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2020 Idaho National Laboratory Water Use Report and Comprehensive Well Inventory (Revision 29)

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Idaho National Laboratory

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2020 Idaho National Laboratory Water Use Report and Comprehensive Well Inventory (Revision 29)

Idaho National Laboratory
Idaho Falls, Idaho 83415

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ABSTRACT

This *2020 Idaho National Laboratory Water Use Report and Comprehensive Well Inventory (Revision 29)* provides water use information for production and potable water wells at the Idaho National Laboratory (INL) Site for calendar year 2020. It also provides detailed information for new, modified, and decommissioned wells. Two new wells (TRA-2317 and USGS-150) were drilled in 2019 and are included in this report. One well (USGS-147) was modified in 2020. The location maps and detailed construction diagrams are provided in the appendix. Fifty-six monitoring wells and boreholes were abandoned (decommissioned) in calendar year 2020. The location maps and construction diagrams, if available, for the decommissioned monitoring wells and boreholes are provided in the appendix.

This report is being submitted in accordance with the Water Rights Agreement between the State of Idaho and the United States, for the United States Department of Energy (dated 1990), the subsequent Partial Decree for Water Right 34-10901 issued June 20, 2003, and the Final Unified Decree issued August 26, 2014.

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TABLES

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ACRONYMS

ATR	Advanced Test Reactor
bbc	below brass cap
bls	below land surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	Central Facilities Area
CITRC	Critical Infrastructure Test Range Complex
CWI	Comprehensive Well Inventory
CY	calendar year
DOE	U.S. Department of Energy
ESRP	Eastern Snake River Plain
ESRPA	Eastern Snake River Plain Aquifer
IDWR	Idaho Department of Water Resources
INL	Idaho National Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
MFC	Materials and Fuels Complex
NRF	Naval Reactors Facility
RWMC	Radioactive Waste Management Complex
TAN	Test Area North
USGS	United States Geological Surveyor, or prefix for groundwater reporting (well) common designation

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2020 Idaho National Laboratory Water Use Report and Comprehensive Well Inventory (Revision 29)

1. INTRODUCTION

This *2020 Idaho National Laboratory Water Use Report and Comprehensive Well Inventory, (Revision 29)* is being submitted in accordance with the "Water Rights Agreement between the State of Idaho and the United States, for the United States Department of Energy*"* [1], the subsequent Partial Decree for Water Right 34-10901 [2] issued June 20, 2003, and the Final Unified Decree [3] issued August 26, 2014. As previously agreed, [8], the annual Water Use Report and Comprehensive Well Inventory are being combined and submitted as one report.

The Idaho National Laboratory (INL) Site water use reported is for calendar year (CY) 2020. Section 2 provides the annual volume of water diverted, maximum and average diversion rates, and "available" pumping levels (water depth) as required by Section 6.2.3 of the Water Rights Agreement for production and potable water wells at the INL Site. Section 2.1 provides total monthly volume, average monthly volume, total annual volume diverted, and water depths (as available) for each production or potable water well. Section 2.2 provides the total monthly volume of water diverted for each facility and the total annual volume for all INL Site production or potable water wells. Section 2.3 provides a summary of the annual water usage, including the total volume of water diverted, maximum diversion rate, and average monthly volume of water diverted for all production and potable wells.

Section 3 is the Comprehensive Well Inventory (CWI) for the INL Site as required by Section 6.2.2 of the Water Rights Agreement. Section 3.1 provides information for new and modified wells. Two new wells (TRA-2317 and USGS-150) were constructed in CY 2019 and are included in this report. One well (USGS-147) modification per IDAPA 37.03.09, "Well Construction Standards Rules," was performed in CY 2020. Section 3.2 provides information for decommissioned wells. Fifty-six wells and boreholes were decommissioned per IDAPA 37.03.09, "Well Construction Standards Rules," in CY 2020.

Appendix A provides location maps and diagrams containing detailed construction information for the two newly constructed wells and one modified well. Appendix B contains maps showing the locations of decommissioned wells and boreholes and diagrams, if available, that provide detailed construction and abandonment information.

2. 2020 WATER USE INFORMATION FOR THE IDAHO NATIONAL LABORATORY SITE

2.1 Water Volume for Individual Idaho National Laboratory Site Production or Potable Water Wells

Eight major facilities are located at the INL Site:

- Advanced Test Reactor (ATR) Complex
- Central Facilities Area (CFA)
- Critical Infrastructure Test Range Complex (CITRC)
- Idaho Nuclear Technology and Engineering Center (INTEC)
- Materials and Fuels Complex (MFC)
- Naval Reactors Facility (NRF)
- Radioactive Waste Management Complex (RWMC)
- Test Area North (TAN).

Each major facility is serviced by one or more production and/or potable water wells. Table 1 through Table 8 show the water information for the production or potable wells at these facilities. The total monthly volumes are recorded as close to the last day of the month as possible. Each table provides the total monthly volume, average monthly volume, and total annual volume of water diverted from each production or potable well during CY 2020. The tables provide water depth measurements where available. Many of the wells were not designed with an access line to measure the water depth. Each well is identified by its official well name, the most common alias name, and the well identification number. Footnotes are provided where applicable.

The wells identified are grouped into tables based on the INL Site facilities they provide water primarily to except for wells grouped under CFA. There are seven wells grouped under the CFA facility in Table 2. Wells CFA-1 and CFA-2 serve the actual CFA facility. The other five wells (i.e., Badging Facility Well, EBR-1, Rifle Range Well, Site-04 [Dairy Farm], and Fire Station Well) serve smaller facilities or processes.

Several wells have been removed from service and their future is being accessed. These wells (i.e., Fire Station Well, NRF-2, ANP-01, and ANP-02) continue to be listed until their use has been determined.

Section 5.3 of the Water Rights Agreement states, “The use of water for fire suppression benefits the public. Water diverted for fire suppression may be taken randomly, without a definition of the specific elements of a recordable water right, and if so, diverted for fire suppression, existing water rights shall not be diminished.” The volumes in the following tables include water used for fire suppression activities.

Table 1. Advanced Test Reactor Complex water volume for 2020.

Volume in Gallons																
Well	Alias	INL Well ID	January	February	March	April	May	June	July	August	September	October	November	December	Total Annual Volume	Average Monthly Volume
TRA-01	NO. 1 DEEP WELL	356	23,804,000	1,420,000	27,564,000	19,750,500	41,939,100	32,281,200	8,530,000	29,635,000	32,927,000	5,103,000	0	0	222,953,800	18,579,483
TRA-03	NO. 3 DEEP WELL	358	591,000	6,000	436,000	20,000	0	20,000	26,000	395,000	25,000	75,000	48,000	16,000	1,658,000	138,167
TRA-04	NO. 4 DEEP WELL	359	5,598,000	26,900,000	261,000	15,649,000	641,000	448,000	29,660,000	1,645,000	7,492,000	31,704,000	24,139,000	22,122,000	166,259,000	13,854,917
TRA-1863	1863-M-1	1863	3,374,000	4,030,000	4,851,000	4,456,000	4,879,000	4,493,000	5,117,000	4,986,000	4,662,000	0	4,458,000	884,000	46,190,000	3,849,167
TRA-2317[a]	2317-M-1	2317	0	0	0	0	0	0	0	0	0	4,516,000	168,000	3,749,000	8,433,000	702,750
Monthly total			33,367,000	32,356,000	33,112,000	39,875,500	47,459,100	37,242,200	43,333,000	36,661,000	45,106,000	41,398,000	28,813,000	26,771,000		

Total annual volume for ATR Complex: **445,493,800**

Depth to water, static water level:

Date	TRA-1863	TRA-2317
September 20, 2020 bls – below land surface	470.3 ft bls	461.93 ft bls[b]

a. TRA-2317 was drilled in 2019 but did not go into service until October in 2020.

b. This measurement is likely inaccurate due to the presence of fluid in the access line.

Table 2. Central Facilities Area water volume for 2020.

Volume in Gallons																
Well	Alias	INL Well ID	January	February	March	April	May	June	July	August	September	October	November	December	Total Annual Volume	Average Monthly Volume
CFA-1[a]	CFA-651	93	0	0	0	0	0	0	0	0	0	29,000	17,700	960,900	1,007,600	83,967
CFA-2	CFA-642	94	1,707,600	1,800,000	2,535,000	1,481,500	2,049,300	5,531,800	10,868,500	9,698,300	9,144,200	1,653,100	1,731,400	1,001,000	49,201,700	4,100,142
Badging Facility Well	B27-605 Main Gate	88	34,460	1,740	17,210	3,060	28,490	46,630	10,480	7,460	5,920	3,090	26,980	32,610	218,130	18,178
EBR-1	EBR 1	149	1,032	1,150	743	186	580	315	240	227	1,038	1,211	454	323	7,499	625
Rifle Range Well	B21-607 Gun Range	267	3,920	3,010	1,970	170	1,470	1,880	1,490	1,760	4,270	1,290	2,110	1,450	24,790	2,066
Site-04	B16-604 Dairy Farm	273	0	0	0	70,995	101,133	139,970	144,675	71,620	67,077	0	0	0	595,470	49,623
Fire Station Well	Fire Station Well	158	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monthly total			1,747,012	1,805,900	2,554,923	1,555,911	2,180,973	5,720,595	11,025,385	9,779,367	9,222,505	1,687,691	1,778,644	1,996,283		

Total annual volume for CFA: **51,055,189**

a. CFA-1 pump failed July 2019 and was repaired during CY 2020.

b. Fire Station Well was removed from service. Future use will be determined.

Table 3. Critical Infrastructure Test Range Complex water volume for 2020.

			Volume in Gallons													
Well	Alias	INL Well ID	January	February	March	April	May	June	July	August	September	October	November	December	Total Annual Volume	Average Monthly Volume
SPERT-1[a]	PBF Deep Well No. 1	280	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPERT-2	PBF Deep Well No. 2	281	377,900	350,200	482,600	318,000	378,500	361,200	486,400	357,300	637,500	342,200	469,000	545,600	5,106,400	425,533
Monthly total			377,900	350,200	482,600	318,000	378,500	361,200	486,400	357,300	637,500	342,200	469,000	545,600		
Total annual volume for CITRC**: 5,106,400**																
a. The pump in SPERT-1 went offline in September 2019, repair is being scheduled.																

Table 4. Idaho Nuclear Technology and Engineering Center water volume for 2020.

			Volume in Gallons													
Well	Alias	INL Well ID	January	February	March	April	May	June	July	August	September	October	November	December	Total Annual Volume	Average Monthly Volume
CPP-01	F-UTI-670	98	0	0	0	0	0	0	0	0	0	0	8,405,000	24,158,987	32,563,987	2,713,666
CPP-02	F-UTI-671	99	16,567,000	15,445,000	18,803,000	17,805,000	19,016,000	23,898,000	25,099,000	14,807,000	20,549,000	21,355,000	8,235,000	0	201,579,000	16,798,250
CPP-04 [a]	P-UTI-660	101	199,055	198,798	176,876	81,958	104,645	191,002	166,997	195,218	168,074	239,719	159,439	182,208	2,063,989	171,999
ICPP-POT-A-012 [a]	F-UTI-699 or CPP-05	1186	199,055	198,798	176,877	81,957	104,646	191,002	166,997	195,217	168,074	239,719	159,439	182,208	2,063,989	171,999
Monthly total			16,965,110	15,842,596	19,156,753	17,968,915	19,225,291	24,280,004	25,432,994	15,197,435	20,885,148	21,834,438	16,958,878	24,523,403		
Total annual volume for INTEC: **238,270,965**																
a. One flow meter is used for potable wells CPP-04 and ICPP-POT-A-012. Operations switched between the wells weekly, so the totals are estimated to be 50% for each well.																

Table 5. Materials and Fuels Complex water volume for 2020.

			Volume in Gallons													
Well	Alias	INL Well ID	January	February	March	April	May	June	July	August	September	October	November	December	Total Annual Volume	Average Monthly Volume
EBR-II 1[a]	EBR-II-1	150	1,078,423.0	930,001.0	947,976.5	949,894.5	970,264.5	3,209,744.0	4,243,915.0	4,136,557.0	1,414,250.5	1,304,395.5	1,053,697.5	1,426,657.0	21,665,776	1,805,481
EBR-II 2[a]	EBR-II-2	151	1,078,423.0	930,001.0	947,976.5	949,894.5	970,264.5	3,209,744.0	4,243,915.0	4,136,557.0	1,414,250.5	1,304,395.5	1,053,697.5	1,426,657.0	21,665,776	1,805,481
Monthly total			2,156,846	1,860,002	1,895,953	1,899,789	1,940,529	6,419,488	8,487,830	8,273,114	2,828,501	2,608,791	2,107,395	2,853,314		
Total annual volume for MFC: **43,331,552**																
a. The two wells share two flow meters. Operations switch between the wells, so the totals are estimated to be 50% for each well.																

Depth to water, static water level:

Date	EBR-II 1	EBR-II 2
June 2020	660. ft bbc	661 ft bbc
November 2020	661 ft bbc	661.8 ft bbc

bbc – below brass cap

Table 6. Naval Reactors Facility water volume for 2020.

Volume in Gallons																
Well	Alias	INL Well ID	January	February	March	April	May	June	July	August	September	October	November	December	Total Annual Volume	Average Monthly Volume
NRF-1	NRF 1	240	1,055,195	517,730	771,182	967,082	7	58,771	69,226	10,064	83,176	395,740	980,794	1,093,647	6,002,614	500,218
NRF-2[a]	NRF 2	241	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRF-3[b]	NRF 3	242	105,524	234,553	205,891	144,612	134,799	127,870	129,192	198,722	137,134	293,059	368,907	362,025	2,442,288	203,524
NRF-4	NRF 4	869	800,247	537,397	808,115	1,382,292	3,183,375	3,258,667	5,054,617	6,813,924	7,075,614	2,036,931	850,395	1,212,112	33,013,686	2,751,141
NRF-14[b]		2204	405,025	190,489	220,949	124,780	192,545	278,375	247,233	183,312	171,119	115,487	3,639	3,498	2,136,451	178,038
Monthly total			2,365,991	1,480,169	2,006,137	2,618,766	3,510,726	3,723,683	5,500,268	7,206,022	7,467,043	2,841,217	2,203,735	2,671,282		
Total annual volume for NRF: **43,595,039**																
a. NRF-2 was removed from service in 2006. Future use will be determined. b. Wells NRF-3 and NRF-14 are used as potable water wells.																
Depth to water, static water level: Date — NRF-3 — NRF-14 April 2020 — 386.37 ft bls — 385.85 ft bls November 2020 — 387.57 ft bls — 387.07 ft bls bls – below land surface																

Table 7. Radioactive Waste Management Complex water volume for 2020.

Volume in Gallons																
Well	Alias	INL Well ID	January	February	March	April	May	June	July	August	September	October	November	December	Total Annual Volume	Average Monthly Volume
RWMC Production	RWMC-PROD	268	569,000	615,000	840,400	338,100	318,400	836,700	1,022,000	1,125,400	1,173,500	1,127,300	860,300	615,000	9,441,100	786,758
PIT 9 Production Well[a]	Pit 9 Prod	2155	0	0	0	0	0	0	0	43,000	0	0	0		43,000	3,583
Monthly total			569,000	615,000	840,400	338,100	318,400	836,700	1,022,000	1,168,400	1,173,500	1,127,300	860,300	615,000		
Total annual volume for RWMC: **9,484,100**																
a. Pit 9 Production well used as needed to provide firewater.																

Table 8. Test Area North water volume for 2020.

Volume in Gallons																
Well	Alias	INL Well ID	January	February	March	April	May	June	July	August	September	October	November	December	Total Annual Volume	Average Monthly Volume
ANP-01[a]	TAN-612	69	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANP-02[b]	TAN-613	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FET-1	TAN-632	154	0	236,200	243,700	257,700	791,700	35,900	0	0	93,600	307,900	173,200	260,100	2,400,000	200,000
FET-2	TAN-639	155	460,500	272,200	471,500	462,600	194,100	661,400	1,613,900	1,684,600	1,285,400	135,600	255,200	201,200	7,698,200	641,517
Monthly total			460,500	508,400	715,200	720,300	985,800	697,300	1,613,900	1,684,600	1,379,000	443,500	428,400	461,300		
Total annual volume for TAN: 10,098,200																
a. ANP-01 and ANP-02 were removed from service in July 2019 because of the TAN/SMC water line upgrade project.																

2.2 Combined Total Volume Diverted from All Production and Potable Water Wells

Table 9 provides the combined total volume from all production and potable water wells at the INL Site during CY 2020. Table 9 includes:

- Total monthly volume of water diverted for each major INL Site facility
- Combined total monthly volume diverted from all the major INL Site facilities
- Monthly average volume diverted for all wells combined
- Monthly maximum volume diverted for all wells combined
- Total annual volume diverted at the INL Site.

2.3 Water Use Summary

The INL Site's Federal Reserved Water Right is 35,000 acre-ft/yr. (1.14×10^{10} gal/yr.), not to exceed a maximum diversion rate of 80 ft^3/s (35,906 gpm). The total volume of water diverted at the INL Site for CY 2020 was approximately 8.46×10^8 gal (see Table 9) or approximately 7.42% of the annual water right. The maximum monthly volume of water diverted was 96,901,777 gal and the maximum diversion rate was 4.8 ft^3/s that occurred in July. The average monthly volume of water diverted for all INL Site production and potable wells remained within the established water right.

Table 9. Idaho National Laboratory Site water volume totals for 2020.

Volume in Gallons												
Facility	January	February	March	April	May	June	July	August	September	October	November	December
Advanced Test Reactor Complex	33,367,000	32,356,000	33,112,000	39,875,500	47,459,100	37,242,200	43,333,000	36,661,000	45,106,000	41,398,000	28,813,000	26,771,000
Central Facilities Area	1,747,012	1,805,900	2,554,923	1,555,911	2,180,973	5,720,595	11,025,385	9,779,367	9,222,505	1,687,691	1,778,644	1,996,283
Critical Infrastructure Test Range Complex	377,900	350,200	482,600	318,000	378,500	361,200	486,400	357,300	637,500	342,200	469,000	545,600
Idaho Nuclear Technology and Engineering Center	16,965,110	15,842,596	19,156,753	17,968,915	19,225,291	24,280,004	25,432,994	15,197,435	20,885,148	21,834,438	16,958,878	24,523,403
Materials and Fuels Complex	2,156,846	1,860,002	1,895,953	1,899,789	1,940,529	6,419,488	8,487,830	8,273,114	2,828,501	2,608,791	2,107,395	2,853,314
Naval Reactors Facility	2,365,991	1,480,169	2,006,137	2,618,766	3,510,726	3,723,683	5,500,268	7,206,022	7,467,043	2,841,217	2,203,735	2,671,282
Radioactive Waste Management Complex	569,000	615,000	840,400	338,100	318,400	836,700	1,022,000	1,168,400	1,173,500	1,127,300	860,300	615,000
Test Area North	460,500	508,400	715,200	720,300	985,800	697,300	1,613,900	1,684,600	1,379,000	443,500	428,400	461,300
Monthly Totals	**58,009,359**	**54,818,267**	**60,763,965**	**65,295,282**	**75,999,318**	**79,281,170**	**96,901,777**	**80,327,239**	**88,699,197**	**72,283,137**	**53,619,352**	**60,437,182**
Maximum monthly volume (gallons)	96,901,777 (July 2020)											
Total average monthly volume (gallons)	70,536,270											
Annual total for 2020 (gallons)	**846,435,245**											

3. COMPREHENSIVE WELL INVENTORY, REVISION 29

3.1 Idaho National Laboratory Site New and Modified Wells in Calendar Year 2020

One new redundant potable water well (i.e., TRA-2317) and one new seismic testing well (USGS-150) were constructed at the INL Site in CY 2019 and are listed in Table 10. Construction information for both wells was received in 2020 and are included in this report. The redundant potable water well was drilled by Thomas Drilling, Inc. and the seismic testing well was drilled by the United States Geological Survey Research Drilling Program (USGS RDP). One well (USGS-147) was modified at the INL Site in CY 2020 and is listed in Table 10. USGS-147 is an aquifer monitoring well that was deepened approximately 300 ft by the United States Geological Survey (USGS).

Well TRA-2317 was drilled in 2019 approximately 1.3 miles northwest of Monroe and Lincoln Boulevard near the ATR Complex to serve as a redundant potable water (municipal) source. This new potable water well will be used alternately with the existing well on a rotational basis. The well was drilled to a completion depth of 590 ft bls and constructed approximately 120 ft into the Eastern Snake River Plain Aquifer (ESRPA). Cement (approximately 4.2 cubic yards) was placed from ground surface to 52 ft bls; a bentonite annular seal was then used from ground surface to approximately 520 ft bls. Carbon steel surface casing (16-in) extends from ground surface to 268 ft bls; carbon steel well casing (10-in) extends approximately 2 ft above ground to 520 ft bls; the well is open (not screened) from 520 to 590 ft bls. The well is equipped with a pitless adapter unit connecting the discharge line to the potable water system (minimum 5 ft bls); a stainless steel (4-in) discharge line extends from approximately 5 to 504 ft bls; pump inlet (40 hp submersible) was placed near 504 ft bls. The initial water level was measured at 469.5 ft bls and was taken June 4, 2019. After the well development and system operability test, water-quality sampling was performed on the well. The results were “absent” for total coliforms and Escherichia coli. Information was not complete until CY 2020 and therefore is being included in this report.

Well USGS-150 was drilled in 2019 approximately 0.15 miles west of the ATR Complex. The purpose for drilling well USGS-150 was to collect geologic, geophysical, and seismic data to improve models used to understand geologic hazards near the ATR Complex. The borehole was originally proposed to be constructed as a monitoring well; however, due to continued problems surrounding borehole stability, efforts to construct the borehole for monitoring are on standby. The well was cored to a depth of 1,399.6 ft bls. Geophysical data was collected through the drill rod and within the open borehole; however, stability issues near 695 ft bls prevented continuous logging. Open borehole logs were successfully collected in short sections using temporary casing, but not all sections could be logged. Attempts to grout and stabilize difficult sections were not successful. USGS-150 was capped after measurements were collected, but the borehole remains open until a determination is made whether to re-enter the borehole and take additional measurements or whether to abandon the borehole. Paleomagnetic analyses will be run on core samples and used for interpretation of related stratigraphy. Information was not complete until CY 2020; therefore, it is being included in this report.

Well USGS-147 was originally drilled in 2018 approximately 2 miles southeast of RWMC. The purpose for the drilling and construction of well USGS-147 was to improve the understanding of hydrogeology southwest of the CFA and will also serve to fill a data gap outlined in the INL groundwater monitoring plan (DOE/ID 2012). Construction was halted at a depth of 751 and a submersible pump and measurement line were installed. The well was placed in the USGS monitoring network and water-quality data were collected between 2018 and 2020, data collected include water-quality samples and water levels.

Well USGS-147 was deepened from 751 to 1048 ft bls in CY 2020 and constructed approximately 390 ft into the ESRPA. The well is open (not screened) between 751 and 1,048 ft bls; the carbon steel

well casing (6-in.) extends approximately 3.5 ft above ground to 751 ft bls. The borehole from 1,000 and 1,048 ft bls was filled with drill cuttings (sluff material) and not grouted. A borehole video run after reaming reveals a blockage in well USGS-147 near 817 ft bls. Attempts to clear the bridge were not successful, so the current well depth sits near 817 ft bls. The USGS had planned to place perforated well casing (5 in.) through this bridged area; however, unforeseen circumstances resulted in delays and placing the well on temporary standby. Currently, the well is capped and used to collect water levels only. Groundwater and geologic data collected will be used to improve INL groundwater and stratigraphic framework models. Paleomagnetic analyses will be run on core samples and used for interpretation of related stratigraphy.

Maps and detailed construction diagrams of both new wells and one modified well can be found in Appendix A. The CWI database maintains detailed well information that can be provided electronically to the state of Idaho upon request.

Table 10. Idaho National Laboratory Site new wells constructed in calendar year 2020.

Well Name	Type	Borehole Depth (ft bls)	Casing Diameter (Inner)[a]	Construction Material	Status	Location	Driller/ License No.
TRA-2317	Potable Water	590	16-in. from 0 to 266 ft bls 10-in. from -2 to 520 ft bls	Carbon Steel Carbon Steel	Active[b]	T03N-R29E-Sec. 014 NW/SE/NE	Thomas Drilling, Inc. / 390
USGS-150	Seismic Testing Well	1,399	10-in. from 0 to 18.3 ft bls	Carbon Steel	Active[b]	T03N-R29E-Sec. 014 NE/SW/NW	USGS RDP
USGS-147	Monitoring Well (Deepened from 751 to 1,048 ft bls)	1,048	10-in. from 0 to 14 ft bls 8-in. from 0 to 272 ft bls 6-in. from -3.5 to 751 ft bls	Carbon Steel Carbon Steel Carbon Steel	Active	T02N-R29E-Sec. 021 NW/SW/SE	USGS

a. Negative value indicates the casing extends above the ground surface. As an example, the 10-in. casing for well TRA-2317 extends 2 ft above the ground surface to 520 ft below land surface (bls).

b. Well drilled prior to CY 2020, detailed construction information not available until 2020.

3.2 Idaho National Laboratory Site Wells Decommissioned in Calendar Year 2020

Table 11 identifies 56 monitoring wells and monitoring boreholes that were abandoned (decommissioned). One abandonment application was submitted to the Idaho Department of Water Resources (IDWR) addressing 52 wells on June 18, 2020, for review (Reno 2020). Four additional shallow boreholes (PA-06, PA-07, PA-08, and PA-09) were not included in this decommission submittal.

Decommissioning of all 56 wells and boreholes were overseen by an Idaho Cleanup Project professional engineer, as agreed to by the IDWR (Stenzel 2009; Lewis 2020), to certify that all substantive requirements of State of Idaho Well Construction Standards Rules (IDAPA 37.03.09) were met.

Wells PA-06, PA-07, PA-08, and PA-09 were neutron access tube (NAT) boreholes that had not been used in many years and were not included in any required monitoring programs. During a demolition project for Operable Unit (OU) 7-13/14 to prepare for construction of an evapotranspiration surface barrier (DOE-ID 2019), the boreholes were exhumed. All four NAT boreholes; the 2-in.-diameter casing was removed to approximately 8 in. below ground surface, the remaining casing depth filled to the top of the casing with bentonite pellets, hydrated with water, and then covered with native fill material to grade.

Decommissioning work for the remaining 52 wells and boreholes began on July 27, 2020 and was completed on November 10, 2020. The casing was removed or cut off below grade. Instruments were removed if possible, or the wiring was cut off below grade. The remaining casing was filled with bentonite pellets to within 8 in. of ground surface and soaked with water (see Figure 1), then covered with native soil. Protective posts, if present, were removed and the remaining holes were also filled in with native soil (see Figure 2).

Appendix B contains maps showing the location of each well and borehole that was decommissioned in CY 2020. Also included in Appendix B are diagrams, if available, that provide detailed construction and decommissioning information for the wells and holes. The CWI database maintains detailed well information that can be provided electronically to the state of Idaho upon request.

Figure 1. Well W-05 during decommissioning activities at the RWMC.

Figure 2. Well D-10 after decommissioning activities were completed at the RWMC.

Table 11. Idaho National Laboratory wells and boreholes decommissioned in calendar year 2020.

Well Name	Well ID	Well Type	Status	Method and Date Decommissioned
79-2	19	MONITORING	Abandoned	Removed 52-ft of 1 1/4-in. galvanized pipe, (2) 5-ft packers, 7-ft of vapor line, cut 6-in. diameter casing approximately 8-in. below surface, fill casing with bentonite, hydrate, cover with native fill on November10, 2020.
98-1	1787	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 6-in. diameter casing approximately 8-in. below surface, cut and cap two lysimeter lines and one level logger, fill casing with bentonite, hydrate with water, cover with native fill on August 5, 2020.
98-2	1788	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 8-in. diameter casing approximately 8-in. below surface, cut and cap one lysimeter lines and one vapor port, fill casing with bentonite, hydrate with water, cover with native fill on August 10, 2020.
98-5	1791	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 6-in. diameter casing approximately 8-in. below surface, cut and cap two lysimeter lines, fill casing with bentonite, hydrate with water, cover with native fill on August 13, 2020.
D-10	145	MONITORING	Abandoned	Cut 6-in. diameter casing approximately 10-in. below surface, cut one tensiometer line and cover end, fill casing with bentonite, hydrate with water, cover with native fill on August 19, 2020.
MS-02	2134	NOT FOUND	Abandoned	Cut 2-in. diameter casing approximately 6-in. below surface, cut and cap one level logger, fill casing with bentonite, hydrate with water, cover with native fill on August 5, 2020.
MS-03	2135	NOT FOUND	Abandoned	Cut 2-in. diameter casing approximately 6-in. below surface, cut and cap one level logger, fill casing with bentonite, hydrate with water, cover with native fill on August 5, 2020.
NAT-22	1942	NEUTRON ACCESS	Abandoned	Cut 2-in. diameter casing approximately 6-in. below surface, fill casing with bentonite, hydrate with water, cover with native fill on August 5, 2020.
PA-01	251	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 8-in. diameter casing approximately 6-in. below surface, cut and cap one lysimeter and one vapor port line, fill casing with bentonite, hydrate with water, cover with native fill on August 19, 2020.
PA-02	252	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 8-in. diameter casing approximately 6-in. below surface, cut and cap two lysimeter lines, fill casing with bentonite, hydrate with water, cover with native fill on August 19, 2020.
PA-03	1792	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 8-in. diameter casing approximately 6-in. below surface, cut and cap one lysimeter line, fill casing with bentonite, hydrate with water, cover with native fill on August 19, 2020.
PA-04	1793	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 8-in. diameter casing approximately 6-in. below surface, cut and cap two lysimeter lines, fill casing with bentonite, hydrate with water, cover with native fill on August 27, 2020.

Table 11. Idaho National Laboratory wells and boreholes decommissioned in calendar year 2020 (cont.)

Well Name	Well ID	Well Type	Status	Method and Date Decommissioned
PA-06	2331	NEUTRON ACCESS	Abandoned	Cut 2-in. diameter casing approximately 6-in. below surface, fill casing with bentonite, hydrate with water, cover with native fill on August 19, 2020.
PA-07	2332	NEUTRON ACCESS	Abandoned	Cut 2-in. diameter casing approximately 6-in. below surface, fill casing with bentonite, hydrate with water, cover with native fill on August 19, 2020.
PA-08	2333	NEUTRON ACCESS	Abandoned	Cut 2-in. diameter casing approximately 6-in. below surface, fill casing with bentonite, hydrate with water, cover with native fill on August 19, 2020.
PA-09	2334	NEUTRON ACCESS	Abandoned	Cut 2-in. diameter casing approximately 6-in. below surface, fill casing with bentonite, hydrate with water, cover with native fill on August 19, 2020.
RWMC-2022	2022	VAPOR PORT	Abandoned	Cut 5-in. diameter casing approximately 8-in. below surface, cut and cap vapor port lines, fill casing with bentonite, hydrate with water, cover with native fill on August 26, 2020.
RWMC-2023	2023	VAPOR PORT	Abandoned	Cut 5-in. diameter casing approximately 8-in. below surface, cut and cap vapor port lines, fill casing with bentonite, hydrate with water, cover with native fill on August 26, 2020.
RWMC-2095	2095	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 8-in. diameter casing approximately 6-in. below surface, cut and cap one vapor port and one lysimeter and one tensiometer lines, fill casing with bentonite, hydrate with water, cover with native fill on July 29, 2020.
RWMC-2096	2096	SCIENTIFIC INSTRUMENTATION	Abandoned	Remove 8-in. surface casing, cut 2-in. diameter casing approximately 6-in. below surface, cut and cap one vapor port and one lysimeter and one tensiometer lines, fill casing with bentonite, hydrate with water, cover with native fill on July 30, 2020.
RWMC-2097	2097	SCIENTIFIC INSTRUMENTATION	Abandoned	Remove 8-in. surface casing, cut 2-in. diameter casing approximately 6-in. below surface, cut and cap one vapor port and one tensiometer lines, fill casing with bentonite, hydrate with water, cover with native fill on July 29, 2020.
RWMC-2098	2098	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 10-in. diameter casing approximately 6-in. below surface, cut and cap one lysimeter and one tensiometer lines, fill casing with bentonite, hydrate with water, cover with native fill on July 30, 2020.
RWMC-2099	2099	SCIENTIFIC INSTRUMENTATION	Abandoned	Remove solar panel and logger box, cut 2-in. diameter casing approximately 6-in. below surface, cut and cap one lysimeter and two vapor port lines, fill casing with bentonite, hydrate with water, cover with native fill on August 5, 2020.
RWMC-2100	2100	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 2-in. diameter casings (2) approximately 6-in. below surface, cut and cap one lysimeter and two vapor port lines, fill casing with bentonite, hydrate with water, cover with native fill on August 5, 2020.
RWMC-2101	2101	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 10-in. diameter casing approximately 6-in. below surface, cut and cap one lysimeter line, fill casing with bentonite, hydrate with water, cover with native fill on July 29, 2020.

Table 11. Idaho National Laboratory wells and boreholes decommissioned in calendar year 2020 (cont.)

Well Name	Well ID	Well Type	Status	Method and Date Decommissioned
RWMC-2102	2102	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 10-in. diameter casing approximately 6-in. below surface, cut and cap one lysimeter and 2 vapor port lines, fill casing with bentonite, hydrate with water, cover with native fill on July 29, 2020.
RWMC-2103	2103	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 10-in. diameter casing approximately 6-in. below surface, cut and cap one lysimeter line, fill casing with bentonite, hydrate with water, cover with native fill on July 29, 2020.
RWMC-2104	2104	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 10-in. diameter casing approximately 6-in. below surface, cut and cap one lysimeter and one vapor port line, fill casing with bentonite, hydrate with water, cover with native fill on July 29, 2020.
RWMC-2105	2105	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 10-in. diameter casing approximately 6-in. below surface, cut and cap one lysimeter and two vapor port lines, fill casing with bentonite, hydrate with water, cover with native fill on July 28, 2020.
RWMC-2148	2148	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 2-in. diameter casings (2) approximately 6-in. below surface, cut and cap one lysimeter and two vapor port lines, fill casing with bentonite, hydrate with water, cover with native fill on July 27, 2020.
RWMC-2149	2149	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 8-in. diameter casing approximately 6-in. below surface, cut and cap two vapor port lines, fill casing with bentonite, hydrate with water, cover with native fill on July 27, 2020.
RWMC-2150	2150	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 10-in. diameter casing approximately 6-in. below surface, cut and cap one lysimeter and two vapor port lines, fill casing with bentonite, hydrate with water, cover with native fill on July 27, 2020.
RWMC-2151	2151	SCIENTIFIC INSTRUMENTATION	Abandoned	Remove telemetry equipment, cut 10-in. diameter casing approximately 6-in. below surface, cut and cap one lysimeter and one tensiometer and two vapor port lines, fill casing with bentonite, hydrate with water, cover with native fill on July 28, 2020.
RWMC-2152	2152	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 10-in. diameter casing approximately 6-in. below surface, cut and cap one lysimeter and two vapor port lines, fill casing with bentonite, hydrate with water, cover with native fill on July 28, 2020.
RWMC-NEU-S-094	1188	NEUTRON ACCESS	Abandoned	Cut 2-in. diameter casing approximately 6-in. below surface, fill casing with bentonite, hydrate with water, cover with native fill on August 6, 2020.
RWMC-NEU-S-096	1190	NEUTRON ACCESS	Abandoned	Cut 2-in. diameter casing approximately 6-in. below surface, fill casing with bentonite, hydrate with water, cover with native fill on August 10, 2020.
RWMC-NEU-S-097	1191	NEUTRON ACCESS	Abandoned	Cut 2-in. diameter casing approximately 6-in. below surface, fill casing with bentonite, hydrate with water, cover with native fill on August 10, 2020.

Table 11. Idaho National Laboratory wells and boreholes decommissioned in calendar year 2020 (cont.)

Well Name	Well ID	Well Type	Status	Method and Date Decommissioned
RWMC-NEU-S-099	1193	NEUTRON ACCESS	Abandoned	Cut 2-in. diameter casing approximately 6-in. below surface, cut and cap 1 tensiometer line, fill casing with bentonite, hydrate with water, cover with native fill on August 6, 2020.
RWMC-NEU-S-104	1198	NEUTRON ACCESS	Abandoned	Cut 2-in. diameter casing approximately 6-in. below surface, cut and cap one tensiometer line, fill casing with bentonite, hydrate with water, cover with native fill on August 10, 2020.
RWMC-NEU-S-107	1201	NEUTRON ACCESS	Abandoned	Cut 2-in. diameter casing approximately 6-in. below surface, fill casing with bentonite, hydrate with water, cover with native fill on August 5, 2020.
RWMC-SCI-S-111	1205	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 6-in. diameter casing approximately 8-in. below surface, cut and cap two lysimeter lines, fill casing with bentonite, hydrate with water, cover with native fill on August 13, 2020.
RWMC-SCI-S-114	1208	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 8-in. diameter casing approximately 6-in. below surface, cut and cap one lysimeter line, fill casing with bentonite, hydrate with water, cover with native fill on August 5, 2020.
RWMC-SCI-S-SVR12-1-L1	1754	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 5-in. diameter casing approximately 8-in. below surface, cut and cap vapor port and lysimeter lines, fill casing with bentonite, hydrate with water, cover with native fill on August 26, 2020.
RWMC-SCI-S-SVR12-1-L2	1755	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 5-in. diameter casing approximately 8-in. below surface, cut and cap vapor port and lysimeter lines, fill casing with bentonite, hydrate with water, cover with native fill on August 26, 2020.
RWMC-SCI-S-SVR12-1-T2	1652	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 5-in. diameter casing approximately 8-in. below surface, cut and cap tensiometer line, fill casing with bentonite, hydrate with water, cover with native fill on August 26, 2020.
RWMC-SCI-S-SVR12-3-VP1	1730	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 5-in. diameter casing approximately 8-in. below surface, cut and cap two vapor port and lines, fill casing with bentonite, hydrate with water, cover with native fill on August 26, 2020.
RWMC-SCI-S-SVR12-3-VP2	1731	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 5-in. diameter casing approximately 8-in. below surface, cut and cap two vapor port and lines, fill casing with bentonite, hydrate with water, cover with native fill on August 26, 2020.
RWMC-SCI-S-SVR12-3-VP3	1732	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 5-in. diameter casing approximately 8-in. below surface, cut and cap two vapor port and lines, fill casing with bentonite, hydrate with water, cover with native fill on August 26, 2020.
RWMC-SCI-S-SVR-12-MB	1705	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 5-in. diameter casing approximately 8-in. below surface, cut and cap moisture probe line, fill casing with bentonite, hydrate with water, cover with native fill on August 26, 2020.

Table 11. Idaho National Laboratory wells and boreholes decommissioned in calendar year 2020 (cont.)

Well Name	Well ID	Well Type	Status	Method and Date Decommissioned
TEN-8	1946	SCIENTIFIC INSTRUMENTATION	Abandoned	Remove four tensiometers from well, cut 8-in. diameter casing approximately 6-in. below surface, fill casing with bentonite, hydrate with water, cover with native fill on August 6, 2020.
TEN-9	1947	SCIENTIFIC INSTRUMENTATION	Abandoned	Remove three tensiometers from borehole, cut 8-in. diameter casing approximately 6-in. below surface, fill casing with bentonite, hydrate with water, cover with native fill on August 10, 2020.
W-05	578	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 8-in. diameter casing to approximately 8-in. below surface, cut and cap three lysimeter lines, fill casing with bentonite, hydrate with water, cover with native fill on August 5, 2020.
W-06	579	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 8-in. diameter casing to approximately 8-in. below surface, cut and cap three tensiometer and two vapor port and one lysimeter lines, fill casing with bentonite, hydrate with water, cover with native fill on August 26, 2020.
W-09	581	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 10-in. diameter casing to approximately 8-in. below surface, cut and cap two vapor port and 12 data logger lines, fill casing with bentonite, hydrate with water, cover with native fill on August 6, 2020.
W-13	585	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 10-in. diameter casing to approximately 8-in. below surface, cut and cap four vapor port and 15 data logger lines, fill casing with bentonite, hydrate with water, cover with native fill on August 10, 2020.
W-23	592	SCIENTIFIC INSTRUMENTATION	Abandoned	Cut 8-in. diameter casing to approximately 8-in. below surface, cut and cap six vapor port and two data logger lines, fill casing with bentonite, hydrate with water, cover with native fill on August 10, 2020.

4. REFERENCES

1. Department of Justice, Environment and Natural Resources Division, 1990, "Water Rights Agreement between the State of Idaho and the United States, for the United States Department of Energy," CCN 23795.
2. District Court-SRBA, Fifth Judicial District, Twin Falls County, Idaho, Order of Partial Decree for Water Right 34-10901 (United States Department of Energy, Idaho National Engineering and Environmental Laboratory), Case No. 39576, June 20, 2003, CCN 23795.
3. District Court-SRBA, Fifth Judicial District, Twin Falls County, Idaho, Final Unified Decree, Case No. 39576, August 25, 2014.
4. DOE-ID, 2019, "Preliminary Decommission and Demolition Plan for Structures within the Design Footprint of the Operable Unit 7-13/14 Phase 3 Subsurface Disposal Area Evapotranspiration Surface Barrier," DOE/ID-12000, Rev. 0, U.S. Department of Energy Idaho Operations Office, August 2019.
5. IDAPA 37.03.09, "Well Construction Standards Rules," 2009.
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7. Reno, S. L., Fluor Idaho, to R. Tracy, IDWR, June 18, 2020, "Decommissioning Notification for Fifty-Two Wells at the Idaho National Laboratory Site," CCN 325357.
8. Stenzel, J. A., BEA, to D. Dunn, IDWR, December 22, 2009, "Record of Meeting Concerning Well Permitting, Maintenance, and Decommissioning at the Idaho National Laboratory," CCN 219522.
9. Street, L.V., INEEL, to D. Dunn, IDWR, September 4, 2001, "INEEL Comprehensive Well Surveys and Annual Water Use Reports," CCN 25370.

Appendix A

Maps and Construction Diagrams for New Wells Completed or Modified in CY 2019 and CY 2020

Appendix A

Maps and Construction Diagrams for New Wells Completed or Modified in CY 2019 and CY 2020

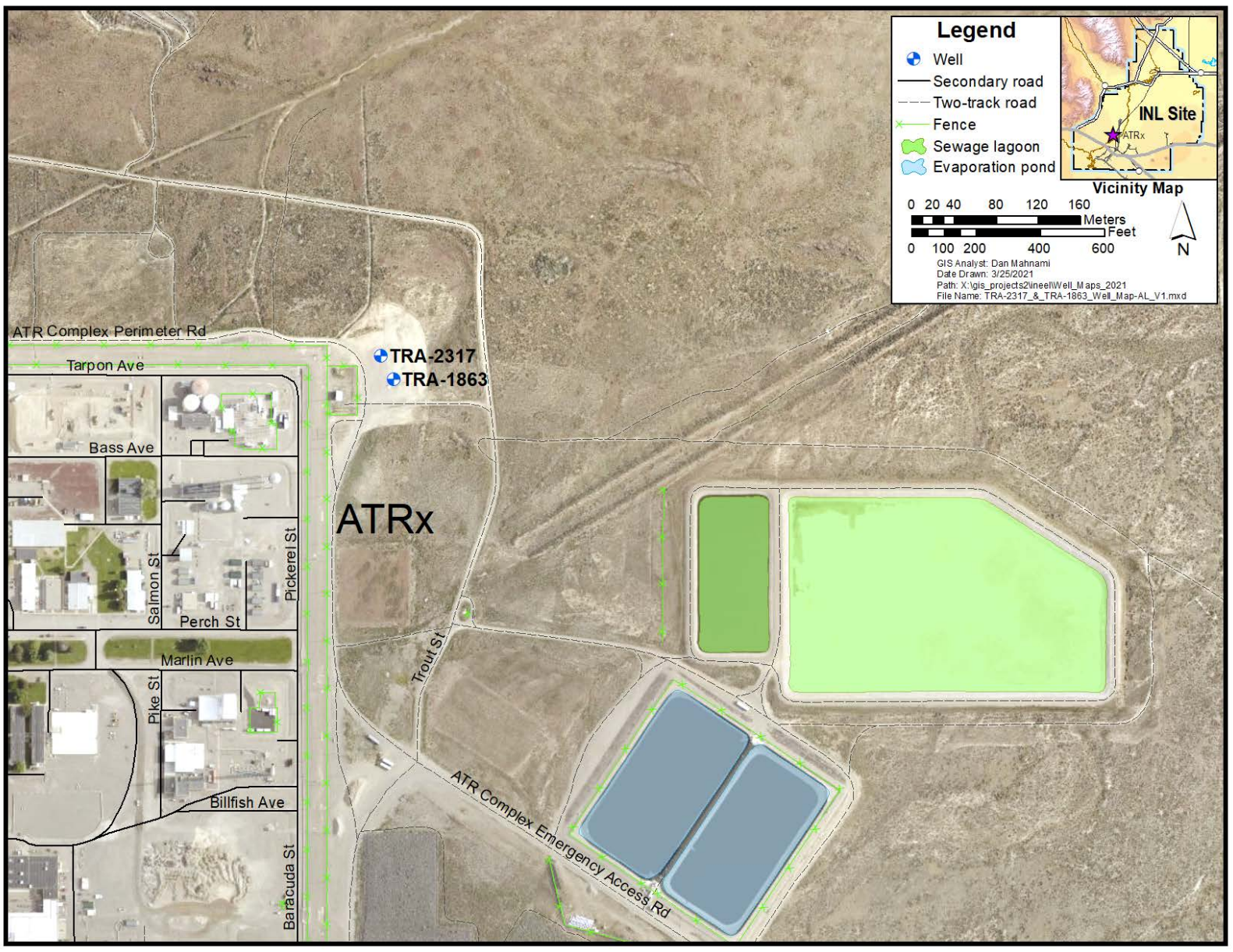


Figure A-1. Map showing location of newly constructed well TRA-2317.

WELL NAME: TRA-2317
WELL ID: 2317
Facility: ATR Complex
Well Type: Potable/Drinking
Well Status: Active
Year Drilled: 2019
Total Depth: 590' BLS
Completion Depth: 577' BLS

Driller: Thomas Drilling
Geologist: Thomas Drilling
Drill Method: Air Rotary
Drill Fluid: NF

Drawing Rev Date: 02/16/2021

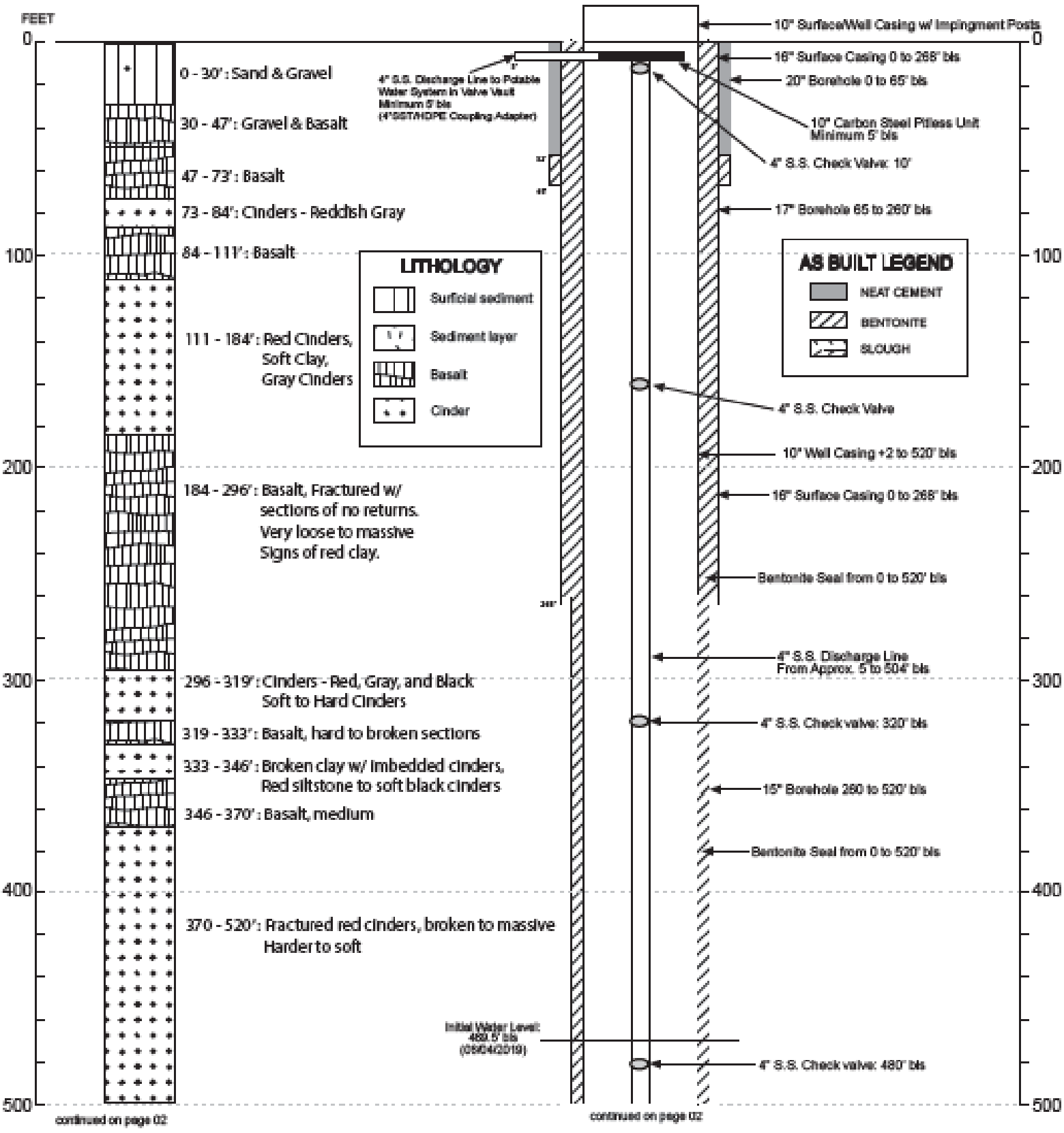


Figure A-2. Construction diagram of new well TRA-2317.

WELL NAME: TRA-2317
WELL ID: 2317

Drawing Rev Date: 02/16/2021

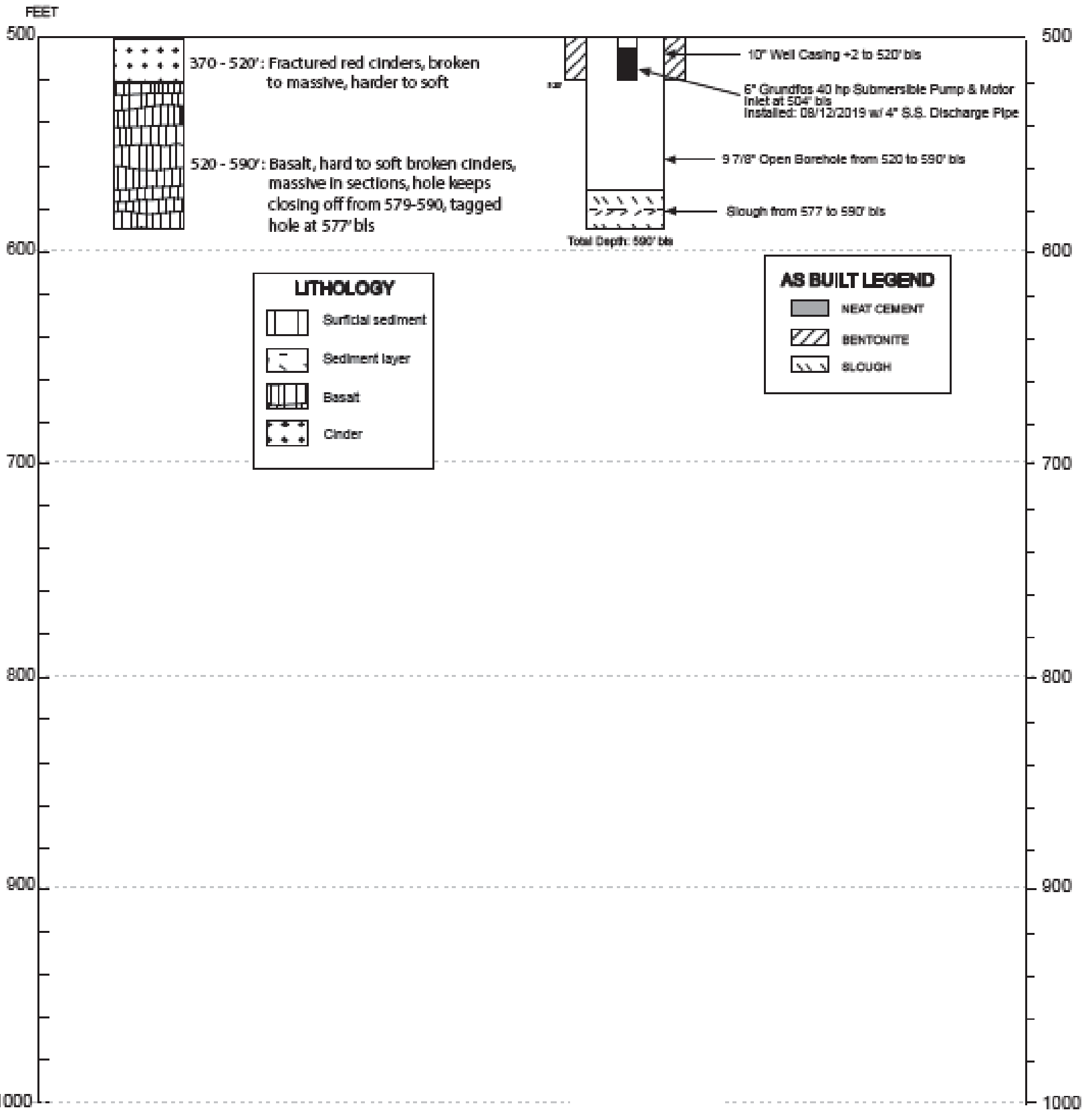


Figure A-2. (continued).

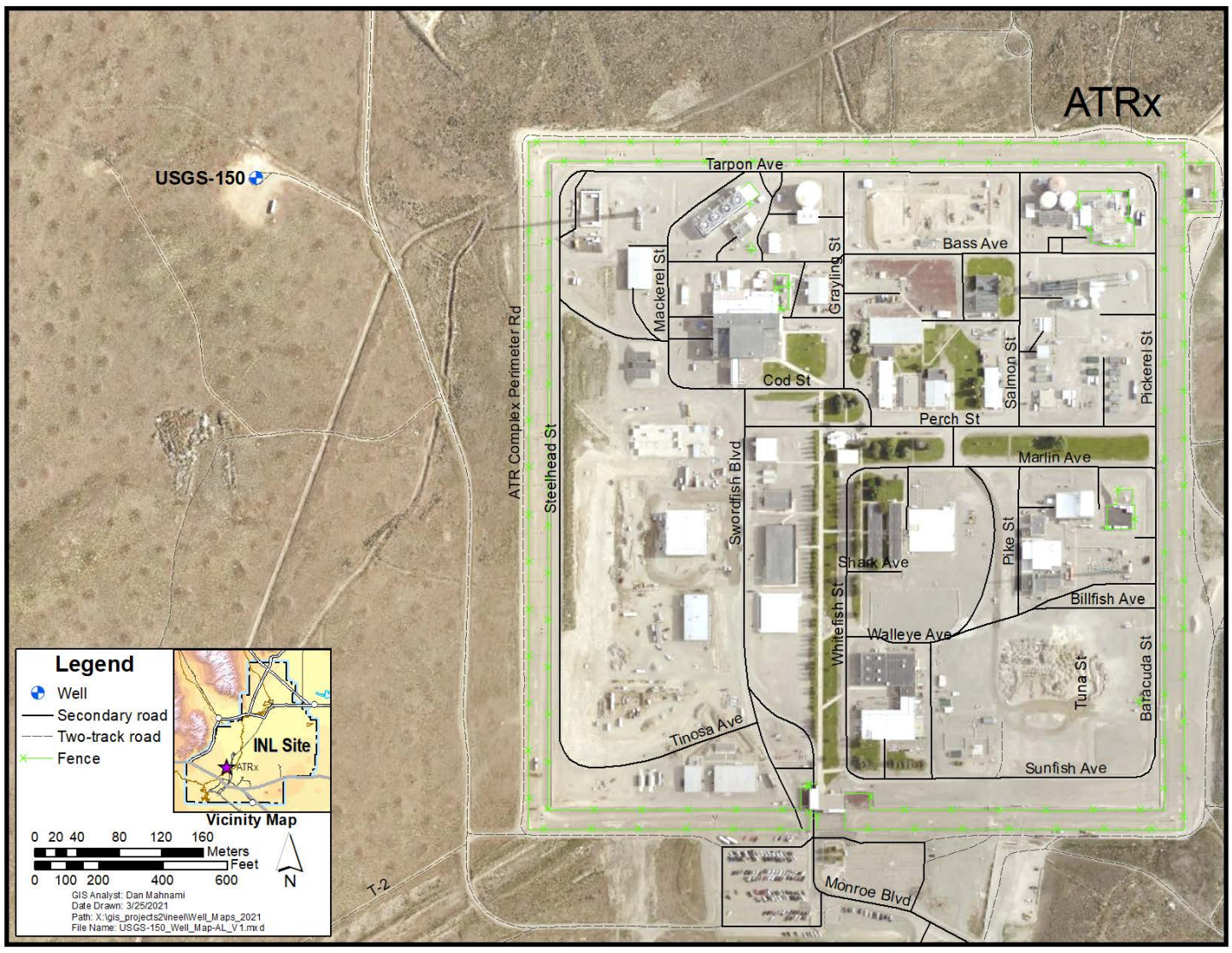
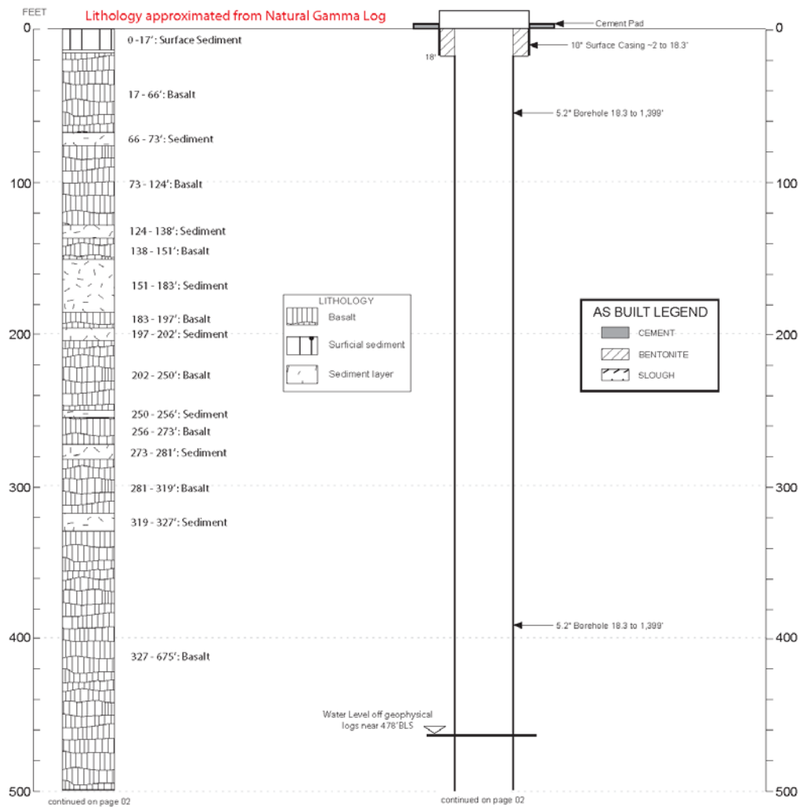


Figure A-3. Map showing location of newly constructed well USGS-150.

WELL NAME: USGS-150
WELL ID: 2328
Facility: ATRx
Well Type: Seismic Testing Well
Well Status: Active
Year Drilled: 2019
Total Depth: 1399'
Drilling Start Date: June-2019
Drilling End Date: Sept-2019
Completion Depth: 1399'

Driller: USGS RDP
Geologist: WOOD
Drill Method: NF
Drill Fluid: NF

Drawing Rev Date: 3/3/2021



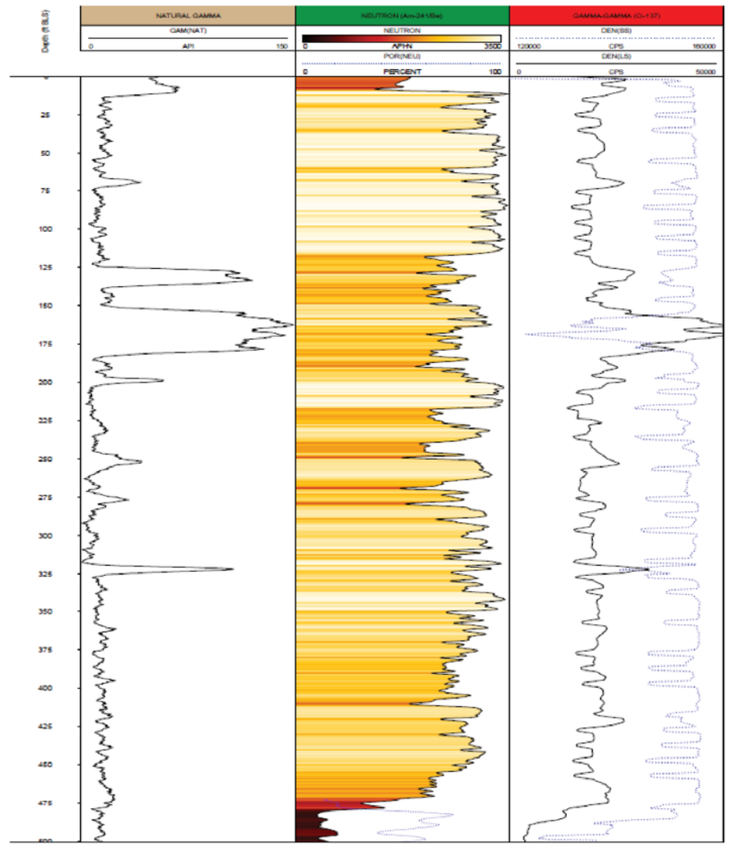


Figure A-4. Construction diagram of new well USGS-150.

WELL NAME: USGS-150
WELL ID: 2328

Drawing Rev Date: 3/3/2021

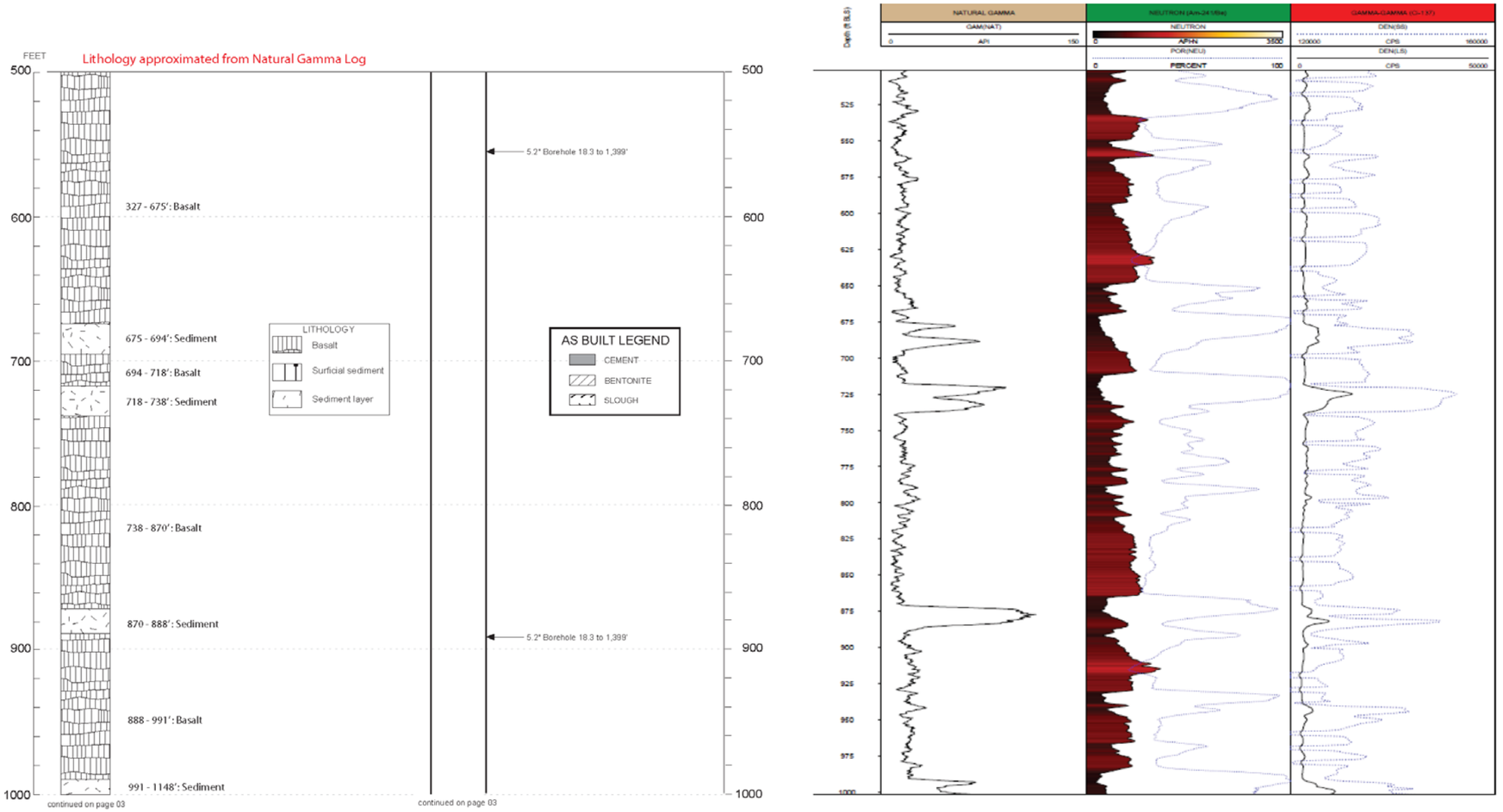


Figure A-4. (continued).

WELL NAME: USGS-150
WELL ID: 2328

Drawing Rev Date: 3/3/2021

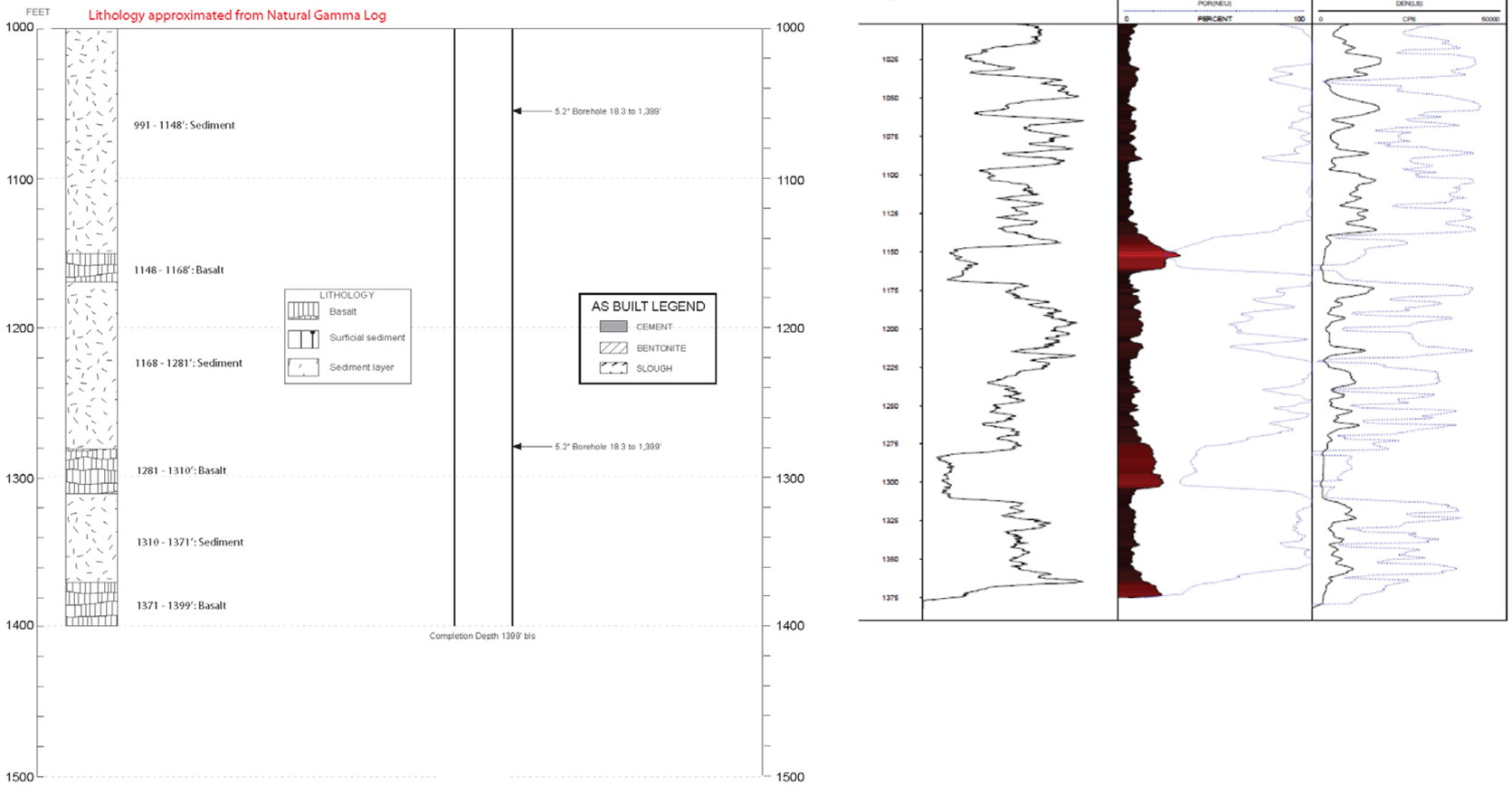


Figure A-4. (continued)

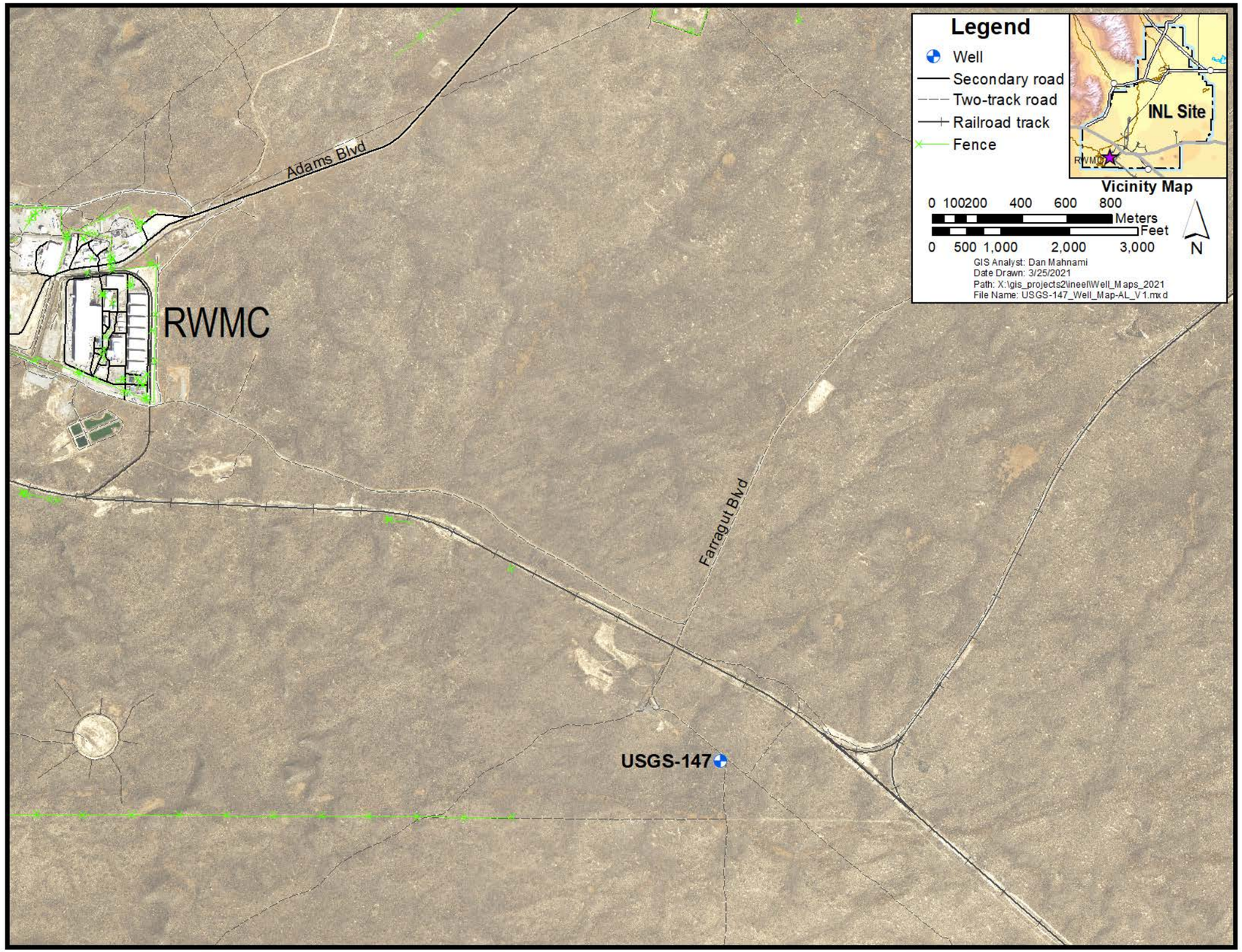


Figure A-5. Map showing location of newly modified well USGS-147.

WELL NAME: USGS-147
WELL ID: 2316
Facility: INL
Well Type: Monitoring
Well Status Active
Year Drilled: 2018 (modified 2020)
Total Depth 1000' BLS
Completion Depth: 1048' BLS

Driller: USGS
Geologist: B. Twining
Drill Method: Air-Rotary
Drill Fluid: Foam
Drilling Start Date 9/4/2018
Drilling End Date 7/9/2020

Drawing Date: 02/22/2021

USGS deepened from 751' to 1048' from May 12 - July 9, 2020. Bridge obstruction near 817' BLS

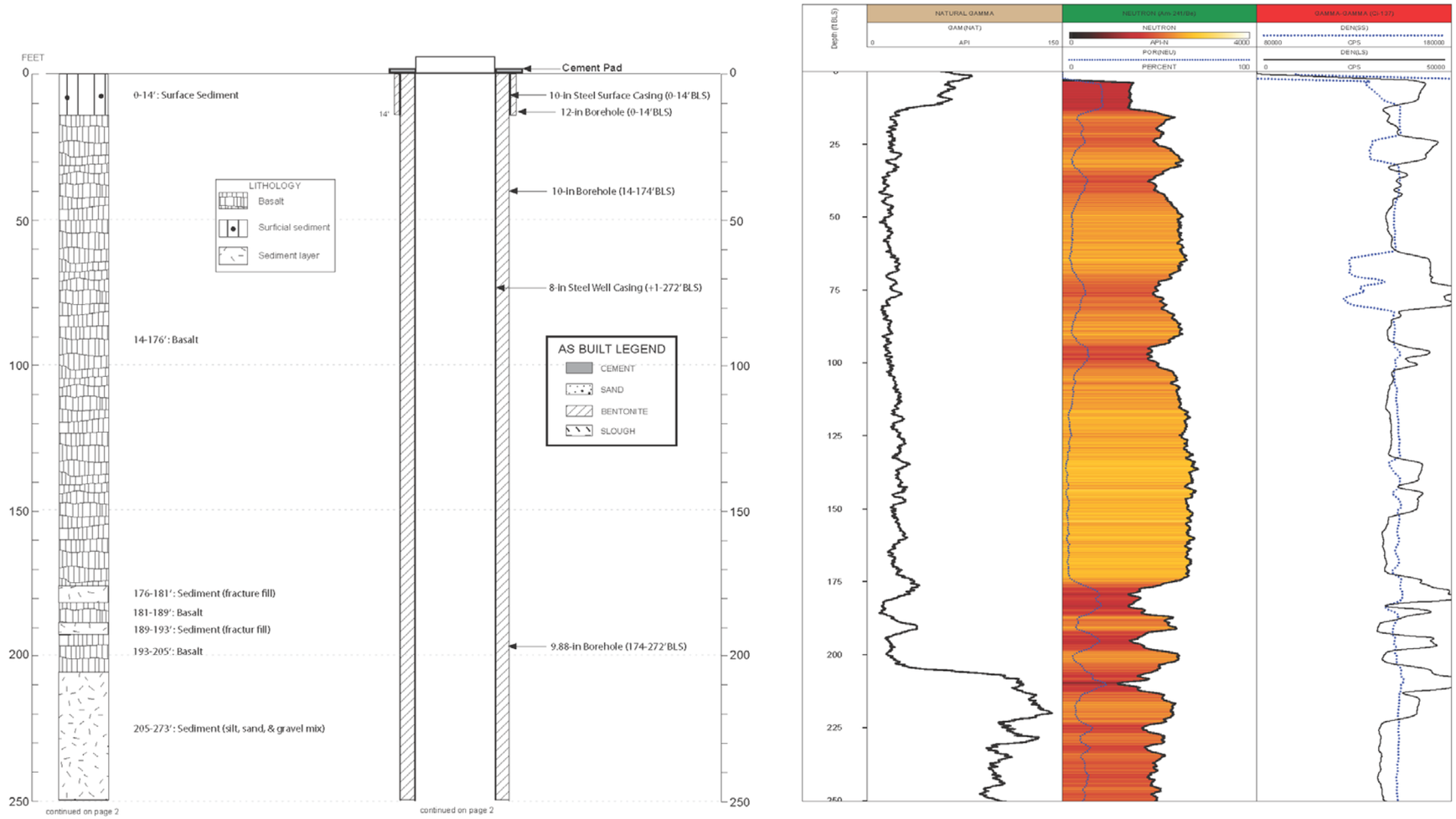
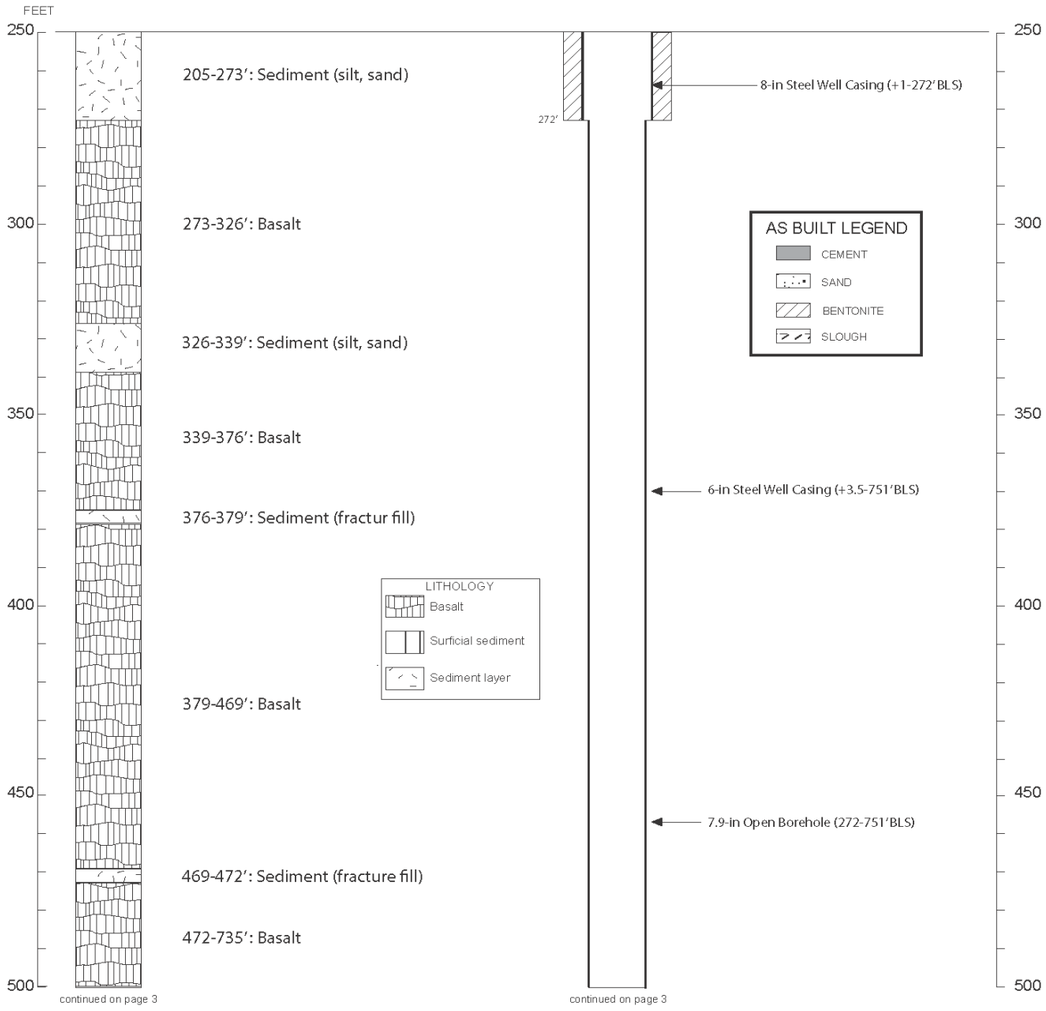


Figure A-6. Construction diagram of modified well USGS-147.

WELL NAME: USGS-147

Drawing Date: 02/22/2021



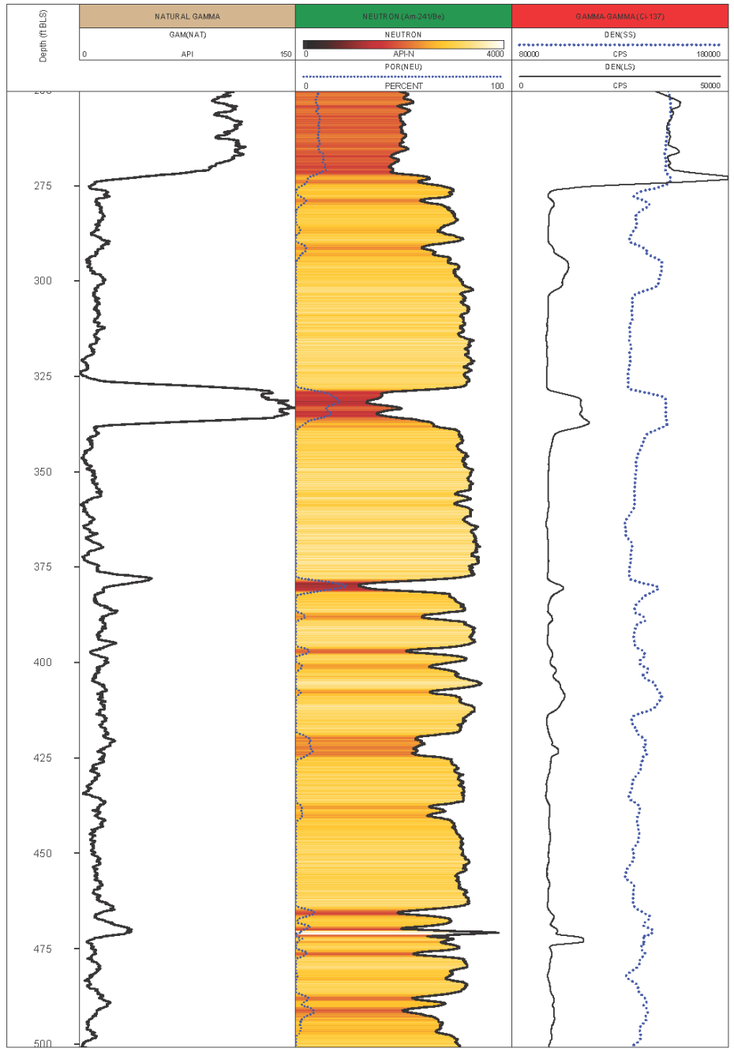
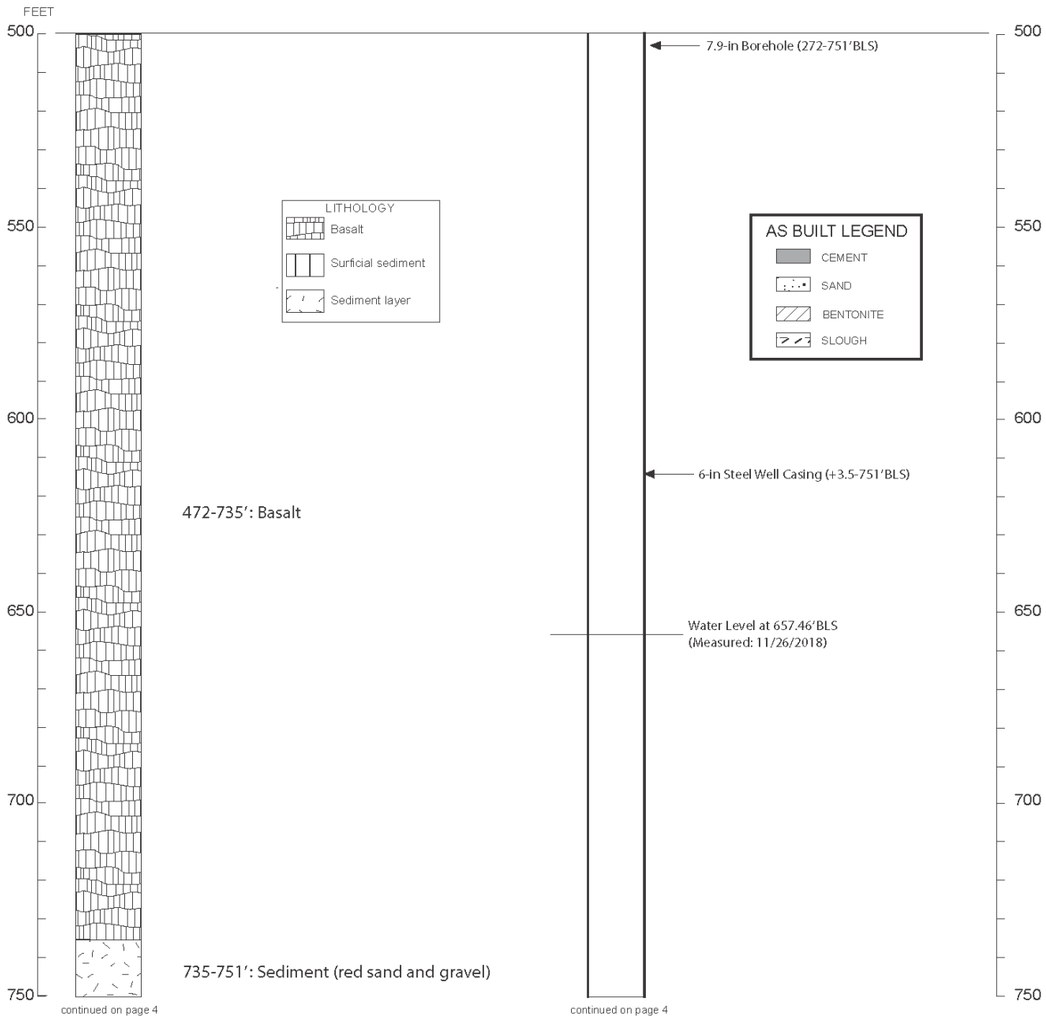


Figure A-6. (continued).

WELL NAME: USGS-147

Drawing Date: 02/22/2021



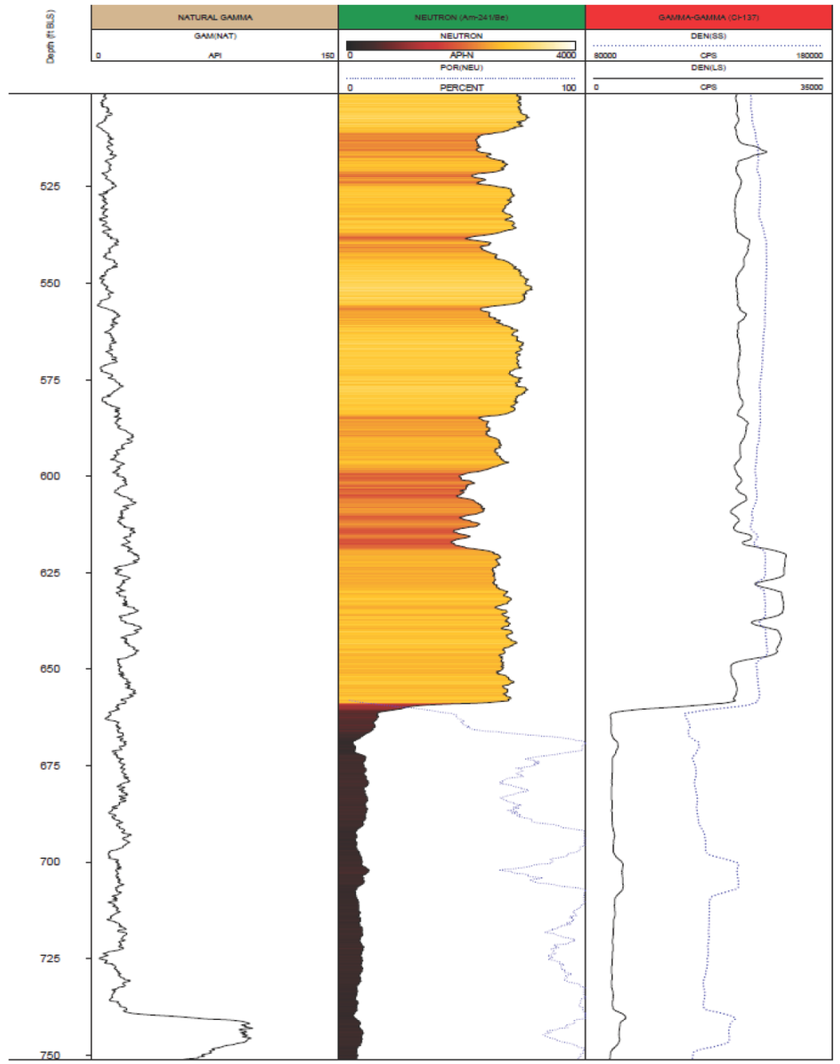
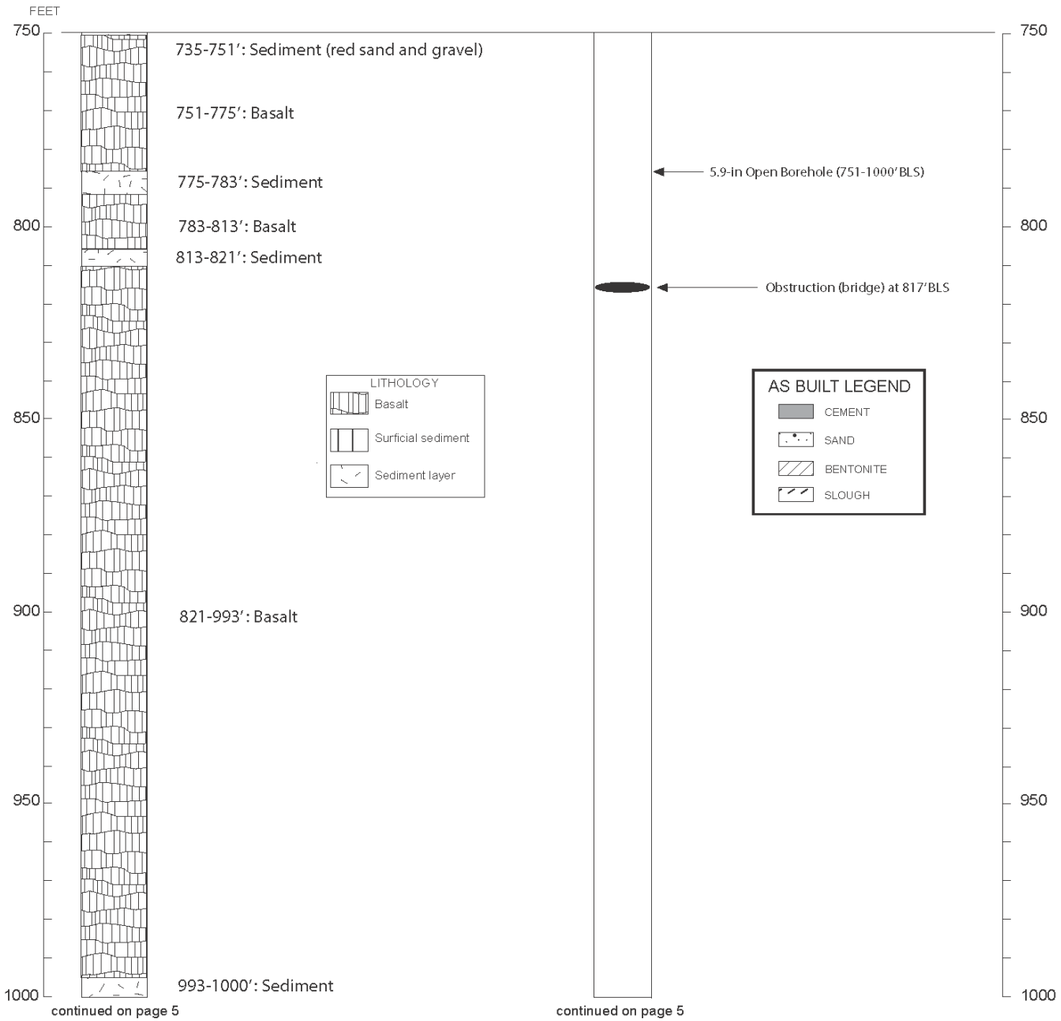


Figure A-6. (continued).

WELL NAME: USGS-147

Drawing Date: 02/22/2021



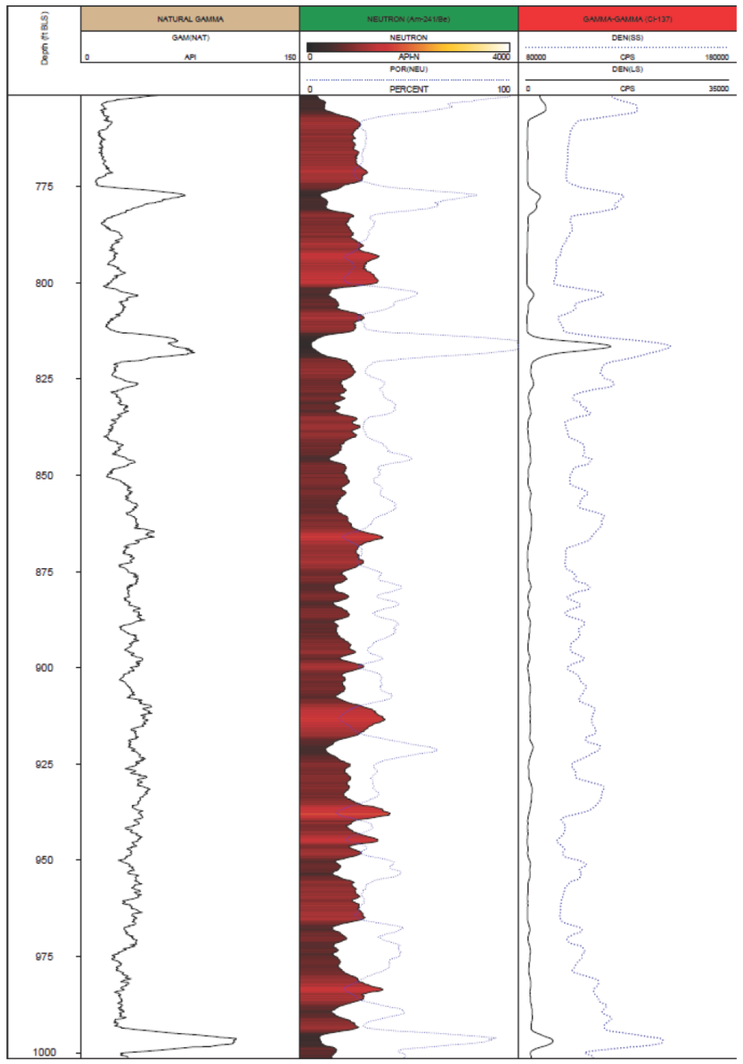
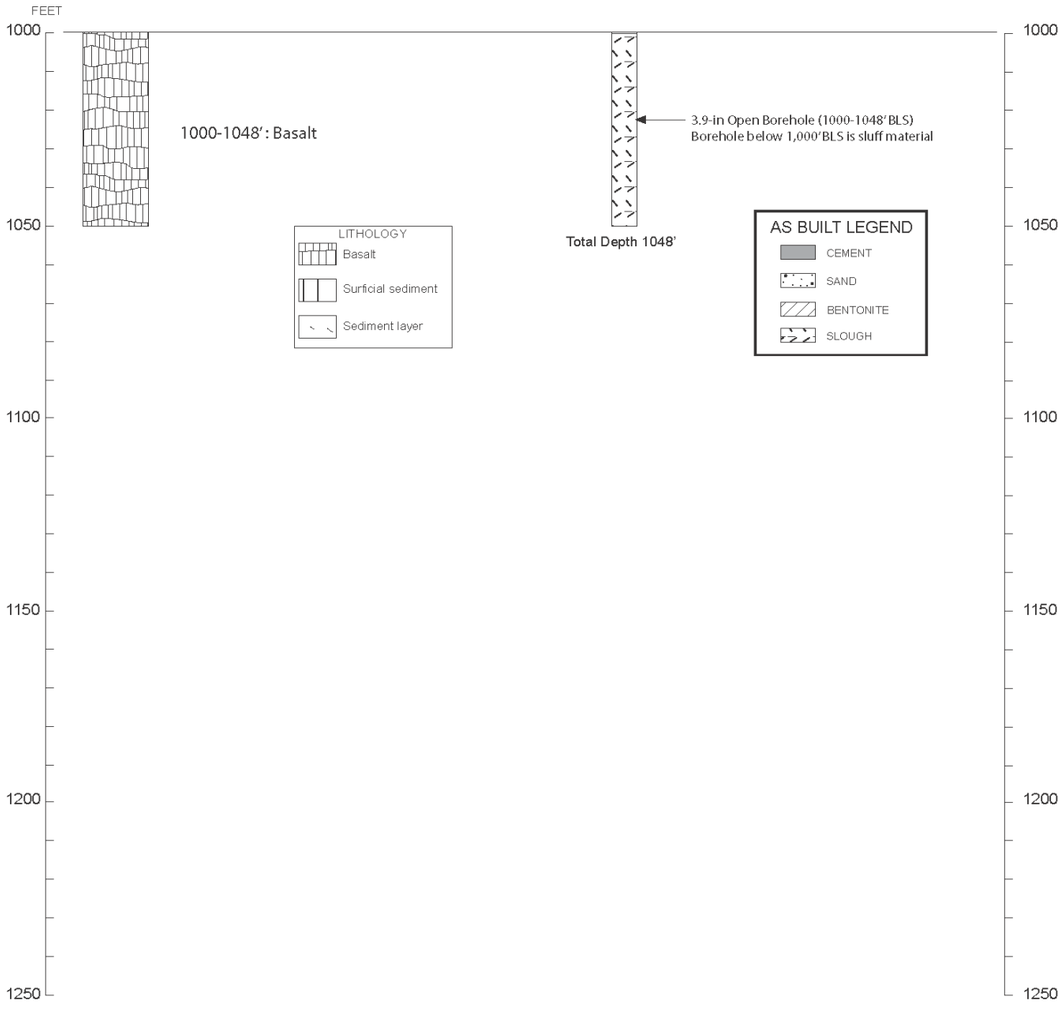


Figure A-6. (continued).

WELL NAME: USGS-147

Drawing Date: 02/22/2021



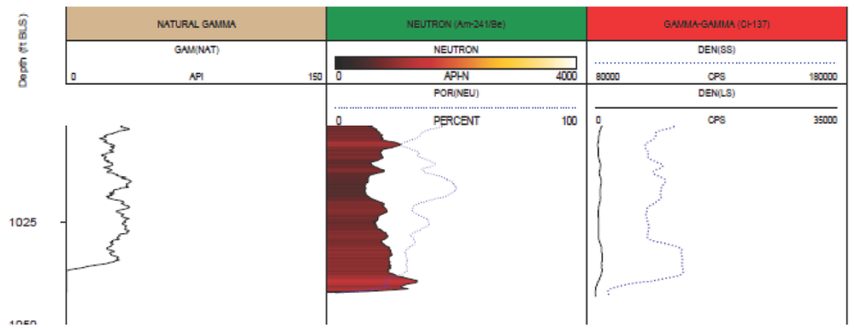


Figure A-6. (continued).

Appendix B

Maps and Construction Diagrams for Wells and Boreholes Decommissioned (Abandoned) in CY 2020

Appendix B

Maps and Construction Diagrams for Wells and Boreholes Decommissioned (Abandoned) in CY 2020

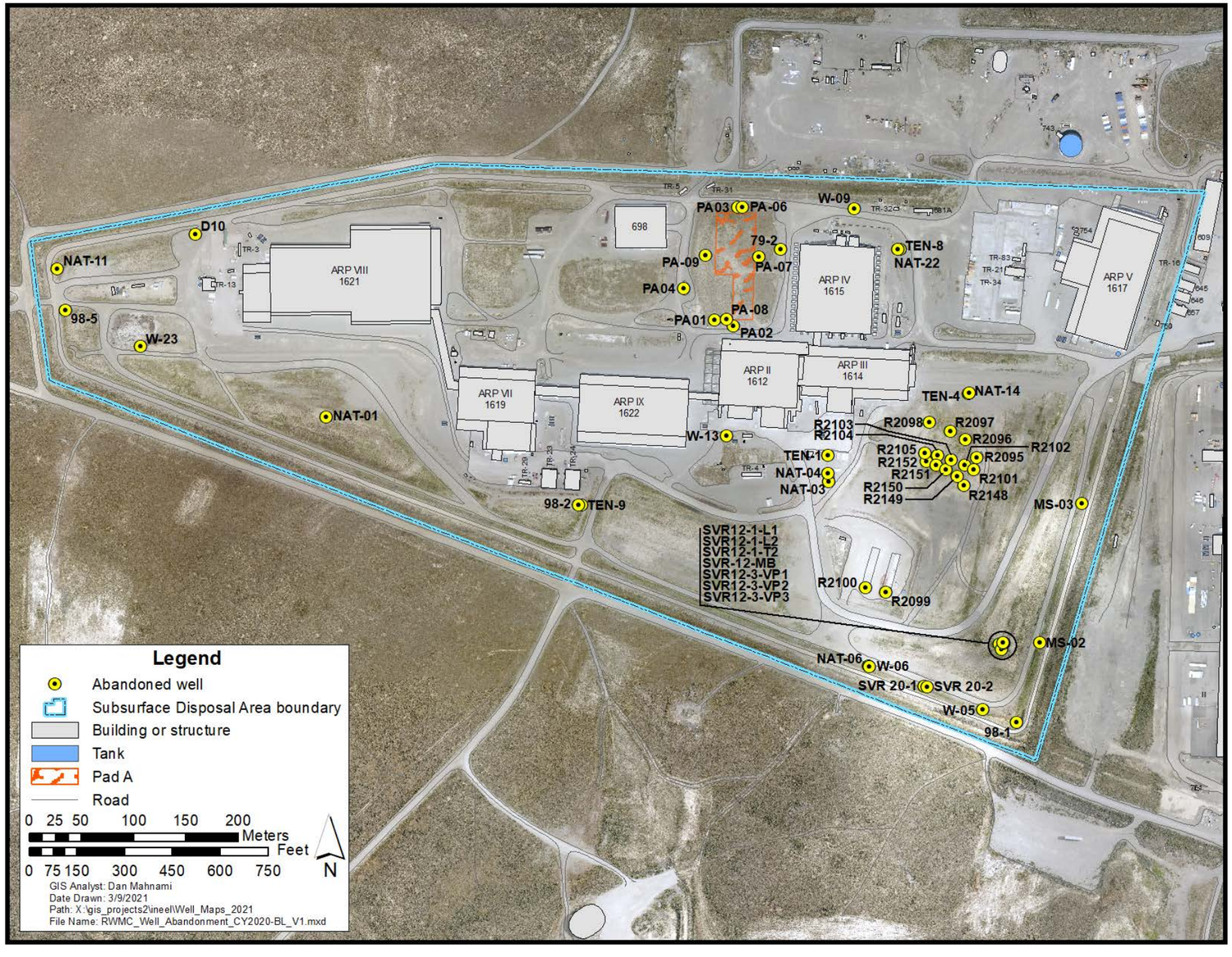


Figure B-1. Map showing location of abandoned wells and boreholes in CY 2020.

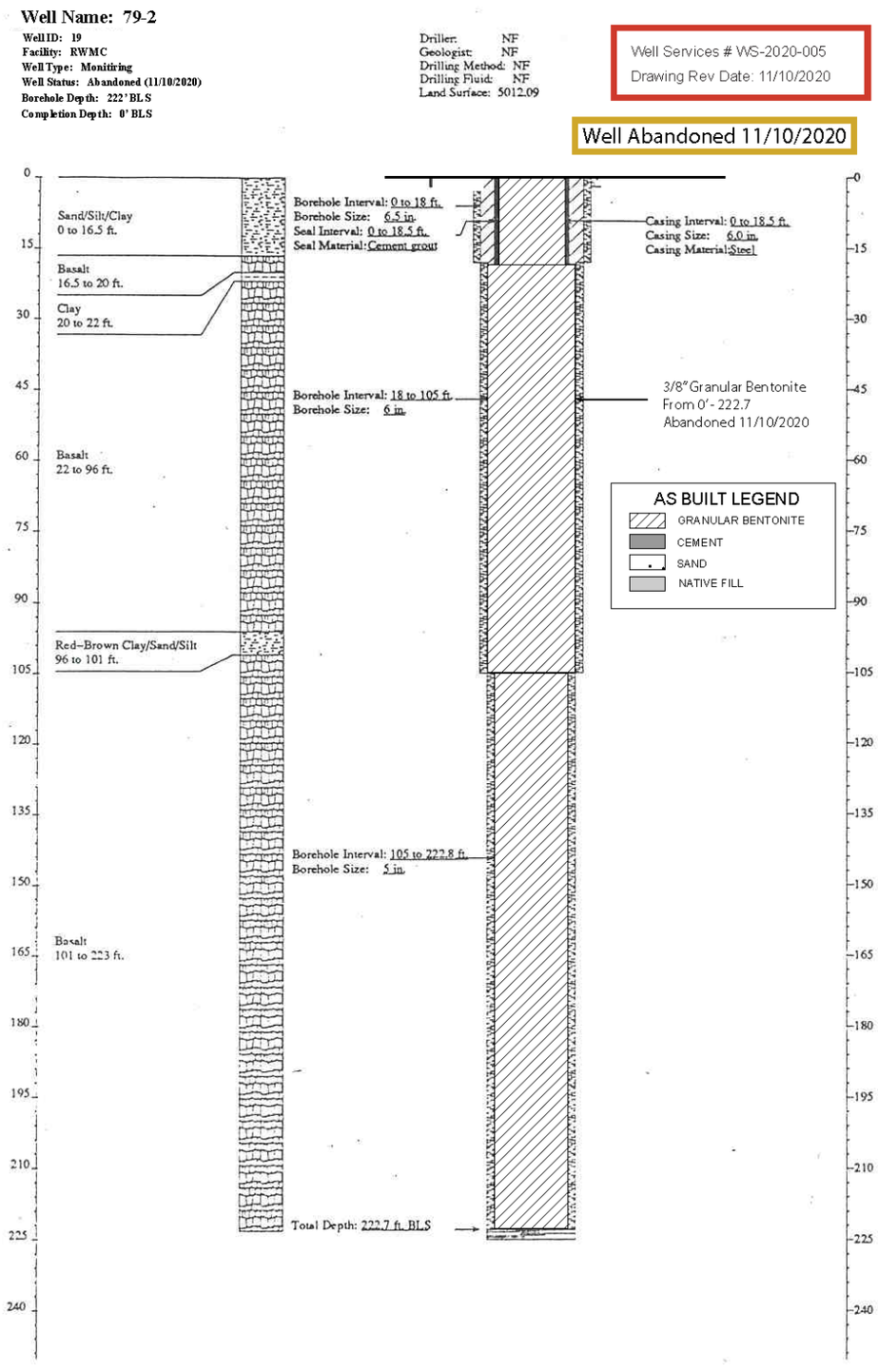


Figure B-2. Construction diagram of abandoned well 79-2.

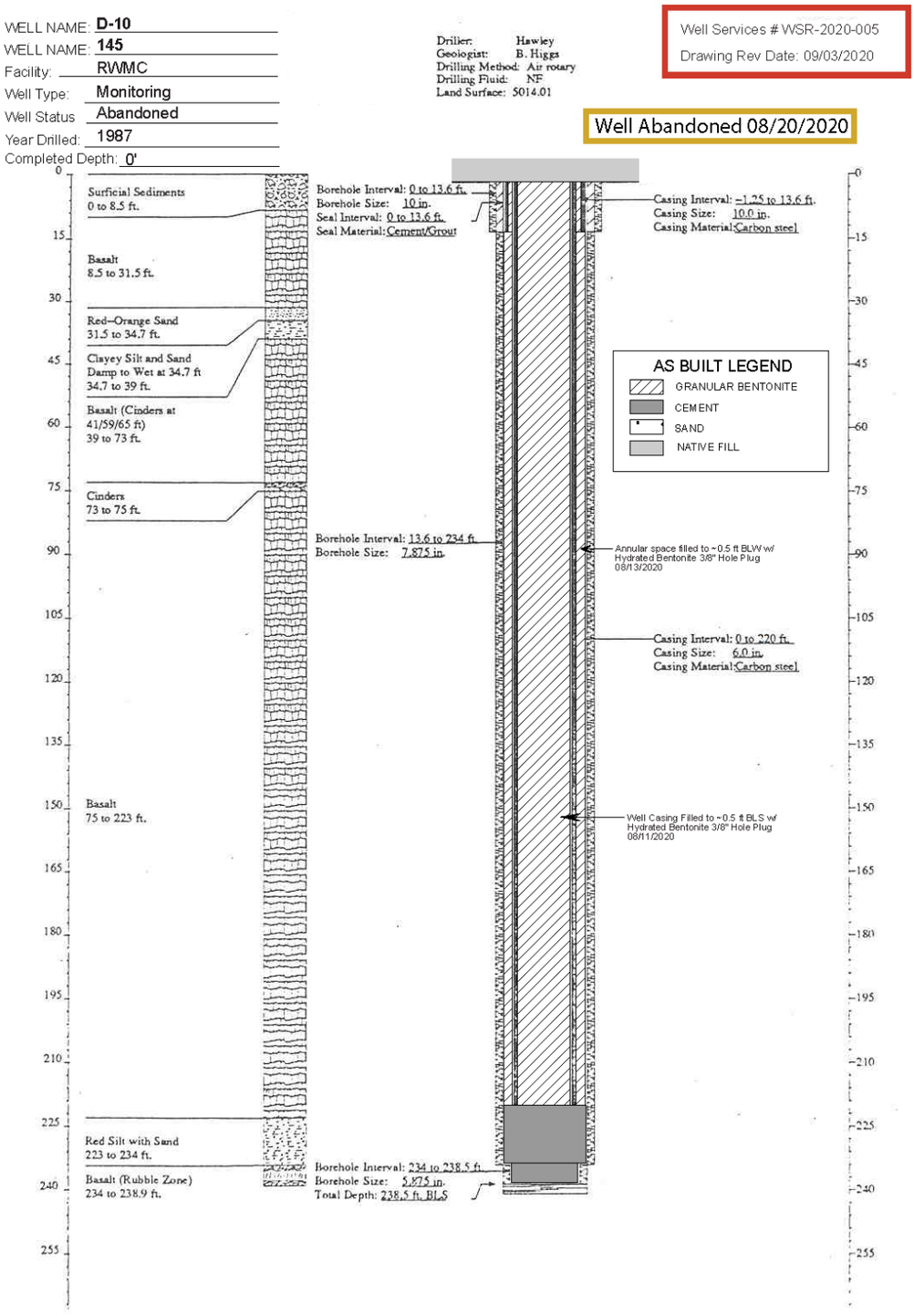


Figure B-3. Construction diagram of abandoned well D-10.

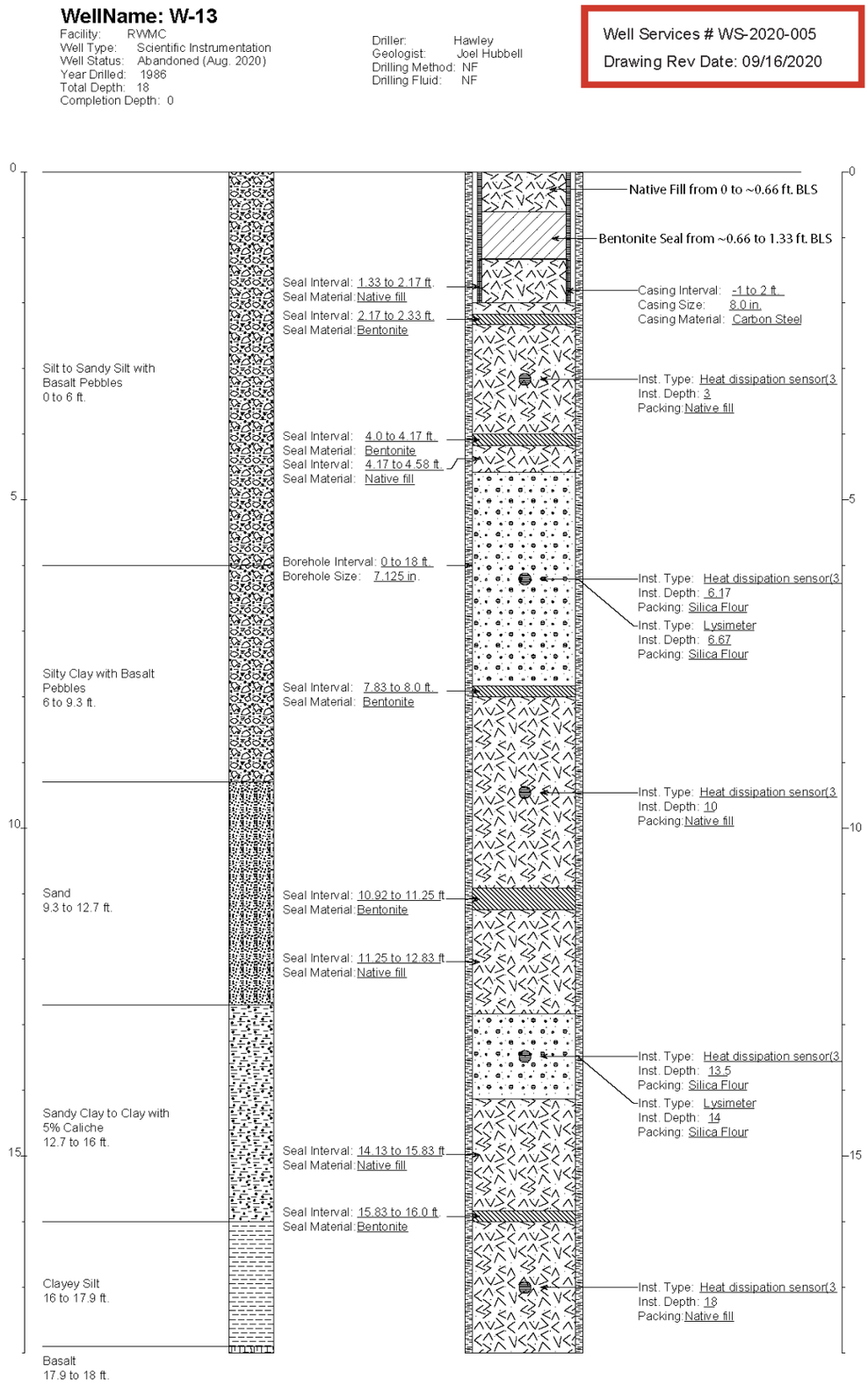


Figure B-4. Construction diagram of abandoned instrumented borehole W-13.

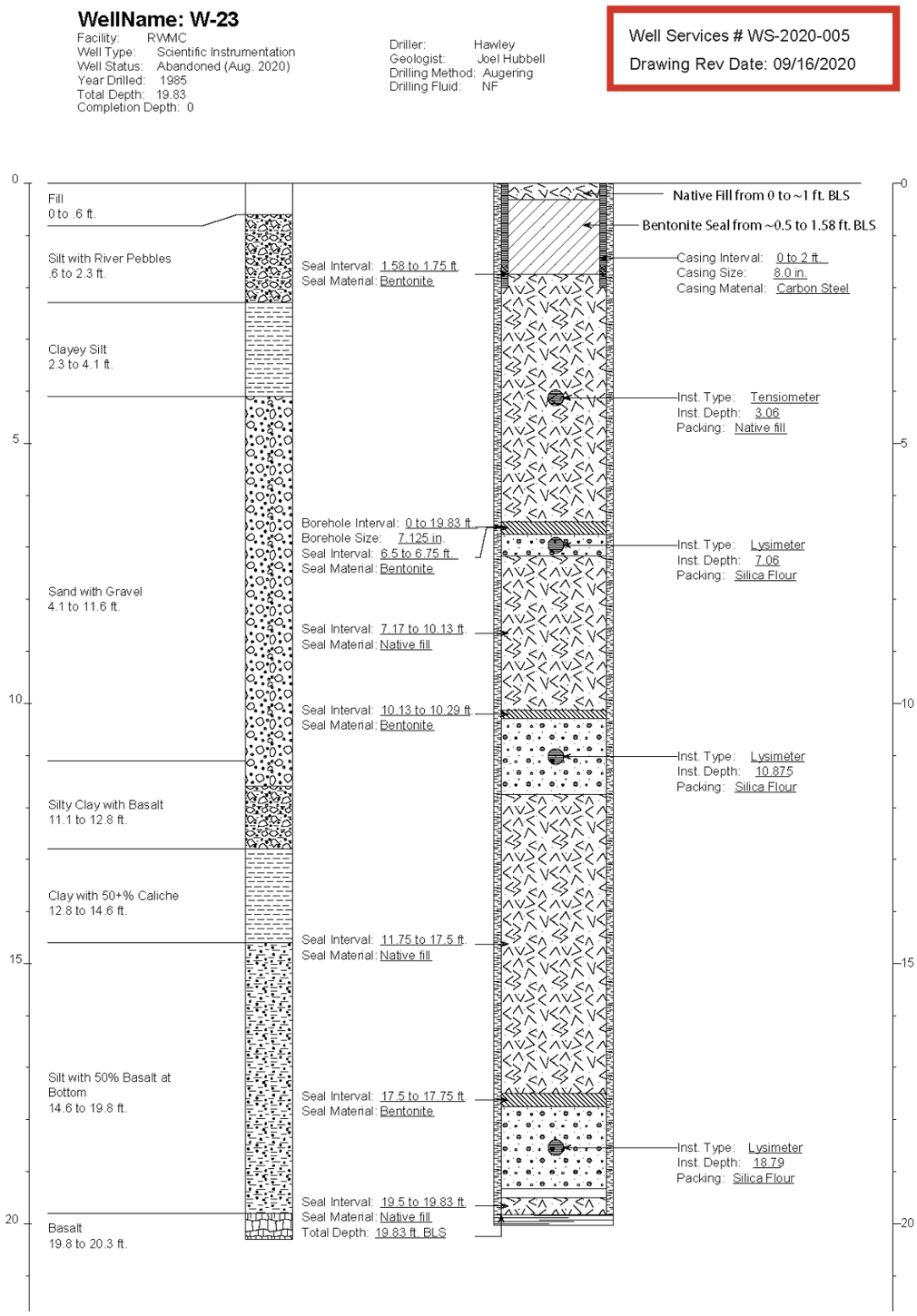


Figure B-5. Construction diagram of abandoned instrumented borehole W-23.