Aspen Ridge Subdivision – Second Filing

Yellowstone County / DEQ Septic Application

May 4, 2015

Job# 14080

Maps

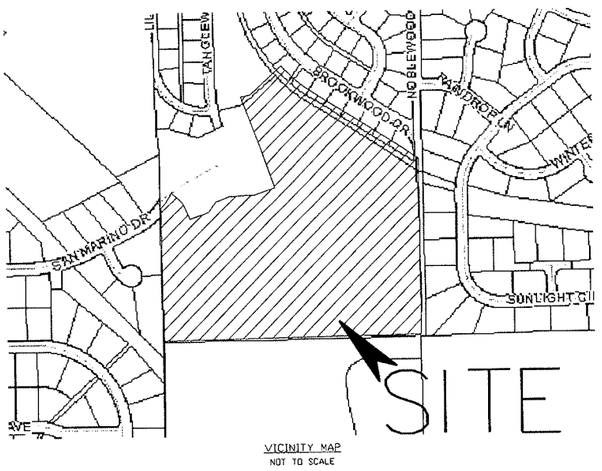
Site Layout
GWIC Well Location Map

PRELIMINARY PLAT OF

ASPEN RIDGE SUBDIVISION, 2ND FILING

SITUATED IN THE SE 1/4, SW 1/4, SECTION 29, T. 1 N., R. 27 E., P.M.M.
YELLOWSTONE COUNTY, MONTANA

Scale 1" = 80'



VICINITY MAP
NOT TO SCALE

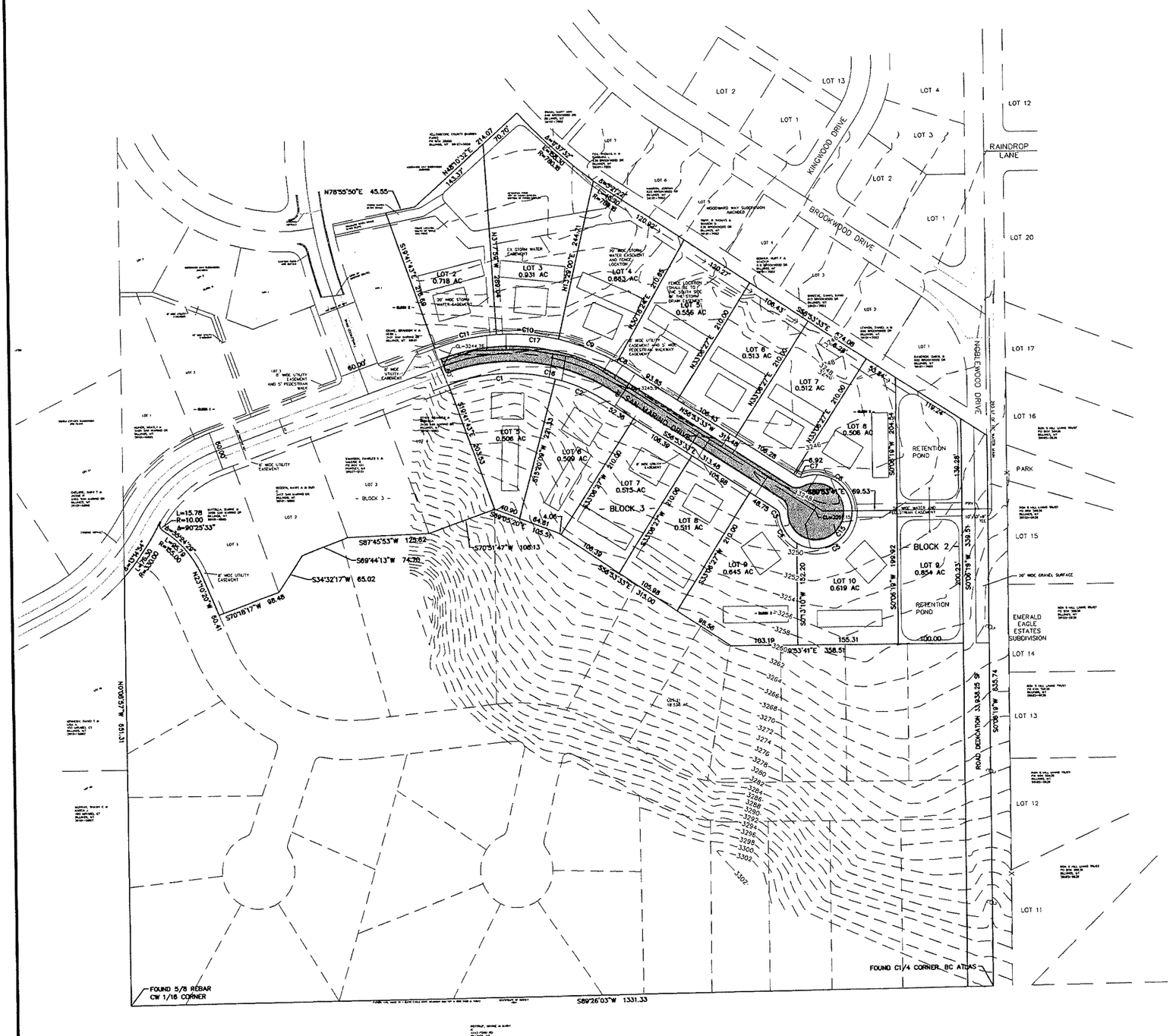
PREPARED FOR: SUPERIOR BUILDERS LLP
SURVEYOR: NORTH STAR LAND SERVICES, P.C.
ENGINEER: BLUELINE ENGINEERING LLC
MAY, 2015
BILLINGS, MONTANA

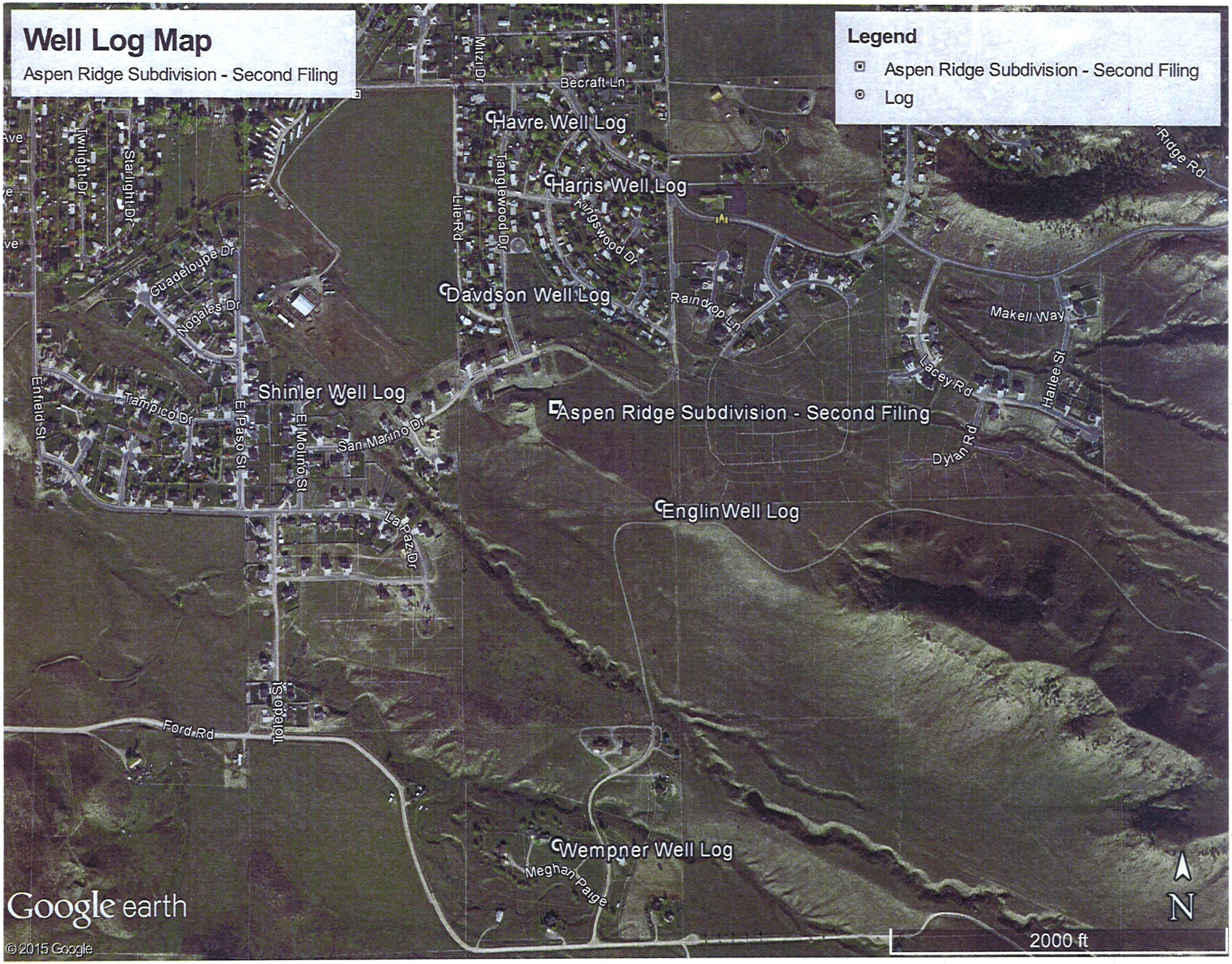
SUBDIVISION DETAILS:

GROSS AREA	=	28.191 ACRES
NET AREA	=	25.541 ACRES
ROAD AREA	=	2.650 ACRES
PARK LAND	=	0.355 ACRES
NUMBER OF LOTS	=	15
MINIMUM LOT SIZE	=	0.506 ACRES
MAXIMUM LOT SIZE	=	18.538 ACRES
EXISTING ZONING	=	R-9600
SURROUNDING ZONING		
NORTH	=	R-9600
SOUTH	=	AG SUBURBAN
EAST	=	R-9600
WEST	=	R-9600
EXISTING LAND USE	=	VACANT
PROPOSED LAND USE	=	RESIDENTIAL

CURVE TABLE

CURVE #	ARC LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH
C1	168.08	270.08	35.66	S87°30'38"W	165.38
C2	83.75	270.00	17.77	N65°46'42"W	83.41
C3	9.20	10.00	52.69	N30°32'42"W	8.88
C4	52.72	56.00	53.94	S31°09'56"E	50.79
C5	119.11	56.00	121.87	N60°56'00"E	97.89
C6	107.11	56.00	109.59	N54°47'37"W	91.51
C7	9.20	10.00	52.69	S83°14'24"E	8.88
C8	16.13	330.00	2.80	N58°17'35"W	16.13
C9	96.89	330.00	16.82	N68°06'18"W	96.55
C10	96.66	330.00	16.78	N84°54'30"W	96.32
C11	97.54	330.00	16.94	S78°13'57"W	97.19
C15	279.02	56.00	285.48	N33°09'08"E	67.81
C16	251.82	270.08	53.42	N83°36'29"W	242.80
C17	287.99	330.00	50.00	N84°41'40"W	278.94




Well Log Map
Aspen Ridge Subdivision - Second Filing
Legend
Aspen Ridge Subdivision - Second Filing
Log
Havre Well Log
Harris Well Log
Davdson Well Log
Shinler Well Log
Aspen Ridge Subdivision - Second Filing
Englin Well Log
Wempner Well Log
Mitzi Dr
Becraft Ln
Twilight Dr
Starlight Dr
Guadeloupe Dr
Nogales Dr
Tanglewood Dr
Lile Rd
Kingswood Dr
Raindrop Ln
Ridge Rd
Makell Way
Lacey Rd
Hailee St
Dylan Rd
Enfield St
Tampico Dr
El Paso St
El Molino St
San Marino Dr
La Paz Dr
Toledo St
Ford Rd
Meghan Paige
Google earth
© 2015 Google
N
2000 ft

Soils

Test Pits

Percolation Test Data

USDA Soils Map

Soil Map—Yellowstone County, Montana
(Aspen Ridge Subdivision- Second Filing)

Map Scale: 1:3,570 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Yellowstone County, Montana
Survey Area Data: Version 13, Sep 3, 2014

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

Date(s) aerial images were photographed: Jul 29, 2011—Aug 17, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Yellowstone County, Montana (MT111)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Ft	Fort Collins and Thurlow clay loams, 1 to 4 percent slopes	20.8	36.3%
Hl	Haverson and Lohmiller soils, 0 to 4 percent slopes	3.4	6.0%
Hm	Haverson and Lohmiller soils, channeled, 0 to 35 percent slopes	2.1	3.7%
Pc	Pierre clay, 4 to 7 percent slopes	30.9	54.0%
Totals for Area of Interest		**57.2**	**100.0%**

#1
LTS

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
PERCOLATION TEST FORM

Owner Name _____

Project Name Aspen Ridge

Lot of Tract Number L 5 Test Number _____

Diameter of Test Hole _____ Depth of Test Hole _____

Date and Time Soak Period Began 13:53 Ended 13:53

Date Test Began _____

Distance of the reference point above the bottom of the hole _____

Test Results

Start Time of Day	End Time of Day	Time Interval (minutes)	Initial Distance Below Reference Point	Final Distance Below Reference Point	Drop in Water Level (inches)	Percolation Rate (mpi)
~~13:53~~						
13:57	14:12	15	0	.75 3/4		
14:13	14:28	15	0	.75 3/4		
14:29	14:44	15	0	.50 1/2		
14:45	1500	15	0	.50 1/2		

I certify that this percolation test was done by a qualified site evaluator in accordance with DEQ-4 Section 1.2.68 and Appendix A.

Name (printed) _____ Signature _____ Date _____

Company _____

#2

2002
mon well
Test Pit

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
PERCOLATION TEST FORM

Owner Name _____

Project Name _____

Lot of Tract Number Lt 7 Test Number _____

Diameter of Test Hole _____ Depth of Test Hole _____

Date and Time Soak Period Began 12:14 Ended 14:14

Date Test Began _____

Distance of the reference point above the bottom of the hole _____

Test Results

Start Time of Day	End Time of Day	Time Interval (minutes)	Initial Distance Below Reference Point	Final Distance Below Reference Point	Drop in Water Level (inches)	Percolation Rate (mpi)
14:15	14:30	15	0	.25 1/4		
14:31	14:46	15	0	.25 1/4		
14:47	15:02	15	0	.25 1/4		
15:03	15:18	15	0	0 1/8		

I certify that this percolation test was done by a qualified site evaluator in accordance with DEQ-4 Section 1.2.68 and Appendix A.

Name (printed) _____ Signature _____ Date _____

Company _____

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
PERCOLATION TEST FORM

Owner Name _____

Project Name _____

Lot of Tract Number _____ Test Number #3

Diameter of Test Hole _____ Depth of Test Hole _____

Date and Time Soak Period Began 1045 Ended 1245

Date Test Began _____

Distance of the reference point above the bottom of the hole _____

Test Results

Start Time of Day	End Time of Day	Time Interval (minutes)	Initial Distance Below Reference Point	Final Distance Below Reference Point	Drop in Water Level (inches)	Percolation Rate (mpi)
1250	1305	15	0	1 1/4		
1306	1321			1 1/4		
1322	1337			1		
1334	1353			1		

I certify that this percolation test was done by a qualified site evaluator in accordance with DEQ-4 Section 1.2.68 and Appendix A.

_____ _____ _____
Name (printed) Signature Date

_____
Company

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
PERCOLATION TEST FORM

Owner Name _____

Project Name _____

Lot of Tract Number _____ Test Number 4

Diameter of Test Hole _____ Depth of Test Hole _____

Date and Time Soak Period Began 1100 Ended 1300

Date Test Began _____

Distance of the reference point above the bottom of the hole _____

Test Results

Start Time of Day	End Time of Day	Time Interval (minutes)	Initial Distance Below Reference Point	Final Distance Below Reference Point	Drop in Water Level (inches)	Percolation Rate (mpi)
1301	13:16	15	0	1 1/4		
1317	13:32		0	1 1/8		
1333	1348		0	1 1/8		
1349	14:04		0	1		

I certify that this percolation test was done by a qualified site evaluator in accordance with DEQ-4 Section 1.2.68 and Appendix A.

_____ _____ _____
Name (printed) Signature Date

_____
Company

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
PERCOLATION TEST FORM

Owner Name _____

Project Name _____

Lot of Tract Number _____ Test Number 5

Diameter of Test Hole _____ Depth of Test Hole _____

Date and Time Soak Period Began 1120 Ended 1320

Date Test Began _____

Distance of the reference point above the bottom of the hole _____

Test Results

Start Time of Day	End Time of Day	Time Interval (minutes)	Initial Distance Below Reference Point	Final Distance Below Reference Point	Drop in Water Level (inches)	Percolation Rate (mpi)
1325	1340	15	0	1/4		
1341	1356	15	0	3/4		
1356	1413	15	0	3/4		
1414	1430	16	0	1/2		

I certify that this percolation test was done by a qualified site evaluator in accordance with DEQ-4 Section 1.2.68 and Appendix A.

Name (printed) _____ Signature _____ Date _____

Company _____

PARK DEDICATION 15,440 SF

WOODWARD WAY SUBDIVISION AMENDED

- BLOCK 2 -

- BLOCK 3 -

NEW ROAD

KINGWOOD DRIVE

RAINDROP LANE

EDGE OF EXISTING GRAVEL

60' RIGHT OF WAY

FIRE HYDRANT

NEW 1" WATER SERVIE (TYP)

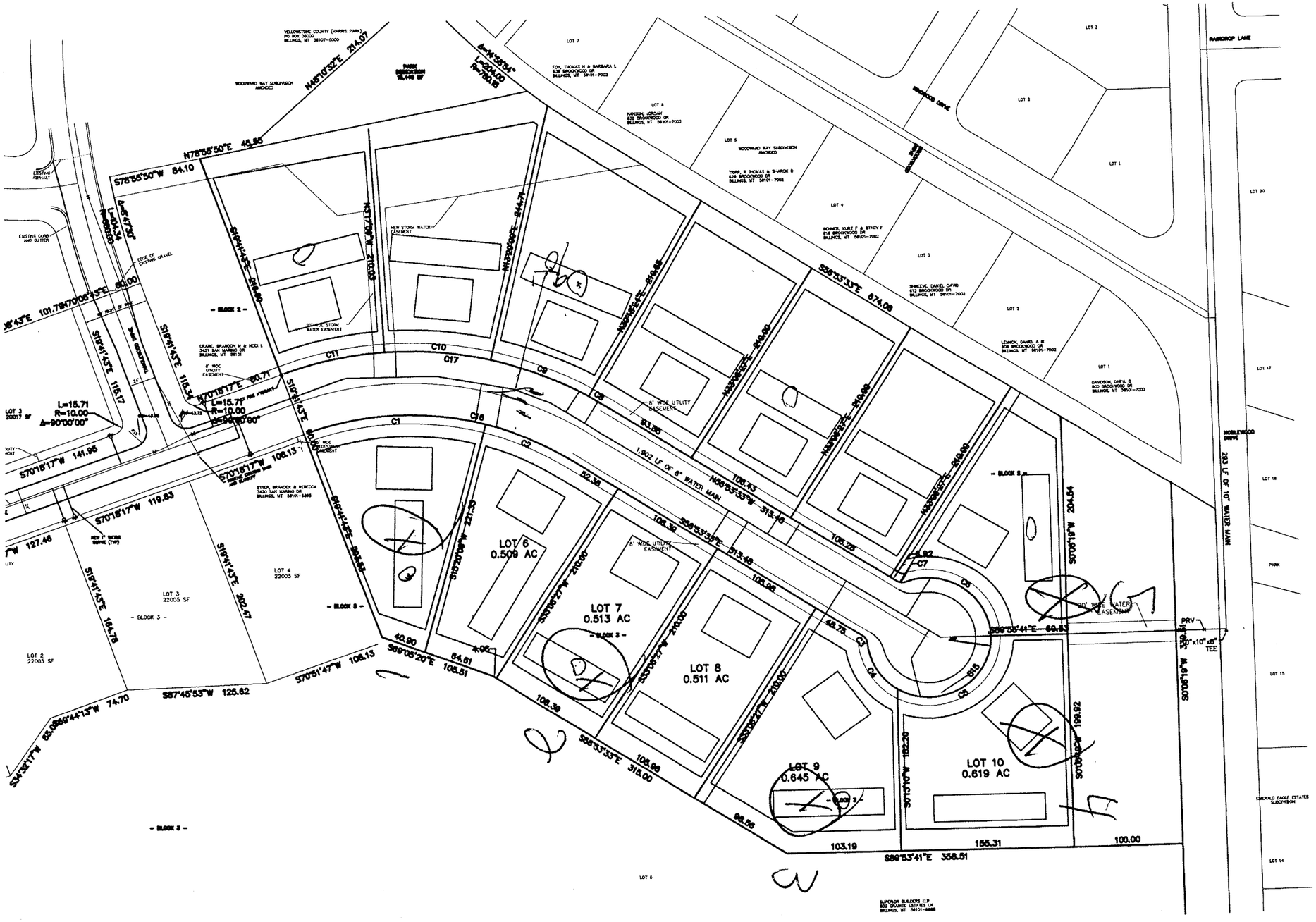
LOT 4 22005 SF

LOT 8 22005 SF

EMERALD EAGLE ESTATES SUBDIVISION

Line Table		
Line #	Length	Direction

Aspen RIDGE
4/22/15



	Test Pit		
Project Name:	Aspen Ridge Subdivision		
Project Number:	14080		
Legal Description:	Lot 5, Block 3, Aspen Ridge Subdivision		
County	Yellowstone		
Date:	4/22/2015		
By:	TML	**Checked:**	

Objective: To describe the Test Pit for septic system design

Observations:

Test Pit Number: 2000

Location: See Site Layout

0" GROUND SURFACE

Texture: Top Soil
H_2O State: Dry
Color: Brown

28"

Texture: Decomposed Shale
H_2O State: Dry
Color: Dark Brown

96" Bottom of Trench

References:

Montana Department of Environmental Quality. *Circular DEQ 4.* 2013 ed.

blueline ENGINEERING	Test Pit			
	Project Name:	Aspen Ridge Subdivision		
	Project Number:	14080		
	Legal Description:	Lot 5, Block 3, Aspen Ridge Subdivision		
	County	Yellowstone		
	Date:	4/22/2015		
	By:	TML	**Checked:**	

Objective: To describe the Test Pit for septic system design

Observations:

Test Pit Number:	**2001**

Location: See Site Layout

0"	GROUND SURFACE
Texture:	Top Soil
H_2O State:	Dry
Color:	Brown
20"	
Texture:	Sandy Clay Loam
H_2O State:	Dry
Color:	Dark Brown
96"	Bottom of Trench

References:

Montana Department of Environmental Quality. *Circular DEQ 4.* 2013 ed.

blueline ENGINEERING	Test Pit			
	Project Name:	Aspen Ridge Subdivision		
	Project Number:	14080		
	Legal Description:	Lot 5, Block 3, Aspen Ridge Subdivision		
	County	Yellowstone		
	Date:	4/22/2015		
	By:	TML	**Checked:**	

Objective: To describe the Test Pit for septic system design

Observations:

Test Pit Number: 2002

Location: See Site Layout

0" GROUND SURFACE

Texture: Top Soil
H_2O State: Dry
Color: Brown

24"

Texture: Decomposed Shale
H_2O State: Dry
Color: Dark Brown

96" Bottom of Trench

References:

Montana Department of Environmental Quality. *Circular DEQ 4.* 2013 ed.

blueline ENGINEERING	Test Pit		
	Project Name:	Aspen Ridge Subdivision	
	Project Number:	14080	
	Legal Description:	Lot 5, Block 3, Aspen Ridge Subdivision	
	County	Yellowstone	
	Date:	4/22/2015	
	By:	TML	**Checked:**

Objective: To describe the Test Pit for septic system design

Observations:

Test Pit Number:	**2003**

Location: See Site Layout

0"	GROUND SURFACE
Texture:	Top Soil
H_2O State:	Dry
Color:	Brown
24"	
Texture:	Sandy Clay Loam
H_2O State:	Dry
Color:	Dark Brown
96"	Bottom of Trench

References:

Montana Department of Environmental Quality. *Circular DEQ 4.* 2013 ed.

blueline ENGINEERING	Test Pit		
	Project Name:	Aspen Ridge Subdivision	
	Project Number:	14080	
	Legal Description:	Lot 5, Block 3, Aspen Ridge Subdivision	
	County	Yellowstone	
	Date:	4/22/2015	
	By:	TML	**Checked:**

Objective: To describe the Test Pit for septic system design

Observations:

Test Pit Number:	**2004**

Location: See Site Layout

0"	GROUND SURFACE
Texture:	Top Soil
H_2O State:	Dry
Color:	Brown
27"	
Texture:	Sandy Clay Loam
H_2O State:	Dry
Color:	Dark Brown
96"	Bottom of Trench

References:

Montana Department of Environmental Quality. *Circular DEQ 4.* 2013 ed.

blueline ENGINEERING	Test Pit		
	Project Name:	Aspen Ridge Subdivision	
	Project Number:	14080	
	Legal Description:	Lot 5, Block 3, Aspen Ridge Subdivision	
	County	Yellowstone	
	Date:	4/22/2015	
	By:	TML	**Checked:**

Objective: To describe the Test Pit for septic system design

Observations:

Test Pit Number:	**2005**

Location: See Site Layout

0"	GROUND SURFACE
Texture:	Top Soil
H_2O State:	Dry
Color:	Brown
24"	
Texture:	Sandy Clay Loam
H_2O State:	Moist
Color:	Dark Brown
96"	Bottom of Trench

References:

Montana Department of Environmental Quality. *Circular DEQ 4.* 2013 ed.

blueline ENGINEERING	Test Pit		
	Project Name:	Aspen Ridge Subdivision	
	Project Number:	14080	
	Legal Description:	Lot 5, Block 3, Aspen Ridge Subdivision	
	County	Yellowstone	
	Date:	4/22/2015	
	By:	TML	**Checked:**

Objective: To describe the Test Pit for septic system design

Observations:

Test Pit Number:	**2006**

Location: See Site Layout

0"	GROUND SURFACE
Texture: Top Soil	
H_2O State: Dry	
Color: Brown	
10"	
Texture: Sandy Clay Loam	
H_2O State: Dry	
Color: Light Brown	
96"	Bottom of Trench

References:

Montana Department of Environmental Quality. *Circular DEQ 4.* 2013 ed.

blueline ENGINEERING	Test Pit			
	Project Name:	Aspen Ridge Subdivision		
	Project Number:	14080		
	Legal Description:	Lot 5, Block 3, Aspen Ridge Subdivision		
	County	Yellowstone		
	Date:	4/22/2015		
	By:	TML	**Checked:**	

Objective: To describe the Test Pit for septic system design

Observations:

Test Pit Number:	**2007**

Location: See Site Layout

0"	GROUND SURFACE
Texture:	Top Soil
H_2O State:	Dry
Color:	Brown
10"	
Texture:	Sandy Clay Loam
H_2O State:	Dry
Color:	Light Brown
96"	Bottom of Trench

References:

Montana Department of Environmental Quality. *Circular DEQ 4.* 2013 ed.

blueline ENGINEERING	Test Pit		
	Project Name:	Aspen Ridge Subdivision	
	Project Number:	14080	
	Legal Description:	Lot 5, Block 3, Aspen Ridge Subdivision	
	County	Yellowstone	
	Date:	4/22/2015	
	By:	TML	**Checked:**

Objective: To describe the Test Pit for septic system design

Observations:

Test Pit Number:	**2008**

Location: See Site Layout

0"	GROUND SURFACE
Texture: Top Soil	
H_2O State: Dry	
Color: Brown	
10"	
Texture: Sandy Clay Loam	
H_2O State: Dry	
Color: Light Brown	
72"	
Texture: Sandy Clay Loam with gravel	
H_2O State: Moist	
Color: Light Brown	
96"	Bottom of Trench

References:

Montana Department of Environmental Quality. *Circular DEQ 4.* 2013 ed.

blueline ENGINEERING

Test Pit			
Project Name:	Aspen Ridge Subdivision		
Project Number:	14080		
Legal Description:	Lot 5, Block 3, Aspen Ridge Subdivision		
County	Yellowstone		
Date:	4/22/2015		
By:	TML	**Checked:**	

Objective: To describe the Test Pit for septic system design

Observations:

Test Pit Number:	**2009**

Location: See Site Layout

0"	GROUND SURFACE
Texture:	Top Soil
H_2O State:	Dry
Color:	Brown
10"	
Texture:	Sandy Clay Loam
H_2O State:	Dry
Color:	Light Brown
72"	
Texture:	Sandy Clay Loam with gravel
H_2O State:	Moist
Color:	Light Brown
96"	Bottom of Trench

References:

Montana Department of Environmental Quality. *Circular DEQ 4.* 2013 ed.

blueline ENGINEERING	Test Pit			
	Project Name:	Aspen Ridge Subdivision		
	Project Number:	14080		
	Legal Description:	Lot 5, Block 3, Aspen Ridge Subdivision		
	County	Yellowstone		
	Date:	4/22/2015		
	By:	TML	**Checked:**	

Objective: To describe the Test Pit for septic system design

Observations:

Test Pit Number:	**2010**

Location: See Site Layout

0" GROUND SURFACE

Texture: Top Soil
H_2O State: Dry
Color: Brown

10"

Texture: Sandy Clay Loam
H_2O State: Dry
Color: Light Brown

96" Bottom of Trench

References:

Montana Department of Environmental Quality. *Circular DEQ 4.* 2013 ed.

blueline ENGINEERING	Test Pit		
	Project Name:	Aspen Ridge Subdivision	
	Project Number:	14080	
	Legal Description:	Lot 5, Block 3, Aspen Ridge Subdivision	
	County	Yellowstone	
	Date:	4/22/2015	
	By:	TML	**Checked:**

Objective: To describe the Test Pit for septic system design

Observations:

Test Pit Number:	**2011**

Location: See Site Layout

0"	GROUND SURFACE
Texture:	Top Soil
H_2O State:	Dry
Color:	Brown
10"	
Texture:	Sandy Clay Loam
H_2O State:	Dry
Color:	Light Brown
96"	Bottom of Trench

References:

Montana Department of Environmental Quality. *Circular DEQ 4.* 2013 ed.

	Test Pit		
Project Name:	Aspen Ridge Subdivision		
Project Number:	14080		
Legal Description:	Lot 5, Block 3, Aspen Ridge Subdivision		
County	Yellowstone		
Date:	4/22/2015		
By:	TML	**Checked:**	

Objective: To describe the Test Pit for septic system design

Observations:

Test Pit Number:	**2012**

Location: See Site Layout

0"	GROUND SURFACE
Texture:	Sandy Clay Loam
H_2O State:	Dry
Color:	Brown
54"	
Texture:	Decomposed Shale
H_2O State:	Dry
Color:	Dark Brown
96"	Bottom of Trench

References:

Montana Department of Environmental Quality. *Circular DEQ 4.* 2013 ed.

Water Analysis

Nitrate Analysis
Specific Conductance Analysis

ANALYTICAL SUMMARY REPORT

June 03, 2015

Blueline Engineering
2110 Overland Ave Ste 119B
Billings, MT 59102

Work Order: B15060166

Project Name: Aspen Ridge

Energy Laboratories Inc Billings MT received the following 1 sample for Blueline Engineering on 6/2/2015 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B15060166-001	Weupner Well	06/02/15 11:00	06/02/15	Aqueous	Conductivity Nitrogen, Nitrate + Nitrite

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

The results as reported relate only to the item(s) submitted for testing.

If you have any questions regarding these test results, please call.

Report Approved By: Jillian Miller
Analyst

Digitally signed by
Jillian B. Miller
Date: 2015.06.03 14:17:03 -06:00

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Blueline Engineering
Project: Aspen Ridge
Lab ID: B15060166-001
Client Sample ID: Weupner Well

Report Date: 06/03/15
Collection Date: 06/02/15 11:00
DateReceived: 06/02/15
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Conductivity @ 25 C	4990	umhos/cm		5		A2510 B	06/02/15 14:14 / cnm
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.01		E353.2	06/03/15 10:28 / bas

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Blueline Engineering
Project: Aspen Ridge

Report Date: 06/03/15
Work Order: B15060166

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **A2510 B**									Batch: R243802
Lab ID: **SC 2nd 1413**	Laboratory Control Sample				Run: PHSC _101-B_150602A				06/02/15 08:50
Conductivity @ 25 C	1420	umhos/cm	5.0	101	90	110			
Lab ID: **MBLK**	Method Blank				Run: PHSC _101-B_150602A				06/02/15 14:06
Conductivity @ 25 C	2	umhos/cm	1						
Lab ID: **B15060163-002ADUP**	Sample Duplicate				Run: PHSC _101-B_150602A				06/02/15 14:11
Conductivity @ 25 C	4770	umhos/cm	5.0				0.3	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Blueline Engineering
Project: Aspen Ridge

Report Date: 06/03/15
Work Order: B15060166

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2								Analytical Run: FIA203-B_150603A	
Lab ID: ICV	Initial Calibration Verification Standard							06/03/15 09:40	
Nitrogen, Nitrate+Nitrite as N	0.553	mg/L	0.010	98	90	110			
Method: E353.2								Batch: R243889	
Lab ID: MBLK	Method Blank				Run: FIA203-B_150603A			06/03/15 09:41	
Nitrogen, Nitrate+Nitrite as N	ND	mg/L	0.010						
Lab ID: LFB	Laboratory Fortified Blank				Run: FIA203-B_150603A			06/03/15 09:42	
Nitrogen, Nitrate+Nitrite as N	0.992	mg/L	0.010	99	90	110			
Lab ID: B15060210-005CMS	Sample Matrix Spike				Run: FIA203-B_150603A			06/03/15 10:51	
Nitrogen, Nitrate+Nitrite as N	1.17	mg/L	0.010	96	90	110			
Lab ID: B15060210-005CMSD	Sample Matrix Spike Duplicate				Run: FIA203-B_150603A			06/03/15 10:52	
Nitrogen, Nitrate+Nitrite as N	1.16	mg/L	0.010	94	90	110	1.4	10	
Lab ID: B15060163-001CMS	Sample Matrix Spike				Run: FIA203-B_150603A			06/03/15 11:16	
Nitrogen, Nitrate+Nitrite as N	0.549	mg/L	0.020	19	90	110			S
Lab ID: B15060163-001CMSD	Sample Matrix Spike Duplicate				Run: FIA203-B_150603A			06/03/15 11:17	
Nitrogen, Nitrate+Nitrite as N	0.562	mg/L	0.020	20	90	110	2.2	10	S

Qualifiers:

RL - Analyte reporting limit.
ND - Not detected at the reporting limit.
S - Spike recovery outside of advisory limits.

Work Order Receipt Checklist

Blueline Engineering

B15060166

Login completed by: Randa Nees
Date Received: 6/2/2015
Reviewed by: BL2000\jmueller
Received by: jrz
Reviewed Date: 6/3/2015
Carrier name: Hand Del

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	22.1°C No Ice		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Contact and Corrective Action Comments:

None

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

PLEASE PRINT (Provide as much information as possible.)

Page ____ of ____

Company Name: Blueline Engineering, LLC

Report Mail Address (Required): 2110 Overland Ave. Suite 112B, Billings, MT 59102

☐ No Hard Copy Email: mplw@blueline-eng.com

Invoice Address (Required): Same

☐ No Hard Copy Email:

Special Report/Formats:
☐ DW ☐ EDD/EDT (Electronic Data)
☐ POTW/WWTP Format:
☐ State: ☐ LEVEL IV
☐ Other: ☐ NELAC

Project Name, PWS, Permit, Etc.: Aspen Ridge

Sample Origin State:

EPA/State Compliance: Yes ☐ No ☐

Contact Name: Marshall PLN Phone/Fax: (406)294-2294

Cell:

Sampler: (Please Print)

Invoice Contact & Phone:

Purchase Order:

Quote/Bottle Order:

ANALYSIS REQUESTED

Number of Containers
Sample Type: A W S V B O DW
Air Water Soils/Solids
Vegetation Bioassay Other
DW - Drinking Water

SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	2	2	SEE ATTACHED
1 Wenner Well	6/2/15	11am		X	X	
2						
3						
4						
5						
6						
7						
8						
9						
10						

Standard Turnaround (TAT)

R U S H

➡ Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments:

Shipped by: HAND

Cooler ID(s): TB

Receipt Temp: 22.1°C

On Ice: Y (N)

Custody Seal: On Bottle Y (N) On Cooler Y (N)

Intact: Y N

Signature Match: Y N

LABORATORY USE ONLY: L15060166-001

Custody Record MUST be Signed

Relinquished by (print): Nicholas McInerney Date/Time: 6/2/15 Signature:

Relinquished by (print): Date/Time: Signature:

Sample Disposal: Return to Client: ____ Lab Disposal: ____

Received by (print): Date/Time: Signature:

Received by (print): Date/Time: Signature:

Received by Laboratory: Brooke Date/Time: 6/2/15 1120 Signature:

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report.
Visit our web site at www.energylab.com for additional information, downloadable fee schedule, forms, and links.

Non-Degradation Calculations

Neighboring Wells

Hydraulic Gradient

Hydraulic Conductivity

Phosphorous Breakthrough Analysis

Nitrate Sensitivity Analysis

Well Logs

Ground Water Information Center
Montana Bureau of Mines and Geology
Montana Tech of The University of Montana
1300 West Park Street - Natural Resources Building Room 329
Butte Montana 59701-8997
Ph: (406) 496-4336 Fx: (406) 496-4343

GWIC Data > Well Construction Data > Township: 01N Range: 27E Sec: 29

The following data were returned from the GWIC databases for the area you requested. For a more detailed description of the data view the GWIC Metadata report. If you notice data entry errors or have questions please let us know by sending us an Email at **GWIC@mtech.edu**. If you wish to view a one page report for a particular site, click the hyperlinked **Gwic Id** for that well. Scroll to the right of your screen to view all the data. All data displayed on the screen may not show up when printed.

Retrieval Statistics*

Field	Max	Min	Avg
Total Depth (ft)	540.00	60.00	199.73
Static Water Level (ft)	97.00	25.00	67.58
Yield (gpm)	50.00	0.00	11.86

* These statistics do not take any geographic, topographic, or geologic factors into consideration. Negative swl values are reported for water levels that are above land surface.

Did you know about...

Other GWIC data

GWIC has 4 field visit(s) for this request area.
GWIC has 3 water level(s) for this request area.

Thanks, Just take me back to the menu.

Other MBMG data

MBMG has 427 publications available for YELLOWSTONE county.
MBMG has 2 abandoned mine record(s) for this request area.

Gwic Id	PDF	DNRC WR	Site Name	Twn	Rng	Sec	Q Sec	Ver?	Type	Td	Swl	Pwl	Rwl	Yield	Test	Date	Use
11722		C009317-00	ENGLIN, HAROLD	01N	27E	29		No	WELL	136.00	40.00	90.00		10.00	PUMP	7/30/1976	DOMESTIC
11724			DARBY, VOS C.	01N	27E	29	AB	No	WELL	60.00	25.00			25.00	OTHER	1/1/1935	STOCKWATER
11723			YELLOWSTONE CO	01N	27E	29	AB	No	WELL	125.00				0.00	OTHER	1/8/1987	
247567			SUN MT LLC	01N	27E	29	AD	No	WELL	180.00						1/17/2008	UNKNOWN
11725			DAVIDSON, SCOTT	01N	27E	29	B	No	WELL	118.00	81.00	113.00		3.00	BAILER	8/14/1985	DOMESTIC
201577			LANDON, JIM	01N	27E	29	BA	No	WELL	540.00	75.00		75.00	4.00	AIR	11/27/2000	IRRIGATION
94289			YELLOWSTONE COUNTY PARK BOARD	01N	27E	29	BA	No	WELL	133.00	68.00	105.00		50.00	AIR	3/25/1987	IRRIGATION
11726			HARVE, BILL	01N	27E	29	BABC	Yes	WELL	128.00	67.00	120.00		18.00	PUMP	5/14/1987	IRRIGATION
259779			ROGERS, BUTCH	01N	27E	29	BB	No	WELL	120.00	71.00		71.00	30.00	AIR	8/4/2010	STOCKWATER
259779			ROGERS, BUTCH	01N	27E	29	BB	No	WELL	120.00	71.00		71.00	14.00	PUMP	8/4/2010	STOCKWATER
11727			SHINLER, ART	01N	27E	29	BC	No	WELL	166.00	70.00	70.00		1.00	BAILER	6/1/1973	DOMESTIC
11728		C018531-00	WEMPNER, JAMES A.	01N	27E	29	CD	No	WELL	85.00	66.00	81.00		1.00	BAILER	4/14/1978	DOMESTIC
170804			WEMPNER, JIM A.	01N	27E	29	CD	No	WELL	340.00			82.00	5.00	AIR	8/26/1998	DOMESTIC
150479		C090948-00	SORLIE, JIM AND KITTY	01N	27E	29	CDAB	Yes	WELL	500.00	80.00			2.50	AIR	6/14/1994	DOMESTIC
145050			MCDONALD, JEAN E.	01N	27E	29	CDC	No	WELL	245.00	97.00		97.00	2.50	AIR	6/24/1992	DOMESTIC
188767			KIRBY CLINT	01N	27E	29	DDDD	Yes	WELL								

End of Report.
16 record(s) listed.

Items of Note:
1This report is restricted to site types of **WELL, BOREHOLE, SPRING, COAL BED METHANE WELL, PETWELL, PIEZOMETER**

MONTANA WELL LOG REPORT

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Other Options

Return to menu
Plot this site on a topographic map
View scanned well log (6/1/2010 1:35:51 PM)

Site Name: ENGLIN, HAROLD
GWIC Id: 11722
DNRC Water Right: C009317-00

Section 1: Well Owner(s)

1) ENGLIN, HAROLD (MAIL)
3412 BECRAFT LN
BILLINGS MT 59101 [07/30/1976]

Section 2: Location

Township	Range	Section	Quarter Sections
01N	27E	29	

County: YELLOWSTONE
Geocode:

Latitude	Longitude	Geomethod	Datum
45.80495879505	108.393354258	TRS-SEC	NAD83

Ground Surface Altitude	Method	Datum	Date

Addition	Block	Lot
LILE ACRES	1	1

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: FORWARD ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Friday, July 30, 1976

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	136	7

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-1	136	4				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
125	136	4		1/4	SLOTS

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	25	BENTONITE	
0	0	BUTYL	

Section 7: Well Test Data

Total Depth: 136
Static Water Level: 40
Water Temperature:

Pump Test *

Depth pump set for test _ feet.
10 gpm pump rate with _ feet of drawdown after 1 hours of pumping.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 90 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

111TRRC - TERRACE DEPOSITS (HOLOCENE)

From	To	Description
0	7	TOPSOIL
7	25	SAND
25	136	GRAVEL

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: T. J. BENES
Company: DIGGER DRILLING

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 on a topographic map
View scanned well log (6/2/2006 4:48:04 PM)

Site Name: YELLOWSTONE COUNTY PARK BOARD
GWIC Id: 94289

Section 1: Well Owner(s)

1) HARRIS, PARK (MAIL)
PO BOX 3500
BILLINGS MT 59107 [03/25/1987]

Section 2: Location

Township	Range	Section	Quarter Sections
01N	27E	29	NE¼ NW¼

County
YELLOWSTONE

Geocode

Latitude	Longitude	Geomethod	Datum
45.81051254505	108.395956508	TRS-SEC	NAD83

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

Addition **Block** **Lot**

Section 3: Proposed Use of Water

IRRIGATION (1)

Section 4: Type of Work

Drilling Method: FORWARD ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Wednesday, March 25, 1987

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	133	10

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
0	131	6	0.25			STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
121	131	6		.30	SCREEN-CONTINUOUS-STAINLESS

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	30	BENTONITE	
0	0	K. PACKER	

Section 7: Well Test Data

Total Depth: 133
Static Water Level: 68
Water Temperature:

Air Test *

50 gpm with drill stem set at _ feet for 4 hours.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 105 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
111ALVM - ALLUVIUM (HOLOCENE)

From	To	Description
0	2	FILL DIRT
2	4	TOPSOIL
4	33	BROWN CLAY
33	38	BROCKEN UP SAND ROCK
38	57	BROWN CLAY
57	65	SMALL GRAVEL BROCKEN UP SAND ROCK
65	114	STICKY BROWN CLAY
114	119	SMALL GRAVEL MIX WITH CLAY
119	132	RIVER GRAVEL AND SAND MIX
132	133	BLUE SHALE

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: CURTIS SCHELLE
Company: AMERICAN DRILLING & SUPPLY
License No: WWC-344
Date

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 on a topographic map
View scanned well log (6/15/2011 9:07:09 AM)

Site Name: SHINLER, ART
GWIC Id: 11727

Section 1: Well Owner(s)

1) SHINLER, ART (MAIL)
N/A
BILLINGS MT N/A [06/01/1973]

Section 2: Location

Township	Range	Section	Quarter Sections
01N	27E	29	SW¼ NW¼

County: YELLOWSTONE
Geocode:

Latitude	Longitude	Geomethod	Datum
45.80681004505	108.401161008	TRS-SEC	NAD83

Ground Surface Altitude: Method: Datum: Date:

Addition: Block: Lot:

Section 3: Proposed Use of Water

DOMESTIC (1)
STOCKWATER (2)

Section 4: Type of Work

Drilling Method: CHURN
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Friday, June 01, 1973

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	166	6.625

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
0	115	6				
6	165	5.5				PVC

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
135	140	5.5		1/4	PERFORATED CASING
150	155	5.5		1/4	PERFORATED CASING

Annular Space (Seal/Grout/Packer)

There are no annular space records assigned to this well.

Section 7: Well Test Data

Total Depth: 166
Static Water Level: 70
Water Temperature:

Bailer Test *

1 gpm with _ feet of drawdown after 5 hours.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 70 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

211CLGT - CLAGGETT SHALE OR FORMATION

From	To	Description
0	25	DIRT
25	115	GRAY SHALE
115	125	GRAY SANDSTONE
125	130	GRAY SANDY SHALE
130	166	GRAY SANDSTONE

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: RUSSELL D. TOLAND
Company: TOLAND DRILLING
License No: WWC-139
Date

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 on a topographic map
View scanned well log (6/15/2011 9:07:20 AM)

Site Name: WEMPNER, JAMES A.
GWIC Id: 11728
DNRC Water Right: C018531-00

Section 1: Well Owner(s)

1) WEMPNER, JAMES (MAIL)
RT 2 FORD RD
BILLINGS MT 59101 [04/14/1978]

Section 2: Location

Township	Range	Section	Quarter Sections
01N	27E	29	SE¼ SW¼

County: YELLOWSTONE
Geocode:

Latitude	Longitude	Geomethod	Datum
45.79940504505	108.395956508	TRS-SEC	NAD83

Ground Surface Altitude: Method: Datum: Date:

Addition: Block: Lot:

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: FORWARD ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Friday, April 14, 1978

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	85	7.875

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
0	15	6				
15	85	5				

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
65	75	5		1/8	SLOTS
85	85	5			OPEN BOTTOM

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	63	BENTONITE	

Section 7: Well Test Data

Total Depth: 85
Static Water Level: 66
Water Temperature:

Bailer Test *

1 gpm with _ feet of drawdown after 1 hours.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 81 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

111CLVM - COLLUVIUM (HOLOCENE)

From	To	Description
0	3	TOPSOIL
3	9	SAND
9	24	GRAVEL
24	60	SAND W/DIRT
60	75	GRAVEL
75	85	BLUE SHALE

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: JACK DAVIS
Company: DAVIS DRILLING
License No: WWC-308
Date

MONTANA WELL LOG REPORT

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Other Options

Return to menu
Plot this site on a topographic map
View hydrograph for this site
View field visits for this site
View scanned well log (2/1/2010 9:25:59 AM)

Site Name: HARVE, BILL
GWIC Id: 11726

Section 1: Well Owner(s)

1) HARVE, BILL (MAIL)
727 LILE ROAD
BILLINGS MT 59101 [05/14/1987]

Section 2: Location

Township	Range	Section	Quarter Sections
01N	27E	29	SW¼ NW¼ NE¼ NW¼

County	Geocode
YELLOWSTONE	

Latitude	Longitude	Geomethod	Datum
45.8116	108.3974	NAV-GPS	NAD27

Ground Surface Altitude	Method	Datum	Date
3169			6/16/2003

Measuring Point Altitude	Method	Datum	Date Applies
3169.4			6/16/2003

Addition	Block	Lot
WOODWARD WAY	3	4

Section 3: Proposed Use of Water

IRRIGATION (1)

Section 4: Type of Work

Drilling Method: FORWARD ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Thursday, May 14, 1987

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	20	10
20	128	9

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
0	20	6	0.25			STEEL
1.6	138	6		160.00		PVC

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
126	128	6		1/8	TORCH OR PLASMA CUTS
128	128	6			OPEN BOTTOM

Annular Space (Seal/Grout/Packer)

Section 7: Well Test Data

Total Depth: 128
Static Water Level: 67
Water Temperature:

Pump Test *

Depth pump set for test _ feet.
18 gpm pump rate with _ feet of drawdown after 3 hours of pumping.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 120 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

111CLVM - COLLUVIUM (HOLOCENE)

From	To	Description
0	2	TOPSOIL
2	35	SANDY CLAY
35	42	WASHED GRAVEL
42	116	BROWN CLAY
116	125	SAND
125	128	GRAVEL AND SAND MIXED SHALE

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: CURTIS SCHELLE
Company: AMERICAN DRILLING & SUPPLY

MONTANA WELL LOG REPORT

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Other Options

Return to menu
Plot this site on a topographic map
View scanned well log (6/1/2010 1:38:38 PM)

Site Name: DAVIDSON, SCOTT
GWIC Id: 11725

Section 1: Well Owner(s)

1) DAVIDSON, SCOTT (MAIL)
646 BROCKWOOD
BILLINGS MT 59101 [08/14/1985]

Section 2: Location

Township	Range	Section	Quarter Sections
01N	27E	29	NW¼

County
YELLOWSTONE

Geocode

Latitude	Longitude	Geomethod	Datum
45.80866129505	108.398558758	TRS-SEC	NAD83

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

Addition	Block	Lot
WOODWARD WAY	5	8

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: FORWARD ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Wednesday, August 14, 1985

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	118	7.875

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
0	10	6	0.25			STEEL
0	115	5		160.00		PVC

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
65	115	5		1/8	SLOTS
115	118	7.875			OPEN BOTTOM

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	18	BENTONITE	

Section 7: Well Test Data

Total Depth: 118
Static Water Level: 81
Water Temperature:

Bailer Test *

3 gpm with _ feet of drawdown after 1 hours.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 113 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
211CLGT - CLAGGETT SHALE OR FORMATION

From	To	Description
0	2	TOPSOIL
2	60	CLAY
60	85	BROKEN UP SAND ROCK AND CLAY
85	118	SHALE

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: CURTIS SCHELLE
Company: BILLINGS DRILLING
License No: WWC-344
Date

blueline ENGINEERING	On-Site Wastewater Treatment System Design		
	Project Name:	Aspen Ridge Subdivision - Second Filing	
	Project Number:	14080	
	Legal Description:	Lot 5, Block 3, Aspen Ridge Subdivision	
	County:	Yellowstone	
	Date:	4/22/2015	
	By:	TML	**Checked:**

Objective: Determine the Hydraulic Gradient using 1/3 of the site topography

Calculations:

Ground Slope across drainfield and mixing zone area

Elevation above drainfield:	3260	ft
Elevation below drainfield:	3247	ft
Change in elevation:	13	ft

Horizontal distance perpendicular to elevation contours:	147.00	ft

Ground Slope:	0.088
Hydraulic Gradient:	0.029

Equations:

Ground Slope = Change in Elevation / Distance between contours
Hydraulic Gradient = Ground Slope / 3

References:

Montana Department of Environmental Quality. *Circular DEQ 4.* 2013 ed.
Montana Department of Environmental Quality. *How to Perform a Nondegredation Analysis for Subsurface Wastewater Treatment Systems (SWTS) Under the Subddivision Review Process.* March 2005 (Revised February 2009)

blueline ENGINEERING	On-Site Wastewater Treatment System Design		
	Project Name:	Aspen Ridge Subdivision - Second Filing	
	Project Number:	14080	
	Legal Description:	Lot 5, Block 3, Aspen Ridge Subdivision - 1st Filing	
	County:	Yellowstone	
	Date:	4/22/2015	
	By:	TML	**Checked:**

Objective: Determine the Hydraulic Conductivity using the Razack and Huntley Equation

Calculations:

GWIC ID	Q Pumping Rate (gpm)	S Drawdown (ft)	T Transmitivity (ft^2/day)	b Aquifer Thickness (ft)	K Hydraulic Conductivity (ft/day)
11722	10	50	387.79	11.00	35.25
11725	3	32	233.41	53.00	4.40
94289	50	37	1394.83	10.00	139.48
11726	18	53	552.94	12.00	46.08
11727	1	1	1140.01	20.00	57.00
11728	1	15	185.75	20.00	9.29

Average K =	36.90

Note: Not included in Average K

Equations:

Razack and Huntley Equation (Fetter, 1994)

T=33.6*(Q/S)^0.67

References:

Montana Department of Environmental Quality. *Circular DEQ 4.* 2013 ed.

Montana Department of Environmental Quality. *How to Perform a Nondegredation Analysis for Subsurface Wastewater Treatment Systems (SWTS) Under the Subddivision Review Process.* March 2005 (Revised February 2009)

Septic System

Drainfield System Plans & Specifications

blueline ENGINEERING	On-Site Wastewater Treatment System Design			
	Project Name:	Aspen Ridge Subdivision - Second Filing		
	Project Number:	14080		
	Legal Description:	Lot 5, Block 3, Aspen Ridge Subdivision		
	County	Yellowstone		
	Date:	4/22/2015		
	By:	TML	**Checked:**	

Objective: To design an on-site underground wastewater treatment system.

Calculations:

Design Wastewater Flow (DEQ #4)

4 Bedroom House	=	350	gpd
Design wastewater flow	=	350	gpd

Soil Classification

Soil: Sandy Clay Loam

Application Rate: 0.20 gpd/ft2

Absorption System Sizing (DEQ #4)

Absorption System Size	=	1750.00	ft^2	Pressure Dose
Trench Width	=	2	ft	
Standard Trench Length	=	875.00	LF	

Septic Tank Sizing, Residential (DEQ#4)

Number of Bedrooms	=	4	
Minimum Tank Capacity	=	1500	gallons
Design Tank Size	=	1500	gallons

Reduction for installation utilizing Leaching Chambers is 25%

Standard Trench Length	=	875.00	LF
Reduced Trench Length	=	656.25	LF

Trench Configuation

Trenches:	7	
Ind. Trench Length:	94.00	LF
Total Trench Length	658.00	LF

References:

Montana Department of Environmental Quality. *Circular DEQ 4.* 2013 ed.

Storm Water Drainage Calculations & Report

Rational Method
DEQ Circular #8