



SECTION C:

- **WATER & SANITATION REPORT**

**SUBDIVISION APPLICATION ATTACHMENT
I: WATER AND SANITATION REPORT – Included**

WATER & SANITATION REPORT

for

Double "R" Acres Lot 8 of Block 1

Legally Described as Lot 8 of Double "R" Acres #1 Subdivision,
Located in Section 26, Township 13 North, Range 20 West, Principle Meridian of Montana,
Missoula County, Montana

Published: September 24, 2020

Prepared For:

Holly Raser
4304 Spurgin Road
Missoula, MT 59804

Prepared By:

Territorial-Landworks, Inc. now IMEG
1817 South Avenue West, Suite A
Missoula, MT 59801

I.1. Map. A vicinity map or plan that shows:

- a. The location, within 100 feet outside of the exterior property line of the subdivision and on the proposed lots, of flood plains; surface water features; springs; irrigation ditches;
A vicinity map is included showing the location of the property in relation to the surrounding area. A more detailed and extensive MDEQ Lot Layout Exhibit is attached (attachment I.3) showing all the required information outlined in section I.1 of the subdivision application and section I.3 of the subdivision application. There are no irrigation ditches that cross through the property or are located within 100 feet outside of the exterior property line of the subdivision. There are no floodplains, surface water features, or known springs within 100 feet of the property.
- b. Existing, previously approved, and, for parcels fewer than 20 acres, proposed water wells and wastewater treatment systems; for parcels less than 20 acres, mixing zones;
Individual wells with service the two residential lots in the subdivision. The existing home is served by an existing well, and a proposed individual well will be serviced for Lot 8B, which will be located on Lot 8A will an access and maintenance easementThe location of these wells is shown on the MDEQ Lot Layout. Individual wastewater treatment and disposal systems will serve the lots in the subdivision. The approximate location of mixing zones which will be designed in accordance with ARM 17.36.320 are shown on the attached MDEQ Lot Layout Exhibit (attachment I.3).
- c. The representative drainfield site used for the soil profile description; and
The representative drainfield sites used for the soil profile description is shown on the MDEQ Lot Layout Exhibit. Four soil profiles were evaluated for the proposed drainfield site on the north lot. The soils were a mixture of Sandy Clay Loam. Additionally, groundwater monitoring

was conducted my MCCHD and It was determined there is a site that is suitable for conventional public wastewater treatment and disposal systems, however it must be shallow trenched due to high groundwater. Groundwater monitoring results have also been included to this report.

- d. The location, within 500 feet outside of the exterior property line of the subdivision, of public water and sewer facilities.

There are no public water or sewer facilities that exist within 500 feet of the exterior property line of the subdivision.

I.2. Description. A description of the proposed subdivision's water supply systems, storm water systems, solid waste disposal systems, and wastewater treatment systems, including whether the water supply and wastewater treatment systems are individual, shared, multiple user, or public as those systems are defined in rules published by the Montana Department of Environmental Quality (DEQ). ***The lots of the subdivision will be served by individual wells. The location of the wells iare shown on the attached MDEQ Lot Layout exhibit with 50-foot and 100-foot isolation zones. Private onsite wastewater treatment and disposal systems will serve each lot. Each lot will be responsible for maintaining retention facilities to mitigate stormwater runoff. No increase in stormwater is expected from the development. Republic Waste Services will provide solid waste disposal.***

I.3. Lot Layout. A drawing of the conceptual lot layout at a scale no smaller than 1 inch equal to 200 feet that shows all information required for a lot layout document in rules adopted by the Montana Department of Environmental Quality pursuant to 76-4-104, MCA.

A drawing of the MDEQ lot layout at a scale of 1-inch equals 30 feet that shows all of the information required pursuant to 76-4-104, MCA is included.

I.4. Suitability. Evidence of suitability for new on-site wastewater treatment systems that, at a minimum, include:

- a. A soil profile description from a representative drain-field site identified on the vicinity map that complies with standards published by the Montana Department of Environmental Quality; ***Soil profiles were completed in the drainfield locations for the north lot while the south lot will continue to utilize the existing septic system. These soil profile locations are marked on the attached MDEQ Lot Layout Exhibit (Attachment I.3). The soil profile results are attached in section I.4.a of this report. The layer in which the on-site wastewater treatment and disposal system laterals would be placed is primarily Sandy Clay Loam. The individual wastewater treatment and disposal systems will be designed in accordance with ARM 17.36 (Subchapter 3).***
- b. Demonstration that the soil profile contains a minimum of 4 feet of vertical separation distance between the bottom of the permeable surface of the proposed wastewater treatment system and a limiting layer; and ***Groundwater monitoring on-site shows there is evidence groundwater within 66" of the surface in the location of the proposed drainfield. A separate location was also monitored with failing results at 50", therefore it is critical the drainfield is located in the location of the passing monitoring hole. The groundwater monitoring was completed by the Missoula City-County Health Department and it was determined that the property has a suitable site for an on-site wastewater treatment and disposal system (attached in section I.4.c).***

- c. In cases in which the soil profile or other information indicates that ground water is within 7 feet of the natural ground surface, evidence that the ground water will not exceed the minimum vertical separation distance of 4 feet.

Groundwater monitoring on-site shows there is evidence groundwater within 66" of the surface in the location of the proposed drainfield. A separate location was also monitored with failing results at 50 therefore it is critical the drainfield is located in the location of the passing monitoring hole. The groundwater monitoring was completed by the Missoula City-County Health Department and it was determined that the property has a suitable site for an on-site wastewater treatment and disposal system (attached in section I.4.c).

I.5. Water Quantity. For new water supply systems, unless cisterns are proposed, evidence of adequate water availability:

- a. obtained from well logs or testing of onsite or nearby wells;
Each home will be supplied with water from individual wells shown on the attached Lot Layout exhibit. According to ARM 17.36.332, in order to show sufficient quantity, the wells must provide a sustained yield of at least fifteen gallons per minute over a one-hour period and ten gallons per minute over a two-hour period. A well pump test will be performed in accordance with DEQ Circular 1-3.2.4.1 to ensure adequate water quantity for each well in the subdivision. Existing well logs in the vicinity show an average of approximately 63 gpm yield per well over a 1-hour period suggesting a more than adequate water supply is available for the homes. A summary of all the wells in the vicinity are attached in section I.5.a of this report. The well will provide sufficient water quantity as described in ARM 17.36.332.
- b. obtained from information contained in published hydro-geological reports; or
Section is not applicable as Section (a) above sufficiently provides evidence of an ample quantity of water.
- c. as otherwise specified by rules adopted by the Montana Department of Environmental Quality pursuant to 76-4-104, MCA.
Section is not applicable as Section (a) above sufficiently provides evidence of an ample quantity of water.

I.6. Water Quality. Evidence of sufficient water quality in accordance with rules adopted by the Montana Department of Environmental Quality pursuant to 76-4-104, MCA.

Evidence of sufficient water quality is supported by the fact that all existing individual wells in the vicinity are permitted, which means they sufficiently met the parameters described in Section 3.2.2 of Circular DEQ-1 and DEQ-3 regarding water quality.

I.7. Impacts to groundwater quality. Preliminary analysis of potential impacts to ground water quality from new wastewater treatment systems, using as guidance rules adopted by the board of environmental review pursuant to 75-5-301, MCA and 75-5-303, MCA related to standard mixing zones for ground water, source specific mixing zones, and non-significant changes in water quality. The preliminary analysis may be based on currently available information and must consider the effects of overlapping mixing zones from proposed and existing wastewater treatment systems within and directly adjacent to the subdivision. Instead of performing the preliminary analysis, the sub-divider may perform a complete non-degradation analysis in the same manner as is required for an application that is reviewed under Title 76, Chapter 4.

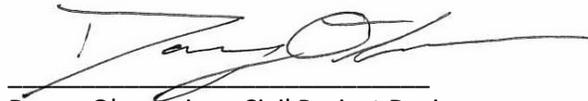
Preliminary analysis of impacts to groundwater quality from the proposed wastewater treatment systems show there will be no significant changes to water quality. As described in Section I.6, the background nitrate is 1.61 mg/L, well below the required 5.0 mg/L needed to show non-significant changes. A 100 feet mixing zone is designated with the individual wastewater treatment and disposal systems. The wastewater treatment and disposal system will be sized to treat 350 gallons per day in a soil that has an application rate of 0.4 gpd/ft².

Groundwater direction has been triangulated by measuring three of the groundwater monitoring wells for site specific groundwater direction results. This was critical to the project due to the neighboring well locations, as well as determining where the proposed well should be drilled.

Cumulative Effects for both Phosphorous Breakthrough Analysis and Nitrate Sensitivity have been included for the proposed drainfield on Lot 8B and the existing drainfield on Lot 8A. Because the existing system was permitted and existing prior to 1993 it does not have a mixing zone. A value of 6.00 mg/L in Nitrates is expected when cumulative effects are considered (See section I.7 – Nondegradation Analysis). This value is below the required 7.5 mg/L needed at the end of the mixing zone. The Phosphorous Breakthrough Analysis is running to the nearest high-quality state surface water with is the Bitterroot River, approximately 2,777' to the west. The cumulative effects show a breakthrough time to surface water of 1,422 years. This is longer than the required 50 years for a breakthrough time to surface water.

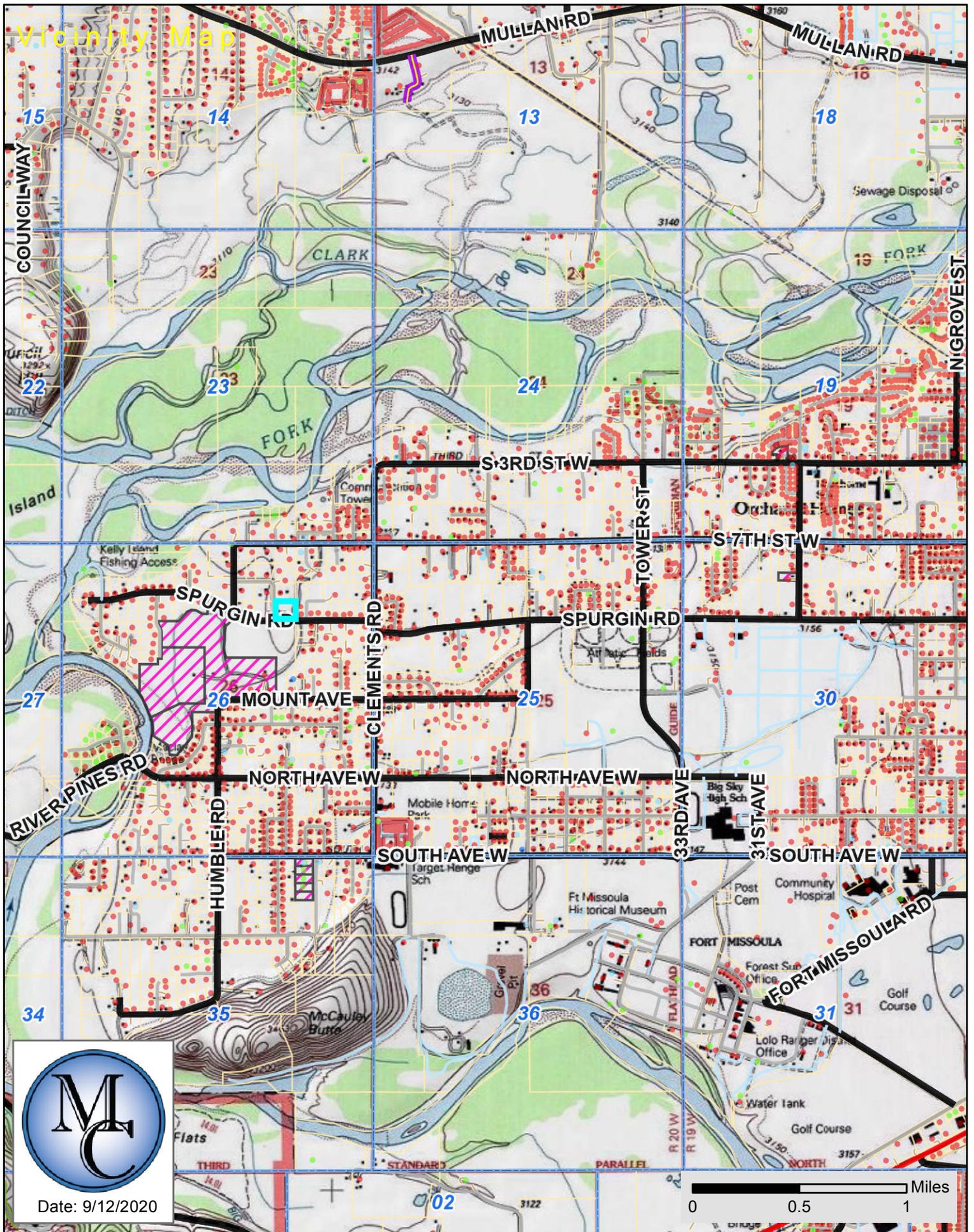
Prepared by:

TERRITORIAL-LANDWORKS, INC. NOW IMEG



Danny Oberweiser, Civil Project Designer

WATER AND SANITATION REPORT ATTACHMENT
I.1: VICINITY MAP – Included



Date: 9/12/2020

Map Center: X: -114.07391 - Y: 46.85968

The material displayed on this page is informational and should be used for reference only. No reliance should be placed thereon without verification by the user. Missoula County does not warrant that the information is either complete or accurate. No representation, warranties or covenants of any kind are made by Missoula County. Before acting on the information contained on this page the user should consult original documents.

WATER AND SANITATION REPORT ATTACHMENT
I.3: MDEQ LOT LAYOUT – Included

FOR MDEQ USE

APPROVAL STAMP

RECEIVED STAMP:

EQ #:



LEGEND

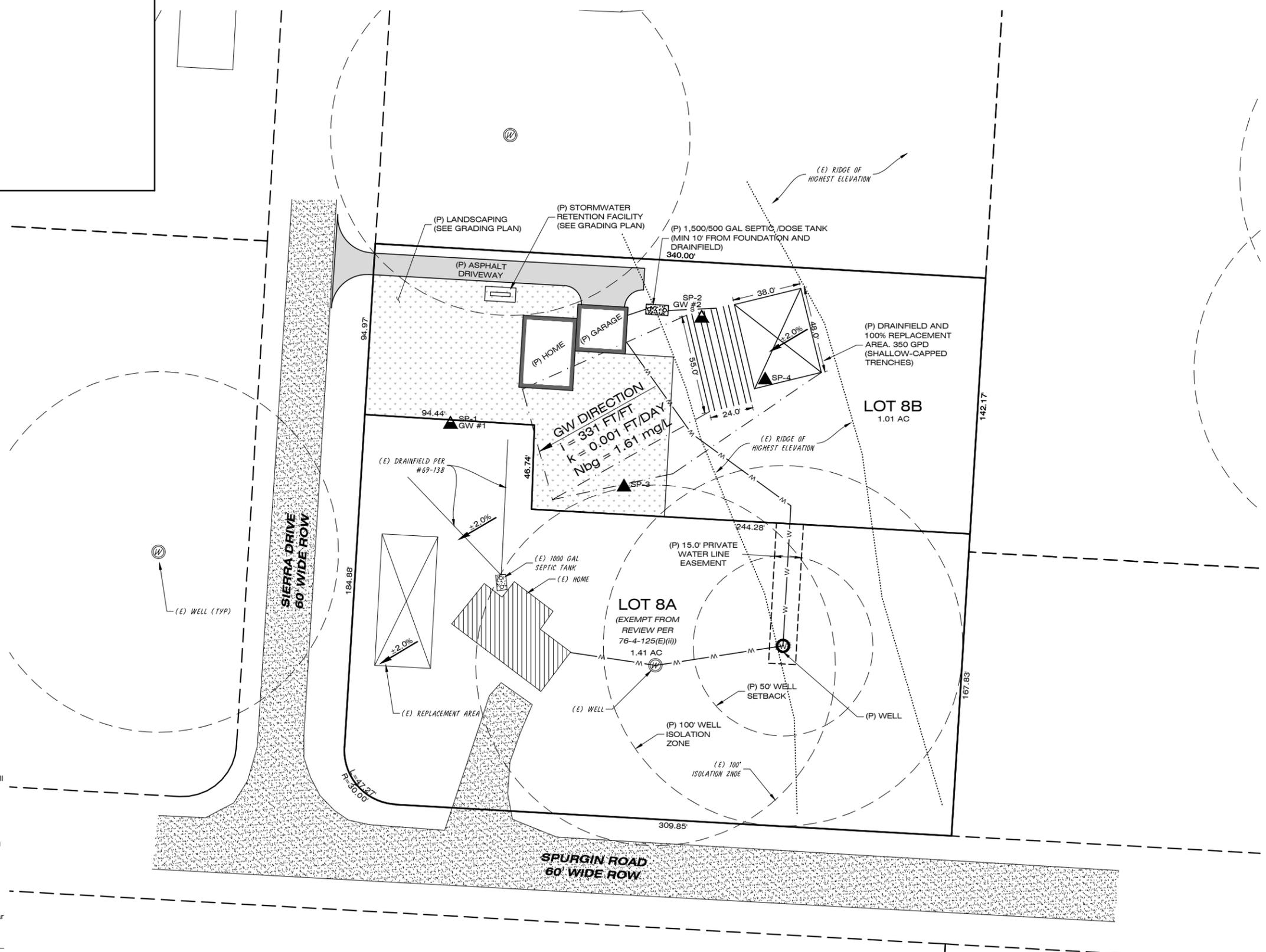
- (E) PROPERTY BOUNDARY
- (E) ADJACENT PROPERTY BOUNDARY
- (E) EASEMENT
- (E) WATER SERVICE
- (E) SEWER LINE
- (E) ASPHALT
- (E) SOIL PROFILE
- (E) GROUNDWATER MONITORING
- (E) SEPTIC TANK
- (E) DRAINFIELD
- (E) WELL

LOT LAYOUT REQUIREMENTS - ARM 17.36.104(2):

- (a) The name of the subdivision, and the county, section, township and range in which the proposed subdivision is located have been listed in the title block to the right.
- (b) A north arrow and scale are shown on this sheet.
- (c) The boundaries, dimensions, and total area of each lot are shown in the plan view for all lots.
- (d) An identifier or number for each lot (e.g., "lot 1, lot 2", "tract 1, tract 2", or "parcel 1, parcel 2") has been included.
- (e) Existing and Proposed easements are shown on the Lot Layout.
- (f) Utilities as shown here are specific to water and sewer. This layout does not show existing or proposed electrical, gas, or communication utilities. It also does not show privately owned utilities such as sewer or water services lines, propane tanks/lines, electrical and gas service lines, or underground sprinkler systems. Locations of existing roads are shown and labeled. There are no proposed roads.
- (g) There are no existing or proposed storm water structures as part of this project and therefore none are shown on the Lot Layout.
- (h) There are no drainage ways for this project.
- (i) The name and affiliation of the person who prepared the lot layout is listed in the lower right side and title block, respectively.
- (j) All applicable information as set out in Table 1 for the specific water supply and wastewater systems in the development has been shown. All systems have been labeled or listed in the legend as "existing" or "proposed". The floodplain boundaries near this subdivision is shown.

MDEQ LOT LAYOUT NOTES:

- Known existing, previously approved, or proposed wells, wastewater treatment systems, and mixing zones on or within 100' of the subdivision have been shown on this Lot Layout.
- All setbacks in ARM 17.36.323 are met.
- Proposed home locations are provided as conceptual in nature. This Lot Layout shall in no way act as a regulatory document for siting homes or driveways.
- No known sources of contamination within 500' of proposed well where found in regards to this development.



TERRITORIAL LANDWORKS, INC.
 CIVIL ENGINEERING • SURVEYING • LAND USE CONSULTING
 www.territoriallandworks.com
 P.O. Box 3851
 Missoula, MT 59806
 Ph: 406/721-0142
 Fax: 406/721-5224

DATE	
REVISIONS	
DESIGNED:	2
DRAFTED:	DO
CHECKED:	DO
DATE:	10/2019

LOCATION: 4304 SPURGIN ROAD
 LOT 8, BLOCK 1, DOUBLE R ACRES
 SECTION 26, T18N, R20W, P.M.M.
 MISSOULA COUNTY
 PREPARED FOR: ALYSSA OBERWEISER

PROJECT NAME: DOUBLE R ACRES, LOT 4 BLOCK 1
 SUBDIVISION
 SHEET TITLE: MDEQ LOT LAYOUT
 (PER ARM 17.36.104(2))

PROJECT NO.
 SHEET: 1 OF 2

WATER AND SANITATION REPORT ATTACHMENT

I.4.a: SOIL PROFILES – Included

Project Name DOUBLE R ACRES BLOCK 1 LOT 8 Project No. XX-XXXX
 Client Name Holly Raser Lot No. Lot 8
 Site Evaluator Danny Oberweiser County Missoula Date July 11th 2020

Soil Profile - SP No: SP- 1

Depth (in)	Thick (in)	Texture	Stoniness	Structure	Color	Moisture	Length of Ribbon	Other Comments*
0 - 36	36	Silt Loam	0%	no structure	black	slightly moist	2"	Topsoil with organics to 3'
36 - 72	36	Fine Sand	0%	granular	brown	slightly moist	0"	
72 - 120	48	Gravelly Fine Sand	25%	granular	brown	Moisture	0"	Increase in cobbles and gravel with depth. Groundwater encountered at 9.6'

* Include information such as roots present, apparent high ground water level, actual water level, bedrock, layer consistency, color variations, or any other information as appropriate.

Site Factors and Setback Distances

Vegetation Grasses Slope <2% Flooding Risk none

Notes _____ SP Application Rate 0.4 gpd/ft²

	Water Supply Wells		Sealed(1)/Other(2) Components		Drainfields Sand Mounds		Notes
Public or Multi-use Wells	-	NA	100	X	100	X	
Other Wells	-	NA	50	X	100	X	
Suction Lines	-	NA	50	X	100	X	
Cisterns	-	NA	25	X	50	X	
Roadcuts/Escarpments	-	NA	10 (3)	X	25	X	
Slopes > 25% (4)	-	NA	10 (3)	X	25	X	
Property Boundaries	10	10	10	X	10	X	
Subsurface Drains	-	NA	10	X	10	X	
Water Lines	-	NA	10	X	10	X	
Drainfields / Sand Mounds	100	100	10	X	-	NA	
Foundation Walls	-	NA	10	X	10	X	
Surface Water, Springs	100	100	50	X	100	X	
Floodplains	10	10	0(1)/100(2)	X	100	X	

(1) Sealed Components include sewer lines, sewer mains, septic tanks, grease traps, dosing tanks, and pumping chambers.

(2) Other Components include intermittent and recirculating sand filters, package plants and evapotranspiration systems

(3) Sewer lines and mains may be located in roadways and on steep slopes if they are safeguarded against damage.

(4) Down-gradient of the sealed component, other component, or drainfield/sand mound.

Project Name DOUBLE R ACRES BLOCK 1 LOT 8 Project No. XX-XXXX
 Client Name Holly Raser Lot No. Lot 8
 Site Evaluator Danny Oberweiser County Missoula Date July 11th 2020

Soil Profile - SP No: SP- 2

Depth (in)	Thick (in)	Texture	Stoniness	Structure	Color	Moisture	Length of Ribbon	Other Comments*
0 - 36	36	Silt Loam	0%	no structure	black	slightly moist	2"	Topsoil with organics to 3'
36 - 84	48	Sandy Clay Loam	5%	granular	brown	slightly moist	2"	
84 - 120	36	gravelly sand	25%	granular	brown	Moisture	0"	Increase in cobbles and gravel with depth. No limiting layer encountered

* Include information such as roots present, apparent high ground water level, actual water level, bedrock, layer consistency, color variations, or any other information as appropriate.

Site Factors and Setback Distances

Vegetation Grasses Slope <2% Flooding Risk none

Notes _____ SP Application Rate 0.4 gpd/ft²

	Water Supply Wells		Sealed(1)/Other(2) Components		Drainfields Sand Mounds		Notes
Public or Multi-use Wells	-	NA	100	X	100	X	
Other Wells	-	NA	50	X	100	X	
Suction Lines	-	NA	50	X	100	X	
Cisterns	-	NA	25	X	50	X	
Roadcuts/Escarpments	-	NA	10 (3)	X	25	X	
Slopes > 25% (4)	-	NA	10 (3)	X	25	X	
Property Boundaries	10	10	10	X	10	X	
Subsurface Drains	-	NA	10	X	10	X	
Water Lines	-	NA	10	X	10	X	
Drainfields / Sand Mounds	100	100	10	X	-	NA	
Foundation Walls	-	NA	10	X	10	X	
Surface Water, Springs	100	100	50	X	100	X	
Floodplains	10	10	0(1)/100(2)	X	100	X	

(1) Sealed Components include sewer lines, sewer mains, septic tanks, grease traps, dosing tanks, and pumping chambers.

(2) Other Components include intermittent and recirculating sand filters, package plants and evapotranspiration systems

(3) Sewer lines and mains may be located in roadways and on steep slopes if they are safeguarded against damage.

(4) Down-gradient of the sealed component, other component, or drainfield/sand mound.

Project Name DOUBLE R ACRES BLOCK 1 LOT 8 Project No. XX-XXXX
 Client Name Holly Raser Lot No. Lot 8
 Site Evaluator Danny Oberweiser County Missoula Date July 11th 2020

Soil Profile - SP No: SP- 3

Depth (in)	Thick (in)	Texture	Stoniness	Structure	Color	Moisture	Length of Ribbon	Other Comments*
0 - 24	24	Silt Loam	0%	no structure	black	slightly moist	2"	Topsoil with organics to 3'
24 - 55	31	Sandy Clay Loam	5%	granular	brown	slightly moist	2"	
55 - 120	65	gravelly sand	25%	granular	brown	Moisture	0"	Increase in cobbles and gravel with depth. No limiting layer encountered. Gravel Caving at 55"

* Include information such as roots present, apparent high ground water level, actual water level, bedrock, layer consistency, color variations, or any other information as appropriate.

Site Factors and Setback Distances

Vegetation Grasses Slope <2% Flooding Risk none

Notes _____ SP Application Rate 0.4 gpd/ft²

	Water Supply Wells		Sealed(1)/Other(2) Components		Drainfields Sand Mounds		Notes
Public or Multi-use Wells	-	NA	100	X	100	X	
Other Wells	-	NA	50	X	100	X	
Suction Lines	-	NA	50	X	100	X	
Cisterns	-	NA	25	X	50	X	
Roadcuts/Escarpments	-	NA	10 (3)	X	25	X	
Slopes > 25% (4)	-	NA	10 (3)	X	25	X	
Property Boundaries	10	10	10	X	10	X	
Subsurface Drains	-	NA	10	X	10	X	
Water Lines	-	NA	10	X	10	X	
Drainfields / Sand Mounds	100	100	10	X	-	NA	
Foundation Walls	-	NA	10	X	10	X	
Surface Water, Springs	100	100	50	X	100	X	
Floodplains	10	10	0(1)/100(2)	X	100	X	

(1) Sealed Components include sewer lines, sewer mains, septic tanks, grease traps, dosing tanks, and pumping chambers.

(2) Other Components include intermittent and recirculating sand filters, package plants and evapotranspiration systems

(3) Sewer lines and mains may be located in roadways and on steep slopes if they are safeguarded against damage.

(4) Down-gradient of the sealed component, other component, or drainfield/sand mound.

Project Name DOUBLE R ACRES BLOCK 1 LOT 8 Project No. XX-XXXX
 Client Name Holly Raser Lot No. Lot 8
 Site Evaluator Danny Oberweiser County Missoula Date July 11th 2020

Soil Profile - SP No: SP- 4

Depth (in)	Thick (in)	Texture	Stoniness	Structure	Color	Moisture	Length of Ribbon	Other Comments*
0 - 24	24	Silt Loam	0%	no structure	black	slightly moist	2"	Topsoil with organics to 3'
24 - 76	52	Sandy Clay Loam	5%	granular	brown	slightly moist	2"	
76 - 120	44	gravelly sand	25%	granular	brown	Moisture	0"	Increase in cobbles and gravel with depth. No limiting layer encountered

* Include information such as roots present, apparent high ground water level, actual water level, bedrock, layer consistency, color variations, or any other information as appropriate.

Site Factors and Setback Distances

Vegetation Grasses Slope <2% Flooding Risk none

Notes _____ SP Application Rate 0.4 gpd/ft²

	Water Supply Wells		Sealed(1)/Other(2) Components		Drainfields Sand Mounds		Notes
	-	NA	100	X	100	X	
Public or Multi-use Wells	-	NA	100	X	100	X	
Other Wells	-	NA	50	X	100	X	
Suction Lines	-	NA	50	X	100	X	
Cisterns	-	NA	25	X	50	X	
Roadcuts/Escarpments	-	NA	10 (3)	X	25	X	
Slopes > 25% (4)	-	NA	10 (3)	X	25	X	
Property Boundaries	10	10	10	X	10	X	
Subsurface Drains	-	NA	10	X	10	X	
Water Lines	-	NA	10	X	10	X	
Drainfields / Sand Mounds	100	100	10	X	-	NA	
Foundation Walls	-	NA	10	X	10	X	
Surface Water, Springs	100	100	50	X	100	X	
Floodplains	10	10	0(1)/100(2)	X	100	X	

(1) Sealed Components include sewer lines, sewer mains, septic tanks, grease traps, dosing tanks, and pumping chambers.

(2) Other Components include intermittent and recirculating sand filters, package plants and evapotranspiration systems

(3) Sewer lines and mains may be located in roadways and on steep slopes if they are safeguarded against damage.

(4) Down-gradient of the sealed component, other component, or drainfield/sand mound.

WATER AND SANITATION REPORT ATTACHMENT
I.4.c: MISSOULA COUNTY GROUNDWATER
MONITORING – Included



Missoula City-County Health Department

ENVIRONMENTAL HEALTH

301 West Alder Street | Missoula MT 59802-4123

www.missoulacounty.us/HealthDept

Phone | 406.258.4755

Fax | 406.258.4781

July 20, 2020

Danny Oberweiser
1817 S Ave W. Suite A
Missoula, MT 59801

RE: Groundwater monitoring at 4304 Spurgin Rd, Missoula, MT 59804
GEOCODE: 04-2199-26-1-06-08-0000

During spring/summer 2020, the department monitored two groundwater test holes located on the above referenced parcel. The test holes were located as shown on the attached lot layout and the results of monitoring are enclosed.

Test hole #1 exhibited groundwater peaking at 50" on 6/4/2020. Test holes #2 exhibited groundwater peaking at 66" on this same date.

Groundwater depth at test hole #1 does not meet the minimum separation of four feet of natural soil between the bottom of all currently approved conventional or alternative on-site wastewater treatment systems and maximum groundwater levels. A septic system cannot be permitted in this location.

Groundwater levels at test hole #2 does not meet the minimum separation requirements for conventional on-site wastewater treatment systems. An alternative system may be possible provided that all other requirements of the Missoula City-County Health Code and State of MT subdivision laws are satisfied.

If you wish to proceed with the test hole #2 location, please submit groundwater testing results with a complete septic permit application. These results are considered during permit review, but do not guarantee permit issuance. Final decisions are based upon comprehensive review of all current applicable rules and regulations.

If you have any questions, please contact me at 258-4755.

Sincerely,

A handwritten signature in black ink, appearing to read "Holly Abercrombie". The signature is written in a cursive, flowing style.

Holly Abercrombie
Environmental Health Specialist



MISSOULA CITY-COUNTY HEALTH DEPARTMENT
 ENVIRONMENTAL HEALTH DIVISION
 301 WEST ALDER
 MISSOULA, MT 59802-4123
 (406) 258-4755 FAX (406) 258-4781

2020-0156W

Log No. _____

GROUNDWATER TEST REPORT

Name of Owner Holly Raser Phone _____
 Name of Applicant Danny Oberweiser Phone 406-491-4942
 *Legal Description: T 13 R 20 S 26, NW Qtr. of the NE Qtr.
 Location of test holes 4304 Spurgin, Missoula MT 59804

GPS	Lat <u>46° 51' 36.9"</u> <u>46° 51' 37.4"</u>		Long <u>114° 05' 16.4"</u> <u>114° 05' 14.3"</u>								Initials
	Height of pipe above ground	<u>12"</u>	<u>6"</u>								
Date	No. <u>1</u> gross	No. <u>2</u> net	No. <u>2</u> gross	No. <u>2</u> net	No. <u>2</u> gross	No. <u>2</u> net	No. <u>2</u> gross	No. <u>2</u> net	No. <u>2</u> gross	No. <u>2</u> net	
<u>04/03</u>	<u>dry</u>	<u>-</u>	<u>dry</u>	<u>-</u>							<u>CS</u>
<u>04/09</u>	<u>10.4</u>	<u>113"</u>	<u>dry</u>	<u>-</u>							<u>CS</u>
<u>04/17</u>	<u>9.8</u>	<u>106"</u>	<u>dry</u>	<u>-</u>							<u>CS</u>
<u>04/24</u>	<u>9.3</u>	<u>100"</u>	<u>dry</u>	<u>-</u>							<u>HIA</u>
<u>5/1</u>	<u>8.0</u>	<u>84"</u>	<u>8.8</u>	<u>100"</u>							↓
<u>5/7</u>	<u>7.2</u>	<u>74"</u>	<u>8.0</u>	<u>90"</u>							
<u>5/14</u>	<u>84"</u>	<u>72"</u>	<u>95"</u>	<u>89"</u>							
<u>5/21</u>	<u>67"</u>	<u>55</u>	<u>78"</u>	<u>72"</u>							
<u>5/29</u>	<u>64"</u>	<u>52"</u>	<u>74"</u>	<u>68"</u>							
<u>6/4</u>	<u>5.2</u>	<u>50'</u>	<u>6.0</u>	<u>66"</u>							

*# of holes monitored 2 *# of holes failed 1
 High Date 6/4/20 High Depth 50"

Comments: _____

Copy given to applicant _____
 *Indicates information required for data entry



MISSOULA CITY-COUNTY HEALTH DEPARTMENT
 ENVIRONMENTAL HEALTH DIVISION
 301 WEST ALDER
 MISSOULA, MT 59802-4123
 (406) 258-4755 FAX (406) 258-4781

Log No. _____

GROUNDWATER TEST REPORT

Name of Owner _____ Phone _____

Name of Applicant _____ Phone _____

*Legal Description: T _____ R _____ S _____, _____ Qtr. of the _____ Qtr.

Location of test holes _____

GPS	Lat											
	Long											
Height of pipe above ground		12"	6"									
Date	No. 1 gross	No. 1 net	No. 2 gross	No. 2 net	No. __ gross	No. __ net	No. __ gross	No. __ net	No. __ gross	No. __ net	Initials	
6/10	5.4	53	6.3	70							HA	
6/18	6.1	67	7.0	78							↓	
6/24	6.4	65	7.2	80"								

*# of holes monitored _____

*# of holes failed _____

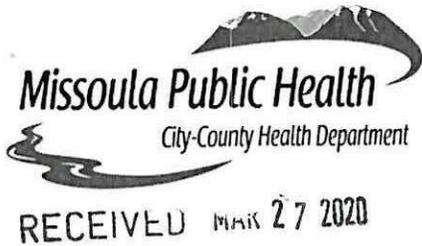
High Date _____

High Depth _____

Comments: _____

Copy given to applicant _____

*Indicates information required for data entry



Missoula City-County Health Department
ENVIRONMENTAL HEALTH
301 West Alder Street | Missoula MT 59802-4123
www.missoulacounty.us/HealthDept
Phone | 406.258.4755
Fax | 406.258.4781

2020-0156W
Basic Fee \$325
Mileage 3x4 = \$12
Extra Test Holes 60
TOTAL \$ 397
CC 3/30/20 a-j

APPLICATION FOR HIGH SEASONAL GROUNDWATER MONITORING

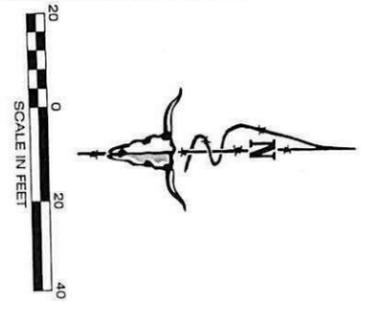
Applicant's Name Danny Oberweiser Phone # 406-491-4942
Applicant's Email daniel.g.oberweiser@imegcorp.com
Applicant's Address ~~4304 Spurgin Road~~ 1817 S Ave W, Suite A
Owner's Name (if different) Holly Raser
Location of test holes: NW 1/4 NE 1/4 T 13N R 20W S 26
Address of site 4304 SPURGIN ROAD
Certificate of Survey (COS) # _____ Subdivision DOUBLE R ACRES #1 BLOCK I
Lot 8 Size of Lot or Parcel 2.42
GEOCODE 04-2199-26-1-06-08-0000

- Provide 1) a USGS map depicting the property; 2) a drawing of the property with detailed location of the test holes and 3) directions or a map showing how to access the site (each no larger than 11x17).
- Number of test holes 2 (2 per drainfield, ≤ 100' apart = 1 test hole)
only monitor #1 & #2

CONDITIONS:

1. **The deadline for receipt of application and installation of test pipes is April 1.** The applicant is responsible for locating and installing test pipes.
2. The testing period may extend one year depending upon conditions peculiar to property: i.e., spring runoff, elevated streams, irrigation, etc.
3. Sufficient perforated pipes shall be installed to a **depth of nine (9) feet** to adequately define the groundwater conditions in the drainfield and replacement areas. Sufficient area must be available at the elevation tested to install the drainfield proposed and provide replacement area room.
4. The Department may refuse to accept seasonal high groundwater data when precipitation or snow pack water equivalent is more than 20% below historical average.
5. The applicant is aware that Missoula City-County Health Department Regulation #1 states, "A groundwater depth at any time of less than 6 feet from the natural ground surface shall preclude the use of conventional subsurface sewage treatment and disposal systems."
6. Applicant certifies by signature below that he/she has legal authority to grant the Department access to the property for the purpose of groundwater monitoring, and that such permission is granted for one year (May 1 – April 30) until monitoring is complete.

Signature of Applicant Date 3/24/20



PRELIMINARY	PROJECT NO. 19-XXXX	PROJECT NAME RASER SPURGIN SUBDIVISION	LOCATION 4304 SPURGIN ROAD LOT 8, BLOCK 1, DOUBLE R ACRES SECTION 26., T13N., R20W., P.M.M. MISSOULA COUNTY	DESIGNED: JM	REVISIONS	DATE	TERRITORIAL LANDWORKS, INC. CIVIL ENGINEERING • SURVEYING • LAND USE CONSULTING www.TerritorialLandworks.com Ph: 406/721-0142 P.O. Box 3851 Fax: 406/721-8224 Missoula, MT 59806
	SHEET: 1 OF 1	SHEET TITLE: GROUNDWATER MONITORING	PREPARED FOR: HOLLY RASER	DRAFTED: JM CHECKED: JM DATE: 10/2/09			

WATER AND SANITATION REPORT ATTACHMENT
I.5.a: SUMMARY OF WELL LOGS IN VICINITY – Included

SUMMARY OF WELLS USED TO SUBSTANTIATE ADEQUATE WATER

Located Well on Map, No used 'k' Value	Outlier or Too Far Away	Project: Double 'R' Acres Lot 8 Block 1
Generally Located Well on Map, Used 'k' Value		
Sampled Well		

TLI Project #:
Well Locations: Sections 26, T13N, R20W

Notes:

- *Well locations shown on USGS Vicinity/Well Locations Map in Section A
- **Gradient calculation shown on USGS Vicinity/Well Locations Map in Section A

Gwic Id	Site Name	Twn	Rng	Sec	Q Sec	Type	Aquifer	Td	Swl	Pwl	Yield	Test Type	Test Time	Dss	Rwl	RTime	Driller	Date	Use	Status	From	To	Description
70005	BARRETT JAMES E	13N	20W	26	0	WELL	112ALVM	100	0	0	0.5	OTHER	0	0	0	0	0	2/1/1960	DOMESTIC	NEW WELL	0	0	0
70017	BEERY RICHARD A.	13N	20W	26	0	WELL	112ALVM	60	6	17	40	OTHER	1	0	0	0	0	7/22/1981	DOMESTIC	NEW WELL	60	60	OPEN BOTTOM *
70004	BERKY CLIFFORD G	13N	20W	26	0	WELL	112ALVM	60	26	0	0	OTHER	0	0	0	0	0	11/10/1957	DOMESTIC	NEW WELL	0	0	0
70011	BETZ KYLE & DARLENE	13N	20W	26	0	WELL	112ALVM	60	6	13	30	OTHER	1.5	0	0	0	0	6/27/1985	DOMESTIC	NEW WELL	60	60	OPEN BOTTOM *
70031	BIELBY BOB	13N	20W	26	0	WELL	111ALVM	30	10	25	40	AIR	5	0	0	0	0	2/3/1981	UNKNOWN	NEW WELL	22	27	SIN SLOT PERFS
70022	BROGGER JAMES	13N	20W	26	0	WELL	111ALVM	27	12	24	20	PUMP	2	0	0	0	0	8/20/1988	DOMESTIC	NEW WELL	27	27	OPEN BOTTOM *
70033	CHAMBERLAIN JOHN A	13N	20W	26	0	WELL	111ALVM	45	25	0	30	OTHER	0	0	0	0	0	4/30/1953	DOMESTIC	NEW WELL	0	0	0
70032	CHAMBERLAIN JOHN A	13N	20W	26	0	WELL	111ALVM	48	25	0	30	OTHER	0	0	0	0	0	11/10/1959	DOMESTIC	NEW WELL	0	0	0
70018	CHAMBERLIN JOHN	13N	20W	26	0	WELL	111ALVM	49	26	40	50	AIR	2	0	0	0	0	11/5/1986	DOMESTIC	NEW WELL	44	49	5 IN SLOT PERFS
70003	DAVIS WARREN B	13N	20W	26	0	WELL	112ALVM	74	5	40	50	AIR	1	0	0	0	0	5/26/1972	DOMESTIC	NEW WELL	74	74	OPEN BOTTOM *
137525	DELANEY DOUGLAS L.	13N	20W	26	0	WELL	112ALVM	119.3	14	40	100	AIR	1	0	0	0	0	9/8/1993	DOMESTIC	NEW WELL	119.3	119.3	OPEN BOTTOM *
120492	DEVLIN TOM	13N	20W	26	0	WELL	112ALVM	60	15	25	50	AIR	3	0	0	0	0	8/23/1990	DOMESTIC	NEW WELL	60	60	OPEN BOTTOM *
89999	DOPP GILBERT C	13N	20W	26	0	WELL	112ALVM	72	50	58	40	AIR	3	0	0	0	0	6/22/1963	DOMESTIC	NEW WELL	67	72	1.25X1/4 PERFS
70008	DUNN C W	13N	20W	26	0	WELL	112ALVM	65	0	0	12	OTHER	0	0	0	0	0	11/20/1958	DOMESTIC	NEW WELL	0	0	0
122224	GARY INCE CONSTRUCTION	13N	20W	26	0	WELL	112ALVM	80	25	45	30	AIR	2.5	0	0	0	0	1/28/1991	DOMESTIC	NEW WELL	80	80	OPEN BOTTOM *
70028	GREGOR JOHN	13N	20W	26	0	WELL	112ALVM	98	20	98	100	AIR	1	0	0	0	0	7/16/1984	DOMESTIC	NEW WELL	98	98	OPEN BOTTOM *
70000	GROLLER AL	13N	20W	26	0	WELL	112ALVM	48	11	40	20	AIR	2	0	0	0	0	9/25/1980	UNKNOWN	NEW WELL	38	45	5 IN SLOT PERFS
70046	HAFFNER STEVE	13N	20W	26	0	WELL	112ALVM	99	17	50	100	AIR	1	0	0	0	0	7/2/1990	DOMESTIC	NEW WELL	99	99	OPEN BOTTOM *
131840	JSM CONSTRUCTION	13N	20W	26	0	WELL	112ALVM	80	25	47	6	AIR	3	0	0	0	0	2/27/1991	DOMESTIC	NEW WELL	27	32	HOLTE PERFORATOR SLOTS
127541	KOBOS MARK	13N	20W	26	0	WELL	112ALVM	80	28	45	40	AIR	1	0	0	0	0	3/30/1992	DOMESTIC	NEW WELL	80	80	OPEN BOTTOM *
138572	MARTIN LARRY/HEADAPOL DANA	13N	20W	26	0	WELL	112ALVM	99	8	40	100	AIR	1	0	0	0	0	10/19/1993	DOMESTIC	NEW WELL	99	99	OPEN BOTTOM *
136493	MATTIE BOB	13N	20W	26	0	WELL	112ALVM	79	19	40	100	AIR	1	0	0	0	0	6/25/1993	DOMESTIC	NEW WELL	79	79	OPEN BOTTOM *
70029	MONACO FRANCIS AND ANN	13N	20W	26	0	WELL	110ALVM	0	20	0	100	OTHER	0	0	0	0	0	5/11/1955	DOMESTIC	NEW WELL	0	0	0
70010	PETRIN MATTHEW AND MARY	13N	20W	26	0	WELL	112ALVM	95	25	0	85.5	OTHER	0	0	0	0	0	12/28/1945	DOMESTIC	NEW WELL	0	0	0
70002	PETROFF TED	13N	20W	26	0	WELL	112ALVM	47	16	39	80	OTHER	0	0	0	0	0	7/5/1963	DOMESTIC	NEW WELL	35	47	2X1/2 PERFS
121527	PHILLIPS CLIFF	13N	20W	26	0	WELL	112ALVM	100	25	45	40	AIR	2.5	0	0	0	0	9/13/1990	DOMESTIC	NEW WELL	100	100	OPEN BOTTOM *
120491	QUALITY CONSTRUCTION	13N	20W	26	0	WELL	112ALVM	60	10	25	50	AIR	2.5	0	0	0	0	8/27/1990	DOMESTIC	NEW WELL	60	60	OPEN BOTTOM *
70015	RANGITSCH ROBERT	13N	20W	26	0	WELL	112ALVM	59	12	59	75	OTHER	1	0	0	0	0	11/19/1984	DOMESTIC	NEW WELL	59	59	OPEN BOTTOM *
70013	RANGITSCH ROBERT	13N	20W	26	0	WELL	112ALVM	59	13	30	50	AIR	1	0	0	0	0	4/10/1985	DOMESTIC	NEW WELL	59	59	OPEN BOTTOM *
164354	RICHARDSON K W	13N	20W	26	0	WELL	110ALVM	0	0	0	0	OTHER	0	0	0	0	0	1/0/1900	0	NEW WELL	0	0	0
70026	RICHARDSON K.W.	13N	20W	26	0	WELL	111ALVM	51	8	8	25	AIR	4.5	0	0	0	0	3/5/1971	DOMESTIC	NEW WELL	45	51	1 INCH OVAL
10024	RICHARDSON K.W.	13N	20W	26	0	WELL	111ALVM	43.5	10	10	25	AIR	1.5	0	0	0	0	7/17/1970	DOMESTIC	NEW WELL	37.5	43.5	1 INCH OVAL
70069	RICHARDSON K.W.	13N	20W	26	0	WELL	111ALVM	40	11	11	25	AIR	2	0	0	0	0	10/16/1970	DOMESTIC	NEW WELL	34	40	1 INCH OVAL
70061	RICHARDSON K.W.	13N	20W	26	0	WELL	111ALVM	45	8	8	25	AIR	1.5	0	0	0	0	7/8/1970	DOMESTIC	NEW WELL	39	45	1 INCH OVAL
70023	RICHARDSON K.W.	13N	20W	26	0	WELL	111ALVM	40	10	10	25	AIR	2	0	0	0	0	10/4/1970	DOMESTIC	NEW WELL	34	40	1 INCH OVAL
70025	RICHARDSON K.W.	13N	20W	26	0	WELL	111ALVM	40	8	8	25	AIR	2.5	0	0	0	0	3/3/1971	DOMESTIC	NEW WELL	34	40	1 INCH OVAL
70027	ROBISON EDWARD AND CAROL	13N	20W	26	0	WELL	112ALVM	72	5	42	80	AIR	5	0	0	0	0	6/4/1969	DOMESTIC	NEW WELL	69	72	TORCH CUTS
70038	RUANA DENNIS	13N	20W	26	0	WELL	111ALVM	45	11	35	20	AIR	2	0	0	0	0	9/26/1980	UNKNOWN	NEW WELL	37	42	5 IN SLOT PERFS
70040	RUANA DENNIS	13N	20W	26	0	WELL	111ALVM	45	12	35	20	AIR	3	0	0	0	0	3/4/1981	UNKNOWN	NEW WELL	38	42	5 IN SLOT PERFS
70021	RUANA DENNIS	13N	20W	26	0	WELL	111ALVM	45	12	0	50	AIR	2	0	0	0	0	10/17/1987	DOMESTIC	NEW WELL	40	45	5 IN SLOT PERFS
70016	RUANA DENNIS	13N	20W	26	0	WELL	111ALVM	45	9	35	50	AIR	1	0	0	0	0	9/24/1985	DOMESTIC	NEW WELL	40	45	5 IN SLOT PERFS
123197	RUANA DENNIS	13N	20W	26	0	WELL	111ALVM	45	8	30	100	AIR	2	0	0	0	0	6/14/1991	DOMESTIC	NEW WELL	40	45	SCREEN
70042	RUANA DENNIS	13N	20W	26	0	WELL	111ALVM	45	9	40	50	AIR	2	0	0	0	0	4/26/1984	DOMESTIC	NEW WELL	40	45	5 IN SLOT PERFS
70041	RUANA DENNIS	13N	20W	26	0	WELL	111ALVM	45	9	40	50	AIR	2	0	0	0	0	4/26/1984	DOMESTIC	NEW WELL	40	45	5 IN SLOT PERFS
70039	RUANA DENNIS	13N	20W	26	0	WELL	111ALVM	45	11	35	20	AIR	2	0	0	0	0	9/26/1980	UNKNOWN	NEW WELL	37	42	5 IN SLOT PERFS
70020	RUANA DENNIS	13N	20W	26	0	WELL	111ALVM	45	10.5	40	50	AIR	1.5	0	0	0	0	7/20/1987	DOMESTIC	NEW WELL	40	45	5 IN SLOT PERFS
70012	RUANA DENNIS	13N	20W	26	0	WELL	111ALVM	45	11	35	99	AIR	1	0	0	0	0	8/23/1985	DOMESTIC	NEW WELL	40	45	5 IN SLOT PERFS
70019	RUANA DENNIS	13N	20W	26	0	WELL	111ALVM	45	10	35	50	AIR	3	0	0	0	0	9/8/1986	DOMESTIC	NEW WELL	40	45	SLOTS
70014	RUANA DENNIS	13N	20W	26	0	WELL	111ALVM	45	12	0	60	AIR	1	0	0	0	0	6/21/1988	DOMESTIC	NEW WELL	40	45	5 IN SLOT PERFS
70047	RUANA DENNIS #1	13N	20W	26	0	WELL	111ALVM	45	10	35	100	AIR	2	0	0	0	0	5/30/1989	DOMESTIC	NEW WELL	40	45	SCREEN
70043	RUANA DENNIS #1	13N	20W	26	0	WELL	111ALVM	45	10	40	100	AIR	2.5	0	0	0	0	5/30/1989	DOMESTIC	NEW WELL	37	42	5 IN SLOT PERFS
70048	RUANA DENNIS #2	13N	20W	26	0	WELL	111ALVM	45	10	35	100	AIR	2	0	0	0	0	5/14/1990	DOMESTIC	NEW WELL	40	45	SLOTS
70044	RUANA DENNIS #2	13N	20W	26	0	WELL	111ALVM	45	10	40	100	AIR	3	0	0	0	0	5/30/1989	DOMESTIC	NEW WELL	37	42	5 IN SLOT PERFS
70001	RUAWA DENNIS	13N	20W	26	0	WELL	112ALVM	45	11	20	20	OTHER	0	0	0	0	0	1/1/1980	UNKNOWN	NEW WELL	37	42	0
89997	RUSSELL DANIEL G	13N	20W	26	0	WELL	112ALVM	75	16	16	65	PUMP	2	0	0	0	0	5/22/1976	DOMESTIC	NEW WELL	65	75	3.5X1/4X16PERFS
89998	SAMSEL WILLIAM K JR	13N	20W	26	0	WELL	112ALVM	82.5	9.7	37	80	AIR	2	0	0	0	0	4/24/1962	DOMESTIC	NEW WELL	82.5	82.5	OPEN BOTTOM *
70009	SCHULER REUBEN	13N	20W	26	0	WELL	112ALVM	79.5	13	79	75	AIR	1	0	0	0	0	4/22/1980	UNKNOWN	NEW WELL	79.5	79.5	OPEN BOTTOM *
70045	SCHWARTZ MARY	13N	20W	26	0	WELL	111ALVM	59.3	23	40	100	AIR	1	0	0	0	0	11/8/1989	DOMESTIC	NEW WELL	59.3	59.3	OPEN BOTTOM *
70016	SELLECK GARY	13N	20W	26	0	WELL	112ALVM	92.5	10	0	100	AIR	1	0	0	0	0	9/5/1984	DOMESTIC	NEW WELL	92.5	92.5	OPEN BOTTOM *
70007	SORENSON KARL E	13N	20W	26	0	WELL	112ALVM	65	25	0	20	OTHER	0	0	0	0	0	11/1/1956	DOMESTIC	NEW WELL	0	0	0
70035	STAHL WALTER	13N	20W	26	0	WELL	112ALVM	52	25	35	30	AIR	0.75	0	0	0	0	4/8/1977	DOMESTIC	NEW WELL	52	52	OPEN BOTTOM *
126923	TODD ROBERT W	13N	20W	26	0	WELL	112ALVM	60.7	25	50	50	AIR	1	0	0	0	0	3/6/1992	DOMESTIC	NEW WELL	60.7	60.7	OPEN BOTTOM *
70006	VAUGHN ROBERT M	13N	20W	26	0	WELL	112ALVM	80	0	0	0	OTHER	0	0	0	0	0	1/1/1960	DOMESTIC	NEW WELL	0	0	0
70036	VINION MARVIN	13N	20W	2																			

SUMMARY OF WELLS USED TO SUBSTANTIATE ADEQUATE WATER

Located Well on Map, No used 'k' Value = Outlier or Too Far Away
 Generally Located Well on Map, Used 'k' Value =
 Sampled Well =

Project: **Double 'R' Acres Lot 8 Block 1**
 TLI Project #:
 Well Locations: **Sections 26, T13N, R20W**

Notes:

*Well locations shown on USGS Vicinity/Well Locations Map in Section A
 **Gradient calculation shown on USGS Vicinity/Well Locations Map in Section A

Gwic Id	Site Name	Twn	Rng	Sec	Q Sec	Type	Aquifer	Td	Swl	Pwl	Yield	Test Type	Test Time	Dss	Rwl	RTime	Driller	Date	Use	Status	From	To	Description
165664	RICHARDSON WAYNE	13N	20W	26	AA	WELL	112ALVM	76	12	18	30	AIR	1	0	0	0	JEROMES DRILLING CO	1/30/1998	DOMESTIC	NEW WELL	76	76	OPEN BOTTOM *
206557	RIGGERT DARR	13N	20W	26	AA	WELL	112ALVM	92	8	0	30	AIR	3	80	8	0.03	JEROMES DRILLING CO	9/1/2003	DOMESTIC	NEW WELL	92	92	OPEN BOTTOM
166003	RIGGERT DARR	13N	20W	26	AA	WELL	111ALVM	58	11	40	75	AIR	1	0	0	0	CAMP WELL DRILLING	3/18/1998	DOMESTIC	NEW WELL	58	58	OPEN BOTTOM *
275506	THORPE, RANDY AND AMY	13N	20W	26	AA	WELL	0	90	9	0	35	AIR	2	80	9	0.08	JEROMES DRILLING CO	7/28/2013	DOMESTIC	NEW WELL	90	90	OPEN BOTTOM
174423	WRIGHT CHARLIE	13N	20W	26	AA	WELL	112ALVM	78	5	38	100	AIR	2.5	0	5	0	CAMP WELL DRILLING	3/22/1999	0	NEW WELL	0	0	0
89919	WOODCOCK, MATT AND PATTI	13N	20W	26	AAA	WELL	112ALVM	65	10	23	40	AIR	4	0	0	0	JEROMES DRILLING CO	2/19/1987	DOMESTIC	NEW WELL	65	65	OPEN BOTTOM *
187521	BABCOCK BOB & NORA	13N	20W	26	AAD	WELL	112ALVM	77	12	0	30	AIR	2	70	12	0.08	JEROMES DRILLING CO	9/18/2000	DOMESTIC	NEW WELL	77	77	OPEN BOTTOM
160387	RAUSCH TROY	13N	20W	26	AAD	WELL	112ALVM	76	9	0	30	AIR	1	0	0	0	CAMP WELL DRILLING	4/14/1997	DOMESTIC	NEW WELL	76	76	OPEN BOTTOM *
176428	ZAVITZ TOM & JEANETTE	13N	20W	26	AAD	WELL	110ALVM	0	0	0	60	AIR	3	65	8	0.03	JEROMES DRILLING CO	5/26/1999	DOMESTIC	NEW WELL	0	0	0
175643	TRIPP LYLE	13N	20W	26	AADC	WELL	112ALVM	60	0	20	30	AIR	1	0	10	0.08	JEROMES DRILLING CO	4/13/1999	0	NEW WELL	60	60	OPEN BOTTOM *
213947	BURLINGAME DICK	13N	20W	26	AB	WELL	112ALVM	80	10	0	100	AIR	1	0	0	0	CAMP WELL DRILLING	8/19/2004	IRRIGATION	NEW WELL	78	80	OPEN BOTTOM
260150	KOBOS, MARK	13N	20W	26	AB	WELL	0	75	38	0	35	AIR	2.5	73	38	2.5	OKEEFE DRILLING CO	8/18/2016	DOMESTIC	NEW WELL	70	75	SCREEN-CONTINUOUS-STAINLESS
268673	MACC KIRK	13N	20W	26	AB	WELL	0	85	8	0	40	AIR	2	85	8	0.08	JEROMES DRILLING CO	3/22/2016	DOMESTIC	NEW WELL	85	85	OPEN BOTTOM
708433	RICHARDSON BROS	13N	20W	26	AB	WELL	111ALVM	21	0	0	0	OTHER	0	0	0	0	0	1/11/1997	UNUSED	NEW WELL	0	0	0
187523	SKIBSTED KYLE	13N	20W	26	AB	WELL	112ALVM	75	13	0	30	AIR	3	65	13	0.03	JEROMES DRILLING CO	9/29/2000	DOMESTIC	NEW WELL	75	75	OPEN BOTTOM
187524	STEMPLE RANDY	13N	20W	26	AB	WELL	112ALVM	78	10	0	48	AIR	1	40	10	0	CAMP WELL DRILLING	9/29/2000	DOMESTIC	NEW WELL	78	80	OPEN BOTTOM
275508	WIDAMAN, JASON	13N	20W	26	AB	WELL	0	87	9	0	35	AIR	2	80	9	0.08	JEROMES DRILLING CO	7/31/2013	DOMESTIC	NEW WELL	87	87	OPEN BOTTOM
242735	GINGERICH DEAN AND PHYLLIS	13N	20W	26	ABA	WELL	0	63	12	0	100	AIR	1.5	40	12	0	CKC DRILLING	2/29/2008	DOMESTIC	NEW WELL	63	63	OPEN BOTTOM
70062	BURLINGAME RICHARD	13N	20W	26	ABB	WELL	112ALVM	40	12	12	65	AIR	1	0	0	0	MAGSTADT	7/2/1977	IRRIGATION	ABANDONED	40	40	OPEN BOTTOM *
242737	GINGERICH PHYLLIS	13N	20W	26	ABC	WELL	0	59	12	0	100	AIR	1.5	40	12	0	CKC DRILLING	2/29/2008	DOMESTIC	NEW WELL	59	59	OPEN BOTTOM
143743	RANGITSCH ROBERT	13N	20W	26	AC	WELL	112ALVM	61	18	50	50	AIR	1	0	0	0	CAMP WELL DRILLING	8/18/1994	DOMESTIC	NEW WELL	61	61	OPEN BOTTOM *
70063	BROWN CLARENCE W.	13N	20W	26	AD	WELL	112ALVM	60	12	0	50	OTHER	0	0	0	0	0	1/11/1957	DOMESTIC	NEW WELL	0	0	0
70064	BROWN CLARENCE W.	13N	20W	26	AD	WELL	111ALVM	6	12	0	50	OTHER	0	0	0	0	0	1/11/1952	DOMESTIC	NEW WELL	0	0	0
126248	DEVLIN TOM	13N	20W	26	AD	WELL	112ALVM	60	15	47	40	AIR	1	0	0	0	JEROMES DRILLING CO	11/1/1991	DOMESTIC	NEW WELL	60	60	OPEN BOTTOM *
209378	HOLLAND MYRON	13N	20W	26	AD	WELL	112ALVM	64	24	0	30	AIR	3	55	24	0.04	JEROMES DRILLING CO	2/5/2004	DOMESTIC	NEW WELL	64	64	OPEN BOTTOM
175644	NICHOLSON MARK	13N	20W	26	AD	WELL	112ALVM	60	9	0	50	AIR	3	50	9	0.08	JEROMES DRILLING CO	5/10/1999	0	NEW WELL	60	60	OPEN BOTTOM *
182149	ROO TED	13N	20W	26	AD	WELL	112ALVM	60	10	0	30	AIR	1	0	0	0	JEROMES DRILLING CO	9/7/1995	DOMESTIC	NEW WELL	60	60	OPEN BOTTOM *
70065	ROSS DAVID	13N	20W	26	AD	WELL	112ALVM	79	10	25	100	AIR	1	0	0	0	CAMP WELL DRILLING	7/26/1985	DOMESTIC	NEW WELL	79	79	OPEN BOTTOM *
157514	WALFORD RYLAND	13N	20W	26	AD	WELL	112ALVM	99	10	25	60	AIR	3.5	0	0	0	CAMP WELL DRILLING	8/20/1996	DOMESTIC	NEW WELL	99	99	OPEN BOTTOM *
127540	FICKES CORRINNE	13N	20W	26	ADA	WELL	111ALVM	52	11	13	30	PUMP	2	0	0	0	CKC	4/15/1992	DOMESTIC	NEW WELL	52	52	OPEN BOTTOM *
70066	HEAVNER LLOYD	13N	20W	26	ADA	WELL	112ALVM	60	12	40	20	AIR	1.5	0	0	0	PRESTON	7/17/1985	DOMESTIC	NEW WELL	60	60	OPEN BOTTOM *
213716	MCCOOL RICK	13N	20W	26	ADD	WELL	112ALVM	60	14	0	30	AIR	3	50	14	0.08	JEROMES DRILLING CO	11/6/2003	DOMESTIC	NEW WELL	60	60	OPEN BOTTOM
70068	HEAVNER LLOYD	13N	20W	26	B	WELL	112ALVM	42	9	10	13	OTHER	2.5	0	0	0	RICHARDSON	4/11/1976	DOMESTIC	NEW WELL	39	42	1/2 INCH HOLES
70067	RUANA DENNIS	13N	20W	26	B	WELL	112ALVM	92.1	11	14	20	AIR	0.75	0	0	0	CAMP WELL DRILLING	5/26/1965	DOMESTIC	NEW WELL	92.1	92.1	OPEN BOTTOM *
155824	MARK TWITE CONSTRUCTION	13N	20W	26	BA	WELL	112ALVM	76	10	0	30	AIR	1	0	0	0	JEROMES DRILLING CO	5/16/1996	DOMESTIC	NEW WELL	76	76	OPEN BOTTOM *
209254	MISSOULA COUNTY WQD WELL W132E	13N	20W	26	BBCA	WELL	110ALVM	26	11.8	0	0	OTHER	0	0	0	0	0	7/12/1995	MONITORING	NEW WELL	6	26	FACTORY SLOTS
70071	BILBY BOB	13N	20W	26	BC	WELL	111ALVM	50	8	20	55	AIR	1	0	0	0	JEROME AND OKEEFE DRILLING CO	6/21/1979	DOMESTIC	NEW WELL	50	50	OPEN BOTTOM *
189483	CHRISTENSEN JOHN	13N	20W	26	BC	WELL	111ALVM	38	12	0	25	AIR	3	30	12	0.03	JEROMES DRILLING CO	11/8/2002	DOMESTIC	NEW WELL	38	38	OPEN BOTTOM
70070	CLOSE DON	13N	20W	26	BC	WELL	112ALVM	53.6	11	40	75	AIR	1	0	0	0	CAMP WELL DRILLING	11/5/1976	DOMESTIC	NEW WELL	53.6	53.6	OPEN BOTTOM *
70072	FISHER JOHN C.	13N	20W	26	BC	WELL	112ALVM	96	16	35	20	OTHER	1.5	0	0	0	JEROMES DRILLING CO	2/20/1984	DOMESTIC	NEW WELL	96	96	OPEN BOTTOM *
121821	LAINE TED	13N	20W	26	BC	WELL	112ALVM	80	15	31	50	AIR	2	0	0	0	JEROMES DRILLING CO	4/6/1989	DOMESTIC	NEW WELL	80	80	OPEN BOTTOM *
120494	MUNTHORP GREG	13N	20W	26	BC	WELL	112ALVM	80	10	39	60	AIR	2	0	0	0	JEROMES DRILLING CO	4/19/1990	DOMESTIC	NEW WELL	80	80	OPEN BOTTOM *
239215	REID, JAMES E./TOCZEK, ELIZABETH A	13N	20W	26	BC	WELL	0	98	14	0	100	AIR	1.5	80	0	0	CAMP WELL DRILLING	10/8/2007	DOMESTIC	NEW WELL	98	98	OPEN BOTTOM
70073	SCHILLE DAVE	13N	20W	26	BC	WELL	112ALVM	78.5	11	78	100	AIR	0.5	0	0	0	CAMP WELL DRILLING	11/29/1984	DOMESTIC	NEW WELL	78.5	78.5	OPEN BOTTOM *
70069	STODDARD CHAM	13N	20W	26	BC	WELL	112ALVM	60	8	25	35	AIR	2	0	0	0	JEROME AND OKEEFE DRILLING CO	6/2/1978	DOMESTIC	NEW WELL	60	60	OPEN BOTTOM *

AVERAGE YIELD 63.7

WATER AND SANITATION REPORT ATTACHMENT
I.7: NONDEGRADATION ANALYSIS – Included

FOR MDEQ USE

APPROVAL STAMP

RECEIVED STAMP:

EQ #:



LEGEND

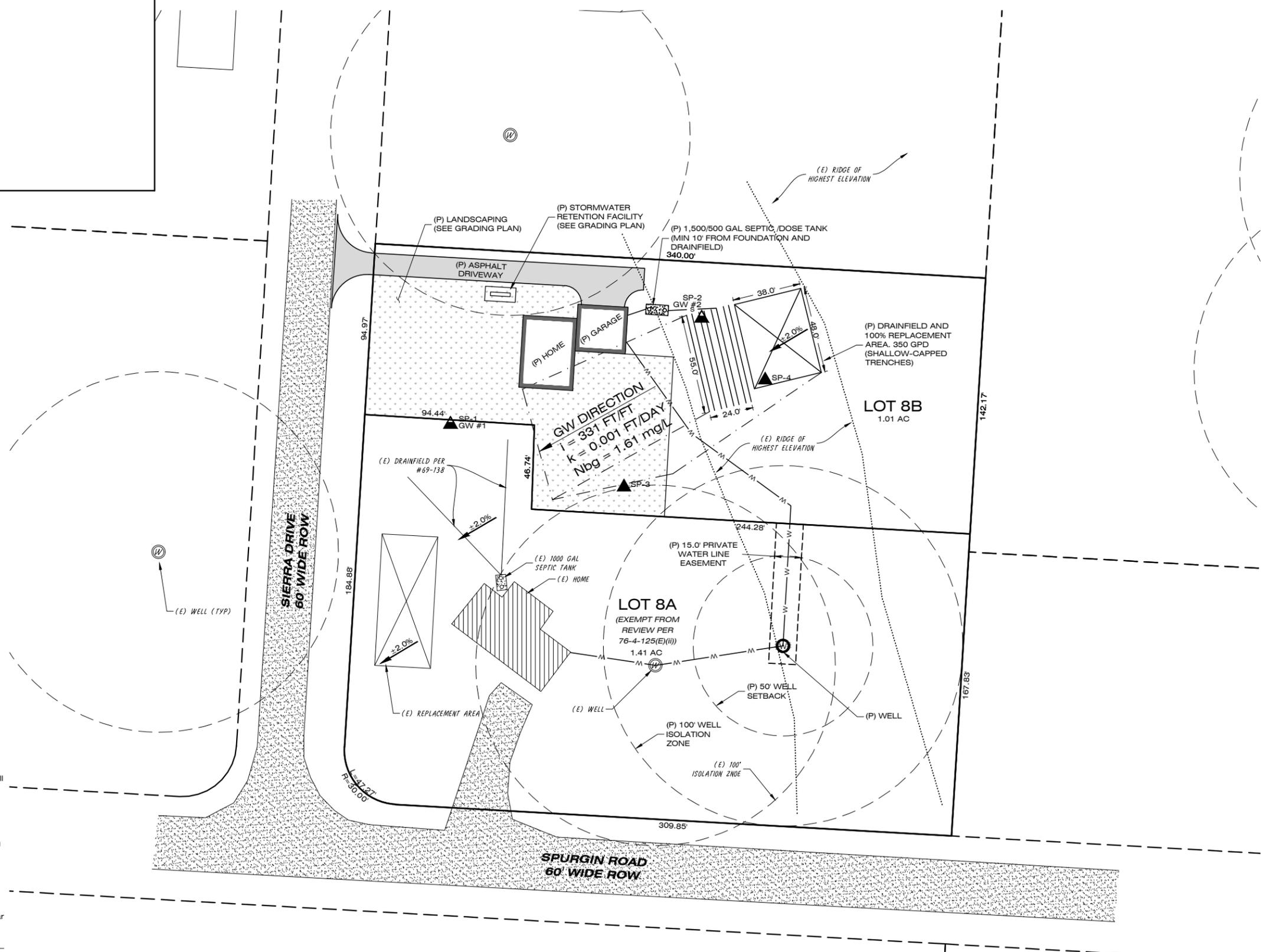
- (E) PROPERTY BOUNDARY
- (E) ADJACENT PROPERTY BOUNDARY
- (E) EASEMENT
- (E) WATER SERVICE
- (E) SEWER LINE
- (E) ASPHALT
- (E) SOIL PROFILE
- (E) GROUNDWATER MONITORING
- (E) SEPTIC TANK
- (E) DRAINFIELD
- (E) WELL

LOT LAYOUT REQUIREMENTS - ARM 17.36.104(2):

- (a) The name of the subdivision, and the county, section, township and range in which the proposed subdivision is located have been listed in the title block to the right.
- (b) A north arrow and scale are shown on this sheet.
- (c) The boundaries, dimensions, and total area of each lot are shown in the plan view for all lots.
- (d) An identifier or number for each lot (e.g., "lot 1, lot 2", "tract 1, tract 2", or "parcel 1, parcel 2") has been included.
- (e) Existing and Proposed easements are shown on the Lot Layout.
- (f) Utilities as shown here are specific to water and sewer. This layout does not show existing or proposed electrical, gas, or communication utilities. It also does not show privately owner utilities such as sewer or water services lines, propane tanks/lines, electrical and gas service lines, or underground sprinkler systems. Locations of existing roads are shown and labeled. There are no proposed roads.
- (g) There are no existing or proposed storm water structures as part of this project and therefore none are shown on the Lot Layout.
- (h) There are no drainage ways for this project.
- (i) The name and affiliation of the person who prepared the lot layout is listed in the lower right side and title block, respectively.
- (j) All applicable information as set out in Table 1 for the specific water supply and wastewater systems in the development has been shown. All systems have been labeled or listed in the legend as "existing" or "proposed". The floodplain boundaries near this subdivision is shown.

MDEQ LOT LAYOUT NOTES:

- Known existing, previously approved, or proposed wells, wastewater treatment systems, and mixing zones on or within 100' of the subdivision have been shown on this Lot Layout.
- All setbacks in ARM 17.36.323 are met.
- Proposed home locations are provided as conceptual in nature. This Lot Layout shall in no way act as a regulatory document for siting homes or driveways.
- No known sources of contamination within 500' of proposed well where found in regards to this development.



TERRITORIAL LANDWORKS, INC.
 CIVIL ENGINEERING • SURVEYING • LAND USE CONSULTING
 www.TerritorialLandworks.com
 P.O. Box 3851
 Missoula, MT 59806
 Ph: 406/721-0142
 Fax: 406/721-5224

DATE	
REVISIONS	
DESIGNED:	2
DRAFTED:	DO
CHECKED:	DO
DATE:	10/20/19

LOCATION: 4304 SPURGIN ROAD
 LOT 8, BLOCK 1, DOUBLE R ACRES
 SECTION 26, T18N, R20W, P.M.M.
 MISSOULA COUNTY, MONTANA
 PREPARED FOR: ALYSSA OBERWEISER

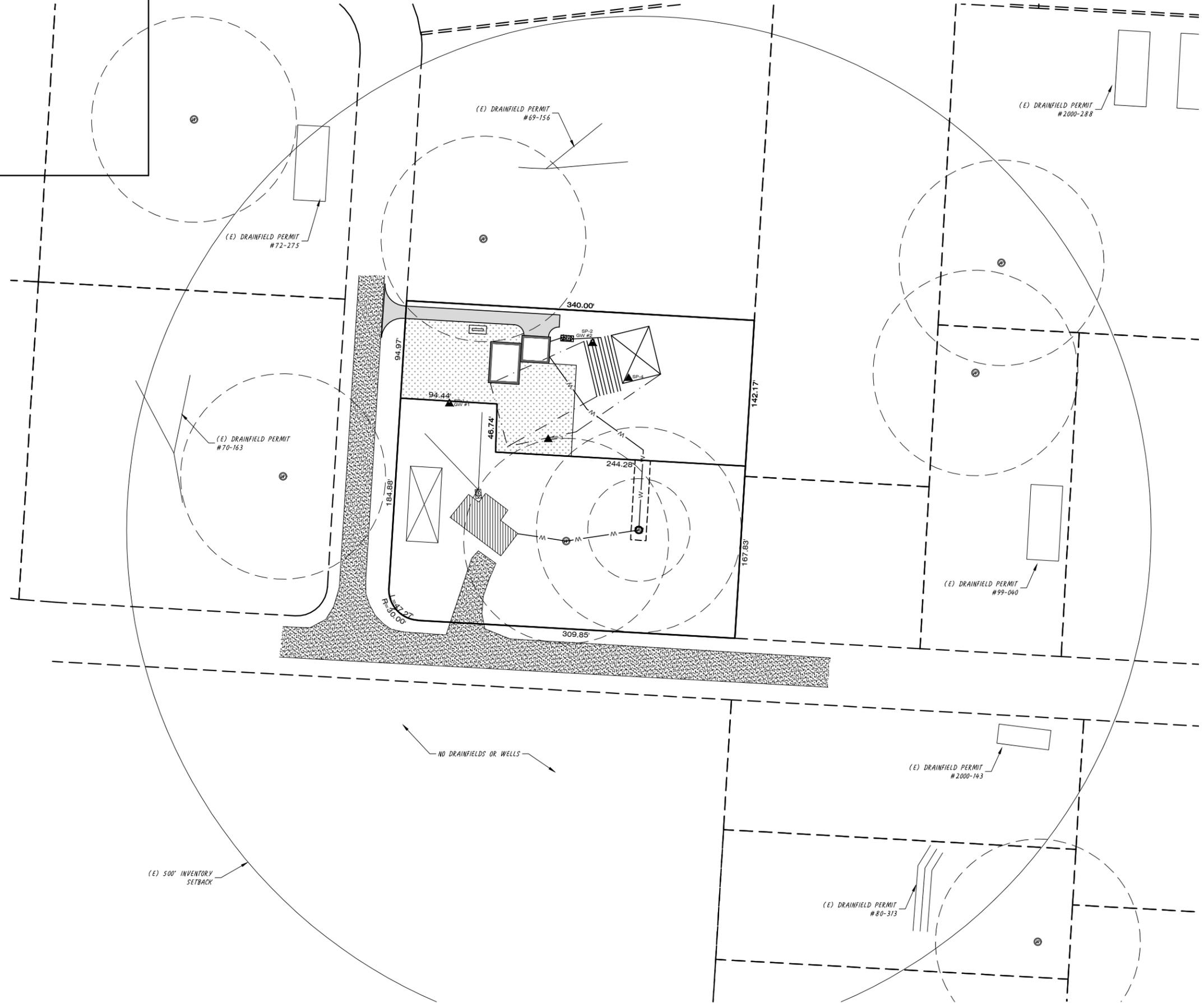
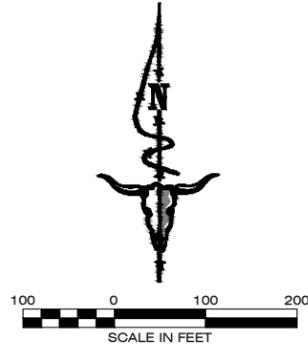
PROJECT NAME: DOUBLE R ACRES, LOT 4 BLOCK 1 SUBDIVISION
 SHEET TITLE: MDEQ LOT LAYOUT (PER ARM 17.36.104(2))
 SHEET: 1 OF 2

FOR MDEQ USE

APPROVAL STAMP

RECEIVED STAMP:

EQ #:



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 Ph: 406/721-0142
 Fax: 406/721-5224
 PLOT DATE: 09/24/2009 7:28 PM

REVISIONS	DATE

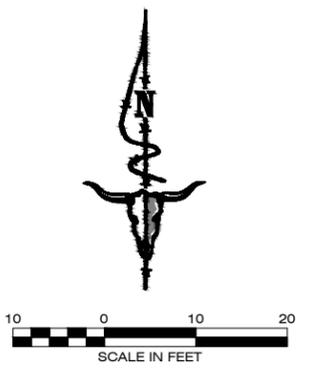
DESIGNED: _____
 DRAFTED: _____
 CHECKED: _____
 DATE: _____

LOCATION:	SPECIFIC LOCATION
MISSOULA COUNTY	OWNER TOP OWNER BOTTOM

PROJECT NAME	PROJECT NAME TOP PROJECT NAME BOTTOM
SHEET TITLE	MDEQ LOT LAYOUT (PER ARM 17.36.104(2))

PROJECT NO. _____
 SHEET: 1 OF 1

PREPARED BY: XXXXXXXX



PRELIMINARY	PROJECT NO.	PROJECT NAME	LOCATION:	REVISIONS	DATE
	SHEET:	DOUBLE 'R' ACRES, LOT 4 BLOCK 1	4304 SPURGIN ROAD LOT 8, BLOCK 1, DOUBLE R ACRES SECTION 26, T13N, R20W, P.M.M. MISSOULA COUNTY	DESIGNED: <u>DO</u>	
	SHEET TITLE:	SITE SPECIFIC GROUNDWATER GRADIENT	PREPARED FOR:	DRAFTED: <u>DO</u>	
	1 OF 1		HOLLY RASER	CHECKED: <u>DO</u>	
				DATE:	10/20/19

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 Missoula, MT 59806
 Ph: 406/721-0102
 Fax: 406/721-5224
 PLOT DATE: 09/18/2019 2:08 PM

Appendix E
MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
NITRATE SENSITIVITY ANALYSIS - Cumulative & Non-Cumulative Effects

SITE NAME: Double 'R' Acres Lot 8 Block 1
 COUNTY: Missoula
 EQ#: _____
 NOTES: _____

BY: Danny Oberweiser, Civil Project Designer
 DATE: 9/1/2020

Nitrate at end of mixing zone(s) with no cumulative effects & same background nitrate level

Variable	(K)	(I)	(D)	(L)	(Y)	(Ng)	(Nr)	(Ne)	(#)	(QI)	(P)	(V)	(W)	(Am)	(As)	(Qg)	(Qr)	(Qe)	Nt
LOT #	Hydr. cond. (ft/day)	Hydr. grad. (ft/ft)	Mix zone thick (feet)	Down grad. distance (feet)	Drain-field width (feet)	Back-ground nitrate (mg/l)	Nitrate in precip (mg/l)	Effluent Nitrate conc. (mg/l)	# of single family homes	Effluent per drain. (ft3/day)	Annual precip. (in/yr)	Percent precip. recharge	Down-grad. width (feet)	Mix zone area (ft ²)	Mix. zone surface area (ft ²)	Ground water flow (ft3/day)	Recharge flow (ft3/day)	Effluent flow (ft3/day)	Resulting nitrate (N) (mg/l)
Proposed Drainfield	332	0.0010	15.0	100	60.0	1.61	1.0	50.0	1.0	26.7	14.0	0.2	77.50	1162.50	7750.00	386.07	4.95	26.70	4.70
Existing Drainfield	332	0.0010	15.0	100	78.0	1.61	1.0	50.0	1.0	26.7	14.0	0.2	95.50	1432.50	9550.00	475.73	6.11	26.70	4.14

Passing?
 YES
 YES

Nitrate at end of mixing zones with cumulative effects

LOT #	(K)	(I)	(D)	(L)	(Y)	(Ng)	(Nr)	(Ne)	(#)	(QI)	(P)	(V)	(W)	(Am)	(As)	(Qg)	(Qr)	(Qe)	Nt
Proposed Drainfield	332	0.0010	15.0	107	60.0	1.61	1.0	50.0	1.0	26.7	14.0	0.2	78.73	1180.88	8423.58	392.17	5.38	26.70	4.65
Existing Drainfield	332	0.0010	15.0	207	78.0	4.65	1.0	50.0	1.0	26.7	0.0	0.0	114.23	1713.38	23644.58	569.01	0.00	26.70	6.68

Passing?
 YES
 YES

REV. 03/2005

NOTES:		
	= fill in values in these cells	
	= these cells are calculated for you	
Hydr. cond. =	K	Hydraulic Conductivity
Hydr. grad. =	I	Hydraulic Gradient
Mix zone thick =	D	Thickness of Mixing Zone up to a Maximum of 15 feet (usually constant at 15 feet)
Down grad. distance =	L	Mixing Zone Length (see ARM 17.30.517(1)(d)(viii)), or this may also be the distance to end of last mixing zone when calculating cumulative effects.
Drainfield width =	Y	Width of Drainfield Perpendicular to Ground Water Flow
Background nitrate =	Ng	Background Nitrate (as Nitrogen) Concentration
Nitrate in precip. =	Nr	Nitrate (as Nitrogen) Concentration in Precipitation (usually constant at 1.0 mg/L)
Effluent Nitrate conc. =	Ne	Nitrate (as Nitrogen) Concentration in Effluent (50 for conventional; 24 for level II; 30 for level 1a; 40 for level 1b)
# single family homes =	#	Number of Single Family Homes on the Drainfield (leave as 1 if effluent volume in next column is adjusted to equal total effluent from drainfield)
Effluent per drain. =	QI	Quantity of Effluent from drainfield (average rate varies depending on number of bedrooms)
Annual precip. =	P	Annual local Precipitation
Percent precip recharge =	V	Percent of Precipitation Recharging Ground Water (usually constant at 0.2)
Down grad. width =	W	Width of Mixing Zone Perpendicular to Ground Water Flow = (D)(L) + (Y)
Mix zone area =	Am	Cross Sectional Area of Aquifer Mixing Zone = (D)(W)
Mix zone surface area =	As	Surface Area of Mixing Zone = (L)(W)
Ground water flow =	Qg	Ground Water Flow Rate = (K)(I)(Am)
Recharge flow =	Qr	Recharge Flow Rate = (As)(P/12/365)(V)
Effluent flow =	Qe	Effluent Flow Rate = (#)(QI)
Resulting nitrate (N) =	Nt	Nitrate (as Nitrogen) Concentration at End of Mixing Zone = ((Ng)(Qg) + (Nr)(Qr) + (Ne)(Qe)) / ((Qg) + (Qr) + (Qe)) (or nitrate concentration to use as background nitrate for next downgradient drainfield when determining cumulative effects)

TERRITORIAL-LANDWORKS, INC
PHOSPHOROUS BREAKTHROUGH ANALYSIS - Cumulative Effects

SITE NAME: Double 'R' Acres Lot 8 Block 1 _____

COUNTY: Missoula _____

EQ#: _____

NOTES: _____

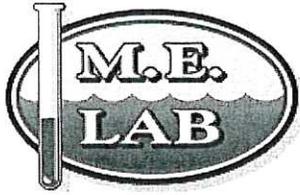
BY: Danny Oberweiser, Civil Project Designer _____

DATE: 9/1/2020 _____

Variable:	(Lg)	(L)	(W)	(B)	(D)	(T)	(Sw)	(Pa)	(#)	(PI)	(X)	(Pt)	(W1)	(W2)	(P)	(BT)	(TR)	(TD)	Satisfies?
Units:	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(lbs/ft3)	(ppm)	(homes)	(lbs/yr)	unitless	(lbs/yr)	(lbs)	(lbs)	(lbs)	(years)	(years)	(years)	(yes or no)
LOT #	See Below for Description of Variables																		
Proposed Drainfield	78	78	21	4.0	107	0.5	100	200	1.0	6.44	1,000,000	6.44	655,200	467,389	225	34.9	50.0	15.1	No
Existing Drainfield	75	75	54	4.0	2777	0.5	100	200	1.0	6.44	1,000,000	6.44	1,620,000	44,152,564	9155	1421.5	65.1	0	Yes

Note: Only needs to satisfy the phosphorus breakthrough requirement after the last drainfield to nearest surface water

NOTES:	
	= fill in values in these cells
	= these cells are calculated for you
	= these cells are generally constant
VARIABLES	DESCRIPTION
Lg	Length of Primary Drainfield as Measured Perpendicular to Ground Water Flow
L	Length of Primary Drainfield's Long Axis
W	Width of Primary Drainfield's Short Axis
B	Depth to Limiting Layer from Bottom of Drainfield Laterals*
D	Distance from Drainfield to Surface Water or next drainfield w/ stacking
T	Phosphorous Mixing Depth in Ground Water (0.5 ft for coarse soils, 1.0 ft for fine soils)**
Sw	Soil Weight (usually constant)
Pa	Phosphorous Adsorption Capacity of Soil (usually constant)
#	Number of Single Family Homes on the Drainfield
CONSTANTS	
PI	Phosphorous Load per Single Family Home (constant)
X	Conversion Factor for ppm to percentage (constant)
EQUATIONS	
Pt	Total Phosphorous Load = (PI)(#)
W1	Soil Weight under Drainfield = (L)(W)(B)(Sw)
W2	Soil Weight from Drainfield to Surface Water = [(Lg)(D) + (0.0875)(D)(D)] (T)(Sw)
P	Total Phosphorous Adsorption by Soils = (W1 + W2)[(Pa)/(X)]
SOLUTION	
BT	Breakthrough Time to Surface Water = P / Pt
TR	Time Required 50 years or 50 years plus deficient time from prior drainfield = TD+50 where TD is from prior drainfield
TD	Time that is deficient in current scenario = TR - BT (0 if BT<50 years)
* Depth to limiting layer is typically based on depth to water in a test pit or bottom of a dry test pit minus two feet to account for burial depth of standard drainfield laterals.	
** Material type is usually based on test pit. A soil that contains more than 35% silt and clay sized particles is considered fine grained.	



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

Territorial Landworks Missoula
Territorial Landworks - Missoula
1817 South Ave West, Ste A
Missoula, MT 59801

PWS ID:
Project: 4413 S 7th St. W (14-3371)

Client Sample ID: Front Garden Spigot
Matrix: DRINKING WATER

Collected: 06/28/2019 15:45

Lab ID: 1906647-01
Received: 07/01/2019 9:00

<u>Analyses</u>	<u>Result</u>	<u>Units</u>	<u>MDL</u>	<u>MCL</u>	<u>Method</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Analyst</u>
Arsenic	0.001	mg/L	0.001	0.010	E200.8		07/03/2019 10:28	BLW
Conductivity	375	umhos/cm	0.1		SM2510B		07/02/2019 15:16	BLW
Nitrate + Nitrite, Total	1.61	mg/L	0.01	10	E353.2		07/05/2019 14:03	GDM