ARUP

Uniper UK Limited

Environmental Permit Variation and Low Risk Partial Surrender Application - North Killingholme Power Project

Appendix D: Site Condition Report

Reference: KLCP-ARP-EN-ACB010-0002

P03 | 11th Demember 2025

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 297973

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ARUP

Document Verification

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List of Abbreviations

bgl	Below Ground Level
BGS	British Geological Survey
BTEX	Benzene, toluene, ethylbenzene, xylene
CAR	Compliance Assessment Report
CCGT	Combined Cycle Gas Turbine
CHP	Combined Heat and Power
CPK	C.RO Ports Killingholme Ltd
CPT	Cone Penetration Test
DELCD	Dry Electrolytic Conductivity Detector
EA	Environment Agency
FID	Flame Ionisation Detector
GI	Ground Investigation
GIR	Ground Investigation Report
LWS	Local Wildlife Site
MIP	Membrane Interface Probe
MOSTAP	Monster Steek Apparaat
PID	Photo Ionisation Detector
SAC	Special Area of Conservation
SCR	Site Condition Report
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest

1.0 SITE DETAILS	
Name of the applicant	Uniper (UK) Limited
Activity address	The site address is: North Killingholme Power Project Clough Lane Killingholme North Lincolnshire DN40 3JP
National grid reference	TA 15700 19800

Document reference and dates for Site Condition Report at permit application and surrender	Application Site Condition Report ("SCR") – original version submitted in November 2013. Construction of the permitted Installation never commenced. Updated SCR – November 2025. Submitted as part of a variation application. This includes a partial surrender to remove land from the boundary of the Installation.

Document references for site plans (including location and boundaries)	Environmental Permit Variation Application, Main Supporting Document, Appendix A.

2.0 CONDITION OF THE LAND AT PERMIT ISSUE	
Environmental setting including: • geology • hydrogeology • surface waters	Overview The Environmental Permit (EPR/FP3838EB) was originally issued to C.Gen Killingholme Limited in 2017. A site condition report was prepared and submitted with this application (which was produced in 2013). Although the existing Environmental Permit was issued in 2017, construction of the Installation never commenced and in 2024 the land and the development rights for the CCGT power station was purchased from C.Gen Killingholme Limited by Uniper UK Limited (Uniper). The existing Environmental Permit was transferred to Uniper in September 2025. As the permitted activity was never constructed, the application sections of this Site Condition Report have been updated to represent the current baseline of the Site prior to any construction. As part of this variation application the Installation Permit Boundary is being amended. This amendment involves a partial surrender of approximately 19.5 hectares (ha) of land in total. Majority of the land being surrendered is within the boundary of the main site. This will include the northern part of the main site and the location of the existing pond located on the southeast corner of the main site. The proposed changes to the Installation Boundary also include an amendment of the route to Emission Point W1. The land being surrendered is not owned by Uniper. The route to the existing W1 is predominantly within the existing Installation boundary, which is being retained with the exception of a small area of land located between Haven Road and Loverose

	Way now being required for the pipeline if that route is chosen. In addition to the existing W1 location, Uniper are proposing an alternative W1 location, which is located approximately 0.9km to the south of the current W1 location. The alternative location is the preferred option, and confirmation of the chosen option will be communicated to the Environment Agency (EA) during the variation determination period. The existing Installation boundary is shown on Figure 1, Appendix A of the Main Supporting Document. The land to be surrendered from the existing Installation boundary is shown in Figure 2 Appendix A of the Main Supporting Document. The Revised Installation Boundary is shown in Figure 3, Appendix A of the Main Supporting Document. Site Location & Setting The Installation is located on land adjacent to the C.RO Ports Killingholme Ltd ("CPK") Terminal at North Killingholme, North Lincolnshire. The Site is situated within an area which is a combination agricultural land (predominantly to the northwest of the Installation) and industry (primarily the land operated by the CPK Terminal with operational power stations and refineries located to the south). Within 2km of the Installation boundary there are the following designated sites: • Humber Estuary Special Protection Area (SPA), Special Area of Conservation (SAC), Ramsar and Site of Special Scientific Interest (SSSI) • North Killingholme Haven Pits SSSI • Halton Marsh Clay Pits, Local Wildlife Site LWS • Swallow Wold SSSI • Wrawby Moor SSSI • Burkinshaw's Covert LWS • Chase Hill Wood LWS • Scrub Lane Field LWS • Swinster Lane Field LWS • East View Meadow LWS Geology, Hydrogeology, Hydrology and Land use Land within the Revised Installation Boundary The sensitivity of the revised Installation area (excluding the parcel of land that is being surrendered) is as follows: • Geology: Areas of Made Ground, with depths of 0.3m to 4.5m and recycled aggregate stockpiles are also present across the site. Alluvium was found to be between 0.2m and 2.3m thick below the Made Ground, comprises slightly sandy, slightly gravelly clay over Glacial Till which contains occasional lenses of gravel and sand. This is underlain by Burnham Chalk Formation which is a sedimentary bedrock. • Hydrogeology: The Burnham Chalk formation underlying the drift geology has been classified as a Principal Aquifer. Principal aquifers are layers of rock that have high inter-granular and/ or fracture permeability meaning they usually provide high levels of water storage. In addition, they may support water supplies and or river base flow on a strategic scale. The drift geology (glacial till) is classified by the EA as a non-aquifer of negligible permeability. As such, these

	formations are generally regarded as containing insignificant quantities of groundwater. • Hydrology: The existing surface water drainage network in the vicinity of the Installation takes the form of natural channels, culverts, and open linear drainage channels around the site boundary. Located beyond the southeast of the Installation Boundary is an existing pond (as shown on Figure 1 in Appendix A of the Main Supporting Document), where it is thought that this network of drains ultimately discharges. The Site is approximately 0.7km from the Humber Estuary at the closest point • Land use: Currently the site remains in a pre-construction phase with some earthworks activities taking place. Existing W1 and Revised Pipeline Located Outside the Existing Installation Boundary (to be included in revised Installation Permit Boundary) The underlying land for the amended pipeline route to the existing W1 location (which is currently outside of the Installation Boundary) has the following underlying geology: • Geology: Superficial geology is classified on the British Geological Survey (BGS) Onshore GeoIndex[1] beach tidal flat deposits comprising predominantly clay, silt and sand overlaying glacial till. For bedrock geology the site overlies the Burnham Chalk Formation. • Hydrogeology: The Burnham Chalk formation underlying the drift geology has been classified as a Principal Aquifer. Principal aquifers are layers of rock that have high inter-granular and/ or fracture permeability meaning they usually provide high levels of water storage. In addition, they may support water supplies and or river base flow on a strategic scale. The drift geology (glacial till) is classified by the EA as a non-aquifer of negligible permeability. As such, these formations are generally regarded as containing insignificant quantities of groundwater. • Hydrology: The parcel of land is located on the banks of the Humber Estuary. An existing pond is located beyond the southeast of the Installation Boundary. • Land use: The area of land overlying the pipeline route has been tarmacked and is currently used as a container storage area. <u>Alternative W1 and Pipeline Route</u> The alternative W1 Emission Point would utilise an existing pipeline. The underlying geology of this pipeline is outlined below: • Geology: Superficial geology is classified on the BGS Onshore GeoIndex[1] as beach tidal flat deposits comprising predominantly clay, silt and sand overlaying glacial till. For bedrock geology the site overlies the Burnham Chalk Formation. The pipeline also passes through some deposits of Made Ground underneath the Humber Sea Terminal land. • Hydrogeology: The Burnham Chalk formation underlying the drift geology has been classified as a Principal Aquifer. Principal aquifers are layers of rock that have high inter-granular and/ or fracture permeability meaning they usually provide high levels of water storage. In addition, they may support water supplies and or river base flow on a strategic scale. The drift geology (glacial till) is classified

[1] British Geological Survey, (n.d.) GeoIndex (Onshore). Available at: https://www.bgs.ac.uk/map-viewers/geoindex-onshore/

	by the EA as a non-aquifer of negligible permeability. As such, these formations are generally regarded as containing insignificant quantities of groundwater. • Hydrology: The parcel of land is located on the banks of the Humber Estuary. • Land use: The area of land immediately south of the Installation is currently open fields. The remaining land is occupied by the Humber Sea Terminal and has been tarmacked and used for car parking. This pipeline was previously used to transport cooling water from the Humber Estuary to and from the former Killingholme A Power Station. This Power Station is no longer in operation and the permit was successfully surrendered in September 2017 as the EA were satisfied that the necessary measures were taken to avoid any pollution risk and that the site had been returned to a satisfactory state. Physical inspections on the pipeline and supporting infrastructure are currently underway. Onshore elements of the pipeline are being inspected using cameras and other non-destructive investigative methods. The onshore pumphouse and associated structures (including suction dock and the dry well) will be inspected using a combination of camera inspections and concrete testing. The pipeline between the pumphouse and the proposed alternative W1 Emission Point will be inspected using cameras. The outfall itself will be inspected using sonar scans and diver surveys.
Pollution history including: • pollution incidents that may have affected land • historical land-uses and associated contaminants • any visual/olfactory evidence of existing contamination • evidence of damage to pollution prevention measures	The site history was presented in the 2013 SCR. In summary, in the late 19th century, the area was largely undeveloped, featuring only a farmhouse, an inn, and a brick yard nearby. No significant changes occurred until the 1930s, when a railway line was introduced to the north. By the mid-1960s, industrial development began with the appearance of tanks, small buildings, and drainage systems, expanding into a full-scale 'Gas Works' by the 1970s. In the late 1990s, the site was decommissioned, with tanks and buildings removed, leaving only foundations and nearby power stations. Since 2006, the site remained unchanged. On 05/12/2024 the Local Area Officer for the EA completed a Compliance Assessment Report (CAR) following a site inspection. During the assessment, the EA confirmed that the site remains in a pre-construction phase, with no evidence suggesting the initiation of any construction activities. The EA Officer confirmed that a large portion of the site had been tarmacked (corresponding to the land to be surrendered) while the remainder consisted of unmade land. The tarmacked areas of land were being used to for the storage of pre-registered cars. This CAR can be found in Appendix B of the Main Supporting Document. The CAR indicated that there were no non-compliances with the permit conditions had been identified and the EA Officer confirmed that the site was in a clean and tidy state. A Groundsure report was completed in March 2025 which identified two landfill sites within 1 km of the Installation boundary. Both landfills were recorded as inert and located 304m north and 363m northeast of the Installation. The Groundsure report is presented in Annex 2 of this SCR.

Evidence of historic contamination, for example, historical site investigation, assessment, remediation and verification reports (where available)	**Previous Intrusive Investigations** The following Ground Investigation (GI) Reports were used to inform the 2013 SCR: • Parsons Brinckerhoff (PB) Ltd (2004) Environmental Assessment Site Investigation Factual Report (Final) Clough Road, North Killingholme, North Lincolnshire, June 2004. Prepared for Second Site Property Holdings Ltd; • Encia Consulting Ltd (2005) Geoenvironmental Appraisal of land at Clough Road, North Killingholme, January 2005. Prepared for Humber Sea Terminal Ltd; and • Encia Consulting Ltd (2005) Site Specific Risk Assessment at Former Gas Reforming Plant, Clough Road, North Killingholme, April 2005. Prepared for Humber Sea Terminal Ltd. The above reports provided information from two phases of intrusive GIs undertaken at the site in 2004 and 2005. Between the two GIs a total of 149 trial pits, 12 boreholes and 6 hand dug pits were excavated. The GIs recorded visible evidence of contamination in the Made Ground in a number of locations comprising clinker/ slag, fly ash, suspected asbestos containing material, occasional catalyst cylinders, black hydrocarbon staining and free phase hydrocarbon product in the form of an iridescent sheen. Olfactory evidence of contamination included hydrocarbon, and sulphurous odours in several locations with occasional phenolic, tarry, sweet solvent and cresol odours. Based on the 2004 ground investigation results approximately 27% of the ground investigation locations recorded evidence of odours and/ or free product. Chemical testing of the soil samples obtained in 2004 and 2005 recorded some elevated concentrations of metals and hydrocarbons, however the risk assessments completed at the time concluded there was no significant risk to human health or controlled waters assuming the site was predominantly covered in hardstanding/ clean cover. The >10m thick clay layer above the chalk is considered likely to act as a barrier to prevent downward migration of contaminants to the underlying chalk preventing any significant contamination of the aquifer. During the 2004 GI items identified as ‘catalyst cylinders’ were recorded on the ground surface with occasional buried cylinders encountered in the Made Ground in five of the trial pits. The cylinders are reported to have been used as part of the former gasification process and may contain the potentially radioactive element uranium (present as depleted uranium). Radiation surveys undertaken during the 2004 GI did not record any radiation levels above normal background levels. A site walkover was conducted in October 2023 and no evidence of cylinders on the ground surface were recorded. A later GI report was undertaken in May 2024. This report concentrated on the main site located within the revised Installation boundary and some of the land to be surrendered. This is presented in Annex 1 of this SCR. The 2024 GI comprised trial pits and the use of a Cone Penetration Test (CPT) rig to progress a Membrane Interface Probe (MIP) to allow screening of headspace for compounds that produce a

response on a Flame Ionisation Detector (FID), Photo Ionisation Detector (PID) and Dry Electrolytic Conductivity Detector (DELCD) followed by Monster Steek Apparat (MOSTAP) soils sampling and subsequent laboratory testing of retrieved soil. A surface water sample was collected from a drainage ditch adjacent to the site for chemical laboratory analysis.

The report concluded the following:

1) Historical soil analysis showed the distribution of contaminants in Made Ground is heterogeneous, and the 2024 GI confirmed this.
2) Due to the heterogeneous distribution of contaminants, although no significant risks were found to human health (with the exception of asbestos), significant risks may be present in other areas of the site not investigated.
3) FID responses indicated the presence of high ionisation potential hydrocarbons at depth. Subsequent chemical analysis did not show any significant concentrations of contaminants to be present.
4) The FID responses are interpreted to be due to the presence of methane, and not due to contaminants relating to the historic use of the site for gasification, or from the off-site migration of contaminants onto the site.

Baseline soil and groundwater reference data

The full baseline soil and surface water results are presented in the 2024 Ground Investigation Report in Annex 1 of this SCR. A total of eight trial pits were excavated across the site to depths of 2m and 5m. Five samples were also taken from stockpiles found on site. The locations of the samples are shown in Appendix 1 of the 2024 Ground Investigation Report in Annex 1 of this SCR. Water samples were taken from a drainage ditch adjacent to the site.

A summary of the results is presented in the following tables.

Soil Sample Laboratory Testing Results - Trial Pits

Parameter	Limit of Detection	Unit	Result
Arsenic	0.2	mg/kg	3.9 – 9.3
Barium	1.5	mg/kg	56 – 140
Beryllium	0.2	mg/kg	0.5 – 3.3
Boron (Water Soluble)	0.2	mg/kg	1.3 – 3.4
Cadmium	0.1	mg/kg	<0.1 – 0.5
Chromium	0.15	mg/kg	10 – 40
Copper	0.2	mg/kg	9.2 – 20
Lead	0.3	mg/kg	10 – 23
Mercury	0.05	mg/kg	<0.05 - 0.09
Nickel	1	mg/kg	6.1 – 95
Selenium	0.5	mg/kg	<0.5 – 1.5
Vanadium	0.8	mg/kg	30 – 42
Zinc	1	mg/kg	43 – 150
pH	-	pH	7.7 – 10.2
Total Organic Carbon	0.5	%	1.1 – 1.5
Petroleum Hydrocarbons	10	mg/kg	<10

(Total C5 – C35)			
PAH USEPA 16 Total	0.1	mg/kg	9.9
PCB Total	0.01	mg/kg	<0.01
Phenols	0.01	mg/kg	<0.01
VOCs	0.01	mg/kg	<0.01
SVOCs	0.1	mg/kg	<0.1
Asbestos			Bundles of amphibole and chrysotile present in three of the eight samples (0.002% - 0.006%)

Soil Samples from Shallow Stockpile Soil Sampling

Parameter	Limit of Detection	Unit	Result
Arsenic	0.2	mg/kg	2.7 – 6.8
Barium	1.5	mg/kg	54 – 130
Beryllium	0.2	mg/kg	0.8 – 4.1
Boron (Water Soluble)	0.2	mg/kg	<0.2 – 1.9
Cadmium	0.1	mg/kg	<0.1 – 0.3
Chromium	0.15	mg/kg	21 – 44
Copper	0.2	mg/kg	16 – 130
Lead	0.3	mg/kg	5.0 – 44
Mercury	0.05	mg/kg	<0.05 – 0.10
Nickel	1	mg/kg	3.4 – 15
Selenium	0.5	mg/kg	0.6 – 1.5
Vanadium	0.8	mg/kg	39 – 84
Zinc	1	mg/kg	64 – 480
pH	-	pH	10.3 – 11.1
Total Organic Carbon	0.5	%	1.0 – 2.7
Petroleum Hydrocarbons (Total C5 – C35)	0.01 - 10	mg/kg	<0.01 - 380
PAH USEPA 16 Total	0.1	mg/kg	44
PCB Total	0.01	mg/kg	<0.01
Phenols	0.01	mg/kg	<0.01 – 0.10
VOCs	0.01	mg/kg	<0.01
SVOCs	0.1	mg/kg	<0.1 – 3.9
Asbestos	N/A	N/A	Bundles of chrysotile present in one sample (<0.001%)

Static Cone Penetration Facilitated MIP and MOSTAP Soil Sample results

Parameter	Limit of Detection	Unit	Result
Heavy Metals	Not tested		
Inorganics	Not tested		
Petroleum Hydrocarbons (Total C5 – C35)	10	mg/kg	<10
PAH USEPA 16 Total	0.1	mg/kg	0.71
PCB Total	0.01	mg/kg	<0.01
Phenols	0.01	mg/kg	<0.01
VOCs	0.01	mg/kg	<0.01
SVOCs	0.1	mg/kg	<0.1
Asbestos	Not tested		

Summary of Surface Water Laboratory Testing Results

Parameter	Limit of Detection	*Unit*	*Result*
Arsenic, Dissolved	0.16	ug/l	1.4
Boron, Dissolved	12	ug/l	100
Cadmium, Dissolved	0.03	ug/l	< 0.03
Calcium, Dissolved	0.09	mg/l	87
Chromium, Dissolved	0.25	ug/l	2.2
Copper, Dissolved	0.4	ug/l	3.0
Lead, Dissolved	0.09	ug/l	0.16
Manganese, Dissolved	0.22	ug/l	1.4
Mercury, Dissolved	0.01	ug/l	< 0.01
Nickel, Dissolved	0.5	ug/l	2.7
Selenium, Dissolved	0.25	ug/l	0.78
Zinc, Dissolved	1.3	ug/l	4.1
pH		pH	7.8
Dissolved Organic Carbon	2	mg/l	8.9
TPH Ali/Aro Total C5-C35	10	ug/l	89
PAH Total	0.2	ug/l	< 0.20
PCB 7 Total	1	ug/l	< 1.0
Phenols	0.1	ug/l	< 0.10
VOCs*	0.1	ug/l	<1
SVOC	1	ug/l	< 1.0
*Exceptions to this result are Methylene Chloride (<27 ug/l) 2,2-dichloropropane (<2 ug/l), Bromochloromethane (<4 ug/l), m+p-Xylene (<2 ug/l) and 1,3-dichlorobenzene (<2 ug/l).			

Supporting information

- 2024 Ground Investigation Report presented in Annex 1 of this SCR.
- Figure 1, Appendix A, of the Main Supporting Document
- Figure 2, Appendix A, of the Main Supporting Document
- Figure 3, Appendix A, of the Main Supporting Document
- Groundsure Report 2025 – Annex 2

3.0 PERMITTED ACTIVITIES	
Permitted activities	There are number of activities carried out at the Installation which fall under Schedule 1 of the EP Regulations, this variation application will vary the existing the Section 1.1 Part A(1) (a) combustion activity. Under the 2025 Environmental Permit Variation, to align the permit with Uniper's design, the Installation will include the following elements: • CCGT with a net electrical output of 540 Megawatt (MWe) • Auxiliary boiler (8.5 MWth) • Two Joules Thomson heaters (3MWth each) • Emergency diesel generator (1.5MWth)
Non-permitted activities undertaken	The following Directly Associated Activities will be carried out at the Installation: • Raw and process water treatment • Drainage systems • Oil Storage For further information see Section 4 of the Main Supporting Document.
Document references for: • plan showing activity layout; and • environmental risk assessment.	• 2024 Ground Investigation Report presented in Annex 1 of this SCR. • 2025 Groundsure Report presented in Annex 2 of this SCR • Stage 1 – 3 Assessment of Hazardous Substances presented in Annex 3 of this SCR • Figure 1, Appendix A, of the Main Supporting Document • Figure 2, Appendix A, of the Main Supporting Document • Figure 3, Appendix A, of the Main Supporting Document

4.0 Changes to the activity	
Have there been any changes to the activity boundary?	A summary of the changes to the Installation Boundary are presented in Section 2 of this SCR. The revised Installation Permit Boundary is presented in Figure 3, Appendix A of the Main Supporting Document.
Have there been any changes to the permitted activities?	See Section 2 of Main Supporting Document.
Have any 'dangerous substances' not identified in the Application Site Condition Report been used or produced as a result of the permitted activities?	A Stage 1 – 3 Assessment of Hazardous Substances has been produced for the Environmental Permit Variation Application which is presented in Annex 3. This outlines the hazardous substances that will be used at the Installation.
Checklist of supporting information	• The land to be surrendered is shown on Main Supporting Document, Appendix A, Figure 2. • The Revised Installation Boundary is shown in Main Supporting Document, Appendix A, Figure 3. • The description of the changes to the permitted activities are outlined in Section 2.2 of the Main Supporting Document. • Stage 1 – 3 Assessment of Hazardous Substances in (Annex 3) of this SCR.

5.0 MEASURES TAKEN TO PROTECT LAND	
Construction and operation of the original activity never commenced. Evidence to support this can be found in the Compliance Assessment Report which is presented in Appendix B of the Main Supporting Document.	
Checklist of supporting information	• 05/12/2024 CAR can be found in Appendix B of the Main Supporting Document.

6.0 POLLUTION INCIDENTS THAT MAY HAVE HAD AN IMPACT ON LAND, AND THEIR REMEDIATION	
No known pollution incidents. Updated baseline GI is presented in Annex 1.	
Checklist of supporting information	• Records of pollution incidents that may have impacted on land • Records of their investigation and remediation

7.0 SOIL GAS AND WATER QUALITY MONITORING (WHERE UNDERTAKEN)	
No monitoring undertaken. See Section 2 for details on the condition on the land.	
Checklist of supporting information	• Description of soil gas and/or water monitoring undertaken • Monitoring results (including graphs)

8.0 DECOMMISSIONING AND REMOVAL OF POLLUTION RISK	
Not applicable	
Checklist of supporting information	• Site closure plan • List of potential sources of pollution risk • Investigation and remediation reports (where relevant)

9.0 REFERENCE DATA AND REMEDIATION (WHERE RELEVANT)	
Not applicable	
Checklist of supporting information	• Land and/or groundwater data collected at application (if collected) • Land and/or groundwater data collected at surrender (where needed) • Assessment of satisfactory state • Remediation and verification reports (where undertaken)

10.0 STATEMENT OF SITE CONDITION

2025 Partial Surrender
The Installation will now occupy the land that was previously earmarked for the gasification plant. As the Installation will only comprise a CCGT generating station, the Installation Site Boundary can be reduced in size from the current permitted Installation Boundary. The land to be surrendered from the Installation Boundary is shown in Figure 2 and the revised Installation Boundary is shown in Figure 3, Appendix A of the Main Supporting Document.

On 05/12/2024 the Local Area Officer for the EA completed a Compliance Assessment Report (CAR) following a site inspection. During the assessment, the EA confirmed that the Site remains in a pre-construction phase, with no evidence suggesting the initiation of any construction activities. Consequently, the report indicated that no non-compliances with the existing Environmental Permit conditions had been identified and the EA Officer confirmed that the Site was is in a clean and tidy state.

The EA Officer confirmed that a large portion of the Site had been tarmacked while the remainder consisted of unmade land. The tarmacked areas of land were being used to for the storage of pre-registered cars. This CAR can be found in Appendix B of the Main Supporting Document.

The land to be surrendered covers an area of approximately 19.5 ha and is shown in Figure 2 in Appendix A of the Main Supporting Document. The majority of the land included in the partial surrender is the land to the north of the site and the area occupied by the existing pond. The land comprising the existing pond is being removed from the permit because the pond is independent from the Installation and not a directly associated activity, as it is not a form part of the site drainage system.
To surrender the land, the Applicant is submitting a partial low risk surrender as part of this Environmental Permit variation application. A 'low risk' surrender application is defined in the Part E2 application form Guidance document[2] as:

"applying to surrender a permit for an activity where the evidence burden to demonstrate that the site is in a satisfactory condition is small or non-existent. This will include permits where the operation never started. If we have confirmed that the facility you wish to surrender is low risk and we do not have to carry out an intrusive investigation (except in the case of a landfill surrender; see below), tick this box and you pay a reduced fee. You must also send a copy of the evidence with the application".

As the Installation was never developed and no listed activities have been carried out under the existing Environmental Permit, no pollution by the permitted activity can have occurred, therefore we consider this to be sufficient information to demonstrate a low risk partial surrender.

[2] Environment Agency, 2020, 'Guidance notes on part E2'. Available at: https://assets.publishing.service.gov.uk/media/5ea01716e90e0704955ec597/Form-guidance-EPC-Part-E2-surrender-application.pdf

Annex 1

Permit Variation – Ground Investigation Factual and Interpretative Report

GEOTECHNICS

BUILD ON CONFIDENCE

Ground Investigation

at North Killingholme

North Killingholme | Lincolnshire

Project No: PY240528

Client: Uniper Energy

Date: May 2024

Factual and Interpretative Report



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GEOTECHNICS
BUILD ON CONFIDENCE

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GEOTECHNICS

BUILD ON CONFIDENCE

Ground Investigation

at North Killingholme

North Killingholme | Lincolnshire

Project No: PY240528

Client: Uniper Energy

Date: May 2024

Factual and Interpretative Report



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1.0 INTRODUCTION

A geoenvironmental investigation was undertaken by Geotechnics Limited at a site in North Killingholme, Lincolnshire. The investigation was carried out to the instructions of the Client, Uniper Energy. This report describes the work undertaken and presents the data obtained.

2.0 OBJECT AND SCOPE OF THE INVESTIGATION

The object of the investigation was to obtain preliminary geoenvironmental information on the ground conditions prior to the potential aquation of the site for redevelopment. The investigation was designed to provide relatively rapid initially assessment of baseline contaminant conditions at the site, based on existing information knowledge of the site including the site history, land uses in the environs of the site, historical ground investigation and chemical laboratory analysis within the limitations posed by exploratory hole numbers, locations, depths, methods adopted and the scope of approved in situ and laboratory testing.

The investigation comprised trial pits and the use of a Cone Penetration Test (CPT) rig to progress a Membrane Interface Probe (MIP) to allow screening of headspace for compounds that produce a response on a Flame Ionisation Detector (FID), Photo Ionisation Detector (PID) and Dry Electrolytic Conductivity Detector (DELCD) followed by Monster Steek Apparat (MOSTAP) soils sampling and subsequent laboratory testing of retrieved soil. A surface water sample was collected from a drainage ditch adjacent to the site for chemical laboratory analysis.

3.0 PRESENTATION

A description of the site and a summary of the procedures followed during the investigation process are presented in Sections 4 to 6. The factual data so obtained are presented in Appendices 2 to 10 of this report. Attention is drawn to the General Notes and Investigation Procedures presented in Appendix 11 to aid an understanding of the procedures followed and the context in which the report should be read.

In addition, the report is presented in electronic format in accordance with "The Electronic Transfer of Geotechnical Data from Ground Investigations" published by the AGS (the AGS Format) are presented separately as a digital file.

4.0 THE SITE

4.1 Location

The site is located off Haven Road and Clough Road, approximately 1km east of east Halton, Lincolnshire. The approximate Ordnance Survey National Grid Reference for the centre of the site is TA158 420 and an extract from the relevant 1:50,000 Scale O.S. Map is included as Appendix 1.

4.2 Description

The site is irregular in shape, although approximately rectangular and covers an area of approximately 2.5Ha. Photographs of the site taken during the fieldwork are presented in Appendix 2. There is an existing electrical sub-station located approximately in the centre of the site.

5.0 PROCEDURE

5.1 Commissioning

The work was awarded following submission of a tender for work designed jointly between the Client and Geotechnics for ground investigation of the site. The scope of the works was reviewed and agreed by the Client's Engineer Arup.

5.2 General

The procedures followed in this site investigation are based on BS 5930: 2015+A1:2020 – Code of Practice for Site Investigations and BS 10175:2011+A2:2017 - Investigation of Potentially Contaminated Sites. The soils encountered have been described in accordance with BS5930:2015+A1:2020, BS EN ISO 14688-1:2018 and BS EN ISO 14689:2018. The Trial Pit Records are included in Appendix 4 and Trial Pit photographs are included in Appendix 5. The factual results of the PID, FID and DELCD profiles achieved by advancing the MIP probe are presented in Appendix 6. The approximate positions are shown on the Exploratory Hole Location Plan in Appendix 3.

Potential Exploratory Hole locations were specified by Geotechnics, following a review of available information. Following deployment to site, some exploratory holes were relocated and/or abandoned due to the location of stockpiles, variable surface conditions due to weather conditions and the presence of below ground obstructions which prevented significant progress. On-going deposition of materials into stockpiles was being undertaken during the investigation which also had an influence of the location of exploratory holes. The co-ordinates and levels shown on the Exploratory Hole Records were measured using a GPS survey device. The depths quoted on the exploratory hole records are in metres below ground level.

At each exploratory hole location, with the exception of the trial pits, an inspection pit was excavated using hand tools to a depth of 1.20m below ground level to check for the presence of underground services. Prior to and on completion of the excavation, the location was scanned using a cable avoidance tool (CAT).

5.3 Trial Pits

Eight (8. No.) Trial Pits (numbered TP01 to TP08) were excavated to depths varying between 2.00m and 5.00m below ground level using a 13 tonne tracked excavator. This work was supervised on site by a geoenvironmental engineer.

The profiles of strata or other features were recorded as excavation proceeded and measurements taken from ground level. Representative samples were taken, where appropriate, for laboratory examination and analysis and in addition, Environmental samples (ES) were recovered at the depths indicated on the Trial Pit Records. Samples were taken directly from excavated materials deposited at the surface. Groundwater observations and trench stability notes are included on the Trial Pit Records. Photographs of the pits are presented in Appendix 5.

5.4 Static Cone Penetration Facilitated MIP and MOSTAP Soil Sampling

Five (5No.) FID, PID and DELCD headspace profiles were undertaken, with the MIP probe advanced via a Static Cone Penetration Tests rig (numbered MIP01 to MIP05). MIP probing profiles were completed to depths varying between 0.70m and 5.60m below ground level. The test locations were selected by Geotechnics Limited and the work was carried out. Separate, adjacent MOSTAP soils sampling was undertaken following assessment of the FID, PID and DELCD profiles.

The MIP profiles and MOSTAP sampling were undertaken using a mounted 17.5 tonne capacity hydraulic penetrometer equipment. The tests were terminated at the depths instructed by the Engineer or at which refusal was reached based on the maximum safe thrust capacity of the equipment.

In addition to the MIP probe tests 6No. MOSTAP sampling runs were carried out adjacent to the MIP probe profiles. The samples collected were taken at the following depths:

Exploratory Hole Number	Sampling Depths (m below ground level)
MIP01	N/A - refusal
MIP02	N/A - refusal
MIP03 & MIP3A	N/A - refusal
MIP04	2.00 – 3.20 4.00 – 5.20
MIP05	2.00 – 3.20 3.20 – 4.40 4.40 – 5.60

The MIP Records are presented in a Report prepared by Lankelma CPT Limited which is included in Appendix 6 Photographs of the MOSTAP samples are included in Appendix 7.

5.5 Shallow Stockpile Soil Sampling

Five (5. No.) shallow stockpile samples (numbered SP01 to SP05) were taken from just below the surface using hand tools, cleaned between each sample. Photographs of the stockpile sampling are included in Appendix 8.

6.0 LABORATORY TESTING

6.1 Contamination

Selected samples of soil and surface water were tested at the laboratories of Derwentside Environmental Testing Services Limited (DETS) for a number of determinands in order to check on potential site contamination. The determinands were selected by Geotechnics Limited and are detailed on the results sheets in Appendix 9 together with the test result as well as the test method, accreditation and detection limit. A number of analytical suites were selected for analysis. These were derived based on a review of the Arup Technical Note, and were designed to provide for broad and encompassing assessment of potential environmental risks. Further details are provided in the suite descriptions below.

Made Ground and Stockpiles
Made Ground and Stockpile soil samples were tested for the following determinands:-

- Arsenic
- Barium
- Boron (Water Soluble)
- Beryllium
- Cadmium

- Chromium
- Chromium Hexavalent (calculated)
- Copper
- Lead
- Mercury
- Nickel
- Selenium
- Vanadium
- Zinc

- pH

- Total Organic Carbon
- Speciated Phenols
- Polyaromatic Hydrocarbons (Speciated)
- PCBs (Speciated)
- Petroleum Hydrocarbons (Speciated)
- Semi-Volatile Organic Compounds (SVOC)
- Volatile Organic Compounds (VOC)

- Asbestos
- Asbestos Quantification

Natural Soils
Natural soil samples were tested for the following determinands:-

- Speciated Phenols
- Polyaromatic Hydrocarbons (Speciated)
- PCBs (Speciated)
- Petroleum Hydrocarbons (Speciated)
- Semi-Volatile Organic Compounds (SVOC)
- Volatile Organic Compounds (VOC)

In addition, Waste Acceptance Criteria (WAC) analyses were carried out on selected samples including tests on solid waste on eluates. The determinands tested for are detailed on the results sheets in Appendix 9.

Tests on solid waste
Acid Neutralising Capacity (ANC)
- Loss on ignition
- Total organic carbon
- Mineral Oils
- BTEX (Total)
- PAH (Total)
- PCB's
- pH

Tests on Eluates (10:1)

- Antimony
- Arsenic
- Barium
- Cadmium
- Chromium
- Copper
- Lead
- Mercury
- Molybdenum
- Nickel
- Selenium
- Zinc
- Phenol
- Sulphate as SO4
- Chloride
- Fluoride
- Total Dissolved Solids
- Dissolved Organic Carbon

Surface water

One surface water sample taken from the drainage ditch adjacent to the site was tested for the following determinands:-

- Arsenic
- Boron
- Calcium
- Cadmium
- Chromium
- Copper
- Lead
- Manganese
- Mercury
- Nickel
- Selenium
- Zinc

- pH

- Dissolved Organic Carbon
- Speciated Phenols
- Polyaromatic Hydrocarbons (Speciated)
- PCBs (Speciated)
- Petroleum Hydrocarbons (Speciated)
- Semi-Volatile Organic Compounds (SVOC)
- Volatile Organic Compounds (VOC)

The laboratory results are included in Appendix 10.

7.0 SUMMARY OF ARUP TECHNICAL NOTE

7.1 General

A Technical Note for the site has been undertaken by Arup and the results presented and discussed in report in Report Number 216198-40 dated 13th December 2023. The Technical Note provides an appraisal of ground conditions at the site, with the aim of identifying potential ground related risks. The Technical Note includes a review of previous investigations, including intrusive investigations, that have been undertaken as part of two phases of investigations in 2004 and 2005.

A total of 149 Trial Pits, 12 boreholes and 6 hand dug pits have been excavated during these investigations. It should be noted that the areas of previous investigation and the current site may not cover the same areas.

7.2 Ground Conditions and Geology

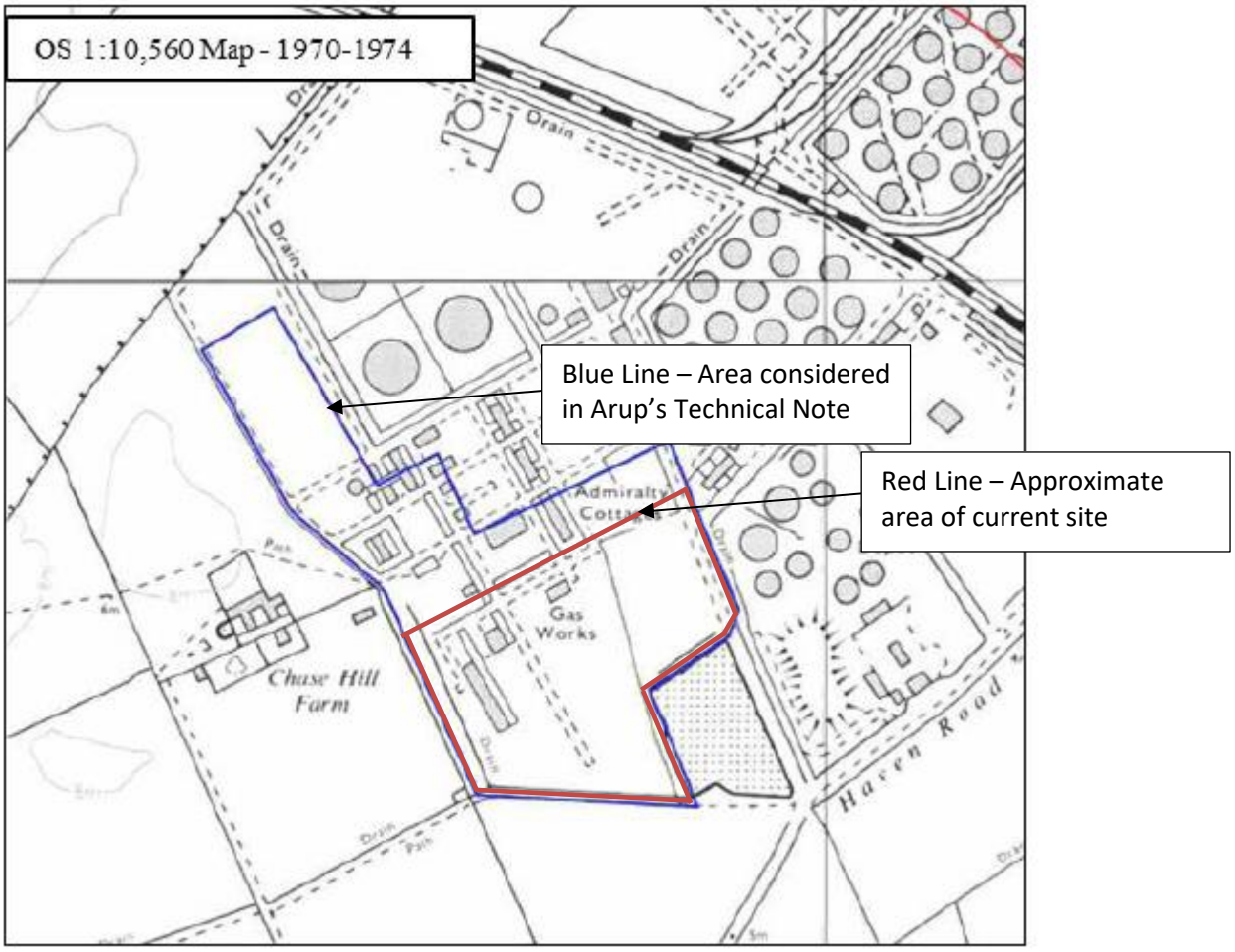
The ground conditions found during the 2004 and 2005 intrusive investigations are summarised below:

Made Ground
Made Ground was encountered to a maximum depth of 3.4m with an average thickness of 1.5m. The materials were typically described as gravelly clay with gravel comprising chalk, flint, brick, clinker/slag, concrete with occasional metal, glass, wood, coal and catalyst cylinders. A significant number of buried structures were encountered comprising former building and tank foundations.

Alluvium and Glacial Till
Alluvium was found to between 0.2m and 2.3m thick. The bedrock is Chalk, although this was not encountered in these investigations.

7.3 Site History

The site has historically been a gas production plant (reforming plant) utilising light petroleum distillate between 1963 and 1974. The main area of the gas plant was located in the centre of the site, with the main naphtha tanks to the north and east (see below).



Taken and adapted From Arup Technical Note 216198-40

The gas plant was demolished to ground level in the late 1980's (except for the electrical substation). Transco used the site until January 2005 for the storage of large diameter pipes. A review of Google Earth aerial photography indicates that earthworks and stockpiling of materials was occurring in 2017 and 2021, although the source of the stockpiled materials is unknown.

7.4 Hydrology

A drainage ditch was observed during site walkovers along the western and southern boundaries.

7.5 Hydrogeology

Shallow groundwater was encountered in the more granular deposits of the Made Ground and Glacial Till. The Chalk bedrock is classified by the Environment Agency as a Principal Aquifer, although there are no known groundwater abstractions in the vicinity of the site.

7.6 Environmental Issues

Previous investigations encountered visible evidence of contamination including iridescent sheen, hydrocarbon staining, suspected asbestos and slag/clinker. There were also olfactory indications of the presence of hydrocarbons being present, as well as sulphurous odours. In the 2004 investigation 'catalyst cylinders' were encountered on the ground surface with occasional cylinders encountered in 5No. Trial Pits. The cylinders are reported to have been used as part of the former gasification process and may contain uranium.

The Technical Note indicates that chemical analysis showed the presence of elevated metals and hydrocarbons although risk assessment indicated minimal risks to human health and controlled waters, assuming hardstanding and/or clean cover materials were placed at ground level. No further details are presented or summarised.

The cohesive Alluvium and Glacial Till deposits are indicated to be greater than 10m thick, which have been assessed to provide a barrier to the vertical migration of contaminants into the underlying Chalk Principal Aquifer.

8.0 INTREPRETATION

8.1 Ground Conditions

On the basis of the expected geology discussed in Section 7.0 and the findings of the exploratory holes it has been possible to classify the various strata proved in the investigation into the following divisions:-

Made Ground
Alluvium
Stockpiled Recycled Aggregates

The ground profile exposed in the exploratory holes represents the conditions at discrete locations. The degree to which they represent conditions between or beyond the exploratory holes is a matter for conjecture and these can only be interpolated and hence, the uncertainties arising from this should be recognised. Where strata boundaries are shown on the exploratory holes they are conjectural and should be treated with caution.

8.1.1 Made Ground

Made Ground was encountered to depths of 0.30m and 4.50m. It was found to typically comprise Soft to firm grey or brown slightly sandy slightly gravelly clay. Gravel was composed of angular to subangular fine to coarse concrete, brick, clinker/slag, sandstone and Chalk. Some glass, metal, ceramics and wood gravel was encountered.

Lenses of firm red sandy clay with brick fragments and lenses of gravel of Chalk were encountered.

8.1.2 Alluvium

Alluvium was encountered below the Made Ground strata at depths of between 0.30m and 4.30m. If was found to typically comprise firm to very stiff reddish brown mottled grey slightly sandy slightly gravelly clay. Gravel was composed of subangular to rounded fine to medium sandstone, flint and Chalk. A relic topsoil was encountered in some exploratory holes above the Alluvium, which contained rootlets.

8.1.3 Stockpiled Recycled Aggregates

These deposits were not directly described during field work, as it is understood they will be removed from site prior to vacant possession being taken by the Client.

8.2 Groundwater

Groundwater was encountered sporadically during the intrusive investigation. Where encountered, groundwater was encountered close to or at the boundary between Made Ground and the underlying Alluvium deposits.

9.0 ENVIROMENTAL ASSESSMENT

9.1 Legal Framework

This report broadly follows the principles and methodology outlined in Land Contamination Risk Management (LCRM) and BS10175:2011+A2:2017 which are currently determined as UK best practice. The primary issues of concern are Risks to Human Health, for which the regulator is generally the Local Authority, risks to Controlled Waters and matters relating to waste soils for which the appropriate regulator is the Environment Agency. Reference should also be made to the Environmental Notes in Appendix 11 to place the discussion in context.

It should be noted that that this report is aimed at highlighting any potential significant environmental risks that should be considered by the Client in relation to geoenvironmental risks, primarily related to the historical uses. That may result in potential liabilities following taking vacant possession of the site and during the process of redevelopment, including obtaining planning permission.

9.2 Conceptual Model

The Conceptual Model (CM) is a representation of the current understanding of the site and the surrounding environment. This includes an understanding of the geology, groundwater, surface water bodies and potential contamination processes acting on substances present and migration pathways. It also takes into account all identified potential pollutant linkages using a source-pathway-receptor approach, based on the proposed use of the site. Where any element of the source-pathway-receptor linkage is absent, there is considered to be no or negligible risk.

The following potential site specific Source-Pathway-Receptor Linkages were identified by reviewing in the Arup Technical Note. Particular attention has been given to identifying previously unidentified geoenvironmental liabilities which may be prohibitive to redevelopment in relation to prohibitive remedial action being required. These formed the basis of the site specific Conceptual Model and the proposed investigation and analytical testing in line with current guidance:

- Presence of sources of heavy metals, petroleum hydrocarbons and asbestos in Made Ground and potential impact to human health (during and following construction) and controlled waters (surface ditch and the underlying Principal Aquifer).
- Presence of sources of heavy metals, petroleum hydrocarbons and asbestos in Made Ground and potential waste implications for disposal / re-use of arisings during earthworks / foundation installation.
- Potential for the presence of petroleum hydrocarbons to be migrating downwards through Alluvium and Glacial Till into the underlying Principal Aquifer.
- Potential for stockpiles of recycled aggregates to remain on site and potential residual waste / re-usability liabilities.

- Potential impact to the surface water ditch from petroleum hydrocarbons in Made Ground

9.3 Findings of the MIP Profiles

The results obtained during the MIP Profile investigation are presented in Appendix 6.

The different detectors which screened down-hole headspace are briefly discussed below, with more information available in the Lankelma report in Appendix 6, and selected figures are also presented below:

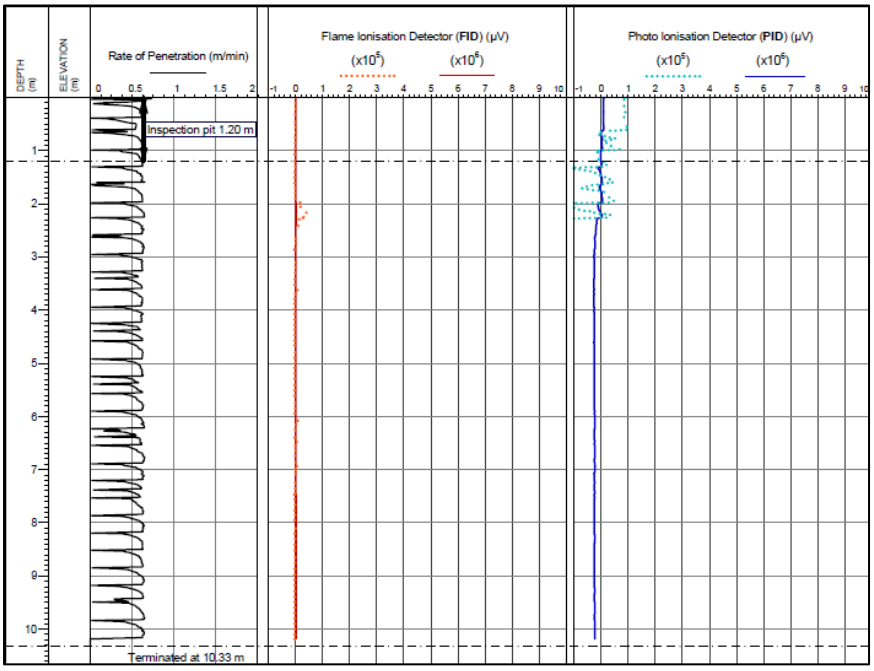
- Photo-Ionisation detector (PID) - Detection of a broad range of organic and inorganic compounds with ionisation potential less than or equal to 10.6 eV. Notably, this detector shoes not respond will to low carbon number organic compounds such as methane.

- Flame Ionisation Detector (FID) - Detection of carbon-hydrogen bonded organic compounds (all hydrocarbons).

- Dry Electrolytic Conductivity Detector (DELCD)- Detection of chlorinated and brominated organic compounds.

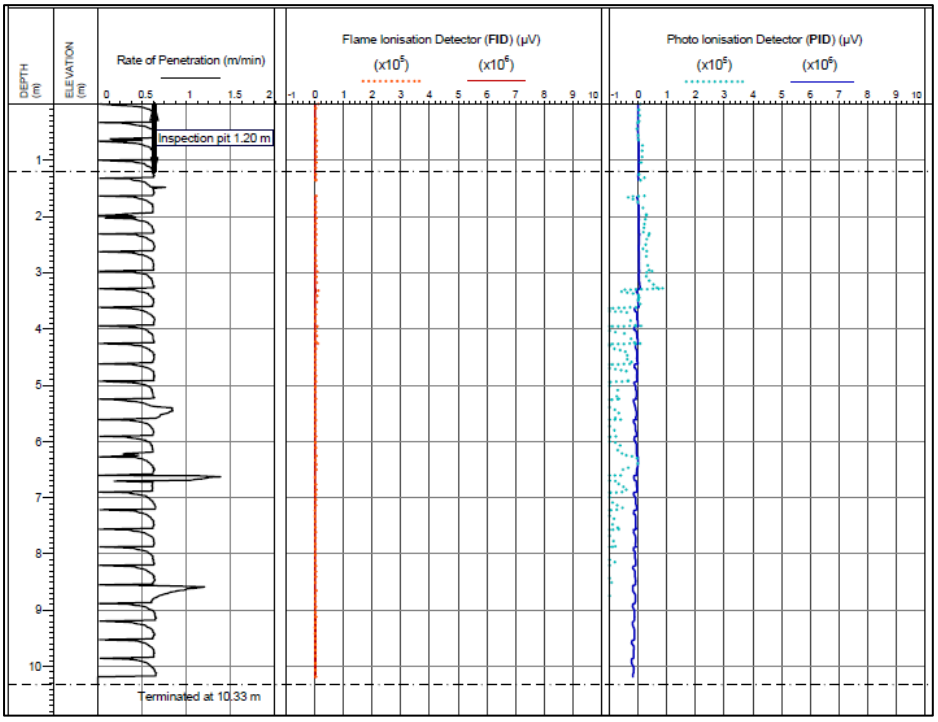
A discussion of the findings of each MIP probe is given below. The location of the MIP profiles is shown in Appendix 3. For all profiles, the DELCD detector response did not show a significant response:

MIP01 – Probe advanced to a depth of 10.33m. FID detector did not so any significant response. PID detector showed a moderate response decreasing to baseline from ground level to a depth of approximately 3.0m



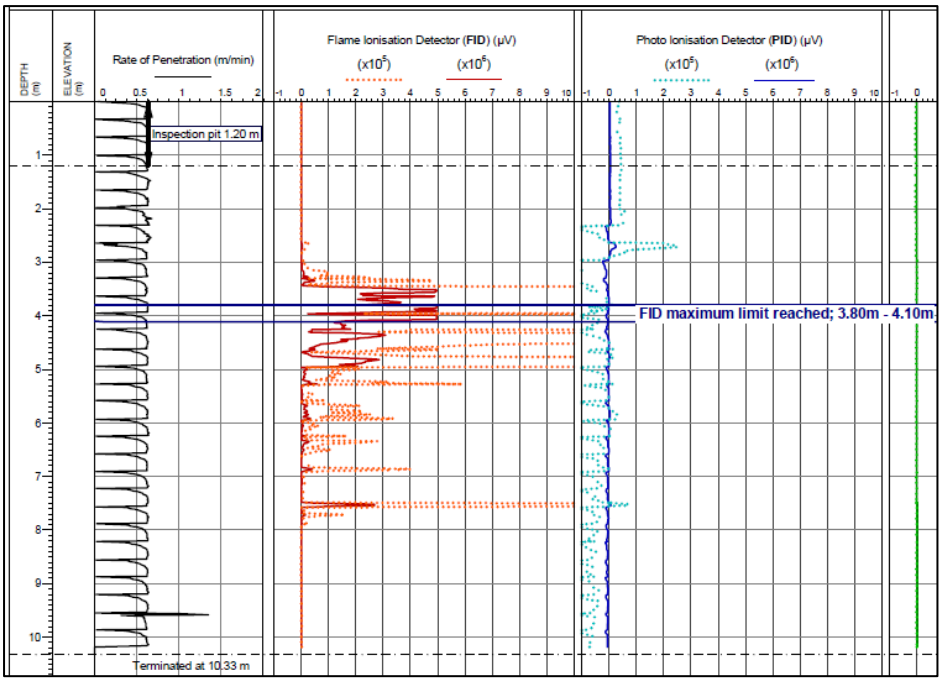
Summary of MIP01 Profile

MIP02 - Probe advanced to a depth of 10.33m. FID and PID detectors did not so any significant response.



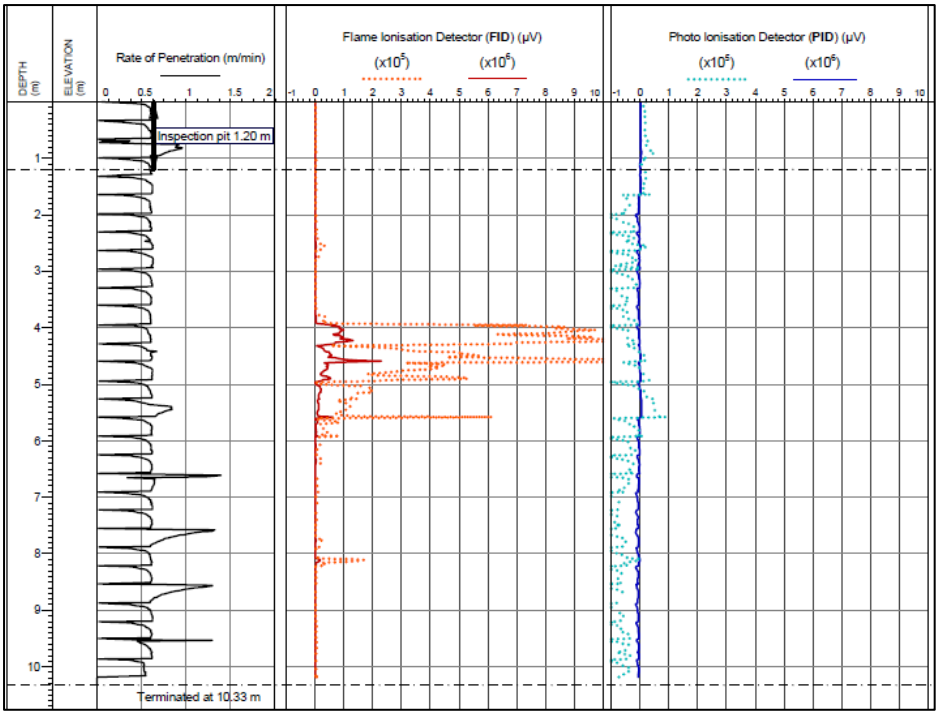
Summary of MIP02 Profile

MIP03 - Probe advanced to a depth of 10.33m. FID detector showed a significant response, particularly between the depths of approximately 3.30m and 7.70m, with the FID maximum limit being reached at between 3.80m and 4.10m. PID detector showed a slight response between approximately 2.6m and 3.0m.



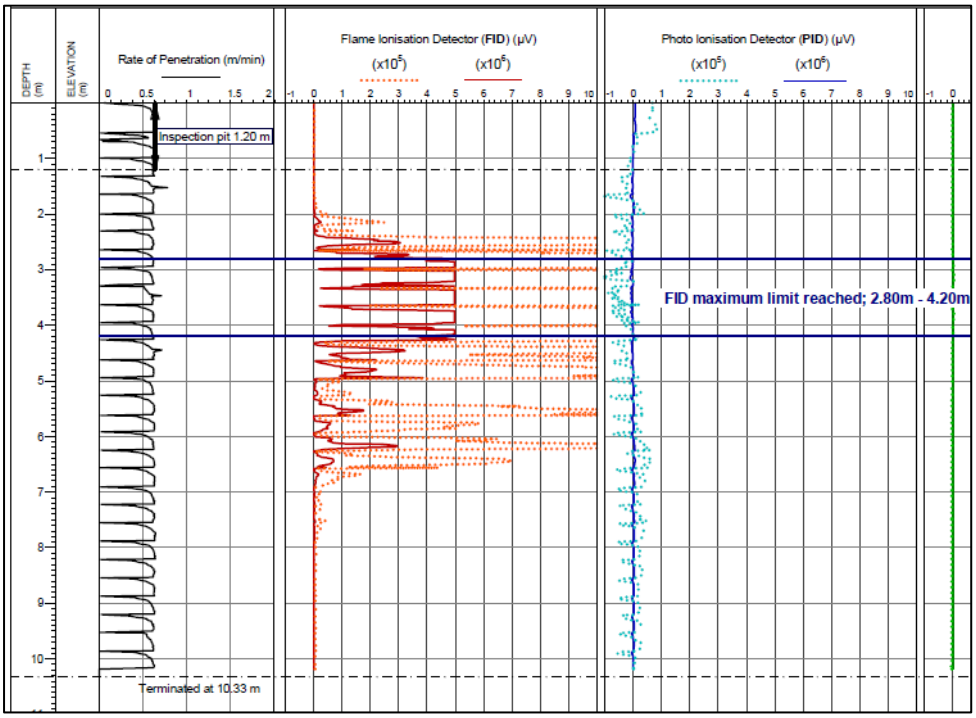
Summary of MIP03 Profile

MIP04 - Probe advanced to a depth of 10.33m. FID detector showed a moderate response, between the depths of approximately 3.90m and 5.50m. PID detector did not show any significant response.



Summary of MIP04 Profile

MIP05 - Probe advanced to a depth of 10.33m. FID detector showed a significant response, particularly between the depths of approximately 2.50m and 6.70m, with the FID maximum limit being reached at between 2.80m and 4.20m. PID detector did not show any significant response.



Summary of MIP05 Profile

In summary, the findings of the MIP Profiles shows the following:

- PID profiles have shown minimal responses, with potentially some marginally elevated responses in shallow soils
- FID profiles, especially for MIP03, MIP04 and MIP05 have shown significant responses in soils from approximately 2.50m and 7.70m, although there is no corresponding PID response suggesting the presence of hydrocarbons with relatively high ionisation potential are present between these depths in a limited area of the site

9.4 Summary of Chemical Analysis from MOSTAP Soil Samples

Progression of the MOSTAP sampler had mixed results with samples unable to be taken from MIP01, MIP02 and MIP03 due to progression refusal. However, MOSTAP sampling was successfully undertaken for MIP04 and MIP05, which both showed elevated FID readings. The following samples were collected from MIP04 and MIP05, aimed at sampling soils both within the zones showing elevated FID readings, and outside of this zone.

- MIP04 – 2.00-3.00m, 3.00-3.20m, 4.00-4.30m, 4.30-4.60m, 4.60-4.70m and 4.70-5.00m
- MIP05 – 2.00-3.00m, 3.20-3.50m, 3.00-3.70m, 3.70-4.20m and 4.60-5.40m

The chemical results show the following:

- For all samples from MIP04 and MIP05, all Speciated TPH, Speciated PCBs, Speciated Phenols, VOCs and SVOCs were not detected above the laboratory limit of detection.

- The majority of Speciated PAHs were below the laboratory limit of detection. The highest concentrations were 0.71mg/kg Total PAHs in MIP04 (3.00-3.20m) and Pyrene and Fluoranthene with concentrations of 0.04mg/kg in MIP05

A summary of the chemical results is presented in Appendix 9.

9.5 Summary of Soil Samples from Trial Pits and Stockpiled Recycled Aggregates

Laboratory testing results were directly compared to the Generic Assessment Criteria (GAC) for 'Commercial' land use, and results are shown in full in Appendix 12. The GAC adopted are those defined by LQM/CIEH Suitable 4 Use Levels' (S4UL) within the exception of lead for which, in the absence of a S4UL or SGV, the Category 4 Screening Level (C4SL) is adopted; as set out in CL:AIRE "Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination", Report SP1010, rev. 2.

Heavy Metals
No concentrations of heavy metals exceeded the adopted GACs.

Organic Contaminants
No concentrations of organic contaminants exceeded the adopted GACs.

Mineralogical contaminants
Asbestos was detected in the following samples, with quantified concentrations:

- TP01, 1.00m – 0.005% (0.002% amphibole bundles, 0.002% chrysotile bundles)
- TP01, 1.70m – 0.005% (0.002% amphibole bundles, 0.003% chrysotile bundles)
- TP02, 0.50m – 0.003% (chrysotile bundles)
- TP07, 2.00m – 0.006% (0.006% amphibole bundles)
- SP01 - <0.001% (<0.001% chrysotile bundles)

9.6 Water Results Summary

The analytical results obtained from sampling during this investigation are presented in Appendix 10 with a summary shown in Appendix 13. The results show an exceedance of the EQS for copper, although using the metal bioavailability assessment tool, included in Appendix 13, the concentration is below the calculated site specific PNEC value.

Concentrations of Fluoranthene and Benzo(b)fluoranthene are above the EQS values, but are only slightly above the laboratory limit of detection, and the EQS value is several orders of magnitude less than the EQS value. TPH concentrations show elevated concentrations of Aliphatic compounds above C10, with a total Aliphatic TPH concentration of 89µg/l.

9.7 Waste Assessment

Soil analysis has been used to assess the potential waste classification if soils were to be disposed of to a licensed waste facility during redevelopment. In addition, samples of the existing stockpiled recycled aggregates have been analysed in order to assess these as potential wastes, if required. Waste classification has been undertaken in accordance with Technical Guidance WM3: Waste Classification – Guidance on the Classification and Assessment of Waste (1st Edition, V1.2 GB).

The assessment shows that all samples are classified as non-hazardous with a likely EWC code of 17 03 02. WAC analysis has shown that all samples are suitable for disposal as Inert waste with the exception of SP03, which exceeds Inert threshold criteria for TPH and PAH concentrations and SP05, which exceeds Inert threshold criteria for TPH. Both of these samples are from recycled aggregate stockpiles.

9.8 Risk Assessment

From the review of the Arup Technical Note, there was found to be potential risks, to human health (during and following construction), potential risks to controlled waters (surface water and groundwater in the underlying Principal Aquifer) and waste liabilities resulting from arisings from earthworks for the proposed redevelopment as well as the potential for residual stockpiles of recycled aggregates to remain on site following vacant possession.

From the Arup Technical Note, it is expected there localised areas of hydrocarbon, asbestos and uranium-containing contamination may be present in Made Ground, both in soils and in perched groundwater. However, the extent to any downward migration of contaminants was not known, and the stockpiles present on site, which were still being tipped during the current field works, had not been characterised. Potential impact to the surface water ditech had also not been assessed.

The intrusive phase of works was designed to characterise soils in Made Ground and stockpiles, as well as investigate any downward migration of contaminants through the underlying natural soils, without puncturing the base of these deposits and creating a preferential pathway for the downward migration of contaminants to the underlying Principal aquifer.

Chemical analysis of Made Ground and recycled aggregate stockpiles has shown that there are no significant risks to human health from chemical contaminants, from the soil samples analysed as part of this investigation. Asbestos has been detected in both Made Ground and recycled aggregate stockpiles up to a maximum concentration of 0.006%. There is no simple way of assessing potential risks to human health from asbestos in soils. Whilst the concentrations are not considered to be especially high, any earthworks involving disturbance of Made Ground and the stockpiles should have a suitable risk assessment undertaken to ensure the works are compliant with the relevant legislation. A cover system would also be required to ensure the production of free fibre fibres from soils being exposed at ground level is negated.

Waste characterisation and classification assessment has shown that all the soil samples analysed are suitable for disposal as non-hazardous waste. The WAC analysis has shown that all the samples analysed for are suitable for disposal as Inert waste, with the exception of SP03, which exceeds Inert threshold criteria for TPH and PAH concentrations and SP05, which exceeds Inert threshold criteria for TPH. Both of these samples are from recycled aggregate stockpiles.

The findings of the MIP Profiles showed the localised presence of hydrocarbons producing a significant response on the FID detector, but not the PID detector. This demonstrates the presence of hydrocarbons which have a relatively high ionisation potential. Subsequent soil sampling and chemical analysis has not shown the presence of any significant, or residual, concentrations of organic contaminants in soils. The suit of analysis is extremely broad, and almost all contaminants were not detected above the laboratory limit of detection. Therefore, it is assumed that the response on the FID detector is due to the localised presence of ground gases, with methane being the mostly likely source of the FID detections.

Although there were access constraints to progressing MOSTAP sampling and refusal due to obstructions, the findings of the MIP profiles and the subsequent soil analysis shows that it is unlikely that there is widespread downward migration of hydrocarbons from shallow Made Ground downwards into the underlying Principal aquifer, and residual risks to groundwater are considered to be low.

Assessment of the chemical analysis of surface water has shown the presence of elevated but low concentrations of Aliphatic hydrocarbons above the C10 range and some low concentrations of PAHs. Whilst is it not possible to rule out impact from the site, a more likely source for the petroleum hydrocarbons is from spillages from vehicles and road run-off.

9.9 Conclusions and Recommendations

The following are the conclusions and recommendations from the investigations:

- Historical soil analysis has shown the distribution of contaminants in Made Ground is heterogeneous, and the current investigation has confirmed this.
- Due to the heterogeneous distribution of contaminants, although no significant risks have been found to human health (with the exception of asbestos), significant risks may be present in other areas of the site not investigated.
- FID responses indicated the presence of high ionisation potential hydrocarbons at depth. Subsequent chemical analysis has not shown any significant concentrations of contaminants to be present.
- The FID responses are interpreted to be due to the presence of methane, and not due to contaminants relating to the historic use of the site for gasification, or from the off-site migration of contaminants onto the site.
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APPENDIX 1

Exploratory Hole Location Plan



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Legend

- Locations By Type - Empty
- Locations By Type - DS
- Locations By Type - SLSP
- Locations By Type - TP

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Engineer:

Client:
Uniper Energy

Project:
North Killingholme

Drawing Title:
Exploratory Hole Location Plan

Scale:	Date:
1:1000 at A3	**14/03/2024**
Project No.: **PY240528**	**Exploratory Hole Location Plan**

APPENDIX 2

Photographs Taken During Site Works

GEOTECHNICS
BUILD ON CONFIDENCE

A stockpile of materials



GEOTECHNICS
BUILD ON CONFIDENCE

Adjacent drainage ditch 2



Adjacent drainage ditch



GEOTECHNICS
BUILD ON CONFIDENCE

Electric Sub-Station



Ground Investigation
North Killingholme, Lincolnshire

Project No: **PY240528**
Date: **May 2024**

GEOTECHNICS

GEOTECHNICS
BUILD ON CONFIDENCE

General view of stockpiled recycled aggregates



GEOTECHNICS
BUILD ON CONFIDENCE

Stockpiles along access road



GEOTECHNICS
BUILD ON CONFIDENCE

View from stockpile showing stockpiles and access



APPENDIX 3

Exploratory Hole Location Plan



N

Legend

- Locations By Type - Empty
- Locations By Type - DS
- Locations By Type - SLSP
- Locations By Type - TP

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Client:
Uniper Energy

Project:
North Killingholme

Drawing Title:
Exploratory Hole Location Plan

Scale:	Date:
1:1000 at A3	**14/03/2024**
Project No.: **PY240528**	**Exploratory Hole Location Plan**

APPENDIX 4

Trial Pit Logs

TRIAL PIT RECORD - Trial Pit

DRAFT

Project	North Killingholme	**Engineer**		**Project No.**	PY240528
				Location ID	TP01
Client	Uniper Energy	**National Grid Coordinates**	515635.0 E 419680.3 N	**Ground Level**	6.06 m OD

Samples and Tests | Strata | Scale 1:50

Depth	Sample Type	Stratum No.	Results	Description	Depth	Legend	Level (m OD)
				MADE GROUND: Firm light brown slightly sandy slightly gravelly clay with a low angular cobble content of concrete slabs. Gravel is angular to subangular fine to coarse of concrete and brick fragments. Some metal, plastic and strips of fabric.			
				MADE GROUND: Firm to stiff brown slightly sandy gravelly clay. Gravel is angular to subangular fine to coarse of concrete, ceramic and brick fragments. Some metal and plastic.	0.50		5.56
1.00	ES						
				MADE GROUND: White slightly sandy subangular to subrounded fine to coarse gravel of chalk.	1.70		4.36
2.00	ES						
				MADE GROUND: Firm dark grey with some staining slightly sandy slightly gravelly clay. Gravel is subangular to subrounded fine to medium of chalk.	2.30		3.76
3.00	ES						
				Grey gravelly slightly clayey fine to coarse SAND. Gravel is subangular to subrounded fine to medium of sandstone and chalk.	3.70		2.36
					3.80		2.26
4.00	ES			Stiff brown slightly sandy slightly gravelly CLAY. Gravel is subrounded to rounded fine to medium of sandstone.	4.00		2.06
				End of Excavation			

Excavation

Plant	13 Tonne tracked excavator.	**Width (B)**	0.75
Date	08/02/2024	**Length (C)**	4.80
Shoring	None.	**Orientation (degrees)**	125
		Date Backfilled	08/02/2024
Stability	Stable during excavation.		

Groundwater

Depth Observed	Depth of Pit	Rose to	in Mins	Remarks
3.70	3.70			Medium inflow.

Remarks ES sample = 1 x 60ml glass vial, 2 x 258ml amber glass jars and 1 x 1 litre plastic tub.
Backfill details from base of hole: arisings up to ground level.

Logged by JP

Figure Sheet 1 of 1
14/03/2024

Symbols and abbrevations are explained on the accompanying key sheets.
All dimensions are in metres.

Logged in accordance with BS5930:2015 + A1:2020

GEOTECHNICS

TRIAL PIT RECORD - Trial Pit

DRAFT

Project	North Killingholme	**Engineer**		**Project No.**	PY240528
				Location ID	TP02
Client	Uniper Energy	**National Grid Coordinates**	515791.2 E 419674.4 N	**Ground Level**	5.29 m OD

Scale 1:50

Samples and Tests				Strata			
Depth	Sample Type	Stratum No.	Results	Description	Depth	Legend	Level (m OD)
				MADE GROUND: Soft brown slightly sandy gravelly clay. Gravel is angular to rounded fine to medium of sandstone, chalk and brick fragments.			
0.50	ES			MADE GROUND: Soft brown slightly sandy slightly gravelly clay. Gravel is angular to subrounded fine to coarse of sandstone, chalk, concrete and brick fragments. Some wood.	0.40		4.89
				Firm to stiff greyish brown slightly sandy CLAY with some rootlets.	2.00		3.29
2.50	ES						
3.30	ES			Stiff reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of chalk.	3.20		2.09
				End of Excavation	3.50		1.79

Excavation

Plant	13 Tonne tracked excavator.	**Width (B)**	0.75
Date	12/02/2024	**Length (C)**	4.80
Shoring	None.	**Orientation (degrees)**	090
		Date Backfilled	12/02/2024
Stability	Stable during excavation.		

Groundwater

Depth Observed	Depth of Pit	Rose to	in Mins	Remarks
				None encountered.

Remarks ES sample = 1 x 60ml glass vial, 2 x 258ml amber glass jars and 1 x 1 litre plastic tub.
Backfill details from base of hole: arisings up to ground level.

Logged by JP

Figure Sheet 1 of 1
14/03/2024

Symbols and abbrevations are explained on the accompanying key sheets.
All dimensions are in metres.

Logged in accordance with BS5930:2015 + A1:2020

GEOTECHNICS

TRIAL PIT RECORD - Trial Pit

DRAFT

Project	North Killingholme	**Engineer**		**Project No.**	PY240528
				Location ID	TP03
Client	Uniper Energy	**National Grid Coordinates**	515674.6 E 419668.7 N	**Ground Level**	5.64 m OD

Scale 1:50

Samples and Tests				Strata			
Depth	Sample Type	Stratum No.	Results	Description	Depth	Legend	Level (m OD)
0.15	ES			MADE GROUND: Soft brown slightly sandy gravelly clay. Gravel is angular to rounded fine to medium of sandstone, limestone, concrete and brick fragments.	0.30		5.34
0.80	ES			MADE GROUND: Firm to stiff orangish brown slightly sandy slightly gravelly clay. Gravel is subangular to subrounded fine to medium of chalk, concrete and brick fragments.	1.40		4.24
1.70	ES			Stiff orangish brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of sandstone and chalk.	2.00		3.64
				End of Excavation			

Excavation

Plant	13 Tonne tracked excavator.	**Width (B)**	0.70
Date	12/02/2024	**Length (C)**	6.50
Shoring	None.	**Date Backfilled**	12/02/2024
Stability	Stable during excavation.		

Groundwater

Depth Observed	Depth of Pit	Rose to	in Mins	Remarks
2.00	2.00			Fast inflow through base of pit.

Remarks ES sample = 1 x 60ml glass vial, 2 x 258ml amber glass jars and 1 x 1 litre plastic tub.
Backfill details from base of hole: arisings up to ground level.

Logged by JP

Figure Sheet 1 of 1
14/03/2024

Symbols and abbrevations are explained on the accompanying key sheets.
All dimensions are in metres.

Logged in accordance with BS5930:2015 + A1:2020

GEOTECHNICS

TRIAL PIT RECORD - *Trial Pit*

DRAFT

Project	North Killingholme	**Engineer**		**Project No.**	PY240528
				Location ID	TP04
Client	Uniper Energy	**National Grid Coordinates**	515723.3 E 419650.0 N	**Ground Level**	4.73 m OD

Scale 1:50

Samples and Tests				Strata			
Depth	Sample Type	Stratum No.	Results	Description	Depth	Legend	Level (m OD)
0.20	ES			MADE GROUND: Brown sandy slightly clayey angular to rounded fine to medium gravel of sandstone, concrete, ceramic and brick fragments.	0.30		4.43
0.50	ES			Possible MADE GROUND: Firm to stiff brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to medium of sandstone.	0.90		3.83
2.00	ES			Stiff reddish brown mottled grey slightly sandy slightly gravelly CLAY Gravel is subrounded to rounded fine to medium of sandstone and chalk.			
				End of Excavation	3.00		1.73

Excavation

Plant	13 Tonne tracked excavator.	**Width (B)**	0.75
Date	09/02/2024	**Length (C)**	5.00
Shoring	None.	**Orientation (degrees)**	045
		Date Backfilled	09/02/2024
Stability	Stable during excavation.		

Groundwater

Depth Observed	Depth of Pit	Rose to	in Mins	Remarks
				None encountered.

Remarks ES sample = 1 x 60ml glass vial, 2 x 258ml amber glass jars and 1 x 1 litre plastic tub.
Backfill details from base of hole: arisings up to ground level.

Logged by JP

Figure Sheet 1 of 1

14/03/2024

Symbols and abbrevations are explained on the accompanying key sheets.
All dimensions are in metres.

Logged in accordance with BS5930:2015 + A1:2020

GEOTECHNICS

TRIAL PIT RECORD - *Trial Pit*

DRAFT

Project	North Killingholme	**Engineer**		**Project No.**	PY240528
				Location ID	TP05
Client	Uniper Energy	**National Grid Coordinates**	515760.6 E 419625.9 N	**Ground Level**	6.19 m OD

Scale 1:50

Samples and Tests				Strata			
Depth	Sample Type	Stratum No.	Results	Description	Depth	Legend	Level (m OD)
0.50	ES			MADE GROUND: Soft brown slightly sandy slightly gravelly clay. Gravel is angular to subrounded fine to coarse of sandstone, chalk, concrete, clinker and brick fragments. Some metal and wood.			
					1.50		4.69
1.70	ES			Possible MADE GROUND: Firm to stiff brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to medium of sandstone.			
					2.00		4.19
3.00	ES			Stiff reddish brown mottled grey slightly sandy slightly gravelly CLAY Gravel is subrounded to rounded fine to medium of sandstone and chalk.			
					4.00		2.19
				End of Excavation			

Excavation

Plant	13 Tonne tracked excavator.	**Width (B)**	0.75
Date	09/02/2024	**Length (C)**	4.80
Shoring	None.	**Orientation (degrees)**	080
		Date Backfilled	09/02/2024
Stability	Pit sides unstable.		

Groundwater

Depth Observed	Depth of Pit	Rose to	in Mins	Remarks
				None encountered.

Remarks

Trial pit excavated on stockpiled material approximately 1.50m above surrounding ground level.
ES sample = 1 x 60ml glass vial, 2 x 258ml amber glass jars and 1 x 1 litre plastic tub.
Backfill details from base of hole: arisings up to ground level.

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Figure Sheet 1 of 1

14/03/2024

Symbols and abbrevations are explained on the accompanying key sheets.
All dimensions are in metres.

Logged in accordance with BS5930:2015 + A1:2020

GEOTECHNICS

TRIAL PIT RECORD - Trial Pit

DRAFT

Project	North Killingholme	**Engineer**		**Project No.**	PY240528
				Location ID	TP06
Client	Uniper Energy	**National Grid Coordinates**	515792.8 E 419582.8 N	**Ground Level**	6.64 m OD

Scale 1:50

Samples and Tests				Strata			
Depth	Sample Type	Stratum No.	Results	Description	Depth	Legend	Level (m OD)
				MADE GROUND: Soft brown slightly sandy slightly gravelly clay. Gravel is angular to subrounded fine to coarse of sandstone, chalk, concrete, clinker and brick fragments. Some metal and wood.			
2.00	ES			MADE GROUND: Firm red sandy clay. Sand of fine brick fragments	2.00		4.64
				MADE GROUND: Firm dark grey and brown slightly sandy slightly gravelly clay. Gravel is angular to subangular fine to coarse of concrete, chalk and brick fragments. Some glass.	2.30		4.34
3.00	ES						
4.70	ES			Stiff reddish brown mottled grey slightly sandy slightly gravelly CLAY Gravel is subrounded to rounded fine to medium of sandstone and chalk.	4.50		2.14
				End of Excavation	5.00		1.64

Excavation

Plant	13 Tonne tracked excavator.	**Width (B)**	0.75
Date	09/02/2024	**Length (C)**	4.80
Shoring	None.	**Orientation (degrees)**	090
		Date Backfilled	09/02/2024
Stability	Stable during excavation.		

Groundwater

Depth Observed	Depth of Pit	Rose to	in Mins	Remarks
				None encountered.

Remarks ES sample = 1 x 60ml glass vial, 2 x 258ml amber glass jars and 1 x 1 litre plastic tub.
Backfill details from base of hole: arisings up to ground level.

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Figure Sheet 1 of 1

14/03/2024

Symbols and abbrevations are explained on the accompanying key sheets.
All dimensions are in metres.

Logged in accordance with BS5930:2015 + A1:2020

GEOTECHNICS

TRIAL PIT RECORD - *Trial Pit*

DRAFT

Project	North Killingholme	**Engineer**		**Project No.**	PY240528
				Location ID	TP07
Client	Uniper Energy	**National Grid Coordinates**	515743.5 E 419547.4 N	**Ground Level**	6.52 m OD

Scale 1:50

Samples and Tests				Strata			
Depth	Sample Type	Stratum No.	Results	Description	Depth	Legend	Level (m OD)
				MADE GROUND: Soft to firm brown slightly sandy slightly gravelly clay. Gravel is angular to rounded fine to medium of sandstone, chalk, concrete and brick fragments. Some wood.			
				MADE GROUND: Firm to stiff brown slightly sandy slightly gravelly clay. Gravel is subangular to rounded fine to medium of sandstone and chalk.	0.60		5.92
				MADE GROUND (REWORKED NATURAL): Firm to stiff laminated orangish brown slightly sandy slightly gravelly clay. Gravel is subangular to rounded fine to medium of sandstone and chalk.	1.00		5.52
2.00	ES			Below 2.30m, gravelly.		▼	
				Firm to stiff greyish brown slightly sandy CLAY.	2.50		4.02
3.50	ES						
				End of Excavation	4.00		2.52

Excavation

Plant	13 Tonne tracked excavator.	**Width (B)**	0.75
Date	12/02/2024	**Length (C)**	4.80
Shoring	None.	**Orientation (degrees)**	045
		Date Backfilled	12/02/2024
Stability	Pit sides unstable between 0.00-2.50m depth.		

Groundwater

Depth Observed	Depth of Pit	Rose to	in Mins	Remarks
2.30	2.30			Slow inflow.

Remarks Trial pit excavated on stockpiled material approximately 2.00m to 2.50m above surrounding ground level.
ES sample = 1 x 60ml glass vial, 2 x 258ml amber glass jars and 1 x 1 litre plastic tub.
Backfill details from base of hole: arisings up to ground level.

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Figure Sheet 1 of 1

14/03/2024

Symbols and abbrevations are explained on the accompanying key sheets.
All dimensions are in metres.

Logged in accordance with BS5930:2015 + A1:2020

GEOTECHNICS

TRIAL PIT RECORD - Trial Pit

DRAFT

Project	North Killingholme	**Engineer**		**Project No.**	PY240528
				Location ID	TP08
Client	Uniper Energy	**National Grid Coordinates**	515722.8 E 419522.5 N	**Ground Level**	6.83 m OD

Scale 1:50

Samples and Tests				Strata			
Depth	Sample Type	Stratum No.	Results	Description	Depth	Legend	Level (m OD)
				MADE GROUND: Stiff brown slightly sandy slightly gravelly clay with some roots and rootlets. Gravel is angular to rounded fine to coarse of chalk, concrete and brick fragments.			
				MADE GROUND: Firm to stiff brown slightly sandy slightly gravelly clay. Gravel is subangular to rounded fine to coarse of sandstone and chalk. Some wood.	1.40		5.43
2.00	ES						
				Soft dark brown slightly sandy organic CLAY with many rootlets. (relict topsoil)	3.50		3.33
3.60	ES			Firm to stiff greyish brown slightly sandy CLAY with some rootlets.	3.70		3.13
				End of Excavation	4.20		2.63

Excavation

Plant	13 Tonne tracked excavator.	**Width (B)**	0.75
Date	12/02/2024	**Length (C)**	4.80
Shoring	None.	**Orientation (degrees)**	135
		Date Backfilled	12/02/2024
Stability	Stable during excavation.		

Groundwater

Depth Observed	Depth of Pit	Rose to	in Mins	Remarks
				None encountered.

Remarks ES sample = 1 x 60ml glass vial, 2 x 258ml amber glass jars and 1 x 1 litre plastic tub.
Backfill details from base of hole: arisings up to ground level.

Logged by JP

Figure Sheet 1 of 1
14/03/2024

Symbols and abbrevations are explained on the accompanying key sheets.
All dimensions are in metres.

Logged in accordance with BS5930:2015 + A1:2020

GEOTECHNICS

APPENDIX 5

Trial Pit Photographs

GEOTECHNICS
BUILD ON CONFIDENCE

Trial Pit 01



GEOTECHNICS
BUILD ON CONFIDENCE

Trial Pit 02 - Spoil



GEOTECHNICS
BUILD ON CONFIDENCE

Trial Pit 02



GEOTECHNICS
BUILD ON CONFIDENCE

Trial Pit 03



GEOTECHNICS
BUILD ON CONFIDENCE

Trial Pit 04



GEOTECHNICS
BUILD ON CONFIDENCE

Trial Pit 05 - Spoil



GEOTECHNICS
BUILD ON CONFIDENCE

Trial Pit 05



GEOTECHNICS
BUILD ON CONFIDENCE

Trial Pit 06 - Spoil



GEOTECHNICS
BUILD ON CONFIDENCE

Trial Pit 06



GEOTECHNICS
BUILD ON CONFIDENCE

Trial Pit 07 - Spoil



GEOTECHNICS
BUILD ON CONFIDENCE

Trial Pit 07



Trial Pit 08 - Spoil



GEOTECHNICS
BUILD ON CONFIDENCE

Trial Pit 08



APPENDIX 6

Lankelma Factual Report

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NORTH KILLINGHOLME

ENVIRONMENTAL SOILS INVESTIGATION

MIP REPORT

Membrane interface probe testing
MOSTAP sampling

Project Reference.: 24-28-27138-6

Report Issue No.: 01 27138_01

PROJECT:	Immingham

CLIENT:	Geotechnics

FIELDWORK

CPT rig(s)	17.9-tonne track-truck mounted CPT unit (UK20)
Date fieldwork started	12th February 2024
Date fieldwork completed	16th February 2024
Lankelma's representative	Paul Dimelow
Client's representative	Chris Bradley

DOCUMENT CHECKING

Action	Date	Name
Completed	23/02/2024	Christopher Player
Checked	23/02/2024	Joseph Hobbs
Approved	23/02/2024	Joseph Hobbs

Issue	Date	Status
01_01	23/02/2024	Final

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1	**INTRODUCTION**	**1**
2	**DISCLAIMER**	**1**
3	**COMPLETED WORKS**	**1**
4	**FIELDWORK**	**1**
4.1	*Membrane interface probe*	*1*
4.2	*MIP quality control*	*3*
4.3	*Field logistics*	*4*
5	**GAS CHROMATOGRAPH COMPOUND RESPONSES**	**5**
5.1	*Flame-ionisation detector*	*5*
5.2	*Photo-ionisation detector*	*6*
5.3	*Dry electrolytic conductivity detector*	*8*
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APPENDIX A	**SUMMARY TABLES**
APPENDIX B	**GENERAL INFORMATION**
APPENDIX C	**MEMBRANE INTERFACE PROBE RESULTS (RAW DATA)**
APPENDIX D	**MEMBRANE INTERFACE PROBE RESULTS (TREATED)**
APPENDIX E	**PRE-RESPONSE TEST RESULTS**

1 INTRODUCTION

At the request of Geotechnics, an environmental soils investigation was carried out on project *Immingham*.

Site location:

(In the general region of)

Humber Sea Terminal
Clough Lane
Haven Road
North Killingholme
Lincolnshire
DN40 3JP

2 DISCLAIMER

The investigation information, raw data and interpretations provided in this report are for the sole benefit of the Client identified at the front of the report.

Lankelma has exercised reasonable skill and care in the fieldwork and preparation of this report. This report has been completed based on information available to Lankelma at the time of preparation. The measurement and interpreted data in this report do not constitute recommendations for design purposes. An appropriately qualified person must review and interpret the data given in this report, together with any assumptions we have made that affect the data, before using the data for design or recommendation. Lankelma accepts no responsibility for the accuracy or suitability of any assumptions contained in this report.

3 COMPLETED WORKS

- 5 nr. membrane interface probe (MIP) tests;
- 5 nr. MOSTAP samples;
- Factual report.

The *Summary Tables* section contains tabulated summaries of the works completed together with analysis results where necessary.

4 FIELDWORK

4.1 MEMBRANE INTERFACE PROBE

Fieldwork was performed with a 17.9-tonne track-truck mounted CPT unit (UK20) equipped with a 17.5-tonne capacity hydraulic ram set.

The probe comprised of a heater block, operating at 120°C, gas permeable membrane and electrical conductivity [EC] sensor, connected by an inert carrier gas trunkline to a gas chromatograph [GC] equipped with a range of volatile organic compound (VOC) detectors. It was advanced by a hydraulic push method in 0.33 m increments at a penetration rate typically varying between 0. –1.5 m/min.

The system is intended to provide semi-quantitative detection of ground borne VOC.

The gas chromatograph contained 3 detectors:

Name	Function	Limit of Detection
Photo-ionisation detector [PID]	Detection of a broad range of organic and inorganic compounds with ionisation potential less than or equal to 10.6 eV. Output recorded against depth in µV.	>1 ppm (parts per million)
Flame ionisation detector [FID]	Detection of carbon-hydrogen bonded organic compounds (all hydrocarbons). Output recorded against depth in µV.	>10 ppm
Dry electrolytic conductivity detector [DELCD]	Detection of chlorinated and brominated organic compounds. Output recorded against depth in µV.	>1 ppm
Electrical conductivity [EC]	Electrical conductivity can be used to indicate basic stratigraphy. Higher conductivity indicates dominantly cohesive material, with lower conductivity indicating more granular materials.	N/A

At each 0.33 m increment, the probe was paused for 45 seconds to allow the heater block to heat the ground interface. This volatised the resident compounds which then diffused through the membrane in a gaseous phase and were collected by the carrier gas flow behind the membrane. The gases were carried up the trunkline to the GC and through the detector array.

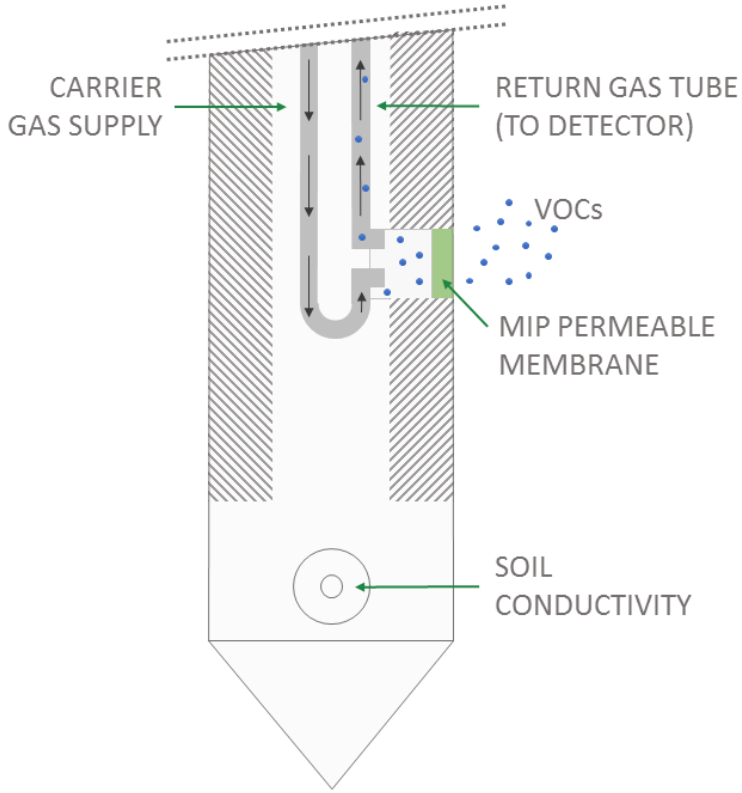


Figure 4-1. Cross section model of a typical membrane interface probe (not to scale).

The EC sensor on the probe acquired electrical conductivity data that enabled an approximation of basic soil type.

4.2 MIP QUALITY CONTROL

To validate probe functionality and the GC detection system, chemical response tests were performed prior to each MIP test location.

Gases used throughout testing were CP Grade (>99.99% purity) Nitrogen and Hydrogen. During the tests, gas pressure was monitored to prevent any significant loss or gain of pressure.

Trichloroethylene was introduced to the membrane at two measured concentrations. The following outputs were recorded:

- Detector responses (FID, PID & DELCD);
- Trip time between the introduction of compound at the membrane and detection at GC.

The trunkline used was 20 m in length with a measured trip time of 27 seconds (+/-1s). A flow rate of 40-45 ml/min was maintained. The test compound used was TCE (C_2HCl_3) at concentrations of 10 parts per million (ppm) and 100 ppm.

The above outputs were used to confirm functionality and provide baseline 'zero' readings. The observed readings before the test compounds were introduced and averaged to provide an estimate of the baseline levels. These were later subtracted from the measured test values.

Measurements of detector response time were taken at each test for the specified trunkline.

After each test, the dipole conductivity was checked using a bronze/silver dipole tester consisting of both bronze and silver pin sets. The checker was placed first on the bronze side to test low level resistance (55 Ω) and then the silver side for high resistance (290 Ω). The results were logged using Direct Image recording software to ensure they were within working range.

4.3 FIELD LOGISTICS

The client was responsible for the positioning and re-survey of all investigative locations.

Target depth for the investigation was 10 m below ground level. Table 1 details the final test depths and reasons for test termination (Refusal Factor). Termination depths were advised by, and agreed with, the client's on-site representative.

5 GAS CHROMATOGRAPH COMPOUND RESPONSES

5.1 FLAME-IONISATION DETECTOR

The flame ionisation detector (FID) involves a process in which organic compounds are ionised to form carbon ions. An outline of the process is shown below;

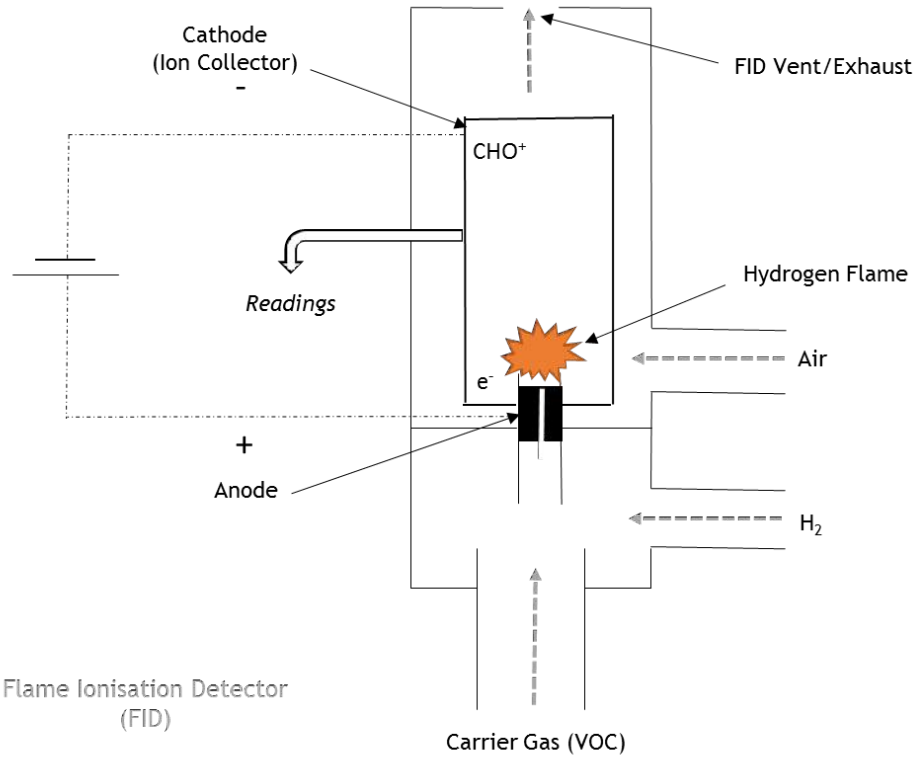


Figure 5-1. Flame Ionisation Detector (FID) process (not to scale).

The sample (carrier gas) is introduced to a hydrogen flame within the FID oven and a thermal process ensures rapid ionisation across carbon bonded compounds to form carbon ions ($C^+ + e^-$). These are then detected by a metal ion detector (high DC voltage bias). By applying positive charge to the flame tip (anode), ions are pushed towards a collection electrode (cathode) and readings of current are recorded via a live monitoring system.

The readings established from the FID, via amplifier/electrometer, are directly proportional to the concentration of hydrocarbons in the sample. Sensitivity is also proportional to the carbon chain length (carbon number) of the compound ionised (e.g. Methane<<Ethane<<Propane etc.). Hydrocarbon impurities, in this instance, can increase baseline noise and therefore reduce detector sensitivity. The FID is a destructive means of testing as the sample is burned during the process (see Section 3.3 for Combination FID/DELCD Process).

Generally, FID responds best to a wide range of VOC encountered. All hydrocarbons will be shown on FID if concentration is high enough. It will not however respond to any inorganic compounds e.g. Ammonia, hydrogen sulphide etc.

5.2 PHOTO-IONISATION DETECTOR

The Photo-Ionisation Detector (PID), also involves a process of ionisation but of both organic and inorganic compounds. It uses an ultraviolet lamp to ionise a receptive species in the following equation;

$$\boldsymbol{R} + \boldsymbol{h}v \rightarrow \boldsymbol{R}^{+} + e^{-}$$

Where:

R = Ionisable Compound (eV < 10.6)
hv = UV Photon with sufficient energy to ionise **R**

Unlike the FID, the PID is a non-destructive test. Imposing temporary photo-ionisation, post-detectors can be run downstream. The figure below represents the PID ion chamber and the action of UV photons to ionise VOC molecules;

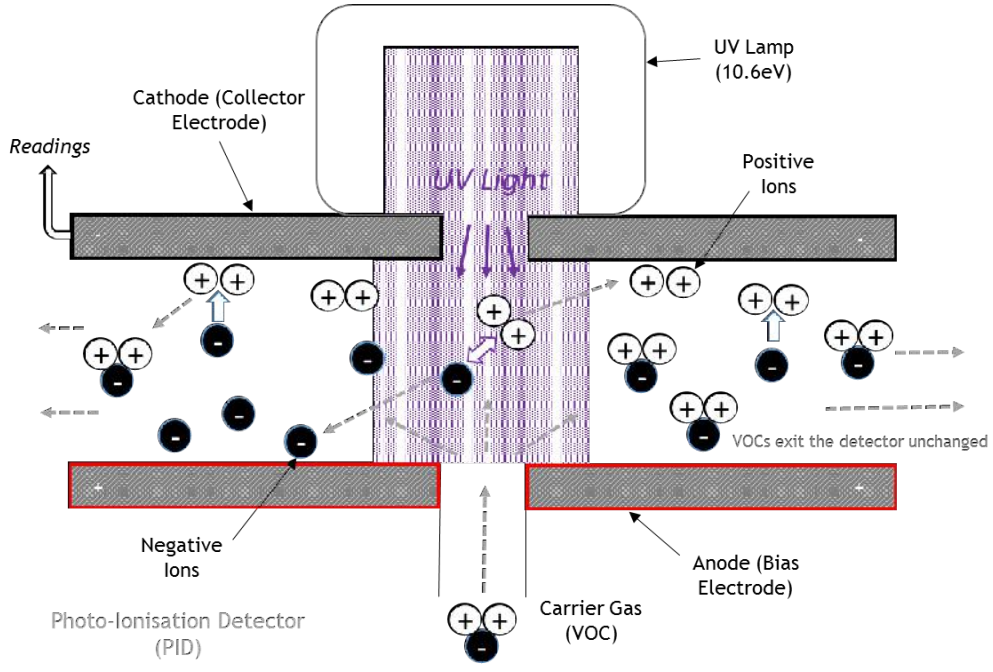


Figure 5-2. UV Ionisation using PID (not to scale).

When molecules enter the PID, in the vacuum-ultraviolet region, they absorb UV photons and eject electrons. These are collected by applying positive charge to a bias electrode (anode) and collecting readings at the collection electrode (cathode). Molecule ionisation is limited to the eV of the UV lamp (10.6 eV). For example, methane (12.6 eV) will not be detected from PID.

As with FID, PID readings are directly proportional to the concentration of a specific group of compounds, and towards carbon chain length. PID however, is also selective in its sensitivity across functional groups. It is 40 times more sensitive than FID for aromatics, 10 times more selective for alkanes and between 10-100 times more sensitive, generally. It will respond to any compound with an ionisation potential (eV) <10.6 e.g. Ammonia (inorganic).

FID

Aromatics, Long-Chain Compounds >> Short-Chain Compounds >> Halogenated-Compounds

PID

Aromatics, Iodine-Compounds >> Amines, Ethers, Ketones, Olefins, Sulphur-Compounds >> Chlorinated Aliphatics, Ethane >> Methane (No Sensitivity)

Figure 5-3. FID vs PID selectivity/sensitivity (adapted from RAE Systems – The PID Handbook).

The lamp used throughout testing was of 10.6 eV capacity. This specification is seen as the most common, strongest and longest-lived although other capacity lamps can be used. The transmission of UV photons is dependent on lamp crystal thickness, quality and age. It is therefore possible to obtain some low responses from a sample with an eV higher than that of the lamp. Additionally, with age, the lamp can become solarised or corroded and may not be able to ionise some compounds near the upper limit of the lamp's nominal capacity. A new 10.6 ev lamp was used for this project so the above factors are unlikely to be significant.

The sensitivity of PID to a range of functional groups will vary as explained above. The response of PID using a 10.6 eV lamp should, in theory, respond to the following;

- All hydrocarbons, whose chemical names end in the letters –ane, –ene or –yne;
    1. Except methane, ethane, propane, and acetylene.
    2. Except some names with chloro-, fluoro- or bromo-.
- All alcohol's whose chemical names end in –ol;
    1. Except methanol.
    2. Except some names with chloro-, fluoro- or bromo-.
- All aldehydes, whose names end in aldehyde;
    1. Except formaldehyde.
    2. Except some names with chloro-, fluoro- or bromo-.
- All ketones, whose chemical names end in –one;
    1. Except rarely if the name includes chloro-, fluoro- or bromo-.
- All esters, whose names end in –ate;
    1. Except rarely if the name includes chloro-, fluoro- or bromo-.
- All amines, sulphides.

Entry adsorption, in the PID inlet, can lead to slower response time for low-volatility samples.

5.3 DRY ELECTROLYTIC CONDUCTIVITY DETECTOR

Unlike the Wet Electrolytic Conductivity Detector (ELCD), the DELCD does not use a solvent and VOCs are detected in a gaseous phase. It also is specific in the detection of oxygenated halogen species. The DELCD, in this instance, is used in combination with FID. DELCD measurements are obtained from the remnants of ionisation from hydrogen flame;

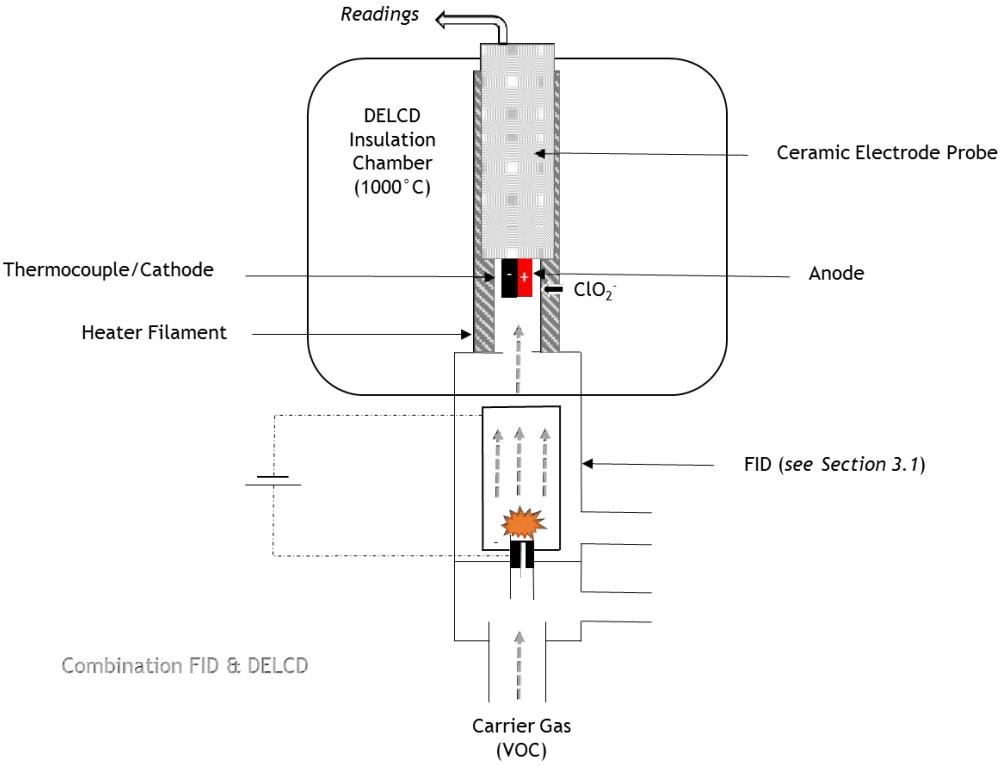


Figure 5-4. Combination FID/DELCD (not to scale).

As the FID collector electrode has a small identification capacity, it acts as a restrictor and splits gas to the exhaust to about ½ the flow. The remaining pass through to the DELCD. Oxidisation of halogens occur (ClO_2^-/ BrO_2^-) and this is detected at the DELCD stage.

The combination FID/DELCD will allow for reliable identification of hydrocarbon peaks and whether compounds are halogenated or not. The system can also be decoupled to run DELCD or FID independently. Cl/Br atoms are 100 times more inclined to react with hydrogen from FID combustion that oxygen. Sensitivity can therefore be increased with decoupling.

Due to the high baseline voltage fluctuation (up to ≈ 200 mV), and sensitivity, a positive response on the DELCD is generally identified by a corresponding strong FID and/or PID response. Therefore, any fluctuation that does not have a clear corresponding response on the FID may be discounted as evidence of halogenated compounds without additional testing and confirmation.

5.4 VOC DETECTION FROM COMBINATION GAS CHROMATOGRAPHY

The order of detection of VOCs is crucial to the GC process as multiple methods of detection are used, some being destructive. As a destructive combination FID/DELCD is used, the first GC process will always be PID.

Examples of the detection of VOCs and their detector responses are shown in the figures below;

Compound	Formula	eV	Density (g/cm^3)	Boiling Point (°C)	Detector Responses		
					FID	PID	DELCD
Acetic Acid	CH_3COOH	10.69**	1.05	118	+	-	-
Acetone	C_3H_6O	9.69	0.79	56	++	++	-
Ammonia	NH_3	10.2*	0.00073	-33	-	+	-
Benzene	C_6H_6	9.25	0.88	80	++	+++	-
Bromomethane	CH_3Br	10.53*	1.73	4	+	+	+
Butene	C_4H_8	9.58	0.62	-7	+++	+++	-
Diesel	$C_{12}H_{23}$	Unknown	0.83	149	+++	++	-
Ethane	C_2H_6	11.65**	0.0014	-89	+	-	-
Ethanol	C_2H_6O	10.47*	0.79	78	+	+	-
Hydrogen Sulphide	H_2S	10.46*	0.0013	-60	-	+	-
Methane	CH_4	12.60**	0.00066	-161	+	-	-
TCAA	$C_2HCl_3O_2$	9.47	1.63	197	+	-	+++
TCE	C_2HCl_3	9.32	1.46	87	+	+++	+++
Vinyl Chloride	C_2H_3Cl	10.00	0.91	-13	+	+	+

Table 5-5. Typical detector responses to a range of contaminants (assuming Combination FID/DELCD).

Where:

Detector Sensitivity; +++ = High, ++ = Medium, + = Low, - = No sensitivity
eV = Chemical ionisation potential (ionisation energy)

* = 10.6 > eV >10 (high eV) compounds are detectable but hard to manage and obtain reliable data although a small positive peak will be present.

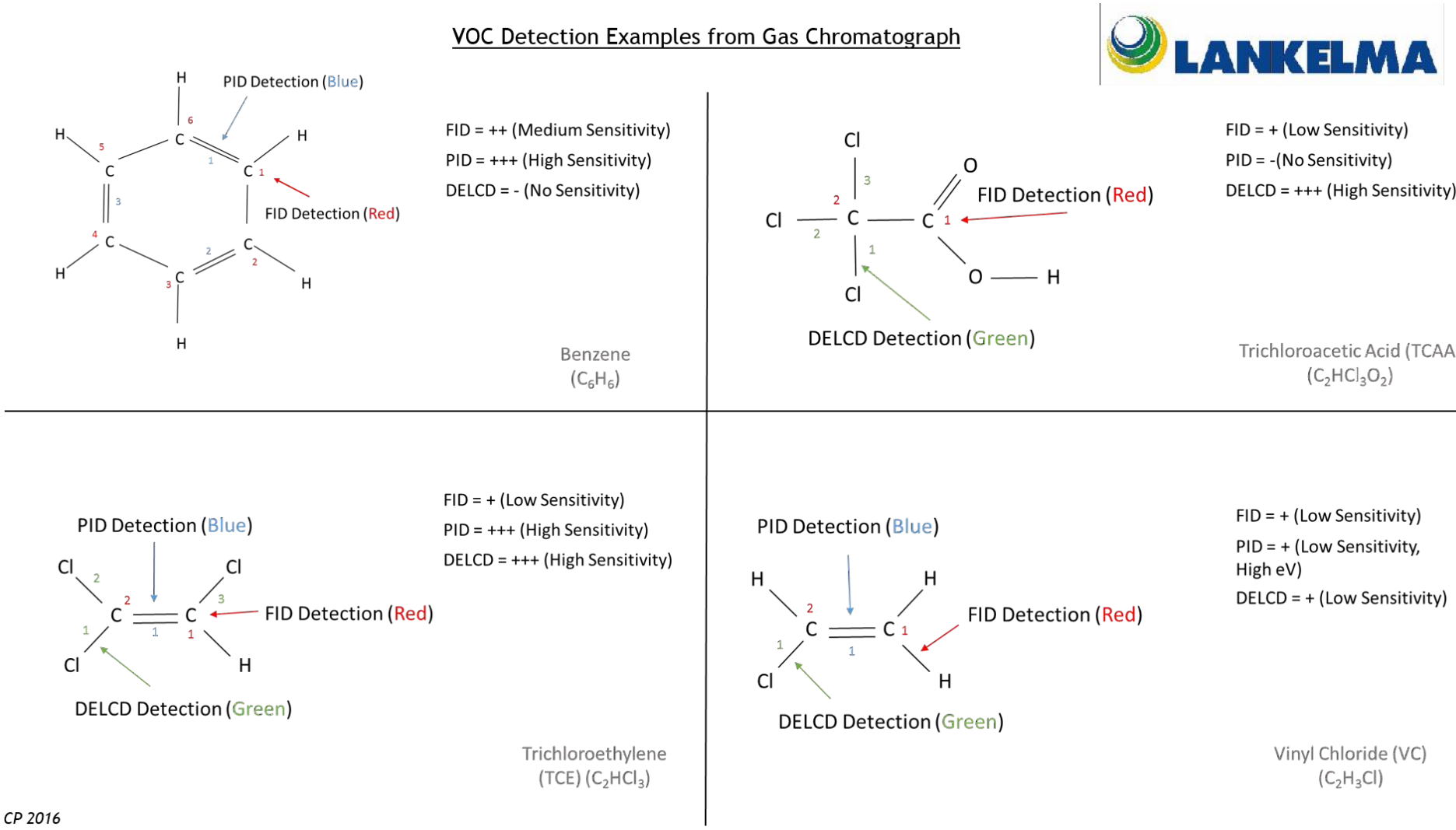


Figure 5-6. VOC detection examples from GC.

6 MIP INTERPRETATIVE DATA

6.1 BASIC SOIL TYPE FROM ELECTRICAL CONDUCTIVITY

A basic soil type can be calculated from dipole measurements on the membrane interface probe as outlined by Grisso *et al.* (2006) and presented in the table below;

Electrical Conductivity (EC) (mS/m)	Basic Soil type
0.2-1.1	SAND
1.2-10	SILT
11-1000	CLAY

Table 6-1. Basic soil type from electrical conductivity (adapted from Grisso *et al.* 2006).

Basic soil type approximated by EC can be used to identify soil layers. It should be noted that many factors, including pH, can influence the EC of the soil tested and that this determination should only be used a rough guide to understand the underlying soil.

Electrical conductivity (EC), in log scale, and basic soil type are presented in Appendices C & D.

7 MIP DATA REDUCTION & PRESENTATION

The microvolt response of each detector is presented against depth. The rate of penetration is also plotted to indicate the depth at which the 45 second penetration pauses were performed. The results are presented in Appendix B. The baseline values for each detector were calculated by taking an average reading for the first 45 seconds of the pre-response test. If there was a gap of less than 45 minutes between soundings, a pre-response test was not carried out and the post-response test from the previous test was applied. Alternatively, if the pre-test showed a constant response decay, the first detector response of the MIP test was used for a better estimation of baseline level. The baseline levels for each detector, at each sounding, are recorded in Table 1.

Treated MIP test results with the baseline values removed are presented in Appendix D. The MIP response tests are also presented in Appendix E. Response tests for FID, PID and DELCD are all presented against time.

Due to the absence of inclinometers within the probe, the penetration length is not corrected for inclination (all tests assumed as vertical). Typically, the error in depth measurement will be <2%.

8 MIP DATA INTERPRETATION NOTES

Provided below is an inexhaustive set of cautionary notes on interpretation of the acquired MIP data with reference to examples within the dataset where appropriate. The interpretation and observations contained herein represent Lankelma's opinion on the data, and do not constitute exhaustive interpretation or recommendations.

Further technical information on the MIP and data interpretation may be found at;
http://geoprobe.com/mip-membrane-interface-probe.

NOTE ON INTERPRETATION OF RESULTS

The MIP is principally intended to identify the presence (or absence) of VOCs and may be used in a semi-quantitative way to assess the relative magnitude of contamination across a site and for specific soil formations. Interpretation of concentrations from the results should be done in conjunction with sampling and measurement of actual contamination levels and appreciation of the large number of variables that can affect GC detector responses under testing conditions. The range in magnitude of the response tests provides an indication of the measurement uncertainty under ideal conditions. In addition to factors already discussed, other factors that can influence the results include;

- Variation in contaminant flux across the membrane due to different excess or hydrostatic pressures;
- Membrane condition;
- Soil permeability;
- Trunkline condensation (see below).

TRUNKLINE CONDENSATION (TC)

Trunkline condensation (TC) occurs when gaseous compounds condense within the MIP carrier trunkline, leading to reduced flow. TC may occur for tests that encounter zones of very high contamination concentration, or contaminants with high boiling points, for a sustained period of penetration.

Results affected this are generally recognised by a gradual decay in the FID signal during a period of recovery or a stepwise increase at penetration pause. Condensation can also be indicated by high, post-test, baseline readings. The majority of the residual contaminants within the system can generally be purged during penetration through less contaminated ground. During the 0.33 m interval test pauses, any significant peak or stepped increase in the signal can be assumed to originate from VOCs within the current soil being tested. Therefore, where the signal is suspected to be influenced by TC, the presence of ground contamination may still be confirmed by the presence of GC signal peaks at the 0.33 m interval penetration pause depth.

GC SENSOR RANGE

In some instances, for example when free flowing product or very high levels of contamination are encountered, the GC detectors reach their maximum capacity (5 V or 5,000,000 µV). After this we see clipping of the detector responses as the detector has reached maximum capacity.

9 MOSTAP SAMPLING

MOSTAP soil samples were taken at depths specified by the client's representative on site. The sampler was hydraulically pushed and recovered 1.20 m samples comprising 1.00 m length, 66 mm diameter stocking wrapped tube sample retained in a UPVC liner and a 0.20 m disturbed pot sample (cutting shoe sample). The MOSTAP sampler has an outside diameter of 90 mm.

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APPENDICES

APPENDIX A SUMMARY TABLES

Table 1 MIP summary

Location ID	Final depth (mBGL)	Rig	Pre-drilled / inspection pit (m)	Refusal factor	Date of test	Pre-test baseline value (mV)			Remarks
						FID	PID	DELCD	
MIP01	10.33	UK20	1.20	Target depth	13/02/2024	46.53	483.49	20.35	
MIP02	10.33	UK20	1.20	Target depth	13/02/2024	31.64	532.76	13.61	
MIP03	10.33	UK20	1.20	Target depth	13/02/2024	37.34	428.56	14.63	FID maximum limit reached; 3.80 – 4.10 m
MIP04	10.33	UK20	1.20	Target depth	13/02/2024	33.36	450.25	15.54	
MIP05	10.33	UK20	1.20	Target depth	14/02/2024	30.12	352.86	27.00	FID maximum limit reached; 2.80 – 4.20 m

MIP Test Plots are presented in Appendices C & D

Table 2 MOSTAP summary

Test ID	Sample ID	Sample Type	Depth Top (mBGL)	Depth Bottom (mBGL)	Recovery (%)	Date of Test	Remarks
MIP04	MIP04 – 1	MOSTAP	2.00	3.20	100	14/02/2024	Pot 1
MIP04	MIP04 – 2	MOSTAP	4.00	5.20	65	16/02/2024	Pot 6
MIP05	MIP05 – 1	MOSTAP	2.00	3.20	94	15/02/2024	Pot 3
MIP05	MIP05 – 2	MOSTAP	3.20	4.40	100	15/02/2024	Pot 4
MIP05	MIP05 – 3	MOSTAP	4.40	5.60	100	15/02/2024	Pot 5

APPENDIX B GENERAL INFORMATION

LIST OF FIGURES

Data sheet: 17.9-tonne track-truck mounted CPT unit (UK20)



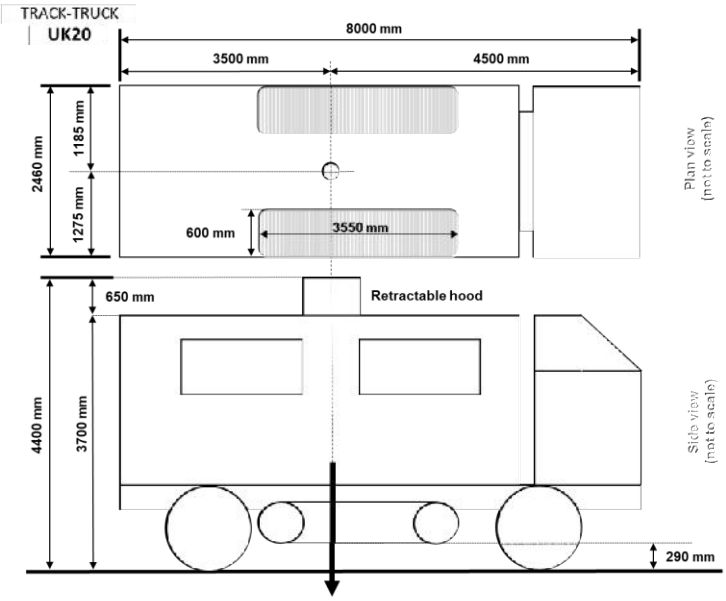
UK20
Track-truck

LANKELMA
01797 280050 – www.lankelma.com

The versatile track-truck is suitable for most geotechnical sites. The rig is driven to site as a self-contained HGV with tracks that can be deployed to cope with soft or uneven terrain.

Remote-controlled tracking to assist with manoeuvring onto location.

Complies with Euro 6 emission standards for use in London's low emissions zones (LEZ).



Rig weight	17.9 T
Max. operating ram capacity	17.5 T
Max. travelling speed	86 km/h
Track material	Steel
Track length	3550 mm
Track width	600 mm
Jack plate dimensions	Tracks act as jacks
Jack arrangements	1nr. on each side
Max. ground clearance on jacks	290 mm
Max. ground bearing pressure	Wheels – 300 kPa Tracks – 48 kPa
Max. testing gradient	10 degrees
Max. traversing gradient	20 degrees (operator assessed)
Noise output at 2 m	Testing - 69.5 dBA Driving – 78.7 dBA
Clamp arrangement	Hydraulic catching – semi automatic
Ram stroke	1.2 m
Max. casing size	55 mm
Typical production	100 m+ of standard CPTu testing per day (depending on conditions and access)

APPENDIX C MEMBRANE INTERFACE PROBE RESULTS (RAW DATA)

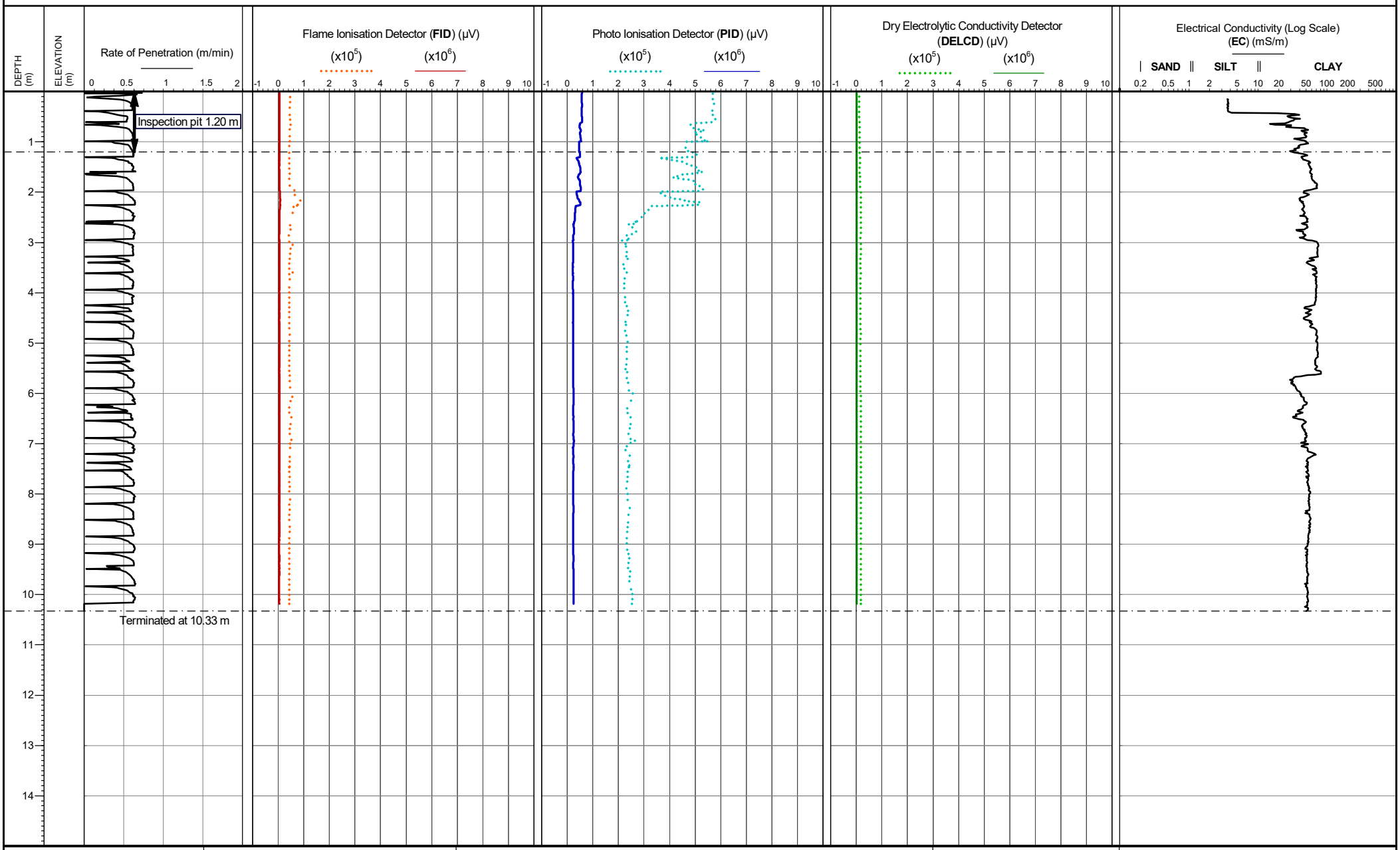
RAW DATA PLOTS

Plots are provided for all MIP locations

LANKELMA

Project: NORTH KILLINGHOLME

Client: GEOTECHNICS



Cone area (mm2):
ConeID: MIP01
Operator: Chris Clarke
Rig Used: UK20
Date of test: 13/02/2024

Location: East Riding of Yorkshire, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks: *Phreatic surface origin: Arbitrary value

See report section 'MIP Interpretive Data' for methods of interpretation.

Termination Remark:
Target depth

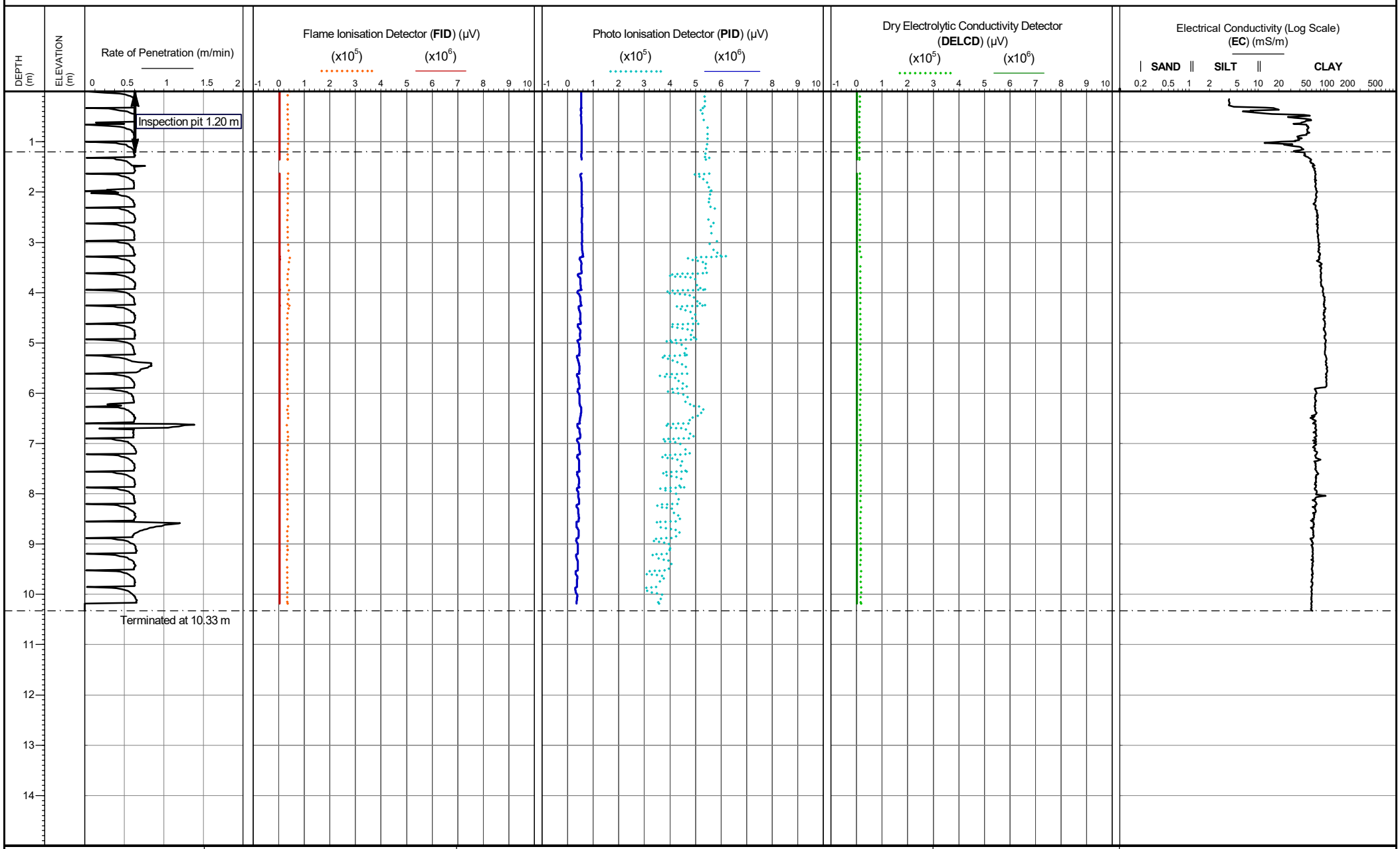
Date of plot: 20-02-24
Lankelma Project Ref: 27138-6

Checked by:
Chris Player

TEST ID: MIP01

Project: NORTH KILLINGHOLME

Client: GEOTECHNICS



Cone area (mm2):
ConeID: MIP01
Operator: Chris Clarke
Rig Used: UK20
Date of test: 13/02/2024

Location: East Riding of Yorkshire, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks: *Phreatic surface origin: Arbitrary value

See report section 'MIP Interpretive Data' for methods of interpretation.

Termination Remark:
Target depth

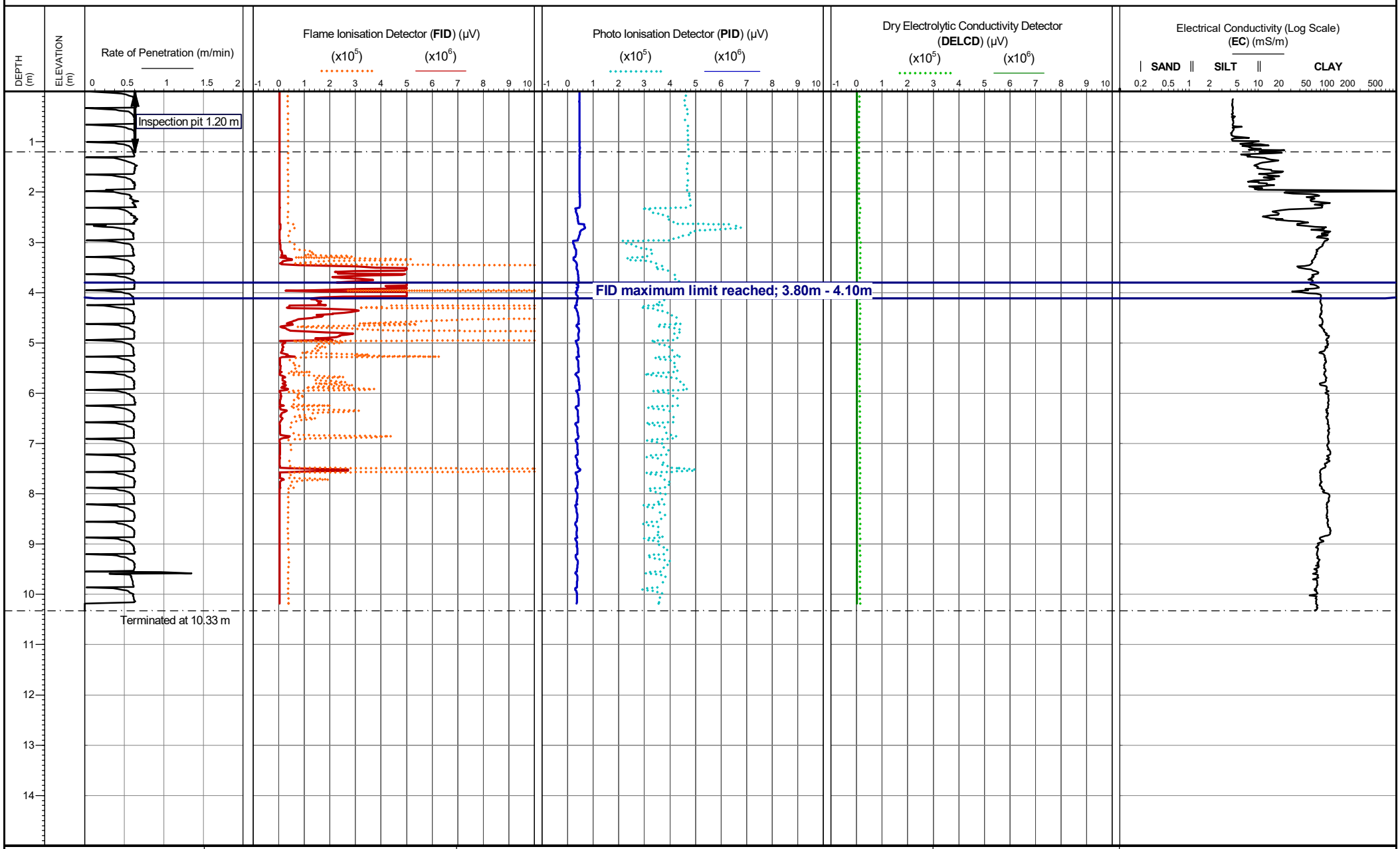
Date of plot: 20-02-24
Lankelma Project Ref: 27138-6

Checked by:
Chris Player

TEST ID: MIP02

Project: NORTH KILLINGHOLME

Client: GEOTECHNICS



Cone area (mm2):
ConeID: MIP01
Operator: Chris Clarke
Rig Used: UK20
Date of test: 13/02/2024

Location: East Riding of Yorkshire, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks: *Phreatic surface origin: Arbitrary value

See report section 'MIP Interpretive Data' for methods of interpretation.

Termination Remark:
Target depth

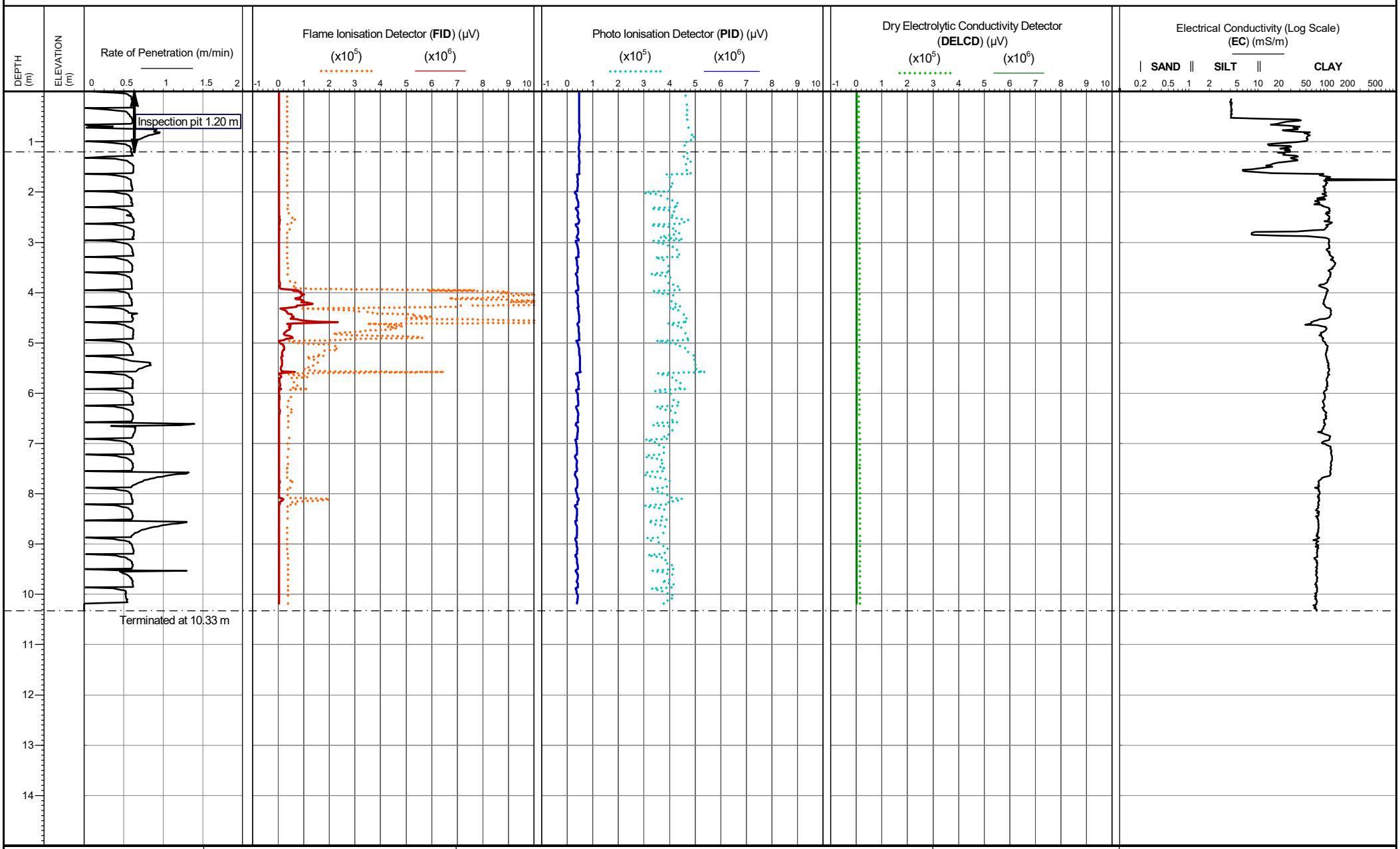
Date of plot: 20-02-24
Lankelma Project Ref: 27138-6

Checked by:
Chris Player

TEST ID: MIP03

Project: NORTH KILLINGHOLME

Client: GEOTECHNICS



Cone area (mm2):
ConeID: MIP01
Operator: Chris Clarke
Rig Used: UK20
Date of test: 13/02/2024

Location: East Riding of Yorkshire, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks: *Phreatic surface origin: Arbitrary value

See report section 'MIP Interpretive Data' for methods of interpretation.

Termination Remark:
Target depth

Date of plot: 20-02-24
Lankelma Project Ref: 27138-6

Checked by:
Chris Player

TEST ID: MIP04

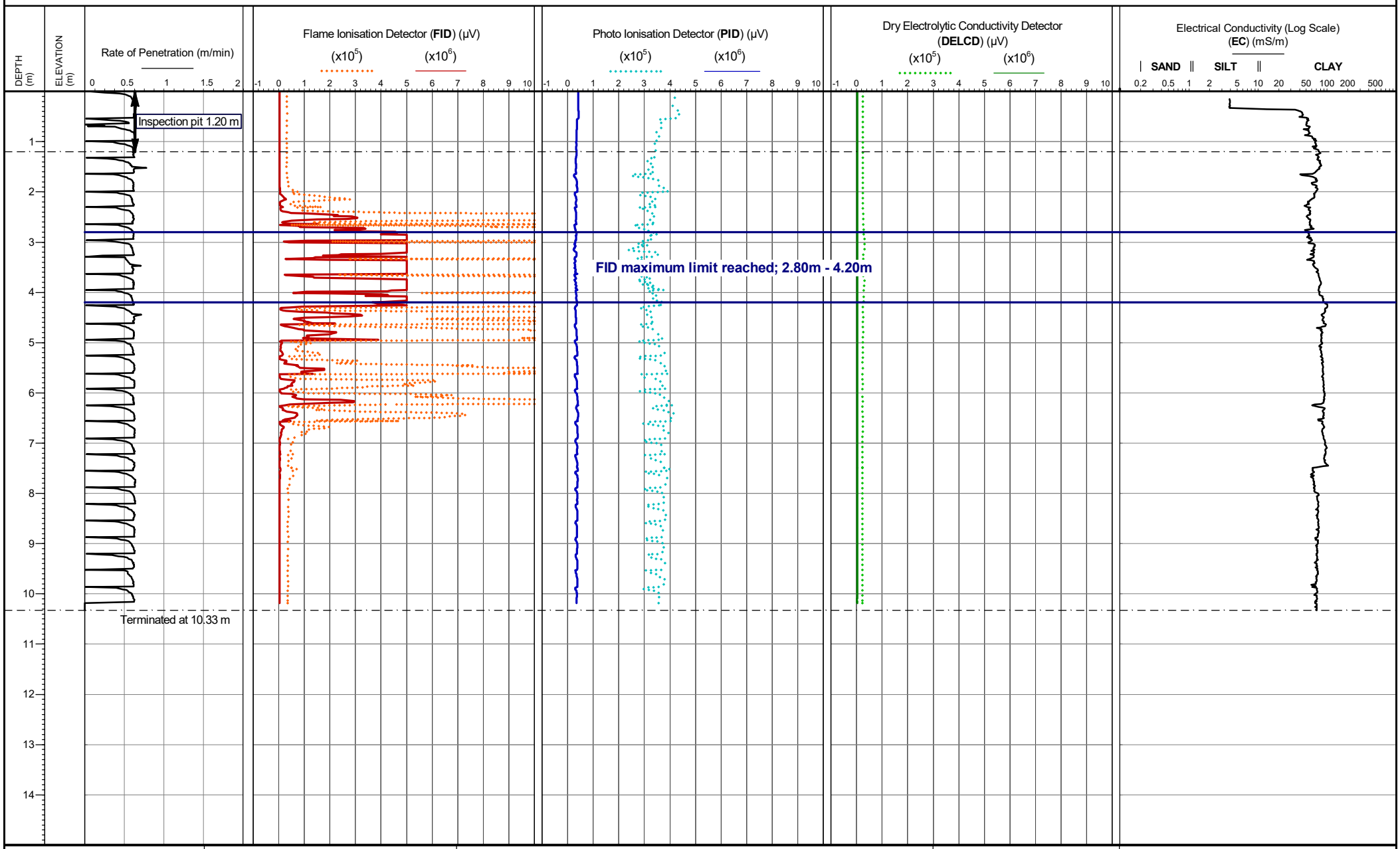
Annex 3

Stage 1 – 3 Assessment of Hazardous Substances

Annex 4
MSDSs

Project: NORTH KILLINGHOLME

Client: GEOTECHNICS



Cone area (mm2):
ConeID: MIP01
Operator: Chris Clarke
Rig Used: UK20
Date of test: 14/02/2024

Location: East Riding of Yorkshire, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks: *Phreatic surface origin: Arbitrary value

Termination Remark:
Target depth

See report section 'MIP Interpretive Data' for methods of interpretation.

Date of plot: 20-02-24
Lankelma Project Ref: 27138-6

Checked by:
Chris Player

TEST ID: MIP05

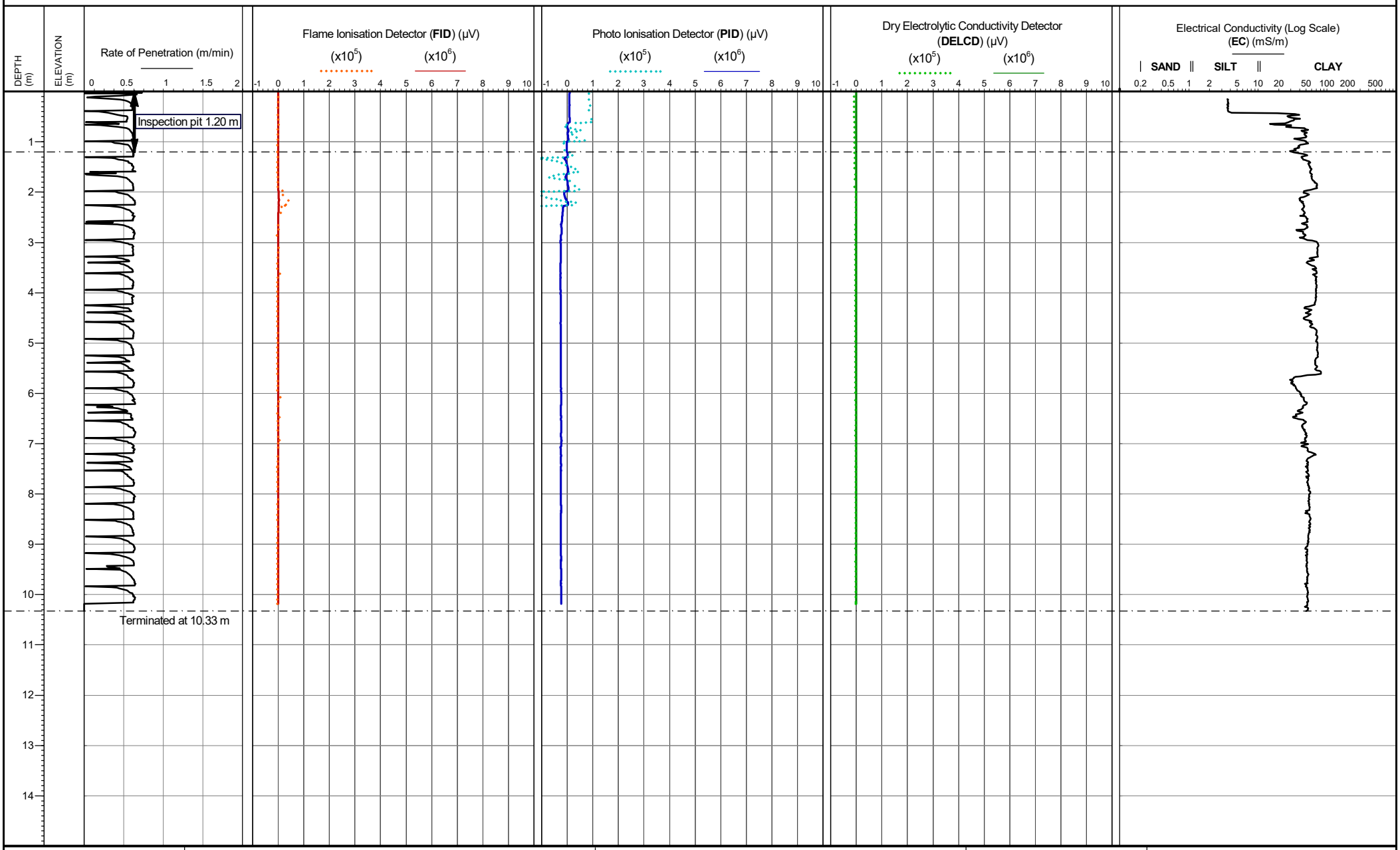
APPENDIX D MEMBRANE INTERFACE PROBE RESULTS (TREATED)

TREATED PLOTS – BASELINE LEVELS REMOVED

Plots are provided for all MIP locations

Project: NORTH KILLINGHOLME

Client: GEOTECHNICS



Cone area (mm2):
ConeID: MIP01
Operator: Chris Clarke
Rig Used: UK20
Date of test: 13/02/2024

Location: East Riding of Yorkshire, UK
Coordinates: ,
Elevation:
Coordinate system:

Pre-response test concentration index:
10 ppm (10^5 Scale) = ...
100 ppm (10^6 Scale) = ——

Test Compound:

Remarks: *Phreatic surface origin: Arbitrary value

See report section 'MIP Interpretive Data' for methods of interpretation.

Termination Remark:
Target depth

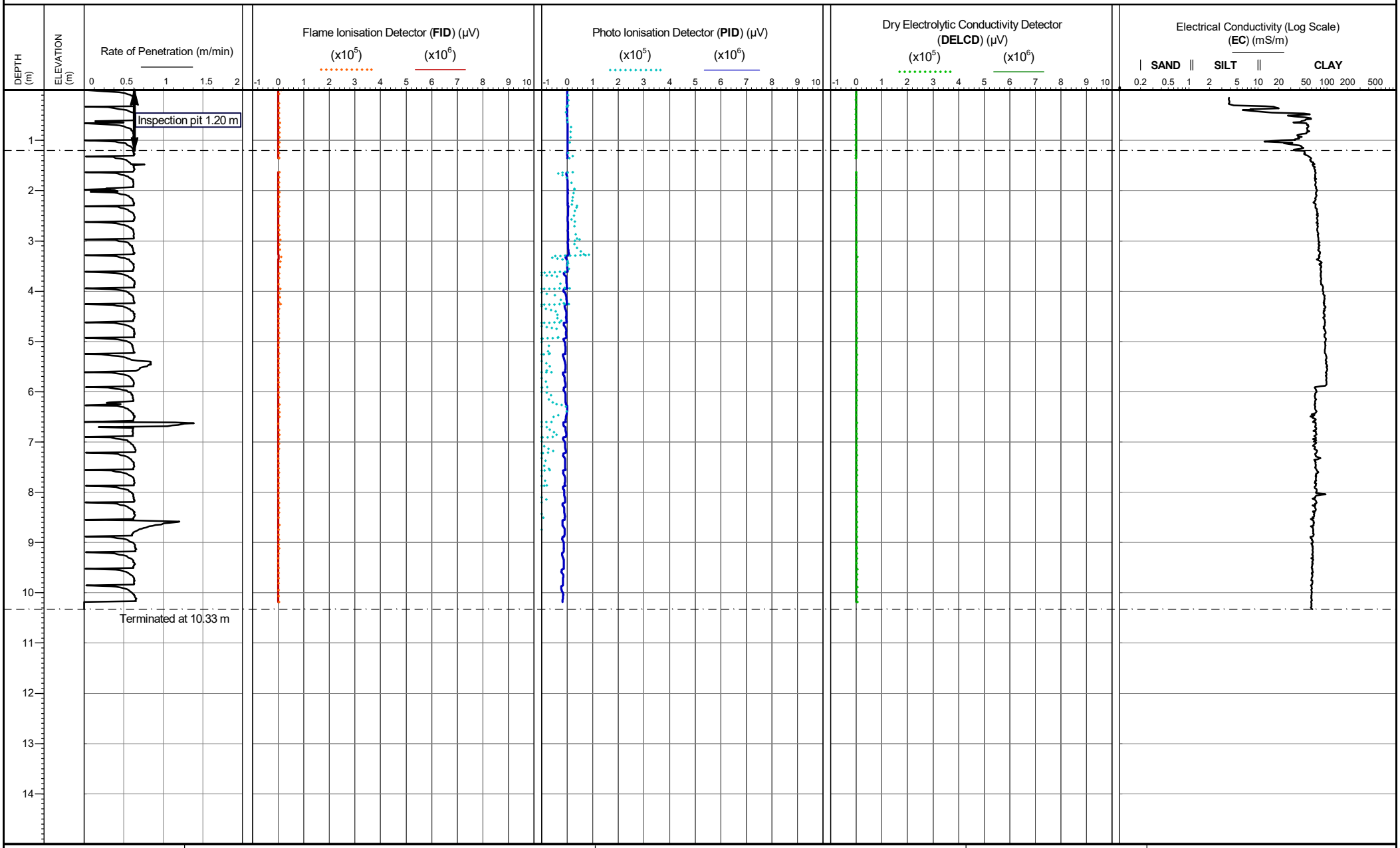
Date of plot: 20-02-24
Lankelma Project Ref: 27138-6

Checked by:
Chris Player

TEST ID: MIP01

Project: NORTH KILLINGHOLME

Client: GEOTECHNICS



Cone area (mm2):
ConeID: MIP01
Operator: Chris Clarke
Rig Used: UK20
Date of test: 13/02/2024

Location: East Riding of Yorkshire, UK
Coordinates: ,
Elevation:
Coordinate system:

Pre-response test concentration index:
10 ppm (10^5 Scale) = ...
100 ppm (10^6 Scale) = ——

Test Compound:

Remarks: *Phreatic surface origin: Arbitrary value

See report section 'MIP Interpretive Data' for methods of interpretation.

Termination Remark:
Target depth

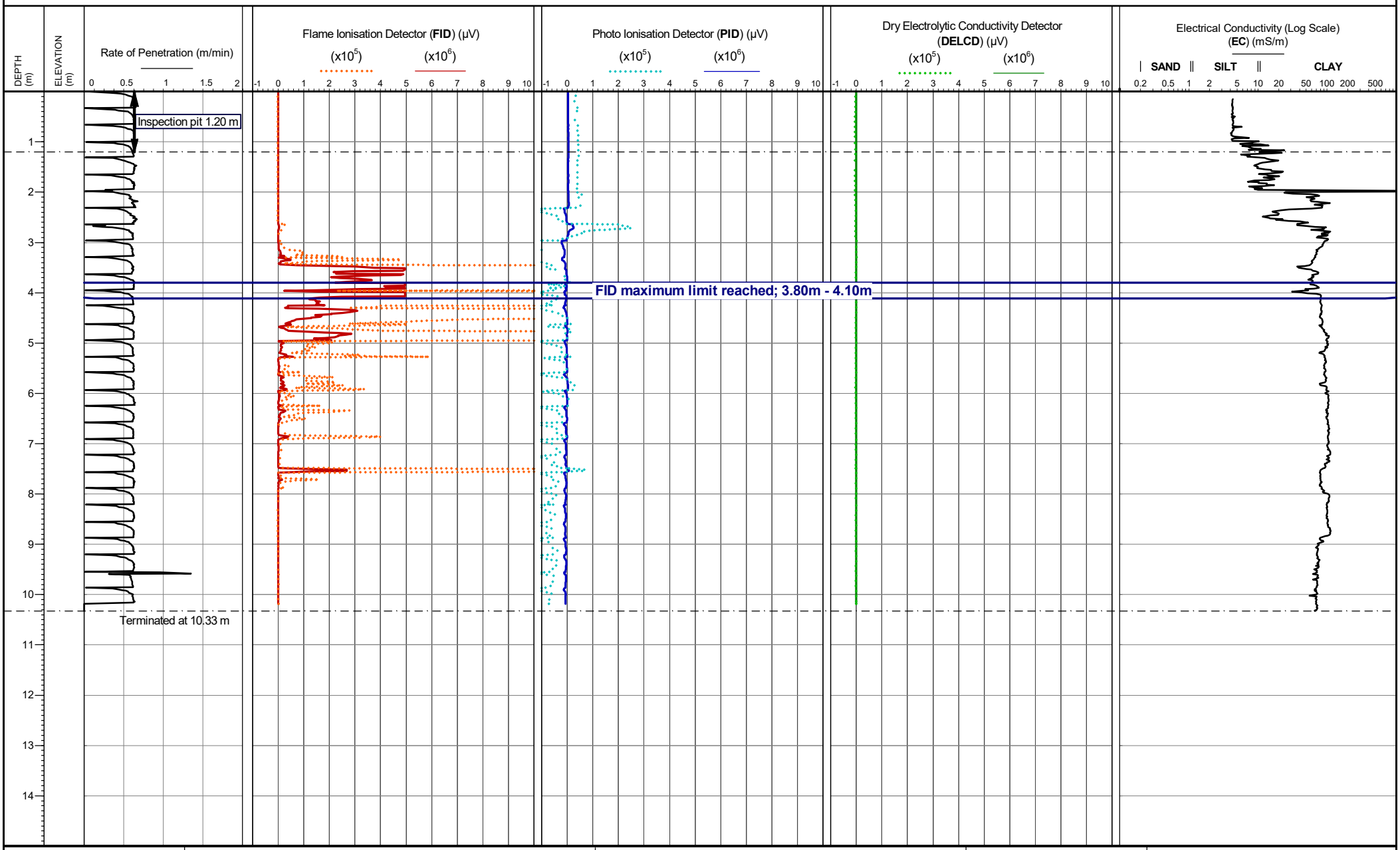
Date of plot: 20-02-24
Lankelma Project Ref: 27138-6

Checked by:
Chris Player

TEST ID: MIP02

Project: NORTH KILLINGHOLME

Client: GEOTECHNICS



Cone area (mm2):
ConeID: MIP01
Operator: Chris Clarke
Rig Used: UK20
Date of test: 13/02/2024

Location: East Riding of Yorkshire, UK
Coordinates: ,
Elevation:
Coordinate system:

Pre-response test concentration index:
10 ppm (10^5 Scale) = ...
100 ppm (10^6 Scale) = ——

Test Compound:

Remarks: *Phreatic surface origin: Arbitrary value

See report section 'MIP Interpretive Data' for methods of interpretation.

Termination Remark:
Target depth

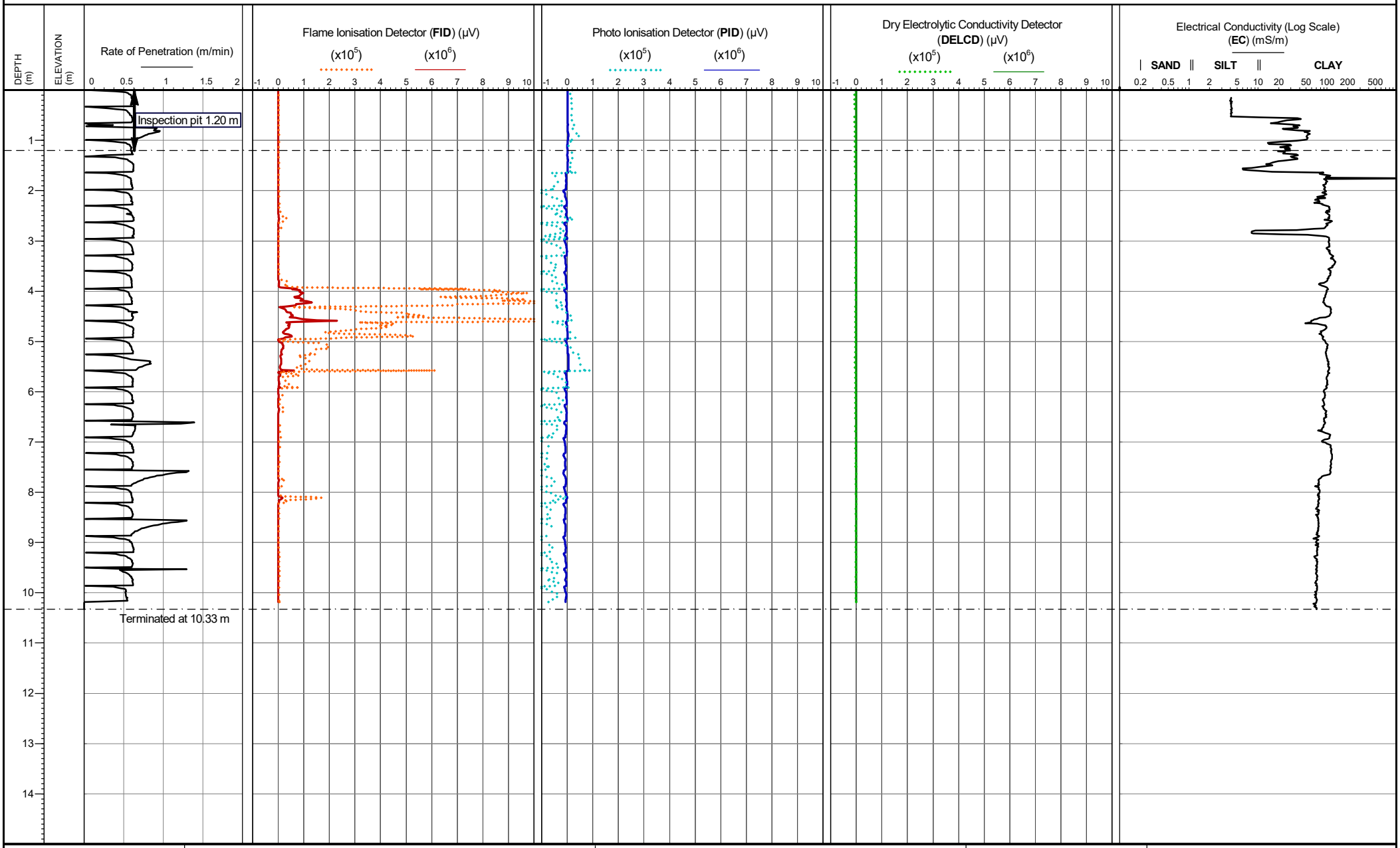
Date of plot: 20-02-24
Lankelma Project Ref: 27138-6

Checked by:
Chris Player

TEST ID: MIP03

Project: NORTH KILLINGHOLME

Client: GEOTECHNICS



Cone area (mm2):
ConeID: MIP01
Operator: Chris Clarke
Rig Used: UK20
Date of test: 13/02/2024

Location: East Riding of Yorkshire, UK
Coordinates: ,
Elevation:
Coordinate system:

Pre-response test concentration index:
10 ppm (10^5 Scale) = ...
100 ppm (10^6 Scale) = ——

Test Compound:

Remarks: *Phreatic surface origin: Arbitrary value

See report section 'MIP Interpretive Data' for methods of interpretation.

Termination Remark:
Target depth

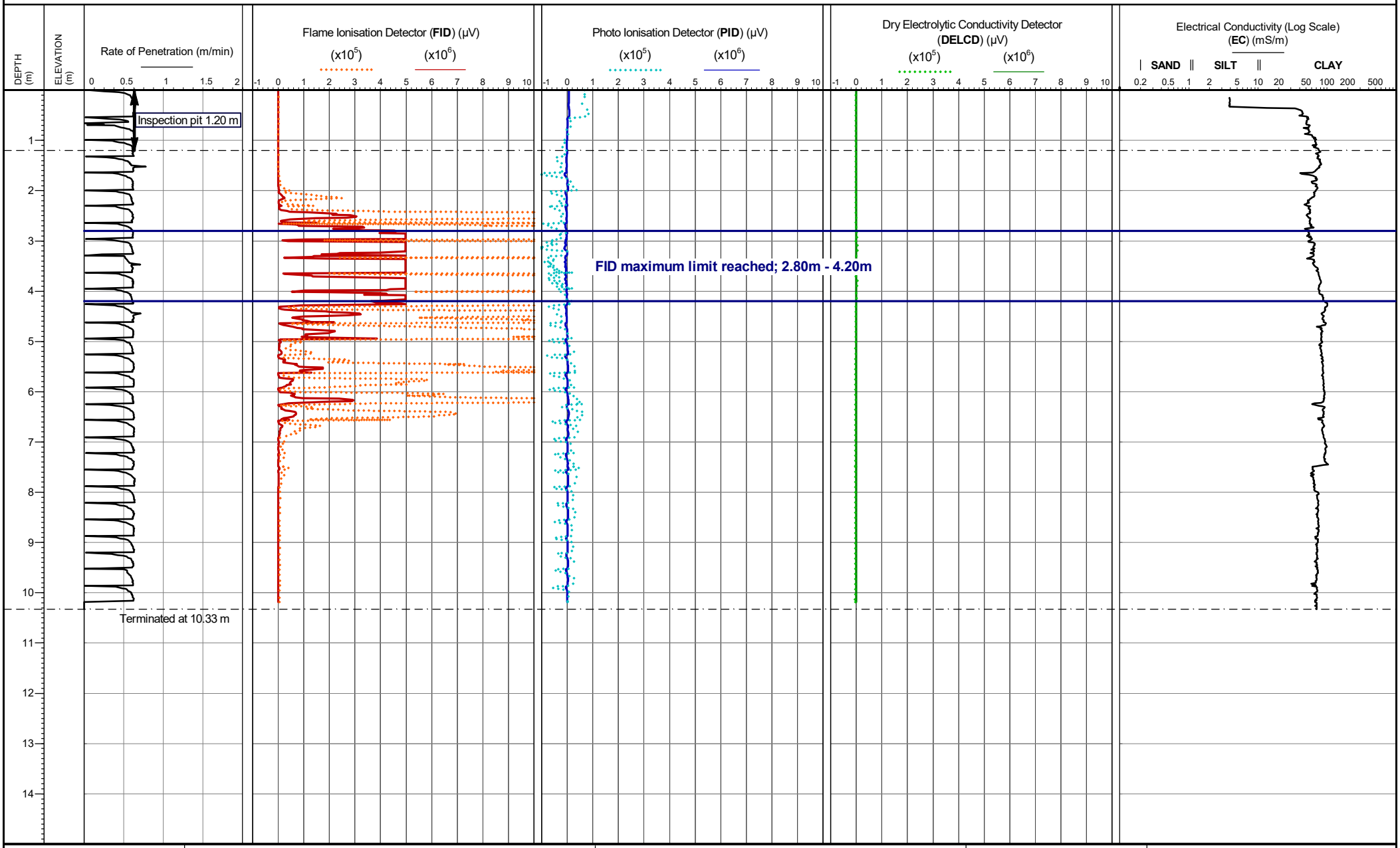
Date of plot: 20-02-24
Lankelma Project Ref: 27138-6

Checked by:
Chris Player

TEST ID: MIP04

Project: NORTH KILLINGHOLME

Client: GEOTECHNICS



Cone area (mm2):
ConeID: MIP01
Operator: Chris Clarke
Rig Used: UK20
Date of test: 14/02/2024

Location: East Riding of Yorkshire, UK
Coordinates: ,
Elevation:
Coordinate system:

Pre-response test concentration index:
10 ppm (10^5 Scale) = ...
100 ppm (10^6 Scale) = ——

Test Compound:

Remarks: *Phreatic surface origin: Arbitrary value

See report section 'MIP Interpretive Data' for methods of interpretation.

Termination Remark:
Target depth

Date of plot: 20-02-24
Lankelma Project Ref: 27138-6

Checked by:
Chris Player

TEST ID: MIP05

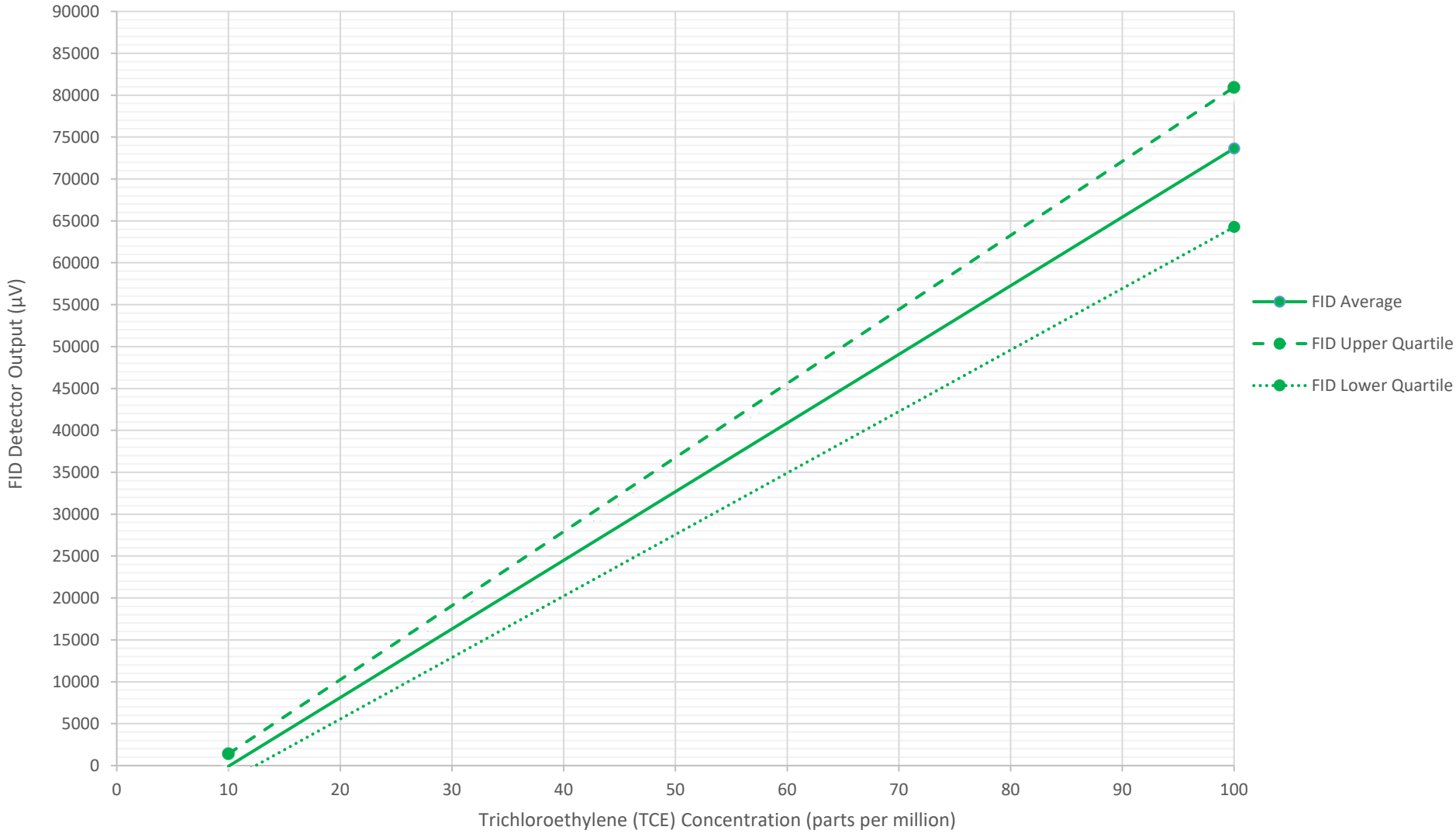
APPENDIX E PRE-RESPONSE TEST RESULTS

EXTRAPOLATED PLOTS

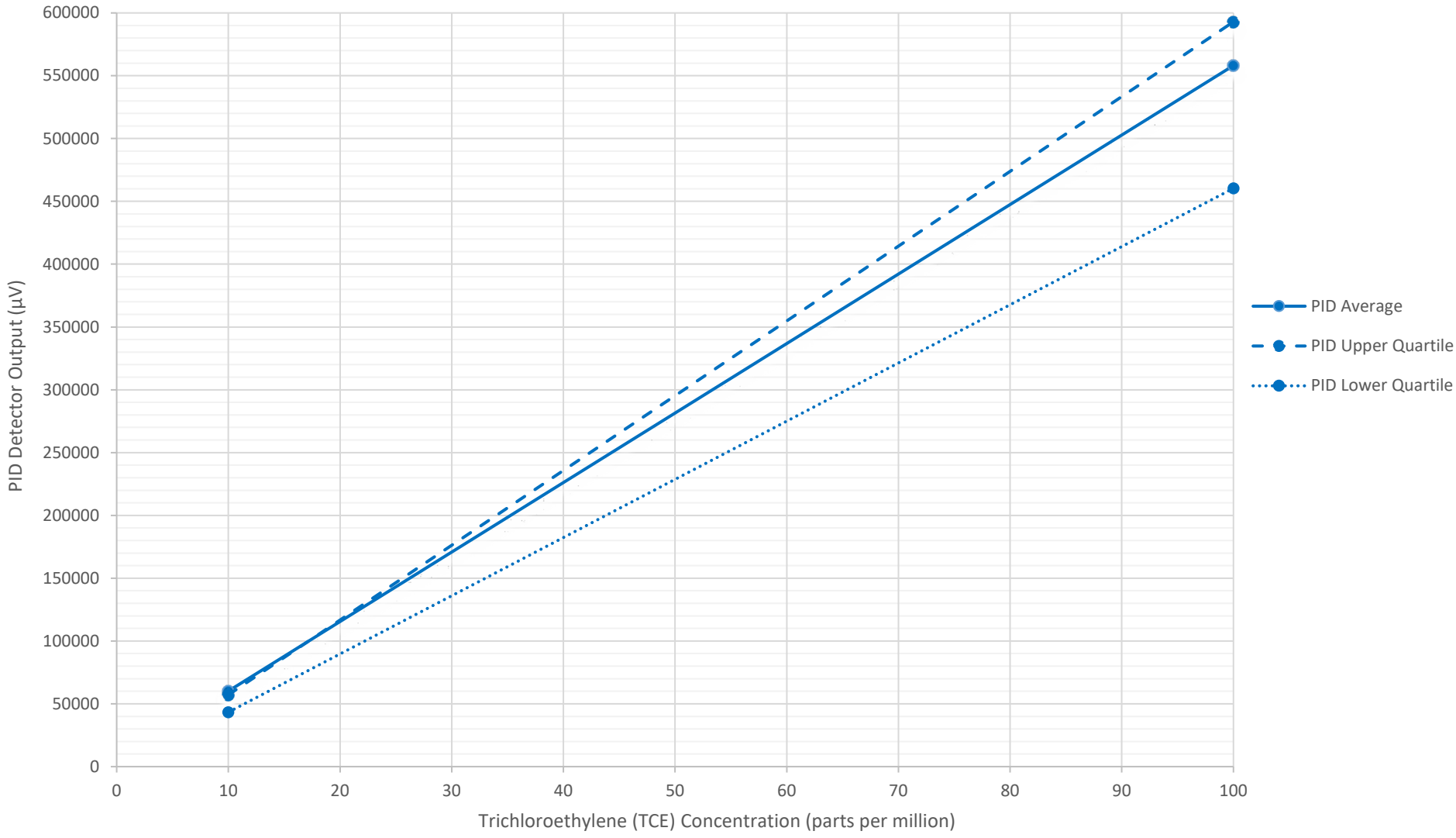
Detector response (µV) at known TCE concentrations (parts per million)

Plots are provided for all MIP locations

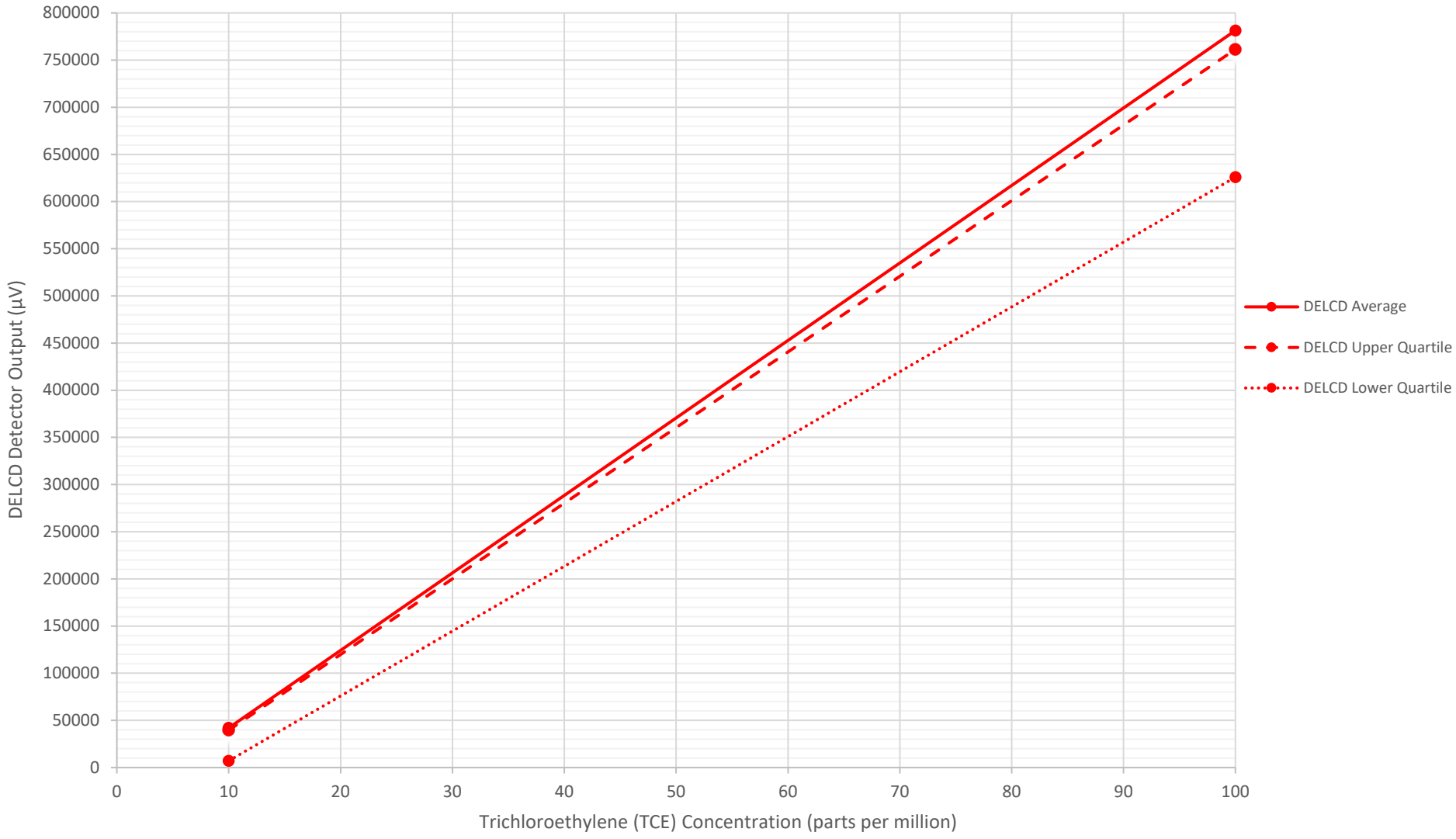
24-28-27138-6 - North Killingholme; FID Pre-Response Tests with Trichloroethylene (TCE)



24-28-27138-6 - North Killingholme; PID Pre-Response Tests with Trichloroethylene (TCE)



24-28-27138-6 - North Killingholme; DELCD Pre-Response Tests with Trichloroethylene (TCE)



APPENDIX 7

MOSTAP Sample Photographs

MIP04 4-5


GEOTECHNICS
geotechnical and geoenvironmental specialists
COVENTRY | CHESTER | EXETER | YORK | BRIDGEND
PHOTOGRAPHIC BOARD
PROJECT NAME
NORTH. KILLINGHOLME
PROJECT NO.
PY240528
HOLE ID
MIP04
DATE
16/02/2024
BOX NO.
-
NOTES
4.00m - 5.00m
cm
10
20
30
40
50
60
70
80
90

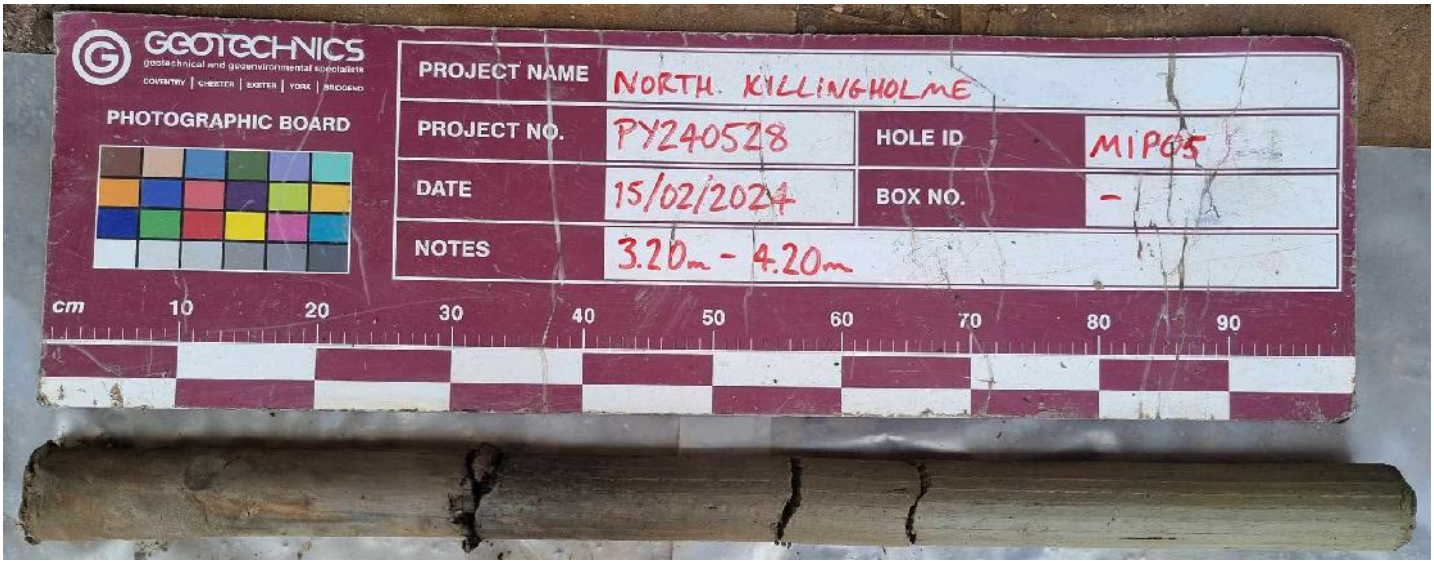
MIP04 - 2-3


GEOTECHNICS
geotechnical and geoenvironmental specialists
COVENTRY | CHESTER | EXETER | YORK | BRIDGEND
PHOTOGRAPHIC BOARD
PROJECT NAME
NORTH. KILLINGHOLME
PROJECT NO.
PY240528
HOLE ID
MIP04
DATE
15/02/2024
BOX NO.
-
NOTES
2.00m - 3.00m
cm
10
20
30
40
50
60
70
80
90

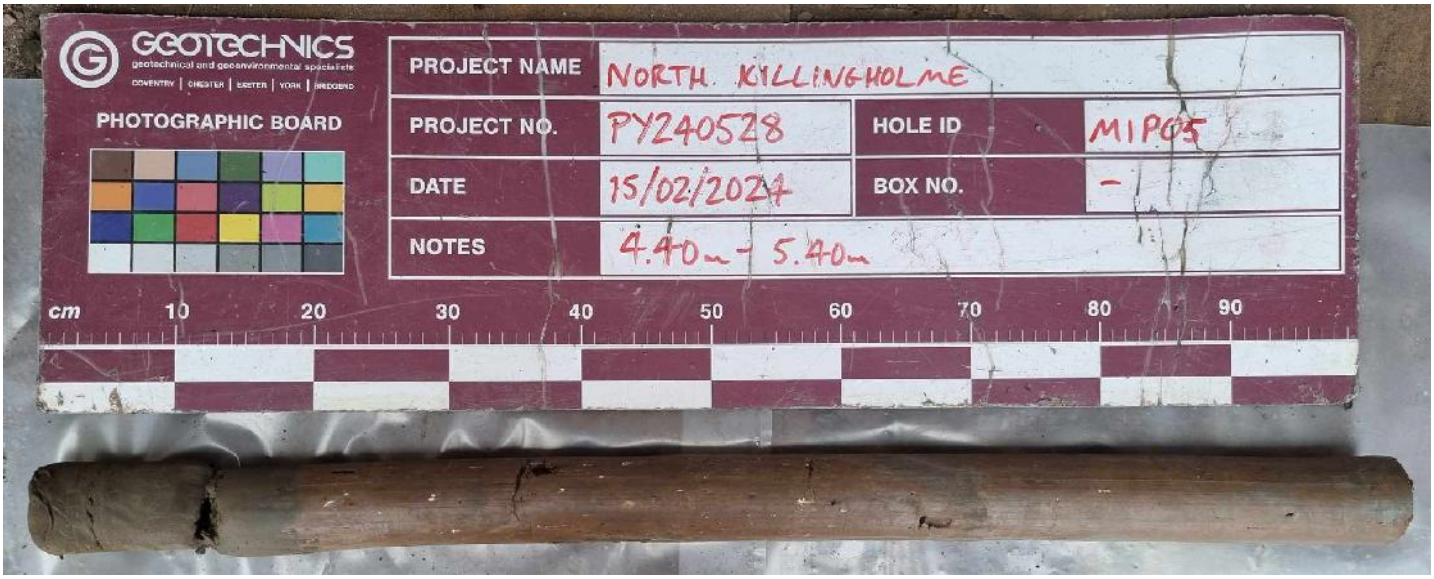
MIP05 2-3


GEOTECHNICS
geotechnical and geoenvironmental specialists
COVENTRY | CHESTER | EXETER | YORK | BRIDGEND
PHOTOGRAPHIC BOARD
PROJECT NAME
NORTH KILLINGHOLME
PROJECT NO.
PY240528
HOLE ID
MIP05
DATE
15/02/2024
BOX NO.
-
NOTES
2.00m - 3.00m
cm
10
20
30
40
50
60
70
80
90

MIP05 3-2 to 4-2



MIP05 4-4 to 5-4



APPENDIX 8

Stockpile Sample Photographs

GEOTECHNICS
BUILD ON CONFIDENCE

SP01



GEOTECHNICS
BUILD ON CONFIDENCE

SP02



GEOTECHNICS
BUILD ON CONFIDENCE

SP03



GEOTECHNICS
BUILD ON CONFIDENCE

SP04



GEOTECHNICS
BUILD ON CONFIDENCE

SP05



APPENDIX 9

Soil Laboratory Certificates of Analysis

Certificate of Analysis

Certificate Number	24-03061	*Issued:*	21-Feb-24

Client Geotechnics LTD
The Geotechnical Centre
Unit 1B Borders Ind. Park
River Lane
Saltney
Chester
CH4 8RJ

Our Reference 24-03061

Client Reference PY240528

Order No OY39674

Contract Title North Killingholme

Description 8 Soil samples, 4 Leachate prepared by DETS samples.

Date Received 13-Feb-24

Date Started 13-Feb-24

Date Completed 21-Feb-24

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

ilac-MRA UKAS TESTING 2139

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03061
Client Ref PY240528
Contract Title North Killingholme

	Lab No	2299329	2299330	2299331	2299332	2299333	2299334
	.Sample ID	TP01	TP01	TP04	TP04	TP05	TP05
	Depth	1.00	3.00	0.20	2.00	0.50	1.70
	Other ID						
	Sample Type	ES	ES	ES	ES	ES	ES
	Sampling Date	08/02/2024	08/02/2024	09/02/2024	09/02/2024	09/02/2024	09/02/2024
	Sampling Time	1430	1430	1000	1000	1130	1130
Test	**Method**	**LOD**	**Units**				
Metals							
Arsenic	DETSC 2301#	0.2	mg/kg	6.7	9.0	7.1		3.9	9.3
Barium	DETSC 2301#	1.5	mg/kg	90	56	140		120	89
Beryllium	DETSC 2301#	0.2	mg/kg	1.4	0.5	3.3		2.0	0.8
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	2.2	1.3	2.4		1.4	3.4
Cadmium	DETSC 2301#	0.1	mg/kg	0.5	0.3	< 0.1		0.2	0.2
Chromium	DETSC 2301#	0.15	mg/kg	30	16	10		40	21
Copper	DETSC 2301#	0.2	mg/kg	20	18	9.2		11	17
Lead	DETSC 2301#	0.3	mg/kg	23	11	13		10	13
Mercury	DETSC 2325#	0.05	mg/kg	0.09	< 0.05	< 0.05		< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	95	22	8.3		6.1	23
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	1.5		0.7	< 0.5
Vanadium	DETSC 2301#	0.8	mg/kg	42	31	41		30	34
Zinc	DETSC 2301#	1	mg/kg	150	63	63		43	54
Inorganics									
pH	DETSC 2008#		pH	9.4	7.7	9.7		10.2	8.0
Total Organic Carbon	DETSC 2084#	0.5	%	1.5	1.1	1.2		1.5	1.1
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.47	< 0.03	0.09	< 0.03	0.33	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	0.19	< 0.03	< 0.03	< 0.03	0.10	< 0.03

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo).

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03061
Client Ref PY240528
Contract Title North Killingholme

			Lab No	2299329	2299330	2299331	2299332	2299333	2299334
			.Sample ID	TP01	TP01	TP04	TP04	TP05	TP05
			Depth	1.00	3.00	0.20	2.00	0.50	1.70
			Other ID						
			Sample Type	ES	ES	ES	ES	ES	ES
			Sampling Date	08/02/2024	08/02/2024	09/02/2024	09/02/2024	09/02/2024	09/02/2024
			Sampling Time	1430	1430	1000	1000	1130	1130
Test	**Method**	**LOD**	**Units**						
Fluoranthene	DETSC 3303#	0.03	mg/kg	2.1	0.04	0.17	< 0.03	1.1	0.04
Pyrene	DETSC 3303#	0.03	mg/kg	2.0	0.03	0.14	< 0.03	0.96	0.04
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	1.0	< 0.03	0.06	< 0.03	0.37	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	1.0	< 0.03	0.07	< 0.03	0.35	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	1.1	< 0.03	0.07	< 0.03	0.41	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.43	< 0.03	< 0.03	< 0.03	0.13	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.83	< 0.03	0.05	< 0.03	0.30	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.30	< 0.03	< 0.03	< 0.03	0.11	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	0.10	< 0.03	< 0.03	< 0.03	0.04	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.34	< 0.03	< 0.03	< 0.03	0.16	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	9.9	< 0.10	0.64	< 0.10	4.3	< 0.10
PCBs									
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 52	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 101	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 118	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 153	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 138	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 180	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 7 Total	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenols									
Phenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
p-cresol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo).

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03061
Client Ref PY240528
Contract Title North Killingholme

			Lab No	2299329	2299330	2299331	2299332	2299333	2299334
			.Sample ID	TP01	TP01	TP04	TP04	TP05	TP05
			Depth	1.00	3.00	0.20	2.00	0.50	1.70
			Other ID						
			Sample Type	ES	ES	ES	ES	ES	ES
			Sampling Date	08/02/2024	08/02/2024	09/02/2024	09/02/2024	09/02/2024	09/02/2024
			Sampling Time	1430	1430	1000	1000	1130	1130
Test	**Method**	**LOD**	**Units**						
VOCs									
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03061
Client Ref PY240528
Contract Title North Killingholme

			Lab No	2299329	2299330	2299331	2299332	2299333	2299334
			.Sample ID	TP01	TP01	TP04	TP04	TP05	TP05
			Depth	1.00	3.00	0.20	2.00	0.50	1.70
			Other ID						
			Sample Type	ES	ES	ES	ES	ES	ES
			Sampling Date	08/02/2024	08/02/2024	09/02/2024	09/02/2024	09/02/2024	09/02/2024
			Sampling Time	1430	1430	1000	1000	1130	1130
Test	**Method**	**LOD**	**Units**						
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
SVOCs									
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03061
Client Ref PY240528
Contract Title North Killingholme

			Lab No	2299329	2299330	2299331	2299332	2299333	2299334
			.Sample ID	TP01	TP01	TP04	TP04	TP05	TP05
			Depth	1.00	3.00	0.20	2.00	0.50	1.70
			Other ID						
			Sample Type	ES	ES	ES	ES	ES	ES
			Sampling Date	08/02/2024	08/02/2024	09/02/2024	09/02/2024	09/02/2024	09/02/2024
			Sampling Time	1430	1430	1000	1000	1130	1130
Test	**Method**	**LOD**	**Units**						
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03061
Client Ref PY240528
Contract Title North Killingholme

			Lab No	2299335	2299336
			.Sample ID	TP06	TP06
			Depth	3.00	4.70
			Other ID		
			Sample Type	ES	ES
			Sampling Date	09/02/2024	09/02/2024
			Sampling Time	1330	1330
Test	**Method**	**LOD**	**Units**		
Metals					
Arsenic	DETSC 2301#	0.2	mg/kg	8.2	
Barium	DETSC 2301#	1.5	mg/kg	90	
Beryllium	DETSC 2301#	0.2	mg/kg	1.1	
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	1.5	
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	
Chromium	DETSC 2301#	0.15	mg/kg	22	
Copper	DETSC 2301#	0.2	mg/kg	17	
Lead	DETSC 2301#	0.3	mg/kg	17	
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	
Nickel	DETSC 2301#	1	mg/kg	19	
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	
Vanadium	DETSC 2301#	0.8	mg/kg	41	
Zinc	DETSC 2301#	1	mg/kg	61	
Inorganics					
pH	DETSC 2008#		pH	8.0	
Total Organic Carbon	DETSC 2084#	0.5	%	1.5	
Petroleum Hydrocarbons					
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10
PAHs					
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.06	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo).

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03061
Client Ref PY240528
Contract Title North Killingholme

			Lab No	2299335	2299336
			.Sample ID	TP06	TP06
			Depth	3.00	4.70
			Other ID		
			Sample Type	ES	ES
			Sampling Date	09/02/2024	09/02/2024
			Sampling Time	1330	1330
Test	**Method**	**LOD**	**Units**		
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.03	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10	< 0.10
PCBs					
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01
PCB 52	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01
PCB 101	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01
PCB 118	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01
PCB 153	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01
PCB 138	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01
PCB 180	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01
PCB 7 Total	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01
Phenols					
Phenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01
p-cresol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03061
Client Ref PY240528
Contract Title North Killingholme

			Lab No	2299335	2299336
			.Sample ID	TP06	TP06
			Depth	3.00	4.70
			Other ID		
			Sample Type	ES	ES
			Sampling Date	09/02/2024	09/02/2024
			Sampling Time	1330	1330
Test	**Method**	**LOD**	**Units**		
VOCs					
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo).

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03061
Client Ref PY240528
Contract Title North Killingholme

			Lab No	2299335	2299336
			.Sample ID	TP06	TP06
			Depth	3.00	4.70
			Other ID		
			Sample Type	ES	ES
			Sampling Date	09/02/2024	09/02/2024
			Sampling Time	1330	1330
Test	**Method**	**LOD**	**Units**		
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01
SVOCs					
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03061
Client Ref PY240528
Contract Title North Killingholme

			Lab No	2299335	2299336
			.Sample ID	TP06	TP06
			Depth	3.00	4.70
			Other ID		
			Sample Type	ES	ES
			Sampling Date	09/02/2024	09/02/2024
			Sampling Time	1330	1330
Test	**Method**	**LOD**	**Units**		
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 24-03061
Client Ref PY240528
Contract Title North Killingholme
Sample Id TP01 1.00

Sample Numbers 2299329 2299337
Date Analysed 21/02/2024

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.5	3	5	6
DETSC2003# Loss On Ignition	%		n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# TPH (C10 - C40)	mg/kg	92.0	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	15.0	100	n/a	n/a
DETSC2008# pH	pH Units		n/a	>6	n/a
DETS073* Acid Neutralisation Capacity (pH4)	mol/kg		n/a	TBE	TBE
DETS073* Acid Neutralisation Capacity (pH7)	mol/kg		n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	2.2	0.022	0.5	2	25
DETSC 2306 Barium as Ba	18	0.18	20	100	300
DETSC 2306 Cadmium as Cd	0.049	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	2.1	0.021	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	9	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	1.1	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	0.27	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	0.27	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	4.6	0.046	4	50	200
DETSC 2055 Chloride as Cl	1500	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	620	6.2	10	150	500
DETSC 2055 Sulphate as SO4	20000	200	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	80000	800	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	2900	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	8.4
DETSC 2009 Conductivity uS/cm	114.0
* Temperature*	18.0

Mass of Sample Kg*	0.120
Mass of dry Sample Kg*	0.099

Stage 1

Volume of Leachant L2*	0.968
Volume of Eluate VE1*	0.91

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 24-03061
Client Ref PY240528
Contract Title North Killingholme
Sample Id TP01 3.00

Sample Numbers 2299330 2299338
Date Analysed 21/02/2024

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.1	3	5	6
DETSC2003# Loss On Ignition	%		n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# TPH (C10 - C40)	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC2008# pH	pH Units		n/a	>6	n/a
DETS073* Acid Neutralisation Capacity (pH4)	mol/kg		n/a	TBE	TBE
DETS073* Acid Neutralisation Capacity (pH7)	mol/kg		n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	1.3	0.013	0.5	2	25
DETSC 2306 Barium as Ba	26	0.26	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.4	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	2.3	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	1.7	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	9.8	0.098	4	50	200
DETSC 2055 Chloride as Cl	1400	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	< 100	< 0.1	10	150	500
DETSC 2055 Sulphate as SO4	19000	190	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	54000	540	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	2200	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	6.7
DETSC 2009 Conductivity uS/cm	76.8
* Temperature*	19.0

Mass of Sample Kg*	0.120
Mass of dry Sample Kg*	0.096

Stage 1

Volume of Leachant L2*	0.937
Volume of Eluate VE1*	0.88

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

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WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 24-03061
Client Ref PY240528
Contract Title North Killingholme
Sample Id TP05 1.70

Sample Numbers 2299334 2299339
Date Analysed 21/02/2024

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.1	3	5	6
DETSC2003# Loss On Ignition	%		n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# TPH (C10 - C40)	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC2008# pH	pH Units		n/a	>6	n/a
DETS073* Acid Neutralisation Capacity (pH4)	mol/kg		n/a	TBE	TBE
DETS073* Acid Neutralisation Capacity (pH7)	mol/kg		n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.72	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	26	0.26	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.5	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	1.3	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	3.4	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	0.47	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	2.6	0.026	4	50	200
DETSC 2055 Chloride as Cl	3400	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	750	7.5	10	150	500
DETSC 2055 Sulphate as SO4	30000	300	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	90000	900	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	< 2000	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	6.9
DETSC 2009 Conductivity uS/cm	129.0
* Temperature*	18.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.093

Stage 1

Volume of Leachant L2*	0.918
Volume of Eluate VE1*	0.86

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

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WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 24-03061
Client Ref PY240528
Contract Title North Killingholme
Sample Id TP06 3.00

Sample Numbers 2299335 2299340
Date Analysed 21/02/2024

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.5	3	5	6
DETSC2003# Loss On Ignition	%		n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# TPH (C10 - C40)	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC2008# pH	pH Units		n/a	>6	n/a
DETS073* Acid Neutralisation Capacity (pH4)	mol/kg		n/a	TBE	TBE
DETS073* Acid Neutralisation Capacity (pH7)	mol/kg		n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	1.4	0.014	0.5	2	25
DETSC 2306 Barium as Ba	12	0.12	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	0.77	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	1.8	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	5.3	0.05	0.5	10	50
DETSC 2306 Antimony as Sb	0.2	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	2000	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	210	2.1	10	150	500
DETSC 2055 Sulphate as SO4	7800	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	67000	670	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	3100	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	7.2
DETSC 2009 Conductivity uS/cm	96.2
* Temperature*	18.0
Mass of Sample Kg*	0.120
Mass of dry Sample Kg*	0.096
Stage 1	
Volume of Leachant L2*	0.937
Volume of Eluate VE1*	0.88

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

Summary of Asbestos Analysis
Soil Samples

Our Ref 24-03061
Client Ref PY240528
Contract Title North Killingholme

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2299329	TP01 1.00	SOIL	Chrysotile Amosite	Bundles of amosite and chrysotile	Shannon Hope
2299330	TP01 3.00	SOIL	NAD	none	Shannon Hope
2299331	TP04 0.20	SOIL	NAD	none	Shannon Hope
2299333	TP05 0.50	SOIL	NAD	none	Shannon Hope
2299334	TP05 1.70	SOIL	Amosite Chrysotile	Bundles of loose amosite and chrysotile	Shannon Hope
2299335	TP06 3.00	SOIL	NAD	none	Shannon Hope

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 24-03061
Client Ref PY240528
Contract North Killingholme

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2299329	TP01 1.00 SOIL	08/02/24	GJ 250ml, GJ 60ml, PT 1L x2		
2299330	TP01 3.00 SOIL	08/02/24	GJ 250ml, GJ 60ml, PT 1L x2		
2299331	TP04 0.20 SOIL	09/02/24	GJ 250ml, GJ 60ml, PT 1L x2		
2299332	TP04 2.00 SOIL	09/02/24	GJ 250ml, GJ 60ml, PT 1L x2		
2299333	TP05 0.50 SOIL	09/02/24	GJ 250ml, GJ 60ml, PT 1L x2		
2299334	TP05 1.70 SOIL	09/02/24	GJ 250ml, GJ 60ml, PT 1L x2		
2299335	TP06 3.00 SOIL	09/02/24	GJ 250ml, GJ 60ml, PT 1L x2		
2299336	TP06 4.70 SOIL	09/02/24	GJ 250ml, GJ 60ml, PT 1L x2		
2299337	TP01 1.00 LEACHATE	08/02/24	GJ 250ml, GJ 60ml, PT 1L x2		
2299338	TP01 3.00 LEACHATE	08/02/24	GJ 250ml, GJ 60ml, PT 1L x2		
2299339	TP05 1.70 LEACHATE	09/02/24	GJ 250ml, GJ 60ml, PT 1L x2		
2299340	TP06 3.00 LEACHATE	09/02/24	GJ 250ml, GJ 60ml, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

Certificate of Analysis

Certificate Number	24-03355	*Issued:*	26-Feb-24
Client	Geotechnics LTD The Geotechnical Centre Unit 1B Borders Ind. Park River Lane Saltney Chester CH4 8RJ		
Our Reference	24-03355		
Client Reference	PY240528		
Order No	OY39674		
Contract Title	North Killingholme		
Description	4 Soil samples.		
Date Received	16-Feb-24		
Date Started	16-Feb-24		
Date Completed	26-Feb-24		
Test Procedures	Identified by prefix DETSn (details on request).		
Notes	Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.		

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03355
Client Ref PY240528
Contract Title North Killingholme

			Lab No	2300965	2300966	2300967	2300968
			.Sample ID	TP03	TP07	TP08	TP08
			Depth	0.80	2.00	2.00	3.60
			Other ID				
			Sample Type	ES	ES	ES	ES
			Sampling Date	12/02/2024	12/02/2024	12/02/2024	12/02/2024
			Sampling Time	1300	1000	1130	1130
Test	**Method**	**LOD**	**Units**				
Metals							
Arsenic	DETSC 2301#	0.2	mg/kg	10	9.1	10	
Barium	DETSC 2301#	1.5	mg/kg	72	87	130	
Beryllium	DETSC 2301#	0.2	mg/kg	0.6	0.8	1.4	
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	0.8	0.6	2.3	
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	0.2	0.2	
Chromium	DETSC 2301#	0.15	mg/kg	19	21	25	
Copper	DETSC 2301#	0.2	mg/kg	17	21	75	
Lead	DETSC 2301#	0.3	mg/kg	11	33	33	
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05	
Nickel	DETSC 2301#	1	mg/kg	23	25	27	
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	
Vanadium	DETSC 2301#	0.8	mg/kg	32	34	45	
Zinc	DETSC 2301#	1	mg/kg	63	52	500	
Inorganics							
pH	DETSC 2008#		pH	7.8	8.0	8.1	
Total Organic Carbon	DETSC 2084#	0.5	%	< 0.5	< 0.5	0.9	
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10
PAHs							
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo).

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03355
Client Ref PY240528
Contract Title North Killingholme

			Lab No	2300965	2300966	2300967	2300968
			.Sample ID	TP03	TP07	TP08	TP08
			Depth	0.80	2.00	2.00	3.60
			Other ID				
			Sample Type	ES	ES	ES	ES
			Sampling Date	12/02/2024	12/02/2024	12/02/2024	12/02/2024
			Sampling Time	1300	1000	1130	1130
Test	**Method**	**LOD**	**Units**				
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.04
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10	< 0.10	< 0.10	< 0.10
PCBs							
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
PCB 52	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
PCB 101	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
PCB 118	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
PCB 153	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
PCB 138	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
PCB 180	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
PCB 7 Total	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Phenols							
Phenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
p-cresol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	0.02
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo).

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03355
Client Ref PY240528
Contract Title North Killingholme

			Lab No	2300965	2300966	2300967	2300968
			.Sample ID	TP03	TP07	TP08	TP08
			Depth	0.80	2.00	2.00	3.60
			Other ID				
			Sample Type	ES	ES	ES	ES
			Sampling Date	12/02/2024	12/02/2024	12/02/2024	12/02/2024
			Sampling Time	1300	1000	1130	1130
Test	**Method**	**LOD**	**Units**				
VOCs							
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo).

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03355
Client Ref PY240528
Contract Title North Killingholme

			Lab No	2300965	2300966	2300967	2300968
			.Sample ID	TP03	TP07	TP08	TP08
			Depth	0.80	2.00	2.00	3.60
			Other ID				
			Sample Type	ES	ES	ES	ES
			Sampling Date	12/02/2024	12/02/2024	12/02/2024	12/02/2024
			Sampling Time	1300	1000	1130	1130
Test	**Method**	**LOD**	**Units**				
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
SVOCs							
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo).

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03355
Client Ref PY240528
Contract Title North Killingholme

			Lab No	2300965	2300966	2300967	2300968
			.Sample ID	TP03	TP07	TP08	TP08
			Depth	0.80	2.00	2.00	3.60
			Other ID				
			Sample Type	ES	ES	ES	ES
			Sampling Date	12/02/2024	12/02/2024	12/02/2024	12/02/2024
			Sampling Time	1300	1000	1130	1130
Test	**Method**	**LOD**	**Units**				
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1

Summary of Asbestos Analysis
Soil Samples

Our Ref 24-03355
Client Ref PY240528
Contract Title North Killingholme

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2300965	TP03 0.80	SOIL	NAD	none	Shannon Hope
2300966	TP07 2.00	SOIL	Amosite	Bundles of amosite	Shannon Hope
2300967	TP08 2.00	SOIL	NAD	none	Shannon Hope

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 24-03355
Client Ref PY240528
Contract North Killingholme

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2300965	TP03 0.80 SOIL	12/02/24	GJ 250ml, GJ 60ml, PT 1L x2		
2300966	TP07 2.00 SOIL	12/02/24	GJ 250ml, GJ 60ml, PT 1L x2		
2300967	TP08 2.00 SOIL	12/02/24	GJ 250ml, GJ 60ml, PT 1L x2		
2300968	TP08 3.60 SOIL	12/02/24	GJ 250ml, GJ 60ml, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

Certificate of Analysis

Certificate Number	24-03361	*Issued:*	26-Feb-24

Client Geotechnics LTD
The Geotechnical Centre
Unit 1B Borders Ind. Park
River Lane
Saltney
Chester
CH4 8RJ

Our Reference 24-03361

Client Reference PY240528

Order No OY39674

Contract Title North Killingholme

Description 5 Soil samples, 3 Leachate prepared by DETS samples.

Date Received 16-Feb-24

Date Started 16-Feb-24

Date Completed 26-Feb-24

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

ilac-MRA UKAS TESTING 2139

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03361
Client Ref PY240528
Contract Title North Killingholme

			Lab No	2300998	2300999	2301000	2301001	2301002
			.Sample ID	SP01	SP02	SP03	SP04	SP05
			Depth					
			Other ID					
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	12/02/2024	13/02/2024	13/02/2024	13/02/2024	13/02/2024
			Sampling Time	1400	1030	1100	1120	1130
Test	**Method**	**LOD**	**Units**					
Metals								
Arsenic	DETSC 2301#	0.2	mg/kg	6.7	6.2	6.8	3.4	2.7
Barium	DETSC 2301#	1.5	mg/kg	90	130	110	89	54
Beryllium	DETSC 2301#	0.2	mg/kg	1.2	2.5	1.3	1.2	0.8
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	1.6	1.3	1.5	1.1	< 0.2
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	< 0.1	0.2	0.2	0.2
Chromium	DETSC 2301#	0.15	mg/kg	21	44	40	22	31
Copper	DETSC 2301#	0.2	mg/kg	31	130	16	20	18
Lead	DETSC 2301#	0.3	mg/kg	21	29	44	21	5.0
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	0.10	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	13	15	14	6.4	3.4
Selenium	DETSC 2301#	0.5	mg/kg	0.7	1.5	0.9	0.6	0.9
Vanadium	DETSC 2301#	0.8	mg/kg	39	84	48	63	50
Zinc	DETSC 2301#	1	mg/kg	110	480	81	120	64
Inorganics								
pH	DETSC 2008#		pH	10.6	10.3	10.7	10.9	11.1
Total Organic Carbon	DETSC 2084#	0.5	%	1.0	1.0	2.5	1.6	2.7
Petroleum Hydrocarbons								
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	3.7	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	18	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	34	7.4
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	6.7	< 3.4	110	120
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	170	120
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	7.4
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	2.2	7.7	17
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	26	36	49
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	50	120	190
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	78	160	260
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	78	330	380
PAHs								
Naphthalene	DETSC 3303#	0.03	mg/kg	0.07	< 0.03	0.18	0.05	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.13	0.04	0.14
Acenaphthene	DETSC 3303#	0.03	mg/kg	0.06	0.03	1.1	0.09	0.41
Fluorene	DETSC 3303	0.03	mg/kg	0.06	< 0.03	1.3	0.10	0.32
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.45	0.35	9.9	1.4	2.5
Anthracene	DETSC 3303	0.03	mg/kg	0.16	0.06	3.6	0.50	1.1

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Summary of Chemical Analysis
Soil Samples

Our Ref 24-03361
Client Ref PY240528
Contract Title North Killingholme

			Lab No	2300998	2300999	2301000	2301001	2301002
			.Sample ID	SP01	SP02	SP03	SP04	SP05
			Depth					
			Other ID					
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	12/02/2024	13/02/2024	13/02/2024	13/02/2024	13/02/2024
			Sampling Time	1400	1030	1100	1120	1130
Test	**Method**	**LOD**	**Units**					
Fluoranthene	DETSC 3303#	0.03	mg/kg	1.0	0.72	13	3.5	9.0
Pyrene	DETSC 3303#	0.03	mg/kg	0.95	0.64	11	3.4	10
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.41	0.24	4.8	1.5	4.3
Chrysene	DETSC 3303	0.03	mg/kg	0.42	0.28	4.6	1.5	4.0
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.41	0.32	4.1	1.5	4.2
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.17	0.10	1.5	0.54	1.6
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.32	0.21	3.0	1.1	3.3
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.12	0.11	0.99	0.38	1.3
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	0.04	0.03	0.34	0.10	0.44
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.14	0.12	1.1	0.43	1.5
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	4.8	3.2	60	16	44
PCBs								
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 52	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 101	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 118	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 153	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 138	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 180	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 7 Total	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenols								
Phenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	0.05	< 0.01	< 0.01
p-cresol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	0.10	< 0.01	< 0.01
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

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Summary of Chemical Analysis
Soil Samples

Our Ref 24-03361
Client Ref PY240528
Contract Title North Killingholme

			Lab No	2300998	2300999	2301000	2301001	2301002
			.Sample ID	SP01	SP02	SP03	SP04	SP05
			Depth					
			Other ID					
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	12/02/2024	13/02/2024	13/02/2024	13/02/2024	13/02/2024
			Sampling Time	1400	1030	1100	1120	1130
Test	**Method**	**LOD**	**Units**					
VOCs								
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

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Summary of Chemical Analysis
Soil Samples

Our Ref 24-03361
Client Ref PY240528
Contract Title North Killingholme

			Lab No	2300998	2300999	2301000	2301001	2301002
			.Sample ID	SP01	SP02	SP03	SP04	SP05
			Depth					
			Other ID					
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	12/02/2024	13/02/2024	13/02/2024	13/02/2024	13/02/2024
			Sampling Time	1400	1030	1100	1120	1130
Test	**Method**	**LOD**	**Units**					
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
SVOCs								
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	0.5	< 0.1	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	2.8	0.1	0.3
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	0.1	< 0.1	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	0.1	< 0.1	< 0.1

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Summary of Chemical Analysis
Soil Samples

Our Ref 24-03361
Client Ref PY240528
Contract Title North Killingholme

			Lab No	2300998	2300999	2301000	2301001	2301002
			.Sample ID	SP01	SP02	SP03	SP04	SP05
			Depth					
			Other ID					
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	12/02/2024	13/02/2024	13/02/2024	13/02/2024	13/02/2024
			Sampling Time	1400	1030	1100	1120	1130
Test	**Method**	**LOD**	**Units**					
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	3.9	0.3	0.3

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 24-03361
Client Ref PY240528
Contract Title North Killingholme
Sample Id SP01

Sample Numbers 2300998 2301003
Date Analysed 26/02/2024

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.0	3	5	6
DETSC2003# Loss On Ignition	%		n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# TPH (C10 - C40)	mg/kg	36.0	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	5.2	100	n/a	n/a
DETSC2008# pH	pH Units		n/a	>6	n/a
DETS073* Acid Neutralisation Capacity (pH4)	mol/kg		n/a	TBE	TBE
DETS073* Acid Neutralisation Capacity (pH7)	mol/kg		n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate) Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	5.3	0.053	0.5	2	25
DETSC 2306 Barium as Ba	25	0.25	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	1.1	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	5.4	0.054	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	4.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	1.3	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	6.3	0.06	0.5	10	50
DETSC 2306 Antimony as Sb	1.1	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	0.8	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	5.1	0.051	4	50	200
DETSC 2055 Chloride as Cl	3000	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	330	3.3	10	150	500
DETSC 2055 Sulphate as SO4	34000	340	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	140000	1400	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	5200	52	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	8.3
DETSC 2009 Conductivity uS/cm	201.0
* Temperature*	17.0

Mass of Sample Kg*	0.120
Mass of dry Sample Kg*	0.100

Stage 1

Volume of Leachant L2*	0.981
Volume of Eluate VE1*	0.93

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 24-03361
Client Ref PY240528
Contract Title North Killingholme
Sample Id SP03

Sample Numbers 2301000 2301004
Date Analysed 26/02/2024

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	2.5	3	5	6
DETSC2003# Loss On Ignition	%		n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# TPH (C10 - C40)	mg/kg	610.0	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	120.0	100	n/a	n/a
DETSC2008# pH	pH Units		n/a	>6	n/a
DETS073* Acid Neutralisation Capacity (pH4)	mol/kg		n/a	TBE	TBE
DETS073* Acid Neutralisation Capacity (pH7)	mol/kg		n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	3	0.03	0.5	2	25
DETSC 2306 Barium as Ba	23	0.23	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	0.69	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	4.3	0.043	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	8.2	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	1.3	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	4.4	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	1.2	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	0.52	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	4.5	0.045	4	50	200
DETSC 2055 Chloride as Cl	2600	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	370	3.7	10	150	500
DETSC 2055 Sulphate as SO4	23000	230	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	110000	1100	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	4700	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	8.1
DETSC 2009 Conductivity uS/cm	152.0
* Temperature*	17.0
Mass of Sample Kg*	0.130
Mass of dry Sample Kg*	0.102
Stage 1	
Volume of Leachant L2*	0.988
Volume of Eluate VE1*	0.932

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WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 24-03361
Client Ref PY240528
Contract Title North Killingholme
Sample Id SP05

Sample Numbers 2301002 2301005
Date Analysed 26/02/2024

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	2.7	3	5	6
DETSC2003# Loss On Ignition	%		n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# TPH (C10 - C40)	mg/kg	890.0	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	60.0	100	n/a	n/a
DETSC2008# pH	pH Units		n/a	>6	n/a
DETS073* Acid Neutralisation Capacity (pH4)	mol/kg		n/a	TBE	TBE
DETS073* Acid Neutralisation Capacity (pH7)	mol/kg		n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	5	0.05	0.5	2	25
DETSC 2306 Barium as Ba	16	0.16	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	0.5	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	2.5	0.025	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	1.6	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	2.3	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	0.98	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	0.7	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	3.3	0.033	4	50	200
DETSC 2055 Chloride as Cl	3100	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	170	1.7	10	150	500
DETSC 2055 Sulphate as SO4	9800	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	63000	630	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	3600	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	8.7
DETSC 2009 Conductivity uS/cm	89.5
* Temperature*	17.0

Mass of Sample Kg*	0.100
Mass of dry Sample Kg*	0.095

Stage 1

Volume of Leachant L2*	0.943
Volume of Eluate VE1*	0.89

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

Summary of Asbestos Analysis
Soil Samples

Our Ref 24-03361
Client Ref PY240528
Contract Title North Killingholme

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2300998	SP01	SOIL	Chrysotile	Bundles of Chrysotile	Shannon Hope
2300999	SP02	SOIL	NAD	none	Shannon Hope
2301000	SP03	SOIL	NAD	none	Shannon Hope
2301001	SP04	SOIL	NAD	none	Shannon Hope
2301002	SP05	SOIL	NAD	none	Shannon Hope

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 24-03361
Client Ref PY240528
Contract North Killingholme

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2300998	SP01 SOIL	12/02/24	GJ 250ml, GJ 60ml, PT 1L x2		
2300999	SP02 SOIL	13/02/24	GJ 250ml, GJ 60ml, PT 1L x2		
2301000	SP03 SOIL	13/02/24	GJ 250ml, GJ 60ml, PT 1L x2		
2301001	SP04 SOIL	13/02/24	GJ 250ml, GJ 60ml, PT 1L x2		
2301002	SP05 SOIL	13/02/24	GJ 250ml, GJ 60ml, PT 1L x2		
2301003	SP01 LEACHATE	12/02/24	GJ 250ml, GJ 60ml, PT 1L x2		
2301004	SP03 LEACHATE	13/02/24	GJ 250ml, GJ 60ml, PT 1L x2		
2301005	SP05 LEACHATE	13/02/24	GJ 250ml, GJ 60ml, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

Certificate of Analysis

Certificate Number	24-03573	*Issued:*	27-Feb-24
Client	Geotechnics LTD The Geotechnical Centre Unit 1B Borders Ind. Park River Lane Saltney Chester CH4 8RJ		
Our Reference	24-03573		
Client Reference	PY240528		
Order No	OY39674		
Contract Title	NORTH KILLINGHOLME		
Description	11 Soil samples.		
Date Received	20-Feb-24		
Date Started	20-Feb-24		
Date Completed	27-Feb-24		
Test Procedures	Identified by prefix DETSn (details on request).		
Notes	Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.		

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03573
Client Ref PY240528
Contract Title NORTH KILLINGHOLME

				Lab No	2302216	2302217	2302218	2302219	2302220	2302221
				.Sample ID	MIP04	MIP04	MIP04	MIP04	MIP04	MIP04
				Depth	2.00-3.00	3.00-3.20	4.00-4.30	4.30-4.60	4.60-4.70	4.70-5.00
				Other ID						
				Sample Type	ES	ES	ES	ES	ES	ES
				Sampling Date	15/02/2024	15/02/2024	15/02/2024	15/02/2024	15/02/2024	15/02/2024
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Petroleum Hydrocarbons										
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
PAHs										
Naphthalene	DETSC 3303#	0.03	mg/kg	0.06	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.20	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	0.16	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.04	0.34	< 0.03	< 0.03	< 0.03	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.07	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	0.06	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.20	0.71	< 0.10	< 0.10	< 0.10	< 0.10
PCBs										
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 52	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 101	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 118	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 153	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 138	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03573
Client Ref PY240528
Contract Title NORTH KILLINGHOLME

			Lab No	2302216	2302217	2302218	2302219	2302220	2302221
			.Sample ID	MIP04	MIP04	MIP04	MIP04	MIP04	MIP04
			Depth	2.00-3.00	3.00-3.20	4.00-4.30	4.30-4.60	4.60-4.70	4.70-5.00
			Other ID						
			Sample Type	ES	ES	ES	ES	ES	ES
			Sampling Date	15/02/2024	15/02/2024	15/02/2024	15/02/2024	15/02/2024	15/02/2024
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PCB 180	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 7 Total	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenols									
Phenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
p-cresol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03573
Client Ref PY240528
Contract Title NORTH KILLINGHOLME

			Lab No	2302216	2302217	2302218	2302219	2302220	2302221
			.Sample ID	MIP04	MIP04	MIP04	MIP04	MIP04	MIP04
			Depth	2.00-3.00	3.00-3.20	4.00-4.30	4.30-4.60	4.60-4.70	4.70-5.00
			Other ID						
			Sample Type	ES	ES	ES	ES	ES	ES
			Sampling Date	15/02/2024	15/02/2024	15/02/2024	15/02/2024	15/02/2024	15/02/2024
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
VOCs									
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03573
Client Ref PY240528
Contract Title NORTH KILLINGHOLME

			Lab No	2302216	2302217	2302218	2302219	2302220	2302221
			.Sample ID	MIP04	MIP04	MIP04	MIP04	MIP04	MIP04
			Depth	2.00-3.00	3.00-3.20	4.00-4.30	4.30-4.60	4.60-4.70	4.70-5.00
			Other ID						
			Sample Type	ES	ES	ES	ES	ES	ES
			Sampling Date	15/02/2024	15/02/2024	15/02/2024	15/02/2024	15/02/2024	15/02/2024
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
SVOCs									
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

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Summary of Chemical Analysis
Soil Samples

Our Ref 24-03573
Client Ref PY240528
Contract Title NORTH KILLINGHOLME

			Lab No	2302216	2302217	2302218	2302219	2302220	2302221
			.Sample ID	MIP04	MIP04	MIP04	MIP04	MIP04	MIP04
			Depth	2.00-3.00	3.00-3.20	4.00-4.30	4.30-4.60	4.60-4.70	4.70-5.00
			Other ID						
			Sample Type	ES	ES	ES	ES	ES	ES
			Sampling Date	15/02/2024	15/02/2024	15/02/2024	15/02/2024	15/02/2024	15/02/2024
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03573
Client Ref PY240528
Contract Title NORTH KILLINGHOLME

			Lab No	2302222	2302223	2302224	2302225	2302226
			.Sample ID	MIP05	MIP05	MIP05	MIP05	MIP05
			Depth	2.00-3.00	3.20-3.50	3.00-3.70	3.70-4.20	4.60-5.40
			Other ID					
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	15/02/2024	15/02/2024	15/02/2024	15/02/2024	15/02/2024
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Petroleum Hydrocarbons								
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10
PAHs								
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.03	< 0.03	< 0.03	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	< 0.03	< 0.03	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	< 0.03	< 0.03	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
PCBs								
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 52	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 101	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 118	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 153	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 138	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

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Summary of Chemical Analysis
Soil Samples

Our Ref 24-03573
Client Ref PY240528
Contract Title NORTH KILLINGHOLME

			Lab No	2302222	2302223	2302224	2302225	2302226
			.Sample ID	MIP05	MIP05	MIP05	MIP05	MIP05
			Depth	2.00-3.00	3.20-3.50	3.00-3.70	3.70-4.20	4.60-5.40
			Other ID					
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	15/02/2024	15/02/2024	15/02/2024	15/02/2024	15/02/2024
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
PCB 180	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 7 Total	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenols								
Phenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
p-cresol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

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Summary of Chemical Analysis
Soil Samples

Our Ref 24-03573
Client Ref PY240528
Contract Title NORTH KILLINGHOLME

			Lab No	2302222	2302223	2302224	2302225	2302226
			.Sample ID	MIP05	MIP05	MIP05	MIP05	MIP05
			Depth	2.00-3.00	3.20-3.50	3.00-3.70	3.70-4.20	4.60-5.40
			Other ID					
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	15/02/2024	15/02/2024	15/02/2024	15/02/2024	15/02/2024
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
VOCs								
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03573
Client Ref PY240528
Contract Title NORTH KILLINGHOLME

				Lab No	2302222	2302223	2302224	2302225	2302226
				.Sample ID	MIP05	MIP05	MIP05	MIP05	MIP05
				Depth	2.00-3.00	3.20-3.50	3.00-3.70	3.70-4.20	4.60-5.40
				Other ID					
				Sample Type	ES	ES	ES	ES	ES
				Sampling Date	15/02/2024	15/02/2024	15/02/2024	15/02/2024	15/02/2024
				Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
SVOCs									
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03573
Client Ref PY240528
Contract Title NORTH KILLINGHOLME

			Lab No	2302222	2302223	2302224	2302225	2302226
			.Sample ID	MIP05	MIP05	MIP05	MIP05	MIP05
			Depth	2.00-3.00	3.20-3.50	3.00-3.70	3.70-4.20	4.60-5.40
			Other ID					
			Sample Type	ES	ES	ES	ES	ES
			Sampling Date	15/02/2024	15/02/2024	15/02/2024	15/02/2024	15/02/2024
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Information in Support of the Analytical Results

Our Ref 24-03573
Client Ref PY240528
Contract NORTH KILLINGHOLME

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2302216	MIP04 2.00-3.00 SOIL	15/02/24	GJ 250ml, GJ 60ml, PT 1L x2		
2302217	MIP04 3.00-3.20 SOIL	15/02/24	GJ 250ml, GJ 60ml		
2302218	MIP04 4.00-4.30 SOIL	15/02/24	GJ 250ml, GJ 60ml		
2302219	MIP04 4.30-4.60 SOIL	15/02/24	GJ 250ml, GJ 60ml, PT 1L		
2302220	MIP04 4.60-4.70 SOIL	15/02/24	GJ 250ml, GJ 60ml		
2302221	MIP04 4.70-5.00 SOIL	15/02/24	GJ 250ml, GJ 60ml, PT 1L		
2302222	MIP05 2.00-3.00 SOIL	15/02/24	GJ 250ml, GJ 60ml, PT 1L x2		
2302223	MIP05 3.20-3.50 SOIL	15/02/24	GJ 250ml, GJ 60ml, PT 1L x2		
2302224	MIP05 3.00-3.70 SOIL	15/02/24	GJ 250ml, GJ 60ml		
2302225	MIP05 3.70-4.20 SOIL	15/02/24	GJ 250ml, GJ 60ml, PT 1L x2		
2302226	MIP05 4.60-5.40 SOIL	15/02/24	GJ 250ml, GJ 60ml, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

Certificate of Analysis

Certificate Number	24-03821	*Issued:*	01-Mar-24

Client Geotechnics LTD
The Geotechnical Centre
Unit 1B Borders Ind. Park
River Lane
Saltney
Chester
CH4 8RJ

Our Reference	24-03821
Client Reference	PY240528
Order No	OY39674
Contract Title	North Killingholme
Description	One Soil sample.
Date Received	22-Feb-24
Date Started	22-Feb-24
Date Completed	01-Mar-24
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03821
Client Ref PY240528
Contract Title North Killingholme

Lab No	2303462
.Sample ID	TP02
Depth	0.50
Other ID	
Sample Type	ES
Sampling Date	12/02/2024
Sampling Time	1300

Test	Method	LOD	Units	
Metals				
Arsenic	DETSC 2301#	0.2	mg/kg	6.8
Barium	DETSC 2301#	1.5	mg/kg	120
Beryllium	DETSC 2301#	0.2	mg/kg	4.1
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	1.9
Cadmium	DETSC 2301#	0.1	mg/kg	0.3
Chromium	DETSC 2301#	0.15	mg/kg	29
Copper	DETSC 2301#	0.2	mg/kg	15
Lead	DETSC 2301#	0.3	mg/kg	10
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05
Nickel	DETSC 2301#	1	mg/kg	12
Selenium	DETSC 2301#	0.5	mg/kg	1.5
Vanadium	DETSC 2301#	0.8	mg/kg	75
Zinc	DETSC 2301#	1	mg/kg	49
Inorganics				
pH	DETSC 2008#		pH	10.4
Total Organic Carbon	DETSC 2084#	0.5	%	1.2
Petroleum Hydrocarbons				
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10
PAHs				
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.05
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo).

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03821
Client Ref PY240528
Contract Title North Killingholme

Lab No	2303462
.Sample ID	TP02
Depth	0.50
Other ID	
Sample Type	ES
Sampling Date	12/02/2024
Sampling Time	1300

Test	Method	LOD	Units	
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.11
Pyrene	DETSC 3303#	0.03	mg/kg	0.10
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.05
Chrysene	DETSC 3303	0.03	mg/kg	0.06
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.06
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.04
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.46
PCBs				
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg	< 0.01
PCB 52	DETSC 3401#	0.01	mg/kg	< 0.01
PCB 101	DETSC 3401#	0.01	mg/kg	< 0.01
PCB 118	DETSC 3401#	0.01	mg/kg	< 0.01
PCB 153	DETSC 3401#	0.01	mg/kg	< 0.01
PCB 138	DETSC 3401#	0.01	mg/kg	< 0.01
PCB 180	DETSC 3401#	0.01	mg/kg	< 0.01
PCB 7 Total	DETSC 3401#	0.01	mg/kg	< 0.01
Phenols				
Phenol	DETSC 3451*	0.01	mg/kg	< 0.01
4-Chloro-3-methylphenol	DETSC 3451*	0.01	mg/kg	< 0.01
2,4-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01
2,4-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01
p-cresol	DETSC 3451*	0.01	mg/kg	< 0.01
2,6-Dimethylphenol	DETSC 3451*	0.01	mg/kg	< 0.01
2,6-Dichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01
2,4,6-Trichlorophenol	DETSC 3451*	0.01	mg/kg	< 0.01

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03821
Client Ref PY240528
Contract Title North Killingholme

Lab No	2303462
.Sample ID	TP02
Depth	0.50
Other ID	
Sample Type	ES
Sampling Date	12/02/2024
Sampling Time	1300

Test	Method	LOD	Units	
VOCs				
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo).

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03821
Client Ref PY240528
Contract Title North Killingholme

Lab No	2303462
.Sample ID	TP02
Depth	0.50
Other ID	
Sample Type	ES
Sampling Date	12/02/2024
Sampling Time	1300

Test	Method	LOD	Units	
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01
SVOCs				
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo).

Summary of Chemical Analysis
Soil Samples

Our Ref 24-03821
Client Ref PY240528
Contract Title North Killingholme

Lab No	2303462
.Sample ID	TP02
Depth	0.50
Other ID	
Sample Type	ES
Sampling Date	12/02/2024
Sampling Time	1300

Test	Method	LOD	Units	
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1

Summary of Asbestos Analysis
Soil Samples

Our Ref 24-03821
Client Ref PY240528
Contract Title North Killingholme

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2303462	TP02 0.50	SOIL	Chrysotile	Chrysotile present as fibre bundles	Ben Barsby

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 24-03821
Client Ref PY240528
Contract North Killingholme

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2303462	TP02 0.50 SOIL	12/02/24	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days), VOC (7 days)	

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

Certificate of Analysis

Certificate Number	24-04106	*Issued:*	29-Feb-24

Client Geotechnics LTD
The Geotechnical Centre
Unit 1B Borders Ind. Park
River Lane
Saltney
Chester
CH4 8RJ

Our Reference	24-04106
Client Reference	PY240528
Order No	OY39674
Contract Title	North Killingholme
Description	2 Soil samples.
Date Received	13-Feb-24
Date Started	27-Feb-24
Date Completed	29-Feb-24
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

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Summary of Asbestos Analysis

Samples

Our Ref 24-04106
Client Ref PY240528
Contract Title North Killingholme

Lab No	Sample ID	Sample Location	Material Type	Result	Comment*	Analyst

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Summary of Asbestos Quantification Analysis
Soil Samples

Our Ref 24-04106
Client Ref PY240528
Contract Title North Killingholme

		Lab No	2305009	2305010
		.Sample ID	TP01	TP05
		Depth	1.00	1.70
		Other ID		
		Sample Type	ES	ES
		Sampling Date	08/02/2024	09/02/2024
		Sampling Time	1430	1130
Test	**Method**	**Units**		
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**0.005**	**0.005**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	0.005	0.005
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na
Breakdown of Gravimetric Analysis (a)				
Mass of Sample		g	520.82	737.65
ACMs present*		type		
Mass of ACM in sample		g		
% ACM by mass		%		
% asbestos in ACM		%		
% asbestos in sample		%		
Breakdown of Detailed Gravimetric Analysis (b)				
% Amphibole bundles in sample		Mass %	0.002	0.002
% Chrysotile bundles in sample		Mass %	0.002	0.003
Breakdown of PCOM Analysis (c)				
% Amphibole fibres in sample		Mass %	na	na
% Chrysotile fibres in sample		Mass %	na	na
Breakdown of Potentially Respirable Fibre Analysis (d)				
Amphibole fibres		Fibres/g	na	na
Chrysotile fibres		Fibres/g	na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Information in Support of the Analytical Results

Our Ref 24-04106
Client Ref PY240528
Contract North Killingholme

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2305009	TP01 1.00 SOIL	08/02/24	GJ 250ml, GJ 60ml, PT 1L x2		
2305010	TP05 1.70 SOIL	09/02/24	GJ 250ml, GJ 60ml, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

Certificate of Analysis

Certificate Number	24-04107	*Issued:*	29-Feb-24
Client	Geotechnics LTD The Geotechnical Centre Unit 1B Borders Ind. Park River Lane Saltney Chester CH4 8RJ		
Our Reference	24-04107		
Client Reference	PY240528		
Order No	OY39674		
Contract Title	North Killingholme		
Description	One Soil sample.		
Date Received	16-Feb-24		
Date Started	27-Feb-24		
Date Completed	29-Feb-24		
Test Procedures	Identified by prefix DETSn (details on request).		
Notes	Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.		

Approved By

Kirk Bridgewood
General Manager

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Summary of Asbestos Analysis
Samples

Our Ref 24-04107
Client Ref PY240528
Contract Title North Killingholme

Lab No	Sample ID	Sample Location	Material Type	Result	Comment*	Analyst

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Summary of Asbestos Quantification Analysis
Soil Samples

Our Ref 24-04107
Client Ref PY240528
Contract Title North Killingholme

Lab No	2305011
.Sample ID	TP07
Depth	2.00
Other ID	
Sample Type	ES
Sampling Date	12/02/2024
Sampling Time	1000

Test	**Method**	**Units**	
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**0.003**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	0.003
Quantification by PCOM (c)	DETSC 1102	Mass %	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na
Breakdown of Gravimetric Analysis (a)			
Mass of Sample		g	769.71
ACMs present*		type	
Mass of ACM in sample		g	
% ACM by mass		%	
% asbestos in ACM		%	
% asbestos in sample		%	
Breakdown of Detailed Gravimetric Analysis (b)			
% Amphibole bundles in sample		Mass %	0.003
% Chrysotile bundles in sample		Mass %	na
Breakdown of PCOM Analysis (c)			
% Amphibole fibres in sample		Mass %	na
% Chrysotile fibres in sample		Mass %	na
Breakdown of Potentially Respirable Fibre Analysis (d)			
Amphibole fibres		Fibres/g	na
Chrysotile fibres		Fibres/g	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Information in Support of the Analytical Results

Our Ref 24-04107
Client Ref PY240528
Contract North Killingholme

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2305011	TP07 2.00 SOIL	12/02/24	GJ 250ml, GJ 60ml, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-
Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

Certificate of Analysis

Certificate Number	24-04108	*Issued:*	29-Feb-24

Client Geotechnics LTD
The Geotechnical Centre
Unit 1B Borders Ind. Park
River Lane
Saltney
Chester
CH4 8RJ

Our Reference	24-04108
Client Reference	PY240528
Order No	OY39674
Contract Title	North Killingholme
Description	One Soil sample.
Date Received	16-Feb-24
Date Started	27-Feb-24
Date Completed	29-Feb-24
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By



Kirk Bridgewood
General Manager

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Summary of Asbestos Analysis

Samples

Our Ref 24-04108
Client Ref PY240528
Contract Title North Killingholme

Lab No	Sample ID	Sample Location	Material Type	Result	Comment*	Analyst

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Summary of Asbestos Quantification Analysis
Soil Samples

Our Ref 24-04108
Client Ref PY240528
Contract Title North Killingholme

Lab No	2305012
.Sample ID	SP01
Depth	
Other ID	
Sample Type	ES
Sampling Date	12/02/2024
Sampling Time	1400

Test	**Method**	**Units**	
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na
Breakdown of Gravimetric Analysis (a)			
Mass of Sample		g	907.71
ACMs present*		type	
Mass of ACM in sample		g	
% ACM by mass		%	
% asbestos in ACM		%	
% asbestos in sample		%	
Breakdown of Detailed Gravimetric Analysis (b)			
% Amphibole bundles in sample		Mass %	na
% Chrysotile bundles in sample		Mass %	<0.001
Breakdown of PCOM Analysis (c)			
% Amphibole fibres in sample		Mass %	na
% Chrysotile fibres in sample		Mass %	na
Breakdown of Potentially Respirable Fibre Analysis (d)			
Amphibole fibres		Fibres/g	na
Chrysotile fibres		Fibres/g	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Information in Support of the Analytical Results

Our Ref 24-04108
Client Ref PY240528
Contract North Killingholme

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2305012	SP01 SOIL	12/02/24	GJ 250ml, GJ 60ml, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

Certificate of Analysis

Certificate Number	24-04341	*Issued:*	05-Mar-24

Client Geotechnics LTD
The Geotechnical Centre
Unit 1B Borders Ind. Park
River Lane
Saltney
Chester
CH4 8RJ

Our Reference	24-04341
Client Reference	PY240528
Order No	OY39674
Contract Title	North Killingholme
Description	One Soil sample.
Date Received	16-Feb-24
Date Started	29-Feb-24
Date Completed	05-Mar-24
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Asbestos Analysis
Samples

Our Ref 24-04341
Client Ref PY240528
Contract Title North Killingholme

Lab No	Sample ID	Sample Location	Material Type	Result	Comment*	Analyst

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Summary of Asbestos Quantification Analysis
Soil Samples

Our Ref 24-04341
Client Ref PY240528
Contract Title North Killingholme

Lab No	2306245
.Sample ID	TP07
Depth	2.00
Other ID	
Sample Type	ES
Sampling Date	12/02/2024
Sampling Time	1000

Test	**Method**	**Units**	
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**0.006**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	0.006
Quantification by PCOM (c)	DETSC 1102	Mass %	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na
Breakdown of Gravimetric Analysis (a)			
Mass of Sample		g	1157.12
ACMs present*		type	
Mass of ACM in sample		g	
% ACM by mass		%	
% asbestos in ACM		%	
% asbestos in sample		%	
Breakdown of Detailed Gravimetric Analysis (b)			
% Amphibole bundles in sample		Mass %	0.006
% Chrysotile bundles in sample		Mass %	na
Breakdown of PCOM Analysis (c)			
% Amphibole fibres in sample		Mass %	na
% Chrysotile fibres in sample		Mass %	na
Breakdown of Potentially Respirable Fibre Analysis (d)			
Amphibole fibres		Fibres/g	na
Chrysotile fibres		Fibres/g	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Information in Support of the Analytical Results

Our Ref 24-04341
Client Ref PY240528
Contract North Killingholme

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2306245	TP07 2.00 SOIL	12/02/24	GJ 250ml, GJ 60ml, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

Certificate of Analysis

Certificate Number	24-04594	*Issued:*	07-Mar-24

Client Geotechnics LTD
The Geotechnical Centre
Unit 1B Borders Ind. Park
River Lane
Saltney
Chester
CH4 8RJ

Our Reference	24-04594
Client Reference	PY240528
Order No	OY39674
Contract Title	North Killingholme
Description	One Soil sample.
Date Received	22-Feb-24
Date Started	04-Mar-24
Date Completed	07-Mar-24
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Asbestos Analysis
Samples

Our Ref 24-04594
Client Ref PY240528
Contract Title North Killingholme

Lab No	Sample ID	Sample Location	Material Type	Result	Comment*	Analyst

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Summary of Asbestos Quantification Analysis
Soil Samples

Our Ref 24-04594
Client Ref PY240528
Contract Title North Killingholme

Lab No	2307460
.Sample ID	TP02
Depth	0.50
Other ID	
Sample Type	ES
Sampling Date	12/02/2024
Sampling Time	1300

Test	Method	Units	
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**0.003**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	0.003
Quantification by PCOM (c)	DETSC 1102	Mass %	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na
Breakdown of Gravimetric Analysis (a)			
Mass of Sample		g	1058.35
ACMs present*		type	
Mass of ACM in sample		g	
% ACM by mass		%	
% asbestos in ACM		%	
% asbestos in sample		%	
Breakdown of Detailed Gravimetric Analysis (b)			
% Amphibole bundles in sample		Mass %	na
% Chrysotile bundles in sample		Mass %	0.003
Breakdown of PCOM Analysis (c)			
% Amphibole fibres in sample		Mass %	na
% Chrysotile fibres in sample		Mass %	na
Breakdown of Potentially Respirable Fibre Analysis (d)			
Amphibole fibres		Fibres/g	na
Chrysotile fibres		Fibres/g	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Information in Support of the Analytical Results

Our Ref 24-04594
Client Ref PY240528
Contract North Killingholme

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2307460	TP02 0.50 SOIL	12/02/24	GJ 250ml, GJ 60ml, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-
Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

APPENDIX 10

Water Laboratory Certificates of Analysis

Certificate of Analysis

Certificate Number	24-03359	*Issued:*	26-Feb-24

Client Geotechnics LTD
The Geotechnical Centre
Unit 1B Borders Ind. Park
River Lane
Saltney
Chester
CH4 8RJ

Our Reference	24-03359
Client Reference	PY240528
Order No	OY39674
Contract Title	North Killingholme
Description	One Water Other sample.
Date Received	16-Feb-24
Date Started	16-Feb-24
Date Completed	26-Feb-24
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Water Samples

Our Ref 24-03359
Client Ref PY240528
Contract Title North Killingholme

Lab No	2300994
.Sample ID	EW1
Depth	
Other ID	
Sample Type	WATER OTHER
Sampling Date	13/02/2024
Sampling Time	1215

Test	Method	LOD	Units	
Metals				
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	1.4
Boron, Dissolved	DETSC 2306*	12	ug/l	100
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03
Calcium, Dissolved	DETSC 2306	0.09	mg/l	87
Chromium, Dissolved	DETSC 2306	0.25	ug/l	2.2
Copper, Dissolved	DETSC 2306	0.4	ug/l	3.0
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.16
Manganese, Dissolved	DETSC 2306	0.22	ug/l	1.4
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	2.7
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.78
Zinc, Dissolved	DETSC 2306	1.3	ug/l	4.1
Inorganics				
pH	DETSC 2008		pH	7.8
Dissolved Organic Carbon	DETSC 2085	2	mg/l	8.9
Petroleum Hydrocarbons				
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	3.6
Aliphatic C12-C16	DETSC 3072*	1	ug/l	8.4
Aliphatic C16-C21	DETSC 3072*	1	ug/l	53
Aliphatic C21-C35	DETSC 3072*	1	ug/l	24
Aliphatic C5-C35	DETSC 3072*	10	ug/l	89
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	ug/l	89
PAHs				
Naphthalene	DETSC 3304	0.05	ug/l	< 0.05
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.02
Anthracene	DETSC 3304	0.01	ug/l	0.01
Fluoranthene	DETSC 3304	0.01	ug/l	0.04
Pyrene	DETSC 3304	0.01	ug/l	0.05

Key: * -not accredited.

Summary of Chemical Analysis
Water Samples

Our Ref 24-03359
Client Ref PY240528
Contract Title North Killingholme

Lab No	2300994
.Sample ID	EW1
Depth	
Other ID	
Sample Type	WATER OTHER
Sampling Date	13/02/2024
Sampling Time	1215

Test	Method	LOD	Units	
Benzo(a)anthracene	DETSC 3304*	0.01	ug/l	0.01
Chrysene	DETSC 3304	0.01	ug/l	0.02
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	< 0.20
PCBs				
PCB 28 + PCB 31	DETSC 3402	0.3	ug/l	< 0.3
PCB 52	DETSC 3402	0.2	ug/l	< 0.2
PCB 101	DETSC 3402	0.3	ug/l	< 0.3
PCB 118 + PCB 123	DETSC 3402	0.6	ug/l	< 0.6
PCB 138	DETSC 3402	0.2	ug/l	< 0.2
PCB 153	DETSC 3402	0.2	ug/l	< 0.2
PCB 180	DETSC 3402	0.2	ug/l	< 0.2
PCB 7 Total	DETSC 3402	1	ug/l	< 1.0
Phenols				
Phenol	DETSC 3451*	0.1	ug/l	< 0.10
4-Chloro-3-methylphenol	DETSC 3451*	0.1	ug/l	< 0.10
2,4-Dichlorophenol	DETSC 3451*	0.1	ug/l	< 0.10
2,4-Dimethylphenol	DETSC 3451*	0.1	ug/l	< 0.10
p-cresol	DETSC 3451*	0.1	ug/l	< 0.10
2,6-Dimethylphenol	DETSC 3451*	0.1	ug/l	< 0.10
2,6-Dichlorophenol	DETSC 3451*	0.1	ug/l	< 0.10
2,4,6-Trichlorophenol	DETSC 3451*	0.1	ug/l	< 0.10

Key: * -not accredited.

Summary of Chemical Analysis
Water Samples

Our Ref 24-03359
Client Ref PY240528
Contract Title North Killingholme

Lab No	2300994
.Sample ID	EW1
Depth	
Other ID	
Sample Type	WATER OTHER
Sampling Date	13/02/2024
Sampling Time	1215

Test	Method	LOD	Units	
VOCs				
Dichlorodifluoromethane	DETSC 3432	1	ug/l	< 1
Chloromethane	DETSC 3432	1	ug/l	< 1
Vinyl Chloride	DETSC 3432	1	ug/l	< 1
Bromomethane	DETSC 3432	1	ug/l	< 1
Chloroethane	DETSC 3432	1	ug/l	< 1
Trichlorofluoromethane	DETSC 3432*	1	ug/l	< 1
1,1-dichloroethylene	DETSC 3432	1	ug/l	< 1
Methylene Chloride	DETSC 3432*	27	ug/l	< 27
Trans-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1
1,1-dichloroethane	DETSC 3432	1	ug/l	< 1
Cis-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1
2,2-dichloropropane	DETSC 3432*	2	ug/l	< 2
Bromochloromethane	DETSC 3432	4	ug/l	< 4
Chloroform	DETSC 3432	1	ug/l	< 1
1,1,1-trichloroethane	DETSC 3432	1	ug/l	< 1
1,1-dichloropropene	DETSC 3432	1	ug/l	< 1
Carbon tetrachloride	DETSC 3432	1	ug/l	< 1
Benzene	DETSC 3432	1	ug/l	< 1
1,2-dichloroethane	DETSC 3432	1	ug/l	< 1
Trichloroethylene	DETSC 3432*	1	ug/l	< 1
1,2-dichloropropane	DETSC 3432	1	ug/l	< 1
Dibromomethane	DETSC 3432	1	ug/l	< 1
Bromodichloromethane	DETSC 3432	4	ug/l	< 4
cis-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1
Toluene	DETSC 3432	1	ug/l	< 1
trans-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1
1,1,2-trichloroethane	DETSC 3432	1	ug/l	< 1
Tetrachloroethylene	DETSC 3432	1	ug/l	< 1
1,3-dichloropropane	DETSC 3432	1	ug/l	< 1
Dibromochloromethane	DETSC 3432	1	ug/l	< 1
1,2-dibromoethane	DETSC 3432	1	ug/l	< 1
Chlorobenzene	DETSC 3432	1	ug/l	< 1
1,1,1,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1
Ethylbenzene	DETSC 3432	1	ug/l	< 1
m+p-Xylene	DETSC 3432	2	ug/l	< 2
o-Xylene	DETSC 3432	1	ug/l	< 1
Styrene	DETSC 3432	1	ug/l	< 1
Bromoform	DETSC 3432	1	ug/l	< 1
Isopropylbenzene	DETSC 3432	1	ug/l	< 1
1,1,2,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1

Key: * -not accredited.

Summary of Chemical Analysis
Water Samples

Our Ref 24-03359
Client Ref PY240528
Contract Title North Killingholme

Lab No	2300994
.Sample ID	EW1
Depth	
Other ID	
Sample Type	WATER OTHER
Sampling Date	13/02/2024
Sampling Time	1215

Test	Method	LOD	Units	
Bromobenzene	DETSC 3432	1	ug/l	< 1
1,2,3-trichloropropane	DETSC 3432	1	ug/l	< 1
n-propylbenzene	DETSC 3432	1	ug/l	< 1
2-chlorotoluene	DETSC 3432	1	ug/l	< 1
1,3,5-trimethylbenzene	DETSC 3432	1	ug/l	< 1
4-chlorotoluene	DETSC 3432	1	ug/l	< 1
Tert-butylbenzene	DETSC 3432	1	ug/l	< 1
1,2,4-trimethylbenzene	DETSC 3432	1	ug/l	< 1
sec-butylbenzene	DETSC 3432	1	ug/l	< 1
p-isopropyltoluene	DETSC 3432	1	ug/l	< 1
1,3-dichlorobenzene	DETSC 3432	2	ug/l	< 2
1,4-dichlorobenzene	DETSC 3432	1	ug/l	< 1
n-butylbenzene	DETSC 3432	1	ug/l	< 1
1,2-dichlorobenzene	DETSC 3432	1	ug/l	< 1
1,2-dibromo-3-chloropropane	DETSC 3432	1	ug/l	< 1
1,2,4-trichlorobenzene	DETSC 3432	1	ug/l	< 1
Hexachlorobutadiene	DETSC 3432	1	ug/l	< 1
1,2,3-trichlorobenzene	DETSC 3432	1	ug/l	< 1
MTBE	DETSC 3432*	1	ug/l	< 1
SVOCs				
Aniline	DETSC 3434*	1	ug/l	< 1.0
2-Chlorophenol	DETSC 3434*	1	ug/l	< 1.0
Benzyl Alcohol	DETSC 3434*	1	ug/l	< 1.0
2-Methylphenol	DETSC 3434*	1	ug/l	< 1.0
Bis(2-chloroisopropyl)ether	DETSC 3434*	1	ug/l	< 1.0
3&4-Methylphenol	DETSC 3434*	1	ug/l	< 1.0
Bis(2-chloroethoxy)methane	DETSC 3434*	1	ug/l	< 1.0
1,2,4-Trichlorobenzene	DETSC 3434*	1	ug/l	< 1.0
2-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0
Hexachlorocyclopentadiene	DETSC 3434*	1	ug/l	< 1.0
2,4,5-Trichlorophenol	DETSC 3434*	1	ug/l	< 1.0
2-Chloronaphthalene	DETSC 3434*	1	ug/l	< 1.0
2-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0
2,4-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0
3-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0
4-Nitrophenol	DETSC 3434*	1	ug/l	< 1.0
Dibenzofuran	DETSC 3434*	1	ug/l	< 1.0
2,6-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0
2,3,4,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0
Diethylphthalate	DETSC 3434*	1	ug/l	< 1.0
4-Chlorophenylphenylether	DETSC 3434*	1	ug/l	< 1.0

Key: * -not accredited.

Summary of Chemical Analysis
Water Samples

Our Ref 24-03359
Client Ref PY240528
Contract Title North Killingholme

Lab No	2300994
.Sample ID	EW1
Depth	
Other ID	
Sample Type	WATER OTHER
Sampling Date	13/02/2024
Sampling Time	1215

Test	Method	LOD	Units	
4-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0
Diphenylamine	DETSC 3434*	1	ug/l	< 1.0
4-Bromophenylphenylether	DETSC 3434*	1	ug/l	< 1.0
Hexachlorobenzene	DETSC 3434*	1	ug/l	< 1.0
Bis(2-ethylhexyl)ester	DETSC 3434*	1	ug/l	< 1.0
Pentachlorophenol	DETSC 3434*	1	ug/l	< 1.0
Di-n-butylphthalate	DETSC 3434*	1	ug/l	< 1.0
Butylbenzylphthalate	DETSC 3434*	1	ug/l	< 1.0
Bis(2-ethylhexyl)phthalate	DETSC 3434*	1	ug/l	< 1.0
Di-n-octylphthalate	DETSC 3434*	1	ug/l	< 1.0
1,4-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0
Dimethylphthalate	DETSC 3434*	1	ug/l	< 1.0
1,3-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0
2,3,5,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0
Azobenzene	DETSC 3434*	1	ug/l	< 1.0
Carbazole	DETSC 3434*	1	ug/l	< 1.0
1-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0

2300994 - WATER OTHER testing is not accredited

Information in Support of the Analytical Results

Our Ref 24-03359
Client Ref PY240528
Contract North Killingholme

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2300994	EW1 WATER	13/02/24	GB 1L, GV x2, PB 1L	pH/Cond (1 days)	

Key: G-Glass P-Plastic B-Bottle V-Vial

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-
Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

APPENDIX 11

Environmental Notes

INVESTIGATION TECHNIQUES

INTRODUCTION

The following brief review of Ground Investigation techniques, generally used as part of most Site Investigations in the UK, summarises their methodology, advantages and limitations. Detailed descriptions of the techniques are available and can be provided on request. This review should be read in conjunction with the accompanying General Notes.

TRIAL PITS

The trial pit is amongst the simplest yet most effective means of identifying shallow ground conditions on a site. Its advantages include simplicity, speed, potential accuracy and cost-effectiveness. The trial pit is most commonly formed using a back-acting excavator which can typically determine ground conditions to some 4 metres below ground level. Hand excavation is often used to locate, expose and detail existing foundations, features or services. In general, it is difficult to extend pits significantly below the water table in predominantly granular soils, where flows can cause instability. Unless otherwise stated, the trial pits will not have been provided with temporary side support during their construction. Under such circumstances, entrance into the pit is not permitted and hence observations will have been made from the ground surface and samples taken from the excavator bucket.

Where access for personnel is required to allow close observation of the exposed strata, the taking of samples and the carrying out of in situ tests, the sides of the trial pits (Observation Pits in BS 5930:2015) will be made safe using temporary supports or the sides battered back to a stable angle. Some limited access to such Trial Pits (Observation Pits) at depths less than 1m may be allowed in stable conditions or where the sides are benched or battered back to a safe angle.

Trends in strata type, level and thickness can be determined, shear surfaces identified and the behaviour of plant, excavation sides and excavated materials can be related to the construction process. They are particularly valuable in land slip investigations. Some types of in situ test can be undertaken in such pits and large disturbed or block samples obtained.

CABLE PERCUSSION BORING

The light Cable Percussion technique of soft ground boring, typically at a diameter of 150mm, is a well-established simple and flexible method of boring vertical holes and generally allows data to be obtained in respect of strata conditions other than rock. A tubular cutter (for cohesive soils) or shell with a flap valve (for granular soils) is repeatedly lifted and dropped using a winch and rope operating from an "A" frame. Soil which enters these tools is regularly removed and either sampled for subsequent examination or test, or laid to one side for later removal off site and licensed disposal or, if permitted by the Client, use as backfill. Steel casing will have been used to prevent collapse of the borehole sides where necessary. A degree of disturbance of soil and mixing of layers is inevitable and the presence of very thin layers of different soils within a particular stratum may not be identified. Changes in strata type can only be detected on recognition of a change in soil samples at the surface, after the interface has been passed. For the foregoing reasons, depth measurements should not be considered to be more accurate than 0.10 metre. The technique can determine ground conditions to depths in excess of 30 metres under suitable circumstances and usually causes less surface disturbance than trial pitting.

In cohesive soils cylindrical samples are retrieved by driving or pushing in 100mm nominal diameter tubes. In soft soils, piston sampling or vane testing may be undertaken. In granular soils and often in cohesive materials, in situ Standard Penetration Tests (SPT's) are performed. The SPT records the number of standard blows required to drive a 50mm diameter open or cone ended probe for 300mm after an initial 150mm penetration. A modified method of recording is used in denser strata. Small disturbed samples are obtained throughout.

ROTARY DRILLING

Rotary Drilling to produce cores by rotating an annular diamond-impregnated tube or barrel into the ground is the technique most appropriate to the forming of site investigation boreholes through rock or other hard strata. It has the advantage of being able to be used vertically or at an angle. Core diameters of less than 100mm are most common for site investigation purposes. Core is normally retrieved in plastic lining tubes. A flushing fluid such as air, water or foam is used to cool the bit and carry cuttings to the surface. Depths in excess of 60 metres can be achieved under suitable circumstances using rotary techniques, with minimal surface disturbance.

Examination of cores allows detailed rock description and generally enables angled discontinuity surfaces to be observed. However, vertical holes do not necessarily reveal the presence of vertical or near-vertical fissures or joint discontinuities. The core type and/or techniques used will depend on the ground conditions. Where open hole rotary drilling is employed, descriptions of strata result from examination at the surface of small particles ejected from the borehole in the flushing medium. In consequence, no indication of fissuring, bedding, consistency or degree of weathering can be obtained.

DYNAMIC SAMPLING

This technique involves the driving of an open-ended tube into the ground and retrieval of the soil which enters the tube. It was previously called window or windowless sampling. The term "window sample" arose from the original device which had a "window" or slot cut into the side of the tube through which samples were taken. This was superseded by the use of a thin-walled plastic liner to retrieve the soil sample from within a sampler (windowless sampling) which has a solid wall. Line diameters range from 36 to 86mm. Such samples can be used for qualitative logging, selection of samples for classification and chemical analysis and for obtaining a rudimentary assessment of strength.

Driving devices can be hand-held or machine mounted and the drive tubes are typically in 1m lengths. Depending on the type of rig used, the hole formed can be cased to prevent collapse of the borehole sides. Where the type of rig does not allow the insertion of casing, the success of this technique can be limited when soils and groundwater conditions are such that the sides of the hole collapse on withdrawal of the sampler. Obstructions within the ground, the density of the material or its strength can also limit the depth and rate of penetration of this light-weight investigation technique. Nevertheless, it is a valuable tool where access is constrained such as within buildings or on embankments. Depths of up to 10m can be achieved in suitable circumstances depending on the rig type but depths of 5m to 6m are more common.

EXPLORATORY HOLE RECORDS

The data obtained by these techniques are generally presented on Trial Pit, Borehole, Drillhole or Dynamic Sample Records. The descriptions of strata result from information gathered from a number of sources which may include published geological data, preliminary field observations and descriptions, in situ test results, laboratory test results and specimen descriptions. A key to the symbols and abbreviations used accompanies the records. The descriptions on the exploratory hole records accommodate but may not necessarily be identical to those on any preliminary records or the laboratory summaries.

The records show ground conditions at the exploratory hole locations. The degree to which they can be used to represent conditions between or beyond such holes, however, is a matter for geological interpretation rather than factual reporting and the associated uncertainties must be recognised.

DYNAMIC PROBING

This technique typically measures the number of blows of a standard weight falling over a standard height to advance a cone-ended rod over sequential standard distances (typically 100mm). Some devices measure the penetration of the probe per standard blow. It is essentially a profiling tool and is best used in conjunction with other investigation techniques where site-specific correlation can be used to delineate the distribution of soft or loose soils or the upper horizon of a dense or strong layer such as rock.

Both machine-driven and hand-driven equipment is available, the selection depending upon access restrictions and the depth of penetration required. It is particularly useful where access for larger equipment is not available, disturbance is to be minimised or where there are cost constraints. No samples are recovered and some techniques leave a sacrificial cone head in the ground. As with other lightweight techniques, progress is limited in strong or dense soils. The results are presented both numerically and graphically. Depths of up to 10m are commonly achieved in suitable circumstances.

The hand-driven DCP probing device has been calibrated by the Highways Agency to provide a profile of CBR values over a range of depths.

INSTRUMENTATION

The most common form of instrument used in site investigation is either the standpipe or else the standpipe piezometer which can be installed in investigation holes. They are used to facilitate monitoring of groundwater levels and water sampling over a period of time following site work. Normally a standpipe would be formed using rigid plastic tubing which has been perforated or slotted over much of its length whilst a standpipe piezometer would have a filter tip which would be placed at a selected level and the hole sealed above and sometimes below to isolate the zone of interest. Groundwater levels are determined using an electronic "dip meter" to measure the depth to the water surface from ground level. Piezometers can also be used to measure permeability. They are simple and inexpensive instruments for long term monitoring but response times can limit their use in tidal areas and access to the ground surface at each instrument is necessary. Remote reading requires more sophisticated hydraulic, electronic or pneumatic equipment.

Settlement can be monitored using surface or buried target plates whilst lateral movement over a range of depths is monitored using slip indicator or inclinometer equipment.

GENERAL NOTES

1. *The report is prepared for the exclusive use of the Client named in the document and copyright subsists with Geotechnics Limited. Prior written permission must be obtained to reproduce all or part of the report. It is prepared on the understanding that its contents are only disclosed to parties directly involved in the current investigation, preparation and development of the site.*

2. *Further copies may be obtained with the Client's written permission, from Geotechnics Limited with whom the master copy of the document will be retained.*

3. *The report and/or opinion is prepared for the specific purpose stated in the document and in relation to the nature and extent of proposals made available to Geotechnics Limited at that time. Re-consideration will be necessary should those details change. The recommendations should not be used for other schemes on or adjacent to the site without further reference to Geotechnics Limited.*

4. *The assessment of the significance of the factual data, where called for, is provided to assist the Client and their Engineer and/or Advisers in the preparation of their designs.*

5. *The report is based on the ground conditions encountered in the exploratory holes together with the results of field and laboratory testing in the context of the proposed development. The data from any commissioned desk study and site reconnaissance are also drawn upon. There may be special conditions appertaining to the site, however, which are not revealed by the investigation and which may not be taken into account in the report.*

6. *Methods of construction and/or design other than those proposed by the designers or referred to in the report may require consideration during the evolution of the proposals and further assessment of the geotechnical and any geoenvironmental data would be required to provide discussion and evaluations appropriate to these methods.*

7. *The accuracy of results reported depends upon the technique of measurement, investigation and test used and these values should not be regarded necessarily as characteristics of the strata as a whole (see accompanying notes on Investigation Techniques). Where such measurements are critical, the technique of investigation will need to be reviewed and supplementary investigation undertaken in accordance with the advice of the Company where necessary.*

8. *The samples selected for laboratory test are prepared and tested in accordance with the relevant Clauses and Parts of BS EN ISO 17892 and BS 1377 Parts 1 to 8, where appropriate, in Geotechnics Limited's UKAS accredited Laboratory, where possible. A list of tests is given.*

9. *Tests requiring the use of another laboratory having UKAS accreditation where possible are identified.*

10. *Any unavoidable variations from specified procedures are identified in the report.*

11. *Specimens are cut vertically, where this is relevant and can be identified, unless otherwise stated*

12. *All the data required by the test procedures are recorded on individual test sheets but the results in the report are presented in summary form to aid understanding and assimilation for design purposes. Where all details are required, these can be made available.*

13. *Whilst the report may express an opinion on possible configurations of strata between or beyond exploratory holes, or on the possible presence of features based on either visual, verbal, written, cartographical, photographic or published evidence, this is for guidance only and no liability can be accepted for its accuracy.*

14. *The Code of Practice for Ground Investigations – BS 5930:2015 calls for man-made soils to be described as Anthropogenic Ground with soils placed in an un-controlled manner classified as Made Ground and soils placed in a controlled manner as Fill. In view of the difficulty in always accurately determining the origin of man-made soils in exploratory holes, Geotechnics Limited classify such materials as Made Ground. Where soils can be clearly identified as being placed in a controlled manner then further classification of the soils as Fill has been added to the Exploratory Hole Records.*

15. *Classification of man-made soils is based on the inspection of retrieved samples or exposed excavations. Where it is obvious that foreign matter such as paper, plastic or metal is present, classification is clear. Frequently, however, for man-made soils that arise from the adjacent ground or from the backfilling of excavations, their visual characteristics can closely resemble those of undisturbed ground. Other evidence such as site history, exploratory hole location or other tests may need to be drawn upon to provide clarification. For these reasons, classification of soils on the exploratory hole records as either Made Ground or naturally occurring strata, the boundary between them and any interpretation that this gives rise to should be regarded as provisional and subject to re-evaluation in the light of further data.*

16. *The classification of materials as Topsoil is generally based on visual description and should not be interpreted to mean that the material so described complies with the criteria for Topsoil used in BS 3882:2015. Specific testing would be necessary where such a definition is a requirement.*

17. *Ground conditions should be monitored during the construction of the works and the report should be re-evaluated in the light of these data by the supervising geotechnical engineers.*

18. *Any comments on groundwater conditions are based on observations made at the time of the investigation, unless specifically stated otherwise. It should be noted, however, that the observations are subject to the method and speed of boring, drilling or excavation and that groundwater levels will vary due to seasonal or other effects.*

19. *Any bearing capacities for conventional spread foundations which are given in the report and interpreted from the investigation are for bases at a minimum depth of 1m below finished ground level in naturally occurring strata and at broadly similar levels throughout individual structures, unless otherwise stated. Typically they are based on serviceability criteria taking account of an assessment of the shear strength and/or density data obtained by the investigation. The foundations should be designed in accordance with the good practice embodied in BS 8004:2015 - Foundations, supplemented for housing by NHBC Standards. Foundation design is an iterative process and bearing pressures may need adjustment or other measures may need to be taken in the context of final layouts and levels prior to finalisation of proposals.*

20. *Unless specifically stated, the investigation does not take account of the possible effects of mineral extraction or of gases from fill or natural sources within, below or outside the site.*

21. *The costs or economic viability of the proposals referred to in the report, or of the solutions put forward to any problems encountered, will depend on very many factors in addition to geotechnical or geoenvironmental considerations and hence their evaluation is outside the scope of the report.*

APPENDIX 12

Soil Chemical Summary Sheets

Site: North Killingholme

CHEMICAL STATISTICAL ANALYSIS - based on CLEA v1.06 (Sandy Loam 1% SOM)

GEOTECHNICS
geotechnical and geoenvironmental specialists

Job No: PY240528

Analyte	Limit of Detection	TP01	TP01	TP02	TP03	TP07	TP08	TP08	TP04	TP04	TP05	TP05	TP06	TP06	SP01	SP02	SP03	SP04	SP05	HMP04	HMP04	HMP04	HMP04	HMP04	HMP04	HMP05	HMP05	HMP05	HMP05	HMP05	Statistical Analysis					SGV / GAC Statistical Results			SGV / GAC Criteria Source		C4SL Screening Criteria		C4SL Criteria Source		LQM/CIEH S4UL Screening Criteria		LQM/CIEH S4UL Criteria Source	
		1.00	3.00	0.5	0.80	2.00	2.00	3.60	0.20	3.00	0.50	1.70	3.00	4.70	-	-	-	-	-	2.00-3.00	3.00-3.20	4.00-4.30	4.30-4.60	4.60-4.70	4.70-5.00	2.00-3.00	3.20-3.50	3.00-3.70	3.70-4.20	4.60-5.40	n	Standard Deviation	Minimum	Average	Maximum	Maximum	Commercial & Industrial Tier 1 Screening Threshold	Pass/ Fail	Source of Screening Criteria	Source of Toxicological Data	Commercial	Pass / Fail	Source of Screening Criteria	Source of Toxicological Data	Commercial	Pass / Fail	Source of Screening Criteria	Source of Toxicological Data
		08/02/2024	08/02/2024	12/02/2024	12/02/2024	12/02/2024	12/02/2024	12/02/2024	09/02/2024	09/02/2024	09/02/2024	09/02/2024	09/02/2024	09/02/2024	12/02/2024	13/02/2024	13/02/2024	13/02/2024	13/02/2024	15/02/2024	15/02/2024	15/02/2024	15/02/2024	15/02/2024	15/02/2024	15/02/2024	15/02/2024	15/02/2024	15/02/2024	15/02/2024																
Asbestos Screen	Positive / Negative	Positive - Bundles of amosite and chrysotile - 0.002%	Negative	Positive - Chrysotile fibre bundles - 0.003%	Negative	Positive - Bundles of amosite - 0.004%	Negative	-	Negative	-	Negative	Positive - Bundles of loose amosite and chrysotile - 0.002%	Negative	-	Positive - Bundles of chrysotile - <0.001%	Negative	Negative	Negative	Negative	-	-	-	-	-	-	-	-	-	-	-	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																																																
Arsenic (total)	<0.2 mg/kg	6.7	9	6.8	10	9.1	10	-	7.1	-	3.9	9.3	8.2	-	6.7	6.2	6.8	3.4	2.7	-	-	-	-	-	-	-	-	-	-	-	15	2.32	3	7	10	10	635	Pass	SC050021*	SC050021	640	Pass	CLEA v1.06	Defra 2014	640	Pass	CLEA v1.06	LQM/CIEH 2014
Boron (water soluble)	<0.2 mg/kg	2.2	1.3	1.9	0.8	0.6	2.3	-	2.4	-	1.4	3.4	1.5	-	1.6	1.3	1.5	1.1	0.2	-	-	-	-	-	-	-	-	-	-	-	15	0.80	0.2	1.6	3.4	3.4	192000	Pass	CLEA v1.06	LQM 2009	-	-	-	-	240000	Pass	CLEA v1.06	LQM/CIEH 2014
Cadmium (total)	<0.1 mg/kg	0.5	0.3	0.3	0.2	0.2	0.2	-	0.1	-	0.2	0.2	0.2	-	0.2	0.1	0.2	0.2	0.2	-	-	-	-	-	-	-	-	-	-	-	15	0.09	0.1	0.2	0.5	0.5	230	Pass	SC050021*	SC050021	420	Pass	CLEA v1.06	Defra 2014	190	Pass	CLEA v1.06	LQM/CIEH 2014
Chromium (hexavalent)	N/A	0.03	0.00	0.29	0.00	0.00	0.00	-	0.02	-	0.25	0.00	0.00	-	0.33	0.35	0.80	0.70	1.55	-	-	-	-	-	-	-	-	-	-	-	15	0.44	0.0	0.3	1.554	1.55	35	Pass	CLEA v1.06	LQM 2009	52	Pass	CLEA v1.06	Defra 2014	33	Pass	CLEA v1.06	LQM/CIEH 2014
Chromium (total) (lil for S4ULs)	<0.15 mg/kg	30	16	29	19	21	25	-	10	-	40	21	22	-	21	44	40	22	31	-	-	-	-	-	-	-	-	-	-	-	15	9.56	10	26	44	44	30400	Pass	CLEA v1.06	LQM 2009	-	-	-	-	8600	Pass	CLEA v1.06	LQM/CIEH 2014
Copper (total)	<0.2 mg/kg	20	18	15	17	21	75	-	9.2	-	11	17	17	-	21	31	130	16	20	18	-	-	-	-	-	-	-	-	-	-	15	31.96	9	29	130	130	71700	Pass	CLEA v1.06	LQM 2009	-	-	-	68000	Pass	CLEA v1.06	LQM/CIEH 2014
Lead (total)	<0.3 mg/kg	23	11	10	11	33	33	-	13	-	10	13	17	-	21	29	44	21	5	-	-	-	-	-	-	-	-	-	-	-	15	11.01	5	20	44	44	N/A	-	-	-	2300	Pass	CLEA v1.06	Defra 2014	-	-	-	-
Mercury (total inorganic)	<0.06 mg/kg	0.09	0.05	0.05	0.05	0.05	0.05	-	0.05	-	0.05	0.05	0.05	-	0.05	0.05	0.1	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	15	0.02	0.1	0.1	0.1	0.10	3640	Pass	SC050021*	SC050021	-	-	-	-	1100	Pass	CLEA v1.06	LQM/CIEH 2014
Nickel (total)	<1 mg/kg	95	22	12	23	25	27	-	8.3	-	6.1	23	19	-	13	15	14	6.4	3.4	-	-	-	-	-	-	-	-	-	-	-	15	21.84	3	21	95	95	840	Pass	CLEA v1.071	EFSA	-	-	-	-	980	Pass	CLEA v1.06	LQM/CIEH 2014
Selenium (total)	<0.5 mg/kg	0.5	0.5	1.5	0.5	0.5	0.5	-	1.5	-	0.7	0.5	0.5	-	0.7	1.5	0.9	0.6	0.9	-	-	-	-	-	-	-	-	-	-	-	15	0.39	0.5	0.8	1.5	2	13000	Pass	SC050021*	SC050021	-	-	-	-	120000	Pass	CLEA v1.06	LQM/CIEH 2014
Zinc (total)	<1 mg/kg	150	63	49	63	52	500	-	63	-	43	54	61	-	110	480	81	120	64	-	-	-	-	-	-	-	-	-	-	-	15	149.11	43	130	500	500	662000	Pass	CLEA v1.06	LQM 2009	-	-	-	-	730000	Pass	CLEA v1.06	LQM/CIEH 2014
Vanadium	<0.8 mg/kg	42	31	75	32	34	45	-	41	-	30	34	41	-	39	84	48	63	50	-	-	-	-	-	-	-	-	-	-	-	15	16.20	30	46	84	84	3160	Pass	CLEA v1.06	LQM 2009	-	-	-	-	9000	Pass	CLEA v1.06	LQM/CIEH 2014
Inorganic																																															
pH Value	pH Units	9.4	7.7	10.4	7.8	8	8.1	-	9.7	-	10.2	8	8	-	10.6	10.3	10.7	10.9	11.1	-	-	-	-	-	-	-	-	-	-	-	15	1.30	7.7	9	11.1	11.1	-	-	-	-	-	-	-	-	-	-	-	-
Organic																																															
TOC	<0.5 %	1.5	1.1	1.2	0.5	0.5	0.9	-	1.2	-	1.5	1.1	1.5	-	1	1	2.5	1.6	2.7	-	-	-	-	-	-	-	-	-	-	-	15	0.62	0.5	1	3	3	-	-	-	-	-	-	-	-	-	-	-	-
Phenols																																															
Phenol	< 0.01 mg/kg	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	29	0.00	0.01	0.01	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	< 0.01 mg/kg	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	29	0.00	0.01	0.01	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-
2,4 Dichlorophenol	< 0.01 mg/kg	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	29	0.00	0.01	0.01	0.01	0.01	-	-	-	-	-	3500	Pass	CLEA v1.06	LQM/CIEH 2014
2,4-Dimethylphenol	< 0.01 mg/kg	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	29	0.01	0.01	0.01	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-
o-cresol	< 0.01 mg/kg	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	29	0.02	0.01	0.01	0.10	0.10	-	-	-	-	-	-	-	-	-	-	-	-
2,6-Dimethylphenol	< 0.01 mg/kg	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	29	0.00	0.01	0.01	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-
2,6-Dichlorophenol	< 0.01 mg/kg	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	29	0.00	0.01	0.01	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6 Trichlorophenol	< 0.01 mg/kg	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	29	0.00	0.01	0.01	0.01	0.01	-	-	-	-	-	3500	Pass	CLEA v1.06	LQM/CIEH 2014
PAH																																															
Naphthalene	<0.03 mg/kg	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.07	0.03	0.18	0.05	0.03	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	29	0.03	0.03	0.04	0.18	0.18	200	Pass	CLEA v1.06	LQM 2009	-	-	-	-	190	Pass	CLEA v1.06	LQM/CIEH 2014
Acenaphthylene	<0.03 mg/kg	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.13	0.04	0.14	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	29	0.03	0.03	0.04	0.14	0.14	84000	Pass	CLEA v1.06	LQM 2009	-	-	-	-	83000	Pass	CLEA v1.06	LQM/CIEH 2014
Acenaphthene	<0.03 mg/kg	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.06	0.03	1.1	0.09	0.41	0.03	0.2	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	29	0.21	0.03	0.09	1.10	1.10	8500	Pass	CLEA v1.06	LQM 2009	-	-	-	-	84000	Pass	CLEA v1.06	LQM/CIEH 2014
Fluorene	<0.03 mg/kg	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.06	0.03	1.3	0.1	0.32	0.03	0.16	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	29	0.24	0.03	0.09	1.30	1.30	64000	Pass	CLEA v1.06	LQM 2009	-	-	-	-	63000	Pass	CLEA v1.06	LQM/CIEH 2014
Phenanthrene	<0.03 mg/kg	0.47	0.03	0.05	0.03	0.03	0.03	0.03	0.09	0.03	0.33	0.03	0.06	0.03	0.45	0.35	9.9	1.4	2.5	0.04	0.34	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	29	1.87	0.03	0.57	9.90	9.90	22000	Pass	CLEA v1.06	LQM 2009	-	-	-	-	22000	Pass	CLEA v1.06	LQM/CIEH 2014
Anthracene	<0.03 mg/kg	0.19	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.1	0.03	0.03	0.03	0.16	0.06	3.6	0.5	1.1	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	29	0.68	0.03	0.22	3.60	3.60	530000	Pass	CLEA v1.06	LQM 2009	-	-	-	-	520000	Pass	CLEA v1.06	LQM/CIEH 2014
Fluoranthene	<0.03 mg/kg	2.1	0.04	0.11	0.03	0.03	0.03	0.04	0.17	0.03	1.1	0.04	0.03	0.03	1	0.72	13	3.5	9	0.07	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.03	0.03	0.03	29	2.90	0.03	1.08	13.00	13.00	23000	Pass	CLEA v1.06	LQM 2009	-	-	-	-	23000	Pass	CLEA v1.06	LQM/CIEH 2014
Pyrene	<0.03 mg/kg	2	0.03	0.1	0.03	0.03	0.03	0.03	0.14	0.03	0.96	0.04	0.03	0.03	0.95	0.64	11	3.4	10	0.06	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.03	0.03	0.03	29	2.73	0.03	1.03	11.00	11.00	54400	Pass	CLEA v1.06	LQM 2009	-	-	-	-	54000	Pass	CLEA v1.06	LQM/CIEH 2014
Benz(a)anthracene	<0.03 mg/kg	1	0.03	0.05	0.03	0.03	0.03	0.03	0.06	0.03	0.37	0.03	0.03	0.03	0.41	0.24	4.8	1.5	4.3	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	29	1.18	0.03	0.46	4.80	4.80	92	Pass	CLEA v1.06	LQM 2009	-	-	-	-	170	Pass	CLEA v1.06	LQM/CIEH 2014
Chrysene	<0.03 mg/kg	1	0.03	0.06	0.03	0.03	0.03	0.03	0.07	0.03	0.35	0.03	0.03	0.03	0.42	0.28	4.6	1.5	4	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	29	1.12	0.03	0.44	4.60	4.60	138	Pass	CLEA v1.06	LQM 2009	-	-	-	-	350	Pass	CLEA v1.06	LQM/CIEH 2014
Benzo(b)fluoranthene	<0.03 mg/kg	1.1	0.03	0.06	0.03	0.03	0.03	0.03	0.07	0.03	0.41	0.03	0.03	0.03	0.41	0.32	4.1	1.5	4.2	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	29	1.08	0.03	0.44	4.20	4.20	100	Pass	CLEA v1.06	LQM 2009	-	-	-	-	44	Pass	CLEA v1.06	LQM/CIEH 2014
Benzo(k)fluoranthene	<0.03 mg/kg	0.43	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.13	0.03	0.03	0.03	0.17	0.1	1.5	0.54	1.6	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	29	0.40	0.03	0.18	1.60	1.60	140	Pass	CLEA v1.06	LQM 2009	-	-	-	-	1200	Pass	CLEA v1.06	LQM/CIEH 2014
Benzo(a)pyrene	<0.03 mg/kg	0.83	0.03	0.04	0.03	0.03	0.03	0.03	0.05	0.03	0.3	0.03	0.03	0.03	0.32	0.21	3	1.1	3.3	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	29	0.82	0.03	0.34	3.30	3.30	14	Pass	CLEA v1.06	LQM 2009	77	Pass	CLEA v1.06	Defra 2014	35	Pass	CLEA v1.06	LQM/CIEH 2014
Indeno(123cd)pyrene	<0.03 mg/kg	0.3	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.11	0.03	0.03	0.03	0.12	0.11	0.99	0.38	1.3	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	29	0.29	0.03	0.14	1.30	1.30	60	Pass	CLEA v1.06	LQM 2009	-	-	-	-	500	Pass	CLEA v1.06	LQM/CIEH 2014
Dibenzo(ah)anthracene	<0.03 mg/kg	0.1	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.03	0.03	0.03	0.04	0.03	0.34	0.1	0.44	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	29	0.09	0.03	0.06	0.44	0.44	13	Pass	CLEA v1.06	LQM 2009	-	-	-	-	3.5	Pass	CLEA v1.06	LQM/CIEH 2014
Benzo(ghi)perylene	<0.03 mg/kg	0.34	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.16	0.03	0.03	0.03	0.14	0.12	1.1	0.43	1.5	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	29	0.34	0.03	0.15	1.50	1.50	650	Pass	CLEA v1.06	LQM 2009	-	-	-	-	3900	Pass	CLEA v1.06	LQM/CIEH 2014
Total EPA-16 PAHs	<0.1 mg/kg	9.9	0.1	0.46	0.1	0.1	0.1	0.1	0.64	0.1	4.3	0.1	0.1	0.1	4.8	3.2	60	16	44	0.2	0.71	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	29	13.64	0.1	5	60.0	60.00	-	-	-	-	-	-	-	-	-	-	-	-
Aliphatic >C_5 - C_6	<0.01 mg/kg	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	29	0.00	0.01	0	0.0	0.01	3400	Pass	CLEA v1.06	LQM 2009	-	-	-	-	3200	Pass	CLEA v1.06	LQM/CIEH 2014
Aliphatic >C_6 - C_8	<0.01 mg/kg	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	29	0.00	0.01	0	0.0	0.01	8300	Pass	CLEA v1.06	LQM 2009	-	-	-	-	7800	Pass	CLEA v1.06	LQM/CIEH 2014
Aliphatic >C_8 - C_{10}	<0.01 mg/kg	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	29	0.00	0.01	0.01	0.01	0.01	2100	Pass	CLEA v1.06	LQM 2009	-	-	-	-	2000	Pass	CLEA v1.06	LQM/CIEH 2014
Aliphatic >C_{10} - C_{12}	<1.5 mg/kg	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	3.7	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	29	0.41	1.5	1.6	3.7	3.7	10000	Pass	CLEA v1.06	LQM 2009	-	-	-	-	9700	Pass	CLEA v1.06	LQM/CIEH 2014
Aliphatic >C_{12} - C_{16}	<1.2 mg/kg	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	18	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	29	3.12	1.2	1.8	18.0	18.0	61000	Pass	CLEA v1.06	LQM 2009	-	-	-	-	59000	Pass	CLEA v1.06	LQM/CIEH 2014
Aliphatic >C_{16} - C_{21}	<1.5 mg/kg	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	34	7.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	29	6.10	1.5	2.8	34.0	34.0	1600000	Pass	CLEA v1.06	LQM 2009	-	-	-	-	160000	Pass	CLEA v1.06	LQM/CIEH 2014
Aliphatic >C_{21} - C_{35}	<3.4 mg/kg	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	6.7	3.4	110	120	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	29	28.79	3.4	11.2	120.0	120.0	1600000	Pass	CLEA v1.06	LQM 2009	-	-	-	-	160000	Pass	CLEA v1.06	LQM/CIEH 2014
Total Aliphatic >C_5 - C_{35}	<10 mg/kg	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	170	120	10	10	10	10	10	10	10	10	10	10	29	35.45	10	19	170.0	170.0	-	-	-	-	-	-	-	-	-	-	-	-
Aromatic C_5 - C_7	<0.01 mg/kg	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	29	0.00	0.01	0.01	0.01	0.01	28000	Pass	CLEA v1.06	LQM 2009	-	-	-	-	26000	Pass	CLEA v1.06	LQM/CIEH 2014
Aromatic C_7 - C_8	<0.01 mg/kg	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	29	0.00	0.01	0.01	0.01	0.01	59000	Pass	CLEA v1.06	LQM 2009	-	-	-	-	56000	Pass	CLEA v1.06	LQM/CIEH 2014
Aromatic >C_8 - C_{10}	<0.01 mg/kg	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	29	0.00	0.01	0.01	0.0	0.01	3700	Pass	CLEA v1.06	LQM 2009	-	-	-	-	3500	Pass	CLEA v1.06	LQM/CIEH 2014
Aromatic >C_{10} - C_{12}	<0.9 mg/kg	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	7.4	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	29	1.21	0.9	1.1	7.4	7.40	17000	Pass	CLEA v1.06	LQM 2009	-	-	-	-	16000	Pass	CLEA v1.06	LQM/CIEH 2014
Aromatic >C_{12} - C_{16}	<0.5 mg/kg	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	2.2	7.7	17	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	29	3.30	0.5	1.4	17.0	17.00	36000	Pass	CLEA v1.06	LQM 2009	-	-	-	-	36000	Pass	CLEA v1.06	LQM/CIEH 2014
Aromatic >C_{16} - C_{21}	<0.6 mg/kg	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	26	34	49	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	29	11.70	0.6	4.4	49.0	49.00	28000	Pass	CLEA v1.06	LQM 2009	-	-	-	-	28000	Pass	CLEA v1.06	LQM/CIEH 2014
Aromatic >C_{21} - C_{35}	<1.

APPENDIX 13

Summary of Water Analysis and m-BAT Sheets

Job No: PY240528
Site: North Killingholme
Summary of Water Analysis - Tier 1 Screening

GEOTECHNICS
geotechnical and geoenvironmental specialists

Sample Location	Units	Minimum Reporting Value	Drinking Water Standard (or closest value)	EQS Freshwater	Esturies and coastal waters	Surface Water
Water Quality						
pH	pH units	-	-	-	-	7.8
Metals						
Arsenic	ug/l	-	10	50	25	1.4
Cadmium	ug/l	0.1	50	See notes	0.2	<0.03
Chromium (Total)	ug/l	-	50	Sum of III and VI		2.2
Chromium (III)	ug/l	-	50	4.7	-	
Chromium (VI)	ug/l	-		3.4	0.6	
Copper	ug/l	-	2000	1*	3.76 (where DOC <1mg/l) 3.76+((DOC/2)-0.5) where DOC >1mg/l	 3.0
Lead	ug/l	-	10	1.2}	1.3	0.16
Manganese	ug/l	-	50	123*	-	1.4
Mercury	ug/l	0.01	1	0.07	0.07	<0.01
Nickel	ug/l	-	20	4*	8.6	2.7
Selenium	ug/l	-	10	-	-	0.8
Zinc	ug/l	-	3000¬	10.9*	6.8	4.1
Calcium	ug/l	-	250	-	-	87
Organics						
Phenol	ug/l	0.5	-	7.7	7.7	<0.1
Polychlorinated Biphenyls						
PCB 28	ug/l	-	-	-	-	<0.3
PCB 52	ug/l	-	-	-	-	<0.2
PCB 101	ug/l	-	-	-	-	<0.3
PCB 118	ug/l	-	-	-	-	<0.6
PCB 138	ug/l	-	-	-	-	<0.2
PCB 153	ug/l	-	-	-	-	<0.2
PCB 180	ug/l	-	-	-	-	<0.2
PAH						
Naphthalene	ug/l	-	-	2	2	<0.05
Acenaphthylene	ug/l	-	-	-	-	<0.01
Acenaphthene	ug/l	-	-	-	-	<0.01
Fluorene	ug/l	-	-	-	-	<0.01
Phenanthrene	ug/l	-	-	-	-	0.02
Anthracene	ug/l	-	-	0.1	0.1	0.01
Fluoranthene	ug/l	-	-	0.0063	0.0063	0.04
Pyrene	ug/l	-	-	-	-	0.05
Benzo[a]anthracene	ug/l	-	-	-	-	0.01
Chrysene	ug/l	-	-	-	-	0.02
Benzo[b]fluoranthene	ug/l	-	0.10	BaP	BaP	0.01
Benzo[k]fluoranthene	ug/l	-	0.10	BaP	BaP	<0.01
Benzo[a]pyrene	ug/l	-	0.01	0.00017	0.00017	<0.01
indeno[1,2,3-cd]pyrene	ug/l	-	0.10	BaP	BaP	<0.01
dibenzo[a,h]anthracene	ug/l	-	-	-	-	<0.01
Benzo[ghi]perylene	ug/l	-	-	BaP	BaP	<0.01
Total EPA-16 PAHs	ug/l	-	-	-	-	
PAH Total 4 DWS	ug/l	-	0.1#	-	-	

Sample Location	Units	Minimum Reporting Value	Drinking Water Standard (or closest value)	EQS Freshwater	Esturies and coastal waters	Surface Water
TPH						
Mineral Oil (C10 - C40)	ug/l	-	10	10	10	
Aliphatic >C5 - C6	ug/l	-	10	10	10	<0.1
Aliphatic >C6 - C8	ug/l	-	10	10	10	<0.1
Aliphatic >C8 - C10	ug/l	-	10	10	10	<0.1
Aliphatic >C10 - C12	ug/l	-	10	10	10	3.6
Aliphatic >C12 - C16	ug/l	-	10	10	10	8.4
Aliphatic >C16 - C21	ug/l	-	10	10	10	53
Aliphatic >C21 - C34	ug/l	-	10	10	10	24
Aliphatic (C5 - C34)	ug/l	-	10	10	10	89
Aromatic >C5 - C7	ug/l	-	10	10	10	<0.1
Aromatic >C7 - C8	ug/l	-	10	10	10	<0.1
Aromatic >C8 - C10	ug/l	-	10	10	10	<0.1
Aromatic >C10 - C12	ug/l	-	10	10	10	<1.0
Aromatic >C12 - C16	ug/l	-	10	10	10	<1.0
Aromatic >C16 - C21	ug/l	-	10	10	10	<1.0
Aromatic >C21 - C35	ug/l	-	10	10	10	<1.0
Aromatic (C5 - C35)	ug/l	-	10	10	10	<10
BTEX						
Benzene	ug/l	1	1	10	8	<1
Toluene	ug/l	4	700+	74	74	<1
Ethylbenzene	ug/l	-	300+	-	-	<1
M/P Xylene	ug/l	-	500+	-	-	<2
O Xylene	ug/l					
MTBE		-	15~	-	-	<1
VOC						All less tha LoD
SVOC						All less tha LoD

Note:

Fail: Above UK EQS

Fail: Above UK DWS

Result below Detection Limit

EQS for cadmium is dependent on hardness <40 mg/l <0.08ug/l. 40 to <50mg/l 0.08ug/l. 50 to <100 mg/l 0.09ug/l. 100-<200mg/l 0.15ug/l. >500mg/l 0.25ug/l

* EQS for substances based on CaCO3 Hardness and second stage asessment with m-BAT tool required if exceeded

Total of 4 Drinking Water Standard PAHs: Benzo[b]fluoranthene, Benzo[k]fluoranthene, Indeno[1,2,3-cd]pyrene, Benzo[ghi]perylene

¬ The Surface Waters (Abstraction for Drinking Water) (Classification) Regulations 1996

~ Drinking Water Inspectorate(2006) DWI1/10/18 (odour threshold)

+ WHO Guidelines for drinking water quality - 4th ed

} - bioavailable

Metal Bioavailability Assessment Tool (M-BAT)

Back

Calculate

Clear Data

INPUT DATA											RESULTS (Copper)				RESULTS (Zinc)				RESULTS (Mn)				RESULTS (Ni)			
ID	Location	Waterbody	Date	Measured Cu Concentration (dissolved) (µg l^{-1})	Measured Zn Concentration (dissolved) (µg l^{-1})	Measured Mn Concentration (dissolved) (µg l^{-1})	Measured Ni Concentration (dissolved) (µg l^{-1})	pH	DOC	Ca	Site-specific PNEC Dissolved Copper (µg l^{-1})	BioF	Bioavailable Copper Concentration (µg l^{-1})	Risk Characterisation Ratio	Site-specific PNEC Dissolved Zinc (µg l^{-1})	BioF	Bioavailable Zinc Concentration (µg l^{-1})	Risk Characterisation Ratio	Site-specific PNEC Dissolved Manganese (µg l^{-1})	BioF	Bioavailable Manganese Concentration (µg l^{-1})	Risk Characterisation Ratio	Site-specific PNEC Dissolved Nickel (µg l^{-1})	BioF	Bioavailable Nickel Concentration (µg l^{-1})	Risk Characterisation Ratio
1	Surface water	ditch	13/02/2024	3	4.1	1.4	2.7	7.8	8.9	87	34.52	0.03	0.09	0.09	41.17	0.26	1.09	0.10	323.36	0.38	0.53	0.00	18.09	0.22	0.60	0.15

Groundsure LOCATION INTELLIGENCE

Enviro+Geo Insight

Killingholme CCP

Order Details

Date: 28/03/2025

Your ref: 305719-57

Our Ref: GS-MUX-Z1E-9LL-UBF

Site Details

Location: 515685 419588

Area: 12.44 ha

Authority: North Lincolnshire Council ↗



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Summary of findings p. 2 >

OS MasterMap site plan N/A: >10ha

Aerial image p. 9 >

Insight User Guide ↗

Contact us with any questions at:
info@groundsure.com ↗
01273 257 755

Certified B Corporation

Summary of findings

Page	Section	Past land use >	On site	0-50m	50-250m	250-500m	500-2000m
14 >	1.1 >	Historical industrial land uses >	3	10	22	11	-
16 >	1.2 >	Historical tanks >	0	1	14	16	-
18	1.3	Historical energy features	0	0	0	0	-
18	1.4	Historical petrol stations	0	0	0	0	-
18	1.5	Historical garages	0	0	0	0	-
19	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped >	On site	0-50m	50-250m	250-500m	500-2000m
20 >	2.1 >	Historical industrial land uses >	3	15	32	18	-
23 >	2.2 >	Historical tanks >	0	1	23	18	-
25	2.3	Historical energy features	0	0	0	0	-
25	2.4	Historical petrol stations	0	0	0	0	-
25	2.5	Historical garages	0	0	0	0	-
Page	Section	Waste and landfill >	On site	0-50m	50-250m	250-500m	500-2000m
26	3.1	Active or recent landfill	0	0	0	0	-
26	3.2	Historical landfill (BGS records)	0	0	0	0	-
27	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
27 >	3.4 >	Historical landfill (EA/NRW records) >	0	0	0	2	-
27	3.5	Historical waste sites	0	0	0	0	-
28	3.6	Licensed waste sites	0	0	0	0	-
28 >	3.7 >	Waste exemptions >	0	0	1	2	-
Page	Section	Current industrial land use >	On site	0-50m	50-250m	250-500m	500-2000m
29 >	4.1 >	Recent industrial land uses >	2	0	6	-	-
30	4.2	Current or recent petrol stations	0	0	0	0	-
30	4.3	Electricity cables	0	0	0	0	-
30	4.4	Gas pipelines	0	0	0	0	-
30	4.5	Sites determined as Contaminated Land	0	0	0	0	-

31 >	4.6 >	Control of Major Accident Hazards (COMAH) >	1	1	0	1	-
31	4.7	Regulated explosive sites	0	0	0	0	-
31 >	4.8 >	Hazardous substance storage/usage >	0	0	0	3	-
32 >	4.9 >	Historical licensed industrial activities (IPC) >	0	0	0	17	-
34 >	4.10 >	Licensed industrial activities (Part A(1)) >	0	0	15	16	-
39 >	4.11 >	Licensed pollutant release (Part A(2)/B) >	0	0	0	5	-
40 >	4.12 >	Radioactive Substance Authorisations >	0	0	0	1	-
40 >	4.13 >	Licensed Discharges to controlled waters >	2	1	2	5	-
42	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
42	4.15	Pollutant release to public sewer	0	0	0	0	-
42 >	4.16 >	List 1 Dangerous Substances >	0	0	0	2	-
43	4.17	List 2 Dangerous Substances	0	0	0	0	-
43 >	4.18 >	Pollution Incidents (EA/NRW) >	0	0	1	2	-
44 >	4.19 >	Pollution inventory substances >	0	0	0	2	-
45 >	4.20 >	Pollution inventory waste transfers >	0	0	0	1	-
47	4.21	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	Hydrogeology >	On site	0-50m	50-250m	250-500m	500-2000m
48 >	5.1 >	Superficial aquifer >	Identified (within 500m)				
50 >	5.2 >	Bedrock aquifer >	Identified (within 500m)				
52 >	5.3 >	Groundwater vulnerability >	Identified (within 50m)				
53	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
53	5.5	Groundwater vulnerability- local information	None (within 0m)				
54 >	5.6 >	Groundwater abstractions >	0	2	0	0	0
55 >	5.7 >	Surface water abstractions >	0	0	0	0	1
56	5.8	Potable abstractions	0	0	0	0	0
56	5.9	Source Protection Zones	0	0	0	0	-
56	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-

Page	Section	Hydrology >	On site	0-50m	50-250m	250-500m	500-2000m
57 >	6.1 >	Water Network (OS MasterMap) >	8	9	4	-	-

59 >	6.2 >	Surface water features >	1	9	3	-	-
59 >	6.3 >	WFD Surface water body catchments >	1	-	-	-	-
60 >	6.4 >	WFD Surface water bodies >	0	0	0	-	-
60 >	6.5 >	WFD Groundwater bodies >	1	-	-	-	-
Page	Section	River and coastal flooding >	On site	0-50m	50-250m	250-500m	500-2000m
61 >	7.1 >	Risk of flooding from rivers and the sea >	High (within 50m)				
62	7.2	Historical Flood Events	0	0	0	-	-
62	7.3	Flood Defences	0	0	0	-	-
62	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
62	7.5	Flood Storage Areas	0	0	0	-	-
63 >	7.6 >	Flood Zone 2 >	Identified (within 50m)				
64 >	7.7 >	Flood Zone 3 >	Identified (within 50m)				
Page	Section	Surface water flooding >					
65 >	8.1 >	Surface water flooding >	1 in 30 year, Greater than 1.0m (within 50m)				
Page	Section	Groundwater flooding >					
67 >	9.1 >	Groundwater flooding >	High (within 50m)				
Page	Section	Environmental designations >	On site	0-50m	50-250m	250-500m	500-2000m
68 >	10.1 >	Sites of Special Scientific Interest (SSSI) >	0	0	0	2	1
69 >	10.2 >	Conserved wetland sites (Ramsar sites) >	0	0	0	2	1
74 >	10.3 >	Special Areas of Conservation (SAC) >	0	0	0	0	1
74 >	10.4 >	Special Protection Areas (SPA) >	0	0	0	2	1
76	10.5	National Nature Reserves (NNR)	0	0	0	0	0
76	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
76	10.7	Designated Ancient Woodland	0	0	0	0	0
76	10.8	Biosphere Reserves	0	0	0	0	0
77	10.9	Forest Parks	0	0	0	0	0
77	10.10	Marine Conservation Zones	0	0	0	0	0
77	10.11	Green Belt	0	0	0	0	0
77	10.12	Proposed Ramsar sites	0	0	0	0	0

77	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
78	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
78	10.15	Nitrate Sensitive Areas	0	0	0	0	0
78 >	10.16 >	Nitrate Vulnerable Zones >	2	0	1	0	3
79 >	10.17 >	SSSI Impact Risk Zones >	4	-	-	-	-
83 >	10.18 >	SSSI Units >	0	0	0	2	5
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
95	11.1	World Heritage Sites	0	0	0	-	-
95	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
95	11.3	National Parks	0	0	0	-	-
95	11.4	Listed Buildings	0	0	0	-	-
96	11.5	Conservation Areas	0	0	0	-	-
96	11.6	Scheduled Ancient Monuments	0	0	0	-	-
96	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations >	On site	0-50m	50-250m	250-500m	500-2000m
97 >	12.1 >	Agricultural Land Classification >	Grade 3 (within 250m)				
98	12.2	Open Access Land	0	0	0	-	-
98 >	12.3 >	Tree Felling Licences >	2	0	0	-	-
98	12.4	Environmental Stewardship Schemes	0	0	0	-	-
98	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations >	On site	0-50m	50-250m	250-500m	500-2000m
99 >	13.1 >	Priority Habitat Inventory >	1	1	4	-	-
100 >	13.2 >	Habitat Networks >	0	0	2	-	-
100	13.3	Open Mosaic Habitat	0	0	0	-	-
100	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale >	On site	0-50m	50-250m	250-500m	500-2000m
102 >	14.1 >	10k Availability >	Identified (within 500m)				
103	14.2	Artificial and made ground (10k)	0	0	0	0	-
104	14.3	Superficial geology (10k)	0	0	0	0	-

104	14.4	Landslip (10k)	0	0	0	0	-
105	14.5	Bedrock geology (10k)	0	0	0	0	-
105	14.6	Bedrock faults and other linear features (10k)	0	0	0	0	-
Page	Section	**Geology 1:50,000 scale >**	On site	0-50m	50-250m	250-500m	500-2000m
106 >	15.1 >	50k Availability >	Identified (within 500m)				
107 >	15.2 >	Artificial and made ground (50k) >	1	0	1	0	-
108 >	15.3 >	Artificial ground permeability (50k) >	1	0	-	-	-
109 >	15.4 >	Superficial geology (50k) >	2	0	0	0	-
110 >	15.5 >	Superficial permeability (50k) >	Identified (within 50m)				
110	15.6	Landslip (50k)	0	0	0	0	-
110	15.7	Landslip permeability (50k)	None (within 50m)				
111 >	15.8 >	Bedrock geology (50k) >	1	0	0	0	-
112 >	15.9 >	Bedrock permeability (50k) >	Identified (within 50m)				
112	15.10	Bedrock faults and other linear features (50k)	0	0	0	0	-
Page	Section	**Boreholes >**	On site	0-50m	50-250m	250-500m	500-2000m
113 >	16.1 >	BGS Boreholes >	11	6	13	-	-
Page	Section	**Natural ground subsidence >**					
115 >	17.1 >	Shrink swell clays >	Low (within 50m)				
116 >	17.2 >	Running sands >	Moderate (within 50m)				
118 >	17.3 >	Compressible deposits >	Moderate (within 50m)				
120 >	17.4 >	Collapsible deposits >	Very low (within 50m)				
121 >	17.5 >	Landslides >	Low (within 50m)				
123 >	17.6 >	Ground dissolution of soluble rocks >	Negligible (within 50m)				
Page	Section	**Mining and ground workings >**	On site	0-50m	50-250m	250-500m	500-2000m
125	18.1	BritPits	0	0	0	0	-
126 >	18.2 >	Surface ground workings >	3	4	10	-	-
126	18.3	Underground workings	0	0	0	0	0
127	18.4	Underground mining extents	0	0	0	0	-
127	18.5	Historical Mineral Planning Areas	0	0	0	0	-

127	18.6	Non-coal mining	0	0	0	0	0
127	18.7	JPB mining areas	None (within 0m)				
127	18.8	The Coal Authority non-coal mining	0	0	0	0	-
128	18.9	Researched mining	0	0	0	0	-
128	18.10	Mining record office plans	0	0	0	0	-
128	18.11	BGS mine plans	0	0	0	0	-
128	18.12	Coal mining	None (within 0m)				
129	18.13	Brine areas	None (within 0m)				
129	18.14	Gypsum areas	None (within 0m)				
129	18.15	Tin mining	None (within 0m)				
129	18.16	Clay mining	None (within 0m)				
Page	Section	Ground cavities and sinkholes	On site	0-50m	50-250m	250-500m	500-2000m
130	19.1	Natural cavities	0	0	0	0	-
130	19.2	Mining cavities	0	0	0	0	0
130	19.3	Reported recent incidents	0	0	0	0	-
130	19.4	Historical incidents	0	0	0	0	-
Page	Section	**Radon** >					
132 >	**20.1** >	**Radon** >	Less than 1% (within 0m)				
Page	Section	**Soil chemistry** >	On site	0-50m	50-250m	250-500m	500-2000m
134 >	**21.1** >	**BGS Estimated Background Soil Chemistry** >	5	0	-	-	-
134	21.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
135	21.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-
Page	Section	**Railway infrastructure and projects** >	On site	0-50m	50-250m	250-500m	500-2000m
136	22.1	Underground railways (London)	0	0	0	-	-
136	22.2	Underground railways (Non-London)	0	0	0	-	-
137	22.3	Railway tunnels	0	0	0	-	-
137 >	**22.4** >	**Historical railway and tunnel features** >	0	0	2	-	-
137	22.5	Royal Mail tunnels	0	0	0	-	-
137	22.6	Historical railways	0	0	0	-	-

138	22.7	Railways	0	0	0	-	-
138	22.8	Crossrail 2	0	0	0	0	-
138	22.9	HS2	0	0	0	0	-

Recent aerial photograph



Capture Date: 11/04/2022

Site Area: 12.44ha

Recent site history - 2019 aerial photograph



Capture Date: 19/09/2019

Site Area: 12.44ha

Recent site history - 2014 aerial photograph



Capture Date: 27/09/2014

Site Area: 12.44ha

Recent site history - 2007 aerial photograph



Capture Date: 27/08/2007

Site Area: 12.44ha

Recent site history - 1999 aerial photograph



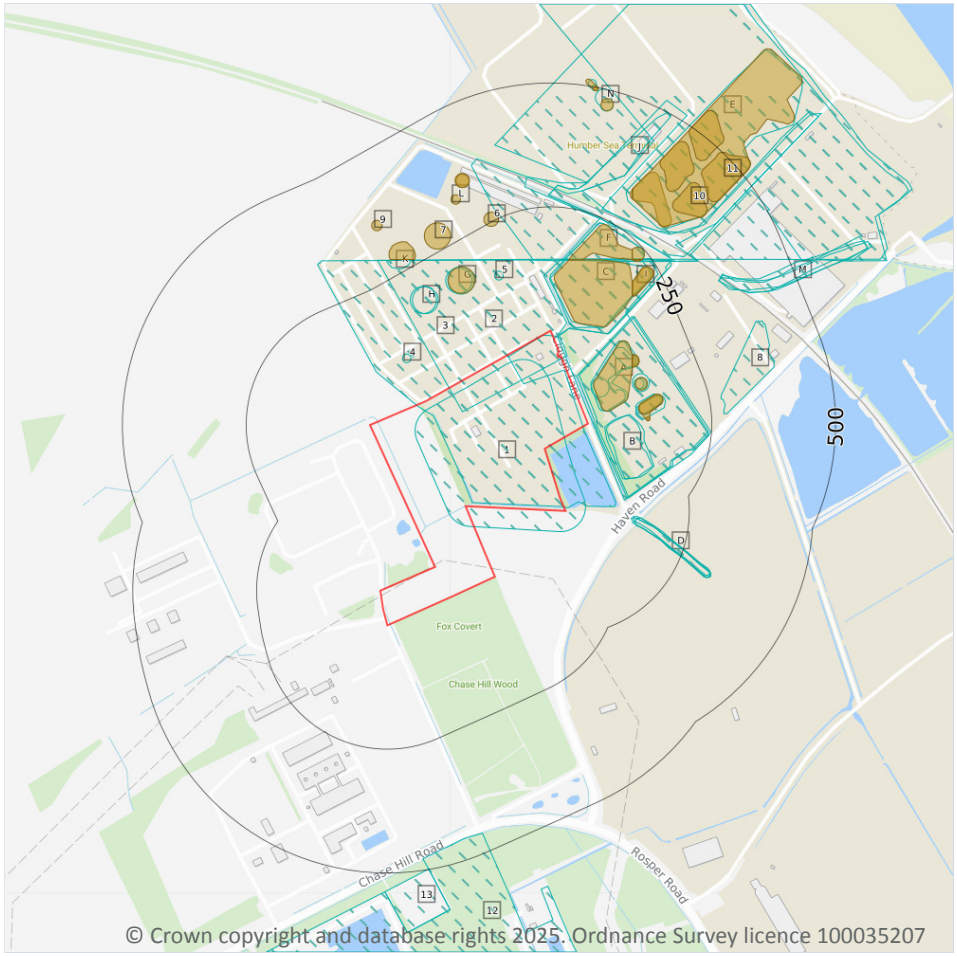
Capture Date: 27/04/1999

Site Area: 12.44ha

Annex 2

2025 Groundsure Report

1 Past land use



Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

1.1 Historical industrial land uses

Records within 500m	46

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14 >**

ID	Location	Land use	Dates present	Group ID
1	**On site**	**Gas Works**	**1974**	**2018944**

ID	Location	Land use	Dates present	Group ID
2	**On site**	**Unspecified Works**	**1968**	**2022920**
3	**On site**	**Unspecified Works**	**1983**	**2031970**
A	8m NE	Unspecified Commercial/Industrial	1951	2020261
A	13m E	Unspecified Depot	1974 - 1983	2025253
A	18m E	Unspecified Works	1968	2020589
A	32m NE	Unspecified Tank	1951	2018625
A	32m NE	Unspecified Tanks	1974 - 1983	2031003
B	34m E	Unspecified Heap	1974 - 1983	2027899
A	37m NE	Unspecified Tanks	1968	2029377
B	38m E	Unspecified Heap	1968	2032039
C	41m NE	Unspecified Tanks	1951 - 1968	2029363
C	46m NE	Unspecified Tanks	1974 - 1983	2032936
4	86m NW	Unspecified Tank	1974 - 1983	2029809
A	99m E	Unspecified Tanks	1951	2023549
A	101m NE	Unspecified Tanks	1951	2030742
A	102m E	Unspecified Tanks	1974 - 1983	2024965
A	105m E	Unspecified Tanks	1968	2029726
A	113m NE	Unspecified Tank	1951	2025841
A	116m NE	Unspecified Tank	1974 - 1983	2021277
A	118m NE	Unspecified Tank	1968	2027919
D	133m E	Unspecified Pit	1947 - 1951	2026035
D	137m E	Unspecified Pit	1910	2022336
5	139m N	Unspecified Tank	1974 - 1983	2032085
E	141m N	Unspecified Works	1952	2021186
D	142m E	Unspecified Pit	1906	2025385
D	142m E	Unspecified Pit	1930 - 1947	2033202
F	145m NE	Unspecified Tanks	1970	2027165
E	146m NE	Unspecified Works	1970	2030750

ID	Location	Land use	Dates present	Group ID
G	150m N	Unspecified Tank	1968	2029899
H	151m N	Unspecified Tank	1968	2030054
H	153m N	Unspecified Tank	1974 - 1983	2032430
G	154m N	Unspecified Tank	1974 - 1983	2024714
J	244m NE	Railway Sidings	1970	2031113
J	247m NE	Railway Sidings	1952	2022839
K	256m N	Unspecified Tank	1974 - 1983	2025413
8	273m E	Unspecified Pit	1947 - 1951	2032941
E	299m NE	Unspecified Tanks	1952 - 1970	2026885
M	352m NE	Railway Sidings	1930 - 1947	2022874
M	353m NE	Railway Sidings	1951 - 1952	2024385
M	358m NE	Railway Sidings	1947	2027345
12	457m S	Oil Refinery	1974 - 1983	2033523
N	457m N	Unspecified Tank	1952 - 1970	2023663
N	493m N	Unspecified Tank	1970	2022144
N	497m N	Unspecified Tank	1952	2028438
13	499m S	Sewage Works	1974 - 1983	2021843

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m	**31**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14 >**

ID	Location	Land use	Dates present	Group ID
A	38m NE	Tanks	1965	348008

ID	Location	Land use	Dates present	Group ID
C	51m NE	Tanks	1965	352799
A	107m E	Tanks	1987	352762
A	107m E	Tanks	1965	352651
A	117m NE	Unspecified Tank	1965 - 1987	353988
A	118m E	Unspecified Tank	1965	349002
A	126m NE	Unspecified Tank	1965	350430
A	126m NE	Unspecified Tank	1987	353241
F	148m NE	Tanks	1965 - 1978	354109
G	150m N	Unspecified Tank	1965	349003
I	179m NE	Tanks	1987	350893
I	180m NE	Tanks	1965	350090
I	218m NE	Unspecified Tank	1986 - 1987	350348
I	220m NE	Unspecified Tank	1965	351932
6	241m N	Unspecified Tank	1965 - 1978	353794
7	252m N	Tanks	1978	348172
K	260m N	Tanks	1978	348170
J	306m NE	Tanks	1965	350152
E	307m NE	Tanks	1986	353031
J	313m NE	Unspecified Tank	1965 - 1978	353747
L	315m N	Tanks	1978	348174
L	337m N	Tanks	1978	348173
L	338m N	Unspecified Tank	1965	349004
9	347m NW	Tanks	1978	348171
10	349m NE	Tanks	1965	350214
J	370m NE	Tanks	1965	351205
11	416m NE	Tanks	1965	352139
E	456m NE	Tanks	1965	350456
N	458m N	Unspecified Tank	1965 - 1978	354193

ID	Location	Land use	Dates present	Group ID
N	493m N	Unspecified Tank	1978	349007
N	493m N	Tanks	1965	348168

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	0

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	0

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

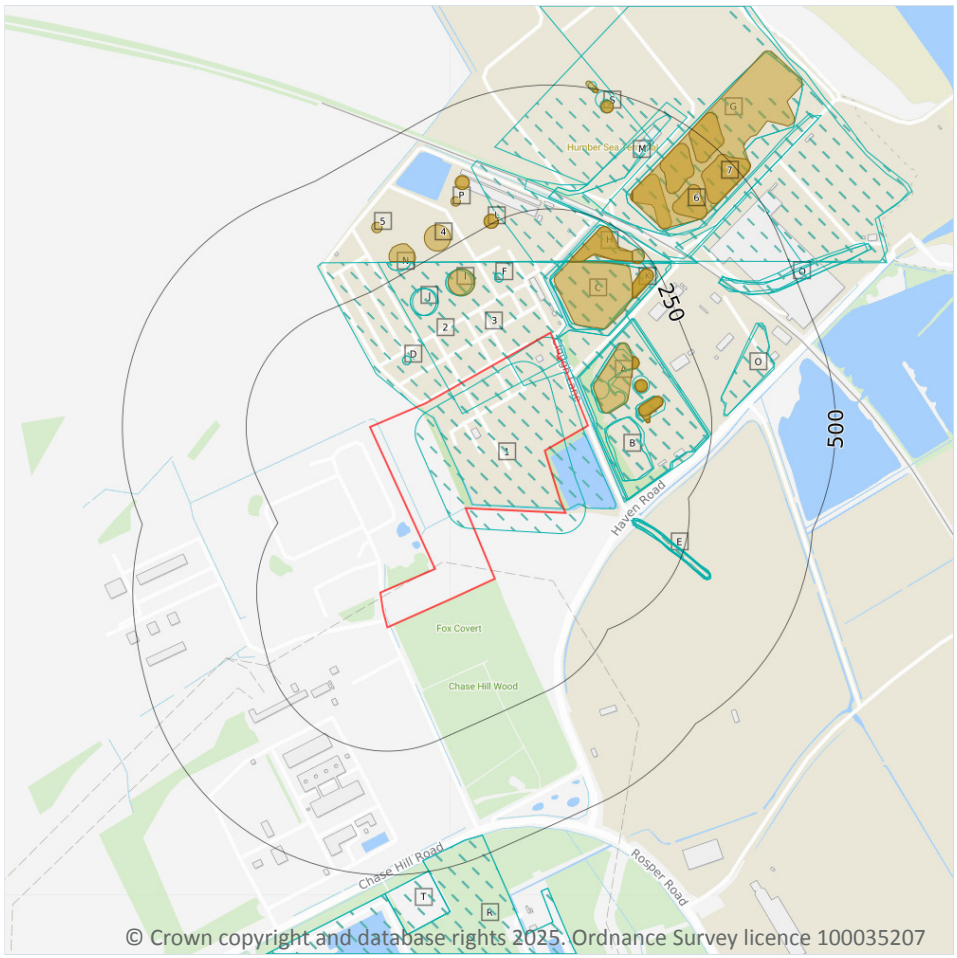
1.6 Historical military land

Records within 500m	0

Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.

2 Past land use - un-grouped



Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

2.1 Historical industrial land uses

Records within 500m	68

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 20 >**

ID	Location	Land Use	Date	Group ID
1	**On site**	**Gas Works**	**1974**	**2018944**
2	**On site**	**Unspecified Works**	**1983**	**2031970**
3	**On site**	**Unspecified Works**	**1968**	**2022920**

ID	Location	Land Use	Date	Group ID
A	8m NE	Unspecified Commercial/Industrial	1951	2020261
A	13m E	Unspecified Depot	1974	2025253
A	13m E	Unspecified Depot	1983	2025253
A	18m E	Unspecified Works	1968	2020589
A	32m NE	Unspecified Tank	1951	2018625
A	32m NE	Unspecified Tanks	1974	2031003
A	32m NE	Unspecified Tanks	1983	2031003
B	34m E	Unspecified Heap	1974	2027899
B	34m E	Unspecified Heap	1983	2027899
A	37m NE	Unspecified Tanks	1968	2029377
B	38m E	Unspecified Heap	1968	2032039
C	41m NE	Unspecified Tanks	1968	2029363
C	41m NE	Unspecified Tanks	1951	2029363
C	46m NE	Unspecified Tanks	1974	2032936
C	46m NE	Unspecified Tanks	1983	2032936
D	86m NW	Unspecified Tank	1974	2029809
D	86m NW	Unspecified Tank	1983	2029809
A	99m E	Unspecified Tanks	1951	2023549
A	101m NE	Unspecified Tanks	1951	2030742
A	102m E	Unspecified Tanks	1974	2024965
A	102m E	Unspecified Tanks	1983	2024965
A	105m E	Unspecified Tanks	1968	2029726
A	113m NE	Unspecified Tank	1951	2025841
A	116m NE	Unspecified Tank	1974	2021277
A	116m NE	Unspecified Tank	1983	2021277
A	118m NE	Unspecified Tank	1968	2027919
E	133m E	Unspecified Pit	1947	2026035
E	137m E	Unspecified Pit	1910	2022336

ID	Location	Land Use	Date	Group ID
E	137m E	Unspecified Pit	1910	2022336
E	138m E	Unspecified Pit	1951	2026035
F	139m N	Unspecified Tank	1974	2032085
F	139m N	Unspecified Tank	1983	2032085
G	141m N	Unspecified Works	1952	2021186
E	142m E	Unspecified Pit	1947	2033202
E	142m E	Unspecified Pit	1930	2033202
E	142m E	Unspecified Pit	1906	2025385
H	145m NE	Unspecified Tanks	1970	2027165
H	145m NE	Unspecified Tanks	1952	2029363
G	146m NE	Unspecified Works	1970	2030750
I	150m N	Unspecified Tank	1968	2029899
J	151m N	Unspecified Tank	1968	2030054
J	153m N	Unspecified Tank	1974	2032430
J	153m N	Unspecified Tank	1983	2032430
I	154m N	Unspecified Tank	1974	2024714
I	154m N	Unspecified Tank	1983	2024714
M	244m NE	Railway Sidings	1970	2031113
M	247m NE	Railway Sidings	1952	2022839
N	256m N	Unspecified Tank	1974	2025413
N	256m N	Unspecified Tank	1983	2025413
O	273m E	Unspecified Pit	1951	2032941
O	275m E	Unspecified Pit	1947	2032941
G	299m NE	Unspecified Tanks	1970	2026885
G	299m NE	Unspecified Tanks	1952	2026885
Q	352m NE	Railway Sidings	1947	2022874
Q	352m NE	Railway Sidings	1930	2022874
Q	353m NE	Railway Sidings	1951	2024385

ID	Location	Land Use	Date	Group ID
Q	358m NE	Railway Sidings	1947	2027345
R	457m S	Oil Refinery	1974	2033523
R	457m S	Oil Refinery	1983	2033523
S	457m N	Unspecified Tank	1970	2023663
S	466m N	Unspecified Tank	1952	2023663
S	493m N	Unspecified Tank	1970	2022144
S	497m N	Unspecified Tank	1952	2028438
T	499m S	Sewage Works	1974	2021843
T	499m S	Sewage Works	1983	2021843

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	**42**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 20 >**

ID	Location	Land Use	Date	Group ID
A	38m NE	Tanks	1965	348008
C	51m NE	Tanks	1965	352799
A	107m E	Tanks	1987	352762
A	107m E	Tanks	1987	352762
A	107m E	Tanks	1965	352651
A	117m NE	Unspecified Tank	1987	353988
A	117m NE	Unspecified Tank	1987	353988
A	118m NE	Unspecified Tank	1965	353988
A	118m E	Unspecified Tank	1965	349002
A	126m NE	Unspecified Tank	1965	350430
A	126m NE	Unspecified Tank	1987	353241

ID	Location	Land Use	Date	Group ID
A	126m NE	Unspecified Tank	1987	353241
H	148m NE	Tanks	1978	354109
H	148m NE	Tanks	1965	354109
I	150m N	Unspecified Tank	1965	349003
K	179m NE	Tanks	1987	350893
K	179m NE	Tanks	1987	350893
K	180m NE	Tanks	1965	350090
K	218m NE	Unspecified Tank	1986	350348
K	220m NE	Unspecified Tank	1965	351932
K	220m NE	Unspecified Tank	1987	350348
K	220m NE	Unspecified Tank	1987	350348
L	241m N	Unspecified Tank	1978	353794
L	241m N	Unspecified Tank	1965	353794
4	252m N	Tanks	1978	348172
N	260m N	Tanks	1978	348170
M	306m NE	Tanks	1965	350152
G	307m NE	Tanks	1986	353031
M	313m NE	Unspecified Tank	1965	353747
M	313m NE	Unspecified Tank	1978	353747
P	315m N	Tanks	1978	348174
P	337m N	Tanks	1978	348173
P	338m N	Unspecified Tank	1965	349004
5	347m NW	Tanks	1978	348171
6	349m NE	Tanks	1965	350214
M	370m NE	Tanks	1965	351205
7	416m NE	Tanks	1965	352139
G	456m NE	Tanks	1965	350456
S	458m N	Unspecified Tank	1978	354193

ID	Location	Land Use	Date	Group ID
S	458m N	Unspecified Tank	1965	354193
S	493m N	Unspecified Tank	1978	349007
S	493m N	Tanks	1965	348168

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m	0

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

2.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

2.5 Historical garages

Records within 500m	0

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill



Site Outline

Search buffers in metres (m)

Historical landfill (EA/NRW)

Waste exemptions

3.1 Active or recent landfill

Records within 500m	0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m	0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m	0

Landfill sites identified from Local Authority records and high detail historical mapping.

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m	2

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

Features are displayed on the Waste and landfill map on **page 26 >**

ID	Location	Details		
2	304m N	Site Address: Clough Lane, Borrow Pit Site, Clough Lane, North Killingholme Licence Holder Address: Clough Lane, North Killingholme, South Humberside	Waste Licence: Yes Site Reference: CTN/pkt/LP 954, A899 Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 08/10/1993 Licence Surrender: -	Operator: Simon Storage Group Limited Licence Holder: Simon Storage Group Limited First Recorded 23/03/1994 Last Recorded: -
4	363m NE	Site Address: Petrofina, Clough Lane, Killingholme Licence Holder Address: -	Waste Licence: Yes Site Reference: 55/190/636, A636 Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 22/09/1977 Licence Surrender: 16/11/1989	Operator: Petrofina UK Limited Licence Holder: Petrofina First Recorded 31/12/1972 Last Recorded: 31/12/1989

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m	0

Waste site records derived from Local Authority planning records and high detail historical mapping.

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m	0

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

Records within 500m	3

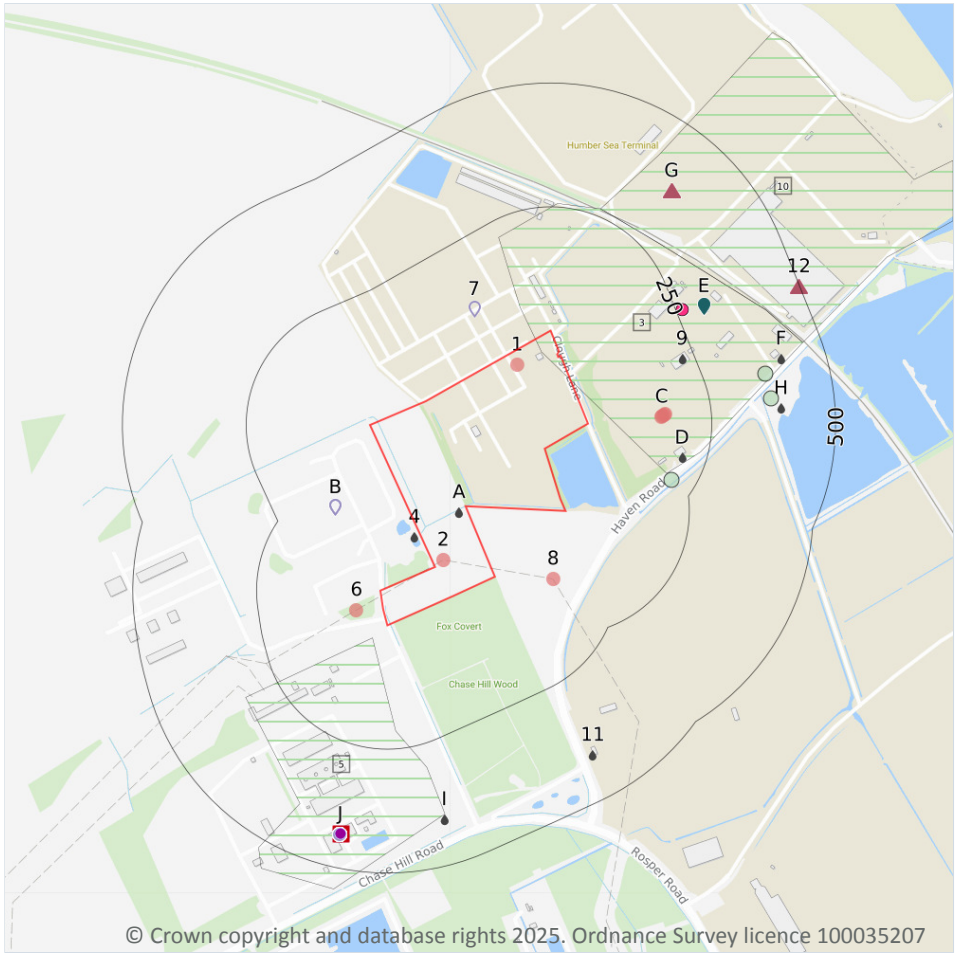
Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

Features are displayed on the Waste and landfill map on **page 26 >**

ID	Location	Site	Reference	Category	Sub-Category	Description
1	85m SW	Balflour Beatty Site Offices, Killingholme Power Station, Chase Hill Road, Immingham, Dn40 3eh	WEX140986	Treating waste exemption	Not on a farm	Treatment of waste aerosol cans
3	362m SW	Uniper Power Station, Chase Hill Road, North Lincolnshire, Dn40 3lu	WEX085993	Treating waste exemption	Not on a farm	Manual treatment of waste
5	383m SW	Killingholme Power Station Chase Hill Road Killingholme Dn40 3lu	EPR/UE5149HC/A001	Treating waste exemption	Non-agricultural waste only	Treatment of kitchen waste in a wormery

This data is sourced from the Environment Agency and Natural Resources Wales.

4 Current industrial land use



Site Outline

Search buffers in metres (m)

- Recent industrial land uses
- Control of Major Accident Hazards
- Hazardous substance storage/usage
- Historical licensed industrial activities
- Part A(1) industrial activities
- Licensed pollutant release (Part A(2)/B)
- Radioactive Substance Authorisations
- Licensed Discharges to controlled waters
- List 1 Dangerous Substances
- Pollution Incidents (EA/NRW)
- Pollution inventory substances
- Pollution inventory waste transfers

4.1 Recent industrial land uses

Records within 250m	8

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 29 >**

ID	Location	Company	Address	Activity	Category
1	**On site**	**Works**	**Lincolnshire, DN40**	**Unspecified Works Or Factories**	**Industrial Features**
2	**On site**	**Pylon**	**Lincolnshire, DN40**	**Electrical Features**	**Infrastructure and Facilities**
6	53m SW	Pylon	Lincolnshire, DN40	Electrical Features	Infrastructure and Facilities

ID	Location	Company	Address	Activity	Category
8	118m SE	Pylon	Lincolnshire, DN40	Electrical Features	Infrastructure and Facilities
C	149m E	Tank	Lincolnshire, DN40	Tanks (Generic)	Industrial Features
C	152m E	Tank	Lincolnshire, DN40	Tanks (Generic)	Industrial Features
C	155m E	Tank	Lincolnshire, DN40	Tanks (Generic)	Industrial Features
C	158m E	Tank	Lincolnshire, DN40	Tanks (Generic)	Industrial Features

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m	0

Open, closed, under development and obsolete petrol stations.

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m	0

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m	0

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m	0

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m	3

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

Features are displayed on the Current industrial land use map on **page 29 >**

ID	Location	Company	Address	Operational status	Tier
3	**On site**	**Simon Warehousing**	**Simon Warehousing, North Killingholme Cargo Terminal, Clough Lane, Killingholme, DN40 3JP**	**Historical COMAH Site**	**-**
5	39m SW	Simon Storage	Simon Storage, Killingholme Wharfage Co Ltd, North Killingholme Haven, Grimsby	Historical COMAH Site	-
10	263m NE	Killingholme Wharfage	Killingholme Wharfage, North Killingholm, DN40 3LX	Historical COMAH Site	-

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m	0

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m	3

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

Features are displayed on the Current industrial land use map on **page 29 >**

ID	Location	Details	
G	373m NE	Application reference number: 7/1992/0523 Application status: Historical Consent Application date: 19/08/1992 Address: Kali (UK) Ltd, Clough Lane, North Killingholme, Grimsby, North Lincolnshire, England, DN40 3JS	Details: Ammonium nitrate fertilizer. Quantity before relevant date - 5000 tonnes. Established quantity - 5000 tonnes Enforcement: No Enforcement Notified Date of enforcement: No Enforcement Notified Comment: No Enforcement Notified

ID	Location	Details	
G	373m NE	Application reference number: 7/1992/0523 Application status: Approved Application date: 19/08/1992 Address: Kali (UK) Ltd, Clough Lane, North Killingholme, Grimsby, North Lincolnshire, England, DN40 3JS	Details: Ammonium nitrate fertilizer. Quantity before relevant date - 5000 tonnes. Established quantity - 5000 tonnes Enforcement: No Enforcement Notified Date of enforcement: No Enforcement Notified Comment: No Enforcement Notified
12	498m NE	Application reference number: 7/1992/0528 Application status: Approved Application date: 27/08/1992 Address: Simon Storage, Killingholme Wharfage Co Ltd, North Killingholme Haven, Grimsby, North Lincolnshire, England, DN40 3JS	Details: Ammonium nitrate fertilizer. Quantity before relevant date - 10000 tonnes. Established quantity - 10000 tonnes Enforcement: No Enforcement Notified Date of enforcement: No Enforcement Notified Comment: No Enforcement Notified

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m	**17**

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

Features are displayed on the Current industrial land use map on **page 29 >**

ID	Location	Details	
J	432m S	Operator: E.ON UK Plc Address: Killingholme Power Station, PO Box 111, Immingham, Grimsby, North Lincs, DN40 3NG Process: Combustion Processes Permit Number: AB5873	Original Permit Number: IPCAPP Date Approved: 9-4-1992 Effective Date: 9-4-1992 Status: Superseded By Variation
J	432m S	Operator: Centrica Kps Ltd Address: Killingholme A Power Station, Chase Hill Road, North Killingholme, Grimsby, North Lincs, DN40 3EH Process: Combustion Processes Permit Number: AF0920	Original Permit Number: IPCAPP Date Approved: 18-12-1992 Effective Date: 18-12-1992 Status: Superseded By Variation
J	432m S	Operator: E.ON UK Plc Address: Killingholme Power Station, PO Box 111, Immingham, Grimsby, North Lincs, DN40 3NG Process: Combustion Processes Permit Number: AF6693	Original Permit Number: IPCMINVAR Date Approved: 23-6-1992 Effective Date: 23-6-1992 Status: Superseded By Variation

ID	Location	Details	
J	432m S	Operator: E.ON UK Plc Address: Killingholme Power Station, PO Box 111, Immingham, Grimsby, North Lincs, DN40 3NG Process: Combustion Processes Permit Number: AG7628	Original Permit Number: IPCMINVAR Date Approved: 20-10-1992 Effective Date: 20-10-1992 Status: Superseded By Variation
J	432m S	Operator: Centrica Kps Ltd Address: Killingholme A Power Station, Chase Hill Road, North Killingholme, Grimsby, North Lincs, DN40 3EH Process: Combustion Processes Permit Number: AJ6637	Original Permit Number: IPCMINVAR Date Approved: 30-8-1993 Effective Date: 30-8-1993 Status: Superseded By Variation
J	432m S	Operator: Centrica Kps Ltd Address: Killingholme A Power Station, Chase Hill Road, North Killingholme, Grimsby, North Lincs, DN40 3EH Process: Combustion Processes Permit Number: AK3404	Original Permit Number: IPCMINVAR Date Approved: 1-11-1993 Effective Date: 1-11-1993 Status: Superseded By Variation
J	432m S	Operator: Centrica Kps Ltd Address: Killingholme A Power Station, Chase Hill Road, North Killingholme, Grimsby, North Lincs, DN40 3EH Process: Combustion Processes Permit Number: AN6825	Original Permit Number: IPCMINVAR Date Approved: 15-12-1994 Effective Date: 1-1-1995 Status: Superseded By Variation
J	432m S	Operator: E.ON UK Plc Address: Killingholme Power Station, PO Box 111, Immingham, Grimsby, North Lincs, DN40 3NG Process: Combustion Processes Permit Number: AN6833	Original Permit Number: IPCMINVAR Date Approved: 2-12-1994 Effective Date: 1-1-1995 Status: Superseded By Variation
J	432m S	Operator: Centrica Kps Ltd Address: Killingholme A Power Station, Chase Hill Road, North Killingholme, Grimsby, North Lincs, DN40 3EH Process: Combustion Processes Permit Number: BC2181	Original Permit Number: IPCMAJVAR Date Approved: 30-4-1999 Effective Date: 1-7-1999 Status: Superseded By Variation
J	432m S	Operator: Centrica Kps Ltd Address: Killingholme A Power Station, Chase Hill Road, North Killingholme, Grimsby, North Lincs, DN40 3EH Process: Combustion Processes Permit Number: BC8791	Original Permit Number: IPCMINVAR Date Approved: 24-11-1998 Effective Date: 30-11-1998 Status: Superseded By Variation
J	432m S	Operator: E.ON UK Plc Address: Killingholme Power Station, PO Box 111, Immingham, Grimsby, North Lincs, DN40 3NG Process: Combustion Processes Permit Number: BC8805	Original Permit Number: IPCMINVAR Date Approved: 24-11-1998 Effective Date: 30-11-1998 Status: Superseded By Variation

ID	Location	Details	
J	432m S	Operator: E.ON UK Plc Address: Killingholme Power Station, PO Box 111, Immingham, Grimsby, North Lincs, DN40 3NG Process: Combustion Processes Permit Number: BE7575	Original Permit Number: IPCMINVAR Date Approved: 18-12-1998 Effective Date: 1-1-1999 Status: Superseded By Variation
J	432m S	Operator: Centrica Kps Ltd Address: Killingholme A Power Station, Chase Hill Road, North Killingholme, Grimsby, North Lincs, DN40 3EH Process: Combustion Processes Permit Number: BI4683	Original Permit Number: IPCMINVAR Date Approved: 25-5-2000 Effective Date: 1-6-2000 Status: Superseded By Variation
J	432m S	Operator: Centrica Kps Ltd Address: Killingholme A Power Station, Chase Hill Road, North Killingholme, Grimsby, North Lincs, DN40 3EH Process: Combustion Processes Permit Number: BM1881	Original Permit Number: IPCMINVAR Date Approved: 25-10-2001 Effective Date: 1-11-2001 Status: Superseded By Variation
J	432m S	Operator: Centrica Kps Ltd Address: Killingholme A Power Station, Chase Hill Road, North Killingholme, Grimsby, North Lincs, DN40 3EH Process: Combustion Processes Permit Number: BU5178	Original Permit Number: IPCMINVAR Date Approved: 15-5-2003 Effective Date: 27-5-2003 Status: Superseded By Variation
J	432m S	Operator: Centrica Kps Ltd Address: Killingholme A Power Station, Chase Hill Road, North Killingholme, Grimsby, North Lincs, DN40 3EH Process: Combustion Processes Permit Number: BY2260	Original Permit Number: IPCMINVAR Date Approved: 9-11-2004 Effective Date: 27-11-2004 Status: Revoked - Now Ippc
J	432m S	Operator: E.ON UK Plc Address: Killingholme Power Station, PO Box 111, Immingham, Grimsby, North Lincs, DN40 3NG Process: Combustion Processes Permit Number: BY3452	Original Permit Number: IPCMINVAR Date Approved: 9-11-2004 Effective Date: 27-11-2004 Status: Revoked - Now Ippc

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m	**31**

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

Features are displayed on the Current industrial land use map on **page 29 >**

ID	Location	Details	
7	114m N	Operator: C.GEN KILLINGHOLME LIMITED Installation Name: C.Gen Killingholme Power Plant - EPR/FP3838EB Process: COMBUSTION; ANY FUEL =>50MW Permit Number: FP3838EB Original Permit Number: FP3838EB	EPR Reference: EPR/FP3838EB Issue Date: 10/08/2017 Effective Date: 10/08/2017 Last date noted as effective: 29/10/2024 Status: Effective
B	133m W	Operator: CENTRICA KPS LIMITED Installation Name: Killingholme Power Station EPR/SP3133LY Process: ASSOCIATED PROCESS Permit Number: SP3133LY Original Permit Number: SP3133LY	EPR Reference: EPR/SP3133LY Issue Date: 19/09/2017 Effective Date: 19/09/2017 Last date noted as effective: 29/10/2024 Status: Surrendered
B	133m W	Operator: CENTRICA KPS LIMITED Installation Name: Killingholme Power Station EPR/SP3133LY Process: COMBUSTION; ANY FUEL =>50MW Permit Number: SP3133LY Original Permit Number: SP3133LY	EPR Reference: EPR/SP3133LY Issue Date: 19/09/2017 Effective Date: 19/09/2017 Last date noted as effective: 29/10/2024 Status: Surrendered
B	133m W	Operator: Centrica KPS Ltd Installation Name: Killingholme Power Station EPR/SP3133LY Process: ASSOCIATED PROCESS Permit Number: MP3632ZZ Original Permit Number: SP3133LY	EPR Reference: - Issue Date: 11/03/2013 Effective Date: 11/03/2013 Last date noted as effective: 21/03/2023 Status: Superceded
B	133m W	Operator: Centrica KPS Ltd Installation Name: Killingholme Power Station EPR/SP3133LY Process: ASSOCIATED PROCESS Permit Number: WP3831FU Original Permit Number: SP3133LY	EPR Reference: - Issue Date: 24/10/2011 Effective Date: 24/10/2011 Last date noted as effective: 21/03/2023 Status: Superceded
B	133m W	Operator: Centrica KPS Ltd Installation Name: Killingholme Power Station EPR/SP3133LY Process: ASSOCIATED PROCESS Permit Number: YP3635HZ Original Permit Number: SP3133LY	EPR Reference: - Issue Date: 22/12/2010 Effective Date: 22/12/2010 Last date noted as effective: 21/03/2023 Status: Superceded
B	133m W	Operator: Centrica KPS Ltd Installation Name: Killingholme Power Station EPR/SP3133LY Process: COMBUSTION; ANY FUEL =>50MW Permit Number: YP3635HZ Original Permit Number: SP3133LY	EPR Reference: - Issue Date: 22/12/2010 Effective Date: 22/12/2010 Last date noted as effective: 21/03/2023 Status: Superceded

ID	Location	Details	
B	133m W	Operator: Centrica KPS Ltd Installation Name: Killingholme Power Station EPR/SP3133LY Process: ASSOCIATED PROCESS Permit Number: GP3034AJ Original Permit Number: SP3133LY	EPR Reference: - Issue Date: 21/12/2015 Effective Date: 01/01/2016 Last date noted as effective: 21/03/2023 Status: Superceded
B	133m W	Operator: Centrica KPS Ltd Installation Name: Killingholme Power Station EPR/SP3133LY Process: COMBUSTION; ANY FUEL =>50MW Permit Number: GP3635FW Original Permit Number: SP3133LY	EPR Reference: - Issue Date: 25/07/2011 Effective Date: 25/07/2011 Last date noted as effective: 21/03/2023 Status: Superceded
B	133m W	Operator: Centrica KPS Ltd Installation Name: Killingholme Power Station EPR/SP3133LY Process: ASSOCIATED PROCESS Permit Number: UP3230YK Original Permit Number: SP3133LY	EPR Reference: - Issue Date: - Effective Date: 19/09/2017 Last date noted as effective: 21/03/2023 Status: Surrender Effective
B	133m W	Operator: Centrica KPS Ltd Installation Name: Killingholme Power Station EPR/SP3133LY Process: COMBUSTION; ANY FUEL =>50MW Permit Number: UP3230YK Original Permit Number: SP3133LY	EPR Reference: - Issue Date: - Effective Date: 19/09/2017 Last date noted as effective: 21/03/2023 Status: Surrender Effective
B	133m W	Operator: Centrica KPS Ltd Installation Name: Killingholme Power Station EPR/SP3133LY Process: COMBUSTION; ANY FUEL =>50MW Permit Number: MP3632ZZ Original Permit Number: SP3133LY	EPR Reference: - Issue Date: 11/03/2013 Effective Date: 11/03/2013 Last date noted as effective: 21/03/2023 Status: Superceded
B	133m W	Operator: Centrica KPS Ltd Installation Name: Killingholme Power Station EPR/SP3133LY Process: COMBUSTION; ANY FUEL =>50MW Permit Number: WP3831FU Original Permit Number: SP3133LY	EPR Reference: - Issue Date: 24/10/2011 Effective Date: 24/10/2011 Last date noted as effective: 21/03/2023 Status: Superceded
B	133m W	Operator: Centrica KPS Ltd Installation Name: Killingholme Power Station EPR/SP3133LY Process: COMBUSTION; ANY FUEL =>50MW Permit Number: GP3034AJ Original Permit Number: SP3133LY	EPR Reference: - Issue Date: 21/12/2015 Effective Date: 01/01/2016 Last date noted as effective: 21/03/2023 Status: Superceded

ID	Location	Details	
B	133m W	Operator: Centrica KPS Ltd Installation Name: Killingholme Power Station EPR/SP3133LY Process: ASSOCIATED PROCESS Permit Number: GP3635FW Original Permit Number: SP3133LY	EPR Reference: - Issue Date: 25/07/2011 Effective Date: 25/07/2011 Last date noted as effective: 21/03/2023 Status: Superceded
J	432m S	Operator: E.ON UK PLC Installation Name: Killingholme Power Station EPR/SP3233LQ Process: COMBUSTION; ANY FUEL =>50MW Permit Number: SP3233LQ Original Permit Number: SP3233LQ	EPR Reference: EPR/SP3233LQ Issue Date: 29/09/2014 Effective Date: 01/10/2014 Last date noted as effective: 29/10/2024 Status: Superseded
J	432m S	Operator: UNIPER UK LIMITED Installation Name: Killingholme Power Station EPR/VP3933RJ Process: COMBUSTION; ANY FUEL =>50MW Permit Number: VP3933RJ Original Permit Number: VP3933RJ	EPR Reference: EPR/VP3933RJ Issue Date: 08/09/2020 Effective Date: 08/09/2020 Last date noted as effective: 29/10/2024 Status: Effective
J	432m S	Operator: UNIPER UK LIMITED Installation Name: KILLINGHOLME POWER STATION EPR/VP3933RJ Process: COMBUSTION; ANY FUEL =>50MW Permit Number: SP3133JR Original Permit Number: VP3933RJ	EPR Reference: - Issue Date: 03/05/2018 Effective Date: 03/05/2018 Last date noted as effective: 28/09/2020 Status: SUPERCEDED
J	432m S	Operator: E.ON UK plc Installation Name: Killingholme Power Station EPR/SP3233LQ Process: COMBUSTION; ANY FUEL =>50MW Permit Number: WP3832UJ Original Permit Number: SP3233LQ	EPR Reference: - Issue Date: 08/04/2008 Effective Date: 08/04/2008 Last date noted as effective: 21/03/2023 Status: Superceded
J	432m S	Operator: E.ON UK plc Installation Name: Killingholme Power Station EPR/SP3233LQ Process: COMBUSTION; ANY FUEL =>50MW Permit Number: XP3132ZN Original Permit Number: SP3233LQ	EPR Reference: - Issue Date: 11/03/2013 Effective Date: 11/03/2013 Last date noted as effective: 21/03/2023 Status: Superceded
J	432m S	Operator: Uniper Uk Limited Installation Name: Killingholme Power Station EPR/VP3933RJ Process: COMBUSTION; ANY FUEL =>50MW Permit Number: BP3638DV Original Permit Number: VP3933RJ	EPR Reference: - Issue Date: 16/06/2016 Effective Date: 16/06/2016 Last date noted as effective: 21/03/2023 Status: Superceded

ID	Location	Details	
J	432m S	Operator: Uniper Uk Limited Installation Name: Killingholme Power Station EPR/VP3933RJ Process: COMBUSTION; ANY FUEL =>50MW Permit Number: DP3204PF Original Permit Number: VP3933RJ	EPR Reference: - Issue Date: 02/10/2019 Effective Date: 02/10/2019 Last date noted as effective: 21/03/2023 Status: Superceded
J	432m S	Operator: Uniper Uk Limited Installation Name: Killingholme Power Station EPR/VP3933RJ Process: COMBUSTION; ANY FUEL =>50MW Permit Number: SP3133JR Original Permit Number: VP3933RJ	EPR Reference: - Issue Date: 03/05/2018 Effective Date: 03/05/2018 Last date noted as effective: 21/03/2023 Status: Superceded
J	432m S	Operator: Uniper Uk Limited Installation Name: Killingholme Power Station EPR/VP3933RJ Process: COMBUSTION; ANY FUEL =>50MW Permit Number: GP3839YP Original Permit Number: VP3933RJ	EPR Reference: - Issue Date: 17/01/2017 Effective Date: 17/01/2017 Last date noted as effective: 21/03/2023 Status: Superceded
J	432m S	Operator: Uniper Uk Limited Installation Name: Killingholme Power Station EPR/VP3933RJ Process: COMBUSTION; ANY FUEL =>50MW Permit Number: BP3638DV Original Permit Number: VP3933RJ	EPR Reference: - Issue Date: 16/06/2016 Effective Date: 16/06/2016 Last date noted as effective: 21/03/2023 Status: Superceded
J	432m S	Operator: E.ON UK plc Installation Name: Killingholme Power Station EPR/SP3233LQ Process: COMBUSTION; ANY FUEL =>50MW Permit Number: LP3835WR Original Permit Number: SP3233LQ	EPR Reference: - Issue Date: 29/09/2014 Effective Date: 01/10/2014 Last date noted as effective: 21/03/2023 Status: Superceded
J	432m S	Operator: Uniper Uk Limited Installation Name: Killingholme Power Station EPR/VP3933RJ Process: COMBUSTION; ANY FUEL =>50MW Permit Number: HP3532RJ Original Permit Number: VP3933RJ	EPR Reference: - Issue Date: 24/12/2015 Effective Date: 01/01/2016 Last date noted as effective: 21/03/2023 Status: Superceded
J	432m S	Operator: Uniper Uk Limited Installation Name: Killingholme Power Station EPR/VP3933RJ Process: COMBUSTION; ANY FUEL =>50MW Permit Number: BP3603LF Original Permit Number: VP3933RJ	EPR Reference: - Issue Date: 08/09/2020 Effective Date: 08/09/2020 Last date noted as effective: 21/03/2023 Status: Effective

ID	Location	Details	
J	432m S	Operator: Uniper Uk Limited Installation Name: Killingholme Power Station EPR/VP3933RJ Process: COMBUSTION; ANY FUEL =>50MW Permit Number: GP3839YP Original Permit Number: VP3933RJ	EPR Reference: - Issue Date: 17/01/2017 Effective Date: 17/01/2017 Last date noted as effective: 21/03/2023 Status: Superceded
J	432m S	Operator: Uniper Uk Limited Installation Name: Killingholme Power Station EPR/VP3933RJ Process: COMBUSTION; ANY FUEL =>50MW Permit Number: HP3532RJ Original Permit Number: VP3933RJ	EPR Reference: - Issue Date: 24/12/2015 Effective Date: 01/01/2016 Last date noted as effective: 21/03/2023 Status: Superceded
J	432m S	Operator: Uniper Uk Limited Installation Name: Killingholme Power Station EPR/VP3933RJ Process: COMBUSTION; ANY FUEL =>50MW Permit Number: VP3933RJ Original Permit Number: VP3933RJ	EPR Reference: - Issue Date: 26/08/2015 Effective Date: 30/09/2015 Last date noted as effective: 21/03/2023 Status: Superceded

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m **5**

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

Features are displayed on the Current industrial land use map on **page 29 >**

ID	Location	Address	Details	
E	305m NE	Astra Fuels Ltd, North Killingholme Cargo Terminal, Clough Lane, North Killingholme, DN40 3JS	Process: Coal & Coke Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
E	305m NE	Simon Storage, North Killingholme Cargo Terminal, Clough Lane, North Killingholme, DN40 3JP	Process: Waste Oil Burner 0.4 MW Status: New Legislation Applies Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified

ID	Location	Address	Details	
E	305m NE	Simon Storage, North Killingholme Cargo Terminal, Clough Lane, North Killingholme, DN40 3JP	Process: Coal & Coke Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
E	305m NE	North Killingholme Storage, North Killingholme Cargo Terminal, Clough Lane, North Killingholme, DN40 3JZ	Process: Coal & Coke Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
E	305m NE	Coastal Fuels Ltd, Nth Killingholme Cargo Terminal, Clough Lane, North Killingholme, DN40 3JS	Process: Coal & Coke Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m **1**

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

Features are displayed on the Current industrial land use map on **page 29 >**

ID	Location	Address	Details	
E	262m NE	The Humber Sea Terminal,Clough Lane, Killingholme, Immingham, DN40 3JP	Operator: Secretary of State for Home Affairs Type: - Permission number: CA6741 Date of approval: -	Effective from: - Last date of update: 01/01/2020 Status: Surrendered

This data is sourced from the Environment Agency and Natural Resources Wales.

4.13 Licensed Discharges to controlled waters

Records within 500m **10**

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

Features are displayed on the Current industrial land use map on **page 29 >**

ID	Location	Address	Details	
A	**On site**	**POTENTIALRADIOACTIVEWASTE DISPOSA,HOUNDMILLSESTATE,BASINGSTOKE,HANTS,RG216XR**	**Effluent Type: TRADE DISCHARGES - UNSPECIFIED Permit Number: PR3NF276 Permit Version: 1 Receiving Water: Haven Road Drain**	**Status: PRE NRA LEGISLATION WHERE ISSUE DATE 01-SEP-89 (HISTORIC ONLY) Issue date: 17/10/1986 Effective Date: 17/10/1986 Revocation Date: 19/02/1992**
A	**On site**	**POTENTIALRADIOACTIVEWASTE DISPOSA,HOUNDMILLSESTATE,BASINGSTOKE,HANTS,RG216XR**	**Effluent Type: TRADE DISCHARGES - UNSPECIFIED Permit Number: PR3NF408 Permit Version: 1 Receiving Water: Haven Road Drain**	**Status: PRE NRA LEGISLATION WHERE ISSUE DATE 01-SEP-89 (HISTORIC ONLY) Issue date: 30/04/1987 Effective Date: 30/04/1987 Revocation Date: 19/02/1992**
4	13m SW	KILLINGHOLMEAPSTN,CHASEHILL ROAD,GRIMSBY	Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: PRNNF04466 Permit Version: 1 Receiving Water: Trib North Killingholme Main D	Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 03/12/1991 Effective Date: 03/12/1991 Revocation Date: 22/02/1994
D	202m E	KILLINGHOLMESTW,NORTHKILLINGHOLME,IMMINGHAM,DN403JS	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: PR3NFF186 Permit Version: 1 Receiving Water: North Killingholme Main Drain	Status: PRE NRA LEGISLATION WHERE ISSUE DATE 01-SEP-89 (HISTORIC ONLY) Issue date: 23/03/1957 Effective Date: 23/03/1957 Revocation Date: -
9	225m NE	CLOUGHLANENORTHKILLINGHOLME,SHELLBPSITE,NORTHLINCOLNSHIRE,DN403LX	Effluent Type: TRADE DISCHARGES - SITE DRAINAGE Permit Number: PR3NFF408 Permit Version: 1 Receiving Water: TRIB OF NTH K'HOLME MAIN DRAIN	Status: PRE NRA LEGISLATION WHERE ISSUE DATE 01-SEP-89 (HISTORIC ONLY) Issue date: 11/11/1963 Effective Date: 11/11/1963 Revocation Date: -
H	391m E	KILLINGHOLMEINSTALLATIONSEWAGETR,NORTHKILLINGHOLME,IMMINGHAM,LINCOLNSHIRE,DN40	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: PR3NFF514 Permit Version: 1 Receiving Water: Unknown trib	Status: PRE NRA LEGISLATION WHERE ISSUE DATE 01-SEP-89 (HISTORIC ONLY) Issue date: 03/02/1966 Effective Date: 03/02/1966 Revocation Date: 20/02/1992
I	408m S	POWERGENCONSTRSITE,NORTH KILLINGHOLME,SHUMBERSIDE	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: PRNNF03604 Permit Version: 2 Receiving Water: Trib North Killingholme Main D	Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 24/02/1992 Effective Date: 24/02/1992 Revocation Date: 31/03/1993

ID	Location	Address	Details	
I	408m S	POWERGENCONSTRSITE,NORTH KILLINGHOLME,SHUMBERSIDE	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: PRNNF03604 Permit Version: 1 Receiving Water: trib of N. Killingh'm Main D'n	Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 17/01/1991 Effective Date: 17/01/1991 Revocation Date: 23/02/1992
11	411m S	WETHERBYRD,SCARCROFT,LEEDS ,LS143HS(FROMSUBSTATION,NO RTHKILLINGHAM	Effluent Type: UNSPECIFIED Permit Number: PRNLF01265 Permit Version: 1 Receiving Water: land	Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 27/07/1989 Effective Date: 27/07/1989 Revocation Date: 01/10/1996
F	411m E	NEWCLOUGHLANE,CLOUGHLAN E,NORTHKILLINGHOLME,IMMIN GHAM,DN403JS	Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: PR3NFF1126 Permit Version: 1 Receiving Water: Unknown trib	Status: PRE NRA LEGISLATION WHERE ISSUE DATE 01-SEP-89 (HISTORIC ONLY) Issue date: 04/11/1975 Effective Date: 04/11/1975 Revocation Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m	0

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.15 Pollutant release to public sewer

Records within 500m	0

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 List 1 Dangerous Substances

Records within 500m	2

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

Features are displayed on the Current industrial land use map on **page 29 >**

ID	Location	Name	Status	Receiving Water	Authorised Substances
J	432m S	Killingholme Power Station	Active	River Humber	Mercury (other), Cadmium
J	432m S	Killingholme A Power Station	Active	River Humber	Mercury (other), Cadmium

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 2 Dangerous Substances

Records within 500m	**0**

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m	**3**

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

Features are displayed on the Current industrial land use map on **page 29 >**

ID	Location	Details	
D	204m E	Incident Date: 26/07/2001 Incident Identification: 19361 Pollutant: Oils and Fuel Pollutant Description: Diesel	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
F	371m E	Incident Date: 04/03/2005 Incident Identification: 297370 Pollutant: Oils and Fuel Pollutant Description: Diesel	Water Impact: Category 2 (Significant) Land Impact: Category 3 (Minor) Air Impact: Category 3 (Minor)
H	373m E	Incident Date: 29/07/2001 Incident Identification: 20062 Pollutant: Contaminated Water Pollutant Description: Other Contaminated Water	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution inventory substances

Records within 500m	2

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

Features are displayed on the Current industrial land use map on **page 29 >**

ID: J, Location: 432m S, Permit: VP3933RJ
Operator: Uniper UK Limited
Activity: COMBUSTION; ANY FUEL =>50MW
Address: Killingholme Power Station Chase Hill Road North Killingholme North Lincolnshire DN40 3LU
Sector: Combustion, Sub-sector: Power
Releases:

Route	Substance	Reporting threshold (kg)	Quantity (kg)
Air	Sulphur oxides (SO2 and SO3) as SO2	100000kg	Below Reporting Threshold
Air	Carbon monoxide	100000kg	Below Reporting Threshold
Air	Nitrous oxide	10000kg	Below Reporting Threshold
Air	Methane	10000kg	Below Reporting Threshold
Air	Nitrogen oxides (NO and NO2) as NO2	100000kg	Below Reporting Threshold
Air	Sulphur hexafluoride	10kg	Below Reporting Threshold
Air	Mercury	1kg	Below Reporting Threshold
Air	Non-methane volatile organic compounds (NMVOCs)	10000kg	Below Reporting Threshold

ID: J, Location: 432m S, Permit: VP3933RJ
Operator: Uniper UK Limited
Activity: COMBUSTION; ANY FUEL =>50MW
Address: Killingholme Power Station Chase Hill Road North Killingholme North Lincolnshire DN40 3LU
Sector: Combustion, Sub-sector: Power
Releases:

Route	Substance	Reporting threshold (kg)	Quantity (kg)
Air	Carbon dioxide	10000000kg	23331064kg

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.20 Pollution inventory waste transfers

Records within 500m	**1**

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

Features are displayed on the Current industrial land use map on **page 29 >**

ID: J, Location: 432m S, Permit: VP3933RJ
Operator: Uniper UK Limited
Activity: COMBUSTION; ANY FUEL =>50MW
Address: Killingholme Power Station Chase Hill Road North Killingholme North Lincolnshire DN40 3LU
Sector: Combustion, Sub-sector: Power
Releases:

Route	Route description	Quantity (tonnes)	Release level	EWC code	EWC description	Hazardous waste
R13	Storage of wastes pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)	13.6	Absolute Value	15 01 06	mixed packaging	No
R4	Recycling/reclamation of metals and metal compounds	13.2	Absolute Value	17 04 05	iron and steel	No
R4	Recycling/reclamation of metals and metal compounds	7.78	Absolute Value	17 04 07	mixed metals	No
R3	Recycling/Reclamation of organic substances which are not used as solvents (including composting and other biological transformatin processes)	5.2	Absolute Value	17 09 04	mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03	No
R3	Recycling/Reclamation of organic substances which are not used as solvents (including composting and other biological transformatin processes)	8.66	Absolute Value	20 01 38	wood other than that mentioned in 20 01 37	No
R1	Use principally as a fuel or other means to generate energy	16.84	Absolute Value	20 03 01	mixed municipal waste	No

Route	Route description	Quantity (tonnes)	Release level	EWC code	EWC description	Hazardous waste
R3	Recycling/Reclamation of organic substances which are not used as solvents (including composting and other biological transformatin processes)	Below Reporting Threshold	Below Reporting Threshold	17 02 01	wood	No
R13	Storage of wastes pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)	Below Reporting Threshold	Below Reporting Threshold	17 06 04	insulation materials other than those mentioned in 17 06 01 and 17 06 03	No
R13	Storage of wastes pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)	Below Reporting Threshold	Below Reporting Threshold	20 01 36	discarded electrical and electronic equipment other than those mentioned in 20 01 21, 20 01 23 and 20 01 35	No
R4	Recycling/reclamation of metals and metal compounds	Below Reporting Threshold	Below Reporting Threshold	20 01 36	discarded electrical and electronic equipment other than those mentioned in 20 01 21, 20 01 23 and 20 01 35	No
R13	Storage of wastes pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)	Below Reporting Threshold	Below Reporting Threshold	20 01 39	plastics	No
R1	Use principally as a fuel or other means to generate energy	Below Reporting Threshold	Below Reporting Threshold	20 02 01	biodegradable waste	No
R1	Use principally as a fuel or other means to generate energy	Below Reporting Threshold	Below Reporting Threshold	20 03 07	bulky waste	No
R13	Storage of wastes pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)	Below Reporting Threshold	Below Reporting Threshold	20 03 01	mixed municipal waste	No
D9	Physio-chemical treatment not specified elsewhere in this Table which results in final compounds or mixtures which are discarded by means of any of the operations numberes D1 to D12 (eg evaporation, drying, calcination, etc.)	22	Absolute Value	13 05 07	oily water from oil/water separators	Yes

Route	Route description	Quantity (tonnes)	Release level	EWC code	EWC description	Hazardous waste
R13	Storage of wastes pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)	0.5	Absolute Value	16 02 15	hazardous components removed from discarded equipment	Yes
R13	Storage of wastes pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)	0.31	Absolute Value	16 06 01	lead batteries	Yes
R13	Storage of wastes pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)	0.23	Absolute Value	20 01 23	discarded equipment containing chlorofluorocarbons	Yes
R13	Storage of wastes pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)	0.17	Absolute Value	20 01 35	discarded electrical and electronic equipment other than those mentioned in 20 01 21 and 20 01 23 containing hazardous components (6)	Yes

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

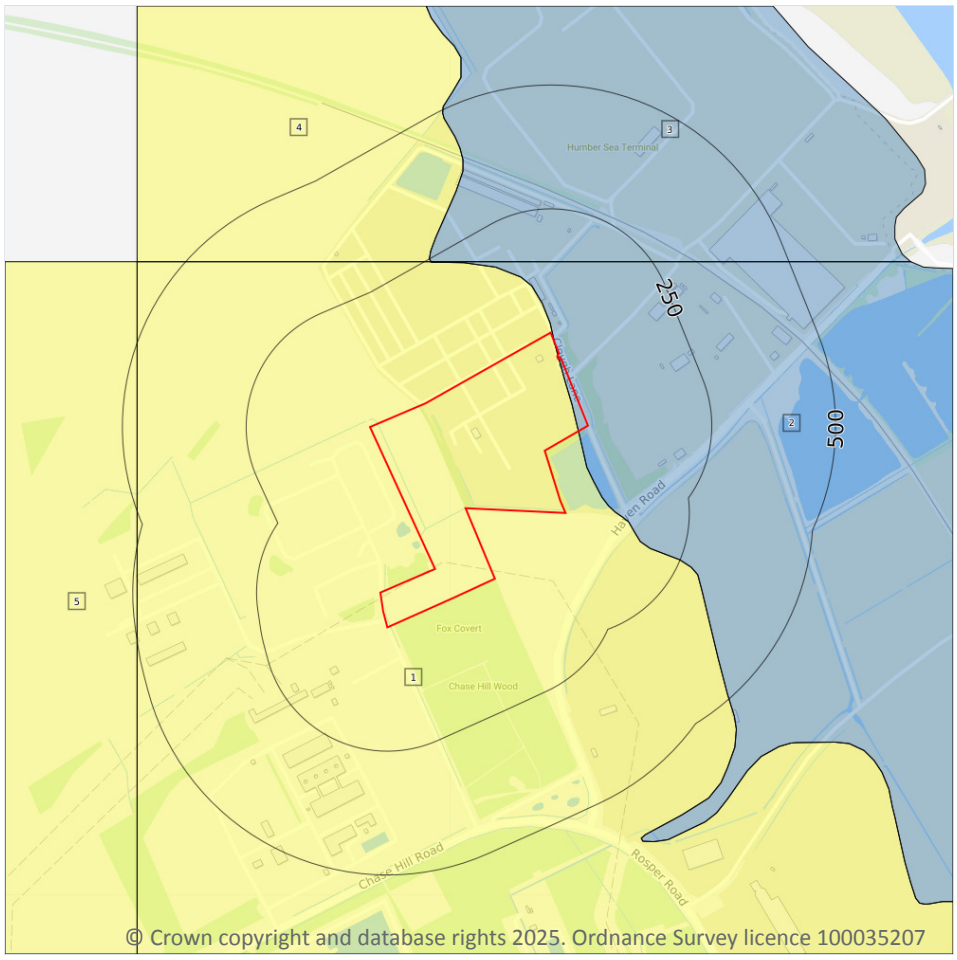
4.21 Pollution inventory radioactive waste

Records within 500m	**0**

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

5 Hydrogeology - Superficial aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive
- Unknown

5.1 Superficial aquifer

Records within 500m	5

Aquifer status of groundwater held within superficial geology.

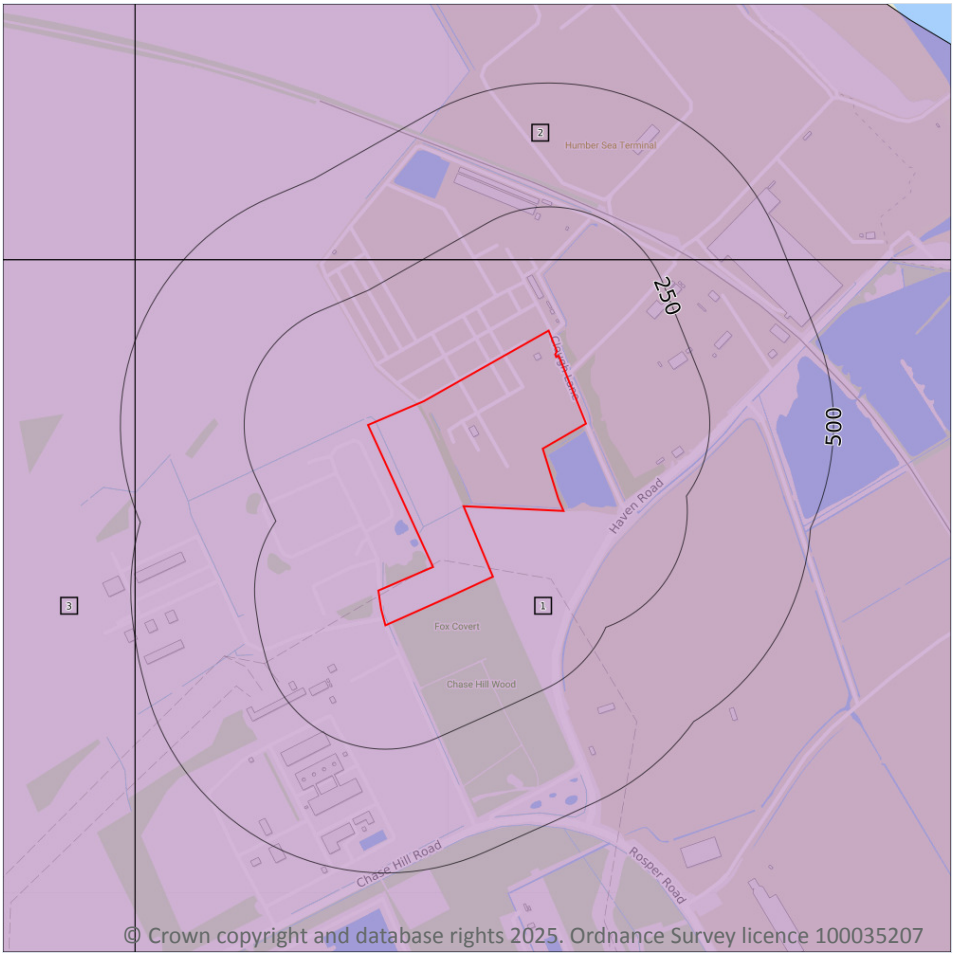
Features are displayed on the Hydrogeology map on **page 48 >**

ID	Location	Designation	Description
1	On site	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
2	On site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

ID	Location	Designation	Description
3	143m N	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
4	244m N	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
5	470m W	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Bedrock aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive

5.2 Bedrock aquifer

Records within 500m **3**

Aquifer status of groundwater held within bedrock geology.

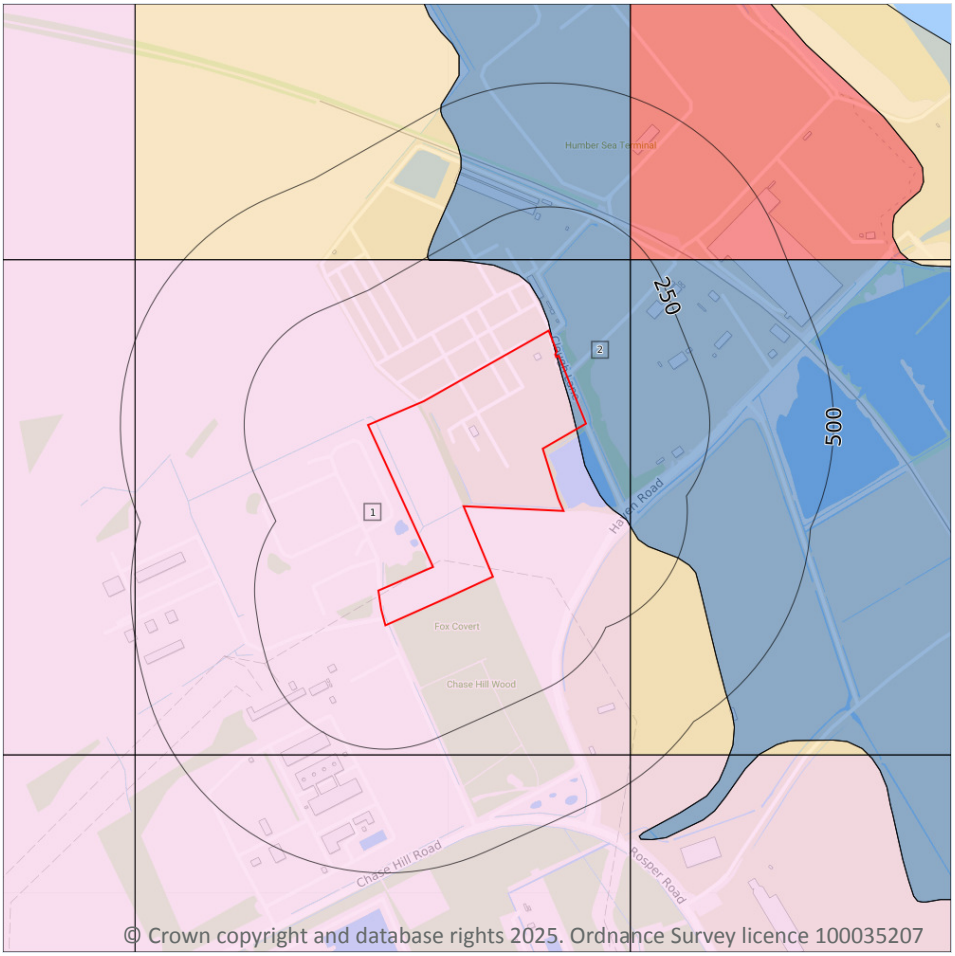
Features are displayed on the Bedrock aquifer map on **page 50 >**

ID	Location	Designation	Description
1	**On site**	**Principal**	**Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers**
2	143m N	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

ID	Location	Designation	Description
3	470m W	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Groundwater vulnerability



Site Outline

Search buffers in metres (m)

Superficial vulnerability
- Principal superficial aquifer, high vulnerability
- Secondary superficial aquifer, high vulnerability
- Principal superficial aquifer, medium vulnerability
- Secondary superficial aquifer, medium vulnerability
- Principal superficial aquifer, low vulnerability
- Secondary superficial aquifer, low vulnerability

Bedrock vulnerability
- Principal bedrock aquifer, high vulnerability
- Secondary bedrock aquifer, high vulnerability
- Principal bedrock aquifer, medium vulnerability
- Secondary bedrock aquifer, medium vulnerability
- Principal bedrock aquifer, low vulnerability
- Secondary bedrock aquifer, low vulnerability

Other information
- Unproductive aquifer
- Soluble rock risk
- Local information

5.3 Groundwater vulnerability

Records within 50m	2

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 52 >**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	On site	Summary Classification: Secondary superficial aquifer - Medium Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Low Infiltration value: 40-70% Dilution value: <300mm/year	Vulnerability: Medium Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: Low	Vulnerability: Low Aquifer type: Principal Flow mechanism: Well connected fractures
2	On site	Summary Classification: Principal bedrock aquifer - Low Vulnerability Combined classification: Productive Bedrock Aquifer, Unproductive Superficial Aquifer	Leaching class: Low Infiltration value: 40-70% Dilution value: <300mm/year	Vulnerability: Unproductive Aquifer type: Unproductive Thickness: >10m Patchiness value: >90% Recharge potential: Low	Vulnerability: Low Aquifer type: Principal Flow mechanism: Well connected fractures

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site	0

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

This data is sourced from the British Geological Survey and the Environment Agency.

5.5 Groundwater vulnerability- local information

Records on site	0

This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk ↗.

This data is sourced from the British Geological Survey and the Environment Agency.

Abstractions and Source Protection Zones



Site Outline

Search buffers in metres (m)

- Source Protection Zone 1 — Inner catchment
- Source Protection Zone 2 — Outer catchment
- Source Protection Zone 3 — Total catchment
- Source Protection Zone 4 — Zone of Special Interest
- Source Protection Zone 1c — Inner catchment - confined aquifer
- Source Protection Zone 2c — Outer catchment - confined aquifer
- Source Protection Zone 3c — Total catchment - confined aquifer
- Drinking water abstraction licences
- Drinking water abstraction licences — Polygon features
- Drinking water abstraction licences — Linear features
- Groundwater abstraction licence (point)
- Groundwater abstraction licence (area)
- Groundwater abstraction licence (linear)
- Surface Water Abstractions (point)
- Surface Water Abstractions (area)
- Surface Water Abstractions (linear)

5.6 Groundwater abstractions

Records within 2000m	2

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 54 >**

ID	Location	Details	
A	39m NE	Status: Historical Licence No: 4/29/09/*G/0008 Details: Process Water Direct Source: GROUND WATER SOURCE OF SUPPLY Point: IMMINGHAM S/CO.BORE1 N.K'HOLME Data Type: Point Name: SIMON STORAGE GROUP LTD Easting: 515900 Northing: 419800	Annual Volume (m^3): 9092 Max Daily Volume (m^3): 1309 Original Application No: - Original Start Date: 01/06/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/03/1993 Version End Date: -
A	39m NE	Status: Historical Licence No: 4/29/09/*G/0008 Details: Process Water Direct Source: GROUND WATER SOURCE OF SUPPLY Point: IMMINGHAM S/CO.BORE2 N.K'HOLME Data Type: Point Name: SIMON STORAGE GROUP LTD Easting: 515900 Northing: 419800	Annual Volume (m^3): 9092 Max Daily Volume (m^3): 1309 Original Application No: - Original Start Date: 01/06/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/03/1993 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m **1**

Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 54 >**

ID	Location	Details	
-	1765m N	Status: Active Licence No: AN/029/0009/014 Details: General Use Relating To Secondary Category (Very Low Loss) Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: DRAIN AT HALTON MARSHES Data Type: Point Name: Able UK Limited Easting: 515062 Northing: 421444	Annual Volume (m^3): 33000 Max Daily Volume (m^3): 2856 Original Application No: NPS/WR/024622 Original Start Date: 26/07/2017 Expiry Date: 31/03/2030 Issue No: 1 Version Start Date: 26/07/2017 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.8 Potable abstractions

Records within 2000m	0

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.9 Source Protection Zones

Records within 500m	0

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination.

This data is sourced from the Environment Agency and Natural Resources Wales.

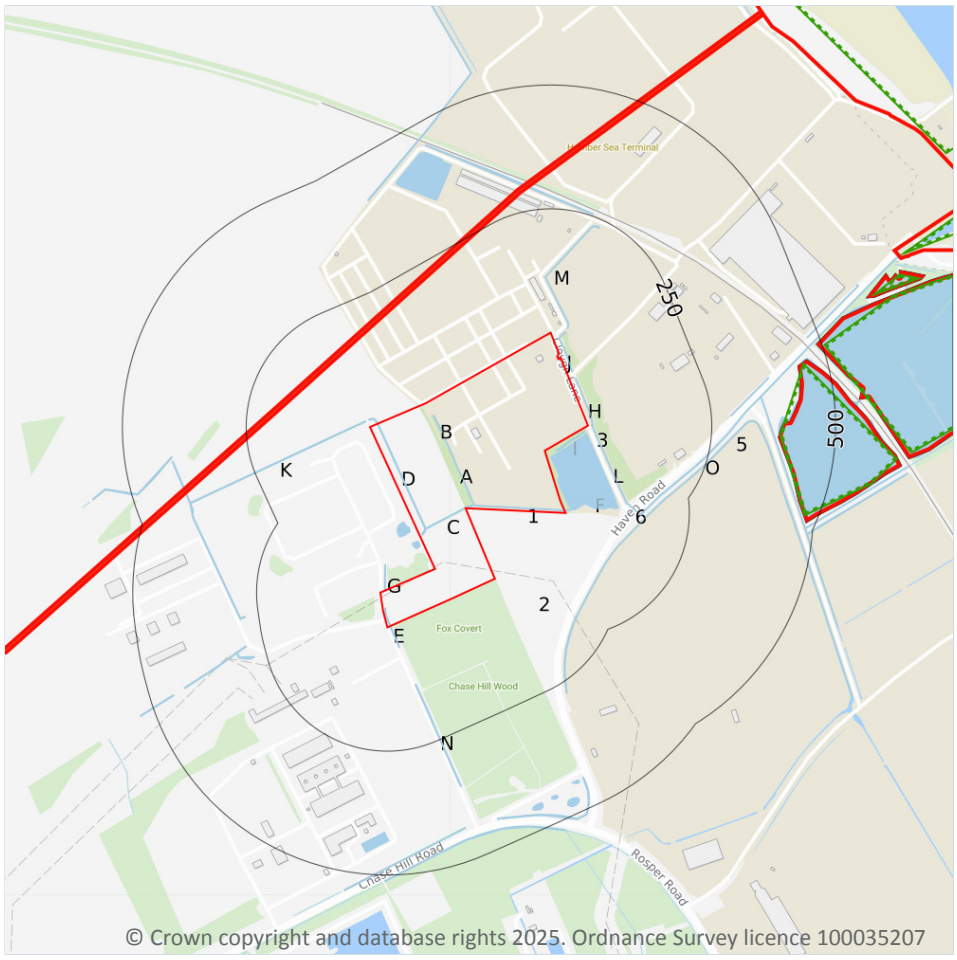
5.10 Source Protection Zones (confined aquifer)

Records within 500m	0

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.

6 Hydrology



Site Outline

Search buffers in metres (m)

Water Network (OS MasterMap)

Surface water features (wider than 5m)

Surface water features (narrower than 5m)

WFD River, canal and surface water transfer water bodies

WFD Lake water bodies

WFD Transitional and coastal water bodies

WFD Surface water body catchments boundaries

WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m	**21**

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

Features are displayed on the Hydrology map on **page 57 >**

ID	Location	Type of water feature	Ground level	Permanence	Name
1	**On site**	**Inland river not influenced by normal tidal action.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**-**

ID	Location	Type of water feature	Ground level	Permanence	Name
A	**On site**	**Inland river not influenced by normal tidal action.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**-**
A	**On site**	**Inland river not influenced by normal tidal action.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**-**
B	**On site**	**Inland river not influenced by normal tidal action.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**-**
C	**On site**	**Inland river not influenced by normal tidal action.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**-**
C	**On site**	**Inland river not influenced by normal tidal action.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**-**
D	**On site**	**Inland river not influenced by normal tidal action.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**-**
E	**On site**	**Inland river not influenced by normal tidal action.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**-**
G	1m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
I	7m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
H	9m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
J	12m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
K	15m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
3	15m E	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-

ID	Location	Type of water feature	Ground level	Permanence	Name
F	21m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
L	22m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
M	35m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
5	125m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
6	126m E	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
N	128m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
O	149m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m	**13**

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

Features are displayed on the Hydrology map on **page 57 >**

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site	**1**

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on **page 57 >**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
2	**On site**	**River**	**North Beck Drain**	**GB104029067575**	**Becks Northern**	**Louth Grimsby and Ancholme**

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified	**1**

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each water body listed.

Features are displayed on the Hydrology map on **page 57 >**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
-	6928m SE	River	North Beck Drain	GB104029067575 ↗	Moderate	Fail	Moderate	2019

This data is sourced from the Environment Agency and Natural Resources Wales.

6.5 WFD Groundwater bodies

Records on site	**1**

Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

Features are displayed on the Hydrology map on **page 57 >**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
A	**On site**	**North Lincolnshire Chalk Unit**	**GB40401G401500 ↗**	**Poor**	**Poor**	**Poor**	**2019**

This data is sourced from the Environment Agency and Natural Resources Wales.

7 River and coastal flooding



Site Outline

Search buffers in metres (m)

River and coastal flooding:

High

Medium

Low

Very Low

Historical Flood Events

Areas Used for Flood Storage

Areas Benefiting from Flood Defences

Flood Defences

7.1 Risk of flooding from rivers and the sea

Records within 50m	10

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m within the Risk of Flooding from Rivers and Sea (RoFRaS)/Flood Risk Assessment Wales (FRAW) models. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition. The risk categories for RoFRaS for rivers and the sea and FRAW for rivers are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance). The risk categories for FRAW for the sea are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 200 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 200 chance) or High (greater than or equal to 1 in 30 chance).

Features are displayed on the River and coastal flooding map on **page 61 >**

Distance	Flood risk category
On site	**Very Low**
0 - 50m	High

This data is sourced from the Environment Agency and Natural Resources Wales.

7.2 Historical Flood Events

Records within 250m	**0**

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.3 Flood Defences

Records within 250m	**0**

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.4 Areas Benefiting from Flood Defences

Records within 250m	**0**

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

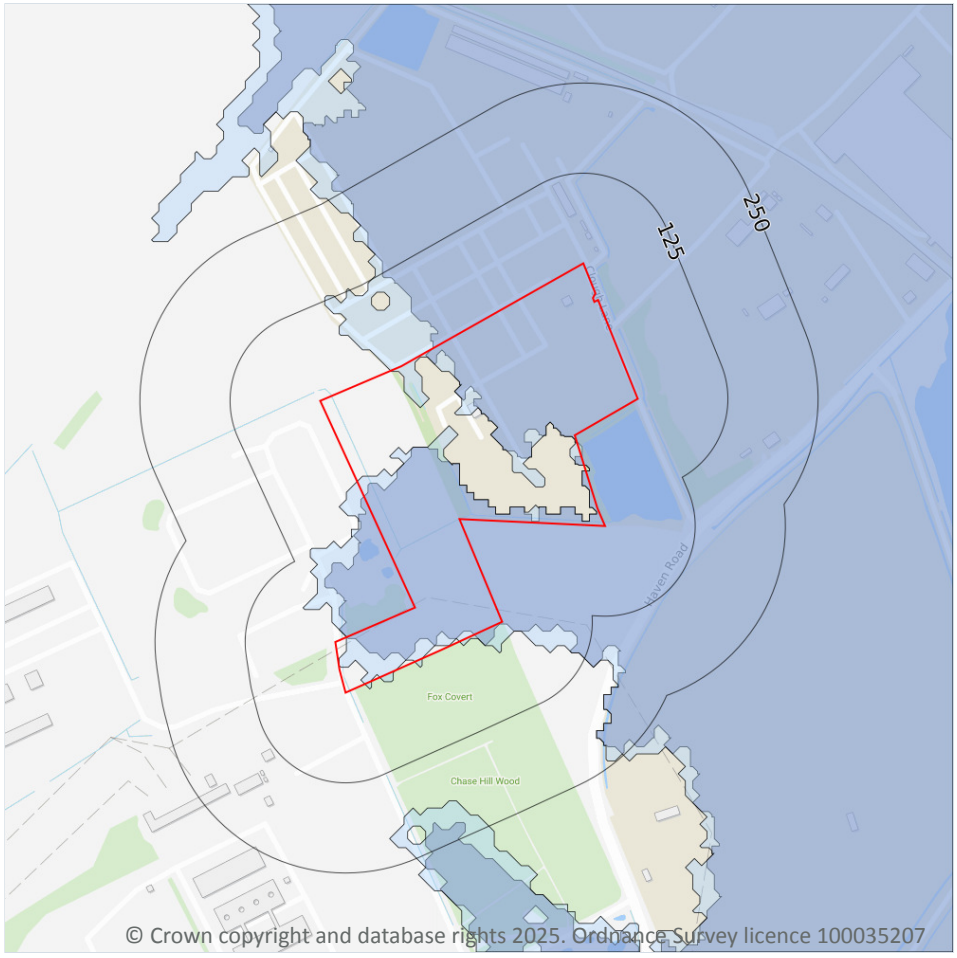
7.5 Flood Storage Areas

Records within 250m	**0**

Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

This data is sourced from the Environment Agency and Natural Resources Wales.

River and coastal flooding - Flood Zones



Site Outline

Search buffers in metres (m)

Flood zone 2

Flood zone 3

7.6 Flood Zone 2

Records within 50m	1

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

Features are displayed on the River and coastal flooding map on **page 61 >**

Location	Type
On site	**Zone 2 - (Fluvial /Tidal Models)**

This data is sourced from the Environment Agency and Natural Resources Wales.

7.7 Flood Zone 3

Records within 50m	1

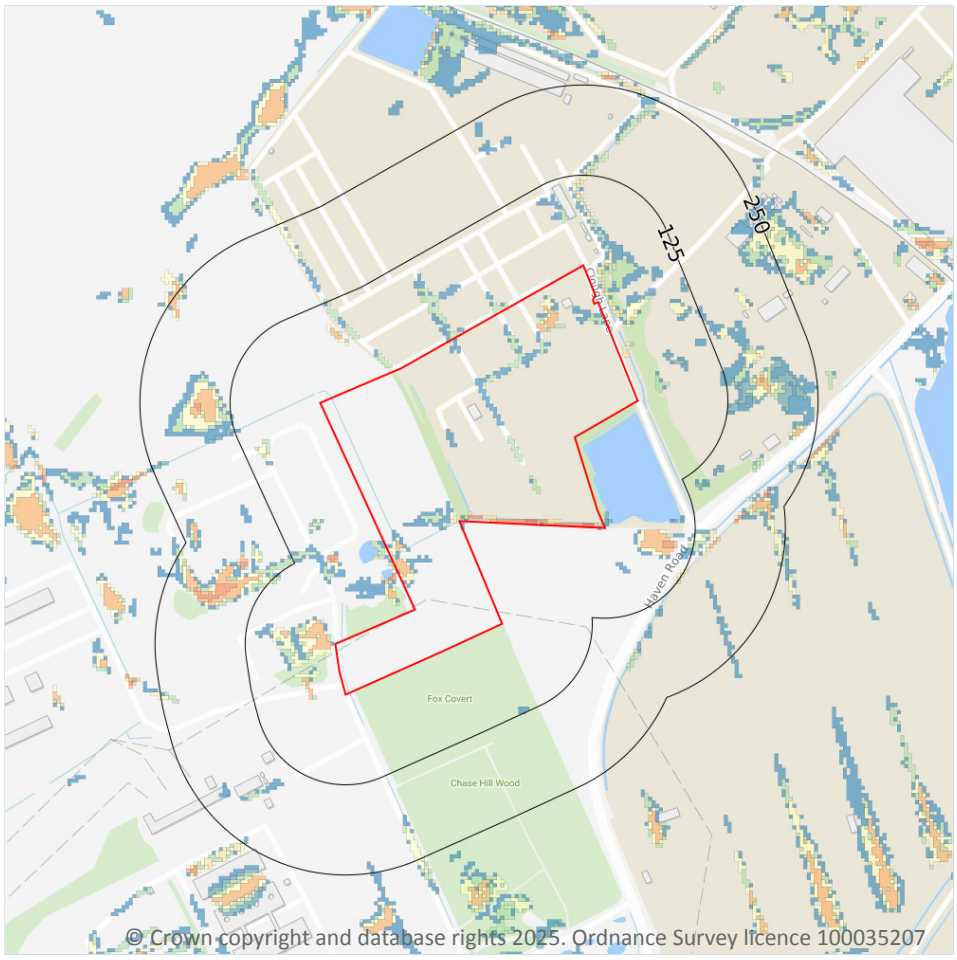
Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

Features are displayed on the River and coastal flooding map on **page 61 >**

Location	Type
On site	**Zone 3 - (Fluvial Models)**

This data is sourced from the Environment Agency and Natural Resources Wales.

8 Surface water flooding



Site Outline
Search buffers in metres (m)

1 in 1000 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 250 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 100 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 30 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

8.1 Surface water flooding

Highest risk on site	**1 in 30 year, Greater than 1.0m**
Highest risk within 50m	**1 in 30 year, Greater than 1.0m**

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on **page 65 >**

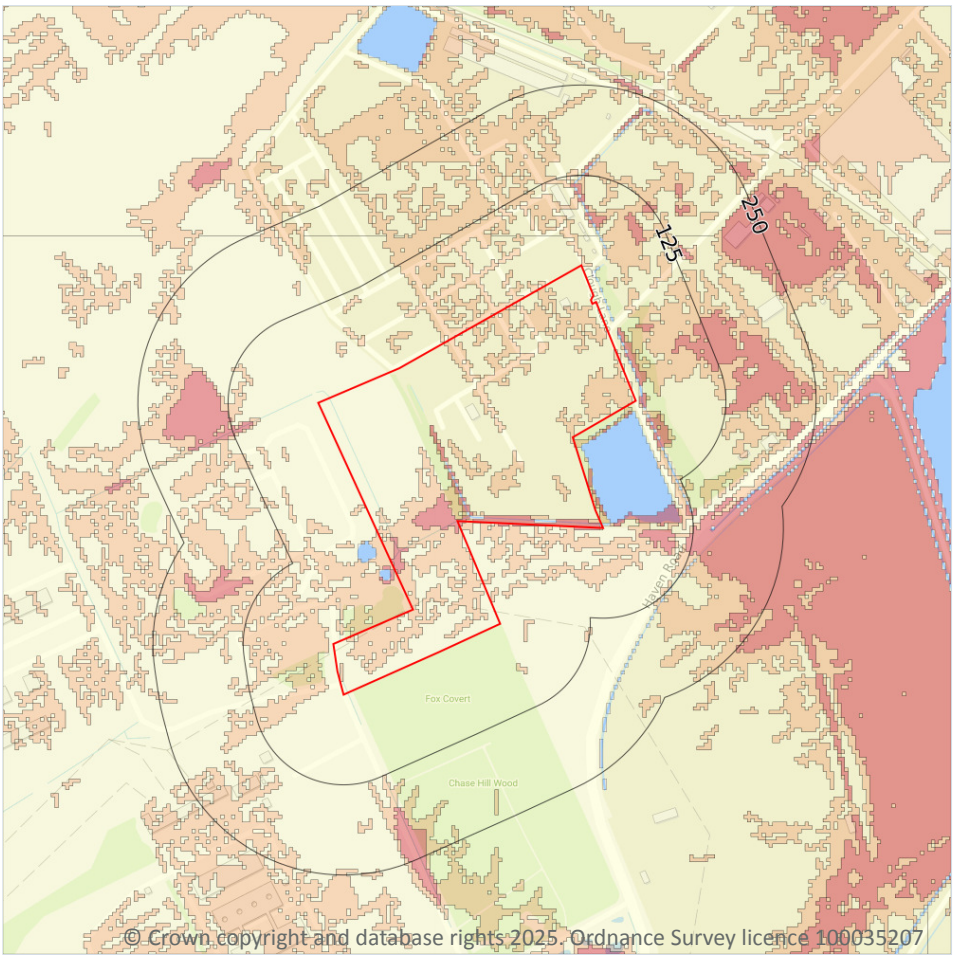
The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on

a site. The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Greater than 1.0m
1 in 250 year	Greater than 1.0m
1 in 100 year	Greater than 1.0m
1 in 30 year	Greater than 1.0m

This data is sourced from Ambiental Risk Analytics.

9 Groundwater flooding



Site Outline

Search buffers in metres (m)

High

Moderate - High

Moderate

Low

Negligible

9.1 Groundwater flooding

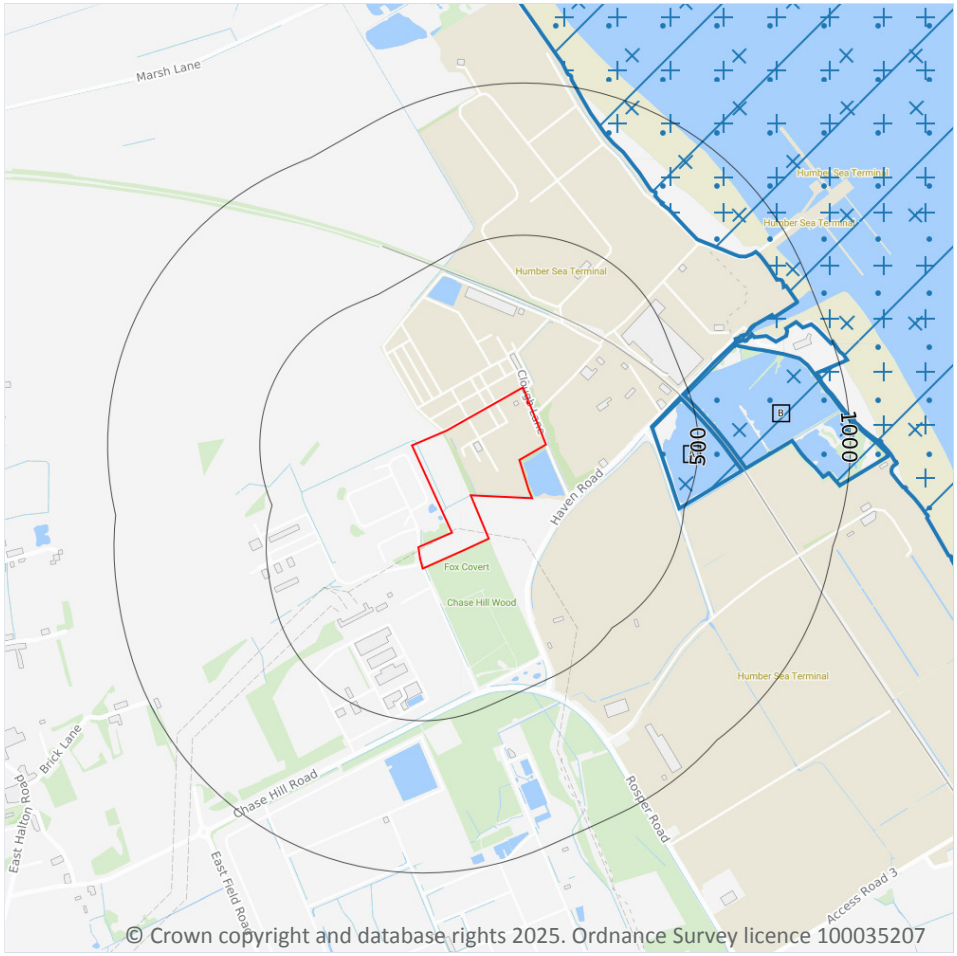
Highest risk on site	**High**
Highest risk within 50m	**High**

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 67 >**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations



Site Outline

Search buffers in metres (m)

Sites of Special Scientific Interest (SSSI)

Conserved wetland sites (Ramsar sites)

Special Areas of Conservation (SAC)

Special Protection Areas (SPA)

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m	3

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

Features are displayed on the Environmental designations map on **page 68 >**

ID	Location	Name	Data source
A	353m E	North Killingholme Haven Pits	Natural England

ID	Location	Name	Data source
B	480m E	North Killingholme Haven Pits	Natural England
C	702m NE	Humber Estuary	Natural England

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m	**3**

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

Features are displayed on the Environmental designations map on **page 68 >**

ID	Location	Site	Details
A	353m E	Name: Humber Estuary Site status: Listed Data source: Natural England	Overview: The Humber Estuary is the largest macro-tidal estuary on the British North Sea coast. It drains a catchment of some 24,240 square kilometres and is the site of the largest single input of freshwater from Britain into the North Sea. It has the second-highest tidal range in Britain (max 7.4 m) and approximately one-third of the estuary is exposed as mud or sand flats at low tide. The inner estuary supports extensive areas of reedbed with areas of mature and developing saltmarsh backed in places by limited areas of grazing marsh in the middle and outer estuary. On the north Lincolnshire coast the saltmarsh is backed by low sand dunes with marshy slacks and brackish pools. The Estuary regularly supports internationally important numbers of waterfowl in winter and nationally important breeding populations in summer. Ramsar criteria: Ramsar criterion 1 The site is a representative example of a near-natural estuary with the following component habitats: dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons. It is a large macro-tidal coastal plain estuary with high suspended sediment loads, which feed a dynamic and rapidly changing system of accreting and eroding intertidal and subtidal mudflats, sandflats, saltmarsh and reedbeds. Examples of both strandline, foredune, mobile, semi-fixed dunes, fixed dunes and dune grassland occur on both banks of the estuary and along the coast. The estuary supports a full range of saline conditions from the open coast to the limit of saline intrusion on the tidal rivers of the Ouse and Trent. Wave exposed sandy shores are found in the outer/open coast areas of the estuary. These change to the more moderately exposed sandy shores and then to sheltered muddy shores within the main body of the estuary and up into the tidal rivers. The lower saltmarsh of the Humber is dominated by common cordgrass Spartina anglica and annual glasswort Salicornia communities. Low to mid marsh communities are mostly represented by sea aster Aster tripolium, common saltmarsh grass Puccinellia maritima and sea purslane Atriplex portulacoides communities. The upper portion of the saltmarsh community is atypical, dominated by sea couch Elytrigia atherica (Elymus pycnanthus) saltmarsh community. In the upper reaches of the estuary, the tidal marsh community is dominated by the common reed Phragmites australis fen and sea club rush Bolboschoenus maritimus swamp with the couch grass Elytrigia repens (Elymus repens) saltmarsh community. Within the Humber Estuary Ramsar site there are good examples of four of the five physiographic types of saline lagoon. Ramsar criterion 3 The Humber Estuary Ramsar site supports a breeding colony of grey seals Halichoerus grypus at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad Bufo calamita. Ramsar criterion 5 Assemblages of international importance: 153,934 waterfowl, non-breeding season (5 year peak mean 1996/97-2000/2001) Ramsar criterion 6 – species/populations occurring at levels of international

ID	Location	Site	Details
B	480m E	Name: Humber Estuary Site status: Listed Data source: Natural England	Overview: The Humber Estuary is the largest macro-tidal estuary on the British North Sea coast. It drains a catchment of some 24,240 square kilometres and is the site of the largest single input of freshwater from Britain into the North Sea. It has the second-highest tidal range in Britain (max 7.4 m) and approximately one-third of the estuary is exposed as mud or sand flats at low tide. The inner estuary supports extensive areas of reedbed with areas of mature and developing saltmarsh backed in places by limited areas of grazing marsh in the middle and outer estuary. On the north Lincolnshire coast the saltmarsh is backed by low sand dunes with marshy slacks and brackish pools. The Estuary regularly supports internationally important numbers of waterfowl in winter and nationally important breeding populations in summer. Ramsar criteria: Ramsar criterion 1 The site is a representative example of a near-natural estuary with the following component habitats: dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons. It is a large macro-tidal coastal plain estuary with high suspended sediment loads, which feed a dynamic and rapidly changing system of accreting and eroding intertidal and subtidal mudflats, sandflats, saltmarsh and reedbeds. Examples of both strandline, foredune, mobile, semi-fixed dunes, fixed dunes and dune grassland occur on both banks of the estuary and along the coast. The estuary supports a full range of saline conditions from the open coast to the limit of saline intrusion on the tidal rivers of the Ouse and Trent. Wave exposed sandy shores are found in the outer/open coast areas of the estuary. These change to the more moderately exposed sandy shores and then to sheltered muddy shores within the main body of the estuary and up into the tidal rivers. The lower saltmarsh of the Humber is dominated by common cordgrass Spartina anglica and annual glasswort Salicornia communities. Low to mid marsh communities are mostly represented by sea aster Aster tripolium, common saltmarsh grass Puccinellia maritima and sea purslane Atriplex portulacoides communities. The upper portion of the saltmarsh community is atypical, dominated by sea couch Elytrigia atherica (Elymus pycnanthus) saltmarsh community. In the upper reaches of the estuary, the tidal marsh community is dominated by the common reed Phragmites australis fen and sea club rush Bolboschoenus maritimus swamp with the couch grass Elytrigia repens (Elymus repens) saltmarsh community. Within the Humber Estuary Ramsar site there are good examples of four of the five physiographic types of saline lagoon. Ramsar criterion 3 The Humber Estuary Ramsar site supports a breeding colony of grey seals Halichoerus grypus at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad Bufo calamita. Ramsar criterion 5 Assemblages of international importance: 153,934 waterfowl, non-breeding season (5 year peak mean 1996/97-2000/2001) Ramsar criterion 6 – species/populations occurring at levels of international

ID	Location	Site	Details
C	702m NE	Name: Humber Estuary Site status: Listed Data source: Natural England	Overview: The Humber Estuary is the largest macro-tidal estuary on the British North Sea coast. It drains a catchment of some 24,240 square kilometres and is the site of the largest single input of freshwater from Britain into the North Sea. It has the second-highest tidal range in Britain (max 7.4 m) and approximately one-third of the estuary is exposed as mud or sand flats at low tide. The inner estuary supports extensive areas of reedbed with areas of mature and developing saltmarsh backed in places by limited areas of grazing marsh in the middle and outer estuary. On the north Lincolnshire coast the saltmarsh is backed by low sand dunes with marshy slacks and brackish pools. The Estuary regularly supports internationally important numbers of waterfowl in winter and nationally important breeding populations in summer. Ramsar criteria: Ramsar criterion 1 The site is a representative example of a near-natural estuary with the following component habitats: dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons. It is a large macro-tidal coastal plain estuary with high suspended sediment loads, which feed a dynamic and rapidly changing system of accreting and eroding intertidal and subtidal mudflats, sandflats, saltmarsh and reedbeds. Examples of both strandline, foredune, mobile, semi-fixed dunes, fixed dunes and dune grassland occur on both banks of the estuary and along the coast. The estuary supports a full range of saline conditions from the open coast to the limit of saline intrusion on the tidal rivers of the Ouse and Trent. Wave exposed sandy shores are found in the outer/open coast areas of the estuary. These change to the more moderately exposed sandy shores and then to sheltered muddy shores within the main body of the estuary and up into the tidal rivers. The lower saltmarsh of the Humber is dominated by common cordgrass Spartina anglica and annual glasswort Salicornia communities. Low to mid marsh communities are mostly represented by sea aster Aster tripolium, common saltmarsh grass Puccinellia maritima and sea purslane Atriplex portulacoides communities. The upper portion of the saltmarsh community is atypical, dominated by sea couch Elytrigia atherica (Elymus pycnanthus) saltmarsh community. In the upper reaches of the estuary, the tidal marsh community is dominated by the common reed Phragmites australis fen and sea club rush Bolboschoenus maritimus swamp with the couch grass Elytrigia repens (Elymus repens) saltmarsh community. Within the Humber Estuary Ramsar site there are good examples of four of the five physiographic types of saline lagoon. Ramsar criterion 3 The Humber Estuary Ramsar site supports a breeding colony of grey seals Halichoerus grypus at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad Bufo calamita. Ramsar criterion 5 Assemblages of international importance: 153,934 waterfowl, non-breeding season (5 year peak mean 1996/97-2000/2001) Ramsar criterion 6 – species/populations occurring at levels of international

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.3 Special Areas of Conservation (SAC)

Records within 2000m **1**

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

Features are displayed on the Environmental designations map on **page 68 >**

ID	Location	Name	Features of interest	Habitat description	Data source
C	702m NE	Humber Estuary	Subtidal sandbanks; Estuaries; Intertidal mudflats and sandflats; Lagoons; Annual vegetation of drift lines; Glasswort and other annuals colonising mud and sand; Cord-grass swards; Atlantic salt meadows; Shifting dunes; Shifting dunes with marram; Dune grassland; Dunes with sea-buckthorn; Sea lamprey; River lamprey; Allis shad; Twaite shad; Grey seal; Common seal	Bogs, Marshes, Water fringed vegetation, Fens; Salt marshes, Salt pastures, Salt steppes; Coastal sand dunes, Sand beaches, Machair; Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	Natural England

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.4 Special Protection Areas (SPA)

Records within 2000m **3**

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

Features are displayed on the Environmental designations map on **page 68 >**

ID	Location	Name	Species of interest	Habitat description	Data source
A	353m E	Humber Estuary	Great bittern; Great bittern; Common shelduck; Eurasian wigeon; Eurasian teal; Mallard; Common pochard; Greater scaup; Common goldeneye; Eurasian marsh harrier; Hen harrier; Eurasian oystercatcher; Pied avocet; Pied avocet; Ringed plover; Ringed plover; European golden plover; Grey plover; Grey plover; Northern lapwing; Red knot; Red knot; Sanderling; Sanderling; Ruff; Bar-tailed godwit; Whimbrel; Eurasian curlew; Common redshank; Common redshank; Common greenshank; Ruddy turnstone; Little tern; Black-tailed godwit; Black-tailed godwit; Dunlin; Dunlin; Dark-bellied brent goose	Salt marshes, Salt pastures, Salt steppes; Inland water bodies (Standing water, Running water); Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins); Coastal sand dunes, Sand beaches, Machair; Bogs, Marshes, Water fringed vegetation, Fens	Natural England
B	480m E	Humber Estuary	Great bittern; Great bittern; Common shelduck; Eurasian wigeon; Eurasian teal; Mallard; Common pochard; Greater scaup; Common goldeneye; Eurasian marsh harrier; Hen harrier; Eurasian oystercatcher; Pied avocet; Pied avocet; Ringed plover; Ringed plover; European golden plover; Grey plover; Grey plover; Northern lapwing; Red knot; Red knot; Sanderling; Sanderling; Ruff; Bar-tailed godwit; Whimbrel; Eurasian curlew; Common redshank; Common redshank; Common greenshank; Ruddy turnstone; Little tern; Black-tailed godwit; Black-tailed godwit; Dunlin; Dunlin; Dark-bellied brent goose	Salt marshes, Salt pastures, Salt steppes; Inland water bodies (Standing water, Running water); Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins); Coastal sand dunes, Sand beaches, Machair; Bogs, Marshes, Water fringed vegetation, Fens	Natural England
C	702m NE	Humber Estuary	Great bittern; Great bittern; Common shelduck; Eurasian wigeon; Eurasian teal; Mallard; Common pochard; Greater scaup; Common goldeneye; Eurasian marsh harrier; Hen harrier; Eurasian oystercatcher; Pied avocet; Pied avocet; Ringed plover; Ringed plover; European golden plover; Grey plover; Grey plover; Northern lapwing; Red knot; Red knot; Sanderling; Sanderling; Ruff; Bar-tailed godwit; Whimbrel; Eurasian curlew; Common redshank; Common redshank; Common greenshank; Ruddy turnstone; Little tern; Black-tailed godwit; Black-tailed godwit; Dunlin; Dunlin; Dark-bellied brent goose	Salt marshes, Salt pastures, Salt steppes; Inland water bodies (Standing water, Running water); Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins); Coastal sand dunes, Sand beaches, Machair; Bogs, Marshes, Water fringed vegetation, Fens	Natural England

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.5 National Nature Reserves (NNR)

Records within 2000m	0

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.6 Local Nature Reserves (LNR)

Records within 2000m	0

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.7 Designated Ancient Woodland

Records within 2000m	0

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.8 Biosphere Reserves

Records within 2000m	0

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.9 Forest Parks

Records within 2000m	0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m	0

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.11 Green Belt

Records within 2000m	0

Areas designated to prevent urban sprawl by keeping land permanently open.

This data is sourced from the Ministry of Housing, Communities and Local Government.

10.12 Proposed Ramsar sites

Records within 2000m	0

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m	0

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales.

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m	0

Special Protection Areas (SPAs) are areas designated (or 'classified') under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m	0

Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

10.16 Nitrate Vulnerable Zones

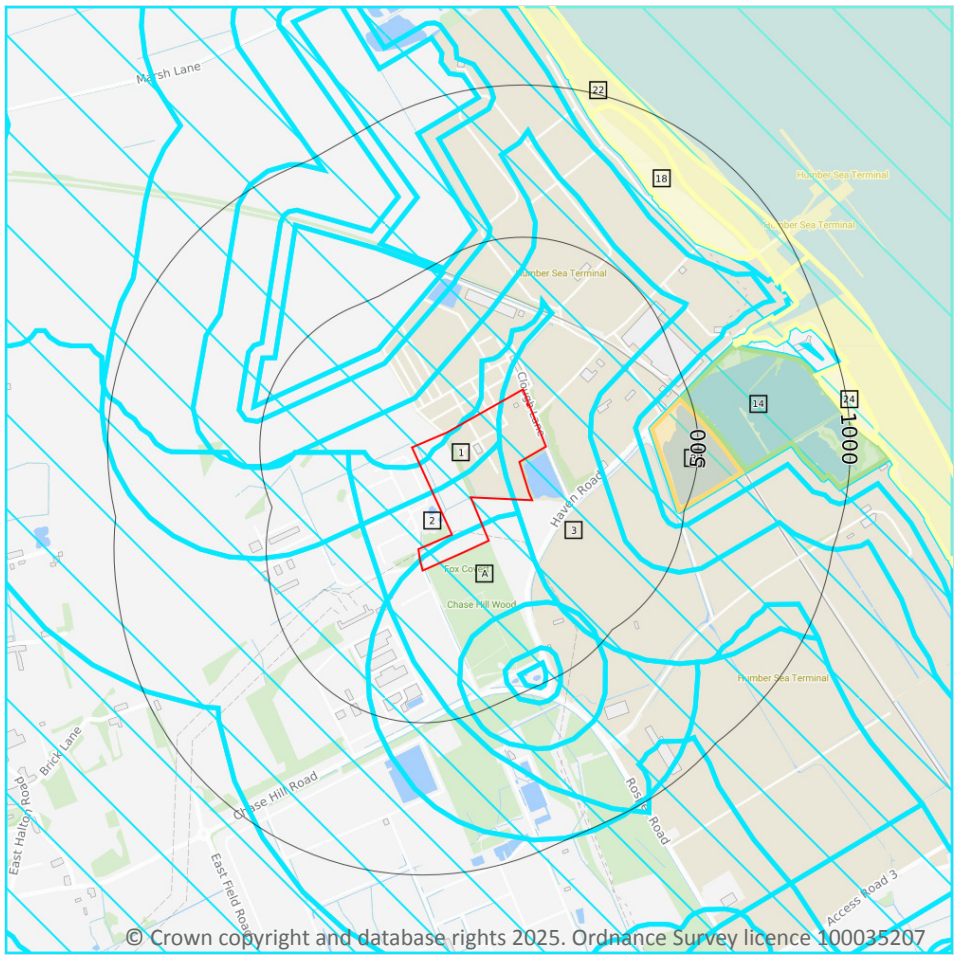
Records within 2000m	6

Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

Location	Name	Type	NVZ ID	Status
On site	**North Beck Drain NVZ**	**Surface Water**	**359**	**Existing**
On site	**Lincolnshire Chalk**	**Groundwater**	**80**	**Existing**
125m W	Skitter Beck / East Halton Beck NVZ	Surface Water	361	Existing
1378m W	Skitter Beck / East Halton Beck NVZ	Surface Water	361	Existing
1378m W	Lincolnshire Chalk	Groundwater	80	Existing
1417m W	Skitter Beck / East Halton Beck NVZ	Surface Water	361	Existing

This data is sourced from Natural England and Natural Resources Wales.

SSSI Impact Zones and Units



Site Outline

Search buffers in metres (m)

SSSI Impact Risk Zones

SSSI Units

- Not recorded
- Favourable
- Unfavourable - Recovering
- Unfavourable - No change
- Unfavourable - Declining
- Partially destroyed
- Destroyed

10.17 SSSI Impact Risk Zones

Records on site	4

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

Features are displayed on the SSSI Impact Zones and Units map on **page 79 >**

ID	Location	Type of developments requiring consultation
1	**On site**	**All applications - All planning applications (except householder) outside or extending outside existing settlements/urban areas affecting greenspace, farmland, semi natural habitats or landscape features such as trees, hedges, streams, rural buildings/structures.** **Infrastructure - Pipelines and underground cables, pylons and overhead cables. Any transport proposal including road, rail and by water (excluding routine maintenance). Airports, helipads and other aviation proposals.** **Wind and Solar - Solar schemes with footprint > 0.5ha, all wind turbines.** **Minerals, Oil and Gas - Planning applications for quarries, including: new proposals, Review of Minerals Permissions (ROMP), extensions, variations to conditions etc. Oil & gas exploration/extraction.** **Rural non-residential - Large non residential developments outside existing settlements/urban areas where net additional gross internal floorspace is > 1,000m² or footprint exceeds 0.2ha.** **Residential - Residential development of 50 units or more.** **Rural residential - Any residential developments outside of existing settlements/urban areas with a total net gain in residential units.** **Air pollution - Any development that could cause AIR POLLUTION (incl: industrial/commercial processes, livestock & poultry units, slurry lagoons & digestate stores, manure stores).** **Combustion - All general combustion processes. Incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion.** **Waste - Mechanical and biological waste treatment, inert landfill, non-hazardous landfill, hazardous landfill, household civic amenity recycling facilities construction, demolition and excavation waste, other waste management.** **Composting - Any composting proposal. Incl: open windrow composting, in-vessel composting, anaerobic digestion, other waste management.** **Discharges - Any discharge of water or liquid waste of more than 2m³/day to ground (ie to seep away) or to surface water, such as a beck or stream.** **Water supply - Large infrastructure such as warehousing / industry where net additional gross internal floorspace is > 1,000m² or any development needing its own water supply .**

ID	Location	Type of developments requiring consultation
2	**On site**	**All applications - All planning applications (except householder) outside or extending outside existing settlements/urban areas affecting greenspace, farmland, semi natural habitats or landscape features such as trees, hedges, streams, rural buildings/structures.** **Infrastructure - Pipelines and underground cables, pylons and overhead cables. Any transport proposal including road, rail and by water (excluding routine maintenance). Airports, helipads and other aviation proposals.** **Wind and Solar - Solar schemes with footprint > 0.5ha, all wind turbines.** **Minerals, Oil and Gas - Planning applications for quarries, including: new proposals, Review of Minerals Permissions (ROMP), extensions, variations to conditions etc. Oil & gas exploration/extraction.** **Rural non-residential - Large non residential developments outside existing settlements/urban areas where net additional gross internal floorspace is > 1,000m² or footprint exceeds 0.2ha.** **Residential - Residential development of 50 units or more.** **Rural residential - Any residential developments outside of existing settlements/urban areas with a total net gain in residential units.** **Air pollution - Any industrial/agricultural development that could cause AIR POLLUTION (incl: industrial processes, livestock & poultry units with floorspace > 500m², slurry lagoons & digestate stores > 200m², manure stores > 250t).** **Combustion - General combustion processes >20MW energy input. Incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion.** **Waste - Landfill. Incl: inert landfill, non-hazardous landfill, hazardous landfill.** **Composting - Any composting proposal with more than 500 tonnes maximum annual operational throughput. Incl: open windrow composting, in-vessel composting, anaerobic digestion, other waste management.** **Discharges - Any discharge of water or liquid waste of more than 2m³/day to ground (ie to seep away) or to surface water, such as a beck or stream.** **Water supply - Large infrastructure such as warehousing / industry where net additional gross internal floorspace is > 1,000m² or any development needing its own water supply .**

ID	Location	Type of developments requiring consultation
3	**On site**	**All applications - All planning applications (except householder) outside or extending outside existing settlements/urban areas affecting greenspace, farmland, semi natural habitats or landscape features such as trees, hedges, streams, rural buildings/structures.** **Infrastructure - Pipelines and underground cables, pylons and overhead cables. Any transport proposal including road, rail and by water (excluding routine maintenance). Airports, helipads and other aviation proposals.** **Wind and Solar - Solar schemes with footprint > 0.5ha, all wind turbines.** **Minerals, Oil and Gas - Planning applications for quarries, including: new proposals, Review of Minerals Permissions (ROMP), extensions, variations to conditions etc. Oil & gas exploration/extraction.** **Rural non-residential - Large non residential developments outside existing settlements/urban areas where net additional gross internal floorspace is > 1,000m² or footprint exceeds 0.2ha.** **Residential - Residential development of 50 units or more.** **Rural residential - Any residential developments outside of existing settlements/urban areas with a total net gain in residential units.** **Air pollution - Any development that could cause AIR POLLUTION (incl: industrial/commercial processes, livestock & poultry units, slurry lagoons & digestate stores, manure stores).** **Combustion - All general combustion processes. Incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion.** **Waste - Mechanical and biological waste treatment, inert landfill, non-hazardous landfill, hazardous landfill, household civic amenity recycling facilities construction, demolition and excavation waste, other waste management.** **Composting - Any composting proposal. Incl: open windrow composting, in-vessel composting, anaerobic digestion, other waste management.** **Discharges - Any discharge of water or liquid waste that is discharged to ground (ie to seep away) or to surface water, such as a beck or stream.** **Water supply - Large infrastructure such as warehousing / industry where net additional gross internal floorspace is > 1,000m² or any development needing its own water supply .**

ID	Location	Type of developments requiring consultation
A	On site	**All applications - All planning applications (except householder) outside or extending outside existing settlements/urban areas affecting greenspace, farmland, semi natural habitats or landscape features such as trees, hedges, streams, rural buildings/structures. Infrastructure - Pipelines and underground cables, pylons and overhead cables. Any transport proposal including road, rail and by water (excluding routine maintenance). Airports, helipads and other aviation proposals. Wind and Solar - Solar schemes with footprint > 0.5ha, all wind turbines. Minerals, Oil and Gas - Planning applications for quarries, including: new proposals, Review of Minerals Permissions (ROMP), extensions, variations to conditions etc. Oil & gas exploration/extraction. Rural non-residential - Large non residential developments outside existing settlements/urban areas where net additional gross internal floorspace is > 1,000m² or footprint exceeds 0.2ha. Residential - Residential development of 50 units or more. Rural residential - Any residential developments outside of existing settlements/urban areas with a total net gain in residential units. Air pollution - Any development that could cause AIR POLLUTION (incl: industrial/commercial processes, livestock & poultry units, slurry lagoons & digestate stores, manure stores). Combustion - All general combustion processes. Incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion. Waste - Mechanical and biological waste treatment, inert landfill, non-hazardous landfill, hazardous landfill, household civic amenity recycling facilities construction, demolition and excavation waste, other waste management. Composting - Any composting proposal. Incl: open windrow composting, in-vessel composting, anaerobic digestion, other waste management. Discharges - Any discharge of water or liquid waste of more than 2m³/day to ground (ie to seep away) or to surface water, such as a beck or stream. Water supply - Large infrastructure such as warehousing / industry where net additional gross internal floorspace is > 1,000m² or any development needing its own water supply .**

This data is sourced from Natural England.

10.18 SSSI Units

Records within 2000m	**7**

Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

Features are displayed on the SSSI Impact Zones and Units map on **page 79 >**

ID:	B
Location:	353m E
SSSI name:	North Killingholme Haven Pits
Unit name:	Small Pit
Broad habitat:	Inshore Sublittoral Sediment - Cl
Condition:	Unfavourable - No change
Reportable features:	

Feature name	Feature condition	Date of assessment
Aggregations of non-breeding birds - Black-tailed godwit, Limosa limosa islandica	Unfavourable - No change	17/05/2021
Marsh Harrier, Circus aeruginosus - A081, b	Favourable	21/04/2022
Population of Schedule 5 annelid worm - Alkmaria romijni, Tentacled Lagoon-worm	Unfavourable - No change	22/07/2013
Saline coastal lagoons	Unfavourable - No change	17/05/2021
Waterbird assemblage	Unfavourable - No change	17/05/2021

ID: 14
Location: 480m E
SSSI name: North Killingholme Haven Pits
Unit name: Large Pits
Broad habitat: Inshore Sublittoral Sediment - Cl
Condition: Favourable
Reportable features:

Feature name	Feature condition	Date of assessment
Aggregations of non-breeding birds - Black-tailed godwit, Limosa limosa islandica	Favourable	17/05/2021
Avocet, Recurvirostra avosetta - A132-A, b	Favourable	17/01/2023
Black-tailed godwit, Limosa limosa - Passage	Favourable	17/05/2021
Black-tailed godwit, Limosa limosa - Wintering	-	-
Black-tailed godwit, Limosa limosa islandica - A616, nb	Favourable	29/03/2022
Estuary	-	-
Population of Schedule 5 annelid worm - Alkmaria romijni, Tentacled Lagoon-worm	Favourable	22/07/2013
Saline coastal lagoons	Favourable	26/06/2018
Waterbird assemblage	Favourable	29/03/2022

ID: 17
Location: 702m NE
SSSI name: Humber Estuary
Unit name: Jetty To North Killingholme Haven
Broad habitat: Littoral Sediment
Condition: Unfavourable - Recovering

Reportable features:

Feature name	Feature condition	Date of assessment
Aggregations of non-breeding birds - Avocet, Recurvirostra avosetta	Favourable	29/03/2022
Aggregations of non-breeding birds - Bar-tailed godwit, Limosa lapponica	Unfavourable - Declining	29/03/2022
Aggregations of non-breeding birds - Black-tailed godwit, Limosa limosa islandica	Favourable	29/03/2022
Aggregations of non-breeding birds - Brent goose (dark-bellied), Branta bernicla bernicla	Favourable	29/03/2022
Aggregations of non-breeding birds - Curlew, Numenius arquata	Unfavourable - Declining	29/03/2022
Aggregations of non-breeding birds - Dunlin, Calidris alpina alpina	Unfavourable - No change	29/03/2022
Aggregations of non-breeding birds - Golden plover, Pluvialis apricaria	Favourable	29/03/2022
Aggregations of non-breeding birds - Greenshank, Tringa nebularia	Unfavourable - No change	29/03/2022
Aggregations of non-breeding birds - Grey plover, Pluvialis squatarola	Favourable	29/03/2022
Aggregations of non-breeding birds - Knot, Calidris canutus	Favourable	29/03/2022
Aggregations of non-breeding birds - Lapwing, Vanellus vanellus	Unfavourable - No change	29/03/2022
Aggregations of non-breeding birds - Oystercatcher, Haematopus ostralegus	Favourable	29/03/2022
Aggregations of non-breeding birds - Pochard, Aythya ferina	Unfavourable - Declining	29/03/2022
Aggregations of non-breeding birds - Redshank, Tringa totanus	Unfavourable - Declining	29/03/2022
Aggregations of non-breeding birds - Ruff, Philomachus pugnax	Unfavourable - No change	29/03/2022
Aggregations of non-breeding birds - Sanderling, Calidris alba	Unfavourable - No change	29/03/2022
Aggregations of non-breeding birds - Shelduck, Tadorna tadorna	Favourable	29/03/2022
Aggregations of non-breeding birds - Teal, Anas crecca	Favourable	29/03/2022
Aggregations of non-breeding birds - Turnstone, Arenaria interpres	Unfavourable - Declining	29/03/2022
Aggregations of non-breeding birds - Whimbrel, Numenius phaeopus	Favourable	29/03/2022
Aggregations of non-breeding birds - Wigeon, Anas penelope	Unfavourable - Declining	29/03/2022
Avocet, Recurvirostra avosetta - A132-A, nb	Favourable	29/03/2022
Bar-tailed godwit, Limosa lapponica - A157, nb	Unfavourable - Declining	29/03/2022
Bar-tailed godwit, Limosa lapponica - Wintering	-	-
Black-tailed godwit, Limosa limosa - Wintering	-	-
Black-tailed godwit, Limosa limosa islandica - A616, nb	Favourable	29/03/2022

Feature name	Feature condition	Date of assessment
Dunlin, Calidris alpina - Passage	-	-
Dunlin, Calidris alpina - Wintering	-	-
Dunlin, Calidris alpina alpina - A672, nb	Unfavourable - No change	29/03/2022
Estuaries	-	-
Estuary	-	-
Golden plover, Pluvialis apricaria - A140, nb	Favourable	29/03/2022
Golden plover, Pluvialis apricaria - Passage	-	-
Golden plover, Pluvialis apricaria - Wintering	-	-
H1130 Estuaries	-	-
H1140 Mudflats and sandflats not covered by seawater at low tide	-	-
H1310 Salicornia and other annuals colonising mud and sand	Favourable	24/02/2022
H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Favourable	24/02/2022
Invert. assemblage M3 saltmarsh, estuary and mudflat	-	-
Knot, Calidris canutus - A143, nb	Favourable	29/03/2022
Knot, Calidris canutus - Passage	-	-
Knot, Calidris canutus - Wintering	-	-
Littoral sediment	Unfavourable - Recovering	30/03/2010
Marsh Harrier, Circus aeruginosus - A081, b	Favourable	21/04/2022
Redshank, Tringa totanus - A162, nb	Unfavourable - Declining	29/03/2022
Redshank, Tringa totanus - Passage	-	-
Redshank, Tringa totanus - Wintering	-	-
River lamprey, Lampetra fluviatilis - Passage	-	-
River lamprey, Lampetra fluviatilis	-	-
Ruff, Calidris pugnax - A151, nb	Unfavourable - No change	29/03/2022
S1095 Sea lamprey, Petromyzon marinus	-	-
S1099 River lamprey, Lampetra fluviatilis	-	-
SM4-28 - Saltmarsh	Favourable	24/02/2022
Sea lamprey, Petromyzon marinus - Passage	-	-

Feature name	Feature condition	Date of assessment
Sea lamprey, Petromyzon marinus	-	-
Shelduck, Tadorna tadorna - A048, nb	Favourable	29/03/2022
Shelduck, Tadorna tadorna - Wintering	-	-
Waterbird assemblage - Wintering	-	-
Waterbird assemblage	Favourable	29/03/2022

ID: 18
Location: 749m NE
SSSI name: Humber Estuary
Unit name: Saltmarsh Behind Works
Broad habitat: Fen, Marsh And Swamp - Lowland
Condition: Unfavourable - Recovering
Reportable features:

Feature name	Feature condition	Date of assessment
Aggregations of non-breeding birds - Avocet, Recurvirostra avosetta	Favourable	29/03/2022
Aggregations of non-breeding birds - Bar-tailed godwit, Limosa lapponica	Unfavourable - Declining	29/03/2022
Aggregations of non-breeding birds - Black-tailed godwit, Limosa limosa islandica	Favourable	29/03/2022
Aggregations of non-breeding birds - Brent goose (dark-bellied), Branta bernicla bernicla	Favourable	29/03/2022
Aggregations of non-breeding birds - Curlew, Numenius arquata	Unfavourable - Declining	29/03/2022
Aggregations of non-breeding birds - Dunlin, Calidris alpina alpina	Unfavourable - No change	29/03/2022
Aggregations of non-breeding birds - Golden plover, Pluvialis apricaria	Favourable	29/03/2022
Aggregations of non-breeding birds - Greenshank, Tringa nebularia	Unfavourable - No change	29/03/2022
Aggregations of non-breeding birds - Grey plover, Pluvialis squatarola	Favourable	29/03/2022
Aggregations of non-breeding birds - Knot, Calidris canutus	Favourable	29/03/2022
Aggregations of non-breeding birds - Lapwing, Vanellus vanellus	Unfavourable - No change	29/03/2022
Aggregations of non-breeding birds - Oystercatcher, Haematopus ostralegus	Favourable	29/03/2022
Aggregations of non-breeding birds - Pochard, Aythya ferina	Unfavourable - Declining	29/03/2022
Aggregations of non-breeding birds - Redshank, Tringa totanus	Unfavourable - Declining	29/03/2022
Aggregations of non-breeding birds - Ruff, Philomachus pugnax	Unfavourable - No change	29/03/2022

Feature name	Feature condition	Date of assessment
Aggregations of non-breeding birds - Sanderling, Calidris alba	Unfavourable - No change	29/03/2022
Aggregations of non-breeding birds - Shelduck, Tadorna tadorna	Favourable	29/03/2022
Aggregations of non-breeding birds - Teal, Anas crecca	Favourable	29/03/2022
Aggregations of non-breeding birds - Turnstone, Arenaria interpres	Unfavourable - Declining	29/03/2022
Aggregations of non-breeding birds - Whimbrel, Numenius phaeopus	Favourable	29/03/2022
Aggregations of non-breeding birds - Wigeon, Anas penelope	Unfavourable - Declining	29/03/2022
Avocet, Recurvirostra avosetta - A132-A, nb	Favourable	29/03/2022
Bar-tailed godwit, Limosa lapponica - A157, nb	Unfavourable - Declining	29/03/2022
Bar-tailed godwit, Limosa lapponica - Wintering	-	-
Black-tailed godwit, Limosa limosa - Wintering	-	-
Black-tailed godwit, Limosa limosa islandica - A616, nb	Favourable	29/03/2022
Dunlin, Calidris alpina - Passage	-	-
Dunlin, Calidris alpina - Wintering	-	-
Dunlin, Calidris alpina alpina - A672, nb	Unfavourable - No change	29/03/2022
Estuaries	-	-
Estuary	-	-
Golden plover, Pluvialis apricaria - A140, nb	Favourable	29/03/2022
Golden plover, Pluvialis apricaria - Passage	-	-
Golden plover, Pluvialis apricaria - Wintering	-	-
H1130 Estuaries	-	-
H1140 Mudflats and sandflats not covered by seawater at low tide	-	-
H1310 Salicornia and other annuals colonising mud and sand	-	-
H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	-	-
Invert. assemblage M3 saltmarsh, estuary and mudflat	-	-
Knot, Calidris canutus - A143, nb	Favourable	29/03/2022
Knot, Calidris canutus - Passage	-	-
Knot, Calidris canutus - Wintering	-	-
Littoral sediment	-	-

Feature name	Feature condition	Date of assessment
Marsh Harrier, Circus aeruginosus - A081, b	Favourable	21/04/2022
Redshank, Tringa totanus - A162, nb	Unfavourable - Declining	29/03/2022
Redshank, Tringa totanus - Passage	-	-
Redshank, Tringa totanus - Wintering	-	-
River lamprey, Lampetra fluviatilis - Passage	-	-
River lamprey, Lampetra fluviatilis	-	-
Ruff, Calidris pugnax - A151, nb	Unfavourable - No change	29/03/2022
S1095 Sea lamprey, Petromyzon marinus	-	-
S1099 River lamprey, Lampetra fluviatilis	-	-
SM4-28 - Saltmarsh	Unfavourable - Recovering	30/03/2010
Sea lamprey, Petromyzon marinus - Passage	-	-
Sea lamprey, Petromyzon marinus	-	-
Shelduck, Tadorna tadorna - A048, nb	Favourable	29/03/2022
Shelduck, Tadorna tadorna - Wintering	-	-
Waterbird assemblage - Wintering	-	-
Waterbird assemblage	Favourable	29/03/2022

ID: 22
Location: 849m NE
SSSI name: Humber Estuary
Unit name: North Killingholme Haven To East Halton Skitter
Broad habitat: Littoral Sediment
Condition: Unfavourable - Recovering
Reportable features:

Feature name	Feature condition	Date of assessment
Aggregations of non-breeding birds - Avocet, Recurvirostra avosetta	Favourable	29/03/2022
Aggregations of non-breeding birds - Bar-tailed godwit, Limosa lapponica	Unfavourable - Declining	29/03/2022
Aggregations of non-breeding birds - Black-tailed godwit, Limosa limosa islandica	Favourable	29/03/2022
Aggregations of non-breeding birds - Brent goose (dark-bellied), Branta bernicla bernicla	Favourable	29/03/2022

Feature name	Feature condition	Date of assessment
Aggregations of non-breeding birds - Curlew, Numenius arquata	Unfavourable - Declining	29/03/2022
Aggregations of non-breeding birds - Dunlin, Calidris alpina alpina	Unfavourable - No change	29/03/2022
Aggregations of non-breeding birds - Golden plover, Pluvialis apricaria	Favourable	29/03/2022
Aggregations of non-breeding birds - Greenshank, Tringa nebularia	Unfavourable - No change	29/03/2022
Aggregations of non-breeding birds - Grey plover, Pluvialis squatarola	Favourable	29/03/2022
Aggregations of non-breeding birds - Knot, Calidris canutus	Favourable	29/03/2022
Aggregations of non-breeding birds - Lapwing, Vanellus vanellus	Unfavourable - No change	29/03/2022
Aggregations of non-breeding birds - Oystercatcher, Haematopus ostralegus	Favourable	29/03/2022
Aggregations of non-breeding birds - Pochard, Aythya ferina	Unfavourable - Declining	29/03/2022
Aggregations of non-breeding birds - Redshank, Tringa totanus	Unfavourable - Declining	29/03/2022
Aggregations of non-breeding birds - Ruff, Philomachus pugnax	Unfavourable - No change	29/03/2022
Aggregations of non-breeding birds - Sanderling, Calidris alba	Unfavourable - No change	29/03/2022
Aggregations of non-breeding birds - Shelduck, Tadorna tadorna	Favourable	29/03/2022
Aggregations of non-breeding birds - Teal, Anas crecca	Favourable	29/03/2022
Aggregations of non-breeding birds - Turnstone, Arenaria interpres	Unfavourable - Declining	29/03/2022
Aggregations of non-breeding birds - Whimbrel, Numenius phaeopus	Favourable	29/03/2022
Aggregations of non-breeding birds - Wigeon, Anas penelope	Unfavourable - Declining	29/03/2022
Avocet, Recurvirostra avosetta - A132-A, nb	Favourable	29/03/2022
Bar-tailed godwit, Limosa lapponica - A157, nb	Unfavourable - Declining	29/03/2022
Bar-tailed godwit, Limosa lapponica - Wintering	-	-
Black-tailed godwit, Limosa limosa - Wintering	-	-
Black-tailed godwit, Limosa limosa islandica - A616, nb	Favourable	29/03/2022
Dunlin, Calidris alpina - Passage	-	-
Dunlin, Calidris alpina - Wintering	-	-
Dunlin, Calidris alpina alpina - A672, nb	Unfavourable - No change	29/03/2022
Estuaries	-	-
Estuary	-	-
Golden plover, Pluvialis apricaria - A140, nb	Favourable	29/03/2022

Feature name	Feature condition	Date of assessment
Golden plover, Pluvialis apricaria - Passage	-	-
Golden plover, Pluvialis apricaria - Wintering	-	-
H1130 Estuaries	-	-
H1140 Mudflats and sandflats not covered by seawater at low tide	-	-
Knot, Calidris canutus - A143, nb	Favourable	29/03/2022
Knot, Calidris canutus - Passage	-	-
Knot, Calidris canutus - Wintering	-	-
Littoral sediment	Favourable	30/03/2010
Marsh Harrier, Circus aeruginosus - A081, b	Favourable	21/04/2022
Redshank, Tringa totanus - A162, nb	Unfavourable - Declining	29/03/2022
Redshank, Tringa totanus - Passage	-	-
Redshank, Tringa totanus - Wintering	-	-
River lamprey, Lampetra fluviatilis - Passage	-	-
River lamprey, Lampetra fluviatilis	-	-
Ruff, Calidris pugnax - A151, nb	Unfavourable - No change	29/03/2022
S1095 Sea lamprey, Petromyzon marinus	-	-
S1099 River lamprey, Lampetra fluviatilis	-	-
SM4-28 - Saltmarsh	Favourable	24/02/2022
Sea lamprey, Petromyzon marinus - Passage	-	-
Sea lamprey, Petromyzon marinus	-	-
Shelduck, Tadorna tadorna - A048, nb	Favourable	29/03/2022
Shelduck, Tadorna tadorna - Wintering	-	-
Waterbird assemblage - Wintering	-	-
Waterbird assemblage	Favourable	29/03/2022

ID: 24
Location: 917m E
SSSI name: Humber Estuary
Unit name: North Killingholme Haven Saltmarsh
Broad habitat: Fen, Marsh And Swamp - Lowland
Condition: Unfavourable - Recovering

Reportable features:

Feature name	Feature condition	Date of assessment
Aggregations of non-breeding birds - Avocet, Recurvirostra avosetta	Favourable	29/03/2022
Aggregations of non-breeding birds - Bar-tailed godwit, Limosa lapponica	Unfavourable - Declining	29/03/2022
Aggregations of non-breeding birds - Black-tailed godwit, Limosa limosa islandica	Favourable	29/03/2022
Aggregations of non-breeding birds - Brent goose (dark-bellied), Branta bernicla bernicla	Favourable	29/03/2022
Aggregations of non-breeding birds - Curlew, Numenius arquata	Unfavourable - Declining	29/03/2022
Aggregations of non-breeding birds - Dunlin, Calidris alpina alpina	Unfavourable - No change	29/03/2022
Aggregations of non-breeding birds - Golden plover, Pluvialis apricaria	Favourable	29/03/2022
Aggregations of non-breeding birds - Greenshank, Tringa nebularia	Unfavourable - No change	29/03/2022
Aggregations of non-breeding birds - Grey plover, Pluvialis squatarola	Favourable	29/03/2022
Aggregations of non-breeding birds - Knot, Calidris canutus	Favourable	29/03/2022
Aggregations of non-breeding birds - Lapwing, Vanellus vanellus	Unfavourable - No change	29/03/2022
Aggregations of non-breeding birds - Oystercatcher, Haematopus ostralegus	Favourable	29/03/2022
Aggregations of non-breeding birds - Pochard, Aythya ferina	Unfavourable - Declining	29/03/2022
Aggregations of non-breeding birds - Redshank, Tringa totanus	Unfavourable - Declining	29/03/2022
Aggregations of non-breeding birds - Ruff, Philomachus pugnax	Unfavourable - No change	29/03/2022
Aggregations of non-breeding birds - Sanderling, Calidris alba	Unfavourable - No change	29/03/2022
Aggregations of non-breeding birds - Shelduck, Tadorna tadorna	Favourable	29/03/2022
Aggregations of non-breeding birds - Teal, Anas crecca	Favourable	29/03/2022
Aggregations of non-breeding birds - Turnstone, Arenaria interpres	Unfavourable - Declining	29/03/2022
Aggregations of non-breeding birds - Whimbrel, Numenius phaeopus	Favourable	29/03/2022
Aggregations of non-breeding birds - Wigeon, Anas penelope	Unfavourable - Declining	29/03/2022
Avocet, Recurvirostra avosetta - A132-A, nb	Favourable	29/03/2022
Bar-tailed godwit, Limosa lapponica - A157, nb	Unfavourable - Declining	29/03/2022
Bar-tailed godwit, Limosa lapponica - Wintering	-	-
Black-tailed godwit, Limosa limosa - Wintering	-	-
Black-tailed godwit, Limosa limosa islandica - A616, nb	Favourable	29/03/2022

Feature name	Feature condition	Date of assessment
Dunlin, Calidris alpina - Passage	-	-
Dunlin, Calidris alpina - Wintering	-	-
Dunlin, Calidris alpina alpina - A672, nb	Unfavourable - No change	29/03/2022
Estuaries	-	-
Estuary	-	-
Golden plover, Pluvialis apricaria - A140, nb	Favourable	29/03/2022
Golden plover, Pluvialis apricaria - Passage	-	-
Golden plover, Pluvialis apricaria - Wintering	-	-
H1130 Estuaries	-	-
H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Unfavourable - No change	24/02/2022
Invert. assemblage M3 saltmarsh, estuary and mudflat	-	-
Knot, Calidris canutus - A143, nb	Favourable	29/03/2022
Knot, Calidris canutus - Passage	-	-
Knot, Calidris canutus - Wintering	-	-
Littoral sediment	-	-
Marsh Harrier, Circus aeruginosus - A081, b	Favourable	21/04/2022
Redshank, Tringa totanus - A162, nb	Unfavourable - Declining	29/03/2022
Redshank, Tringa totanus - Passage	-	-
Redshank, Tringa totanus - Wintering	-	-
Ruff, Calidris pugnax - A151, nb	Unfavourable - No change	29/03/2022
SM4-28 - Saltmarsh	Unfavourable - No change	24/02/2022
Shelduck, Tadorna tadorna - A048, nb	Favourable	29/03/2022
Shelduck, Tadorna tadorna - Wintering	-	-
Waterbird assemblage - Wintering	-	-
Waterbird assemblage	Favourable	29/03/2022

ID: 25
Location: 944m NE
SSSI name: Humber Estuary
Unit name: Humber Bridge To Grimsby Dock Subtidal
Broad habitat: Littoral Sediment
Condition: Unfavourable - Recovering
Reportable features:

Feature name	Feature condition	Date of assessment
Aggregations of non-breeding birds - Pochard, Aythya ferina	Unfavourable - Declining	29/03/2022
Estuaries	Unfavourable - Recovering	21/12/2010
Estuary	-	-
H1110 Sandbanks which are slightly covered by sea water all the time	-	-
H1130 Estuaries	-	-
River lamprey, Lampetra fluviatilis - Passage	-	-
River lamprey, Lampetra fluviatilis	Unfavourable - Recovering	21/12/2010
S1095 Sea lamprey, Petromyzon marinus	-	-
S1099 River lamprey, Lampetra fluviatilis	-	-
Sea lamprey, Petromyzon marinus - Passage	-	-
Sea lamprey, Petromyzon marinus	Unfavourable - Recovering	21/12/2010
Waterbird assemblage - Wintering	-	-

This data is sourced from Natural England and Natural Resources Wales.

11 Visual and cultural designations

11.1 World Heritage Sites

Records within 250m	0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.2 Area of Outstanding Natural Beauty

Records within 250m	0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m	0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m	0

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.5 Conservation Areas

Records within 250m	0

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.6 Scheduled Ancient Monuments

Records within 250m	0

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

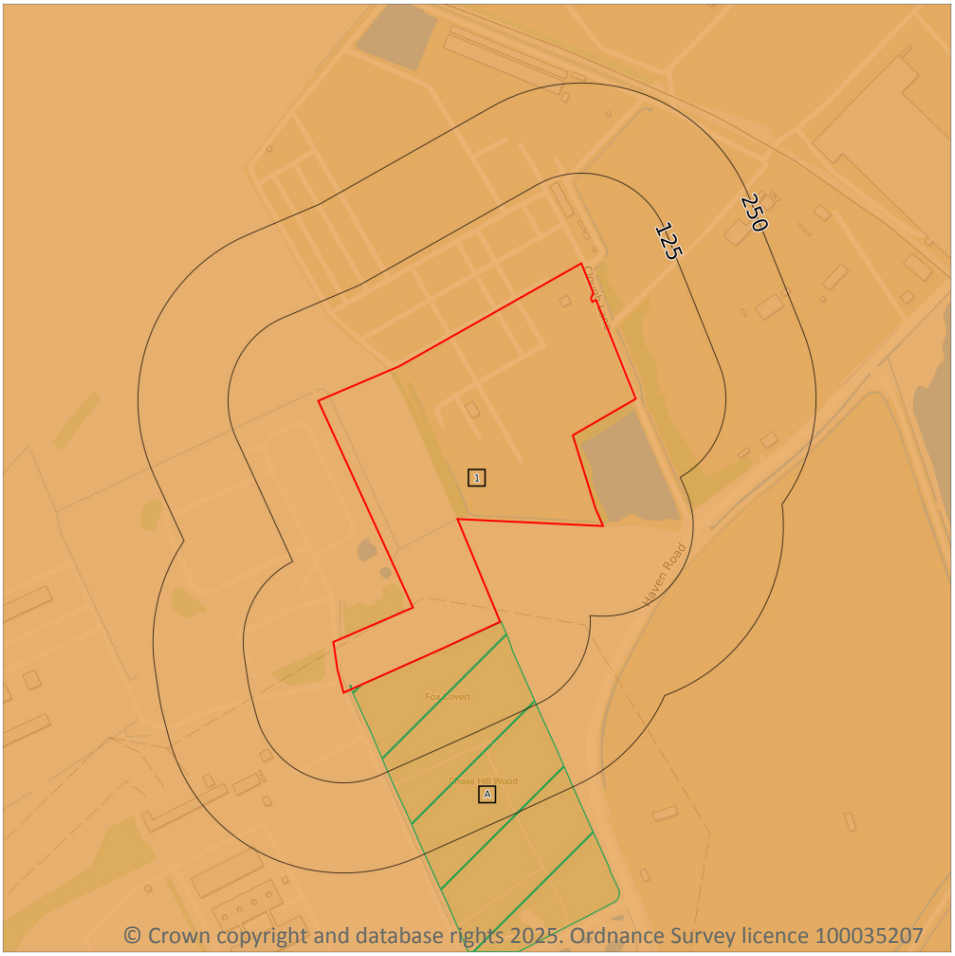
11.7 Registered Parks and Gardens

Records within 250m	0

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

12 Agricultural designations



Site Outline

Search buffers in metres (m)

- Grade 1 - excellent quality
- Grade 2 - very good quality
- Grade 3 - good to moderate quality
- Grade 3a - good quality
- Grade 3b - moderate quality
- Grade 4 - poor quality
- Grade 5 - very poor quality
- Non-agricultural land
- Urban land
- Exclusion land
- Tree felling licences
- Open Access land

12.1 Agricultural Land Classification

Records within 250m	1

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on **page 97 >**

ID	Location	Classification	Description
1	On site	Grade 3	**Good to moderate quality agricultural land. Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2.**

This data is sourced from Natural England.

12.2 Open Access Land

Records within 250m	0

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

This data is sourced from Natural England and Natural Resources Wales.

12.3 Tree Felling Licences

Records within 250m	2

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

Features are displayed on the Agricultural designations map on **page 97 >**

ID	Location	Description	Reference	Application date
A	**On site**	**Selective Fell/Thin (Conditional)**	**012/60/10-11**	**22/02/2011**
A	**On site**	**Selective Fell/Thin (Unconditional)**	**012/75/08-09**	**18/11/2008**

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m	0

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. The schemes identified may be historical schemes that have now expired, or may still be active.

This data is sourced from Natural England.

12.5 Countryside Stewardship Schemes

Records within 250m	0

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

This data is sourced from Natural England.

13 Habitat designations



Site Outline

Search buffers in metres (m)

Priority Habitat Inventory
Open Mosaic Habitat
Limestone Pavement Orders

Habitat Networks
Primary Habitat
Restorable Habitat
Associated Habitats
Habitat Restoration-Creation
Network Enhancement Zone 1
Network Enhancement Zone 2

13.1 Priority Habitat Inventory

Records within 250m	**6**

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

Features are displayed on the Habitat designations map on **page 99 >**

ID	Location	Main Habitat	Other habitats
1	**On site**	**Deciduous woodland**	**Main habitat: DWOOD (INV > 50%)**
2	13m NE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
3	71m SE	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
4	128m E	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)

ID	Location	Main Habitat	Other habitats
5	145m S	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
6	155m SE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m	**2**

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

Features are displayed on the Habitat designations map on **page 99 >**

ID	Location	Type	Habitat
7	222m E	Network Enhancement Zone 1	Not specified
8	248m NE	Network Enhancement Zone 2	Not specified

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m	**0**

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

This data is sourced from Natural England.

13.4 Limestone Pavement Orders

Records within 250m	**0**

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.

14 Geology 1:10,000 scale - Availability



Site Outline

Search buffers in metres (m)

Full coverage

Partial coverage

No coverage

14.1 10k Availability

Records within 500m	1

An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 102 >**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**No coverage**	**No coverage**	**No coverage**	**No coverage**	**NoCov**

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Artificial and made ground

14.2 Artificial and made ground (10k)

Records within 500m	0

Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Superficial

14.3 Superficial geology (10k)

Records within 500m	0

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

This data is sourced from the British Geological Survey.

14.4 Landslip (10k)

Records within 500m	0

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Bedrock

14.5 Bedrock geology (10k)

Records within 500m	0

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

This data is sourced from the British Geological Survey.

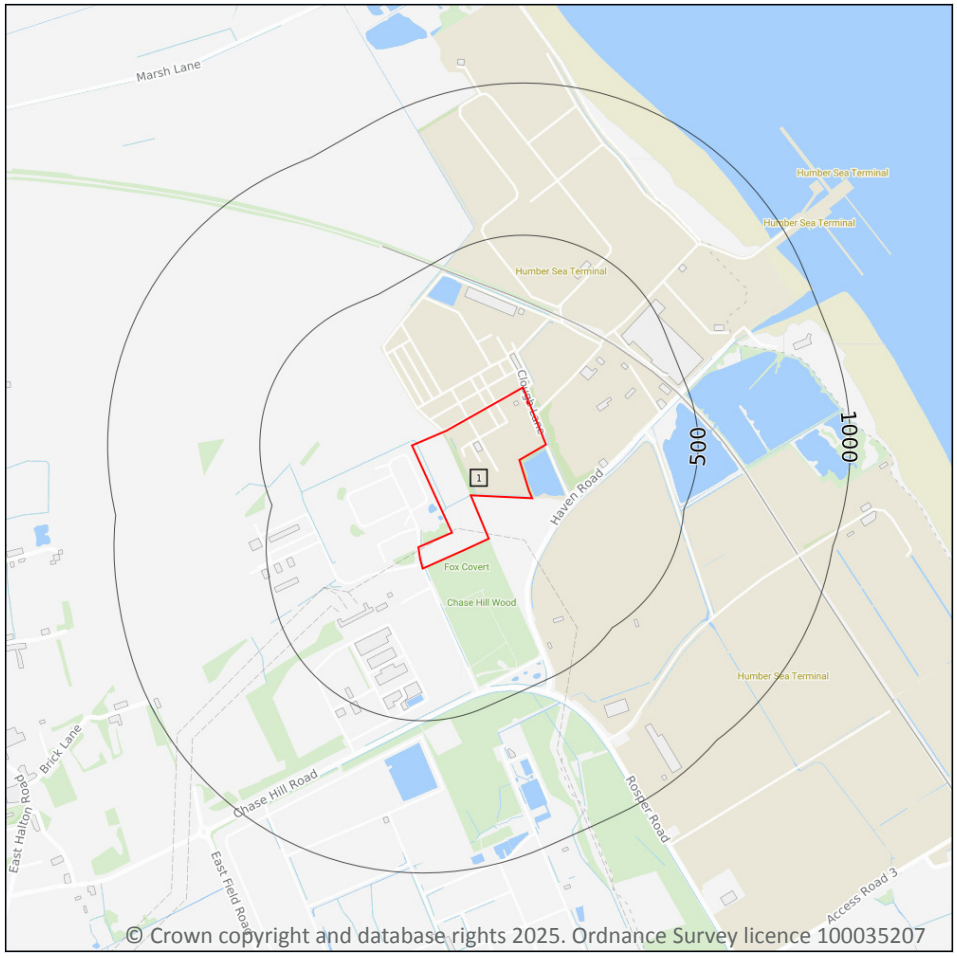
14.6 Bedrock faults and other linear features (10k)

Records within 500m	0

Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

15 Geology 1:50,000 scale - Availability



Site Outline

Search buffers in metres (m)

Geological map tile

15.1 50k Availability

Records within 500m	1

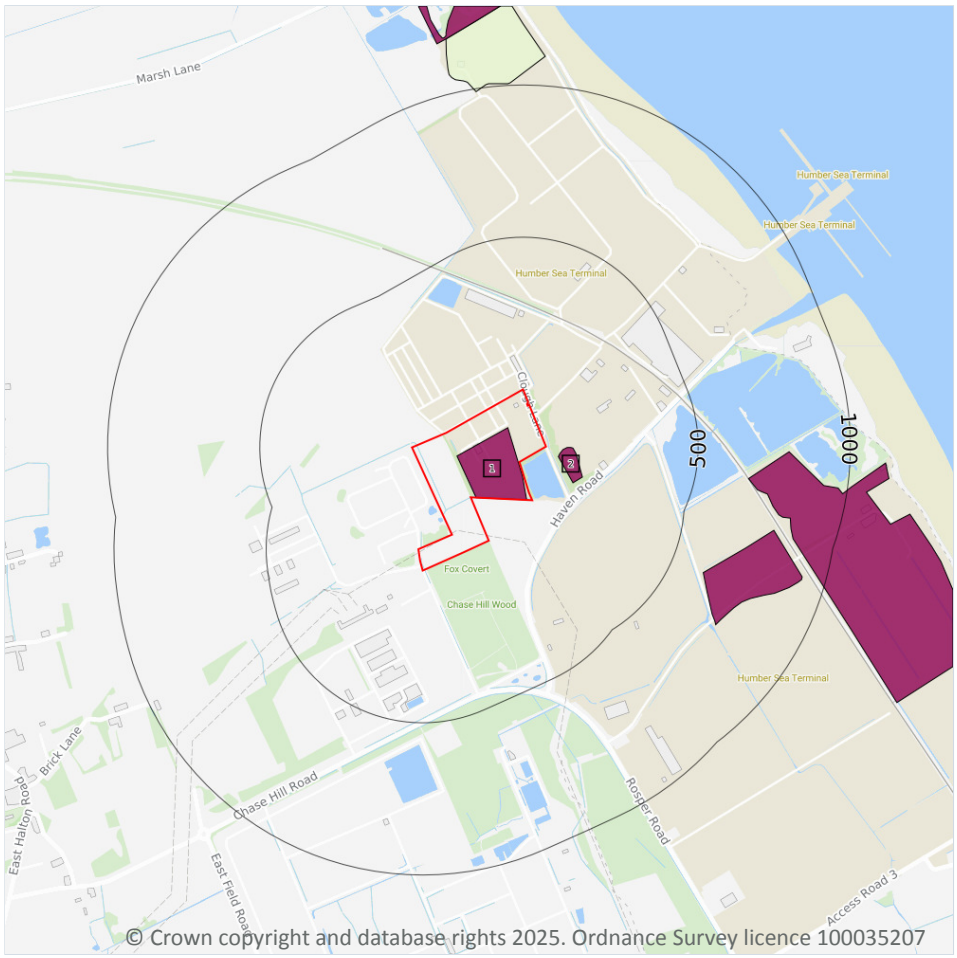
An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 106 >**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**No coverage**	**EW081_082_patrington_and_spurn_v4**

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Artificial and made ground



Site Outline

Search buffers in metres (m)

- Made ground
- Worked ground
- Infilled ground
- Disturbed ground
- Landscaped ground

15.2 Artificial and made ground (50k)

Records within 500m	2

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

Features are displayed on the Geology 1:50,000 scale - Artificial and made ground map on **page 107 >**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**MGR-ARTDP**	**MADE GROUND (UNDIVIDED)**	**ARTIFICIAL DEPOSIT**
2	51m E	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

This data is sourced from the British Geological Survey.

15.3 Artificial ground permeability (50k)

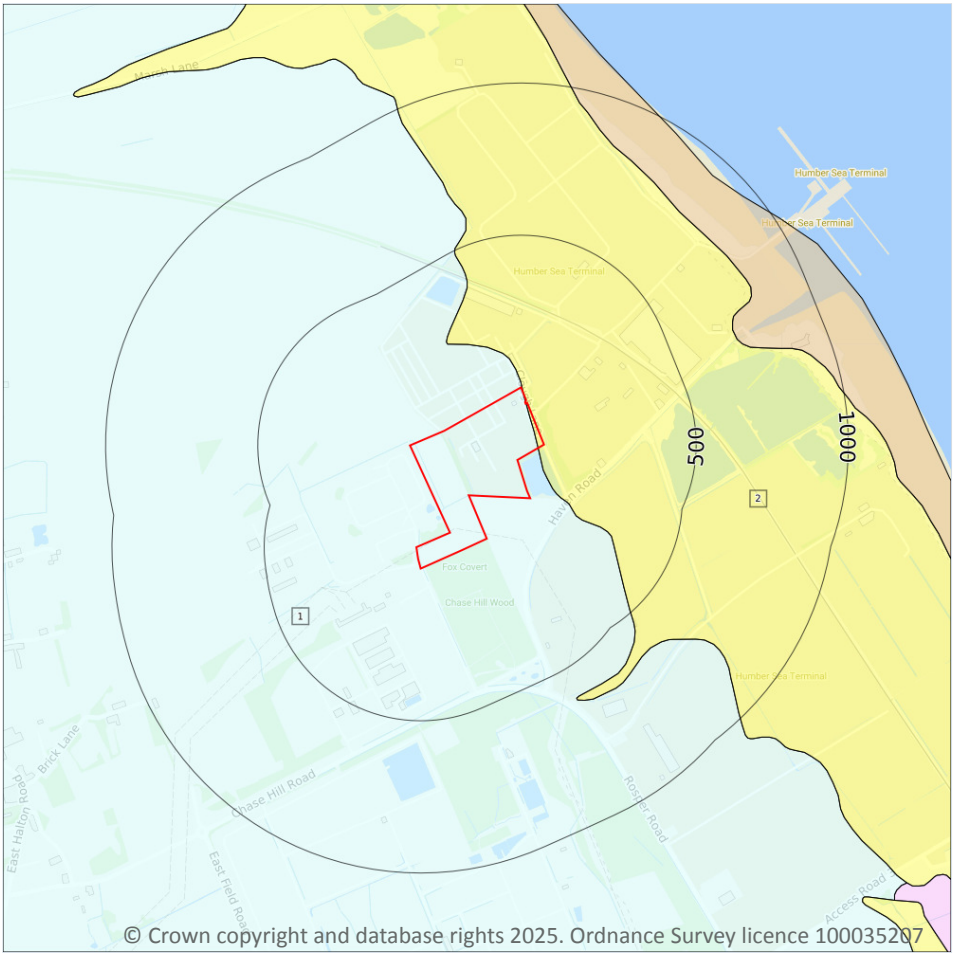
Records within 50m	1

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Mixed**	**Very High**	**Low**

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (50k)

Superficial geology (50k)
Please see table for more details.

15.4 Superficial geology (50k)

Records within 500m **2**

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 109 >**

ID	Location	LEX Code	Description	Rock description
1	On site	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
2	On site	TFD-XCZ	TIDAL FLAT DEPOSITS	CLAY AND SILT

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m	2

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Intergranular**	**Low**	**Very Low**
On site	**Mixed**	**High**	**Low**

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m	0

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

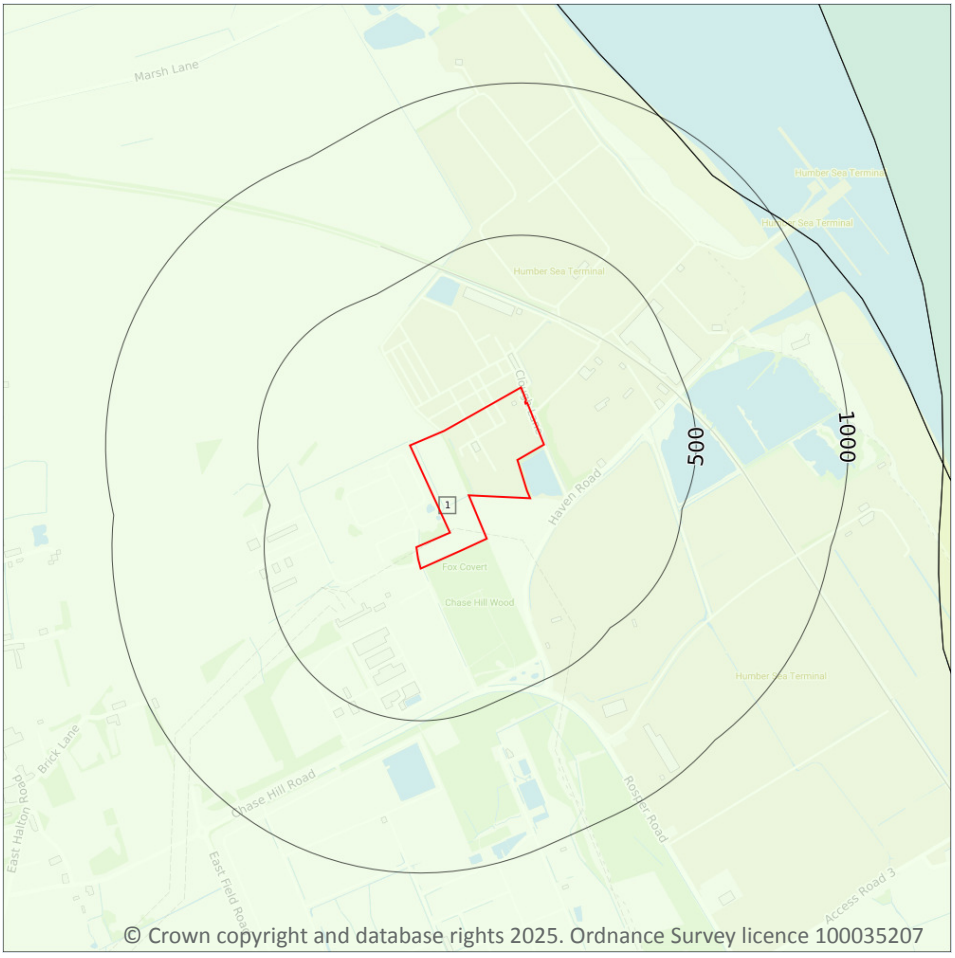
15.7 Landslip permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (50k)

Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m	1

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 111 >**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**BCK-CHLK**	**BURNHAM CHALK FORMATION - CHALK**	**TURONIAN**

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m	1

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Fracture**	**Very High**	**Very High**

This data is sourced from the British Geological Survey.

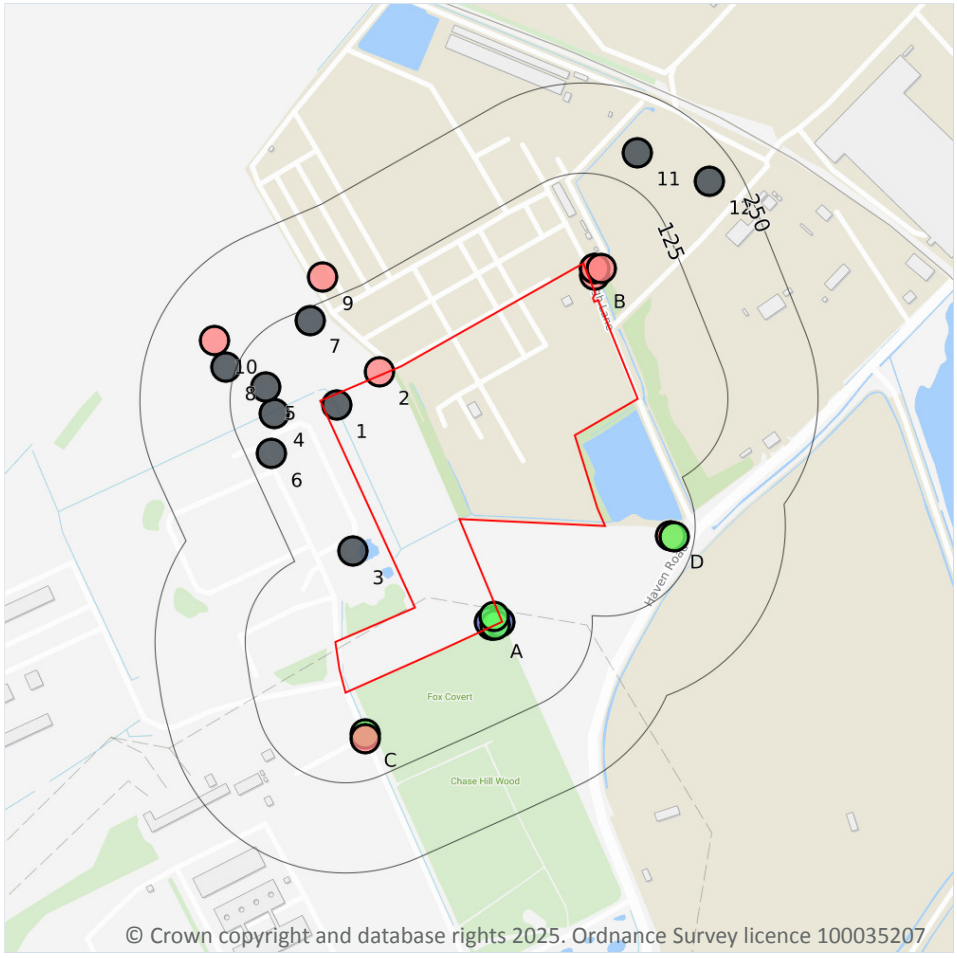
15.10 Bedrock faults and other linear features (50k)

Records within 500m	0

Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

16 Boreholes



Site Outline

Search buffers in metres (m)

Confidential

0 - 10m

10 - 30m

30m+

Unknown

16.1 BGS Boreholes

Records within 250m	30

The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

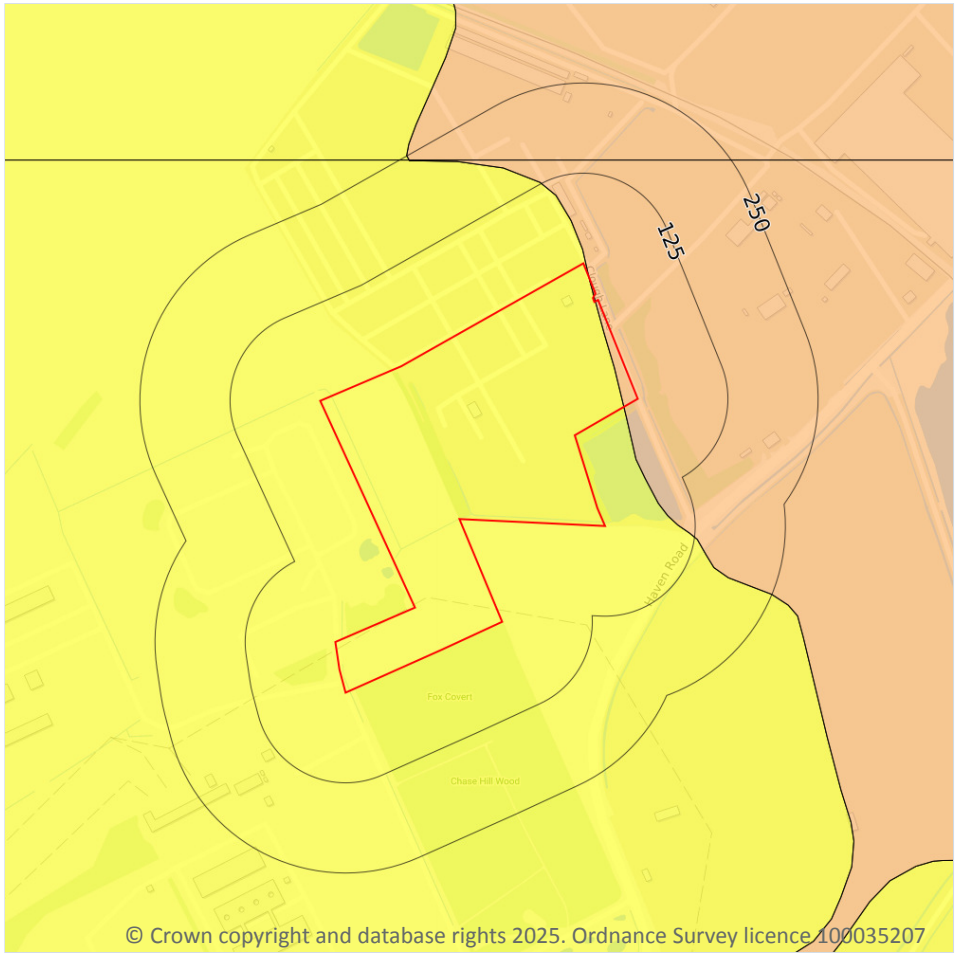
Features are displayed on the Boreholes map on **page 113 >**

ID	Location	Grid reference	Name	Length	Confidential	Web link
1	**On site**	**515493 419660**	**GAS TURBINE KILLINGHOLME 73**	**-**	**Y**	**N/A**
A	**On site**	**515707 419355**	**KILLINGHOLME 7**	**22.0**	**N**	**461130 ↗**

ID	Location	Grid reference	Name	Length	Confidential	Web link
A	**On site**	**515711 419360**	**KILLINGHOLME OW7**	**22.38**	**N**	**461171**
A	**On site**	**515709 419355**	**KILLINGHOLME 31**	**12.2**	**N**	**461136**
A	**On site**	**515715 419358**	**KILLINGHOLME 32**	**8.0**	**N**	**461137**
A	**On site**	**515713 419362**	**KILLINGHOLME 46**	**6.3**	**N**	**461141**
A	**On site**	**515707 419360**	**KILLINGHOLME 47**	**10.8**	**N**	**461142**
A	**On site**	**515705 419359**	**KILLINGHOLME 72**	**4.0**	**N**	**461148**
A	**On site**	**515719 419359**	**KILLINGHOLME 80**	**8.9**	**N**	**461153**
A	**On site**	**515713 419356**	**KILLINGHOLME 81**	**12.6**	**N**	**461154**
A	**On site**	**515711 419367**	**KILLINGHOLME 19**	**15.4**	**N**	**461156**
2	5m NW	515552 419706	KILLINGHOLME 90	107.36	N	461108
B	8m NE	515850 419840	ADMIRALTY OIL DEPOT	54.86	N	461264
B	11m NE	515850 419850	ADMIRALTRY OIL DEPOT NORTH KILLINGHOLME	54.86	N	461022
B	11m NE	515850 419850	ADMIRALTRY OIL DEPOT NORTH KILLINGHOLME	64.0	N	461023
B	21m NE	515860 419850	ADMIRALTY OIL DEPOT	64.0	N	461265
3	45m SW	515516 419458	GAS TURBINE KILLINGHOLME 74	-	Y	N/A
C	63m S	515532 419205	KILLINGHOLME 153	13.1	N	461155
4	67m W	515406 419648	GAS TURBINE KILLINGHOLME 70	-	Y	N/A
C	69m S	515533 419198	KILLINGHOLME 10	35.35	N	461132
5	79m W	515394 419686	GAS TURBINE KILLINGHOLME 81	-	Y	N/A
6	92m W	515403 419593	GAS TURBINE KILLINGHOLME 78	-	Y	N/A
D	92m E	515956 419479	KILLINGHOLME 0W4A	50.3	N	461170
D	97m E	515961 419478	KILLINGHOLME 101	16.6	N	461183
7	108m NW	515456 419778	GAS TURBINE KILLINGHOLME 72	-	Y	N/A
8	139m W	515339 419713	GAS TURBINE KILLINGHOLME 71	-	Y	N/A
9	157m NW	515474 419838	KILLINGHOLME 6	39.81	N	461129
10	169m NW	515324 419750	KILLINGHOLME 4	55.63	N	461128
11	171m NE	515910 420010	HUMBER SEA TERMINAL PHASE 2 TP134	-	Y	N/A
12	209m NE	516010 419970	HUMBER SEA TERMINAL PHASE 2 TP133	-	Y	N/A

This data is sourced from the British Geological Survey.

17 Natural ground subsidence - Shrink swell clays



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Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.1 Shrink swell clays

Records within 50m	2

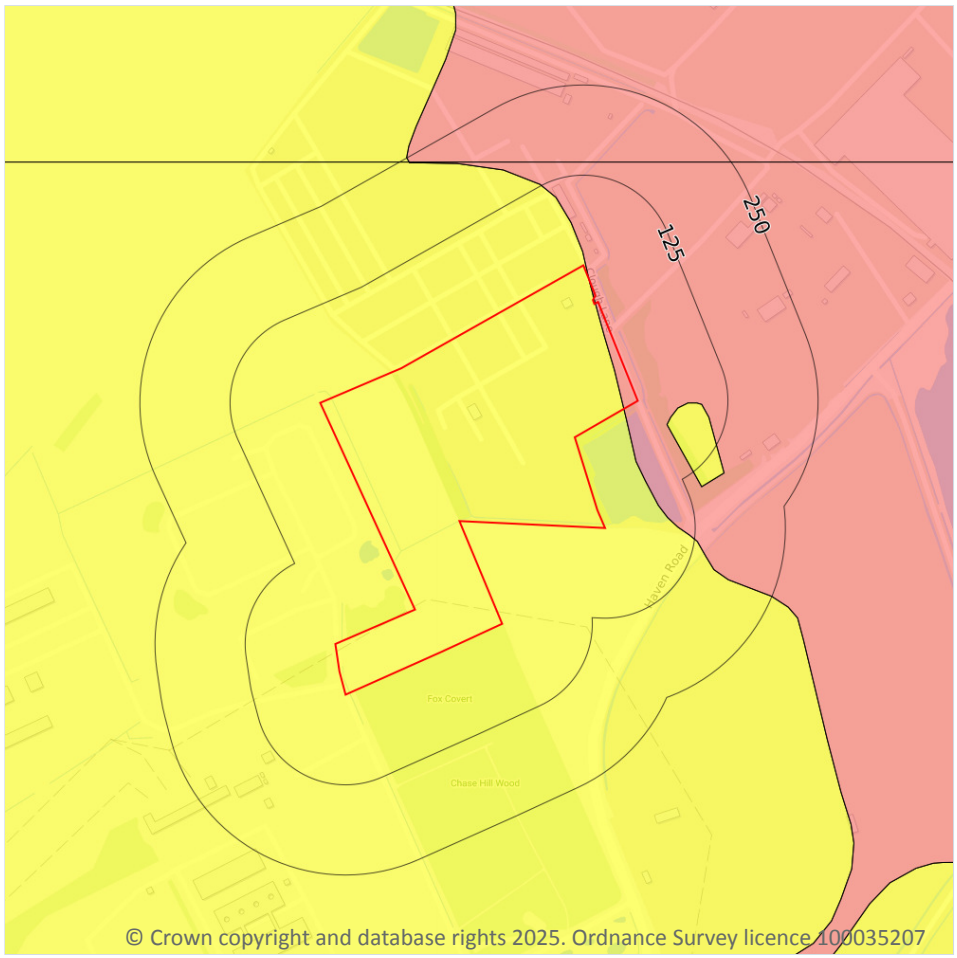
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 115 >**

Location	Hazard rating	Details
On site	**Very low**	**Ground conditions predominantly low plasticity.**
On site	**Low**	**Ground conditions predominantly medium plasticity.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.2 Running sands

Records within 50m	2

The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

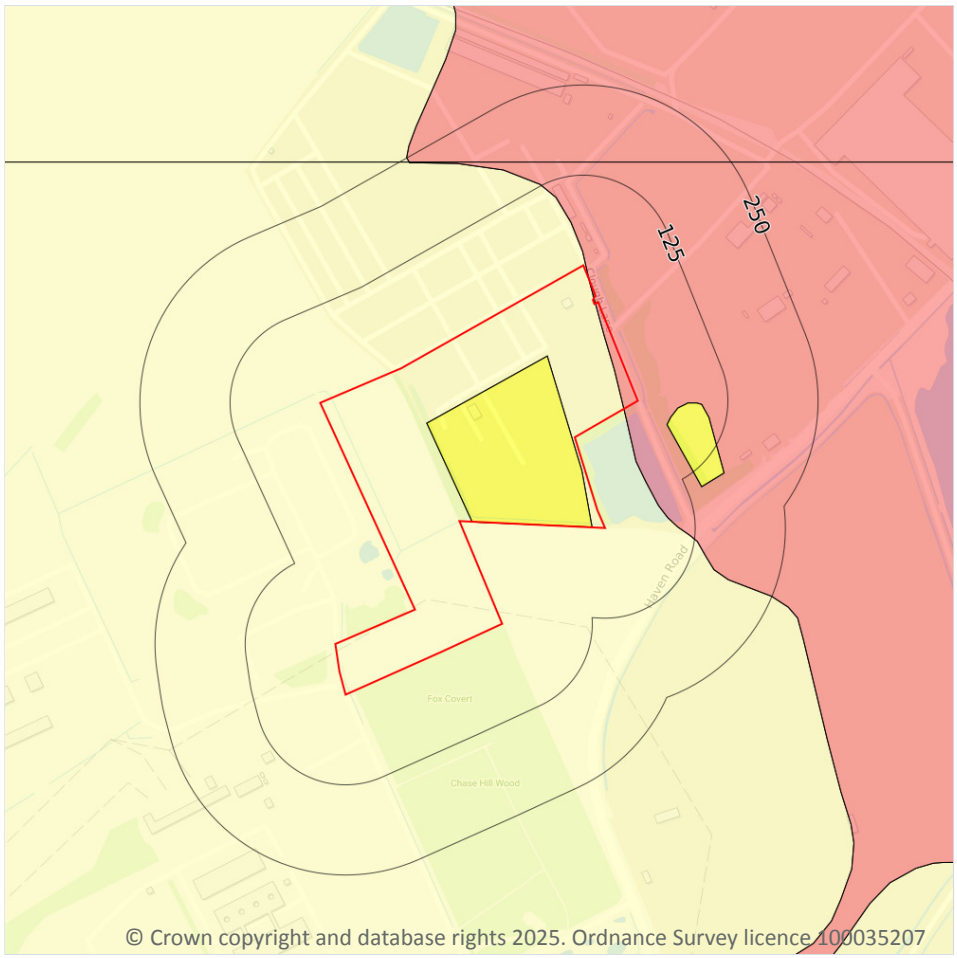
Features are displayed on the Natural ground subsidence - Running sands map on **page 116 >**

Location	Hazard rating	Details
On site	**Very low**	**Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.**

Location	Hazard rating	Details
On site	**Moderate**	**Running sand conditions are probably present. Constraints may apply to land uses involving excavation or the addition or removal of water.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



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Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.3 Compressible deposits

Records within 50m	3

The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

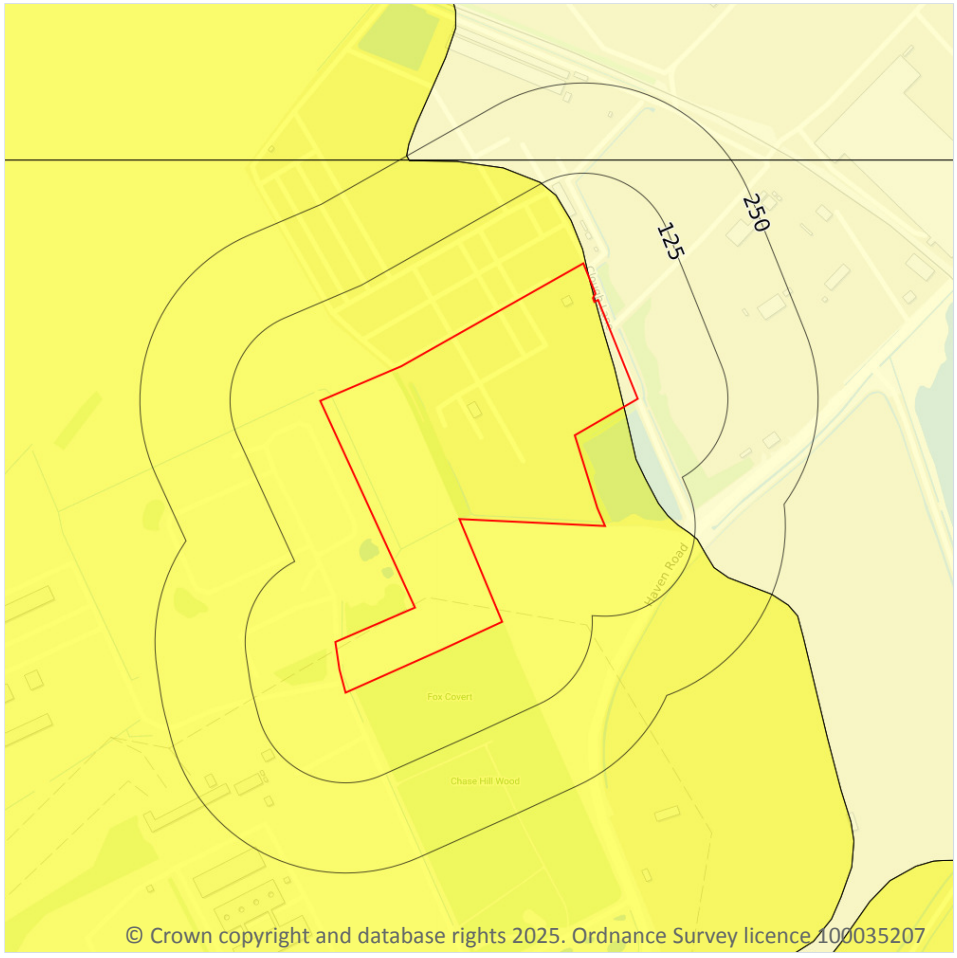
Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 118 >**

Location	Hazard rating	Details
On site	**Negligible**	**Compressible strata are not thought to occur.**
On site	**Very low**	**Compressibility and uneven settlement problems are not likely to be significant on the site for most land uses.**

Location	Hazard rating	Details
On site	**Moderate**	**Compressibility and uneven settlement hazards are probably present. Land use should consider specifically the compressibility and variability of the site.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.4 Collapsible deposits

Records within 50m	2

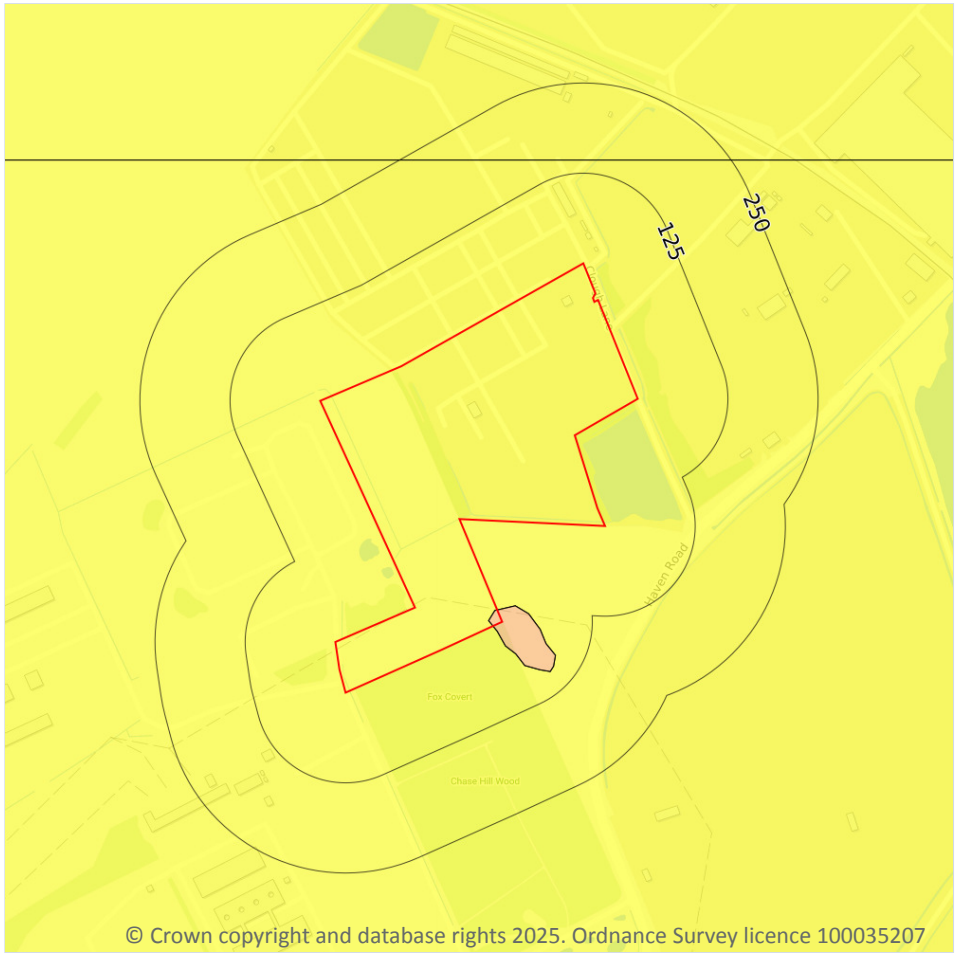
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 120 >**

Location	Hazard rating	Details
On site	**Negligible**	**Deposits with potential to collapse when loaded and saturated are believed not to be present.**
On site	**Very low**	**Deposits with potential to collapse when loaded and saturated are unlikely to be present.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.5 Landslides

Records within 50m	2

The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

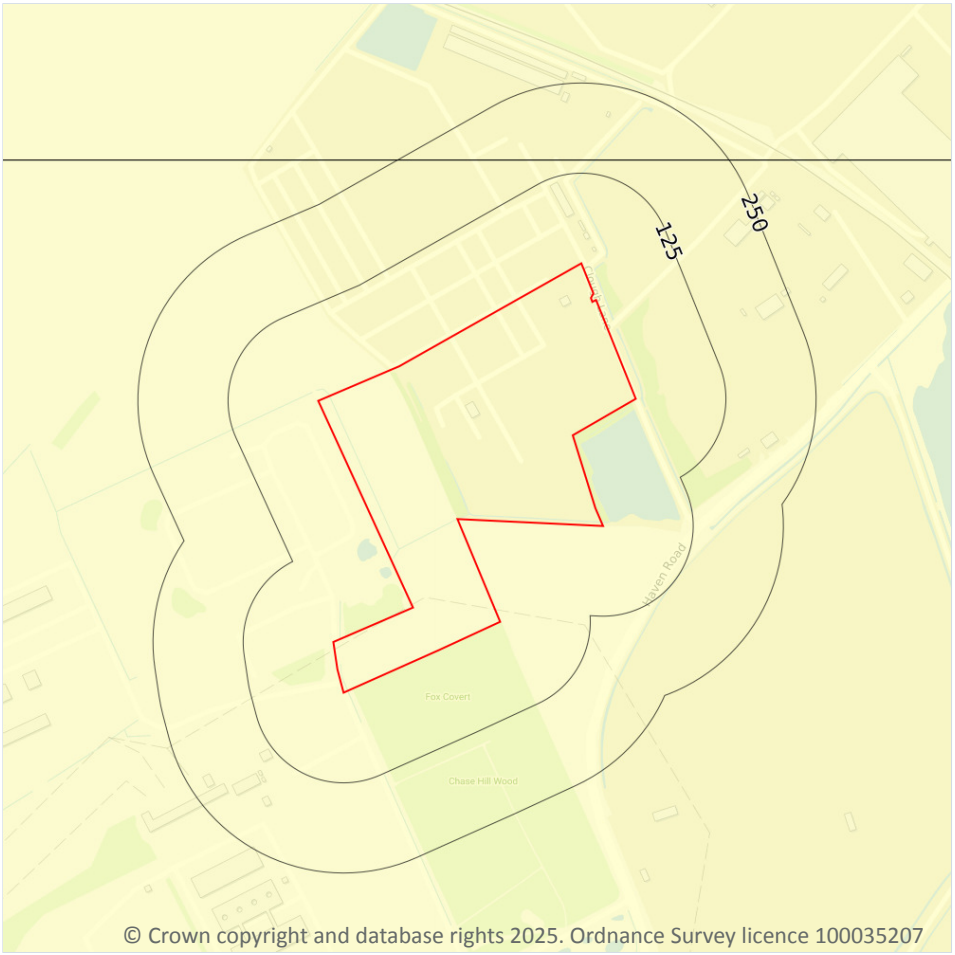
Features are displayed on the Natural ground subsidence - Landslides map on **page 121 >**

Location	Hazard rating	Details
On site	**Very low**	**Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.**

Location	Hazard rating	Details
On site	**Low**	**Slope instability problems may be present or anticipated. Site investigation should consider specifically the slope stability of the site.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Ground dissolution of soluble rocks



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Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.6 Ground dissolution of soluble rocks

Records within 50m	1

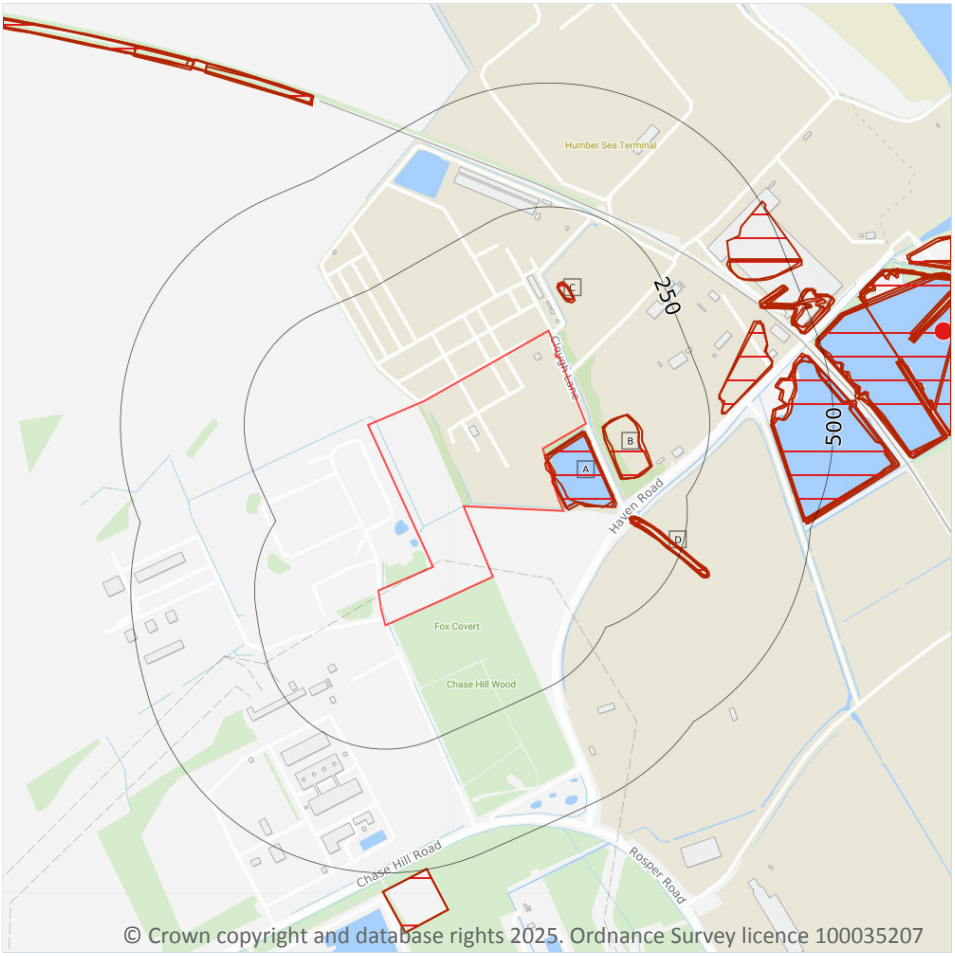
The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 123 >**

Location	Hazard rating	Details
On site	**Negligible**	**Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.**

This data is sourced from the British Geological Survey.

18 Mining and ground workings



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Site Outline

Search buffers in metres (m)

BritPits

Surface ground workings

Underground workings

Underground mining extents

Historical mineral planning areas

TCA non-coal mining

Non Coal Mining

Sporadic underground mining of restricted extent possible

Localised small scale underground mining possible

Small scale mining possible

Underground mining known or likely within or in close proximity

Underground mining known within or in very close proximity

18.1 BritPits

Records within 500m	0

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

This data is sourced from the British Geological Survey.

18.2 Surface ground workings

Records within 250m	17

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining and ground workings map on **page 125 >**

ID	Location	Land Use	Year of mapping	Mapping scale
A	**On site**	**Pond**	**1951**	**1:10560**
A	**On site**	**Water Body**	**1974**	**1:10000**
A	**On site**	**Water Body**	**1983**	**1:10000**
A	3m E	Pond	1968	1:10560
B	34m E	Unspecified Heap	1974	1:10000
B	34m E	Unspecified Heap	1983	1:10000
B	38m E	Unspecified Heap	1968	1:10560
C	69m NE	Pond	1886	1:10560
C	72m NE	Pond	1910	1:10560
C	74m NE	Pond	1886	1:10560
D	133m E	Unspecified Pit	1947	1:10560
D	137m E	Unspecified Pit	1910	1:10560
D	137m E	Unspecified Pit	1910	1:10560
D	138m E	Unspecified Pit	1951	1:10560
D	142m E	Unspecified Pit	1947	1:10560
D	142m E	Unspecified Pit	1930	1:10560
D	142m E	Unspecified Pit	1906	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.3 Underground workings

Records within 1000m	0

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

This is data is sourced from Ordnance Survey/Groundsure.

18.4 Underground mining extents

Records within 500m	0

This data identifies underground mine workings that could present a potential risk, including adits and seam workings. These features have been identified from BGS Geological mapping and mine plans sourced from the BGS and various collections and sources.

This data is sourced from Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m	0

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m	0

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

This data is sourced from the British Geological Survey.

18.7 JPB mining areas

Records on site	0

Areas which could be affected by former coal and other mining. This data includes some mine plans unavailable to the Coal Authority.

This data is sourced from Johnson Poole and Bloomer.

18.8 The Coal Authority non-coal mining

Records within 500m	0

This data provides an indication of the potential zone of influence of recorded underground non-coal mining workings. Any and all analysis and interpretation of Coal Authority Data in this report is made by Groundsure, and is in no way supported, endorsed or authorised by the Coal Authority. The use of the data is restricted to the terms and provisions contained in this report. Data reproduced in this report may be the

copyright of the Coal Authority and permission should be sought from Groundsure prior to any re-use.

This data is sourced from The Coal Authority.

18.9 Researched mining

Records within 500m	0

This data indicates areas of potential mining identified from alternative or archival sources, including; BGS Geological paper maps, Lidar data, aerial photographs (from World War II onwards), archaeological data services, websites, Tithe maps, and various text/plans from collected books and reports. Some of this data is approximate and Groundsure have interpreted the resultant risk area and, where possible, specific areas of risk have been captured.

This data is sourced from Groundsure.

18.10 Mining record office plans

Records within 500m	0

This dataset is representative of Mining Record Office and/or plan extents held by Groundsure and should be considered approximate. Where possible, plans have been located and any specific areas of risk they depict have been captured.

This data is sourced from Groundsure.

18.11 BGS mine plans

Records within 500m	0

This dataset is representative of BGS mine plans held by Groundsure and should be considered approximate. Where possible, plans have been located and any specific areas of risk they depict have been captured.

This data is sourced from Groundsure.

18.12 Coal mining

Records on site	0

Areas which could be affected by past, current or future coal mining.

This data is sourced from the Coal Authority.

18.13 Brine areas

Records on site	0

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.

18.14 Gypsum areas

Records on site	0

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.15 Tin mining

Records on site	0

Generalised areas that may be affected by historical tin mining.

This data is sourced from Groundsure.

18.16 Clay mining

Records on site	0

Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).

19 Ground cavities and sinkholes

19.1 Natural cavities

Records within 500m	0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

This data is sourced from Stantec UK Ltd.

19.2 Mining cavities

Records within 1000m	0

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

This data is sourced from Stantec UK Ltd.

19.3 Reported recent incidents

Records within 500m	0

This data identifies sinkhole information gathered from media reports and Groundsure's own records. This data goes back to 2014 and includes relative accuracy ratings for each event and links to the original data sources. The data is updated on a regular basis and should not be considered a comprehensive catalogue of all sinkhole events. The absence of data in this database does not mean a sinkhole definitely has not occurred during this time.

This data is sourced from Groundsure.

19.4 Historical incidents

Records within 500m	0

This dataset comprises an extract of 1:10,560, 1:10,000, 1:2,500 and 1:1,250 scale historical Ordnance Survey maps held by Groundsure, dating back to the 1840s. It shows shakeholes, deneholes and other 'holes' as noted on these maps. Dene holes are medieval chalk extraction pits, usually comprising a narrow shaft with a number of chambers at the base of the shaft. Shakeholes are an alternative name for suffusion sinkholes, most commonly found in the limestone landscapes of North Yorkshire but also extensively noted around the Brecon Beacons National Park.

Not all 'holes' noted on Ordnance Survey mapping will necessarily be present within this dataset.

This data is sourced from Groundsure.

20 Radon



Site Outline

Search buffers in metres (m)

Greater than 30%

Between 10% and 30%

Between 5% and 10%

Between 3% and 5%

Between 1% and 3%

Less than 1%

20.1 Radon

Records on site	1

The Radon Potential data classifies areas based on their likelihood of a property having a radon level at or above the Action Level in Great Britain. The dataset is intended for use at 1:50,000 scale and was derived from both geological assessments and indoor radon measurements (more than 560,000 records). A minimum 50m buffer should be considered when searching the maps, as the smallest detectable feature at this scale is 50m. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain (1:100,000 scale).

Features are displayed on the Radon map on **page 132 >**

Location	Estimated properties affected	Radon Protection Measures required
On site	**Less than 1%**	**None**

This data is sourced from the British Geological Survey and UK Health Security Agency.

21 Soil chemistry

21.1 BGS Estimated Background Soil Chemistry

Records within 50m	5

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km^2. In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km^2; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	**15 - 25 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**90 - 120 mg/kg**	**30 - 45 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**90 - 120 mg/kg**	**30 - 45 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**90 - 120 mg/kg**	**30 - 45 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**90 - 120 mg/kg**	**30 - 45 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**90 - 120 mg/kg**	**30 - 45 mg/kg**

This data is sourced from the British Geological Survey.

21.2 BGS Estimated Urban Soil Chemistry

Records within 50m	0

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km^2).

This data is sourced from the British Geological Survey.

21.3 BGS Measured Urban Soil Chemistry

Records within 50m	0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km^2.

This data is sourced from the British Geological Survey.

22 Railway infrastructure and projects



Site Outline

Search buffers in metres (m)

- Crossrail 2 Stations
- Crossrail 2 Route
- Crossrail 2 Worksites
- Crossrail 2 Safeguarding
- Crossrail 2 Headhouses
- Railway stations
- Active railways
- Active tunnels
- Abandoned railways
- Historic railways
- Historic tunnels
- Underground stations
- Underground Lines
- Royal Mail tunnels
- HS2 optimised route
- HS2 Stations
- HS2 Depots
- HS2 Surface Safeguarding
- HS2 Subsurface Safeguarding

22.1 Underground railways (London)

Records within 250m	0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

22.2 Underground railways (Non-London)

Records within 250m	0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.

This data is sourced from publicly available information by Groundsure.

22.3 Railway tunnels

Records within 250m	0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

22.4 Historical railway and tunnel features

Records within 250m	2

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

Features are displayed on the Railway infrastructure and projects map on **page 136 >**

Location	Land Use	Year of mapping	Mapping scale
244m NE	Railway Sidings	1970	10000
247m NE	Railway Sidings	1952	10560

This data is sourced from Ordnance Survey/Groundsure.

22.5 Royal Mail tunnels

Records within 250m	0

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.

This data is sourced from Groundsure/the Postal Museum.

22.6 Historical railways

Records within 250m	0

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

This data is sourced from OpenStreetMap.

22.7 Railways

Records within 250m	0

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways.

This data is sourced from Ordnance Survey and OpenStreetMap.

22.8 Crossrail 2

Records within 500m	0

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

22.9 HS2

Records within 500m	0

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

This data is sourced from HS2 ltd.

Data providers

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Annex 3

Stage 1 – 3 Assessment of Hazardous Substances

ARUP

Project title	Environmental Permit Variation Application – North Killingholme Power Project
Job number	305719
File reference	Appendix D - Site Condition Report Annex 3
cc	
Prepared by	Izzy Mills
Date	10th October 2025
Subject	Stage 1-3 Assessment

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1. Introduction

As part of this Environmental Permit Variation a Stage 1 – 3 assessment, as outlined in the European Commission Guidance concerning baseline reporting (2014/C 136/03), has been produced to support the Site Condition Report. The European Commission Guidance under Article 22(2) of Directive 2010/75/EU specifies criteria for baseline reports, covering aspects such as the necessity of the report, investigation design, and report development. Consequently, the Environment Agency request that a Stage 1 to 3 assessment including the following components is carried out:

- Specification of primary containment, including the volume of any relevant hazardous substances (RHS) proposed for storage or use within the scope of this variation and their Material Safety Data Sheets (MSDS).
- Description of secondary containment measures and their volumes, alongside a compliance evaluation in accordance with CIRIA Report C736—Containment systems for the prevention of pollution.

To address this requirement the aim of this report is to conduct an assessment aligned with Stages 1-3 of the European Guidance concerning baseline reports as outlined in Article 22(2) of Directive 2010/75/EU on Industrial Emissions. The guidance describes the following stages:

- Stage 1: Identify the hazardous substances currently in use, produced or released at the installation.
- Stage 2: Identify relevant hazardous substances to evaluate pollution risks.
- Stage 3: Assess the site-specific pollution possibility.

The outcome of the three stages will determine the pollution risk for the site.

Following the identification of the pollution risk and the information gathered from this assessment, the CIRIA Report C736—Containment systems for the prevention of pollution will be used to undertake a qualitative assessment to determine what level of classification of secondary containment

is appropriate and the requirements of that level of classification. The report will then consider how the design of the secondary containment complies with the secondary containment classification requirements.

2. Stage 1 – 2

Stage 1 requires the identification of hazardous materials that may be encountered within the Installation including raw materials, products, intermediaries, by-products, emissions or waste. The materials that will be present at the Installation are detailed in Table 1.

Stage 2 requires the assessment of the potential pollution risk posed by the hazardous substances identified in Stage 1. This assessment requires a review of the chemical and physical properties of each material. To do this the information necessary for this evaluation has been gathered primarily from MSDS for the relevant substances. The available MSDS are presented in Annex 4 of the Site Condition Report. These documents provide essential information, including the Chemical Abstracts Service (CAS) numbers for each substance, which serve as unique identifiers for chemical compounds. The assessment also considers the classification of the materials under the European Union's Regulation (EC) No. 1272/2008, which governs the classification, labelling, and packaging of substances and mixtures (CLP Regulation). A summary of the findings from both stages of this assessment is presented in Table 1. This includes not only the identified hazardous substances but also their corresponding classifications and any relevant safety considerations.

Table 1 Raw Materials to be Stored, Used and Handled on-Site and Waste Materials Produced and Stored

Stage 1	Stage 2					
Material	**State** **S Solid** **L Liquid** **G Gas**	**CAS No.**	**CLP Hazard Classification**	**Hazardous substances under Stage 2 (Yes/No)**	**Environmental Fate and Behaviours** **Product (P)** **Water (W)** **Sewer (S)** **Air (A)** **Waste/ Land (L)**	**Potential Pollution Risk to soil and groundwater**
Aqueous ammonia (dosing/condensate system)	L	7664-41-7	H221: Flammable gas H280: Contains gas under pressure; may explode if heated H314: Causes severe skin burns and eye damage H332: Harmful if inhaled	Yes	A, W, L	Yes, if released to the environment
Biocide (cooling water treatment chemical)	L	7732-18-5 10377-60-3 26172-55-4 2682-20-4	H317: May cause an allergic skin reaction H412: Harmful to aquatic life with long lasting effects	Yes	W, L	Yes, if released to the environment
Carbonhydrazide (closed cooling system)	S	497-18-7	H302: Harmful if swallowed. H315: Causes skin irritation. H317: May cause an allergic skin reaction H411: Toxic to aquatic life with long lasting effects	Yes	L	Yes, if released to the environment
Caustic Soda (demineralisation water treatment chemical, condensate polishing)	S	1310-73-2 497-19-8 7647-14-5	H290: May be corrosive to metals H314: Causes severe skin burns and eye damage H370: Causes damage to organs	Yes	W, L	Yes, if released to the environment
Chlorine (cooling water treatment plant)	G	7782-50-5	H270 May cause or intensify fire; oxidizer	No	A	Material is a gas and therefore not likely to cause

Stage 1	Stage 2					
Material	**State** **S Solid** **L Liquid** **G Gas**	**CAS No.**	**CLP Hazard Classification**	**Hazardous substances under Stage 2 (Yes/No)**	**Environmental Fate and Behaviours** **Product (P)** **Water (W)** **Sewer (S)** **Air (A)** **Waste/ Land (L)**	**Potential Pollution Risk to soil and groundwater**
			H280: Contains gas under pressure; may explode if heated H330: Fatal if inhaled H314: Causes severe skin burns and eye damage H318: Causes serious eye damage H335: May cause respiratory irritation			pollution to soil and groundwater.
Corrosion Inhibitor (water treatment chemical)	L	Mixture	Not classified	Yes	W, L	Yes, if released to the environment
Detergent (gas turbine washing)	L	25155-30-0 68439-46-3 68585-47-7	H319: Causes serious eye irritation.	Yes	W, L	Yes, if released to the environment
Diesel (emergency diesel generator fuel)	L	68334-30-5	H226: Flammable liquid and vapour H304: May be fatal if swallowed and enters airways H315: Causes skin irritation H332: Harmful if inhaled H351: Suspected of causing cancer H373: May cause damage to organs through prolonged or repeated exposure. Bone marrow, Liver, Thymus H411: Toxic to aquatic life with long lasting effects	Yes	W, L	Yes, if released to the environment

Stage 1	Stage 2					
Material	**State** **S Solid** **L Liquid** **G Gas**	**CAS No.**	**CLP Hazard Classification**	**Hazardous substances under Stage 2 (Yes/No)**	**Environmental Fate and Behaviours** **Product (P)** **Water (W)** **Sewer (S)** **Air (A)** **Waste/ Land (L)**	**Potential Pollution Risk to soil and groundwater**
Ferric chloride (cooling water chemical)	S	7705-08-0	H290: May be corrosive to metals. H302: Harmful if swallowed. H315: Causes skin irritation. H318: Causes serious eye damage.	Yes	L	Yes, if released to the environment.
Hydrogen (system processes)	G	1333-74-0	H280: Contains gas under pressure; may explode if heated.	No	A	Pollution risk to air but not to soil and groundwater
Hypochlorite (cooling water treatment chemical)	L	7681-52-9	H290: May be corrosive to metals. H314: Causes severe skin burns and eye damage.	Yes	W, L	Yes, if released to the environment
Lubrication oil (mechanical equipment)	L	Mixture	H412: Harmful to aquatic life with long lasting effects.	Yes	W, L	Yes, if released to the environment
Morpholine (corrosion control in steam condensate system)	L	110-91-8	H224: Flammable liquid and vapor H302: Harmful if swallowed H311: Toxic in contact with skin H314: Causes severe skin burns and eye damage H331: Toxic if inhaled H335: May cause respiratory irritation H372: May cause damage to organs through prolonged or repeated exposure	Yes	W, L	Yes, if released to the environment
Carbon Dioxide	G	124-38-9	H280: Contains gas under pressure; may explode if heated.	No	A	Material is a gas and therefore not

Stage 1	Stage 2					
Material	**State** **S Solid** **L Liquid** **G Gas**	**CAS No.**	**CLP Hazard Classification**	**Hazardous substances under Stage 2 (Yes/No)**	**Environmental Fate and Behaviours** **Product (P)** **Water (W)** **Sewer (S)** **Air (A)** **Waste/ Land (L)**	**Potential Pollution Risk to soil and groundwater**
						likely to cause pollution to soil and groundwater.
Argon	G	007440-37-1	H280: Contains gas under pressure; may explode if heated.	No	A	Material is a gas and therefore not likely to cause pollution to soil and groundwater.
Natural gas (fuel gas)	G	74-82-8 74-84-0 74-98-6 106-97-8	H220: Extremely flammable gas H280: Contains gas under pressure; may explode if heated.	No	A	Material is a gas and therefore not likely to cause pollution to soil and groundwater.
Nitrogen (blanketing HRSG)	G	7727-37-9	H280: Contains gas under pressure; may explode if heated. H330: May displace oxygen and cause rapid suffocation	No	A	Material is a gas and therefore not likely to cause pollution to soil and groundwater.
Oxygen Scavenger (demineralisation water treatment plant)	L	64-19-7 7732-18-5 7553-56-2	H226: Flammable liquid and vapor H314: Causes severe skin burns and eye damage H372: Causes damage to organs through prolonged or repeated exposure H318: Causes serious eye damage	Yes	W, L	Yes, if released to the environment

Stage 1	Stage 2					
Material	**State** **S Solid** **L Liquid** **G Gas**	**CAS No.**	**CLP Hazard Classification**	**Hazardous substances under Stage 2 (Yes/No)**	**Environmental Fate and Behaviours** **Product (P)** **Water (W)** **Sewer (S)** **Air (A)** **Waste/ Land (L)**	**Potential Pollution Risk to soil and groundwater**
pH Control (cooling water treatment plant demineralisation water treatment plant)	L	0001310-73-2	H314: Causes severe skin burns and eye damage. H318: Causes serious eye damage H402: Harmful to aquatic life	Yes	W, L	Yes, if released to the environment
Propylene Glycol (closed cooling system)	L	57-55-6	None listed however there are potential hazards for	No	W, L	Not a risk due to small quantities on site, contained within closed loop cooling system and no hazard classification.
Sodium Bisulphite (demineralisation water treatment chemical)	S	7631-90-5	H302: Harmful if swallowed H335: May cause respiratory irritation	Yes	W, L	Yes, if released to the environment
Sodium hypochlorite (cooling water treatment)	L	7681-52-9	H290: May be corrosive to metals. H314: Causes severe skin burns and eye damage. H318: Causes serious eye damage. H400: Very toxic to aquatic life. H411: Toxic to aquatic life with long lasting effects.	Yes	W, L	Yes, if released to the environment

Stage 1	Stage 2					
Material	**State** **S Solid** **L Liquid** **G Gas**	**CAS No.**	**CLP Hazard Classification**	**Hazardous substances under Stage 2 (Yes/No)**	**Environmental Fate and Behaviours** **Product (P)** **Water (W)** **Sewer (S)** **Air (A)** **Waste/ Land (L)**	**Potential Pollution Risk to soil and groundwater**
Sulphuric Acid (condensate polishing)	L	7664-93-9	H314: Causes severe skin burns and eye damage. H290: May be corrosive to metals	Yes	W, L	Yes, if released to the environment
Transformer Oil	L	Mixture	H412: Harmful to aquatic life with long lasting effects.	Yes	W, L	Yes, if released to the environment
Water (raw & cooling)	L	7732-18-5	Not hazardous	No	W, L	Not a risk as it is not considered to be hazardous

3. Stage 3

Stage 3 of the European Commission Guidance focuses on assessing the site-specific pollution possibility. The first requirement is to identify potential pollution risks by evaluating each relevant hazardous substance to determine if circumstances exist that may result in its release in sufficient quantities to pose a pollution risk. The guidance requires the consideration of the quantity of hazardous substances handled, produced, or emitted, as well as their location on the site, including delivery, storage, usage, and movement. Additionally, the guidance requires the assessment of the presence and integrity of containment, site surfacing, and drainage systems.

As outlined in Table 1, the following substances have been identified as not having a pollution risk to soil and groundwater and therefore will not be assessed as part of Stage 3:

- Chlorine (gas)
- Natural gas
- Hydrogen
- Nitrogen
- Propylene glycol
- Water
- Carbon dioxide
- Argon

The following materials will be further assessed in Stage 3:

- Aqueous ammonia
- Condensate system chemicals
  - Morpholine
  - Sulphuric Acid
- Cooling water and demineralisation water treatment chemicals
  - Biocide
  - Caustic Soda
  - Chlorine
  - Corrosion Inhibitor
  - Ferric chloride
  - Hypochlorite
  - Oxygen Scavenger
  - pH Control
  - Sodium Bisulphite

  - Sodium hypochlorite
- Auxiliary boiler closed cooling system
  - Carbohydrazide
- Detergent (gas turbine washing chemical)
- Diesel (emergency diesel generator fuel)
- Lubrication oil (mechanical equipment)
- Transformer Oil

Stage 3 of the assessment is presented in Table 2.

Table 2 Stage 3: Assessment of Site-specific Pollution Potential

Stage 3							
Material	**Estimated volumes per annum**	**Location of storage**	**Delivery**	**Primary and secondary storage**	**Handling and use details**	**Additional containment measures and procedures**	**Pollution risk**
Aqueous Ammonia	25 m^3	Within dosing container near HRSG and within the vicinity of the auxiliary boiler	All chemicals will be delivered by a Uniper approved contractor to appropriate unloading bays. Appropriate site training/ induction will be provided to Uniper staff and contractors. During delivery audio/ visual alarms will be present during any bulk chemical transfers.	Primary: IBC Secondary: IBC will be bunded to 110%	An Environmental Management System (EMS) for the Installation will be in place which will outline all measures for delivery, handling, and storage of chemicals. All personnel who are required to handle aqueous ammonia will receive relevant training on the safe handling of the chemical. Aqueous ammonia will be stored within close proximity to the location of their use thereby minimising travel distances within the Installation boundary.	Areas where chemicals are handled, will comprise concrete hard standing of watertight construction and be kerbed/ bunded to ensure that spillages and/ or leaks in those areas are contained. Surace water in these areas will be directed towards a contamination sump. If the effluent quality is within the discharge limits set by the Environmental Permit, it will be discharged to the River Humber via W1. Water not meeting the discharge quality limit will be taken off-site for disposal. A closed drain system will be present to collect liquid maintenance drains from equipment and piping that contain hazardous or toxic fluids. Effluent from the closed drain systems will be collected and taken offsite to an appropriate facility for treatment/ disposal. Areas of chemical storage will be bunded and will be constructed according to the requirements of CIRIA C736, API 650 and relevant Eurocodes. All bunding will be inspected regularly by an operative who has received the appropriate training. Any defects will be accurately recorded and managed/ rectified accordingly.	Low due to measures in place.

Stage 3							
Material	**Estimated volumes per annum**	**Location of storage**	**Delivery**	**Primary and secondary storage**	**Handling and use details**	**Additional containment measures and procedures**	**Pollution risk**
Condensate system chemicals • Caustic soda • Morpholine • Sulphuric Acid	40 m^3	Condensate polishing plant	All chemicals will be delivered by a Uniper approved contractor to appropriate unloading bays. Appropriate site training/ induction will be in place and appropriate monitoring points, and audio/ visual alarms will be present during any bulk chemical transfers to minimise the chance of leaks/ overfill/ spill.	Primary: IBC or steel tank Secondary: Stored within chemical storage area with a minimum capacity of 110% of the largest container or 25% of the total volume of all containers.	An EMS for the Installation will be in place which will outline all measures for delivery, handling, and storage of chemicals. All personnel who are required to handle the condensate system chemicals will receive relevant training on the safe handling of the chemicals. The chemicals will be stored within close proximity to the location of their use thereby minimising travel distances within the Installation boundary.	Areas where chemicals are handled, will comprise concrete hard standing of watertight construction and be kerbed/ bunded to ensure that spillages and/ or leaks in those areas are contained. Surace water in these areas will be directed towards a contamination sump. If the effluent quality is within the discharge limits set by the environmental permit, it will be discharged to the River Humber via W1. Water not meeting the discharge quality limit will be taken off-site for disposal. A closed drain system will be present to collect liquid maintenance drains from equipment and piping that contain hazardous or toxic fluids. Effluent from the closed drain systems will be collected and taken offsite to an appropriate facility for treatment/disposal. Areas of chemical storage will be bunded and will be constructed according to the requirements of CIRIA C736, API 650 and relevant Eurocodes. All bunding will be inspected regularly by an operative who has received the appropriate training. Any defects will be accurately recorded and managed/ rectified accordingly.	Low due to measures in place.

Stage 3							
Material	**Estimated volumes per annum**	**Location of storage**	**Delivery**	**Primary and secondary storage**	**Handling and use details**	**Additional containment measures and procedures**	**Pollution risk**
Cooling water and demineralisation water treatment chemicals • Biocide • Caustic Soda • Chlorine • Corrosion Inhibitor • Ferric chloride • Hypochlorite • Oxygen Scavenger • pH Control • Sodium Bisulphite • Sodium hypochlorite	42 m^3	Near either the cooling water and demineralisation water treatment plants	All chemicals will be delivered by a Uniper approved contractor to appropriate unloading bays. Appropriate site training/ induction will be in place and appropriate monitoring points, and audio/ visual alarms will be present during any bulk chemical transfers to minimise the chance of leaks/ overfill/ spill.	Primary: IBC or steel tank Secondary: Stored within chemical storage area with a minimum capacity of 110% of the largest container or 25% of the total volume of all containers.	An EMS for the Installation will be in place which will outline all measures for delivery, handling and storage of chemicals onsite. All personnel who are required to handle the water treatment chemicals will receive relevant training on the safe handling of the chemicals. The chemicals will be stored within close proximity to the location of their use, thereby minimising travel distances within the installation.	Areas where chemicals are handled, will comprise concrete hard standing of watertight construction and be kerbed/ bunded to ensure that spillages and/ or leaks in those areas are contained. Surace water in these areas will be directed towards a contamination sump. If the effluent quality is within the discharge limits set by the environmental permit, it will be discharged to the River Humber via W1. Water not meeting the discharge quality limit will be taken off-site for disposal A closed drain system will be present to collect liquid maintenance drains from equipment and piping that contain hazardous or toxic fluids. Effluent from the closed drain systems will be collected and taken offsite to an appropriate facility for treatment/disposal. Areas of chemical storage will be bunded and will be constructed according to the requirements of CIRIA C736, API 650 and relevant Eurocodes. All bunding will be inspected regularly by an operative who has received the appropriate training. Any defects will be accurately recorded and managed/ rectified accordingly.	Low due to measures in place.

Stage 3							
Material	**Estimated volumes per annum**	**Location of storage**	**Delivery**	**Primary and secondary storage**	**Handling and use details**	**Additional containment measures and procedures**	**Pollution risk**
Closed cooling system for auxiliary boiler chemicals: • Carbohydrazide	Unknow at this stage however the capacity of the closed loop cooling system is 50l and will predominantly be a mix of demineralised water and glycol.	Auxiliary boiler cooling system	Delivered via road tanker and added directly into cooling system.	Contained within auxiliary boiler cooling system,	Carbohydrazide will remain contained within the closed cooling system. The glycol and water mix will be replaced as required.	None required	Low due to measures in place.
Detergent	4 m^3	Near Gas turbine		Primary: IBC or steel tank Secondary: Stored within chemical storage area with a minimum capacity of 110% of the largest container or 25% of the total volume of all containers.	An EMS for the Installation will be in place which will outline all measures for delivery, handling and storage of chemicals onsite. All personnel who are required to handle the water treatment chemicals will receive relevant training on the safe handling of the chemicals. The chemicals will be stored within close proximity to the location of their use, thereby minimising travel distances within the installation.	Areas where chemicals are handled will comprise concrete hard standing of watertight construction and be kerbed/ bunded to ensure that spillages and/ or leaks in those areas are contained. Surace water in these areas will be directed towards a contamination sump. If the effluent quality is within the discharge limits set by the environmental permit, it will be discharged to the River Humber via W1. Water not meeting the discharge quality limit will be taken off-site for disposal. A closed drain system will be present to collect liquid maintenance drains from equipment and piping that contain hazardous or toxic fluids. Effluent from the closed drain systems will be collected and taken offsite to an appropriate facility for treatment/disposal.	Low due to measures in place.

Stage 3							
Material	**Estimated volumes per annum**	**Location of storage**	**Delivery**	**Primary and secondary storage**	**Handling and use details**	**Additional containment measures and procedures**	**Pollution risk**
						Areas of chemical storage will be bunded and will be constructed according to the requirements of CIRIA C736, API 650 and relevant Eurocodes. All bunding will be inspected regularly by an operative who has received the appropriate training. Any defects will be accurately recorded and managed/ rectified accordingly.	
Diesel	25 m^3	Emergency diesel generator storage tank	Delivered to the site as required in tankers	Containment to be confirmed as to whether the diesel will be stored in a belly tank or an individual tank. It is expected that both containment options will comprise a integrally bunded steel tank with 110% spill containment capacity.	Diesel will be brought to the site and offloaded directly into the storage tank. The filling will be observed by a trained, competent person. A drip tray will be present beneath the filling location. The tank will be fitted with measures to prevent overfill.	Stored diesel will be located on a concrete surface. In areas where diesel is present, the flooring/ surfacing will be of a watertight construction and be kerbed/ bunded to ensure that spillages and/ or leaks in those areas are contained, manually cleaned up and removed for treatment off-site. The surface water collected in the areas of diesel storage will be directed towards a sump before passing through an oil separator. The diesel will be collected and tankered offsite for disposal.	Low due to measures in place.
Lubrication oil	6.6 m^3	Within the CCGT building	Delivered to site in tankers.	Primary: Sealed container Secondary: To be confirmed but the capacity of the secondary containment will be 110% of the primary tank capacity.	Lubrication oil will be brought to the site and offloaded directly into the storage tank. The filling will be observed by a trained, competent person. A drip tray will be present	Stored lubrication oil will be located on a concrete surface. In areas where oil is present the surfacing/ flooring will be of a watertight construction and be kerbed/ bunded to ensure that spillages and/ or leaks in those areas are contained, manually cleaned up and removed for treatment off-site.	Low due to measures in place.

Stage 3							
Material	**Estimated volumes per annum**	**Location of storage**	**Delivery**	**Primary and secondary storage**	**Handling and use details**	**Additional containment measures and procedures**	**Pollution risk**
					beneath the filling location. The tank will be fitted with measures to prevent overfill.	The surface water collected in the areas of diesel storage will be directed towards a sump before passing through an oil separator. The diesel will be collected and tankered offsite for disposal.	
Transformer oil	4 m^3	Stored within the vicinity of the transformers	Delivered to site in tankers.	Primary: Sealed container Secondary: To be confirmed but the capacity of the secondary containment will be 110% of the primary tank capacity.	Transformer oil will be brought to the site in a sealed container. The transformer oil will be offloaded and taken to the transformer oil storage area.	Stored transformer oil will be located on a concrete surface. In areas where oil is present, surfacing/ flooring will be of a watertight construction and be kerbed/ bunded to ensure that spillages and/ or leaks in those areas are contained, manually cleaned up and removed for treatment off-site. The surface water collected in the areas of storage will be directed towards a sump before passing through an oil separator. The oil will be collected and tankered offsite for disposal.	Low due to measures in place.

4. Pollution Risk

4.1 Pollution Sources

The pollution sources relevant to the Soil and Groundwater Pollution Risk Assessment are those RHS identified in Table 2 and are summarised in the list below:

- Aqueous ammonia
- Condensate system chemicals
- Cooling water and demineralisation water treatment chemicals
- Auxiliary boiler closed cooling system chemicals
- Detergent (gas turbine washing chemical)
- Diesel (emergency diesel generator fuel)
- Lubrication oil (mechanical equipment)
- Transformer Oil

4.2 Pathways

The only pathway for any of the materials stored and used at site to impact on potential soil and groundwater would be the direct loss of materials to unsurfaced ground or permeable site surfacing.

4.3 Receptors

The environmental sensitivity of the Installation site is outlined in Table 3.

Table 3 Environmental Sensitivity of the Installation

Receptor	Sensitivity	Description
Groundwater	Low to very high sensitivity	The Burnham Chalk formation underlying the drift geology has been classified as a Principal Aquifer. Principal aquifers are layers of rock that have high inter-granular and/ or fracture permeability meaning they usually provide high levels of water storage. In addition, they may support water supplies and or river base flow on a strategic scale. The drift geology (glacial till) is classified by the EA as a non-aquifer of negligible permeability. As such, these formations are generally regarded as containing insignificant quantities of groundwater.
Surface water	Moderate sensitivity	A water body (dark grey area) is located in the southeast corner the Installation Boundary, as shown on Figure 3 in Appendix A of the Main Supporting Document. This pond is used as an attenuation pond and is linked to the existing C.RO Ports Killingholme Ltd (CPK) drainage network.
Land use	Low sensitivity	The Installation is surrounded by industrial and agricultural land and no significant land uses have been identified

4.4 Control Measures

4.4.1 Storage

Table 2 outlines the measures in place that contribute to the low risk of pollution to soil and groundwater associated with the use of the raw materials. The materials will be delivered to the site

via a road vehicle and will be offloaded within designated unloading bays within a fuel/ chemical delivery area. The materials will then be transferred to their appropriate storage location. All materials will be stored within containers that are appropriately designed to contain the incoming contents.

All chemicals will be delivered in a sealed container and moved to the chemical storage area located within a building.

4.4.2 Secondary Containment

As outlined in Table 2 the materials will be stored within appropriately bunded areas. Containment bunds would be provided where there is risk of spillage and would be designed and constructed according to the requirements of CIRIA C736, API 650 and relevant Eurocodes.

The capacity of the bunding will be either 110% of the largest tank's volume or 25% of the total volume of all tanks within it.

The main Site activities will all be undertaken within buildings.

The building concrete flooring will act to provide containment for any spills within this area. All materials stored within the building will also be located over impermeable concrete hard standing which provides an impermeable barrier to pollution entering soil or groundwater.

Areas where chemicals are handled will comprise concrete hard standing of watertight construction and will be kerbed/ bunded to ensure that spillages and/ or leaks are contained. Spills/ leaks will be handled with appropriate spill kits. There will be a combination of closed drainages systems and potentially contaminated surface water systems in these areas. Wastewaters collected in these systems will be tested for contamination and only released to Emission Point W1 where suitable. Where not suitable for release, wastewater will be collected by a licensed third-party waste contractor for treatment or disposal off-site.

4.4.3 Management Procedures

In addition to the primary and secondary containment storage systems that are outlined in Table 2 the site activities will also be managed in accordance with the site Environmental Management System (EMS) which will include procedures on the delivery of raw materials and removal of waste, transporting the materials within the Installation boundary, management of storage areas, spill response, incident response, and reporting and follow up of incidents. The EMS will also detail the requirements for inspections and maintenance of the Installation to ensure efficient operation.

The management and procedures within the EMS will be subject to periodic audit and update. All site personnel will receive appropriate training on the implementation of the management procedures and controls. This will include regular site inspections to identify signs of degradation of plant infrastructure and leaks of substances. All storage areas will also be subject to scheduled visual inspections to ensure that there are no leaks or losses from primary containment. Any spillages will be cleaned up at point of spillage using appropriate techniques depending on the type of spilled material.

5. CIRIA C736 Assessment

5.1 Qualitative Site Risk Assessment

The CIRIA C736 guidance outlines three levels of secondary containment classification (Classification 1, 2 & 3). A qualitative assessment of the criteria for the CIRIA 736 risk assessment methodology has been conducted to provide a Class 1 Secondary Containment Rating for the substances listed in Table 2. Fuel gas has been excluded as the CIRIA C736 guidance primarily focusses on the storage of liquids. Under normal operation glycol will be mixed with water (70% water, 30% glycol), this dilution has been factored into the qualitative assessment.

A Class 1 containment system is suitable for low-risk scenarios involving non-flammable and low-toxicity substances. It typically includes simple structures like reinforced blockwork bunds, prefabricated units, or earth bunds with adequate impermeability. These systems are designed to contain spills from small volumes of relatively benign materials and must meet minimum capacity requirements — either 110% of the largest container or 25% of the total volume stored, whichever is greater. Class 1 systems do not require fire resistance, leak detection, or enhanced inspection regimes, making them appropriate where environmental sensitivity and the likelihood of containment failure are both low.

The determination of this classification rating is based on two scores, the Site Hazard Rating and the Site Risk Rating. The site hazard rating is defined in the CIRIA C736 guidance as a classification that reflects the potential environmental hazard posed by a combination of three key factors:

- Source – the nature and quantity of the hazardous inventory (e.g. chemicals, fuels, firewater, etc.).
- Pathway – the means by which a release could reach the environment (e.g. drains, soil, groundwater).
- Receptor – the sensitivity of the receiving environment (e.g. rivers, aquifers, protected habitats).

Each of these components is rated as High, Moderate, or Low, and the site hazard rating is determined by combining them. The highest individual rating among the combinations typically governs the overall site hazard rating. The site hazard rating is determined by using the Site Hazard Matrix outlined in Box 2.1 of CIRIA C736 an extract of which is shown in Figure 1.

Figure 1 Box 2.1 of CIRIA C736 Guidance Displaying the Site Hazard Risk Matrix

Environmental hazard ratings

H = High rating

M = Moderate rating

L = Low rating

Source (hazard rating)	**Pathway** (transport potential)	**Receptor** (damage potential)
May be H, M or L	May be H, M or L	May be H, M or L
Possible combination of ratings:		**Suggested consequent overall site hazard rating:**
HHH or HHM or HMM		**HIGH**
HHL or MMM or HML		**MODERATE**
MML or HLL or MILL or LLL		**LOW**

Table 4 CIRIA C736 Qualitative Risk Assessment

Component	Risk Rating	Justification	Overall Site Hazard Rating	Likelihood of loss of containment	Final Site Risk Rating	CIRIA C736 Containment Classification
Aqueous ammonia						
Source	Moderate	Due to volume and CLP classification	Low	Low	Low to Moderate	Class 1
Pathway	Low	Robust containment				
Receptor	Moderate	Risk if comes into contact with the environment				
Condensate system chemicals						
Source	Moderate	Due to risk of environmental hazards if released	Low	Low	Low to Moderate	Class 1
Pathway	Low	Robust containment				
Receptor	Low	Controlled discharge is spilled				
Cooling water and demineralisation water treatment chemicals						
Source	Moderate	Due to risk of environmental hazards if released	Low	Low	Low to Moderate	Class 1
Pathway	Low	Robust containment				
Receptor	Low	Controlled discharge is spilled				
Auxiliary boiler closed cooling system						
Source	Moderate	Due to risk of environmental hazards if released	Low	Low	Low to Moderate	Class 1
Pathway	Low	Robust containment				
Receptor	Low	Controlled discharge is spilled				
Detergent (gas turbine washing chemical)						

Component	Risk Rating	Justification	Overall Site Hazard Rating	Likelihood of loss of containment	Final Site Risk Rating	CIRIA C736 Containment Classification
Source	Moderate	Due to risk of environmental hazards if released	Low	Low	Low to Moderate	Class 1
Pathway	Low	Robust containment				
Receptor	Low	Discharged to closed drain within GT hall.				
Diesel (emergency diesel generator fuel)						
Source	Moderate to high	Due to CLP classification but relatively low volumes of consumption annually	Moderate	Low	Low	Class 1
Pathway	Low	Robust containment				
Receptor	Low	Risk if comes into contact with the environment				
Lubrication oil (mechanical equipment)						
Source	Moderate to high	Due to CLP Classification	Moderate	Low	Low to Moderate	Class 1
Pathway	Low	Robust containment and drainage				
Receptor	Low	Controlled discharge if spilled				
Transformer Oil						
Source	Moderate	Due to risk of environmental hazards if released	Low	Low	Low to Moderate	Class 1
Pathway	Low	Robust containment				
Receptor	Low	Discharged to closed drain within GT hall.				

6. Conclusions

A Stage 1–3 assessment has been undertaken in accordance with the European Commission Guidance under Article 22(2) of Directive 2010/75/EU and the Environment Agency's requirements for baseline reporting. The assessment considered the hazardous substances associated with the Installation.

Following the identification of the pollution risk rating and the information gathered from this assessment, the CIRIA Report C736—Containment systems for the prevention of pollution was used to inform a qualitative risk assessment to determine what level of classification of secondary containment is appropriate and the requirements of that level of classification. Based on the site-specific assessment, both the overall site hazard rating and the site risk rating are considered to be low. This is because the findings indicated that all relevant substances will be managed within appropriate containment systems, including integrally bunded tanks, and hardstanding with closed drainage connected to an effluent management system. These measures, combined with operational controls such as leak detection, alarms, and regular inspections, significantly reduce the likelihood of environmental release. Consequently, a Class 1 secondary containment classification is deemed appropriate for the substances assessed.

The proposed secondary containment design for the relevant substances on the Installation comply with the requirements of a Class 1 containment system classification.

Annex 4
MSDSs

Safety Data Sheet

Version 1.18 SDS Number 300000000003
Revision Date 08/01/2016 Print Date 08/04/2018

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Ammonia
Chemical formula	:	NH3
Synonyms	:	Ammonia, Anhydrous
Product Use Description	:	General Industrial
Manufacturer/Importer/Distributor	:	Versum Materials US, LLC 8555 South River Parkway Tempe, AZ 85284 Exporter EIN No.475632014 www.versummaterials.com
Telephone	:	(602)282-1000
Emergency telephone number (24h)	:	1-800-424-9300 (CHEMTREC) and (+1) 703-741-5970 (CHEMTREC)

2. HAZARDS IDENTIFICATION

GHS classification

Flammable gases - Category 2
Gases under pressure - Liquefied gas.
Acute toxicity - Inhalation Category 4
Skin corrosion - Category 1B

GHS label elements

Hazard pictograms/symbols



Signal Word: Danger

Hazard Statements:

H221:Flammable gas.
H280:Contains gas under pressure; may explode if heated.
H314:Causes severe skin burns and eye damage.
H332:Harmful if inhaled.
EUH071:Corrosive to the respiratory tract.

Precautionary Statements:

Prevention	:	P210:Keep away from heat, hot surfaces, sparks, open flames, and other ignition sources. No smoking. P264:Wash hands thoroughly after handling. P280:Wear protective gloves/protective clothing/eye protection/face protection.
Response	:	P301+P330+P331 :IF SWALLOWED: rinse mouth. Do NOT induce vomiting. P305+P351+P338 :IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P310 :Immediately call a POISON CENTRE/doctor. P377 :Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
Storage	:	P403+P233:Store in a well-ventilated place. Keep container tightly closed. P405:Store locked up.
Disposal	:	P501:Disposal of contents/container to be specified in accordance with regulations.

Hazards not otherwise classified

Flammable.
Vapors may form explosive mixture with air.
Immediate fire and explosion hazard exists when mixed with air at concentrations exceeding the lower flammability limit (LFL).
Wear self-contained breathing apparatus and protective suit.
Direct contact with liquid can cause frostbite.
May react violently with water.
Do not breathe gas.
Corrosive to eyes, respiratory system and skin.
Compressed liquefied gas.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Concentration (Volume)
Ammonia	7664-41-7	100 %

Concentration is nominal. For the exact product composition, please refer to technical specifications.

4. FIRST AID MEASURES

General advice	:	Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped. Use chemically protective clothing.
Eye contact	:	In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Keep eye wide open while rinsing.
Skin contact	:	Flush with copious amounts of water until treatment is available. Immediate medical treatment is necessary as untreated wounds from corrosion of the skin heal slowly and badly.
Ingestion	:	Ingestion is not considered a potential route of exposure.
Inhalation	:	Move to fresh air. If breathing has stopped or is labored, give assisted respirations. Supplemental oxygen may be indicated. If the heart has stopped, trained personnel should begin cardiopulmonary resuscitation immediately. Mouth to mouth resuscitation is not recommended. Use a barrier device. If unconscious place in recovery position and seek medical advice. In case of shortness of breath, give oxygen. Consult a doctor.
Most important symptoms/effects - acute and delayed	:	Aspiration may cause pulmonary edema and pneumonitis. Coughing, irritation in the throat and nasal tract. May cause severe chemical burns to skin and cornea. Suitable first-aid treatment should be immediately available. Seek medical advice before using product. Cough. Headache. Nausea.

Immediate Medical Attention and Special Treatment

Treatment	:	Treat bronchospasm and laryngeal edema if present. Observe for delayed chemical pneumonitis, pulmonary hemorrhage or edema. Obtain medical attention. If exposed or concerned: Get medical attention/advice.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	All known extinguishing media can be used.
Specific hazards	:	Extinguish fire only if gas flow can be stopped. If possible, shut-off source of gas and allow the fire to burn itself out. Downwind personnel must be evacuated. Ammonia can form explosive compounds when combine d with mercury. Upon exposure to intense heat or flame, cylinder will vent rapidly and or rupture violently. Product is nonflammable and does not support combustion. Use of water may result in the formation of very toxic aqueous solutions. Move away from container and cool with water from a protected position. Do not allow run-off from fire fighting to enter drains or water courses. Keep containers and surroundings cool with water spray. If possible, stop flow of product. Most cylinders are designed to vent contents when exposed to elevated temperatures.
Special protective equipment for fire-fighters	:	In the event of fire, wear self-contained breathing apparatus. Use self-contained breathing apparatus and chemically protective clothing.
Further information	:	Use of water may result in the formation of very toxic aqueous solutions.,

Combustion by-products may be toxic., If flames are accidentally extinguished, explosive re-ignition may occur; therefore, appropriate measures should be taken(e.g. total evacuation to protect persons from cylinder fragments and toxic fumes) should a rupture occur., In the event of fire, cool tanks with water spray .

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures	:	Remove all sources of ignition. Evacuate personnel to safe areas. Ventilate the area. Approach suspected leak areas with caution. Use self-contained breathing apparatus or positive pressure air line with mask and escape pack in areas where concentration is unknown or above the exposure limits.
Environmental precautions	:	Should not be released into the environment. Prevent further leakage or spillage if safe to do so. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.
Methods for cleaning up	:	Keep area evacuated and free from ignition sources until any spilled liquid has evaporated. (Ground free from frost.) Ventilate the area. Wash contaminated equipment or sites of leaks wit h copious quantities of water. Reduce vapor with fog or fine water spray.
Additional advice	:	If possible, stop flow of product. Increase ventilation to the release area and monitor concentrations. If leak is from cylinder or cylinder valve, call the emergency telephone number. If the leak is in the user's system, close the cylinder valve, safely vent the pressure, and purge with an inert gas before attempting repairs.

7. HANDLING AND STORAGE

Handling

Use equipment rated for cylinder pressure. Cylinders should be stored upright with valve protection cap in place and firmly secured to prevent falling or being knocked over. Protect cylinders from physical damage; do not drag, roll, slide or drop. Do not allow storage area temperature to exceed 50°C (122°F). Only experienced and properly instructed persons should handle compressed gases/cryogenic liquids. Before using the product, determine its identity by reading the label. Know and understand the properties and hazards of the product before use. When doubt exists as to the correct handling procedure for a particular gas, contact the supplier. Do not remove or deface labels provided by the supplier for the identification of the cylinder contents. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. Use an adjustable strap wrench to remove over-tight or rusted caps. Before connecting the container, check the complete gas system for suitability, particularly for pressure rating and materials. Before connecting the container for use, ensure that back feed from the system into the container is prevented. Ensure the complete gas system is compatible for pressure rating and materials of construction. Ensure the complete gas system has been checked for leaks before use. Employ suitable pressure regulating devices on all containers when the gas is being emitted to systems with lower pressure rating than that of the container. Never insert an object (e.g. wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may damage valve, causing a leak to occur. Open valve slowly. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier. Close container valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Damaged valves should be reported immediately to the supplier. Close valve after each use and when empty. Replace outlet caps or plugs and container caps as soon as container is disconnected from equipment. Do not subject

containers to abnormal mechanical shock. Never attempt to lift a cylinder by its valve protection cap or guard. Do not use containers as rollers or supports or for any other purpose than to contain the gas as supplied. Never strike an arc on a compressed gas cylinder or make a cylinder a part of an electrical circuit. Keep container valve outlets clean and free from contaminates particularly oil and water. Do not smoke while handling product or cylinders. Never re-compress a gas or a gas mixture without first consulting the supplier. Never attempt to transfer gases from one cylinder/container to another. Always use backflow protective device in piping. Purge air from system before introducing gas. Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service. Avoid suckback of water, acid and alkalis. Installation of a cross purge assembly between the cylinder and the regulator is recommended. When returning cylinder install valve outlet cap or plug leak tight. Never use direct flame or electrical heating devices to raise the pressure of a container. Containers should not be subjected to temperatures above 50°C (122°F). Never attempt to increase liquid withdrawal rate by pressurizing the container without first checking with the supplier. Never permit liquefied gas to become trapped in parts of the system as this may result in hydraulic rupture.

Storage

Flammable storage areas should be separated from oxygen and other oxidizers by a minimum distance of 20 ft. (6.1 m.) or by a barrier of non-combustible material at least 5 ft. (1.5 m.) high, having a fire resistance rating of at least 1/2 hour. Post "No Smoking or Open Flames" signs in the storage areas. Use a back flow preventative device in the piping. Do not open valve until connected to equipment prepared for use. Use only with equipment of compatible materials of construction, rated for cylinder pressure. Close valve after each use and when empty. Read and follow the Safety Data Sheet (SDS) before use. Open/close valve slowly. Close when not in use. Wear Safety Eye Protection. Check Safety Data Sheet before use. Use a back flow preventative device in the piping. Do not open valve until connected to equipment prepared for use. Use only with equipment of compatible materials of construction, rated for cylinder pressure. Close valve after each use and when empty. Read and follow the Safety Data Sheet (SDS) before use. Full containers should be stored so that oldest stock is used first. Containers should be stored in a purpose build compound which should be well ventilated, preferably in the open air. Observe all regulations and local requirements regarding storage of containers. Stored containers should be periodically checked for general condition and leakage. Local codes may have special requirements for toxic gas storage. Protect containers stored in the open against rusting and extremes of weather. Containers should not be stored in conditions likely to encourage corrosion. Containers should be stored in the vertical position and properly secured to prevent toppling. The container valves should be tightly closed and where appropriate valve outlets should be capped or plugged. Container valve guards or caps should be in place. Keep containers tightly closed in a cool, well-ventilated place. Full and empty cylinders should be segregated. Do not allow storage temperature to exceed 50°C (122°F). Return empty containers in a timely manner.

Technical measures/Precautions

Containers containing flammable gases should be stored away from other combustible materials. Where necessary containers containing oxygen and oxidants should be separated from flammable gases by a fire resistant partition. Provide sufficient air exchange and/or exhaust in work rooms. Containers should be segregated in the storage area according to the various categories (e.g. flammable, toxic, etc.) and in accordance whit local regulations.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures

Handle product only in closed system or provide appropriate exhaust ventilation at machinery.
Provide natural or explosion-proof ventilation adequate to ensure concentrations are kept below exposure limits.
Provide readily accessible eye wash stations and safety showers.

Personal protective equipment

Respiratory protection	:	Keep self contained breathing apparatus readily available for emergency use. Use self-contained breathing apparatus or positive pressure air line with mask and escape pack in areas where concentration is unknown or above the exposure limits. Users of breathing apparatus must be trained.
Hand protection	:	Sturdy work gloves are recommended for handling cylinders. Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Eye protection	:	Safety glasses recommended when handling cylinders. A full faceshield should be worn in addition to safety glasses when connecting, disconnecting or opening cylinders.
Skin and body protection	:	Use chemically protective clothing. Safety shoes are recommended when handling cylinders. Encapsulated chemical protective suit in emergency situations.
Special instructions for protection and hygiene	:	Ensure adequate ventilation, especially in confined areas. Provide good ventilation and/or local exhaust to prevent accumulation of concentrations above exposure limits.

Exposure limit(s)

Ammonia	Time Weighted Average (TWA): ACGIH	25 ppm	-
Ammonia	Short Term Exposure Limit (STEL): ACGIH	35 ppm	-
Ammonia	Recommended exposure limit (REL): NIOSH	25 ppm	18 mg/m3
Ammonia	Short Term Exposure Limit (STEL): NIOSH	35 ppm	27 mg/m3
Ammonia	Permissible exposure limit: OSHA Z1	50 ppm	35 mg/m3
Ammonia	Short Term Exposure Limit (STEL): OSHA Z1A	35 ppm	27 mg/m3
Ammonia	Time Weighted Average (TWA) Permissible Exposure Limit (PEL): US CA OEL	25 ppm	18 mg/m3
Ammonia	Short Term Exposure Limit (STEL): US CA OEL	35 ppm	27 mg/m3
Ammonia	Short Term Exposure Limit (STEL): TN OEL	35 ppm	27 mg/m3

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Liquefied gas. Colorless gas
Odor	:	Ammoniacal.
Odor threshold	:	No data available.
pH	:	Not applicable.
Melting point/range	:	-108 °F (-77.7 °C)

Boiling point/range	:	-28 °F (-33.5 °C)
Flash point	:	Not applicable.
Evaporation rate	:	Not applicable.
Flammability (solid, gas)	:	Refer to product classification in Section 2
Upper/lower explosion/flammability limit	:	28 %(V) / 15 %(V)
Vapor pressure	:	124.73 psia (8.60 bara) at 68 °F (20 °C)
Water solubility	:	Hydrolyses.
Relative vapor density	:	0.588 (air = 1)
Relative density	:	0.7 (water = 1)
Partition coefficient (n-octanol/water)	:	Not applicable.
Auto-ignition temperature	:	630 °C
Decomposition temperature	:	No data available.
Viscosity	:	Not applicable.
Molecular Weight	:	17.03 g/mol
Density	:	0.044 lb/ft3 (0.0007 g/cm3) at 70 °F (21 °C) Note: (as vapor)
Specific Volume	:	22.49 ft3/lb (1.4040 m3/kg) at 70 °F (21 °C)

10. STABILITY AND REACTIVITY

Chemical Stability	:	Stable under normal conditions.
Conditions to avoid	:	Heat, flames and sparks.
Materials to avoid	:	Copper, silver, cadmium and zinc and their alloys; mercury, tin, acids, alcohols, aldehydes, halogens and oxidizers. Ammonia can form explosive compounds when combined with mercury. May react violently with oxidants. May react violently with acids. Reacts with water to form corrosive alkalis. Overexposure to the atmosphere results in water absorption.
Hazardous decomposition	:	No decomposition if stored normally.

products
Possibility of hazardous Reactions/Reactivity : Vapors may form explosive mixture with air.

11. TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Likely routes of exposure

Effects on Eye	:	Causes eye burns. May cause blindness. Irritating to eyes. Causes severe eye burns. May cause permanent eye injury.
Effects on Skin	:	Causes skin burns. Contact with liquid may cause cold burns/frostbite. Causes skin irritation. Causes skin burns.
Inhalation Effects	:	Toxic by inhalation. Can cause severe eye, skin and respiratory tract burns. Irritating to respiratory system. Can cause severe lung damage. May be fatal if inhaled. Delayed adverse effects possible. Prolonged exposure to small concentrations may result in pulmonary edema. Delayed fatal pulmonary edema possible.
Ingestion Effects	:	Ingestion is not considered a potential route of exposure.
Symptoms	:	Aspiration may cause pulmonary edema and pneumonitis. Coughing, irritation in the throat and nasal tract. May cause severe chemical burns to skin and cornea. Suitable first-aid treatment should be immediately available. Seek medical advice before using product. Cough. Headache. Nausea.

Acute toxicity

Acute Oral Toxicity	:	No data is available on the product itself.
Inhalation	:	LC50 (1 h) : 7338 ppm Species : Rat.
Acute Dermal Toxicity	:	No data is available on the product itself.
Skin corrosion/irritation	:	Causes skin burns.
Serious eye damage/eye irritation	:	Risk of serious damage to eyes.
Sensitization.	:	No data available.

Chronic toxicity or effects from long term exposures

Carcinogenicity	:	This product contains no listed carcinogens according to IARC, ACGIH, NTP and/or OSHA in concentrations of 0.1 percent or greater.
Reproductive toxicity	:	No data is available on the product itself.

Germ cell mutagenicity	:	No data is available on the product itself.
Specific target organ systemic toxicity (single exposure)	:	No data available.
Specific target organ systemic toxicity (repeated exposure)	:	No data available.
Aspiration hazard	:	No data available.

Delayed and Immediate Effects and Chronic Effects from Short and Long Term Exposure

Asthma.

12. ECOLOGICAL INFORMATION

Ecotoxicity effects

Aquatic toxicity	:	May cause pH changes in aqueous ecological systems.
Toxicity to other organisms	:	No data available.

Persistence and degradability

Biodegradability	:	No data is available on the product itself.
Mobility	:	No data available.
Bioaccumulation	:	Refer to Section 9 "Partition Coefficient (n-octanol/water)".

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products	:	In accordance with local and national regulations. Return unused product in original cylinder to supplier. Contact supplier if guidance is required. Must not be discharged to atmosphere.
Contaminated packaging	:	Return cylinder to supplier.

14. TRANSPORT INFORMATION

DOT

UN/ID No.	:	UN1005
Proper shipping name	:	Ammonia, anhydrous

Class or Division	:	2.2
Label(s)	:	2.2
RQ Substance	:	Yes
Marine Pollutant	:	Yes

* NOTE: This product contains a USDOT Hazardous Substance and will meet the Reportable Quantity definition when shipped to, from, or within the United States, in the amount specified in 49CFR 172.101 Appendix A.
** NOTE: This product contains a substance that is regulated as a Marine Pollutant when transported in bulk packages (liquid – volume exceeding 450 liters, gas – water capacity exceeding 454 kilograms).

IATA

Transport Forbidden

IMDG

UN/ID No.	:	UN1005
Proper shipping name	:	AMMONIA, ANHYDROUS
Class or Division	:	2.3
Label(s)	:	2.3 (8)
RQ Substance	:	Yes
Marine Pollutant	:	Yes

* NOTE: This product contains a USDOT Hazardous Substance and will meet the Reportable Quantity definition when shipped to, from, or within the United States, in the amount specified in 49CFR 172.101 Appendix A.
** NOTE: This product contains a substance that: 1) is regulated as a Marine Pollutant, or 2) meets the definition of toxic to the aquatic environment.

TDG

UN/ID No.	:	UN1005
Proper shipping name	:	AMMONIA, ANHYDROUS
Class or Division	:	2.3
Label(s)	:	2.3 (8)
RQ Substance	:	Yes
Marine Pollutant	:	Yes

* NOTE: This product contains a USDOT Hazardous Substance and will meet the Reportable Quantity definition when shipped to, from, or within the United States, in the amount specified in 49CFR 172.101 Appendix A.
** NOTE: This product contains a substance that: 1) is regulated as a Marine Pollutant, or 2) meets the definition of toxic to the aquatic environment.

Further Information

Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. The transportation information is not intended to convey all specific regulatory data relating to this material. For complete transportation information, contact customer service.

15. REGULATORY INFORMATION

Toxic Substance Control Act (TSCA) 12(b) Component(s):

None.

Country	Regulatory list	Notification
USA	TSCA	Included on Inventory.
EU	EINECS	Included on Inventory.
Canada	DSL	Included on Inventory.
Australia	AICS	Included on Inventory.
Japan	ENCS	Included on Inventory.
South Korea	ECL	Included on Inventory.
China	SEPA	Included on Inventory.
Philippines	PICCS	Included on Inventory.

EPA SARA Title III Section 312 (40 CFR 370) Hazard Classification
Acute Health Hazard Sudden Release of Pressure Hazard.

EPA SARA Title III Section 313 (40 CFR 372) Component(s) above 'de minimus' level
Ammonia

US. California Safe Drinking Water & Toxic Enforcement Act (Proposition 65)
This product does not contain any chemicals known to State of California to cause cancer, birth defects or any other harm.

16. OTHER INFORMATION

NFPA Rating

Health	: 3
Fire	: 1
Instability	: 0

HMIS Rating

Health	: 3
Flammability	: 1
Physical hazard	: 2

Prepared by	:	Versum Materials, Product Regulatory Department
Telephone	:	(602)282-1000
Preparation Date	:	08/04/2018

For additional information, please visit our Versum Materials' Product Stewardship web site.
http://www.versummaterials.com/productstewardship/

SAFETY DATA SHEET

Creation Date 17-Dec-2024 **Revision Date** 17-Dec-2024 **Revision Number** 1

1. Identification

Product Name **BIOCIDE - 7330**

Cat No. : **610000000005A**

Synonyms No information available

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Sensitization	Category 1A

Label Elements

Signal Word
Warning

Hazard Statements
May cause an allergic skin reaction



Precautionary Statements
Prevention
Avoid breathing dust/fume/gas/mist/vapors/spray
Contaminated work clothing should not be allowed out of the workplace

Wear protective gloves
Skin
IF ON SKIN: Wash with plenty of soap and water
If skin irritation or rash occurs: Get medical advice/attention
Wash contaminated clothing before reuse
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Harmful to aquatic life with long lasting effects

3. Composition/information on Ingredients

Component	CAS No	Weight %
Water	7732-18-5	95.5
Magnesium nitrate	10377-60-3	3
5-Chloro-2-methyl-3-isothiazolone	26172-55-4	1.1
2-Methyl-3-isothiazolone	2682-20-4	0.4

4. First-aid measures

General Advice If symptoms persist, call a physician.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.

Inhalation Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.

Ingestion Clean mouth with water and drink afterwards plenty of water.

Most important symptoms and effects May cause allergic skin reaction. None reasonably foreseeable. Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products

Carbon oxides. Nitrogen oxides (NOx). Magnesium oxides. Hydrogen chloride. Sulfur oxides.

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	0	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment as required.

Environmental Precautions Do not flush into surface water or sanitary sewer system.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and Storage

Handling Wear personal protective equipment/face protection. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation.

Storage. Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limitsestablished by the region specific regulatory bodies.

Engineering Measures Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Recommended Filter type: Particulates filter conforming to EN 143.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	No information available
Odor	No information available
Odor Threshold	No information available
pH	No information available
Melting Point/Range	No data available
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable

Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	No information available
Density	1.02
Specific Gravity	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products Carbon oxides, Nitrogen oxides (NOx), Magnesium oxides, Hydrogen chloride, Sulfur oxides

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Oral LD50 Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.

Dermal LD50 Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.

Vapor LC50 Based on ATE data, the classification criteria are not met. ATE > 20 mg/l.

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Water	-	-	-
Magnesium nitrate	LD50 = 5440 mg/kg (Rat)	Not listed	Not listed
5-Chloro-2-methyl-3-isothiazolone	LD50 = 481 mg/kg (Rat)	Not listed	LC50 = 1.23 mg/L (Rat) 4 h
2-Methyl-3-isothiazolone	LD50 232 - 249 mg/kg (Rat) LD50 = 120 mg/kg (Rat)	LD50 = 200 mg/kg (Rabbit)	LC50 = 0.11 mg/L (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization May cause sensitization by skin contact

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Water	7732-18-5	Not listed	Not listed	Not listed	Not listed	Not listed
Magnesium nitrate	10377-60-3	Not listed	Not listed	Not listed	Not listed	Not listed

5-Chloro-2-methyl-3-isothiazolone	26172-55-4	Not listed	Not listed	Not listed	Not listed	Not listed
2-Methyl-3-isothiazolone	2682-20-4	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

The product contains following substances which are hazardous for the environment. Contains a substance which is:. Very toxic to aquatic organisms.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
5-Chloro-2-methyl-3-isothiazolone	EC50: 0.03 - 0.13 mg/L, 96h static (Pseudokirchneriella subcapitata) EC50: 0.11 - 0.16 mg/L, 72h static (Pseudokirchneriella subcapitata)	LC50: = 1.6 mg/L, 96h semi-static (Oncorhynchus mykiss)	EC50 = 5.7 mg/L 16 h	EC50: = 4.71 mg/L, 48h (Daphnia magna) EC50: 0.12 - 0.3 mg/L, 48h Flow through (Daphnia magna) EC50: 0.71 - 0.99 mg/L, 48h Static (Daphnia magna)
2-Methyl-3-isothiazolone	Not listed	LC50: 0.07 mg/L/96h (Oncorhynchus mykiss)	Not listed	EC50: 0.18 mg/L/48h

Persistence and Degradability No information available

Bioaccumulation/ Accumulation No information available.

Mobility No information available.

Component	log Pow
5-Chloro-2-methyl-3-isothiazolone	-0.71 - 0.75
2-Methyl-3-isothiazolone	-0.26 -0.34 -0.28

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated

IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory Information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Water	7732-18-5	X	ACTIVE	-
Magnesium nitrate	10377-60-3	X	ACTIVE	-
5-Chloro-2-methyl-3-isothiazolone	26172-55-4	X	ACTIVE	PMN;SP
2-Methyl-3-isothiazolone	2682-20-4	X	ACTIVE	PMN;SP

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed
PMN - Indicates a commenced PMN substance
SP - Indicates a substance that is identified in a proposed SNUR

TSCA - Per 40 CFR 751, Regulation of Certain Chemical Substances & Mixtures, Under TSCA Section 6(h) (PBT) Not applicable

TSCA 12(b) - Notices of Export Not applicable

Component	CAS No	**TSCA 12(b)** - Notices of Export
5-Chloro-2-methyl-3-isothiazolone	26172-55-4	Section 5(a)(2)
2-Methyl-3-isothiazolone	2682-20-4	Section 5(a)(2)

International Inventories
China, X = listed, Australia, U.S.A. (TSCA), Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Australia (AICS), Korea (KECL), China (IECSC), Japan (ENCS), Philippines (PICCS), Taiwan (TCSI), Japan (ISHL), New Zealand (NZIoC), Japan (ISHL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Water	7732-18-5	X	-	231-791-2	X	X		X	X	KE-35400
Magnesium nitrate	10377-60-3	X	-	233-826-7	X	X	X	X	X	KE-22725
5-Chloro-2-methyl-3-isothiazolone	26172-55-4	X	-	247-500-7	X	X	X	X	X	KE-05736
2-Methyl-3-isothiazolone	2682-20-4	X	-	220-239-6	X	X	X	X	X	KE-24316

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

Component	CAS No	Weight %	SARA 313 - Threshold Values %	SARA 313 - Reporting threasholds
Magnesium nitrate	10377-60-3	3	1.0 %	-

SARA 311/312 Hazard Categories
Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Water	-	-	X	-	-
Magnesium nitrate	X	X	X	X	X

U.S. Department of Transportation
Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Authorisation/Restrictions according to EU REACH

Component	CAS No	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Water	7732-18-5	-	-	-
Magnesium nitrate	10377-60-3	-	-	-
5-Chloro-2-methyl-3-isothiazolone	26172-55-4	-	-	-
2-Methyl-3-isothiazolone	2682-20-4	-	Use restricted. See entry 75. (see link for restriction details)	-

REACH links
https://echa.europa.eu/substances-restricted-under-reach

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Water	7732-18-5	Listed	Not applicable	Not applicable	Not applicable
Magnesium nitrate	10377-60-3	Listed	Not applicable	Not applicable	Not applicable
5-Chloro-2-methyl-3-isothiazolone	26172-55-4	Listed	Not applicable	Not applicable	Not applicable
2-Methyl-3-isothiazolone	2682-20-4	Listed	Not applicable	Not applicable	Not applicable

Contains component(s) that meet a 'definition' of per & poly fluoroalkyl substance (PFAS)?

Not applicable

Other International Regulations

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Water	7732-18-5	Not applicable	Not applicable	Not applicable	Not applicable
Magnesium nitrate	10377-60-3	Not applicable	Not applicable	Not applicable	Not applicable
5-Chloro-2-methyl-3-isothiazolone	26172-55-4	Not applicable	Not applicable	Not applicable	Not applicable
2-Methyl-3-isothiazolone	2682-20-4	Not applicable	Not applicable	Not applicable	Not applicable

16. Other Information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 17-Dec-2024
Revision Date 17-Dec-2024
Print Date 17-Dec-2024
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Creation Date 25-Oct-2010 **Revision Date** 26-Dec-2021 **Revision Number** 5

1. Identification

Product Name **Carbohydrazide**

Cat No. : **AC403970000; AC403970250; AC403971000; AC403975000**

CAS No 497-18-7
Synonyms Carbazic Acid, Hydrazide.; Carbazide

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company

Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute oral toxicity	Category 4
Acute dermal toxicity	Category 4
Acute Inhalation Toxicity - Dusts and Mists	Category 4
Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	
Combustible dust	Yes

Label Elements

Signal Word
Warning

Hazard Statements
May form combustible dust concentrations in air
Causes skin irritation
Causes serious eye irritation
May cause respiratory irritation
Harmful if swallowed, in contact with skin or if inhaled



Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Wear protective gloves/protective clothing/eye protection/face protection
Avoid breathing dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician if you feel unwell
Skin
IF ON SKIN: Wash with plenty of soap and water
Call a POISON CENTER or doctor/physician if you feel unwell
If skin irritation occurs: Get medical advice/attention
Take off contaminated clothing and wash before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Ingestion
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth
Storage
Store in a well-ventilated place. Keep container tightly closed
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Toxic to aquatic life with long lasting effects
Risk of explosion if heated under confinement

3. Composition/Information on Ingredients

Component	CAS No	Weight %
Carbonic dihydrazide	497-18-7	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Get medical attention. Wash off immediately with plenty of water for at least 15 minutes.

Inhalation	Remove to fresh air. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required. If not breathing, give artificial respiration.
Ingestion	Do NOT induce vomiting. Call a physician or poison control center immediately.
Most important symptoms and effects	No information available.
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Water spray. Carbon dioxide (CO_2). Dry chemical. Chemical foam.
Unsuitable Extinguishing Media	No information available
Flash Point	No information available
Method -	No information available
Autoignition Temperature	No information available
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Dust can form an explosive mixture with air. Containers may explode when heated. Keep product and empty container away from heat and sources of ignition. Thermal decomposition can lead to release of irritating gases and vapors. Fine dust dispersed in air may ignite.

Hazardous Combustion Products
Nitrogen oxides (NOx). Carbon monoxide (CO). Carbon dioxide (CO_2).
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	1	3	N/A

6. Accidental release measures

Personal Precautions	Use personal protective equipment as required. Ensure adequate ventilation. Avoid contact with skin and eyes. Keep people away from and upwind of spill/leak. Avoid dust formation.
Environmental Precautions	Do not flush into surface water or sanitary sewer system.
Methods for Containment and Clean Up	Avoid dust formation. Sweep up and shovel into suitable containers for disposal. Do not let this chemical enter the environment.

7. Handling and storage

Handling	Avoid contact with skin and eyes. Do not breathe dust. Do not ingest. If swallowed then seek immediate medical assistance. Ensure adequate ventilation. Wear personal protective equipment/face protection. Avoid dust formation.
Storage.	Keep in a dry, cool and well-ventilated place. Keep container tightly closed. Keep refrigerated. Incompatible Materials. Strong oxidizing agents.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limitsestablished by the region specific regulatory bodies.

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	White
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	153 - 156.50 °C / 307.4 - 313.7 °F
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	Not applicable
Specific Gravity	1.020
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	C H6 N4 O
Molecular Weight	90.09

10. Stability and reactivity

Reactive Hazard Yes

Stability Stable under normal conditions.

Conditions to Avoid Avoid dust formation. Heat, flames and sparks. Incompatible products.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products Nitrogen oxides (NOx), Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Carbonic dihydrazide	311 mg/kg (rat)	LD50 > 2000 mg/kg (Rat)	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes, respiratory system and skin

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Carbonic dihydrazide	497-18-7	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Carbonic dihydrazide	EC50 = 9.5 mg/l (72h) Scenedesmus subspicatus	LC50 = 190 mg/L (96h) Lepomis macrochirus (Bluegill)	Not listed	LC50 = 96 mg/L (48h) Daphnia magna

Persistence and Degradability No information available

Bioaccumulation/ Accumulation No information available.

Mobility No information available.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN3077
Proper Shipping Name Environmentally hazardous substances, liquid, n.o.s.
Technical Name (CARBOHYDRAZIDE)
Hazard Class 9
Packing Group III

TDG

UN-No UN3077
Proper Shipping Name ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
Hazard Class 9
Packing Group III

IATA

UN-No UN3077
Proper Shipping Name Environmentally hazardous substances, solid, n.o.s.
Hazard Class 9
Packing Group III

IMDG/IMO

UN-No UN3077
Proper Shipping Name Environmentally hazardous substances, solid, n.o.s.
Hazard Class 9
Packing Group III

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Carbonic dihydrazide	497-18-7	X	ACTIVE	-

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Carbonic dihydrazide	497-18-7	X	-	207-837-2	X	X	X	X	X	KE-04751

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations Not applicable

U.S. Department of Transportation
Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Authorisation/Restrictions according to EU REACH

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Carbonic dihydrazide	497-18-7	Not applicable	Not applicable	Not applicable	Not applicable

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Carbonic dihydrazide	497-18-7	Not applicable	Not applicable	Not applicable	Not applicable

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

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Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

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End of SDS

Safety Data Sheet
CAUSTIC SODA

Version 1.2 Revision Date: 11/13/2023

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : CAUSTIC SODA

Recommended use of the chemical and restrictions on use

Recommended use : Industrial chemical
Restrictions on use : None known.

Manufacturer or supplier's details

Company : Univar Solutions USA
Address 3075 Highland Pkwy Suite 200
Downers Grove, IL 60515
United States of America (USA)

Emergency telephone number:
Transport North America: CHEMTREC (1-800-424-9300)
CHEMTREC INTERNATIONAL Tel # 703-527-3887

Additional Information: : Responsible Party: Product Compliance Department
E-mail: SDSNA@univarsolutions.com
SDS Requests: 1-855-429-2661
Website: www.univarsolutions.com

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Corrosive to metals : Category 1

Skin corrosion : Category 1A

Serious eye damage : Category 1

Specific target organ toxicity - single exposure : Category 1

GHS label elements

Hazard pictograms :



Signal word : Danger

Hazard statements : H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.
H370 Causes damage to organs.

Precautionary statements : **Prevention:**
P234 Keep only in original container.
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:

P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.
P307 + P311 IF exposed: Call a POISON CENTER or doctor/ physician.
P363 Wash contaminated clothing before reuse.
P390 Absorb spillage to prevent material damage.
Storage:
P405 Store locked up.
P406 Store in corrosive resistant container with a resistant inner liner.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

CAS-No.	Chemical name	Weight percent
1310-73-2	Sodium hydroxide	90 - 100
497-19-8	Sodium carbonate	0 - 5
7647-14-5	Sodium chloride (NaCl)	0 - 5

Any Concentration shown as a range is due to batch variation.

Synonyms : CAUSTIC SODA BEADS; CAUSTIC SODA FLAKES; CAUSTIC SODA PELLETS; SODIUM HYDROXIDE**,**

SECTION 4. FIRST AID MEASURES

General advice : Move out of dangerous area.
Consult a physician.
Show this safety data sheet to the doctor in attendance.
Do not leave the victim unattended.

If inhaled : If unconscious, place in recovery position and seek medical advice.
If symptoms persist, call a physician.
Oxygen or artificial respiration if needed.

In case of skin contact : Immediate medical treatment is necessary as untreated wounds from corrosion of the skin heal slowly and with difficulty.

		If on skin, rinse well with water. If on clothes, remove clothes.
In case of eye contact	:	Small amounts splashed into eyes can cause irreversible tissue damage and blindness. In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Continue rinsing eyes during transport to hospital. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist. Take victim immediately to hospital.
If swallowed	:	Clean mouth with water and drink afterwards plenty of water. Keep respiratory tract clear. Do not induce vomiting without medical advice. Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital.
Notes to physician	:	Treat symptomatically

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Use an extinguishing media appropriate for surrounding fire.
Unsuitable extinguishing media	:	High volume water jet
Specific hazards during fire-fighting	:	Do not allow run-off from fire fighting to enter drains or water courses. Heat generated when contacted with water may raise the temperature of combustible materials to above their autoignition temperature thereby causing combustion. In emergency situations, water and/or water-based foam can be used; the amount should be large enough to overcome heat and acid build-up. The use of water should be based on a careful evaluation by a knowledgeable person.
Hazardous combustion products	:	Sodium oxides
Specific extinguishing methods	:	Use water spray to cool unopened containers.
Further information	:	Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Special protective equipment for firefighters	:	Wear self-contained breathing apparatus for firefighting if necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment. Avoid dust formation. Avoid breathing dust.

Environmental precautions	:	Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.
Methods and materials for containment and cleaning up	:	Neutralise with acid. Keep in suitable, closed containers for disposal.

SECTION 7. HANDLING AND STORAGE

Advice on protection against fire and explosion	:	Avoid dust formation. Provide appropriate exhaust ventilation at places where dust is formed.
Advice on safe handling	:	Avoid formation of respirable particles. Do not breathe vapours/dust. Avoid contact with skin and eyes. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Dispose of rinse water in accordance with local and national regulations.
Conditions for safe storage	:	Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Observe label precautions. Electrical installations / working materials must comply with the technological safety standards.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

CAS-No.	Components	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
1310-73-2	Sodium hydroxide	C	2 mg/m3	ACGIH
		C	2 mg/m3	NIOSH REL
		TWA	2 mg/m3	OSHA Z-1
		C	2 mg/m3	OSHA P0
		C	2 mg/m3	CAL PEL

Personal protective equipment

Respiratory protection	:	No personal respiratory protective equipment normally required. In the case of dust or aerosol formation use respirator with an approved filter.

Hand protection

Remarks	:	The suitability for a specific workplace should be discussed with the producers of the protective gloves.
Eye protection	:	Eye wash bottle with pure water

		Tightly fitting safety goggles Wear face-shield and protective suit for abnormal processing problems.
Skin and body protection	:	Dust impervious protective suit Choose body protection according to the amount and concentration of the dangerous substance at the work place.
Hygiene measures	:	When using do not eat or drink. When using do not smoke. Wash hands before breaks and at the end of workday.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	pellets
Colour	:	colourless, white
Odour	:	odourless
Odour Threshold	:	No data available
pH	:	13 @ 0.5 %
Freezing Point (Melting point/freezing point)	:	323 °C (613 °F)
Boiling Point (Boiling point/boiling range)	:	1,388 °C (2,530 °F)
Flash point	:	Not applicable
Evaporation rate	:	No data available
Flammability (solid, gas)	:	No data available
Upper explosion limit	:	Not applicable
Lower explosion limit	:	Not applicable
Vapour pressure	:	< 0.001 mmHg @ 20 °C (68 °F)
Relative vapour density	:	No data available
Relative density	:	2.13 @ 25 °C (77 °F)
Density	:	No data available
Solubility(ies)		
Water solubility	:	1,110 g/l completely soluble
Solubility in other solvents	:	No data available
Partition coefficient: n-octanol/water	:	No data available
Auto-ignition temperature	:	No data available
Thermal decomposition	:	No data available

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Exothermic reaction with acids.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	Gives off hydrogen by reaction with metals. Heat is generated when mixed with water. Spattering and boiling can result. A reaction accompanied by large heat release occurs when

		the product is mixed with acids. Heat generated may be sufficient to cause vigorous boiling creating a hazard due to splashing or splattering of hot material.
Conditions to avoid	:	Heat Exposure to moisture
Incompatible materials	:	Alkalis Formaldehyde Metals Nitriles Organic materials phosphorus Reducing agents Strong acids Strong oxidizing agents water Zinc
Hazardous decomposition products	:	Sodium oxides

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity

Product:

Acute oral toxicity	:	Assessment: The substance or mixture has no acute oral toxicity
Acute dermal toxicity	:	Assessment: The substance or mixture has no acute dermal toxicity

Skin corrosion/irritation

Components:

1310-73-2:
Species: Rabbit
Result: Causes severe burns.

Serious eye damage/eye irritation

Components:

1310-73-2:
Species: Rabbit
Result: Risk of serious damage to eyes.

497-19-8:
Species: Rabbit
Result: Irritating to eyes.

Germ cell mutagenicity

Components:

7647-14-5:

Genotoxicity in vitro : Test Type: Mammalian cell gene mutation assay
Species: mouse lymphoma cells
Metabolic activation: Without metabolic activation
Result: positive

Carcinogenicity

IARC	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
OSHA	No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.
NTP	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
ACGIH	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

STOT - single exposure

Product:

Assessment: The substance or mixture is classified as specific target organ toxicant, single exposure, category 1.

Aspiration toxicity

Product:

Corrosive to the respiratory tract.

Further information

Product:

Remarks: No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

No data available

Persistence and degradability

No data available

Bioaccumulative potential

No data available

Mobility in soil

No data available

Other adverse effects

Product:

Ozone-Depletion Potential	:	Regulation: 40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class I Substances Remarks: This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).
Additional ecological information	:	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Harmful to aquatic life with long lasting effects.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	Dispose of in accordance with all applicable local, state and federal regulations. For assistance with your waste management needs - including disposal, recycling and waste stream reduction, contact Univar Solutions ChemCare: 1-800-637-7922 Dispose of in accordance with all applicable local, state and federal regulations. For assistance with your waste management needs - including disposal, recycling and waste stream reduction, contact Univar Solutions ChemCare: 1-800-637-7922
Contaminated packaging	:	Empty remaining contents. Dispose of as unused product. Do not re-use empty containers.

SECTION 14. TRANSPORT INFORMATION

DOT (Department of Transportation):
UN1823, Sodium hydroxide, solid, 8, II

IATA (International Air Transport Association):
UN1823, Sodium hydroxide, solid, 8, II

IMDG (International Maritime Dangerous Goods):
UN1823, SODIUM HYDROXIDE, SOLID, 8, II

SECTION 15. REGULATORY INFORMATION

WHMIS Classification : D1B: Toxic Material Causing Immediate and Serious Toxic Effects
E: Corrosive Material

EPCRA - Emergency Planning and Community Right-to-Know Act

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Sodium hydroxide	1310-73-2	1000	1000

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 311/312 Hazards : Corrosive to metals
Skin corrosion or irritation
Serious eye damage or eye irritation
Specific target organ toxicity (single or repeated exposure)

SARA 302 : No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Clean Air Act

This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 112 (40 CFR 61).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489).

Clean Water Act

The following Hazardous Substances are listed under the U.S. CleanWater Act, Section 311, Table 116.4A:

1310-73-2 Sodium hydroxide

The following Hazardous Chemicals are listed under the U.S. CleanWater Act, Section 311, Table 117.3:

1310-73-2 Sodium hydroxide

This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307

US State Regulations

Massachusetts Right To Know

1310-73-2	Sodium hydroxide	90 - 100 %

Pennsylvania Right To Know

1310-73-2	Sodium hydroxide	90 - 100 %

New Jersey Right To Know

1310-73-2	Sodium hydroxide	90 - 100 %
497-19-8	Sodium carbonate	0 - 5 %
7647-14-5	Sodium chloride (NaCl)	0 - 5 %

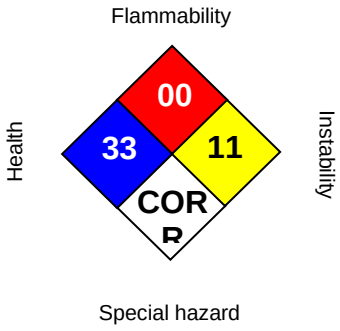
California Prop 65	:	This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

The components of this product are reported in the following inventories:

TSCA	:	On TSCA Inventory
DSL	:	All components of this product are on the Canadian DSL
AICS	:	Not in compliance with the inventory
NZIoC	:	Not in compliance with the inventory
ENCS	:	On the inventory, or in compliance with the inventory
KECI	:	On the inventory, or in compliance with the inventory
PICCS	:	On the inventory, or in compliance with the inventory
IECSC	:	On the inventory, or in compliance with the inventory

SECTION16. OTHER INFORMATION

NFPA:



HMIS III:

HEALTH	3
FLAMMABILITY	0
PHYSICAL HAZARD	1

0 = not significant, 1 =Slight,
2 = Moderate, 3 = High
4 =Extreme, * = Chronic

The information accumulated is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made become available subsequently to the date hereof, we do not assume any responsibility for the results of its use. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances. This SDS has been prepared by Univar Solutions Product Compliance Department (1-855-429-2661) SDSNA@univarsolutions.com.

Revision Date	:	11/13/2023
Legacy SDS:	:	100000041439

Material number:
16195110, 16187854, 16181036, 16058121, 16161482, 16058120, 770038, 123912, 104219, 102821, 171903, 128713, 102701, 70909, 102197, 54074, 85745, 102215, 85812, 70037, 102697, 86334, 52987, 102130, 122166, 504307, 20143, 54468, 550293, 104369, 75486, 71803, 56947, 16161484, 16147083, 16137075, 16144738, 16161485, 16155800, 16154572, 16154395, 16153167, 16149566, 16147084, 16143736, 16137714, 556610, 56305, 16151687, 16152292, 16142055, 16138329, 16138328, 16041698, 613716, 16170625, 16162065, 16156828

Key or legend to abbreviations and acronyms used in the safety data sheet			
ACGIH	American Conference of Government Industrial Hygienists	LD50	Lethal Dose 50%
AICS	Australia, Inventory of Chemical Substances	LOAEL	Lowest Observed Adverse Effect Level
DSL	Canada, Domestic Substances List	NFPA	National Fire Protection Agency
NDSL	Canada, Non-Domestic Substances List	NIOSH	National Institute for Occupational Safety & Health
CNS	Central Nervous System	NTP	National Toxicology Program
CAS	Chemical Abstract Service	NZIoC	New Zealand Inventory of Chemicals
EC50	Effective Concentration	NOAEL	No Observable Adverse Effect Level
EC50	Effective Concentration 50%	NOEC	No Observed Effect Concentration
EGEST	EOSCA Generic Exposure Scenario Tool	OSHA	Occupational Safety & Health Administration
EOSCA	European Oilfield Specialty Chemicals Association	PEL	Permissible Exposure Limit
EINECS	European Inventory of Existing Chemical Substances	PICCS	Philippines Inventory of Commercial Chemical Substances
MAK	Germany Maximum Concentration Values	PRNT	Presumed Not Toxic
GHS	Globally Harmonized System	RCRA	Resource Conservation Recovery Act
>=	Greater Than or Equal To	STEL	Short-term Exposure Limit
IC50	Inhibition Concentration 50%	SARA	Superfund Amendments and Reauthorization Act.
IARC	International Agency for Research on Cancer	TLV	Threshold Limit Value
IECSC	Inventory of Existing Chemical Substances in China	TWA	Time Weighted Average
ENCS	Japan, Inventory of Existing and New Chemical Substances	TSCA	Toxic Substance Control Act
KECI	Korea, Existing Chemical Inventory	UVCB	Unknown or Variable Composition, Complex Reaction Products, and Biological Materials
<=	Less Than or Equal To	WHMIS	Workplace Hazardous Materials Information System
LC50	Lethal Concentration 50%		

Chlorine

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations
SDS ID: 900046
Issue date: 3/25/2016 Revision date: 10/11/2021 Supersedes: 3/25/2016 Version: 2.1

SECTION 1: Identification

1.1. Identification

Product form	:	Substance
Substance name	:	Chlorine
CAS-No.	:	7782-50-5
Product code	:	SG-1001-01518

1.2. Recommended use and restrictions on use

Use of the substance/mixture	:	Test gas/Calibration gas.

1.3. Supplier

Air Liquide USA LLC and its affiliates
9811 Katy Freeway, Suite 100
Houston, TX, 77024
USA
T 1-800-819-1704
www.us.airliquide.com

1.4. Emergency telephone number

Emergency number	:	Chemtrec: 1-800-424-9300

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS US classification

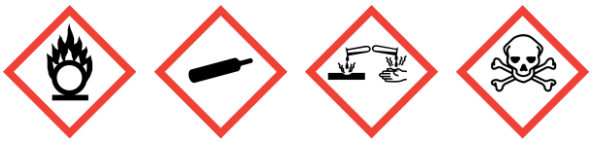
Oxidizing gases Category 1	H270	May cause or intensify fire; oxidizer
Gases under pressure Compressed gas	H280	Contains gas under pressure; may explode if heated
Acute toxicity (inhalation:gas) Category 2	H330	Fatal if inhaled
Skin corrosion/irritation Category 1A	H314	Causes severe skin burns and eye damage
Serious eye damage/eye irritation Category 1	H318	Causes serious eye damage
Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation	H335	May cause respiratory irritation

Full text of H statements : see section 16

2.2. GHS Label elements, including precautionary statements

GHS US labeling

Hazard pictograms (GHS US) :



Signal word (GHS US) : Danger

Hazard statements (GHS US) :
H270 - May cause or intensify fire; oxidizer
H280 - Contains gas under pressure; may explode if heated
H314 - Causes severe skin burns and eye damage
H318 - Causes serious eye damage
H330 - Fatal if inhaled
CGA-HG22 - Corrosive to the respiratory tract

Precautionary statements (GHS US) : P202 - Do not handle until all safety precautions have been read and understood.
P220 - Keep/Store away from Combustible materials, clothing
P260 - Do not breathe gas.
P271 - Use only outdoors or in a well-ventilated area.
P280 - Wear eye protection, face protection, protective gloves, protective clothing.
P303+P361+P353 - If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P403 - Store in a well-ventilated place.
P405 - Store locked up.
P501 - Dispose of contents/container in accordance with local/regional/national/international regulations
P244 - Keep reduction valves/valves and fittings free from oil and grease.
P284 - Wear respiratory protection.
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing.
P370+P376 - In case of fire: Stop leak if safe to do so.
P307+P311 - If exposed: Call a poison center/doctor.
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C/125 °F
CGA-PG05 - Use a back flow preventive device in the piping
CGA-PG06 - Close valve after each use and when empty
CGA-PG10 - Use only with equipment rated for cylinder pressure
CGA-PG14 - Approach suspected leak area with caution
CGA-PG18 - When returning cylinder, install leak tight valve outlet cap or plug
CGA-PG20 - Use only with equipment of compatible materials of construction and rated for cylinder pressure
CGA-PG21 - Open valve slowly
CGA-PG22 - Use only with equipment cleaned for oxygen service

2.3. Other hazards which do not result in classification

No additional information available

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances

Name	Product identifier	%	GHS US classification
Chlorine (Main constituent)	CAS-No.: 7782-50-5	> 99	Ox. Gas 1, H270 Press. Gas (Comp.), H280 Acute Tox. 2 (Inhalation:gas), H330 Skin Corr. 1A, H314 Eye Dam. 1, H318 STOT SE 3, H335

Full text of hazard classes and H-statements : see section 16

3.2. Mixtures

Not applicable

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures general : Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a poison center or doctor/physician. Specific treatment is urgent (see supplemental first aid instruction on this label). Call a POISON CENTER or doctor/physician if you feel unwell.

First-aid measures after skin contact : Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse. Immediately call a poison center or doctor/physician.

First-aid measures after eye contact : Rinse immediately with plenty of water for 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice/attention. Rinse cautiously with water for several minutes. Immediately call a poison center or doctor/physician.

First-aid measures after ingestion : Ingestion is not considered a potential route of exposure. Rinse mouth. Do NOT induce vomiting. Immediately call a poison center or doctor/physician.

4.2. Most important symptoms and effects (acute and delayed)

Potential Adverse human health effects and symptoms : Based on available data, the classification criteria are not met. Fatal if inhaled.

Symptoms/effects : Causes severe skin burns and eye damage.

Symptoms/effects after inhalation : Fatal if inhaled. Corrosive to the respiratory tract. Fatal if inhaled. May cause respiratory irritation.

Symptoms/effects after skin contact : Causes severe skin burns and eye damage.

Symptoms/effects after eye contact : Causes serious eye damage.

Symptoms/effects after ingestion : Ingestion is not considered a potential route of exposure.

Symptoms/effects upon intravenous administration : Not known.

Most important symptoms and effects, both acute and delayed : May cause irritation to cornea (with temporary disturbance to vision). May cause irritation to skin. Material is destructive to tissue of the mucuous membranes and upper respiratory tract. Cough, shortness of breath, headache, nausea. Refer to section 11.

Chronic symptoms : Adverse effects not expected from this product.

4.3. Immediate medical attention and special treatment, if necessary

If you feel unwell, seek medical advice. If breathing is difficult, give oxygen.

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media : Use extinguishing media appropriate for surrounding fire. Foam. Dry powder. Carbon dioxide. Water spray. Sand.

Unsuitable extinguishing media : Do not use water jet to extinguish. Do not use a heavy water stream.

5.2. Specific hazards arising from the chemical

Fire hazard : The product is not flammable.

Explosion hazard : Product is not explosive. Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries.

Hazardous combustion products : None.

5.3. Special protective equipment and precautions for fire-fighters

Firefighting instructions : In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion. Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire-fighting water from entering environment.

Protection during firefighting : Standard protective clothing and equipment (e.g, Self Contained Breathing Apparatus) for fire fighters. Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Ensure adequate ventilation.

6.1.1. For non-emergency personnel

Protective equipment : Wear protective equipment consistent with the site emergency plan.

Emergency procedures : Evacuate personnel to a safe area. Close doors and windows of adjacent premises. Keep containers closed. Mark the danger area. Seal off low-lying areas. Keep upwind. Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment : Standard protective clothing and equipment (e.g, Self Contained Breathing Apparatus) for fire fighters. Equip cleanup crew with proper protection.

Emergency procedures : Evacuate and limit access. Ventilate area. Stop leak if safe to do so.

6.2. Environmental precautions

Try to stop release if without risk. Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

For containment : Try to stop release if without risk.

Methods for cleaning up : Dispose of contents/container in accordance with local/regional/national/international regulations. Store away from other materials.

Methods and material for containment and cleaning up : Hose down area with water. Wash contaminated equipment or sites of leaks with copious quantities of water.

6.4. Reference to other sections

See also Sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed : Pressurized container: Do not pierce or burn, even after use. Use only with equipment rated for cylinder pressure. Close valve after each use and when empty.

Precautions for safe handling : Do not handle until all safety precautions have been read and understood. Use only outdoors or in a well-ventilated area. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapor. Keep reduction valves free from grease and oil. Do not breathe dust/fume/gas/mist/vapors/spray. Avoid contact during pregnancy/while nursing. Avoid breathing dust/fume/gas/mist/vapors/spray.

Hygiene measures : Do not eat, drink or smoke when using this product. Wash hands, forearms and face thoroughly after handling.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Comply with applicable regulations.

Storage conditions : Do not expose to temperatures exceeding 52 °C/ 125 °F. Protect containers from physical damage; do not drag, roll, slide or drop. Store in well ventilated area. Store locked up. Keep only in the original container in a cool, well ventilated place away from : Keep container tightly closed.

Incompatible products : None known. Strong bases. Strong acids.

Incompatible materials : Flammable materials. Combustible materials. Reducing agents. Sources of ignition. Direct sunlight.

Conditions for safe storage, including any incompatibilities : Observe all regulations and local requirements regarding storage of containers. Containers should not be stored in conditions likely to encourage corrosion. Container valve guards or caps should be in place. Containers should be stored in the vertical position and properly secured to prevent them from falling over. Stored containers should be periodically checked for general condition and leakage. Keep container below 50°C in a well ventilated place. Segregate from flammable gases and other flammable materials in store. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible materials.

Storage area : Store in a well-ventilated place.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Chlorine (7782-50-5)	
USA - ACGIH - Occupational Exposure Limits	
ACGIH OEL TWA [ppm]	0.1 ppm
ACGIH OEL STEL [ppm]	0.4 ppm
ACGIH chemical category	Not Classifiable as a Human Carcinogen
USA - OSHA - Occupational Exposure Limits	
OSHA PEL (Ceiling)	3 mg/m³
OSHA PEL C [ppm]	1 ppm
USA - IDLH - Occupational Exposure Limits	
IDLH [ppm]	10 ppm
USA - NIOSH - Occupational Exposure Limits	
NIOSH REL (Ceiling)	1.45 mg/m³
NIOSH REL C [ppm]	0.5 ppm

8.2. Appropriate engineering controls

Appropriate engineering controls : Ensure exposure is below occupational exposure limits (where available). Provide adequate general and local exhaust ventilation. Systems under pressure should be regularly checked for leakages. Consider the use of a work permit system e.g. for maintenance activities. Alarm detectors should be used when toxic gases may be released.

Environmental exposure controls : Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

8.3. Individual protection measures/Personal protective equipment

Personal protective equipment:
Avoid all unnecessary exposure.

Hand protection:
Wear working gloves when handling gas containers. 29 CFR 1910.138: Hand protection. Wear chemically resistant protective gloves when making or breaking process connections. Wear protective gloves.

Eye protection:
Wear safety glasses with side shields. Chemical goggles or face shield. 29 CFR 1910.133: Eye and Face Protection. Wear goggles and a face shield when transfilling or breaking transfer connections.

Skin and body protection:
Wear suitable protective clothing, e.g. lab coats, coveralls or flame resistant clothing. Wear suitable protective clothing

Respiratory protection:
Wear respiratory protection. Consult respirator supplier´s product information for the selection of the appropriate respiratory protection. Wear a respirator when performing non-routine tasks not limited to line breaking or sampling. Wear a respirator during routine operations if determined to be necessary during a process-specific review. Consult respirator suppliers' product information or their representatives for the selection of the appropriate respirator. See Sections 5 & 6.

Thermal hazard protection:
None necessary during normal and routine operations.

Other information:
Wear safety shoes while handling containers. Keep suitable chemically resistant protective clothing readily available for emergency use. 29 CFR 1910.136: Foot Protection. Do not eat, drink or smoke during use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Gas
Appearance	:	Greenish-yellow gas.
Color	:	Greenish gas.
Odor	:	Pungent.
Odor threshold	:	Odor threshold is subjective and inadequate to warn for overexposure 0.23 mg/m³ (Dixon and Ikels)
pH	:	If dissolved in water pH-value will be affected.
Melting point	:	-101 °C
Freezing point	:	No data available
Boiling point	:	-32.95 °C
Critical temperature	:	144.75 °C
Critical pressure	:	7991 kPa
Flash point	:	No data available
Relative evaporation rate (butyl acetate=1)	:	No data available
Flammability (solid, gas)	:	See Section 2.1 and 2.2 Non flammable.
Vapor pressure	:	3692.287318698 mbar
Relative vapor density at 20 °C	:	2.473
Relative density	:	1.6
Density	:	2.7 kg/m³ (at 50 °C)
Molecular mass	:	70.906 g/mol
Relative gas density	:	Heavier than air
Solubility	:	Water: 8620 mg/l
Partition coefficient n-octanol/water (Log Pow)	:	Not applicable for inorganic products.
Auto-ignition temperature	:	Not applicable - non flammable
Decomposition temperature	:	No data available
Viscosity, kinematic	:	No reliable data available.
Viscosity, dynamic	:	No reliable data available.
Explosion limits	:	Not applicable - non flammable
Explosive properties	:	Not applicable (non-flammable gas).
Oxidizing properties	:	Not combustible but enhances combustion of other substances. May cause or intensify fire; oxidizer.
Ci	:	0.7

9.2. Other information

Additional information	:	Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground level

SECTION 10: Stability and reactivity

10.1. Reactivity

Reacts with water to form corrosive acids. Corrosive vapors. Thermal decomposition generates :

10.2. Chemical stability

Stable under normal conditions. Not established.

10.3. Possibility of hazardous reactions

May react violently with reducing agents. Can form explosive mixtures with flammable materials. Not established.

10.4. Conditions to avoid

Moisture. Direct sunlight. Extremely high or low temperatures.

10.5. Incompatible materials

Combustible materials. Flammable materials. Reducing agents. Strong acids. Strong bases.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced. fume. Carbon monoxide. Carbon dioxide. Thermal decomposition generates : Corrosive vapors.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral) : Not classified
Acute toxicity (dermal) : Not classified
Acute toxicity (inhalation) : Fatal if inhaled.

Chlorine (7782-50-5)	
LD50 oral rat	6800 mg/kg
LC50 Inhalation - Rat [ppm]	146.5 ppm/4h
ATE US (gases)	146.5 ppmV/4h
ATE US (vapors)	0.86 mg/l/4h
ATE US (dust, mist)	0.86 mg/l/4h

Skin corrosion/irritation : Causes severe skin burns.
pH: If dissolved in water pH-value will be affected.
Serious eye damage/irritation : Causes serious eye damage.
pH: If dissolved in water pH-value will be affected.
Respiratory or skin sensitization : Not classified
Germ cell mutagenicity : Not classified
Carcinogenicity : Not classified
Reproductive toxicity : Not classified
STOT-single exposure : May cause respiratory irritation.
STOT-repeated exposure : Not classified
Aspiration hazard : Not classified
Viscosity, kinematic : No reliable data available.
Potential Adverse human health effects and symptoms : Based on available data, the classification criteria are not met. Fatal if inhaled.
Symptoms/effects : Causes severe skin burns and eye damage.

Symptoms/effects after inhalation	:	Fatal if inhaled. Corrosive to the respiratory tract. Fatal if inhaled. May cause respiratory irritation.
Symptoms/effects after skin contact	:	Causes severe skin burns and eye damage.
Symptoms/effects after eye contact	:	Causes serious eye damage.
Symptoms/effects after ingestion	:	Ingestion is not considered a potential route of exposure.
Symptoms/effects upon intravenous administration	:	Not known.
Most important symptoms and effects, both acute and delayed	:	May cause irritation to cornea (with temporary disturbance to vision). May cause irritation to skin. Material is destructive to tissue of the mucuous membranes and upper respiratory tract. Cough, shortness of breath, headache, nausea. Refer to section 11.
Chronic symptoms	:	Adverse effects not expected from this product.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects.

Chlorine (7782-50-5)	
LC50 - Fish [1]	0.44 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [flow-through])
EC50 - Crustacea [1]	0.017 mg/l (Exposure time: 48 h - Species: Daphnia magna)
LC50 - Fish [2]	0.014 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [flow-through])
LC50-96 h - fish [mg/l]	0.032 mg/l
EC50 48h - Daphnia magna [mg/l]	0.141 mg/l
EC50 72h Algae [mg/l]	0.001 – 0.01 mg/l

12.2. Persistence and degradability

Chlorine (7782-50-5)	
Persistence and degradability	Not applicable for inorganic products .

12.3. Bioaccumulative potential

Chlorine (7782-50-5)	
BCF - Fish [1]	(no bioaccumulation expected)
Partition coefficient n-octanol/water (Log Pow)	Not applicable for inorganic products.
Bioaccumulative potential	No data available.

12.4. Mobility in soil

Chlorine (7782-50-5)	
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution. Partition into soil is unlikely.

12.5. Other adverse effects

Other adverse effects	:	May cause pH changes in aqueous ecological systems.
Effect on the ozone layer	:	No effect on the ozone layer.
Effect on global warming	:	No known effects from this product.
Other information	:	Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Disposal methods

Waste treatment methods : Contact supplier if guidance is required. Do not discharge into any place where its accumulation could be dangerous. Ensure that the emission levels from local regulations or operating permits are not exceeded.

Product/Packaging disposal recommendations : Refer to the CGA Pamphlet P-63 "Disposal of Gases" available at www.cganet.com for more guidance on suitable disposal methods. Dispose in a safe manner in accordance with local/national regulations. Dispose of contents/container in accordance with local/regional/national/international regulations.

Ecology - waste materials : Hazardous waste due to toxicity. Avoid release to the environment.

SECTION 14: Transport information

In accordance with DOT / TDG / IMDG / IATA

14.1. UN number

DOT NA No : UN1017
UN-No. (TDG) : UN1017
UN-No. (IMDG) : 1017
UN-No. (IATA) : Forbidden

14.2. UN proper shipping name

Proper Shipping Name (DOT) : Chlorine
Proper Shipping Name : CHLORINE
Proper Shipping Name (IMDG) : Not applicable
Proper Shipping Name (IATA) : Not applicable

14.3. Transport hazard class(es)

DOT

Transport hazard class(es) (DOT) : 2.3 (5.1, 8)
Hazard labels (DOT) : 2.3, 5.1, 8



TDG

Transport hazard class(es) (TDG) : 2.3 (5.1, 8)
Hazard labels (TDG) : 2.3, 5.1, 8



IMDG

Transport hazard class(es) (IMDG) : 2



IATA

Transport hazard class(es) (IATA) : Not applicable

14.4. Packing group

Packing group (DOT) : Not applicable
Packing group (TDG) : Not applicable
Packing group (IMDG) : Not applicable
Packing group (IATA) : Not applicable

14.5. Environmental hazards

Marine pollutant : Yes (IMDG only)



Other information : No supplementary information available.

14.6. Special precautions for user

Special transport precautions : Avoid transport on vehicles where the load space is not separated from the driver's compartment, Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency, Before transporting product containers: - Ensure there is adequate ventilation, - Ensure that containers are firmly secured, - Ensure cylinder valve is closed and not leaking, - Ensure valve outlet cap nut or plug (where provided) is correctly fitted, - Ensure valve protection device (where provided) is correctly fitted.

DOT

UN-No.(DOT) : UN1017

DOT Special Provisions (49 CFR 172.102) : 2 - This material is poisonous by inhalation (see 171.8 of this subchapter) in Hazard Zone B (see 173.116(a) or 173.133(a) of this subchapter), and must be described as an inhalation hazard under the provisions of this subchapter.
B9 - Bottom outlets are not authorized.
B14 - Each bulk packaging, except a tank car or a multi-unit-tank car tank, must be insulated with an insulating material so that the overall thermal conductance at 15.5 C (60 F) is no more than 1.5333 kilojoules per hour per square meter per degree Celsius (0.075 Btu per hour per square foot per degree Fahrenheit) temperature differential. Insulating materials must not promote corrosion to steel when wet.
N86 - UN pressure receptacles made of aluminum alloy are not authorized.
T50 - When portable tank instruction T50 is referenced in Column (7) of the 172.101 Table, the applicable liquefied compressed gases are authorized to be transported in portable tanks in accordance with the requirements of 173.313 of this subchapter.
TP19 - The calculated wall thickness must be increased by 3 mm at the time of construction. Wall thickness must be verified ultrasonically at intervals midway between periodic hydraulic tests (every 2.5 years). The portable tank must not be used if the wall thickness is less than that prescribed by the applicable T code in Column (7) of the Table for this material.

DOT Packaging Exceptions (49 CFR 173.xxx) : None
DOT Packaging Non Bulk (49 CFR 173.xxx) : 304
DOT Packaging Bulk (49 CFR 173.xxx) : 314;315
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : Forbidden
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : Forbidden
DOT Vessel Stowage Location : D - The material must be stowed ‘‘on deck only’’ on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers or one passenger per each 3 m of overall vessel length, but the material is prohibited on passenger vessels in which the limiting number of passengers is exceeded.

DOT Vessel Stowage Other : 40 - Stow ‘‘clear of living quarters’’,51 - Stow ‘‘separated from’’ acetylene,55 - Stow ‘‘separated from’’ ammonia,62 - Stow ‘‘separated from’’ diborane,68 - Stow ‘‘separated from’’ hydrogen,89 - Segregation same as for oxidizers,90 - Stow ‘‘separated from’’ radioactive materials

TDG

UN-No. (TDG) : UN1017

TDG Special Provisions : 23 - (1) A person must not import, offer for transport, handle or transport these dangerous goods unless
(a) they are contained in a means of containment that is marked in accordance with section 4.23, or, for UN1005, ANHYDROUS AMMONIA, in a large means of containment, in accordance with section 4.18.2; and
(b) they are accompanied by a shipping document that complies with subparagraph 3.5(1)(c)(vii).
(2) This special provision does not apply to a person who transports these dangerous goods in accordance with an exemption set out in section 1.15, 1.17, 1.17.1 or 1.24 of Part 1 (Coming Into Force, Repeal, Interpretation, General Provisions and Special Cases).

ERAP Index : 500

Explosive Limit and Limited Quantity Index : 0

Excepted quantities (TDG) : E0

Passenger Carrying Ship Index : Forbidden

Passenger Carrying Road Vehicle or Passenger Carrying Railway Vehicle Index : Forbidden

Emergency Response Guide (ERG) Number : 124;173

IMDG

No data available

IATA

No data available

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

SECTION 15: Regulatory information

15.1. US Federal regulations

Chlorine (7782-50-5)	
Subject to reporting requirements of United States SARA Section 313 Listed on EPA Hazardous Air Pollutant (HAPS)	
CERCLA RQ	10 lb
Section 302 EPCRA Reportable Quantity (RQ)	10 lb
SARA Section 302 Threshold Planning Quantity (TPQ)	100 lb

Commercial status of components according to the United States Environmental Protection Agency’s Toxic Substances Control Act (TSCA):

Name	CAS-No.	Listing	Commercial status	Flags
Chlorine	7782-50-5	Present	Active	

15.2. International regulations

CANADA

Chlorine (7782-50-5)
Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations

Chlorine (7782-50-5)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

National regulations

Chlorine (7782-50-5)
Listed introduction on Australian Industrial Chemicals Introduction Scheme (AICIS Inventory) Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China) Listed on KECL/KECI (Korean Existing Chemicals Inventory) Listed on NZIoC (New Zealand Inventory of Chemicals) Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances) Japanese Poisonous and Deleterious Substances Control Law Listed on INSQ (Mexican National Inventory of Chemical Substances) Listed on the TCSI (Taiwan Chemical Substance Inventory)

15.3. US State regulations

Chlorine (7782-50-5)	
State or local regulations	U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List U.S. - Pennsylvania - RTK (Right to Know) List

SECTION 16: Other information

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Revision date : 10/11/2021

Other information : None. This Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product.

Full text of H-phrases	
H270	May cause or intensify fire; oxidizer
H280	Contains gas under pressure; may explode if heated
H314	Causes severe skin burns and eye damage
H318	Causes serious eye damage
H330	Fatal if inhaled
H335	May cause respiratory irritation

Safety Data Sheet (SDS), USA

This Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product. To the best of Air Liquide USA LLC and its affiliates' knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this product is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.

BIO-CIRCLE®
A division of
Walter Surface Technologies

SAFETY DATA SHEET

CORROSION INHIBITOR ADDITIVE

Section 1. Identification

GHS product identifier : CORROSION INHIBITOR ADDITIVE

Product code : 53-G 001(950 mL), 53-G 006 (5 L), 53-G 927 (20 L), 53-G 928 (208 L)

SDS no. : L-56E

Product type : Liquid.

Identified uses

Corrosion inhibitor additive.

Manufacturer : Walter Surface Technologies Inc.
Bio-Circle - A Division of Walter Surface Technologies Inc.
810 Day Hill Road
Windsor, CT 06095
United States
General Information: 18665925837
info.us@walter.com
www.walter.com

Emergency telephone number (with hours of operation) : INFOTRAC® 1-800-535-5053, Outside U.S.A. call collect: 1-352-323-3500
24 hours/day, 7 days/week.

Section 2. Hazards identification

OSHA/HCS status : While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this SDS contains valuable information critical to the safe handling and proper use of the product. This SDS should be retained and available for employees and other users of this product.

Classification of the substance or mixture : Not classified.

GHS label elements

Signal word : No signal word.

Hazard statements : No known significant effects or critical hazards.

Precautionary statements

Prevention : Not applicable.

Response : Not applicable.

Storage : Not applicable.

Disposal : Not applicable.

Hazards not otherwise classified : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Product code : 53-G 001(950 mL), 53-G 006 (5 L), 53-G 927 (20 L), 53-G 928 (208 L)

CAS number/other identifiers

CAS number : Not applicable.

There are no ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Skin contact : Flush contaminated skin with plenty of water. Get medical attention if symptoms occur.

Ingestion : Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : No specific fire or explosion hazard.

Hazardous thermal decomposition products : No specific data.

Special protective actions for fire-fighters : No special measures are required.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8).

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

None.

Appropriate engineering controls : Ensure adequate ventilation. No personal respiratory protective equipment normally required.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
Recommended: Nitrile gloves 0.4 mm thick, permeation time 480 minutes.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Section 8. Exposure controls/personal protection

Respiratory protection : Use a NIOSH/MSHA approved respirator if there is a risk of exposure at levels exceeding the exposure limits. Advice should be sought from respiratory protection specialists.

Section 9. Physical and chemical properties

Appearance

Physical state : Liquid.

Color : Yellow.

Odor : Mild.

Odor threshold : Not available.

pH : 8.5

Melting point : Not available.

Boiling point : Not available.

Flash point : Closed cup: >100°C (>212°F)

Evaporation rate : Not available.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : Not available.

Vapor density : Not available.

Density : 1.17 g/ml @ 20°C (68°F)

Solubility : Miscible in water.

Partition coefficient: n-octanol/water : Not available.

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

Viscosity : Not available.

VOC content : 0 % (w/w)

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Incompatible materials : Not applicable.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

There is no data available.

Irritation/Corrosion

There is no data available.

Sensitization

There is no data available.

Carcinogenicity

There is no data available.

Specific target organ toxicity (single exposure)

There is no data available.

Specific target organ toxicity (repeated exposure)

There is no data available.

Aspiration hazard

There is no data available.

Information on the likely routes of exposure : Dermal contact. Ingestion.

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : No known significant effects or critical hazards.

Potential delayed effects : No known significant effects or critical hazards.

Long term exposure

Potential immediate effects : No known significant effects or critical hazards.

Potential delayed effects : No known significant effects or critical hazards.

Potential chronic health effects

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Section 11. Toxicological information

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

There is no data available.

Section 12. Ecological information

Toxicity

There is no data available.

Persistence and degradability

There is no data available.

Bioaccumulative potential

There is no data available.

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-
Transport hazard class(es)	-	-	-

Section 14. Transport information

Packing group	-	-	-
Environmental hazards	No.	No.	No.
Additional information	-	-	-

AERG : Not applicable.

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage. Protect from freezing. Freezing will damage product and render it unusable.

Transport in bulk according to Annex II of MARPOL and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

United States inventory (TSCA 8b): All components are listed or exempted.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Not applicable.

SARA 313

No products were found.

State regulations

Massachusetts : None of the components are listed.

New York : None of the components are listed.

New Jersey : None of the components are listed.

Section 15. Regulatory information

Pennsylvania : None of the components are listed.

California Prop. 65

No products were found.

International lists

National inventory

Australia	:	All components are listed or exempted.
Canada	:	All components are listed or exempted.
China	:	All components are listed or exempted.
Europe	:	All components are listed or exempted.
Japan	:	All components are listed or exempted.
Malaysia	:	All components are listed or exempted.
New Zealand	:	All components are listed or exempted.
Philippines	:	All components are listed or exempted.
Republic of Korea	:	All components are listed or exempted.

Section 16. Other information

History

Date of issue mm/dd/yyyy	:	12/30/2015
Date of previous issue	:	08/01/2015
Version	:	1.2
Revised Section(s)	:	2, 8, 16.
Prepared by	:	KMK Regulatory Services Inc.
Key to abbreviations	:	ATE = Acute Toxicity Estimate BCF = Bioconcentration Factor GHS = Globally Harmonized System of Classification and Labelling of Chemicals IATA = International Air Transport Association IBC = Intermediate Bulk Container IMDG = International Maritime Dangerous Goods LogPow = logarithm of the octanol/water partition coefficient MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution) UN = United Nations

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

SAFETY DATA SHEET

Detergent

Section 1. Identification

GHS product identifier : Detergent

Product code : 471

Other means of identification : Not available.

Product type : Liquid.

Relevant identified uses of the substance or mixture and uses advised against

Identified uses
Laundry Detergent

Uses advised against	Reason
For Industrial and Institutional Use Only	-

Supplier's details : Betco Corporation
400 Van Camp Road
Bowling Green, Ohio 43402
www.betco.com
888-462-3826

Emergency telephone number (with hours of operation) : Chemtrec (800) 424-9300 24 hour

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : EYE IRRITATION - Category 2A

GHS label elements

Hazard pictograms :



Signal word : Warning

Hazard statements : Causes serious eye irritation.

Precautionary statements

Prevention : Wear eye or face protection. Wash hands thoroughly after handling.

Response : IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.

Storage : Not applicable.

Disposal : Not applicable.

Hazards not otherwise classified : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Other means of identification : Not available.

Ingredient name	%	CAS number
sodium dodecylbenzenesulfonate	≤6.3	25155-30-0
Alcohols, C9-11, ethoxylated	≤10	68439-46-3
Sulfuric acid, mono-C10-16-alkyl esters, sodium salts	≤2.7	68585-47-7

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Section 4. First aid measures

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : In a fire or if heated, a pressure increase will occur and the container may burst.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides
sulfur oxides
metal oxide/oxides

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Section 6. Accidental release measures

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
sodium dodecylbenzenesulfonate	None.
Alcohols, C9-11, ethoxylated	None.
Sulfuric acid, mono-C10-16-alkyl esters, sodium salts	None.

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Section 8. Exposure controls/personal protection

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties

Appearance

Physical state : Liquid.

Color : Violet. Clear. to Hazy

Odor : Pleasant.

Odor threshold : Not available.

pH : 8.5 to 9.5

Melting point : Not available.

Boiling point : Not available.

Flash point : Closed cup: >100°C (>212°F)

Evaporation rate : Not available.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : Not available.

Vapor density : Not available.

Relative density : 1.0432

Solubility : Easily soluble in the following materials: cold water and hot water.

Solubility in water : Not available.

Partition coefficient: n-octanol/water : Not available.

Section 9. Physical and chemical properties

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

Viscosity : Not available.

Flow time (ISO 2431) : Not available.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Incompatible materials : Not available.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
sodium dodecylbenzenesulfonate	LD50 Oral	Rat	438 mg/kg	-
Alcohols, C9-11, ethoxylated	LD50 Oral	Rat	1378 mg/kg	-

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
sodium dodecylbenzenesulfonate	Eyes - Severe irritant	Rabbit	-	24 hours 250 Micrograms	-
	Eyes - Severe irritant	Rabbit	-	1 Percent	-
	Skin - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Section 11. Toxicological information

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Routes of entry anticipated: Oral, Dermal.
Routes of entry not anticipated: Inhalation.

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Route	ATE value
Oral	5036 mg/kg

Section 11. Toxicological information

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
sodium dodecylbenzenesulfonate	Acute EC50 29000 µg/l Fresh water	Algae - Chlorella pyrenoidosa - Exponential growth phase	96 hours
	Acute EC50 7.81 mg/l Fresh water	Crustaceans - Ceriodaphnia dubia - Neonate	48 hours
	Acute EC50 0.15 ppm Fresh water	Daphnia - Daphnia pulex	48 hours
	Acute IC50 112.4 mg/l Fresh water	Algae - Pseudokirchneriella subcapitata - Exponential growth phase	72 hours
	Acute LC50 1.18 ppm Fresh water	Fish - Lepomis macrochirus	96 hours
Alcohols, C9-11, ethoxylated	Acute EC50 5.36 mg/l Fresh water	Crustaceans - Ceriodaphnia dubia - Neonate	48 hours
	Acute EC50 2686 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 8500 µg/l Fresh water	Fish - Pimephales promelas	96 hours
Sulfuric acid, mono-C10-16-alkyl esters, sodium salts	Acute EC50 1.37 mg/l Fresh water	Crustaceans - Ceriodaphnia dubia - Neonate	48 hours

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
sodium dodecylbenzenesulfonate	1.96	-	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	TDG Classification	Mexico Classification	ADR/RID	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-	-	-	-
Transport hazard class(es)	-	-	-	-	-	-
Packing group	-	-	-	-	-	-
Environmental hazards	No.	No.	No.	No.	No.	No.

Additional information

DOT Classification : **Reportable quantity** 15913.4 lbs / 7224.7 kg [1829.5 gal / 6925.5 L]. Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 5(a)2 proposed significant new use rules**: 5-chloro-2-methyl-2H-isothiazol-3-one

TSCA 8(a) PAIR: α-hexylcinnamaldehyde; 2-(4-tert-butylbenzyl)propionaldehyde; vanillin

TSCA 8(a) CDR Exempt/Partial exemption: Not determined

Clean Water Act (CWA) 311: sodium dodecylbenzenesulfonate; sodium hydroxide

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

Section 15. Regulatory information

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : EYE IRRITATION - Category 2A

Composition/information on ingredients

Name	%	Classification
sodium dodecylbenzenesulfonate	≤6.3	ACUTE TOXICITY (oral) - Category 4 SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A
Alcohols, C9-11, ethoxylated	≤10	EYE IRRITATION - Category 2A
Sulfuric acid, mono-C10-16-alkyl esters, sodium salts	≤2.7	ACUTE TOXICITY (oral) - Category 4 SKIN IRRITATION - Category 2 SERIOUS EYE DAMAGE - Category 1

State regulations

Massachusetts : The following components are listed: SODIUM DODECYLBENZENE SULFONATE; Sodium Hydroxide Solution

New York : The following components are listed: Sodium dodecylbenzene sulfonate; Dodecylbenzene sulfonate

New Jersey : The following components are listed: SODIUM DODECYLBENZENE SULFONATE; BENZENESULFONIC ACID, DODECYL-, SODIUM SALT; Sodium Hydroxide Solution; PROPYLENE GLYCOL; 1,2-PROPANEDIOL

Pennsylvania : The following components are listed: BENZENESULFONIC ACID, DODECYL-, SODIUM SALT; Sodium Hydroxide Solution; 1,2-PROPANEDIOL

California Prop. 65

⚠ **WARNING**: This product can expose you to N,N-Dimethylformamide, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

Ingredient name	No significant risk level	Maximum acceptable dosage level
N,N-Dimethylformamide	-	-

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

Australia : At least one component is not listed.

Canada : Not determined.

China : At least one component is not listed.

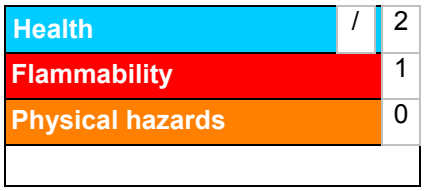
Europe : At least one component is not listed.

Section 15. Regulatory information

Japan	:	**Japan inventory (ENCS)**: At least one component is not listed. **Japan inventory (ISHL)**: Not determined.
Malaysia	:	Not determined
New Zealand	:	At least one component is not listed.
Philippines	:	At least one component is not listed.
Republic of Korea	:	Not determined.
Taiwan	:	Not determined.
Thailand	:	Not determined.
Turkey	:	Not determined.
United States	:	At least one component is not listed.
Viet Nam	:	Not determined.

Section 16. Other information

Hazardous Material Information System (U.S.A.)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.

The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

National Fire Protection Association (U.S.A.)



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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Classification	Justification
EYE IRRITATION - Category 2A	Calculation method

History

Date of printing	:	8/14/2020
Date of issue/Date of revision	:	8/14/2020

Section 16. Other information

Date of previous issue : 8/10/2020

Version : 1.01

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

References : Not available.

Indicates information that has changed from previously issued version.

Notice to reader

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SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: **DIESEL**
Product Description: Hydrocarbons and Additives
Product Code: 708109-60, 708163-60, 708164-60, 708165-60, 708166-60
Intended Use: Diesel engine fuel

Trade Names	Trade Names
GAS OIL 350	GAS OIL 50
GAS OIL PECHE	GAS OIL SOUTE

COMPANY IDENTIFICATION

SECTION 2 HAZARDS IDENTIFICATION

This material is hazardous according to regulatory guidelines (see (M)SDS Section 15).

CLASSIFICATION OF SUBSTANCE OR MIXTURE:
Flammable liquid: Category 3.
Acute inhalation toxicant: Category 4. Skin irritation: Category 2. Carcinogen: Category 2. Specific target organ toxicant (repeated exposure): Category 2. Aspiration toxicant: Category 1.
Chronic aquatic toxicant: Category 2.

LABEL ELEMENTS:

Pictograms:





Signal Word: Danger

Hazard Statements:

Physical: H226: Flammable liquid and vapour.
Health: H304: May be fatal if swallowed and enters airways. H315: Causes skin irritation. H332: Harmful if inhaled. H351: Suspected of causing cancer. H373: May cause damage to organs through prolonged or repeated exposure. Bone marrow, Liver, Thymus
Environmental: H411: Toxic to aquatic life with long lasting effects.

Precautionary Statements:

Prevention: P201: Obtain special instructions before use. P202: Do not handle until all safety precautions have been read and understood. P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P233: Keep container tightly closed. P240: Ground and bond container and receiving equipment. P241: Use explosion-proof electrical, ventilating and lighting equipment. P242: Use non-sparking tools. P243: Take action to prevent static discharges. P260: Do not breathe mist / vapours. P264: Wash skin thoroughly after handling. P271: Use only outdoors or in a well-ventilated area. P273: Avoid release to the environment. P280: Wear protective gloves/protective clothing/eye protection/face protection.
Response: P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P302 + P352: IF ON SKIN: Wash with plenty of soap and water. P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing. P308 + P313: IF exposed or concerned: Get medical advice/attention. P314: Get medical advice/attention if you feel unwell. P331: Do NOT induce vomiting. P332 + P313: If skin irritation occurs: Get medical advice/attention. P362 + P364: Take off contaminated clothing and wash it before reuse. P370 + P378: In case of fire: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish. P391: Collect spillage.
Storage: P403 + P235: Store in a well-ventilated place. Keep cool. P405: Store locked up.
Disposal: P501: Dispose of contents and container in accordance with local regulations.

Contains: DIESEL OIL..C9-20

Other hazard information:

Physical / Chemical Hazards:

Material can accumulate static charges which may cause an ignition. Material can release vapours that readily form flammable mixtures. Vapour accumulation could flash and/or explode if ignited.

Health Hazards:

May cause central nervous system depression. High-pressure injection under skin may cause serious damage. Under conditions of poor personal hygiene and prolonged repeated contact, some polycyclic aromatic compounds (PACs) have been suspected as a cause of skin cancer in humans. May be irritating to the eyes, nose, throat, and lungs.

Environmental Hazards:
No additional hazards.

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

Reportable Hazardous Substance(s) or Complex Substance(s)

Name	CAS#	Concentration*	GHS Hazard Codes
DIESEL OIL..C9-20	68334-30-5	> 92 %	H226, H304, H332, H351, H315, H373, H401, H411

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

NOTE: Composition may contain up to 0.5% performance additives and / or dyes.

SECTION 4 FIRST AID MEASURES

INHALATION
Immediately remove from further exposure. Get immediate medical assistance. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. Give supplemental oxygen, if available. If breathing has stopped, assist ventilation with a mechanical device.

SKIN CONTACT
Remove contaminated clothing. Dry wipe exposed skin and cleanse with waterless hand cleaner and follow by washing thoroughly with soap and water. For those providing assistance, avoid further skin contact to yourself or others. Wear impervious gloves. Launder contaminated clothing separately before reuse. Discard contaminated articles that cannot be laundered. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT
Flush thoroughly with water. If irritation occurs, get medical assistance.

INGESTION
Seek immediate medical attention. Do not induce vomiting.

NOTE TO PHYSICIAN
If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

PRE-EXISTING MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED BY EXPOSURE
Contains hydrocarbon solvent/petroleum hydrocarbons; skin contact may aggravate an existing dermatitis.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

Inappropriate Extinguishing Media: Straight streams of water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply. Fire-fighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Unusual Fire Hazards: Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

Hazardous Combustion Products: Aldehydes, Incomplete combustion products, Oxides of carbon, Smoke, Fume, Sulphur oxides

FLAMMABILITY PROPERTIES

Flash Point [Method]: >56°C (133°F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.6 UEL: 7.0
Autoignition Temperature: >250°C (482°F)

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required, due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: half-face or full-face respirator with filter(s) for organic vapor and, when applicable, H2S, or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to aromatic hydrocarbons are recommended. Note: gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

SPILL MANAGEMENT

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do so without risk. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapour-suppressing foam may be used to reduce vapour. Absorb or cover with dry earth, sand or other non-

combustible material and transfer to containers. Use clean non-sparking tools to collect absorbed material. Large Spills: Water spray may reduce vapour, but may not prevent ignition in enclosed spaces.

Water Spill: Stop leak if you can do so without risk. Eliminate sources of ignition. Warn other shipping. If the Flash Point exceeds the Ambient Temperature by 10 deg C or more, use containment booms and remove from the surface by skimming or with suitable absorbents when conditions permit. If the Flash Point does not exceed the Ambient Air Temperature by at least 10C, use booms as a barrier to protect shorelines and allow material to evaporate. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Large Spills: Dyke far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid all personal contact. Do not siphon by mouth. Do not use as a cleaning solvent or other non-motor fuel uses. For use as a motor fuel only. It is dangerous and/or unlawful to put petrol into unapproved containers. Do not fill container while it is in or on a vehicle. Static electricity may ignite vapour and cause fire. Place container on ground when filling and keep nozzle in contact with container. Do not use electronic devices (including but not limited to cellular phones, computers, calculators, pagers or other electronic devices etc) in or around any fuelling operation or storage area unless the devices are certified intrinsically safe by an approved national testing agency and to the safety standards required by national and/or local laws and regulations. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

Static Accumulator: This material is a static accumulator. A liquid is typically considered a nonconductive, static accumulator if its conductivity is below 100 pS/m (100x10E-12 Siemens per meter) and is considered a semiconductive, static accumulator if its conductivity is below 10,000 pS/m. Whether a liquid is nonconductive or semiconductive, the precautions are the same. A number of factors, for example liquid temperature, presence of contaminants, anti-static additives and filtration can greatly influence the conductivity of a liquid.

STORAGE

The type of container used to store the material may affect static accumulation and dissipation. Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Storage containers should be earthed and bonded. Fixed storage containers, transfer containers and associated equipment should be earthed and bonded to prevent accumulation of static charge. Keep away from incompatible materials.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

Exposure limits/standards (Note: Exposure limits are not additive):

Substance Name	Form	Limit/Standard			Note	Source
Fuels, diesel	Stable Aerosol.	TWA	5 mg/m3		Skin	ExxonMobil Middle East Marketing Corporation
Fuels, diesel	Vapour.	TWA	200 mg/m3		Skin	ExxonMobil Middle East Marketing Corporation
Fuels, diesel [total hydrocarb, vapor&aerosol]	Inhalable fraction and vapour	TWA	100 mg/m3		Skin	ACGIH

Note: Information about recommended monitoring procedures can be obtained from the relevant agency(ies)/institute(s):

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

Use explosion-proof ventilation equipment to stay below exposure limits.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

Half-face filter respirator Type AP filter material., European Committee for Standardization (CEN) standards EN 136, 140 and 405 provide respirator masks and EN 149 and 143 provide filter recommendations.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapour warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

Chemical resistant gloves are recommended. If contact with forearms is likely wear gauntlet style gloves. Nitrile, minimum 0.38 mm thickness or comparable protective barrier material with a high

performance level for continuous contact use conditions, permeation breakthrough minimum 480 minutes in accordance with CEN standards EN 420 and EN 374.

Eye Protection: If contact with material is likely, chemical goggles are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:
Chemical/oil resistant clothing is recommended.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practise good housekeeping.

ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State: Liquid
Colour: Light Coloured
Odour: Petroleum/Solvent
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 °C): 0.82 - 0.845 [EN ISO 3675]
Density (at 15 ºC): 820 kg/m³ (6.84 lbs/gal, 0.82 kg/dm³) - 845 kg/m³ (7.05 lbs/gal, 0.85 kg/dm³) [EN ISO 3675]
Flammability (Solid, Gas): N/A
Flash Point [Method]: >56°C (133°F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.6 UEL: 7.0
Autoignition Temperature: >250°C (482°F)
Boiling Point / Range: > 180°C (356°F)
Decomposition Temperature: N/D
Vapour Density (Air = 1): N/D
Vapour Pressure: < 0.04 kPa (0.3 mm Hg) at 20 °C
Evaporation Rate (n-butyl acetate = 1): N/D
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): > 3.5
Solubility in Water: Negligible
Viscosity: 2 cSt (2 mm2/sec) at 40ºC - 4 cSt (4 mm2/sec) at 40ºC
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: N/D

Melting Point: N/D

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Open flames and high energy ignition sources.

MATERIALS TO AVOID: Halogens, Strong Acids, Strong Bases, Strong oxidisers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
Inhalation	
Acute Toxicity: (Rat) 4 hour(s) LC50 > 4000 mg/m3 (Vapor and aerosol)	Moderately toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 403
Irritation: No end point data for material.	Elevated temperatures or mechanical action may form vapours, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs.
Ingestion	
Acute Toxicity (Rat): LD50 > 5000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 401
Skin	
Acute Toxicity (Rabbit): LD50 > 5000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 434
Skin Corrosion/Irritation (Rabbit): Data available.	Irritating to the skin. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 404
Eye	
Serious Eye Damage/Irritation (Rabbit): Data available.	May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 405
Sensitisation	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: Data available.	Not expected to be a skin sensitizer. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 406
Aspiration: Data available.	May be fatal if swallowed and enters airways. Based on physico-chemical properties of the material.
Germ Cell Mutagenicity: Data available.	Not expected to be a germ cell mutagen. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 471 475
Carcinogenicity: Data available.	Caused cancer in laboratory animals, but the relevance to humans is uncertain. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 451
Reproductive Toxicity: No end point data for material.	Not expected to be a reproductive toxicant.

Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.
Specific Target Organ Toxicity (STOT)	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: Data available.	Concentrated, prolonged or deliberate exposure may cause organ damage. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 410 413

OTHER INFORMATION

For the product itself:

Target Organs Repeated Exposure: Bone marrow, Liver, Thymus

Vapour concentrations above recommended exposure levels are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anaesthetic and may have other central nervous system effects. Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema.
Diesel fuel: Carcinogenic in animal tests. Caused mutations in-vitro. Repeated dermal exposures to high concentrations in test animals resulted in reduced litter size and litter weight, and increased fetal resorptions at maternally toxic doses. Dermal exposure to high concentrations resulted in severe skin irritation with weight loss and some mortality. Inhalation exposure to high concentrations resulted in respiratory tract irritation, lung changes/infiltration/accumulation, and reduction in lung function. Diesel exhaust fumes: Carcinogenic in animal tests. Inhalation exposures to exhaust for 2 years in test animals resulted in lung tumours and lymphoma. Extract of particulate produced skin tumours in test animals. Caused mutations in-vitro.

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

MOBILITY

More volatile component -- Highly volatile, will partition rapidly to air. Not expected to partition to sediment and wastewater solids.

Less volatile component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

Majority of components -- Low potential to migrate through soil.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Material -- Expected to be inherently biodegradable

Atmospheric Oxidation:

Majority of components -- Expected to degrade rapidly in air

BIOACCUMULATION POTENTIAL

Majority of components -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

ECOLOGICAL DATA

Ecotoxicity

Test	Duration	Organism Type	Test Results
Aquatic - Acute Toxicity	48 hour(s)	Daphnia magna	EL50 1 - 1000 mg/l: data for similar materials
Aquatic - Acute Toxicity	96 hour(s)	Fish	LL50 1 - 100 mg/l: data for similar materials
Aquatic - Acute Toxicity	72 hour(s)	Pseudokirchneriella subcapitata	EL50 1 - 100 mg/l: data for similar materials
Aquatic - Chronic Toxicity	72 hour(s)	Pseudokirchneriella subcapitata	NOELR 1 - 10 mg/l: data for similar materials

Persistence, Degradability and Bioaccumulation Potential

Media	Test Type	Duration	Test Results
Water	Ready Biodegradability	28 day(s)	Percent Degraded < 60 : similar material

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14 TRANSPORT INFORMATION

LAND (ADR/RID)

Proper Shipping Name: DIESEL FUEL, GAS OIL OR HEATING OIL, LIGHT
Proper Shipping Name Suffix: Special Provision 640L
Hazard Class: 3
Classification Code: F1
UN Number: 1202
Packing Group: III
Label(s) / Mark(s): 3, EHS

Hazard ID Number: 30
Hazchem EAC: 3Y

SEA (IMDG)

Proper Shipping Name: DIESEL FUEL, GAS OIL OR HEATING OIL, LIGHT
Hazard Class & Division: 3
EMS Number: F-E, S-E
UN Number: 1202
Packing Group: III
Marine Pollutant: Yes
Label(s): 3
Transport Document Name: UN1202, DIESEL FUEL, GAS OIL OR HEATING OIL, LIGHT, 3, PG III, (56°C c.c.), MARINE POLLUTANT

AIR (IATA)

Proper Shipping Name: DIESEL FUEL, GAS OIL OR HEATING OIL, LIGHT
Hazard Class & Division: 3
UN Number: 1202
Packing Group: III
Label(s) / Mark(s): 3
Transport Document Name: UN1202, DIESEL FUEL, GAS OIL OR HEATING OIL, LIGHT, 3, PG III

SECTION 15 REGULATORY INFORMATION

This material is considered hazardous according to the Classification of Chemicals based on Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

REGULATORY STATUS AND APPLICABLE LAWS AND REGULATIONS

Listed or exempt from listing/notification on the following chemical inventories: AICS, DSL, IECSC, KECI, PICCS, TCSI, TSCA

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable
KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):
H226: Flammable liquid and vapour; Flammable Liquid, Cat 3
H304: May be fatal if swallowed and enters airways; Aspiration, Cat 1
H315: Causes skin irritation; Skin Corr/Irritation, Cat 2
H332: Harmful if inhaled; Acute Tox Inh, Cat 4
H351: Suspected of causing cancer; GHS Carcinogenicity, Cat 2
H373: May cause damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 2
H401: Toxic to aquatic life; Acute Env Tox, Cat 2
H411: Toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 2

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Updates made in accordance with implementation of GHS requirements.

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Internal Use Only

MHC: 1A, 0B, 2, 0, 4, 1 PPEC: C

DGN: 7081438XAA (1017892)

Safety Data Sheet

Version 1.16 SDS Number 300000000074
Revision Date 08/01/2016 Print Date 08/04/2018

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Hydrogen
Chemical formula	:	H2
Synonyms	:	Hydrogen
Product Use Description	:	General Industrial
Manufacturer/Importer/Distributor	:	Versum Materials US, LLC 8555 South River Parkway Tempe, AZ 85284 Exporter EIN No.475632014 www.versummaterials.com
Telephone	:	(602)282-1000
Emergency telephone number (24h)	:	1-800-424-9300 (CHEMTREC) and (+1) 703-741-5970 (CHEMTREC)

2. HAZARDS IDENTIFICATION

GHS classification

Flammable gases - Category 1
Gases under pressure - Compressed gas.

GHS label elements

Hazard pictograms/symbols



Signal Word: Danger

Hazard Statements:

H220:Extremely flammable gas.

H280:Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.
May form explosive mixtures in air.
Burns with invisible flame.

Precautionary Statements:

Prevention	:	P210:Keep away from heat, hot surfaces, sparks, open flames, and other ignition sources. No smoking.
Response	:	P377 :Leaking gas fire: Do not extinguish, unless leak can be stopped safely. P381 :Eliminate all ignition sources if safe to do so.
Storage	:	P410+P403:Protect from sunlight. Store in a well-ventilated place.

Hazards not otherwise classified

Burns with an invisible flame.
Can ignite on contact with air.
High pressure gas.
Can cause rapid suffocation.
Extremely flammable.
May form explosive mixtures in air.
Immediate fire and explosion hazard exists when mixed with air at concentrations exceeding the lower flammability limit (LFL).
High concentrations that can cause rapid suffocation are within the flammable range and should not be entered.
Avoid breathing gas.
Self contained breathing apparatus (SCBA) may be required.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Concentration (Volume)
Hydrogen	1333-74-0	100 %

Concentration is nominal. For the exact product composition, please refer to technical specifications.

4. FIRST AID MEASURES

General advice	:	Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
Eye contact	:	In case of direct contact with eyes, seek medical advice.
Skin contact	:	Adverse effects not expected from this product. IF exposed or concerned: Get medical advice/attention.

Ingestion	:	Ingestion is not considered a potential route of exposure.
Inhalation	:	In case of shortness of breath, give oxygen. Move to fresh air. If breathing has stopped or is labored, give assisted respirations. Supplemental oxygen may be indicated. If the heart has stopped, trained personnel should begin cardiopulmonary resuscitation immediately. Seek medical advice.
Most important symptoms/effects - acute and delayed	:	Exposure to oxygen deficient atmosphere may cause the following symptoms: Dizziness. Salivation. Nausea. Vomiting. Loss of mobility/consciousness.

Immediate Medical Attention and Special Treatment

Treatment	:	If exposed or concerned: Get medical attention/advice.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	Use extinguishing media appropriate for surrounding fire.
Extinguishing media which must not be used for safety reasons.	:	Carbon dioxide (CO_2).
Specific hazards	:	Ignitable by static electricity. Burns with an invisible flame. Gas is lighter than air and can accumulate in the upper sections of enclosed spaces. Upon exposure to intense heat or flame, cylinder will vent rapidly and or rupture violently. Keep containers and surroundings cool with water spray. Extinguish fire only if gas flow can be stopped. If possible, shut off the source of gas and allow the fire to burn itself out. Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire. Move away from container and cool with water from a protected position. Keep adjacent cylinders cool by spraying with large amounts of water until fire burns itself out. If flames are accidentally extinguished, explosive re-ignition may occur; therefore, appropriate measures should be taken(e.g. total evacuation to protect persons from cylinder fragments and toxic fumes should a rupture occur). Most cylinders are designed to vent contents when exposed to elevated temperatures.
Special protective equipment for fire-fighters	:	Wear self contained breathing apparatus for fire fighting if necessary.
Further information	:	The presence of a hydrogen flame can be detected by approaching cautiously with an outstretched straw broom to make the flame visible.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures	:	Evacuate personnel to safe areas. Remove all sources of ignition. Never enter a confined space or other area where the flammable gas concentration is greater the 10% of its lower flammable limit. Ventilate the area.
Environmental precautions	:	Do not discharge into any place where its accumulation could be dangerous. Should not be released into the environment. Prevent further leakage or spillage if safe to do so.

Methods for cleaning up	:	Ventilate the area. Approach suspected leak areas with caution.
Additional advice	:	Increase ventilation to the release area and monitor concentrations. If leak is from cylinder or cylinder valve, call the emergency telephone number. If the leak is in the user's system, close the cylinder valve, safely vent the pressure, and purge with an inert gas before attempting repairs.

7. HANDLING AND STORAGE

Handling

May ignite if valve is opened to air. Protect cylinders from physical damage; do not drag, roll, slide or drop. Do not allow storage area temperature to exceed 50°C (122°F). Only experienced and properly instructed persons should handle compressed gases/cryogenic liquids. Before using the product, determine its identity by reading the label. Know and understand the properties and hazards of the product before use. When doubt exists as to the correct handling procedure for a particular gas, contact the supplier. Do not remove or deface labels provided by the supplier for the identification of the cylinder contents. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. Use an adjustable strap wrench to remove over-tight or rusted caps. Before connecting the container, check the complete gas system for suitability, particularly for pressure rating and materials. Before connecting the container for use, ensure that back feed from the system into the container is prevented. Ensure the complete gas system is compatible for pressure rating and materials of construction. Ensure the complete gas system has been checked for leaks before use. Employ suitable pressure regulating devices on all containers when the gas is being emitted to systems with lower pressure rating than that of the container. Never insert an object (e.g. wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may damage valve, causing a leak to occur. Open valve slowly. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier. Close container valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Damaged valves should be reported immediately to the supplier. Close valve after each use and when empty. Replace outlet caps or plugs and container caps as soon as container is disconnected from equipment. Do not subject containers to abnormal mechanical shock. Never attempt to lift a cylinder by its valve protection cap or guard. Do not use containers as rollers or supports or for any other purpose than to contain the gas as supplied. Never strike an arc on a compressed gas cylinder or make a cylinder a part of an electrical circuit. Do not smoke while handling product or cylinders. Never re-compress a gas or a gas mixture without first consulting the supplier. Never attempt to transfer gases from one cylinder/container to another. Always use backflow protective device in piping. Purge air from system before introducing gas. When returning cylinder install valve outlet cap or plug leak tight. Never use direct flame or electrical heating devices to raise the pressure of a container. Containers should not be subjected to temperatures above 50°C (122°F). All piped systems and associated equipment must b e grounded.

Storage

Do not change or force fit connections. Always keep container in upright position. Use a back flow preventative device in the piping. Use only with equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Open/close valve slowly. Close when not in use. Wear Safety Eye Protection. Check Safety Data Sheet before use. Containers should be stored in a purpose build compound which should be well ventilated, preferably in the open air. Observe all regulations and local requirements regarding storage of containers. Stored containers should be periodically checked for general condition and leakage. Protect containers stored in the open against rusting and extremes of weather. Containers should not be stored in conditions likely to encourage corrosion. Containers should be stored in the vertical position and properly

secured to prevent toppling. The container valves should be tightly closed and where appropriate valve outlets should be capped or plugged. Container valve guards or caps should be in place. Keep containers tightly closed in a cool, well-ventilated place. Store containers in location free from fire risk and away from sources of heat and ignition. Full and empty cylinders should be segregated. Do not allow storage temperature to exceed 50°C (122°F). Smoking should be prohibited within storage areas or while handling product or containers. Display "No Smoking or Open Flames" signs in the storage areas. The amounts of flammable or toxic gases in storage should be kept to a minimum. Return empty containers in a timely manner. Flammable storage areas should be separated from oxygen and other oxidizers by a minimum distance of 20 ft. (6.1 m.) or by a barrier of non-combustible material at least 5 ft. (1.5 m.) high, having a fire resistance rating of at least 1/2 hour.

Technical measures/Precautions

Containers should be segregated in the storage area according to the various categories (e.g. flammable, toxic, etc.) and in accordance whit local regulations. Keep away from combustible material. All electrical equipment in the storage areas should be compatible with flammable materials stored. Containers containing flammable gases should be stored away from other combustible materials. Where necessary containers containing oxygen and oxidants should be separated from flammable gases by a fire resistant partition.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures

Provide natural or explosion-proof ventilation that is adequate to ensure flammable gas does not reach its lower explosive limit.

Personal protective equipment

Respiratory protection	:	High concentrations that can cause rapid suffocation are within the flammable range and should not be entered.
Hand protection	:	Wear working gloves when handling gas containers.
Eye protection	:	Safety glasses recommended when handling cylinders.
Skin and body protection	:	Safety shoes are recommended when handling cylinders. Wear as appropriate: Flame retardant protective clothing.
Special instructions for protection and hygiene	:	Ensure adequate ventilation, especially in confined areas.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Compressed gas. Colorless gas
Odor	:	None.
Odor	:	Mixture contains one or more component(s) which have the following odor: No odor warning properties.

Odor threshold	:	No data available.
pH	:	Not applicable.
Melting point/range	:	-435 °F (-259.2 °C)
Boiling point/range	:	-423 °F (-252.9 °C)
Flash point	:	Not applicable.
Evaporation rate	:	Not applicable.
Flammability (solid, gas)	:	Refer to product classification in Section 2
Upper/lower explosion/flammability limit	:	75 %(V) / 4 %(V)
Vapor pressure	:	Not applicable.
Water solubility	:	0.0016 g/l
Relative vapor density	:	0.07 (air = 1)
Relative density	:	0.07 (water = 1)
Partition coefficient (n-octanol/water)	:	Not applicable.
Auto-ignition temperature	:	560 °C
Decomposition temperature	:	No data available.
Viscosity	:	Not applicable.
Molecular Weight	:	2.02 g/mol
Density	:	0.006 lb/ft3 (0.0001 g/cm3) at 70 °F (21 °C) Note: (as vapor)
Specific Volume	:	191.97 ft3/lb (11.9830 m3/kg) at 70 °F (21 °C)

10. STABILITY AND REACTIVITY

Chemical Stability	:	Stable under normal conditions.
Conditions to avoid	:	Heat, flames and sparks. May form explosive mixtures with air and oxidizing agents.
Materials to avoid	:	Oxygen.

Oxidizing agents.

Hazardous decomposition products	:	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Possibility of hazardous Reactions/Reactivity	:	No data available.

11. TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Likely routes of exposure

Effects on Eye	:	In case of direct contact with eyes, seek medical advice.
Effects on Skin	:	Adverse effects not expected from this product.
Inhalation Effects	:	In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Asphyxiation may bring about unconsciousness without warning and so rapidly that victim may be unable to protect themselves.
Ingestion Effects	:	Ingestion is not considered a potential route of exposure.
Symptoms	:	Exposure to oxygen deficient atmosphere may cause the following symptoms: Dizziness. Salivation. Nausea. Vomiting. Loss of mobility/consciousness.

Acute toxicity

Acute Oral Toxicity	:	No data is available on the product itself.
Inhalation	:	No data is available on the product itself.
Acute Dermal Toxicity	:	No data is available on the product itself.
Skin corrosion/irritation	:	No data available.
Serious eye damage/eye irritation	:	No data available.
Sensitization.	:	No data available.

Chronic toxicity or effects from long term exposures

Carcinogenicity	:	No data available.
Reproductive toxicity	:	No data is available on the product itself.
Germ cell mutagenicity	:	No data is available on the product itself.

Specific target organ systemic toxicity (single exposure)	:	No data available.
Specific target organ systemic toxicity (repeated exposure)	:	No data available.
Aspiration hazard	:	No data available.

Delayed and Immediate Effects and Chronic Effects from Short and Long Term Exposure

Not applicable.

12. ECOLOGICAL INFORMATION

Ecotoxicity effects

Aquatic toxicity	:	No data is available on the product itself.
Toxicity to other organisms	:	No data available.

Persistence and degradability

Biodegradability	:	No data is available on the product itself.
Mobility	:	Because of its high volatility, the product is unlikely to cause ground pollution.
Bioaccumulation	:	Refer to Section 9 "Partition Coefficient (n-octanol/water)".

Further information

This product has no known eco-toxicological effects.

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products	:	Contact supplier if guidance is required. Return unused product in original cylinder to supplier. Do not discharge into areas where there is a risk of forming an explosive mixture with air. Waste gas should be flared through a suitable burner with flash back arrestor.
Contaminated packaging	:	Return cylinder to supplier.

14. TRANSPORT INFORMATION

DOT

UN/ID No. : UN1049
Proper shipping name : Hydrogen, compressed
Class or Division : 2.1
Label(s) : 2.1
Marine Pollutant : No

IATA

UN/ID No. : UN1049
Proper shipping name : Hydrogen, compressed
Class or Division : 2.1
Label(s) : 2.1
Marine Pollutant : No

IMDG

UN/ID No. : UN1049
Proper shipping name : HYDROGEN, COMPRESSED
Class or Division : 2.1
Label(s) : 2.1
Marine Pollutant : No

TDG

UN/ID No. : UN1049
Proper shipping name : HYDROGEN, COMPRESSED
Class or Division : 2.1
Label(s) : 2.1
Marine Pollutant : No

Further Information

Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. The transportation information is not intended to convey all specific regulatory data relating to this material. For complete transportation information, contact customer service.

15. REGULATORY INFORMATION

Toxic Substance Control Act (TSCA) 12(b) Component(s):

None.

Country	Regulatory list	Notification
USA	TSCA	Included on Inventory.
EU	EINECS	Included on Inventory.
Canada	DSL	Included on Inventory.

Australia	AICS	Included on Inventory.
South Korea	ECL	Included on Inventory.
China	SEPA	Included on Inventory.
Philippines	PICCS	Included on Inventory.
Japan	ENCS	Included on Inventory.

EPA SARA Title III Section 312 (40 CFR 370) Hazard Classification
Fire Hazard. Sudden Release of Pressure Hazard.

US. California Safe Drinking Water & Toxic Enforcement Act (Proposition 65)
This product does not contain any chemicals known to State of California to cause cancer, birth defects or any other harm.

16. OTHER INFORMATION

NFPA Rating

Health : 0
Fire : 4
Instability : 0

HMIS Rating

Health : 0
Flammability : 4
Physical hazard : 3

Prepared by : Versum Materials, Product Regulatory Department

Telephone : (602)282-1000

Preparation Date : 08/04/2018

For additional information, please visit our Versum Materials' Product Stewardship web site.
http://www.versummaterials.com/productstewardship/

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1 Identification

· **Product identifier**

· **Trade name: Hypochlorite A**
· **Product code:** HR8939

· **Recommended use and restriction on use**
· **Recommended use:** Laboratory chemicals
· **Restrictions on use:** No relevant information available.

· **Details of the supplier of the Safety Data Sheet**
· **Manufacturer/Supplier:**
AquaPhoenix Scientific, Inc.
860 Gitts Run Road
Hanover, PA 17331 USA
Tel +1 (717)632-1291
Toll-Free: (866)632-1291
info@aquaphoenixsci.com
· **Distributor:**
AquaPhoenix Scientific
860 Gitts Run Road,
Hanover, PA 17331
(717) 632-1291

· **Emergency telephone number:**
ChemTel Inc.
(800)255-3924 (North America)
+1 (813)248-0585 (International)

2 Hazard(s) identification

· **Classification of the substance or mixture**

Met. Corr.1	H290	May be corrosive to metals.
Skin Corr. 1B	H314	Causes severe skin burns and eye damage.
Eye Dam. 1	H318	Causes serious eye damage.

· **Label elements**
· **GHS label elements**
The product is classified and labeled according to the Globally Harmonized System (GHS).
· **Hazard pictograms:**



GHS05

· **Signal word:** Danger
· **Hazard statements:**
H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.
· **Precautionary statements:**
P234 Keep only in original container.
P260 Do not breathe mist/vapors/spray.
P264 Wash thoroughly after handling.

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P280	Wear protective gloves and eye protection.
P301+P330+P331	If swallowed: Rinse mouth. Do NOT induce vomiting.
P303+P361+P353	If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a poison center/doctor.
P363	Wash contaminated clothing before reuse.
P390	Absorb spillage to prevent material damage.
P405	Store locked up.
P406	Store in corrosive resistant container with a resistant inner liner.
P501	Dispose of contents/container in accordance with local/regional/national/international regulations.

· **Other hazards** There are no other hazards not otherwise classified that have been identified.

3 Composition/information on ingredients

· **Chemical characterization: Mixtures**

· **Components:**

64-19-7	Acetic acid Flam. Liq. 3, H226 Met. Corr.1, H290; Skin Corr. 1A, H314	25%

· **Additional information:** For the wording of the listed Hazard Statements, refer to section 16.

4 First-aid measures

· **Description of first aid measures**

· **After inhalation:** Supply fresh air; consult doctor in case of complaints.

· **After skin contact:**
Immediately rinse with water.
If skin irritation continues, consult a doctor.
Seek immediate help for blistering or open wounds.

· **After eye contact:**
Protect unharmed eye.
Remove contact lenses if worn.
Rinse opened eye for 15 to 20 minutes under running water. Then consult a doctor.

· **After swallowing:**
Rinse out mouth and then drink plenty of water.
Do not induce vomiting; immediately call for medical help.

· **Most important symptoms and effects, both acute and delayed:**
Eye damage.
Strong caustic effect on skin and mucous membranes.
Gastric or intestinal disorders when ingested.

· **Danger:**
Causes severe skin burns and eye damage.
Danger of gastric perforation.

· **Indication of any immediate medical attention and special treatment needed:**

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Medical supervision for at least 48 hours.
If medical advice is needed, have product container or label at hand.

5 Fire-fighting measures

· **Extinguishing media**
· **Suitable extinguishing agents:** Use fire fighting measures that suit the environment.
· **For safety reasons unsuitable extinguishing agents:** No relevant information available.
· **Special hazards arising from the substance or mixture**
Formation of toxic gases is possible during heating or in case of fire.
· **Advice for firefighters**
· **Protective equipment:**
Wear self-contained respiratory protective device.
Wear fully protective suit.

6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures**
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation.
For large spills, use respiratory protective device against the effects of fumes/dust/aerosol.
· **Environmental precautions**
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
· **Methods and material for containment and cleaning up**
Use calcium oxide as a neutralizing agent.
Pick up mechanically.
Send for recovery or disposal in suitable receptacles.
· **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

· **Handling**
· **Precautions for safe handling:**
Prevent formation of aerosols.
Avoid splashes or spray in enclosed areas.
Use only in well ventilated areas.
· **Information about protection against explosions and fires:** The product is not flammable.

· **Conditions for safe storage, including any incompatibilities**
· **Requirements to be met by storerooms and receptacles:**
Store only in the original receptacle.
Store in a well-ventilated place. Keep cool.
· **Information about storage in one common storage facility:**

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Store away from metals.
Do not store together with alkalis (caustic solutions).
Store away from oxidizing agents.
Store away from foodstuffs.

· **Further information about storage conditions:** Keep containers tightly sealed.

· **Specific end use(s)** No relevant information available.

8 Exposure controls/personal protection

· **Control parameters**

· **Components with limit values that require monitoring at the workplace:**	
64-19-7 Acetic acid	
PEL (USA)	Long-term value: 25 mg/m³, 10 ppm
REL (USA)	Short-term value: 37 mg/m³, 15 ppm Long-term value: 25 mg/m³, 10 ppm
TLV (USA)	Short-term value: 37 mg/m³, 15 ppm Long-term value: 25 mg/m³, 10 ppm
EL (Canada)	Short-term value: 15 ppm Long-term value: 10 ppm
EV (Canada)	Short-term value: 37 mg/m³, 15 ppm Long-term value: 25 mg/m³, 10 ppm
LMPE (Mexico)	Short-term value: 15 ppm Long-term value: 10 ppm

· **Exposure controls**

· **General protective and hygienic measures:**
The usual precautionary measures for handling chemicals should be followed.
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Avoid contact with the eyes and skin.

· **Engineering controls:** Provide adequate ventilation.

· **Breathing equipment:** In case of inadequate ventilation wear respiratory protection.

· **Protection of hands:**



Protective gloves

· **Material of gloves**
Nitrile rubber, NBR
Natural rubber, NR
Sensibilization by the components in the glove materials is possible.

· **Eye protection:**



Safety glasses

Follow relevant national guidelines concerning the use of protective eyewear.

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· **Body protection:** Protective work clothing
· **Limitation and supervision of exposure into the environment**
No relevant information available.
· **Risk management measures** No relevant information available.

9 Physical and chemical properties

· **Information on basic physical and chemical properties**

· **Appearance:**	
Form:	Liquid
Color:	Clear
· **Odor:**	Vinegar-like.
· **Odor threshold:**	Not determined.
· **pH-value:**	Not determined.
· **Melting point/Melting range:**	Not determined.
· **Boiling point/Boiling range:**	Not determined.
· **Flash point:**	Not applicable.
· **Flammability (solid, gaseous):**	Not applicable.
· **Auto-ignition temperature:**	Not determined.
· **Decomposition temperature:**	Not determined.
· **Danger of explosion:**	Product does not present an explosion hazard.
· **Explosion limits**	
Lower:	Not determined.
Upper:	Not determined.
· **Oxidizing properties:**	Non-oxidizing.
· **Vapor pressure:**	Not determined.
· **Density:**	
Relative density:	Not determined.
Vapor density:	Not determined.
Evaporation rate:	Not determined.
· **Solubility in / Miscibility with**	
Water:	Fully miscible.
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity**	
Dynamic:	Not determined.
Kinematic:	Not determined.
· **Other information**	No relevant information available.

10 Stability and reactivity

· **Reactivity:** No relevant information available.

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· **Chemical stability:** Stable under normal temperatures and pressures.
· **Thermal decomposition / conditions to be avoided:**
No decomposition if used and stored according to specifications.
· **Possibility of hazardous reactions** No dangerous reactions known.
· **Conditions to avoid** Excessive heat.
· **Incompatible materials**
Metals.
Alkalis.
Oxidizing agents.
· **Hazardous decomposition products**
Under fire conditions only:
Carbon monoxide and carbon dioxide

11 Toxicological information

· **Information on toxicological effects**
· **Acute toxicity:** Based on available data, the classification criteria are not met.

· **LD/LC50 values that are relevant for classification:**		
ATE (Acute Toxicity Estimate)		
Oral	LD50	13240 mg/kg (rat)

64-19-7 Acetic acid		
Oral	LD50	3310 mg/kg (rat)

· **Primary irritant effect:**
· **On the skin:** Strong caustic effect on skin and mucous membranes.
· **On the eye:** Strong caustic effect.
· **Sensitization:** Based on available data, the classification criteria are not met.

· **IARC (International Agency for Research on Cancer):**
None of the ingredients are listed.

· **NTP (National Toxicology Program):**
None of the ingredients are listed.

· **OSHA-Ca (Occupational Safety & Health Administration):**
None of the ingredients are listed.

· **Probable route(s) of exposure:**
Ingestion.
Inhalation.
Eye contact.
Skin contact.
· **Acute effects (acute toxicity, irritation and corrosivity):** Causes severe skin burns and eye damage.
· **Germ cell mutagenicity:** Based on available data, the classification criteria are not met.
· **Carcinogenicity:** Based on available data, the classification criteria are not met.
· **Reproductive toxicity:** Based on available data, the classification criteria are not met.
· **STOT-single exposure:** Based on available data, the classification criteria are not met.
· **STOT-repeated exposure:** Based on available data, the classification criteria are not met.
· **Aspiration hazard:** Based on available data, the classification criteria are not met.

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12 Ecological information

· **Toxicity**
· **Aquatic toxicity** No relevant information available.
· **Persistence and degradability** No relevant information available.
· **Bioaccumulative potential:** No relevant information available.
· **Mobility in soil:** No relevant information available.
· **Additional ecological information**
· **General notes:**
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
Must not reach bodies of water or drainage ditch undiluted or unneutralized.
Rinse off of bigger amounts into drains or the aquatic environment may lead to decreased pH-values. A low pH-value harms aquatic organisms. If the dilution of the use-level pH-value is considerably increased after use, the aqueous waste, emptied into drains, is only low water-dangerous.
· **Other adverse effects** No relevant information available.

13 Disposal considerations

· **Waste treatment methods**
· **Recommendation:**
The user of this material has the responsibility to dispose of unused material, residues and containers in compliance with all relevant local, state and federal laws and regulations regarding treatment, storage and disposal for hazardous and nonhazardous wastes.

· **Uncleaned packagings**
· **Recommendation:** Disposal must be made according to official regulations.

14 Transport information

· **UN-Number**	
· **DOT, ADR/RID/ADN, IMDG, IATA**	UN2790
· **UN proper shipping name**	
· **DOT**	Acetic acid solution, 25% Acid
· **ADR/RID/ADN, IMDG, IATA**	ACETIC ACID SOLUTION, 25% Acid
· **Transport hazard class(es)**	
· **DOT**	



· **Class**	8
· **Label**	8

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· **ADR/RID/ADN**



· **Class**	8 (C3)
· **Label**	8

· **IMDG, IATA**



· **Class**	8
· **Label**	8
· **Packing group**	
· **DOT, ADR/RID/ADN, IMDG, IATA**	III
· **Environmental hazards**	Not applicable.
· **Special precautions for user**	Warning: Corrosive substances
· **Hazard identification number (Kemler code):**	80
· **EMS Number:**	F-A,S-B
· **Segregation groups**	Acids
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.

15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**

· **United States (USA)**

· **SARA**

· **Section 302 (extremely hazardous substances):**

None of the ingredients are listed.

· **Section 313 (Specific toxic chemical listings):**

None of the ingredients are listed.

· **TSCA (Toxic Substances Control Act)**

All ingredients are listed or exempt.

· **Proposition 65 (California)**

· **Chemicals known to cause cancer:**

None of the ingredients are listed.

· **Chemicals known to cause developmental toxicity for females:**

None of the ingredients are listed.

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· **Chemicals known to cause developmental toxicity for males:**
None of the ingredients are listed.

· **Chemicals known to cause developmental toxicity:**
None of the ingredients are listed.

· **EPA (Environmental Protection Agency):**
None of the ingredients are listed.

· **IARC (International Agency for Research on Cancer):**
None of the ingredients are listed.

· **Canadian Domestic Substances List (DSL):**
All ingredients listed on DSL or NDSL.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Abbreviations and acronyms:**
ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
CAS: Chemical Abstracts Service (division of the American Chemical Society)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
OSHA: Occupational Safety & Health Administration
Flam. Liq. 3: Flammable liquids – Category 3
Met. Corr.1: Corrosive to metals – Category 1
Skin Corr. 1A: Skin corrosion/irritation – Category 1A
Skin Corr. 1B: Skin corrosion/irritation – Category 1B
Eye Dam. 1: Serious eye damage/eye irritation – Category 1

· **Sources**
Website, European Chemicals Agency (echa.europa.eu)
Website, US EPA Substance Registry Services (ofmpub.epa.gov/sor internet/registry/substreg/home/overview/home.do)
Website, Chemical Abstracts Registry, American Chemical Society (www.cas.org)
Patty's Industrial Hygiene, 6th ed., Rose, Vernon, ed. ISBN: 978-0-470-07488-6
Casarett and Doull's Toxicology: The Basic Science of Poisons, 8th Ed., Klaasen, Curtis D., ed., ISBN: 978-0-07-176923-5.
Safety Data Sheets, Individual Manufacturers

SDS Prepared by:
ChemTel
1305 North Florida Avenue
Tampa, Florida USA 33602-2902
Toll Free North America 1-888-255-3924 Intl. +01 813-248-0573
Website: www.chemtel.com

Conforms to EU Regulation 1907/2006/EC as amended.

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Trade name : Performax™ DC5006
COOLING WATER TREATMENT
™ Trademark, Solenis or its subsidiaries or affiliates, registered in various countries

1.2 Relevant identified uses of the substance or mixture and uses advised against

Use of the Substance/Mixture : Production aid for use in the pulp & paper industry

1.3 Details of the supplier of the safety data sheet	1.4 Emergency telephone number
Solenis Pesetastraat 62 2991 XT Barendrecht Netherlands Solenis UK Industries Limited P. O. Box 38, Cleckheaton Rd, Low Moor, Bradford, BD12 0JZ, United Kingdom **E-mail address of person responsible for the SDS:** EHSProductSafetyTeam@solenis.com **Product Information** Contact your local Solenis representative	+1-302-502-0991 , or contact your local emergency telephone number at 112

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Not a hazardous substance or mixture.

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Not a hazardous substance or mixture.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

Ecological information: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Toxicological information: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Components

Remarks : No hazardous ingredients

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice : No hazards which require special first aid measures.

If inhaled : If breathed in, move person into fresh air.
If unconscious, place in recovery position and seek medical advice.
If symptoms persist, call a physician.

In case of skin contact : First aid is not normally required. However, it is recommended that exposed areas be cleaned by washing with soap and water.

In case of eye contact : Remove contact lenses.
Protect unharmed eye.

If swallowed : Do not give milk or alcoholic beverages.
Never give anything by mouth to an unconscious person.
If symptoms persist, call a physician.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms : No symptoms known or expected.

4.3 Indication of any immediate medical attention and special treatment needed

Treatment : No hazards which require special first aid measures.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Water spray
Foam
Carbon dioxide (CO2)
Dry chemical

5.2 Special hazards arising from the substance or mixture

Specific hazards during firefighting : Do not allow run-off from fire fighting to enter drains or water courses.

Hazardous combustion products : No hazardous combustion products are known

5.3 Advice for firefighters

Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus.

Specific extinguishing methods : Product is compatible with standard fire-fighting agents.

Further information : Standard procedure for chemical fires.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions : Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed.
Comply with all applicable federal, state, and local regulations.

6.2 Environmental precautions

Environmental precautions : Prevent further leakage or spillage if safe to do so.

6.3 Methods and material for containment and cleaning up

Methods for cleaning up : Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For further information see Section 8 and Section 13 of the safety data sheet.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling	:	Smoking, eating and drinking should be prohibited in the application area. For personal protection see section 8.
Advice on protection against fire and explosion	:	Normal measures for preventive fire protection.
Hygiene measures	:	General industrial hygiene practice.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers	:	Electrical installations / working materials must comply with the technological safety standards.
Advice on common storage	:	No materials to be especially mentioned.
Further information on storage stability	:	No decomposition if stored and applied as directed.

7.3 Specific end use(s)

Specific use(s)	:	No data available

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Engineering measures

General room ventilation should be adequate for normal conditions of use. However, if unusual operating conditions exist, provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below exposure guidelines (if applicable) or below levels that cause known, suspected or apparent adverse effects.

Personal protective equipment

Eye protection	:	Not required under normal conditions of use. Wear splash-proof safety goggles if material could be misted or splashed into eyes.
Skin and body protection	:	Wear as appropriate: Safety shoes Wear resistant gloves (consult your safety equipment supplier).

Respiratory protection : No personal respiratory protective equipment normally required.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state	:	Aqueous solution
Colour	:	clear, amber
Odour	:	odourless
Odour Threshold	:	No data available
Melting point/freezing point	:	-5 °C
Boiling point/boiling range	:	100 °C
Flammability	:	Not classified as supporting combustion according to the transport regulations.
Upper explosion limit / Upper flammability limit	:	No data available
Lower explosion limit / Lower flammability limit	:	No data available
Flash point	:	Not applicable
Decomposition temperature	:	No data available
pH	:	6
Viscosity		
Viscosity, dynamic	:	250 mPa.s (20 °C)
Viscosity, kinematic	:	No data available
Solubility(ies)		
Water solubility	:	completely soluble
Solubility in other solvents	:	No data available
Partition coefficient: n-octanol/water	:	No data available
Vapour pressure	:	31,06 hPa (30 °C) Calculated Vapor Pressure

Relative density	:	No data available
Density	:	ca. 1,2 g/cm3 (20 °C)
Relative vapour density	:	No data available

9.2 Other information

Oxidizing properties	:	No data available
Self-ignition	:	No data available
Evaporation rate	:	No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No decomposition if stored and applied as directed.

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Hazardous reactions	:	Product will not undergo hazardous polymerization.

10.4 Conditions to avoid

Conditions to avoid	:	No data available

10.5 Incompatible materials

Materials to avoid	:	No data available

10.6 Hazardous decomposition products

Hazardous decomposition products	:	Carbon monoxide Carbon dioxide (CO2)

SECTION 11: Toxicological information

11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity

Not classified based on available information.

Product:

Acute oral toxicity	:	LD50 (Mouse): > 5.000 mg/kg

Skin corrosion/irritation

Not classified based on available information.

Product:

Result : Not irritating to skin

Serious eye damage/eye irritation

Not classified based on available information.

Product:

Result : Not irritating to eyes

Remarks : Unlikely to cause eye irritation or injury.

Respiratory or skin sensitisation

Skin sensitisation

Not classified based on available information.

Respiratory sensitisation

Not classified based on available information.

Germ cell mutagenicity

Not classified based on available information.

Carcinogenicity

Not classified based on available information.

Reproductive toxicity

Not classified based on available information.

STOT - single exposure

Not classified based on available information.

STOT - repeated exposure

Not classified based on available information.

Aspiration toxicity

Not classified based on available information.

11.2 Information on other hazards

Endocrine disrupting properties

Product:

Assessment : The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Further information

Product:

Remarks : No data available

SECTION 12: Ecological information

12.1 Toxicity

Product:

Toxicity to fish : LC50 (Danio rerio (zebra fish)): > 100 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203
Remarks: Based on a similar product formulation.

Toxicity to microorganisms : EC50 (Pseudomonas putida): > 4.000 mg/l
Remarks: Information given is based on data on the components and the ecotoxicology of similar products.

12.2 Persistence and degradability

Product:

Biochemical Oxygen Demand (BOD) : 12 mg/g

Chemical Oxygen Demand (COD) : 413 mg/g

Physico-chemical removability : Remarks: The product can be eliminated from water by abiotic processes, e.g. adsorption on activated sludge.

12.3 Bioaccumulative potential

Product:

Bioaccumulation : Remarks: The bioaccumulation potential cannot be determined.

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

Product:

Assessment : This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher..

12.6 Endocrine disrupting properties

Product:

Assessment : The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

12.7 Other adverse effects

Product:

Additional ecological information : No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product : Dispose of in accordance with local regulations.

Contaminated packaging : Empty remaining contents.

SECTION 14: Transport information

14.1 UN number or ID number

ADR: Not dangerous goods

ADN: Not dangerous goods

RID: Not dangerous goods

IMDG-Code: Not dangerous goods

IATA-DGR: Not dangerous goods

14.2 UN proper shipping name

ADR: Not dangerous goods
ADN: Not dangerous goods
RID: Not dangerous goods
IMDG-Code: Not dangerous goods
IATA-DGR: Not dangerous goods

14.3 Transport hazard class(es)

ADR: Not dangerous goods
ADN: Not dangerous goods
RID: Not dangerous goods
IMDG-Code: Not dangerous goods
IATA-DGR: Not dangerous goods

14.4 Packing group

ADR: Not dangerous goods
ADN: Not dangerous goods
RID: Not dangerous goods
IMDG-Code: Not dangerous goods
IATA-DGR: Not dangerous goods

14.5 Environmental hazards

ADR: Not applicable
ADN: Not applicable
RID: Not applicable
IMDG-Code: Not applicable
IATA-DGR: Not applicable
`

14.6 Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

14.7 Maritime transport in bulk according to IMO instruments

Not applicable for product as supplied.

Dangerous goods descriptions (if indicated above) may not reflect quantity, end-use or region-specific exceptions that can be applied. Consult shipping documents for descriptions that are specific to the shipment.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles (Annex XVII)	:	Not applicable
REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59).	:	Not applicable
REACH - List of substances subject to authorisation (Annex XIV)	:	Not applicable

Regulation (EC) No 1005/2009 on substances that deplete the ozone layer	:	Not applicable
Regulation (EU) 2019/1021 on persistent organic pollutants (recast)	:	Not applicable
UK REACH List of substances subject to authorisation (Annex XIV)	:	Not applicable
Regulation (EC) No 649/2012 of the European Parliament and the Council concerning the export and import of dangerous chemicals	:	Not applicable

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances. Not applicable

The components of this product are reported in the following inventories:

TCSI	:	On the inventory, or in compliance with the inventory
TSCA	:	On or in compliance with the active portion of the TSCA inventory
AIIC	:	All components are listed on the inventory, regulatory obligations/restrictions apply
DSL	:	This product contains one or more components that are not on the Canadian DSL and have annual quantity limits.
ENCS	:	Not in compliance with the inventory
KECI	:	Not in compliance with the inventory
PICCS	:	On the inventory, or in compliance with the inventory
IECSC	:	On the inventory, or in compliance with the inventory

15.2 Chemical safety assessment

No data available

SECTION 16: Other information

Further information

Revision Date: 14.06.2022

Full text of other abbreviations

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - Agreement concerning the International Carriage of Dangerous Goods by Road; AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; SVHC - Substance of Very High Concern; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

Sources of key data used to compile the Safety Data Sheet
Key literature references and sources of data
SOLENIS Internal data
SOLENIS internal data including own and sponsored test reports
The UNECE administers regional agreements implementing harmonised classification for labelling (GHS) and transport.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. This SDS has been prepared by the Solenis Environmental Health and Safety Department.

GB / EN

SAFETY DATA SHEET

Creation Date 06-Aug-2010 **Revision Date** 10-Mar-2015 **Revision Number** 3

1. Identification

Product Name **Morpholine**

Cat No. : **AC433850000; AC433851000; AC433858000; AC433855000**

Synonyms Tetrahydro-2H-1,4-oxazine; 1-Oxa-4-azacyclohexane

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 3
Acute oral toxicity	Category 4
Acute dermal toxicity	Category 3
Acute Inhalation Toxicity - Vapors	Category 3
Skin Corrosion/irritation	Category 1 B
Serious Eye Damage/Eye Irritation	Category 1
Specific target organ toxicity (single exposure) Target Organs - Respiratory system.	Category 3
Specific target organ toxicity - (repeated exposure) Target Organs - Liver, Kidney.	Category 2

Label Elements

Signal Word
Danger

Hazard Statements
Flammable liquid and vapor
Harmful if swallowed
Toxic in contact with skin
Causes severe skin burns and eye damage
Toxic if inhaled
May cause respiratory irritation
May cause damage to organs through prolonged or repeated exposure



Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Wear protective gloves/protective clothing/eye protection/face protection
Use only outdoors or in a well-ventilated area
Do not breathe dust/fume/gas/mist/vapors/spray
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Keep cool
Response
Immediately call a POISON CENTER or doctor/physician
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
Wash contaminated clothing before reuse
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Ingestion
Rinse mouth
Do NOT induce vomiting
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
None identified

3. Composition / information on ingredients

Component	CAS-No	Weight %
Morpholine	110-91-8	>95

4. First-aid measures

General Advice Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Eye Contact In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Keep eye wide open while rinsing.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Immediate medical

attention is required.

Inhalation If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with a respiratory medical device. Move to fresh air. If not breathing, give artificial respiration. Call a physician or Poison Control Center immediately.

Ingestion Do not induce vomiting. Call a physician or Poison Control Center immediately. Immediate medical attention is required. Remove from exposure, lie down. Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person.

Most important symptoms/effects None reasonably foreseeable. Causes burns by all exposure routes. . Breathing difficulties. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting: Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. Cool closed containers exposed to fire with water spray.

Unsuitable Extinguishing Media No information available

Flash Point 32 °C / 89.6 °F
Method - No information available

Autoignition Temperature 255 °C / 491 °F
Explosion Limits
Upper 11.2%
Lower 2%
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors. The product causes burns of eyes, skin and mucous membranes. Flammable. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. In the event of fire and/or explosion do not breathe fumes.

Hazardous Combustion Products
Carbon monoxide (CO) Carbon dioxide (CO_2) Nitrogen oxides (NOx) Thermal decomposition can lead to release of irritating gases and vapors
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
3	3	1	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment. Ensure adequate ventilation. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Remove all sources of ignition. Take precautionary measures against static discharges.

Environmental Precautions Should not be released into the environment. See Section 12 for additional ecological information. Do not flush into surface water or sanitary sewer system. Prevent further leakage or spillage if safe to do so. Prevent product from entering drains.

Methods for Containment and Clean Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

Up Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

7. Handling and storage

Handling Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Use only under a chemical fume hood. Do not breathe vapors or spray mist. Do not ingest. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. Take precautionary measures against static discharges. Do not taste or swallow. This material should be handled at the biosafety level 2 (BSL2) as required by OSHA Bloodborne Pathogen Rule (29 CFR 1910.1030.7).

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Corrosives area. Keep away from heat and sources of ignition. Keep in properly labeled containers. Flammables area.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
Morpholine	TWA: 20 ppm Skin	(Vacated) TWA: 20 ppm (Vacated) TWA: 70 mg/m³ (Vacated) STEL: 30 ppm (Vacated) STEL: 105 mg/m³ Skin TWA: 20 ppm TWA: 70 mg/m³	IDLH: 1400 ppm TWA: 20 ppm TWA: 70 mg/m³ STEL: 30 ppm STEL: 105 mg/m³

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
Morpholine	TWA: 20 ppm TWA: 71 mg/m³ Skin	TWA: 20 ppm TWA: 70 mg/m³ STEL: 30 ppm STEL: 105 mg/m³	TWA: 20 ppm Skin

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location. Use explosion-proof electrical/ventilating/lighting/equipment. Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166. Tightly fitting safety goggles. Face-shield.

Skin and body protection Long sleeved clothing. impervious clothing. Chemical resistant apron. Boots. Impervious gloves.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice. Keep away from food, drink and animal feeding stuffs. When using, do not eat, drink or smoke. Contaminated work clothing should not be allowed out of the workplace. Provide regular cleaning of equipment, work area and clothing. Avoid contact with skin, eyes and clothing. For environmental protection remove and wash all contaminated protective equipment

before re-use. Wear suitable gloves and eye/face protection.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	amine-like
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-5 °C / 23 °F
Boiling Point/Range	126 - 130 °C / 258.8 - 266 °F @ 760 mmHg
Flash Point	32 °C / 89.6 °F
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	11.2%
Lower	2%
Vapor Pressure	11 mbar @ 20 °C
Vapor Density	3.0 (Air = 1.0)
Relative Density	0.990
Solubility	Soluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	255 °C / 491 °F
Decomposition Temperature	No information available
Viscosity	2.23 cP at 20°C
Molecular Formula	C4 H9 N O
Molecular Weight	87.12

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Hygroscopic.

Conditions to Avoid Incompatible products. Excess heat. Keep away from open flames, hot surfaces and sources of ignition. Exposure to moist air or water. Exposure to air or moisture over prolonged periods.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2), Nitrogen oxides (NOx), Thermal decomposition can lead to release of irritating gases and vapors

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Oral LD50	Category 4.
Dermal LD50	Category 3.
Vapor LC50	Category 4.

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Morpholine	1050 mg/kg (Rat) 1900 mg/kg (Rat)	310 mg/kg (Rabbit) 500 mg/kg (Rabbit)	8000 ppm (Rat) 8 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Causes burns by all exposure routes

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Morpholine	110-91-8	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system
STOT - repeated exposure Liver Kidney

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting: Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation

Endocrine Disruptor Information No information available

Other Adverse Effects See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Do not empty into drains.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Morpholine	28 mg/L EC50 = 96 h	1000 mg/L LC50 96 h 375 - 460 mg/L LC50 96 h 350 mg/L LC50 96 h	EC50 = 57.0 mg/L 30 min	100 mg/L EC50 = 24 h

Persistence and Degradability Soluble in water Persistence is unlikely based on information available.
Bioaccumulation/ Accumulation No information available.

Mobility . Will likely be mobile in the environment due to its water solubility.

Component	log Pow
Morpholine	-2.55

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN2054
Proper Shipping Name MORPHOLINE
Hazard Class 8
Subsidiary Hazard Class 3
Packing Group I

TDG

UN-No	UN2054
Proper Shipping Name	MORPHOLINE
Hazard Class	8
Subsidiary Hazard Class	3
Packing Group	I

IATA

UN-No	UN 2054
Proper Shipping Name	MORPHOLINE
Hazard Class	8
Subsidiary Hazard Class	3
Packing Group	I

IMDG/IMO

UN-No	UN 2054
Proper Shipping Name	MORPHOLINE
Hazard Class	8
Subsidiary Hazard Class	3
Packing Group	I

15. Regulatory information

All of the components in the product are on the following Inventory lists: X = listed

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Morpholine	X	X	-	203-815-1	-		X	X	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	Yes
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act Not applicable

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Morpholine	X	X	X	-	X

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade Serious risk, Grade 3

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class
B2 Flammable liquid
E Corrosive material
D2B Toxic materials
D1A Very toxic materials



16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 06-Aug-2010
Revision Date 10-Mar-2015
Print Date 10-Mar-2015
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer
The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

Carbon Dioxide

Safety Data Sheet 906849

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 08/29/2016 Version: 2.0

SECTION 1: Identification

1.1. Identification

Product form	:	Substance
Substance name	:	Carbon Dioxide
Chemical name	:	Carbon Dioxide
CAS-No.	:	124-38-9
Product code	:	SG-1001-07262
Formula	:	CO_2

1.2. Recommended use and restrictions on use

Use of the substance/mixture	:	Protective Atmosphere for Food and Beverages
Use of the substance/mixture	:	Semiconductor Purposes Manufacture of substances

1.3. Supplier

Air Liquide USA LLC and its affiliates
9811 Katy Freeway, Suite 100
Houston, TX 77024 - USA
T 1-800-819-1704
www.us.airliquide.com

1.4. Emergency telephone number

Emergency number	:	Chemtrec: 1-800-424-9300

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS-US classification

Gases under pressure Liquefied gas	H280	Contains gas under pressure; may explode if heated

Full text of H statements : see section 16

2.2. GHS Label elements, including precautionary statements

GHS-US labeling

Hazard pictograms (GHS-US) :



GHS04

Signal word (GHS-US) : Warning

Hazard statements (GHS-US) :
H280 - Contains gas under pressure; may explode if heated
OSHA-H01 - May displace oxygen and cause rapid suffocation
CGA-HG01 - May cause frostbite
CGA-HG03 - May increase respiration and heart rate

Precautionary statements (GHS-US) :
P202 - Do not handle until all safety precautions have been read and understood.
P261 - Avoid breathing gas.
P271 - Use only outdoors or in a well-ventilated area.
P280 - Wear eye protection, face protection, protective gloves, protective clothing.
P302 - IF ON SKIN: Thaw frosted parts with lukewarm water. Do not rub affected area, Get immediate medical advice/attention.
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P308+P313 - If exposed or concerned: Get medical advice/attention.
P403 - Store in a well-ventilated place.
P501 - Dispose of contents/container in accordance with local/regional/national/international regulations
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C/125 °F
CGA-PG05 - Use a back flow preventive device in the piping

CGA-PG06 - Close valve after each use and when empty
CGA-PG10 - Use only with equipment rated for cylinder pressure
CGA-PG14 - Approach suspected leak area with caution
CGA-PG21 - Open valve slowly

2.3. Other hazards which do not result in classification

No additional information available

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances

Name : Carbon Dioxide

CAS-No. : 124-38-9

Name	Product identifier	%	GHS-US classification
Carbon Dioxide	(CAS-No.) 124-38-9	<= 99.9	Press. Gas (Liq.), H280

Full text of hazard classes and H-statements : see section 16

3.2. Mixtures

Not applicable

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If you feel unwell, seek medical advice.

First-aid measures after skin contact : Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice/attention.

First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects (acute and delayed)

Symptoms/effects after inhalation : May displace oxygen and cause rapid suffocation. May increase respiration and heart rate.

Symptoms/effects after skin contact : May cause frostbite.

Symptoms/effects after eye contact : Contact with the product may cause cold burns or frostbite.

Symptoms/effects after ingestion : Ingestion is not considered a potential route of exposure.

Symptoms/effects upon intravenous administration : Not known.

Chronic symptoms : Adverse effects not expected from this product.

4.3. Immediate medical attention and special treatment, if necessary

If you feel unwell, seek medical advice. If breathing is difficult, give oxygen.

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media : Use extinguishing media appropriate for surrounding fire.

Unsuitable extinguishing media : Do not use water jet to extinguish.

5.2. Specific hazards arising from the chemical

Fire hazard : The product is not flammable.

Explosion hazard : Product is not explosive. Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries.

Reactivity : None known.

Hazardous combustion products : None

5.3. Special protective equipment and precautions for fire-fighters

Firefighting instructions : In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion. Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire.

Protection during firefighting : Standard protective clothing and equipment (e.g, Self Contained Breathing Apparatus) for fire fighters. Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Ensure adequate ventilation.

6.1.1. For non-emergency personnel

Protective equipment : Wear protective equipment consistent with the site emergency plan.

Emergency procedures : Evacuate personnel to a safe area. Close doors and windows of adjacent premises. Keep containers closed. Mark the danger area. Seal off low-lying areas. Keep upwind.

6.1.2. For emergency responders

Protective equipment : Standard protective clothing and equipment (e.g, Self Contained Breathing Apparatus) for fire fighters. Equip cleanup crew with proper protection.

Emergency procedures : Evacuate and limit access. Ventilate area.

6.2. Environmental precautions

Try to stop release if without risk.

6.3. Methods and material for containment and cleaning up

For containment : Try to stop release if without risk.

Methods for cleaning up : Dispose of contents/container in accordance with local/regional/national/international regulations.

6.4. Reference to other sections

See also Sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed : Pressurized container: Do not pierce or burn, even after use. Use only with equipment rated for cylinder pressure. Close valve after each use and when empty.

Precautions for safe handling : Do not handle until all safety precautions have been read and understood. Use only outdoors or in a well-ventilated area.

Hygiene measures : Do not eat, drink or smoke when using this product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Comply with applicable regulations.

Storage conditions : Do not expose to temperatures exceeding 52 °C/ 125 °F. Keep container closed when not in use. Protect cylinders from physical damage; do not drag, roll, slide or drop. Store in well ventilated area.

Incompatible products : None known.

Incompatible materials : None known.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Carbon Dioxide (124-38-9)		
ACGIH	ACGIH TWA (ppm)	5000 ppm
ACGIH	ACGIH STEL (ppm)	30000 ppm
OSHA	OSHA PEL (TWA) (mg/m³)	9000 mg/m³
OSHA	OSHA PEL (TWA) (ppm)	5000 ppm
IDLH	US IDLH (ppm)	40000 ppm
NIOSH	NIOSH REL (TWA) (mg/m³)	9000 mg/m³
NIOSH	NIOSH REL (TWA) (ppm)	5000 ppm
NIOSH	NIOSH REL (STEL) (mg/m³)	54000 mg/m³
NIOSH	NIOSH REL (STEL) (ppm)	30000 ppm

8.2. Appropriate engineering controls

Appropriate engineering controls	:	Ensure exposure is below occupational exposure limits (where available). Provide adequate general and local exhaust ventilation. Systems under pressure should be regularly checked for leakages. Oxygen detectors should be used when asphyxiating gases may be released. Consider the use of a work permit system e.g. for maintenance activities.
Environmental exposure controls	:	Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

8.3. Individual protection measures/Personal protective equipment

Hand protection:

Wear working gloves when handling gas containers. 29 CFR 1910.138: Hand protection

Eye protection:

Wear safety glasses with side shields. 29 CFR 1910.133: Eye and Face Protection

Skin and body protection:

Wear suitable protective clothing, e.g. lab coats, coveralls or flame resistant clothing.

Respiratory protection:

None necessary during normal and routine operations. See Sections 5 & 6.

Thermal hazard protection:

None necessary during normal and routine operations.

Other information:

Wear safety shoes while handling containers. 29 CFR 1910.136: Foot Protection.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Gas
Appearance	:	Clear, colorless gas.
Color	:	Colorless
Odor	:	Odorless
Odor threshold	:	No data available
pH	:	No data available
Melting point	:	No data available
Freezing point	:	-56.6 °C
Boiling point	:	No data available
Critical temperature	:	31.1 °C
Critical pressure	:	7381.8 kPa
Flash point	:	Not applicable (non-flammable gas)
Relative evaporation rate (butyl acetate=1)	:	No data available
Relative evaporation rate (ether=1)	:	Not applicable
Flammability (solid, gas)	:	See Section 2.1 and 2.2
Vapor pressure	:	5730 kPa
Relative vapor density at 20 °C	:	No data available
Relative density	:	0.82
Molecular mass	:	44.01 g/mol
Relative gas density	:	1.52 Heavier than air
Solubility	:	Water: 90 %
Log Pow	:	No data available
Auto-ignition temperature	:	Not applicable
Decomposition temperature	:	No data available
Viscosity, kinematic	:	Not applicable

Viscosity, dynamic	:	Not applicable
Explosion limits	:	Not applicable (non-flammable gas)
Explosive properties	:	Not applicable (non-flammable gas).
Oxidizing properties	:	None.

9.2. Other information

Sublimation point	:	-78.5 °C
Additional information	:	Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground level

SECTION 10: Stability and reactivity

10.1. Reactivity

None known.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

None known.

10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials

None known.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified

Carbon Dioxide (124-38-9)	
LC50 inhalation rat (ppm)	820000 ppm/4h
ATE US (gases)	820000.000 ppmV/4h

Carbon Dioxide (124-38-9)	
LC50 inhalation rat (ppm)	820000 ppm/4h

Skin corrosion/irritation	:	Not classified
Serious eye damage/irritation	:	Not classified
Respiratory or skin sensitization	:	Not classified
Germ cell mutagenicity	:	Not classified
Carcinogenicity	:	Not classified
Reproductive toxicity	:	Not classified
Specific target organ toxicity – single exposure	:	Not classified
Specific target organ toxicity – repeated exposure	:	Not classified
Aspiration hazard	:	Not classified
Symptoms/effects after inhalation	:	May displace oxygen and cause rapid suffocation. May increase respiration and heart rate.
Symptoms/effects after skin contact	:	May cause frostbite.
Symptoms/effects after eye contact	:	Contact with the product may cause cold burns or frostbite.
Symptoms/effects after ingestion	:	Ingestion is not considered a potential route of exposure.
Symptoms/effects upon intravenous administration	:	Not known.
Chronic symptoms	:	Adverse effects not expected from this product.

SECTION 12: Ecological information

12.1. Toxicity

No additional information available

12.2. Persistence and degradability

Carbon Dioxide (124-38-9)	
Persistence and degradability	No ecological damage caused by this product.

12.3. Bioaccumulative potential

Carbon Dioxide (124-38-9)	
BCF fish 1	(no bioaccumulation)
Log Pow	0.83
Bioaccumulative potential	No ecological damage caused by this product.

12.4. Mobility in soil

Carbon Dioxide (124-38-9)	
Ecology - soil	No ecological damage caused by this product.

12.5. Other adverse effects

Effect on ozone layer : No known effects from this product.

Effect on global warming : No known effects from this product.

GWPmix comment : No known effects from this product.

SECTION 13: Disposal considerations

13.1. Disposal methods

Waste treatment methods : Contact supplier if guidance is required. Do not discharge into any place where its accumulation could be dangerous. Ensure that the emission levels from local regulations or operating permits are not exceeded.

Product/Packaging disposal recommendations : Refer to the CGA Pamphlet P-63 "Disposal of Gases" available at www.cganet.com for more guidance on suitable disposal methods.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

Transport document description : UN1013 Carbon dioxide, 2.2

UN-No.(DOT) : UN1013

Proper Shipping Name (DOT) : Carbon dioxide

Class (DOT) : 2.2 - Class 2.2 - Non-flammable compressed gas 49 CFR 173.115

Hazard labels (DOT) : 2.2 - Non-flammable gas



DOT Packaging Non Bulk (49 CFR 173.xxx) : 302;304

DOT Packaging Bulk (49 CFR 173.xxx) : 302;314;315

DOT Packaging Exceptions (49 CFR 173.xxx) : 306

DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : 75 kg

DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 150 kg

DOT Vessel Stowage Location : A - The material may be stowed ‘‘on deck’’ or ‘‘under deck’’ on a cargo vessel and on a passenger vessel.

Emergency Response Guide (ERG) Number : 120

Other information : No supplementary information available.

Transportation of Dangerous Goods

Transport document description : UN1013 CARBON DIOXIDE, 2.2

UN-No. (TDG) : UN1013

Proper Shipping Name : CARBON DIOXIDE

TDG Primary Hazard Classes : 2.2 - Class 2.2 - Non-Flammable, Non-Toxic Gas.

TDG Special Provisions : 148 - (1) Part 5 (Means of Containment) does not apply to radiation detectors that contain these dangerous goods in non-refillable pressure receptacles if (a)the working pressure in each receptacle is less than 5 000 KPa; (b)the capacity of each receptacle is less than 12 L; (c)each receptacle has a minimum burst pressure of (i)at least 3 times the working pressure, when the receptacle is fitted with a relief device, or (ii)at least 4 times the working pressure, when the receptacle is not fitted with a relief device; (d)each receptacle is manufactured from material that will not fragment upon rupture; (e)each detector is manufactured under a quality assurance program; ISO 9001:2008 is an example of a quality assurance program. (f)the detectors are transported in strong outer means of containment; and (g)a detector in its outer means of containment is capable of withstanding a 1.2 m drop test without breakage of the detector or rupture of the outer means of containment. (2)Part 5 (Means of Containment) does not apply to radiation detectors that contain these dangerous goods in non-refillable pressure receptacles and that are included in equipment, if (a)the conditions set out in paragraphs (1)(a) to (e) are met; and (b)the equipment is contained in a strong outer means of containment or the equipment affords the detectors with protection that is equivalent to that provided by a strong outer means of containment. (3)These Regulations, except for Part 1 (Coming into Force, Repeal, Interpretation, General Provisions and Special Cases) and Part 2 (Classification), do not apply to radiation detectors that contain these dangerous goods in non-refillable pressure receptacles, including detectors in radiation detection systems, if the detectors meet the requirements of subsection (1) or (2), as applicable, and the capacity of the receptacles that contain the detectors is less than 50 mL. SOR/2014-306

Explosive Limit and Limited Quantity Index : 0.125 L

Passenger Carrying Road Vehicle or Passenger Carrying Railway Vehicle Index : 75 L

Transport by sea

Transport document description (IMDG) : UN 1013 CARBON DIOXIDE, 2.2

UN-No. (IMDG) : 1013

Proper Shipping Name (IMDG) : CARBON DIOXIDE

Class (IMDG) : 2 - Gases

Limited quantities (IMDG) : 120 ml

Air transport

Transport document description (IATA) : UN 1013 Carbon dioxide, 2.2

UN-No. (IATA) : 1013

Proper Shipping Name (IATA) : Carbon dioxide

Class (IATA) : 2

SECTION 15: Regulatory information

15.1. US Federal regulations

Carbon Dioxide (124-38-9)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

15.2. International regulations

CANADA

Carbon Dioxide (124-38-9)
Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations

Carbon Dioxide (124-38-9)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

National regulations

Carbon Dioxide (124-38-9)
Listed on the AICS (Australian Inventory of Chemical Substances)
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory
Listed on the Japanese ISHL (Industrial Safety and Health Law)
Listed on the Korean ECL (Existing Chemicals List)
Listed on NZIoC (New Zealand Inventory of Chemicals)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
Listed on the Canadian IDL (Ingredient Disclosure List)
Listed on INSQ (Mexican National Inventory of Chemical Substances)
Listed on CICR (Turkish Inventory and Control of Chemicals)
Listed on the TCSI (Taiwan Chemical Substance Inventory)

15.3. US State regulations

Carbon Dioxide (124-38-9)
U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) List

SECTION 16: Other information

Other information : This Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product.

Full text of H-phrases:

H280	Contains gas under pressure; may explode if heated

SDS US (GHS HazCom 2012)

This Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product. To the best of Air Liquide USA LLC and its affiliates' knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this product is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.

Conforms to US OSHA Hazard Communication 29CFR1910.1200

SAFETY DATA SHEET

Agilent Technologies

Argon

Section 1. Identification

GHS product identifier : Argon

Part no. : G8000-70001

Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Reagents and Standards for Analytical Chemistry Laboratory Use
950 cc (Steel container)

Supplier/Manufacturer : Agilent Technologies, Inc.
5301 Stevens Creek Blvd
Santa Clara, CA 95051, USA
800-227-9770

Emergency telephone number (with hours of operation) : CHEMTREC®: 1-800-424-9300

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture

H280 GASES UNDER PRESSURE - Compressed gas
SIMPLE ASPHYXIANTS

GHS label elements

Hazard pictograms :



Signal word : Warning

Hazard statements : H280 - Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Precautionary statements

Prevention : Not applicable.

Response : Not applicable.

Storage : Not applicable.

Disposal : Not applicable.

Supplemental label elements : Keep container tightly closed. Use only with adequate ventilation. Do not enter storage areas and confined spaces unless adequately ventilated.

Other hazards

Hazards not otherwise classified : None known.

Hazards identified when used : No known significant effects or critical hazards.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Ingredient name	Synonyms	%	Identifiers
Argon	Argon	100	CAS: 7440-37-1

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. Get medical attention if adverse health effects persist or are severe.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.

Ingestion : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.

Inhalation : At very high concentrations, can displace the normal air and cause suffocation from lack of oxygen.

Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.

Ingestion : As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

Hazardous thermal decomposition products : No specific data.

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Methods for cleaning up : Immediately contact emergency personnel. Stop leak if without risk.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid contact with eyes, skin and clothing. Avoid breathing gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Section 7. Handling and storage

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Keep container tightly closed and sealed until ready for use. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Argon	**ACGIH TLV (United States, 1/2024)** Oxygen depletion [asphyxiant].

Biological exposure indices

No exposure indices known.

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Section 8. Exposure controls/personal protection

Respiratory protection : The gas can cause asphyxiation without warning by replacing the oxygen in the air. Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. If operating conditions cause high gas concentrations to be produced or any recommended or statutory exposure limit is exceeded, use an air-fed respirator or self-contained breathing apparatus. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

The conditions of measurement of all properties are at standard temperature and pressure unless otherwise indicated.

Appearance

Physical state : Gas. [Inert material.]

Color : Colorless.

Odor : Odorless.

Odor threshold : Not available.

pH : Not applicable.

Melting point/freezing point : -189.2°C (-308.6°F)

Boiling point or initial boiling point and boiling range : -185°C (-301°F)

Flash point : Not applicable.

Evaporation rate : Not available.

Flammability : Not available.

Lower and upper explosion limit/flammability limit : Not available.

Vapor pressure : Not available.

Relative vapor density : 1.66 [Air = 1]

Relative density : 1.38

Density : 1.38 g/cm³

Solubility(ies) :

Media	Result
water	Insoluble

Solubility in water : 0.055 g/l

Partition coefficient: n-octanol/water : 0.74 [Calculated]

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

Viscosity : Dynamic (room temperature): Not available.
Kinematic (room temperature): Not available.
Kinematic (40°C (104°F)): Not available.

Particle characteristics

Median particle size : Not applicable.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : Do not allow gas to accumulate in low or confined areas.

Incompatible materials : May react or be incompatible with oxidizing materials.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Conclusion/Summary [Product] : Not available.

Skin corrosion/irritation

Conclusion/Summary [Product] : Not available.

Serious eye damage/eye irritation

Conclusion/Summary [Product] : Not available.

Respiratory corrosion/irritation

Conclusion/Summary [Product] : Not available.

Respiratory or skin sensitization

Skin

Conclusion/Summary [Product] : Not available.

Respiratory

Conclusion/Summary [Product] : Not available.

Germ cell mutagenicity

Conclusion/Summary [Product] : Not available.

Carcinogenicity

Not available.

Conclusion/Summary [Product] : Not available.

Section 11. Toxicological information

Reproductive toxicity

Conclusion/Summary [Product] : Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Routes of entry anticipated: Inhalation.

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.

Inhalation : At very high concentrations, can displace the normal air and cause suffocation from lack of oxygen.

Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.

Ingestion : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Conclusion/Summary [Product] : Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Section 11. Toxicological information

Reproductive toxicity : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

N/A

Section 12. Ecological information

Toxicity

Conclusion/Summary [Product] : Not available.

Persistence and degradability

Conclusion/Summary [Product] : Not available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Argon	0.74	-	Low

Mobility in soil

Soil/Water partition coefficient : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty pressure vessels should be returned to the supplier. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

	DOT Classification	TDG Classification	Mexico Classification	IMDG	IATA
UN number	UN1006	UN1006	UN1006	UN1006	UN1006
UN proper shipping name	Argon, compressed	ARGON, COMPRESSED	ARGÓN COMPRIMIDO	ARGON, COMPRESSED	Argon, compressed
Transport hazard class(es)	2.2 	2.2 	2.2 	2.2 	2.2 

Section 14. Transport information

Packing group	-	-	-	-	-
Environmental hazards	No.	No.	No.	No.	No.

Additional information

DOT Classification : **Limited quantity** Yes.
Packaging instruction Exceptions: 306, 307. Non-bulk: 302. Bulk: 314, 315.
Quantity limitation Passenger aircraft/rail: 75 kg. Cargo aircraft: 150 kg.

TDG Classification : Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2).
Explosive Limit and Limited Quantity Index 0.125
Passenger Carrying Road or Rail Index 75
Special provisions 148

Mexico Classification : **Special provisions** 378, 392

IMDG : **Emergency schedules** F-C, S-V
Special provisions 378, 392, 406

IATA : **Quantity limitation** Passenger and Cargo Aircraft: 75 kg. Packaging instructions: 200. Cargo Aircraft Only: 150 kg. Packaging instructions: 200. Limited Quantities - Passenger Aircraft: Forbidden. Packaging instructions: Forbidden.
Special provisions A69, A202

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to IMO instruments : Not available.

Section 15. Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture

U.S. Federal regulations

TSCA 12(b) - Chemical export notification

Not applicable.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Section 15. Regulatory information

Classification : GASES UNDER PRESSURE - Compressed gas
SIMPLE ASPHYXIANTS

Composition/information on ingredients

Name	%	Classification
Argon	100	GASES UNDER PRESSURE - Compressed gas SIMPLE ASPHYXIANTS

State regulations

Massachusetts : This material is not listed.

New York : This material is not listed.

New Jersey : This material is not listed.

Pennsylvania : This material is not listed.

California Prop. 65

This product does not require a Safe Harbor warning under California Prop. 65.

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

Australia : This material is listed or exempted.

Canada : This material is listed or exempted.

China : This material is listed or exempted.

Japan : **Japan inventory (CSCL)**: This material is listed or exempted.
Japan inventory (ISHL): This material is listed or exempted.

New Zealand : This material is listed or exempted.

Philippines : This material is listed or exempted.

Republic of Korea : This material is listed or exempted.

Taiwan : This material is listed or exempted.

Thailand : This material is listed or exempted.

Turkey : This material is listed or exempted.

United States : This material is active or exempted.

Viet Nam : This material is listed or exempted.

Section 16. Other information

Procedure used to derive the classification

Classification	Justification
GASES UNDER PRESSURE - Compressed gas SIMPLE ASPHYXIANTS	On basis of test data Expert judgment

History

Date of issue/Date of revision : 09/24/2025

Date of previous issue : 02/23/2023

Version : 7

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
DOT = Department of Transportation
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
IMO = International Maritime Organization
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
N/A = Not available
SGG = Segregation Group
TDG = Transportation of Dangerous Goods
UN = United Nations

Indicates information that has changed from previously issued version.

Notice to reader

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Natural gas, compressed

Safety Data Sheet P-4627

This SDS conforms to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

Date of issue: 01/01/1979 Revision date: 07/23/2019 Supersedes: 10/17/2016 :

SECTION: 1. Product and company identification

1.1. Product identifier

Product form : Mixture

Trade name : Natural Gas

Formula : Mixture of methane, ethane, propane, and butane

Other means of identification : Natural gas, compressed

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : Industrial use; Use as directed.

1.3. Details of the supplier of the safety data sheet

Praxair, Inc.
10 Riverview Drive
Danbury, CT 06810-6268 - USA
T 1-800-772-9247 (1-800-PRAXAIR) - F 1-716-879-2146
www.praxair.com

1.4. Emergency telephone number

Emergency number : Onsite Emergency: 1-800-645-4633

CHEMTREC, 24hr/day 7days/week
— Within USA: 1-800-424-9300, Outside USA: 001-703-527-3887
(collect calls accepted, Contract 17729)

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

GHS US classification

Flam. Gas 1 H220
Press. Gas (Liq.) H280

2.2. Label elements

GHS US labeling

Hazard pictograms (GHS US) :



GHS02 GHS04

Signal word (GHS US) : Danger

Hazard statements (GHS US) : H220 - EXTREMELY FLAMMABLE GAS
H280 - CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED
OSHA-H01 - MAY DISPLACE OXYGEN AND CAUSE RAPID SUFFOCATION.
CGA-HG01 - MAY CAUSE FROSTBITE.
CGA-HG04 - MAY FORM EXPLOSIVE MIXTURES WITH AIR

Precautionary statements (GHS US) : P202 - Do not handle until all safety precautions have been read and understood.
P210 - Keep away from Heat, Open flames, Sparks, Hot surfaces. - No smoking
P271+P403 - Use and store only outdoors or in a well-ventilated place.
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 - Eliminate all ignition sources if safe to do so.
CGA-PG05 - Use a back flow preventive device in the piping.
CGA-PG10 - Use only with equipment rated for cylinder pressure.
CGA-PG06 - Close valve after each use and when empty.
CGA-PG11 - Never put cylinders into unventilated areas of passenger vehicles.
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F).

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2.3. Other hazards

No additional information available

2.4. Unknown acute toxicity (GHS US)

No data available

SECTION 3: Composition/Information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name	Product identifier	%
Methane	(CAS-No.) 74-82-8	83 - 98.7
Ethane	(CAS-No.) 74-84-0	1 - 13
Propane	(CAS-No.) 74-98-6	0.1 - 3
Butane	(CAS-No.) 106-97-8	0.2 - 1

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Remove to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. If breathing is difficult, trained personnel should give oxygen. Call a physician.

First-aid measures after skin contact : Adverse effects not expected from this product. If skin irritation occurs: Wash with plenty of soap and water.

First-aid measures after eye contact : Adverse effects not expected from this product. In case of eye irritation: Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately.

First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed

No additional information available

4.3. Indication of any immediate medical attention and special treatment needed

None.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Carbon dioxide, Dry chemical, Water spray or fog.

5.2. Special hazards arising from the substance or mixture

Fire hazard : EXTREMELY FLAMMABLE GAS. If venting or leaking gas catches fire, do not extinguish flames. Flammable vapors may spread from leak, creating an explosive reignition hazard. Vapors can be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharge, or other ignition sources at locations distant from product handling point. Explosive atmospheres may linger. Before entering an area, especially a confined area, check the atmosphere with an appropriate device.

Explosion hazard : EXTREMELY FLAMMABLE GAS. Forms explosive mixtures with air and oxidizing agents.

Reactivity : No reactivity hazard other than the effects described in sub-sections below.

5.3. Advice for firefighters

Firefighting instructions : Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with OSHA 29 CFR 1910.156 and applicable standards under 29 CFR 1910 Subpart L—Fire Protection.

Protection during firefighting : Compressed gas: asphyxiant. Suffocation hazard by lack of oxygen.

Special protective equipment for fire fighters : Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.

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Specific methods	:	Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas containers to rupture. Cool endangered containers with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems. Stop flow of product if safe to do so. Use water spray or fog to knock down fire fumes if possible.
Other information	:	Containers are equipped with a pressure relief device. (Exceptions may exist where authorized by DOT.).

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : **Danger:** EXTREMELY FLAMMABLE GAS. Forms explosive mixtures with air and oxidizing agents. See section 5. Evacuate personnel to a safe area. Appropriate self-contained breathing apparatus may be required. Approach suspected leak area with caution. Remove all sources of ignition. if safe to do so. Reduce gas with fog or fine water spray. Stop flow of product if safe to do so. Ventilate area or move container to a well-ventilated area. Flammable gas may spread from leak. Before entering the area, especially a confined area, check the atmosphere with an appropriate device. Wear self-contained breathing apparatus when entering area unless atmosphere is proven to be safe. Evacuate area. Ensure adequate ventilation. Stop leak if safe to do so.

6.1.1. For non-emergency personnel

No additional information available

6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

Prevent waste from contaminating the surrounding environment. Prevent soil and water pollution. Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

6.3. Methods and material for containment and cleaning up

No additional information available

6.4. Reference to other sections

See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use only non-sparking tools. Use only explosion-proof equipment.

Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Never insert an object (e.g, wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.

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7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store only where temperature will not exceed 125°F (52°C). Post “No Smoking/No Open Flames” signs in storage and use areas. There must be no sources of ignition. Separate packages and protect against potential fire and/or explosion damage following appropriate codes and requirements (e.g, NFPA 30, NFPA 55, NFPA 70, and/or NFPA 221 in the U.S.) or according to requirements determined by the Authority Having Jurisdiction (AHJ). Always secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand when the container is not in use. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods. For other precautions in using this product, see section 16.

OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE: When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

7.3. Specific end use(s)

None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Ethane (74-84-0)		
ACGIH	Not established	
USA OSHA	Not established	

Propane (74-98-6)		
USA OSHA	OSHA PEL (TWA) (mg/m³)	1800 mg/m³
USA OSHA	OSHA PEL (TWA) (ppm)	1000 ppm
ACGIH	Not established	

Methane (74-82-8)		
ACGIH	Not established	
USA OSHA	Not established	

Butane (106-97-8)		
ACGIH	ACGIH TLV-STEL (ppm)	1000 ppm
USA OSHA	Not established	

8.2. Exposure controls

Appropriate engineering controls : During welding, ensure that there is adequate ventilation to keep worker exposure below applicable limits for fumes, gases, and other by-products of welding. Do not breathe fumes or gases. Short-term overexposure to fumes may cause dizziness, nausea, and dryness or irritation of the nose, throat, and eyes, or may cause other similar discomfort. Use an explosion-proof local exhaust system. Local exhaust and general ventilation must be adequate to meet exposure standards. MECHANICAL (GENERAL): **Inadequate - Use only in a closed system.** Use explosion proof equipment and lighting.

Eye protection : Wear safety glasses with side shields.

Skin and body protection : As needed for welding, wear hand, head, and body protection to help prevent injury from radiation and sparks. (See ANSI Z49.1.) At a minimum, this includes welder’s gloves and protective goggles, and may include arm protectors, aprons, hats, and shoulder protection as well as substantial clothing.

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Respiratory protection	:	When workplace conditions warrant respirator use, follow a respiratory protection program that meets OSHA 29 CFR 1910.134, ANSI Z88.2, or MSHA 30 CFR 72.710 (where applicable). Use an air-supplied or air-purifying cartridge if the action level is exceeded. Ensure that the respirator has the appropriate protection factor for the exposure level. If cartridge type respirators are used, the cartridge must be appropriate for the chemical exposure. For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).
Thermal hazard protection	:	Wear cold insulating gloves when transfilling or breaking transfer connections.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Gas
Appearance	:	Colorless gas.
Color	:	Colorless
Odor	:	Unpleasant
Odor threshold	:	No data available
pH	:	Not applicable.
Relative evaporation rate (butyl acetate=1)	:	No data available
Relative evaporation rate (ether=1)	:	Not applicable.
Melting point	:	No data available
Freezing point	:	No data available
Boiling point	:	-164 - -88 °C
Flash point	:	No data available
Auto-ignition temperature	:	482 - 632 °C
Decomposition temperature	:	No data available
Flammability (solid, gas)	:	3.8 - 17 vol %
Vapor pressure	:	Not applicable.
Relative vapor density at 20 °C	:	No data available
Relative density	:	0.7
Density	:	0.66 kg/m³ Vapor density @15.6°C, 1 atm
Relative gas density	:	0.7 @15.6°C, 1 atm
Solubility	:	Water: No data available
Log Pow	:	Not applicable.
Log Kow	:	Not applicable.
Viscosity, kinematic	:	Not applicable.
Viscosity, dynamic	:	Not applicable.
Explosive properties	:	Not applicable.
Oxidizing properties	:	None.
Explosion limits	:	No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

No reactivity hazard other than the effects described in sub-sections below.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Can form explosive mixture with air. May react violently with oxidants.

10.4. Conditions to avoid

Keep away from heat/sparks/open flames/hot surfaces. – No smoking.

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10.5. Incompatible materials

Oxidizing agent. Halogens. Acids.

10.6. Hazardous decomposition products

Thermal decomposition or burning may produce carbon monoxide, carbon dioxide, and hydrogen. The welding and cutting process may form reaction products such as carbon monoxide and carbon dioxide. Other decomposition products of normal operation originate from the volatilization, reaction, or oxidation of the material being worked.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified

Ethane (74-84-0)	
ATE US (vapors)	658 mg/l/4h
ATE US (dust, mist)	658 mg/l/4h

Propane (74-98-6)	
LC50 inhalation rat (ppm)	> 800000 ppm (Exposure time: 15 min)

Skin corrosion/irritation : Not classified

pH: Not applicable.

Serious eye damage/irritation : Not classified

pH: Not applicable.

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

Specific target organ toxicity – single exposure : Not classified

Specific target organ toxicity – repeated exposure : Not classified

Aspiration hazard : Not classified

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : No ecological damage caused by this product.

12.2. Persistence and degradability

Natural Gas	
Persistence and degradability	No ecological damage caused by this product.

Ethane (74-84-0)	
Persistence and degradability	The substance is biodegradable. Unlikely to persist.

Propane (74-98-6)	
Persistence and degradability	The substance is biodegradable. Unlikely to persist.

Methane (74-82-8)	
Persistence and degradability	The substance is biodegradable. Unlikely to persist.

Butane (106-97-8)	
Persistence and degradability	The substance is biodegradable. Unlikely to persist.

12.3. Bioaccumulative potential

Natural Gas	
Log Pow	Not applicable.
Log Kow	Not applicable.

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Natural Gas	
Bioaccumulative potential	No ecological damage caused by this product.

Ethane (74-84-0)	
Log Pow	1.81
Log Kow	Not applicable.
Bioaccumulative potential	Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.

Propane (74-98-6)	
Log Pow	2.36
Log Kow	Not applicable.
Bioaccumulative potential	Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.

Methane (74-82-8)	
Log Pow	1.09
Bioaccumulative potential	Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.

Butane (106-97-8)	
Log Pow	2.89
Bioaccumulative potential	Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.

12.4. Mobility in soil

Natural Gas	
Mobility in soil	No data available.

Ethane (74-84-0)	
Mobility in soil	No data available.
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

Propane (74-98-6)	
Mobility in soil	No data available.
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

Methane (74-82-8)	
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

Butane (106-97-8)	
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5. Other adverse effects

Effect on ozone layer : None.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product/Packaging disposal recommendations : Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

SECTION 14: Transport information

In accordance with DOT

Transport document description : UN1971 Natural gas, compressed, 2.1

UN-No.(DOT) : UN1971

Proper Shipping Name (DOT) : Natural gas, compressed

Class (DOT) : 2.1 - Class 2.1 - Flammable gas 49 CFR 173.115

Hazard labels (DOT) : 2.1 - Flammable gas



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Additional information

Other information : No supplementary information available.

Special transport precautions : Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers: - Ensure there is adequate ventilation. - Ensure that containers are firmly secured. - Ensure cylinder valve is closed and not leaking. - Ensure valve outlet cap nut or plug (where provided) is correctly fitted. - Ensure valve protection device (where provided) is correctly fitted.

Transport by sea

UN-No. (IMDG) : 1971

Proper Shipping Name (IMDG) : NATURAL GAS, COMPRESSED

Class (IMDG) : 2 - Gases

Division (IMDG) : 2.1 - Flammable gases

Air transport

UN-No. (IATA) : 1971

Proper Shipping Name (IATA) : Natural gas, compressed

Class (IATA) : 2

SECTION 15: Regulatory information

15.1. US Federal regulations

All components of this product are listed on the Toxic Substances Control Act (TSCA) inventory.

15.2. International regulations

CANADA

Ethane (74-84-0)
Listed on the Canadian DSL (Domestic Substances List)

Propane (74-98-6)
Listed on the Canadian DSL (Domestic Substances List)

Methane (74-82-8)
Listed on the Canadian DSL (Domestic Substances List)

Butane (106-97-8)
Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations

15.2.2. National regulations

No additional information available

15.3. US State regulations

Natural Gas()	
U.S. - California - Proposition 65 - Carcinogens List	No
U.S. - California - Proposition 65 - Developmental	No

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Natural Gas()	
Toxicity	
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm

Ethane (74-84-0)				
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. - California - Proposition 65 - Reproductive Toxicity - Female	U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No significant risk level (NSRL)
No	No	No	No	

Propane (74-98-6)				
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. - California - Proposition 65 - Reproductive Toxicity - Female	U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No significant risk level (NSRL)
No	No	No	No	

Methane (74-82-8)				
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. - California - Proposition 65 - Reproductive Toxicity - Female	U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No significant risk level (NSRL)
No	No	No	No	

Butane (106-97-8)				
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. - California - Proposition 65 - Reproductive Toxicity - Female	U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No significant risk level (NSRL)
No	No	No	No	

Ethane (74-84-0)

U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) List

Propane (74-98-6)

U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) List

Methane (74-82-8)

U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) List

Butane (106-97-8)

U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) List

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SECTION 16: Other information

Other information : When using this product in welding and cutting, read and understand the manufacturer's instructions and the precautionary label on the product. Ask your welding products supplier for a copy of Praxair's free safety booklet, P-2035, Precautions and Safe Practices for Gas Welding, Cutting, and Heating, and for other manufacturers' safety publications. For a detailed treatment, get ANSI Z49.1, Safety in Welding, Cutting, and Allied Processes, published by the American Welding Society (AWS), www.aws.org. Order AWS documents from Global Engineering Documents, global.ihs.com. Arcs and sparks can ignite combustible materials. Prevent fires. Refer to NFPA 51B, Standard for Fire Prevention During Welding, Cutting, and Other Hotwork. Do not strike an arc on the container. The defect produced by an arc burn may lead to container rupture.

Fumes and gases produced during welding and cutting processes can be dangerous to your health and may cause serious lung disease. KEEP YOUR HEAD OUT OF FUMES. DO NOT BREATHE FUMES AND GASES. Use enough ventilation, local exhaust, or both to keep fumes and gases from your breathing zone and the general area. Short-term overexposure to fumes may cause dizziness, nausea, and dryness or irritation of the nose, throat, and eyes; or may cause other similar discomfort. Contaminants in the air may add to the hazard of fumes and gases.

When you mix two or more chemicals, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Before using any plastics, confirm their compatibility with this product.

Praxair asks users of this product to study this SDS and become aware of the product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this SDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Safety Data Sheet. Since the use of this information and the conditions of use are not within the control of Praxair, Inc, it is the user's obligation to determine the conditions of safe use of the product.

Praxair SDSs are furnished on sale or delivery by Praxair or the independent distributors and suppliers who package and sell our products. To obtain current SDSs for these products, contact your Praxair sales representative, local distributor, or supplier, or download from www.praxair.com. If you have questions regarding Praxair SDSs, would like the document number and date of the latest SDS, or would like the names of the Praxair suppliers in your area, phone or write the Praxair Call Center (Phone: 1-800-PRAXAIR/1-800-772-9247; Address: Praxair Call Center, Praxair, Inc, P.O. Box 44, Tonawanda, NY 14151-0044).

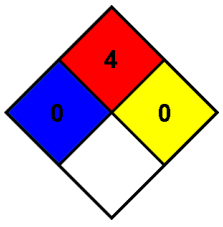
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Revision date : 07/23/2019

NFPA health hazard : 0 - Materials that, under emergency conditions, would offer no hazard beyond that of ordinary combustible materials.

NFPA fire hazard : 4 - Materials that rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air and burn readily.

NFPA instability : 0 - Material that in themselves are normally stable, even under fire conditions.



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This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

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SAFETY DATA SHEET

Nitrogen

Section 1. Identification

GHS product identifier : Nitrogen

Chemical name : nitrogen

Other means of identification : nitrogen (dot); nitrogen gas; Nitrogen NF, Nitrogen FG

Product type : Gas.

Product use : Synthetic/Analytical chemistry.

Synonym : nitrogen (dot); nitrogen gas; Nitrogen NF, Nitrogen FG

SDS # : 001040

Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

24-hour telephone : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : GASES UNDER PRESSURE - Compressed gas
SIMPLE ASPHYXIANTS

GHS label elements

Hazard pictograms :



Signal word : Warning

Hazard statements : Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

May displace oxygen and cause rapid suffocation.

Precautionary statements

General : Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction.

Prevention : Not applicable.

Response : Not applicable.

Storage : Protect from sunlight. Store in a well-ventilated place.

Disposal : Not applicable.

Supplemental label elements : Keep container tightly closed. Use only with adequate ventilation. Do not enter storage areas and confined spaces unless adequately ventilated.

Hazards not otherwise classified : In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Chemical name : nitrogen

Other means of identification : nitrogen (dot); nitrogen gas; Nitrogen NF, Nitrogen FG

Product code : 001040

CAS number/other identifiers

CAS number : 7727-37-9

Ingredient name	%	CAS number
Nitrogen	100	7727-37-9

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.

Inhalation : At very high concentrations, can displace the normal air and cause suffocation from lack of oxygen.

Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion : As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Section 4. First aid measures

Notes to physician : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
nitrogen oxides

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Immediately contact emergency personnel. Stop leak if without risk.

Large spill : Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid breathing gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Avoid contact with eyes, skin and clothing. Empty containers retain product residue and can be hazardous.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F). Keep container tightly closed and sealed until ready for use. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Nitrogen	**ACGIH TLV (United States, 3/2019). Oxygen Depletion [Asphyxiant].**

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Section 8. Exposure controls/personal protection

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : The gas can cause asphyxiation without warning by replacing the oxygen in the air. Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. If operating conditions cause high gas concentrations to be produced or any recommended or statutory exposure limit is exceeded, use an air-fed respirator or self-contained breathing apparatus. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Gas. [Compressed gas.]

Color : Colorless.

Odor : Odorless.

Odor threshold : Not available.

pH : Not available.

Melting point : -210.01°C (-346°F)

Boiling point : -196°C (-320.8°F)

Critical temperature : -146.95°C (-232.5°F)

Flash point : [Product does not sustain combustion.]

Evaporation rate : Not available.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : Not available.

Vapor density : 0.967 (Air = 1) Liquid Density@BP: 50.46 lb/ft3 (808.3 kg/m3)

Specific Volume (ft ^{3}/lb) : 13.8889

Gas Density (lb/ft ^{3}) : 0.072

Relative density : Not applicable.

Solubility : Not available.

Solubility in water : Not available.

Partition coefficient: n-octanol/water : 0.67

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

Viscosity : Not applicable.

Flow time (ISO 2431) : Not available.

Molecular weight : 28.02 g/mole

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : Do not allow gas to accumulate in low or confined areas.

Incompatible materials : No specific data.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Not available.

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.

Inhalation : At very high concentrations, can displace the normal air and cause suffocation from lack of oxygen.

Section 11. Toxicological information

Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.

Ingestion : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Nitrogen	0.67	-	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Section 12. Ecological information

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1066	UN1066	UN1066	UN1066	UN1066
UN proper shipping name	NITROGEN, COMPRESSED	NITROGEN, COMPRESSED	NITROGEN, COMPRESSED	NITROGEN, COMPRESSED	NITROGEN, COMPRESSED
Transport hazard class(es)	2.2 	2.2 	2.2 	2.2 	2.2 
Packing group	-	-	-	-	-
Environmental hazards	No.	No.	No.	No.	No.

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Additional information

DOT Classification : **Limited quantity** Yes.
Quantity limitation Passenger aircraft/rail: 75 kg. Cargo aircraft: 150 kg.

TDG Classification : Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2).
Explosive Limit and Limited Quantity Index 0.125
Passenger Carrying Road or Rail Index 75

IATA : **Quantity limitation** Passenger and Cargo Aircraft: 75 kg. Cargo Aircraft Only: 150 kg.

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to IMO instruments : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: This material is listed or exempted.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Refer to Section 2: Hazards Identification of this SDS for classification of substance.

State regulations

Massachusetts : This material is listed.

New York : This material is not listed.

New Jersey : This material is listed.

Pennsylvania : This material is listed.

California Prop. 65

This product does not require a Safe Harbor warning under California Prop. 65.

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

Australia : This material is listed or exempted.

Canada : This material is listed or exempted.

China : This material is listed or exempted.

Europe : This material is listed or exempted.

Japan : **Japan inventory (ENCS)**: Not determined.
Japan inventory (ISHL): Not determined.

New Zealand : This material is listed or exempted.

Philippines : This material is listed or exempted.

Section 15. Regulatory information

Republic of Korea : This material is listed or exempted.

Taiwan : This material is listed or exempted.

Thailand : Not determined.

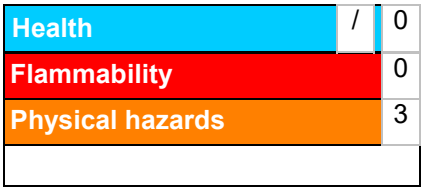
Turkey : Not determined.

United States : This material is active or exempted.

Viet Nam : This material is listed or exempted.

Section 16. Other information

Hazardous Material Information System (U.S.A.)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.

The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

National Fire Protection Association (U.S.A.)



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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Classification	Justification
GASES UNDER PRESSURE - Compressed gas SIMPLE ASPHYXIANTS	Expert judgment Expert judgment

History

Date of printing : 8/31/2021

Date of issue/Date of revision : 8/31/2021

Date of previous issue : 4/30/2019

Version : 1.04

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient

Section 16. Other information

MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

References : Not available.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

SAFETY DATA SHEET

MOEL's Public Notice No. 2016-19 (Standards for Classification and Labeling of Chemical Substances and Safety Data Sheets)

WAI4 - KGHS - KOREAN **Issue Date** 05-Sep-2019 **Revision Date** 05-Sep-2019 **Revision Number** 1

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Product Identifier

Product Name Oxygen Scavenger Reagent

Product No 181811

Pure substance/mixture Mixture

Contains Acetic Acid, Iodine

Relevant identified uses of the substance or mixture and uses advised against

Recommended Use Use as laboratory reagent

Uses advised against No Information available

Supplier

Fisher Scientific Korea
D5,D6, Incheon Airport Logistics Complex
150, Gonghangdong-Ro Mapo-Gu 296 Beon-Gil
Jung-Gu, Incheon 400-340
Tel: +82-2-6196-5500
Fax: +82-2-6196-5501

Thermo Fisher Scientific©
Water and Lab Products
22 Alpha Road
Chelmsford, MA 01824, USA
1-978-232-6000

E-mail address

Chem.KR@thermofisher.com info.water@thermo.com

Emergency Telephone Number

Emergency telephone: **Medical: +(82) 070-7686-0086 or + 1-703-741-5970**
CHEMTREC: 1-800-424-9300 or + 1-703-527-3887
Korea: 00-308-13-2549 (24 hours a day, 7 days a week)

Made in USA

SECTION 2: HAZARDS IDENTIFICATION

Classification of the substance or mixture

Physical hazards
Flammable liquids Category 3

Health hazards

Skin Corrosion/Irritation	Category 1
Serious Eye Damage/Eye Irritation	Category 1
Specific target organ toxicity - (repeated exposure)	Category 1

Environmental hazards
Based on available data, the classification criteria are not met

Label Elements



Signal Word **Danger**

Hazard Statements
H226 - Flammable liquid and vapor
H314 - Causes severe skin burns and eye damage
H372 - Causes damage to organs through prolonged or repeated exposure
H318 - Causes serious eye damage

Precautionary Statements

Prevention
P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking
P240 - Ground/Bond container and receiving equipment
P242 - Use only non-sparking tools
P243 - Take precautionary measures against static discharge
P264 - Wash face, hands and any exposed skin thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P271 - Use only outdoors or in a well-ventilated area
P280 - Wear protective gloves/ protective clothing/ eye protection/ face protection
P233 - Keep container tightly closed
P235 - Keep cool
P241 - Use explosion-proof electrical/ ventilating/ lighting/ equipment
P260 - Do not breathe dust/fume/gas/mist/vapors/spray

Response
P301 + P330 + P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting
P303 + P361 + P353 - IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower
P304 + P340 - IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a POISON CENTER or doctor/ physician
P363 - Wash contaminated clothing before reuse
P370 + P378 - In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction
P321 - Specific treatment (see supplemental first aid instructions on this label)
P314 - Get medical advice/ attention if you feel unwell

Storage
P403 + P233 - Store in a well-ventilated place. Keep container tightly closed
P403 + P235 - Store in a well-ventilated place. Keep cool
P405 - Store locked up

Disposal
P501 - Dispose of contents/ container to an approved waste disposal plant

Other Hazards

NFPA

Health	Flammability	Instability	Physical hazards
3	2	0	N/A

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.2. Mixtures

Component	Common Name	CAS-No	Index No.	Weight %
Acetic Acid	No information available	64-19-7	KE-00013	60 - 70
Water	No information available	7732-18-5	KE-35400	>=10 - 20
Iodine	No information available	7553-56-2	KE-21023	>=10 - 20

SECTION 4: FIRST AID MEASURES

First aid measures

General Advice Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Remove and wash contaminated clothing before re-use. Call a physician immediately.

Inhalation If not breathing, give artificial respiration. Remove from exposure, lie down. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a physician immediately.

Ingestion Do not induce vomiting. Clean mouth with water. Never give anything by mouth to an unconscious person. Call a physician immediately.

Self-Protection of the First Aider Use personal protective equipment. See section 8 for more information. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

Most important symptoms and effects, both acute and delayed

Most important symptoms and effects Causes burns by all exposure routes Breathing difficulties

Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically

SECTION 5: FIREFIGHTING MEASURES

Suitable Extinguishing Media

CO_2, dry chemical, dry sand, alcohol-resistant foam. Cool closed containers exposed to fire with water spray.

Unsuitable Extinguishing Media
No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors. The product causes burns of eyes, skin and mucous membranes. Flammable. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back.

Explosion Data
Sensitivity to Mechanical Impact None
Sensitivity to Static Discharge None

Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Remove all sources of ignition. Take precautionary measures against static discharges.

Environmental Precautions Should not be released into the environment. See Section 12 for additional ecological information. Do not flush into surface water or sanitary sewer system.

Methods and Material for Containment and Cleaning Up

Methods for Containment Prevent further leakage or spillage if safe to do so.

Methods for Cleaning Up Soak up with inert absorbent material. Pick up and transfer to properly labeled containers.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling

Handling
Wear personal protective equipment
Do not get in eyes, on skin, or on clothing
Use only under a chemical fume hood
Do not breathe vapors or spray mist
Do not ingest
Keep away from open flames, hot surfaces and sources of ignition
Use only non-sparking tools
Take precautionary measures against static discharges

Conditions for Safe Storage, Including any Incompatibilities

Storage
Corrosives area
Keep containers tightly closed in a dry, cool and well-ventilated place
Keep away from heat and sources of ignition

Incompatible Products No information available

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

Component	CAS-No	Korea	ACGIH TLV	OSHA PEL
Acetic Acid	64-19-7	STEL: 15 ppm	TWA: 10 ppm	(Vacated) TWA: 10 ppm

		TWA: 10 ppm	STEL: 15 ppm	(Vacated) TWA: 25 mg/m³ TWA: 10 ppm TWA: 25 mg/m³
Water	7732-18-5	Not listed	Not listed	Not listed
Iodine	7553-56-2	STEL: 0.1 ppm TWA: 0.01 ppm	TWA: 0.01 ppm STEL: 0.1 ppm	Ceiling: 0.1 ppm Ceiling: 1 mg/m³ (Vacated) Ceiling: 0.1 ppm (Vacated) Ceiling: 1 mg/m³

Component	CAS-No	European Union	The United Kingdom	Germany
Acetic Acid	64-19-7	TWA: 25 mg/m³ (15min) TWA: 10 ppm (15min) STEL: 50 mg/m³ (8h) STEL: 20 ppm (8h)	STEL: 20 ppm 15 min STEL: 50 mg/m³ 15 min TWA: 10 ppm 8 hr TWA: 25 mg/m³ 8 hr	TWA: 10 ppm (8 Stunden). AGW - exposure factor 2 TWA: 25 mg/m³ (8 Stunden). AGW - exposure factor 2 TWA: 10 ppm (8 Stunden). MAK TWA: 25 mg/m³ (8 Stunden). MAK Höhepunkt: 20 ppm Höhepunkt: 50 mg/m³
Water	7732-18-5	Not listed	Not listed	Not listed
Iodine	7553-56-2	Not listed	STEL: 0.1 ppm 15 min STEL: 1.1 mg/m³ 15 min	Haut

Biological Exposure Indices

Component	CAS-No	Biological Exposure Indices
Acetic Acid	64-19-7	Not listed
Water	7732-18-5	Not listed
Iodine	7553-56-2	Not listed

Appropriate engineering controls

Engineering Measures Ensure that eyewash stations and safety showers are close to the workstation location Ensure adequate ventilation, especially in confined areas Use explosion-proof electrical/ventilating/lighting/equipment

Individual protection measures, such as personal protective equipment

Personal protective equipment Use only those certified by the Korea Occupational Safety and Health Administration.

Eye/face Protection Wear chemical splash goggles and face shield. If splashes are likely to occur, wear:. Face-shield.

Skin and Body Protection Wear protective gloves/clothing.

Respiratory Protection None under normal use conditions. In case of inadequate ventilation wear respiratory protection.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

Environmental exposure controls Prevent product from entering drains

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical State Liquid
Appearance Dark red
Odor vinegar-like
Odor Threshold No information available

pH	1.8
PH Range	0.3 - 3.3

Property	**Values**	**Remarks • Method**
Melting point/freezing point	No information available	
Boiling Point/Range	~ 100 °C / 212 °F	
Flash Point (High in °C)	N/A	
Evaporation Rate	No information available	
Flammability (solid, gas)	No information available	
Flammability Limit in Air		
Upper flammability limit:	No information available	
Lower flammability limit:	No information available	
Vapor pressure	No information available	
Vapor Density	No information available	
Specific Gravity	No information available	
Water Solubility	Soluble in water	
Solubility in other solvents	No information available	
Partition coefficient	No information available	
Autoignition Temperature	-	
Decomposition Temperature	No information available	
Kinematic viscosity	No information available	
Dynamic viscosity	No information available	
Explosive Properties	No information available	
Oxidizing Properties	No information available	

Other Information

Softening Point	No information available
Molecular Weight	No information available
VOC Content(%)	61
Density	No Information available
Bulk Density	No information available

SECTION 10: STABILITY AND REACTIVITY

Reactivity
No Information available

Chemical Stability
Stable under normal conditions

Possibility of Hazardous Reactions
None under normal processing

Conditions to Avoid
Keep away from open flames, hot surfaces and sources of ignition.

Incompatible Materials
No information available

Hazardous Decomposition Products
Thermal decomposition can lead to release of irritating gases and vapors.

SECTION 11: TOXICOLOGICAL INFORMATION

Product Information

Information on likely routes of exposure

Inhalation	Not an expected route of exposure.
Ingestion	May be harmful if swallowed.
Eyes	Avoid contact with eyes. Corrosive to the eyes and may cause severe damage including blindness.
Skin	Avoid contact with skin. Causes burns. Skin corrosion/irritation.

Information on Toxicological Effects

Symptoms Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation

Delayed and immediate effects as well as chronic effects from short and long-term exposure

(b) skin corrosion/irritation;	Category 1. A.
Sensitization	No information available
Mutagenic Effects	No information available
Carcinogenicity	No information available.
Reproductive Effects	No information available
STOT - single exposure	No information available
STOT - repeated exposure	No information available
Aspiration hazard	No information available

Numerical measures of toxicity - Product Information

The following values are calculated based on chapter 3.1 of the GHS document .

ATEmix (oral)	5054 mg/kg
ATEmix (dermal)	1337 mg/kg
ATEmix (inhalation-dust/mist)	5.6 mg/L

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity

0% of the mixture consists of components(s) of unknown hazards to the aquatic environment

Component	Freshwater Algae	Freshwater Fish	Water Flea
Acetic Acid 64-19-7	-	LC50: = 75 mg/L, 96h static (Lepomis macrochirus) LC50: = 79 mg/L, 96h static (Pimephales promelas)	EC50: = 47 mg/L, 24h (Daphnia magna) EC50: = 65 mg/L, 48h Static (Daphnia magna)

Persistence and Degradability
No information available

Bioaccumulation/ Accumulation
No information available

Mobility
.

Component	log Pow
Acetic Acid	-0.31

64-19-7	

Other adverse effects
No information available

SECTION 13: DISPOSAL CONSIDERATIONS

Waste treatment methods

Waste Disposal Methods Disposal should be in accordance with applicable regional, national and local laws and regulations.

Contaminated Packaging Dispose of this container to hazardous or special waste collection point. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep product and empty container away from heat and sources of ignition.

SECTION 14: TRANSPORT INFORMATION

Road and Rail Transport

UN-No UN2790
Proper Shipping Name Acetic acid solution
Hazard Class 8
Packing Group II

IATA

UN-No UN2790
Proper Shipping Name Acetic acid solution
Hazard Class 8
Packing Group II

IMDG/IMO

UN-No UN2790
Proper Shipping Name Acetic acid solution
Hazard Class 8
Packing Group II
Marine Pollutant Not Applicable

Special Precautions for User No special precautions required

SECTION 15: REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture

Legend: X - Listed '-' - Not Listed

International Inventories

Component	CAS-No	KECL	TSCA	EINECS	IECSC	DSL	NDSL	PICCS	ENCS	AICS
Acetic Acid	64-19-7	KE-00013	X	200-580-7	X	X	-	X	X	X
Water	7732-18-5	KE-35400	X	231-791-2	X	X	-	X	-	X
Iodine	7553-56-2	KE-21023	X	231-442-4	X	X	-	X	-	X

Component	CAS-No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Acetic Acid	64-19-7	Not applicable	Not applicable	Not applicable	Annex I - Y34
Water	7732-18-5	Not applicable	Not applicable	Not applicable	Not applicable
Iodine	7553-56-2	Not applicable	Not applicable	Not applicable	Not applicable

Component	CAS-No	OECD HPV	Persistent Organic	Ozone Depletion

			Pollutant	Potential
Acetic Acid	64-19-7	Listed	Not applicable	Not applicable
Water	7732-18-5	Listed	Not applicable	Not applicable
Iodine	7553-56-2	Listed	Not applicable	Not applicable

Korean National Regulations

Component	CAS-No	Act on Registration and Evaluation of Chemical Substances (K-REACH)	Authorised Chemicals	Existing Substances Subject to Registration
Acetic Acid	64-19-7	Annex 1 - KE-00013	Not applicable	Not applicable
Water	7732-18-5	Annex 1 - KE-35400 Exempt (Index No. 25)	Not applicable	Not applicable
Iodine	7553-56-2	Annex 1 - KE-21023	Not applicable	Not applicable

Component	CAS-No	Chemical Control Act - Toxic Chemicals	Chemical Control Act - Prohibited Chemicals	Chemical Control Act - Use Restricted Chemicals
Acetic Acid	64-19-7	Not applicable	Not applicable	Not applicable
Water	7732-18-5	Not applicable	Not applicable	Not applicable
Iodine	7553-56-2	Not applicable	Not applicable	Not applicable

Component	CAS-No	Chemical Control Act - Accident Precaution Chemicals (% in mixtures)	Chemical Control Act - Accident Precaution Chemicals - Quantity limits Storage (% in mixtures)	Chemical Control Act - Accident Precaution Chemicals - Quantity limits Manufacture/Use (% in mixtures)
Acetic Acid	64-19-7	Not applicable	Not applicable	Not applicable
Water	7732-18-5	Not applicable	Not applicable	Not applicable
Iodine	7553-56-2	Not applicable	Not applicable	Not applicable

Component	CAS-No	Waste Control Law	Ministry of Environment - CMR risk	Ministry of Environment - Critically Controlled Substance
Acetic Acid	64-19-7	Not applicable	Not applicable	Not applicable
Water	7732-18-5	Not applicable	Not applicable	Not applicable
Iodine	7553-56-2	Not applicable	Not applicable	Not applicable

Component	CAS-No	ISHA - Harmful Agents Subject to Work Environment Monitoring	ISHA - Prohibited substances	ISHA - Substances requiring permission
Acetic Acid	64-19-7	Listed	Not applicable	Not applicable
Water	7732-18-5	Not applicable	Not applicable	Not applicable
Iodine	7553-56-2	Listed	Not applicable	Not applicable

Component	CAS-No	ISHA - Substances subject to control	ISHA - Harmful Agents Requiring Health Examination	ISHA - Permissible Exposure Limits
Acetic Acid	64-19-7	Listed	Not applicable	Not applicable
Water	7732-18-5	Not applicable	Not applicable	Not applicable
Iodine	7553-56-2	Listed	Listed	Not applicable

Component	CAS-No	ISHA - Subject to Process Safety Reports (minimum quantity)	ISHA - Threshold Limit Values (TLVs) Chemicals	ISHA - Special management materials
Acetic Acid	64-19-7	Not applicable	STEL: 15 ppm TWA: 10 ppm	Not applicable
Water	7732-18-5	Not applicable	Not applicable	Not applicable
Iodine	7553-56-2	Not applicable	STEL: 0.1 ppm TWA: 0.01 ppm	Not applicable

National Fire Association - Dangerous Substances Minimum quantity requiring a permit

Component	CAS-No	Class 1 - Oxidising solids	Class 2 - Flammable solid	Class 3 - Spontaneously Combustible Substances and Dangerous Substances When Wet	Class 4 - Flammable liquids	Class 5 - Self-reactive substances	Class 6 - Oxidising liquids
Acetic Acid	64-19-7	Not applicable	Not applicable	Not applicable	4. Group 2 Petroleum (Soluble) 2000 L	Not applicable	Not applicable
Water	7732-18-5	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Iodine	7553-56-2	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable

Control Parameters

Component	CAS-No	Korea	Biological Exposure Indices
Acetic Acid	64-19-7	STEL: 15 ppm TWA: 10 ppm	Not listed
Water	7732-18-5	Not listed	Not listed
Iodine	7553-56-2	STEL: 0.1 ppm TWA: 0.01 ppm	Not listed

US Management Information

OSHA - Occupational Safety and Health Administration

Not applicable

Component	CAS-No	Specifically Regulated Chemicals	Highly Hazardous Chemicals
Acetic Acid	64-19-7	Not applicable	Not applicable
Water	7732-18-5	Not applicable	Not applicable
Iodine	7553-56-2	Not applicable	Not applicable

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	CAS-No	CERCLA EHS RQs	Hazardous Substances RQs	SARA 313 - Threshold Values %
Acetic Acid	64-19-7	Not applicable	5000 lb	Not applicable
Water	7732-18-5	Not applicable	Not applicable	Not applicable
Iodine	7553-56-2	Not applicable	Not applicable	Not applicable

CLP Classification - Regulation (EC) No 1272/2008

Danger.

H226 - Flammable liquid and vapor. H314 - Causes severe skin burns and eye damage. H372 - Causes damage to organs through prolonged or repeated exposure.

P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking. P303 + P361 + P353 - IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower. P280 - Wear protective gloves/ protective clothing/ eye protection/ face protection. P301 + P330 + P331 - IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P310 - Immediately call a POISON CENTER or doctor/ physician.

SECTION 16: OTHER INFORMATION

Prepared By Regulatory Affairs

Prepared For Thermo Fisher Scientific Inc.©

Issue Date 05-Sep-2019

Revision Date	05-Sep-2019
Reason for revision	Initial Release.

MOEL's Public Notice No. 2016-19 (Standards for Classification and Labeling of Chemical Substances and Safety Data Sheets)

Disclaimer

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End of Safety Data Sheet

Safety Data Sheet
pH Control®

SDS Revision Date: **03/16/2015**

1. Identification

1.1. Product identifier

Product Identity	pH Control®
Alternate Names	pH Control®

1.2. Relevant identified uses of the substance or mixture and uses advised against

Intended use	See Technical Data Sheet.
Application Method	See Technical Data Sheet.

1.3. Details of the supplier of the safety data sheet

Company Name	Pharmacal Research Labs.,Inc. 562 Captain Neville Dr. Waterbury, CT 06705, USA
24 hour Emergency Telephone No.:	
CHEMTREC (USA)	(800) 424-9300
IN CANADA CALL CANUTEC	(613) 996-6666
Customer Service: Pharmacal Research Labs.,Inc.	203-755-4908, (800)-243-5350

2. Hazard(s) identification

2.1. Classification of the substance or mixture

Skin Corr. 1A;H314	Causes severe skin burns and eye damage.
Eye Dam. 1;H318	Causes serious eye damage.
Aquatic Acute 3;H402	Harmful to aquatic life.

2.2. Label elements

Using the Toxicity Data listed in section 11 and 12 the product is labeled as follows.



Danger

H314 Causes severe skin burns and eye damage.

H318 Causes serious eye damage.

H402 Harmful to aquatic life.

[Prevention]:

P260 Do not breathe mist / vapors / spray.

P264 Wash thoroughly after handling.

P273 Avoid release to the environment.

P280 Wear protective gloves / eye protection / face protection.

[Response]:

P301+330+331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P303+361+353 IF ON SKIN (or hair): Remove / Take off immediately all contaminated clothing. Rinse skin with water / shower.

P304+340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P305+351+338 IF IN EYES: Rinse continuously with water for several minutes. Remove contact lenses if present and easy to do - continue rinsing.

P310 Immediately call a POISON CENTER or doctor / physician.

P363 Wash contaminated clothing before reuse.

P391 Collect spillage.

[Storage]:

P406 Store in corrosive resistant container with a resistant inner liner.

[Disposal]:

P501 Dispose of contents / container in accordance with local / national regulations.

3. Composition/information on ingredients

This product contains the following substances that present a hazard within the meaning of the relevant State and Federal Hazardous Substances regulations.

Ingredient/Chemical Designations	Weight %	GHS Classification	Notes
Sodium hydroxide **CAS Number: 0001310-73-2**	**20**	**Skin Corr. 1A;H314** **Acute Tox(Dermal). 4;H312** **Eye Dam. 1, H318** **Aquatic Acute 3, H402**	**[1][2]**

[1] Substance classified with a health or environmental hazard.
[2] Substance with a workplace exposure limit.
[3] PBT-substance or vPvB-substance.
*The full texts of the phrases are shown in Section 16.

4. First aid measures

4.1. Description of first aid measures

General	In all cases of doubt, or when symptoms persist, seek medical attention. Never give anything by mouth to an unconscious person.
Inhalation	Corrosive and irritating to upper respiratory tract and mucous membranes. Remove affected person to fresh air; wash mouth and nasal passages with water repeatedly; if breathing difficulties persist, seek medical attention
Eyes	Hold eye open and rinse slowly and gently with water for 15 - 20 minutes. Remove contact lenses, if present, after the first five minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.
Skin	Take off contaminated clothing. Rinse skin immediately with plenty of water for 15 - 20 minutes. Call a poison control center or doctor for treatment advice.
Ingestion	DO NOT induce vomiting; Rinse mouth with water; Seek medical attention immediately.

4.2. Most important symptoms and effects, both acute and delayed

Overview	EFFECTS OF OVEREXPOSURE: SKIN: Will cause severe irritation, redness, and, if untreated, can result in deep chemical burns. EYES: Corrosive to eyes resulting in irritation, reddening, chemical burns, and, if untreated, possibly permanent blindness. INGESTION: Will causes burns of the mucous membranes in the mouth, throat, esophagus, stomach, and can result in possible death. INHALATION: Airborne concentrations of dusts or mists will cause damage to the upper respiratory tract and lungs, which may result in chemical pneumonia. See section 2 for further details.
Eyes	Causes serious eye damage.
Skin	Causes severe skin burns and eye damage.

5. Fire-fighting measures

5.1. Extinguishing media

Use media appropriate for surrounding area.

5.2. Special hazards arising from the substance or mixture

Non-combustible material.

Do not breathe mist / vapors / spray.

5.3. Advice for fire-fighters

Not combustible, however following evaporation of aqueous component residual material can decompose if involved in a fire, emitting toxic fumes. Contact with metals may liberate hydrogen gas which is extremely flammable. Fire fighters to wear self-contained breathing apparatus and suitable protective clothing if risk of exposure to products of

decomposition.

ERG Guide No. 154

6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Put on appropriate personal protective equipment (see section 8).

6.2. Environmental precautions

Do not allow spills to enter drains or waterways.

Use good personal hygiene practices. Wash hands before eating, drinking, smoking or using toilet. Promptly remove soiled clothing and wash thoroughly before reuse.

6.3. Methods and material for containment and cleaning up

Protective clothing and equipment must be worn. Contain spill or leakage in suitable container or holding area. Do not allow drainage to sewers, streams or storm drains. Recover with vacuum equipment and flush with water. Spilled material is slippery.
"EMPTY" CONTAINER WARNINGS: Do not reuse empty container. Triple rinse with water - dispose of in conformance with federal, state, and local regulations.

7. Handling and storage

7.1. Precautions for safe handling

Avoid storing next to strong acids. Avoid inhalation of vapor or mist.

See section 2 for further details. - [Prevention]:

7.2. Conditions for safe storage, including any incompatibilities

Handle containers carefully to prevent damage and spillage.

Incompatible materials: May react with water, acids, metals and reducing sugars (fructose). Avoid contact with "soft" metals such as magnesium, zinc and aluminum.

Keep in well ventilated area - store above 10°c (50°f). Use goggles or face shield, rubber gloves, and boots where contact is expected.

See section 2 for further details. - [Storage]:

7.3. Specific end use(s)

Keep out of reach of children.
For professional use only.
Do not mix with any other chemicals unless compatibility has been established by the manufacturer.

8. Exposure controls and personal protection

8.1. Control parameters

Exposure

CAS No.	Ingredient	Source	Value
0001310-73-2	Sodium hydroxide	OSHA	TWA 2 mg/m3
		ACGIH	Ceiling: 2 mg/m3
		NIOSH	C 2 mg/m3
		Supplier	No Established Limit

Carcinogen Data

CAS No.	Ingredient	Source	Value
0001310-73-2	Sodium hydroxide	OSHA	Select Carcinogen: No
		NTP	Known: No; Suspected: No
		IARC	Group 1: No; Group 2a: No; Group 2b: No; Group 3: No; Group 4: No;

8.2. Exposure controls

Respiratory For mist use NIOSH approved respirator.

Eyes Chemical Splash goggles or face shield

Skin A rubber apron and boots are recommended to minimize contact. Protective gloves: Nitrile Rubber

Engineering Controls Provide adequate ventilation. Where reasonably practicable this should be achieved by the use of local exhaust ventilation and good general extraction. If these are not sufficient to maintain concentrations of particulates and any vapor below occupational exposure limits suitable respiratory protection must be worn.

Other Work Practices Use good personal hygiene practices. Wash hands before eating, drinking, smoking or using toilet. Promptly remove soiled clothing and wash thoroughly before reuse.

See section 2 for further details. - [Prevention]:

9. Physical and chemical properties

Appearance	Clear Liquid
Odor	Not Measured
Odor threshold	Not Measured
pH	13

Melting point / freezing point	Not Measured
Initial boiling point and boiling range	Not Measured
Flash Point	Not Measured
Evaporation rate (Ether = 1)	Not Measured
Flammability (solid, gas)	Not Applicable
Upper/lower flammability or explosive limits	**Lower Explosive Limit:** Not Measured
	Upper Explosive Limit: Not Measured
Vapor pressure (Pa)	Not Measured
Vapor Density	Not Measured
Specific Gravity	1.21
Solubility in Water	Complete @ 1 ATM and 25C
Partition coefficient n-octanol/water (Log Kow)	Not Measured
Auto-ignition temperature	Not Measured
Decomposition temperature	Not Measured
Viscosity (cSt)	Not Measured

9.2. Other information

Physical properties are approximate or typical values and should not be used for precise design purposes

10. Stability and reactivity

10.1. Reactivity

Do not allow contact with acids

10.2. Chemical stability

Stable under normal circumstances.

10.3. Possibility of hazardous reactions

No data available.

10.4. Conditions to avoid

Avoid contact with strong acids

10.5. Incompatible materials

May react with water, acids, and metals. Avoid contact with "soft" metals such as magnesium, zinc and aluminum.

10.6. Hazardous decomposition products

Other decomposition products- no data available
In the event of fire: see section 5

11. Toxicological information

Acute toxicity

Ingredient	Oral LD50, mg/kg	Skin LD50, mg/kg	Inhalation Vapor LD50, mg/L/4hr	Inhalation Dust/Mist LD50, mg/L/4hr	Inhalation Gas LD50, ppm
Sodium hydroxide - (1310-73-2)	6,600.00, Mouse - Category: NA	1,350.00, Rabbit - Category: 4	600.00, Mouse - Category: NA	No data available	No data available

Note: When no route specific LD50 data is available for an acute toxin, the converted acute toxicity point estimate was used in the calculation of the product's ATE (Acute Toxicity Estimate).

Classification	Category	Hazard Description
Acute toxicity (oral)	---	Not Applicable
Acute toxicity (dermal)	---	Not Applicable
Acute toxicity (inhalation)	---	Not Applicable
Skin corrosion/irritation	1A	Causes severe skin burns and eye damage.
Serious eye damage/irritation	1	Causes serious eye damage.
Respiratory sensitization	---	Not Applicable
Skin sensitization	---	Not Applicable
Germ cell mutagenicity	---	Not Applicable
Carcinogenicity	---	Not Applicable
Reproductive toxicity	---	Not Applicable
STOT-single exposure	---	Not Applicable
STOT-repeated exposure	---	Not Applicable
Aspiration hazard	---	Not Applicable

12. Ecological information

12.1. Toxicity

Harmful to aquatic life.

Harmful to aquatic life with long lasting effects.

No additional information provided for this product. See Section 3 for chemical specific data.

Aquatic Ecotoxicity

Ingredient	96 hr LC50 fish, mg/l	48 hr EC50 crustacea, mg/l	ErC50 algae, mg/l
Sodium hydroxide - (1310-73-2)	196.00, Poecilia reticulata	40.38, Ceriodaphnia dubia	Not Available

12.2. Persistence and degradability

There is no data available on the preparation itself.

12.3. Bioaccumulative potential

Not Measured

12.4. Mobility in soil

No data available.

12.5. Results of PBT and vPvB assessment

This product contains no PBT/vPvB chemicals.

12.6. Other adverse effects

No data available.

13. Disposal considerations

13.1. Waste treatment methods

Observe all federal, state and local regulations when disposing of this substance.

14. Transport information

	DOT (Domestic Surface Transportation)	IMO / IMDG (Ocean Transportation)	ICAO/IATA
14.1. UN number	UN1824	UN1824	UN1760
14.2. UN proper shipping name	Sodium Hydroxide Solution	Sodium Hydroxide Solution	Sodium Hydroxide Solution
14.3. Transport hazard class(es)	**DOT Hazard Class:** 8 **DOT Label:** 8	**IMDG:** 8 **Sub Class:** Not Applicable	**Air Class:** 8
14.4. Packing group	II	II	II

14.5. Environmental hazards

IMDG Marine Pollutant: No

14.6. Special precautions for user: No further information

15. Regulatory information

Regulatory Overview The regulatory data in Section 15 is not intended to be all-inclusive, only selected regulations are represented.

Toxic Substance Control Act (TSCA) All components of this material are either listed or exempt from listing on the TSCA Inventory.

WHMIS Classification D2B E

US EPA Tier II Hazards

Fire: No
Sudden Release of Pressure: No
Reactive: No
Immediate (Acute): Yes
Delayed (Chronic): No

EPCRA 311/312 Chemicals and RQs (lbs):

Sodium hydroxide (1,000.00)

EPCRA 302 Extremely Hazardous:
To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

EPCRA 313 Toxic Chemicals:
To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

Proposition 65 - Carcinogens (>0.0%):
To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

Proposition 65 - Developmental Toxins (>0.0%):
To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

Proposition 65 - Female Repro Toxins (>0.0%):
To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

Proposition 65 - Male Repro Toxins (>0.0%):
To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

N.J. RTK Substances (>1%):

Sodium hydroxide

Penn RTK Substances (>1%):

Sodium hydroxide

16. Other information

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind, expressed or implied, is made with respect to the information contained herein. We accept no responsibility and disclaim all liability for any harmful effects which may be caused by exposure to our products. Customers/users of this product must comply with all applicable health and safety laws, regulations, and orders.

The full text of the phrases appearing in section 3 is:

H312 Harmful in contact with skin.

H314 Causes severe skin burns and eye damage.

H318 Causes serious eye damage.

H402 Harmful to aquatic life.

This is the first version in the GHS SDS format. Listings of changes from previous versions in other formats are not applicable.

The information and recommendations contained herein are, to the best of Pharmacal's knowledge and belief, accurate and reliable as of the date issued. Pharmacal does not warrant or guarantee their accuracy or reliability, and Pharmacal shall not be liable for any loss or damage arising out of there use thereof.
The information and recommendations are offered for the user's consideration and examination, and it is the user's responsibility to satisfy itself that they are suitable and complete for its particular use.
The hazardous materials identification system (HMIS) and national fire protection association ratings have been included by Pharmacal research laboratories INC. In order to provide additional health and hazard information. The ratings recommended are based upon criteria supplied by the developers of these rating systems, together with Pharmacal's interpretation of the available data.

End of Document

SAFETY DATA SHEET

Version 6.5
Revision Date 04/28/2022
Print Date 02/04/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Propylene glycol

Product Number : W294004
Brand : Aldrich
CAS-No. : 57-55-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture.

2.2 GHS Label elements, including precautionary statements

Not a hazardous substance or mixture.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms : Propylene glycol
1,2-Propanediol

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Formula	:	$C_3H_8O_2$
Molecular weight	:	76.09 g/mol
CAS-No.	:	57-55-6
EC-No.	:	200-338-0

Component	Classification	Concentration
1,2-propanediol		
		<= 100 %

SECTION 4: First aid measures

4.1 Description of first-aid measures

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact
Wash off with soap and plenty of water.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Avoid breathing vapors, mist or gas.
For personal protection see section 8.

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6.2 Environmental precautions
No special environmental precautions required.

6.3 Methods and materials for containment and cleaning up
Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Keep container tightly closed in a dry and well-ventilated place.

hygroscopic

Storage class
Storage class (TRGS 510): 10: Combustible liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
1,2-propanediol	57-55-6	TWA	10 mg/m3	USA. Workplace Environmental Exposure Levels (WEEL)

8.2 Exposure controls

Appropriate engineering controls
General industrial hygiene practice.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

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Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Respiratory protection not required. For nuisance exposures use type OV/AG (US) or type ABEK (EU EN 14387) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
No special environmental precautions required.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear, viscous Color: colorless
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -60 °C (-76 °F) - lit.
f)	Initial boiling point and boiling range	187 °C 369 °F - lit.
g)	Flash point	103 °C (217 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 12.5 %(V) Lower explosion limit: 2.6 %(V)
k)	Vapor pressure	0.11 hPa at 20 °C (68 °F)

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l)	Vapor density	2.63 - (Air = 1.0)
m)	Density	1.036 g/cm3 at 25 °C (77 °F) - lit.
	Relative density	No data available
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	log Pow: -0.8 at 25 °C (77 °F)
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Relative vapor density	2.63 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Acid chlorides, Acid anhydrides, Oxidizing agents, Chloroformates, Reducing agentsAcid chlorides, Acid anhydrides, Oxidizing agents, Chloroformates, Reducing agents

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male and female - 22,000 mg/kg
Remarks: (ECHA)
Inhalation: No data available
LD50 Dermal - Rabbit - > 2,000 mg/kg
Remarks: (ECHA)

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No data available

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation - 4 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation
(OECD Test Guideline 405)

Respiratory or skin sensitization
Maximization Test - Guinea pig
Result: negative
(OECD Test Guideline 406)

Germ cell mutagenicity
Test Type: Chromosome aberration test in vitro
Test system: Human lymphocytes
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative
Test Type: Ames test
Test system: S. typhimurium
Metabolic activation: with and without metabolic activation
Result: negative
Remarks: (ECHA)

Test Type: Micronucleus test
Species: Mouse
Cell type: Bone marrow
Application Route: Intraperitoneal

Result: negative
Remarks: (ECHA)

Test Type: Chromosome aberration test in vitro
Species: Rat
Cell type: Bone marrow
Application Route: Oral

Result: negative
Remarks: (ECHA)

Test Type: dominant lethal test
Species: Rat

Application Route: Oral

Result: negative
Remarks: (ECHA)

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

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NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

Repeated dose toxicity - Rat - male - Oral - 2 yr - NOAEL (No observed adverse effect level) - 1,700 mg/kg
Remarks: (ECHA)

RTECS: TY2000000
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Hazardous properties cannot be excluded but are unlikely when the product is handled appropriately.

Handle in accordance with good industrial hygiene and safety practice.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	static test LC50 - Oncorhynchus mykiss (rainbow trout) - 40,613 mg/l - 96 h Remarks: (ECHA)
Toxicity to daphnia and other aquatic invertebrates	static test LC50 - Ceriodaphnia dubia (water flea) - 18,340 mg/l - 48 h (US-EPA)
Toxicity to algae	static test ErC50 - Pseudokirchneriella subcapitata (green algae) - 19,000 mg/l - 96 h (OECD Test Guideline 201)
Toxicity to bacteria	NOEC - Pseudomonas putida - > 20,000 mg/l - 18 h Remarks: (ECHA)

12.2 Persistence and degradability

Biodegradability	aerobic Dissolved organic carbon (DOC) - Exposure time 28 d Result: 98.3 % - Readily biodegradable. (OECD Test Guideline 301F)

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12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties
No data available

12.7 Other adverse effects
Biological effects:
When discharged properly, no impairments in the function of adapted biological wastewater treatment plants are to be expected.

Stability in water	- 2.3 yr
	Remarks: reaction with hydroxyl radicals(IUCLID)

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

Further information
Not classified as dangerous in the meaning of transport regulations.

SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components

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This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
No SARA Hazards

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

1,2-propanediol	CAS-No. 57-55-6	Revision Date 2007-03-01

1,2-propanediol	CAS-No. 57-55-6	Revision Date 2007-03-01

New Jersey Right To Know Components

1,2-propanediol	CAS-No. 57-55-6	Revision Date 2007-03-01

California Prop. 65 Components
This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

SECTION 16: Other information

Further information
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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.5 Revision Date: 04/28/2022 Print Date: 02/04/2024

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SAFETY DATA SHEET

Creation Date 14-May-2010 **Revision Date** 05-Feb-2016 **Revision Number** 2

1. Identification

Product Name **Sodium bisulfite**

Cat No. : **AC419440000; AC419440010; AC419440025; AC419440050; AC419441000**

Synonyms Sodium hydrogen sulfite

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute oral toxicity	Category 4
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word
Warning

Hazard Statements
Harmful if swallowed
May cause respiratory irritation



Precautionary Statements

Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Avoid breathing dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician if you feel unwell
Ingestion
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth
Storage
Store in a well-ventilated place. Keep container tightly closed
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Contact with acids liberates toxic gas
Other hazards
May produce an allergic reaction. May cause eye, skin, and respiratory tract irritation.

3. Composition / information on ingredients

Component	CAS-No	Weight %
Sodium bisulfite	7631-90-5	100

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Obtain medical attention.

Inhalation Remove from exposure, lie down. Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Obtain medical attention.

Ingestion Do not induce vomiting. Get medical attention.

Most important symptoms/effects May cause allergic skin reaction. May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Dry chemical. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
Sulfur oxides Sodium oxides
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	0	2	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment. Ensure adequate ventilation. Keep people away from and upwind of spill/leak. Avoid dust formation.

Environmental Precautions See Section 12 for additional ecological information.

Methods for Containment and Clean Up Sweep up or vacuum up spillage and collect in suitable container for disposal. Avoid dust formation.

7. Handling and storage

Handling Avoid contact with skin and eyes. Do not breathe dust. Use only in area provided with appropriate exhaust ventilation. Handle under inert gas, protect from moisture. Wear personal protective equipment. Avoid dust formation.

Storage Keep in a dry, cool and well-ventilated place. Keep container tightly closed. Keep away from acids.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
Sodium bisulfite	TWA: 5 mg/m³	(Vacated) TWA: 5 mg/m³	TWA: 5 mg/m³

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
Sodium bisulfite	TWA: 5 mg/m³		TWA: 5 mg/m³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	White
Odor	rotten-egg like
Odor Threshold	No information available
pH	4-5 25% aq. sol
Melting Point/Range	150 °C / 302 °F
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	Not applicable
Specific Gravity	1.480
Solubility	300 g/l
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	H Na O3 S
Molecular Weight	104.06

10. Stability and reactivity

Reactive Hazard Yes

Stability Moisture sensitive. May react with air to form toxic gas.

Conditions to Avoid Avoid dust formation. Excess heat. Exposure to air. Incompatible products. Exposure to moist air or water. Temperatures above 150°C. acids.

Incompatible Materials Acids, Metals

Hazardous Decomposition Products Sulfur oxides, Sodium oxides

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Sodium bisulfite	LD50 = 1310 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation May cause eye, skin, and respiratory tract irritation

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Sodium bisulfite	7631-90-5	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Sodium bisulfite	Not listed	LC50: = 240 mg/L, 96h static (Gambusia affinis)	Not listed	EC50: = 119 mg/L, 48h (Daphnia magna)

Persistence and Degradability Soluble in water Persistence is unlikely based on information available.
Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Sodium bisulfite	X	X	-	231-548-0	-		X	X	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated

polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	Yes

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Sodium bisulfite	X	5000 lb	-	-

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Sodium bisulfite	5000 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Sodium bisulfite	X	X	X	-	X

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and

the MSDS contains all the information required by the CPR

WHMIS Hazard Class
D2B Toxic materials
F Dangerously reactive material



16. Other information

Prepared By
Regulatory Affairs
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Print Date 05-Feb-2016
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Version 7.4
Revision Date 11.03.2025
Print Date 28.06.2025

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Sodium hypochlorite solution
Product Number	:	425044
Brand	:	SIGALD
UFI	:	MCQ3-T68P-J99Y-750T
REACH No.	:	

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances
Uses advised against	:	This product is not intended for consumer use.

1.3 Details of the supplier of the safety data sheet

Company	:	Merck Life Science UK Limited New Road The Old Brickyard GILLINGHAM Dorset SP8 4XT UNITED KINGDOM
Telephone	:	+44 (0)1747 833-000
Fax	:	+44 (0)1747 833-313
E-mail address	:	TechnicalService@merckgroup.com

1.4 Emergency telephone

Emergency Phone #	:	+44 (0)870 8200418 (CHEMTREC)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 as amended by GB-CLP Regulation, UK SI 2019/720, and UK SI 2020/1567

Corrosive to Metals, (Category 1)	H290: May be corrosive to metals.
Skin corrosion, (Sub-category 1B)	H314: Causes severe skin burns and eye damage.
Serious eye damage, (Category 1)	H318: Causes serious eye damage.

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Short-term (acute) aquatic hazard, (Category 1)	H400: Very toxic to aquatic life.
Long-term (chronic) aquatic hazard, (Category 2)	H411: Toxic to aquatic life with long lasting effects.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008 as amended by GB-CLP Regulation, UK SI 2019/720, and UK SI 2020/1567

Pictogram



Signal Word	Danger
Hazard Statements	
H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.
H410	Very toxic to aquatic life with long lasting effects.
Precautionary Statements	
P234	Keep only in original packaging.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Supplemental Hazard information (EU)	
EUH031	Contact with acids liberates toxic gas.

Reduced Labeling (<= 125 ml)

Pictogram



Signal Word	Danger
Hazard Statements	
H314	Causes severe skin burns and eye damage.
Precautionary Statements	
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Supplemental Hazard information (EU)	
EUH031	Contact with acids liberates toxic gas.

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2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

Ecological information:
The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.
Toxicological information:
The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Formula : ClNaO
Molecular weight : 74.44 g/mol

Component		Classification	Concentration
sodium hypochlorite solution			
CAS-No. EC-No. Index-No.	7681-52-9 231-668-3 017-011-00-1 *	Met. Corr. 1; Skin Corr. 1B; Eye Dam. 1; Aquatic Acute 1; Aquatic Chronic 1; H290, H314, H318, H400, H410 Concentration limits: >= 5 %: , EUH031; M-Factor - Aquatic Acute: 10 - Aquatic Chronic: 1	>= 10 - < 20 %

*A registration number is not available for this substance as the substance or its use are exempted from registration according to Article 2 REACH Regulation (EC) No 1907/2006, or the annual tonnage does not require a registration.

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice

First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

If inhaled

After inhalation: fresh air. Call in physician.

In case of skin contact

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Call a physician immediately.

In case of eye contact

After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

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If swallowed
After swallowing: make victim drink water (two glasses at most), avoid vomiting (risk of perforation). Call a physician immediately. Do not attempt to neutralise.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Hydrogen chloride gas
Sodium oxides
Not combustible.
Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent and neutralising material (e.g. Chemizorb® OH^-, Merck Art. No. 101596). Dispose of properly. Clean up affected area.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
For precautions see section 2.2.

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7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
No metal containers.
Tightly closed.
Do not store near acids.
Storage stability Recommended storage temperature
2 - 8 °C
Storage class
Storage class (TRGS 510): 8B: Non-combustible, corrosive hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

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SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

Skin protection
Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Body Protection
protective clothing

Respiratory protection
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.
Recommended Filter type: Filter type ABEK

The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

Control of environmental exposure
Do not let product enter drains.

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SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Physical state	liquid
b)	Color	light green
c)	Odor	No data available
d)	Melting point/freezing point	-28.9 °C
e)	Initial boiling point and boiling range	111 °C
f)	Flammability (solid, gas)	No data available
g)	Upper/lower flammability or explosive limits	No data available
h)	Flash point	Not applicable
i)	Autoignition temperature	Not applicable
j)	Decomposition temperature	No data available
k)	pH	12 - 13 at 20 °C
l)	Viscosity	Viscosity, kinematic: No data available Viscosity, dynamic: No data available
m)	Water solubility	completely miscibleat 20 °C soluble
n)	Partition coefficient: n-octanol/water	No data available
o)	Vapor pressure	23.3 hPa at 20 °C
p)	Density	1.206 g/mL at 25 °C
	Relative density	No data available
q)	Relative vapor density	No data available
r)	Particle characteristics	No data available
s)	Explosive properties	Not classified as explosive.
t)	Oxidizing properties	none

9.2 Other safety information

No data available

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SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Violent reactions possible with:
Generates dangerous gases or fumes in contact with:
Acids
The generally known reaction partners of water.

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
Strong acids, Organic materials, Powdered metals, Forms shock-sensitive mixtures with certain other materials., Amines, Reacts violently with ammonium salts, aziridine, methanol, and phenylaceto primary aliphatic or aromatic amines to form explosively unstable n-chlor 55°C.Metals

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Mixture

Acute toxicity
Oral: No data available
Symptoms: If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the esophagus and the stomach.
Symptoms: mucosal irritations, Cough, Shortness of breath, Possible damages:, damage of respiratory tract
Dermal: No data available

Skin corrosion/irritation
Remarks: No data available
Remarks: Mixture causes burns.

Serious eye damage/eye irritation
Remarks: No data available
Remarks: Mixture causes serious eye damage.
Risk of blindness!

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure

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No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

Endocrine disrupting properties

Product:

Assessment	The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.
Other dangerous properties can not be excluded.

Handle in accordance with good industrial hygiene and safety practice.

Components

sodium hypochlorite solution

Acute toxicity
LD50 Oral - Rat - male - 1,100 mg/kg
(OECD Test Guideline 401)
Inhalation: No data available
LD50 Dermal - Rabbit - male and female - > 20,000 mg/kg
(OECD Test Guideline 402)

Skin corrosion/irritation
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Serious eye damage/eye irritation
Remarks: Causes serious eye damage.

Respiratory or skin sensitization
- Guinea pig
Result: Not a skin sensitizer.
(OECD Test Guideline 406)

Germ cell mutagenicity
Result: negative
Method: Mutagenicity (micronucleus test)
Species: Mouse - male
Result: negative

Carcinogenicity
No data available

Reproductive toxicity
No data available

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Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

SECTION 12: Ecological information

12.1 Toxicity

Mixture
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Endocrine disrupting properties
Product:

Assessment	:	The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

12.7 Other adverse effects
No data available

Components

sodium hypochlorite solution

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 0.08 mg/l - 96 h Remarks: (Regulation (EC) No 1272/2008, Annex VI) (ECOTOX Database)
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 0.04 mg/l - 48 h Remarks: (Regulation (EC) No 1272/2008, Annex VI) (ECOTOX Database)
Toxicity to algae	static test ErC50 - Pseudokirchneriella subcapitata - 0.036 mg/l - 72 h (OECD Test Guideline 201) static test EC10 - Pseudokirchneriella subcapitata - 0.02 mg/l - 72 h

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	(OECD Test Guideline 201)
Toxicity to bacteria	static test EC50 - activated sludge - 77.1 mg/l - 3 h (OECD Test Guideline 209) Remarks: (ECHA)

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. Notice Directive on waste 2008/98/EC.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 1791 IMDG: 1791 IATA: 1791

14.2 UN proper shipping name

ADR/RID: HYPOCHLORITE SOLUTION
IMDG: HYPOCHLORITE SOLUTION (sodium hypochlorite solution)
IATA: Hypochlorite solution
Passenger Aircraft: Not permitted for transport
Cargo Aircraft: Not permitted for transport

14.3 Transport hazard class(es)

ADR/RID: 8 IMDG: 8 IATA: 8

14.4 Packaging group

ADR/RID: III IMDG: III IATA: III

14.5 Environmental hazards

ADR/RID: yes IMDG Marine pollutant: yes IATA: no

14.6 Special precautions for user

Tunnel restriction code : (E)

Further information : No data available

14.7 Maritime transport in bulk according to IMO instruments

Not applicable for product as supplied.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006.

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Authorisations and/or restrictions on use

National legislation

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.	E1	ENVIRONMENTAL HAZARDS

Other regulations

Take note of Dir 94/33/EC on the protection of young people at work.

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements

EUH031	Contact with acids liberates toxic gas.
H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H400	Very toxic to aquatic life.
EUH031	Contact with acids liberates toxic gas.

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Full text of other abbreviations

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - Agreement concerning the International Carriage of Dangerous Goods by Road; AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Classification of the mixture		**Classification procedure:**
Met. Corr.1	H290	Calculation method
Skin Corr.1B	H314	Calculation method
Eye Dam.1	H318	Calculation method
Aquatic Acute1	H400	Calculation method
Aquatic Chronic2	H411	Calculation method

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the

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document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

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Safety Data Sheet

SULPHURIC ACID 98%

Revision: 2019-03-14 **Version:** 01.0

SECTION 1: Identification of the substance/mixture and supplier

1.1 Product identifier
Product name: SULPHURIC ACID 98%

1.2 Recommended use and restrictions on use
Identified uses:
Industrial application.
Restrictions of use:
Uses other than those identified are not recommended

1.3 Details of the supplier
Diversey Australia Pty. Limited
29 Chifley St, Smithfield, NSW, 2164, Australia
Telephone: 1800 647 779 (toll free)
Fax: (02) 9725 5767
Email: aucustserv@diversey.com
Website: www.diversey.com/

1.4 Emergency telephone number
Seek medical advice (show the label or safety data sheet where possible)
Call 1800 033 111 (24hrs)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture
Skin corrosion, Category 1A
Corrosive to metals, Category 1

2.2 Label elements



Signal word: Danger

Hazard statements:
H314 - Causes severe skin burns and eye damage.
H290 - May be corrosive to metals.

Prevention statement(s):
P234 - Keep only in original packaging.
P260 - Do not breathe vapours.
P264 - Wash face, hands and any exposed skin thoroughly after handling.
P280 - Wear protective gloves, protective clothing and eye or face protection.

Response statement(s):
P301 + P330 + P331 - IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 - Immediately call a POISON CENTRE, doctor or physician.
P321 - Specific treatment (see supplemental first aid instructions on this label).
P363 - Wash contaminated clothing before reuse.
P390 - Absorb spillage to prevent material damage.

Storage statement(s):
P405 - Store locked up.

P406 - Store in corrosive-resistant container with a resistant inner liner.

Disposal statement(s):
P501 - Dispose of unused content as chemical waste.

2.3 Other hazards
No other hazards known.

SECTION 3: Composition/information on ingredients

3.1 Substances / Mixtures

Ingredient(s)	CAS number	EC number	Weight percent
sulphuric acid	7664-93-9	231-639-5	>= 60

Non-hazardous ingredients are the remainder and add up to 100%.

[4] Polymer.
Workplace exposure limit(s), if available, are listed in subsection 8.1.
For the full text of the H and AUH phrases mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

Inhalation: Remove person to fresh air and keep comfortable for breathing. Get medical attention or advice if you feel unwell.

Skin contact: Take off immediately all contaminated clothing and wash it before re-use. Immediately call a POISON CENTRE, doctor or physician.

Eye contact: Immediately rinse eyes cautiously with lukewarm water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTRE, doctor or physician.

Ingestion: Rinse mouth. Immediately drink 1 glass of water. Do NOT induce vomiting. Keep at rest. Immediately call a POISON CENTRE, doctor or physician.

Self-protection of first aider: Consider personal protective equipment as indicated in subsection 8.2.

First aid facilities: Shower and eyewash facilities should be considered in a workplace where necessary.

4.2 Most important symptoms and effects, both acute and delayed

Inhalation: No known effects or symptoms in normal use.

Skin contact: Causes severe burns.

Eye contact: Causes severe or permanent damage.

Ingestion: Ingestion will lead to a strong caustic effect on mouth and throat and to the danger of perforation of oesophagus and stomach.

4.3 Indication of any immediate medical attention and special treatment needed
No information available on clinical testing and medical monitoring. Specific toxicological information on substances, if available, can be found in section 11.

Poison Information Center: Call 13 11 26 (Australia Wide).

SECTION 5: Firefighting measures

5.1 Extinguishing media
Carbon dioxide. Dry powder. Water spray jet. Fight larger fires with water spray jet or alcohol-resistant foam.

5.2 Special hazards arising from the substance or mixture
No special hazards known.

5.3 Advice for firefighters
As in any fire, wear self contained breathing apparatus and suitable protective clothing including gloves and eye/face protection.

5.4 Hazchem code

2P

2 - Fine water spray.

P - Liquid-tight chemical protective clothing and breathing apparatus. Dilute.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Ensure adequate ventilation. Do not breathe dust or vapour. Wear suitable protective clothing, gloves and eye/face protection.

6.2 Environmental precautions
Do not allow to enter drainage system, surface or ground water. Dilute with plenty of water.

6.3 Methods and material for containment and cleaning up
Use neutralising agent. Absorb onto dry sand or similar inert material. Ensure adequate ventilation.

6.4 Reference to other sections
For personal protective equipment see subsection 8.2. For disposal considerations see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Measures to prevent fire and explosions:
No special precautions required.

Measures required to protect the environment:
For environmental exposure controls see subsection 8.2.

Advices on general occupational hygiene:
Handle in accordance with good industrial hygiene and safety practice. Keep away from food, drink and animal feeding stuffs. Do not mix with other products unless adviced by Diversey. Wash hands before breaks and at the end of workday. Wash face, hands and any exposed skin thoroughly after handling. Take off immediately all contaminated clothing. Wash contaminated clothing before reuse. Use personal protective equipment as required. Avoid contact with skin and eyes. Do not breathe vapours. Use only with adequate ventilation.

7.2 Conditions for safe storage, including any incompatibilities
Store in accordance with local and national regulations. Keep only in original packaging. Store in a closed container.
For conditions to avoid see subsection 10.4. For incompatible materials see subsection 10.5.

7.3 Specific end use(s)
No specific advice for end use available.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters
Workplace exposure limits

Air limit values, if available:

Ingredient(s)	Long term value(s) (TWA)	Short term value(s) (STEL)	Peak value(s)
sulphuric acid	1 mg/m³	3 mg/m³	

Biological limit values, if available:

8.2 Exposure controls

The following information applies for the uses indicated in subsection 1.2 of the Safety Data Sheet.
If available, please refer to the product information sheet for application and handling instructions.
Normal use conditions are assumed for this section.

Recommended safety measures for handling the undiluted product:

Appropriate engineering controls: No special requirements under normal use conditions.
Appropriate organisational controls: Avoid direct contact and/or splashes where possible. Train personnel.

Personal protective equipment
Eye / face protection: Safety glasses or goggles (EN 166). The use of a full-face shield or other full-face protection is strongly recommended when handling open containers or if splashes may occur.
Hand protection: Chemical-resistant protective gloves (EN 374). Verify instructions regarding permeability and breakthrough time, as provided by the gloves supplier. Consider specific local use conditions, such as risk of splashes, cuts, contact time and temperature.
Suggested gloves for prolonged contact: Material: butyl rubber Penetration time: ≥ 480 min Material thickness: ≥ 0.7 mm
Suggested gloves for protection against splashes: Material: nitrile rubber Penetration time: ≥ 30 min Material thickness: ≥ 0.4 mm
In consultation with the supplier of protective gloves a different type providing similar protection may be chosen.
Body protection: Wear chemical-resistant clothing and boots in case direct dermal exposure and/or splashes may occur (EN 14605).
Respiratory protection: Respiratory protection is not normally required. However, inhalation of vapour, spray, gas or aerosols should be avoided.

Environmental exposure controls: Should not reach sewage water or drainage ditch undiluted or unneutralised.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

	Method / remark
Physical State: Liquid	
Colour: Clear, from Colourless to Brown	
Odour: Product specific	
Odour threshold: Not applicable	
pH: ≈ 0.3 (neat)	
Melting point/freezing point (°C): Not determined	Not relevant to classification of this product
Initial boiling point and boiling range (°C): Not determined	
Flammability (liquid): Not determined.	
Flash point (°C): Not applicable.	
Sustained combustion: Not applicable.	
(UN Manual of Tests and Criteria, section 32, L.2)	
Evaporation rate: Not determined	
Flammability (solid, gas): Not determined	
Upper/lower flammability limit (%): Not determined	
Vapour pressure: Not determined	
Vapour density: Not determined	
Relative density: ≈ 1.84 (20 °C)	
Solubility in / Miscibility with Water: Fully miscible	
Partition coefficient: n-octanol/water No information available.	
Substance data, partition coefficient n-octanol/water (log Kow): see subsection 12.3	
Autoignition temperature: Not determined	
Decomposition temperature: Not applicable.	
Viscosity: Not determined	
Explosive properties: Not explosive.	
Oxidising properties: Not oxidising	

9.2 Other information

Surface tension (N/m): Not determined	
Corrosion to metals: Corrosive	Weight of evidence

SECTION 10: Stability and reactivity

10.1 Reactivity
No reactivity hazards known under normal storage and use conditions.

10.2 Chemical stability
Stable under normal storage and use conditions.

10.3 Possibility of hazardous reactions
No hazardous reactions known under normal storage and use conditions.

10.4 Conditions to avoid
None known under normal storage and use conditions.

10.5 Incompatible materials
Reacts with alkali and metals. Keep away from products containing chlorine-based bleaching agents or sulphites.

10.6 Hazardous decomposition products
None known under normal storage and use conditions.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

No data is available on the mixture.

Substance data, where relevant and available, are listed below:.

Acute toxicity
Acute oral toxicity

Ingredient(s)	Endpoint	Value (mg/kg)	Species	Method	Exposure time (h)
sulphuric acid	LD_{50}	2140	Rat	OECD 401 (EU B.1)	

Acute dermal toxicity

Ingredient(s)	Endpoint	Value (mg/kg)	Species	Method	Exposure time (h)
sulphuric acid		No data available			

Acute inhalative toxicity

Ingredient(s)	Endpoint	Value (mg/l)	Species	Method	Exposure time (h)
sulphuric acid	LC_{50}	0.375 (mist)	Rat	OECD 403 (EU B.2)	

Irritation and corrosivity

Skin irritation and corrosivity

Ingredient(s)	Result	Species	Method	Exposure time
sulphuric acid	Corrosive	Rabbit	Method not given	

Eye irritation and corrosivity

Ingredient(s)	Result	Species	Method	Exposure time
sulphuric acid	Corrosive	Rabbit	Method not given	

Respiratory tract irritation and corrosivity

Ingredient(s)	Result	Species	Method	Exposure time
sulphuric acid	No data available			

Sensitisation

Sensitisation by skin contact

Ingredient(s)	Result	Species	Method	Exposure time (h)
sulphuric acid	Not sensitising			

Sensitisation by inhalation

Ingredient(s)	Result	Species	Method	Exposure time
sulphuric acid	No data available			

CMR effects (carcinogenicity, mutagenicity and toxicity for reproduction)

Mutagenicity

Ingredient(s)	Result (in-vitro)	Method (in-vitro)	Result (in-vivo)	Method (in-vivo)
sulphuric acid	No data available		No data available	

Carcinogenicity

Ingredient(s)	Effect
sulphuric acid	No evidence for carcinogenicity, negative test results

Toxicity for reproduction

Ingredient(s)	Endpoint	Specific effect	Value (mg/kg bw/d)	Species	Method	Exposure time	Remarks and other effects reported
sulphuric acid			No data available				

Repeated dose toxicity

Sub-acute or sub-chronic oral toxicity

Ingredient(s)	Endpoint	Value (mg/kg bw/d)	Species	Method	Exposure time (days)	Specific effects and organs affected
sulphuric acid	NOAEL	150	Rat	Method not given	60	

Sub-chronic dermal toxicity

Ingredient(s)	Endpoint	Value (mg/kg bw/d)	Species	Method	Exposure time (days)	Specific effects and organs affected
sulphuric acid		No data available				

Sub-chronic inhalation toxicity

Ingredient(s)	Endpoint	Value (mg/kg bw/d)	Species	Method	Exposure time (days)	Specific effects and organs affected
sulphuric acid	TCL_{0}	3	Human	Method not given		

Chronic toxicity

Ingredient(s)	Exposure route	Endpoint	Value (mg/kg bw/d)	Species	Method	Exposure time	Specific effects and organs affected	Remark
sulphuric acid			No data available					

STOT-single exposure

Ingredient(s)	Affected organ(s)
sulphuric acid	No data available

STOT-repeated exposure

Ingredient(s)	Affected organ(s)
sulphuric acid	No data available

Aspiration hazard
Substances with an aspiration hazard (H304), if any, are listed in section 3. If relevant, see section 9 for dynamic viscosity and relative density of the product.

Potential adverse health effects and symptoms
Effects and symptoms related to the product, if any, are listed in subsection 4.2.

SECTION 12: Ecological information

12.1 Toxicity

No data is available on the mixture.

Substance data, where relevant and available, are listed below:

Aquatic short-term toxicity
Aquatic short-term toxicity - fish

Ingredient(s)	Endpoint	Value (mg/l)	Species	Method	Exposure time (h)
sulphuric acid	LC_{50}	16 - 28	*Lepomis macrochirus*	Method not given	96

Aquatic short-term toxicity - crustacea

Ingredient(s)	Endpoint	Value (mg/l)	Species	Method	Exposure time (h)
sulphuric acid	EC_{50}	29	*Daphnia magna Straus*	Method not given	24

Aquatic short-term toxicity - algae

Ingredient(s)	Endpoint	Value (mg/l)	Species	Method	Exposure time (h)
sulphuric acid	EC_{50}	> 100	*Desmodesmus subspicatus*	Method not given	72

Aquatic short-term toxicity - marine species

Ingredient(s)	Endpoint	Value (mg/l)	Species	Method	Exposure time (days)
sulphuric acid		No data available			-

Impact on sewage plants - toxicity to bacteria

Ingredient(s)	Endpoint	Value (mg/l)	Inoculum	Method	Exposure time
sulphuric acid	EC_{50}	58	*Activated sludge*	Method not given	120 hour(s)

Aquatic long-term toxicity
Aquatic long-term toxicity - fish

Ingredient(s)	Endpoint	Value (mg/l)	Species	Method	Exposure time	Effects observed
sulphuric acid	NOEC	0.31	*Salvelinus fontinalis*	Method not given		

Aquatic long-term toxicity - crustacea

Ingredient(s)	Endpoint	Value (mg/l)	Species	Method	Exposure time	Effects observed
sulphuric acid	NOEC	0.15	*Daphnia magna*	Method not given		

Aquatic toxicity to other aquatic benthic organisms, including sediment-dwelling organisms, if available:

Ingredient(s)	Endpoint	Value (mg/kg dw sediment)	Species	Method	Exposure time (days)	Effects observed
sulphuric acid		No data available			-	

Terrestrial toxicity
Terrestrial toxicity - soil invertebrates, including earthworms, if available:

Ingredient(s)	Endpoint	Value (mg/kg dw	Species	Method	Exposure time (days)	Effects observed

		soil)				
sulphuric acid		No data available			-	

Terrestrial toxicity - plants, if available:

Ingredient(s)	Endpoint	Value (mg/kg dw soil)	Species	Method	Exposure time (days)	Effects observed
sulphuric acid		No data available			-	

Terrestrial toxicity - birds, if available:

Ingredient(s)	Endpoint	Value	Species	Method	Exposure time (days)	Effects observed
sulphuric acid		No data available			-	

Terrestrial toxicity - beneficial insects, if available:

Ingredient(s)	Endpoint	Value (mg/kg dw soil)	Species	Method	Exposure time (days)	Effects observed
sulphuric acid		No data available			-	

Terrestrial toxicity - soil bacteria, if available:

Ingredient(s)	Endpoint	Value (mg/kg dw soil)	Species	Method	Exposure time (days)	Effects observed
sulphuric acid		No data available			-	

12.2 Persistence and degradability

Abiotic degradation

Abiotic degradation - photodegradation in air, if available:

Abiotic degradation - hydrolysis, if available:

Abiotic degradation - other processes, if available:

Biodegradation

Ready biodegradability - aerobic conditions

Ingredient(s)	Inoculum	Analytical method	DT_{50}	Method	Evaluation
sulphuric acid					Not applicable (inorganic substance)

Ready biodegradability - anaerobic and marine conditions, if available:

Degradation in relevant environmental compartments, if available:

12.3 Bioaccumulative potential

Partition coefficient n-octanol/water (log Kow)

Ingredient(s)	Value	Method	Evaluation	Remark
sulphuric acid	No data available		No bioaccumulation expected	

Bioconcentration factor (BCF)

Ingredient(s)	Value	Species	Method	Evaluation	Remark
sulphuric acid	No data available				

12.4 Mobility in soil

Adsorption/Desorption to soil or sediment

Ingredient(s)	Adsorption coefficient Log Koc	Desorption coefficient Log Koc(des)	Method	Soil/sediment type	Evaluation
sulphuric acid	No data available				Low potential for adsorption to soil

12.5 Other adverse effects

No other adverse effects known.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Waste from residues / unused products:

The concentrated contents or contaminated packaging should be disposed of by a certified handler or according to the site permit. Release of waste to sewers is discouraged. The cleaned packaging material is suitable for energy recovery or recycling in line with local legislation.

Empty packaging
Recommendation: Dispose of observing national or local regulations.
Suitable cleaning agents: Water, if necessary with cleaning agent.

SECTION 14: Transport information



ADG, IMO/IMDG, ICAO/IATA
14.1 UN number: 1830
14.2 UN proper shipping name:
Sulphuric acid
14.3 Transport hazard class(es):
Transport hazard class (and subsidiary risks): 8
14.4 Packing group: II
14.5 Environmental hazards:
Environmentally hazardous: No
Marine pollutant: No
14.6 Special precautions for user: None known.
14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code: The product is not transported in bulk tankers.

Other relevant information:
Hazchem code: 2P
EmS: F-A, S-B

The product has been classified, labelled and packaged in accordance with the requirements of ADG7.5 Code and the provisions of the IMDG Code.
Transport regulations include special provisions for certain classes of dangerous goods packed in limited quantities.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

National regulations	Globally Harmonised System of Classification and Labelling of Chemicals (GHS) as published by Safework Australia.
Poison schedule	Classified as a Schedule 6 (S6) Poison using the criteria in the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP).
Classification	Globally Harmonised System of Classification and Labelling of Chemicals (GHS) as published by Safework Australia.
Inventory listing(s)	AICS (Australian Inventory of Chemical Substances): All components are listed on AICS, or are exempt.

SECTION 16: Other information

The information in this document is based on our best present knowledge. However, it does not constitute a guarantee for any specific product features and does not establish a legally binding contract

SDS code: MS31000406 **Version:** 01.0 **Revision:** 2019-03-14

Full text of the H phrases mentioned in section 3:
Additional information:
Acids: When mixing acids with water (diluting), caution must be taken as heat will be generated which causes violent spattering. Always add a small volume of acid to a large volume of water, NEVER the reverse.

Respirators: In general the use of respirators should be limited and engineering controls employed to avoid exposure. If respiratory equipment must be worn ensure correct respirator selection and training is undertaken. Remember that some respirators may be extremely uncomfortable when used for long periods. The use of air powered or air supplied respirators should be considered where prolonged or repeated use is necessary.

Work practices - solvents: Organic solvents may present both a health and flammability hazard. It is recommended that engineering controls should be adopted to reduce exposure where practicable (for example, if using indoors, ensure explosion proof extraction ventilation is available). Flammable or combustible liquids with explosive limits have the potential for ignition from static discharge. Refer to AS 1020 (The control of undesirable static electricity) and AS 1940 (The storage and handling of flammable and combustible liquids) for control procedures.

Exposure standards - Time Weighted Average (TWA) or Workplace Exposure Standard (WES) (NZ): Exposure standards are established on the premise of an 8 hour work period of normal intensity, under normal climatic conditions and where a 16 hour break between shifts exists

to enable the body to eliminate absorbed contaminants. In the following circumstances, exposure standards must be reduced: strenuous work conditions; hot, humid climates; high altitude conditions; extended shifts (which increase the exposure period and shorten the period of recuperation).

Personal protective equipment guidelines: The recommendation for protective equipment contained within this report is provided as a guide only. Factors such as method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

Health effects from exposure: It should be noted that the effects from exposure to this product will depend on several factors including: frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a Safety Data Sheet which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

Abbreviations and acronyms:
- ATE - Acute Toxicity Estimate
- LC50 - Lethal Concentration, 50% / Median Lethal Concentration
- LD50 - Lethal Dose, 50% / Median Lethal dose
- STOT-RE - Specific target organ toxicity (repeated exposure)
- STOT-SE - Specific target organ toxicity (single exposure)
- EC No. - European Community Number

End of Safety Data Sheet

SAFETY DATA SHEET
TRANSFORMER OIL

RS CHIP3 MSDS Date 01/10/03

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY:

PRODUCT NAME: TRANSFORMER OIL

PART No.: RS 423-7363

SUPPLIER:
ELECTROLUBE. A division of HK WENTWORTH LTD
KINGSBURY PARK, MIDLAND ROAD
SWADLINCOTE
DERBYSHIRE, DE11 0AN
Tel: +44(0)1283 222 111
Fax: +44(0)1283 550 177

Supplied by:
RS Components Ltd,
Birchington Road, Corby, Northants, NN17 9RS.
Tel: (01536) 402888

2. COMPOSITION/INFORMATION ON INGREDIENTS:

3. HAZARDS IDENTIFICATION:

Not regarded as a health or environmental hazard under current legislation.

4. FIRST AID MEASURES:

INHALATION: Move the exposed person to fresh air at once. Provide rest, warmth and fresh air.

INGESTION: Rinse mouth thoroughly. Get medical attention.

SKIN: Wash the skin immediately with soap and water. Get medical attention if irritation persists after washing.

EYES: Make sure to remove any contact lenses from the eyes before rinsing. Promptly wash eyes with plenty of water while lifting the eye lids. Continue to rinse for at least 15 minutes. Get medical attention if any discomfort continues.

5. FIRE FIGHTING MEASURES:

EXTINGUISHING MEDIA: This material is not flammable. Use extinguishing media appropriate for surrounding fire.

6. ACCIDENTAL RELEASE MEASURES:

SPILL CLEANUP METHODS: Absorb in vermiculite, dry sand or earth and place into containers. Flush with plenty of water to clean spillage area.

7. HANDLING AND STORAGE:

USAGE PRECAUTIONS: Avoid spilling, skin and eye contact.

STORAGE PRECAUTIONS: Keep in cool, dry, ventilated storage and closed containers. Keep in original container.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION:

INGREDIENT COMMENTS:	OES = Occupational Exposure Standard. MEL = Maximum Exposure Limit.
VENTILATION:	No particular ventilation requirements.
PROTECTIVE GLOVES:	Use suitable protective gloves if risk of skin contact.
EYE PROTECTION:	If risk of splashing, wear safety goggles or face shield.
OTHER PROTECTION:	Wear appropriate clothing to prevent any possibility of skin contact.
HYGIENIC WORK PRACTICES:	Wash at the end of each work shift and before eating, smoking and using the toilet. Wash promptly if skin becomes wet or contaminated. No eating or drinking while working with this material.

9. PHYSICAL AND CHEMICAL PROPERTIES:

APPEARANCE:	Liquid.		
ODOUR/TASTE:	Characteristic.		
BOILING POINT (°C, interval):	>250	**Pressure:**	
MELT./FREEZ. POINT (°C, interval):	<-45		
DENSITY/SPECIFIC GRAVITY (g/ml):	0.888	**Temperature (°C):**	15
VAPOUR PRESSURE:	160 Pa	**Temperature (°C):**	100
SOLUBILITY DESCRIPTION:	Insoluble in water.		
FLASH POINT (°C):	>140	**Method:**	PM Closed cup.
AUTO IGNITION TEMP. (°C):	>270		

10. STABILITY AND REACTIVITY:

STABILITY:	Normally stable.
CONDITIONS TO AVOID:	Avoid excessive heat for prolonged periods of time.
HAZARDOUS DECOMP. PRODUCTS:	No specific hazardous decomposition products noted.

11. TOXICOLOGICAL INFORMATION:

HEALTH WARNINGS:	No specific health warnings noted. No specific acute or chronic health impact noted, but this chemical may still have adverse impact on human health, either in general or on certain individuals with pre-existing or latent health problems.
OTHER HEALTH EFFECTS:	This substance has no evidence of carcinogenic properties.

12. ECOLOGICAL INFORMATION:

ECOLOGICAL INFORMATION:	Not regarded as dangerous for the environment.

13. DISPOSAL CONSIDERATIONS:

DISPOSAL METHODS: Dispose of in accordance with Local Authority requirements.

14. TRANSPORT INFORMATION:

RAIL TRANSPORT NOTES: Not Classified.

SEA TRANSPORT NOTES: Not Classified.

AIR TRANSPORT NOTES: Not Classified.

15. REGULATORY INFORMATION:

NC Not classified

RISK PHRASES: Not classified.

SAFETY PHRASES: Not classified.

UK REGULATORY REFERENCES: Chemicals (Hazard Information & Packaging) Regulations 1993.

EU DIRECTIVES: Dangerous Substance Directive 67\548. Dangerous Preparations Directive 88\379.

STATUTORY INSTRUMENTS: Chemicals (Hazard Information and Packaging) Regulations. Control of Substances Hazardous to Health.

APPROVED CODE OF PRACTICE: Classification and Labelling of Substances and Preparations Dangerous for Supply.

GUIDANCE NOTES: Occupational Exposure Limits EH40. Introduction to Local Exhaust Ventilation HS(G)37. CHIP for everyone HSG(108).

16. OTHER INFORMATION:

REVISION COMMENTS: Revised in accordance with CHIP3 and EU Directive 1999/45/EC

REVISION DATE: MAY 2003

REV. No./REPL. SDS GENERATED: 0

DISCLAIMER: The information contained in this safety data sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for the safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification This information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process unless specified in the text.