

Project Name

Legunita Tank-Outlet Modifications

Project Description

Modification of the outlet discharge flow path from an existing earthen agricultural (stock) tank to

- 1.) promote beneficial use of the discharge from the tank by directing the flow to a region proposed for mesquite eradication/grassland restoration,
- 2.) improve the stabilization of the tank outlet,
- 3.) restore the existing eroded channel that is currently fed by the tank outlet discharge, and
- 4.) convert incised channel flow to shallow sheet flow

Potential Project Partners

Santa Margarita Ranch
Natural Resources Conservation Service
U.S. Fish & Wildlife Service
Altar Valley Conservation Alliance

Purpose of the Project

To divert the outlet discharge from an agricultural stock tank (water retention structure) away from an existing eroded channel towards a region proposed for mesquite eradication and grassland restoration.

Relationship to Goals/Desired Conditions of the Watershed Framework

Indicate which goals/desired conditions the project will help to achieve from [this list](#). Insert the number of the desired condition below (ex: 1a)

2a, 2d, 3a, 3b, 3c, 3d, 3f, 4d, 5g

Value

This project will make beneficial use of runoff discharging from an agricultural stock tank, reduce erosion occurring in the existing downstream outlet channel, and direct additional runoff towards a region proposed for mesquite eradication and grassland restoration.

Implications of no Action

Without the project, flows discharging from the tank will continue to cause erosion at the tank outlet and downstream channel.

Work and/or Studies to Date

A 2-dimensional surface water flow model was created using FLO-2D Pro, considering precipitation on the model grid. This model was used to characterize flow patterns and dynamics under various return-interval storms, for existing and proposed (with project) conditions. The proposed conditions model was used to substantiate the concept and facilitate estimation of berm geometry and construction costs. Refer to Figures 4-7 for depiction of the results of the flood modeling under existing and proposed conditions.

Project: Legunita Tank– Outlet Modifications

The output of the FLO-2D model was used to conduct a sediment transport analysis of the watershed, primarily to estimate the amount of sediment inflows to the Tank, informing management decisions relative to routine maintenance and sediment removal.

Analyses of repeat aerial photography spanning years 1937 to 2019 and topography data spanning 2011 to 2019 indicate the following: Legunita Wash was diverted at an upstream location sometime between 1937 and 1956 to feed the Legunita Tank.

Inventory of existing linear erosion control features includes a point at the Legunita Tank.

Project Area and Site Conditions

The Legunita Tank is located within the Bailey Wash watershed, which flows into Puertocito Wash, a significant tributary to the Altar Wash. The tank is located in parcel 302-17-0020, which is private property owned by the Santa Margarita Ranch. Refer to Figures 1 and 2 for Project Location and Site Maps.

The outflow of Legunita Tank is currently incised and flows into an eroded channel. The area where the proposed berm would direct the outflow is a broad floodplain where mesquite grubbing is planned. Although the area where flows will be re-directed is anticipated to allow surface flows to infiltrate, major headcuts exist downstream of that area.

The location of the proposed outlet modification and berm is Sonoran semi-desert grassland, with sparse vegetation including grasses, cacti, and mesquite trees.

Project Activities

Construction of this project will involve modifying the outlet of the earthen stock tank by removing a portion of an existing earthen berm, filling a portion of the downstream channel, and constructing an earthen berm to direct the outlet discharge to the northeast towards a region proposed for Mesquite eradication and grassland restoration as shown on Figure 3. Tank maintenance and potential minor modification is under consideration by the ranch ownership, potential benefits exist if material excavated from the tank can be used as borrow for berm construction and channel fill.

Initial work will consist of clearing and grubbing the channel and footprint of the proposed berm, excavating of the existing berm, followed by overexcavating the soils beneath the proposed berm, preparation of the subgrade, and placement of engineered fill to the designed top grades and cross section. The following were assumed for the purposes of concept layout: 3' overexcavation depth, use of the native soil and local borrow for engineered fill, berm top width of 4', side slopes of 4H to 1V, maximum height of 3.0' (including 1' freeboard). Those assumptions will require refinement during engineering design.

The concept for the berm installation is presented on Figure 3 – Concept Berm Layout. Figures 4-7 provide additional details regarding the project details for this location.

Project: Legunita Tank– Outlet Modifications

In addition to installing the berm, low-tech erosion control structures such as media lunas will be placed in the new outflow area to facilitate water infiltration and decrease the chances of contributing to downstream headcut advancement.

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Project Timeline & Estimated Costs

Planning, Design/Engineering, & monitoring plan, permitting	Implementation/ Construction	Monitoring (post-implementation)	Maintenance (post-implementation)
<i>Activities: Survey, Engineering Design</i> <i>Duration: 4 months</i> <i>Estimated cost:</i> ☐ <\$10k ☒ \$10k - \$100k ☐ \$100k - \$500k ☐ \$500k - \$1 million ☐ >\$1 million	<i>Activities: Berm Construction</i> <i>Duration: 3 months</i> <i>Estimated cost:</i> ☐ < \$10k ☐ \$10k - \$100k ☒ \$100k - \$500k ☐ \$500k - \$1 million ☐ >\$1 million	<i>Activities: Inspect for damage; monitor headcuts with stakes and photographs</i> <i>Cycle: Annual and after each significant flow event.</i> <i>Estimated cycle cost:</i> ☐ < \$1,000 ☒ \$1 -10k ☐ \$10k - \$100k ☐ \$100k - \$500k	<i>Activities: Repair damage as needed</i> <i>Cycle: Annual or as needed</i> <i>Estimated cycle cost:</i> ☐ < \$1,000 ☒ \$1 -10k ☐ \$10k - \$100k ☐ \$100k - \$500k

Estimated Service Life

25 years

Potential Funding Sources

Natural Resources Conservation Service (NRCS)

U.S. Fish & Wildlife Service

AZGFD Habitat Partnership Committee grants

Required Permits

Pima County Regional Flood Control District (PCRFCDD) Floodplain Use Permit

U.S. Army Corps of Engineers Section 404 Permit

Project: Legunita Tank– Outlet Modifications

Figure 1 - Project Location Map

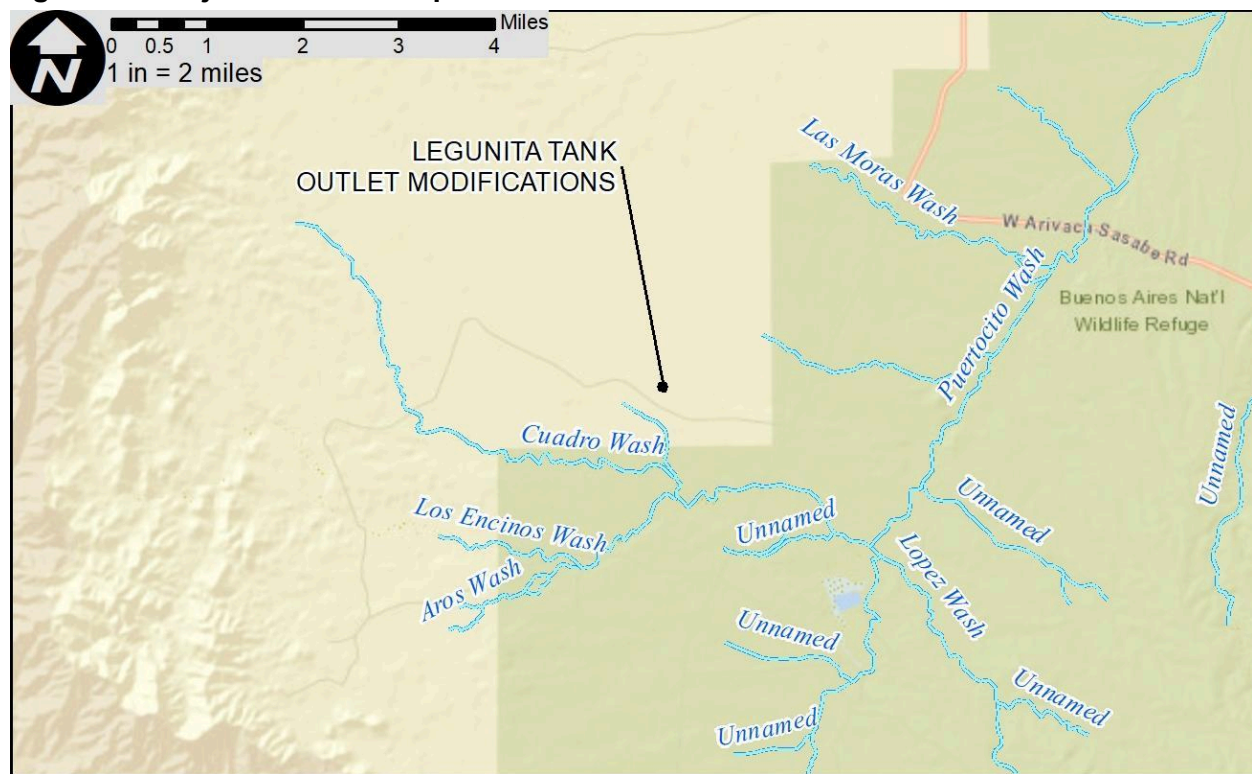


Figure 2 – Site Map

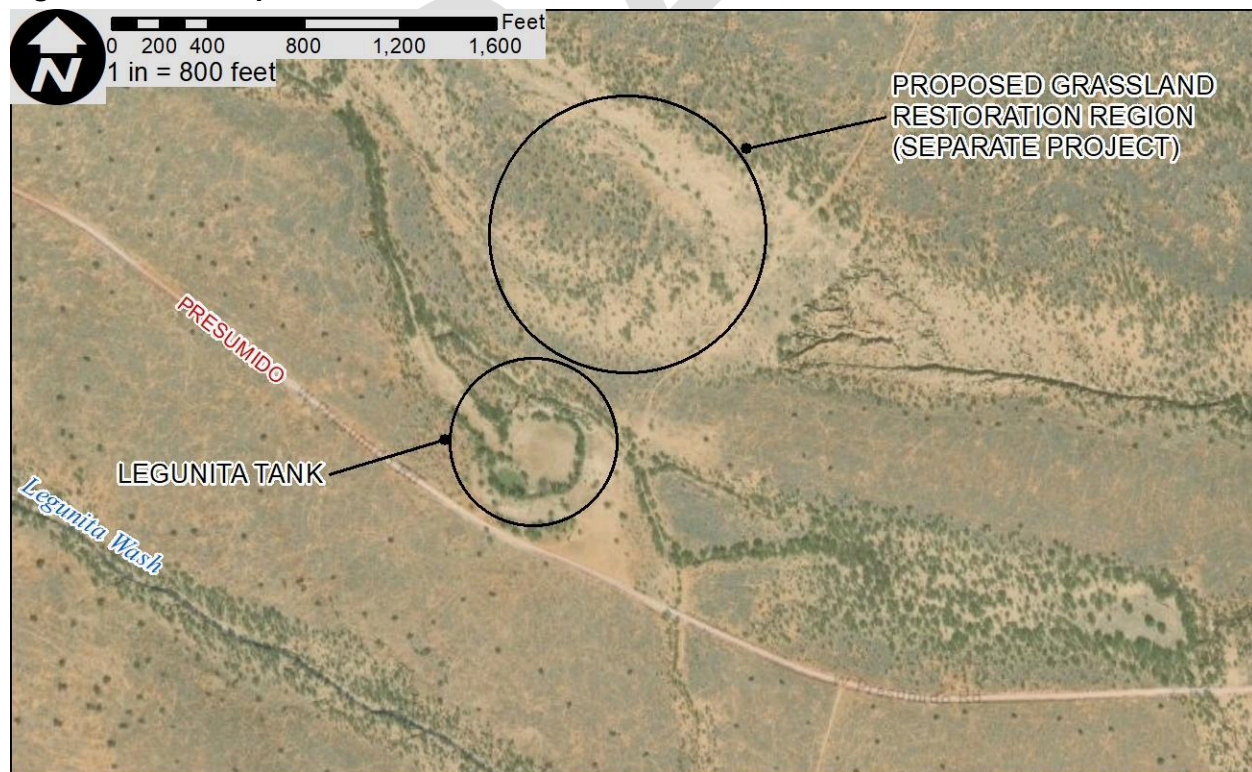


Figure 3 – Project Layout

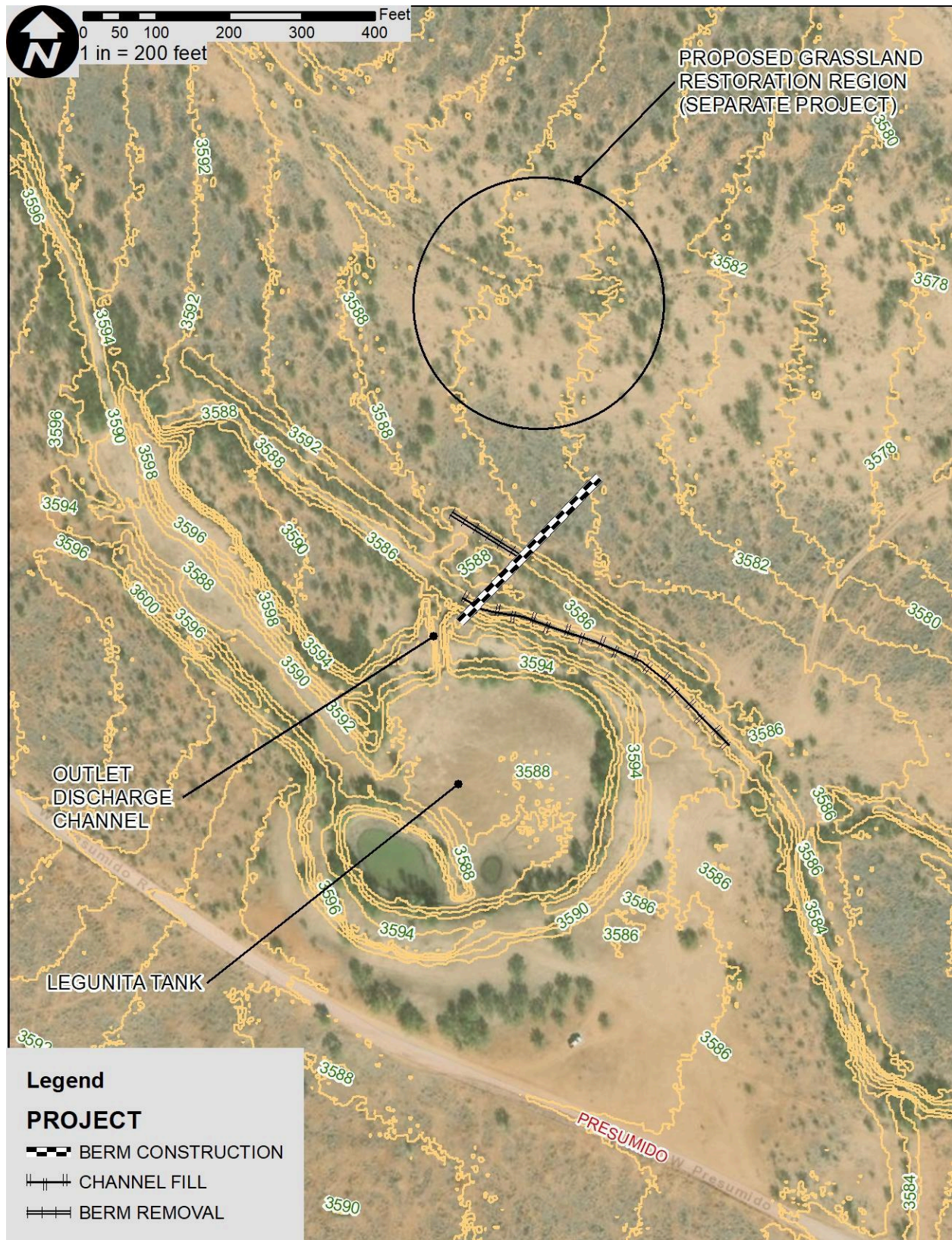
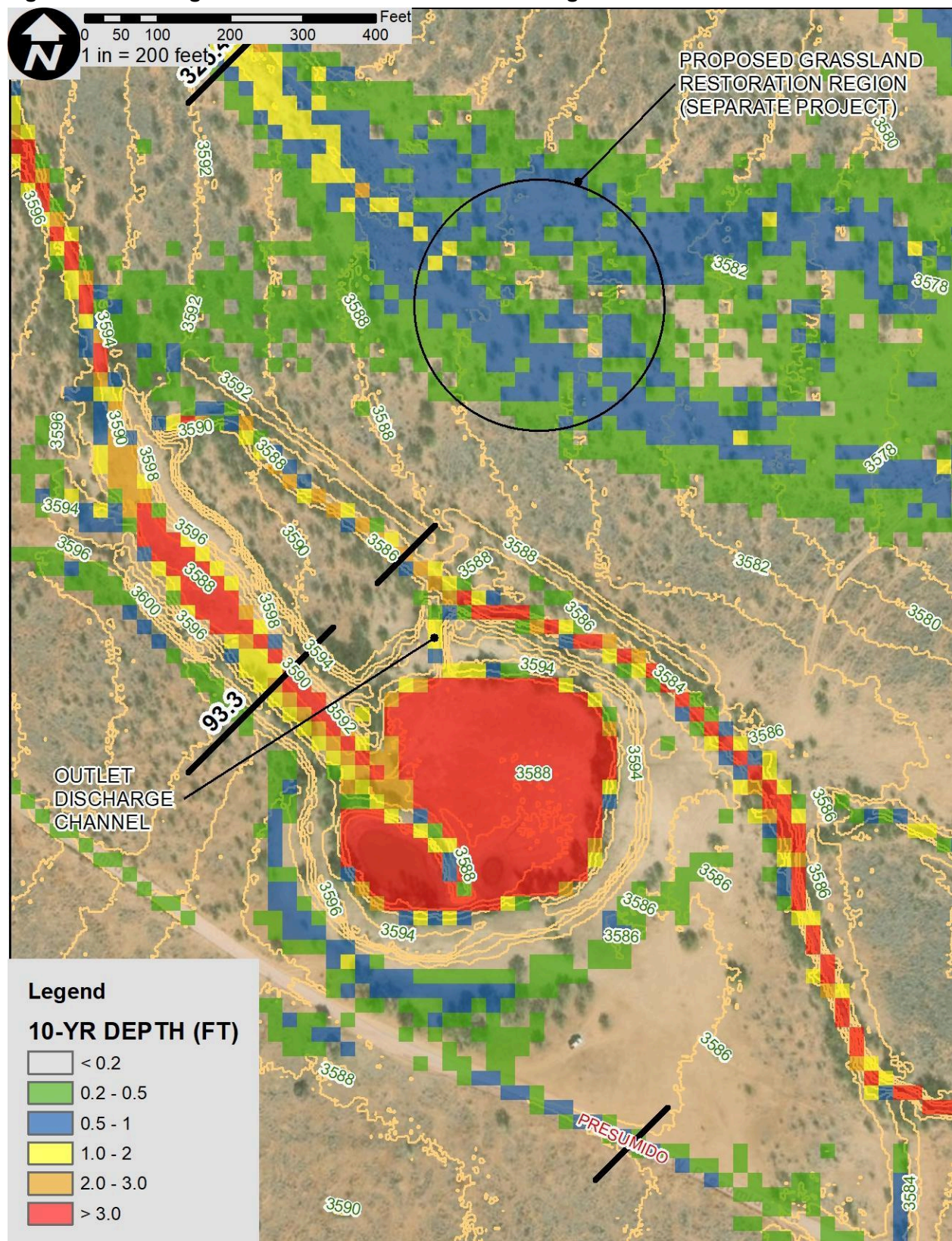


Figure 4 – Existing Conditions 10-Year Flood Modeling



The map displays the Presumido Wetland Complex with 10-year depth contours. A legend in the bottom left corner defines the depth ranges in feet: < 0.2 (white), 0.2 - 0.5 (light green), 0.5 - 1 (blue), 1.0 - 2 (yellow), 2.0 - 3.0 (orange), and > 3.0 (red). The map also shows project features: BERM CONSTRUCTION (black dashed line), CHANNEL FILL (black line with cross-ticks), and BERM REMOVAL (black line with parallel ticks). Key locations include the OUTLET DISCHARGE CHANNEL, PROPOSED GRASSLAND RESTORATION REGION (SEPARATE PROJECT), and the PRESUMIDO area. Elevation contours are labeled with values such as 3580, 3582, 3584, 3586, 3588, 3590, 3592, 3594, 3596, 3598, and 3600. Specific elevation points are marked with values like 59.55, 93.26, 211.69, 248.73, and 578.71. A scale bar at the top left indicates 0 to 400 feet, and a north arrow is present.

Figure 6 – Existing Conditions 100-Year Flood Modeling

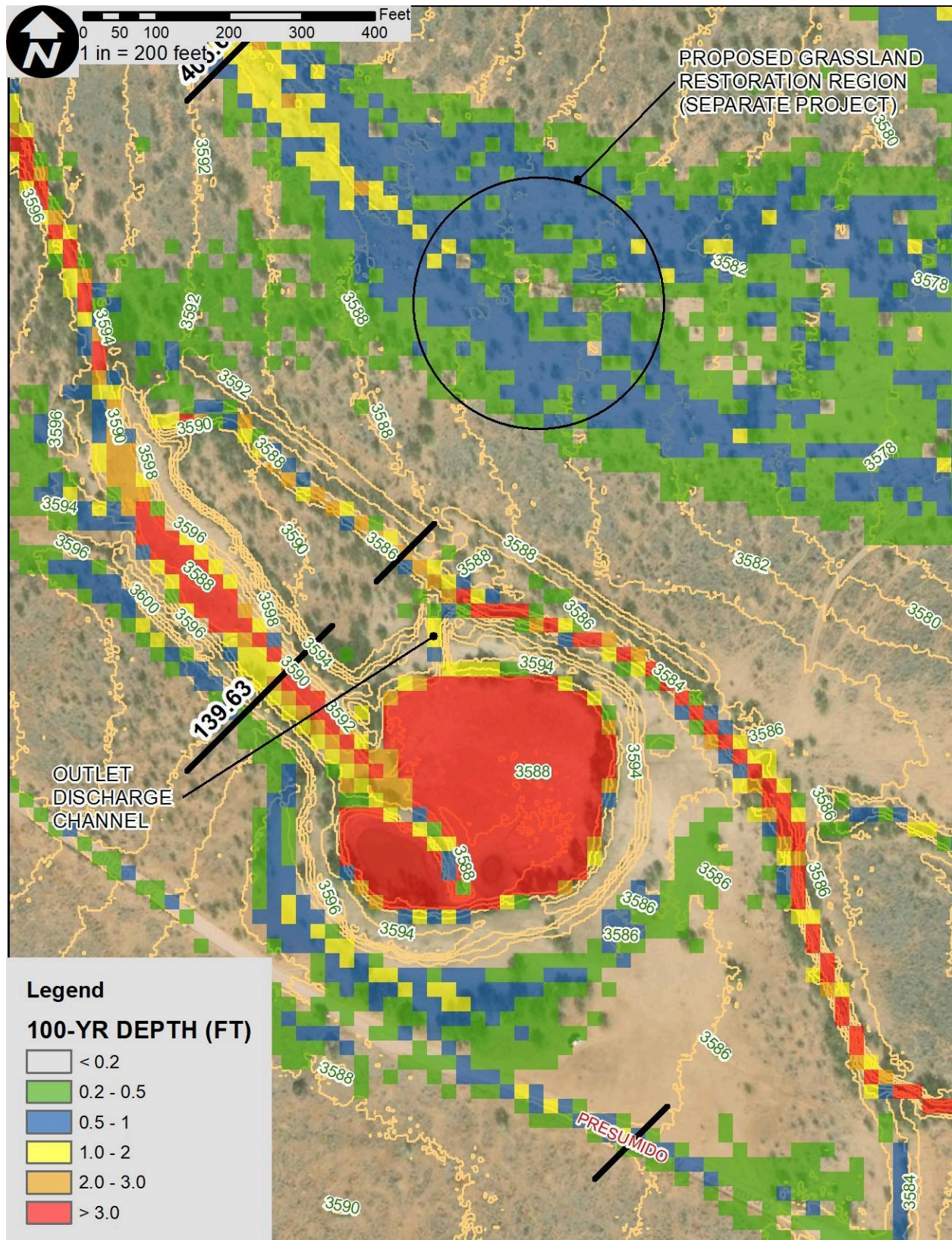


Figure 7 – Proposed Conditions 100-Year Flood Modeling

