N3B-Los Alamos
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Los Alamos, New Mexico 87544
(505) 257-7690

Environmental Management
Los Alamos Field Office
1200 Trinity Drive, Suite 400
Los Alamos, New Mexico 87545
(240) 562-1122

Date: January 9, 2023
Refer To: N3B-2022-0498

Jack Richardson, Deputy Utility Manager
Gas, Water, and Sewer Services
Los Alamos County
1000 Central Avenue, Suite 130
Los Alamos, NM 87544

Subject: Los Alamos National Laboratory Site-Wide Monitoring Program, Los Alamos County Water Supply Wells, 2023 Sampling and Analysis Plan

Dear Mr. Richardson:

Water supply wells in Los Alamos County (the County) are routinely sampled for both general characterization and specific constituents of interest under Los Alamos National Laboratory's Site-Wide Monitoring Program. These wells include G-2A, G-3A, G-4A, G-5A, O-1, O-4, PM-1, PM-2, PM-3, PM-4, and PM-5. In addition, O-2 will be sampled, once it is online.

The U.S. Department of Energy (DOE) Environmental Management Los Alamos Field Office (EM-LA) and Newport News Nuclear BWXT-Los Alamos, LLC (N3B) continue to coordinate with the County to conduct an annual review of the sampling and analysis plan (SAP).

The enclosed 2023 SAP illustrates the next four quarters of the County sampling calendar (January 1, 2023, to December 31, 2023). The sampling suites and methods in this SAP are the same as those applied to the sampling of groundwater monitoring wells under the New Mexico Environment Department-approved Interim Facility-Wide Groundwater Monitoring Plan.

N3B will continue to implement the following practices associated with groundwater sampling and evaluation of data collected from County water supply wells.

1. N3B will follow the SAP to conduct sampling of the water supply wells using the N3B groundwater sampling standard operating procedure (N3B-SOP-ER-3003, R1) for water supply wells, which incorporates best industry practices.
2. N3B will provide to the County an automated report of the data upon receipt from the analytical laboratory. Sixty days after the automated report is provided, the data will be posted to the publicly accessible website Intellus (http://www.intellusnm.com).

3. If a new contaminant is detected in a County well, EM-LA and N3B will (1) work with County Water Utilities to evaluate the data and (2) review the need to modify the SAP and/or to collect additional samples to address questions raised by the potential contaminant.

The enclosed 2023 SAP is consistent with the previous SAP, aside from the additional sampling of well O-2. Sampling will be completed on a semiannual basis, and will include three per- and polyfluoroalkyl substances (PFAS) and polychlorinated biphenyls (PCBs). With the exception of O-2, PFAS and PCB sampling has been conducted at the County's water supply wells, although PFAS sampling was conducted for only two rounds. Because there were no detections during sampling, PFAS and PCBS were removed from the SAP. At minimum, two rounds of PFAS and PCB sampling will be completed at O-2; if no detections of these compounds are found, they will be removed from this SAP.

Additionally, PM-3 has not been sampled as planned due to a mechanical issue. We will conduct sampling as planned once the location is online again.

If you have any questions, please contact Amanda White at (505) 309-1366 (amanda.white@em-la.doe.gov) or Cheryl Rodriguez at (505) 414-0450 (cheryl.rodriguez@em.doe.gov).

Sincerely,

Robert Macfarlane
Program Manager
Environment, Safety, Health & Quality
N3B-Los Alamos

Sincerely,

M Lee Bishop

Digitally signed by M Lee Bishop
Date: 2023.01.09 07:17:19 -07'00'

M. Lee Bishop, Director
Office of Quality and Regulatory Compliance
U.S. Department of Energy
Environmental Management
Los Alamos Field Office

Enclosure(s):
1. Los Alamos National Laboratory Site-Wide Monitoring Program, Los Alamos County Water Supply Wells, 2023 Sampling and Analysis Plan (EM2022-0867)

cc (letter and enclosure[s] emailed):
Laurie King, EPA Region 6, Dallas, TX
Aaron Rand, City of Santa Fe, Santa Fe, NM
Bill Schneider, City of Santa Fe, Santa Fe, NM
Steve Yanicak, NMED-DOE-OB
Joe Martinez, NMED-DWB
Justin Ball, NMED-GWQB
Rick Shean, NMED-HWB
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City, State, ZIP+4® Los Alamos, NM 87544
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Los Alamos National Laboratory Site-Wide Monitoring Program,
Los Alamos County Water Supply Wells, 2023 Sampling and Analysis Plan

Table 1
Sampling and Analysis Plan for Los Alamos County Water Supply Wells for the Period of January 1, 2023, to December 31, 2023

Location	Analytical Suites[a]									
	Metals		Organics				Radionuclides		Inorganics	PFAS
	Metals	Chromium[b]	VOCs[c]	SVOCs[d]	PCBs[e]	HEXP[f]	Radionuclides	Low-Level Tritium	General Inorganics	PFAS[g]
G-2A	Q[h] 2	—[i]	Q2	Q2	—	Q2	Q2	Q2	Q2	—
G-3A	Q2	—	Q2	Q2	—	Q2	Q2	Q2	Q2	—
G-4A	Q2	—	Q2	Q2	—	Q2	Q2	Q2	Q2	—
G-5A	Q2	—	Q2	Q2	—	Q2	Q2	Q2	Q2	—
O-1	Q2, Q4	—	Q2	Q2	—	Q2	Q2	Q2	Q2, Q4	—
O-2	Q2, Q4	—	Q2, Q4	Q2, Q4	Q2, Q4	Q2, Q4	Q2, Q4	Q2, Q4	Q2, Q4	Q2, Q4
O-4	Q2, Q4	—	Q2	Q2	—	Q2	Q2	Q2	Q2, Q4	—
PM-1	Q2, Q4	—	Q2	Q2	—	Q2, Q4	Q2	Q2, Q4	Q2, Q4	—
PM-2	Q2, Q4	—	Q2	Q2	—	Q2, Q4	Q2	Q2, Q4	Q2, Q4	—
PM-3	Q1, Q2, Q3, Q4	Monthly	Q2	Q2	—	Q2	Q2	Q2, Q4	Q1, Q2, Q3, Q4	—
PM-4	Q2, Q4	Monthly	Q2	Q2	—	Q2, Q4	Q2	Q2, Q4	Q1,Q2, Q3, Q4	—
PM-5	Q2, Q4	Monthly	Q2	Q2	—	Q2, Q4	Q2	Q2, Q4	Q1, Q2, Q3, Q4	—

Notes: Sampling schedule: Q1 = Jan–Mar 2023; Q2 = Apr–Jun 2023; Q3 = Jul–Sep 2023; Q4 = Oct–Dec 2023; Monthly = Samples will be collected on a monthly basis. Quality control samples will be collected in accordance with Appendix D of the Interim Facility-Wide Groundwater Monitoring Plan for the associated monitoring year. Figure 1 shows locations of the Los Alamos County wells.

[a] Table 2 of this sampling and analysis plan presents the analytical suites, sample field preparation, analytical methods, and analytes for the analytical suites specified in Table 1.

[b] Monthly chromium samples will be filtered and analyzed using the SW-846:6020 method.

[c] VOCs = Volatile organic compounds.

[d] SVOCs = Semivolatile organic compounds.

[e] PCBs = Polychlorinated biphenyls.

[f] HEXP = High explosives.

[g] PFAS = Per- and polyfluoroalkyl substances: perfluorohexane sulfonic acid (PFHxS), perfluorooctanoic acid (PFOA), and perfluorooctane sulfate (PFOS). No additional PFAS sampling will be performed after 2023 unless a NMWQCC regulatory standard has been exceeded.

[h] Q = Quarter.

[i] — = Samples are not collected at this location.

Table 2
Analytes, Field Preparation, and Analytical Methods
Used by United States Environmental Protection Agency
Contract Laboratory Program Laboratories for Samples Collected
Under the Sampling and Analysis Plan for Los Alamos County Water Supply Wells

Analytical Suite	Field Preparation	Analytical Method	Analytes
Metals	Unfiltered	SW-846:6010	Aluminum
		SW-846:7470 series	Mercury
		SW-846:6020	Selenium
	Filtered	SM:A2340	Hardness
		SW-846:6010	Aluminum, barium, beryllium, boron, calcium, cobalt, copper, iron, magnesium, manganese, potassium, silicon dioxide, sodium, strontium, tin, vanadium, zinc
		SW-846:6020	Antimony, arsenic, cadmium, chromium, lead, molybdenum, nickel, selenium, silver, thallium, uranium
		SW-846:7470 series	Mercury
	Unfiltered	SW-846:7470 series	Mercury
VOCs[a]	Unfiltered	SW-846:8260 series	See Table 3
SVOCs[b]	Unfiltered	SW-846:8270 series	See Table 3, includes prometon (pesticide) and sulfolane (solvent)
PCBs[c]	Unfiltered	SW-846:8082	See Table 3
HEXP[d]	Unfiltered	SW-846:8330 series	See Table 3
PFAS[e]	Unfiltered	EPA 537.1 Modified	Perfluorohexane sulfonic acid (PFHxS), perfluorooctane sulfate (PFOS), perfluorooctanoic acid (PFOA)
Radionuclides	Unfiltered	EPA:900	Gross alpha, gross beta
		EPA:901.1	Cesium-137, cobalt-60, neptunium-237, potassium-40, sodium-22
		EPA:905.0	Strontium-90
		HASL-300:AM-241	Americium-241
		HASL-300:ISOPU	Plutonium-238, plutonium-239/240
		HASL-300:ISOU	Uranium-234, uranium-235/236, uranium-238
		EPA:903.1	Radium-226
		EPA:904	Radium-228
		Generic: radium by calculation	Radium-226+228
Low-level tritium	Unfiltered	Generic: Low-Level Tritium	Tritium

Table 2 (continued)

Analytical Suite	Field Preparation	Analytical Method	Analytes
General inorganics	Filtered	EPA:120.1	Specific conductance
		EPA:150.1	Acidity or alkalinity of a solution
		EPA:160.1	Total dissolved solids
		EPA:300.0	Bromide, chloride, fluoride, sulfate
		EPA:310.1	Alkalinity-CO3, alkalinity-CO3+HCO3
		SW-846:6850	Perchlorate
	Filtered	EPA:350.1	Ammonia as nitrogen
		EPA:353.2	Nitrate-nitrite as nitrogen
		EPA:365.4	Total phosphate as phosphorus
	Unfiltered	EPA:351.2	Total Kjeldahl nitrogen
		SW-846:9060	Total organic carbon
		EPA:335.4	Cyanide (Total)

[a] VOCs = Volatile organic compounds.

[b] SVOCs = Semivolatile organic compounds.

[c] PCBs = Polychlorinated biphenyls.

[d] HEXP = High explosives.

[e] PFAS = Per- and polyfluoroalkyl substances: perfluorohexane sulfonic acid (PFHxS), perfluorooctanoic acid (PFOA), and perfluorooctane sulfate (PFOS). No additional PFAS sampling will be performed after 2023 unless a NMWQCC regulatory standard has been exceeded.

Table 3
Analytical Methods Used by
Contract Laboratories for Samples Collected
Under the Sampling and Analysis Plan for Los Alamos County Water Supply Wells

Symbol or CAS[a] No.	Analyte
Analytical Suite: VOCs[b] **Analytical Method: SW-846:8260**	
67-64-1	Acetone
75-05-8	Acetonitrile
107-02-8	Acrolein
107-13-1	Acrylonitrile
71-43-2	Benzene
108-86-1	Bromobenzene
74-97-5	Bromochloromethane
75-27-4	Bromodichloromethane
75-25-2	Bromoform
74-83-9	Bromomethane
71-36-3	Butanol[1-]
78-93-3	Butanone[2-]
104-51-8	Butylbenzene[n-]

Table 3 (continued)

Symbol or CAS[a] No.	Analyte
135-98-8	Butylbenzene[sec-]
98-06-6	Butylbenzene[tert-]
75-15-0	Carbon disulfide
56-23-5	Carbon tetrachloride
107-05-1	Chloro-1-propene[3-]
108-90-7	Chlorobenzene
124-48-1	Chlorodibromomethane
75-00-3	Chloroethane
67-66-3	Chloroform
74-87-3	Chloromethane
95-49-8	Chlorotoluene[2-]
106-43-4	Chlorotoluene[4-]
96-12-8	Dibromo-3-chloropropane[1,2-]
106-93-4	Dibromoethane[1,2-]
74-95-3	Dibromomethane
95-50-1	Dichlorobenzene[1,2-]
541-73-1	Dichlorobenzene[1,3-]
106-46-7	Dichlorobenzene[1,4-]
75-71-8	Dichlorodifluoromethane
75-34-3	Dichloroethane[1,1-]
107-06-2	Dichloroethane[1,2-]
75-35-4	Dichloroethene[1,1-]
540-59-0	Dichloroethene[cis/trans-1,2-]
156-59-2	Dichloroethene[cis-1,2-]
156-60-5	Dichloroethene[trans-1,2-]
78-87-5	Dichloropropane[1,2-]
142-28-9	Dichloropropane[1,3-]
594-20-7	Dichloropropane[2,2-]
563-58-6	Dichloropropene[1,1-]
10061-01-5	Dichloropropene[cis-1,3-]
10061-02-6	Dichloropropene[trans-1,3-]
60-29-7	Diethyl ether
123-91-1	Dioxane[1,4-]
97-63-2	Ethyl methacrylate
100-41-4	Ethylbenzene
87-68-3	Hexachlorobutadiene
591-78-6	Hexanone[2-]
74-88-4	Iodomethane
78-83-1	Isobutyl alcohol

Table 3 (continued)

Symbol or CAS[a] No.	Analyte
98-82-8	Isopropylbenzene
99-87-6	Isopropyltoluene[4-]
126-98-7	Methacrylonitrile
80-62-6	Methyl methacrylate
1634-04-4	Methyl tert-butyl ether
108-10-1	Methyl-2-pentanone[4-]
75-09-2	Methylene chloride
91-20-3	Naphthalene
107-12-0	Propionitrile
103-65-1	Propylbenzene[1-]
100-42-5	Styrene
630-20-6	Tetrachloroethane[1,1,1,2-]
79-34-5	Tetrachloroethane[1,1,2,2-]
127-18-4	Tetrachloroethene
108-88-3	Toluene
76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]
87-61-6	Trichlorobenzene[1,2,3-]
120-82-1	Trichlorobenzene[1,2,4-]
71-55-6	Trichloroethane[1,1,1-]
79-00-5	Trichloroethane[1,1,2-]
79-01-6	Trichloroethene
75-69-4	Trichlorofluoromethane
96-18-4	Trichloropropane[1,2,3-]
95-63-6	Trimethylbenzene[1,2,4-]
108-67-8	Trimethylbenzene[1,3,5-]
108-05-4	Vinyl acetate
75-01-4	Vinyl chloride
95-47-6	Xylene[1,2-]
Xylene[m+p]	Xylene[1,3-]+xylene[1,4-]
Analytical Suite: SVOCs[c] **Analytical Method: SW-846:8270**	
83-32-9	Acenaphthene
208-96-8	Acenaphthylene
62-53-3	Aniline
120-12-7	Anthracene
1912-24-9	Atrazine
92-87-5	Benzidine
56-55-3	Benzo(a)anthracene
50-32-8	Benzo(a)pyrene

Table 3 (continued)

Symbol or CAS[a] No.	Analyte
205-99-2	Benzo(b)fluoranthene
191-24-2	Benzo(g,h,i)perylene
207-08-9	Benzo(k)fluoranthene
65-85-0	Benzoic acid
100-51-6	Benzyl alcohol
111-91-1	Bis(2-chloroethoxy)methane
111-44-4	Bis(2-chloroethyl)ether
117-81-7	Bis(2-ethylhexyl)phthalate
101-55-3	Bromophenyl-phenylether[4-]
85-68-7	Butylbenzylphthalate
59-50-7	Chloro-3-methylphenol[4-]
106-47-8	Chloroaniline[4-]
91-58-7	Chloronaphthalene[2-]
95-57-8	Chlorophenol[2-]
7005-72-3	Chlorophenyl-phenyl[4-] ether
218-01-9	Chrysene
53-70-3	Dibenz(a,h)anthracene
132-64-9	Dibenzofuran
95-50-1	Dichlorobenzene[1,2-]
541-73-1	Dichlorobenzene[1,3-]
106-46-7	Dichlorobenzene[1,4-]
91-94-1	Dichlorobenzidine[3,3'-]
120-83-2	Dichlorophenol[2,4-]
84-66-2	Diethylphthalate
131-11-3	Dimethyl phthalate
105-67-9	Dimethylphenol[2,4-]
84-74-2	Di-n-butylphthalate
534-52-1	Dinitro-2-methylphenol[4,6-]
51-28-5	Dinitrophenol[2,4-]
121-14-2	Dinitrotoluene[2,4-]
606-20-2	Dinitrotoluene[2,6-]
117-84-0	Di-n-octylphthalate
88-85-7	Dinoseb
123-91-1	Dioxane[1,4-]
122-66-7	Diphenylhydrazine[1,2]
122-39-4	Diphenylamine
206-44-0	Fluoranthene
86-73-7	Fluorene
118-74-1	Hexachlorobenzene

Table 3 (continued)

Symbol or CAS[a] No.	Analyte
87-68-3	Hexachlorobutadiene
77-47-4	Hexachlorocyclopentadiene
67-72-1	Hexachloroethane
193-39-5	Indeno(1,2,3-cd)pyrene
78-59-1	Isophorone
90-12-0	Methylnaphthalene[1-]
91-57-6	Methylnaphthalene[2-]
95-48-7	Methylphenol[2-]
65794-96-9	Methylphenol[3-,4-]
91-20-3	Naphthalene
88-74-4	Nitroaniline[2-]
99-09-2	Nitroaniline[3-]
100-01-6	Nitroaniline[4-]
98-95-3	Nitrobenzene
88-75-5	Nitrophenol[2-]
100-02-7	Nitrophenol[4-]
55-18-5	Nitrosodiethylamine[N-]
62-75-9	Nitrosodimethylamine[N-]
924-16-3	Nitroso-di-n-butylamine[N-]
621-64-7	Nitroso-di-n-propylamine[N-]
930-55-2	Nitrosopyrrolidine[N-]
108-60-1	Oxybis(1-chloropropane)[2,2'-]
608-93-5	Pentachlorobenzene
87-86-5	Pentachlorophenol
85-01-8	Phenanthrene
108-95-2	Phenol
1610-18-0	Prometon
129-00-0	Pyrene
110-86-1	Pyridine
126-33-0	Sulfolane
95-94-3	Tetrachlorobenzene[1,2,4,5]
58-90-2	Tetrachlorophenol[2,3,4,6-]
120-82-1	Trichlorobenzene[1,2,4-]
95-95-4	Trichlorophenol[2,4,5-]
88-06-2	Trichlorophenol[2,4,6-]
Analytical Suite: PCBs[d] **Analytical Method: SW-846:8082**	
12674-11-2	Aroclor-1016
11104-28-2	Aroclor-1221
11141-16-5	Aroclor-1232

Table 3 (continued)

Symbol or CAS[a] No.	Analyte
53469-21-9	Aroclor-1242
12672-29-6	Aroclor-1248
11097-69-1	Aroclor-1254
11096-82-5	Aroclor-1260
37324-23-5	Aroclor-1262
Analytical Suite: HEXP[e] **Analytical Method: SW-846:8330**	
6629-29-4	2,4-diamino-6-nitrotoluene
59229-75-3	2,6-diamino-4-nitrotoluene
618-87-1	3,5-dinitroaniline
19406-51-0	Amino-2,6-dinitrotoluene[4-]
35572-78-2	Amino-4,6-dinitrotoluene[2-]
99-65-0	Dinitrobenzene[1,3-]
121-14-2	Dinitrotoluene[2,4-]
606-20-2	Dinitrotoluene[2,6-]
2691-41-0	HMX[f]
98-95-3	Nitrobenzene
88-72-2	Nitrotoluene[2-]
99-08-1	Nitrotoluene[3-]
99-99-0	Nitrotoluene[4-]
78-11-5	PETN[g]
121-82-4	RDX[h]
3058-38-6	TATB[i]
479-45-8	Tetryl
99-35-4	Trinitrobenzene[1,3,5-]
118-96-7	Trinitrotoluene[2,4,6-]
78-30-8	Tris (o-cresyl) phosphate

Note: Table 3 is referenced in Table 2 and serves to complete the analyte lists in Table 2.

[a] CAS = Chemical Abstracts Service.

[b] VOCs = Volatile organic compounds.

[c] SVOCs = Semivolatile organic compounds.

[d] PCBs = Polychlorinated biphenyls.

[e] HEXP = High explosives.

[f] HMX = Her Majesty's Explosive.

[g] PETN = Pentaerythritol tetranitrate.

[h] RDX = Royal Demolition Explosive.

[i] TATB = Triaminotrinitrobenzene.

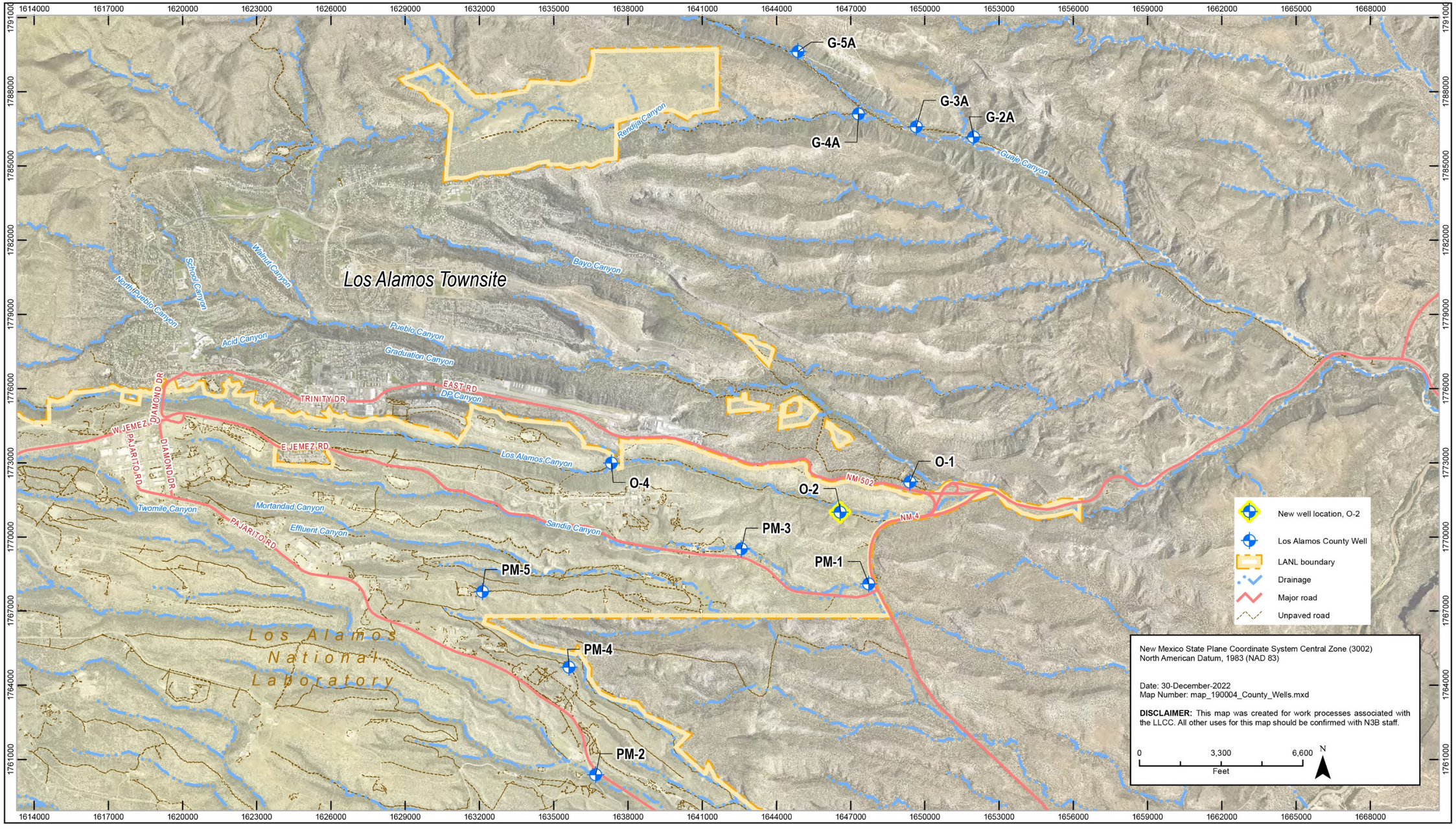

Figure 1 Locations of Los Alamos County wells