



# Pillar Recovery at Platosa Mine

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EXCELLON

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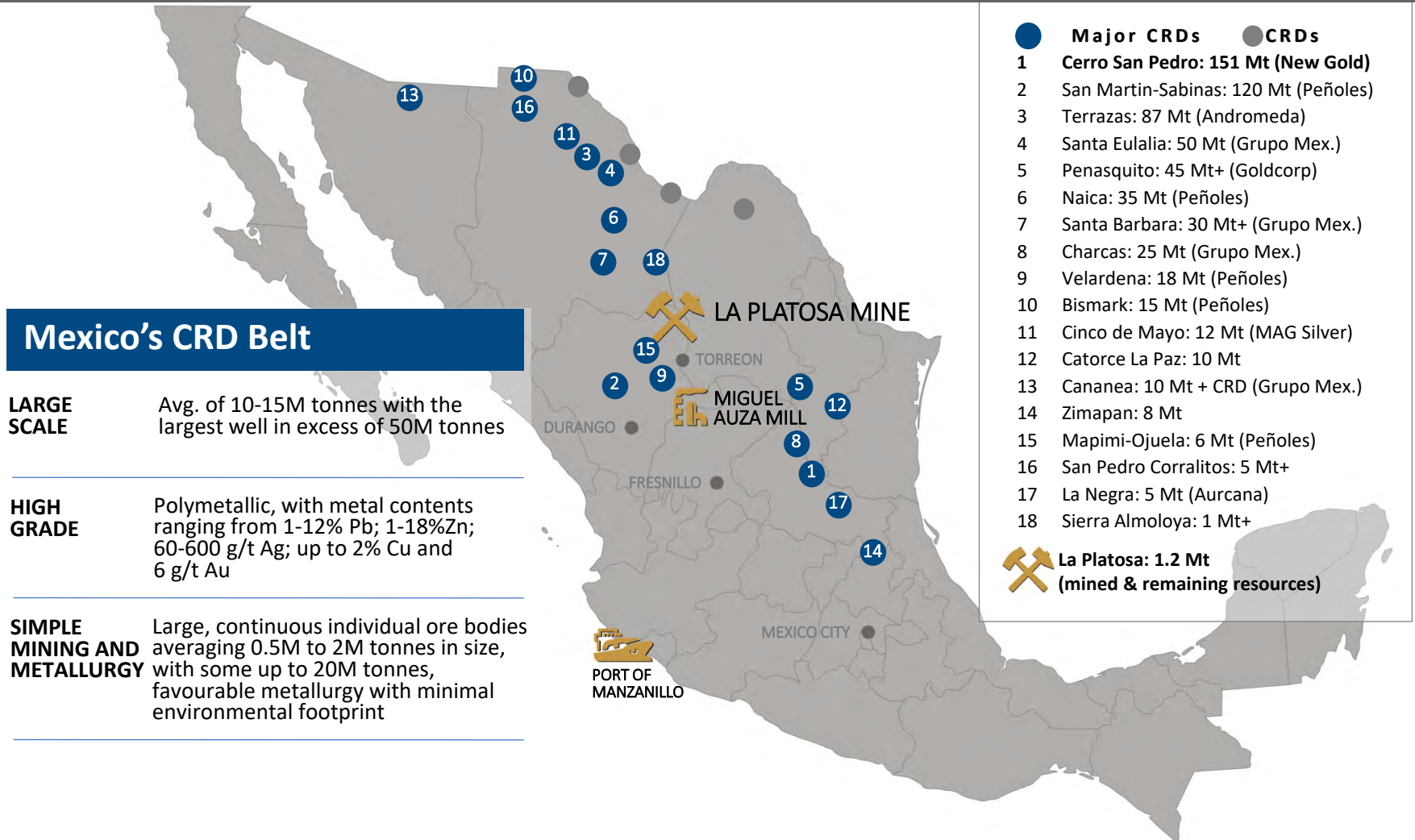
The terms “Measured”, “Indicated” and “Inferred” Mineral Resources used or reference in this document are defined in accordance with Canadian National Instrument 43-101 – Standards of Disclosure for Mineral Projects (“NI 43-101”) under the guidelines set out in the Canadian Institute of Mining, Metallurgy and Petroleum (the “CIM”) Standards on Mineral Resources and Mineral Reserves. The CIM standards differ significantly from standards in the United States. United States investors are advised that while such terms are recognized and required by Canadian regulations, the United States Securities and Exchange Commission does not recognize them. “Inferred Mineral Resources” have a great amount of uncertainty as to their existence, and as to their economic and legal feasibility. It cannot be assumed that all or any part of an Inferred Mineral Resource will ever be upgraded to a higher category or that Mineral Resources will ever be upgraded to Mineral Reserves. Under Canadian rules, estimates of Inferred Mineral Resources may not form the basis of feasibility or other economic studies other than Preliminary Economic Assessments. United States investors are cautioned not to assume that all or any part of Indicated Mineral Resources will ever be converted into Mineral Reserves. United States investors are also cautioned not to assume that all or any part of an Inferred Mineral Resource exists or is economically or legally mineable, or that an Indicated Mineral Resource is economically or legally mineable.

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# World Class Silver Prospects

## Platosa: +10 years of the highest grade silver production in Mexico







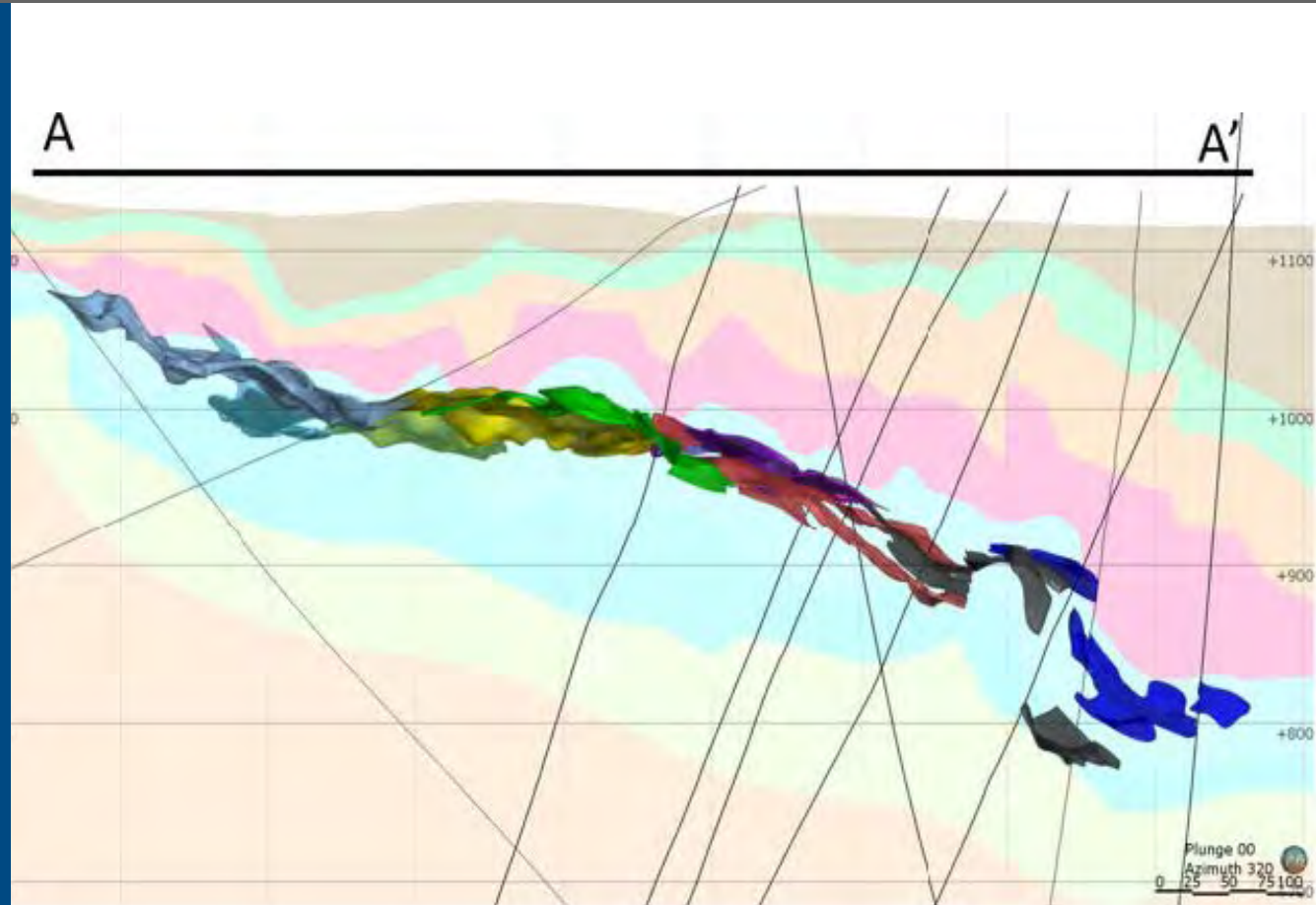
# Geology

## Structurally controlled mantos hosted in limestone

Underground silver-lead-zinc mine, began production in 2005

Previously constrained by water issues. Currently ramping up production to 250 tpd

Transitioned from room and pillar mining to cut and fill mining in 2018



# Opportunity

## Significant resource left in historical pillars

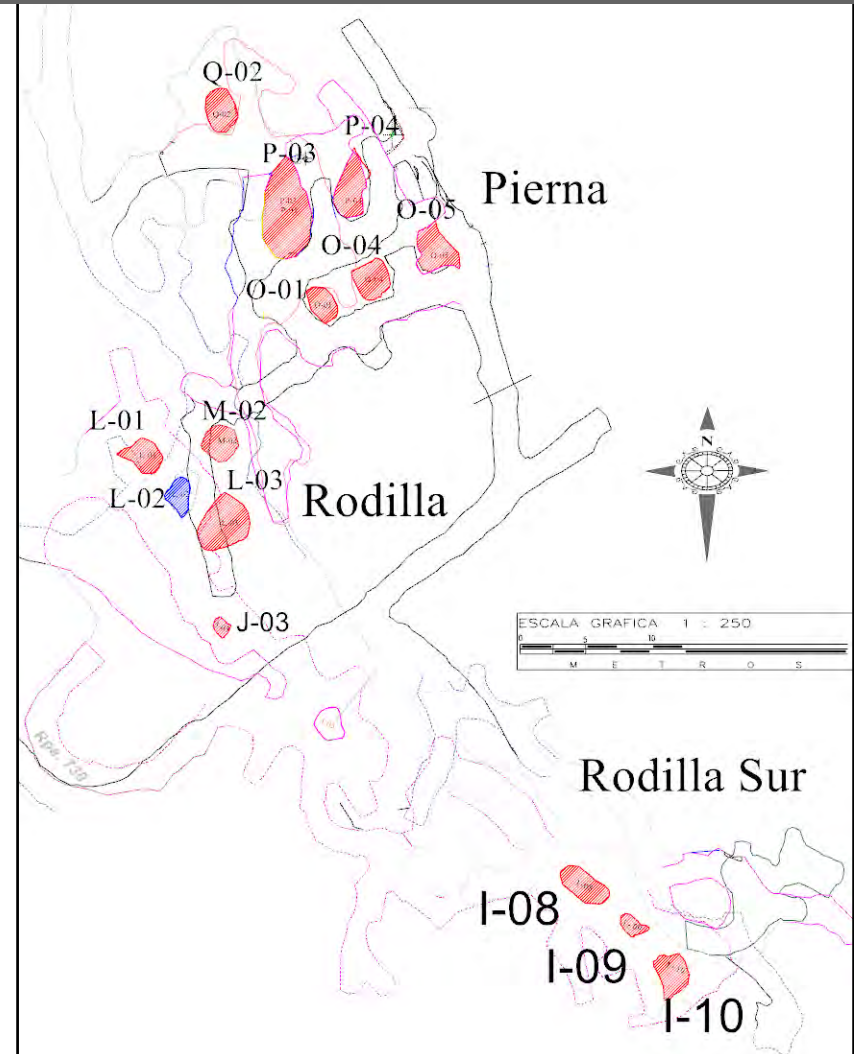


- Room and Pillar method achieved 80-85% recovery of resource
- Objective is to recover valuable mineralization left behind during room and pillar mining
- Estimated 25,500 tonnes in 5 mantos at ~615 g/t Ag, 6.7% Pb, 8% Zn
- Necessary to rethink previous approach to recovery

# Opportunity

## Recovery commencing in most recently mined areas

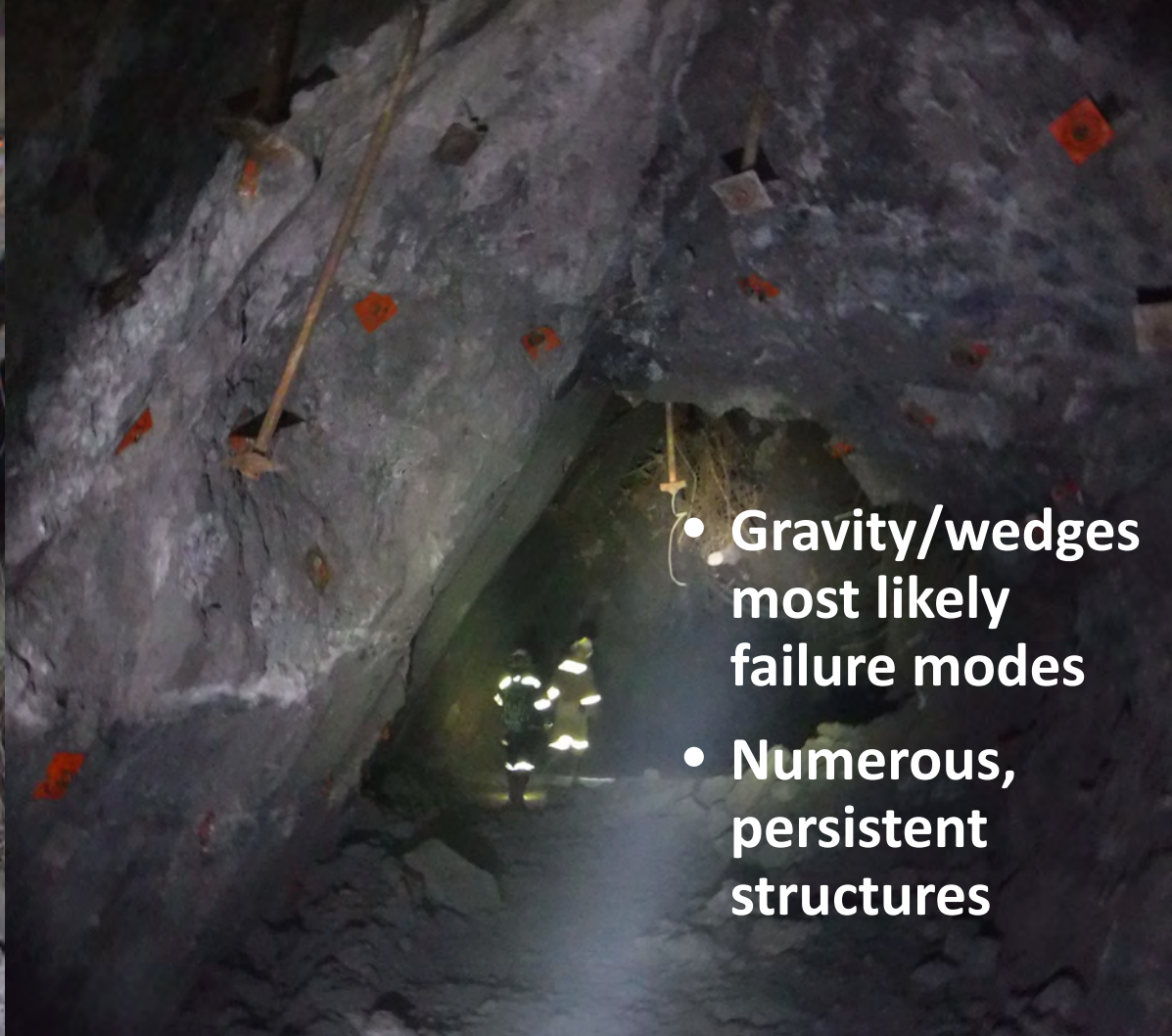
- 14 pillars in Rodilla and Pierna identified for extraction
- Introduced cable bolts and remote scoop at Platosa
- Started UCS testing of core





# Geotechnical Considerations

Shallow mining conditions resulting in low stress regime



- Gravity/wedges most likely failure modes
- Numerous, persistent structures

# Geotechnical Considerations

## Historical grouting



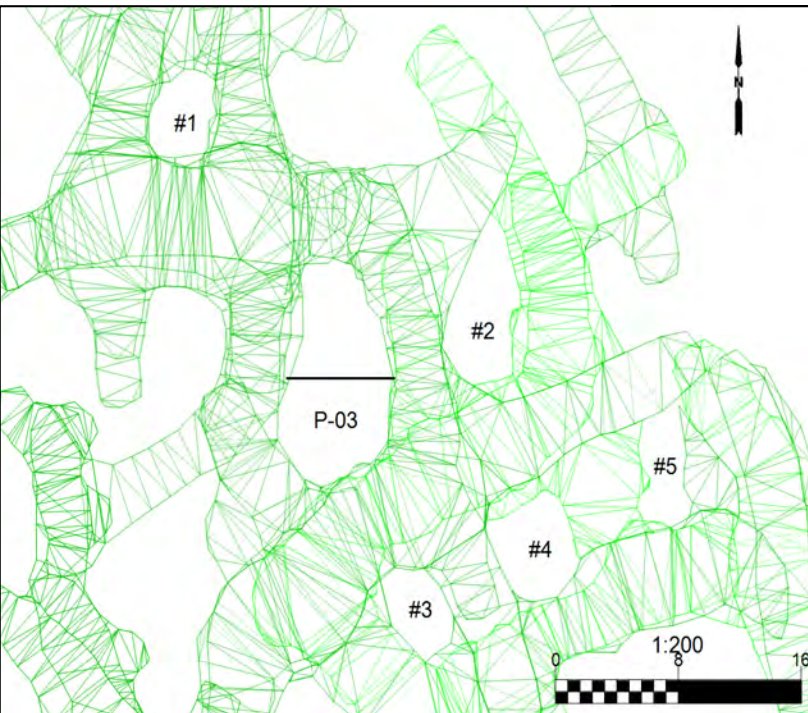
- Improved rockmass due to grouting
- GSI ~50-70 (fair-good)
- Rock Strength
  - UCS: 50-60 MPa
  - Tensile: 2.0-2.5 MPa



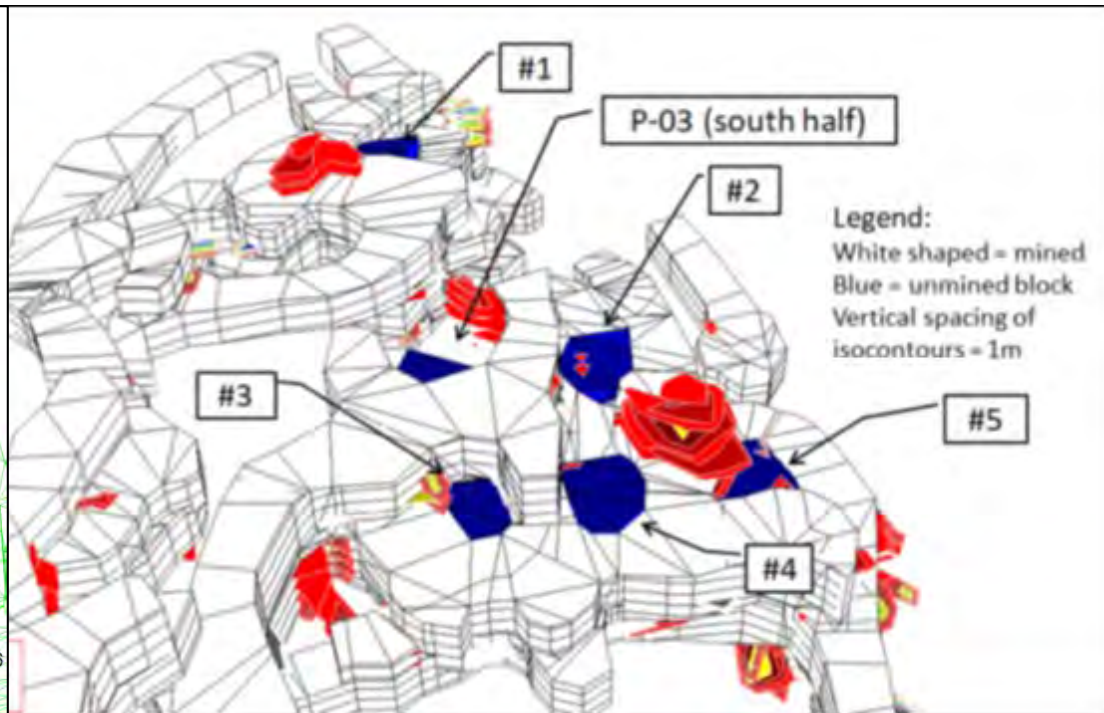
# Numerical Modeling – Map3D

## Used to predict changes in loading

Pierna plan view



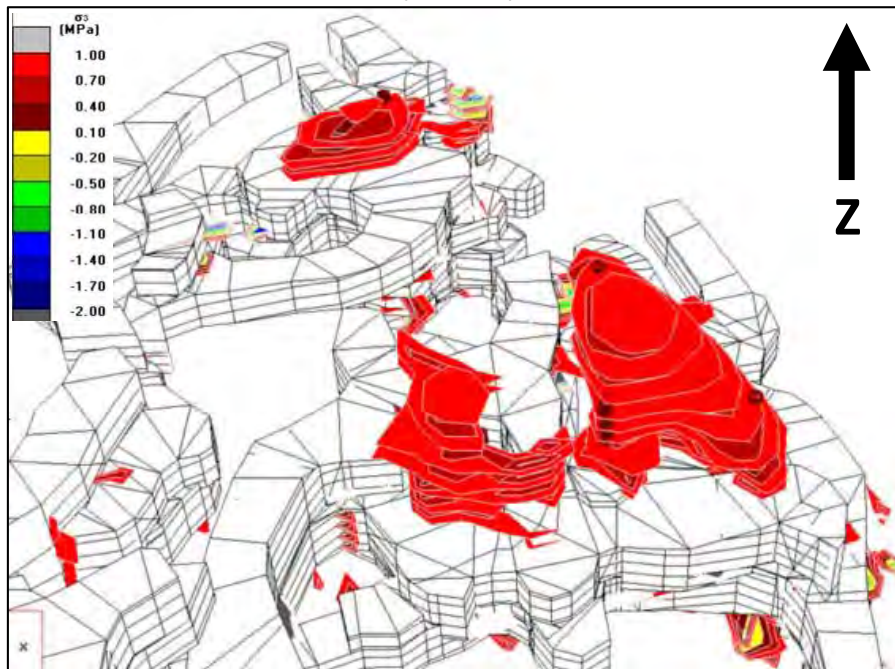
Isometric view



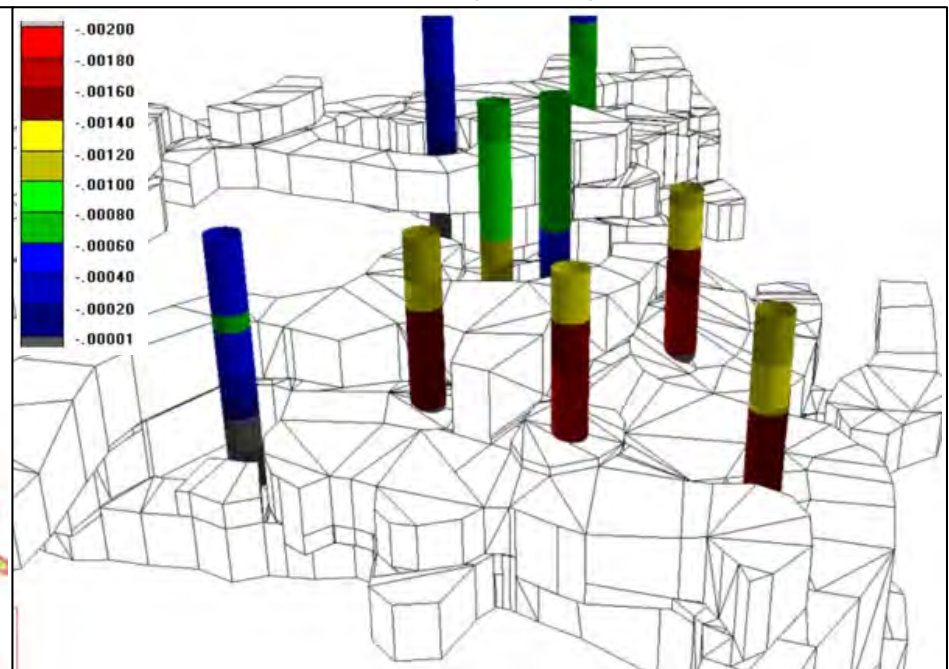
# Numerical Modeling – Map3D

## Deformation deeper than support if all pillars removed

Stress (tensile) - MPa



Deformation (vertical) - mm





# Safety Considerations: Change Management

## Hazards identified in risk assessment

- Exclusion zones required the procurement of a remote operated LHD (a first for Platosa)
- Design and construction of remote stands
- Extra lighting to improve visibility
- Development of protocols and subsequent training





# Safety Considerations

Remote operated LHD most significant change for workers



# Pillar Recovery Preparation

Extensometers installed to monitor ground movement







# Pillar Recovery Preparation

Before extraction, spans were pre-supported



5 meter cable bolts:

- 2-3 rings around pillar
- 2.5m spacing between rings
- Tensioned to 4-5 tonnes



# Pillar Recovery Preparation

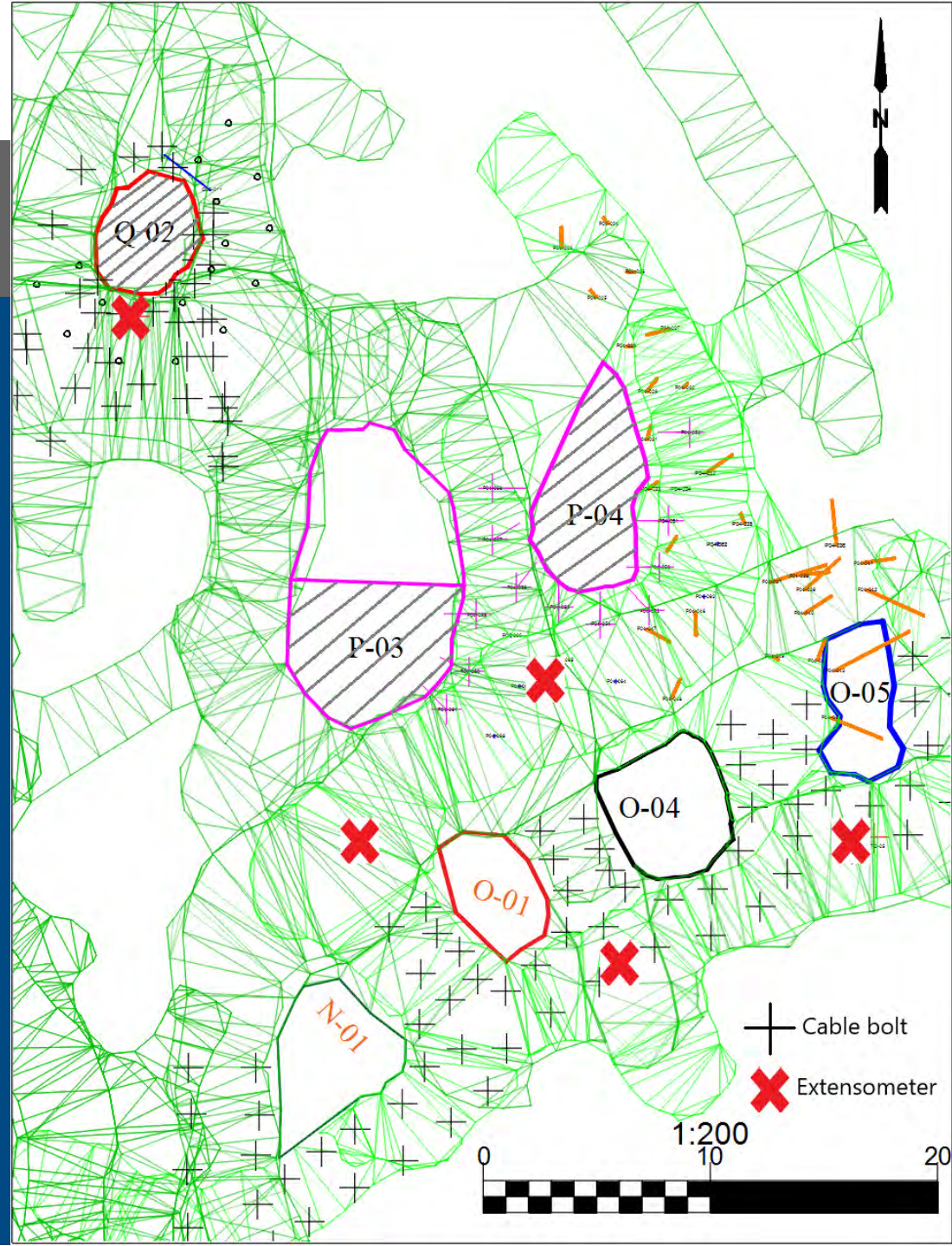
**Voids around pillars backfilled with  
unconsolidated waste**



# Results to date

## Pierna

- Pillars recovered:
  - Q-02
  - P-04
  - South half of P-03





# Results: Pillar Q-02, blasted 4 Sept 2018

Before



After





# Results: Pillar P-04, blasted 26 Sept 2018

Before



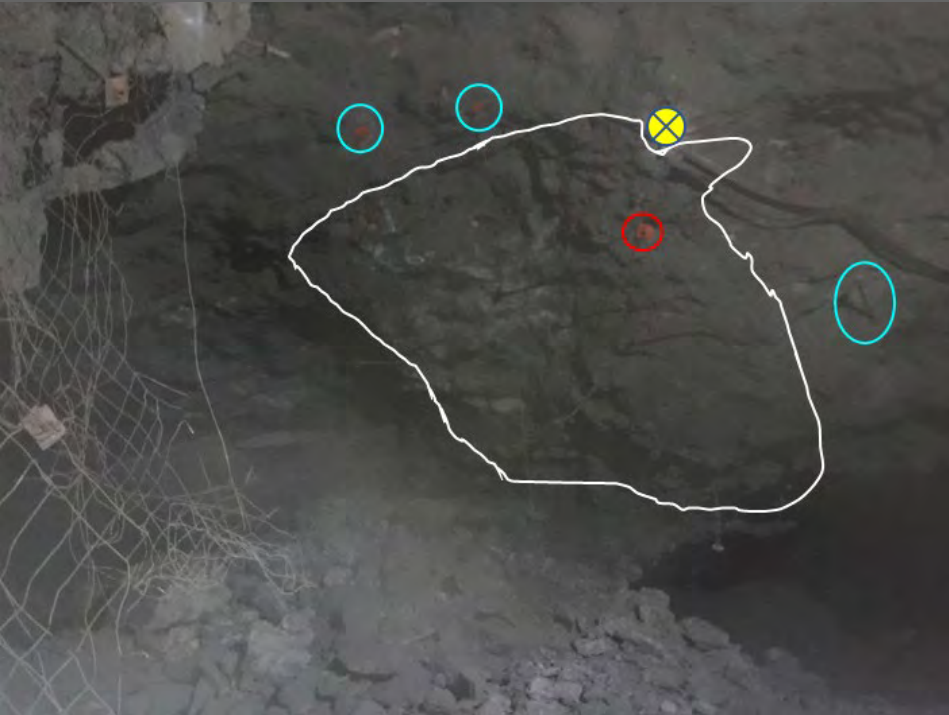
After



Large pillar presented some challenges




# Pillar P-04 Back Failure – 1 Oct 2018

Before



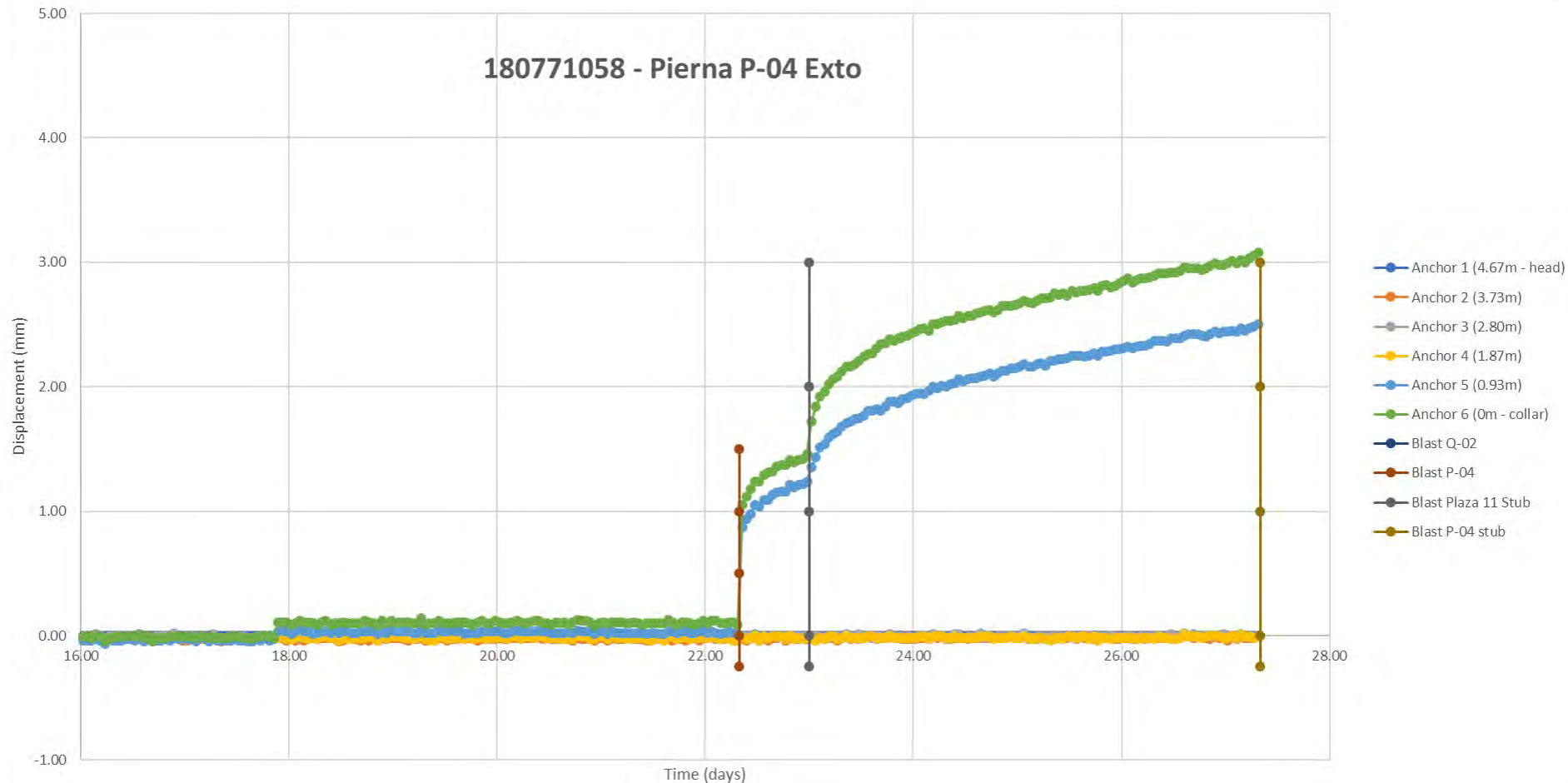
After



 Stable cable bolts    Failed cable bolt    Extensometer

**Mucking suspended when extensometer indicated motion,  
failure occurred after an additional blast**

# Pillar P-04 – Extensometer Data



**Mucking was suspended when extensometer indicated motion, failure occurred after an additional blast**



# Pillar P-03 – Blasted 21 March 2019

Large pillar that was deemed “too big to fail”



Large pillar in Pierna –  
half was blasted with remaining left in place for stability

# Pillar P-03, blasted 21 March 2019

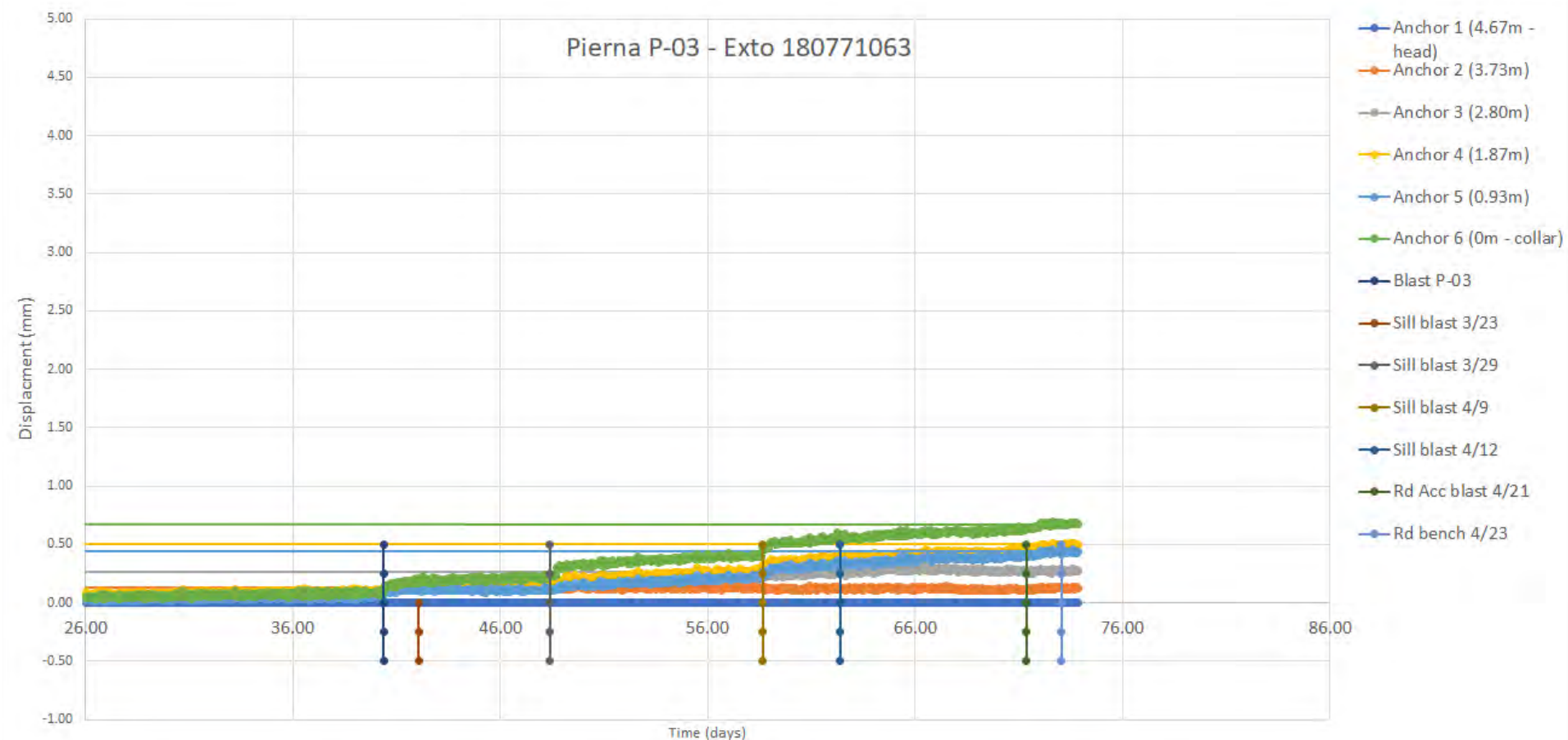
After blasting, remaining portion of pillar was stable





# Pillar P-03, blasted 21 March 2019

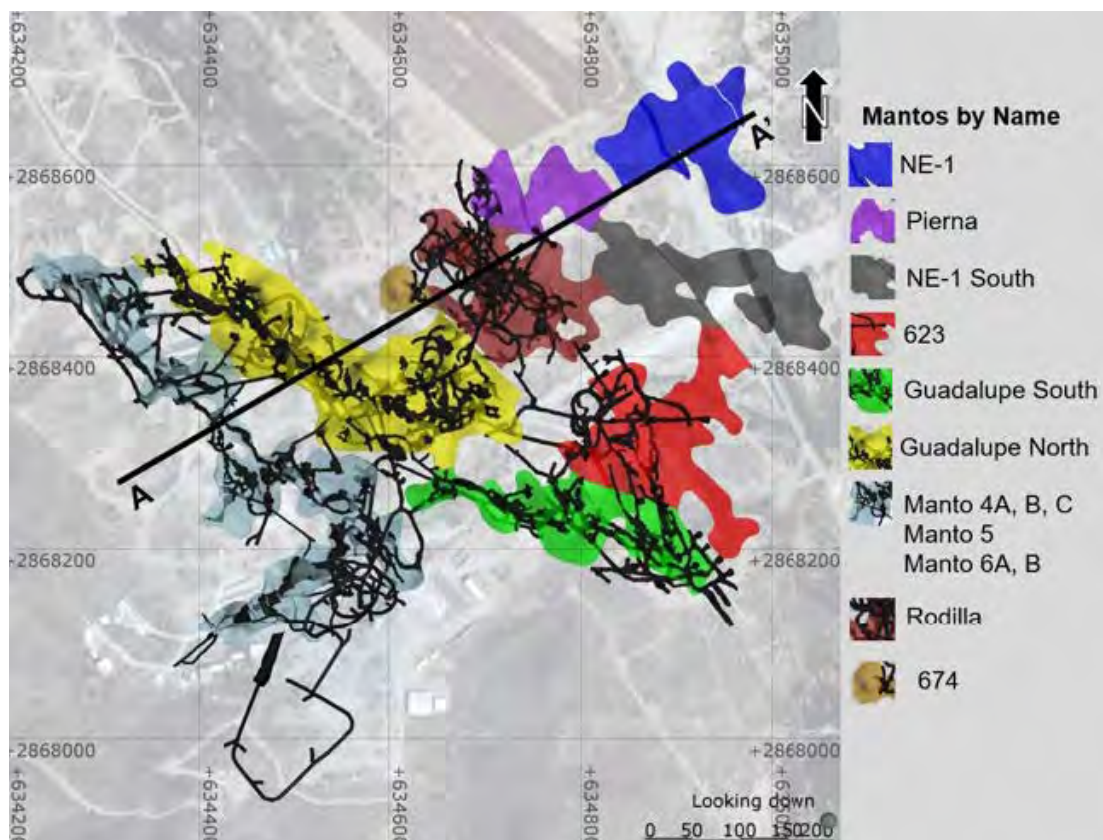
After blasting, remaining portion of pillar was stable



# Path Forward

## Continue to extract pillars and assess historical pillars

- Continue with 500 – 600 tonnes per month through 2019
- Finish Pierna and begin in Rodilla
- Additional areas to be assessed:
  - Mantos Guadalupe North and South
  - Manto 4, 5, and 6





# Conclusions

## Continue to extract pillars and assess historical pillars

- Benefits to date
  - 1,350 tonnes at 650g/t Ag, 6.5% Pb, and 10% Zn for an additional 100,000 AgEqOz
  - Added production during transition to cut and fill mining
- Additional Recovery:
  - Originally ~85% recovery of mineralization in Pierna
  - Additional 10% recovery with all planned pillars extracted

# Partners

## Helped make pillar recovery possible

- Geotechnical Engineering: John Henning 

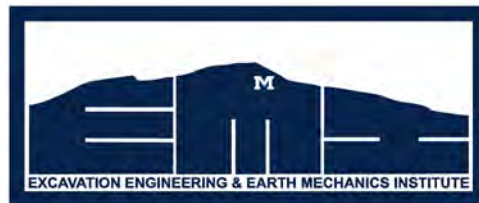
- Extensometers:  *Sensing the future*

- Bolters:  

- Ground support elements:



- Rock Testing:







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