

## **Status Update**

### **Remediation of Unstable Brine Cavern in Carlsbad, New Mexico**

by Energy Minerals & Natural Resources Department (EMNRD)  
to Transportation Infrastructure Revenue Subcommittee

October 16, 2019

# What This Project Is Attempting To Avoid

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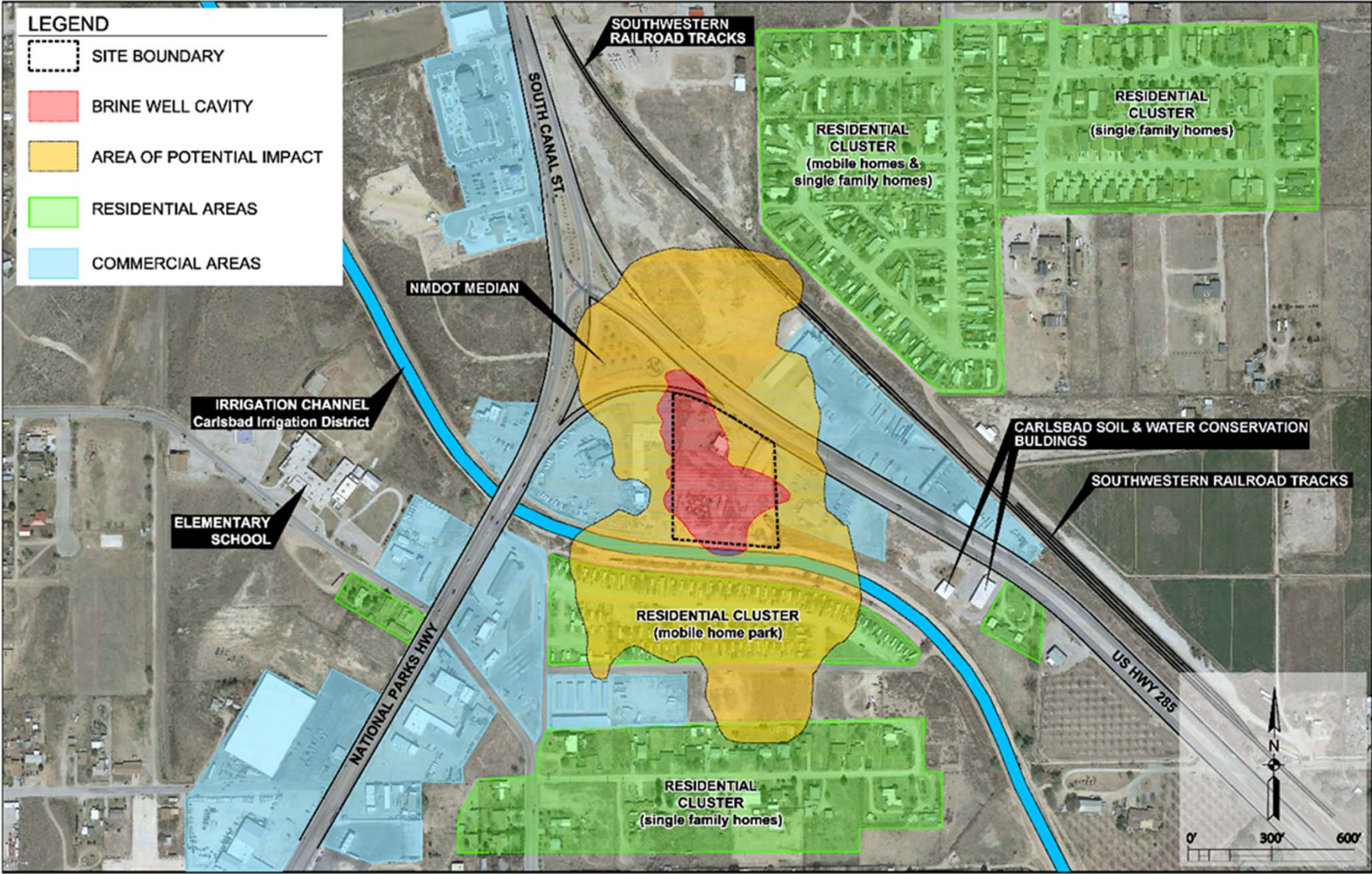


Jim's Water Service – July 2008

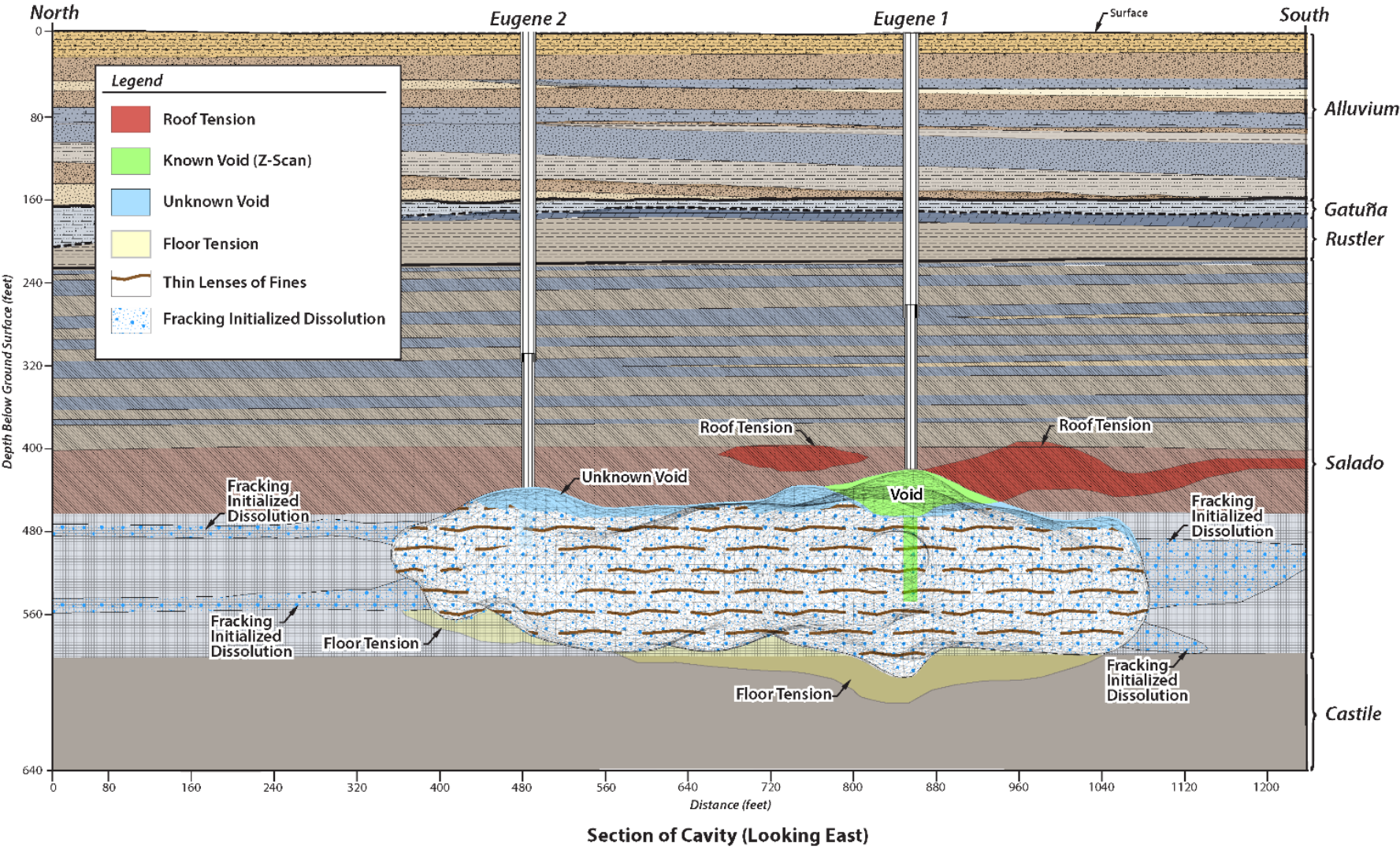
Loco Hills Disposal – November 2008



# I&W Brine Cavern in Carlsbad



# I&W Brine Cavern in Carlsbad



# Remedy

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- Install a series of wells to sequentially pressure inject grout in two phases while simultaneously extracting brine
  - Maintain cavity pressure
  - Balance volume of brine removed with volume of grout injected
  - Injection Phase 1 - Establish a subsurface cap using high mobility grout materials to support the existing weakened cavity roof
  - Injection Phase 2 – Consolidate the existing partially dissolved cavern rubble using low mobility grout to structurally support the new grout cap

# Grouting Well Sequence



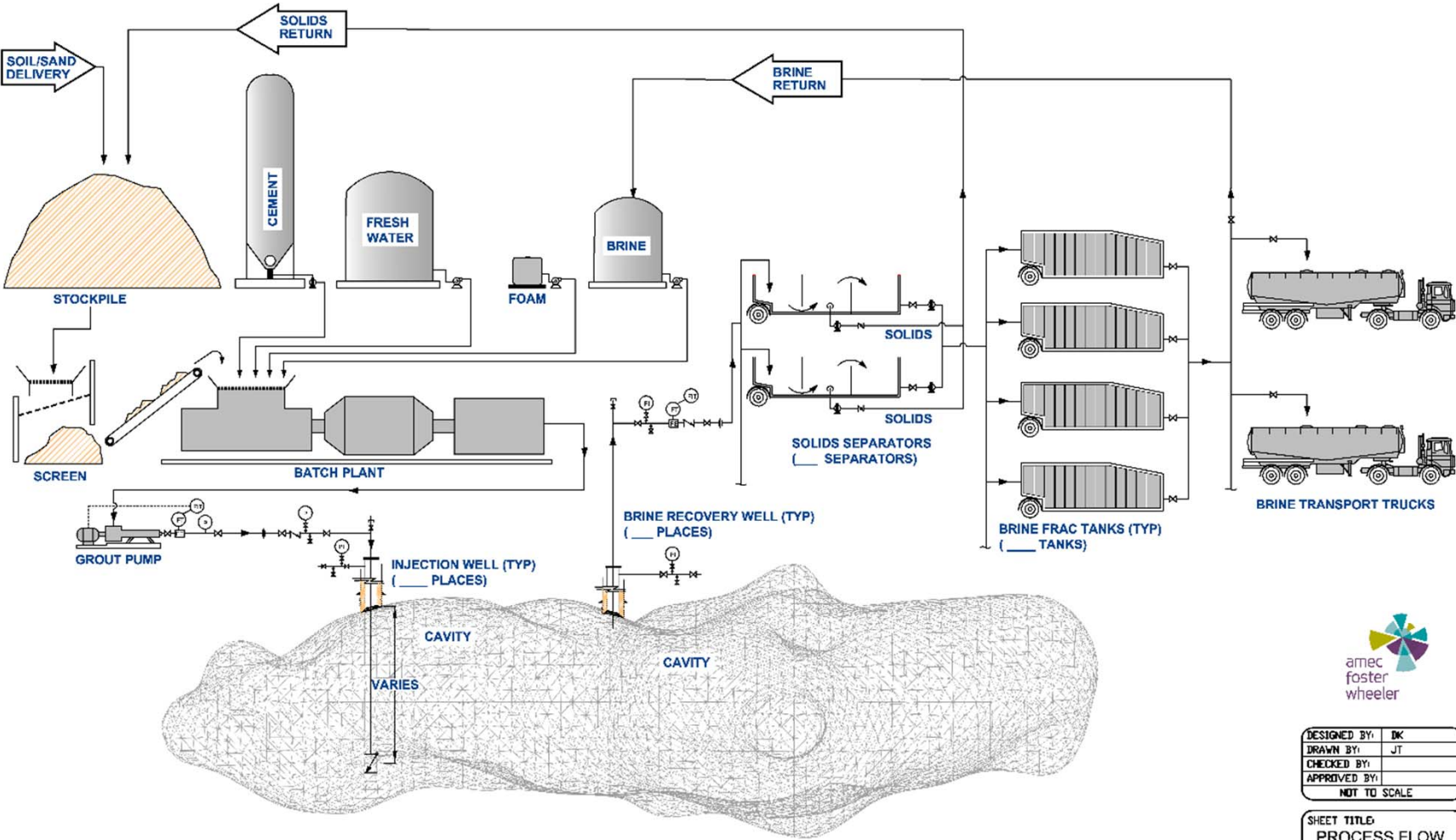
- LEGEND**
- PHASE 1 WELLS
  - PHASE 2 WELLS

GROUT SEQUENCING	
PHASE	GROUT/BRINE RECOVERY WELL
1	1 (GW 9)
	2 (GW 6)
	3 (GW 10)
	4 (GW 12)
	5 (GW 11)
	6 (GW 3)
	7 (GW 2)
	8 (GW 1)
2	9 (GW 14)
	10 (GW 15)
	11 (GW 16)
	12 (GW 13)
	13 (GW 8)
	14 (GW 7)
	15 (GW 5)
	16 (GW 4)

**GROUT WELL DRILLING PLAN & GROUTING SEQUENCE**

**16 WELLS, 2 PHASES  
125-FT SPACING**

# Cavity Filling Process



DESIGNED BY:	DK
DRAWN BY:	JT
CHECKED BY:	
APPROVED BY:	
NOT TO SCALE	

SHEET TITLE:  
 PROCESS FLOW  
 DIAGRAM  
 I&W Brine Cavity

# Risk Management

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- Keep public and workers safe
- Close monitoring during remedy implementation
  - Borehole Tilt Meters (10 new, 14 total)
  - Microseismic Arrays (5 new, 9 total)
  - Horizontal In-Place Inclinator Arrays (2 new)
  - Constant feedback for advanced warning of cavern failure
- Post remedy monitoring
  - 2 years of post-injection monitoring to confirm success



# Project Status

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Remediation Design Finalized

All Access Agreements Finalized

Traffic Modifications Constructed Implemented

On-Site Buildings Demolished and Removed

Drill Site Grading for Stormwater Control Completed

Utility Upgrade - 90% Complete

Monitoring System Upgrade - 95% Complete

Perimeter Fencing - 80% Installed

Sept. 30 – Drilling Began (2 rigs operating 24/7)

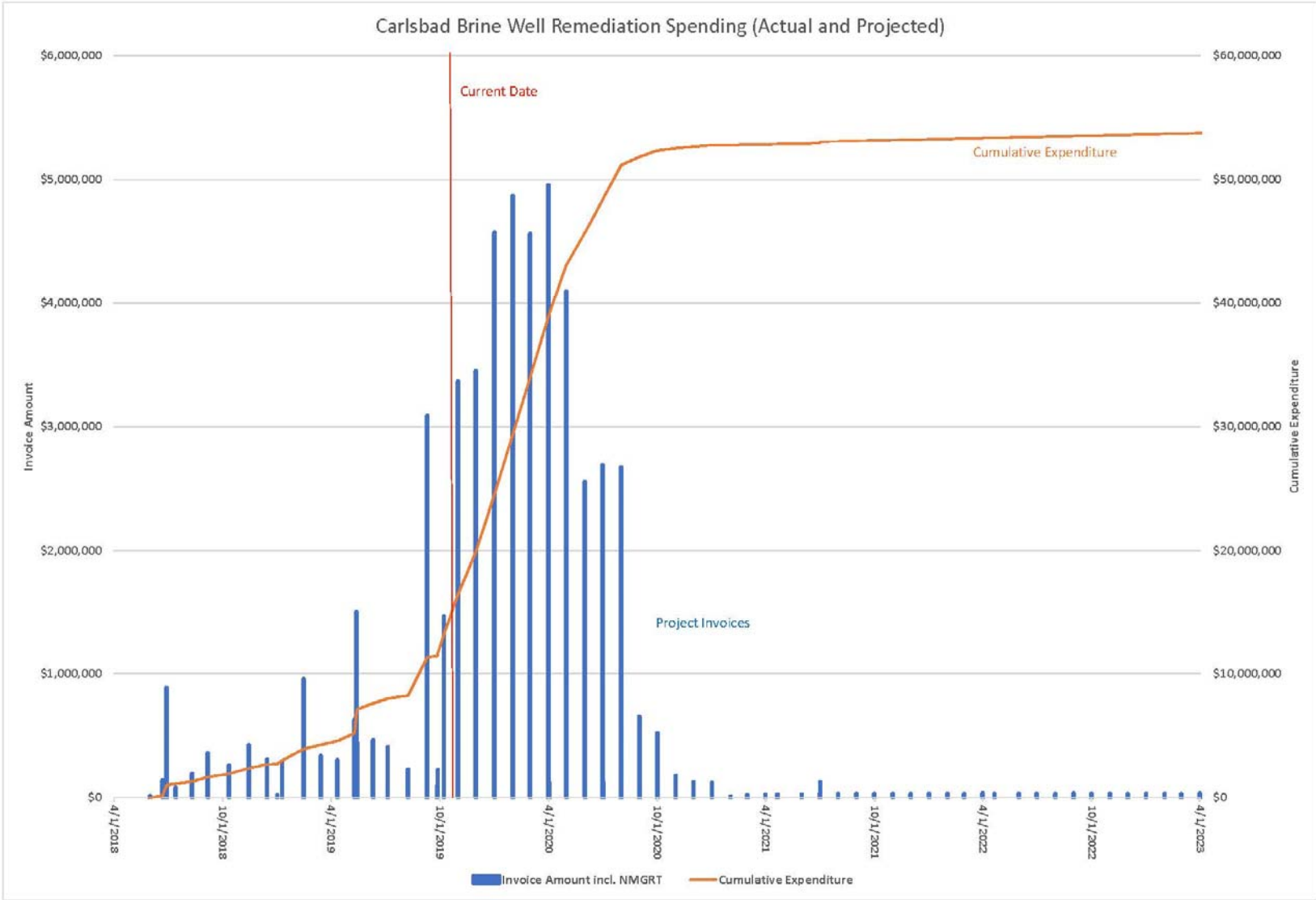
Nov. 2019 to Aug. 2020 - Grout Injection

# Project Funding & Expenditures

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- Total Funding Secured to Date - \$45,498,800
  - \$4,020,000 - City of Carlsbad
    - (phased over 3 years: FYs 19, 20, & 21 )
  - \$4,020,000 - Eddy County
    - (phased over 3 years: FYs 19, 20, & 21)
  - \$30,000,000 - NMDoT
    - (phased over 3 years: FYs 19, 20, & 21)
  - \$2,000,000 - NM Environment Dept
    - (phased over 2 years: FYs 18 & 19)
  - \$3,500,000 - General Fund (FY 19)
  - \$1,958,800 - Bonds
- Expenditures to Date - \$13,128,777.56

# Project Expenditure Timeline



# Current Budget Projection

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FEL2 Cost Estimate	43,985,000.00
FEL3 Cost Estimate (includes 10% contingency)	\$47,928,706.00
NMGRT (7.875%)	3,774,385.60
Property Access	2,289,514.75
EMNRD Partial Overhead (3 years)	375,000.00
<u>Total</u>	<u>\$54,367,606.35</u>
<u>Funding to Date</u>	<u>45,498,800.00</u>
Currently Anticipated Budget Shortfall	(\$8,909,606.35)

# Questions

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# Thank You

