SPRING HILL
MASTER UTILITY REPORT

Prepared for:

ME Erie, LLC
7353 South Alton Way
Centennial, Colorado 80112
Phone: (303) 770-9111
Contact: Matt Janke

Prepared by Engineer:
Westwood Professional Services, Inc.
Contact: Brian Wilson, P.E.
10333 E. Dry Creek Road, Suite 240
Englewood, CO 80112
(720) 482-9526

Submitted To:
Town of Erie, Colorado

DECEMBER, 2021

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December, 2021

Town Acceptance

This report has been reviewed and found to be in general compliance with the Town of Erie Standards and Specifications for Design and Construction and other Town requirements. THE ACCURACY AND VALIDITY OF THE ENGINEERING DESIGN, DETAILS, DIMENSIONS, QUANTITIES, AND CONCEPTS IN THIS REPORT REMAINS THE SOLE RESPONSIBILITY OF THE PROFESSIONAL ENGINEER WHOSE STAMP AND SIGNATURE APPEAR HEREON.

Accepted by: _____ _____
Town Engineer Date

If during the construction process or at any time within one year following the acceptance by the TOWN of the completed improvements, any deficiencies or errors are discovered in the construction plans, specifications, drainage reports, or the actual constructed improvements, the TOWN shall have the right to require the developer to make any and all corrections which may be deemed necessary by the TOWN.

Table of Contents

I. SITE DESCRIPTION

The Spring Hill property is located in the East half of Section 6, Township 1 North, Range 68 West of the 6th Principal Meridian, Weld County, Colorado. The overall site is bounded on the North by Highway 52 and large lot County residential parcels. The site is bounded on the East by Weld County Road 3 and large lot County residential parcels, Highview Ranch Planned Unit Development (PUD), on the west by the Broomfield Becky property, and on the south by the Morgan Hill Subdivision. The Spring Hill project is a planned single family residential subdivision, with a mixture of parks and open space. The project will be built in five filings.

Filing 1 is 14.4 acres and does not include any lots but will primarily contain the major roads that run through the site. These roads include both major connections to County Road 3. The large park will also be built in filing 1.

Filing 2 is a 19.7 acre residential subdivision located in the Town of Erie and bounded by County Road 3 to the east, Westview Estates Subdivision to the west, and Morgan Hill to the south. A large part of this filing is bisected by the major Road being constructed in filing 1.

Filing 3 is a 12.8 acre residential subdivision located in the Town of Erie and is located in the center of the site.

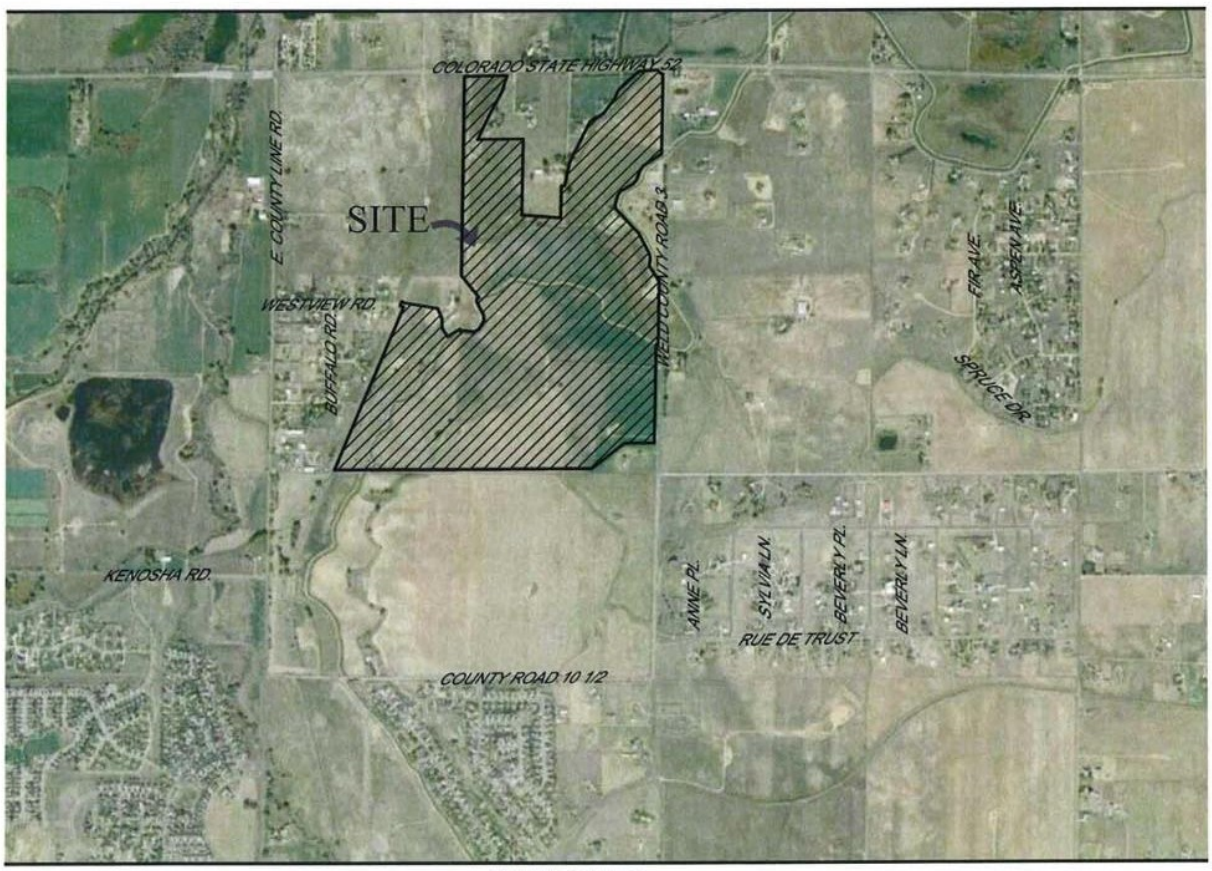
Filing 4 is a 16.1 acre residential subdivision located in the Town of Erie and is located in the north west area of the site. There is an existing 30’ easement for an existing sanitary sewer line that runs from the east to the northwest of this filing. There is also a channel running just to the west of this filing that wraps around to the south of filing 4 and crosses over the just inside the filing 4 boundary.

Filing 5 is a 3.9 acre residential subdivision located in the Town of Erie and is located in the north east area of the site.

The project consists of the development of 418 home sites in filing 2, 68 home sites in filing 3, 76 home sites in filing 4, and 70 home sites in filing 5 for a total of 632 residential units. It also includes the roadways and utility infrastructure to support them, which includes water, sanitary sewer, and storm sewer.

Non-potable water in the form of an irrigation system will also be included as part of the Spring Hill project. Design information about this system and the proposed connections will be included as part of the final utility construction drawings.

Figure: Vicinity Map



II. WATER DISTIBUTION SYSTEM

The water distribution system for this development will be tied into four existing water mains, one to the northwest, one to the northeast, one to the southeast, and one to the south. This will provide a looped system for redundancy and consistent supply and quality.

The northwest connection is located at the south end of Highway 52. The waterline will be installed along Street S on the site.

The southeast connection is located at County Road 3 just to the east of the site. The waterline will be installed from this connection point to the west along Street B on to the site.

The northeast connection is located at County Road 3 just to the east of the site. The waterline will be installed from this connection point along Street V.
The southern connection is located south of the site at County line Road and CR 10 1/2. The line being tied into is a 24" existing line

The water system is modeled from the town of Erie Standards and Specifications. This places the average demand at 140 gallons per capita per day. This demand was multiplied by an estimated 2.89 people per unit which was obtained from the 2006 Town of Erie Water and Wastewater Master Plan. Multiplying the demand by people per unit gives an average demand per unit of 0.271 gallons per minute. The max day demand was modeled as 2.6 times the average demand. The max hour demand was modeled as 2.0 times the average demand. The site demands as well as two existing dwelling units were included in the water model.

Four scenarios were modeled, average day, max day, max hour day, and fire flow analysis, Fire flow demands were modeled with max day flows and at the gallons per minute rate indicated in the standard specifications at each fire flow node modeled.

WATER MODEL SUMMARY – NO FIRE FLOW				
SCENARIO	**MIN PRESSURE**	**MIN PRESSURE AT NODE**	**MAX ONSITE PRESSURE**	**MAX PRESSURE AT NODE**
AVERAGE DAY	53.6	J-13	72.6	J-86
MAX DAY	52.7	J-13	71.8	J-86
MAX HOUR	51.9	J-13	71.2	J-86

MINIMUM SYSTEM PRESSURES WITH FIRE FLOW				
SCENARIO	**FIRE FLOW AT NODE**	**RESIDUAL AT FIRE FLOW NODE**	**NODE WITH MIN SYSTEM PRESSURE**	**MIN SYSTEM PRESSURE**
FIRE FLOW NORTH	J-10	40.6	J-10	40.6
FIRE FLOW SOUTH	J-78	58.2	J-75	52.7

Assumptions for Model:
140 GPCD
2.89 People per unit
MD/AD = 2.6
MH/AD = 2.0
Hazen Williams for 8” and 10” pipe c = 120
Hazen Williams for 16” pipe c = 120
Mannings n = 0.011
Darcy-Weisenbach E = 0.0009

III. SANITARY COLLECTION SYSTEM

The sanitary collection system for this development will be tied into an existing sanitary main in three locations. The connections will serve the entire project. All proposed sanitary sewer lines will be 8” PVC.

The sanitary system is designed from the town of Erie Standards and Specifications. This places the average residential flow at 90 gallons per capita per day. This flow was multiplied by an estimated 2.79 people per unit to an average flow per unit of 251.1 gallons per day. The peaking factor was calculated using the following equation taken from the Erie Standards and Specifications.

$PF = 2.6 * (Q_{max\text{-}day})^{-0.16}$ (where $Q_{max\text{-}day}$ = max daily flow in CFS) and $2<PF<4$

	SANITARY FLOWS						
PIPE	NUMBER OF UNITS	AVERAGE FLOW (MGD)	CALCULATED PEAKING FACTOR	PEAKING FACTOR	PEAK FLOW (MGD)	PIPE CAPACITY (MGD)	VELOCITY (FPS)
NORTH EAST 8” PVC	69	0.0210	7.33	5	0.105	0.57 @ 50% CAPACITY	2.49
SOUTH EAST 8” PVC	161	0.0465	6.40	5	0.2325	0.57 @ 50% CAPACITY	2.49
SOUTH 8” PVC	401	0.10475	5.58	5	.52375	0.57 @ 50% CAPACITY	2.49

IV. CONCLUSIONS

Based on the findings of this report, the proposed infrastructure will support the requirements of the proposed development per the town of Erie Standards and Specifications. The Appendix contains the WaterGEMS and Sewer flow results, and layout exhibit.

V. REFERENCES

Standards and Specifications, Town of Erie, Colorado, www.erieco.gov

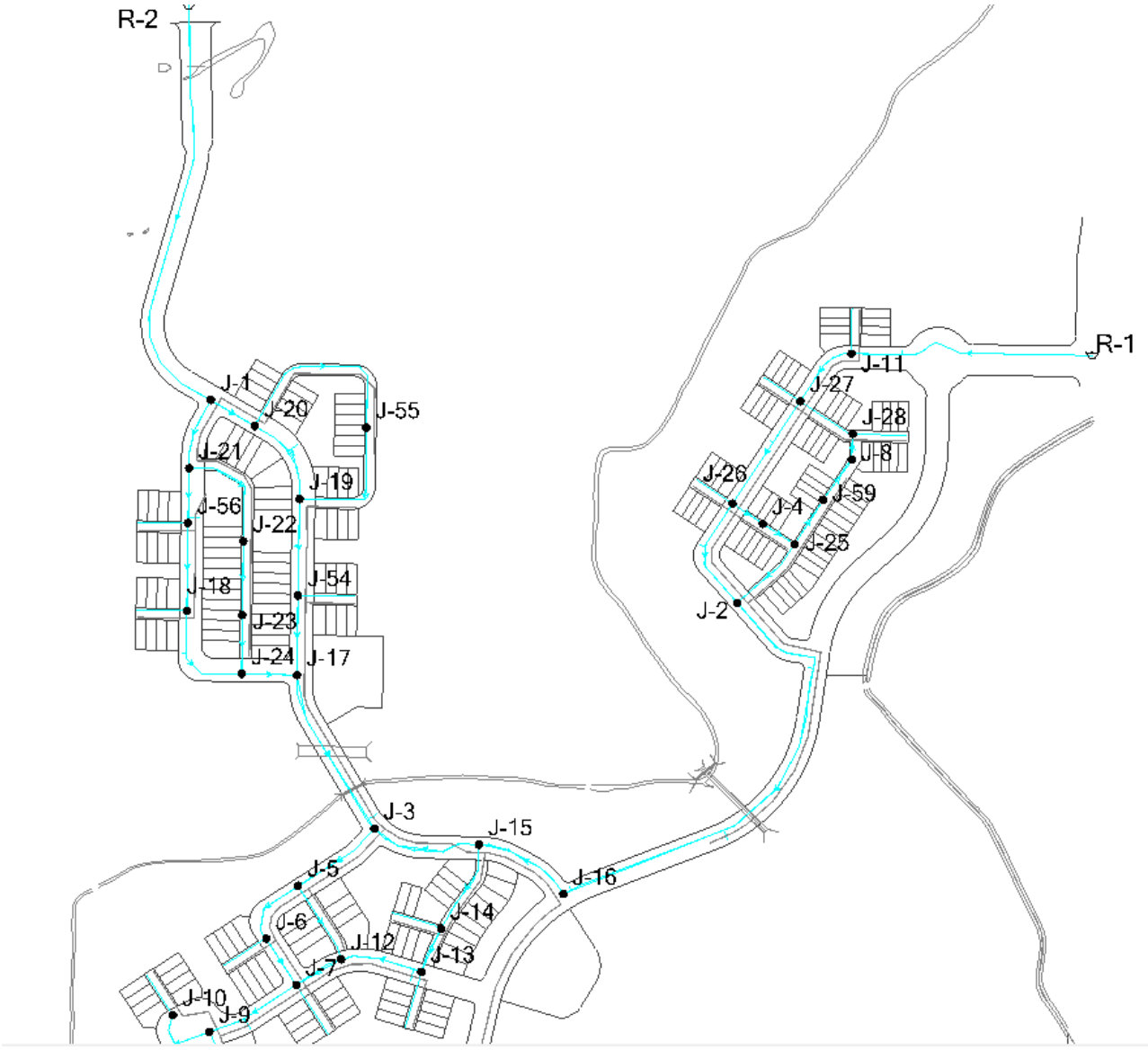
VI. APPENDIX

A. **APPENDIX A – WATER SYSTEM CALCULATIONS**
B. **APPENDIX B – SANITARY SYSTEM CALCULATIONS**
C. **APPENDIX C – WATER DESIGN REQUIREMENTS (TOWN OF ERIE)**
D. **APPENDIX D – SANITARY DESIGN REQUIREMENTS (TOWN OF ERIE)**

WATER SYSTEM DEMAND

WATER SYSTEM SCHEMATIC

SPRING HILL NORTH WATER MODEL LAYOUT



SPRING HILL SOUTH WATER MODEL LAYOUT

AVERAGE DAY

Spring Hill
Active Scenario: AVERAGE DAY
FlexTable: Pipe Table

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Velocity (ft/s)	Flow (gpm)	Headloss Gradient (ft/ft)
P-4	J-5	J-6	192	8.0	PVC	120.0	0.54	-84.85	0.000
P-5	J-6	J-7	144	8.0	PVC	120.0	0.56	-87.02	0.000
P-8	J-9	J-10	180	8.0	PVC	120.0	0.01	2.17	0.000
P-11	J-12	J-5	224	8.0	PVC	120.0	0.84	131.54	0.000
P-12	J-12	J-13	216	8.0	PVC	120.0	1.44	-225.07	0.001
P-13	J-13	J-14	124	8.0	PVC	120.0	1.45	-227.78	0.001
P-15	J-3	J-15	293	8.0	PVC	120.0	2.65	-415.92	0.004
P-16	J-15	J-14	248	8.0	PVC	120.0	1.47	230.49	0.001
P-17	J-15	J-16	265	8.0	PVC	120.0	4.14	-648.59	0.010
P-27	J-26	J-27	321	8.0	PVC	120.0	4.23	-663.23	0.010
P-28(1)	R-1	J-11	645	8.0	PVC	120.0	4.26	667.57	0.010
P-28(2)	J-11	J-27	193	8.0	PVC	120.0	4.25	665.40	0.010
P-29	R-2	J-1	1,120	8.0	PVC	120.0	3.89	-609.52	0.008
P-30	R-3	J-29	452	8.0	PVC	120.0	7.54	-1,180.98	0.029
P-31	J-30	J-31	258	8.0	PVC	120.0	2.52	-394.80	0.004
P-32	J-32	J-33	435	8.0	PVC	120.0	2.59	-405.38	0.004
P-33	J-33	J-34	150	8.0	PVC	120.0	1.32	-206.31	0.001
P-34	J-35	J-36	347	8.0	PVC	120.0	0.31	-48.25	0.000
P-35	J-37	J-33	324	8.0	PVC	120.0	1.28	201.24	0.001
P-36	J-38	J-39	208	8.0	PVC	120.0	2.10	328.76	0.003
P-37	J-29	J-39	475	8.0	PVC	120.0	5.08	-795.67	0.014
P-38	J-36	J-40	289	8.0	PVC	120.0	1.55	-243.51	0.002
P-39	J-41	J-38	336	8.0	PVC	120.0	2.22	348.03	0.003
P-40	J-41	J-42	155	8.0	PVC	120.0	2.20	-345.46	0.003
P-41	J-42	J-43	280	8.0	PVC	120.0	0.10	16.36	0.000
P-42	J-43	J-40	328	8.0	PVC	120.0	1.46	229.40	0.001
P-43	J-35	J-44	288	8.0	PVC	120.0	1.07	-167.28	0.001
P-44	J-44	J-45	304	8.0	PVC	120.0	0.75	-116.84	0.000
P-45	J-45	J-46	280	8.0	PVC	120.0	0.83	-129.70	0.000
P-46	J-46	J-40	280	8.0	PVC	120.0	0.13	20.49	0.000
P-47	J-48	J-49	280	8.0	PVC	120.0	0.43	-66.72	0.000
P-48	J-50	J-51	280	8.0	PVC	120.0	2.86	-447.46	0.005
P-49	J-51	J-52	280	8.0	PVC	120.0	3.05	478.57	0.005
P-50	J-53	J-39	260	8.0	PVC	120.0	2.98	466.91	0.005
P-51(2)	J-17	J-54	208	8.0	PVC	120.0	1.83	286.77	0.002
P-52(1)(1)	J-54	J-19	252	8.0	PVC	120.0	1.82	284.60	0.002
P-52(1)(2)	J-19	J-20	244	8.0	PVC	120.0	1.20	187.86	0.001
P-52(2)	J-20	J-1	134	8.0	PVC	120.0	1.78	278.64	0.002
P-54(1)	J-1	J-21	191	8.0	PVC	120.0	2.11	-330.89	0.003
P-54(2)	J-21	J-56	143	8.0	PVC	120.0	1.05	-165.28	0.001
P-55(1)	J-56	J-18	230	8.0	PVC	120.0	1.07	-167.45	0.001
P-60(1)	J-28	J-8	67	8.0	PVC	120.0	0.01	-2.17	0.000
P-60(2)	J-8	J-59	130	8.0	PVC	120.0	0.03	-4.61	0.000
P-61	J-59	J-25	137	8.0	PVC	120.0	0.04	-6.78	0.000
P-62	J-50	J-60	222	8.0	PVC	120.0	1.40	219.55	0.001

Spring Hill
Active Scenario: AVERAGE DAY
FlexTable: Pipe Table

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Velocity (ft/s)	Flow (gpm)	Headloss Gradient (ft/ft)
P-63	J-60	J-61	253	8.0	PVC	120.0	1.39	217.38	0.001
P-64	J-61	J-43	187	8.0	PVC	120.0	1.37	215.21	0.001
P-65	J-52	J-62	202	8.0	PVC	120.0	1.52	238.46	0.001
P-66	J-62	J-63	401	8.0	PVC	120.0	1.51	236.02	0.001
P-67	J-63	J-53	313	8.0	PVC	120.0	1.49	233.85	0.001
P-68	J-51	J-64	286	8.0	PVC	120.0	2.34	366.16	0.003
P-69	J-64	J-42	375	8.0	PVC	120.0	2.32	363.99	0.003
P-70	J-40	J-65	298	8.0	PVC	120.0	0.04	6.38	0.000
P-71	J-65	J-66	283	8.0	PVC	120.0	0.03	4.75	0.000
P-72	J-66	J-41	187	8.0	PVC	120.0	0.02	2.58	0.000
P-73	J-37	J-67	262	8.0	PVC	120.0	0.09	-13.85	0.000
P-74	J-67	J-68	190	8.0	PVC	120.0	0.10	-16.02	0.000
P-75	J-68	J-69	183	8.0	PVC	120.0	0.11	-17.64	0.000
P-76	J-69	J-38	203	8.0	PVC	120.0	0.12	-19.27	0.000
P-77	J-70	J-45	246	8.0	PVC	120.0	0.07	-10.69	0.000
P-78	J-71	J-70	181	8.0	PVC	120.0	0.05	-8.52	0.000
P-79	J-49	J-72	187	8.0	PVC	120.0	0.03	-4.18	0.000
P-79	J-24	J-23	154	8.0	PVC	120.0	1.10	172.12	0.001
P-80	J-72	J-71	299	8.0	PVC	120.0	0.04	-6.35	0.000
P-80	J-23	J-22	192	8.0	PVC	120.0	1.08	169.95	0.001
P-81	J-47	J-73	293	8.0	PVC	120.0	0.15	-22.97	0.000
P-82	J-73	J-74	365	8.0	PVC	120.0	0.16	-25.14	0.000
P-83	J-74	J-48	379	8.0	PVC	120.0	0.17	-27.31	0.000
P-84	J-49	J-75	250	8.0	PVC	120.0	0.41	-64.71	0.000
P-84(2)	J-20	J-55	525	8.0	PVC	120.0	0.59	-92.94	0.000
P-85	J-75	J-76	252	8.0	PVC	120.0	0.43	-66.88	0.000
P-85	J-24	J-17	144	8.0	PVC	120.0	2.19	-343.37	0.003
P-86	J-46	J-77	468	8.0	PVC	120.0	1.43	-223.57	0.001
P-86(1)	J-25	J-4	99	8.0	PVC	120.0	1.96	-307.29	0.002
P-86(2)	J-4	J-26	95	8.0	PVC	120.0	1.98	-309.74	0.002
P-87	J-77	J-50	493	8.0	PVC	120.0	1.44	-225.74	0.001
P-87	J-2	J-25	217	8.0	PVC	120.0	1.91	-298.89	0.002
P-88	J-78	J-32	314	8.0	PVC	120.0	1.06	-165.31	0.001
P-88	J-2	J-26	313	8.0	PVC	120.0	2.24	-351.33	0.003
P-89	J-31	J-79	191	8.0	PVC	120.0	1.03	-161.24	0.001
P-89	J-2	J-16	1,251	8.0	PVC	120.0	4.14	648.59	0.010
P-90	J-79	J-78	330	8.0	PVC	120.0	1.04	-163.14	0.001
P-90	J-3	J-5	251	8.0	PVC	120.0	1.37	-214.22	0.001
P-91	J-32	J-80	181	8.0	PVC	120.0	1.52	237.90	0.001
P-91	J-17	J-3	455	8.0	PVC	120.0	4.02	-630.14	0.009
P-92	J-80	J-31	239	8.0	PVC	120.0	1.50	235.73	0.001
P-92	J-7	J-9	259	8.0	PVC	120.0	0.03	4.34	0.000
P-93	J-48	J-81	195	8.0	PVC	120.0	0.24	37.25	0.000
P-93	J-55	J-19	361	8.0	PVC	120.0	0.60	-94.57	0.000
P-94	J-81	J-82	216	8.0	PVC	120.0	0.22	35.08	0.000

Spring Hill
Active Scenario: AVERAGE DAY
FlexTable: Pipe Table

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Velocity (ft/s)	Flow (gpm)	Headloss Gradient (ft/ft)
P-94	J-21	J-22	301	8.0	PVC	120.0	1.07	-167.78	0.001
P-95	J-82	J-47	150	8.0	PVC	120.0	0.21	32.91	0.000
P-95	J-18	J-24	286	8.0	PVC	120.0	1.08	-169.62	0.001
P-96	J-7	J-12	135	8.0	PVC	120.0	0.60	-93.53	0.000
P-98	J-84	J-30	183	8.0	PVC	120.0	2.50	-392.36	0.004
P-99	J-85	J-84	60	8.0	PVC	120.0	2.49	-390.73	0.004
P-100	J-29	J-86	388	8.0	PVC	120.0	2.47	-386.94	0.004
P-101	J-86	J-85	312	8.0	PVC	120.0	2.48	-388.56	0.004
P-102(1)	J-36	J-57	181	8.0	PVC	120.0	1.24	193.64	0.001
P-102(2)	J-57	J-87	151	8.0	PVC	120.0	1.22	191.74	0.001
P-103	J-87	J-37	244	8.0	PVC	120.0	1.21	189.57	0.001
P-104	J-53	J-88	638	8.0	PVC	120.0	1.50	-235.50	0.001
P-105	J-88	J-52	276	8.0	PVC	120.0	1.52	-237.67	0.001
P-106	J-34	J-89	201	8.0	PVC	120.0	1.33	-208.48	0.001
P-107	J-89	J-90	242	8.0	PVC	120.0	1.34	-210.65	0.001
P-108	J-90	J-35	170	8.0	PVC	120.0	1.36	-213.36	0.001
P-109	J-76	J-83	278	8.0	PVC	120.0	0.44	-69.05	0.000
P-110	J-83	J-46	169	8.0	PVC	120.0	0.45	-71.22	0.000
P-111	J-44	J-58	199	8.0	PVC	120.0	0.34	-52.62	0.000
P-112	J-58	J-47	389	8.0	PVC	120.0	0.34	-53.70	0.000
P-113	R-4	J-51	219	8.0	PVC	120.0	8.26	1,294.36	0.034

Spring Hill
Active Scenario: AVERAGE DAY
FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-1	4,964.71	0.00	65.7	5,116.48
J-2	4,983.63	1.63	66.6	5,137.66
J-3	4,986.00	0.00	58.9	5,122.03
J-4	4,985.16	2.44	66.3	5,138.39
J-5	4,983.80	2.17	59.9	5,122.34
J-6	4,984.30	2.17	59.7	5,122.38
J-7	4,988.58	2.17	57.9	5,122.42
J-8	4,990.92	2.44	63.7	5,138.15
J-9	4,986.70	2.17	58.7	5,122.42
J-10	4,988.00	2.17	58.2	5,122.42
J-11	4,990.49	2.17	66.3	5,143.72
J-12	4,991.58	0.00	56.6	5,122.45
J-13	4,996.71	2.71	54.5	5,122.74
J-14	4,994.67	2.71	55.5	5,122.91
J-15	4,989.15	2.17	58.0	5,123.26
J-16	4,991.65	0.00	58.0	5,125.78
J-17	4,974.14	0.00	62.2	5,117.94
J-18	4,970.03	2.17	63.7	5,117.29
J-19	4,968.72	2.17	64.1	5,116.98
J-20	4,966.03	2.17	65.2	5,116.75
J-21	4,966.42	2.17	65.2	5,117.01
J-22	4,969.77	2.17	63.8	5,117.24
J-23	4,971.61	2.17	63.1	5,117.39
J-24	4,972.46	1.63	62.8	5,117.52
J-25	4,987.00	1.63	65.4	5,138.15
J-26	4,984.04	2.17	66.9	5,138.62
J-27	4,988.16	2.17	66.5	5,141.79
J-28	4,991.60	2.17	63.4	5,138.15
J-29	5,012.06	1.63	70.7	5,175.48
J-30	5,016.00	2.44	70.5	5,178.96
J-31	5,018.50	2.17	69.8	5,179.93
J-32	5,025.69	2.17	67.0	5,180.55
J-33	5,023.49	2.17	68.7	5,182.28
J-34	5,019.30	2.17	70.6	5,182.45
J-35	5,023.56	2.17	69.1	5,183.18
J-36	5,026.60	1.63	67.8	5,183.21
J-37	5,032.11	2.17	65.1	5,182.63
J-38	5,029.83	0.00	66.1	5,182.64
J-39	5,022.22	0.00	69.2	5,182.08
J-40	5,031.17	0.00	66.0	5,183.65
J-41	5,041.78	0.00	61.4	5,183.65
J-42	5,043.98	2.17	60.6	5,184.11
J-43	5,038.09	2.17	63.2	5,184.11
J-44	5,026.34	2.17	68.0	5,183.40
J-45	5,030.65	2.17	66.1	5,183.52
J-46	5,035.69	2.17	64.0	5,183.66

Spring Hill
Active Scenario: AVERAGE DAY
FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-47	5,031.90	2.17	65.6	5,183.46
J-48	5,041.23	2.17	61.5	5,183.48
J-49	5,045.40	2.17	59.8	5,183.52
J-50	5,049.25	2.17	58.7	5,184.94
J-51	5,041.59	2.17	62.6	5,186.28
J-52	5,036.60	2.44	64.1	5,184.76
J-53	5,025.00	2.44	68.5	5,183.43
J-54	4,971.65	2.17	63.1	5,117.50
J-55	4,971.92	1.63	62.7	5,116.89
J-56	4,967.81	2.17	64.6	5,117.11
J-57	5,028.21	1.90	67.0	5,183.02
J-58	5,028.20	1.08	67.2	5,183.42
J-59	4,989.11	2.17	64.5	5,138.15
J-60	5,045.05	2.17	60.4	5,184.66
J-61	5,040.70	2.17	62.1	5,184.34
J-62	5,033.46	2.44	65.3	5,184.46
J-63	5,028.17	2.17	67.4	5,183.88
J-64	5,044.04	2.17	61.1	5,185.33
J-65	5,035.07	1.63	64.3	5,183.65
J-66	5,039.17	2.17	62.5	5,183.65
J-67	5,034.36	2.17	64.2	5,182.64
J-68	5,033.54	1.63	64.5	5,182.64
J-69	5,031.67	1.63	65.3	5,182.64
J-70	5,032.56	2.17	65.3	5,183.52
J-71	5,034.49	2.17	64.5	5,183.52
J-72	5,041.03	2.17	61.6	5,183.52
J-73	5,034.24	2.17	64.6	5,183.46
J-74	5,037.58	2.17	63.1	5,183.47
J-75	5,049.55	2.17	58.0	5,183.55
J-76	5,044.76	2.17	60.1	5,183.59
J-77	5,046.96	2.17	59.4	5,184.28
J-78	5,022.36	2.17	68.3	5,180.31
J-79	5,019.64	1.90	69.4	5,180.07
J-80	5,022.45	2.17	68.3	5,180.28
J-81	5,037.83	2.17	63.0	5,183.47
J-82	5,034.29	2.17	64.5	5,183.46
J-83	5,038.74	2.17	62.7	5,183.63
J-84	5,013.44	1.63	71.3	5,178.27
J-85	5,012.76	2.17	71.5	5,178.05
J-86	5,008.94	1.63	72.7	5,176.90
J-87	5,029.56	2.17	66.3	5,182.87
J-88	5,032.99	2.17	65.5	5,184.35
J-89	5,020.16	2.17	70.3	5,182.69
J-90	5,022.28	2.71	69.5	5,182.97

Spring Hill
Active Scenario: AVERAGE DAY
FlexTable: Reservoir Table

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
101	R-1	5,150.18	667.57	5,150.18
104	R-2	5,107.00	-609.52	5,107.00
107	R-3	5,162.45	-1,180.98	5,162.45
321	R-4	5,193.75	1,294.36	5,193.75

MAX DAY

Spring Hill
Active Scenario: MAX DAY
FlexTable: Pipe Table

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Velocity (ft/s)	Flow (gpm)	Headloss Gradient (ft/ft)
P-4	J-5	J-6	192	8.0	PVC	120.0	0.49	-76.44	0.000
P-5	J-6	J-7	144	8.0	PVC	120.0	0.52	-82.08	0.000
P-8	J-9	J-10	180	8.0	PVC	120.0	0.04	5.64	0.000
P-11	J-12	J-5	224	8.0	PVC	120.0	0.81	127.07	0.000
P-12	J-12	J-13	216	8.0	PVC	120.0	1.44	-226.08	0.001
P-13	J-13	J-14	124	8.0	PVC	120.0	1.49	-233.14	0.001
P-15	J-3	J-15	293	8.0	PVC	120.0	2.64	-413.84	0.004
P-16	J-15	J-14	248	8.0	PVC	120.0	1.53	240.19	0.002
P-17	J-15	J-16	265	8.0	PVC	120.0	4.21	-659.68	0.010
P-27	J-26	J-27	321	8.0	PVC	120.0	4.45	-697.76	0.011
P-28(1)	R-1	J-11	645	8.0	PVC	120.0	4.53	709.05	0.011
P-28(2)	J-11	J-27	193	8.0	PVC	120.0	4.49	703.41	0.011
P-29	R-2	J-1	1,120	8.0	PVC	120.0	3.56	-558.12	0.007
P-30	R-3	J-29	452	8.0	PVC	120.0	7.14	-1,118.77	0.026
P-31	J-30	J-31	258	8.0	PVC	120.0	2.39	-375.21	0.003
P-32	J-32	J-33	435	8.0	PVC	120.0	2.57	-402.72	0.004
P-33	J-33	J-34	150	8.0	PVC	120.0	1.26	-197.58	0.001
P-34	J-35	J-36	347	8.0	PVC	120.0	0.39	-61.25	0.000
P-35	J-37	J-33	324	8.0	PVC	120.0	1.35	210.77	0.001
P-36	J-38	J-39	208	8.0	PVC	120.0	1.86	290.73	0.002
P-37	J-29	J-39	475	8.0	PVC	120.0	4.90	-768.25	0.013
P-38	J-36	J-40	289	8.0	PVC	120.0	1.63	-255.20	0.002
P-39	J-41	J-38	336	8.0	PVC	120.0	2.18	342.11	0.003
P-40	J-41	J-42	155	8.0	PVC	120.0	2.36	-369.80	0.003
P-41	J-42	J-43	280	8.0	PVC	120.0	0.15	23.50	0.000
P-42	J-43	J-40	328	8.0	PVC	120.0	1.59	248.77	0.002
P-43	J-35	J-44	288	8.0	PVC	120.0	1.02	-160.32	0.001
P-44	J-44	J-45	304	8.0	PVC	120.0	0.79	-123.23	0.000
P-45	J-45	J-46	280	8.0	PVC	120.0	0.99	-155.49	0.001
P-46	J-46	J-40	280	8.0	PVC	120.0	0.07	-11.39	0.000
P-47	J-48	J-49	280	8.0	PVC	120.0	0.51	-79.40	0.000
P-48	J-50	J-51	280	8.0	PVC	120.0	3.16	-495.51	0.006
P-49	J-51	J-52	280	8.0	PVC	120.0	3.24	507.85	0.006
P-50	J-53	J-39	260	8.0	PVC	120.0	3.05	477.52	0.005
P-51(2)	J-17	J-54	208	8.0	PVC	120.0	1.76	276.24	0.002
P-52(1)(1)	J-54	J-19	252	8.0	PVC	120.0	1.73	270.60	0.002
P-52(1)(2)	J-19	J-20	244	8.0	PVC	120.0	1.12	175.18	0.001
P-52(2)	J-20	J-1	134	8.0	PVC	120.0	1.63	255.08	0.002
P-54(1)	J-1	J-21	191	8.0	PVC	120.0	1.93	-303.03	0.002
P-54(2)	J-21	J-56	143	8.0	PVC	120.0	0.97	-152.36	0.001
P-55(1)	J-56	J-18	230	8.0	PVC	120.0	1.01	-158.00	0.001
P-60(1)	J-28	J-8	67	8.0	PVC	120.0	0.04	-5.64	0.000
P-60(2)	J-8	J-59	130	8.0	PVC	120.0	0.08	-11.99	0.000
P-61	J-59	J-25	137	8.0	PVC	120.0	0.11	-17.63	0.000
P-62	J-50	J-60	222	8.0	PVC	120.0	1.55	242.20	0.002

Spring Hill
Active Scenario: MAX DAY
FlexTable: Pipe Table

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Velocity (ft/s)	Flow (gpm)	Headloss Gradient (ft/ft)
P-63	J-60	J-61	253	8.0	PVC	120.0	1.51	236.56	0.001
P-64	J-61	J-43	187	8.0	PVC	120.0	1.47	230.92	0.001
P-65	J-52	J-62	202	8.0	PVC	120.0	1.61	252.03	0.002
P-66	J-62	J-63	401	8.0	PVC	120.0	1.57	245.69	0.002
P-67	J-63	J-53	313	8.0	PVC	120.0	1.53	240.04	0.002
P-68	J-51	J-64	286	8.0	PVC	120.0	2.58	404.58	0.004
P-69	J-64	J-42	375	8.0	PVC	120.0	2.55	398.94	0.004
P-70	J-40	J-65	298	8.0	PVC	120.0	0.11	-17.82	0.000
P-71	J-65	J-66	283	8.0	PVC	120.0	0.14	-22.05	0.000
P-72	J-66	J-41	187	8.0	PVC	120.0	0.18	-27.69	0.000
P-73	J-37	J-67	262	8.0	PVC	120.0	0.24	-37.27	0.000
P-74	J-67	J-68	190	8.0	PVC	120.0	0.27	-42.91	0.000
P-75	J-68	J-69	183	8.0	PVC	120.0	0.30	-47.15	0.000
P-76	J-69	J-38	203	8.0	PVC	120.0	0.33	-51.38	0.000
P-77	J-70	J-45	246	8.0	PVC	120.0	0.17	-26.62	0.000
P-78	J-71	J-70	181	8.0	PVC	120.0	0.13	-20.97	0.000
P-79	J-49	J-72	187	8.0	PVC	120.0	0.06	-9.69	0.000
P-79	J-24	J-23	154	8.0	PVC	120.0	1.07	167.60	0.001
P-80	J-72	J-71	299	8.0	PVC	120.0	0.10	-15.33	0.000
P-80	J-23	J-22	192	8.0	PVC	120.0	1.03	161.96	0.001
P-81	J-47	J-73	293	8.0	PVC	120.0	0.13	-20.28	0.000
P-82	J-73	J-74	365	8.0	PVC	120.0	0.17	-25.93	0.000
P-83	J-74	J-48	379	8.0	PVC	120.0	0.20	-31.57	0.000
P-84	J-49	J-75	250	8.0	PVC	120.0	0.48	-75.35	0.000
P-84(2)	J-20	J-55	525	8.0	PVC	120.0	0.55	-85.55	0.000
P-85	J-75	J-76	252	8.0	PVC	120.0	0.52	-81.00	0.000
P-85	J-24	J-17	144	8.0	PVC	120.0	2.14	-335.48	0.003
P-86	J-46	J-77	468	8.0	PVC	120.0	1.54	-242.03	0.002
P-86(1)	J-25	J-4	99	8.0	PVC	120.0	2.06	-323.11	0.003
P-86(2)	J-4	J-26	95	8.0	PVC	120.0	2.10	-329.45	0.003
P-87	J-77	J-50	493	8.0	PVC	120.0	1.58	-247.67	0.002
P-87	J-2	J-25	217	8.0	PVC	120.0	1.92	-301.24	0.002
P-88	J-78	J-32	314	8.0	PVC	120.0	1.04	-163.67	0.001
P-88	J-2	J-26	313	8.0	PVC	120.0	2.31	-362.67	0.003
P-89	J-31	J-79	191	8.0	PVC	120.0	0.98	-153.09	0.001
P-89	J-2	J-16	1,251	8.0	PVC	120.0	4.21	659.68	0.010
P-90	J-79	J-78	330	8.0	PVC	120.0	1.01	-158.03	0.001
P-90	J-3	J-5	251	8.0	PVC	120.0	1.26	-197.87	0.001
P-91	J-32	J-80	181	8.0	PVC	120.0	1.49	233.41	0.001
P-91	J-17	J-3	455	8.0	PVC	120.0	3.90	-611.72	0.009
P-92	J-80	J-31	239	8.0	PVC	120.0	1.45	227.76	0.001
P-92	J-7	J-9	259	8.0	PVC	120.0	0.07	11.28	0.000
P-93	J-48	J-81	195	8.0	PVC	120.0	0.27	42.19	0.000
P-93	J-55	J-19	361	8.0	PVC	120.0	0.57	-89.78	0.000
P-94	J-81	J-82	216	8.0	PVC	120.0	0.23	36.55	0.000

Spring Hill
Active Scenario: MAX DAY
FlexTable: Pipe Table

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Velocity (ft/s)	Flow (gpm)	Headloss Gradient (ft/ft)
P-94	J-21	J-22	301	8.0	PVC	120.0	1.00	-156.32	0.001
P-95	J-82	J-47	150	8.0	PVC	120.0	0.20	30.91	0.000
P-95	J-18	J-24	286	8.0	PVC	120.0	1.04	-163.64	0.001
P-96	J-7	J-12	135	8.0	PVC	120.0	0.63	-99.01	0.000
P-98	J-84	J-30	183	8.0	PVC	120.0	2.35	-368.86	0.003
P-99	J-85	J-84	60	8.0	PVC	120.0	2.33	-364.63	0.003
P-100	J-29	J-86	388	8.0	PVC	120.0	2.26	-354.76	0.003
P-101	J-86	J-85	312	8.0	PVC	120.0	2.29	-358.99	0.003
P-102(1)	J-36	J-57	181	8.0	PVC	120.0	1.21	189.72	0.001
P-102(2)	J-57	J-87	151	8.0	PVC	120.0	1.18	184.79	0.001
P-103	J-87	J-37	244	8.0	PVC	120.0	1.14	179.14	0.001
P-104	J-53	J-88	638	8.0	PVC	120.0	1.56	-243.83	0.002
P-105	J-88	J-52	276	8.0	PVC	120.0	1.59	-249.47	0.002
P-106	J-34	J-89	201	8.0	PVC	120.0	1.30	-203.23	0.001
P-107	J-89	J-90	242	8.0	PVC	120.0	1.33	-208.87	0.001
P-108	J-90	J-35	170	8.0	PVC	120.0	1.38	-215.92	0.001
P-109	J-76	J-83	278	8.0	PVC	120.0	0.55	-86.64	0.000
P-110	J-83	J-46	169	8.0	PVC	120.0	0.59	-92.28	0.000
P-111	J-44	J-58	199	8.0	PVC	120.0	0.27	-42.73	0.000
P-112	J-58	J-47	389	8.0	PVC	120.0	0.29	-45.55	0.000
P-113	R-4	J-51	219	8.0	PVC	120.0	9.02	1,413.58	0.040

Spring Hill
Active Scenario: MAX DAY
FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-1	4,964.71	0.00	65.0	5,115.06
J-2	4,983.63	4.23	66.1	5,136.32
J-3	4,986.00	0.00	58.1	5,120.24
J-4	4,985.16	6.35	65.7	5,137.07
J-5	4,983.80	5.64	59.1	5,120.51
J-6	4,984.30	5.64	58.9	5,120.54
J-7	4,988.58	5.64	57.1	5,120.57
J-8	4,990.92	6.35	63.1	5,136.81
J-9	4,986.70	5.64	57.9	5,120.57
J-10	4,988.00	5.64	57.4	5,120.57
J-11	4,990.49	5.64	66.0	5,142.96
J-12	4,991.58	0.00	55.8	5,120.61
J-13	4,996.71	7.05	53.7	5,120.90
J-14	4,994.67	7.05	54.7	5,121.08
J-15	4,989.15	5.64	57.2	5,121.46
J-16	4,991.65	0.00	57.3	5,124.06
J-17	4,974.14	0.00	61.5	5,116.37
J-18	4,970.03	5.64	63.0	5,115.75
J-19	4,968.72	5.64	63.5	5,115.49
J-20	4,966.03	5.64	64.6	5,115.28
J-21	4,966.42	5.64	64.5	5,115.50
J-22	4,969.77	5.64	63.1	5,115.71
J-23	4,971.61	5.64	62.4	5,115.85
J-24	4,972.46	4.23	62.1	5,115.96
J-25	4,987.00	4.23	64.8	5,136.82
J-26	4,984.04	5.64	66.3	5,137.33
J-27	4,988.16	5.64	66.0	5,140.82
J-28	4,991.60	5.64	62.8	5,136.81
J-29	5,012.06	4.23	70.2	5,174.24
J-30	5,016.00	6.35	69.8	5,177.25
J-31	5,018.50	5.64	69.1	5,178.14
J-32	5,025.69	5.64	66.2	5,178.72
J-33	5,023.49	5.64	67.9	5,180.43
J-34	5,019.30	5.64	69.8	5,180.59
J-35	5,023.56	5.64	68.2	5,181.31
J-36	5,026.60	4.23	66.9	5,181.35
J-37	5,032.11	5.64	64.3	5,180.82
J-38	5,029.83	0.00	65.3	5,180.87
J-39	5,022.22	0.00	68.4	5,180.42
J-40	5,031.17	0.00	65.2	5,181.83
J-41	5,041.78	0.00	60.6	5,181.85
J-42	5,043.98	5.64	59.9	5,182.37
J-43	5,038.09	5.64	62.4	5,182.36
J-44	5,026.34	5.64	67.1	5,181.51
J-45	5,030.65	5.64	65.3	5,181.64
J-46	5,035.69	5.64	63.2	5,181.83

Spring Hill
Active Scenario: MAX DAY
FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-47	5,031.90	5.64	64.7	5,181.55
J-48	5,041.23	5.64	60.7	5,181.58
J-49	5,045.40	5.64	58.9	5,181.63
J-50	5,049.25	5.64	58.0	5,183.34
J-51	5,041.59	5.64	62.0	5,184.95
J-52	5,036.60	6.35	63.5	5,183.26
J-53	5,025.00	6.35	67.9	5,181.82
J-54	4,971.65	5.64	62.4	5,115.96
J-55	4,971.92	4.23	62.1	5,115.40
J-56	4,967.81	5.64	63.9	5,115.59
J-57	5,028.21	4.94	66.2	5,181.17
J-58	5,028.20	2.82	66.3	5,181.52
J-59	4,989.11	5.64	63.9	5,136.82
J-60	5,045.05	5.64	59.7	5,183.00
J-61	5,040.70	5.64	61.4	5,182.63
J-62	5,033.46	6.35	64.7	5,182.93
J-63	5,028.17	5.64	66.7	5,182.30
J-64	5,044.04	5.64	60.5	5,183.82
J-65	5,035.07	4.23	63.5	5,181.84
J-66	5,039.17	5.64	61.7	5,181.84
J-67	5,034.36	5.64	63.4	5,180.83
J-68	5,033.54	4.23	63.7	5,180.84
J-69	5,031.67	4.23	64.5	5,180.85
J-70	5,032.56	5.64	64.5	5,181.64
J-71	5,034.49	5.64	63.7	5,181.63
J-72	5,041.03	5.64	60.8	5,181.63
J-73	5,034.24	5.64	63.7	5,181.55
J-74	5,037.58	5.64	62.3	5,181.56
J-75	5,049.55	5.64	57.2	5,181.68
J-76	5,044.76	5.64	59.3	5,181.73
J-77	5,046.96	5.64	58.7	5,182.55
J-78	5,022.36	5.64	67.6	5,178.49
J-79	5,019.64	4.94	68.6	5,178.26
J-80	5,022.45	5.64	67.5	5,178.46
J-81	5,037.83	5.64	62.2	5,181.56
J-82	5,034.29	5.64	63.7	5,181.56
J-83	5,038.74	5.64	61.9	5,181.79
J-84	5,013.44	4.23	70.6	5,176.64
J-85	5,012.76	5.64	70.8	5,176.44
J-86	5,008.94	4.23	72.0	5,175.45
J-87	5,029.56	5.64	65.5	5,181.03
J-88	5,032.99	5.64	64.8	5,182.81
J-89	5,020.16	5.64	69.5	5,180.81
J-90	5,022.28	7.05	68.7	5,181.09

Spring Hill
Active Scenario: MAX DAY
FlexTable: Reservoir Table

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
101	R-1	5,150.18	709.05	5,150.18
104	R-2	5,107.00	-558.12	5,107.00
107	R-3	5,162.45	-1,118.77	5,162.45
321	R-4	5,193.75	1,413.58	5,193.75

MAX HOUR

Spring Hill
Active Scenario: MAX HOUR
FlexTable: Pipe Table

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Velocity (ft/s)	Flow (gpm)	Headloss Gradient (ft/ft)
P-4	J-5	J-6	192	8.0	PVC	120.0	0.51	-79.66	0.000
P-5	J-6	J-7	144	8.0	PVC	120.0	0.54	-84.00	0.000
P-8	J-9	J-10	180	8.0	PVC	120.0	0.03	4.34	0.000
P-11	J-12	J-5	224	8.0	PVC	120.0	0.82	128.78	0.000
P-12	J-12	J-13	216	8.0	PVC	120.0	1.44	-225.80	0.001
P-13	J-13	J-14	124	8.0	PVC	120.0	1.48	-231.23	0.001
P-15	J-3	J-15	293	8.0	PVC	120.0	2.65	-414.71	0.004
P-16	J-15	J-14	248	8.0	PVC	120.0	1.51	236.65	0.001
P-17	J-15	J-16	265	8.0	PVC	120.0	4.19	-655.70	0.010
P-27	J-26	J-27	321	8.0	PVC	120.0	4.37	-685.00	0.011
P-28(1)	R-1	J-11	645	8.0	PVC	120.0	4.43	693.68	0.011
P-28(2)	J-11	J-27	193	8.0	PVC	120.0	4.40	689.34	0.011
P-29	R-2	J-1	1,120	8.0	PVC	120.0	3.69	-577.58	0.008
P-30	R-3	J-29	452	8.0	PVC	120.0	7.29	-1,142.62	0.027
P-31	J-30	J-31	258	8.0	PVC	120.0	2.44	-382.85	0.004
P-32	J-32	J-33	435	8.0	PVC	120.0	2.58	-404.01	0.004
P-33	J-33	J-34	150	8.0	PVC	120.0	1.28	-200.99	0.001
P-34	J-35	J-36	347	8.0	PVC	120.0	0.36	-56.40	0.000
P-35	J-37	J-33	324	8.0	PVC	120.0	1.32	207.36	0.001
P-36	J-38	J-39	208	8.0	PVC	120.0	1.95	305.13	0.002
P-37	J-29	J-39	475	8.0	PVC	120.0	4.97	-778.77	0.013
P-38	J-36	J-40	289	8.0	PVC	120.0	1.60	-250.92	0.002
P-39	J-41	J-38	336	8.0	PVC	120.0	2.20	344.54	0.003
P-40	J-41	J-42	155	8.0	PVC	120.0	2.31	-361.36	0.003
P-41	J-42	J-43	280	8.0	PVC	120.0	0.13	20.35	0.000
P-42	J-43	J-40	328	8.0	PVC	120.0	1.54	241.19	0.002
P-43	J-35	J-44	288	8.0	PVC	120.0	1.04	-163.04	0.001
P-44	J-44	J-45	304	8.0	PVC	120.0	0.77	-120.70	0.000
P-45	J-45	J-46	280	8.0	PVC	120.0	0.93	-145.93	0.001
P-46	J-46	J-40	280	8.0	PVC	120.0	0.00	0.52	0.000
P-47	J-48	J-49	280	8.0	PVC	120.0	0.48	-74.89	0.000
P-48	J-50	J-51	280	8.0	PVC	120.0	3.05	-477.70	0.005
P-49	J-51	J-52	280	8.0	PVC	120.0	3.17	496.96	0.006
P-50	J-53	J-39	260	8.0	PVC	120.0	3.02	473.64	0.005
P-51(2)	J-17	J-54	208	8.0	PVC	120.0	1.79	280.27	0.002
P-52(1)(1)	J-54	J-19	252	8.0	PVC	120.0	1.76	275.93	0.002
P-52(1)(2)	J-19	J-20	244	8.0	PVC	120.0	1.15	179.99	0.001
P-52(2)	J-20	J-1	134	8.0	PVC	120.0	1.69	263.99	0.002
P-54(1)	J-1	J-21	191	8.0	PVC	120.0	2.00	-313.58	0.002
P-54(2)	J-21	J-56	143	8.0	PVC	120.0	1.00	-157.26	0.001
P-55(1)	J-56	J-18	230	8.0	PVC	120.0	1.03	-161.60	0.001
P-60(1)	J-28	J-8	67	8.0	PVC	120.0	0.03	-4.34	0.000
P-60(2)	J-8	J-59	130	8.0	PVC	120.0	0.06	-9.22	0.000
P-61	J-59	J-25	137	8.0	PVC	120.0	0.09	-13.56	0.000
P-62	J-50	J-60	222	8.0	PVC	120.0	1.49	233.85	0.001

Spring Hill
Active Scenario: MAX HOUR
FlexTable: Pipe Table

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Velocity (ft/s)	Flow (gpm)	Headloss Gradient (ft/ft)
P-63	J-60	J-61	253	8.0	PVC	120.0	1.46	229.51	0.001
P-64	J-61	J-43	187	8.0	PVC	120.0	1.44	225.17	0.001
P-65	J-52	J-62	202	8.0	PVC	120.0	1.58	246.99	0.002
P-66	J-62	J-63	401	8.0	PVC	120.0	1.55	242.11	0.002
P-67	J-63	J-53	313	8.0	PVC	120.0	1.52	237.77	0.001
P-68	J-51	J-64	286	8.0	PVC	120.0	2.49	390.39	0.004
P-69	J-64	J-42	375	8.0	PVC	120.0	2.46	386.05	0.004
P-70	J-40	J-65	298	8.0	PVC	120.0	0.06	-9.22	0.000
P-71	J-65	J-66	283	8.0	PVC	120.0	0.08	-12.48	0.000
P-72	J-66	J-41	187	8.0	PVC	120.0	0.11	-16.82	0.000
P-73	J-37	J-67	262	8.0	PVC	120.0	0.18	-28.56	0.000
P-74	J-67	J-68	190	8.0	PVC	120.0	0.21	-32.90	0.000
P-75	J-68	J-69	183	8.0	PVC	120.0	0.23	-36.16	0.000
P-76	J-69	J-38	203	8.0	PVC	120.0	0.25	-39.42	0.000
P-77	J-70	J-45	246	8.0	PVC	120.0	0.13	-20.89	0.000
P-78	J-71	J-70	181	8.0	PVC	120.0	0.11	-16.55	0.000
P-79	J-49	J-72	187	8.0	PVC	120.0	0.05	-7.87	0.000
P-79	J-24	J-23	154	8.0	PVC	120.0	1.08	169.35	0.001
P-80	J-72	J-71	299	8.0	PVC	120.0	0.08	-12.21	0.000
P-80	J-23	J-22	192	8.0	PVC	120.0	1.05	165.01	0.001
P-81	J-47	J-73	293	8.0	PVC	120.0	0.14	-21.40	0.000
P-82	J-73	J-74	365	8.0	PVC	120.0	0.16	-25.74	0.000
P-83	J-74	J-48	379	8.0	PVC	120.0	0.19	-30.08	0.000
P-84	J-49	J-75	250	8.0	PVC	120.0	0.46	-71.36	0.000
P-84(2)	J-20	J-55	525	8.0	PVC	120.0	0.56	-88.35	0.000
P-85	J-75	J-76	252	8.0	PVC	120.0	0.48	-75.70	0.000
P-85	J-24	J-17	144	8.0	PVC	120.0	2.16	-338.54	0.003
P-86	J-46	J-77	468	8.0	PVC	120.0	1.50	-235.17	0.001
P-86(1)	J-25	J-4	99	8.0	PVC	120.0	2.03	-317.27	0.003
P-86(2)	J-4	J-26	95	8.0	PVC	120.0	2.06	-322.15	0.003
P-87	J-77	J-50	493	8.0	PVC	120.0	1.53	-239.51	0.002
P-87	J-2	J-25	217	8.0	PVC	120.0	1.92	-300.45	0.002
P-88	J-78	J-32	314	8.0	PVC	120.0	1.05	-164.40	0.001
P-88	J-2	J-26	313	8.0	PVC	120.0	2.29	-358.50	0.003
P-89	J-31	J-79	191	8.0	PVC	120.0	1.00	-156.27	0.001
P-89	J-2	J-16	1,251	8.0	PVC	120.0	4.19	655.70	0.010
P-90	J-79	J-78	330	8.0	PVC	120.0	1.02	-160.06	0.001
P-90	J-3	J-5	251	8.0	PVC	120.0	1.30	-204.10	0.001
P-91	J-32	J-80	181	8.0	PVC	120.0	1.50	235.26	0.001
P-91	J-17	J-3	455	8.0	PVC	120.0	3.95	-618.81	0.009
P-92	J-80	J-31	239	8.0	PVC	120.0	1.47	230.92	0.001
P-92	J-7	J-9	259	8.0	PVC	120.0	0.06	8.68	0.000
P-93	J-48	J-81	195	8.0	PVC	120.0	0.26	40.47	0.000
P-93	J-55	J-19	361	8.0	PVC	120.0	0.58	-91.60	0.000
P-94	J-81	J-82	216	8.0	PVC	120.0	0.23	36.13	0.000

Spring Hill
Active Scenario: MAX HOUR
FlexTable: Pipe Table

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Velocity (ft/s)	Flow (gpm)	Headloss Gradient (ft/ft)
P-94	J-21	J-22	301	8.0	PVC	120.0	1.03	-160.67	0.001
P-95	J-82	J-47	150	8.0	PVC	120.0	0.20	31.79	0.000
P-95	J-18	J-24	286	8.0	PVC	120.0	1.06	-165.94	0.001
P-96	J-7	J-12	135	8.0	PVC	120.0	0.62	-97.02	0.000
P-98	J-84	J-30	183	8.0	PVC	120.0	2.41	-377.97	0.003
P-99	J-85	J-84	60	8.0	PVC	120.0	2.39	-374.71	0.003
P-100	J-29	J-86	388	8.0	PVC	120.0	2.34	-367.12	0.003
P-101	J-86	J-85	312	8.0	PVC	120.0	2.36	-370.37	0.003
P-102(1)	J-36	J-57	181	8.0	PVC	120.0	1.22	191.27	0.001
P-102(2)	J-57	J-87	151	8.0	PVC	120.0	1.20	187.47	0.001
P-103	J-87	J-37	244	8.0	PVC	120.0	1.17	183.13	0.001
P-104	J-53	J-88	638	8.0	PVC	120.0	1.54	-240.75	0.002
P-105	J-88	J-52	276	8.0	PVC	120.0	1.56	-245.09	0.002
P-106	J-34	J-89	201	8.0	PVC	120.0	1.31	-205.33	0.001
P-107	J-89	J-90	242	8.0	PVC	120.0	1.34	-209.67	0.001
P-108	J-90	J-35	170	8.0	PVC	120.0	1.37	-215.10	0.001
P-109	J-76	J-83	278	8.0	PVC	120.0	0.51	-80.04	0.000
P-110	J-83	J-46	169	8.0	PVC	120.0	0.54	-84.38	0.000
P-111	J-44	J-58	199	8.0	PVC	120.0	0.30	-46.68	0.000
P-112	J-58	J-47	389	8.0	PVC	120.0	0.31	-48.85	0.000
P-113	R-4	J-51	219	8.0	PVC	120.0	8.74	1,369.40	0.038

Spring Hill
Active Scenario: MAX HOUR
FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-1	4,964.71	0.00	65.3	5,115.58
J-2	4,983.63	3.26	66.3	5,136.82
J-3	4,986.00	0.00	58.4	5,120.91
J-4	4,985.16	4.88	65.9	5,137.57
J-5	4,983.80	4.34	59.4	5,121.19
J-6	4,984.30	4.34	59.2	5,121.23
J-7	4,988.58	4.34	57.4	5,121.26
J-8	4,990.92	4.88	63.3	5,137.32
J-9	4,986.70	4.34	58.2	5,121.26
J-10	4,988.00	4.34	57.7	5,121.26
J-11	4,990.49	4.34	66.1	5,143.24
J-12	4,991.58	0.00	56.1	5,121.29
J-13	4,996.71	5.43	54.0	5,121.59
J-14	4,994.67	5.43	55.0	5,121.76
J-15	4,989.15	4.34	57.5	5,122.13
J-16	4,991.65	0.00	57.6	5,124.70
J-17	4,974.14	0.00	61.8	5,116.95
J-18	4,970.03	4.34	63.3	5,116.32
J-19	4,968.72	4.34	63.7	5,116.04
J-20	4,966.03	4.34	64.8	5,115.82
J-21	4,966.42	4.34	64.7	5,116.06
J-22	4,969.77	4.34	63.4	5,116.27
J-23	4,971.61	4.34	62.7	5,116.42
J-24	4,972.46	3.26	62.3	5,116.54
J-25	4,987.00	3.26	65.0	5,137.32
J-26	4,984.04	4.34	66.5	5,137.81
J-27	4,988.16	4.34	66.2	5,141.19
J-28	4,991.60	4.34	63.0	5,137.32
J-29	5,012.06	3.26	70.4	5,174.71
J-30	5,016.00	4.88	70.0	5,177.89
J-31	5,018.50	4.34	69.4	5,178.82
J-32	5,025.69	4.34	66.5	5,179.41
J-33	5,023.49	4.34	68.2	5,181.13
J-34	5,019.30	4.34	70.1	5,181.30
J-35	5,023.56	4.34	68.6	5,182.02
J-36	5,026.60	3.26	67.3	5,182.05
J-37	5,032.11	4.34	64.6	5,181.51
J-38	5,029.83	0.00	65.6	5,181.54
J-39	5,022.22	0.00	68.7	5,181.05
J-40	5,031.17	0.00	65.5	5,182.53
J-41	5,041.78	0.00	60.9	5,182.53
J-42	5,043.98	4.34	60.2	5,183.03
J-43	5,038.09	4.34	62.7	5,183.03
J-44	5,026.34	4.34	67.4	5,182.23
J-45	5,030.65	4.34	65.6	5,182.36
J-46	5,035.69	4.34	63.5	5,182.53

Spring Hill
Active Scenario: MAX HOUR
FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-47	5,031.90	4.34	65.1	5,182.27
J-48	5,041.23	4.34	61.0	5,182.30
J-49	5,045.40	4.34	59.3	5,182.35
J-50	5,049.25	4.34	58.3	5,183.94
J-51	5,041.59	4.34	62.2	5,185.46
J-52	5,036.60	4.88	63.7	5,183.83
J-53	5,025.00	4.88	68.1	5,182.43
J-54	4,971.65	4.34	62.7	5,116.53
J-55	4,971.92	3.26	62.3	5,115.95
J-56	4,967.81	4.34	64.2	5,116.16
J-57	5,028.21	3.80	66.5	5,181.87
J-58	5,028.20	2.17	66.6	5,182.24
J-59	4,989.11	4.34	64.1	5,137.32
J-60	5,045.05	4.34	60.0	5,183.63
J-61	5,040.70	4.34	61.7	5,183.28
J-62	5,033.46	4.88	64.9	5,183.51
J-63	5,028.17	4.34	66.9	5,182.89
J-64	5,044.04	4.34	60.7	5,184.39
J-65	5,035.07	3.26	63.8	5,182.53
J-66	5,039.17	4.34	62.0	5,182.53
J-67	5,034.36	4.34	63.7	5,181.51
J-68	5,033.54	3.26	64.0	5,181.52
J-69	5,031.67	3.26	64.8	5,181.53
J-70	5,032.56	4.34	64.8	5,182.35
J-71	5,034.49	4.34	64.0	5,182.35
J-72	5,041.03	4.34	61.1	5,182.35
J-73	5,034.24	4.34	64.0	5,182.28
J-74	5,037.58	4.34	62.6	5,182.29
J-75	5,049.55	4.34	57.5	5,182.39
J-76	5,044.76	4.34	59.6	5,182.43
J-77	5,046.96	4.34	58.9	5,183.21
J-78	5,022.36	4.34	67.9	5,179.18
J-79	5,019.64	3.80	68.9	5,178.95
J-80	5,022.45	4.34	67.8	5,179.15
J-81	5,037.83	4.34	62.5	5,182.29
J-82	5,034.29	4.34	64.0	5,182.28
J-83	5,038.74	4.34	62.2	5,182.49
J-84	5,013.44	3.26	70.9	5,177.25
J-85	5,012.76	4.34	71.1	5,177.05
J-86	5,008.94	3.26	72.3	5,176.00
J-87	5,029.56	4.34	65.8	5,181.73
J-88	5,032.99	4.34	65.1	5,183.40
J-89	5,020.16	4.34	69.8	5,181.52
J-90	5,022.28	5.43	69.0	5,181.81

Spring Hill
Active Scenario: MAX HOUR
FlexTable: Reservoir Table

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
101	R-1	5,150.18	693.68	5,150.18
104	R-2	5,107.00	-577.58	5,107.00
107	R-3	5,162.45	-1,142.62	5,162.45
321	R-4	5,193.75	1,369.40	5,193.75

MAX DAY WITH

FIRE FLOW

Spring Hill
Active Scenario: MAX DAY WITH FIRE FLOW
FlexTable: Pipe Table

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Velocity (ft/s)	Flow (gpm)	Headloss Gradient (ft/ft)
P-4	J-5	J-6	192	8.0	PVC	120.0	3.90	611.73	0.009
P-5	J-6	J-7	144	8.0	PVC	120.0	3.87	606.09	0.008
P-8	J-9	J-10	180	8.0	PVC	120.0	9.61	1,505.64	0.045
P-11	J-12	J-5	224	8.0	PVC	120.0	1.76	-276.44	0.002
P-12	J-12	J-13	216	8.0	PVC	120.0	4.05	-634.40	0.009
P-13	J-13	J-14	124	8.0	PVC	120.0	4.09	-641.45	0.009
P-15	J-3	J-15	293	8.0	PVC	120.0	2.01	-314.62	0.002
P-16	J-15	J-14	248	8.0	PVC	120.0	4.14	648.51	0.009
P-17	J-15	J-16	265	8.0	PVC	120.0	6.18	-968.77	0.020
P-27	J-26	J-27	321	8.0	PVC	120.0	6.43	-1,006.85	0.021
P-28(1)	R-1	J-11	645	8.0	PVC	120.0	6.50	1,018.14	0.022
P-28(2)	J-11	J-27	193	8.0	PVC	120.0	6.46	1,012.50	0.022
P-29	R-2	J-1	1,120	8.0	PVC	120.0	4.04	632.79	0.009
P-30	R-3	J-29	452	8.0	PVC	120.0	3.52	-551.29	0.007
P-31	J-30	J-31	258	8.0	PVC	120.0	1.48	231.85	0.001
P-32	J-32	J-33	435	8.0	PVC	120.0	5.08	-795.66	0.014
P-33	J-33	J-34	150	8.0	PVC	120.0	2.26	-353.65	0.003
P-34	J-35	J-36	347	8.0	PVC	120.0	0.72	-113.35	0.000
P-35	J-37	J-33	324	8.0	PVC	120.0	2.86	447.65	0.005
P-36	J-38	J-39	208	8.0	PVC	120.0	1.30	203.95	0.001
P-37	J-29	J-39	475	8.0	PVC	120.0	5.16	-807.83	0.014
P-38	J-36	J-40	289	8.0	PVC	120.0	2.49	-389.94	0.004
P-39	J-41	J-38	336	8.0	PVC	120.0	2.61	409.57	0.004
P-40	J-41	J-42	155	8.0	PVC	120.0	3.12	-488.38	0.006
P-41	J-42	J-43	280	8.0	PVC	120.0	0.27	41.59	0.000
P-42	J-43	J-40	328	8.0	PVC	120.0	2.22	347.62	0.003
P-43	J-35	J-44	288	8.0	PVC	120.0	1.69	-264.28	0.002
P-44	J-44	J-45	304	8.0	PVC	120.0	1.22	-191.25	0.001
P-45	J-45	J-46	280	8.0	PVC	120.0	1.43	-224.36	0.001
P-46	J-46	J-40	280	8.0	PVC	120.0	0.17	-26.62	0.000
P-47	J-48	J-49	280	8.0	PVC	120.0	0.74	-115.35	0.000
P-48	J-50	J-51	280	8.0	PVC	120.0	4.24	-664.99	0.010
P-49	J-51	J-52	280	8.0	PVC	120.0	4.05	634.21	0.009
P-50	J-53	J-39	260	8.0	PVC	120.0	3.85	603.88	0.008
P-51(2)	J-17	J-54	208	8.0	PVC	120.0	1.71	-268.41	0.002
P-52(1)(1)	J-54	J-19	252	8.0	PVC	120.0	1.75	-274.05	0.002
P-52(1)(2)	J-19	J-20	244	8.0	PVC	120.0	1.20	-188.36	0.001
P-52(2)	J-20	J-1	134	8.0	PVC	120.0	1.85	-289.57	0.002
P-54(1)	J-1	J-21	191	8.0	PVC	120.0	2.19	343.22	0.003
P-54(2)	J-21	J-56	143	8.0	PVC	120.0	1.08	169.31	0.001
P-55(1)	J-56	J-18	230	8.0	PVC	120.0	1.04	163.66	0.001
P-60(1)	J-28	J-8	67	8.0	PVC	120.0	0.04	-5.64	0.000
P-60(2)	J-8	J-59	130	8.0	PVC	120.0	0.08	-11.99	0.000
P-61	J-59	J-25	137	8.0	PVC	120.0	0.11	-17.63	0.000
P-62	J-50	J-60	222	8.0	PVC	120.0	2.06	322.95	0.003

Spring Hill
Active Scenario: MAX DAY WITH FIRE FLOW
FlexTable: Pipe Table

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Velocity (ft/s)	Flow (gpm)	Headloss Gradient (ft/ft)
P-63	J-60	J-61	253	8.0	PVC	120.0	2.03	317.31	0.003
P-64	J-61	J-43	187	8.0	PVC	120.0	1.99	311.67	0.002
P-65	J-52	J-62	202	8.0	PVC	120.0	2.01	315.17	0.002
P-66	J-62	J-63	401	8.0	PVC	120.0	1.97	308.82	0.002
P-67	J-63	J-53	313	8.0	PVC	120.0	1.94	303.18	0.002
P-68	J-51	J-64	286	8.0	PVC	120.0	3.45	541.26	0.007
P-69	J-64	J-42	375	8.0	PVC	120.0	3.42	535.62	0.007
P-70	J-40	J-65	298	8.0	PVC	120.0	0.44	-68.94	0.000
P-71	J-65	J-66	283	8.0	PVC	120.0	0.47	-73.17	0.000
P-72	J-66	J-41	187	8.0	PVC	120.0	0.50	-78.81	0.000
P-73	J-37	J-67	262	8.0	PVC	120.0	1.22	-191.52	0.001
P-74	J-67	J-68	190	8.0	PVC	120.0	1.26	-197.16	0.001
P-75	J-68	J-69	183	8.0	PVC	120.0	1.29	-201.39	0.001
P-76	J-69	J-38	203	8.0	PVC	120.0	1.31	-205.62	0.001
P-77	J-70	J-45	246	8.0	PVC	120.0	0.18	-27.47	0.000
P-78	J-71	J-70	181	8.0	PVC	120.0	0.14	-21.82	0.000
P-79	J-49	J-72	187	8.0	PVC	120.0	0.07	-10.54	0.000
P-79	J-24	J-23	154	8.0	PVC	120.0	1.00	-156.99	0.001
P-80	J-72	J-71	299	8.0	PVC	120.0	0.10	-16.18	0.000
P-80	J-23	J-22	192	8.0	PVC	120.0	1.04	-162.63	0.001
P-81	J-47	J-73	293	8.0	PVC	120.0	0.23	-35.33	0.000
P-82	J-73	J-74	365	8.0	PVC	120.0	0.26	-40.97	0.000
P-83	J-74	J-48	379	8.0	PVC	120.0	0.30	-46.62	0.000
P-84	J-49	J-75	250	8.0	PVC	120.0	0.70	-110.45	0.000
P-84(2)	J-20	J-55	525	8.0	PVC	120.0	0.61	95.57	0.000
P-85	J-75	J-76	252	8.0	PVC	120.0	0.74	-116.09	0.000
P-85	J-24	J-17	144	8.0	PVC	120.0	1.98	310.78	0.002
P-86	J-46	J-77	468	8.0	PVC	120.0	2.11	-330.75	0.003
P-86(1)	J-25	J-4	99	8.0	PVC	120.0	2.98	-466.39	0.005
P-86(2)	J-4	J-26	95	8.0	PVC	120.0	3.02	-472.74	0.005
P-87	J-77	J-50	493	8.0	PVC	120.0	2.15	-336.39	0.003
P-87	J-2	J-25	217	8.0	PVC	120.0	2.84	-444.53	0.005
P-88	J-78	J-32	314	8.0	PVC	120.0	3.80	-595.78	0.008
P-88	J-2	J-26	313	8.0	PVC	120.0	3.37	-528.48	0.007
P-89	J-31	J-79	191	8.0	PVC	120.0	2.65	414.80	0.004
P-89	J-2	J-16	1,251	8.0	PVC	120.0	6.18	968.77	0.020
P-90	J-79	J-78	330	8.0	PVC	120.0	2.62	409.87	0.004
P-90	J-3	J-5	251	8.0	PVC	120.0	5.70	893.81	0.017
P-91	J-32	J-80	181	8.0	PVC	120.0	1.24	194.24	0.001
P-91	J-17	J-3	455	8.0	PVC	120.0	3.70	579.19	0.008
P-92	J-80	J-31	239	8.0	PVC	120.0	1.20	188.60	0.001
P-92	J-7	J-9	259	8.0	PVC	120.0	9.65	1,511.28	0.046
P-93	J-48	J-81	195	8.0	PVC	120.0	0.40	63.09	0.000
P-93	J-55	J-19	361	8.0	PVC	120.0	0.58	91.33	0.000
P-94	J-81	J-82	216	8.0	PVC	120.0	0.37	57.44	0.000

Spring Hill
Active Scenario: MAX DAY WITH FIRE FLOW
FlexTable: Pipe Table

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Velocity (ft/s)	Flow (gpm)	Headloss Gradient (ft/ft)
P-94	J-21	J-22	301	8.0	PVC	120.0	1.07	168.28	0.001
P-95	J-82	J-47	150	8.0	PVC	120.0	0.33	51.80	0.000
P-95	J-18	J-24	286	8.0	PVC	120.0	1.01	158.02	0.001
P-96	J-7	J-12	135	8.0	PVC	120.0	5.81	-910.84	0.018
P-98	J-84	J-30	183	8.0	PVC	120.0	1.52	238.19	0.001
P-99	J-85	J-84	60	8.0	PVC	120.0	1.55	242.43	0.002
P-100	J-29	J-86	388	8.0	PVC	120.0	1.61	252.30	0.002
P-101	J-86	J-85	312	8.0	PVC	120.0	1.58	248.07	0.002
P-102(1)	J-36	J-57	181	8.0	PVC	120.0	1.74	272.35	0.002
P-102(2)	J-57	J-87	151	8.0	PVC	120.0	1.71	267.42	0.002
P-103	J-87	J-37	244	8.0	PVC	120.0	1.67	261.77	0.002
P-104	J-53	J-88	638	8.0	PVC	120.0	1.96	-307.05	0.002
P-105	J-88	J-52	276	8.0	PVC	120.0	2.00	-312.69	0.002
P-106	J-34	J-89	201	8.0	PVC	120.0	2.29	-359.29	0.003
P-107	J-89	J-90	242	8.0	PVC	120.0	2.33	-364.94	0.003
P-108	J-90	J-35	170	8.0	PVC	120.0	2.37	-371.99	0.003
P-109	J-76	J-83	278	8.0	PVC	120.0	0.78	-121.73	0.000
P-110	J-83	J-46	169	8.0	PVC	120.0	0.81	-127.37	0.000
P-111	J-44	J-58	199	8.0	PVC	120.0	0.50	-78.67	0.000
P-112	J-58	J-47	389	8.0	PVC	120.0	0.52	-81.49	0.000
P-113	R-4	J-51	219	8.0	PVC	120.0	11.78	1,846.10	0.066

Spring Hill
Active Scenario: MAX DAY WITH FIRE FLOW
FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-1	4,964.71	0.00	57.2	5,096.83
J-2	4,983.63	4.23	60.3	5,122.96
J-3	4,986.00	0.00	45.8	5,091.94
J-4	4,985.16	6.35	60.3	5,124.49
J-5	4,983.80	5.64	44.9	5,087.63
J-6	4,984.30	5.64	44.0	5,085.99
J-7	4,988.58	5.64	41.6	5,084.78
J-8	4,990.92	6.35	57.6	5,123.98
J-9	4,986.70	5.64	37.3	5,072.97
J-10	4,988.00	1,505.64	33.2	5,064.85
J-11	4,990.49	5.64	63.0	5,136.06
J-12	4,991.58	0.00	41.4	5,087.19
J-13	4,996.71	7.05	40.0	5,089.16
J-14	4,994.67	7.05	41.4	5,090.31
J-15	4,989.15	5.64	44.8	5,092.67
J-16	4,991.65	0.00	46.0	5,097.97
J-17	4,974.14	0.00	52.5	5,095.44
J-18	4,970.03	5.64	54.5	5,095.99
J-19	4,968.72	5.64	55.2	5,096.31
J-20	4,966.03	5.64	56.5	5,096.55
J-21	4,966.42	5.64	56.2	5,096.28
J-22	4,969.77	5.64	54.6	5,096.04
J-23	4,971.61	5.64	53.8	5,095.90
J-24	4,972.46	4.23	53.4	5,095.79
J-25	4,987.00	4.23	59.3	5,123.98
J-26	4,984.04	5.64	61.0	5,124.99
J-27	4,988.16	5.64	62.2	5,131.87
J-28	4,991.60	5.64	57.3	5,123.98
J-29	5,012.06	4.23	66.4	5,165.63
J-30	5,016.00	6.35	64.1	5,164.13
J-31	5,018.50	5.64	62.8	5,163.76
J-32	5,025.69	5.64	59.9	5,164.18
J-33	5,023.49	5.64	63.5	5,170.21
J-34	5,019.30	5.64	65.5	5,170.67
J-35	5,023.56	5.64	64.5	5,172.68
J-36	5,026.60	4.23	63.3	5,172.81
J-37	5,032.11	5.64	60.4	5,171.76
J-38	5,029.83	0.00	61.8	5,172.65
J-39	5,022.22	0.00	65.0	5,172.41
J-40	5,031.17	0.00	61.7	5,173.88
J-41	5,041.78	0.00	57.2	5,174.01
J-42	5,043.98	5.64	56.6	5,174.88
J-43	5,038.09	5.64	59.2	5,174.86
J-44	5,026.34	5.64	63.5	5,173.20
J-45	5,030.65	5.64	61.8	5,173.50
J-46	5,035.69	5.64	59.8	5,173.87

Spring Hill
Active Scenario: MAX DAY WITH FIRE FLOW
FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-47	5,031.90	5.64	61.2	5,173.32
J-48	5,041.23	5.64	57.2	5,173.38
J-49	5,045.40	5.64	55.4	5,173.49
J-50	5,049.25	5.64	55.1	5,176.54
J-51	5,041.59	5.64	59.6	5,179.33
J-52	5,036.60	6.35	60.6	5,176.78
J-53	5,025.00	6.35	64.7	5,174.58
J-54	4,971.65	5.64	53.7	5,095.83
J-55	4,971.92	4.23	53.9	5,096.41
J-56	4,967.81	5.64	55.5	5,096.16
J-57	5,028.21	4.94	62.4	5,172.47
J-58	5,028.20	2.82	62.8	5,173.24
J-59	4,989.11	5.64	58.4	5,123.98
J-60	5,045.05	5.64	56.6	5,175.96
J-61	5,040.70	5.64	58.2	5,175.32
J-62	5,033.46	6.35	61.8	5,176.27
J-63	5,028.17	5.64	63.7	5,175.31
J-64	5,044.04	5.64	57.7	5,177.38
J-65	5,035.07	4.23	60.1	5,173.93
J-66	5,039.17	5.64	58.3	5,173.97
J-67	5,034.36	5.64	59.6	5,172.02
J-68	5,033.54	4.23	60.0	5,172.22
J-69	5,031.67	4.23	60.9	5,172.42
J-70	5,032.56	5.64	61.0	5,173.50
J-71	5,034.49	5.64	60.1	5,173.49
J-72	5,041.03	5.64	57.3	5,173.49
J-73	5,034.24	5.64	60.2	5,173.33
J-74	5,037.58	5.64	58.7	5,173.35
J-75	5,049.55	5.64	53.7	5,173.58
J-76	5,044.76	5.64	55.8	5,173.68
J-77	5,046.96	5.64	55.5	5,175.15
J-78	5,022.36	1,005.64	60.3	5,161.63
J-79	5,019.64	4.94	62.0	5,162.97
J-80	5,022.45	5.64	61.2	5,163.99
J-81	5,037.83	5.64	58.6	5,173.35
J-82	5,034.29	5.64	60.2	5,173.33
J-83	5,038.74	5.64	58.4	5,173.80
J-84	5,013.44	4.23	65.3	5,164.40
J-85	5,012.76	5.64	65.6	5,164.49
J-86	5,008.94	4.23	67.5	5,164.99
J-87	5,029.56	5.64	61.7	5,172.19
J-88	5,032.99	5.64	61.9	5,176.10
J-89	5,020.16	5.64	65.4	5,171.31
J-90	5,022.28	7.05	64.8	5,172.10

Spring Hill
Active Scenario: MAX DAY WITH FIRE FLOW
FlexTable: Reservoir Table

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
101	R-1	5,150.18	1,018.14	5,150.18
104	R-2	5,107.00	632.79	5,107.00
107	R-3	5,162.45	-551.29	5,162.45
321	R-4	5,193.75	1,846.10	5,193.75

SANITARY SEWER LAYOUT

SPRING HILL SANITARY SEWER SYSTEM

CO 3

HWY 52

TIE INTO EXISTING SS LINE

TIE INTO EXISTING SS LINE

TIE INTO EXISTING SS LINE

TIE INTO EXISTING SS LINE

TIE INTO EXISTING SS LINE

TIE INTO EXISTING SS LINE

NOTE:
SEE SANITARY PLANS
FOR MORE DETAIL

200 100 0 200 400

SCALE: 1" = 200'

N:\PROJECTS\SPRING HILL\CAD\ENGINEERING\EXHIBITS\6-30-21 SPRING HILL SANITARY SEWER SYSTEM.DWG, AALAMAR, 12/7/2021 1:27 PM

No.	Revisions	Date	Init.	Appr.	Date
			CVL		

CVL a Westwood team
10333 E. Dry Creek Rd.
Suite 240
Englewood, CO 80112
Tel:720.482.952
www.cvlinc.net
westwoodps.com

SPRING HILL
EXHIBIT
SANITARY SEWER SYSTEM EXHIBIT

SCALE:	AS SHOWN	FILE NO:	8130307501
DRAWN BY:	MSD		
CHECKED BY:	BPW		
DATE:	DECEMBER, 2021		
SHEET NUMBER	EX		

SECTION 600 WATER SUPPLY FACILITIES

610.00 DESIGN CRITERIA

610.01 General

All water distribution systems shall comply with the requirements of the STANDARDS AND SPECIFICATIONS for water main and service line construction and may include special criteria established by the Town for the overall hydraulics of the water utility system. Special criteria shall be outlined at pre-design meetings scheduled, as determined necessary, by the Town Engineer. The requirements set forth in the latest edition of the Denver Water Board Engineering Standards shall apply for information not set forth in these STANDARDS AND SPECIFICATIONS.

611.00 Design Flow Requirements

The design of the water distribution system shall be based on the following:

UNIT WATER DEMANDS FOR FUTURE LAND USE

Land Type	Avg. Demand	Max. Day Demand	Peak Hour: Max. Day Flow Ratio
Residential	140 GPCD*	1,000 gpd/SFE	2.0
Commercial	N/A	3,000 gpd/acre	2.0
Industrial	N/A	1,630 gpd/SFE	2.0

*Gallons Per Capita/Day

611.01 Fire Flows

Fire flows may be calculated from more than one hydrant, providing the hydrants used are directly accessible to all possible fire locations in the area served. Fire flows, per Mountain View Fire Protection District, shall be:

A. Available fire flow shall be based on a 20 psi residual minimum.

B. Minimum fire flow for any newly developed areas:

1. 1 and 2 family units..... 1,000 gpm, 2 hour duration
2. Multi-family units ..... 1,500 gpm, 2 hour duration
3. Institutional development 2,000 gpm, 2 hour duration
4. Commercial development..... 2,500 gpm, 2 hour duration
5. Industrial development..... 3,500 gpm, 3 duration

SECTION 700 SANITARY SEWER FACILITIES

710.00 DESIGN CRITERIA

711.00 General

All extensions of and/or additions to the Town sewer systems will comply with the requirements of these STANDARDS AND SPECIFICATIONS for sewer main and service line construction.

712.00 Design Flow

The design will include consideration of providing service for the entire area tributary to the outfall point. The following wastewater flow rates, which include infiltration, shall be used:

User Type	Unit Wastewater Flow Rate
Residential	90 gallons/capita/day
Industrial	1,500 gallons/acre/day
Commercial	1,000 gallons/acre/day
Park/Recreation	50 gallons/acre/day
Elementary Schools	13 gallons/student/day
Jr. & Sr. High Schools	20 gallons/student/day

The Town's minimum residential population density or household density is 2.89 people per dwelling unit. The land usage shall be as noted on an approved PUD and/or Plat.

Wastewater flow peaking factors shall be computed using the following equation:

$PF = 2.6 * Q_{\text{Max Day}}^{-0.16}$
Where $Q_{\text{Max Day}}$ = maximum daily flow in CFS

The peaking factor will not be less than 2.0 or greater than four (4.0).

713.00 Hydraulic Design

Sewers twelve (12) inches in diameter and smaller shall carry the peak design flow at a maximum flow depth of fifty percent (50%) of the pipe diameter (d/D). Sewer mains larger than twelve (12) inches in diameter may be designed to 0.70 d/D at the peak design flow rate.

The minimum velocity at the peak design flow rate shall be two (2) feet per second. Where actual flow will be considerably below the design flow for several years, the Town Engineer may require that the minimum velocity be attained by suitable grades at the partial peak design flow rate.

PRELIMINARY GEOTECHNICAL SUBSURFACE EXPLORATION REPORT
PROPOSED ANDALUSIA DEVELOPMENT
WELD COUNTY, COLORADO
SOILOGIC # 13-1109
September 27, 2013

September 27, 2013

Moradi Properties
c/o Mr. Jerry Bouldin- Owner's Authorized Representative
3733 Florentine Circle
Longmont, Colorado 80503

Attn: Mr. Jerry Bouldin

Re: Preliminary Geotechnical Subsurface Exploration Report
Proposed Andalusia Development - 313 Acre Parcel
Southwest Corner of Colorado State Highway 52 and Weld County Road 3
Weld County, Colorado
Soilogic Project #13-1109

Mr. Bouldin:

Soilogic, Inc. (Soilogic) personnel have completed the preliminary geotechnical subsurface exploration you requested for the proposed Andalusia PUD, a single and multi-family residential development on approximately 313 acres of land located southwest of the intersection of Colorado State Highway 52 and County Road 3 in Weld County, Colorado. The results of our preliminary explorations are included with this report.

The subsurface materials encountered in the completed test borings consisted of approximately 4 to 6 inches of vegetation and topsoil underlain by brown/rust/beige/gray sandy lean clay and silty to clayey sand. The lean clay and silty/clayey sand varied from very soft to very stiff in terms of consistency or very loose to dense in terms of relative density and typically showed no to low swell potential at current moisture and density conditions. The lean clay/silty, clayey sand extended to the bottom of borings B-1, B-4, B-6, B-7, B-8, B-10 and B-15 at a depth of approximately 15 feet below present site grade and to depths ranging from approximately 8½ to 14½ feet below ground surface in the remainder of the completed site borings and was underlain by siltstone/sandstone and/or claystone bedrock of varying composition or sand with silt and gravel. The bedrock varied from weathered to very hard in hardness. The siltstone/sandstone and interbedded sandstone/siltstone/claystone bedrock typically showed low swell potential at in-situ moisture and density conditions, while the claystone bedrock showed very high swell potential. Borings B-2, B-3, B-5 and B-11 through B-14 were terminated at a

depths ranging of approximately 15 feet below present site grades in the competent bedrock. Boring B-9 was terminated at a depth of approximately 15 feet below present site grade in a sand with silt and gravel deposit.

The subsurface materials encountered in the subsequent test pits excavated at the subject property consisted of approximately the same subsurface stratigraphy. The lean clay and silty/clayey sand varied from very soft to stiff in terms of consistency or very loose to medium dense in terms of relative density and typically showed no to low swell potential at current moisture and density conditions. The lean clay/silty, clayey sand extended to the bottom of test pits TP-1 through TP-7, TP-9 and TP-11 at depths of approximately 5 to 10 feet below present site grade and to depths ranging from approximately 4 to 9 feet below ground surface in the remainder of the completed test pits and was underlain by bedrock of varying composition similar as previously discussed. Test pits TP-8 and TP-10 were terminated at a depth of approximately 10 feet below present site grades in the competent bedrock.

Groundwater level measurements were completed in all borings approximately 24 hours after the completion of drilling. Groundwater was measured in borings B-2, B-3, B-5, B-7 through B-9, B-11 and B-15 at depths ranging from about 4 to 13 feet below present site grades. Borings B-1, B-6, B-10 and B-12 through B-14 were observed to be dry to the approximate depths explored at that time, while boring B-4 had dry caved at a depth of about 7½ feet below ground surface. Groundwater level measurements were completed in the test pit excavations shortly after completion. Groundwater was measured at depths between about 2 to 3½ feet below ground surface in test pits TP-1 through TP-5, and at depths between about 6 to 8 feet below ground surface in test pits TP-6 through TP-8. Test pits TP-9 through TP-11 remained dry to the depth explored, about 10 feet below ground surface.

Based on the subsurface conditions encountered and type of construction proposed, we expect most of the proposed lightly-loaded residential structures could be constructed with conventional spread footing foundations and slab-on-grade floors bearing on the site lean clay, silty/clayey sand or underlying siltstone/sandstone bedrock with low swell potential, however, moderate to very high swelling claystone bedrock was encountered on portions of this site at depths which could influence spread footing foundations and

slab-on-grade floors. Where moderate or higher swelling claystone bedrock is encountered within 5 to 6 feet of proposed basement foundation bearing elevation, drilled pier foundations used in conjunction with structurally-supported floor systems should be anticipated.

With the presence of shallow groundwater in areas of the site (notably in the vicinities of borings B-2, B-3 and B-9 and test pits TP-1 through TP-5), care will be needed to maintain adequate separation distances between site groundwater and finish basement floor slab levels. Precluding basement construction will likely be necessary in some areas of the site unless these areas are raised considerably from present site grade. Installation of an underdrain system could also be considered to facilitate basement construction but would require a suitable outfall. Very soft to soft/very loose to loose lean clay/clayey, silty sand was also encountered relatively near-surface in the site borings/test pits completed in these areas. Care will be needed at the time of construction to ensure grading fills are properly compacted such that footing foundations are supported on soils with suitable strength. Overexcavation/backfill procedures could be considered in areas of soft/loose lean clay/clayey and/or silty sand to reduce the potential for post-construction movement of the proposed residences. The soft lean clay/very loose silty, clayey sand encountered relatively near surface in several of the completed site borings/test pits would be subject to consolidation under additionally imposed loads. Areas of the site expected to receive fill depths greater than 3 to 4 feet should be evaluated closely for consolidation potential. Fill soils may need to be placed and allowed to remain in place for several months prior to construction of any overlying improvements in order to allow for consolidation of the underlying soft/very loose soils.

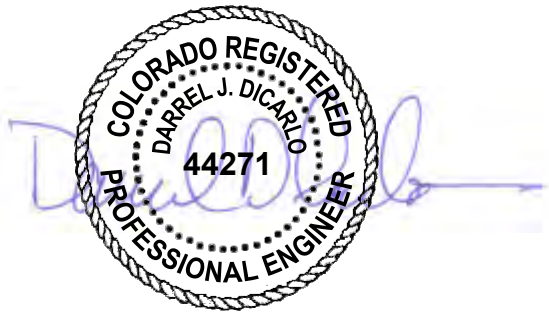
The site lean clay/clayey, silty sand also appears suitable for support of site pavements and exterior flatwork. Depending on finish site grading, stabilization of the pavement subgrades may be necessary to develop a suitable paving platform.

Other preliminary opinions and recommendations concerning design criteria and construction details for the proposed site improvements are included with this report. Pavement section design estimates are also provided. A final subsurface exploration and pavement design report for the interior site roadways should be completed once the roadways have been cut to approximate finish grade. Site-specific explorations should

also be completed for each of the individual residential structures after infrastructure development of the site has been completed.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the enclosed information or if we can be of further service to you in any way, please do not hesitate to contact us.

Very Truly Yours,
Soilogic, Inc.



Darrel DiCarlo, P.E.
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Reviewed by:

Wolf von Carlowitz, P.E.
Principal Engineer

PRELIMINARY GEOTECHNICAL EXPLORATION REPORT
PROPOSED ANDALUSIA DEVELOPMENT
WELD COUNTY, COLORADO
SOILOGIC # 13-1109
September 27, 2013

INTRODUCTION

This report contains the results of the preliminary geotechnical subsurface exploration completed for the proposed Andalusia PUD, a proposed single and multi-family residential development located southwest of the intersection of Colorado State Highway 52 and Weld County Road 3, north of the Town of Erie, Colorado. The purpose of our investigation was to describe the subsurface conditions encountered in the completed site borings and test pit excavations and develop preliminary recommendations concerning design and construction of residence foundations and support of floor slabs and site pavements. Recommendations concerning the installation of site utilities and pavement section design estimates for the interior site roadways are also included. The conclusions and recommendations outlined in this report are based on the results of the completed field and laboratory testing and our experience with subsurface conditions in this area. As part of our evaluation, two preliminary geotechnical subsurface exploration reports prepared for the subject parcel by Terracon Consultants Inc. (Project #22055172, dated September 13, 2005 and Project #22055197, dated October 28, 2005) were reviewed.

PROPOSED CONSTRUCTION

The proposed development parcel includes approximately 313 acres to be developed as single and multi-family residential. A small portion of the site at the northeast property boundary may be developed as commercial/retail. We expect the residential structures will be lightly-loaded one or two-story, wood-frame structures which will likely include full basements, if/where subsurface conditions permit. Foundations loads for the structures are expected to be relatively light, with continuous wall loads less than 3 kips per lineal foot and individual column loads less than 75 kips. Floor loads are expected to be light, on the order of 150 psf or less. Infrastructure improvements for the development will include utility installation and roadway construction. We expect the site roadways

will be used by relatively low volumes of automobiles and light trucks. Small grade changes are anticipated to develop finish site grades.

SITE DESCRIPTION

The development site includes a total of approximately 313 acres located in the South ½ and East ½ of Section 6, Township 1 North, Range 68 West of the 6th Principal Meridian in Weld County, Colorado. In general, the site is surrounded by agricultural land and sparse residential development. At the time of our site exploration, the site was being used for agricultural and livestock grazing purposes and contained both tilled and vegetated areas. Residential properties were noted near the north property boundary along CO Highway 52. Site topography is generally characterized by a knoll near the center of the south property line, which is the relative high point of the property. Ground surface slopes downward in a radial fashion from the relative high point. Site drainage across the property was generally toward the north overall, with a maximum difference in ground surface elevation across the site estimated to be approximately 80 to 90 feet based on provided site topography. Numerous water features are located on or adjacent to the property, most notably the Lower Boulder Ditch, Boulder & Weld County Ditch and Cottonwood Extension Ditch, all earth-lined irrigation channels of varying size. These irrigation channels were active and carrying water at the time of our explorations. The site has also been drilled for oil/gas production in the past, as evidenced by several well-heads and associated collection equipment. Evidence of prior building construction was not observed on the development parcel at the time of drilling.

SITE EXPLORATION

Field Exploration

To develop subsurface information across the development parcel, a total of fifteen (15) soil borings were extended to a depth of approximately 15 feet below present site grades across the parcel. In addition, eleven (11) test pits were excavated to depths between approximately 5 to 10 feet below present site grades at selected locations. The boring and test pit locations were selected based upon the provided preliminary development plan and were established in the field by Soilogic personnel by using a mechanical

surveyor's wheel and by estimating angles from identifiable site references. A diagram indicating the approximate boring and test pit locations is included with this report. Graphic logs of each of the auger borings and test pit excavations are also included.

The test holes were advanced using 4-inch diameter continuous-flight auger, powered by a truck-mounted CME-45 drill rig. Samples of the subsurface materials were obtained at regular intervals using California barrel sampling procedures in general accordance with ASTM specification D-1586. As part of the D-1586 sampling procedure, the standard sampling barrel is driven into the substrata using a 140-pound hammer falling a distance of 30 inches. The number of blows required to advance the sampler a distance of 12 inches is recorded and helpful in estimating the consistency, relative density or hardness of the soils or bedrock encountered. In the California barrel sampling procedure, relatively undisturbed samples are obtained in removable brass liners.

Test pits were excavated with a backhoe to the approximate depth of groundwater encountered or to about 10 feet below present site grade, whichever resulted in the lesser excavation depth. A dynamic cone penetrometer was used to estimate the "N" value, or consistency/relative density of the soils encountered. A hand sampler with a California barrel sleeve was driven into the subsoils to obtain relatively intact and undisturbed soil samples at the test pit locations at selected elevations. Samples of the subsurface materials obtained in the field were sealed and returned to the laboratory for further evaluation, classification and testing.

Laboratory Testing

The samples collected were tested in the laboratory to measure natural moisture content and visually and/or manually classified in accordance with the Unified Soil Classification System (USCS). The USCS group symbols are indicated on the attached boring logs. An outline of the USCS classification system is included with this report. Classification of bedrock was completed through visual and tactual observation of disturbed samples. Other bedrock types could be revealed through petrographic analysis.

As part of the laboratory testing, a calibrated hand penetrometer (CHP) was used to estimate the unconfined compressive strength of essentially cohesive specimens. The

CHP also provides a more reliable estimate of soil consistency than tactual observation alone. Dry density, Atterberg limits, -200 wash and swell/consolidation tests were completed on selected samples to help establish specific soil characteristics. Atterberg limits tests are used to determine soil plasticity. The percent passing the #200 size sieve (-200 wash) test is used to determine the percentage of fine grained soils (clay and silt) in a sample. Swell/consolidation tests are performed to evaluate soil and bedrock volume change potential with variation in moisture content. The results of the completed laboratory tests are outlined on the attached boring and test pit logs and swell/ consolidation test summaries.

SUBSURFACE CONDITIONS

The subsurface materials encountered in the completed test borings consisted of approximately 4 to 6 inches of vegetation and topsoil underlain by brown/rust/beige/gray sandy lean clay and silty to clayey sand. The lean clay and silty/clayey sand varied from very soft to very stiff in terms of consistency or very loose to dense in terms of relative density and typically showed no to low swell potential at current moisture and density conditions. The lean clay/silty, clayey sand extended to the bottom of borings B-1, B-4, B-6, B-7, B-8, B-10 and B-15 at a depth of approximately 15 feet below present site grade and to depths ranging from approximately 8½ to 14½ feet below ground surface in the remainder of the completed site borings and was underlain by siltstone/sandstone and/or claystone bedrock of varying composition or sand with silt and gravel. The bedrock varied from weathered to very hard in hardness. The siltstone/sandstone and interbedded interbedded sandstone/siltstone/claystone bedrock typically showed low swell potential at in-situ moisture and density conditions, while the claystone bedrock tested showed very high swell potential. Borings B-2, B-3, B-5 and B-11 through B-14 were terminated in the competent bedrock at a depth of approximately 15 feet below present site grades. Boring B-9 was terminated at a depth of approximately 15 feet below present site grade in sand with silt and gravel.

The subsurface materials encountered in the subsequent test pits excavated at the subject property consisted of approximately the same subsurface stratigraphy. The lean clay and silty/clayey sand varied from very soft to stiff in terms of consistency or very loose to medium dense in terms of relative density and typically showed no to low swell potential

at current moisture and density conditions. The lean clay/silty, clayey sand extended to the bottom of test pits TP-1 through TP-7, TP-9 and TP-11 at depths of approximately 5 to 10 feet below present site grade and to depths ranging from approximately 4 to 9 feet below ground surface in the remainder of the completed test pits and was underlain by bedrock of varying composition similar as previously discussed. Test pits TP-8 and TP-10 were terminated at a depth of approximately 10 feet below present site grades in the competent bedrock.

The stratigraphy indicated on the included boring and test pit logs represents the approximate location of changes in soil and bedrock types. Actual changes may be more gradual than those indicated.

Groundwater level measurements were completed in all borings immediately after the completion of drilling and approximately 24 hours later. Groundwater was measured in borings B-2, B-3, B-5, B-7 through B-9, B-11 and B-15 at depths ranging from about 4 to 13 feet below present site grades when checked one day after drilling. Borings B-1, B-6, B-10 and B-12 through B-14 were observed to be dry to the approximate depths explored at that time, while boring B-4 had dry caved at a depth of about 7½ feet below ground surface. Groundwater level measurements were completed in the test pits shortly after completion of excavation and then the excavations were backfilled due to livestock safety concerns. Groundwater was measured at depths between about 2 to 3½ feet below ground surface in test pits TP-1 through TP-5, and at depths between about 6 to 8 feet below ground surface in test pits TP-6 through TP-8. Test pits TP-9 through TP-11 remained dry to the depth explored, about 10 feet below ground surface.

Groundwater levels will vary seasonally and over time based on weather conditions, site development, irrigation practices and other hydrologic conditions. We expect site groundwater levels would be directly impacted by the activity/water levels in the multiple irrigation channels which cross the property. Perched and/or trapped groundwater conditions may also be encountered at some locations at times throughout the year. Perched water is commonly encountered in soils overlying less permeable soil layers and/or bedrock. Trapped water is typically encountered within more permeable zones of layered soil and bedrock systems. The location and amount of perched and/or trapped water can also vary over time. Longer-term observation of site groundwater levels would

be required in wells which are cased and sealed from the influence of surface water to more accurately establish static groundwater levels and possible fluctuations in those groundwater levels over time.

ANALYSIS AND RECOMMENDATIONS

General

At the time of test pit exploration and/or when checked 24 hours after completion of drilling, groundwater was encountered on the lower-lying areas of the development site (most notably in the vicinities of borings B-2, B-3 and B-9 and test pits TP-1 through TP-8) at depths ranging from approximately 2 to 8 feet below ground surface. Depending on finish site grading, we expect current groundwater levels at the above-mentioned locations as well as localized areas near the irrigation ditches on this site and fluctuations in overall site groundwater levels would impact the feasibility of full-depth basement construction. We estimate full depth basement construction may not be possible across approximately 20% to 30% of the site. Precluding the use of full depth basement construction may be required at some locations where groundwater was encountered less than about 4 feet below present site grade. Raising finish site grades in these areas and constructing basements as shallow as possible or lowering the groundwater table with an underdrain system could be considered to facilitate garden-level, or possibly full-basement construction. If an underdrain system will be constructed, a suitable outfall would be required to accommodate any collected waters. Although normally not feasible, lining or piping the irrigation ditches crossing the parcel could also be considered. Typically, we recommend a minimum 3-foot separation be maintained between basement floor slab levels and seasonal high groundwater.

Zones of very soft to soft/very loose to loose lean clay/clayey, silty sand were encountered relatively near-surface in many of the completed site borings, especially where comparatively shallow groundwater was encountered. The site soils would be expected to be soft/loose near current groundwater levels. These soils may complicate site grading and require stabilization prior to the placement of grading fill. We recommend avoiding grading cuts in the vicinity of the irrigation ditches and near the marshy area where test pits TP-2 through TP-5 were excavated or limiting them to as

shallow as possible. If soft/loose soils are encountered at proposed foundation bearing elevation at the time of construction, some overexcavation/backfill procedures or other approved stabilization measures may be required to develop suitable strength foundation bearing. The soft/very loose soils encountered with depth would be easily disturbed by construction activities. Soft clay and very loose sand which are disturbed by the construction activities should be removed and replaced or reworked or stabilized in-place prior to placement of any overlying improvements. Depending on finish site grades, the time of year when pavement construction occurs and other hydrologic conditions, stabilization of the pavement subgrade soils may be required to develop a suitable paving platform.

Site Development

All existing topsoil and vegetation should be removed from any proposed fill and pavement areas. After stripping and completing all cuts and prior to placement of any overlying fill and/or improvements, we recommend the exposed subgrade soils be scarified to a depth of 9 inches, adjusted in moisture content and compacted to at least 95% of the materials standard Proctor maximum dry density. The moisture content of the reconditioned subgrade soils should be adjusted to be within the range of ±2% of standard Proctor optimum moisture content at the time of compaction. Areas of soft lean clay/very loose silty, clayey sand were encountered relatively near surface in several of the completed site borings and test pits. Depending on the depth of site cuts, stabilization procedures may be required in some areas to develop a suitable working platform.

Fill soils required to develop structural areas of the site should consist of approved low volume change (LVC) soils free from organic matter, debris and other objectionable materials. Based on the results of the completed laboratory testing, it is our opinion the site lean clay and silty/clayey sand could be used as fill to develop the site. In general, the site siltstone/sandstone and interbedded sandstone/siltstone/claystone bedrock appears suitable for use as fill provided those materials are thoroughly-processed and the proper moisture contents developed prior to placement and compaction. Because of the high plasticity and swell potential of the site claystone bedrock, it is considered unsuitable for use as fill below any structural or paved areas of the site. Wet materials encountered near current groundwater levels would need to be dried out prior to placement as fill. If it is

necessary to import fill material to the site, those materials should have low potential for volume change and be relatively impervious. Fill soils should be approved by Soilogic prior to use. We recommend suitable fill materials be placed in loose lifts not to exceed 9 inches thick, adjusted in moisture content and compacted as recommended for the scarified materials above.

The soft lean clay/very loose silty, clayey sand encountered relatively near surface in several of the completed site borings/test pits would be subject to consolidation under additionally imposed loads. Areas of the site expected to receive fill depths greater than 3 to 4 feet should be evaluated closely for consolidation potential. Fill soils may need to be placed and allowed to remain in place for several months prior to construction of any overlying improvements in order to allow for consolidation of the underlying soft/very loose soils.

The soft lean clay/very loose silty, clayey sand soils encountered relatively near surface would be easily disturbed by the construction activities. Disturbed soils should be removed and replaced or reworked in place prior to placement of any overlying improvements

Footing Foundations

Based on the materials encountered in the completed site borings and the results of laboratory testing, we expect most of the site structures could be supported on conventional footing foundations bearing on the natural site lean clay or silty/clayey sand overburden soils, suitable fill soils placed and compacted as outlined above or siltstone/sandstone and interbedded interbedded sandstone/siltstone/claystone bedrock with low swell potential. All foundations for individual site structures should bear on like materials.

For design of footing foundations bearing on the natural site lean clay, silty/clayey sand or properly placed and compacted fill developed as outlined above, maximum net allowable soil bearing pressures in the range of 1,000 to 2,000 psf appear usable. Soft clay and very loose silty/clayey sand with insufficient strength were encountered relatively near surface in several of the completed site borings. Settlement of

improvements placed directly on or immediately above soft clay or very loose sands would be expected subsequent to construction. If more extensive zones of soft clay or very loose sand are encountered near proposed foundation bearing at the time of construction, some overexcavation/backfill procedures may be required. For site structures supported on siltstone/sandstone or interbedded sandstone/siltstone/claystone bedrock with low swell potential, maximum net allowable soil bearing pressures in the range of 2,000 to 3,000 psf appear usable with minimum dead load pressures in the range of 500 to 1,000 psf. If basement area foundations will be supported on siltstone/ sandstone or interbedded sandstone/siltstone/claystone bedrock with low swell potential, extending garage and any other at-grade footing foundations deeper may be required to develop consistent foundation bearing.

Individual site explorations should be completed for the proposed residences to help better define subsurface conditions at the specific residence locations and help ensure the proposed improvements will be supported on like materials with suitable strength and low volume change potential.

No unusual problems are anticipated in completing excavations through the site overburden soils required for construction of footing foundations. Layers of cemented sandstone were encountered in limited areas of the site. Depending on finish site grading, heavy duty excavation equipment may be required to penetrate these more competent bedrock layers.

Floor Slabs

Based on the type of construction proposed and results of the completed field and laboratory testing, we expect most of the lightly-loaded residential floor slabs could be supported on natural, undisturbed site lean clay, silty/clayey sand, siltstone/sandstone or interbedded sandstone/siltstone/claystone bedrock with low swell potential or properly placed and compacted fill.

Care should be taken to avoid disturbing floor slab subgrades prior to concrete placement. Subgrade soils expected to receive floor slab concrete should be evaluated closely prior to surfacing. If areas of disturbed, wet and softened, or dry subgrade soils develop during

construction, those materials should be removed and replaced or reworked in place prior to placement of the overlying improvements.

Drilled Pier Foundations

The siltstone/sandstone and interbedded sandstone/siltstone/claystone bedrock tested at this site generally showed low swell potential at current moisture and density conditions. However, isolated areas of claystone bedrock with moderate or higher swell potential were encountered in test borings drilled for this and previous explorations, most notably to the south of the Cottonwood Extension Ditch and some areas slightly north of the ditch.

If/where moderately to highly expansive claystone bedrock is encountered near proposed foundation bearing elevation at the time of subsurface exploration, it is our opinion drilled pier foundations used in conjunction with structural flooring systems would offer the most reliable method for mitigating damage to the residences and residence floor slabs as a result of expansive bedrock uplift forces. We expect drilled pier and structural flooring systems would be required across approximately 10% to 20 % of the site. Drilled piers would develop support capacity through a combination of end bearing and skin friction along the drilled shaft extended into bedrock underlying the site. Uplift forces developed on the drilled piers by expansive soils would be resisted by anchoring the piers into deeper lying bedrock less likely to experience moisture induced volume change subsequent to construction. Minimum bedrock penetration lengths of 10 to 15 feet would be expected with minimum overall pier lengths on the order of approximately 26 to 32 feet. Based on the depth to groundwater observed in the completed site borings, we expect casing of the drilled pier excavations or placement of pier concrete with a tremmie would be required.

Basement Construction

We recommend perimeter drain systems be installed around all below-grade areas to help reduce the potential for development of hydrostatic pressures behind below-grade walls and surface water infiltration into the basement areas. Perimeter drain systems should consist of perforated drain pipe surrounded by a minimum of six (6) inches of free

draining gravel. A filter fabric should be considered around the free-draining gravel or perforated pipe to reduce the potential for an influx of fine-grained soils into the systems. The drain pipes should be placed at approximate foundation bearing level at the high point of the systems and run around the exterior perimeter of the below-grade areas to a sump pit and pump system, underdrain system or free outfall with a minimum slope of ⅛-inch per foot to facilitate efficient water removal. If free outfalls will be considered, measures to help reduce the potential for reverse flow and animal access into the systems should be considered.

Backfill placed adjacent to the below-grade walls should consist of LVC potential and relatively impervious soils which are free from organic matter, debris and other objectionable materials. The site lean clay, silty/clayey sand and thoroughly-processed siltstone/sandstone and interbedded sandstone/siltstone/claystone bedrock could be used as fill in these areas. Because of the high plasticity and swell potential of the claystone bedrock encountered on limited areas of the site, we do not recommend this material for use as foundation wall backfill. The backfill soils should be placed in loose lifts not to exceed 9 inches thick, adjusted to be within ±2% of standard Proctor optimum moisture content and compacted to at least 95% of the materials standard Proctor maximum dry density.

Excessive lateral stress can be imposed on below-grade walls when using heavier mechanical compaction equipment. We recommend compaction of unbalanced basement wall backfill be completed using light mechanical or hand compaction equipment.

Utility Installation

Bedding around utility pipelines should be placed in accordance with recommendations from the pipeline designer. Backfill soils placed above pipelines should consist of approved materials which are free from organic matter, debris and other objectionable materials. The on-site lean clay, silty/clayey sand and thoroughly-processed siltstone/ sandstone and interbedded sandstone/siltstone/claystone bedrock could be used as pipeline backfill. Because of the high plasticity and swell potential of the site claystone bedrock, we recommend these materials be placed as deep as possible in the utility trenches and not be used as utility trench backfill within three (3) feet of finish roadway

subgrade levels. Care will be needed to keep expansive claystone materials separated from more suitable lean clay/clayey, silty sand, siltstone/sandstone and interbedded sandstone/siltstone/claystone utility backfill. Bedrock should be processed to less than 3 inches in any dimension prior to use as utility backfill. LVC pipeline backfill should be placed in maximum 9-inch loose lifts, adjusted to within ±2% of standard Proctor optimum moisture content and compacted to at least 95% of the materials standard Proctor maximum dry density. Claystone bedrock should be adjusted to within -1% to +3% of standard Proctor optimum moisture content and compacted to within 94% to 98% of standard Proctor maximum dry density. Wet soils encountered with depth would need to be dried out prior to placement as utility backfill.

Care will be needed to ensure utilities are not placed on or above disturbed or sloughed materials. Utility excavations will likely expose the overburden lean clay and silty/ clayey sand. Care will also be needed to develop stable side slopes in pipeline trenches excavated through some of the less cohesive overburden soils and soft lean clay. As such, we expect temporary shoring, bracing, or cutting of shallow slopes may be necessary in deeper excavations and where groundwater is encountered. Excavations should be sloped or shored in the interest of safety following local and federal regulations, including current OSHA excavation and trench safety standards. As a safety measure, it is recommended that vehicles and soil stockpiles be kept to a minimum lateral distance from the crest of the slope equal to no less than the slope height.

Cuts below groundwater elevation will require dewatering to facilitate proper construction. We expect a majority of the dewatering procedures could be completed through open pumping procedures in sumps fed from ditches or sloped trench excavations. If deeper utility installation is required in areas of cleaner sands, well-point dewatering systems may be required.

Site Roadways

We expect the site pavement subgrades will consist of lean clay and silty/clayey sand with low swell potential. Pavement subgrades should be developed as outlined in the "Site Development" portion of this report. A final subgrade evaluation and pavement section design report should be completed once roadways are developed to approximate

finish grade. For preliminary design estimates, a pavement section consisting of 4 inches of asphaltic concrete overlying 6 inches of aggregate base course could be used for local residential roadways. A pavement section consisting of approximately 5 inches of asphaltic concrete overlying 8 inches of aggregate base course could be used for preliminary estimates for collector roadways. Arterial roadways would likely require a thicker pavement section.

The site lean clay and silty/clayey sand would be particularly susceptible to strength loss and instability when elevated in moisture content with a tendency to rut and pump when wetted. Depending on the time of year when construction occurs and other hydrologic conditions, stabilization of site pavement subgrades may become necessary to develop a suitable paving platform. If required, we recommend consideration be given to stabilization of the pavement subgrades with Class C fly ash. Fly ash stabilization can also eliminate some of the uncertainty associated with attempting to pave during periods of inclement weather. In addition, it may be possible to reduce the required thicknesses of asphaltic concrete and aggregate base course with the increase in subgrade strength developed through the stabilization procedures.

Drainage

Positive drainage is imperative for long-term performance of the proposed site structures and associated site improvements. We recommend positive drainage be developed away from all site structures and pavement areas to reduce the potential for wetting of the subgrade and bearing materials. Water which is allowed to pond adjacent to the site improvements can result in unacceptable performance of those improvements over time.

LIMITATIONS

This report was prepared based upon the data obtained from the completed site exploration, laboratory testing, engineering analysis and any other information discussed. The completed borings provide an indication of subsurface conditions at the boring locations only. Variations in subsurface conditions can occur in relatively short distances away from the borings. This report does not reflect any variations which may occur across the site or away from the borings. If variations in the subsurface conditions

anticipated become evident, the geotechnical engineer should be notified immediately so that further evaluation and supplemental recommendations can be provided.

The scope of services for this project does not include either specifically or by implication any biological or environmental assessment of the site or identification or prevention of pollutants or hazardous materials or conditions. Other studies should be completed if concerns over the potential of such contamination or pollution exist.

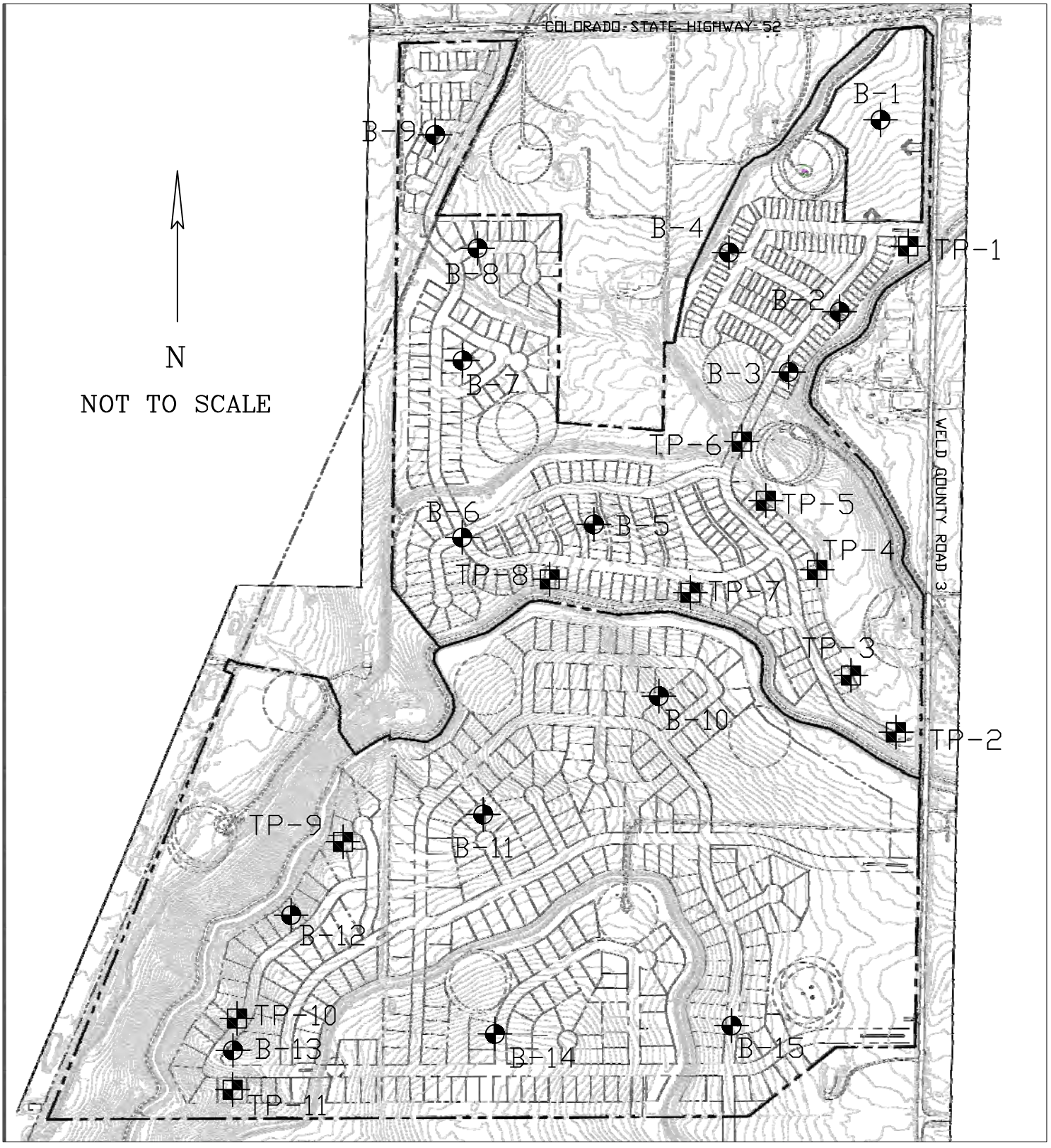
The geotechnical engineer should be retained to review the plans and specifications so that comments can be made regarding the interpretation and implementation of our geotechnical recommendations in the design and specifications. The geotechnical engineer should also be retained to provide testing and observation services during construction to help determine that the design requirements are fulfilled.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with the generally accepted standard of care for the profession. No warranties express or implied, are made. The conclusions and recommendations contained in this report should not be considered valid in the event that any changes in the nature, design or location of the project as outlined in this report are planned, unless those changes are reviewed and the conclusions of this report modified and verified in writing by the geotechnical engineer.

SEPTEMBER 2013
PROJECT #13-1109

TEST BORING AND TEST PIT LOCATION DIAGRAM

SOILOGIC



ANDALUSIA PROPERTY PRELIMINARY EXPLORATION

SOUTHWEST OF CO HIGHWAY 52 AND WCR 3, ERIE, COLORADO

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

LOG OF BORING B-1

Sheet	1/1	Drilling Rig:	CME 45	Water Depth Information	
Start Date	9/3/2013	Auger Type:	4" CFA	During Drilling	NE
Finish Date	9/3/2013	Hammer Type:	Manual	After Drilling	NE
Surface Elev.	-	Field Personnel:	BMc	24 Hours After Drilling	NE

USCS	SOIL DESCRIPTION	Depth (ft)	Sampler	"N"	MC (%)	DD (pcf)	Estimated q_u (psf)	% Swell @ 500 psf	Swell Pressure (psf)	Atterberg Limits		% Passing # 200 Sieve (%)
										LL	PI	
	0 - 4" VEGETATION & TOPSOIL	-										
		1										
		-										
		2										
		-										
		3										
		-										
		4										
		-										
		5	**CS**	**8**	**4.9**	**96.1**	**N/A**	**None**	**<500**	**-**	**-**	**-**
		-										
		6										
		-										
CL w/ SC-SM	SANDY LEAN CLAY with SILTY to CLAYEY SAND lenses brown, rust, beige medium stiff to stiff / loose	7										
		-										
		8										
		-										
		9										
		-										
		10	**CS**	**9**	**8.1**	**101.7**	**6000**	**None**	**<500**	**-**	**-**	**-**
		-										
		11										
		-										
		12										
		-										
		13										
		-										
		14										
		-										
		15	**CS**	**11**	**9.6**	**112.9**	**7500**	**-**	**-**	**-**	**-**	**-**
	BOTTOM OF BORING @ 15.0'	-										
		16										
		-										
		17										
		-										
		18										
		-										
		19										
		-										
		20										
		-										
		21										
		-										
		22										
		-										
		23										
		-										
		24										
		-										
		25										

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

LOG OF BORING B-2

Sheet	1/1	Drilling Rig:	CME 45	Water Depth Information	
Start Date	9/3/2013	Auger Type:	4" CFA	During Drilling	4.0'
Finish Date	9/3/2013	Hammer Type:	Manual	After Drilling	4.0'
Surface Elev.	-	Field Personnel:	BMc	24 Hours After Drilling	4.0'

USCS	SOIL DESCRIPTION	Depth (ft)	Sampler	"N"	MC (%)	DD (pcf)	Estimated q_u (psf)	% Swell @ 500 psf	Swell Pressure (psf)	Atterberg Limits		% Passing # 200 Sieve (%)
										LL	PI	
	0 - 4" VEGETATION & TOPSOIL	-										
		1										
		-										
		2										
		-										
		3										
		-										
		4										
		-										
		5	**CS**	**2**	**22.9**	**102.9**	**<500**	**None**	**<500**	**-**	**-**	**-**
		-										
		6										
CL	SANDY LEAN CLAY	-										
w/	with SILTY to CLAYEY SAND lenses	7										
SC-SM	dark brown, brown, rust, beige	-										
	very soft to stiff /	8										
	very loose to loose	-										
		9										
		-										
		10	**CS**	**13**	**19.6**	**105.3**	**7000**	**None**	**<500**	**-**	**-**	**-**
		-										
		11										
		-										
		12										
		-										
		13										
		-										
		14										
	SILTSTONE/SANDSTONE	-										
	gray, beige, rust, very hard	**15**	**CS**	**50/3"**	**NR**	**NR**	**NR**	**-**	**-**	**-**	**-**	**-**
	BOTTOM OF BORING @ 15.0'	-										
		16										
		-										
		17										
		-										
		18										
		-										
		19										
		-										
		20										
		-										
		21										
		-										
		22										
		-										
		23										
		-										
		24										
		-										
		25										

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

LOG OF BORING B-3

Sheet	1/1	Drilling Rig:	CME 45	Water Depth Information	
Start Date	9/3/2013	Auger Type:	4" CFA	During Drilling	4.0'
Finish Date	9/3/2013	Hammer Type:	Manual	After Drilling	4.0'
Surface Elev.	-	Field Personnel:	BMc	24 Hours After Drilling	Wci @ 4.0'

USCS	SOIL DESCRIPTION	Depth (ft)	Sampler	"N"	MC (%)	DD (pcf)	Estimated q_u (psf)	% Swell @ 500 psf	Swell Pressure (psf)	Atterberg Limits LL	Atterberg Limits PI	% Passing # 200 Sieve (%)
	0 - 4" VEGETATION & TOPSOIL	-										
		1 - 2 - 3 - 4 -										
		5	**CS**	**5**	**21.4**	**104.5**	**1000**	**None**	**<500**	**-**	**-**	**-**
SC-SM w/ CL	SILTY to CLAYEY SAND with SANDY LEAN CLAY lenses dark brown, brown, rust, beige very loose / very soft to soft	6 - 7 - 8 - 9 -										
		10	**CS**	**2**	**25.5**	**101.1**	**<500**	**None**	**<500**	**-**	**-**	**-**
		11 - 12 - 13 - 14 -										
	SILTSTONE/SANDSTONE gray, beige, rust, medium hard	**15**	**CS**	**50/10"**	**18.6**	**102.1**	**9000+**	**-**	**-**	**-**	**-**	**-**
	BOTTOM OF BORING @ 15.0'	16 - 17 - 18 - 19 - **20** - 21 - 22 - 23 - 24 - **25**										

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

LOG OF BORING B-4

Sheet	1/1	Drilling Rig:	CME 45	Water Depth Information	
Start Date	9/3/2013	Auger Type:	4" CFA	During Drilling	NE
Finish Date	9/3/2013	Hammer Type:	Manual	After Drilling	NE
Surface Elev.	-	Field Personnel:	BMc	24 Hours After Drilling	Dci @ 7.5'

USCS	SOIL DESCRIPTION	Depth (ft)	Sampler	"N"	MC (%)	DD (pcf)	Estimated q_u (psf)	% Swell @ 500 psf	Swell Pressure (psf)	Atterberg Limits LL	Atterberg Limits PI	% Passing # 200 Sieve (%)
	0 - 4" VEGETATION & TOPSOIL	-										
		1 - 2 - 3 - 4 -										
		5	**CS**	**12**	**7.4**	**107.8**	**9000+**	**None**	**<500**	**22**	**9**	**59.2%**
CL w/ SC-SM	SANDY LEAN CLAY with SILTY to CLAYEY SAND lenses brown, rust, beige stiff / loose	- 6 - 7 - 8 - 9 -										
		10	**CS**	**14**	**8.8**	**105.3**	**9000+**	**0.8%**	**1200**	**-**	**-**	**-**
		- 11 - 12 - 13 - 14 -										
		15	**CS**	**12**	**7.3**	**111.1**	**9000+**	**-**	**-**	**-**	**-**	**-**
	BOTTOM OF BORING @ 15.0'	- 16 - 17 - 18 - 19 - **20** - 21 - 22 - 23 - 24 - **25**										

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

LOG OF BORING B-5

Sheet	1/1	Drilling Rig:	CME 45	Water Depth Information	
Start Date	9/3/2013	Auger Type:	4" CFA	During Drilling	NE
Finish Date	9/3/2013	Hammer Type:	Manual	After Drilling	NE
Surface Elev.	-	Field Personnel:	BMc	24 Hours After Drilling	10.0'

USCS	SOIL DESCRIPTION	Depth (ft)	Sampler	"N"	MC (%)	DD (pcf)	Estimated q_u (psf)	% Swell @ 500 psf	Swell Pressure (psf)	Atterberg Limits LL	Atterberg Limits PI	% Passing # 200 Sieve (%)
	0 - 4" VEGETATION & TOPSOIL	-										
		1										
		-										
		2										
		-										
		3										
		-										
		4										
SC-SM	SILTY to CLAYEY SAND	-										
w/	with SANDY LEAN CLAY lenses	**5**	**CS**	**10**	**10.1**	**108.4**	**9000+**	**None**	**<500**	**-**	**-**	**48.9%**
CL	dark brown, brown, rust, beige	-										
	loose / medium stiff to stiff	6										
		-										
		7										
		-										
		8										
		-										
		9										
		-										
		10	**CS**	**12**	**17.8**	**108.6**	**9000+**	**0.3%**	**1000**	**-**	**-**	**-**
		-										
		11										
		-										
	SANDSTONE/SILTSTONE/CLAYSTONE	12										
	olive-gray, brown, rust	-										
	slightly weathered to very hard	13										
		-										
		14										
		-										
		15	**CS**	**50/3"**	**14.0**	**114.1**	**9000+**	**-**	**-**	**-**	**-**	**-**
	BOTTOM OF BORING @ 15.0'	-										
		16										
		-										
		17										
		-										
		18										
		-										
		19										
		-										
		20										
		-										
		21										
		-										
		22										
		-										
		23										
		-										
		24										
		-										
		25										

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

LOG OF BORING B-6

Sheet	1/1	Drilling Rig:	CME 45	Water Depth Information	
Start Date	9/3/2013	Auger Type:	4" CFA	During Drilling	NE
Finish Date	9/3/2013	Hammer Type:	Manual	After Drilling	NE
Surface Elev.	-	Field Personnel:	BMc	24 Hours After Drilling	Dci @ 13.0'

USCS	SOIL DESCRIPTION	Depth (ft)	Sampler	"N"	MC (%)	DD (pcf)	Estimated q_u (psf)	% Swell @ 500 psf	Swell Pressure (psf)	Atterberg Limits LL	Atterberg Limits PI	% Passing # 200 Sieve (%)
	0 - 4" VEGETATION & TOPSOIL	- 1 - 2 - 3 - 4 -										
		5	**CS**	**14**	**6.0**	**108.4**	**9000+**	**0.5%**	**1000**	**-**	**-**	**-**
CL w/ SC-SM	SANDY LEAN CLAY with SILTY to CLAYEY SAND lenses brown, rust, beige medium stiff to stiff / loose	- 6 - 7 - 8 - 9 -										
		10	**CS**	**9**	**11.6**	**101.8**	**9000+**	**None**	**<500**	**-**	**-**	**-**
		- 11 - 12 - 13 - 14 -										
		15	**CS**	**10**	**12.5**	**116.0**	**8000**	**-**	**-**	**-**	**-**	**-**
	BOTTOM OF BORING @ 15.0'	- 16 - 17 - 18 - 19 - **20** - 21 - 22 - 23 - 24 - **25**										

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

LOG OF BORING B-7

Sheet	1/1	Drilling Rig:	CME 45	Water Depth Information	
Start Date	9/3/2013	Auger Type:	4" CFA	During Drilling	11.5'
Finish Date	9/3/2013	Hammer Type:	Manual	After Drilling	11.5'
Surface Elev.	-	Field Personnel:	BMc	24 Hours After Drilling	10.5'

USCS	SOIL DESCRIPTION	Depth (ft)	Sampler	"N"	MC (%)	DD (pcf)	Estimated q_u (psf)	% Swell @ 500 psf	Swell Pressure (psf)	Atterberg Limits LL	Atterberg Limits PI	% Passing # 200 Sieve (%)
	0 - 4" VEGETATION & TOPSOIL	- 1 - 2 - 3 - 4 -										
		5	**CS**	**18**	**11.3**	**119.1**	**9000+**	**0.4%**	**800**	**-**	**-**	**-**
CL w/ SC-SM	SANDY LEAN CLAY with SILTY to CLAYEY SAND lenses brown, rust, beige soft to stiff / loose to medium dense	- 6 - 7 - 8 - 9 -										
		10	**CS**	**3**	**21.1**	**105.9**	**1000**	**None**	**<500**	**-**	**-**	**-**
		- 11 - 12 - 13 - 14 -										
		15	**CS**	**17**	**20.0**	**105.0**	**4500**	**-**	**-**	**-**	**-**	**-**
	BOTTOM OF BORING @ 15.0'	- 16 - 17 - 18 - 19 - **20** - 21 - 22 - 23 - 24 - **25**										

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

LOG OF BORING B-8

Sheet	1/1	Drilling Rig:	CME 45	Water Depth Information	
Start Date	9/3/2013	Auger Type:	4" CFA	During Drilling	NE
Finish Date	9/3/2013	Hammer Type:	Manual	After Drilling	NE
Surface Elev.	-	Field Personnel:	BMc	24 Hours After Drilling	13.5'

USCS	SOIL DESCRIPTION	Depth (ft)	Sampler	"N"	MC (%)	DD (pcf)	Estimated q_u (psf)	% Swell @ 500 psf	Swell Pressure (psf)	Atterberg Limits LL	Atterberg Limits PI	% Passing # 200 Sieve (%)
	0 - 4" VEGETATION & TOPSOIL	-										
SC-SM w/ CL	SILTY to CLAYEY SAND with SANDY LEAN CLAY lenses brown, rust, beige loose / medium stiff	1 - 2 - 3 - 4 -										
		5	**CS**	**10**	**8.4**	**106.7**	**N/A**	**-**	**-**	**-**	**-**	**-**
		- 6 - 7 - 8 - 9 -										
		10	**CS**	**15**	**15.0**	**114.9**	**9000+**	**None**	**<500**	**-**	**-**	**-**
CL w/ SC-SM	SANDY LEAN CLAY with SILTY to CLAYEY SAND lenses brown, rust, beige stiff to very stiff / medium dense	- 11 - 12 - 13 - 14 -										
		15	**CS**	**20**	**22.4**	**106.3**	**6000**	**-**	**-**	**-**	**-**	**-**
	BOTTOM OF BORING @ 15.0'	- 16 - 17 - 18 - 19 - **20** - 21 - 22 - 23 - 24 - **25**										

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

LOG OF BORING B-9

Sheet	1/1	Drilling Rig:	CME 45	Water Depth Information	
Start Date	9/3/2013	Auger Type:	4" CFA	During Drilling	6.0'
Finish Date	9/3/2013	Hammer Type:	Manual	After Drilling	6.0'
Surface Elev.	-	Field Personnel:	BMc	24 Hours After Drilling	6.0'

USCS	SOIL DESCRIPTION	Depth (ft)	Sampler	"N"	MC (%)	DD (pcf)	Estimated q_u (psf)	% Swell @ 500 psf	Swell Pressure (psf)	Atterberg Limits LL	Atterberg Limits PI	% Passing # 200 Sieve (%)
	0 - 4" VEGETATION & TOPSOIL	-										
		1										
		-										
		2										
		-										
		3										
		-										
		4										
		-										
		5	**CS**	**4**	**23.6**	**101.0**	**<500**	**None**	**<500**	**-**	**-**	**-**
		-										
		6										
CL	SANDY LEAN CLAY	-										
w/	with SILTY to CLAYEY SAND lenses	7										
SC-SM	dark brown, brown, rust, beige	-										
	soft to stiff /	8										
	loose to medium dense	-										
		9										
		-										
		10	**CS**	**15**	**17.9**	**110.5**	**5000**	**-**	**-**	**-**	**-**	**-**
		-										
		11										
		-										
		12										
		-										
		13										
		-										
		14										
		-										
SP-SM	SAND with SILT and GRAVEL, medium dense	**15**	**CS**	**27**	**14.3**	**105.8**	**N/A**	**-**	**-**	**-**	**-**	**-**
	BOTTOM OF BORING @ 15.0'	-										
		16										
		-										
		17										
		-										
		18										
		-										
		19										
		-										
		20										
		-										
		21										
		-										
		22										
		-										
		23										
		-										
		24										
		-										
		25										

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

LOG OF BORING B-10

Sheet	1/1	Drilling Rig:	CME 45	Water Depth Information	
Start Date	9/3/2013	Auger Type:	4" CFA	During Drilling	NE
Finish Date	9/3/2013	Hammer Type:	Manual	After Drilling	NE
Surface Elev.	-	Field Personnel:	BMc	24 Hours After Drilling	NE

USCS	SOIL DESCRIPTION	Depth (ft)	Sampler	"N"	MC (%)	DD (pcf)	Estimated q_u (psf)	% Swell @ 500 psf	Swell Pressure (psf)	Atterberg Limits		% Passing # 200 Sieve (%)
										LL	PI	
	0 - 4" VEGETATION & TOPSOIL	-										
		1										
		-										
		2										
		-										
		3										
		-										
		4										
		-										
		5	**CS**	**6**	**7.1**	**106.1**	**9000+**	**None**	**<500**	**-**	**-**	**-**
		-										
		6										
CL	SANDY LEAN CLAY	-										
w/	with SILTY to CLAYEY SAND lenses	7										
SC-SM	dark brown, brown, rust, beige	-										
	medium stiff / loose	8										
		-										
		9										
		-										
		10	**CS**	**6**	**11.5**	**109.8**	**3000**	**None**	**<500**	**-**	**-**	**-**
		-										
		11										
		-										
		12										
		-										
		13										
		-										
		14										
		-										
		15	**CS**	**10**	**14.5**	**111.9**	**6000**	**-**	**-**	**-**	**-**	**-**
	BOTTOM OF BORING @ 15.0'	-										
		16										
		-										
		17										
		-										
		18										
		-										
		19										
		-										
		20										
		-										
		21										
		-										
		22										
		-										
		23										
		-										
		24										
		-										
		25										

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

LOG OF BORING B-11

Sheet	1/1	Drilling Rig:	CME 45	Water Depth Information	
Start Date	9/3/2013	Auger Type:	4" CFA	During Drilling	13.0'
Finish Date	9/3/2013	Hammer Type:	Manual	After Drilling	13.0'
Surface Elev.	-	Field Personnel:	BMc	24 Hours After Drilling	Wci @ 13.0'

USCS	SOIL DESCRIPTION	Depth (ft)	Sampler	"N"	MC (%)	DD (pcf)	Estimated q_u (psf)	% Swell @ 500 psf	Swell Pressure (psf)	Atterberg Limits LL	Atterberg Limits PI	% Passing # 200 Sieve (%)
	0 - 4" VEGETATION & TOPSOIL	-										
		1 - 2 - 3 - 4										
		- 5	CS	5	9.6	107.7	8000	None	<500	-	-	-
SC-SM w/ CL	SILTY to CLAYEY SAND with SANDY LEAN CLAY lenses brown, rust, beige loose / soft to medium stiff	- 6 - 7 - 8 - 9										
		- 10	CS	6	24.4	96.2	2000	-	-	-	-	-
		- 11 - 12 - 13 - 14										
	CLAYSTONE gray, rust/orange, brown slightly weathered to firm	- 15	CS	31	20.7	108.0	9000+	-	-	-	-	-
	BOTTOM OF BORING @ 15.0'	- 16 - 17 - 18 - 19 - 20 - 21 - 22 - 23 - 24 - 25										

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

LOG OF BORING B-12

Sheet	1/1	Drilling Rig:	CME 45	Water Depth Information	
Start Date	9/3/2013	Auger Type:	4" CFA	During Drilling	NE
Finish Date	9/3/2013	Hammer Type:	Manual	After Drilling	NE
Surface Elev.	-	Field Personnel:	BMc	24 Hours After Drilling	NE

USCS	SOIL DESCRIPTION	Depth (ft)	Sampler	"N"	MC (%)	DD (pcf)	Estimated q_u (psf)	% Swell @ 500 psf	Swell Pressure (psf)	Atterberg Limits LL	Atterberg Limits PI	% Passing # 200 Sieve (%)
	0 - 4" VEGETATION & TOPSOIL	-										
		1										
		-										
		2										
		-										
		3										
		-										
		4										
		-										
		5	**CS**	**14**	**4.1**	**111.3**	**9000+**	**0.1%**	**700**	**-**	**-**	**-**
		-										
CL	SANDY LEAN CLAY	6										
w/	with SILTY to CLAYEY SAND lenses	-										
SC-SM	dark brown, brown, rust, beige	7										
	medium stiff to stiff / loose	-										
		8										
		-										
		9										
		-										
		10	**CS**	**7**	**9.7**	**107.8**	**9000+**	**None**	**<500**	**-**	**-**	**-**
		-										
		11										
		-										
		12										
		-										
		13										
	SILTSTONE/SANDSTONE	-										
	gray, olive-brown, rust	14										
	slightly weathered to very hard	-										
		15	**CS**	**50/1"**	**16.2**	**-**	**9000+**	**-**	**-**	**-**	**-**	**-**
	BOTTOM OF BORING @ 15.0'	-										
		16										
		-										
		17										
		-										
		18										
		-										
		19										
		-										
		20										
		-										
		21										
		-										
		22										
		-										
		23										
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ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

LOG OF BORING B-13

Sheet	1/1	Drilling Rig:	CME 45	Water Depth Information	
Start Date	9/3/2013	Auger Type:	4" CFA	During Drilling	NE
Finish Date	9/3/2013	Hammer Type:	Manual	After Drilling	NE
Surface Elev.	-	Field Personnel:	BMc	24 Hours After Drilling	Dci @ 12.5'

USCS	SOIL DESCRIPTION	Depth (ft)	Sampler	"N"	MC (%)	DD (pcf)	Estimated q_u (psf)	% Swell @ 500 psf	Swell Pressure (psf)	Atterberg Limits LL	Atterberg Limits PI	% Passing # 200 Sieve (%)
	0 - 4" VEGETATION & TOPSOIL	-										
		1 - 2 - 3 - 4 -										
		5	**CS**	**21**	**4.0**	**106.6**	**9000+**	**0.7%**	**1100**	**-**	**-**	**-**
CL w/ SC-SM	SANDY LEAN CLAY with SILTY to CLAYEY SAND lenses dark brown, brown, rust, beige medium stiff to very stiff / loose to medium dense	- 6 - 7 - 8 - 9 -										
		10	**CS**	**8**	**10.6**	**105.1**	**9000+**	**None**	**<500**	**-**	**-**	**-**
		- 11 - 12 - 13 - 14 -										
	SILTSTONE/SANDSTONE gray, olive-brown, rust slightly weathered to very hard	**15**	**CS**	**50/1"**	**8.8**	**-**	**9000+**	**-**	**-**	**-**	**-**	**-**
	BOTTOM OF BORING @ 15.0'	- 16 - 17 - 18 - 19 - **20** - 21 - 22 - 23 - 24 - **25**										

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

LOG OF BORING B-14

Sheet	1/1	Drilling Rig:	CME 45	Water Depth Information	
Start Date	9/3/2013	Auger Type:	4" CFA	During Drilling	NE
Finish Date	9/3/2013	Hammer Type:	Manual	After Drilling	NE
Surface Elev.	-	Field Personnel:	BMc	24 Hours After Drilling	Dci @ 12.0'

USCS	SOIL DESCRIPTION	Depth (ft)	Sampler	"N"	MC (%)	DD (pcf)	Estimated q_u (psf)	% Swell @ 500 psf	Swell Pressure (psf)	Atterberg Limits LL	Atterberg Limits PI	% Passing # 200 Sieve (%)
	0 - 4" VEGETATION & TOPSOIL	-										
CL w/ SC-SM	SANDY LEAN CLAY with SILTY to CLAYEY SAND lenses dark brown, brown, rust, beige medium stiff to very stiff / loose to medium dense	1 - 2 - 3 - 4 - **5**	**CS**	**13**	**4.6**	**99.2**	**9000+**	**-**	**-**	**-**	**-**	**-**
		- 6 - 7 - 8 - 9 - **10**	**CS**	**50/9"**	**11.3**	**109.1**	**9000+**	**11.2%**	**11000**	**-**	**-**	**-**
	CLAYSTONE gray, rust/orange, brown, yellow slightly weathered to hard slightly LIGNITIC in places	- 11 - 12 - 13 - 14 - **15**	**CS**	**11**	**15.4**	**107.9**	**9000+**	**-**	**-**	**-**	**-**	**-**
	BOTTOM OF BORING @ 15.0'	- 16 - 17 - 18 - 19 - **20** - 21 - 22 - 23 - 24 - **25**										

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

LOG OF BORING B-15

Sheet	1/1	Drilling Rig:	CME 45	Water Depth Information	
Start Date	9/3/2013	Auger Type:	4" CFA	During Drilling	13.5'
Finish Date	9/3/2013	Hammer Type:	Manual	After Drilling	13.5'
Surface Elev.	-	Field Personnel:	BMc	24 Hours After Drilling	13.0'

USCS	SOIL DESCRIPTION	Depth (ft)	Sampler	"N"	MC (%)	DD (pcf)	Estimated q_u (psf)	% Swell @ 500 psf	Swell Pressure (psf)	Atterberg Limits LL	Atterberg Limits PI	% Passing # 200 Sieve (%)
	0 - 4" VEGETATION & TOPSOIL	- 1 - 2 - 3 - 4 -										
		5	**CS**	**10**	**9.7**	**106.6**	**9000+**	**None**	**<500**	**-**	**-**	**-**
CL w/ SC-SM	SANDY LEAN CLAY with SILTY to CLAYEY SAND lenses dark brown, brown, rust, beige medium stiff to stiff / loose	- 6 - 7 - 8 - 9 -										
		10	**CS**	**9**	**7.2**	**101.5**	**6500**	**None**	**<500**	**-**	**-**	**-**
		- 11 - 12 - 13 - 14 -										
		15	**CS**	**11**	**20.2**	**90.1**	**1500**	**-**	**-**	**-**	**-**	**-**
	BOTTOM OF BORING @ 15.0'	- 16 - 17 - 18 - 19 - **20** - 21 - 22 - 23 - 24 - **25**										

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

LOG OF TEST PIT TP-1

Sheet	1/1	Drilling Rig:	Backhoe	Water Depth Information	
Start Date	9/10/2013	Auger Type:	-	During Excavation	-
Finish Date	9/10/2013	Hammer Type:	DCP	After Excavation	3.5'
Surface Elev.	-	Field Personnel:	BMc	24 Hours After Ex.	Backfilled

USCS	SOIL DESCRIPTION	Depth (ft)	Sampler	"N"	MC (%)	DD (pcf)	Estimated q_u (psf)	% Swell @ 500 psf	Swell Pressure (psf)	Atterberg Limits		% Passing # 200 Sieve (%)
										LL	PI	
	0 - 4" VEGETATION & TOPSOIL	-										
		1										
		-										
CL	SANDY LEAN CLAY	2										
w/	with SILTY to CLAYEY SAND lenses	-										
SC-SM	brown, rust, beige	3	HS	13	15.4	120.5	4000	-	-	-	-	-
	very soft to stiff /	-										
	very loose to medium dense	4										
		-										
		5	HS	2	24.4	101.2	<500	None	<500	-	-	-
	BOTTOM OF TEST PIT @ 5.0'	-										
		6										
		-										
		7										
		-										
		8										
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ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

LOG OF TEST PIT TP-2

Sheet	1/1	Drilling Rig:	Backhoe	Water Depth Information	
Start Date	9/10/2013	Auger Type:	-	During Excavation	-
Finish Date	9/10/2013	Hammer Type:	DCP	After Excavation	2.0'
Surface Elev.	-	Field Personnel:	BMc	24 Hours After Ex.	Backfilled

USCS	SOIL DESCRIPTION	Depth (ft)	Sampler	"N"	MC (%)	DD (pcf)	Estimated q_u (psf)	% Swell @ 500 psf	Swell Pressure (psf)	Atterberg Limits		% Passing # 200 Sieve (%)
										LL	PI	
	0 - 4" VEGETATION & TOPSOIL	-										
		1										
		-										
SC-SM	SILTY to CLAYEY SAND	2										
w/	with SANDY LEAN CLAY lenses	-										
CL	dark brown, gray/black, rust	3	HS	2	17.5	108.8	6000	-	-	-	-	-
	very loose / very soft	-										
		4										
		-										
		5	HS	2	22.2	103.3	<500	None	<500	-	-	-
	BOTTOM OF TEST PIT @ 5.0'	-										
		6										
		-										
		7										
		-										
		8										
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ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

LOG OF TEST PIT TP-3

Sheet	1/1	Drilling Rig:	Backhoe	Water Depth Information	
Start Date	9/10/2013	Auger Type:	-	During Excavation	-
Finish Date	9/10/2013	Hammer Type:	DCP	After Excavation	2.0'
Surface Elev.	-	Field Personnel:	BMc	24 Hours After Ex.	Backfilled

USCS	SOIL DESCRIPTION	Depth (ft)	Sampler	"N"	MC (%)	DD (pcf)	Estimated q_u (psf)	% Swell @ 500 psf	Swell Pressure (psf)	Atterberg Limits		% Passing # 200 Sieve (%)
										LL	PI	
	0 - 4" VEGETATION & TOPSOIL	-										
SC-SM w/ CL	SILTY to CLAYEY SAND with SANDY LEAN CLAY lenses dark brown, gray/black, rust very loose to loose / very soft to soft	1 - 2 -										
		3	HS	4	22.8	100.5	1000	-	-	-	-	-
		- 4 -										
		5	HS	2	25.9	95.4	<500	None	<500	-	-	-
	BOTTOM OF TEST PIT @ 5.0'	- 6 - 7 - 8 - 9 - 10 - 11 - 12 - 13 - 14 - 15 - 16 - 17 - 18 - 19 - 20 - 21 - 22 - 23 - 24 - 25										

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

LOG OF TEST PIT TP-4

Sheet	1/1	Drilling Rig:	Backhoe	Water Depth Information	
Start Date	9/10/2013	Auger Type:	-	During Excavation	-
Finish Date	9/10/2013	Hammer Type:	DCP	After Excavation	2.0'
Surface Elev.	-	Field Personnel:	BMc	24 Hours After Ex.	Backfilled

USCS	SOIL DESCRIPTION	Depth (ft)	Sampler	"N"	MC (%)	DD (pcf)	Estimated q_u (psf)	% Swell @ 500 psf	Swell Pressure (psf)	Atterberg Limits LL	Atterberg Limits PI	% Passing # 200 Sieve (%)
	0 - 4" VEGETATION & TOPSOIL	-										
		1										
		-										
SC-SM	SILTY to CLAYEY SAND	2										
w/	with SANDY LEAN CLAY lenses	-										
CL	dark brown, gray/black, rust	3	HS	2	21.2	110.2	1000	-	-	-	-	-
	very loose / very soft	-										
		4										
		-										
		5	HS	2	19.4	110.8	<500	None	<500	-	-	-
	BOTTOM OF TEST PIT @ 5.0'	-										
		6										
		-										
		7										
		-										
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ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

LOG OF TEST PIT TP-5

Sheet	1/1	Drilling Rig:	Backhoe	Water Depth Information	
Start Date	9/10/2013	Auger Type:	-	During Excavation	-
Finish Date	9/10/2013	Hammer Type:	DCP	After Excavation	3.5'
Surface Elev.	-	Field Personnel:	BMc	24 Hours After Ex.	Backfilled

USCS	SOIL DESCRIPTION	Depth (ft)	Sampler	"N"	MC (%)	DD (pcf)	Estimated q_u (psf)	% Swell @ 500 psf	Swell Pressure (psf)	Atterberg Limits		% Passing # 200 Sieve (%)
										LL	PI	
	0 - 4" VEGETATION & TOPSOIL	-										
		1										
		-										
SC-SM	SILTY to CLAYEY SAND	2										
w/	with SANDY LEAN CLAY lenses	-										
CL	dark brown, gray/black, rust	3	HS	7	19.5	108.8	4500	None	<500	-	-	-
	very loose to loose /	-										
	very soft to medium stiff	4										
		-										
		5	HS	2	22.4	100.3	2000	-	-	-	-	-
	BOTTOM OF TEST PIT @ 5.0'	-										
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		7										
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ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

LOG OF TEST PIT TP-6

Sheet	1/1	Drilling Rig:	Backhoe	Water Depth Information	
Start Date	9/10/2013	Auger Type:	-	During Excavation	-
Finish Date	9/10/2013	Hammer Type:	DCP	After Excavation	8.0'
Surface Elev.	-	Field Personnel:	BMc	24 Hours After Ex.	Backfilled

USCS	SOIL DESCRIPTION	Depth (ft)	Sampler	"N"	MC (%)	DD (pcf)	Estimated q_u (psf)	% Swell @ 500 psf	Swell Pressure (psf)	Atterberg Limits		% Passing # 200 Sieve (%)
										LL	PI	
	0 - 4" VEGETATION & TOPSOIL	-										
		1										
		-										
		2										
		-										
		3										
		-										
		4										
CL	SANDY LEAN CLAY	-										
w/	with SILTY to CLAYEY SAND lenses	**5**	**HS**	**10**	**15.2**	**107.1**	**4500**	**None**	**<500**	**-**	**-**	**-**
SC-SM	brown, rust, beige	-										
	very soft to stiff /	6										
	very loose to medium dense	-										
		7										
		-										
		8										
		-										
		9										
		-										
		10	**HS**	**2**	**21.9**	**109.3**	**<500**	**None**	**<500**	**-**	**-**	**-**
	BOTTOM OF TEST PIT @ 10.0'	-										
		11										
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ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

LOG OF TEST PIT TP-7

Sheet	1/1	Drilling Rig:	Backhoe	Water Depth Information	
Start Date	9/10/2013	Auger Type:	-	During Excavation	-
Finish Date	9/10/2013	Hammer Type:	DCP	After Excavation	6.0'
Surface Elev.	-	Field Personnel:	BMc	24 Hours After Ex.	Backfilled

USCS	SOIL DESCRIPTION	Depth (ft)	Sampler	"N"	MC (%)	DD (pcf)	Estimated q_u (psf)	% Swell @ 500 psf	Swell Pressure (psf)	Atterberg Limits		% Passing # 200 Sieve (%)
										LL	PI	
	0 - 4" VEGETATION & TOPSOIL	-										
		1										
		-										
		2										
		-										
		3										
		-										
		4										
SC-SM	SILTY to CLAYEY SAND	-										
w/	with SANDY LEAN CLAY lenses	**5**	**HS**	**5**	**21.1**	**104.1**	**<500**	**None**	**<500**	**-**	**-**	**-**
CL	brown, gray, rust	-										
	very loose to loose / very soft to soft	6										
		-										
		7										
		-										
		8										
		-										
		9										
		-										
		10	**HS**	**2**	**22.3**	**92.8**	**1500**	**-**	**-**	**-**	**-**	**-**
	BOTTOM OF TEST PIT @ 10.0'	-										
		11										
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ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

LOG OF TEST PIT TP-8

Sheet	1/1	Drilling Rig:	Backhoe	Water Depth Information	
Start Date	9/10/2013	Auger Type:	-	During Excavation	-
Finish Date	9/10/2013	Hammer Type:	DCP	After Excavation	8.0'
Surface Elev.	-	Field Personnel:	BMc	24 Hours After Ex.	Backfilled

USCS	SOIL DESCRIPTION	Depth (ft)	Sampler	"N"	MC (%)	DD (pcf)	Estimated q_u (psf)	% Swell @ 500 psf	Swell Pressure (psf)	Atterberg Limits LL	Atterberg Limits PI	% Passing # 200 Sieve (%)
	0 - 4" VEGETATION & TOPSOIL	-										
CL w/ SC-SM	SANDY LEAN CLAY with SILTY to CLAYEY SAND lenses brown, rust, beige stiff / loose to medium dense	1 - 2 - 3 - 4 -										
		5	**HS**	**9**	**22.9**	**96.8**	**1500**	**-**	**-**	**-**	**-**	**-**
		- 6 - 7 - 8 - 9 -										
	SILTSTONE/SANDSTONE with CLAYSTONE, gray, medium hard	-										
		10	**HS**	**50/10"**	**22.6**	**100.6**	**9000+**	**None**	**<500**	**-**	**-**	**-**
	BOTTOM OF TEST PIT @ 10.0'	- 11 - 12 - 13 - 14 - **15** - 16 - 17 - 18 - 19 - **20** - 21 - 22 - 23 - 24 - **25**										

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

LOG OF TEST PIT TP-9

Sheet	1/1	Drilling Rig:	Backhoe	Water Depth Information	
Start Date	9/10/2013	Auger Type:	-	During Excavation	-
Finish Date	9/10/2013	Hammer Type:	DCP	After Excavation	NE
Surface Elev.	-	Field Personnel:	BMc	24 Hours After Ex.	Backfilled

USCS	SOIL DESCRIPTION	Depth (ft)	Sampler	"N"	MC (%)	DD (pcf)	Estimated q_u (psf)	% Swell @ 500 psf	Swell Pressure (psf)	Atterberg Limits		% Passing # 200 Sieve (%)
										LL	PI	
	0 - 4" VEGETATION & TOPSOIL	-										
		1										
		-										
		2										
		-										
		3										
		-										
		4										
SC-SM	SILTY to CLAYEY SAND	-										
w/	with SANDY LEAN CLAY lenses	**5**	**HS**	**12**	**3.8**	**95.4**	**N/A**	**-**	**-**	**-**	**-**	**-**
CL	brown, rust, beige	-										
	loose to medium dense / stiff	6										
		-										
		7										
		-										
		8										
		-										
		9										
		-										
		10	**HS**	**9**	**12.0**	**103.0**	**7000**	**None**	**<500**	**-**	**-**	**-**
	BOTTOM OF TEST PIT @ 10.0'	-										
		11										
		-										
		12										
		-										
		13										
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ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

LOG OF TEST PIT TP-10

Sheet	1/1	Drilling Rig:	Backhoe	Water Depth Information	
Start Date	9/10/2013	Auger Type:	-	During Excavation	-
Finish Date	9/10/2013	Hammer Type:	DCP	After Excavation	NE
Surface Elev.	-	Field Personnel:	BMc	24 Hours After Ex.	Backfilled

USCS	SOIL DESCRIPTION	Depth (ft)	Sampler	"N"	MC (%)	DD (pcf)	Estimated q_u (psf)	% Swell @ 500 psf	Swell Pressure (psf)	Atterberg Limits		% Passing # 200 Sieve (%)
										LL	PI	
	0 - 4" VEGETATION & TOPSOIL	-										
CL w/ SC-SM	SANDY LEAN CLAY with SILTY to CLAYEY SAND lenses brown, rust, beige	1 - 2 - 3 - 4										
		- 5	HS	50/5"	7.5	-	9000+	-	-	-	-	-
	SILTSTONE/SANDSTONE with lenticular CLAYSTONE interbeds gray, brown, rust very hard	- 6 - 7 - 8 - 9										
		- 10	HS	50/3"	NR	NR	NR	-	-	-	-	-
	BOTTOM OF TEST PIT @ 10.0'	- 11 - 12 - 13 - 14 - 15 - 16 - 17 - 18 - 19 - 20 - 21 - 22 - 23 - 24 - 25										

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

LOG OF TEST PIT TP-11

Sheet	1/1	Drilling Rig:	Backhoe	Water Depth Information	
Start Date	9/10/2013	Auger Type:	-	During Excavation	-
Finish Date	9/10/2013	Hammer Type:	DCP	After Excavation	NE
Surface Elev.	-	Field Personnel:	BMc	24 Hours After Ex.	Backfilled

USCS	SOIL DESCRIPTION	Depth (ft)	Sampler	"N"	MC (%)	DD (pcf)	Estimated q_u (psf)	% Swell @ 500 psf	Swell Pressure (psf)	Atterberg Limits		% Passing # 200 Sieve (%)
										LL	PI	
	0 - 4" VEGETATION & TOPSOIL	-										
		1										
		-										
		2										
		-										
		3										
		-										
		4										
SC-SM	SILTY to CLAYEY SAND	-										
w/	with SANDY LEAN CLAY lenses	**5**	**HS**	**10**	**7.5**	**101.5**	**4000**	**None**	**<500**	**-**	**-**	**-**
CL	brown, gray, rust	-										
	very loose to medium dense /	6										
	very soft to stiff	-										
		7										
		-										
		8										
		-										
		9										
		-										
		10	**HS**	**2**	**26.5**	**96.4**	**<500**	**-**	**-**	**-**	**-**	**-**
	BOTTOM OF TEST PIT @ 10.0'	-										
		11										
		-										
		12										
		-										
		13										
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		14										
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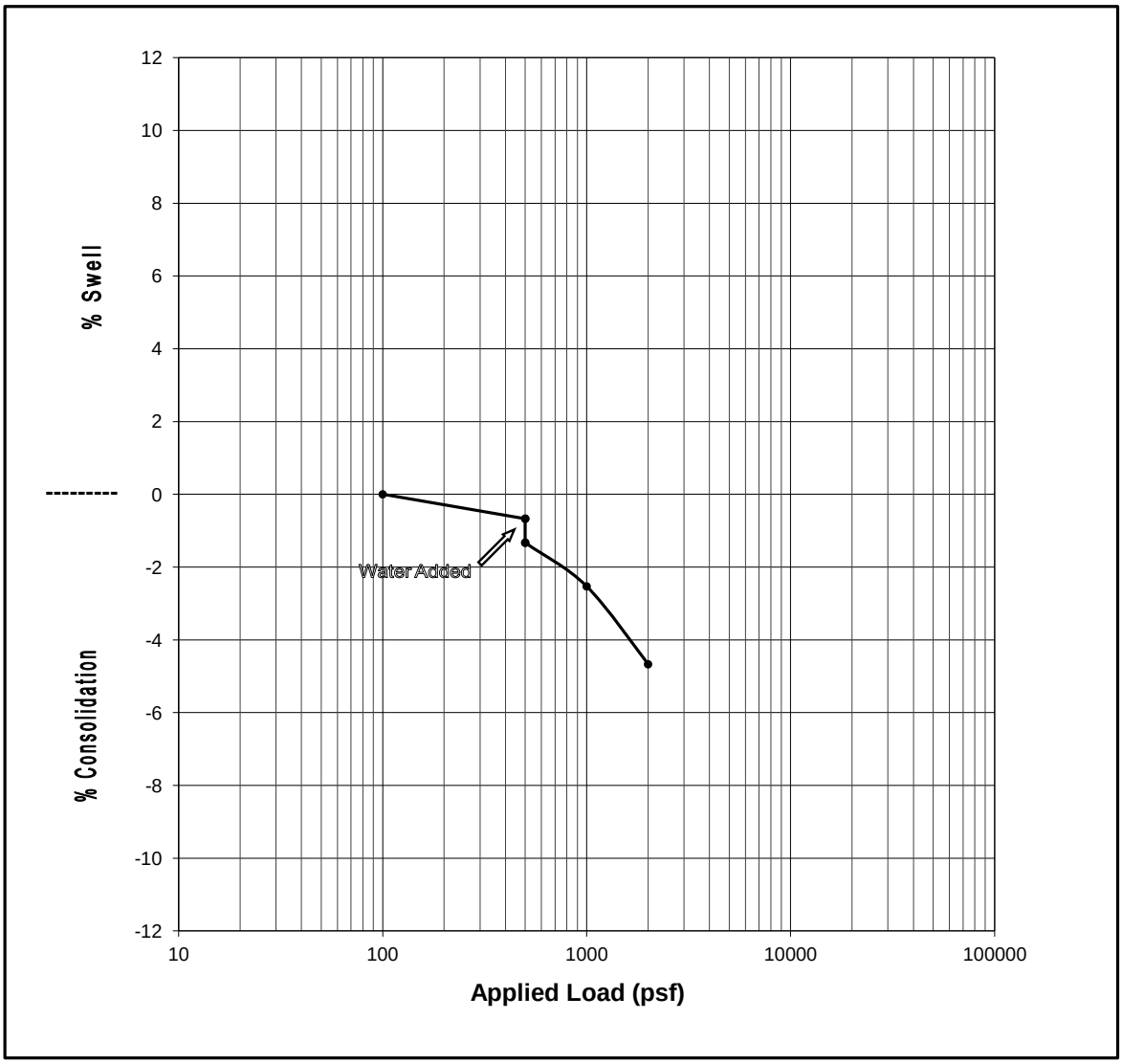
ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: B-1 @ 4'

Sample Description: Rusty Olive-Brown Clayey, Silty Sand (SC-SM)

Initial Moisture	4.9%	Liquid Limit	-
Final Moisture	22.4%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	96.1 pcf

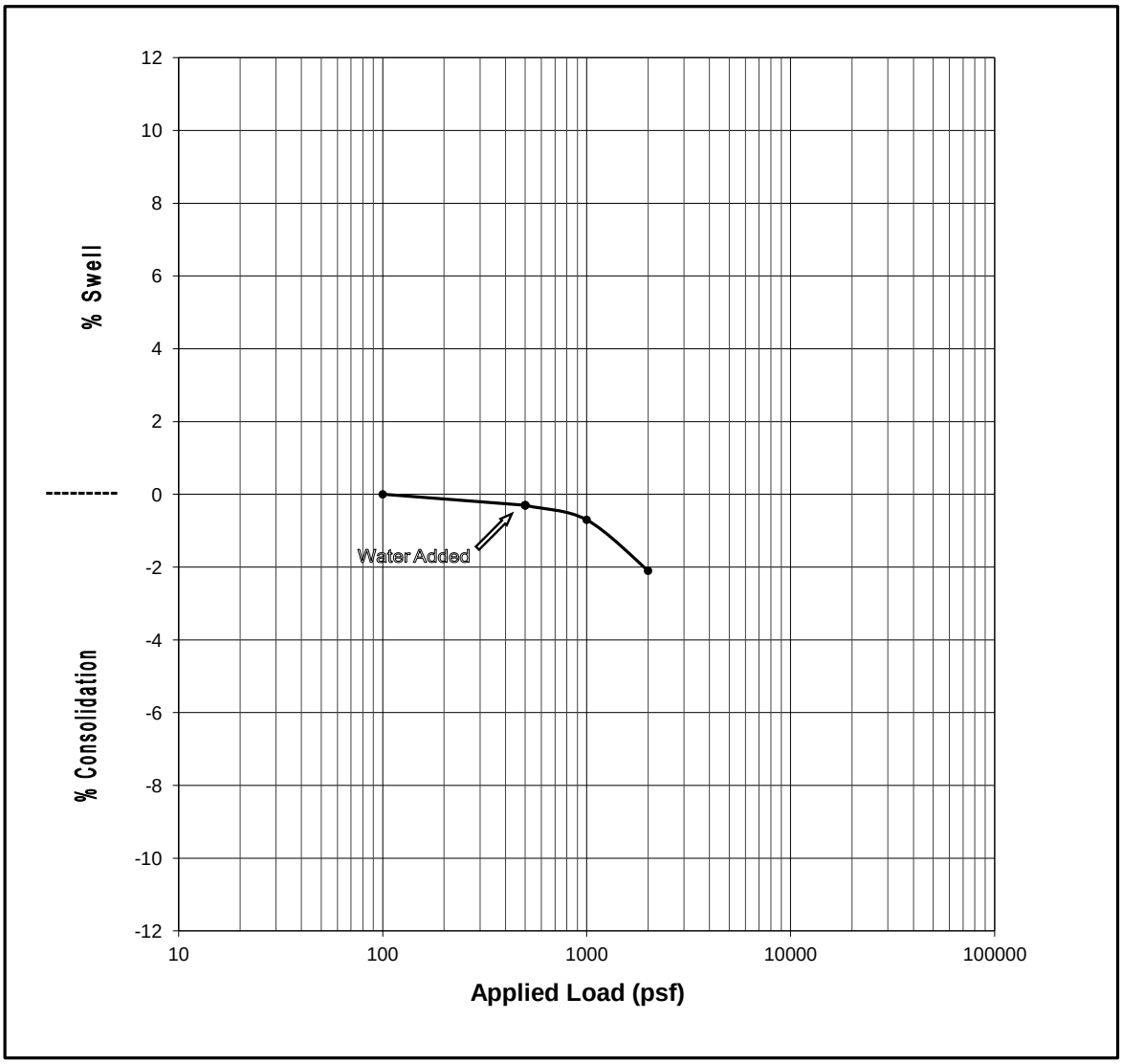
ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: B-1 @ 9'

Sample Description: Brown/Beige/Rust Sandy Lean Clay to Clayey Sand (CL)

Initial Moisture	8.1%	Liquid Limit	-
Final Moisture	20.1%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	101.7 pcf

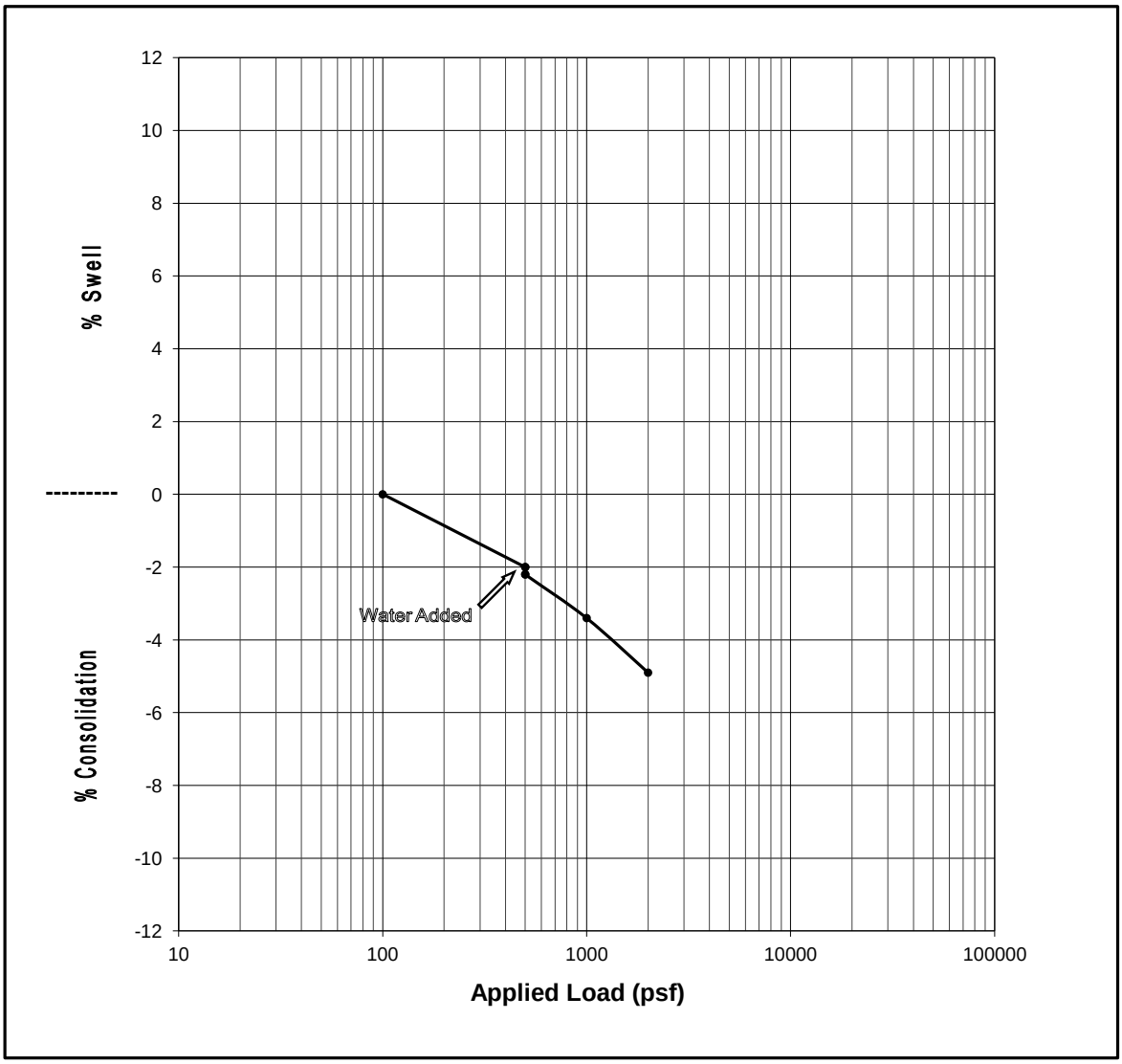
ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: B-2 @ 4'

Sample Description: Brown/Beige Silty, Clayey Sand (SC-SM)

Initial Moisture	22.9%	Liquid Limit	-
Final Moisture	19.7%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	102.9 pcf

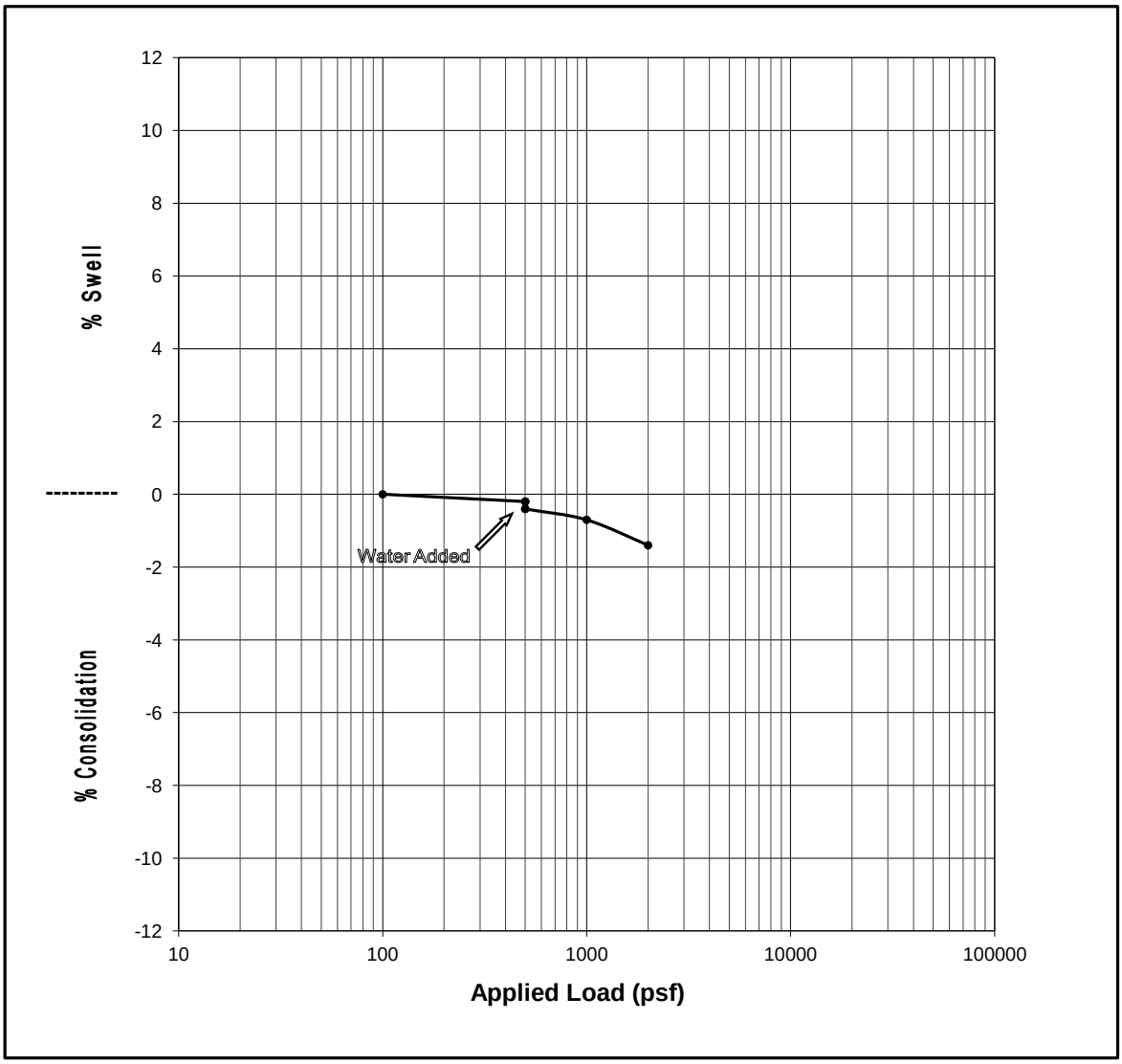
ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: B-2 @ 9'

Sample Description: Rusty Brown/Beige Clayey Sand (SC)

Initial Moisture	19.6%	Liquid Limit	-
Final Moisture	20.8%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	105.3 pcf

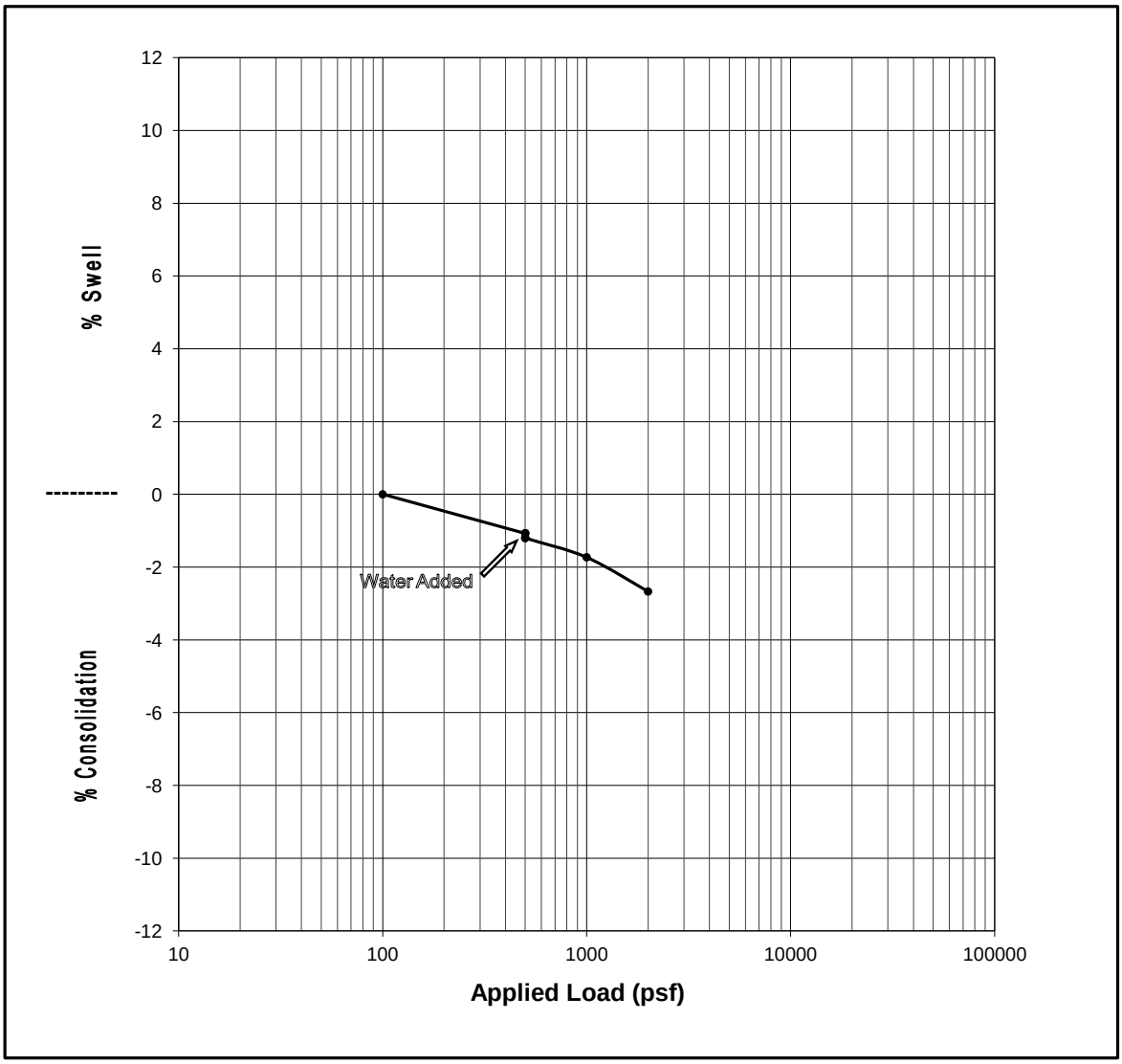
ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: B-3 @ 4'

Sample Description: Brown Silty, Clayey Sand (SC-SM)

Initial Moisture	21.4%	Liquid Limit	-
Final Moisture	19.0%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	104.5 pcf

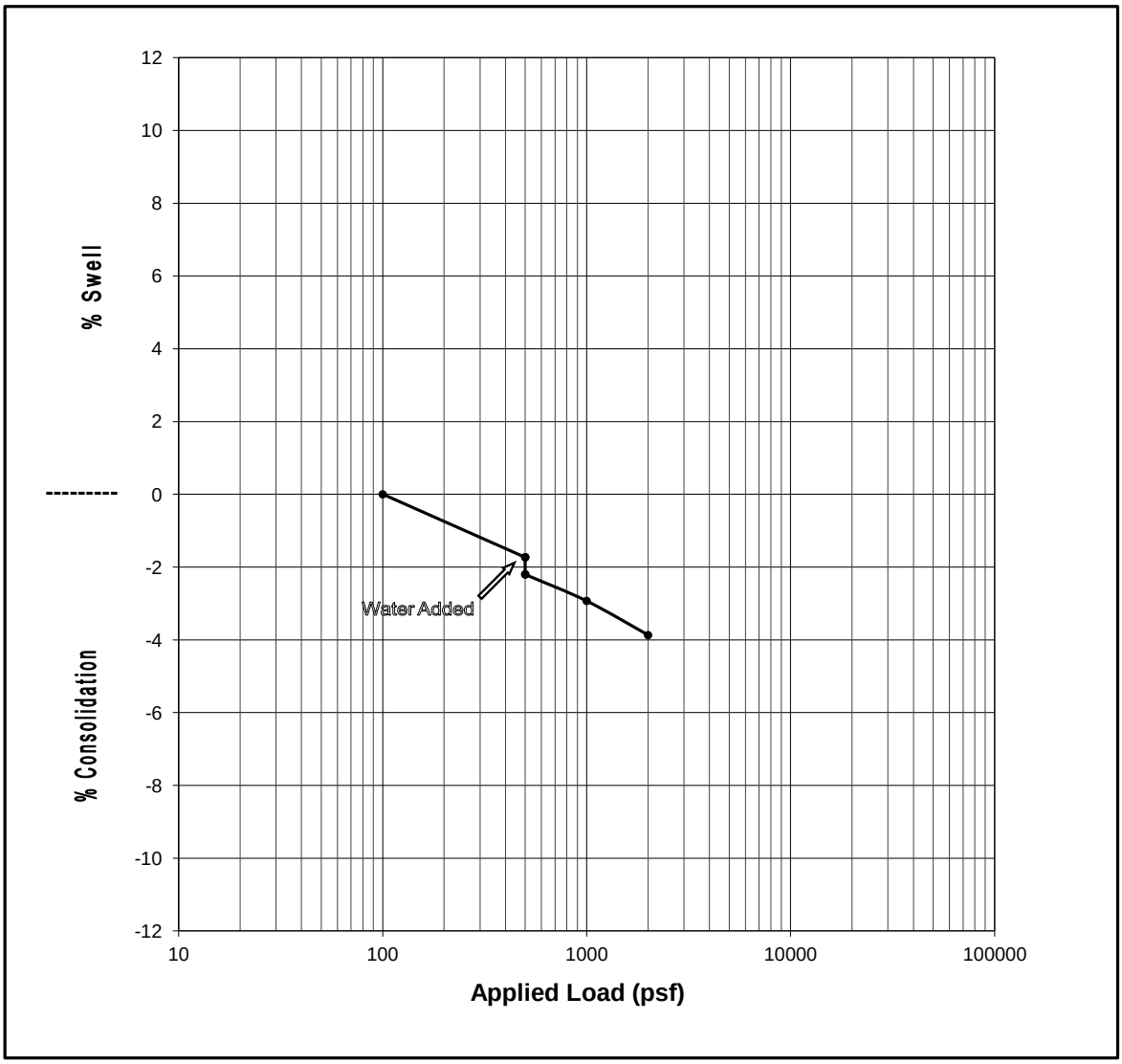
ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: B-3 @ 9'

Sample Description: Brown Silty, Clayey Sand (SC-SM)

Initial Moisture	25.5%	Liquid Limit	-
Final Moisture	17.7%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	101.1 pcf

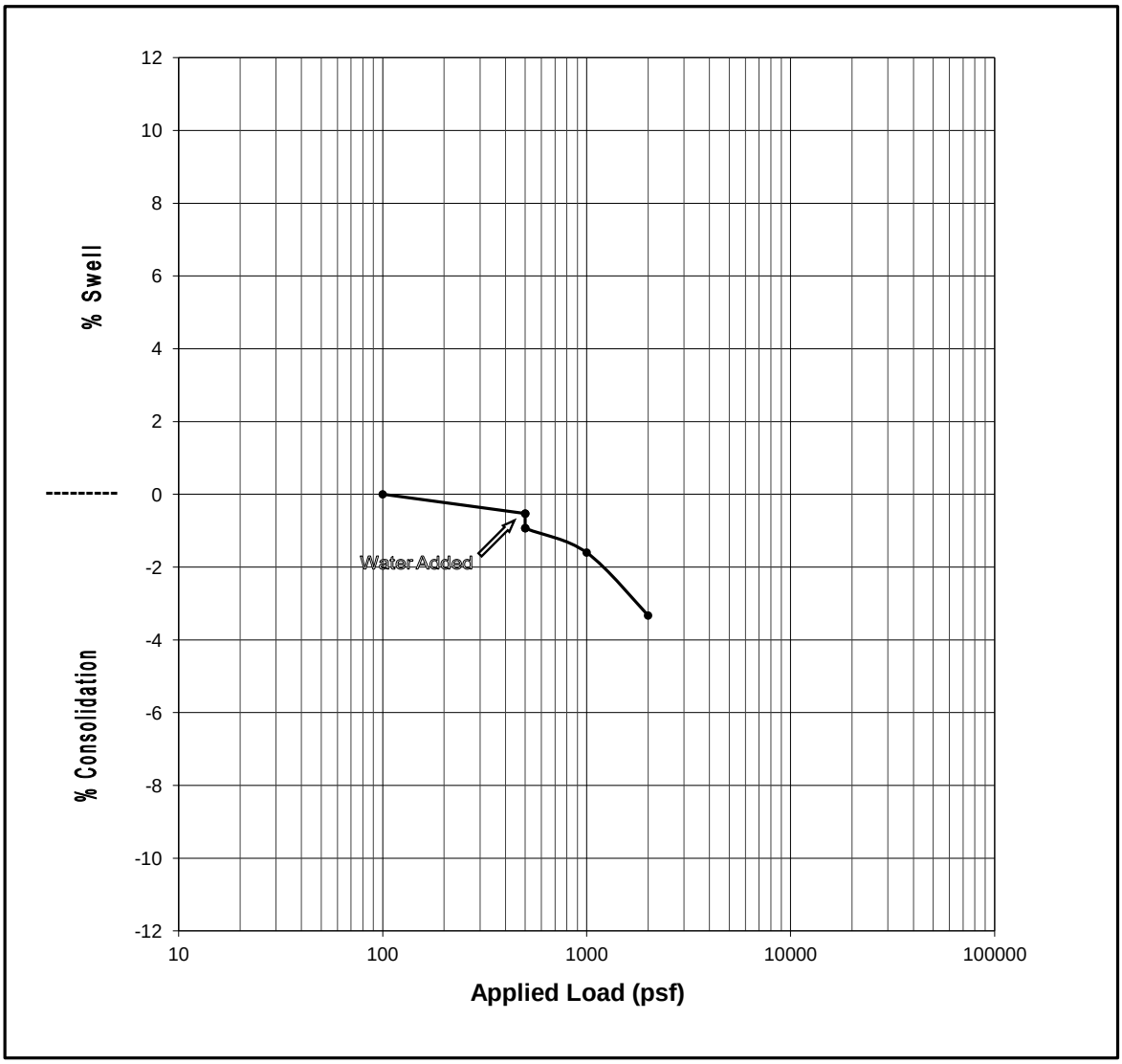
ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: B-4 @ 4'

Sample Description: Dark Brown Sandy Lean Clay (CL)

Initial Moisture	7.4%	Liquid Limit	22
Final Moisture	18.5%	Plasticity Index	9
% Swell @ 500 psf	None	% Passing #200	59.2%
Swell Pressure	<500 psf	Dry Density	107.8 pcf

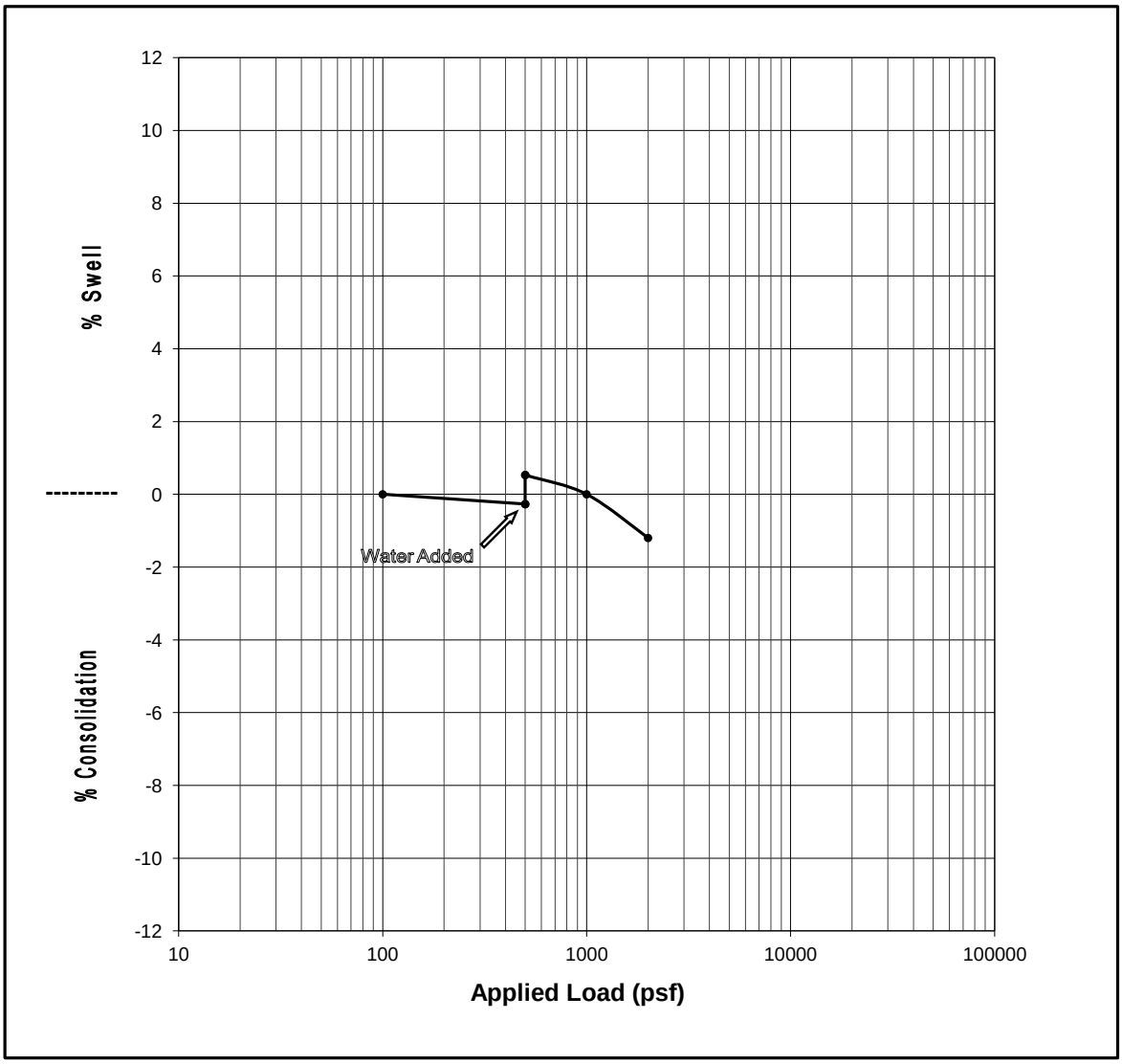
ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: B-4 @ 9'

Sample Description: Brown Sandy Lean Clay to Clayey Sand (CL-SC)

Initial Moisture	8.8%	Liquid Limit	-
Final Moisture	23.0%	Plasticity Index	-
% Swell @ 500 psf	0.8%	% Passing #200	48.9%
Swell Pressure	1,200 psf	Dry Density	105.3 pcf

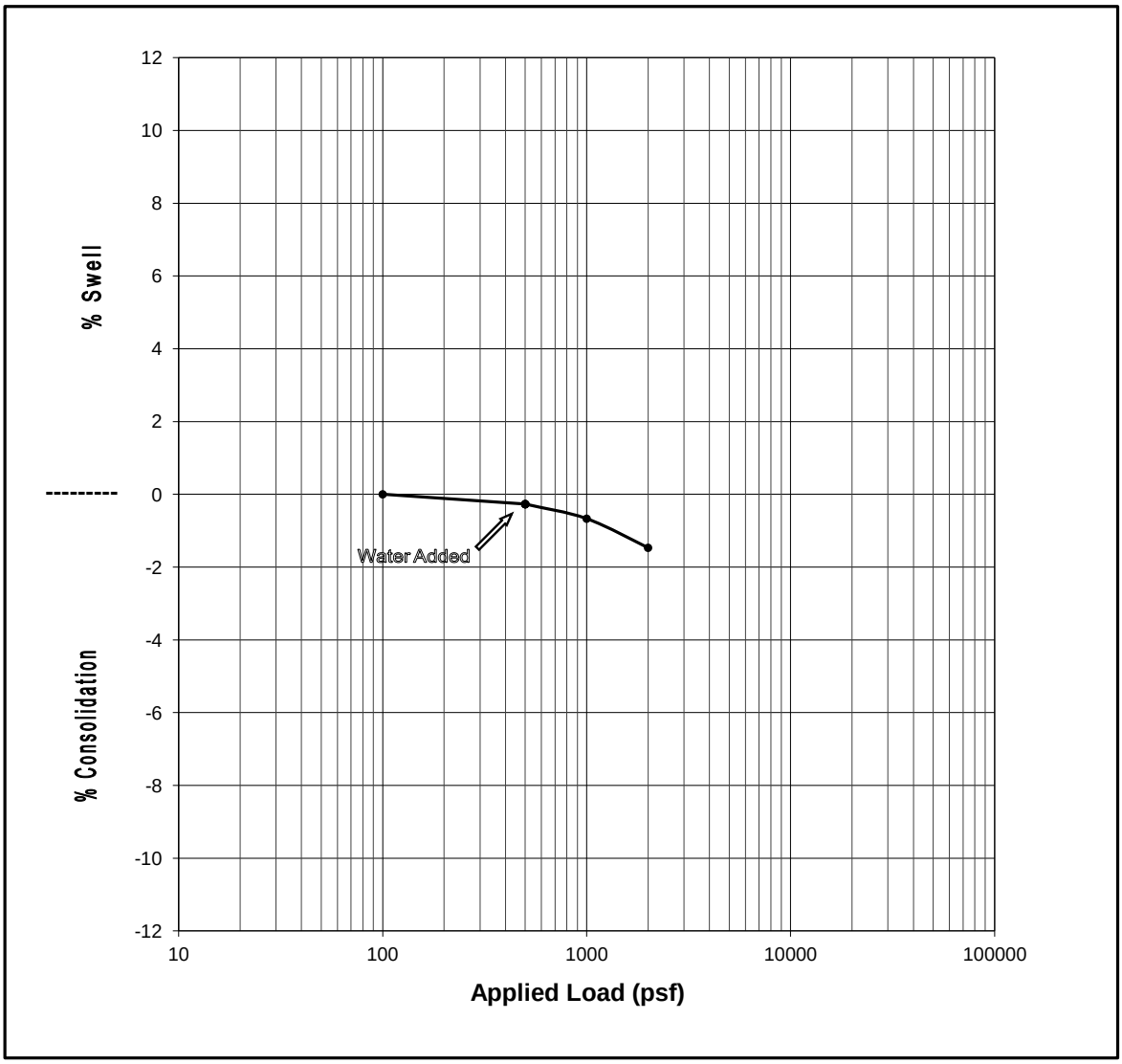
ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: B-5 @ 4'

Sample Description: Brown Silty Sand with Sandy Lean Clay lenses (SM w/CL)

Initial Moisture	10.1%	Liquid Limit	-
Final Moisture	22.7%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	
Swell Pressure	<500 psf	Dry Density	108.4 pcf

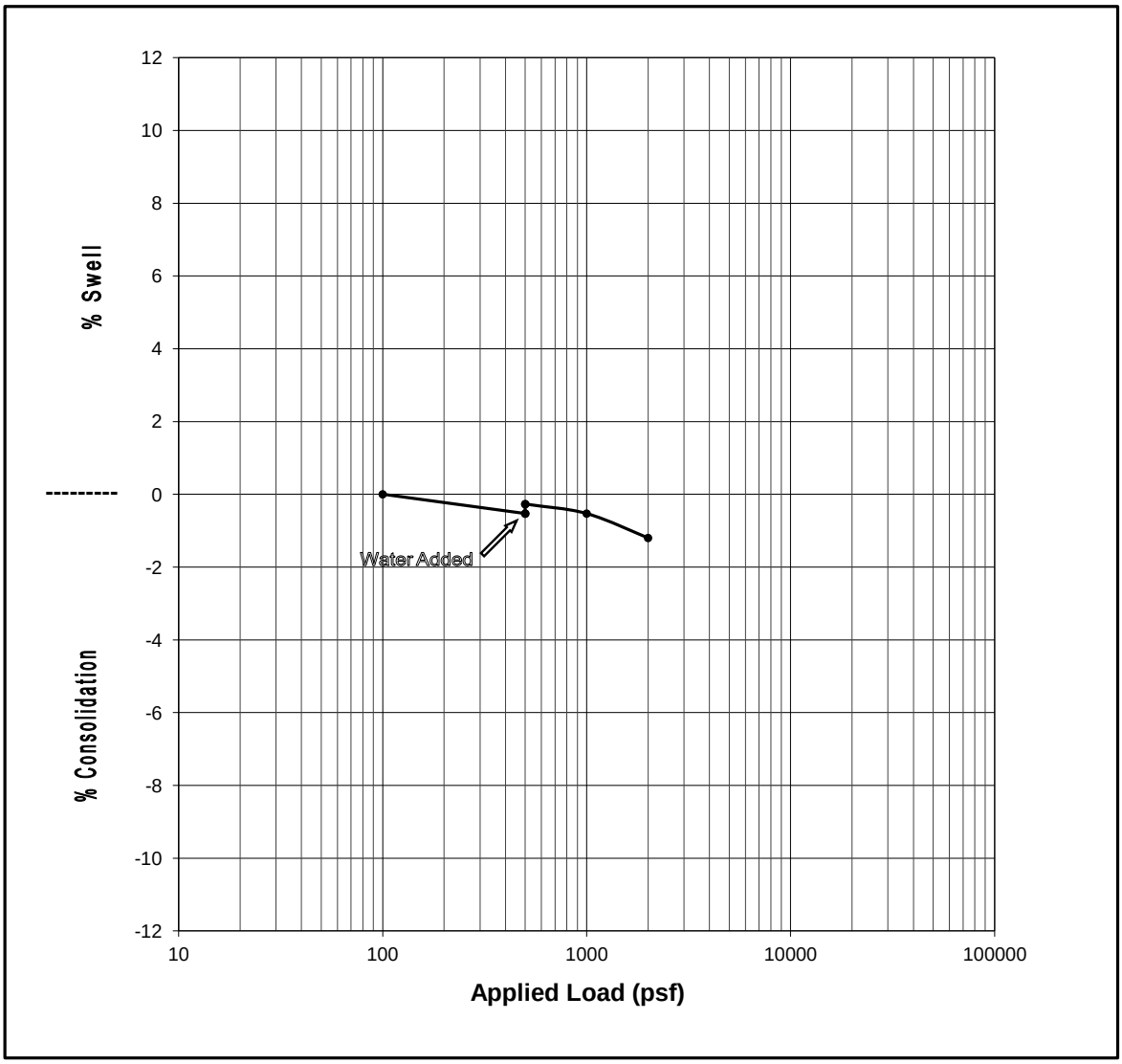
ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: B-5 @ 9'

Sample Description: Gray/Brown/Rust Sandstone/Siltstone/Claystone

Initial Moisture	17.8%	Liquid Limit	-
Final Moisture	20.5%	Plasticity Index	-
% Swell @ 500 psf	0.3%	% Passing #200	-
Swell Pressure	1,000 psf	Dry Density	108.6 pcf

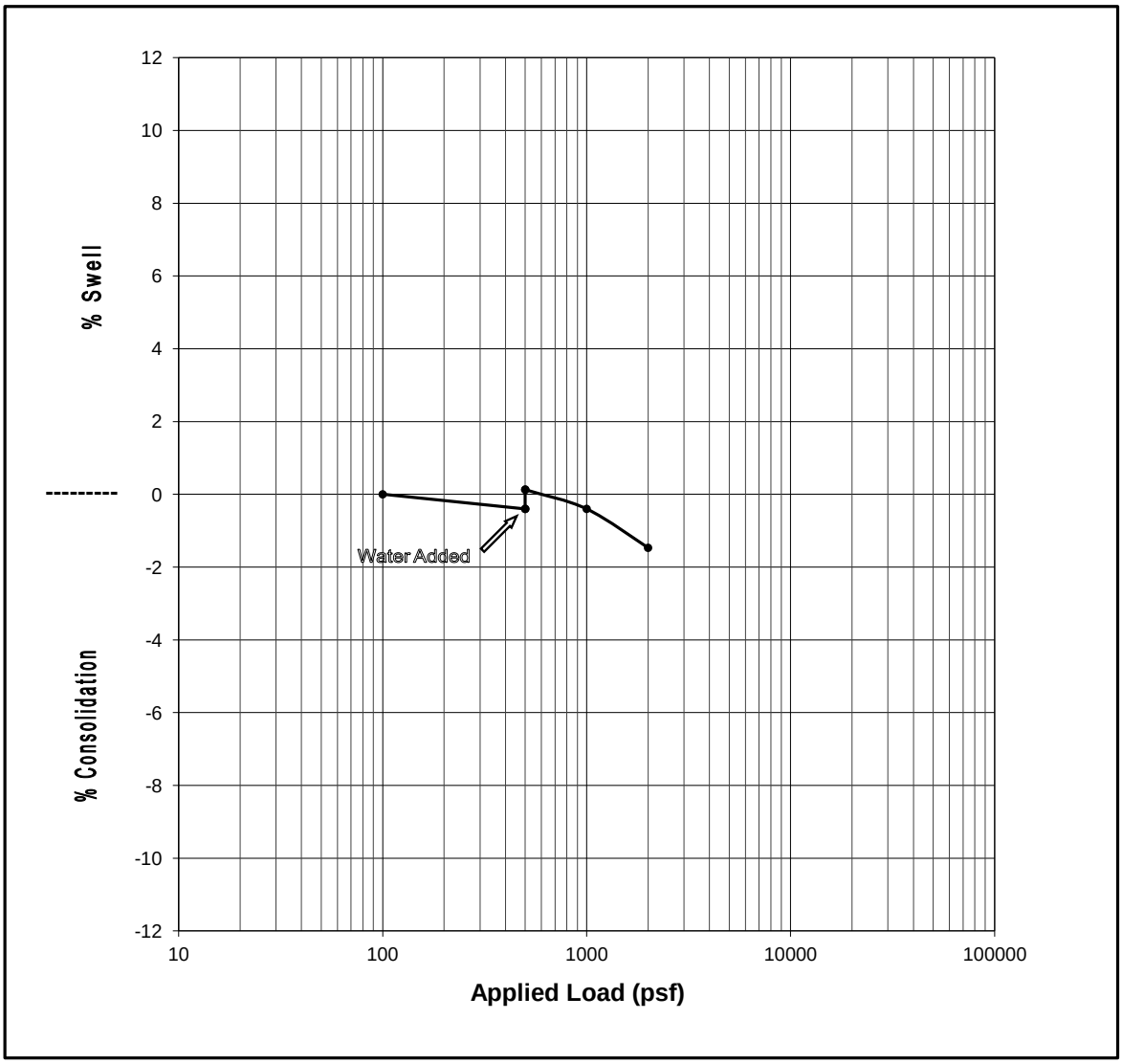
ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: B-6 @ 4'

Sample Description: Brown Sandy Lean Clay (CL)

Initial Moisture	6.0%	Liquid Limit	-
Final Moisture	18.7%	Plasticity Index	-
% Swell @ 500 psf	0.5%	% Passing #200	-
Swell Pressure	1,000 psf	Dry Density	108.4 pcf

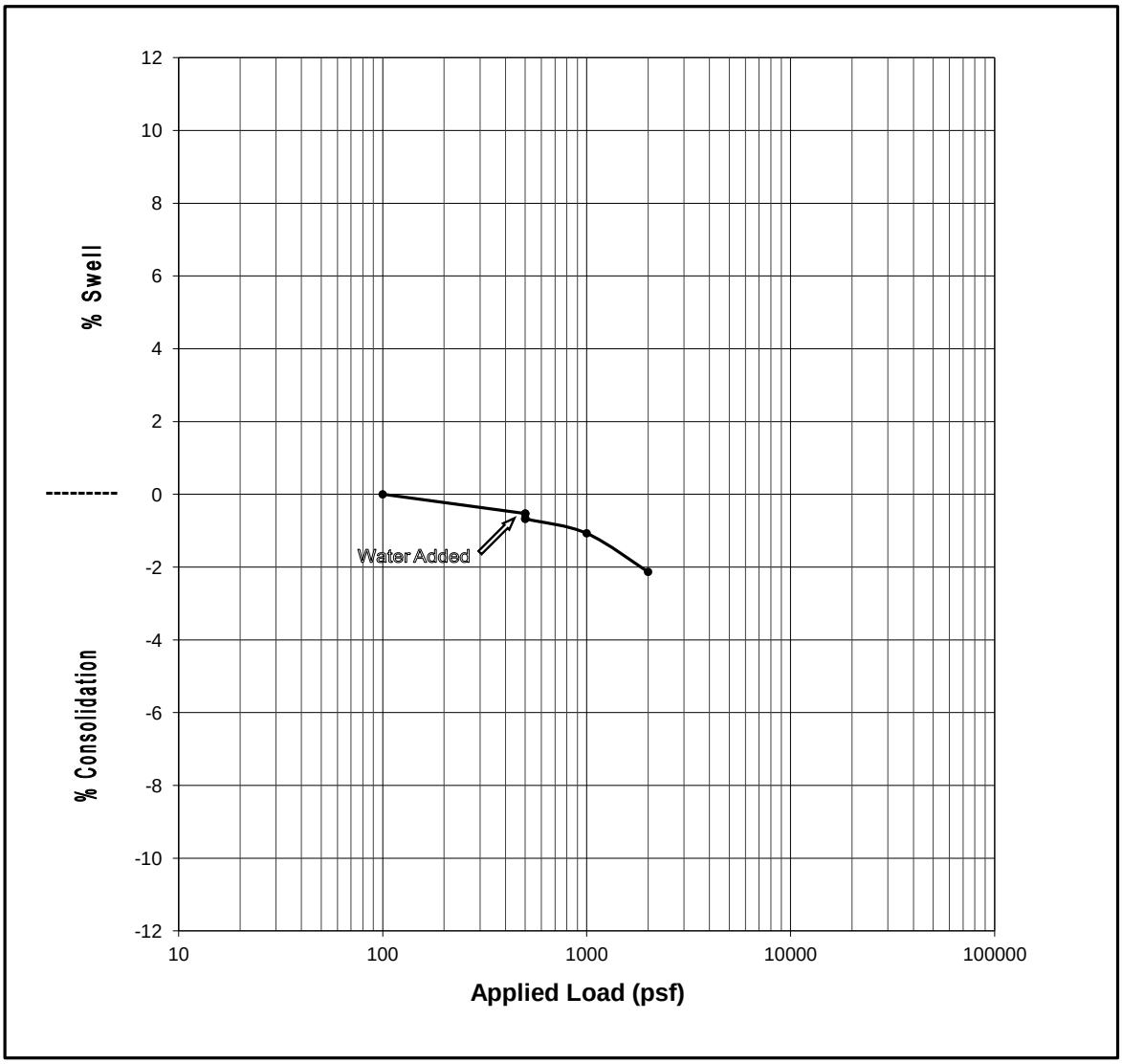
ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: B-6 @ 9'

Sample Description: Brown/Beige Sandy Lean Clay (CL)

Initial Moisture	11.6%	Liquid Limit	-
Final Moisture	21.4%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	101.8 pcf

ANDALUSIA PRELIMINARY EXPLORATION

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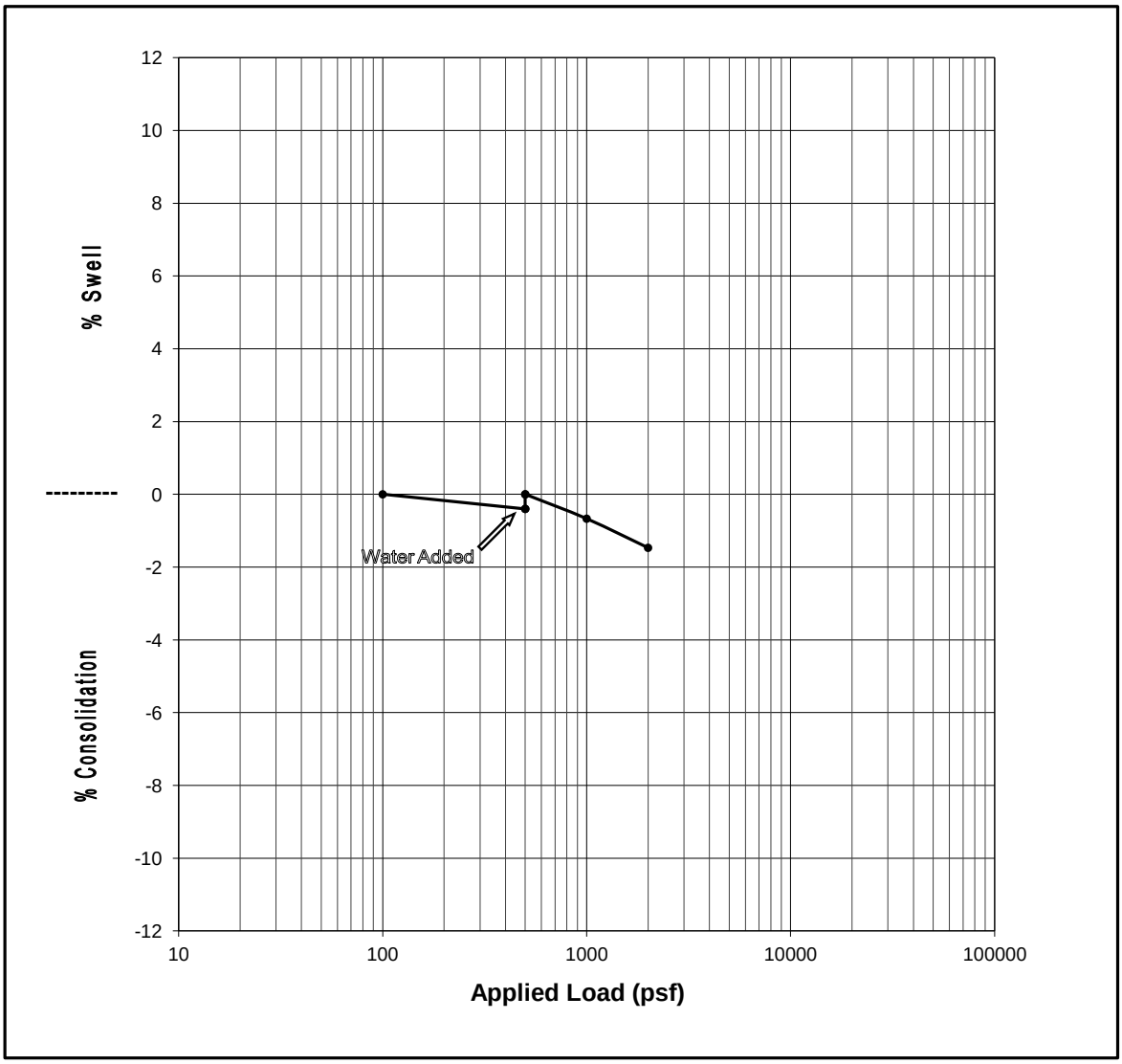
SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: B-7 @ 4'

Sample Description: Rusty Brown Sandy Lean Clay (CL)

Initial Moisture	11.3%	Liquid Limit	-
Final Moisture	16.8%	Plasticity Index	-
% Swell @ 500 psf	0.4%	% Passing #200	-
Swell Pressure	800 psf	Dry Density	119.1 pcf

ANDALUSIA PRELIMINARY EXPLORATION

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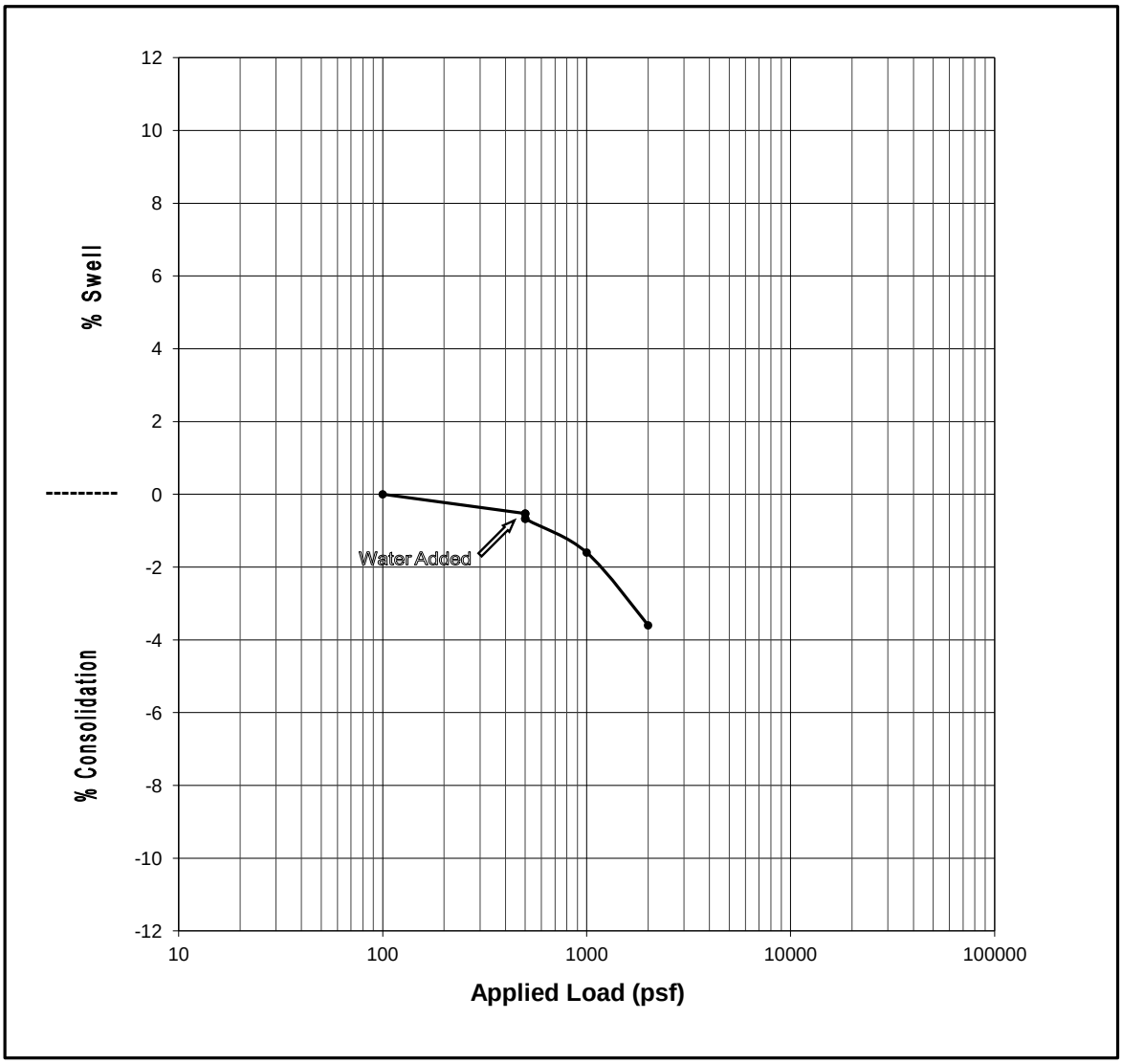
SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: B-7 @ 9'

Sample Description: Brown Sandy Lean Clay (CL)

Initial Moisture	21.1%	Liquid Limit	-
Final Moisture	21.4%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	105.9 pcf

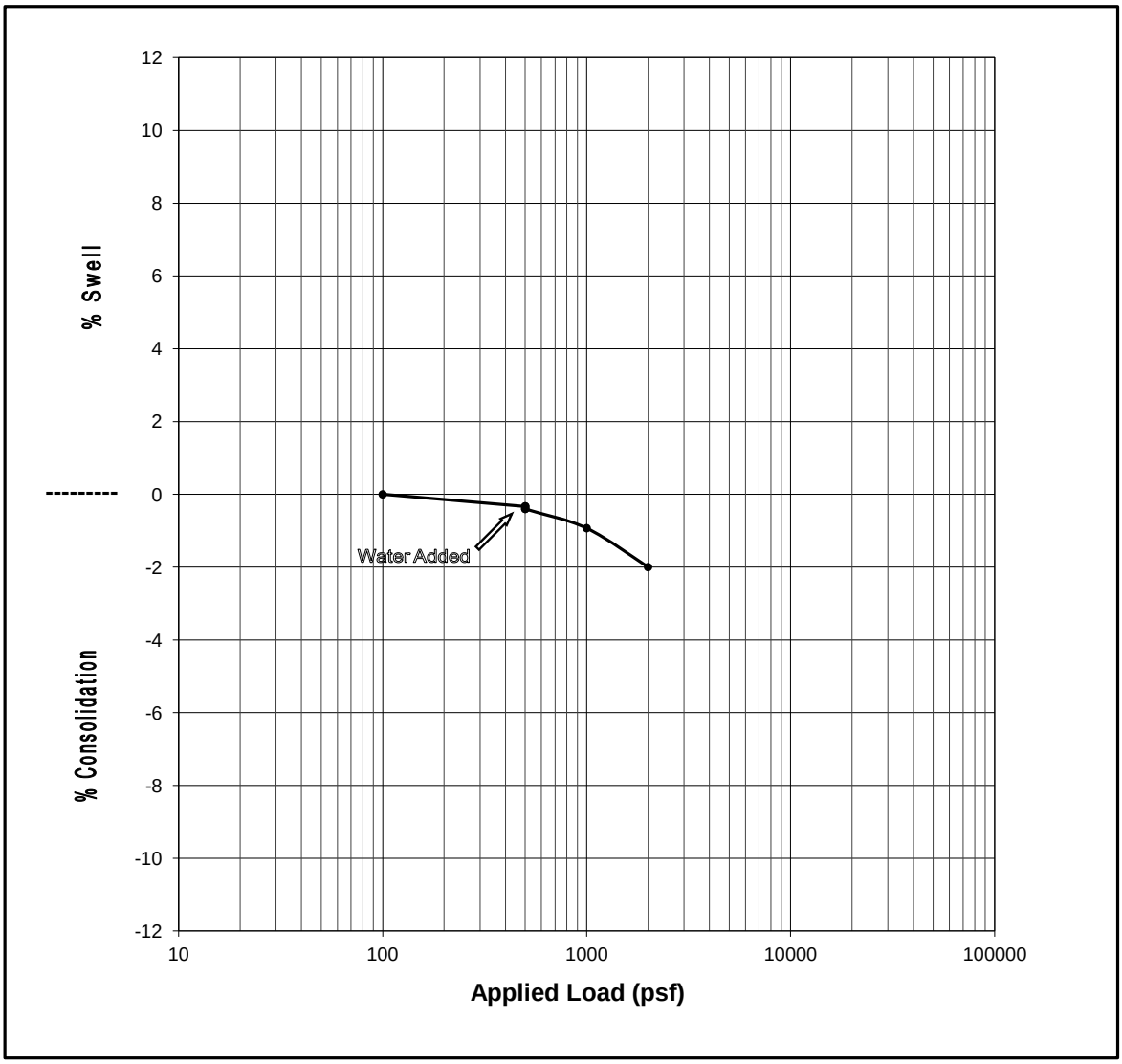
ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: B-8 @ 9'

Sample Description: Rusty Brown Sandy Lean Clay to Clayey Sand (CL-SC)

Initial Moisture	15.0%	Liquid Limit	-
Final Moisture	16.3%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	114.9 pcf

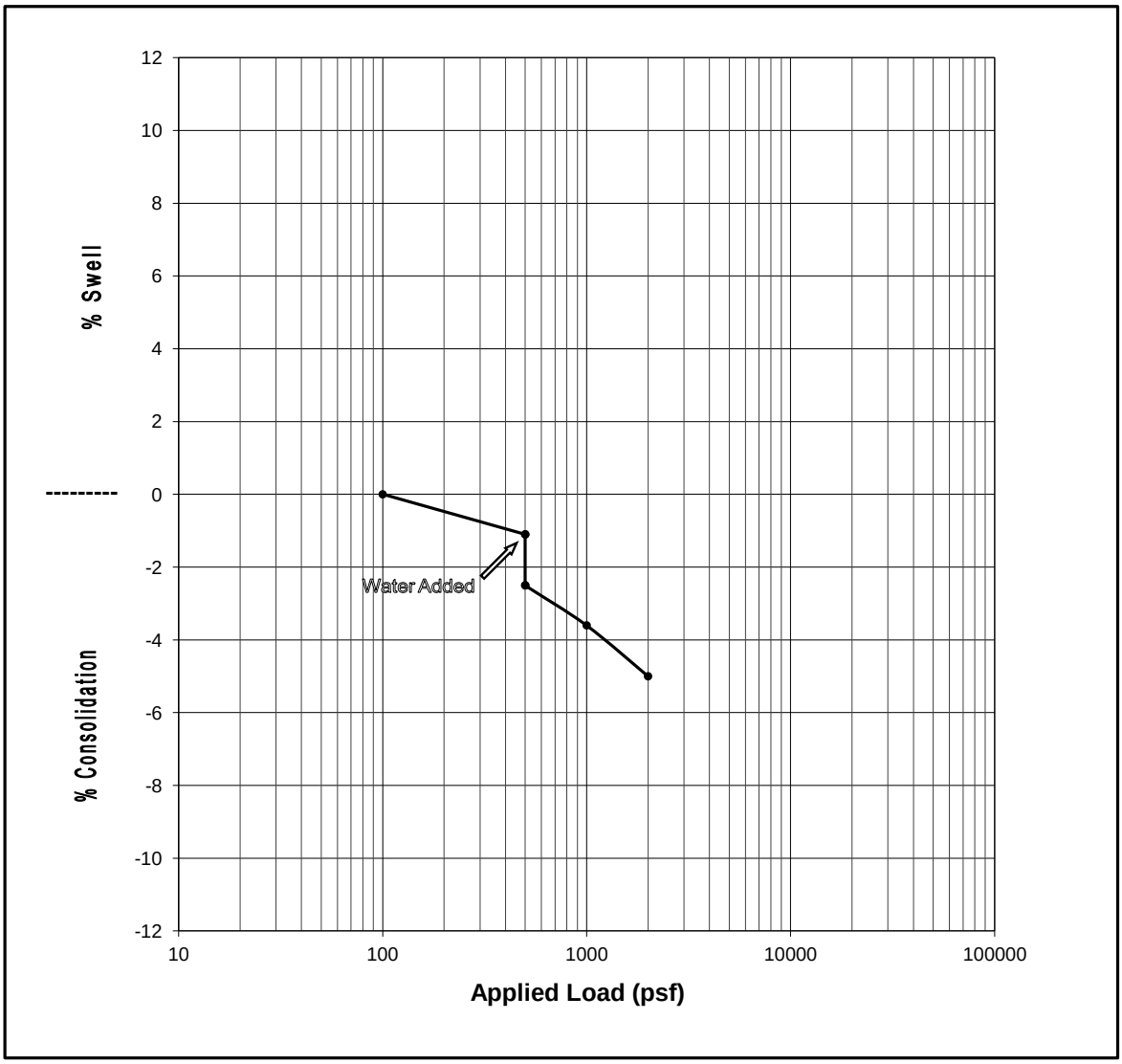
ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: B-9 @ 4'

Sample Description: Dark Brown Sandy Lean Clay (CL)

Initial Moisture	23.6%	Liquid Limit	-
Final Moisture	22.2%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	101.0 pcf

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

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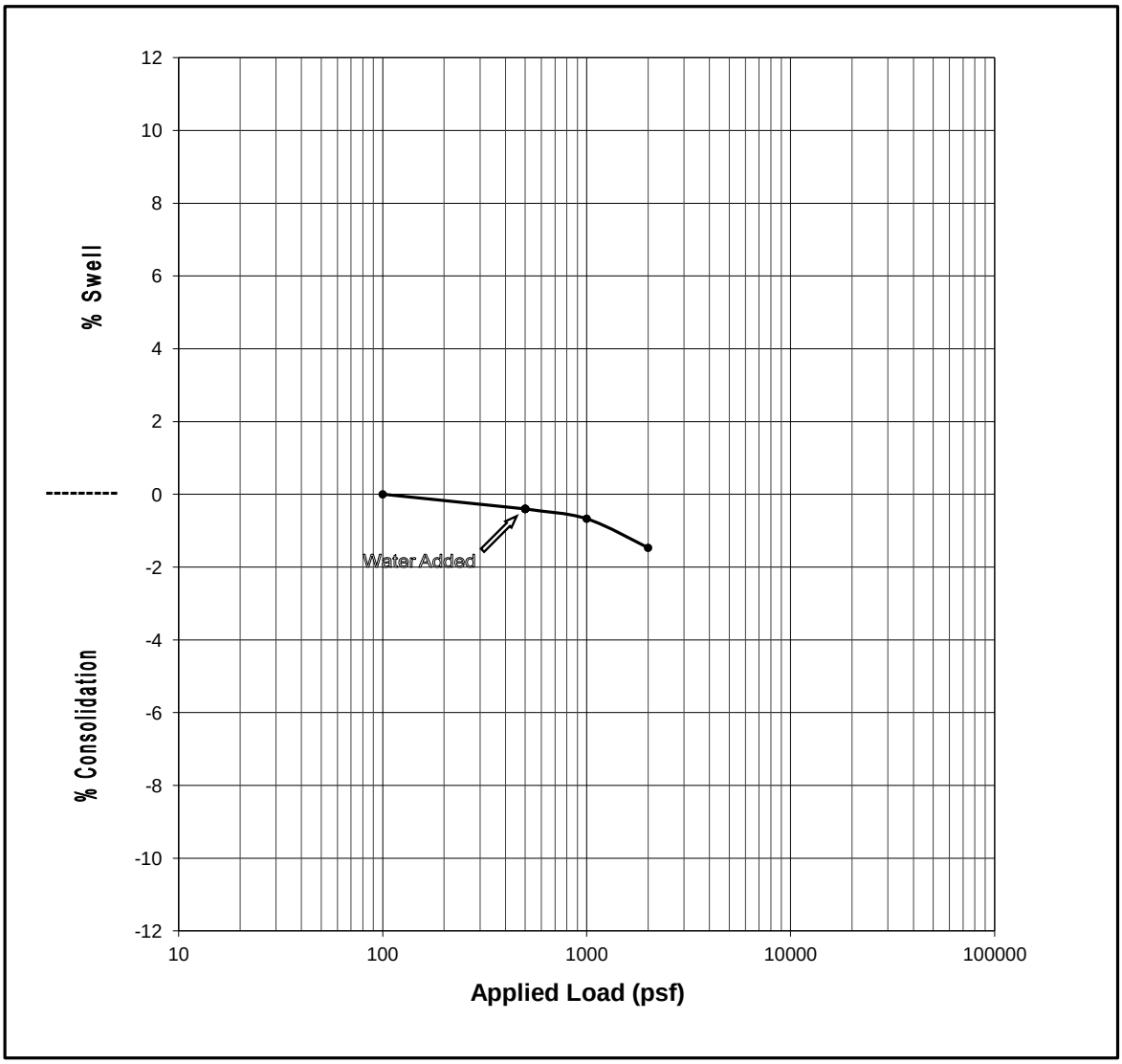
September 2013

SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: B-10 @ 4'

Sample Description: Rusty Brown Sandy Lean Clay to Clayey Sand (CL-SC)

Initial Moisture	7.1%	Liquid Limit	-
Final Moisture	19.0%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	106.1 pcf

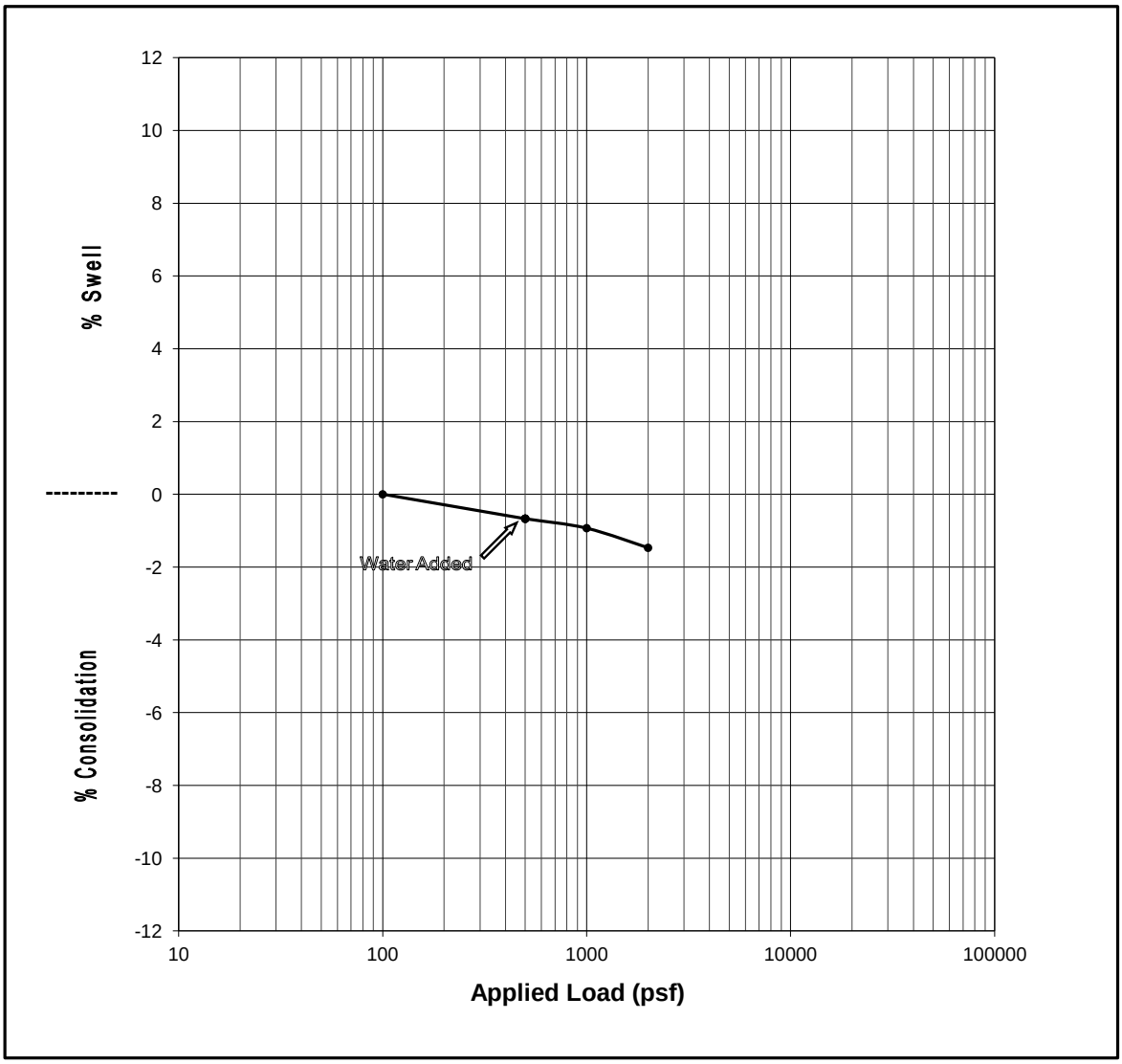
ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: B-10 @ 9'

Sample Description: Brown Sandy Lean Clay (CL)

Initial Moisture	11.5%	Liquid Limit	-
Final Moisture	17.6%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	109.8 pcf

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

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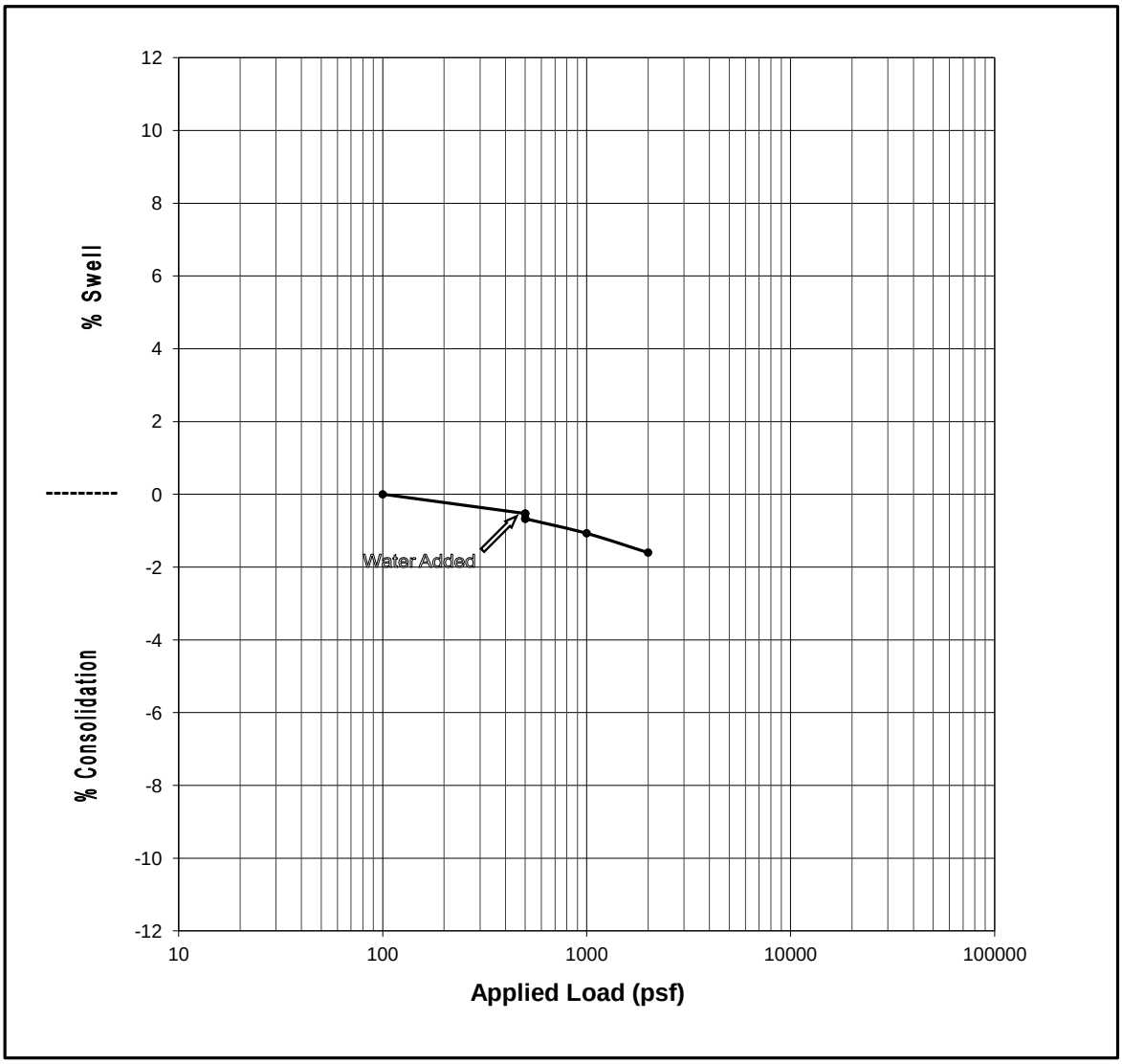
SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: B-11 @ 4'

Sample Description: Brown Sandy Lean Clay to Clayey Sand (CL-SC)

Initial Moisture	9.6%	Liquid Limit	-
Final Moisture	16.8%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	107.7 pcf

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

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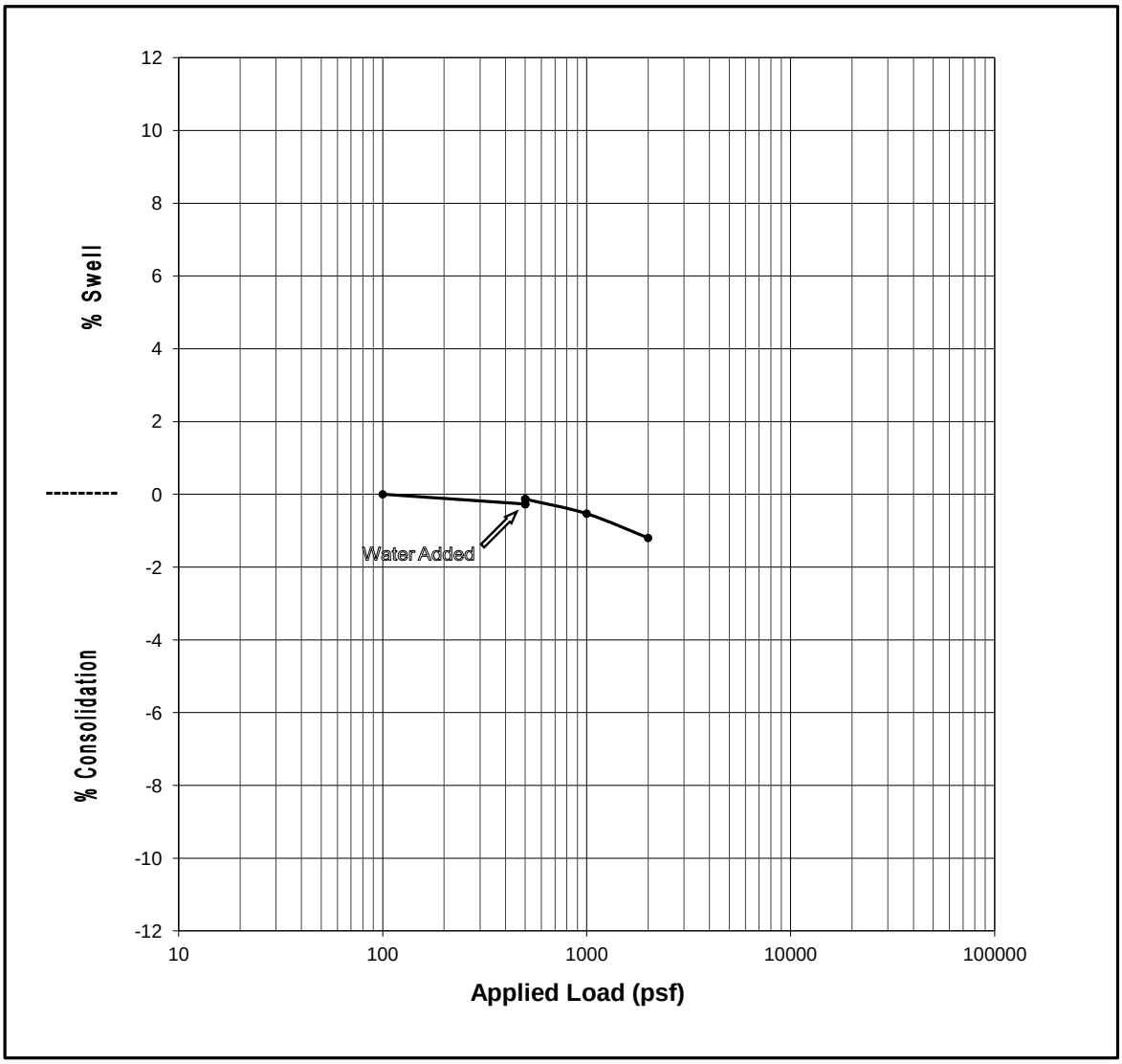

Sample ID: B-12 @ 4'

Sample Description: Light Brown/Beige Silty, Sandy Lean Clay (CL)

Initial Moisture	4.1%	Liquid Limit	-
Final Moisture	19.0%	Plasticity Index	-
% Swell @ 500 psf	0.1%	% Passing #200	-
Swell Pressure	700 psf	Dry Density	111.3 pcf

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

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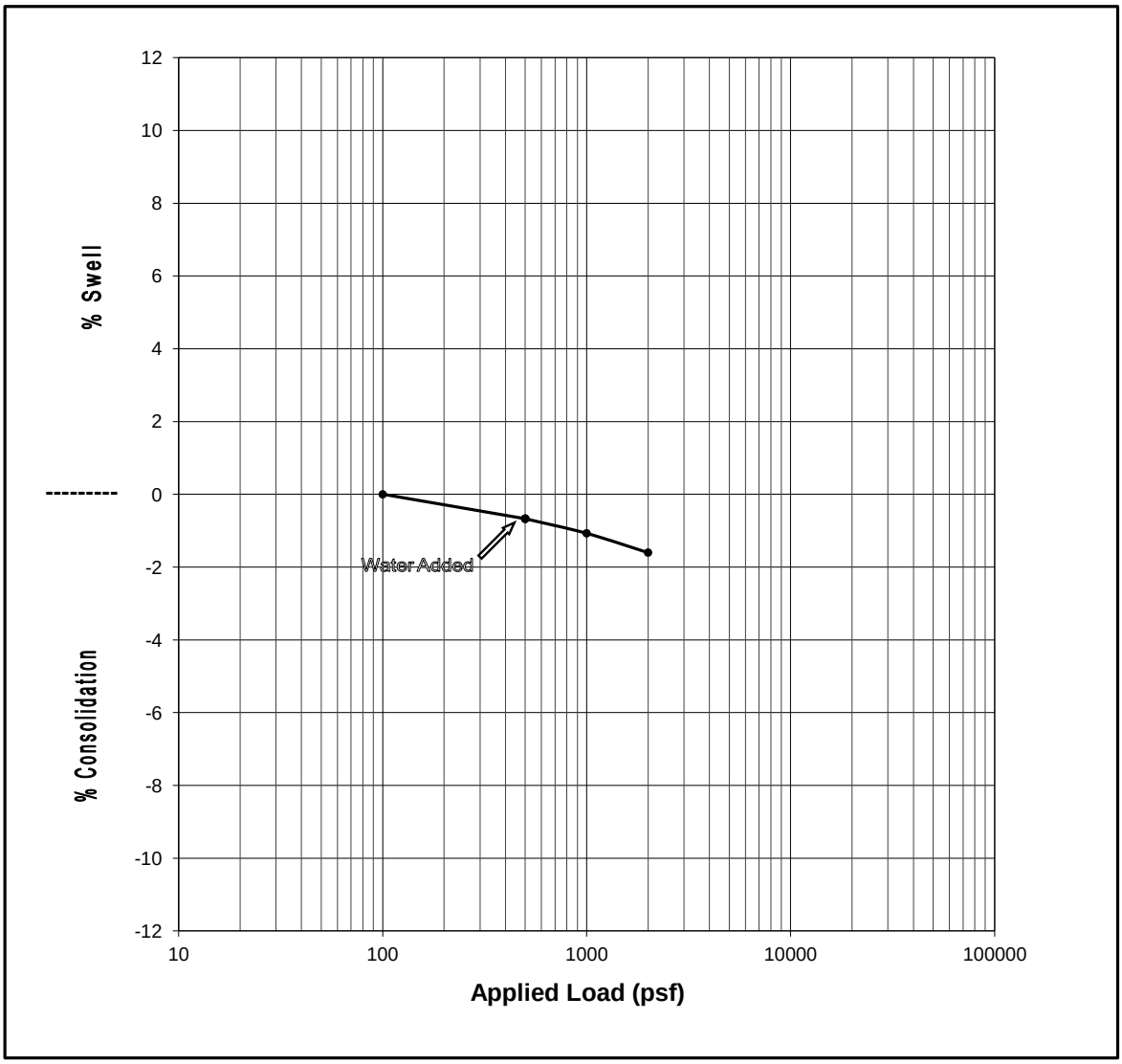

Sample ID: B-12 @ 9'

Sample Description: Brown Clayey, Silty Sand with Sandy Lean Clay (SC-SM w/CL)

Initial Moisture	9.7%	Liquid Limit	-
Final Moisture	20.3%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	107.8 pcf

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

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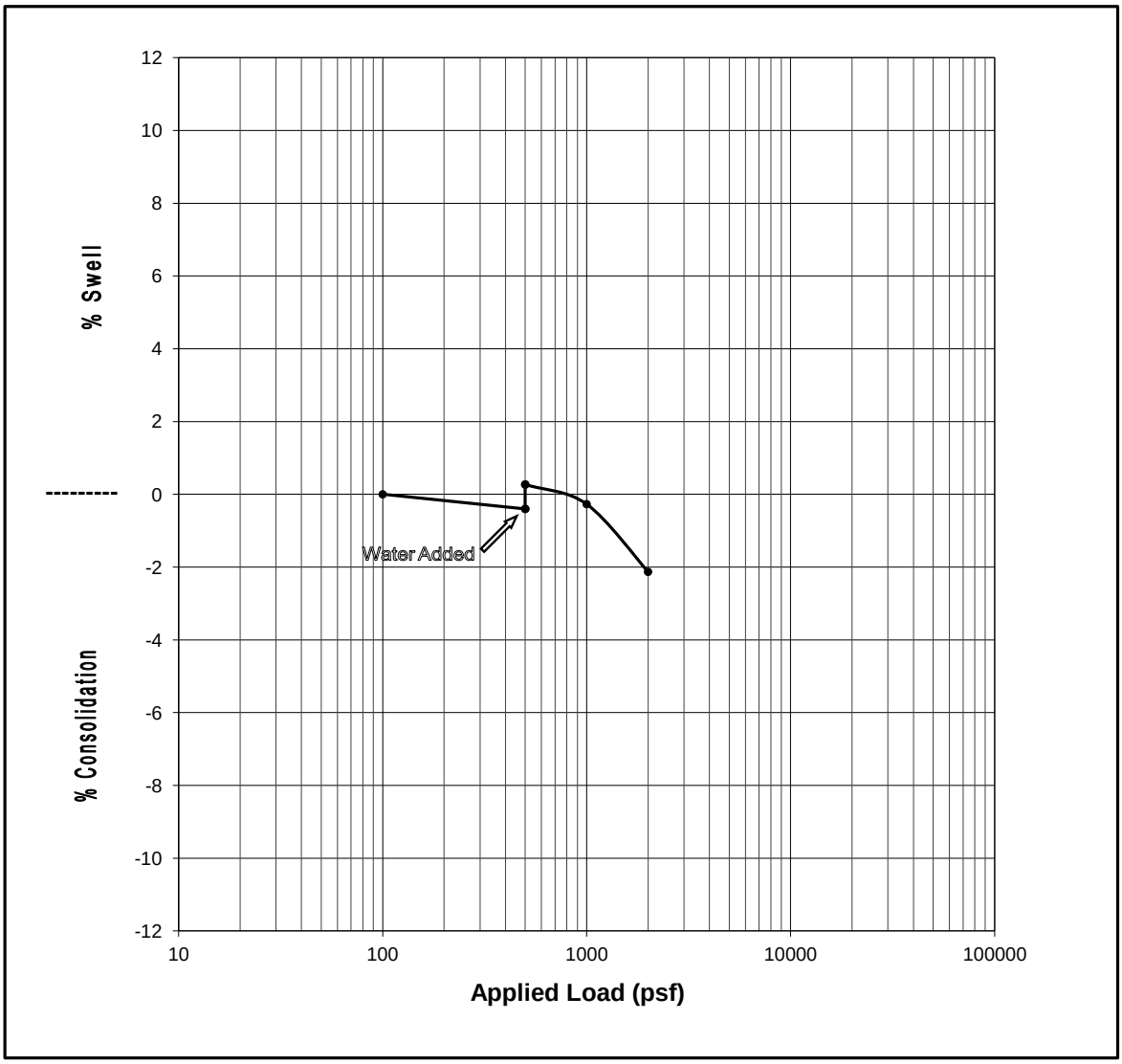
September 2013

SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: B-13 @ 4'

Sample Description: Light Brown/Beige Silty, Sandy Lean Clay (CL)

Initial Moisture	4.0%	Liquid Limit	-
Final Moisture	21.7%	Plasticity Index	-
% Swell @ 500 psf	0.7%	% Passing #200	-
Swell Pressure	1,100 psf	Dry Density	106.6 pcf

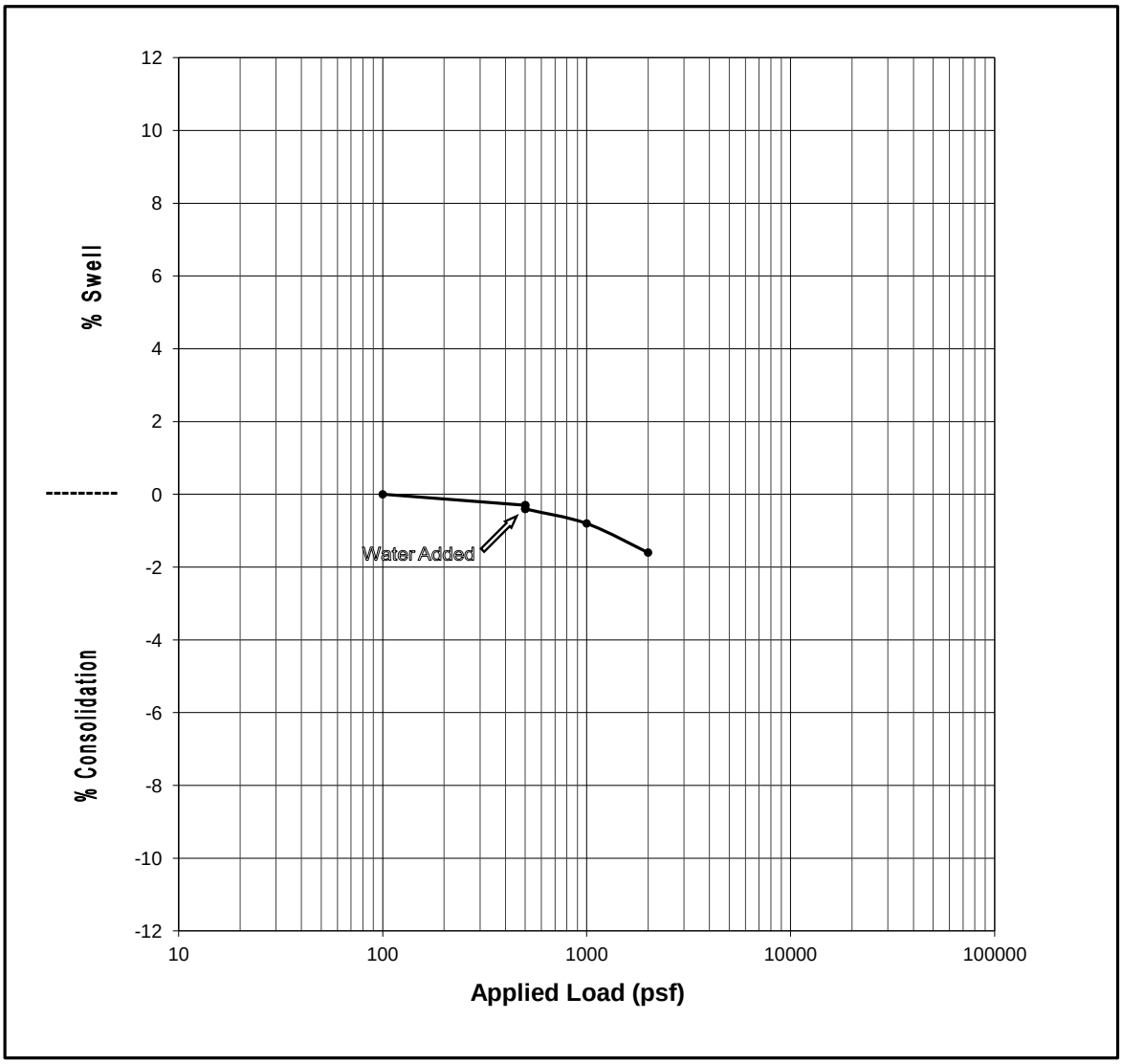
ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: B-13 @ 9'

Sample Description: Red Brown Silty, Sandy Lean Clay (CL)

Initial Moisture	10.6%	Liquid Limit	-
Final Moisture	21.0%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	105.1 pcf

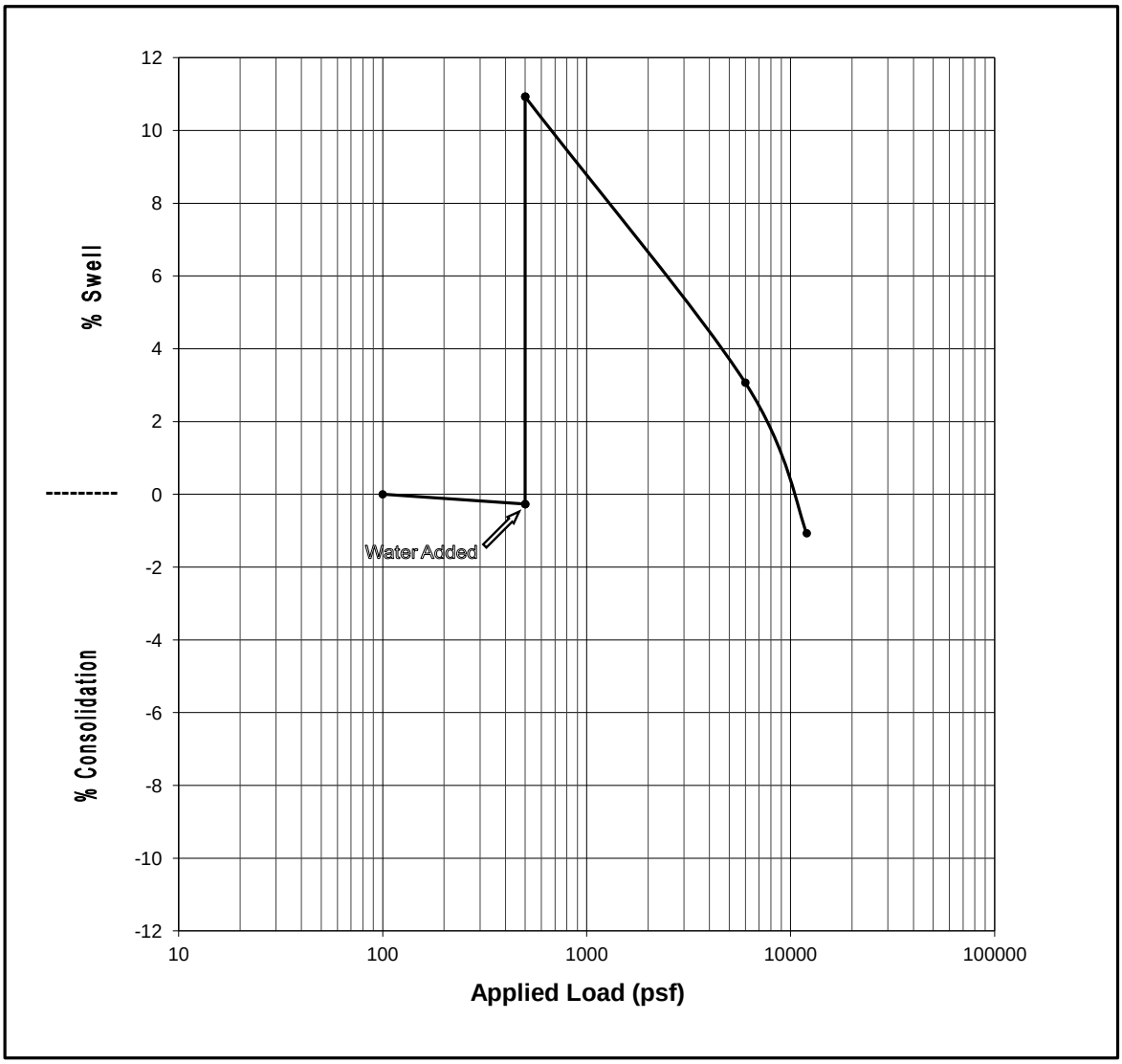
ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: B-14 @ 9'

Sample Description: Dark Gray/Yellow Claystone

Initial Moisture	11.3%	Liquid Limit	-
Final Moisture	29.3%	Plasticity Index	-
% Swell @ 500 psf	11.2%	% Passing #200	-
Swell Pressure	11,000 psf	Dry Density	109.1 pcf

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

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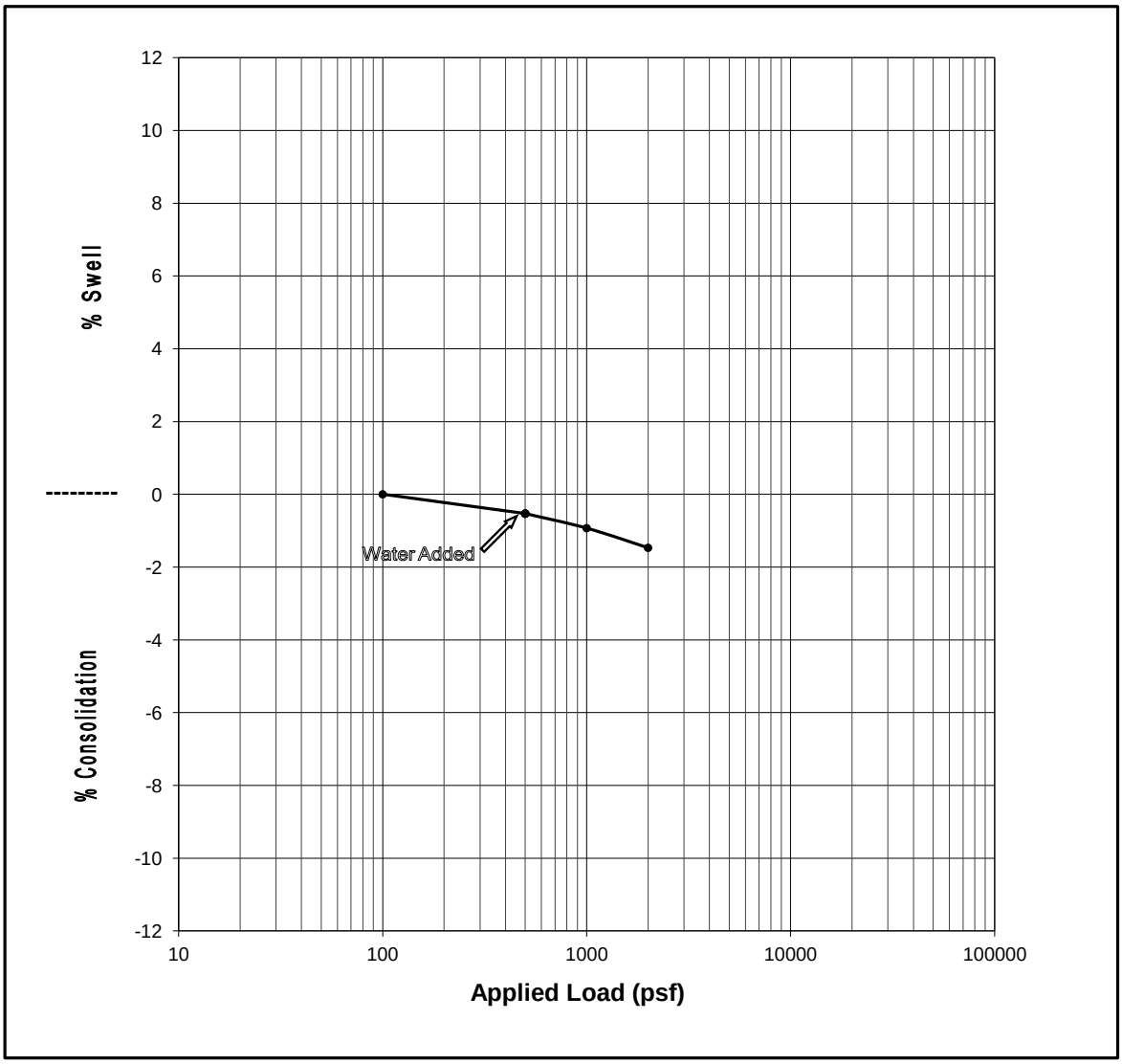


Sample ID: B-15 @ 4'

Sample Description: Brown/Beige Silty, Sandy Lean Clay (CL)

Initial Moisture	9.7%	Liquid Limit	-
Final Moisture	21.7%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	106.6 pcf

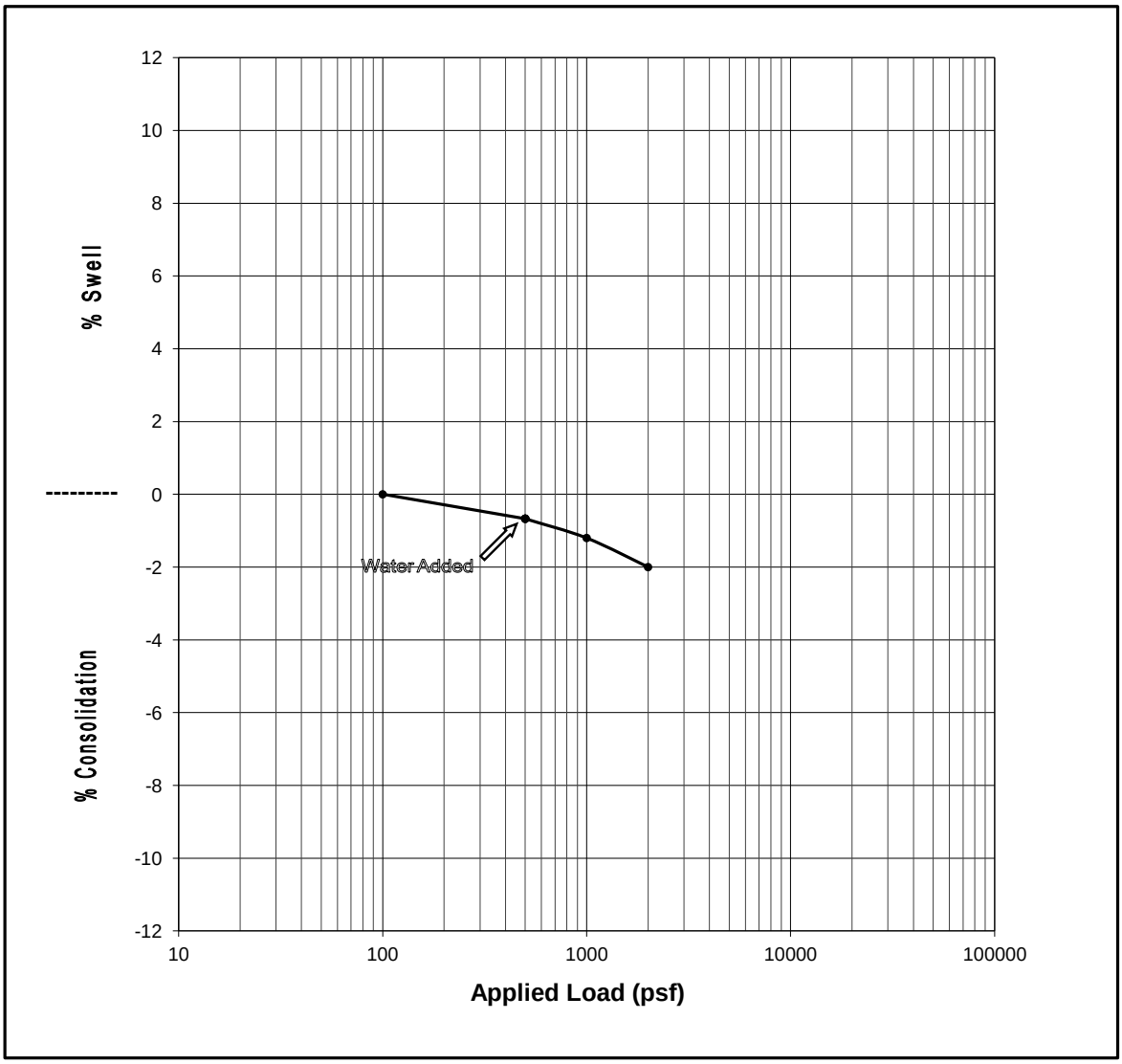
ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: B-15 @ 9'

Sample Description: Rusty Brown Clayey, Silty Sand with Sandy Lean Clay (SC-SM w/CL)

Initial Moisture	7.2%	Liquid Limit	-
Final Moisture	22.7%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	101.5 pcf

ANDALUSIA PRELIMINARY EXPLORATION

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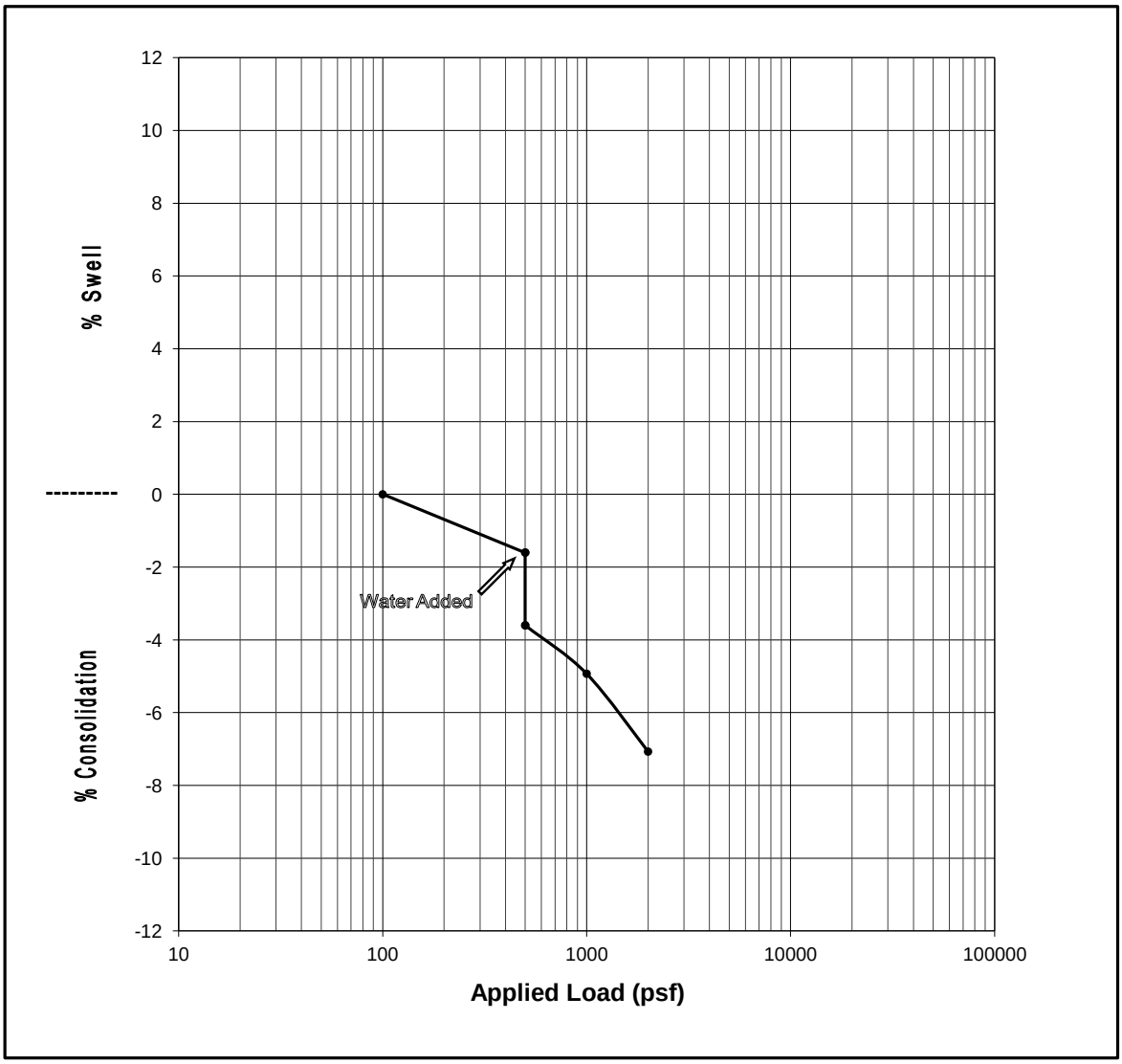


Sample ID: TP-1 @ 4'

Sample Description: Light Brown/Beige Silty to Clayey Sand (SM to SC)

Initial Moisture	24.4%	Liquid Limit	-
Final Moisture	20.8%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	101.2 pcf

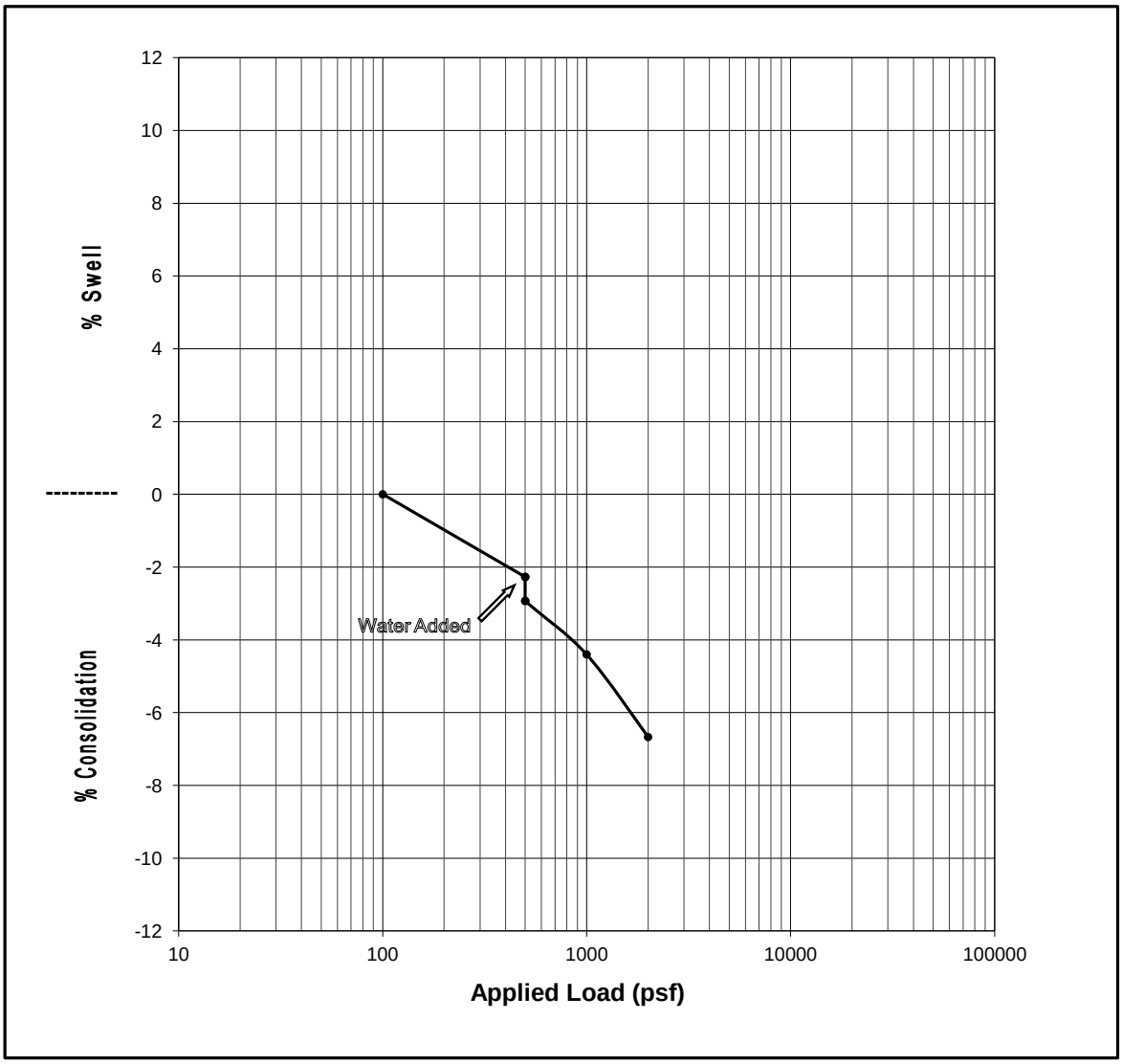
ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: TP-2 @ 4'

Sample Description: Brown Silty, Clayey Sand (SC-SM), with trace organics

Initial Moisture	22.2%	Liquid Limit	-
Final Moisture	19.5%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	103.3 pcf

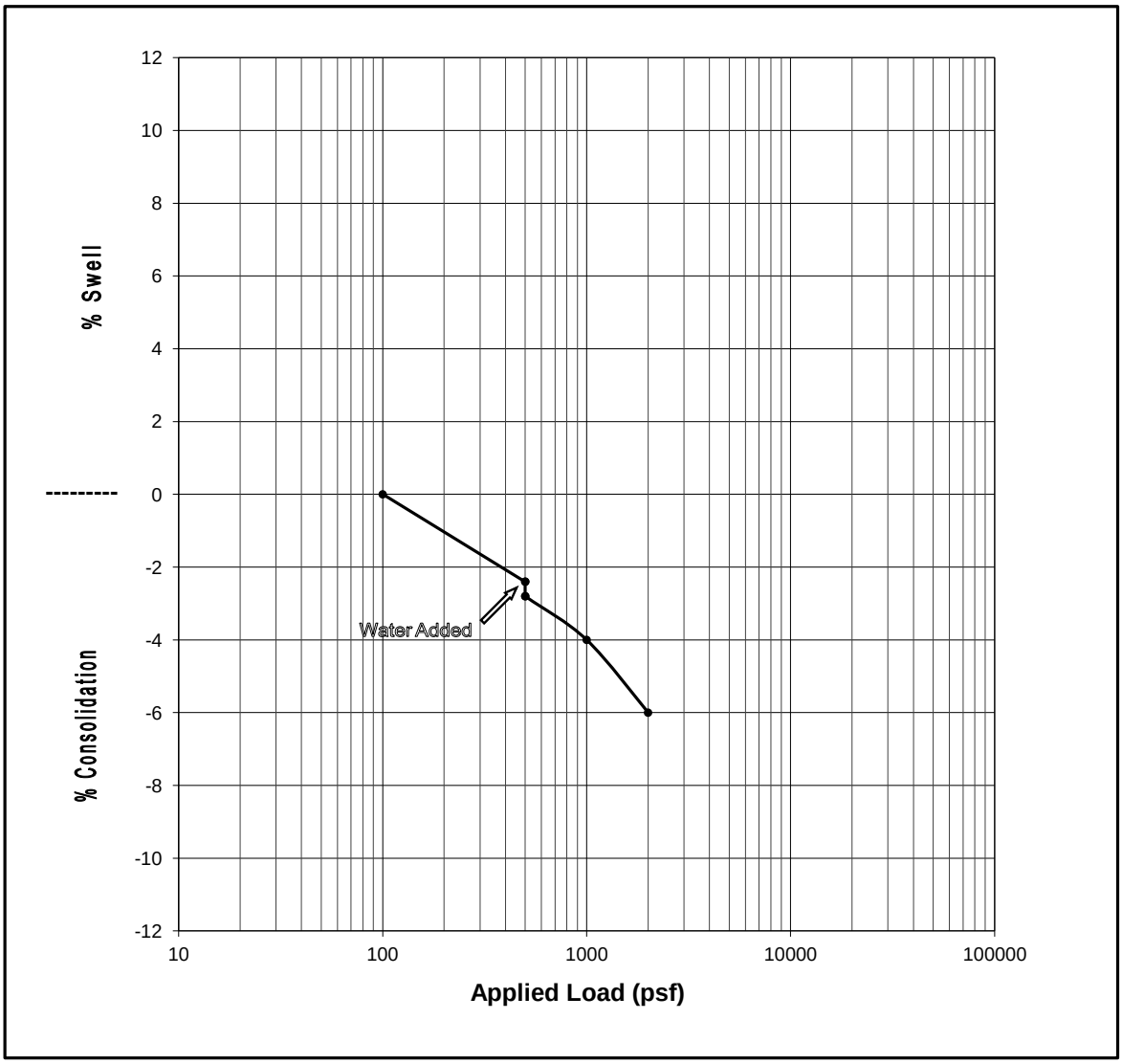
ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: TP-3 @ 4'

Sample Description: Olive Brown Clayey Sand (SC)

Initial Moisture	25.9%	Liquid Limit	-
Final Moisture	21.2%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	95.4 pcf

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

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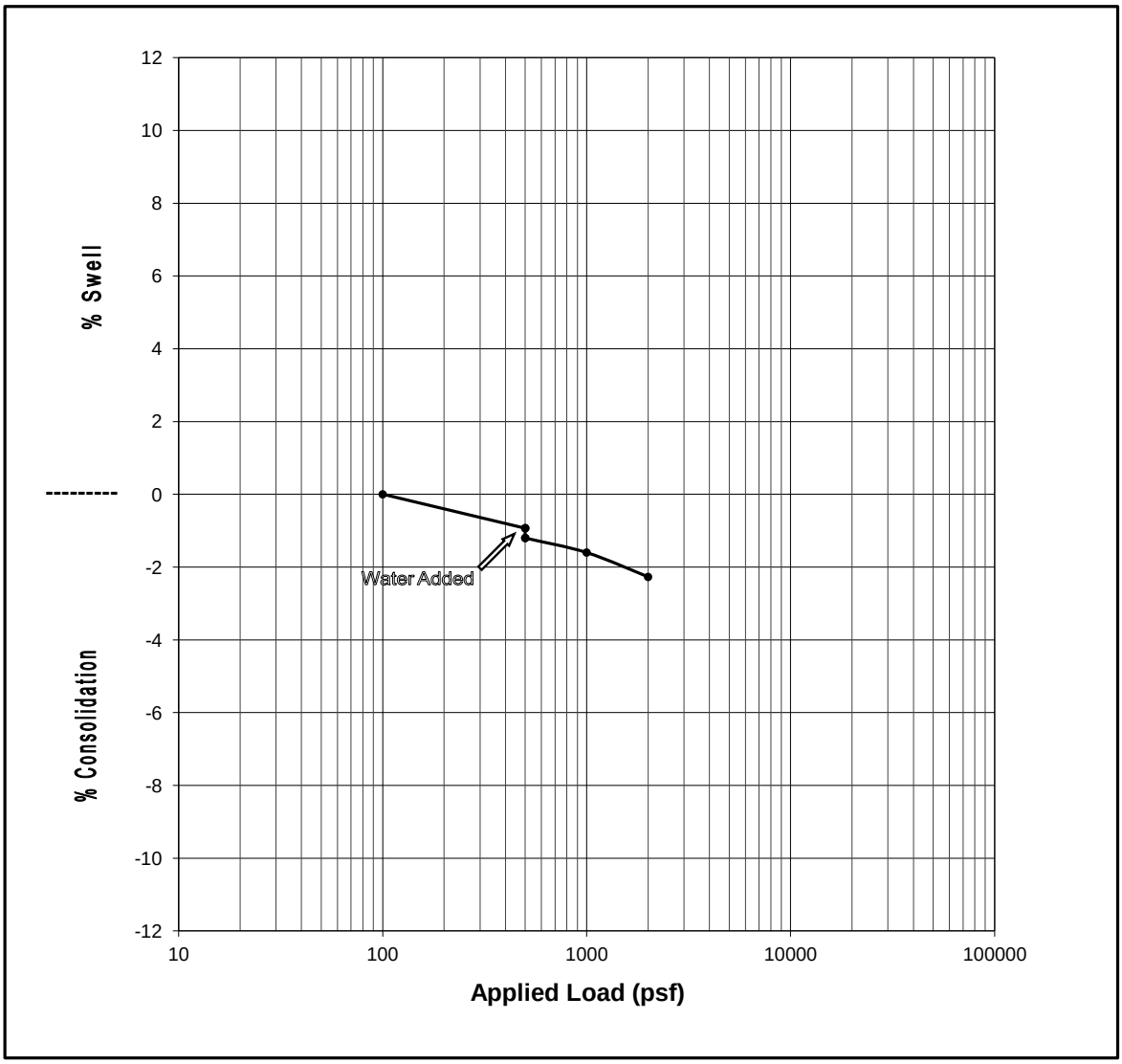
SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: TP-4 @ 4'

Sample Description: Brown Silty, Clayey Sand (SC-SM)

Initial Moisture	19.4%	Liquid Limit	-
Final Moisture	17.0%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	110.8 pcf

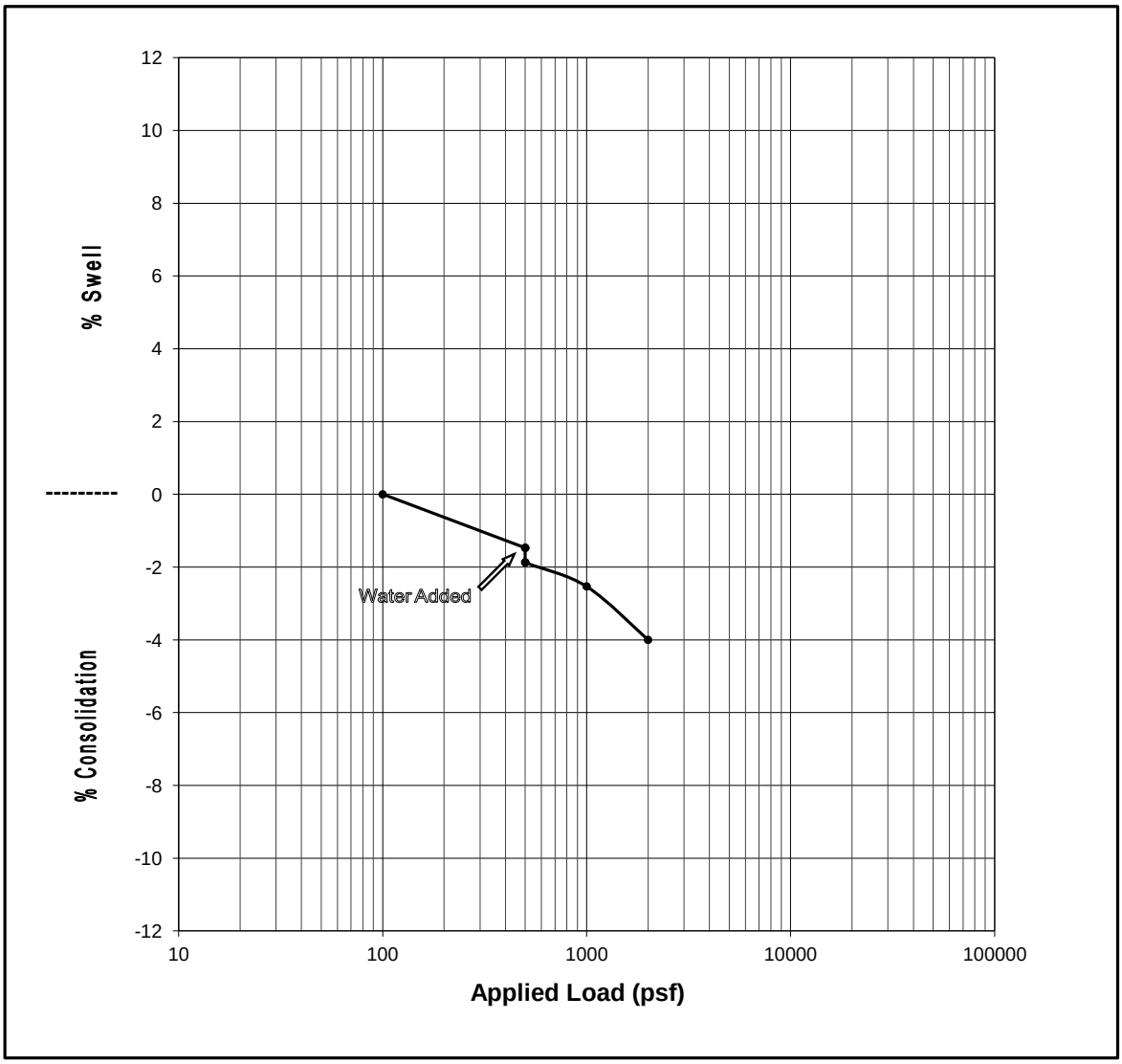
ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: TP-5 @ 2'

Sample Description: Dark Brown Silty, Clayey Sand (SC-SM)

Initial Moisture	19.5%	Liquid Limit	-
Final Moisture	19.0%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	108.8 pcf

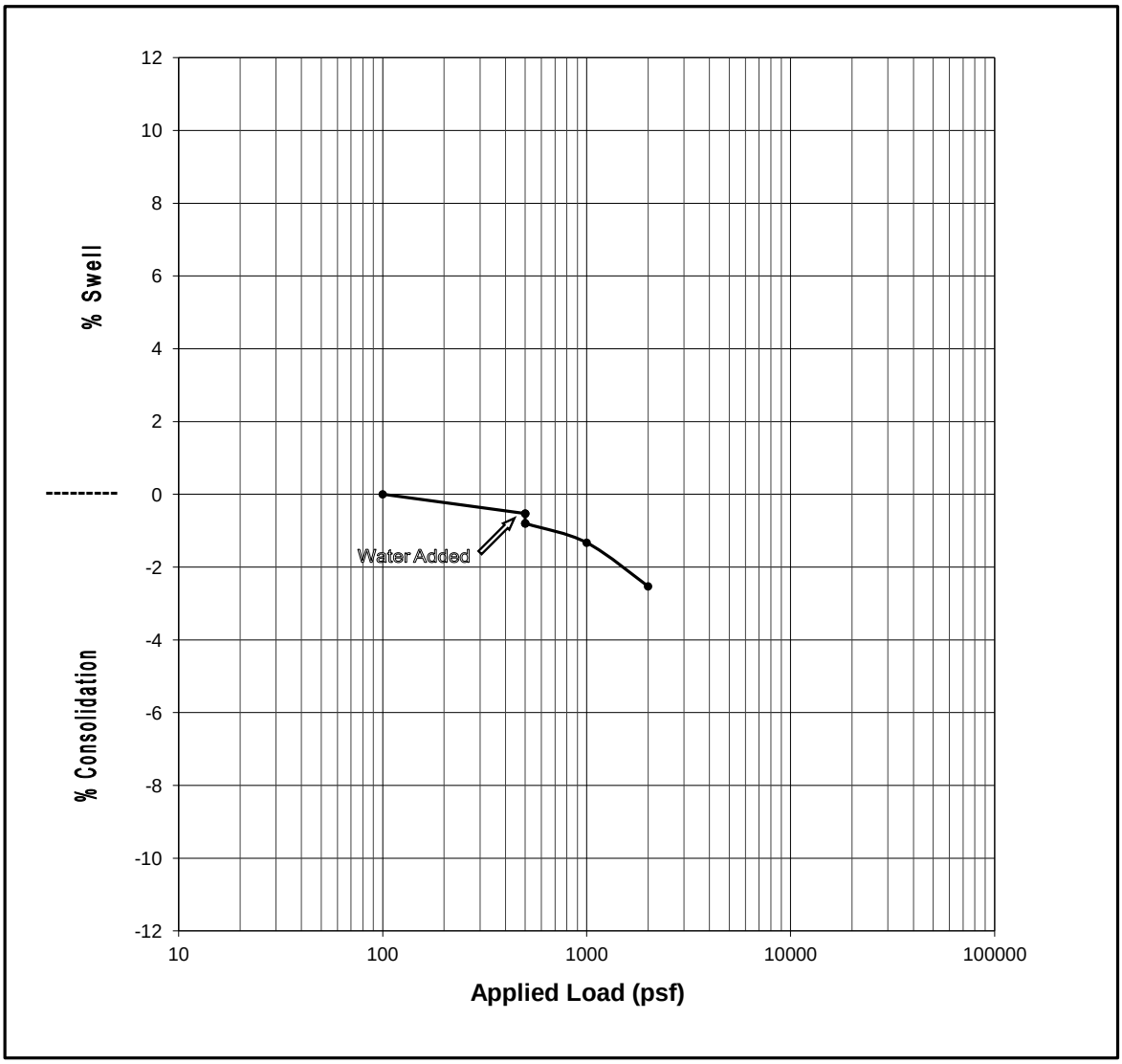
ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: TP-6 @ 4'

Sample Description: Rusty Brown Sandy Lean Clay with Silty, Clayey Sand (CL w/SC-SM)

Initial Moisture	15.2%	Liquid Limit	-
Final Moisture	17.8%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	107.1 pcf

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

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September 2013

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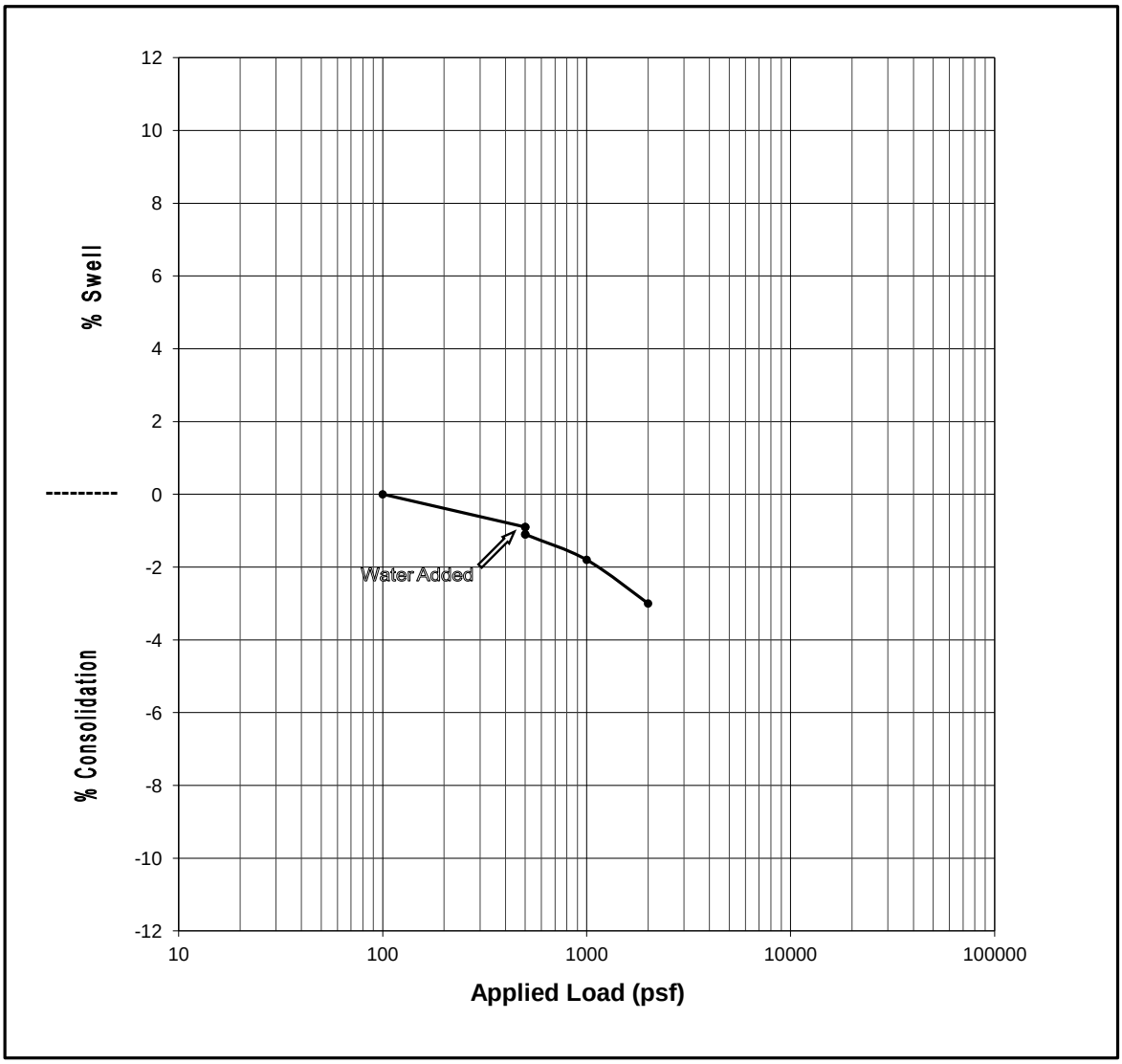


Sample ID: TP-6 @ 9'

Sample Description: Brown Clayey Sand (SC)

Initial Moisture	21.9%	Liquid Limit	-
Final Moisture	18.7%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	109.3 pcf

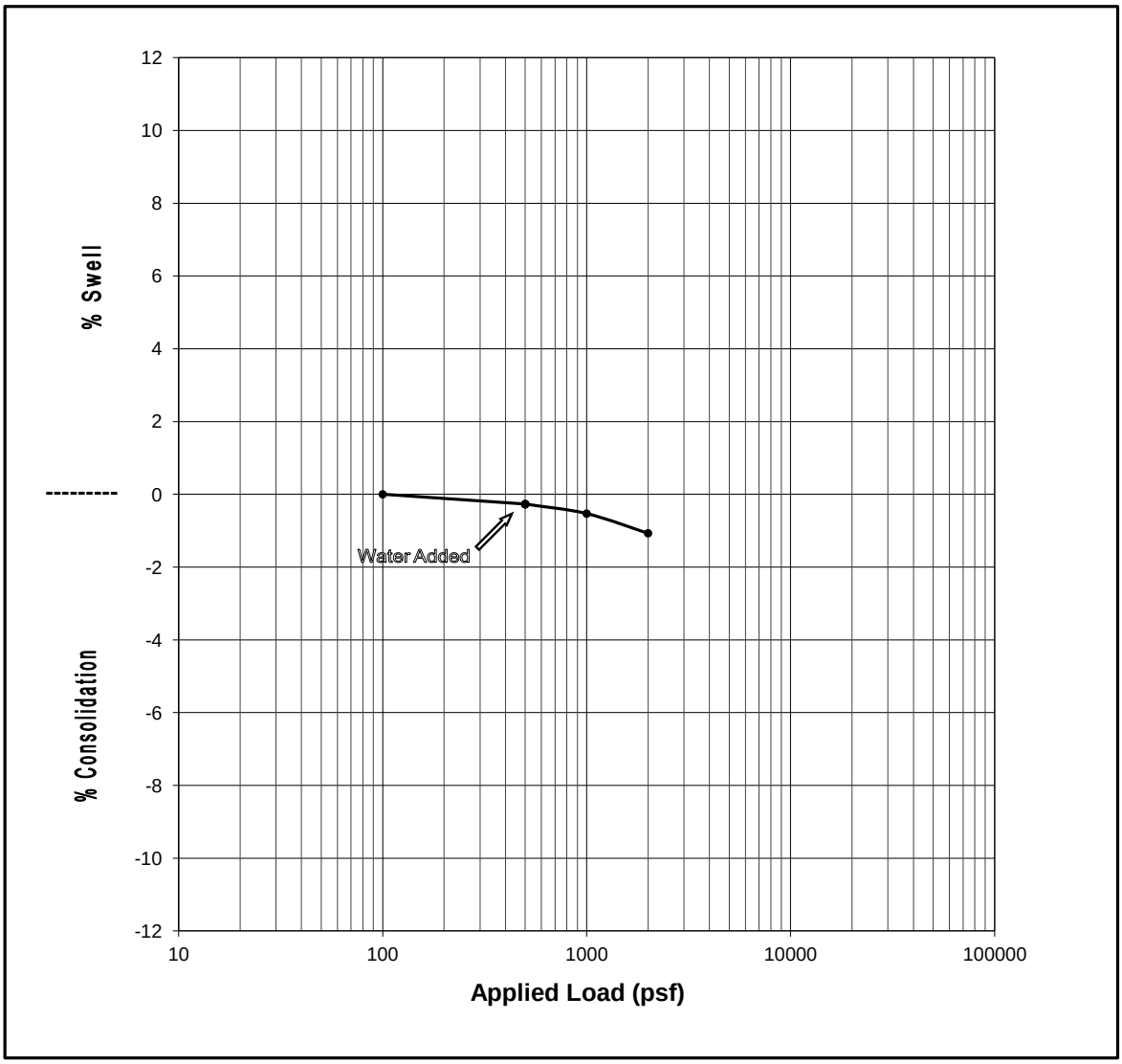
ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

Project # 13-1109

September 2013

SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: TP-7 @ 4'

Sample Description: Brown Silty, Clayey Sand (SC-SM)

Initial Moisture	21.1%	Liquid Limit	-
Final Moisture	19.2%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	104.1 pcf

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

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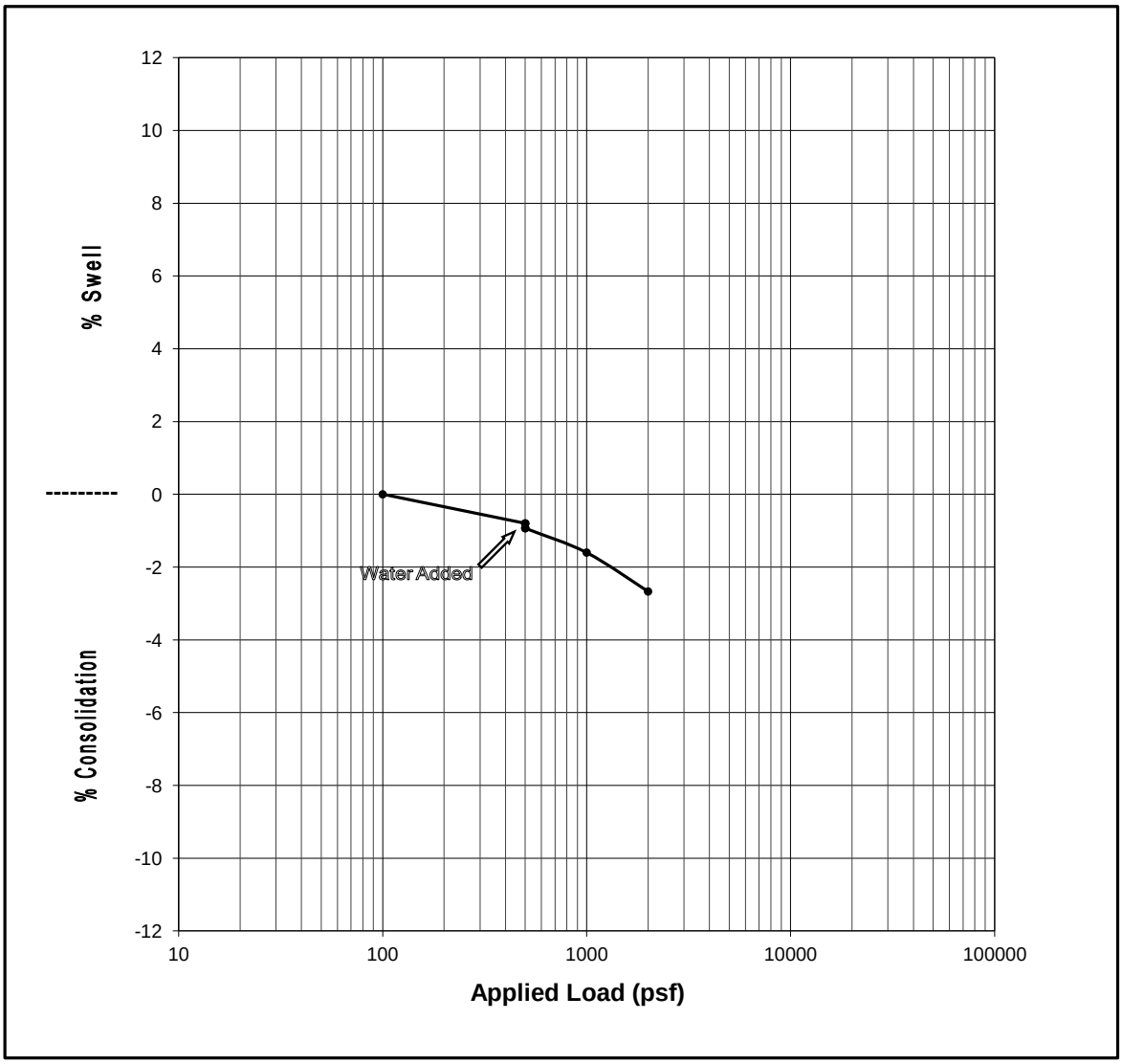

Sample ID: TP-8 @ 9'

Sample Description: Olive-Brown/Gray/Rust Siltstone/Sandstone

Initial Moisture	22.6%	Liquid Limit	-
Final Moisture	24.0%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	100.6 pcf

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

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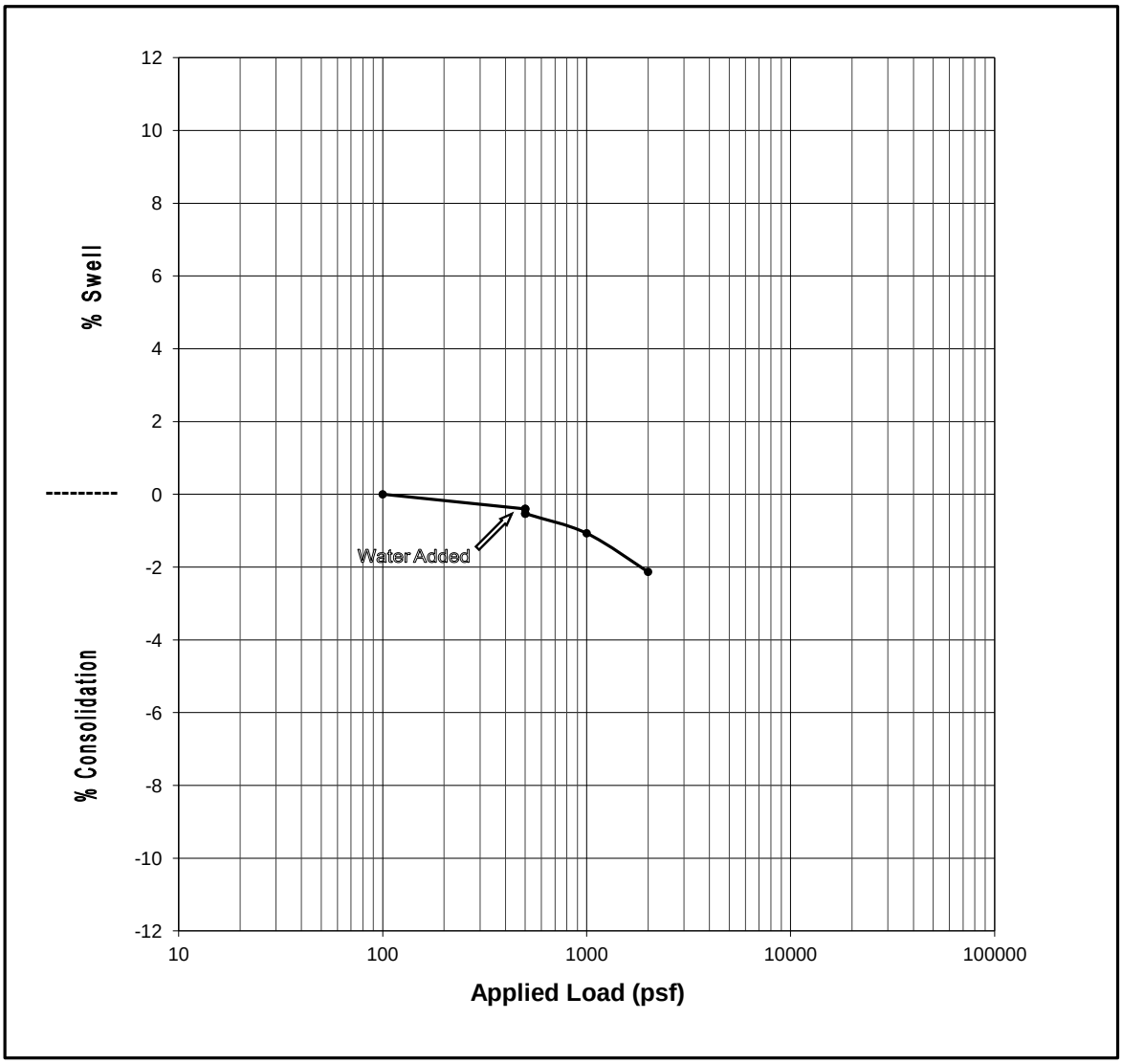
SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: TP-9 @ 9'

Sample Description: Brown Sandy Lean Clay with Silty, Clayey Sand (CL w/SC-SM)

Initial Moisture	12.0%	Liquid Limit	-
Final Moisture	21.0%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	103.0 pcf

ANDALUSIA PRELIMINARY EXPLORATION

SOUTHWEST OF CO HWY 52 AND WCR 3, ERIE, COLORADO

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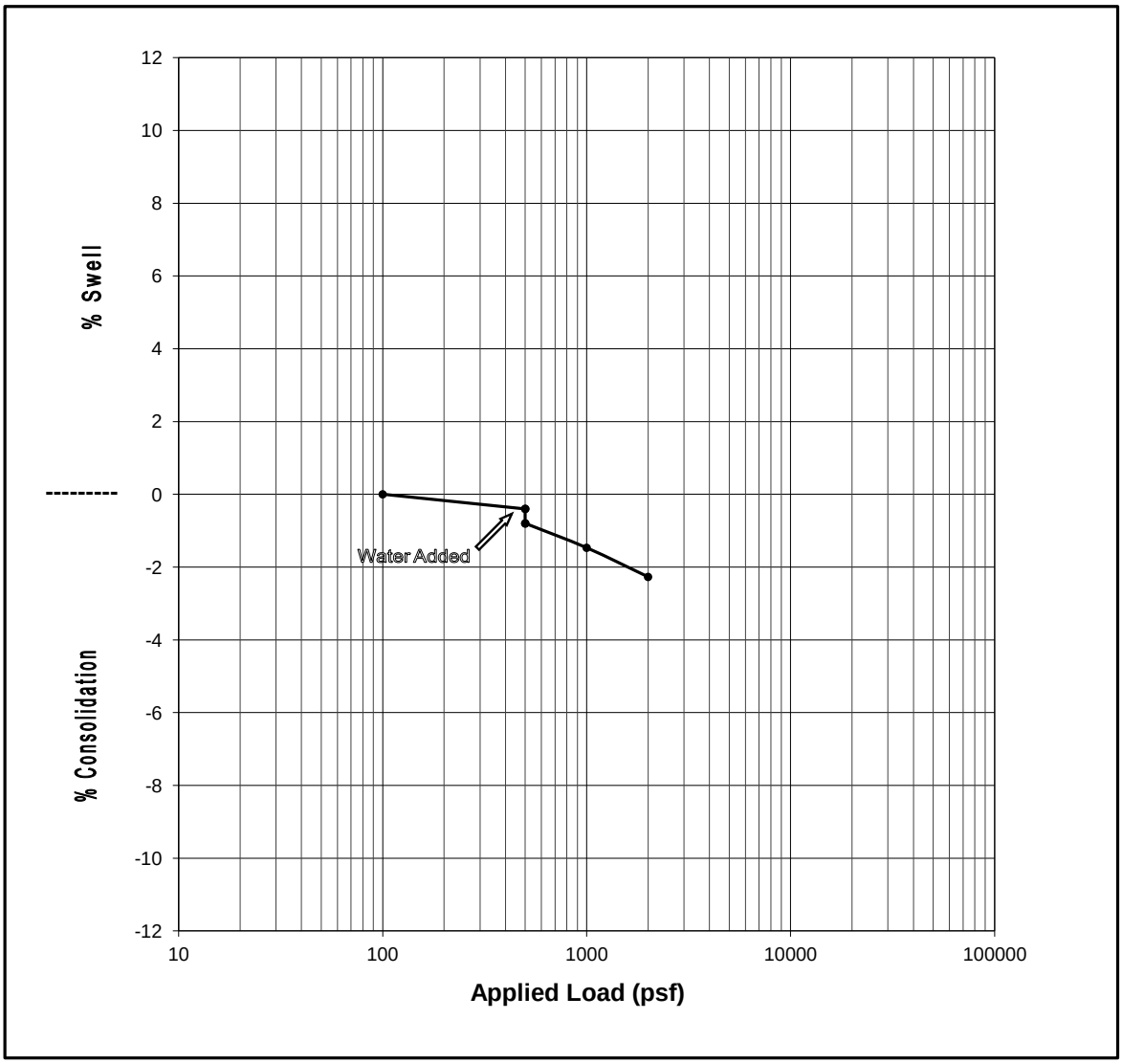
September 2013

SWELL/CONSOLIDATION TEST SUMMARY



Sample ID: TP-11 @ 4'

Sample Description: Brown Silty to Clayey Sand (SM to SC)

Initial Moisture	7.5%	Liquid Limit	-
Final Moisture	19.9%	Plasticity Index	-
% Swell @ 500 psf	None	% Passing #200	-
Swell Pressure	<500 psf	Dry Density	101.5 pcf

UNIFIED SOIL CLASSIFICATION SYSTEM

(USCS)

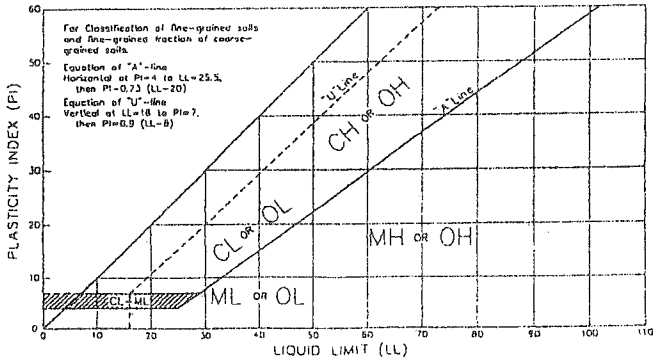
Coarse-Grained Soils more than 50% retained on No. 200 sieve	Gravels more than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines	$Cu \geq 4$ and $<Cc \leq 3$ [E]	GW	Well-graded gravel [F]
			$Cu < 4$ and/or $1 > Cc > 3$ [E]	GP	Poorly-graded gravel [F]
		Gravels with Fines more than 12% fines	Fines classify as ML or MH	GM	Silty gravel, G,H
			Fines classify as CL or CH	GC	Clayey Gravel [F,G,H]
	Sands 50% or more coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines	$Cu \geq 6$ and $1 < Cc \leq 3$ [E]	SW	Well-graded sand [I]
			$Cu < 6$ and/or $1 > Cc > 3$ [E]	SP	Poorly-graded sand [I]
		Sands with Fines more than 12% fines	Fines classify as ML or MH	SM	Silty sand [G,H,I]
			Fines classify as CL or CH	SC	Clayey sand [G,H,I]
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid Limit less than 50	inorganic	PI > 7 and plots on or above "A" Line [J]	CL	Lean clay [K,L,M]
			PI < 4 or plots below "A" Line [J]	ML	Silt [K,L,M]
		organic	Liquid Limit - oven dried / Liquid Limit - not dried < 0.75	OL	Organic clay [K,L,M,N] / Organic silt [K,L,M,O]
	Silts and Clays Liquid Limit 50 or more	inorganic	PI plots on or above "A" Line	CH	Fat clay [K,L,M]
			PI plots below "A" Line	MH	Elastic Silt [K,L,M]
		organic	Liquid Limit - oven dried / Liquid Limit - not dried < 0.75	OH	Organic clay [K,L,M,P] / Organic silt [K,L,M,Q]
Highly organic soils		Primarily organic matter, dark in color, and organic odor		PT	Peat

[A] Based on the material passing the 3-in. (75-mm) sieve
[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
[C] Gravels with 5 to 12% fines required dual symbols:
GW-GM well graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly-graded gravel with silt
GP-GC poorly-graded gravel with clay
[D] Sands with 5 to 12% fines require dual symbols:
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$, $Cc = \frac{(D_{30})}{D_{10} \times D_{60}}$

[F] If soil contains ≥15% sand, add "with sand" to group name.
[G] If fines classify as CL-ML, use dual symbol GC-CM, or SC-SM.
[H] If fines are organic, add "with organic fines" to group name
[I] If soil contains >15% gravel, add "with gravel" to group name.
[J] If Atterberg limits plots shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel", whichever is predominant.
[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.
[M] If soil contains ≥ 30% plus No. 200 predominantly gravel, add "gravelly" to group name.
[N] PI ≥ 4 and plots on or above "A" line.
[O] PI ≤ 4 or plots below "A" line.
[P] PI plots on or above "A" line.
[Q] PI plots below "A" line.



Fine Grained Soils		Coarse Grained Soils		Bedrock	
Qu (psf)	Consistency	Blows/ft	Relative Density	Blows/ft	Weathering
<500	Very Soft	0-4	Very Loose	0-50	Weathered
500-1000	Soft	5-8	Loose	50+	Competent
1001-2000	Medium Stiff	9-12	Slightly Dense	Degree of Weathering	
2001-4000	Stiff	13-30	Medium Dense	Slight:	Slight decomposition, possible color change
4001-8000	Very Stiff	31-50	Dense	Moderate:	Some decomposition and color change throughout
8001-16000	Very Hard	50+	Very Dense	High:	Rock highly decomposed, may be extremely broken

GENERAL NOTES

DRILLING & SAMPLING SYMBOLS:

SS:	Split Spoon - 1⅜" I.D., 2" O.D., unless otherwise noted	HS:	Hollow Stem Auger
ST:	Thin-Walled Tube – 2.5" O.D., unless otherwise noted	PA:	Power Auger
RS:	Ring Sampler - 2.42" I.D., 3" O.D., unless otherwise noted	HA:	Hand Auger
CS:	California Barrel - 1.92" I.D., 2.5" O.D., unless otherwise noted	RB:	Rock Bit
BS:	Bulk Sample or Auger Sample	WB:	Wash Boring or Mud Rotary

The number of blows required to advance a standard 2-inch O.D. split-spoon sampler (SS) the last 12 inches of the total 18-inch penetration with a 140-pound hammer falling 30 inches is considered the "Standard Penetration" or "N-value". For 2.5" O.D. California Barrel samplers (CB) the penetration value is reported as the number of blows required to advance the sampler 12 inches using a 140-pound hammer falling 30 inches, reported as "blows per inch," and is not considered equivalent to the "Standard Penetration" or "N-value".

WATER LEVEL MEASUREMENT SYMBOLS:

WL:	Water Level	WS:	While Sampling
WCI:	Wet Cave in	WD:	While Drilling
DCI:	Dry Cave in	BCR:	Before Casing Removal
AB:	After Boring	ACR:	After Casing Removal

Water levels indicated on the boring logs are the levels measured in the borings at the times indicated. Groundwater levels at other times and other locations across the site could vary. In pervious soils, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of groundwater levels may not be possible with only short-term observations.

DESCRIPTIVE SOIL CLASSIFICATION: Soil classification is based on the Unified Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

FINE-GRAINED SOILS			COARSE-GRAINED SOILS			BEDROCK		
(CB) Blows/Ft.	(SS) Blows/Ft.	Consistency	(CB) Blows/Ft.	(SS) Blows/Ft.	Relative Density	(CB) Blows/Ft.	(SS) Blows/Ft.	Consistency
< 3	0-2	Very Soft	0-5	< 3	Very Loose	< 24	< 20	Weathered
3-5	3-4	Soft	6-14	4-9	Loose	24-35	20-29	Firm
6-10	5-8	Medium Stiff	15-46	10-29	Medium Dense	36-60	30-49	Medium Hard
11-18	9-15	Stiff	47-79	30-50	Dense	61-96	50-79	Hard
19-36	16-30	Very Stiff	> 79	> 50	Very Dense	> 96	> 79	Very Hard
> 36	> 30	Hard						

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Terms of Other Constituents	Percent of Dry Weight
Trace	< 15
With	15 – 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300mm)
Cobbles	12 in. to 3 in. (300mm to 75 mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm)
Silt or Clay	Passing #200 Sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

Descriptive Terms of Other Constituents	Percent of Dry Weight
Trace	< 5
With	5 – 12
Modifiers	> 12

PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1-10
Medium	11-30
High	30+

SOILOGIC

Phase I Environmental Site Assessment

Andalusia Property, 313 Acres within Section 6,
Township 1 North, Range 68 West,
Erie, Colorado 80516

Prepared For:
I & J Partnership
c/o Jerry Bouldin
STF Land Development Consultants, Inc.
3733 Florentine Circle
Longmont, CO 80503

WESTERN ENVIRONMENT AND ECOLOGY, INC.
2217 West Powers Avenue
Littleton, Colorado 80120
(303) 730-3452
(303) 730-3461 (fax)
westernenvironment.com

Phase I Environmental Site Assessment

Andalusia Property, 313 Acres within Section 6,
Township 1 North, Range 68 West,
Erie, Colorado 80516

Western Environment and Ecology, Inc.
Project Number: 640-001-01

June 4th, 2014

Prepared for:
I & J Partnership
c/o Jerry Bouldin
STF Land Development Consultants, Inc.
3733 Florentine Circle
Longmont, CO 80503

Prepared By:

Austin Curry
Staff Scientist

Greg D. Sherman P.G.
President

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TABLE OF CONTENTS

1.0 INTRODUCTION

The purpose of a Phase I Environmental Site Assessment is to identify, to the extent feasible, recognized environmental conditions in connection with the subject property. A Phase I Environmental Site Assessment has four components - Records Review, Site Reconnaissance, Interviews and a Report. These specific activities are further defined by the American Society for Testing and Materials (ASTM E 1527-13, Standard Practice for Environmental Site Assessments; Phase I Environmental Site Assessments, December 2013).

The U.S. Environmental Protection Agency issued a final rule governing "All Appropriate Inquiries" (AAI) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) on November 1, 2006 (40 C.F.R. Part 312). The EPA has determined that a Phase I Environmental Site Assessment prepared in accordance with ASTM 1527-13 meets the AAI requirements.

Western Environment and Ecology, Inc. (Western Environment) has previously performed several investigations on the subject property, including Phase I Environmental Site Assessments (Project #330-003-01 and #330-004-01). The results of these investigations were used in the preparation of this report.

The following document was prepared at the request of Mr. Jerry Bouldin, representative for the current owners of the property, the Moradi Family. Mr. Bouldin indicated that this Phase I Assessment was in expectation of the potential sale and residential development of the property.

On February 20th, 2014, Western Environment provided an Environmental Questionnaire to Mr. Bouldin. The questionnaire (attached), which was returned, on March 10th, 2014, stated he was unaware of any environmental issues, liens, covenants, or hazardous materials spills associated with the site. Additionally, during a telephone conversation with Western Environment on March 12th, 2014, Mr. Bouldin indicated that he was only familiar with the results of the previous Environmental Assessments performed by Western Environment. The Weld County Assessors Office records indicate that the subject property consists of five parcels. The northern parcel is currently owned by I & J Partnership LP, and the ownership of the four southern parcels is divided into multiple proportional trusts and holdings of the Moradi family.

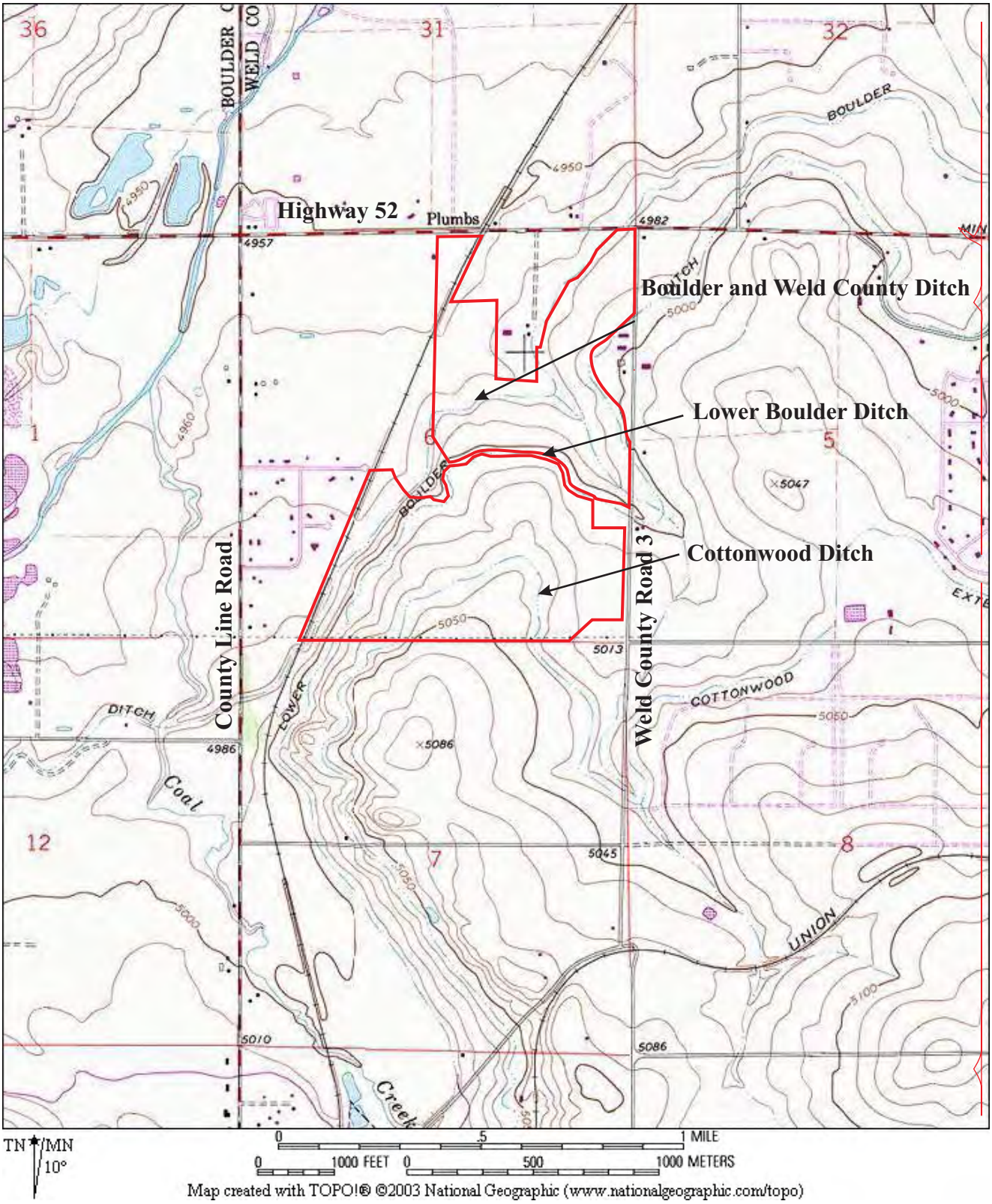
2.0 SITE DESCRIPTION

This Phase I Environmental Site Assessment was conducted for five parcels consisting of approximately 313 acres within Section 6, Township 1 North, Range 68 West, Erie, Colorado. According to the Weld County Assessors Office, the property is currently zoned for agricultural. For the purpose of this report, the property is divided into northern and southern parcels by the Lower Boulder Ditch (Figure 1).

The northern parcel of the project is surrounded by agricultural property to the north, south, and east, and west. With the exception of oil and gas production facilities, the site contains only one 2,160 ft^2 agricultural equipment building built in 2006 (Figure 2). There are large lot single family homes on the properties surrounding the site, as well as an abandoned dairy bordering the site on the east. Two irrigation ditches are located on the northern parcel. The Boulder & Weld County Ditch bisects the parcel from west to east, while the Lower Boulder Ditch comprises the southern border of the project. Twelve oil/gas wells are present in the northern parcel. Also, an abandoned Burlington Northern Railroad right of way bisects the northwest corner of the property.

The southern tract of the site is surrounded by agricultural property to the north, south, and east, and residential development to the west. Individual farm homes are located to the northwest, southeast, and east of the property. Sixteen oil/gas wells occur on the southern portion. In addition to The Boulder & Weld County Ditch occurring to the west and the Lower Boulder Ditch comprising much of the border to the north, the southern parcel is also bisected by the Cottonwood Extension Ditch (Figure 2).

Topographically, the northern parcel slopes northeast towards The Boulder & Weld County Ditch, while the southern parcel sits on an ridge and slopes downward to the north, east, and west. Soils and bedrock in this area generally consist of sandy clay soil overlying the Cretaceous Age Laramie Formation (Tweto 1979). The Colorado Division of Water Resources records indicated that a domestic use water well (Permit # 209646) is located to the west of the property at 423 Westview Road, Erie. This well is 500 foot deep and produces 7 gallons per minute from a static water level at 25 feet.



USGS Erie, CO Quadrangle, 1978

WESTERN ENVIRONMENT AND ECOLOGY, INC.
2217 West Powers Avenue
Littleton, Colorado 80120

Figure 1 - Site Location Map
Andalusia Project
313 Acres
Section 6, T1N, R68W
Erie, Colorado

Scale 1 Inch = 1500 feet

0 1500

Aerial Photo from: Weld County Assessor

WESTERN ENVIRONMENT
AND ECOLOGY, INC.
2217 West Powers Avenue
Littleton, Colorado 80120

Figure 2 - Project Map
Andalusia Project
313 Acres
Section 6, T1N, R68W
Erie, Colorado

3.0 RECORDS REVIEW

The purpose of the records review is to obtain and review information that will help identify the potential for recognized environmental conditions in connection with the property. Availability of records varies from information source to information source, including governmental jurisdictions. Western Environment did not identify, obtain or review every possible record that might exist with respect to the property. Instead, record information from reasonably ascertainable standard sources was reviewed. The approximate minimum search distance utilized in the review, the resources utilized, and the number of sites found are listed below:

Lists Reviewed	ASTM Standard Minimum Search Distance	Number of Site Within Search Distance
Federal and Colorado NPL List	1.0 mile	0
Federal and State CERCLIS List	0.5 Mile	0
Federal RCRA TSD Facilities List	1.0	0
Federal RCRA Generators List	Property and Adjoining Property	0
Federal RCRA Corrective Action List	1.0	0
State Landfill and/or Solid Waste Disposal Site List	0.5	0
State Leaking UST List	0.5	0
State Registered UST List	Property and Adjoining Property	0
Colorado Brownfield / Voluntary Cleanup List	0.5	0
Federal ERNS List	Property and Adjoining Property	0

Definitions:

NPL: *National Priority List (Superfund)*
CERCLIS: *Comprehensive Environmental Response, Compensation and Liability Information System*
RCRA: *Resource Conservation and Recovery Act*
TSD: *Hazardous Waste Transport, Storage, and Disposal*
UST: *Underground Storage Tank*
ERNS: *Emergency Response Notification System*

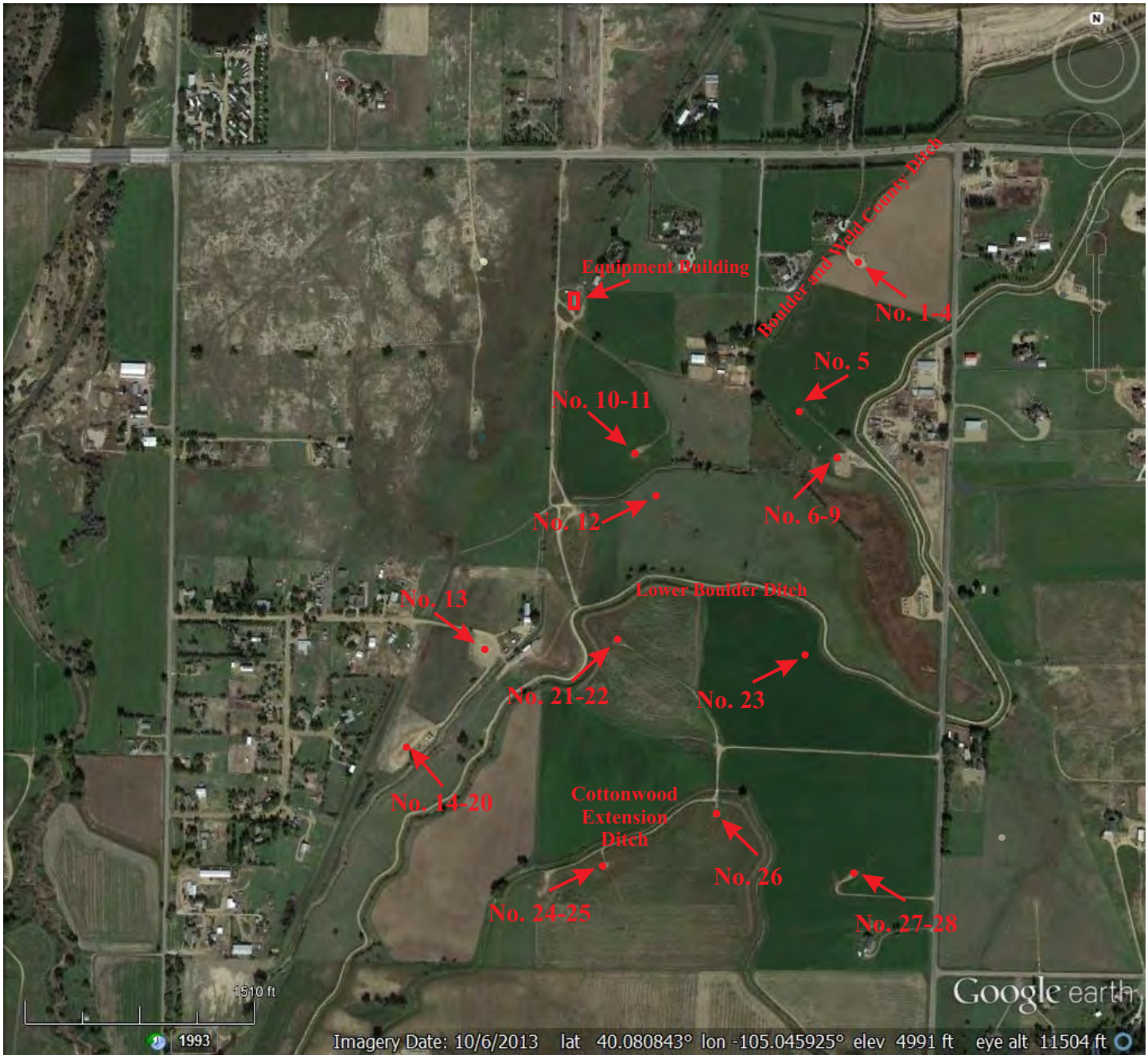
3.1 Results

No sites were located within the minimum ASTM search distances during the records review.

3.2 Colorado Oil and Gas Conservation Commission

The Colorado Oil and Gas Conservation Commission (COGCC) indicates that 28 oil/gas production wells occur on the property (Figure 3). Records for these wells, including the facility ID, name, current operator, recorded releases, and current status, are located below.

Facility ID	Facility Name	Operator	Releases	Current Status	Map Number
05-123-32921	I & J 1-6-7H	KP Kauffman Company, Inc.	None	XX	1
05-123-26881	Bulthaup 1-6	Kerr-McGee	None	Producing	2
05-123-26882	Bulthaup 27-6	Kerr-McGee	None	Producing	3
05-123-16057	Koch 41-6	KP Kauffman Company, Inc.	**6/31/1996**	Producing	4
05-123-26880	Bulthaup 17-6	Kerr-McGee	None	Producing	5
05-123-09204	Kenneth E Koch 1	KP Kauffman Company, Inc.	None	Producing	6
05-123-26879	Bulthaup 8-6	Kerr-McGee	None	Producing	7
05-123-26890	Bulthaup 24-6	Kerr-McGee	None	Producing	8
05-123-26891	Bulthaup 40-6	Kerr-McGee	None	Producing	9
05-123-26878	I & J 7-6	Kerr-McGee	None	Producing	10
05-123-26883	Bulthaup 21-6	Kerr-McGee	None	Producing	11
05-123-20489	Bulthaup 7-6	KP Kauffman Company, Inc.	None	AL	12
05-123-22162	Bearden 23-6	Encana Oil and Gas	**3/23/2010**	Producing	13
05-123-23602	Bearden 13-6	Encana Oil and Gas	None	Producing	14
05-123-34942	Bearden 2-4-6	Encana Oil and Gas	None	Producing	15
05-123-09764	Bearden 1	Encana Oil and Gas	**1/19/2005**	Producing	16
05-123-34949	Bearden 0-6-6	Encana Oil and Gas	None	Producing	17
05-123-23001	Bearden 14-6	Encana Oil and Gas	**3/23/2010**	Producing	18
05-123-34943	Bearden 2-8-6	Encana Oil and Gas	None	Producing	19
05-123-23559	Bearden 24-6	Encana Oil and Gas	None	Producing	20
05-123-26888	Bulthaup 10-6	Kerr-McGee	None	Producing	21
05-123-29465	Bulthaup 9-6	Kerr-McGee	None	Producing	22
05-123-26889	Bulthaup 9-6	Kerr-McGee	None	AL	23
05-123-26886	Bulthaup 23-6	Kerr-McGee	None	Producing	24
05-123-26887	Bulthaup 15-6	Kerr-McGee	None	Producing	25
05-123-12456	Kenneth E Koch A-1	Kerr-McGee	None	Producing	26
05-123-26885	Bulthaup 16-6	Kerr-McGee	None	Producing	27
05-123-06884	Bulthaup 39-6	Kerr-McGee	None	Producing	28



Scale 1 Inch = 1500 feet

0 1500

Aerial Photo from: Google Earth

WESTERN ENVIRONMENT AND ECOLOGY, INC.
2217 West Powers Avenue
Littleton, Colorado 80120

Figure 3 - Well Location Map
Andalusia Project
313 Acres
Section 6, T1N, R68W
Erie, Colorado

The majority of the releases reported are minor soil staining associated with leaking valves. COGCC inspectors required that the operators remove the soil. However, a significant release was reported associated with one oil/gas production facility on the northern parcel of the property. A letter from HS Resources, Inc dated June 12th, 1996 described a release from the above the Koch 41-6 Tank Battery. Remedial efforts including soil removal were performed by KP Kaufman. The June 12th letter indicated that groundwater may have been impacted by the release. However, no mention of remedial actions or additional investigations was contained within the document. During the completion of the previous assessments, Western Environment personnel attempted to contact Mr. Alan Williams of Kerr-McGee (HS Resource, Inc is now Kerr-McGee) to inquire about further investigation of soil and groundwater near the facility. Mr. Williams and Kerr McGee did not respond to these inquires. No additional information concerning this release was available with the COGCC.

Records also indicate that a release associated with the Bearden 1 Tank Battery facility has occurred on southern parcel of the property. Remedial efforts have included soil removal and groundwater removal and treatment. A letter from the Colorado Oil and Gas Conservation Commission dated May 18th, 2005 required one year of quarterly groundwater monitoring and additional groundwater sampling within the "source area". If the groundwater samples indicate contamination below the maximum contaminate levels, then the site will not require any additional investigation. On January 11th, 2006 the COGCC published a letter stating that the Bearden 1 Tank Battery had met conditions for remediation closure.

Subsequently, in March of 2013 petroleum impacted soil was discovered below a flowline near the production water tank on the Bearden Well Pad and Tank Battery. On February 12th, 2014, Encana Oil and Gas (USA), Inc. installed 10 monitoring wells on and adjacent to the Bearden Well Pad. These wells, which were drilled by Eagle Environmental Consulting Services, Inc. (Eagle), were sampled and determined to have soil and groundwater contamination above above COGCC regulatory limits. These results are presented in a report dated March 10th, 2014 (attached). Groundwater beneath the Bearden site is shallow, approximately 5-6 feet below the surface and flows to the northwest away from the proposed Andalusia project. Currently, no active remediation of soil or groundwater is occluding. However, the Eagle report does recommend that Air Sparging and Vapor Extraction be used to reduce contaminate levels to regulator limits.

3.3 Government Inquiries

On February 20th, 2014, Western Environment submitted an Environmental Issues Inquiries to the Weld County Department of Public Health and Environment and the Mountain View Fire Department regarding the subject property. LuAnn Penfold of the Mountain View Fire Department verbally responded to the inquiry on February 24th, 2014, stating that the Department was unable to find any records regarding the subject property. On February 26th, 2014, Ms. Marcela Swain of the Weld County Department of Public Health and Environment, indicated that she did not have any records of incident or complaint associated with the subject property. The inquiry letters and Ms. Swain's response are included in the appendix.

3.4 Aerial Photography Review

Aerial photography from April 29th, 1965 to October 7th, 2012 was reviewed to document previous uses of the property. In all photos reviewed, the subject property was in agricultural use. Aerial photography from April 29th, 1965 and November 7th, 1974 and show fewer residences to the west of both parcels. In photos from and earlier, the residence to the west, as well as the oil wells, were not visible. In photos from May 3rd, 2000 and earlier, the residence to the southeast is not visible. In the photo from March 30th, 2008 new gas well facilities are visible to the west, as well as a trash pit just south of the Cottonwood Extension Ditch. In the July 15th, 2010 photos, new gas well facilities and tank batteries are visible on the east end of the site property. A complete list of photos reviewed is presented in Appendix B.

4.0 SITE INSPECTION / INTERVIEWS

The purpose of a site reconnaissance is to obtain information indicating the likelihood of identifying recognized environmental conditions in connection with the property. During site visits on March 6th, 2014 and April 24th, 2014, Western Environment personnel visually and physically observed the property to the extent not obstructed by bodies of water, adjacent buildings, or other obstacles and debris. The property was inspected to identify unusual debris, chemical staining, evidence of contamination, and hazardous materials.

At the time of inspection, the northeastern area of the northern parcel contained irrigated crops, however the remainder of the of the northern parcel was used for grazing or fallow. Twelve oil/gas wells were observed throughout the northern parcel, including an older oil well labeled Koch 41-6, located in the northeast area of the site just east of the Boulder and Weld Ditch. No petroleum staining was observed associated with these facility.

One of the 28 petroleum production facilities on the project

A large currently leased equipment building was observed in the northwest corner of the property. Various agricultural equipment and heavy machinery surrounded the building. No soil staining was observed around the structure. Two cattle sheds made from underground storage tanks were observed on the property. A large cattail marsh is present in the center portion of the northen tract. Off site inspection of the residences adjoining the property indicated that they contained homes and varying numbers of buildings. The old Koch Dairy farm borders the project site to the east, and contains many sheds and abandoned vehicles parked on the property. Additionally, the residence to the northeast contained an above ground storage tank.

Leased equipment shed northwest portion of site

At the time of the inspection, the southern parcel of the subject site was also in agricultural use. Areas to the east contained irrigated crops including alfalfa hay with the western area used for grazing. Hay bales, and farm equipment were observed in the center of the property. Sixteen oil/gas wells were located throughout the southern parcel. No significant soil staining was observed adjacent to the wells. A trash burn pit for was observed on the southwest end of the property. This pit contained lumber, bailing twine tree limbs, household trash and deer and cow carcasses.

Burn pit, view to northwest

5.0 CONCLUSIONS

Western Environment and Ecology, Inc. performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527-13 for 313 acres in the East ½ of Section 6, Township 1 North, Range 68 West, Weld County, Colorado. Any exceptions to, or deletions from, this practice are described in Section 5.1 of this report. **This assessment has revealed no evidence of recognized environmental conditions in connection with the subject property except**:

- **Soil and groundwater contamination from past reported releases associated with petroleum production facilities**. **According to Title 34, Article 60 (As Amended) of the "Oil and Gas Conservation Act" Section 34-06-102 the State of Colorado gives the Oil and Gas Commission legislative declaration over the development, production, and utilization of the natural resources in the state of Colorado. Moreover, this legislation gives the Commission the authority to force the operator to perform remediation activities deemed necessary in compliance with all Federal and State health regulations.** The majority of these events involve stained soil and can be considered minor. However, Western Environment did perform a Limited Phase II Environmental Site Assessment (Project # 640-001-02) of wells with reported releases (Koch 41-6 and Kenneth E Koch 1). This assessment (attached) did not identify any soil or groundwater contamination.
- **Soil and groundwater contamination associated with the Bearden Tank Battery**. This is an on-going event under the supervision of the COGCC. However, due to the groundwater flow direction, the contamination is migrating to the north and west away from the proposed Andalusia development.
- **Uncontrolled dumping and burning**. The contents of the burn pit should be removed and properly disposed of.

5.1 Deviations

Due to the site being undeveloped, records search of building departments , city directories and Sandborn Fire Maps could not be performed. It is the opinion of Western Environment that this lack of information does not constitute a Data Failure as defined by ASTM E-1527-13, Section 8.3.2.3. No other significant "Data Gaps" as defined in ASTM E-1527-13, Section 12.7 were identified.

APPENDICES

APPENDIX A

REFERENCE LISTS

Radius Report

Satellite view

Target Property:

Andalusia
Weld County, Colorado 80516

Prepared For:

Western Environment & Ecology Inc

Order #: 32891
Job #: 73086
Project #: 640-001-01
Date: 02/24/2014

Table of Contents

Target Property Summary

Andalusia
Weld County, Colorado 80516

USGS Quadrangle: ***Erie, CO***
Target Property Geometry: ***Area***

Target Property Longitude(s)/Latitude(s):
(-105.03708, 40.087599), (-105.03743, 40.073237), (-105.05347, 40.073167), (-105.04436, 40.087599), (-105.03722, 40.087739), (-105.03708, 40.087599)

County/Parish Covered:
Weld (CO) , Boulder (CO)

Zipcode(s) Covered:
Longmont CO: 80504
Erie CO: 80516

State(s) Covered:
CO

****Target property is located in Radon Zone 1.***
Zone 1 areas have a predicted average indoor radon screening level greater than 4 pCi/L (picocuries per liter).

Database Findings Summary

FEDERAL LISTING

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
CLANDESTINE DRUG LABORATORY LOCATIONS	CDL	0	0	0.2500
FEDERAL ENGINEERING INSTITUTIONAL CONTROL SITES	EC	0	0	0.2500
EMERGENCY RESPONSE NOTIFICATION SYSTEM	ERNSCO	0	0	0.2500
HISTORICAL GAS STATIONS	HISTPST	0	0	0.2500
HAZARDOUS MATERIALS INCIDENT REPORTING SYSTEM	HMIRSR08	0	0	0.2500
LAND USE CONTROL INFORMATION SYSTEM	LUCIS	0	0	0.2500
NO LONGER REGULATED RCRA GENERATOR FACILITIES	NLRRCRAG	0	0	0.2500
RESOURCE CONSERVATION & RECOVERY ACT - GENERATOR FACILITIES	RCRAGR08	0	0	0.2500
RESOURCE CONSERVATION & RECOVERY ACT - NON-GENERATOR FACILITIES	RCRANGR08	0	0	0.2500
RCRA SITES WITH CONTROLS	RCRASC	0	0	0.2500
TOXICS RELEASE INVENTORY	TRI	0	0	0.2500
BROWNFIELDS MANAGEMENT SYSTEM	BF	0	0	0.5000
COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION & LIABILITY INFORMATION SYSTEM	CERCLIS	0	0	0.5000
NO FURTHER REMEDIAL ACTION PLANNED SITES	NFRAP	0	0	0.5000
NO LONGER REGULATED RCRA NON-CORRACTS TSD FACILITIES	NLRRCRAT	0	0	0.5000
OPEN DUMP INVENTORY	ODI	0	0	0.5000
RESOURCE CONSERVATION & RECOVERY ACT - TREATMENT, STORAGE & DISPOSAL FACILITIES	RCRAT	0	0	0.5000
DELISTED NATIONAL PRIORITIES LIST	DNPL	0	0	1.0000
NO LONGER REGULATED RCRA CORRECTIVE ACTION FACILITIES	NLRRCRAC	0	0	1.0000
NATIONAL PRIORITIES LIST	NPL	0	0	1.0000
PROPOSED NATIONAL PRIORITIES LIST	PNPL	0	0	1.0000
RESOURCE CONSERVATION & RECOVERY ACT - CORRECTIVE ACTION FACILITIES	RCRAC	0	0	1.0000
RECORD OF DECISION SYSTEM	RODS	0	0	1.0000

SUB-TOTAL		0	0	

Database Findings Summary

STATE (CO) LISTING

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
ABOVEGROUND STORAGE TANK FACILITIES	AST	0	0	0.2500
CLANDESTINE DRUG LABORATORY LOCATIONS	CDL	0	0	0.2500
ENVIRONMENTAL REAL COVENANTS LIST	COVENANTS	0	0	0.2500
HAZARDOUS WASTE SITES- GENERATOR	HWSG	0	0	0.2500
SPILLS LISTING	SPILLS	0	0	0.2500
UNDERGROUND STORAGE TANK FACILITIES	UST	0	0	0.2500
HISTORICAL SOLID WASTE LANDFILLS	HISTSWLF	0	0	0.5000
HAZARDOUS WASTE SITES- TREATMENT, STORAGE & DISPOSAL	HWSTSD	0	0	0.5000
LEAKING STORAGE TANK FACILITIES	LST	0	0	0.5000
LEAKING UNDERGROUND STORAGE TANKS TRUST FUND SITES	LUSTTRUST	0	0	0.5000
METHANE GAS STUDY SITES	METHANESITES	0	0	0.5000
SOLID WASTE FACILITIES	SWF	0	0	0.5000
VOLUNTARY CLEANUP AND REDEVELOPMENT PROGRAM SITES	VCRA	0	0	0.5000
HAZARDOUS WASTE SITES- CORRECTIVE ACTION	HWSCA	0	0	1.0000
SUPERFUND SITES	SF	0	0	1.0000

SUB-TOTAL		0	0	

Database Findings Summary

LOCAL LISTING

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
WELD COUNTY SOLID WASTE FACILITIES	WCSWF	0	0	0.5000
SUB-TOTAL		0	0	

Database Findings Summary

TRIBAL LISTING

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
UNDERGROUND STORAGE TANKS ON TRIBAL LANDS	USTR08	0	0	0.2500
LEAKING UNDERGROUND STORAGE TANKS ON TRIBAL LANDS	LUSTR08	0	0	0.5000
OPEN DUMP INVENTORY ON TRIBAL LANDS	ODINDIAN	0	0	0.5000
INDIAN RESERVATIONS	INDIANRES	0	0	1.0000
SUB-TOTAL		0	0	
TOTAL		0	0	

Locatable Database Findings

FEDERAL LISTING

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
CDL	0.2500		0	0	NS	NS	NS	0
EC	0.2500		0	0	NS	NS	NS	0
ERNSCO	0.2500		0	0	NS	NS	NS	0
HISTPST	0.2500		0	0	NS	NS	NS	0
HMIRSR08	0.2500		0	0	NS	NS	NS	0
LUCIS	0.2500		0	0	NS	NS	NS	0
NLRRCRAG	0.2500		0	0	NS	NS	NS	0
RCRAGR08	0.2500		0	0	NS	NS	NS	0
RCRANGR08	0.2500		0	0	NS	NS	NS	0
RCRASC	0.2500		0	0	NS	NS	NS	0
TRI	0.2500		0	0	NS	NS	NS	0
BF	0.5000		0	0	0	NS	NS	0
CERCLIS	0.5000		0	0	0	NS	NS	0
NFRAP	0.5000		0	0	0	NS	NS	0
NLRRCRAT	0.5000		0	0	0	NS	NS	0
ODI	0.5000		0	0	0	NS	NS	0
RCRAT	0.5000		0	0	0	NS	NS	0
DNPL	1.0000		0	0	0	0	NS	0
NLRRCRAC	1.0000		0	0	0	0	NS	0
NPL	1.0000		0	0	0	0	NS	0
PNPL	1.0000		0	0	0	0	NS	0
RCRAC	1.0000		0	0	0	0	NS	0
RODS	1.0000		0	0	0	0	NS	0
SUB-TOTAL			0	0	0	0	0	0

Locatable Database Findings

STATE (CO) LISTING

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
AST	0.2500		0	0	NS	NS	NS	0
CDL	0.2500		0	0	NS	NS	NS	0
COVENANTS	0.2500		0	0	NS	NS	NS	0
HWSG	0.2500		0	0	NS	NS	NS	0
SPILLS	0.2500		0	0	NS	NS	NS	0
UST	0.2500		0	0	NS	NS	NS	0
HISTSWLF	0.5000		0	0	0	NS	NS	0
HWSTSD	0.5000		0	0	0	NS	NS	0
LST	0.5000		0	0	0	NS	NS	0
LUSTTRUST	0.5000		0	0	0	NS	NS	0
METHANESITES	0.5000		0	0	0	NS	NS	0
SWF	0.5000		0	0	0	NS	NS	0
VCRA	0.5000		0	0	0	NS	NS	0
HWSCA	1.0000		0	0	0	0	NS	0
SF	1.0000		0	0	0	0	NS	0
SUB-TOTAL			0	0	0	0	0	0

Locatable Database Findings

LOCAL LISTING

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
WCSWF	0.5000		0	0	0	NS	NS	0
SUB-TOTAL			0	0	0	0	0	0

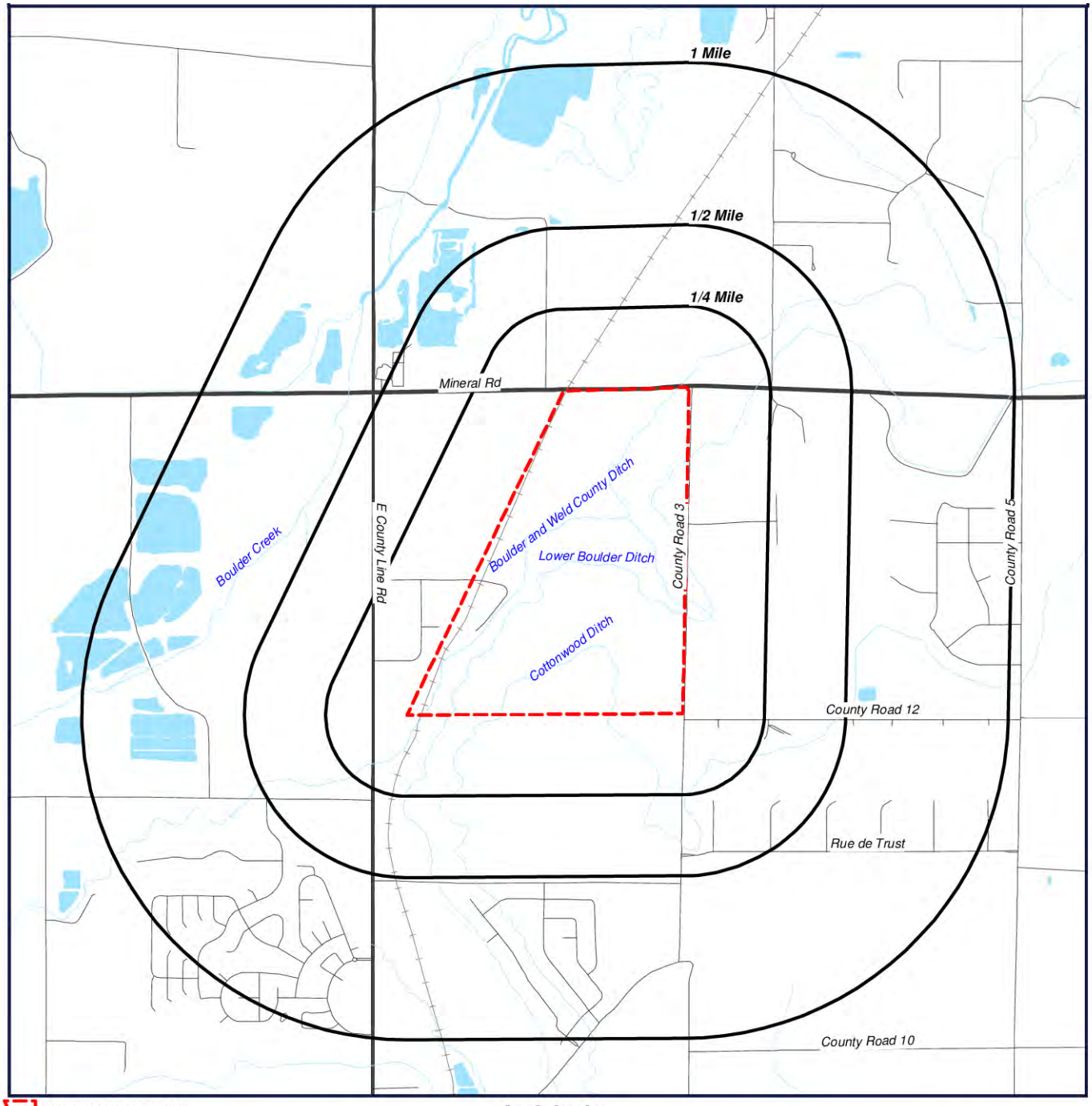
Locatable Database Findings

TRIBAL LISTING

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
USTR08	0.2500		0	0	NS	NS	NS	0
LUSTR08	0.5000		0	0	0	NS	NS	0
ODINDIAN	0.5000		0	0	0	NS	NS	0
INDIANRES	1.0000		0	0	0	0	NS	0
SUB-TOTAL			0	0	0	0	0	0
TOTAL			0	0	0	0	0	0

NOTES:
NS = NOT SEARCHED
TP/AP = TARGET PROPERTY/ADJACENT PROPERTY

Radius Map 1



Target Property (TP)

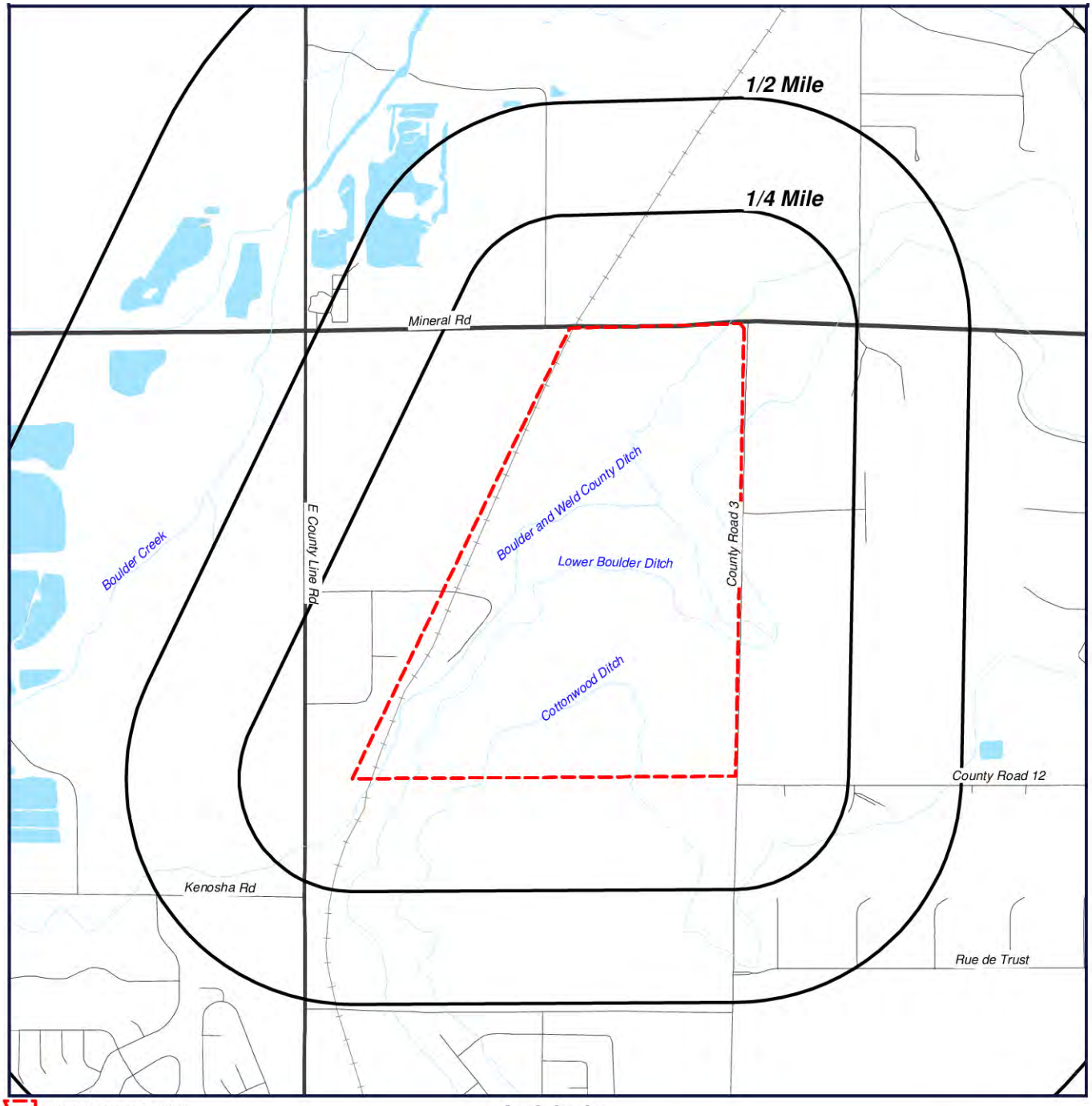
Andalusia
Weld County, Colorado
80516

N
W E
S

0' 1250' 2500' 3750'
SCALE: 1" = 2500'

[Click here to access Satelite view]

Radius Map 2



Target Property (TP)

Andalusia
Weld County, Colorado
80516

N
W E
S

0' 900' 1800' 2700'
SCALE: 1" = 1800'

[Click here to access Satelite view]

Ortho Map

Target Property (TP)

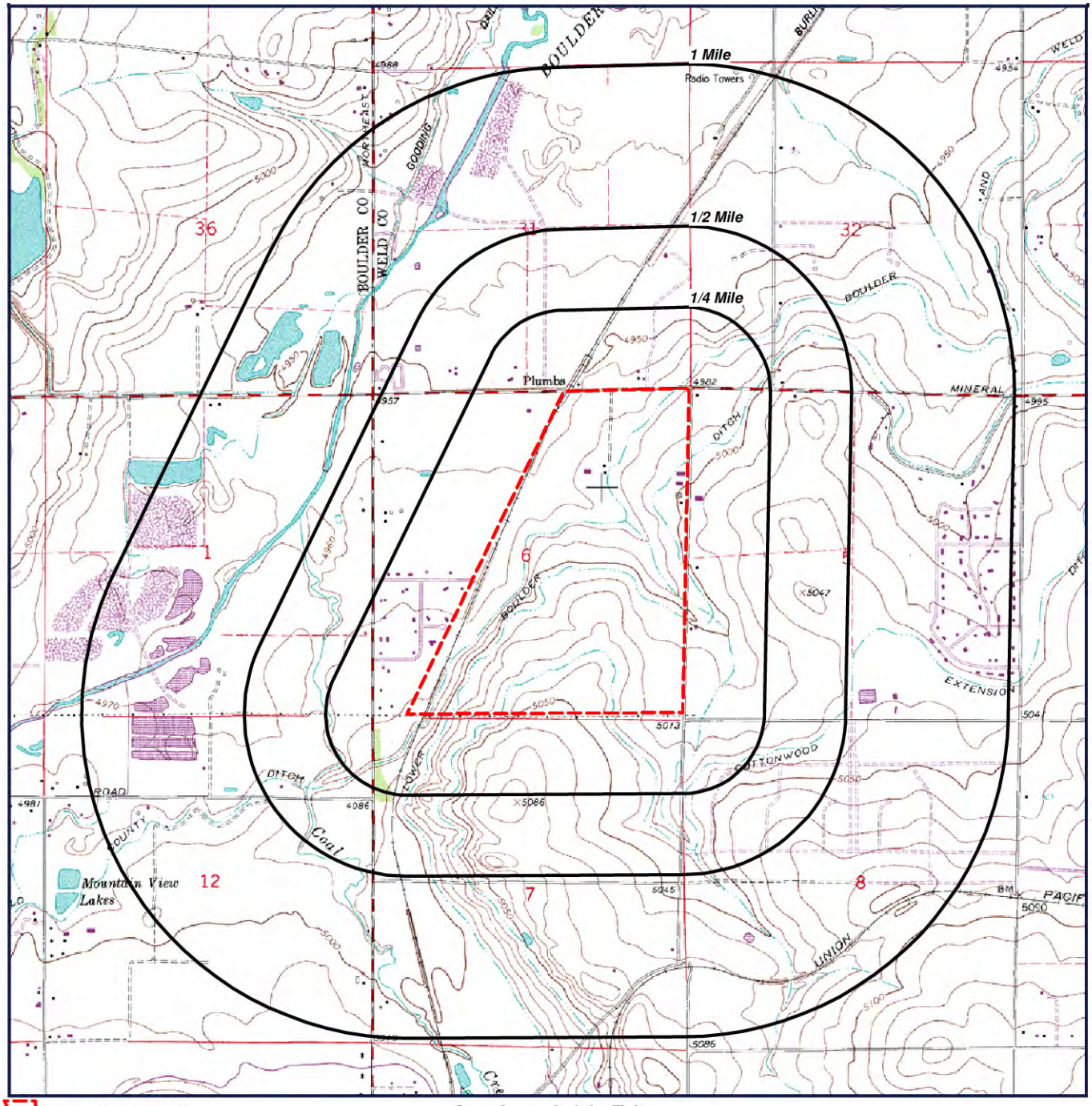
Quadrangle(s): Erie
Andalusia
Weld County, Colorado
80516

N
W E
S

0' 900' 1800' 2700'
SCALE: 1" = 1800'

[Click here to access Satelite view]

Topographic Map



Target Property (TP)

Quadrangle(s): Erie
Source: USGS, 1994
Andalusia
Weld County, Colorado
80516

N
W E
S

0' 1250' 2500' 3750'
SCALE: 1" = 2500'

[Click here to access Satelite view]

Environmental Records Definitions - FEDERAL

CDL Clandestine Drug Laboratory Locations

VERSION DATE: 09/06/13

The U.S. Department of Justice ("the Department") provides this information as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments. The Department does not establish, implement, enforce, or certify compliance with clean-up or remediation standards for contaminated sites; the public should contact a state or local health department or environmental protection agency for that information.

EC Federal Engineering Institutional Control Sites

VERSION DATE: 12/09/13

This database includes site locations where Engineering and/or Institutional Controls have been identified as part of a selected remedy for the site as defined by United States Environmental Protection Agency official remedy decision documents. A site listing does not indicate that the institutional and engineering controls are currently in place nor will be in place once the remedy is complete; it only indicates that the decision to include either of them in the remedy is documented as of the completed date of the document. Institutional controls are actions, such as legal controls, that help minimize the potential for human exposure to contamination by ensuring appropriate land or resource use. Engineering controls include caps, barriers, or other device engineering to prevent access, exposure, or continued migration of contamination.

ERNSCO Emergency Response Notification System

VERSION DATE: 12/31/12

This National Response Center database contains data on reported releases of oil, chemical, radiological, biological, and/or etiological discharges into the environment anywhere in the United States and its territories. The data comes from spill reports made to the U.S. Environmental Protection Agency, U.S. Coast Guard, the National Response Center and/or the U.S. Department of Transportation.

HISTPST Historical Gas Stations

VERSION DATE: 07/01/30

This historic directory of service stations is provided by the Cities Service Company. The directory includes Cities Service filling stations that were located throughout the United States in 1930.

HMIRSR08 Hazardous Materials Incident Reporting System

VERSION DATE: 01/10/14

The HMIRS database contains unintentional hazardous materials release information reported to the U.S.

Department of Transportation located in EPA Region 8. This region includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

LUCIS Land Use Control Information System

VERSION DATE: 09/01/06

The LUCIS database is maintained by the U.S. Navy and contains information for former Base Realignment and Closure (BRAC) properties across the United States.

NLRRCRAG No Longer Regulated RCRA Generator Facilities

VERSION DATE: 12/12/13

This database includes RCRA Generator facilities that are no longer regulated by the United States Environmental Protection Agency or do not meet other RCRA reporting requirements. This listing includes facilities that formerly generated hazardous waste.
Large Quantity Generators: Generate 1,000 kg or more of hazardous waste during any calendar month; or Generate more than 1 kg of acutely hazardous waste during any calendar month; or Generate more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, or acutely hazardous waste during any calendar month; or Generate 1 kg or less of acutely hazardous waste during any calendar month, and accumulate more than 1kg of acutely hazardous waste at any time; or Generate 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulated more than 100 kg of that material at any time.
Small Quantity Generators: Generate more than 100 and less than 1000 kilograms of hazardous waste during any calendar month and accumulate less than 6000 kg of hazardous waste at any time; or Generate 100 kg or less of hazardous waste during any calendar month, and accumulate more than 1000 kg of hazardous waste at any time.
Conditionally Exempt Small Quantity Generators: Generate 100 kilograms or less of hazardous waste per calendar month, and accumulate 1000 kg or less of hazardous waste at any time; or Generate one kilogram or less of acutely hazardous waste per calendar month, and accumulate at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, or acutely hazardous waste; or Generate 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, or acutely hazardous waste during any calendar month, and accumulate at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste.

RCRAGR08 Resource Conservation & Recovery Act - Generator Facilities

VERSION DATE: 12/12/13

This database includes sites listed as generators of hazardous waste (large, small, and exempt) in the RCRAInfo system. The United States Environmental Protection Agency defines RCRAInfo as the comprehensive information system which provides access to data supporting the Resource Conservation and Recovery Act

(RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS). This database includes sites located in EPA Region 8. This region includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.
Large Quantity Generators: Generate 1,000 kg or more of hazardous waste during any calendar month; or Generate more than 1 kg of acutely hazardous waste during any calendar month; or Generate more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, or acutely hazardous waste during any calendar month; or Generate 1 kg or less of acutely hazardous waste during any calendar month, and accumulate more than 1kg of acutely hazardous waste at any time; or Generate 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulated more than 100 kg of that material at any time.
Small Quantity Generators: Generate more than 100 and less than 1000 kilograms of hazardous waste during any calendar month and accumulate less than 6000 kg of hazardous waste at any time; or Generate 100 kg or less of hazardous waste during any calendar month, and accumulate more than 1000 kg of hazardous waste at any time.
Conditionally Exempt Small Quantity Generators: Generate 100 kilograms or less of hazardous waste per calendar month, and accumulate 1000 kg or less of hazardous waste at any time; or Generate one kilogram or less of acutely hazardous waste per calendar month, and accumulate at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, or acutely hazardous waste; or Generate 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, or acutely hazardous waste during any calendar month, and accumulate at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste.

RCRANGR08 Resource Conservation & Recovery Act - Non-Generator Facilities

VERSION DATE: 12/12/13

This database identifies RCRAInfo system sites that only handle hazardous waste without generating any amount hazardous waste. The United States Environmental Protection Agency defines RCRAInfo as the comprehensive information system which provides access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS). This database includes sites located in EPA Region 8. This region includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

RCRASC RCRA Sites with Controls

VERSION DATE: 01/14/14

This list of Resource Conservation and Recovery Act sites with institutional controls in place is provided by the U.S. Environmental Protection Agency.

Environmental Records Definitions - FEDERAL

TRI Toxics Release Inventory

VERSION DATE: 12/31/12

The Toxics Release Inventory, provided by the United States Environmental Protection Agency, includes data on toxic chemical releases and waste management activities from certain industries as well as federal facilities. This inventory contains information about the types and amounts of toxic chemicals that are released each year to the air, water, and land as well as information on the quantities of toxic chemicals sent to other facilities for further waste management.

BF Brownfields Management System

VERSION DATE: 01/13/14

Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. The United States Environmental Protection Agency maintains this database to track activities in the various brown field grant programs including grantee assessment, site cleanup and site redevelopment.

CERCLIS Comprehensive Environmental Response, Compensation & Liability Information System

VERSION DATE: 10/25/13

CERCLIS is the repository for site and non-site specific Superfund information in support of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). This United States Environmental Protection Agency database contains an extract of sites that have been investigated or are in the process of being investigated for potential environmental risk.

NFRAP No Further Remedial Action Planned Sites

VERSION DATE: 10/25/13

This database includes sites which have been determined by the United States Environmental Protection Agency, following preliminary assessment, to no longer pose a significant risk or require further activity under CERCLA. After initial investigation, no contamination was found, contamination was quickly removed or contamination was not serious enough to require Federal Superfund action or NPL consideration.

NLRRCRAT No Longer Regulated RCRA Non-CORRACTS TSD Facilities

VERSION DATE: 12/12/13

This database includes RCRA Non-Corrective Action TSD facilities that are no longer regulated by the United States Environmental Protection Agency or do not meet other RCRA reporting requirements. This listing includes facilities that formerly treated, stored or disposed of hazardous waste.

Environmental Records Definitions - FEDERAL

ODI Open Dump Inventory

VERSION DATE: 06/01/85

The open dump inventory was published by the United States Environmental Protection Agency. An “open dump” is defined as a facility or site where solid waste is disposed of which is not a sanitary landfill which meets the criteria promulgated under section 4004 of the Solid Waste Disposal Act (42 U.S.C. 6944) and which is not a facility for disposal of hazardous waste. This inventory has not been updated since June 1985.

RCRAT Resource Conservation & Recovery Act - Treatment, Storage & Disposal Facilities

VERSION DATE: 12/12/13

This database includes Non-Corrective Action sites listed as treatment, storage and/or disposal facilities of hazardous waste in the RCRAInfo system. The United States Environmental Protection Agency defines RCRAInfo as the comprehensive information system which provides access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS).

DNPL Delisted National Priorities List

VERSION DATE: 10/25/13

This database includes sites from the United States Environmental Protection Agency’s Final National Priorties List (NPL) where remedies have proven to be satisfactory or sites where the original analyses were inaccurate, and the site is no longer appropriate for inclusion on the NPL, and final publication in the Federal Register has occurred.

NLRRCRAC No Longer Regulated RCRA Corrective Action Facilities

VERSION DATE: 12/12/13

This database includes RCRA Corrective Action facilities that are no longer regulated by the United States Environmental Protection Agency or do not meet other RCRA reporting requirements.

NPL National Priorities List

VERSION DATE: 10/25/13

This database includes United States Environmental Protection Agency (EPA) National Priorities List sites that fall under the EPA's Superfund program, established to fund the cleanup of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action.

PNPL Proposed National Priorities List

VERSION DATE: 10/25/13

Environmental Records Definitions - FEDERAL

This database contains sites proposed to be included on the National Priorities List (NPL) in the Federal Register. The United States Environmental Protection Agency investigates these sites to determine if they may present long-term threats to public health or the environment.

RCRAC Resource Conservation & Recovery Act - Corrective Action Facilities

VERSION DATE: 12/12/13

This database includes hazardous waste sites listed with corrective action activity in the RCRAInfo system. The Corrective Action Program requires owners or operators of RCRA facilities (or treatment, storage, and disposal facilities) to investigate and cleanup contamination in order to protect human health and the environment. The United States Environmental Protection Agency defines RCRAInfo as the comprehensive information system which provides access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS).

RODS Record of Decision System

VERSION DATE: 10/31/13

These decision documents maintained by the United States Environmental Protection Agency describe the chosen remedy for NPL (Superfund) site remediation. They also include site history, site description, site characteristics, community participation, enforcement activities, past and present activities, contaminated media, the contaminants present, and scope and role of response action.

Environmental Records Definitions - STATE (CO)

AST Aboveground Storage Tank Facilities

VERSION DATE: 01/27/14

The Oil and Public Safety Division of the Colorado Department of Labor and Employment maintains this list of aboveground storage tank (AST) facilities. This AST database also includes other types of storage tank facilities such as liquefied petroleum gas (LPG), vehicle tank meters (VTM), and compressed natural gas facilities.

CDL Clandestine Drug Laboratory Locations

VERSION DATE: 12/31/10

The North Metro Task Force provides this list of Methamphetamine labs seized between 2001 and 2010. The North Metro area includes the following Cities and Counties of Colorado: Adams County, Broomfield, Brighton, Commerce City, Federal Heights, Northglenn, Thornton, and Westminster. According to Section 2 of Colorado Revised Statutes: "25-18.5-103. Discovery of an illegal drug laboratory - property owner - clean-up - liability. (1) (a) Upon notification from a peace officer that chemicals, equipment, or supplies indicative of an illegal drug laboratory are located on a property, or when an illegal drug laboratory used to manufacture methamphetamine is otherwise discovered and the property owner has received notice, the owner of any contaminated property shall meet the cleanup standards for property established by the board in section 25-18.5-102".

COVENANTS Environmental Real Covenants List

VERSION DATE: 10/14/13

Senate Bill 01-145 gave authority to the Colorado Department of Public Health and Environment to approve requests to restrict the future use of a property using an enforceable agreement called an environmental covenant. These covenants, which are recorded with the deed and run with the land, provide a mechanism to ensure that institutional controls that are part of environmental remediation projects are properly implemented and that engineered structures are protected and maintained, so that implemented remedies continue to be protective of human health and the environment for as long as any residual contamination remains a risk.

HWSG Hazardous Waste Sites- Generator

VERSION DATE: 06/30/03

The Resource Conservation and Recovery Act (RCRA) was enacted by congress in 1976, followed by the promulgation of implementing regulations in 1980. In 1984, the State was authorized by EPA to implement the RCRA program in Colorado on their behalf. This facility listing includes RCRA sites listed as generators of hazardous waste (Small Quantity Generators and Large Quantity Generators) and was provided by the Colorado Department of Public Health and Environment.
Small Quantity Generators (SQG) generate, in any calendar month, more than 100 kg (220 lbs.) but less than 1,000 kg (2,200 lbs.) of RCRA hazardous waste; and generate, in any calendar month, or accumulate at any time, no more than 1 kg (2.2 lbs.) of acute hazardous waste and no more than 100 kg (220 lbs.) of material from the cleanup of a spill of acute hazardous waste; and accumulate on-site no more than 6000 kg (13,200 lbs) of hazardous waste at any one time; or, the site is a Small Quantity Generator if the site met all other criteria for a Conditionally Exempt Small Quantity Generator, but accumulated, at any time, more than 1,000 kg (2,200 lbs.) of

RCRA hazardous waste.
Large Quantity Generators (LQG) generate, in any calendar month, 1,000 kg (2,200 lbs.) or more of RCRA hazardous waste; or generate, in any calendar month, or accumulated at any time, more than 1 kg (2.2 lbs.) of RCRA acute hazardous waste; or generate, in any calendar month, or accumulated at any time, more than 100 kg (220 lbs.) of spill cleanup material contaminated with RCRA acute hazardous waste.

SPILLS Spills Listing

VERSION DATE: 10/28/13

The Colorado Department of Public Health and Environment's Division of Emergency Preparedness and Response maintains this listing of chemical spills and/or releases.

UST Underground Storage Tank Facilities

VERSION DATE: 01/27/14

The Oil and Public Safety Division of the Colorado Department of Labor and Employment maintains this list of underground storage tank facilities.

HISTSWLF Historical Solid Waste Landfills

VERSION DATE: NR

This historical solid waste landfills database contains data from the Hazardous Materials Waste Management Division (HMWMD) of the Colorado Department of Public Health and other various state and local agencies. In the early 1980s, the HMWMD conducted a survey of staff members and local agencies to compile this listing of sites that were known or thought to have waste issues. This Solid Waste Historical Data is not considered complete or verifiable and has not been maintained since the late 1980s. The HMWMD is not responsible and shall not be liable to the used for damages of any kind arising out of the use of this data or information.

HWSTSD Hazardous Waste Sites- Treatment, Storage & Disposal

VERSION DATE: 06/30/03

The Resource Conservation and Recovery Act (RCRA) was enacted by congress in 1976, followed by the promulgation of implementing regulations in 1980. In 1984, the State was authorized by EPA to implement the RCRA program in Colorado on their behalf. TSD facilities treat, store, dispose, or recycle hazardous waste on site in units and therefore are subject to RCRA permitting requirements. Historic TSDs are facilities that have completed closure and/or post-closure of the RCRA Subtitle C Regulated Unit(s) or the Treatment/Storage/Disposal Unit is no longer regulated. This database was provided by the Colorado Department of Public Health and Environment.

LST Leaking Storage Tank Facilities

VERSION DATE: 02/21/14

Environmental Records Definitions - STATE (CO)

The Oil and Public Safety Division of the Colorado Department of Labor and Employment maintains this list of leaking aboveground and underground storage tank facilities.

LUSTTRUST Leaking Underground Storage Tanks Trust Fund Sites

VERSION DATE: 01/01/00

Suspected tank leaks have been discovered at the sites included in this database, but the facility responsible for the leak has not been identified. The state's investigtion and search for responsible parties is paid for out of the state's Leaking Underground Storage Tank (LUST) Trust Fund. This database was provided by the Colorado Department of Labor & Employment, Division of Oil and Public Safety, State Fund Section and is no longer updated.

METHANESITES Methane Gas Study Sites

VERSION DATE: 01/01/81

This Investigation of Methane Gas Hazards report was prepared by the Denver Office of Emergency Preparedness in 1981. The purpose of this study was to assess the actual and potential generation, migration, explosive and related problems associated with specified landfills, and to identify existing and potential problems, suggested strategies to prevent, abate, and control such problems and recommend investigative and monitoring functions as may be deemed necessary. The Colorado Department of Health selected eight landfills as priorities due to population density and potential hazards to population and property.

SWF Solid Waste Facilities

VERSION DATE: 01/14/14

The Colorado Department of Public Health and Environment maintains this database of active solid waste disposal facilities, transfer stations, recyclers, waste tire registrants, and waste grease registrants.

VCRA Voluntary Cleanup and Redevelopment Program Sites

VERSION DATE: 09/12/13

This site listing is provided by the Colorado Department of Public Health and Environment (CDPHE) and includes both voluntary cleanup and brownfield properties. The Voluntary Cleanup and Redevelopment program was created in 1994. The objective of the program is to facilitate the redevelopment and transfer of contaminated properties. Properties that sit untouched because of their real or perceived contamination can be rehabilitated using the CDPHE's Brownfields Program in conjunction with the Voluntary Cleanup Program. Cleanup decisions are based on existing standards and the proposed use of the property. The actual cleanup and verification is the owner's responsibility.

HWSCA Hazardous Waste Sites- Corrective Action

VERSION DATE: 06/30/03

Environmental Records Definitions - STATE (CO)

The Resource Conservation and Recovery Act (RCRA) was enacted by congress in 1976, followed by the promulgation of implementing regulations in 1980. In 1984, the Hazardous and Solid Waste Amendments (HSWA) were added to RCRA providing for corrective action at facilities subject to RCRA. That same year, the State was authorized by EPA to implement the RCRA program in Colorado on their behalf. Corrective action may be implemented as part of a RCRA Hazardous Waste Permit, an Order, or a Corrective Action Plan pursuant to the Colorado Hazardous Waste Regulations. Corrective action is the process by which regulated facilities investigate and remediate, as necessary, all contamination (soil, ground water, surface water, air) associated with their releases into the environment. Historic Corrective Action Sites are facilities that have completed the RCRA Subtitle C corrective Action process. This database was provided by the Colorado Department of Public Health and Environment.

SF Superfund Sites

VERSION DATE: 06/01/03

This listing contains active, deleted and proposed "Superfund" hazardous waste sites, as well as those sites identified through the Natural Resource Damages section of Superfund legislation and one Private Non-Superfund Cleanup site. A site qualifies for the National Priorities List (NPL or Superfund list) when the U.S. Environmental Protection Agency (EPA) determines there is a release or threatened release of hazardous substances that may endanger public health, welfare or the environment. In Colorado, the lead agency for Superfund remediation may be either the EPA or the Colorado Department of Public Health and Environment.

Environmental Records Definitions - LOCAL

WCSWF	Weld County Solid Waste Facilities
VERSION DATE: 08/03/09	

This listing of solid waste facilities is provided by the Weld County Public Health Department.

Environmental Records Definitions - TRIBAL

USTR08 Underground Storage Tanks On Tribal Lands

VERSION DATE: 02/01/13

This database, provided by the United States Environmental Protection Agency (EPA), contains underground storage tanks on Tribal lands located in EPA Region 8. This region includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

LUSTR08 Leaking Underground Storage Tanks On Tribal Lands

VERSION DATE: 02/01/13

This database, provided by the United States Environmental Protection Agency (EPA), contains leaking underground storage tanks on Tribal lands located in EPA Region 8. This region includes the following states: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

ODINDIAN Open Dump Inventory on Tribal Lands

VERSION DATE: 11/08/06

This Indian Health Service database contains information about facilities and sites on tribal lands where solid waste is disposed of, which are not sanitary landfills or hazardous waste disposal facilities, and which meet the criteria promulgated under section 4004 of the Solid Waste Disposal Act (42 U.S.C. 6944).

INDIANRES Indian Reservations

VERSION DATE: 01/01/00

The Department of Interior and Bureau of Indian Affairs maintains this database that includes American Indian Reservations, off-reservation trust lands, public domain allotments, Alaska Native Regional Corporations and Recognized State Reservations.

APPENDIX B

AIR PHOTO DOCUMENTATION

Table 1: Colorado Aerial Photo Service Photos, 9/2/2005

PHOTO DATE	FRAMES
6/6/2005	13, 14
5/3/2000	32, 33
6/26/1995	232, 233
9/24/1991	12, 13
11/18/1984	92, 93
6/3/1979	114
11/7/1974	141 - 46
4/29/1965	120-0

APPENDIX C

ENVIRONMENTAL ISSUES INQUIRIES

and SUPPORTING DOCUMENTATION

8. Are you aware or have you ever been notified that another property around yours has caused or had an environmental impact to your property.

_____

If yes, please describe which property and a brief description of the issue: _____

_____

_____

9. Are there any prior environmental reports (Phase 1 Environmental Site Assessments) concerning the subject property or related addresses? _____

If yes, can you provide copies of these reports or know where there are copies of these reports? _____

_____

Additional Information

How long have you owned the subject property? _____

Description of current activity on the subject property? _____

_____

Do you have any knowledge of past ownership or activity on the subject property that would be of environmental concern? _____

_____

What is the reason the Phase I is being conducted? _____

List all parties who will rely on the Phase I ESA report:

_____

_____

Completed by:

Signature: Jerry Bouldin

Printed Name: Jerry Bouldin

Date: 3-10-14

Western Environment and Ecology, Inc.
User Questionnaire for a Phase I Environmental Site Assessment, ASTM 1527-05

Subject Property Address or Description:

313 Acre Andalusia Property, East ½ of Section 6, Township 1 North, Range 68 West, Weld County, Colorado

In order to qualify for one of the Landowner Liability Protections (LLPs) offered by the Small Business Liability Relief and Brownfields Revitalization Act of 2001, The user of a Phase I Environmental Site Assessment must provide the following information (if available) to the environmental professional. Failure to provide this information could result in a determination that "all appropriate inquiry" is not complete.

1. Environmental cleanup liens that are filed or recorded against the site:

Are you aware of any environmental cleanup liens against the subject property that are filed or recorded under federal, tribal, state, or local law? No, none I am aware of.

If yes, please describe the lien and provide supporting documentation:

_____

_____

_____

2. Activity and land use limitations (AULs) that are in place on the site or that have been filed or recorded in a registry:

Are you aware of any AULs, such as engineering controls, land use restrictions, or institutional controls that are in place at the subject property and/or have been filed or recorded in a registry under federal, tribal, state, or local law? No, none I am aware of.

If yes, please describe the AUL and provide supporting documentation:

_____

_____

_____

3. Specialized knowledge or experience of the person seeking to qualify for the LLP

As the potential user of the subject property, do you have any specialized knowledge or experience related to the subject property or nearby properties? For example, are you involved in the same line of business as the current or former occupants of the property or adjoining property so that you would have specialized knowledge of the chemicals, processes, etc., used by this type of business?

No, none I am aware of

If yes, please describe this specialized knowledge or experience:

4. Relationship of the purchase price to the fair market value of the subject property if it were not contaminated.

Has the purchase price of this property been lowered below fair market value because of any contamination or some type of environmental issue? No

If yes, please describe the reasons for the lower purchase price:

5. Commonly known or reasonably ascertainable information about the property.

Are you aware of commonly known or reasonably ascertainable information about the property that would help the environmental professional to identify conditions indicative of releases or threatened releases?

A. Do you know the past uses of the property? (if "Yes", what?)

Yes. Dairy farming, crops and oil & gas wells

B. Do you know of chemicals that are present or once were present at the property? No, but probably normal pesticides associated with farming, and potentially oil and/or petroleum products associated with standard farming practices and oil/gas well exploration.

C. Do you know of any petroleum based products that are present or were once present on the subject property (in 5-gal or greater size containers, barrels, or tanks)? Yes. Active oil & gas wells and holding tanks.

D. Do you know of any spills or other chemical releases that have taken place at the property? Told there may have been an oil spill at one of the oil wells, but it was contained.

E. Do you know of any environmental cleanups that have taken place at the property? Clean-up of oil spill on one of the oil well pads.

If yes, please describe the information:

Told by land owner there may have been a minor oil / petroleum release / spill at one of the oil well sites, but that it was contained on the oil pad (well site pad) and was cleaned-up by the well operator.

6. Do you know of any special permits need for the operation of the business or businesses that have occupied the subject property? Oil & gas well drilling permit.

- **Waste water discharge permit?** No - not aware of any.
- **Air emissions permit?** No - not aware of any.
- **Any other type of permits?** No - not aware of any.

7. The degree of obviousness of the presence of contamination at the property, and the ability to detect the contamination by appropriate investigation.

As the potential user of the subject property, based on your knowledge and experience related to the property, are there any obvious indicators that point to the presence or likely presence of contamination at the property?

No - just standard oil & gas well operations described herein.

If yes, please describe the information:

_____

_____

_____

8. Are you aware or have you ever been notified that another property around the subject site has caused or had an environmental impact to the property.

No

If yes, please describe which property and a brief description of the issue: _____

9. Are there any prior environmental reports concerning the subject property or related addresses? No, not that I am aware of.

If yes, can you provide copies of these reports or know where there are copies of these reports? _____

Additional Information

How long have you had interest in acquiring the subject property?

3 months

Description of current activity on the subject property? Farming, oil & gas well operations

Do you have any knowledge of past ownership or activity on the subject property that would be of environmental concern? No, just the farming, oil & gas well activity on the property described herein.

What is the reason the Phase I is being conducted? We plan to aquire, develop and sell lots to builders for a residential community

List all parties who will rely on the Phase I ESA report:

Completed by:

Signature: _____

Printed Name: Brock Chapman

Date: 2/21/19

WESTERN ENVIRONMENT AND ECOLOGY, INC

February 20, 2014

Lu Ann Penfold
Mountain View Fire Rescue
9119 East County Line Road
Longmont, Colorado 80501

Subject: **Environmental Issues Inquiry, 313 Acre Andalusia Property, East ½ of Section 6, Township 1 North, Range 68 West, Weld County, Colorado**

Dear Ms Penfold,

As a requirement for a Phase I Environmental Site Assessment, I respectively submit this request for an environmental records search of the subject properties by your office. I am especially interested in any records of environmental releases, chemical recovery, responses, above ground and/or underground storage tanks, hazardous materials storage, incidents, landfills, etc., which may be, or are impacting the site.

I look forward to receiving your response. If you have any questions about these properties, do not hesitate to contact me at 303-730-3452. Faxed (303-730-3461) or emailed response of your review would be more than sufficient. Thank you very much for your time in this matter.

Sincerely,
WESTERN ENVIRONMENT AND ECOLOGY, INC.

Austin Curry
Staff Scientist

cc. File

2217 WEST POWERS AVENUE * LITTLETON, COLORADO 80120
PHONE (303)730-3452 * FAX (303)730-3461
WWW.WESTERNENVIRONMENT.COM

WESTERN ENVIRONMENT AND ECOLOGY, INC

February 20, 2014

Weld County
Department of Public Health and Environment
1555 North 17th Avenue
Greeley, Colorado 80631
mswain@co.weld.co.us

Subject: **Environmental Issues Inquiry, 313 Acre Andalusia Property, East ½ of Section 6, Township 1 North, Range 68 West, Weld County, Colorado.**

Dear Ms. Swain,

As a requirement for a Phase I Environmental Site Assessment, I respectively submit this request for an environmental records search of the subject properties and adjacent properties by your office. I am especially interested in any records of environmental releases, chemical recovery, responses, above ground and/or underground storage tanks, hazardous materials storage, incidents, landfills, etc., which may be, or are, impacting the site.

I look forward to receiving your response. If you have questions about these properties, do not hesitate to contact me at 303-730-3452. Faxed or emailed responses of your review would be more than sufficient. Thank you very much for your time in this matter.

Sincerely,
WESTERN ENVIRONMENT AND ECOLOGY, INC.

Austin Curry
Staff Technician

cc. File

2217 WEST POWERS AVENUE * LITTLETON, COLORADO 80120
PHONE (303)730-3452 * FAX (303)730-3461
WWW.WESTERNENVIRONMENT.COM

WESTERN ENVIRONMENT AND ECOLOGY, INC

June 3, 2014

I & J Partnership
c/o Jerry Bouldin
STF Land Development Consultants, Inc.
3733 Florentine Circle
Longmont, CO 80503

Subject: Limited Phase II Environmental Site Assessment Andalusia PUD, 313 Acres in Section 6 Township 1 North Range 68 West Erie Colorado. Western Environment and Ecology, Inc. Project Number 640-001-02.

Dear Mr. Bouldin:

In accordance with Western Environment and Ecology, Inc's. (Western Environment) Proposal Number P14-15, and in response to the conclusions presented in Phase I Environmental Site Assessment prepared by Western Environment (Project #'s 330-003-01 and 330-004-01) we are pleased to present you with the following Limited Phase II Environment Site Assessment of the above referenced property (Figure 1). The purpose of this investigation is to determine if soil and /or groundwater contamination as a result of petroleum production activities has occurred. The focus of the assessment was on releases reported to the Colorado Oil and Gas Conservation Commission from two wells located on the property. These wells, Koch 41-6 and Kenneth E Koch 1 , are shown on Figure 2.

On March 6th, 2014, Western Environment personnel drilled six borings on the subject property. The borings were completed with a 7730 Track Mounted GeoProbe using 2 inch drive rods. Continuous soil samples were taken from each boring to a maximum depth of 18.9 feet. Boring logs and well completion diagrams were constructed of the holes using USCS soil classification system (attached). The extracted soil samples were screened with a Photo Ionization Detector (PID) and visually for evidence of contamination. Using PID data and visual and geologic criteria, soil samples from each boring were selected for analysis. These samples were taken, using appropriate quality assurance and quality control methods and transported, under chain of custody controls, to Technology Laboratories in Fort Collins, Colorado. The samples were analyzed for benzene, toluene, ethyl-benzene and xylene (BTEX) and Total Recoverable Petroleum Hydrocarbons (TRPH) utilizing EPA Methods 8260 and 418.1 respectively.

After completing the borings, two groundwater monitoring wells were constructed. The wells consist of screw-type 1" PVC pipe extended to an estimated maximum depth of 18.9 feet below the surface. Five (5) feet of 20 slot screen with 10/20 silica sand was placed from the bottom of the borings to approximately 2 feet above the screened interval. Bentonite "crumbles" were then placed to the surface and hydrated.

On March 11th, 2014, Western Environment returned to the site to measure the static water level in the wells and evaluate water quality in preparation of acquiring samples for analysis. Groundwater was encountered in the two wells at 18.36 and 10.40 feet below grade. Water quality values including dissolved oxygen, temperature, conductivity and pH were collected in each well and are presented in this report. The wells were then developed and sampled on March 12th in compliance with US EPA Guidance Document SW-846 for BTEX and TRPH's and also transported to Technology Laboratories in Fort Collins. A surface water sample (TB-SW), was acquired from directly west side of the tank battery located adjacent to Weld County Road 3 (Figure 2). These samples were also analyzed for BTEX and TRPH.

2217 WEST POWERS AVENUE * LITTLETON, COLORADO 80120
PHONE (303)730-3452 * FAX (303)730-3461
WWW.WESTERNENVIRONMENT.COM

On March 27th, 2014 Western Environment received the analytical results from the soil and water samples. The results (attached) were all non-detect for BTEX and TRPH.

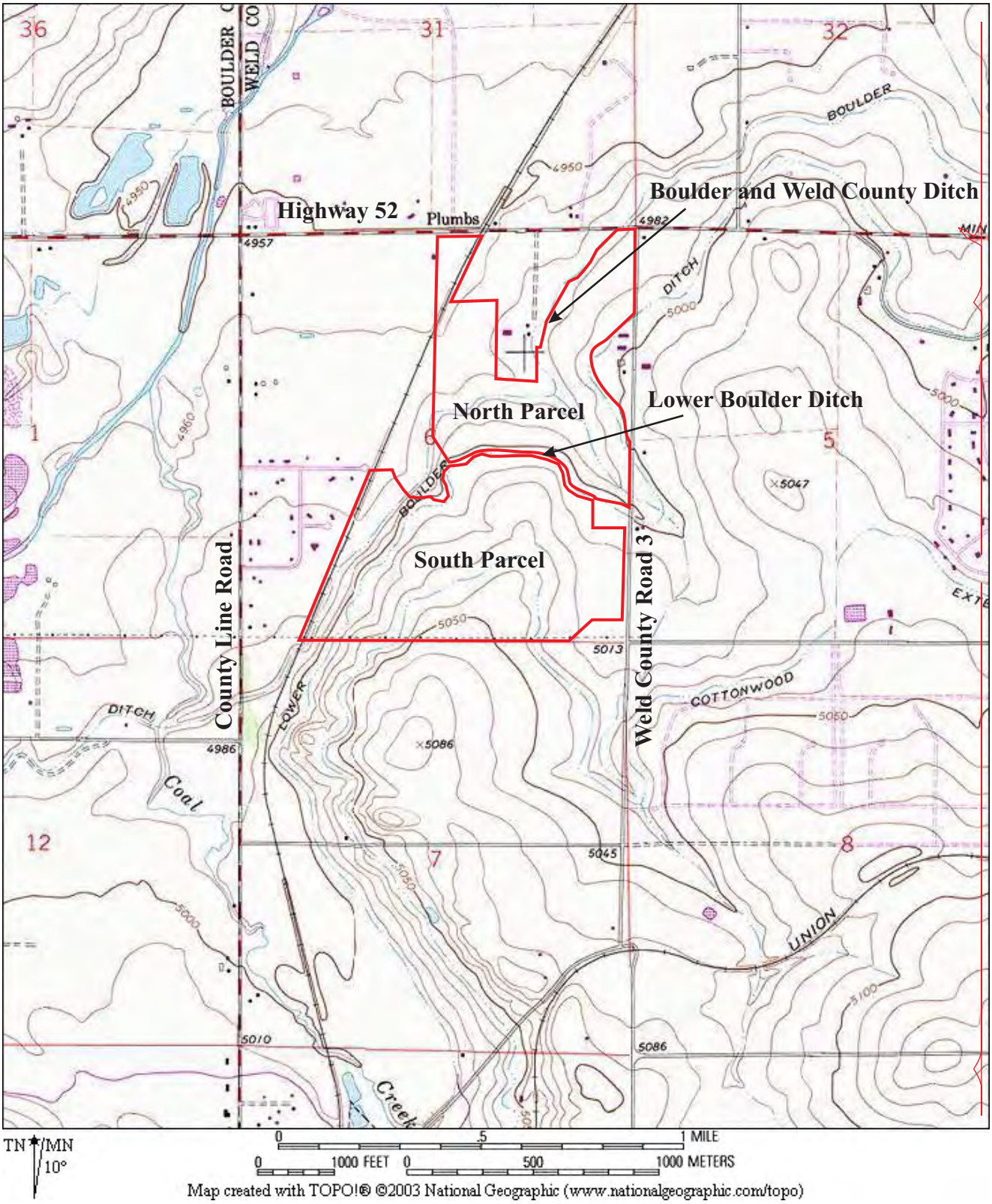
Based upon the results of the soil and water analysis it is the opinion of Western Environment and Ecology, Inc. that contamination as a result of petroleum production from wells Koch 41-6 and Kenneth E Koch 1, is not likely to occur.

We appreciate the opportunity to provide you with this assessment. Please feel free to contact us if you have any questions or comments.

Sincerely,
WESTERN ENVIRONMENT AND ECOLOGY, INC.

Greg D. Sherman P.G.
President

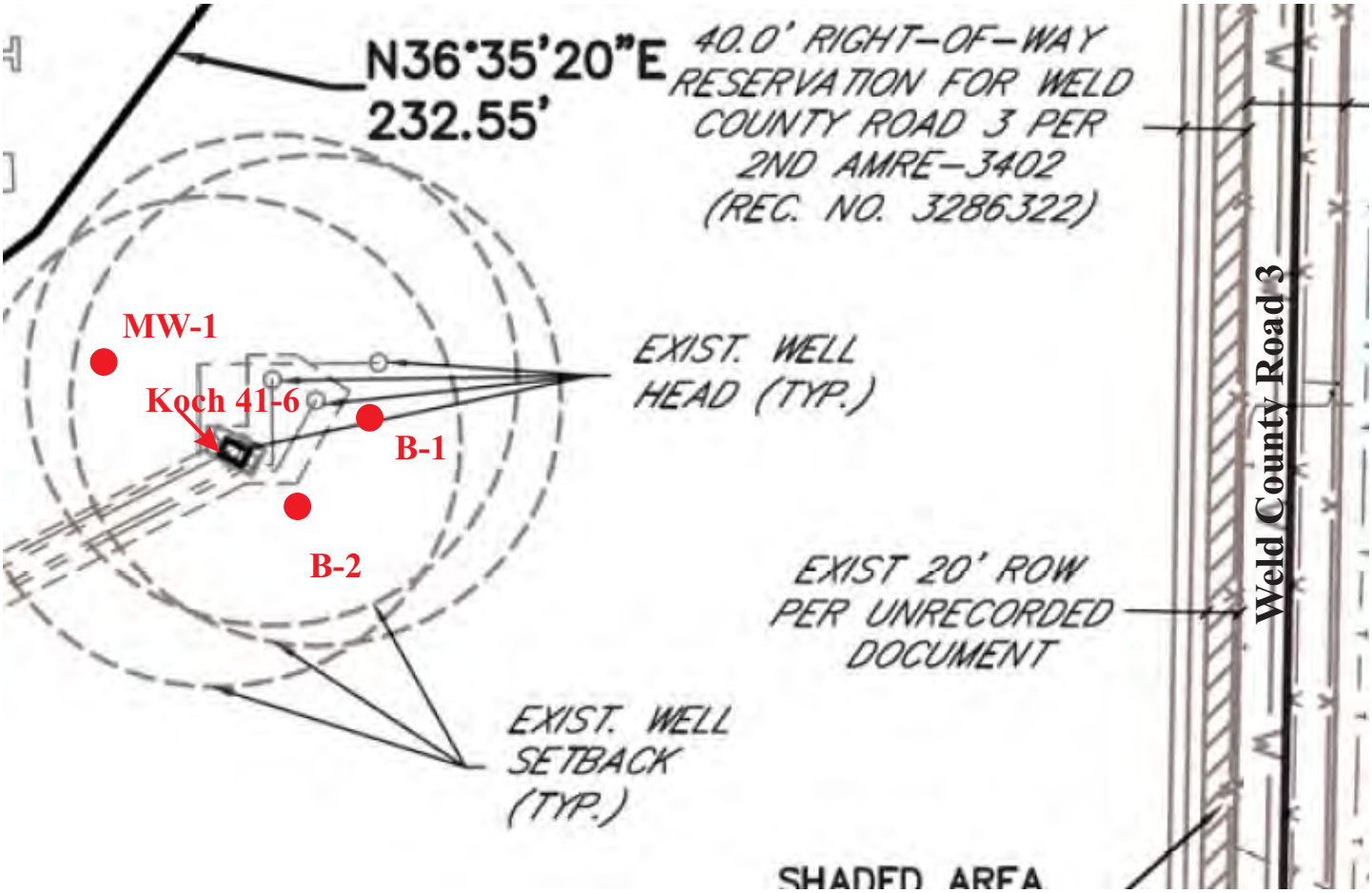
att.



USGS Erie, CO Quadrangle, 1978

WESTERN ENVIRONMENT AND ECOLOGY, INC.
2217 West Powers Avenue
Littleton, Colorado 80120

Figure 1 - Site Location Map
Andalusia Project
313 Acres
Section 6, T1N, R68W
Erie, Colorado

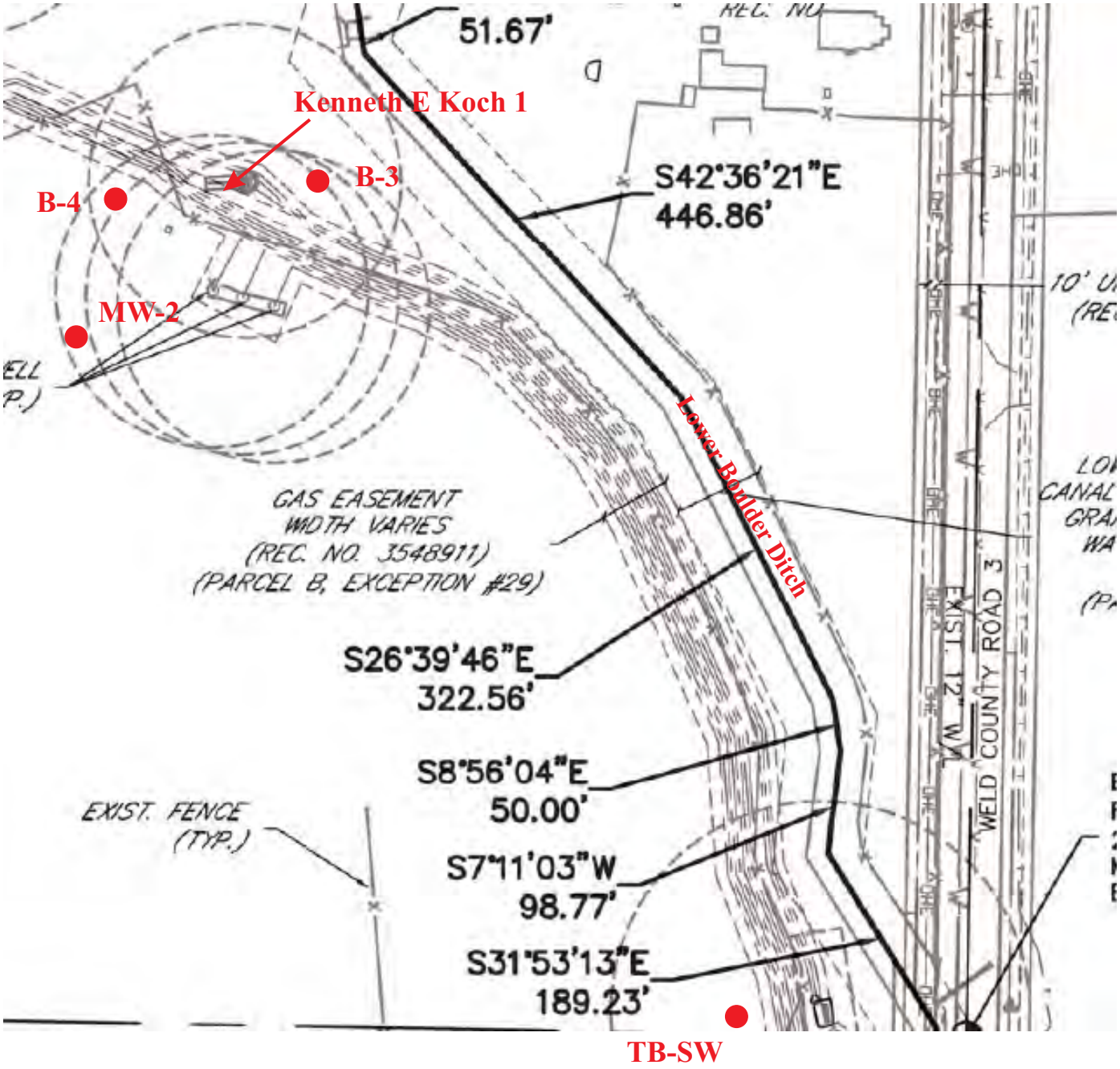


Scale in feet

0 100

WESTERN ENVIRONMENT AND ECOLOGY, INC.
2217 West Powers Avenue
Littleton, Colorado 80120

Figure 2 - Boring Location Map
Koch 41-6 Well
Andalusia Property
Section 6, T1N, R68W
Erie, Colorado



WESTERN ENVIRONMENT AND ECOLOGY, INC. 2217 West Powers Avenue Littleton, Colorado 80120	Figure 2 - Boring Location Map Kenneth E Koch 1 Well Andalusia Property Section 6, T1N, R68W Erie, Colorado

western environment and ecology inc.

Lithologic Log and Construction of Monitoring Well

Client	I&J Partnership LP	Drilling Information	
Project Number	640-001-02	Date Started 3/6/14	Date Completed 3/6/14
Project Location	Andalusia \	Method 2" GeoProbe	Total Depth 18.9'
Boring No.	MW-1	Well Completion Information	
Logged by	G. Sherman	Screen/Casing Diameter 1"	Screen Length 5'
Approved by	Greg Sherman	Slot Size 20	Casing Length 17'
Drilled by	Site Services	Top of Casing Elevation NA	Type PVC

Depth (ft)	Description	PID	Sample Interval/ Sample Type	Soil Classification	Blow Count	Well Completion	Water Level
	Medium to dark brown clay and sand, moist.	0 ppm	CS	SC			
5	Light brown fine to medium grained sand.	0 ppm		SP			
	Medium brown clay.	0 ppm		CL			
10	Light brown fine grained sand.	0 ppm		SP			
	Medium brown clay.	0 ppm		CL			
15	Moist at 14.5'						
	Light brown fine grained sand.	0 ppm		SP			
	(sample at 17.5')						
	Refusal at 18.9'						
20	Total depth 18.9'						
25							
30							

18.36'
3/11/14

Legend

Concrete
Bentonite
Sand 10/20

Sample Type
SS - Split Spoon
ST - Pressed Shelby Tube
CS - Continuous Sampler
CBS - California Barrel Sampler

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Lithologic Log and Construction of Monitoring Well

Client	I&J Partnership LP	Drilling Information	
Project Number	640-001-02	Date Started 3/6/14	Date Completed 3/6/14
Project Location	Andalusia \	Method 2" GeoProbe	Total Depth 18.9'
Boring No.	B-1	Well Completion Information	
Logged by	G. Sherman	Screen/Casing Diameter	Screen Length NA
Approved by	Greg Sherman	Slot Size NA	Casing Length NA
Drilled by	Site Services	Top of Casing Elevation NA	Type NA

Depth (ft)	Description	PID	Sample Interval/ Sample Type	Soil Classification	Blow Count	Well Completion	Water Level
	Light brown fine to medium grained sand.	0 ppm	CS	SP			
5							
	Medium to dark brown clay and sand, moist.	0 ppm		SC			
10	Light brown fine grained sand.						
	(sample at 12.0')	0 ppm		SP			
	Light brown fine grained quartzose sandstone.	0 ppm					
15	Total depth 13.8'						
20							
25							
30							

Legend

Concrete
Bentonite
Sand 10/20

Sample Type

SS - Split Spoon
ST - Pressed Shelby Tube
CS - Continuous Sampler
CBS - California Barrel Sampler

western environment and ecology inc.

Lithologic Log and Construction of Monitoring Well

Client I&J Partnership LP	Drilling Information		
Project Number 640-001-02	Date Started 3/6/14	Date Completed 3/6/14	
Project Location Andalusia	Method 2" GeoProbe	Total Depth 13.0'	
Boring No. B-2	Well Completion Information		
Logged by G. Sherman	Screen/Casing Diameter	Screen Length NA	
Approved by Greg Sherman	Slot Size NA	Casing Length NA	
Drilled by Site Services	Top of Casing Elevation NA	Type NA	

Depth (ft)	Description	PID	Sample Interval/ Sample Type	Soil Classification	Blow Count	Well Completion	Water Level
5	Light brown fine to medium grained sand.	0 ppm	CS	SP			
10	Medium to dark brown clay and sand, moist.	0 ppm		SC			
	Light brown fine grained sand. (sample at 12.5')	0 ppm		SP			
15	Light brown fine grained quartzose sandstone.	0 ppm					
20	Total depth 14.5'						
25							
30							

Legend

Concrete
Bentonite
Sand 10/20

Sample Type

SS - Split Spoon
ST - Pressed Shelby Tube
CS - Continuous Sampler
CBS - California Barrel Sampler

western environment and ecology inc.

Lithologic Log and Construction of Monitoring Well

Client	I&J Partnership LP	Drilling Information	
Project Number	640-001-02	Date Started 3/6/14	Date Completed 3/6/14
Project Location	Andalusia	Method 2" GeoProbe	Total Depth 13.0'
Boring No.	B-3	Well Completion Information	
Logged by	G. Sherman	Screen/Casing Diameter	Screen Length NA
Approved by	Greg Sherman	Slot Size NA	Casing Length NA
Drilled by	Site Services	Top of Casing Elevation NA	Type NA

Depth (ft)	Description	PID	Sample Interval/ Sample Type	Soil Classification	Blow Count	Well Completion	Water Level
	Light brown clay and sand.			SC			
	Light brown fine to medium grained sand moist.		CS				
5		0 ppm		SP			
	(sample at 9.0')						
10	(saturated at 9.5')	0 ppm					
	Light greenish gray fine grained quartzose sandstone.	0 ppm					
	Total depth 13.0'						
15							
20							
25							
30							

Legend

Concrete
Bentonite
Sand 10/20

Sample Type

SS - Split Spoon
ST - Pressed Shelby Tube
CS - Continuous Sampler
CBS - California Barrel Sampler

western environment and ecology inc.

Lithologic Log and Construction of Monitoring Well

Client	I&J Partnership LP	Drilling Information	
Project Number	640-001-02	Date Started 3/6/14	Date Completed 3/6/14
Project Location	Andalusia	Method 2" GeoProbe	Total Depth 14.0'
Boring No.	B-4	Well Completion Information	
Logged by	G. Sherman	Screen/Casing Diameter	Screen Length NA
Approved by	Greg Sherman	Slot Size NA	Casing Length NA
Drilled by	Site Services	Top of Casing Elevation NA	Type NA

Depth (ft)	Description	PID	Sample Interval/ Sample Type	Soil Classification	Blow Count	Well Completion	Water Level
	Light brown clay and sand.			SC			
	Light brown fine to medium grained sand moist.		CS				
5		0 ppm					
	(sample at 6.5')	0 ppm		SP			
	(saturated at 7.0')						
10							
	Light greenish gray fine grained quartzose sandstone.	0 ppm					
15	Total depth 14.0'						
20							
25							
30							

Legend

Concrete

Bentonite

Sand 10/20

Sample Type

SS - Split Spoon

ST - Pressed Shelby Tube

CS - Continuous Sampler

CBS - California Barrel Sampler

western environment and ecology inc.

Lithologic Log and Construction of Monitoring Well

Client	I&J Partnership LP	Drilling Information	
Project Number	640-001-02	Date Started 3/6/14	Date Completed 3/6/14
Project Location	Andalusia \	Method 2" GeoProbe	Total Depth 18.9'
Boring No.	MW-2	Well Completion Information	
Logged by	G. Sherman	Screen/Casing Diameter 1"	Screen Length 5'
Approved by	Greg Sherman	Slot Size 20	Casing Length 10'
Drilled by	Site Services	Top of Casing Elevation NA	Type PVC

Depth (ft)	Description	PID	Sample Interval/ Sample Type	Soil Classification	Blow Count	Well Completion / Water Level
5	Light brown clay and sand, gravel at 2.5(fill).	0 ppm	CS	SC		
10	Dark brown clay with sand (roots). (sample at 7.5')	0 ppm		SC		
15	Light brown fine grained sand saturated. (sample at 11.0')	0 ppm		SP		10.40' 3/11/14
20	Total depth 13.0'					
25						
30						

Legend

Concrete
Bentonite
Sand 10/20

Sample Type

SS - Split Spoon
ST - Pressed Shelby Tube
CS - Continuous Sampler
CBS - California Barrel Sampler

TECHNOLOGY LABORATORY, INC.

CENTRE PROFESSIONAL PARK

1012 Centre Avenue
Fort Collins, Colorado 80526
(970) 490-1414

CERTIFICATE OF ANALYSIS

Western Environment & Ecology
2217 W. Powers Ave
Littleton, CO 80120

Sampled: 03/06/14
Received: 03/12/14

Sample ID: MW-1, 17.5'
Project No.: 640-001-02

Laboratory ID B1032-01
Matrix: Soil

CAS Number	Parameter	Result	Units	MDL	Method	Date Analyzed
71-43-2	Benzene	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
108-88-3	Toluene	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
100-41-4	Ethylbenzene	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
1330-20-7	Total Xylenes	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
N/A	HEM	< 50	mg/Kg	50	EPA-9071B	03/20/14

QA/QC SURROGATE RECOVERIES

Compound	% Recovery	% Rec. Limits
Dibromofluoromethane	102	68-120
Toluene-d8	101	81-128
Bromofluorobenzene	99	70-113

The results contained in this report relate only to those items tested.

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Fort Collins, Colorado 80526
(970) 490-1414

CERTIFICATE OF ANALYSIS

Western Environment & Ecology
2217 W. Powers Ave
Littleton, CO 80120

Sampled: 03/06/14
Received: 03/12/14

Sample ID: MW-2, 11.0'
Project No.: 640-001-02

Laboratory ID B1032-02
Matrix: Soil

CAS Number	Parameter	Result	Units	MDL	Method	Date Analyzed
71-43-2	Benzene	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
108-88-3	Toluene	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
100-41-4	Ethylbenzene	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
1330-20-7	Total Xylenes	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
N/A	HEM	< 50	mg/Kg	50	EPA-9071B	03/20/14

QA/QC SURROGATE RECOVERIES

Compound	% Recovery	% Rec. Limits
Dibromofluoromethane	101	68-120
Toluene-d8	102	81-128
Bromofluorobenzene	96	70-113

The results contained in this report relate only to those items tested.

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Littleton, CO 80120

Sampled: 03/06/14
Received: 03/12/14

Sample ID: MW-2, 7.5'
Project No.: 640-001-02

Laboratory ID B1032-03
Matrix: Soil

CAS Number	Parameter	Result	Units	MDL	Method	Date Analyzed
71-43-2	Benzene	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
108-88-3	Toluene	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
100-41-4	Ethylbenzene	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
1330-20-7	Total Xylenes	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
N/A	HEM	< 50	mg/Kg	50	EPA-9071B	03/20/14

QA/QC SURROGATE RECOVERIES

Compound	% Recovery	% Rec. Limits
Dibromofluoromethane	103	68-120
Toluene-d8	100	81-128
Bromofluorobenzene	97	70-113

The results contained in this report relate only to those items tested.

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Western Environment & Ecology
2217 W. Powers Ave
Littleton, CO 80120

Sampled: 03/06/14
Received: 03/12/14

Sample ID: B-1, 12.0'
Laboratory ID B1032-04

Project No.: 640-001-02
Matrix: Soil

CAS Number	Parameter	Result	Units	MDL	Method	Date Analyzed
71-43-2	Benzene	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
108-88-3	Toluene	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
100-41-4	Ethylbenzene	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
1330-20-7	Total Xylenes	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
N/A	HEM	< 50	mg/Kg	50	EPA-9071B	03/20/14

QA/QC SURROGATE RECOVERIES

Compound	% Recovery	% Rec. Limits
Dibromofluoromethane	101	68-120
Toluene-d8	101	81-128
Bromofluorobenzene	98	70-113

The results contained in this report relate only to those items tested.

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2217 W. Powers Ave
Littleton, CO 80120

Sampled: 03/06/14
Received: 03/12/14

Sample ID: B-2, 12.5'
Project No.: 640-001-02

Laboratory ID B1032-05
Matrix: Soil

CAS Number	Parameter	Result	Units	MDL	Method	Date Analyzed
71-43-2	Benzene	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
108-88-3	Toluene	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
100-41-4	Ethylbenzene	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
1330-20-7	Total Xylenes	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
N/A	HEM	< 50	mg/Kg	50	EPA-9071B	03/20/14

QA/QC SURROGATE RECOVERIES

Compound	% Recovery	% Rec. Limits
Dibromofluoromethane	101	68-120
Toluene-d8	102	81-128
Bromofluorobenzene	97	70-113

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Littleton, CO 80120

Sampled: 03/06/14
Received: 03/12/14

Sample ID: B-3, 9.0'
Project No.: 640-001-02

Laboratory ID B1032-06
Matrix: Soil

CAS Number	Parameter	Result	Units	MDL	Method	Date Analyzed
71-43-2	Benzene	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
108-88-3	Toluene	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
100-41-4	Ethylbenzene	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
1330-20-7	Total Xylenes	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
N/A	HEM	< 50	mg/Kg	50	EPA-9071B	03/20/14

QA/QC SURROGATE RECOVERIES

Compound	% Recovery	% Rec. Limits
Dibromofluoromethane	102	68-120
Toluene-d8	101	81-128
Bromofluorobenzene	97	70-113

The results contained in this report relate only to those items tested.

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Littleton, CO 80120

Sampled: 03/06/14
Received: 03/12/14

Sample ID: B-4, 6.5'
Project No.: 640-001-02

Laboratory ID B1032-07
Matrix: Soil

CAS Number	Parameter	Result	Units	MDL	Method	Date Analyzed
71-43-2	Benzene	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
108-88-3	Toluene	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
100-41-4	Ethylbenzene	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
1330-20-7	Total Xylenes	< 0.01	mg/Kg	0.01	EPA-8260B	03/14/14
N/A	HEM	< 50	mg/Kg	50	EPA-9071B	03/20/14

QA/QC SURROGATE RECOVERIES

Compound	% Recovery	% Rec. Limits
Dibromofluoromethane	100	68-120
Toluene-d8	102	81-128
Bromofluorobenzene	100	70-113

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CERTIFICATE OF ANALYSIS

Western Environment & Ecology
2217 W. Powers Ave
Littleton, CO 80120

Sampled: 03/12/14
Received: 03/12/14

Sample ID: MW-2 (1L)
Laboratory ID B1032-08

Project No.: 640-001-02
Matrix: Water

CAS Number	Parameter	Result	Units	MDL	Method	Date Analyzed
N/A	HEM	< 5.0	mg/L	1.4	EPA-1664A	03/25/14

The results contained in this report relate only to those items tested.

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CERTIFICATE OF ANALYSIS

Western Environment & Ecology
2217 W. Powers Ave
Littleton, CO 80120

Sampled: 03/12/14
Received: 03/12/14

Sample ID: MW-1
Laboratory ID B1032-09

Project No.: 640-001-02
Matrix: Water

CAS Number	Parameter	Result	Units	MDL	Method	Date Analyzed
71-43-2	Benzene	< 0.001	mg/L	0.001	EPA-8260B	03/26/14
108-88-3	Toluene	< 0.001	mg/L	0.001	EPA-8260B	03/26/14
100-41-4	Ethylbenzene	< 0.001	mg/L	0.001	EPA-8260B	03/26/14
1330-20-7	Total Xylenes	< 0.001	mg/L	0.001	EPA-8260B	03/26/14

QA/QC SURROGATE RECOVERIES

Compound	% Recovery	% Rec. Limits
Dibromofluoromethane	93	68-120
Toluene-d8	101	81-128
Bromofluorobenzene	96	70-113

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CERTIFICATE OF ANALYSIS

Western Environment & Ecology
2217 W. Powers Ave
Littleton, CO 80120

Sampled: 03/12/14
Received: 03/12/14

Sample ID: MW-2 (VOA)
Laboratory ID B1032-10

Project No.: 640-001-02
Matrix: Water

CAS Number	Parameter	Result	Units	MDL	Method	Date Analyzed
71-43-2	Benzene	< 0.001	mg/L	0.001	EPA-8260B	03/25/14
108-88-3	Toluene	< 0.001	mg/L	0.001	EPA-8260B	03/25/14
100-41-4	Ethylbenzene	< 0.001	mg/L	0.001	EPA-8260B	03/25/14
1330-20-7	Total Xylenes	< 0.001	mg/L	0.001	EPA-8260B	03/25/14

QA/QC SURROGATE RECOVERIES

Compound	% Recovery	% Rec. Limits
Dibromofluoromethane	95	68-120
Toluene-d8	110	81-128
Bromofluorobenzene	95	70-113

The results contained in this report relate only to those items tested.

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CERTIFICATE OF ANALYSIS

Western Environment & Ecology
2217 W. Powers Ave
Littleton, CO 80120

Sampled: 03/12/14
Received: 03/12/14

Sample ID: TB-SW (1L)
Laboratory ID B1032-11

Project No.: 640-001-02
Matrix: Water

CAS Number	Parameter	Result	Units	MDL	Method	Date Analyzed
N/A	HEM	< 5.0	mg/L	1.4	EPA-1664A	03/25/14

The results contained in this report relate only to those items tested.

TECHNOLOGY LABORATORY, INC.

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Fort Collins, Colorado 80526
(970) 490-1414

CERTIFICATE OF ANALYSIS

Western Environment & Ecology
2217 W. Powers Ave
Littleton, CO 80120

Sampled: 03/12/14
Received: 03/12/14

Sample ID: TB-SW (VOA)
Laboratory ID B1032-12

Project No.: 640-001-02
Matrix: Water

CAS Number	Parameter	Result	Units	MDL	Method	Date Analyzed
71-43-2	Benzene	< 0.001	mg/L	0.001	EPA-8260B	03/25/14
108-88-3	Toluene	< 0.001	mg/L	0.001	EPA-8260B	03/25/14
100-41-4	Ethylbenzene	< 0.001	mg/L	0.001	EPA-8260B	03/25/14
1330-20-7	Total Xylenes	< 0.001	mg/L	0.001	EPA-8260B	03/25/14

QA/QC SURROGATE RECOVERIES

Compound	% Recovery	% Rec. Limits
Dibromofluoromethane	99	68-120
Toluene-d8	110	81-128
Bromofluorobenzene	97	70-113

The results contained in this report relate only to those items tested.

TECHNOLOGY LABORATORY, INC.
1012 CENTRE AVENUE
FORT COLLINS, CO 80526
Phone: (970)490-1414 Fax: (970)472-5488
www.techlabusa.com info@techlabusa.com

W.O. NUMBER B1032

CHAIN-OF-CUSTODY REPORT

COMPANY NAME: Western Environment & Ecology
PROJECT MANAGER: Chris Sherman
PROJECT NUMBER: 640-001-02
PROJECT LOCATION OR NAME: Andalusia
SAMPLER'S SIGNATURE:

	SAMPLE ID	DATE/TIME SAMPLED	SAMPLE MATRIX: SOIL (S) AIR (A) AQUEOUS (W) OTHER (O)	NUMBER OF CONTAINERS	ANALYSIS REQUESTED: BTEX / MTBE / TVPH	TEPH (DRO)	OIL & GREASE	VOC 624 / 8260 (TOTAL / TCLP)	SVOC 625 / 8270 / PAH (TOTAL / TCLP)	pH / TSS / TDS	RCRA 8 METALS (TOTAL / TCLP / DISSOLVED)	React. / Ignite. / Corr. / Paint Filt.	BTEX/TVPH Emissions Vapor	BTEX Soil Vapor	TO-14 / TO-15 / TVPH Vapor	NITRATE / NITRITE / AMMONIA	BOD / COD	PCBs	TRPH 418.1	OTHER	OTHER	OTHER	OTHER	OTHER	OTHER	HOLD AFTER ANALYSIS	HOLD, DON'T ANALYZE
01	MW-1, 17.5'	3-6-14, 1035	S	1	X														X								
02	MW-3, 11.0'	3-6-14, 1252	S	1	X														X								
03	MW-2, 7.5'	3-6-14, 1240	S	1	X														X								
04	B-1, 12.0'	3-6-14, 1152	S	1	X														X								
05	B-2, 12.5'	3-6-14, 1214	S	1	X														X								
06	B-3, 9.0'	3-6-14, 1329	S	1	X														X								
07	B-4, 6.5'	3-6-14, 1339	S	1	X														X								
08	MW-2 (1L)	3-12-14, 1155	W	1															X								
09	MW-1	3-12-14, 1140	W	1	X																						
10	MW-2 (VOA)	3-12-14, 1155	W	1	X																						
11	TB-SW	3-12-14, 1220	W	1	X																						
12	TB-SW	3-12-14, 1220	W	1															X								

PAGE 1 OF 1

TURNAROUND TIME
- [X] Normal (≤10 Working Days)
- [ ] 3 Day (1.5 x Normal Rates)
- [ ] Next Day (2 x Normal Rates)
- [ ] Same Day (4 x Normal Rates)

NPDES PERMIT? ____YES ____NO

COMMENTS:

LOGGED IN BY: SW

Sample Preservative: [X] ≤ 6° C [ ] Acid [ ] None [ ] Filtered [ ] Other

RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE: 3/12/14
COMPANY: Western	TIME:	COMPANY: TLI	TIME: 2:45pm
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
COMPANY:	TIME:	COMPANY:	TIME:

APPENDIX D

Western Environment and Ecology Inc.

Statement of Qualifications

"We declare that, to the best of our professional knowledge and belief, we meet the definition of Environmental professional as defined in 40 CFR 312 and we have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed the appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312."

REAL ESTATE TRANSFER ENVIRONMENTAL AUDITS

(RETA)

In response to provisions contained within the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA), lending institutions, firms and individuals involved with property transfers have become painfully aware of the costs associated with environmental liabilities. In an attempt to make informed decisions and potentially avail themselves of the "innocent purchaser defense" as defined in CERCLA, lending institutions are requiring the completion of an environmental audit. Previously, the completeness and the thoroughness of these audits varied as greatly as the cost. However, in late 1992, the American Society of Testing and Materials (ASTM) adopted specific standards for completion of Phase I audits. The ASTM standards (E-1527 and E-1528) are quite specific as to the level of investigation necessary to complete the audit. **WESTERN ENVIRONMENT AND ECOLOGY, INC.** has performed Real Estate Transfer Environmental Audits to ASTM standards long before the standards were adopted. Additionally, **WESTERN ENVIRONMENT AND ECOLOGY, INC.** personnel have provided training to FDIC regional offices on environmental compliance and financial institution liabilities. This familiarity with lending institutions and more than fifteen years of experience in performing RETA's allows **WESTERN ENVIRONMENT AND ECOLOGY, INC.** to provide efficient and complete reports meeting short time frame requirements.

SERVICES

- Historical Photo Records Search
- Environmental Records Search
- Interviews
- On-site Inspection
- Lead-Based Paint Survey
- Asbestos Survey
- Radon Survey
- PCB Survey

SELECTED CLIENT LIST

Community Development Group Denver, Colorado
City of Aurora, Aurora, Colorado
City of Wheat Ridge, Colorado
Shively, Strommen & Holst, Longmont, Colorado
Town of Lyons, Colorado

GREG D. SHERMAN, P.G.

President

PROFESSIONAL CAPABILITIES:

Mr. Sherman has more than 39 years of professional experience. He is currently President of **WESTERN ENVIRONMENT AND ECOLOGY, INC.** Prior to his current position, he was the Principal Geologist with SEACOR in its Lakewood, Colorado office and Project Director with Roy F. Weston also in Lakewood.

Duties performed in these capacities involved responsibility for CERCLA RI/FS studies and RCRA investigations. His professional assignments include project management and technical direction of the design and installation of the 2,000-foot long the 881 Hillside Groundwater Interception trench at the Rocky Flats Nuclear Weapons Plant in Jefferson County, Colorado. Mr. Sherman was Field Operations Manager for the installation of 75 groundwater extraction wells and vapor extraction and sparging points. This work was completed on the Stanford Research Park Superfund site in Palo Alto, California. Recently, he has concentrated on VOC remediation system design and installation utilizing on-site re-injection of treated groundwater and enhanced oxygenation systems. Mr. Sherman was lead investigator for the City of Wheat Ridge regarding the characterization of the Jay Street Park. This project, which was submitted to the Colorado Voluntary Clean-Up Program, received a grant from the Colorado Department of Public Health and Environment for innovative use of a Brownsfields site. Mr. Sherman and Western Environment and Ecology, Inc. was selected by the Cities of Aurora and Lakewood as their approved USEPA Brownsfields contractor.

Mr. Sherman is past Chairman of the Rocky Mountain Section of the Association of Engineering Geologists. He has served as Chairman of Executive Enterprises Seminars on Sampling and Data Analysis. He has extensive experience in geotechnical and geological investigations, groundwater studies, UST testing and evaluation, construction materials testing and mineral resource evaluation.

Mr. Sherman is recognized in the region as one of the leading experts in underground storage tank management and mine subsidence. He has placed special emphasis on the application of geophysical techniques to environmental and geotechnical investigations. Clients for these projects range from Federal, state and local governments to private industry and commercial developments. The project types included petroleum distribution facilities, nuclear power plants, highways and streets, dams and reservoirs, transmission lines, sewage treatment plants and sewage systems, hazardous and industrial waste disposal areas, and mining facilities, as well as residential and commercial developments. Mr. Sherman has performed geotechnical and geological investigations in Alaska, Arizona, California, Colorado, Idaho, Illinois, Montana, New Mexico, New York, Nevada, North Dakota, South Dakota, Texas, Utah and Wyoming. Additionally, he has international evaluation experience in the Middle East and Mexico.

REGISTRATION/CERTIFICATION

Wyoming Professional Geologist #2296
Indiana Certified Geologist #786
Certified Professional Geologist, CPG #6586
Petro Tite Training Course, 1986
40-Hour OSHA Training Course, 1987
8-Hour OSHA Supervisor Course, 1987
Nuclear Density Gauge Operation and Safety Training Course, 1984
NRC Quality Assurance Training, 1978
Asbestos Inspector, 1996

EXPERIENCE

Western Environment and Ecology, Inc., Littleton, Colorado; President, 1994.
SEACOR, Inc., Lakewood, Colorado; Principal Scientist, 1992-1993.
Roy F. Weston, Inc., Lakewood, Colorado; Principal Geologist, 1990-1992.
ATEC Associates, Inc., Denver, Colorado; Environmental Division Manager, 1985-1990.
Tierra Consultants, Inc., Denver, Colorado; President, 1982-1985.
Apache Energy and Minerals, Denver, Colorado; Senior Project Geologist, 1979-1982.
Dames and Moore, Denver, Colorado; Project Geologist, 1977-1979.
Resource Associates of Alaska, Fairbanks, Alaska; Staff Geologist, 1976.
Uranerez U.S.A., Inc., Casper, Wyoming; Staff Geologist, 1975-1976.
Amoco Production Company, Denver, Colorado; Lab Technician, 1974.
Cities Service Company, Durango, Colorado; Field Technician, 1973.

EDUCATION

B.S., Geology, University of Northern Colorado, 1975
Graduate Studies, New Mexico Institute of Mining and Technology, 1977

AWARDS

Rocky Mountain Associate of Geologists, Outstanding Senior, 1975
Who's Who in the West, 1988
Colorado Wildlife Federation, 1996 Conservationist of the Year (Owl Mountain Partnership)

PROFESSIONAL ASSOCIATIONS

Association of Engineering Geologists

American Institute of Professional Geologists

Senior Scientist Colca Canyon Scientific Expedition, 1990

Colorado School of Mines, Non-facility Senior Design Team Advisor

PUBLICATIONS/PRESENTATIONS

Sherman Greg D.,"Mine Subsidence Assessment, Boulder-Weld Coal Field, Using British National Coal Board Methods" The Mountain Geologist, Volume 46, Number 1 January 2009.

Sherman Greg D. and Brian R. Partington., "Abandoned Mine Subsidence Prediction Using British National Coal Board Methods, Boulder/Weld Coal Field, Denver, Colorado" Proceedings for the International Association of Engineering Geologists, 2006 Meeting Nottingham, United Kingdom. September 2006.

Sherman, Greg D., "Sampling and Data Analysis"; Executive Enterprises Seminar, Chairman, May 1992.

Sherman, Greg D., "Statistical Design of Sampling Plans"; Executive Enterprises Seminar, June 1990.

Sherman, Greg D., "Impact of the EPA UST Regulations"; Tri-State Petroleum Marketer, December 1988.

Sherman, Greg D., "Variables Effecting Volumetric Leak Detection Methods for Underground Storage Tanks"; Paper given to the Colorado Section, American Society of Civil Engineers, 1988.

Sherman, Greg D., "The Impact of Underground Storage Tank Regulations on Industry"; Extended Abstracts, American Institute of Chemical Engineers, National Meeting, 1988.

Sherman, Greg D., "Assessment of Subsidence Damage to Existing Structures in Louisville, Lafayette, Colorado"; Proceedings of the Colorado Governor's Conference on Subsidence, 1985.

Sherman, Greg D., "Geology and Mining History of the Boulder/Weld Coal Field"; Paper given at Denver Coal Club Meeting, 1985.

Sherman, Greg D., "The New Mexico Gold Belt Regional Structural Implications"; Proceedings of the Western Mining Association, 1982 Convention.

Sherman, Greg D., "Colorado Front Range Uranium Deposits, A Possible Origin": in review.

Sherman, Greg D., "Origin of Monoclinal Folding Near Livermore, Colorado"; The Mountain Geologist, April 1976.