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October 2016

**Floodplain Assessment for  
Corrective Actions in Ancho Canyon,  
Technical Area 39,  
Los Alamos National Laboratory,  
Los Alamos, New Mexico**

Prepared by: Environmental Protection and Compliance Division,  
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Prepared for: U.S. Department of Energy

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## **ACRONYMS AND TERMS**

CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
IP	Individual Permit for Storm Water Protection
LANL	Los Alamos National Laboratory
SMA	Site Monitoring Area
SWMU	Solid Waste Management Unit

## INTRODUCTION

This floodplain assessment was prepared in accordance with 10 Code of Federal Regulations (CFR) 1022 *Compliance with Floodplain and Wetland Environmental Review Requirements*, which was promulgated to implement the U.S. Department of Energy (DOE) requirements under Executive Order 11988 *Floodplain Management* and Executive Order 11990 *Wetlands Protection*. According to 10 CFR 1022, a 100-year floodplain<sup>1</sup> is defined as “the lowlands adjoining inland and coastal waters and relatively flat areas and flood prone areas of offshore islands.” In this action, DOE is proposing to construct a diversion berm with a spillway and two check dams for erosion protection within a 100-year floodplain at Los Alamos National Laboratory (LANL), Los Alamos, New Mexico. The structures are designed to limit and decrease the off-site sediment load and migration by redirecting and temporarily retaining and slowing storm water run-off.

The project is located at Technical Area 39 in the North Ancho Canyon stream bed and is partially within and northeast of Solid Waste Management Unit<sup>2</sup> (SWMU) 39-010 (Figure 1). SWMU 39-010 is an area of approximately 76,200 square feet of soil that was excavated and deposited during the 1978 construction of the Point 88 firing site<sup>3</sup> (building 39-0088). Additionally, SWMU 39-010 is within an Individual Permit for Storm Water Protection (IP) monitoring site A-SMA-2.5 and falls under a corrective action within the IP. The IP is a requirement of the Compliance Order on Consent<sup>4</sup>.

Personnel conducting the 2015 annual IP site inspection observed that a portion of SWMU 39-010 had eroded at the soil deposit adjacent to the stream channel in Ancho Canyon. The erosion resulted in a five-foot-high channel bluff (Photo 1). This bank erosion along the eastern boundary of SWMU 39-010 exposed debris of wires, nails, and metal piping.

During a subsequent surveillance site visit on February 25, 2016, metal, glass, and construction debris were encountered in and downstream of the eroded bank in North Ancho Canyon (e.g., an approximately one-centimeter-diameter piece of uranyl, a weathered/oxidized form of depleted uranium<sup>5</sup> metal with a yellow/green color, was discovered extruding from the eroded bank about

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<sup>1</sup> A 100-year floodplain is a base floodplain with a 1.0 percent chance of flooding in any given year.

<sup>2</sup> Includes any discernable materials that have ever accumulated, treated, stored, or disposed of solid wastes (irrespective of whether the materials were intended for waste).

<sup>3</sup> A firing site is an area used for explosives testing.

<sup>4</sup> The Compliance Order on Consent between the State of New Mexico Environment Department and DOE and LANL provides for specified compliance requirements for all of the solid waste management units, areas of concern, canyons, and watershed aggregates included in the Compliance Order on Consent.

<sup>5</sup> Depleted uranium is a weakly radioactive and toxic metal, although less toxic than other heavy metals such as lead, arsenic, and mercury. Depleted uranium is approximately 40 percent less radioactive than naturally occurring uranium. The Agency for Toxic Substances and Disease Registry states that “to be exposed to radiation from uranium, you have to eat, drink, or breathe it, or get it on your unprotected skin.” Depleted uranium that remains outside your body cannot harm you. Radiation emitted from depleted uranium is blocked by clothing.

four feet above the watercourse channel). On March 1, 2016, LANL personnel surveyed and removed the piece of uranyl from the eroded stream bank.



**Photo 1. Stream bank with erosion**

Based on the sample results, which included metal fragments and depleted uranium, erosion control measures at the site are proposed to minimize sediment migration. Accordingly, DOE prepared this floodplain assessment to evaluate the potential impacts of implementing the proposed erosion control project within a floodplain, as required by 10 CFR 1022. These watershed-based storm water controls will focus on addressing erosion occurring within the floodplain through mitigating and reducing both current and future channelization<sup>6</sup> and head cutting<sup>7</sup>.

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<sup>6</sup> Channelization is the straightening and deepening of a natural stream channel resulting in faster water movement and increasing erosion and sediment movement.

<sup>7</sup> A head cut is a sudden change in elevation or drop off at the leading edge of a gully.

## **PROJECT DESCRIPTION**

### **Project Area**

DOE proposes to redirect channel flows away from SWMU 39-010 to protect it from erosion. This would entail the construction of a diversion berm made from soil surfaced with rock riprap<sup>8</sup> or redi-rock blocks<sup>9</sup> in North Ancho Canyon to divert channel flows away from the soil dump (Figures 1 and 2). The earthen berm would be covered in turf reinforcement mats<sup>10</sup>, a stabilized material used to limit erosion and encourage vegetation regrowth. The berm would have a spill way to slow water and allow sediment to deposit behind the new berm. In addition, two rock check dams would be placed upstream from the new structure. The disturbed area, including temporary access routes to the site, would be hydromulched<sup>11</sup> with native seed mix to restore vegetation to the site and to limit erosion.

### **FLOODPLAIN IMPACTS**

The project area is less than one acre and approximately 0.90 acres would be disturbed as a result of proposed corrective actions. The existing road would be used by the heavy equipment required for construction of the erosion protection measures.

Negative, short-term direct effects from the installation of berms and other related activities will be mitigated and minimized by the implementation of the following best management practices for work in floodplains during construction.

- Support structures such as personnel trailers or permanent laydown yards will not be installed within the floodplain.
- Equipment staging areas will not be located within the floodplain.
- Equipment will not be refueled within 100 feet from any drainage.
- No hazardous materials, chemicals, fuels, or oils will be stored within the floodplain.
- Any disturbed areas will be revegetated with an appropriate native seed mix or plants within 30 days or at the beginning of the growing season after construction is completed.
- All trash and debris (e.g., construction material) will be removed from the floodplain after construction is complete.

Compliance with the Migratory Bird Treaty Act requires that no vegetation removal occurs during the peak bird breeding season, May 15 through July 31, unless biological resources staff

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<sup>8</sup> Riprap is rock or other material used to armor shorelines, streambeds, bridge abutments, pilings and other shoreline structures against scour and water erosion. It is made from a variety of rock types.

<sup>9</sup> Reddi-rock is a large concrete block stacked to create a retaining wall.

<sup>10</sup> Turf reinforcement mats or TRM are permanent erosion protection mats with a flexible three-dimensional structure. The mat's structure provides new vegetation with stability in order to survive under adverse conditions.

<sup>11</sup> Hydro mulching is applying a slurry of water, native seed, wood fiber mulch, and a tackifier to prevent soil erosion.

at LANL have conducted a nest check to ensure that there are no nesting birds present. If active nests are found, the nest tree or bush will be left until the nesting is complete.

Construction site inspections would be conducted every seven days or after precipitation events producing 0.25 inches or more within 30 minutes according to requirements in the National Pollutant Discharge Elimination System Storm Water Individual Permit for storm water discharges from the construction project area.

There would be negative, short-term direct effects to the floodplain from the installation of grade control structures<sup>12</sup>, channel grading, access roads, and other related activities. Erosion, sediment transport, and flood hazard would be minimized once construction is completed and vegetation restored.

The retention of the natural run-off will impact the floodplain in a positive way by enhancing native plant growth, which will stabilize the soils and improve natural floodplain processes.

No long-term negative direct or indirect impacts to the 100-year floodplain are expected under the proposed project. No effects to lives or property associated with floodplain disturbance are anticipated.

## **ALTERNATIVES**

Alternatives to the proposed action that were considered but eliminated include a full investigation and removal of all affected soils and capping all of the areas for no exposure. Neither of these two alternatives is practical at this time because sections of the project area are still a permitted active firing site. These alternatives were eliminated from further consideration because they would not meet DOE's stated purpose and need to reduce potential sediment-borne pollutants migration from DOE lands. In addition, DOE considered a No Action Alternative. This alternative was not selected because it would not allow DOE to fulfill its requirements under the IP. The reduction of potential migration of metals is an important goal of LANL's operation practices.

## **CONCLUSIONS**

This project would not result in long-term adverse impacts to the 100-year floodplain. Temporary disturbance within the floodplain would cease following completion of construction activities. Best management practices would be implemented. This proposed project would not significantly modify existing elevations and flow paths within the floodplain from pre-project conditions to post-project conditions or result in other long-term negative impacts to the floodplain and its functionality. No effects to lives and property associated with floodplain

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<sup>12</sup> Grade control structures are configurations of earthen, wooden, or concrete material built across a drainage-way to prevent gully erosion.

modifications are anticipated. This project would result in long-term beneficial effects to the 100-year floodplain.

In accordance with 10 CFR Part 1022, a Statement of Findings based on the information in this document will be published and available for public comment. This statement will include a brief description of the proposed project, an explanation of why it is located in a floodplain, the alternatives considered, a statement indicating if the action conforms to state and local floodplain requirements, and a brief description of the steps to be taken to minimize potential harm within the floodplain.



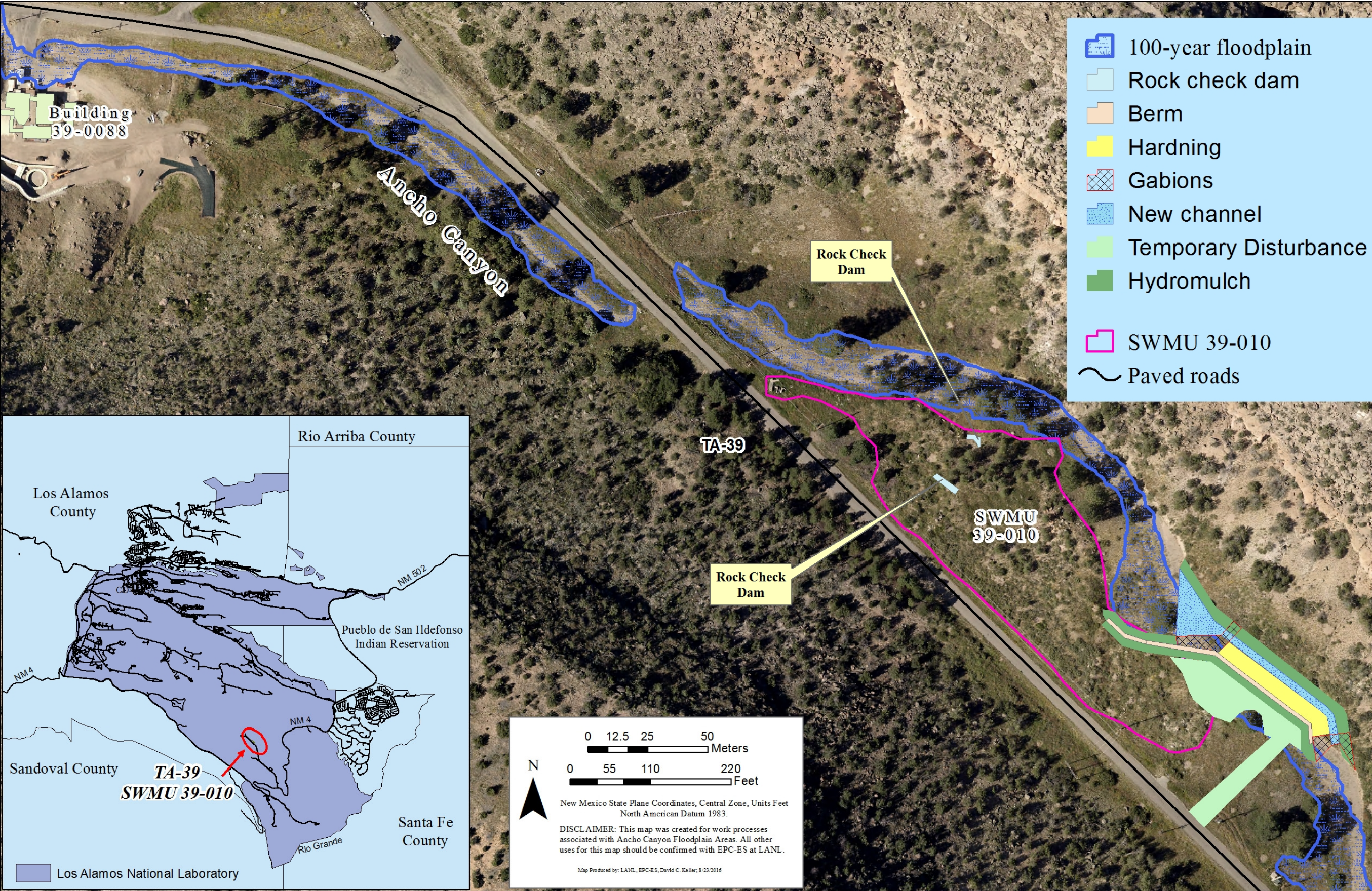


Figure 1. Proposed project area



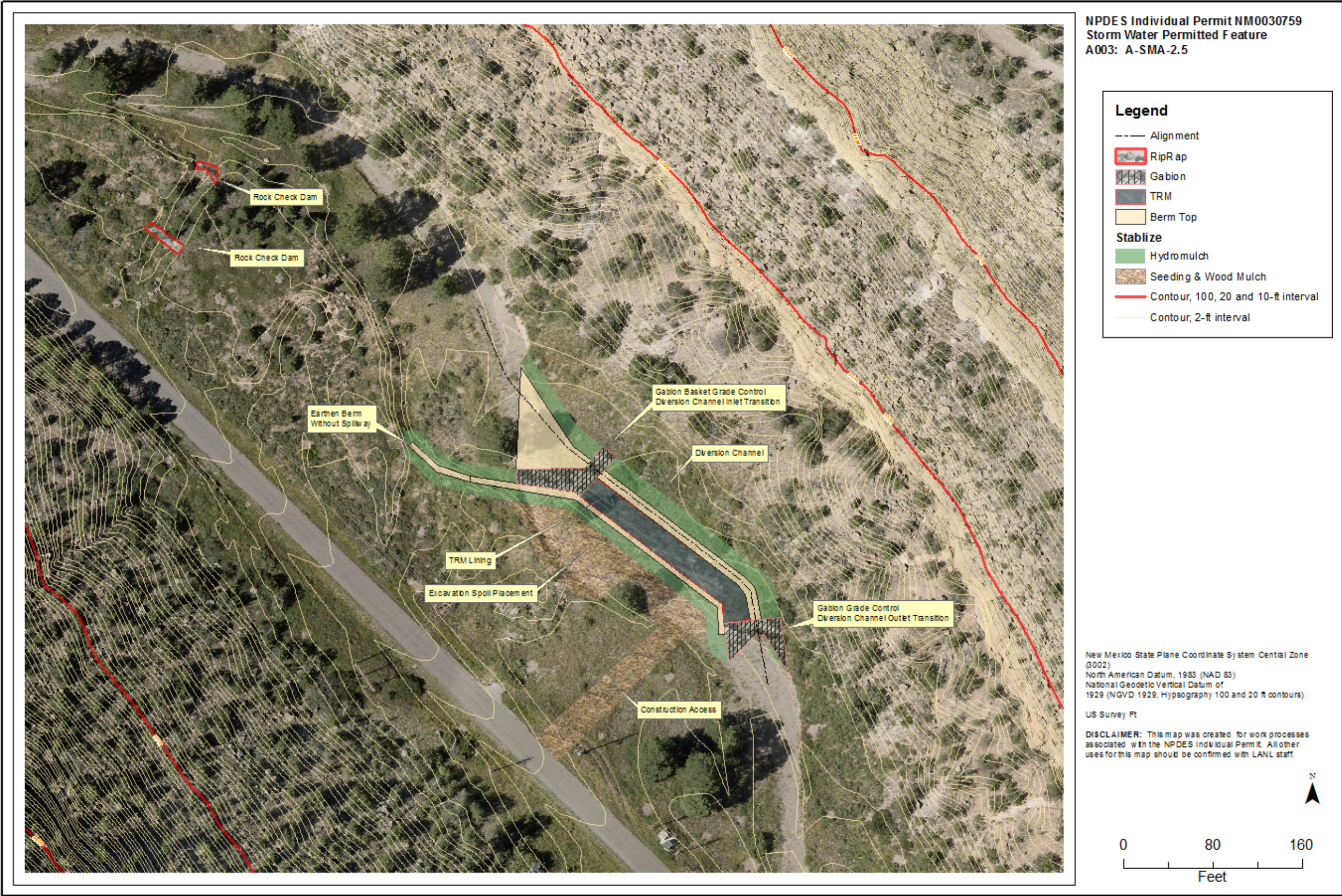


Figure 2. Detailed project area