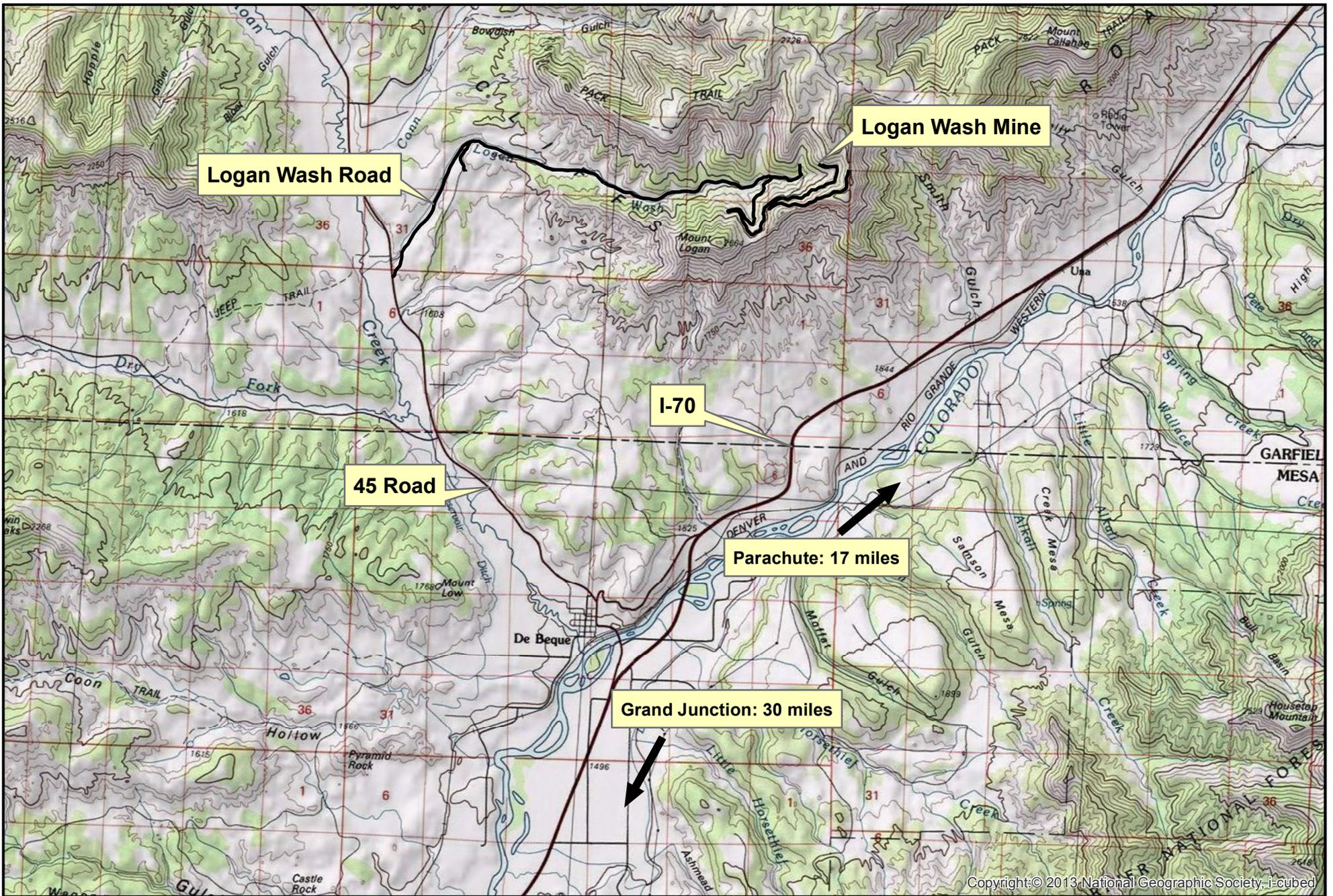


**FIGURES**



Copyright: © 2013, National Geographic Society, i-cubed

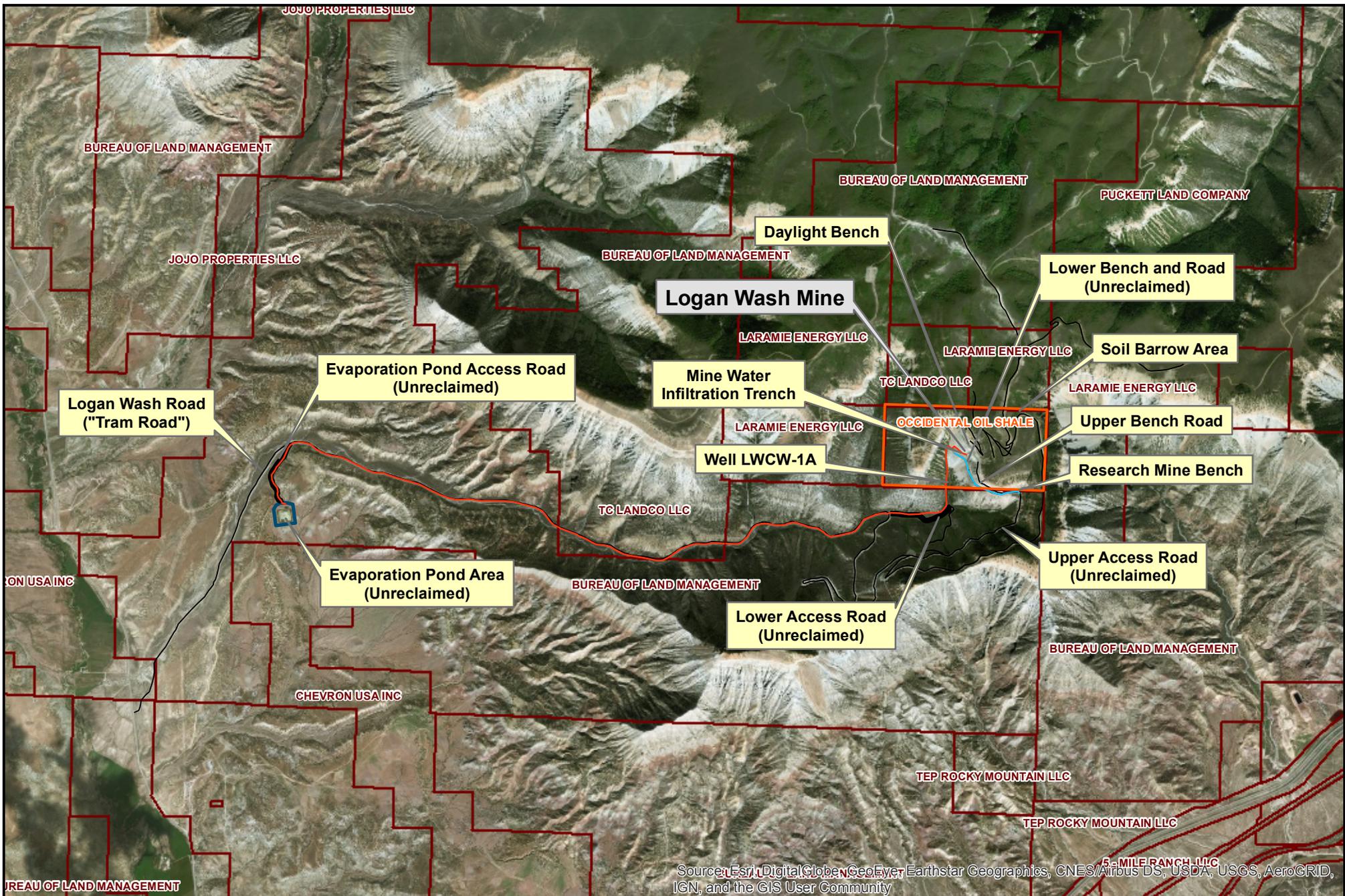
**Figure 1. Logan Wash Mine Location Map**

N1/2, S 25, T 7S, R 97W, 6 P.M.  
Garfield County, Colorado



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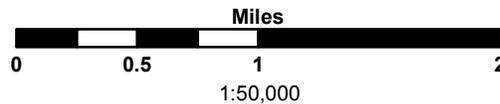
Base Map Source: USGS and NGS 2007(C) and Esri Arc GIS Online Maps



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

**Legend**

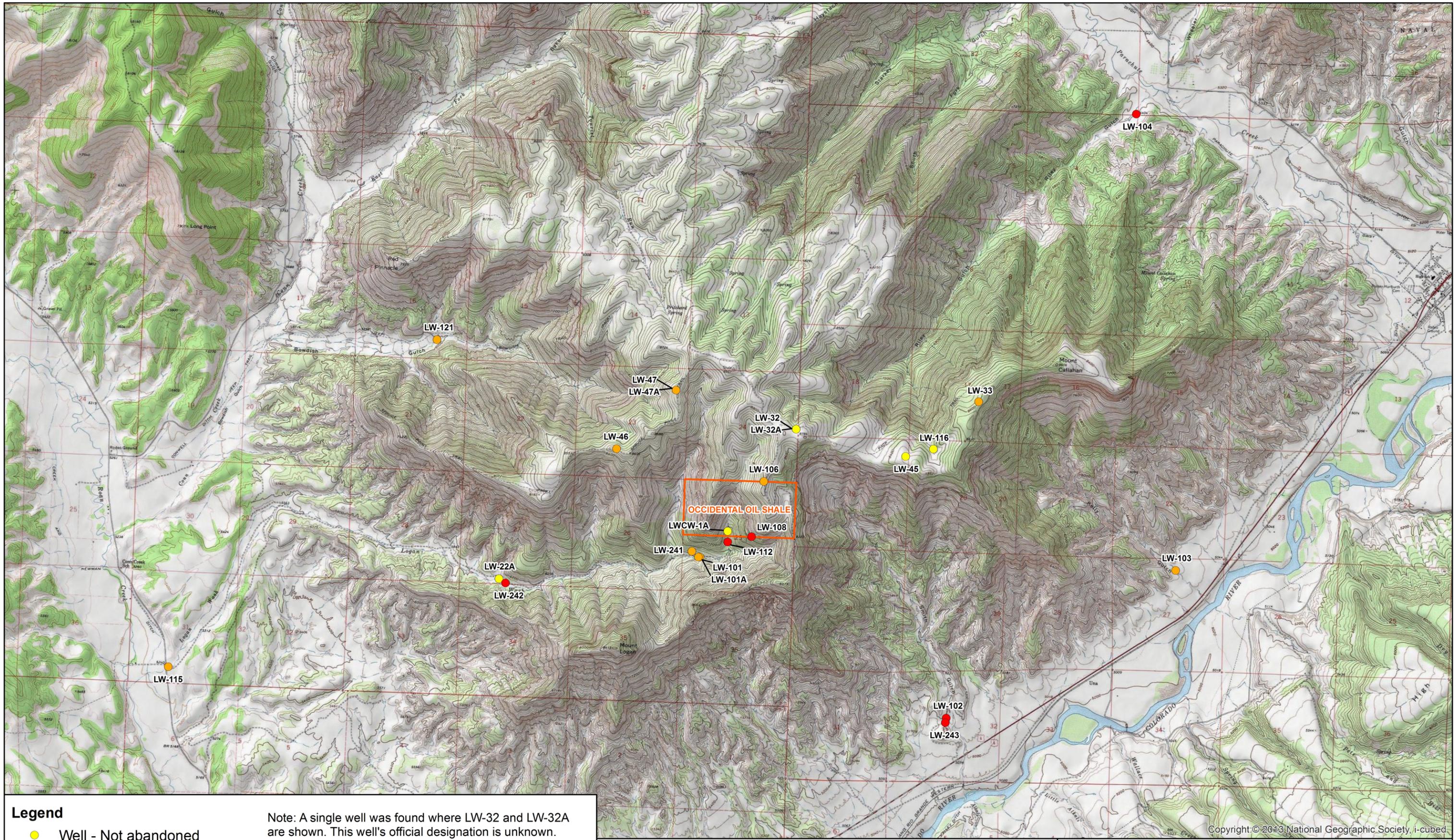
-  Retort Water Pipeline
-  Research Mine Water Pipeline



**Figure 2. Logan Wash Mine Facilities  
(Unreclaimed areas noted)**

Garfield County, Colorado

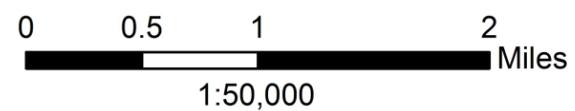




**Legend**

- Well - Not abandoned
- Well - Abandoned
- Well - Could not be located; Potentially abandoned

Note: A single well was found where LW-32 and LW-32A are shown. This well's official designation is unknown.



**Figure 3. Logan Wash Mine Wells**

Garfield County, Colorado



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Area Number	Name	Warranty Release Request Date
1	Mine Dump	2020
2	Upper Mine Bench	2020
3	Lower Mine Bench	TBD
4	Research Mine Bench and Dump	2020
5	Old Surface Process Facility	Released in 1986
6	Two Overflow Ponds	Released in 2006
7	Equipment & Parts Storage	Released in 1986
8	Ventilation Fan Site	Released in 2006
9	Power Substation	Released in 2006
10	Helo Pad	2020
11	Guard Gate Area	N/A
12	Met Tower	Released in 2006
13	Misc. Access Roads	2020
14	Oil Transfer Pipeline	Released in 2006
15	Heater/Treater	Released in 2006
16	Microwave Tower	Released in 2006
17	Exhaust Stack	Released in 2006
18	Logan Wash Road	N/A
19	Surface Process Control	Released in 2006
20	Top Soil Storage	Released in 2006
21	Berm Material	Released in 1986
22	Heater Treater Meteorological Station	Released in 1986
B1-B10	Logan Wash Road Realign	2020
New	Soil Barrow Area (2005)	2020
23	Evaporation Pond and Pipeline	TBD



**Legend**

- Parcel boundaries
  
- Permit Reclamation Areas**
- Not to be reclaimed
- In use; Not under reclamation
- Reclaimed and released
- Under reclamation
  
- Roads**
- Not to be reclaimed
- Reclaimed
- In use; Not under reclamation

**Figure 4A. Logan Wash Mine Reclamation Status**

Garfield County, Colorado

Area Number	Name	Warranty Release Request Date
1	Mine Dump	2020
2	Upper Mine Bench	2020
3	Lower Mine Bench	TBD
4	Research Mine Bench and Dump	2020
5	Old Surface Process Facility	Released in 1986
6	Two Overflow Ponds	Released in 2006
7	Equipment & Parts Storage	Released in 1986
8	Ventilation Fan Site	Released in 2006
9	Power Substation	Released in 2006
10	Helo Pad	2020
11	Guard Gate Area	N/A
12	Met Tower	Released in 2006
13	Misc. Access Roads	2020
14	Oil Transfer Pipeline	Released in 2006
15	Heater/Treater	Released in 2006
16	Microwave Tower	Released in 2006
17	Exhaust Stack	Released in 2006
18	Logan Wash Road	N/A
19	Surface Process Control	Released in 2006
20	Top Soil Storage	Released in 2006
21	Berm Material	Released in 1986
22	Heater Treater Meteorological Station	Released in 1986
B1-B10	Logan Wash Road Realign	2020
New	Soil Barrow Area (2005)	2020
23	Evaporation Pond and Pipeline	TBD



**Legend**

Parcel boundaries

**Permit Reclamation Areas**

Not to be reclaimed

In use; Not under reclamation

Reclaimed and released

Under reclamation

**Roads**

Not to be reclaimed

Reclaimed

In use; Not under reclamation

Evaporation Pond Pipeline

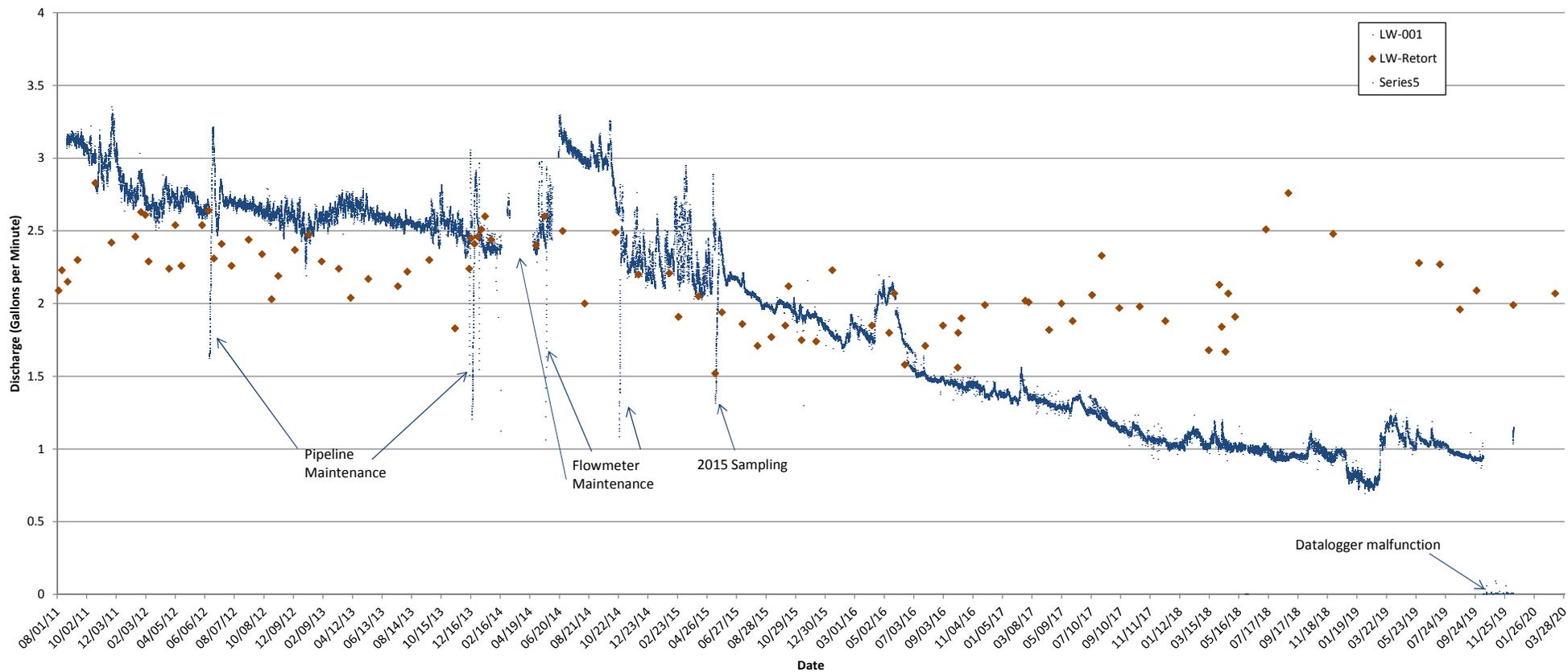
**Figure 4B. Logan Wash Mine Reclamation Status**

Garfield County, Colorado



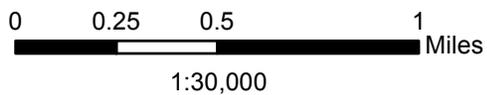
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Figure 5. Logan Wash Mine LW-001 and LW-Retort Discharge





● Sampled Locations



**Figure 6. 2019 Semi-Annual Sampling Locations**

Garfield County, Colorado



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**Figure 7. Logan Wash Mine Evaporation Pond Leak Detection Vault Water Levels**

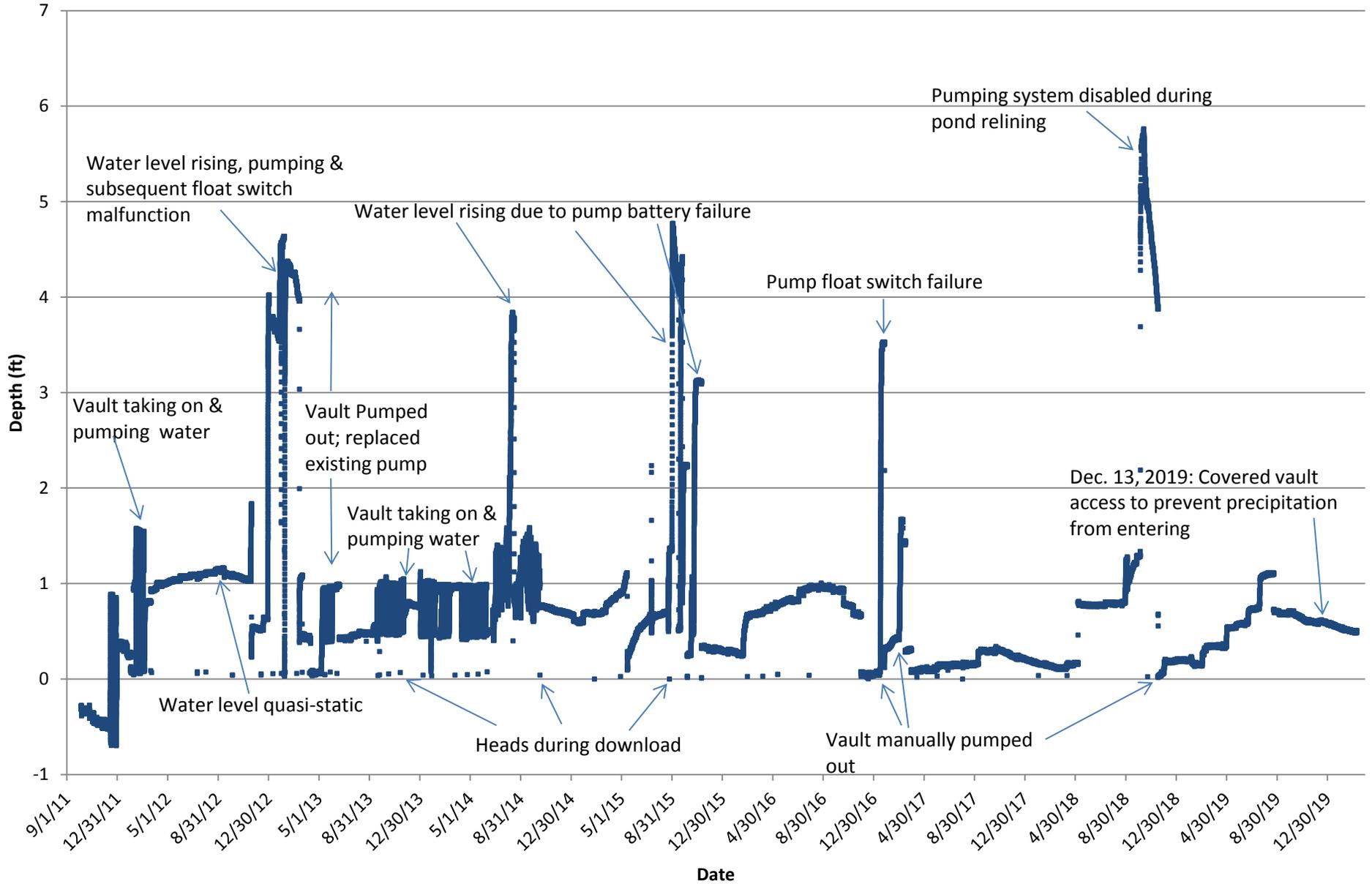
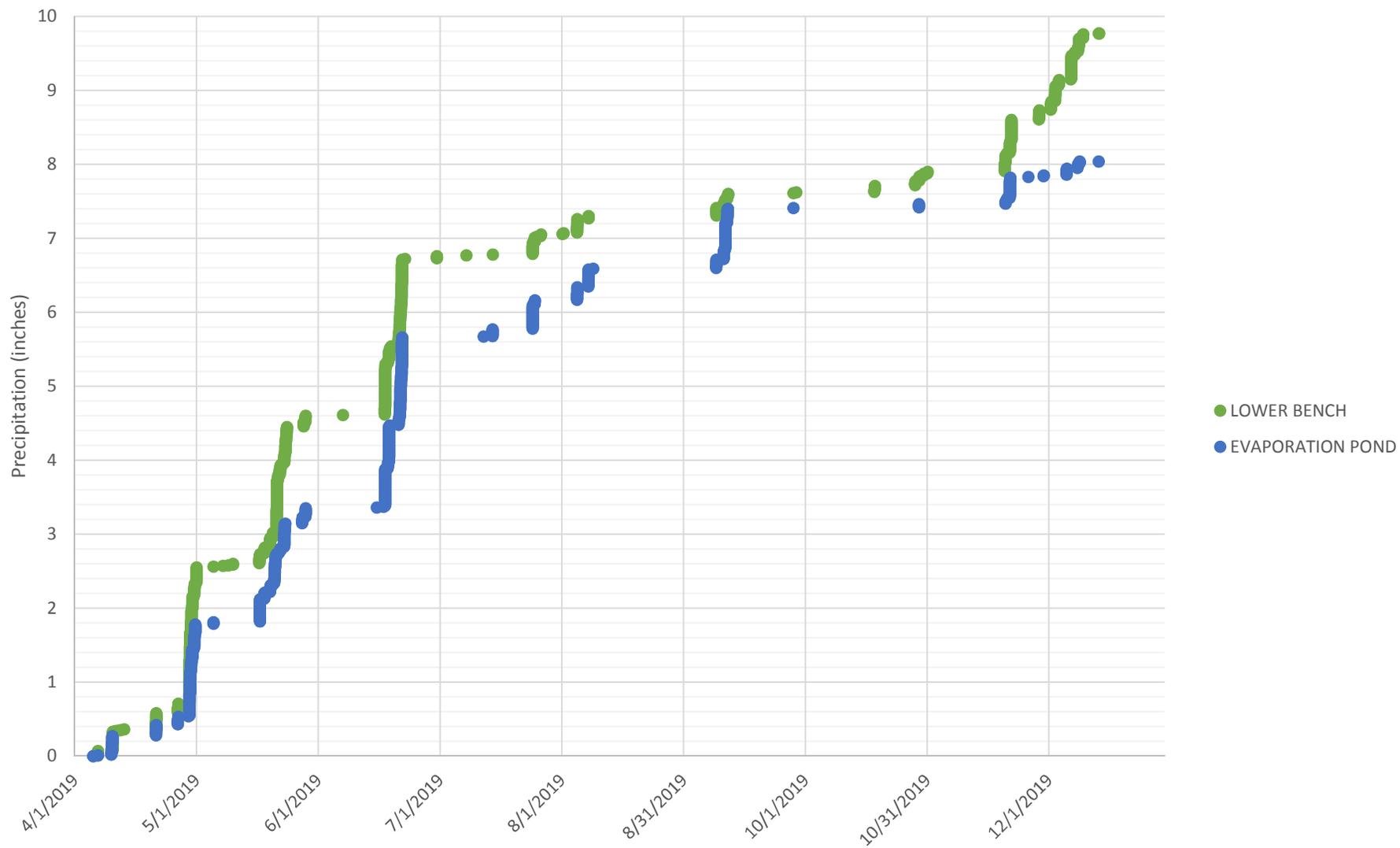
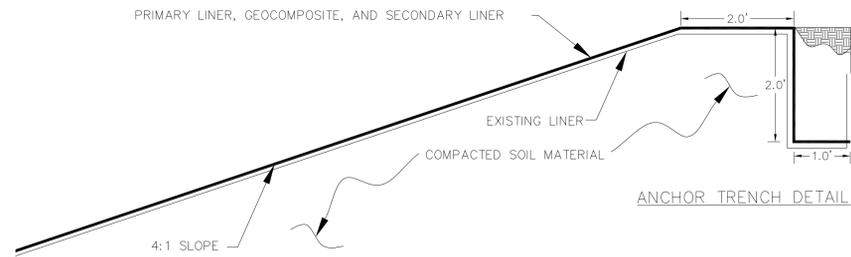


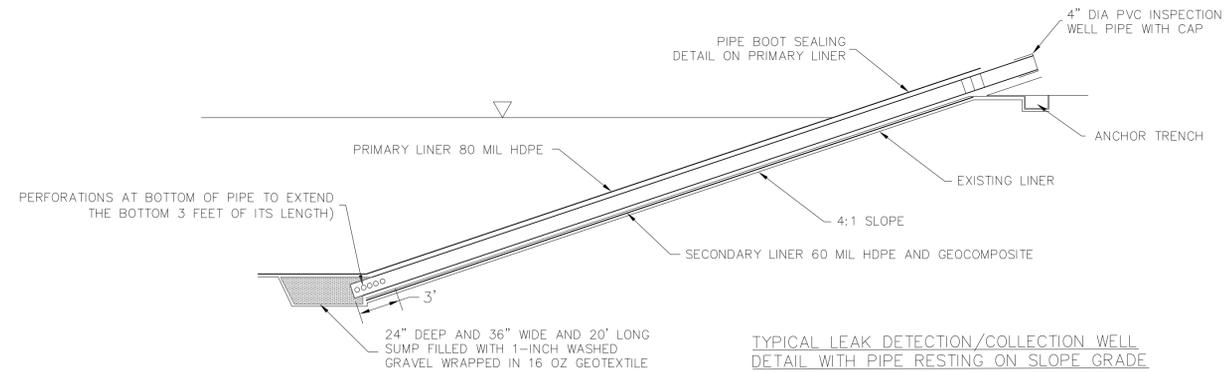
Figure 8. 2019 Logan Wash Mine Precipitation



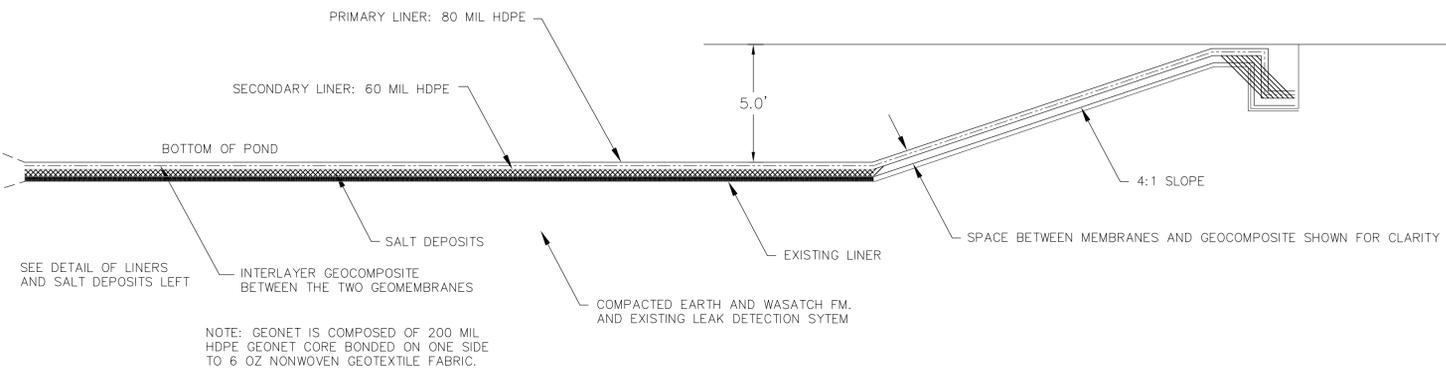
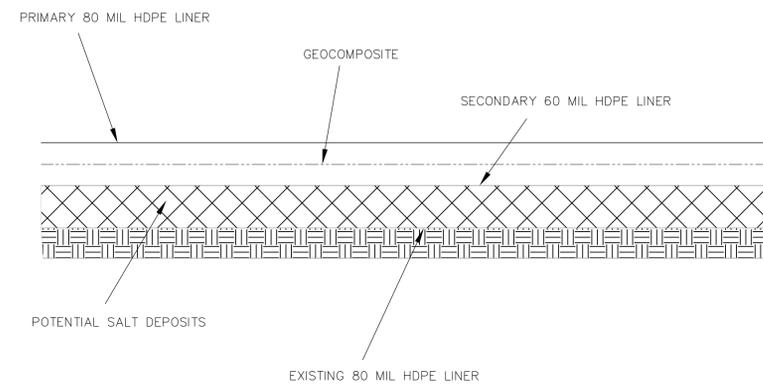
DATE	DESCRIPTION	BY	CHK
09-11-18	CHANGED SECONDARY 80 MIL LINER TO 60 MIL LINER	JEK	JEK



NO SCALE



NO SCALE



NOTE: GEONET IS COMPOSED OF 200 MIL HDPE GEONET CORE BONDED ON ONE SIDE TO 6 OZ NONWOVEN GEOTEXTILE FABRIC.

MEMBRANE LINERS AND GEOCOMPOSITE DETAILS

NO SCALE

LOGAN WASH MINE  
EVAPORATION POND RELINING PROJECT  
OCCIDENTAL OIL SHALE, INC.

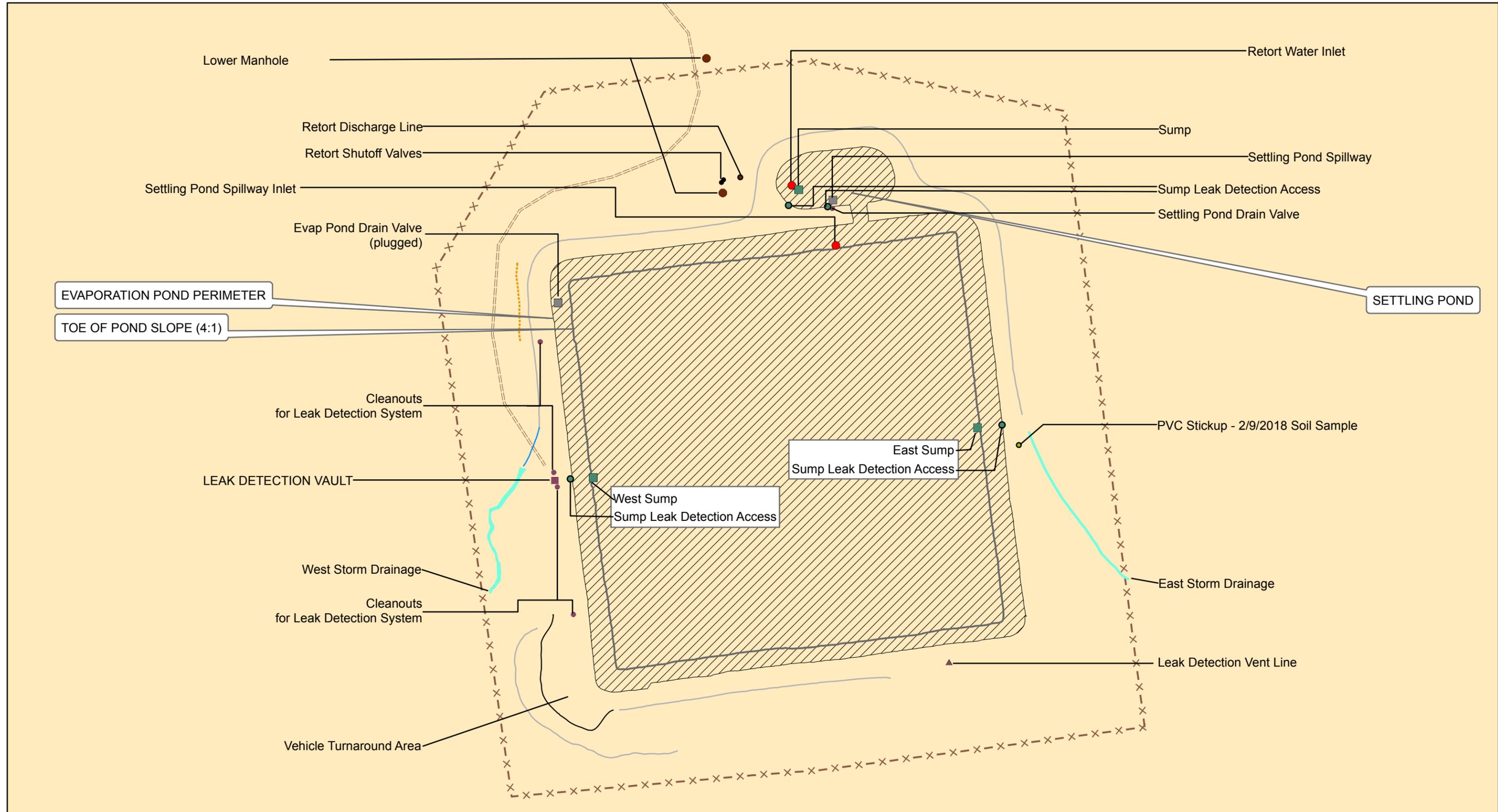


Rhino Engineering, Inc.  
PO Box 810  
Cedaredge CO 81413  
(970) 241-6027  
info@rhinoengineers.com  
www.rhinoengineers.com

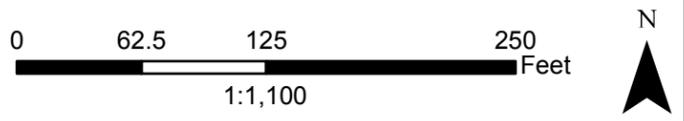


SHEET

Figure 9. Pond Lining System



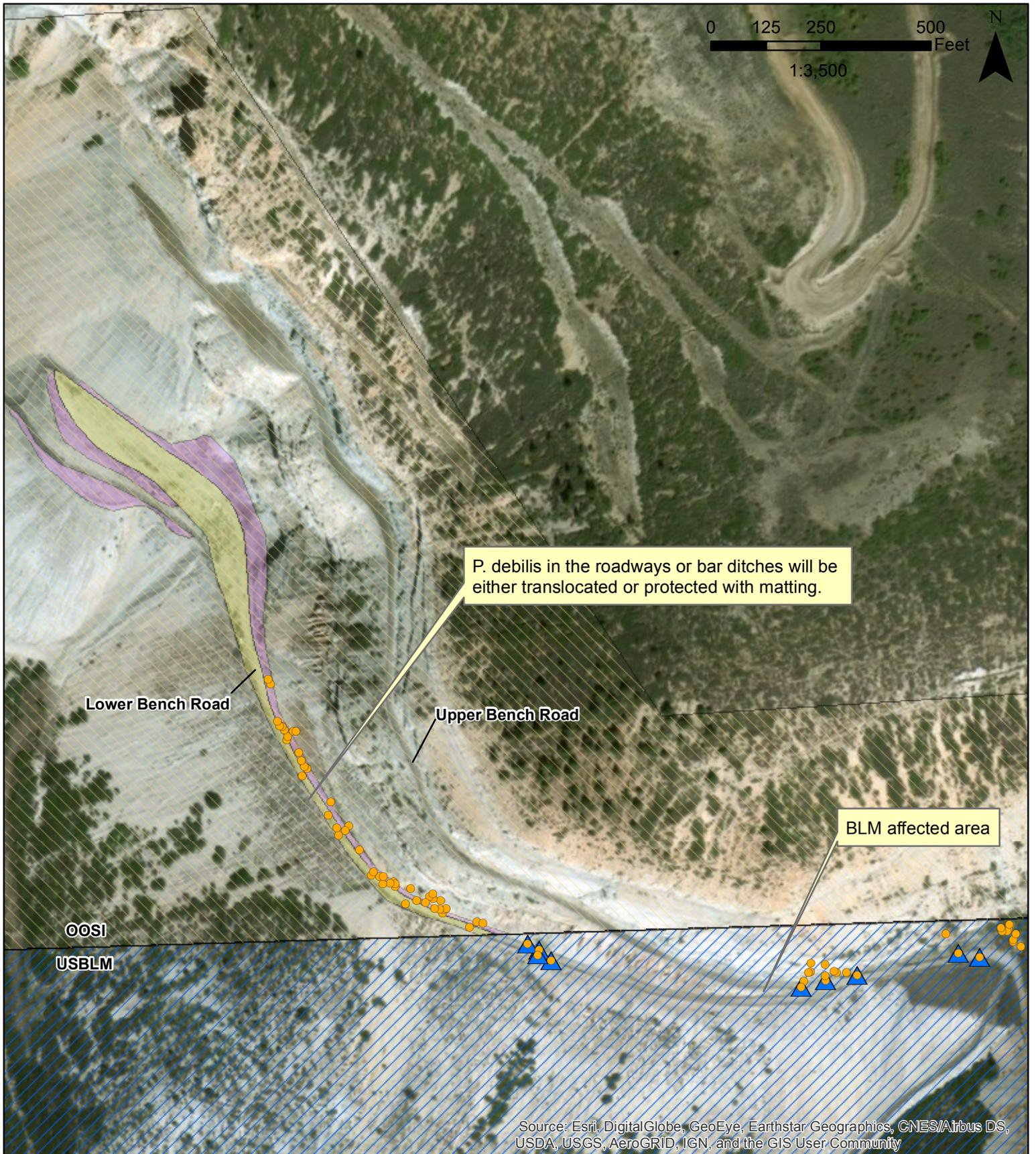
- Legend**
- × - Pond Perimeter Wildlife Fence
  - - - Safety Fence
  - Low Crossing Swale
  - Toe of Cut Slope
  - == Access Road



**Figure 10. Logan Wash Mine  
Evaporation Pond Site Map As-Built 2018 Pond Reline Project**

Garfield County, Colorado





Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

**Legend**

- Potentially disturbed area
- Potential transplant area
- CNAP boundary
- Bureau of Land Management (USBLM) parcels
- Penstemon debilis (Location accuracy +/- 10 feet)
- Protective barricade or matting

**Figure 11. Locations of P. debilis, Proposed Mitigation measures and Potential Transplant Areas**

Garfield County, Colorado



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Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus-DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

**Figure 12**  
**Logan Wash Mine *P. debilis* Transplanting**  
**March 25, 2015**

N 1/2 S. 25 T. 7S R. 97W 6 P.M.  
 Garfield County, Colorado



**Legend**

- Original location
- Transplanted location
- ▨ CNAP boundary
- ▨ Bureau of Land Management (BLM) parcels

0 25 50 100 Feet  
 1:800

Note: The original location of Plant No. 29 was overlooked during the survey.