100008804

DEERE & AULT
A SCHNABEL ENGINEERING COMPANY

600 South Airport Road, Suite A-205
Longmont, Colorado 80503
T/ 303-651-1468

WEEKLY REPORT – RED & BONITA BULKHEAD TEST

DATE: September 10-16, 2020	**REPORT NO: 10**
TEST PHASE: Phase 3, Filling to 200 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**

Actions Taken This Week:

- The globe valve remained closed to raise the pressure from 50 feet of head to 200 feet of head (Phase 3). Head rose from about 175 feet to 181 feet during this test period.
- Pressure readings were 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 and adit flume measurements were performed by ER.
- Weekly inspections were performed by MSI at all sites listed in the R&B Bulkhead Test Execution Plan and at new emergent flow locations (Attachment B).
- Flow rates and pressures from various on-site instruments were monitored and recorded.
- D&A and DRMS were on site for mine entries on September 15th.
- Water sampling event started this week to coincide with the highest level behind the bulkhead. The end of the sampling event will occur on September 19th, 2020, where the USGS and MSI will perform slug tests at nine locations along Cement Creek.

Items Pending Resolution:

- Confirm final drain down water sampling plan, and coordinate with laboratory to provide rush turnaround on tests (3-4 days) so test results may be used to inform the treatment process and the decision to return discharge to Cement Creek. Rush lab turnaround planned only towards end of drain down as quality visually improves. Tentative plan is to collect one sample at the start of draindown, and weekly thereafter.

Key Observations:

- The team decided to end Phase 3 (filling behind the bulkhead to 200') on September 21st, 2020, allowing approximately four weeks to drain down the level in Red & Bonita before the start of winter weather conditions.
- Pressure has been rising slowly and steadily behind the Red & Bonita bulkhead. The rate has slowed to approximately 0.9 feet per day (Figures 1 and 2). At this rate, it is estimated we will reach about 185-190 feet of head before the drawdown begins.

- Flow rates at Gold King continue with daily fluctuation cycles between approximately 290 to 330 gpm (Figure 1). Average daily flow rates increased from 305 to 330 gpm from 9/9 to 9/16 and daily fluctuations were less volatile than in previous weeks. Flow rates were similar to those in early to mid-August. The flow rates generally correspond with flow rates measured at the treatment plant.
- The data from American Tunnel and Mogul will not be updated this week. The data download will happen during the slug testing with the USGS on Sept. 19th, 2020. Additionally the barometer was stolen from Mogul, so there will be another gap in the data. Figure 3 is shown for reference.
- Water levels in NFPZ-1 following typical seasonal cycle (Figure 4). Level in NFPZ-1 peaked in mid-August and is dropping as part of the typical cycle.
- ATPZ-2 (water level behind American Tunnel Bulkhead 3) remaining fairly steady (Figure 4). Slight increase in ATPZ-2 level in the past couple weeks – this will continue to be monitored in future weeks.
- Good agreement between pressure gauges at R&B portal and bulkhead.
- Weeping visible around R&B Bulkhead. This is normal and expected for this bulkhead test.
- Some weeps in joints 20-50 feet outby of bulkhead. This is normal and expected for this bulkhead test.
- Primary seepage path appears to be in right rib. This is visible at the bulkhead face, in the rib near 2+40, and in the right floor. Secondary seepage in the right rib near 2+18.
- Seepage on the left rib near 2+19 and 2+40. Overall less seepage on the left rib than the right. The seepage near 2+19 has increased since the previous site visit.
- Walked length of side drift
    - Follows small vein (wet joint) for 90’
    - Turn after 40’ puts drift roughly parallel to main drift
    - Moisture only along vein/wet joint on left, right rib is dry
    - 1 area of noticeable seepage but no major inflow
- Flows through Flume 1 side drift are measuring between 1.4 gpm and 1.7 gpm (Figure 5).
- Flows from Flume 2 in the main adit near station 2+30 stayed relatively stable around 6.8 gpm (Figure 5). This is within the expected range.
- Flows from Flume 3 at the bulkhead hovered around 1 gpm (Figure 5), relatively unchanged (up 0.1 gpm) from last week and still far from the 17 gpm threshold of concern.
- Pressure readings from VWP in good agreement with pressure gauges.
- Water depth in Red & Bonita adit is still ankle to knee deep in low spots.
- Outflow from the portal is minimal (trickling). Due to permeable nature of the disturbed ferricrete in the floor of the adit and the rock in the waste pile, water appears to be flowing down into the waste rock pile within the first 25 feet of the adit and in the vicinity of the sump pond. Attempts to plug the permeable material with clay have been largely unsuccessful. While the outflow is unlikely to cause structural or stability problems in the waste pile, sampling at seeps below the waste pile (SS407, SS408) suggest that the water quality degrades as it passes through the waste. Hence a plan should be developed to seal the adit floor and route flow around the pile before the bulkhead is permanently closed.
- Overall planned seeps and springs monitoring locations are unchanged or experiencing seasonal reduced flows.
- Twenty-five newly identified seep and spring locations prior to the bulkhead closure showing recent emergent flow. Several of these are monitoring locations which have previously been sampled (prior to 2019). A total of 20 of are newly named locations, though many of them show indications of previous seepage. One additional location near R&B was discovered this week. These additional seepage locations are in four key areas:
    - Along Cement Creek, between the fen at the base of Red & Bonita and the confluence with the North Fork Cement Creek (SS415-SS417 – Formerly Outflow 0.9, 0.5, 1 and 2)
    - Near the intersection of the North Fork of Cement Creek and Cement Creek (SS400-SS405, SS407 - SS412, SS418, SS420)
    - Southeast of the American Tunnel portal (SS406, SS413, SS419, SS055)

  - Along the road to Natalie Occidental (CR-52) (SS414, SS016, SS017).

  These are described in Attachment B.
- Figure 8 overlays seepage observations locations with previously mapped areas of ferricrete, manganocrete and bog occurrences. Ferricrete is a natural phenomenon consisting of surficial deposits cemented in place by iron oxyhydroxide. The surficial deposits serve as flow paths and precipitation sites for iron-rich water derived from the oxidation of pyrite. Ferricrete deposits generally indicate areas of long-standing acidic groundwater expression at the ground surface. Ferricrete conditions have existed in the area before, during and after mining. The fact that seepage observations generally align with areas of ferricrete supports the theory that seepage is largely following pre-existing pathways, as groundwater returns to pre-mining levels during the bulkhead test.

Actions for Next Week:

- Continue to monitor the pressure behind the bulkhead while filling to as close to 200' as possible.
- Slug test in Cement Creek is scheduled to occur on September 19th, 2020 (MSI, USGS).
- Reopening of the bulkhead valve is scheduled for September 21st. Following opening the valve, we will move into Phase 4 of the test, drain down and treatment of outflow water. Drain at 300-600 gpm depending on plant performance. Rate will be adjusted slowly in close coordination with plant operators.
- Regular daily inspections of R&B (ER), and weekly inspections of all planned sites and emergent flow sites in the area (MSI). Reduced monitoring after next week.
- Monitoring to detect newly identified seepage/outflow sites in the area (MSI) and possible opportunistic sampling at these sites.
- Opportunistic sampling of R&B seepage water within the mine by MSI.

Observations by Location at Originally Planned Sites (See Bulkhead Test Execution Plan):

Location	Observations
Adams Mine	Water level in pool has dropped (much drier)
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	Well was pumped for sampling this week (9/14/20).
Blackhawk Mine	No changes observed. Visited on 9/7/20.
Gladstone Seeps & Springs	No changes observed.
Gold King Level 7	No changes observed.
Lead Carbonate Mine	No changes observed. Visited on 9/7/20.
Mogul Mine	Slightly drier
Mogul Mine – South Adits	No changes observed.
Natalie / Occidental	After IROD work to improve gate with hinge and remove debris water cleared out allowing views further in showing collapsed timber set; new mine timber and lagging removed from grate.
NFPZ-1	Well was pumped for sampling this week (9/14/20).
North Fork Seeps & Springs	No changes observed in baseline observation locations.
Pride of Bonita	No changes in flow observed.
Red & Bonita	See key observations above.

Location	Observations
Red & Bonita / Adams Mine Gulch Seeps & Springs	Seasonal flows decreasing.
Terry Tunnel	Middle flow dried up. Visited 9/17/20.

Observations by Location at Seepage Sites Not Originally Planned for Monitoring - Opportunistically Added:

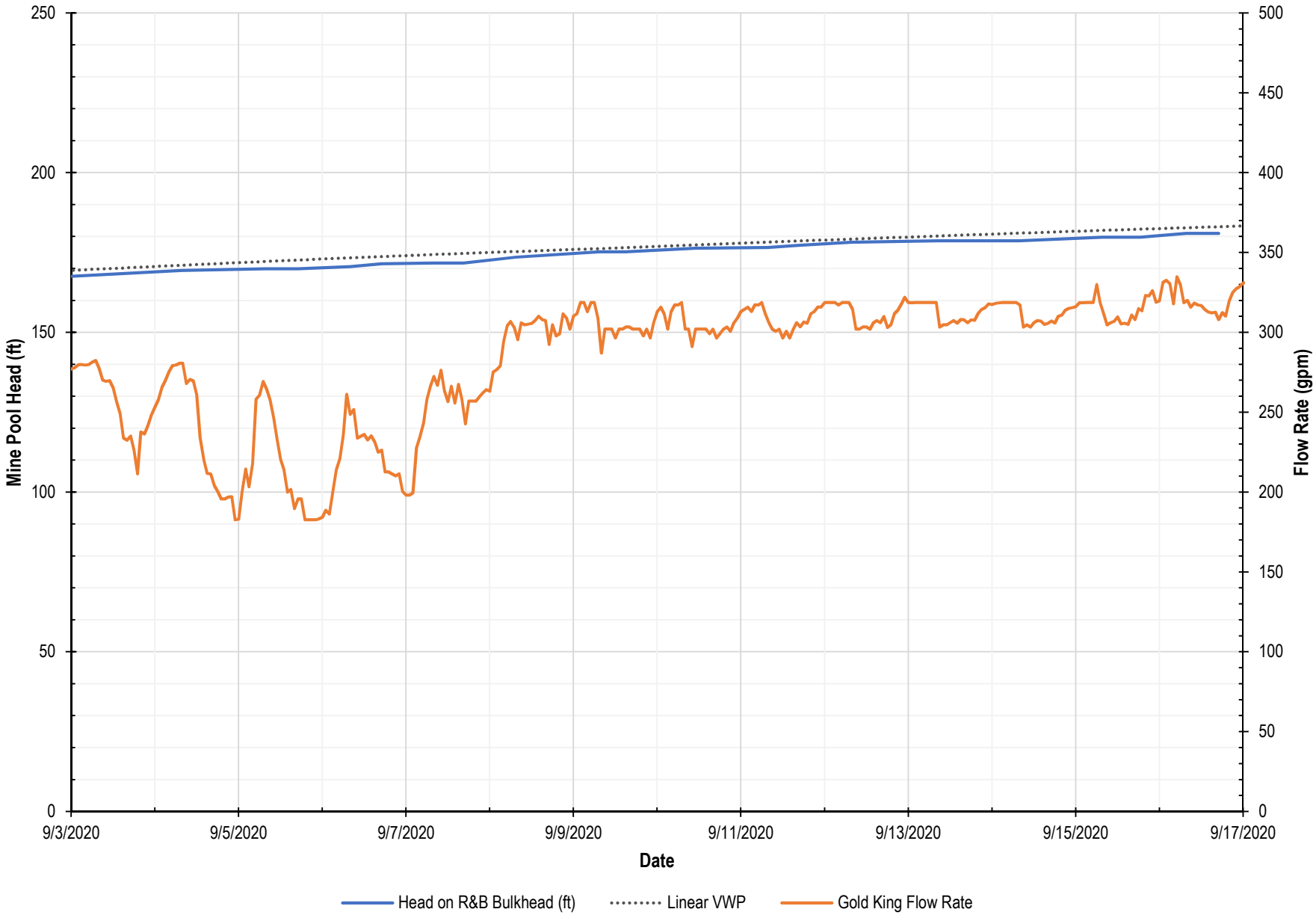
Location	Observations
SS416, SS415, SS417 (Outflows #1, 2, 0.5 & 0.9) Base of Red & Bonita	An increase in flow at SS415. SS417 was dry. SS416 had no noticeable changes.
SS400-SS405 and SS409-SS412, SS418, SS420, SS407, SS408 along Cement Creek and the Mogul Mine Road	New seep location this week was discovered, SS420, located on the east side of road about 25' south of R&B culvert. Not able to sample SS420. No other major changes since last week.
SS055, SS419, SS413, SS406 near American Tunnel	Flows slightly decreased from last week in SS406, SS413 & SS419, but are relatively unchanged. Field parameters for SS406 are similar to that of the American Tunnel.
SS414 and SS016-017 along CR 52	SS016 & SS17 have deceased in flow since last week.

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 Adit Flume Flows
Figure 6: Red & Bonita Plan & Profile with Estimated Groundwater Table
Figure 7: Red & Bonita Extended Plan & Profile with Estimated Groundwater Table
Figure 8: Cement Creek Area, Study of Ferricrete, Manganocrete, and Iron Bog Occurrences by USGS

Attachment A: Photographs, September 10-16, 2020
Attachment B: Weekly Summary Report of MSI Observations (table and maps)

FIGURES

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



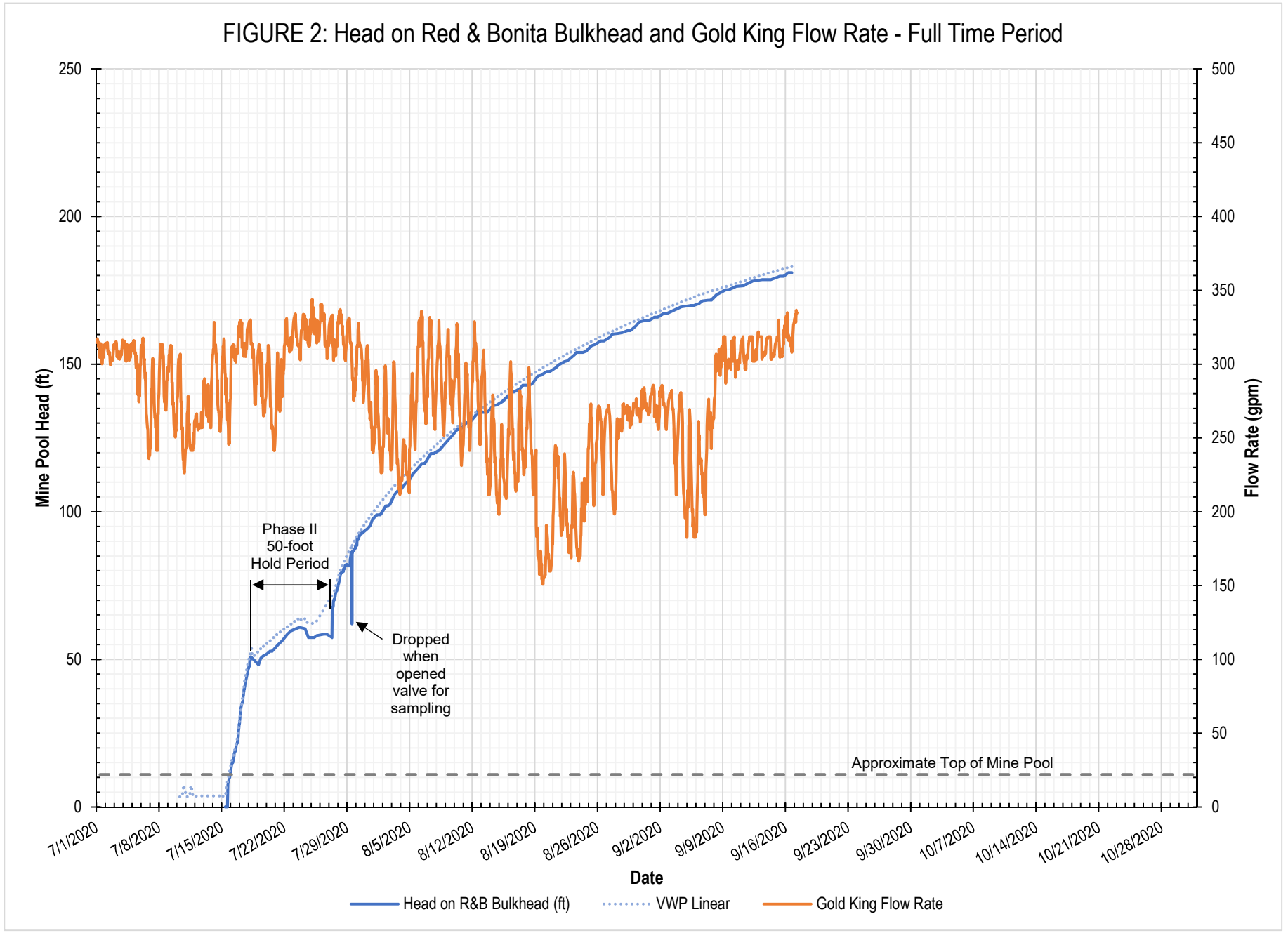


FIGURE 2: Head on Red & Bonita Bulkhead and Gold King Flow Rate - Full Time Period
Mine Pool Head (ft)
Flow Rate (gpm)
250
200
150
100
50
0
500
450
400
350
300
250
200
150
100
50
0
Phase II
50-foot
Hold Period
Dropped
when
opened
valve for
sampling
Approximate Top of Mine Pool
7/1/2020
7/8/2020
7/15/2020
7/22/2020
7/29/2020
8/5/2020
8/12/2020
8/19/2020
8/26/2020
9/2/2020
9/9/2020
9/16/2020
9/23/2020
9/30/2020
10/7/2020
10/14/2020
10/21/2020
10/28/2020
Date
Head on R&B Bulkhead (ft)
VWP Linear
Gold King Flow Rate

FIGURE 3: Adit Flows and Water Levels

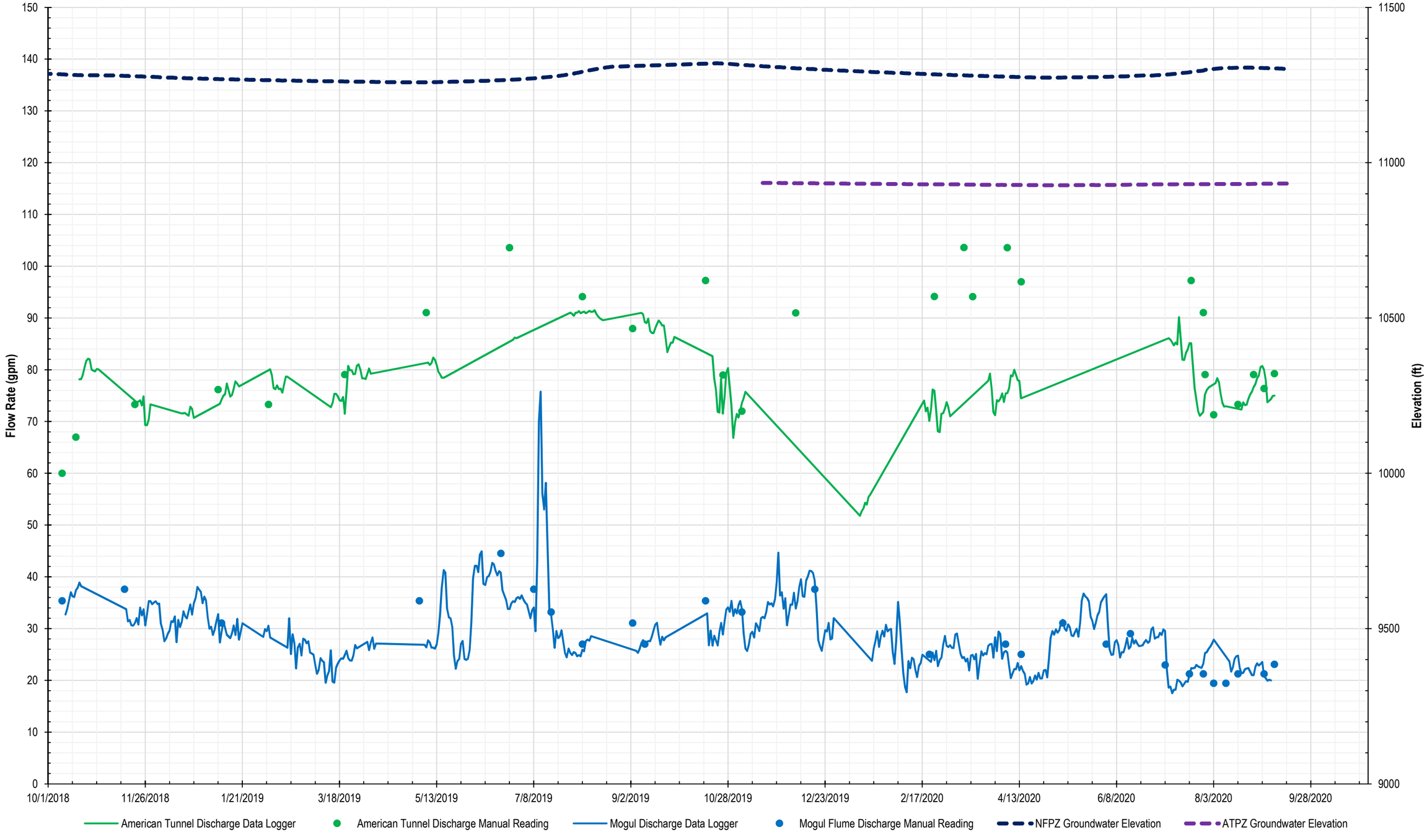
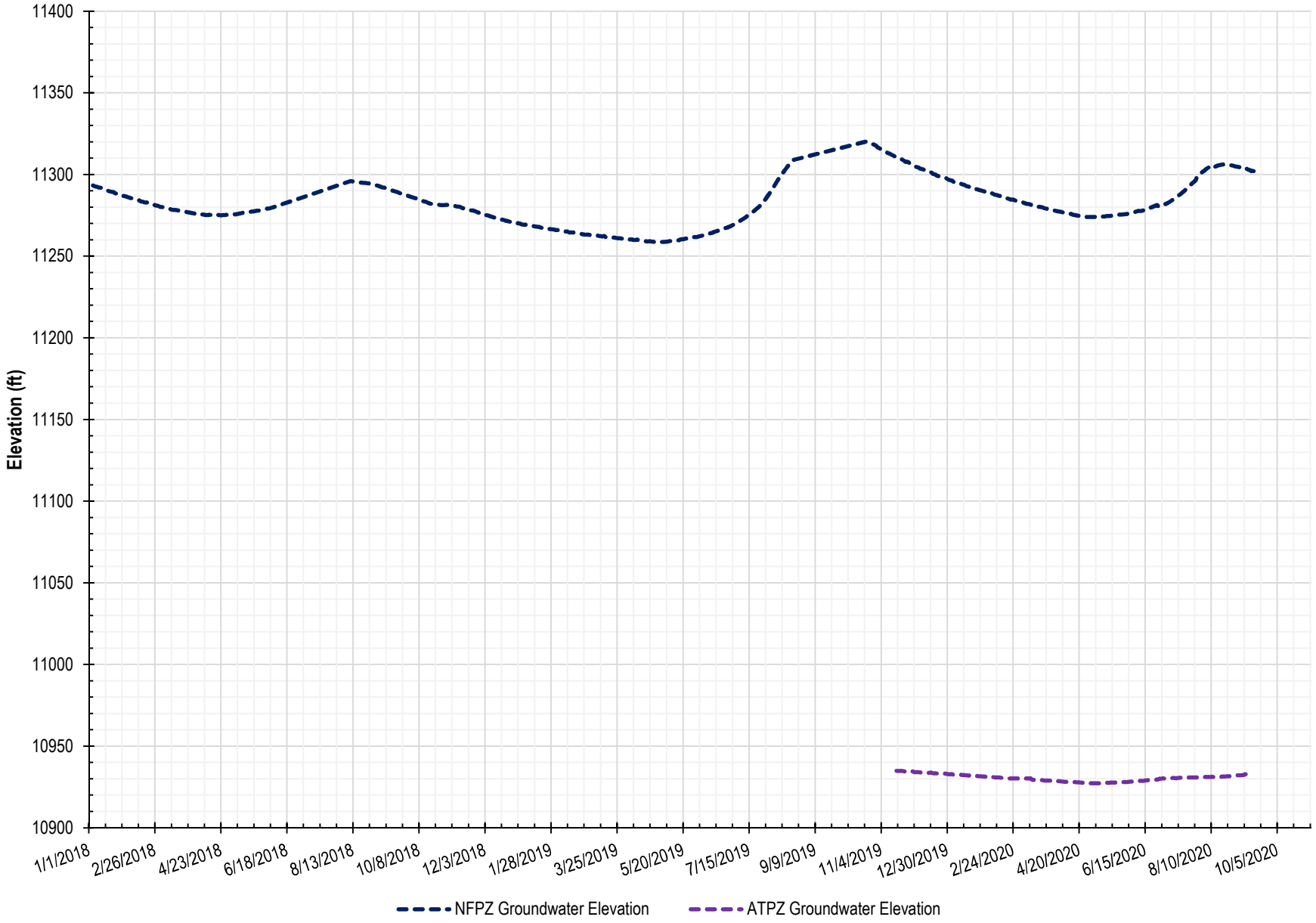


FIGURE 4: Groundwater Elevations



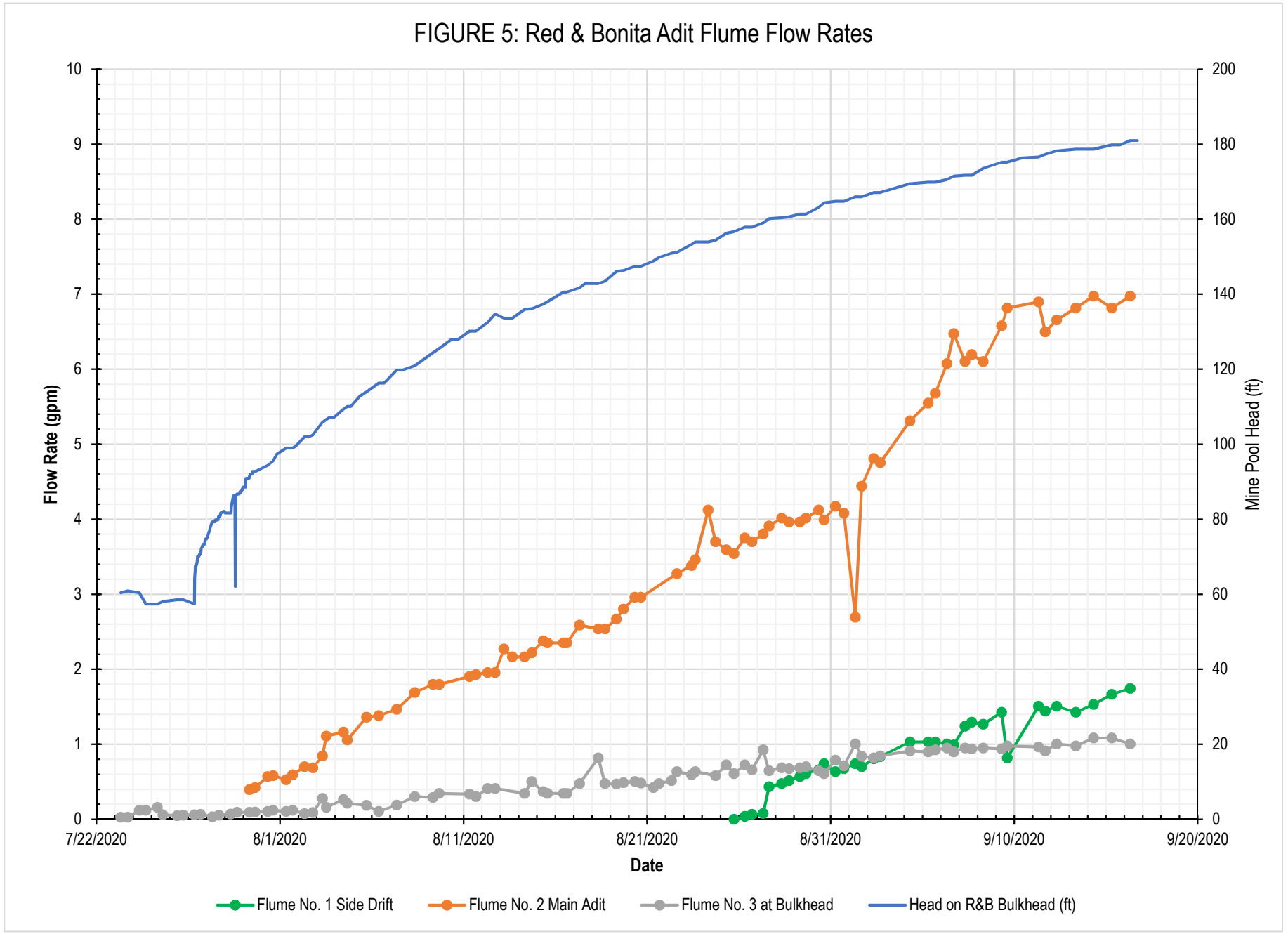
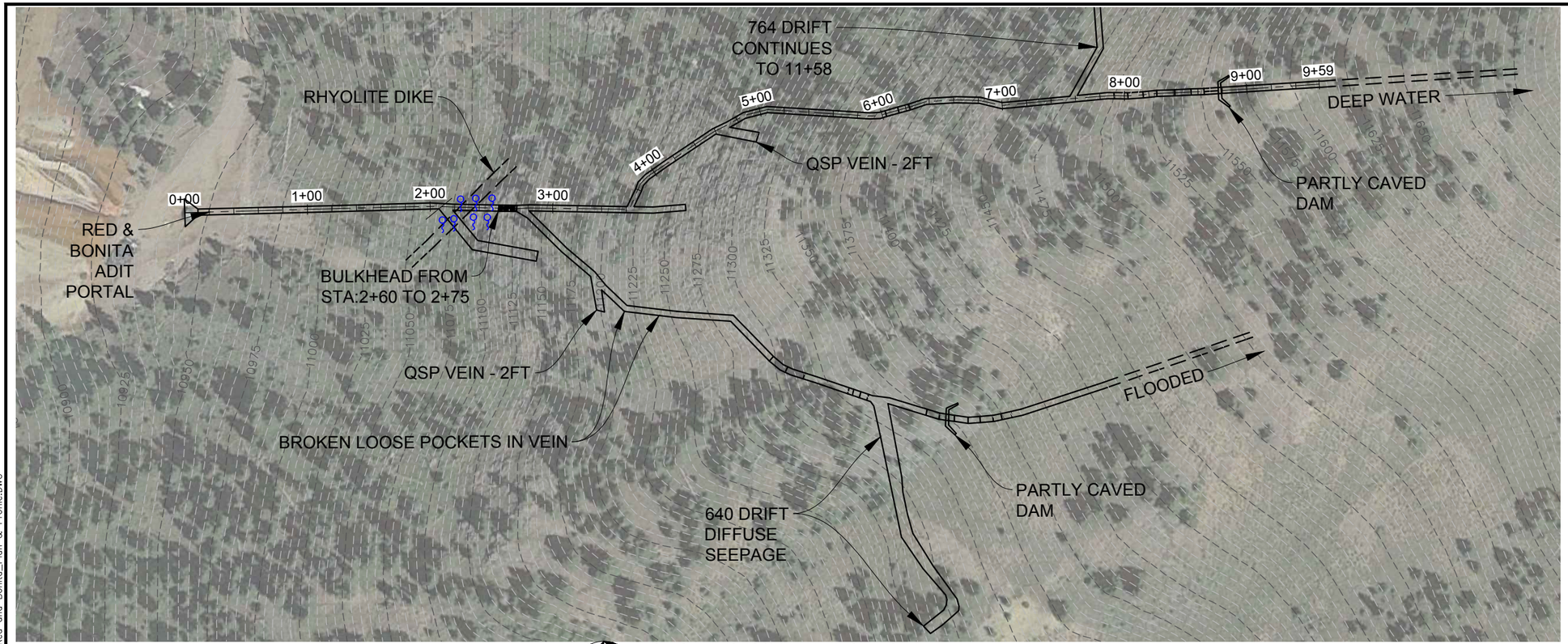
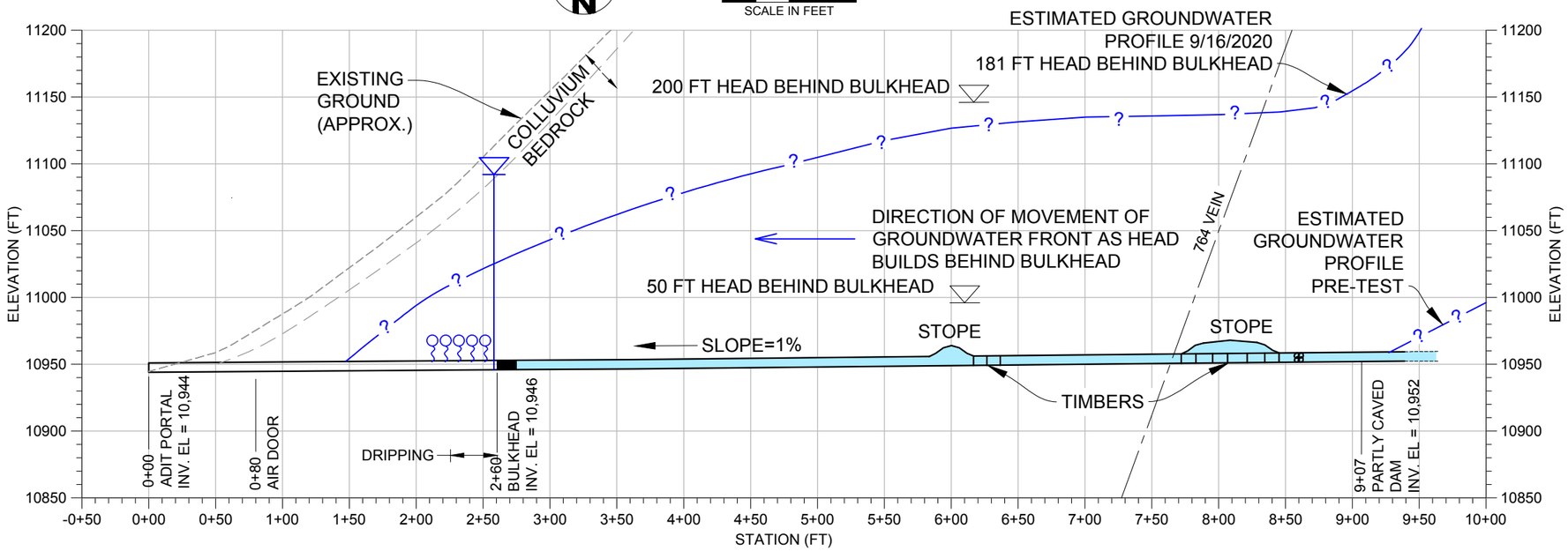


FIGURE 5: Red & Bonita Adit Flume Flow Rates
Flow Rate (gpm)
Mine Pool Head (ft)
Date
0
1
2
3
4
5
6
7
8
9
10
0
20
40
60
80
100
120
140
160
180
200
7/22/2020
8/1/2020
8/11/2020
8/21/2020
8/31/2020
9/10/2020
9/20/2020
Flume No. 1 Side Drift
Flume No. 2 Main Adit
Flume No. 3 at Bulkhead
Head on R&B Bulkhead (ft)



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.

JOB NO. 0251.002.00

RED & BONITA ADIT

PLAN & PROFILE

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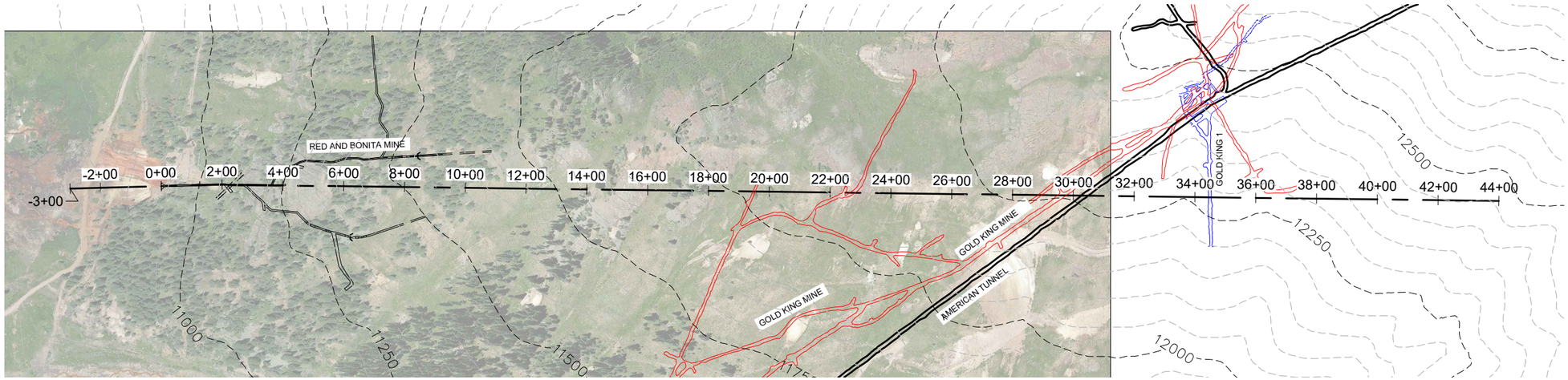
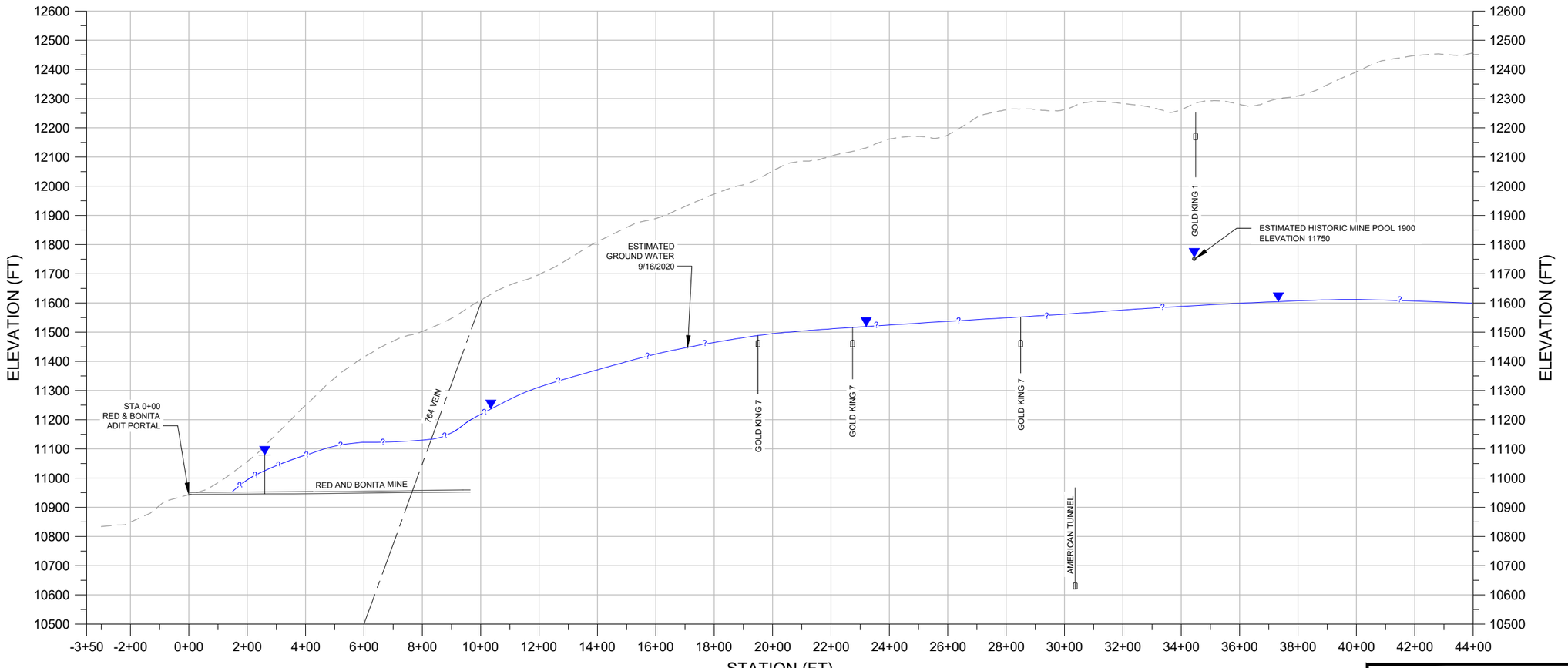
FIGURE NO. **6**

DATE: **SEPT 17, 2020**

SCALE: **AS NOTED**





RED AND BONITA EXTENDED PROFILE

0 200' 400'
SCALE IN FEET
HORIZONTAL AND VERTICAL

JOB NO. 0251.002.00

RED AND BONITA ADIT
CROSS-SECTION

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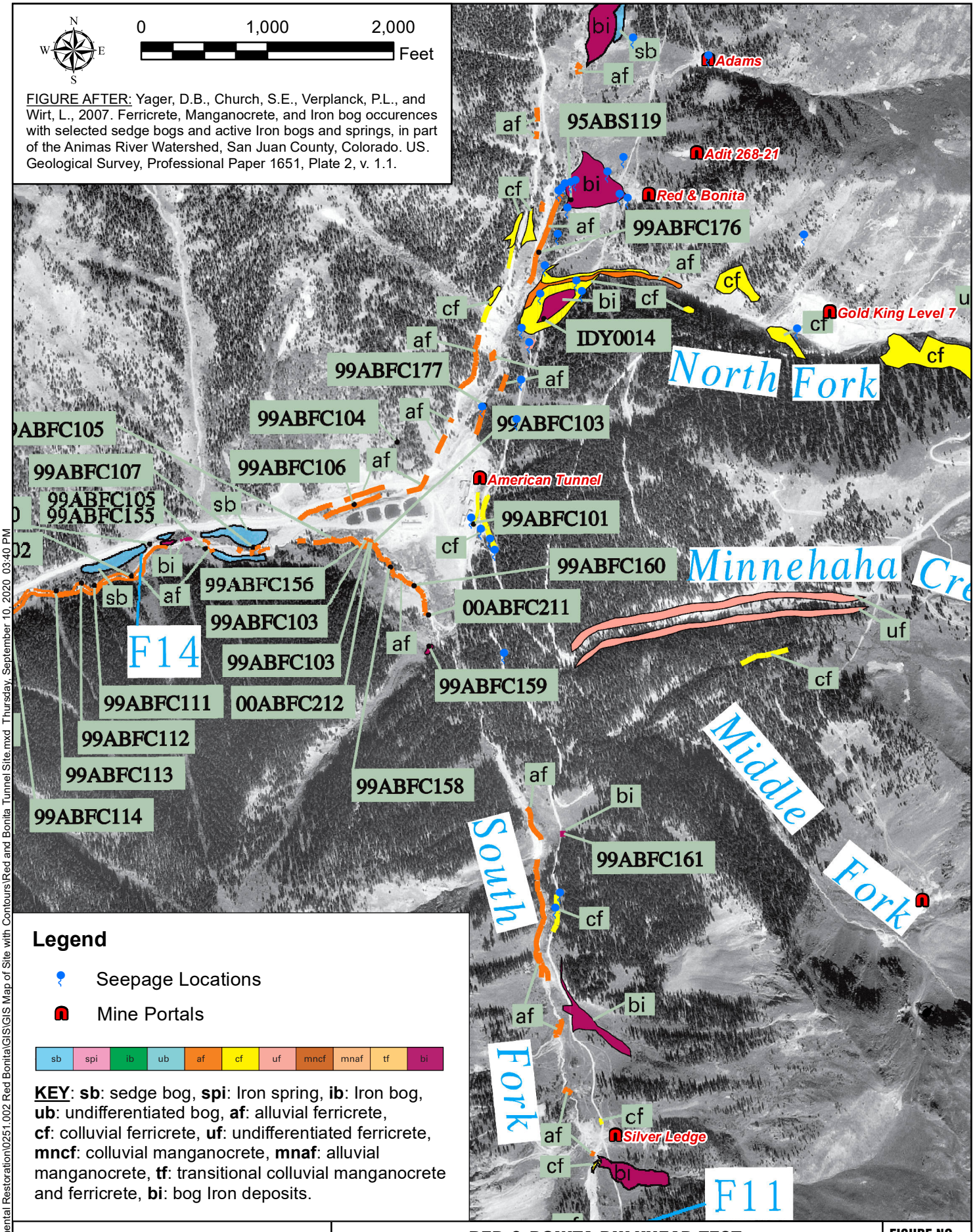
FIGURE NO. 7

DATE: SEPT 17, 2020

SCALE: AS NOTED

Thursday, September 17, 2020 11:55:39 AM DRAWING: Q:\0251 Environmental Restoration\0251.002 Red Bonita\CAD\Working\Red and Bonita Existing Cross-Section.DWG



Q:\0251 Environmental Restoration\0251.002 Red Bonita\GIS\GIS Map of Site with Contours\Red and Bonita Tunnel Site.mxd Thursday, September 10, 2020 03:40 PM

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RED & BONITA BULKHEAD TEST

Cement Creek Area, Study of Ferricrete, Manganocrete, and Iron Bog Occurrences by USGS

JOB NO: 20C26021.00

SCALE: 1 inch=1,000 feet

FIGURE NO. 8

ATTACHMENT A: PHOTOGRAPHS

PHOTO 1

DATE TAKEN: 09/15/2020

LOCATION:

Red & Bonita Bulkhead

COMMENTS:

Looking at the Red & Bonita bulkhead with flume #3.

PHOTO 2

DATE TAKEN: 09/15/2020

LOCATION:

Red & Bonita Bulkhead

COMMENTS:

Looking behind the gate valve at the base of the Red & Bonita bulkhead with flume #3.

PHOTO 3

DATE TAKEN: 09/15/2020

LOCATION:

Red & Bonita Side Drift

COMMENTS:

Side drift of R&B with flume #1.

PHOTO 4

DATE TAKEN: 09/15/2020

LOCATION:

Red & Bonita Flume # 2

COMMENTS:

Ponding behind Flume #2 in Red & Bonita adit, looking towards the portal (outby). Note also seepage in left rib (right in photo) near station 2+19.

PHOTO 5

DATE TAKEN: 09/15/2020

LOCATION:

Red & Bonita Bulkhead

COMMENTS:

Seepage measurement and water quality sampling the right of the bulkhead.

PHOTO 6

DATE TAKEN: 09/15/2020

LOCATION:

Seepage Location SS016

COMMENTS:

Seepage location SS016, along the road to Natalie Occidental (CR-52).

PHOTO 7

DATE TAKEN: 09/14/2020

LOCATION:

Seepage Location SS055

COMMENTS:

Seepage location at SS055, along CR51, towards ATPZ-2.

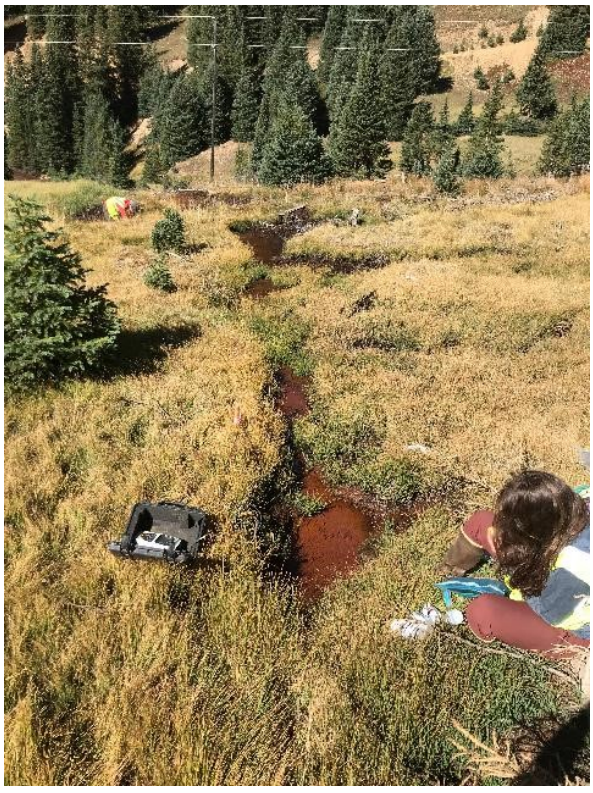

PHOTO 8

DATE TAKEN: 09/14/2020

LOCATION:

Seepage Location SS062

COMMENTS:

Seepage location in the fen below R&B.

PHOTO 9

DATE TAKEN: 09/14/2020

LOCATION:

Seepage Location SS069

COMMENTS:

Seepage location at SS069, below the Adams mine, along Cement Creek above the North Fork.

PHOTO 10

DATE TAKEN: 09/07/2020

LOCATION:

Seepage Location SS084

COMMENTS:

Seepage location SS084, below the Gold King Level 7 portal, along the North Fork.

PHOTO 11

DATE TAKEN: 09/14/2020

LOCATION:

Seepage monitoring location SS404

COMMENTS:

Seepage location SS404, along the road to R&B (CR-53).

PHOTO 12

DATE TAKEN: 09/14/2020

LOCATION:

Seepage monitoring location SS301

COMMENTS:

Seepage location SS301, along Cement Creek up stream from the American Tunnel Portal.

PHOTO 13

DATE TAKEN: 09/14/2020

LOCATION:

Seepage monitoring location SS406

COMMENTS:

Seepage monitoring location SS406. Near the intersection of CR-51, CR-52 & CR-53. Likely same water as AT or SS413, flows have been inconsistent but likely coming under road grade from SS413

PHOTO 14

DATE TAKEN: 09/142020

LOCATION:

Newly Identified Seepage Location SS420

COMMENTS:

Newly identified seepage this week at location SS420 on the east side of CR-53 south of the R&B culvert. Not flowing enough to sample.

PHOTO 15

DATE TAKEN: 09/14/2020

LOCATION:

SS407

COMMENTS:

Seepage monitoring location SS407 showing increased flow at the base of the Red & Bonita waste pile.

PHOTO 16

DATE TAKEN: 09/14/2020

LOCATION:

SS408

COMMENTS:

Seepage monitoring location SS408 showing increased flow at the base of the Red & Bonita waste pile.

PHOTO 17

DATE TAKEN: 09/14/2020

LOCATION:

SS416 (Outflow #1) in fen downhill of Red & Bonita

COMMENTS:

Minor outflow at SS416. Note this is not necessarily a change in condition or new flow, but an effort to document flows from the wetland area that may not have been discernible when R&B discharge was flowing through these channels.

PHOTO 18

DATE TAKEN: 09/14/2020

LOCATION:

SS417 (Outflow #0.5,0.9) in fen downhill of Red & Bonita

COMMENTS:

Outflow at SS417 location. Note this is not necessarily a change in condition or new flow, but an effort to document flows from the wetland area that may not have been discernible when R&B discharge was flowing through these channels.

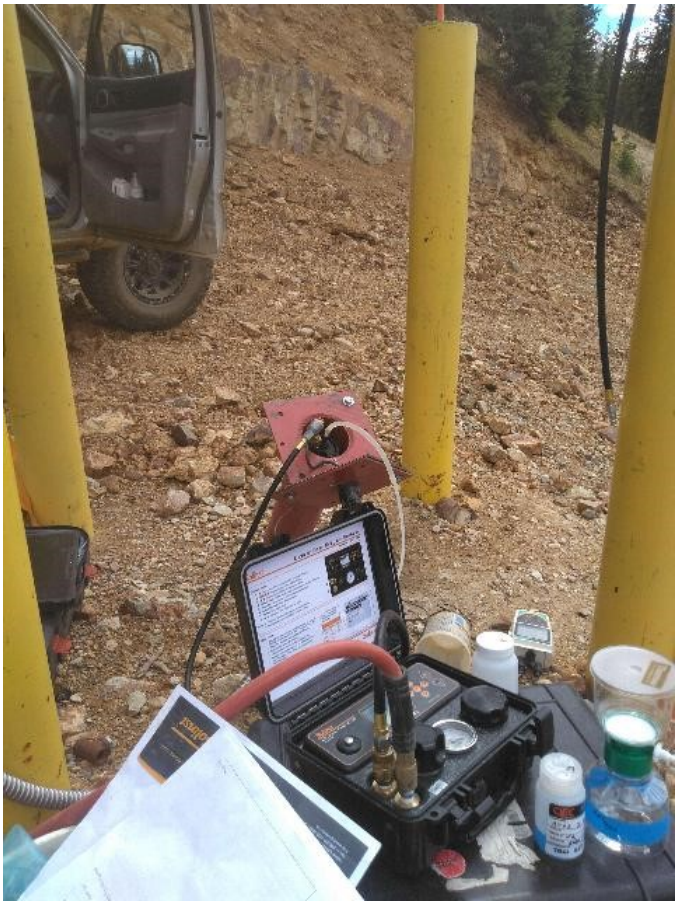

PHOTO 19

DATE TAKEN: 09/14/2020

LOCATION:

ATPZ-2 Well Head

COMMENTS:

ATPZ-2 was pumped for the site-wide sampling event this week.

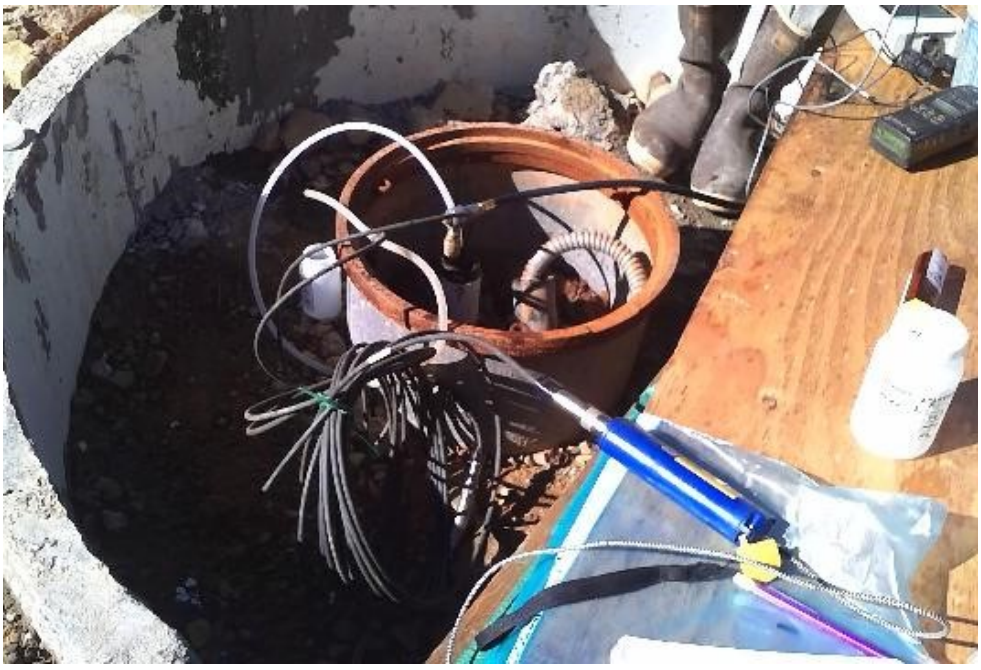

PHOTO 20

DATE TAKEN: 09/14/2020

LOCATION:

NFPZ-1 Well Head

COMMENTS:

NFPZ-1 was pumped this week for the site-wide sampling event.

PHOTO 21

DATE TAKEN: 09/15/2020

LOCATION:

Red & Bonita Side Drift

COMMENTS:

Looking in just past flume #1. Note wet joint on left rib and dry rib right.

PHOTO 22

DATE TAKEN: 09/15/2020

LOCATION:

Red & Bonita Side Drift

COMMENTS:

Second leg of side drift looking to face.

PHOTO 23

DATE TAKEN: 09/15/2020

LOCATION:

Red & Bonita Side Drift

COMMENTS:

Close up of end of side drift

PHOTO 24

DATE TAKEN: 09/15/2020

LOCATION:

Red & Bonita Side Drift

COMMENTS:

Area of seepage along joint in side drift; this is the area closest to the bulkhead

PHOTO 23

DATE TAKEN: 09/15/2020

LOCATION:

Red & Bonita Side Drift

COMMENTS:

Looking back towards main drift; note dry rib

PHOTO 24

DATE TAKEN: 09/15/2020

LOCATION:

Red & Bonita Side Drift

COMMENTS:

Turn in side drift looking toward main drift.

ATTACHMENT B: MSI OBSERVATION SUMMARY

Red and Bonita Bulkhead Test Closure Sampling Event #3 **sample collected unless otherwise stated (or dry)*
Week of 9/14/2020

Mountain Studies Institute
SAN JUAN MOUNTAINS COLORADO

Event Date	Event Time	Location ID	Location Description	Temp (Celsius)	Specific Conductivity (µS/cm)	pH	Flow (CFS)	Flow (GPM)	Observations
9/15/2020	15:38	A68	Animas River at Silverton (USGS Gage)	13.5	331	6.57	36.7000	16313.5	No noticeable change since the last visit.
9/15/2020	14:40	A72	Animas River below Silverton (USGS Gage)	11.9	478	6.19	90.0000	40005.9	No noticeable change since the last visit.
9/14/2020	10:34	Adit_2	Dry adit south of SS129, near Adams	NA	NA	NA	NA	NA	Dry. No noticeable change since the last visit.
9/14/2020	11:18	Adit_268-20	Located between Adams and Adit 268-21	NA	NA	NA	NA	NA	Dry. No noticeable change since the last visit.
9/14/2020	11:26	Adit_268-21	Located between R&B and Adams	NA	NA	NA	NA	NA	Dry. No noticeable change since the last visit.
9/14/2020	14:00	ATPZ02	ATPZ-2	8.4	2200	6.14	NA	NA	No noticeable change since the last visit. Pumped well for sample. Very turbid.
9/15/2020	9:40	CC06	Gold King Level 7	8.1	1869	3.16	NA	NA	No noticeable change since the last visit.
9/15/2020	13:05	CC48	Cement Creek at Silverton (USGS Gage)	9.5	1040	3.51	13.6000	6045.3	No noticeable change since the last visit.

Event Date	Event Time	Location ID	Location Description	Temp (Celsius)	Specific Conductivity (µS/cm)	pH	Flow (CFS)	Flow (GPM)	Observations
9/14/2020	11:04	Drainage 127.5	Drainage between SS127 and Adit_268-20	5.6	133	3.54	NA	NA	Drainage between SS127 and Adit_268-20 at the headwall just south and below SS127. Small flow dispersed over a few drips and seeps, likely due to recent snow that is still melting in patches on the north slopes of the drainage, as seen on the downstream photo. No sample collected.
9/15/2020	15:10	M34	Mineral Creek at Silverton (USGS Gage)	12	437	6.09	29.6000	13157.5	No noticeable change since the last visit.
9/14/2020	9:55	NFPZ1	NFPZ	5.6	550	5.29	NA	NA	Took 2 hours to pump well. Static level 55.4 ft DTW.
9/14/2020	11:14	RBPZ01	R&B fen below R&B Mine	NA	NA	NA	NA	NA	Dry. No noticeable change since the last visit.
9/14/2020	11:18	RBPZ02	R&B fen below R&B Mine	NA	NA	NA	NA	NA	Some water. Stick up 43.5cm, stick down 91cm.
9/14/2020	11:09	RBPZ03	R&B fen below R&B Mine	NA	NA	NA	NA	NA	Dry. No noticeable change since the last visit.
9/15/2020	11:20	SS016	Historic SS016, South Fork Cement Creek	6.2	340	4.05	0.0010	0.4	No noticeable change since the last visit.

Event Date	Event Time	Location ID	Location Description	Temp (Celsius)	Specific Conductivity (µS/cm)	pH	Flow (CFS)	Flow (GPM)	Observations
9/15/2020	11:35	SS017	Historic SS017, South Fork Cement Creek	4.6	356	4.23	0.0062	2.8	Measured flow just before culvert and subtracted flow measured along the road above seep. Leakage calculation included.
9/14/2020	14:05	SS055	Mine debris pile on the corner of CR53 and CR52	9.4	312	4.37	0.0007	0.3	Isotope sample only due to very low flow.
9/14/2020	8:45	SS060	Cement Creek above North Fork	5.1	88	4.40	0.0022	1.0	No noticeable change since the last visit.
9/14/2020	9:36	SS061	Cement Creek above North Fork	NA	NA	NA	NA	NA	Dry. No noticeable change since the last visit.
9/14/2020	10:45	SS062	Cement Creek above North Fork	4.5	649	5.73	0.0017	0.8	No noticeable change since the last visit.
9/14/2020	12:25	SS067	Cement Creek above North Fork	4.6	1285	3.84	0.0006	0.3	No noticeable change since the last visit.
9/14/2020	10:20	SS069	Cement Creek above North Fork	7.4	493	4.23	0.0003	0.1	No noticeable change since the last visit.
9/15/2020	10:35	SS084	North Fork Cement Creek	7.4	1218	2.63	0.0003	0.1	Seep has been dry the last few weeks. Increased flow could be attributed to recent snow melt?
9/14/2020	13:10	SS086	Above AT below N Fork	7.7	1271	3.33	0.0006	0.2	No noticeable change since the last visit.

Event Date	Event Time	Location ID	Location Description	Temp (Celsius)	Specific Conductivity (µS/cm)	pH	Flow (CFS)	Flow (GPM)	Observations
9/14/2020	8:10	SS105	Mogul South Mine	4.2	894	5.45	0.0518	23.0	No noticeable change since the last visit.
9/14/2020	10:58	SS127	Adams Mine	NA	NA	NA	NA	NA	No noticeable change since the last visit.
9/14/2020	10:17	SS128	Pride of Bonita Mine	NA	NA	NA	NA	NA	Dry. No noticeable change since the last visit.
9/14/2020	10:29	SS129	73m SW of Pride of Bonita Mine	NA	NA	NA	NA	NA	Dry. No noticeable change since the last visit.
9/15/2020	10:00	SS130	East side of CR53	NA	NA	NA	NA	NA	Dry. No noticeable change since the last visit.
9/14/2020	11:10	SS236	Cement Creek above North Fork	8.4	752	3.93	0.0074	3.3	Discharge taken downstream below confluence of both seeps.
9/14/2020	9:15	SS250	Cement Creek above North Fork	7.4	1164	6.66	0.0294	13.1	No noticeable change since the last visit.
9/14/2020	9:00	SS300	Cement Creek above North Fork	4.9	143	5.80	0.0012	0.5	No noticeable change since the last visit.
9/14/2020	14:50	SS301	Cement Creek above AT	7.9	1991	3.06	0.0032	1.4	No noticeable change since the last visit.
9/14/2020	13:26	SS400	East side of road, above SS086	11.4	1029	2.40	0.0393	17.5	No noticeable change since the last visit. No sample collected.
9/14/2020	13:00	SS401	East side of road, above SS086	7.8	1594	4.21	0.0002	0.1	No noticeable change since the last visit. No sample collected.

Event Date	Event Time	Location ID	Location Description	Temp (Celsius)	Specific Conductivity (µS/cm)	pH	Flow (CFS)	Flow (GPM)	Observations
9/14/2020	13:02	SS402	South side of NFPZ adjacent to CCSG5	6.7	1868	2.39	0.0049	2.2	No noticeable change since the last visit. No sample collected.
9/14/2020	12:40	SS404	Culvert north of North Fork Cement Creek	9	734	3.45	0.0111	5.0	No noticeable change since the last visit.
9/14/2020	13:33	SS405	East side of road, south of North Fork Cement Creek	7.8	1356	4.21	0.0011	0.5	No noticeable change since the last visit. No sample collected.
9/14/2020	14:33	SS406	100m right of CC19	15.3	1715	3.14	0.0003	0.1	Last week this seep was dry at stake with some water about 25ft towards AT. Took flow and field parameters at site stake. No sample collected.
9/14/2020	12:01	SS407	Below R&B Mine	11.5	2200	2.76	0.0009	0.4	Increase in dispersed flow on hill below R&B. Appears to be more wet spots along tailings pile south of SS407. No sample collected.
9/14/2020	12:12	SS408	Below R&B Mine	6.7	3070	2.53	0.0003	0.1	Measured additional flow below confluence of SS407 and SS408 to capture additional seepage. 2.4 liters in 20 seconds 5% leakage (7.56 lpm). No sample collected.
9/14/2020	10:36	SS409	East side of CR53	NA	NA	NA	NA	NA	Not enough water to quanitfy.
9/14/2020	11:31	SS410	West Side of Cement Creek	8.7	1265	3.46	0.0037	1.6	No noticeable change since the last visit. No sample collected.

Event Date	Event Time	Location ID	Location Description	Temp (Celsius)	Specific Conductivity (µS/cm)	pH	Flow (CFS)	Flow (GPM)	Observations
9/14/2020	11:39	SS411	Located between SS410 and SS416 along Cement Creek	6.7	585	4.10	0.0017	0.7	No noticeable change since the last visit. No sample collected.
9/14/2020	13:43	SS412	Above AT along CR53	11.2	2270	2.94	0.0015	0.7	No noticeable change since the last visit. No sample collected.
9/14/2020	14:15	SS413	Corner of CR53 and CR51	10.9	1516	3.31	0.0022	1.0	Flow measured at stake, next to road. Sample taken near first emergence.
9/14/2020	11:23	SS415	R&B Outflow Channel	15	1248	3.18	0.0090	4.0	Increased flow in old R&B fen outflow channel above original first point of emergence of SS415. Uphill channel has been mostly dry throughout the test and is now showing significant flow.No sample collected.
9/14/2020	11:34	SS416	R&B Outflow Channel	10.7	1541	3.06	0.0001	0.1	No noticeable change since the last visit. No sample collected.
9/14/2020	11:50	SS417	R&B Outflow Channel	NA	NA	NA	NA	NA	Dry. No noticeable change since the last visit. No sample collected.
9/14/2020	13:10	SS418	North tongue of North Fork	14.1	1755	2.50	0.0001	0.0	Seep on old road cut, now pipeline. Oily sheen on water surface. No sample collected.
9/14/2020	14:10	SS419	Culvert between SS055 and SS413	6.5	971	3.94	0.0059	2.6	No noticeable change since the last visit. No sample collected.

Event Date	Event Time	Location ID	Location Description	Temp (Celsius)	Specific Conductivity (µS/cm)	pH	Flow (CFS)	Flow (GPM)	Observations
9/14/2020	12:05	SS420	East side of road below R&B	NA	NA	NA	NA	NA	New seep observed on east side of road about 25' south of R&B culvert. Wet seep, not enough flow to be able to measure. No sample collected.

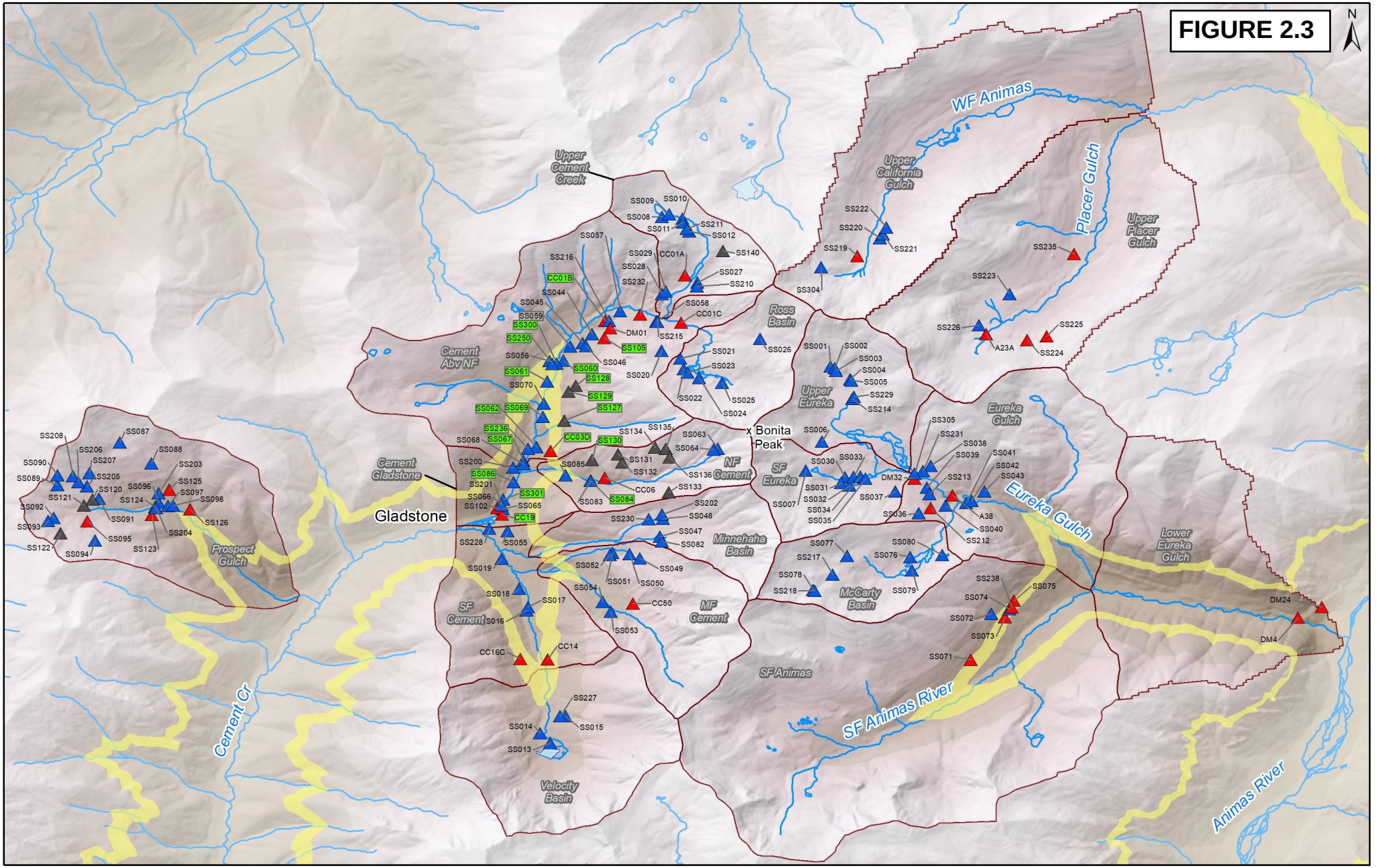
FIGURE 2.3
N
WF Animas
Upper Cement Creek
Upper California Gulch
Placer Gulch
Upper Placer Gulch
Ross Basin
Cement Abv NF
Upper Eureka
Eureka Gulch
Bonita Peak
Cement Gladstone
Gladstone
NF Cement
SF Eureka
Eureka Gulch
Lower Eureka Gulch
Prospect Gulch
Minnehaha Basin
McCarty Basin
SF Cement
MF Cement
SF Animas
SF Animas River
Cement Cr
Velocity Basin
Animas River
BPMD
Seeps, Springs, & Draining Mines 2016-18
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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

Red and Bonita Test Closure Monitoring Locations

Map 1: R&B and Gladstone as of 9/2/2020

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Red and Bonita Test Closure Monitoring Locations

- Draining Mine
- Dry Mine
- Seep/Spring Source
- Surface Water
- Well

Mine workings

0 200 400 800 1,200 1,600 2,000 Feet

Red and Bonita Test Closure Monitoring Locations

Map 2: SF Cement and Gladstone as of 9/2/2020

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Red and Bonita Test Closure Monitoring Locations

- Draining Mine
- Dry Mine
- Seep/Spring Source
- Surface Water
- Well

Mine workings

N

0 200 400 800 1,200 1,600 2,000 Feet