INVENTUM ENGINEERING, PC

April 13, 2020

Megan Kuczka
Environmental Program Specialist - 1
Division of Environmental Remediation
New York State Department of Environmental Conservation
270 Michigan Avenue
Buffalo, New York 14203-2915

RE: Buffalo Color Corporation Sites Areas A & B
Site No. C915230
Hydraulic Control Measures Evaluation, Sewer Survey, and Retaining Wall Backfill Maintenance Work Plan

Dear Ms. Kuczka:

Inventum Engineering, PC ("Inventum"), on behalf of South Buffalo Development, LLC (SBD), is providing a work plan for tasks related to evaluation of engineering controls in place in Area A of the Buffalo Color Corporation Site (Site No. C915230) located in Buffalo, New York (the "site"). Specifically, the work plan will address:

- An evaluation of the need for additional hydraulic controls measures behind (upgradient) the existing vertical hydraulic barrier (VHB).
- A visual evaluation of flow and potential infiltration in the site storm sewer network.
- Replacement of gravel behind the existing sheet piling wall along the Buffalo River in the southeast corner of the site.

All intrusive site work will be conducted in accordance with the Excavation Work Plan (EWP) and Health and Safety Plan (HASP) established in the approved Site Management Plan (SMP).

Scope of Work

Hydraulic Control Measures Evaluation

Periodic groundwater level elevation data collected from the six observation well sets along the length of the VHB show a potential for outward groundwater gradient in A-OW Set 3 through A-OW Set 6 (Attachment A). There is an inward gradient based on the data collected from A-OW Set 1 and A-OW Set 2. Extracted groundwater volumes from the corresponding extraction wells follow a similar trend. Those wells showing consistent inward groundwater gradient (A-OW Set 1 and A-OW Set 2) correlate to extraction wells (A-EW-1 and A-EW-2) producing over 100,000 gallons per month (gal/month). Those wells showing outward groundwater gradient (A-OW Set 3

through A-OW Set 6) correlated to extraction wells (A-EW-3A through A-EW-5) producing under 50,000 gal/month (Figure 1; Attachment A).

Inventum believes alternative extraction well locations, new well construction, or additional extraction wells may be necessary to maintain an inward hydraulic gradient across the full length of the VHB (Figure 1) due to both: (A) the increased distance of extraction wells A-EW-3A through A-EW-5 from the VHB compared to A-EW-1 and A-EW-2, and (B) the lower production volumes generated in A-EW-3A through A-EW-5 which may be diminished by the surrounding impermeable surfaces and the distance from the Buffalo River.

Three (3) additional extraction wells will be installed at the approximate locations shown on Figure 1. Each extraction well boring will be completed to an approximate depth of 40-feet[1] below ground surface (bgs) using an 8.25-inch inside diameter hollow stem auger (12-inch outside diameter) by a driller licensed in the State of New York. Wells will be keyed a minimum of 2-feet into the underlying clay formation. Each well will be completed with a 4-inch diameter polyvinyl chloride (PVC) casing and screen. The boring depth is approximately two feet below the deepest depth of the existing extraction wells. This will allow for installation of two (2) feet of solid casing beneath the bottom of the screened interval that will function as a "sump" for the extraction. Up to twenty (20) feet of slotted screen will be installed above the solid "sump" casing. Actual Screen length will be determined by the onsite geologist to span the entire saturated interval in the underlying fill and alluvium formations. A filter sand pack will be installed from one foot below the base of the screen to 5 foot above the top of the screened interval. A 2-foot thick layer of bentonite will be installed above the sand filter pack and the remaining annular space will be filled with a bentonite-cement grout.

Soil cuttings will be screened with a photoionization detector (PID) equipped with a 10.6eV lamp. Material may be segregated if visual, olfactory, or PID screening indicates the presence of any grossly contaminated soil in accordance with the EWP; however, all soils, apart from the upper one foot of clean cover, will be containerized for off-site disposal as described below.

The upper one foot of clean cover will be segregated from the other soil cuttings and temporarily stored adjacent to the borehole. These clean soils will be used as backfill in the upper foot of annular space for the new extraction wells.

Soil cuttings from below the demarcation barrier will be containerized in Department of Transportation (DOT)-compliant open topped 55-gallon drums, or a double lined (10 mil min) roll-off container, labeled, and temporarily staged adjacent to the extraction system treatment building. A composite sample of the soils will be tested for disposal profile parameters and it is assumed that all containerized cuttings will be disposed of as non-hazardous waste in accordance with local, state (including 6NYCRR Part 360), and federal regulations.

Electric or pneumatic submersible pumps will be installed in each well and temporary piping or hose (to allow draining between tests) will be used to connect the pump discharge to the existing treatment process. The extracted water will be conveyed to and treated in the existing system.

[1] The depth of the existing extraction wells ranges from 32 to 38-feet bgs.

In the northeast corner between Areas A and B there is a corrugated HDPE sump that was reportedly installed by a contractor for construction of the Tesla facility (the "Tesla Sump"). Reportedly, the water from the sump was pumped to allow construction of a sewer line. The water in the sump will be tested, and if it contains any Area A or Area B constituents in excess of the Class GA standards, a pump will be temporarily placed in the structure. The extracted water will be conveyed to and treated in the existing system.

Pumping Tests

A sequence of pumping tests will be conducted after installation of the new extraction wells. Baseline groundwater level readings will be collected from the monitoring/observation well network shown on Figure 1 a minimum of 1-week and 24-hours prior to starting the test(s).

The testing sequence will proceed as follows:

(A) Operation of all five (5) existing extraction wells and the three (3) additional extraction wells.
(B) Operation of existing extraction wells A-EW-1, A-EW-2, and A-EW-3A and the three (3) additional extraction wells.
(C) Operation of existing extraction wells A-EW-1, A-EW-2 and the three (3) additional extraction wells.
(D) Operation of existing extraction wells A-EW-1, A-EW-2, new extraction wells A-EW-6 and A-EW-7, and the Tesla Sump.
(E) Additional configurations as may be dictated based on field observations and the results of tests (A) through (D).

The testing of each configuration will run until elevation monitoring indicates the aquifer response to the pumping has stabilized, which is anticipated to require approximately 24- to 72-hours. There will be periodic groundwater level elevation monitoring of the monitoring/observation well network during each of the tests described above. Pressure transducers may be utilized in select observation wells in order to capture any rapid changes in water elevations at the start of each test. The monitoring/observation well network will be allowed to re-equilibrate to baseline conditions prior to starting a new test.

If at any time during the testing the observation well network indicates an increasing outward gradient, any wells that are shut down will be restarted.

Reporting

Inventum will prepare a summary report detailing the results of the hydraulic control measures evaluation and recommendations for any modifications to the hydraulic control system. Recommendations may include conversion of one or more of the additional extraction wells from temporary to permanent connection to the system as well as removal/abandonment of existing extraction wells.

Storm Sewer Inspection

Analytical results for samples collected of the storm water conveyance system discharge as part of routine site monitoring showed detections of 2,6-dinitrotoluene and nitrobenzene above the New York State Groundwater Effluent Limitations for Class GA waters. Inventum will conduct a video pipe inspection of the storm sewer network on the site (Figure 1) in an effort to find any points of breakage, seepage, or punctures where groundwater may be infiltrating the system. The video inspection will start at the storm sewer sampling manhole (DMH-A3) nearest the Buffalo River outfall and progress "upgradient".

The video inspection tool will be fitted with a transmitter that will allow identification on the ground surface of any potential points of seepage or infiltration. The video footage will be collected, saved, and included as an electronic file attached to a summary report of findings to the NYSDEC.

Any corrective measures resulting from the video inspection will be proposed in the summary report of findings.

Sheet Pile Wall Backfill Replacement

South Buffalo Properties and the NYSDEC has noted the loss of granular fill between the steel sheet pile and the displaced concrete retaining wall adjacent to the South Park Avenue bridge over the past several years. Inventum will check the depth to the remaining gravel at the time of the replacement and replace any material to the proper grade. Inventum believes the pea gravel that was installed behind the sheet pile wall to allow drainage may be too small diameter and has washed out. The gravel will be replaced with a larger diameter stone (No less than 2-inch nominal diameter). The gravel surface will be marked on the inside of the sheet pile allowing for easy visual inspection of any future subsidence of the stone. Inspection of the area for subsidence will be added to the periodic inspections completed as part of the SMP.

Schedule

Inventum is prepared to initiate the hydraulic control measures testing and storm sewer analysis within 30-days of approval of this work plan. Inventum will provide the NYSDEC with no less than 5 days' notice of the start of each phase of this work plan. A summary report(s) will be prepared within 10-days of completing each scope of work. Replacement of the gravel backfill can be completed within 15 to 30-days of approval of this work plan.

Closing

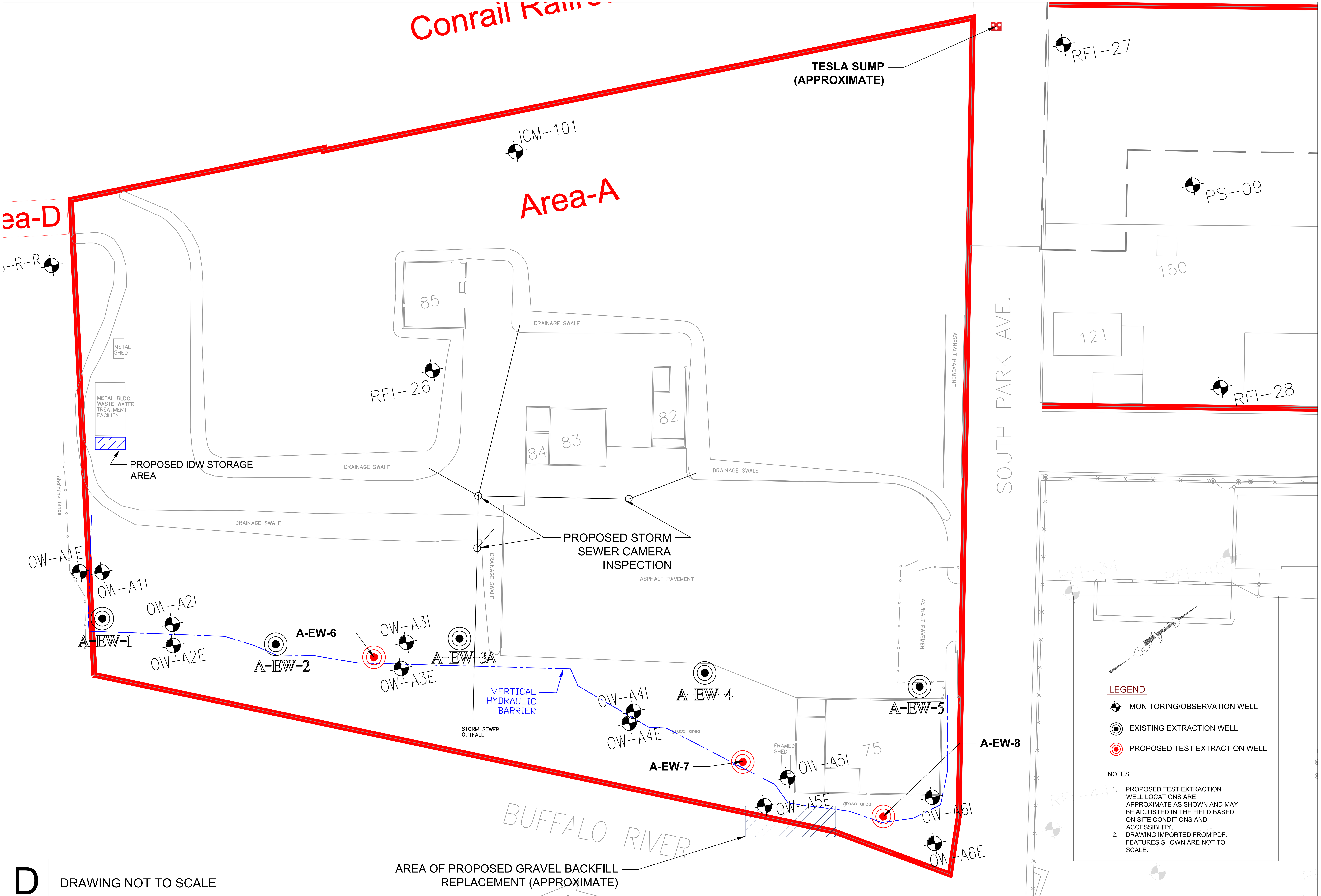
If you have any questions regarding the above, please feel free to contact me (john.black@inventumeng.com; 571.217.6761) or Todd Waldrop (todd.waldrop@inventumeng.com; 571.217.3627).

Sincerely,

John Black, PE
Inventum Engineering, PC
481 Carlisle Drive
Suite 202
Herndon, Virginia 20170

Ecc: Jon Williams – South Buffalo Development, LLC
John Yensan - OSC, Inc
Rich Galloway - Honeywell

Figure



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FORMER BUFFALO COLOR CORPORATION
AREA A
CONTROLS EVALUATION WORK
PLAN OVERVIEW

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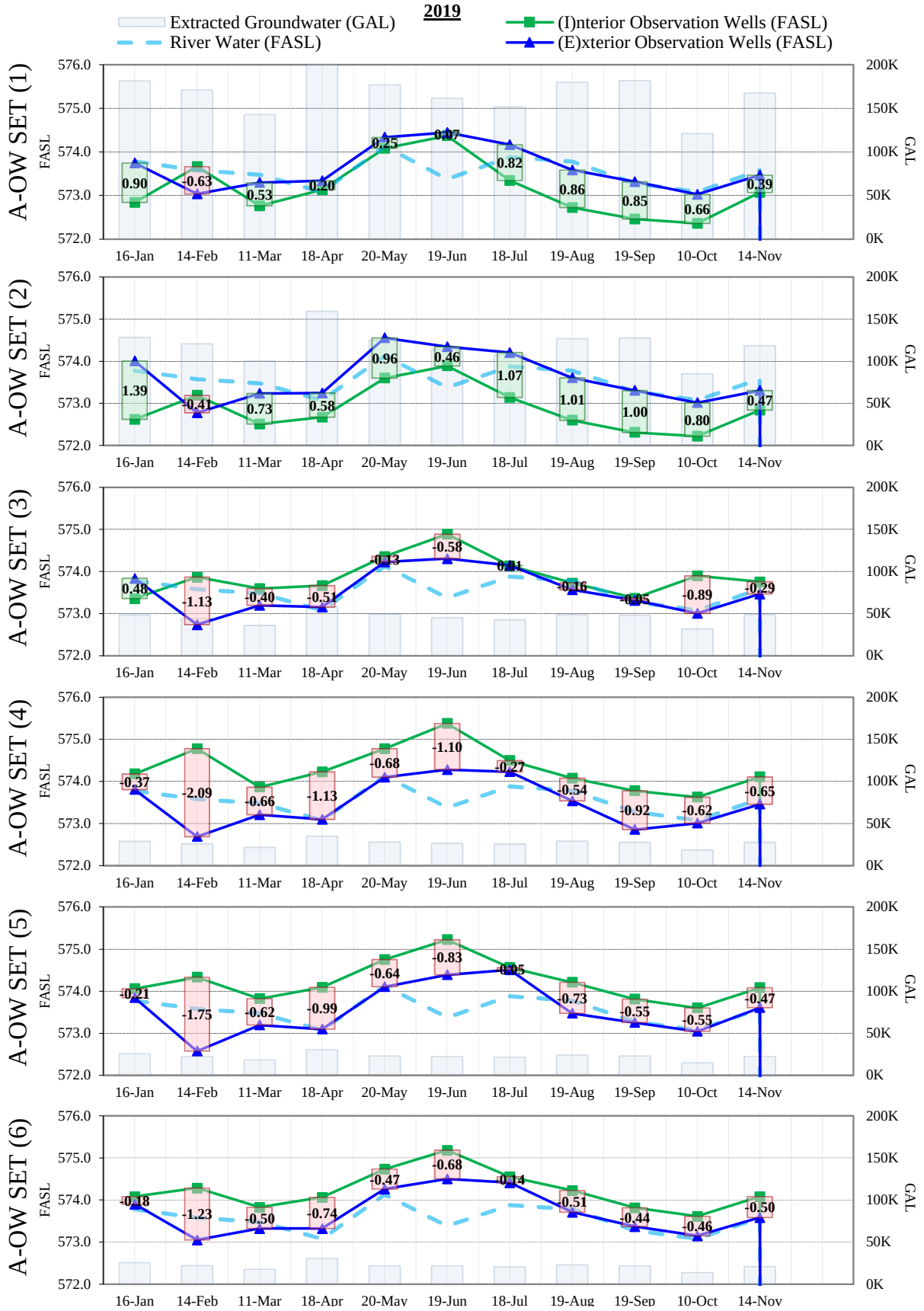
FIGURE 1

Attachment A – 2019 Area A VHB Hydraulic Control System Monitoring

Buffalo Color, Area A - Buffalo River Water Elevations, Observation Well Groundwater Elevations & Extraction Well Network Allocations



Buffalo Color, Area A - Buffalo River Water Elevations (FASL), Observation Well Groundwater Elevations (FASL), Elevation Differentials (FT) & Extraction Well Network Totals (GAL)

Abbreviations: River Stadia Rod (RSR), Observation Well (OW), Elevation Differential (ED), Extraction Well (EW)

2019	RIVER	A-OW SET (1)			A-OW SET (2)			A-OW SET (3)			A-OW SET (4)			A-OW SET (5)			A-OW SET (6)			AVERAGES			A-EW					
Date	**RSR**	**1I**	**1E**	**1ED**	**2I**	**2E**	**2ED**	**3I**	**3E**	**3ED**	**4I**	**4E**	**4ED**	**5I**	**5E**	**5ED**	**6I**	**6E**	**6ED**	**I**	**E**	**ED**	**1**	**2**	**3A**	**4**	**5**	**TOTAL**
16-Jan	573.78	572.84	573.75	0.90	572.62	574.01	1.39	573.36	573.84	0.48	574.18	573.81	-0.37	574.06	573.85	-0.21	574.08	573.90	-0.18	573.52	573.86	0.33	349,776	27,397	20,233	8,483	32,326	438,215
14-Feb	573.58	573.66	573.04	-0.63	573.19	572.78	-0.41	573.87	572.74	-1.13	574.78	572.69	-2.09	574.33	572.58	-1.75	574.28	573.05	-1.23	574.02	572.81	-1.21	331,382	25,035	17,717	7,172	25,408	406,714
11-Mar	573.48	572.76	573.30	0.53	572.51	573.24	0.73	573.60	573.20	-0.40	573.87	573.21	-0.66	573.82	573.20	-0.62	573.82	573.32	-0.50	573.40	573.24	-0.15	277,198	19,034	14,022	7,007	19,844	337,105
18-Apr	573.08	573.13	573.34	0.20	572.67	573.25	0.58	573.67	573.16	-0.51	574.23	573.10	-1.13	574.09	573.10	-0.99	574.06	573.32	-0.74	573.64	573.21	-0.43	439,140	29,685	24,100	10,298	36,924	540,147
20-May	574.13	574.08	574.34	0.25	573.60	574.56	0.96	574.36	574.23	-0.13	574.78	574.10	-0.68	574.75	574.11	-0.64	574.73	574.26	-0.47	574.38	574.26	-0.12	342,358	24,303	26,487	9,411	22,030	424,589
19-Jun	573.38	574.37	574.45	0.07	573.89	574.35	0.46	574.89	574.31	-0.58	575.38	574.28	-1.10	575.22	574.39	-0.83	575.18	574.50	-0.68	574.82	574.38	-0.44	311,742	22,563	23,104	9,802	24,588	391,799
18-Jul	573.88	573.34	574.17	0.82	573.14	574.21	1.07	574.14	574.15	0.01	574.50	574.23	-0.27	574.56	574.51	-0.05	574.55	574.41	-0.14	574.04	574.28	0.24	291,848	22,026	22,014	10,890	23,127	369,905
19-Aug	573.78	572.72	573.59	0.86	572.60	573.61	1.01	573.73	573.57	-0.16	574.08	573.54	-0.54	574.21	573.48	-0.73	574.22	573.71	-0.51	573.59	573.58	-0.01	347,314	24,735	23,512	11,602	24,661	431,824
19-Sep	573.28	572.46	573.32	0.85	572.31	573.31	1.00	573.37	573.32	-0.05	573.78	572.86	-0.92	573.81	573.26	-0.55	573.81	573.37	-0.44	573.26	573.24	-0.02	352,706	24,108	22,151	9,110	22,014	430,089
10-Oct	573.08	572.36	573.03	0.66	572.22	573.02	0.80	573.90	573.01	-0.89	573.63	573.01	-0.62	573.60	573.05	-0.55	573.61	573.15	-0.46	573.22	573.04	-0.18	235,306	15,454	15,182	6,749	12,554	285,245
14-Nov	573.58	573.07	573.47	0.39	572.84	573.31	0.47	573.76	573.47	-0.29	574.11	573.46	-0.65	574.08	573.61	-0.47	574.08	573.58	-0.50	573.66	573.48	-0.18	322,720	23,006	29,149	9,931	21,114	405,920
Avg | Sum	***573.55***	***573.16***	***573.61***	***0.45***	***572.87***	***573.60***	***0.73***	***573.87***	***573.54***	***-0.33***	***574.30***	***573.48***	***-0.82***	***574.23***	***573.56***	***-0.68***	***574.22***	***573.69***	***-0.53***	***573.78***	***573.58***	***-0.20***	**3,601,490**	**257,346**	**237,671**	**100,455**	**264,590**	**4,461,552**