



Little Bear Fire at Bonito Reservoir and Recovery

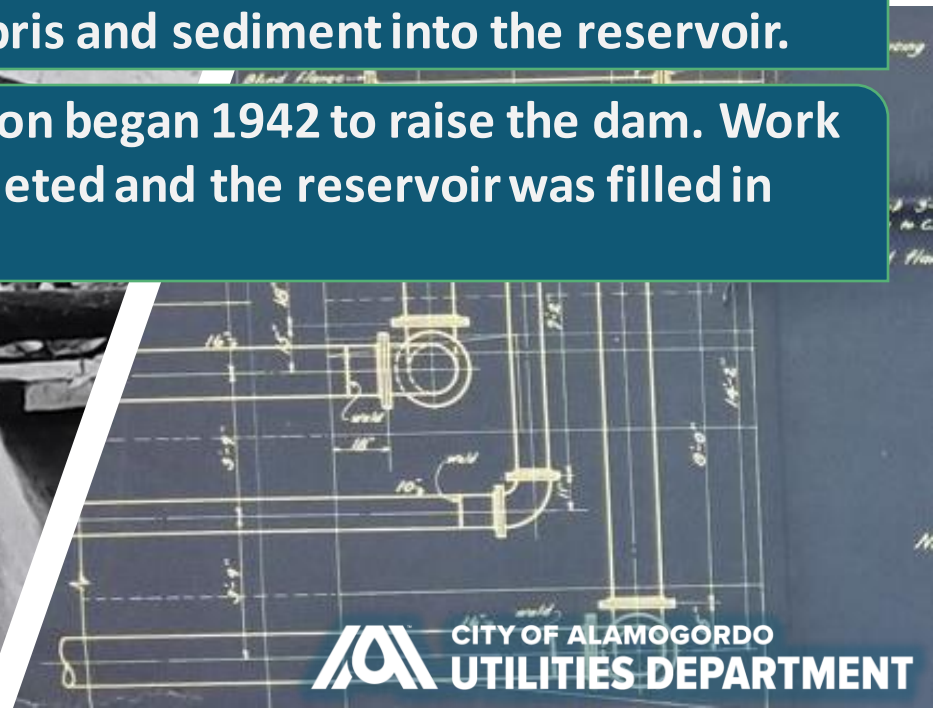
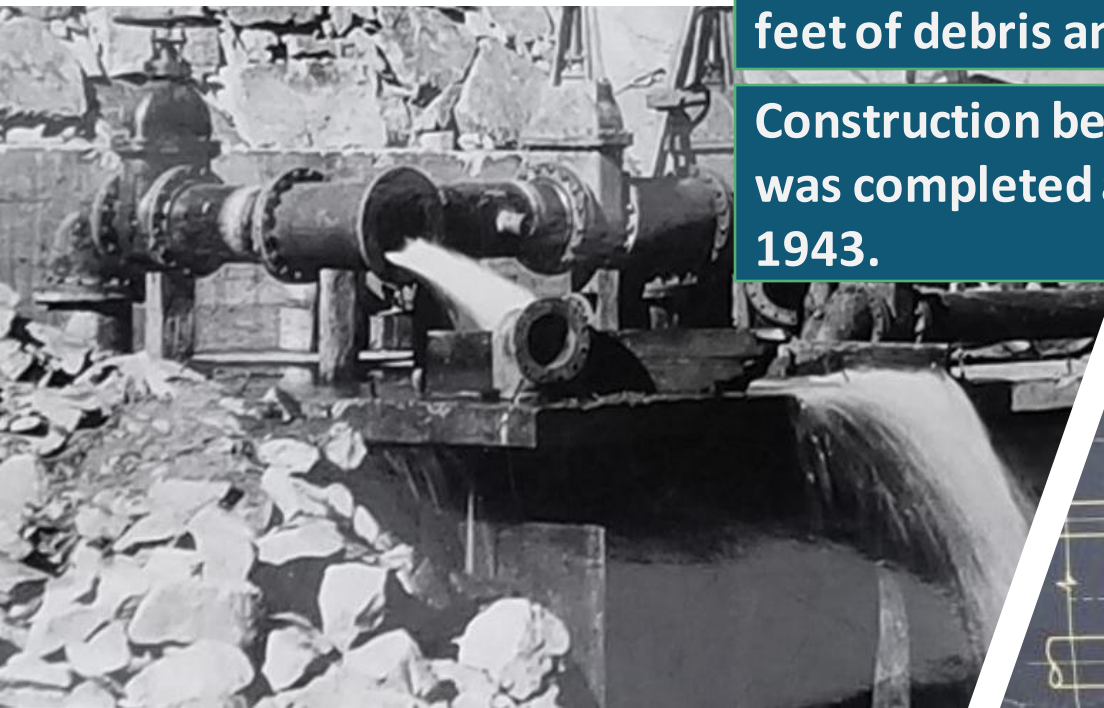
October 12, 2023



Bonito Reservoir began construction in 1929. The reservoir completed and filled in 1931

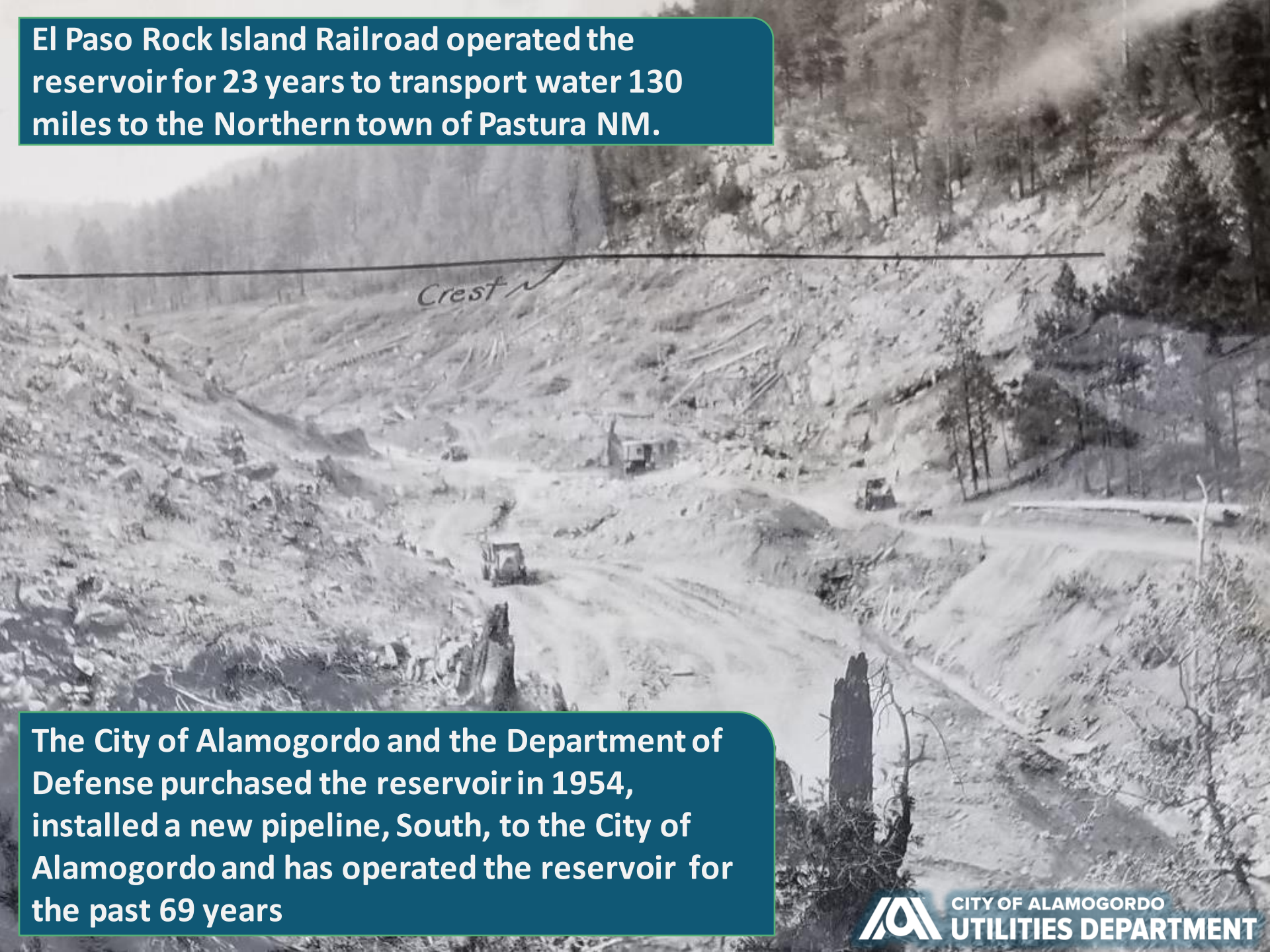
Major storm event in September 1941 resulted in a record flood in Bonito Canyon depositing 26 feet of debris and sediment into the reservoir.

Construction began 1942 to raise the dam. Work was completed and the reservoir was filled in 1943.



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El Paso Rock Island Railroad operated the reservoir for 23 years to transport water 130 miles to the Northern town of Pastura NM.



The City of Alamogordo and the Department of Defense purchased the reservoir in 1954, installed a new pipeline, South, to the City of Alamogordo and has operated the reservoir for the past 69 years



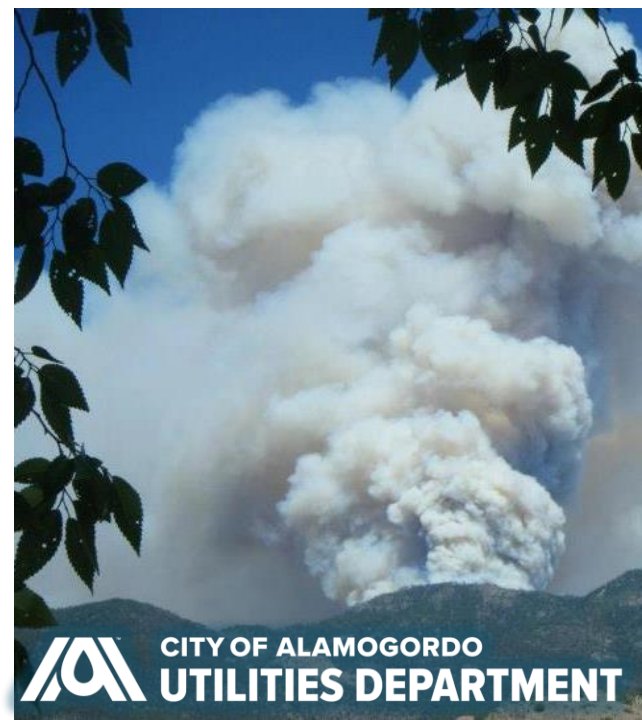
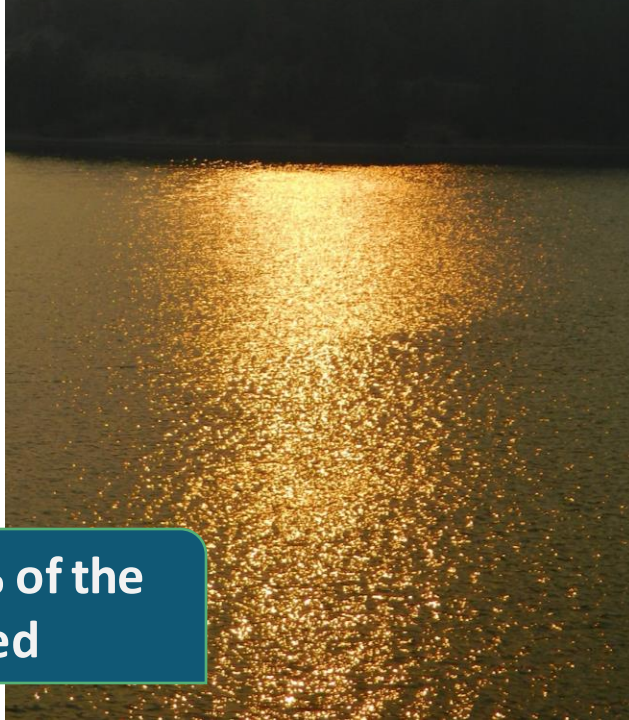
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June 2012 – Little Bear Fire



Little Bear fire burned 85% of the Bonito Reservoir water shed



Bonito Reservoir served as a water resource to help fight the Little Bear Fire



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June 22, 2012 – Major storm event #1

The storm created a massive debris flow pushing burned soil, ash, rocks and downed timber into the reservoir. The effects resulted in poor water quality and plugged the outlet works of the Dam.



This was the beginning of the monsoon season, so more storm events were imminent



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The City of Alamogordo responded by acquiring four 8" pumps to draw down the reservoir to ensure the capacity could handle another debris flow event.



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How will the City remove the debris
that was deposited into the lake?

Is there really a church?
How long will it take?

When will it rain?

How will the City pay for it?

Is there gold?

Will the water ever be usable?

When will the campground open?

How do we unplug the outlet works?




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How will the City supply water to the customers in the meantime?



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Excessive Water Wasting
- Enforcement
No additional outdoor
water features /
fountains
Monitoring watering
schedules via Aqua Hawk

Updated and Implemented Water Conservation Ordinance

Improved Capacity of Underground Sources

Re-Drilled Prather wells 1 and 2
Re-Drilled La Luz wells 2, 3, and 5
Developed Snake Tank well 5
Constructed 1 MGD Desalination
Facility

Improved Capacity of Surface Water Sources – Springs and Stream Diversions

Worked with State Forestry Division to thin and masticate Alamo Canyon spring area.
Additional thinning and masticating arounds Crockett and Upper Maruche Spring area (CFRP).
Implemented a comprehensive Springs Maintenance Program that include quarterly inspections on
all 68 springs, mowing and grounds maintenance.



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July 05, 2012 – Major storm event #2



This event resulted with additional debris and sediment being deposited into the Bonito Reservoir.



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How much debris and sediment
was deposited in Bonito
Reservoir?



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Initial estimate was 750,000 cu yd

Second estimate was 247,000 cu yd



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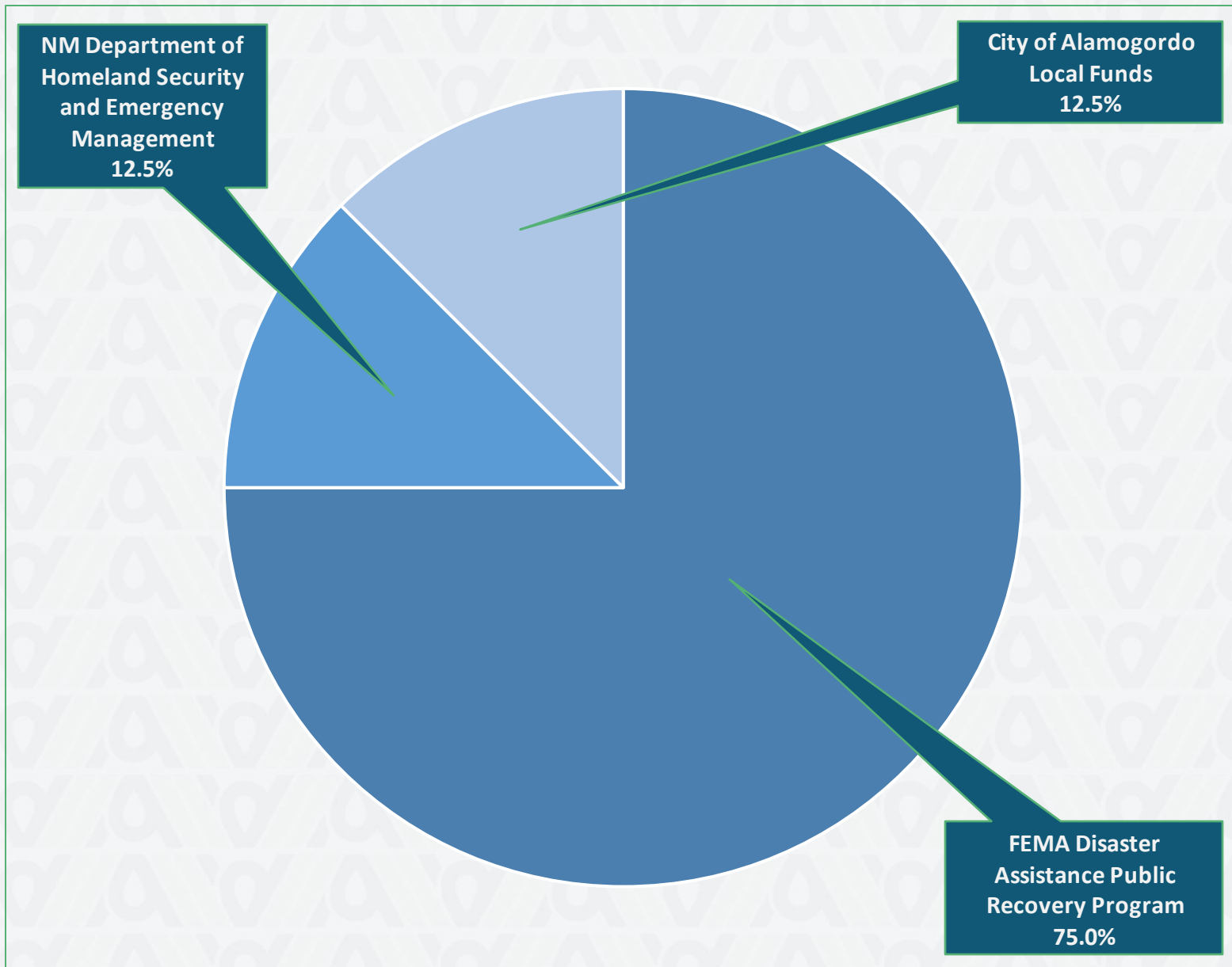
**Geotech report after dewatering Bonito
Reservoir estimated 539,000 to 661,000 cu yd**

**FEMA agreed to pay for the removal of
581,000 cu yd and soil testing to eliminate
concerns about hazardous waste**



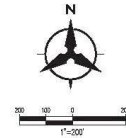
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Funding the Debris Removal



CONSTRUCTION NOTES

- 1 PROJECT ACCESS/HAUL ROUTE FROM NEW MEXICO STATE HIGHWAY 37 APPROXIMATELY 3 MILES. SEE DWG TC-01 FOR HAUL ROUTE TO DISPOSAL SITE APPROXIMATELY 25 MILES.
- 2 EXISTING GRAVEL PARKING LOT, CONTRACTOR STORAGE AND STAGING AREA. RETURN TO ORIGINAL CONDITION UPON COMPLETION. PROTECT NATURAL WETLAND AREA ON EAST EDGE OF OPEN SPACE AT ALL TIMES DURING CONSTRUCTION WITH K-RAIL OR OTHER BARRIER.
- 3 EXISTING LAKE MAINTENANCE ACCESS GATE AND DIRT RAMP. RECONSTRUCT TO FACILITATE DEBRIS REMOVAL FOR THE DURATION OF THE PROJECT. ALL LAKE DEBRIS REMOVAL WILL TAKE PLACE THROUGH THIS LOCATION. SEE DWGS. C-28 AND C-29 FOR ADDITIONAL INFORMATION.
- 4 LAKE DEBRIS REMOVAL AREAS A, B, AND C. REFER TO SPEC 01014 - WORK SEQUENCE, DWGS. C-07 THROUGH C-25 AND SPEC 2220.
- 5 CONSTRUCT NEW SHEET PILE COFFER DAM FOR PERENNIAL CREEK FLOW DIVERSION. SEE DWGS. S-01 THROUGH S-04 AND SPEC 05125.
- 6 CONTRACTOR ACCESS ROUTE FOR COFFER DAM AND OUTFALL PIPELINE CONSTRUCTION ONLY.
- 7 CONSTRUCT 48" HDPE PIPE OUTFALL FOR PERENNIAL FLOW DIVERSION TO EXISTING SPILLWAY. SEE DWGS. C-01 THROUGH C-05 AND SPEC 02724.
- 8 CONSTRUCT IMPROVEMENTS TO DAM DISCHARGE PIPING AND VALVING SYSTEMS. SEE DWGS. S-08 AND M-01 THROUGH M-06 AND SPEC 15100.
- 9 CONSTRUCT IMPROVEMENTS TO EXISTING INTAKE TOWER AND NEW PEDESTRIAN WALKWAY. SEE DWGS. S-09 THROUGH S-16 AND DIV 3, 5, 15.
- 10 CONSTRUCT NEW SEDIMENTATION STRUCTURE UPON COMPLETION OF ALL DEBRIS REMOVAL. SEE DWGS. C-26 THROUGH C-32 AND SPEC 02632.

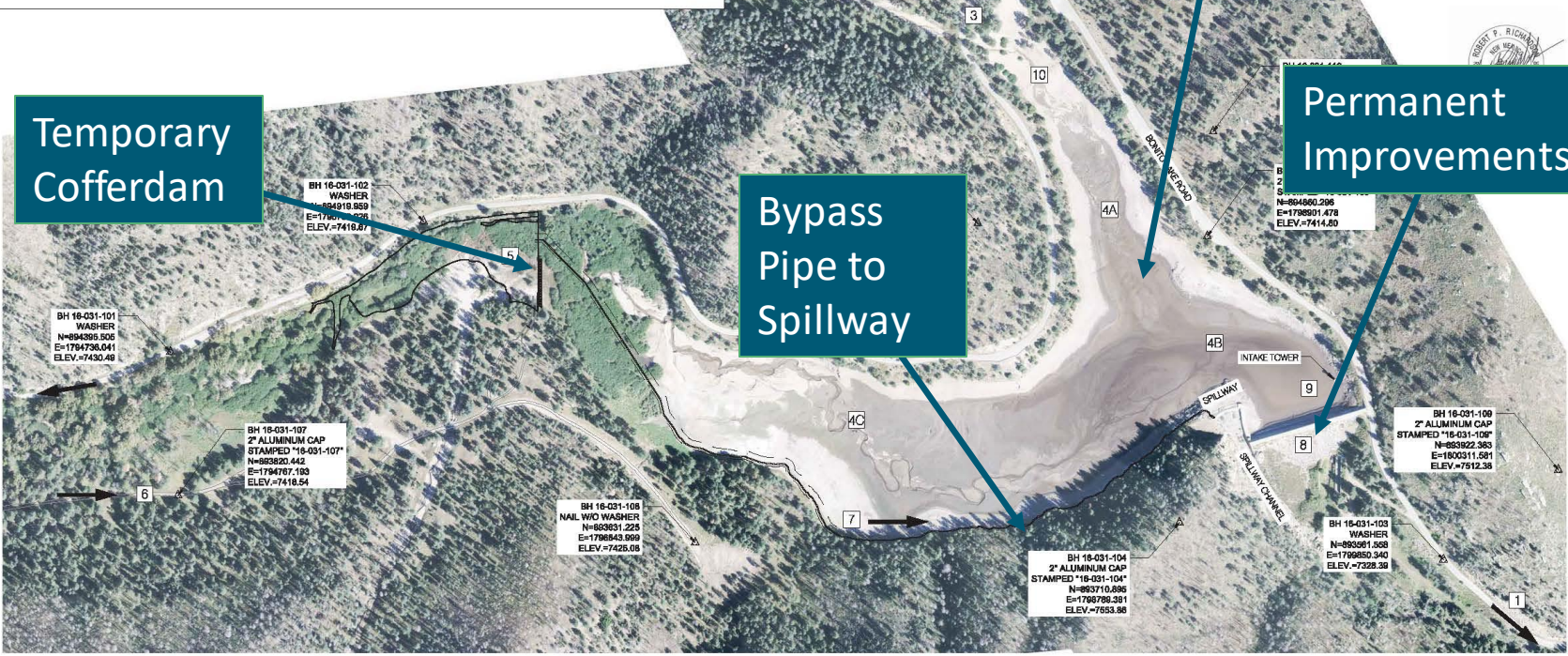


Temporary Cofferdam

Bypass Pipe to Spillway

Remove Sediment

Permanent Improvements



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					DESIGNED BY: <u>RPR</u>	 9000 Latham Boulevard, N.E. Suite 200 Albuquerque, NM 87110 Tel: (505) 240-3200	 www.bhinc.com 800.877.5332	CITY OF ALAMOGORDO	BONITO LAKE RESTORATION	PROJECT SITE PLAN	PROJECT NO: 20160051
					DRAWN BY: <u>LJM</u>						FILE NAME:
					CHECKED BY: <u>DP</u>						DWG. NO:
					GROSS CHECK BY:						G-04
REV	NO.	DATE	DRWN	CHKD	REMARKS	APPROVED BY: <u>RPR</u>					
						DATE: <u>JUNE 2017</u>					

Project Design

Bonito Creek bypass and cofferdam



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The debris was disposed
of in the Copper
Mountain quarry

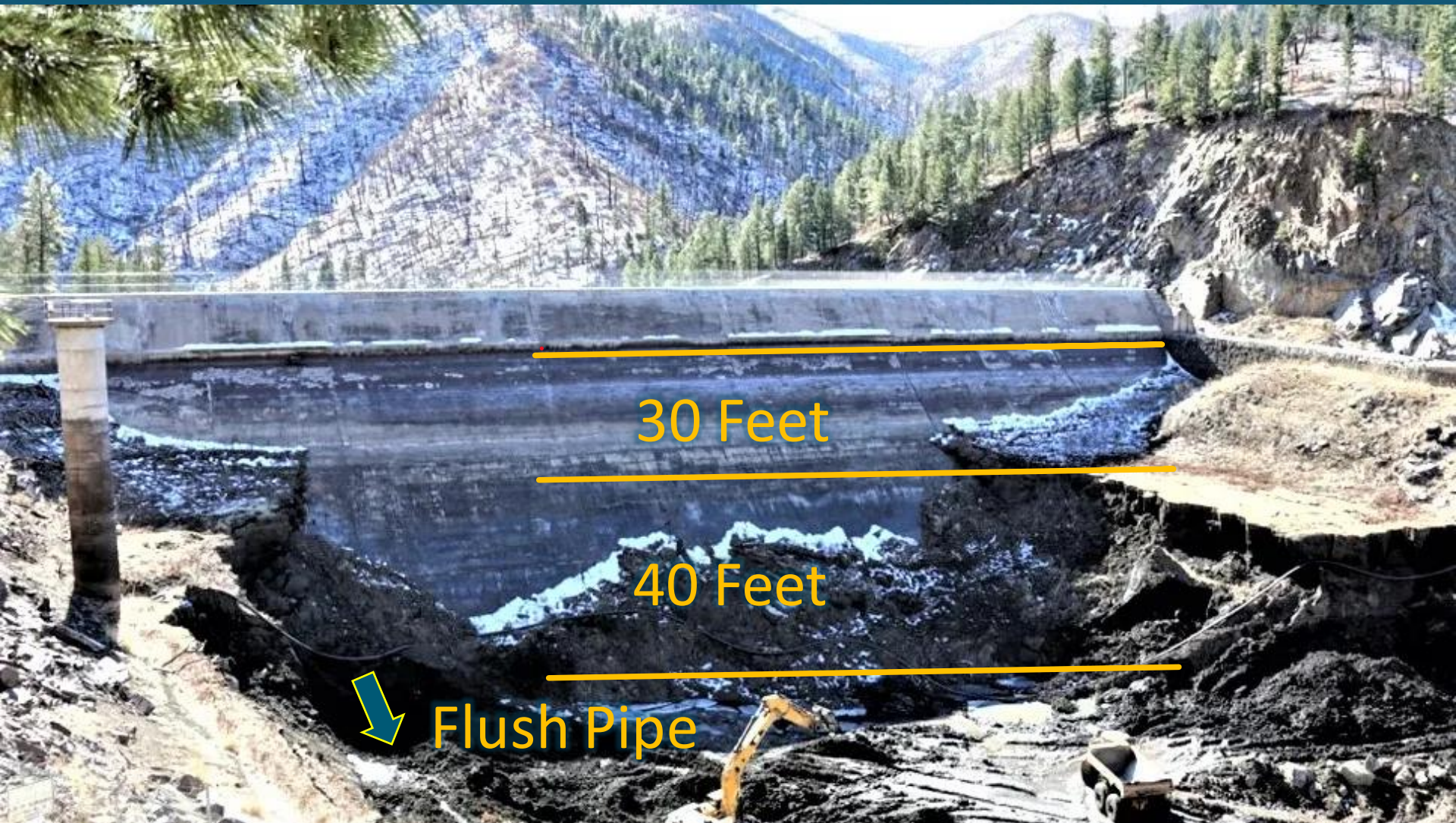


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Debris and Sediment Removal



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Bonito Reservoir has not been emptied since 1943

Should additional improvements be made while it is empty?

What type of improvements should be made while it is empty?

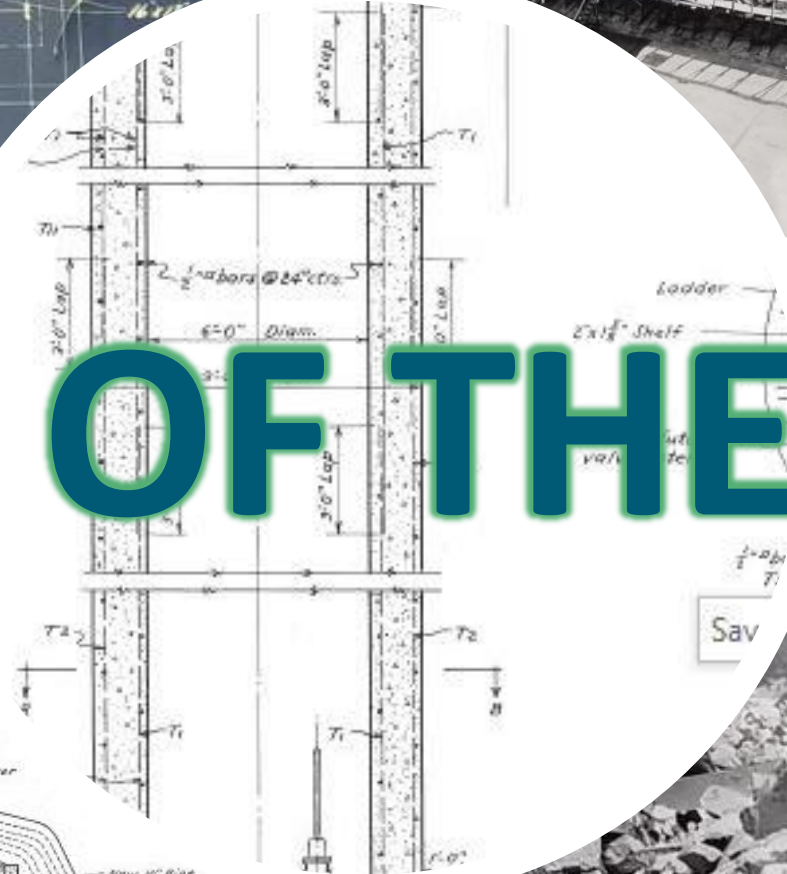
Can we fund the necessary improvements?

How can we improve overall dam security?

How can we improve operator safety?



ALL OF THEM!





Replaced and extended catwalk located on the dam valve gallery house



Replaced all valves and piping inside the dam valve gallery



Replaced the existing valve on the intake structure and added three additional intake ports at various levels for improved water quality. Installed a catwalk for operator and maintenance access, thus saving time and improving safety



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How long
did it
take?

June 2012 - Little Bear Fire

June and July 2012 - Major Storm Events

April 2013 - Preliminary Debris Reports Reviewed

November 2014 - Engineering Team selected

September 2017 - Debris removal project awarded

June 2018 - Debris removal started

April 2021 - Debris removal completed

September 2021 - Permanent Improvements construction started

October 2022 - Permanent Improvements construction completed

October 2022 - New EAP approved

Currently - Dam Safety Bureau reviewing construction documents

Project Statistics

Debris Removal Project Cost - \$22,294,512.00

Federal - \$16,670,966.00

State - \$2,811,773.00

Alamogordo - 2,811,773.00

Permanent Improvements Project Cost - \$4,169,223.00

OSE-DSB Grant - \$900,000.00

Alamogordo - 1,139,223.00

Drinking Water State Revolving Fund - \$2,130,000.00

Debris Removed - 571,000 cu yds

Debris truckloads hauled - 43,824

Diesel fuel used - 375,232 gallons

Man-hours worked - 111,855

Lost time accidents - 0

