

Lewis & Clark County Water Quality Protection District

2020 Groundwater Monitoring & Sampling Plan



Prepared by:

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Lewis & Clark County Water Quality Protection District

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1.0 Introduction

The purpose of this plan is to document groundwater monitoring and sampling activity conducted by the Lewis & Clark County Water Quality Protection District (WQPD). The WQPD monitors groundwater level from a network of over 150 wells in the Helena Valley and adjacent areas within the Lake Helena Watershed. 'Network' wells consist primarily of residential wells, and also include a variety of dedicated monitoring wells installed by the WQPD, the Montana Bureau of Mines and Geology (MBMG), and the United States Geological Survey (USGS).

1.1 Project Area Overview

The project area includes the Lake Helena watershed and adjacent areas. The Lake Helena watershed is located in west-central Montana in Lewis & Clark and Jefferson Counties. Helena, Montana's capitol city, lies near the center of the watershed (Figure 1). The Lake Helena watershed is part of the Upper Missouri Watershed (USGS 8-digit hydrologic cataloging unit number 10030101).

1.2 Project Goals and Objectives

The primary goal of this monitoring and sampling plan is to provide a monitoring framework for groundwater data collected by the WQPD. The WQPD collects both groundwater level measurements and water quality samples from wells throughout the Helena Valley. Assessment of groundwater levels is an important component to understanding how the local groundwater systems respond to flooding, recharge, pumping/extraction, and to short and long-term climatic trends. Likewise, analysis of groundwater samples is an important component to understanding and characterizing groundwater quality, and sources of annual recharge to local groundwater systems. Groundwater data can help to inform residents, institutions and local governments regarding resource management and community planning efforts.

The monitoring and sampling objectives of this monitoring plan include:

- Measure groundwater levels from network wells
- Sample water quality from network wells

2.0 Groundwater Monitoring Study Design

Groundwater monitoring consists of measuring water levels and water quality from a network of wells in the Helena Valley and surrounding areas. Monitoring methods and quality assurance procedures follow those in the WQPD *Quality Assurance Plan: Environmental Sampling Programs (QAP)*. Field forms for the collection of groundwater samples, field parameters and water levels are provided in QAP Appendix A. QAP Appendix B includes a groundwater quality analyte list used by the WQPD for laboratory analysis of groundwater samples. Periodic modifications to the well monitoring network are made to address data needs, specific investigations, or emerging issues.

2.1 Groundwater Level Measurement

Groundwater level measurements are collected from a network of 155 wells on either a monthly or quarterly schedule (Figure 2, Table 1). Monitoring locations include 109 private wells and 46 publicly-owned monitoring wells. Measurements are collected by WQPD staff following procedures presented in the WQPD's *Quality Assurance Plan: Environmental Sampling Programs*.

2.2 Groundwater Quality Sampling

Groundwater samples are collected periodically in support of specific projects, and general aquifer characterization. Sampling is conducted by WQPD staff following procedures presented in the WQPD's *Quality Assurance Plan: Environmental Sampling Programs*.

**Note that groundwater quality sampling addressed in this monitoring plan only covers those wells where aquifer-quality samples are desired. Accordingly, samples from residential wells are collected prior to in-home treatment*

(typically from an outside hydrant). Samples from dedicated monitoring wells are collected directly from the well casing using an electric pump or disposable bailer.

3.0 Project Team and Data Management

3.1 Project Team and Responsibilities

Person	Role	Affiliation	Responsibilities
Peter Schade	Project Coordinator	WQPD	<ul style="list-style-type: none">• Project Planning & Coordination• Data Collection• Data Reporting• Outreach
James Swierc	Technical Coordinator	WQPD	<ul style="list-style-type: none">• Data Collection• Data Reporting• Technical Assistance & Analysis• Outreach
Jennifer McBroom	Administration	WQPD	<ul style="list-style-type: none">• Project Oversight• Outreach
Valerie Stacey	Technical Support	WQPD	<ul style="list-style-type: none">• Data Collection• Data Management• Outreach

3.2 Data Management and Reporting

Data is managed by the Lewis & Clark County Water Quality Protection District, and maintained in spreadsheets, hardcopy field sheets and .pdf files. Additionally, groundwater level measurements are uploaded to the Groundwater Information Center (GWIC) database managed by the Montana Bureau of Mines and Geology, and available for public consumption. All data is available to the public, government agencies and non-government organizations by written request. There are no statutory reporting requirements for this data.

Water level data for network wells is also made available to the public through an ESRI on-line mapping application (ESRI Story Map) that shows the record of water levels for all wells in WQPD's monitoring network. This Story Map can be accessed at <https://arcg.is/1qO1Pf>.

Table 1. Well Monitoring Network

Map ID	Latitude	Longitude	GWIC ID	Address	Monitoring Frequency	Ownership	Total Depth	Year Drilled
1	46.630038	-112.043559	293450	287 Ohana Ct	12x	Private	60	2017
2	46.645904	-112.037226	61215	546 Mill Rd	12x	Private	42	1970
3	46.644423	-112.031875	302696	Motsiff and McHugh	12x	County	25	2019
4	46.644188	-112.028648	61368	775 Motsiff Road	12x	Private	NA	NA
5	46.640981	-112.026216	256510	964 Cheryl Road	12x	Private	58	2010
6	46.645859	-112.015984	892195	Mill Road	12x	USGS	23	NA
7	46.649587	-112.028470	61260	5260 Kerr Dr	12x	Private	43	1959
8	46.653312	-112.028317	278709	5502 Kerr Dr	12x	Private	42	NA
9	46.653157	-112.020893	302701	Forestvale and N Montana	12x	County	28	2019
10	46.654177	-112.022008	61189	5560 N Montana	12x	Private	52	1938
11	46.658243	-112.015939	255363	1497 Sierra Rd E	12x	County	25	2010
12	46.662269	-112.015803	300744	6170 Goodwin Dr	12x	Private	21	NA
13	46.663597	-112.025927	65043	940 Vallejo Dr	12x	Private	47	1972
14	46.666124	-112.019456	65088	1208 Hilmen Rd	12x	Private	52	1960
15	46.666063	-112.013411	302706	Hilmen Rd	12x	County	17	2019
16	46.680431	-112.030891	302709	Rinay Rd	12x	County	20	2019
17	46.690000	-112.051484	197571	7125 Sagebrush	12x	Private	130	2002
18	46.688540	-112.054076	258300	7085 Green Meadow Dr	12x	Private	140	2010
19	46.675316	-112.042587	191555	Applegate and Norris North Well	12x	County	29	2001
20	46.675243	-112.042603	257063	11N03W30CCCC	12x	County	60	2010
21	46.615566	-112.073959	261223	2720 Country Club Ave	12x	Private	358	NA
22	46.614235	-112.071587	62748	2720 Country Club Ave	12x	Private	100	1988
23	46.630684	-112.084412	191557	HEAD LANE WELL	12x	County	80	2001
24	46.652409	-112.079567	62369	615 BLUE GROUSE RD	12x	Private	110	1976
25	46.662876	-112.093529	65615	6184 HEAD LANE	12x	Private	125	1976
26	46.648590	-112.103981	706014	1063 SUNNY VISTA RD	12x	Private	206	NA
27	46.645716	-112.077518	177986	560 Franklin Mine Road	4x	Private	85	1999
28	46.646146	-112.077494	706058	560 Franklin Mine Road	4x	Private	46	NA
29	46.633098	-112.061906	121040	4355 Paydirt	12x	Private	112	1978
30	46.623703	-112.051871	193574	125 Horseshoe Bend Rd	12x	Private	100	2001
31	46.623974	-112.048874	191539	HORSESHOE BEND ROAD	12x	County	19	2001
32	46.705391	-112.041534	191534	Gravel Pit Well	12x	County	100	2001
33	46.712368	-112.043358	187372	365 Applebrook Road	12x	Private	137	2000
34	46.713753	-112.026520	199993	1085 View Road	4x	Private	135	2002
35	46.720191	-112.056685	168598	7965 Garrick Lane	4x	Private	203	1998
36	46.719353	-112.053253	65271	7954 Bergren Road	12x	Private	176	1973
37	46.727158	-112.059425	206026	Guthrie Road	12x	Private	200	2003
38	46.754696	-112.092094	194435	574 Cabin Road West	4x	Private	57	2001
39	46.732140	-112.087738	180976	8260 Buffalohorn Road	4x	Private	370	1999
40	46.743961	-112.039001	206393	8570 Capri Road	4x	Private	177	2003
41	46.728334	-112.036360	191532	North Hills	4x	County	100	2001

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Map ID	Latitude	Longitude	GWIC ID	Address	Monitoring Frequency	Ownership	Total Depth	Year Drilled
42	46.733955	-112.024254	243352	1030 Praire Road	4x	Private	156	2008
43	46.731758	-112.019287	64737	8001 N. Montana Ave.	12x	State	208	1982
44	46.736465	-112.019920	64649	8375 N MT Ave.	12x	Private	110	1988
45	46.754036	-112.020981	187438	8865 Douglas Circle	4x	Private	120	2000
46	46.740410	-112.021599	64686	8480 N. Montana Ave	12x	Private	95	1976
47	46.736720	-112.027229	206394	945 Erickson Road	12x	Private	200	2003
48	46.738625	-112.030815	143645	820 Raptor	12x	Private	174	1994
49	46.735336	-112.022804	237990	1120 Terrance Road	12x	Private	266	2007
50	46.723289	-112.020172	64755	8001 N. Montana Ave.	12x	State	441	1967
51	46.544400	-112.080800	132801	1973 OROFINO GULCH	12x	Private	122	1992
52	46.545235	-112.070900	58923	4105 SPRINGHILL RD	4x	Private	124	1986
53	46.581833	-112.017952	62261	222 WALLACE ST	4x	Private	140	1987
54	46.533203	-112.004471	58737	64 HILL BROTHER RD, CLANCY	4x	Private	207	1986
55	46.533913	-111.939415	134497	# 3 PRICKLY PEAR RD, CLANCY	4x	Private	145	1993
56	46.605049	-112.015999	62006	1414 POPLAR	4x	Private	100	1988
57	46.604200	-112.074300	62802	913 GRANITE	12x	Private	130	1990
58	46.588879	-112.174500	706042	6150 American Creek Trail	12x	Private	100	NA
59	46.571381	-112.240471	62995	7415 CLAUSEN RD	4x	Private	135	1981
60	46.544971	-112.187607	59133	6298 TWIN PINES RD	4x	Private	260	1987
61	46.624443	-112.107155	248640	JFHQ-MT, 1956 Mt Majo Street	12x	State	70	1995
62	46.631191	-112.100784	123839	3802 Barrett Road	12x	Private	201	1991
63	46.632133	-112.133224	706032	4060 OESTERLE RD	12x	Private	120	NA
64	46.635564	-112.102493	134697	3825 Birdseye Rd	12x	Private	161	1993
65	46.674801	-112.143517	65541	5200 HIDDEN VALLEY DRIVE	4x	Private	200	1972
66	46.654572	-112.216278	147130	4697 ELK RD	4x	Private	140	1994
67	46.707977	-112.206650	155613	Threemile Rd & Murray Dr. N	4x	Private	500	1995
68	46.743731	-112.192550	223345	6479 Marysville Rd	4x	Private	170	2005
69	46.749096	-112.299388	138530	177 Grand St	4x	Private	150	1993
70	46.749083	-112.299198	272028	177 Grand St	4x	Private	380	2013
71	46.751688	-112.300291	152548	284 Fourth St	4x	Private	100	1995
72	46.751596	-112.301500	66455	104 Fourth St	4x	Private	70	1986
73	46.728980	-112.106590	706051	8180 RED RIDGE DR.	12x	Private	250	NA
74	46.704632	-112.077110	65316	7573 Bumsteer Dr	12x	Private	97	1971
75	46.704720	-112.076584	237167	7573 Bumsteer Dr	12x	Private	465	2000
76	46.705643	-112.074745	246101	7573 Bumsteer Dr	12x	Private	49	1918
77	46.660511	-111.972794	191526	Sierra and Floweree North Well	4x	County	46	2001
78	46.660591	-111.972786	191527	Sierra and Floweree South Well	4x	County	18	2001
79	46.652290	-111.994774	191524	Buoy Road North Well (Shallow)	4x	County	25	2001
80	46.652222	-111.994827	191525	Buoy Road South Well (Deep)	4x	County	50	2001
81	46.609283	-112.008163	191528	Airport West - North Well	4x	County	90	2001
82	46.609283	-112.008163	191529	Airport West - South Well	4x	County	25	2001

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Map ID	Latitude	Longitude	GWIC ID	Address	Monitoring Frequency	Ownership	Total Depth	Year Drilled
83	46.704200	-112.020900	191537	LINCOLN AND MONTANA WELL	4x	County	43	2001
84	46.717674	-111.990562	144726	1935 Lucky Strike Road	4x	Private	240	1992
85	46.722085	-112.009630	295393	1612 Scenic View Rd	12x	Private	NA	NA
86	46.721416	-112.009851	207290	1606 Wooten Rd	12x	Private	535	2003
87	46.721414	-112.009899	64740	1606 Wooten Rd	12x	Private	220	1977
88	46.724583	-111.994125	176012	6055 Glass Drive	12x	Private	140	1999
89	46.723812	-111.995973	145957	6055 Glass Drive	12x	Private	115	1994
90	46.723938	-111.993807	257065	6055 Glass Drive	4x	Private	360	2010
91	46.736186	-111.984892	213253	6350 Sleeping Giant Vw	4x	Private	324	2004
92	46.736824	-111.984207	286769	6350 Sleeping Giant Vw	4x	Private	170	2016
93	46.734592	-111.977234	144725	2224 Tea Road	4x	Private	192	1994
94	46.732598	-111.974502	205626	2275 Tea Rd	4x	Private	420	2003
95	46.732843	-111.966647	154817	2423 Tea Rd	4x	Private	458	1995
96	46.734800	-111.958195	128054	2580 Tea Rd	4x	Private	390	1992
97	46.733322	-111.958460	223525	6296 Ferry Dr	4x	Private	530	2005
98	46.732967	-111.955460	148259	2623 Tea Road	4x	Private	350	1993
99	46.733810	-111.952324	145955	2680 Tea Rd	4x	Private	254	1994
100	46.734234	-111.947940	178089	2755 Tea Rd	4x	Private	365	1999
101	46.735767	-111.946280	239744	2755 Tea Rd	4x	Private	526	2007
102	46.739258	-111.966860	143641	2423 SNOWDRIFT RD	4x	Private	178	1994
103	46.729385	-111.952340	219845	2676 Fantasy Rd	12x	Private	221	2005
104	46.721344	-111.959080	176014	5980 Ferry Dr	12x	Private	180	1999
105	46.725767	-111.963220	64774	6040 Ferry Dr	4x	Private	420	1983
106	46.729136	-111.976947	290440	2204 Lorac Court	4x	Private	187	2016
107	46.725050	-111.979004	176010	6070 Collins Dr	4x	Private	259	1999
108	46.718605	-111.974197	64798	5843 Collins Road	4x	Private	85	1988
109	46.710327	-111.978661	257064	11N03W16DBBD	4x	MBMG	55	2010
110	46.704330	-111.995697	5846	Lincoln Rd -east of I-5	4x	USGS	46	1978
111	46.716042	-111.913177	170202	5850 Timber Trail Drive	12x	Private	300	1997
112	46.678246	-111.899582	5816	Merritt Lane	4x	USGS	45	1978
113	46.667465	-111.895905	225904	4391 Fox View Loop	12x	Private	135	2006
114	46.664497	-111.897827	202169	4460 Fox View Loop	12x	Private	97	2003
115	46.666340	-111.893181	214268	Emerald Ridge Park	4x	County	400	2004
116	46.665813	-111.890680	258256	4431 Ruby Court	4x	Private	225	2010
117	46.665977	-111.890980	268597	4431 Ruby Court	4x	Private	740	2012
118	46.663975	-111.890358	295922	4322 Emerald Ridge Lp	4x	Private	740	2017
119	46.663975	-111.890465	247915	4322 Emerald Ridge Lp	4x	Private	325	2008
120	46.662304	-111.889870	258900	4330 Stoney Dr	4x	Private	600	2010
121	46.661518	-111.883583	263418	4309 Mica	4x	Private	356	2011
122	46.662792	-111.884682	276039	4371 Pearl Court	4x	Private	540	2013
123	46.665234	-111.886147	223764	3955 Topaz	4x	Private	220	2006

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Map ID	Latitude	Longitude	GWIC ID	Address	Monitoring Frequency	Ownership	Total Depth	Year Drilled
124	46.665253	-111.886124	252112	3955 Topaz	4x	Private	483	2009
125	46.668339	-111.884247	227175	3985 Chromium Court	4x	Private	240	2006
126	46.651588	-111.874413	191530	REGULATING RESERVOIR WELL	4x	County	56	2001
127	46.646214	-111.937111	88214	3900 Wylie Dr	4x	MBMG	25	1990
128	46.646217	-111.937126	88213	3900 Wylie Dr	4x	MBMG	104	1990
129	46.635006	-111.954056	191551	WARREN SCHOOLS S WELL/Red Cap	4x	County	19	2001
130	46.635059	-111.954071	191550	WARREN SCHOOL NORTH WELL	4x	County	47	2001
131	46.631593	-111.942106	892180	2902 Howard Rd	4x	USGS	40	1978
132	46.631593	-111.942106	123550	2902 Howard Rd	4x	MBMG	78	1990
133	46.661713	-111.946991	191549	HELBERG LANE SOUTH WELL	4x	County	16	2001
134	46.661762	-111.946899	191554	HELBERG LANE NORTH WELL	4x	County	61	2001
135	46.615696	-111.981941	191538	Airport North - North Well	4x	County	80	2001
136	46.615673	-111.981934	193012	Airport North - South Well	4x	County	34	2001
137	46.618462	-111.959984	PW1	Canyon Ferry Rd at WWTP	4x	City		
138	46.618469	-111.960403	61851	Canyon Ferry Rd at WWTP	4x	City	342	1987
139	46.605762	-111.935852	140486	Wylie Drive	4x	County	150	2001
140	46.626884	-111.914154	191536	Eichoff and Valley Well	4x	County	70	2001
141	46.613953	-111.906250	182549	3565 Applebee Road	4x	Private	100	2000
142	46.614471	-111.895844	238195	3045/3779 Meadowlark Drive	4x	Private	102	1986
143	46.624886	-111.897720	224230	3737 Sly Road	4x	Private	80	2005
144	46.616627	-111.857600	293234	4484 Highfield Rd	12x	Private	304	2017
145	46.614924	-111.864760	287404	4338 Berkshire Rd	12x	Private	165	2016
146	46.615569	-111.869711	296170	4256 Berkshire Rd	12x	Private	220	2018
147	46.612850	-111.871872	293307	2922 Callaway Dr	12x	Private	181	2017
148	46.612403	-111.868595	297015	4287 St John Rd	12x	Private	227	2018
149	46.613232	-111.863443	288545	2945 Ranger Dr	12x	Private	220	2016
150	46.597916	-111.896347	153703	3765 Wildfire	4x	Private	257	1995
151	46.591637	-111.877907	191548	Prairie Nest and Lone Prairie Well	12x	County	136	2001
152	46.590378	-111.994621	191540	MOTOR POOL EAST WELL	4x	County	61	2001
153	46.590389	-111.994659	191531	MOTOR POOL WEST WELL	4x	County	121	2001
154	46.601616	-111.980713	191533	Airport South - North Well	4x	County	121	2001
155	46.601658	-111.980713	191535	Airport South - South Well	4x	County	55	2001

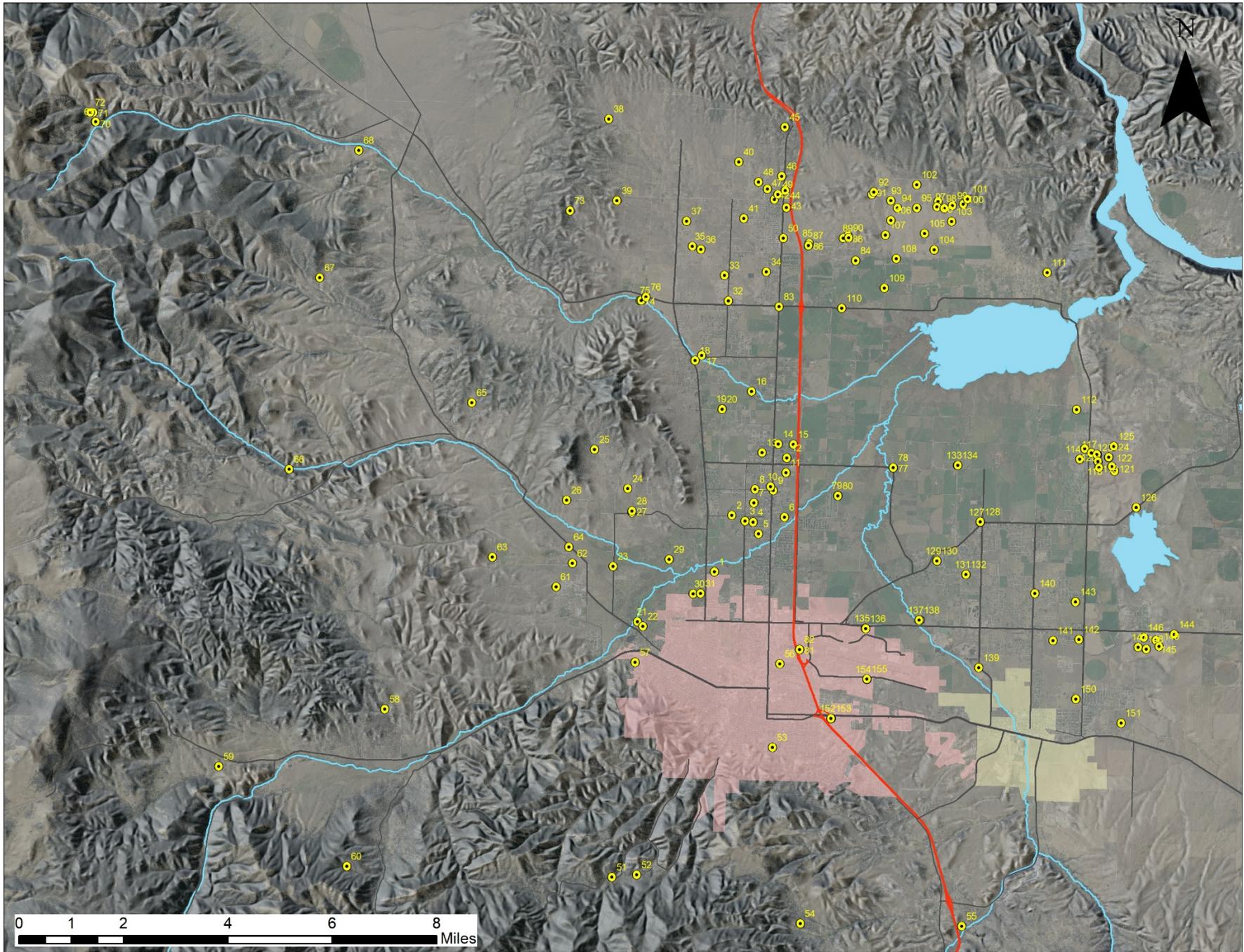


Figure 1: 2020 Well Monitoring Locations