

## Memorandum

<b>To</b>	Department of Mines, Industry Regulation and Safety (DMIRS)		
<b>From</b>	Damian Jagoe-Banks	<b>Date</b>	27 November 2023
<b>Subject</b>	Backfill Stability Monitoring Progress Report	<b>Project No.</b>	96721.03

### 1.0 Introduction

This technical memorandum provides the results of ongoing monitoring of the backfill stability following the rehabilitation of 11 mining features located at Lot F27 Goodwood Road, Upper Capel, approximately 2 km south of Donnybrook townsite.

The rehabilitation work, comprising backfilling of the mine features with a granular material, was undertaken between 9 and 16 November 2022.

The monitoring comprises a visual inspection undertaken by a geotechnical engineer and surveying of the surface level of the backfill surface from a given location, established immediately following completion of the backfill in November 2022.

### 2.0 Monitoring Programme

Following completion of the backfill works in November 2022, the following target monitoring programme has been implemented:

**Table 1: Monitoring Programme - Completed and Forecast.**

Visit Number	Date	Duration from Completion of Rehabilitation
1	30 November 2022	2 weeks (14 days)
2	23 January 2023	10 weeks (68 days)
3	12 April 2023	5 months (147 days)
4	17 July 2023	8 months (243 days)
5	20 September 2023	10 months (308 days)
6	13 November 2023	12 months (362 days)

### 3.0 Monitoring Results

#### 3.1 General Observations

Observation of the ground surface at each backfilled mine feature was made by a Geotechnical Engineer during each monitoring event (refer to Table 1 above).

Visual inspection undertaken during site visits 1 and 2 indicated no apparent changes in the condition of the backfill placed within the 11 rehabilitated mine features, ten weeks after completion of the backfilling.

Inspection undertaken during Visit 3 on 12 April 2023, identified localised depressions at the surface of the backfill for Features 4 and 5. Dimensions of the depressions are detailed in Table 2 below.

**Table 2: Observations of Localised Surface Depression on 12 April 2023**

Mine Feature	Description
4	1.3 m L x 0.9 m W x 0.4 m D depression
5	0.8 m L x 0.75 m W x 0.4 m D depression

Note [1]: L = length, W = width, D = depth

Inspections undertaken from the fourth visit (on 17 July 2023) onwards have indicated no notable changes to the localised depressions observed at Features 4 and 5.

#### 3.2 Surveying

To assist in the assessment of backfill stability, surface of the backfill at each mine feature was surveyed during each monitoring event (Table 1 above), using conventional surveying technique referenced to a local datum specific to each mine feature. The results are provided in Table 3, next page.

**Table 3: Surface Level Measurements**

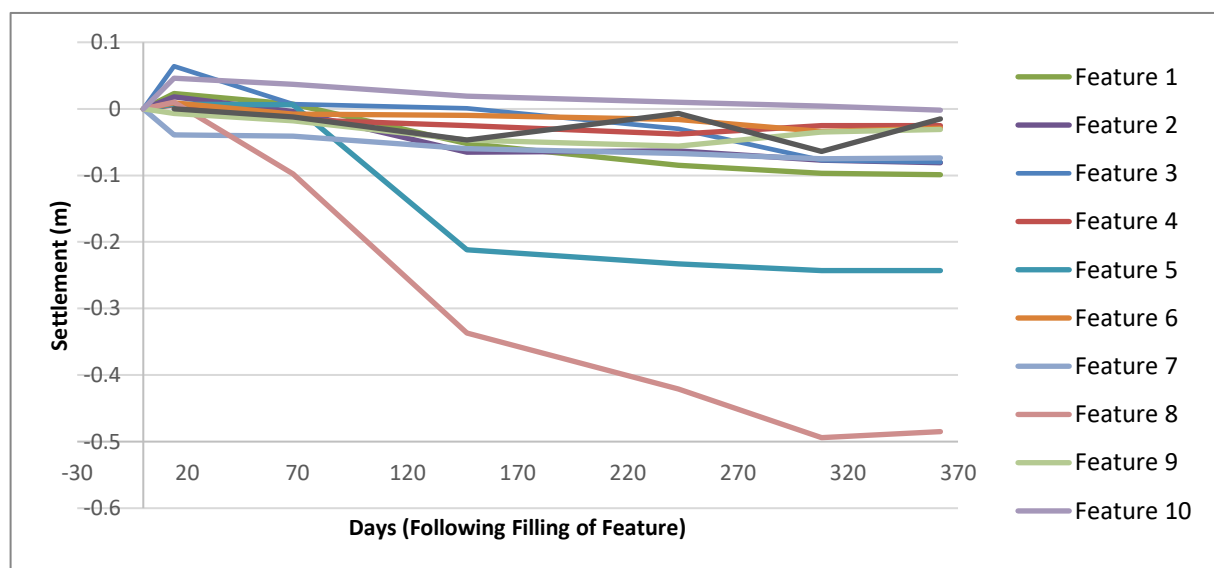
Mine Feature	Location		Initial Level m <sup>[1]</sup>	Surface Level to Datum (m) <sup>[2]</sup>						Total Settlement (m) <sup>[3]</sup>
	Easting	Northing		Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6	
1	390198	6281516	1.84	1.82	1.83	1.89	1.92	1.94	1.94	0.10
2	390245	6281436	1.80	1.78	1.80	1.86	1.86	1.87	1.88	0.08
3	390240	6281428	1.93	1.86	1.92	1.93	1.96	2.00	2.00	0.07
4	390245	6281405	1.05	1.04	1.07	1.08	1.09	1.08	1.08	0.03
5	390247	6281386	1.19	1.19	1.19	1.41	1.43	1.44	1.44	0.25
6	390257	6281378	1.21	1.20	1.22	1.22	1.23	1.25	1.25	0.04
7	390249	6281360	2.91	2.95	2.95	2.97	2.98	2.99	2.99	0.08
8	390245	6281347	1.32	1.31	1.42	1.66	1.74	1.81	1.80	0.49
9	390234	6281355	1.74	1.75	1.76	1.79	1.80	1.78	1.78	0.04
10	390237	6281328	1.86	1.81	1.82	1.84	1.85	1.85	1.86	0.00
Dog Shaft	390633	6282193	NA	1.48	1.49	1.53	1.49	1.55	1.50	0.02

Note [1]: All levels in Table 3 are referenced to local datum specific to each mine feature and established on an existing tree adjacent to each feature. 'Initial Level' represents the elevation at a target measurement point at the surface of the backfill, in the local datum.

[2]: Increasing values relative to initial level measurement represents a drop in the surface of the backfill (e.g. settlement).

[3]: Total Settlement derived from Visit 6 level relative to the Initial Level at all features, except for the Dog Shaft (relative to Visit 1 measurement).

**Figure 1: Observed Settlement History**





## 4.0 Engineering Comments

Total settlement of not more than 100 mm, which is within expectation regarding self-densification of the backfill, was recorded for features other than Features 5 and 8, over a monitoring period of 1 year.

Settlements of 0.25 m and 0.49 m were recorded at Features 5 and 8 respectively. It is noted that since observations made on the third visit, 5 months following placement of the backfill, the rate of settlement has been slowing. Results of the 6<sup>th</sup> monitoring visit suggest that the majority of the settlement for these two features (like the other features) is likely to have occurred. The greatest settlement at Feature 8 (compared to the other features) is commensurate to the significantly greater depth (17 m) of this feature prior to backfilling. Figure 2 below provides an indication of the condition of this feature at the time of the 6<sup>th</sup> monitoring visit, 1 year following placement of the fill.

**Figure 2: Condition of Feature 8 on 13 November 2023, 12 months following fill placement.**



No obvious changes in the localised depressions observed at Features 4 and 5 were evident in the most recent visit (visit 6), and as such are not considered problematic at this time.

Based on the monitoring undertaken to date, no unexpected behaviour has been detected at the rehabilitated features, and as such, no additional remedial actions are warranted with regard to the

backfilled features. Settlement observations indicate that the majority of expected settlement has likely occurred and the backfill within the features can be considered to be stable. No further detailed monitoring of the rehabilitated features is considered warranted.

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