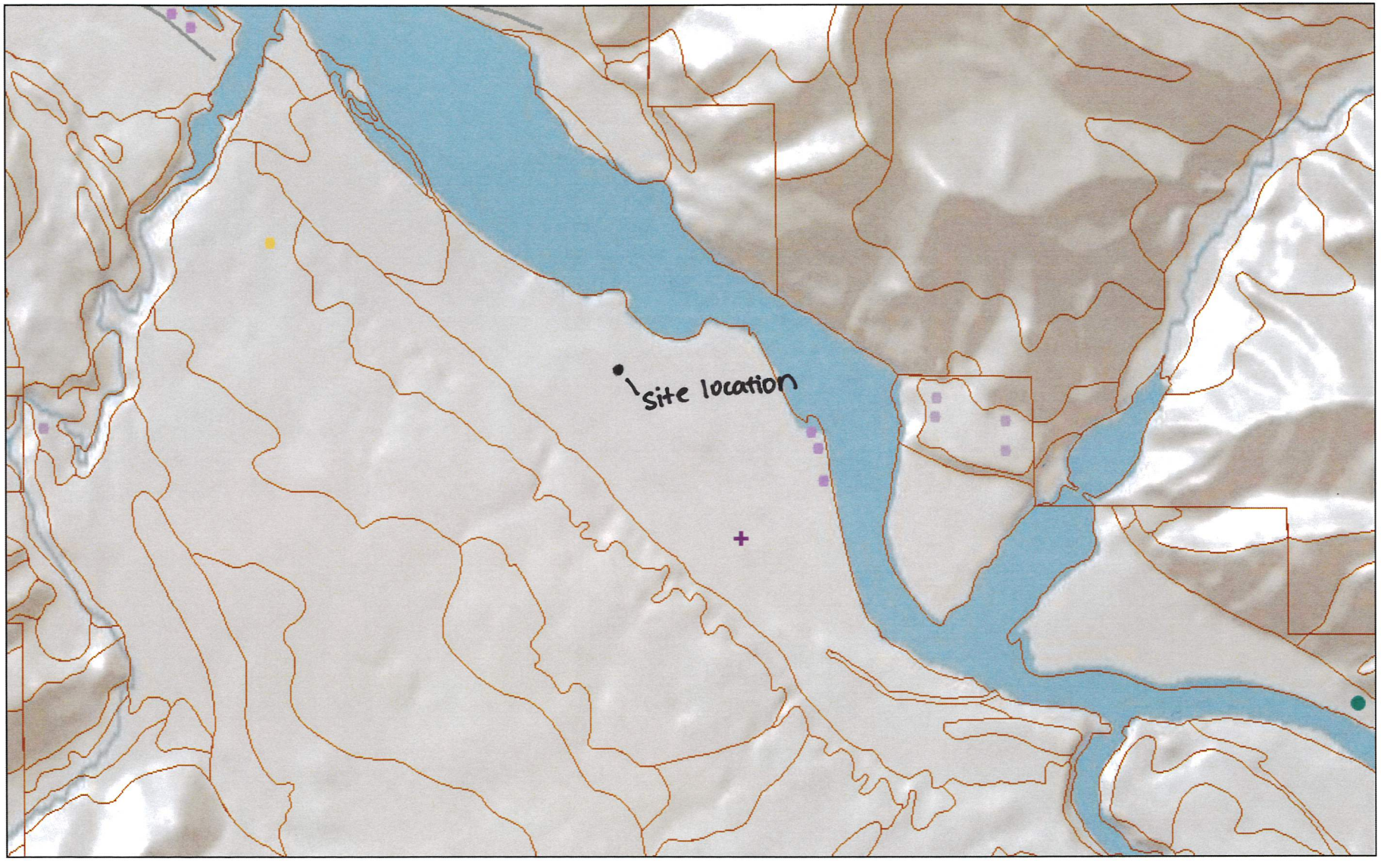
SEPDENS2010

- High
- Medium
- Low

Map created using the Digtal Atlas May 6, 2024
http://msl.mt.gov/GIS/Atlas

Montana State Libary - Digital Library
(406) 444-5354 | geoinfo@mt.gov | http://msl.mt.gov

SSURGO Soils Map



Soils MU
SSURGO_POINT
Stony
Gravelly
Sandy
Gravel Pit
Marsh
SOIL_LINE
Escarpment

Map created using the Digtal Atlas May 6, 2024
http://msl.mt.gov/GIS/Atlas

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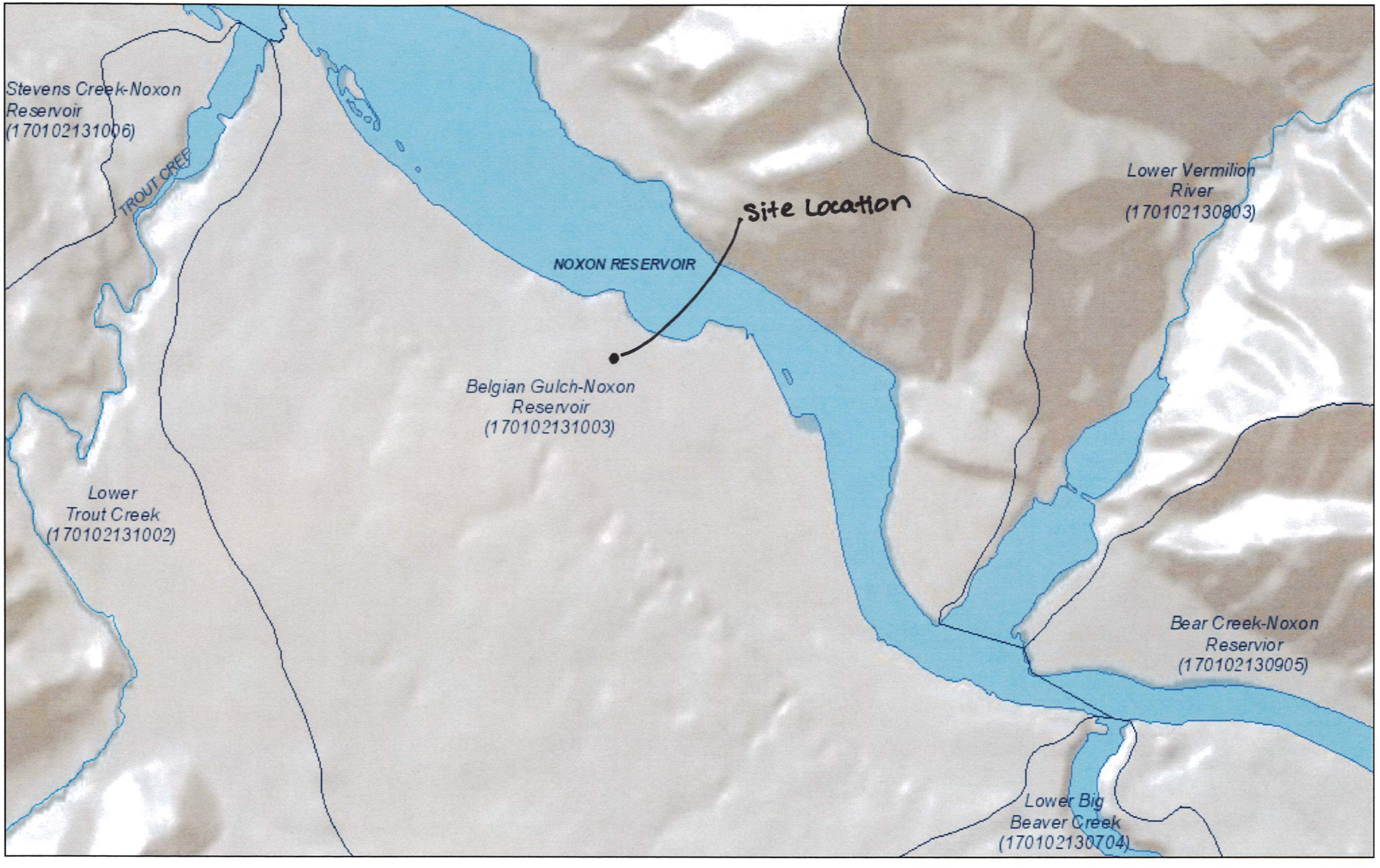
(406) 444-5354 | geoinfo@mt.gov | http://msl.mt.gov

Watershed Map



Subwatershed (WBD_HU12)
Watershed (WBD_HU10)
Subbasin (WBD_HU8)
Lakes24K_NamedOnly
Streams24K_NamedOnly

Map created using the Digtal Atlas May 6, 2024
http://msl.mt.gov/GIS/Atlas

Montana State Libary - Digital Library
(406) 444-5354 | geoinfo@mt.gov | http://msl.mt.gov

Montana Digital At

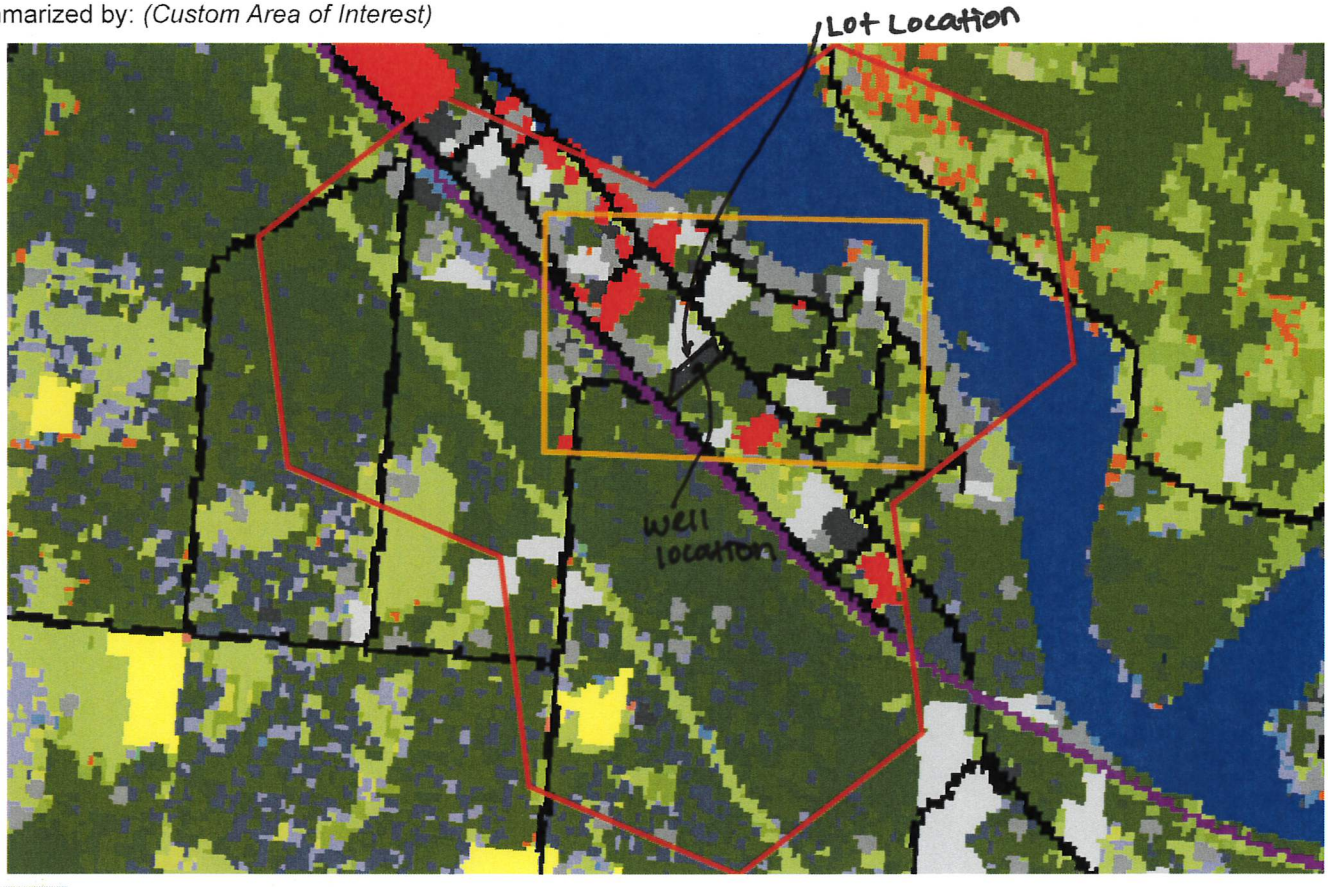
MONTANA STATE LIBRARY
NATURAL HERITAGE PROGRAM
A program of the Montana State Library's
Natural Resource Information System

Land Cover Map

Latitude Longitude
47.80868 -115.56243
47.84346 -115.60570

Land Cover

Summarized by: *(Custom Area of Interest)*



23% (*433 Acres*)

Forest and Woodland Systems
Conifer-dominated forest and woodland (xeric-mesic)

Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest

This ecological system, composed of highly variable montane conifer forests, is found throughout Montana. It is associated with a submesic climate regime with annual precipitation ranging from 250 to 1,000 millimeters (10-39 inches), with most precipitation occurring during winter, and April through June. Winter snowpacks typically melt off in early spring at lower elevations. Elevations range from valley bottoms to 1,676 meters (5,500 feet) in northwestern Montana and up to 2,286 meters (7,500 feet) on warm aspects in southern Montana. In northwestern and west-central Montana, this ecosystem forms a forest belt on warm, dry to slightly moist sites. It generally occurs on gravelly soils with good aeration and drainage and a neutral to slightly acidic pH. In the western part of the state, it is seen mostly on well drained mountain slopes and valleys from lower treeline to up to 1,676 meters (5,500 feet). Immediately east of the Continental Divide, in north-central Montana, it occurs at montane elevations. Douglas-fir (*Pseudotsuga menziesii*) is the dominant conifer both as a seral and climax species. West of the Continental Divide, occurrences can be dominated by any combination of Douglas-fir and long-lived, seral western larch (*Larix occidentalis*), grand fir (*Abies grandis*), ponderosa pine (*Pinus ponderosa*) and lodgepole pine (*Pinus contorta*). Aspen (*Populus tremuloides*) and western white pine (*Pinus monticola*) have a minor status, with western white pine only in extreme western Montana. East of the Continental Divide, larch is absent and lodgepole pine is the co-dominant. Engelmann spruce (*Picea engelmannii*), white spruce, (*Picea glauca*)or their hybrid, become increasingly common towards the eastern edge of the Douglas-fir forest belt.

21% (*399 Acres*)

Forest and Woodland Systems
Conifer-dominated forest and woodland (mesic-wet)

Rocky Mountain Mesic Montane Mixed Conifer Forest

These forests are generally dominated by western hemlock (*Tsuga heterophylla*), western red cedar (*Thuja plicata*), and grand fir (*Abies grandis*). They are found in areas influenced by incursions of mild, wet, Pacific maritime air masses west of the Continental Divide in Montana. Occurrences are found on all slopes and aspects but grow best on sites with high soil moisture, such as toeslopes and bottomlands. At the periphery of its distribution, this system is confined to moist canyons and cooler, moister aspects. Generally, these are moist, non-flooded or upland forest sites that are not saturated yearlong. In northwestern Montana, western hemlock and western red cedarforests occur on bottomland and northerly exposures between 609-1,585 meters (2,000-5,200 feet) on sites with an average annual precipitation of 635 millimeters (25 inches). These forests are common in extreme northwestern Montana, and extend eastward to the Continental Divide in the Lake McDonald drainage of Glacier National Park. Isolated stands of western hemlock occur in the Swan Valley, but are found most commonly in the Libby and Thompson Falls vicinities, west to the Idaho border. Western red cedaroccurs extensively in the Mission Mountain ranges south to Missoula, and on lower flanks of the Swan Range north of Lion Creek. It is confined to the riparian zone of major streams on the east face of the Bitterroot Mountain Range. Grand fir, being less moisture dependent, occurs in more southerly and easterly sites than western red cedar and western hemlock. This system is similar to Rocky Mountain Dry-Mesic Mixed Montane Conifer Forest, which can be described as a seral phase of this system on appropriate sites west of the Continental Divide.

11% (213 Acres)

Wetland and Riparian Systems
Open Water

Open Water

All areas of open water, generally with less than 25% cover of vegetation or soil

9% (164 Acres)

Grassland Systems
Montane Grassland

Rocky Mountain Lower Montane, Foothill, and Valley Grassland

This grassland system of the northern Rocky Mountains is found at lower montane to foothill elevations in mountains and valleys throughout Montana. These grasslands are floristically similar to Big Sagebrush Steppe but are defined by shorter summers, colder winters, and young soils derived from recent glacial and alluvial material. They are found at elevations from 548 - 1,650 meters (1,800-5,413 feet). In the lower montane zone, they range from small meadows to large open parks surrounded by conifers; below the lower treeline, they occur as extensive foothill and valley grasslands. Soils are relatively deep, fine-textured, often with coarse fragments, and non-saline. Microphytic crust may be present in high-quality occurrences. This system is typified by cool-season perennial bunch grasses and forbs (>25%) cover, with a sparse shrub cover (<10%). Rough fescue (*Festuca campestris*) is dominant in the northwestern portion of the state and Idaho fescue (*Festuca idahoensis*) is dominant or co-dominant throughout the range of the system. Bluebunch wheatgrass (*Pseudoroegneria spicata*) occurs as a co-dominant throughout the range as well, especially on xeric sites. Western wheatgrass (*Pascopyrum smithii*) is consistently present, often with appreciable coverage (>10%) in lower elevation occurrences in western Montana and virtually always present, with relatively high coverages (>25%), on the edge of the Northwestern Great Plains region. Species diversity ranges from a high of more than 50 per 400 square meter plot on mesic sites to 15 (or fewer) on xeric and disturbed sites. Most occurrences have at least 25 vascular species present. Farmland conversion, noxious species invasion, fire suppression, heavy grazing and oil and gas development are major threats to this system.

No Image

6% (117 Acres)

Human Land Use
Developed

Other Roads

County, city and or rural roads generally open to motor vehicles.

6% (117 Acres)

Human Land Use
Developed

Low Intensity Residential

Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20-50% of total cover. These areas most commonly include single-family housing units in rural and suburban areas. Paved roadways may be classified into this category.

5% (87 Acres)

Wetland and Riparian Systems
Floodplain and Riparian

Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland

This ecological system is found throughout the Rocky Mountain and Colorado Plateau regions. In Montana, sites occur at elevations of 609-1,219 meters (2,000-4,000 feet) west of the Continental Divide. East of the Continental Divide, this system ranges up to 1,676 meters (5,500 feet). It generally comprises a mosaic of multiple communities that are tree-dominated with a diverse shrub component. It is dependent on a natural hydrologic regime with annual to episodic flooding, so it is usually found within the flood zone of rivers, on islands, sand or cobble bars, and along streambanks. It can form large, wide occurrences on mid-channel islands in larger rivers, or narrow bands on small, rocky canyon tributaries and well-drained benches. It is also typically found in backwater channels and other perennially wet but less scoured sites, such as floodplains, swales and irrigation ditches. In some locations, occurrences extend into moderately high intermountain basins where the adjacent vegetation is sage steppe. Black cottonwood (*Populus balsamifera* ssp. *trichocarpa*) is the key indicator species. Other dominant trees may include boxelder maple (*Acer negundo*), narrowleaf cottonwood (*Populus angustifolia*), eastern cottonwood (*Populus deltoides*), Douglas-fir (*Pseudotsuga menziesii*), peachleaf willow (*Salix amygdaloides*), or Rocky Mountain juniper (*Juniperus scopulorum*). Dominant shrubs include Rocky Mountain maple (*Acer glabrum*), thinleaf alder (*Alnus incana*), river birch (*Betula occidentalis*), redoiser dogwood (*Cornus sericea*), hawthorne (*Crataegus* species), chokecherry (*Prunus virginiana*), skunkbush sumac (*Rhus trilobata*), willows (*Salix* species), rose (*Rosa* species), silver buffaloberry (*Shepherdia argentea*), or snowberry (*Symphoricarpos* species).

4% (76 Acres)

Forest and Woodland Systems
Conifer-dominated forest and woodland (xeric-mesic)

Rocky Mountain Ponderosa Pine Woodland and Savanna

This system occurs on warm, dry, exposed sites in the foothills of the Rocky Mountains in west-central and central Montana, at the ecotone between grasslands or shrublands and more mesic coniferous forests. Elevations range from 1,066 to 1,676 meters (3,500-5,500 feet), with higher elevation examples mostly confined to central Montana. Occurrences are found on all slopes and aspects; however, moderately steep to very steep slopes or ridgetops are most common. True savanna types are infrequent; the system is more characteristically an open forest with a grassy understory. In the western part of the state, this system is seen mostly on dry slopes in the rainshadow of the Bitterroot Mountains. East of the Continental Divide, it is most widespread around Helena and Lewistown, although it occurs throughout mountain ranges as far east as the Little Rocky and Bearpaw Mountains. Ponderosa pine (*Pinus ponderosa*) is the dominant conifer. Douglas-fir (*Pseudotsuga menziesii*) and western larch (*Larix occidentalis*) may be present in the tree canopy in the more western areas, but are usually absent. In central Montana, limber pine (*Pinus flexilis*) and horizontal juniper (*Juniperus horizontalis*) are frequently components. Although the understory of ponderosa pine forests is often shrubby in other states, in Montana, habitats are mostly dominated by graminoids, although bitterbrush (*Purshia tridentata*), white snowberry (*Symphoricarpos albus*), and skunkrush (*Rhus trilobata*) occur in forests on benchlands and rocky slopes in the central portion of the state. Understory vegetation is more typically grasses and forbs that resprout following low to moderate intensity surface fires. Prolonged drought, beetle kill and exotic invasion are rapidly changing the dynamics of this system.

4% (69 Acres)

Human Land Use
Developed

Developed, Open Space

Vegetation (primarily grasses) planted in developed settings for recreation, erosion control, or aesthetic purposes. Impervious surfaces account for less than 20% of total cover. This category often includes highway and railway rights of way and graveled rural roads.

No Image

2% (39 Acres)

Human Land Use
Developed

Commercial / Industrial

Businesses, industrial parks, hospitals, airports; utilities in commercial/industrial areas.

No Image

2% (*39 Acres*)

Human Land Use
Developed

Major Roads

U.S. and State Highways that are not part of the National Highway System (NHS) Interstate network. This category includes entrance and exit ramps to NHS Interstate highways.

2% (*35 Acres*)

Human Land Use
Developed

High Intensity Residential

Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50-80% of the total cover. These areas most commonly include single-family housing units in urban areas. Paved roadways, parking lots, and other large impervious surfaces may be classified into this category.

No Image

2% (*33 Acres*)

Human Land Use
Developed

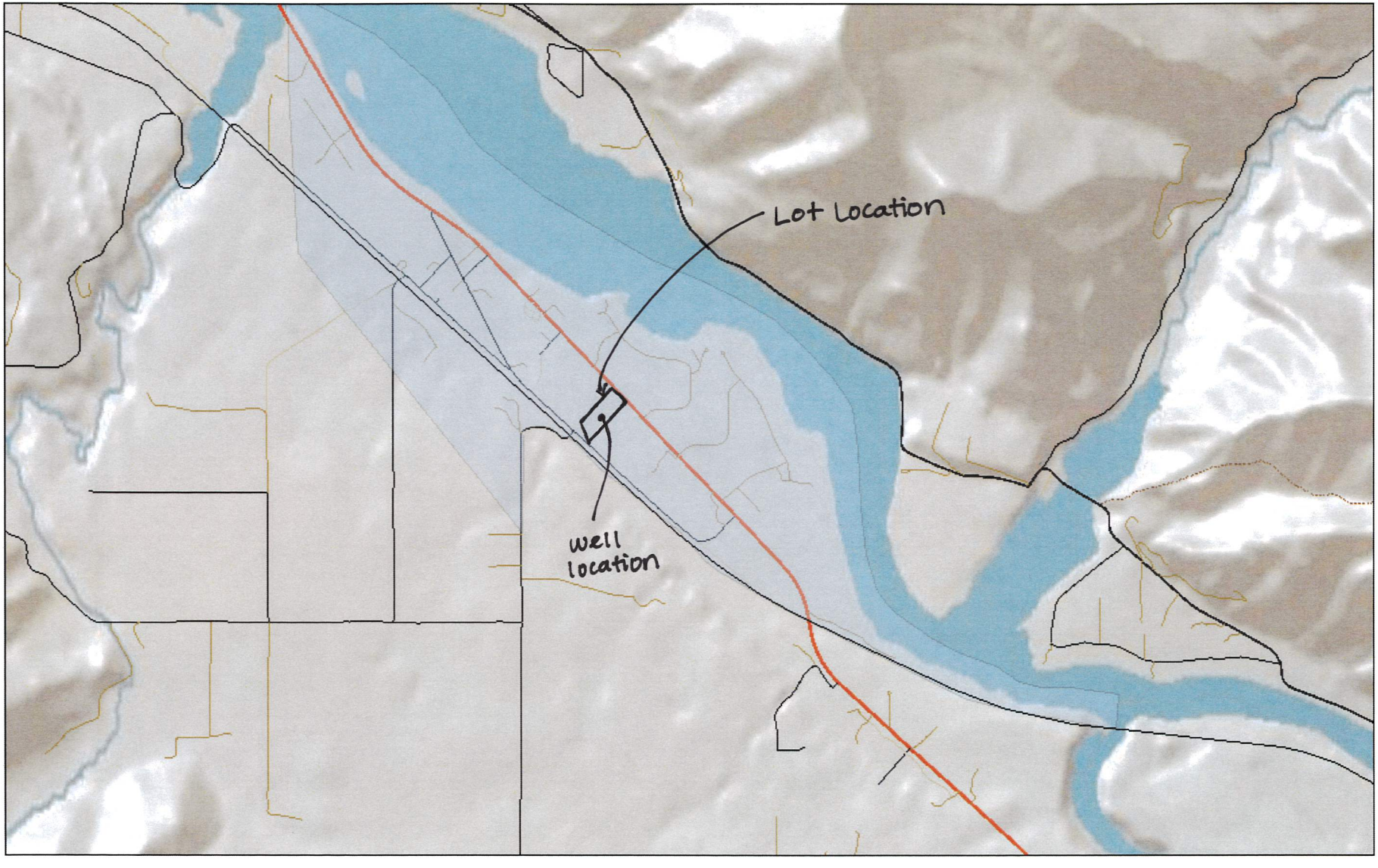
Railroad

Railroad tracks and railroad berms/rights of way, currently in use or capable of use

Additional Limited Land Cover

1% (*27 Acres*) Rocky Mountain Montane-Foothill Deciduous Shrubland
1% (*23 Acres*) Alpine-Montane Wet Meadow
1% (*20 Acres*) Insect-Killed Forest
1% (*15 Acres*) Pasture/Hay
<1% (*5 Acres*) Rocky Mountain Subalpine-Montane Mesic Meadow
<1% (*4 Acres*) Emergent Marsh
<1% (*2 Acres*) Rocky Mountain Cliff, Canyon and Massive Bedrock
<1% (*1 Acres*) Introduced Upland Vegetation - Annual and Biennial Forbland
<1% (*1 Acres*) Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland
<1% (*0 Acres*) Rocky Mountain Subalpine-Montane Fen

Population and Roadway Map



TRAILS
RAILROADS
TOWNAREAS
Census Designated Place

Other Roads
Agency Road
Access Road
Public Roads
Public Road

Highways
NHS Interstate
NHS Primary
Primary
Secondary

Map created using the Digtal Atlas May 6, 2024
http://msl.mt.gov/GIS/Atlas

Montana State Libary - Digital Library
(406) 444-5354 | geoinfo@mt.gov | http://msl.mt.gov

M

APPENDIX C:

Existing Well Documents
Water Quality Sample Test

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
Plot this site in State Library Digital Atlas
Plot this site in Google Maps
View scanned well log (7/16/2009 1:11:20 PM)

Site Name: 7TH DAY ADV CHR
GWIC Id: 78745
DNRC Water Right: 19812

Section 1: Well Owner(s)

1) 7TH DAY ADVENT CHURCH (MAIL)
N/A
TROUT CREEK MT 59874 [09/01/1977]

Section 2: Location

Township	Range	Section	Quarter Sections
24N	31W	21	NW¼

County: SANDERS
Geocode:

Latitude	Longitude	Geomethod	Datum
47.828752	-115.584602	TRS-SEC	NAD83

Ground Surface Altitude: **Ground Surface Method**: **Datum**: **Date**:

Addition: **Block**: **Lot**:

Section 3: Proposed Use of Water

PUBLIC WATER SUPPLY (1)

Section 4: Type of Work

Drilling Method: FORWARD ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Thursday, September 1, 1977

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	104	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-1	104	6	0.25			STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
104	104	6			OPEN BOTTOM

Annular Space (Seal/Grout/Packer)

There are no annular space records assigned to this well.

Section 7: Well Test Data

Total Depth: 104
Static Water Level: 36
Water Temperature:

Air Test *

50 gpm with drill stem set at _ feet for 2 hours.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 41 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	1	SOIL
1	36	COBBLESTONES SAND
36	104	SAND GRAVEL WATER

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name: EUGENE KANE
Company: KANE WELL DRILLING & PUMP SERVICE
License No: WWC-23
Date Completed: 9/1/1977

(1) Proj#9522-24

State of Montana and EPA certified drinking water analysis laboratory

RD Water Lab, LLC

Colilert test:

3700 S. Russell St. 120 - #1 Missoula, MT 59801
Phone: (406) 721-8179

P.O. Box 5064
Missoula, MT 59806

Bacteriological Analysis of Drinking Water

Name of business: TC 7th Day Adventist Church
City: Trout Creek PWSID #:
Date collected: 4/29/2024 Time: 2:30pm
Sample collector: Terri Stoltz Cert #:
Type of water supply: Upstairs Bathroom Sink faucet
Chlorine residual:

Person to receive report: Email: oliviaa@pcimontana.com
Name: PCI
Address: P.O. Box 1750
City: Missoula St.: MT Zip: 59806
Phone: ☐ Phone results
Email

1050
Received: 4-30-24
Reported: 5-1-24
Analyst: LG

☒ Satisfactory at this time.
☐ Contaminated: Water supply should be disinfected and retested before being used as drinking or household water.

Test Type	Lab #	ENTER SAMPLE SITE	
P/A	2404-374	upstairs bathroom Sink faucet	☒ Coliform Absent ☐ Coliform present E. coli ☒ Absent ☐ Present
			☐ Coliform Absent ☐ Coliform present E. coli ☐ Absent ☐ Present
		Coliform Absent	☐ Coliform Absent ☐ Coliform present E. coli ☐ Absent ☐ Present
			☐ Coliform Absent ☐ Coliform present E. coli ☐ Absent ☐ Present
			☐ Coliform Absent ☐ Coliform present E. coli ☐ Absent ☐ Present

1100
1100

B

SAMPLES MUST ARRIVE WITHIN 30 HOURS OF COLLECTION! Keep Sample Cool, NOT frozen

Samples may be dropped off in the office Monday - Friday 9am - 4pm,
or mailed Monday - Thursday ONLY to P.O. Box 5064 • Missoula, MT 59806

M

(2) Proj #9522-24

State of Montana and EPA certified drinking water analysis laboratory

RD Water Lab, LLC

Colilert test:

3700 S. Russell St. 120 - #1, Missoula, MT 59801
Phone: (406) 721-5179

P.O. Box 5064
Missoula, MT 59806

Bacteriological Analysis of Drinking Water

Name of business: TC 7th Day Adventist Church
City: Trout Creek PWSID #:
Date collected: 4/29/2024 Time: 2:35pm
Sample collector: Terri Stoltz Cert #:
Type of water supply: Kitchen faucet
Chlorine residual:

Person to receive report: Email: oliviaa@pcimontana.com
Name: PCI
Address: P.O. Box 1750
City: Missoula St.: MT Zip: 59806
Phone: ☐ Phone results
Email

1050
Received: 4-30-24
Reported: 5-1-24
Analyst: UG

☒ Satisfactory at this time.
☐ Contaminated: Water supply should be disinfected and retested before being used as drinking or household water.

B

Test Type	Lab #	ENTER SAMPLE SITE	
P/A	2404-375	Kitchen faucet	☒ Coliform Absent ☐ Coliform present E. coli ☒ Absent ☐ Present
		Coliform Absent	☐ Coliform Absent ☐ Coliform present E. coli ☐ Absent ☐ Present
			☐ Coliform Absent ☐ Coliform present E. coli ☐ Absent ☐ Present
			☐ Coliform Absent ☐ Coliform present E. coli ☐ Absent ☐ Present
			☐ Coliform Absent ☐ Coliform present E. coli ☐ Absent ☐ Present

1100/1100

SAMPLES MUST ARRIVE WITHIN 30 HOURS OF COLLECTION! Keep Sample Cool, NOT frozen M
Samples may be dropped off in the office Monday - Friday 9am - 4pm,
or mailed Monday - Thursday ONLY to P.O. Box 5064 • Missoula, MT 59806

(3)

Proj #9522-24

State of Montana and EPA certified drinking water analysis laboratory

RD Water Lab, LLC

Colilert test:

3700 S. Russell St. 120 - #1 Missoula, MT 59801 | P.O. Box 5964, Missoula, MT 59806
Phone: (406) 721-8179

Bacteriological Analysis of Drinking Water

Name of business: TC 7th Day Adventist Church Person to receive report: Email: oliviaa@pcimontana.com
City: Trout Creek PWSID #: _____ Name: PCI
Date collected: 4/29/2024 Time: 2:40pm Address: P.O. Box 1750
Sample collector: Terri Stoltz Cert #: _____ City: Missoula St: MT Zip: 59806
Type of water supply: outside spigot (west side) Phone: _____ ☐ Phone results
Chlorine residual: _____ Email

1100
1100

1050
Received: 4-30-24
Reported: 5-1-24
Analyst: LG

Test Type	Lab #	ENTER SAMPLE SITE	
	2404-376	outside spigot west side	X Coliform Absent ☐ Coliform present E. coli X Absent ☐ Present
			☐ Coliform Absent ☐ Coliform present E. coli ☐ Absent ☐ Present
		Coliform Absent	☐ Coliform Absent ☐ Coliform present E. coli ☐ Absent ☐ Present
			☐ Coliform Absent ☐ Coliform present E. coli ☐ Absent ☐ Present
			☐ Coliform Absent ☐ Coliform present E. coli ☐ Absent ☐ Present

B

X Satisfactory at this time.
☐ Contaminated: Water supply should be disinfected and retested before being used as drinking or household water.

M

SAMPLES MUST ARRIVE WITHIN 30 HOURS OF COLLECTION! Keep Sample Cool, NOT frozen
Samples may be dropped off in the office Monday - Friday 9am - 4pm,
or mailed Monday - Thursday ONLY to P.O. Box 5064 • Missoula, MT 59806

ANALYTICAL REPORT

Montana Environmental Laboratory LLC
1170 N. Meridian Rd., P.O. Box 8900, Kalispell, MT 59904-1900
Phone: 406-755-2131 Fax: 406-257-5359 www.melab.us

Professional Consultants
Professional Consultants
P.O. Box 1750
Missoula, MT 59806

PWS ID:
Project: 3020 MT Hwy 200, Trout Creek

Client Sample ID: Frost Free Spigot
Matrix: DRINKING WATER **Collected:** 04/11/2024 11:30

Lab ID: 2403345-01
Received: 04/15/2024 9:00

Analyses	Result	Units	RL	MCL	Method	Prepared	Analyzed	Analyst
Arsenic	**ND**	mg/L	0.001	0.010	E200.8		04/19/2024 16:07	BLW
Calcium	**44**	mg/L	1	1000	3500CA-B		04/19/2024 16:38	BLW
Chloride	**1.5**	mg/L	0.1	250	E300		04/16/2024 11:22	BLW
Conductivity	**396**	umho/cm	0.1		SM2510B		04/16/2024 14:45	BLW
Hardness	**220**	mg/L	1		SM2340C		04/17/2024 13:18	BLW
Iron	**ND**	mg/L	0.01	0.3	E200.8		04/19/2024 16:07	BLW
Magnesium	**26.7**	mg/L	0.1	500	E200.8		04/19/2024 16:07	BLW
Manganese	**ND**	mg/L	0.001	0.05	E200.8		04/19/2024 16:07	BLW
Nitrate + Nitrite, Total	**0.68**	mg/L	0.01	10	E353.2		04/16/2024 11:22	BLW
pH	**7.94**	pH	0.1		E150.1	04/15/2024	04/16/2024 14:43	BLW
Sodium	**2.4**	mg/L	0.1	20	E200.8		04/19/2024 16:07	BLW
Sulfate	**6.3**	mg/L	0.1	500	E300.0		04/16/2024 11:22	BLW

MCL = Maximum Contaminant Limit ND = Not Detected
RL = Reporting Limit

MEL REVIEW: _____