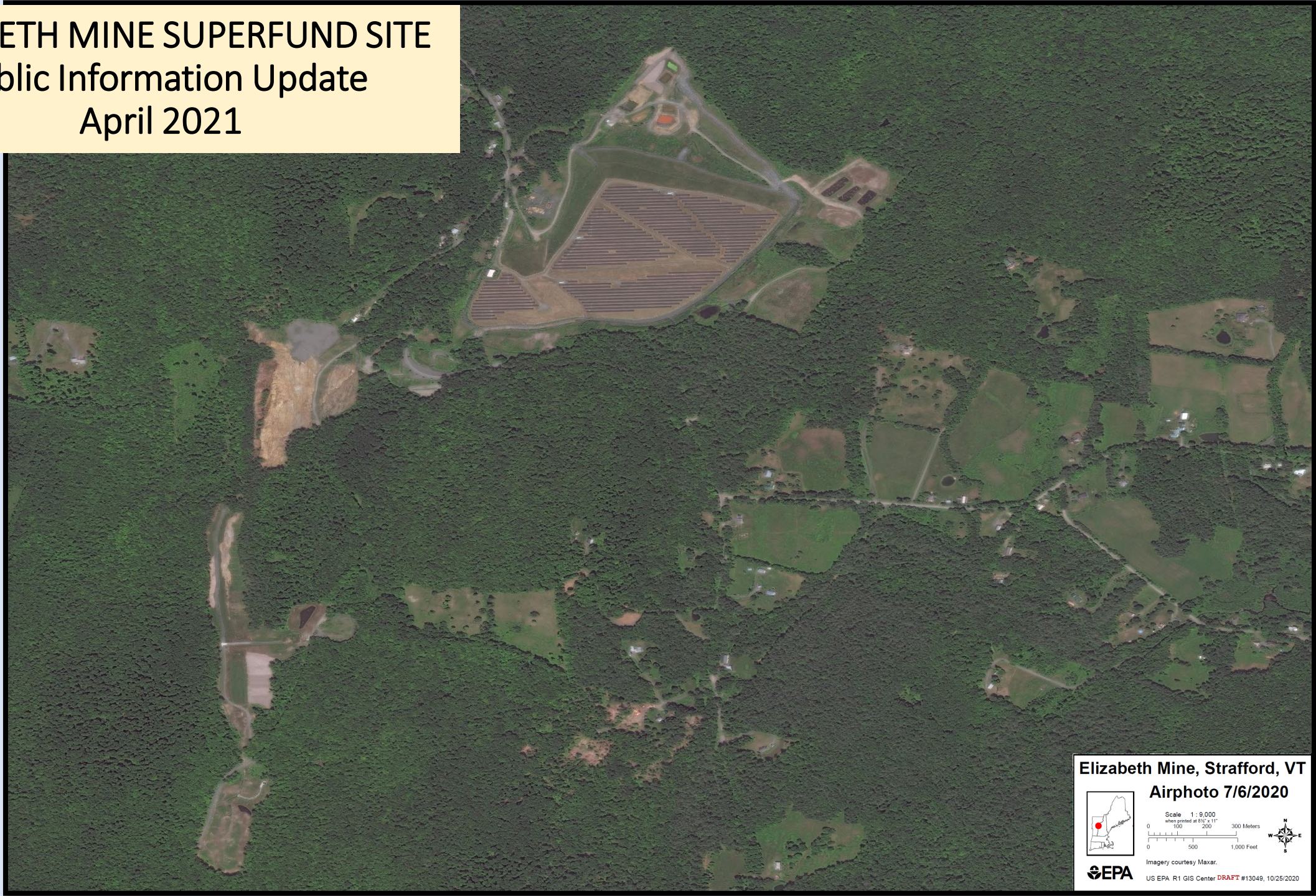


# ELIZABETH MINE SUPERFUND SITE

## Public Information Update

### April 2021



Elizabeth Mine, Strafford, VT

Airphoto 7/6/2020



Scale 1:8,000  
when printed at 8 1/2" x 11"  
0 100 200 300 Meters  
0 500 1,000 Feet



Imagery courtesy Maxar.

US EPA R1 GIS Center DRAFT #13049, 10/25/2020



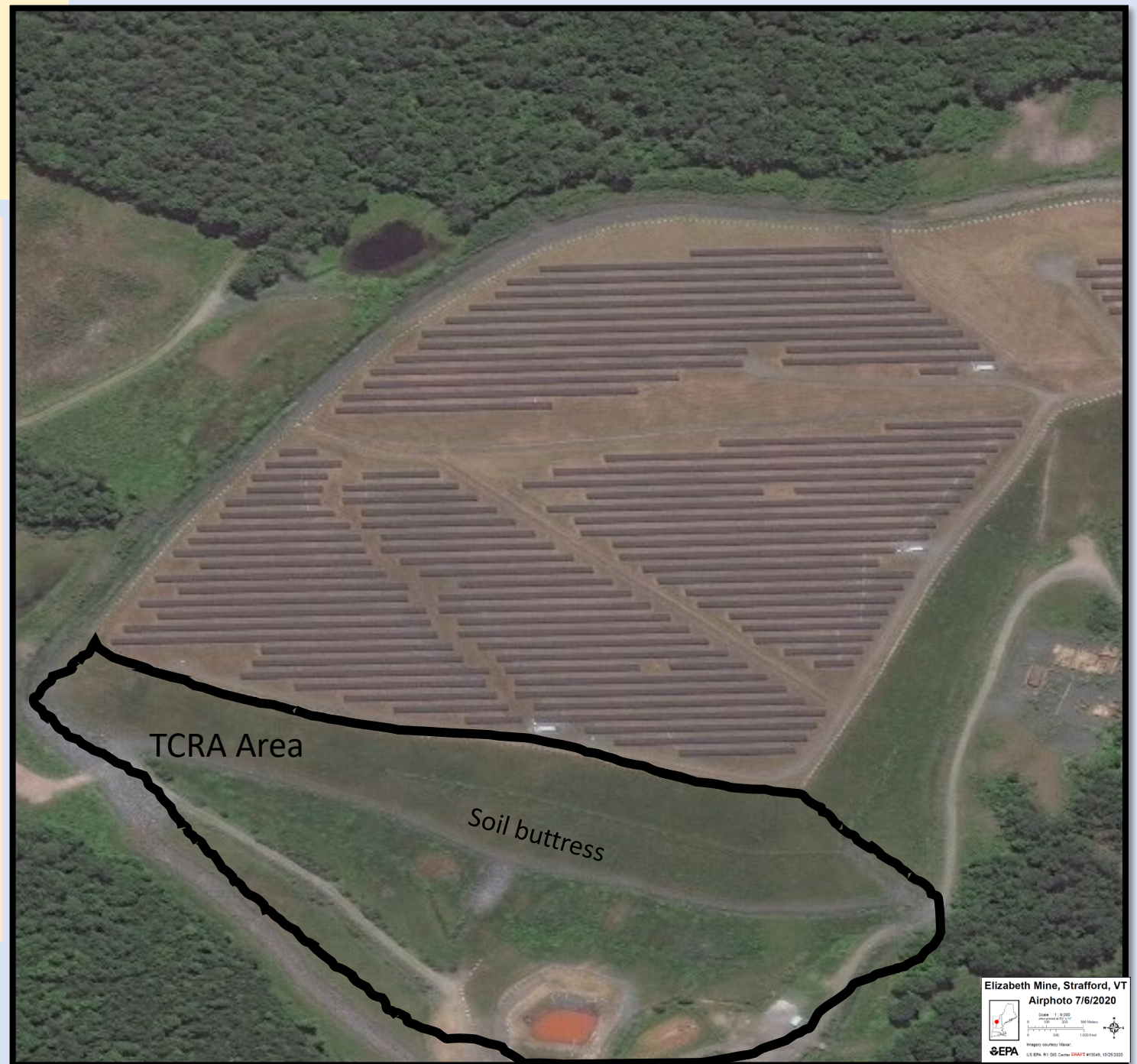
## Outline

- Summary of Cleanup Actions at Elizabeth Mine
- Cleanup activities planned for 2021
  - Bridge deck repair
  - 1898 Adit Closure
  - Groundwater, surface water, sediment, and residential well sampling
  - Decommission wells no longer needed
  - Final groundwater delineation
  - Final Site Restoration Activities
  - Transition to VTDEC

# Elizabeth Mine Public Information Update April 2021

## Cleanup Actions at Elizabeth Mine Superfund Site

- Time-Critical Removal Action (TCRA)
  - Tailing Dam stabilization
    - Installation of 60,000 cubic yard soil buttress to reinforce Tailing Dam and Toe Drain system.
    - Grading of slope above buttress
    - Completed in 2005



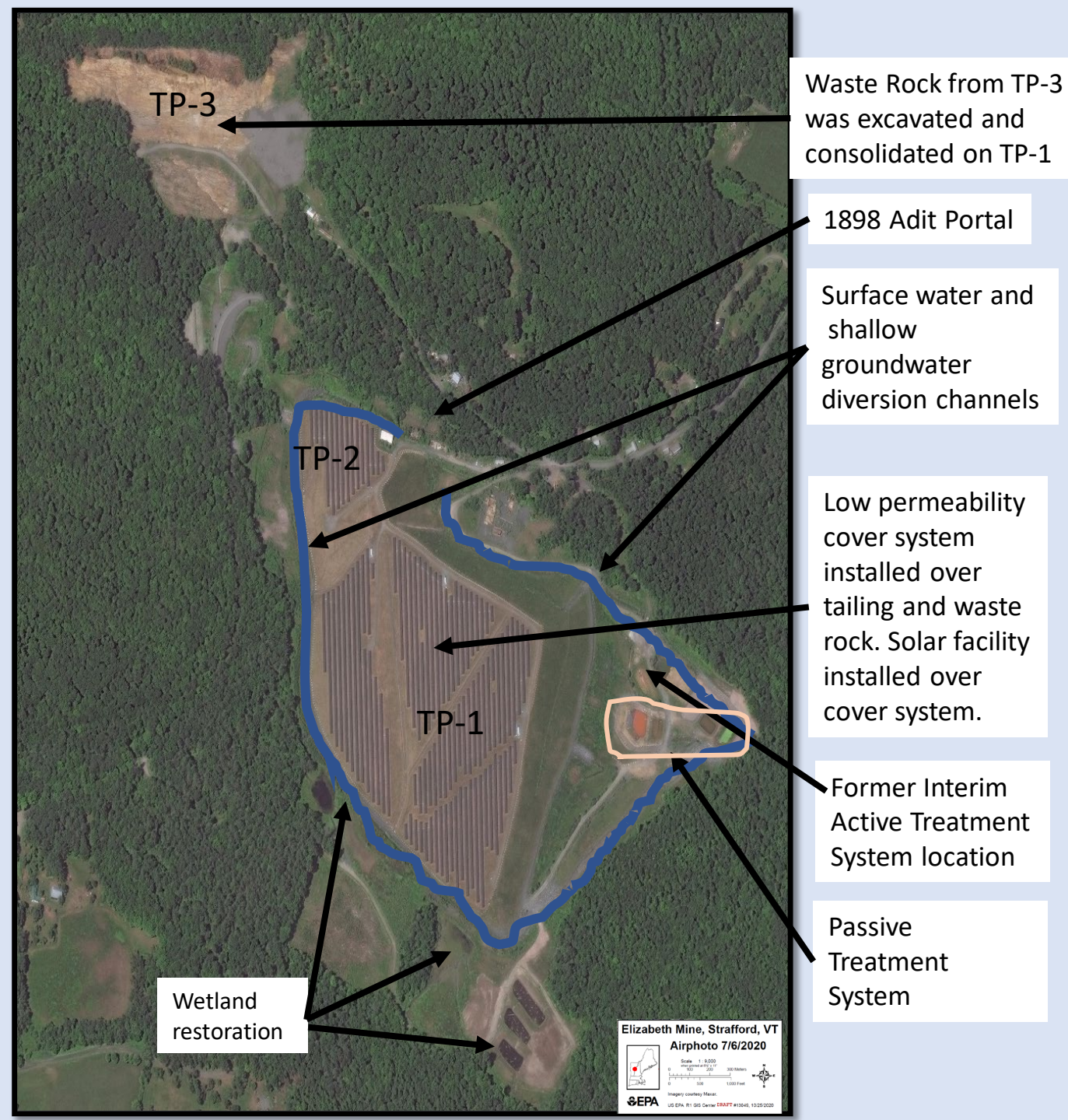


# Elizabeth Mine Public Information Update

## April 2021

### Cleanup Actions at Elizabeth Mine Superfund Site

- Non-Time-Critical Removal Action (NTCRA)
  - Phase 1: Surface water and shallow groundwater diversion channels, TP-3 waste relocation and consolidation, and interim water treatment system. Completed in 2010.
- Phase 2: TP-1/TP-2 cover system, additional surface water diversion channels, continued operation of interim water treatment system, and site restoration.
  - Active water treatment system operated until 2018, decommissioned in 2019.
  - Final actions will be the closure/stabilization of the 1898 Adit and site restoration. To be completed in 2021.
- Phase 3: Passive treatment system for leachate from TP-1. Completed in 2020.

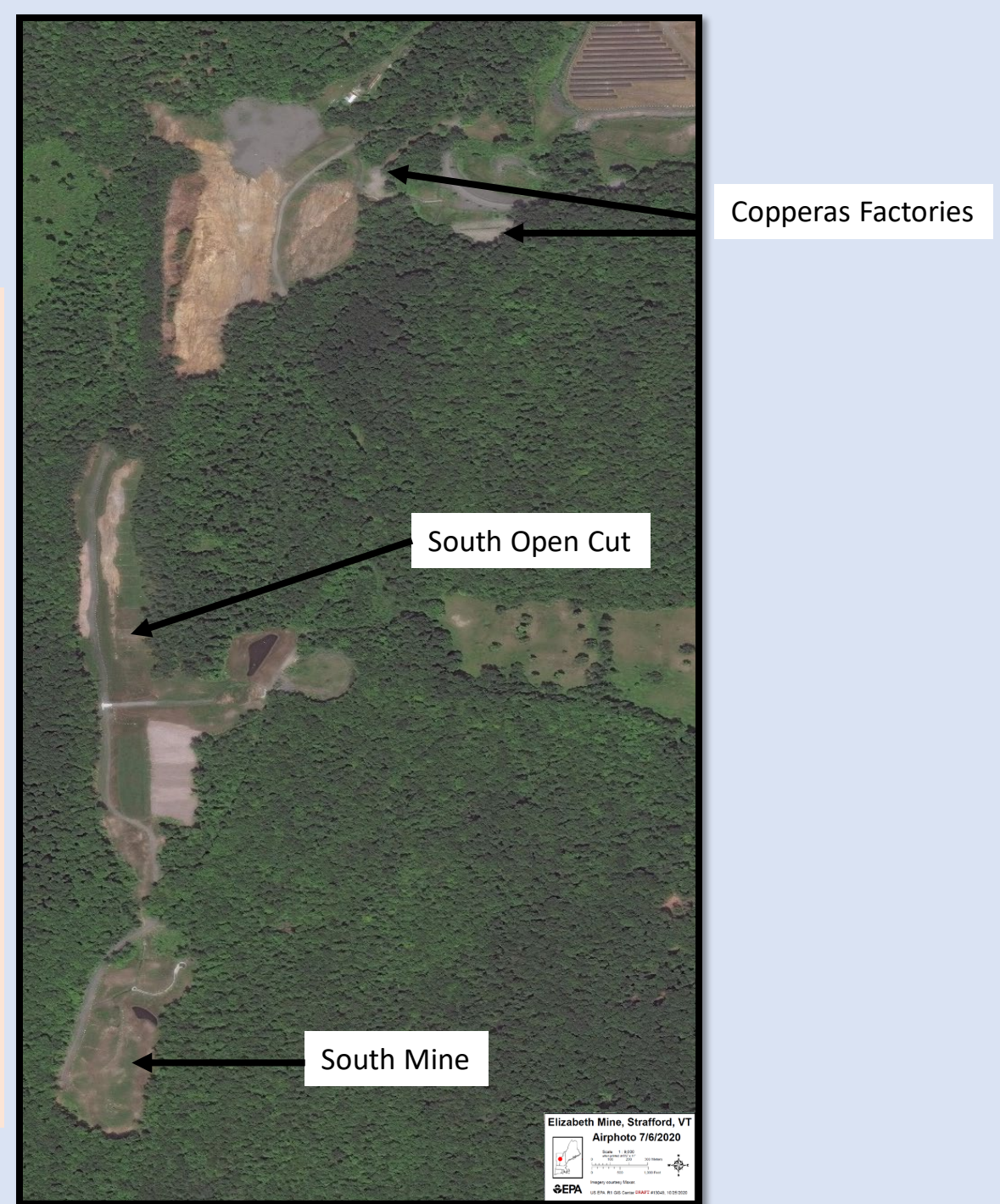




# Elizabeth Mine Public Information Update April 2021

## Cleanup Actions at Elizabeth Mine Superfund Site

- Remedial Action (RA)
  - Phase 1: Copperas Factories. Lead contaminated soil cleanup. Completed in 2010.
  - Phase 2: Lord Brook Source Areas (South Open Cut and South Mine): Completed in 2020.
  - Phase 3: Site-wide groundwater use restrictions; long-term monitoring of surface water, sediments, and groundwater; land-use restrictions; and final site restoration.
    - To be completed in 2021.
    - The Phase 3 activities are discussed later in this presentation.







#### IMPLEMENTATION PHASE ACTIVITY-SPECIFIC FMEA

ELIZABETH MINE  
SUPERFUND SITE

MINE ROAD  
SOUTH STRAFFORD,  
VERMONT


NO.	DATE	DESCRIPTION
REVISIONS		

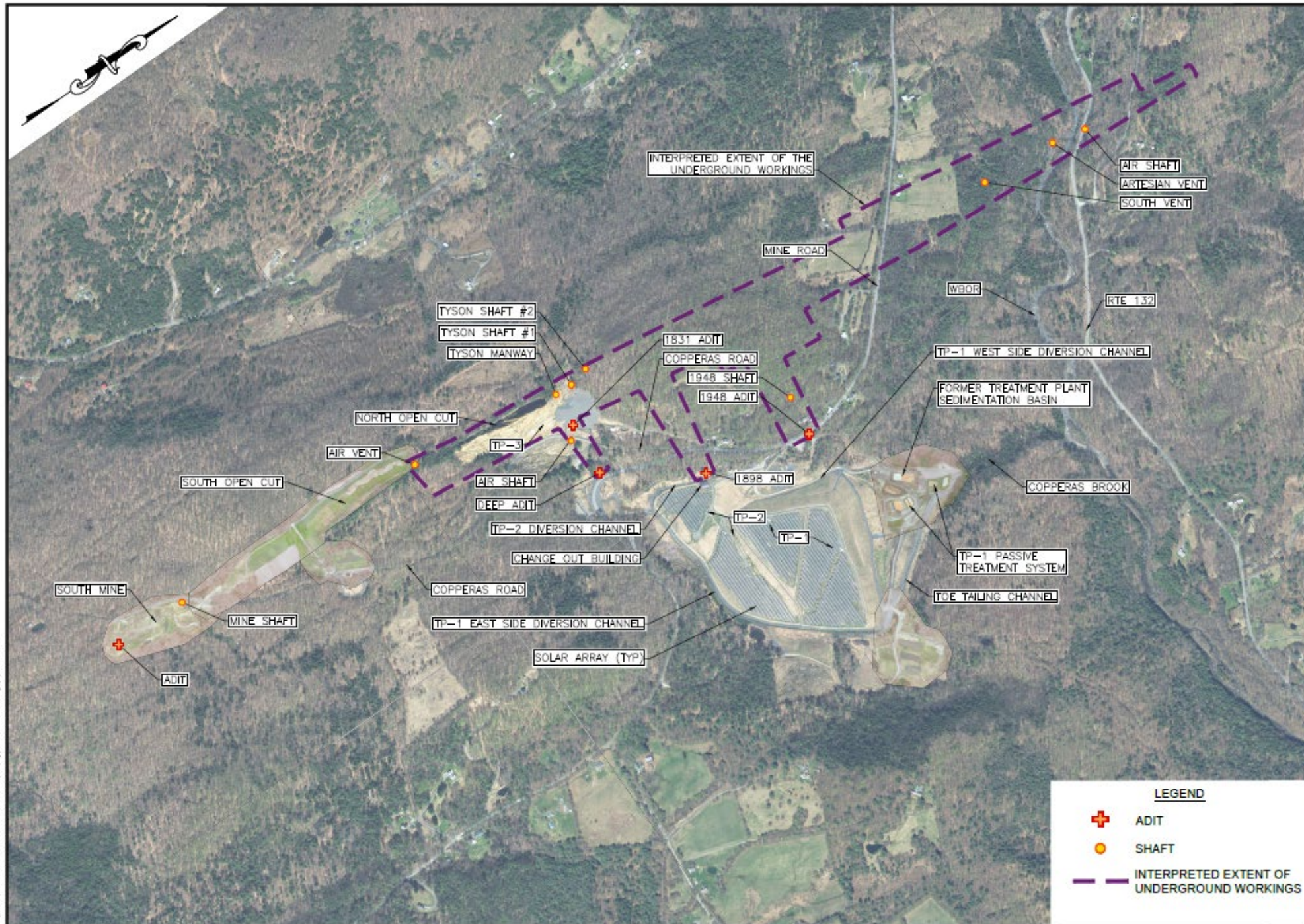
## REVISIONS






DATE:	FEB. 5, 2001
MOBIS PROJECT NO:	94506.00
DRAWN BY:	NZ
CHECKED BY:	CA
CAD DRAWING FILE:	94506-PMEA FIGURES.dwg

SHEET TITLE

## Major Site Features



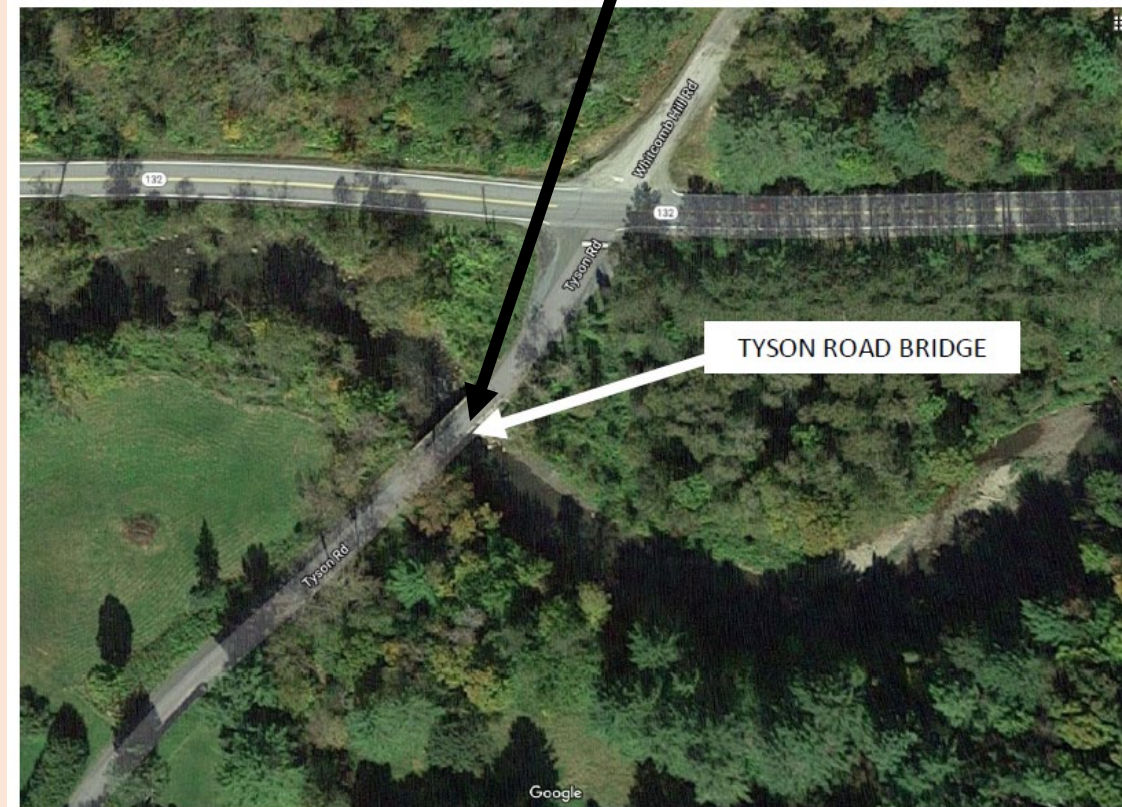
### LEGEND

-  ADIT  
 SHAFT  
 INTERPRETED EXTENT OF UNDERGROUND WORKINGS



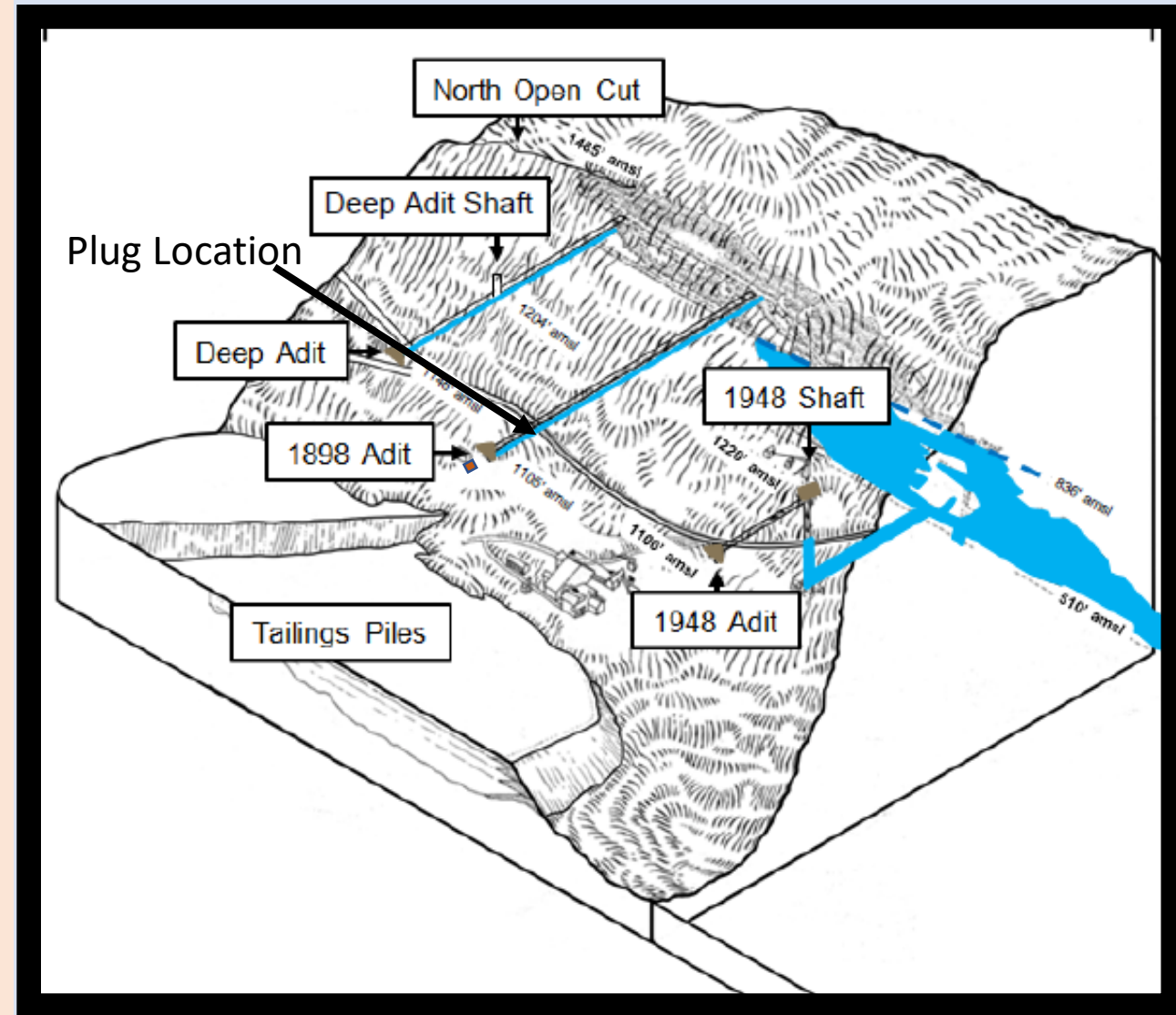
## Tyson Road Bridge Deck Repair

- Initial attempt to repair the deck on Tyson Bridge was initiated during 2020.
- Once the bituminous asphalt layer over the concrete bridge deck was partially removed, the bridge deck was found to have deteriorated to a degree that a simple repair was not appropriate.
- The US Army Corps of Engineers (USACE), working for EPA, collaborated with the Town of Strafford, Vtrans, VTDEC, and the site contractor, Nobis, to develop a bridge deck replacement design.
- Work is expected to begin in May 2021 and the bridge should be re-opened by August 2021.
- The bridge beams were inspected by Vtrans and found to be in acceptable condition.



## • 1898 Adit Closure

- The 1898 Adit has two internal blockages impounding an estimated 719,000 gallons of acidic water.
- The 1898 Adit also is believed to be the cause of the sink hole that formed adjacent to Mine Road in 2018.
- A concrete plug will be installed inside the 1898 Adit beneath Mine Road to prevent a future release of the impounded water.
- The concrete plug will also reduce the potential for a future sink hole at Mine Road.
- The work will take place from May 2021 – September 2021.
- Short-term closures of Mine Road may be necessary during the work.
- Copperas Road will be closed during the entire period from May 2021 – August 2021.





- 1898 Adit Plug Activities

- May – August 2021

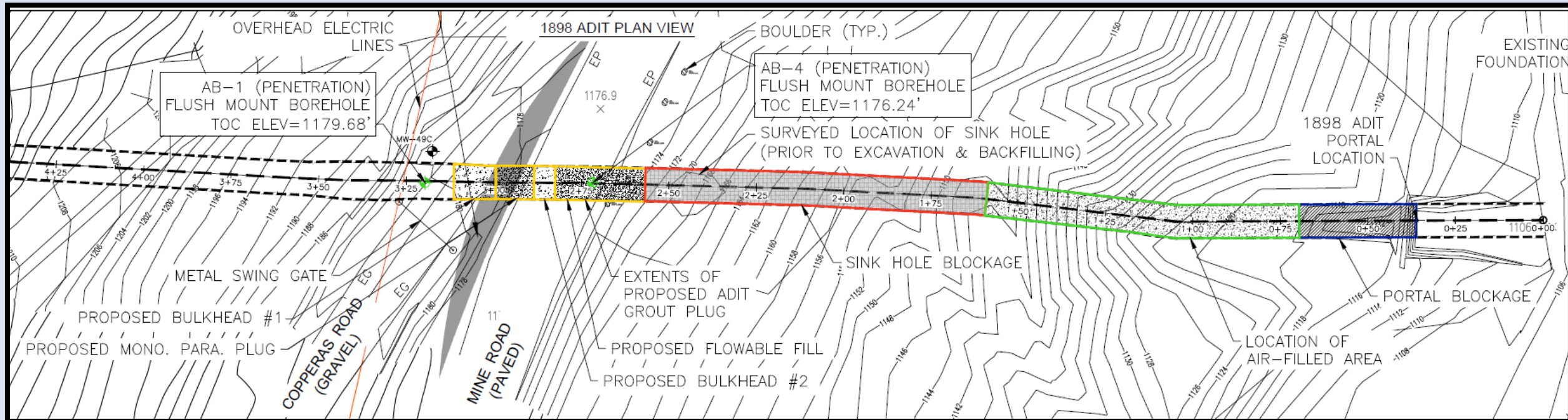
- Copperas Road will be closed.
    - Equipment will be mobilized to the Site.
    - Dewatering of the 1898 Adit will be performed.
      - The water will be treated to neutralize the acidity and discharged into the Underground Workings.
    - A drilling contractor will bore 22 holes to access the 1898 Adit from Mine Road and Copperas Road.
    - There will be five phases of plug activities
      - A concrete bulkhead (bulkhead #1) will be installed on the Copperas Road side of the plug to prevent water from entering the work zone and act as a seal.
      - An acid resistant coating will be placed on the upgradient side bulkhead #1.
      - A second concrete bulkhead (bulkhead #2) will be installed on the downgradient side to create a form for the plug.
      - Grout/concrete will be pumped at high pressure between the bulkheads to create the plug.
      - Flowable fill will be injected into the 1898 Adit downgradient of bulkhead #2 to fill the void space between the bulkhead and the blockage at the Sink Hole.
    - Equipment will be demobilized and the disturbed areas restored.
    - The section of Mine Road where the work is performed will be repaved.





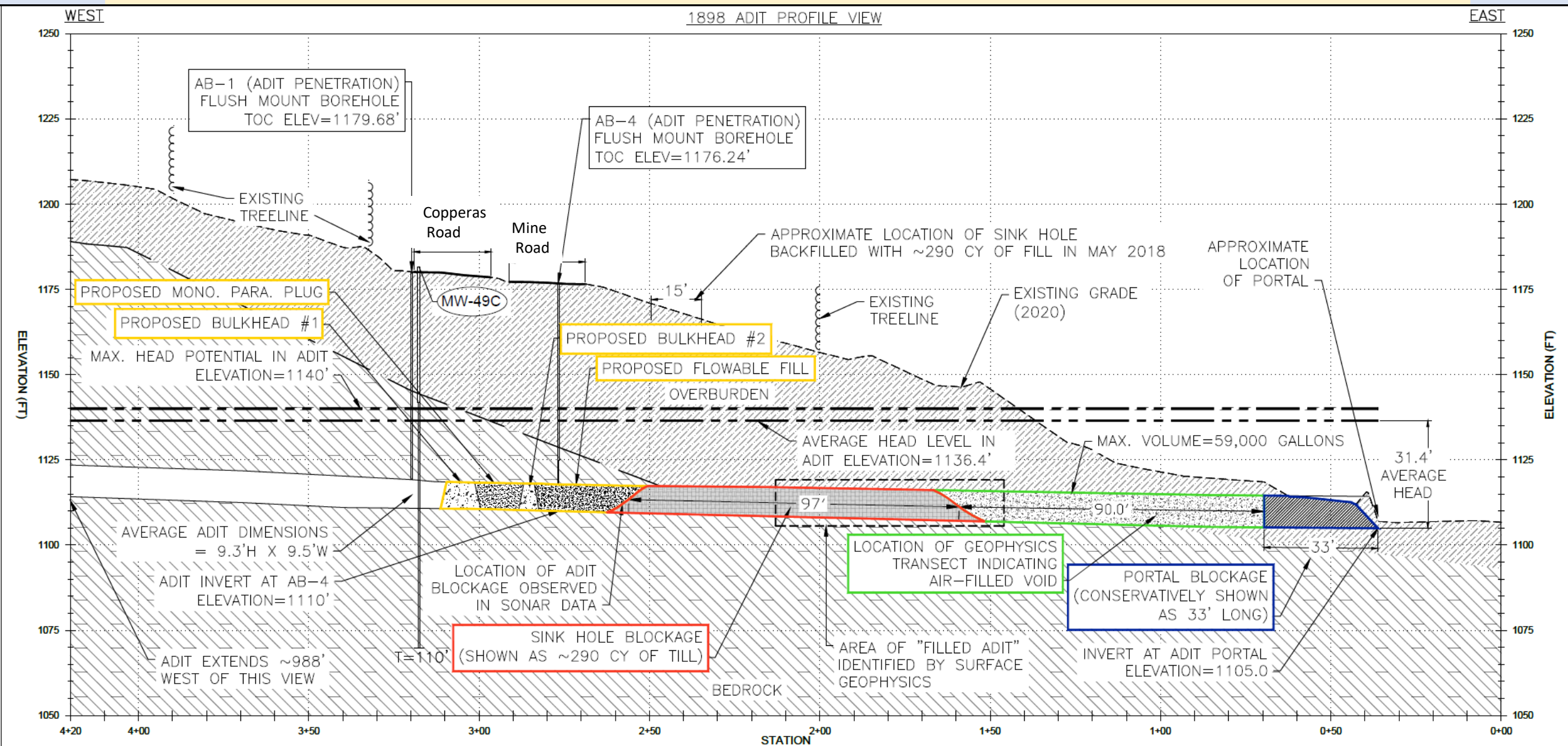


Plan view of 1898 Adit Closure showing location of the two collapse zones (blockages)





# Cross- sectional view of the 1898 Adit Closure and collapse zones (blockages)







ISSUED FOR  
CONSTRUCTION

ELIZABETH MINE  
SUPERFUND SITE

ADIT CLOSURE  
IMPLEMENTATION  
WORK PLAN

SOUTH STRAFFORD,  
VERMONT

NO.	DATE	DESCRIPTION
-----	------	-------------

REVISIONS



DATE:	FEB. 5, 2021
NOBIS PROJECT NO.:	94506.00
DRAWN BY:	NG
CHECKED BY:	CA
CAD DRAWING FILE:	94501-ADIT-CLOSURE-BMP.dwg

SHEET TITLE

GENERAL  
OVERVIEW OF  
DEWATERING  
SYSTEM SETUP

FIGURE  
6-11

**LEGEND:**

- ADIT BOREHOLE/  
MONITORING WELL
- DISCHARGE HOSE FROM  
ADIT TO WEIR TANK
- DISCHARGE HOSE FROM  
WEIR TANK TO TYSON  
MANWAY



• Monitoring and Assessment

- The ongoing groundwater, surface water, and residential well quality monitoring program will continue through 2021.
- Sampling of the Passive Treatment System will also continue through 2021.
- A sediment toxicity testing program will be performed for the tributaries to Lord Brook that receive drainage from the South Mine and South Open Cut.
- Data collected through 2020 indicates:
  - Residential wells currently in use are not impacted by the mine related contamination.
  - Groundwater contamination appears to be confined to the former waste areas (South Mine, South Open Cut, TP-3, TP-1, and TP-2) and also within the limits of the Underground Workings.
  - Surface water data shows continued improvement for Copperas Brook, Lord Brook, the tributaries of Lord Brook, and the West Branch of the Ompompanoosuc River.

Surface Water Sampling Locations





- Passive Treatment System

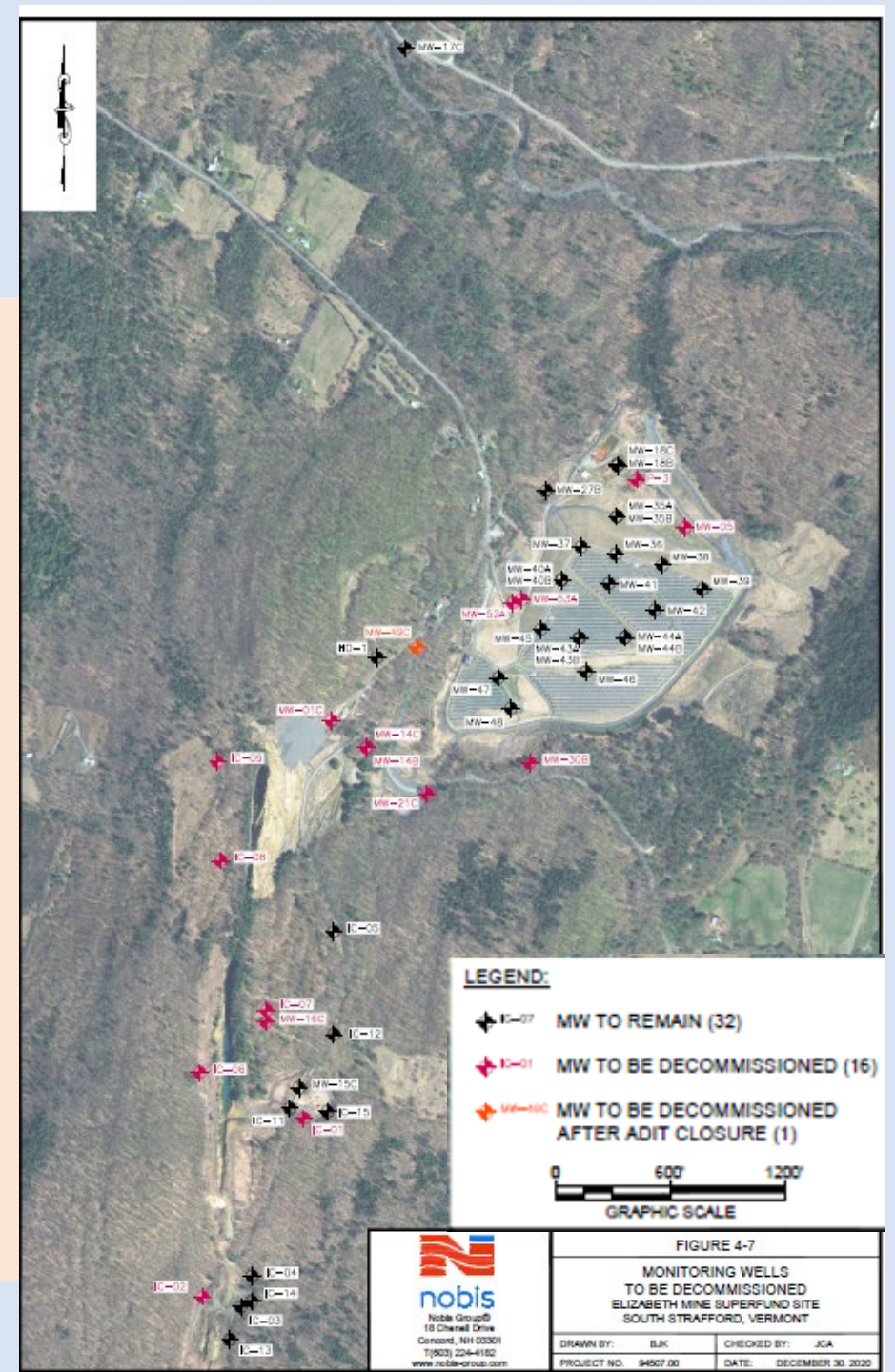
- Performance monitoring will continue during 2021.
- Sample locations are shown with blue stars on adjacent figure. Samples are also collected from Copperas Brook.
- System consistently reduced iron concentration by >99%.
- Iron concentration in discharge from passive treatment system below 1 mg/l for all samples collected in 2020 and through March 2021.





## • Monitoring well decommissioning

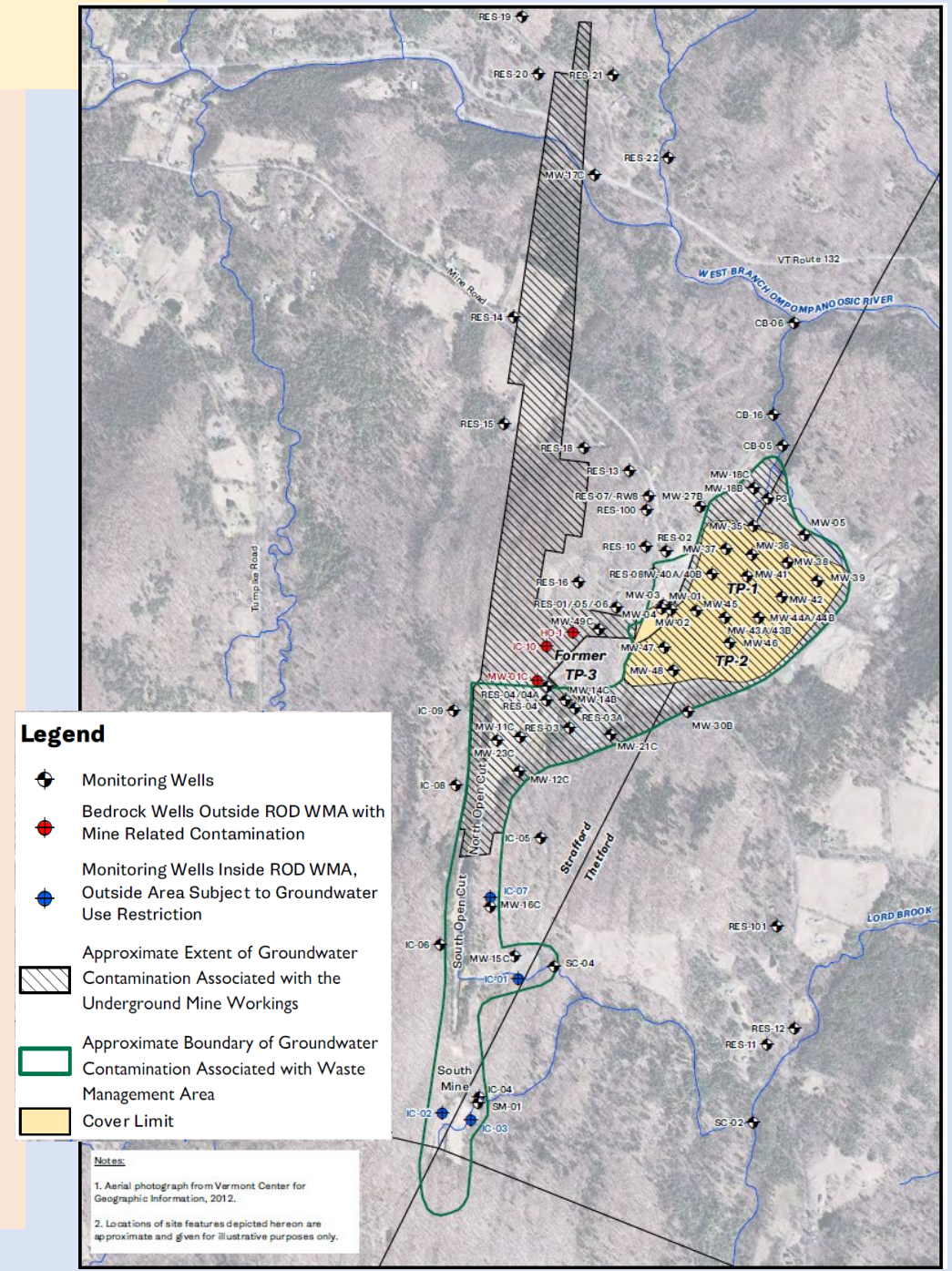
- With the transition of the Site maintenance and monitoring to VTDEC by the end of 2021, EPA is removing (decommissioning) monitoring wells that are no longer needed.
- About 16 monitoring wells are being removed (shown in red).
- The remaining 28 monitoring wells will be used to evaluate water quality and water levels across the Site area.





## • Groundwater Contamination Delineation

- The major contaminants detected in groundwater are cobalt and manganese. Cadmium, copper, iron, nickel and sulfate are also detected in mine impacted groundwater.
- The approximate extent of where groundwater contamination could be present within or adjacent to the Underground Mine working is shown with the cross-hatching.
- The approximate extent of groundwater contamination associated with the Waste Management area is within the green line.
- Five monitoring wells were installed in 2020 to refine the extent of contamination associated with the South Open Cut and South Mine areas.
- Two additional monitoring are being installed in 2021 to further refine the groundwater contamination associated with the South Mine area.





# Location of New Monitoring Wells






- Monitoring wells at locations IC11, IC12, IC13, IC14 and IC15 were installed in 2020.
- Two additional monitoring wells will be installed at IC 16 and IC17 during 2021 to further refine the extent of groundwater contamination.

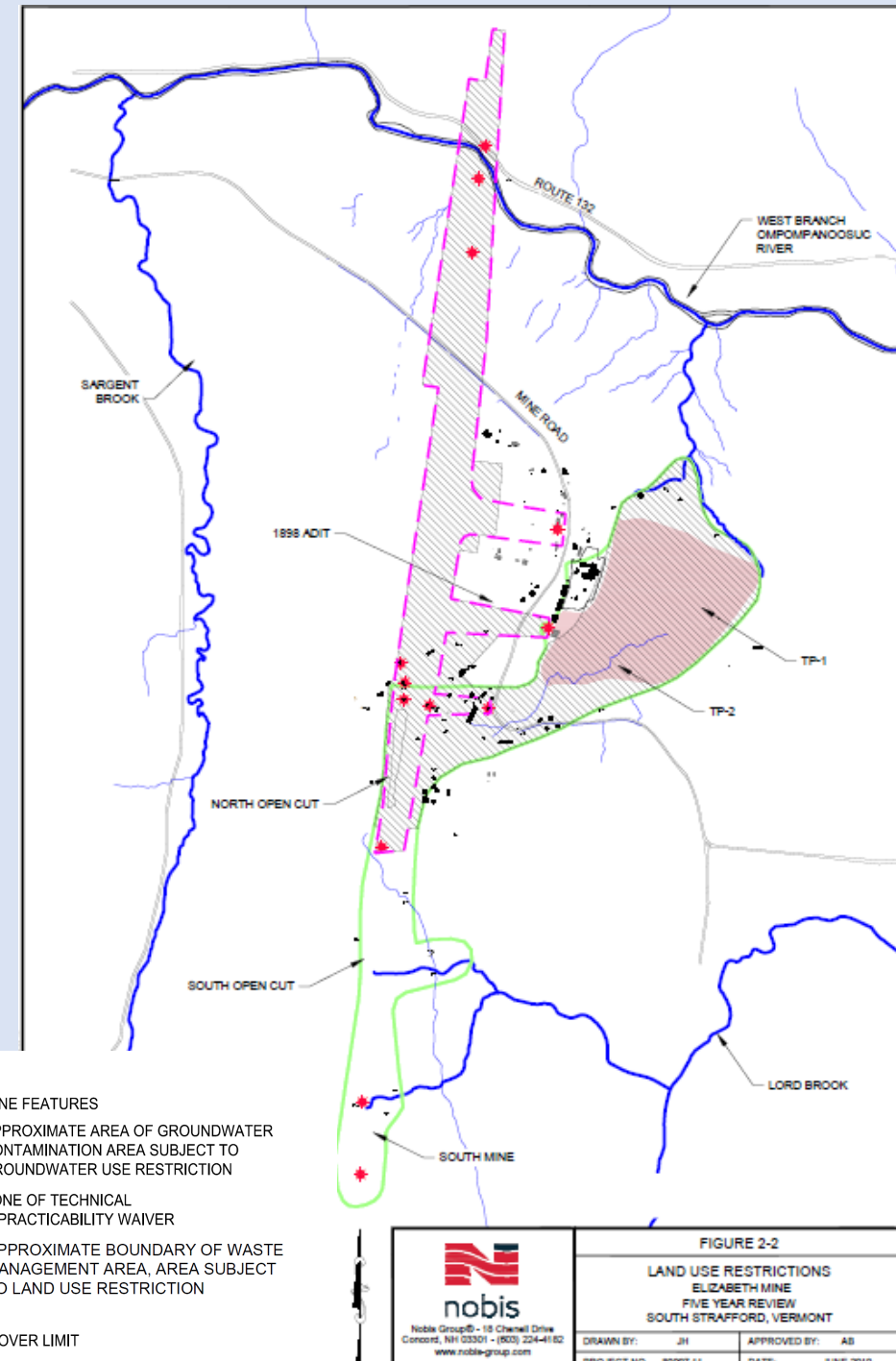




- Institutional Controls are used to protect the completed cleanup actions, prevent future exposure to contaminated materials or contaminated groundwater, and prohibit activities that could release contamination into surface water.
- Two types of Institutional Controls are being implemented at the Elizabeth Mine.
  - For those properties within the Waste Management Area (where mine waste is still present) a *Grant of Environmental Restrictions, Right of Access and Easement* will be completed between the State of Vermont Department of Environmental Conservation (VTDEC) and the property owner to impose restrictions on the use of the property.
  - Groundwater Reclassification is being considered as a mechanism to require careful consideration regarding the location and depth of a future water supply well prior to installation.

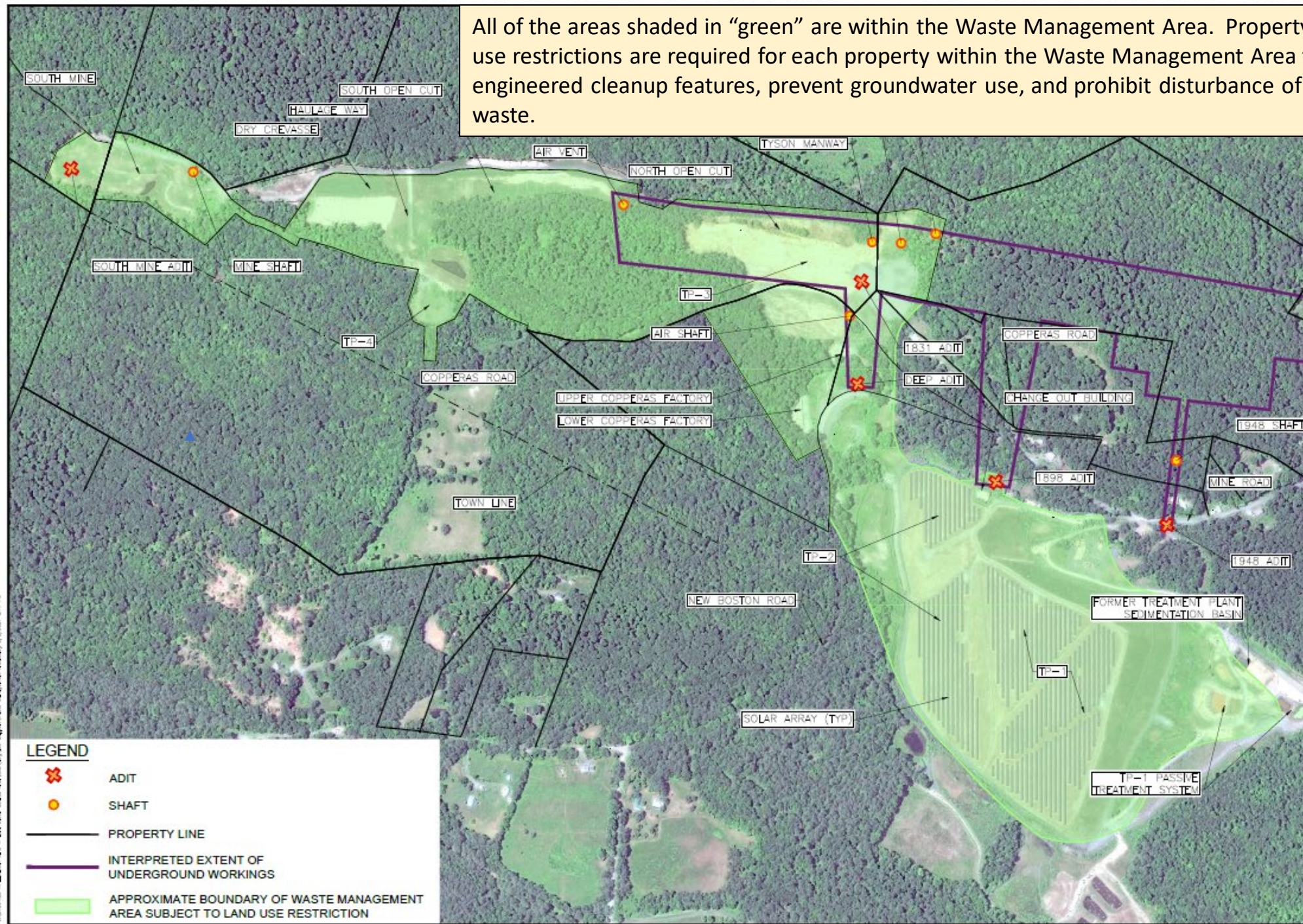
LEGEND

-  MINE FEATURES
-  APPROXIMATE AREA OF GROUNDWATER CONTAMINATION AREA SUBJECT TO GROUNDWATER USE RESTRICTION
-  ZONE OF TECHNICAL IMPRACTICABILITY WAIVER
-  APPROXIMATE BOUNDARY OF WASTE MANAGEMENT AREA, AREA SUBJECT TO LAND USE RESTRICTION
-  COVER LIMIT





All of the areas shaded in "green" are within the Waste Management Area. Property specific land use restrictions are required for each property within the Waste Management Area to protect the engineered cleanup features, prevent groundwater use, and prohibit disturbance of any buried mine waste.



#### LEGEND



ADIT



SHAFT

— PROPERTY LINE

— INTERPRETED EXTENT OF UNDERGROUND WORKINGS



APPROXIMATE BOUNDARY OF WASTE MANAGEMENT AREA SUBJECT TO LAND USE RESTRICTION

NOT ISSUED  
FOR  
CONSTRUCTION

#### ELIZABETH MINE SUPERFUND SITE

INSTITUTIONAL CONTROL  
ZONES

MINE ROAD  
SOUTH STRAFFORD,  
VERMONT

NO.	DATE	DESCRIPTION

REVISIONS

0 250' 500'  
GRAPHIC SCALE

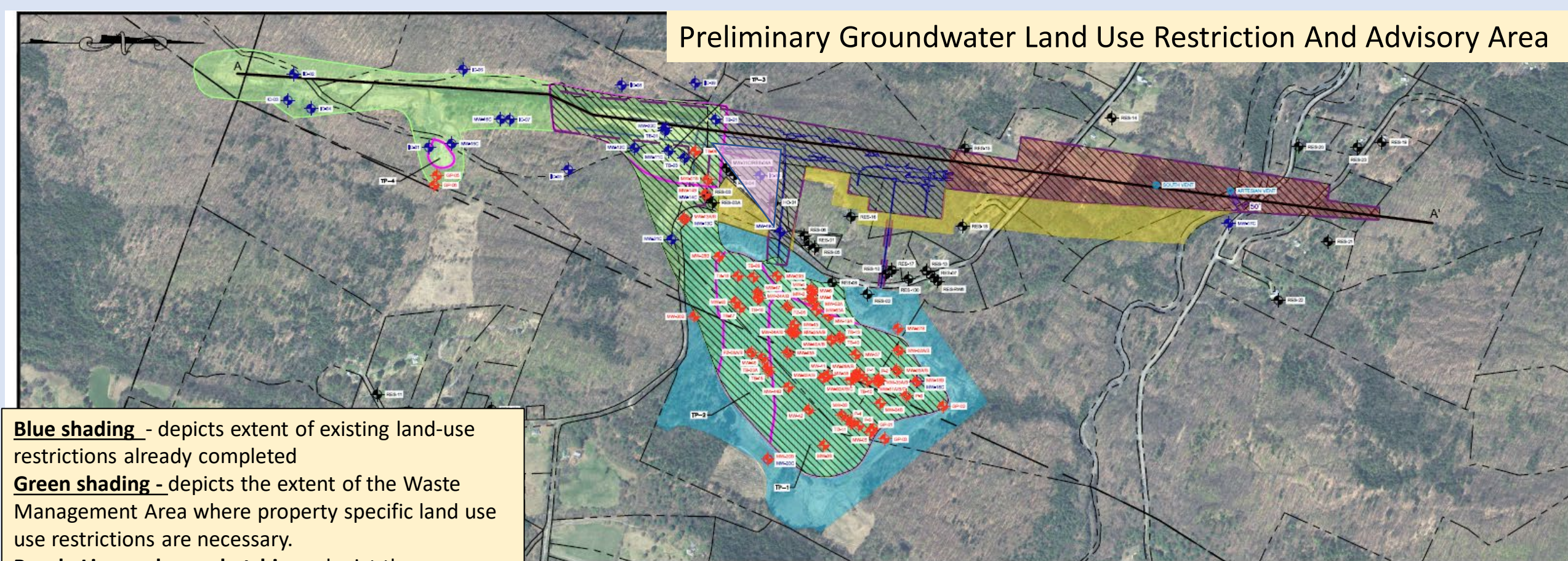
DATE: FEBRUARY 9, 2021  
NOBIS PROJECT NO. 94506.00  
DRAWN BY: AD  
CHECKED BY: BK  
CAD DRAWING FILE:  
Waste Management Areas.dwg  
SHEET TITLE

WASTE  
MANAGEMENT  
AREAS

FIGURE  
WMA-1



# Preliminary Groundwater Land Use Restriction And Advisory Area



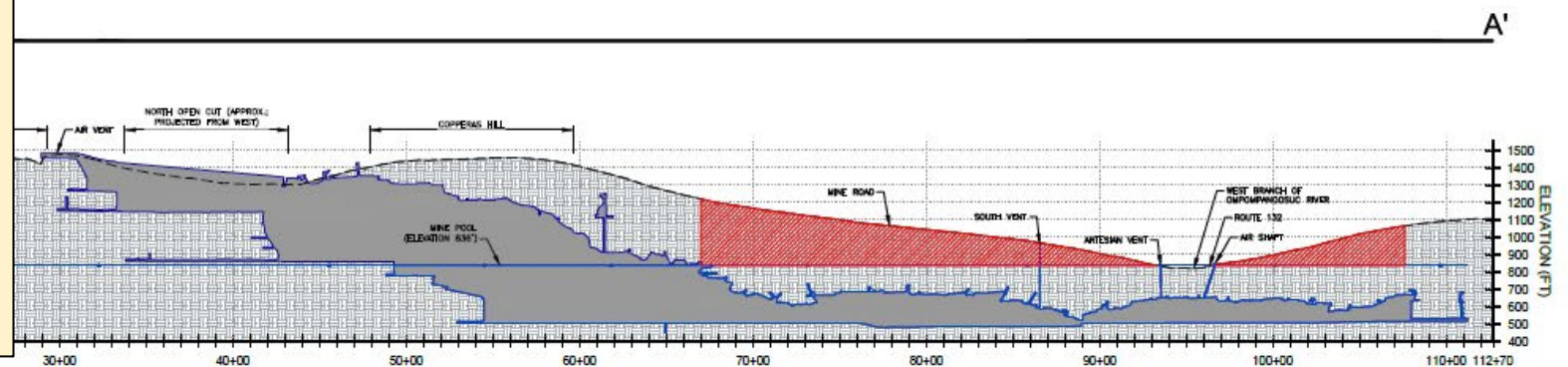
**Blue shading** - depicts extent of existing land-use restrictions already completed

**Green shading** - depicts the extent of the Waste Management Area where property specific land use restrictions are necessary.

**Purple Line and cross hatching** - depict the areas most likely to reside above the Underground Workings where some form of well installation restriction is necessary.

**Pink Shading** – area of groundwater contamination outside the Waste Management Area and not within the Underground Workings.

**Yellow Shading** – depicts area where there may be an advisory due to uncertainty regarding the distance from the Underground Mine workings that a well should be located.





- Summary:
  - Major site activities in 2021 include:
    - Closure of the 1898 Adit;
      - Copperas Road will be closed from May – August 2021.
      - Short-term closures of Mine Road may be necessary.
    - Repair of the Tyson Road bridge deck;
    - Installation of 2 additional monitoring wells;
    - Sampling of groundwater, surface water, sediment, and residential wells;
    - Continued work to secure land-use restrictions on properties within the Waste Management Area;
    - Continued work to develop groundwater use restrictions for areas where groundwater contamination may be located; and
    - Transition of the site management from EPA to VTDEC



# Elizabeth Mine Site Contacts

Edward Hathaway  
US EPA ME/VT/CT Superfund Section  
5 Post Office Square, Suite 100  
Mailcode: 07-1  
Boston, MA 02109-3912  
(617) 918-1372  
[Hathaway.ed@epa.gov](mailto:Hathaway.ed@epa.gov)

John Schmeltzer, Environmental Analyst  
VTANR/Department of Environmental Conservation  
Waste Management and Prevention Division  
1 National Life Drive – Davis 1  
Montpelier, VT 05620-3704  
(802) 249-5620  
[John.Schmeltzer@vermont.gov](mailto:John.Schmeltzer@vermont.gov)

You can view the information about the Elizabeth Mine at: [www.epa.gov/superfund/elizmine](http://www.epa.gov/superfund/elizmine)