

1 Executive Summary

- 1.1.1 Monitoring was undertaken across C1 throughout October 2022 in response to site construction activities. Graphs showing the monitoring data for the month are attached in Appendix A.
- 1.1.2 Monitoring at Chalfont St Peter (CSP) ventilation shaft remained at a quarterly monitoring frequency, whilst monitoring at Chalfont St Giles (CSG), Amersham (AMS), and Little Missenden (LMI) vent shaft sites continued monthly in line with the SSMP's. Chesham Road (CHR) and North Portal (NPTL) both continue to be monitored weekly in response to construction works.
- 1.1.3 Monitoring at Colne Valley Viaduct (CVV) module 1 continued at a weekly frequency in response to rotary bored piling (RBP) at piers 3-5. Monitoring at Modules 4, 3, and 2 remained at a monthly monitoring frequency.
- 1.1.4 Monitoring across the South Portal and Western Valley Slopes areas continued at a monthly monitoring frequency, with continued surface water monitoring of the drainage systems. Pynesfield monitoring remains at a fortnightly monitoring schedule.
- 1.1.5 The priority monitoring round was completed, with all locations visited where possible. ML035-RO003a, ML035-CR004 (RTD) were both reported as dry and could not be monitored. ML027-RC021 was decommissioned, and a sample was not collected. ML027-RO062a (the replacement borehole for ML027-RC062) was missed in error.
- 1.1.6 No trigger level exceedances were observed in October, although a number of other occurrences worth noting did take place during the month. [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED] Heavy rainfall was recorded on the 23rd of October, which caused a banded area of high pH water to enter the clean water Pond 3 on South Portal. This raised the pH slightly above the discharge limit of 9. Once this was detected, the discharge was stopped and water retreated to lower the pH before resuming discharge to the A412 ditch.
- 1.1.7 Additionally, between the 25th and 27th October, it was noted that the liner in the CSP attenuation pond appeared to be leaking, as the water level was

dropping despite there being consistent rainfall. The pond was subsequently drained and an investigation into the cause and solution undertaken.

- 1.1.8 Rain was observed throughout the month, with 13 days of rainfall recorded across the South Portal site, with 36mm recorded on the 23rd of October.

Colne Valley Viaduct (CVV)

1.1.54 Rotary piling activities continued with the following locations worked on during the month:

- P3
- P4
- P5
- P12
- P13
- P14
- P15
- P16

1.1.55 Approximately 80 m³ of support fluid was lost between Pier 16 to Pier12, and Pier 5 to Pier 3 was reported during October. Most of the total volume of losses were at Pier 14 and Pier 5. No impact on groundwater quality was detected as a result of these losses. Table 11 displays the reported losses.

Table 11 Support fluid loss in October >1m³

Pier	Loss (m ³)
P14	17
P5	47
P4	12

CVV Module 4 (North Embankment to Pier 43)

Groundwater

- 1.1.56 There were no trigger limit breaches during the month in Module 4.
- 1.1.57 Table 12 compares typical priority borehole ranges for the area with trigger levels and any trigger level exceedances.

Table 12 CVV Module 4 borehole in-field parameter data

	pH	SPC (µS/cm)	Turb (NTU)	REDOX (mV)	DO (mg/L)
Typical Range	6.5 – 8	700 - 875	1 – 25	50 - 300	8 – 11
Trigger limit	5 – 9	1000	100 ³ /250 ⁴ /500 ⁵	-	-
Trigger Level Exceedances	-		-	-	-
Exceeding borehole	-		-	-	-

- 1.1.58 Groundwater levels displayed an increase between approximately 0.1 – 0.5m across the month.

Surface water

- 1.1.59 Surface water monitoring was completed during the month with chemical sampling and gauge board readings collected where possible. Monitoring continued both weekly and monthly. Surface water bodies within Module 4 include ML029-SW001, Denham Water-Ski Lake (ML028-SW004 and SW003) and the River Colne (ML028-SW002).
- 1.1.60 Table 13 compares typical surface water ranges for the area with trigger levels and any trigger level exceedances.

³ ML029-CR010, ML029-RO431

⁴ ML028-CR018, ML028-CR009

⁵ ML028-CR006

Table 13 CVV Module 4 surface water in-field parameter data

	pH	SPC (µS/cm)	Turb (NTU)	REDOX (mV)	DO (mg/L)
Typical Range	7.8 – 8.5	500 – 650	1 – 25	100 – 225	9 – 13
Exceedances	-	-	-	-	-
Exceeding location	-	-	-	-	-

CVV Module 3 (Pier 42 – P29)

Groundwater

- 1.1.61 Table 14 compares typical priority borehole ranges for the area with trigger levels and any trigger level exceedances.
- 1.1.62 No trigger limit breaches were observed during the month in Module 3.

Table 14 CVV Module 3 borehole in-field parameter data

	pH	SPC (µS/cm)	Turb (NTU)	REDOX (mV)	DO (mg/L)
Typical Range	7.1 – 7.9	600 – 775	1 – 25	100 – 300	3 – 9
Trigger limit	5 – 9	1000	250	-	-
Trigger Level Exceedances	-	-	-	-	-
Exceeding borehole	-	-	-	-	-

- 1.1.63 Groundwater levels displayed an increase between approximately 0.1 – 0.4m across the month.

Surface water

- 1.1.64 Surface water bodies within Module 3 include the River Colne, Long Pond (ML028-SW001 and ML027-SW003), and Korda Lake (ML027-SW002 and ML027-SW001).
- 1.1.65 Table 15 compares typical surface water ranges for the area with trigger levels and any trigger level exceedances.

Table 15 CVV Module 3 surface water in-field parameter data

	pH	SPC ($\mu\text{S/cm}$)	Turb (NTU)	REDOX (mV)	DO (mg/L)
Typical Range	7 – 8.5	550 - 900	1 – 25	50 - 250	7– 13
Exceedances	-	-	-	-	-
Exceeding location	-	-	-	-	-

CVV Module 2 (Pier 28 - Pier 13)

Groundwater

1.1.66 Table 16 compares typical priority borehole ranges for the area with trigger levels and any trigger level exceedances.

1.1.67 There were no trigger limit breaches in Module 2 during the month.

Table 16 CVV Module 2 borehole in-field parameter data

	pH	SPC ($\mu\text{S/cm}$)	Turb (NTU)	REDOX (mV)	DO (mg/L)
Typical Range	7 – 8	600 - 850	1 – 25	50 - 300	7 – 11
Trigger limit	5 – 9	1000	250	-	-
Trigger Level Exceedances	-	-	-	-	-
Exceeding borehole	-	-	-	-	-

1.1.68 Groundwater levels displayed increases of between approximately 0.1 – 0.2 across the month.

Surface water

1.1.69 Surface water bodies within Module 2 include Savay Lake (ML027-SW006), and Small Pond (ML027-SW004 and SW005), as well as the Grand Union Canal (ML026-SW001).

1.1.70 Table 17 compares typical surface water ranges for the area with trigger levels and any trigger level exceedances.

Table 17 CVV Module 2 surface water in-field parameter data

	pH	SPC (µS/cm)	Turb (NTU)	REDOX (mV)	DO (mg/L)
Typical Range	7 – 7.7	700-850	1 – 25	0 - 250	6 – 13
Exceedances	-	-	-	-	-
Exceeding location	-	-	-	-	-

- 1.1.71 EC and pH at ML026-SW001 (surface water location in the Grand Union Canal (GUC)) have displayed slight increasing trends and increased variability since February/March 2022. Observations during this time have gone from ranging between 800 – 900 µS/cm / 7.7 to 8.2 pH (November to March) to 650 to 950 µS/cm / 7.7 – 8.8pH (July to October).
- 1.1.72 Previous data from 2021 displays a gradual decrease in EC from March to August, before increasing significantly from September to December. It is possible that this is a natural phenomenon within the canal. It is also likely that under a higher frequency of monitoring, variability within the canal has been more obvious.
- 1.1.73 Align are not conducting works that would be likely to impact the surface water at within the GUC. Considering the River Colne and GUC join and split several times upstream of this location, the changes are attributed to outside influences rather than Align’s work.
- 1.1.74 A decreasing trend in DO has been observed in ML027-SW004 since approximately April 2022. An invasive non-native species exclusion zone is set up around this corner of Savay Lake, making access to the sampling point difficult. As a result, the monitoring team have been collecting a sample from a small corner of the pond, which is likely a dead-end zone and not reflective of the wider lake. A more representative sampling location is being investigated.

CVV Module 1 (Pier 13 to South Embankment)

Groundwater

- 1.1.75 There were no trigger limit breaches in Module 1 during the month.
- 1.1.76 Table 18 compares typical borehole ranges for the area with trigger levels and any trigger level exceedances.

Table 18 CVV Module 1 borehole in-field parameter data

	pH	SPC ($\mu\text{S}/\text{cm}$)	Turb (NTU)	REDOX (mV)	DO (mg/L)
Typical Range	6.7 – 7.7	620 - 1300	1 – 25	-50 - 300	1 – 11
Trigger limit	5 – 9	1500 ⁶	500	-	-
Trigger Level Exceedances	-	-	-	-	-
Exceeding borehole	-	-	-	-	-

1.1.77 Groundwater levels displayed an increase across September approximately 0.1 – 0.2 m.

Surface water

1.1.78 Surface water bodies within Module 1 include Harefield lake No. 2 (ML026-SW002 and ML026-SW003) and New Years Green Bourne (ML026-SW005 and ML026-SW006).

1.1.79 Table 19 compares typical surface water ranges for the area with trigger levels and any trigger level exceedances.

Table 19 CVV Module 1 surface water in-field parameter data

	pH	SPC ($\mu\text{S}/\text{cm}$)	Turb (NTU)	REDOX (mV)	DO (mg/L)
Typical Range	7.7 – 8.5	600 - 1200	1 – 20	0 - 300	7.5 – 13
Exceedances	-	-	-	-	-
Exceeding location	-	-	-	-	-

1.1.80 The New Years Green Bourne (NYGB) remained dry throughout September.

1.1.81 The variability in EC at ML026-SW002 during September reported last month was attributable to incorrect data (typos). As such the data has been corrected for this month's report.

⁶ Due to pre-existing contamination in the Module 1 area, EC values are generally higher than anywhere else in Section C1.