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WEEKLY REPORT – RED & BONITA BULKHEAD TEST

DATE: July 15 – 22, 2020	**REPORT NO: 2**
TEST PHASE: Phase 2, Filling to 50 ft Head	**TO: Kerry Guy, James Hou**
PREPARED BY: Christoph Goss, PhD, PE, Morley Beckman, PE, and Erinn Johnson	**FROM: Deere & Ault, Mountain Studies Institute, U.S. Environmental Protection Agency, Environmental Restoration, and Weston Solutions**

Note: Weekly Report No. 1 covered the period July 11 – 17 (Saturday – Friday). Starting this week, reports shall start on Thursdays and end on Wednesdays. Data contained in this report overlaps slightly with Report No. 1.

Actions Taken This Week:

- Pressure readings taken on regular basis at the pressure gauge by the Red & Bonita (R&B) portal, and at the pressure gauges by the R&B bulkhead
- Daily R&B adit inspections by ER
- Weekly inspections performed by MSI at all sites listed in the R&B Bulkhead Test Execution Plan
- ER/MSI installed a third flume inside Red & Bonita portal. Three flumes currently installed.
- Flow rates and pressures from various on-site instruments monitored and recorded.
- Laptop PC hooked up to Campbell Scientific datalogger in Red & Bonita to vibrating wire piezometer readings behind bulkhead and flowmeter readings on R&B discharge pipeline.

Items Pending Resolution:

- Red & Bonita datalogger (flowmeter on R&B discharge pipeline and vibrating wire piezometer behind R&B bulkhead) is not transmitting properly due to a problem with the antenna cables. Hence this data cannot be viewed real-time. MSI and Campbell Scientific are working on fixing the issue. MSI is also considering a backup antenna option. Data is being manually downloaded.
- Previous 2 months of American Tunnel pressure transducer readings are not in agreement with manual flume readings, however most recent comparison (which will be included in next week's report) shows good agreement. Recent comparison includes data from after the recalibrated old transducer was reinstalled, indicating the transducer may have been the issue.
- R&B vibrating wire piezometer raw data needs to be processed with instrument- and location-specific variables including temperature and barometric pressure. Deere & Ault is working on the correct processing equation to convert raw data to psi / feet of head.

Key Observations:

- Pressure behind the bulkhead reached ~50 feet of head on July 18th, 2020.
- The pressure is holding steady in the 50-60 feet of head range, with an average bypass flow rate of 116 gpm.
- 7/21/20 – Water from Red & Bonita reading at: pH: 5.72, Electric Conductivity: 2.35 µS/cm
- During full closure of Red & Bonita valve (7/16-18) flow rates at Gold King increased slightly and had lower diurnal fluctuations. When the Red & Bonita globe valve was partially opened, the slightly lower flow rates and great diurnal fluctuations resumed (Figure 1).
- Good agreement between pressure gauges at R&B portal and bulkhead.
- Weeping visible around Red & Bonita Bulkhead. This is normal and expected.
- Some weeps in joints 20 feet outby of bulkhead. This is normal and expected.
- No flows coming from side drift.
- No flows measured in 3 adit flumes.

Actions for Next Week:

- Close globe valve and begin filling to 200'.
- Sample flow at plant from R&B before closing valve.
- Regular daily inspections of Red & Bonita (ER) and weekly inspections of all planned sites in the area (MSI).

Observations by location:

Location	Observations
Adams Mine	No changes observed
Adams Mine – North Adit	No changes observed
Adit 268-20	No changes observed
Adit 268-21	No changes observed
American Tunnel	No changes observed
ATPZ-2	Water level constant
Blackhawk Mine	Visited on July 10, 2020. No observations to note
Gladstone Seeps & Springs	No changes observed
Gold King Level 7	See "Key Observations" section above
Lead Carbonate Mine	Will visit by July 31, 2020
Mogul Mine	No changes observed
Mogul Mine – South Adits	No changes observed
Natalie / Occidental	Visited on July 1, 2020. seasonal flows are decreasing
NFPZ-1	Slowly rising as is typical for season
North Fork Seeps & Springs	No changes observed
Pride of Bonita	No changes observed
Red & Bonita	Weeping/seepage near bulkhead, normal and expected, as outlined under "Key Observations" above
Red & Bonita / Adams Mine Gulch Seeps & Springs	Seasonal flows decreasing
Terry Tunnel	Some seepage, avalanches appear to have moved material at portal and drainage ditches

Figure 1: Head Behind Red & Bonita Bulkhead and Gold King Flows vs. Time (Current Testing Period)
Figure 2: Gold King Flow and Red & Bonita Head vs. Time (Full Testing Period)
Figure 3: Adit Flows and Piezometers vs. Time
Figure 4: NFPZ-1 and ATPZ-2 vs. Time
Figure 5: Red & Bonita Plan & Profile

Attachment A: Photographs, July 15 - 22, 2020
Attachment B: Weekly Summary Report of MSI Observations (table and map)

FIGURE 1: Head on Red & Bonita Bulkhead and Gold King Flow Rate

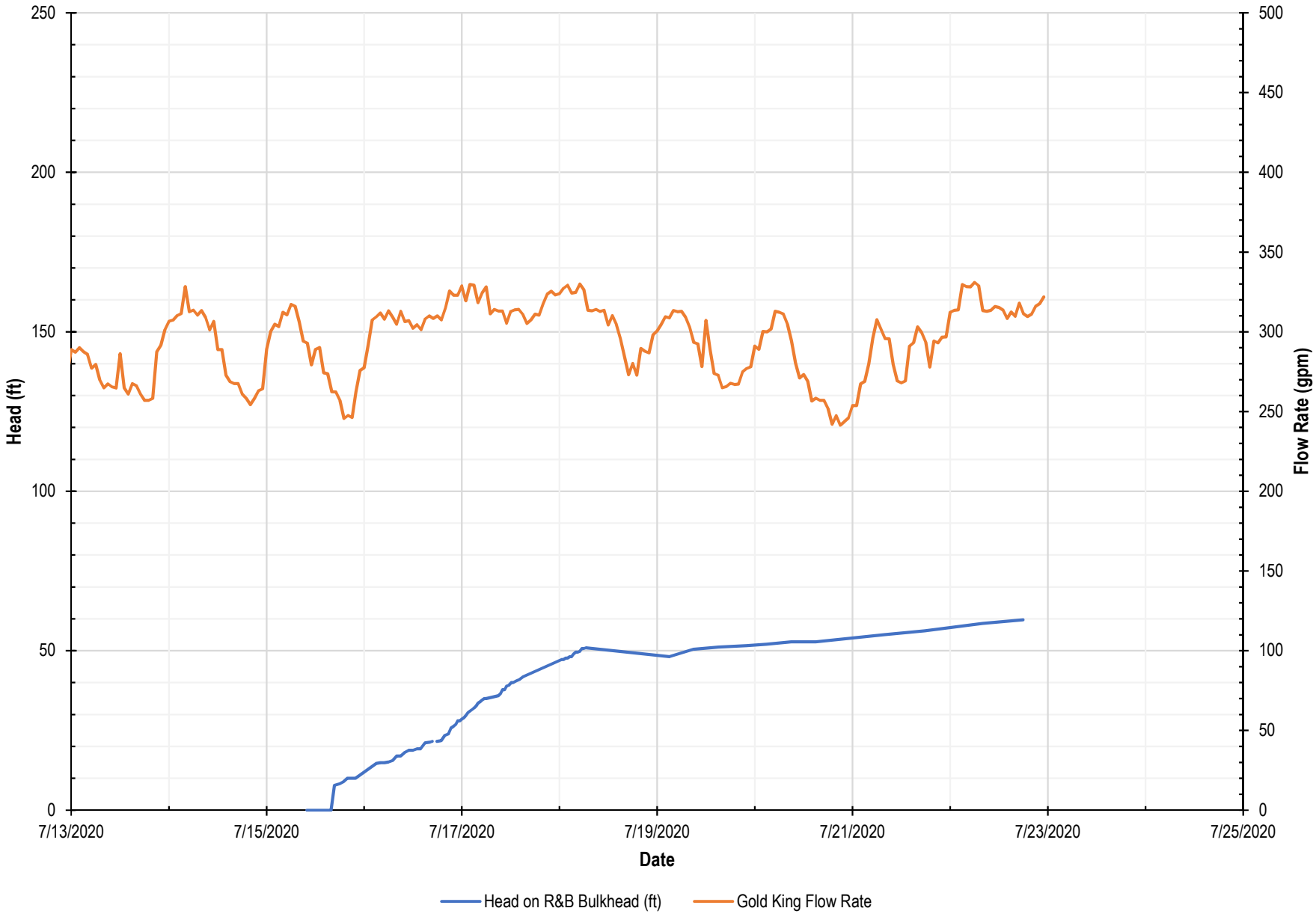


FIGURE 2: Head on Red & Bonita Bulkhead and Gold King Flow Rate - Full Time Period

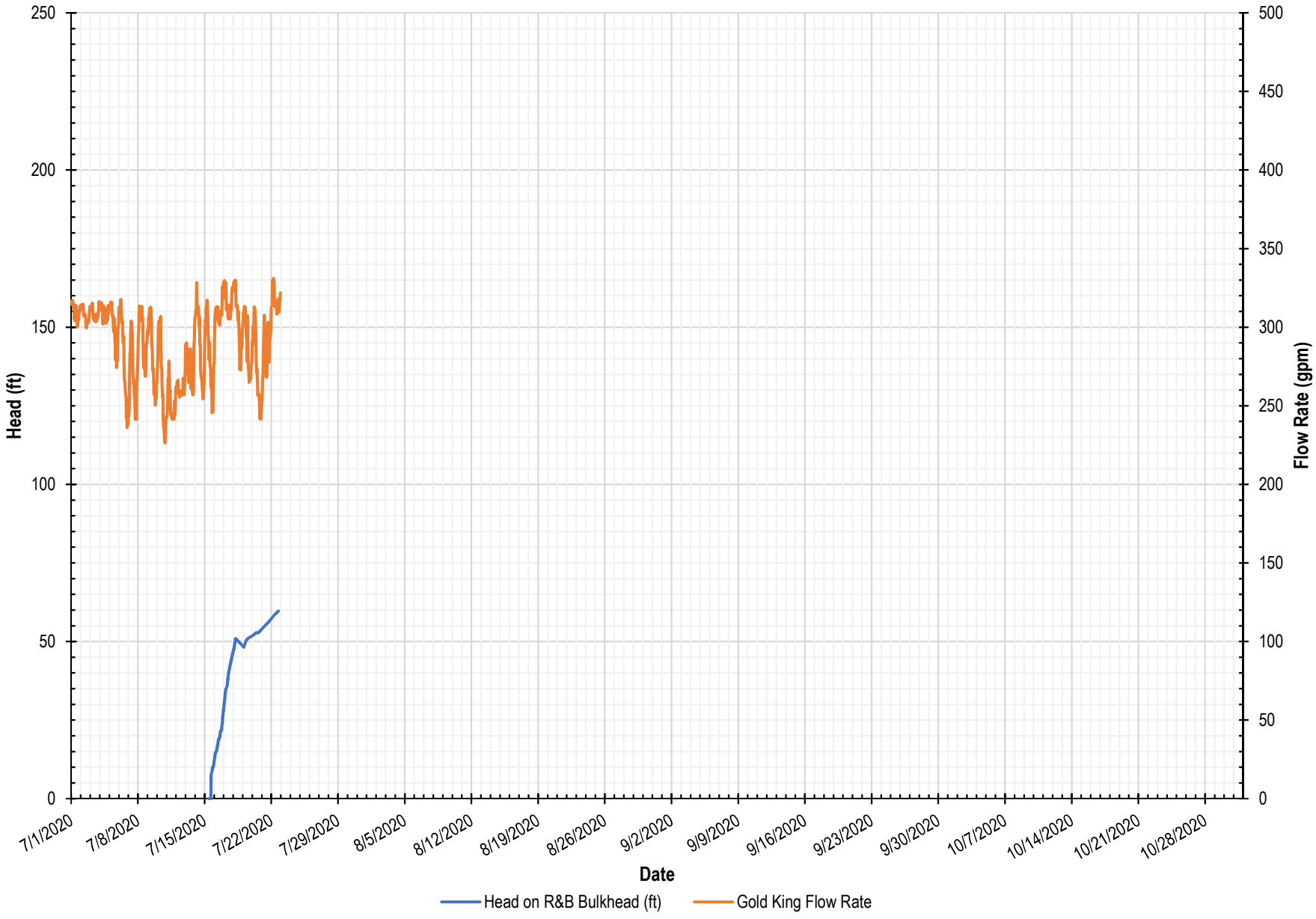


FIGURE 3: Adit Flows and Water Levels

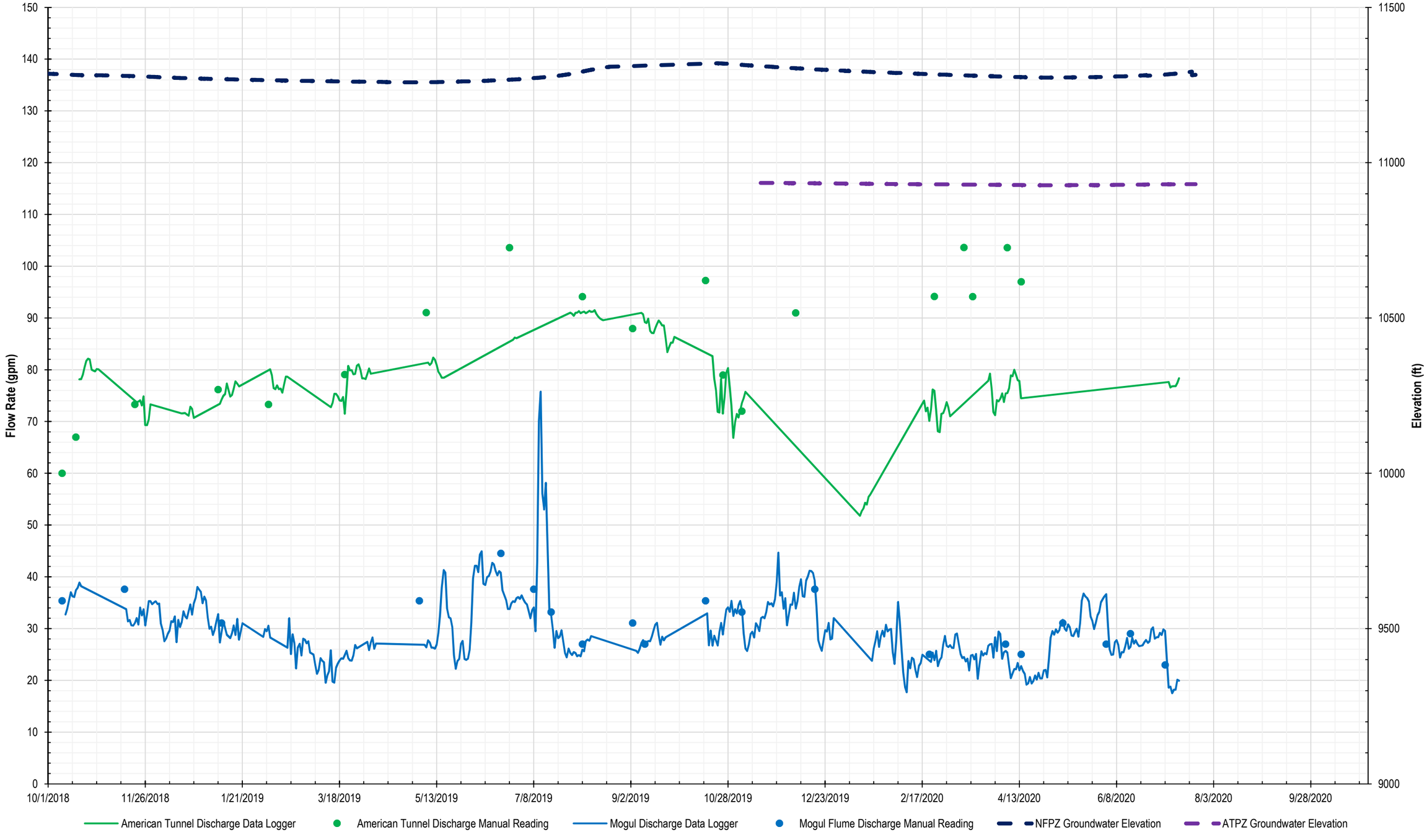
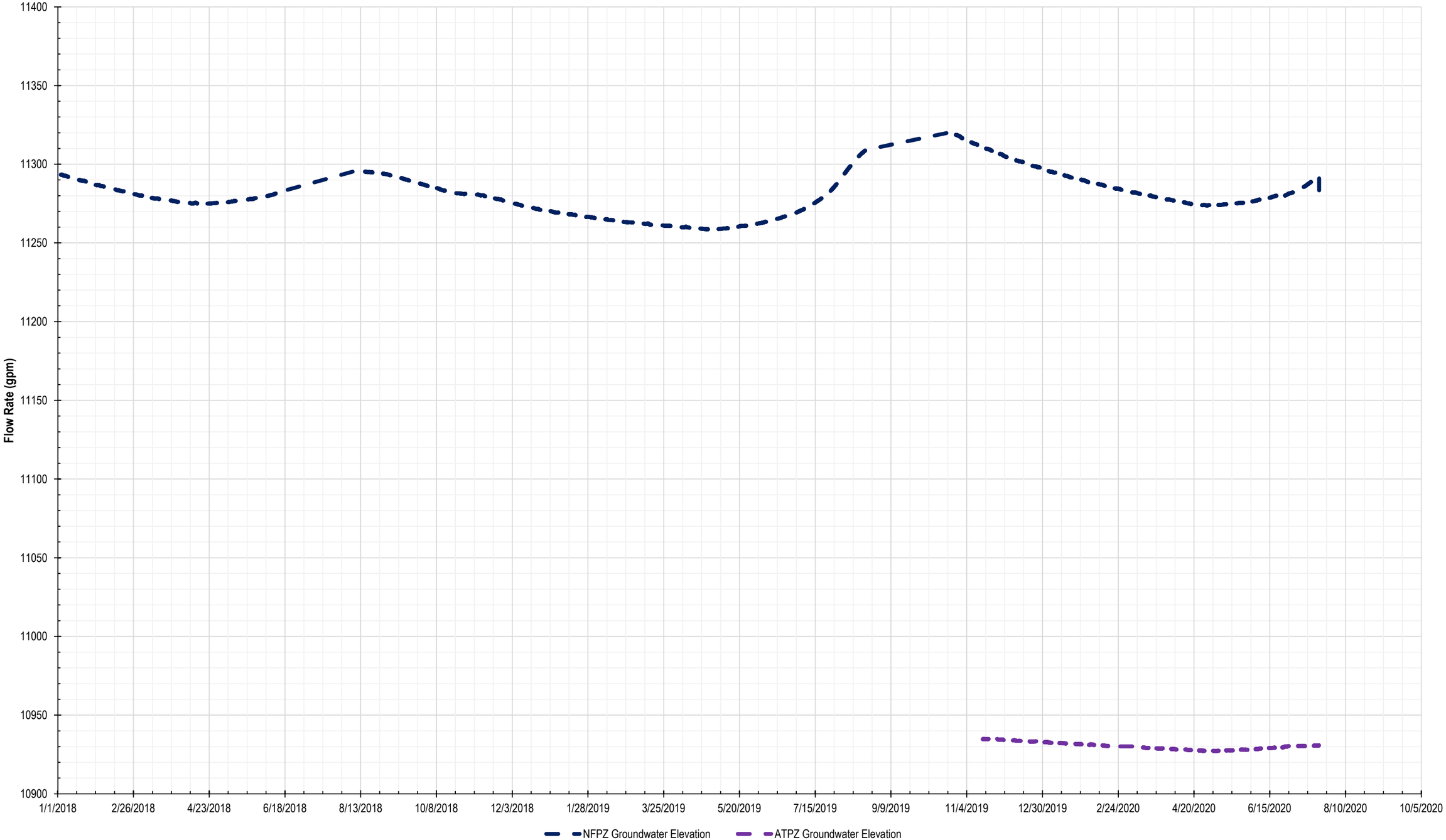
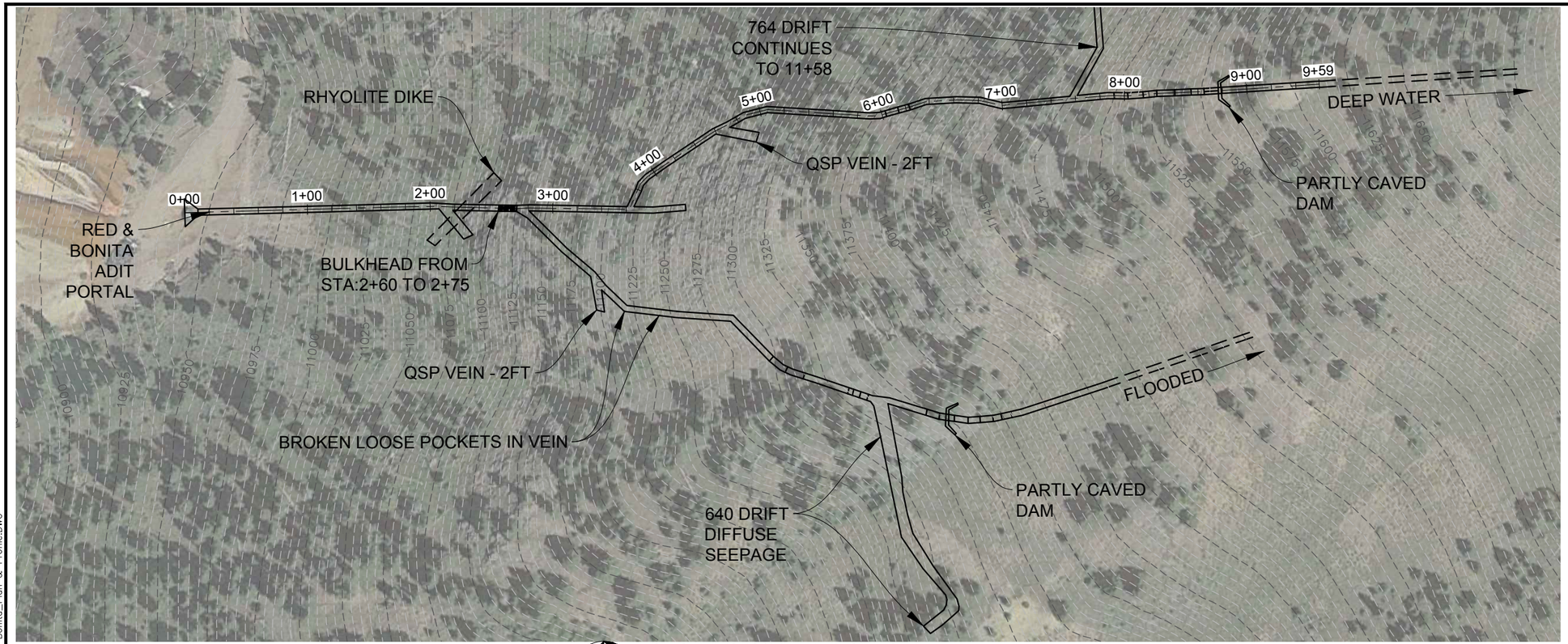


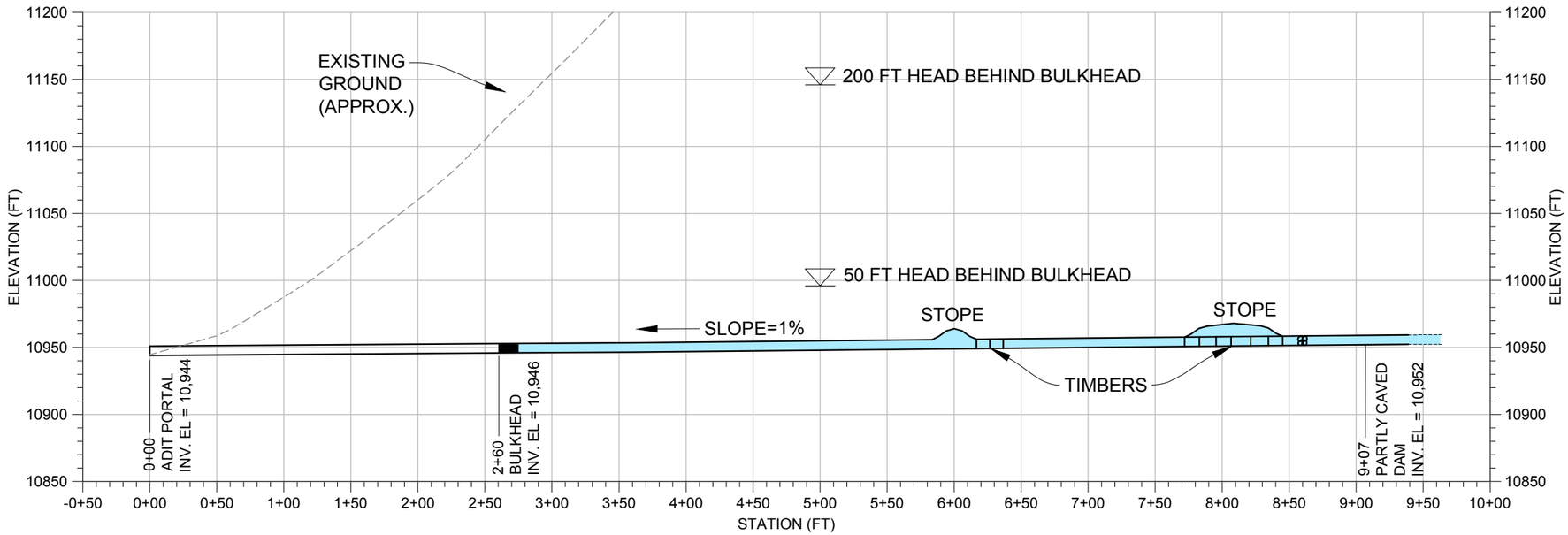
FIGURE 4: Groundwater Elevations





RED AND BONITA ADIT PLAN

0 50 100
SCALE IN FEET



RED AND BONITA ADIT PROFILE

0 50 100
SCALE IN FEET

NOTES:

1. RED AND BONITA ADIT MAP PLAN VIEW BY BRUCE K. STOVER, COLORADO DIVISION OF RECLAMATION, MINING AND SAFETY (DRMS), AUGUST 13, 2013.
2. SURVEY BY ITC RESOURCES JUNE 2020.

DRAFT

JOB NO. 0251.002.00

RED & BONITA ADIT

PLAN & PROFILE

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FIGURE NO. **5**

DATE: **JULY 2020**

SCALE: **AS NOTED**

Friday, July 24, 2020 10:30:53 AM DRAWING: Q:\0251 Environmental Restoration\0251.002 Red Bonita\CAD\Working\Red and Bonita_Plan & Profile.DWG

PHOTO 1

DATE TAKEN: 07/22/2020

LOCATION:

Red & Bonita Portal.

COMMENTS:

Portal sump with rainwater.

PHOTO 2

DATE TAKEN: 07/22/2020

LOCATION:

Red & Bonita Portal.

COMMENTS:

PC set up to read data logger inside mine (vibrating wire piezometer behind bulkhead and flow meter on pipe).

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PHOTO 3

DATE TAKEN: 07/22/2020

LOCATION:

Red & Bonita Portal.

COMMENTS:

Pressure gauge upstream of globe valve. 26 psi here is 59 feet of head on the bulkhead.

PHOTO 4

DATE TAKEN: 07/22/2020

LOCATION:

Red & Bonita Adit near Station 1+00.

COMMENTS:

Shotcrete in good shape. Monitor for seeps and drill relief holes if needed.

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PHOTO 5

DATE TAKEN: 07/22/2020

LOCATION:

Red & Bonita Adit near Station 1+00.

COMMENTS:

Bulkhead visible straight ahead, side drift on right.

PHOTO 6

DATE TAKEN: 07/22/2020

LOCATION:

Red & Bonita Side Drift.

COMMENTS:

Flume in side drift, no flow.

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PHOTO 7

DATE TAKEN: 07/22/2020

LOCATION:

Red & Bonita Bulkhead

COMMENTS:

General overview, note flume to measure seepage.

PHOTO 8

DATE TAKEN: 07/22/2020

LOCATION:

Red & Bonita Bulkhead

COMMENTS:

Note water pool on floor.

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PHOTO 9

DATE TAKEN: 07/22/2020

LOCATION:

Red & Bonita Bulkhead

COMMENTS:

Pressure gauges on bulkhead sampling pipe. Average 25 psi here is 59 feet of head on the bulkhead which agrees with the portal gauge.

PHOTO 10

DATE TAKEN: 07/22/2020

LOCATION:

Red & Bonita Bulkhead

COMMENTS:

Minor seeps along right rib of bulkhead. This is normal.

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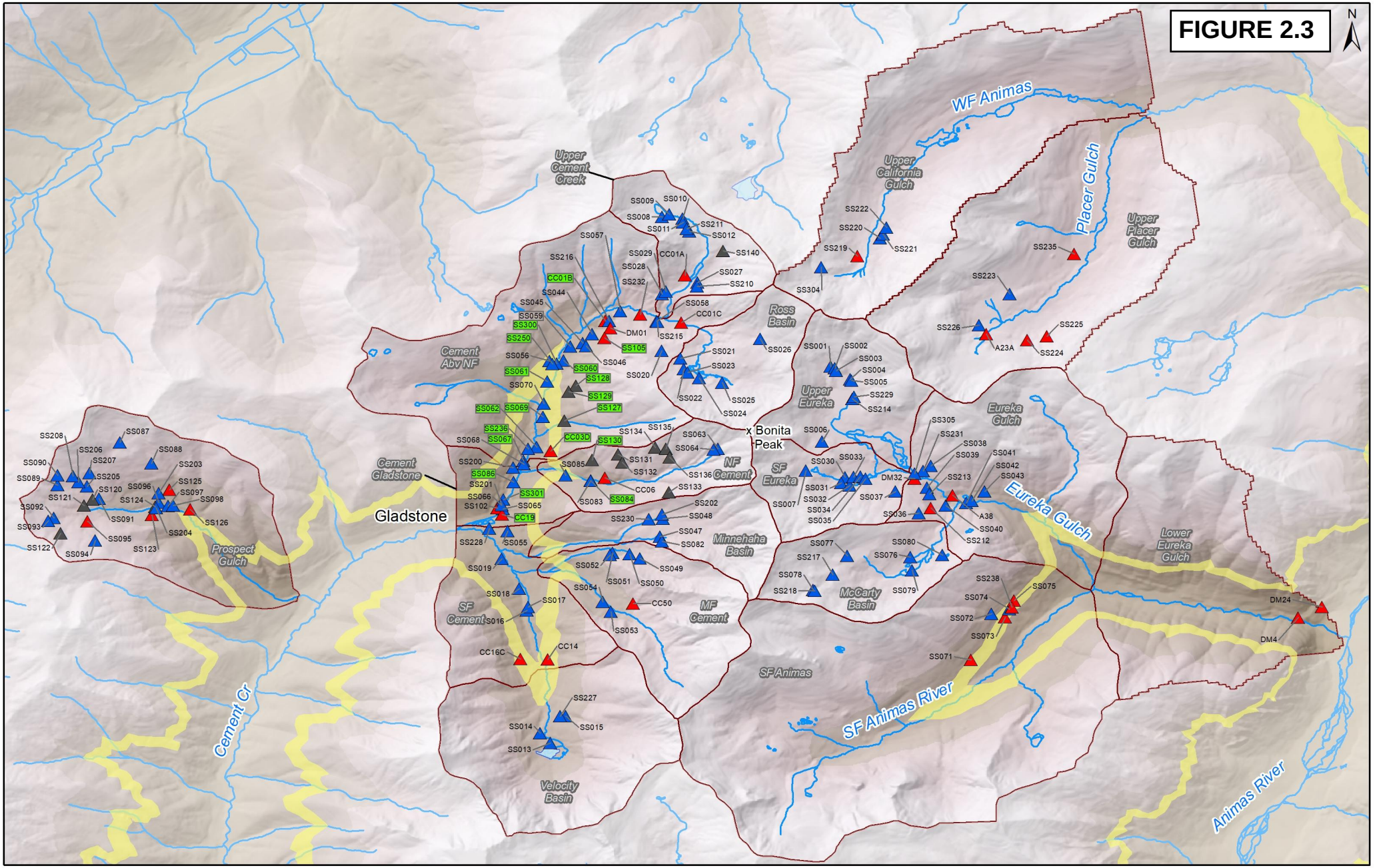
FIGURE 2.3
N
WF Animas
Upper Cement Creek
Upper California Gulch
Placer Gulch
Upper Placer Gulch
Ross Basin
Cement Abv NF
Upper Eureka
Eureka Gulch
Bonita Peak
Cement Gladstone
Gladstone
NF Cement
SF Eureka
Eureka Gulch
Lower Eureka Gulch
Prospect Gulch
Minnehaha Basin
McCarty Basin
SF Cement
MF Cement
SF Animas
SF Animas River
Cement Cr
Velocity Basin
Animas River
BPMD
Seeps, Springs, & Draining Mines 2016-18
Mountain Studies Institute
RESEARCH & EDUCATION IN THE SAN JUAN MOUNTAINS, COLORADO
mountainstudies.org
Locations sampled 2016-18
Draining Mine
Dry Mine
Seep/Spring
200' Elevation Band Above Red & Bonita Mine
Sub-basins focused on for this report
Locations sampled 2016-18 selected to be sampled in 2020
0
0.5
1
2
3
4
Miles
San Miguel County
Ouray County
Hinsdale County
Dolores County
San Juan County
Montezuma County
La Plata County
Archuleta County
Colorado
New Mexico

Mountain Studies Institute
SAN JUAN MOUNTAINS COLORADO

Event Date	Event Time	Sample Event	Location_ID	Temperature (Celsius) -	SPC - Specific Conductivity	pH - [Surface Water]	Flow	Why is Flow not being sampled?	Flow (cfs)	Flow_LPS_CFS_Calc	Miscellaneous Comments
7/20/2020	11:46	RBweekly	Adit_2				No	Not Required dry			
7/20/2020	12:07	RBweekly	Adit_268-20				No	Not Required			
7/21/2020	10:54	RBweekly	Adit_268-21				No	Not Required dry			
7/20/2020	8:03	RBweekly	CC01B-00	5.2	1347	3.37	Yes		0.0474		
7/21/2020	9:23	RBweekly	CC03C	6.4	1712	5	Yes			0.000824	Small trickle at outflow. Flow
7/20/2020	8:34	RBweekly	CC06-00	7.7	1950	3.08	No	Not Required			
7/21/2020	11:28	RBweekly	CC19	7.91	1914	4.43	Yes		0.1287		
7/21/2020	11:50	RBweekly	CCSG_3	10.8	638	3.87	Yes		2.3		Manual q cross section
7/21/2020	9:55	RBweekly	CCSG_5	8.3	945	2.88	Yes		0.029		1” Baski
7/21/2020	8:36	RBweekly	CCSG_6	5.6	355	5.71	Yes		1.63		Manual q cross section
7/20/2020	8:21	RBweekly	CCSG_7	5.5	303.6	5.42	Yes		8		
7/21/2020	12:30	RBweekly	CCSG-1	10	714	6.19	Yes		8		
7/21/2020	10:26	RBweekly	SS086	8.4	1237	3.05	Yes			0.001177	
7/20/2020	7:58	RBweekly	SS105-00	4.1	679.3	6.59	Yes		0.039		
7/20/2020	11:57	RBweekly	SS127				No	Not Required dry			
7/20/2020	11:29	RBweekly	SS128				No	Not Required, dry			No field params taken
7/20/2020	11:37	RBweekly	SS129				No	Not Required dry			
7/21/2020	8:30	RBweekly	SS236	4.9	698	3.74	Yes			0.001177	
7/20/2020	9:06	RBweekly	SS250	6.9	963	6.5	No	Not Required; too disperse			
7/20/2020	9:00	RBweekly	SS300	6.3	64.86	4.6	Yes			0.003531	
7/21/2020	11:20	RBweekly	SS301	7.3	1740	2.88	Yes			0.003531	
7/20/2020	8:55	RBweekly	SS60-00	4.6	61.43	4.68	Yes			0.005297	Bag method
7/20/2020	11:17	RBweekly	SS61-00								
7/21/2020	8:20	RBweekly	SS62-00	7.5	628.3	6.39	Yes			0.000294	
7/21/2020	9:39	RBweekly	SS67-00	4.9	1161	3.7	Yes			0.000589	
7/20/2020	12:23	RBweekly	SS69-00	13.7	421	4.06	Yes			0.000589	