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BY EMAIL

Our Ref: ORH/23/L1/MHjc

23rd June 2026

Dear Candy

Denby Lane, Grange Moor
Post Grout Validation Ground Gas Risk Assessment

As requested, a review of third-party information has been undertaken to reassess the ground gas risk assessment for the above-mentioned site. The assessment is based on a review of previous reports by Lithos and Groundtech Consulting that have been made available to ARP.

Background

The proposed development comprises 21no. properties on the 0.9-hectare site with associated garages, garden areas, highways and driveways. It is understood that development has commenced.

The site has been subject to various phases of investigation over the years undertaken by Lithos Consulting and Groundtech Consulting. Relevant report made available to ARP have been reviewed and discussed below.

Lithos Geo-environmental Appraisal (Site A and Site B)

A Geo-environmental Appraisal Report, referenced 4511/1A dated 11th June 2024, was undertaken by Lithos which included the Orion Homes development site (Site B) and the site directly adjacent to the west (Site A). The appraisal reviewed a site investigation undertaken by Lithos in 2022.

On the Orion Homes development site the ground conditions encountered comprised made ground to a maximum depth of 0.8m overlying cohesive and granular residual soils to 2.6m with shallow coal encountered in the north between 1.9m and 2.6m depth. The made ground was restricted to the centre of the site and comprised granular fill with fragments of brick, coal and mudstone.

In the report Lithos identified several potential sources of ground gas including onsite made ground, off-site backfilled opencast (directly to the east) and shallow workings. The onsite made ground was considered to be inert, with little degradable matter and therefore was considered to be low risk. Both the off-site backfilled opencast and shallow workings were classed as low risk with no significant thickness of low permeable soil.



Based on the above Lithos installed six gas monitoring wells which included two within Orion Homes development site boundary. As the gas generation potential was considered to be low and given the proposed residential land use, nine rounds of gas monitoring was undertaken by Lithos.

Upon completion of the gas monitoring program a hazardous Gas Risk Assessment was issued by Lithos in May 2023. Carbon Dioxide Concentrations of up to 3.2% v/v were detected and no detectable levels of methane. Based on worst-case (peak) gas concentrations and steady flow, a Gas Screening Value (GSV) for Carbon Dioxide of 0.0043 was calculated. This GSV equates to Characteristic Situation CS1, therefore Lithos concluded that no gas protection measures were required. It is understood that this assessment, which includes the footprint of the current Orion Homes development site, was formally accepted by Kirklees Council.

Groundtech Geo-Environmental Appraisal

Subsequent to the Lithos investigation a Geo-Environmental Appraisal and Revised Coal Mining Risk Assessment (report ref GRO-24078-5170 dated 22nd May 2024) was undertaken by Groundtech Consulting.

The site investigation comprised the formation of six windowless sample boreholes, eleven trial pits and five rotary open hole boreholes. The ground investigation encountered a surfacing covering of topsoil or made ground topsoil to between 0.3m and 0.5m depth across the site. The topsoil/made ground topsoil was locally underlain by made ground to between 0.75m and 1.0m. The made ground was restricted to the northeast (WS01 and WS02) and the central section of the site (TP6, TP7 and TP8). In WS01 and WS02 the made ground was described as either gravelly sandy clay or gravelly clayey sand with fragments of brick. Within the central section the made ground was generally described as gravelly sand with fragments of brick, plastic, ceramics occasional glass. Wood was identified at two locations TP7 and TP8, but the estimated quantity was not noted. This coincides with the location of the historical sewage works and is generally consistent with the made ground identified during the Lithos investigation in this area.

The rotary probe holes identified shallow coal workings restricted to the southwestern section of the site within influencing depth of the surface. No evidence of workings was identified in the northern section of the site. Groundtech subsequently concluded that grout stabilisation of the shallow coal workings was necessary restricted to the southwestern end of site only.

A total of seven gas and groundwater monitoring wells were installed during this site investigation. Six of these wells were installed within the windowless sample boreholes (WS1 – WS6). The wells were installed to between 2m and 4m depth, with the bottom 1m to 3m comprising slotted pipe with gravel surround, and the upper 1m comprising plain pipe with bentonite seal. The response zone installed entirely within the natural residual clay or mudstone horizons, below the shallow made ground (in WS01). Coal seams were also within the response zone in WS02 and WS03. One deeper monitoring well was installed within rotary borehole R01 to between 5m and 8m within natural mudstone.

At the time of the Groundtech report an interim three out of six gas monitoring visits had been carried out between 4th April 2024 and 2nd May 2024. No detectable Methane was recorded within any of the boreholes and Carbon Dioxide concentrations ranged between 0.0%v/v to a peak of 6.9% with associated depleted oxygen of a minimum 3.8% v/v.



Despite being undertaken during periods of low atmospheric pressure (between 976mb and 988mb), borehole gas flow rates remained completely undetectable at 0.0 l/hr across the entire site. Based on these worst-case flow conditions, an interim Gas Screening Value (GSV) for Carbon Dioxide of 0.0069 l/hr was calculated, which equates to Characteristic Situation 1 (CS1).

However, because Carbon Dioxide concentrations exceeded the standard 5.0% v/v screening threshold within the natural clay of WS01 on two occasions, Groundtech conservatively suggested that consideration should be given to upgrading the site to CS2. They hypothesized that the source of this isolated accumulation was likely migratory mine gas associated with the former opencast highwall immediately east of the site boundary.

Groundtech noted that the final gas risk assessment would take into consideration the CL:AIRE guidance document "Good Practice for Mine Gas Emissions" to accurately classify the site. They also note that there was no evidence of mine gases such as carbon monoxide, methane and hydrogen sulphate were recorded within the monitoring period to date and the existing workings were to be grouted which would remove the source onsite.

Groundtech Permanent Ground Gas Risk Assessment - Ref. GRO-24078-5293 1.2, dated 9th May 2025)

Following the completion of the ground gas monitoring program Groundtech consulting produced a Permanent Ground Gas Risk Assessment. This document was subsequently revised twice following comments with Kirklees Council.

This ground gas assessment was produced in accordance with the guidance documents BS 8485:2019, BS 8576:2013 NHBC Foundation Hazardous Ground Gas (April 2023) and CIRIA Report C665 (November 2007).

In total six rounds of monitoring were undertaken between the 4th April 2024 and the 14th June 2024. The atmospheric pressure ranged between 972mb and 988mb during the monitoring period and was carried out during periods of rising, steady and falling barometric pressure.

No concentrations of Methane were recorded during the monitoring period; detectable levels of Carbon Dioxide were recorded up to a maximum concentration 6.9%v/v. The Carbon Dioxide levels were generally below 2% v/v across the site with the exception of WS01 with Carbon Dioxide readings between 4.1% v/v and 6.9% v/v.

Oxygen concentrations generally ranged between 18.8%v/v and 20.9%v/v. Depleted oxygen concentrations were identified in WS01 during the second monitoring visit at a level of 3.8%v/v, lower concentrations of oxygen were also identified in WS01 during the initial visit at a minimum level of 13.9%v/v. No positive gas flow rates were recorded during the gas monitoring programme.

The CL:AIRE guidance document 'Good Practice for Mine Gas Emissions' was used by Groundtech in this assessment to accurately classify the site. Historic mine workings were identified in the southern section of the site to a minimum depth of 9.6mbgl with no mine workings encountered beneath the rest of the site. No evidence of elevated hazardous gases was detected in R03 and WS06, located in the southern section of the site. The install in R03 targeted the coal seam, which was worked in other areas further to the south, as well as the mudstone above. Groundtech noted that concentrations of hydrogen sulphide were detected in the first monitoring visit in R03 as well as WS05, the main source of hydrogen sulphide was considered to be from wastewater and sewage sludge associated with former sewage works as well



as drilling disturbance. The coal workings to the south were not ruled out as a source in this instance, however, they noted that the workings in the southern section were to be grouted which removed the source of mine gas in this area.

Groundtech indicate that the source of the elevated Carbon Dioxide in WS01 is the former sewage works or the possible deep made ground associated with the Hunt Royd Opencast located immediately east of the site and conclude that there are no mine gases present.

The depleted oxygen concentrations in WS01 were also considered within the assessment. It was stated that where there was depleted oxygen, the concentration of Carbon Dioxide increased however, there was no increase in Carbon Monoxide or Hydrogen Sulphide, indicating that other gases such as Nitrogen are taking its place. Groundtech suggested that this further confirms mine gases are not present.

They noted that a subfloor void and a very efficient passive ventilation system will be sufficient to mitigate the risks, of the slightly elevated carbon dioxide with no flow with the mine workings to be grouted.

Groundtech concluded the site to be Characteristic Situation 1 (CS1, no gas protection measures required) following the remediation of mine workings. However, following comments from Kirklees Council, the site was elevated to 2 (CS2) as a precautionary measure with gas protection measures required.

Groundtech Remedial Specification

A Remediation Specification was issued by Groundtech Consulting (Ref. GRO-24078-5847, dated 20th June 2025). Issues relating to ground gas emissions were as per the gas risk assessment with site conditions indicating CS1 but, following liaison with Kirklees Council, being raised to CS2.

Groundtech Drill and Grout Validation Report

A Drill and Grout Validation Report (report ref GRO-24078-6221 dated 11th December 2025) was undertaken by Groundtech.

The Drilling and Grouting was undertaken by Demolition and Geotechnical Ltd between 10th October 2025 and 31st October 2025 across the southern treatment zone. A total 65no. boreholes were drilled and subsequently grouted within the footprint of the proposed plots to the south with eight holes drilled across the proposed road. Two rotary test holes were drilled and subsequently grouted on completion of the drill and grout works to confirm the stabilisation of the site.

Broken ground and soft drilling were recorded in 31no. of the rotary boreholes undertaken at the site to between depths of between 7.0m and 10.2m depth. No further intact coal or broken ground was recorded below this depth to 30m depth.

Groundtech concluded that all of the boreholes were grouted to ground level successfully. Secondary boreholes were positioned where grout takes exceed the threshold of 1 tonne in accordance with the drill and grout specification and the remainder of the boreholes drilled across the north of the site and grout intake was recorded at 0.22 tonne or less. The grout testing has recorded results within the tolerable ranges detailed in the specification and is considered suitable for use. On completion of the drill and grout program, it was concluded that no further remedial action was required and the surface of the site was considered to be stable.



ARP Post Drill and Grout Validation Risk Assessment

Based on the documents reviewed above ARP have updated the Gas Risk Assessment for the site following the completion of the stabilisation of the shallow coal workings in the southern end of the site.

The key point from the Grountech's ground gas monitoring is summarised below;

- Six rounds of monitoring were completed with all visits undertaken during low pressure (<1000mb) with final visit also undertaken during falling pressure event. This represents a true worst-case assessment scenario.
- No detectable Methane was encountered within any borehole during any of the six monitoring visits.
- Carbon Dioxide concentrations generally below 2% v/v. The only exception was WS01, where concentrations ranged between 4.7%v/v and to 6.9%v/v.
- During monitoring rounds 1 and 2, the response zones in all boreholes were flooded.
- Oxygen concentrations generally ranged between 18.8%v/v and 20.9%v/v. Depleted Oxygen concentrations identified in WS01 during the second monitoring visit at 3.8%v/v, low concentrations of oxygen also identified in WS01 during the initial visit at a minimum level of 13.9%v/v and in WS04 during the second monitoring visit at 14.0%v/v. During monitoring rounds 1 and 2, the response zones in all boreholes were flooded. Oxygen concentrations in WS01 for monitoring visits three to six ranged from 18.8% to 19.9%v/v, which represents normal background conditions.
- No positive gas flow rates were recorded during the gas monitoring programme, even during falling pressure during the final monitoring visit.
- Hydrogen Sulfide and Carbon Monoxide were generally below detection limits. A trace temporary detection of H₂S (1ppm) and CO (6ppm) occurred exclusively during Visit 2 at WS01 and was entirely absent for the remaining four monitoring rounds, confirming the absence of an active, ongoing mine gas or hazardous anaerobic source.
- Groundwater levels ranged between 0.4m and 1.4m depth within the shallow windowless sample monitoring wells and sat at 1.5m depth within the deeper well with response zone within coal measures. This demonstrates a high-water table that completely floods the underlying workings.

Risk Assessment

The British Standard, BS 8485: 2015 + A1: 2019, utilises the concept of borehole hazardous gas flow rates (Q_{hg}), in litres/hour (l/hr), which are obtained by multiplying flow rate by concentrations in the air stream of the particular gas being considered for each borehole. The Q_{hg} is used to derive a gas screening value (GSV), which is defined as the "flow rate of a specific hazardous gas representative of a site or zone, derived from assessment of borehole concentration and flow rate measurements and taking account of all other influencing factors, in accordance with a conceptual site model".

The maximum recorded concentration of CH₄ and CO₂ is 0.0% v/v and 6.9% v/v, respectively. However, during monitoring rounds 1 and 2, the response zones in all boreholes were flooded. Therefore, the highest steady CO₂ concentration recorded on site is considered to be 5.9% v/v in WS01 (monitoring round 4). The worst credible and worst-case gas regime identified on the site (based on the maximum recorded flow rate and concentration detected together within an individual borehole and the highest flow and highest detectable concentration in any boreholes) is a Q_{hg} of 0.000 l/hr for CH₄ and 0.0059 l/hr for CO₂. This equates to a Characteristic Situation of CS1, for CO₂ & CH₄.



Coal Mine Gas Risk Assessment

The Characteristic Situation is an empirical approach which was developed based on data from monitoring wells installed in soil-based sources. Coal mine gas emissions involve flow through open voids and fractured rock which the method was not intended to be applied to. As such, GSV's are to be used with extreme caution and should not be used in isolation. A decision support tool for coal mine gas risk assessment is provided in Figure 13.1 of the CL: AIRE Good Practice for Risk Assessment for Coal Mine Gas Emissions dated October 2021. Using this support tool a multiple lines of evidence approach must be undertaken and is presented below.

Oxygen depletion

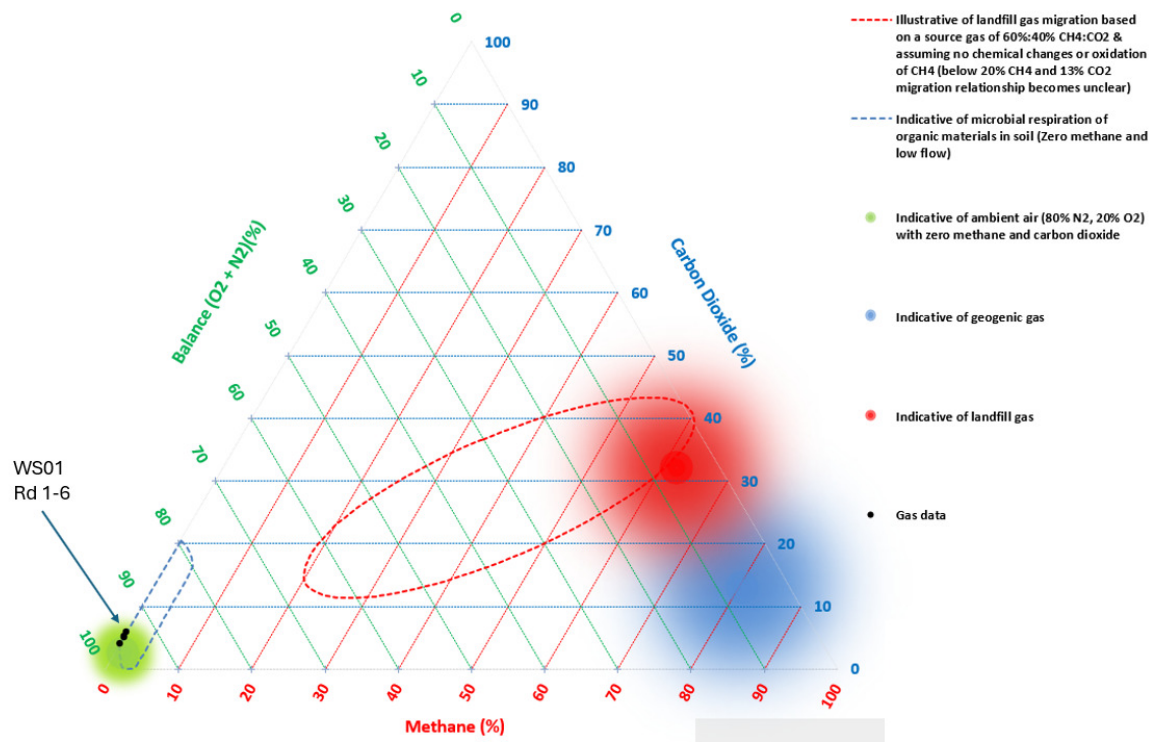
Carbon Dioxide and depleted Oxygen are commonly recorded in monitoring wells installed in either unworked strata with no credible pathway to workings, or in superficial deposits. This is caused by carbon cycling processes such as biological oxidation. The concentration can vary with temperature, soil moisture, nutrient availability and oxygen supply.

Depleted Oxygen concentrations were identified in WS01 during the second monitoring visit at a level of 3.8%v/v. Lower concentrations of Oxygen were also identified in WS01 during the initial visit at 13.9%v/v and in WS04 during the second monitoring visit at 14.0%v/v, however, during monitoring rounds 1 and 2, the response zones in all boreholes were flooded. Oxygen concentrations in WS01 recovered to normal background ranges during monitoring visits three to six (when the response zones were not flooded) ranging between 18.8% to 19.9%v/v. This proves the pocket was small, un-pressurized, and has already vented naturally.

Ternary Plot

Where Carbon Dioxide from mine workings is of concern, Methane may not be present. However, Carbon Dioxide is also widely produced in unworked Coal Measures and superficial strata by aerobic microbial respiration or the oxidation of organic material in soils.

The monitoring undertaken on site has not recorded any concentration of Methane. No flow has been recorded. The worst-case monitoring data (all data from WS01) has been plotted on the Ternary Plot below and indicates a possible microbial respiration source (zero methane and low flow), rather than a deep, pressurised mine gas signature.



Mine Workings

Rotary borehole investigation by Lithos and Groundtech encountered shallow mine workings in the southern section of the site which required stabilisation by ground injection. No evidence of mine workings was encountered across the remainder of the site, therefore grout treatment was isolated to the southern section of the site.

In addition to the above, the following specific mine gas sources and migration pathways have been systematically considered:

- **Recorded mine entries** - No mine entries on site or within 20m of the site.
- **Unrecorded mine entries** - No unrecorded mine entries on or in the immediate vicinity of the site.
- **Geological faults** - No faults within influencing distance from the site.
- **Mine Gas Pathways**: Shallow mine workings that could theoretically result in gas emissions have been fully stabilized and sealed.
- **Colliery Spoil** - No colliery spoil encountered on site.
- **Opencast Workings** - A historical opencast mine is located to the west/northwest of the site. The potential lateral migration risk from this feature is fully mitigated by the natural site topography and the hydrogeological regime detailed below.

Drilling and grouting have successfully been completed within all of the plots in the southern section of the site.

Groundwater monitoring records show a consistently high-water table within the shallow coal measures. Groundtech's deep monitoring well in R03 encounters standing water levels of 1.55m below ground level within the coal measures horizon. Saturated ground conditions prevent the aerobic oxidation of coal and act as a natural hydraulic barrier blocking vertical gas migration. Following the successful grouting works, any residual open migration pathways within the saturated zones have been completely sealed.



Other gas sources

The Groundtech report suggests that the made ground associated with the sewage works is a potential source for the elevated Carbon Dioxide within WS01. However, the response zone is within the natural residual clay beneath the made ground. Furthermore, the maximum thickness of made ground encountered across the site was less than 1.0m thick and largely comprised inert materials, with the minor exception of localised wood fragments noted at just two locations.

Following the recent groundworks and reduced-level site strip, this shallow made ground layer has largely been removed within the plot footprint closest to WS01. Therefore, given the negligible thickness of the original made ground, the total absence of significant degradable mass, and its subsequent physical excavation, the made ground is not considered to be a significant or ongoing source of soil gas generation potential. This conclusion is entirely consistent with the previously approved findings of the wider Lithos appraisal.

Conclusions

Six rounds of ground gas monitoring have been executed across the site layout. The maximum recorded concentration of methane and carbon dioxide, in unflooded monitoring wells, was 0.0% v/v and 5.9% v/v respectively. Crucially, positive borehole gas flow rates remained completely undetectable (consistently 0.0 l/hr) across all six monitoring events. Atmospheric conditions during the monitoring programme intentionally captured worst-case conditions, with all visits undertaken during low barometric pressure (<1000mb) and the final visit executed during a sharp falling pressure event.

Temporarily depleted oxygen concentrations (low of 3.8% v/v) were isolated to two boreholes on two early monitoring occasions and directly correlated with the elevated carbon dioxide at WS01. During these monitoring rounds, the response zones in all boreholes were flooded. Oxygen levels subsequently recovered to normal atmospheric concentrations (18.8% to 19.9% v/v) for the remainder of the monitoring program, when response zone was unflooded, confirming the localized, un-pressurized, and stagnated nature of the pocket.

When plotted on a standard Ternary Plot, the worst-case data from WS01 confirms a localised microbial respiration source (characterised by zero methane and an absence of advective flow) rather than a deep, pressurized mine gas signature.

A Lines of Evidence approach demonstrates that all potential hazardous ground gas risks have been completely discounted or neutralised:

Regulatory Precedent: The initial wide-area Geo-environmental Appraisal by Lithos (Ref: 4511/1A) concluded that the site footprint was a low-risk Characteristic Situation 1 (CS1) regime. It is understood that this assessment was formally reviewed and accepted by Kirklees Council. The subsequent, localised 5.9% v/v carbon dioxide reading identified by Groundtech does not represent an escalated, site-wide geogenic risk, but is a minor, localised variant within an already approved layout.

Source Characterisation: The isolated 5.9% v/v Carbon Dioxide reading is a localised reflection of natural background soil gas, driven by routine biogenic respiration and root cycling within the natural shallow subsoil horizons. It is entirely unrelated to deep coal mine workings.



Physical Source Removal: Following recent groundworks, a minimum 0.5m reduced-level site strip has been executed across the plot footprints, including the WS01 zone. This reduction has physically excavated and removed the shallow, near-surface soil layers responsible for any natural biogenic respiration, effectively depleting the localised source within the building footprints.

Pathway Removal: Shallow mine workings identified exclusively across the southwestern section of the site have been stabilised via grout injection. Independent pressure validation has verified 100% closure of all theoretical vertical migration pathways.

Hydrogeological Seal: Groundwater levels sit permanently high across the bedrock horizon, with standing water recorded at 1.55m depth within the deeper coal measures response zone (R03). Saturated ground conditions naturally flood the underlying workings, cutting off oxygen to prevent aerobic coal oxidation and acting as a definitive hydraulic barrier to upward gas migration.

In accordance with BS 8485:2015+A1:2019 and CL:AIRE (2021) guidance, the site features zero advective drive, no mine gas pathways, and the localised made ground has been physically stripped. The site is considered to default to a Characteristic Situation 1 (CS1) classification.

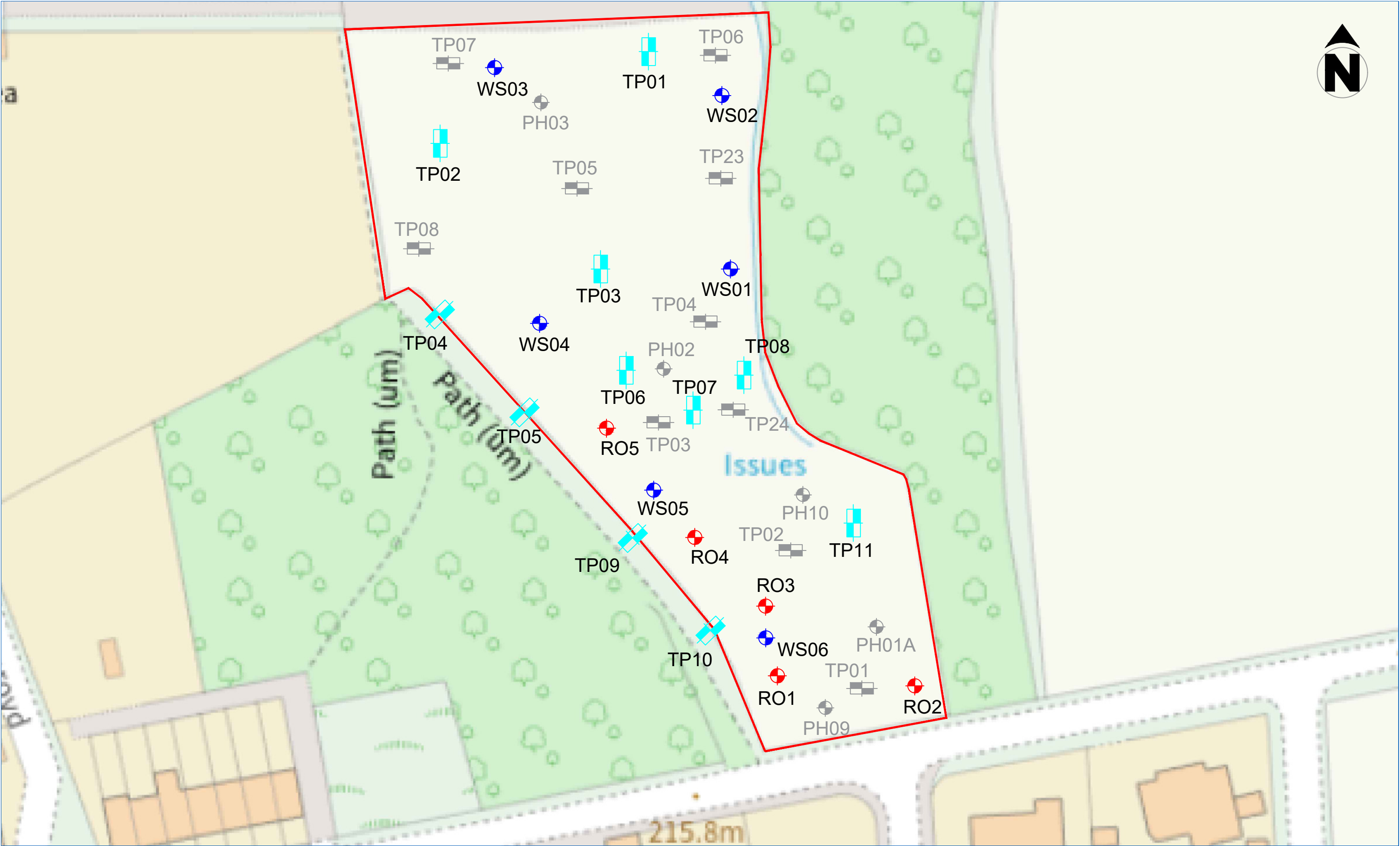
The suspended beam-and-block floor layout on the development inherently provides a 1.5-point passive sub-floor air dispersal void, which is structurally over-engineered for this natural background soil gas regime. Specialist gas protection membranes are not considered necessary.

We trust the above is sufficient for your requirements. However, should you have any queries, or wish to discuss the matter further, please do not hesitate to contact us at your convenience.

Yours sincerely
for ARP GEOTECHNICAL LTD

Mike Harper
BSc (Hons) MSc CEnv MEnvSc

Encs



GROUNDTECH CONSULTING	CLIENT	ORION HOMES	DATE	MARCH 2024				Status		Notes Groundtech Consulting Rotary Borehole (March 2024) Groundtech Consulting Trial Pit (March 2024) Groundtech Consulting Windowless Sample Borehole (March 2024) Lithos Consulting Rotary Probehole (October 2022) Groundtech Consulting Trial Pit (October 2022)
	PROJECT TITLE	DENBY LANE, GRANGE MOOR	SCALE	NTS				Preliminary		
	PLAN TITLE	EXPLORATORY HOLE LOCATION PLAN - EXISTING	PLAN NUMBER	GRO-24078-P02A				Draft		
								Issued		
								For Comment		
					Rev.	Details	Date	Approved		

SITE NAME:		DENBY LANE, GRANGE MOOR				ENGINEER:		Georgia Barnes				
CLIENT:		ORION HOMES				DATE:		04/04/2024				
JOB NO:		GRO-24078										
Pressure Trend:		Rising	Weather:	Overcast			Equipment:		GFM 436			
Ambient:		O ₂ (%v/v)	CH ₄ (%v/v)	CO ₂ (%v/v)	LEL	H ₂ S (ppm)	CO (ppm)					
Start		20.7	0.0	0.0	0.0	0.0	0.0					
Finish		20.7	0.0	0.0	0.0	0.0	0.0					

BH Ref.	Gas Flow Rate (l/hr)		Borehole Pressure (mb)	Methane (%v/v)			Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)		Carbon Monoxide (ppm)		Q _{hg} CO ₂ (l/hr)	Q _{hg} CH ₄ (l/hr)	Atmos Press (mb)	PID (ppm)	Sheen (Y/N)	LNAPL (Y/N)	DNAPL (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady								
RO3	0.0	0.0	0.00	0.0	0.0	0.0	1.7	1.1	19.0	18.0	11.0	10.0	0.0	0.0	0.0017	0.0000	974	-	N	N/A	N/A	2.10
WS01	0.0	0.0	0.00	0.0	0.0	0.0	5.0	4.9	14.1	13.9	0.0	0.0	0.0	0.0	0.0050	0.0000	974	-	N	N/A	N/A	0.82
WS02	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	20.7	20.6	0.0	0.0	0.0	0.0	0.0000	0.0000	974	-	N	N/A	N/A	0.83
WS03	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	20.8	20.8	0.0	0.0	0.0	0.0	0.0000	0.0000	974	-	N	N/A	N/A	0.50
WS04	0.0	0.0	0.00	0.0	0.0	0.0	0.7	0.7	19.5	19.4	0.0	0.0	0.0	0.0	0.0007	0.0000	974	-	N	N/A	N/A	0.22
WS05	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	20.9	20.8	10.0	0.0	0.0	0.0	0.0000	0.0000	974	-	N	N/A	N/A	0.37
WS06	0.0	0.0	0.00	0.0	0.0	0.0	0.4	0.1	20.8	20.8	0.0	0.0	0.0	0.0	0.0004	0.0000	974	-	N	N/A	N/A	0.29

PERMANENT GROUND GAS MONITORING FORM



SITE NAME:	DENBY LANE, GRANGE MOOR					ENGINEER:	Georgia Barnes						
CLIENT:	ORION HOMES					DATE:	16/04/2024						
JOB NO:	GRO-24078												
Pressure Trend:	Steady	Weather:	Sunny			Equipment:	GFM 436						
Ambient:	O ₂ (%v/v)	CH ₄ (%v/v)	CO ₂ (%v/v)	LEL	H ₂ S (ppm)	CO (ppm)							
Start	20.7	0.0	0.0	0.0	0.0	0.0							
Finish	20.7	0.0	0.0	0.0	0.0	0.0							

BH Ref.	Gas Flow Rate (l/hr)		Borehole Pressure (mb)	Methane (%v/v)			Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)		Carbon Monoxide (ppm)		Q _{hg} CO ₂ (l/hr)	Q _{hg} CH ₄ (l/hr)	Atmos Press (mb)	PID (ppm)	Sheen (Y/N)	LNAPL (Y/N)	DNAPL (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady								
RO3	0.0	0.0	0.00	0.0	0.0	0.0	0.1	0.0	20.4	20.3	0.0	0.0	0.0	0.0	0.0001	0.0000	987	-	N	N/A	N/A	1.98
WS01	0.0	0.0	0.00	0.0	0.0	0.0	6.9	6.9	3.8	3.8	0.0	0.0	0.0	0.0	0.0069	0.0000	987	-	N	N/A	N/A	0.72
WS02	0.0	0.0	0.00	0.0	0.0	0.0	0.4	0.1	20.3	19.8	0.0	0.0	0.0	0.0	0.0004	0.0000	988	-	N	N/A	N/A	0.74
WS03	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	20.6	20.5	0.0	0.0	0.0	0.0	0.0000	0.0000	987	-	N	N/A	N/A	0.45
WS04	0.0	0.0	0.00	0.0	0.0	0.0	3.9	3.9	14.0	14.0	0.0	0.0	0.0	0.0	0.0039	0.0000	987	-	N	N/A	N/A	0.24
WS05	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	20.6	20.5	0.0	0.0	0.0	0.0	0.0000	0.0000	986	-	N	N/A	N/A	0.47
WS06	0.0	0.0	0.00	0.0	0.0	0.0	0.4	0.0	20.5	20.5	0.0	0.0	0.0	0.0	0.0004	0.0000	988	-	N	N/A	N/A	0.27

Notes:

SITE NAME:		DENBY LANE, GRANGE MOOR				ENGINEER:		William Sandiford Mitchell				
CLIENT:		ORION HOMES				DATE:		17/05/2024				
JOB NO:		GRO-24078										
Pressure Trend:		Rising	Weather:	Overcast			Equipment:		GFM 436			
Ambient:		O ₂ (%v/v)	CH ₄ (%v/v)	CO ₂ (%v/v)	LEL	H ₂ S (ppm)	CO (ppm)					
Start		20.8	0.0	0.0	0.0	0.0	0.0					
Finish		20.8	0.0	0.0	0.0	0.0	0.0					

BH Ref.	Gas Flow Rate (l/hr)		Borehole Pressure (mb)	Methane (%v/v)			Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)		Carbon Monoxide (ppm)		Q _{hg} CO ₂ (l/hr)	Q _{hg} CH ₄ (l/hr)	Atmos Press (mb)	PID (ppm)	Sheen (Y/N)	LNAPL (Y/N)	DNAPL (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady								
RO3	0.0	0.0	0.00	0.0	0.0	0.0	0.2	0.2	19.8	19.6	0.0	0.0	0.0	0.0	0.0002	0.0000	986	-	N	N/A	N/A	1.61
WS01	0.0	0.0	0.00	0.0	0.0	0.0	4.7	4.1	19.3	19.5	0.0	0.0	0.0	0.0	0.0047	0.0000	986	-	N	N/A	N/A	2.49
WS02	0.0	0.0	0.00	0.0	0.0	0.0	0.9	0.7	20.1	20.0	0.0	0.0	0.0	0.0	0.0009	0.0000	985	-	N	N/A	N/A	0.93
WS03	0.0	0.0	0.00	0.0	0.0	0.0	0.1	0.1	20.3	20.2	0.0	0.0	0.0	0.0	0.0001	0.0000	986	-	N	N/A	N/A	1.49
WS04	0.0	0.0	0.00	0.0	0.0	0.0	1.5	1.4	19.7	19.9	0.0	0.0	0.0	0.0	0.0015	0.0000	986	-	N	N/A	N/A	1.52
WS05	0.0	0.0	0.00	0.0	0.0	0.0	0.1	0.0	20.5	20.6	0.0	0.0	0.0	0.0	0.0001	0.0000	985	-	N	N/A	N/A	1.26
WS06	0.0	0.0	0.00	0.0	0.0	0.0	0.6	0.3	20.4	20.1	0.0	0.0	0.0	0.0	0.0006	0.0000	986	-	N	N/A	N/A	0.79

Notes:

SITE NAME:		DENBY LANE, GRANGE MOOR				ENGINEER:		William Sandiford Mitchell				
CLIENT:		ORION HOMES				DATE:		30/06/2024				
JOB NO:		GRO-24078										
Pressure Trend:		Steady	Weather:	Overcast			Equipment:		GFM 436			
Ambient:		O ₂ (%v/v)	CH ₄ (%v/v)	CO ₂ (%v/v)	LEL	H ₂ S (ppm)	CO (ppm)					
Start		20.6	0.0	0.0	0.0	0.0	0.0					
Finish		20.6	0.0	0.0	0.0	0.0	0.0					

BH Ref.	Gas Flow Rate (l/hr)		Borehole Pressure (mb)	Methane (%v/v)			Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)		Carbon Monoxide (ppm)		Q _{hg} CO ₂ (l/hr)	Q _{hg} CH ₄ (l/hr)	Atmos Press (mb)	PID (ppm)	Sheen (Y/N)	LNAPL (Y/N)	DNAPL (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady								
RO3	0.0	0.0	0.00	0.0	0.0	0.0	0.1	0.1	20.5	20.7	0.0	0.0	0.0	0.0	0.0001	0.0000	985	-	N	N/A	N/A	1.55
WS01	0.0	0.0	0.00	0.0	0.0	0.0	6.3	5.9	19.1	18.8	0.0	0.0	0.0	0.0	0.0063	0.0000	986	-	N	N/A	N/A	1.88
WS02	0.0	0.0	0.00	0.0	0.0	0.0	1.4	1.3	19.8	19.7	0.0	0.0	0.0	0.0	0.0014	0.0000	986	-	N	N/A	N/A	0.97
WS03	0.0	0.0	0.00	0.0	0.0	0.0	0.2	0.2	20.3	20.2	0.0	0.0	0.0	0.0	0.0002	0.0000	986	-	N	N/A	N/A	1.45
WS04	0.0	0.0	0.00	0.0	0.0	0.0	2.4	2.0	19.5	19.3	0.0	0.0	0.0	0.0	0.0024	0.0000	985	-	N	N/A	N/A	1.48
WS05	0.0	0.0	0.00	0.0	0.0	0.0	0.1	0.3	20.4	20.3	0.0	0.0	0.0	0.0	0.0001	0.0000	985	-	N	N/A	N/A	1.19
WS06	0.0	0.0	0.00	0.0	0.0	0.0	0.8	0.7	19.3	19.5	0.0	0.0	0.0	0.0	0.0008	0.0000	986	-	N	N/A	N/A	0.82

SITE NAME:		DENBY LANE, GRANGE MOOR				ENGINEER:		William Sandiford Mitchell				
CLIENT:		ORION HOMES				DATE:		14/06/2024				
JOB NO:		GRO-24078										
Pressure Trend:		Falling	Weather:	OVERCAST			Equipment:		GFM 436			
Ambient:		O ₂ (%v/v)	CH ₄ (%v/v)	CO ₂ (%v/v)	LEL	H ₂ S (ppm)	CO (ppm)					
Start		20.6	0.0	0.0	0.0	0.0	0.0					
Finish		20.6	0.0	0.0	0.0	0.0	0.0					

BH Ref.	Gas Flow Rate (l/hr)		Borehole Pressure (mb)	Methane (%v/v)			Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)		Carbon Monoxide (ppm)		Q _{hg} CO ₂ (l/hr)	Q _{hg} CH ₄ (l/hr)	Atmos Press (mb)	PID (ppm)	Sheen (Y/N)	LNAPL (Y/N)	DNAPL (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady								
RO3	0.0	0.0	0.00	0.0	0.0	0.0	0.4	0.4	20.3	20.5	0.0	0.0	0.0	0.0	0.0004	0.0000	972	-	N	N/A	N/A	1.48
WS01	0.0	0.0	0.00	0.0	0.0	0.0	5.2	5.1	19.4	19.5	0.0	0.0	0.0	0.0	0.0052	0.0000	975	-	N	N/A	N/A	1.94
WS02	0.0	0.0	0.00	0.0	0.0	0.0	1.2	1.0	20.2	20.1	0.0	0.0	0.0	0.0	0.0012	0.0000	972	-	N	N/A	N/A	1.03
WS03	0.0	0.0	0.00	0.0	0.0	0.0	0.3	0.2	20.3	20.2	0.0	0.0	0.0	0.0	0.0003	0.0000	972	-	N	N/A	N/A	1.29
WS04	0.0	0.0	0.00	0.0	0.0	0.0	2.5	2.3	18.9	18.8	0.0	0.0	0.0	0.0	0.0025	0.0000	972	-	N	N/A	N/A	1.44
WS05	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	20.5	20.4	0.0	0.0	0.0	0.0	0.0000	0.0000	972	-	N	N/A	N/A	1.31
WS06	0.0	0.0	0.00	0.0	0.0	0.0	0.6	0.4	19.8	20.1	0.0	0.0	0.0	0.0	0.0006	0.0000	973	-	N	N/A	N/A	1.05

Notes:

SITE NAME:		DENBY LANE, GRANGE MOOR				ENGINEER:		Georgia Barnes				
CLIENT:		ORION HOMES				DATE:		02/05/2024				
JOB NO:		GRO-24078										
Pressure Trend:		Steady	Weather:	Sunny			Equipment:		GFM 436			
Ambient:		O ₂ (%v/v)	CH ₄ (%v/v)	CO ₂ (%v/v)	LEL	H ₂ S (ppm)	CO (ppm)					
Start		20.6	0.0	0.0	0.0	0.0	0.0					
Finish		20.6	0.0	0.0	0.0	0.0	0.0					

BH Ref.	Gas Flow Rate (l/hr)		Borehole Pressure (mb)	Methane (%v/v)			Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)		Carbon Monoxide (ppm)		Q _{hg} CO ₂ (l/hr)	Q _{hg} CH ₄ (l/hr)	Atmos Press (mb)	PID (ppm)	Sheen (Y/N)	LNAPL (Y/N)	DNAPL (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady								
RC03	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	20.4	20.4	0.0	0.0	0.0	0.0	0.0000	0.0000	976	-	N	N/A	N/A	1.61
WS01	0.0	0.0	0.00	0.0	0.0	0.0	5.3	5.2	20.0	19.9	0.0	0.0	0.0	0.0	0.0053	0.0000	978	-	N	N/A	N/A	2.75
WS02	0.0	0.0	0.00	0.0	0.0	0.0	0.4	0.1	20.3	19.8	0.0	0.0	0.0	0.0	0.0004	0.0000	988	-	N	N/A	N/A	1.02
WS03	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	20.1	20.1	0.0	0.0	0.0	0.0	0.0000	0.0000	978	-	N	N/A	N/A	1.57
WS04	0.0	0.0	0.00	0.0	0.0	0.0	1.1	1.1	20.2	20.2	0.0	0.0	0.0	0.0	0.0011	0.0000	978	-	N	N/A	N/A	1.63
WS05	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	20.3	20.3	0.0	0.0	0.0	0.0	0.0000	0.0000	977	-	N	N/A	N/A	1.37
WS06	0.0	0.0	0.00	0.0	0.0	0.0	0.4	0.1	20.4	20.4	0.0	0.0	0.0	0.0	0.0004	0.0000	976	-	N	N/A	N/A	0.91
Notes:																						