March 2024
EM2024-0046

Floodplain Assessment for Regional Groundwater Monitoring Well SIMR-3 and Access Road Improvements

N3B Los Alamos

CONTENTS

Figures

1.0 INTRODUCTION

This floodplain assessment was prepared in accordance with 10 Code of Federal Regulations (CFR) Part 1022, “Compliance with Floodplain and Wetland Environmental Review Requirements.” According to 10 CFR Part 1022, a floodplain is defined as “the lowlands adjoining inland and coastal waters and relatively flat areas and flood prone areas of offshore islands” and has a 1 in 100 chance of being equaled or exceeded by a flood event in any 1-year period.

Per Executive Order 14030, “Climate-Related Financial Risk,” the Federal Flood Risk Management Standard (FFRMS) was reinstated. The FFRMS provides three approaches or options for federal agencies to establish flood hazard areas. The climate informed science approach (CISA) requires federal agencies to “use the best available, actionable hydrologic and hydraulic data and methods that integrate current and future changes in flooding based on climate science” (FEMA 2015). Furthermore, for areas vulnerable to riverine flood hazards, federal agencies must “account for changes in riverine conditions due to current and future changes in climate and other factors (e.g., land use) by applying state-of-the art science in a manner appropriate to policies, practices, criticality, and consequences (risk).”

In regard to the best available and actionable data and methods that could be used to forecast flood hazard areas under future climate changes and other factors, the currently implemented base floodplain extent model at Los Alamos National Laboratory (LANL) (LANL 2001) complies with the CISA described in the FFRMS in the following ways:

- The digital elevation model (i.e., topography) used in the base floodplain extent model is of a resolution equal to or superior to other publicly available data sources.
- The empirically measured rainfall intensity data used are still the best available and actionable data for use in determining flood hazard areas.
- The watershed hydrologic parameterization methods used are the best available and are typical of current watershed modeling efforts.
- The model results were validated using observed data from stream gages located throughout LANL.
- The model was developed using the Hydrologic Engineering Center’s Hydrologic Modeling System (HEC-HMS) and River Analysis System (HEC-RAS), which the Federal Emergency Management Agency (FEMA) has approved for use in flood hazard mapping.
- Future projections of extreme precipitation events in the region do not indicate a clear and actionable trend and/or are not of a temporal and spatial resolution that could inform a watershed-scale, event-based hydrologic model.
- Flooding-related impacts from changes in land use are limited within the Pajarito Plateau watershed.
- The base floodplain extent map was modeled using watershed hydrologic parameters representative of post-fire conditions.

The U.S. Department of Energy Environmental Management Los Alamos Field Office (EM-LA) has prepared this floodplain assessment to evaluate the potential impacts of the proposed actions on the floodplains and wetlands within the project area, to identify alternatives to the proposed actions, and to allow for meaningful public comment.

1.1 Background

1.1.1 Floodplain Description

The Ten Site and Mortandad Canyon floodplains drain a portion of the Pajarito Plateau below the Jemez Mountains across LANL and Pueblo de San Ildefonso properties. The relatively wide and shallow drainages are ephemeral, typically flowing only during intense rainfall associated with the North American Monsoon from late June through September. The proposed project area is located in a predominantly undeveloped reach of Ten Site and Mortandad Canyons. Vegetation within this reach typifies a ponderosa pine (*Pinus ponderosa*; Lawson & C. Lawson) savanna, characterized by shrubs (e.g., Gambel oak [*Quercus gambelii*; Nutt.], skunkbush sumac [*Rhus trilobata*; Nutt.], common hoptree [*Ptelea trifoliata*; L.]), grasses (e.g., sand dropseed [*Sporobolus cryptandrus*; {Torr.} A. Gray], blue grama [*Bouteloua gracilis*; {Kunth} Lag. ex Griffiths], needle-and-thread [*Hesperostipa comata*; {Trin. & Rupr.} Barkworth]), and forbs with interspersed tree cover (e.g., ponderosa pine, one-seed juniper [*Juniperus monosperma*; {Engelm.} Sarg.]). An unpaved network of dirt roads connects the project area to LANL property and NM 4 (Figure 1).

1.1.2 Chromium Contamination and Monitoring

From 1956 to 1972, water used in power plant cooling towers at LANL was treated with potassium dichromate, a corrosion inhibitor. The resulting effluent was discharged into Sandia Canyon (N3B 2018). The historic releases have resulted in hexavalent chromium [Cr(VI)] contamination in the groundwater underlying Mortandad Canyon. Since 2005, an ongoing investigation of the Cr(VI) plume has found Cr(VI) concentrations within the regional aquifer in excess of 50 ppb, the New Mexico groundwater standard. Beginning in 2015, an interim measure was implemented to impede potential plume migration onto adjacent Pueblo de San Ildefonso property and further characterize the nature and extent of contamination in preparation for a final remedy.

EM-LA is proposing to drill and install monitoring well SIMR-3 (San Ildefonso Monitoring Replacement monitoring well 3) within Ten Site Canyon near the confluence with Mortandad Canyon on Pueblo de San Ildefonso property (Figure 2). In addition, EM-LA is proposing to improve access roads from NM-4 and monitoring well R-13 to monitoring well SIMR-3 (Figure 1).

2.0 PROJECT DESCRIPTION

2.1 Monitoring Well SIMR-3

The primary objective for monitoring well SIMR-3 is to enhance the monitoring capability along the southern boundary of the Cr(VI) plume. The migration of Cr(VI) towards Pueblo de San Ildefonso property is a serious concern for both the New Mexico Environment Department (NMED) and Pueblo de San Ildefonso. Monitoring well SIMR-3 will address Pueblo de San Ildefonso concerns about whether Cr(VI) is present on Pueblo de San Ildefonso property and will give EM-LA and NMED a better understanding of the direction of groundwater flow to gauge the effectiveness of the chromium interim measures treatment system. The secondary objectives are to (1) improve potentiometric surface maps for the regional aquifer and (2) gain further understanding of aquifer conditions and the effects of pumping supply well PM-4 on hydraulic gradient and groundwater flow direction and speed.

EM-LA plans to install the well pad for monitoring well SIMR-3 directly adjacent to the floodplain (Figure 2). Possible minor adjustments to the well pad location during construction may result in the constructed well pad and/or temporary ground disturbance activities extending into the floodplain. EM-LA will limit well pad development and ground disturbance within the floodplain to the extent practicable. The

well pad will consist of the well, cuttings pit, and areas to stage equipment and materials. Well pad construction will involve clearing vegetation, grading, compacting soil, and laying base course. Stormwater controls (e.g., retention berms, diversion berms, swales) will be installed to limit runoff and erosion from the pad. These controls may extend into the floodplain.

Drill cuttings will be managed in accordance with the NMED-approved "Decision Tree for the Land Application of Drill Cuttings" (April 2016). Drilling, purge, and development waters will be managed in accordance with the NMED-approved "Decision Tree for Land Application of Drilling, Development, Rehabilitation, and Sampling Purge Water" (November 2016). Initially, drill cuttings and drilling fluids will be stored in a lined pit on the drill pad (Figure 2). Representative samples of the drill cuttings and drilling fluids will be collected and analyzed, and waste determinations will be made from validated data. If validated analytical data show these wastes cannot be land-applied, they will be removed from the pit, containerized, and placed in accumulation areas appropriate for the type of waste. If the cuttings meet the criteria for land application, they will be mixed with base course and used as fill material for the pit.

Investigation-derived waste (IDW) water produced during well development and aquifer testing will be stored in Baker tanks on the well pad and will be disposed of in accordance with the NMED-approved "Decision Tree for Land Application of Drilling, Development, Rehabilitation, and Sampling Purge Water" (November 2016).

Once the waste in the cuttings pit is dispositioned, the portion of the pad where the cuttings pit is located will be restored (i.e., ripped, regraded, and seeded).

2.2 Access Roads Improvements

Access to the project area is provided by a small network of dirt roads within Mortandad and Ten Site Canyons. One spur off of the road network provides access from LANL property near monitoring well R-13 to monitoring well SIMR-3. Another portion of the roadway continues east along Mortandad Canyon to NM-4 (Figure 1). Currently, both roads would require improvements to ensure heavy equipment needed to install monitoring well SIMR-3 can access the project area. Portions of the roadways that may be improved overlap the floodplain.

Road improvements will be completed as needed. Those improvements may include the following: grading, compaction, laying of base course, and adjacent vegetation clearing. Riprap may be installed to help armor areas vulnerable to erosion.

The nature and extent of the floodplain hazard are not expected to change as a result of the proposed actions.

3.0 FLOODPLAIN IMPACTS

3.1 Short-Term Impacts

Ground disturbance from the well pad installation and road access improvements may result in short-term negative direct and/or indirect effects to the floodplain within the project area. The following best management practices will be used to mitigate these impacts:

- Work in a floodplain will not take place on undisturbed, unprotected soil that is too wet to support equipment.
- Stormwater best management practices will be implemented as prescribed in the Stormwater Pollution Prevention Plan (SWPPP).

Controls will be put in place to ensure hazardous materials, chemicals, fuels, and/or oils do not directly or indirectly negatively impact the floodplain within the project area. These controls include the following:

- Only hazardous materials, chemicals, fuels, and oils necessary for the completion of this project will be kept on-site. These items will be stored outside of the floodplain (Figure 2).
- Fewer than 1320 gal. of fuel will be stored within the well pad at any given time.
- Baker tanks storing IDW will not be located within the floodplain.
- Portable generators, compressors, the drill rig, and other fuel-driven equipment will be staged on bermed plastic sheeting as a form of secondary containment. Construction equipment (e.g., graders, dozers, excavators, etc.) and light vehicles will not be subject to this restriction.
- Periodic inspections for leaks and spills will be conducted.
- Spill kits will be available in areas where equipment using fuel, oil, or other liquefied hydrocarbons will be staged or used.
- If any spillage occurs, all contaminated soil will immediately be containerized and relocated outside of the immediate proximity of the floodplain before proper disposal.

3.2 Long-Term Impacts

Although the well pad is not planned to be installed within the floodplain, there is the potential for some construction activities to extend into the floodplain. Additionally, road access improvement will require ground disturbance within the floodplain. These proposed actions have the potential to have very minor long-term adverse impacts on the floodplain within the project area. To mitigate these direct and/or indirect effects, the following best management practices will be used:

- The well pad site will be reinforced to minimize the potential for erosion following project completion.
- Road improvements will include armoring as needed to minimize erodibilty within the floodplain.
- Project staff will remove all trash and debris (e.g., construction material) from the project area after project completion.
- Disturbed areas outside of the permanent project areas will be revegetated using an appropriate native seed mix.

No effects to life and property associated with floodplain disturbance are anticipated.

3.3 Regulatory Compliance

EM-LA requires all project work to be reviewed by subject matter experts (SMEs) via their Project Planning and Regulatory Review system. This system allows for the early identification of all institutional, state, and/or federal requirements relevant to the project. In coordination with SMEs, the project management team ensures compliance with all applicable regulations. Identified regulatory requirements include the following:

- To comply with the Migratory Bird Treaty Act, vegetation will not be removed during the peak bird-nesting season (May 15 through July 15) unless a biological resources SME conducts a nest check to ensure no active nests will be disturbed. Bollards and empty pipes will be capped so birds will not be caught inside.
- Work that may result in any discharge into Waters of the United States will require a permit under Sections 401 and/or 404 of the Clean Water Act.
- All waste generated from drilling activities shall be managed in accordance with N3B-QP-RGC-0002, "Regulatory Requirements for the Land Application of Groundwater," (N3B 2021) and N3B-QP-RGC-0003, "Land Application of Drill Cuttings" (N3B 2019).
- A SWPPP will be developed and implemented to ensure coverage under the U.S. Environmental Protection Agency's Construction General Permit for stormwater discharges.

4.0 ALTERNATIVES

The alternatives considered for floodplain impacts were (1) a no-action alternative; (2) relocating monitoring well SIMR-3 and road improvements; and (3) drilling an angled well.

A no-action alternative was not selected, as it would not meet the objective of increasing monitoring capabilities of potential Cr(VI) contamination in the regional aquifer on Pueblo de San Ildefonso property.

Relocating monitoring well SIMR-3 and the associated road improvements is not a practicable alternative because (1) monitoring well SIMR-3 needs to be located to the south of the Cr(VI) plume to monitor potential plume migration in this direction, (2) topographic constraints and Pueblo de San Ildefonso restricted areas limit alternative locations in the immediate well pad project area (Figure 1), and (3) access to LANL property and NM-4 from monitoring well SIMR-3 requires crossing the floodplain (Figure 2).

Drilling an angled monitoring well to shift the proposed action out of the floodplain is not practicable because of additional safety risks and challenges. A previous attempt at drilling an angled well within Mortandad Canyon was unsuccessful.

5.0 CONCLUSIONS

This project will minimize long- and short-term adverse impacts to the floodplain through the implementation of best management practices. Most impacts will conclude upon the installation of the monitoring well SIMR-3 pad. The proposed actions will greatly improve the ability to monitor the regional aquifer for contaminants on Pueblo de San Ildefonso property and ensure the potential migration of the Cr(VI) plume to the south can be promptly detected. To best achieve the objectives of the Groundwater Monitoring program, the monitoring well SIMR-3 site and associated road improvements may be located in the Ten Site and Mortandad Canyon floodplains. Post-project conditions are not expected to

significantly deviate from pre-project conditions or result in other long-term, negative impacts to the floodplain and its functionality; therefore, no impacts to life and property associated with floodplain modifications are anticipated. In the unlikely event that unanticipated impacts to life or property occur, DOE will engage with Pueblo San Ildefonso to implement appropriate mitigation measures.

6.0 REFERENCES

FEMA (Federal Emergency Management Agency), October 2015. "Guidelines for Implementing Executive Order 11988, Floodplain Management, and Executive Order 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input." (FEMA 2015)

LANL (Los Alamos National Laboratory), 2001. "Mapping 100-Year Floodplain Boundaries Following the Cerro Grande Wildfire," Los Alamos National Laboratory document LA-UR-01-5218, Los Alamos, New Mexico. (LANL 2001)

N3B (Newport News Nuclear BWXT-Los Alamos, LLC) (D. Katzman, V. Vesselinov, P. Reimus, D. Broxton, J. Heikoop, G. Woldegabriel, M. Everett, K. Birdsell, and C. Rodriguez), March 2018. "Chromium Plume at LANL – From Conceptual Site Model to Development of Complex Remediation Strategies – 18682," N3B document number 18682, Los Alamos, New Mexico. (N3B 2018)

N3B (Newport News Nuclear BWXT-Los Alamos, LLC), "Land Application of Drill Cuttings," N3B document number N3B-QP-RGC-0003, effective date July 30, 2019, Los Alamos, New Mexico (N3B 2019)

N3B (Newport News Nuclear BWXT-Los Alamos, LLC), "Regulatory Requirements for the Land Application of Groundwater," N3B document number N3B-QP-RGC-0002, effective date August 12, 2021, Los Alamos, New Mexico (N3B 2021)

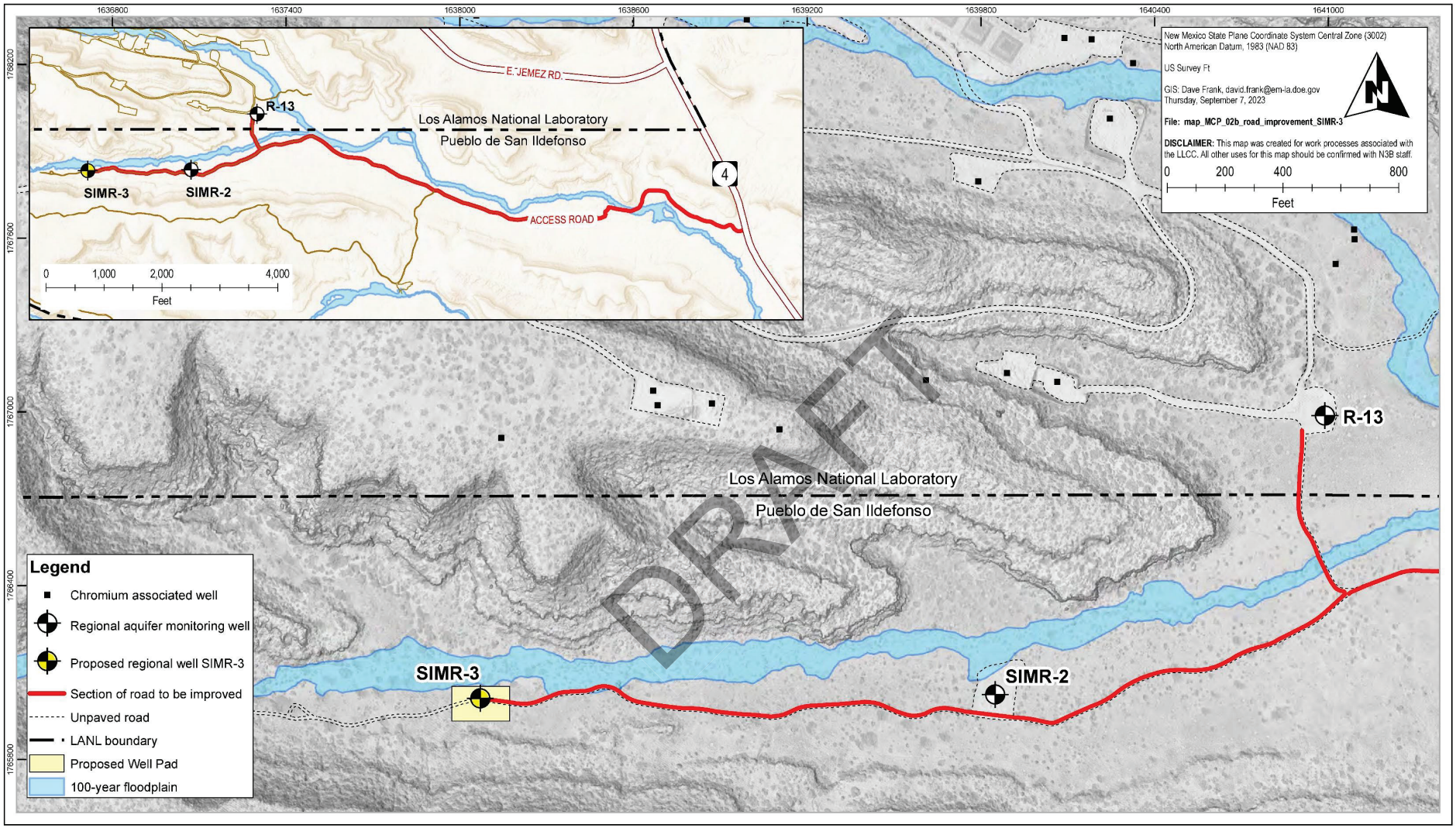

Figure 1 Proposed access road improvements and floodplain

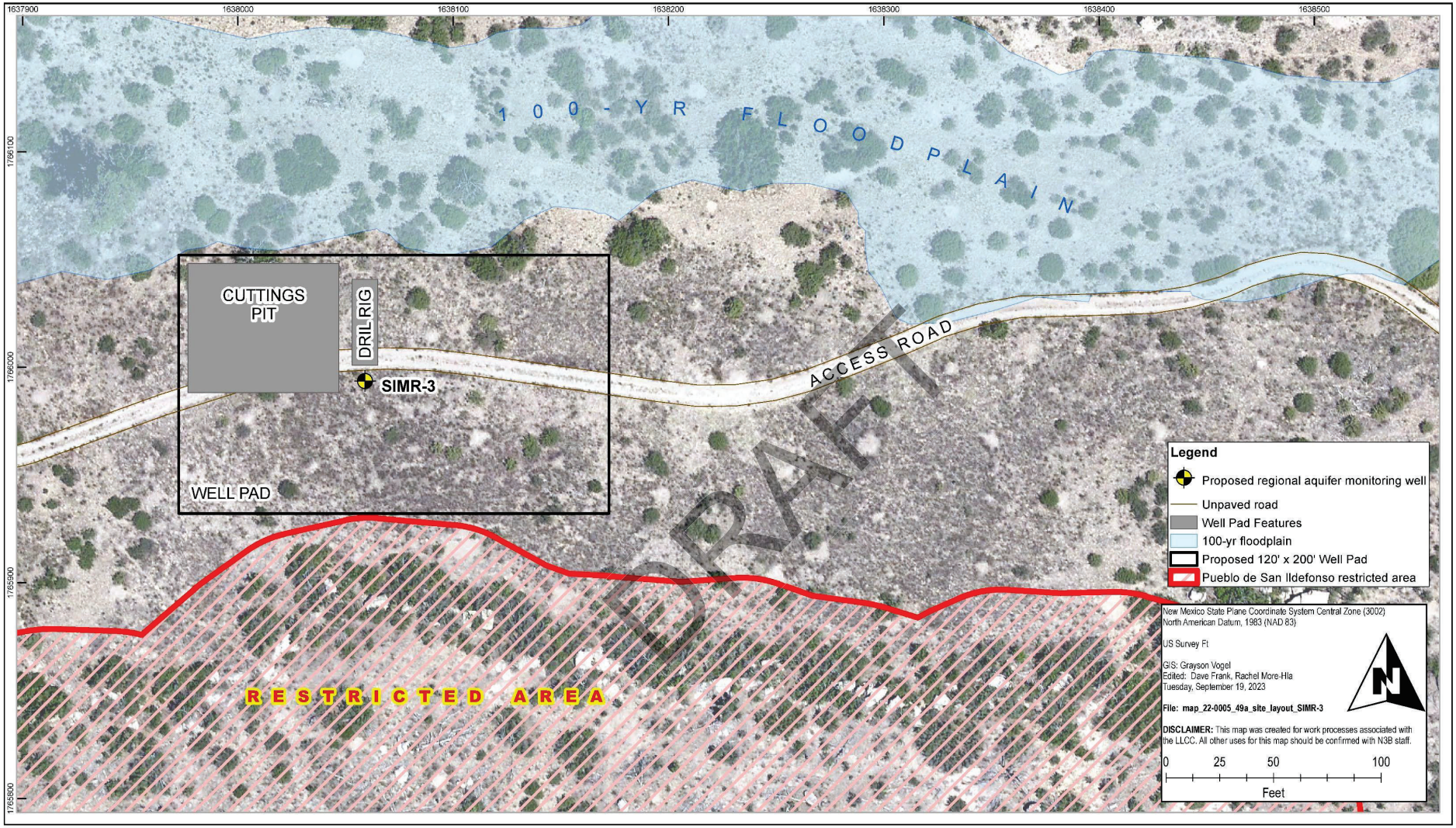

Figure 2 Proposed monitoring well SIMR-3 well pad and floodplain