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June 25, 2020

Department of Natural Resources
Attn: Jared Ebert
Colorado Division of Reclamation, Mining & Safety
1313 Sherman Street Room 215
Denver, CO 80203-2243

Re: Sandy Acres Pit, DRMS Permit No. M-1980-110
Hydrologic Balance response

Dear Mr. Ebert:

This is a follow up to our October 29, 2019 letter regarding water observed at the former Sandy Acres Pit.

Since our last letter we have continued our investigations but to date we have not found the source of water. The attached memorandum from BBA Water Consultants summarizes the explorative work and analysis completed to date and the recommended next steps. We are requesting that we follow the recommendations from our consultant and report our findings back to you on or before July 1, 2021.

If you have any other questions or need more information, please call me at (303) 537-3710.

Sincerely

A handwritten signature in blue ink that reads "Derek Slack".

Derek Slack, P.E.
Roadway Maintenance Manager

MEMORANDUM



To: Derek Slack, P.E. and Neil Thomson, P.E.
E-470 Public Highway Authority (E-470)
From: Austin Malotte, P.E.
Subject: Sandy Acres Ponding – June 2020 Status
Job: 9607.00
Date: June 24, 2020

This memorandum summarizes information collected to-date and recommended next steps regarding mitigation of water ponding issues at E-470's Sandy Acres Pit.

Overview and Background Information

The Sandy Acres Pit is a backfilled, inactive, unlined gravel pit located on E-470's property in the Southeast $\frac{1}{4}$ of Section 26, Township 1 South, Range 67 West of the 6th P.M. near Henderson, Colorado. The former pit was permitted under Colorado Division of Reclamation, Mining and Safety (DRMS) as "Henderson Development" in Permit No. M-1980-110. DRMS approved Amendment No. 6, AM-06 on September 3, 2014 and Technical Revision No. 3 on May 12, 2015, permitting E-470 to backfill the Sandy Acres Pit with washed fines from a neighboring gravel pit. The backfilling work was completed by July 1, 2016 in accordance with the conditions of the permit amendment and technical revision.

Since 2014, E-470 has replaced stream depletions associated with historical evaporation of ground water exposed by the former gravel pit pursuant to a series of Substitute Water Supply Plans (SWSPs).¹ Stream depletions associated with Sandy Acres Pit are currently replaced pursuant to an October 25, 2019 letter from the Colorado Division of Water Resources approving SWSP operations through September 30, 2024.

During a 2019 site inspection, DRMS staff noted standing water at the base of the (backfilled) pit at the southern end of the site. Representatives from E-470 and BBA Water Consultants, Inc. (BBA) visited the site and confirmed the presence of ponded water on top of the backfill material at Sandy Acres.

Evaluation and Mitigation Efforts To-Date

Since first identifying the ponding issue at Sandy Acres, E-470 has taken several proactive steps to identify the source or sources of the ponded water. This section describes E-470's activities to-date, including mapping and data reviews, field investigations, and a monitoring well program.

¹ SWSP ID 3102 pursuant to §37-90-137(11) C.R.S.

Activities to Identify Water Source

It is necessary to identify the source or sources of the water collecting at Sandy Acres Pit before a solution for mitigation can be identified and implemented. To that end, E-470 has taken the following actions since the ponding issue was first identified in 2019:

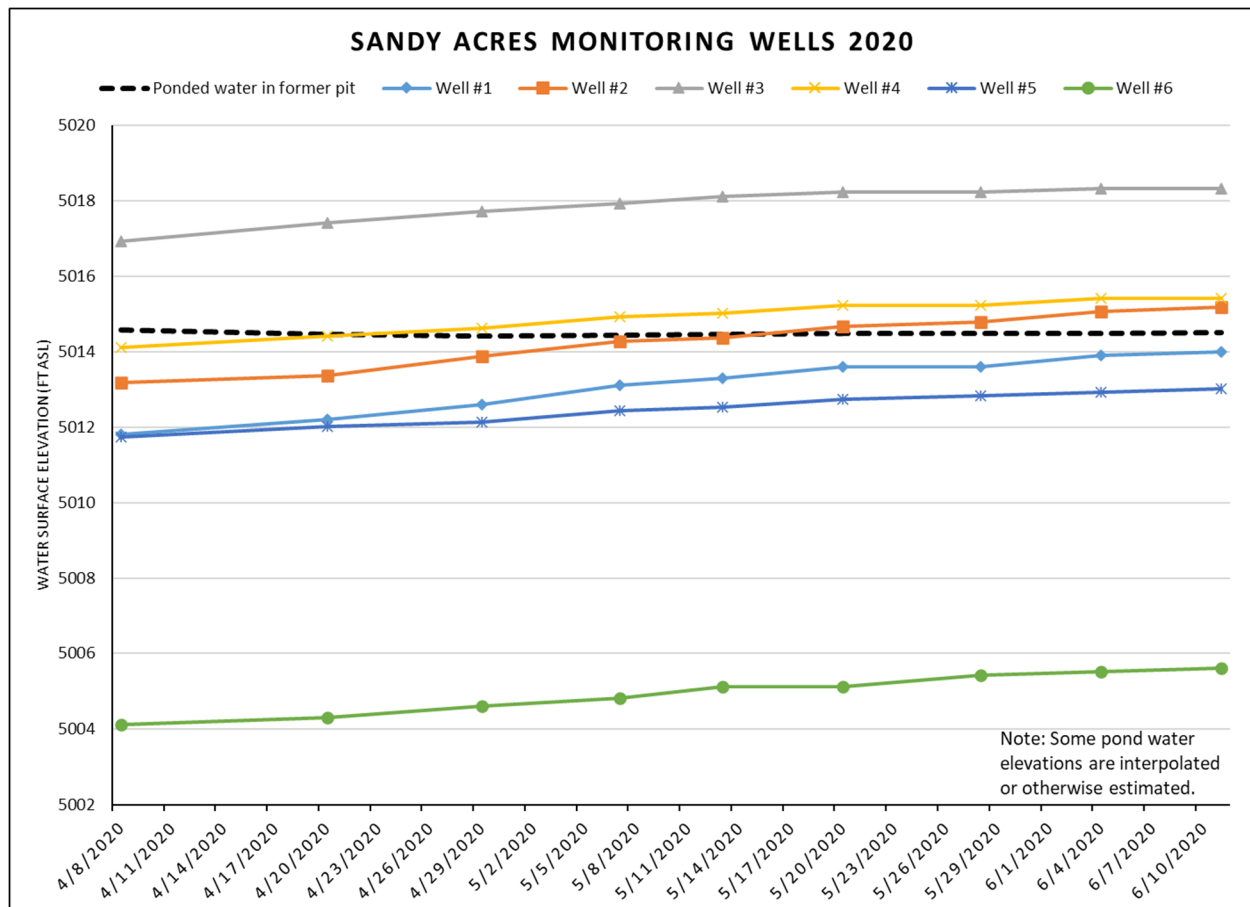
- Reviewed historical aerial imagery and topographic mapping
- Reviewed mapping of storm drainage systems that may direct surface water to or through Sandy Acres
- Performed field investigations to identify possible point inflows for surface runoff
- Reviewed local precipitation data for correlation with inflows to Sandy Acres
- Reviewed diversion records for the Fulton Ditch, which traverses to the east of Sandy Acres
- Communication with owner of raw water transmission line adjacent to Sandy Acres pit
- Reviewed available data from nearby water wells
- Identified locations of nearby slurry walls and lined reservoirs
- Initiated monitoring well program at Sandy Acres to gain better understanding of ground water patterns in the vicinity of Sandy Acres.

Sandy Acres Monitoring Well Program

In March 2020, E-470 installed six monitoring wells (monitoring holes) within and around the Sandy Acres property. The locations for the monitoring holes were selected with assistance from BBA and were constructed by Kumar & Associates, Inc. and their subcontractors. The six new monitoring wells are as follows:

WELL NO.	WELL PERMIT NO.	TOTAL DEPTH	TOP ELEV.
MW-1	MH-60550	43.0 feet	5024.90
MW-2	MH-60550	49.0 feet	5033.78
MW-3	MH-60550	44.75 feet	5038.32
MW-4	MH-60550	49.0 feet	5033.32
MW-5	MH-60550	45.0 feet	5029.13
MW-6	MH-60554	35.0 feet	5014.51

The locations of these six monitoring wells are shown on Figure 1, attached. Water levels were collected approximately weekly from each of the six wells since April 2020. The water surface elevation in the ponded portion of Sandy Acres was collected concurrently with well levels. Water level data for April 8 through June 11, 2020 are illustrated graphically below.



The water level data illustrated in the above chart reflect a local ground water gradient from the south/southeast (Well No. 3) toward the north/northwest (Well No. 6) across the Sandy Acres property. However, the relatively consistent surface water level at Sandy Acres compared with nearby ground water levels over the period of record suggests the ponded water may not be a simple expression of the local ground water table. Additional evaluation is needed to identify the amounts and vectors by which water is entering the former pit, and additional data are needed to support such evaluations.

Recommended Next Steps

In line with E-470's desire to address the issue of ponding water at Sandy Acres, BBA provides the following recommendations:

1. Continue regular collection of water level data from the Sandy Acres monitoring wells and ponded area (to the extent it persists) until at least one year of data have been collected, through April 2021.

2. Collect geophysical/geotechnical data in the vicinity of the former Sandy Acres pit, with a focus on the area immediately north of the former pit. One or more borings may be needed to collect these data.
3. Identify sources, approximate amounts and pathways by which water is entering the former Sandy Acres pit based upon collected data.
4. Develop and evaluate conceptual alternatives for mitigation of ponding at the former Sandy Acres pit.
5. Select a preferred conceptual alternative for mitigation of the ponding issue, present selected alternative to DRMS. Some conceptual alternatives may also require review and/or approval from the Colorado Division of Water Resources.



Figure 1
E-470
Sandy Acres Pit
Monitoring Well Locations

Date: 6/22/2020 | Job No. 9607.00

Legend

- + Monitoring Holes (Name, Permit No.)
- Sandy Acres Pit Former High Water Line

Aerial Photo Date: 8/3/2019 NAIP-USDA
Data Source: CDSS, CDOT, USGS, BLM

Overview Map

