COLORADO
Division of Reclamation, Mining and Safety
Department of Natural Resources

# MINERALS PROGRAM INSPECTION REPORT
## PHONE: (303) 866-3567

**The Division of Reclamation, Mining and Safety has conducted an inspection of the mining operation noted below. This report documents observations concerning compliance with the terms of the permit and applicable rules and regulations of the Mined Land Reclamation Board.**

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| **MINE NAME:** Howe Pit | **MINE/PROSPECTING ID#:** M-1978-052 | **MINERAL:** Sand and gravel | **COUNTY:** Adams |
| **INSPECTION TYPE:** Monitoring | **INSPECTOR(S):** Jared L. Ebert | **INSP. DATE:** February 2, 2017 | **INSP. TIME:** 09:00 |
| **OPERATOR:** City & County of Denver, Board of Water Commissioners | **OPERATOR REPRESENTATIVE:** Ryan Stitt, Denver Water | **TYPE OF OPERATION:** 112c - Construction Regular Operation | |

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| **REASON FOR INSPECTION:** Normal I&E Program | **BOND CALCULATION TYPE:** None | **BOND AMOUNT:** $0.00 |
| **DATE OF COMPLAINT:** NA | **POST INSP. CONTACTS:** None | **JOINT INSP. AGENCY:** None |
| **WEATHER:** Cloudy | **INSPECTOR'S SIGNATURE:** Jared Ebert | **SIGNATURE DATE:** February 6, 2017 |

## GENERAL INSPECTION TOPICS

**This list identifies the environmental and permit parameters inspected and gives a categorical evaluation of each. No problems or possible violations were noted during the inspection. The mine operation was found to be in full compliance with Mineral Rules and Regulations of the Colorado Mined Land Reclamation Board for the Extraction of Construction Materials and/or for Hard Rock, Metal and Designated Mining Operations. Any person engaged in any mining operation shall notify the office of any failure or imminent failure, as soon as reasonably practicable after such person has knowledge of such condition or of any impoundment, embankment, or slope that poses a reasonable potential for danger to any persons or property or to the environment; or any environmental protection facility designed to contain or control chemicals or waste which are acid or toxic-forming, as identified in the permit.**

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| (AR) RECORDS---------- N | (FN) FINANCIAL WARRANTY-------- NA | (RD) ROADS---------- Y |
| (HB) HYDROLOGIC BALANCE---------- Y | (BG) BACKFILL & GRADING---------- Y | (EX) EXPLOSIVES--------- NA |
| (PW) PROCESSING WASTE/TAILING---- NA | (SF) PROCESSING FACILITIES------- NA | (TS) TOPSOIL---------- N |
| (MP) GENL MINE PLAN COMPLIANCE- Y | (FW) FISH & WILDLIFE---------- N | (RV) REVEGETATION---- Y |
| (SM) SIGNS AND MARKERS---------- N | (SP) STORM WATER MGT PLAN---- NA | (CI) COMPLETE INSP---- NA |
| (ES) OVERBURDEN/DEV. WASTE--------- NA | (SC) EROSION/SEDIMENTATION--- NA | (RS) RECL PLAN/COMP-- Y |
| (AT) ACID OR TOXIC MATERIALS------- NA | (OD) OFF-SITE DAMAGE---------- Y | (ST) STIPULATIONS------- NA |

**Y = Inspected and found in compliance / N = Not inspected / NA = Not applicable to this operation / PB = Problem cited / PV = Possible violation cited**

## OBSERVATIONS

This was a monitoring inspection of the Howe Pit, DRMS Permit No. M-1978-052, operated by City and County of Denver, Board of Water Commissioners (Denver Water). I, Jared Ebert of the Colorado Division of Reclamation, Mining and Safety (Division) conducted the inspection. Mr. Ryan Stitt, Wes Eversole, Kris Sandoval and Brad Piede with Denver Water accompanied me during the inspection. The weather was cold and cloudy during the inspection. The Howe Pit is a 112c mining operations with 389.24 permitted acres. According to the permit, the site will be reclaimed primarily for water storage but also for private recreation and wildlife habitat. Overall, mining appears to be complete at the site and two lined water storage reservoirs and one open groundwater pond remains. The Howe Pit Reservoir A is located south of the Fist Creek channel and Reservoir B is located north of the First Creek Channel. The open ground water pond is located to the east of Reservoir B.

Backfilling and Grading:

The pond slopes of Reservoir A and B were observed. Overall, the slopes vary in steepness but appear to be graded to a 4:1 to 3:1 slope from the bottom of the reservoirs to the top of the reservoirs. The dense wetland vegetation that has established around the open ground water pond obscures the interior slopes of the pond from view. Given the density of the wetland vegetation the interior slopes of the pond are appear very gentle. Flood damage had occurred on the western pit slopes of both Reservoirs A and B, these areas have been repaired and have been seeded. However, it appears the operator intends to re-seed the repaired pit slopes this year.

A small workspace/pad area has been extended out from the access road on the east side of the emergency spillway of Reservoir B (northern reservoir). The side slopes of this pad extend into the reservoir and are steeper than the required 3:1 angle. This area will need to be graded to the approved slope angle.

Hydrologic Balance:

Reservoir A and B, were holding a small amount of water in places. These are clay lined reservoirs and on January 23, 2017, Mr. Stitt sent me documentation in the form of two letters from the Colorado Division of Water Resources (DWR) that both Reservoirs A and B meets the design standard referenced in the August 1999 State Engineer Guidelines for Lining Criteria for Gravel Pits.

The exposed ground water pond that is located to the east of Reservoir B was an area that that was mined prior to 1981 according to Mr. Stitt. Based on the original permit application submitted for the Howe Pit in 1978, it appears this was an existing feature.

Portions of the re-located Bull Seep were observed south of Reservoir A and west of both reservoirs. The channel appears stable and functional and dense riparian vegetation has established adjacent to the channel.

First Creek runs from a head gate at the Fulton Ditch into a channel that bisects Reservoirs A and B. This channel is stable with dense grassy vegetation established on the slopes of the channel. A mounding drainage has been installed west of Reservoir B. The representatives from Denver Water showed me various plumbing and valve features that controls the mounding drain. The primary outlet for the mounding drain is located adjacent to the site's main office. The mounding drain discharges from a pipe into the First Creek channel.

Roads:
Interior access roads are located around the reservoirs and along the First Creek channel that bisects Reservoirs A and B. Denver Water intends to use these roads to access and maintain the water storage reservoirs infrastructure. As discussed during the site inspection. Denver Water will need to revise the reclamation plan to indicate that these roads will remain on the site and the reclamation plan map will need to be updated to show the location of these roads.

Reclamation Success:
The approved reclamation plan calls for the creation of two lined water storage reservoirs. The operator has created two lined reservoirs and a separate open water ground water pond remains at the site. Based on the mining and reclamation plan, it appears the original intent was to tie the norther reservoir (Reservoir B) into the shallow ground water pond. Reservoir B and the open ground water pond are separate. Denver Water will need to update the reclamation plan to update the final configuration of the reclaimed area.

According to the approved reclamation plan, the slopes of the reservoirs are required to be graded to a 3:1 slope on the south, west and north sides. On the east side, the reclamation plan calls for grading the side slopes at a 5:1 horizontal to vertical ratio above the proposed water line and five feet below the proposed water line and to a 3:1 slope for the remainder to the pit slope. The south, west and north slopes vary in angle, but the majority of these slopes appear to be graded to a 3:1 to 4:1 horizontal to vertical ratio. The east side slopes of the reservoirs also vary in steepness but the majority of the slopes appear to be graded to a 3:1 to 4:1 horizontal to vertical ratio. While the slopes on the eastern side of the reservoirs are in compliance with the grading requirements of Rule 3.1.5(7) of the Construction Materials Rules and Regulations, they deviate from the approved reclamation plan. Given that 3:1 slopes are acceptable for pond slopes per rule 3.1.5(7), Denver Water will need to revise the permit to indicate the slopes of the eastern portions of the reservoirs will be no greater than a 3:1 slope.

It appears topsoil has been spread throughout the site where revegetation is required. Vegetation has established throughout the affected area with the exception of the pit bottoms, the location of roads and other reservoir structures and portions of the pit slopes that have been recently repaired because of past flood damage. Some standing dead thistle stocks were observed, but overall the majority of the vegetation established throughout the affected area is grass species. It appears the affected area was mowed at the end of the growing season so it was difficult to determine the type of grass species that have established at the site. Additionally, the reclamation plan calls for the planting of trees and shrubs. Details of this plan are shown on Exhibit G-1 of the permit. Based on this plan, a number of planting areas were designated with a specific number and type of tree or shrubs to be planted. Denver Water has not planted these trees and shrubs in accordance with the approved plan. However, a public recreation path has been installed west of the reservoirs along the South Platte River and Denver Water has planted a number trees adjacent to this path west of Reservoir A. According to the Denver Water representatives, they would prefer not to plant trees and shrubs in the areas depicted on the map as their root system may damage the clay liner of the reservoirs. Given this, Denver Water will need to revise the reclamation plan to change or eliminate the requirement for tree and shrub planting.

A number of structures have been installed that will remain on the site in order to maintain and manage the water storage reservoirs. These structures include various inlet and outlet structures and access ramps into

the lined reservoirs. Denver Water will need to update the reclamation plan to indicate the structures that will remain on the site and update the reclamation plan to depict these structures.

Revegetation:
Please see the Reclamation Success section of this report for additional detail about the plant establishment at the site.

Slides and Other Damage:
The South Platte River flooded in 2013 and damaged the western side slopes of Reservoir A and B in several locations. Denver Water has repaired these areas and they appear stable. These area are largely devoid of vegetation. Vegetation will need to be established in these areas before they are eligible for bond release.

## PHOTOGRAPHS

**Figure 1. Water discharging from mounding drain into the First Creek Channel north of the site office.**

**Figure 2. Southern pit slope of Reservoir A.**

**Figure 3. From southeast corner of Reservoir A looking northwest.**

**Figure 4. Northwest corner of Reservoir A. Area where slope repair occurred from flood damage.**

**Figure 5. From the west end of the First Creek Channel looking southeast.**

**Figure 6. View of the Bull Seep near the confluence of First Creek, looking north.**

**Figure 7. View of the Bull Seep near the confluence of First Creek, looking south.**

**Figure 8. Public path adjacent to Reservoirs A and B.**

**Figure 9. Western Slope of Reservoir B.**

**Figure 10. Emergency Spillway of Reservoir B.**

**Figure 11. From the emergency spillway of Reservoir B looking north at the outlet of the Bull Seep.**

**Figure 12. View of the open groundwater pond from the east end looking west.**

**Inspection Contact Address**
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Enclosure: None

CC: None