

025/5003/AG/cc

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Mr J Scott
Britology
jonathan@britology.co.uk



Registered in England 07068066

Parkhill
Wetherby
West Yorkshire
LS22 5DZ

T 01937 545 330
www.lithos.co.uk

Dear Jonathan

Lower Edge Quarry – well repair and sampling

Further to our recent correspondence, we are now able to report details of borehole repair and groundwater sampling undertaken at Lower Edge Quarry, Elland.

Background

Lithos installed 5 dual gas and groundwater monitoring wells between the 7th and 15th October 2024. A total of 12 monthly visits are scheduled to be undertaken to aid the application of a landfill permit. Details of the monitoring wells are listed below.

Monitoring well	Coordinates		Level	Installation	Response zone depths m bgl (m AOD)	Response zone lithology
	easting	northing				
BH01	412845.1	421374.6	160.149	19mm HDPE pipe	1.0 – 3.0 (159.15 – 157.15)	Quarry backfill
				50mm HDPE pipe	18.0 – 22.0 (142.15 – 138.15)	Quarry backfill
BH02	412729.9	421182.0	172.376	19mm HDPE pipe	1.0 – 3.0 (171.38 – 169.38)	Elland Flags
				50mm HDPE pipe	18.0 – 22.0 (154.38 – 150.38)	Elland Flags
BH03	412813.4	421106.3	177.696	19mm HDPE pipe	1.0 – 3.0 (176.70 – 174.70)	Granular Residual Soils
				50mm HDPE pipe	28.0 – 32.0 (149.70 – 145.70)	Elland Flags
BH04	412940.4	421050.0	176.317	19mm HDPE pipe	1.0 – 3.0 (175.32 – 173.32)	Quarry backfill
				50mm HDPE pipe	36.0 – 40.0 (140.32 – 136.32)	Possible Elland Flags
BH05	413013.5	421099.8	173.108	19mm HDPE pipe	1.0 – 3.0 (172.12 – 170.12)	Elland Flags
				50mm HDPE pipe	35.5 – 39.5 (137.61 – 133.61)	Elland Flags

To date, two gas monitoring visits have been undertaken on the 7th November 2024 and the 4th December 2024. During visit 1, wells were developed to allow for groundwater sampling on visit 2. Due to slow recharge rates during well development, the recovery of groundwater samples is only considered possible in BH04 and BH05.

Equipment failure and during visit 2 resulted in no groundwater samples being recovered.

Visit 3 was undertaken on 6th January 2025, where it was discovered that BHs 04 & 05 had been severely damaged (accidentally) by an excavator over the Christmas period, despite being protected. A follow-up visit was undertaken on the 13th January 2025 to repair the monitoring wells. Photos of the damage and subsequent repairs are attached to this letter.

Gas monitoring and groundwater dips were recorded from the remaining 3 boreholes (BHs 01 to 03) on the 6th January as these wells remained intact. The results of the gas monitoring will be included in January's letter report.



Well repair details – 13th January 2025

BH04

Both BHs 04 & 05 were protected using large vehicle tyres after installation in November 2024. The vehicle tyre used to protect BH04 had been moved and was upstanding, and the top section of pipe and well cover had been removed and relocated c. 5m from the original well position. At the time of visit 3, the ground was covered in snow, giving limited visibility. It was decided to wait until the snow thawed to further inspect the area for potential well remains.

On the 13th January, under the instruction and supervision of a Lithos engineer, a tracked excavator slowly scraped the surface within the vicinity of BH04's original location. Both the 50mm and 19mm pipes were discovered c. 0.8m below original ground level.

The 50mm pipe had been broken and therefore the damaged section of 50mm pipe was removed and replaced with a new length of plain 50mm pipe, to bring the installation back up to original ground levels.

A full length of plain pipe (1m) and around 30cm of slotted pipe had been removed during the destruction of the well and the remaining 19mm pipe was blocked with soils. Due to the blockage and damage to the slotted pipe, a new 3m pipe length comprising 2m slotted, 1m plain 19mm pipe was installed.

A new cover and bentonite seal was also installed.

The base of the well was dipped to determine whether the response zone had been affected. New depths to base (m bgl) are given in the table below.

Monitoring Well	Visit 2 depth to base (m bgl)		Visit 3 depth to base (m bgl)	
	19mm pipe	50mm pipe	19mm pipe	50mm pipe
BH04	2.82	41.55	2.75	38.31

It is clear from the above that 3.24m at the base of the well has been blocked/filled with soil and/or stones and 1.69m of the response zone is blocked, leaving 2.31m available. Attempts were made to dislodge and remove the materials from the base of the well using a surge blocker and waterra tubing.

Fifty litres of groundwater was purged from the well using 16mm diameter waterra tubing, followed by sampling of groundwater using 13mm diameter low flow waterra tubing.

BH05

Damage to BH05 was less severe and comprised removal of the raised cover, snapping of the top c. 0.4m of the 19mm pipe and removal of the top section of 50mm plain pipe to c. 0.5m below ground level.

The tracked excavator lowered surrounding ground levels, to expose the 50mm pipe that was below ground. A new section of pipe was added to raise the installation to original ground levels and the well cover and bentonite seal was replaced.

Both the 19mm pipe and 50mm pipes were dipped to determine the damage to the response zones. It can be seen that no damage has occurred for the 19mm pipe, however, the base of the 50mm pipe has been raised to 38.60m bgl.

Monitoring Well	Visit 2 depth to base (m bgl)		Visit 3 depth to base (m bgl)	
	19mm pipe	50mm pipe	19mm pipe	50mm pipe
BH05	2.90	40.83	2.90	(38.60) 39.02

A surge blocker and watterra tubing was used to dislodge the material from the base of the well, which resulted in 0.42m of pipe being cleared, leaving an available response zone of 3.52m.

Following the removal of the soil, 60 litres of water was purged from BH05 using 16mm diameter watterra tubing, before being sampled with 13mm low flow watterra tubing.

Discussion

Groundwater samples from BH04 & BH05 have been sent to the laboratory and testing is now underway. Results will be forwarded upon receipt, which is expected to be late January 2025.

Discussions with the quarry owner have enabled further, more rigid protection for the monitoring wells to be installed to avoid future damage, accidental or otherwise.

It is considered that enough response zone (at least 2m) has been recovered from BHs 04 & 05, and therefore groundwater sampling and gas monitoring can resume as previously planned.

We trust this satisfies your present requirements, but please contact the undersigned with any queries.

Yours sincerely



Adam Gombocz
Director
for and on behalf of
LITHOS CONSULTING LIMITED

BH04 Before Repair



BH04 After Repair



BH05 Before Repair



BH05 After Repair

