

**N3B-Los Alamos**

1200 Trinity Drive, Suite 150
 Los Alamos, New Mexico 87544
 (505) 257-7690

**Environmental Management**

Los Alamos Field Office
 P.O. Box 1663, MS M984
 Los Alamos, New Mexico 87545
 (505) 257-7950/FAX (505) 606-2132

Date: April 17, 2020
Refer To: N3B-2020-0131

Steve Pullen
 Ground Water Quality Bureau
 New Mexico Environment Department
 1190 S. St. Francis Drive
 Santa Fe, NM 87502-5469

Subject: Submittal of the Report for Characterization of Soils in the Land Application Zones Used at the Chromium and RDX Project Areas Under Discharge Permit 1793

Dear Mr. Pullen:

Enclosed is the report for characterization of specific constituents (i.e., chromium, RDX [Royal Demolition Explosive], and perchlorate) in soil within designated land application zones under Discharge Permit 1793. The sampling and analysis plan for the characterization work was submitted to the New Mexico Environment Department (NMED) on October 29, 2019, and NMED approved the plan on December 18, 2019. The report presents results from samples collected from representative locations in each land application zone in the chromium project area in Mortandad Canyon and the RDX project area.

If you have questions, please contact Christian Maupin at (505) 695-4281 (christian.maupin@em-la.doe.gov) or Cheryl Rodriguez at (505) 414-0450 (cheryl.rodriguez@em.doe.gov).

Sincerely,

Elizabeth Lowes
 Program Manager
 Environment, Safety and Health
 N3B-Los Alamos

Sincerely,

David
 Nickless

Digitally signed by David
 Nickless
 Date: 2020.04.17
 12:56:22 -06'00'

David Nickless, Acting Director
 Office of Quality and Regulatory Compliance
 Environmental Management
 Los Alamos Field Office

Enclosure(s):

1. Report for Characterization of Soils in the Land Application Zones Used at the Chromium and RDX Project Areas Under Discharge Permit 1793 (EM2020-0039)

cc (letter and enclosure[s] emailed):

Laurie King, EPA Region 6, Dallas, TX

Patrick Longmire, NMED-GWQB

Steve Pullen, NMED-GWQB

Andrew Romero, NMED-GWQB

Chris Catechis, NMED-DOE-OB

Steve Yanicak, NMED-DOE-OB

David Nickless, EM-LA

Cheryl Rodriguez, EM-LA

Hai Shen, EM-LA

Ben Underwood, EM-LA

Emily Day, N3B

Jeannette Hyatt, N3B

Danny Katzman, N3B

Kim Lebak, N3B

Dana Lindsay, N3B

Joseph Legare, N3B

Frazer Lockhart, N3B

Elizabeth Lowes, N3B

Christian Maupin, N3B

Patrick McGuire, N3B

Glenn Morgan, N3B

Bruce Robinson, N3B

Bradley Smith, N3B

Steve White, N3B

emla.docs@em.doe.gov

n3brecords@em-la.doe.gov

Public Reading Room (EPRR)

PRS Website

Pamela T. Maestas

From: Pullen, Steve, NMENV <steve.pullen@state.nm.us>
Sent: Monday, April 20, 2020 7:37 AM
To: Pamela T. Maestas
Subject: RE: Submittal to NMED on 4/17/2020 of DP-1793 Cr/RDX Soil Rpt

Received

Steve Pullen

Steve Pullen
Section Manager
New Mexico Environment Department
Ground Water Quality Bureau
Pollution Prevention Section
1190 S. St. Francis Drive, Santa Fe, NM
(505) 827-2962
steve.pullen@state.nm.us
<https://www.env.nm.gov/>

From: Pamela T. Maestas <pamela.maestas@em-la.doe.gov>
Sent: Friday, April 17, 2020 2:36 PM
To: Pullen, Steve, NMENV <steve.pullen@state.nm.us>
Cc: Romero, Andrew C, NMENV <AndrewC.Romero@state.nm.us>; Emily M. Day <Emily.Day@em-la.doe.gov>; Regulatory Documentation <RegDocs@EM-LA.DOE.GOV>; Martinez, Cynthia, NMENV <cynthia.martinez1@state.nm.us>; Danny Katzman <danny.katzman@em-la.doe.gov>; cheryl.rodriguez@em.doe.gov; Christian T. Maupin <Christian.Maupin@em-la.doe.gov>
Subject: [EXT] Submittal to NMED on 4/17/2020 of DP-1793 Cr/RDX Soil Rpt

Mr. Pullen,

Attached for submittal is a pdf of the following:

- Submittal of the Report for Characterization of Soils in the Land Application Zones Used at the Chromium and RDX Project Areas Under Discharge Permit 1793 (letter and enclosure)

Please acknowledge receipt of this submittal by responding to this email.

Let me know if you have any questions.

Thank you.

Pamela T. Maestas
Regulatory Documentation Manager
Newport News Nuclear BWXT-Los Alamos, LLC
c. 505-927-7882
regdocs@em-la.doe.gov



1200 Trinity Drive, Suite 150
Los Alamos, NM 87544

REPORT FOR CHARACTERIZATION OF SOILS IN THE LAND APPLICATION ZONES USED AT THE CHROMIUM AND RDX PROJECT AREAS UNDER DISCHARGE PERMIT 1793

1.0 INTRODUCTION

This report presents data from soil sampling conducted to characterize concentrations of key constituents in soil within designated land-application zones following land application of treated effluent used for the chromium and RDX (Royal Demolition Explosive) project areas. The sampling is required under the U.S. Department of Energy Environmental Management Los Alamos Field Office and Newport News Nuclear BWXT-Los Alamos, LLC (N3B) Discharge Permit 1793 (DP-1793). The data collected for this report are used to evaluate whether land application of treated groundwater could result in increased concentrations (loading) of constituents within soil. Samples were collected from representative locations in each New Mexico Environment Department– (NMED-) approved land application zone, within both project areas, in accordance with a requirement under Work Plan #5 and Work Plan #4 (NMED 2017) and an NMED-approved sampling and analysis plan submitted in October 2019 (N3B 2019). The conditions in the work plans under DP-1793 and the sampling and analysis plan require samples to be collected 6 mo before the end of the DP-1793 permit term, which is July 27, 2020. This report is required to be submitted to NMED within 60 days of receipt of sample data from the analytical laboratories, which was February 17, 2020. Samples were analyzed for total chromium and perchlorate in the chromium project area and for RDX in the RDX project area. Sample analysis was performed at a National Environmental Laboratory Accreditation Program-accredited analytical laboratory. The DP-1793, Work Plan #5 requirement for the analytical suite for the chromium project area did not include analysis for perchlorate; however, perchlorate analysis was performed to evaluate the additional potential for perchlorate loading in soil.

2.0 APPROACH

2.1 Chromium Project Area

Four zones are designated for land application of treated groundwater in the chromium project area (Figure 2.1-1). Baseline samples were collected in July 2016 from two depths (0–6 in. and 6–12 in.) at each of the ten total locations within Zones 1, 3, and 4. Zone 2 was not sampled in 2016 because that zone constitutes the road, which is subject to periodic grading. Figure 2.1-1 shows the locations of samples analyzed for chromium and perchlorate collected in 2016. The same locations were resampled in January 2020. Zone 2 was sampled in January 2020 and the data are presented in this report in accordance with NMED's requirement in the Work Plan #5 approval letter to sample all land application zones (NMED 2017).

2.2 RDX Project Area

Nine zones are designated for land application of treated groundwater in the RDX project area (Figure 2.2-1). Figure 2.2-1 shows the locations of baseline and post-land application samples collected in 2016 and 2020, respectively. Baseline samples were collected in late June and early July 2016 from two depths (0–6 in. and 6–12 in.) at nine locations and one depth (0–6 in.) at one additional location, all within application Zones 1, 3, 4, and 9, which were the zones where land application was planned to occur. Those same zones and Zones 2, 5, 6, 7, and 8 were sampled in January 2020 in accordance with the work plan (N3B 2019) and NMED's requirement in the Work Plan #4 approval letter to sample all land application zones (NMED 2017). Land application only occurred within three of the nine approved zones,

including Zones 1, 3, and 9. For zones where no land application occurred, both the baseline and post land-application samples effectively represent the local RDX concentrations in the absence of land application.

3.0 RESULTS

The soil sampling results from the chromium and RDX project land-application areas are presented in Tables 3.0-1 and 3.0-2, respectively. The tables present comparisons between the results of baseline samples collected in 2016 with data from post land-application samples collected from the same locations in 2020. The comparisons are made to evaluate whether loading of key constituents may have occurred in association with land application of treated water. The tables include the residential soil screening levels for soils from NMED's 2019 "Risk Assessment Guidance for Site Investigations and Remediation," Table A-1 (NMED 2019) and an applicable soil background concentration for chromium. No background value is available for perchlorate and RDX in soils. RDX does not naturally occur in soil, and perchlorate was not included in the Los Alamos National Laboratory's soil background study (Ryti 1998).

For the samples collected in the chromium project area, the baseline and post land-application results for chromium and perchlorate show similar concentrations for all locations and are within background concentrations. For samples collected in the RDX project area, RDX was not detected in the baseline and post land-application areas.

The conclusion of this sampling is that application of treated water at concentrations below the limits allowed under DP-1793 has not resulted in increased concentrations of chromium, perchlorate, and RDX in soils where application occurs.

4.0 REFERENCES

- N3B 2019. (Newport News Nuclear BWXT-Los Alamos, LLC), October 2019. "Sampling and Analysis Plan for Characterization of Soils in the Land Application Zones Used at the Chromium and Royal Demolition Explosive Project Areas under Discharge Permit 1793," Newport News Nuclear BWXT-Los Alamos, LLC, document EM2019-0370, Los Alamos, New Mexico.
- NMED 2017. (New Mexico Environment Department), June 15, 2017. "Approval with Modification of Work Plan #5 for Treatment and Land Application of Groundwater at TA-05, Los Alamos National Laboratory, Discharge Permit 1793," New Mexico Environment Department letter to J. Bretzke (LANL) and C. Rodriguez (EM-LA) from M. Hunter (NMED-GWQB), Santa Fe, New Mexico.
- NMED 2019. (New Mexico Environment Department), June 19, 2019. "Risk Assessment Guidance for Site Investigations and Remediation," February 2019 (Revision 2, 6/19/19), Hazardous Waste Bureau and Ground Water Quality Bureau, Santa Fe, New Mexico.
- Ryti 1998. Ryti, R. T., P. A. Longmire, D. E. Broxton, S. L. Reneau, and E. V. McDonald, May 7, 1998. "Inorganic and Radionuclide Background Data for Soils, Canyon Sediments, and Bandelier Tuff at Los Alamos National Laboratory" (draft), Los Alamos National Laboratory Report, Los Alamos, New Mexico.

Table 3.0-1
Comparison of Baseline and Post Land-Application Data from the Chromium Project Area

Land Application Zone	Sample Location ID	Sample Depth (in.)	Chromium (mg/kg)				Perchlorate (mg/kg)			
			Baseline (2016)	Lab Qualifier	Post Land Application (2020)	Lab Qualifier	Baseline (2016)	Lab Qualifier	Post Land Application (2020)	Lab Qualifier
1	MO-61240	0–6	9.03	— ^a	8.41	—	0.000503	U ^b	0.00058	U
1	MO-61240	6–12	9.19	—	7.31	—	0.000506	U	0.000551	U
1	MO-61241	0–6	5.99	—	0.696	—	0.000509	U	0.000528	U
1	MO-61241	6–12	5.56	—	2.5	—	0.000515	U	0.000572	U
n/a ^c	MO-61242	0–6	3.42	—	3.82	—	0.000505	U	0.000553	U
n/a	MO-61242	6–12	3.35	—	4.59	—	0.000504	U	0.000601	U
3	MO-61243	0–6	2.47	—	2.82	—	0.000504	U	0.000559	U
3	MO-61243	6–12	3.04	—	2.24	—	0.000498	U	0.000606	U
3	MO-61244	0–6	4.1	—	3.59	—	0.000508	U	0.000651	U
3	MO-61244	6–12	3.9	—	3.93	—	0.000501	U	0.000536	U
3	MO-61245	0–6	2.81	—	3.62	—	0.000503	U	0.000529	U
3	MO-61245	6–12	2.47	—	2.83	—	0.000507	U	0.00054	U
3	MO-61246	0–6	3.07	—	2.65	—	0.00107	J	0.00814	—
3	MO-61246	6–12	3.09	—	3.07	—	0.00148	J	0.00868	—
4	MO-61247	0–6	3.53	—	4.02	—	0.000509	U	0.000561	U
4	MO-61247	6–12	3.16	—	3.71	—	0.000509	U	0.000552	U
4	MO-61248	0–6	3.05	—	3.98	—	0.000506	U	0.000619	U
4	MO-61248	6–12	4.12	—	4.22	—	0.000516	U	0.000542	U
3	MO-61249	0–6	3.72	—	3.88	—	0.000511	U	0.000549	U
3	MO-61249	6–12	4.09	—	3.31	—	0.00051	U	0.000529	U
2	MO-61295	0–6	NC ^d	n/a	2.58	—	NC	n/a	0.000544	U
2	MO-61295	6–12	NC	n/a	1.38	—	NC	n/a	0.000541	U

Notes: Chromium background = 19.3 mg/kg; Chromium residential soil screening level = 96.6 mg/kg. Perchlorate background is not available; Perchlorate residential soil screening level = 54.8 mg/kg.

^a — = Not qualified.

^b U = Not detected.

^c n/a = Not applicable.

^d NC = Not collected.

Table 3.0-2
Comparison of Baseline and Post Land-Application Data from the RDX Project Area

Land Application Zone ^a	Sample Location ID	Sample Depth (in.)	Baseline (mg/kg) (2016)	Lab Qualifier	Post Land Application (mg/kg) (2020)	Lab Qualifier
3	09-22513	0—6	0.493	U ^b	0.149	U
3	09-22513	6–12	0.495	U	0.143	U
4	09-22514	0–6	0.495	U	0.146	U
4	09-22514	6–12	0.495	U	0.147	U
4	09-22515	0–6	0.493	U	0.15	U
4	09-22515	6–12	0.493	U	0.142	U
9	16-61432	0–6	0.495	U	0.146	U
9	16-61432	6–12	0.5	U	0.144	U
1	16-61433	0–6	0.495	U	0.146	U
1	16-61433	6–12	0.495	U	0.146	U
9	16-61434	0–6	0.498	U	0.146	U
9	16-61434	6–12	0.495	U	0.142	U
1	16-61435	0–6	0.5	U	0.15	U
1	16-61435	6–12	0.5	U	0.145	U
9	16-61436	0–6	0.493	U	0.133	U
9	16-61436	6–12	0.5	U	0.15	U
3	16-61437	0–6	0.495	U	0.142	U
3	16-61437	6–12	NC ^c	U	0.149	U
1	16-61438	0–6	0.5	U	0.14	U
1	16-61438	6–12	0.498	U	0.144	U
2	16-61440	0–6	NC	n/a ^d	0.15	U
2	16-61440	6–12	NC	n/a	0.135	U
5	16-61441	0–6	NC	n/a	0.149	U
5	16-61441	6–12	NC	n/a	0.147	U
6	16-61442	0–6	NC	n/a	0.144	U
6	16-61442	6–12	NC	n/a	0.147	U
7	16-61443	0–6	NC	n/a	0.15	U
7	16-61443	6–12	NC	n/a	0.143	U
8	16-61444	0–6	NC	n/a	0.141	U
8	16-61444	6–12	NC	n/a	0.146	U

Notes: RDX background not available; RDX residential soil screening level = 83.1 mg/kg.

^a Bold specifies zones where land application occurred,

^b U = Not detected.

^c NC = Not collected.

^d n/a = Not applicable.

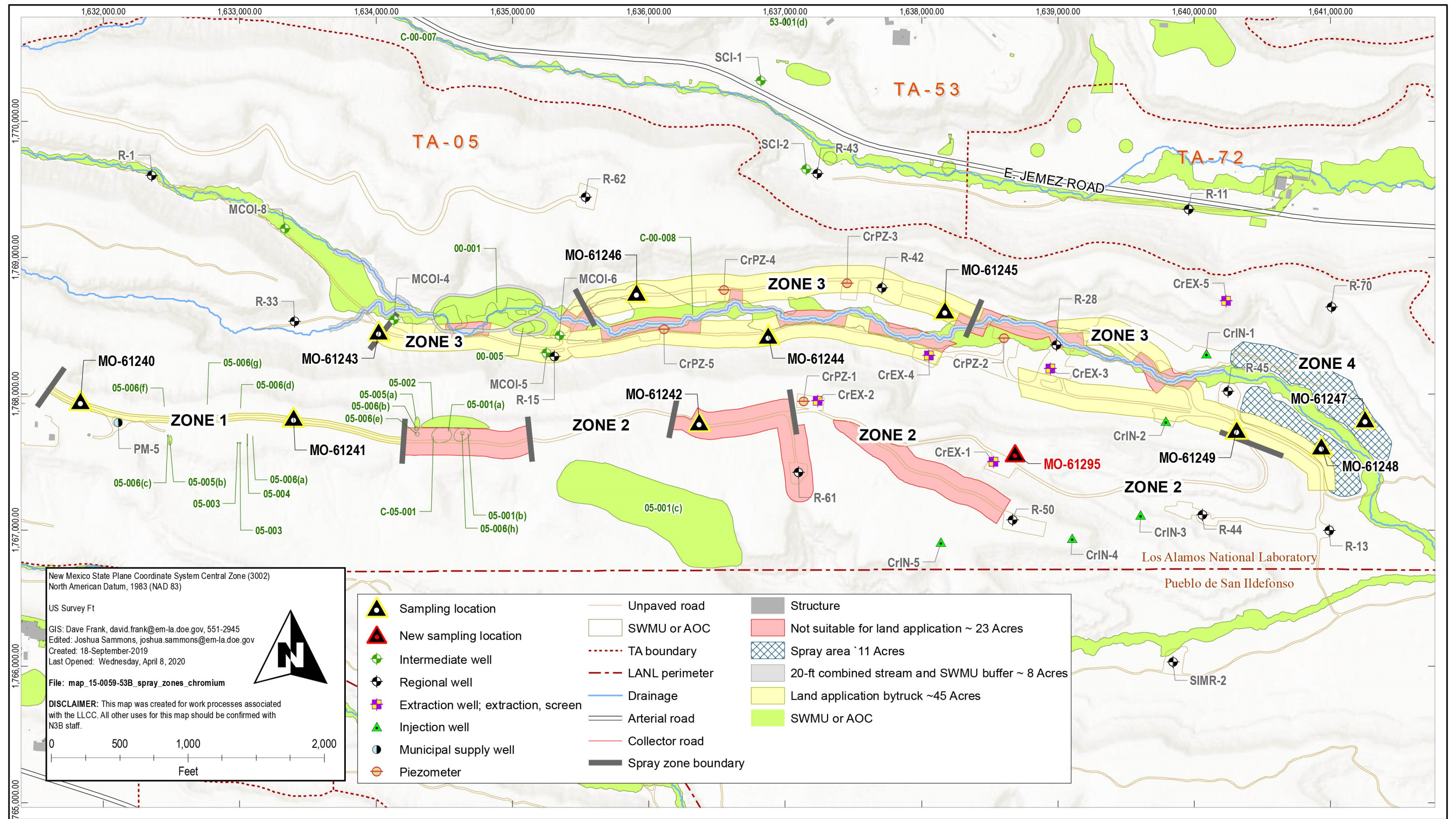


Figure 2.1-1 Map showing chromium project area zones designated for land application of treated groundwater and locations of baseline and post land-application soil samples

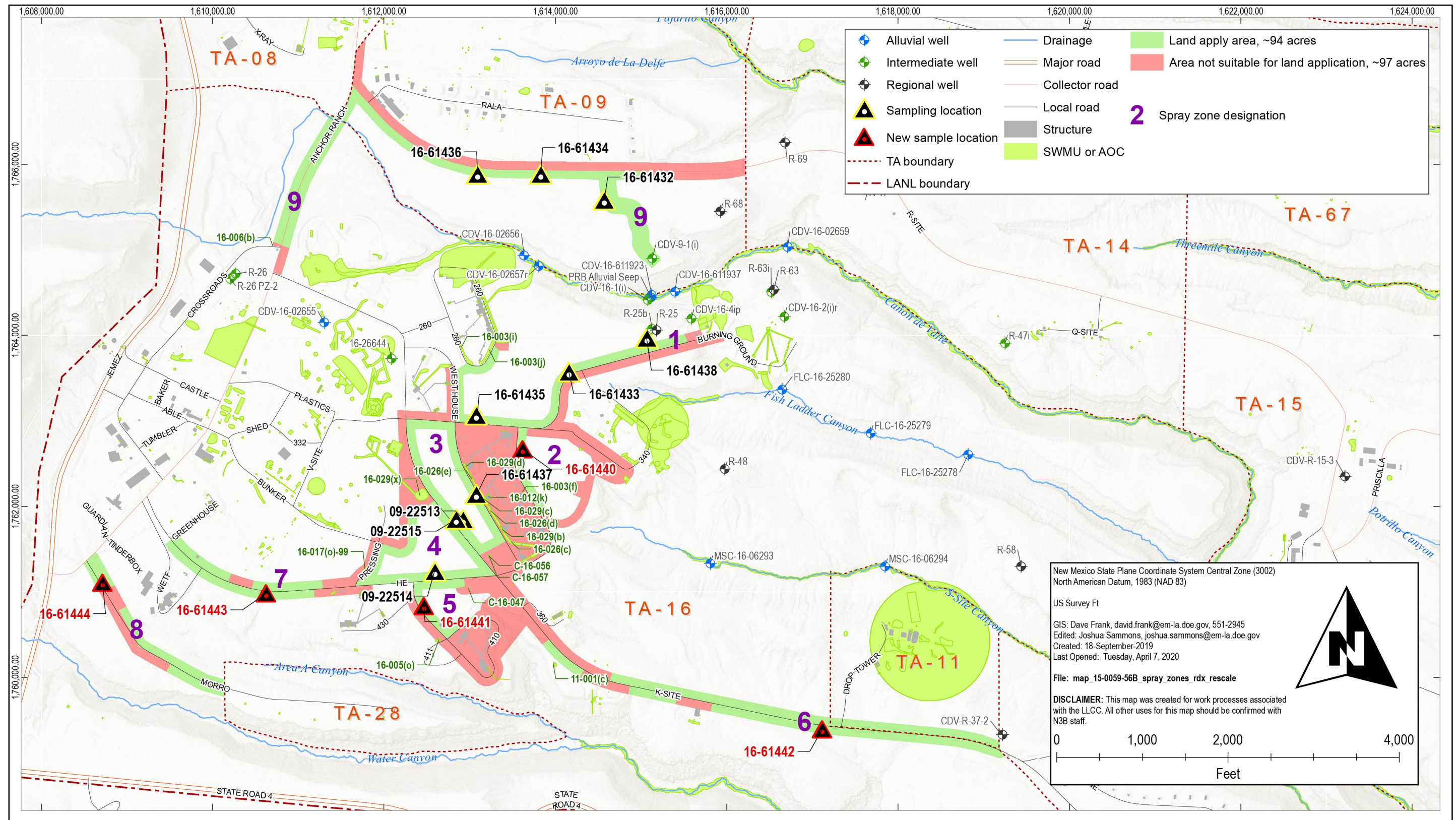


Figure 2.2-1 Map showing RDX project area zones designated for land application of treated groundwater and locations of baseline and post land-application soil samples