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Preliminary Onshore Ground Investigation for Net Zero Teesside Ground Investigation Report

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Preliminary Onshore Ground Investigation for Net Zero Teesside

Ground Investigation Report

bp

Project number: 60657467
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28 January 2022

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1. List of Symbols and Definitions

A list of abbreviations and symbols used throughout this Report are defined below.

Abbreviation	Title
AEC	Acute Evaluation Criteria
ACM	Asbestos Containing Materials
AEG	Allied Exploration Geotechnics
AMP	Asbestos Management Plan
BGS	British Geological Survey
BH	Borehole
BRE SD	Building Research Establishment Special Digest
BSI	British Standards Institution
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
CATS	Central Area Transmission System
CBR	California Bearing Ratio
CCUS	Carbon Capture, Utilisation and Storage
CIEH	Chartered Institute of Environmental Health
CIM	Clay of medium plasticity
CIH	Clay of high plasticity
CL:AIRE	Contaminated Land: Applications in Real Environments
CLEA	Contaminated Land Exposure Assessment
CEMP	Construction Environmental Management Plan
CPP	Construction Phase Plan
CPT	Cone Penetration Test
CSM	Conceptual Site Model
C4SL	Defra Category 4 Screening Level
DA	Design Approach
DETS	Derwentside Environmental Testing Services Limited
DNAPL	Dense non-aqueous phase liquid
DQRA	Detailed Quantitative Risk Assessments
DWS	Drinking Water Standard
EA	Environment Agency
EC	Evaluation Criteria
EQS	Environmental Quality Standard
FEED	Front End Engineering and Design
GAC	Generic Assessment Criteria
GDR	Geotechnical Design Report
GI	Ground Investigation
GIR	Ground Investigation Report
GIS	Geographic Information System
GQRA	Generic Quantitative Risk Assessment
GSV	Gas Screening Values
GWL	Groundwater Level
H&S	Health and Safety
HQ	Hazard Quotients
HI	Hazard Index

Abbreviation	Title
ICE	Institution of Civil Engineers
LL	Liquid Limit
LQM	Land Quality Management
m bgl	Meters Below Ground Level
m OD	Meters Ordinance Datum
mg/kg	milligram per kilogram
mg/l	milligram per litre
MASW	Multi-channel Analysis of Surface Waves
MMP	Materials Management Plan
MTBE	Methyl Tert-Butyl Ether
NAPL	Non-Aqueous Phase Liquid
NZT	Net Zero Teesside
OCR	Over Consolidation Ratio
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethene
PCOC	Potential Contaminant of Concern
PID	Photo-ionisation Detector
PL	Plastic Limit
PLT	Point Load Test
PPE	Personal Protective Equipment
ppm	Parts Per Million
PSD	Particle Size Distribution
RAMS	Risk Assessment and Method Statement
RMF	Redcar Mudstone Formation
RPE	Respiratory Protective Equipment
SoBRA	Society of Brownfield Risk Assessment
SOM	Soil Organic Matter Content
SPT	Standard Penetration Test
SPA	Special Protection Area
SSI	Sahaviriya Steel Industries
SSSI	Site of Special Scientific interest
SSV	Soil Screening Value
SVOC	Semi Volatile Organic Compounds
STDC	South Tees Development Corporation
TAME	Tert-Amyl Methyl Ether
TCE	Trichloroethene
TDEM	Time-Domain Electromagnetics
TFD	Tidal Flat Deposits
TOC	Total organic CARBON
TP	Trial Pit
TPH CWG	Total Petroleum Hydrocarbons Criteria Working Group
TRS	Thomas Research Services
UCS	Uniaxial Compressive Strength
USEPA	US Environmental Protection Agency
UXO	Unexploded Ordinance
µg/kg	microgram per kilogram
µg/l	microgram per litre

Abbreviation	Title
VOC	Volatile organic compound
VC	Vinyl chloride
VWP	Vibrating Wire Piezometers
WHO	World Health Organisation
WMP	Waste Management Paper

Symbol	Title
ϕ'	Angle of shearing resistance
$\phi'_{cv,k}$	Constant volume effective angle of shearing resistance
$\phi'_{pk,k}$	Peak angle of shearing resistance
ϕ'_{ang}	Contribution to $\varphi'_{cv,k}$ from the angularity of the particles based on visual description on the exploratory hole logs
ϕ'_{PSD}	Contribution to $\varphi'_{cv,k}$ from grading of the soil
c_u	Undrained shear strength
c'_k	Effective Cohesion
C_C	Compression Index
C_s	Swelling Index
I_p	Plasticity Index
q_{uc}	Unconfined Compressive Strength
E	Modulus of Elasticity
γ	Weight Density
$\gamma_{b,k}$	Bulk Unit Weight
γ_d	Dry Density
I_{s50}	Point Load Index
I_C	Consistency Index
P_c	Preconsolidation Pressure
pH	Alkalinity-Acidity
SO_4	Sulfate
O_2	Oxygen
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
H_2S	Hydrogen Sulphide

2. Executive Summary

bp, as part of OGCI, plan to develop the Net Zero Teesside (NZT) project at land and in the vicinity of the former SSI steel works site ('the site'), Redcar, Teesside. The gas-fired power station and CO_2 gathering, and compressor station will be located on part of the former steel works, land that is controlled by the STDC (now Teesworks).

A preliminary ground investigation was carried out at the site, following a detailed desk study and identification of key ground risks at the site. The fieldwork was carried out between May and July 2021 on instruction of bp, in support of the Front-End Engineering Design (FEED) for the Net Zero Teesside project. For this Ground Investigation, AECOM was Principal Contractor, Principal Designer and Designer. Allied Exploration & Geotechnics (AEG) was the GI Contractor.

This Ground Investigation Report (GIR) presents AECOM's (in role of Designer) interpretation of the ground investigation data gathered within the Main Site and Onshore CO_2 Export Pipeline Corridor. The fieldwork comprised trial pits to a maximum depth of 4.50m, sonic and rotary drill holes to 38.30m depth, in-situ testing and associated soil, rock and groundwater laboratory testing. This GIR includes three rounds of groundwater level measurements covering the period July 2021 to November 2021; and three rounds of water quality results covering the periods 10th August to 13th August 2021,12th October to 18th October 2021 and 15th to 17th November, respectively. The report also includes in-situ aquifer hydraulic permeability tests carried out at the site between October 2021 and November 2021 and three rounds of post fieldwork ground gas monitoring carried out at the site covering the period August 2021 to November 2021.

The ground investigation has enabled a better understanding of ground risks identified at the desk study stage and the findings have been used to develop a detailed ground model for the site. This will allow Front-End Engineering Design to progress and will ultimately de-risk the project development. Additional data will be required to de-risk the project development as the project moves beyond FEED, particularly with regard to expansivity of slag deposits, performance of the Made Ground following remediation and to fill gaps in information resulting from access constraints.

A summary of the key findings from the ground investigation in relation to the previously identified ground risks detailed in the AECOM Ground Investigation Rationale (PR-60559321_ACM_TN_ENV_001_B) is given below. Reference should be made to the full text for more detail.

Inadequate bearing capacity	The site is underlain by a variable thickness of Made Ground and soft/loose Tidal Flat deposits. The Made Ground was found to be highly variable comprising cohesive, granular, slag dominant materials and hydraulic fill. Blown Sand Deposits anticipated to be present beneath the eastern part of the site were not identified due to access constraints in this area. These materials are likely to exhibit poor strength and compressibility. It is recommended that appropriate foundations are used to transfer structure loads to soils or bedrock of adequate strength. Conventional pad or shallow strip foundations are generally suitable for lightly loaded low threat structures that are not susceptible to creep or dynamic loading. Shallow raft foundations spanning the entire footprint of a structure are potentially suitable for low and medium threat structures. Raft foundations bearing in Slag Dominant Made Ground (d1) may provide a suitable option for some of the proposed structures, although there is a potential for differential movement with heave occurring below one area of the raft and settlement across other areas. Shallow foundations are not recommended to be constructed in Cohesive Made Ground (d4) due to the low undrained shear strength and variability of this soil. It is also recommended that static maintained load tests are undertaken on bearing soils for each structure supported by shallow foundations. Large plate load testing across the development footprint should also be considered to properly assess the performance of the near surface soils for shallow pad or raft foundations. Piles to transmit heavy loads from the Power, Capture Compression and Utilities & Outfall areas to more competent soils and bedrock may comprise driven cast-in-situ concrete piles, driven steel piles, continuous flight auger (CFA) or bored piles. Permanent sleeving may be used to mitigate heave effects. Further work is recommended to assess the preferred piling solution and also to determine pile performance.
Heave	The presence of expansive slag dominant Made Ground poses a risk of heave during proposed site redevelopment and operation. Specialist laboratory testing and historical GI data suggests a volumetric expansion of between 2% and 3% can be anticipated from the site development following recovery and processing of the upper 2.5 m of Made Ground at the site, and replacement by controlled compaction of suitable material. However, the material does not expand omnidirectionally in equal amounts, and expansion may occur along a plane in the fragment (one direction), in a void (all directions) or at a point (but not necessarily equally in all directions), resulting in differential movements occurring within strata layers. Given the inherent uncertainty a moderately conservative assumption in this report is that the full 3% expansion may occur over the full depth of slag material, with mitigation measures or further testing to reduce this risk to be made at FEED. However, as noted, actual %

	expansivity will be impacted by a number of variables such as groundwater, surface area of the slag, slag content within the specific soil column. Therefore, the actual % expansivity may be lower than the 3% assumed in this report and should be subject to further assessment during FEED.
Settlement and collapse of underlying soils	The ground investigations proved soft, variable, compressible and saturated soils including the presence of poorly sorted and compacted Made Ground and significant thickness of normally consolidated Tidal Flat Deposits (soft clays and loose sands). These deposits pose a risk of collapse settlement due to a change in loading and changes to the groundwater regime. It is recommended that a structure specific ground investigation is undertaken at FEED as well as adoption of appropriate foundation solutions to transfer loads to soils or bedrock of adequate strength.
Earthworks, obstructions and voids	Ground obstructions from the former Redcar Iron and Steel Works have been proven widely across the site and include gravel, cobble and boulder sized pieces of slag, very dense material, relict buried foundations, walls, ground slabs, tunnels and possibly pile foundations from former infrastructure. The most significant ground obstructions are anticipated trending north-west south-east below the former Steel Plant, Coke Processing Plant and the location of former travelling cranes present across the site. The spatial extent of some of these features has been indicated but the depth is not known. Identification of obstructions and time for removal and/or coring through encountered obstructions will need to be considered during future project stages. Any remediation works and removal of obstructions will need to be overseen by a qualified engineer.
UXO	A preliminary risk assessment identified that there is a High risk posed to the Site from Unexploded Ordnance (UXO), given the industrial nature of the site during World War Two (WWII), the nature of surrounding land uses (defensive structures, firing ranges etc) and likely nature of the proposed development works. No unexploded ordnance was encountered during the ground investigations. Intrusive works were carried out under a watching brief.
Shallow groundwater	The presence of shallow groundwater levels may pose a risk to intrusive works. Groundwater readings from three monitoring rounds undertaken between July and November 2021 indicated that groundwater is present in all geological units beneath the site. In the Made Ground and Tidal Flat Deposits, the static groundwater level varies between 2.79 and 4.21m OD and 1.88 and 3.84m OD, respectively. In the Glacial Till, the piezometric groundwater level varies between 2.15 and 5.53 m OD. While in the Mudstone, the piezometric groundwater level varies between 0.97 and 4.67m OD. The groundwater level readings suggest hydraulic continuity between groundwater in the Made Ground and the underlying Tidal Flat Deposits. However, the Glacial Till does not appear to be in hydraulic continuity with groundwater in the overlying Tidal Flat Deposits and the underlying Mudstone, suggesting that it creates a confining aquifer between the Tidal Flat Deposits and the underlying Mudstone. The average groundwater level in the Mudstone is consistently higher than that of the Tidal Flat Deposits, suggesting a vertical upward hydraulic gradient from the Mudstone to the Tidal Flat Deposits. Groundwater monitoring (quality and water levels) for at least another 12 months is recommended to establish adequate baseline groundwater conditions and tidal and seasonal variational effects. Further in-situ investigation to establish the aquifer hydraulic properties for each geological unit is recommended when additional data is obtained or becomes available.
Soil contamination	The desk study and previous ground investigation by others identified a potential for soil contamination to exist on site. The presence of soil contamination can present a risk to human health and groundwater, amongst other receptors, if not properly mitigated. The ground investigation confirmed that generally, concentrations of contaminants within the soil are low based on the industrial uses of the site and comparable with values reported in previous investigation. Other than potential risks from asbestos and pH, the risk to future users from the contaminants in the soil is deemed acceptable. No contaminants exceeded the Evaluation Criteria (EC) designed to be protective of human health for the proposed commercial/industrial end use, nor for acute construction workers EC. Minor isolated exceedances of the chronic construction worker EC were identified for arsenic and lead which may pose a risk to construction workers and potential construction worker end-users if mitigation measures are not implemented to reduce the risk of exposure. Asbestos detected was mainly described as bundles of chrysotile fibres but also bundles of amosite and chrysotile present in microscopic cement debris. All the soils where the bundles of fibres were detected were recorded to contain <0.001 mass %. Where the asbestos was present in microscopic cement debris, this was recorded to contain 0.001 mass %. Thus, none were detected at concentrations greater than the hazardous material threshold of 0.1 mass %. Only one sample within the Main Site (previous investigation) has recorded a concentration >0.1%. On the basis of the limited exceedances of assessment criteria in soil leachate (metals, PAHs nitrite and ammoniacal nitrogen), the magnitude of exceedances in relation to screening criteria, the spatial distribution of the exceedances across the site and expected attenuation, it is considered that the soil is unlikely to pose a significant risk to surface water quality or result in harm or damage to potable water resources. The majority of the soil leachable PAHs are detected within the Made Ground in the upper 2.5m bgl. PAHs are generally relatively immobile in the sub-surface and in the absence of a free-phase it is unlikely there would be significant impact off the site.

	Contaminated materials may be present within the soils in areas of the site that have not been subject to intrusive investigation (Workshops, Furnace Stockhouse, the Sinter Plant and the area of the overhead conveyor connecting these areas). Chemical verification testing is recommended either prior to its excavation or during its excavation and placement. Based on the ground gas assessment undertaken to date, the site could be classified as CS1 with minimal methane and carbon dioxide noted within the Made Ground gas monitoring wells. This suggests that no specific ground gas protection measures are required to be incorporated into the building design. The ground gas risk assessment will be revisited on completion of the monitoring programme.
Groundwater contamination	Groundwater sampling and monitoring by others indicated a potential for groundwater contamination in the underlying soils. However, historical monitoring data was insufficient to confirm seasonal trends or reliability/repeatability of the measured concentrations. Disturbance of the ground may release contaminated leachate into groundwater by creating new pathways. Based on the groundwater quality analyses results for samples taken from the site, exceedances in the groundwater are unlikely to result in harm or damage to potable groundwater and/or surface water resources. Furthermore, given the industrial history of the site and location of the aquifers (water-bearing zones) beneath the site, it is highly unlikely that the aquifers within the superficial deposits and/or bedrock (mudstone) will be exploited for potable water supply in the future. In-situ groundwater electrical conductivity measurements from the site indicated the presence of saline water intrusion and or connate water in the superficial deposits and bedrock beneath the site. Key contaminants identified within the groundwater at the site are fluoranthene, naphthalene, hydrocarbons (including benzene), cyanide, thiocyanate,ammoniacal nitrogen, nitrite and sulfate. Elevated concentrations of these contaminants above the Evaluation Criteria (EC) in the groundwater were generally in the central and northern areas of the Main Site. However, the more prevalent concentrations of naphthalene within the groundwater were only observed greater than EC designed to be protective of controlled waters in the southwest of the Main Site. The greatest concentration of cyanide detected in groundwater was also in the south of the Main Site, within the southeast corner. Although the groundwater quality beneath the Site is unlikely to pose a significant risk to surface water as per the findings of the GQRA, the potential for migration of groundwater off site (to the northwest) has not been assessed as there are no down gradient boreholes in the northwest area of the site. Isolated and marginal exceedances of contaminants encountered against screening criteria protective of controlled waters would suggest that the risk to surface waters and groundwater would remain low, despite of the lack of confirmatory groundwater information in this northwest area. However, further ground investigation assessment would be beneficial to reduce the uncertainty, particularly to assess the more elevated concentrations of ammoniacal nitrogen within the northwest area. The increasing concentration trend for ammoniacal nitrogen in particular should be monitored to assess whether this is seasonal variation or a longer-term trend. Perched, confined groundwater heavily contaminated with hydrocarbons may be encountered on site throughout the development works as obstructions (historical structures etc.) are removed. These waters should be contained, assessed and removed as part of remedial / construction works.
Aggressive ground conditions for buried concrete and steel	The ground investigation highlighted a risk of aggressive ground conditions for buried concrete and steel. Aggressive Chemical Environment for Concrete (ACEC) Classification for the site is generally AC-3 with a Design Sulfate Class of DS-3 (in accordance with BRE Special Digest 1: 2005). A classification of DS-5 AC-5 may be required in slag-dominant Made Ground (d1) and potentially Lacustrine Deposits (b3), subject to further testing. Soils may be classified as ‘aggressive’ to ‘very aggressive’ corrosivity classification, as per CD 375 (Highway Structures & Bridges Design, 2020) as all encountered strata at the site returned chloride values greater than 50mg/l.

3. List of References and Related Documents

Summary of existing information relating to the site and other references are summarised below.

Report Type	Report Reference
Desk Study	AECOM (December 2020). Net Zero Teesside STDC 'Main Site' Geotechnical and Geo-Environmental Desk Study. Document 60559231-CTR005-003 Revision P03. AECOM (January 2021). Net Zero Teesside, Onshore CO_2 Export Pipeline Corridor, Geotechnical and Geo-Environmental Desk Study. Document 60559231-CTR005-003 Revision P02.
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	British Standards Institution (2014). BS EN 1997-1:2004+A1:2013 Incorporating corrigendum February 2009 Eurocode 7 – Geotechnical Design – Part 1: General Rules, Incorporating corrigendum 1 February 2009 Implementation of CEN amendment July 2014. ISBN 978 0 580 80773 2. British Standards Institution (2018). BS EN ISO 14689:2018, Geotechnical investigation and testing - Identification, description and classification of rock (ISO 14689:2017). CIRIA C665 (2007). Assessing Risks Posed by Hazardous Ground Gases to Buildings. CIRIA 504 (1999) Engineering in glacial tills. Highways Structures & Bridges (March 2020). CD 375, Design of corrugated steel buried structures. Institution of Civil Engineers (2012). UK Specification for Ground Investigation.
Other	AECOM (2021). Preliminary Onshore Ground Investigation for Net Zero Teesside – Ground Investigation Rationale. Document PR-60559321_ACM_TN_ENV_001_B. AECOM (2021). Preliminary Onshore Ground Investigation for Net Zero Teesside, Ground Investigation Specification. Document PR-60559231_ACM_SP_ENV_001 Revision P02. AECOM (2021). Net Zero Teesside, Preliminary Onshore Ground Investigation, Construction Phase Plan. Document 60559231_ACM_MS_EN_0001_A Version 04. AECOM (2021). Net Zero Teesside, Main Site Foundations Optioneering Appraisal. Document PR-60559231_ACM_RP_GE_P02 Revision P02. ARUP (June 2021). Net Zero Teesside (NZT) Landfall Feasibility Study. Ref. BP-ARP-NZT-REP-000001 DRAFT. Arcadis (2020). Earthworks Specification Grangetown Prairie Site South Tees Development Corporation. Report Number 10035117-AUK-XX-XX-RP-ZZ-0171-01-Earthworks_Spec. 6 Alpha Associates (November 2020). Onshore Unexploded Ordnance Threat and Risk Assessment with Risk Mitigation Strategy: Net Zero Teesside. 6 Alpha Associates (November 2020). Offshore Unexploded Ordnance Threat and Risk Assessment with Risk Mitigation Strategy for Net Zero Teesside. Landmark Information Group (February 2020). Envirocheck Report, Order 233803971_1_1, Customer Ref. 60559231/CTR05.002.

Publication

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4. Introduction

4.1 Background

The Client, bp, aims to develop former SSI steel works site, Redcar, Teesside, located in the northeast of England into a Carbon Capture, Utilisation and Storage (CCUS) facility, Net Zero Teesside. The site is centred on NGR NZ571255, and comprises two areas:

- NZT Main Site (hereafter referred to as the "Main Site"); and
- NZT pipeline landfall up to and including Mean High-Water Level, including a pipeline corridor connecting to Main Site (hereafter referred to as the "Onshore CO_2 Export Pipeline Corridor").

The site has a long history of development and heavy industrial usage having been initially reclaimed from the Tees Estuary in the 1800s. This has left a legacy of possible contamination and geotechnical constraints across the site.

AECOM Ltd (AECOM) has been commissioned by bp to provide consultancy support to the Net Zero Teesside project through design, procurement support, monitoring and reporting of a preliminary phase of ground investigation at the 'Main Site' and CO_2 export pipeline. The preliminary ground investigation works were carried out by Allied Exploration Geotechnics (AEG) between May 2021 and July 2021 in order to support the preliminary development phases of the Net Zero Teesside CCUS project.

The locations of the proposed Main Site and Onshore CO_2 Export Pipeline Corridor are shown on Drawing 60657467-ACM-GIR-DRG-001 and Figure 5-1.

4.2 Scope and purpose of report

This Ground Investigation Report (GIR) covers reporting of the recent preliminary ground investigation undertaken at the 'Main Site' and Onshore CO_2 Export Pipeline Corridor, required to support engineering development. The scope of this GIR comprises the following tasks:

- A geotechnical evaluation of the factual data including ground conditions proved and a review of in-situ and laboratory test data;
- Details and descriptions of the various soils / materials encountered;
- Presentation of ground investigation data as a series of plots, figures and/ or summary tables;
- Update of ground risk constraint mapping (in GIS);
- Update of ground model, including incorporating the results from geophysics survey into a 3D ground model using proprietary software Leapfrog ;
- Provision of a summary table of preliminary geotechnical parameters;
- Review of groundwater strikes recorded during ground investigation site works, details of groundwater/gas monitoring information;
- Preliminary engineering assessment for shallow and deep foundations, excavations, roads/pavements and re-use of site won materials;
- Interpretation and summary of ground aggressivity data;
- Preparation of geotechnical risk register;
- Geo-environmental conceptual site model (CSM), semi-quantitative risk assessment and interpretation of the geo-environmental data obtained during the preliminary ground investigation;
- Assessment of the geotechnical risks associated with the construction and development proposals; and,
- Recommendations for further investigation if necessary.

The output of this GIR will be used to inform the ongoing concept development and optioneering as the project moves into FEED in late 2021. It should be noted that the preliminary ground investigation alone will not be sufficient to provide the information required for FEED. Further structure-specific geotechnical (and geo-environmental) investigation is likely to be required during Define (FEED) to support Execute (Detailed Design).

4.3 Structure of report

This report provides interpretation of the ground investigation data for the preliminary onshore ground investigation for the Net Zero Teesside (NZT) project. The report is divided into twelve sections.

- Sections 1 and 2 list the symbols, definitions and references,
- Section 2 provides a summary of the report
- Section 4 outlines the background, existing information for the site and structure of the report and its limitations.
- Section 5 describes the site and its development history and the proposed construction of the project.
- Section 6 details the ground investigations carried out at the site in July 2021.
- Sections 7 and 8 describe the geology encountered and the hydrogeological conditions determined from the preliminary ground investigations
- Section 9 summarises the geotechnical properties gathered from the respective strata.
- Sections 10 and 11 describes the environmental aspects of the ground investigations.
- Section 12 presents the ground model incorporating all the geotechnical and geo-environmental information for the site and
- Section 13 provides a geotechnical risk register.
- Section 14 provides engineering recommendations.
- Section 15 provides recommendations for further work.
- Section 16 provides a summary and conclusions

4.4 Limitations of Report

The information, views and conclusions drawn concerning the site are based, in part, on information supplied to AECOM by other parties. AECOM has proceeded in good faith on the assumption that this information is accurate. AECOM accepts no liability for any inaccurate conclusions, assumptions or actions taken resulting from any inaccurate information supplied to AECOM from others.

The investigation itself was designed generally to meet the objectives of a main investigation, as defined by BS10175:2011+A2:2017 Investigation of Potentially Contaminated Sites: Code of Practice (BSI) (and BS EN 1997-1:2004+A1:2013 (BSI, 2004)). As a main investigation, the results aim to provide sufficient data to support bp in the assessment of remediation works being undertaken by Teesworks to create a suitable development platform for the proposed construction.

The exploratory holes carried out during the fieldwork, which investigate only a small volume of the ground in relation to the size of the site, can only provide a general indication of site conditions. The comments made and recommendations given in this report are based on the ground conditions apparent at the site of the exploratory holes. There may be exceptional ground conditions elsewhere on the site which have not been disclosed by this investigation and which have therefore not been taken into account in this report. No exploratory holes were undertaken in or around existing structures.

The comments made on groundwater conditions are based on observations made during site work and during a subsequent limited monitoring programme. It should be noted that groundwater levels may vary due to seasonal or other effects such as tidal related fluctuations.

The opinions expressed in this report concerning any contamination found and the risks arising there from are based on current good practice, simple statistical assessment and comparison with available soil guideline values, AECOM generic assessment criteria and other guidance values.

It should be noted that the effects of ground and water borne contamination on the environment are constantly under review, and authoritative guidance values are potentially subject to change. The conclusions presented herein are based on the guidance values available at the time this report was prepared, however, no liability by AECOM can be accepted for the retrospective effects of any changes or amendments to these values.

5. Site description and setting

A detailed description of the sites is provided in the relevant desk study reports (AECOM, 2020) and (AECOM, 2021). A concise summary is provided below for reference. Readers are encouraged to refer to the above referenced desk studies for further information.

5.1 Site location

The NZT site is located to the north-west of Redcar, North Yorkshire and is centred on NGR NZ571255, as shown o

n Figure 5-1 and on the Site Location Plan in Drawing 60657467-ACM-GIR-DRG-001. It comprises two areas:

- NZT Main Site at STDC (hereafter referred to as the “Main Site”); and
- NZT pipeline landfill up to and including Mean High-Water Level, including a pipeline corridor connecting to Main Site (hereafter referred to as the “Onshore CO_2 Export Pipeline Corridor”).

Figure 5-1 Site Location (including details of existing land uses)

5.2 Site description

5.2.1 Main Site

The 66 hectare (ha) Main Site is currently identified as the south eastern part of the former industrial land associated with the former SSI Redcar Iron and Steel works (SSI site). It is bounded to the north by the Coatham Sands and the Teesmouth and Cleveland Coast RAMSAR, Site of Special Scientific interest (SSSI) and Special Protection Area (SPA) areas. A summary of the existing industrial areas on the Main Site are shown on Figure 5-1.

North of the Main Site, the land was formed from early 19th century reclamation of estuary tidal marshes with extensive areas of historical slag waste subsequently deposited as a by-product of the historical iron and steel production. It includes an area of marshland and Iron Ponds beyond which are sand dune habitats and the North Sea. The west and southern boundaries of the Main Site are formed by the wider industrial area of the former Sahaviriya Steel Industries (SSI) site, currently occupied by the disused Blast Furnace and Power Station to the west and the Sinter Plant and Sinter Plant stockpile areas to the south. Land to the east comprises either open former industrial land associated with the former SSI site or beach habitat of Coatham Sands.

The Central Area Transmission System (CATS) and Breagh high-pressure gas pipelines run parallel with, and approximately 50m from the east boundary of the Main Site. These sensitive service utility lines run from the North Sea making landfall to the north-east of the site forming a known constraint requiring consideration for development.

5.2.2 Onshore CO_2 Export Pipeline Corridor

The 38 ha Onshore CO_2 Export Pipeline Corridor comprises sand dunes north of the Main Site, the foreshore of Coatham Sands and the adjacent North Sea. The southern portion of this site was reclaimed from the Tees Estuary and subsequently covered by extensive areas of slag disposed as waste from iron and steel making in the wider area. This part of the site now includes an area of marshland and ponds.

The site is within the Teesmouth and Cleveland Coast RAMSAR, SSSI and SPA areas. There are significant ecological constraints within the Onshore CO_2 Export Pipeline Corridor. The Teesmouth and Cleveland Coast RAMSAR site encompasses a range of habitats (sand and mudflats, rocky shore, saltmarsh, freshwater marsh and sand dunes) on and around the Tees Estuary. Note – Schedule 1 birds were identified in within the site area during the site works described in this report.

The land to the east is occupied by Cleveland Golf Links, located north of Warrenby. The southern boundary of the site is formed by the northern extents of the former Teesside Works Redcar, which also forms the boundary between the proposed Onshore CO_2 Export Pipeline Corridor and the Main Site.

The CATS and Breagh pipelines run parallel with the site, being located approximately 50m from the east boundary of the Onshore CO_2 Export Pipeline Corridor.

5.3 Development history

5.3.1 Main Site

In the 1850s the area surrounding Redcar was predominantly agricultural land with marshland towards the coast and estuarine deposits adjacent to the River Tees. The town of Redcar was already established by this time. Historical development on the Main Site is dominated by two phases of development; first as Redcar Iron and Steel Works, and more recently the Redcar Blast Furnace and Coking Works (Teesside Works) acquired by SSI in 2012, and finally closed in 2015.

The initial works comprised a steel works and a rolling mill, with the iron works assumed to be located east of the site. Most of the old structures relating to the Teesside Works still exist on site (note – demolition of these structure is ongoing at the time of preparing this report). Historical imagery shows that auxiliary buildings were present on the Main Site; these have since been demolished, this may include large chimneys. The extent to which relict foundations have been removed is unknown. However, all investigations on site, including the most recent investigation reported here, have encountered buried obstructions including foundations and tunnels. Therefore, it can be assumed that relict foundations and structures within the ground are to be expected.

It should be noted that much of the site was reclaimed from the estuary in the 1800s to facilitate the construction of the South Gare peninsular including former breakwaters below the site. A large proportion of the fill material appears to be end-tipped slag, likely to have been derived from iron works located to the east of the site. It is also known that dredging material has been used to reclaim land either side of the main Tees Estuary channel and may have been used on the site. Additional land was reclaimed to the south of the Redcar Iron and Steel Works by draining "The Marshes", which facilitated later expansion of the works. Reclamation of areas of Bran Sands in the 1970s is likely to have utilised a similar methodology to that employed at Seal Sands on the north side of the estuary, with construction of slag walls and placement of hydraulic fill dredged from the River Tees.

Pertinent historical features from 1:2,500, 1:10,000 and 1:10,560 scale Ordnance Survey (OS) mapping and historical aerial photographs purchased from Historic England which may form geotechnical and geoenvironmental constraints in relation to the site are shown on Drawings 60657467-ACM-GIR-DRG-002 to 007. The drawings include the proposed layout of the of the U&O, Sterile/Laydown, HP Compression, Cooling, Capture and Power structures in relation to the historical features identified. Further information is presented in the Main Site Desk Study (AECOM, 2020).

5.3.2 Onshore CO_2 Export Pipeline Corridor

In 1856, large portions of the site sat below the high water mark of Ordinary Spring Tide within the Tees Bay area of "Bran Sand". A ~200 m wide spit of land attached to Coatham Common to the east stretched across the middle of the site from east to west. The south-east portion of the site comprised sands above high tide leading within the site boundary to dunes. The dunes stretched south off-site to Tod Point located ~250 m south-east of the closest site boundary, and also east along the coast towards Coatham.

The hinterland south of the dunes comprised mainly sand separated from Coatham Marsh by the coastal Middlesbrough and Redcar Railway constructed in 1846. Coatham Marsh was relatively poorly developed with some farming evident at Marsh House ~600 m from the site. Historically, the marshes are known for primitive medieval salt manufacture from brine.

Much of the southern portion of the Onshore CO_2 Export Pipeline Corridor site was reclaimed from the Tees Bay between 1863 and 1888 to facilitate the construction of the South Gare peninsular including the former breakwater south of the site. A large proportion of the fill material appears to be end-tipped blast furnace slag, likely to have been derived from iron works located to the south and east (Bulmer's 1890 History, Topography and Directory of North Yorkshire). It is also known that dredging material has been used to reclaim land either side of the main Tees Estuary channel between 1859 and 1871, and this too may have been used on the site. Subsequently the land appears to have been used for disposal of wastes, presumed to come from the iron, steel and coking industries on adjacent land. The site has also been used as a rifle range, first shown on the 1914 OS mapping, and no longer identified by 1929.

Industrial development of South Gare south and west of the site is dominated by three phases of development;

I. Coatham Ironworks (1872)
II. Redcar Steel Works (1917)
III. Redcar Blast Furnace & Coking Works, Teesside Works (1973)

These developments are complex and have associated industries making use of by-products such as Slag & Tarmacadam Works and coal-derived fuels (e.g. benzol).

Further information is presented in the Onshore CO_2 Export Pipeline Corridor Desk Study (AECOM, 2021).

5.4 Geology & Hydrogeology

The geology beneath the site is shown on 1:50,000 scale BGS Geological Map Sheet 33, Solid and Drift Edition – Stockton (BGS, 1987) and Sheet 34, Solid and Drift Edition – Guisborough (BGS, 1998) and extracts of the 1:50,000 Digital Geological Map of Great Britain (BGS, Undated) included in Envirocheck reports purchased during the preparation of the AECOM Desk Study reports in 2020 and 2021.

Artificial ground (here in referred to as "Made Ground"), superficial geology (recent and drift soils) and bedrock geology mapped across individual areas of the site are described in Table 5-1. Further discussion is presented in the Main Site Desk Study (AECOM, 2020) and Onshore CO_2 Export Pipeline Corridor Desk Study (AECOM, 2021).

Geological mapping is available in the georeferenced database provided by AECOM and now hosted on bp's OneMap portal.

Table 5-1 Summary of Geology on Main Site and Onshore CO_2 Export Pipeline Corridor

Geology	Expected Location (Main Site)	Typical Description (Main Site)	Expected Location (Onshore CO_2 Export Pipeline Corridor)	Typical Description (Onshore CO_2 Export Pipeline Corridor)
Made Ground	Made Ground is expected between 4m and 9m in thickness.	Various types of slag including expansive ferrous slag (poorly sorted and compacted).	Depths/thickness unknown, although understood to be present from BGS mapping.	The composition is unknown, although likely to comprise estuary dredging, slag, steel and tarmacadam waste.
Tidal Flat Deposits	Tidal Flat Sand Deposits present across most of the site. Tidal Flat Clay Deposits are irregularly distributed across south and east of site. Anticipated to be encountered between 4m – 21m below ground level (bgl) and between 3m – 15m thickness.	Predominantly medium dense comprising silty gravelly sand with layers/bands of gravel. Clay deposits comprise soft silty clay, with layers of sand, gravel and peat.	Depths/thickness unknown, although understood to be present from BGS mapping.	Blown Sand and Beach and Tidal Flat Deposits (sand, silt and clay).
Glacial Till	Anticipated to be encountered between 14m – 27m bgl and between 2.5m – 9m thickness.	Highly variable clay with pebbles and lenses of gravel. Localised deposits of Glacio-Lacustrine Clay present in the Glacial Till.	Depths/thickness unknown, although may be present beneath the site.	Clay with pebbles and lenses of gravel.
Redcar Mudstone Formation (RMF)	Covers most of the site area. Anticipated to be encountered at or below at least 22m bgl.	Extremely weak or weak grey mudstone, locally fossiliferous. Sometimes heavily fractured, or, recovered as non-intact rock.	Depths/thickness unknown, covers the eastern area.	Mudstone (details unknown).
Mercia Mudstone Group (MMG)	Infringes on the north west corner of the Main Site.	Extremely weak or weak distinctly weathered red brown mudstone. Thin beds of gypsum/anhydrite; sandstones are also present.	Depths/thickness unknown, covers the eastern area.	Mudstone (details unknown).
Penarth Group	The Penarth Group outcrops as a thin band between the MMG and RMF across the north west corner of the Main Site.	Weak weathered interbedded mudstones and siltstones.	Depths/thickness unknown, outcrops as a thin band between the MMG and RMF across the middle of the pipeline corridor.	Mudstone (details unknown).

<u>Sources:</u>

1:50,000 scale BGS Geological Map Sheet 33, Solid and Drift Edition – Stockton (BGS, 1987), 1:50,000 scale BGS Geological Map Sheet 34, Solid and Drift Edition – Guisborough (BGS, 1998), 1:50,000 Digital Geological Map of Great Britain (BGS, Undated), Factual Report, Contract 4153 & 4154 (AEG, 2018), SSI 1 Factual Report (CH2M Hill, 2017) and SSI 2 Factual Report (CH2M Hill, 2017).

5.4.1 Structural geology

The 1:50,000 scale BGS Geological Map Sheet 33, Solid and Drift Edition – Stockton Map (BGS, 1987) shows the strata to have a regional dip to the east. There are no faults mapped below the site; however, the presence of bedrock at depth overlain by a considerable cover of Made Ground, recent and drift superficial deposits may mask the faulting pattern in the rock succession below the site.

5.4.2 Hydrology

The Main Site is not recorded to be in a flood risk area; however, the Onshore CO_2 Export Pipeline Corridor site is recorded to be in a Zone 3 risk of flooding from Rivers or Seas without Defences, which is identified as a High Risk. Flood risk is associated with tidal flooding from the North Sea. Further details are provided in the Main Site Desk Study (AECOM, 2020) and Onshore CO_2 Export Pipeline Desk Study (AECOM, 2021).

5.4.3 Hydrogeology

The hydrogeological condition of the site, including the groundwater conditions and classification of the water-bearing zones (aquifer), is discussed in Section 8. Findings from the groundwater level monitoring and quality are also discussed in Section 8. The chemistry of the groundwater data collected as part of the ground investigation works are discussed in Appendix G**.**

5.5 Site reconnaissance

A site walkover was undertaken by an AECOM representative in March 2020. Photographs and observations made are presented in the Main Site Desk Study (AECOM, 2020).

5.6 Proposed construction

The preliminary layout of the proposed development was provided by bp and is shown on Wood Drawing NS051-PI-LAY-007-00001-001 Rev. B03.

6. Summary of 2021 Ground Investigation

6.1 Introduction

The preliminary ground investigation (GI) was undertaken by Allied Exploration & Geotechnics Ltd (hereafter referred to as "AEG"), the overall aim of which was to obtain an understanding of the overall ground conditions for the site. Intrusive field works were undertaken from 17th May to 13th July 2021. Gas and groundwater monitoring (including well development) was undertaken during the field works (further discussed in Section 6.1.4).

The location of the exploratory holes is shown on Drawing 60657467-ACM-GIR-DRG-008, which also shows the location of exploratory holes from previous phases of ground investigation as listed in Section 3. The proposed construction layout in relation to the exploratory holes, is overlain on this drawing.

In total, the GI comprised the works listed in Sections 6.1.1 to 6.1.4:

6.1.1 Utility clearance

- PAS 128 Type B-D Survey;
- 5 vacuum extraction inspection pits to a maximum depth of 0.43m bgl;
- 18 hand-dug inspection pits to a maximum depth of 1.50m bgl; and
- Unexploded Ordnance (UXO) screening.

6.1.2 Intrusive investigation

- 18 resonance (sonic) drilling boreholes progressed to depths of between 11.70m and 20.00m bgl;
- 15 sonic drilling boreholes were progressed using rotary core drilling with water flush, to depths ranging between 29.00m and 38.30m bgl;
- 8 static cone penetration tests (CPTs) in the CO_2 Onshore Corridor to depths of between 7.42m and 25.00m bgl; and
- 12 machine excavated trial pits to a maximum depth of 4.50m bgl.

6.1.3 In-situ testing

- 208 Standard Penetration Tests (SPTs) typically undertaken at 1.50m to 3.00m intervals;
- 8 high-pressure dilatometer tests carried out approximately 2.00m and 5.00m into intact bedrock;
- 699 Photo-ionisation Detector (PID) tests;
- 281 Litmus Paper tests; and
- 10 variable head permeability tests (rising/falling head).

6.1.4 Ground gas and groundwater monitoring and sampling

- 2 rounds of well development;
- 3 rounds of ground gas and groundwater monitoring; and
- 3 rounds of groundwater sampling.

6.2 Design of the ground investigation

The GI was designed in line with BS EN 1997-1:2004+A1:2013 (BSI, 2004) with the requirements defined for development and optioneering under FEED as a preliminary investigation. The GI Specification (AECOM, 2021) was developed in accordance with the UK Specification for Ground Investigation (ICE, 2012) and set out to obtain the following core objectives:

- Prove the stratigraphy at the site in order to develop a ground model for use in geotechnical design, including determination of the depth and composition of Made Ground, Superficial soils and underlying Bedrock;
- Prove the composition of the Made Ground in relation to the historical development of the site. This included an assessment of the composition of the materials within the South Gare Breakwater and unnamed Breakwater to the north.
- Confirm or otherwise the presence of saturated, potentially unstable and water bearing Blown Sand and Beach and Tidal Flat Deposits (undifferentiated) – mainly in the Onshore CO_2 Export Pipeline Corridor;
- Delineate obstructions and voids that may impact the proposed development;
- Obtain engineering properties through sampling, in situ and laboratory testing of man-made deposits, underlying natural soils and bedrock, and derive preliminary geotechnical design parameters;
- Determine the hydrogeological regime across the site through installation of vibrating wire piezometers and down hole water level loggers (divers);
- Determine the aggressiveness of the soils and groundwater to buried concrete and steel; and
- Enabling sampling and subsequent environmental testing of soils and groundwater to inform the Conceptual Site Model (CSM) and contamination risk assessment identified in the AECOM desk study reports. It is understood that the geo-environmental aspects of the scope are required in a part client assurance capacity (i.e. it is understood that Teesworks will undertake site remediation prior to handover to bp), and also to inform the future design in terms of excavated materials management and ongoing groundwater and ground gas monitoring.

A summary of the GI rationale in the context of key ground hazards/risks identified is presented in the GI Rationale (AECOM, 2021).

6.2.1 Changes to design

Three of the scheduled exploratory holes were not completed due to restrictions relating to ecological constraints (Schedule 1 birds) and utility clearance. An additional exploratory hole had to be relocated. These are detailed in Table 6-1.

Table 6-1 Summary of Exploratory Holes Changes

Exploratory Hole ID	Reason for Change
MS\BH01	Abandoned due to nesting birds.
MS\TP01	Relocated due to nesting birds.
MS\TP02	Abandoned due to nesting birds.
MS\TP08	Unable to safely locate due to utilities. Abandoned.

6.3 Boreholes and sampling

The information below summarises the exploratory techniques and sampling employed for this ground investigation. Further information is in presented in the NZT Factual GI Report (AEG, 2022).

6.3.1 Vacuum excavation

Given the nature of the Made Ground, traditional service clearance techniques could not be used at the site. Therefore, vacuum excavation was attempted at five exploratory hole locations to identify the presence of utilities. Three other locations were identified for attempting vacuum excavation: MS\BH11, MS\BH12 and MS\BH13. However, due to access constraints it was not possible to complete these. The technique was unsuccessful with only limited penetration into the Made Ground.

6.3.2 Inspection pits

All exploratory borehole locations were preceded by a hand-dug inspection pit to check for presence of buried services. It should be noted that all hand-dug inspection pits were terminated before 1.2m due to the presence of large obstructions and metalliferous material within Made Ground.

6.3.3 UXO testing

The site has been identified by as High Risk with regard to UXO (6 Alpha Associates, 2020). UXO testing was undertaken by a specialist UXO Subject Matter Expert following with best practice guidance and in accordance with the AECOM Construction Phase Plan.

6.3.4 Sonic drilling

Resonance (sonic) drilling was undertaken in all exploratory boreholes to a maximum depth of 20.00m bgl. Sonic drilling was progressed to the interface between coarse (granular) and fine (cohesive) Tidal Flat Deposits, where telescope drilling techniques were employed to allow the insertion of Aquifer Protection.

6.3.5 Rotary cored drilling

Rotary cored drilling utilising the Geobore-S triple barrel coring system was undertaken in all boreholes with the exception of MS\BH15, MS\BH16 and MS\BH17. Rotary coring was used in both soil and rock, and advanced from either the fine (cohesive) Tidal Flat Deposits or Glacial Till at depths of between 11.70m and 16.75m bgl. Rotary coring progressed to a maximum depth of 38.30m bgl.

6.3.6 Undisturbed sampling

Undisturbed samples were obtained at approximately 3.00m intervals in fine (cohesive) soils. Undisturbed sampling was carried out during both sonic and rotary cored drilling. A summary is presented below.

During Sonic Drilling:

- Open Tube Sample thin-walled (OS-T/W), typically in soft, firm sandy or laminated clays; and
- Open Tube Sample thick-walled (OS-TK/W), typically in stiff clay soils.

During Rotary Cored Drilling:

- Class 1 samples obtained from Geobore-S drilling.

6.3.7 Geo-environmental sampling

Samples for contamination testing were recovered in all exploratory holes across the full investigation depth. Geo-environmental samples comprised:

- Soil;
- Soil leachate; and
- Groundwater.

Soil and soil leachate samples were accompanied by PID readings (refer to Section 6.3.8). In addition, Made Ground samples were accompanied by Litmus paper testing readings (refer to Section 6.3.9).

Groundwater samples were collected as part of the post-fieldwork monitoring programme. A single groundwater grab sample was obtained during trial pitting works.

The chemical analysis undertaken on the samples obtained is presented in Section 6.6.2.

6.3.8 Photo-ionisation detector testing

PID testing was undertaken at approximately 0.5m intervals in Made Ground and at 1m intervals thereafter for the full depth of the exploratory holes. A summary of the PID testing results is provided in Table 6-2.

Table 6-2 Summary of PID Testing

Exploratory Hole ID	Maximum Recorded Value	Depth (m bgl) / Stratum
MS\BH02	0.1	0.30 / Made Ground (d1) & 0.50 / Made Ground (d1)
MS\BH03	0.3	2.00 / Tidal Flat Deposits (c2)
MS\BH05	0.1	0.12 / Made Ground (d7)
MS\BH06	5.1	12.70 / Tidal Flat Deposits (c2)

Exploratory Hole ID	Maximum Recorded Value	Depth (m bgl) / Stratum
MS\BH07	1.0	4.20 / Made Ground (d1)
MS\BH08	0.4	8.20 / Tidal Flat Deposits (c2)
MS\BH13	0.1	0.30 / Made Ground (d1)
MS\BH14	1.0	4.20 / Made Ground (d1)
MS\BH17	2.0	3.90 / Made Ground (d1)
MS\TP01	0.2	2.00 / Made Ground (d1) & 3.00 / Made Ground (d1)
MS\TP03	0.5	1.00 / Made Ground (d1)
MS\TP04	0.5	0.50 / Made Ground (d1) & 1.00 / Made Ground (d1)
MS\TP05	7.2	2.00 / Made Ground (d1)
MS\TP06	501.0	3.20 / Made Ground (d1)
MS\TP07	1.1	1.50 / Made Ground (d1)
MS\TP09	10.3	1.00 / Made Ground (d1)
LF\BH01	0.1	1.00 / Made Ground (d1)
LF\TP01	0.2	2.00 / Made Ground (d1) & 2.50 / Made Ground (d1)
LF\TP02	2.1	2.50 / Made Ground (d1)
LF\TP03	2.2	4.00 / Made Ground (d1)

Notes:

1. *Minimum reading for all exploratory holes was <0.01ppm.*
2. *Limit of Detection for equipment is 0.1ppm.*
3. *Exploratory holes not shown recorded no values greater than Limit of Detection (<0.01ppm).*

6.3.9 Litmus paper testing

Litmus paper testing was undertaken on all geo-environmental samples taken within the Made Ground. A summary of the results is provided in Table 6-3.

Table 6-3 Summary of Litmus Paper Testing

Minimum Recorded Value (pH Units)	Exploratory Hole ID / Depth (m bgl) / Stratum	Maximum Recorded Value (pH Units)	Exploratory Hole ID / Depth (m bgl) / Stratum
1	MS\BH16 / 1.00 / Made Ground (d1)	9	Multiple

6.4 Borehole instrumentation and monitoring

On completion of exploratory boreholes, boreholes were installed with the following instrumentation:

- Dual/single gas/groundwater standpipe (including downhole groundwater level diver where specified); or
- Multilevel vibrating wire piezometer.

Further details are provided below:

6.4.1 Ground gas/groundwater standpipe

A summary of gas/groundwater standpipe construction is provided in Table 6-4.

Table 6-4 Summary of Gas/Groundwater Standpipe Construction

Exploratory Hole ID	Standpipe[1] / Type	Top Seal From (m bgl)	Top Seal To (m bgl)	Bottom Seal From (m bgl)	Bottom Seal To (m bgl)	Well Screen From (m bgl)	Well Screen To (m bgl)	Response Zone From (m bgl)	Response Zone To (m bgl)	Response Zone Strata	Downhole Groundwater Level Diver (m bgl)
MS\BH03	MS\BH03S / Ground gas	0.60	1.10	2.80	3.80	1.20	2.70	1.10	2.80	Made Ground (d1) & TFD (c2)[3]	
	MS\BH03D / Groundwater	23.50	24.50	N/A	N/A	25.50	28.50	24.50	29.10	RMF (a3)	28.50
MS\BH04	MS\BH04S / Groundwater	0.60	1.60	6.10	7.10	2.00	5.00	1.60	6.10	TFD (c2)	
	MS\BH04D / Groundwater	12.10	13.75	21.50	22.60	15.00	18.00	13.75	21.50	Lacustrine Deposits (b3) and Glacial Till (b1)	
MS\BH05	MS\BH05S / Groundwater	4.00	5.00	13.50	14.70	6.50	12.50	5.00	13.50	TFD (c2)	12.00
	MS\BH05D / Groundwater	13.50	14.70	N/A	N/A	23.50	29.90	21.50	31.00	RMF (a3)	
MS\BH07	MS\BH07S / Ground gas	0.60	1.60	4.65	5.70	1.70	4.60	1.60	4.65	Made Ground (d1)	
	MS\BH07D / Groundwater	4.65	5.70	8.50	9.50	5.80	7.30	5.70	8.50	TFD (c2)	6.80
MS\BH08	MS\BH08S / Ground gas	0.60	1.10	5.80	6.80	1.20	5.70	1.10	5.80	Made Ground (d1)	
	MS\BH08D / Groundwater	10.20	11.20	13.40	14.40	11.30	13.30	11.20	13.40	TFD (c2)	
MS\BH09	MS\BH09S / Ground gas	0.60	1.60	4.60	5.60	1.70	4.50	1.60	4.60	Made Ground (d1)	
	MS\BH09D / Groundwater	4.60	5.60	9.00	10.00	5.70	8.70	5.60	9.00	TFD (c2)	
MS\BH11	MS\BH11S / Ground gas	0.60	1.10	4.50	5.50	1.20	4.40	1.10	4.50	Made Ground (d1)	
	MS\BH11D / Groundwater	4.50	5.50	11.5	14.70	7.00	11.40	6.90	11.50	TFD (c2)	
MS\BH12	MS\BH12S / Groundwater	16.65	18.10	20.60	21.60	18.20	20.50	18.10	20.60	Glacial Till (b1) & RMF (a3)[4]	20.00
	MS\BH12D / Groundwater	20.60	21.60	34.60	35.60	30.70	34.50	30.60	34.60	RMF (a3)	
MS\BH13	MS\BH13S / Groundwater	2.90	5.70	10.30	11.70	6.50	9.50	5.70	10.30	TFD (c2 & c1)[5]	9.00
	MS\BH13D / Groundwater	14.80	15.80	N/A	N/A	17.00	20.00	15.80	20.20	RMF (a3)	
MS\BH14	MS\BH14 / Groundwater	3.50	4.50	8.50	9.50	5.00	8.00	4.50	8.50	TFD (c2)	7.50
MS\BH15	MS\BH15S / Ground gas	0.60	1.60	5.30	6.30	2.00	5.00	1.60	5.30	Made Ground (d4, d3 & d1) & TFD (c2)[6]	
	MS\BH15D / Groundwater	5.30	6.30	12.80	14.70	9.00	12.00	6.30	12.80	TFD (c2)	

Exploratory Hole ID	Standpipe[1] / Type	Top Seal From (m bgl)	Top Seal To (m bgl)	Bottom Seal From (m bgl)	Bottom Seal To (m bgl)	Well Screen From (m bgl)	Well Screen To (m bgl)	Response Zone From (m bgl)	Response Zone To (m bgl)	Response Zone Strata	Downhole Groundwater Level Diver (m bgl)
MS\BH17	MS\BH17S / Ground gas	0.60	1.60	5.50	6.50	2.00	5.00	1.60	5.50	Made Ground (d4 & d1)[7]	
	MS\BH17D / Groundwater	17.20	18.20	N/A	N/A	18.50	20.00	18.20	20.00	RMF (a3)	
LF\BH01	LF\BH01S / Groundwater	3.00	4.00	8.20	9.20	5.10	8.10	4.00	8.20	TFD (c2)	8.00
	LF\BH01D / Groundwater	33.00	34.00	N/A	N/A	35.00	38.00	34.00	38.60	RMF (a3)	

Notes:

1. *"S" suffix indicates shallow standpipe within exploratory hole. "D" suffix indicates deeper standpipe within same exploratory hole.*
2. *N/A – no bentonite seal inserted at base with bedrock assumed to act as an impermeable stratum.*
3. *0.65m Made Ground (d1) and 1.05m TFD (c2)*
4. *0.2m overlap with (a3)*
5. *0.35m overlap with (c1)*
6. *0.1m overlap with (c2)*
7. *0.1m overlap with (d4)*

Filter material comprised 2-4mm clean washed filter sand, with the exception of BH12D where 10mm clean washed shingle was used. Downhole groundwater level divers were installed 0.5m from the base of selected standpipes on completion of well development.

Details of the standpipe installations are presented on the exploratory hole logs in the NZT Factual GI Report (AEG, 2022).

6.4.2 Multilevel vibrating wire piezometer

A summary of the multilevel vibrating wire piezometer (VWP) instrumentation details is provided in Table 6-5 below.

Table 6-5 Summary of Multilevel Vibrating Wire Piezometers

Exploratory Hole ID	VWP 1 (m bgl / Stratum)	VWP 2 (m bgl / Stratum)	VWP 3 (m bgl / Stratum)	VWP 4 (m bgl / Stratum)
MS\BH02	7.5 / TFD SAND (c2)	13.5 / TFD CLAY (c1)	18.0 / Glacial Till (b1)	26.5 / RMF MUDSTONE (a3)
MS\BH06	4.5 / Made Ground (d1)	10.0 / TFD SAND (c2)	19.2 / Glacial Till (b1)	30.0 / RMF MUDSTONE (a3)
MS\BH10	4.3 / Made Ground (d1)	8.0 / TFD SAND (c2)	16.0 / Glacial Till (b1)	32.0 / RMF MUDSTONE (a3)
MS\BH16	5.0 / Made Ground (d4)	8.0 / TFD SAND (c2)	16.0 / Glacial Till (b1)	18.5 / RMF MUDSTONE (a3)
LF\BH02	6.5 / TFD SAND (c2)	17.0 / TFD CLAY (c1)	23.0 / Glacial Till (b1)	32.5 / RMF MUDSTONE (a3)

VWPs were installed in a cement/bentonite grout mix which was prepared as described in Table 6-6.

Table 6-6 Cement/Bentonite Grout Mix for Fully Grouted VWPs

Material	Ratio by Weight
Water	3.5
Portland Cement	1.0
Bentonite	0.3

VWPs installed within the slag-dominant Made Ground (d1) were backfilled with 10mm clean washed shingle, after an initial attempt using the grout mix described above.

6.4.3 Ground gas and groundwater level monitoring

Daily dip readings and weekly gas monitoring were undertaken during site works, the results of these are available in the NZT Factual GI Report (AEG, 2022).

All wells were developed by bailer between 19th July and 23rd July 2021. This method was not in line with the AECOM GI Specification (AECOM, 2021) and AECOM requested that the Contractor revisit this after the first ground gas and groundwater monitoring round. Well development in line with the AECOM GI Specification was undertaken by air-lifting week commencing 28th September 2021. The results are presented in the in the final NZT Factual GI Report (AEG, 2022).

Three rounds of post-fieldwork ground gas and groundwater monitoring have been undertaken between 9th August 2021,17tth November 2021. As part of the post-fieldwork monitoring, a review of historic wells installed by AEG in 2017 (AEG, 2018) was undertaken during the 2nd monitoring round.

Variable head permeability testing was undertaken on selected wells during the 2nd gas and groundwater monitoring round. A summary of the results is presented in the final NZT Factual GI Report (AEG, 2022).

The results of ground gas and groundwater monitoring are further discussed in Appendix H and Section 8 respectively, with full records available in Field Enclosures 6 and 7 of the NZT Factual GI Report (AEG, 2022).

6.4.4 Downhole groundwater level diver monitoring

Downhole groundwater level divers were installed in 7 borehole installations, details of which are presented in Table 6-4 in Section 6.4.1.

Data from the downhole groundwater level divers were downloaded on a monthly basis and the results are further discussed in Section 8.

6.4.5 Vibrating wire piezometer monitoring

Vibrating wire piezometers (VWPs) were installed in 5 borehole installations, details of which are presented in Table 6-5 in Section 6.4.2. VWPs were set to record the following parameters:

- Pore-water Pressure (kPa);
- Temperature (°C); and
- Barometric Pressure (mb).

Data from the VWPs were downloaded on a monthly basis and the results are further discussed in Section 8.

6.5 In-situ testing

Details of the in-situ testing carried out are provided in Section 6.1.3. The in-situ test results are provided on the exploratory hole logs and in the NZT Factual GI Report (AEG, 2022).

Analysis of the in-situ test results is provided under Section 9 of this report.

6.6 Laboratory Testing

6.6.1 Geotechnical testing

Geotechnical testing was undertaken by AEG, Terra Tek, Derwentside Environmental Testing Services Limited (DETS) and Thomas Research Services (TRS). The testing undertaken is summarised in Table 6-7.

Table 6-7 Summary of Geotechnical Laboratory Testing

Test Type	Test Standard	Number of Tests
Natural water content	BS EN ISO 17892-1:2014, Cl. 5	206
Atterberg Limits	BS 1377-2:1990, Cl 4.3 & 5.3	128
Particle Size Distribution[1]	BS EN ISO 17892-4:2016, Cl. 5.2 & 5.4	120 (44)[1]
Particle Density	BS 1377: Part 2:1990, Cl. 8.2	19
1-D consolidation (oedometer)[2]	BS 1377: Part 5:1990, Cl. 3	21
Unconsolidated undrained triaxial compression[2]	BS 1377-7:1990, Cl. 8	29
Consolidated undrained triaxial compression[2]	BS 1377: Part 8: 1990	6
Compaction using 2.5kg hammer	BS 1377: Part 4:1990, Cl. 3.3/3.4	19
Compaction using vibrating rammer	BS 1377: Part 4:1990, Cl. 3.3/3.4	4
California Bearing Ratio	BS 1377 Part 4:1990 and Part 2:1990, Cl. 3.2	8
Moisture Condition Value	BS 1377: Part 4:1990, Cl. 5	9
Consolidated Drained Shear Box	BS 1377: Part 7: 1990, Cl. 4	9
BRE Special Digest 1 (7) Full Suite	Various in-house methods	83 (13)[3]
Chloride	In-house method	2
Organic matter	In-house method	29
Loss on Ignition	In-house method	26
Point Load	ISRM 2007	136
Uniaxial Compressive Strength[2]	ISRM 2007	10
TRS Slag Testing	In-house methods	17

Notes:

[1] *Figure in brackets represents number of tests that underwent sedimentation testing.*

[2] *Bulk density and/or moisture content determination also made as part of these tests.*

[3] *Figure in brackets represents number of tests undertaken on groundwater samples.*

The results of the geotechnical laboratory analyses are included as Laboratory Enclosures 0 to 17 in the NZT Factual GI Report (AEG, 2022).

6.6.2 Geo-environmental testing

Representative geo-environmental (contamination) soil specimens were tested on samples obtained from a range of strata encountered across the site. The range of testing undertaken on soil and groundwater samples are detailed below.

Geo-environmental testing was undertaken by DETS and Element Material Technology. The results of the geo-environmental laboratory analyses are included as Appendix I of the NZT Factual GI Report (AEG, 2022).

6.6.2.1 Soils

A total of 115 (including 11 VOC quality control samples) soil samples were scheduled for geo-environmental testing of which 15 were also tested for soil leachate. A summary of the soil and soil leachate testing suites specified by AECOM and the number of samples scheduled for each suite is presented in Table 6-8.

Table 6-8 Summary of Geo-environmental Soil Laboratory Testing

Suites	Number of Tests
Suite E	
Arsenic, Boron, Beryllium, Cadmium, Copper, Chromium III, Chromium VI, Lead, Mercury, Nickel, Selenium, Vanadium, Zinc, Total Cyanide, Free Cyanide, Thiocyanate, Nitrate, Water Soluble Sulfate, Free Sulfur, Total Sulfur, Total Hydrocarbons, Total Phenols, Polycyclic Aromatic Hydrocarbons (PAH) 16 Speciated, pH, Soil Organic Matter Content (SOM), Moisture Content	93
Suite F	
Total Petroleum Hydrocarbons Criteria Working Group (TPH CWG) with aliphatic and aromatic split and BTEX including MTBE & TAME	48
Suite G	
Volatile Organic Compounds (VOC) and Semi Volatile Organic Compounds (SVOC)	67
Suite I	
Asbestos Screen including Asbestos Quantification where specified	50 (7)
Suite J	
Polychlorinated Biphenyl (PCB) 7 Congeners and PCB WHO 12 Congeners	19
Suite K	
Speciated Phenols	25
Additional Soils Suite	
Arsenic, Boron, Beryllium, Cadmium, Copper, Chromium III, Chromium VI, Lead, Mercury, Nickel, Selenium, Vanadium and Zinc	8
Suite M	
Preparation of Leachate, Arsenic, Boron, Cadmium, Copper, Chromium III, Chromium VI, Iron, Lead, Mercury, Selenium, Zinc, Total Cyanide, Free Cyanide pH, Ammonia expressed as N, Water Soluble Sulfate, Nitrate, Nitrite, PAH 16 Speciated, Total Organic Carbon (TOC), and Hardness	15

Notes:

1. *Figure in brackets represents number of tests that underwent asbestos quantification.*

6.6.2.2 Groundwater Quality

Three groundwater sampling rounds have been completed.
Table 6-9 summarises the groundwater laboratory testing.

Table 6-9 Summary of Geo-environmental Groundwater Laboratory Testing

Suites	Number of Tests
Suite N	
Arsenic, Beryllium, Boron, Cadmium, Copper, Chromium III, Chromium VI, Iron, Lead, Mercury, Nickel, Selenium, Vanadium, Zinc, Total Cyanide, Free Cyanide, pH, Ammonia expressed as	64

Suites	Number of Tests
N, Ammoniacal Nitrogen, Water Soluble Sulfate, Nitrate, Nitrite, PAH 16 Speciated, TOC, Total Petroleum Hydrocarbons, Hardness and Phenols	
Suite O	
TPH CWG with aliphatic and aromatic split and BTEX including MTBE & TAME	64
Suite P	
VOC and SVOC	44 and 42
Suite R	
PCB 7 Congeners and PCB WHO 12 Congeners	3

6.6.2.3 Ground Gas Monitoring

7 gas monitoring standpipes were installed within the Made Ground in selected boreholes. Three ground gas monitoring rounds have been completed. During the first monitoring round carried out week commencing 9th August 2021, all standpipes (including those only intended for groundwater monitoring) were monitored for ground gas. Details of the standpipe installations are presented in Table 6-4 in Section 6.4.1 and presented on the exploratory hole records in Field Data Enclosure 1 of the NZT Factual GI Report (AEG, 2022).

Standing water levels were monitored using an interface probe to check for the presence of non-aqueous phase liquid (NAPL). NAPL was not recorded in any of the boreholes throughout the monitoring programme. The gas monitoring recorded the following parameters:

- Concentrations of Methane, Carbon Dioxide, Oxygen, Hydrogen Sulphide and Carbon Monoxide;
- Gas Flow Rate; and
- Atmospheric Pressure and Relative Pressure.

6.7 Factual Report

The results of the GI and laboratory testing undertaken by AEG in 2021 are presented in the NZT GI Factual Report (AEG, 2022) included as Appendix A.

7. Ground Summary

7.1 Identified ground conditions

The findings of the GI were used to determine geological units that form the stratigraphy underlying the site. Interpretation was undertaken considering descriptions of strata, testing results, published geology, site observations and engineering judgement.

The location of the exploratory holes in relation to the existing and proposed site layout is shown on Drawing 60657467-ACM-GIR-008. The stratigraphy is presented in the 3D Ground Model and the following geological sections:

- 60657467-ACM-GIR-DRG-009 - Geological Section A-A';
- 60657467-ACM-GIR-DRG-010 - Geological Section B-B'; and
- 60657467-ACM-GIR-DRG-011 - Geological Section C-C'.

These sections show the stratigraphy encountered during the scheme specific GI as well as ground conditions proved as part of previous phases of GI, standard penetration test (SPT) data along with groundwater strikes, rises and the maximum groundwater levels recorded in the standpipe piezometers during one post site works monitoring visit. Sections A-A' and B-B' are orientated north northeast – south southwest through the Main Site, with Section C-C'; orientated north east – south west through the Onshore CO_2 Export Pipeline Corridor.

A review of geological information has indicated that ground conditions on the site are likely to comprise variable thickness of Made Ground (d1 – d7) associated with the development of the site as an iron and steel works, including the reclamation of land and installation of breakwaters. Made Ground is thicker beneath the Main Site compared to the Onshore CO_2 Export Corridor, with greatest depths proven in the south of the Main Site, below the footprint of the former Redcar Steelworks building footprint between the Northern and South Gare breakwaters and in localised areas across northern Main Site (refer to Drawing 60657467-ACM-GIR-DRG-012). The deepest Made Ground proven on-site was at MS\BH08 (7.80m bgl / 0.95m OD) and the shallowest at MS\TP10 (0.60m bgl / 7.53m OD). It is noted that areas where the greatest thickness of Made Ground is inferred as typically associated with high points and heaps present across the site. The inferred base elevation of Made Ground is shown on Drawing 60657467-ACM-GIR-DRG-013. Made Ground predominantly comprised slag-dominant material (d1), understood to be associated with the site's historic use as an iron and steel works. Made Ground (d1) was encountered in all but 6 of the exploratory holes across the site, all of which were Cone Penetration Tests (CPT) located in the beach sections of the Onshore CO_2 Export Corridor.

Made Ground (d1 – d7) is underlain by post-glacial Tidal Flat Deposits, comprising layers predominantly of sand (c2) and clay (c1), the latter which are found at greater depths and particularly prevalent at the interface between the Tidal Flat Deposits and the underlying Glacial Lacustrine Deposits (b3) and/or Glacial Till (b1). Tidal Flat Deposits were encountered at depths of between ground level in the CPT exploratory holes (excluding LF\CPT02 & LF\CPT02A) and proven to be between 4.36m (LF\CPT02) and 21.22m (LF\CPT06) thick. Tidal Flat Deposits (c1 & c2) were encountered in all of the exploratory holes, with the exception of trial pits, and are thicker towards the north, particularly below the Onshore Export CO_2 Corridor. The base of the Tidal Flat Deposits is typically around -5m OD along the southern boundary of the Main Site reducing to -10m OD towards the north boundary below the proposed structures, see Geological Sections A-A' and B-B'. The base of the Tidal Flat Deposits is inferred to reduce further along the Onshore Export CO_2 Corridor to a low point of -20.43m OD, see Geological Section C-C'. The inferred upper surface of the Tidal Flat Deposits is shown on Drawing 60657467-ACM-GIR-DRG-014.

Underlying the Tidal Flat Deposits (c1 & c2) are Glacial Lacustrine Deposits (b3) and/or Glacial Till (b1). Glacial deposits were encountered across the site, proven to depths of between 15.30m (-9.59m OD) in MS\BH13 and 28.65m bgl (21.37m OD) in LF\BH01. Glacial deposits are thinner towards the southern extent of the Main Site and north extents of the Onshore CO_2 Export Pipeline Corridor, with the thickest deposits encountered in the Onshore CO_2 Export Pipeline Corridor in LF\BH01 (11.90m). The inferred upper surface elevation of the Glacial Deposits is shown on Drawing 60657467-ACM-GIR-DRG-015.

Bedrock geology of the Redcar Mudstone Formation (a3) was proven in 18 exploratory holes, at depths ranging from 15.30m (-9.59m OD) in MS\BH13 to 38.60m bgl (-31.32m OD) in LF\BH01. Rockhead levels to the top of the Redcar Mudstone Formation (a3) generally increase in depth towards the north. The inferred upper surface elevation of the Redcar Mudstone Formation is shown on Drawing 60657467-ACM-GIR-DRG-016.

A detailed summary of the strata proved including material descriptions, strata codes, depth (m bgl), level (m OD), and thickness (m) is provided in Table 7-1. For the purposes of this assessment the summary of depths, levels and thickness provided in Table 7.1 are the minimum and maximum values calculated from all exploratory holes formed on the site. Exploratory hole specific minimum and maximum depths and corresponding levels for each strata type are described in Sections 7.1.1 to 7.1.15 below. Typical photographs of encountered strata are provided in Table 7-2.

Table 7-1 Generalised Strata Succession and Strata Codes

Strata	Strata Code	Depth (m bgl)		Level (m OD)		Thickness (m)		Typical Strata Description
		From	To	From	To	Min.	Max.	
Topsoil	e1							Topsoil was not encountered in any of the exploratory holes reflecting the industrial site use.
Other	d7	0.00	2.80	7.48	4.68	0.05	2.80	MADE GROUND: Macadam, or: MADE GROUND: Strong white grey concrete, recovered as gravel, cobbles and boulders.
Topsoil Made Ground	d6	0.00	0.40	8.83	3.51	0.05	0.40	MADE GROUND: Brown slightly silty slightly organic fine and medium SAND with many rootlets, or: MADE GROUND: Red brown or grey very sandy subangular fine and medium GRAVEL of slag. Sand is fine to coarse of crushed slag. Slag is vesicular, or: MADE GROUND: Grass over soft dark brown clayey topsoil with occasional rootlets.
Cohesive Made Ground	d4	0.00	5.60	9.25	2.06	0.35	4.10	MADE GROUND: Soft to firm red brown and brown sandy slightly gravelly CLAY with low cobble content. Gravel is angular and subangular fine to coarse of various lithologies including slag. Cobbles are angular and subangular or slag and brick.
Granular Made Ground	d3	0.05	7.80	7.28	0.94	0.30	0.90	MADE GROUND: Brown yellow fine and medium SAND, or: MADE GROUND: Grey slightly gravelly clayey fine to coarse SAND. Gravel angular to subrounded fine to coarse of various lithologies including slag.
Hydraulic Fill	d2	1.20	7.20	5.13	1.42	0.25	1.50	MADE GROUND: Brown fine to coarse SAND with occasional fragments of white bivalve shell.
Slag-dominant material	d1	0.00	7.20	8.75	0.77	0.10	5.90	MADE GROUND: Grey, black and brown sandy angular and subangular fine to coarse GRAVEL of various lithologies including slag. With low to high cobble content. Cobbles and boulders are angular and subangular of various lithologies including slag, or: MADE GROUND: Grey, black and brown slightly sandy angular and subangular fine to coarse GRAVEL of various lithologies including slag with high cobble and low boulder content. Cobbles and boulders are angular and subangular of slag, or: MADE GROUND: Dark grey angular and subangular fine to coarse GRAVEL of fused slag with medium cobble content. Cobbles are angular and subangular of slag.
Wind Blown Sand	c3							Wind Blown Sand was not encountered in any of the exploratory holes.

Strata	Strata Code	Depth (m bgl)		Level (m OD)		Thickness (m)		Typical Strata Description
		From	To	From	To	Min.	Max.	
Tidal Flat Deposits Sand	c2	0.00	16.10	4.71	-13.04	4.36	15.16	Medium dense yellow fine to coarse SAND with occasional fragments of white bivalve shell and pockets of soft brown silty clay, or: Medium dense brown and grey slightly gravelly fine to coarse SAND with occasional fragments of white bivalve shell. Gravel is angular to rounded fine to coarse of various lithologies.
Tidal Flat Deposits Clay	c1	4.20	21.22	2.79	-20.43	0.10	13.36	Soft thinly laminated dark brown slightly sandy silty CLAY with occasional fragments of white bivalve shell, or: Soft grey and brown silty organic CLAY with frequent traces of organic material. Organic odour commonly noted, or: Soft to firm brown and grey slightly sandy slightly gravelly CLAY. Gravel is angular to rounded fine to coarse of various lithologies, or: Black pseudofibrous PEAT (MS\BH14).
Lacustrine Deposits	b3	10.90	25.90	-5.19	-23.56	0.20	9.05	Firm to stiff thinly laminated dark brown, grey brown or red brown slightly sandy slightly gravelly CLAY with occasional silt dustings on laminae. Gravel is angular and subangular fine to coarse of various lithologies.
Glacial Till	b1	11.70	28.65	-5.99	-21.78	1.05	9.70	Stiff locally firm red brown locally dark grey slightly sandy slightly gravelly CLAY. Gravel is angular and subangular fine to coarse of various lithologies.
Redcar Mudstone Formation	a3	15.30	38.60	-8.75	-31.37	1.00	15.60[1]	Extremely weak thinly laminated blue grey MUDSTONE. Recovered as gravelly clay or sand and gravel (residual), or: Extremely weak locally very weak thinly laminated dark grey or grey MUDSTONE (destructured to distinctly weathered), or: Weak thinly laminated dark grey MUDSTONE with occasional fossilised remains (partially weathered).
Penarth Group	a2							Penarth Group was not encountered in any of the exploratory holes.
Mercia Mudstone Group	a1							Mercia Mudstone Group was not encountered in any of the exploratory holes.

Notes:

1. *Thickness not fully proven.*

Table 7-2. Typical Photographs of Encountered Strata

Other Made Ground (d7),

MADE GROUND: Strong white grey concrete, recovered as gravel, cobbles and boulders,

MS\BH05 core run 0.12m – 1.2m.

Cohesive Made Ground (d4),

MADE GROUND: Soft to firm red brown and brown sandy slightly gravelly CLAY with low cobble content. Gravel is angular and subangular fine to coarse of various lithologies including slag. Cobbles are angular and subangular or slag and brick,

MS\BH17 core run 1.20m – 2.70m.

Granular Made Ground (d3),

MADE GROUND: Grey slightly gravelly clayey fine to coarse SAND. Gravel angular to subrounded fine to coarse of various lithologies including slag,

MS\BH15 core run 2.70m – 4.20m.

Hydraulic Fill (d2),

MADE GROUND: Brown fine to coarse SAND with occasional fragments of white bivalve shell,

MS\BH13 core run 2.70m – 4.20m.

Slag-dominant Made Ground (d1), MADE GROUND: Grey, black and brown sandy angular and subangular fine to coarse GRAVEL of various lithologies including slag. With low to high cobble content. Cobbles and boulders are angular and subangular of various lithologies including slag, MS\BH08 core run 2.70m – 4.20m.	Tidal Flat Deposits Sand (c2), Medium dense yellow fine to coarse SAND with occasional fragments of white bivalve shell and pockets of soft brown silty clay, MS\BH16 core run 7.20m – 8.70m.

Tidal Flat Deposits Clay (c1), Soft thinly laminated dark brown slightly sandy silty CLAY with occasional fragments of white bivalve shell, MS\BH13 core run 4.20m – 5.70m.	Tidal Flat Deposits Clay (c1), Soft grey and brown silty organic CLAY with frequent traces of organic material. Organic odour commonly noted, MS\BH10 core run 8.70m – 10.20m.

Lacustrine Deposits (b3),	Glacial Till (b1), Stiff locally firm red brown locally dark grey slightly sandy slightly gravelly CLAY. Gravel is angular and subangular fine to coarse of various lithologies,

Firm to stiff thinly laminated dark brown, grey brown or red brown slightly sandy slightly gravelly CLAY with occasional silt dustings on laminae. Gravel is angular and subangular fine to coarse of various lithologies,

LF\BH01 core run 19.10m – 20.60m.

LF\BH01 core run 19.10m – 20.60m.

Redcar Mudstone Formation (a3),

Extremely weak thinly laminated blue grey MUDSTONE. Recovered as gravelly clay or sand and gravel (residual),

MS\BH05 core run 23.00m – 24.90m.

Redcar Mudstone Formation (a3),

Extremely weak locally very weak thinly laminated dark grey or grey MUDSTONE (destructured to distinctly weathered,

MS\BH14 core run 17.70m – 19.20m.

Redcar Mudstone Formation (a3),

Weak thinly laminated dark grey MUDSTONE with occasional fossilised remains (partially weathered),

MS\BH10 core run 33.20m – 34.70m.

Redcar Mudstone Formation (a3),

Weak thinly laminated dark grey MUDSTONE with occasional fossilised remains (partially weathered),

LF\BH02 core run 36.15m – 37.70m.

Notes:

1. *No photographic reference provided for strata with limited thicknesses.*
2. *Additional photographs are available on the exploratory hole logs in the NZT Factual Report.*

7.1.1 Topsoil (e1)

Topsoil was not encountered in any of the exploratory holes reflecting the industrial use of the site as an iron and steel works.

7.1.2 Made Ground – Other (d7)

Made Ground (d7) was encountered in exploratory holes: MS\BH05 and MS\BH09 which are located in the north-west of the Main Site. Typical descriptions for Made Ground (d7) were macadam or strong grey, white concrete.

7.1.3 Made Ground – Topsoil Made Ground (d6)

Made Ground (d6) was encountered in 12 exploratory holes: 7 in the Main Site and 5 in the Onshore CO_2 Export Pipeline Corridor. The locations coincide with areas of the site that are currently covered in grass and regularly contained rootlets.

7.1.4 Made Ground – Cohesive Made Ground (d4)

Made Ground (d4) was encountered in 5 exploratory holes: MS\BH13, MS\BH15, MS\BH16, MS\BH17 and MS\TP10 which are located in the south of the Main Site.

Olfactory evidence of contamination, described as “hydrogen sulphide odour”, was recorded at MS\BH16 between 5.00m bgl (2.47m OD) and 5.60m bgl (1.87m OD).

7.1.5 Made Ground – Granular Made Ground (d3)

Made Ground (d3) was encountered in 7 exploratory holes: 6 in the north of the site (both Main Site (3) and Onshore CO_2 Export Pipeline Corridor (3)) with a single localised occurrence in MS\BH15 between 3.30m bgl (3.95m OD) and 4.20m bgl (3.05m OD).

7.1.6 Made Ground – Hydraulic Fill (d2)

Made Ground (d2) was encountered in 6 exploratory holes: LF\BH01, LF\BH02, MS\BH02, MS\BH08, MS\BH13 and MS\TP01 which are located in the north of the site.

Olfactory evidence of contamination, described as “hydrocarbon odour”, was recorded at MS\BH13 between 3.65m bgl (2.06m OD) and 4.20m bgl (1.51m OD).

7.1.7 Made Ground – Slag-Dominant Material (d1)

Made Ground on site predominantly comprised slag-dominant material (d1) and was proven in the majority of the exploratory holes formed on site. It was encountered from ground level to a maximum depth of 7.20m bgl (2.05m OD) in MS\BH17. Made Ground (d1) predominantly comprised vesicular and occasionally vitreous slag (MS\TP07) included as unsorted sand, gravel, cobble and boulder sized fractions. The slag is mixed with various other anthropogenic and natural constituents including, but not limited to metal, plastic, brick, refractory brick, clinker, ash, limestone and sandstone. Made Ground (d1) can be categorised into 3 subdivisions: slag gravel, slag gravel with boulders and fused slag gravel; these are discussed in Table 7-3.

Table 7-3 Summary of Made Ground (d1)

Subdivision	General Description	Number of Occurrences	General Location On-Site
Slag gravel	MADE GROUND: Grey, black and brown sandy angular and subangular fine to coarse GRAVEL of various lithologies including slag. With low to high cobble content. Cobbles and boulders are angular and subangular of various lithologies including slag.	23	Across both the Main Site and Onshore CO_2 Export Pipeline Corridor in majority of exploratory holes.
Slag gravel with boulders	MADE GROUND: Grey, black and brown slightly sandy angular and subangular fine to coarse GRAVEL of various lithologies including slag with high cobble and low boulder content. Cobbles and boulders are angular and subangular of slag.	16	Across both the Main Site and Onshore CO_2 Export Pipeline Corridor in trial pits and locally in boreholes (MS\BH04, MS\BH06, MS\BH11 and LF\BH02).

Subdivision	General Description	Number of Occurrences	General Location On-Site
Fused slag gravel	MADE GROUND: Dark grey angular and subangular fine to coarse GRAVEL of fused slag with medium cobble content. Cobbles are angular and subangular of slag.	3	Centre of Main Site.

Notes:

1. It is likely that the slag gravel and slag gravel with boulders subdivisions are the same unit, but that boulders were only encountered in trial pits with boulder fragments suspected to be present occasionally in boreholes.

Visual and olfactory evidence of hydrocarbon contamination was observed in the Made Ground (d1), a summary of this is presented in Table 7-4.

Table 7-4 Summary of Visual/Olfactory Evidence of Hydrocarbon Contamination in Made Ground (d1)

Exploratory Hole ID	Depth From (m bgl)	Depth To (m bgl)	Visual/Olfactory Evidence	PID Reading (ppm)
MS\BH07	4.20	4.65	Mild tar odour and tar coating.	1.0
MS\BH11	3.50	4.60	Chemical odour.	<0.1
MS\BH14	4.20	4.40	Mild to moderate hydrocarbon odour.	1.0
MS\BH15	4.20	5.20	Mild hydrogen sulphide odour.	<0.1
MS\BH16	4.20	5.00	Mild hydrocarbon odour.	<0.1
MS\BH17	3.90	5.70	Mild hydrocarbon odour.	2.0
MS\BH17	5.70	7.20	Moderate organic odour.	<0.1
MS\TP06	2.80	3.20	Strong hydrocarbon odour. Oily sheen on groundwater.	501.0

Slag testing has been scheduled to be undertaken by Thomas Research Services (TRS). Exploratory hole locations specifically selected for TRS constituent identification, mineralogical testing and expansion are shown on Drawing 60657467-ACM-GIR-DRG-017. The drawing also shows the exploratory holes where TRS slag testing has been undertaken as part of previous phases of ground investigation. Details of the TRS slag testing results are reported in Section 9.5.

7.1.8 Post-Glacial – Wind Blown Sand (c3)

Wind Blown Sand (c3) was not encountered in any of the exploratory holes.

7.1.9 Post-Glacial – Tidal Flat Deposits – Sand (c2)

Tidal Flat Deposits (c2) was encountered in 26 exploratory holes across the site, encountered from ground level (multiple CPT holes) to 16.10m bgl (-8.83mOD) in LF\BH01. Tidal Flat Deposits (c2) predominantly comprised layers of medium dense yellow fine to coarse SAND occasional fragments of white bivalve shell and pockets of soft brown silty clay underlain and/or interbedded with layers of medium dense brown and grey slightly gravelly fine to coarse SAND with occasional fragments of white bivalve shell.

Visual and olfactory evidence of hydrocarbon contamination was observed in the Tidal Flat Deposits (c2), a summary of this is presented in Table 7-5.

Table 7-5 Summary of Visual/Olfactory Evidence of Hydrocarbon Contamination in Tidal Flat Deposits (c2)

Exploratory Hole ID	Depth From (m bgl)	Depth To (m bgl)	Visual/Olfactory Evidence	PID Reading (ppm)
MS\BH03	1.75	2.80	Mild hydrocarbon odour relating to sand pockets	0.3
MS\BH07	4.65	5.60	Mild hydrocarbon odour	<0.1
MS\BH14	4.50	8.70	Mild organic odour	<0.1

7.1.10 Post-Glacial – Tidal Flat Deposits – Clay (c1)

Tidal Flat Deposits (c1) was generally encountered beneath Tidal Flat Deposits (c2), although frequently interbedded with this unit. Tidal Flat Deposits (c1) was encountered in 21 exploratory holes across the site and is thickest in the north of the site in the Coatham Sands and the Teesmouth and Cleveland Coast RAMSAR area (see Section 5.2) and at MS\BH13 in the west of the Main Site.

Tidal Flat Deposits (c1) can be categorised into four subdivisions: laminated clays, organic clays, gravelly clays and peat; these are discussed in Table 7-6.

Table 7-6 Summary of Tidal Flat Deposits (c1)

Subdivision	General Description	Number of Occurrences	General Location On-Site
Laminated clays	Soft thinly laminated dark brown slightly sandy silty CLAY with occasional fragments of white bivalve shell.	26	Across both the Main Site and Onshore CO_2 Export Pipeline Corridor in majority of exploratory holes.
Organic clays	Soft grey and brown silty organic CLAY with frequent traces of organic material. Organic odour commonly noted.	11	South of Main Site, locally central Main Site (MS\BH07 & MS\BH08).
Gravelly clays	Soft to firm brown and grey slightly sandy slightly gravelly CLAY. Gravel is angular to rounded fine to coarse of various lithologies.	9	Centre of Main Site, locally north-east Main Site (MS\BH04).
Peat	Black pseudofibrous PEAT.	1	MS\BH14 only (4.40m – 4.50m bgl / 2.79m – 2.69m OD).

7.1.11 Glacial – Lacustrine Deposits (b3)

Lacustrine Deposits (b3) were encountered in 15 exploratory holes across both sites, present in all boreholes, excluding MS\BH03, MS\BH05, MS\BH11, MS\BH12 and MS\BH14, and in LF\CPT05 and LF\CPT06. Lacustrine Deposits were encountered at depths ranging from 10.90m bgl (-5.19m OD) in MS\BH13 to 25.90m bgl (-19.57m OD) in LF\BH02 and proven to a maximum thickness of 9.05m in LF\BH01. Lacustrine Deposits were commonly interbedded with Glacial Till (b1) (see Section 7.1.12).

7.1.12 Glacial – Glacial Till (b1)

Glacial Till (b1) was encountered in 18 exploratory holes, present in all boreholes, LF\CPT03 and LF\CPT04. Glacial Till (b1) was encountered at shallower depths than Lacustrine Deposits (b3): 11.70m bgl (5.99m OD) MS\BH13 to 28.65m bgl (-21.37m OD) in MS\BH08 and was thicker than the finer lacustrine soils. A maximum thickness of till of 9.70m was recorded in MS\BH04 with an average thickness of 5.48m (compared to 2.60m for (b3)).

7.1.13 Bedrock – Redcar Mudstone Formation (a3)

Bedrock geology of the Redcar Mudstone Formation was encountered in all boreholes across the site, at depths ranging from 15.30m bgl (-9.59m OD) in MS\BH13 to 38.60m bgl (-31.32m OD) in LF\BH01, although not fully penetrated in any location. The weathered top of the Redcar Mudstone Formation (a3) was encountered at depths of between 15.30m bgl (-9.59m OD) in MS\BH13 and 28.95m bgl (-21.67m OD) in LF\BH01, with solid bedrock present below. Rock mass weathering grades in accordance with BS EN ISO 14689 (BSI, 2018) have been assigned, the details of which are presented on the exploratory hole logs in the NZT Factual GI Report (AEG, 2022).

7.1.14 Bedrock – Penarth Group (a2)

Penarth Group (a2) was not encountered in any of the exploratory holes.

7.1.15 Bedrock – Mercia Mudstone Formation (a1)

Mercia Mudstone Group (a1) was not encountered in any of the exploratory holes.

8. Hydrogeological Conditions

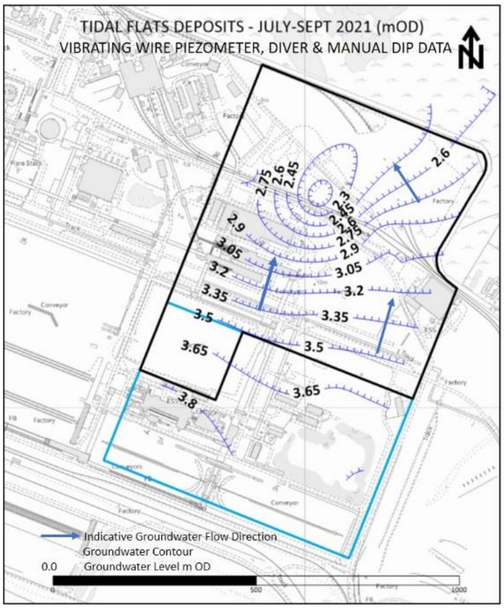
8.1 Groundwater occurrence, flow and levels

Groundwater level measurements taken from a number of boreholes, vibrating wire piezometers and standpipe piezometers (see Section 6.4) installed to intercept the geological units beneath the site at different depths at strategic locations across the site, as shown in Figure 8.1, have been used to determine the groundwater conditions beneath the site. The boreholes and piezometers have been equipped with automatic water level transducers (divers) (see Section 6.4.4) and multi-level vibrating wire piezometers (VWP) (see Section 6.4.5) to record real-time groundwater level data across the site from the different geological units. The data from the divers and vibrating wire piezometers have been compensated for barometric changes. The vibrating wire piezometer base readings provided by the GI Contactor have been checked using both linear gauge and polynomial gauge factors. Polynomial gauge factor calculations from instrument base readings indicate slightly higher groundwater levels. These have been conservatively adopted on the groundwater level interpretation discussed in this section. Three rounds of the groundwater level monitoring data from the VWP, divers and manual dip standpipe piezometers data covering the period July 2021 to November 2021 are available for interpretation in this GIR.

8.2 Groundwater flow and level monitoring

The groundwater level monitoring data (hereafter referred to as “groundwater data” or the “data”) obtained from the boreholes and piezometers show that groundwater is present in all the geological units, as discussed in Section 5.4 and summarised in Table 5-1. The data also show that groundwater flow across the site is generally from South-west to North-east to the coast (Sea) with a local hydraulic gradient ranging between 0.001 and 0.002 in the superficial deposits (including Made Ground) overlying the bedrock and 0.0002 in the Mudstone bedrock respectively. Within the superficial deposits, the combined data contour plot of the vibrating wire piezometer, diver and manual dip water level data indicates a potential reversal in the hydraulic gradient/groundwater flow direction from northeast to southwest. The data also indicated a groundwater level depression in the Tidal Flat Deposits towards the north around the vicinity between MS\BH06 and MS\BH02 and as indicated in the water level contour plot shown in Figure 8.2a. However, there is insufficient data to ascertain this contrasting groundwater flow condition, and in contrast, as shown in Figure 8.2b, the contour plot of the manual dip water level data alone does not show the groundwater level reversal or depression. The cause of this contrasting hydraulic gradient from southwest to northeast and northeast to southwest could be due to several factors. These include the potential for groundwater levels to be locally influenced by potential seawater intrusion/increased water pressure head due to the effect of freshwater - saline water interface likely to be present beneath this area within the Tidal Flat Deposits close to the North Sea coast and/or Tees Estuary. As shown in Figure 8.3a, the data contour plot indicates the presence of a potential groundwater level mound within the Mudstone around the central area of the site with a southwest-northeast flow direction. But, as with the Tidal Flats Deposits, as shown in Figure 8.3b, the contour plot of the manual dip water level data alone does not show the groundwater level mound.

Figure 8.2 (a & b) Average Groundwater Level (m OD) Contours Plots within the Tidal Flats Deposits



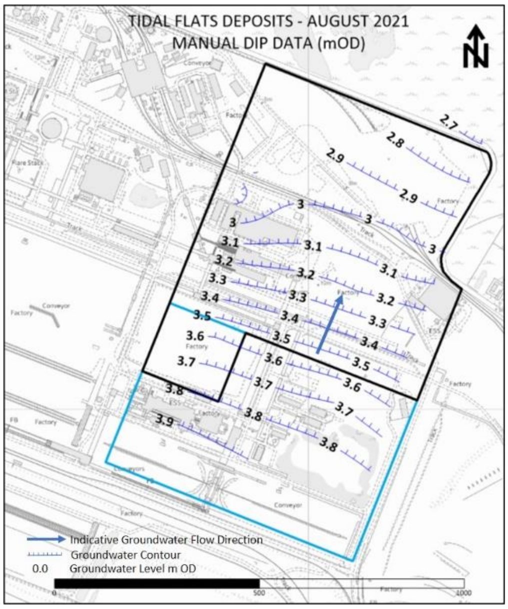
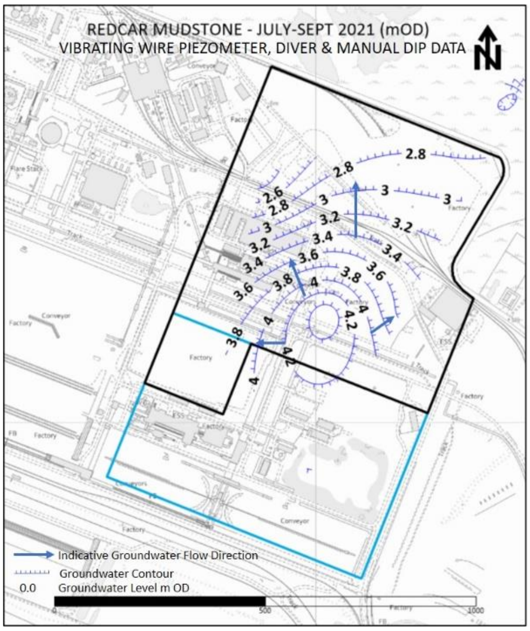


Figure 8.3 (a & b) Groundwater Level Contours Plots within the Redcar (Mudstone)



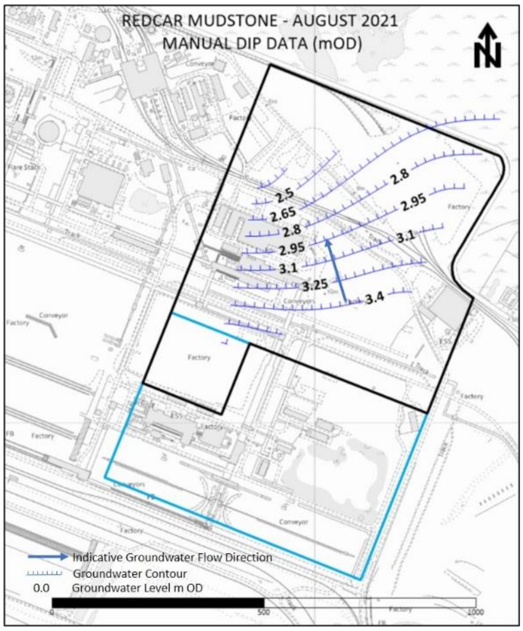


Table 8-1 summarises the average, maximum and minimum groundwater level and depth recorded from the boreholes and piezometers. Figure 8.4 to Figure 8.9 show the first, second and third rounds of the groundwater level monitoring data plots and depths measured from the divers, vibrating wire piezometers and standpipe piezometers installed in each geological unit. Figure 8.10 to Figure 8.14 provide summary plots of the average groundwater level (m OD) measurements recorded from each borehole and piezometer over the monitoring period (June 2021 to November 2021) as summarised below. Figure 8.15 to Figure 8.19 provide groundwater level variability within each geological unit as recorded by the vibrating wire piezometers spatially located across the site from north to south - LFBH02 (Figure 8.15) in the most northern area of the site, close to the coast, and MSBH16 (Figure 8.19) located in the most southern area of the site.

Made Ground: Made Ground (d4) was encountered in all the boreholes across the site, with piezometers installed in the Made Ground, mainly in the south of the site where the Made Ground is thickest. Based on the data from all three rounds, the average groundwater level and depth recorded from the Made Ground ranges between 3.15m OD and 3.93m OD (4.71m bgl and 3.83m bgl) with a maximum groundwater level of 4.21m OD (4.18m bgl) recorded in MS\BH16 located in the southeast quadrant of the site, see Figure 8.4. The observed groundwater level data from the Made Ground indicated groundwater flow is from southwest to northeast at a natural hydraulic gradient of 0.002.

Tidal Flat Deposits: Tidal Flat Deposits comprising Sand (c1) and Clay (c2) were encountered below the Made Ground across the site. Based on the data from all three rounds, the average groundwater levels and depths in the TFD Sand (c2) across the site range between 1.97m OD and 3.61m OD, with a maximum groundwater level of 3.84m OD recorded in MS\BH16 located in the southern section of the site. As shown in Figure 8.5, Figure 8.6 and Figure 8.7, the groundwater level in the TFD Clay (c1) showed very similar groundwater conditions (see Figure 8.5) as in the Tidal Sand (c2) at various locations across the site, suggesting hydraulic continuity between both units and as such can therefore be treated as a single aquifer unit with potential for leakage from one unit to the other. The TFDs are classified by the Environment Agency (EA) as a Secondary (A) Superficial Aquifer (see Table 8-2).

Glacial Till: Glacial Till (b1) is present across the site below the Tidal Flat Deposits. The groundwater level in the Glacial Till (b1) suggests a slightly higher (about 0.5m - 1m higher) groundwater level compared to levels recorded in the other formations, see Figure 8.8. Based on the data from all three rounds, the average groundwater level in the Glacial Till (b1) ranges between 2.73m OD and 5.07m OD with a maximum groundwater level of 5.53m OD recorded in LF\BH02 located in the northern section of the site, indicating a potential reversal in the hydraulic gradient/groundwater flow from northeast to southwest as discussed above. Comparing the groundwater hydraulic head in the Glacial Till and that of the Tidal Flat Deposits over the monitoring period, groundwater flow in the Glacial Till is more likely to be vertical. However, there is insufficient long-term monitoring data to ascertain this groundwater flow condition. The EA has classified the Glacial Till as a Secondary Undifferentiated Aquifer which is unlikely to store or transmit significant amounts of water (see Table 8-2).

Redcar Mudstone Formation (a3): The RMF (Bedrock) (a1) is present at depth below the site. The EA has classified the Mudstone as a Secondary (B) aquifer (see Table 8-2). Figure 8.9 shows that groundwater in the Mudstone appears to be confined by the overlying Glacial Till. Average piezometric groundwater levels and depths in the Mudstone across the site ranges between 2.82m OD and 4.53m OD, with a maximum groundwater level of 4.67m OD recorded in MS\BH10 located in the southern section of the site.

Table 8-1 Summary of the 1st , 2nd and 3rd Rounds of the Groundwater Level Monitoring Data

Borehole ID	Recording Instrument	Groundwater level			
		Min (m OD)	Max (m OD)	Average (m OD)	Stratum
MS\BH16	Vibrating Wire Piezometer	3.73	4.21	3.93	Made Ground (d4)
MS\BH10	Vibrating Wire Piezometer	2.79	3.14	2.92	Made Ground (d1)
MS\BH06	Vibrating Wire Piezometer	3.03	3.32	3.15	Made Ground (d1)
MS\BH16	Vibrating Wire Piezometer	3.47	3.84	3.61	TFD SAND (c2)
MS\BH14	Diver	3.54	3.77	3.62	TFD SAND (c2)
MS\BH13	Diver	3.43	3.63	3.51	TFD SAND (c2) & TFD CLAY (c1)[1]
MS\BH10	Vibrating Wire Piezometer	3.05	3.41	3.20	TFD SAND (c2)
MS\BH07	Diver	2.97	3.06	3.02	TFD SAND (c2)
MS\BH06	Vibrating Wire Piezometer	1.88	2.12	1.97	TFD SAND (c2)
MS\BH05	Diver	2.91	3.03	2.98	TFD SAND (c2)
MS\BH02	Vibrating Wire Piezometer	2.22	2.46	2.30	TFD SAND (c2)
LF\BH01	Diver	2.52	2.68	2.59	TFD SAND (c2)
LF\BH02	Vibrating Wire Piezometer	2.73	3.05	2.87	TFD SAND (c2)
MS\BH10	Vibrating Wire Piezometer	2.15	2.47	2.26	Glacial Till (b1)
LF\BH02	Vibrating Wire Piezometer	2.37	2.92	2.58	TFD CLAY (c1)
MS\BH02	Vibrating Wire Piezometer	2.28	2.50	2.36	TFD CLAY (c1)
MS\BH16	Vibrating Wire Piezometer	3.95	4.30	4.08	Glacial Till (b1)
MS\BH12	Diver	2.95	3.38	3.19	Glacial Till (b1) & RMF (a3)[2]
MS\BH06	Vibrating Wire Piezometer	3.76	4.01	3.84	Glacial Till (b1)
MS\BH02	Vibrating Wire Piezometer	2.65	2.88	2.73	Glacial Till (b1)
LF\BH02	Vibrating Wire Piezometer	5.00	5.53	5.07	Glacial Till (b1)
MS\BH16	Vibrating Wire Piezometer	3.81	4.10	3.92	RMF MUDSTONE (a3)
MS\BH10	Vibrating Wire Piezometer	4.44	4.67	4.53	RMF MUDSTONE (a3)
MS\BH06	Vibrating Wire Piezometer	2.96	3.24	3.05	RMF MUDSTONE (a3)
MS\BH03	Diver	2.75	2.94	2.82	RMF MUDSTONE (a3)
MS\BH02	Vibrating Wire Piezometer	0.97	1.18	1.06	RMF MUDSTONE (a3)
LF\BH02	Vibrating Wire Piezometer	3.59	4.01	3.66	RMF MUDSTONE (a3)

Notes:

1. *0.35m overlap with TFD CLAY (c1)*
2. *0.2m overlap with RMF (a3)*

Table 8-2 presents details on the Environment Agency aquifer classifications for geology at the site.

Table 8-2 Aquifer Classifications

Geological Unit	Stratum	Aquifer Classification
Superficial	Tidal Flat Deposits	Secondary A
Superficial	Glacial Till	Secondary Undifferentiated
Bedrock	Redcar Mudstone Formation	Secondary Undifferentiated
	Mercia Mudstone Group	Secondary B
	Penarth Group	Secondary B

Source:

Envirocheck Report (Landmark Information Group, 2021)

8.2.1.1 Hydraulic Continuity

In terms of hydraulic continuity of groundwater between the different geological units, the groundwater data suggest possible hydraulic continuity between groundwater in the Made Ground (d) and the Tidal Flat Deposits (both Tidal Sands (c2) and Tidal Clay (c1)).

Groundwater in the Glacial Till does not appear to be in hydraulic continuity with groundwater in the overlying Tidal Flat Deposits and the underlying Mudstone. This stratum potentially creates a confining aquifer between the Tidal Flats and the underlying Secondary (B) bedrock aquifer. The data indicates groundwater in the Mudstone is unlikely to be in hydraulic continuity with the overlying Glacial Till. The average groundwater level in the Mudstone is consistently higher than the average water level in the Tidal Sand at each location, suggesting a vertical upward hydraulic gradient from the bedrock to the Tidal Flat Deposits.

8.3 Aquifer hydraulic properties

Hydraulic conductivity values for each geological unit have been estimated from in-situ permeability test carried out at the site on selected boreholes following additional well development activities completed in September 2021. The tests comprise slug tests (falling and rising head tests) and variable head tests (falling head and rising head) following BS5930:1999 (Amendment 1): Section 4: Clause 25. The mechanisms for both tests vary, in that a slug is used to create the change (rise or fall) in the water level in the borehole during the test. The complete tests (data and analysis results) are presented in In-Situ Testing Enclosures 4 and 8 of the NZT GI Factual GI Report (AEG, 2022). A summary of the aquifer hydraulic conductivity values for each geological unit as derived from the tests are presented in Table 8-3 below.

The aquifer hydraulic conductivity values derived from the geological units and presented in Table 8-3 are typical of the individual units and consistent with the literature values. However, it should be noted that these derived test values can only indicate the potential permeability within a few metres around the vicinity of the test locations and should therefore be taken or used with caution for broader-scale ground conditions interpretations.

Table 8-3 Hydraulic conductivity derived from falling and rising head slug and variable head tests

Borehole ID	Geology	Slug Test		Variable Head Test	
		Hydraulic conductivity (k) (m/sec) Falling Head Test	Maximum Hydraulic conductivity (k) (m/sec) Rising Head Test	Hydraulic conductivity y (k) (m/sec) Falling Head Test	Maximum Hydraulic conductivity (k) (m/sec) Rising Head Test
MS\BH03S[4]	Made Ground (d1) and Tidal Flat Deposits Sand (c2)[1]	N/A	N/A	$2.53E^{-04}$	$2.53E^{-05}$
MS\BH05D	RMF MUDSTONE (a3)	N/A	N/A	$1.58E^{-07}$	$1.72E^{-07}$

Borehole ID	Geology	Slug Test		Variable Head Test	
		Hydraulic conductivity (k) (m/sec) Falling Head Test	Maximum Hydraulic conductivity (k) (m/sec) Rising Head Test	Hydraulic conductivity y (k) (m/sec) Falling Head Test	Maximum Hydraulic conductivity (k) (m/sec) Rising Head Test
MS\BH15S[4]	Made Ground (d4, d3 & d1) & Tidal Flat Deposits Sand (c2)[2]	N/A	N/A	$2.04E^{-04}$	$4.29E^{-05}$
MS\BH03D	RMF MUDSTONE (a3)	$5.801E^{-05}$	$5.473E^{-05}$	N/A	N/A
		$6.171E^{-05}$	$5.687E^{-05}$	N/A	N/A
MS\BH05S	Tidal Flat Deposits Sand (c2)	$1.950E^{-03}$	$1.219E^{-03}$	N/A	N/A
		$9.748E^{-04}$	$1.625E^{-03}$	N/A	N/A
MS\BH07D	Tidal Flat Deposits Sand (c2)	$1.813E^{-04}$	$1.483E^{-04}$	N/A	N/A
MS\BH13D	RMF MUDSTONE (a3)	$1.973E^{-06}$	$4.242E^{-06}$	N/A	N/A
		$2.333E^{-06}$	$3.797E^{-06}$	N/A	N/A
MS\BH13S	Tidal Flat Deposits Sand (c2) & Tidal Flat Deposits Clay (c1)[3]	$4.086E^{-03}$	$1.816E^{-03}$	N/A	N/A
		$3.269E^{-03}$	$1.634E^{-03}$	N/A	N/A
MS\BH14	Tidal Flat Deposits Sand (c2)	$1.167E^{-03}$	$1.167E^{-03}$	N/A	N/A
		$1.634E^{-03}$	$1.167E^{-03}$	N/A	N/A
MS\BH15D	Tidal Flat Deposits (c2)	$1.167E^{-03}$	$1.362E^{-03}$	N/A	N/A

Notes:

1. *0.65m Made Ground (d1) and 1.05m TFD SAND (c2)*
2. *0.1m overlap with TFD SAND (c2)*
3. *0.1m overlap with TFD CLAY (c1)*
4. *Results are unreliable, possibly due to instrument error but this has not been confirmed*

8.4 Recorded levels

Table 8-4 presents the groundwater levels recorded from the manual dip measurements in the standpipe installations. The data includes measured water levels from the first, second and third monitoring rounds.

Table 8-4 Summary of Recorded Manual Dip Readings

Exploratory Hole ID	Round 1 Water Level (m OD)	Round 2 Water Level (m OD)	Round 3 Water Level (m OD)	Response Zone Stratum	Groundwater Level Stratum
MS\BH07S	3.04	3.23	2.94	Made Ground (d1)	Made Ground (d1)
MS\BH07D	3.03	2.82	2.95	TFD SAND (c2)	Made Ground (d1)
MS\BH08D	3.05	3.06	3.01	TFD SAND (c2)	Made Ground (d1)
MS\BH09D	2.83	2.77	3.13	TFD SAND (c2)	Made Ground (d1)
MS\BH11S	3.31	3.28	Dry	Made Ground (d1)	Made Ground (d1)

Exploratory Hole ID	Round 1 Water Level (m OD)	Round 2 Water Level (m OD)	Round 3 Water Level (m OD)	Response Zone Stratum	Groundwater Level Stratum
MS\BH11D	3.19	3.01	3.09	TFD SAND (c2)	Made Ground (d1)
MS\BH14	3.69	3.71	3.59	TFD SAND (c2)	Made Ground (d1)
MS\BH15S	3.97	4.18	3.72	Made Ground (d4, d3 & d1) & TFD SAND (c1)[1]	Made Ground (d3)
MS\BH15D	3.97	4.20[6]	3.68	TFD SAND (c2)	Made Ground (d3)
MS\BH17D	3.84	4.08	3.61	RMF MUDSTONE (a3)	Made Ground (d1)
MS\BH03S	2.78	1.87	2.76	Made Ground (d1) & Tidal Flat Deposits Sand (c2)[2]	TFD SAND (c2)
MS\BH03D	2.90	3.00	2.69	RMF MUDSTONE (a3)	TFD SAND (c2)
MS\BH04S	2.71	2.73	2.66	TFD SAND (c2)	TFD SAND (c2)
MS\BH04D	2.72	2.94	2.61	Lacustrine Deposits (b3) & Glacial Till (b1)	TFD SAND (c2)
MS\BH05S	3.01	3.15	2.87	TFD SAND (c2)	Made Ground (d1)
MS\BH05D	2.23	2.62	1.79	RMF MUDSTONE (a3)	Made Ground (d7)
MS\BH12S	3.34	3.64	3.14	Glacial Till (b1) & RMF MUDSTONE (a3)[3]	TFD SAND (c2)
MS\BH12D	3.52	4.00	3.17	RMF MUDSTONE (a3)	TFD SAND (c2)
MS\BH13S	3.60[8]	3.78[7]	3.43[8]	TFD SAND (c2) & TFD CLAY (c1)[4]	Made Ground (d4) & (d2)
MS\BH13D	3.74[7]	4.05[7]	3.36[8]	RMF MUDSTONE (a3)	Made Ground (d4) & (d2)
LF\BH01S	2.60	2.58	2.70	TFD SAND (c1)	Made Ground (d1)
LF\BH01D	2.55	2.43	2.72	RMF MUDSTONE (a3)	Made Ground (d1)
MS\BH08S	Damp	Dry	Dry	Made Ground (d1)	No water
MS\BH09S	Damp	Dry	Dry	Made Ground (d1)	No water
MS\BH17S	Dry	Dry	Dry	Made Ground (d4 & d1)[5]	No water

Notes:

1. *0.1m overlap with TFD SAND (c2)*
2. *0.65m Made Ground (d1) and 1.05m TFD SAND (c2)*
3. *0.2m overlap with RMF MUDSTONE (a3)*
4. *0.35m overlap with TFD CLAY (c1)*
5. *0.1m overlap with Made Ground (d4)*
6. *On boundary between Made Ground (d3) and (d1)*
7. *Made Ground (d2)*
8. *Made Ground (d4)*

8.5 Tidal variability

Studies have shown that ocean tides can daily affect groundwater level fluctuation in coastal aquifers, particularly when monitored continuously or at shorter intervals (Kim et al. 2006[1]; Kim et al. 2008[2]; Wang et al. 2015[3]; and Singaraja et al. 2018[4]). The aquifers within the geological units beneath the site can be likened to coastal aquifers given the proximity of the site to the sea. The possibility of any tidal influences (i.e., fluctuation in the water table) on the groundwater level monitoring measurements over the monitoring periods have been assessed using tidal data from the tidal monitoring data from the Environment Agency's tidal station in the area as there are no tidal monitoring data from the site or nearby locations.

The Whitby Tidal Monitoring Station, located approximately 36km southeast of the site, is the closest tidal station. The site is operated and maintained by the Environment Agency. The tidal data for this station has been corrected relative to Ordnance Datum (OD) at Whitby - meaning the data can, therefore, be negative and does not indicate water depth. However, the influence of such data can still be reflected on continuous or shorter interval groundwater level measurements. Figure 8.24 shows the December 2021 – January 2022 tidal data from the Whitby station. The data shows the six-hourly diurnal tidal fluctuation of the seawater level. Records from the Environment Agency shows that the usual range of the tidal data from this station is between -2.22m and 3.07m sea level. Furthermore, over the past 12 months, this has typically been between -2.31m and 3.10m sea level and has been between these levels for at least 150 days in the past year. Accordingly, comparing the tidal data in Figure 8.24 with the groundwater level plots presented in Figures 8.4 to Figure 8.14, it is noted that the fluctuations in the tidal data are not reflected in any of the groundwater level plots, suggesting no short-term tidal effects in the groundwater level within the geological units at the monitoring locations.

Continuation of groundwater quality and level monitoring is recommended to continue evaluating seasonal variations in water quality and levels.

8.6 Seasonal variability

Groundwater level measurement has been recovered over a three-month monitoring period. This period has proved insufficient to establish any seasonal variability of the groundwater level. However, it is understood that bp proposes monitoring groundwater levels at the site for a minimum of 12 months to establish seasonal variability. A review of future additional data over this period is outside the scope of this report..

8.7 Groundwater Quality Electrical Conductivity

Electrical Conductivity (EC) values of the groundwater in each geological unit were measured in-situ from selected boreholes using an EC probe which estimates the proportion of the salt/ionic solutes concentration in the groundwater. The range of average EC values measured in the groundwater from each geological unit is as summarised below:

- **Made Ground** – Average EC ranges approximately between 1,800µS/cm and 2,700µS/cm
- **Tidal Flat Deposits**: Average EC ranges approximately between 1,100µS/cm and 5,300µS/cm
- **Mudstone:** Average EC ranges approximately between 1,100µS/cm and 26,000µS/cm.

Three rounds of EC monitoring data were carried out in August, October, and November 2021. The average EC values recorded from each monitoring point in each geological unit over the monitoring period are presented in Figure 8.20 – Figure 8.23. It is noted that some of the raw data readings of the EC may be erroneous given the inconsistencies in the data between each round. This is particularly the case for EC values reported as 0.07µS/cm

[1] Kim KY, Seong H, Kim T, Park KH, Woo NC, Park YS, Koh GW, Park WB (2006) Tidal effects on variations of fresh-saltwater interface and groundwater flow in a multilayered coastal aquifer on volcanic island (Jeju Island, Korea). J Hydrol 330:525–542

[2] Kim KY, Chon CM, Park KH, Park YS, Woo NC (2008) Multi-depth monitoring of electrical conductivity and temperature of groundwater at a multilayered coastal aquifer: Jeju Island, Korea. Hydrol Process 22:3724–3733

[3] Wang T, Yang Z, Copping A (2015) A modeling study of the potential water quality impacts from in-stream tidal energy extraction. Estuar Coasts 38(1):173–186

[4] Singaraja, C., Chidambaram, S. & Jacob, N. A study on the influence of tides on the water table conditions of the shallow coastal aquifers. *Appl Water Sci* **8,** 11 (2018). https://doi.org/10.1007/s13201-018-0654-5

in the Round 2 data and or anomalously low/high spikes in EC values from a single borehole between each monitoring round, which may be a result of a number of factors including equipment error or other external factors such as potential contamination. The results have been plotted from south (landwards) to north (seawards) to show the average EC variability from the land area towards the sea and to assess any potential saline water intrusion. The findings are discussed further below:

Tidal Flat Sand Deposits and Made Ground: The average EC values measured in groundwater within the TFD and Made Ground are relatively similar and indicate EC of groundwater recharged by precipitation near an ocean or coastal areas. The only exception is MS\BH13S installed in the Tidal Sand Deposits, which has a significantly higher EC of about 5,300µS/cm (See Figure 8.20 and Figure 8.22), which may be attributed to potential leakage or upward flow of saline water or connate water of over 20,000µS/cm EC from the Mudstone through the deep MS\BH13D (see Figure 8.23) intercepting both the TFD and the Mudstone.

Mudstone: The high average EC values of over 20,000µS/cm (See Figure 8.23) measured from MS\BH12D, MS\BH13D, and MS\BH03D indicated the presence of possible saline water intrusion or trapped connate salty groundwater within the Mudstone at these locations.

Note: It is noted that the currently available EC data from each sampling borehole and the geological unit is insufficient to establish the long-term average EC and any potential trend/changes in the groundwater EC that is likely to arise as a result of tidal fluctuation and fluctuating water level heads.

9. Material properties

This section details how the geotechnical parameters are derived, either directly from field or laboratory test data, empirical correlations, engineering judgement or references to design codes. Historic data has not been included in the assessment of geotechnical parameters. The material properties and geotechnical parameters provided in this GIR are used to derive a preliminary assessment of the ground conditions and to inform geotechnical design of the proposed NZT structures to be carried as part of future phases of scheme development. The geotechnical properties have been classified into the following categories:

Physical characteristics

- Standard penetration tests (SPT) N values. Uncorrected SPT 'N' values are plotted against depth and elevation on Figures 9.1 and 9.2 respectively for all strata. Where the SPT refused prior to completion of the 300mm test drive, the results have been extrapolated to give an assessed field N-value for the equivalent full 300mm test drive, truncated to a maximum N value of 100. The field SPT N-values have been corrected to N60, which is the equivalent SPT corrected to 60% of the theoretical free-fall hammer energy in accordance with BS EN ISO 22476-3:2005+A1:2011. Plots of N60 against elevation are presented in Figure 9.3 and 9.4.
- Weight density, γ. For soils, both saturated and dry weight density has been derived from bulk density values established directly from laboratory testing (direct testing on undisturbed samples used for triaxial and oedometer testing).
- Plasticity – Atterberg limits, plastic limit (PL), liquid limit (LL), plasticity index (PI), are presented on plasticity charts in relation to the U and T lines in accordance with BS EN ISO 14688-2:2018 in Figures 9.5 to 9.10. Test results of Atterberg limits and Natural water content have been used to calculate consistency index (CI) for fine soils in accordance with BS EN ISO 14688-2:2018 from which a consistency term is derived.
- Natural water content, NMC are plotted against depth and elevation on Figures 9.11 and 9.12. Natural water contents are compared with the plastic and liquid limits in Figures 9.13 and 9.14 for all strata and Figures 9.15 and 9.26 for individual strata.
- Particle size distribution gradings obtained from particle size distribution analyses are plotted on grading charts based on strata type in Figures 9.27 to 9.35. The shape of the grading curves has been classified in accordance with Table 2 of BS EN ISO 14688-2:2018 based on uniformity coefficient (Cu) and coefficient of curvature (Cc).

Strength

- Undrained shear strength (c_u) values measured from unconsolidated undrained laboratory triaxial tests are presented in Figures 9.36 and 9.37. For fine (cohesive) soils c_u has also been estimated from the uncorrected SPT 'N' values (truncated to a maximum of 50 blows) in accordance with the empirical correlation $c_u = f_1 * N$ (kPa), as devised by Stroud and Butler (1975). Values typically used for 'f_1' generally range between 4 and 6, depending on soil plasticity. Based on the results of this preliminary ground investigation, a value of 4.5 has been used for the cohesive Made Ground, Tidal Flat Deposits, Glacial Till and Lacustrine Deposits.
- It is noted that BS EN 1997-1:2004+A1:2013 (Eurocode 7: Geotechnical Design Part 1: General rules) states that design values should be based on direct measurements of shear strength. However, for the purposes of this assessment, direct data has been compared with strengths derived from correlation with in-situ SPT N test results. The direct and indirect c_u data has been assessed against the range of undrained shear strengths and descriptions given in Table 5 of BS EN ISO 14688-2:2018.
- Undrained shear strengths for specific borehole profiles at the structure foundation locations will be further considered as part of detailed design by others.
- Effective angle of friction, φ'
  Values of constant volume effective angle of shearing resistance (also known as critical state) ($\varphi'_{cv,k}$) have been calculated for fine soils based on measured plasticity indices using an empirical relationship by Santamarina and Diaz-Rodriguez (2003) reported in BS8004: 2015+A1:2020:

  $$\emptyset'_{cv,k} = \left(42^o - 12.5 log_{10} I_p\right) \quad for\ 5\% \leq I_p \leq 100\%$$

  The empirically derived constant volume effective angle of shearing resistance values have been plotted with the peak angle of shearing resistance ($\varphi'_{pk,k}$) derived from effective stress triaxial tests and shear box tests in Figures 9.38 and 9.39.

Given the limited number of shear box tests undertaken, for siliceous sands and gravels, values of constant volume effective angle of shearing resistance ($\varphi'_{cv,k}$) has, in the absence of reliable laboratory test results, been estimated from the correlation provided in BS8004: 2015 +A1:2020:

$$\emptyset'_{cv,k} = 30 + \emptyset'_{ang} + \emptyset'_{PSD}$$

where: φ'_{ang} is contribution to $\varphi'_{cv,k}$ from the angularity of the particles based on visual description on the exploratory hole logs; and φ'_{PSD} is contribution to $\varphi'_{cv,k}$ from the grading of the soil, as defined in Table 1 of BS8004: 2015. For siliceous sands and gravels with a fines content less than 15%, the characteristic peak effective angle of shearing resistance ($\varphi'_{pk,k}$) may be estimated from: $\varphi'_{pk,k} = \varphi'_{cv,k} + \varphi'_{dil}$ assuming an additional contribution from soil dilatancy. Where the fines content of the coarse soil exceeds 25%, then φ'_{dil} is assumed to be zero.

Stiffness

Pressuremeter testing using a 95mm diameter Cambridge High Pressure Dilatometer was carried out at four borehole locations, to provide estimates of ground stiffness within the bedrock. At each borehole, two levels of pressuremeter testing were conducted approximately 2m and 5m into intact bedrock providing a total of 8 tests. Further details are provided in Appendix A.

Compressibility

Compression index (c_c) was derived directly from laboratory incremental loading (one dimensional) oedometer tests by determining the slope of the virgin compression line slope in the e-log σ' plots. Similarly, the swelling index (c_s) was derived directly by determining the slope of the e-log σ' plot swelling line from oedometer test results. Figure 9.40 and 9.41 show the compressive and swelling indices plotted against depth and elevation respectively. Preconsolidation pressure, P'_c, has been estimated from the e vs log σ' curves from the oedometer tests using the construction proposed by Casagrande, 1936.

Compaction

Figures 9.42 to 9.47 show the dry density versus water content plots obtained from laboratory compaction tests on the Made Ground and Tidal Flat Deposits using a 2.5kg rammer. The maximum dry density is highlighted and curves relating to dry density at air contents of 0%, 5% and 10% with water content are also shown, based on a particle density value of 2.25Mg/m^3 for Hydraulic Fill Made Ground (d2) and 2.65Mg/m^3 for all other Made Ground soils reducing to 2.5Mg/m^3 and 2.4Mg/m^3 for Tidal Flat Deposits Clay (c1) and Tidal Flat Deposits Sand (c2) respectively.

Permeability

Given the design elements proposed, a quantitative analysis of the permeability of soils and the underlying bedrock was not the focus of the proposed GI and hence only limited insitu permeability testing was carried out as described in Section 8.3. Porosity values for rock samples are taken directly from testing results.

Rock Parameters

Figures 9.48 to 9.52 show uniaxial compressive strength (UCS) either determined directly from UCS testing (bedrock only) or from an empirical relationship with point load testing (bedrock). I_{s50} values are determined from point load testing and a factor applied as follows –

$$UCS = k\, I_{s50}$$

A 'k' I_{s50} value of 18 was selected, based on both data from this ground investigations and historical data (see Figure 9.48).

Details of these parameters for each stratum is provided below and in Appendix D. Minimum, maximum and geometric mean values are presented which have then been used in the derivation of characteristic geotechnical parameters for the purposes of preliminary design.

9.1 Derivation of geotechnical parameters

Figures 9.1 to 9.52 show the in-situ and laboratory test data from the preliminary GI completed by AEG (see Appendix A) included in the associated AGS data. The data is predominantly plotted against depth below ground level (m) and ordnance datum level (m OD). The range of depths and levels are kept consistent on the plots to aid visual assessment of variation in depth and thickness of each material type.

The geotechnical parameters presented are considered 'moderately conservative' and have been derived using a cautious estimate of average from minimum and maximum values obtained from in-situ and laboratory testing and empirical correlations supplemented by engineering judgement, where necessary.

The results have been used to provide preliminary characteristic geotechnical values for each material type for use in design, which are summarised in Table 9-11.

9.1.1 Made Ground

Figures 9.1 to 9.4 show results of 44 SPT tests undertaken within the Made Ground, with uncorrected SPT N values being typically up to 60. The uncorrected SPT N Values indicate that the relative density of the Made Ground primarily ranges from very loose (0 – 4 blows) to dense (30 – 50 blows) with some very dense (>50 blows) material, based on classifications in BS5930:2015+A1:2020. The wide scatter of values within the Made Ground is indicative of its inherent variability. Uncorrected SPT N values of 4 to 100 in the Slag-dominant Made Ground (d1) suggest it is loose to very dense. Uncorrected SPT N values of 6 to 32 in Made Ground Hydraulic Fill (d2) suggest it is loose to dense. A single uncorrected SPT N value of 12 in Granular Made Ground (d3) suggests it is medium dense. Uncorrected SPT N values of 9 and 26 obtained within the cohesive Made Ground (d4) suggest soils of medium to high strength, based on classifications in BS5930:2015+A1:2020.

The bulk density determined from 6 Slag-dominant Made Ground (d1) samples ranged from 1.59 to 2.48Mg/m^3 (geomean 1.92Mg/m^3). Similarly, the dry density ranged from 1.41 to 2.16Mg/m^3 (geomean 1.92Mg/m^3). The Hydraulic Fill (d2) and cohesive Made Ground (d4) gave bulk densities of 1.95Mg/m^3 and 1.82Mg/m^3 respectively and dry densities of 1.63Mg/m^{3}and 1.64Mg/m^3 respectively. In the absence of laboratory test data, a characteristic bulk density of 1.9 Mg/m^3 has been assumed for the granular Made Ground (d3) based on guidance provided in Figure 2 of BS8004: 2015 +A1:2020.

Atterberg Limits tests were undertaken on 1 sample of Slag-dominant Material (d1) recovered from 6.2m depth and 8 samples of Cohesive Made Ground (d4) recovered at depths ranging between 0.2 and 5m (7.93 to 2.9m OD). The data is plotted on a plasticity chart in Figures 9.5 and 9.6. The Slag-dominant Made Ground (d1) is predominantly a coarse (granular) material and is not anticipated to include a significant proportion of fine (cohesive) soils suggesting this sample may have been mis-logged. The sample tested plots as silt of medium plasticity (SiM) while 75% of the cohesive Made Ground (d4) (6 of the 8 samples) plots as medium plasticity clay (CIM). One of the cohesive Made Ground (d4) samples plots as a high plasticity clay (CIH). Another cohesive Made Ground (d4) sample described as “Soft brown very sandy very gravelly clay with low cobble content and fragments of plastic” plots on the A line suggesting a higher proportion of fines; this is also of high plasticity (SiH/CIH). A discussion on the expansivity of Slag-dominant Made Ground (d1) is presented in Section 14.4.

The natural water content, liquid and plastic limits are plotted against depth and level on Figures 9.11 to 9.14 for all strata. Specific plots for all the Made Ground are shown in Figures 9.15 and 9.16. The cohesive Made Ground (d4) has water content just below the plastic limit for samples recovered close to existing ground (to 2.3m). The data generally suggests stiff consistency soils, however, these soils may have been subject to seasonal drying associated with water content changes as the GI was undertaken in July 2021 when air temperatures are at their highest and rainfall generally low. Alternatively, the samples may have partially dried out whilst being stored before testing was undertaken. Soils below 2.3m exhibit water contents above the plastic limit indicative of soft to firm consistency soils. Atterberg limits data is not available for the Hydraulic Fill (d2) and Other Made Ground deposits (d7) so no comparisons are made against the natural water contents determined in these strata.

Particle size distribution (PSD) curves for the Made Ground are shown on Figures 9.27 to 9.30. Testing was undertaken on 45 samples taken from depths up to 6.2m (2.1m OD to 8.75m OD). Figures 9.27 shows gradings for 37 Made Ground Slag-dominant Material (d1) comprising predominantly sand and gravel sized fragments: gravels (1% to 97%), sands (0% to 56%), silts (12% to 16%) and clays (1% to 2%). It is noted that a high proportion of the PSD samples exhibit cobble size content exceeding the 75mm sieve. Between approximately 30 and 90% was retained during grading. The gradings are not considered reliable for the material as a whole as insufficient sample mass can be obtained from conventional trial pits for such very coarse soils. The fines content passing the

63µm sieve ranged between 0% and 17% (geomean 0%). As expected, the slag dominant Made Ground is highly variable displaying both uniformly graded or gap graded compositions. The uniformity coefficient (C_u) ranges from 2.29 to 239 (geomean 34.7) with the coefficient of curvature ranging from 0.14 to 22.85 (geomean 1.7).

Figures 9.28 shows four gradings for Made Ground Hydraulic Fill (d2) which fall into a tight envelope of uniformly graded fine to medium sand. Two of the four samples contain coarser (gravel) material. The Hydraulic Fill is uniformly graded with a uniformity coefficient of 1.44 to 2.08 (geomean 1.6) and a coefficient of curvature of 0.9 to 1.33 (geomean of 1).

Gradings for three Made Ground Cohesive (d4) samples (Figure 9.29) show a wide range of gradings comprising gravels (6% to 24%), sands (12% to 35%), silts (33% to 50%) and clays (8% to 42%). The fines content passing the 63µm sieve ranges between 44 and 75% (geomean 60%). A uniformity coefficient of 75 and coefficient of curvature of 1.02 obtained from one of the four PSD samples indicate that this material is well graded to gap graded.

Figures 9.30 shows the grading obtained on one sample of Made Ground Other (d7) which comprised 54% cobbles, 45% medium to coarse gravels and 1% sand. The material is poorly graded to (C_u of 3.33) to well-graded (C_c= 1.70). Again, the shape of the grading curve suggests approximately 30% of the sample material included cobble size fractions greater than 75mm.

Undrained shear strengths in the cohesive Made Ground (d4) of 41kPa to 117kPa (geomean 58kPa) have been inferred from correlation with three uncorrected SPT 'N' values. The data is plotted against depth and level on Figures 9.36 and 9.37, respectively.

Due to limited laboratory data obtained in the Made Ground, effective (drained) strength parameters were estimated using well known correlations. Peak and critical angle of shearing resistances of 36° and 34° respectively were estimated for slag dominant Made Ground (d1) using ϕ'_{ang}, ϕ'_{PSD} and ϕ'_{dil} parameters, in accordance with procedures described in BS8004: 2015 +A1:2020. Similar procedures were used to estimate a peak and critical angle of shearing resistance of 31.5° and 31° for the Hydraulic Fill (d2). Insufficient data was available to make similar interpretations for the granular Made Ground (d3). Plasticity index values from eight cohesive Made Ground (d4) samples taken from 0.2m to 5m depth (7.93m OD to 2.90m OD) derived $\varphi'_{cv,k}$ values ranging from 23° to 27°. These values are plotted against depth and elevation in Figures 9.38 and 9.39. No direct measurements of $\varphi'_{cv,k}$ are available for the cohesive Made Ground.

Compaction curves for the Made Ground are shown in Figures 9.42 to 9.45. Compaction testing undertaken on the slag dominant Made Ground (d1) is shown on Figure 9.43. It is inferred the undulating compaction curves obtained on small sample masses of the finest proportion of this very coarse unnatural material type suggests the results are not reliable. Figure 9.44 shows four compaction curves for the Hydraulic Fill (d2). Maximum dry densities ($\rho_{d,max}$) of 1.56 to 1.66 Mg/m^3 occur at an optimum moisture content of 14% to 18%. The geomean water content of 19% indicates that the Hydraulic Fill Made Ground (d2) is wet of optimum moisture content. Figure 9.45 presents three compaction curves for cohesive Made Ground (d4) which show maximum dry densities of 1.75 to 1.93Mg/m^3 obtained at an optimum moisture contents of 14% to 19%. Two of the three results produce $\rho_{d,max}$ <1.8Mg/m^3 and exhibit relatively flat curves which show little change in dry density with water content. These curves are indicative of predominantly uniformly graded soils. The geometric mean water content of 23% indicates that the cohesive Made Ground (d4) is wet of optimum compaction. Where soils are wet of optimum this would likely preclude re-use in earthworks being controlled using moisture content criteria without pre-treatment.

CBR values from two slag dominant Made Ground (d1) samples taken from 0.4m depth (6.24 to 6.77m OD) ranged from 28% to 71%. CBR values from one Hydraulic Fill Made Ground (d2) sample taken from 3.4m depth (3.24m OD) ranged from 7.6% (top) to 16% (base).

Table 9-1 Summary of insitu and laboratory tests – Made Ground

Parameter	Unit	Made Ground Slag-dominant Material (d1)	Made Ground Hydraulic Fill (d2)	Made Ground Granular (d3)	Made Ground Cohesive (d4)	Made Ground Other (d7)
Uncorrected SPT N value	Blows/300mm	4 - 100 (27)	6 - 32 (14)		9 - 26 (15)	-

Parameter	Unit	Made Ground Slag-dominant Material (d1)	Made Ground Hydraulic Fill (d2)	Made Ground Granular (d3)	Made Ground Cohesive (d4)	Made Ground Other (d7)
Bulk density, γ	Mg/m^3	1.59 – 2.48 (1.92)	1.95		1.82	
Dry density, γ_d	Mg/m^3	1.41 – 2.16 (1.92)	1.63	-	1.64	-
Water content	%	1 – 24 (9)	11 – 25 (19)	3.1	12 – 32 (23)	0.6 – 1.9 (1)
Plastic Limit	%	29			18 – 32 (22)	-
Liquid Limit	%	38 – 48 (43)			35 – 65 (45)	-
Plasticity Index	-	9 – 27 (18)			17 – 33 (22)	-
PSD % passing 63µm sieve	%	0 – 17 (0)	<10%	-	44 – 75 (60)	0%
Uniformity coefficient, C_u		2.29 – 239 (34.7)	1.44 – 2.08 (1.6)		75	3.33
Coefficient of curvature C_c		0.14 – 22.85 (1.7)	0.9 – 1.33 (1)		1.02	1.70
$c_u = f_1$ x SPT N 'f_1' = 4.5	kPa	-	-	-	41 – 117 (58)	-
$\varphi'_{pk,k}$ (estimated from ϕ'_{ang}, ϕ'_{PSD} & ϕ'_{dil})	degrees	36	31.5	-	-	-
$\varphi'_{cv,k}$ (derived from I_p)	degrees	-	-	-	23 – 27 (25)	-
$\varphi'_{cv,k}$ (estimated from ϕ'_{ang} & ϕ'_{PSD})	degrees	34	31	-	-	-
Max dry density $\rho_{d,\ max}$	Mg/m^3	1.63 – 1.95 (1.81)	1.56 – 1.66 (1.61)		1.75 – 1.93 (1.80)	
Optimum Moisture content	%	11 – 18 (14)	14 – 18 (16)		14 – 19 (16)	
Particle density	Mg/m^3	1.19 – 2.96 (2.41)			2.5	2.62
CBR	%	39 – 49 (44) top 28 – 71 (45) base	7.6 (top) 16 (base)		- -	- -

Note.

[1] Values reported as minimum, maximum (geometric mean).

[2] Consolidation tests not undertaken on the Made Ground samples.

9.1.2 Tidal Flat Deposits (c1 & c2)

In the coarse (granular) Tidal Flat Sand Deposits (c2), uncorrected SPT N values from 103 tests typically ranged from 2 to 96 (geomean 22) indicating a very loose to very dense deposit (Figures 9.1 to 9.4). Uncorrected SPT N values in the fine (cohesive) Tidal Flat Clay Deposits (c1) in 6 tests give SPT N values of 4 to 6 (geomean 5) indicative of very low to low strength. A single result of >100 is reported within the dataset which is not considered representative of in-situ strength has been excluded from the dataset and is not considered further.

The bulk density determined from 21 Tidal Flat Deposits Clay (c1) samples ranged from 1.62 to 2.1Mg/m^3 (geomean 1.92Mg/m^3). Similarly, the dry density ranged from 1.11 to 1.75Mg/m^3 (geomean 1.46Mg/m^3). The bulk density determined from 15 Tidal Flat Deposits Sand (c2) samples ranged from 1.7 to 2.04Mg/m^3 (geomean 1.9Mg/m^3). Similarly, the Tidal Flat Deposits Sand (c2) dry density ranged from 1.13 to 1.75Mg/m^3 (geomean 1.56Mg/m^3).

Atterberg Limits tests were undertaken on 40 samples of Tidal Flat Deposits Clay (c1) recovered from depths ranging between 4.2 and 16.3m (1.5 to -7.56m OD) and 1 sample of Tidal Flat Deposits Sand (c2) recovered from 4.5m (2.69m OD). The data is plotted on a plasticity chart in Figure 9.7. The Tidal Flat Deposits Clay (c1) generally plot as a low to high plasticity clay (CIL to CIH). The range in plasticity reflects the laminated nature of the soils which are typically interbedded with thin lenses of sand and silt. The CIL results may be attributed to a relatively high proportion of sand and/or silt being present within the samples tested. Two samples plot outside and above the main data body as a very high plasticity silt (SiV). Atterberg Limits tests may have been scheduled on the Tidal Flat Deposits Sand (c2) due to the preliminary nature of the exploratory logs available at the time of laboratory scheduling. The one sample tested plots as a medium plasticity silt (SiM).

Natural water contents of 41 samples from the Tidal Flat Clay (c1) shown in Figures 9.11 to 9.14 range between 18 and 97% (geomean 30%) and generally are well above the plastic limit indicative of very soft and soft soils as Natural water content shown in Figures 9.17 to 9.18. Natural water contents of 42 samples from the Tidal Flat Sand (c2) shown in Figures 9.11 to 9.14 range between 5.5 and 37% (geomean 21%). A single sample is identified to be cohesive and is likely to be more representative of the fine (c1) Tidal Flat Clays. The sample is described as “black very organic pseudofibrosis peat” (Figures 9.19 to 9.20).

PSD testing was undertaken on 17 Tidal Flat Clay (c1) samples at depths ranging between 4.2m and 16.3m (1.51m OD and -7.55m OD) and 42 Tidal Flat Sand (c2) samples at depths ranging between 0.9m and 12.45m (4.11m OD and -6.12m OD). PSD curves for the Tidal Flat Sand (c2) and Tidal Flat Clay (c1) are shown on Figure 9.31 and 9.32 respectively. Figure 9.31 shows that the majority of the Tidal Flat Sand (c2) gradings for fall into a narrow envelope typical of uniformly graded fine to medium sand with some gravel (≤ 28%) and <10% fines (uniformity coefficient geomean of 2.4). Four samples exhibit a greater fines content of 12 to 37%, with these soils most likely encountered at the interface between the c1 and c2 soils. One sample from MS\BH04 at 11.7m showed significantly greater fines of 76%, this high proportion of silt and fines present is typical of high plasticity fine (cohesive) soils rather than cohesionless sand. Figure 9.32 shows that the Tidal Flat Clay (c1) comprises sand (2 to 47%), with a high proportion of silt (33 to 83%) and clays (8 to 33%) with minimal gravel (<2%). The fines content ranges from 51% to 98% (geomean 83%). The Tidal Flat Clay (c1) is medium to well graded with a geomean uniformity coefficient of 10.83 and a geomean coefficient of curvature of 1.30.

Undrained shear strengths from undrained triaxial testing on 8 samples retrieved from the Tidal Flat Clay (c1) varied from 12 to 43kPa with one measurement being160kPa (geomean 27kPa), as shown on Figures 9.36 and 9.37. Undrained shear strengths derived from correlation with uncorrected SPT ‘N’ values from 5 Tidal Flat Clay (c1) samples (as described in Section 9.1) correlate well with the majority of measured values, ranging from 18kPa to 27kPa (geomean 22kPa), as shown on Figures 9.36 and 9.37. The values do not vary with depth. A value of 25 kPa is adopted as a cautious estimate of characteristic c_u for design disregarding the 160kPa high data outlier. However, in view of the limited number of undrained shear strength values, data should be reviewed in relation to individual scheme elements during detailed design.

The peak effective angle of shearing resistance ($\varphi'_{pk,k}$) and critical state angle of shearing resistance ($\varphi'_{cv,k}$) of the Tidal Flat deposits are plotted against depth and elevation in Figures 9.38 and 9.39. Shear box tests undertaken on seven Tidal Flat Sand (c2) samples retrieved from 2.55m to 10.8m depth (1.56m OD to -6.69m OD) gave $\varphi'_{pk,k}$ values of 26 to 34° (geomean of 29°). The geomean of 29° is comparable with a $\varphi'_{pk,k}$ value of 30° estimated from $\varphi'_{ang,}$ φ'_{PSD} and φ'_{dil} as described in BS8004: 2015 +A1:2020 (see Section 9.1). A $\varphi'_{cv,k}$ value of 30° (the same as $\phi'_{pk,k}$) was estimated for Tidal Flat Sand (c2) from the ϕ'_{ang} and ϕ'_{PSD}. A characteristic $\varphi'_{pk,k}$ and $\varphi'_{cv,k}$ value of 30° is to be adopted for the Tidal Flat Sand (c2). The apparent cohesion, c’, of Tidal Flat Sand (c2) is reported as 0 to 3kPa from the shear box tests and for design purposes a characteristic c’ value of 0kPa is to be adopted.

A consolidated undrained triaxial compression effective stress test on a Tidal Flat Clay (c1) sample retrieved from 11.7m depth (-4.2m OD) gave a $\varphi'_{pk,k}$ value of 27°. As would be expected, this value lies within the range of $\varphi'_{cv,k}$ values of 21° to 31° (geometric mean of 25.9°) derived from plasticity indices for 40 Tidal Flat Clay (c1) samples taken from depths of 4.2m to 16.3m (1.51m OD to -7.56m OD). Characteristic $\varphi'_{pk,k}$ and $\varphi'_{cv,k}$ values of 27° and 26° respectively are recommended for the Tidal Flat Clay (c1).

One dimensional oedometer testing on 11 Tidal Flat Clay (c1) samples taken from 5.7m to 16.2m depth (0.01m OD to -9.05m OD) gave compressibility indices (C_c) of 0.133 to 0.432 (geomean 0.201), swelling indices (C_s) of 0.011 to 0.166 (geomean 0.035) and preconsolidation pressures of to 184 to 700kPa (geomean 385kPa). Compressibility and swelling indices plotted against depth and elevation are presented in Figures 9.40 and 9.41 and the preconsolidation pressures are summarised in Table 9-2. Compaction curves for the Tidal Flat Deposits are shown in Figures 9.42, 9.46 and 9.47 and would only be relevant if excavation depth extended below Made Ground. Figure 9.46 shows a single compaction curve for the Tidal Flat Clay (c1). A maximum dry density of 1.64 Mg/m^3 occurs at an optimum moisture content which primarily lies on the 0% air voids line at an optimum moisture content of 20%. The geomean water content of 30% indicates that the Tidal Flat Clay (c1) is wet of optimum compaction.

Figure 9.47 shows seven compaction curves for Tidal Flat Sand (c2) with maximum dry densities of 1.57 to1.78Mg/m^3 (geomean 1.63Mg/m^3) at optimum moisture contents of 11% to 19% (geomean 16%). All of the curves are flat with little change in dry density with water content. Six tests have produced similar results ($\rho_{d,max}$ of 1.57 to 1.66Mg/m^3) with the other test producing a noticeably higher maximum dry density. The optimum moisture content obtained on the outlier test is much lower than the other six tests which produced optimum moisture content values of 15 to 19%. A change in material type, grading or mineralogy is inferred. The geomean water content of 31% indicates that the Tidal Flat Sands (c2) is also wet of optimum moisture content. Where soils are wet of optimum this would likely preclude re-use in earthworks being controlled using moisture content criteria without pre-treatment. The low shear strength of these soils precludes them for use in engineered earthworks without pre-treatment, although modification/improvement of engineering properties by the addition of lime or cement may be possible.

CBR values from four Tidal Flat Sands (c2) samples taken from 2.7 to 4.95m depth (2.31 to 0.06m OD) ranged from 9.6 to 20% at the top to 3.5 to 22% at the base. CBR values from one Tidal Flat Clay (c1) sample taken from 4.2m depth (1.51m OD) ranged from 0.47% (base) to 0.52% (top).

Table 9-2 Summary of preconsolidation pressures in the Tidal Flat Clay (c1)

BH ID	Sample Depth (m BGL)	Sample Elevation (m OD)	Preconsolidation pressure (kPa)
MS\BH13	5.7	0.014	184
MS\BH08	9.1	-0.355	500
MS\BH03	11.7	-7.028	210
MS\BH10	11.7	-4.198	320
MS\BH04	13.2	-8.194	260
MS\BH11	13.2	-5.945	320
MS\BH14	14.2	-7.009	700
MS\BH15	14.7	-7.453	760
MS\BH08	14.7	-5.955	640
MS\BH12	16.2	-9.053	P_c not reached
LF\BH02	17.8	-11.474	412.5

Table 9-3 Summary of insitu and laboratory tests – Tidal Flat Deposits

Parameter	Unit	Tidal Flat Deposits Sand (c2)	Tidal Flat Deposits Clay (c1)
Uncorrected SPT N value	Blows/300mm	2 – 96 (22)	4 – 6 (5)
Bulk density, γ	Mg/m^3	1.70 – 2.04 (1.90)	1.62 - 2.10 (1.92)
Dry density, γ_d	Mg/m^3	1.13 – 1.75 (1.56)	1.11 – 1.75 (1.46)
Water content	%	5.5 – 37 (21)	18 – 97 (30)
Plastic Limit	%	35	11 - 72 (22)
Liquid Limit	%	48	27 – 100 (42)
Plasticity Index	-	13	8 – 46 (19)
PSD % passing 63µm sieve	%	0 – 76 (0)	51 – 98 (83)
Uniformity coefficient, C_u		1.39 – 81.48 (2.4)	10.83
Coefficient of curvature C_c		0.33 – 28.45 (1.3)	1.30
c_u (measured)	kPa	-	12 – 160 (27)
$c_u = f_1$ x SPT N ‘f_1’ = 4.5	kPa	-	18 – 27 (22)
$\varphi'_{pk,k}$ (direct shear tests)	degrees	26 – 34 (29)	-
$\varphi'_{pk,k}$ (estimated from ϕ'_{ang}, ϕ'_{PSD} & ϕ'_{dil})	degrees	30	-
$\varphi'_{pk,k}$ (effective stress triaxial)	degrees	-	27
$\varphi'_{cv,k}$ (estimated from ϕ'_{ang} & ϕ'_{PSD})	degrees	30	-
$\varphi'_{cv,k}$ (derived from I_p)	degrees	-	21 – 31 (25.9)
c’	kPa	0-3 (0)	-
C_c		-	0.133 – 0.432 (0.201)
C_s		-	0.011 – 0.166 (0.035)
P_c'	kPa	-	184 – 700 (385)
Max dry density $\rho_{d, max}$	Mg/m^3	1.57 – 1.78 (1.63)	1.64
Optimum moisture content	%	11 – 19 (16)	20
Particle density	Mg/m^3	2.56 – 2.7 (2.63)	2.52

Parameter	Unit	Tidal Flat Deposits Sand (c2)	Tidal Flat Deposits Clay (c1)
CBR	%	9.6 – 20 (14) top	0.52 (top)
		3.5 – 22 (12) base	0.47 (base)

Note. Values reported as minimum, maximum (geometric mean).

9.1.3 Lacustrine Deposits (b3)

In the Lacustrine Deposits, uncorrected SPT N values from 11 tests varied from 9 to 46 (geomean 19) and are indicative of medium to very high strength (Figures 9.1 to 9.4).

The bulk density determined from 4 Lacustrine Deposits (b3) samples ranged from 1.95 to 2.09Mg/m^3 (geomean 2.02Mg/m^3). Similarly, the dry density ranged from 1.54 to 1.69Mg/m^3 (geomean 1.62Mg/m^3).

Atterberg Limits tests were undertaken on 17 samples of Lacustrine Deposits (b3) recovered from depths ranging between 11.5 and 25.2m (-5.79 to -17.92m OD). The data is plotted on a plasticity chart in Figures 9.5 and 9.9. The Lacustrine Deposits primarily plot as a medium to high plasticity clay (CIM to CIH).

Natural water contents of 17 Lacustrine Deposit (b3) samples shown in Figures 9.11 to 9.14 range between 18 and 41% (geomean 28%) and generally lie close to the corresponding plastic limit indicative of stiff consistency soils.

Two PSD curves for the Lacustrine Deposits (b3) are shown on Figure 9.34. Testing was undertaken on samples at depths of 18.5m and 20.8m (-11.03m OD and -12.05m OD). The gradings show the soils contain a high proportion of silt (43 and 53% respectively) and fines content passing the 63µm sieve of 75 and 92%. The high proportion of silt and fines present is typical of high plasticity fine (cohesive) soils.

Undrained shear strengths measured from 3 samples retrieved from the Lacustrine Deposit (b3) varied from 50kPa to 190kPa (geomean 113kPa). Undrained shear strengths derived from correlation with uncorrected SPT 'N' values from 10 Lacustrine Deposits samples (b3) (as described in Section 9.1) correlate well with the measured values, however, there is no apparent trend with depth. The data is plotted against depth and level on Figures 9.36 and 9.37, respectively. A value of 75kPa is adopted as a cautious estimate of characteristic c_u for design. However, in view of the wide variation in undrained shear strength observed, data should be reviewed in relation to individual scheme elements during detailed design.

A peak effective angle of shearing resistance ($\varphi'_{pk,k}$) of 28° was obtained from a triaxial effective stress test on a Lacustrine Deposits (b3) sample retrieved from MS\BH02 at 21.25m depth (-16.43m OD). Figures 9.38 and 9.39 show that this direct measurement is greater than critical state angles of shearing resistance of 22 to 26° derived from the plasticity indices (geometric mean 24°). The plasticity indices were obtained from 17 Lacustrine Deposits (b3) samples retrieved from depths of 11.5m to 25.2m (-5.79m OD to -17.92m OD). Based on this information, a characteristic peak and critical state effective angle of shearing resistance of 28° and 24° is recommended for the Lacustrine Deposits (b3).

At the Main Site, one dimensional consolidation testing on a Lacustrine Deposits (b3) sample from MS\BH08 at 20.35m depth (-11.61m OD) gave C_c and C_s values of 0.233 and 0.066 respectively together with a preconsolidation pressure of 830kPa. Compressibility and swelling indices plotted against depth and elevation are presented in Figures 9.40 and 9.41 and the preconsolidation pressures (p_c') is summarised in Table 9-4. There is marked difference between the p_c' values estimated from the two oedometer tests, a change in material type is inferred.

Point load tests were undertaken on two samples classified as Lacustrine Deposit (b3) recovered at the interface of this material with the underlying mudstone bedrock. Figures 9.49 and 9.50 show the resulting point load indices, I_{s50}, of 0.2 and 0.5MPa which were used to derive UCS values of 3.6MPa and 9MPa. The estimated UCS values are shown on Figures 9.51 and 9.52. These samples are considered to be representative of the engineering properties of the underlying mudstone.

Table 9-4 Summary of preconsolidation pressures in the Lacustrine Deposit (b3)

BH ID	Sample Depth (m BGL)	Sample Elevation (m OD)	Preconsolidation pressure (kPa)

MS\BH08	20.35	-11.605	830

Table 9-5 Summary of insitu and laboratory tests – Lacustrine Deposits (b3)

Parameter	Unit	Lacustrine Deposits(b3)
Uncorrected SPT N value	Blows/300mm	9 to 46 (19)
Bulk density, γ	Mg/m^3	1.95 – 2.09 (2.02)
Dry density, γ_d	Mg/m^3	1.54 – 1.69 (1.62)
Water content	%	18 – 41 (28)
Plastic Limit	%	18 – 27 (23)
Liquid Limit	%	37 – 60 (50)
Plasticity Index	-	19 – 37 (27)
PSD % passing 63µm sieve	%	75 – 92 (83)
c_u (measured)	kPa	50 – 190 (113)
$c_u = f_1$ x SPT N ‘f_1’ = 4.5	kPa	41 – 207 (85)
$\varphi'_{cv,k}$ (derived from I_p)	degrees	22 – 26 (24)
$\varphi'_{pk,k}$ (effective stress triaxial)	degrees	28
C_c		0.233
C_s		0.066
P_c'	kPa	830
UCS (derived from I_{s50})	MPa	3.6 – 9 (5.7)
$I_{s(50)}$	MPa	0.2 – 0.5 (0.32)

Note. Values reported as minimum, maximum (geometric mean).

9.1.4 Glacial Till (b1)

In the Glacial Till, uncorrected SPT N values from 28 tests were generally 10 to 30 (geomean 21) with isolated values of 4 and 100 (Figures 9.1 to 9.4). The geomean indicates the Glacial Till is typically of high strength. The one SPT N value below 10 is likely to be due to the difficulty in balancing ground water pressures during drilling, resulting in high water pressures and ‘blowing’ at the base of the exploratory hole. SPT N values truncated to a maximum of 100 blows are indicative of boulder and cobble obstructions encountered during drilling and are not considered representative of the in-situ density or mass strength of the soil as a whole.

The bulk density determined from 27 Glacial Till (b1) samples ranged from 1.89 to 2.26 Mg/m^3 (geomean 2.08Mg/m^3). Similarly, the dry density ranged from 1.43 to 1.97Mg/m^3 (geometric mean 1.71Mg/m^3).

Atterberg Limits tests were undertaken on 50 Glacial Till (b1) samples recovered from depths ranging between 11.7 and 28.2m (-5.99 to -20.92m OD). The data is plotted on a plasticity chart in Figures 9.5 and 9.8. The majority of the Glacial Till (b1) plots as a medium plasticity clay (CIM) with five samples plotting as a low plasticity (CIL) clay and seven samples plotting as high plasticity clay (CIH). The distribution of the test results is similar to the plasticity data exhibited by the Lacustrine Deposits (b3), see Figure 9.9.

Natural water contents of 51 samples from the Glacial Till (b1) shown in Figures 9.11 to 9.14 range between 7.5 and 39% (geomean 21%) and generally lie close to the plastic limit, indicative of stiff consistency soils. The material appears to be weaker where it is close to the overlying Tidal Flats. For approximately 4m below the strata boundary, plastic limits are well above the corresponding moisture contents, indicative of firm consistency. Some variability is also noted in the data between 17.5 and 20m depth, where most plastic limits lie close to moisture contents but others are a little above. At these depths, variable consistency is suggested.

PSD curves for the Glacial Till (b1) are shown on Figure 9.33. Testing was undertaken on 13 samples at depths ranging between 15 and 22.9m (-7.52 to -18.23m OD). The Glacial Till appears to be well graded comprising a large range of particle sizes including 2 to 16% (geomean 5%) gravel, 2 to 22% (geomean 12%) sand and fines content passing the 63μm sieve ranging between 62 and 96% (geomean 79%). The high proportion of silt and fines present is typical of high plasticity fine (cohesive) soils.

Undrained shear strengths measured from 17 samples retrieved from the Glacial Till (b1) varied from 75 to 230kPa (geomean 139kPa), as shown on Figures 9.36 and 9.37. Undrained shear strengths derived from correlation with 28 uncorrected SPT ‘N’ values from the Glacial Till (b1) (as described in Section 9.1) are also presented. The data is plotted against depth and level, respectively. There is a wide scatter in the measured and derived results and no apparent trend of increasing strength with depth or significant spatial distribution in the test results obtained. A value of 100kPa is adopted as a cautious estimate of characteristic c_u for design. However, in view of the wide variation in undrained shear strength observed, data should be reviewed in relation to individual scheme elements during detailed design.

Peak effective angle of shearing resistance ($\varphi'_{pk,k}$) from triaxial effective stress tests on three Glacial Till (b1) samples retrieved from 17.38 to 17.82m depth (-10.05m OD to -12.81m OD) range from 27 to 31° (geomean of 29°). Figures 9.38 and 9.39 show that these direct measurements correlate well with critical state angle of shearing resistance values of 23 to 29° (geomean of 25.4°) derived from plasticity indices of 50 Glacial Till (b1) samples, retrieved from depths of 11.7m to 28.2m (-5.99m OD to -20.92m OD). A characteristic peak and critical state effective angle of shearing resistance of 29° and 25° is recommended for the Glacial Till (b1).

One dimensional consolidation testing on seven Glacial Till (b1) samples taken from 14.7m to 21m depth (-6.8m OD to -14.67m OD) gave compressibility indices of 0.149 to 0.365 (geomean 0.208), swelling indices of 0.033 to 0.1 (geomean 0.059) and preconsolidation pressures of 397 to 960kPa (geomean 589kPa). Compressibility and swelling indices plotted against depth and elevation are presented in Figures 9.40 and 9.41 and the preconsolidation pressures are summarised in Table 9-6. C_c values calculated from liquid limit fall within the range of compressibility indices derived from oedometer tests. The depth plot indicates a reduction in compressibility indices (C_c, C_s) below 18m approximately.

Point load tests were undertaken on two samples classified as Glacial Till (b1) recovered at the interface of the glacial drift with the underlying mudstone bedrock. Figures 9.49 and 9.50 show the resulting point load indices, I_{s50}, of 0.3 and 0.4 which were used to estimate UCS values of 5.4 and 7.2MPa. The correlated UCS values are shown on Figures 9.51 and 9.52. These samples are considered to be representative of the engineering properties of the underlying mudstone.

Table 9-6 Summary of preconsolidation pressures in the Glacial Till (b1)

BH ID	Sample Depth (m BGL)	Sample Elevation (m OD)	Preconsolidation pressure (kPa)
MS\BH13	11.72	-6.006	748
MS\BH16	14.75	-6.846	397
MS\BH11	15.9	-8.645	960

BH ID	Sample Depth (m BGL)	Sample Elevation (m OD)	Preconsolidation pressure (kPa)
MS\BH15	17.7	-10.453	400
MS\BH17	17.7	-8.453	437
MS\BH11	17.9	-10.645	829
LF\BH02	21.05	-14.724	595

Table 9-7 Summary of insitu and laboratory tests – Glacial Till (b1)

Parameter	Unit	Glacial Till (b1)
Uncorrected SPT N value	Blows/300mm	4 - >100 (21)
Bulk density, γ	Mg/m^3	1.89 – 2.26 (2.08)
Dry density, γ_d	Mg/m^3	1.43 – 1.97 (1.71)
Water content	%	7.5 – 39 (21)
Plastic Limit	%	14 – 29 (20)
Liquid Limit	%	25 – 61 (41)
Plasticity Index	-	11 – 36 (21)
PSD % passing 63µm sieve	%	62 – 96 (79)
c_u (measured)	kPa	75 – 230 (139)
$c_u = f_1$ x SPT N ‘f_1’ = 4.5	kPa	18 – 185 (85)
$\varphi'_{pk,k}$ (effective stress triaxial)	degrees	27 – 31 (29)
$\varphi'_{cv,k}$ (derived from I_p)	degrees	23 – 29 (25.4)
C_c		0.149 – 0.365 (0.208)
C_s		0.033 – 0.1 (0.059)
P_c'	kPa	397 – 960 (589)
UCS (measured)	MPa	-
UCS (derived from I_{s50})	MPa	5.4 – 7.2 (6.24)
$I_{s(50)}$	MPa	0.3 – 0.4 (0.35)

Note. Values reported as minimum, maximum (geometric mean).

9.1.5 Bedrock – Redcar Mudstone Formation (a3)

Fourteen SPT tests carried out in the Redcar Mudstone Formation (a3) gave uncorrected SPT N values ranging from 32 to 100 (geomean 68), reflecting a very high strength (Figures 9.1 to 9.4). The data plots in two groups (Figure 9.1). Around a third of the data lies in the 30 to 50 approximately with most of the rest of the tests indicative of N values of 90 or more. There is no trend with depth. It is postulated that the lower results may represent weathered lower strength material at or close to rockhead.

The bulk density determined from 2 Redcar Mudstone Formation (a3) samples ranged from 2.17 to 2.29 Mg/m^3 (geomean 2.23Mg/m^3). Similarly, the dry density ranged from 1.86 to 2.03Mg/m^3 (geomean 1.94Mg/m^3).

Atterberg Limits tests were undertaken on 5 Redcar Mudstone Formation (a3) samples recovered at depths ranging between 18 and 24.35m (-10.1 to -15.61m OD). The data is plotted on a plasticity chart in Figures 9.5 and 9.10. The Redcar Mudstone Formation plots as a low to medium clay (CIL to CIM).

Natural water contents of 9 Redcar Mudstone Formation samples (a3) shown in Figures 9.11 to 9.14 range between 9.2 and 23% (geomean 16%) and generally lie slightly below or above the plastic limit indicative of stiff consistency soils.

A single PSD curve for a Redcar Mudstone Formation (a3) sample taken from 23.8m (-15.05m OD) is shown on Figure 9.35. The gradings show 8% gravel, 37% sand, 39% silt, and 16% clay. The fines content passing the 63µm sieve is 55% and this high proportion of silt and clay present is typical of high plasticity fine (cohesive) soils. This sample was retrieved very close to the Redcar Mudstone Formation (a3) boundary is described as "stiff grey sandy slightly gravelly CLAY with medium cobble content …Probable Weathered Redcar Mudstone Formation" and may actually represent the overlying Glacial Till (b1).

UCS values from 10 Redcar Mudstone Formation (a3) samples taken from depths of 25.5m to 35m depth (-18.35 to -27.74m OD) ranged from 3 to 18MPa (geomean 10 MPa). Figures 9.49 and 9.50 show point load tests on 132 samples which give point load indices, I_{s50}, of up to 4.9 and 6MPa when historic data is included. The I_{s50} data was used to derive UCS values of up to 88.2MPa. Both measured and correlated UCS values are shown on Figures 9.51 and 9.52. UCS is plotted against depth below top of bedrock in Figure 9.53. The top 2m of the Redcar Mudstone Formation (a3) is extremely to moderately weak as defined in BS 5930:2015+A1:2020 with the characteristic UCS being approximately 3MPa. Below 2m depth penetration into the bedrock, the Redcar Mudstone Formation (a3) is primarily weak with a geometric mean UCS of 6.4MPa (based on direct laboratory measurements) and 10MPa (derived from empirical correlation with I_{s50}). Direct measurements of UCS tend to plot to the upper range of the UCS values derived from I_{S50}. The variability in UCS values is not surprising given that the formation is known from nearby coastal exposures to comprise a predominantly mudrock succession which contains thin bands of stronger fossiliferous limestone and siltstone as well ironstone nodules or concretions. The test data is considered reflect the interbedded and variable nature of the formation. Differences in the data are also likely to be in part due to some samples being more intact than others.

Table 9-8 Summary of preconsolidation pressures in the Redcar Mudstone Formation (a3)

BH ID	Sample Depth (m BGL)	Sample Elevation (m OD)	Preconsolidation pressure (kPa)
MS\BH08	23.3	-14.56	930

Eight pressuremeter testing were conducted approximately 2 and 5m into intact bedrock, as summarised in Table 9-9. The tests were undertaken by Cambridge Insitu using the 95mm diameter Cambridge High Pressure Dilatometer (HPD) specially designed for soft to weak rock.

Table 9-9 Summary of pressuremeter tests (see Appendix A)

BH ID	Ground Level (m OD)	Test Depth (m BGL)	Test Depth (m OD)	P_o (KPa)	σ'_H / σ'_v (KPa)	G_{hh} [3] MPa	E_s MPa
MS\BH06	7.976	25.75	-17.77	593	1.07	515	1088
		27.8	-19.82	796	1.48	945	2100
MS\BH07	7.330	25.2	-17.87	440	0.67	246	507
		27.4	-20.07	614	1.03	549	1189
MS\BH09	7.466	22.4	-14.93	619	1.4	553	1173
		25.15	-17.68	666	1.33	938	2147
MS\BH11	7.255	22.8	-15.54	479	0.93	593	1291
		25.8	-18.54	651	1.24	709	1570

Notes:

[1] The cavity reference pressure, P_o, is also the best estimate of σ_{ho}, the total horizontal insitu stress

[2] σ'_H/σ'_V is the ratio of the effective horizontal insitu stress to effective vertical insitu stress

[3] The secant shear modulus parameter G_{hh} is reported for the last loop at a shear strain of 10^{-3}. Corresponding values for secant Young's modulus E_s are also reported.

Table 9-10 Summary of insitu and laboratory tests – Redcar Mudstone Formation

Parameter	Unit	Redcar Mudstone Formation (a3)
Uncorrected SPT N value[l]	Blows/300mm	32 - >100 (68)
Bulk density, γ	Mg/m^3	2.17 – 2.29 (2.23)
Dry density, γ_d	Mg/m^3	1.86 – 2.03 (1.94)
Water content	%	9.2 – 23 (16)
Plastic Limit	%	15 – 19 (17)
Liquid Limit	%	26 – 37 (32)
Plasticity Index	-	11 – 19 (15)
PSD % passing 63µm sieve	%	55
P_c	kPa	930
UCS (measured, ≤2m depth)	MPa	12.4
UCS (derived from I_{s50}) ≤2m depth	MPa	0 – 45 (4.7)
UCS (measured, >2m depth)	MPa	3 – 18 (10)
UCS (derived from I_{s50}) >2m depth	MPa	0 – 88.2 (6.4)

Parameter	Unit	Redcar Mudstone Formation (a3)
$I_{s(50)}$	MPa	0 – 4.9 (0.22)

Note. Values reported as minimum, maximum (geometric mean).

9.2 Summary of Characteristic Geotechnical Parameters

A summary of characteristic values for geotechnical parameters for the principal geological units are presented in Table 9-11. ‘Characteristic Value’ is defined in Eurocode - Basis of structural design, BS EN 1990:2002+A1:2005 EN 1990:2002+A1:2005 (E) as the *'value of a material or product property having a prescribed probability of not being attained in a hypothetical unlimited test series. This value generally corresponds to a specified fractile of the assumed statistical distribution of the particular property of the material or product. A nominal value is used as the characteristic value in some circumstances’*. BS EN 1997-1:2004+A1:2013 (Eurocode 7 Part 1) includes twelve criteria which may form a part of the selection of characteristic values under Section 2.4.5.2. In this assessment the geotechnical parameters adopted have been derived as a cautious estimate of either geomean or average values as appropriate.

Characteristic design values obtained from in-situ and laboratory testing undertaken on the fine (cohesive) Tidal Flat Deposits Clays (c1) generally compare favourably and within the margins of variability to those included in Bell and Coulthard, A survey of some geotechnical properties of the Tees Laminated Clay of central Middlesbrough, North East England (April 1997). It is noted that the Tees Laminated Clay deposits have been reclassified by the BGS as Tidal Flat Deposits. Variability is apparent in the plasticity data with published information showing the soils to be of high plasticity (CIH) only, compared to ground investigation data which identified soils to include clays of medium (CIM) and low (CIL) plasticity. Variability in plasticity is likely to be a result of selection of ‘idealised’ samples of clay soils for research purposes, compared to site samples which are laminated and interbedded with thin lenses of sand and silt, with these soils likely to exhibit lower plasticity. Undrained shear strengths obtained are lower than anticipated, which is likely due to sample disturbance resulting from the difficulty in balancing groundwater pressures during drilling and ‘blowing’ at the base of the exploratory holes. Geotechnical properties including γ_{b}, $\varphi'_{pk,k}$ and $\varphi'_{cv,k}$ compare favourably with published values.

Characteristic design values obtained from in-situ and laboratory testing undertaken on the Glacial Till (b1) soils compare favourably and within the margins of variability for all parameters tested against values published in CIRIA 504 Engineering in glacial tills (1999).

Published papers specific to the Redcar Mudstone Formation were not available at the time of writing this GIR. Unconfined compressive strength (UCS) laboratory testing compares favourably to the rock descriptions provided on the exploratory hole logs and are generally in accordance with the strength values provided in Table 25 of BS 5930:2015+A1:2020. Rock descriptions of weathering and strength compare favourably to those described in Jorden and Dobie, Tests on piles in Keuper Marl for the foundations of a blast furnace at Redcar (date unknown).

Characteristic design values will need to be assessed for scheme specific design elements including the U&O, HP CO_2 compression, power and capture plants and the Onshore CO_2 Export Pipeline Corridor (see Section 5.6) as part of FEED and detailed design. Design parameters should be derived from the most relevant exploratory holes to each structural element under consideration. The characteristic parameter values / value ranges adopted for future detailed design should be selected following appropriate analysis of both the depth and spatial distribution of each dataset.

Table 9-11 Characteristic Preliminary Geotechnical Design Parameters

Strata	Bulk Unit Weight, $\gamma_{b,k}$ Mg/m^3	Undrained Shear Strength, $c_{u,k}$, kN/m^2	Effective Cohesion, c'_k kN/m^2	Peak Angle of Shearing Resistance, $\varphi'_{pk,k}$ (°)	Critical Angle of Shearing Resistance, $\varphi'_{cv,k}$ (°)	Compression Index, C_C	Swelling Index C_s	UCS MPa
Made Ground Slag-dominant Material (d1)	1.92	-	-	36	34	-	-	-
Made Ground Hydraulic Fill (d2)	1.95	-	-	34	31	-	-	-
Made Ground Granular (d3) [1]	1.9	-	-	-	-	-	-	-
Made Ground Cohesive (d4)	1.82	41	-0	*	-	-	-	-

Strata	Bulk Unit Weight, $\gamma_{b,k}$ Mg/m³	Undrained Shear Strength, $c_{u,k}$, kN/m²	Effective Cohesion, c'_k kN/m²	Peak Angle of Shearing Resistance, $\varphi'_{pk,k}$ (°)	Critical Angle of Shearing Resistance, $\varphi'_{cv,k}$ (°)	Compression Index, C_C	Swelling Index C_s	UCS MPa
Made Ground Other (d7)	-	-	-	-	-	-	-	-
Tidal Flat Deposits Clay (c1)	1.92	25	-	27	26	0.2	0.035	-
Tidal Flat Deposits Sand (c2)	1.90	-	0	30	30	-	-	-
Lacustrine Deposits (b3)	2.02	75	0	28	24	0.233	0.066	-
Glacial Till (b1)	2.08	100	0	29	25	0.208	0.059	-
Redcar Mudstone Formation (a3)	2.23	-	0	-	-	0.133	0.033	3 [2] 10 [3]

[1] No laboratory data is available to estimate strength parameters for granular Made Ground (d3). Bulk density assumed based on BS8004: 2015 +A1:2020.

[2] UCS ≤ 2m below rockhead surface

[3] UCS >2m below rockhead surface

9.3 Aggressive Ground conditions

In accordance with BRE Special Digest (SD) 1 (BRE, 2005), the potential for sulfate content on buried concrete in contact with soil and groundwater at a site is classified based on the sulfate content expressed as SO_4, mobility of groundwater, the acidity and form of concrete. Water soluble sulfate and pH determinations were undertaken on 83 soil and 13 groundwater samples. The results of the BRE testing are summarised in Table 9-12.

Table 9-12 Summary of BRE Ground Aggressivity Testing

		Soil							Groundwater			
Strata	**Strata Code**	**Number of Tests**	**pH Min. – Max. (CV)**	**Water Soluble Sulfate as SO_4 (mg/l) Min. – Max. (CV)**	**Total Sulfur (%S) Min. – Max.**	**Total Potential Sulfate (%S) Min. – Max. (CV)**	**Water Soluble Chloride (mg/l) Min. – Max.**	**ACEC Classification for Brownfield Locations (BRE SD1 Table C2)**	**Number of Tests**	**pH Min. – Max. (CV)**	**Water Soluble Sulfate as SO_4 (mg/l) Min. – Max. (CV)**	**ACEC Classification for Brownfield Locations (BRE SD1 Table C2)**
Made Ground	d4	2	8.27 – 8.66 (8.3)	92.83 – 868.63 (**869**)	0.03 – 0.34 (0.10)	0.10 – 1.03 (**1.03**)	180.57 – 219.22	DS-3 AC-3	4	7.90 – 10.70 (7.9)	4.00 – 1100.00 (**1100**)	DS-2 AC-2
Made Ground	d2	1	8.98 (9.0)	871.35 (**871**)	0.15	0.44 (**0.44**)	100.68	DS-2 AC-2				
Made Ground	d1	24	8.74 – 12.17 (9.4)	25.29 – 1881.66 (**1649**)	0.09 – 0.92	0.27 – 6.26 (**5.50**)	3.58 – 306.50	DS-5 AC-5				
Tidal Flat Deposits Sand	c2	11	8.10 – 12.17 (8.5)	32.38 – 734.92 (**534**)	0.02 – 0.36	0.05 – 1.09 (**0.60**)	4.18 – 832.27	DS-2 AC-2	4	7.70 – 12.20 (7.7)	4.00 – 1000.00 (**1000**)	DS-2 AC-2
Tidal Flat Deposits Clay	c1	6	6.74 – 9.90 (7.2)	642.38 – 2106.17 (**1927**)	0.38 – 2.80	1.14 – 8.40 (**6.09**)	20.91 – 1586.54	DS-5 AC-5	0			
Glacial Till	b1	11	8.15 – 11.06 (8.2)	265.74 – 1739.25 (**1094**)	0.04 – 0.55	0.12 – 1.66 (**0.91**)	60.58 – 1527.35	DS-3 AC-3	0			
Redcar Mudstone Formation	a3	27	6.87 – 9.84 (7.7)	223.13 – 1715.30 (**1026**)	0.09 – 1.32	0.27 – 3.95 (**1.28**)	45.63 – 1120.54	DS-3 AC-3	4	7.20 – 12.20 (8.8)	5.00 – 1300.00 (**1200**)	DS-2 AC-2

<u>Notes:</u>

1. *(**BOLD**) defines limiting factor for ACEC Classification above DS-1.*
2. *Characteristic Value (CV) calculated as defined in BRE SD1 (2005).Average is geometric mean.*
3. *Standpipe installations screened across multiple Made Ground subdivisions. As a result, groundwater results for Made Ground have been considered as one unit.*

36 out of the 83 soil samples tested returned water soluble sulfates less than 500mg/l and pH values were all greater than 5.5. These samples with water soluble sulfate values less than 500mg/l (using the geometric mean value) are indicative of Class DS-1 in accordance with BRE SD1 Table C2, with the rest being indicative of Class DS-2 or DS-3.

Groundwater samples were collected across the site from standpipe installations screened in Made Ground, Tidal Flat Deposits Sand (c2) and Redcar Mudstone Formation (a3). The results from all strata indicate a site-wide DS-1 sulfate design class is appropriate.

The Total Potential Sulfate (TPS) has been calculated in accordance with BRE SD1 (BRE, 2005) as TS % S where TPS = total sulfur determined by laboratory testing. TPS is an upper limit value for sulfates in the ground. It is calculated as the sum of sulfates already present in the ground, plus those that may result from oxidation of pyrite, pyritic clay or similar minerals. The results generally suggest a site-wide concrete classification DS3- AC-3 should be adopted for design, but that DS-5 AC-5 may be required in slag-dominant Made Ground (d1) soils, Tidal Flat Deposits – Clay (c2) and Lacustrine Deposits (b3); however, further testing is recommended in both the Tidal Flat Deposits Clay (c2) and Lacustrine Deposits (b3) as only a small number of samples have been tested (5) – Tidal Flat Deposits Clay (c2) and 1 – Lacustrine Deposits (b3). It is possible that the elevated sulfate results in both strata may be due to ground contamination or could be indicative of the presence of Made Ground.

CD 375 (Highway Structures & Bridges Design, 2020) indicates that corrosion is unlikely at chloride concentrations less than 50ppm (50mg/l) at pH values ranging from 6 to 9. Chloride aqueous extract determinations were undertaken as part of the ground aggressivity test suite. 23 soil samples tested chloride less than 50mg/l, with the remaining 60 ranging between 53.43 and 1586.545mg/l.

All encountered strata at the site returned chloride values greater than 50mg/l. Based on Section 8.5 and Table 8.5 of CD375 and assumed values of soil resistivity, surrounding soils may be classified as 'aggressive' to 'very aggressive' corrosivity classification. These values should be considered during future detailed design as they pose a significant risk.

9.4 Loss on ignition

26 loss on ignition laboratory tests were undertaken on samples across the investigation depth. The results of these tests are presented in Table 9-13 with full records available in the NZT Factual GI Report (AEG, 2022).

Table 9-13. Summary of Loss on Ignition and Organic Matter Laboratory Testing

Strata	Strata Code	Number of Loss on Ignition Tests	Loss on Ignition Sample Depth (m bgl) Min. – Max.	Loss on Ignition (%) Min. – Max. (Average)	Number of Organic Matter Tests	Organic Matter Sample Depth (m bgl) Min. – Max.	Organic Matter (%) Min. – Max. (Average)
Made Ground	d7				1	2.70	1.50
Made Ground	d6	1	0.10	8.20	1	0.10	3.70
Made Ground	d2				1	3.00	2.60
Made Ground	d1	5	1.50 – 6.20	1.30 – 7.80 (4.10)	4	1.50 – 6.20	0.90 – 2.60 (1.50)
Tidal Flat Deposits Sand	c2	4	5.90 – 10.50	0.66 – 2.70 (1.35)	6	5.90 – 11.70	0.10 – 1.00 (0.45)
Tidal Flat Deposits Clay	c1	11	4.50 – 15.60	3.60 – 15.00 (6.30)	14	4.50 – 16.30	0.10 – 12.00 (3.25)
Glacial Till	b1	5	14.00 – 17.70	0.01 – 8.10 (5.36)	2	14.00 – 15.10	2.20 – 2.80 (2.50)

The results indicate a widely varying range of loss on ignition values. The results are a function of carbonaceous, organic content and moisture content, and don't necessarily indicate the combustibility of the material. The generally low loss on ignition and organic matter values would suggest a low risk of combustion.

9.5 Slag expansivity testing

9.5.1 Introduction

Specialist slag expansivity testing was carried out by Thomas Research Services Ltd (TRS) of New Holland, North Lincolnshire. The results were received on 3rd December 2021 following issue of the AECOM NZT GIR on 26th November 2021.

9.5.2 Summary and Conclusions of Investigation and Material Assessment

Slag expansivity testing has been completed on samples retrieved from 3 boreholes and 9 machine excavated trial pits excavated across the proposed development area (see Table 9-14). Three of these machine excavated trial pits (LF\TP01, LF\TP02 and LF\TP03) were located immediately on the north east outside of the plant construction development footprint located within the CO_2 transport corridor as seen in Drawing 60657467-ACM-GIR-DRG-017 (TRS Slag Testing Locations). The findings conclude a varied thickness of predominantly granular Made Ground ranging from 0.90 to 7.80m bgl predominantly comprising of vesicular and occasionally vitreous slag included as unsorted sand, gravel, cobble and boulder size fractions, occasionally described as crushed (LF\TP01 and MS\TP03). The slag is mixed with various other anthropogenic and natural constituents including, but not limited to metal, plastic, brick, refractory brick, clinker, ash, limestone, sandstone, wood etc.

Targeted selection of 17 samples of Made Ground comprising a significant content of slag for specialist testing has been completed to appraise the nature of the constituents and determine the potential for volumetric expansion. The material identification and specialist slag expansion testing has been carried out by Thomas Research Services Ltd and the findings are reviewed and discussed in this summary.

The distribution of slag material was found to vary slightly across the development site footprint shown on Drawing 60657467-ACM-GIR-DRG-001 (Site Location Plan), as can be seen summarised in Table 9-14. The material examined predominantly comprises Blast Furnace Slag, with locally significant reported component of Basic Steel slag, as follows:

- Material recovered from the CO_2 transport corridor, the north-east quadrant of the PCC site area, and the future expansion area to the south are described as comprising predominantly of ‘very large’ amounts of ‘Blast Furnace Slag’, with only occasional samples recording ‘medium’ amounts of ‘Basic Steel Slag’.
- Material recovered from the main central portion of the PCC site area records a greater significance of ‘Basic Steel Slag’ reported as present in ‘large to medium amounts’ in six of the eight samples examined. A single sample from this area recovered from near ground surface recorded no presence of slag, but ‘very large amounts’ of refractory material, and one sample only recorded ‘very large amounts’ of blast furnace slag constituent.
- Otherwise ‘Aluminium-Silica Refractory’ material has only been identified from two samples recovered from the central portion of the PCC site area.
- Metals are also reported on the site and recorded on a number of trial pit excavation records and described as a constituent on a small number of material blocks.

Examination of the recovered samples of Made Ground suggests a variable mix of slag material is present across the site area alluding to the long history of development of iron and steel production.

Slag expansion testing has been undertaken, with 16 of the 17 samples subjected to the TRS Accelerated Expansion Test. A summary of the results is included in Table 9-14. It can be seen that samples comprising predominantly of Blast Furnace Slag record the least expansion typically recording values of up to 0.16% expansion subject to the 14-day testing regime. Whereas the samples that include a Basic Steel Slag component record more significant expansion over the 28-day test regime with the highest expansion recorded at 2.15%.

Sulfur testing has been scheduled from 24 samples of slag containing Made Ground. The suite of tests records total sulfur values ranging between 0.09 and 0.92%S concluding Total Potential Sulfate range of 0.28 to 2.77%SO_4. The water-soluble sulfate range was recorded between 25.29 and 1881.66mg/l SO_4. The test results indicate high sulfate availability with a BRE ACEC Classification of DS-5 AC-5 indicating that the material is highly aggressive to concrete and may provoke a deleterious reaction with Portland cement leading to progressive disintegration of the concrete.

9.5.3 Slag Reaction Instability

The potential for expansivity is associated with blast furnace and steel slags particularly from older historical production. The principal mechanisms attributed to the expansion of blast furnace slags include iron unsoundness, which is very rare and will occur to completion following initial wetting of susceptible material which is considered to have already occurred as the open texture of the Made Ground allows surface water infiltration, and groundwater movement as confirmed by the investigation. Beta-to-gamma inversion of dicalcium silicate occurs in blast furnace slags, which tends to be a thermal reaction which occurs as hot slag cools and therefore this will have occurred in accord with the historical production and is unlikely to be problematic. Problems associated with blast furnace slags tend to occur with historical material and are predominantly derived from their sulfur content. Sulfate related expansion occurs as sulfide minerals present in blast furnace slag weather (oxidise) following exposure to atmospheric conditions, and through the ensuing reactions this produces sulfate minerals that are the cause of volumetric instability. This process is analogous with sulfate attack reported in concrete.

Basic steel slags tend to contain very little sulfur but include concentrates of free MgO (periclase) and free CaO (lime) which readily hydrate producing volumetric instability. More modern material was managed through a quality process that tended to deal with this producing a stable product. In contrast, practically all older steelmaking slag material (generally predating mid 1960's) tends to have serious chemical instability defects. Lime and magnesium oxide are often embedded in otherwise stable slag that is impenetrable to moisture, and therefore remains in a stable condition. When the slag is mechanically disturbed or processed the oxides are exposed to hydration, the lime may hydrate rapidly with 100% volume increase, whereas the periclase may persist for longer before it hydrates and can according to Dunster et al (2005) cause disruption many years after deposition of the fill (original and reworked).

Refractory bricks and other refractory materials have a high concentration of free MgO and are also implicated in volumetric expansion.

9.5.4 Discussion

A comparison of the current findings with previous investigations are in general agreement, albeit the expansion recorded currently is very slightly higher. The review of findings of the current investigation and previous investigations carried out at the site are summarised to inform the development process as follows.

- Previous site wide ground investigations have been carried out by AEG under direction from CH2M and Arcadis.
- The general varied distribution of Made Ground is confirmed by the latest ground investigation.
- Previous investigations generally comprising of machine excavated trial pits have included selection of 50 samples for slag expansivity assessment from across the site, only 5 of which were recovered specifically from below proposed structures and 10 within the PCC red boundary (Drawing 60657467-ACM-GIR-DRG-017).
- The evaluation of the samples from the current investigation including petrographic assessment, concluded that materials examined from site consisted of mixed slags predominantly comprising variably weathered blast furnace slag material with a significant minor component of steel slag, and that both included some unreacted material with potential for future expansion.
- A total of 16 samples were selected for a minimum 14-day accelerated expansion testing as part of the current investigation, of these 8 were subjected to the extended 28-day accelerated expansion test, based on containing sufficient constituents that were potentially expansive.
- The samples tested recorded between 0.02 and 1.72% uniaxial expansion for the 14-day tested material, and 0.67 to 2.15% uniaxial expansion for the 28-day tested material. .
- Examination recorded that approximately half of the samples examined contained the aluminosulfate mineral ettringite (generated through the oxidation of sulfide minerals and ensuing reaction) indicating that some expansion had occurred in the past due to weathering.
- The chemical testing recorded high total sulfur and sulfate values from the samples, which show a significant component remaining as unreacted sulfide, with potential for oxidative weathering and potential expansion suggesting that expansion is not necessarily complete.

The exploratory holes confirm a predominance of slag bearing materials at the site. Assessment of the slag expansion has been carried out under controlled laboratory conditions and involves processing and crushing of the test samples in preparation for the inspection, chemical characterisation and swell testing. Therefore, the findings are considered to be generally representative of material that may be subjected to recovery, processing and recompaction at a site level.

It is therefore concluded that a volumetric expansion of between 2 and 3% can be anticipated from the site development following recovery and processing of the nominally upper 2.5m of Made Ground at the site, following replacement by controlled compaction of suitable material. It should be noted that the sampling process will have excluded the very large material described as cobbles and boulders. These fragments may contain larger quantities of unreacted material, and therefore should be managed separately.

Properly utilised slag materials intended for construction of the development platforms are considered to be an excellent source of construction material, but mitigation may be necessary and should be considered for the various design aspects and where appropriate included in connection with various aspects of construction. Mitigation measures may include but are not limited to forms of separation between structural elements and the slag material and adopting the following measures to limit potential differential movement:

- Careful selection of the grading of processed slag material (i.e., material class). Particle size and dilution have an influence on the expansive behaviour of slag as it allows access to water. A continuously graded material is likely to be more expansive that a less-well graded and highly voided material, as the voids may take up a significant proportion of the expansion product. Therefore, the potential for damage from expansive slag can be reduced by dilution with inert material.
- Processing of material should consider thorough mixing of the material; compaction in layers to an even thickness across the site; separate processing of larger slag particles (cobbles and boulders particularly Basic Steel Slag material) that are likely to contain significant amounts of unreacted material – which then should be placed separately under a layer of inert material, or placed in non-critical areas of the site.
- Granular construction interfaces (also functioning as capillary breaks) of adequate thickness for ground bearing slabs and pavements.
- Void formers to structural elements.
- Foundation options should consider design of reinforced concrete raft foundations to accommodate uplift in an even manner and / or sleeved bored concrete piles for transfer of bearing loads to underlying strata.
- Suitable design of ground placed concrete for potentially aggressive ground conditions (DS-5 AC-5).
- Consideration of including granular rafts for the transfer of load to partially mitigate adverse effects caused by total and differential movements.
- There is little consensus over the period of time that heave is likely to occur under natural conditions and this will apply to processed slag used in earthworks. The timescales are dependent on the degree of exposure to water and the reactivity of the slag, a subject that is not very well understood. The very nature of the slag expansion process is that relatively small quantities of the worst material may result in disruptive ground heave, and therefore blending and separation of product resulting from processing of oversized components needs to be managed. It is recommended that long term monitoring of ground movement is implemented, and trial compaction undertaken at an early stage of the earthworks to enable observation of any changes.

Table 9-14 Summary of Slag Assessment

Exploratory Location	Sample ID	Sample Depth (m BGL)	Summary Description	TRS Slag Identification Summary		TRS Accelerated Expansion (%)	
				Slag Classification	Accessories	14 day	28 day [1]
CO_2 Transport Corridor							
LF\TP01	LB18	3.90	Slight sandy Gravel and Cobbles with low boulder content. Sand and gravel and cobbles are of crushed vesicular slag.	**VL – BFS**	None identified	0.11	-
LF\TP02	LB13	3.80	Silty sandy Gravel and Cobbles with low boulder content. Materials include vesicular slag.	L – BFS / m - BSS	None identified	0.61	0.70
LF\TP03	LB7	1.10	Slightly sandy Gravel and Cobbles with low boulder content. Materials include vesicular slag and metal.	**VL – BFS**	None identified	0.05	-
	LB20	4.50		**VL – BFS**	None identified	0.03	-
Power, Capture & Compressor (PCC) Site: North-Eastern Quadrant							
MS\TP01	LB11	2.00	Gravelly Sand with low cobble and boulder content, and including metal, plastic, brick, concrete. 50-75% of slag is vesicular.	**VL – BFS**	None identified	0.16	-
	LB20	4.00	Slightly clayey gravelly Sand. Gravel includes clinker and slag.	**VL – BFS**	None identified	0.04	-
MS\TP03	LB11	2.10	Slightly sandy Gravel and Cobbles with low boulder content. Includes predominantly vesicular slag, iron and wood.	**VL – BFS**	None identified	0.09	-
Power, Capture & Compressor (PCC) Site: Central Portion of Area (coverage extending from east to west across this zone)							
MS\BH06	B30	0.20 – 0.90	Gravelly Sand with medium cobble content. Gravel and cobbles are of vesicular slag.	No slag identified.	VL amount of Al-Si refractory.	Not Tested	
MS\BH09	B5	0.75 – 1.20	Sand and Gravel. Gravel is of vesicular slag and clinker.	L – BFS / L - BSS	None identified	0.96	1.46
MS\BH12	B6	0.12 – 1.20	Sandy Gravel with medium cobble content of vesicular slag.	L – BFS / L - BSS	None identified	1.09	1.51
MS\TP4	LB19	4.00	Slightly sandy Gravel and Cobbles with low boulder content. Includes slag which is all vesicular. Slightly saturated.	**VL – BFS**	None identified	0.02	-
MS\TP5	LB7	1.00	Clayey very sandy Gravel with high cobble and low boulder content. With pockets of ash. Includes concrete, clinker, brick, vesicular slag and non-vesicular slag.	m – BFS / L – BSS	None identified	1.72	2.15
	LB20	4.00	Silty sandy Gravel with high cobble content. Includes clinker, vesicular slag and non-vesicular slag.	L – BFS / L - BSS	None identified	1.29	1.61
MS\TP7	LB11	2.00	Slightly sandy Gravel with high cobble and low boulder content. Includes glassy and vesicular slag. Excavation refusal at 4.00m due to possible concrete structure.	m – BFS / L – BSS	None identified	1.02	1.39
	LB20	4.00		m – BFS / L – BSS	s amount of Al-Si refractory.	1.00	1.15
Future Expansion Area (coverage in north central section of this quadrant)							
MS\TP09	LB7	1.00	Sandy Gravel with high cobble content, includes limestone, vesicular slag and non-vesicular slag, with sulfurous odour	**VL – BFS**	None identified	0.13	-
	LB20	4.00	Slightly clayey very sandy Gravel with low to medium cobble content. Slag is vesicular.	L – BFS / m- BSS	None identified	0.58	0.67

Note: BFS = Blast Furnace Slag; BSS = Basic Steel Slag; VL = very large amount; L = large amount, m = medium amount, s = small amount.

[1] 28 days test only carried out if >0.5% TRS Accelerated Expansion at 14 days

10. Soil and groundwater chemistry

Soil and groundwater samples were obtained during the 2021 preliminary ground investigation with a selection submitted for chemical analysis as described in Section 6.3.7 and Section 6.6.2. Soil samples sent for chemical analysis were obtained from the Made Ground (70 samples), Tidal Flat Deposits (c1 and c2) (28 samples), Lacustrine Deposits (b3) (5 samples), Glacial Till (b1) (8 samples) and Redcar Mudstone Formation (a3) (4 samples). Of these, 44 soil samples were obtained from soils within the top 2.5m of the ground (surface to 2.5m bgl) and 71 were obtained below 2.5mbgl to a maximum depth of 28.95mbgl.

Groundwater samples have been obtained from monitoring wells installed within the Made Ground, Tidal Flat Deposits, Glacial Till and Redcar Mudstone Formation. Further details on the monitoring installations are detailed in Table 6-4 in Section 6.4.1.

Due to ecological access constraints, two trial pits and a borehole proposed to be undertaken in the northwest corner of the Main Site were unable to be completed. Therefore, there is limited data available in this area. It should be noted that trial pitting was carried out in this area as part of the previous investigations undertaken at the Main Site (Drawing (60657467-ACM-GIR-DRG-008).

However, no groundwater monitoring boreholes were drilled within this area of the site as part of the previous investigations. The closest to this area was S2 BHA04 on the northern boundary of the site which had a dual installation within the Made Ground and Tidal Flats Clay (c2).

The area of the Main Site where groundwater monitoring wells are absent is presented in Figure 10-1 below.

No ground investigation data (including previous ground investigations) has been obtained from the areas where buildings were still present when the survey was undertaken. This included the Area Workshops, Furnace Stockhouse, the Sinter Plant and the area of the overhead conveyor connecting these areas (Drawings 60657467-ACM-GIR-DRG-006 and 60657467-ACM-GIR-DRG-007).

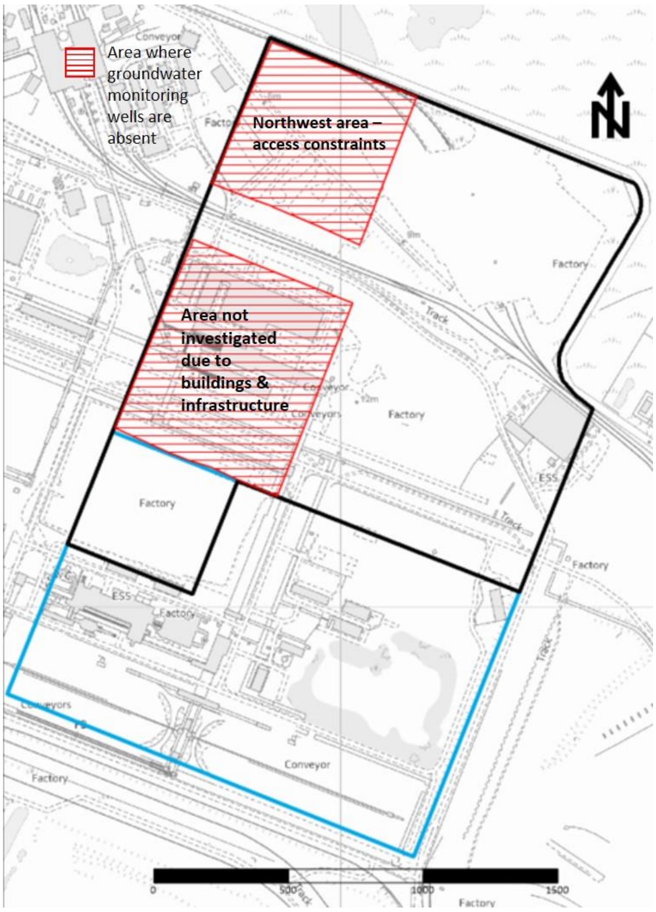


Figure 10-1 Areas where monitoring wells are absent

10.1 Previous Ground Investigation Contaminant Distribution

Based on the previous ground investigation data (CH2M HILL, 2017 and AEG, 2018) the preliminary conceptual site model undertaken as part of the AECOM, 2020 and 2021 desk studies (summarised in Appendix E) identified potential risks to human health and controlled waters (ranging from moderate low to high potential risks) from the potential presence of asbestos, pH, acids, alkalis, sulfate, ammonia, cyanides, coal tar, PAH, TPH, VOCs, SVOCs and hazardous ground gas. The distribution of the key contaminants identified as part of the previous investigation are presented in Appendix E, Table E.1

The previous contaminant screening of the two previous ground investigations (CH2M HILL 2017 & AEG 2018) undertaken by AECOM (AECOM, 2020) indicated high pH, asbestos, isolated occurrences of cyanide, and PAH at concentrations which may pose a risk to human health based on a commercial/industrial end use and PAHs (in particular fluoranthene and naphthalene) and thiocyanate in groundwater which exceeded screening criteria protective of controlled waters. Metals were also present in soil leachate and groundwater. However, these were assessed as marginal exceedances in reference to risk to controlled waters.

Asbestos analysis of the Made Ground as part of the previous investigation detected chrysotile and amosite asbestos as “fibre bundles”, “clumps” and “loose fibrous asbestos debris” in eight soil samples spread across the site at depths of between 0.2 m and 3.6 m. This did not include the proposed extension area to the south of the Main Site.

AECOM noted that whilst it may have been possible to rule out widespread contamination for some potential contaminants, significant localised contamination may still have been present between exploratory holes or at unexplored depths.

10.2 AECOM 2021 Ground investigation contaminant distribution

10.2.1 General

Based on the samples obtained from the NZT GI (AEG, 2022), an assessment of the soils and groundwater beneath the Site has been undertaken and are presented in Appendix F and Appendix G. This includes human health and controlled waters generic quantitative risk assessments. The key findings of these assessments are summarised below, highlighting the key contaminants requiring consideration. Full details of all the contaminants identified at the Site and assessment thereof, are provided within Appendices F, G and I,

In general, concentrations of contaminants within the soil and groundwater are low based on the industrial uses of the Site and the intended proposed use of the Site. They are also not dissimilar to the previous investigation concentrations that were identified within the Main Site boundary.

As noted in Section 6.2.1, no exploratory hole locations were able to be located in the north west corner of the Site due to access constraints. As there were also no boreholes/monitoring wells drilled/installed as part of the previous investigations either within this area of the site (only trial pits were undertaken), it should be noted that there are no down gradient boreholes to allow assessment of potential migration of groundwater off site. Therefore, additional boreholes within the north west corner of the site (if possible) would be beneficial to assess concentrations at the boundary in this area to mitigate this potential data gap. However, given the limited exceedances of EC in groundwater and soil leachate, the magnitude of exceedances in relation to the EC, the spatial distribution of the exceedances across the Site and expected attenuation, it is considered that the risk to surface waters and groundwater is considered to be low. However, further ground investigation assessment would be beneficial to reduce the uncertainty, particularly to assess the more elevated concentrations of ammoniacal nitrogen within the northwest area.

The three monitoring rounds undertaken to date indicate that there has been a general increase in concentrations of ammoniacal nitrogen in particular. Whilst concentrations at this stage are not necessarily a cause for concern, if the upward trend was to continue additional assessment of action may be required.

It is likely that perched, confined groundwater heavily contaminated with hydrocarbons may be encountered on Site throughout the development works as obstructions etc. are removed. This was evident, as proven by contaminated water ingress being observed within MS/TP06 (see Table 7-4). If encountered, these waters should be contained, assessed and removed as part of remedial/construction works.

10.2.2 Asbestos

The asbestos distribution within the soils is presented in Figure F4 and F5 in Appendix F.

Asbestos was detected within seven of the fifty soil samples analysed for asbestos as part of the 2021 NZT GI (AEG, 2022). These were mainly described as bundles of chrysotile fibres but a bundle of amosite fibres was also present at one location and chrysotile present in microscopic cement debris in another location. All the soils where the bundles of fibres were detected were recorded to contain <0.001 mass %. Where the asbestos was present in microscopic cement debris, this was recorded to contain 0.001 mass %. Thus, none were detected at concentrations greater than the hazardous material threshold of 0.1 mass %.

The results of the NZT GI (AEG, 2022) data were assessed in context with the previous investigations undertaken at the site. Figure F.5 in Appendix F presents the historical data in terms of asbestos detections found above and below 2.5m depth, the locations of those where quantification testing was undertaken and the results of the quantification analysis.

Asbestos was generally recorded at depths below 2.5m within the southeast corner of the site (within the proposed expansion area), with asbestos quantification % mass where detected, being between 0.002 and 0.047% within samples analysed as part of the historical data set in this area. This area is in the location of the former Pelletizer Plant and the southern section of the former steel plant. The AECOM 2021 GI results provide a confirmatory pattern, with the presence of asbestos at depth in this area (MS/BH14, 4.2 to 4.4m bgl), together with the only detectable quantification result (0.001%) noted as part of the NZT GI (AEG, 2022) also being recorded in this sample.

The main bulk of asbestos detections and greater % mass concentrations are detected off site to the south of the Site, beyond the Sinter Stockpiles (former conveyor area).

Of all the laboratory samples analysed (NZT GI (AEG, 2022) and the previous investigation data) for asbestos it is noted that no exploratory hole locations were identified as having asbestos detected both above and below 2.5 m bgl.

Scattered asbestos detects are located elsewhere across the main site, although these are less densely populated with most soil samples taken not observing or detecting asbestos containing material. However, the greatest mass % of fibres noted within the Main Site boundary and the only sample to exceed the hazardous material threshold of 0.1 mass % was detected in the northeast of the site during the previous ground investigation, 0.333% mass was recorded. It should be noted that no investigation has been undertaken in the location of Area workshops or the Furnace Stockhouse in the central western section of the Main Site. This is due to presence of the building structures remaining present during the different phases of the investigation works.

The risk to ground workers from inhalation of asbestos fibres during ground disturbance has been assessed to remain as High, with a key area of risk currently identified within the south east of the site (within the proposed expansion area and former Pelletiser Plant). This is located in the proposed Laydown/construction area. It is advised that unless proven otherwise, mitigation will be required to avoid an unacceptable risk during development. Although a limited number of samples analysed contained asbestos fibres, it should be noted that samples were generally too small to obtain a high probability of detecting pieces of asbestos containing materials (ACM), which if unbound could release significant quantities of fibres when disturbed. Also, not all Made Ground samples taken were able to be analysed for asbestos given the depth of Made Ground, sampling strategy and budgetary requirements. A survey by a specialist in asbestos identification in soils is advised to ensure appropriate samples are taken for testing as part of the remedial works. Asbestos control measures will be required during development/construction works. Mitigation and monitoring will be required to eliminate, reduce, control or manage the risk, or in the last resort provide suitable personal protective equipment (PPE)/respiratory protective equipment (RPE) for ground workers. Mitigation will also be required to minimise the risk of off-site migration.

A Moderate risk from exposure by inhalation of asbestos fibres has been assessed for future site users of the Site assuming Made Ground is exposed within landscaped areas. This risk could be mitigated by evaluation of “releasability” of fibres during soil disturbance (activity-based testing). However, in practice it is expected that most of the development will comprise hardstanding and therefore provision of a designed cover layer, marker layer/anti dig layer is advised in areas of soft landscaping thereby reducing the risks to future site users to Low.

It should be noted that asbestos is not a risk below hardstanding as there would be no exposure from inhalation of fibres; therefore, the principal risks occur for exposure during construction and to future site users from asbestos in landscaped areas, and the risk for maintenance workers coming in contact with contaminated soils within service corridors.

10.2.3 pH

pH levels within the Made Ground soils have been identified at levels which are considered to be corrosive and thus may pose harm. The distribution of pH levels within the soils is presented in Figure F2 and F3 in Appendix F. High pH in dust in soil is a hazard for construction workers therefore control of dust will be particularly important during groundworks. It should also be noted that the groundwater is also at a high pH and should be considered as a potential hazard during groundworks. Control measures during ground works should be considered such as minimisation of simultaneously open cut areas, damping down and water spraying as part of a managed system of dust control.

10.2.4 Fluoranthene

Fluoranthene in the groundwater and soil leachate was regarded as the most widespread contaminant noted to exceed the Environmental Quality Standard (EQS) Evaluation Criteria (EC) protective of surface water, exceeding in 54% of the groundwater samples in tested in Round 1 and 66% of the soil leachates. However, this was notably reduced in Rounds 2 and 3 where only 18% of the groundwater samples exceeded. The distribution of the groundwater sample exceedances for Round 1 is presented in Figure G.2 in Appendix G. The greatest concentration of fluoranthene in groundwater is located in the south of the Site (MS\BH14) in the proposed expansion area in the area of Main Site, north (down gradient) of the former Pelletiser Plant, followed by the central eastern area of the Main Site, formerly occupied by the Steel Plant, railway infrastructure and more recently possibly a former filling station. This generally coincides with the greatest concentrations of fluoranthene identified in the soil. The concentrations of fluoranthene in monitoring wells closest to the surface water receptors (those towards the northern boundary) are between 0.01 and 0.02µg/l or less than the limit of detection. These are less than a factor of 4 times greater than the EQS EC.

Within the central eastern area of the Main Site, formerly occupied by the Steel Plant, railway infrastructure and more recently possibly a former filling station, at MS\TP06 contamination was observed within groundwater ingress. A brown iridescent appearance and moderate hydrocarbon odour was noted. A grab water sample was obtained from trial pit MS/TP06 during the works. Organic contamination including speciated hydrocarbons and PAHs (including fluoranthene) were noted. A fluoranthene concentration of 5,400µg/l was recorded, greater than one order of magnitude above the solubility limit indicating the presence of non-aqueous phase liquid or sediment with sorbed phase. This is compared to the highest concentration of fluoranthene detected in the groundwater beneath the Site of 0.266µg/l.

The PAH concentrations identified in the groundwater are generally consistent with the previous ground investigations. The majority of the soil leachable PAHs are detected within the Made Ground in the upper 2.5 m bgl. PAHs are generally relatively immobile in the sub-surface and in the absence of a mobile non-aqueous free-phase it is unlikely there would be significant impact off the site (northwest/northeast from the site boundaries).

10.2.5 Naphthalene

Naphthalene was only noted within the groundwater from MS\BH15D (Tidal Flat Deposits) in the southwest of the Main Site (within the proposed expansion area) at a concentration which exceeded the EQS EC. A concentration of 4.9 µg/l (Round 1) and 5.1 µg/l (Round 2) compared to the EQS of 2µg/l was recorded. Therefore, this is considered to be a marginal exceedance. It was also not detected greater than the EQS EC in Round 3.

No leachable concentrations greater than the EQS screening value were observed in any of the soils analysed from the Site. This included a sample taken from the Made Ground within MS\BH15D. The maximum soil concentration of naphthalene recorded during the NZT GI (AEG, 2022) was 1.8mg/kg.

The location of the naphthalene groundwater exceedance is consistent with the findings of the previous investigation with concentrations exceeding the EQS for naphthalene from locations within the southwest corner of the site (See Table E.1), southeast of MS\BH13 and northeast of MS\BH15. Also, to note, to the south of the site boundary, south of MS\BH15D, concentrations of naphthalene were recorded in soils between 39 and 4100mg/kg at depths between 0.4 and 2.5m bgl as part of the previous investigations. Therefore, there is the potential that the naphthalene in this area is the result of an off-site source (migrating onto the site due to groundwater flow being in a southeast/southwest to northwest/northeast direction). Given the lack of leachable naphthalene recorded and low concentrations of naphthalene observed in the soils on the Site (maximum 1.8mg/kg), this is considered likely.

Although there is a potential source of naphthalene present in the groundwater, it is unlikely to impact surface waters, given the distance to these receptors down gradient from the source area and the lack of naphthalene present within the remaining monitoring wells in the north (down gradient) of the site. The closest down gradient borehole (MS\BH13) recorded less than limit of detection for naphthalene for both Round 2 and Round 3, having recorded a concentration of 0.24µgl (less than the EQS) during Round 1.

10.2.6 Hydrocarbons

TPH >EC5-EC7 aromatics and benzene and ethylbenzene were only detected greater than EQS in one location during the first monitoring round. This was MS\BH03 (within the Redcar Mudstone Formation response zone well) in the iron ponds area of the Main Site (Drawing 60657467-ACM-GIR-DRG-007) and Figure G.2). The concentrations detected are within the same order of magnitude as the EQS EC. Therefore, they are considered to be marginal exceedances. No exceedances of hydrocarbons were detected within the overlying Tidal Flat Deposits monitoring well at this location or within the Tidal Flats site wide. A mild hydrocarbon odour was noted on the exploratory log and was stated to be related to sand pockets within the Tidal Flat Deposits. There were no detectable concentrations of speciated TPH, benzene or ethylbenzene recorded in the Made Ground soils or Tidal Flat Deposits soils at this location. Ethylbenzene did exceed in the groundwater at MS\BH04(D) in Round 2 only (albeit the well at this location is within the Glacial Deposits) but no exceedance of hydrocarbons were detected in LF\BH01 (within the Tidal Flats or Redcar Mudstone Formation) in any of the monitoring rounds. Both these wells are to the north (therefore considered generally downgradient) of MS\BH03. Ethylbenzene also exceeded in Round 2 in MS\BH12(S), also in the Glacial Deposits.

TPH >EC5-EC7 aromatics and / or benzene were also detected greater than Drinking Water Standard EC (protective of groundwater quality) in MS\BH03(D) (Redcar Mudstone Formation) and within MS\BH05 (S and D) and MS\BH09(D) on the north west boundary of the Site within the Tidal Flat Deposits (See Appendix G). However, the concentrations observed in the groundwater at the two locations within the Tidal Flats Deposits were an order of magnitude less than that at MS\BH03(D) with a maximum concentration of TPH >EC5-EC7 aromatics and benzene of 5.2µg/l being recorded compared to 58 µg/l in MS\BH03(D). Therefore, the greatest concentrations of these contaminants are within the northern section of the Main Site. TPH Aromatic C16-C21 and aromatic C21-C35 were also noted to exceed the DWS in MS\BH09(D). This is comparable to the previous investigations, where benzene was noted to be generally absent within the southern section of the site.

The greatest concentration of TPH within the soils were recorded in the central eastern area of the Main Site, formally occupied by the Steel Plant, railway infrastructure and more recently possibly a former filling station. Within this area, at MS\TP06 contamination was observed within groundwater ingress. A brown iridescent appearance and moderate hydrocarbon odour was noted. A grab water sample was obtained from trial pit MS/TP06 during the works. Organic contamination exceedances of the DWS screening value included speciated hydrocarbons. A TPH concentration of 430,000µg/l was detected within this grab sample, compared to the greatest concentration in groundwater of 3,500µg/l in MS\BH03.

10.2.7 Cyanide

The cyanide concentrations detected in groundwater are noted to be generally site wide, with the lowest concentrations recorded in the northeast corner of the Site. This is generally consistent with the previous investigations. The number of cyanide total exceedances have increased in Rounds 2 and 3 compared to the Round 1 groundwater sample analysis within all groundwater strata. This is primarily due to a lower detection limit being applied for Round 2 and Round 3. The distribution and concentrations of free cyanide have remained relatively similar (generally low concentrations), with a slight increase in number of exceedances in the Tidal Flat Deposits over the monitoring period (Figure G.3, Appendix G). However, no location demonstrated exceedances of free cyanide over both Rounds 2 and 3. The greatest concentration of cyanide was recorded in the Redcar Mudstone Formation monitoring well of MS\BH17(D) in the southeast of the Site (0.076 mg/l). However, in general, the central and north western locations tend to have had the higher concentrations. It should be noted that “Blue Billy” (complex cyanides) was detected in the north west of the Site during previous investigation.

10.2.8 Thiocyanate

With regard to the risk to groundwater quality thiocyanate in groundwater was detected at concentrations at the Site which could not be deemed as generally isolated occurrences. However, in general, the concentrations detected in groundwater were less than 0.25mg/l. The greatest concentrations were recorded in MS\BH13 Tidal Flat Deposits, located in the central west area of the Main Site. This was not analysed for thiocyanate during Round 1. A concentration of 9.3 mg/l was recorded. However, within the lower Redcar Mudstone at this location, the concentration was only recorded at 0.042 mg/l. The DWS is 0.004 mg/l. In MS\BH05 concentrations increased during the monitoring programme. Maximum concentrations of 4.4 mg/l in the Tidal Flat Deposits (2 times the Round 1 concentration) and 3.9 mg/l in the Redcar Mudstone Formation (9.5 times the Round 1 concentration) were recorded. The next highest concentration was in MS\BH015 (Made Ground and Tidal Flats Deposits) in the southwest of the Main Site. This recorded similar concentrations across all three rounds and were generally approximately 1 order of magnitude less than those concentrations detected in MS\BH13 and MS\BH05.

The widespread occurrence of thiocyanate is consistent with the findings of the previous investigations undertaken at the Site. The concentration range of thiocyanate in groundwater recorded during Round 1 across the Site is presented in Figure G.4.

As per the cyanide concentrations discussed above, there are currently no down gradient locations north of these locations to confirm off-site migration.

10.2.9 Ammoniacal Nitrogen

Ammoniacal nitrogen in groundwater exceeded the EQS screening value in all but two samples during the three monitoring rounds. The greatest concentration was detected within MS/BH05 in the Tidal Flat deposits on the western boundary of the site (ranging from 10 to 19 mg/l) but generally, the concentrations were noted to be within 1 to 2 orders of magnitude greater than the EQS screening value across the Site. In the northeast corner of the Site (and within LF\BH01 to the north of the Main Site) which are downgradient locations, concentrations were generally lower than the rest of the Site. In total, approximately 35% of the samples analysed were less than 1 mg/l and 56% of the samples less than 2.1 mg/l (2 orders of magnitude of the EQS). The distribution of the groundwater sample exceedances for Round 1 are presented in Figure G.2 in Appendix G.

Based on the monitoring data from Rounds 2 and 3, ammoniacal nitrogen remains widespread and concentrations have generally slightly increased from Round 1 to Rounds 2 and 3. This may be as a result of the seasonal variation between monitoring rounds, with the first round taking place in August 2021 and Round 2 and Round 3 taking place in wetter months of October 2021 and November 2021. The ammoniacal nitrogen concentrations and distribution within the Tidal Flats have remained relatively similar, but with a slight elevation in concentrations in the central/ southern area of the Main Site. Slightly elevated concentrations are noted within the Made Ground groundwater samples also in the southern area of the Main Site. The greatest increase in ammoniacal nitrogen concentrations were within the Glacial Deposits and Redcar Mudstone Formation monitoring wells. MSBH05 (Tidal Flats) continued to record the greatest concentrations of ammoniacal nitrogen and overall concentrations remained within 1 to 2 orders of magnitude greater than the EQS screening value across the site as per Round 1.

Ammoniacal nitrogen was detected greater than the DWS in 68% of the samples analysed over the three monitoring rounds. Although there has been a general increase in concentrations from Round 1 to Rounds 2 and 3 the majority of the exceedances (60%) remained within the same order of magnitude as the DWS of 0.5 mg/l. It is noted that all the Made Ground soil leachate concentrations were detected less than the DWS, with the only soil leachate to exceed being from a soil sample in the Tidal Flats Deposits (clay) at 11.3m bgl.

It is noted that the EQS is for unionised ammonia and hence a direct comparison of this criteria to the reported ammonia concentrations is inherently conservative as only a proportion of the ammonia will be in the unionised form. However, increasing alkalinity favours the unionised form and hence, at the elevated pH detected in groundwater at a number of locations, the unionised form may comprise a significant proportion of the total ammonia concentration.

As per the thiocyanate and cyanide concentrations discussed above, there are currently no down gradient locations north of MS\BH05 in particular, to confirm off-site migration.

10.2.10 Sulfate

Sulfate concentrations were greater than the DWS in 70% of the samples analysed over the three monitoring rounds. Although there was a general increase in concentrations from Round 1 to Rounds 2 and 3 the majority of the exceedances (90%) remained within the same order of magnitude as the DWS of 250 mg/l.

10.2.11 Nitrite

Nitrite concentrations showed an increase in concentrations in Rounds 2 and 3 compared to Round 1, often recorded 1 to 2 orders of magnitude greater than Round 1. This resulted in 18 samples from Rounds 2 and 3 exceeding the DWS compared to only 1 in Round 1. This is potentially due to seasonal variation as round 1 was undertaken in August 2021, whilst Round 2 and 3 were undertaken in seasonal wetter months of October 2021 and November 2021. As with ammoniacal nitrogen, further groundwater monitoring may provide more information on this potential trend.

10.3 Summary of risk to human health

Based on the results of the soil screening assessment of the AECOM 2021 chemical data no contaminants exceeded the Evaluation Criteria (EC) designed to be protective of human health for the proposed commercial/industrial end use, nor for acute construction workers GAC. However, asbestos and high pH were noted within the soils and minor isolated exceedances of the chronic construction workers GAC were identified for arsenic and lead at the site which may pose a risk to construction workers and potential end-users if mitigation measures are not implemented to reduce the risk of exposure.

Therefore, other than potential risks from asbestos and pH, the risk to future users from the contaminants in the soil is deemed acceptable. However, it is important to note that this does not account for the areas of the Main Site that have not yet been investigated. For example, within the north west area of the Main Site, a cyanide hotspot exceedance was noted as part of the screening of the previous investigation data set and is also where it was noted that there was evidence on the ground indicating the presence of complex cyanides (“Prussian Blue”/“Blue Billy”). This area has not been able to be further investigated.

10.4 Summary of risk to surface water

With regards the potential risk to surface water, exceedances of the EC EQS were identified in the groundwater samples for metals, TPH, PAHs, phenols, cyanide and ammoniacal nitrogen. Isolated and sporadic exceedance of semi volatile compound bis(2-ethylhexyl)phthalate was also detected. These were detected within the groundwater samples from the Made Ground, Tidal Flat Deposits, Glacial Deposits and Redcar Mudstone Formation monitoring wells in varying concentration and distribution. With the exception of ammoniacal nitrogen and cyanide and to a much lesser extent mercury and fluoranthene, the exceedances detected are localised isolated occurrences in the groundwater beneath the Site.

Phenol and pentachlorophenol were detected in groundwater above the EQS screening value only within the Tidal Flat Deposits and only from one location (LF\BH01) and from the first monitoring round only. These were marginal exceedances as they were within the same order of magnitude as the EQS. There has been no source identified for this within the Site, with all soil samples within the AECOM 2021 preliminary GI recording concentrations of less than the limit of detection (0.1mg/kg). Similarly, as part of the previous investigations only occasional soil samples were detected greater than the limit of detection within the Main Site boundary at concentrations less than 20mg/kg and generally less than 1mg/kg.

On the basis of the limited exceedances of EQS in groundwater and soil leachate, the magnitude of exceedances in relation to the EQS, the spatial distribution of the exceedances across the Site and expected attenuation, it is considered that the soil and groundwater quality beneath the Site is unlikely to pose a significant risk to surface water quality.

However, as there were no exploratory hole locations able to be located in the far northwest corner of Site due to access constraints there are no down gradient boreholes to able to fully assess the potential for migration off site. Additional boreholes within the northwest corner of the site (if able to be undertaken) would be beneficial to be able to assess concentrations at the boundary in this area, in particular for the more elevated concentrations of ammoniacal nitrogen and cyanide identified within the northwest area. The increasing concentration trend for ammoniacal nitrogen in particular should be monitored to assess whether this is seasonal variation or a longer-term trend

10.5 Summary of risk to groundwater quality

The majority of the exceedances recorded are less than an order of magnitude or the same order of magnitude above EC, with the exception of isolated benzene and iron, sporadic nitrite exceedances and more widespread ammoniacal nitrogen and thiocyanate. This is despite the monitoring data for Round 2 and 3 indicating that there has been a general overall slight increase in ammoniacal nitrogen, thiocyanate and sulfate within the groundwater at the site during the monitoring rounds and the increase in nitrite by 1 to 2 orders of magnitude compared to Round 1.

Given the industrial history and location of these aquifers, it is highly unlikely that the aquifer will be exploited as a potable water in the future. This is reaffirmed in that the site is not within or near a groundwater source protection zone. Therefore, the use of DWS criteria in this assessment is considered to be very conservative.

Therefore, the exceedances in the groundwater or soil leachate described above are unlikely to result in harm or damage to potable water resources.

11. Ground gas

Gas monitoring was undertaken as outlined in Section 6.1.4. The results of this monitoring and the gas assessment undertaken are presented in the Ground Gas Risk Assessment in Appendix H.

The ground gas assessment is based on three post fieldwork monitoring rounds.

The gas monitoring results indicate that the maximum CH_4 concentration recorded during the monitoring was 0.2% v/v at MS\BH09S and the maximum CO_2 concentration recorded during the monitoring was 0.7 % v/v, also from MS\BH09S. The maximum flow rate recorded during the monitoring was 0.3l/hr at MS\BH08S.

In addition, the post-fieldwork monitoring round, ground gas monitoring was undertaken at weekly intervals during the intrusive ground investigation works. The concentrations recorded during these monitoring events were below the limit of detection for CH_4 and CO_2, with flow rates also recorded as below the limit of detection.

Based on the groundwater levels recorded within the monitoring wells during the monitoring events, the Made Ground monitoring wells were not deemed to be flooded and thus were applicable to be used for the ground gas monitoring assessment.

Based on the results the site could be classified as CS1. This provisionally indicates that no specific gas protection measures are required to be incorporated into the building design with regard to ground gas.

12. Ground model

A three dimensional ground model has been generated to help visualise the ground conditions encountered on the site. This ground model makes best use of the wide variety of ground investigation data available, incorporating ground data from prior and recent investigation, geophysical survey data, historical mapping, and overlaid proposed development footprints.

The model accompanies this report as a series of Leapfrog Scenes which are described below. Guidance to download and use Seequent Leapfrog Works to view and interact with the Scenes can be found in Appendix J.

Selected sections have also been cut from the model and overlaid with exploratory hole lithology, in situ testing and groundwater data. Sections A – A', B – B' and C – C' are presented on Drawings 60657467-ACM-GIR-DRG-009 to 011. Given the variability of the geology across the site, it is suggested that designer uses the geological sections provided and the description of ground conditions in Section 7 Ground Summary to determine a local ground model at the area of specific interest.

12.1 Scene 1: Base geological Model

A base model represents the geological conditions across the Main Site and Onshore CO_2 Export Pipeline Corridor and is largely based on materials encountered in the intrusive preliminary ground investigation. This model presents the site geology as four units:

- Made Ground
- Tidal Flat Deposits
- Glacial Deposits
- Bedrock

Unit boundaries are modelled between known contacts at exploratory holes to build three-dimensional unit volumes. Unit boundary surfaces are a mathematical extrapolation from known points with consideration of stratigraphic relationships and boundary conditions. As such, boundaries should be treated as approximate. In addition to classified exploratory hole descriptions, geological and site knowledge has been applied to constrain the geology to better match real-world observations.

Scene 1 includes the following information:

- Ground surface based on Environment Agency 1m resolution LiDAR (data acquired 2019);
- Aerial image draped over the topographic ground surface (Bing);
- 280 exploratory holes including exploratory holes from 2021 AEG investigations (39), historic boreholes from British Geological Society archives (6) and relevant holes from prior AEG and CH2M investigations;
- Unit volumes representing the interpreted geology; and
- Overlay GIS data including historical mapping (Ordnance Survey), tide levels (Ordnance Survey), site boundaries, and the proposed development footprint.

12.2 Scene 2: Sub-surface geophysics

AECOM recently carried out a significant campaign of geophysical investigation across the sites including various surface and subsurface survey techniques (AECOM (June 2021). Net Zero Teesside-Geophysical Investigation Revision 01). Processed data from 13 lines of Multi-channel Analysis of Surface Waves (MASW) survey have been integrated with the base geological model. The ground response represented in the MASW data has been used to refine unit boundaries between known points at exploratory holes.

Scene 2 includes the following information:

- All contents of Scene 1 described above;
- Lines draped on the ground surface illustrating where MASW surveys were carried out; and
- 13 MASW shear wave velocity sections shown in place below the ground surface;

12.3 Scene 3: Surface geophysics and obstruction mapping

Further utilising the geophysical data acquired by AECOM on the site, time-domain electromagnetics (TDEM) survey data has also been integrated with the base geological model. In depth discussion of the survey work and interpretation of probable sub-surface obstructions is presented in Appendix B. Scene 3 illustrates the location of the probable and known ground obstructions by including overlay of TDEM response, and GIS representations of the mapped obstructions, and known obstructions from intrusive ground investigation.

Scene 3 includes the following information:

- All contents of Scene 1 described above;
- TDEM ground response;
- Mapped ground obstructions (tracks, walls, slabs, other features) from (Appendix B); and
- Boreholes with known buried obstructions

13. Geotechnical risk register

Ground risks have been assessed against a project specific 5 x 5 risk matrix. Table 13-1 below summarises the criteria that have been applied to assess the key ground risks. Risks are initially assessed against unmitigated consequences (no barriers in place or of limited effectiveness) and then again assuming mitigation in place and effective.

A preliminary Geotechnical and Geoenvironmental risk register for the Main Site and the Onshore CO_2 Export Pipeline Corridor is presented in Table 13-2 and Table 13-3 below. The purpose of the register is to identify the risks and consequences of those risks together with measures to be undertaken to mitigate the risks. The recommendations provided are based on site observations, an interpretation of the ground investigation (GI) information and historical records obtained to date. This register will require regular review and should be updated and revised as scheme design progresses. Risks and mitigation measures identified in this report should be considered in future detailed design and where required, discussed further during the reporting of geotechnical design calculations.

In order to comply with the Construction (Design and Management) Regulations 2015 (CDM 2015) (Ref. [20]), the Principal Designer should be informed of the results of this study. It is recommended that Construction Environmental Management Plan (CEMP), Materials Management Plan (MMP), Asbestos Management Plan (AMP) and Construction Specifications are developed during detailed design and construction of the scheme.

The main risks identified are summarised below:

1. Inadequate bearing capacity
2. Heave
3. Settlement and collapse of underlying soils
4. Earthworks, obstructions and voids
5. UXO
6. Shallow groundwater
7. Soil contamination
8. Groundwater contamination
9. Aggressive ground conditions for buried concrete and steel
10. Other

Table 13-1. Criteria to be used when assessing risks in line with project 5 X 5 risk matrix approach

For the purposes of this Ground Investigation Report (GIR), risk has been assessed with reference to 'impact' and 'likelihood' and 'risk classification'. Risk classification (R) = Impact (I) x Likelihood (L).

Impact		Likelihood				
		1	2	3	4	5
		Rare	Unlikely	Possible	Likely	Almost Certain
5	Severe	5	10	15	20	25
4	Major	4	8	12	16	20
3	Medium	3	6	9	12	18
2	Low	2	4	6	8	10
1	Insignificant	1	2	3	4	5

Score	
Above 19	1. Highest
Above 9, up to 19	2. High
Above 4, up to 9	3. Medium
Above 2, up to 4	4. Moderate
Up to 2	5. Low

The risk classification is the product of the likelihood and the **impact**

Impact	Score	Description
Severe	5	Would result in catastrophic events resulting in programme/project failure and benefits not being realised
Major	4	Would result in significant disruption to the programme/project, resulting in the need to conduct re-planning and re-estimating. In the extreme, it may result in failure of the programme / project
Medium	3	Would result in delays or additional work that would exceed existing contingencies, resulting in exceeded time scales, additional resource and/or additional budget requirements
Low	2	Would result in delays or additional work that could be contained within existing contingencies
Insignificant	1	Would result in negligible delays or disruption

Likelihood	Score	Description
Almost Certain	5	Is a feature of programmes/projects of this type, or has occurred many times in recent history, or is a brand new risk that has been identified that is imminent
Likely	4	Has occurred many times in the past, or has occurred a few times in recent history
Possible	3	Has occurred a few times in the past, or has occurred infrequently in recent history
Unlikely	2	Has occurred infrequently in the past, or a "one off" from the past
Rare	1	Possible to occur but no known precedents

Table 13-2. Geotechnical Risk Register – Main Site

				Risk Statement			Initial			Response	Residual		
Risk Category	Risk Title	Risk Type	Discipline	Causes	Event	Unmitigated Consequences	Prob	Imp	Sev	Mitigation/Realisation Overview	Prob	Imp	Sev
1. Inadequate bearing resistance	Inadequate bearing (including total and differential settlement) due to poorly compacted, loose and soft underlying material	Threat	Engineering	Thick various types of Made Ground, of variable, (sometimes very loose and loose density) and chemical composition underlain by low strength, potentially highly compressible Tidal Flat Deposits and Glacio- lacustrine Deposits.	**Collapse - structural failure of buildings due to loss of support by foundations.**	1) HSE incident on site 2) Possible redesign, construction delay, increase in cost.	3	3	9	Adequate design. Adopt appropriate foundations to transfer structure loads to soils or bedrock of adequate strength.	1	3	3
1. Inadequate bearing resistance	Difficult foundation construction	Threat	Construction	Soft, variable, compressible and / or saturated soils.	**Ground squeezing leading to 'necking' of pile shafts formed using continuous flight auger (CFA) techniques.**	1) Pile concrete integrity and pile capacity is compromised. 2) Possible redesign, construction delay, increase in cost.	4	3	12	Ground Investigation has proved soft, variable, compressible and saturated soils. Appropriate techniques selection including balancing of pore water pressures at pile toe during construction. Mitigate where possible through careful foundation selection and design.	2	3	6
1. Inadequate bearing resistance	Difficult excavation conditions	Threat	Construction	Infiltration of surface water. Infiltration of groundwater.	**Collapse settlement of founding stratum.**	1) Collapse of excavations. 2) Instability of temporary open cut excavations. 3) Prolonged pumping of groundwater induces ground settlement and damages adjacent third-party infrastructure. 4) Litigation resulting from damage caused to third party infrastructure.	4	2	8	Adequate design for ground and groundwater conditions proved on site. Appropriate temporary works measures for open cut sections formed at an appropriate side slope angle or alternatively continuous side support by provision of temporary sheet piles or propped trench box sections. Temporary groundwater control measures will be required, such as sump pumping, well pointing, vacuum extraction systems, and provision of temporary sheet pile cut off. Temporary works well point dewatering measures combined with sheet pile cut off. Include cost / risk allowance for slow construction progress in the Construction Risk Register.	2	2	4
2. Heave	Heave of underlying soils. Total and / or differential ground displacement.	Threat	Engineering	Chemical changes of slag-dominant and refractory materials	**Ground heave and ground movement.**	1) Serviceability problems affecting foundations, ground bearing floor slabs, hardstanding areas, service roads and the connections / cross fall of buried utilities.	4	4	16	TRS Slag testing results were not available at the time of preparation of this risk register. Site specific verification, test methodology and specification during FEED. Identification and treatment of the most prone types of slag including slag weathering tests. Reacted material should be confirmed to manage the isolation if required, especially big blocks, which may be placed in areas of less critical design. Slag with swelling potential exceeding 3% to be excavated and replaced with clean inert site won or imported granular fill. Granular construction interfaces (also functioning as capillary breaks) of adequate thickness for ground bearing slabs and pavements. Additional slag testing may be undertaken to confirm the most likely value of expansivity at specific structure locations. Void formers to structural elements. Sleeved bored piles to accommodate lateral expansion and / or heave and transfer of bearing loads to underlying strata. Pile and beam foundation options for support structures Extend length of pile rock socket to resist heave.	2	4	8
3. Settlement and collapse of underlying soils	Total and / or differential ground displacement (settlement)	Threat	Engineering	Thick various types of Made Ground, of variable, (sometimes very loose and loose density) and chemical composition underlain by low strength, potentially highly compressible Tidal Flat Deposits and Glacio- lacustrine Deposits.	**Excessive total and / or differential settlement.**	1) Structural damage caused by excessive ground displacement. 2) Serviceability problems leading to structural damage / long term maintenance.	4	3	12	FEED Design structure specific ground investigation. Adequate design. Adopt appropriate foundations to transfer structure loads to soils or bedrock of adequate strength.	2	3	6
3. Settlement and collapse of underlying soils	Collapse settlement	Threat	Engineering	Infiltration of surface water. Inundation of poorly compacted Made Ground due to a permanent or temporary rise in groundwater levels.	**Collapse settlement of founding stratum.**	1) Structural failure. 2) Excessive total and / or differential settlement of structures.	4	2	8	Ground Investigation has proved groundwater to be a shallow depth between 2 and 3m bgl. Adequate design. Adopt appropriate foundations to transfer structure loads to soils or bedrock of adequate strength.	2	2	4
4. Earthworks, obstructions and voids	Difficult foundation construction condition	Threat	Construction	Obstructions in the Made Ground including gravel, cobble and boulder sized pieces of slag, very dense material, relict buried foundations, walls, ground slabs, tunnels and possibly pile foundations from former infrastructure.	**Unable to construct foundations as design.**	1) Possible redesign, construction delay, increase in cost. 2) Unable to advance pile to design toe level. 3) Structural damage (cracking / spalling) to driven concrete or steel piles or loss of plan position and verticality tolerances. 4) Unable to construct shallow foundations, ground slabs, road / hardstanding areas for utilities as planned.	4	3	12	Ensure condition of land in option agreement is adequately specified to minimise risks. Ground Investigation including geophysics and trial pitting has identified potential ground obstructions across the site. Consideration to the viability of undertaking targeted excavation and replacement of obstructions. Carry out advanced probing at pile positions. Consider use of cased rotary bored or ODEX piling techniques as alternative to contiguous flight auger (cfa) or driven precast concrete segmental piles. Over sight by qualified engineer of the remediation works and removal of obstructions Need for detailed design SI by FEED / EPC Contractors	2	3	6
4. Earthworks, obstructions and voids	Difficult foundation construction	Threat	Construction	Natural obstructions within the glacial drift soils present below the site. Presence of strong bands of limestone and / or ironstone within solid succession.	**Unable to construct foundations as design.**	1) Unable to achieve pile design toe levels. 2) Construction results in damage piling equipment (augers), piles, or piles which do meet specified out of plan and / or verticality tolerances. 3) Possible redesign, construction delay, increase in cost.	3	3	9	Ground Investigation did not identify significant natural obstructions in the glacial soils. Appropriate technique selection, including consideration of unconfined compressive strength of bedrock and rig torque capacity. Mitigate where possible through careful foundation selection and design. Over sight by qualified engineer of the remediation works and removal of obstructions Need for detailed design SI by FEED / EPC Contractors	1	3	3
5. Presence of UXO	UXO	Threat	Construction	UXO risk on site poorly understood.	**UXO discovery or initiation.**	1) HSE incident on site. 2) Possible redesign, construction delay, increase in cost.	3	4	12	Review UXO Risk Assessment and Risk Mitigation Strategy Report (6 Alpha Associates). Specialist UXO clearance surveys to be undertaken as part of all future below ground works. Risk zoning of site. Site briefings and tool box talks. Adopt avoidance in high risk areas.	2	4	8

				Risk Statement			Initial			Response	Residual		
Risk Category	Risk Title	Risk Type	Discipline	Causes	Event	Unmitigated Consequences	Prob	Imp	Sev	Mitigation/Realisation Overview	Prob	Imp	Sev
7. Soil contamination	Onshore Site Conditions	Threat	Engineering	1. Geophysical onshore conditions are not well known 2. Potential for unknown substances on site (degraded industrial zone) 3. Potential UXO on site	**Excessive remediation scope required on site.**	1) Potential underestimation of project cost.	3	4	12	Ground investigation has been undertaken. FEED contractor to review the results of ground investigation as part of further phases of design.	2	4	8
7. Soil contamination	Chemical reaction with organic contaminants	Threat	Engineering	Elevated concentrations of coal tar, petroleum hydrocarbons, solvents, cutting fluids etc.	**Damage and permeation of plastic pipes and membranes.**	1) Chemical breakdown of damp proofing and gas resistant membranes with loss of protection. 2) Permeation of polyethylene (PE) and polyvinyl chloride (PVC) plastic pipes affecting potable water supplies.	3	3	9	Provision of permanent sleeving to protect pipes installed through the most aggressive material (Slag dominant material). Utilities may be installed within clean inert pipe bedding material. Use of wrapped steel, wrapped ductile iron, copper and PE barrier pipe with an aluminium barrier layer (PE-Al-PE) for services and water supplies in contaminated soils	1	3	3
7. Soil contamination	Material re-use	Threat	Construction	Material excavated may be contaminated and / or unacceptable for re-use in bulk earthworks.	**Disposal offsite.**	1) Additional disposal of soils required outside anticipated earthworks volume.	3	3	9	Cost / risk allowance for waste disposal of contaminated soils to be allowed for within construction risk register. Waste may be contaminated with Hazardous materials. Development of a Remediation Design Strategy and implementation of Materials Management Plan, Asbestos Management Plan, Construction Environmental Mitigation Plan and Verification Report on completion of the works.	2	3	6
7. Soil contamination	Dust management	Threat	Construction	High pH, asbestos fibres, mineral (slag) wool, silica in soils below cover layer.	**Fines/contamination released into air.**	1) Exposure of construction, maintenance workers and site users to fibres and fine particles with acute and chronic health impacts.	3	3	9	Undertake Foundation Works Risk Assessment. Mitigate where possible through design. Dust management plan.	2	3	6
7. Soil contamination	Construction workers	Threat	Construction	Arsenic & lead within soils may potentially pose chronic risk to construction workers	**Contaminated soils during construction works**	1) Exposure of construction, maintenance workers-chronic health impacts.	2	3	6	Mitigate through design, Health and Safety documentation, Construction Environmental Mitigation Plan	1	3	3
8. Groundwater contamination	Groundwater remediation	Threat	Environmental	Groundwater monitoring data was incomplete at the time of preparation of this risk assessment. Data ongoing for range or time variation. Pollution indicators present for pH, metals, hydrocarbons, cyanide, thiocyanate and ammonical nitrogen. However, risks to surface water and groundwater considered to be low. Areas of site remain univestigated . Therefore, full impact water pollution on aquifers and SSSI is not fully characterised and potential for Potential on-site and off-site point and diffuse pollution sources to remain. Unknown regulatory requirements.	**Groundwater contamination event.**	Delay to programme and cost increase due to: 1. Regulatory delay. 2. Underestimated scope for soil clean-up. 3. Long term monitoring and / or groundwater remediation.	3	3	9	Ensure groundwater conditions have been adequately characterised. Unacceptable sources of continuing groundwater pollution to be removed. Agreement for the requirements of ongoing monitoring and or remediation prior to site hand-over. Ongoing groundwater monitoring and testing, modelling, risk assessment. Regulatory dialogue. Long term monitoring and / or groundwater remediation.	1	3	3
8. Groundwater contamination	Surface water pollution	Threat	Construction	Failure of waste containment for soils, pumped water and run-off	**Pollution incident.**	1) Pollution incident. 2) Fines. 3) Additional remediation cost. 4) Project delays and cost impact. 5) Loss of licence.	4	2	8	Site specific environmental management plan (contingency planning). Surface water management. Waste management plan. Environmental site supervision.	2	2	4
8. Groundwater contamination	Groundwater pollution	Threat	Construction	Ground disturbance through intrusive works construction and piling.	**Mobilise trapped pollutants into watercourses.**	Create source – pathway – receptor between contaminated groundwater and the underlying superficial and bedrock aquifers. Pollution incident. Fines. Cost for remediation. Project delays and cost impact. Loss of licence.	4	2	8	Potential additional ground investigation of potential point sources. Programme of groundwater monitoring. Determine sensitivity of groundwater. Undertake Foundation Works Risk Assessment. Mitigate where possible through careful foundation selection and design. Consultation with the Environment Agency and Redcar and Cleveland Borough Council.	2	2	4

				Risk Statement			Initial			Response	Residual		
Risk Category	Risk Title	Risk Type	Discipline	Causes	Event	Unmitigated Consequences	Prob	Imp	Sev	Mitigation/Realisation Overview	Prob	Imp	Sev
8. Groundwater contamination	Groundwater contamination	Threat	Construction	High pH, fines content (metals, PAHs), hydrocarbons, phenols, thiocyanate, ammoniacal nitrogen in groundwater	**Contaminated groundwater discovered during construction.**	1) Project delay and costs associated with waste water storage, treatment and disposal.	3	4	12	Programme of groundwater monitoring. Determine water level variability. Avoid construction below the water table. Explore options for off-site treatment. Assess options for on-site treatment. Manage surface water separately.	2	4	8
9. Aggressive ground conditions for buried concrete and steel	Aggressive ground conditions	Threat	Engineering	Elevated concentrations of sulphate and chloride and acidic or alkaline pH in soil or groundwater.	**Damage to buried concrete and steel.**	1) Chloride attack resulting in corrosion of buried steel leading to a loss in strength and / or excessive structural deflection. 2) Sulphate attack to buried concrete resulting in a reduction in concrete strength. 3) Serviceability problems leading to long term maintenance liability.	4	3	12	Ground Investigation has indicated soils to be aggressive to buried concrete with BRE SD1 ACEC Classification ranging between DS2 AC-2 and DS5AC-5. Adopt appropriate concrete class. 'Ground Investigation has indicated soils to be aggressive' to 'very aggressive' corrosivity classification for buried steel. Allow for steel surface treatment, encapsulation of sacrificial section for corrosion losses for buried steel . Provision of permanent sleeving to protect piles installed through the most aggressive material (Slag dominant material). Utilities may be installed within clean inert pipe bedding material. Use of wrapped steel, wrapped ductile iron, copper and PE barrier pipe with an aluminium barrier layer (PE-Al-PE) for services and water supplies in contaminated soils	4	2	8
10. Other	Seismic	Threat	Engineering	Seismic event, inadequate design.	**Structural collapse.**	1) HSE incident on site. 2) Possible redesign, construction delay, increase in cost.	2	5	10	Initial seismic design requirements review. Incorporate seismic parameters in design if required.	1	5	5
10. Other	Slope stability	Threat	Engineering	Poor design, weather/ seismic event, poor construction.	**Collapse of excavations.**	1) HSE incident on site 2) Possible redesign, construction delay, increase in cost.	2	3	6	Mitigate where possible through design.	1	3	3
10. Other	Difficult construction conditions	Threat	Construction	Disused redundant and live buried services associated with past land use.	**Unexpected services are identified during construction.**	1. Potential underestimation of project cost.	3	4	12	Ensure condition of land in option agreement is adequately specified to minimise risks.	1	4	4
10. Other	Difficult construction conditions – sensitive environmental location	Threat	Construction	Special environmental / ecological requirements.	**Ecological damage.**	1) Potential loss of dune habitat. 2) Construction delay; increase in cost and possible redesign. 3) Adverse effect on nationally protected wildlife (dune habitat and migratory birds).	3	3	9	Maximise re-use of excavated sands in construction to minimise loss of sand habitat. Development of Ecological Risk Assessment and Mitigation Strategy and implementation in Construction Environmental Mitigation Plan.	2	3	6

Table 13-3. Geotechnical Risk Register – Onshore CO_2 Export Pipeline Corridor

				Risk Statement			Initial			Response	Residual		
Risk Category	Risk Title	Risk Type	Discipline	Causes	Event	Unmitigated Consequences	Prob	Imp	Sev	Mitigation/Realisation Overview	Prob	Imp	Sev
4. Earthworks, obstructions and voids	Slope stability Difficult earthworks open cut construction	Threat	Construction	Difficult construction conditions – stability of temporary open cut excavations in granular coarse soils which form the dune habitat and adjacent beach foreshore	**Side slope instability**	1) Side slope instability, slumping or ravelling of slopes dug below ground. 2) Cost / risk allowance for slow construction progress. 3) Possible redesign, construction delay, increase in cost.	3	4	12	- Appropriate temporary works measures for open cut sections formed at an appropriate side slope angle or alternatively continuous side support by provision of temporary sheet piles or propped trench box sections.	2	4	8
4. Earthworks, obstructions and voids	Difficult excavation for open cut construction	Threat	Construction	Obstructions in the Made Ground including gravel, cobble and boulder sized pieces of slag, very dense material, fused slag.	**Unable to construct open cut for proposed pipeline**	1) Not possible to construct in-ground sections to depth or vertical alignment as planned. 2) Possible redesign, construction delay, increase in cost.	2	3	6	- If rerouting is not practical, carry out advanced works ahead of main pipeline construction including advanced probing along the proposed pipeline alignment and / or limited earthworks to remove identified constraints (fused slag) by undertaking targeted excavation and replacement of obstructions.	1	2	3
4. Earthworks, obstructions and voids	Difficult foundation construction	Threat	Construction	Natural obstructions within the glacial drift soils present below the site. Presence of strong bands of limestone and / or ironstone within solid succession.	**Unable to construct pipeline using Horizontal Directional Drilling?**	1) Unable to achieve pile design toe levels. 2) Construction results in damage to HDD equipment. 3) Possible redesign, construction delay, increase in cost.	2	3	6	- Appropriate technique selection, including consideration of unconfined compressive strength of bedrock and HDD capacity. - Mitigate where possible through pipeline alignment.	1	3	3
5. Presence of UXO	UXO	Threat	Construction	UXO risk on site poorly understood	**UXO discovery or initiation**	1) HSE incident on site 2) Unable to construct proposed pipeline along proposed alignment and / or re-route sections to avoid known UXO risk. 3) Possible redesign, construction delay, increase in cost.	3	4	12	- Undertake detailed UXO risk assessment - Risk zoning of site - Site briefings and tool box talks - Adopt avoidance in high risk areas - Pipeline construction optioneering (e.g. open cut versus HDD)	2	4	8
6. Shallow groundwater	Slope stability Difficult earthworks open cut construction	Threat	Construction	Difficult construction conditions – tidal groundwater control.	**Side slope stability Shallow groundwater inflows [from wet, coarse soils].**	1) Groundwater inflows into excavations, side slope instability, slumping or ravelling of slopes dug below ground. 2) Liquefaction or pumping of silts and / or sands under loading from earth moving plant. 3) Possible redesign, construction delay, increase in cost.	4	3	12	- Adequate design for the ground and groundwater conditions proved on site. - Appropriate temporary works measures for open cut sections formed at an appropriate side slope angle or alternatively continuous side support by provision of temporary sheet piles or propped trench box sections	2	4	8
7. Soil contamination	Material Re-use	Threat	Construction	Material excavated may be contaminated and / or unacceptable for re-use as bulk backfill above buried service utilities.	**Disposal offsite and import of clean inert material**	1) Potential loss of dune habitat	3	3	9	- Contamination assessment of chemical data. - Cost / risk allowance for waste disposal of contaminated soils to be allowed for within construction risk register. Waste may be contaminated with Hazardous materials. - Development of a Remediation Design Strategy and implementation of Materials Management Plan, Asbestos Management Plan, Construction Environmental Mitigation Plan and Verification Report on completion of the works	2	3	6
7. Soil contamination	Chemical reaction with organic contaminants	Threat	Engineering	Elevated concentrations of coal tar, petroleum hydrocarbons, solvents, cutting fluids etc.	**Damage to buried concrete and steel.**	1) Long term operation and serviceability limits impacted. 2)Long term maintenance and repair costs.	3	3	9	Provision of adequate concrete BRE Class concrete installed through the most aggressive material (Slag dominant material).	2	3	6
7. Soil contamination	Soil contamination	Threat	Environmental	Contaminants in shallow soil exceed the acceptable limits for Public Open Space or workers' health and safety.	**Materials excavated from depth do not meet the site safety criteria for shallow soils.**	Exposure of construction workers and members of the pubic to harmful substances in the ground.	3	3	9	- Contamination assessment for deep and shallow soils - Ensure that clean and contaminated soils are not mixed in construction - Provide a cover of clean site-won or imported materials - Verify the clean cover after construction	2	3	6

				Risk Statement			Initial			Response	Residual		
Risk Category	Risk Title	Risk Type	Discipline	Causes	Event	Unmitigated Consequences	Prob	Imp	Sev	Mitigation/Realisation Overview	Prob	Imp	Sev
7. Soil contamination	Dust management	Threat	Construction	High pH, asbestos fibres, mineral (slag) wool, silica in soils below cover layer	**Fines/contamination released into air**	Exposure of construction workers to fibres and fine particles with acute and chronic health impacts	3	2	6	- Undertake foundation works risk assessment - Mitigate where possible through design - Dust management plan	2	2	4
8. Groundwater contamination	Groundwater remediation	Threat	Environmental	No groundwater data available for site; hydraulic continuity expected between Made Ground and the underlying Blown Sands & Tidal Flat Deposits though unproven. Upgradient data for the Redcar Blast Furnace has pollution indicators present for pH, metals, hydrocarbons, cyanide, thiocyanate. Potential on-site and off-site point and diffuse pollution sources. Impact of water pollution on aquifers and SSSI is not fully characterised Unknown regulatory requirements	**Groundwater contamination event**	Delay to programme and cost increase due to: Regulatory delay. Underestimated scope for soil clean-up, soil import and disposal of waste arisings based on impacts to groundwater. Long term monitoring and / or groundwater remediation	3	3	9	- identify of areas of soil contamination. - Monitor variations of water level and groundwater quality. - Risk assessment to determine soil clean-up requirements. - Determine the requirements for ongoing monitoring and or remediation prior to site hand-over - Regulatory dialogue - Plan removal, treatment and or disposal of unsuitable materials from pipeline excavations. - Long term monitoring and / or groundwater remediation	2	3	6
8. Groundwater contamination	Groundwater pollution	Threat	Construction	Ground disturbance through intrusive works	**Mobilise trapped pollutants in to groundwater**	Spike in groundwater monitoring data Increased concentrations of pollutants in construction dewatering Cost for remediation Project delays and cost impact Loss of licence	2	4	8	- Programme of groundwater monitoring - Determine sensitivity of groundwater and hydraulic connectivity - Undertake foundation works risk assessment - Mitigate where possible through design of temporary and permanent works.	1	4	4
8. Groundwater contamination	Surface water pollution	Threat	Construction	Failure of waste containment for soils, pumped water and run-off	**Pollution incident**	Pollution incident Fines Cost for remediation Project delays and cost impact Loss of licence	2	4	8	- Site specific environmental management plan (contingency planning) - Surface water management - Waste management plan - Environmental site supervision	1	4	4
8. Groundwater contamination	Contaminated groundwater	Threat	Construction	High pH, fines content (metals, PAHs), hydrocarbons phenols, cyanide, ammonia... in groundwater	**Contaminated groundwater is drawn into excavations or dewatering wells.**	Project delay and costs associated with waste water storage, treatment and disposal	3	4	9	- Programme of groundwater monitoring - Determine water level variability - Avoid construction below the water table - Explore options for off-site treatment - Assess options for on-site treatment - Manage surface water separately	2	4	8
9. Aggressive ground conditions for buried concrete and steel	Aggressive ground conditions	Threat	Engineering	Elevated concentrations of sulphate and chloride and acidic or alkaline pH in soil or groundwater,	**Damage to buried concrete and steel.**	1) Chloride attack resulting in corrosion of buried steel leading to a loss in strength and / or excessive structural deflection. 2) Sulphate attack to buried concrete resulting in a reduction in concrete strength. 3) Serviceability problems leading to long term maintenance liability.	2	3	6	- Adequate specification of design sulphate class	1	3	3
10. Other	Onshore Site Conditions	Threat	Engineering	1. Geophysical onshore conditions are not well known 2. Potential for unknown substances on site (degraded industrial zone) 3. Potential UXO on site	**Excessive remediation scope required on site**	1. Potential underestimation of project cost	3	2	6	- Ensure condition of land in option agreement is adequately specified to minimize risks. - Need to complete a geotechnical survey - risk profile would change significantly	2	2	4
10. Other	Slope stability	Threat	Engineering	Poor design, weather/ seismic event, poor construction	**Collapse of excavations**	1) HSE incident on site 2) Possible redesign, construction delay, increase in cost.	2	3	6	- Mitigate where possible through design	2	3	6

Risk Category	Risk Title	Risk Type	Discipline	Risk Statement			Initial			Response	Residual		
				Causes	Event	Unmitigated Consequences	Prob	Imp	Sev	Mitigation/Realisation Overview	Prob	Imp	Sev
10. Other	Difficult construction conditions – sensitive environmental location	Threat	Construction	Sensitive environmental designations [SPA RAMSAR, SSSI]. Special environmental / ecological requirements.	**Damage designated sites and or species. Legislative penalties.**	1) Regulatory infringement / incident. 2) Potential loss of sand habitat (Blown Sand and Tidal Flat deposits – Sand and Silt). 3) Construction delay, increase in cost and possible redesign. 4) Adverse effect on protected wildlife (dune habitat and migratory birds) 5) Adverse effect on protected wildlife (ponds)	4	3	12	- Adequate design for the ground and groundwater conditions proved on site. - Maximise re-use of excavated sands in construction to minimise loss of sand habitat. - Baseline ecological assessment, Development of Ecological Risk Assessment and Mitigation Strategy and implementation in Construction Environmental Mitigation Plan.	2	3	6
10. Other	Difficult construction conditions – sensitive environmental location	Threat	Construction	Sensitive environmental designations [SPA RAMSAR, SSSI]. Special environmental / ecological requirements.	**Damage designated sites and or species. Legislative penalties.**	1) Regulatory infringement / incident. 2) Potential loss of pond habitat as a result of dewatering. 3) Construction delay, increase in cost and possible redesign.	4	3	12	- Adequate design for the ground and groundwater conditions proved on site. - Re-route the alignment of the proposed pond to reduce as far as is reasonable practicable the impact on the exist marsh and ponds on the site. - Hydrogeological modelling of ground and groundwater conditions. - Appropriate temporary works measures for open cut sections formed at an appropriate side slope angle or alternatively continuous side support by provision of temporary sheet piles or propped trench box sections	2	3	6
10. Other	Seismic	Threat	Engineering	Seismic event, inadequate design	**Structural collapse**	1) HSE incident on site 2) Possible redesign, construction delay, increase in cost.	1	3	3	- Initial seismic design requirements review - Incorporate seismic parameters in design if required	1	3	3

14. Engineering Recommendations

14.1 Earthworks

14.1.1 General considerations

The main geotechnical risks relating to earthworks are the presence of obstructions and voids, shallow groundwater, soil contamination and groundwater contamination

Detailed earthwork proposals and cut and fill requirements were not available at the time of writing this report and calculation of earthwork materials cut/fill balance for the scheme will be addressed by others. It is understood that an Earthwork Specification has been developed for South Tees Development Corporation for preparation of a development platform for construction.

All earthwork operations will need to be undertaken in accordance with BS6031:2009 'Code of Practice for Earthworks' and a design specification based on a recognised national standard such as Highways England (HE) (now renamed National Highways) guidelines included in the Design Manual for Roads and Bridges (DMRB) Series 600 'Earthworks'. Further, more detailed ground investigation is required to determine the geotechnical properties of materials which may be re-used in earthworks constructed on site.

It is important that the site won material is, where possible, not classified as waste as this will limit options for re-use and have a significant impact on material disposal cost and the environmental impact of the proposed development.

The development of a Remediation Strategy agreed and approved in line with the Planning Application Process, in accordance with the tiered approach of the Environment Agency online Land Contamination Risk Management Guidance (LCRM), BS10175:2011 + A2:2017 and the Environment Agency's guiding principles for land contamination in assessing risks to controlled waters, GPLC1 is required. In accordance with this guidance, a verification report of the reclamation and remedial works undertaken will also be required.

Excavation and remediation of the former 'iron ponds' was taking place during the NZT preliminary GI and the thickness of Made Ground is likely to have changed in this area.

Ground investigation has been completed prior to these remedial and platform construction works and ground conditions are likely to have changed from those described in this GIR.

14.1.2 Excavatability and Groundwater Control

Groundwater within the granular Made Ground (d3), slag dominant material (d1) and the Tidal Flats Deposits Sands (c1) are noted to vary between approximately 3.0 and 4.0m OD although is noted to be shallower in MS\BH's 02 and LF\BH02 in the north portion of the site.

The shallowest groundwater level observed in the coarse Made Ground soils (d1) and Tidal Flat Deposits Sands (c2) was 1.89m bgl (2.78m OD) in borehole MS\BH03. Considering existing ground levels, excavations extending 2 to 3m below ground level are likely to encounter groundwater inflows particularly from coarse Made Ground soils (d1 and d3) or within the water bearing Tidal Flat Deposits Sands (c2) soils, especially during and after prolonged periods of wet weather. Such materials will require continuous support. For shallow excavations below groundwater, pumping from sumps in the base of excavations may be feasible.

For deeper excavations, the use of proprietary trench boxes or the installation of sheet piles to form cut off walls to control inflow and prevent base instability may be required. It is noted that the Tidal Flat Deposits Sands (c1) are interpreted to be high permeability soils extending to approximately 10m depth along the south boundary of the site thickening to 20m depth to the north at the northern extent of the Onshore CO_2 Export Pipeline Corridor. Control of groundwater during excavation using sheet piles may not be feasible due to the depth of pile required to form a cut off into the underlying low permeability Glacial Lacustrine Deposits (b3) and Glacial Till (b1).

For deep excavations a combination of sheet pile cut off and well point dewatering measures to lower the water table may be required.

Temporary excavations should be either cut back to a safe angle determined on site or be continuously supported. In order to comply with health and safety legislation, a risk assessment must be undertaken to assess the potential for harm if construction workers have to enter an excavation. Control of groundwater flows, running sands and silts as well as maintaining excavation side slope stability during construction and in the longer term will need to be assessed during detailed scheme design.

14.1.3 Reuse of materials

At the time of writing this GIR the proposed platform level/s and earthworks cut fill balance quantities were unknown.

Notwithstanding the above, material re-use is likely to be most applicable to the Made Ground slag dominant (d1) and Made Ground granular (d3) materials which occur across the site from ground level to approximately 7m depth. Soil descriptions, particle size distribution and compaction testing has shown that these soils contain a significant proportion of oversize material including slag cobbles and boulders, concrete and masonry boulders, rebar, metal waste etc, particularly within the slag dominant material. Given the large proportion of cobble sized material the results from these tests are unlikely to be reliable. Prior to reuse on site this material will require processing to crush oversize materials, reclaim metal scrap and remove unsuitable material. Where slag material is crushed it is possible this will result in increased expansivity as in its current state the material is surface weathered, or internally limited by its permeability. Crushed slag results in a larger surface area of unreacted material. However, it is noted that the slag expansivity testing undertaken replicates this scenario as it involves crushing the material for testing. The risk from expansivity of crushed slag may be reduced through mixing with inert granular material such as crushed demolition waste so as not to concentrate but disperse and evenly spread the slag material.

Reuse of soils will need to be specified in accordance with the Highways England (now National Highways) Specification for Highway Works (SHW), Series 600, Earthworks. In accordance with this specification, once processed the Made Ground granular (d3) and slag dominant (d1) material it may in principle be possible to reuse this material as:

- Class 1A/B/C - General Granular Fill
- Class 6A/B - Selected coarse/uniformly graded granular material – Starter layer
- Class 6F2 – Selected granular material (coarse grading) - Capping
- Class 6I/J - Selected well graded/uniformly graded granular material - Fill to reinforced soil and anchored earth structures
- Class 6N/P/Q - Fill to structures

Slag dominant material with expansivity <3% may be suitable for Class 1 General Granular Fill. Significantly more onerous expansivity limits are likely to apply to Class 6 materials, which should be determined as part of FEED.

The SHW places limits on water soluble sulfate and total sulfur (TS) concentrations for slag materials placed within 500mm of any concrete, cement bound materials, other cementitious mixtures or stabilised capping and any metallic structural elements forming part of the permanent works.

Cohesive Made Ground (d4) was only encountered locally and is not anticipated to be widespread across the site. These soils will not be suitable for use in bulk earthworks but could be reused as Class 4 Fill to landscape areas.

Based on the risk assessments carried out there are no constraints on the re-use of material from a potential contamination perspective. In order to adequately control the re-use of materials such as soils and crushed concrete, metal and wood, suitable controls should be in place and developed and implemented as part of a Construction Environmental Management Plan (CEMP), a Site Waste Management Plan (SWMP), Materials Management Plan (MMP) and an Asbestos Management Plan (AMP).

The earthworks materials should be subject to chemical verification testing during the reclamation works to ensure that the materials are suitable for re-use in accordance with the MMP.

Should unforeseen contamination be encountered during the reclamation works, then it should be managed in accordance with the plans detailed above and remediated such that it can be re-used in the works.

There is the potential for contaminated materials to be present within the areas of the site that have not been subject to intrusive investigation. However, it is assumed that the Made Ground in these areas will be similar to the remainder of the site and therefore be suitable for re-use. However, chemical verification testing should be undertaken either prior to its excavation or during its excavation and placement.

14.2 Foundations

14.2.1 General considerations

The main geotechnical risks relating to the proposed foundations are the presence of obstructions and voids, inadequate bearing due to poorly compacted, loose and soft underlying material (including total and differential settlement), heave and collapse settlement of Made Ground subject to loading or changes in the groundwater regime, soil contamination, groundwater contamination and aggressive ground conditions for buried concrete and steel.

BRE IP8/05 indicates that expansion of steel slag and some blast furnace slags can cause the ground to move, resulting in damage to buildings, structures, roads and services. The ground may heave and move laterally, possibly decades after deposition. Owing to the variability of the materials, ground movements are inherently uneven, and the most severe problems occur due to differential movements. Observations during the AECOM and BP site walkover (March 2020) highlighted the potential risk to structures from heave and collapse of underlying soils with several structures exhibiting signs of distress and cracking. It was noted that hardstanding surfaces were 'wavy' and cracked, providing further evidence of heave inferred to have resulted from the presence of expansive slag materials below these areas. Further details and site walkover photographs are provided in the AECOM Main Site Desk Study (2021).

AECOM has prepared a Foundations Optioneering Appraisal, AECOM (2021). Net Zero Teesside, Main Site Foundations Optioneering Appraisal. Document No PR-60559231_ACM_RP_GE_P02 Revision P02. Reference to this report is advised.

For geotechnical design, Eurocode 7 BS EN 1997-1:2004+A1:2013 (Geotechnical Design Part 1 – General Rules) and Eurocode BS EN 1990-2002 (Basis of Structural Design) are adopted to define derived values for use in foundation design. The accompanying National Annex sets out that from the three Design Approach options given in Eurocode 7, only Design Approach 1 (DA1) is to be used in the United Kingdom. DA1 has two possible load combinations, DA1-1 and DA1-2.

DA1-1 (Combination 1) involves applying partial factors to actions (loads) or the effects of actions (dead loads/ surcharges) whilst using unfactored values for the soil parameters and earth resistance. In DA1-2 (Combination 2) partial factors are applied to unfavourable variable actions and material properties.

Detailed structure General Arrangement Drawings were not available at the time of writing of this report. At the time of this preliminary assessment, details of proposed structure actions (axial and/ or lateral load conditions) or structure specific serviceability limits, pile layout, pile group effects, settlement and tension requirements etc are not available and are to be developed as part of later phases of FEED and detailed design.

Without known load conditions and serviceability limits it is not possible to provide foundation design recommendations compliant with Eurocode 7: Geotechnical design – Part 1: General rules BS EN 1997-1:2004+A1:2013 and British Standard Code of Practice for Foundations BS8004:2015+A1:2020.

Therefore, the following discussion is intended to provide general recommendations only and will need to be developed once structure actions (loads) and serviceability limit criteria are determined as FEED.

14.2.2 Shallow foundations - Rafts

The Foundations Optioneering Appraisal report (AECOM 2021) identified that shallow raft foundations spanning the entire footprint of a structure is potentially suitable for low and medium threat structures at the Main Site. The advantage of raft foundations is that they can span localised areas of soft or loose density ground significantly reduce the potential for differential settlement if sufficiently rigid, which reduces the potential for structure distress or cracking.

Raft foundations bearing in Made Ground Slag Dominant (d1) soils may provide a suitable option for the proposed Administration and CCR buildings as well the adjacent Warehouse and Workshop. As with pad foundations, any loose Made Ground or cohesive soft spots identified during construction at foundation level would need to be removed and replaced with suitably compacted granular fill or lean mix concrete prior to construction.

As detailed above, structure axial and lateral loads are not available at the time of preparation of this GIR. A presumed design bearing resistance has been established through an iterative process to determine an applied load resulting in predicted settlement of <25mm, which is taken as an assumed serviceability limit in this assessment.

Calculation of consolidation settlement has been undertaken based on compression index (c_c) and swelling index (c_s) estimated from correlation with index properties, oedometer testing and engineering judgement. The methodology adopted is based on an in-house developed spreadsheet, which calculates stress changes using elastic solutions under rectangular loaded areas. One dimensional ground movement has been calculated from the stress changes using the non-linear compression index (c_c) method.

Calculations are based on the ground conditions encountered in MS\BH13 which was drilled adjacent to the proposed CCR buildings, refer to Geological Section B-B' shown on Drawing 60657467-ACM-GIR-010. Calculations are based on the parameters shown in Table 9-11. Groundwater is assumed to be at 3.6m OD. Although it is likely that the structures may be supported by a series of raft foundations separated by expansion joints, for the purposes of this assessment the raft foundation is assumed to extend over the entire footprint of the CCR and Workshop buildings and a raft dimension of 128m in length and 55m in width has been modelled. The raft is assumed to be 1m thick, embedded 1m below ground level. The ground model assumed is summarised in Table 14-2 below.

Table 14-1. Ground model – MS\BH13 - CCR & Workshop Buildings- Ground Level 5.7m OD

Strata	Strata Code	Depth from (m)	Depth to (m)	Level from (m OD)	Level to (m OD)	Thickness
Made Ground – Slag dominant	d1	0.00	2.70	5.70	3.00	2.70
Made Ground – Soft clay	d4	2.70	3.65	3.00	2.05	0.95
Made Ground – Sand (hydrocarbon odour)	d2	3.65	4.20	2.05	1.50	0.55
Tidal Flats – Clay (soft organic)	c1	4.20	6.05	1.50	-0.35	1.85
Tidal Flats - Sand	c2	6.05	10.90	-0.35	-5.20	4.85
Lacustrine Deposits – Laminated Clay	b3	10.90	11.70	-5.20	-6.00	0.80
Glacial Till	b1	11.7	15.3	-6.00	-9.60	3.60

Settlement of 25mm is calculated at an applied stress of 35 kPa. Calculated stress (kPa), Constrained modulus (E) (kPa), Coefficient of Volume Compressibility (mv) and foundation settlement profile is included in Appendix K.

It is noted that calculation of predicted settlement has been undertaken independently of potential uplift (heave) from potentially expansive slag dominant (d1) soils which were proved to 2.7m in MS\BH13. It is understood that soils with expansion potential >3% are to be removed / treated as part of the preparation of the development platform for construction by Teesworks. Assuming as a worst case, the slag dominant material below the raft exhibits expansion potential of 3% suggests, up to 81mm of heave could be anticipated. As the slag materials are not uniform it could be anticipated that heave may occur below one area of the raft and settlement across other areas. Therefore, theoretically differential movements of around 100mm could be anticipated across the foundation.

Where raft foundations are proposed additional slag testing may be undertaken to confirm the most likely value of expansivity for specific structures to ensure differential movements are within structure serviceability limits.

14.2.3 Shallow foundations - Pads

The Foundation Optioneering Appraisal report (AECOM 2021) identified that conventional pad or shallow strip foundations are generally suitable for lightly loaded low threat structures that are not susceptible to creep or dynamic loading, for example lighting columns, fencing, cable trays and unoccupied buildings. Shallow foundations will not be suitable for structures subject to long term creep movements or stringent serviceability limits.

Bearing capacity of shallow foundations will be a function of the assumed foundation size, foundation depth, groundwater depth and applied loads. Structure loads were not available at the time of writing this GIR.

Cohesive Made Ground (d4) is generally described as soft to firm red brown and brown sandy slightly gravelly CLAY with low cobble content and angular to subangular fine to coarse of gravel of various lithologies including slag and brick. Due to the low undrained shear strength and variability of these soils it is not recommended that shallow foundations are constructed in these soils.

Slag dominant material (d1) is widely present across the site. It is typically described generally described as grey, black and brown sandy angular and subangular fine to coarse GRAVEL of various lithologies including slag with low to high cobble content. Uncorrected SPT N values for the d1 soils range from 4 (loose) to >100 (very dense) with an average value of 27 suggesting the soils are typically medium dense. Typically, medium dense coarse (granular) sand and gravel soils have a presumed bearing value in the range of 200 to 600 kPa. Lightly loaded structures could be founded on shallow pad foundations within the slag dominant Made Ground (d1) soils below the depth of influence of any seasonal, climatic or vegetation effects. Any loose Made Ground or cohesive soft spots identified during construction at foundation level would need to be removed and replaced with suitably compacted granular fill or lean mix concrete prior to construction.

As detailed above, structure axial and lateral loads are not available at the time of preparation of this GIR. A presumed design bearing resistance has been established through an iterative process to determine an applied load resulting in predicted settlement of <25mm, which is taken as an assumed serviceability limit in this assessment. Calculation of consolidation settlement has been undertaken based on compression index (c_c) and swelling index (c_s) estimated from correlation with index properties, oedometer testing and engineering judgement as described above. Calculations are based on the ground conditions encountered in MS\BH13 and the ground model included in Table 14-1.

Typical pad dimensions and presumed bearing value are summarised in Table 14-2 below.

Table 14-2. Presumed Bearing Value – Pad Foundations

Pad Foundation Size	Presumed Bearing Resistance (kPa)	Settlement
1m X1m	225	<25mm
2m X 2m	150	<25mm
3m X 3m	100	<25mm

It is noted that the presumed bearing resistance reduces for pad foundations greater than 1m X 1m in order to maintain predicted settlement <25mm given. This is due to an increasing proportion of load being transferred into the normally consolidated soft Tidal Flat Deposits clays (1) and loose sands (c2) resulting in settlement compared to the smallest pad size.

As described above, assuming the slag dominant material below the pad foundations exhibit expansion potential of 3%, approximately 80mm of heave could be anticipated. Flexible connections would be required between pad foundation supports for continuous structures such as cable trays and/or utility service runs. Alternatively, the material may be locally excavated and replaced with inert material or site specific testing is undertaken to confirm expansivity.

14.2.4 Pile foundations

Pile foundations are used to transmit structural loads through weaker near-surface soils onto a more competent bearing stratum at greater depth. The piles may be constructed either as a single pile supporting a load bearing column or as a group of piles supporting either the entire superstructure or heavily loaded parts of the structure. There are several different types of piles varying on the method of construction. The choice of pile will depend on the ground conditions, pile performance requirements (working load and settlement tolerances), environmental requirements (noise, vibration, spoil disposal, contamination and carbon efficiency) and site constraints. Additional mitigation measures such as a detailed UXO risk strategy and probing for obstructions in the Made Ground before piling commences should be considered.

The Foundations Optioneering Appraisal report (AECOM 2021) identified that deep pile foundations were found to be most appropriate for medium and high risk structures. Appropriate construction techniques may comprise driven cast-in-situ concrete piles, driven steel piles, continuous flight auger (CFA) piles, bored cased piles or bored cased and sleeved piles. Due to the presence of obstructions and shallow groundwater within the Made Ground, CFA and bored piles were considered most applicable to the proposed development.

For preliminary assessment it is considered the provision of permanent sleeving (e.g. bentonite / vermiculite) around the CFA / bored piles over the zone expected to be vulnerable to movements caused by volumetric changes (e.g. swelling) in order to resist uplift generated by heave should be allowed for preliminary costing purposes.

Calculations of long term ultimate unit skin friction and end bearing achieved by a CFA / bored concrete pile installed in cohesive and cohesionless soils, end bearing on Redcar Mudstone Formation (a1) are based on the ground conditions proved in MS\BH08, refer to Geological Section A-A' shown on Drawing 60657467-ACM-GIR-DRG-009. The methodology adopted is based an in-house spreadsheet adopting the empirical beta method using the parameters shown in Table 9-11. Ground conditions proved in MS\BH08 are considered a conservative 'worst case' ground model due the thickness of Slag Dominant materials (d1), and Tidal Flat Clays(c1) and depth to the Redcar Mudstone bedrock (a1). It is noted that the depth and level to bedrock generally increases trending north towards the laydown area. MS\BH08 is located below the Cooling structure, however, for the preliminary assessment this ground model is considered typical of the ground conditions identified below the Power, Capture Compression and Utilities & Outfall areas. Groundwater is assumed to be at 3.0m OD. The ground model assumed is summarised in Table 14-3.

Table 14-3. Ground model – MS/BH08 - Cooling- Ground Level 7.98m OD

Strata	Strata Code	Depth from (m)	Depth to (m)	Level from (m OD)	Level to (m OD)	Thickness
Made Ground – Slag dominant	d1	0.00	5.90	7.98	2.08	5.90
Made Ground – Silty Sand	d2	5.90	7.20	2.08	0.78	1.30
Made Ground - Gravel	d3	7.20	7.80	0.78	0.18	0.60
Tidal Flats - Sand	c2	7.80	8.50	0.18	-0.52	0.70
Tidal Flats – Clay (soft organic)	c1	8.50	10.20	-0.52	-2.22	1.70
Tidal Flats - Sand	c2	10.20	13.80	-2.22	-5.82	3.60
Tidal Flats – Clay	c1	13.80	17.80	-5.82	-9.82	4.00
Lacustrine Deposits – Laminated Clay	b3	17.80	21.80	-9.82	-13.82	4.00
Glacial Till	b1	21.80	23.8	-13.82	-15.82	2.00
Redcar Mudstone Formation	a1	23.80	29.90 (proved)	-15.82	-21.92	6.10 (proved)

For the purposes of this preliminary assessment the ultimate axial resistance of a single CFA/ bored pile at assumed 600, 750, 900 and 1200mm diameters, 25.8m in length socketed 2.0m into the Redcar Mudstone bedrock (a1) has been calculated assuming effective stress (drained) soil parameters and rock compressive strength. The results are summarised in Table 14-4 and included in Appendix K, which shows presumed ultimate axial compressive pile capacity generated over the length of the pile. Ground level at MS\NH08 is 7.98m OD, a 1.0m pile cap thickness is assumed with formation level taken as 6.98m OD.

Unit skin friction within the Made Ground Slag Dominant material (d5) is assumed to be zero given the likely requirement for bentonite / vermiculite sleeving of the pile.

To allow for the relief of lateral stresses which occurs when boring through soils, the coefficient of in-situ earth pressure, K is limited to 1. Accurate calculation of the ultimate skin friction around a pile augered into rock is not possible due to the disruption of the structure of the bedrock by the auger tools. The skin friction is limited to $0.2\sqrt{\sigma c}$ (MPa) in accordance with guidance provided in CIRIA Report 181. Significant dependence is placed on use of higher torque piling rigs capable of socketing piles into the underlying rock to prevent unacceptable total and differential settlement.

As noted above, loads were not available at the time of writing this GIR and this assessment is not intended to comply with current Eurocode or British Design Standards which require partial factors are applied to both unfavourable variable actions (loads) and material properties. For the purposes of this initial assessment a lumped factor for safety (FOS) of 3 is applied to the toe, with a FOS of 2.5 applied to unit skin friction. Preliminary calculations assume settlement including pile compression is <25mm.

Table 14-4. Preliminary Ultimate Axial Compressive Pile Capacity

Pile Diameter (mm)	Presumed Ultimate Axial Compressive Pile Capacity (Resistance) (kN)	Presumed Allowable Axial Compressive Pile Capacity (Resistance) (kN)
600	6000	2250
750	8350	3050
900	11000	4000
1200	17200	6200

Driven tubular steel displacement piles may provide an alternative piling solution at the site. These may have an added environmental benefit if these are formed from recycled casings salvaged from the oil and gas industry, subject to availability. It is noted that obstructions in the Made Ground may be problematic and may result in unacceptable structural damage (cracking) to driven steel piles or loss of plan position and verticality tolerances. Driven steel piles may be susceptible to high chloride concentrations present with the groundwater. However, corrosion protection to buried steel or allowance for steel section loss could be provided as part of the design. Driven piles have the advantage that once site conditions are understood empirical formulae may be established that they can be driven to a set blow count at the proposed installation depth to demonstrate axial capacity during construction.

For the purposes of this preliminary assessment the ultimate axial resistance of a single nominal 340mm diameter pile, assumed 20mm wall thickness and 25.8m in length pile socketed 2.0m into the Redcar Mudstone (a1) has been calculated assuming effective stress (drained) parameters assigned to soils and the underlying bedrock, adopting the ground model described above. The results are summarised in Table 14.5 and included in Appendix K, which shows presumed ultimate axial compressive pile capacity generated over the length of the pile.

Table 14-5. Preliminary Ultimate Axial Compressive Pile Capacity

Pile Diameter (mm)	Presumed Ultimate Axial Compressive Pile Capacity (Resistance) (kN)	Presumed Allowable Axial Compressive Pile Capacity (Resistance) (kN)
340	2800	1050

Integrity problems can occur when bored piles are installed through variable water bearing strata such as those present at the site. These are largely believed to have been addressed with the introduction of automated rig monitoring systems. Small strain sonic velocity or resonant frequency measurements should be made to assess the integrity of pile concrete over the length of the bored piles.

Piles end bearing into the Redcar Mudstone bedrock (a1) will rely on generating a high proportion of their ultimate resistance as base resistance. Given the importance of maintaining a clean toe in the bedrock to achieving the predicted the design resistance , efforts should be made to achieving base cleanliness during construction. CFA piling rigs should be instrumented to measure concrete flow rates, volumes and torque forces during installation.

Static maintained load tests should be undertaken on each structure. Testing should also be in accordance with the Federation of Piling Specialists, Handbook on Pile Load Testing (2006) which recommends 1 preliminary pile test per 500 piles and 1 working pile test per 100 piles for medium risk construction conditions. Dynamic or Statnamic load testing on driven piles may be considered in conjunction with static maintained load tests. An advantage of driven steel displacement piles is that it may be possible to extend and drive the pile if axial resistance is identified to be lower than anticipated from statnamic testing. Pile load testing requirements will need to be detailed in the project piling specification as part of FEED design.

Consideration may be given to undertaking site trials of the favoured pile method/s in advance of construction to demonstrate constructability and demonstrate that axial and lateral resistance is in accordance with the FEED design assumptions. Pile load testing could be undertaken on trial piles during early execute to demonstrate capacity in advance of the main works.

Driven piles installed into mudstone often suffer 'false sets' due to excess negative pore water pressures developed during installation which dissipate over time. This can lead to dynamic pile testing undertaken soon after installation producing unrealistically high ultimate load capacities which overestimate the actual long term pile capacities. In this case the statnamic load test could be repeated once negative porewater pressures have dissipated, typically after one to two weeks following installation. This issue could be resolved by site trials.

14.3 Obstructions and Voids

Potential ground obstructions from the former Redcar Iron and Steel Works are anticipated to be widely present on the site and pose geotechnical risk to proposed structures in these areas. The most significant ground obstructions are anticipated trending north-west south-east below the former Steel Plant, Coke Processing Plant and the location of former travelling cranes present across the site.

The north east corner of the site is an area of former 'iron ponds'. Historically, when problems were encountered during steel production or where excess iron was produced that was unable to be processed by the Basic Oxygen Furnace Steelmaking (BOS) Plant, this molten iron was transported to this area and tilted as a 'torpedo'' to 'pond'. The iron was then fractured and recycled back to the blast furnace. It is reported that there were a series of nine 'ponds' which covered an area of 8,000m^2 with a capacity to hold 60,000t of iron. The former 'pond' area is now covered in various spoil heaps of blast furnace slag and crushed concrete, with metal detritus varying in size typical of gravel, cobbles and boulders across the area. Large, fused steel slag boulders are present intermittently across the area. Buried obstructions may be present with the former ‘iron ponds. However, it is noted that excavation and remediation of the former ‘iron ponds’ was taking place during the NZT preliminary GI and the thickness of Made Ground and nature of obstructions is likely to have changed in this area since issue of this GIR. Fused slag boulders and concrete foundations are also present to the north within the CO_2 Onshore Export Pipeline Corridor.

The location of former structures and location where trial pits from all phases of ground investigation terminated on obstructions is shown on Drawing 60657467-ACM-GIR-DRG-018.

The results of an electromagnetic geophysical survey undertaken at the site in November to December 2020 (AECOM, June 2021) coupled with observations from trial pit excavations (AEG, 2021) were used to identify potential obstructions at the site. The results of the electromagnetic geophysical survey in relation to the former structures is shown on Drawing 60657467-ACM-GIR-DRG-019. The electromagnetic geophysical survey indicates spatial extent of features but this technique does not provide sufficient resolution to interpret the depth of features. However, allowance will need to be made for excavation and removal of obstructions encountered. Further details of the obstruction mapping are provided in Appendix B and a summary of potential obstructions at the site is given in Table 14-6.

Machine (Komatsu 210) excavated trial pits which encountered obstructions in the NZT preliminary ground investigation (AEG 2021) described in this GIR were terminated due to health and safety concerns and there is the potential for buried utilities to be present that may not have been identified by service clearance. Therefore, no attempt was made to further extend these trial pits through obstructions by ripping, use of hydraulic breakers or coring. All the remaining trial pits excavated through the Made Ground slag dominate material (d1) achieved the scheduled depth by conventional excavation. Other than where groundwater was encountered as detailed in Table 14.6; trial pits sides are recorded as moderately stable throughout excavation. None of the 18 resonance (sonic) drilling exploratory boreholes terminated at shallow depth due to obstructions.

Table 14-6 Summary of Obstructions

Ground Investigation	Exploratory Hole ID	Depth of Obstruction (m bgl)	Type of Obstruction	Description of Obstruction
NZT 2021	MS\TP03	2.35	Groundwater	Moderate inflow.
	MS\TP06	0.50 – 3.00	Obstruction	Historic structure (potentially furnace/ladle).
	MS\TP06	3.20	Obstruction	Historic structure (potentially flue vent).
	MS\TP06A	0.70	Obstruction	Metal pipe surrounded by cobbles of metallic black rick with iridescent sheen. Possible solidified tar used to insulate pipe.
	MS\TP07	1.20	Obstruction	Yellow refractory bricks at east corner. Layer of concrete in Face A.
	MS\TP07	1.40	Obstruction	Metal sheet (2.10m x 0.30m).
	MS\TP10	0.55 – 0.60	Obstruction	Reinforced concrete.
AEG 4153 & 4154 2018	S1-BH07	1	Obstruction	
	S1-BH11[1]	1.1	Obstruction	
	S1-BH13	0.5	Obstruction	
	S1-BH13A	8	Obstruction	
	S1-BH18	19.1	Obstruction	
	S1-BH20	1.5	Obstruction	
	S1-BH20A	5	Obstruction	
	S2-BHA05	11	Obstruction	UXO anomaly.
	S2-TPA31	3.2	Obstruction	Flat concrete surface.
	S2-TPA32[1]	3.1	Obstruction	Flat concrete surface.
	S2-TPA35[1]	2.2	Obstruction	
	S2-TPA37	2.4	Obstruction	
	S2-TPA38	1.8	Obstruction	
CH2M SS1 2017	TPC38	2.8	Utility	Possible drain.
	TPD34	0.8	Obstruction	Layer of slag, unable to progress.
	TPE24	2[1]	Obstruction	Very dense, unable to progress.
	TPH09	0.6	Utility	Pipes/cables discovered.

Ground Investigation	Exploratory Hole ID	Depth of Obstruction (m bgl)	Type of Obstruction	Description of Obstruction
	TPH10	2.4	Groundwater	
	TPH12	1.9	Groundwater	
	TPH14	2.5	Groundwater	Fast inflow.
	TPH15	3.1[1]	Groundwater	
	TPH18	2.2	Groundwater	
	TPH23	3.6	Groundwater	
	TPH30	2.9	Groundwater	Groundwater and collapsing.
	TPH31	2.9	Groundwater	Groundwater and collapsing.
	TPH33	2.3	Groundwater	
	TPH35	2.2	Groundwater	Fast inflow from 2m bgl.
	TPI01	1.2	Obstruction	Solid concrete base covering full extent of hole.
	TPI14	0.7	Obstruction	Concrete base, covers full length and width of pit.
	TPI17	1.1	Obstruction	Concrete base.
	TPI21	3.6	Groundwater	
	TPI25	3.8	Groundwater	
	TPI28	4.1	Groundwater	
	TPI33	3.7	Groundwater	
	TPI35	2.4	Utility	Suspected services.
	TPI37	4.2	Groundwater	
	S2-TP79	1.05	Obstruction	Three sides of excavation surrounded by concrete walls. Concrete floor slab at base.
	S2-TP86	3.1	Obstruction	Concrete foundations at the bottom and at side.

Notes:

1. *Indicates exploratory hole that is outside site boundary.*
2. *Photographic reference can be found on corresponding exploratory hole log in applicable Factual Report.*

14.4 Expansive Materials

Chemical changes of slag-dominant and refractory slag at the site pose a risk of differential heave movement on proposed pavements and building structures.

Exploratory hole locations specifically selected for TRS constituent identification, mineralogical testing and expansion are shown on Drawing 60657467-ACM-GIR-DRG-017. The drawing also shows the exploratory holes where TRS slag testing has been undertaken.

Confirmatory ground investigation has been completed including 12 No boreholes and 8 No machine excavated trial pits located across the proposed development area. The findings conclude a varied thickness of predominantly granular Made Ground ranging from 0.90 to 7.80m bgl predominantly comprising of vesicular and occasionally vitreous slag included as unsorted sand, gravel, cobble and boulder size fractions. The slag is mixed with various other anthropogenic and natural constituents including, but not limited to metal, plastic, brick, refractory brick, clinker, ash, limestone, sandstone etc. Groundwater levels recorded in the trial pits varied from 2.50m bgl, to dry excavation to depths of 4.50m bgl, indicating a highly variable groundwater regime. Current remediation works proposals for the site involve excavating down 2.5 to 3.5m across the site. If this is not undertaken, it is proposed to remove the upper 2.5m of material for processing, including screening, crushing and replacement by controlled compaction.

The distribution of material was found to be varied across the site alluding to the long history of development of iron and steel production. The potential for expansivity is associated with blast furnace and steel slags particularly from older historical production.

The principal mechanisms attributed to the expansion of blast furnace slags include iron unsoundness, which is very rare and will occur to completion following initial wetting of susceptible material; beta-to-gamma inversion of dicalcium silicate, which tends to be a thermal reaction which occurs as hot slag cools and therefore will have occurred; and sulfate related. Sulfate related expansion occurs as sulfide minerals present in blast furnace slag weather (oxidise) following exposure to atmospheric conditions, and through the ensuing reactions produce sulfate minerals associated with volumetric instability. This process is analogous with sulfate attack reported in concrete.

Basic steel slags tend not to contain sulfide minerals but include concentrates of free MgO and free CaO which readily hydrate producing volumetric instability.

Refractory bricks and other refractory materials have a high concentration of free MgO and are also implicated in volumetric expansion.

Scheme specific TRS slag testing has confirmed the presence of potentially expansive materials at the site. A review of results included in the AEG 2021 ground investigation and findings from previous investigations carried out at the site has been completed to inform the development process and is summarised as follows:

- Previous site wide ground investigations have been carried out by AEG under direction from CH2M and Arcadis.
- The general varied distribution of Made Ground is confirmed by the latest ground investigation.
- Previous investigations generally comprising of machine excavated trial pits have included selection of 50 No. samples for slag expansivity assessment from across the site, only 4 No. of which were recovered specifically from within the development platform footprint.
- The evaluation of the samples including petrographic assessment, and chemical and thermogravimetric characterisation concluded that materials examined from site consisted of mixed slags predominantly comprising variably weathered blast furnace slag material with a significant minor component of steel slag, and that both components included a component for potential future expansion.
- A total of 35 No. samples were selected for a minimum 14-day accelerated expansion testing, of these 17 No. were subjected to the extended 28-day accelerated expansion test, based on containing sufficient constituents that were potentially expansive.
- The samples tested recorded between 0.01 and 2.05% volumetric expansion.
- Examination recorded that approximately half of the samples examined contained the aluminosulfate mineral ettringite (generated through the oxidation of sulfide minerals and ensuing reaction) indicating that some expansion had occurred in the past due to weathering.

- The chemical testing recorded high total sulfur and sulfate values from the samples, which show a significant component remaining as unreacted sulfide, with potential for oxidative weathering and potential expansion suggesting that expansion is not necessarily complete.

The exploratory holes confirm a predominance of slag bearing materials at the site. Assessment of the slag expansion has been carried out under controlled laboratory conditions and involves processing and crushing of the test samples in preparation for the inspection, chemical characterisation and swell testing. Therefore, the findings are considered to be representative of material that may be subjected to recovery, processing and recompaction at a site level. It is therefore concluded that a volumetric expansion of between 2% and 3% can be anticipated from the site development following recovery and processing of the upper 2.5m of Made Ground at the site, following replacement by controlled compaction of suitable material.

It is noted that the slag expansivity is based on an assumed volumetric total based on a 1D expansion test. However, the material does not expand omnidirectionally in equal amounts, the expansion may occur along a plane in the fragment (one direction) or in a void (all directions) or at a point (but not necessarily equally in all directions), resulting in differential movements occurring within or across strata layers. Given the inherent uncertainty in these materials the moderately conservative assumption is that 3% expansion may occur over the full depth of slag material.

It is assumed the FEED contractor will include mitigation measures for this within the design as detailed below, or alternatively undertake further testing to reduce this risk.

Properly utilised slag materials intended for construction of the development platforms are considered to be an excellent source of construction material, but mitigation may be necessary and should be considered for the various design aspects and where appropriate included in connection with various aspects of construction, these may include but are not limited to forms of separation between the structural elements and the slag material and mitigate against potential differential movement including:

- Additional slag verification testing may be undertaken to confirm the most likely value of expansivity for specific scheme design elements. Accelerated slag weathering tests could be carried in advance of construction or during early execute. This would require preparation of a crushed compacted trial pad subjected to wetting and drying, surcharged with a nominal load. The trial pad would be instrumented to measure ground movement over time. It is noted that these tests take a considerable amount of time and should be monitored until ground movements have ceased. A site specific test methodology and specification would need to be developed.
- Granular construction interfaces (also functioning as capillary breaks) of adequate thickness for ground bearing slabs and pavements.
- Void formers to structural elements.
- Sleeved bored piles for transfer of bearing loads to underlying strata.
- Pile and beam foundation options for support structures.
- Suitable design of ground placed concrete for potentially aggressive ground conditions.
- Appropriate design of reinforced concrete slabs.
- Consideration of granular rafts for transfer of load and to mitigate for differential movement.
- Reduce the risk for potential expansion in the slag material through mixing with inert granular material such as crushed demolition waste and / or construction of an inert capping layer.

14.5 Pavements

The main geotechnical risks relating to the proposed pavements are differential heave movement and the presence of obstructions and voids.

The design of new pavement foundation soils is based on CD225 which replaced IAN73/06 revision 1 (2009) HD25/94 in March 2020. The design subgrade surface modulus shall be used in pavement foundation design.

CD225 provides a CBR to subgrade surface modulus conversion equation ($E = 17.6(\text{CBR})^{0.64}$ where, E is the estimated subgrade surface modulus (MPa), CBR is the California Bearing Ratio (CBR) of the subgrade. This equation is valid for CBR values in the range 2 to 12 per cent. CD225 requires designers to determine short-term and long-term subgrade surface modulus values for each section of proposed pavement subgrade. The design subgrade surface modulus is equal to the lower of the short-term and long-term subgrade surface modulus values.

Low undrained shear strength is apparent for the cohesive Made Ground (d4) soils and CBR values of <2.3% and equivalent subgrade surface modulus of 30MPa are anticipated. Proof rolling of the formation level will be required and any areas of soft fine (cohesive) soils where the subgrade surface modulus is <30MPa improved. Options for improvement of the subgrade include excavation and replacement of between 500 and 1000mm of the soft subgrade with granular fill, mechanical stabilisation (geogrids and/or geotextiles) and soil stabilisation which will be further assessed as part of detailed design. Where imported coarse (granular) soils are present below the subgrade, CBR values of >12% (long term subgrade surface modulus >85 MPa) can be assumed.

Laboratory CBR values for two slag dominant Made Ground (d1) samples taken from 0.4m depth (6.24 to 6.77m OD) ranged from 28 to 71%. CBR values in the reprocessed development platform material and Made Ground slag dominant material (d1) materials are anticipated to exhibit CBR values >12% (long term subgrade surface modulus >85MPa). A minimum total highway pavement construction thickness of 450mm is recommended for frost protection.

As detailed above the Made Ground slag dominant (d1) material is considered potentially expansive and granular construction interfaces (also functioning as capillary breaks) of adequate thickness are recommended below pavements.

14.6 Aggressive Ground Conditions

Aggressive ground conditions for buried concrete and steel pose geotechnical risks for future construction at the site.

In accordance with BRE Special Digest (SD) 1, the potential for sulfate attack on buried concrete in contact with soil and groundwater at a site is classified based on the sulfate content expressed as SO_4, mobility of groundwater, the acidity and form of concrete.

The results generally suggest a site-wide concrete classification DS3- AC-3 should be adopted for design, but that DS-5 AC-5 may be required in slag-dominant Made Ground (d1) soils and potentially Lacustrine Deposits (b3); however, further testing is recommended in the Lacustrine Deposits (b3) as only a single sample has been tested.

CD 375 (Highway Structures & Bridges Design, 2020) indicates that corrosion is unlikely at chloride concentrations less than 50ppm (50mg/l) at pH values ranging from 6 to 9. All encountered strata at the site returned chloride values greater than 50mg/l. Based on Section 8.5 and Table 8.5 of CD375 and assumed values of soil resistivity, surrounding soils may be classified as 'aggressive' to 'very aggressive' corrosivity classification.

The SHW places limits on water soluble sulfate and total sulfur (TS) concentrations for slag materials placed within 500mm of any concrete, cement bound materials, other cementitious mixtures or stabilised capping and any metallic structural elements forming part of the permanent works. Therefore, either a minimum of 500mm clean cover will be required below and surrounding structure foundations or BRE SD1 concrete classification SD5-AC-5 assumed for preliminary design and costing purposes.

14.7 Ground Improvement

The Foundation Options Appraisal report (AECOM 2021) identified that ground improvement is unlikely to be economically feasible for proposed low threat low load structures at the Main Site. It may be more appropriate for medium and high threat structures. It is important to note that field trials, in-situ testing and monitoring are highly recommended to verify the performance and effectiveness of any ground improvement solutions that may be implemented. Three ground improvement techniques were identified as summarised below.

14.7.1 Excavation and Replacement

Excavation and replacement ground treatment involves excavating the Made Ground above the water table and replacing it with processed or imported, compacted Engineered Fill. This should be done under a controlled construction process and is primarily targeted at reducing total and differential settlement but may also increase the bearing resistance of the Made Ground. This technique may be suitable below proposed pavements, pad and raft foundations. It is understood that Made Ground slag dominant (d1) soils with expansion potential >3% are to be removed / treated as part of the preparation of the development platform for construction being undertaken by Teesworks.

Made Ground slag dominant (d1) soils have been proved to a maximum depth of 7.9m with maximum thickness of 5.9m. Removal and replacement of a proportion of these soils may be considered beneficial in reducing the theoretical 'worst case' uplift and ground heave. For example, assuming a 6m layer of slag dominant material, excavation and replacement of 3m from ground surface would theoretically reduce the potential heave from 180mm to 90mm, assuming a worst case expansivity of 3% over the full depth of soils.

14.7.2 Vibro-compaction and Vibro-replacement

The Foundation Optioneering Appraisal report (AECOM 2021) identified that vibro-replacement may be adopted for both medium and high threat structures in conjunction with raft foundations to reduce total and differential settlement.

Vibro-compaction is a densification process that may be used up to depths of approximately 20m in granular soils. A vibrating closed-ended steel tube, typically 300 to 500mm diameter, is inserted into the ground and the vibrations cause the surrounding soil particles to be rearranged reducing air voids and increasing soil density. This results in stiffening the ground and reduces foundation settlement (total and/or differential) when loaded. Vibro-replacement creates 600 to 800mm diameter columns of compacted stone to transmit load or resist shear. The stone may be introduced at the top of the hole, and similar to vibro-compaction, it is compacted using a vibrating steel tube. Alternatively, the stone may be introduced from the bottom of the hole if the Made Ground or underlying natural strata is weak or the water table is high.

Potential construction constraints identified for this technique include the presence of obstructions in the Made Ground, expansive and / or fused slag, the fines rich Tidal Flat deposits and shallow groundwater; all of which have been proved as part of the NZT preliminary GI (AEG 2021) completed. The soils are of relatively low strength and may not generate sufficient lateral/passive resistance to prevent bulging of the stone columns during or after installation. In addition, the Tidal Flat Deposits have been proved to exceed 20m depth towards the north boundary of the Main Site which may mean it is not possible to fully treat them, leaving a zone of soft clays and silts / loose sands below the columns in which significant residual movements could still occur under load transferred down from surface.

14.7.3 Other

Deep soil mixing (lime or cement columns) and dynamic compaction techniques are not considered appropriate in the ground conditions at the site as detailed in the Foundation Optioneering Appraisal report (AECOM 2021).

14.8 Onshore CO_2 Export Pipeline Corridor

The main geotechnical risks relating to the proposed construction in the Onshore CO_2 Export Pipeline Corridor (either deep excavation or trenchless techniques) are earthworks, obstructions and voids, presence of UXO, soil contamination, groundwater contamination and aggressive ground conditions for buried concrete and steel.

It is understood the Onshore CO_2 Export Pipeline Corridor will be constructed either in open cut excavation or using horizontal direction drilling (HDD) techniques. At the time of writing this GIR, information on proposed levels or the preferred alignment of the corridor were not known.

The interface between the 'Onshore' and 'Offshore' elements of the pipeline design and construction between low mean water (L.M.W.) and high mean water (H.M.W.) levels between ordinary spring / seasonal tides will need to be considered in order to identify the optimum transition position between open cut and HDD construction.

bp has provided AECOM with a Landfall Feasibility Study, ARUP, Ref. BP-ARP-NZT-REP-000001, dated 25 June 2021. The report indicates HDD is a feasible option for the landfall area but does not consider the option for construction in open cut. It is understood that an optioneering study is currently being undertaken as part of FEED in order to assess whether construction in open cut may provide an alternative and/or more economical solution. This should consider the impact that the proposed construction may have on the ground risks identified, together with the programme and cost implications to the development.

For example, whilst open cut may be considered the least onerous construction option, this form of construction may increase the likelihood and impact of other risks such as impacting environmental designations, dewatering and groundwater contamination which may be in part be mitigated by adopting HDD construction techniques. Conversely, HDD construction may reduce these risks but may result in an increased risk from other ground constraints such as the presence of obstructions and / or hard strata, both which could lead to slow construction progress, equipment damage, project delay and cost uncertainty / increases. Large obstructions and fused slag may be present in Made Ground placed by the infilling which took place over the central, southern and south western parts of the corridor.

Ground conditions proved along the length of the Onshore CO_2 Export Pipeline Corridor are shown on Geological Section C-C' on Drawing 60657467-ACM-GIR-DRG-011. Ground investigation has proved Made Ground slag dominant (d1) material to a maximum depth of 4.5m (LF/TP03). This material was typically described as Made Ground comprising grey slightly sandy gravel and cobbles with low boulder content of vesicular slag with high metal content. Made Ground is not anticipated the be present north of LF\CPT02A towards the nationally protected dune habitat and the North Sea.

Ground conditions proved in LF\BH02 are considered typical of conditions for the Onshore CO_2 Export Pipeline Corridor north of the main site. The ground model assumed is summarised in Table 14-7.

Table 14-7. Ground model – LF\BH02 - Onshore CO_2 Export Pipeline Corridor- Ground Level 6.33m OD

Strata	Strata Code	Depth from (m)	Depth to (m)	Level from (m OD)	Level to (m OD)	Thickness
Made Ground – Slag dominant	d1	0.00	4.20	6.33	2.46	4.2
Tidal Flats – Sand (medium dense)	c2	4.20	14.70	2.13	-8.04	10.5
Tidal Flats – Clay (soft becoming firm)	c1	14.70	18.70	-8.37	-12.04	4
Glacial Till	b1	18.70	25.00	-12.37	-18.34	6.3
Lacustrine Deposits – Laminated Clay	b3	25.00	25.90	-18.67	-19.24	0.9
Glacial Till	b1	25.90	27.40	-19.57	-20.74	1.5
Redcar Mudstone Formation (weak)	a1	27.40	37.7	-21.07	-31.04	10.3 (proved)

Significant obstructions were not proved during excavation of LF\TP's 01 to 03, however the presence of large boulders of slag and/or fused slag along the length of the pipeline corridor cannot be discounted. Obstructions within the Made Ground are likely to be prohibitive, particularly where HDD construction is adopted.

Trial pit sides and base of excavation were recorded as stable during the NZT preliminary GI (AEG 2021). However, it is noted that these are short term undrained conditions which may not be representative of equilibrium conditions and the long term stability of excavations over an extended construction period.

Groundwater inflows were not identified during excavation of LF\TP's 01 to 03 with soils recorded as damp between 2.0 and 4.5m. However, shallow groundwater was proved in LF/BH's 01 and 02 (approximately 3.5m bgl (2.5 m OD)) which is likely to be subject to tidal fluctuations trending north towards the North Sea.

14.8.1 Open cut excavation

Granular Made Ground (d1, d2 & d3) and superficial Tidal Flat Sands (c2) deposits are likely be loose and variable in nature, and as result, expected to be unstable. Dependent upon depth of open cut proposed, excavation in these materials may require continuous support. Alternatively, temporary excavation faces will have to be battered back to a safe angle as determined on site if there is sufficient working space. The safe slope angle that may be required for temporary excavations is subject to a number of constraints including excavation depth, the length of excavation, the time over which the excavation is required to remain open, groundwater levels and the weather conditions prevalent at the time of construction. For preliminary assessment slope angles of 1 vertical to 2 horizontal (1V:2H) may be appropriate in granular materials and 1V:3H in any cohesive soils encountered. Given the undulating dune habit and changes in existing ground level this would result in significant excavation width, depth and earthworks volume.

Dewatering, sheet pile cut-off or box trench construction may be required for open cut excavation and construction. Construction may be impacted by the presence of obstructions within Made Ground. Further monitoring of groundwater is recommended in order to characterise water quality and identify suitable arrangements for dealing with water pumped from temporary excavations. Consideration should also be given to carrying out dewatering trials, pumping tests or other means to determine the discharge required to lower the groundwater for any proposed temporary works.

The results of the NZT preliminary GI (AEG 2021) suggest that open cut construction may be the most favoured option:

- where invert levels are above approximately 2.5m OD;
- along sections to be formed through Made Ground slag dominant (d1); and

- above the groundwater table.

This method will avoid potential risks of HDD construction through large cobble and/or boulder obstructions present within the Made Ground and associated with UXO.

Given the potential for unpredictable heave and/or settlement from expansive slag occurring over the lifetime of the proposed development, open cut excavations should be backfilled with either imported clean inert material or natural site won arisings.

It is noted open cut construction may have a more adverse impact on sensitive ecological receptors within the Teesmouth and Cleveland Coast RAMSAR, SSSI and SPA areas due to the extent of excavation that may be required.

14.8.2 Horizontal directional drilling

The NZT preliminary GI (AEG 2021) suggests HDD construction may be the most favourable option where:

- invert levels are below approximately 2.5m OD;
- below the level of Made Ground slag dominate (d1) materials; and
- below the groundwater table.

HHD construction is likely to result in significantly lower impact on sensitive ecological receptors within the Teesmouth and Cleveland Coast RAMSAR, SSSI and SPA areas.

It is understood that a thrust or reception pit is proposed to be constructed within the former ‘iron ponds’ in the north east corner of the site to facilitate HDD should this option be favoured. Groundwater was proved at approximately 4.0m OD in Made Ground slag dominant materials (d1) in MS\BH07 along the southern edge of this area. Groundwater levels are inferred to reduce to approximately 3.0m OD to the north. The minimum depth at which groundwater is likely to be encountered will be subject to finished ground levels across the development platform over this area currently being constructed as part of the wider STDC development by Teesworks. Excavatability and groundwater constraints within the former ‘iron ponds’ are anticipated to be similar to those described in Section 14.1.2.

The presence of obstructions or cobbles and boulders within the former ‘iron ponds’ could lead to slow construction progress, equipment damage, project delay and cost uncertainty / increases. However, it is noted that excavation and remediation of the former ‘iron ponds’ was taking place during the NZT preliminary GI and the thickness of Made Ground and nature of obstructions is likely to have changed in this area since issue of this GIR.

15. Recommendations for further work

It is recommended that the Geotechnical Risk Register presented in this report is regularly revisited and updated as new information and data comes to light, e.g., after and future phases of proposed ground investigation are completed and reported and in light of further works to be undertaken as part of FEED. Recommendations for further work, considering proposed enabling works, include:

- Continuation of groundwater quality and level monitoring is recommended to establish tidal and seasonal variation effects.
- Additional ground investigation is required particularly across the footprint of the proposed Capture plant. Access not possible during the NZT preliminary GI due to existing structures and ground investigation could not be completed.
- Cut and fill modelling should be undertaken during FEED, with an associated Material Management Strategy developed, with appropriate testing, to ensure minimal off-site waste and that sustainable material reuse is considered.
- Ground investigation for groundwater quality monitoring was restricted in the areas of the Workshops, Furnace Stockhouse, the Sinter Plant and the area of the overhead conveyor connecting these areas. Consideration may be given to additional ground investigation in these areas depending on the results of further groundwater quality monitoring rounds. No exploratory hole locations were able to be located in the far north west corner of the Site due to access constraints. Therefore, it should be noted that there are no down gradient boreholes to able to fully assess the potential for migration of groundwater off site. Therefore, additional boreholes within the north west corner of the site (if possible) would be beneficial to assess concentrations at the boundary in this area. This would allow increased certainty within this area, where currently a data gap remains
- Additional ground investigation may be considered along the alignment of the proposed Onshore $C0_2$ Export Pipeline Corridor, particularly between LF\NH02, LFBo01A, 02A and LF\CPT03 where there is discrepancy in the extent of the Made Ground slag dominant (d1) materials.
- Where raft foundations are proposed further slag testing may be undertaken to confirm the most likely value of expansivity for specific structures to ensure differential movements are within structure serviceability limits.
- Accelerated slag weathering tests could be carried out in advance of construction or during early execute. This would require preparation of a crushed compacted trial pad subjected to wetting and drying, surcharged with a nominal load. The trial pad would be instrumented to measure ground movement over time.
- In order to appropriately classify the potential for contamination to be present in soils in areas of the site not amenable for intrusive investigation chemical classification and verification testing prior to re-use / during earthworks should be undertaken.
- Large plate load (skip) tests could be undertaken across the development platform to confirm the presumed bearing resistance of the surface soils below proposed raft or pad foundations. Plate load tests could be instrumented and monitored over the long term to assess any creep settlement and/or heave.
- Consideration may be given to undertaking site trials of the favoured pile method/s in advance of construction to demonstrate constructability, and that axial and lateral resistance is in accordance with the FEED design assumptions.
- The 3D ground model, presented in Leapfrog, should be continually updated as further data becomes available and should be considered as the single source of truth for subsequent geotechnical and geo-environmental development.

16. Summary and conclusions

The NZT Teesworks site comprises the Main Site and Onshore CO_2 Export Pipeline Corridor covering a pipeline landfall up to and including Mean High-Water Level. The Main Site, reclaimed from estuary tidal marshes in the early 19th Century, consists of former industrial land associated with the former SSI Redcar Iron and Steel works (SSI site). The Central Area Transmission System (CATS) pipeline and Breagh high-pressure gas pipelines runs parallel with, and approximately 50m from the east boundary of the Main Site. The Onshore CO_2 Export Pipeline Corridor comprises sand dunes north of the Main Site, the foreshore of Coatham Sands and the adjacent North Sea.

16.1 Site Environs

The Main Site has a long history of development and heavy industrial usage having been initially reclaimed from the Tees Estuary in the 1800s, which has left a legacy of possible contamination and geotechnical constraints across the site. The Onshore CO_2 Export Pipeline Corridor is occupied by sand and mudflats, rocky shore, saltmarsh, freshwater marsh and sand dunes and has significant ecological constraints being located within the Teesmouth and Cleveland Coast RAMSAR, SSSI and SPA areas. It should be noted that Schedule 1 protected birds were observed to be nesting within the site boundary during the ground investigation.

16.2 Site Reconnaissance

The Main Site is occupied by former industrial land and plant including a disused Blast Furnace and Power Station to the west and the Sinter Plant and associated stockpile areas to the south. Areas of hardstanding, soft landscaping, marshland, iron ponds and extensive areas of historical slag waste (by-product of the historical Iron, Iron and Steel and Steel productions) are present across the Main Site.

The Onshore CO_2 Export Corridor comprises a dune habitat, the foreshore of Coatham Sands and the adjacent North Sea. There are areas of marshland and bunds composed of waste slag material in addition to the steel blast furnace slag that is spread across the area.

16.3 Site History

The earliest historical maps indicate the Main Site was reclaimed from the estuary in the 1800’s. By 1850, it was primarily occupied by agricultural land with, marshland towards the coast and estuarine deposits adjacent to the River Tees. The Main Site was developed first as Redcar Iron and Steel Works, and more recently the Redcar Blast Furnace and Coking Works (Teesside Works) acquired by SSI (Sahaviriya Steel Industries) in 2012, and finally closed in 2015. Most of the old structures relating to the Teesside Works still exist on site.

The earliest historical maps indicate the northern part of the Onshore CO_2 Export Pipeline Corridor to be below the high water mark of Ordinary Spring Tide within the Tees Bay area. Much of the southern portion of the Onshore CO_2 Export Pipeline Corridor site was reclaimed from the Tees Bay between 1863 and 1888. The south-east portion of the Onshore CO_2 Export Pipeline Corridor comprised sands above high tide leading within the site boundary to dunes. The dunes stretched south off-site and also east along the coast towards Coatham.

16.4 Ground and Groundwater Conditions

The ground conditions beneath the site, identified from the exploratory holes, comprise a variable thickness of Made Ground, predominantly comprising slag-dominant material, proven to be thicker beneath the Main Site in comparison to the Onshore CO_2 Export Pipeline Corridor. Tidal Flat Deposits were proven underlying the Made Ground, comprising layers of sand and clay. Glacial deposits comprising Lacustrine Deposits clay and Glacial Till clay were encountered at depths greater than or equal to -5.19m OD. Bedrock geology of the Redcar Mudstone Formation was encountered in all exploratory boreholes. The weathered top is indicated to be present to depths of between -9.99m OD and -21.67m OD, with solid bedrock present beneath.

Groundwater level data collected from installed instrumentation indicates standing groundwater levels at between 2.01m bgl (1.23m OD) and 5.10m bgl (5.97m OD), with an average of 3.31m bgl (3.79m OD).

16.5 Ground Contamination

In general, concentrations of contaminants within the soil and groundwater are low based on the industrial uses of the Site and the intended proposed use of the Site. They are also not dissimilar to the previous investigation concentrations that were identified within the Main Site boundary. The key contaminants identified at the site are, asbestos, pH, fluoranthene, naphthalene, hydrocarbons (including benzene), cyanide, thiocyanate, sulfate, nitrite and ammoniacal nitrogen. The greatest concentrations within soil and groundwater were generally in the central and northern areas of the Main Site. However, the more prevalent area for asbestos detection was within the southeast area of the Main Site and naphthalene within groundwater was only observed greater than evaluation criteria designed to be protective of controlled waters in the southwest of the Main Site. The greatest concentration of cyanide within the groundwater was also located in the south of the Main Site, in the south east corner.

16.6 Generic Quantitative Risk Assessment (GQRA)

No contaminants exceeded the Evaluation Criteria (EC) designed to be protective of human health for the proposed commercial/industrial end use, nor for acute construction workers EC. However, asbestos and high pH were noted within the soils. Therefore, other than potential risks from asbestos and pH, the risk to future users from the contaminants in the soil is deemed acceptable.

Minor isolated exceedances of the chronic construction worker EC were identified for arsenic and lead which may pose a risk to construction workers and potential construction worker end-users if mitigation measures are not implemented to reduce the risk of exposure.

Based on the GQRA it is considered that the soil and groundwater quality beneath the Site is unlikely to pose a significant risk to surface water or groundwater quality. However, a data gap does remain with regards to the lack of down gradient monitoring wells in the north west of the site to fully assess and monitor the potential for off site migration of contaminants which exceed screening values protective of surface water. The increasing concentration trend for ammoniacal nitrogen in particular should also be monitored to assess whether this is seasonal variation or a longer-term trend.

Given the industrial history and location of the aquifers, it is highly unlikely that the aquifers will be exploited as a potable water in the future. Therefore, the exceedances in the groundwater or soil leachate are unlikely to result in harm or damage to potable water resources.

16.7 Remediation

A survey by a specialist in asbestos identification in soils is advised to ensure appropriate samples are taken for testing as part of the remedial works. Asbestos control measures will be required during development/construction works. Mitigation and monitoring will be required to eliminate, reduce, control or manage the risk, or in the last resort provide suitable personal protective equipment (PPE)/respiratory protective equipment (RPE) for ground workers. Mitigation will also be required to minimise the risk of off-site migration.

It is expected that most of the development will comprise hardstanding and therefore provision of a designed cover layer, marker layer / anti dig layer is advised in areas of soft landscaping thereby reducing the risks to future site users.

High pH in dust in soil is a hazard for construction workers. Therefore, control of dust will be particularly important during groundworks. Control measures during ground works should be considered such as minimisation of simultaneously open cut areas, damping down and water spraying as part of a managed system of dust control. High pH in the soil is also a hazard for future users via direct contact. Therefore, mechanisms will be required to be put in place to minimise risk from exposure to these soils (hardstanding, soils with lower pH cover system for example). It should also be noted that the groundwater also exhibits high pH levels, which could also pose a hazard to construction workers.

Perched, confined groundwater heavily contaminated with hydrocarbons may be encountered on site throughout the development works as obstructions etc. are removed. If encountered, these waters should be contained, assessed and removed as part of remedial/construction works.

16.8 Geotechnical Hazards

The main geotechnical hazards identified include inadequate bearing capacity of bearing soil, heave of slag dominant Made Ground, settlement and collapse of underlying soils, presence of buried obstructions and voids, UXO, shallow groundwater, soil contamination, groundwater contamination and aggressive ground conditions for buried concrete and steel. A number of less significant hazards have also been identified as detailed in Section 13. A risk register has been provided that provides required mitigation against the risk identified. Risks have been plotted on a project specific risk matrix.

16.9 Reuse of materials

The proposed platform level/s and earthworks cut fill balance quantities are currently not known. All earthwork materials to be subject to chemical verification testing to ensure suitability for re-use in accordance with the Materials Management Plan. Material re-use is likely to be most applicable to the Slag Dominant Made Ground (d1) and Granular Made Ground (d3) which occur across the site from ground level to approximately 7m depth. Cohesive Made Ground (d4) was only encountered locally and will not be suitable for use in bulk earthworks but could be reused as Class 4 Fill to landscape areas.

16.10 Excavations

Excavations and earthworks should be possible with conventional plant and techniques with appropriate groundwater control. Excavations extending 2 to 3m below ground level are likely to encounter groundwater inflows particularly from coarse Made Ground soils or within the water bearing Tidal Flat Deposits Sands soils, especially during and after prolonged periods of wet weather. The use of proprietary trench boxes or the installation of sheet piles to form cut off walls to control inflow and prevent base instability may be required for deeper excavations.

16.11 Obstructions and voids

Potential ground obstructions from the former Redcar Iron and Steel Works are anticipated to be widely present on the site. The most significant ground obstructions are anticipated trending north-west south-east below the former Steel Plant, Coke Processing Plant and the location of former travelling cranes present across the Site. The spatial extent of these features is indicated but the depth is not known.

16.12 Foundations

Axial and lateral loads for the proposed structures were not available at the time of preparation of this GIR. A presumed design bearing resistance has been established through an iterative process to determine an applied load to pad and raft foundations resulting in predicted settlement of <25mm.

Conventional pad or shallow strip foundations are generally suitable for lightly loaded low threat structures that are not susceptible to creep or dynamic loading

Shallow raft foundations spanning the entire footprint of a structure are potentially suitable for low and medium threat structures at the Main Site. Raft foundations bearing in Slag Dominant Made Ground (d1) may provide a suitable option for the proposed Administration and CCR buildings as well the adjacent Warehouse and Workshop, although it could be anticipated that heave may occur below one area of the raft and settlement across other areas. Shallow foundations are not recommended to be constructed in Cohesive Made Ground (d4) due to the low undrained shear strength and variability of this soil.

Piles to transmit loads from the Power, Capture Compression and Utilities & Outfall areas to more competent soils and bedrock may comprise driven cast-in-situ concrete piles, driven steel piles, continuous flight auger (CFA) or bored piles. Permanent sleeving may be used to mitigate heave effects.

Calculations of ultimate axial resistance of a single CFA/ bored pile at assumed 600, 750, 900 and 1200mm diameters, 25.8m in length socketed 2.0m into the Redcar Mudstone bedrock (a1) assuming effective stress (drained) soil parameters and rock compressive strength are provided. Calculation of ultimate axial resistance for an alternative piling option, comprising a single driven tubular displacement pile, 340mm diameter and 25.8m in length is also provided.

16.13 Pavements

Low undrained shear strength is apparent for the cohesive Made Ground (d4) soils and CBR values of <2.3% and equivalent subgrade surface modulus of 30MPa are anticipated. Where the subgrade surface modulus is <30MPa options for improvement of the subgrade include excavation and replacement of between 500 and 1000mm of the soft subgrade with granular fill, mechanical stabilisation (geogrids and/or geotextiles). Made Ground slag dominant material (d1) materials are anticipated to exhibit CBR values >12% (long term subgrade surface modulus >85MPa). A minimum total highway pavement construction thickness of 450mm is recommended for frost protection.

The Aggressive Chemical Environment for Concrete (ACEC) Classification is generally AC-3 with a Design Sulfate Class for the site of DS-3 (in accordance with BRE Special Digest 1: 2005). DS-5 AC-5 may be required in slag-dominant Made Ground (d1) and potentially Lacustrine Deposits (b3); however, further testing is recommended in the Lacustrine Deposits (b3) as only a single sample has been tested.

All encountered strata at the site returned chloride values that were found to be greater than 50mg/l indicating soils may be classified as 'aggressive' to 'very aggressive' corrosivity classification, as per CD 375 (Highway Structures & Bridges Design, 2020).

16.14 Expansive Materials

Historical GI data suggests a volumetric expansion of between 2% and 3% can be anticipated from the site development following recovery and processing of the upper 2.5m of Made Ground at the site, and replacement by controlled compaction of suitable material.

Specialist laboratory testing to evaluate expansivity potential within the Made Ground slag material recorded between 0.02 and 1.72% uniaxial expansion for the 14-day tested material, and 0.67 to 2.15% uniaxial expansion for the 28-day tested material. It can therefore be expected that a volumetric expansion of between 2 and 3% can be anticipated from the site development following recovery and processing of the nominally upper 2.5m of Made Ground at the site, following replacement by controlled compaction of suitable material. However, the expansivity sampling process will have excluded cobbles and boulders which may contain larger quantities of unreacted material, and therefore should be managed separately.

16.15 Ground Improvement

It is understood that Slag Dominant Made Ground (d1) with expansion potential >3% is to be excavated / treated by Teesworks.

Deep soil mixing (lime or cement columns) and dynamic compaction techniques are not considered appropriate in the ground conditions at the site.

The presence of obstructions in the Made Ground, expansive and / or fused slag, the fines rich Tidal Flat deposits and shallow groundwater present potential construction constraints for Vibro-compaction and Vibro-replacement ground improvement.

16.16 Further Works

Generally, the work undertaken to date is considered to provide adequate information for the current stage of the project, with a detailed ground model developed, geotechnical priorities assigned, and ground risks understood. However, as the project moves into FEED and Detailed Design, a number of recommendations are made to provide additional data required to de-risk the project development.

Investigation was not possible in the far north west corner of the Main Site and across the footprint of the proposed Capture plant due to access and ecological constraints. – further investigation may be required if deemed necessary for FEED.

It is noted that there is a potential for contaminated materials to be present within the areas of the site that have not been subject to intrusive investigation (Workshops, Furnace Stockhouse, the Sinter Plant and the area of the overhead conveyor connecting these areas, together with the northwest of the site (groundwater). However, chemical verification testing should be undertaken either prior to its excavation or during its excavation and placement.

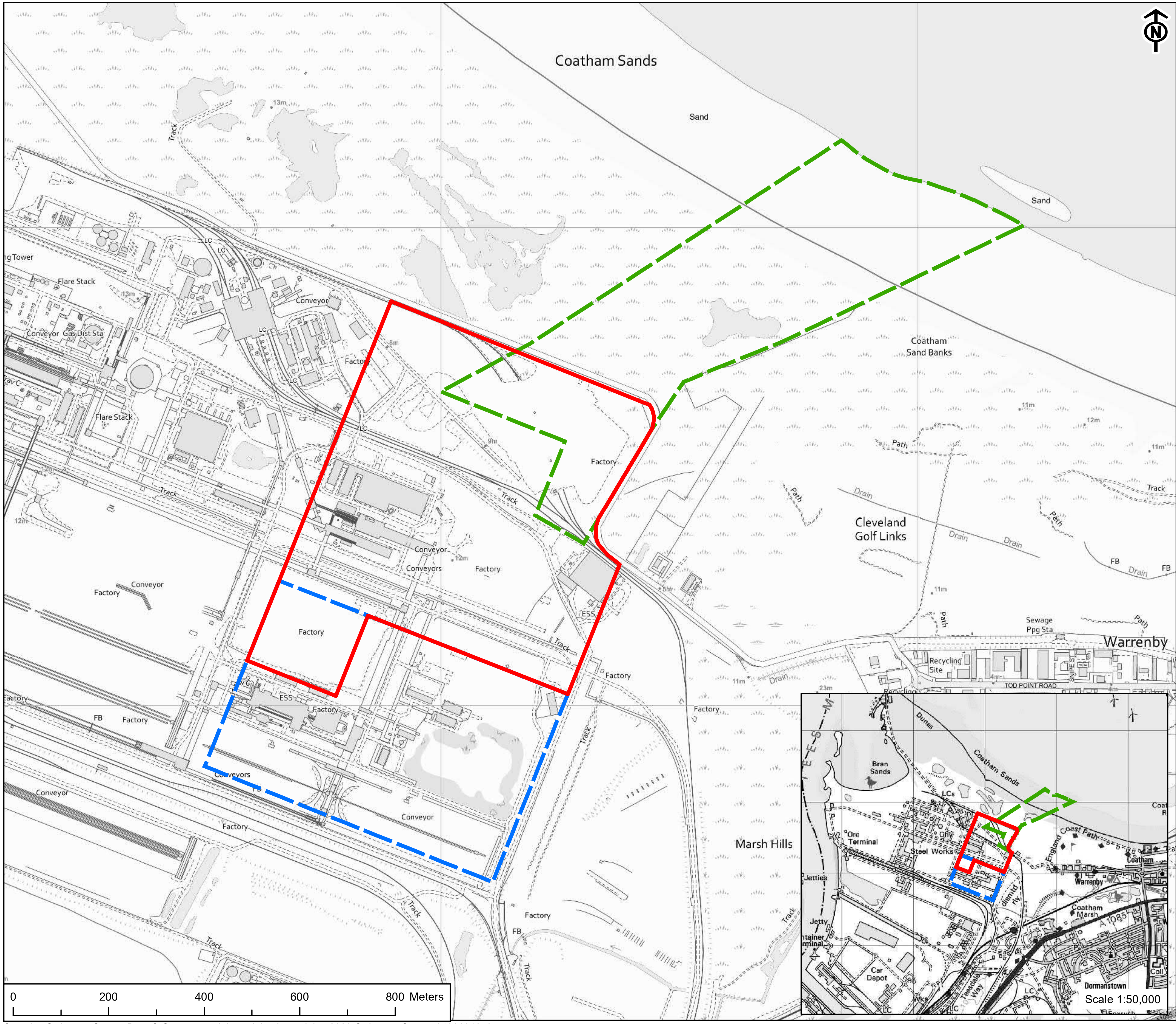
There are no down gradient boreholes (in the northwest of the site) to able to fully assess the potential for migration of groundwater off site. However, given the limited exceedances of EC in groundwater and soil leachate, the magnitude of exceedances in relation to the EC, the spatial distribution of the exceedances across the Site and expected attenuation, it is considered that the risk to surface waters and groundwater would remain low, despite of the lack of confirmatory groundwater information in this northwest area of the site. However, further ground investigation in this area would be beneficial to assess concentrations at the boundary, in particular for the more prevalent contaminants identified. The increasing concentration trend for ammoniacal nitrogen in particular should be monitored to assess whether this is seasonal variation or a longer-term trend.

Groundwater monitoring (quality and water levels) should continue for at least 12 months to establish seasonal variation effects.

With regards to the ground risks identified, further work is recommended to assess the preferred piling solution and also to determine pile performance. This may include a desk based Geotechnical Design Report and site based testing in FEED. For detailed design/ Execute stage, it has been recommended that static maintained load tests are to be undertaken on for each structure. Large plate load testing across the development footprint should also be considered to properly assess the performance of the near surface soils in regard to shallow pad or raft foundations.

17. Drawings

Project Management Initials: RL Designer: RPA Checked: NF Approved: JT



Scale @ A3 1:7,500

AECOM

PROJECT
NET ZERO TEESSIDE

CLIENT
bp

KEY
- Power, Capture & Compressor (PCC) Site
- Future Expansion
- CO2 Transport Corridor

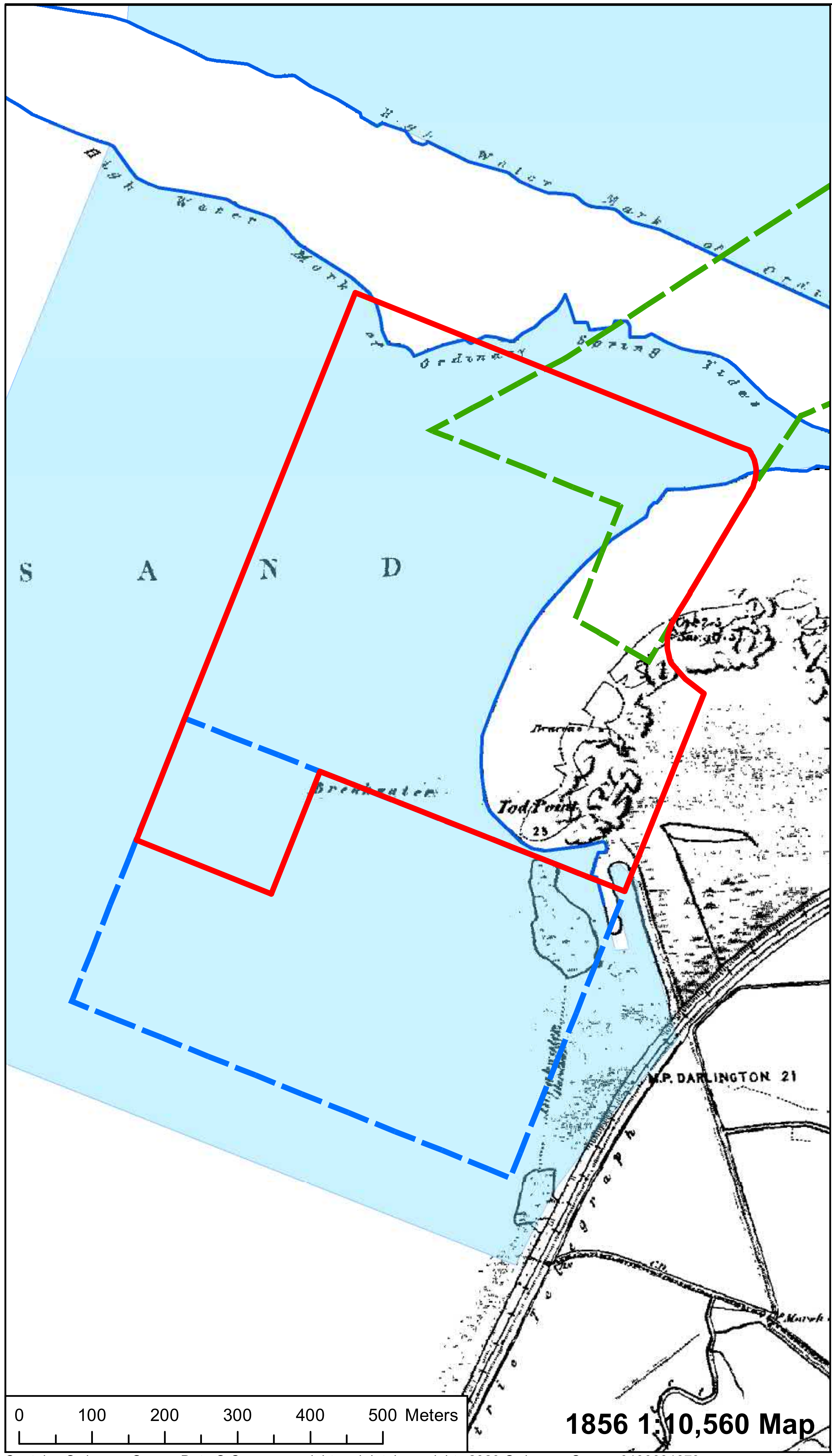
TITLE
GROUND INVESTIGATION REPORT
SITE LOCATION PLAN

REFERENCE
60657467-ACM-GIR-DRG-001

SHEET NUMBER: 1 of 1

DATE: 14/10/2021

Project Management Initials: RL Designer: RPA Checked: NF Approved: JT



Scale @ A3 1:7,000

AECOM

PROJECT
NET ZERO TEESSIDE

CLIENT
bp

NOTES \ KEY
- Power, Capture & Compressor (PCC) Site
- CO2 Transport Corridor
- Future Expansion Area

Historical Features
- H.M.W.M.O.S.T (1856)
- Sea 1856

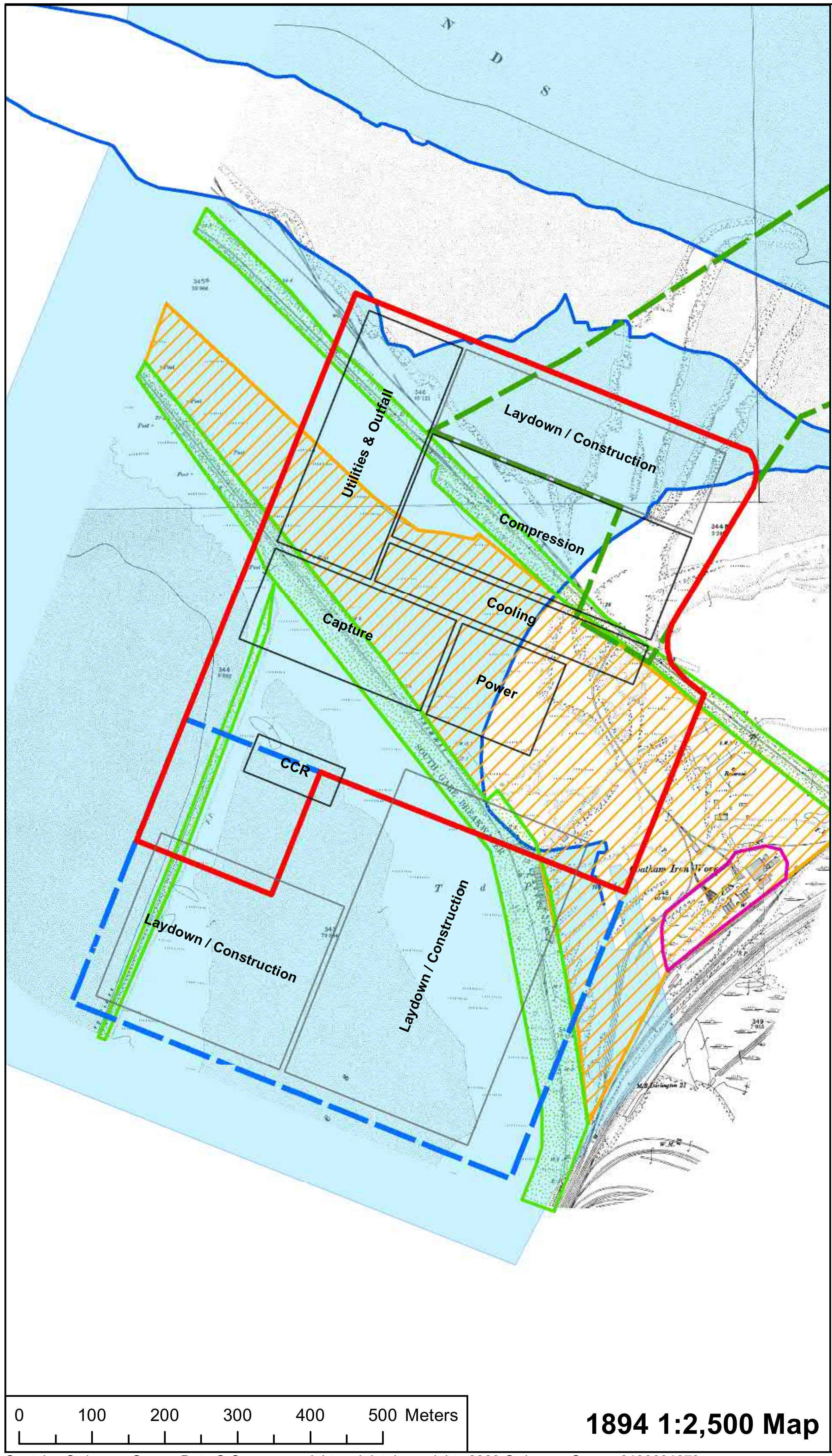
TITLE
HISTORICAL MAPPING 1856 - 1857
OS FIRST EDITION

REFERENCE
60657467-ACM-GIR-DRG-002

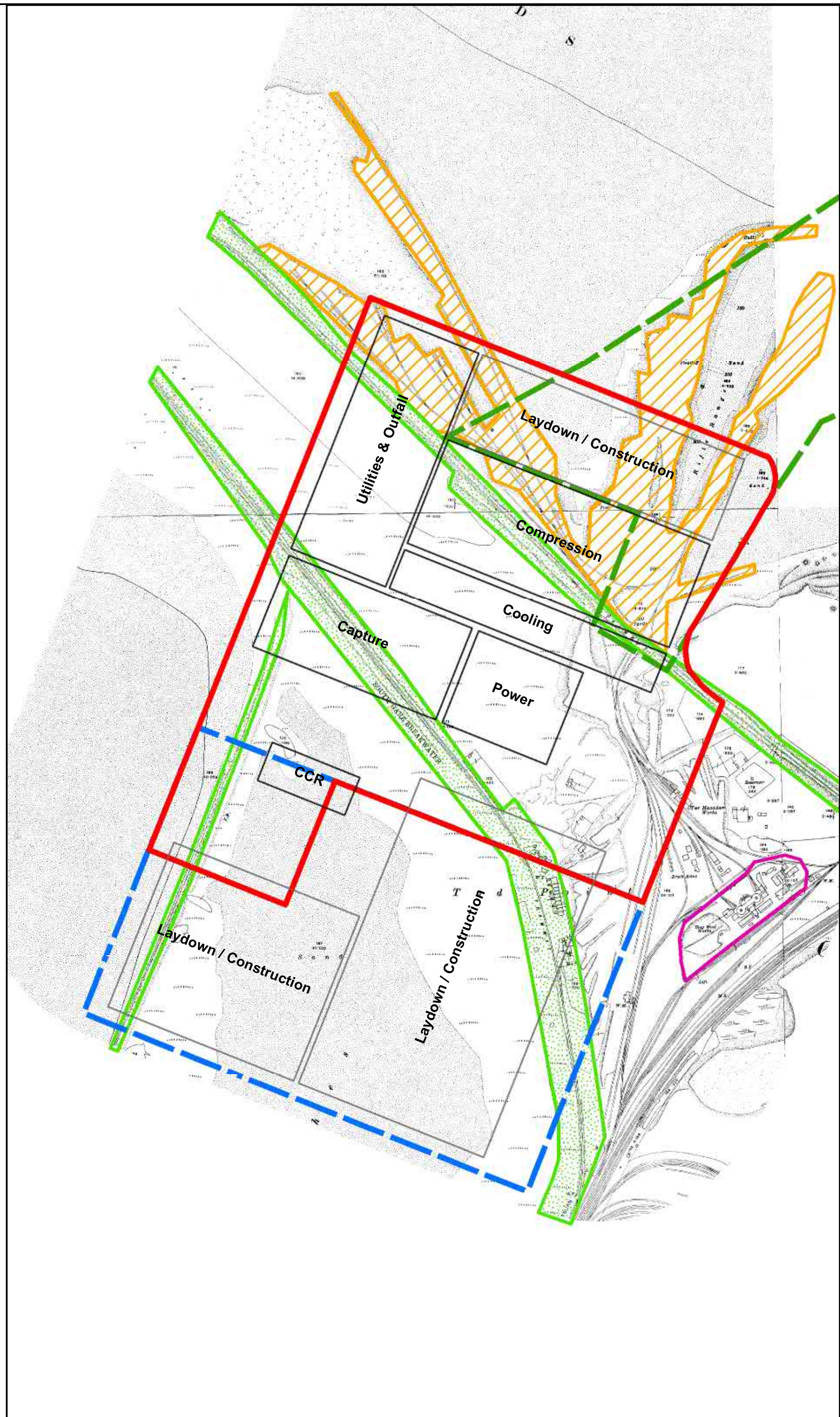
SHEET NUMBER
1 of 1

DATE
14/10/2021

Project Management Initials: RL Designer: RPA Checked: NF Approved: JT



1894 1:2,500 Map



1915 1:2,500 Map

Scale @ A3 1:7,000

AECOM

PROJECT
NET ZERO TEESSIDE

CLIENT
bp

NOTES \ KEY

- Power, Capture & Compressor (PCC) Site
- CO2 Transport Corridor
- Future Expansion Area

Historical Features

- Coatham Iron Works
- Breakwater
- Infill
- H.M.W.M.O.S.T (1856)
- Sea 1856

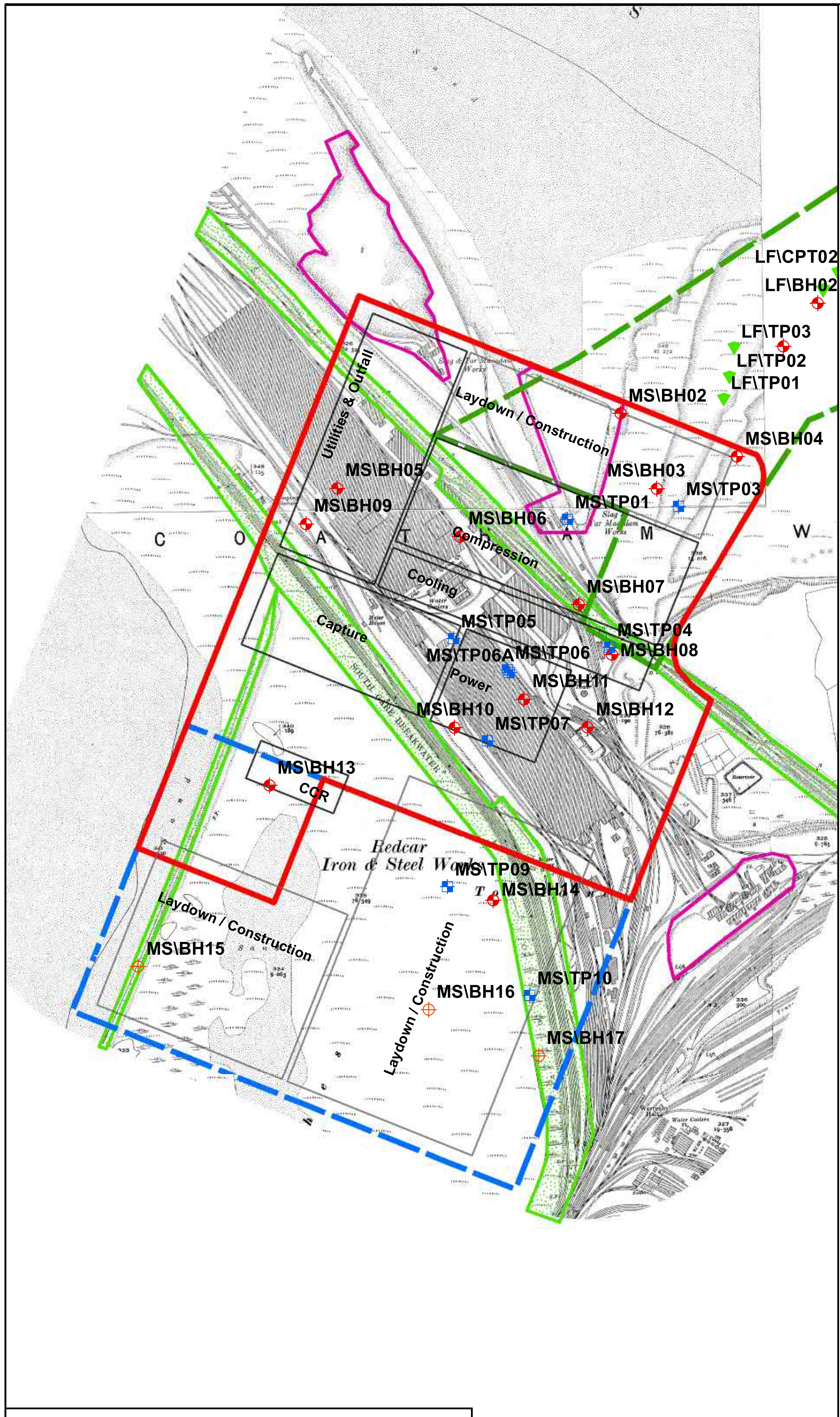
TITLE
HISTORICAL MAPPING 1894 - 1915
EARLY LAND RECLAMATION
& COATHAM WORKS

REFERENCE
60657467-ACM-GIR-DRG-003

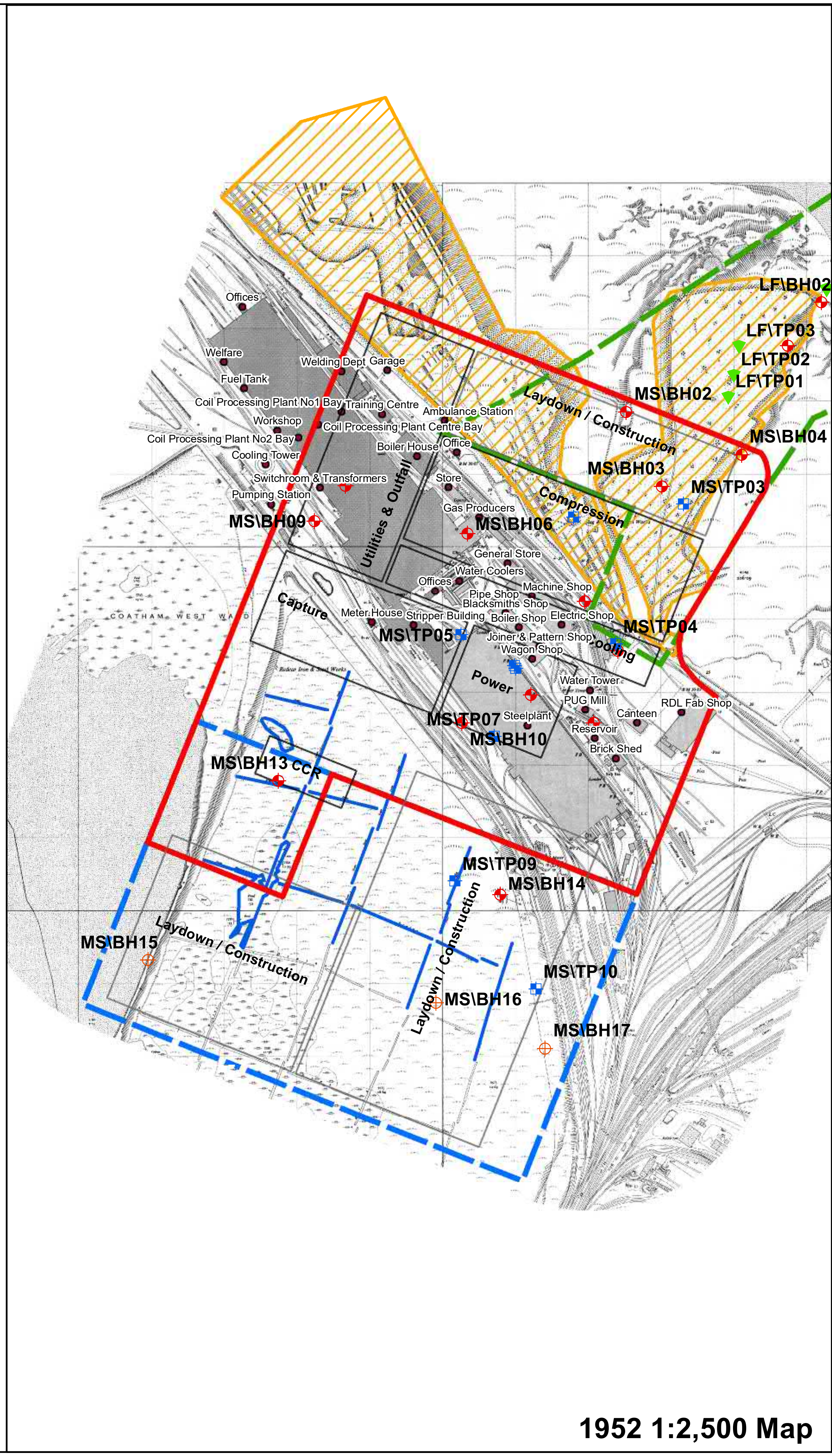
SHEET NUMBER
1 of 1

DATE
15/10/2021

Project Management Initials: RL Designer: RPA Checked: NF Approved: JT



1929 1:2,500 Map



1952 1:2,500 Map

Scale @ A3 1:7,000

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AECOM

PROJECT
NET ZERO TEESSIDE

CLIENT
bp

NOTES \ KEY

- Power, Capture & Compressor (PCC) Site
- CO2 Transport Corridor
- Future Expansion Area

AEG 2021 NZT Investigation

- Sonic Drilled Borehole
- Sonic Drilled Borehole with Rotary Core Follow On
- Cone Penetration Test (CPT)
- Trial Pit

Historical Features

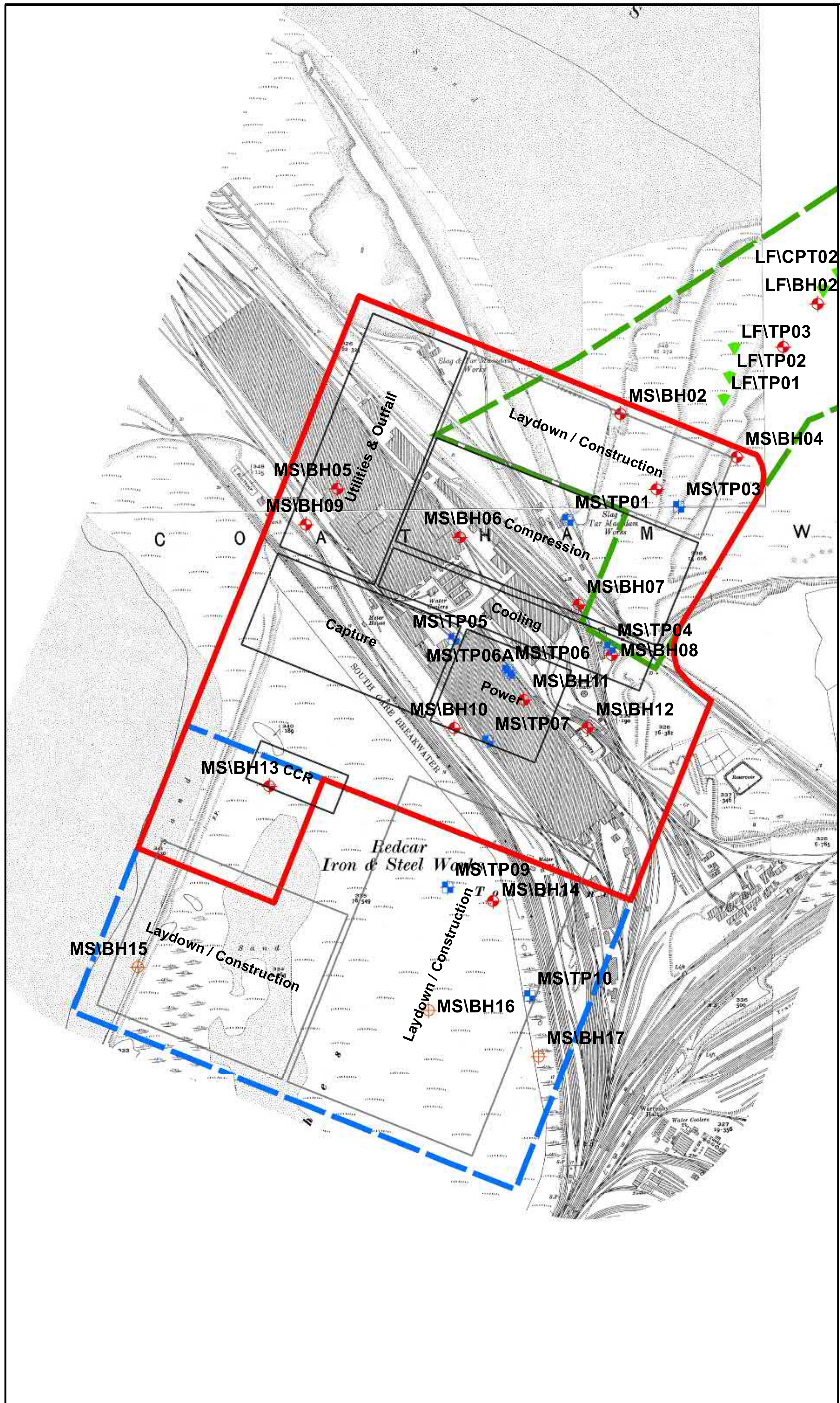
- Slag & Tar Macadam Works
- Coatham Iron Works
- Breakwater
- Infill
- Drain
- Historical Building Label

TITLE
HISTORICAL MAPPING 1929 - 1952
REDCAR STEEL WORKS

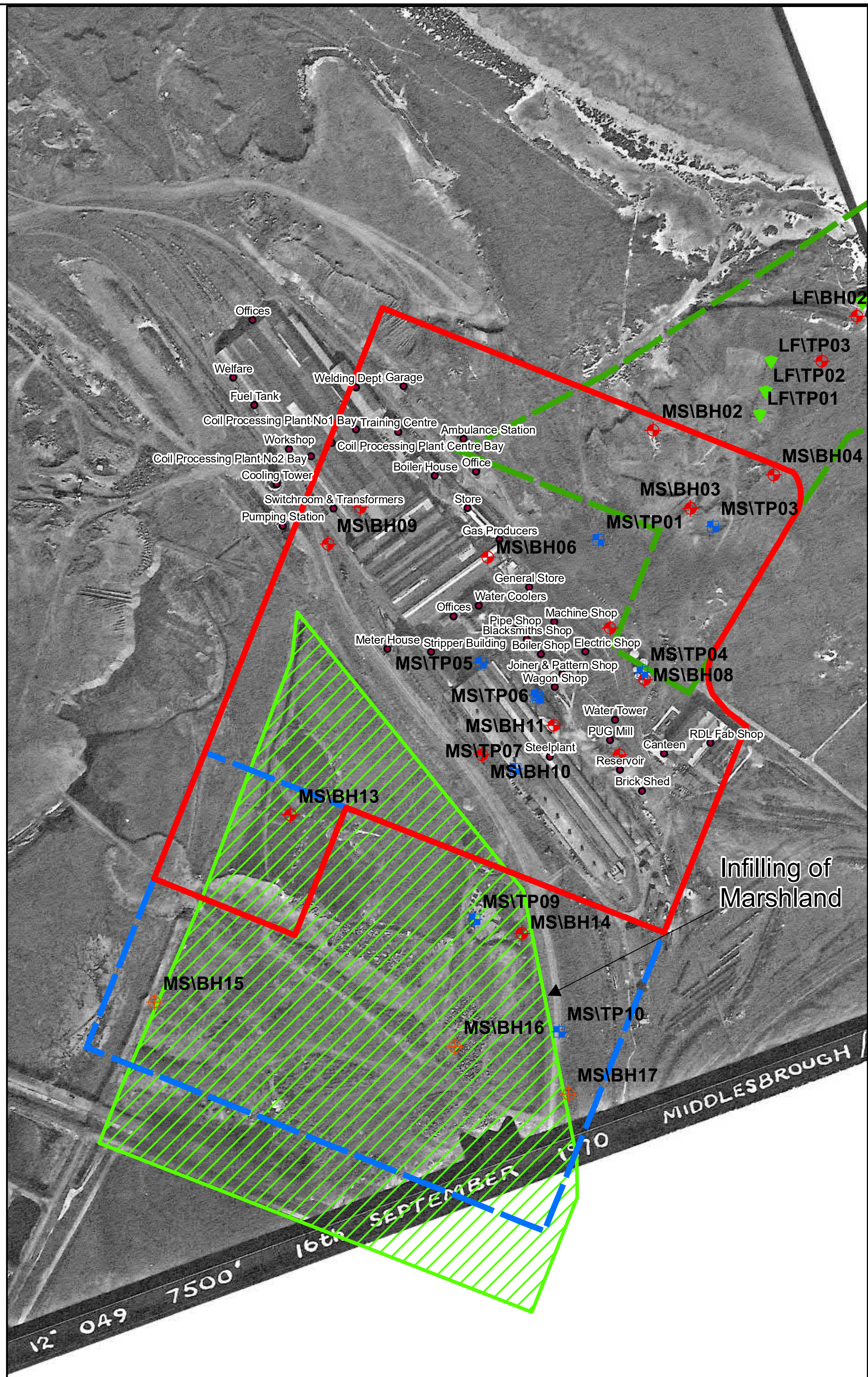
REFERENCE
60657467-ACM-GIR-DRG-004

SHEET NUMBER
1 of 1

DATE
15/10/2021



1953 1:2,500 Map



September 1970 Aerial Photograph

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Scale @ A3 1:7,000

AECOM

PROJECT
NET ZERO TEESSIDE

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bp

NOTES \ KEY

- Power, Capture & Compressor (PCC) Site
- CO2 Transport Corridor
- Future Expansion Area

AEG 2021 NZT Investigation

- Sonic Drilled Borehole
- Sonic Drilled Borehole with Rotary Core Follow On
- Cone Penetration Test (CPT)
- Trial Pit

Historical Features

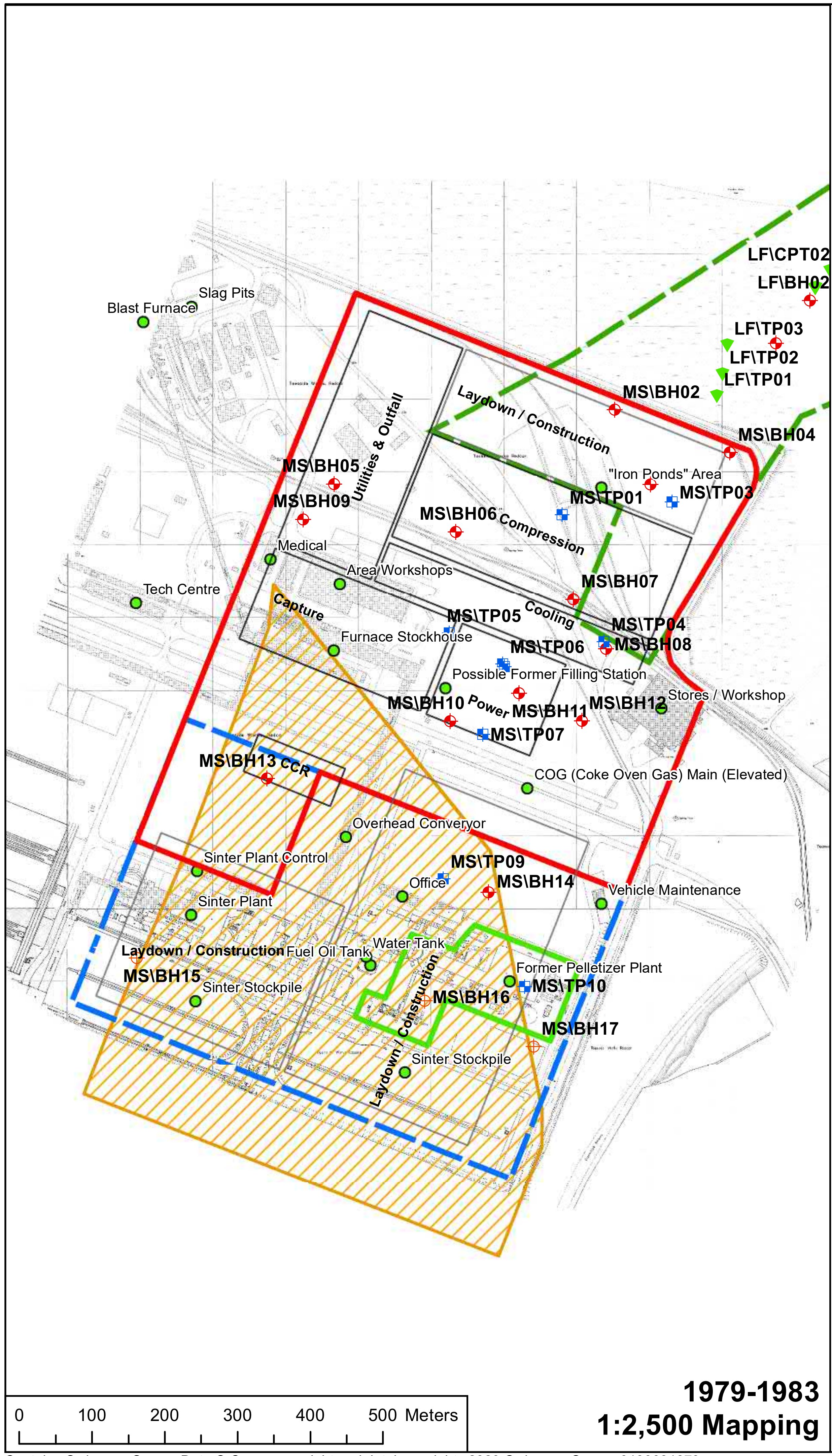
- Marsh Infill (1970s)
- Historical Building Label

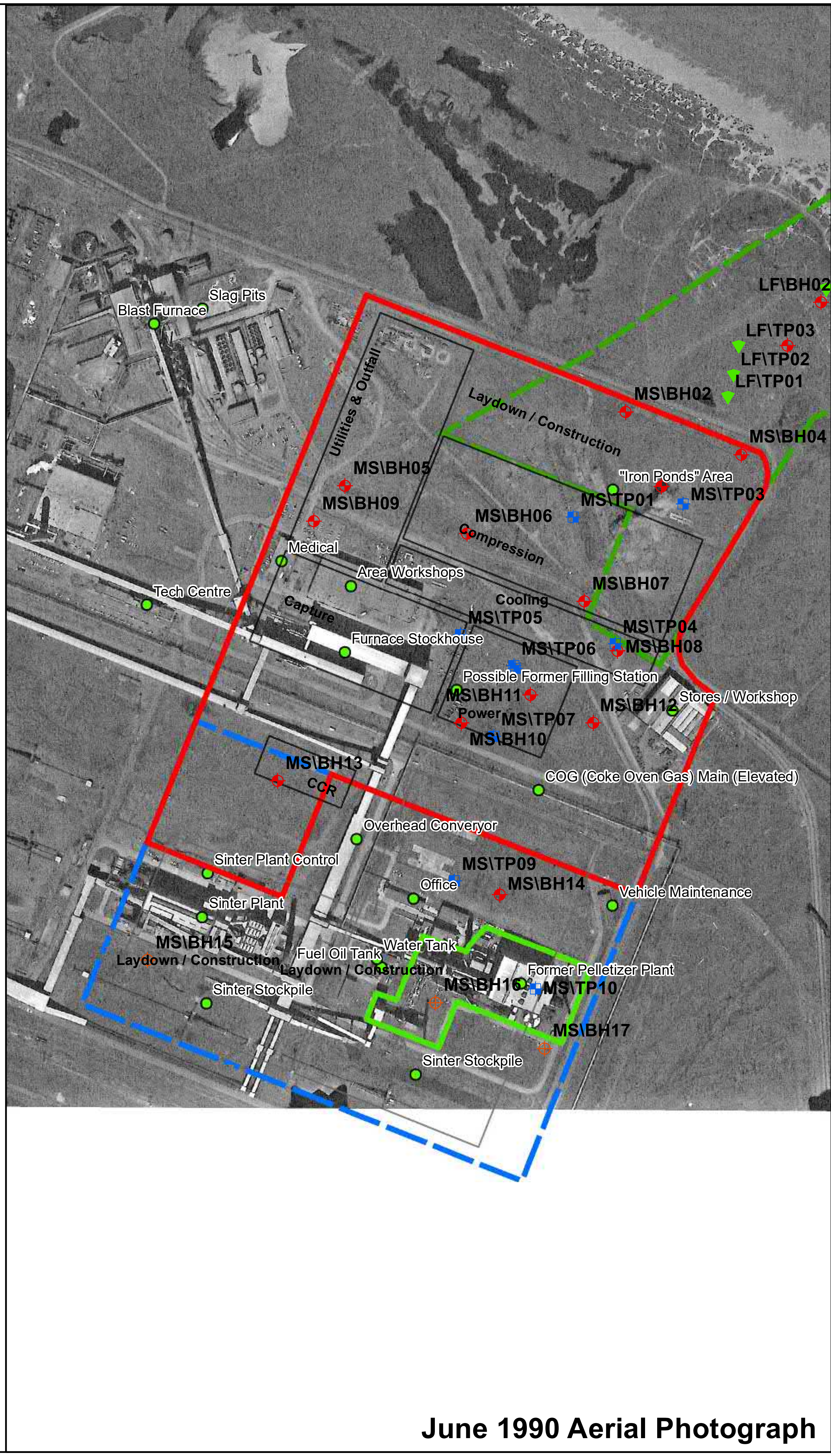
TITLE
HISTORICAL MAPPING 1953 - 1970
MARSH INFILL

REFERENCE
60657467-ACM-GIR-DRG-005

SHEET NUMBER	DATE
1 of 1	15/10/2021

Project Management Initials: RL Designer: RPA Checked: NF Approved: JT





Scale @ A3 1:7,000

AECOM

PROJECT
NET ZERO TEESSIDE

CLIENT
bp

NOTES \ KEY

- Power, Capture & Compressor (PCC) Site
- CO2 Transport Corridor
- Future Expansion Area

AEG 2021 NZT Investigation

- Sonic Drilled Borehole
- Sonic Drilled Borehole with Rotary Core Follow On
- Cone Penetration Test (CPT)
- Trial Pit

Historical Features

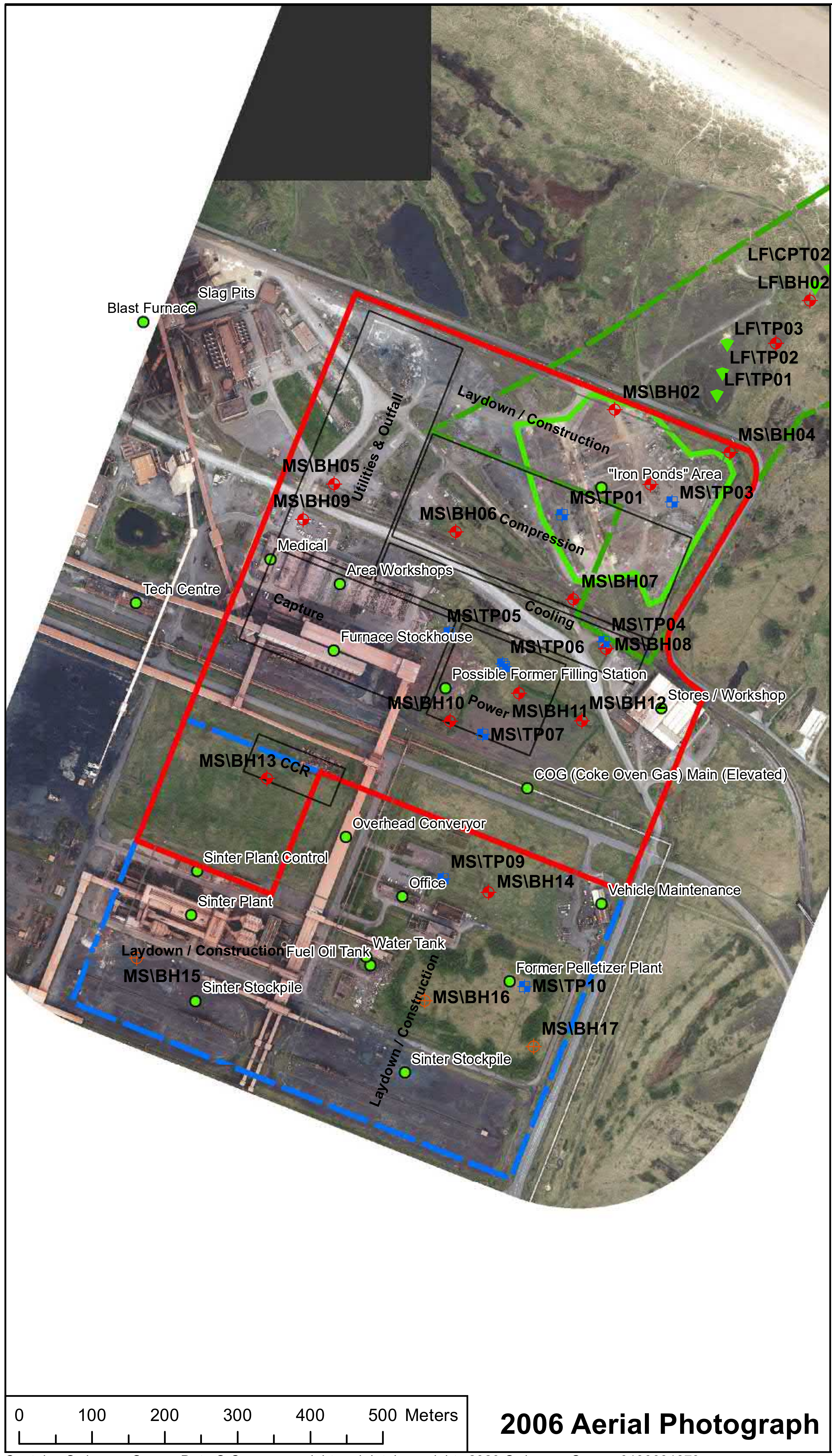
- Infill behind breakwater & slag wall (1970's)
- Pelletizer Plant (Demolished)
- Building Labels

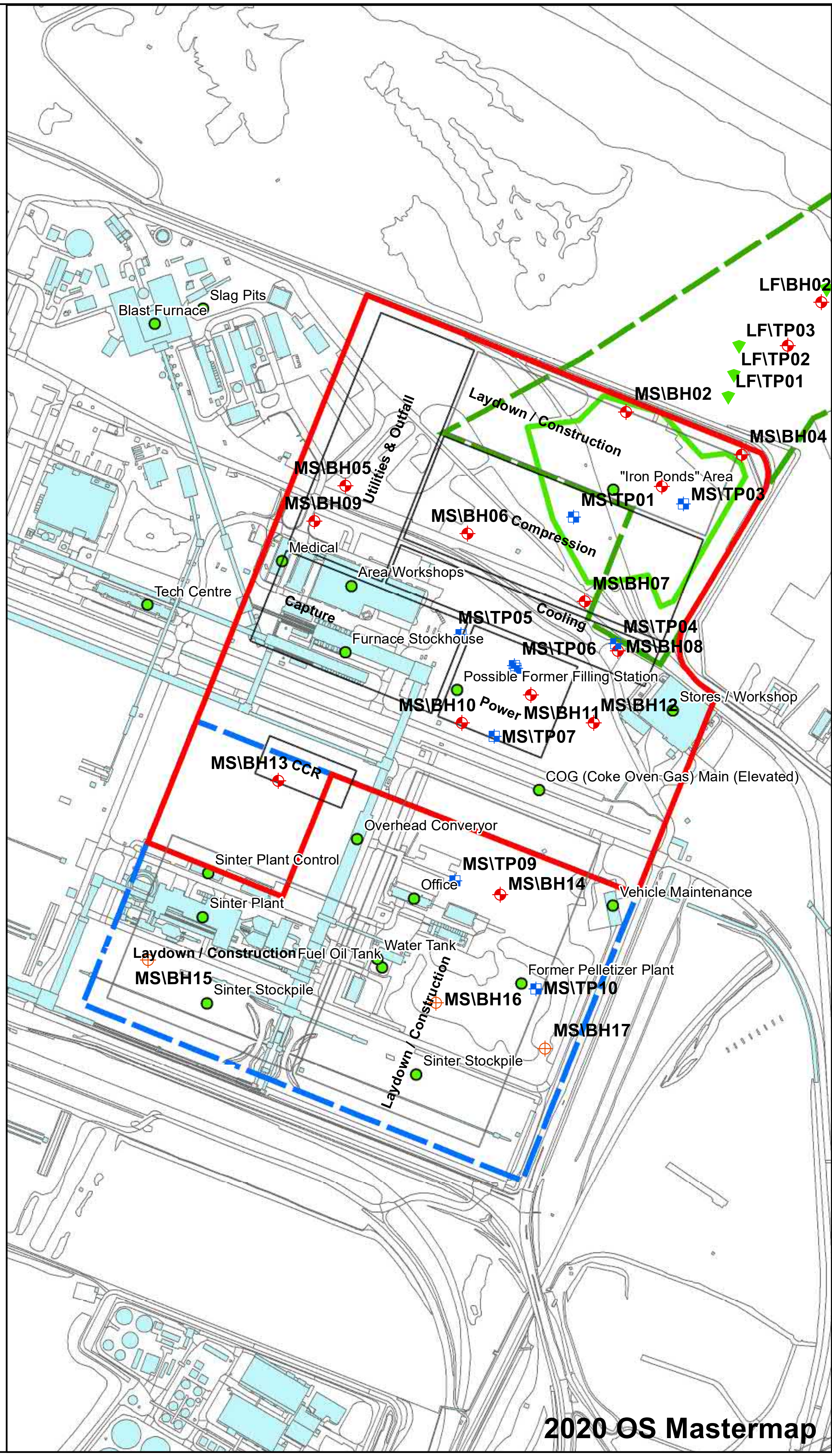
TITLE
HISTORICAL MAPPING 1979 - 1990
TEESSIDE WORKS & FORMER PELLET PLANT

REFERENCE
60657467-ACM-GIR-DRG-006

SHEET NUMBER	DATE
1 of 1	15/10/2021

Project Management Initials: RL Designer: RPA Checked: NF Approved: JT





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AECOM

PROJECT
NET ZERO TEESSIDE

CLIENT
bp

NOTES \ KEY
- Power, Capture & Compressor (PCC) Site
- CO2 Transport Corridor
- Future Expansion Area

AEG 2021 NZT Investigation
- Sonic Drilled Borehole
- Sonic Drilled Borehole with Rotary Core Follow On
- Cone Penetration Test (CPT)
- Trial Pit

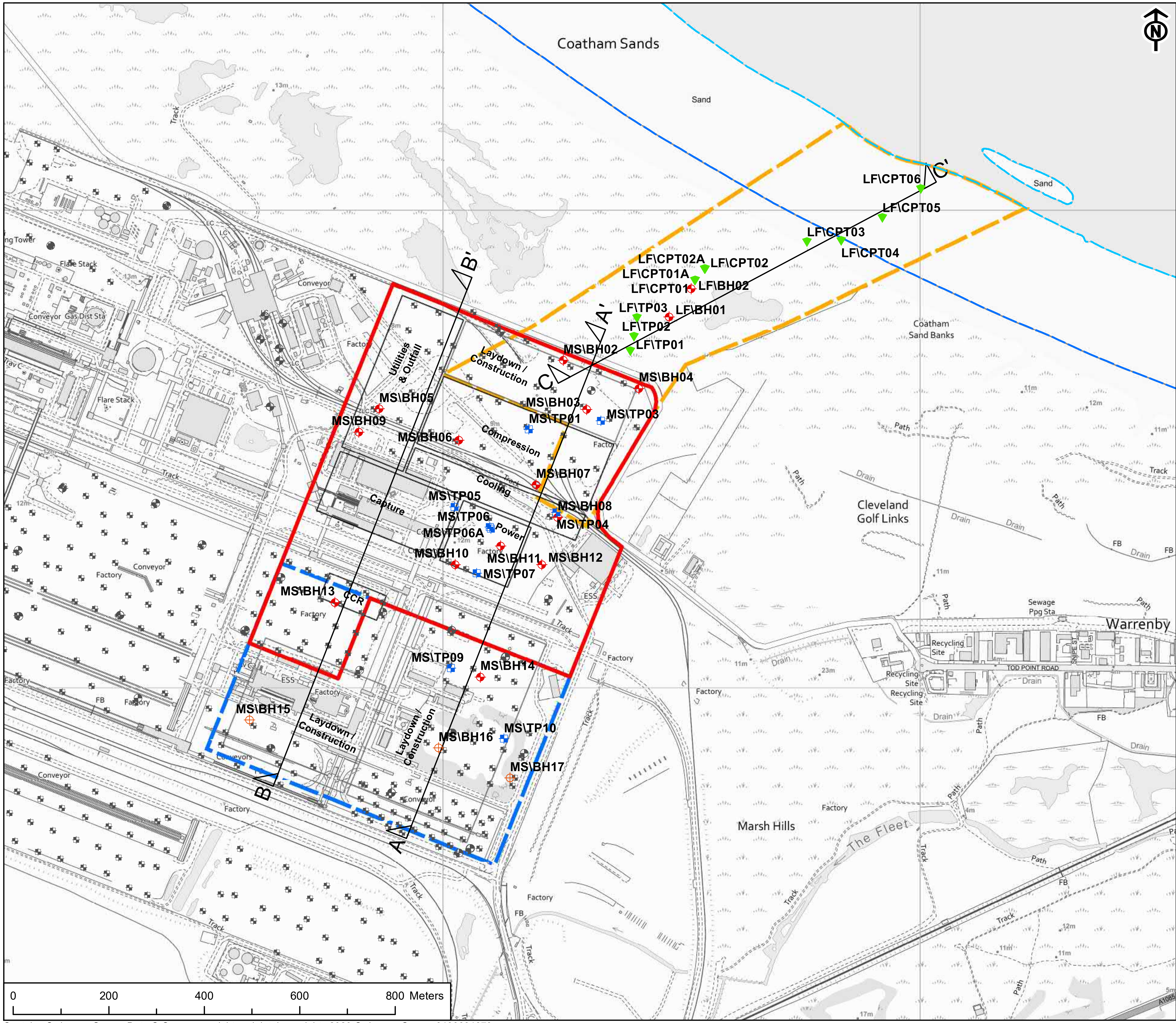
Historical Features
- Iron Ponds Area
- Building Labels

TITLE
HISTORICAL MAPPING 2006 - 2020
"IRON PONDS"

REFERENCE
60657467-ACM-GIR-DRG-007

SHEET NUMBER	DATE
1 of 1	15/10/2021

Project Management Initials: RL Designer: RPA Checked: NF Approved: JT



Scale @ A3 1:7,500

AECOM

PROJECT
NET ZERO TEESSIDE

CLIENT
NZT POWER AND NZNS STORAGE

KEY
- PCC Site
- Future Expansion Area
- CO2 Transport Corridor

AEG 2021 NZT Investigation
- Sonic Drilled Borehole
- Sonic Drilled Borehole with Rotary Core Follow On
- Cone Penetration Test (CPT)
- Trial Pit

Previous Exploratory Holes
- CP
- CP+RC
- TP

EXPLORATORY HOLES TAKEN FROM THE FOLLOWING REPORTS:

ALLIED EXPLORATION & GEOTECHNICS LTD - PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT, CONTRACT 4339, PRELIMINARY FINAL FACTUAL REPORT. DATED SEPTEMBER 2021.

HISTORICAL GROUND INVESTIGATIONS

ALLIED EXPLORATION & GEOTECHNICS LTD - THE FORMER SSI STEELWORKS, REDCAR – GROUND INVESTIGATION CONTRACT – PRIORITY AREAS WITHIN SSI LANDHOLDINGS CONTRACT 1 AND CONTRACT 2 (AREA A), FINAL FACTUAL REPORT, CONTRACT NO. 4153 & 4154 (AREA A), SOUTH TEES SITE COMPANY, JUNE 2018.

CH2M HILL - SSI REDCAR – SSI 1, FACTUAL REPORT – INITIAL TRIAL PITTING, SOUTH TEES SITE COMPANY LTD, NOVEMBER 2017.

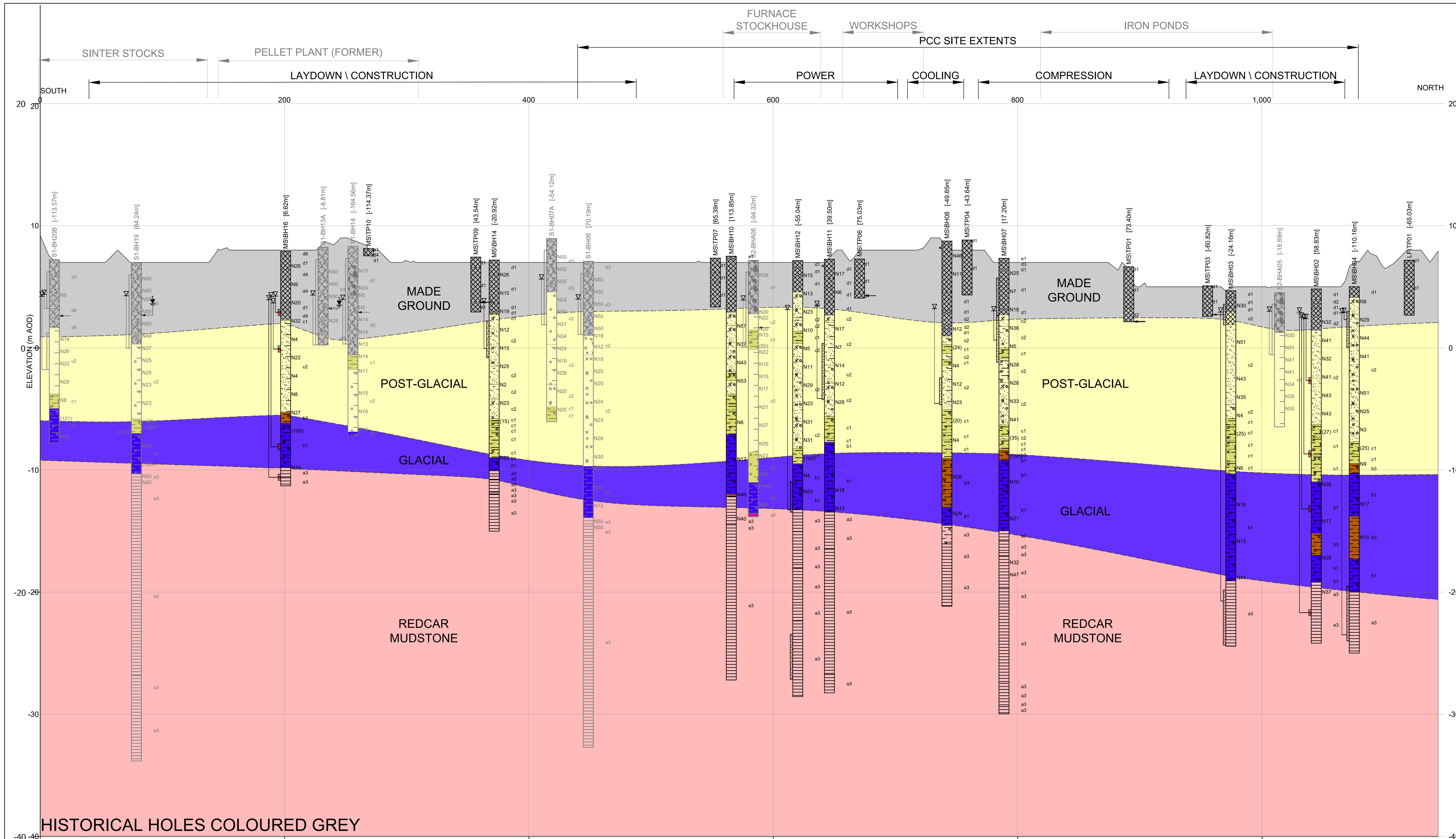
CH2M HILL - SSI REDCAR – SSI 2, FACTUAL REPORT – INITIAL TRIAL PITTING, SOUTH TEES SITE COMPANY LTD, NOVEMBER 2017.

TITLE
GROUND INVESTIGATION REPORT
EXPLORATORY HOLE LOCATION PLAN
(AEG 2021)

REFERENCE
60657467-ACM-GIR-DRG-008

SHEET NUMBER
1 of 1

DATE
14/10/2021



GEOLOGICAL SECTION A-A' (SOUTH - NORTH)

SCALE H1:2000 V1:200

1:2000 HORIZONTAL

1:200 VERTICAL

GEOLOGICAL UNIT LEGEND

SUPERFICIAL SOILS

- d7 MADE GROUND (MISCELLANEOUS)
- d6 MADE GROUND (TOPSOIL)
- d4 MADE GROUND (COHESIVE)
- d3 MADE GROUND (GRANULAR)
- d1 MADE GROUND (SLAG-DOMINANT MATERIAL)
- c2 ESTUARINE - SAND
- c1 ESTUARINE - CLAY & SILT
- b3 LACUSTRINE DEPOSITS
- b1 GLACIAL TILL

BEDROCK

JURASSIC

- a3 REDCAR MUDSTONE

TRIASSIC

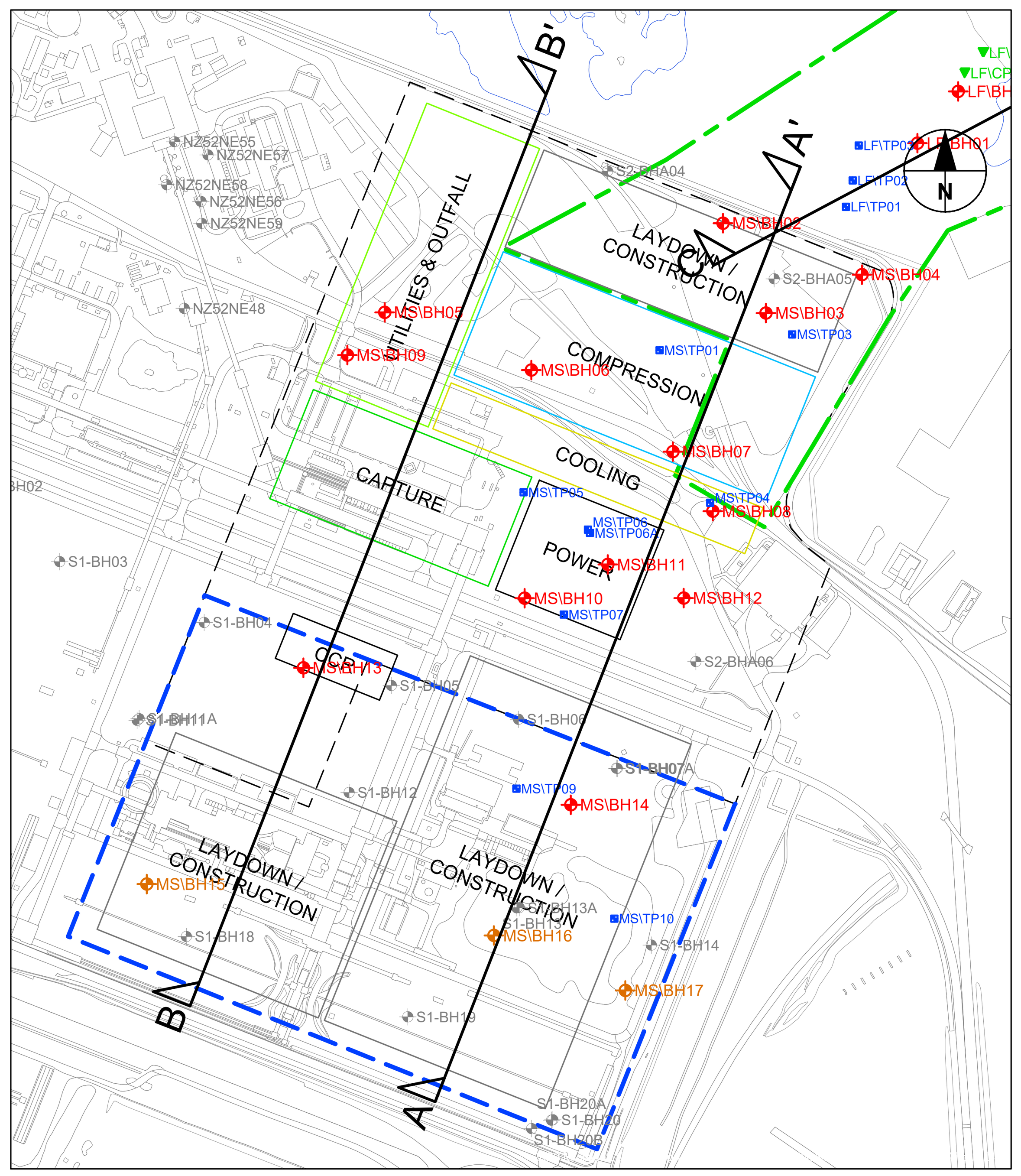
- a2 PENARTH GROUP
- a1 MERCIA MUDSTONE

GEOLOGICAL STRATA HATCH

- MADE GROUND -COHESIVE
- MADE GROUND -GRANULAR
- MADE GROUND - SLAG DOMINANT
- OTHER MADE GROUND
- CLAY
- CLAYEY
- SILT
- SILTY
- SAND
- SANDY
- GRAVEL
- GRAVELLY
- MUDSTONE

GEOLOGICAL SECTION KEY

- S1-BH20A [11.3M] HOLE ID AND PERPENDICULAR DISTANCE FROM SECTION LINE
- WATER STRIKE AND RISE LEVEL
- RESPONSE ZONE, PIEZO TIP AND MAXIMUM WATER LEVEL MONITORED
- VIBRATING WIRE PIEZOMETER TIP
- N9 SPT N VALUE



SITE KEY

- POWER, CAPTURE & COMPRESSOR (PCC) SITE
- FUTURE EXPANSION AREA
- CO2 TRANSPORT CORRIDOR

ISO A1 594mm x 841mm

Project Management Initials: Designer: RPA Checked: CMC Approved: SDM

AECOM

1. GROUND INVESTIGATION DATA FROM THE FOLLOWING FACTUAL REPORTS:
   - ALLIED EXPLORATION & GEOTECHNICS LTD - THE FORMER SSI STEELWORKS, REDCAR – GROUND INVESTIGATION CONTRACT – PRIORITY AREAS WITHIN SSI LANDHOLDINGS CONTRACT 1 AND CONTRACT 2 (AREA A), FINAL FACTUAL REPORT, CONTRACT NO. 4153 & 4154 (AREA A), SOUTH TEES SITE COMPANY, JUNE 2018.
   - CH2M HILL - SSI REDCAR – SSI 1, FACTUAL REPORT – INITIAL TRIAL PITTING, SOUTH TEES SITE COMPANY LTD, NOVEMBER 2017.
   - CH2M HILL - SSI REDCAR – SSI 2, FACTUAL REPORT – INITIAL TRIAL PITTING, SOUTH TEES SITE COMPANY LTD, NOVEMBER 2017.
   - ALLIED EXPLORATION & GEOTECHNICS LTD - PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT, CONTRACT 4339, PRELIMINARY FINAL FACTUAL REPORT. SEPTEMBER 2021.
2. FOR EXPLORATORY HOLE AND SECTIONLINE LOCATIONS SEE DRAWING 60657467-ACM-GIR-DRG-008.
3. FOR GEOLOGICAL SECTIONS B-B' & C-C' REFER TO DRAWING 60657467-ACM-GIR-DRG-010 & 011.
4. GROUNDWATER DATA UPTO AUGUST 2021 PRESENTED.
5. EXISTING GROUND SURFACE DERIVED FROM ENVIRONMENT AGENCY LIDAR DATA 2020. MODIFICATIONS TO THE GROUND ELEVATION SINCE THE LIDAR WAS ACQUIRED WILL NOT BE REPRESENTED.

ISSUE/REVISION

I/R	DATE	DESCRIPTION
P01	2021-10-28	FIRST ISSUE

CLIENT

bp

PROJECT

NET ZERO TEESSIDE

SHEET TITLE

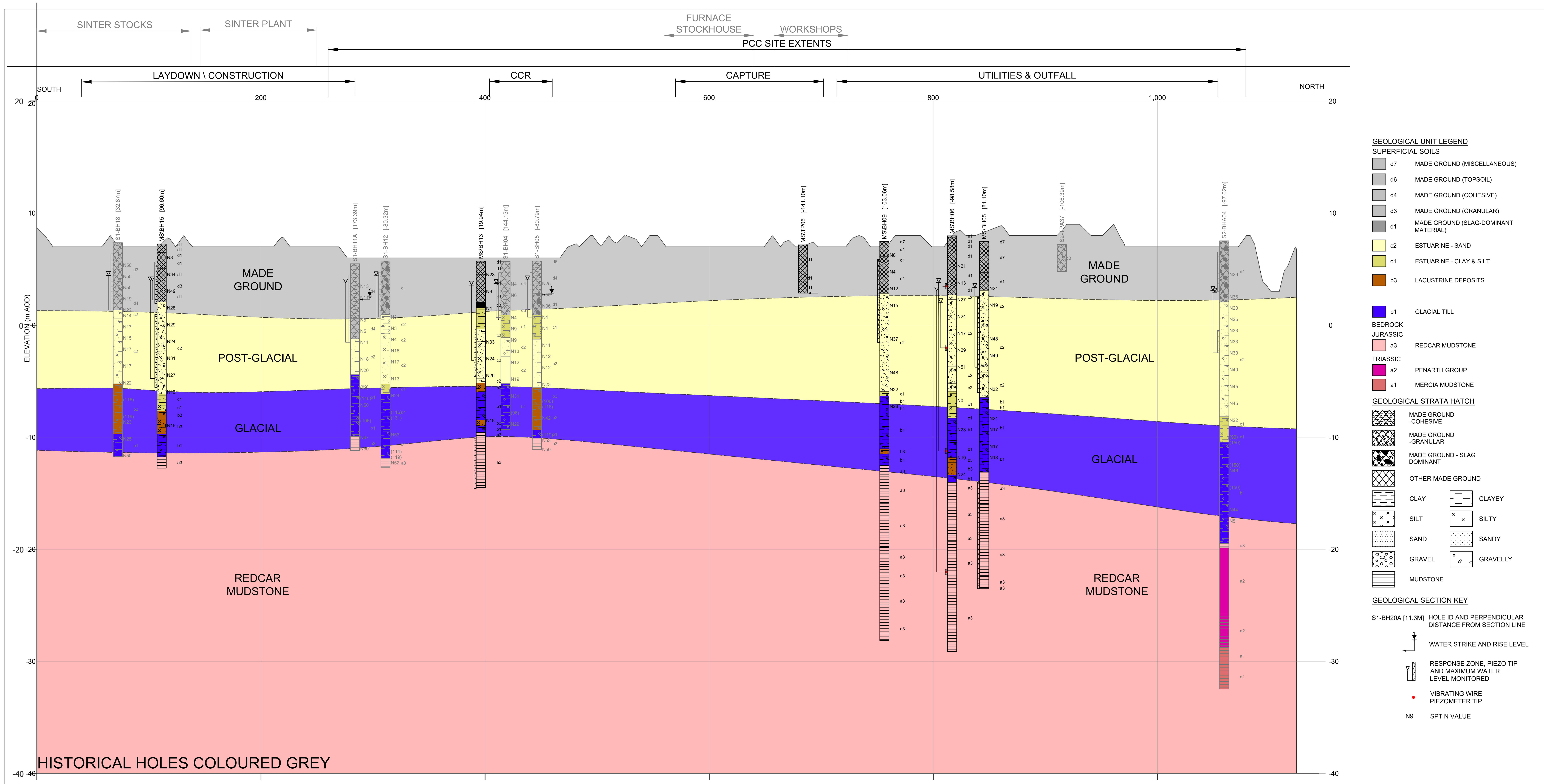
PCC SITE GEOLOGICAL SECTION A-A'

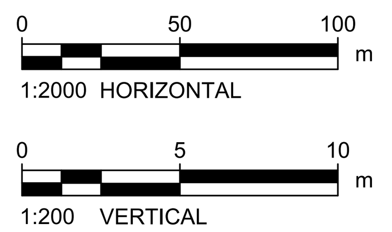
CONSULTANT

AECOM
One Trinity Gardens
Newcastle upon Tyne
0191 224 6500 tel 0191 224 6599 fax
www.aecom.com

SHEET NUMBER

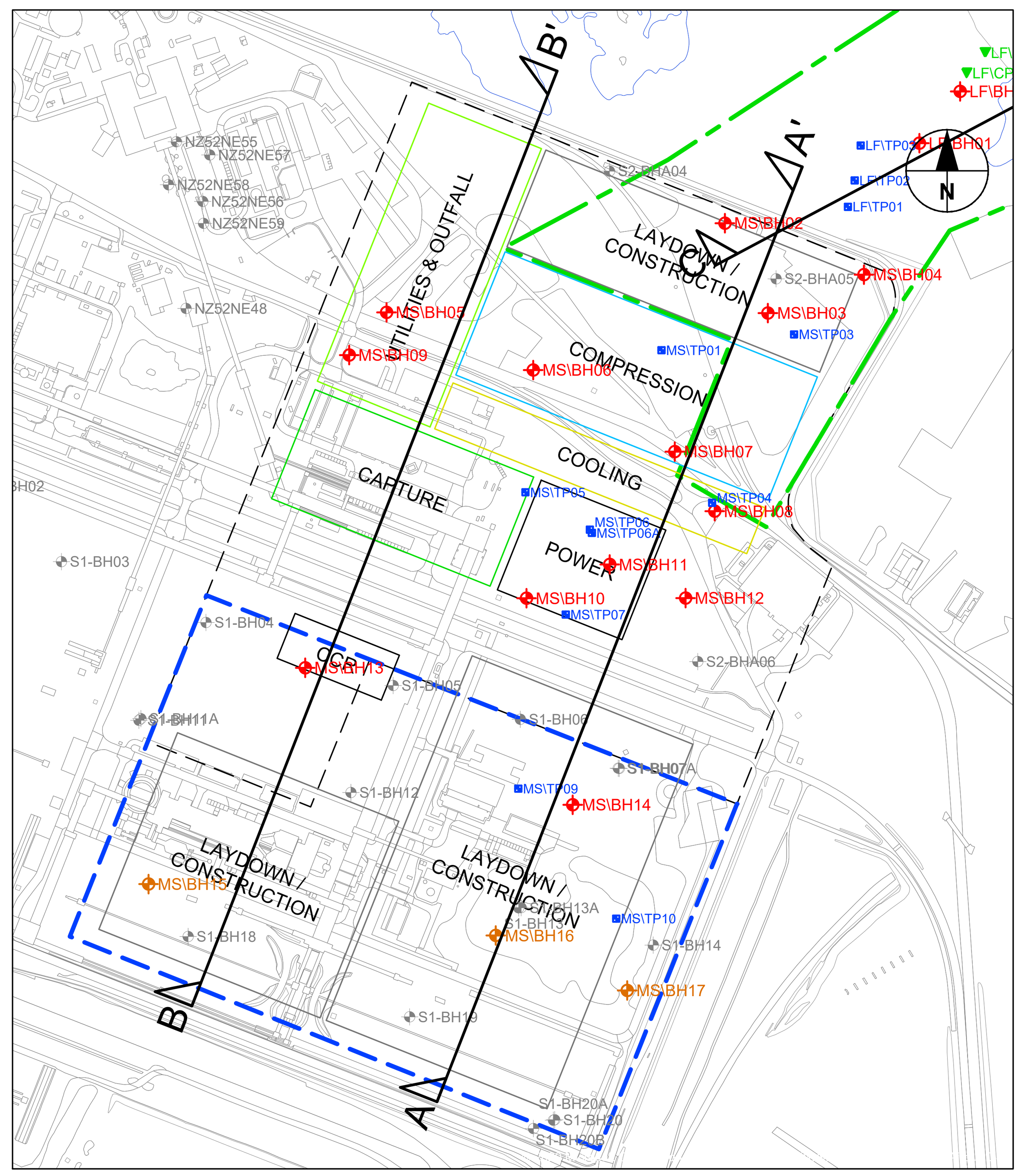
60657467-ACM-GIR-DRG-009





GEOLOGICAL SECTION B-B' (SOUTH - NORTH)

SCALE H1:2000 V1:200



SITE KEY

- POWER, CAPTURE & COMPRESSOR (PCC) SITE
- FUTURE EXPANSION AREA
- CO2 TRANSPORT CORRIDOR

AECOM

1. GROUND INVESTIGATION DATA FROM THE FOLLOWING FACTUAL REPORTS:
   - ALLIED EXPLORATION & GEOTECHNICS LTD - THE FORMER SSI STEELWORKS, REDCAR – GROUND INVESTIGATION CONTRACT – PRIORITY AREAS WITHIN SSI LANDHOLDINGS CONTRACT 1 AND CONTRACT 2 (AREA A), FINAL FACTUAL REPORT, CONTRACT NO. 4153 & 4154 (AREA A), SOUTH TEES SITE COMPANY, JUNE 2018.
   - CH2M HILL - SSI REDCAR – SSI 1, FACTUAL REPORT – INITIAL TRIAL PITTING, SOUTH TEES SITE COMPANY LTD, NOVEMBER 2017.
   - CH2M HILL - SSI REDCAR – SSI 2, FACTUAL REPORT – INITIAL TRIAL PITTING, SOUTH TEES SITE COMPANY LTD, NOVEMBER 2017.
   - ALLIED EXPLORATION & GEOTECHNICS LTD - PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT, CONTRACT 4339, PRELIMINARY FINAL FACTUAL REPORT. SEPTEMBER 2021.
2. FOR EXPLORATORY HOLE AND SECTIONLINE LOCATIONS SEE DRAWING 60657467-ACM-GIR-DRG-008.
3. FOR GEOLOGICAL SECTIONS A-A' & C-C' REFER TO DRAWING 60657467-ACM-GIR-DRG-009 & 011.
4. GROUNDWATER DATA UPTO AUGUST 2021 PRESENTED.
5. EXISTING GROUND SURFACE DERIVED FROM ENVIRONMENT AGENCY LIDAR DATA 2020. MODIFICATIONS TO THE GROUND ELEVATION SINCE THE LIDAR WAS ACQUIRED WILL NOT BE REPRESENTED.

ISSUE/REVISION

I/R	DATE	DESCRIPTION
P01	2021-10-28	FIRST ISSUE

CLIENT

bp

PROJECT

NET ZERO TEESSIDE

SHEET TITLE

PCC SITE
GEOLOGICAL SECTION B-B'

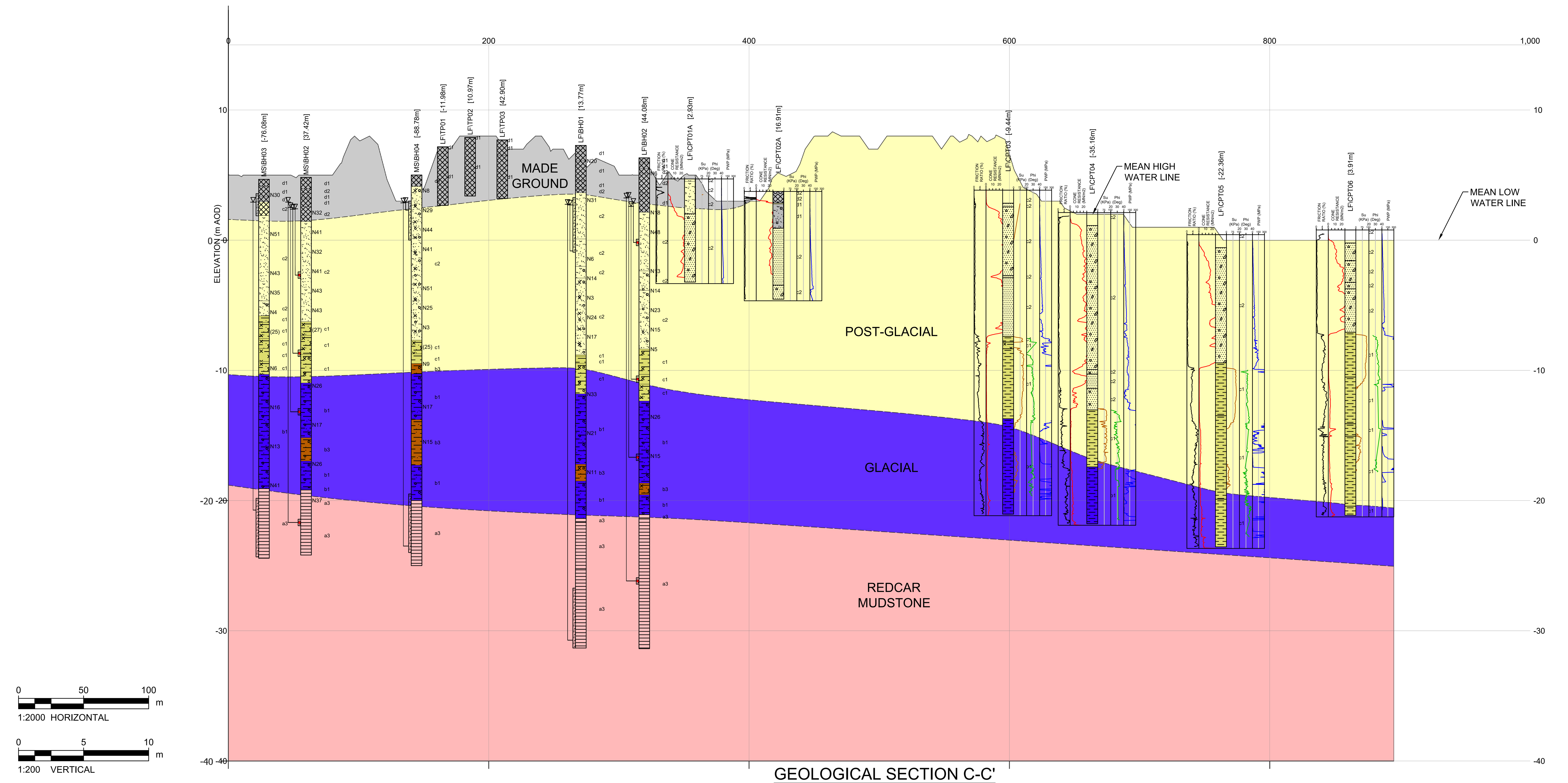
CONSULTANT

AECOM
One Trinity Gardens
Newcastle upon Tyne
0191 224 6500 tel 0191 224 6599 fax
www.aecom.com

SHEET NUMBER

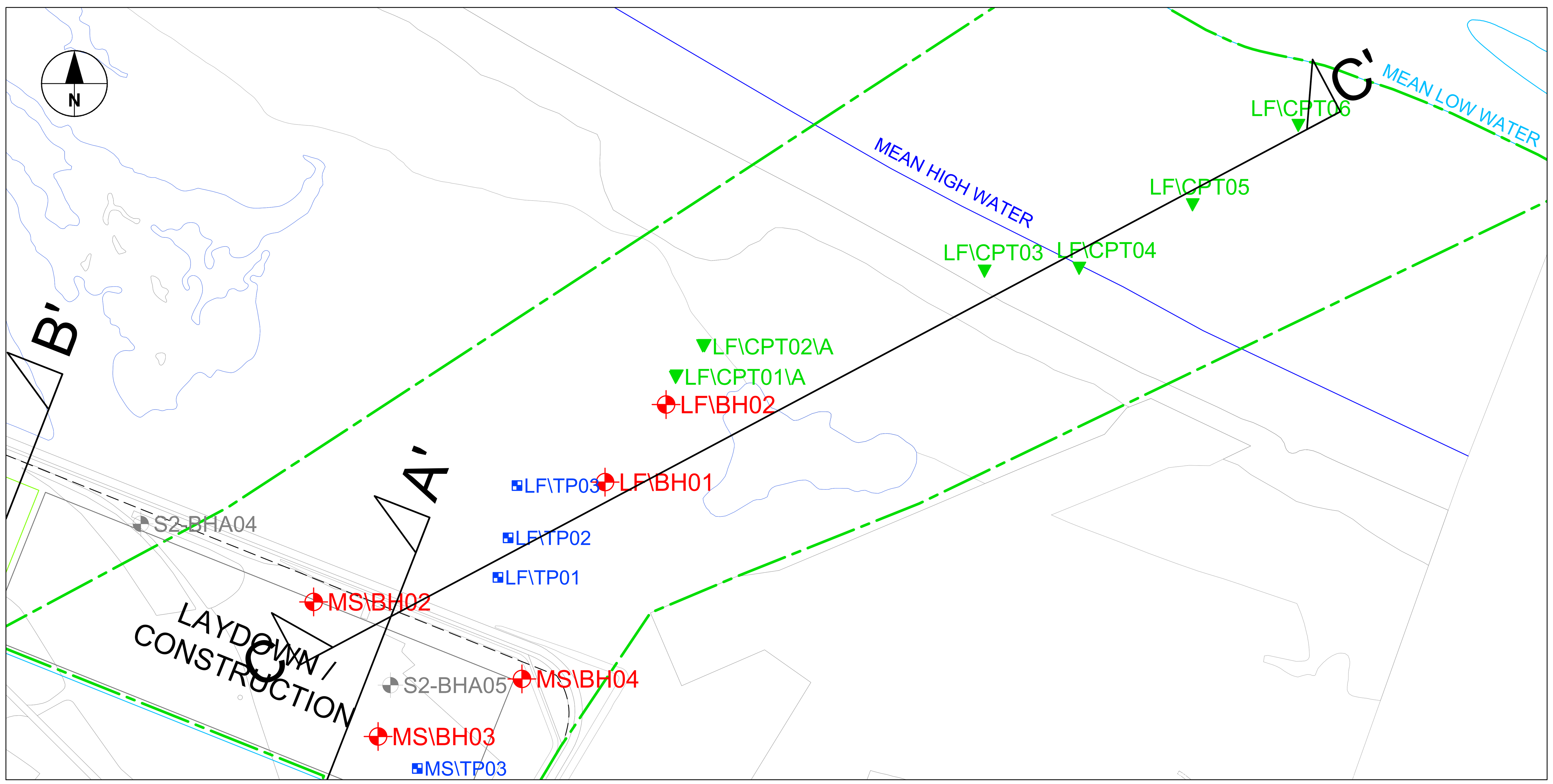
60657467-ACM-GIR-DRG-010

Project Management Initials: Designer: RPA Checked: CMC Approved: SDM ISO A1 594mm x 841mm



GEOLOGICAL SECTION C-C'

SCALE H1:2000 V1:200



GEOLOGICAL UNIT LEGEND

SUPERFICIAL SOILS

d7	MADE GROUND (MISCELLANEOUS)
d6	MADE GROUND (TOPSOIL)
d4	MADE GROUND (COHESIVE)
d3	MADE GROUND (GRANULAR)
d1	MADE GROUND (SLAG-DOMINANT MATERIAL)
c2	ESTUARINE - SAND
c1	ESTUARINE - CLAY & SILT
b3	LACUSTRINE DEPOSITS
b1	GLACIAL TILL

BEDROCK

JURASSIC

a3	REDCAR MUDSTONE

TRIASSIC

a2	PENARTH GROUP
a1	MERCIA MUDSTONE

GEOLOGICAL STRATA HATCH

- MADE GROUND -COHESIVE
- MADE GROUND -GRANULAR
- MADE GROUND - SLAG DOMINANT
- OTHER MADE GROUND
- CLAY
- CLAYEY
- SILT
- SILTY
- SAND
- SANDY
- GRAVEL
- GRAVELLY
- MUDSTONE

GEOLOGICAL SECTION KEY

S1-BH20A [11.3M]	HOLE ID AND PERPENDICULAR DISTANCE FROM SECTION LINE
	WATER STRIKE AND RISE LEVEL
	RESPONSE ZONE, PIEZO TIP AND MAXIMUM WATER LEVEL MONITORED
	VIBRATING WIRE PIEZOMETER TIP
N9	SPT N VALUE

SITE KEY

- POWER, CAPTURE & COMPRESSOR (PCC) SITE
- FUTURE EXPANSION AREA
- CO2 TRANSPORT CORRIDOR

AECOM

1. GROUND INVESTIGATION DATA FROM THE FOLLOWING FACTUAL REPORTS:

- ALLIED EXPLORATION & GEOTECHNICS LTD - THE FORMER SSI STEELWORKS, REDCAR – GROUND INVESTIGATION CONTRACT – PRIORITY AREAS WITHIN SSI LANDHOLDINGS CONTRACT 1 AND CONTRACT 2 (AREA A), FINAL FACTUAL REPORT, CONTRACT NO. 4153 & 4154 (AREA A), SOUTH TEES SITE COMPANY, JUNE 2018.
- CH2M HILL - SSI REDCAR – SSI 1, FACTUAL REPORT – INITIAL TRIAL PITTING, SOUTH TEES SITE COMPANY LTD, NOVEMBER 2017.
- CH2M HILL - SSI REDCAR – SSI 2, FACTUAL REPORT – INITIAL TRIAL PITTING, SOUTH TEES SITE COMPANY LTD, NOVEMBER 2017.
- ALLIED EXPLORATION & GEOTECHNICS LTD - PRELIMINARY ONSHORE GROUND INVESTIGATION FOR NZT, CONTRACT 4339, PRELIMINARY FINAL FACTUAL REPORT. SEPTEMBER 2021.

2. FOR EXPLORATORY HOLE AND SECTIONLINE LOCATIONS SEE DRAWING 60657467-ACM-GIR-DRG-008.
3. FOR GEOLOGICAL SECTIONS A-A' & B-B' REFER TO DRAWING 60657467-ACM-GIR-DRG-009 & 010.
4. GROUNDWATER DATA UPTO AUGUST 2021 PRESENTED.
5. EXISTING GROUND SURFACE DERIVED FROM ENVIRONMENT AGENCY LiDAR DATA 2020. MODIFICATIONS TO THE GROUND ELEVATION SINCE THE LiDAR WAS ACQUIRED WILL NOT BE REPRESENTED.

ISSUE/REVISION

I/R	DATE	DESCRIPTION
P01	2021-10-28	FIRST ISSUE

CLIENT

bp

PROJECT

NET ZERO TEESSIDE

SHEET TITLE

CO2 TRANSPORT CORRIDOR GEOLOGICAL SECTION C-C'

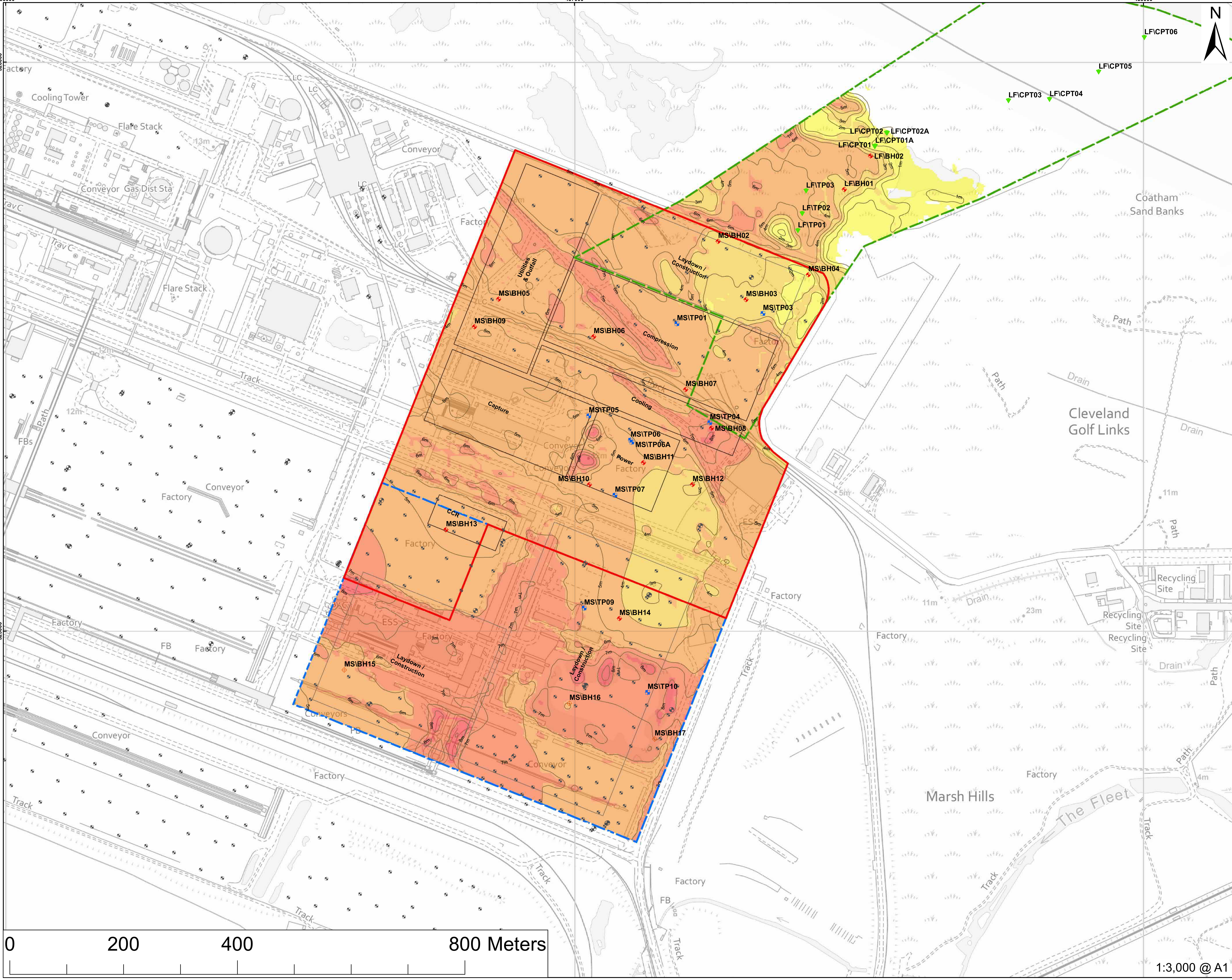
CONSULTANT

AECOM
One Trinity Gardens
Newcastle upon Tyne
0191 224 6500 tel 0191 224 6599 fax
www.aecom.com

SHEET NUMBER

60657467-ACM-GIR-DRG-011

Revision: 01 Drawn:MJRB Checked: XX Approved: XX Date: 02/11/2021



AECOM

PROJECT

NET ZERO TEESIDE

CLIENT

bp

CONSULTANT

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T: +44-191-2246500
www.aecom.com

LEGEND

- Power, Capture & Compressor (PCC) Site
- Future Expansion
- CO2 Transport Corridor

AEG 2021 NZT Investigation

- Sonic Drilled Borehole
- Sonic Drilled Borehole with Rotary Core Follow On
- Cone Penetration Test (CPT)
- Trial Pit

Previous Exploratory Holes

- CP
- CP+RC
- TP

Made Ground Thickness (m)

- 0.00006 - 2
- 2.01 - 4
- 4.01 - 6
- 6.01 - 8
- 8.01 - 12
- Made Ground Thickness Contour (m)

NOTES

1. GROUND INVESTIGATION DATA FROM THE FOLLOWING FACTUAL REPORTS:
- ALLIED EXPLORATION & GEOTECHNICS LTD - THE FORMER SSI STEELWORKS, REDCAR – GROUND INVESTIGATION CONTRACT – PRIORITY AREAS WITHIN SSI LANDHOLDINGS CONTRACT 1 AND CONTRACT 2 (AREA A), FINAL FACTUAL REPORT, CONTRACT NO. 4153 & 4154 (AREA A), SOUTH TEES SITE COMPANY, JUNE 2018.
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- CH2M HILL - SSI REDCAR – SSI 2, FACTUAL REPORT – INITIAL TRIAL PITTING, SOUTH TEES SITE COMPANY LTD, NOVEMBER 2017.
- DRAFT DATA FROM AEG INVESTIGATIONS, JULY 2021.

2. DISTRIBUTION AND THICKNESS OF MADE GROUND IS APPROXIMATE BASED ON THE INFORMATION AVAILABLE. THICKNESS ILUSSTRATED IS THE DIFFERENCE BETWEEN INFERRED BASE OF MADE GROUND AND GROUND SURFACE (EA LiDAR 2020). MODIFICATIONS TO THE GROUND ELEVATION SINCE THE LiDAR WAS DATA WAS ACQUIRED WILL NOT BE REPRESENTED.

3. EXPLORATORY HOLES INVESTIGATE ONLY A SMALL VOLUME OF THE GROUND IN RELATION TO THE SIZE OF THE SITE, AND CAN ONLY PROVIDE A GENERAL INDICATION OF SITE CONDITIONS. THERE MAY BE EXCEPTIONAL GROUND CONDITIONS ELSEWHERE ON THE SITE WHICH HAVE NOT BEEN DISCLOSED BY THIS INVESTIGATION AND WHICH HAVE THEREFORE NOT BEEN TAKEN INTO ACCOUNT IN THIS MODELLING.

TITLE

INFERRED THICKNESS OF MADE GROUND

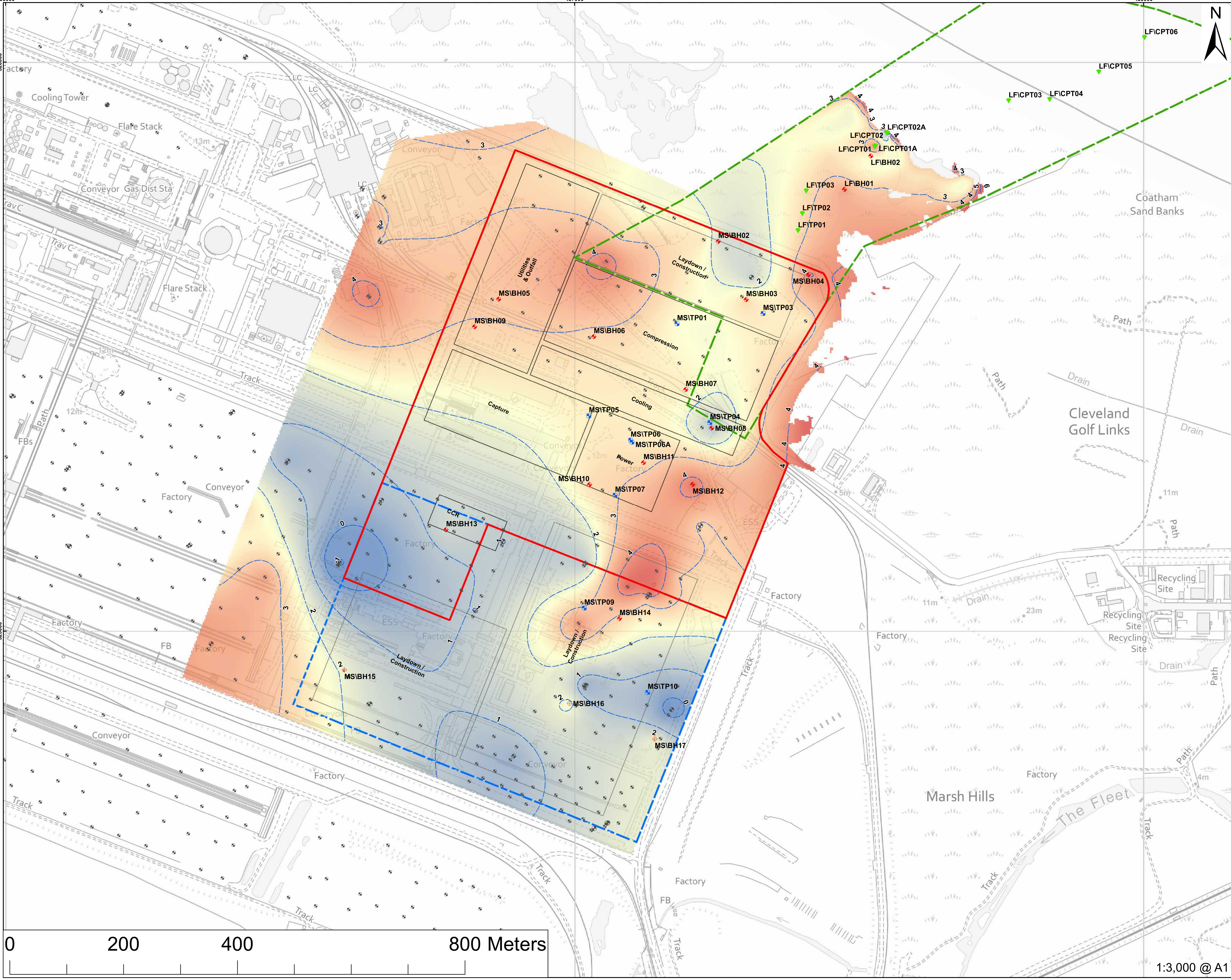
PROJECT NUMBER

60657467

SHEET NUMBER

60657467-ACM-GIR-DRG-012

Revision: 01 Drawn: MJRB Checked: XX Approved: XX Date: 02/11/2021



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PROJECT

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LEGEND

- Power, Capture & Compressor (PCC) Site
- Future Expansion Area
- CO2 Transport Corridor

AEG 2021 NZT Investigation

- Sonic Drilled Borehole
- Sonic Drilled Borehole with Rotary Core Follow On
- Cone Penetration Test (CPT)
- Trial Pit

Previous Exploratory Holes

- CP
- CP+RC
- TP

Made Ground Base Elevation (m AOD)

High : 6.94

Low : -1.18

- Made Ground Base Elevation Contour (m AOD)

NOTES

1. GROUND INVESTIGATION DATA FROM THE FOLLOWING FACTUAL REPORTS:
- ALLIED EXPLORATION & GEOTECHNICS LTD - THE FORMER SSI STEELWORKS, REDCAR – GROUND INVESTIGATION CONTRACT – PRIORITY AREAS WITHIN SSI LANDHOLDINGS CONTRACT 1 AND CONTRACT 2 (AREA A), FINAL FACTUAL REPORT, CONTRACT NO. 4153 & 4154 (AREA A), SOUTH TEES SITE COMPANY, JUNE 2018.
- CH2M HILL - SSI REDCAR – SSI 1, FACTUAL REPORT – INITIAL TRIAL PITTING, SOUTH TEES SITE COMPANY LTD, NOVEMBER 2017.
- CH2M HILL - SSI REDCAR – SSI 2, FACTUAL REPORT – INITIAL TRIAL PITTING, SOUTH TEES SITE COMPANY LTD, NOVEMBER 2017.
- DRAFT DATA FROM AEG INVESTIGATIONS, JULY 2021.

2. DISTRIBUTION AND THICKNESS OF MADE GROUND IS APPROXIMATE BASED ON THE INFORMATION AVAILABLE. THICKNESS ILUSSTRATED IS THE DIFFERENCE BETWEEN INFERRED BASE OF MADE GROUND AND GROUND SURFACE (EA LiDAR 2020). MODIFICATIONS TO THE GROUND ELEVATION SINCE THE LiDAR WAS DATA WAS ACQUIRED WILL NOT BE REPRESENTED.

3. EXPLORATORY HOLES INVESTIGATE ONLY A SMALL VOLUME OF THE GROUND IN RELATION TO THE SIZE OF THE SITE, AND CAN ONLY PROVIDE A GENERAL INDICATION OF SITE CONDITIONS. THERE MAY BE EXCEPTIONAL GROUND CONDITIONS ELSEWHERE ON THE SITE WHICH HAVE NOT BEEN DISCLOSED BY THIS INVESTIGATION AND WHICH HAVE THEREFORE NOT BEEN TAKEN INTO ACCOUNT IN THIS MODELLING.

TITLE

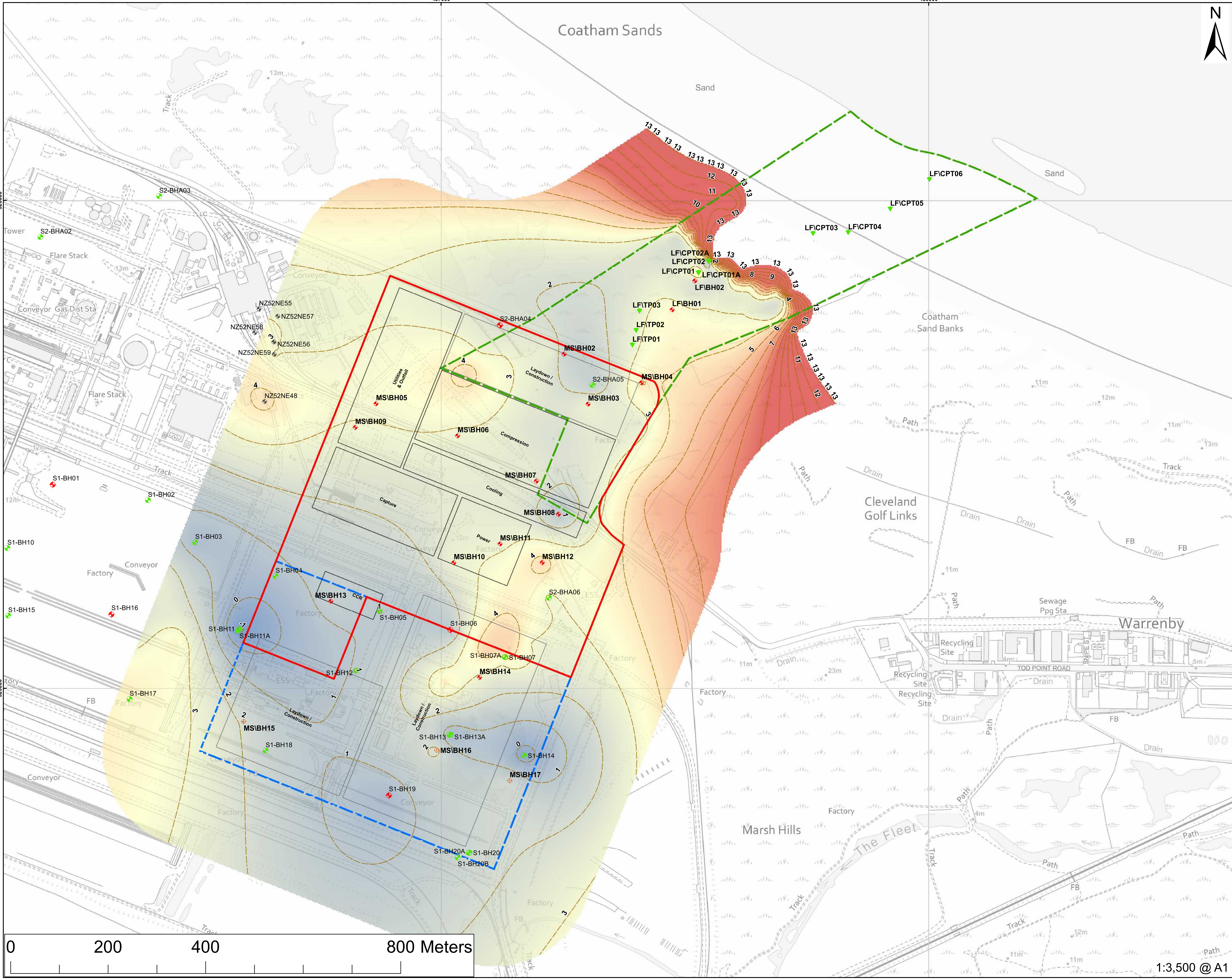
INFERRED BASE ELEVATION OF MADE GROUND

PROJECT NUMBER

60657467

SHEET NUMBER

60657467-ACM-GIR-DRG-013



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PROJECT

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LEGEND

- Power, Capture & Compressor (PCC) Site
- Future Expansion Area
- CO2 Transport Corridor

AEG 2021 NZT Investigation

- Sonic Drilled Borehole
- Sonic Drilled Borehole with Rotary Core Follow On
- Cone Penetration Test (CPT)

Previous Exploratory Holes

- BGS

4153 AEG Investigation

- CP
- CP+RC

Tidal Flats Elevation (m AOD)

High : 13.0598

Low : -1.17887

- Tidal Flats Elevation Contour (m AOD)

NOTES

1. GROUND INVESTIGATION DATA FROM THE FOLLOWING FACTUAL REPORTS:

- ALLIED EXPLORATION & GEOTECHNICS LTD - THE FORMER SSI STEELWORKS, REDCAR – GROUND INVESTIGATION CONTRACT – PRIORITY AREAS WITHIN SSI LANDHOLDINGS CONTRACT 1 AND CONTRACT 2 (AREA A), FINAL FACTUAL REPORT, CONTRACT NO. 4153 & 4154 (AREA A), SOUTH TEES SITE COMPANY, JUNE 2018.

- CH2M HILL - SSI REDCAR – SSI 1, FACTUAL REPORT – INITIAL TRIAL PITTING, SOUTH TEES SITE COMPANY LTD, NOVEMBER 2017.

- CH2M HILL - SSI REDCAR – SSI 2, FACTUAL REPORT – INITIAL TRIAL PITTING, SOUTH TEES SITE COMPANY LTD, NOVEMBER 2017.

- DRAFT DATA FROM AEG INVESTIGATIONS, JULY 2021.

2. EXPLORATORY HOLES INVESTIGATE ONLY A SMALL VOLUME OF THE GROUND IN RELATION TO THE SIZE OF THE SITE, AND CAN ONLY PROVIDE A GENERAL INDICATION OF SITE CONDITIONS. THERE MAY BE EXCEPTIONAL GROUND CONDITIONS ELSEWHERE ON THE SITE WHICH HAVE NOT BEEN DISCLOSED BY THIS INVESTIGATION AND WHICH HAVE THEREFORE NOT BEEN TAKEN INTO ACCOUNT IN THIS MODELLING.

TITLE

INFERRED TIDAL FLATS UPPER SURFACE ELEVATION (mAOD)

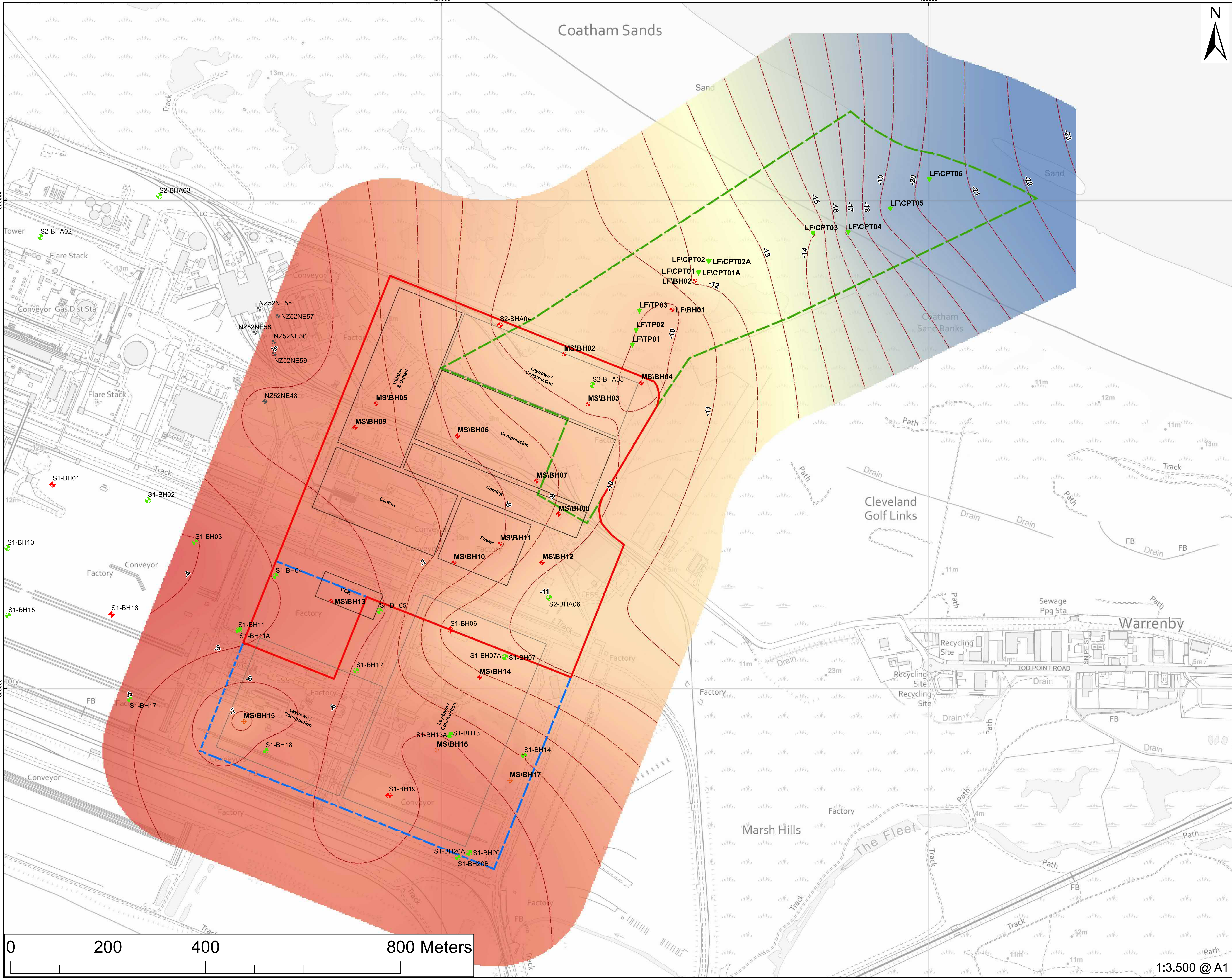
PROJECT NUMBER

60657467

SHEET NUMBER

60657467-ACM-GIR-DRG-014

Revision: 01 Drawn: MJRB Checked: XX Approved: XX Date: 28/10/2021



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PROJECT

NET ZERO TEESIDE

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LEGEND

- Power, Capture & Compressor (PCC) Site
- Future Expansion Area
- CO2 Transport Corridor

AEG 2021 NZT Investigation

- Sonic Drilled Borehole
- Sonic Drilled Borehole with Rotary Core Follow On
- Cone Penetration Test (CPT)

Previous Exploratory Holes

- BGS

4153 AEG Investigation

- CP
- CP+RC

Glacial Till Elevation

(m AOD)

High : -3.75279

Low : -23.3472

- Glacial Till Elevation (m AOD)

NOTES

1. GROUND INVESTIGATION DATA FROM THE FOLLOWING FACTUAL REPORTS:

- ALLIED EXPLORATION & GEOTECHNICS LTD - THE FORMER SSI STEELWORKS, REDCAR – GROUND INVESTIGATION CONTRACT – PRIORITY AREAS WITHIN SSI LANDHOLDINGS CONTRACT 1 AND CONTRACT 2 (AREA A), FINAL FACTUAL REPORT, CONTRACT NO. 4153 & 4154 (AREA A), SOUTH TEES SITE COMPANY, JUNE 2018.

- CH2M HILL - SSI REDCAR – SSI 1, FACTUAL REPORT – INITIAL TRIAL PITTING, SOUTH TEES SITE COMPANY LTD, NOVEMBER 2017.

- CH2M HILL - SSI REDCAR – SSI 2, FACTUAL REPORT – INITIAL TRIAL PITTING, SOUTH TEES SITE COMPANY LTD, NOVEMBER 2017.

- DRAFT DATA FROM AEG INVESTIGATIONS, JULY 2021.

2. EXPLORATORY HOLES INVESTIGATE ONLY A SMALL VOLUME OF THE GROUND IN RELATION TO THE SIZE OF THE SITE, AND CAN ONLY PROVIDE A GENERAL INDICATION OF SITE CONDITIONS. THERE MAY BE EXCEPTIONAL GROUND CONDITIONS ELSEWHERE ON THE SITE WHICH HAVE NOT BEEN DISCLOSED BY THIS INVESTIGATION AND WHICH HAVE THEREFORE NOT BEEN TAKEN INTO ACCOUNT IN THIS MODELLING.

TITLE

INFERRED GLACIAL TILL UPPER SURFACE ELEVATION (mAOD)

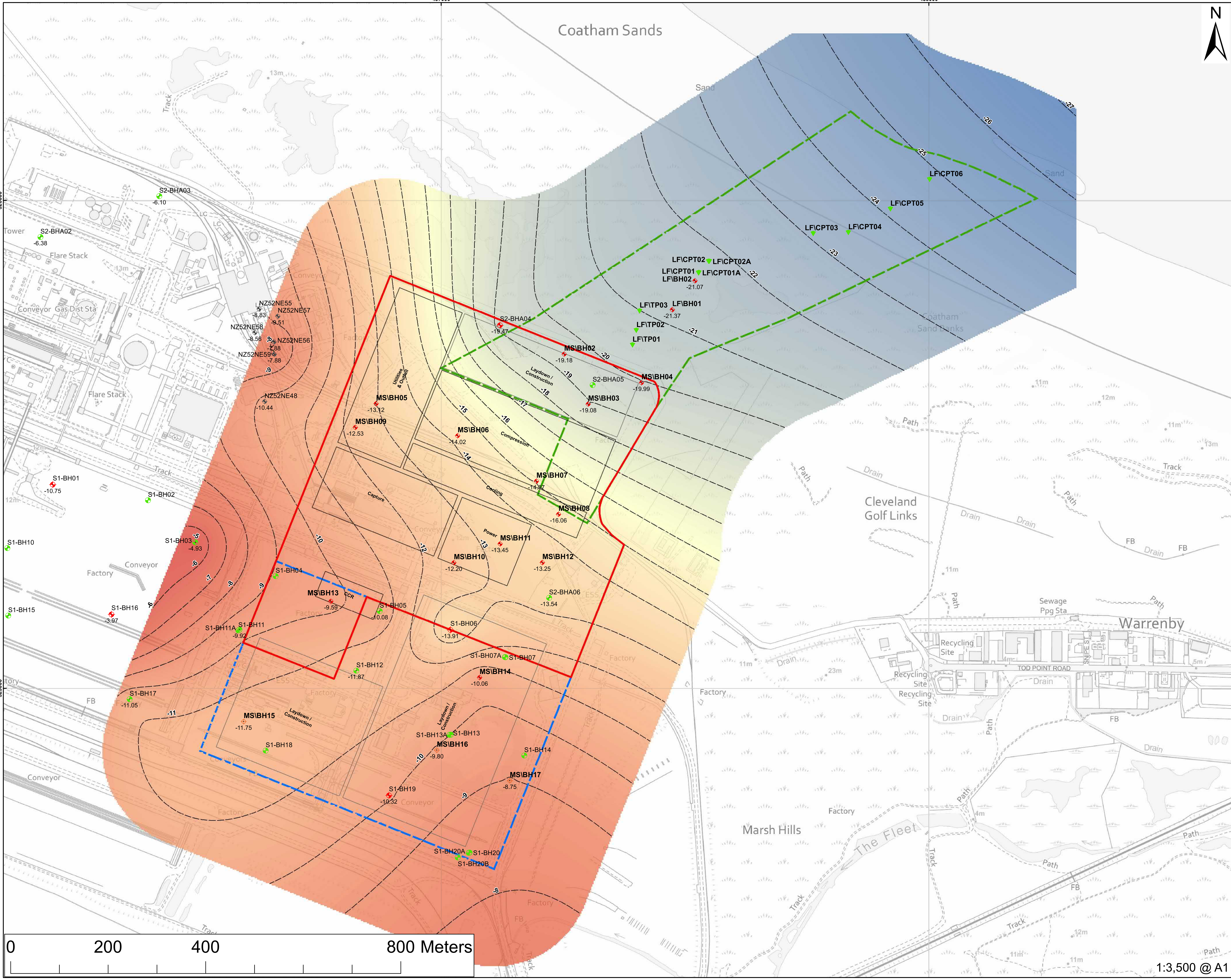
PROJECT NUMBER

60657467

SHEET NUMBER

60657467-ACM-GIR-DRG-015

Revision: 01 Drawn:MJRB Checked: XX Approved: XX Date: 28/10/2021



Filename: L:\Legacy\V1IE\Environmental Group Management\GIS Management\Teesside_Clean_Gas_Remote\Detailed_GI\STDC_Data\02 Maps\GIR\016 - NZT_A1_Rockhead Elevation.mxd

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PROJECT

NET ZERO TEESIDE

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LEGEND

- Power, Capture & Compressor (PCC) Site
- Future Expansion Area
- CO2 Transport Corridor

AEG 2021 NZT Investigation

- Sonic Drilled Borehole
- Sonic Drilled Borehole with Rotary Core Follow On
- Cone Penetration Test (CPT)

Previous Exploratory Holes

- BGS

4153 AEG Investigation

- CP
- CP+RC

Bedrock Elevation

(mAOD)

High : -4.96141

Low : -27.074

- Bedrock Elevation (m AOD)

NOTES

1. GROUND INVESTIGATION DATA FROM THE FOLLOWING FACTUAL REPORTS:

- ALLIED EXPLORATION & GEOTECHNICS LTD - THE FORMER SSI STEELWORKS, REDCAR – GROUND INVESTIGATION CONTRACT – PRIORITY AREAS WITHIN SSI LANDHOLDINGS CONTRACT 1 AND CONTRACT 2 (AREA A), FINAL FACTUAL REPORT, CONTRACT NO. 4153 & 4154 (AREA A), SOUTH TEES SITE COMPANY, JUNE 2018.

- CH2M HILL - SSI REDCAR – SSI 1, FACTUAL REPORT – INITIAL TRIAL PITTING, SOUTH TEES SITE COMPANY LTD, NOVEMBER 2017.

- CH2M HILL - SSI REDCAR – SSI 2, FACTUAL REPORT – INITIAL TRIAL PITTING, SOUTH TEES SITE COMPANY LTD, NOVEMBER 2017.

- DRAFT DATA FROM AEG INVESTIGATIONS, JULY 2021.

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TITLE

INFERRED BEDROCK ELEVATION (mAOD)

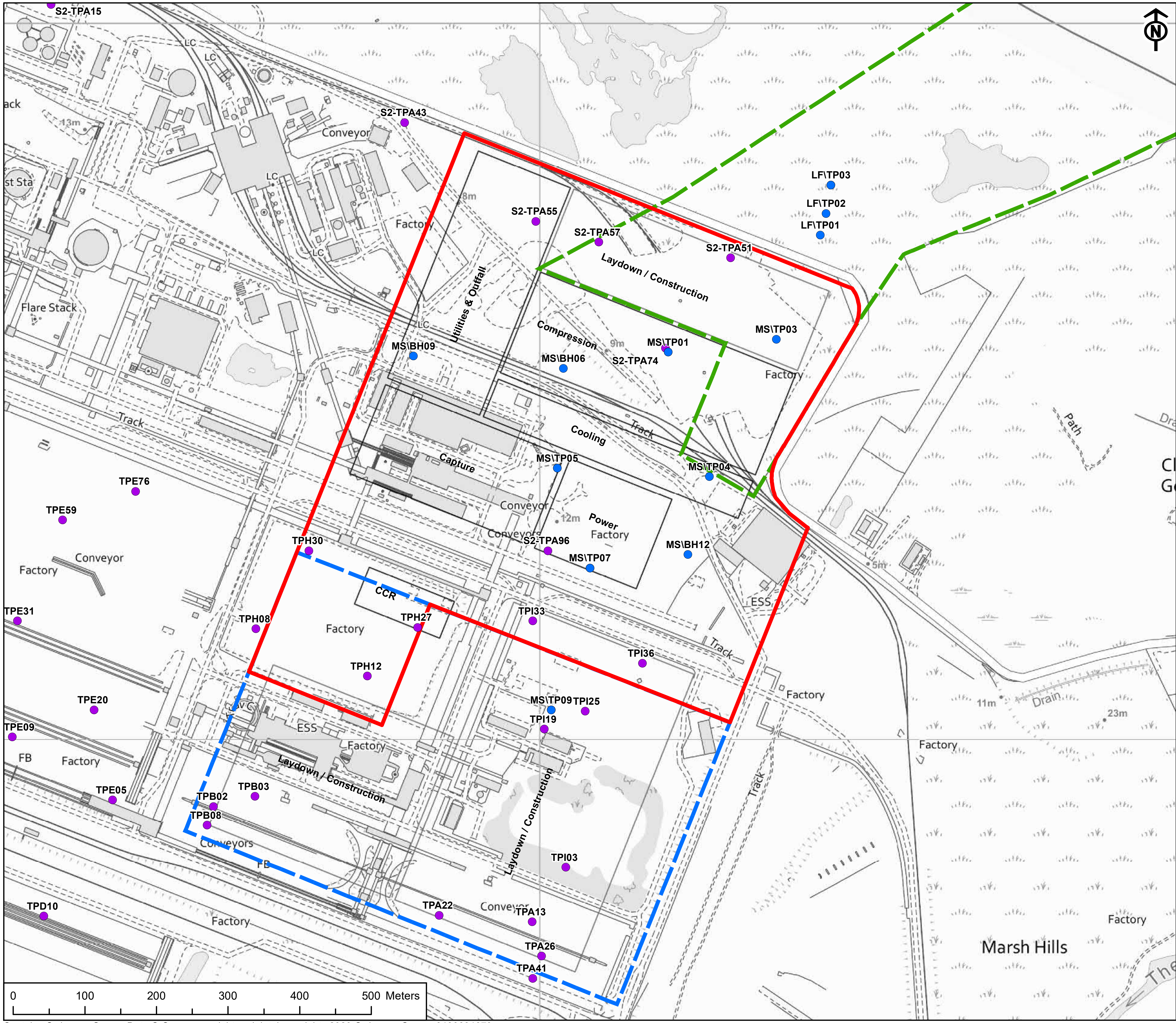
PROJECT NUMBER

60657467

SHEET NUMBER

60657467-ACM-GIR-DRG-016

Project Management Initials: JT Designer: RPA Checked: CMC Approved: SDM



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PROJECT
NET ZERO TEESSIDE

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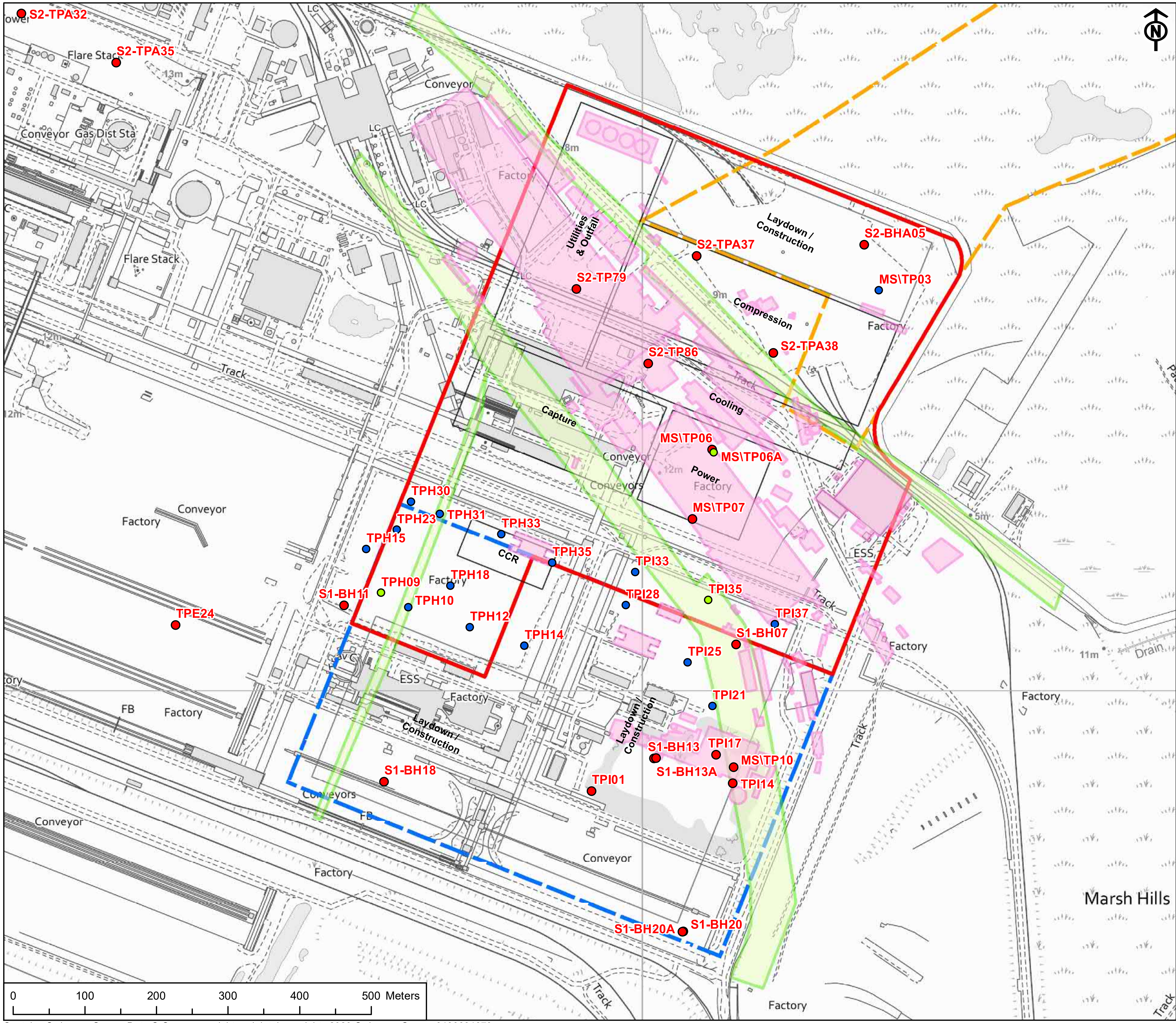
KEY
- Power, Capture & Compressor (PCC) Site
- CO2 Transport Corridor
- Future Expansion
- Slag Testing (AEG 2021)
- Slag Testing (Previous Investigations)

TITLE
GROUND INVESTIGATION REPORT
TRS SLAG TESTING LOCATIONS

REFERENCE
60657467-ACM-GIR-DRG-017

SHEET NUMBER	DATE
1 of 1	02/11/2021

Project Management Initials: RL Designer: RPA Checked: NF Approved: JT



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NOTES \ KEY
Power, Capture & Compressor (PCC) Site
Future Expansion Area
CO2 Transport Corridor

Hole Termination
Obstruction
Groundwater
Utility

Historical Features
Breakwaters
Historical Building Footprints

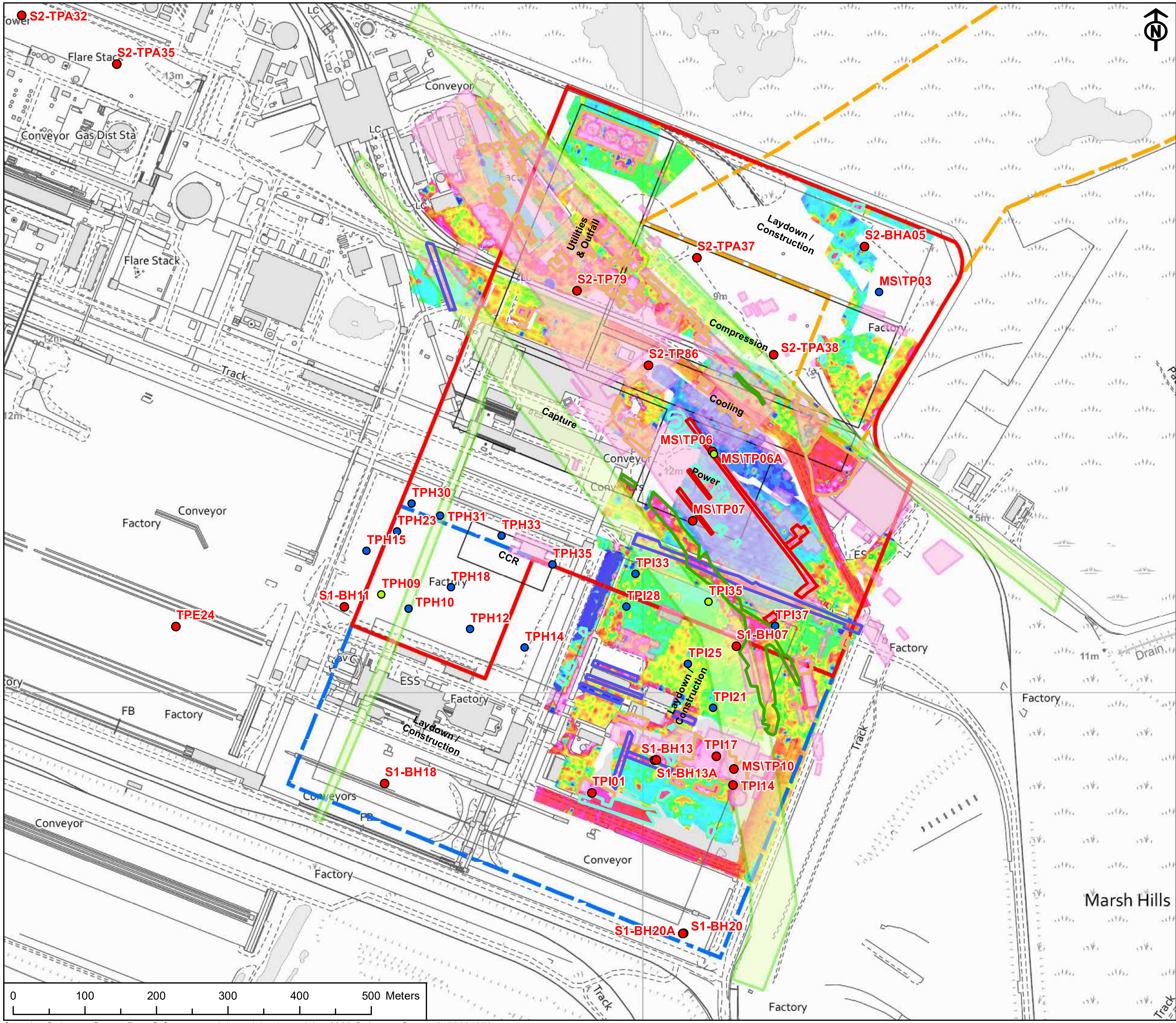
TITLE
GROUND INVESTIGATION REPORT
OBSTRUCTIONS

REFERENCE
60657467-ACM-GIR-DRG-018

SHEET NUMBER
1 of 1

DATE
28/10/2021

Project Management Initials: RL Designer: RPA Checked: NF Approved: JT



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NOTES \ KEY

GEOPHYSICAL SURVEY (TIME-DOMAIN ELECTROMAGNETICS TDEM) UNDERTAKEN BY AECOM NOVEMBER\DECEMBER 2020. FULL DETAILS CAN BE FOUND IN NET ZERO TEESSIDE-GEOPHYSICAL INVESTIGATION" REPORT.

- Power, Capture & Compressor (PCC) Site
- Future Expansion Area
- CO2 Transport Corridor

Hole Termination
- Obstruction
- Groundwater
- Utility

Historical Features
- Breakwaters
- Historical Building Footprints

Geophysical Interpretation

Feature Type
- Other
- Slab
- Tracks
- Unknown
- Utility
- Walls

ELECTROMAGNETIC (TDEM) SURVEY KEY

High response
0.0271
0.0156
0.0124
0.0098
0.0076
0.0060
0.0049
0.0040
0.0033
0.0026
0.0023
0.0020
0.0015
0.0009
0.0001
-0.0010
-0.0027
-0.0076
-0.0134
Low response

Normalized
(Ch4-Ch3)
[-]

TITLE
GROUND INVESTIGATION REPORT OBSTRUCTIONS WITH ELECTRO MAGNETIC SURVEY

REFERENCE
60657467-ACM-GIR-DRG-019

SHEET NUMBER	DATE
1 of 1	28/10/2021

18. Appendix A Factual Report

19. Appendix B Obstruction mapping

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12 Regan Way
Chetwynd Business Park
Nottingham NG9 6RZ
United Kingdom

T: +44 (115) 907 7000
aecom.com

Project name:
NZT

Project ref:
60657467

From:
Dr Arre Verweerd

Date:
24 September 2021

To:
Net zero Teeside
BPbp

CC:
Njemile Faustin
Michael Blakely

AECOM Ground,Energy & Transaction Solutions

Memo

Subject: Buried Objects-Geophysics-V3

The following technical memo will detail a re-interpretation of the time-domain electromagnetics (TDEM) data collected over the Net Zero Teesside (NZT) site at Redcar by the AECOM geophysics team between 16th November and 4th of December 2020. Details of that survey and further findings, methodology and equipment specification can be found in the “Net Zero Teesside-Geophysical investigation” report[1].

Historical data and maps were obtained from AECOM’s “Net Zero Teesside- STDC 'Main Site' Geotechnical and Geo-Environmental Desk Study”[2]

Processing Methodology :

A suite of processing trials were undertaken to enhance the imaging of the TDEM data collected. The final processing flow used in this interpretation is as follows:

- Levelling of each individual data set (corresponding to survey day) to ensure a (unitless) dynamic data range of all data sets between 0-1
- Subtracting of normalized Channel 3 (bottom coil, gate 706µs) from Channel 4 (top coil, gate 706µs)
- Kriging gridding, utilizing 1m grid cells

Georeferenced historic building maps and satellite images were added to the map for reference and to assist with interpretation/classification of the data.

[1] Net Zero Teesside-Geophysical investigation, revision 01. 11.06.2021
[2] 60559231-CTR005-003 GEO-002, April 2020

Interpretation:

After identification of current surface infrastructure (roads, railway tracks, structure, visible concrete/asphalt slabs) the following object categories were chosen based on a combination of geophysical response, intrusive data and features on current and historical maps:

- (Reinforced) concrete slabs
- Former building walls
- Buried railway tracks/remains
- Buried pipes/utilities
- Unidentified features
- Existing roads/buildings/surface features (not mapped)

Only spatial extent of features could be identified, depth estimates of features did not yield any reliable and non-unique values.

The interpretation is based on geophysical (TDEM) responses only, with the historic building and infrastructure outline maps used to classify different categories only. No prior knowledge of the actual use/purpose of the buildings or the construction material used for the different elements was included.

It is advised to validate a selected number of features from each category by trenching/trial pits to validate the features highlighted and update the results of this interpretation.

The interpreted features have been drawn as polygons on the gridded TDEM data, examples of the different categories have been included below.

Slabs:

Rectangular high signal responses that are likely to indicate (reinforced) concrete floor slabs and foundations of demolished buildings. Most of the responses correlate to the location of former buildings Only high signal responses are traced rather then complete building footprints. It is likely some of the building floors will have been removed during demolition or have a different construction.

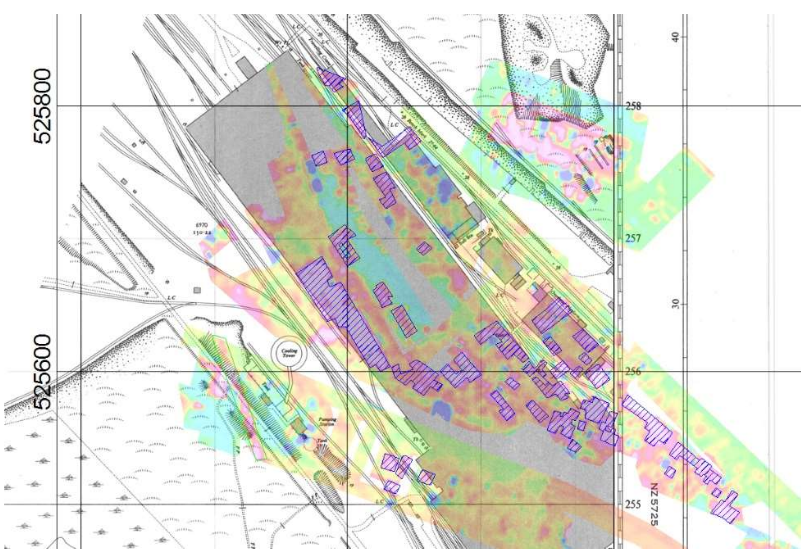


Figure 1: Example slabs (blue) overlain on 1952 OS Map

Former building walls:

Narrow, linear high signal responses correlating with the outlines of historical buildings. These features could relate to building rubble and foundations.

Buried railway tracks/remains:

Irregular, linear features corresponding to historic railway or tramway lines. The responses might be indicative of existing (buried) metallic tracks, remnants of demolished tracks or ore/slag waste. These signatures are characterized as fragmented high responses over a broad area.

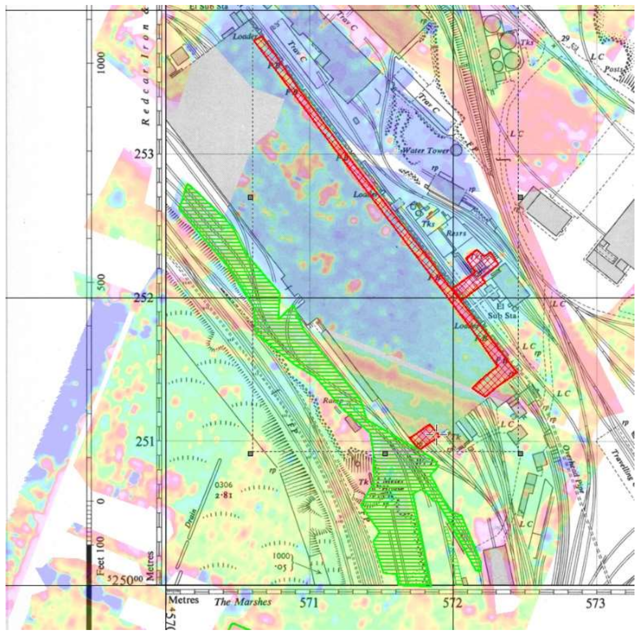


Figure 2: Example steel mill wall (red) buried tracks response (green) overlaying 1952 OS Map tile

Buried pipes/utilities:

Linear high signal response features corresponding to the location of known utilities (as per STATS from Nov 2020).

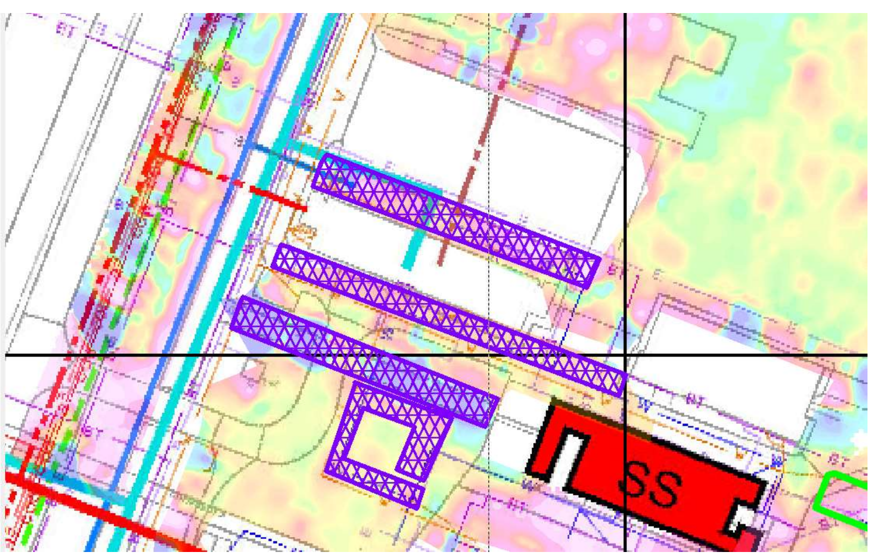


Figure 3: Example known buried utilities (purple), overlaying Buried Services drawing

Unidentified Features

A mixture of high and low responses, not correlating to known features on historic maps.

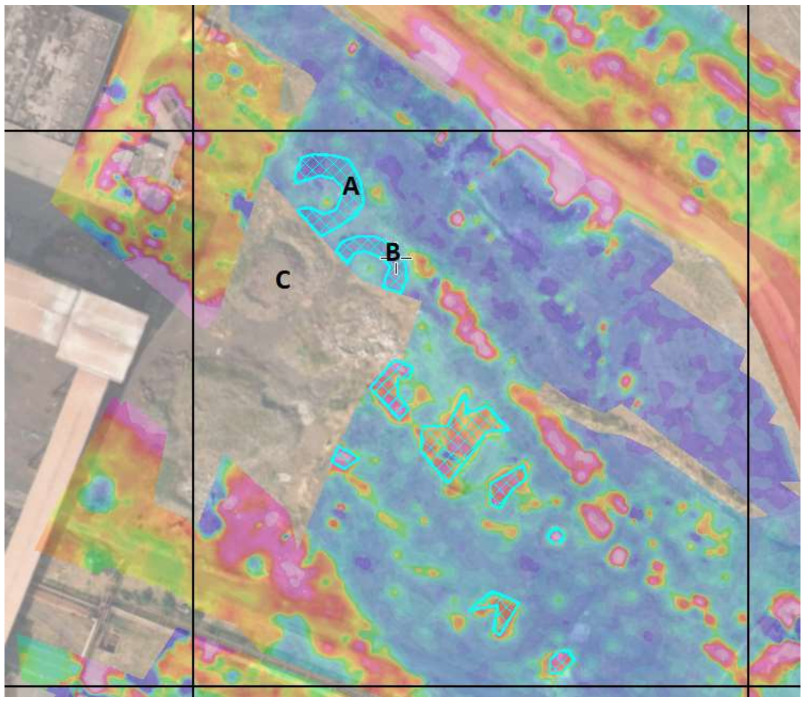


Figure 4: Example Unidentified features

A special mention needs to be made with regards to features A,B and C as identified in Figure 4. The circular mound or rubble “C” as visible on the satellite image has corresponding features (with similar shape & diameter) as very low responses identified as “A” and “B” in figure 4.It is unknown what the origin of mound C is, or if there is any relation between the features. The geophysical survey site team had no recollection of anything present on site, nor is there any feature identifiable on the historic drawings.

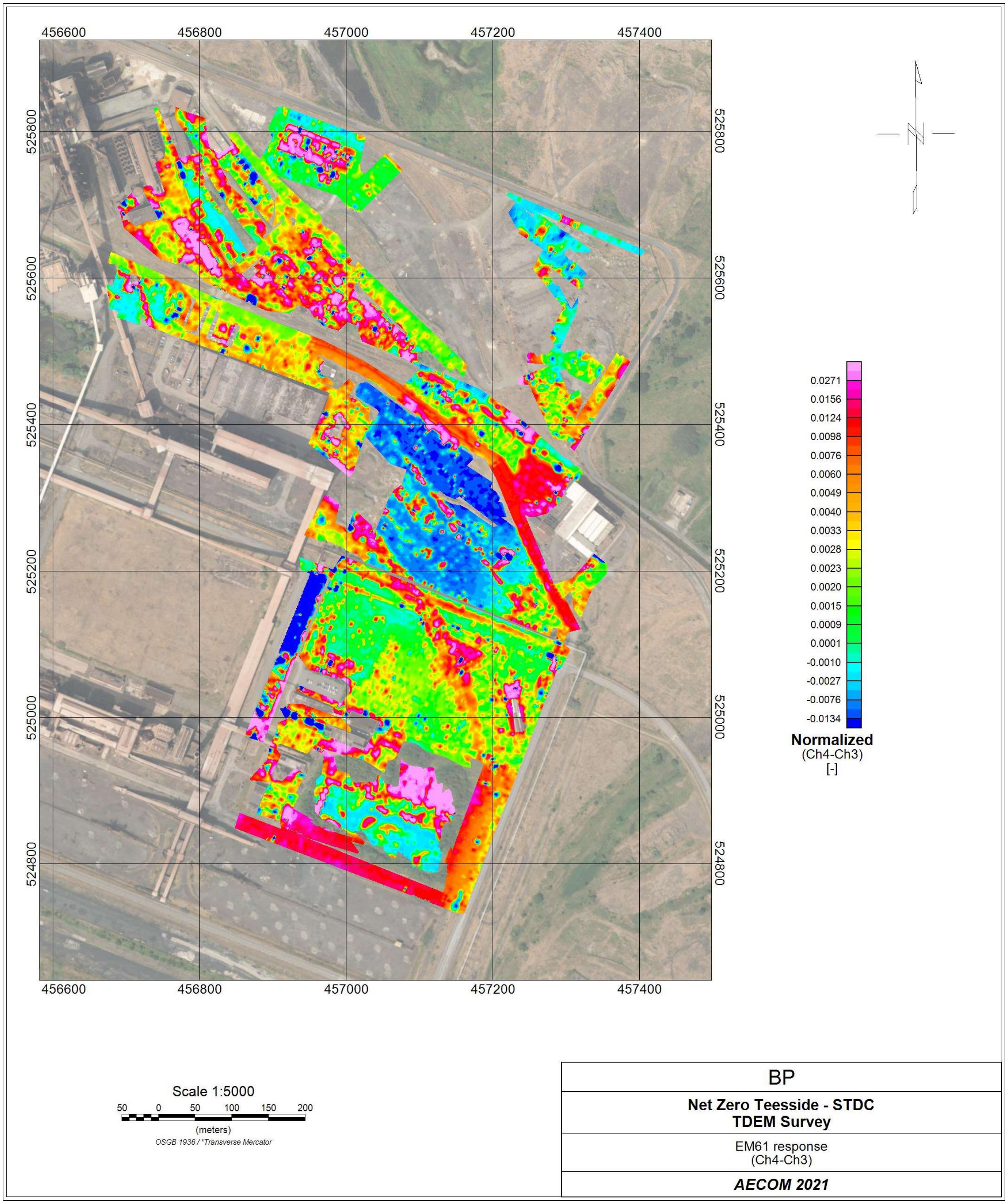
Existing roads/buildings/surface features:

Typically, high responses correlating with surface features from Microsoft Azure satellite imagery. It is likely these signatures are responses to reinforced concrete road and building slabs. These features have been excluded from this assessment and therefore not been highlighted as polygons.

Results:

Identified and classified features will be presented in maps attached to this memo. A digital delivery is also included for inclusion in the 3D geotechnical model consisting of:

- **NZT_TDEM_proc.grd:** An Oasis Montaj georeferenced (OSGB36) gridfile of the processed TDEM dataset as presented and used in this analysis
- **JPG** image files of each of the interpretive maps
- A set of ARCView polygon files with the interpreted georeferenced shapes have also been provided
    - **NZT_tracks:** responses likely related to former tracks/trackbed (based on historical maps)
    - **NZT_walls:** responses likely related to former building walls (foundations below walls?)
    - **NZT_slabs:** responses likely related to (partially) buried reinforced concrete slabs, either building floors or outside hardstanding
    - **NZT_other:** responses of unknown origin
- **NZT_utilities:** responses likely related to buried utilities as identified on the available STATS drawing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456800
457000
457200
457400
525800
525600
525400
525200
525000
524800
0.0271
0.0156
0.0124
0.0098
0.0076
0.0060
0.0049
0.0040
0.0033
0.0028
0.0023
0.0020
0.0015
0.0009
0.0001
-0.0010
-0.0027
-0.0076
-0.0134
Normalized
(Ch4-Ch3)
[-]
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BP
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TDEM Survey
EM61 response
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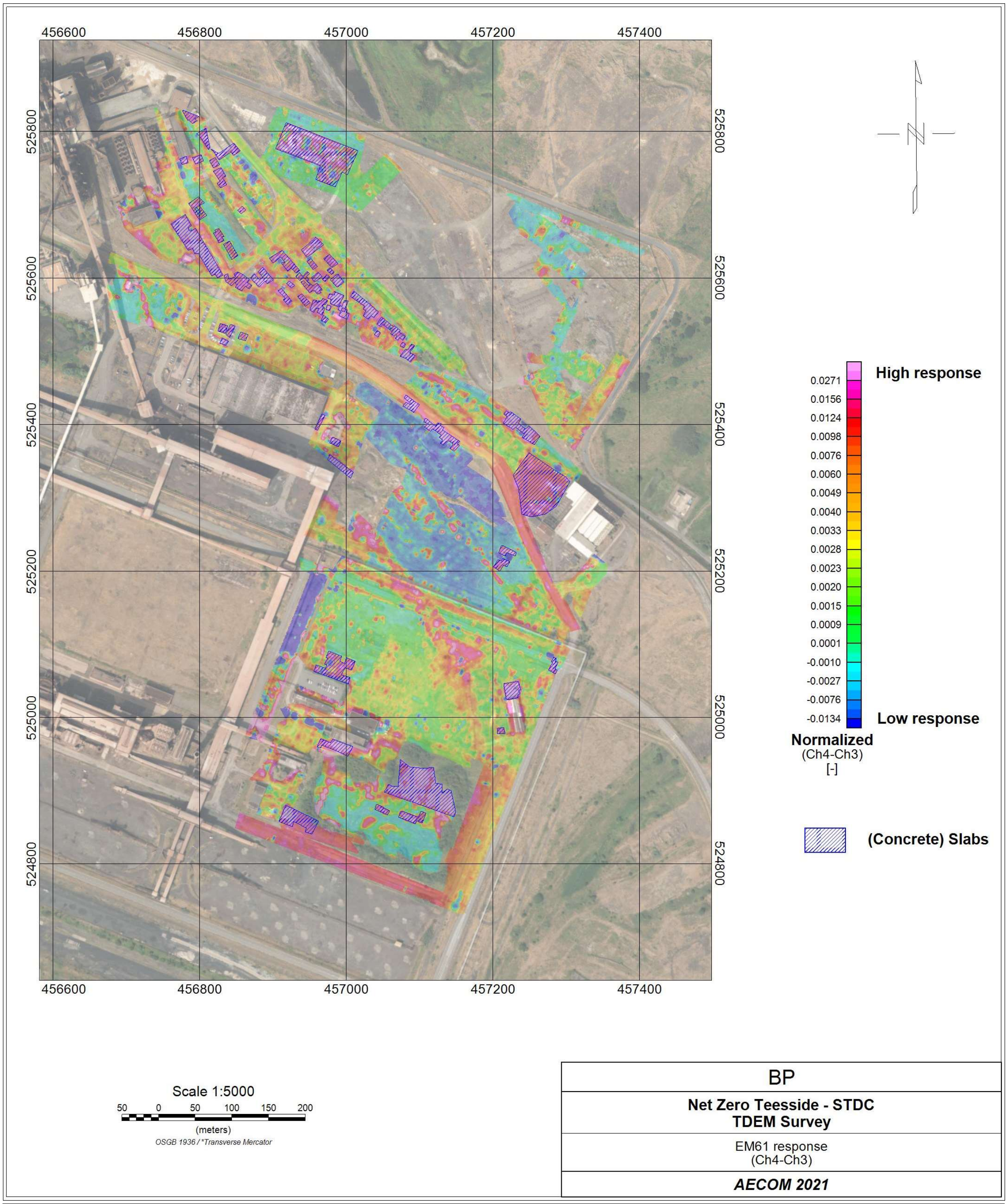
AECOM 2021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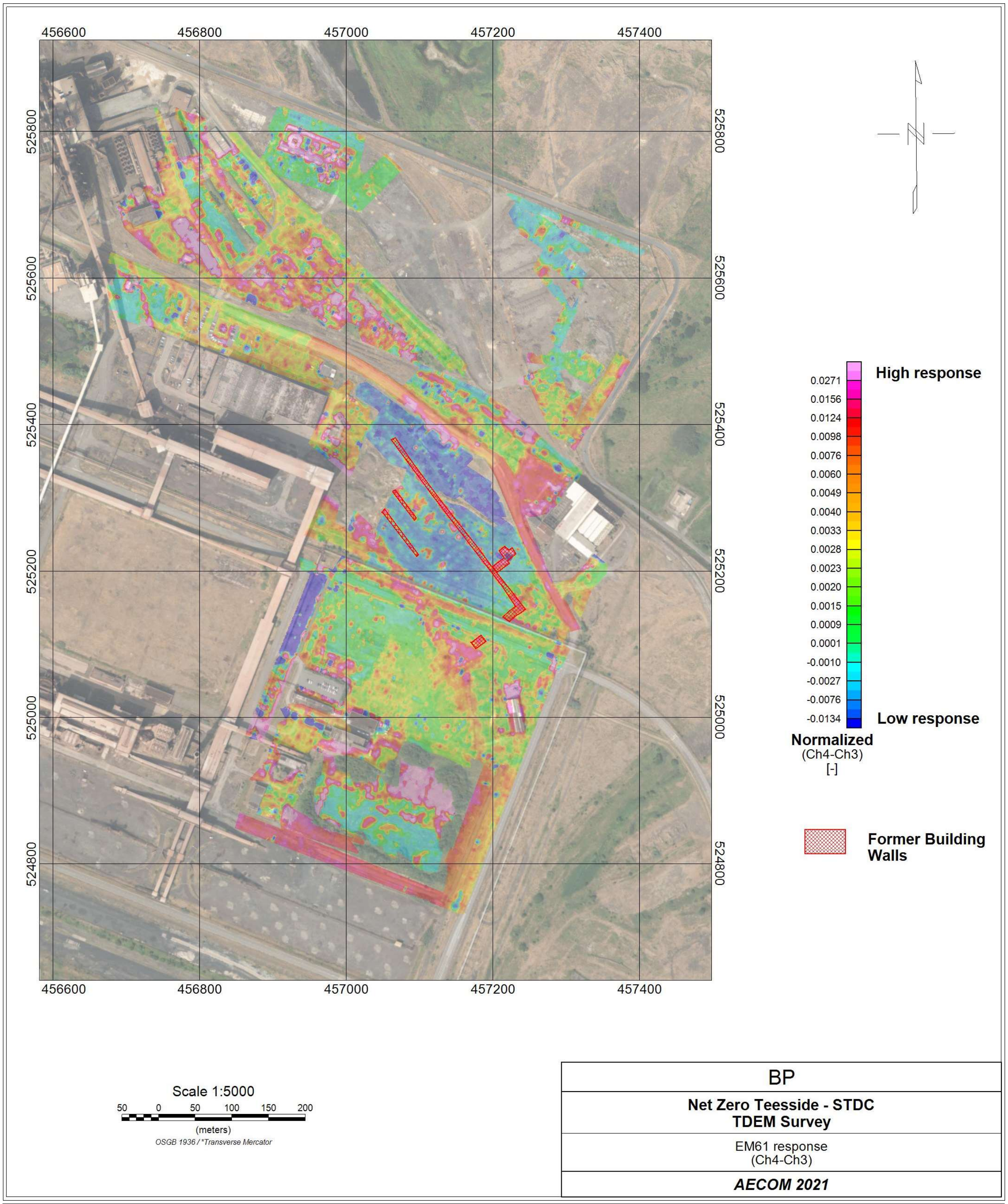
EM61 response
(Ch4-Ch3)
AECOM 2021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Normalized
(Ch4-Ch3)
[-]
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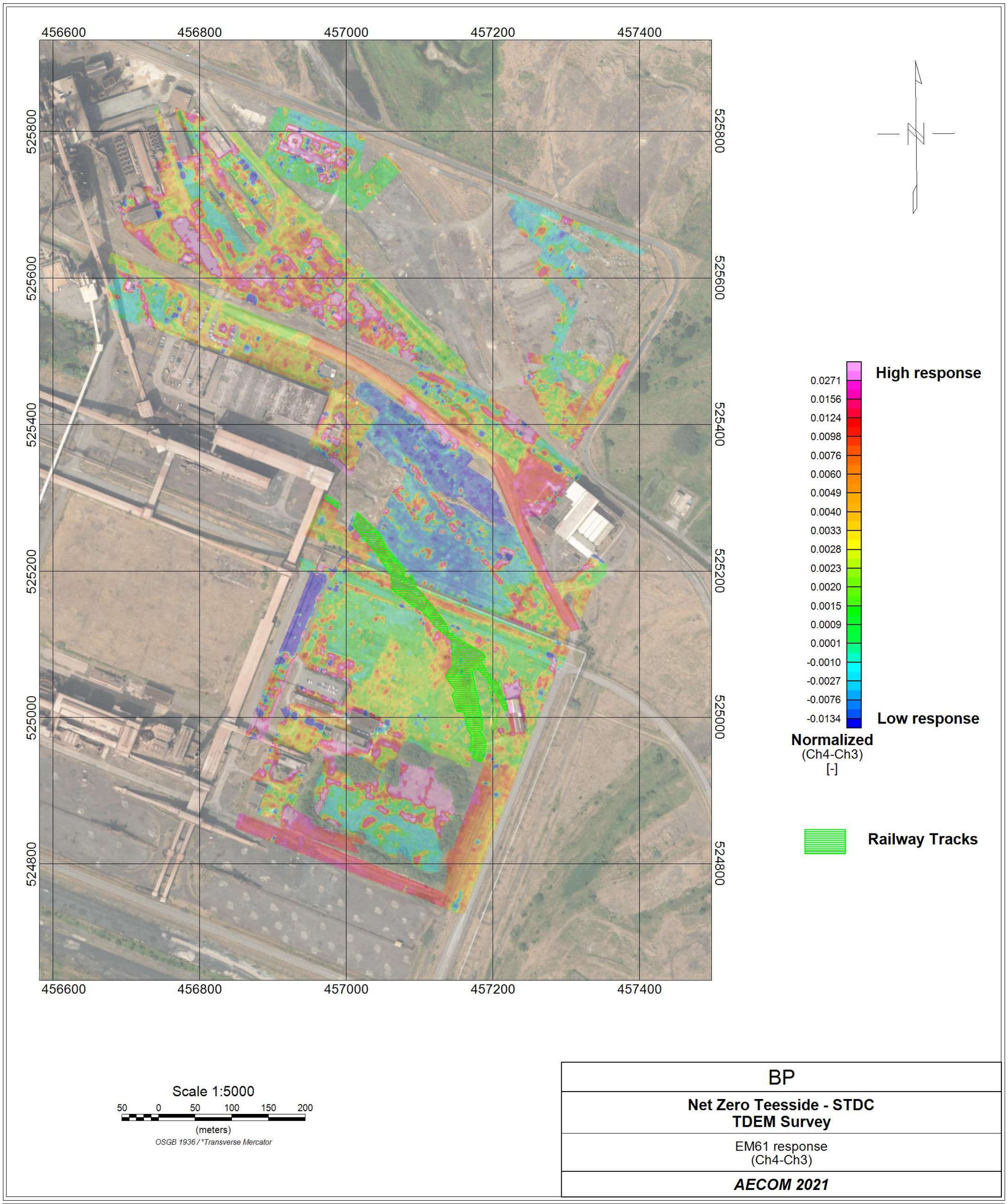
AECOM 2021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(Ch4-Ch3)
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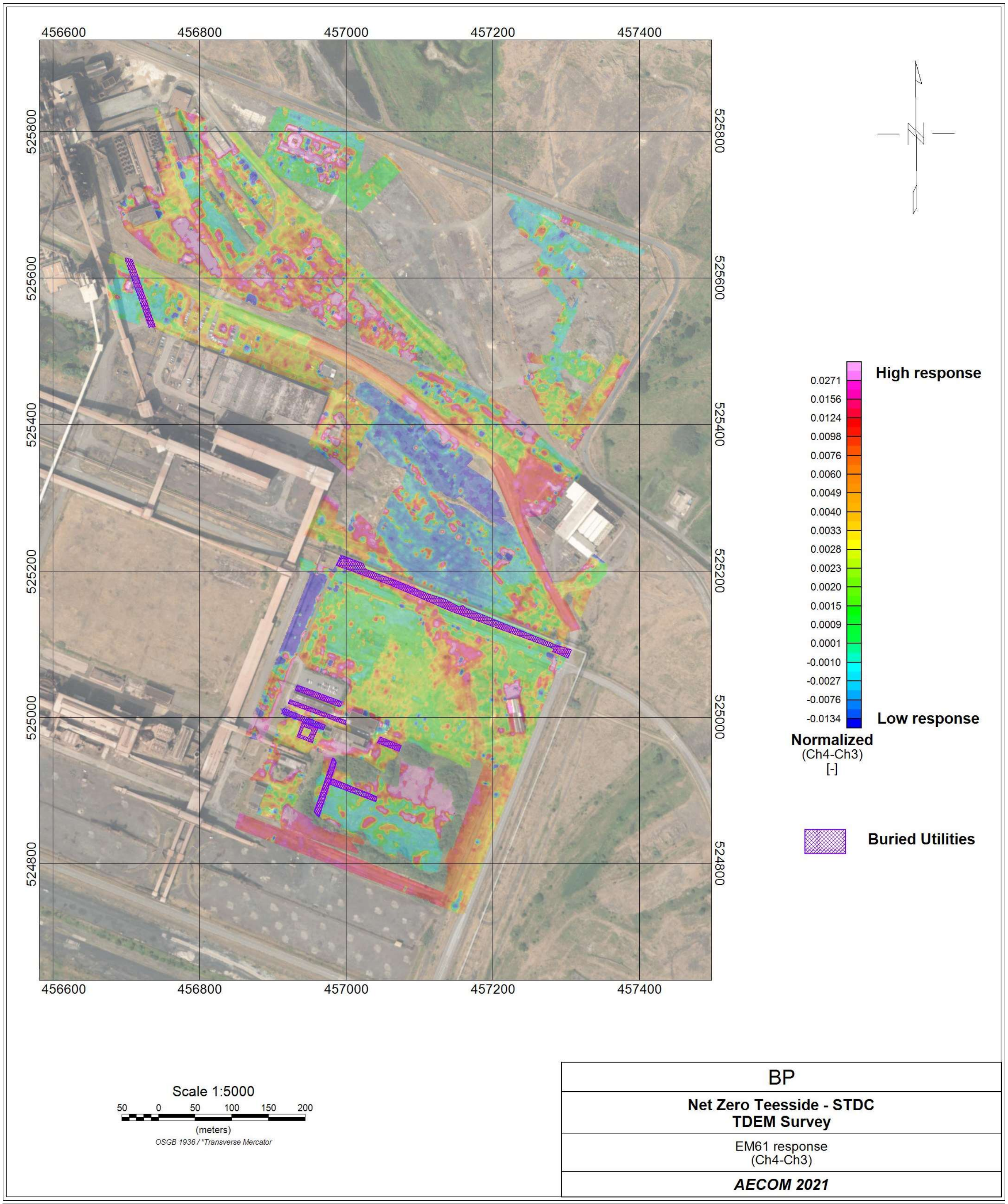
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Normalized
(Ch4-Ch3)
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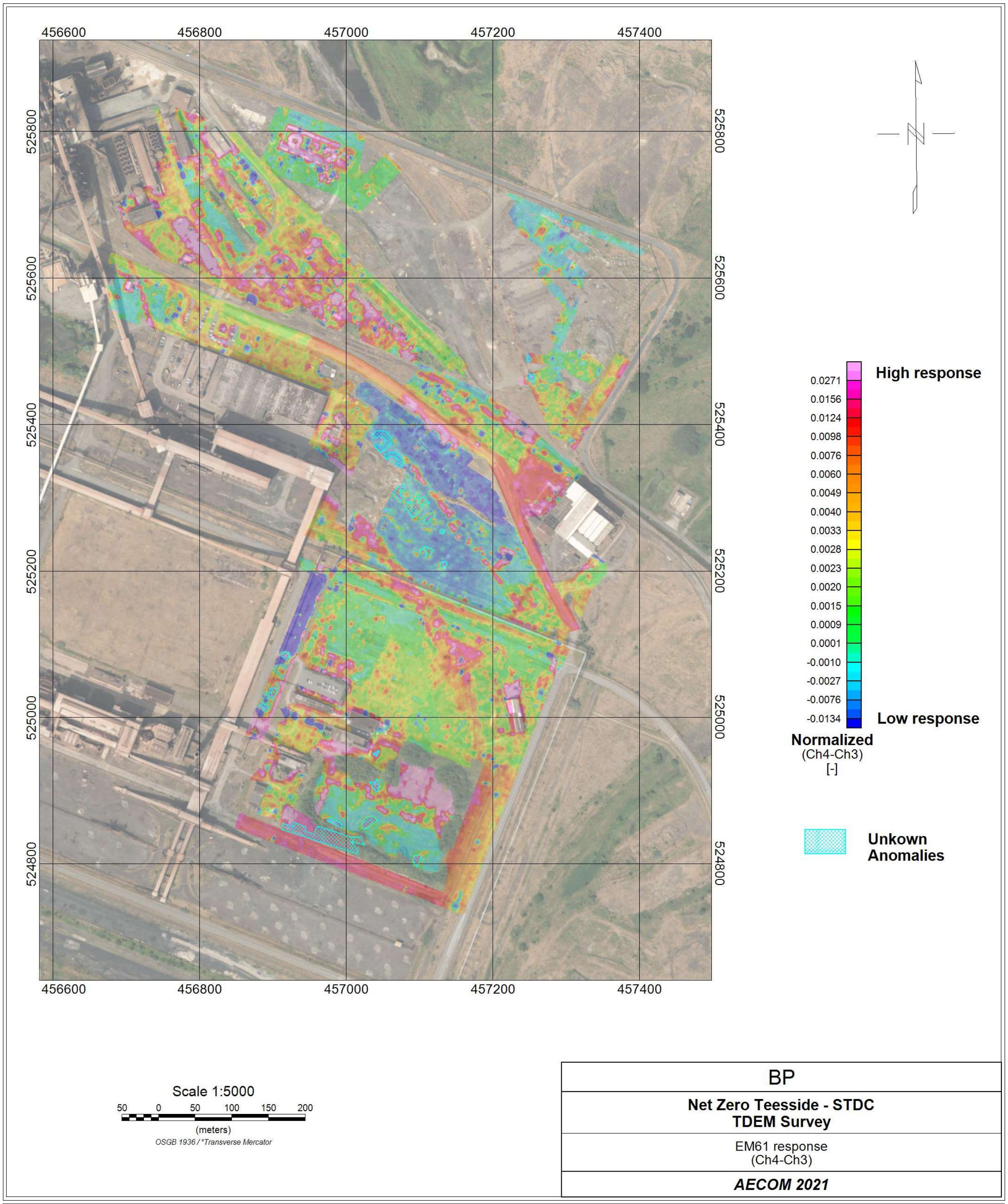
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(Ch4-Ch3)
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Unkown Anomalies
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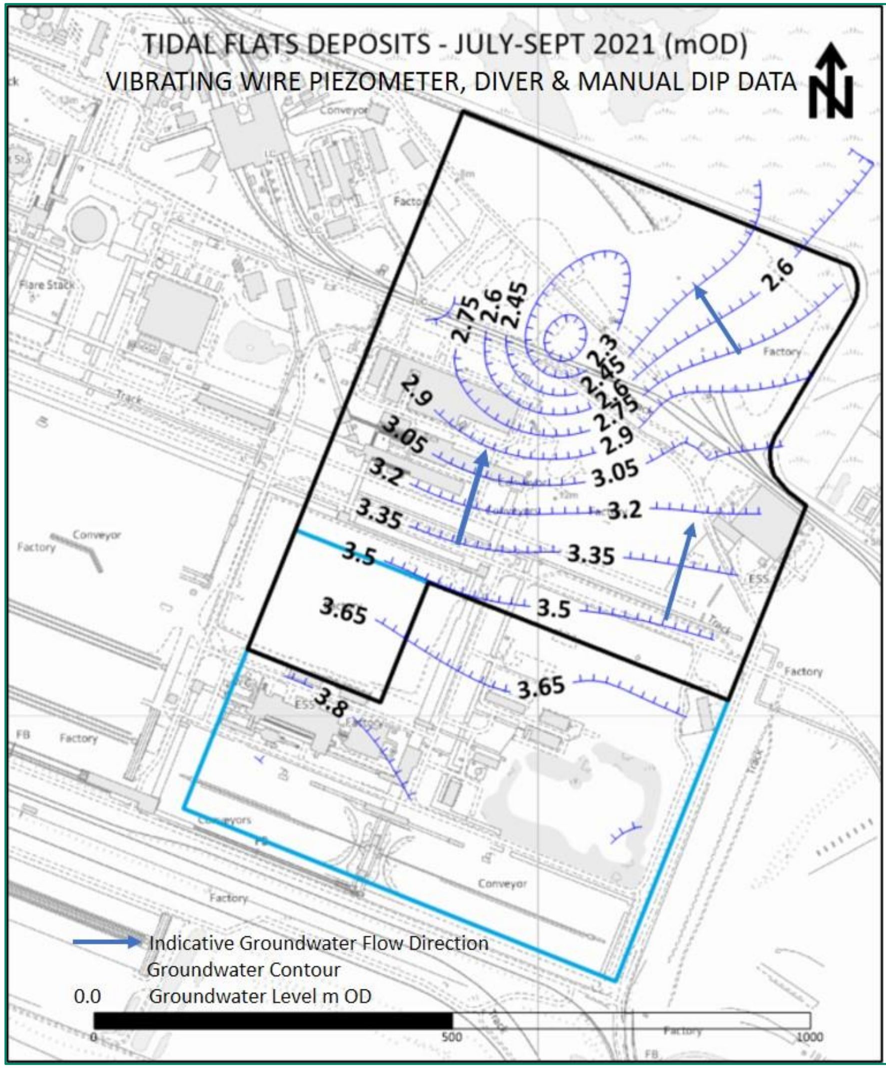
(meters)
OSGB 1936 / *Transverse Mercator
BP
Net Zero Teesside - STDC
TDEM Survey
EM61 response
(Ch4-Ch3)
AECOM 2021

20. Appendix C Groundwater Figures

Figure 8-1 Site Plan showing the locations of the scheduled boreholes and piezometers

Figure 8.2a&b Groundwater level contour (Tidal Flat Deposits)



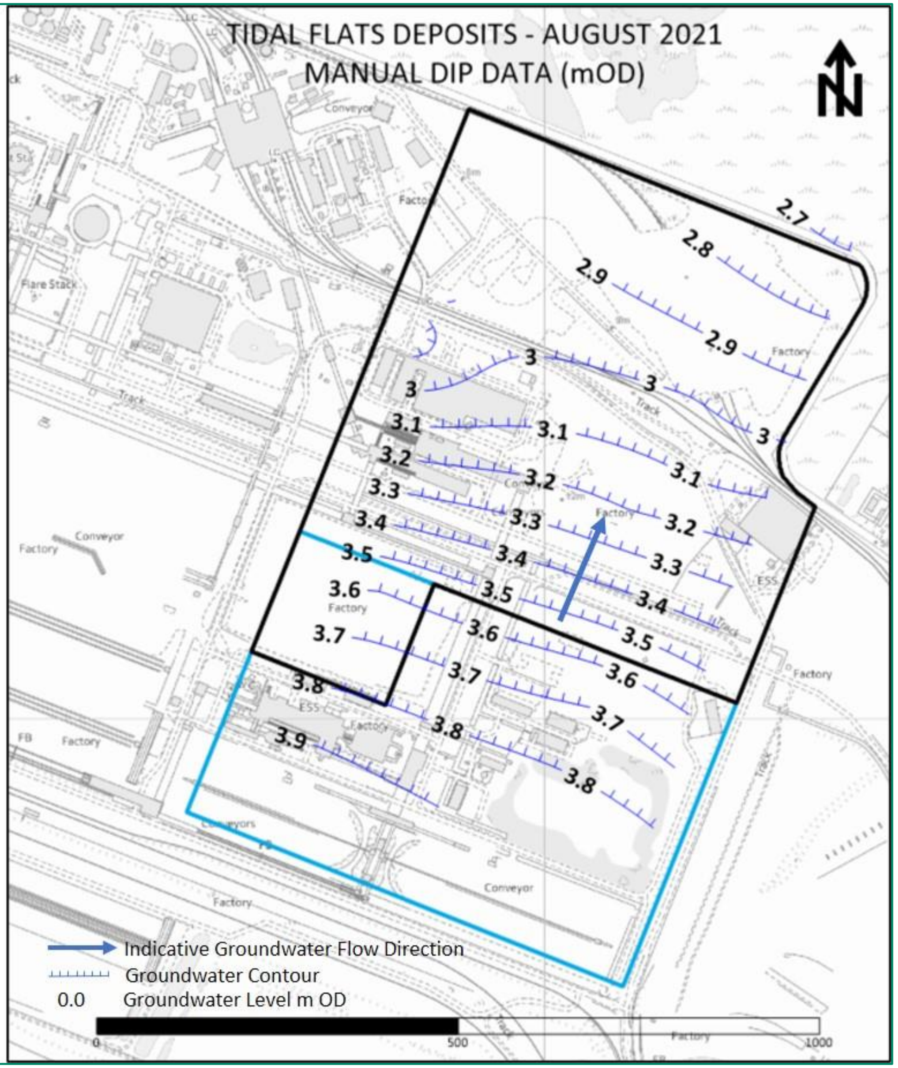


Figure 8.3a&b Groundwater level contour (Mudstone)

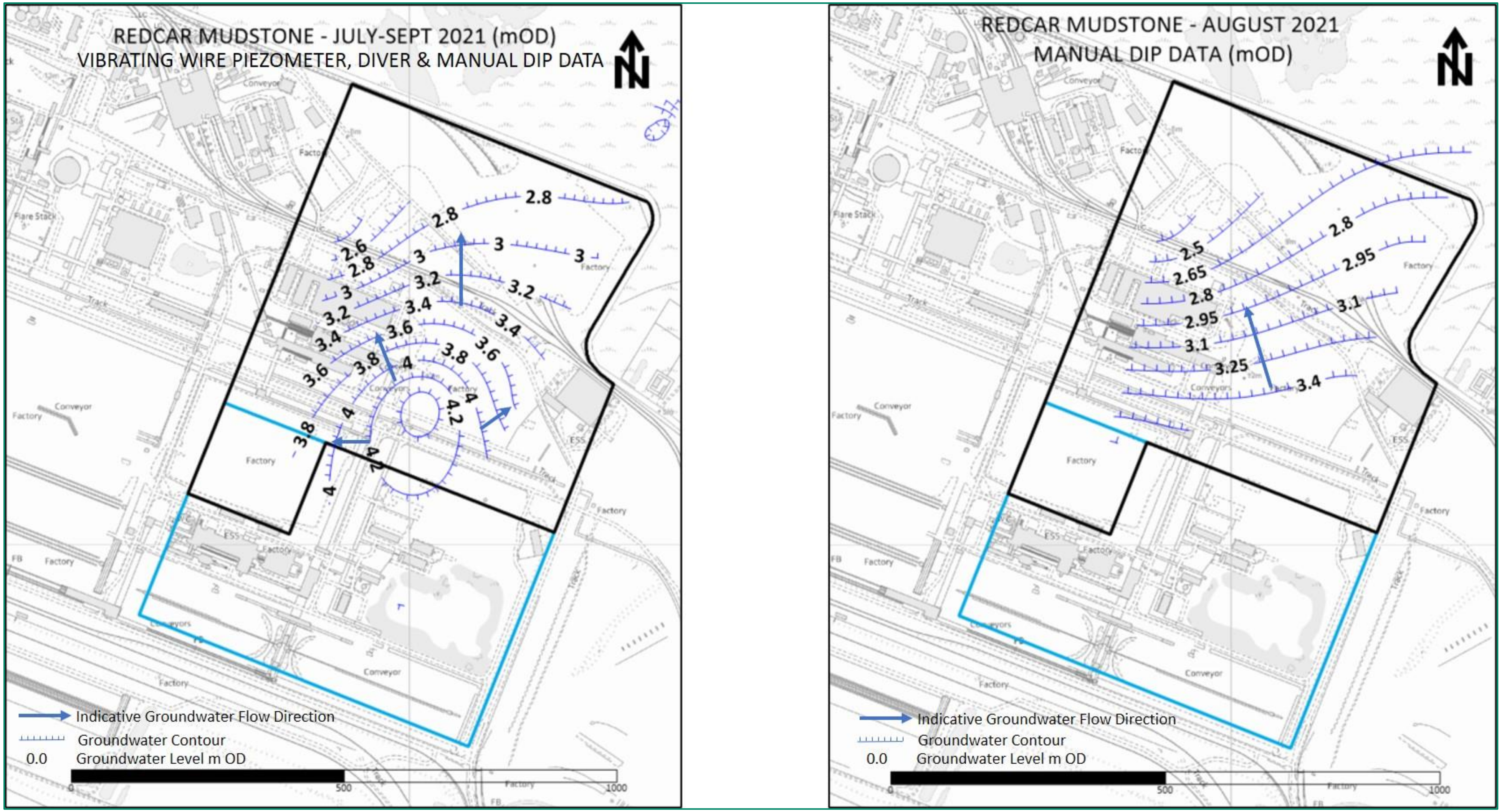


Figure 8.4 Made Ground Groundwater Level Monitoring Data for the Period June 2021 – November 2021

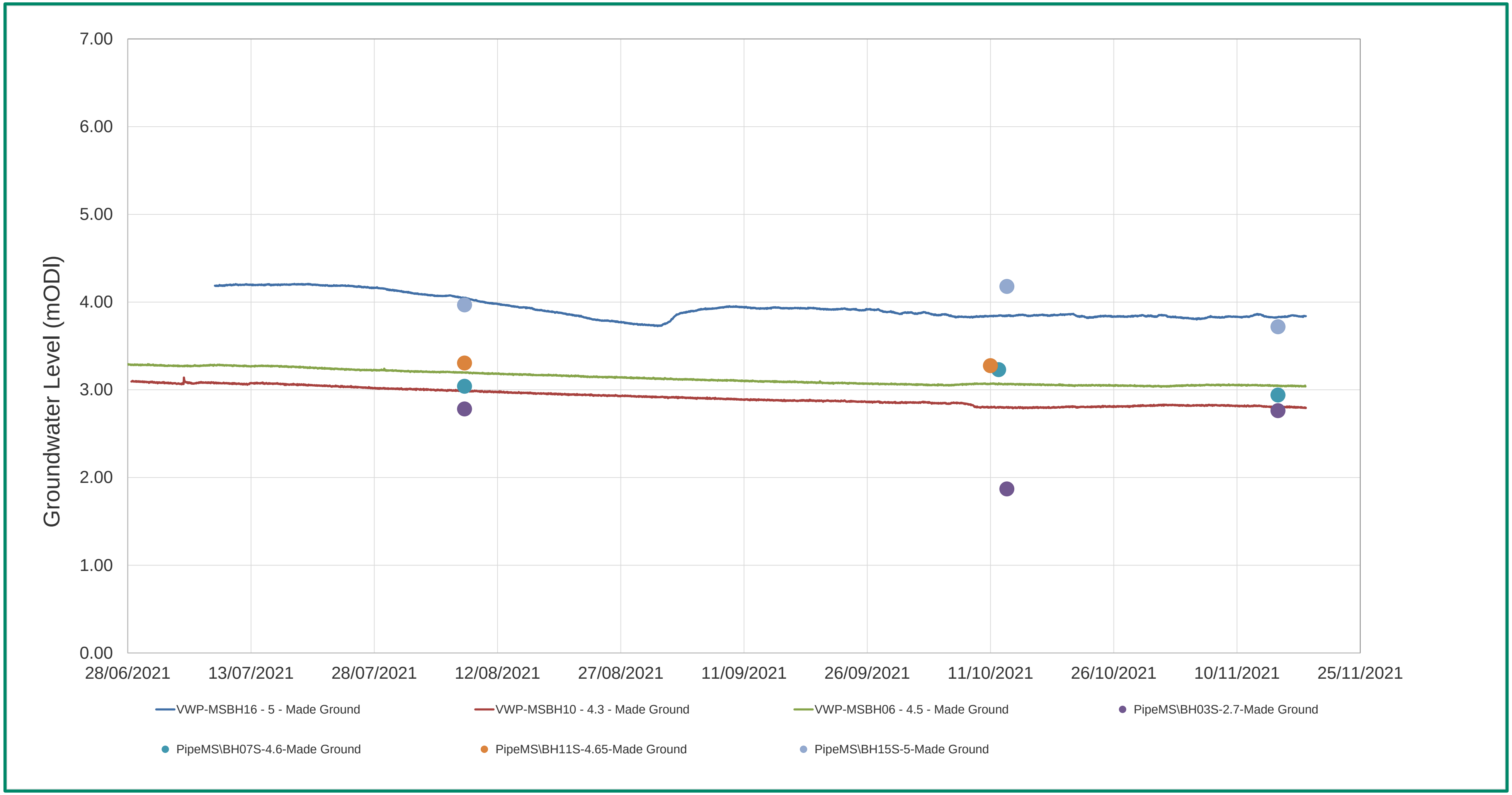


Figure 8.5 Tidal Sand Groundwater Level Monitoring Data for the Period June 2021 – November 2021

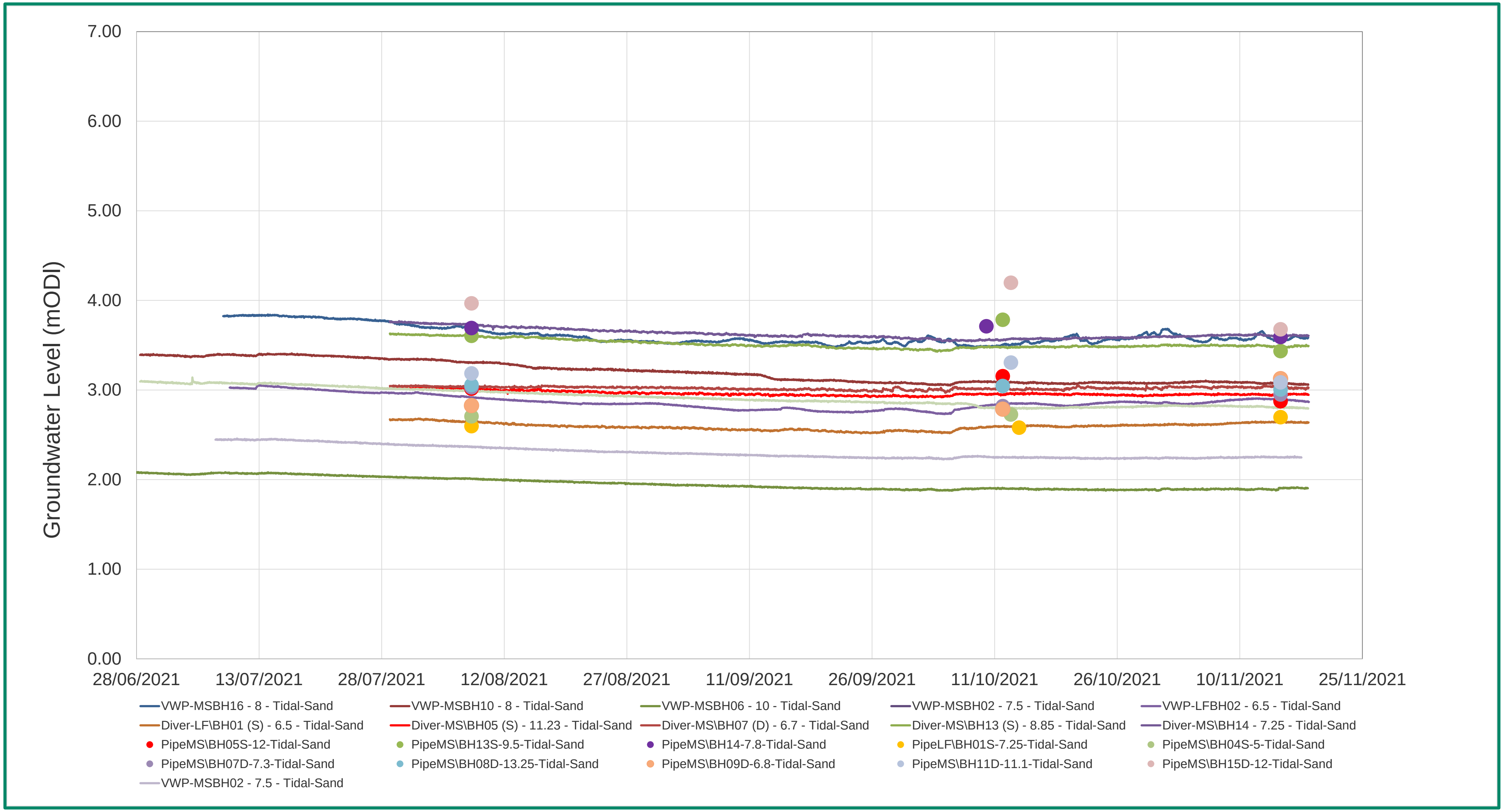


Figure 8.6 Combined Tidal Sand and Tidal Clay Groundwater Level Monitoring Data for the Period June 2021 – November 2021

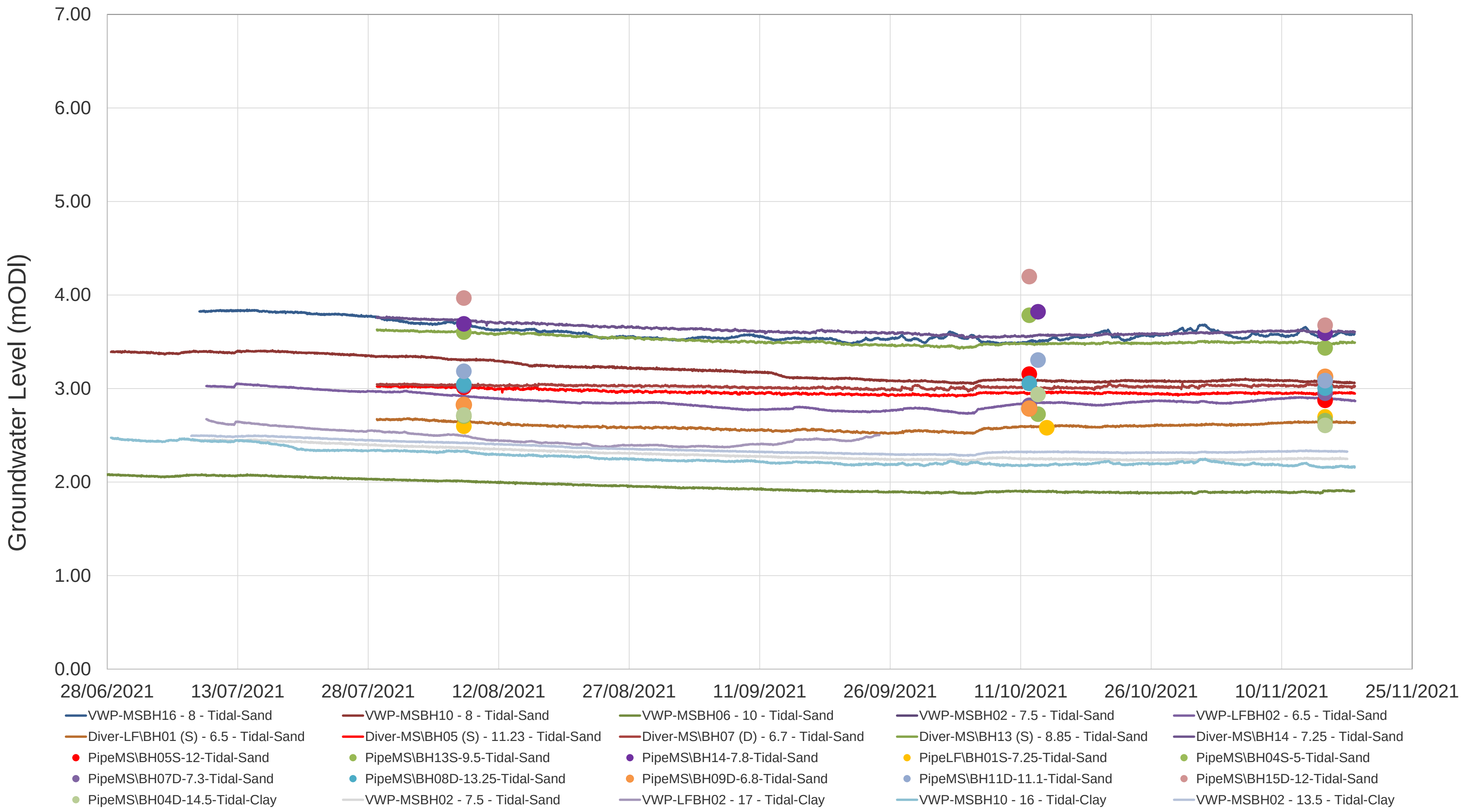


Figure 8.7 Tidal Clay Groundwater Level Monitoring Data for the Period June 2021 – November 2021

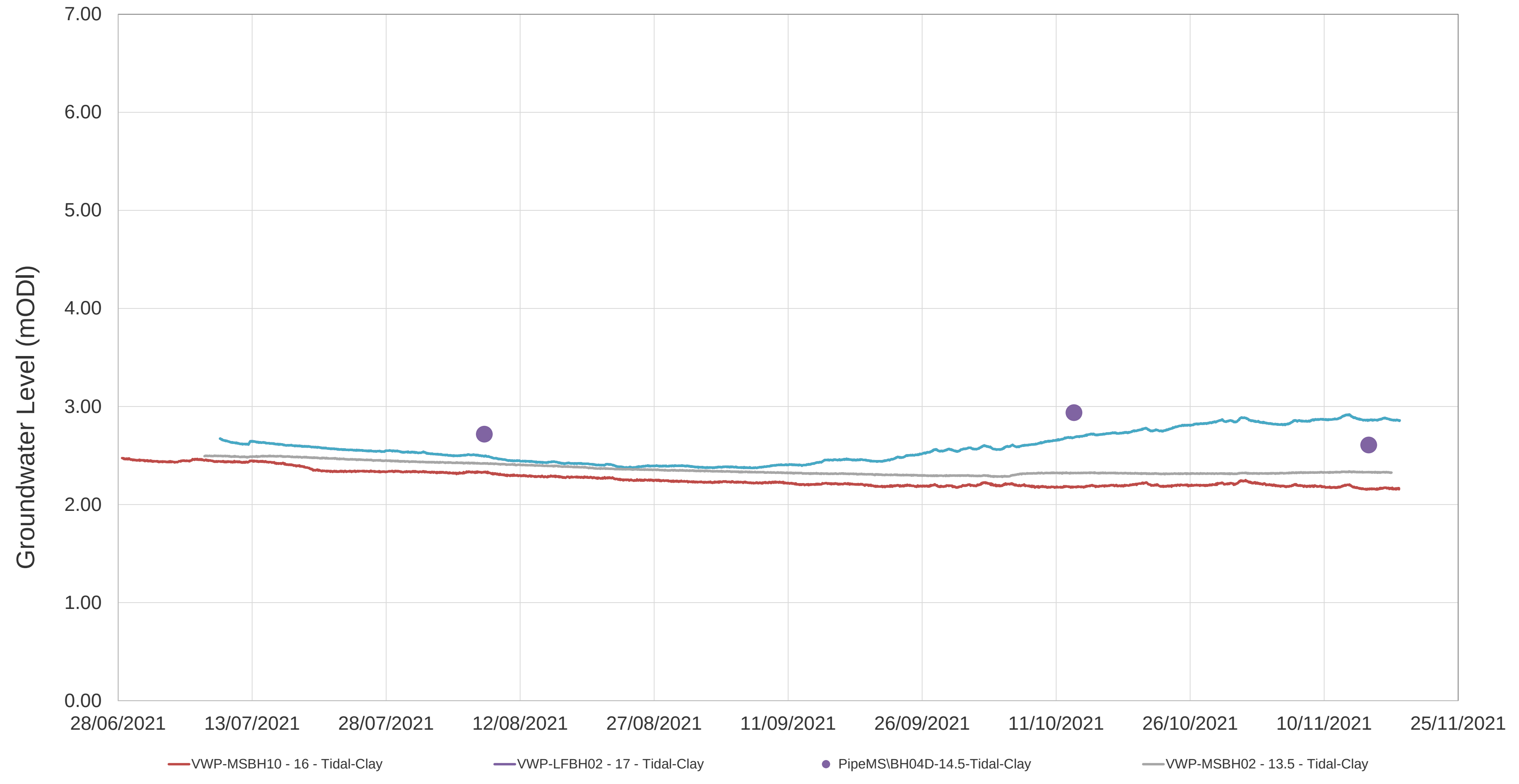


Figure 8.8 Glacial Till Groundwater Level Monitoring Data for the Period June 2021 – November 2021

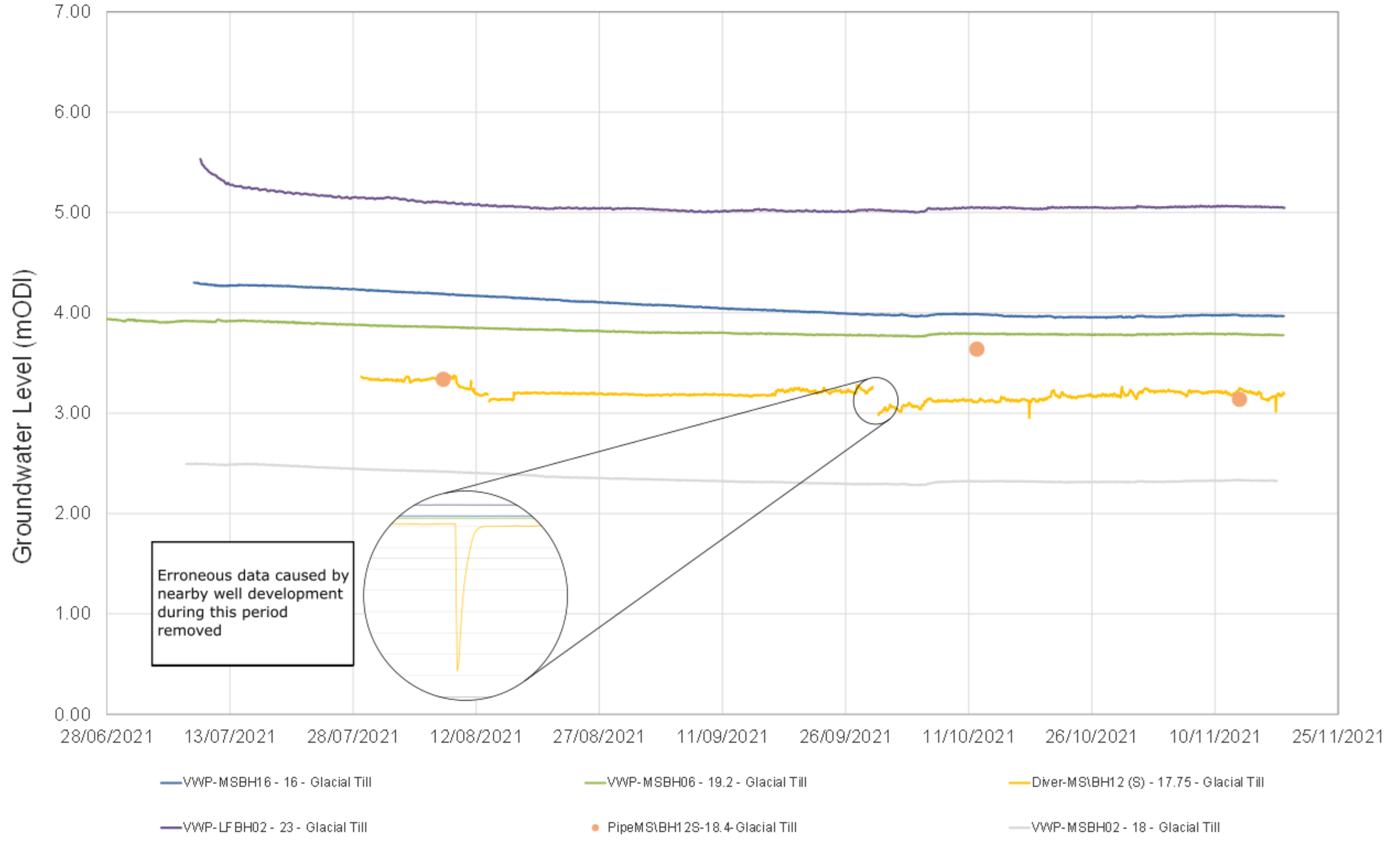


Figure 8.9 Mudstone Groundwater Level Monitoring Data for the Period June 2021 – November 2021

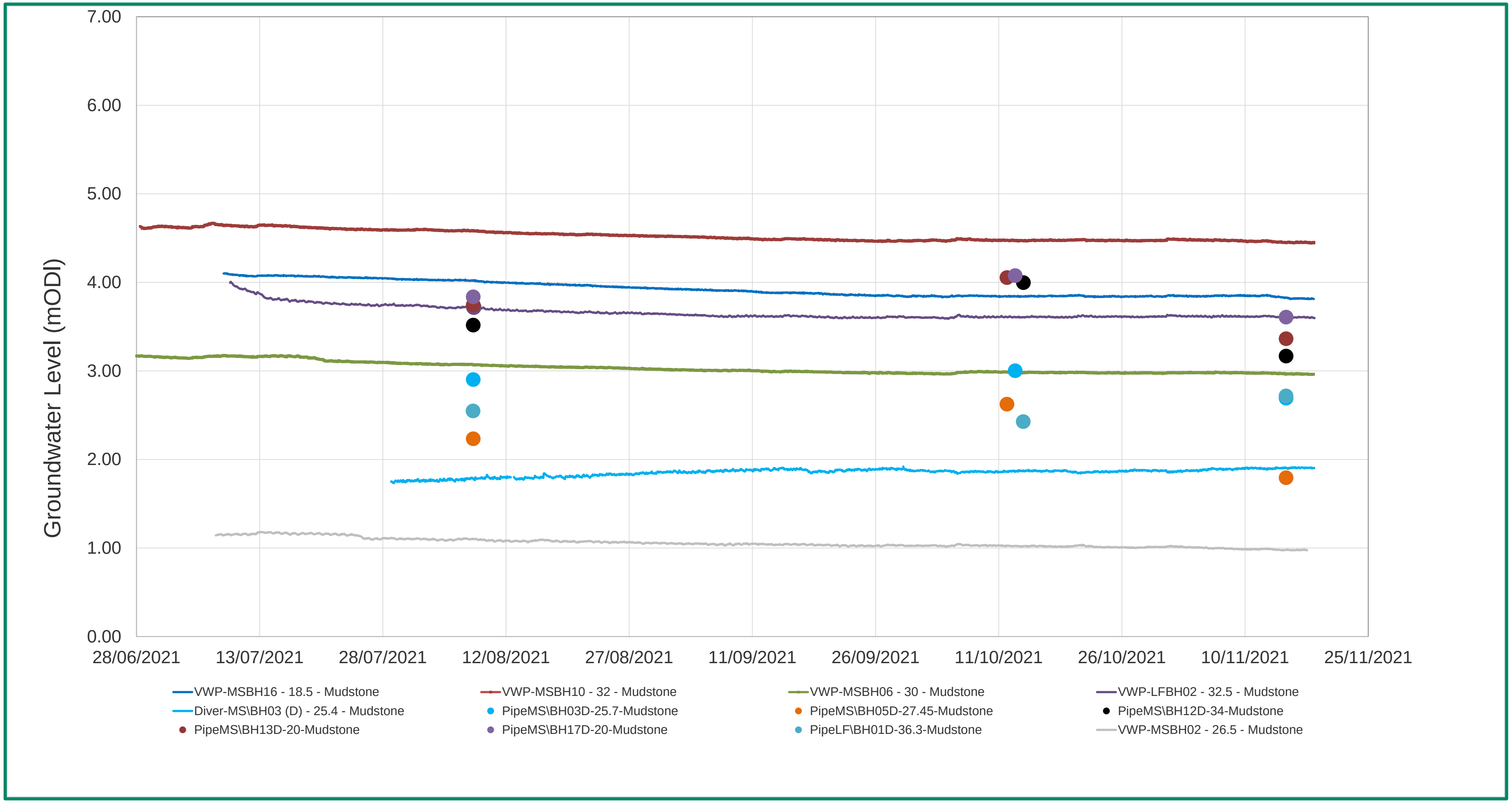


Figure 8.10 Made Ground – Average Groundwater Level for the Period June 2021 – November 2021

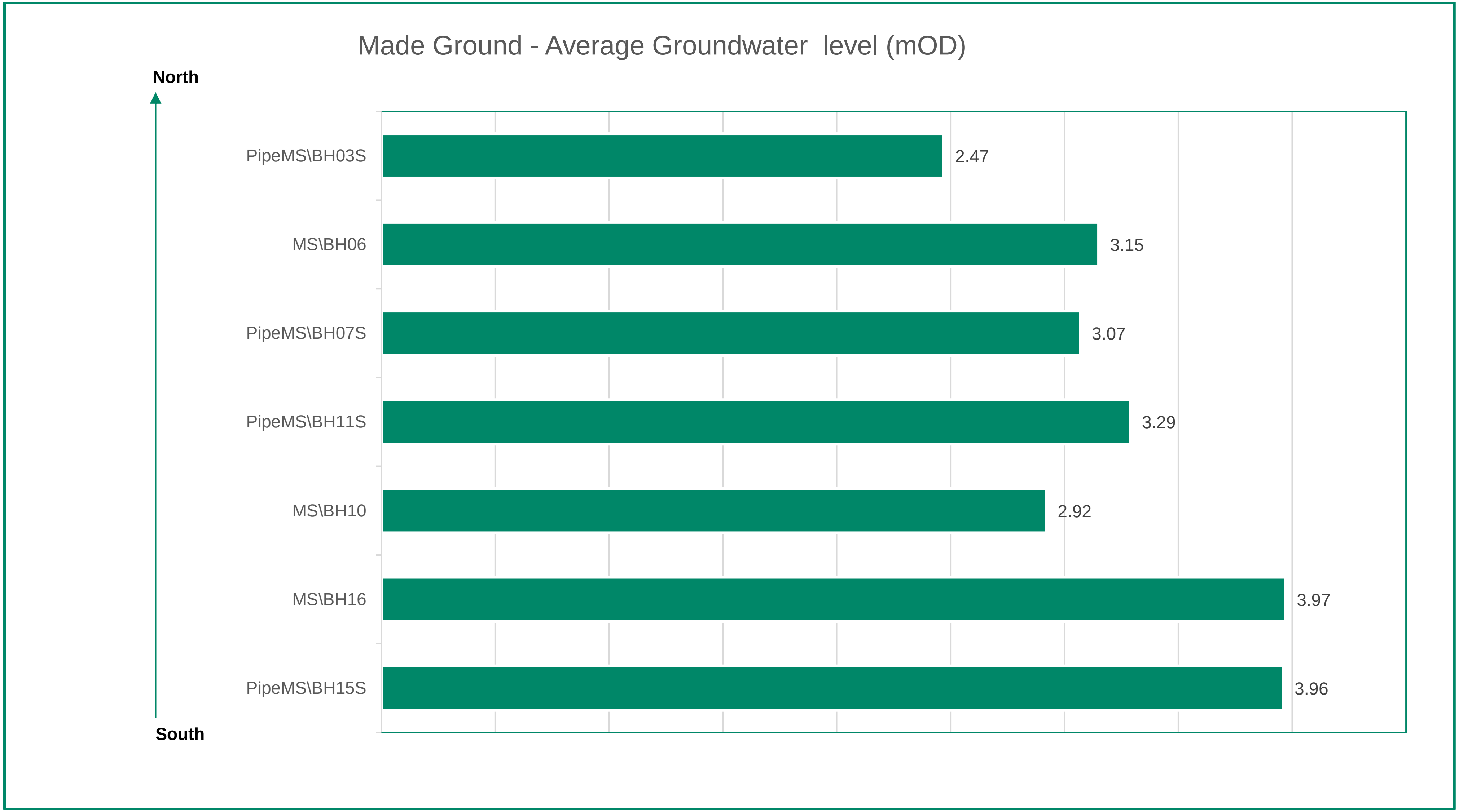


Figure 8.11 Tidal Sand – Average Groundwater Level for the Period June 2021 – November 2021

Figure 8.12 Tidal Clay – Average Groundwater Level for the Period June 2021 – November 2021

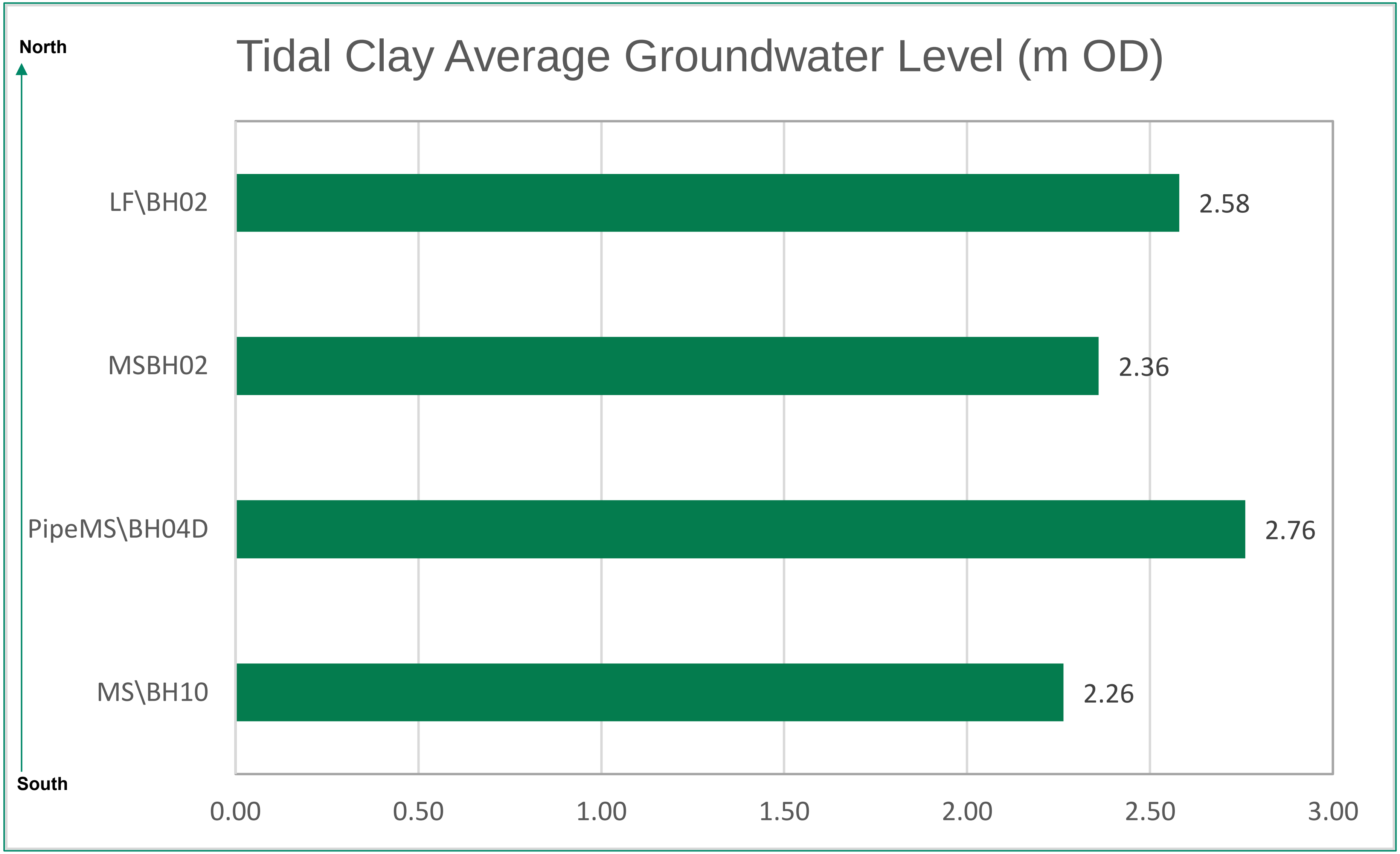


Figure 8.13 Glacial Till – Average Groundwater Level for the Period June 2021 – November 2021

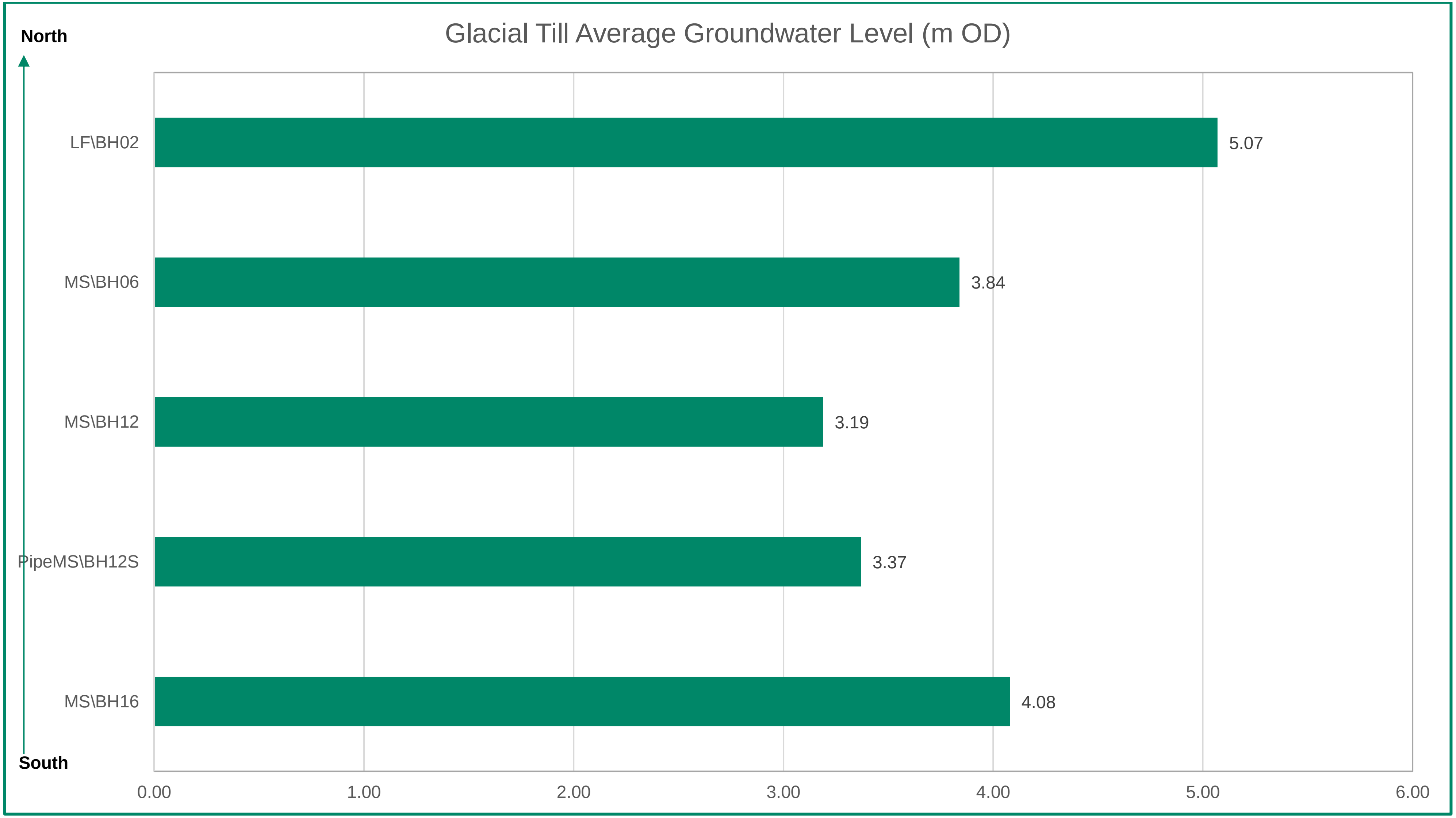


Figure 8.14 Mudstone – Average Groundwater Level for the Period June 2021 – November 2021

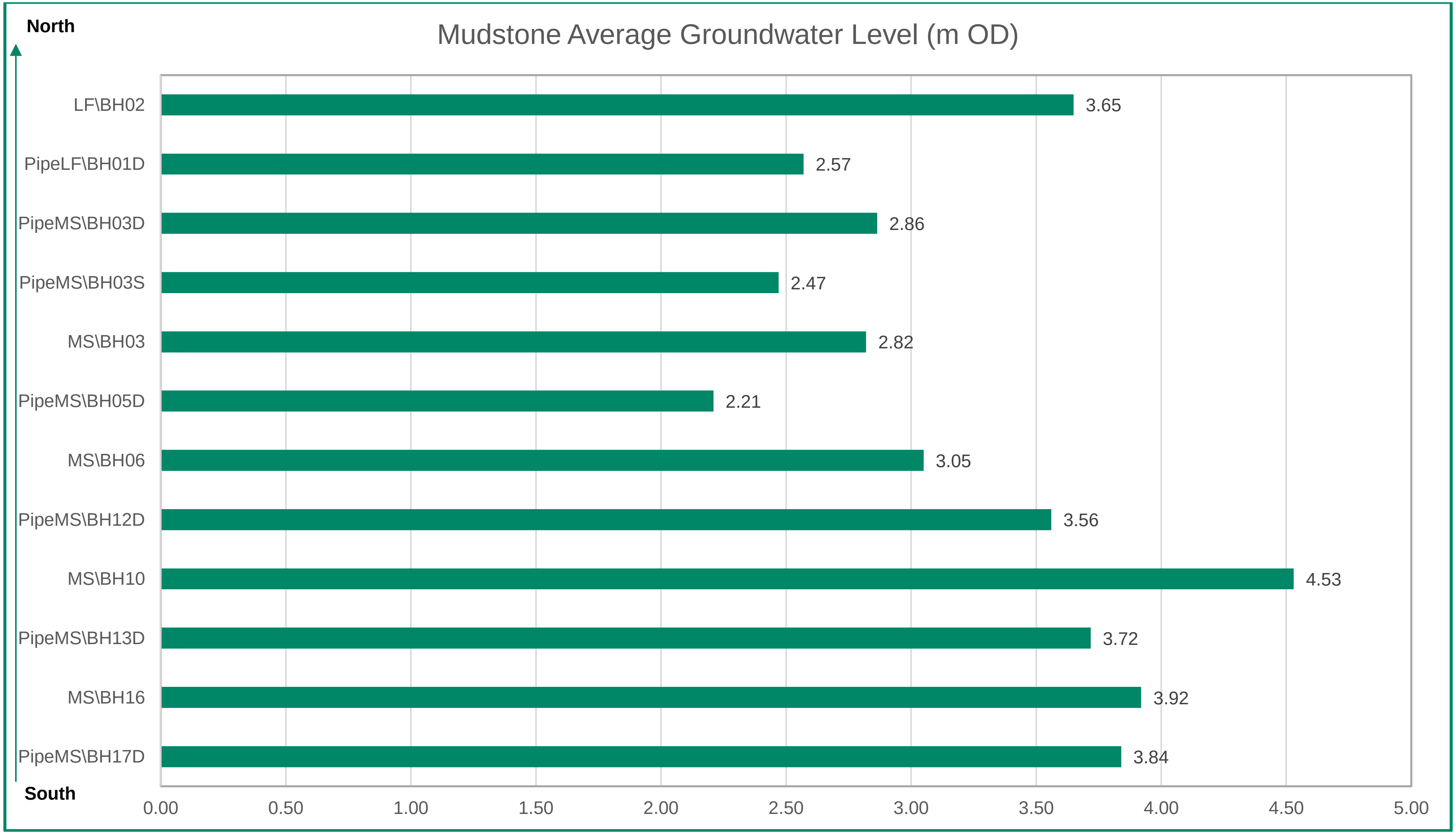


Figure 8.15 Groundwater Level variation in the Geological Units as Recorded at LFBH02 for the Period June 2021 – November 2021

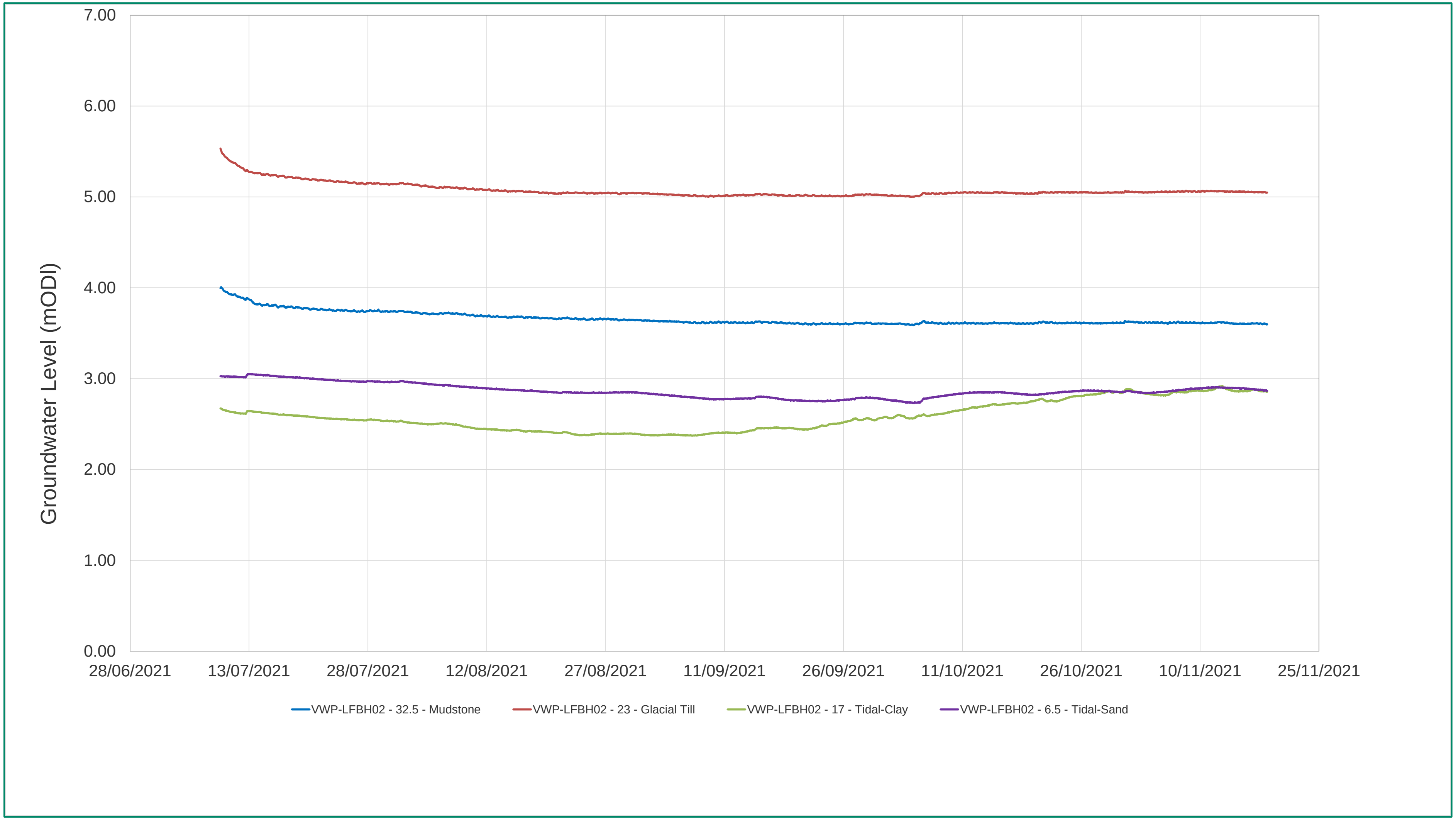


Figure 8.16 Groundwater Level in the Geological Units as Recorded at MSBH02 for the Period June 2021 – November 2021

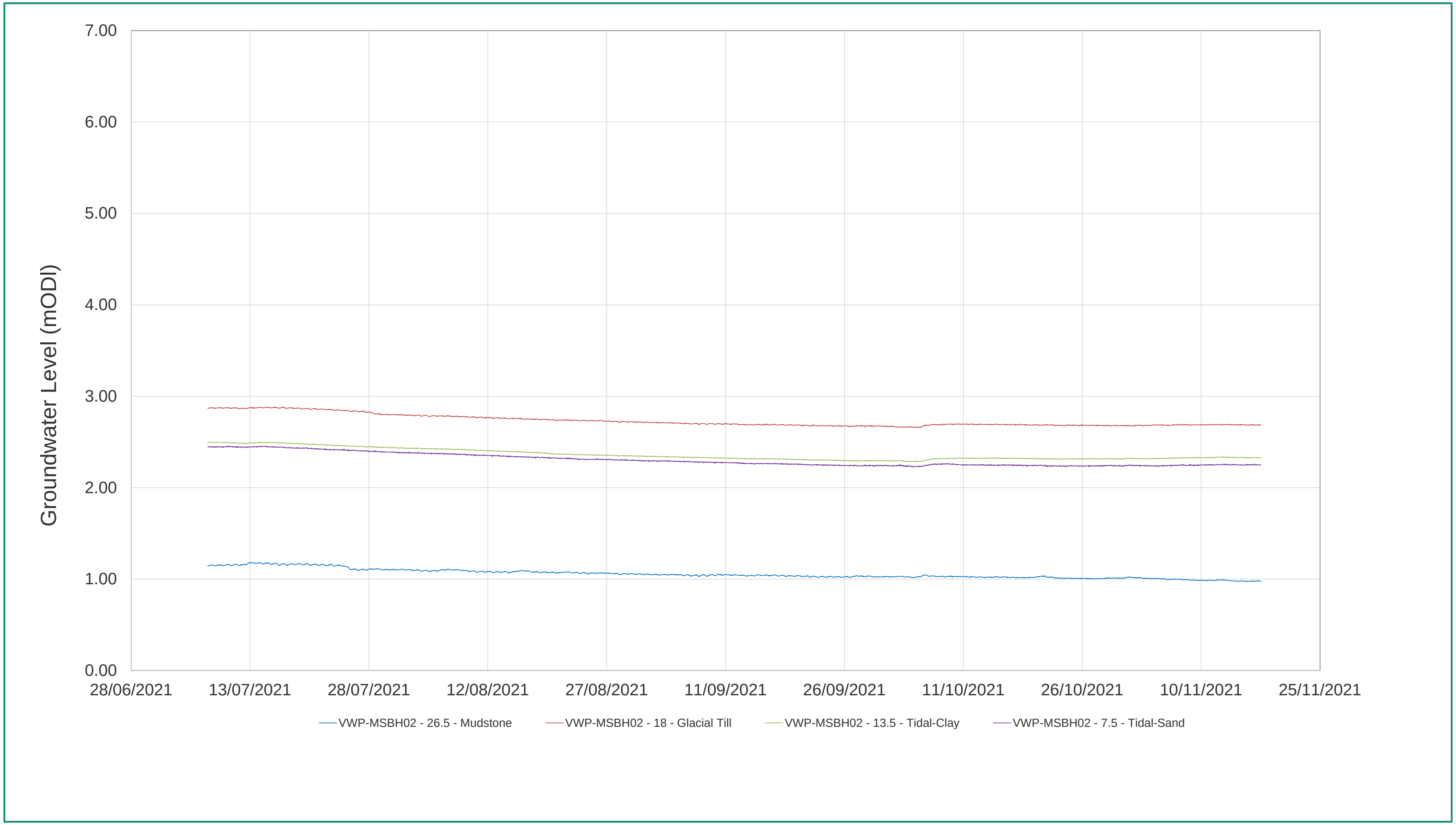


Figure 8.17 Groundwater Level in the Geological Units as Recorded at MSBH06 for the Period June 2021 – November 2021

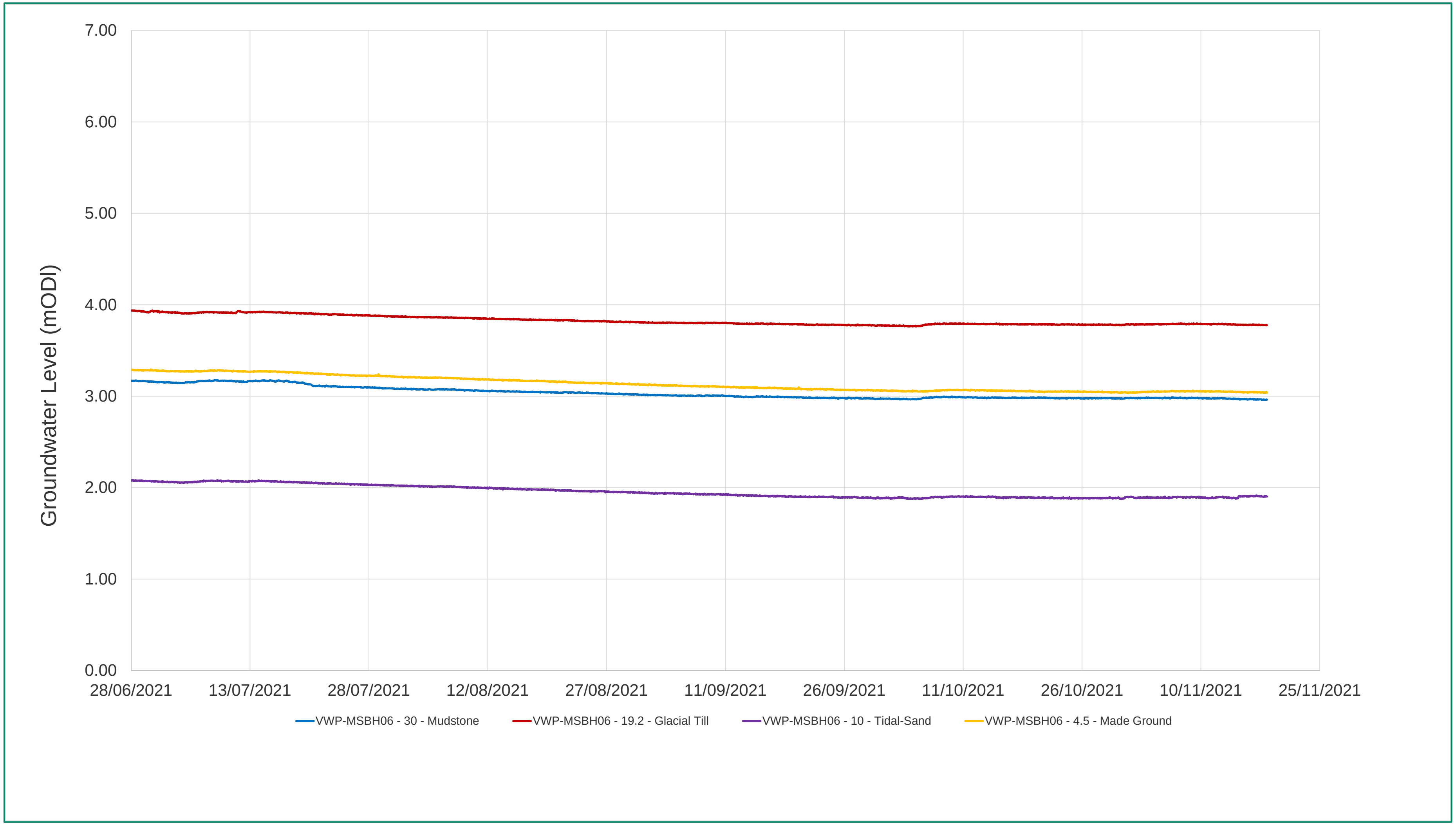


Figure 8.18 Groundwater Level in the Geological Units as Recorded at MSBH10 for the Period June 2021 – November 2021

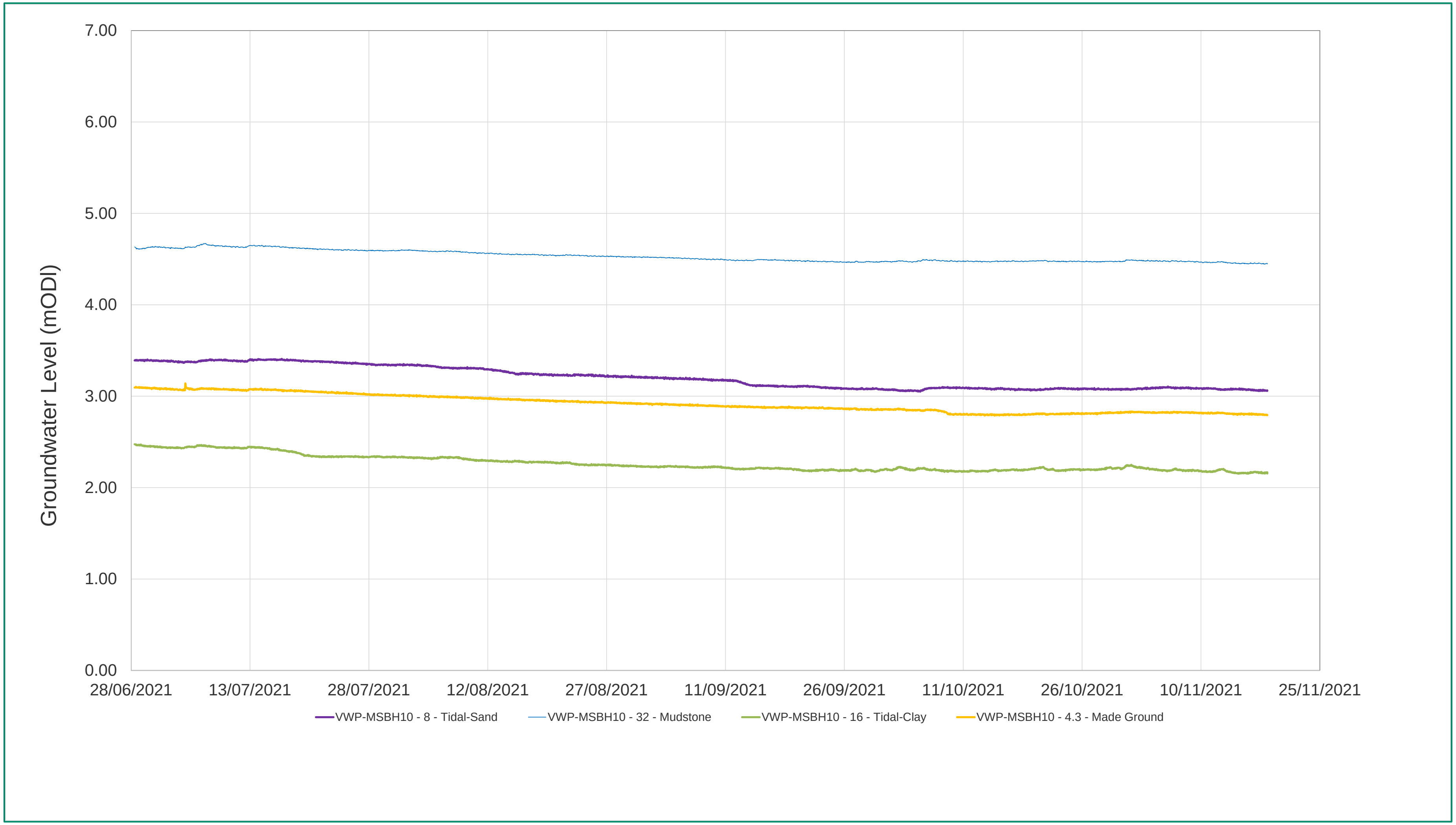


Figure 8.19 Groundwater Level in the Geological Units as Recorded at MSBH16 for the Period June 2021 – November 2021

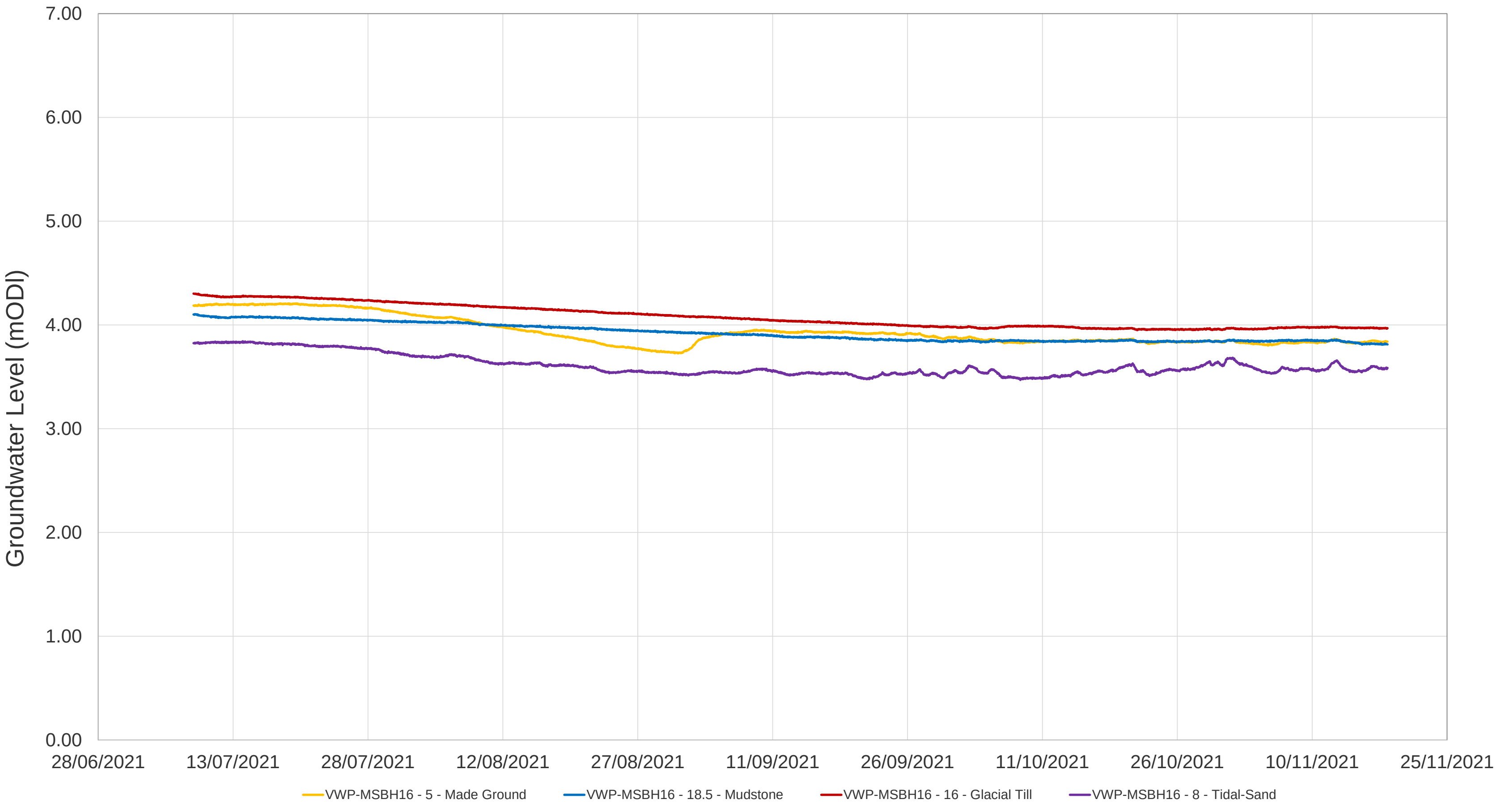


Figure 8.20 Average Electircal Conductivitiy of Groundwater in the Made Ground for the Period August 2021 – November 2021

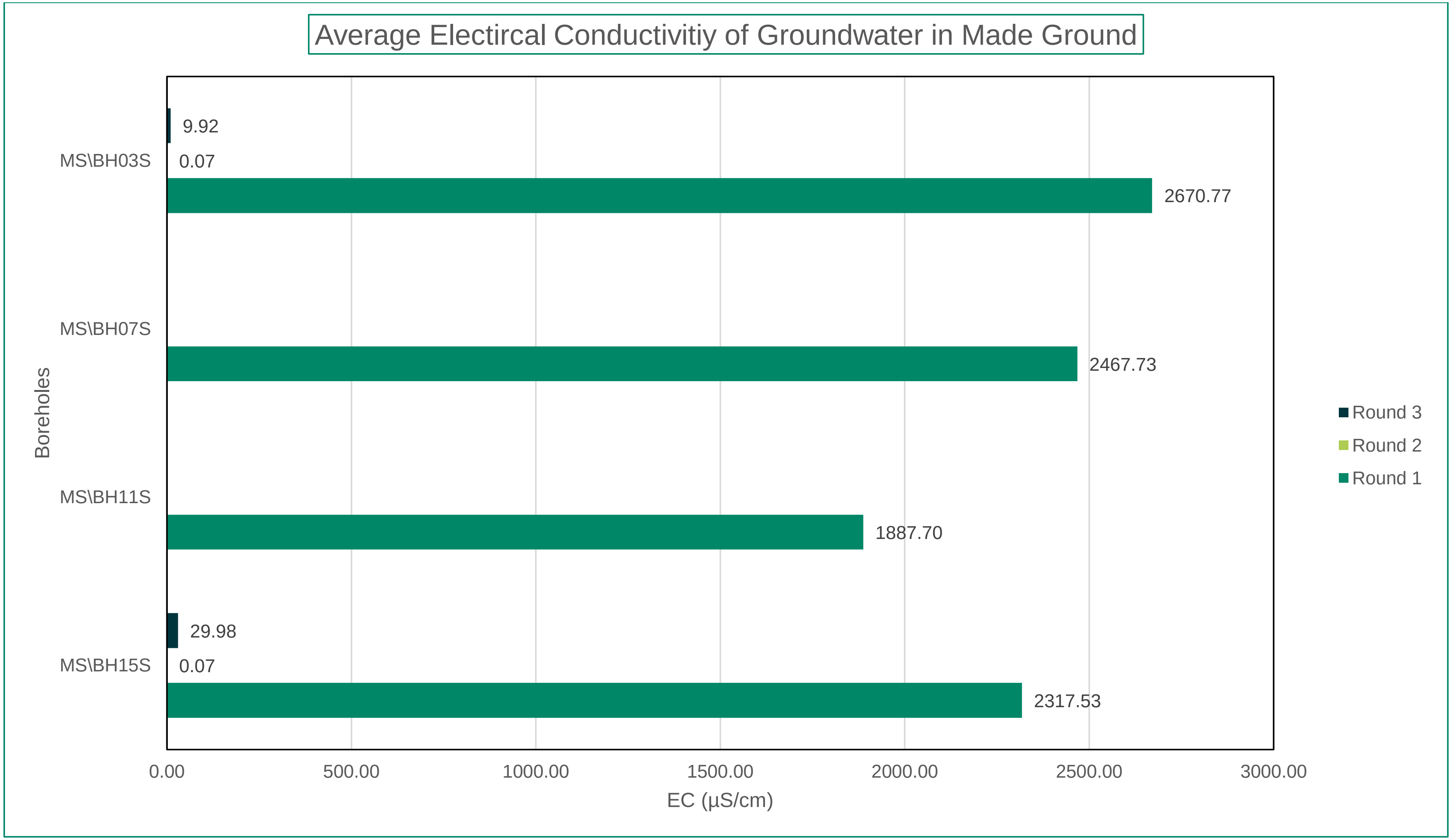


Figure 8.21A Average Electircal Conductivitiy of Groundwater in the Tidal Sands Deposits for the Period August 2021 – November 2021

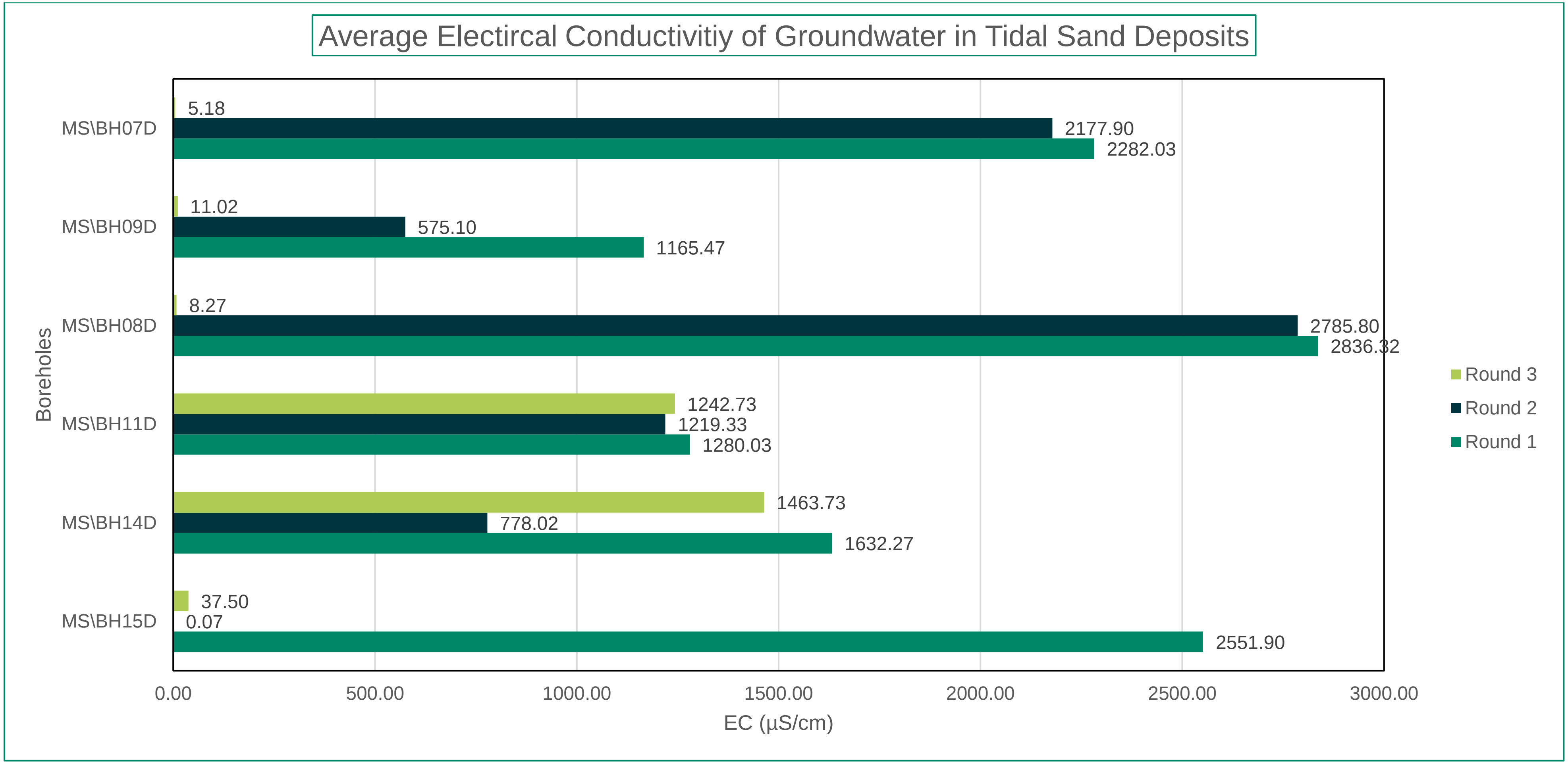


Figure 8.22B Average Electircal Conductivitiy of Groundwater in the Tidal Sands Deposits for the Period August 2021 – November 2021

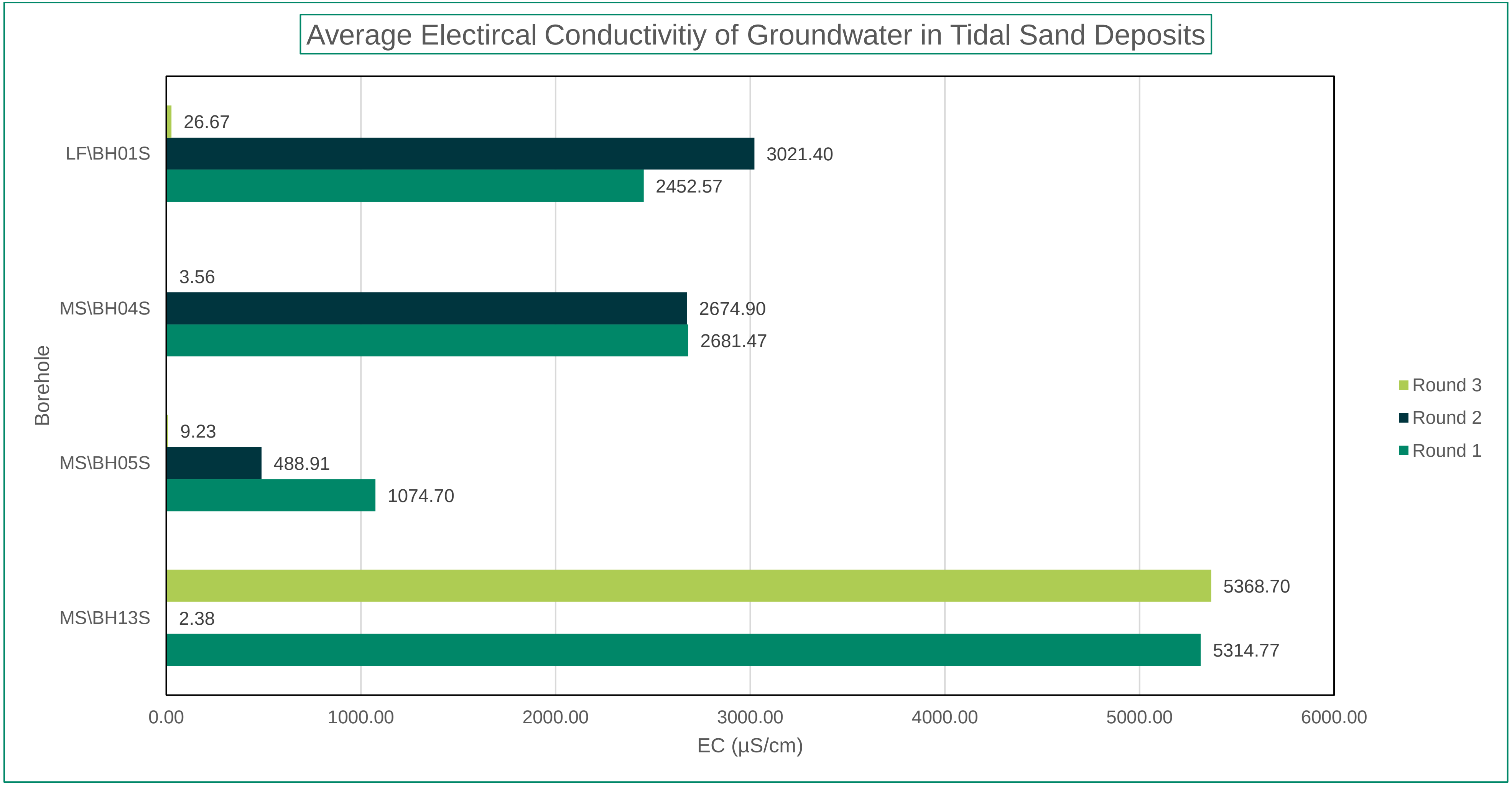


Figure 8.23 Average Electircal Conductivitiy of Groundwater in the Mudstone for the Period August 2021 – November 2021

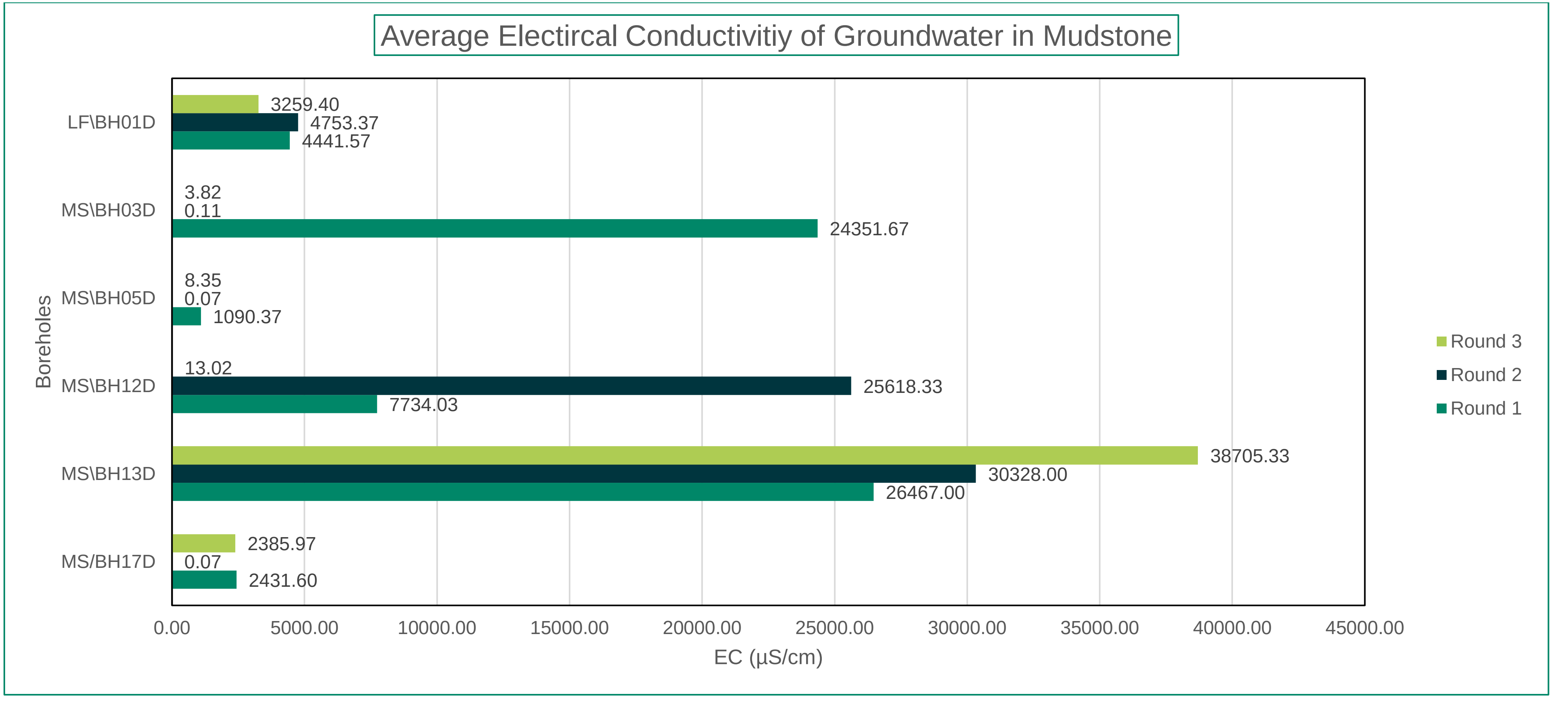
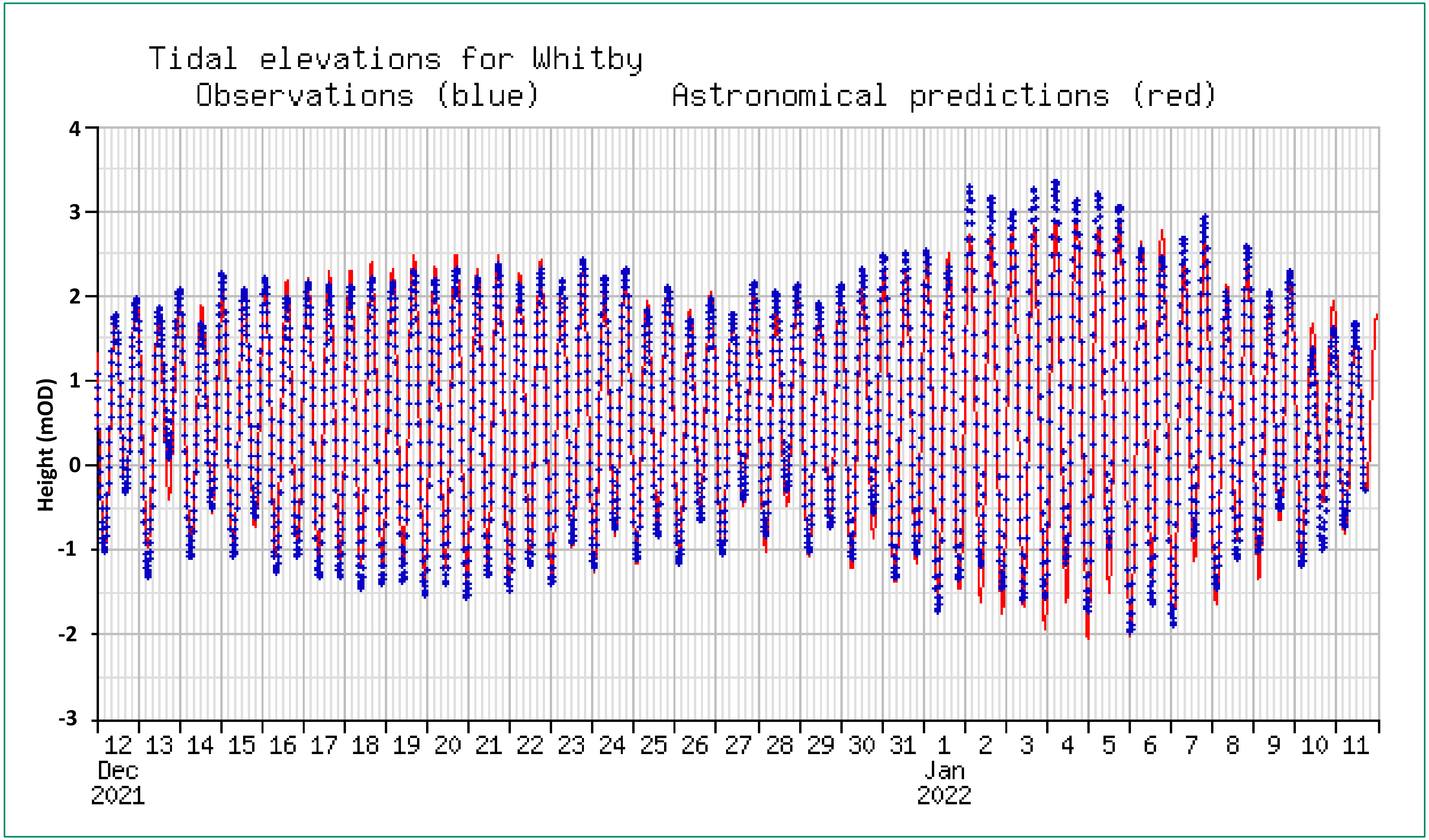
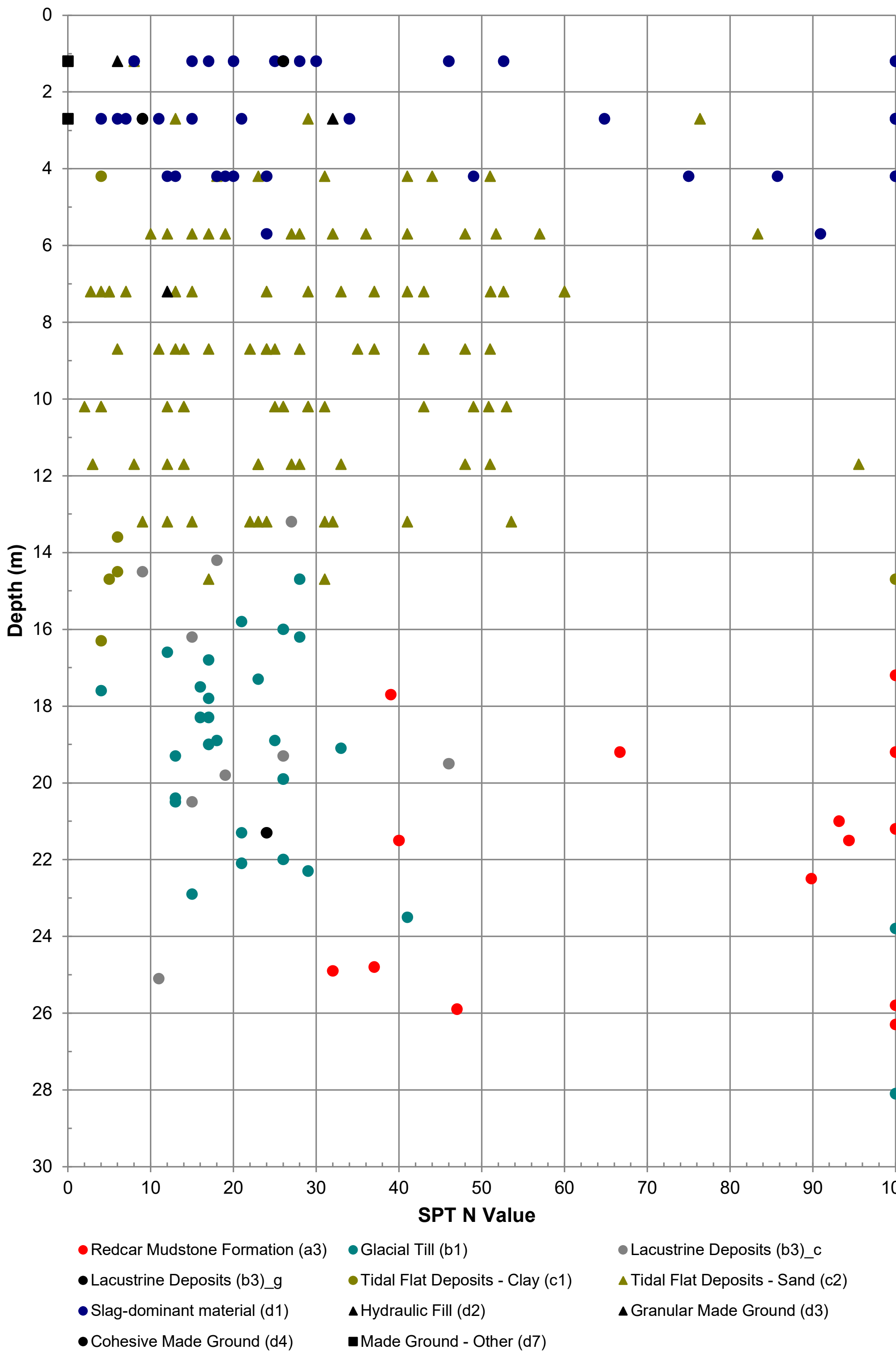


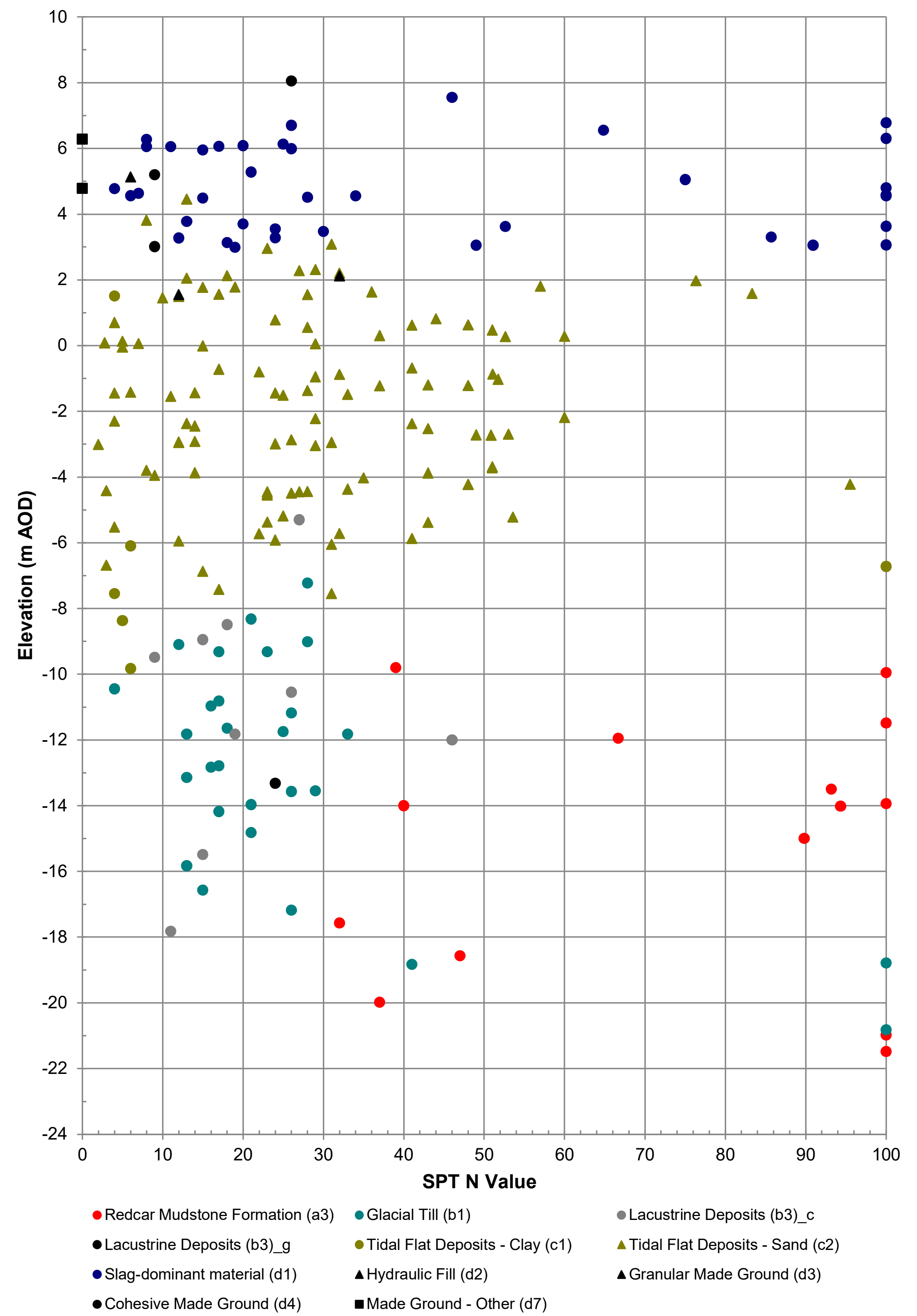
Figure 8.24 Tidal data from the Whitby Tidal Monitoring Station for the Month of December 2021



21. Appendix D Geotechnical Properties - Figures



Client	bp	Figure title	**SPT N vs Depth - All Strata**	Figure no. 9.1	Date 18/10/2021
Project title	Preliminary Onshore Ground Investigation for Net Zero Teesside		Project no. 60657467		AECOM



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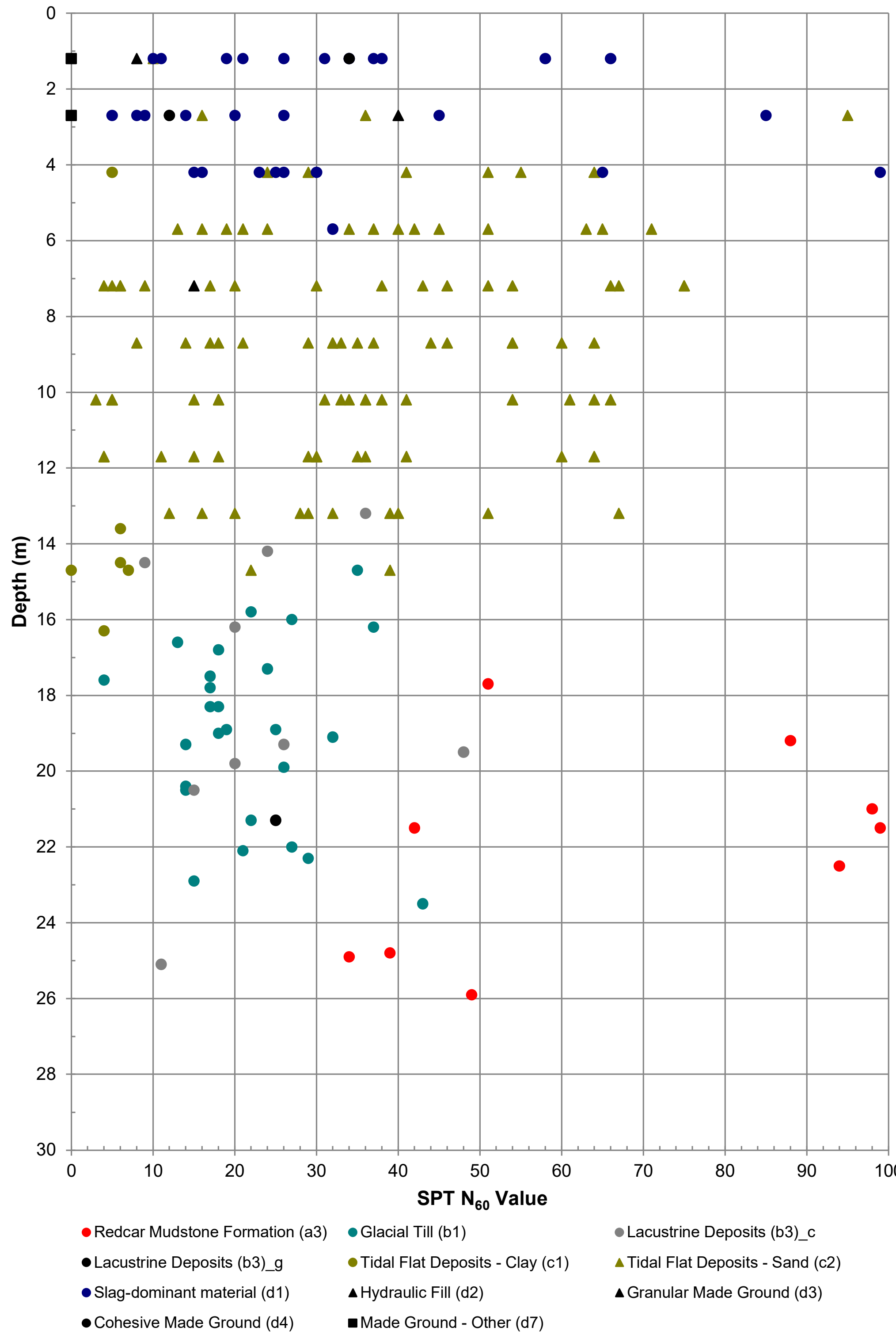

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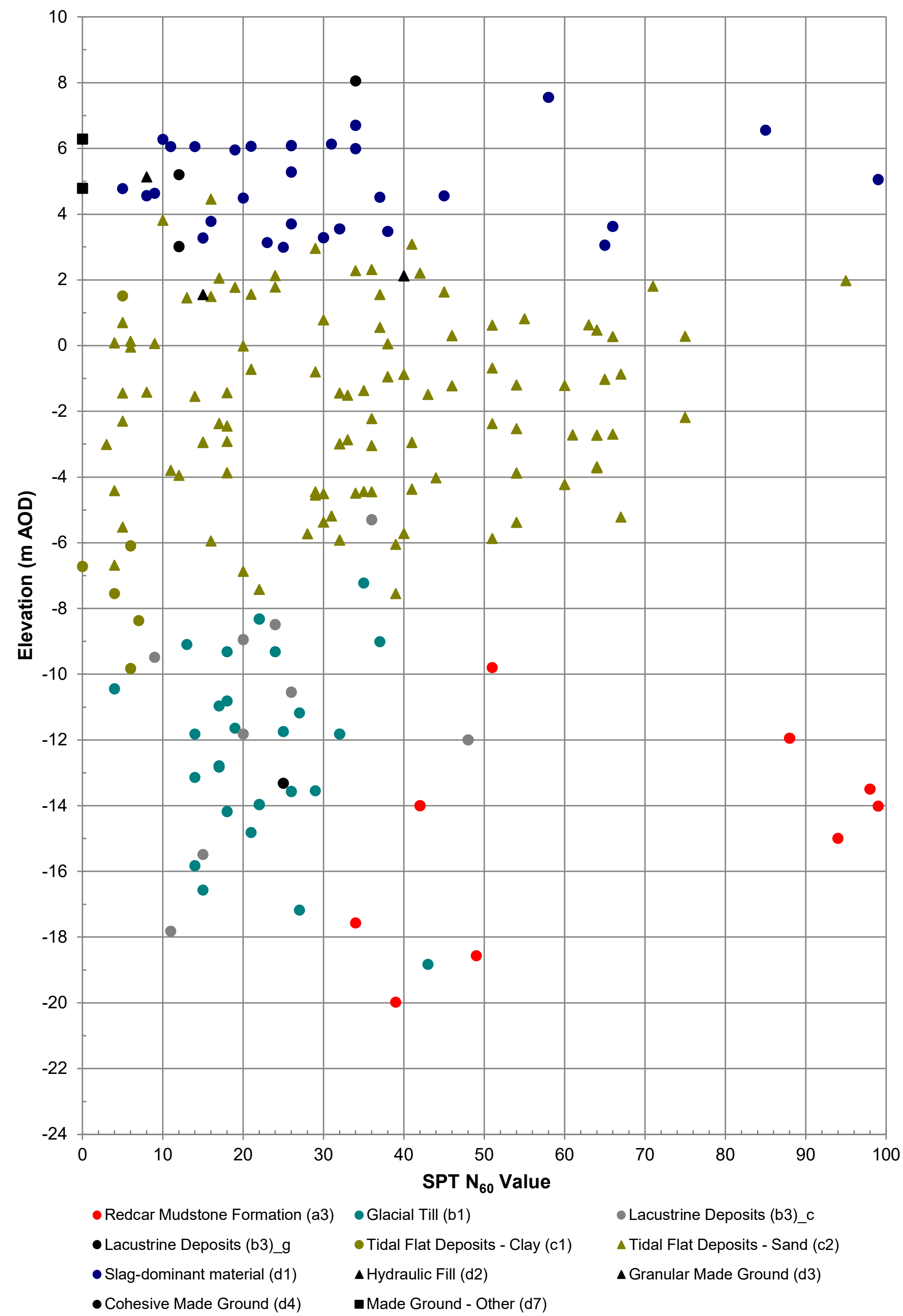

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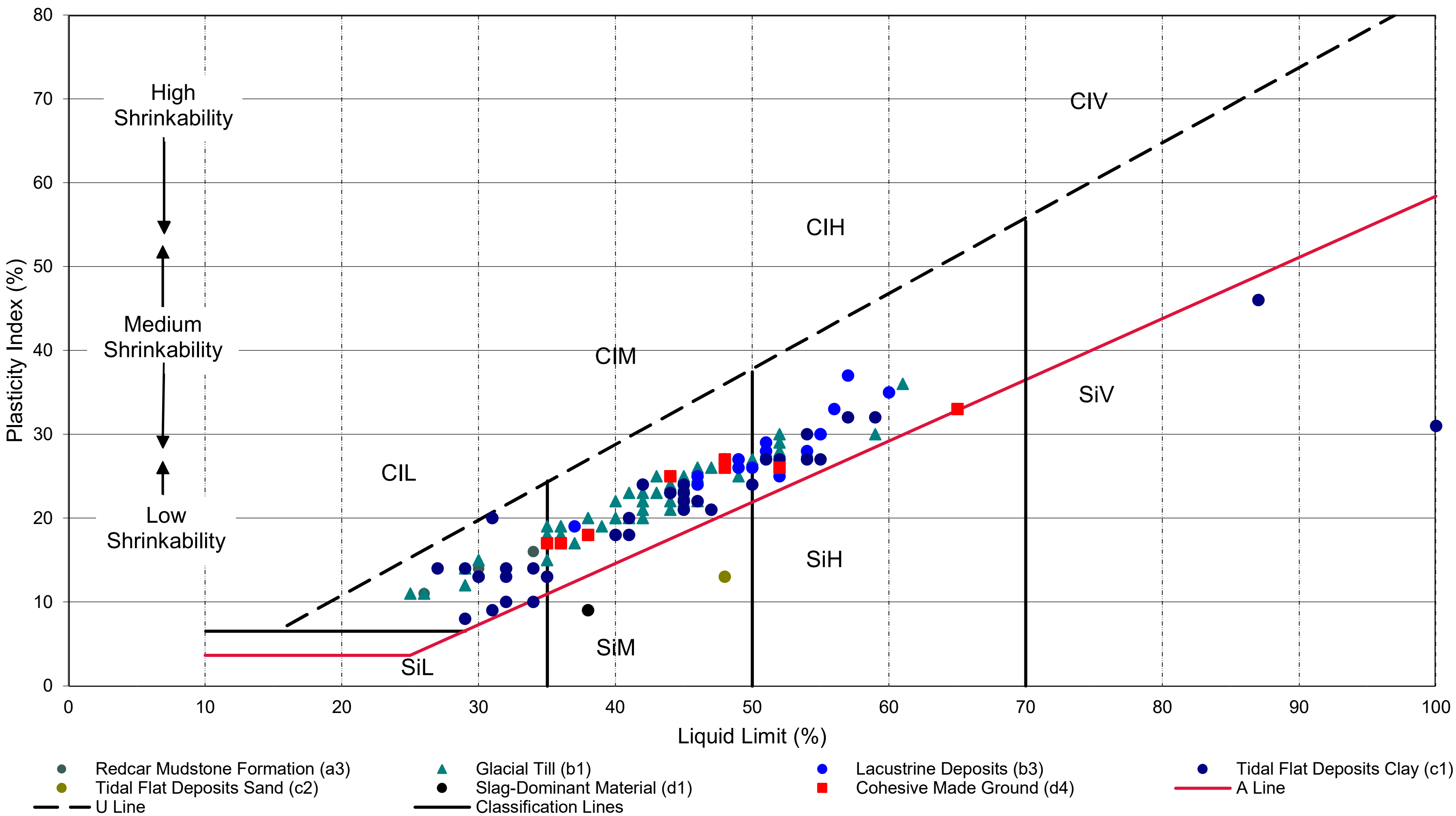

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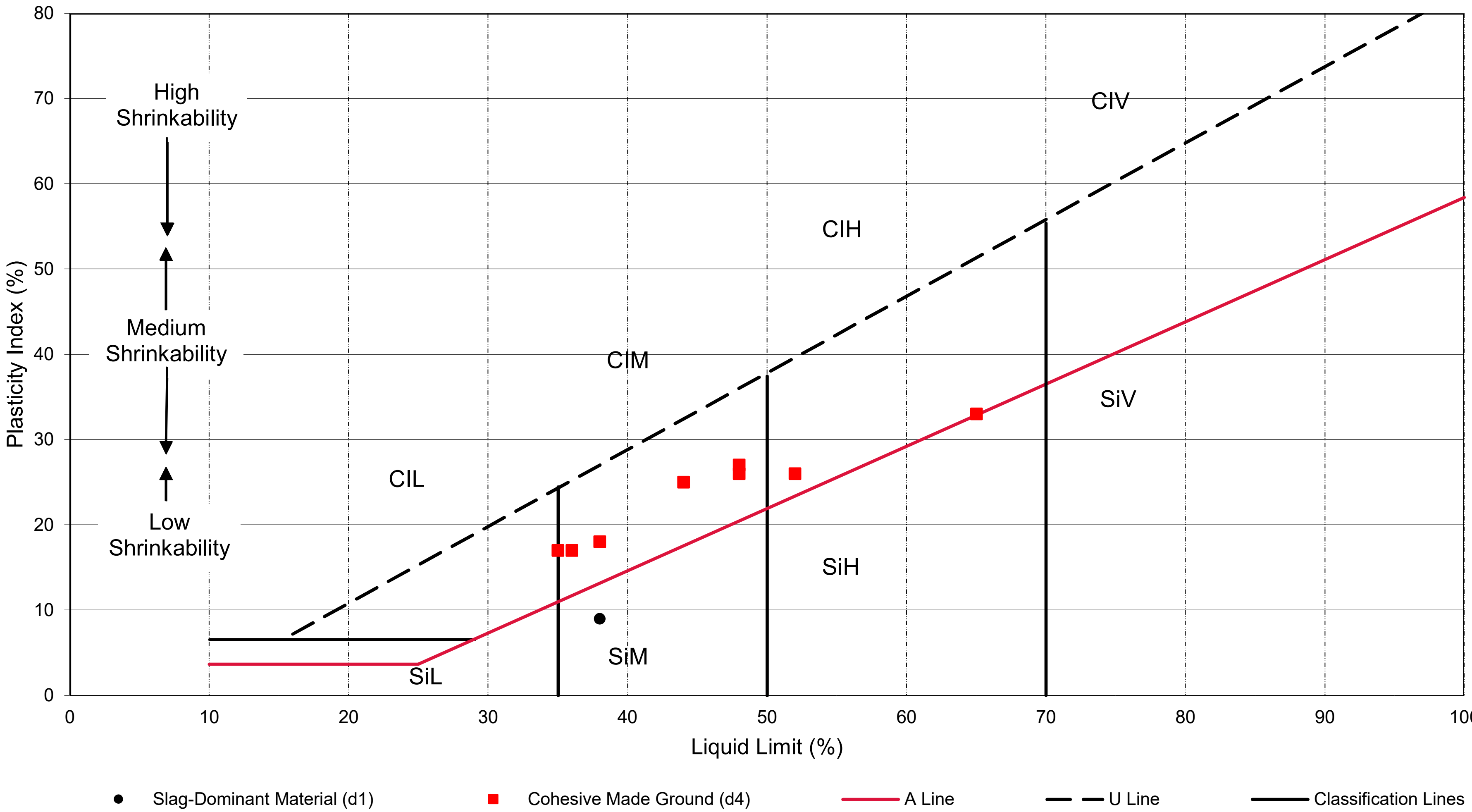
		Project title	Preliminary Onshore Ground Investigation for Net Zero Teesside	Project no. 60657467		



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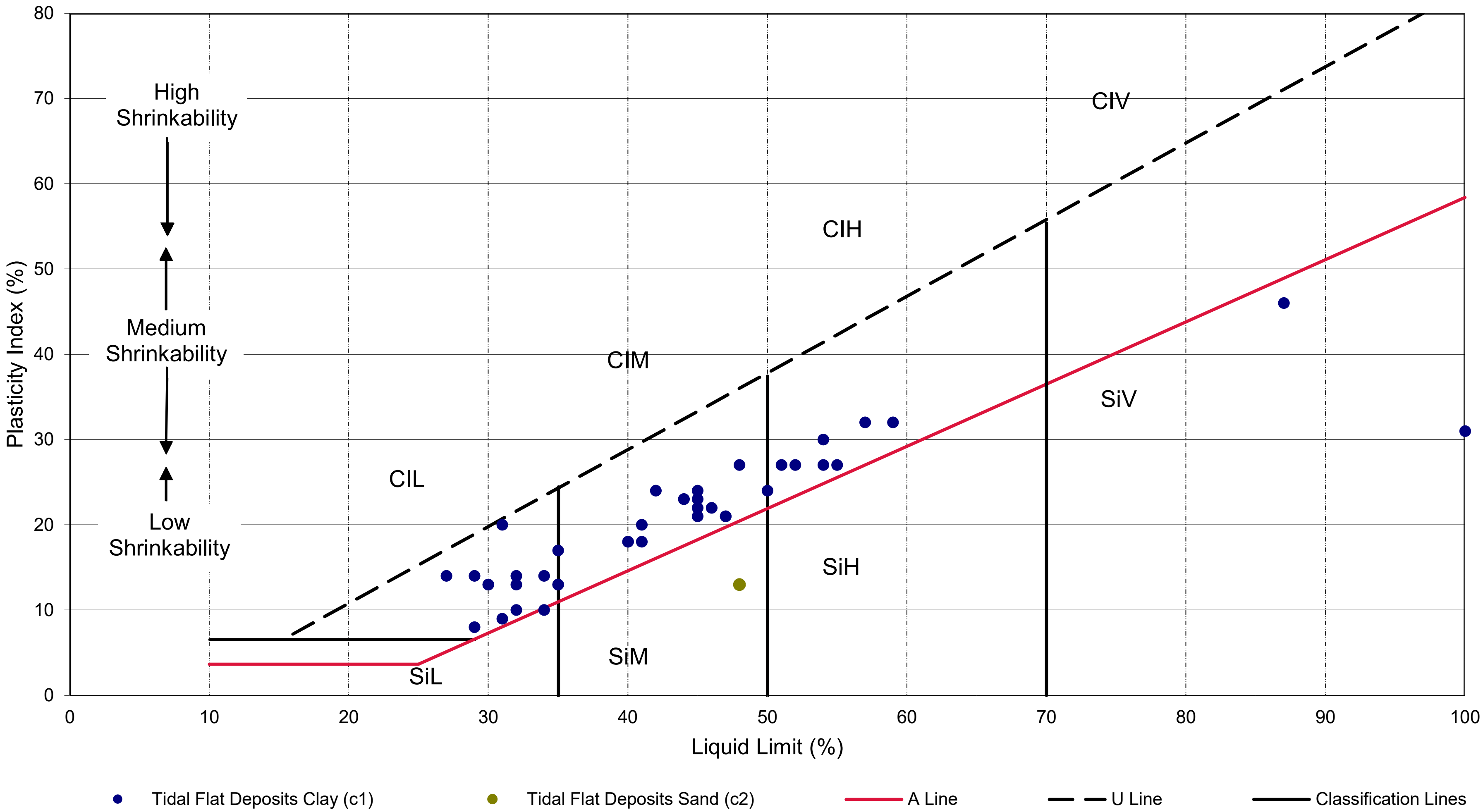
	Project title	Preliminary Onshore Ground Investigation for Net Zero Teesside	Project no. 60657467	AECOM



Client	bp	Figure title	**Casagrande Plasticity Chart - Tidal Flat Deposits (c1, c2)**	Figure no. 9.7	Date 25/10/2021
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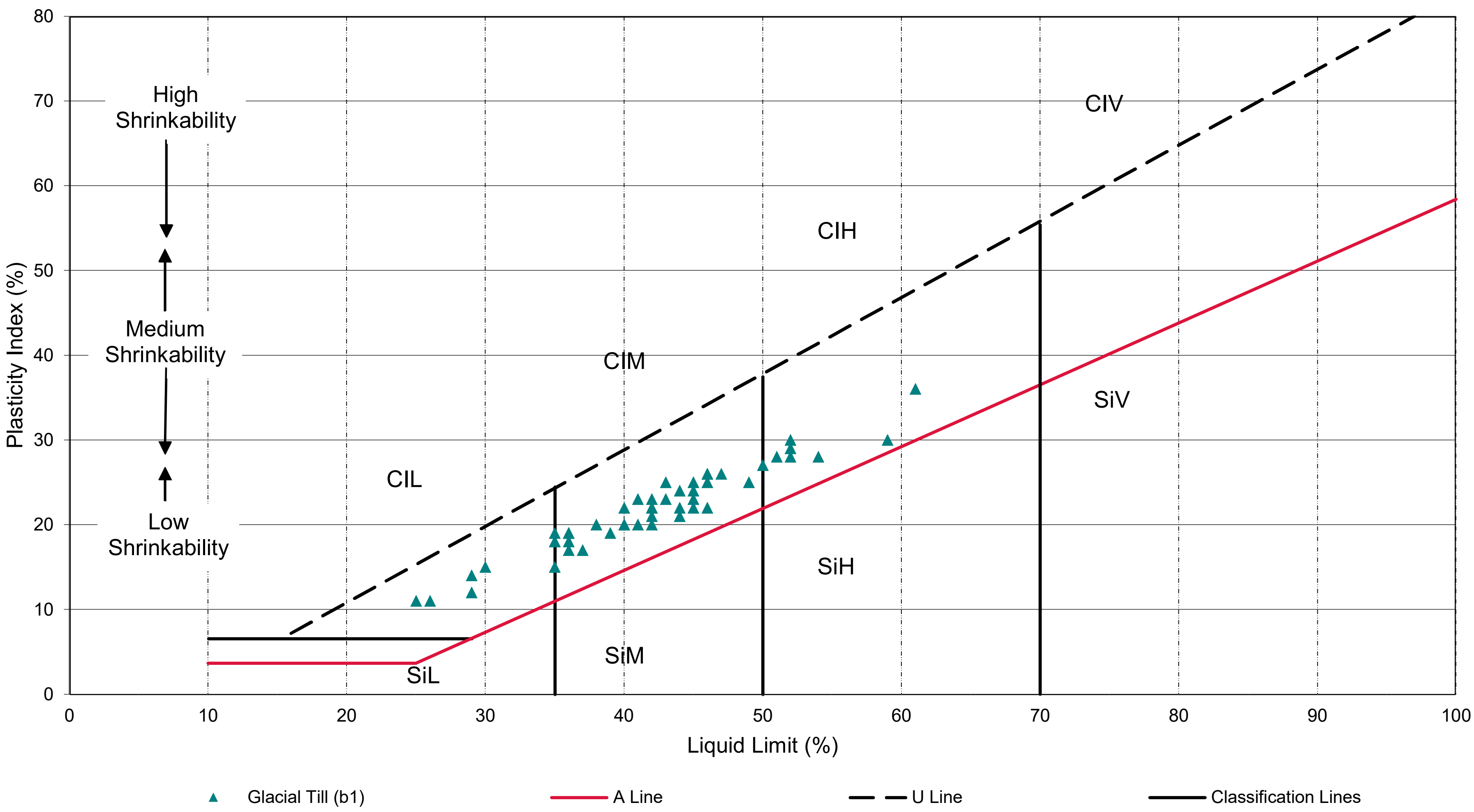

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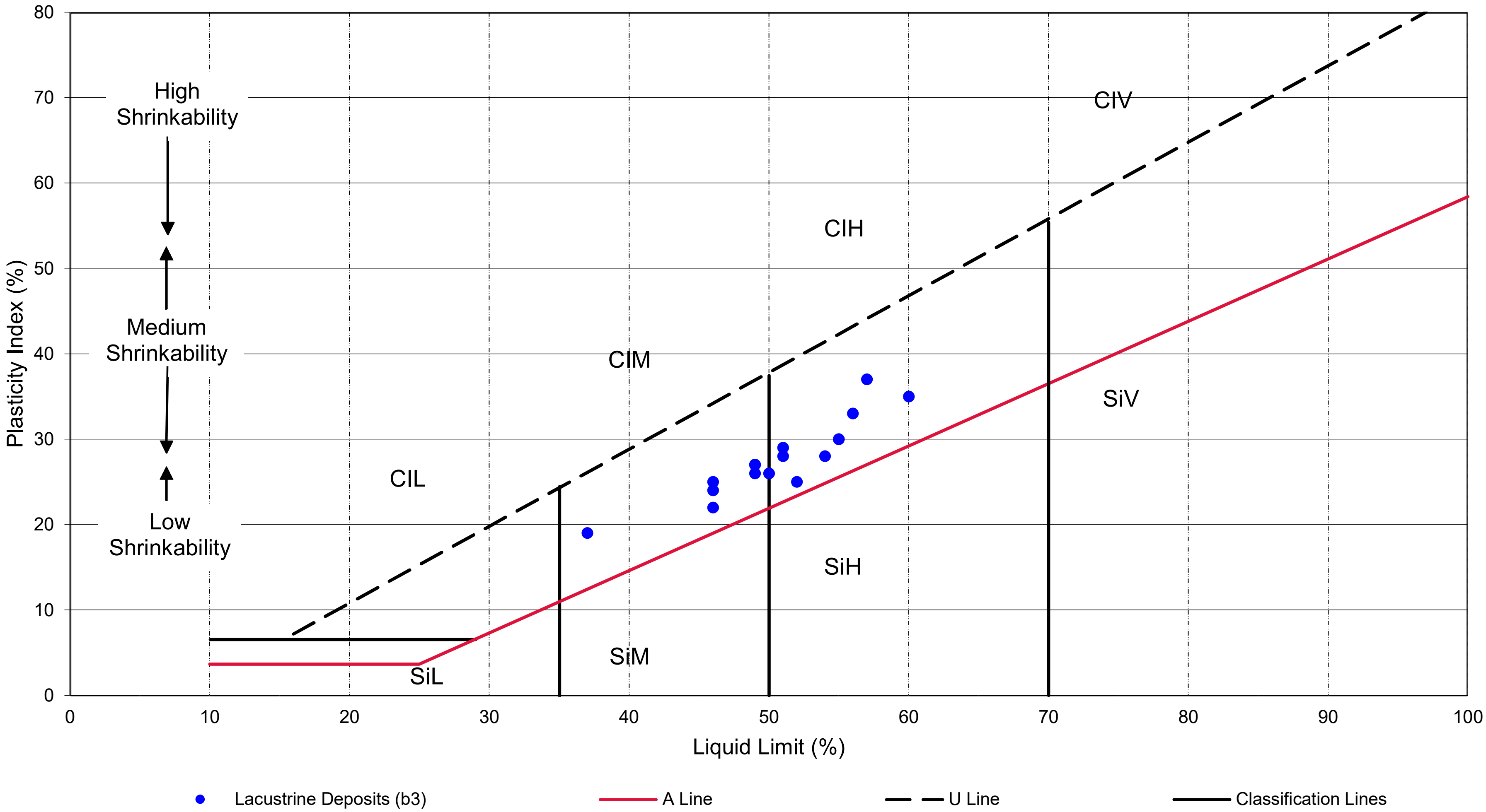

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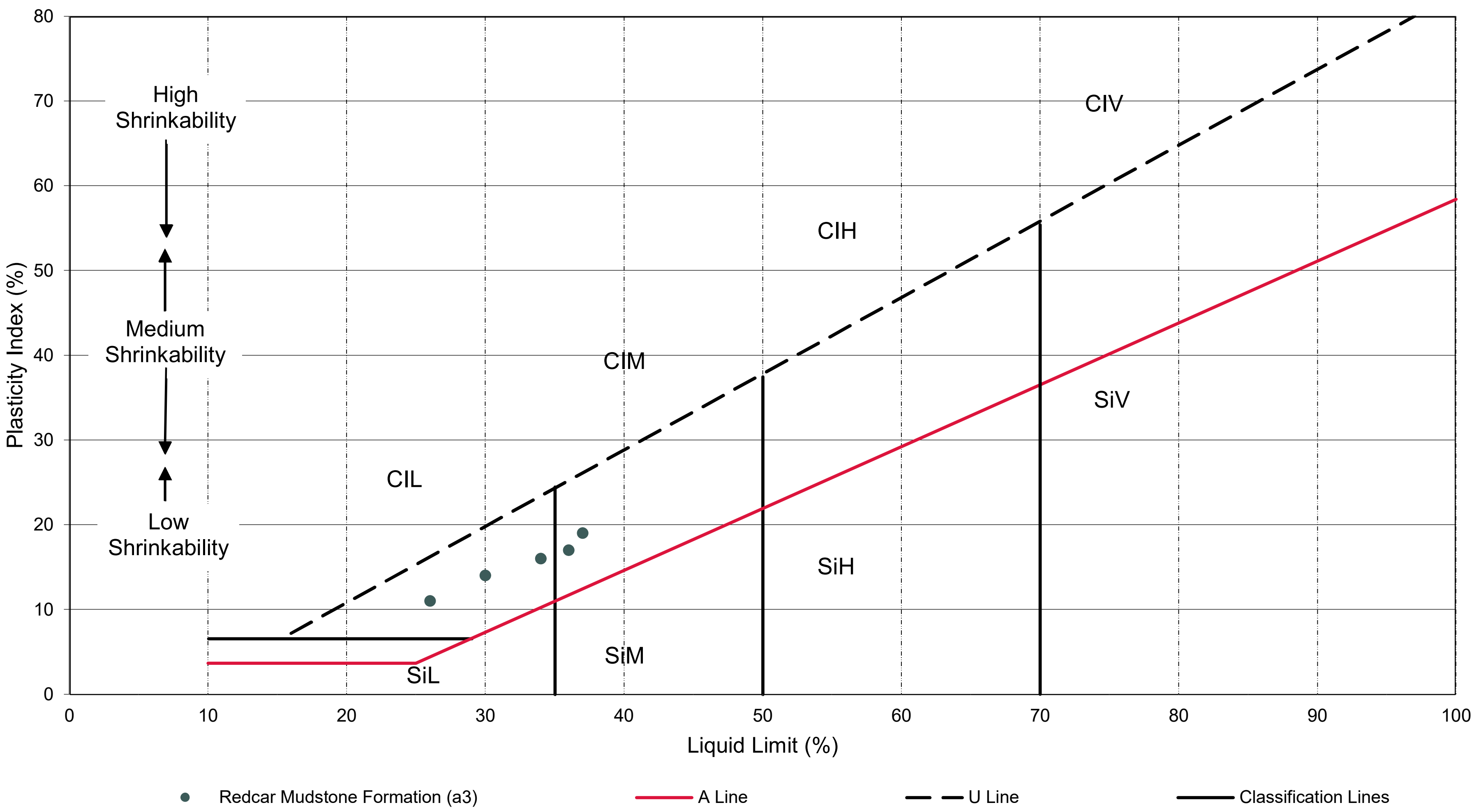
		Project title	Preliminary Onshore Ground Investigation for Net Zero Teesside	Project no. 60657467	AECOM	



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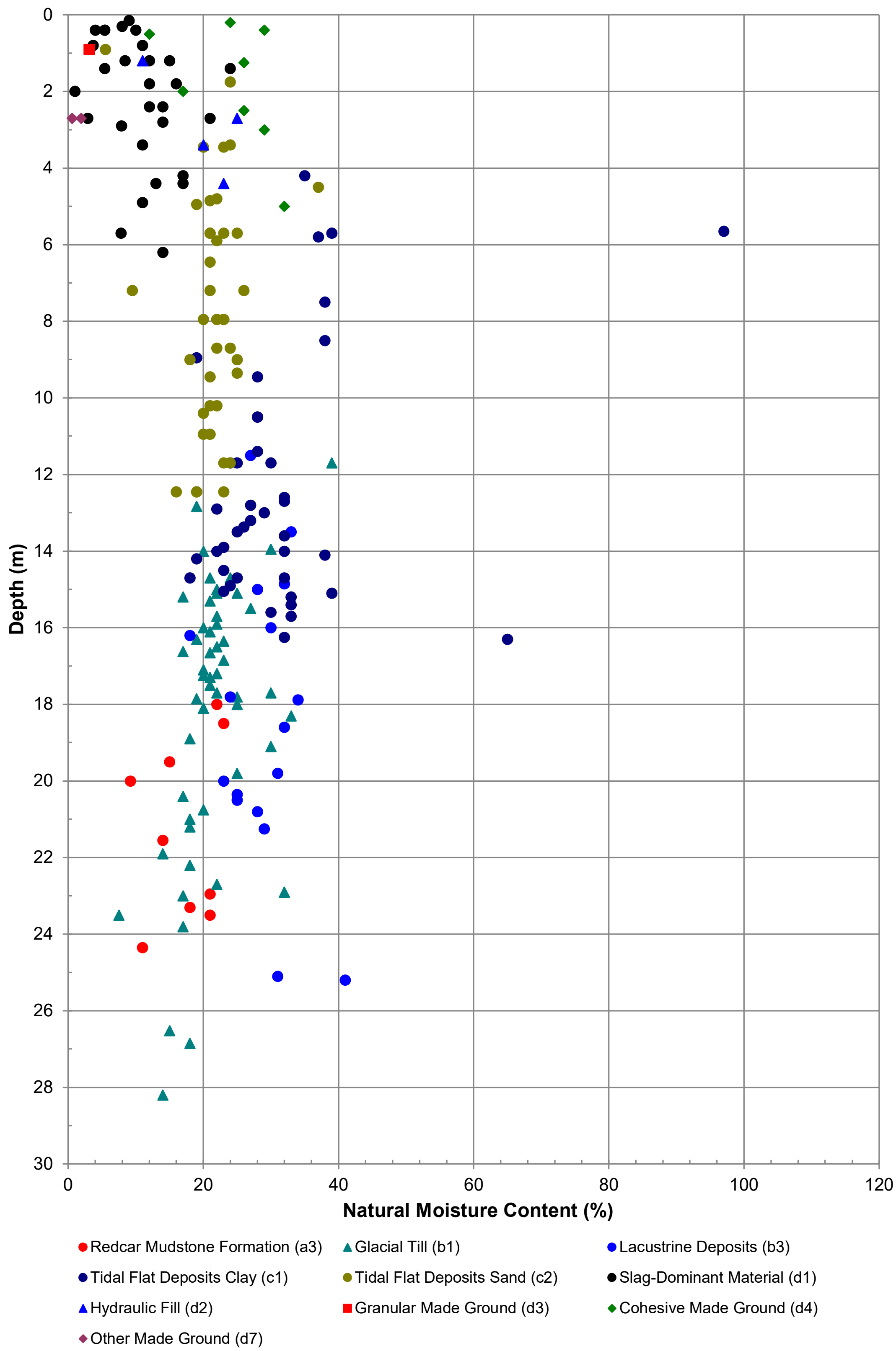
		Project title	Preliminary Onshore Ground Investigation for Net Zero Teesside	Project no. 60657467

AECOM



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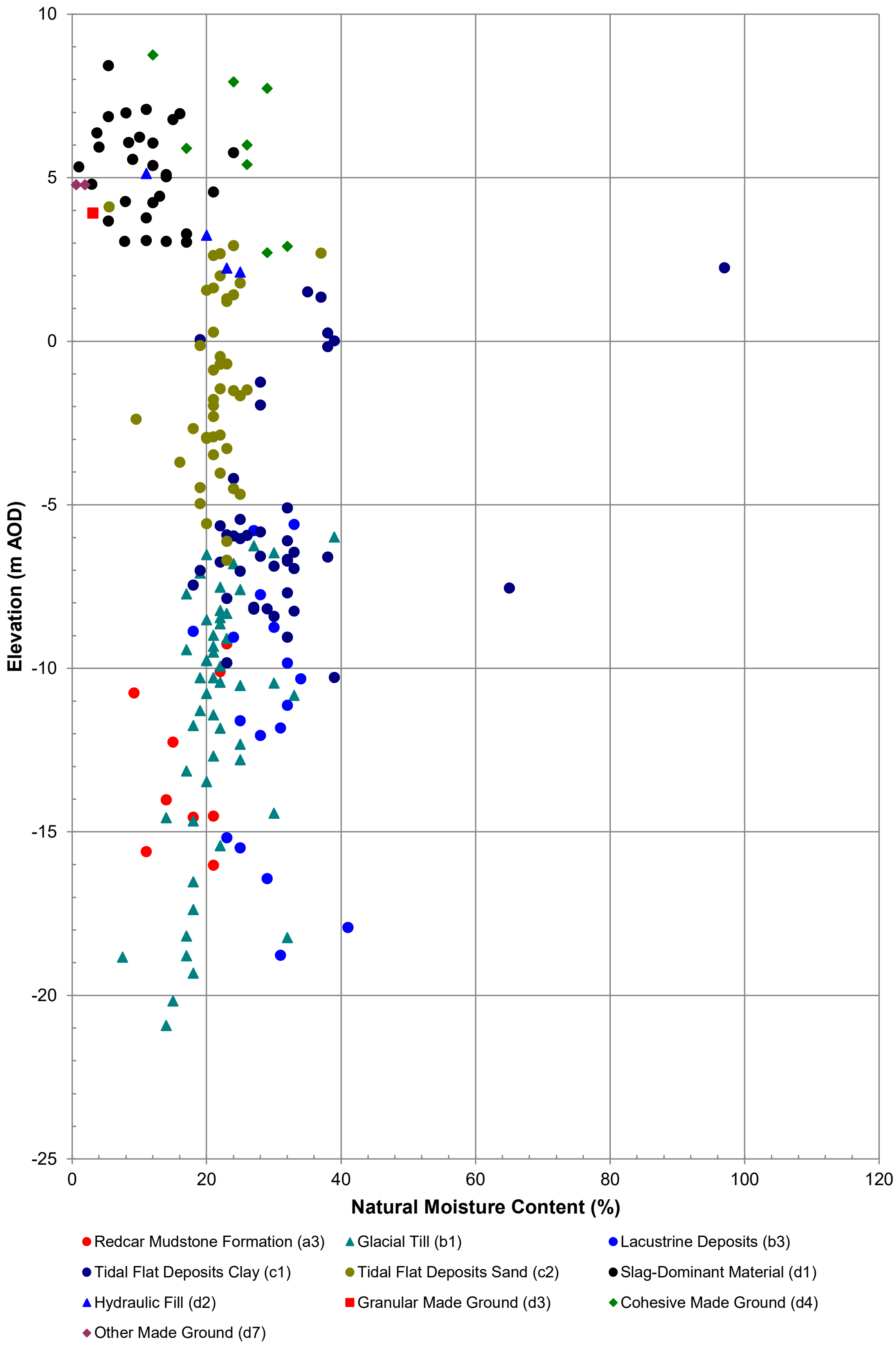

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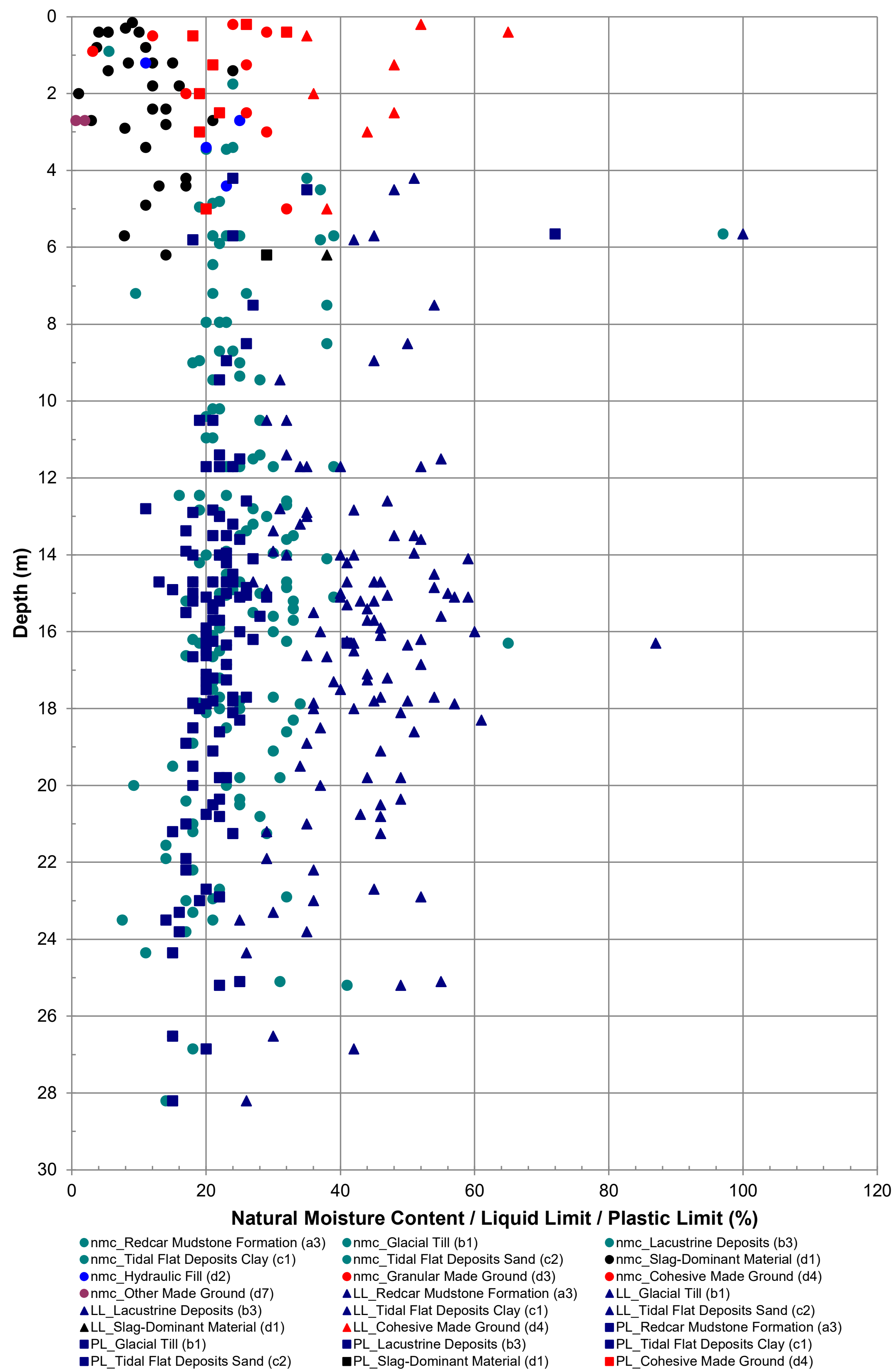

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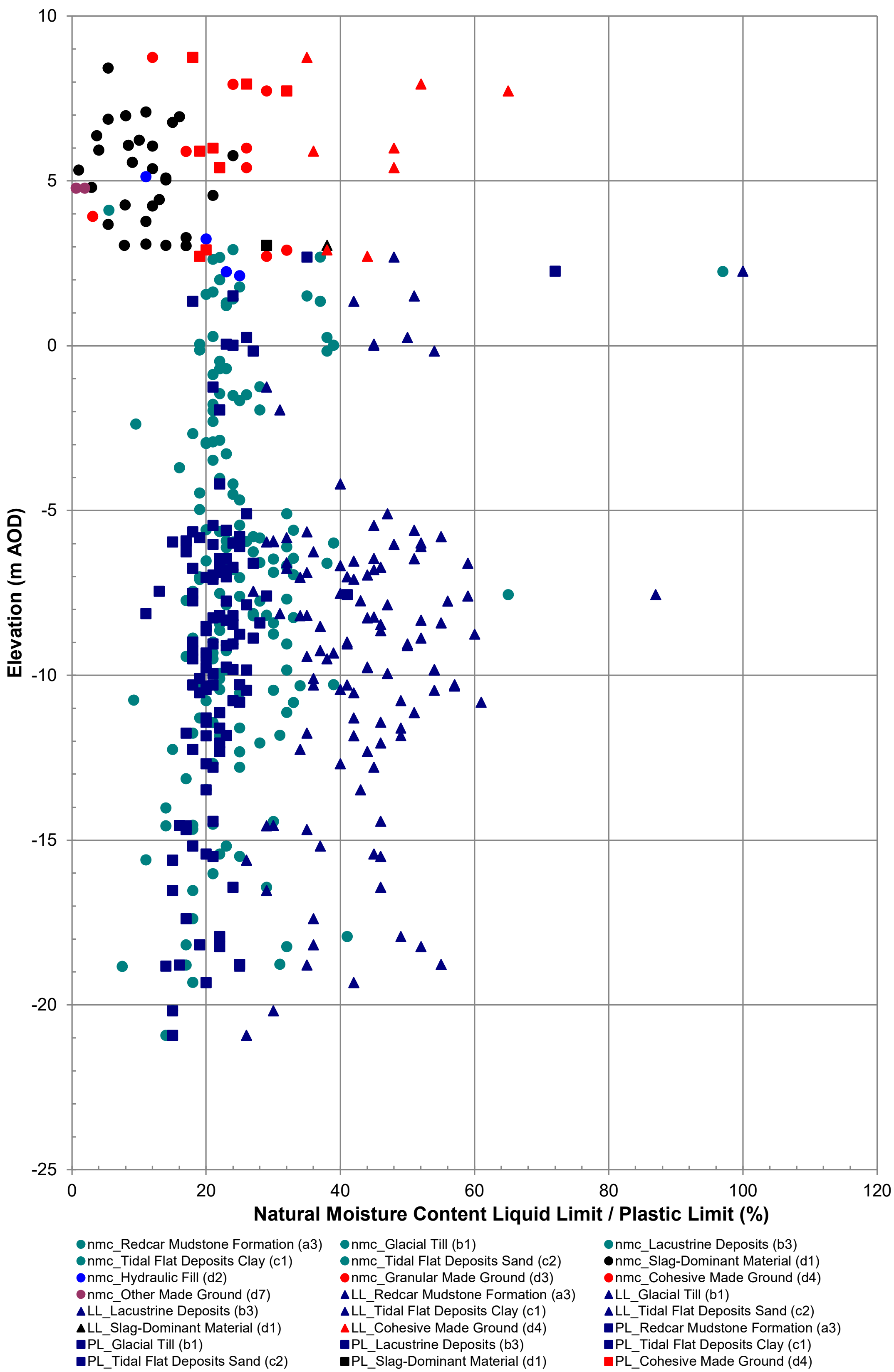
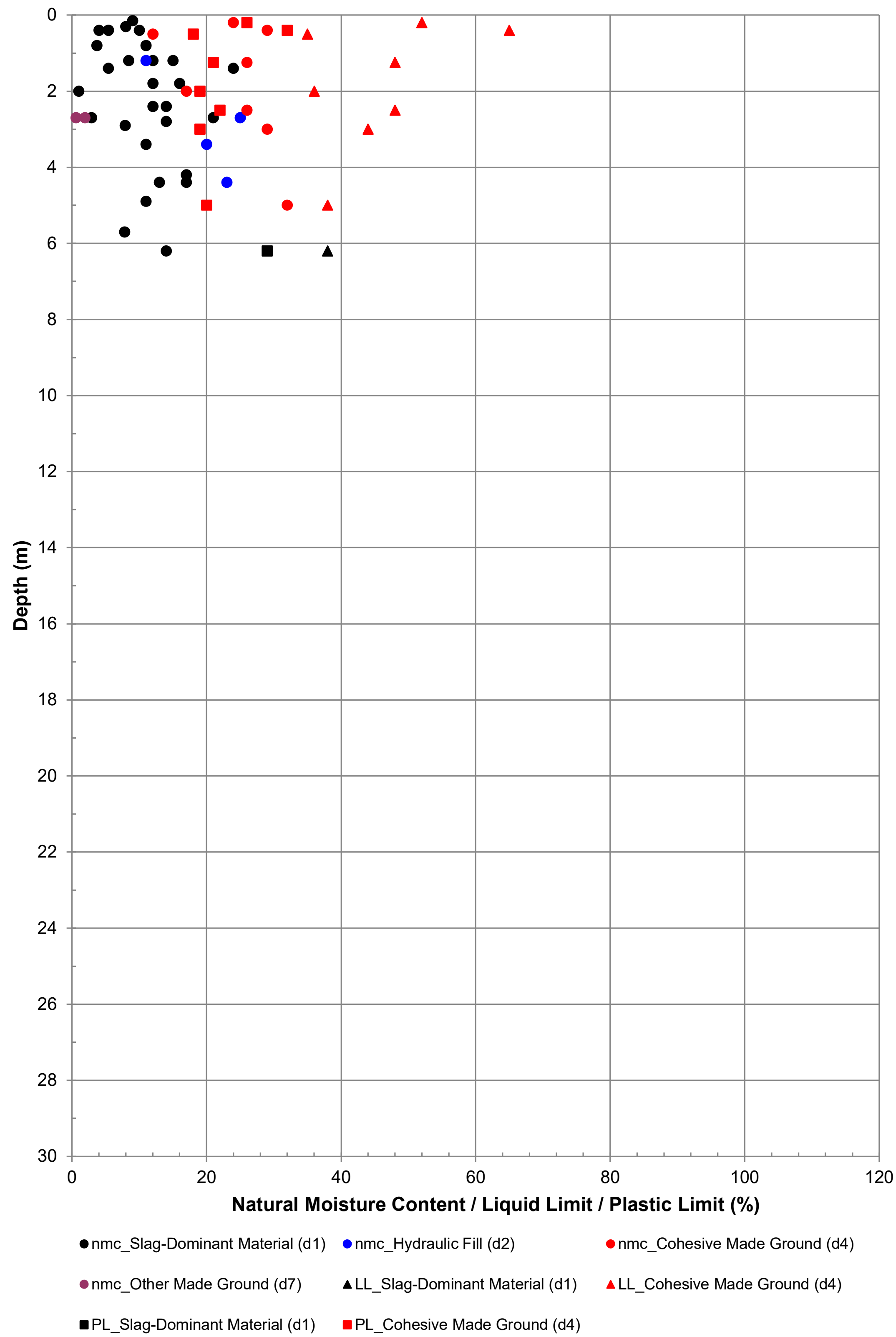
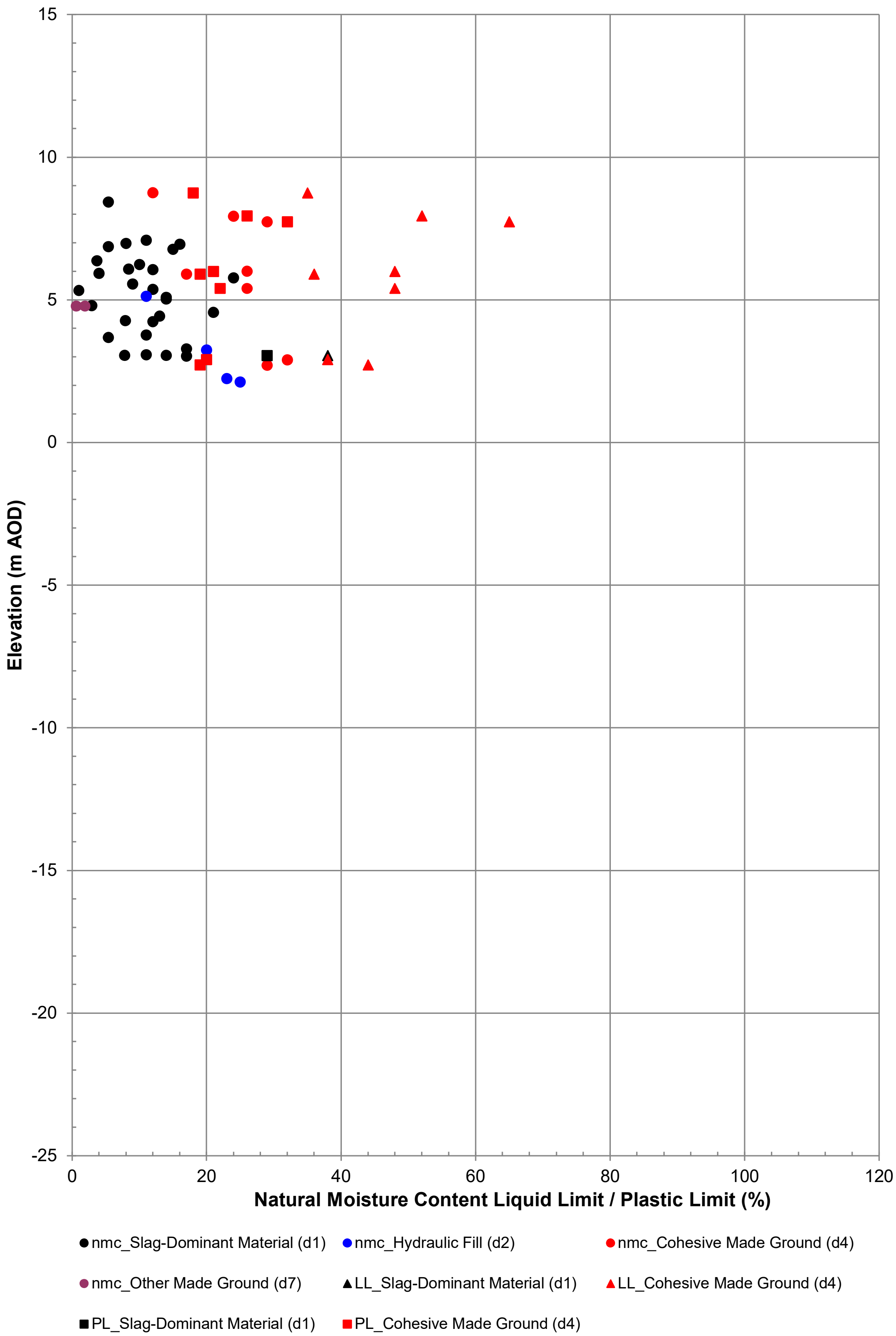
Project title	Preliminary Onshore Ground Investigation for Net Zero Teesside		Project no. 60657467	AECOM	



Client	bp	Figure title	Moisture Content and Atterberg Limits vs Elevation - All Strata	Figure no. 9.14	Date 21/09/2021
Project title	Preliminary Onshore Ground Investigation for Net Zero Teesside		Project no. 60657467	AECOM	



Client	bp	Figure title	**Moisture Content and Atterberg Limits vs Depth - Made Ground**	Figure no. 9.15	Date 21/09/2021
Project title	Preliminary Onshore Ground Investigation for Net Zero Teesside		Project no. 60657467	AECOM	



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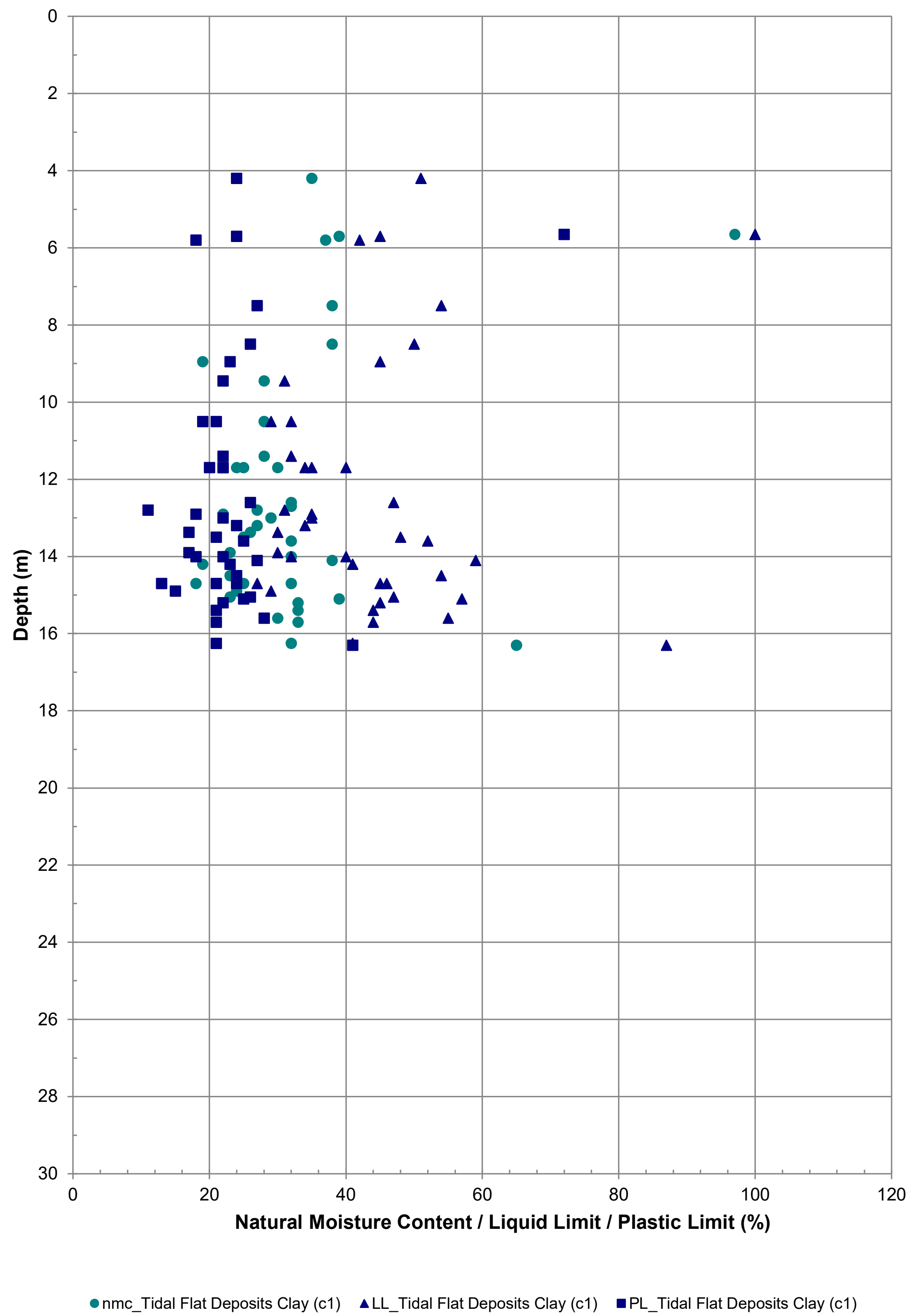
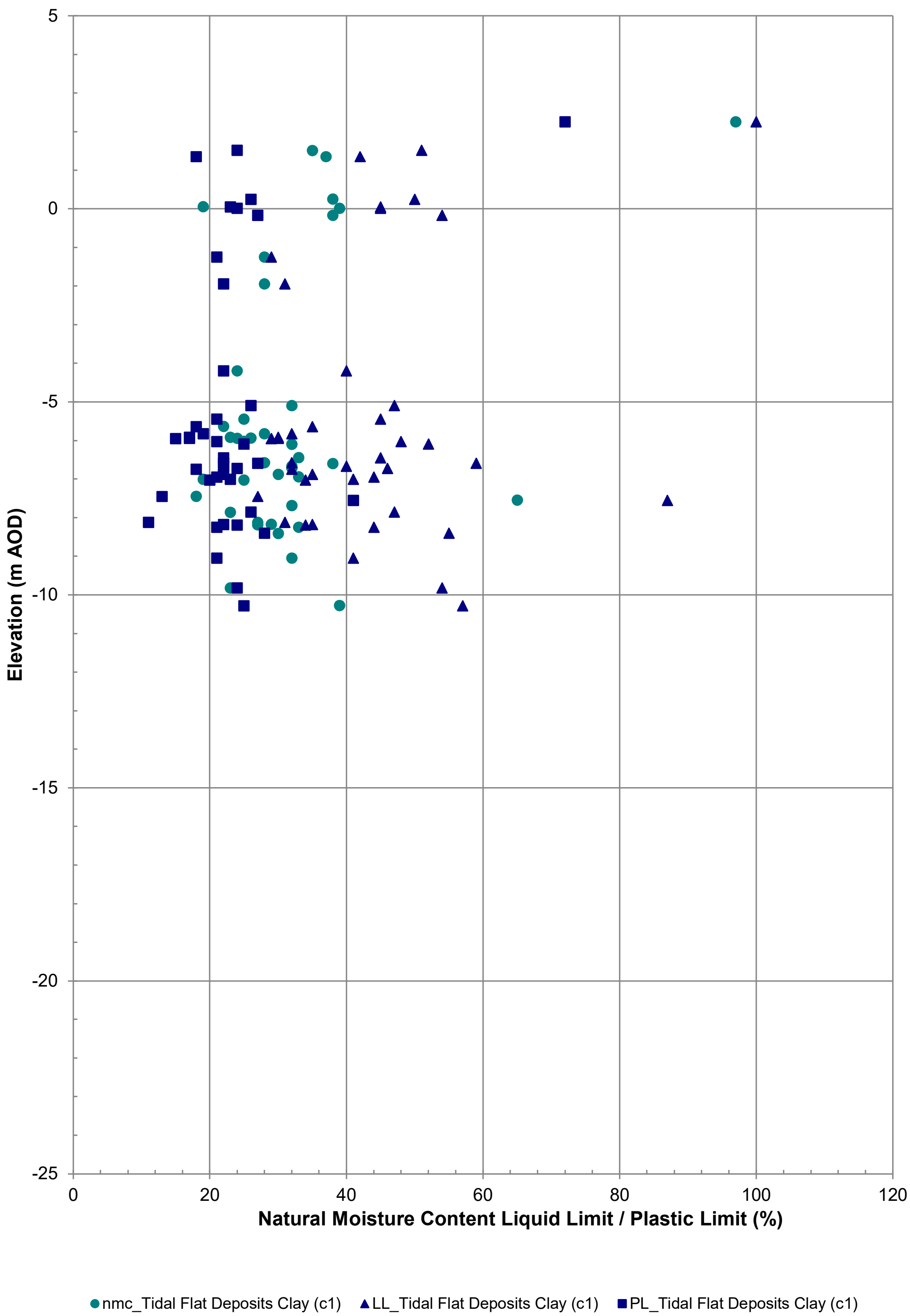


Client	bp	Figure title	**Moisture Content and Atterberg Limits vs Depth - Tidal Flat Deposits Clay (c1)**	Figure no. 9.17	Date 21/09/2021
Project title	Preliminary Onshore Ground Investigation for Net Zero Teesside		Project no. 60657467		AECOM



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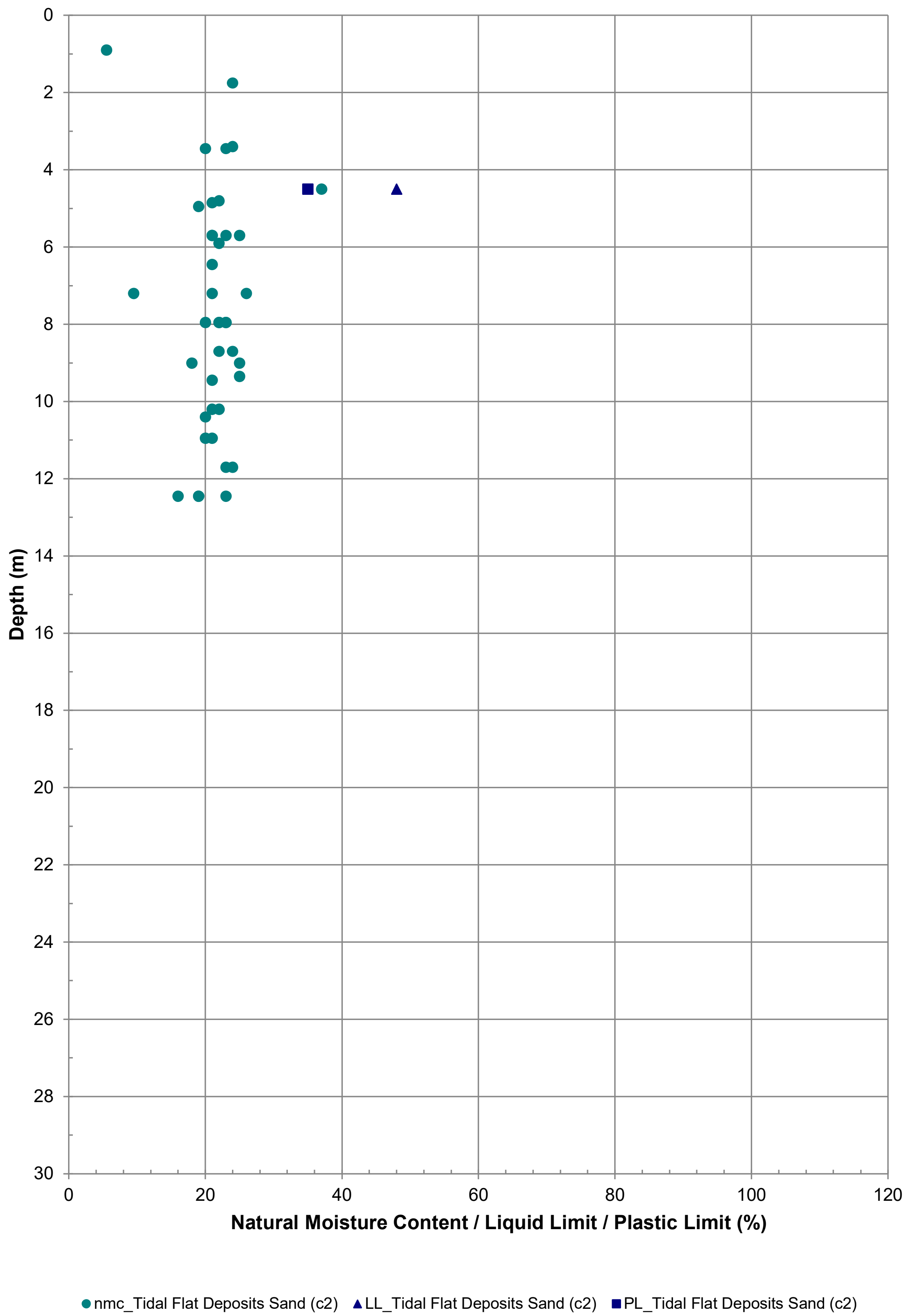

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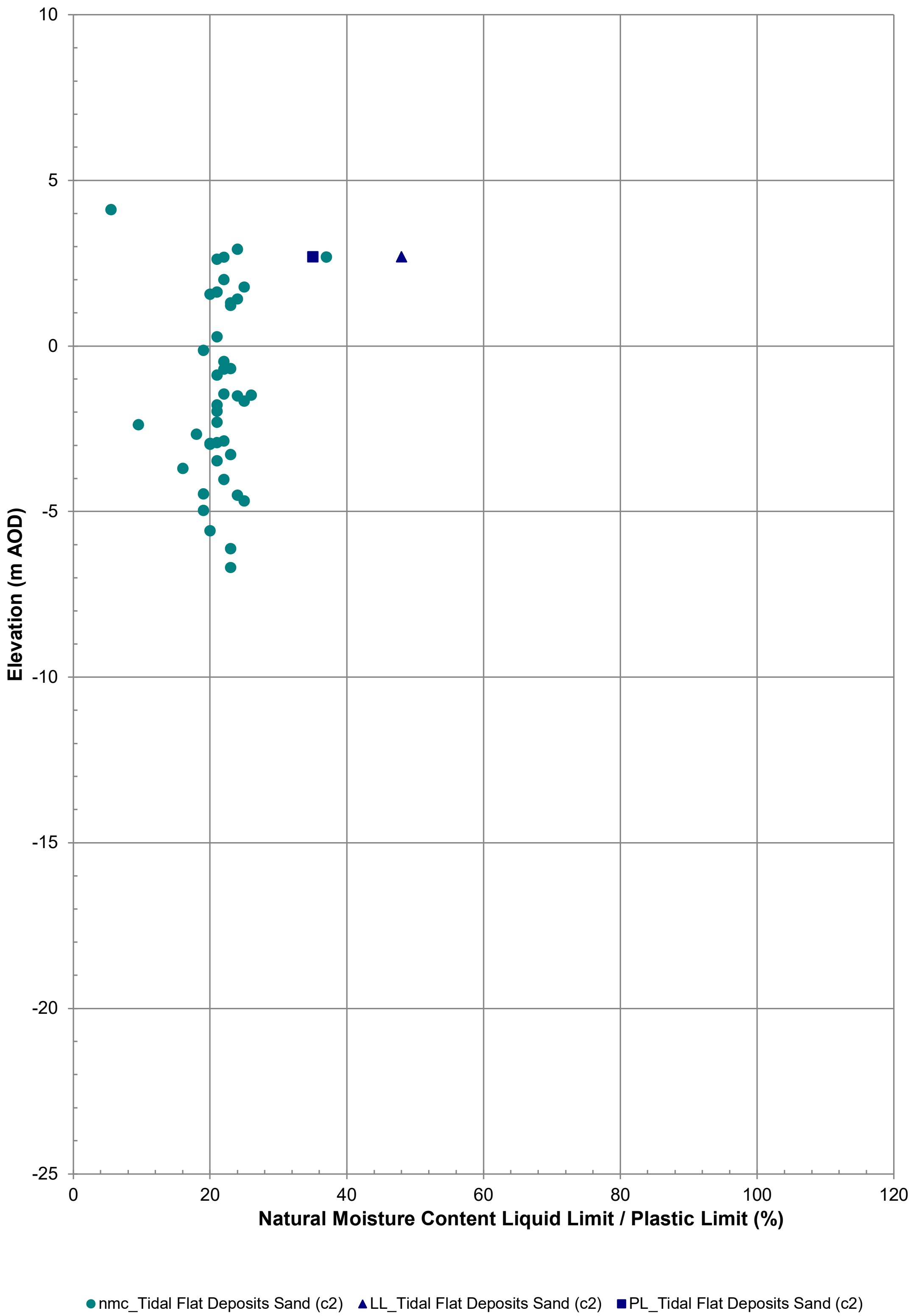
Project title	Preliminary Onshore Ground Investigation for Net Zero Teesside		Project no. 60657467	AECOM	



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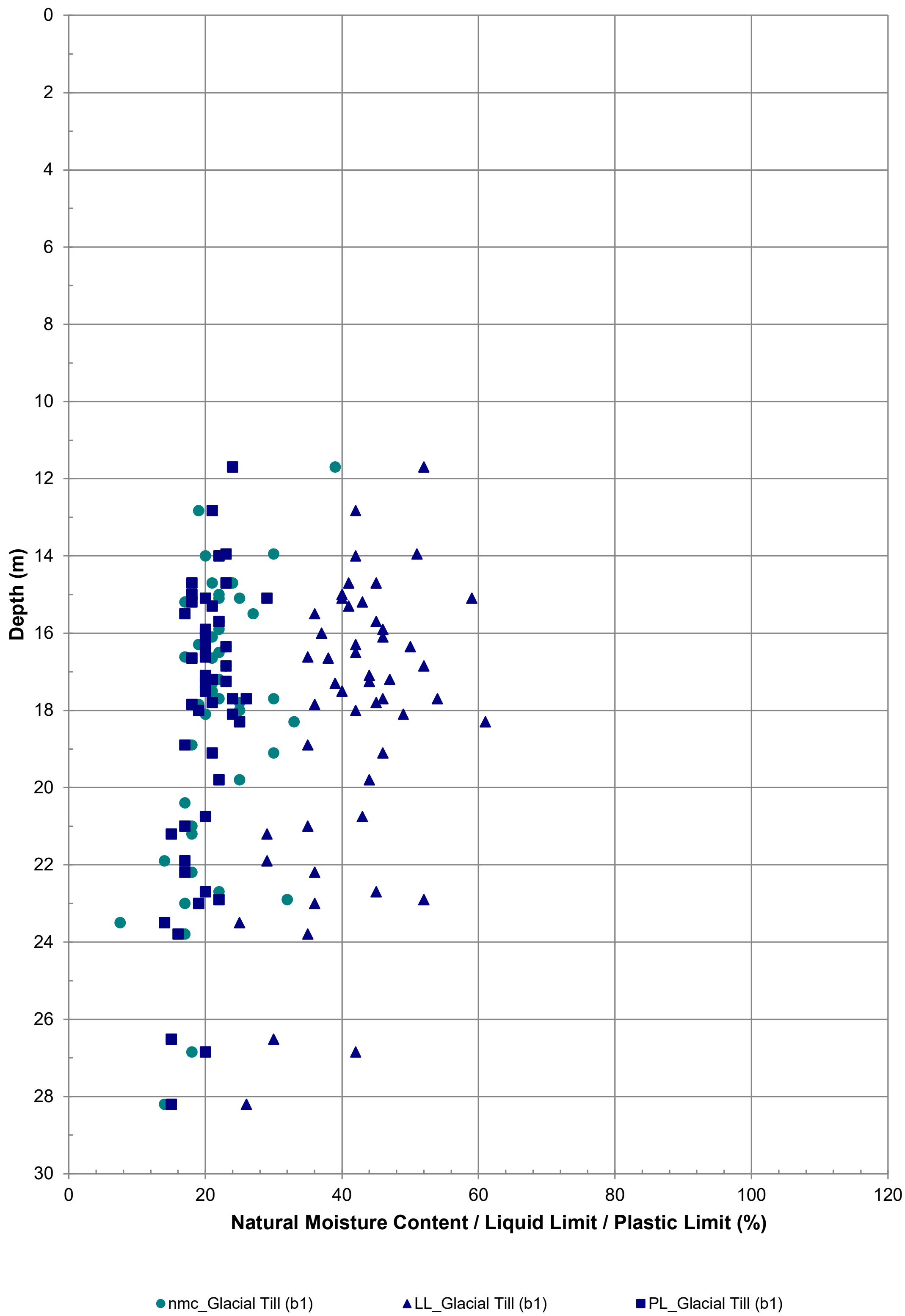
Project title	Preliminary Onshore Ground Investigation for Net Zero Teesside		Project no. 60657467	AECOM	



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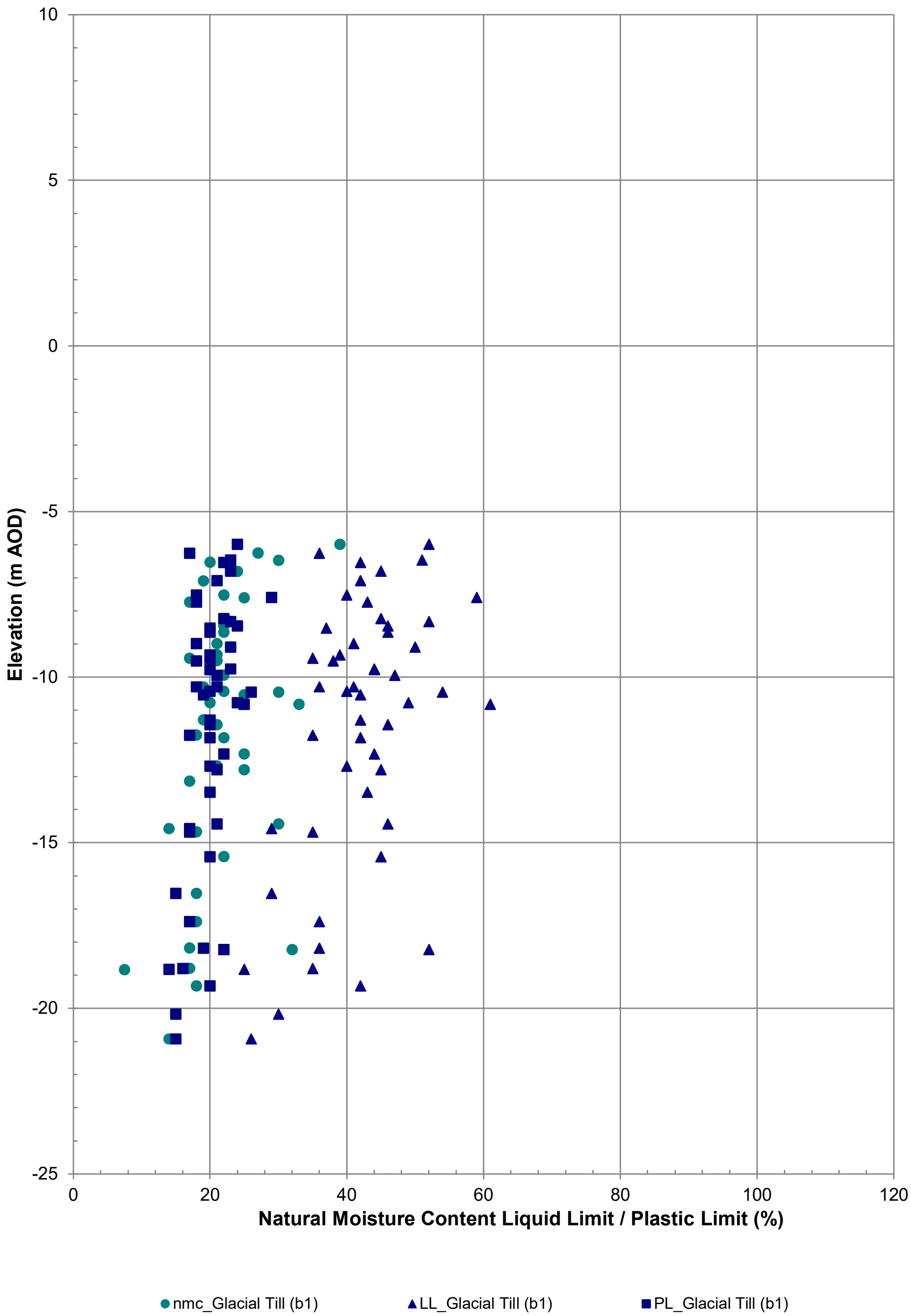
Project title	Preliminary Onshore Ground Investigation for Net Zero Teesside		Project no. 60657467		AECOM



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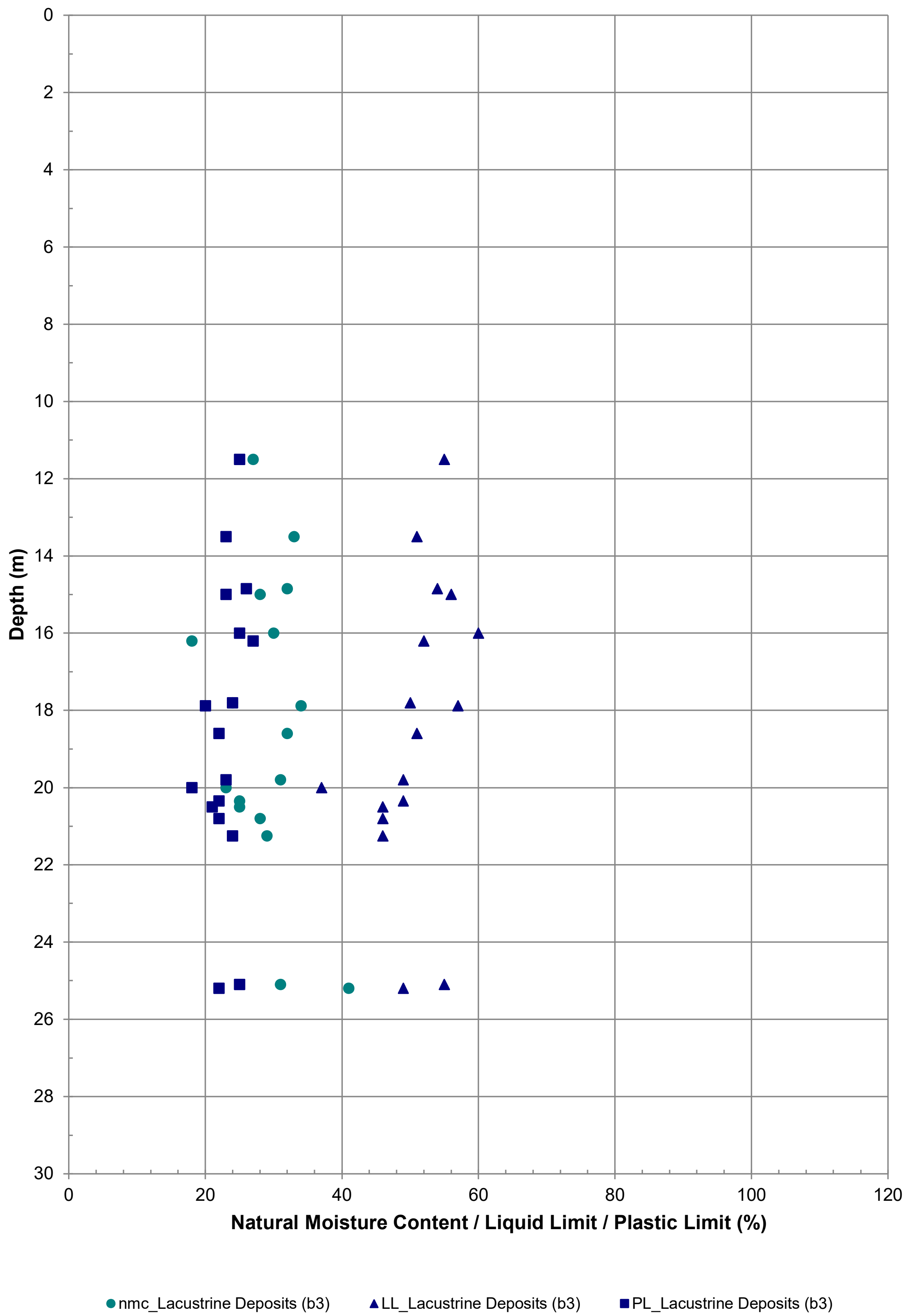
Project title	Preliminary Onshore Ground Investigation for Net Zero Teesside		Project no. 60657467	AECOM	



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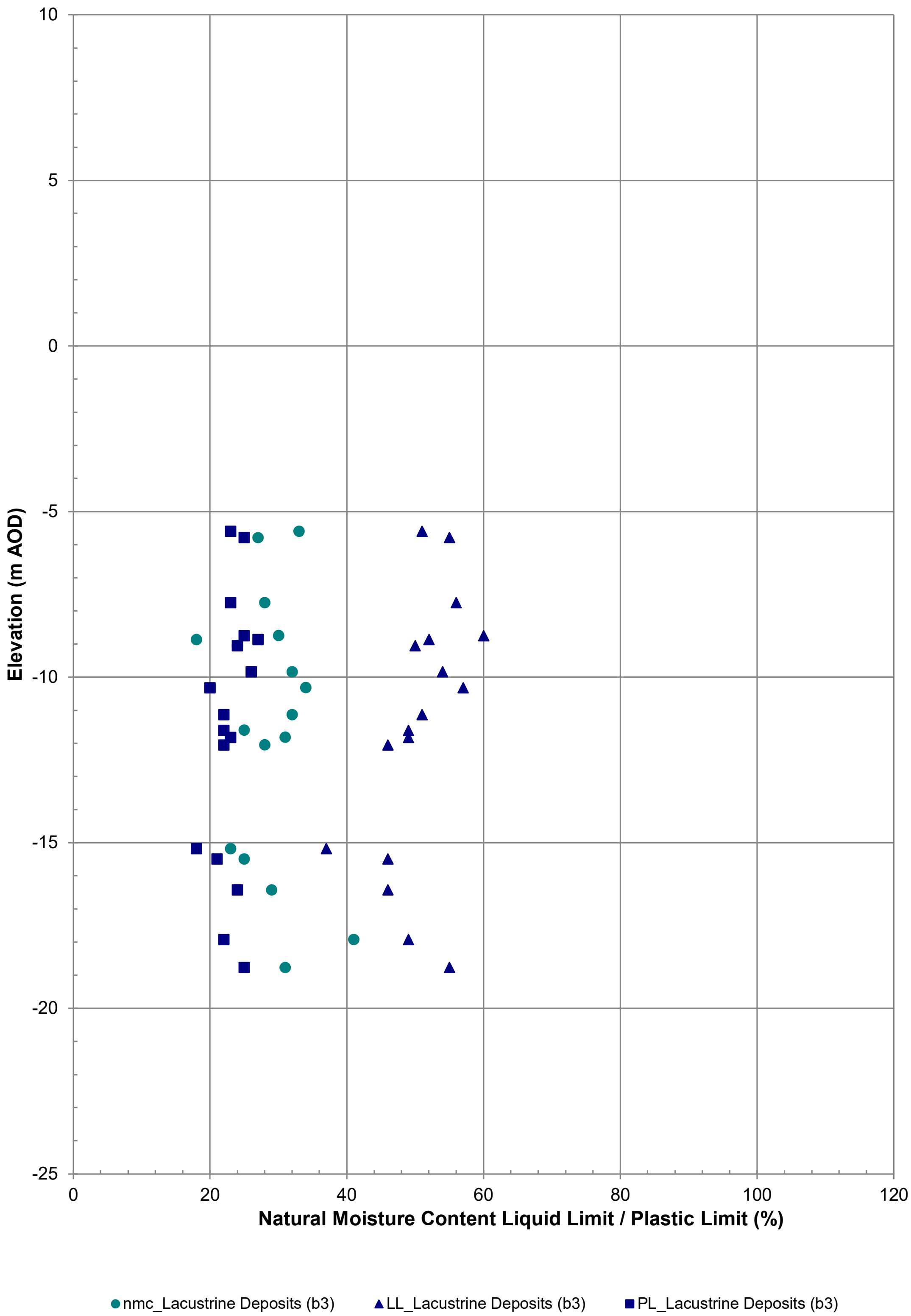
Project title	Preliminary Onshore Ground Investigation for Net Zero Teesside		Project no. 60657467	AECOM



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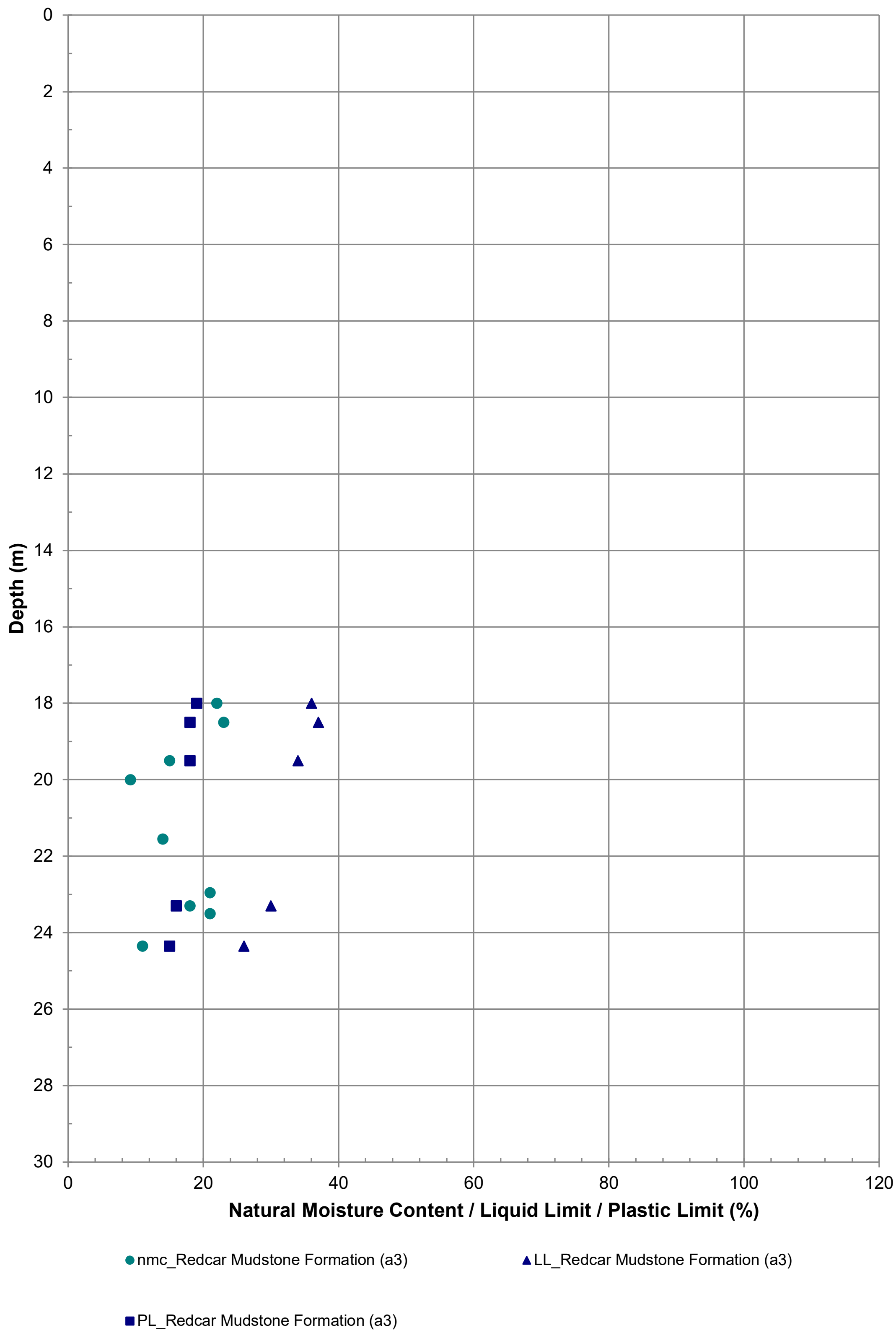

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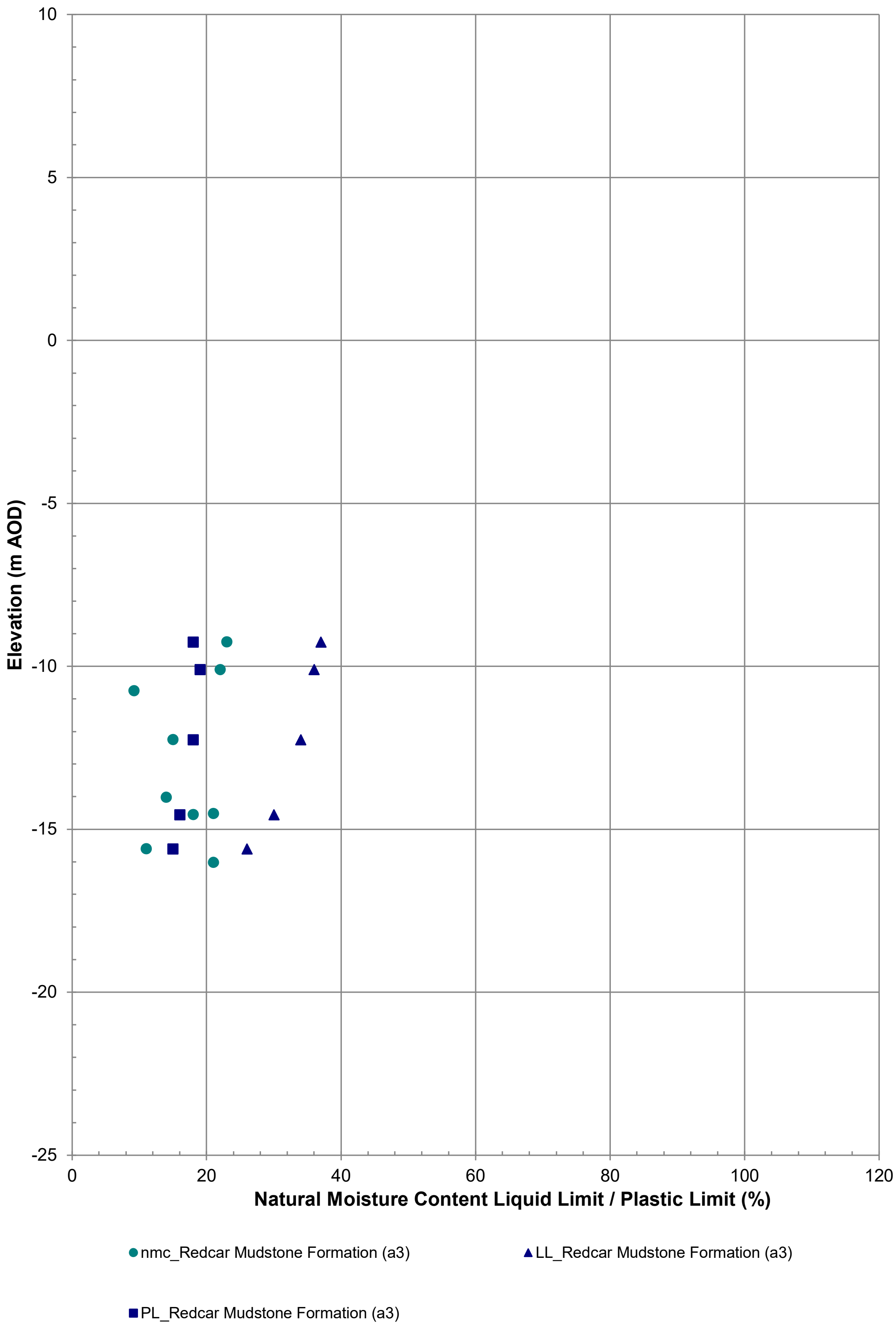

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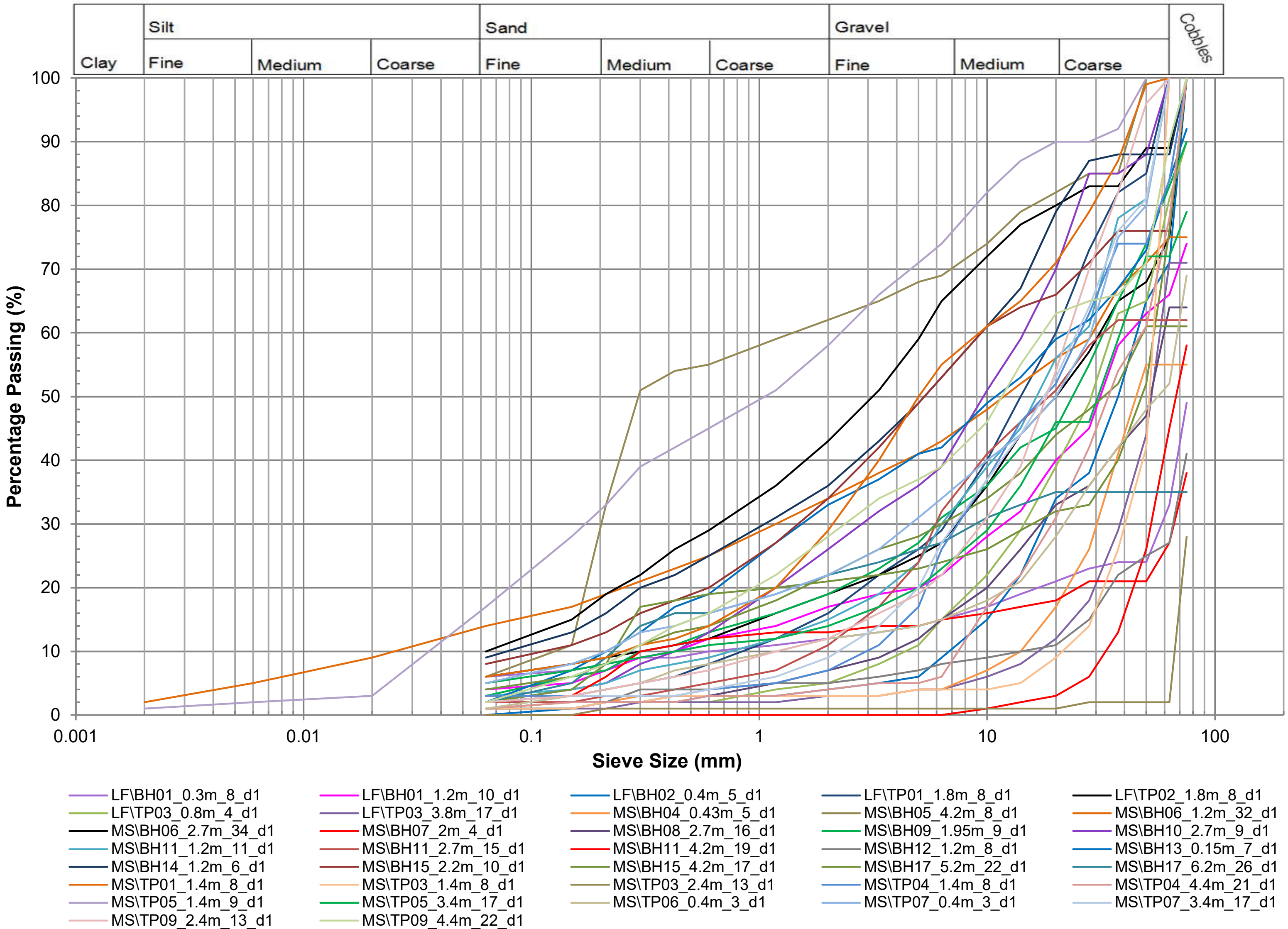

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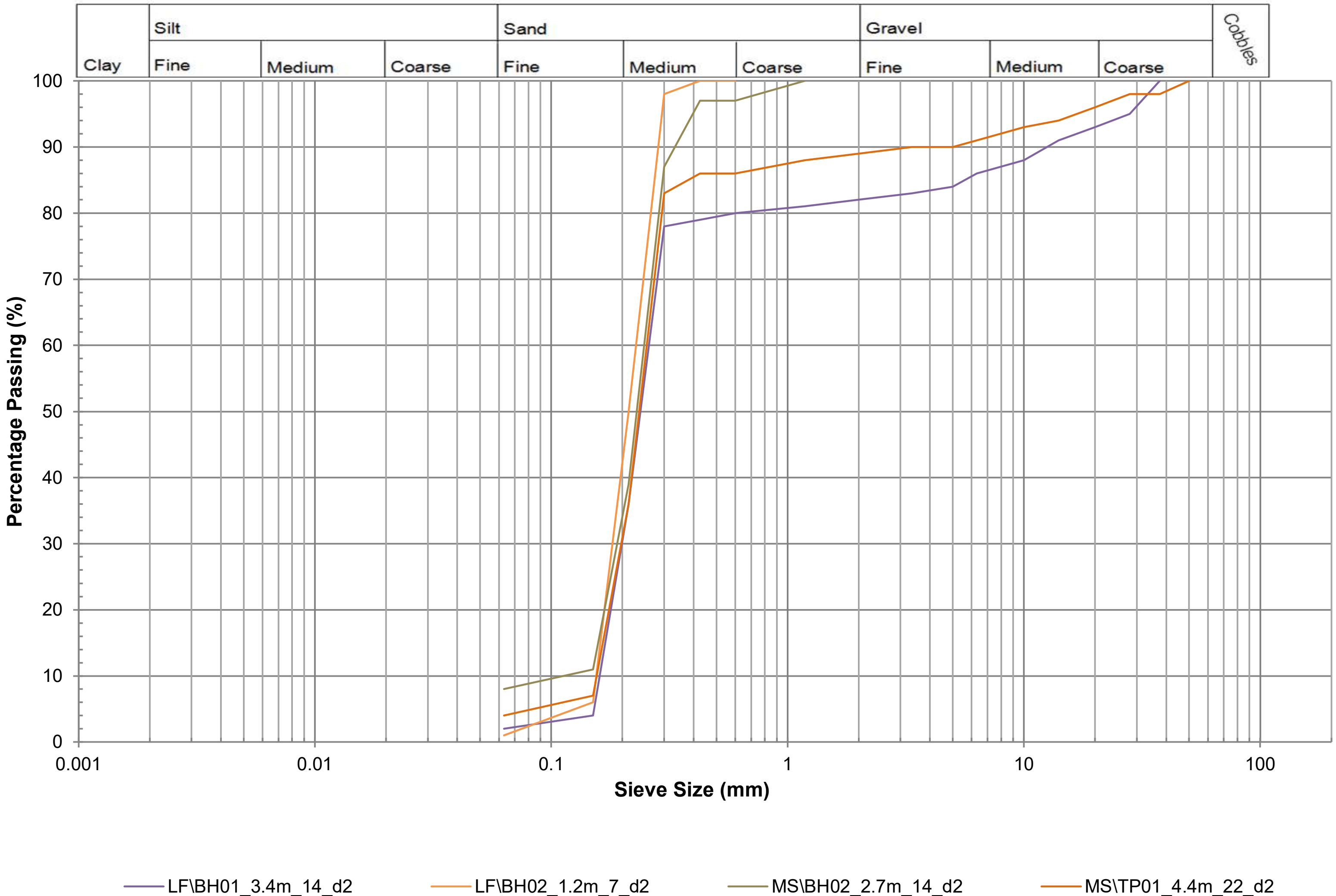
		Project title	Preliminary Onshore Ground Investigation for Net Zero Teesside	Project no. 60657467	AECOM



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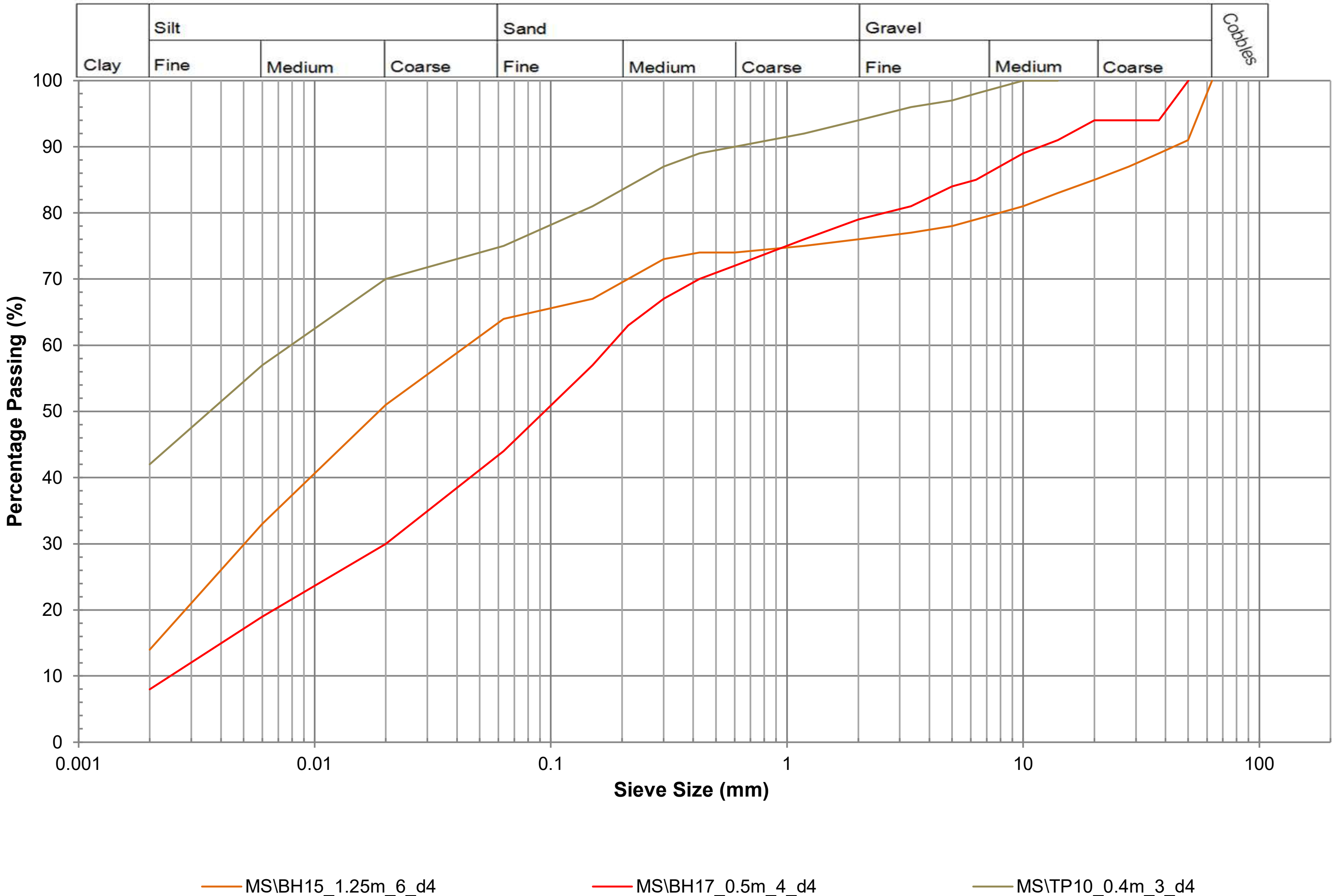
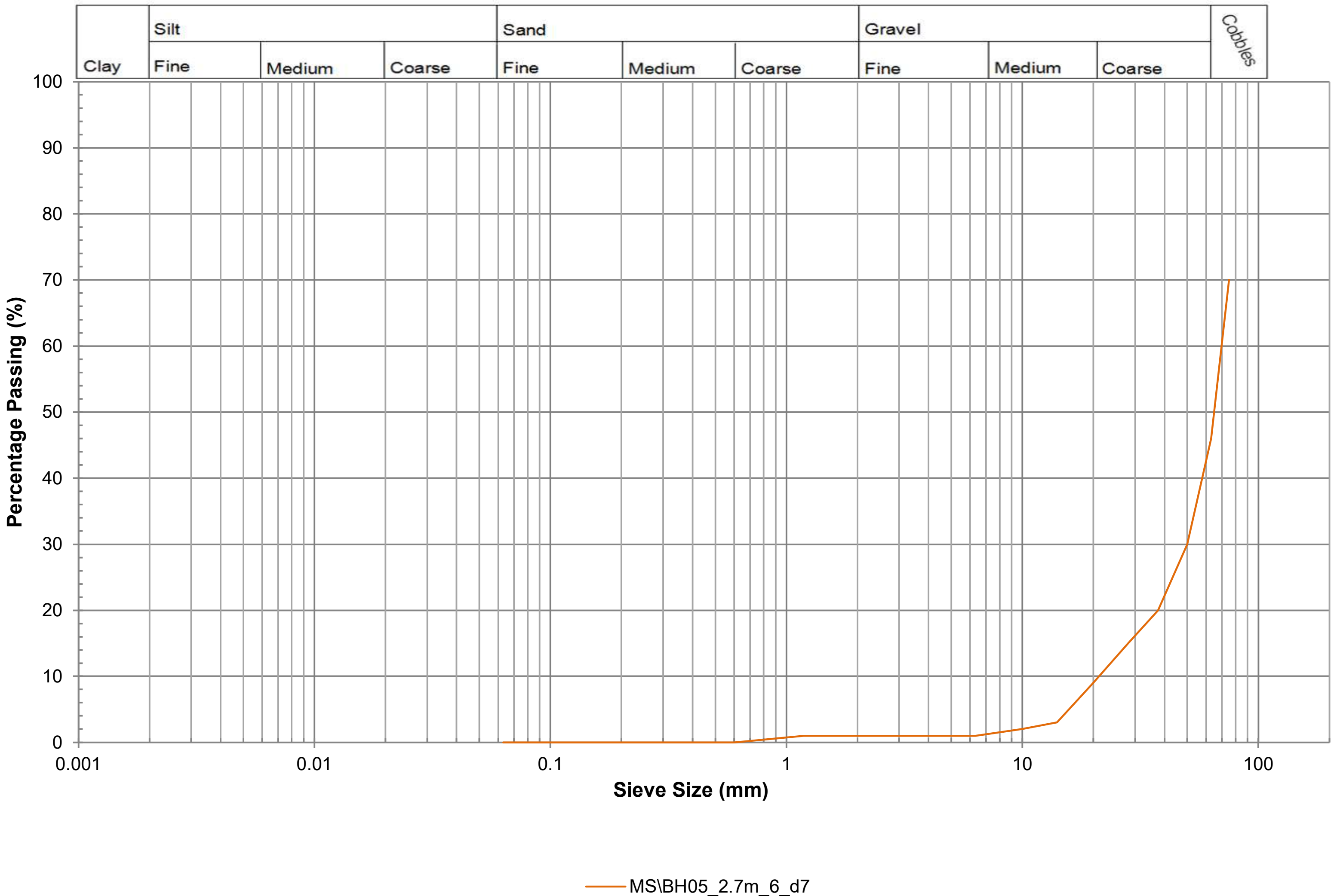


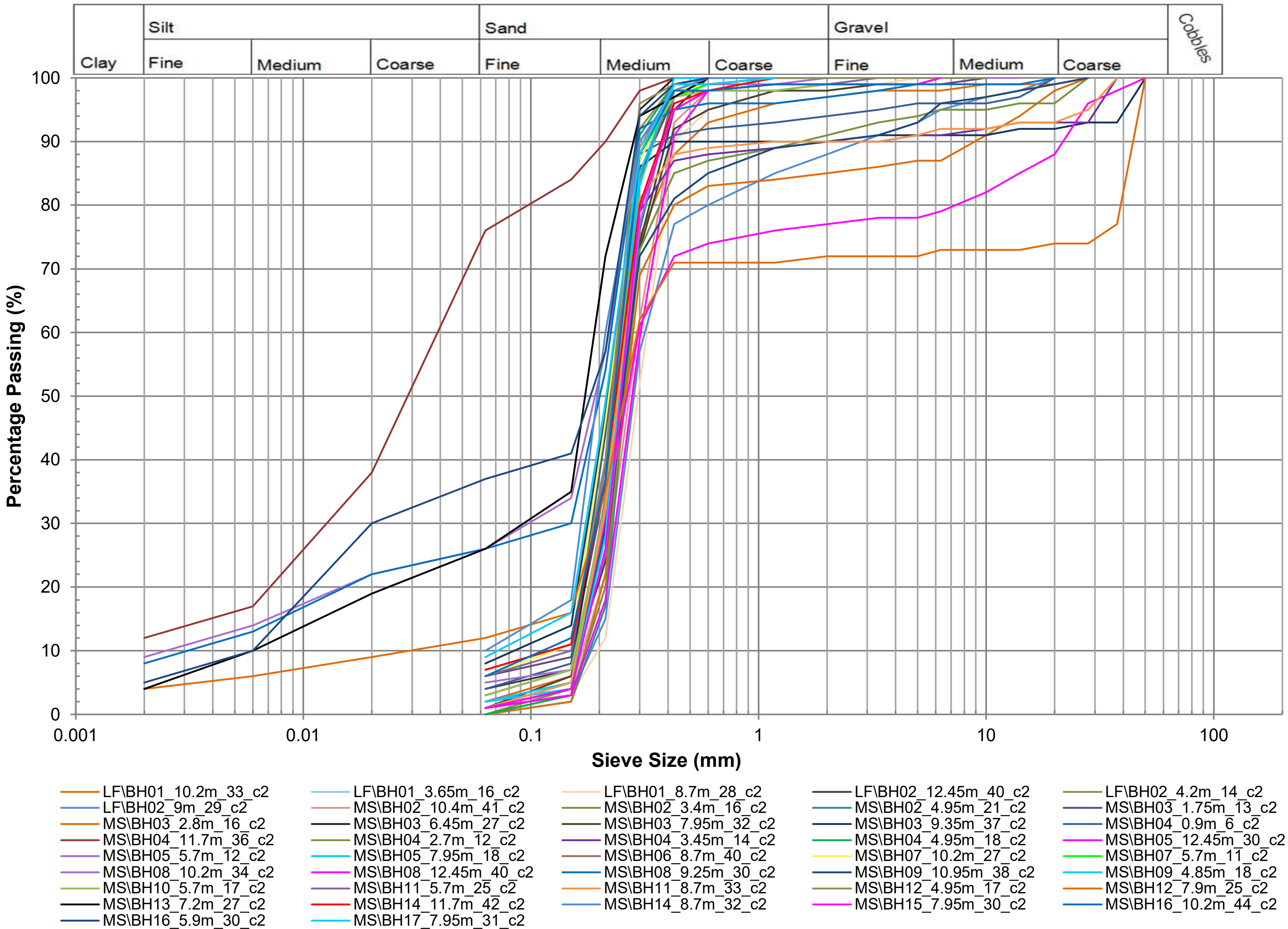
Client	bp	Figure title	**Particle Size Distribution - Made Ground (d4)**	Figure no. 9.29
		Project title	Preliminary Onshore Ground Investigation for Net Zero Teesside	Project no. 60657467

Date 25/10/2021

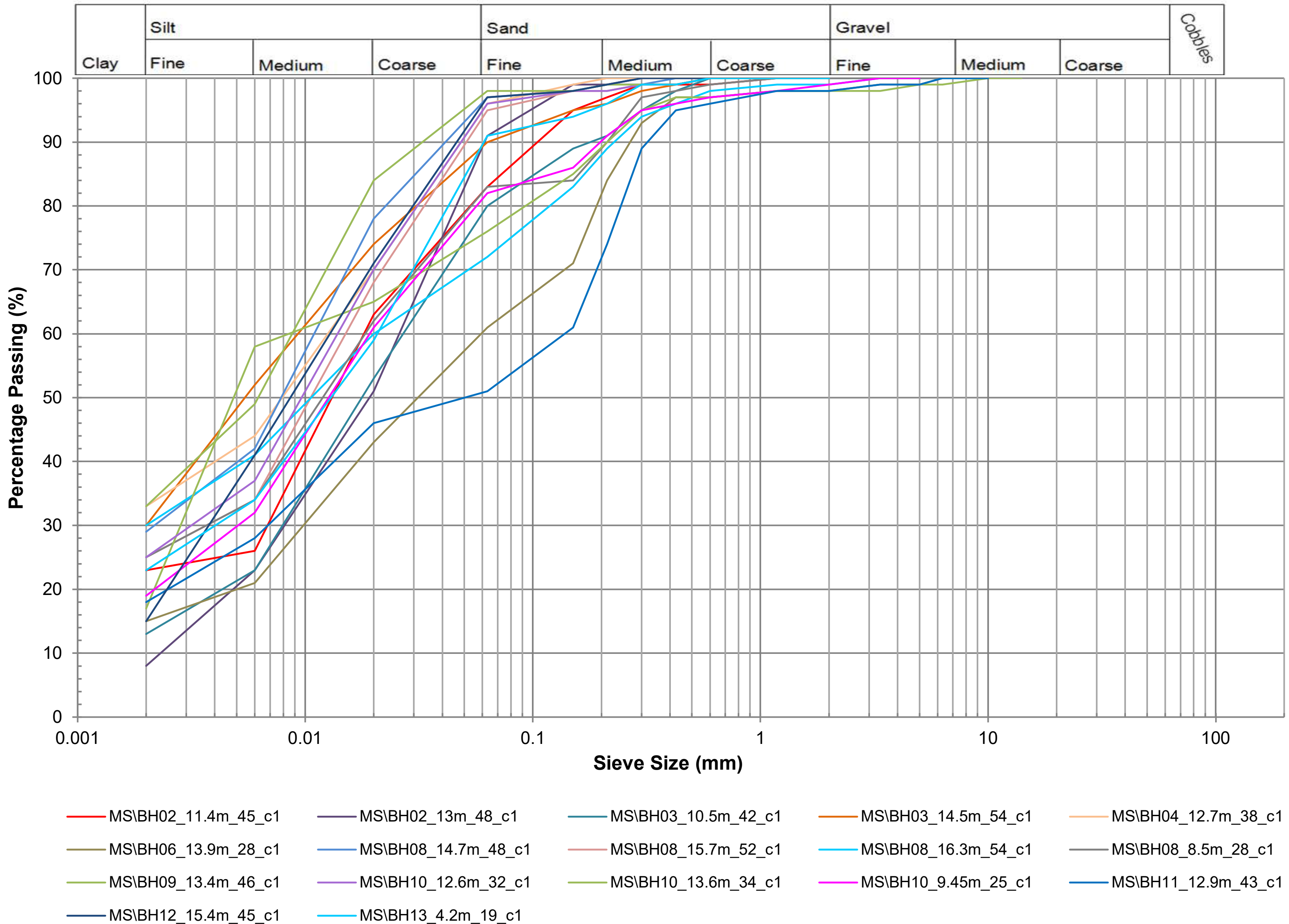
AECOM



Client bp	Figure title **Particle Size Distribution - Made Ground (d7)**		Figure no. 9.30 / Date 25/10/2021
	Project title Preliminary Onshore Ground Investigation for Net Zero Teesside	Project no. 60657467	AECOM



Client	bp	Figure title **Particle Size Distribution - Tidal Flat Deposits Sand (c2)**	Figure no. 9.31	Date 25/10/2021
		Project title Preliminary Onshore Ground Investigation for Net Zero Teesside	Project no. 60657467	AECOM



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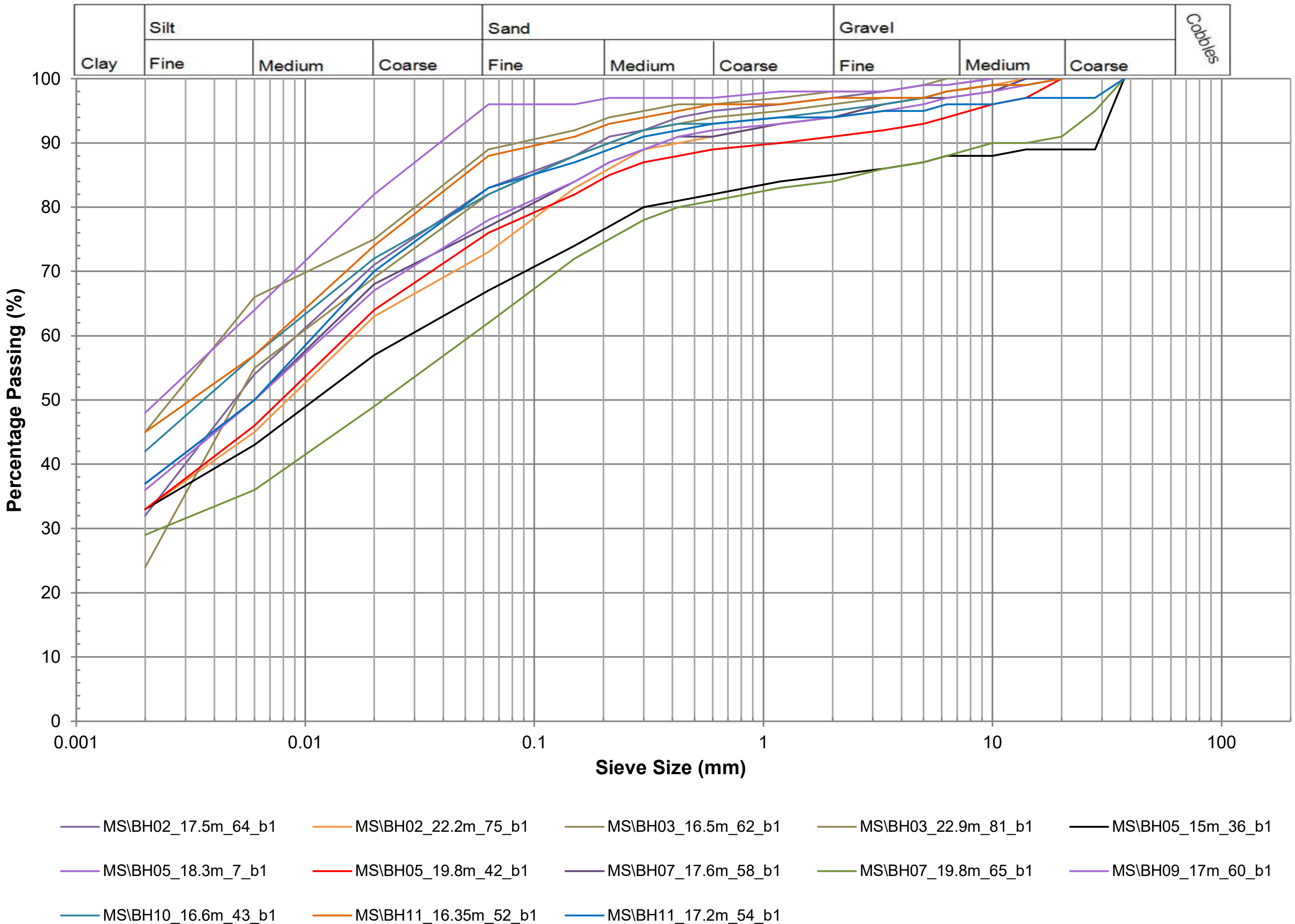

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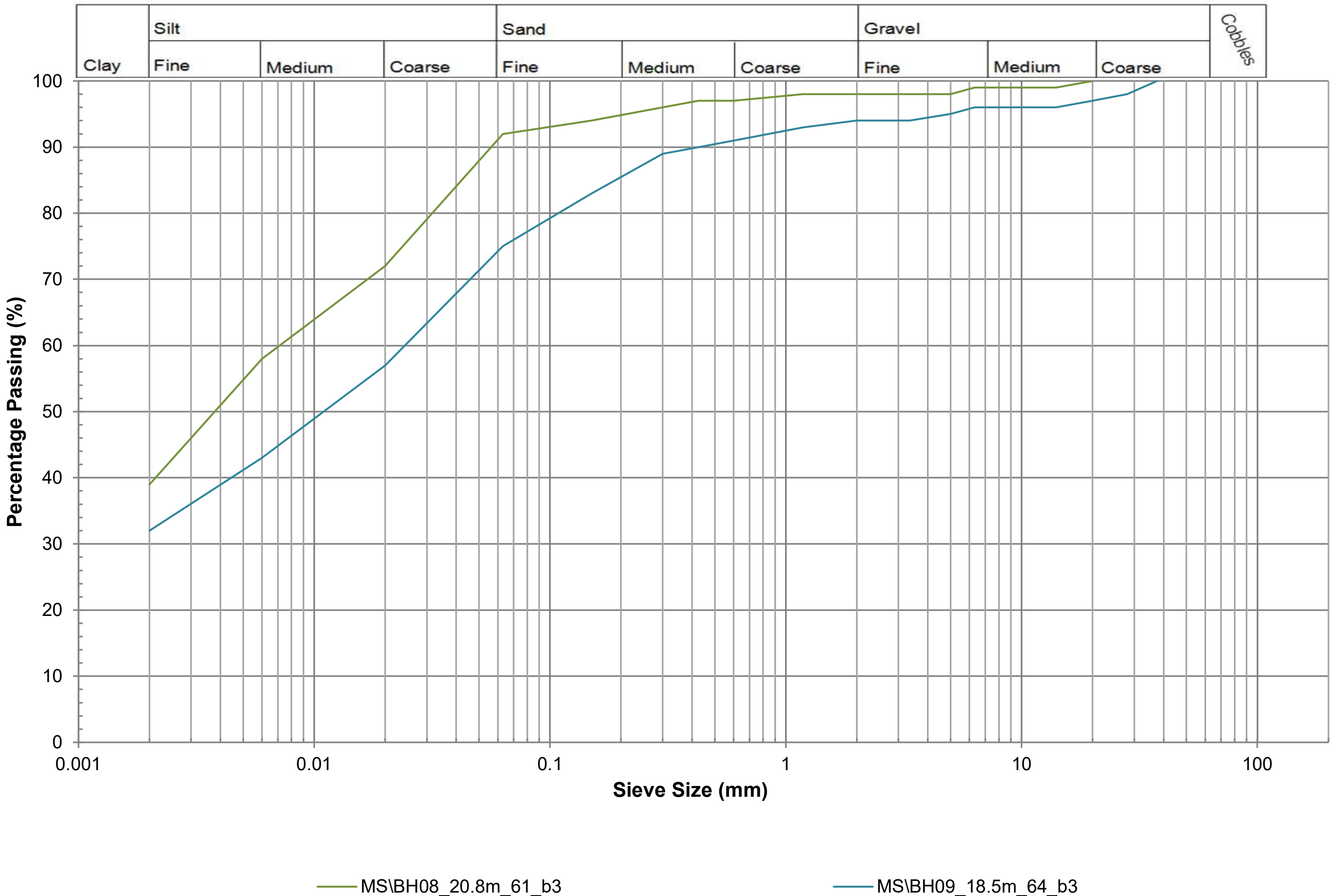

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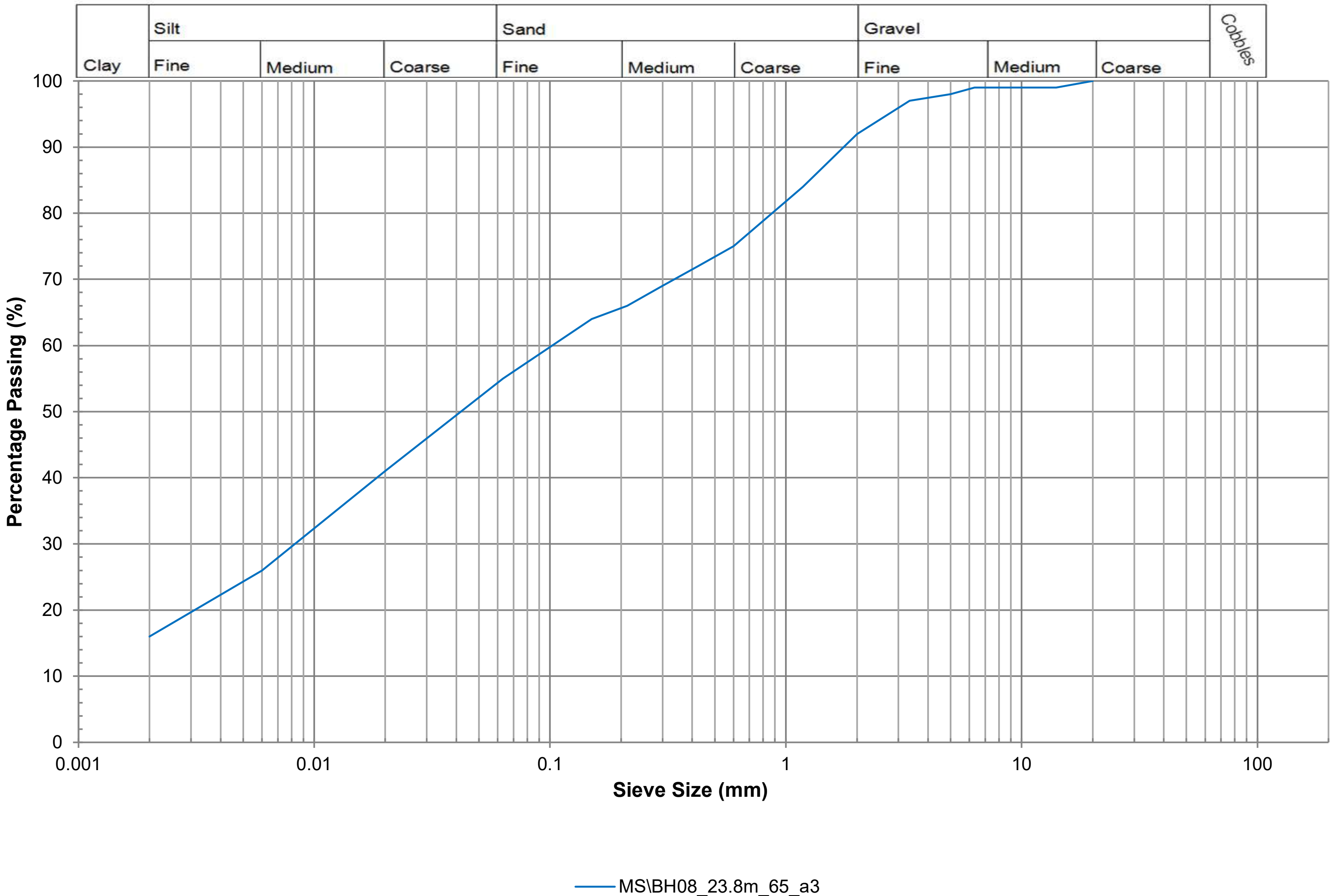

Client bp	Figure title	**Particle Size Distribution - Redcar Mudstone Formation (a3)**	Figure no. 9.35	Date 25/10/2021
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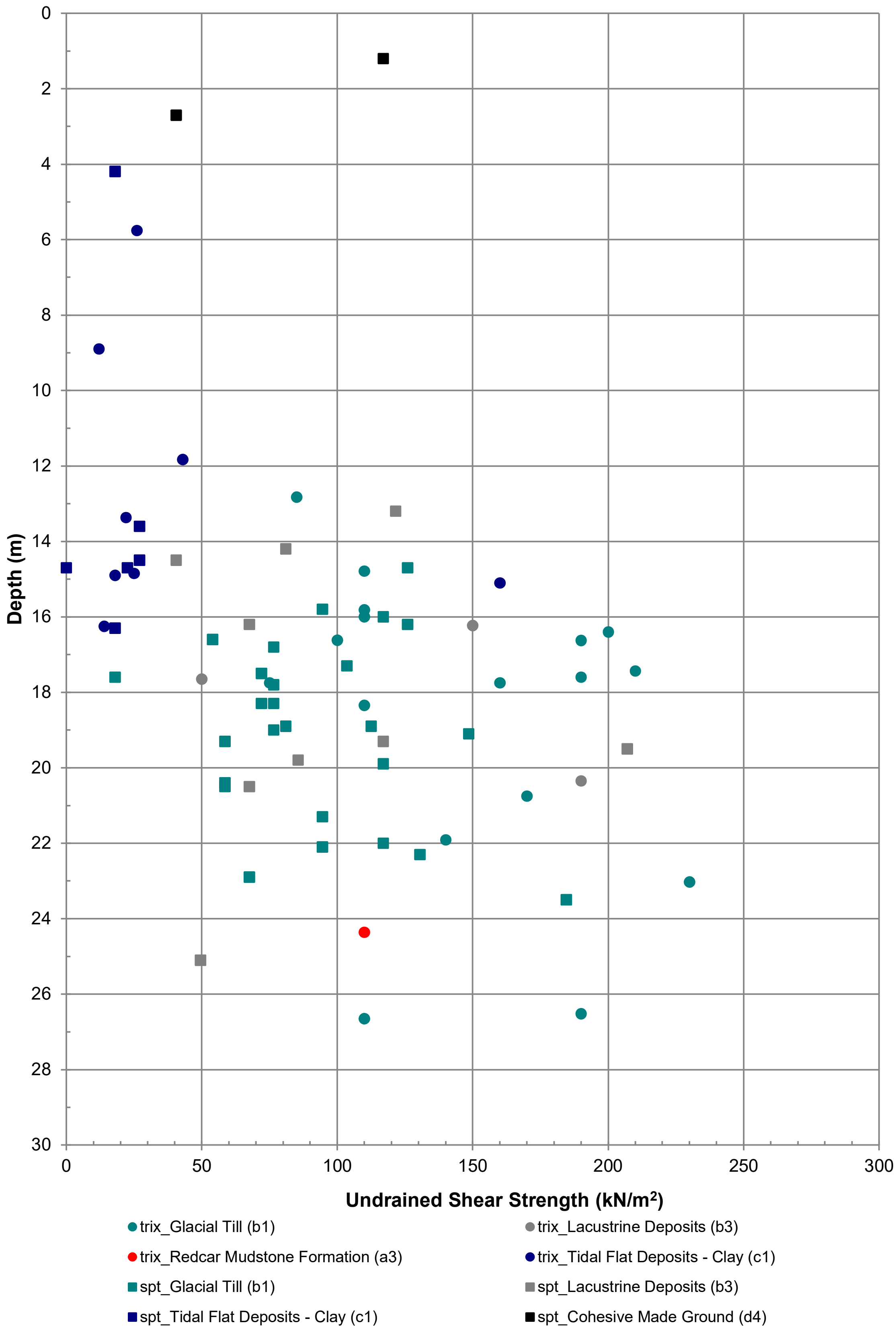
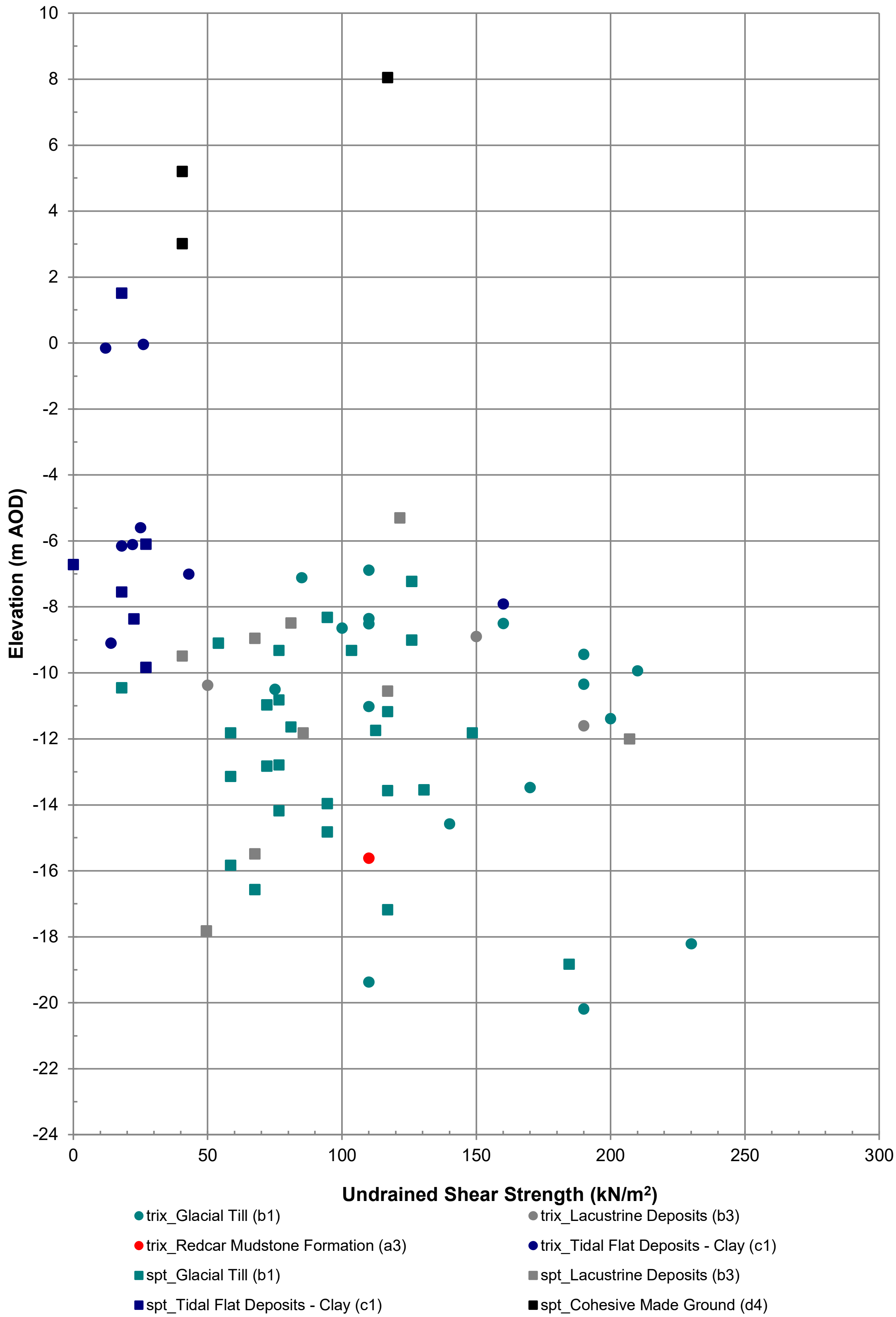


Client: bp	Figure title: **Undrained Shear Strength (Derived) vs Depth - All Strata**	Figure no. 9.36	Date 25/10/2021
Project title: Preliminary Onshore Ground Investigation for Net Zero Teesside		Project no. 60657467	AECOM



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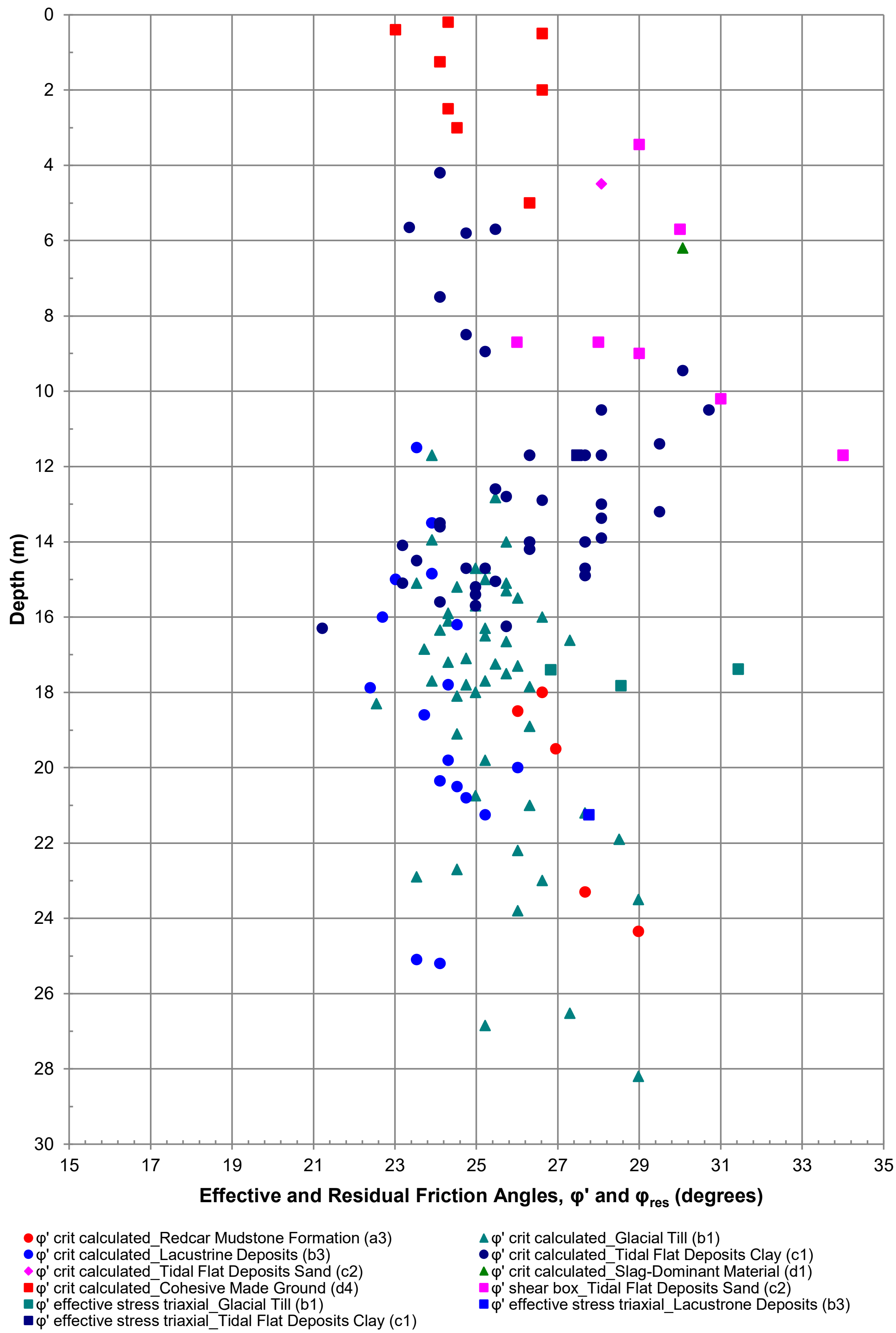
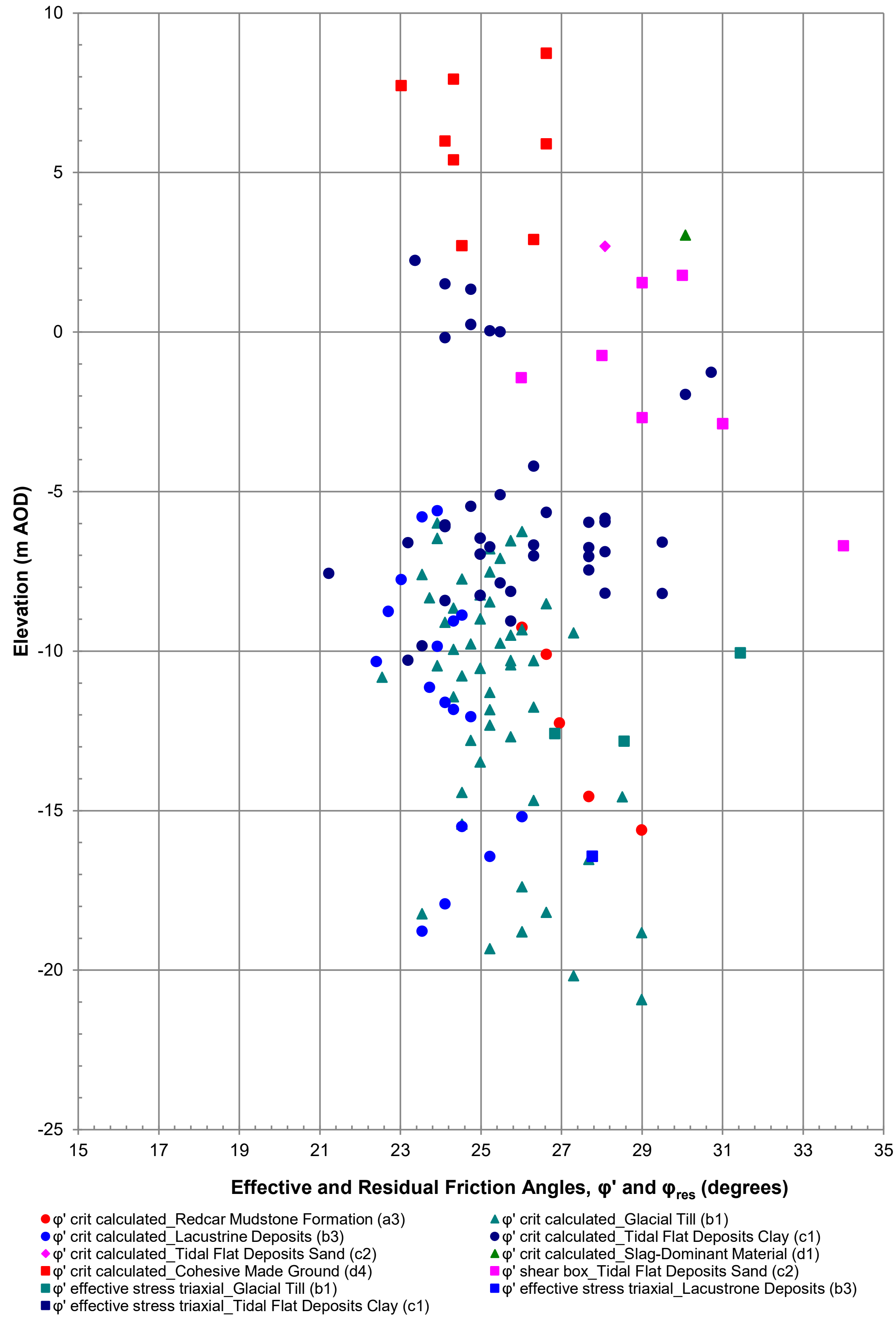


Client	bp	Figure title	Effective and Residual Friction Angles vs Depth - All Strata	Figure no. 9.38	Date 21/09/2021
Project title	Preliminary Onshore Ground Investigation for Net Zero Teesside		Project no. 60657467		AECOM



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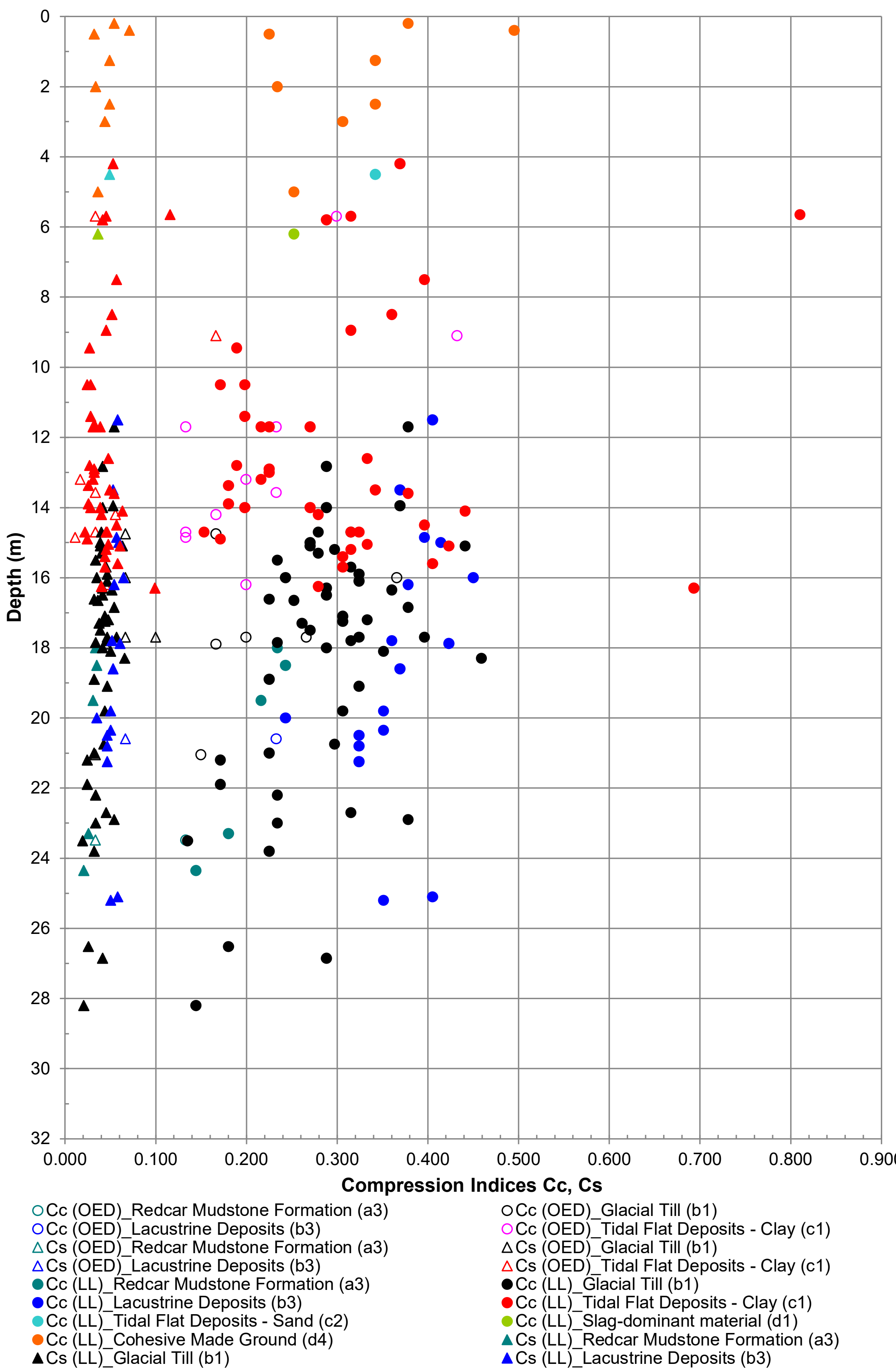
Project title	Preliminary Onshore Ground Investigation for Net Zero Teesside		Project no. 60657467		AECOM



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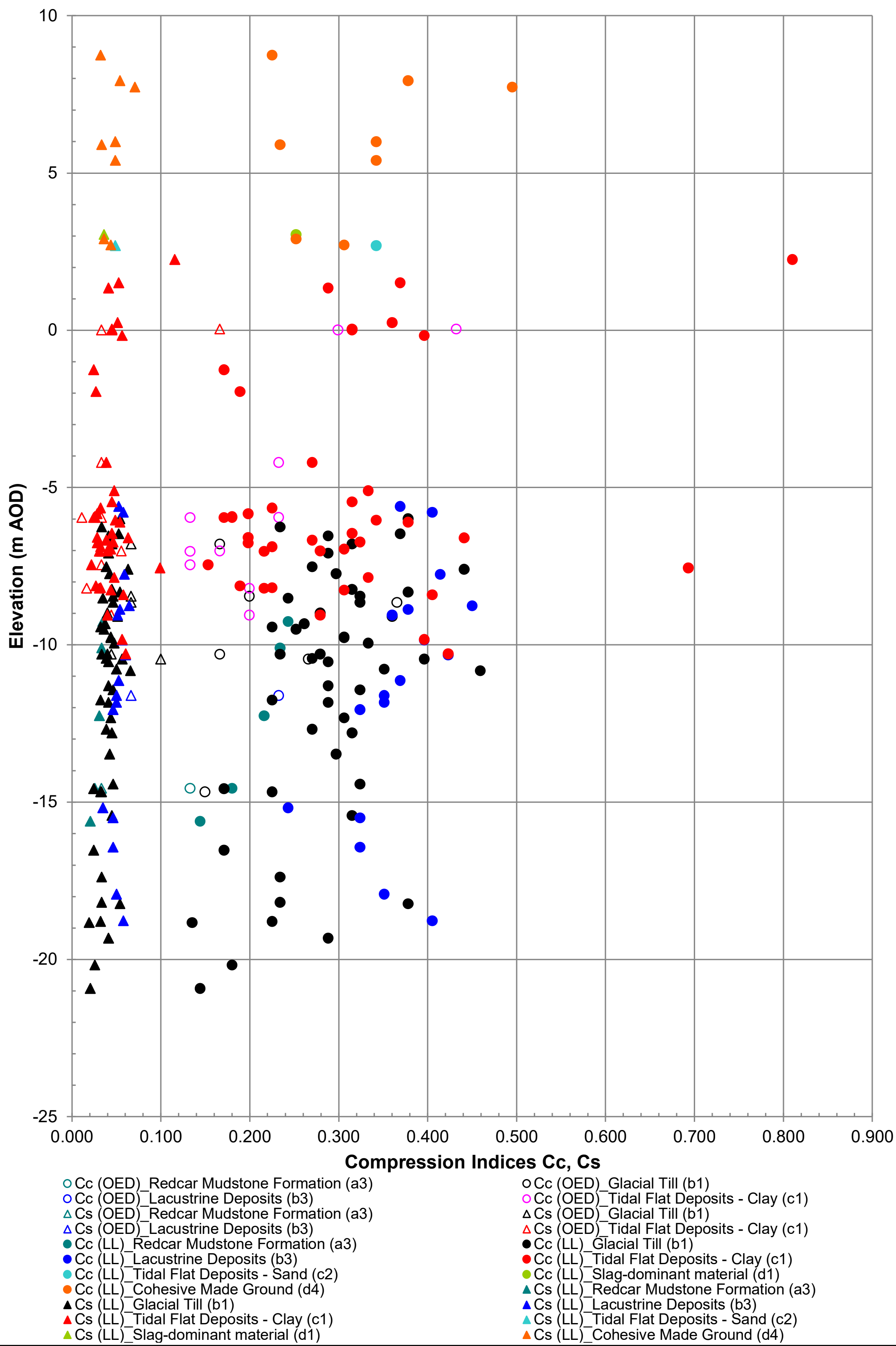
Project title	Preliminary Onshore Ground Investigation for Net Zero Teesside		Project no. 60657467	AECOM	



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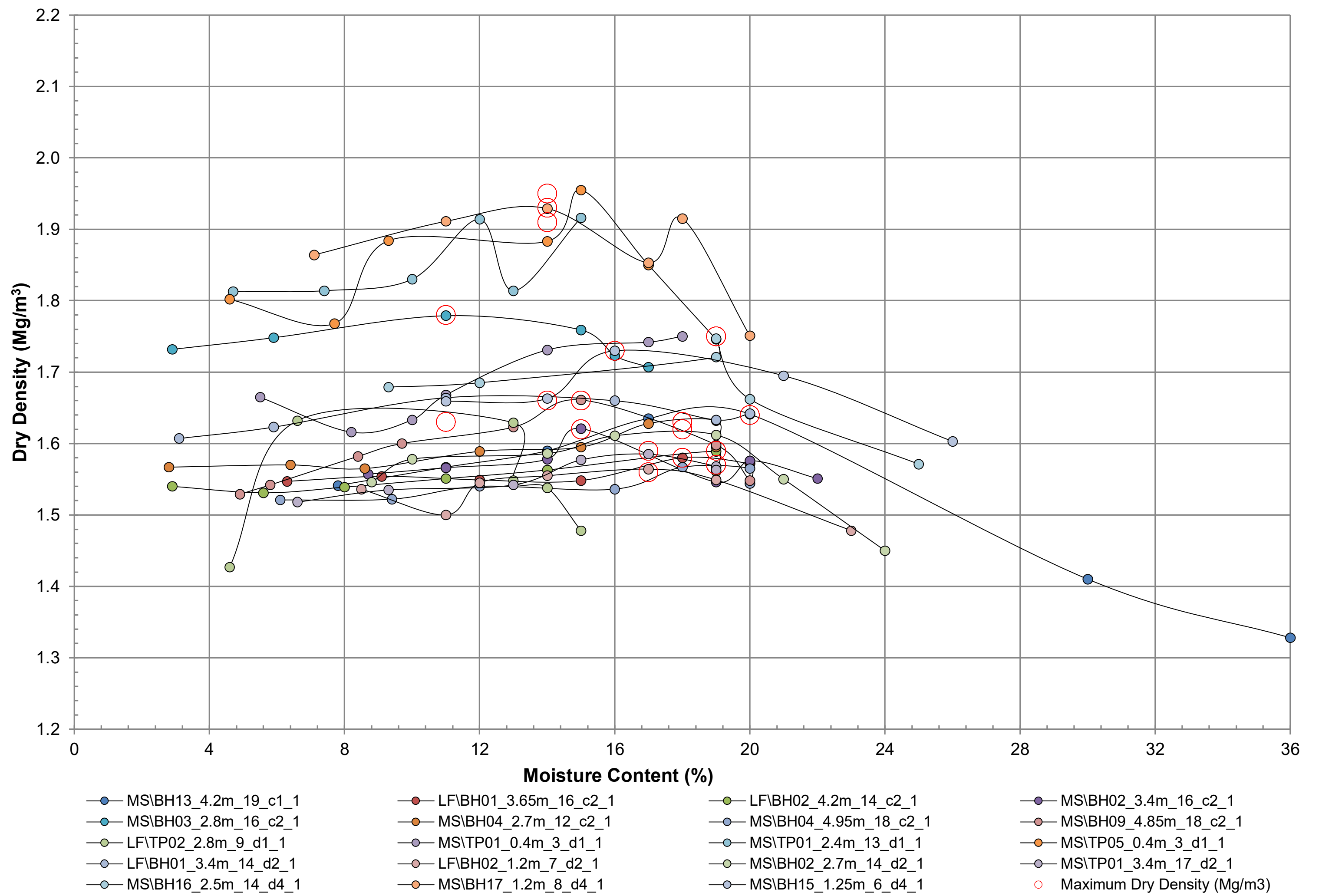
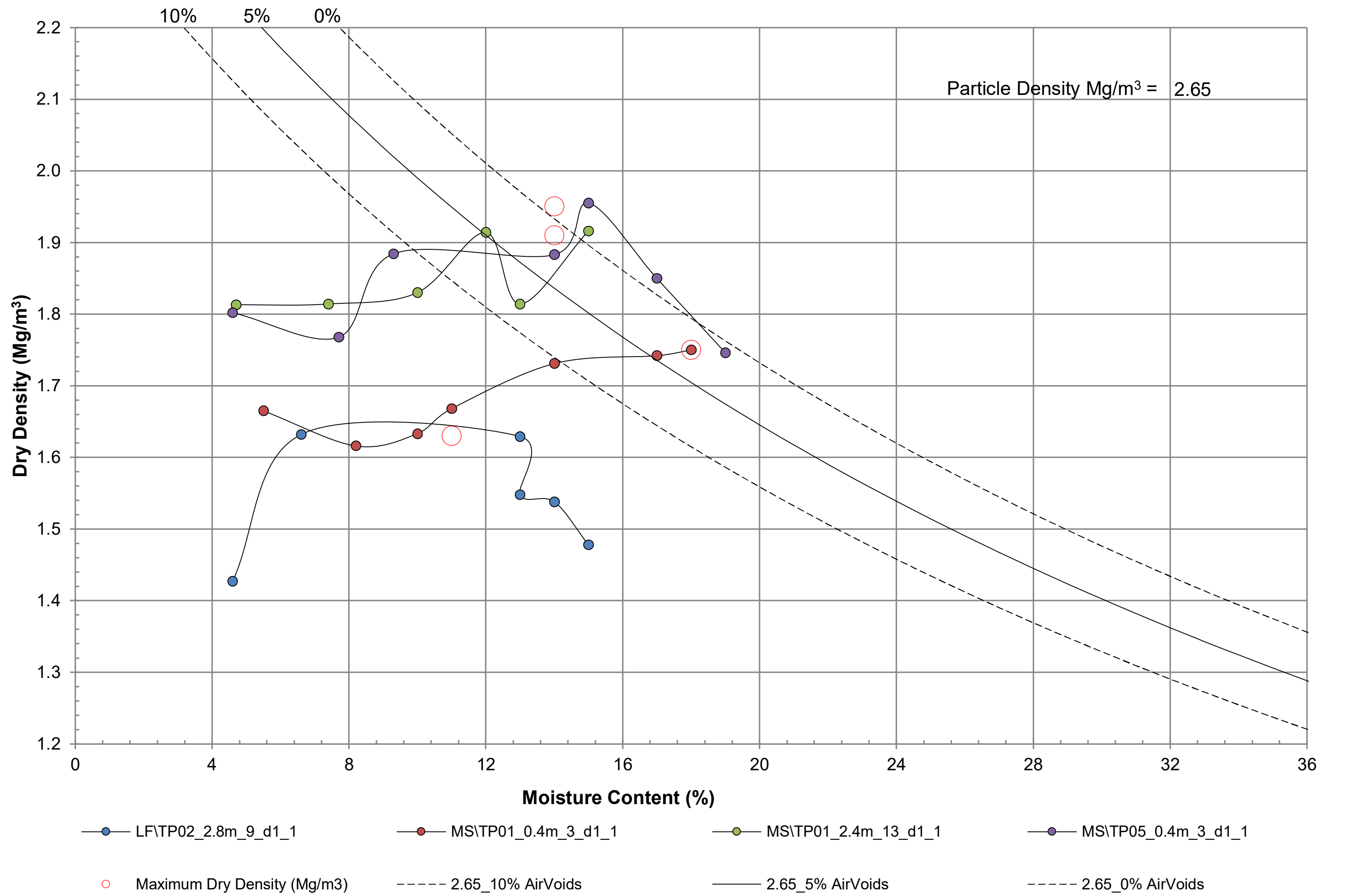


Client	bp	Figure title	Dry Density vs Moisture Content - All Strata	Figure no. 9.42	Date 28/09/2021
		Project title	Preliminary Onshore Ground Investigation for Net Zero Teesside	Project no. 60657467	AECOM



Client bp	Figure title	**Dry Density vs Moisture Content - Made Ground (d1)**	Figure no. 9.43	Date 28/09/2021
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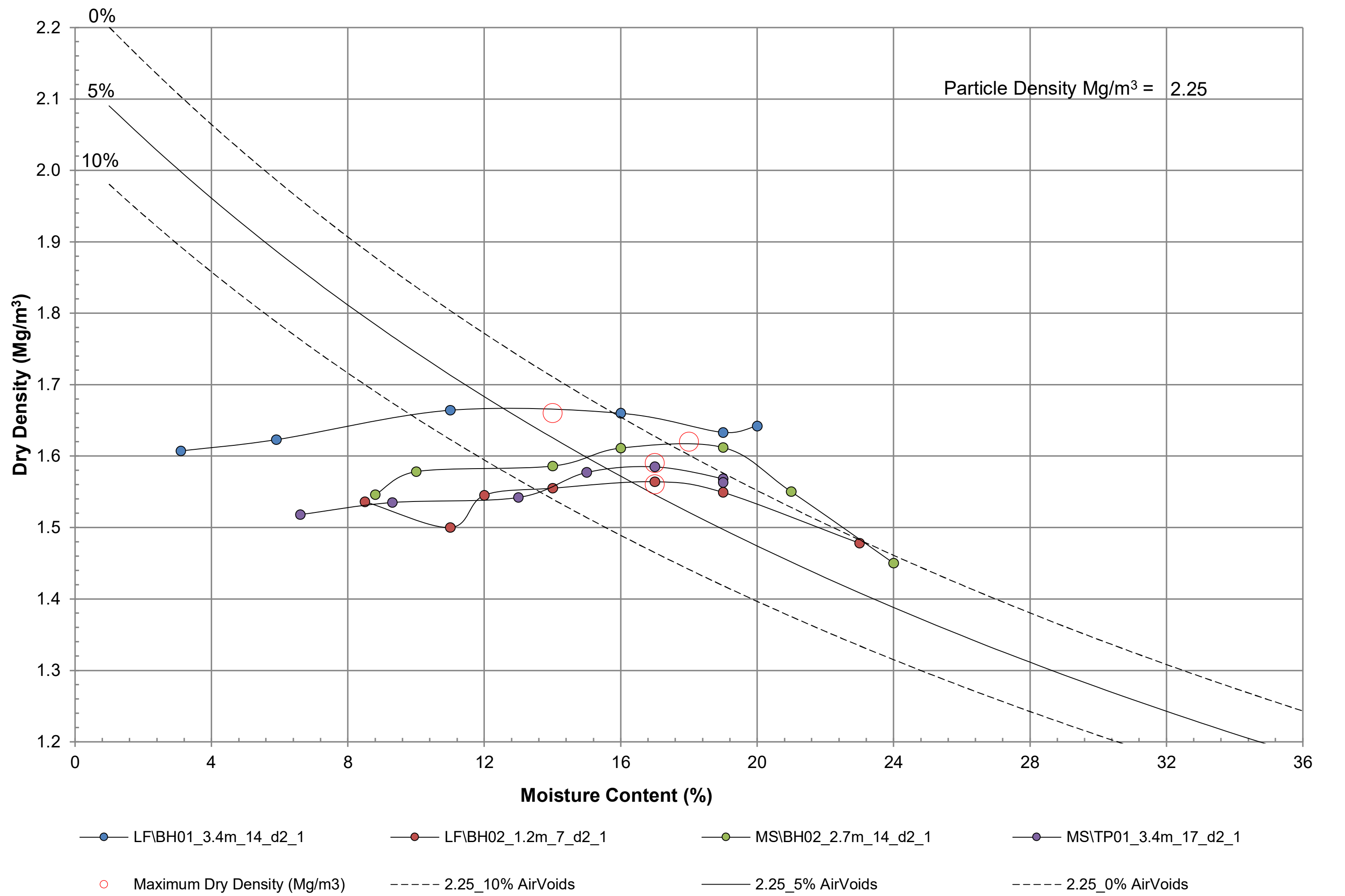

Client	bp	Figure title	**Dry Density vs Moisture Content - Made Ground (d2)**	Figure no. 9.44	Date 28/09/2021
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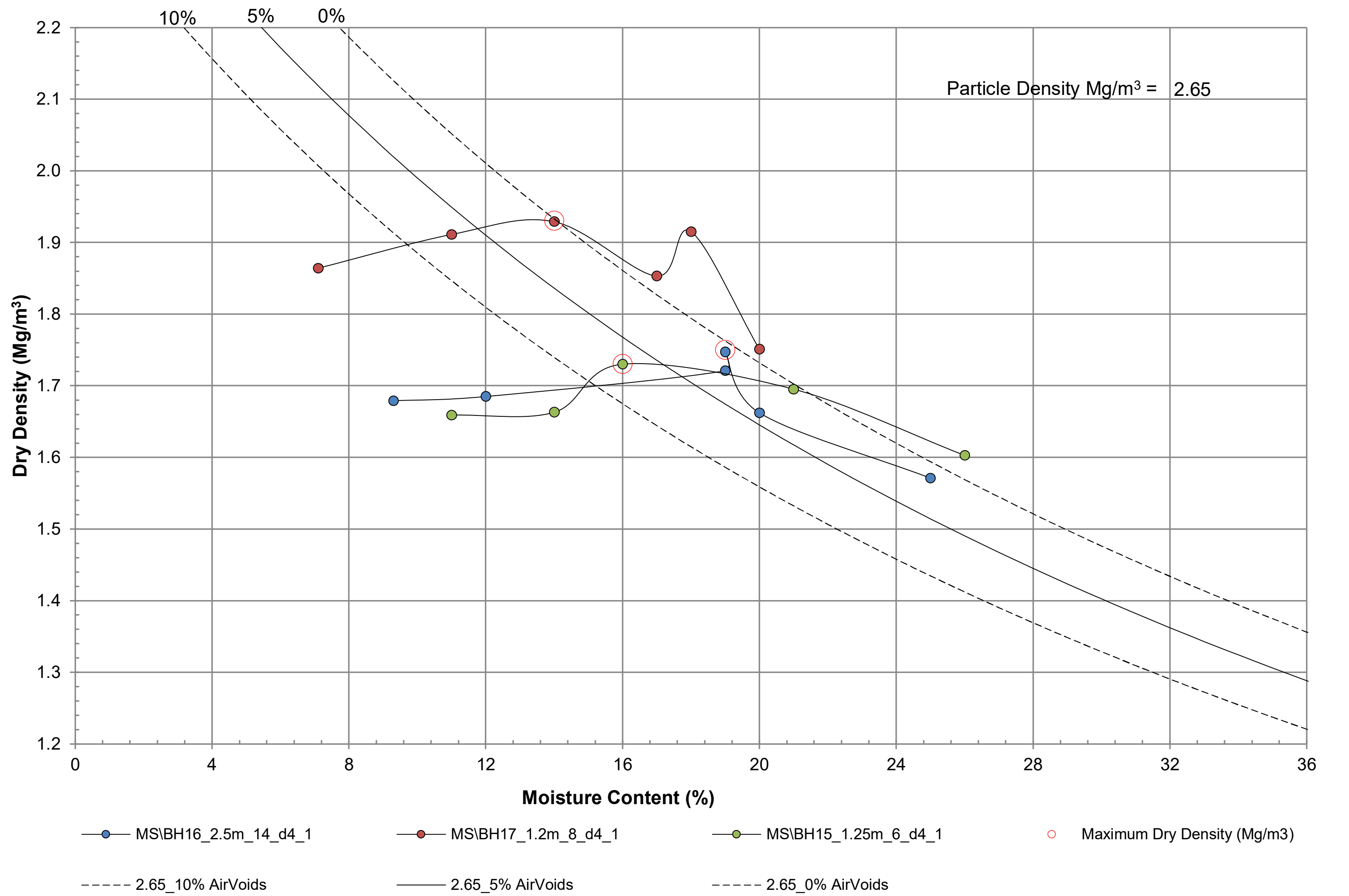

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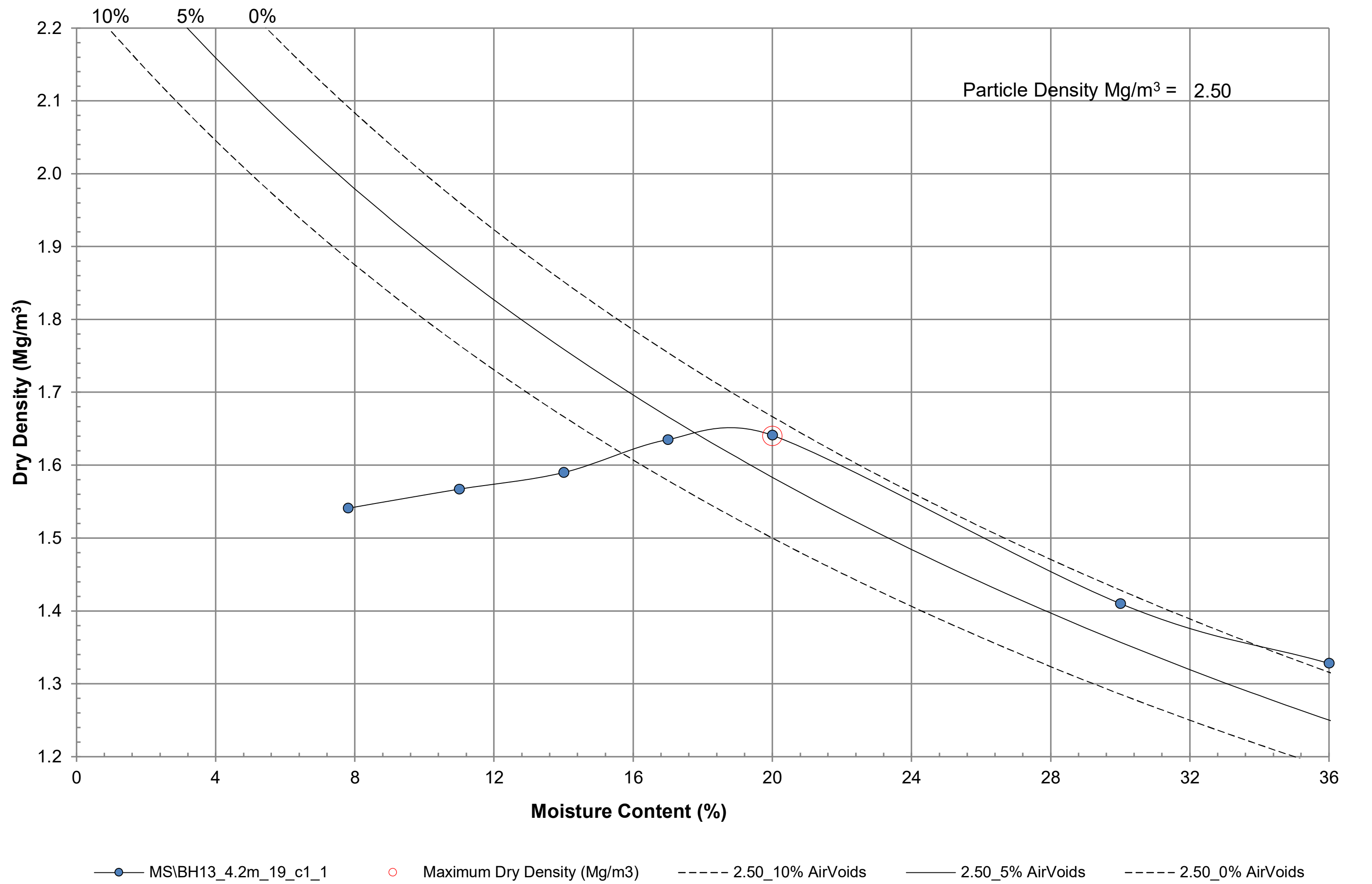

Client	bp	Figure title	**Dry Density vs Moisture Content - Tidal Flat Deposits (c1)**	Figure no. 9.46 / Date 28/09/2021
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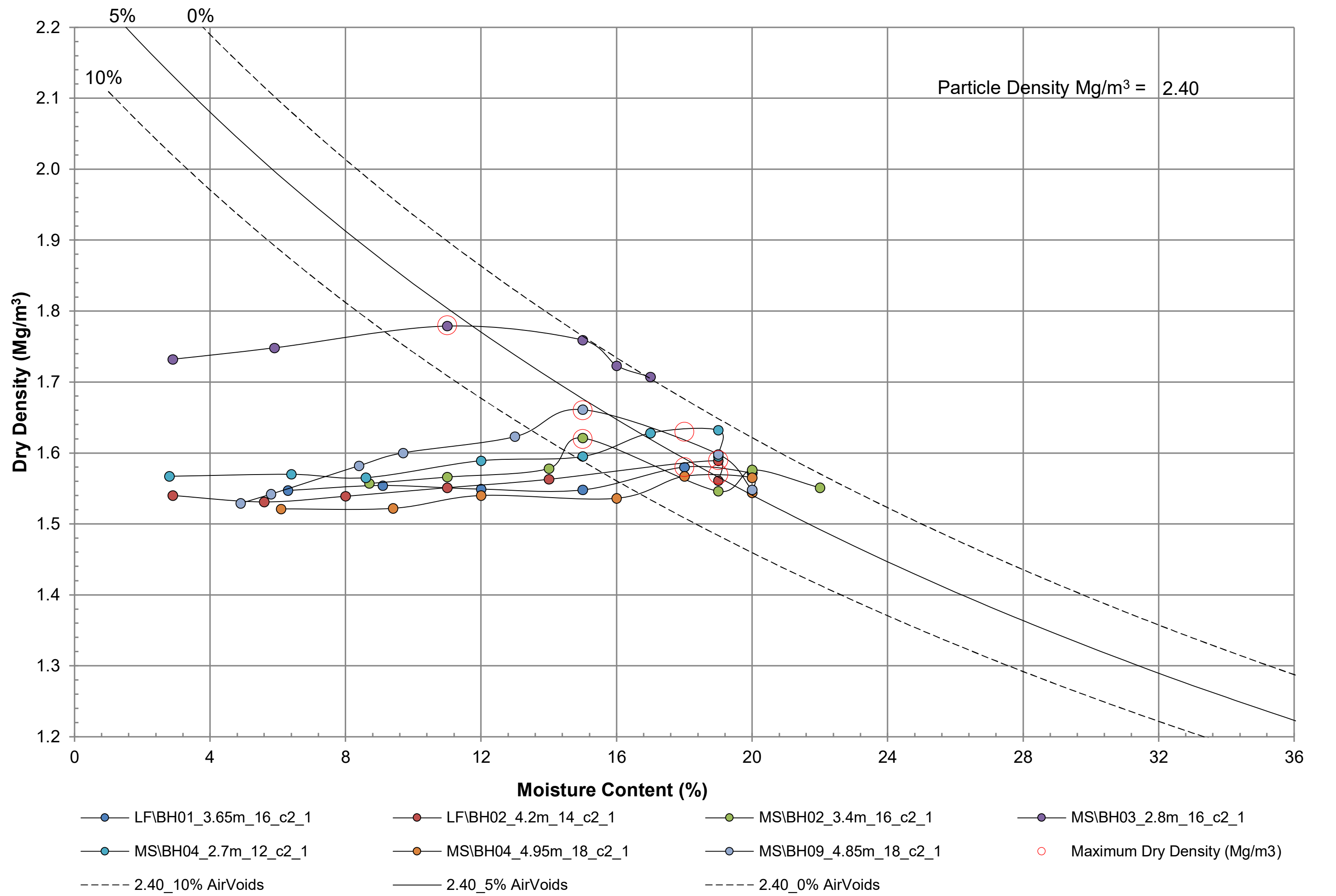

Client	bp	Figure title	**Dry Density vs Moisture Content - Tidal Flat Deposits (c2)**	Figure no. 9.47	Date 28/09/2021
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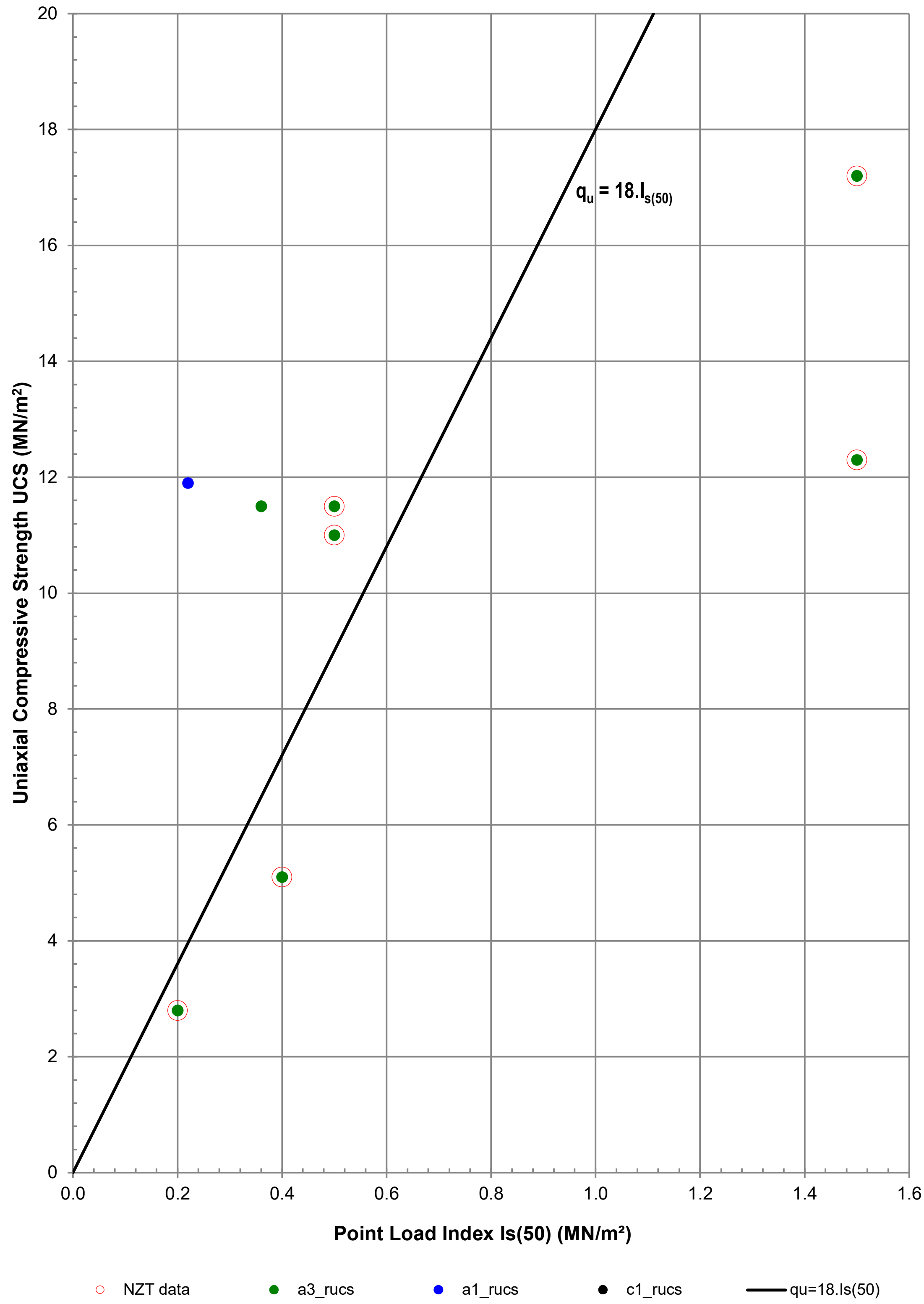
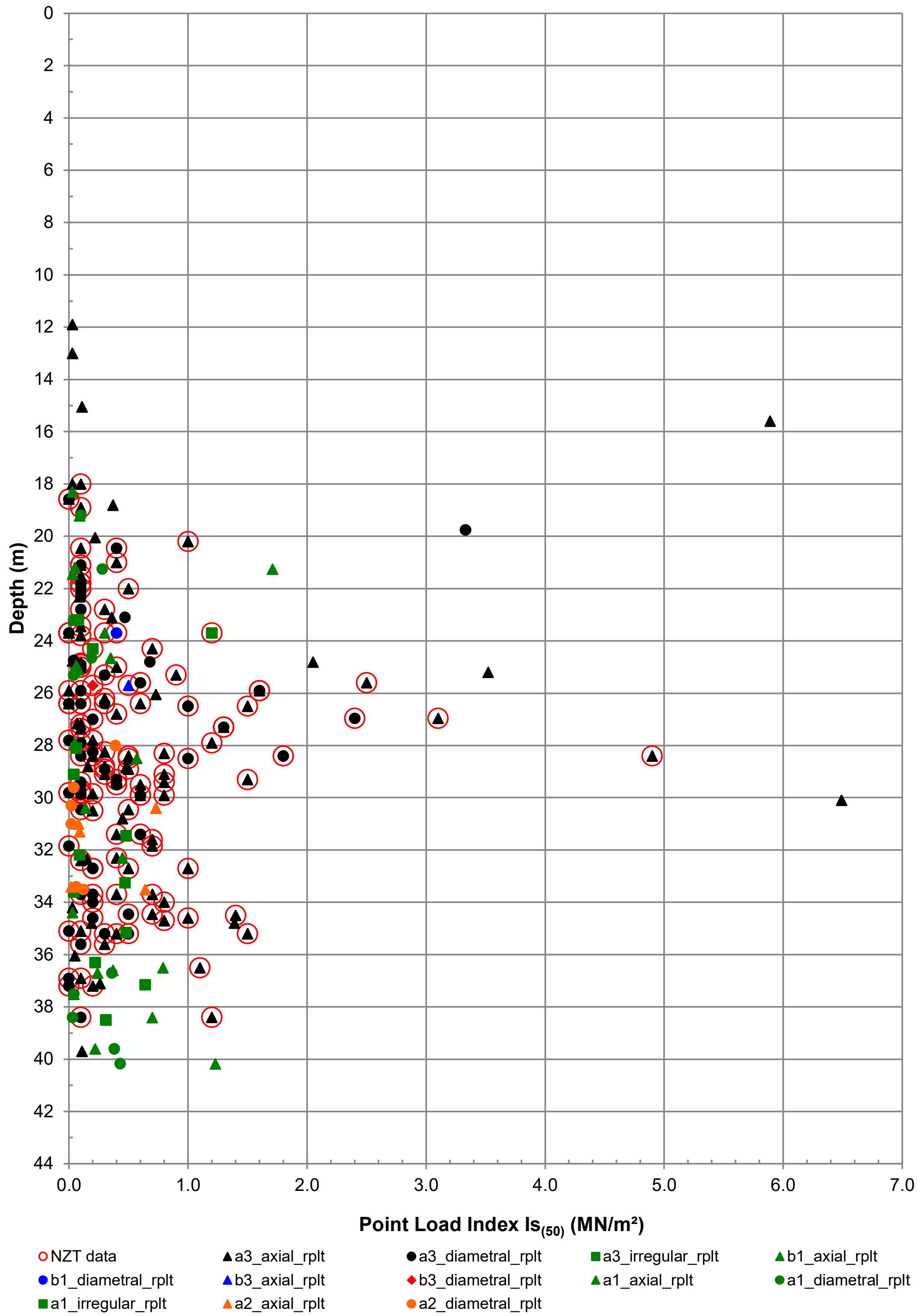
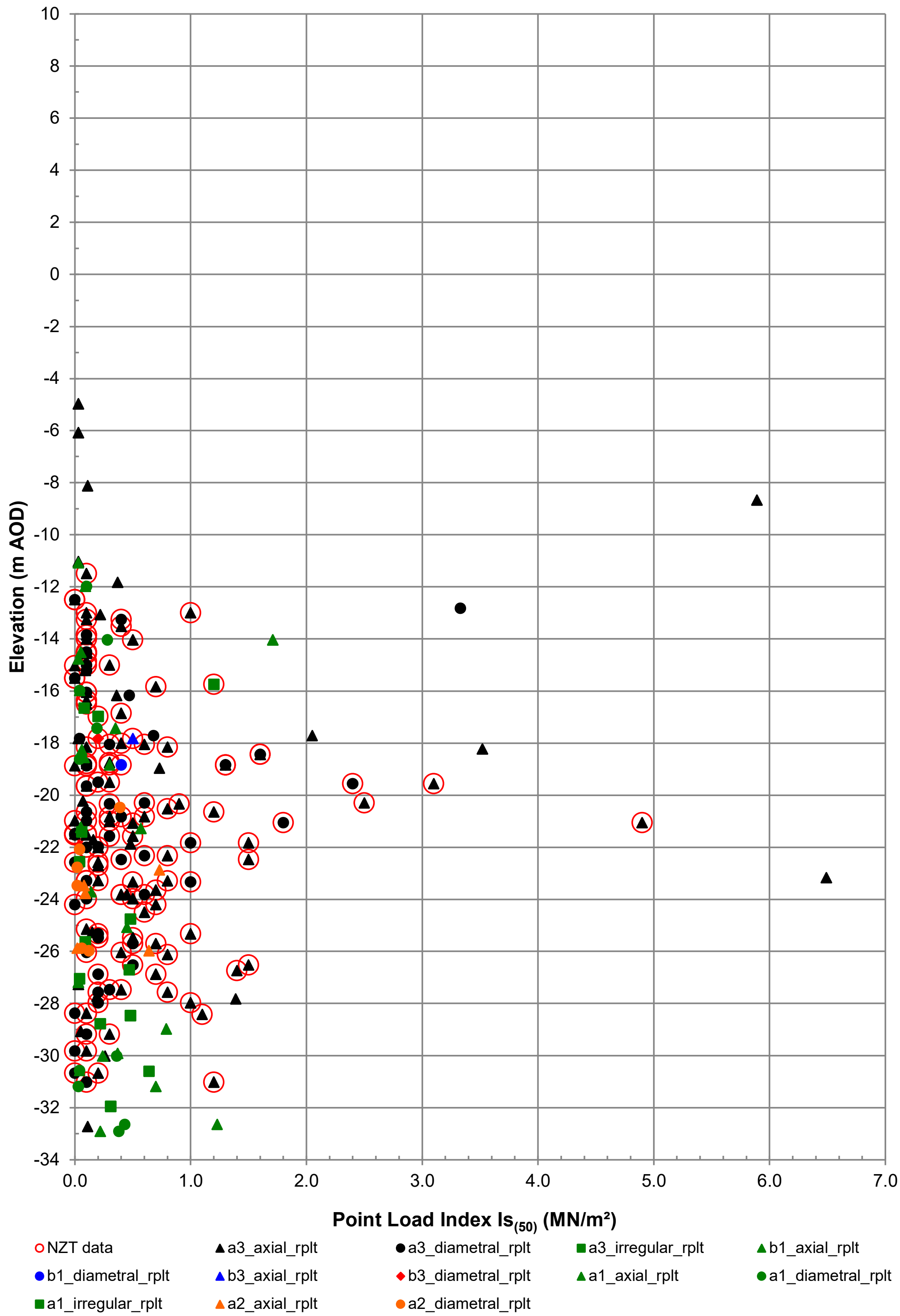


Client	bp	Figure title	**Point Load Index Values Is(50) vs Uniaxial Compressive Strength - All Strata**	Figure no. 9.48	Date 25/10/2021
Project title	Preliminary Onshore Ground Investigation for Net Zero Teesside		Project no. 60657467	AECOM	



Client	bp	Figure title	**Point Load Index Values Is(50) vs Depth - All Strata**	Figure no. 9.49	Date 25/10/2021
Project title	Preliminary Onshore Ground Investigation for Net Zero Teesside		Project no. 60657467	AECOM	



Client	bp	Figure title	**Point Load Index Values Is(50) vs Elevation - All Strata**	Figure no. 9.50	Date 25/10/2021
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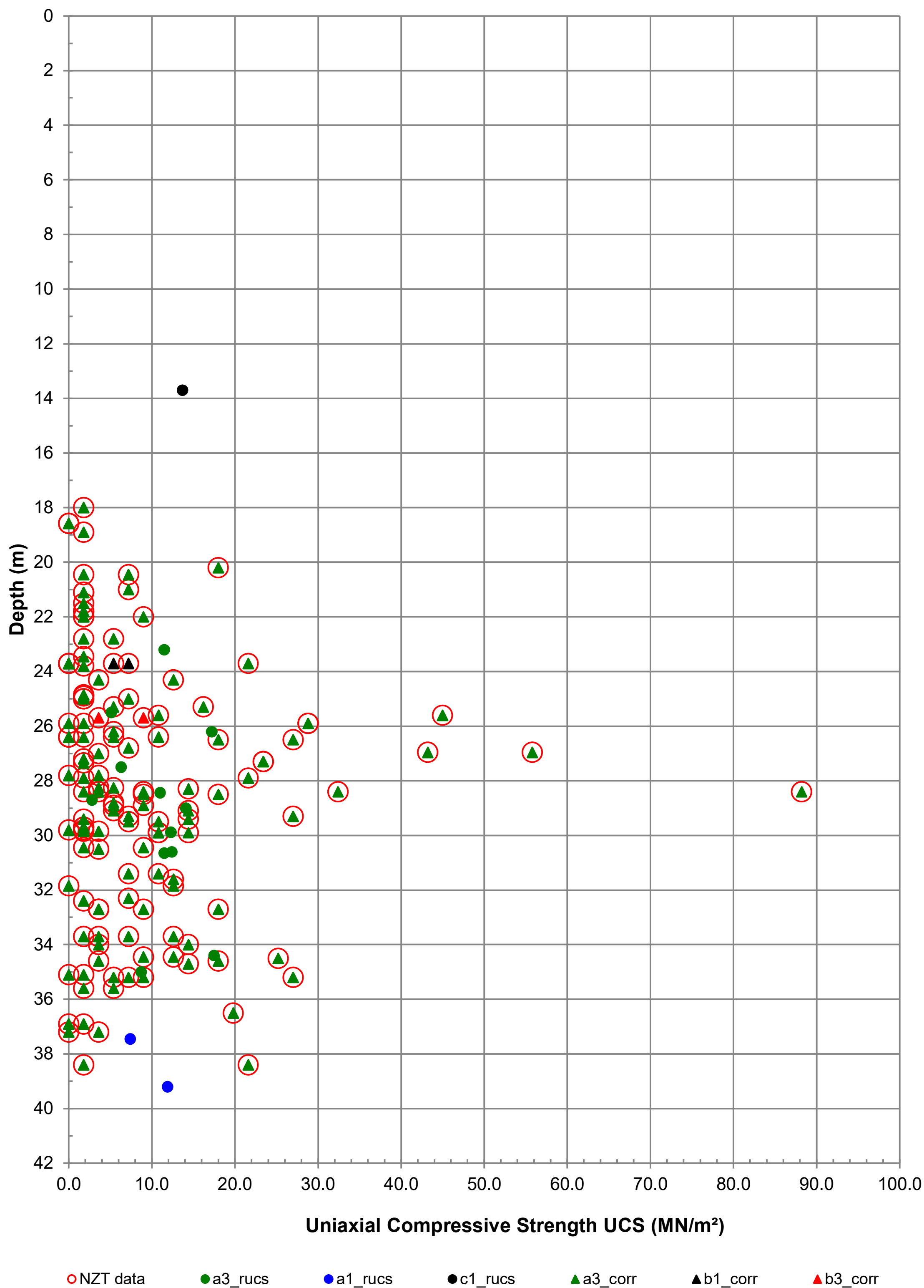
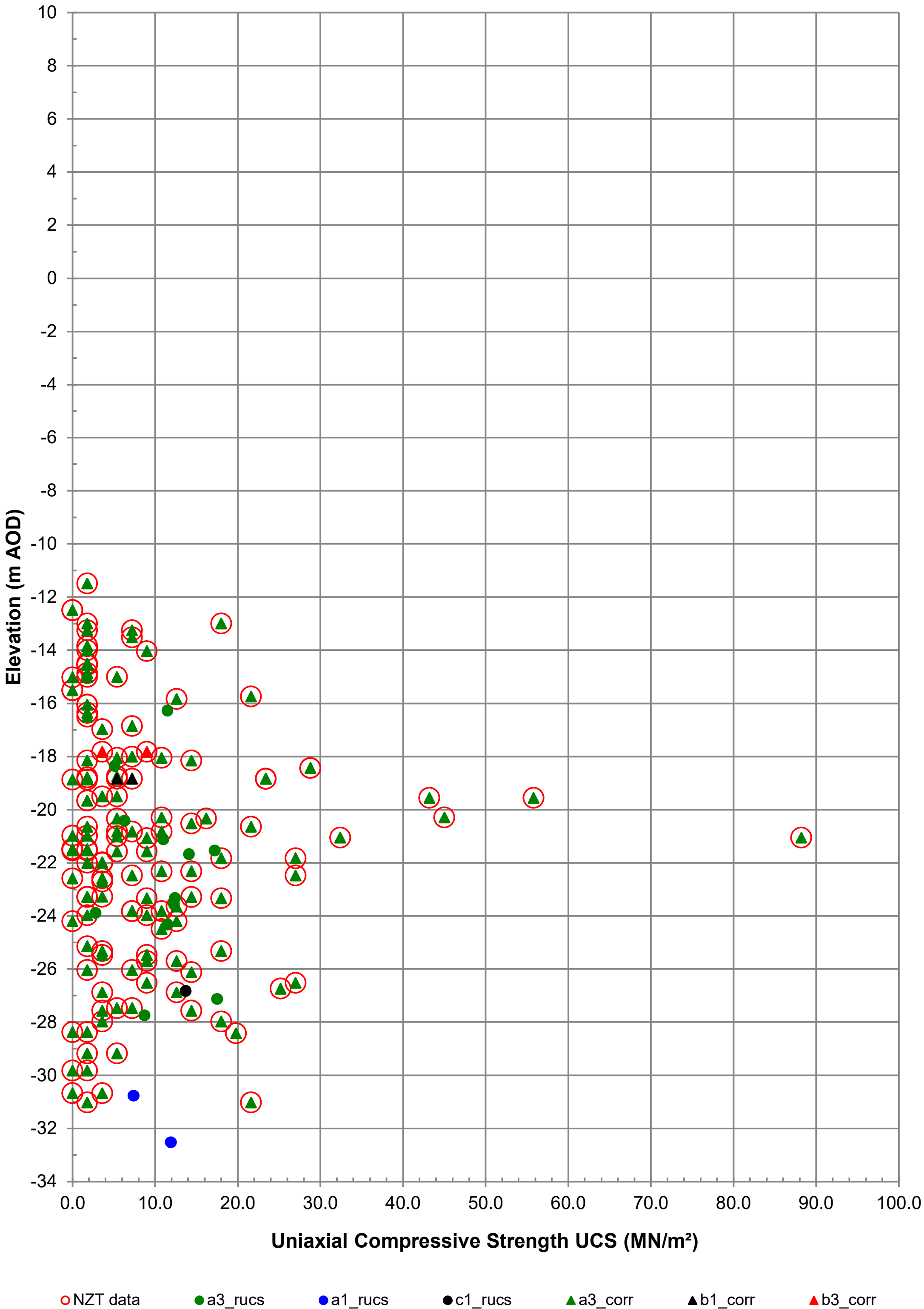


Client	bp	Figure title	**Correlated Uniaxial Compressive Strength vs Depth - All Strata**	Figure no. 9.51	Date 25/10/2021
Project title	Preliminary Onshore Ground Investigation for Net Zero Teesside		Project no. 60657467		AECOM



Client	bp	Figure title	Correlated Uniaxial Compressive Strength vs Elevation - All Strata	Figure no. 9.52	Date 25/10/2021
Project title	Preliminary Onshore Ground Investigation for Net Zero Teesside		Project no. 60657467	AECOM	

22. Appendix E Contamination Assessment - Preliminary Conceptual Site Model and Risk Assessment

A preliminary conceptual site model (CSM) was undertaken by AECOM as part of the AECOM Main Site Desk Study (AECOM 2020) and the Onshore Export CO_2 Export Pipeline Corridor Desk Study (AECOM 2021). Whilst the "Main Site" boundary defined within these reports did not include the potential expansion area to the south, the preliminary CSM is considered applicable and suitable for use for the preliminary CSM associated with this AECOM Ground Investigation Report. It provides a comprehensive assessment of the potential sources, receptors and pathways which are also applicable to the 2021 extended site boundary. Full details of the preliminary CSM are provided within the two AECOM desk study reports (AECOM 2020 and AECOM 2021). The information provided below provides a summary of the CSM.

The assessment methodology for the preliminary CSM was based on guidance provided in CIRIA C552 - Contamination Land Risk Assessment, A Guide to Good Practice. The risk assessment was preliminary in nature as further site-specific ground investigation and laboratory testing of environmental samples were required to confirm site conditions.

Potential sources, pathways and receptors were identified. This included a review of the previous ground investigations undertaken within the Main Site area (as defined in the AECOM Main Site Desk Study (AECOM 2020), including a screen of the soils, soils leachate and groundwater samples against generic assessment criteria (GAC) designed to be protective of human health (for the proposed commercial/industrial end use), surface water and groundwater. The previous ground investigations were undertaken by CH2M HILL in 2017 and AEG in 2018.

The review of potential contaminant linkages for development indicated possible geo-environmental constraints across the site from contamination as would be expected for industrial land associated with steel works activity. The potential contamination risks identified in the AECOM Desk Studies (AECOM 2020 and AECOM 2021) depended on the type of development proposed as well as the previous industry, therefore, they were considered according to site area.

A summary of the land contamination qualitative risk assessment is detailed in Table E.1 below. This has taken into account the results of the previous two ground investigations (CH2M HILL 2017 and AEG 2018).

22.1E.1Potential Sources

The potential **sources** were considered to be:

1. Teesside Works/Redcar Iron & Steel Works – Asbestos, metals, pH, acids, alkalis, sulfate
2. Tar Macadam Works/Redcar Iron & Steel Works - Coal tar PAH/TPH/VOCs/SVOCs
3. Infilled Land – Asbestos, PAH/TPH/VOCs/SVOCs, hazardous ground gas
4. Railways Land - PAH/TPH/VOCs/SVOCs
5. Petroleum Fuel Storage (also Benzol) – TPH
6. Brackish Water – chloride

- The locations of buildings and infrastructure associated with the Teesside Works/Tar Macadam Works/Redcar Iron and Steel Works and locations of railway land and infilled land are presented on Drawings 60559231-ACM-CTR005-002-DRG-002, 60657467-ACM-GIR-DRG-003 to 60657467-ACM-GIR-DRG-007.

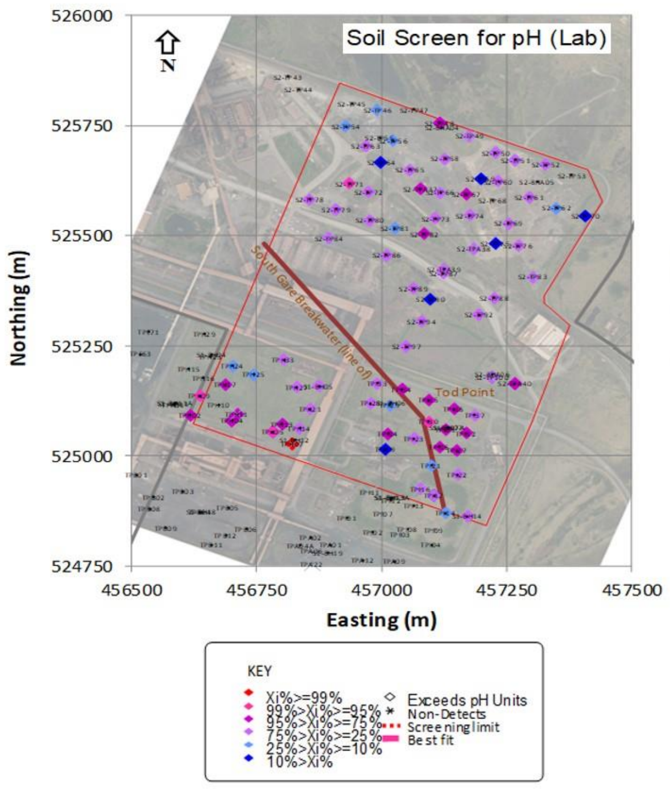
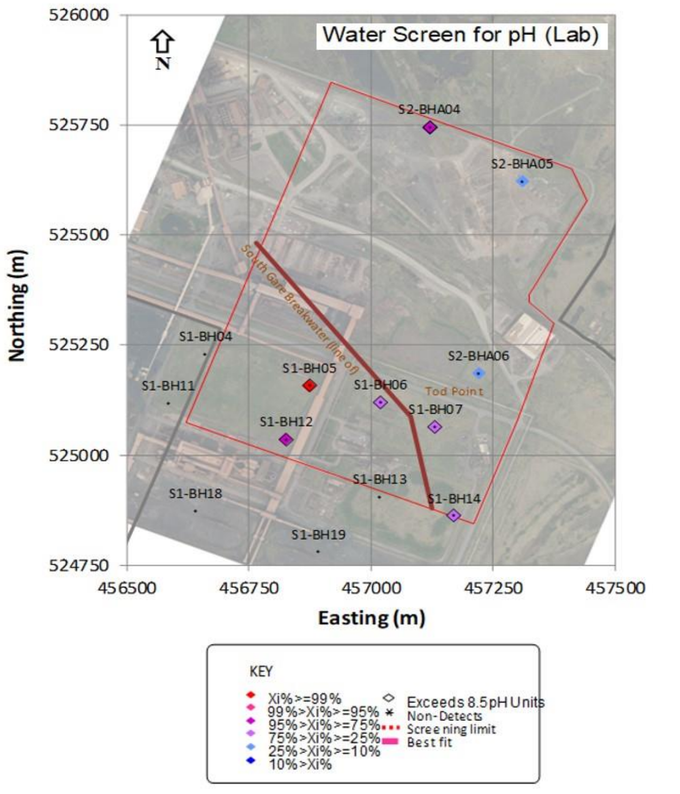
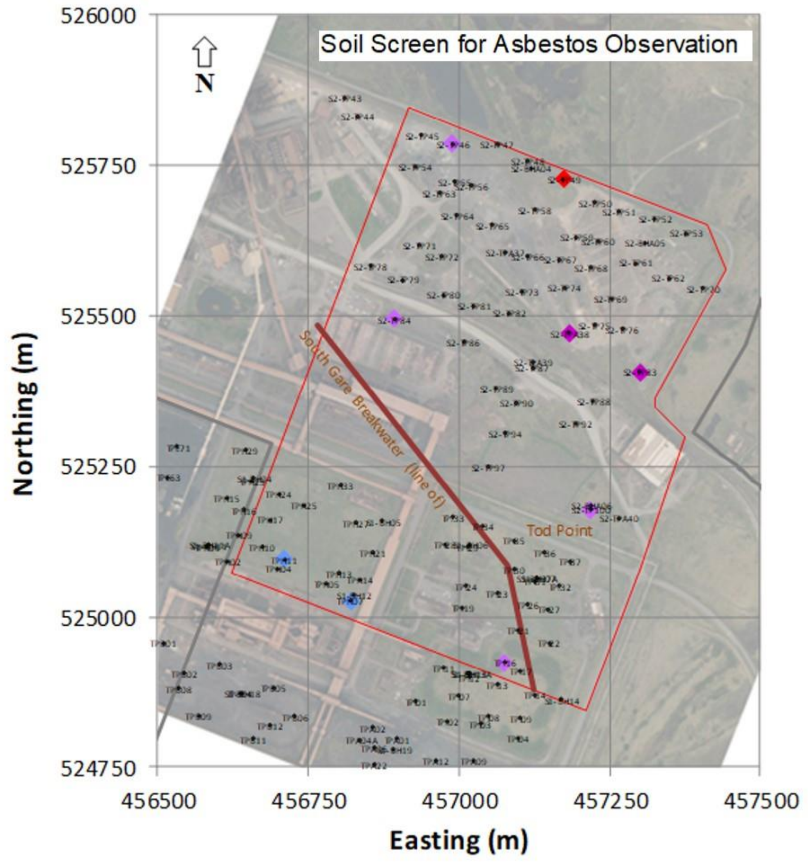
22.1.1 E.1.1Contaminant Screening (Previous Investigations)

The previous contaminant screening undertaken by AECOM as part of the desk study phase of works (AECOM 2020 and AECOM 2021) identified the following with regards to contamination within the soils and groundwater at and beneath the site. It was noted that central areas of open ground on the west of the site adjacent to the Phase III blast furnace stock house, and east of the site at the former location of Phase II steel foundry hearths and connecting tunnels had little or no investigation coverage.

The results of these preliminary stage investigations were used to develop the conceptual model to reduce uncertainty and plan further investigation. AECOM noted that whilst it may have been possible to rule out widespread contamination for some PCOCs, significant localised contamination may still have been present between exploratory holes or at unexplored depths.

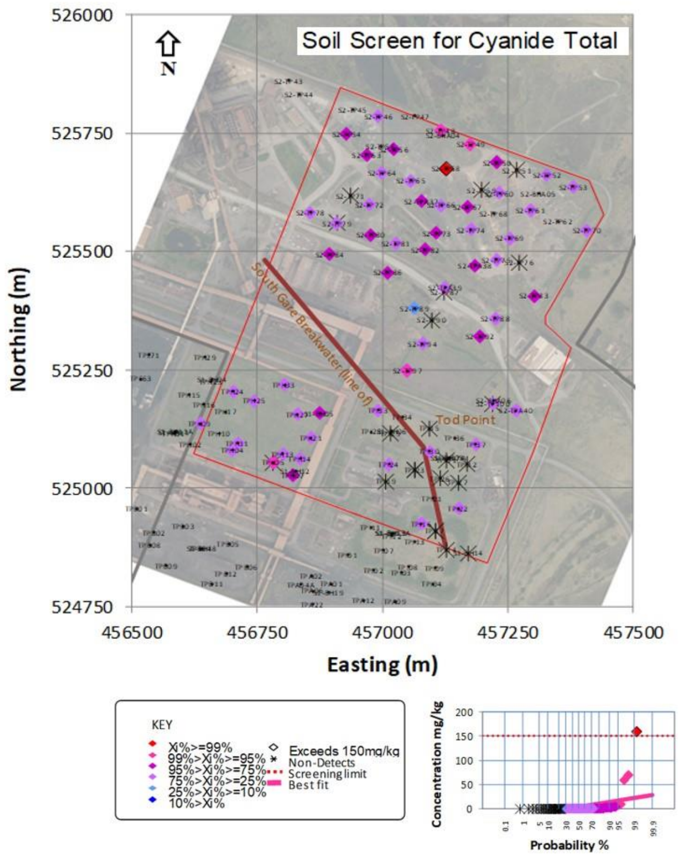
The results of environmental testing were screened against AECOM generic assessment criteria for a commercial/industrial end use and protection of sensitive controlled water receptors. A hierarchy of controlled water assessment criteria were selected with preference given to estuarine/surface waters over drinking water standards given that the shallow aquifers have a low resource potential. A summary of the findings and AECOMs comments are presented in Table E1 below. Figures have been included within this table from previous reports. These figures are presented to provide a quick visual assessment of the distribution of results across the site, with high concentrations/levels indicated by warmer colours (red-purple) and low concentrations/levels by cooler colours (blue). Each figure is presented at full scale in the AECOM 2020 Desk Study, to allow further detailed assessment. Where relevant, further discussion will be presented within Appendix H and I. For full details of the environmental screening and associated commentary, reference should be made to the AECOM Desk Study Reports (AECOM 2020 and AECOM 2021).

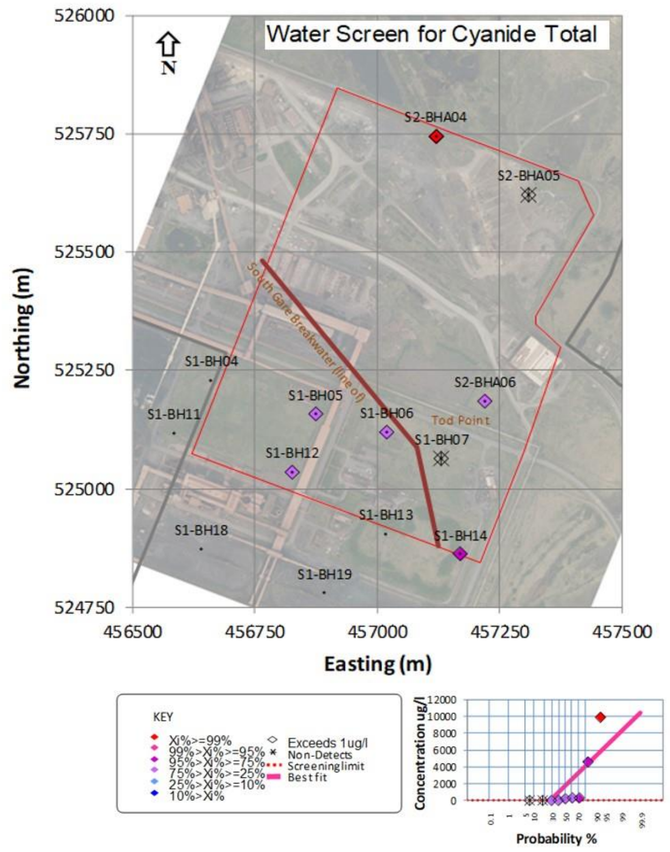
Table E.1 Summary of AECOM Screening of Chemical Data from Previous Investigations (AECOM, 2020)

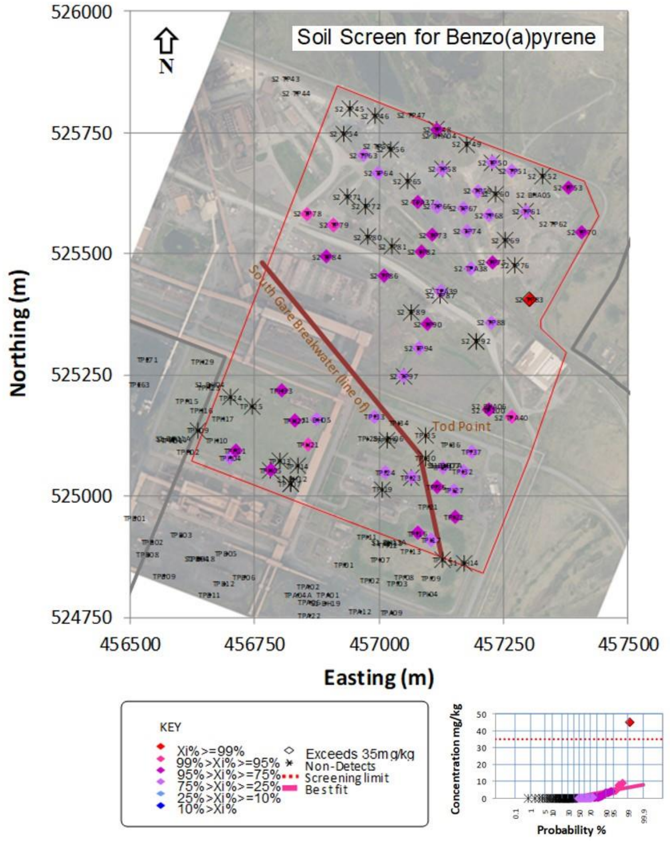
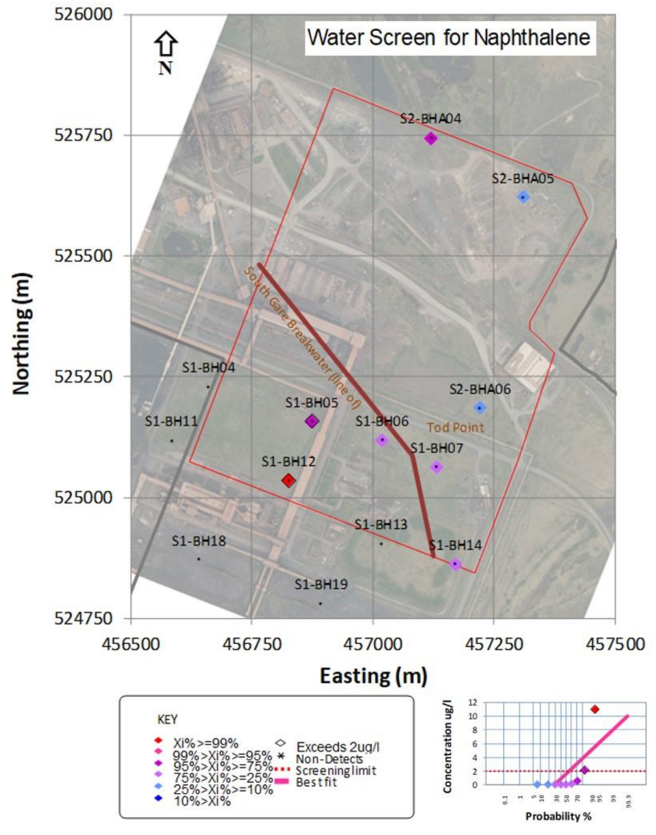
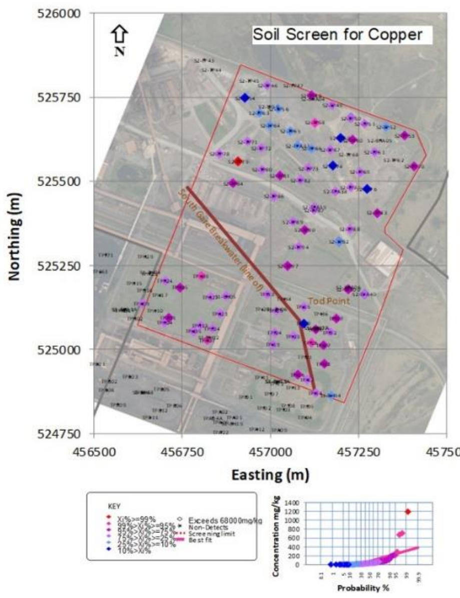
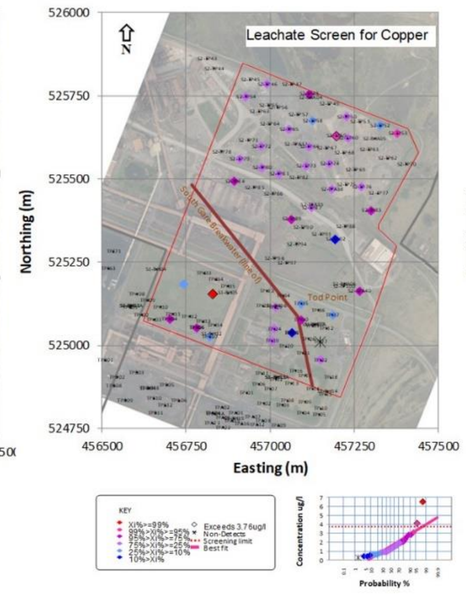
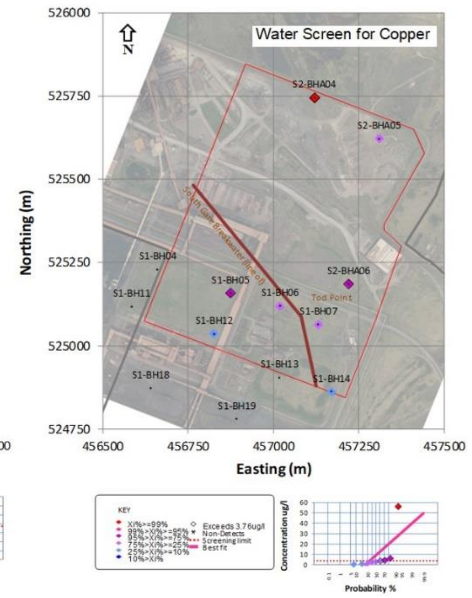
Determinand	Comment	Detailed Comment	Distribution (Figures taken and adapted from Appendix J of AECOM Desk Study (AECOM 2020))
pH	pH was found to be generally elevated in both soil and groundwater. The highest values were found within the southern half of the site.	High pH in soil derived dust is a hazard for construction workers therefore control of dust will be particularly important during groundworks. High pH in surface soils is also not desirable in finished landscaped areas and a clean cover layer may be required for any planting and to prevent generation of dust from bare soil. pH was also found to be elevated at several locations across the site in groundwater. High pH may help to mobilise amphoteric metals such as Zinc.	 
Asbestos	Chrysotile and Amosite asbestos “fibre bundles”, “clumps” and “loose fibrous asbestos debris” were observed in eight soil samples spread across the site at depths of between 0.2 m and 3.6 m.	Presence of asbestos fibres in these few samples, the nature of the industry carried out on the site, and the possibility for historical import of asbestos in uncontrolled fill (or before asbestos was widely recognised as a health risk) all mitigate against re-use of Made Ground at shallow depth unless it is processed to identify and remove ACM. The figure present locations of asbestos observations and samples tested with asbestos.	

Location	Depth (m)	Description
S2-TP49	2	Small bundle of Amosite fibres.
S2-TP83	3	Chrysotile present as loose fibrous asbestos debris.
S2-TPA38	3.6	Chrysotile present as loose fibrous asbestos debris.
S2-TP100	0.2	Chrysotile present as small clumps and fibre bundles.
S2-TP84	0.5	Chrysotile suspected but not confirmed.
S2-TP46	2	Small bundles of Amosite seen.
TPI16	4	Bundle of Chrysotile fibres.
TPH07	2	Amosite present as fibre bundle.
TPH11	1.7	Amosite present as fibre bundle.

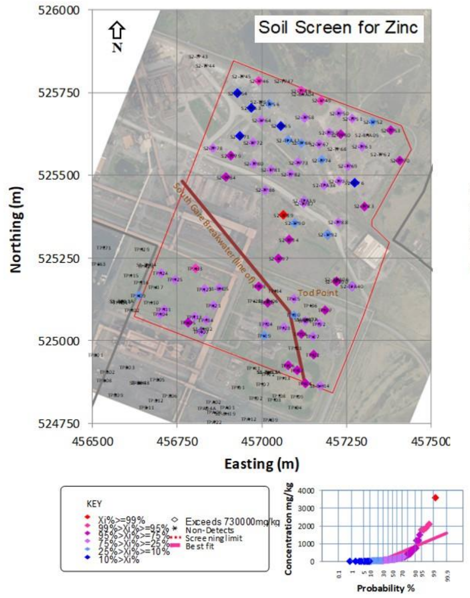
Determinand	Comment	Detailed Comment	Distribution (Figures taken and adapted from Appendix J of AECOM Desk Study (AECOM 2020))
Coke Works Wastes	Testing of total concentrations showed that most PCOCs identified as part of the preliminary CSM (PAH/TPH/VOCs/SVOCs, inorganics, metals) were present at acceptable concentrations for the relatively insensitive industrial land use with very few exceptions	-	
Coke Works Wastes - Cyanide	Total Cyanide of 160 mg/kg in S2-TP58 (slag) at 3.6m bgl exceeding the screening level of 150 mg/kg for industrial use (human health)	The exceedance of the screening level for cyanide is marginal and a defined hotspot. However, it was noted that evidence on the ground on the northwest boundary of the site indicates presence of complex cyanides (Prussian Blue / Blue Billy), possibly due to oxidation of arisings from exploratory holes. Distributions for total cyanide concentrations for soils and for groundwater indicate locally elevated concentrations adjacent to the boundary. Notably the highest total cyanide concentrations corresponded with very high concentrations of iron, which supported the interpretation that these result from disposal of spent oxides from coking works. Concentrations of thiocyanate for soil and groundwater indicated that other areas are impacted by coking wastes or slag to the apparent detriment of shallow groundwater within Made Ground on the site. The data were considered not sufficient to assess the impact if any to controlled waters or the surrounding land. However, it should be noted that the main area of coke works lies off-site to the north west, and areas to the south upgradient in the direction of groundwater flow are also impacted.	See figures below

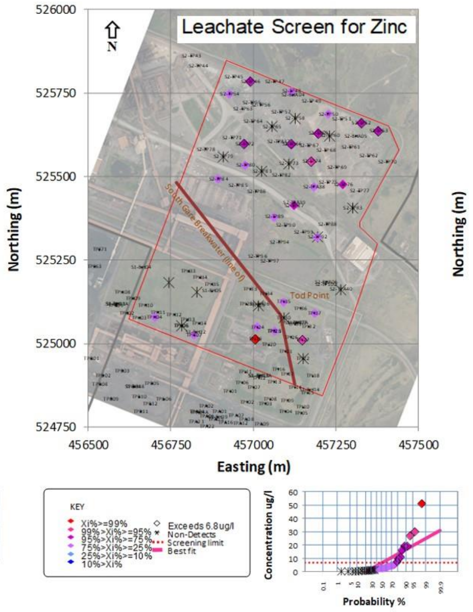


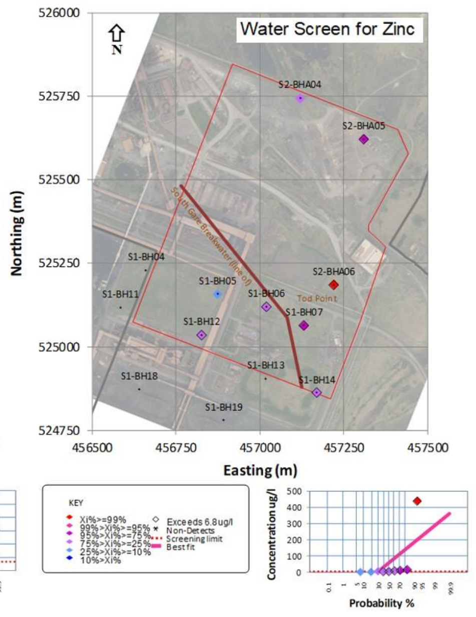


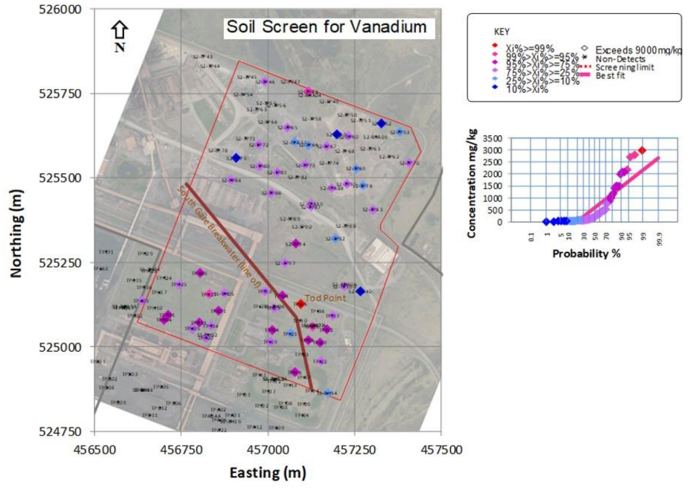
Determinand	Comment	Detailed Comment	Distribution (Figures taken and adapted from Appendix J of AECOM Desk Study (AECOM 2020))
Coke Works Wastes – PAHs/VOCs	Soil: S2-TP83 (granular Made Ground) at 3m bgl exceeded the screening limit for industrial use (human health)of 35 mg/kg for benzo(a)pyrene (45 mg/kg) and 15 mg/kg as a surrogate for Coal Tar, together with benzo(b)fluoranthene and dibenz(a,h)anthracene. Fluoranthene and naphthalene were both detected in groundwater at concentrations in excess of their screening criteria protective of controlled waters.	Only S2-TP83 sample contained concentrations of coal tars in excess of the screening limit for benzo(a)pyrene or other PAHs. Due to the variable nature of coal tar concentration, which is likely to be controlled by local activities, such as storage and transport of coking by-products or use of coal tars in construction there is a risk that high PAH concentrations may occur in some locations. However, the evidence suggested that concentrations were generally acceptable for an industrial end use. Concentrations of one or more PAHs and, in particular, fluoranthene were elevated above the screening level in most of the water samples. However, in comparison with the solubility in water of the higher molecular weight PAHs it was considered that some or most of the PAH must be attached to suspended solids in the water samples. PAHs are generally relatively immobile in the sub-surface and in the absence of a free-phase it is unlikely there would be significant impact off the site. Benzene and naphthalene are shown as marker substances for groundwater impact from both petroleum fuels and coal tars (also coal tar derivative Benzol). Benzene is generally absent or identified rarely in the southern half of the site found at the detection limit of 1 µg/l (i.e. did not exceed the GAC). However, Naphthalene in groundwater was identified exceeding its GAC at S1-BH12 and S1-BH05.. It is worth noting that there were no boreholes in the vicinity of the former fuelling station purported to be in the vicinity of the Blast Furnace Stockhouse.	 
Metals	Concentrations of metals found in samples from the site did not exceed the screening levels for human health. Some concentrations of metals were found to be slightly elevated in prepared leachates and groundwater in relation to screening criteria protective of controlled waters.	Concentrations of copper in four of nine groundwater samples are only marginally above the screening level of 3.76 µg/l except for the relatively high concentration of 56 µg/l found at BHA04 (4.6m bgl) on the northern edge of the site. This corresponds with the area of suspected spent oxides and high vanadium concentrations detected in soils. Generally, concentrations of copper do not appear to be significantly elevated. Concentration of zinc in groundwater also has one high outlier value of 440 µg/l compared to a screening value of 6.8 µg/l. However, this sample is located in the southern half of the site at S2-BHA06 (3.35m bgl). Five of the nine other samples also exceed the screening level however they are of the same order of magnitude and do not take account of the background concentration of zinc used. to adjust the screening criteria Concentrations of both copper and zinc in soils appear to be generally higher on the southern half of the site. However, there are outlier high values in the northern half, with slightly elevated concentrations of zinc being co-located with high total cyanide concentrations on the northwest site boundary. Vanadium was likely to have been first used in the early twentieth century when for example it was found to be useful in the manufacture of steel used in armour plating and car parts. Wastes from steel rolling mills from operation of Phase II (1919-onwards) and imported landfill materials in the 1950's are more likely to	  

Determinand	Comment	Detailed Comment	Distribution (Figures taken and adapted from Appendix J of AECOM Desk Study (AECOM 2020))
		contain vanadium than materials used for construction of South Gare or the Phase I and II works. Vanadium may also occur as a contaminant of petroleum spills in any fill however soils without TPH contamination would not likely be affected. Concentrations of vanadium fit the general pattern for metals and are evidently higher in the southern half of the site, with one notable exception on the northern boundary of the site at S2-TP48 at 0.8m bgl and 4.2m bgl. Vanadium marginally exceeded groundwater EQS in two locations (S1-BH07 and S1BH05. However, none of the soil leachate concentrations were recorded greater than the EQS	See figures below









22.2E.2Potential Pathways

The potentially viable **pathways** were:

- Ingestion/skin contact;
- Dust Inhalation;
- Vapour Inhalation;
- Explosion/Asphyxiation;
- Plant Uptake/Phytotoxicity;
- Leaching to surface water;
- Leaching to groundwater;
- Lateral groundwater migration;
- Corrosion/chemical attack;
- Permeation of pipes; and
- Exposure to contaminated water.

22.3E.3Potential Receptors

The potential **receptors** were:

- Groundworkers (involved in construction across the site and future site occupants)
- Members of the general public (offsite for the main site, on site for the CO_2 pipeline corridor)
- Surface waters (River Tees and Tees Bay)
- Tidal Flat Deposits and subsidiary Blown Sands - Secondary A aquifer
- Bedrock – Secondary undifferentiated (Redcar Mudstone Formation) and Secondary B aquifer (Penarth Group and Mercia Mudstone Group)

22.4E.4Preliminary Conceptual Site Model and Risk Assessment

The risk ratings presented below are those potential contamination linkages which were assessed as being potentially a moderate/low risk or higher to the receptors identified above based on the sources and pathways identified.

Table E.2 Summary of the preliminary land contamination qualitative risk assessment

Industry	Source Substance/Class	Receptor	Main Site* Risk rating	CO_2 Onshore Export Pipeline Corridor
Teesside Works/Redcar Iron & Steel Works	Asbestos	Ground workers	High	Moderate
		Future Site users	Moderate	N/A
		General Public	N/A	Moderate/low
	pH, acids, alkalis, sulfate, ammonia, cyanides	Ground workers	Moderate/low	Moderate/low
		General Public	N/A	Moderate/low
		Infrastructure	Moderate/low	Moderate

Industry	Source Substance/Class	Receptor	Main Site* Risk rating	CO_2 Onshore Export Pipeline Corridor
Tar Macadam Works/Redcar Iron & Steel Works	Coal tar PAH/TPH/VOCs/SVOCs	Ground workers	High	High
		Future Site users	Moderate	N/A
		General Public	N/A	Moderate
		Groundwater & surface water	Moderate/low	Moderate/low
		Infrastructure/utilities	Moderate/low	Moderate
Infilled Land	Asbestos	Ground workers	Moderate/low	Moderate/low
	PAH/TPH/VOCs/SVOCs	Ground workers	Moderate/low	Moderate/low
	Hazardous (ground) gas	Ground workers	Moderate/low	Moderate/low
Railways Land	PAH/TPH/VOCs/SVOCs	Ground workers	Moderate/low	Moderate/low
Petroleum Fuel Storage (also Benzol)	TPH	Ground workers	Moderate	N/A
		Site users	Moderate/low	N/A
		Infrastructure/utilities	Moderate/low	N/A
		Groundwater & Surface water	Moderate/low	N/A
Brackish Water	Chloride	Infrastructure	Moderate	Moderate

*Excluded potential expansion area to the south. However, risk ratings remain the same.

23. Appendix F Human Health Generic Quantitative Risk Assessment

23.1 F.1 General

The preliminary CSM provided in Appendix E identified potential risks to groundworkers, site users and the general public from a variety of contaminants in soil including, asbestos, pH, acids, alkalis, sulfate, ammonia, cyanides, coal tar, and PAH/TPH/VOCs/SVOCs from the contaminative use activities undertaken at the site.

The previous contaminant screening of the two previous ground investigations (CH2M HILL 2017 & AEG 2018) undertaken by AECOM indicated high pH, asbestos, isolated occurrences of cyanide, and PAH at concentrations which may pose a risk to human health based on a commercial/industrial end use.

A repeat of the screening exercise undertaken previously as part of the AECOM 2020 and AECOM 2021 Desk Study work has not been undertaken as part of this scope of works and reference should be made to the desk study report for detailed finding of the historic chemical data. Figure F.1 below identifies the limited locations where soils exceedances for a commercial industrial end use were identified during the previous soil screening. The red locations represented locations where an SSV (soil screening value) had been exceeded and represented a higher hazard. Amber locations were deemed as an intermediate hazard and green as low hazard potential. Figure F.1 has been adapted from figures included within Appendix K of the AECOM 2020 desk study.

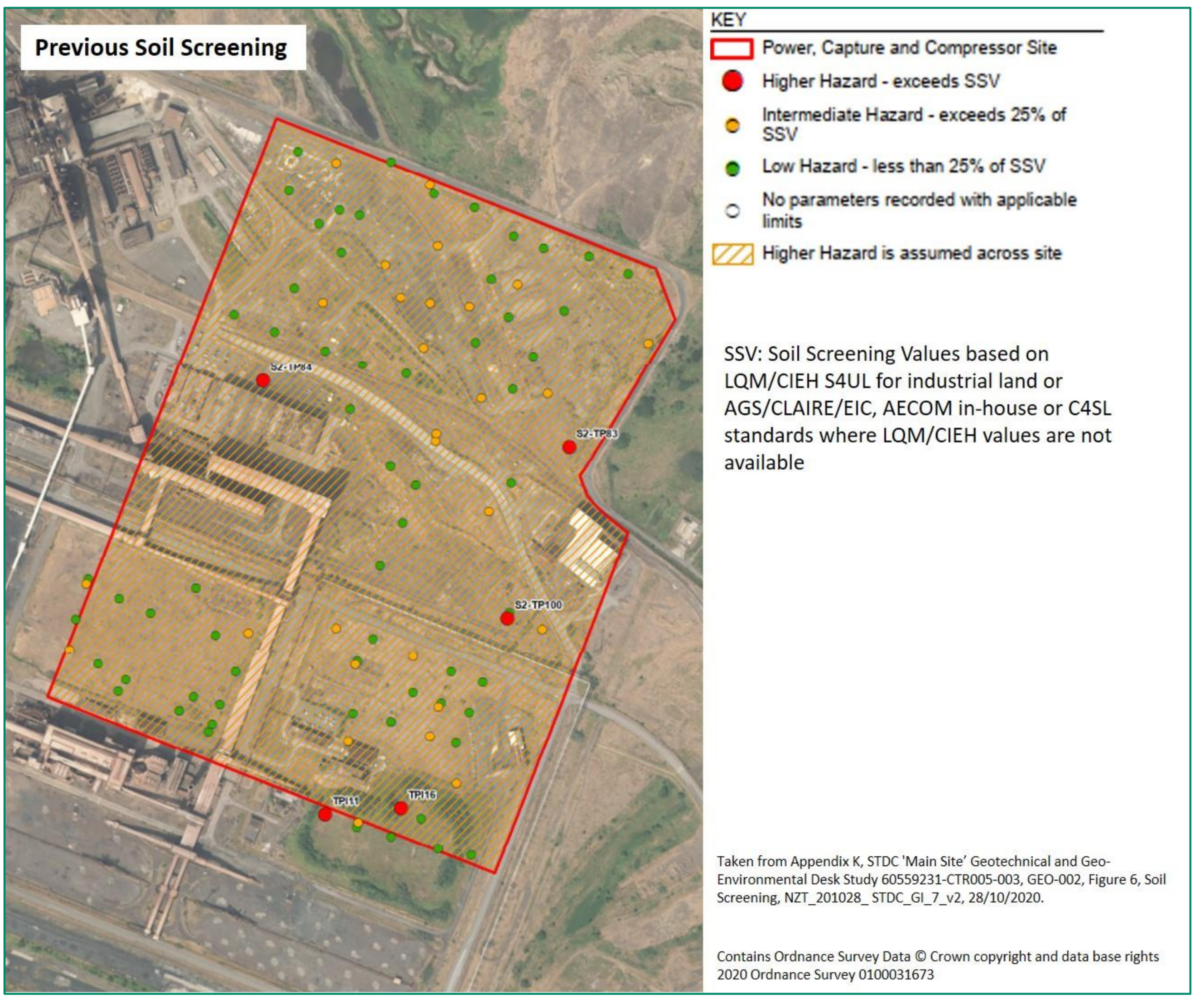


Figure F.1 Previous Soil Screening Hazard Plot (CH2M HILL 2017 and AEG 2018 Previous GI investigations)

23.2F.2 Human Health Generic Quantitative Risk Assessment

The findings of the ground investigation and chemical analysis undertaken, together with the initial CSM established in Appendix E, have been used as the basis for undertaking a human health Generic Quantitative Risk Assessment (GQRA). The GQRA aims to quantify the potential risks identified in relation to the potential sources and linkages previously summarised in the initial CSM through the screening of chemical soil sample data.

The CSM identifies potential source-pathway-receptor contaminant linkages that may require further assessment. This is consistent with the tiered approach advocated by the Environment Agency's online guidance for the management of land contamination, LCRM.

An assessment of the potential significance of the concentrations detected in soil during the ground investigations conducted to date has been undertaken against Evaluation Criteria (EC) that are intended to be protective of human health based on a proposed future commercial/industrial end use.

The EC provide a conservative means of initial assessment and provide the basis for screening out potential contaminants that do not warrant further consideration or action (i.e. the level of risk associated with the determinand is acceptable and not of concern).

Where applicable and appropriate, the assessment has been divided into two sets of data, comprising those soils samples obtained from ground level to 2.5m bgl and those below 2.5mbgl to aid with the assessment of bp's potential liabilities associated with this project.

23.2.1 F.2.1 Human Health Assumptions and Criteria Used

Risks to human health have been primarily assessed in accordance with the Contaminated Land Exposure Assessment (CLEA) methodology.

Risks to potential future site users (commercial/industrial users) and off-site users from potential contamination within the soils at the site have been assessed. Risk to construction workers are considered separately.

Soil EC have been published for numerous contaminants by both regulatory and industry recognised bodies. Where EC have not been published, AECOM has derived its own EC values using industry recommended and accepted methods.

EC have been derived for a commercial/industrial land use in order to assess the risk from soils to future site users. The assessment serves to quantify the available soils data and provide an understanding of the overall baseline condition of the soil quality within the site boundary.

It is noted that the commercial/industrial human health EC are not based on any aesthetic consideration of soil quality, nor suitability for plant health (re: any proposed landscaping), nor suitability for subsurface utilities.

The derivation of the EC for human health includes the following assumptions:

- Contaminants are present in the top 1m of the ground profile and there is a viable pathway to the surface;
- Contaminants are present at depths below 1m of the ground profile which may be exposed during excavation/construction works/ final formation levels.
- Soil at the site has a total organic carbon (TOC) geometric mean content of 0.52% (0.9% soil organic matter (SOM)); varying between <0.058% to 1.92% (<0.1 to 3.4% SOM). The geometric mean TOC for Made Ground and the natural stratum is similar, 0.94% and 0.84% respectively. Therefore, a TOC range of 0.58% to <1.45% has been used in selecting the appropriate EC; and
- Soils are deemed to be most representative of a 'sandy loam' type soil.

The following hierarchy has been adopted in selecting the appropriate EC to use for the potential contaminants of concern to screen as part of this assessment:

- Defra (2014) SP1010: Development of Category 4 Screening Levels for Assessment of Land Contamination - Policy Companion Document, December 2014. Commercial/industrial. 1% Soil Organic Matter (SOM);
- CL:AIRE (2021) CL:AIRE Category 4 Screening Levels: Vinyl chloride, trichloroethene (TCE), tetrachloroethene (PCE) 1% SOM;
- LQM/CIEH Suitable 4 Use Levels (2015). Commercial/industrial. 1% SOM; and
- USEPA RSL (May 2020).

The Hazardous Waste value of 11.5 (HP8 – corrosive) as per the Environment Agency “Guidance on the Classification and Assessment of Waste (1st Edition v1.2.GB), Technical Guidance WM3A, has been used for pH to assess acute human health risk from the alkaline soils at the site.

The Environment Agency Report ‘The UK Approach for Evaluating Human Health Risk from Petroleum Hydrocarbons in Soils’ (SR: P5-080/TR3, 2005) states that even where guideline values for the individual TPH fractions are not exceeded, potential additive toxicological effects between the fractions may result in a potential risk to human health. The suggested approach to address this issue is to calculate Hazard Quotients (HQ) for each fraction by dividing the recorded concentration of the fraction by the corresponding guideline value. These HQ are then summed to form an overall Hazard Index (HI). Where the HI exceeds 1, further risk assessment or an appraisal of remedial works should be undertaken; where HI is less than one, no further action is required.

The calculated HQ and HI from the soil samples obtained across the site have been calculated in respect to assessment criteria for commercial/industrial end use and are presented in Appendix I.

The methodology and assumptions presented for human health in this assessment are not applicable to the short-term, and typically high frequency of exposure experienced by construction/maintenance workers. It has been assumed that the risk to this receptor group will be appropriately managed through construction health and safety legislation and practice including for groundworkers to assess site specific risk to health and incorporate appropriate mitigation. Personal protective equipment will also be a minimum requirement for site workers. The main potential contamination linkages applicable to construction/maintenance workers are:

- Direct contact with, or ingestion of, contaminants within soils, groundwater, and soil derived dust;
- Inhalation of organic vapours from soils, groundwater, and soil derived dust (primarily asbestos); and
- Ground gas inhalation/explosion risk.

However, AECOM has derived its own construction worker GAC values for chronic exposure, based on the assumptions made in SoBRA (2020) Development of Acute Generic Assessment Criteria for Assessing Risks to Human Health from Contaminants in Soil, Version 2.0, Society of Brownfield Risk Assessment, July 2020 and in accordance with UK Environment Agency (EA) guidance and the methodology set out within the Contaminated Land Exposure Assessment (CLEA) Model framework. Therefore, a quantitative assessment of the potential risks to human health for construction workers has been included as part of this assessment.

23.2.2 F.2.2 Human Health – Soil Results

Soil samples obtained during the recent ground investigation were analysed for a range of determinands and the results were screened against the EC for a commercial/industrial end use. This included results from 70 Made Ground samples and 41 natural stratum samples.

There were no exceedances of the EC from the soil samples obtained from the AECOM 2021 ground investigation with regard to chronic risks to human health.

23.2.2.1 F.2.2.1 pH

A total of eight samples recorded pH in the soil in excess of pH 11.5. Although not directly applicable to human health, this is a value taken from Environment Agency “Guidance on the Classification and Assessment of Waste (1st Edition v1.2.GB), Technical Guidance WM3A”, where waste with a pH ≤ 2 or ≥ 11.5 should be considered HP8 Corrosive.

Therefore, with regard to protection of groundworkers this is considered to be an arbitrary value on which to screen the soil data. The exceedances are presented in the Table F.1 below and Figures F.2 and F.3.

Table F.1 Summary of pH greater than 11.5 pH value identified within the Site Boundary

Location	Sample Depth	pH Value	Geology
0.0 to 2.5m bgl			
LF\BH02	0.3	12	Made Ground
MS\BH03	0.5	11.6	Made Ground
MS\BH10	1.0	11.5	Made Ground
MS\BH13	0.5	12.2	Made Ground
MS\BH14	0.3	11.7	Made Ground
>2.5m bgl			
MS\BH11	5.0	11.6	Tidal Flat Deposits - Sand
MS\BH15	2.7-2.9	11.6	Made Ground
MS\TP07	4	11.9	Made Ground

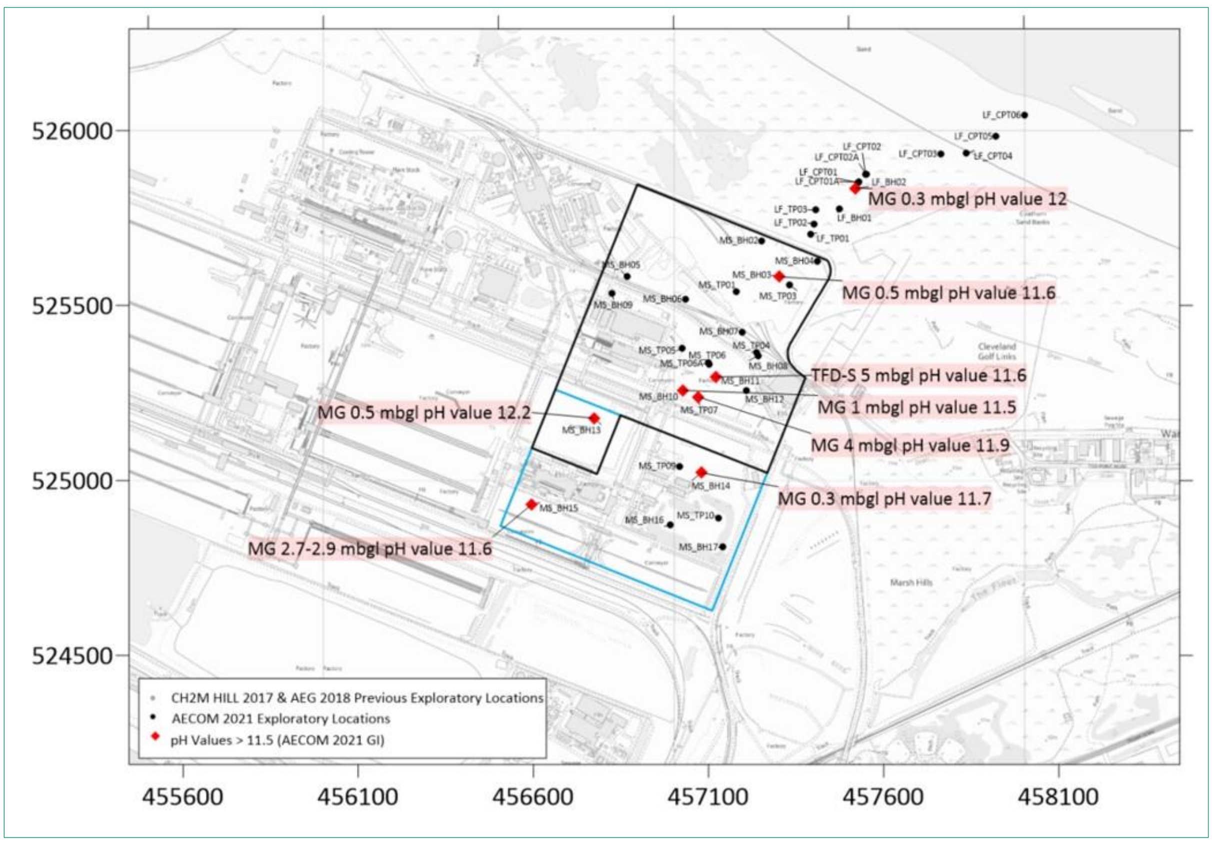


Figure F.2 AECOM 2021 GI – pH values exceeding pH 11.5 (corrosive)

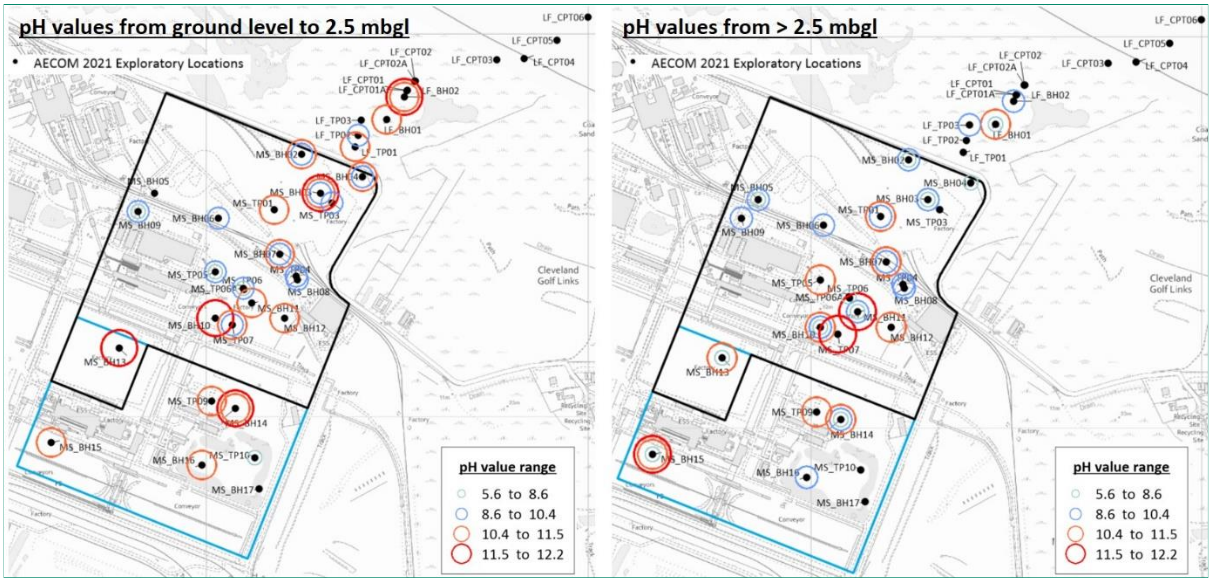


Figure F.3 AECOM 2021 GI – Distribution of pH values within ground level to 2.5m bgl & >2.5m bgl

The distribution generally shows that pH values are highest within the shallower material, in particular in the northern section of the Main Site and the Onshore CO_2 Export Pipeline Corridor, when compared to the values below 2.5m bgl within these areas. However, the central and southern areas of the site indicate that pH values are high in both the shallow and deeper soils.

High pH in dust in soils is a hazard for construction workers therefore control of dust will be particularly important during groundworks. Control measures during ground works should be considered such as minimisation of simultaneously open cut areas, damping down and water spraying as part of a managed system of dust control.

23.2.2.2 F.2.2.2 Hazard Quotient for TPH Assessment

The Environment Agency Report "The UK Approach for Evaluating Human Health Risk from Petroleum Hydrocarbons in Soils" (SR:P5-080/TR3, 2005) states that even where guideline values for the individual TPH fractions are not exceeded potential additive toxicological effects between the fractions may result in a potential risk to human health.

The suggested approach to address this issue is to calculate Hazard Quotients (HQs) for each fraction by dividing the recorded concentration of the fraction by the corresponding guideline value. These HQs are then summed to form an overall Hazard Index (HI). Where the HI exceeds 1, further risk assessment or an appraisal of remedial works should be undertaken; where the HI is less than 1 no further action is required.

The calculated Hazard Quotients (HQs) from locations across the site have been calculated in respect to assessment criteria for Commercial Industrial use and are presented in Appendix I. All samples analysed for speciated TPH recorded the Hazard Index (HI) below 1. The HI ranged from 0.0003 to 0.13. Therefore, the risks associated with the cumulative toxicological effects from the combined TPH species is are low and thus no further assessment is required.

23.3F.3 Asbestos Analysis and Assessment

A total of 50 samples of Made Ground were analysed for the presence of asbestos. Of these, eight were identified as containing asbestos material, of which 7 were scheduled for asbestos quantification analysis.

The exceedances are presented in Table F.2 below and presented within Figure F.4

Table F.2 Summary of asbestos identified within the Site Boundary

Location	Asbestos Type	Asbestos Containing Material Types Detected	Quantification
0.0 to 2.5m bgl			
MS\BH04 @ 0.5mbgl	Chrysotile	Bundle of fibres	<0.001 (mass %)
MS\BH06 @ 0.5mbgl	Chrysotile	Bundle of fibres	<0.001 (mass %)
MS\BH09 @ 0.5mbgl	Chrysotile	Bundle of fibres	<0.001 (mass %)
MS\BH11 @ 0.5mbgl	Amosite	Bundles of fibres	<0.001 (mass %)
MS\TP05 @ 0.5mbgl	Chrysotile	Bundle of fibres	<0.001 (mass %)
>2.5m bgl			
MS\BH14 @ 4.2 to 4.4m bgl	Chrysotile	present in microscopic cement debris	0.001 (mass %)
MS\TP06 @ 3.8m bgl	Chrysotile	Bundle of fibres	-

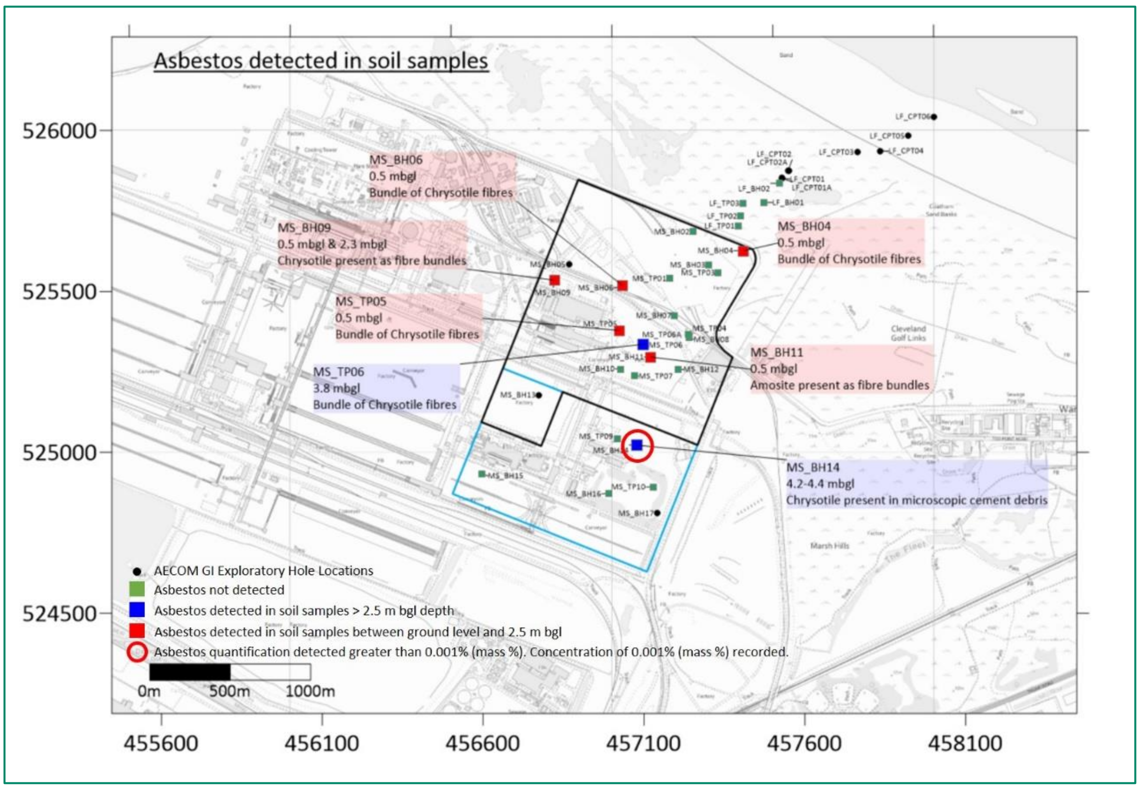


Figure F.4 AECOM 2021 GI – Distribution of asbestos within the Made Ground

Given that asbestos is a key contaminant of concern with regards to human health and should be a fundamental part of any remedial works being undertaken at the site, it is considered prudent to assess the AECOM 2021 data in context with the previous investigations undertaken at the site. Figure F.5 presents the historic data in terms of asbestos detections found above and below 2.5m depth and the locations of those where quantification testing was undertaken and the results of the quantification analysis.

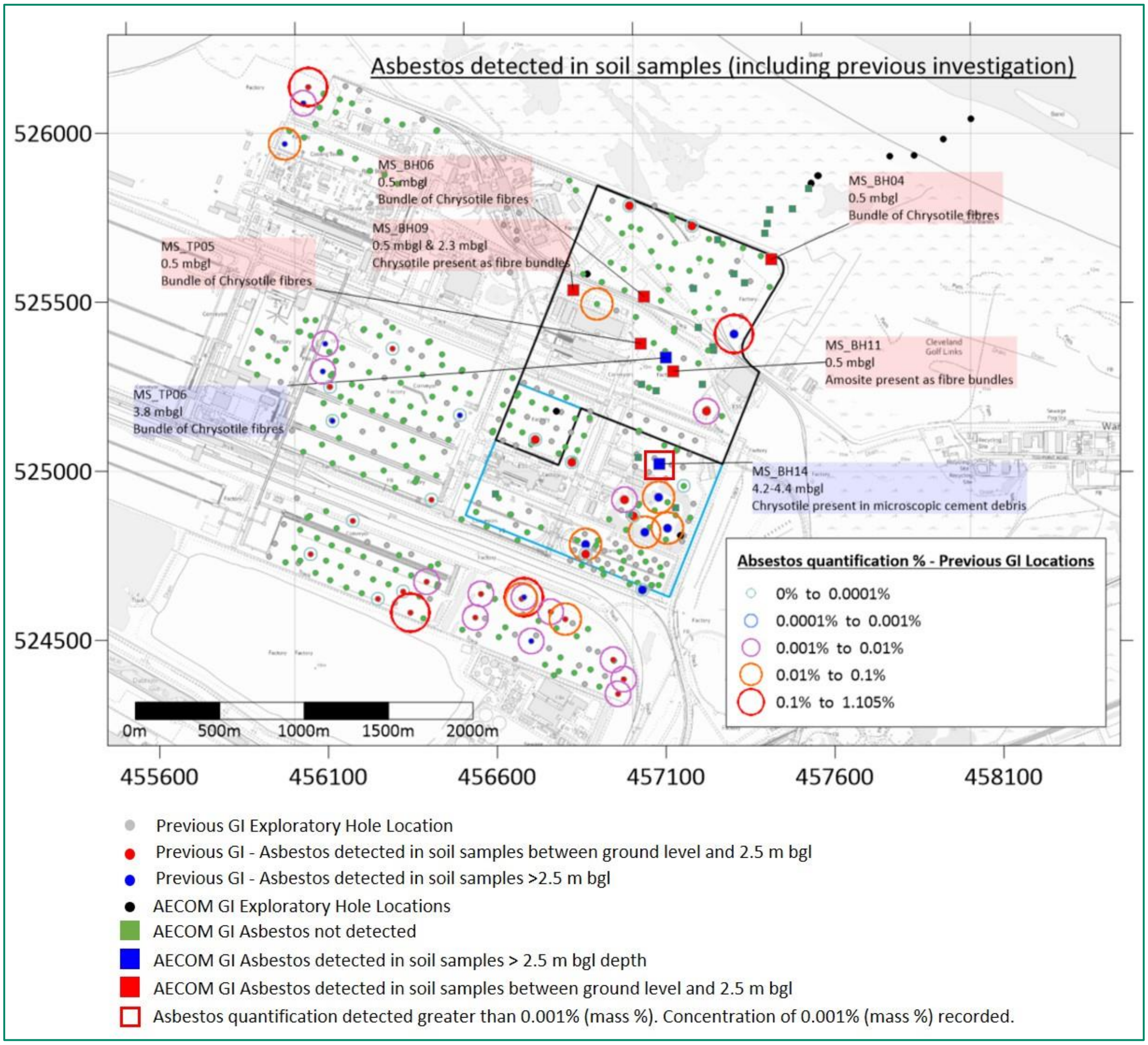


Figure F.5 Distribution of asbestos within the Made Ground on and off site including previous investigations

Based on the information within Figure F.5, it is noted that asbestos is generally recorded at depths below 2.5m within the southeast corner of the site (within the proposed expansion area), with asbestos quantification % mass where detected, was between 0.002 and 0.047% within samples analysed as part of the historic data set in this area. This area is in the location of the former Pelletizer Plant and the southern section of the former steel plant (Drawings 60559231-ACM-CTR005-002-DRG-002, 60657467-ACM-GIR-DRG-003 to 60657467-ACM-GIR-DRG-007). The AECOM 2021 GI results provide a confirmatory pattern, with the presence of asbestos at depth in this area (MS/BH14, 4.2 to 4.4m bgl), together with the only detectable quantification result noted as part of the AECOM GI also being recorded in this sample.

The main bulk of asbestos detections and greater % mass concentrations are detected off site to the south of the site, beyond the Sinter Stockpiles (former conveyor area).

Of all the samples analysed (AECOM GI 2021 and the previous investigation data) for asbestos it is noted that no exploratory hole locations were identified as having asbestos detected both above and below 2.5 m bgl. The closest to this occurring was MS\BH09 where asbestos was detected at both 0.5m bgl and 2.0 to 2.3m bgl.

Scattered asbestos detects are located elsewhere across the main site, although these are less densely populated with most soil samples taken not observing or detecting asbestos containing material. However, the greatest mass % of fibres noted within the Main Site boundary was detected in the northeast of the site during the previous ground investigation, 0.333% mass % was recorded. It should be noted that no investigation has been undertaken in the location of Area workshops or the Furnace Stockhouse in the central western section of the Main Site. This is due to presence of the building structures remaining present during the different phases of the works.

23.4F.4 Construction Worker Assessment

It is considered, based on the proposed development / end use of the site as Carbon Capture, Utilisation and Storage (CCUS) facility and the connecting Onshore CO_2 Export Pipeline Corridor and the redevelopment / earthworks taking place, that a quantitative assessment should be made of the potential risks to human health for construction workers. The commercial EC used in Sections F1 to F2 to assess risks to human health are not considered appropriate as a reliable indicator of risk to construction workers as the EC for this scenario are based on different assumptions about viable exposure pathways, and the frequency, duration and rates of exposure.

It should be noted, the risks from asbestos is specifically excluded from this methodology. The assessment for asbestos must be undertaken in accordance with the ‘CL:AIRE (2016) Control of Asbestos Regulations 2012 Interpretation for Managing and Working with Asbestos in Soil and Construction and Demolition Materials, Industry guidance, CAR-SOIL, CL:AIRE, London, 2016’ (CAR-SOIL 2016) and associated industry guidance.

The construction worker assessment details both acute and chronic exposure risk. Acute risk is associated with one-off or short-term exposure to relatively high contaminant concentrations (e.g. “hotspots”) whereas chronic exposure is associated with frequently repeated long-term exposure to average concentrations.

Acute risks can be assessed by comparison to the acute EC (AEC) derived by the Society of Brownfield Risk Assessment (SoBRA) in 2020. These were derived for seven contaminants: arsenic, benzene, cadmium, free cyanide, phenol, trichloroethene (TCE) and vinyl chloride (VC). These were derived for two groups of receptors: members of the public and workers involved with excavations. Exposure scenarios considered for the latter are:

- Oral exposure – short-term exposure via direct contact with outdoor soil on the assumption that personal protective equipment (PPE) is not worn;
- Dermal exposure – short-term exposure via direct contact with outdoor soil on the assumption that PPE is not worn; and
- Inhalation exposure – short-term exposure via inhalation of dusts or vapours released from excavation activities without the use of PPE. Note that the exposure is assumed to occur for a worker at ground level at the top of the excavation. It does not apply to construction workers entering excavations.

A summary of the determinands where a published SoBRA AEC is present are shown below.

Table F.3: Summary of determinand concentrations against acute construction worker EC

Determinand	Number. of samples Exceeding AGAC / Number. of samples analysed	Construction Worker AEC (mg/kg)	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)
Arsenic	0/101	7000	3.1	180
Cadmium	0/101	1200	<0.1	22
Benzene	0/67	370	<0.01	<0.05
Phenol	0/55	175000	<0.01	<1.0
Trichloroethene	0/49	33000	<0.01	<0.05
Vinyl Chloride	0/49	220	<0.01	<0.05
Cyanide (free)	0/93	1400	<0.1	0.2

Determinand	Number. of samples Exceeding AGAC / Number. of samples analysed	Construction Worker AEC (mg/kg)	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)

The SoBRA 2020 AEC guidance, although only for seven substances, indicates that acute risks are unlikely to be of concern for most contaminants if concentrations do not exceed EC based on chronic exposure.

AECOM has derived its own construction worker EC values for chronic exposure, based on the assumptions made in the above SoBRA report and in accordance with UK Environment Agency (EA) guidance and the methodology set out within the Contaminated Land Exposure Assessment (CLEA) Model framework.

Construction worker EC have been derived for chronic exposure, as previously stated due to different assumptions about viable exposure pathways, and the frequency, duration and rates of exposure compared to the commercial / industrial EC. Commercial / Industrial EC are based on a worker in an office / other commercial building, where the majority of the site is covered by hardstanding or vegetation, and direct soil contact is minimal. Compared to the construction worker scenario the commercial / industrial scenario considers a lower inhalation rate, lower soil ingestion rate and lower soil to skin adherence factor. As a result of the increase in the soil ingestion rate for construction workers, the construction worker EC for substances where the ingestion route dominates are lower than the standard commercial land-use EC. Where ingestion does not dominate for the standard commercial land use scenario the construction worker EC can be the higher EC – this is typically the case for volatile substances or substances with particularly low toxicity thresholds in air and therefore where indoor air exposure dominates.

The soil chemical results were screened against the AECOM construction worker GAC and a summary of the determinands which have been identified with exceedances above GAC are shown in Table F.4 below.

Table F.4: Summary of determinands identifying exceedances above chronic construction worker EC

Determinand	of samples Exceeding GAC / of samples analysed	Construction Worker GAC (mg/kg)	Min Concentration (mg/kg)	Max Concentration (mg/kg)
Arsenic	1/101	117	3.1	180
Lead	5/101	429	0.9	1000

Exceedances of the chronic construction worker EC were identified for arsenic and lead. However, these were isolated exceedances, with the majority of samples considerably below the chronic EC for these determinands. The arsenic exceedance was recorded in soils at 2.0m bgl in the Made Ground from MS\TP05. The lead exceedances were identified within the following soils samples, with all concentrations recorded within the same order of magnitude as the chronic GAC and thus are considered marginal exceedances:

- MS\ BH14 at 4.2 to 4.4m bgl (Made Ground) – 570 mg/kg;
- MS\ BH16 at 13.4m bgl (Lacustrine Deposits b3) – 490 mg/kg;
- MS\ BH17 at 5.0m bgl (Made Ground) – 720 mg/kg;
- MS\ TP05 at 0.5m bgl (Made Ground) – 630 mg/kg;
- MS\ TP06 at 3.8m bgl (Made Ground) – 1000 mg/kg;

MS\BH14, MS\BH16 and BH17 are all located in the southeast section of the Main Site, associated with the former Pelletizer Plant and location of proposed Laydown/Construction area. MS\TP05 and MS\TP06 are located in the centre of the Main Site, in the area of the former steel plant and stripper buildings and proposed Power/Capture area.

The EC used in this assessment were derived based on the assumption that personal protective equipment (PPE) is **not worn** and no methods of work are adopted to prevent or control exposure to soil. Therefore, they are considered conservative. However, where exceedances of the EC have been identified, it is recommended that the results of this risk assessment are taken into account in the planning of construction works in accordance with relevant statutory health and safety requirements.

23.5F.5 Human Health GQRA Findings and Conclusions

The risk to ground workers from inhalation of asbestos fibres during ground disturbance has been assessed as High, with a key area of risk currently identified within the southeast of the site (within the proposed expansion area). It is advised that unless proven otherwise, mitigation will be required to avoid an unacceptable risk during development. Although a limited number of samples analysed contained asbestos fibres, it should be noted that samples were generally too small to obtain a high probability of detecting pieces of asbestos containing materials (ACM), which if unbound could release significant quantities of fibres when disturbed. Also, not all Made Ground samples taken were able to be analysed for asbestos given the depth of Made Ground, sampling strategy and budgetary requirements. A survey by a specialist in asbestos identification in soils is advised to ensure appropriate samples are taken for testing as part of the remedial works. Asbestos control measures will be required during development/construction works. Mitigation and monitoring will be required to eliminate, reduce, control or manage the risk, or in the last resort provide suitable personal protective equipment (PPE)/respiratory protective equipment (RPE) for ground workers. Mitigation will also be required to minimise the risk of off-site migration.

A Moderate risk from exposure by inhalation of asbestos fibres has been assessed for future site users of the Site assuming Made Ground is exposed within landscaped areas. This risk could be mitigated by evaluation of “releasability” of fibres during soil disturbance (activity based testing). However, in practice it is expected that most of the development will comprise hardstanding and therefore provision of a designed cover layer, marker layer / anti dig layer is advised in areas of soft landscaping thereby reducing the risks to future site users to Low. It should be noted that asbestos is not a risk below hardstanding as there would be no exposure from inhalation of fibres; therefore, the principal risks occur for exposure during construction and to future site users from asbestos in landscaped areas, and the risk for maintenance workers coming in contact with contaminated soils within service corridors.

pH levels within the Made Ground soils have been identified at levels which are considered to be corrosive and thus may pose harm. High pH in dust in soil is a hazard for construction workers therefore control of dust will be particularly important during groundworks. Control measures during ground works should be considered such as minimisation of simultaneously open cut areas, damping down and water spraying as part of a managed system of dust control.

Other than asbestos and pH, based on the results of the screening assessment of the AECOM 2021 chemical data no contaminants exceeded the EC for the proposed commercial / industrial end use. Therefore, the risk to future users is deemed negligible and thus acceptable with regard to other contaminants identified within the CSM. However, it should also be noted that areas of the Site have not yet been investigated, primarily due to access constraints. This includes the Area Workshops and the Furnace Stockhouse as well as the northwest corner of the Site. Within this latter area of the site, a cyanide hotspot exceedance was noted as part of the screening of the previous investigation data set and is where it was also noted during these previous works that there was evidence on the ground indicating the presence of complex cyanides (Prussian Blue / Blue Billy).

No exceedances were identified of the acute construction worker EC. However, minor isolated exceedances of the chronic construction worker EC were identified for arsenic and lead. Whilst the potential risks to construction workers is considered to be Low it is recommended that PPE is worn by all construction workers and that the planning of construction works is undertaken in accordance with relevant statutory health and safety requirements.

24. Appendix G Contamination Assessment Controlled Waters

24.1 G.1 Controlled Waters Assumptions and Criteria Used

Risks to controlled waters have been assessed using a tiered approach based on that described in the Environment Agency's Remedial Targets Methodology (RTM).

Soil leachate and groundwater data has been screened against controlled waters Evaluation Criteria (EC) that are designed to be protective of surface water (River Tees / North Sea) and groundwater (Secondary A and (undifferentiated) aquifers associated with superficial deposits and bedrock).

Controlled waters EC selected for soils and groundwater are primarily Environmental Quality Standards (EQS) for protection of the surface water and England & Wales Drinking Water Standards (DWS) for aquifer protection. However, these are not published for certain determinands and so, in the absence of an EQS or DWS, reference has been made to the following in order of preference:

EQS (coastal) criteria:

- The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 – AA-EQS / MAC-EQS Transitional/Coastal;
- The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 - Saltwater Standards;
- The Water Environment (River Basin Management Planning etc.) (Miscellaneous Amendments) (Scotland) Regulations 2015. Scottish SI 2015 211. 1AA-EQS / MAC-EQS Transitional/Coast;
- SEPA - Supporting Guidance (WAT-SG-53) Environmental Quality Standards for Discharges to Surface Waters. v6. Dec 2015. Marine EQS – AA / MAC;
- The Water Framework Directive (Classification, Priority Substances and Shellfish Waters) Regulations (Northern Ireland) 2015. AA-EQS / MAC EQS Transitional/Coast;
- The Water Framework Directive (Classification, Priority Substances and Shellfish Waters) Regulations (Northern Ireland) 2015 - Saltwater Standards;
- European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015. S.I. 386 of 2015. Ireland - AA-EQS / MAC-EQS Transitional/Coast;
- PNEC derived for EU REACH registration dossiers – Coastal;

DWS criteria:

- Water, England & Wales - Water Supply (Water Quality) Regulations, 2016 614;
- Guidelines for Drinking-water Quality (4th Edition inc. the First Addendum). World Health Organisation. 2017;
- World Health Organisation (WHO), Petroleum Products in Drinking-water. Background document for development of WHO Guidelines for Drinking-water Quality WHO/SDE/WSH/05.08/123, 2008;
- Drinking Water Guidelines Calculated (AECOM) using WHO Methodology; and
- US Environmental Protection Agency (USEPA), Risk Screening Levels, May 2020. Tap water.

A conservative Tier 2 Risk Assessment was undertaken to compare the soil leachate and groundwater sampling datasets to the criteria detailed above to identify whether any of the samples had recorded elevated concentrations of metals, inorganic or organic determinands compared to the above hierarchy of criteria. The dataset assessed comprised the soil leachate results and groundwater sample results from the AECOM 2021 ground investigation. The soils selected for soil leachate analysis were selected based on observations of contamination within the soils during the fieldwork, together with obtaining a lateral and vertical spread across the site, primarily within the Made Ground soils. It is noted on this basis therefore, that not necessarily all those soils with the greatest concentrations of contaminants recorded will have a corresponding soil leachate analysis. Therefore, there is the potential that the soil leachate results may not fully represent the potential leachable concentrations of contaminants across the site. A total of three groundwater sampling rounds have been undertaken. Rounds 2 and 3 were undertaken following an additional round of well development and purging.

Laboratory chemical analysis data from the recent AECOM 2021 ground investigation has been used in the analysis of risk to controlled waters. It should be noted that for a risk to be present then a viable contaminant linkage should be identified between the source and receptor. It is possible that a risk to controlled waters may be identified which is not a direct impediment to the development and this will be stated in the conclusions of the report.

The Environment Agency Remedial Targets Methodology sets out a hierarchy of data relevant to controlled waters risk assessment, namely groundwater or surface water data, soil leachate data, and lastly soil data.

In the absence of soil leachate data, an assessment can be undertaken on the soil sample data to evaluate potential risks to controlled waters from reported contaminant concentrations in soil. This references calculated soil EC that represent theoretical soil concentrations that could partition at equilibrium to give a concentration in soil pore water equivalent to the applicable EC in the above list (as described in Section 5 of the RTM). As soil leachate data is available, this exercise has not been undertaken at this level of assessment as the actual soil leachate sample data provides a more accurate reflection of site conditions.

24.2G.2 Critical Receptors

The main surface water receptors are the River Tees and Tees Bay. A proportion of precipitation falling on the current site is expected to seep into underlying fill and enter preferential pathways such as relict drains and migrate towards the North Sea. Due to the appreciable distance of travel by ground or by watercourse there is likely to be some attenuation for most contaminants before drainage reaches the receiving water, as well as upon entering the Tees estuary or North Sea.

The underlying superficial deposits of the Tidal Flat Deposits (c2) are defined by the Environment Agency as a Secondary A aquifer. The bedrock, the Redcar Mudstone Formation (a3) is defined as a Secondary B aquifer. Hydraulic continuity has been assumed between Made Ground and the Tidal Flat Deposits (c2)/Blown Sands (c3) aquifer. Locally water may be trapped within redundant drains, cavities and foundations where it may be encountered by shallow excavation, i.e. within the top 3m below ground surface.

The Glacial Till Deposits (b1) situated between the Tidal Flats Deposits and the bedrock are considered to be a Secondary Undifferentiated stratum with Glacial Lacustrine Deposits (b3) (where encountered on site were often interbedded with the Glacial Till) being unproductive stratum.

As described in Section 8, in terms of hydraulic continuity of groundwater between the different geological units, the data suggest possible hydraulic continuity between groundwater in the Made Ground and the Tidal Flat Deposits. However, groundwater in the Glacial Till does not appear to be in hydraulic continuity with groundwater in the overlying Tidal Flat Deposits and the underlying Mudstone. These strata potentially create a confining aquifer between the Tidal Flats and the underlying Secondary (B) bedrock aquifer. The data indicates groundwater in the Mudstone is unlikely to be in hydraulic continuity with the overlying Glacial Till. The average groundwater level in the Mudstone is consistently higher than the average water level in the Tidal Sand at each location, suggesting a vertical upward hydraulic gradient from the bedrock to the Tidal Flat deposits.

Groundwater flow across the site is noted to be generally from South-west to North-east towards the coast. Further details with regard to groundwater flow variation is presented in Section 8.

Soil leachate and groundwater test results have been compared against the corresponding Environmental Quality Standards (EQS) for potential risks to the River Tees /North Sea.

The site is not within or near a groundwater source protection zone. Therefore, the use of Drinking Water Standards (DWS) criteria in this assessment is considered to be very conservative. It should be noted that given the industrial history and location of this aquifer, it is highly unlikely that it will be exploited as potable water and so any failure to meet the DWS is unlikely to result in harm or damage to potable water resources.

24.3G.3 Previous Investigations

A repeat of the screening exercise undertaken previously as part of the AECOM 2020 and AECOM 2021 Desk Study work has not been undertaken as part of this scope of works and reference should be made to the desk study report for detailed finding of the historical chemical data. However, in order to provide general indication of soil leachate concentrations and groundwater quality recorded as part of the previous ground investigations, Figure G.1 below has been adapted from figures included within Appendix K of the AECOM 2020 desk study. It broadly shows the distribution of concentrations of contaminants from the previous ground investigations in relation to the magnitude of exceedance above the water quality standards to provide a hazard plot for the Main Site. The red locations represented locations where a water standard had been exceeded by 10x or more the value. Amber locations were deemed as an intermediate hazard, where the quality standard had been exceeded but by less than 10x and green as low hazard potential as the concentration was less than the water standard screening value.

Further detail regarding the previous soil leachate and groundwater screening results and assessment is provided within the AECOM 2020 Desk Study.

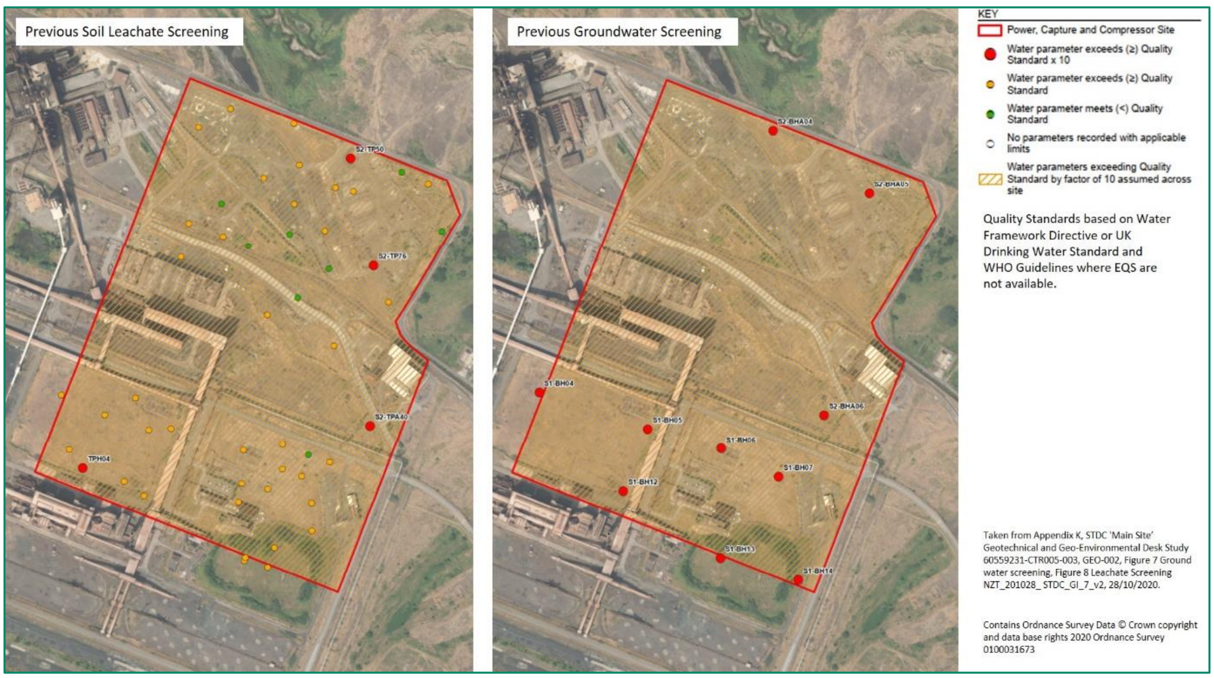


Figure G.1 Previous Soil Leachate and Groundwater Screening Hazard Plot (CH2M HILL 2017 and AEG 2018 Previous GI investigations)

24.4G.4 Ground Water Sampling Locations

Groundwater samples during three monitoring rounds (August, October and November 2021) were obtained from 15 locations. The proposed monitoring wells are detailed in Table G.1 below. Monitoring wells MS/BH08S, MS/BH09S and MS/BH17S were dry at the time of sampling. Therefore, no groundwater sample could be obtained from these monitoring wells.

Table G.1 Summary Groundwater monitoring Locations

Exploratory Hole ID	Standpipe[1] / Type	Monitoring Round (groundwater samples obtained)		
		1	2	3
Response Zone Stratum – Made Ground				
MS\BH07	MS\BH07S	Yes	Damp	i/s
MS/BH08	MS/BH08S	Damp	Dry	Dry
MS/BH09	MS/BH09S	Damp	Dry	Dry
MS\BH11	MS\BH11S	Yes	Dry	Dry
MS\BH15	MS\BH15S[d]	Yes	Yes	Yes
MS/BH17	MS/BH17S[d]	Dry	Dry	Dry
Response Zone Stratum – TFD SAND				
MS\BH03	MS\BH03S[a]	Yes	Yes	Yes
MS\BH04	MS\BH04S	Yes	Yes	Yes
MS\BH05	MS\BH05S	Yes	Yes	Yes
MS\BH07	MS\BH07D	Yes	Yes	Yes
MS\BH08	MS\BH08D	Yes	Yes	Yes
MS\BH09	MS\BH09D	Yes	Yes	Yes
MS\BH11	MS\BH11D	Yes	Yes	Yes
MS\BH13	MS\BH13S[e]	Yes	Yes	Yes
MS\BH14	MS\BH14	Yes	Yes	Yes
MS\BH15	MS\BH15D	Yes	Yes	Yes
LF\BH01	LF\BH01S	Yes	Yes	Yes
Response Zone Stratum – Glacial Deposits				
MS\BH04	MS\BH04D[b]	Yes	Yes	Yes
MS\BH12	MS\BH12S[c]	Yes	Yes	Yes
Response Zone Stratum – RMF MUDSTONE				
MS\BH03	MS\BH03D	Yes	Yes	Yes
MS\BH05	MS\BH05D	Yes	Yes	Yes
MS\BH12	MS\BH12D	Yes	Yes	Yes
MS\BH13	MS\BH13D	Yes	Yes	Yes
MS\BH17	MS\BH17D	Yes	Yes	Yes
LF\BH01	LF\BH01D	Yes	Yes	Yes
MS\BH17	MS\BH17D	Yes	Yes	Yes

<u>Notes:</u>

i/s *insufficient water to obtain sample*

a *0.65m overlap with Made Ground (d1). Tidal Flat Deposits (c2) used as stratum*

b *Predominately Glacial Lacustrine Deposits (b3), interbedded (0.8m) with Glacial Till (b1).*

c. *0.2m overlap with Redcar Mudstone Formation (a3). Glacial Deposits (b3) used as stratum*

d. *0.1m overlap with Tidal Flat Deposits (c2). Made Ground (d4, d3 & d1) used as stratum*

e *0.35m overlap with (Tidal Flat Deposits (c1)). Tidal Flat Deposits (c2) used as stratum*

1. "S" suffix indicates shallow standpipe within exploratory hole. "D" suffix indicates deeper standpipe within same exploratory hole.

24.5G.5 Risk to Surface Water

24.5.1 G.5.1 Groundwater Sampling Test Results (Tier 2 Screening)

The Tier 2 Screening Table for groundwater samples are presented in Appendix K and the results are discussed in the following sections. The certificates of chemical analysis are presented in the AEG Factual Report, Appendix A.

Table G.2 and G.3 detail the summary of the determinands in groundwater that exceeded the EC protective of surface water.

Table G.2 Summary Groundwater Exceedances (EQS) – Round 1

Chemical Group	Determinand	EQS (Coastal) Screening Value[1]	Number of Results	Number of Detects	Minimum Concentration	Maximum Concentration	Number of Guideline Exceedances
TPH&BTEX	>EC5-EC7 Aromatics	8	22	2	<0.1	58	1
	Benzene	8	22	3	<1	58	1
	Ethylbenzene	20	22	2	<1	210	1
PAHS	Naphthalene	2	22	22	0.06	4.9	1
	Anthracene	0.1	22	5	<0.01	0.19	1
	Fluoranthene	0.0063	22	12	<0.01	0.24	12
	Benzo(g,h,i)perylene	0.00082	22	2	<0.01	0.01	2
Metals	Chromium (hexavalent)	0.6	22	5	<7	120	5
	Iron (Filtered)	1,000	22	22	8.6	1200	1
	Lead (Filtered)	1.3	22	13	<0.09	1.8	1
	Mercury (Filtered)	0.07	22	18	<0.01	0.72	9
	Nickel (Filtered)	8.6	22	22	0.6	22	2
	Zinc (Filtered)	6.8	22	20	<1.3	220	3
Inorganics	Cyanide (Free)	0.001 (mg/l)	22	20	<0.0001	0.0044	5
	Cyanide Total	0.001 (mg/l)	19	1	<0.04	0.042	1
	Ammoniacal Nitrogen as N	0.021 (mg/l)	22	22	0.015	10	21
SVOCS	Phenol	7.7	12	7	<1	7.9	1
	Pentachlorophenol	0.4	12	1	<1	1.4	1

[1]. *µg/l unless otherwise stated*

Monitoring rounds 2 and 3 were undertaken following an additional round of well development and purging.

Table G.3 Groundwater EQS Exceedance Summary (Rounds 2 & 3)

Chemical Group	Determinand	EQS (Coastal) Screening Value[1]	Number of Results	Number of Detects	Minimum Concentration[1]	Maximum Concentration[1]	Number of Guideline Exceedances*
TPH&BTEX	Ethylbenzene	20	40	2	<1	72	2
PAHS	Naphthalene	2	38	23	<0.1	5.1	1
	Fluoranthene	0.0063	38	8	<0.012	0.266	7
Metals	Arsenic	25	40	40	0.72	61	1
	Chromium (hexavalent)	0.6	40	1	<7	9.2	1
	Iron (Filtered)	1,000	40	40	7.6	11000	5
	Lead (Filtered)	1.3	40	22	<0.09	2.5	3
	Mercury (Filtered)	0.07	40	31	<0.01	0.28	12
	Nickel (Filtered)	8.6	40	35	<0.5	15	1
	Zinc (Filtered)	6.8	40	28	<1.3	51	8
Inorganics	Cyanide (Free)	0.001 (mg/l)	40	39	<0.0001	0.0056	6
	Cyanide Total	0.001 (mg/l)	40	34	<0.0001	0.076	33
	Ammoniacal Nitrogen as N	0.021 (mg/l)	40	39	<0.015	19	37
SVOCS	Phenol-monohydric	50	40	10	<100	2000	10
	Bis(2-ethylhexyl)phthalate	1.3	27	4	<1	13	3

[1]. *µg/l unless otherwise stated*

000.1 = Concentration greater than that recorded in Round 1

**Not including duplicates*

Table G.4 Summary Groundwater Exceedance Determinands Stratum Comparison (EQS) – Round 1 to 3

	Determinand	Arsenic, Dissolved	Chromium, Hexavalent	Iron, Dissolved	Lead, Dissolved	Mercury, Dissolved	Nickel, Dissolved	Zinc, Dissolved	Cyanide, Total Low Level	Cyanide, Free Low Level	Ammoniacal Nitrogen as N	Naphthalene	Anthracene	Fluoranthene	Benzo(ghi)perylene	Aromatic C5-C7	Benzene	Ethylbenzene	Phenol	Pentachlorophenol	Bis(2-ethylhexyl)phthalate
Min concentration	MG	1.1	<7	9.2	<0.09	0.05	0.9	<1.3	<0.0001	<0.0001	0.16	<0.1	<0.01	0.01	<0.01	<0.1	<1	<1	<1	<1	<1
	TFD	2.5	<7	8.6	<0.09	<0.01	<0.5	<1.3	<0.0001	<0.0001	<0.015	<0.1	<0.01	<0.01	<0.01	<0.1	<1	<1	<1	<1	<1
	GD	0.95	<7	15	<0.09	<0.01	0.9	<1.3	<0.0001	<0.0001	0.07	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<1	<1	<1	<1
	RMF	0.58	<7	7.6	<0.09	<0.01	<0.5	<1.3	<0.0001	<0.0001	0.12	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<1	<1	<1	<1
Max concentration	MG	13	<7	41	1.8	0.33	2.7	220	0.012	0.0012	1.9	<0.1	<0.01	0.09	0.01	<0.1	<1	<1	5	<1	<1
	TFD	61	50	2400	1.6	0.41	6.3	51	0.42	0.0056	19	5.1	0.19	0.266	0.01	5.2	4	<1	7.9	1.4	0.01
	GD	7.7	<7	510	0.57	0.08	5.8	3.8	0.0099	0.0021	4.1	1.3	<0.1	0.04	<0.1	<0.1	<1	72	<1	<1	<1
	RMF	9.6	120	11000	2.5	0.72	22	22	0.076	0.0016	13	0.8	0.02	0.04	<0.01	58	58	210	4.4	<1	5
Average Concentration	MG	8.58	<7	19.64	0.47	0.19	1.38	47.1	<0.03	<0.0004	0.92	<0.1	<0.01	0.04	0.01	<0.1	<1	<1	2.36	<1	<1
	TFD	9.38	8.29	228.16	0.2	0.09	1.71	4.82	<0.02	0.0009	3.14	0.46	0.02	0.03	0.01	0.25	1.42	<1	1.83	1.2	0.01
	GD	3.28	<7	245.67	0.4	0.04	2.7	2.64	0.007	0.0012	1.775	0.67	<0.1	0.03	<0.1	<0.1	<1	16.5	<1	<1	<1
	RMF	3.98	18.39	1126.1	0.45	0.12	5.29	6.01	0.02	0.0005	3.12	0.29	0.01	0.02	<0.01	3.32	4.17	17.08	1.71	<1	1.4
Geomean	MG	6.55	<7	16.94	0.22	0.16	1.25	6.61	<0.02	0.0003	0.66	<0.1	<0.01	0.03	0.01	<0.1	<1	<1	1.8	<1	<1
	TFD	6.99	7.46	61.16	0.14	0.05	1.23	2.87	<0.01	0.0005	1.22	0.22	0.01	0.02	0.01	0.11	1.22	<1	1.43	1.09	0.01
	GD	2.55	<7	91.349	0.362	0.03	2.3	2.54	0.007	0.0011	0.73	0.6	<0.1	0.028	<0.01	<0.1	<0.1	3.43	<1	<1	<1
	RMF	2.72	10.19	101.15	0.22	0.05	3.07	3.99	0.006	0.0003	1.33	0.2	0.01	0.01	<0.01	0.14	1.25	1.5	1.43	<1	1.17
Median	MG	8.9	<7	14	0.16	0.19	1	3.7	<0.03	0.0003	0.57	<0.1	<0.01	0.03	0.01	<0.1	<1	<1	1.0	<1	<1
	TFD	7.4	7	44	0.09	0.06	1.0	2.6	<0.01	0.0004	1.9	0.1	0.013	0.012	0.01	0.1	<1	<2	1.0	1.0	0.01
	GD	2.7	<7	226.5	0.4	0.025	2.4	2.4	0.007	0.001	1.13	0.5	<0.1	0.03	<0.01	<0.1	<0.1	<1	<1	<1	<1
	RMF	2.7	<7	53.5	0.12	0.05	3.8	4.35	0.006	0.0003	2.65	0.18	0.01	0.01	<0.01	0.1	<1	<1	<1	<1	<1

24.5.1.1 G.5.1.1 Made Ground

Exceedances of the EC protective of surface water were recorded within the Made Ground monitoring wells. The exceedances from the three monitoring rounds are presented in Table I.1 in Appendix I.

As part of the Round 1 sampling, groundwater samples were obtained from three wells screened in the Made Ground (MS\BH07(S), MS\BH11(S) and MS\BH15(S)). During Round 2 and 3, MS\BH07(S) and MS\BH11(S) were dry/damp/had insufficient water to be unable to be sampled during the subsequent two monitoring rounds.

The key findings associated with the Made Ground groundwater are as follows:

- With the exception of ammoniacal nitrogen the greatest concentrations of contaminants in the Made Ground during Round 1 were from MS\BH07(S) and MS\BH11(S). This included free cyanide (MS\BH07(S)) and benzo(g,h,i)perylene and lead (MS\BH11(S)) that were only detected in the groundwater in excess of the EQS at these locations.
- Zinc exceeded the EQS in MS\BH11(S) and MS\BH15(S) in Round 1 but did not exceed in either Rounds 2 and 3. The maximum concentration of zinc was from groundwater obtained from the Made Ground. The Made Ground groundwater also contained the highest average concentration of zinc. The maximum concentration was in MS\BH11(S) and was 220 µg/l. This was compared to the EQS of 6.8 µg/l. The well was dry during subsequent rounds.
- Cyanide total was not recorded greater than the EQS in Round 1 but exceeded the EQS in Rounds 2 and 3 in MS\BH15(S). The exceedances are all within the same order of magnitude as the EQS with the exception of Round 2 where it exceeded by just over 1 order of magnitude. The exceedances are thus considered marginal.
- Mercury was only recorded in MS\BH07(S) and MS\BH15(S) at concentrations greater than the EQS. Mercury exceeded from the groundwater obtained from MS\BH15(S) from all three monitoring rounds. The greatest concentration of mercury was recorded in MS\BH07(S), 0.33 µg/l compared with the EQS of 0.07 µg/l. This is considered a marginal exceedance (same order of magnitude). The greatest concentration from MS\BH15(S) was 0.25 µg/l from Round 2.
- Ammoniacal nitrogen exceeded in all samples analysed. Ammoniacal nitrogen was recorded at greater concentrations in Rounds 2 and 3 in MS\BH15(S) compared to Round 1 (up to 3.3 times greater). However, concentrations from all three rounds at this location remained between one and two orders of magnitude of the EQS. The maximum concentration recorded from MS\BH15(S) was in Round 2; 1.9 mg/l compared to the EQS of 0.021 mg/l. The Round 1 concentration was 0.57 mg/l. This was similar to the concentration recorded in MS\BH07(S), with the concentration in MS\BH11(S) being marginally lower at 0.16 mg/l.
- Fluoranthene was detected greater than the EQS in all samples analysed in all three rounds. Concentrations were generally consistent in MS\BH15(S) throughout the three rounds, ranging from 0.018 to 0.031 µg/l. In MS\BH07(S) and MS\BH11(S) the concentrations in the first round were 0.01 and 0.09 µg/l. respectively. These are all within the same order of magnitude and the method detection limit.

24.5.1.2 G.5.1.2 Tidal Flat Deposits

Exceedances of the EC protective of surface water were recorded within the Tidal Flat Deposits monitoring wells. The exceedances from the three monitoring rounds are presented in Table I.2 in Appendix I. The monitoring wells include LF\BH01(S), MS\BH03(S), MS\BH04(S), MS\BH05(S) , MS\BH07(D), MS\BH08(D), MS\BH09(D), MS\BH11(D), MS\BH13(S), MS\BH14 and MS\BH15(D).

The key findings associated with the Tidal Flat Deposits groundwater are as follows.

- Anthracene and benzo(g,h,i)pyrelene only exceeded the EQS in Round 1 from MS\BH14. These are isolated exceedances.
- Pentachlorophenol and phenol only exceeded the EQS in Round 1 from LF\BH01. These are isolated exceedances.

- Arsenic, iron, lead, zinc and, bis(2-ethylhexyl)phthalate and cyanide total did not exceed the EQS in Round 1.
- Arsenic and lead were only detected greater than the EQS in MS\BH14 during Round 2. These are marginal exceedances as they are within the same order of magnitude as the EQS. A concentration of 61 µg/l and 1.6 µg/l compared to EQS of 25 µg/l and 1.3 µg/l were recorded for arsenic and lead respectively. Therefore, these are isolated, marginal exceedances within the Tidal Flats Deposits.
- Iron was only detected greater than the EQS in MS\BH04(S). This was in Round 2 and 3. The concentrations are marginal exceedances of the EQS (less than 2.5 times greater).
- Bis(2-ethylhexyl)phthalate was only detected greater than the EQS in MS\BH07(D) and MS\BH09(D) during Round 2 and Round 3 respectively. These are considered isolated occurrences within the Tidal Flat Deposits.
- Chromium hexavalent was only detected greater than the EQS in LF\BH01(S) (Round 1) and MS\BH04(S) (Round 2). These are considered isolated occurrences.
- Mercury exceeded in all three monitoring rounds in LF\BH01(S) and MS\BH15(D). Exceedances were also detected in MS\BH09(D) and MS\BH14. The maximum concentration of 0.41 µg/l compared to the EQS of 0.07 µg/l was recorded in MS\BH14 during Round 1. All other concentrations within the Tidal Flats Deposits (with the exception of one at 0.23µg/l) are less than 0.2µg/l.
- Naphthalene was only detected at concentrations greater than the EQS in Rounds 1 and 2 at MS\BH15(D) at concentrations of 4.9 µg/l and 5.1 µg/l respectively. Naphthalene was not detected greater than the EQS in any location within the Tidal Flat Deposits during Round 3.
- Fluoranthene concentrations recorded in all three rounds are similar. However, the distribution of exceedances has slightly reduced in Rounds 2 and 3 compared to Round 1. MS\BH14 was the only location to have exceedances of fluoranthene from all three monitoring rounds. The concentrations at this location range from 0.053 µg/l to 0.266 µg/l. Only three other locations out of the 10 remaining locations exceeded for fluoranthene. These were LF\BH01(S) and MS\BH11(S) in Round 1 and MS\BH07(D) in Round 3. Fluoranthene contamination is not considered to be pervasive within the Tidal Flat Deposits.
- Ammoniacal nitrogen concentrations and distribution are similar across all three monitoring rounds. All locations exceeded in Round 3, compared to all but one in Rounds 1 and 2. There has been a general marginal increase in concentrations over the three rounds. At each location, the increase is small, with all concentrations being within the same order of magnitude as each other. However, ammoniacal nitrogen in MS\BH03 was recorded at a lower concentration during Rounds 2 and 3. The greatest concentration of 19 mg/l was recorded in MS\BH05(S). This location recorded the maximum concentration during each of the three monitoring rounds.
- Total cyanide was detected in all locations exceeding the EQS in Rounds 2 and 3. This is compared to no exceedances in Round 1 (potentially due to the higher limit of detection). Generally, the concentrations are low, being the same order of magnitude as the EQS or occasionally 1 order of magnitude greater. Free cyanide was less pervasive being marginally above the EQS (between 2 and 6 times greater). The greatest concentration was recorded in MS\BH03 (0.006 µg/l) which is where the only exceedance from Round 1 was observed. The distribution of the cyanide concentrations are shown on Figure G.3.

24.5.1.3 G.5.1.3 Glacial Deposits

Exceedances of the EC protective of surface water were recorded within the Glacial Deposits monitoring wells. The exceedances from the three monitoring rounds are presented in Table I.3 in Appendix I. The monitoring wells include MS\BH04(D) and MS\BH12(S).

The key findings associated with the Glacial Deposits groundwater are as follows.

- Fluoranthene and mercury only exceeded the EQS during Round 1. Fluoranthene was recorded in both monitoring wells to a maximum of 0.04 µg/l in MS\BH12(S).

- Cyanide (free and total) were detected greater than the EQS from either (or both) of Rounds 2 & 3. It was not recorded greater than the EQS in Round 1. The exceedances are marginal (same order of magnitude as the EQS). The cyanide distribution is presented in Figure G.3.
- Ethylbenzene was only detected greater than the EQS in MS\BH04(D) in Round 2 and MS\BH12(S) in Round 3 only. The exceedances are considered to be isolated and marginal exceedances (less than 3 times the EQS and 1.15 times greater than the EQS respectively).
- Ammoniacal nitrogen was recorded greater than the EQS in all three rounds at both locations. In MS\BH012(S), there is an increase in concentration in Rounds 2 and 3 compared to Round 1. The increase is approximately 6.2 times greater (4.1 mg/l compared to 0.66 mg/l). The increase in concentration also raises the EQS exceedance to 2 orders of magnitude greater compared to the previous 1 order of magnitude. In MS\BH04(D), the concentration in Round 3 was less than Round 1.

24.5.1.4 G.5.1.3 Redcar Mudstone Formation

Exceedances of the EC protective of surface water were recorded within the Redcar Mudstone Formation monitoring wells. The exceedances from the three monitoring rounds is presented in Table I.4 in Appendix I. The monitoring wells include LF\BH01(D), MS\BH03(D), MS\BH05(D), MS\BH12(D), MS\BH13(D) and MS\BH17(D)

The key findings associated with the Redcar Mudstone Formation groundwater are as follows.

- Chromium hexavalent, >EC5-EC7 Aromatics, benzene and ethylbenzene only exceeded the EQS in Round 1. The hydrocarbons only exceeded in MS\BH03(D). No hydrocarbon exceedances were detected within the shallower well at this location (within the Tidal Flat Deposits). Therefore, these determinands are considered to be isolated occurrences.
- Iron was observed in MS/BH03(D), BH12(S) and BH13D (between 1.2 and 11 times greater than the EQS) across Rounds 1 to 3 and was only detected on more than one occasion at BH12(D).
- Lead was noted in LF\BH01(D) and MS\BH13D (maximum of 1.92 time greater than the EQS) during Round 2 only.
- Cyanide total was detected greater than the EQS in Rounds 2 and 3, having not been detected in Round 1. The greatest concentration was MS\BH17(D) in the southeast of the Main Site being recorded 1 order of magnitude greater than the EQS. In the northeast of the Main Site and north of the Main Site concentrations were generally lower, either not greater than the EQS or only marginally exceeding. The distribution of cyanide is presented in Figure G.3.
- Cyanide free was only detected greater than the EQS in MS\BH05(D) in Rounds 1 and Round 2. The concentrations are comparable with both only marginally (maximum 1.6 times) greater than the EQS.
- Mercury, nickel and zinc exceedances were generally isolated throughout the three monitoring rounds. MS\BH05(D) recorded the greatest concentration of mercury in Round 1 (0.72 µg/l). The EQS was not exceeded in Rounds 2 and 3 at this location. Nickel exceedances were isolated occurrences. Zinc exceedances again, were generally isolated. However, the EQS for zinc was exceeded in all three monitoring rounds from MS\BH13(D).
- Fluoranthene concentrations and distribution were generally consistent throughout the three monitoring rounds. It did not exceed in LF\BH01 and MS\BH03(D) and it did not exceed in all three monitoring rounds in a single location. The greatest concentration was 0.04µg/l in MS\BH17(D) in Round 1.
- Ammoniacal nitrogen was detected greater than the EQS in all Redcar Mudstone Formation locations during each of the three monitoring rounds. Concentrations were generally greater in Rounds 2 and 3 compared to Round 1, being either the same order or 1 order of magnitude greater than the Round 1 concentrations. The most notable change was from MS\BH05(D), concentrations ranged from 0.27 mg/l in Round 1 to 13 mg/l in Round 3 (greater than 2 orders of magnitude above the EQS).

- An isolated exceedance of bis(2-ethylhexyl)phthalate was recorded greater than the EQS in LF\BH01(D). It was a marginal exceedance and was only recorded during Round 2.

24.5.1.5 G.5.1.4 MS/TP06

A grab water sample was obtained from trial pit MS/TP06 during the works due to contamination being observed within groundwater ingress. A brown iridescent appearance and moderate hydrocarbon odour was noted. Organic contamination exceedances of the EQS screening value included fluoranthene recorded at a concentration of 5,400 µg/l and benzo(b)fluoranthene at 140 µg/l. The EQS screening values for these are 0.0063 and 0.017 µg/l respectively. Concentrations of arsenic, cadmium, iron, lead and zinc were also recorded to exceed the EQS in this location. This is discussed further within the groundwater risk section.

24.5.2 G.5.2 Soil Leachate Sampling Test Results (Tier 2 Screening)

A total of fifteen soil samples were analysed for soil leachate analysis. This included 13 from the Made Ground, 1 from the Tidal Flat Deposits and 1 from the Glacial Till. The Made Ground samples were taken from depths ranging from 0.3 to 4.65m bgl. The Tidal Flat Deposits and Glacial Till samples were taken from the same exploratory location at depths of 11.3 and 19.1m bgl respectively.

Table G5 Summary Soil leachate EQS Exceedances

Chemical Group	Determinand	EQS (Coastal) Screening Value[1]	Number of Results	Number of Detects	Minimum Concentration	Maximum Concentration	Number of Guideline Exceedances
PAH	Anthracene	0.1	15	7	<0.02	0.23	1
	Benzo(a) pyrene	0.00017	15	6	<0.02	0.49	6
	Benzo(b)fluoranthene	0.017	15	6	<0.02	0.66	6
	Benzo(g,h,i)perylene	0.00082	15	6	<0.02	0.51	6
	Benzo(k)fluoranthene	0.017	15	6	<0.02	0.25	6
	Fluoranthene	0.0063	15	10	<0.02	0.63	10
Metals	Cadmium	0.2	15	3	<0.03	3.1	1
	Chromium (hexavalent)	0.6	15	1	<7	22	1
	Copper	3.76	15	14	<0.4	33	1
	Lead	1.3	15	10	<0.09	26	3
	Mercury	0.07	15	8	<0.01	0.25	2
	Nickel	8.6	15	5	<0.5	35	1
	Zinc	6.8	15	13	<1.3	200	2
Inorganics	Ammoniacal Nitrogen	0.021 (mg/l)	15	6	<0.015	0.66	5

[1]. *µg/l unless otherwise stated*

* *unionised ammonia*

No soil leachate exceedances were recorded from MSBH10 at 11.3m bgl (TFD) and MS\TP09 at 3.0m bgl.

Soil leachate exceedances were recorded from the sample obtained within the Glacial Till at 19.1m bgl. However, only metals were detected greater than the EQS screening values at this location. With regards to cadmium, copper and nickel, this was the only sample to exceed for these determinands, being generally an order of magnitude greater than the rest of the data set. This sample also exceeded the EQS for lead (again an order of magnitude greater than the rest of the data set), mercury and zinc. The following tables present the soil leachate concentrations from samples obtained from ground level to 2.5m bgl and below 2.5 m bgl.

Table G.6Summary Soil leachate EQS Exceedances – ground level to 2.5m bgl

Determinand	EQS (Coastal) Screening Value[1]	LF\TP02	MS\BH08	MS\BH09	MS\BH14	MS\BH14	MS\BH15	MS\BH16	MS\TP10
		MG	MG	MG	MG	MG	MG	MG	MG
	Depth	1.0m bgl	0.36m bgl	0.5m bgl	0.3m bgl	1m bgl	1m bgl	0.5m bgl	0.3m bgl
		Exceedance Concentrations							
Fluoranthene	**0.0063**		0.19	0.32		0.25	0.23	0.32	0.13
Benzo(a) pyrene	**0.00017**		0.05	0.49		0.15	0.09	0.13	
Benzo(g,h,i)perylene	**0.000823**		0.03	0.51		0.1	0.05	0.09	
Benzo(b)fluoranthene	**0.017**		0.06	0.66		0.21	0.12	0.19	
Benzo(k)fluoranthene	**0.017**		0.02	0.25		0.08	0.04	0.07	
Lead	**1.3**			2.3	2				
Mercury	**0.07**				0.25				
Ammoniacal nitrogen	**0.021**	0.06	0.06	0.078					

[1] *µg/l unless otherwise stated*

**unionised ammonia*

MG = Made Ground

Table G.7Summary Soil leachate EQS Exceedances – Below 2.5m bgl

Determinand	EQS (Coastal) Screening Value[1]	MS\BH02	MS\BH07	MS\BH10	MS\BH10	MS\BH11	MS\TP06
		MG	MG	TFD	GT	MG	MG
	Depth	2.25-2.7m bgl	4.2-4.65m bgl		19.1m bgl	4m bgl	3.8m bgl
		Exceedance Concentrations					
Anthracene	0.1						0.23
Fluoranthene	0.0063	0.05	0.03			0.13	0.63
Benzo(a) pyrene	0.00017						0.14
Benzo(g,h,i)perylene	0.00082						0.11
Benzo(b)fluoranthene	0.017						0.21
Benzo(k)fluoranthene	0.017						0.08
Cadmium	0.2				3.1		
Copper	3.76				33		
Lead	1.3				26		
Mercury	0.07				0.16		
Nickel	8.6				35		
Zinc	6.8				73		200
Chromium (hexavalent)	0.6				<7		22
Ammoniacal nitrogen	0.021			0.66		0.06	

[1]. *µg/l unless otherwise stated*

**unionised ammonia*
MG = Made Ground
GT = Glacial Till
TFD = Tidal Flat Deposits

24.5.3 G.5.3 Discussion

Exceedances of metals, TPH, PAHs, cyanide and ammoniacal nitrogen were detected within the groundwater samples from the Made Ground, Tidal Flat Deposits, Glacial Deposits and Redcar Mudstone Formation monitoring wells.

Sporadic and isolated exceedances of phenol, pentachlorophenol, TPH (including ethylbenzene and benzene) and bis(2-ethylhexyl)phthalate were also recorded. Phenol and pentachlorophenol were only detected above the EQS screening value within the Tidal Flat Deposits at one location during the first monitoring round only, within the Onshore CO_2 Export Pipeline Corridor.

With the exception of ammoniacal nitrogen and cyanide and to a much lesser extent mercury and fluoranthene, the exceedances detected in the groundwater are localised isolated occurrences. Similarly, widespread exceedances were generally limited to ammoniacal nitrogen and cyanide. Fluoranthene exceeded the EQS screening value, exceeding in 54% of the groundwater samples tested in Round 1 but only 18% in Round 2 and 3 combined. It exceeded in 66% of the soil leachates. The distribution of the groundwater sample exceedances from Round 1 is presented in Figure G.2 below. This also shows the concentration range of fluoranthene and ammoniacal nitrogen across the site, given these were the most prevalent contaminant noted in Round 1. The concentrations of fluoranthene in monitoring wells closest to the surface water receptors (those towards the northern boundary) are between 0.01 and 0.02µg/l or less than the limit of detection during Round 1 and reduced during Round 2 and 3. These are less than a factor of 4 greater than the EC. The greatest concentration of fluoranthene is located in the south of the Site (MS\BH14) in the proposed expansion area in the area of Site, north (down gradient) of the former Pelletizer Plant.

In Round 1, ammoniacal nitrogen was noted to exceed the EQS screening value within all groundwater samples with the exception of BH04(S) within the Tidal Flat deposits. The greatest concentration was detected within MS/BH05 in the Tidal Flat deposits on the western boundary of the site (10 mg/l) but generally, the concentrations were noted to be within 1 to 2 orders of magnitude greater than the EQS screening value across the site. However, in the northeast corner of the site (and within LF\BH01 to the north of the Main Site) which are downgradient locations, concentrations were generally within the same order of magnitude as the EQS screening value or did not exceed the screening value.

Based on the monitoring data from Rounds 2 and 3, ammoniacal nitrogen remains widespread and concentrations have generally slightly increased from Round 1 to Round 2 and 3. This may be as a result of the seasonal variation between monitoring rounds, with the first round taking place in August and Round 2 and Round 3 taking place in wetter months of October and November. The ammoniacal nitrogen concentrations and distribution within the Tidal Flats have remained relatively similar, but with a slight elevation in concentrations in the central/ southern area of the Main Site. Slightly elevated concentrations are noted within the Made Ground groundwater samples also in the southern area of the Main Site. The greatest increase in ammoniacal nitrogen concentrations were within the Glacial Deposits and Redcar Mudstone Formation monitoring wells. MSBH05 (Tidal Flats) continued to record the greatest concentrations of ammoniacal nitrogen and overall concentrations remained within 1 to 2 orders of magnitude greater than the EQS screening value across the site as per Round 1. It should be noted that there are currently no down gradient locations north of MS/BH05 to confirm off-site migration

It should be noted that the screening value used is for unionised ammonia and thus is a conservative value to use as a screening value, assuming that all the ammoniacal nitrogen will be in unionised form. Also, soil leachate analysis undertaken indicated that 66% of the soil leachates were less than the EQS screening value. Therefore, it is possible that the concentrations within groundwater may be partially the result of the wider groundwater regime and quality of the wider regional area.

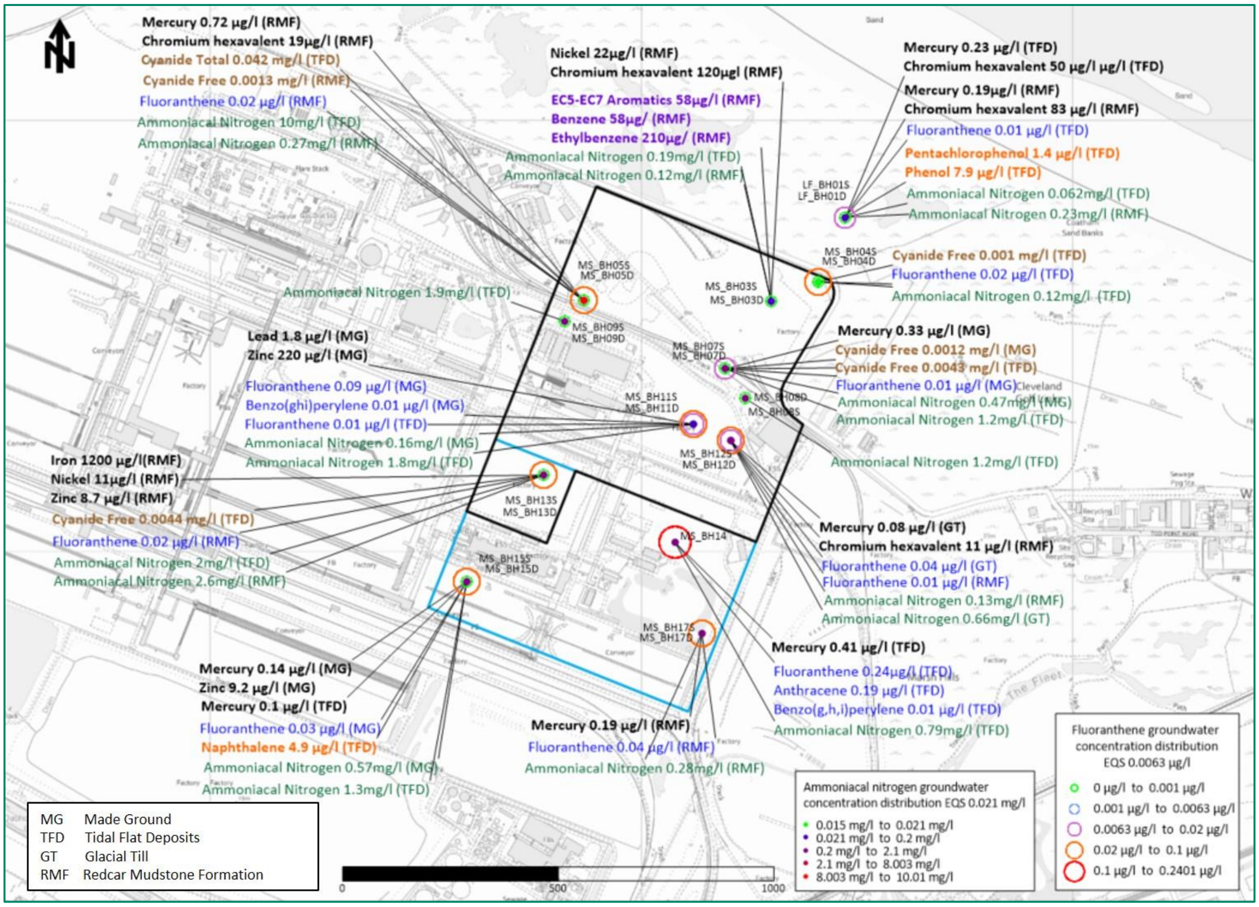


Figure G.2 Groundwater Screening exceedances against EQS Screening Criteria and fluoranthene and ammoniacal nitrogen concentration distributions (Round 1)

Naphthalene was only noted within MS\BH15D (Tidal Flat Deposits) at a concentration which exceeded the EQS screening value in Rounds 1 and 2. It did not exceed in Round 3. No leachable concentrations greater than the EQS screening value were observed in any of the soils analysed. This included a sample taken from the Made Ground within MS\BH15D.

It should be noted that the location of the groundwater exceedance is consistent with the findings of the previous investigation where locations S1-BH12 and S1-BH05 within the southwest corner of the site (See Figure G.1), recorded naphthalene at concentrations of 11 µg/l and 2.2 µg/l respectively. These locations are southeast of MS\BH13 and northeast of MS\BH15. Also, as part of the previous investigations, it was noted that to the south of the site boundary, south of MS\BH15D, concentrations of naphthalene were recorded in soils between 39 and 4,100 mg/kg at depths between 0.4 and 2.5m bgl. Therefore, there is the potential that the naphthalene in this area is the result of an off-site source. Given the lack of leachable naphthalene recorded and naphthalene observed in the soils (maximum concentration 1.8 mg/kg) on the Site, this is considered likely.

However, although there is a potential source of naphthalene present in the groundwater, it is unlikely to impact surface waters, given the distance to these receptors and the lack of naphthalene present/detected within the remaining monitoring wells in the north of the site. The closest down gradient borehole (MS\BH13) recorded less than limit of detection for naphthalene for both Round 2 and Round 3.

The PAH concentrations identified are generally consistent with the previous ground investigations. In general, the number of PAH exceedances (fluoranthene) have decreased within the Tidal Flat Deposits during the monitoring programmes with only MS\BH14 (north of the former Pelletizer plant) recording exceedances of fluoranthene during each of the three rounds. Other PAHs at this location which exceeded in Round 1 (anthracene and benzo(g,h,i)perylene did not exceed as part of Round 2 or 3 sampling screen. Concentrations and distribution of fluoranthene in the Made Ground and Redcar Mudstone Formation have remained relatively consistent.

The majority of the soil leachable PAHs are detected within the Made Ground in the upper 2.5m bgl. PAHs are generally relatively immobile in the sub-surface and in the absence of a free-phase it is unlikely there would be significant impact off the site.

The metal concentrations identified are generally consistent with the previous ground investigations and generally consistent throughout the monitoring rounds. Of note, chromium hexavalent only exceeded the EQS in Round 1 and iron has been recorded at greater concentrations in the northeast corner of the Main Site in Rounds 2 and 3 compared to Round 1.

The cyanide concentrations detected in groundwater are noted to be in the site wide, with the lowest concentrations recorded in the northeast corner of the Site. This is which are generally consistent with the previous investigations. The number of cyanide total exceedances have increased in Rounds 2 and 3 compared to the Round 1 groundwater sample analysis within all groundwater strata. This is primarily due to a lower detection limit being applied for Round 2 and Round 3. The distribution and concentrations of free cyanide have remained relatively similar (generally low concentrations), with a slight increase in number of exceedances in the Tidal Flat Deposits over the monitoring period. However, no location demonstrated exceedances of free cyanide over both Rounds 2 and 3. The greatest concentration of cyanide was recorded in the Redcar Mudstone Formation monitoring well of MS\BH17(D) in the southeast of the Site (0.076 mg/l). However, in general, the central and north western locations tend to have had the higher concentrations. It should be noted that blue billy was detected in the north west of the site during previous investigation.

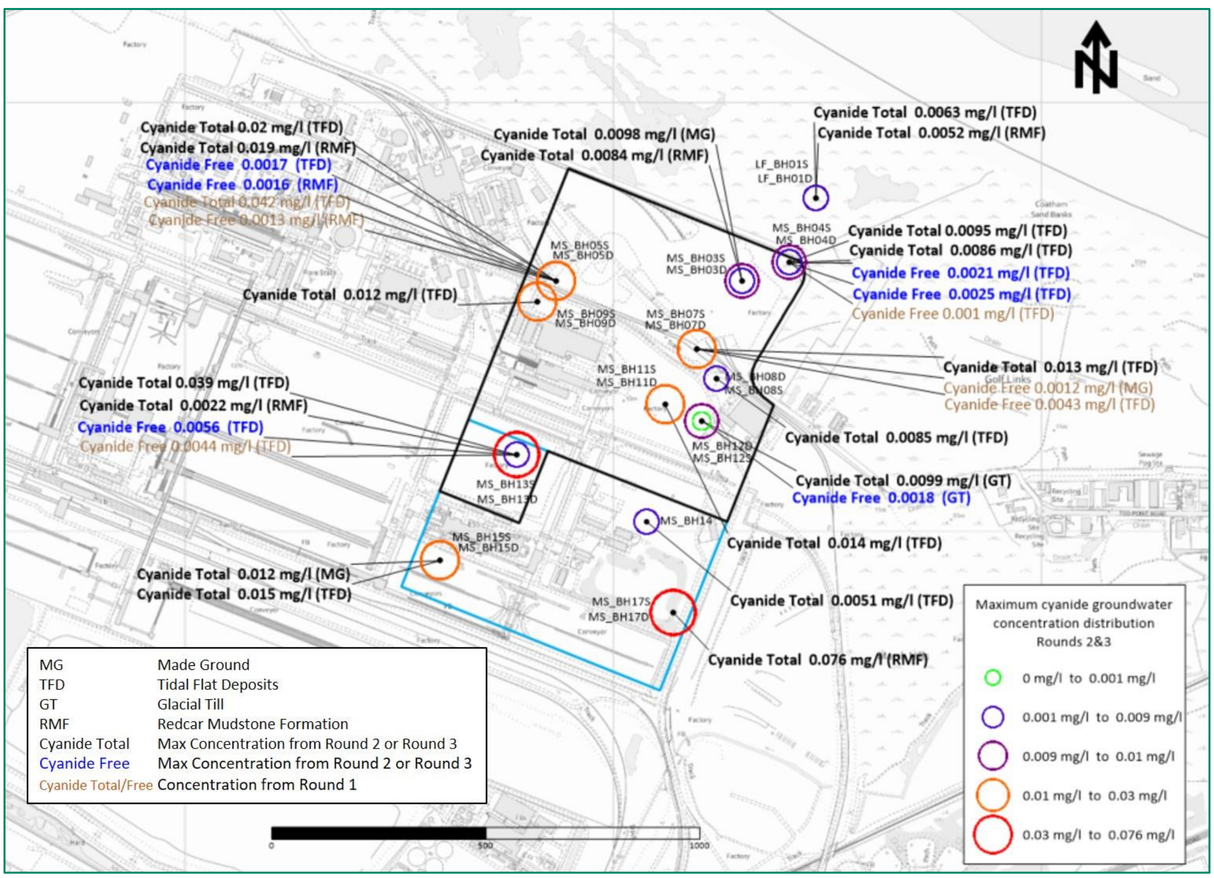


Figure G.3. Cyanide exceedances in groundwater monitoring Round 2 and 3 versus Round 1

TPH >EC5-EC7 aromatics and benzene and ethylbenzene were only detected greater than EQS in one location during the first monitoring round. This was MS\BH03 (within the Redcar Mudstone Formation response zone well) in the iron ponds area of the Main Site (Drawing 60657467-ACM-GIR-DRG-007) and Figure G.2). The concentrations detected are within the same order of magnitude as the EQS EC. Therefore, they are considered to be marginal exceedances. No exceedances of hydrocarbons were detected within the overlying Tidal Flat Deposits monitoring well at this location. A mild hydrocarbon odour was noted on the exploratory log and was stated to be related to sand pockets within the Tidal Flat Deposits. There were no detectable concentrations of speciated TPH, benzene or ethylbenzene recorded in the Made Ground soils or Tidal Flat Deposits soils at this location. Ethylbenzene did exceed in the groundwater in MS\BH04(D) in Round 2 only (albeit the well at this location is within the Glacial Deposits) but no exceedance of hydrocarbons were detected in LF\BH01 (within the Tidal Flats or Redcar Mudstone Formation) in any of the monitoring rounds. Both of these wells are to the north (therefore considered generally downgradient) of MS\BH03. Ethylbenzene also exceeded in Round 2 in MS\BH12(S), also in the Glacial Deposits.

TPH >EC5-EC7 aromatics and / or benzene were also detected greater than DWS in MS\BH03(D) and within MS\BH05(S and D) and MS\BH09(D) on the north west boundary of the Site within the Redcar Mudstone Formation and the Tidal Flats Deposits (see following section). Therefore, the greatest concentrations of these contaminants are within the northern section of the site. TPH Aromatic C16-C21 and aromatic C21-C35 were also noted to exceed the DWS in MS\BH09. This is comparable to the previous investigations, where benzene was noted to be generally absent within the southern section of the site.

On the basis of the limited exceedances of assessment criteria in groundwater and soil leachate, the magnitude of exceedances in relation to screening criteria, the spatial distribution of the exceedances across the site and expected attenuation, it is considered that the soil and groundwater quality is unlikely to pose a significant risk to surface water quality.

No exploratory hole locations were able to be located in the far northwest corner of Site due to access constraints. Therefore, based on the initial groundwater contour plots, there are no down gradient boreholes to able to fully assess the potential for migration off site. Additional boreholes within the northwest corner of the site (if able to be undertaken) would be beneficial to assess concentrations at the boundary in this area. However, the risk to surface waters and groundwater is considered to be low and thus may not be warranted. However, further ground investigation assessment would be beneficial to reduce the uncertainty, particularly to assess the more elevated concentrations of ammoniacal nitrogen within the northwest area.

As proven by MS/TP06 (See Risk to Groundwater Section below for full details), perched, confined groundwater heavily contaminated with hydrocarbons may be encountered on site throughout the development works as obstructions etc. are removed. These waters should be contained, assessed and removed as part of remedial / construction works.

24.6 G.6 Risk to Groundwater

24.6.1 G.6.1 Groundwater Sampling Test Results (Tier 2 Screening)

The Tier 2 Screening Table for groundwater samples are presented in Appendix K and the results are discussed in the following sections. The certificates of chemical analysis are presented in the AEG Factual Report, Appendix A.

Table G.8 and G9 details the summary of the determinands in groundwater that exceeded the EC protective of groundwater in Rounds 1, 2 and 3.

Table G.8 Summary Groundwater Exceedances (DWS) - Round 1

Chemical Group	Determinand	DWS Screening Value[1]	Number of Results	Number of Detects	Minimum Concentration	Maximum Concentration	Number of Guideline Exceedances
TPH	>EC5-EC7 Aromatics	**1**	22	2	<0.1	58	2

Chemical Group	Determinand	DWS Screening Value[1]	Number of Results	Number of Detects	Minimum Concentration	Maximum Concentration	Number of Guideline Exceedances
	Benzene	**1**	22	3	<1	58	3
Metals	Arsenic (Filtered)	**10**	22	22	0.58	24	5
	Chromium (hexavalent)	**50**	22	5	<7	120	3
	Iron (Filtered)	**200**	22	22	8.6	1200	3
	Nickel (Filtered)	**20**	22	22	0.6	22	1
	Selenium (Filtered)	**10**	22	22	0.29	28	5
	Vanadium (Filtered)	**86**	19	17	<0.6	93	1
Other	Thiocyanate (mg/l)	**0.004 (mg/l)**	19	13	<0.02	2.3	13
	Nitrite (as NO2-)	**0.5 (mg/l)**	6	2	<0.1	0.69	1
	Ammoniacal Nitrogen	**0.5 (mg/l)***	22	22	0.0015	10.0	11

[1]. *µg/l unless otherwise stated*

** mgNH4/l*

Table G.9 Summary Groundwater Exceedances (DWS) - Round 2 and 3

Chemical Group	Determinand	DWS Screening Value[1]	Number of Results	Number of Detects	Minimum Concentration[1]	Maximum Concentration[1]	Number of Guideline Exceedances**
TPH&BTEX	Aromatic C16-C21	**90**	42	8	<1	110	1
	Aromatic C21-C35	**90**	42	7	<1	110	1
	Benzene	**1**	30	5	<1	5	4
Metals	Arsenic, Dissolved	**10**	42	42	0.72	61	4
	Iron, Dissolved	**200**	42	42	7.6	11000	12
	Vanadium, Dissolved	**86**	42	33	<0.6	96	1
Inorganics	Cyanide, Total Low Level (mg/l)	**0.05**	42	41	<0.0001	0.076	1
	Thiocyanate	**4**	42	29	<20	9300	27
	Ammoniacal Nitrogen as N (mg/l)	**0.5****	42	41	<0.015	19	31
	Nitrate as NO3 (mg/l)	**50**	28	11	<0.1	140	1
	Nitrite as NO2 (mg/l)	**0.5**	30	19	<0.1	440	18
	Sulfate as SO4 (mg/l)	**250**	42	42	7.5	3000	27
SVOCS	Bis(2-ethylhexyl)phthalate	**8**	28	4	<1	13	1

[1]. *µg/l unless otherwise stated*

000.1 = Concentration greater than that recorded in Round 1

**Not including duplicates*

*** mgNH4/l*

Table G.10 Summary Groundwater Exceedance Determinands Stratum Comparison (DWS) – Round 1 to 3

	Determinand	Arsenic, Dissolved	Chromium, Hexavalent	Iron, Dissolved	Nickel, Dissolved	Selenium	Vanadium	Cyanide, Total Low Level	Thiocyanate	Ammoniacal Nitrogen as N	Nitrate as NO3 (mg/l)	Nitrite as NO2 (mg/l)	Sulfate as SO4 (mg/l)	Aromatic C5-C7	Aromatic C16-C21	Aromatic C21-C35	Benzene	Bis(2-ethylhexyl)phthalate
Min concentration	MG	1.1	<7	9.2	0.9	0.96	7.6	<0.0001	<20	0.16	<0.1	1.7	770	<0.1	<1	<1	<1	<1
	TFD	2.5	<7	8.6	<0.5	<0.25	<0.6	<0.0001	<20	<0.015	<0.1	<0.1	67	<0.1	<1	<1	<1	<1
	GD	0.95	<7	15	0.9	0.6	<0.6	<0.0001	<20	0.07	<0.1	<0.1	160	<0.1	<1	<1	<1	<1
	RMF	0.58	<7	7.6	<0.5	<0.25	<0.6	<0.0001	<20	0.12	<0.1	<0.1	7.5	<0.1	<1	<1	<1	<1
Max concentration	MG	13	<7	41	2.7	27	96	0.012	220	1.9	0.12	2.9	1100	<0.1	3.6	<!	<1	<1
	TFD	61	50	2400	6.3	15	63	0.42	9300	19	0.82	44	1500	5.2	110	110	4	0.01
	GD	7.7	<7	510	5.8	28	54	0.0099	25	4.1	0.17	23	2700	<0.1	<1	<1	<1	<1
	RMF	9.6	120	11000	22	27	59	0.076	3900	13	140	440	3000	58	42	6.2	58	5
Average Concentration	MG	8.58	<7	19.64	1.38	9.29	54.65	<0.03	180.5	0.92	0.11	2.3	964	<0.1	1.52	<1	<1	<1
	TFD	9.38	8.29	228.16	1.71	2.50	7.34	<0.02	907.7	3.14	0.2	4.45	555.69	0.25	10.63	6.029	1.42	0.01
	GD	3.28	<7	245.67	2.7	6.82	10.6	0.007	20.83	1.78	0.14	8.36	1190	<0.1	<1	<1	<1	<1
	RMF	3.98	18.39	1126.1	5.29	4.39	8.68	0.02	449.47	3.12	19.99	64.71	973.36	3.32	3.28	1.29	4.17	1.4
Geomean	MG	6.55	<7	16.94	1.25	5.69	34.95	<0.02	155.1	0.66	0.11	2.22	955.2	<0.1	1.29	<1	<1	<1
	TFD	6.99	7.46	61.16	1.23	1.25	2.93	<0.01	131.28	1.22	0.16	0.7	369.04	0.11	1.96	1.59	1.22	0.01
	GD	2.55	<7	91.349	2.3	2.48	2.35	0.007	20.76	0.73	0.13	2.81	841.05	<0.1	<1	<1	<0.1	<1
	RMF	2.72	10.19	101.15	3.07	1.55	2.85	0.006	68.51	1.33	0.88	1.08	453.23	0.14	1.23	1.11	1.25	1.17
Median	MG	8.9	<7	14	1	6.5	57.5	<0.03	220	0.57	0.11	2.3	970	<0.1	<1	<1	<1	<1
	TFD	7.4	7	44	1.0	1.4	2.25	<0.01	130	1.9	0.1	0.435	420	0.1	<1	<1	<1	0.01
	GD	2.7	<7	226.5	2.4	1.92	1.8	0.007	20	1.13	0.135	1.4	1250	<0.1	<1	<1	<0.1	<1
	RMF	2.7	<7	53.5	3.8	1.4	1.7	0.006	32	2.65	0.54	0.1	815	0.1	<1	<1	<1	<1

24.6.1.1 G.6.1.1 Made Ground

Exceedances of the EC protective of groundwater were recorded within the Made Ground monitoring wells. The exceedances from the three monitoring rounds are presented in Table I.1 in Appendix I.

The key findings associated with the Made Ground groundwater are as follows.

- No exceedances were recorded within the groundwater obtained from MS\BH11(S)
- The concentrations observed in MS\BH15(S) over three rounds, were generally consistent.
- During the three rounds, arsenic was only detected greater than the DWS in MS\BH07(S) in Round 1 and MS\BH15(S) in Round 3. The concentrations were marginal exceedances, 13 and 12 µg/l respectively compared to the DWS of 10 µg/l.
- Selenium was only detected above the DWS at one location on one occasion (MW\BH07(S) – 27 µg/l compared to the DWS of 10 µg/l).
- Vanadium was recorded greater than the DWS in MS\BH15(S) in Rounds 1 and 2. It did not exceed in Round 3.
- Ammoniacal Nitrogen did not exceed the DWS in MS\BH07(S) or MS\BH15(S) in Round 1. Exceedances were recorded from MS\BH15 (S) during Rounds 2 and 3. The exceedances are marginal, being within the same order of magnitude as the DWS.
- Thiocyanate concentrations at MS\BH15(S) are consistent in all three rounds (220 to 230 µg/l), exceeding the DWS by 1 order of magnitude. The concentration recorded in MS\BH07(S) in Round 1 was 52 µg/l.
- Nitrite did not exceed in MS\BH07(S) or MS\BH11(S) during Round 1. Concentrations from MS\BH15(S) were comparable in all three rounds (same or order of magnitude as the DWS) yet show a slight increase in concentration trend over the three rounds. A maximum concentration of 2.9 mg/l was recorded compared to the DWS of 0.5 mg/l.
- Sulfate concentrations were generally consistent during the three monitoring rounds. There is a slight decrease in concentration trend over the three rounds in MS\BH15(S). The maximum concentration of 1,100 mg/l was recorded in Round 1 in both MS\BH07(S) and MS\BH15(S) compared to a DWS of 250 mg/l.

24.6.1.2 G.6.1.2 Tidal Flat Deposits

Exceedances of the EC protective of groundwater were recorded within the Tidal Flat Deposits monitoring wells. The exceedances from the three monitoring rounds are presented in Table I.2 in Appendix I.

The key findings associated with the Tidal Flats Deposits groundwater are as follows.

- Selenium and >EC5-EC7 Aromatics were only detected greater than the DWS in Round 1 at one location (LF\BH01(S) and MS\BH05(S) respectively).
- Marginal DWS exceedances of arsenic were recorded in either Round 2 or Round 3 in locations that in Round 1 did not exceed. These locations included LF\BH01(S) and MS\BH13(S). The exceedances are marginal (maximum of 16 µg/l compared to the DWS of 10 µg/l). Similarly, MS\BH08(D) and MS\BH15(D) having exceeded for arsenic in Round 1, were less that the DWS in Round 2 and 3. The greatest concentration of arsenic (61 µg/l) continued to be from MS\BH14 (north of the former Pelletizer plant), which exceeded in both Round 1 and Round 2 but not Round 3.
- Chromium hexavalent was not recorded to be greater than the DWS screening value in Rounds 2 or 3, having exceeded in LF\BH01(S) in Round 1. This was the only location across the three rounds where chromium hexavalent exceeded the DWS from within the Tidal Flat Deposits.
- Iron exceedances were noted at MS\BH04(S) during all three monitoring rounds with a maximum concentration of 2,400 µg/l, over an order of magnitude above the DWS of 200 µg/l. Exceedances were also detected in MS\BH07(D), MS\BH13(S) and MS\BH14 in Rounds 2 and/or 3 that were not recorded during Round 1. The

exceedances at these locations were marginal when compared to the DWS, being within the same order of magnitude as the DWS.

- Benzene exceedances were only detected in MS\BH05(S) and MS\BH09(D). However, concentrations reduced during the monitoring rounds, whereby no exceedances were detected in Round 3 in MS\BH05(S).
- TPH aromatic C16-C21 and aromatic C21-C35, were noted to exceed DWS in MS\BH09 from Round 2 only. The exceedance was marginal, 110 µg/l compared to the DWS of 90 µg/l.
- Thiocyanate and ammoniacal nitrogen were generally consistent during the three monitoring rounds. The general exceptions being, MS\BH05(S) where thiocyanate concentrations were almost double in Rounds 2 and 3 compared to Round 1 and MS\BH13(D) where the greatest concentration of thiocyanate was recorded in Rounds 2 and 3 (a groundwater sample from MS\BH13(D) was not analysed for thiocyanate as part of the Round 1 monitoring). The maximum concentration of 9300 µg/l was detected at MS\BH13(S), compared to the DWS of 4 µg/l. Both these locations are located on the west side of the Main Site.
- Concentrations of nitrite as NO_2 exceeded the DWS in Round 2 and 3, having not done so in Round 1. The majority of exceedances were recorded from Round 2. Most samples were observed to be within 1-2 orders of magnitude as the DWS. The greatest concentration was recorded in MS\BH13(S) (44 mg/l) during Round 2. No exceedance was recorded at this location during Round 3. The DWS is 0.5 mg/l.
- Sulfate concentrations were generally consistent across the three monitoring rounds. General exceptions included MS\BH05(S) and BH\BH07(D) where concentrations notably reduced over the monitoring rounds and MS\BH15(D) where the concentrations notably increased from the first monitoring round. All exceedances recorded were within the same order of magnitude as the DWS.
- An isolated exceedance of bis(2-ethylhexyl)phthalate was recorded greater than the DWS in MS\BH07(D). It was a marginal exceedance (13 µg/l compared to the DWS of 8 µg/l) and was only recorded during Round 2.

24.6.1.3 G.6.1.2 Glacial Deposits

Exceedances of the EC protective of groundwater were recorded within the Glacial Deposits monitoring wells. The exceedances from the three monitoring rounds is presented in Table I.3 in Appendix I.

The key findings associated with the Glacial Deposits groundwater are as follows.

- Iron concentrations in MS\BH04(D) exceeded the DWS in all three rounds. The concentrations showed a gradual decease over the three rounds. Iron did not exceed in MS\BH12(S)
- Selenium only exceeded the DWS in MS\BH12S in Round 1. The exceedance was marginal (factor of 2.8).
- Thiocyanate was detected greater than the DWS in Round 2 and only in MS\BH12(S). The exceedances is within the same order of magnitude as the DWS.
- Ammoniacal nitrogen concentrations increased in Round 2 and 3 compared to Round 1 in MS\BH12(S). However, concentrations remained within the same order of magnitude as the DWS. In MS\BH04(D) ammoniacal nitrogen only exceeded in Round 2
- Nitrite as NO_2 exceeded the DWS in Rounds 1 and 2 at MS\BH12(S) and Round 3 only in MS\BH04(D). There was a notable increase in concentration during Round 2 from Round 1 at MS\BH12(S) and then a subsequent decrease to below the DWS in Round 3.
- Concentrations of sulfate have shown a gradual increase over the three rounds in MS\BH12(S) but a decrease in MS\BH04(D). The greatest concentration recorded in MS\BH12(S) remains within the same order of magnitude as the DWS.

24.6.1.4 G.6.1.3 Redcar Mudstone Formation

Exceedances of the EC protective of groundwater were recorded within the Redcar Mudstone Formation monitoring wells. The exceedances from the three monitoring rounds are presented in Table I.4 in Appendix I.

The key findings associated with the Redcar Mudstone Formation groundwater are as follows.

- Chromium (hexavalent), nickel, selenium and TPH >EC5-EC7 Aromatics only exceeded the DWS in Round 1. These were generally isolated or sporadic exceedances with the majority from MS\BH03(D).
- Cyanide total only exceeded the DWS in Round 3 (MS\BH17(D)). It was a marginal exceedance, 0.076 mg/l compared to the DWS of 0.5 mg/l.
- Nitrate and nitrite only exceeded the DWS in Round 2 and were isolated and sporadic. The highest nitrite concentration (440 mg/l) was approaching three orders of magnitude above the DWS of 0.5 mg/l.
- Thiocyanate concentrations are generally similar across the three rounds. However, there was a slight marked increase in MS\BH05(D) from 410 µg/l in Round 1 to a maximum of 3,900 µg/l in Round 2. The Round 3 concentration was 2,700 µg/l.
- Sulfate exceedance concentrations and distributions are similar across all three rounds. However, generally slightly increased concentrations in Rounds 2 and 3 compared to Round 1.
- In Round 1 benzene was an isolated exceedance from MS\BH03. In Round 3 benzene was also an isolated exceedance but from MS\BH05(D). The concentration in MS\BH03(S) was a factor of 11.6 times the concentration of 5 µg/l recorded from MS\BH05(D).
- Ammoniacal nitrogen was detected at greater concentrations in Round 2 and Round 3 compared to Round 1. MS\BH03(D), MS\BH05(D), MS\BH12(D) and MS\BH17(D) all exceeded the DWS in Round 2 and 3, not Round 1. The concentrations were generally an order of magnitude greater in Round 2 and 3 compared to Round 1. The greatest concentration was 13 mg/l in Round 3 in MS\BH05(D).

24.6.1.5 G.6.1.4 MS/TP06

A grab water sample was obtained from trial pit MS/TP06 during the works due to contamination being observed within groundwater ingress. A brown iridescent appearance and moderate hydrocarbon odour was noted. Organic contamination exceedances of the DWS screening value included speciated hydrocarbons and PAHs at concentrations greatly in excess of the DWS screening value. Dibenzofuran, arsenic and iron were also noted to exceed the DWS screening value. However, these were only marginal. The organic contamination detected within the water that entered into MS\TP06 is presented in Table G.11 below.

Table G.11 Summary TPH and PAH Exceedances (DWS) from water ingress into MS\TP06 (grab sample)

Determinand	DWS Screening Value[1]	Concentration (µg/l)
>C10-C12 Aliphatics	300	1,900
>C12-C16 Aliphatics	300	28,000
>C16-C21 Aliphatics	300	180,000
>C21-C35 Aliphatics	300	44,000
>EC10-EC12 Aromatics	90	7,000
>EC12-EC16 Aromatics	90	23,000
>EC16-EC21 Aromatics	90	120,000
>EC21-EC35 Aromatics	90	28,000
Acenaphthene	18	150
Fluoranthene	4	5,400
Pyrene	9	5,400

Determinand	DWS Screening Value[1]	Concentration (µg/l)
Benz(a)anthracene	3.5	660
Chrysene	7	460
PAHs (sum of 4)	0.1	440

The presence of these elevated hydrocarbons and PAHs within the water encountered within this pit indicates that there are perched areas of contaminated water present at the Site, confined by the presence of buried structures/foundations etc. This is not unexpected given the site's historical use.

Based on the findings of the AECOM ground investigation, the underlying aquifers do not appear to have been impacted by these local occurrences of perched contaminated water. However, these will require appropriate management during the earthworks to avoid potential contaminant loading into the aquifer and or surface waters.

24.6.2 G.6.2 Soil Leachate Sampling Test Results (Tier 2 Screening)

A summary of the soil leachate results exceeding DWS screening criteria (protective of groundwater) is provided in Table G.12 below.

Table G.12 Summary Soil leachate DWS Exceedances

Chemical Group	Determinand	DWS Screening Value[1]	Number of Results	Number of Detects	Minimum Concentration	Maximum Concentration	Number of Guideline Exceedances
PAH	Benzo(a) pyrene	**0.01**	15	6	<0.02	0.49	6
	Dibenz(a,h)anthracene	**0.07**	15	4	<0.02	0.16	1
	Phenanthrene	**4**	15	11	<0.02	47	1
	PAHs (sum of 4)[2]	**0.1**	15	6	<0.08	1.81	6
Metals	Iron	**200**	15	10	<5.5	270	1
	Lead	**10**	15	10	<0.09	26	1
	Nickel	**20**	15	5	<0.5	35	1
Inorganic	Nitrite (as NO2-	**0.5 (mg/l)**	15	7	<0.1	6.8	3

1. *µg/l unless otherwise stated*
2. *sum of 4 (benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene and indeno(1,2,3-cd)pyrene)*

No soil leachate exceedances were recorded from LF\TP02 at 1.0m bgl. MS\BH10 at 11.3m bgl (TFD), MS\BH11 at 4.0m bgl, MS\BH14 at 0.3m bgl and MS\TP09 at 3.0m bgl.

As with the screening against EQS, soil leachate exceedances were recorded from the sample obtained within the Glacial Till at 19.1m bgl. However, only metals were detected greater than the DWS screening values at this location. With regards to lead and nickel, this was the only sample to exceed for these determinands, being generally an order of magnitude or more, greater than the rest of the data set. The following tables present the soil leachate concentrations from samples obtained from ground level to 2.5m bgl and below 2.5 m bgl.

Table G.13 Summary Soil leachate DWS Exceedances – ground level to 2.5m bgl

Determinand	DWS Screening Value[1]	MS\BH08	MS\BH09	MS\BH14	MS\BH15	MS\BH16	MS\TP10
		MG	MG	MG	MG	MG	MG
	Depth	0.36m bgl	0.5m bgl	1m bgl	1m bgl	0.5m bgl	0.3m bgl
		Exceedance Concentrations					
Benzo(a) pyrene	**0.01**	0.05	0.49	0.15	0.09	0.13	
Dibenz(a,h)anthracene	**0.07**		0.16				
Phenanthrene	**4**	47					
PAHs (sum of 4)	**0.1**	0.13	1.81	0.48	0.26	0.42	
Iron	**200**						270
Nitrite (as NO2-)	**0.5 (mg/l)**			6.8			

[1] µg/l unless otherwise stated
MG = Made Ground

Table G.14 Summary Soil leachate DWS Exceedances – below 2.5m bgl

Determinand	DWS Screening Value[1]	MS\BH02	MS\BH07	MS\BH10	MS\BH10	MS\TP06
		MG	MG	TFD	GT	MG
	Depth	2.25-2.7m bgl	4.2-4.65m bgl	11.3	19.1m bgl	3.8m bgl
Benzo(a) pyrene	**0.01**					0.14
PAHs (sum of 4)	**0.1**					0.49
Lead	**10**				26	
Nickel	**20**				35	
Nitrite (as NO2-)	**0.5 (mg/l)**	2.8	0.61			
Ammoniacal nitrogen	**0.5 (mg/l)**			0.66		

[1]. *µg/l unless otherwise stated*
** mgNH4/l*

MG = Made Ground, GT = Glacial Till

24.6.3 G.6.3 Discussion

Thiocyanate in groundwater was detected at concentrations at the site which could not be deemed as generally isolated occurrences, with 13 of the 19 samples analysed exceeding the DWS screening value in Round 1 and 27 out 42 in Rounds 2 and 3. This is partly due to a stringent DWS criteria (United States Environmental Protection Agency Regional Screening Level (no UK or WHO drinking water criteria exist)), resulting in exceedances when detected above limit of detection of the laboratory method.

In general, the thiocyanate concentrations detected were less than 0.25 mg/l. However, in MS\BH05 located in the northwest of the Site thiocyanate was detected at concentrations of 0.41 and 2.3 mg/l during Round 1. A concentration of 0.23 mg/l was also detected in MS\BH15 (in the Made Ground monitoring well and 0.11 mg/l in the Tidal Flat Deposits monitoring well at this location) during Round 1, which is located on the southwestern boundary of the Site. During Round 2 and 3 the widespread occurrence and distribution of thiocyanate remained consistent with Round 1. The greatest concentrations identified, as per Round 1 were in the west of the Main Site. In MS\BH05 it was detected at maximum concentrations of 4.4 mg/l in the Tidal Flat Deposits (2 times Round 1 concentration) and 3.9 mg/l in the Redcar Mudstone Formation (9.5 times Round 1 concentration). The greatest concentrations in Rounds 2 and 3 were recorded in MS\BH13 Tidal Flat Deposits, located in central west area of the Main Site. This was not analysed for thiocyanate during Round 1. A concentration of 9.3 mg/l was recorded. However, within the lower Redcar Mudstone at this location, the concentration was only recorded at 0.042 mg/l. The DWS is 0.004 mg/l. The next greatest concentration was in MS\BH015 (Made Ground and Tidal Flats Deposits) in the southwest of the Main Site. This recorded similar concentrations across all three rounds and were generally approximately 1 order of magnitude less than those concentrations detected in MS\BH13 and MS\BH05.

The widespread occurrence of thiocyanate is consistent with the findings of the previous investigations undertaken at the Site. The distribution of the groundwater samples exceeding DWS from Round 1 is presented in Figure G.4 below. This also shows the concentration range of thiocyanate across the Site, given this was the most prevalent contaminant noted.

As per the cyanide concentrations discussed within Section G.5.3 there are currently no down gradient locations north of these locations to confirm off-site migration. It should be noted that blue billy was detected in the north west of the site during previous investigation.

Ammoniacal nitrogen was detected greater than the DWS in 68% of the samples analysed over the three monitoring rounds. Although there has been a general increase in concentrations from Round 1 to Rounds 2 and 3 the majority of the exceedances (60%) remained within the same order of magnitude as the DWS of 0.5 mg/l. The greatest concentrations remained from MS\BH05 (10 to 19 mg/l) during the monitoring rounds. It is noted that all the Made Ground soil leachate concentrations were detected less than the DWS, with the only soil leachate to exceed being from a soil sample in the Tidal Flats Deposits (clay) at 11.3m bgl.

Sulfate concentrations were greater than the DWS in 70% of the samples analysed over the three monitoring rounds. Although there has been a general increase in concentrations from Round 1 to Rounds 2 and 3 the majority of the exceedances (90%) remained within the same order of magnitude as the DWS of 250 mg/l.

Nitrite concentrations increased in Rounds 2 and 3 compared to Round 1 and were often recorded 1 to 2 orders of magnitude greater than Round 1. This resulted in 18 samples from Rounds 2 and 3 exceeding the DWS compared to only 1 in Round 1. This is potentially due to seasonal variation as Round 1 was undertaken in August, whilst Round 2 and 3 were undertaken in seasonal wetter months of October and November. As with ammoniacal nitrogen, further groundwater monitoring may provide more information on this potential trend

The discussion regarding hydrocarbons detected has been discussed in Section G.5.3.

The majority of the exceedances recorded are less than an order of magnitude or the same order of magnitude above EC, with the exception of isolated benzene, iron and more widespread ammoniacal nitrogen and thiocyanate. This is despite the monitoring sampling data for Round 2 and 3 indicating that there has been a general overall slight increase in ammoniacal nitrogen, thiocyanate and sulfate within the groundwater at the site compared to Round 1 Given the industrial history and location of this aquifer, it is highly unlikely that the aquifer will be exploited as a potable water in the future. This is reaffirmed in that the Site is not within or near a groundwater source protection zone. Therefore, the use of DWS criteria in this assessment is considered to be very conservative

Therefore, the exceedances in the groundwater or soil leachate described above are unlikely to result in harm or damage to potable water resources.

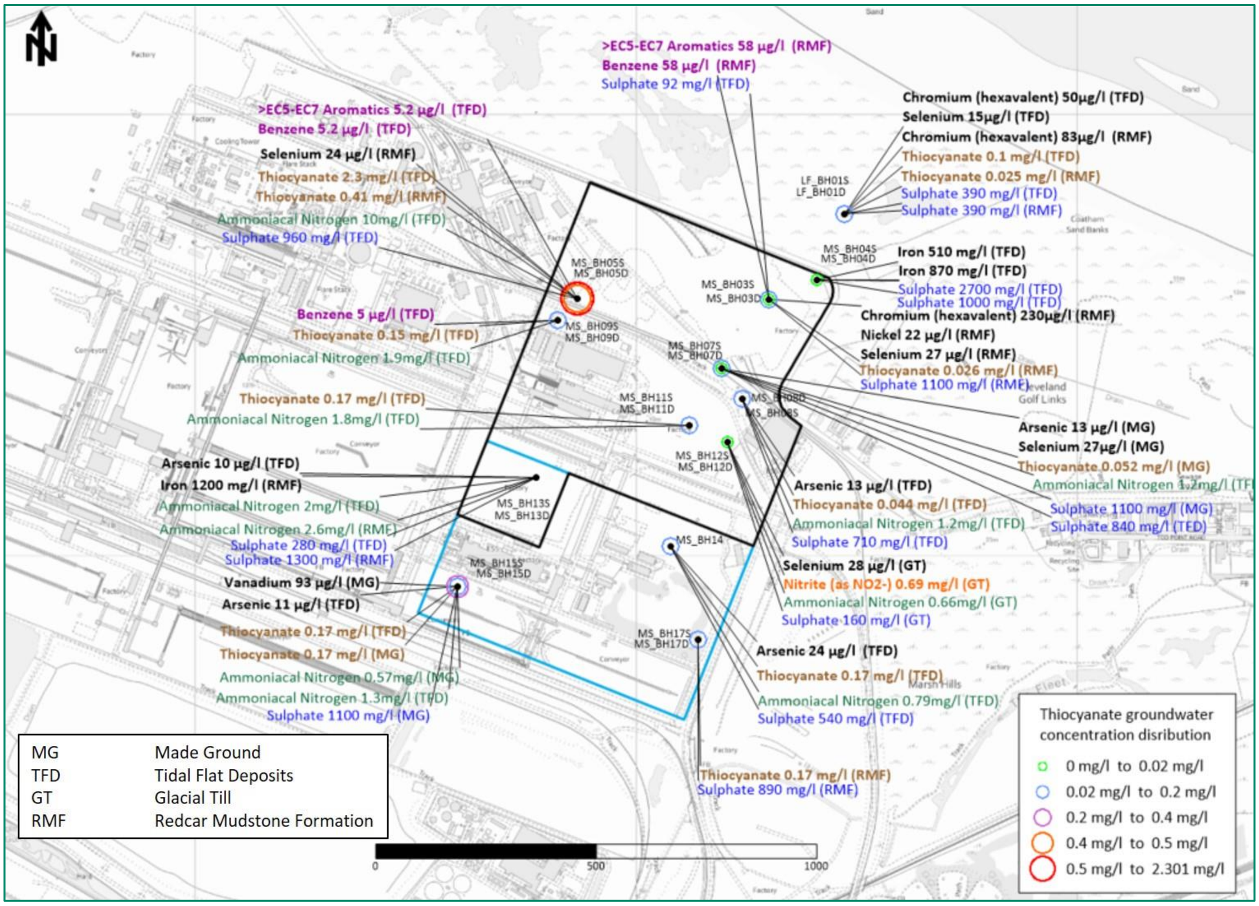


Figure G.4 Groundwater screening exceedances against DWS Screening Criteria and thiocyanate concentrations distribution (Round 1)

25. Appendix H Ground Gas Assessment

25.1H.1 Ground Gas Risk Assessment

The generation of migration of ground gases from natural sources can pose a major hazard to structures if gases are able to accumulate within them. In terms of the proposed scheme, the major risks are that ground gases may accumulate within any buildings, excavations, any enclosed structures such as drainage runs and manholes, or beneath any pavements.

For the purpose of this ground gas risk assessment, only the standpipe installations screened with the Made Ground have been considered, this includes the following installations: MS\BH03S, MS\BH07S, MS\BH08S, MS\BH09S, MS\BH11S, MS\BH15S and MS\BH17S.

For this study, the borehole gas concentration and flow rate results for carbon dioxide (CO_2) and methane (CH_4) have been compared to guidance values given in the following documents:

- BS 8485:2015+A1:2019 "Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings"; and
- CIRIA Report C665 (2007) "Assessing Risks Posed by Hazardous Ground Gases to Buildings".

25.2H.2 Previous Ground Gas Risk Assessment

A previous ground gas risk assessment was undertaken as part of the Main Site Desk Study (AECOM, 2020). The report concluded that that the gas regime for the site met CIRIA C665 guidelines for Characteristic Situation (CS) 1. However, the report did continue to state that the ground gas monitoring programme did not manage to capture concentrations during critical conditions of falling barometric pressures.

25.3H.3 Ground Gas Monitoring Results

An assessment has been undertaken on the data collected from the 3 monitoring rounds. .

The range of gas concentrations, flow rates and atmospheric pressures recorded during the monitoring round is presented in Table H.1 below along with the CS grade for each well installation. Recorded barometric pressure ranged between 1007mbar and 1026mbar throughout the monitoring period.

Table H.1. Summary of Ground Gas Monitoring Results

Well Installation	Response Zone	Max. CH_4 (% v/v)	Max. CO_2 (% v/v)	Min. O_2 (% v/v)	Max. CO (ppm)	Max. H_2S (ppm)	Flow Rate (l/hr)	CS Grade
MS\BH03S	Made Ground	**0.1**	<0.1	16.4	3.0	<1.0	0.2	CS1
MS\BH07S	Made Ground	**0.1**	**0.2**	20.4	2.0	<1.0	0.1	CS1
MS\BH08S	Made Ground	<0.1	**0.1**	**20.2**	7.0	1.0	0.3	CS1
MS\BH09S	Made Ground	0.2	**0.7**	18.0	1.0	<1.0	0.1	CS1
MS\BH11S	Made Ground	<0.1	**0.1**	19.8	1.0	<1.0	0.1	CS1
MS\BH15S	Made Ground	<0.1	**0.1**	**18.8**	1.0	<1.0	0.1	CS1
MS\BH17S	Made Ground	0.1	**0.1**	9.3	1.0	<1.0	0.1	CS1
LF\BH01S	TFD	<0.1	0.2	20.6	<1.0	<1.0	-0.2	CS1
LF\BH01D	RMF	<0.1	0.1	20.4	2.9	5.0	-8.2	CS1

LF\BH01S and LF\BH01D were mistakenly monitored during the final monitoring round by the Contractor. Only the shallow Made Ground installations were intended to be monitored. The results are generally in line with those recorded in the other wells, indicating a CS1 or the Site. However, a negative flow rate was recorded at LF\BH01D and (BSI, 2015) states that negative flow rates should be assessed whether, under different temporal conditions, a similar positive out-flow of as could occur. LF\BH01D was screened in the lower Redcar Mudstone Formation (a3), and the response zone was flooded, with water recorded between 4.55m bgl and 4.73m bgl during the monitoring programme. These factors, in addition to the lack of previous monitoring data, have led to the flow rate being considered positive for purposes of assessment. It does not alter the findings of the assessment.

Groundwater was encountered within the ground gas monitoring wells in all except MS\08(S) MS\09(S) and MS\17(S). The details of the groundwater levels within each of the ground gas monitoring wells is presented in Table 8-4 within Section 8. Within the gas monitoring installations where groundwater was encountered, the groundwater level was recorded within the response zone for each well. The details of the response zones are presented in Table 6-4 in Section 6. Therefore, the monitoring wells were not deemed to be flooded and thus applicable to be used for ground gas monitoring.

The gas monitoring results indicate that the maximum CH_4 concentration recorded during the monitoring was 0.2% v/v at MS\BH09S and the maximum CO_2concentration recorded during the monitoring was 0.6 % v/v, also from MS\BH09S. The maximum flow rate recorded during the monitoring was 0.3l/hr at MS\BH08S.

In addition to the post-fieldwork monitoring round, ground gas monitoring was undertaken at weekly intervals during the intrusive ground investigation works. The concentrations recorded during these monitoring events were below the limit of detection for CH_4 and CO_2, with flow rates also recorded as below the limit of detection.

25.4H.4 Classification of Gas Regime

In accordance with BS 8485 (BSI, 2015), Gas Screening Values (GSVs) have been calculated to assess the significance of gas generation at the site. GSV can be calculated from the gas concentration and the flow rate:

$$GSV\ (l/hr) = \frac{Gas\ concentration\ (\%\, v/v)}{100}\ \ x\ \ flow\ rate\ (l/hr)$$

A GSV has been calculated for each well installation based on the maximum gas concentration (CH_4 or CO_2) and maximum flow rate recorded. The corresponding CS for the site is based on the comparison of the calculated GSV to the values given in Table H.2 taken from BS 8485 (BSI, 2015).

Table H.2. Classification Scheme for Site Gas Risk Assessment

Characteristic Situation	Risk Classification	Gas Screening Value	Additional Factors	Typical Source of General
1	Very Low	<0.07	Typically, CH4 <1% and CO_2 <5%. Otherwise consider increase to CS2.	Natural Soil with low organic content. “Typical” Made Ground.
2	Low	<0.7	Borehole air flow rate not to exceed 70l/hr. Otherwise consider increase to CS3.	Natural Soil with high peat/organic content. “Typical” Made Ground.
3	Moderate	<3.5	-	Old landfill Inert waste Mineworking (flooded)
4	Moderate to High	<15	Quantitative Risk Assessment required to evaluate scope of protective measures.	Mineworking susceptible to flooding Completed Landfill (WMP 26b criteria)

Characteristic Situation	Risk Classification	Gas Screening Value	Additional Factors	Typical Source of General
5	High	<70	-	Mineworking unflooded inactive with shallow workings near the surface.
6	Very High	>70	-	Recent Landfill site

Source: Modified Wilson and Card Classification

The initial approach in the assessment is to use the worst-case scenario by determining the GSV based on the maximum gas concentrations and maximum flow rate recorded across the site over the monitoring period. Guidance set out in BS 8485 (BSI, 2015), which is equivalent to the characteristic GSV in CIRIA C665 (CIRIA, 2007), stipulates a site characteristic maximum GSV of <0.07l/hr, with a typical maximum concentration of 1% v/v for CH_4, or 5% v/v for CO_2 for classification as CS1.

In accordance with the methodology outlined in BS 8485 (BSI, 2015), AECOM have utilised the results of the ground gas monitoring programme to calculate a tentative GSV, presented in Table H.3

Table H.3. Site GSV Values

Gas Concentration	Max. Concentration (% v/v)	Max. Flow (l/hr)	GSV
CH_4	0.2	0.3	0.0006
CO_2	0.7	0.3	0.0021

Based on the results in Table H.3 the site could be classified as CS1. It is noted that all of the individual well installations are classified as CS1 and that slightly elevated CH_4 and CO_2 was only recorded in a single well installation (MS\BH09S).

BS 8485 (BSI, 2015) states the requirements for gas protection are based on the CS score and the resulting building type. These are combined to provide a gas protection score. The proposed development classifies as a Type D building in accordance with Table 3 in BS 8485. The gas protection score for a Type D building constructed on a CS1 site is 0 (refer to Table 4 in BS 8485). The standard provides various gas protection measures, each with their own points score which when added together must equal or exceed the score. These methods include structural barriers, ventilations measures and gas resistant membranes. However, as the site is scored at 0, no protection measures are deemed to be required to be incorporated into the building design.H.5 Ground Gas and Constriction and Maintenance Workers

A potential risk to construction workers from the accumulation of ground gas could exist during the construction and maintenance phases. There is not considered to be a significant risk from ground gas during the operation phase as ground gas accumulation is only considered a risk in confined/enclosed spaces and this can be mitigated through design of appropriate in-ground protection measures following BS 8485 (BSI, 2015).

During the construction phase, restricted access to confined spaces, including excavations should be implemented. Where work in confined spaces is unavoidable, a site-specific and task-specific risk assessment should be undertaken prior to commencement of works. Monitoring of confined spaces for potential ground gas accumulations should be undertaken by suitably trained personnel with the use of specialist PPE where necessary.

Maintenance workers that are required to undertaken excavations during the operation life of the scheme will be provided with sufficient information by the project team on the nature of each sub-area at the site, upon which to base site and task-specific risk assessments. Such maintenance work will also include measures as detailed in the construction phase to minimise the effects of the work to human health.

The assessment presented in the following sections focuses on occupational exposure risks.

25.4.1 H.5.1 Methane

The greatest hazards posed by methane are those of fire and explosion. The limits of flammability, i.e. the Lower Explosion Limit (LEL) and Upper Explosion Limit (UEL), are 5% v/v and 15% v/v respectively. Where methane concentrations are encountered between these two ranges there is the possibility of ignition/explosion. However, it is important to note that where methane is outside of this range, i.e. above, safety shouldn't be assumed as further dilution can occur bringing it back to within explosive limits.

Where monitored, none of the installations had concentrations of methane within the 5% to 15% v/v range. Maximum methane (% v/v) concentrations within each of the wells were recorded below the detection limit of the monitoring equipment on all occasions.

For methane, the threshold for toxicity by asphyxiation is considered to be 30% (v/v) (8 hour long term Occupational Exposure Limit (OEL). The results show that the concentrations of methane (% v/v) recorded, do not exceed this limit.

Ventilation in tunnels and confined spaces is required at concentrations greater than 0.25% (v/v). This should be monitored on site during construction activities. Where entry into excavations is unavoidable the activity should comply with confined space legislation.

25.4.2 H.5.2 Oxygen

The results show that oxygen concentrations ranged from 9.3% v/v to 20.4% v/v. Depleted oxygen (i.e. less than 18%) was detected in MS\BH03S, MS\BH09S and MS\BH17S.

Table H.4 summarises the physiological effects of an oxygen deficient atmosphere (CIRIA, 1995). Based on the oxygen data recorded at the site, it is concluded that there would be a potential risk to construction workers entering excavations or enclosed spaces at the site.

Table H.4 Effects Reduced Oxygen Concentrations

Oxygen% (vol./vol.)	Physiological Effects
19 – 21	Normal range of concentration in the atmospheric air
17	Faster breathing, slight impairment of judgement
10 – 16	Initial signs of anoxia leading to emotional upsets, abnormal fatigue upon exertion
6 – 10	Nausea, vomiting, unconsciousness, collapse may occur
<6	Convulsions, gasping respirations, death

25.4.3 H.5.3 Carbon Dioxide

For carbon dioxide there is no risk of flammability; however, there is a risk of asphyxiation and as such there are toxicity levels of 0.5% (v/v) for an 8 hour long-term Occupation Exposure Limit (OEL) and 1.5% (v/v) for a 10 minute OEL. None of the monitoring wells recorded carbon dioxide levels are these OELs.

A potential risk of asphyxiation would exist if concentrations exceeding the toxicity limits were identified within confined spaces. It is recommended that confined space legislation be adhered to where entry into excavations by site workers is unavoidable.

25.4.4 H.5.4 Hydrogen Sulphide

A long-term (8 hour) workplace exposure limit of 5pm and a short-term (15 minute) workplace exposure limit of 10ppm are given for hydrogen sulphide.

Hydrogen sulphide concentrations were recorded at or below the detection limit of the monitoring equipment.

25.4.5 H.5.5 Carbon Monoxide

A long-term (8 hour) workplace exposure limit of 30ppm and a short-term (15 minute) workplace exposure limit of 200ppm are given for carbon monoxide.

Carbon monoxide concentrations were recorded at concentrations ranging from <1.0ppm (detection limit of monitoring equipment) to 3.0ppm.

26. Appendix I GQRA Screening Tables

				Location_Code	LF\BH01	LF\BH01	LF\BH01	LF\BH01	LF\BH01	LF\BH01	LF\BH02	LF\BH02	LF\BH02	LF\BH02	LF\BH02	LF\TP01	LF\TP01	LF\TP02	LF\TP03	MS\BH02
				Sample_Depth_Range	0.3	0.5	2	4	28.1	28.65-28.95	0.3	1	8.7-8.9	18.4	24.9	0.3	1	1	4	0.3
				Sampled_Date_Time	22/06/2021	22/06/2021	22/06/2021	22/06/2021	23/06/2021	29/06/2021	22/06/2021	22/06/2021	24/06/2021	06/07/2021	08/07/2021	22/06/2021	22/06/2021	23/06/2021	24/06/2021	25/06/2021
Chem_Group	ChemName	output unit	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	MG	MG	MG	TFD-S	GT	RMU	MG	MG	TFD-S	TFD-C	GT	MG	MG	MG	MG	MG
TPH	EPH >C10-C40	mg/kg			<10	<10	<10	<10	-	<10	<10	13	<10	-	-	<10	<10	<10	<10	<10
	>C5-C6 Aliphatics	mg/kg	**3.200**[#1]		-	-	-	-	-	-	-	-	<0.01	-	-	<0.01	<0.01	<0.01	<0.01	-
	>C6-C8 Aliphatics	mg/kg	**7.800**[#1]		-	-	-	-	-	-	-	-	<0.01	-	-	<0.01	<0.01	<0.01	<0.01	-
	>C8-C10 Aliphatics	mg/kg	**2.000**[#1]		-	-	-	-	-	-	-	-	<0.01	-	-	<0.01	<0.01	<0.01	<0.01	-
	>C10-C12 Aliphatics	mg/kg	**9.700**[#1]		-	-	-	-	-	-	-	-	<1.5	-	-	<1.5	<1.5	<1.5	<1.5	-
	>C12-C16 Aliphatics	mg/kg	**59.000**[#1]		-	-	-	-	-	-	-	-	2.8	-	-	<1.2	<1.2	<1.2	<1.2	-
	>C16-C21 Aliphatics	mg/kg			-	-	-	-	-	-	-	-	4.9	-	-	<1.5	<1.5	<1.5	<1.5	-
	>C16-C35 Aliphatics	mg/kg	**1.600.000**[#1]		-	-	-	-	-	-	-	-	8.3	-	-	<4.9	<4.9	<4.9	<4.9	-
	>C21-C35 Aliphatics	mg/kg			-	-	-	-	-	-	-	-	<3.4	-	-	<3.4	<3.4	<3.4	<3.4	-
	>C5-C35 Aliphatics	mg/kg			-	-	-	-	-	-	-	-	<10	-	-	<10	<10	<10	<10	-
	>EC5-EC7 Aromatics	mg/kg	**26.000**[#1]		-	-	-	-	-	-	-	-	<0.01	-	-	<0.01	<0.01	<0.01	<0.01	-
	>EC7-EC8 Aromatics	mg/kg	**56.000**[#1]		-	-	-	-	-	-	-	-	<0.01	-	-	<0.01	<0.01	<0.01	<0.01	-
	>EC8-EC10 Aromatics	mg/kg	**3.500**[#1]		-	-	-	-	-	-	-	-	<0.01	-	-	<0.01	<0.01	<0.01	<0.01	-
	>EC10-EC12 Aromatics	mg/kg	**16.000**[#1]		-	-	-	-	-	-	-	-	<0.9	-	-	<0.9	<0.9	<0.9	<0.9	-
	>EC12-EC16 Aromatics	mg/kg	**36.000**[#1]		-	-	-	-	-	-	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	-
	>EC16-EC21 Aromatics	mg/kg	**28.000**[#1]		-	-	-	-	-	-	-	-	<0.6	-	-	<0.6	<0.6	<0.6	<0.6	-
	>EC21-EC35 Aromatics	mg/kg	**28.000**[#1]		-	-	-	-	-	-	-	-	<1.4	-	-	<1.4	<1.4	<1.4	<1.4	-
	>EC5-EC35 Aromatics	mg/kg			-	-	-	-	-	-	-	-	<10	-	-	<10	<10	<10	<10	-
	>C5-C35 Aliphatics & Aromatics	mg/kg			-	-	-	-	-	-	-	-	<10	-	-	<10	<10	<10	<10	-
VOC	Dichlorodifluoromethane	mg/kg	**370**[#2]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-	-
	MTBE	mg/kg	**7.900**[#3]		-	-	-	-	<0.05	-	-	-	<0.01	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	Chloromethane	mg/kg	**1**[#3]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-	-
	Vinyl chloride	mg/kg	**0.059**[#1]	*1.1*	-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	Bromomethane	mg/kg	**30**[#2]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-	-
	Chloroethane	mg/kg	**960**[#3]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-	-
	Trichlorofluoromethane	mg/kg	**350.000**[#2]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-	-
	1,1-dichloroethene	mg/kg	**26**[#3]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	Dichloromethane	mg/kg	**270**[#3]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-	-
	trans-1,2-dichloroethene	mg/kg	**22**[#3]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	1,1-dichloroethane	mg/kg	**280**[#3]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	cis-1,2-dichloroethene	mg/kg	**14**[#3]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	2,2-dichloropropane	mg/kg			-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	Bromochloromethane	mg/kg	**630**[#2]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	Chloroform	mg/kg	**99**[#1]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	1,1,1-trichloroethane	mg/kg	**660**[#1]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	1,1-dichloropropene	mg/kg			-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	Carbon tetrachloride	mg/kg	**2.9**[#1]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	1,2-dichloroethane	mg/kg	**0.67**[#1]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	Benzene	mg/kg	**27**[#1]	*27*[#4]	-	-	-	-	<0.05	-	-	-	<0.01	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	Trichloroethene	mg/kg	**1.2**[#1]	*0.73*	-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	1,2-dichloropropane	mg/kg	**3.3**[#3]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	Dibromomethane	mg/kg	**99**[#2]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	Bromodichloromethane	mg/kg	**1.3**[#2]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	cis-1,3-dichloropropene	mg/kg			-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	Toluene	mg/kg	**56.000**[#1]		-	-	-	-	<0.05	-	-	-	<0.01	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	trans-1,3-dichloropropene	mg/kg			-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	1,1,2-trichloroethane	mg/kg	**94**[#3]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	Tetrachloroethene	mg/kg	**19**[#1]	*24*	-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	1,3-dichloropropane	mg/kg	**23.000**[#2]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	Sum of PCE and TCE	mg/kg			-	-	-	-	<0.1	-	-	-	-	-	<0.1	<0.02	<0.02	<0.02	<0.02	-
	Chlorodibromomethane	mg/kg	**39**[#2]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	1,2-dibromoethane	mg/kg	**0.16**[#2]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	Chlorobenzene	mg/kg	**56**[#1]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	1,1,1,2-tetrachloroethane	mg/kg	**110**[#1]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	Ethylbenzene	mg/kg	**5.700**[#1]		-	-	-	-	<0.05	-	-	-	<0.01	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	Xylene (m & p)	mg/kg			-	-	-	-	<0.1	-	-	-	-	-	<0.1	<0.01	<0.01	<0.01	<0.01	-
	Xylene Total	mg/kg	**5.900**[#1]		-	-	-	-	<0.15	-	-	-	<0.01	-	<0.15	<0.01	<0.01	<0.01	<0.01	-
	Xylene (o)	mg/kg	**6.600**[#1]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	Styrene	mg/kg	**3.300**[#3]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	Bromoform	mg/kg	**760**[#3]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	Isopropylbenzene	mg/kg	**1.400**[#3]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	1,1,2,2-tetrachloroethane	mg/kg	**270**[#1]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-	-
	Bromobenzene	mg/kg	**97**[#3]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	1,2,3-trichloropropane	mg/kg	**0.11**[#2]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	0.04	0.03	<0.01	<0.01	-
	n-propylbenzene	mg/kg	**4.100**[#3]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-

Chem_Group	ChemName	output unit	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	LF\BH01	LF\BH01	LF\BH01	LF\BH01	LF\BH01	LF\BH01	LF\BH02	LF\BH02	LF\BH02	LF\BH02	LF\BH02	LF\TP01	LF\TP01	LF\TP02	LF\TP03	MS\BH02
				Sample_Depth_Range	0.3	0.5	2	4	28.1	28.65-28.95	0.3	1	8.7-8.9	18.4	24.9	0.3	1	1	4	0.3
				Sampled_Date_Time	22/06/2021	22/06/2021	22/06/2021	22/06/2021	23/06/2021	29/06/2021	22/06/2021	22/06/2021	24/06/2021	06/07/2021	08/07/2021	22/06/2021	22/06/2021	23/06/2021	24/06/2021	25/06/2021
					MG	MG	MG	TFD-S	GT	RMU	MG	MG	TFD-S	TFD-C	GT	MG	MG	MG	MG	MG
	2-chlorotoluene	mg/kg	23.000[#2]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	1,3,5-trimethylbenzene	mg/kg	1.500[#2]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	4-chlorotoluene	mg/kg	23.000[#2]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	tert-butylbenzene	mg/kg	120.000[#2]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	1,2,4-trimethylbenzene	mg/kg	42[#3]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	sec-butylbenzene	mg/kg	120.000[#2]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	p-isopropyltoluene	mg/kg			-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	1,3-dichlorobenzene	mg/kg	30[#1]		-	-	-	-	<0.01	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-
	1,4-dichlorobenzene	mg/kg	4.400[#1]		-	-	-	-	<0.01	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-
	n-butylbenzene	mg/kg	58.000[#2]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	1,2-dichlorobenzene	mg/kg	2.000[#1]		-	-	-	-	<0.01	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-
	1,2-dibromo-3-chloropropane	mg/kg	0.064[#2]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	1,2,4-trichlorobenzene	mg/kg	220[#1]		-	-	-	-	<0.01	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-
	Hexachlorobutadiene	mg/kg	31[#1]		-	-	-	-	<0.01	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-
	1,2,3-trichlorobenzene	mg/kg	102[#1]		-	-	-	-	<0.05	-	-	-	-	-	<0.05	<0.01	<0.01	<0.01	<0.01	-
	1,2-Dichloroethene	mg/kg	14[#3]		-	-	-	-	<0.1	-	-	-	-	-	<0.1	<0.02	<0.02	<0.02	<0.02	-
	Trihalomethanes	mg/kg			-	-	-	-	<0.2	-	-	-	-	-	<0.2	<0.04	<0.04	<0.04	<0.04	-
	Hexachlorobenzene	mg/kg	110[#1]		-	-	-	-	<0.01	-	-	-	-	-	<0.01	<0.1	<0.1	<0.1	<0.1	-
	Trichlorobenzene (total)	mg/kg			-	-	-	-	<0.06	-	-	-	-	-	<0.06	<0.02	<0.02	<0.02	<0.02	-
PAH	Naphthalene	mg/kg	190[#1]		0.04	<0.03	0.04	<0.03	<0.01	<0.03	0.06	0.1	<0.03	-	0.022 - 0.1	<0.01 - 0.04	<0.01 - 0.04	<0.03	<0.03	0.04
	Acenaphthylene	mg/kg	83.000[#1]		<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	0.1	0.13	<0.03	-	<0.01	<0.03	<0.03	<0.03	<0.03	<0.03
	Acenaphthene	mg/kg	84.000[#1]		<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	<0.03	<0.03	<0.03	-	<0.01	<0.03	<0.03	<0.03	<0.03	<0.03
	Fluorene	mg/kg	63.000[#1]		<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	0.1	0.12	<0.03	-	<0.01	<0.03	<0.03	<0.03	<0.03	<0.03
	Phenanthrene	mg/kg	22.000[#1]		0.04	<0.03	0.04	<0.03	<0.01	<0.03	0.16	0.28	<0.03	-	0.027	<0.1 - 0.06	<0.1 - 0.04	0.05	<0.03	0.14
	Anthracene	mg/kg	520.000[#1]		<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	0.07	0.11	<0.03	-	<0.01	<0.1 - 0.05	<0.03	<0.03	<0.03	<0.03
	Fluoranthene	mg/kg	23.000[#1]		0.05	<0.03	0.05	<0.03	<0.01	<0.03	0.28	0.56	<0.03	-	<0.01	<0.1 - 0.09	<0.1 - 0.05	0.06	<0.03	0.23
	Pyrene	mg/kg	54.000[#1]		0.05	<0.03	0.04	<0.03	<0.01	<0.03	0.23	0.47	<0.03	-	<0.01	<0.1 - 0.08	<0.1 - 0.05	0.04	<0.03	0.2
	Benz(a)anthracene	mg/kg	170[#1]		0.06	<0.03	0.05	0.06	<0.01	<0.03	0.19	0.4	<0.03	-	<0.01	<0.1 - 0.08	<0.1 - 0.06	0.06	<0.03	0.09
	Chrysene	mg/kg	350[#1]		0.04	<0.03	0.04	0.05	<0.01	<0.03	0.18	0.36	<0.03	-	<0.01	<0.1 - 0.06	<0.03	0.04	<0.03	0.15
	Benzo(a) pyrene	mg/kg	35[#1]	77[#4]	<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	0.18	0.53	<0.03	-	<0.01	<0.03	<0.03	<0.03	<0.03	0.06
	Indeno(1,2,3-c,d)pyrene	mg/kg	500[#1]		<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	0.11	0.31	<0.03	-	<0.01	<0.03	<0.03	0.03	<0.03	0.09
	Dibenz(a,h)anthracene	mg/kg	3.5[#1]		<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	0.03	0.09	<0.03	-	<0.01	<0.03	<0.03	<0.03	<0.03	<0.03
	Benzo(g,h,i)perylene	mg/kg	3.900[#1]		0.04	<0.03	<0.03	<0.03	<0.01	<0.03	0.16	0.43	<0.03	-	<0.01	<0.1 - 0.06	<0.1 - 0.05	<0.03	<0.03	0.09
	Benzo(b)fluoranthene	mg/kg	44[#1]		0.11	<0.03	<0.03	<0.03	<0.01	<0.03	0.34	0.77	<0.03	-	<0.01	<0.1 - 0.14	<0.1 - 0.11	0.04	<0.03	0.14
	Benzo(k)fluoranthene	mg/kg	1.200[#1]		<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	0.1	0.28	<0.03	-	<0.01	<0.03	<0.03	<0.03	<0.03	0.06
	Benzo(b)&(k)fluoranthene	mg/kg			0.14	<0.06	<0.06	<0.06	<0.01	<0.06	0.44	1.05	<0.06	-	<0.01	0.17	0.14	0.07	<0.06	0.2
	PAHs (sum of 4)	mg/kg			0.21	<0.12	<0.12	<0.12	<0.04	<0.12	0.71	1.79	<0.12	-	<0.04	0.26	0.22	0.13	<0.12	0.38
	PAH 16 Total	mg/kg			0.43	<0.1	0.26	0.11	-	<0.1	2.3	4.9	<0.1	-	-	0.64	0.4	0.34	<0.1	1.3
	benzo(g,h,i)perylene + indeno(1,2,3-cd)pyrene	mg/kg			0.07	<0.06	<0.06	<0.06	<0.02	<0.06	0.27	0.74	<0.06	-	<0.02	0.09	0.08	0.06	<0.06	0.18
	Benzo(a)pyrene (surrogate marker for PAH mixtu	mg/kg	15[#1]		<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	0.18	0.53	<0.03	-	<0.01	<0.03	<0.03	<0.03	<0.03	0.06
SVOC	2,3,4,6-tetrachlorophenol	mg/kg	25.000[#2]		-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	-
	2,3,5,6-Tetrachlorophenol	mg/kg			-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	-
	2,6-dichlorophenol	mg/kg			-	-	-	-	-	-	-	<0.01	-	-	-	<0.01	<0.01	-	-	-
	Aniline	mg/kg	400[#2]		-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	-
	2-chlorophenol	mg/kg	5.800[#2]		-	-	-	-	<0.01	-	-	-	-	-	<0.01	<0.1	<0.1	<0.1	<0.1	-
	2-methylphenol	mg/kg	160000[#3]		-	-	-	-	<0.01	-	-	-	-	-	<0.01	<0.1	<0.1	<0.1	<0.1	-
	2-nitrophenol	mg/kg			-	-	-	-	<0.01	-	-	-	-	-	<0.01	-	-	-	-	-
	2,4-dichlorophenol	mg/kg	2.500[#2]		-	-	-	-	<0.01	-	-	<0.01	-	-	<0.01	<0.01	<0.01	<0.1	<0.1	-
	2,4-dimethylphenol	mg/kg	16.000[#3]		-	-	-	-	<0.01	-	-	<0.01	-	-	<0.01	<0.01	<0.01	<0.1	<0.1	-
	2,4,5-trichlorophenol	mg/kg	82.000[#2]		-	-	-	-	<0.01	-	-	-	-	-	<0.01	<0.1	<0.1	<0.1	<0.1	-
	2,4,6-trichlorophenol	mg/kg	210[#2]		-	-	-	-	<0.01	-	-	<0.01	-	-	<0.01	<0.01	<0.01	<0.1	<0.1	-
	4-chloro-3-methylphenol	mg/kg	82.000[#2]		-	-	-	-	<0.01	-	-	<0.01	-	-	<0.01	<0.01	<0.01	<0.1	<0.1	-
	4-methylphenol	mg/kg	160000[#3]		-	-	-	-	<0.01	-	-	<0.01	-	-	<0.01	<0.01	<0.01	-	-	-
	4-nitrophenol	mg/kg			-	-	-	-	<0.01	-	-	-	-	-	<0.01	<0.1	<0.1	<0.1	<0.1	-
	Pentachlorophenol	mg/kg	400[#1]		-	-	-	-	<0.01	-	-	-	-	-	<0.01	<0.1	<0.1	<0.1	<0.1	-
	Phenol	mg/kg	440[#1]		-	-	-	-	<0.01	-	-	<0.01	-	-	<0.01	<0.01	<0.01	<0.1	<0.1	-
	2-chloronaphthalene	mg/kg	390[#3]		-	-	-	-	<0.01	-	-	-	-	-	<0.01	<0.1	<0.1	<0.1	<0.1	-
	2-methylnaphthalene	mg/kg	3.000[#2]		-	-	-	-	<0.01	-	-	-	-	-	0.031	<0.1	<0.1	<0.1	<0.1	-
	Bis(2-ethylhexyl) phthalate	mg/kg	85.000[#3]		-	-	-	-	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-
	Butyl benzyl phthalate	mg/kg	940.000[#3]		-	-	-	-	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-
	Di-n-butyl phthalate	mg/kg	15.000[#3]		-	-	-	-	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-
	Di-n-octyl phthalate	mg/kg	89.000[#3]		-	-	-	-	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-
	Diethylphthalate	mg/kg	150.000[#3]		-	-	-	-	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-
	Dimethyl phthalate	mg/kg			-	-	-	-	<0.1	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-
	2-nitroaniline	mg/kg	8.000[#2]		-	-	-	-	<0.01	-	-	-	-	-	<0.01	<0.1	<0.1	<0.1	<0.1	-

Chem_Group	ChemName	output unit	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	LF\BH01	LF\BH01	LF\BH01	LF\BH01	LF\BH01	LF\BH01	LF\BH02	LF\BH02	LF\BH02	LF\BH02	LF\BH02	LF\TP01	LF\TP01	LF\TP02	LF\TP03	MS\BH02
				Sample_Depth_Range	0.3	0.5	2	4	28.1	28.65-28.95	0.3	1	8.7-8.9	18.4	24.9	0.3	1	1	4	0.3
				Sampled_Date_Time	22/06/2021	22/06/2021	22/06/2021	22/06/2021	23/06/2021	29/06/2021	22/06/2021	22/06/2021	24/06/2021	06/07/2021	08/07/2021	22/06/2021	22/06/2021	23/06/2021	24/06/2021	25/06/2021
					MG	MG	MG	TFD-S	GT	RMU	MG	MG	TFD-S	TFD-C	GT	MG	MG	MG	MG	MG
	3-nitroaniline	mg/kg			-	-	-	-	<0.01	-	-	-	-	-	<0.01	<0.1	<0.1	<0.1	<0.1	-
	4-bromophenyl phenyl ether	mg/kg			-	-	-	-	<0.01	-	-	-	-	-	<0.01	<0.1	<0.1	<0.1	<0.1	-
	4-chloroaniline	mg/kg	11[#2]		-	-	-	-	<0.01	-	-	-	-	-	<0.01	-	-	-	-	-
	4-chlorophenyl phenyl ether	mg/kg			-	-	-	-	<0.01	-	-	-	-	-	<0.01	<0.1	<0.1	<0.1	<0.1	-
	4-nitroaniline	mg/kg	110[#2]		-	-	-	-	<0.01	-	-	-	-	-	<0.01	<0.1	<0.1	<0.1	<0.1	-
	Azobenzene	mg/kg	26[#2]		-	-	-	-	<0.01	-	-	-	-	-	<0.01	<0.1	<0.1	<0.1	<0.1	-
	Bis(2-chloroethoxy) methane	mg/kg	2.500[#2]		-	-	-	-	<0.01	-	-	-	-	-	<0.01	<0.1	<0.1	<0.1	<0.1	-
	Bis(2-chloroethyl)ether	mg/kg	1[#2]		-	-	-	-	<0.01	-	-	-	-	-	<0.01	-	-	-	-	-
	Carbazole	mg/kg			-	-	-	-	<0.01	-	-	-	-	-	<0.01	<0.1	<0.1	<0.1	<0.1	-
	Dibenzofuran	mg/kg	1.200[#2]		-	-	-	-	<0.01	-	-	-	-	-	<0.01	<0.1	<0.1	<0.1	<0.1	-
	Hexachlorocyclopentadiene	mg/kg	7.5[#2]		-	-	-	-	<0.01	-	-	-	-	-	<0.01	<0.1	<0.1	<0.1	<0.1	-
	Hexachloroethane	mg/kg	22[#3]		-	-	-	-	<0.01	-	-	-	-	-	<0.01	-	-	-	-	-
	Isophorone	mg/kg	2.400[#2]		-	-	-	-	<0.01	-	-	-	-	-	<0.01	-	-	-	-	-
	N-nitrosodi-n-propylamine	mg/kg	0.33[#2]		-	-	-	-	<0.01	-	-	-	-	-	<0.01	-	-	-	-	-
	Benzyl alcohol	mg/kg	82.000[#2]		-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	-
	Bis(2-chloroisopropyl)ether	mg/kg			-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	-
	2,6-Dimethylphenol	mg/kg	490[#2]		-	-	-	-	-	-	-	<0.01	-	-	-	<0.01	<0.01	-	-	-
	4,6-Dinitro-2-methylphenol	mg/kg	66[#2]		-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	-
	Total Monohydric Phenols (S) Corrected	mg/kg			0.4	<0.3	<0.3	<0.3	-	<0.3	<0.3	<0.3	<0.3	-	-	<0.3	<0.3	<0.3	<0.3	<0.3
	Diphenylamine	mg/kg	82.000[#2]		-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	-
PCBs	PCB congener 28 + 31	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Tetrachlorobiphenyl, 3,3,4,4- (PCB 77)	mg/kg	0.16[#2]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Tetrachlorobiphenyl, 3,4,4,5- (PCB 81)	mg/kg	0.048[#2]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Pentachlorobiphenyl, 2,3,3,4,4- (PCB 105)	mg/kg	0.49[#2]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Pentachlorobiphenyl, 2,3,4,4,5- (PCB 114)	mg/kg	0.5[#2]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	PCB 118	mg/kg	0.49[#2]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Pentachlorobiphenyl, 2,3,4,4,5- (PCB 123)	mg/kg	0.49[#2]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Pentachlorobiphenyl, 3,3,4,4,5- (PCB 126)	mg/kg	0.00015[#2]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 156)	mg/kg	0.5[#2]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 157)	mg/kg	0.5[#2]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hexachlorobiphenyl, 2,3,4,4,5,5- (PCB 167)	mg/kg	0.51[#2]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hexachlorobiphenyl, 3,3,4,4,5,5- (PCB 169)	mg/kg	0.00051[#2]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Heptachlorobiphenyl, 2,3,3,4,4,5,5- (PCB 189)	mg/kg	0.52[#2]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	PCB 52	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	PCB 101	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	PCB 138	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	PCB 153	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	PCB 180	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total PCB 7 Congeners	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Explosives	1,3-Dinitrobenzene	mg/kg	82[#2]		-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	-
	2,4-Dinitrotoluene	mg/kg	3.700[#3]		-	-	-	-	<0.01	-	-	-	-	-	<0.01	<0.1	<0.1	<0.1	<0.1	-
	2,6-dinitrotoluene	mg/kg	1.900[#3]		-	-	-	-	<0.01	-	-	-	-	-	<0.01	<0.1	<0.1	<0.1	<0.1	-
	Nitrobenzene	mg/kg	22[#2]		-	-	-	-	<0.01	-	-	-	-	-	<0.01	-	-	-	-	-
Metals	Arsenic	mg/kg	640[#1]	*640 [#4]*	5	3.5	3.2	4.6	-	54	9.4	11	6.1	8.6	-	3.5	4.8	4.9	7	4.1
	Beryllium	mg/kg	12[#1]		7.9	5.9	5.8	4.7	-	1.8	1.1	7.5	<0.2	0.8	-	1.2	5.7	3.4	5	3.1
	Cadmium	mg/kg	190[#1]	*410 [#4]*	<0.1	<0.1	<0.1	<0.1	-	<0.1	0.4	0.6	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	0.2
	Copper	mg/kg	68.000[#1]		8.2	6.1	5.1	6.8	-	12	59	17	5.8	20	-	5.3	7.4	6.9	5.8	13
	Iron	mg/kg	820.000[#2]		-	-	-	-	-	-	-	-	-	38,000	-	-	-	-	-	-
	Lead	mg/kg	2.300[#4]	*2.300 [#4]*	3	1	1.1	1.1	-	15	84	49	2.7	27	-	3.3	1.8	3.3	1.3	25
	Mercury	mg/kg	1100[#1]		<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	0.06	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05
	Nickel	mg/kg	980[#1]		1.3	<1	<1	<1	-	32	13	6.1	2.2	27	-	1.4	<1	2.5	1.5	8.3
	Selenium	mg/kg	12.000[#1]		2	1.4	1.1	2	-	<0.5	6.9	2.3	<0.5	0.5	-	<0.5	2.8	1.1	2.2	2.6
	Vanadium	mg/kg	9.000[#1]		37	16	14	110	-	320	1900	95	8.7	61	-	12	170	32	48	350
	Zinc	mg/kg	730.000[#1]		10	26	3.5	27	-	83	62	120	13	75	-	20	5.5	21	5.2	50
	Boron (Water Soluble)	mg/kg			4.9	11	6.4	4.3	-	1.9	1.5	2.2	<0.2	3.7	-	5.4	2.7	1.2	5.5	2.2
	Chromium (hexavalent)	mg/kg	33[#1]	*49 [#4]*	<1	<1	<1	<1	-	<1	<1	<1	<1	<1	-	<1	<1	<1	<1	<1
	Chromium (Trivalent)	mg/kg	8.600[#1]		11	3.3	3	12	-	72	750	22	2.8	37	-	2.4	22	6	6.4	240
Inorganics	Cyanide (Free)	mg/kg			<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1
	Cyanide Total	mg/kg	150[#2]		0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	0.6	<0.1	-	-	<0.1	<0.1	0.2	<0.1	<0.1
	Thiocyanate	mg/kg	230[#2]		1.1	1.5	0.9	0.6	-	<0.6	<0.6	0.8	<0.6	-	-	<0.6	<0.6	<0.6	<0.6	<0.6
	Nitrate (as NO3-)	mg/kg	1.900.000[#2]		6.7	4.2	4.5	4.3	-	17	54	7.3	<1	-	-	<1	2.2	1.2	<1	8.7
	Sulphide	mg/kg			1500	1000	1200	1500	-	120	680	1300	<10	-	-	200	1400	3000	3200	560
	Sulphur as S	mg/kg			6900	3000	3700	4600	-	4100	2800	5700	300	-	-	700	6100	2600	7200	2900
	Soluble Sulphate 2:1 extract as SO4 BRE	g/l			1.7	0.59	1.7	1.4	-	0.2	0.24	0.55	0.024	-	-	0.4	0.94	0.37	1.7	0.4
	Elemental Sulphur	mg/kg			120	240	32	2.4	-	18	2.5	<0.75	3.2	-	-	53	5.6	7.5	64	33

Chem_Group	ChemName	output unit	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	LF\BH01	LF\BH01	LF\BH01	LF\BH01	LF\BH01	LF\BH01	LF\BH02	LF\BH02	LF\BH02	LF\BH02	LF\BH02	LF\TP01	LF\TP01	LF\TP02	LF\TP03	MS\BH02
				Sample_Depth_Range	0.3	0.5	2	4	28.1	28.65-28.95	0.3	1	8.7-8.9	18.4	24.9	0.3	1	1	4	0.3
				Sampled_Date_Time	22/06/2021	22/06/2021	22/06/2021	22/06/2021	23/06/2021	29/06/2021	22/06/2021	22/06/2021	24/06/2021	06/07/2021	08/07/2021	22/06/2021	22/06/2021	23/06/2021	24/06/2021	25/06/2021
					MG	MG	MG	TFD-S	GT	RMU	MG	MG	TFD-S	TFD-C	GT	MG	MG	MG	MG	MG
Other	Organic Matter	%			0.8	0.6	1.3	1.2	-	0.9	1	1.5	0.3	-	-	0.8	1.6	2	0.7	1.2
	Moisture	%			-	-	-	-	-	14	-	-	21	-	-	-	-	4.6	9.9	6.1
	TOC	%			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos	Asbestos Quantification - Total - %	%			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Asbestos Identification	None			0	0	0	-	-	-	0	0	-	-	-	0	0	0	0	-
Field	pH	pH_Units	**11.5**		11	11.2	10.9	11	-	8.1	**12**	10.6	9.2	-	-	11	10.7	8.8	9.3	11.4
MISC	1,2-Dinitrobenzene	mg/kg	**82**#2		-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	-
	1,4-dinitrobenzene	mg/kg	**82**#2		-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	-
	Decane	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Natural Moisture Content	%			-	-	-	-	14	-	-	-	-	-	23.4	-	-	-	-	-
	3/4-Methylphenol (m/p-cresol)	mg/kg			-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	-

Env Stds Comments
#1:LQM/CIEH S4ULs 2015
#2:USEPA RSL (May 2020)
#3:EIC/AGS/CL:AIRE
#4:Defra C4SL 12/2014

C4SL 2021 - Vinyl chloride, tetrachloroethene, trichloroethene
GAC: Generic Assessment Criteria
(blank): No assessment criteria available
- : Not analysed
HH: Human Health

1,2-Dichloroethene - cis 1,2-dichloroethene used
2-methylphenol - cresol total used
4-methylphenol -cresol total used
pH - Hazardous Waste Value - corrosive

XXX	Exceedance of HH Soil. Commercial/Industrial. Sandy Loam. TOC>=0.58 to <1.45%
XXX	Exceedance of HH Soil. C4SL Commercial (England, Ireland, Northern Ireland, Wales. TOC>=0.58 to <3.48 &>0.58 to <1.45%

MG - Made Ground
TFD-S - Tidal Flat Deposits - Sand
TFD-C - Tidal F;at Deposits - Clay
GT - Glacial Till
RMU - Redcar Mudstone Formation

Chem_Group	ChemName	output unit	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	MS\BH02	MS\BH02	MS\BH02	MS\BH03	MS\BH03	MS\BH03	MS\BH03	MS\BH03	MS\BH03	MS\BH03	MS\BH03	MS\BH04	MS\BH04	MS\BH04	MS\BH04	MS\BH05
				Sample_Depth_Range	2.25-2.7	10.2-10.4	11.2-11.4	0.5	1	2	3-3.3	9.5-9.8	11-11.2	11.2	23.4	0.3	0.5	1	22.3	4.4
				Sampled_Date_Time	28/06/2021	28/06/2021	28/06/2021	22/06/2021	22/06/2021	22/06/2021	23/06/2021	24/06/2021	24/06/2021	23/06/2021	28/06/2021	17/06/2021	17/06/2021	17/06/2021	23/06/2021	16/06/2021
					MG	TFD-S	TFD-C	MG	MG	TFD-S	TFD-S	TFD-S	TFD-C	TFD-C	GT	MG	MG	TFD-S	GT	TFD-S
TPH	EPH >C10-C40	mg/kg			<10	<10	34	14	<10	<10	<10	<10	<10	-	<10	<10	12	<10	<10	<10
	>C5-C6 Aliphatics	mg/kg	3.200[#1]		<0.01	<0.01	<0.01	-	<0.01	<0.01	-	-	<0.01	-	<0.01	<0.01	-	<0.01	-	-
	>C6-C8 Aliphatics	mg/kg	7.800[#1]		<0.01	<0.01	<0.01	-	<0.01	<0.01	-	-	<0.01	-	<0.01	<0.01	-	<0.01	-	-
	>C8-C10 Aliphatics	mg/kg	2.000[#1]		<0.01	<0.01	<0.01	-	<0.01	<0.01	-	-	<0.01	-	<0.01	<0.01	-	<0.01	-	-
	>C10-C12 Aliphatics	mg/kg	9.700[#1]		530	<1.5	<1.5	-	<1.5	<1.5	-	-	<1.5	-	<1.5	<1.5	-	<1.5	-	-
	>C12-C16 Aliphatics	mg/kg	59.000[#1]		520	<1.2	<1.2	-	<1.2	<1.2	-	-	<1.2	-	<1.2	<1.2	-	<1.2	-	-
	>C16-C21 Aliphatics	mg/kg			340	<1.5	<1.5	-	<1.5	<1.5	-	-	<1.5	-	<1.5	<1.5	-	<1.5	-	-
	>C16-C35 Aliphatics	mg/kg	1.600.000[#1]		1320	<4.9	<4.9	-	<4.9	<4.9	-	-	<4.9	-	<4.9	<4.9	-	<4.9	-	-
	>C21-C35 Aliphatics	mg/kg			980	<3.4	<3.4	-	<3.4	<3.4	-	-	<3.4	-	<3.4	<3.4	-	<3.4	-	-
	>C5-C35 Aliphatics	mg/kg			2400	<10	<10	-	<10	<10	-	-	<10	-	<10	<10	-	<10	-	-
	>EC5-EC7 Aromatics	mg/kg	26.000[#1]		<0.01	<0.01	<0.01	-	<0.01	<0.01	-	-	<0.01	-	<0.01	<0.01	-	<0.01	-	-
	>EC7-EC8 Aromatics	mg/kg	56.000[#1]		<0.01	<0.01	<0.01	-	<0.01	<0.01	-	-	<0.01	-	<0.01	<0.01	-	<0.01	-	-
	>EC8-EC10 Aromatics	mg/kg	3.500[#1]		<0.01	<0.01	<0.01	-	<0.01	<0.01	-	-	<0.01	-	<0.01	<0.01	-	<0.01	-	-
	>EC10-EC12 Aromatics	mg/kg	16.000[#1]		<0.9	<0.9	<0.9	-	<0.9	<0.9	-	-	<0.9	-	<0.9	<0.9	-	<0.9	-	-
	>EC12-EC16 Aromatics	mg/kg	36.000[#1]		<0.5	<0.5	<0.5	-	<0.5	<0.5	-	-	<0.5	-	<0.5	<0.5	-	<0.5	-	-
	>EC16-EC21 Aromatics	mg/kg	28.000[#1]		<0.6	<0.6	1.7	-	<0.6	<0.6	-	-	<0.6	-	<0.6	<0.6	-	<0.6	-	-
	>EC21-EC35 Aromatics	mg/kg	28.000[#1]		<1.4	<1.4	15	-	<1.4	<1.4	-	-	<1.4	-	<1.4	<1.4	-	<1.4	-	-
	>EC5-EC35 Aromatics	mg/kg			<10	<10	17	-	<10	<10	-	-	<10	-	<10	<10	-	<10	-	-
	>C5-C35 Aliphatics & Aromatics	mg/kg			2400	<10	17	-	<10	<10	-	-	<10	-	<10	<10	-	<10	-	-
VOC	Dichlorodifluoromethane	mg/kg	370[#2]		-	-	-	-	-	-	-	-	-	<0.05	-	-	-	-	-	-
	MTBE	mg/kg	7.900[#3]		<0.01	<0.01	<0.01	-	<0.01	<0.01	-	-	<0.01	<0.05	<0.01	<0.01	-	<0.01	-	-
	Chloromethane	mg/kg	1[#3]		-	-	-	-	-	-	-	-	-	0.166 - 0.206	-	-	-	-	-	-
	Vinyl chloride	mg/kg	0.059[#1]	1.1	<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	Bromomethane	mg/kg	30[#2]		-	-	-	-	-	-	-	-	-	<0.05	-	-	-	-	-	-
	Chloroethane	mg/kg	960[#3]		-	-	-	-	-	-	-	-	-	<0.05	-	-	-	-	-	-
	Trichlorofluoromethane	mg/kg	350.000[#2]		-	-	-	-	-	-	-	-	-	<0.05	-	-	-	-	-	-
	1,1-dichloroethene	mg/kg	26[#3]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	Dichloromethane	mg/kg	270[#3]		-	-	-	-	-	-	-	-	-	<0.05	-	-	-	-	-	-
	trans-1,2-dichloroethene	mg/kg	22[#3]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	1,1-dichloroethane	mg/kg	280[#3]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	cis-1,2-dichloroethene	mg/kg	14[#3]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	2,2-dichloropropane	mg/kg			<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	Bromochloromethane	mg/kg	630[#2]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	Chloroform	mg/kg	99[#1]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	1,1,1-trichloroethane	mg/kg	660[#1]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	1,1-dichloropropene	mg/kg			<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	Carbon tetrachloride	mg/kg	2.9[#1]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	1,2-dichloroethane	mg/kg	0.67[#1]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	Benzene	mg/kg	27[#1]	27[#4]	<0.01	<0.01	<0.01	-	<0.01	<0.01	-	-	<0.01	<0.05	<0.01	<0.01	-	<0.01	-	-
	Trichloroethene	mg/kg	1.2[#1]	0.73	<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	1,2-dichloropropane	mg/kg	3.3[#3]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	Dibromomethane	mg/kg	99[#2]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	Bromodichloromethane	mg/kg	1.3[#2]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	cis-1,3-dichloropropene	mg/kg			<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	Toluene	mg/kg	56.000[#1]		<0.01	<0.01	<0.01	-	<0.01	<0.01	-	-	<0.01	<0.05	<0.01	<0.01	-	<0.01	-	-
	trans-1,3-dichloropropene	mg/kg			<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	1,1,2-trichloroethane	mg/kg	94[#3]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	Tetrachloroethene	mg/kg	19[#1]	24	<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	1,3-dichloropropane	mg/kg	23.000[#2]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	Sum of PCE and TCE	mg/kg			<0.02	<0.02	-	-	<0.02	<0.02	-	-	-	<0.1	-	<0.02	-	<0.02	-	-
	Chlorodibromomethane	mg/kg	39[#2]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	1,2-dibromoethane	mg/kg	0.16[#2]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	Chlorobenzene	mg/kg	56[#1]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	1,1,1,2-tetrachloroethane	mg/kg	110[#1]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	Ethylbenzene	mg/kg	5.700[#1]		<0.01	<0.01	<0.01	-	<0.01	<0.01	-	-	<0.01	<0.05	<0.01	<0.01	-	<0.01	-	-
	Xylene (m & p)	mg/kg			<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.1	-	<0.01	-	<0.01	-	-
	Xylene Total	mg/kg	5.900[#1]		<0.01	<0.01	<0.01	-	<0.01	<0.01	-	-	<0.01	<0.15	<0.01	<0.01	-	<0.01	-	-
	Xylene (o)	mg/kg	6.600[#1]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	Styrene	mg/kg	3.300[#3]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	Bromoform	mg/kg	760[#3]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	Isopropylbenzene	mg/kg	1.400[#3]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	1,1,2,2-tetrachloroethane	mg/kg	270[#1]		-	-	-	-	-	-	-	-	-	<0.05	-	-	-	-	-	-
	Bromobenzene	mg/kg	97[#3]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	1,2,3-trichloropropane	mg/kg	0.11[#2]		<0.01	<0.01	-	-	<0.01	0.03	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	n-propylbenzene	mg/kg	4.100[#3]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-

Chem_Group	ChemName	output unit	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	MS\BH02	MS\BH02	MS\BH02	MS\BH03	MS\BH03	MS\BH03	MS\BH03	MS\BH03	MS\BH03	MS\BH03	MS\BH03	MS\BH04	MS\BH04	MS\BH04	MS\BH04	MS\BH05
				Sample_Depth_Range	2.25-2.7	10.2-10.4	11.2-11.4	0.5	1	2	3-3.3	9.5-9.8	11-11.2	11.2	23.4	0.3	0.5	1	22.3	4.4
				Sampled_Date_Time	28/06/2021	28/06/2021	28/06/2021	22/06/2021	22/06/2021	22/06/2021	23/06/2021	24/06/2021	24/06/2021	23/06/2021	28/06/2021	17/06/2021	17/06/2021	17/06/2021	23/06/2021	16/06/2021
					MG	TFD-S	TFD-C	MG	MG	TFD-S	TFD-S	TFD-S	TFD-C	TFD-C	GT	MG	MG	TFD-S	GT	TFD-S
	2-chlorotoluene	mg/kg	23.000[#2]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	1,3,5-trimethylbenzene	mg/kg	1.500[#2]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	4-chlorotoluene	mg/kg	23.000[#2]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	tert-butylbenzene	mg/kg	120.000[#2]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	1,2,4-trimethylbenzene	mg/kg	42[#3]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	sec-butylbenzene	mg/kg	120.000[#2]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	p-isopropyltoluene	mg/kg			<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	1,3-dichlorobenzene	mg/kg	30[#1]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	<0.01	-	-
	1,4-dichlorobenzene	mg/kg	4.400[#1]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	<0.01	-	-
	n-butylbenzene	mg/kg	58.000[#2]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	1,2-dichlorobenzene	mg/kg	2.000[#1]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	<0.01	-	-
	1,2-dibromo-3-chloropropane	mg/kg	0.064[#2]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	1,2,4-trichlorobenzene	mg/kg	220[#1]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	<0.01	-	-
	Hexachlorobutadiene	mg/kg	31[#1]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	<0.01	-	-
	1,2,3-trichlorobenzene	mg/kg	102[#1]		<0.01	<0.01	-	-	<0.01	<0.01	-	-	-	<0.05	-	<0.01	-	<0.01	-	-
	1,2-Dichloroethene	mg/kg	14[#3]		<0.02	<0.02	-	-	<0.02	<0.02	-	-	-	<0.1	-	<0.02	-	<0.02	-	-
	Trihalomethanes	mg/kg			<0.04	<0.04	-	-	<0.04	<0.04	-	-	-	<0.2	-	<0.04	-	<0.04	-	-
	Hexachlorobenzene	mg/kg	110[#1]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	<0.01	-	<0.1	-	<0.1	-	-
	Trichlorobenzene (total)	mg/kg			<0.02	<0.02	-	-	<0.02	<0.02	-	-	-	<0.06	-	<0.02	-	<0.02	-	-
PAH	Naphthalene	mg/kg	190[#1]		<0.03	<0.03	<0.03	0.05	<0.01	<0.01 - 0.04	<0.03	<0.03	<0.03	<0.01	<0.03	<0.01	<0.03	<0.01	<0.03	<0.03
	Acenaphthylene	mg/kg	83.000[#1]		<0.03	<0.03	<0.03	0.1	<0.03	<0.1 - 0.1	<0.03	<0.03	<0.03	<0.01	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
	Acenaphthene	mg/kg	84.000[#1]		<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	<0.03	0.04	<0.03	<0.03	<0.03
	Fluorene	mg/kg	63.000[#1]		<0.03	<0.03	<0.03	0.1	<0.03	<0.1 - 0.11	<0.03	<0.03	<0.03	<0.01	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
	Phenanthrene	mg/kg	22.000[#1]		<0.03	<0.03	<0.03	0.11	<0.03	<0.1 - 0.05	<0.03	<0.03	<0.03	<0.01	<0.03	<0.03	0.14	<0.03	<0.03	0.03
	Anthracene	mg/kg	520.000[#1]		<0.03	<0.03	<0.03	0.06	<0.03	<0.1 - 0.05	<0.03	<0.03	<0.03	<0.01	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
	Fluoranthene	mg/kg	23.000[#1]		<0.03	<0.03	<0.03	0.25	<0.03	<0.1 - 0.06	<0.03	<0.03	<0.03	<0.01	<0.03	<0.03 - 0.2	0.48	<0.03 - 0.4	<0.03	<0.03
	Pyrene	mg/kg	54.000[#1]		<0.03	<0.03	<0.03	0.2	<0.03	<0.1 - 0.06	<0.03	<0.03	<0.03	<0.01	<0.03	<0.03 - 0.1	0.28	<0.03 - 0.4	<0.03	<0.03
	Benz(a)anthracene	mg/kg	170[#1]		<0.03	<0.03	<0.03	0.14	<0.1 - 0.06	<0.1 - 0.07	<0.03	<0.03	<0.03	<0.01	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
	Chrysene	mg/kg	350[#1]		<0.03	<0.03	<0.03	0.12	<0.03	<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
	Benzo(a) pyrene	mg/kg	35[#1]	77[#4]	<0.03	<0.03	<0.03	0.09	<0.03	<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	<0.1 - 0.06	0.26	<0.03	<0.03	<0.03
	Indeno(1,2,3-c,d)pyrene	mg/kg	500[#1]		<0.03	<0.03	<0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	<0.1 - 0.05	0.12	<0.03	<0.03	<0.03
	Dibenz(a,h)anthracene	mg/kg	3.5[#1]		<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	<0.03	0.04	<0.03	<0.03	<0.03
	Benzo(g,h,i)perylene	mg/kg	3.900[#1]		<0.03	<0.03	<0.03	0.1	<0.03	<0.1 - 0.06	<0.03	<0.03	<0.03	<0.01	<0.03	<0.1 - 0.07	0.14	<0.1 - 0.04	<0.03	<0.03
	Benzo(b)fluoranthene	mg/kg	44[#1]		<0.03	<0.03	<0.03	0.26	<0.03	<0.1 - 0.13	<0.03	<0.03	<0.03	<0.01	<0.03	<0.1 - 0.46	0.62	<0.1 - 0.4	<0.03	0.03
	Benzo(k)fluoranthene	mg/kg	1.200[#1]		<0.03	<0.03	<0.03	0.06	<0.03	<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	<0.1 - 0.05	0.14	<0.03	<0.03	<0.03
	Benzo(b)&(k)fluoranthene	mg/kg			<0.06	<0.06	<0.06	0.32	<0.06	0.16	<0.06	<0.06	<0.06	<0.01	<0.06	0.51	0.76	0.43	<0.06	0.06
	PAHs (sum of 4)	mg/kg			<0.12	<0.12	<0.12	0.47	<0.12	0.25	<0.12	<0.12	<0.12	<0.04	<0.12	0.63	1.02	0.5	<0.12	0.12
	PAH 16 Total	mg/kg			<0.1	<0.1	<0.1	1.7	<0.1	0.75	<0.1	<0.1	<0.1	-	<0.1	0.69	2.3	0.44	<0.1	<0.1
	benzo(g,h,i)perylene + indeno(1,2,3-cd)pyrene	mg/kg			<0.06	<0.06	<0.06	0.15	<0.06	0.09	<0.06	<0.06	<0.06	<0.02	<0.06	0.12	0.26	0.07	<0.06	<0.06
	Benzo(a)pyrene (surrogate marker for PAH mixtu	mg/kg	15[#1]		<0.03	<0.03	<0.03	0.09	<0.03	<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	0.06	0.26	<0.03	<0.03	<0.03
SVOC	2,3,4,6-tetrachlorophenol	mg/kg	25.000[#2]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	-	-	<0.1	-	<0.1	-	-
	2,3,5,6-Tetrachlorophenol	mg/kg			<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	-	-	<0.1	-	<0.1	-	-
	2,6-dichlorophenol	mg/kg			-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	<0.01	<0.01	-	-	-	-
	Aniline	mg/kg	400[#2]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	-	-	<0.1	-	<0.1	-	-
	2-chlorophenol	mg/kg	5.800[#2]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	<0.01	-	<0.1	-	<0.1	-	-
	2-methylphenol	mg/kg	160000[#3]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	<0.01	-	<0.1	-	<0.1	-	-
	2-nitrophenol	mg/kg			-	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-	-
	2,4-dichlorophenol	mg/kg	2.500[#2]		<0.1	<0.01	<0.01	-	<0.01	<0.01	-	-	-	<0.01	<0.01	<0.01	-	<0.1	-	-
	2,4-dimethylphenol	mg/kg	16.000[#3]		<0.1	<0.01	<0.01	-	<0.01	<0.01	-	-	-	<0.01	<0.01	<0.01	-	<0.1	-	-
	2,4,5-trichlorophenol	mg/kg	82.000[#2]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	<0.01	-	<0.1	-	<0.1	-	-
	2,4,6-trichlorophenol	mg/kg	210[#2]		<0.1	<0.01	<0.01	-	<0.01	<0.01	-	-	-	<0.01	<0.01	<0.01	-	<0.1	-	-
	4-chloro-3-methylphenol	mg/kg	82.000[#2]		<0.1	<0.01	<0.01	-	<0.01	<0.01	-	-	-	<0.01	<0.01	<0.01	-	<0.1	-	-
	4-methylphenol	mg/kg	160000[#3]		-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	<0.01	<0.01	<0.01	-	-	-	-
	4-nitrophenol	mg/kg			<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	<0.01	-	<0.1	-	<0.1	-	-
	Pentachlorophenol	mg/kg	400[#1]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	<0.01	-	<0.1	-	<0.1	-	-
	Phenol	mg/kg	440[#1]		<0.1	<0.01	<0.01	-	<0.01	<0.01	-	-	-	<0.01	<0.01	<0.01	-	<0.1	-	-
	2-chloronaphthalene	mg/kg	390[#3]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	<0.01	-	<0.1	-	<0.1	-	-
	2-methylnaphthalene	mg/kg	3.000[#2]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	<0.01	-	<0.1	-	<0.1	-	-
	Bis(2-ethylhexyl) phthalate	mg/kg	85.000[#3]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	<0.1	-	-
	Butyl benzyl phthalate	mg/kg	940.000[#3]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	<0.1	-	-
	Di-n-butyl phthalate	mg/kg	15.000[#3]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	<0.1	-	-
	Di-n-octyl phthalate	mg/kg	89.000[#3]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	<0.1	-	-
	Diethylphthalate	mg/kg	150.000[#3]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	<0.1	-	-
	Dimethyl phthalate	mg/kg			<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	<0.1	-	-
	2-nitroaniline	mg/kg	8.000[#2]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	<0.01	-	<0.1	-	<0.1	-	-

Chem_Group	ChemName	output unit	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	MS\BH02	MS\BH02	MS\BH02	MS\BH03	MS\BH03	MS\BH03	MS\BH03	MS\BH03	MS\BH03	MS\BH03	MS\BH03	MS\BH04	MS\BH04	MS\BH04	MS\BH04	MS\BH05
				Sample_Depth_Range	2.25-2.7	10.2-10.4	11.2-11.4	0.5	1	2	3-3.3	9.5-9.8	11-11.2	11.2	23.4	0.3	0.5	1	22.3	4.4
				Sampled_Date_Time	28/06/2021	28/06/2021	28/06/2021	22/06/2021	22/06/2021	22/06/2021	23/06/2021	24/06/2021	24/06/2021	23/06/2021	28/06/2021	17/06/2021	17/06/2021	17/06/2021	23/06/2021	16/06/2021
					MG	TFD-S	TFD-C	MG	MG	TFD-S	TFD-S	TFD-S	TFD-C	TFD-C	GT	MG	MG	TFD-S	GT	TFD-S
	3-nitroaniline	mg/kg			<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	<0.01	-	<0.1	-	<0.1	-	-
	4-bromophenyl phenyl ether	mg/kg			<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	<0.01	-	<0.1	-	<0.1	-	-
	4-chloroaniline	mg/kg	11[#2]		-	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-	-
	4-chlorophenyl phenyl ether	mg/kg			<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	<0.01	-	<0.1	-	<0.1	-	-
	4-nitroaniline	mg/kg	110[#2]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	<0.01	-	<0.1	-	<0.1	-	-
	Azobenzene	mg/kg	26[#2]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	<0.01	-	<0.1	-	<0.1	-	-
	Bis(2-chloroethoxy) methane	mg/kg	2.500[#2]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	<0.01	-	<0.1	-	<0.1	-	-
	Bis(2-chloroethyl)ether	mg/kg	1[#2]		-	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-	-
	Carbazole	mg/kg			<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	<0.01	-	<0.1	-	<0.1	-	-
	Dibenzofuran	mg/kg	1.200[#2]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	<0.01	-	<0.1	-	<0.1	-	-
	Hexachlorocyclopentadiene	mg/kg	7.5[#2]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	<0.01	-	<0.1	-	<0.1	-	-
	Hexachloroethane	mg/kg	22[#3]		-	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-	-
	Isophorone	mg/kg	2.400[#2]		-	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-	-
	N-nitrosodi-n-propylamine	mg/kg	0.33[#2]		-	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-	-
	Benzyl alcohol	mg/kg	82.000[#2]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	-	-	<0.1	-	<0.1	-	-
	Bis(2-chloroisopropyl)ether	mg/kg			<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	-	-	<0.1	-	<0.1	-	-
	2,6-Dimethylphenol	mg/kg	490[#2]		-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	<0.01	<0.01	-	-	-	-
	4,6-Dinitro-2-methylphenol	mg/kg	66[#2]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	-	-	<0.1	-	<0.1	-	-
	Total Monohydric Phenols (S) Corrected	mg/kg			<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	-	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
	Diphenylamine	mg/kg	82.000[#2]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	-	-	<0.1	-	<0.1	-	-
PCBs	PCB congener 28 + 31	mg/kg			-	<0.01	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-
	Tetrachlorobiphenyl, 3,3,4,4- (PCB 77)	mg/kg	0.16[#2]		-	<0.01	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-
	Tetrachlorobiphenyl, 3,4,4,5- (PCB 81)	mg/kg	0.048[#2]		-	<0.01	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-
	Pentachlorobiphenyl, 2,3,3,4,4- (PCB 105)	mg/kg	0.49[#2]		-	<0.01	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-
	Pentachlorobiphenyl, 2,3,4,4,5- (PCB 114)	mg/kg	0.5[#2]		-	<0.01	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-
	PCB 118	mg/kg	0.49[#2]		-	<0.01	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-
	Pentachlorobiphenyl, 2,3,4,4,5- (PCB 123)	mg/kg	0.49[#2]		-	<0.01	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-
	Pentachlorobiphenyl, 3,3,4,4,5- (PCB 126)	mg/kg	0.00015[#2]		-	<0.01	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 156)	mg/kg	0.5[#2]		-	<0.01	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 157)	mg/kg	0.5[#2]		-	<0.01	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-
	Hexachlorobiphenyl, 2,3,4,4,5,5- (PCB 167)	mg/kg	0.51[#2]		-	<0.01	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-
	Hexachlorobiphenyl, 3,3,4,4,5,5- (PCB 169)	mg/kg	0.00051[#2]		-	<0.01	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-
	Heptachlorobiphenyl, 2,3,3,4,4,5,5- (PCB 189)	mg/kg	0.52[#2]		-	<0.01	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-
	PCB 52	mg/kg			-	<0.01	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-
	PCB 101	mg/kg			-	<0.01	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-
	PCB 138	mg/kg			-	<0.01	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-
	PCB 153	mg/kg			-	<0.01	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-
	PCB 180	mg/kg			-	<0.01	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-
	Total PCB 7 Congeners	mg/kg			-	<0.01	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-
Explosives	1,3-Dinitrobenzene	mg/kg	82[#2]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	-	-	<0.1	-	<0.1	-	-
	2,4-Dinitrotoluene	mg/kg	3.700[#3]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	<0.01	-	<0.1	-	<0.1	-	-
	2,6-dinitrotoluene	mg/kg	1.900[#3]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	<0.01	-	<0.1	-	<0.1	-	-
	Nitrobenzene	mg/kg	22[#2]		-	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-	-
Metals	Arsenic	mg/kg	640[#1]	640[#4]	9	11	12	4	14	12	9.7	4.9	7.2	-	27	10	8.3	6.9	4.4	7.1
	Beryllium	mg/kg	12[#1]		<0.2	<0.2	0.6	2.1	5.6	6.6	<0.2	<0.2	0.7	-	1.3	7.3	7.2	0.3	0.7	<0.2
	Cadmium	mg/kg	190[#1]	410[#4]	<0.1	<0.1	0.1	0.2	1.1	<0.1	<0.1	<0.1	0.1	-	0.1	0.2	0.3	0.5	0.1	<0.1
	Copper	mg/kg	68.000[#1]		4.6	5.4	15	19	22	12	5	3.5	16	-	19	17	12	5.4	15	5.5
	Iron	mg/kg	820.000[#2]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lead	mg/kg	2.300[#4]	2.300[#4]	18	4.3	12	21	59	12	4.7	3.5	12	-	13	11	39	27	11	20
	Mercury	mg/kg	1100[#1]		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Nickel	mg/kg	980[#1]		3.1	4.5	21	13	7.7	6.4	3.7	3	21	-	31	5.2	3.5	2.6	22	2.9
	Selenium	mg/kg	12.000[#1]		<0.5	<0.5	<0.5	1.7	2.2	3.6	<0.5	<0.5	<0.5	-	<0.5	2.5	2.4	<0.5	<0.5	<0.5
	Vanadium	mg/kg	9.000[#1]		12	17	39	220	96	60	26	12	34	-	160	100	100	11	26	13
	Zinc	mg/kg	730.000[#1]		27	17	49	71	150	31	19	15	52	-	62	37	67	150	41	22
	Boron (Water Soluble)	mg/kg			0.8	1.8	6.7	1.7	5.1	2.9	0.4	0.7	6	-	1.4	3.4	4.8	0.8	1.5	0.3
	Chromium (hexavalent)	mg/kg	33[#1]	49[#4]	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	<1	<1	<1	<1
	Chromium (Trivalent)	mg/kg	8.600[#1]		3.8	4.9	22	200	20	16	4.8	3.3	22	-	43	26	19	3	20	3.8
Inorganics	Cyanide (Free)	mg/kg			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Cyanide Total	mg/kg	150[#2]		1.9	<0.1	<0.1	0.1	0.1	0.2	<0.1	<0.1	<0.1	-	<0.1	0.1	0.1	<0.1	<0.1	<0.1
	Thiocyanate	mg/kg	230[#2]		<0.6	<0.6	<0.6	<0.6	<0.6	0.7	<0.6	<0.6	<0.6	-	<0.6	<0.6	0.8	<0.6	<0.6	<0.6
	Nitrate (as NO3-)	mg/kg	1.900.000[#2]		2.1	2.1	16	10	11	4.7	1.2	1.2	3.7	-	13	<1	4.6	6.5	4.5	4.9
	Sulphide	mg/kg			150	32	92	600	800	1200	<10	<10	84	-	40	2100	1100	7600	72	32
	Sulphur as S	mg/kg			1600	400	8000	2000	7600	4600	600	200	4500	-	3400	5800	7500	300	2000	200
	Soluble Sulphate 2:1 extract as SO4 BRE	g/l			0.25	0.28	0.85	0.21	1.9	0.6	0.12	0.065	0.95	-	0.23	0.76	1.3	0.12	0.86	0.028
	Elemental Sulphur	mg/kg			60	5.9	2.2	120	80	6.4	<0.75	1.9	4.3	-	<0.75	19	170	11	<0.75	3.5

				Location_Code	MS\BH02	MS\BH02	MS\BH02	MS\BH03	MS\BH03	MS\BH03	MS\BH03	MS\BH03	MS\BH03	MS\BH03	MS\BH03	MS\BH04	MS\BH04	MS\BH04	MS\BH04	MS\BH05
				Sample_Depth_Range	2.25-2.7	10.2-10.4	11.2-11.4	0.5	1	2	3-3.3	9.5-9.8	11-11.2	11.2	23.4	0.3	0.5	1	22.3	4.4
				Sampled_Date_Time	28/06/2021	28/06/2021	28/06/2021	22/06/2021	22/06/2021	22/06/2021	23/06/2021	24/06/2021	24/06/2021	23/06/2021	28/06/2021	17/06/2021	17/06/2021	17/06/2021	23/06/2021	16/06/2021
Chem_Group	**ChemName**	**output unit**	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	MG	TFD-S	TFD-C	MG	MG	TFD-S	TFD-S	TFD-S	TFD-C	TFD-C	GT	MG	MG	TFD-S	GT	TFD-S
Other	Organic Matter	%			0.8	0.4	3.4	1.8	1.1	1.3	0.3	0.4	2.9	-	0.6	0.8	1	0.4	0.4	<0.1
	Moisture	%			20	21	22	-	-	-	19	20	23	-	11	3.4	4.4	4	13	18
	TOC	%			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos	Asbestos Quantification - Total - %	%			-	-	-	-	-	-	-	-	-	-	-	-	<0.001	-	-	-
	Asbestos Identification	None			0	-	-	0	0	0	-	-	-	-	-	0	1	-	-	-
Field	pH	pH_Units	**11.5**		9	9	8.2	**11.6**	9.8	10.4	8.6	9.2	8.4	-	8.4	10	10.9	9.5	8.2	8.9
MISC	1,2-Dinitrobenzene	mg/kg	**82**[#2]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	-	-	<0.1	-	<0.1	-	-
	1,4-dinitrobenzene	mg/kg	**82**[#2]		<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	-	-	<0.1	-	<0.1	-	-
	Decane	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Natural Moisture Content	%			-	-	-	-	-	-	-	-	-	14.7 - 28.1	-	-	-	-	-	-
	3/4-Methylphenol (m/p-cresol)	mg/kg			<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	-	-	<0.1	-	<0.1	-	-

Env Stds Comments
#1:LQM/CIEH S4ULs 2015
#2:USEPA RSL (May 2020)
#3:EIC/AGS/CL:AIRE
#4:Defra C4SL 12/2014

C4SL 2021 - Vinyl chloride, tetrachloroethene, trichloroethene
GAC: Generic Assessment Criteria
(blank): No assessment criteria available
- : Not analysed
HH: Human Health

1,2-Dichloroethene - cis 1,2-dichloroethene used
2-methylphenol - cresol total used
4-methylphenol -cresol total used
pH - Hazardous Waste Value - corrosive

XXX	Exceedance of HH Soil. Commercial/Industrial. Sandy Loam. TOC>=0.58 to <1.45%
XXX	Exceedance of HH Soil. C4SL Commercial (England, Ireland, Northern Ireland, Wales. TOC>=0.58 to <3.48 &>0.58 to <1.45%

MG - Made Ground
TFD-S - Tidal Flat Deposits - Sand
TFD-C - Tidal F;at Deposits - Clay
GT - Glacial Till
RMU - Redcar Mudstone Formation

Chem_Group	ChemName	output unit	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	MS\BH05	MS\BH06	MS\BH06	MS\BH07	MS\BH07	MS\BH07	MS\BH07	MS\BH07	MS\BH07	MS\BH07	MS\BH07	MS\BH08	MS\BH08	MS\BH08	MS\BH09	MS\BH09
				Sample_Depth_Range	17.3	0.5	5.3	0.35	1-2	2.7-4.2	4.2-4.65	4.65-5	15.7	15.7-15.9	22.4	0.36	3	6	0.5	2-2.3
				Sampled_Date_Time	21/06/2021	24/05/2021	24/05/2021	30/06/2021	30/06/2021	30/06/2021	30/06/2021	30/06/2021	05/07/2021	01/07/2021	06/07/2021	28/05/2021	28/05/2021	28/05/2021	06/07/2021	06/07/2021
					GT	MG	TFD-S	MG	MG	MG	MG	TFD-S	LD	LD	RMU	MG	MG	MG	MG	MG
TPH	EPH >C10-C40	mg/kg			<10	3300	<10	<10	<10	40	7400	<10	-	<10	-	<10	18	<10	<10	<10
	>C5-C6 Aliphatics	mg/kg	**3.200**[#1]		<0.01	<0.01	<0.01	-	-	-	<0.01	<0.01	-	<0.01	-	<0.01	-	-	<0.01	-
	>C6-C8 Aliphatics	mg/kg	**7.800**[#1]		<0.01	<0.01	<0.01	-	-	-	<0.01	<0.01	-	<0.01	-	<0.01	-	-	<0.01	-
	>C8-C10 Aliphatics	mg/kg	**2.000**[#1]		<0.01	<0.01	<0.01	-	-	-	<0.01	<0.01	-	<0.01	-	<0.01	-	-	<0.01	-
	>C10-C12 Aliphatics	mg/kg	**9.700**[#1]		<1.5	<1.5	<1.5	-	-	-	12	<1.5	-	<1.5	-	<1.5	-	-	<1.5	-
	>C12-C16 Aliphatics	mg/kg	**59.000**[#1]		<1.2	12	<1.2	-	-	-	170	<1.2	-	<1.2	-	<1.2	-	-	<1.2	-
	>C16-C21 Aliphatics	mg/kg			<1.5	140	<1.5	-	-	-	540	<1.5	-	<1.5	-	<1.5	-	-	<1.5	-
	>C16-C35 Aliphatics	mg/kg	**1.600.000**[#1]		<4.9	1440	<4.9	-	-	-	1840	<4.9	-	<4.9	-	<4.9	-	-	<4.9	-
	>C21-C35 Aliphatics	mg/kg			<3.4	1300	<3.4	-	-	-	1300	<3.4	-	<3.4	-	<3.4	-	-	<3.4	-
	>C5-C35 Aliphatics	mg/kg			<10	1500	<10	-	-	-	2000	<10	-	<10	-	<10	-	-	<10	-
	>EC5-EC7 Aromatics	mg/kg	**26.000**[#1]		<0.01	<0.01	<0.01	-	-	-	<0.01	<0.01	-	<0.01	-	<0.01	-	-	<0.01	-
	>EC7-EC8 Aromatics	mg/kg	**56.000**[#1]		<0.01	<0.01	<0.01	-	-	-	<0.01	<0.01	-	<0.01	-	<0.01	-	-	<0.01	-
	>EC8-EC10 Aromatics	mg/kg	**3.500**[#1]		<0.01	<0.01	<0.01	-	-	-	<0.01	<0.01	-	<0.01	-	<0.01	-	-	<0.01	-
	>EC10-EC12 Aromatics	mg/kg	**16.000**[#1]		<0.9	<0.9	<0.9	-	-	-	4.1	2.7	-	<0.9	-	<0.9	-	-	<0.9	-
	>EC12-EC16 Aromatics	mg/kg	**36.000**[#1]		<0.5	4	<0.5	-	-	-	150	2.3	-	<0.5	-	<0.5	-	-	<0.5	-
	>EC16-EC21 Aromatics	mg/kg	**28.000**[#1]		<0.6	60	<0.6	-	-	-	850	12	-	<0.6	-	<0.6	-	-	<0.6	-
	>EC21-EC35 Aromatics	mg/kg	**28.000**[#1]		<1.4	880	<1.4	-	-	-	2500	59	-	<1.4	-	<1.4	-	-	<1.4	-
	>EC5-EC35 Aromatics	mg/kg			<10	940	<10	-	-	-	3500	76	-	<10	-	<10	-	-	<10	-
	>C5-C35 Aliphatics & Aromatics	mg/kg			<10	2400	<10	-	-	-	5500	76	-	<10	-	<10	-	-	<10	-
VOC	Dichlorodifluoromethane	mg/kg	**370**[#2]		-	-	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-
	MTBE	mg/kg	**7.900**[#3]		<0.01	<0.01	<0.01	-	-	-	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	-	-	<0.01	-
	Chloromethane	mg/kg	**1**[#3]		-	-	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-
	Vinyl chloride	mg/kg	**0.059**[#1]	*1.1*	-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	Bromomethane	mg/kg	**30**[#2]		-	-	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-
	Chloroethane	mg/kg	**960**[#3]		-	-	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-
	Trichlorofluoromethane	mg/kg	**350.000**[#2]		-	-	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-
	1,1-dichloroethene	mg/kg	**26**[#3]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	Dichloromethane	mg/kg	**270**[#3]		-	-	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-
	trans-1,2-dichloroethene	mg/kg	**22**[#3]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	1,1-dichloroethane	mg/kg	**280**[#3]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	cis-1,2-dichloroethene	mg/kg	**14**[#3]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	2,2-dichloropropane	mg/kg			-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	Bromochloromethane	mg/kg	**630**[#2]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	Chloroform	mg/kg	**99**[#1]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	1,1,1-trichloroethane	mg/kg	**660**[#1]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	1,1-dichloropropene	mg/kg			-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	Carbon tetrachloride	mg/kg	**2.9**[#1]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	1,2-dichloroethane	mg/kg	**0.67**[#1]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	Benzene	mg/kg	**27**[#1]	*27*[#4]	<0.01	<0.01	<0.01	-	-	-	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	-	-	<0.01	-
	Trichloroethene	mg/kg	**1.2**[#1]	*0.73*	-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	1,2-dichloropropane	mg/kg	**3.3**[#3]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	Dibromomethane	mg/kg	**99**[#2]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	Bromodichloromethane	mg/kg	**1.3**[#2]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	cis-1,3-dichloropropene	mg/kg			-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	Toluene	mg/kg	**56.000**[#1]		<0.01	<0.01	<0.01	-	-	-	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	-	-	<0.01	-
	trans-1,3-dichloropropene	mg/kg			-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	1,1,2-trichloroethane	mg/kg	**94**[#3]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	Tetrachloroethene	mg/kg	**19**[#1]	*24*	-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	1,3-dichloropropane	mg/kg	**23.000**[#2]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	Sum of PCE and TCE	mg/kg			-	<0.02	-	-	-	-	<0.02	<0.02	<0.1	-	<0.02	<0.02	-	-	-	-
	Chlorodibromomethane	mg/kg	**39**[#2]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	1,2-dibromoethane	mg/kg	**0.16**[#2]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	Chlorobenzene	mg/kg	**56**[#1]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	1,1,1,2-tetrachloroethane	mg/kg	**110**[#1]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	Ethylbenzene	mg/kg	**5.700**[#1]		<0.01	<0.01	<0.01	-	-	-	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	-	-	<0.01	-
	Xylene (m & p)	mg/kg			-	<0.01	-	-	-	-	<0.01	<0.01	<0.1	-	<0.01	<0.01	-	-	-	-
	Xylene Total	mg/kg	**5.900**[#1]		<0.01	<0.01	<0.01	-	-	-	<0.01	<0.01	<0.15	<0.01	<0.02	<0.01	-	-	<0.01	-
	Xylene (o)	mg/kg	**6.600**[#1]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	Styrene	mg/kg	**3.300**[#3]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	Bromoform	mg/kg	**760**[#3]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	Isopropylbenzene	mg/kg	**1.400**[#3]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	1,1,2,2-tetrachloroethane	mg/kg	**270**[#1]		-	-	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-
	Bromobenzene	mg/kg	**97**[#3]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	1,2,3-trichloropropane	mg/kg	**0.11**[#2]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	n-propylbenzene	mg/kg	**4.100**[#3]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-

Chem_Group	ChemName	output unit	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	MS\BH05	MS\BH06	MS\BH06	MS\BH07	MS\BH07	MS\BH07	MS\BH07	MS\BH07	MS\BH07	MS\BH07	MS\BH07	MS\BH08	MS\BH08	MS\BH08	MS\BH09	MS\BH09
				Sample_Depth_Range	17.3	0.5	5.3	0.35	1-2	2.7-4.2	4.2-4.65	4.65-5	15.7	15.7-15.9	22.4	0.36	3	6	0.5	2-2.3
				Sampled_Date_Time	21/06/2021	24/05/2021	24/05/2021	30/06/2021	30/06/2021	30/06/2021	30/06/2021	30/06/2021	05/07/2021	01/07/2021	06/07/2021	28/05/2021	28/05/2021	28/05/2021	06/07/2021	06/07/2021
					GT	MG	TFD-S	MG	MG	MG	MG	TFD-S	LD	LD	RMU	MG	MG	MG	MG	MG
	2-chlorotoluene	mg/kg	23.000[#2]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	1,3,5-trimethylbenzene	mg/kg	1.500[#2]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	4-chlorotoluene	mg/kg	23.000[#2]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	tert-butylbenzene	mg/kg	120.000[#2]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	1,2,4-trimethylbenzene	mg/kg	42[#3]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	sec-butylbenzene	mg/kg	120.000[#2]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	p-isopropyltoluene	mg/kg			-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	1,3-dichlorobenzene	mg/kg	30[#1]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-
	1,4-dichlorobenzene	mg/kg	4.400[#1]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-
	n-butylbenzene	mg/kg	58.000[#2]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	1,2-dichlorobenzene	mg/kg	2.000[#1]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-
	1,2-dibromo-3-chloropropane	mg/kg	0.064[#2]		-	<0.01	-	-	-	-	<0.01	0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	1,2,4-trichlorobenzene	mg/kg	220[#1]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-
	Hexachlorobutadiene	mg/kg	31[#1]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-
	1,2,3-trichlorobenzene	mg/kg	102[#1]		-	<0.01	-	-	-	-	<0.01	<0.01	<0.05	-	<0.01	<0.01	-	-	-	-
	1,2-Dichloroethene	mg/kg	14[#3]		-	<0.02	-	-	-	-	<0.02	<0.02	<0.1	-	<0.02	<0.02	-	-	-	-
	Trihalomethanes	mg/kg			-	<0.04	-	-	-	-	<0.04	<0.04	<0.2	-	<0.04	<0.04	-	-	-	-
	Hexachlorobenzene	mg/kg	110[#1]		-	<1	-	-	-	-	<0.1	<0.1	<0.01	-	<0.1	<0.1	-	-	-	-
	Trichlorobenzene (total)	mg/kg			-	<0.02	-	-	-	-	<0.02	<0.02	<0.06	-	<0.02	<0.02	-	-	-	-
PAH	Naphthalene	mg/kg	190[#1]		<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	<0.01	<0.03	<0.03	0.88	<0.03	<0.03
	Acenaphthylene	mg/kg	83.000[#1]		<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	<0.1	<0.03	<0.03	0.09	<0.03	<0.03
	Acenaphthene	mg/kg	84.000[#1]		<0.03	<0.03	<0.03	<0.03	0.03	<0.03	0.03	<0.03	<0.01	<0.03	<0.1	<0.03	<0.03	2.2	<0.03	<0.03
	Fluorene	mg/kg	63.000[#1]		<0.03	<0.03	<0.03	<0.03	0.03	<0.03	<0.03	<0.03	<0.01	<0.03	<0.1	<0.03	<0.03	1.7	<0.03	<0.03
	Phenanthrene	mg/kg	22.000[#1]		<0.03	<0.03	<0.03	0.03	0.37	<0.03	0.07	<0.03	<0.01	<0.03	<0.1	<0.03	<0.03	11	0.09	0.04
	Anthracene	mg/kg	520.000[#1]		<0.03	<0.03	<0.03	0.04	0.12	<0.03	0.06	<0.03	<0.01	<0.03	<0.1	<0.03	<0.03	3.1	<0.03	<0.03
	Fluoranthene	mg/kg	23.000[#1]		<0.03	0.04	<0.03	0.07	0.36	<0.03	0.08	<0.03	<0.01	<0.03	<0.1	<0.03	<0.03	14	0.26	<0.03
	Pyrene	mg/kg	54.000[#1]		<0.03	0.05	<0.03	0.05	0.27	<0.03	0.58	<0.03	<0.01	<0.03	<0.1	<0.03	<0.03	12	0.26	<0.03
	Benz(a)anthracene	mg/kg	170[#1]		<0.03	0.33	<0.03	0.03	0.11	<0.03	0.22	0.05	<0.01	<0.03	<0.1	<0.03	<0.03	5.7	0.11	0.04
	Chrysene	mg/kg	350[#1]		<0.03	0.13	<0.03	0.04	0.17	0.03	0.15	<0.03	<0.01	<0.03	<0.1	<0.03	<0.03	4.5	0.11	<0.03
	Benzo(a) pyrene	mg/kg	35[#1]	77[#4]	<0.03	<0.03	<0.03	<0.03	0.07	<0.03	0.13	<0.03	<0.01	<0.03	<0.1	<0.03	<0.03	4.5	0.1	<0.03
	Indeno(1,2,3-c,d)pyrene	mg/kg	500[#1]		<0.03	<0.03	<0.03	<0.03	0.07	<0.03	<0.03	<0.03	<0.01	<0.03	<0.1	<0.03	<0.03	2.3	0.06	<0.03
	Dibenz(a,h)anthracene	mg/kg	3.5[#1]		<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	<0.1	<0.03	<0.03	0.75	<0.03	<0.03
	Benzo(g,h,i)perylene	mg/kg	3.900[#1]		<0.03	<0.03	<0.03	<0.03	0.06	<0.03	0.07	<0.03	<0.01	<0.03	<0.1	<0.03	<0.03	2.7	0.08	<0.03
	Benzo(b)fluoranthene	mg/kg	44[#1]		<0.03	0.06	<0.03	0.03	0.12	<0.03	0.11	<0.03	<0.01	<0.03	<0.1	<0.03	<0.03	6.2	0.18	<0.03
	Benzo(k)fluoranthene	mg/kg	1.200[#1]		<0.03	<0.03	<0.03	<0.03	0.04	<0.03	0.03	<0.03	<0.01	<0.03	<0.1	<0.03	<0.03	2.2	0.08	<0.03
	Benzo(b)&(k)fluoranthene	mg/kg			<0.06	0.09	<0.06	0.06	0.16	<0.06	0.14	<0.06	<0.01	<0.06	<0.2	<0.06	<0.06	8.4	0.26	<0.06
	PAHs (sum of 4)	mg/kg			<0.12	0.15	<0.12	0.12	0.29	<0.12	0.24	<0.12	<0.04	<0.12	<0.4	<0.12	<0.12	13.4	0.4	<0.12
	PAH 16 Total	mg/kg			<0.1	0.61	<0.1	0.3	1.8	<0.1	1.5	<0.1	-	<0.1	-	<0.1	<0.1	74	1.3	<0.1
	benzo(g,h,i)perylene + indeno(1,2,3-cd)pyrene	mg/kg			<0.06	<0.06	<0.06	<0.06	0.13	<0.06	0.1	<0.06	<0.02	<0.06	<0.2	<0.06	<0.06	5	0.14	<0.06
	Benzo(a)pyrene (surrogate marker for PAH mixtu	mg/kg	15[#1]		<0.03	<0.03	<0.03	<0.03	0.07	<0.03	0.13	<0.03	<0.01	<0.03	<0.1	<0.03	<0.03	4.5	0.1	<0.03
SVOC	2,3,4,6-tetrachlorophenol	mg/kg	25.000[#2]		-	<1	-	-	-	-	<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	-
	2,3,5,6-Tetrachlorophenol	mg/kg			-	<1	-	-	-	-	<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	-
	2,6-dichlorophenol	mg/kg			<0.01	-	-	-	-	-	<0.01	<0.01	-	-	-	<0.01	-	-	<0.01	-
	Aniline	mg/kg	400[#2]		-	<1	-	-	-	-	<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	-
	2-chlorophenol	mg/kg	5.800[#2]		-	<1	-	-	-	-	<0.1	<0.1	<0.01	-	<0.1	<0.1	-	-	-	-
	2-methylphenol	mg/kg	160000[#3]		-	<1	-	-	-	-	<0.1	<0.1	<0.01	-	<0.1	<0.1	-	-	-	-
	2-nitrophenol	mg/kg			-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-	-	-
	2,4-dichlorophenol	mg/kg	2.500[#2]		<0.01	<1	-	-	-	-	<0.01	<0.01	<0.01	-	<0.1	<0.01	-	-	<0.01	-
	2,4-dimethylphenol	mg/kg	16.000[#3]		<0.01	<1	-	-	-	-	<0.01	<0.01	<0.01	-	<0.1	<0.01	-	-	<0.01	-
	2,4,5-trichlorophenol	mg/kg	82.000[#2]		-	<1	-	-	-	-	<0.1	<0.1	<0.01	-	<0.1	<0.1	-	-	-	-
	2,4,6-trichlorophenol	mg/kg	210[#2]		<0.01	<1	-	-	-	-	<0.01	<0.01	<0.01	-	<0.1	<0.01	-	-	<0.01	-
	4-chloro-3-methylphenol	mg/kg	82.000[#2]		<0.01	<1	-	-	-	-	<0.01	<0.01	<0.01	-	<0.1	<0.01	-	-	<0.01	-
	4-methylphenol	mg/kg	160000[#3]		<0.01	-	-	-	-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	-	<0.01	-
	4-nitrophenol	mg/kg			-	<1	-	-	-	-	<0.1	<0.1	<0.01	-	0.2	<0.1	-	-	-	-
	Pentachlorophenol	mg/kg	400[#1]		-	<1	-	-	-	-	<0.1	<0.1	<0.01	-	<0.1	<0.1	-	-	-	-
	Phenol	mg/kg	440[#1]		<0.01	<1	-	-	-	-	<0.01	<0.01	<0.01	-	<0.1	<0.01	-	-	<0.01	-
	2-chloronaphthalene	mg/kg	390[#3]		-	<1	-	-	-	-	<0.1	<0.1	<0.01	-	<0.1	<0.1	-	-	-	-
	2-methylnaphthalene	mg/kg	3.000[#2]		-	<1	-	-	-	-	<0.1	<0.1	<0.01	-	<0.1	<0.1	-	-	-	-
	Bis(2-ethylhexyl) phthalate	mg/kg	85.000[#3]		-	<1	-	-	-	-	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	-	-	-
	Butyl benzyl phthalate	mg/kg	940.000[#3]		-	<1	-	-	-	-	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	-	-	-
	Di-n-butyl phthalate	mg/kg	15.000[#3]		-	<1	-	-	-	-	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	-	-	-
	Di-n-octyl phthalate	mg/kg	89.000[#3]		-	<1	-	-	-	-	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	-	-	-
	Diethylphthalate	mg/kg	150.000[#3]		-	<1	-	-	-	-	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	-	-	-
	Dimethyl phthalate	mg/kg			-	<1	-	-	-	-	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	-	-	-
	2-nitroaniline	mg/kg	8.000[#2]		-	<1	-	-	-	-	<0.1	<0.1	<0.01	-	<0.1	<0.1	-	-	-	-

				Location_Code	MS\BH05	MS\BH06	MS\BH06	MS\BH07	MS\BH07	MS\BH07	MS\BH07	MS\BH07	MS\BH07	MS\BH07	MS\BH07	MS\BH08	MS\BH08	MS\BH08	MS\BH09	MS\BH09
				Sample_Depth_Range	17.3	0.5	5.3	0.35	1-2	2.7-4.2	4.2-4.65	4.65-5	15.7	15.7-15.9	22.4	0.36	3	6	0.5	2-2.3
				Sampled_Date_Time	21/06/2021	24/05/2021	24/05/2021	30/06/2021	30/06/2021	30/06/2021	30/06/2021	30/06/2021	05/07/2021	01/07/2021	06/07/2021	28/05/2021	28/05/2021	28/05/2021	06/07/2021	06/07/2021
Chem_Group	ChemName	output unit	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	GT	MG	TFD-S	MG	MG	MG	MG	TFD-S	LD	LD	RMU	MG	MG	MG	MG	MG
	3-nitroaniline	mg/kg			-	<1	-	-	-	-	<0.1	<0.1	<0.01	-	<0.1	<0.1	-	-	-	-
	4-bromophenyl phenyl ether	mg/kg			-	<1	-	-	-	-	<0.1	<0.1	<0.01	-	<0.1	<0.1	-	-	-	-
	4-chloroaniline	mg/kg	11[#2]		-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-	-	-
	4-chlorophenyl phenyl ether	mg/kg			-	<1	-	-	-	-	<0.1	<0.1	<0.01	-	<0.1	<0.1	-	-	-	-
	4-nitroaniline	mg/kg	110[#2]		-	<1	-	-	-	-	<0.1	<0.1	<0.01	-	<0.1	<0.1	-	-	-	-
	Azobenzene	mg/kg	26[#2]		-	<1	-	-	-	-	<0.1	<0.1	<0.01	-	<0.1	<0.1	-	-	-	-
	Bis(2-chloroethoxy) methane	mg/kg	2.500[#2]		-	<1	-	-	-	-	<0.1	<0.1	<0.01	-	<0.1	<0.1	-	-	-	-
	Bis(2-chloroethyl)ether	mg/kg	1[#2]		-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-	-	-
	Carbazole	mg/kg			-	<1	-	-	-	-	<0.1	<0.1	<0.01	-	<0.1	<0.1	-	-	-	-
	Dibenzofuran	mg/kg	1.200[#2]		-	<1	-	-	-	-	<0.1	<0.1	<0.01	-	<0.1	<0.1	-	-	-	-
	Hexachlorocyclopentadiene	mg/kg	7.5[#2]		-	<1	-	-	-	-	<0.1	<0.1	<0.01	-	<0.1	<0.1	-	-	-	-
	Hexachloroethane	mg/kg	22[#3]		-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-	-	-
	Isophorone	mg/kg	2.400[#2]		-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-	-	-
	N-nitrosodi-n-propylamine	mg/kg	0.33[#2]		-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-	-	-
	Benzyl alcohol	mg/kg	82.000[#2]		-	<1	-	-	-	-	<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	-
	Bis(2-chloroisopropyl)ether	mg/kg			-	<1	-	-	-	-	<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	-
	2,6-Dimethylphenol	mg/kg	490[#2]		<0.01	-	-	-	-	-	<0.01	<0.01	-	-	-	<0.01	-	-	<0.01	-
	4,6-Dinitro-2-methylphenol	mg/kg	66[#2]		-	<1	-	-	-	-	<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	-
	Total Monohydric Phenols (S) Corrected	mg/kg			<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	-	<0.3	-	<0.3	<0.3	<0.3	<0.3	<0.3
	Diphenylamine	mg/kg	82.000[#2]		-	<1	-	-	-	-	<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	-
PCBs	PCB congener 28 + 31	mg/kg			-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	Tetrachlorobiphenyl, 3,3,4,4- (PCB 77)	mg/kg	0.16[#2]		-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	Tetrachlorobiphenyl, 3,4,4,5- (PCB 81)	mg/kg	0.048[#2]		-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	Pentachlorobiphenyl, 2,3,3,4,4- (PCB 105)	mg/kg	0.49[#2]		-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	Pentachlorobiphenyl, 2,3,4,4,5- (PCB 114)	mg/kg	0.5[#2]		-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	PCB 118	mg/kg	0.49[#2]		-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	Pentachlorobiphenyl, 2,3,4,4,5- (PCB 123)	mg/kg	0.49[#2]		-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	Pentachlorobiphenyl, 3,3,4,4,5- (PCB 126)	mg/kg	0.00015[#2]		-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 156)	mg/kg	0.5[#2]		-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 157)	mg/kg	0.5[#2]		-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	Hexachlorobiphenyl, 2,3,4,4,5,5- (PCB 167)	mg/kg	0.51[#2]		-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	Hexachlorobiphenyl, 3,3,4,4,5,5- (PCB 169)	mg/kg	0.00051[#2]		-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	Heptachlorobiphenyl, 2,3,3,4,4,5,5- (PCB 189)	mg/kg	0.52[#2]		-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	PCB 52	mg/kg			-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	PCB 101	mg/kg			-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	PCB 138	mg/kg			-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	PCB 153	mg/kg			-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	PCB 180	mg/kg			-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	Total PCB 7 Congeners	mg/kg			-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	-	-	-
Explosives	1,3-Dinitrobenzene	mg/kg	82[#2]		-	<1	-	-	-	-	<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	-
	2,4-Dinitrotoluene	mg/kg	3.700[#3]		-	<1	-	-	-	-	<0.1	<0.1	<0.01	-	<0.1	<0.1	-	-	-	-
	2,6-dinitrotoluene	mg/kg	1.900[#3]		-	<1	-	-	-	-	<0.1	<0.1	<0.01	-	<0.1	<0.1	-	-	-	-
	Nitrobenzene	mg/kg	22[#2]		-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-	-	-
Metals	Arsenic	mg/kg	640[#1]	*640* [#4]	7.8	5.6	9.5	3.1	3.9	3.7	3.3	4.1	-	9.5	-	8.7	6.1	7.1	34	25
	Beryllium	mg/kg	12[#1]		1	0.3	3.2	3.7	6.6	6.9	6.4	1.5	-	1.1	-	8.1	7.9	0.3	2.3	3.4
	Cadmium	mg/kg	190[#1]	*410* [#4]	0.1	0.2	2.2	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	<0.1	<0.1	2.2	0.2
	Copper	mg/kg	68.000[#1]		23	160	69	15	4	4.8	5.2	5.1	-	21	-	6.6	7.3	4.5	120	46
	Iron	mg/kg	820.000[#2]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lead	mg/kg	2.300[#4]	*2.300* [#4]	17	30	51	8	2.2	0.9	1.9	17	-	15	-	2.1	2.7	17	130	25
	Mercury	mg/kg	1100[#1]		<0.05	1.9	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	-	0.07	<0.05	<0.05	<0.05	<0.05
	Nickel	mg/kg	980[#1]		33	61	28	2	<1	<1	<1	2.2	-	50	-	3.5	2.1	2.6	41	13
	Selenium	mg/kg	12.000[#1]		<0.5	<0.5	<0.5	1.4	1.6	1.6	1.6	<0.5	-	<0.5	-	2.1	1.6	<0.5	1.5	6.3
	Vanadium	mg/kg	9.000[#1]		36	160	110	48	34	36	39	16	-	46	-	26	34	13	520	170
	Zinc	mg/kg	730.000[#1]		57	70	1000	32	7.5	4.6	8.8	20	-	48	-	8.6	23	20	520	63
	Boron (Water Soluble)	mg/kg			3.3	0.3	0.4	2.8	6.5	5.2	6.4	3.4	-	5.5	-	7.4	3.6	0.9	1.4	1.6
	Chromium (hexavalent)	mg/kg	33[#1]	*49* [#4]	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	<1	<1	<1	<1	<1
	Chromium (Trivalent)	mg/kg	8.600[#1]		29	50	24	18	6.8	4.6	8.2	3.4	-	42	-	8.2	9.4	4.2	130	30
Inorganics	Cyanide (Free)	mg/kg			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1
	Cyanide Total	mg/kg	150[#2]		<0.1	0.8	<0.1	0.2	<0.1	<0.1	0.1	<0.1	-	<0.1	-	<0.1	0.2	0.4	<0.1	<0.1
	Thiocyanate	mg/kg	230[#2]		<0.6	<0.6	<0.6	0.7	0.8	<0.6	1	<0.6	-	<0.6	-	1.9	<0.6	<0.6	<0.6	<0.6
	Nitrate (as NO3-)	mg/kg	1.900.000[#2]		3.5	<1	1.2	<1	<1	<1	<1	<1	-	13	-	13	1.7	4.8	3.6	3.8
	Sulphide	mg/kg			40	110	2400	2800	1500	2000	1900	640	-	36	-	800	1800	210	340	800
	Sulphur as S	mg/kg			400	500	4100	2200	4600	5500	4700	2000	-	900	-	8200	17,000	1000	1300	4600
	Soluble Sulphate 2:1 extract as SO4 BRE	g/l			0.35	0.032	0.97	0.51	0.78	1.3	0.97	0.81	-	0.49	-	0.91	2.5	1.5	0.11	0.32
	Elemental Sulphur	mg/kg			<0.75	5.6	<0.75	31	140	95	95	89	-	<0.75	-	14	23	13	1.8	5.4

				Location_Code	MS\BH05	MS\BH06	MS\BH06	MS\BH07	MS\BH07	MS\BH07	MS\BH07	MS\BH07	MS\BH07	MS\BH07	MS\BH07	MS\BH08	MS\BH08	MS\BH08	MS\BH09	MS\BH09
				Sample_Depth_Range	17.3	0.5	5.3	0.35	1-2	2.7-4.2	4.2-4.65	4.65-5	15.7	15.7-15.9	22.4	0.36	3	6	0.5	2-2.3
				Sampled_Date_Time	21/06/2021	24/05/2021	24/05/2021	30/06/2021	30/06/2021	30/06/2021	30/06/2021	30/06/2021	05/07/2021	01/07/2021	06/07/2021	28/05/2021	28/05/2021	28/05/2021	06/07/2021	06/07/2021
Chem_Group	**ChemName**	**output unit**	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	GT	MG	TFD-S	MG	MG	MG	MG	TFD-S	LD	LD	RMU	MG	MG	MG	MG	MG
Other	Organic Matter	%			2.3	0.5	0.7	0.8	0.5	0.6	1.4	0.4	-	1.8	-	0.8	1.3	0.5	2	1.3
	Moisture	%			15	6.6	15	8	2.2	2.4	6.4	18	-	19	-	11	9	20	13	10
	TOC	%			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos	Asbestos Quantification - Total - %	%			-	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001
	Asbestos Identification	None			-	1	-	-	-	-	0	-	-	-	-	0	0	-	1	1
Field	pH	pH_Units	**11.5**		8.5	8.9	10.2	9.2	11.1	10.7	11.1	10.8	-	8.7	-	10	10.3	9.1	10	8.1
MISC	1,2-Dinitrobenzene	mg/kg	**82**#2		-	<1	-	-	-	-	<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	-
	1,4-dinitrobenzene	mg/kg	**82**#2		-	<1	-	-	-	-	<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	-
	Decane	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Natural Moisture Content	%			-	-	-	-	-	-	-	-	25.4	-	-	-	-	-	-	-
	3/4-Methylphenol (m/p-cresol)	mg/kg			-	<1	-	-	-	-	<0.1	<0.1	-	-	<0.1	<0.1	-	-	-	-

Env Stds Comments
#1:LQM/CIEH S4ULs 2015
#2:USEPA RSL (May 2020)
#3:EIC/AGS/CL:AIRE
#4:Defra C4SL 12/2014

C4SL 2021 - Vinyl chloride, tetrachloroethene, trichloroethene
GAC: Generic Assessment Criteria
(blank): No assessment criteria available
 - : Not analysed
HH: Human Health

1,2-Dichloroethene - cis 1,2-dichloroethene used
2-methylphenol - cresol total used
4-methylphenol -cresol total used
pH - Hazardous Waste Value - corrosive

XXX	Exceedance of HH Soil. Commercial/Industrial. Sandy Loam. TOC>=0.58 to <1.45%
XXX	Exceedance of HH Soil. C4SL Commercial (England, Ireland, Northern Ireland, Wales. TOC>=0.58 to <3.48 &>0.58 to <1.45%

MG - Made Ground
TFD-S - Tidal Flat Deposits - Sand
TFD-C - Tidal F;at Deposits - Clay
GT - Glacial Till
RMU - Redcar Mudstone Formation

				Location_Code	MS\BH09	MS\BH09	MS\BH09	MS\BH10	MS\BH10	MS\BH10	MS\BH10	MS\BH10	MS\BH11	MS\BH11	MS\BH11	MS\BH11	MS\BH12	MS\BH12	MS\BH13	MS\BH13
				Sample_Depth_Range	4.65-4.85	13	14	1	4	5	11.3	19.1	0.5	4	5	13.2	1	2.7-3	0.5	3
				Sampled_Date_Time	06/07/2021	07/07/2021	07/07/2021	07/06/2021	09/06/2021	14/06/2021	16/06/2021	18/06/2021	02/06/2021	02/06/2021	02/06/2021	03/06/2021	03/06/2021	03/06/2021	25/06/2021	28/06/2021
Chem_Group	ChemName	output unit	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	TFD-S	TFD-S	GT	MG	MG	TFD-S	TFD-C	GT	MG	MG	TFD-S	TFD-C	MG	TFD-S	MG	MG
TPH	EPH >C10-C40	mg/kg			<10	-	-	<10	<10	<10	<10	<10	110	<10	<10	<10	<10	<10	84	-
	>C5-C6 Aliphatics	mg/kg	3.200[#1]		-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	-	-	-
	>C6-C8 Aliphatics	mg/kg	7.800[#1]		-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	-	-	-
	>C8-C10 Aliphatics	mg/kg	2.000[#1]		-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	-	-	-
	>C10-C12 Aliphatics	mg/kg	9.700[#1]		-	-	-	<1.5	<1.5	-	<1.5	<1.5	-	<1.5	<1.5	-	<1.5	-	-	-
	>C12-C16 Aliphatics	mg/kg	59.000[#1]		-	-	-	<1.2	<1.2	-	<1.2	<1.2	-	<1.2	<1.2	-	<1.2	-	-	-
	>C16-C21 Aliphatics	mg/kg			-	-	-	<1.5	<1.5	-	<1.5	<1.5	-	<1.5	<1.5	-	<1.5	-	-	-
	>C16-C35 Aliphatics	mg/kg	1.600.000[#1]		-	-	-	<4.9	<4.9	-	<4.9	<4.9	-	<4.9	<4.9	-	<4.9	-	-	-
	>C21-C35 Aliphatics	mg/kg			-	-	-	<3.4	<3.4	-	<3.4	<3.4	-	<3.4	<3.4	-	<3.4	-	-	-
	>C5-C35 Aliphatics	mg/kg			-	-	-	<10	<10	-	<10	<10	-	<10	<10	-	<10	-	-	-
	>EC5-EC7 Aromatics	mg/kg	26.000[#1]		-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	-	-	-
	>EC7-EC8 Aromatics	mg/kg	56.000[#1]		-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	-	-	-
	>EC8-EC10 Aromatics	mg/kg	3.500[#1]		-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	-	-	-
	>EC10-EC12 Aromatics	mg/kg	16.000[#1]		-	-	-	<0.9	<0.9	-	<0.9	<0.9	-	<0.9	<0.9	-	<0.9	-	-	-
	>EC12-EC16 Aromatics	mg/kg	36.000[#1]		-	-	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	-	-	-
	>EC16-EC21 Aromatics	mg/kg	28.000[#1]		-	-	-	<0.6	<0.6	-	<0.6	<0.6	-	<0.6	<0.6	-	<0.6	-	-	-
	>EC21-EC35 Aromatics	mg/kg	28.000[#1]		-	-	-	<1.4	<1.4	-	<1.4	<1.4	-	<1.4	<1.4	-	<1.4	-	-	-
	>EC5-EC35 Aromatics	mg/kg			-	-	-	<10	<10	-	<10	<10	-	<10	<10	-	<10	-	-	-
	>C5-C35 Aliphatics & Aromatics	mg/kg			-	-	-	<10	<10	-	<10	<10	-	<10	<10	-	<10	-	-	-
VOC	Dichlorodifluoromethane	mg/kg	370[#2]		-	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05
	MTBE	mg/kg	7.900[#3]		-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.05
	Chloromethane	mg/kg	1[#3]		-	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	0.126
	Vinyl chloride	mg/kg	0.059[#1]	1.1	-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	Bromomethane	mg/kg	30[#2]		-	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05
	Chloroethane	mg/kg	960[#3]		-	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05
	Trichlorofluoromethane	mg/kg	350.000[#2]		-	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05
	1,1-dichloroethene	mg/kg	26[#3]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	Dichloromethane	mg/kg	270[#3]		-	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05
	trans-1,2-dichloroethene	mg/kg	22[#3]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	1,1-dichloroethane	mg/kg	280[#3]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	cis-1,2-dichloroethene	mg/kg	14[#3]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	2,2-dichloropropane	mg/kg			-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	Bromochloromethane	mg/kg	630[#2]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	Chloroform	mg/kg	99[#1]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	1,1,1-trichloroethane	mg/kg	660[#1]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	1,1-dichloropropene	mg/kg			-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	Carbon tetrachloride	mg/kg	2.9[#1]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	1,2-dichloroethane	mg/kg	0.67[#1]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	Benzene	mg/kg	27[#1]	27[#4]	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.05
	Trichloroethene	mg/kg	1.2[#1]	0.73	-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	1,2-dichloropropane	mg/kg	3.3[#3]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	Dibromomethane	mg/kg	99[#2]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	Bromodichloromethane	mg/kg	1.3[#2]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	cis-1,3-dichloropropene	mg/kg			-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	Toluene	mg/kg	56.000[#1]		-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.05
	trans-1,3-dichloropropene	mg/kg			-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	1,1,2-trichloroethane	mg/kg	94[#3]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	Tetrachloroethene	mg/kg	19[#1]	24	-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	1,3-dichloropropane	mg/kg	23.000[#2]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	Sum of PCE and TCE	mg/kg			-	-	<0.02	<0.02	<0.02	-	-	<0.02	-	<0.02	-	-	<0.02	<0.02	-	<0.1
	Chlorodibromomethane	mg/kg	39[#2]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	1,2-dibromoethane	mg/kg	0.16[#2]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	Chlorobenzene	mg/kg	56[#1]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	1,1,1,2-tetrachloroethane	mg/kg	110[#1]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	Ethylbenzene	mg/kg	5.700[#1]		-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.05
	Xylene (m & p)	mg/kg			-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.1
	Xylene Total	mg/kg	5.900[#1]		-	-	<0.02	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.02	-	<0.15
	Xylene (o)	mg/kg	6.600[#1]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	Styrene	mg/kg	3.300[#3]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	Bromoform	mg/kg	760[#3]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	Isopropylbenzene	mg/kg	1.400[#3]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	1,1,2,2-tetrachloroethane	mg/kg	270[#1]		-	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.05
	Bromobenzene	mg/kg	97[#3]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	1,2,3-trichloropropane	mg/kg	0.11[#2]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	n-propylbenzene	mg/kg	4.100[#3]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05

Chem_Group	ChemName	output unit	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	MS\BH09	MS\BH09	MS\BH09	MS\BH10	MS\BH10	MS\BH10	MS\BH10	MS\BH10	MS\BH11	MS\BH11	MS\BH11	MS\BH11	MS\BH12	MS\BH12	MS\BH13	MS\BH13
				Sample_Depth_Range	4.65-4.85	13	14	1	4	5	11.3	19.1	0.5	4	5	13.2	1	2.7-3	0.5	3
				Sampled_Date_Time	06/07/2021	07/07/2021	07/07/2021	07/06/2021	09/06/2021	14/06/2021	16/06/2021	18/06/2021	02/06/2021	02/06/2021	02/06/2021	03/06/2021	03/06/2021	03/06/2021	25/06/2021	28/06/2021
					TFD-S	TFD-S	GT	MG	MG	TFD-S	TFD-C	GT	MG	MG	TFD-S	TFD-C	MG	TFD-S	MG	MG
	2-chlorotoluene	mg/kg	23.000[#2]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	1,3,5-trimethylbenzene	mg/kg	1.500[#2]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	4-chlorotoluene	mg/kg	23.000[#2]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	tert-butylbenzene	mg/kg	120.000[#2]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	1,2,4-trimethylbenzene	mg/kg	42[#3]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	sec-butylbenzene	mg/kg	120.000[#2]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	p-isopropyltoluene	mg/kg			-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	1,3-dichlorobenzene	mg/kg	30[#1]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.01
	1,4-dichlorobenzene	mg/kg	4.400[#1]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.01
	n-butylbenzene	mg/kg	58.000[#2]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	1,2-dichlorobenzene	mg/kg	2.000[#1]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.01
	1,2-dibromo-3-chloropropane	mg/kg	0.064[#2]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	1,2,4-trichlorobenzene	mg/kg	220[#1]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.01
	Hexachlorobutadiene	mg/kg	31[#1]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.01
	1,2,3-trichlorobenzene	mg/kg	102[#1]		-	-	<0.01	<0.01	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	<0.01	-	<0.05
	1,2-Dichloroethene	mg/kg	14[#3]		-	-	<0.02	<0.02	<0.02	-	-	<0.02	-	<0.02	-	-	<0.02	<0.02	-	<0.1
	Trihalomethanes	mg/kg			-	-	<0.04	<0.04	<0.04	-	-	<0.04	-	<0.04	-	-	<0.04	<0.04	-	<0.2
	Hexachlorobenzene	mg/kg	110[#1]		-	-	<0.01	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	<0.01
	Trichlorobenzene (total)	mg/kg			-	-	<0.02	<0.02	<0.02	-	-	<0.02	-	<0.02	-	-	<0.02	<0.02	-	<0.06
PAH	Naphthalene	mg/kg	190[#1]		<0.03	-	<0.01	<0.03	<0.03	<0.03	<0.03	<0.01	0.04	<0.03	<0.03	<0.03	0.05	<0.03	<0.03	<0.01
	Acenaphthylene	mg/kg	83.000[#1]		<0.03	-	<0.01	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.01
	Acenaphthene	mg/kg	84.000[#1]		<0.03	-	<0.01	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.01
	Fluorene	mg/kg	63.000[#1]		<0.03	-	<0.01	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.01
	Phenanthrene	mg/kg	22.000[#1]		<0.03	-	<0.01	<0.03	<0.03	0.05	<0.03	<0.03	0.6	0.07	<0.03	<0.03	0.2	<0.03	0.18	0.025
	Anthracene	mg/kg	520.000[#1]		<0.03	-	<0.01	<0.03	<0.03	<0.03	<0.03	<0.03	0.08	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.01
	Fluoranthene	mg/kg	23.000[#1]		<0.03	-	<0.01	<0.03	<0.03	0.08	<0.03	<0.03	1.3	0.06	<0.03	<0.03	0.62	<0.03	0.6	0.023
	Pyrene	mg/kg	54.000[#1]		<0.03	-	<0.01	<0.03	<0.03	0.06	<0.03	<0.03	0.98	0.04	<0.03	<0.03	0.55	<0.03	0.5	0.021
	Benz(a)anthracene	mg/kg	170[#1]		<0.03	-	<0.01	<0.03	<0.03	0.04	<0.03	<0.03	0.7	<0.03	<0.03	<0.03	0.26	<0.03	0.21	0.039
	Chrysene	mg/kg	350[#1]		<0.03	-	<0.01	<0.03	<0.03	0.04	<0.03	<0.03	0.5	<0.03	<0.03	<0.03	0.27	<0.03	0.35	0.02
	Benzo(a) pyrene	mg/kg	35[#1]	77[#4]	<0.03	-	<0.01	<0.03	<0.03	<0.03	<0.03	<0.03	0.57	<0.03	<0.03	<0.03	0.43	<0.03	0.2	<0.01
	Indeno(1,2,3-c,d)pyrene	mg/kg	500[#1]		<0.03	-	<0.01	<0.03	<0.03	<0.03	<0.03	<0.03	0.25	<0.03	<0.03	<0.03	0.27	<0.03	0.19	<0.01
	Dibenz(a,h)anthracene	mg/kg	3.5[#1]		<0.03	-	<0.01	<0.03	<0.03	<0.03	<0.03	<0.03	0.05	<0.03	<0.03	<0.03	0.05	<0.03	0.03	<0.01
	Benzo(g,h,i)perylene	mg/kg	3.900[#1]		<0.03	-	<0.01	<0.03	<0.03	<0.03	<0.03	<0.03	0.28	<0.03	<0.03	<0.03	0.33	<0.03	0.2	<0.01
	Benzo(b)fluoranthene	mg/kg	44[#1]		<0.03	-	<0.01	<0.03	<0.03	<0.03	<0.03	<0.03	0.6	<0.03	<0.03	<0.03	0.75	<0.03	0.4	0.017
	Benzo(k)fluoranthene	mg/kg	1.200[#1]		<0.03	-	<0.01	<0.03	<0.03	<0.03	<0.03	<0.03	0.41	<0.03	<0.03	<0.03	0.26	<0.03	0.17	<0.01
	Benzo(b)&(k)fluoranthene	mg/kg			<0.06	-	<0.01	<0.06	<0.06	<0.06	<0.06	<0.06	1.01	<0.06	<0.06	<0.06	1.01	<0.06	0.57	0.023
	PAHs (sum of 4)	mg/kg			<0.12	-	<0.04	<0.12	<0.12	<0.12	<0.12	<0.12	1.54	<0.12	<0.12	<0.12	1.61	<0.12	0.96	0.047
	PAH 16 Total	mg/kg			<0.1	-	-	<0.1	<0.1	0.26	<0.1	<0.1	6.3	0.17	<0.1	<0.1	4	<0.1	3	-
	benzo(g,h,i)perylene + indeno(1,2,3-cd)pyrene	mg/kg			<0.06	-	<0.02	<0.06	<0.06	<0.06	<0.06	<0.06	0.53	<0.06	<0.06	<0.06	0.6	<0.06	0.39	<0.02
	Benzo(a)pyrene (surrogate marker for PAH mixtu	mg/kg	15[#1]		<0.03	-	<0.01	<0.03	<0.03	<0.03	<0.03	<0.03	0.57	<0.03	<0.03	<0.03	0.43	<0.03	0.2	<0.01
SVOC	2,3,4,6-tetrachlorophenol	mg/kg	25.000[#2]		-	-	<0.1	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	-
	2,3,5,6-Tetrachlorophenol	mg/kg			-	-	<0.1	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	-
	2,6-dichlorophenol	mg/kg			-	-	-	-	<0.01	-	-	-	-	<0.01	-	-	<0.01	-	-	-
	Aniline	mg/kg	400[#2]		-	-	<0.1	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	-
	2-chlorophenol	mg/kg	5.800[#2]		-	-	<0.01	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	<0.01
	2-methylphenol	mg/kg	160000[#3]		-	-	<0.01	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	<0.01
	2-nitrophenol	mg/kg			-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
	2,4-dichlorophenol	mg/kg	2.500[#2]		-	-	<0.01	<0.1	<0.01	-	-	<0.1	-	<0.01	-	-	<0.01	<0.1	-	<0.01
	2,4-dimethylphenol	mg/kg	16.000[#3]		-	-	<0.01	<0.1	<0.01	-	-	<0.1	-	<0.01	-	-	<0.01	<0.1	-	<0.01
	2,4,5-trichlorophenol	mg/kg	82.000[#2]		-	-	<0.01	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	<0.01
	2,4,6-trichlorophenol	mg/kg	210[#2]		-	-	<0.01	<0.1	<0.01	-	-	<0.1	-	<0.01	-	-	<0.01	<0.1	-	<0.01
	4-chloro-3-methylphenol	mg/kg	82.000[#2]		-	-	<0.01	<0.1	<0.01	-	-	<0.1	-	<0.01	-	-	<0.01	<0.1	-	<0.01
	4-methylphenol	mg/kg	160000[#3]		-	-	<0.01	-	<0.01	-	-	-	-	<0.01	-	-	<0.01	-	-	<0.01
	4-nitrophenol	mg/kg			-	-	<0.01	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	<0.01
	Pentachlorophenol	mg/kg	400[#1]		-	-	<0.01	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	<0.01
	Phenol	mg/kg	440[#1]		-	-	<0.01	<0.1	<0.01	-	-	<0.1	-	<0.01	-	-	<0.01	<0.1	-	<0.01
	2-chloronaphthalene	mg/kg	390[#3]		-	-	<0.01	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	<0.01
	2-methylnaphthalene	mg/kg	3.000[#2]		-	-	<0.01	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	<0.01
	Bis(2-ethylhexyl) phthalate	mg/kg	85.000[#3]		-	-	<0.1	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	<0.1
	Butyl benzyl phthalate	mg/kg	940.000[#3]		-	-	<0.1	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	<0.1
	Di-n-butyl phthalate	mg/kg	15.000[#3]		-	-	<0.1	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	<0.1
	Di-n-octyl phthalate	mg/kg	89.000[#3]		-	-	<0.1	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	<0.1
	Diethylphthalate	mg/kg	150.000[#3]		-	-	<0.1	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	<0.1
	Dimethyl phthalate	mg/kg			-	-	<0.1	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	<0.1
	2-nitroaniline	mg/kg	8.000[#2]		-	-	<0.01	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	<0.01

				Location_Code	MS\BH09	MS\BH09	MS\BH09	MS\BH10	MS\BH10	MS\BH10	MS\BH10	MS\BH10	MS\BH11	MS\BH11	MS\BH11	MS\BH11	MS\BH12	MS\BH12	MS\BH13	MS\BH13
				Sample_Depth_Range	4.65-4.85	13	14	1	4	5	11.3	19.1	0.5	4	5	13.2	1	2.7-3	0.5	3
				Sampled_Date_Time	06/07/2021	07/07/2021	07/07/2021	07/06/2021	09/06/2021	14/06/2021	16/06/2021	18/06/2021	02/06/2021	02/06/2021	02/06/2021	03/06/2021	03/06/2021	03/06/2021	25/06/2021	28/06/2021
Chem_Group	ChemName	output unit	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	TFD-S	TFD-S	GT	MG	MG	TFD-S	TFD-C	GT	MG	MG	TFD-S	TFD-C	MG	TFD-S	MG	MG
	3-nitroaniline	mg/kg			-	-	<0.01	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	<0.01
	4-bromophenyl phenyl ether	mg/kg			-	-	<0.01	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	<0.01
	4-chloroaniline	mg/kg	11[#2]		-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
	4-chlorophenyl phenyl ether	mg/kg			-	-	<0.01	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	<0.01
	4-nitroaniline	mg/kg	110[#2]		-	-	<0.01	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	<0.01
	Azobenzene	mg/kg	26[#2]		-	-	<0.01	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	<0.01
	Bis(2-chloroethoxy) methane	mg/kg	2.500[#2]		-	-	<0.01	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	<0.01
	Bis(2-chloroethyl)ether	mg/kg	1[#2]		-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
	Carbazole	mg/kg			-	-	<0.01	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	<0.01
	Dibenzofuran	mg/kg	1.200[#2]		-	-	<0.01	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	<0.01
	Hexachlorocyclopentadiene	mg/kg	7.5[#2]		-	-	<0.01	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	<0.01
	Hexachloroethane	mg/kg	22[#3]		-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
	Isophorone	mg/kg	2.400[#2]		-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
	N-nitrosodi-n-propylamine	mg/kg	0.33[#2]		-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
	Benzyl alcohol	mg/kg	82.000[#2]		-	-	<0.1	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	-
	Bis(2-chloroisopropyl)ether	mg/kg			-	-	<0.1	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	-
	2,6-Dimethylphenol	mg/kg	490[#2]		-	-	-	-	<0.01	-	-	-	-	<0.01	-	-	<0.01	-	-	-
	4,6-Dinitro-2-methylphenol	mg/kg	66[#2]		-	-	<0.1	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	-
	Total Monohydric Phenols (S) Corrected	mg/kg			<0.3	-	-	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	-
	Diphenylamine	mg/kg	82.000[#2]		-	-	<0.1	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	-
PCBs	PCB congener 28 + 31	mg/kg			-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	Tetrachlorobiphenyl, 3,3,4,4- (PCB 77)	mg/kg	0.16[#2]		-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	Tetrachlorobiphenyl, 3,4,4,5- (PCB 81)	mg/kg	0.048[#2]		-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	Pentachlorobiphenyl, 2,3,3,4,4- (PCB 105)	mg/kg	0.49[#2]		-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	Pentachlorobiphenyl, 2,3,4,4,5- (PCB 114)	mg/kg	0.5[#2]		-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	PCB 118	mg/kg	0.49[#2]		-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	Pentachlorobiphenyl, 2,3,4,4,5- (PCB 123)	mg/kg	0.49[#2]		-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	Pentachlorobiphenyl, 3,3,4,4,5- (PCB 126)	mg/kg	0.00015[#2]		-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 156)	mg/kg	0.5[#2]		-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 157)	mg/kg	0.5[#2]		-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	Hexachlorobiphenyl, 2,3,4,4,5,5- (PCB 167)	mg/kg	0.51[#2]		-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	Hexachlorobiphenyl, 3,3,4,4,5,5- (PCB 169)	mg/kg	0.00051[#2]		-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	Heptachlorobiphenyl, 2,3,3,4,4,5,5- (PCB 189)	mg/kg	0.52[#2]		-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	PCB 52	mg/kg			-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	PCB 101	mg/kg			-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	PCB 138	mg/kg			-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	PCB 153	mg/kg			-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	PCB 180	mg/kg			-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-	-	-	-
	Total PCB 7 Congeners	mg/kg			-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-	-	-	-
Explosives	1,3-Dinitrobenzene	mg/kg	82[#2]		-	-	<0.1	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	-
	2,4-Dinitrotoluene	mg/kg	3.700[#3]		-	-	<0.01	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	<0.01
	2,6-dinitrotoluene	mg/kg	1.900[#3]		-	-	<0.01	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	<0.01
	Nitrobenzene	mg/kg	22[#2]		-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Metals	Arsenic	mg/kg	640[#1]	640[#4]	8.9	7.9	-	14	12	8.5	9.4	6.4	6.2	5.7	12	8.7	9.5	6.6	3.2	-
	Beryllium	mg/kg	12[#1]		<0.2	<0.2	-	1.1	0.8	<0.2	0.8	3.5	3.8	<0.2	2.1	0.8	2.1	0.3	0.5	-
	Cadmium	mg/kg	190[#1]	410[#4]	0.1	<0.1	-	0.2	0.2	<0.1	<0.1	0.2	20	8.1	4.2	<0.1	0.4	<0.1	0.4	-
	Copper	mg/kg	68.000[#1]		7.4	12	-	14	11	7.1	19	17	21	5.9	47	18	54	5.6	49	-
	Iron	mg/kg	820.000[#2]		-	11,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lead	mg/kg	2.300[#4]	2.300[#4]	34	26	-	5.5	3.1	33	19	29	110	38	520	17	34	11	22	-
	Mercury	mg/kg	1100[#1]		<0.05	<0.05	-	0.78	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
	Nickel	mg/kg	980[#1]		4.1	5.7	-	11	3.7	3.9	30	15	11	4.7	11	27	11	2.6	12	-
	Selenium	mg/kg	12.000[#1]		<0.5	<0.5	-	8.8	5.4	<0.5	<0.5	1.1	1.2	<0.5	5.1	<0.5	3.9	<0.5	10	-
	Vanadium	mg/kg	9.000[#1]		24	30	-	2100	1600	14	51	57	37	17	1400	47	1300	43	1300	-
	Zinc	mg/kg	730.000[#1]		44	42	-	11	11	38	73	60	4100	350	980	64	78	21	51	-
	Boron (Water Soluble)	mg/kg			0.4	4.3	-	0.3	1.2	2.5	1.7	3.8	1.2	0.2	0.6	4.4	1.2	<0.2	1.9	-
	Chromium (hexavalent)	mg/kg	33[#1]	49[#4]	<1	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-
	Chromium (Trivalent)	mg/kg	8.600[#1]		5.7	12	-	570	430	4.2	32	20	14	6.6	760	29	350	14	990	-
Inorganics	Cyanide (Free)	mg/kg			<0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
	Cyanide Total	mg/kg	150[#2]		0.4	-	-	<0.1	0.3	<0.1	0.1	0.1	0.1	0.1	0.3	<0.1	<0.1	<0.1	<0.1	-
	Thiocyanate	mg/kg	230[#2]		<0.6	-	-	<0.6	<0.6	2.4	<0.6	<0.6	2.8	<0.6	0.7	<0.6	<0.6	<0.6	<0.6	-
	Nitrate (as NO3-)	mg/kg	1.900.000[#2]		1.3	-	-	10	7.3	1.5	8.6	5.7	5.4	18	7.2	<1	4.2	<1	3.9	-
	Sulphide	mg/kg			40	-	-	340	260	44	180	2700	1800	<10	1700	52	460	130	270	-
	Sulphur as S	mg/kg			300	-	-	2300	2500	800	3700	4200	5800	300	3200	3600	2200	500	1600	-
	Soluble Sulphate 2:1 extract as SO4 BRE	g/l			0.037	-	-	0.043	0.12	0.27	0.54	1.5	1.4	0.12	0.6	0.38	0.11	0.071	0.019	-
	Elemental Sulphur	mg/kg			<0.75	-	-	1.5	1.7	<0.75	69	5.1	22	21	<0.75	3.5	3.4	<0.75	6.6	-

Chem_Group	ChemName	output unit	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Location_Code	MS\BH09	MS\BH09	MS\BH09	MS\BH10	MS\BH10	MS\BH10	MS\BH10	MS\BH10	MS\BH11	MS\BH11	MS\BH11	MS\BH11	MS\BH12	MS\BH12	MS\BH13	MS\BH13
				Sample_Depth_Range	4.65-4.85	13	14	1	4	5	11.3	19.1	0.5	4	5	13.2	1	2.7-3	0.5	3
				Sampled_Date_Time	06/07/2021	07/07/2021	07/07/2021	07/06/2021	09/06/2021	14/06/2021	16/06/2021	18/06/2021	02/06/2021	02/06/2021	02/06/2021	03/06/2021	03/06/2021	03/06/2021	25/06/2021	28/06/2021
				Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	TFD-S	TFD-S	GT	MG	MG	TFD-S	TFD-C	GT	MG	MG	TFD-S	TFD-C	MG	TFD-S	MG	MG
Other	Organic Matter	%			0.2	-	-	0.7	0.6	2.1	2.3	1.1	0.5	0.2	1.2	2.7	1.2	0.2	1.4	-
	Moisture	%			20	-	-	2.4	3.5	21	26	13	6.1	13	18	24	5.9	17	4.6	-
	TOC	%			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos	Asbestos Quantification - Total - %	%			-	-	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-
	Asbestos Identification	None			-	-	-	0	0	-	-	-	1	0	-	-	0	-	-	-
Field	pH	pH_Units	**11.5**		8.8	-	-	**11.5**	11.4	10.3	8.4	10.2	11.4	8.6	**11.6**	8.1	10.9	10.7	**12.2**	-
MISC	1,2-Dinitrobenzene	mg/kg	**82#2**		-	-	<0.1	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	-
	1,4-dinitrobenzene	mg/kg	**82#2**		-	-	<0.1	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	-
	Decane	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Natural Moisture Content	%			-	-	21.9	-	-	-	-	-	-	-	-	-	-	-	-	25.9
	3/4-Methylphenol (m/p-cresol)	mg/kg			-	-	<0.1	<0.1	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	-	-

Env Stds Comments
#1:LQM/CIEH S4ULs 2015
#2:USEPA RSL (May 2020)
#3:EIC/AGS/CL:AIRE
#4:Defra C4SL 12/2014

C4SL 2021 - Vinyl chloride, tetrachloroethene, trichloroethene
GAC: Generic Assessment Criteria
(blank): No assessment criteria available
- : Not analysed
HH: Human Health

1,2-Dichloroethene - cis 1,2-dichloroethene used
2-methylphenol - cresol total used
4-methylphenol -cresol total used
pH - Hazardous Waste Value - corrosive

XXX	Exceedance of HH Soil. Commercial/Industrial. Sandy Loam. TOC>=0.58 to <1.45%
XXX	Exceedance of HH Soil. C4SL Commercial (England, Ireland, Northern Ireland, Wales. TOC>=0.58 to <3.48 &>0.58 to <1.45%

MG - Made Ground
TFD-S - Tidal Flat Deposits - Sand
TFD-C - Tidal F;at Deposits - Clay
GT - Glacial Till
RMU - Redcar Mudstone Formation

Chem_Group	ChemName	output unit	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	MS\BH13	MS\BH13	MS\BH13	MS\BH13	MS\BH14	MS\BH14	MS\BH14	MS\BH14	MS\BH14	MS\BH14	MS\BH15	MS\BH15	MS\BH15	MS\BH15	MS\BH15	MS\BH15
				Sample_Depth_Range	3.6	10.2-10.4	11	11-11.2	0.3	1	4.2-4.4	4.5-4.8	14.2	17.5-17.7	1	2	2.7-2.9	4.4-4.6	12.45-13	17.15
				Sampled_Date_Time	25/06/2021	28/06/2021	28/06/2021	28/06/2021	28/06/2021	28/06/2021	29/06/2021	29/06/2021	01/07/2021	02/07/2021	01/07/2021	05/07/2021	02/07/2021	02/07/2021	06/07/2021	06/07/2021
					MG	TFD-S	LD	LD	MG	MG	MG	TFD-S	TFD-C	RMU	MG	MG	MG	MG	TFD-S	GT
TPH	EPH >C10-C40	mg/kg			<10	<10	-	<10	<10	<10	<10	<10	<10	<10	<10	-	<10	<10	<10	-
	>C5-C6 Aliphatics	mg/kg	**3,200**[#1]		-	-	-	-	-	-	<0.01	-	<0.01	<0.01	<0.01	-	<0.01	-	-	-
	>C6-C8 Aliphatics	mg/kg	**7,800**[#1]		-	-	-	-	-	-	<0.01	-	<0.01	<0.01	<0.01	-	<0.01	-	-	-
	>C8-C10 Aliphatics	mg/kg	**2,000**[#1]		-	-	-	-	-	-	0.04	-	<0.01	<0.01	<0.01	-	<0.01	-	-	-
	>C10-C12 Aliphatics	mg/kg	**9,700**[#1]		-	-	-	-	-	-	<1.5	-	<1.5	<1.5	<1.5	-	<1.5	-	-	-
	>C12-C16 Aliphatics	mg/kg	**59,000**[#1]		-	-	-	-	-	-	<1.2	-	<1.2	<1.2	<1.2	-	<1.2	-	-	-
	>C16-C21 Aliphatics	mg/kg			-	-	-	-	-	-	<1.5	-	<1.5	<1.5	<1.5	-	<1.5	-	-	-
	>C16-C35 Aliphatics	mg/kg	**1,600,000**[#1]		-	-	-	-	-	-	<4.9	-	<4.9	<4.9	<4.9	-	<4.9	-	-	-
	>C21-C35 Aliphatics	mg/kg			-	-	-	-	-	-	<3.4	-	<3.4	<3.4	<3.4	-	<3.4	-	-	-
	>C5-C35 Aliphatics	mg/kg			-	-	-	-	-	-	<10	-	<10	<10	<10	-	<10	-	-	-
	>EC5-EC7 Aromatics	mg/kg	**26,000**[#1]		-	-	-	-	-	-	<0.01	-	<0.01	<0.01	<0.01	-	<0.01	-	-	-
	>EC7-EC8 Aromatics	mg/kg	**56,000**[#1]		-	-	-	-	-	-	<0.01	-	<0.01	<0.01	<0.01	-	<0.01	-	-	-
	>EC8-EC10 Aromatics	mg/kg	**3,500**[#1]		-	-	-	-	-	-	0.28	-	<0.01	<0.01	<0.01	-	<0.01	-	-	-
	>EC10-EC12 Aromatics	mg/kg	**16,000**[#1]		-	-	-	-	-	-	<0.9	-	<0.9	<0.9	<0.9	-	<0.9	-	-	-
	>EC12-EC16 Aromatics	mg/kg	**36,000**[#1]		-	-	-	-	-	-	<0.5	-	<0.5	<0.5	<0.5	-	<0.5	-	-	-
	>EC16-EC21 Aromatics	mg/kg	**28,000**[#1]		-	-	-	-	-	-	<0.6	-	<0.6	<0.6	<0.6	-	<0.6	-	-	-
	>EC21-EC35 Aromatics	mg/kg	**28,000**[#1]		-	-	-	-	-	-	<1.4	-	<1.4	<1.4	<1.4	-	<1.4	-	-	-
	>EC5-EC35 Aromatics	mg/kg			-	-	-	-	-	-	<10	-	<10	<10	<10	-	<10	-	-	-
	>C5-C35 Aliphatics & Aromatics	mg/kg			-	-	-	-	-	-	<10	-	<10	<10	<10	-	<10	-	-	-
VOC	Dichlorodifluoromethane	mg/kg	**370**[#2]		-	-	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	<0.05
	MTBE	mg/kg	**7,900**[#3]		-	-	<0.05	-	-	-	<0.01	-	<0.01	<0.01	<0.01	<0.05	<0.01	-	-	<0.05
	Chloromethane	mg/kg	**1**[#3]		-	-	<0.05	-	-	-	-	-	-	0.12	-	0.119	-	-	-	<0.05
	Vinyl chloride	mg/kg	**0.059**[#1]	*1.1*	-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	Bromomethane	mg/kg	**30**[#2]		-	-	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	<0.05
	Chloroethane	mg/kg	**960**[#3]		-	-	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	<0.05
	Trichlorofluoromethane	mg/kg	**350,000**[#2]		-	-	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	<0.05
	1,1-dichloroethene	mg/kg	**26**[#3]		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	Dichloromethane	mg/kg	**270**[#3]		-	-	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	<0.05
	trans-1,2-dichloroethene	mg/kg	**22**[#3]		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	1,1-dichloroethane	mg/kg	**280**[#3]		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	cis-1,2-dichloroethene	mg/kg	**14**[#3]		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	2,2-dichloropropane	mg/kg			-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	Bromochloromethane	mg/kg	**630**[#2]		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	Chloroform	mg/kg	**99**[#1]		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	1,1,1-trichloroethane	mg/kg	**660**[#1]		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	1,1-dichloropropene	mg/kg			-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	Carbon tetrachloride	mg/kg	**2.9**[#1]		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	1,2-dichloroethane	mg/kg	**0.67**[#1]		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	Benzene	mg/kg	**27**[#1]	*27*[#4]	-	-	<0.05	-	-	-	<0.01	-	<0.01	<0.01	<0.01	<0.05	<0.01	-	-	<0.05
	Trichloroethene	mg/kg	**1.2**[#1]	*0.73*	-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	1,2-dichloropropane	mg/kg	**3.3**[#3]		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	Dibromomethane	mg/kg	**99**[#2]		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	Bromodichloromethane	mg/kg	**1.3**[#2]		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	cis-1,3-dichloropropene	mg/kg			-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	Toluene	mg/kg	**56,000**[#1]		-	-	<0.05	-	-	-	<0.01	-	<0.01	<0.01	<0.01	<0.05	<0.01	-	-	<0.05
	trans-1,3-dichloropropene	mg/kg			-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	1,1,2-trichloroethane	mg/kg	**94**[#3]		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	Tetrachloroethene	mg/kg	**19**[#1]	*24*	-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	1,3-dichloropropane	mg/kg	**23,000**[#2]		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	Sum of PCE and TCE	mg/kg			-	-	<0.1	-	-	-	<0.02	-	-	<0.1	<0.02	<0.1	-	-	-	<0.1
	Chlorodibromomethane	mg/kg	**39**[#2]		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	1,2-dibromoethane	mg/kg	**0.16**[#2]		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	Chlorobenzene	mg/kg	**56**[#1]		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	1,1,1,2-tetrachloroethane	mg/kg	**110**[#1]		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	Ethylbenzene	mg/kg	**5,700**[#1]		-	-	<0.05	-	-	-	<0.01	-	<0.01	<0.01	<0.01	<0.05	<0.01	-	-	<0.05
	Xylene (m & p)	mg/kg			-	-	<0.1	-	-	-	<0.01	-	-	<0.1	<0.01	<0.1	-	-	-	<0.1
	Xylene Total	mg/kg	**5,900**[#1]		-	-	<0.15	-	-	-	<0.01	-	<0.01	<0.01	<0.01	<0.15	<0.01	-	-	<0.15
	Xylene (o)	mg/kg	**6,600**[#1]		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	Styrene	mg/kg	**3,300**[#3]		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	Bromoform	mg/kg	**760**[#3]		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	Isopropylbenzene	mg/kg	**1,400**[#3]		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	1,1,2,2-tetrachloroethane	mg/kg	**270**[#1]		-	-	<0.05	-	-	-	-	-	-	<0.05	-	<0.05	-	-	-	<0.05
	Bromobenzene	mg/kg	**97**[#3]		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	1,2,3-trichloropropane	mg/kg	**0.11**[#2]		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	n-propylbenzene	mg/kg	**4,100**[#3]		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05

				Location_Code	MS\BH13	MS\BH13	MS\BH13	MS\BH13	MS\BH14	MS\BH14	MS\BH14	MS\BH14	MS\BH14	MS\BH14	MS\BH15	MS\BH15	MS\BH15	MS\BH15	MS\BH15	MS\BH15
				Sample_Depth_Range	3.6	10.2-10.4	11	11-11.2	0.3	1	4.2-4.4	4.5-4.8	14.2	17.5-17.7	1	2	2.7-2.9	4.4-4.6	12.45-13	17.15
				Sampled_Date_Time	25/06/2021	28/06/2021	28/06/2021	28/06/2021	28/06/2021	28/06/2021	29/06/2021	29/06/2021	01/07/2021	02/07/2021	01/07/2021	05/07/2021	02/07/2021	02/07/2021	06/07/2021	06/07/2021
Chem_Group	**ChemName**	**output unit**	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	MG	TFD-S	LD	LD	MG	MG	MG	TFD-S	TFD-C	RMU	MG	MG	MG	MG	TFD-S	GT
	2-chlorotoluene	mg/kg	**23.000[#2]**		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	1,3,5-trimethylbenzene	mg/kg	**1.500[#2]**		-	-	<0.05	-	-	-	0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	4-chlorotoluene	mg/kg	**23.000[#2]**		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	tert-butylbenzene	mg/kg	**120.000[#2]**		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	1,2,4-trimethylbenzene	mg/kg	**42[#3]**		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	sec-butylbenzene	mg/kg	**120.000[#2]**		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	p-isopropyltoluene	mg/kg			-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	1,3-dichlorobenzene	mg/kg	**30[#1]**		-	-	<0.01	-	-	-	<0.01	-	-	<0.01	<0.01	<0.01	-	-	-	<0.01
	1,4-dichlorobenzene	mg/kg	**4.400[#1]**		-	-	<0.01	-	-	-	<0.01	-	-	<0.01	<0.01	<0.01	-	-	-	<0.01
	n-butylbenzene	mg/kg	**58.000[#2]**		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	1,2-dichlorobenzene	mg/kg	**2.000[#1]**		-	-	<0.01	-	-	-	<0.01	-	-	<0.01	<0.01	<0.01	-	-	-	<0.01
	1,2-dibromo-3-chloropropane	mg/kg	**0.064[#2]**		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	1,2,4-trichlorobenzene	mg/kg	**220[#1]**		-	-	<0.01	-	-	-	<0.01	-	-	<0.01	<0.01	<0.01	-	-	-	<0.01
	Hexachlorobutadiene	mg/kg	**31[#1]**		-	-	<0.01	-	-	-	<0.01	-	-	<0.01	<0.01	<0.01	-	-	-	<0.01
	1,2,3-trichlorobenzene	mg/kg	**102[#1]**		-	-	<0.05	-	-	-	<0.01	-	-	<0.05	<0.01	<0.05	-	-	-	<0.05
	1,2-Dichloroethene	mg/kg	**14[#3]**		-	-	<0.1	-	-	-	<0.02	-	-	<0.1	<0.02	<0.1	-	-	-	<0.1
	Trihalomethanes	mg/kg			-	-	<0.2	-	-	-	<0.04	-	-	<0.2	<0.04	<0.2	-	-	-	<0.2
	Hexachlorobenzene	mg/kg	**110[#1]**		-	-	<0.01	-	-	-	<0.1	-	-	<0.01	<0.1	<0.01	-	-	-	<0.01
	Trichlorobenzene (total)	mg/kg			-	-	<0.06	-	-	-	<0.02	-	-	<0.06	<0.02	<0.06	-	-	-	<0.06
PAH	Naphthalene	mg/kg	**190[#1]**		<0.03	<0.03	<0.01	<0.03	<0.03	<0.03	0.05	<0.03	<0.03	<0.01	0.36	<0.01	<0.03	<0.03	<0.03	<0.01
	Acenaphthylene	mg/kg	**83.000[#1]**		<0.03	<0.03	<0.01	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	<0.01	<0.03	<0.03	<0.03	<0.01
	Acenaphthene	mg/kg	**84.000[#1]**		<0.03	<0.03	<0.01	<0.03	<0.03	<0.03	0.05	<0.03	<0.03	<0.01	0.11	<0.01	<0.03	<0.03	<0.03	<0.01
	Fluorene	mg/kg	**63.000[#1]**		<0.03	<0.03	<0.01	<0.03	<0.03	<0.03	0.05	<0.03	<0.03	<0.01	0.05	<0.01	<0.03	0.03	<0.03	<0.01
	Phenanthrene	mg/kg	**22.000[#1]**		<0.03	<0.03	<0.01	<0.03	<0.03	<0.03	0.44	<0.03	<0.03	<0.01	1.5	<0.01	0.04	0.1	<0.03	<0.01
	Anthracene	mg/kg	**520.000[#1]**		<0.03	<0.03	<0.01	<0.03	<0.03	<0.03	0.08	<0.03	<0.03	<0.01	0.12	<0.01	<0.03	<0.03	<0.03	<0.01
	Fluoranthene	mg/kg	**23.000[#1]**		<0.03	<0.03	<0.01	<0.03	<0.03	<0.03	0.73	<0.03	<0.03	<0.01	1.3	<0.01	0.04	0.03	<0.03	<0.01
	Pyrene	mg/kg	**54.000[#1]**		<0.03	<0.03	<0.01	<0.03	<0.03	<0.03	0.55	<0.03	<0.03	<0.01	0.92	<0.01	0.06	<0.03	<0.03	<0.01
	Benz(a)anthracene	mg/kg	**170[#1]**		<0.03	<0.03	<0.01	<0.03	<0.03	<0.03	0.21	<0.03	<0.03	<0.01	0.59	<0.01	<0.03	<0.03	<0.03	<0.01
	Chrysene	mg/kg	**350[#1]**		<0.03	<0.03	<0.01	<0.03	<0.03	<0.03	0.29	<0.03	0.03	<0.01 - 0.03	0.65	<0.01	0.05	<0.03	<0.03	<0.01
	Benzo(a) pyrene	mg/kg	**35[#1]**	*77[#4]*	<0.03	<0.03	<0.01	<0.03	<0.03	<0.03	0.11	<0.03	<0.03	<0.01	0.32	<0.01	<0.03	<0.03	<0.03	<0.01
	Indeno(1,2,3-c,d)pyrene	mg/kg	**500[#1]**		<0.03	<0.03	<0.01	<0.03	<0.03	<0.03	0.09	<0.03	<0.03	<0.01	0.19	<0.01	<0.03	<0.03	<0.03	<0.01
	Dibenz(a,h)anthracene	mg/kg	**3.5[#1]**		<0.03	<0.03	<0.01	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	<0.01	<0.03	<0.03	<0.03	<0.01
	Benzo(g,h,i)perylene	mg/kg	**3.900[#1]**		<0.03	<0.03	<0.01	<0.03	<0.03	<0.03	0.11	<0.03	<0.03	<0.01	0.18	<0.01	<0.03	<0.03	<0.03	<0.01
	Benzo(b)fluoranthene	mg/kg	**44[#1]**		<0.03	<0.03	<0.01	<0.03	<0.03	<0.03	0.22	<0.03	<0.03	<0.01	0.55	<0.01	<0.03	<0.03	<0.03	<0.01
	Benzo(k)fluoranthene	mg/kg	**1.200[#1]**		<0.03	<0.03	<0.01	<0.03	<0.03	<0.03	0.11	<0.03	<0.03	<0.01	0.2	<0.01	0.04	<0.03	<0.03	<0.01
	Benzo(b)&(k)fluoranthene	mg/kg			<0.06	<0.06	<0.01	<0.06	<0.06	<0.06	0.33	<0.06	<0.06	<0.01	0.75	<0.01	0.07	<0.06	<0.06	<0.01
	PAHs (sum of 4)	mg/kg			<0.12	<0.12	<0.04	<0.12	<0.12	<0.12	0.53	<0.12	<0.12	<0.04	1.12	<0.04	0.13	<0.12	<0.12	<0.04
	PAH 16 Total	mg/kg			<0.1	<0.1	-	<0.1	<0.1	<0.1	3.1	<0.1	<0.1	<0.1	7	-	0.22	0.16	<0.1	-
	benzo(g,h,i)perylene + indeno(1,2,3-cd)pyrene	mg/kg			<0.06	<0.06	<0.02	<0.06	<0.06	<0.06	0.2	<0.06	<0.06	<0.02	0.37	<0.02	<0.06	<0.06	<0.06	<0.02
	Benzo(a)pyrene (surrogate marker for PAH mixtu	mg/kg	**15[#1]**		<0.03	<0.03	<0.01	<0.03	<0.03	<0.03	0.11	<0.03	<0.03	<0.01	0.32	<0.01	<0.03	<0.03	<0.03	<0.01
SVOC	2,3,4,6-tetrachlorophenol	mg/kg	**25.000[#2]**		-	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-	-
	2,3,5,6-Tetrachlorophenol	mg/kg			-	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-	-
	2,6-dichlorophenol	mg/kg			-	-	-	-	-	-	<0.01	-	-	<0.01	<0.01	-	-	-	-	-
	Aniline	mg/kg	**400[#2]**		-	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-	-
	2-chlorophenol	mg/kg	**5.800[#2]**		-	-	<0.01	-	-	-	<0.1	-	-	<0.01	<0.1	<0.01	-	-	-	<0.01
	2-methylphenol	mg/kg	**160000[#3]**		-	-	<0.01	-	-	-	<0.1	-	-	<0.01	<0.1	<0.01	-	-	-	<0.01
	2-nitrophenol	mg/kg			-	-	<0.01	-	-	-	-	-	-	<0.01	-	<0.01	-	-	-	<0.01
	2,4-dichlorophenol	mg/kg	**2.500[#2]**		-	-	<0.01	-	-	-	<0.01	-	-	<0.01	<0.01	<0.01	-	-	-	<0.01
	2,4-dimethylphenol	mg/kg	**16.000[#3]**		-	-	<0.01	-	-	-	<0.01	-	-	<0.01	<0.01	<0.01	-	-	-	<0.01
	2,4,5-trichlorophenol	mg/kg	**82.000[#2]**		-	-	<0.01	-	-	-	<0.1	-	-	<0.01	<0.1	<0.01	-	-	-	<0.01
	2,4,6-trichlorophenol	mg/kg	**210[#2]**		-	-	<0.01	-	-	-	<0.01	-	-	<0.01	<0.01	<0.01	-	-	-	<0.01
	4-chloro-3-methylphenol	mg/kg	**82.000[#2]**		-	-	<0.01	-	-	-	<0.01	-	-	<0.01	<0.01	<0.01	-	-	-	<0.01
	4-methylphenol	mg/kg	**160000[#3]**		-	-	<0.01	-	-	-	<0.01	-	-	<0.01	<0.01	<0.01	-	-	-	<0.01
	4-nitrophenol	mg/kg			-	-	<0.01	-	-	-	<0.1	-	-	<0.01	<0.1	<0.01	-	-	-	<0.01
	Pentachlorophenol	mg/kg	**400[#1]**		-	-	<0.01	-	-	-	<0.1	-	-	<0.01	<0.1	<0.01	-	-	-	<0.01
	Phenol	mg/kg	**440[#1]**		-	-	<0.01	-	-	-	<0.01	-	-	<0.01	<0.01	<0.01	-	-	-	<0.01
	2-chloronaphthalene	mg/kg	**390[#3]**		-	-	<0.01	-	-	-	<0.1	-	-	<0.01	<0.1	<0.01	-	-	-	<0.01
	2-methylnaphthalene	mg/kg	**3.000[#2]**		-	-	<0.01	-	-	-	<0.1	-	-	<0.01	0.2	<0.01	-	-	-	<0.01
	Bis(2-ethylhexyl) phthalate	mg/kg	**85.000[#3]**		-	-	<0.1	-	-	-	<0.1	-	-	<0.1	<0.1	<0.1	-	-	-	<0.1
	Butyl benzyl phthalate	mg/kg	**940.000[#3]**		-	-	<0.1	-	-	-	<0.1	-	-	<0.1	<0.1	<0.1	-	-	-	<0.1
	Di-n-butyl phthalate	mg/kg	**15.000[#3]**		-	-	<0.1	-	-	-	<0.1	-	-	<0.1	<0.1	<0.1	-	-	-	<0.1
	Di-n-octyl phthalate	mg/kg	**89.000[#3]**		-	-	<0.1	-	-	-	<0.1	-	-	<0.1	<0.1	<0.1	-	-	-	<0.1
	Diethylphthalate	mg/kg	**150.000[#3]**		-	-	<0.1	-	-	-	<0.1	-	-	<0.1	<0.1	<0.1	-	-	-	<0.1
	Dimethyl phthalate	mg/kg			-	-	<0.1	-	-	-	<0.1	-	-	<0.1	<0.1	<0.1	-	-	-	<0.1
	2-nitroaniline	mg/kg	**8.000[#2]**		-	-	<0.01	-	-	-	<0.1	-	-	<0.01	<0.1	<0.01	-	-	-	<0.01

Chem_Group	ChemName	output unit	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	MS\BH13	MS\BH13	MS\BH13	MS\BH13	MS\BH14	MS\BH14	MS\BH14	MS\BH14	MS\BH14	MS\BH14	MS\BH15	MS\BH15	MS\BH15	MS\BH15	MS\BH15	MS\BH15
				Sample_Depth_Range	3.6	10.2-10.4	11	11-11.2	0.3	1	4.2-4.4	4.5-4.8	14.2	17.5-17.7	1	2	2.7-2.9	4.4-4.6	12.45-13	17.15
				Sampled_Date_Time	25/06/2021	28/06/2021	28/06/2021	28/06/2021	28/06/2021	28/06/2021	29/06/2021	29/06/2021	01/07/2021	02/07/2021	01/07/2021	05/07/2021	02/07/2021	02/07/2021	06/07/2021	06/07/2021
					MG	TFD-S	LD	LD	MG	MG	MG	TFD-S	TFD-C	RMU	MG	MG	MG	MG	TFD-S	GT
	3-nitroaniline	mg/kg			-	-	<0.01	-	-	-	<0.1	-	-	<0.01	<0.1	<0.01	-	-	-	<0.01
	4-bromophenyl phenyl ether	mg/kg			-	-	<0.01	-	-	-	<0.1	-	-	<0.01	<0.1	<0.01	-	-	-	<0.01
	4-chloroaniline	mg/kg	11#2		-	-	<0.01	-	-	-	-	-	-	<0.01	-	<0.01	-	-	-	<0.01
	4-chlorophenyl phenyl ether	mg/kg			-	-	<0.01	-	-	-	<0.1	-	-	<0.01	<0.1	<0.01	-	-	-	<0.01
	4-nitroaniline	mg/kg	110#2		-	-	<0.01	-	-	-	<0.1	-	-	<0.01	<0.1	<0.01	-	-	-	<0.01
	Azobenzene	mg/kg	26#2		-	-	<0.01	-	-	-	<0.1	-	-	<0.01	<0.1	<0.01	-	-	-	<0.01
	Bis(2-chloroethoxy) methane	mg/kg	2.500#2		-	-	<0.01	-	-	-	<0.1	-	-	<0.01	<0.1	<0.01	-	-	-	<0.01
	Bis(2-chloroethyl)ether	mg/kg	1#2		-	-	<0.01	-	-	-	-	-	-	<0.01	-	<0.01	-	-	-	<0.01
	Carbazole	mg/kg			-	-	<0.01	-	-	-	<0.1	-	-	<0.01	0.2	<0.01	-	-	-	<0.01
	Dibenzofuran	mg/kg	1.200#2		-	-	<0.01	-	-	-	<0.1	-	-	<0.01	0.3	<0.01	-	-	-	<0.01
	Hexachlorocyclopentadiene	mg/kg	7.5#2		-	-	<0.01	-	-	-	<0.1	-	-	<0.01	<0.1	<0.01	-	-	-	<0.01
	Hexachloroethane	mg/kg	22#3		-	-	<0.01	-	-	-	-	-	-	<0.01	-	<0.01	-	-	-	<0.01
	Isophorone	mg/kg	2.400#2		-	-	<0.01	-	-	-	-	-	-	<0.01	-	<0.01	-	-	-	<0.01
	N-nitrosodi-n-propylamine	mg/kg	0.33#2		-	-	<0.01	-	-	-	-	-	-	<0.01	-	<0.01	-	-	-	<0.01
	Benzyl alcohol	mg/kg	82.000#2		-	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-	-
	Bis(2-chloroisopropyl)ether	mg/kg			-	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-	-
	2,6-Dimethylphenol	mg/kg	490#2		-	-	-	-	-	-	<0.01	-	-	<0.01	<0.01	-	-	-	-	-
	4,6-Dinitro-2-methylphenol	mg/kg	66#2		-	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-	-
	Total Monohydric Phenols (S) Corrected	mg/kg			<0.3	<0.3	-	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	-	<0.3	<0.3	<0.3	-
	Diphenylamine	mg/kg	82.000#2		-	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-	-
PCBs	PCB congener 28 + 31	mg/kg			-	-	-	-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-
	Tetrachlorobiphenyl, 3,3,4,4- (PCB 77)	mg/kg	0.16#2		-	-	-	-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-
	Tetrachlorobiphenyl, 3,4,4,5- (PCB 81)	mg/kg	0.048#2		-	-	-	-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-
	Pentachlorobiphenyl, 2,3,3,4,4- (PCB 105)	mg/kg	0.49#2		-	-	-	-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-
	Pentachlorobiphenyl, 2,3,4,4,5- (PCB 114)	mg/kg	0.5#2		-	-	-	-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-
	PCB 118	mg/kg	0.49#2		-	-	-	-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-
	Pentachlorobiphenyl, 2,3,4,4,5- (PCB 123)	mg/kg	0.49#2		-	-	-	-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-
	Pentachlorobiphenyl, 3,3,4,4,5- (PCB 126)	mg/kg	0.00015#2		-	-	-	-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 156)	mg/kg	0.5#2		-	-	-	-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 157)	mg/kg	0.5#2		-	-	-	-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-
	Hexachlorobiphenyl, 2,3,4,4,5,5- (PCB 167)	mg/kg	0.51#2		-	-	-	-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-
	Hexachlorobiphenyl, 3,3,4,4,5,5- (PCB 169)	mg/kg	0.00051#2		-	-	-	-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-
	Heptachlorobiphenyl, 2,3,3,4,4,5,5- (PCB 189)	mg/kg	0.52#2		-	-	-	-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-
	PCB 52	mg/kg			-	-	-	-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-
	PCB 101	mg/kg			-	-	-	-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-
	PCB 138	mg/kg			-	-	-	-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-
	PCB 153	mg/kg			-	-	-	-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-
	PCB 180	mg/kg			-	-	-	-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-
	Total PCB 7 Congeners	mg/kg			-	-	-	-	-	-	<0.01	<0.01	-	<0.01	<0.01	-	-	-	-	-
Explosives	1,3-Dinitrobenzene	mg/kg	82#2		-	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-	-
	2,4-Dinitrotoluene	mg/kg	3.700#3		-	-	<0.01	-	-	-	<0.1	-	-	<0.01	<0.1	<0.01	-	-	-	<0.01
	2,6-dinitrotoluene	mg/kg	1.900#3		-	-	<0.01	-	-	-	<0.1	-	-	<0.01	<0.1	<0.01	-	-	-	<0.01
	Nitrobenzene	mg/kg	22#2		-	-	<0.01	-	-	-	-	-	-	<0.01	-	<0.01	-	-	-	<0.01
Metals	Arsenic	mg/kg	640#1	640 #4	5.8	5.5	-	7.6	5.7	10	36	9.7	7	9.2	15	-	9.3	7.3	12	-
	Beryllium	mg/kg	12#1		<0.2	0.2	-	1.4	2.8	6.8	0.8	<0.2	0.9	0.9	7.1	-	0.4	5.5	0.2	-
	Cadmium	mg/kg	190#1	410 #4	<0.1	<0.1	-	<0.1	0.2	0.3	4.1	<0.1	0.1	<0.1	0.5	-	0.6	<0.1	<0.1	-
	Copper	mg/kg	68.000#1		4.2	5.8	-	27	16	10	210	6.9	20	32	7.3	-	57	8.2	5.5	-
	Iron	mg/kg	820.000#2		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lead	mg/kg	2.300#4	2.300 #4	30	4.3	-	16	6.6	22	570	46	16	8.4	7.8	-	37	9.1	6.2	-
	Mercury	mg/kg	1100#1		<0.05	<0.05	-	<0.05	<0.05	<0.05	8.4	0.09	<0.05	<0.05	<0.05	-	<0.05	0.06	<0.05	-
	Nickel	mg/kg	980#1		3.1	4.9	-	49	5	6	78	5.9	39	46	18	-	25	5.6	6.1	-
	Selenium	mg/kg	12.000#1		<0.5	<0.5	-	<0.5	4.7	1.9	1.5	<0.5	<0.5	<0.5	2.1	-	6.9	1.6	<0.5	-
	Vanadium	mg/kg	9.000#1		14	30	-	49	1000	57	410	22	31	35	130	-	2200	41	19	-
	Zinc	mg/kg	730.000#1		21	17	-	49	15	200	580	42	53	47	150	-	120	26	22	-
	Boron (Water Soluble)	mg/kg			0.3	1.2	-	9.6	2.2	2.9	2.4	0.4	2.6	2.9	9	-	1	5.8	0.7	-
	Chromium (hexavalent)	mg/kg	33#1	49 #4	<1	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	<1	-
	Chromium (Trivalent)	mg/kg	8.600#1		5.1	13	-	41	410	17	290	7.1	29	29	38	-	800	12	6.8	-
Inorganics	Cyanide (Free)	mg/kg			<0.1	<0.1	-	<0.1	<0.1	0.1	0.2	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	-
	Cyanide Total	mg/kg	150#2		<0.1	<0.1	-	<0.1	<0.1	0.2	0.2	<0.1	<0.1	<0.1	<0.1	-	0.4	<0.1	<0.1	-
	Thiocyanate	mg/kg	230#2		<0.6	<0.6	-	<0.6	<0.6	0.7	1.5	<0.6	<0.6	<0.6	<0.6	-	<0.6	<0.6	<0.6	-
	Nitrate (as NO3-)	mg/kg	1.900.000#2		2.5	3.1	-	7	14	6.5	8.6	6.7	9.4	2.5	1.9	-	16	5.6	1.3	-
	Sulphide	mg/kg			60	72	-	44	3800	960	240	52	24	40	560	-	150	560	120	-
	Sulphur as S	mg/kg			400	600	-	800	4200	6800	2600	700	400	7700	9000	-	4700	3800	1200	-
	Soluble Sulphate 2:1 extract as SO4 BRE	g/l			0.064	0.14	-	0.55	0.28	0.43	0.42	0.046	0.36	0.31	2.9	-	0.31	0.58	0.28	-
	Elemental Sulphur	mg/kg			19	11	-	<0.75	25	38	13	2.1	<0.75	<0.75	690	-	<0.75	32	1.7	-

				Location_Code	MS\BH13	MS\BH13	MS\BH13	MS\BH13	MS\BH14	MS\BH14	MS\BH14	MS\BH14	MS\BH14	MS\BH14	MS\BH15	MS\BH15	MS\BH15	MS\BH15	MS\BH15	MS\BH15
				Sample_Depth_Range	3.6	10.2-10.4	11	11-11.2	0.3	1	4.2-4.4	4.5-4.8	14.2	17.5-17.7	1	2	2.7-2.9	4.4-4.6	12.45-13	17.15
				Sampled_Date_Time	25/06/2021	28/06/2021	28/06/2021	28/06/2021	28/06/2021	28/06/2021	29/06/2021	29/06/2021	01/07/2021	02/07/2021	01/07/2021	05/07/2021	02/07/2021	02/07/2021	06/07/2021	06/07/2021
Chem_Group	**ChemName**	**output unit**	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	MG	TFD-S	LD	LD	MG	MG	MG	TFD-S	TFD-C	RMU	MG	MG	MG	MG	TFD-S	GT
Other	Organic Matter	%			0.8	0.8	-	2	0.8	1	2.4	0.6	1.9	1	1.9	-	1.1	1	0.8	-
	Moisture	%			18	18	-	20	6	11	24	18	16	10	3.9	-	18	9	16	-
	TOC	%			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos	Asbestos Quantification - Total - %	%			-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-
	Asbestos Identification	None			-	-	-	-	-	-	1	-	-	-	0	-	-	-	-	-
Field	pH	pH_Units	**11.5**		10.4	10.9	-	8.1	**11.7**	11	10.6	8.5	8.4	8.9	10.6	-	**11.6**	10.9	8.1	-
MISC	1,2-Dinitrobenzene	mg/kg	**82**#2		-	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-	-
	1,4-dinitrobenzene	mg/kg	**82**#2		-	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-	-
	Decane	mg/kg			-	-	-	-	-	-	0.6845	-	-	-	-	-	-	-	-	-
	Natural Moisture Content	%			-	-	25.9	-	-	-	-	-	-	13.1	-	27.8	-	-	-	19.1
	3/4-Methylphenol (m/p-cresol)	mg/kg			-	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-	-

Env Stds Comments
#1:LQM/CIEH S4ULs 2015
#2:USEPA RSL (May 2020)
#3:EIC/AGS/CL:AIRE
#4:Defra C4SL 12/2014

C4SL 2021 - Vinyl chloride, tetrachloroethene, trichloroethene
GAC: Generic Assessment Criteria
(blank): No assessment criteria available
 - : Not analysed
HH: Human Health

1,2-Dichloroethene - cis 1,2-dichloroethene used
2-methylphenol - cresol total used
4-methylphenol -cresol total used
pH - Hazardous Waste Value - corrosive

XXX	Exceedance of HH Soil. Commercial/Industrial. Sandy Loam. TOC>=0.58 to <1.45%
XXX	Exceedance of HH Soil. C4SL Commercial (England, Ireland, Northern Ireland, Wales. TOC>=0.58 to <3.48 &>0.58 to <1.45%

MG - Made Ground
TFD-S - Tidal Flat Deposits - Sand
TFD-C - Tidal F;at Deposits - Clay
GT - Glacial Till
RMU - Redcar Mudstone Formation

				Location_Code	MS\BH16	MS\BH16	MS\BH16	MS\BH16	MS\BH16	MS\BH16	MS\BH16	MS\BH17	MS\BH17	MS\BH17	MS\BH17	MS\BH17	MS\BH17	MS\BH17	MS\BH17	MS\TP01
				Sample_Depth_Range	0.5	3.3-3.5	4.2-4.4	5	5-5.2	5.7-5.9	13.4	1-1.2	3	3.9	5	6	7.2	14.2	18.7-18.9	0.5
				Sampled_Date_Time	01/07/2021	02/07/2021	02/07/2021	05/07/2021	02/07/2021	02/07/2021	07/07/2021	07/07/2021	07/07/2021	07/07/2021	07/07/2021	07/07/2021	07/07/2021	07/07/2021	08/07/2021	16/06/2021
Chem_Group	**ChemName**	**output unit**	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	MG	MG	MG	MG	MG	TFD-S	LD	MG	MG	MG	MG	MG	TFD-S	TFD-C	RMU	MG
TPH	EPH >C10-C40	mg/kg			110	470	<10	-	<10	<10	-	-	-	-	-	-	-	-	-	<10
	>C5-C6 Aliphatics	mg/kg	**3.200**#1		<0.01	<0.01	<0.01	-	<0.01	-	-	-	-	-	-	-	-	-	-	-
	>C6-C8 Aliphatics	mg/kg	**7.800**#1		<0.01	<0.01	<0.01	-	<0.01	-	-	-	-	-	-	-	-	-	-	-
	>C8-C10 Aliphatics	mg/kg	**2.000**#1		<0.01	<0.01	<0.01	-	<0.01	-	-	-	-	-	-	-	-	-	-	-
	>C10-C12 Aliphatics	mg/kg	**9.700**#1		<1.5	<1.5	<1.5	-	<1.5	-	-	-	-	-	-	-	-	-	-	-
	>C12-C16 Aliphatics	mg/kg	**59.000**#1		<1.2	<1.2	<1.2	-	<1.2	-	-	-	-	-	-	-	-	-	-	-
	>C16-C21 Aliphatics	mg/kg			1.8	<1.5	<1.5	-	<1.5	-	-	-	-	-	-	-	-	-	-	-
	>C16-C35 Aliphatics	mg/kg	**1.600.000**#1		43.8	<4.9	<4.9	-	<4.9	-	-	-	-	-	-	-	-	-	-	-
	>C21-C35 Aliphatics	mg/kg			42	<3.4	<3.4	-	<3.4	-	-	-	-	-	-	-	-	-	-	-
	>C5-C35 Aliphatics	mg/kg			45	<10	<10	-	<10	-	-	-	-	-	-	-	-	-	-	-
	>EC5-EC7 Aromatics	mg/kg	**26.000**#1		<0.01	<0.01	<0.01	-	<0.01	-	-	-	-	-	-	-	-	-	-	-
	>EC7-EC8 Aromatics	mg/kg	**56.000**#1		<0.01	<0.01	<0.01	-	<0.01	-	-	-	-	-	-	-	-	-	-	-
	>EC8-EC10 Aromatics	mg/kg	**3.500**#1		<0.01	<0.01	<0.01	-	<0.01	-	-	-	-	-	-	-	-	-	-	-
	>EC10-EC12 Aromatics	mg/kg	**16.000**#1		2.4	<0.9	<0.9	-	<0.9	-	-	-	-	-	-	-	-	-	-	-
	>EC12-EC16 Aromatics	mg/kg	**36.000**#1		0.8	<0.5	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-
	>EC16-EC21 Aromatics	mg/kg	**28.000**#1		2.1	<0.6	<0.6	-	<0.6	-	-	-	-	-	-	-	-	-	-	-
	>EC21-EC35 Aromatics	mg/kg	**28.000**#1		33	<1.4	<1.4	-	<1.4	-	-	-	-	-	-	-	-	-	-	-
	>EC5-EC35 Aromatics	mg/kg			39	<10	<10	-	<10	-	-	-	-	-	-	-	-	-	-	-
	>C5-C35 Aliphatics & Aromatics	mg/kg			83	<10	<10	-	<10	-	-	-	-	-	-	-	-	-	-	-
VOC	Dichlorodifluoromethane	mg/kg	**370**#2		-	-	-	<0.05	-	-	-	-	-	-	-	-	-	<0.05	-	-
	MTBE	mg/kg	**7.900**#3		<0.01	<0.01	<0.01	<0.05	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	Chloromethane	mg/kg	**1**#3		-	-	-	0.856	-	-	-	-	-	-	-	-	-	0.269	-	-
	Vinyl chloride	mg/kg	**0.059**#1	*1.1*	-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	Bromomethane	mg/kg	**30**#2		-	-	-	<0.05	-	-	-	-	-	-	-	-	-	<0.05	-	-
	Chloroethane	mg/kg	**960**#3		-	-	-	<0.05	-	-	-	-	-	-	-	-	-	<0.05	-	-
	Trichlorofluoromethane	mg/kg	**350.000**#2		-	-	-	<0.05	-	-	-	-	-	-	-	-	-	<0.05	-	-
	1,1-dichloroethene	mg/kg	**26**#3		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	Dichloromethane	mg/kg	**270**#3		-	-	-	<0.05	-	-	-	-	-	-	-	-	-	<0.05	-	-
	trans-1,2-dichloroethene	mg/kg	**22**#3		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	1,1-dichloroethane	mg/kg	**280**#3		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	cis-1,2-dichloroethene	mg/kg	**14**#3		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	2,2-dichloropropane	mg/kg			-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	Bromochloromethane	mg/kg	**630**#2		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	Chloroform	mg/kg	**99**#1		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	1,1,1-trichloroethane	mg/kg	**660**#1		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	1,1-dichloropropene	mg/kg			-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	Carbon tetrachloride	mg/kg	**2.9**#1		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	1,2-dichloroethane	mg/kg	**0.67**#1		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	Benzene	mg/kg	**27**#1	*27* #4	<0.01	<0.01	<0.01	<0.05	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	Trichloroethene	mg/kg	**1.2**#1	*0.73*	-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	1,2-dichloropropane	mg/kg	**3.3**#3		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	Dibromomethane	mg/kg	**99**#2		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	Bromodichloromethane	mg/kg	**1.3**#2		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	cis-1,3-dichloropropene	mg/kg			-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	Toluene	mg/kg	**56.000**#1		<0.01	<0.01	<0.01	<0.05	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	trans-1,3-dichloropropene	mg/kg			-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	1,1,2-trichloroethane	mg/kg	**94**#3		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	Tetrachloroethene	mg/kg	**19**#1	*24*	-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	1,3-dichloropropane	mg/kg	**23.000**#2		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	Sum of PCE and TCE	mg/kg			-	<0.02	-	<0.1	-	-	<0.02	<0.02	<0.02	<0.02	<0.02	-	-	<0.1	<0.02	-
	Chlorodibromomethane	mg/kg	**39**#2		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	1,2-dibromoethane	mg/kg	**0.16**#2		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	Chlorobenzene	mg/kg	**56**#1		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	1,1,1,2-tetrachloroethane	mg/kg	**110**#1		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	Ethylbenzene	mg/kg	**5.700**#1		<0.01	<0.01	<0.01	<0.05	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	Xylene (m & p)	mg/kg			-	<0.01	-	<0.1	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.1	<0.01	-
	Xylene Total	mg/kg	**5.900**#1		<0.01	<0.01	<0.01	<0.15	<0.01	-	<0.02	<0.02	<0.02	<0.02	<0.02	-	-	<0.15	<0.02	-
	Xylene (o)	mg/kg	**6.600**#1		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	Styrene	mg/kg	**3.300**#3		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	Bromoform	mg/kg	**760**#3		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	Isopropylbenzene	mg/kg	**1.400**#3		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	1,1,2,2-tetrachloroethane	mg/kg	**270**#1		-	-	-	<0.05	-	-	-	-	-	-	-	-	-	<0.05	-	-
	Bromobenzene	mg/kg	**97**#3		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	1,2,3-trichloropropane	mg/kg	**0.11**#2		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	n-propylbenzene	mg/kg	**4.100**#3		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-

				Location_Code	MS\BH16	MS\BH16	MS\BH16	MS\BH16	MS\BH16	MS\BH16	MS\BH16	MS\BH17	MS\BH17	MS\BH17	MS\BH17	MS\BH17	MS\BH17	MS\BH17	MS\BH17	MS\TP01
				Sample_Depth_Range	0.5	3.3-3.5	4.2-4.4	5	5-5.2	5.7-5.9	13.4	1-1.2	3	3.9	5	6	7.2	14.2	18.7-18.9	0.5
				Sampled_Date_Time	01/07/2021	02/07/2021	02/07/2021	05/07/2021	02/07/2021	02/07/2021	07/07/2021	07/07/2021	07/07/2021	07/07/2021	07/07/2021	07/07/2021	07/07/2021	07/07/2021	08/07/2021	16/06/2021
Chem_Group	ChemName	output unit	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	MG	MG	MG	MG	MG	TFD-S	LD	MG	MG	MG	MG	MG	TFD-S	TFD-C	RMU	MG
	2-chlorotoluene	mg/kg	23.000[#2]		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	1,3,5-trimethylbenzene	mg/kg	1.500[#2]		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	4-chlorotoluene	mg/kg	23.000[#2]		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	tert-butylbenzene	mg/kg	120.000[#2]		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	1,2,4-trimethylbenzene	mg/kg	42[#3]		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	sec-butylbenzene	mg/kg	120.000[#2]		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	p-isopropyltoluene	mg/kg			-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	1,3-dichlorobenzene	mg/kg	30[#1]		-	<0.01	-	<0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.01	<0.01	-
	1,4-dichlorobenzene	mg/kg	4.400[#1]		-	<0.01	-	<0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.01	<0.01	-
	n-butylbenzene	mg/kg	58.000[#2]		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	1,2-dichlorobenzene	mg/kg	2.000[#1]		-	<0.01	-	<0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.01	<0.01	-
	1,2-dibromo-3-chloropropane	mg/kg	0.064[#2]		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	1,2,4-trichlorobenzene	mg/kg	220[#1]		-	<0.01	-	<0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.01	<0.01	-
	Hexachlorobutadiene	mg/kg	31[#1]		-	<0.01	-	<0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.01	<0.01	-
	1,2,3-trichlorobenzene	mg/kg	102[#1]		-	<0.01	-	<0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.05	<0.01	-
	1,2-Dichloroethene	mg/kg	14[#3]		-	<0.02	-	<0.1	-	-	<0.02	<0.02	<0.02	<0.02	<0.02	-	-	<0.1	<0.02	-
	Trihalomethanes	mg/kg			-	<0.04	-	<0.2	-	-	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	<0.2	<0.04	-
	Hexachlorobenzene	mg/kg	110[#1]		-	<0.1	-	<0.01	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.01	<0.1	-
	Trichlorobenzene (total)	mg/kg			-	<0.02	-	<0.06	-	-	<0.02	<0.02	<0.02	<0.02	<0.02	-	-	<0.06	<0.02	-
PAH	Naphthalene	mg/kg	190[#1]		0.07	0.11	1.8	<0.01	0.33	<0.03	<0.01	<0.01	<0.01	0.19	<0.01	-	-	<0.01	<0.01	<0.03
	Acenaphthylene	mg/kg	83.000[#1]		<0.03	<0.03	0.14	<0.01	<0.03	<0.03	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.01	<0.1	<0.03
	Acenaphthene	mg/kg	84.000[#1]		<0.03	<0.03	0.34	<0.01	<0.03	<0.03	<0.1	<0.1	<0.1	0.2	<0.1	-	-	<0.01	<0.1	<0.03
	Fluorene	mg/kg	63.000[#1]		<0.03	<0.03	0.58	<0.01	<0.03	<0.03	<0.1	<0.1	<0.1	0.2	<0.1	-	-	<0.01	<0.1	<0.03
	Phenanthrene	mg/kg	22.000[#1]		0.2	0.09	3.8	0.03	0.04	<0.03	<0.1	<0.1	0.1	1.6	0.3	-	-	<0.01	<0.1	<0.03
	Anthracene	mg/kg	520.000[#1]		0.05	<0.03	0.35	<0.01	<0.03	<0.03	<0.1	<0.1	<0.1	0.4	0.1	-	-	<0.01	<0.1	<0.03
	Fluoranthene	mg/kg	23.000[#1]		0.28	0.12	1.1	0.034	<0.03	<0.03	<0.1	0.1	0.1	1.8	0.5	-	-	<0.01	<0.1	<0.03
	Pyrene	mg/kg	54.000[#1]		0.24	0.09	0.68	0.029	<0.03	<0.03	<0.1	0.1	<0.1	1.8	0.4	-	-	<0.01	<0.1	<0.03
	Benz(a)anthracene	mg/kg	170[#1]		0.14	0.04	0.13	0.044	<0.03	<0.03	<0.1	0.1	<0.1	0.9	0.3	-	-	<0.01	<0.1	<0.03
	Chrysene	mg/kg	350[#1]		0.16	0.06	0.15	0.018	0.04	<0.03	<0.1	0.1	<0.1	0.9	0.3	-	-	<0.01	<0.1	<0.03
	Benzo(a) pyrene	mg/kg	35[#1]	77[#4]	0.14	<0.03	0.06	0.016	<0.03	<0.03	<0.1	<0.1	<0.1	0.7	0.3	-	-	<0.01	<0.1	<0.03
	Indeno(1,2,3-c,d)pyrene	mg/kg	500[#1]		0.13	<0.03	<0.03	<0.01	<0.03	<0.03	<0.1	<0.1	<0.1	0.3	0.1	-	-	<0.01	<0.1	<0.03
	Dibenz(a,h)anthracene	mg/kg	3.5[#1]		0.04	<0.03	<0.03	<0.01	<0.03	<0.03	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.01	<0.1	<0.03
	Benzo(g,h,i)perylene	mg/kg	3.900[#1]		0.17	<0.03	<0.03	0.015	<0.03	<0.03	<0.1	<0.1	<0.1	0.3	0.2	-	-	<0.01	<0.1	<0.03
	Benzo(b)fluoranthene	mg/kg	44[#1]		0.33	0.05	0.12	0.024	<0.03	<0.03	<0.1	<0.1	<0.1	0.7	0.2	-	-	<0.01	<0.1	0.03
	Benzo(k)fluoranthene	mg/kg	1.200[#1]		0.1	<0.03	0.04	<0.01	<0.03	<0.03	<0.1	<0.1	<0.1	0.5	0.2	-	-	<0.01	<0.1	<0.03
	Benzo(b)&(k)fluoranthene	mg/kg			0.43	0.08	0.16	0.033	<0.06	<0.06	<0.2	<0.2	<0.2	1.2	0.4	-	-	<0.01	<0.2	0.06
	PAHs (sum of 4)	mg/kg			0.73	0.14	0.22	0.059	<0.12	<0.12	<0.4	<0.4	<0.4	1.8	0.7	-	-	<0.04	<0.4	0.12
	PAH 16 Total	mg/kg			2.1	0.56	9.3	-	0.33	<0.1	-	-	-	-	-	-	-	-	-	<0.1
	benzo(g,h,i)perylene + indeno(1,2,3-cd)pyrene	mg/kg			0.3	<0.06	<0.06	0.025	<0.06	<0.06	<0.2	<0.2	<0.2	0.6	0.3	-	-	<0.02	<0.2	<0.06
	Benzo(a)pyrene (surrogate marker for PAH mixtu	mg/kg	15[#1]		0.14	<0.03	0.06	0.016	<0.03	<0.03	<0.1	<0.1	<0.1	0.7	0.3	-	-	<0.01	<0.1	<0.03
SVOC	2,3,4,6-tetrachlorophenol	mg/kg	25.000[#2]		-	<0.1	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	<0.1	-
	2,3,5,6-Tetrachlorophenol	mg/kg			-	<0.1	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	<0.1	-
	2,6-dichlorophenol	mg/kg			-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aniline	mg/kg	400[#2]		-	<0.1	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	<0.1	-
	2-chlorophenol	mg/kg	5.800[#2]		-	<0.1	-	<0.01	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.01	<0.1	-
	2-methylphenol	mg/kg	160000[#3]		-	<0.1	-	<0.01	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.01	<0.1	-
	2-nitrophenol	mg/kg			-	-	-	<0.01	-	-	-	-	-	-	-	-	-	<0.01	-	-
	2,4-dichlorophenol	mg/kg	2.500[#2]		-	<0.01	-	<0.01	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.01	<0.1	-
	2,4-dimethylphenol	mg/kg	16.000[#3]		-	<0.01	-	<0.01	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.01	<0.1	-
	2,4,5-trichlorophenol	mg/kg	82.000[#2]		-	<0.1	-	<0.01	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.01	<0.1	-
	2,4,6-trichlorophenol	mg/kg	210[#2]		-	<0.01	-	<0.01	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.01	<0.1	-
	4-chloro-3-methylphenol	mg/kg	82.000[#2]		-	<0.01	-	<0.01	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.01	<0.1	-
	4-methylphenol	mg/kg	160000[#3]		-	<0.01	-	<0.01	-	-	-	-	-	-	-	-	-	<0.01	-	-
	4-nitrophenol	mg/kg			-	<0.1	-	<0.01	-	-	<0.1	0.2	<0.1	<0.1	<0.1	-	-	<0.01	<0.1	-
	Pentachlorophenol	mg/kg	400[#1]		-	<0.1	-	<0.01	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.01	<0.1	-
	Phenol	mg/kg	440[#1]		-	<0.01	-	<0.01	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.01	<0.1	-
	2-chloronaphthalene	mg/kg	390[#3]		-	<0.1	-	<0.01	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.01	<0.1	-
	2-methylnaphthalene	mg/kg	3.000[#2]		-	<0.1	-	<0.01	-	-	<0.1	<0.1	<0.1	0.2	<0.1	-	-	<0.01	<0.1	-
	Bis(2-ethylhexyl) phthalate	mg/kg	85.000[#3]		-	<0.1	-	<0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.1	<0.1	-
	Butyl benzyl phthalate	mg/kg	940.000[#3]		-	<0.1	-	<0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.1	<0.1	-
	Di-n-butyl phthalate	mg/kg	15.000[#3]		-	<0.1	-	<0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.1	<0.1	-
	Di-n-octyl phthalate	mg/kg	89.000[#3]		-	<0.1	-	<0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.1	<0.1	-
	Diethylphthalate	mg/kg	150.000[#3]		-	<0.1	-	<0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.1	<0.1	-
	Dimethyl phthalate	mg/kg			-	<0.1	-	<0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.1	<0.1	-
	2-nitroaniline	mg/kg	8.000[#2]		-	<0.1	-	<0.01	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.01	<0.1	-

				Location_Code	MS\BH16	MS\BH16	MS\BH16	MS\BH16	MS\BH16	MS\BH16	MS\BH16	MS\BH17	MS\BH17	MS\BH17	MS\BH17	MS\BH17	MS\BH17	MS\BH17	MS\BH17	MS\TP01
				Sample_Depth_Range	0.5	3.3-3.5	4.2-4.4	5	5-5.2	5.7-5.9	13.4	1-1.2	3	3.9	5	6	7.2	14.2	18.7-18.9	0.5
				Sampled_Date_Time	01/07/2021	02/07/2021	02/07/2021	05/07/2021	02/07/2021	02/07/2021	07/07/2021	07/07/2021	07/07/2021	07/07/2021	07/07/2021	07/07/2021	07/07/2021	07/07/2021	08/07/2021	16/06/2021
Chem_Group	**ChemName**	**output unit**	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	MG	MG	MG	MG	MG	TFD-S	LD	MG	MG	MG	MG	MG	TFD-S	TFD-C	RMU	MG
	3-nitroaniline	mg/kg			-	<0.1	-	<0.01	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.01	<0.1	-
	4-bromophenyl phenyl ether	mg/kg			-	<0.1	-	<0.01	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.01	<0.1	-
	4-chloroaniline	mg/kg	**11[#2]**		-	-	-	<0.01	-	-	-	-	-	-	-	-	-	<0.01	-	-
	4-chlorophenyl phenyl ether	mg/kg			-	<0.1	-	<0.01	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.01	<0.1	-
	4-nitroaniline	mg/kg	**110[#2]**		-	<0.1	-	<0.01	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.01	<0.1	-
	Azobenzene	mg/kg	**26[#2]**		-	<0.1	-	<0.01	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.01	<0.1	-
	Bis(2-chloroethoxy) methane	mg/kg	**2.500[#2]**		-	<0.1	-	<0.01	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.01	<0.1	-
	Bis(2-chloroethyl)ether	mg/kg	**1[#2]**		-	-	-	<0.01	-	-	-	-	-	-	-	-	-	<0.01	-	-
	Carbazole	mg/kg			-	<0.1	-	<0.01	-	-	<0.1	<0.1	<0.1	0.2	<0.1	-	-	<0.01	<0.1	-
	Dibenzofuran	mg/kg	**1.200[#2]**		-	<0.1	-	<0.01	-	-	<0.1	<0.1	<0.1	0.2	<0.1	-	-	<0.01	<0.1	-
	Hexachlorocyclopentadiene	mg/kg	**7.5[#2]**		-	<0.1	-	<0.01	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.01	<0.1	-
	Hexachloroethane	mg/kg	**22[#3]**		-	-	-	<0.01	-	-	-	-	-	-	-	-	-	<0.01	-	-
	Isophorone	mg/kg	**2.400[#2]**		-	-	-	<0.01	-	-	-	-	-	-	-	-	-	<0.01	-	-
	N-nitrosodi-n-propylamine	mg/kg	**0.33[#2]**		-	-	-	<0.01	-	-	-	-	-	-	-	-	-	<0.01	-	-
	Benzyl alcohol	mg/kg	**82.000[#2]**		-	<0.1	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	<0.1	-
	Bis(2-chloroisopropyl)ether	mg/kg			-	<0.1	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	<0.1	-
	2,6-Dimethylphenol	mg/kg	**490[#2]**		-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	4,6-Dinitro-2-methylphenol	mg/kg	**66[#2]**		-	<0.1	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	<0.1	-
	Total Monohydric Phenols (S) Corrected	mg/kg			<0.3	<0.3	<0.3	-	<0.3	<0.3	-	-	-	-	-	-	-	-	-	<0.3
	Diphenylamine	mg/kg	**82.000[#2]**		-	<0.1	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	<0.1	-
PCBs	PCB congener 28 + 31	mg/kg			0.1	<0.01	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-
	Tetrachlorobiphenyl, 3,3,4,4- (PCB 77)	mg/kg	**0.16[#2]**		<0.01	<0.01	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-
	Tetrachlorobiphenyl, 3,4,4,5- (PCB 81)	mg/kg	**0.048[#2]**		<0.01	<0.01	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-
	Pentachlorobiphenyl, 2,3,3,4,4- (PCB 105)	mg/kg	**0.49[#2]**		<0.01	<0.01	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-
	Pentachlorobiphenyl, 2,3,4,4,5- (PCB 114)	mg/kg	**0.5[#2]**		<0.01	<0.01	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-
	PCB 118	mg/kg	**0.49[#2]**		<0.01	<0.01	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-
	Pentachlorobiphenyl, 2,3,4,4,5- (PCB 123)	mg/kg	**0.49[#2]**		<0.01	<0.01	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-
	Pentachlorobiphenyl, 3,3,4,4,5- (PCB 126)	mg/kg	**0.00015[#2]**		<0.01	<0.01	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 156)	mg/kg	**0.5[#2]**		<0.01	<0.01	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 157)	mg/kg	**0.5[#2]**		<0.01	<0.01	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-
	Hexachlorobiphenyl, 2,3,4,4,5,5- (PCB 167)	mg/kg	**0.51[#2]**		<0.01	<0.01	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-
	Hexachlorobiphenyl, 3,3,4,4,5,5- (PCB 169)	mg/kg	**0.00051[#2]**		<0.01	<0.01	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-
	Heptachlorobiphenyl, 2,3,3,4,4,5,5- (PCB 189)	mg/kg	**0.52[#2]**		<0.01	<0.01	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-
	PCB 52	mg/kg			0.07	<0.01	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-
	PCB 101	mg/kg			0.01	<0.01	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-
	PCB 138	mg/kg			<0.01	<0.01	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-
	PCB 153	mg/kg			<0.01	<0.01	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-
	PCB 180	mg/kg			<0.01	<0.01	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-
	Total PCB 7 Congeners	mg/kg			0.18	<0.01	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-
Explosives	1,3-Dinitrobenzene	mg/kg	**82[#2]**		-	<0.1	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	<0.1	-
	2,4-Dinitrotoluene	mg/kg	**3.700[#3]**		-	<0.1	-	<0.01	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.01	<0.1	-
	2,6-dinitrotoluene	mg/kg	**1.900[#3]**		-	<0.1	-	<0.01	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.01	<0.1	-
	Nitrobenzene	mg/kg	**22[#2]**		-	-	-	<0.01	-	-	-	-	-	-	-	-	-	<0.01	-	-
Metals	Arsenic	mg/kg	**640[#1]**	*640[#4]*	6.1	11	6.1	-	10	6.3	24	-	-	17	44	35	6.6	14	-	4.4
	Beryllium	mg/kg	**12[#1]**		0.7	1.3	1.3	-	1.5	<0.2	1.1	-	-	1.7	1.9	0.8	<0.2	0.6	-	4.7
	Cadmium	mg/kg	**190[#1]**	*410[#4]*	0.7	0.3	0.2	-	0.2	<0.1	0.5	-	-	2	3.6	3.7	<0.1	0.4	-	<0.1
	Copper	mg/kg	**68.000[#1]**		52	32	22	-	30	3.5	180	-	-	80	130	78	6.6	21	-	11
	Iron	mg/kg	**820.000[#2]**		-	-	-	-	-	-	57,000	-	-	54,000	73,000	38,000	6200	26,000	-	-
	Lead	mg/kg	**2.300[#4]**	*2.300[#4]*	43	49	30	-	160	30	490	-	-	300	720	400	9.6	57	-	4.9
	Mercury	mg/kg	**1100[#1]**		<0.05	<0.05	<0.05	-	<0.05	<0.05	0.11	-	-	0.2	0.28	0.11	<0.05	<0.05	-	<0.05
	Nickel	mg/kg	**980[#1]**		24	26	28	-	41	4.8	50	-	-	19	33	30	3	21	-	3
	Selenium	mg/kg	**12.000[#1]**		6.8	0.6	0.8	-	<0.5	<0.5	0.7	-	-	5.6	4.7	1.9	<0.5	0.7	-	1.8
	Vanadium	mg/kg	**9.000[#1]**		860	89	71	-	50	13	49	-	-	850	1000	260	15	55	-	50
	Zinc	mg/kg	**730.000[#1]**		140	140	76	-	89	23	720	-	-	790	710	1000	21	160	-	70
	Boron (Water Soluble)	mg/kg			2.9	2.6	4.8	-	2.5	0.7	5.2	-	-	2.2	3	1.6	0.4	1	-	3.8
	Chromium (hexavalent)	mg/kg	**33[#1]**	*49[#4]*	<1	<1	<1	-	<1	<1	<1	-	-	<1	<1	<1	<1	<1	-	<1
	Chromium (Trivalent)	mg/kg	**8.600[#1]**		410	49	49	-	41	5.3	270	-	-	400	340	170	4.1	36	-	30
Inorganics	Cyanide (Free)	mg/kg			<0.1	<0.1	<0.1	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	0.1
	Cyanide Total	mg/kg	**150[#2]**		0.6	<0.1	<0.1	-	0.2	<0.1	-	-	-	-	-	-	-	-	-	0.1
	Thiocyanate	mg/kg	**230[#2]**		<0.6	<0.6	<0.6	-	<0.6	<0.6	-	-	-	-	-	-	-	-	-	2.3
	Nitrate (as NO3-)	mg/kg	**1.900.000[#2]**		13	2.5	6.2	-	<1	3.2	-	-	-	-	-	-	-	-	-	6.8
	Sulphide	mg/kg			350	370	32	-	220	64	-	-	-	-	-	-	-	-	-	1100
	Sulphur as S	mg/kg			1700	4100	4100	-	5000	600	-	-	-	-	-	-	-	-	-	4400
	Soluble Sulphate 2:1 extract as SO4 BRE	g/l			0.3	1.3	0.85	-	0.59	0.17	-	-	-	-	-	-	-	-	-	0.73
	Elemental Sulphur	mg/kg			3.1	<0.75	11	-	3.9	5	-	-	-	-	-	-	-	-	-	<0.75

Chem_Group	ChemName	output unit	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	MS\BH16	MS\BH16	MS\BH16	MS\BH16	MS\BH16	MS\BH16	MS\BH16	MS\BH17	MS\BH17	MS\BH17	MS\BH17	MS\BH17	MS\BH17	MS\BH17	MS\BH17	MS\TP01
				Sample_Depth_Range	0.5	3.3-3.5	4.2-4.4	5	5-5.2	5.7-5.9	13.4	1-1.2	3	3.9	5	6	7.2	14.2	18.7-18.9	0.5
				Sampled_Date_Time	01/07/2021	02/07/2021	02/07/2021	05/07/2021	02/07/2021	02/07/2021	07/07/2021	07/07/2021	07/07/2021	07/07/2021	07/07/2021	07/07/2021	07/07/2021	07/07/2021	08/07/2021	16/06/2021
					MG	MG	MG	MG	MG	TFD-S	LD	MG	MG	MG	MG	MG	TFD-S	TFD-C	RMU	MG
Other	Organic Matter	%			0.6	2.8	1.6	-	2.4	0.2	-	-	-	-	-	-	-	-	-	1.4
	Moisture	%			8	18	22	-	23	18	-	-	-	-	-	-	-	-	-	8.1
	TOC	%			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos	Asbestos Quantification - Total - %	%			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Asbestos Identification	None			0	0	-	-	0	-	-	-	-	-	-	-	-	-	-	0
Field	pH	pH_Units	**11.5**		11.3	9.7	10.3	-	9.3	8.9	-	-	-	-	-	-	-	-	-	11.3
MISC	1,2-Dinitrobenzene	mg/kg	**82#2**		-	<0.1	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	<0.1	-
	1,4-dinitrobenzene	mg/kg	**82#2**		-	<0.1	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	<0.1	-
	Decane	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Natural Moisture Content	%			-	-	-	25.1	-	-	-	-	-	-	-	-	-	31.3	-	-
	3/4-Methylphenol (m/p-cresol)	mg/kg			-	<0.1	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	<0.1	-

Env Stds Comments
#1:LQM/CIEH S4ULs 2015
#2:USEPA RSL (May 2020)
#3:EIC/AGS/CL:AIRE
#4:Defra C4SL 12/2014

C4SL 2021 - Vinyl chloride, tetrachloroethene, trichloroethene
GAC: Generic Assessment Criteria
(blank): No assessment criteria available
 - : Not analysed
HH: Human Health

1,2-Dichloroethene - cis 1,2-dichloroethene used
2-methylphenol - cresol total used
4-methylphenol -cresol total used
pH - Hazardous Waste Value - corrosive

XXX	Exceedance of HH Soil. Commercial/Industrial. Sandy Loam. TOC>=0.58 to <1.45%
XXX	Exceedance of HH Soil. C4SL Commercial (England, Ireland, Northern Ireland, Wales. TOC>=0.58 to <3.48 &>0.58 to <1.45%

MG - Made Ground
TFD-S - Tidal Flat Deposits - Sand
TFD-C - Tidal F;at Deposits - Clay
GT - Glacial Till
RMU - Redcar Mudstone Formation

Chem_Group	ChemName	output unit	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	MS\TP01	MS\TP01	MS\TP03	MS\TP04	MS\TP04	MS\TP05	MS\TP05	MS\TP05	MS\TP05	MS\TP06	MS\TP06	MS\TP06	MS\TP07	MS\TP07	MS\TP07	MS\TP09
				Sample_Depth_Range	3	4	2	0.5	4	0.5	1	2	3	0.5	1.2	3.8	0.5	2	4	1
				Sampled_Date_Time	17/06/2021	17/06/2021	14/06/2021	14/06/2021	15/06/2021	17/06/2021	17/06/2021	17/06/2021	17/06/2021	15/06/2021	15/06/2021	22/06/2021	17/06/2021	18/06/2021	18/06/2021	16/06/2021
					MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG
TPH	EPH >C10-C40	mg/kg			38	<10	<10	<10	<10	<10	51	<10	<10	<10	21	6800	68	<10	<10	<10
	>C5-C6 Aliphatics	mg/kg	3.200#1		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	<0.01	<0.01	-	<0.01	-	<0.01
	>C6-C8 Aliphatics	mg/kg	7.800#1		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	<0.01	<0.01	-	<0.01	-	<0.01
	>C8-C10 Aliphatics	mg/kg	2.000#1		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	<0.01	<0.01	-	<0.01	-	<0.01
	>C10-C12 Aliphatics	mg/kg	9.700#1		-	<1.5	-	-	<1.5	-	<1.5	<1.5	-	-	<1.5	<1.5	-	<1.5	-	<1.5
	>C12-C16 Aliphatics	mg/kg	59.000#1		-	<1.2	-	-	<1.2	-	<1.2	<1.2	-	-	<1.2	250	-	<1.2	-	<1.2
	>C16-C21 Aliphatics	mg/kg			-	<1.5	-	-	<1.5	-	<1.5	<1.5	-	-	15	1000	-	<1.5	-	<1.5
	>C16-C35 Aliphatics	mg/kg	1.600.000#1		-	<4.9	-	-	<4.9	-	<4.9	<4.9	-	-	71	1160	-	<4.9	-	<4.9
	>C21-C35 Aliphatics	mg/kg			-	<3.4	-	-	<3.4	-	<3.4	<3.4	-	-	56	160	-	<3.4	-	<3.4
	>C5-C35 Aliphatics	mg/kg			-	<10	-	-	<10	-	<10	<10	-	-	72	1500	-	<10	-	<10
	>EC5-EC7 Aromatics	mg/kg	26.000#1		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	<0.01	<0.01	-	<0.01	-	<0.01
	>EC7-EC8 Aromatics	mg/kg	56.000#1		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	<0.01	<0.01	-	<0.01	-	<0.01
	>EC8-EC10 Aromatics	mg/kg	3.500#1		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	<0.01	<0.01	-	<0.01	-	<0.01
	>EC10-EC12 Aromatics	mg/kg	16.000#1		-	<0.9	-	-	<0.9	-	<0.9	<0.9	-	-	3.2	2.7	-	<0.9	-	<0.9
	>EC12-EC16 Aromatics	mg/kg	36.000#1		-	<0.5	-	-	<0.5	-	<0.5	<0.5	-	-	5.3	200	-	<0.5	-	<0.5
	>EC16-EC21 Aromatics	mg/kg	28.000#1		-	<0.6	-	-	<0.6	-	<0.6	<0.6	-	-	34	1100	-	<0.6	-	<0.6
	>EC21-EC35 Aromatics	mg/kg	28.000#1		-	<1.4	-	-	<1.4	-	<1.4	<1.4	-	-	98	220	-	<1.4	-	<1.4
	>EC5-EC35 Aromatics	mg/kg			-	<10	-	-	<10	-	<10	<10	-	-	140	1500	-	<10	-	<10
	>C5-C35 Aliphatics & Aromatics	mg/kg			-	<10	-	-	<10	-	<10	<10	-	-	210	3000	-	<10	-	<10
VOC	Dichlorodifluoromethane	mg/kg	370#2		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MTBE	mg/kg	7.900#3		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	<0.01	<0.01	-	<0.01	-	<0.01
	Chloromethane	mg/kg	1#3		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Vinyl chloride	mg/kg	0.059#1	1.1	-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	Bromomethane	mg/kg	30#2		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chloroethane	mg/kg	960#3		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Trichlorofluoromethane	mg/kg	350.000#2		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,1-dichloroethene	mg/kg	26#3		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	Dichloromethane	mg/kg	270#3		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	trans-1,2-dichloroethene	mg/kg	22#3		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	1,1-dichloroethane	mg/kg	280#3		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	cis-1,2-dichloroethene	mg/kg	14#3		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	2,2-dichloropropane	mg/kg			-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	Bromochloromethane	mg/kg	630#2		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	Chloroform	mg/kg	99#1		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	1,1,1-trichloroethane	mg/kg	660#1		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	1,1-dichloropropene	mg/kg			-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	Carbon tetrachloride	mg/kg	2.9#1		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	1,2-dichloroethane	mg/kg	0.67#1		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	Benzene	mg/kg	27#1	27#4	-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	<0.01	<0.01	-	<0.01	-	<0.01
	Trichloroethene	mg/kg	1.2#1	0.73	-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	1,2-dichloropropane	mg/kg	3.3#3		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	Dibromomethane	mg/kg	99#2		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	Bromodichloromethane	mg/kg	1.3#2		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	cis-1,3-dichloropropene	mg/kg			-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	Toluene	mg/kg	56.000#1		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	<0.01	<0.01	-	<0.01	-	<0.01
	trans-1,3-dichloropropene	mg/kg			-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	1,1,2-trichloroethane	mg/kg	94#3		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	Tetrachloroethene	mg/kg	19#1	24	-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	1,3-dichloropropane	mg/kg	23.000#2		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	Sum of PCE and TCE	mg/kg			-	<0.02	-	-	<0.02	-	<0.02	<0.02	-	-	-	<0.02	-	<0.02	-	-
	Chlorodibromomethane	mg/kg	39#2		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	1,2-dibromoethane	mg/kg	0.16#2		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	Chlorobenzene	mg/kg	56#1		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	1,1,1,2-tetrachloroethane	mg/kg	110#1		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	Ethylbenzene	mg/kg	5.700#1		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	<0.01	<0.01	-	<0.01	-	<0.01
	Xylene (m & p)	mg/kg			-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	Xylene Total	mg/kg	5.900#1		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	<0.01	<0.01	-	<0.01	-	<0.01
	Xylene (o)	mg/kg	6.600#1		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	Styrene	mg/kg	3.300#3		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	Bromoform	mg/kg	760#3		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	Isopropylbenzene	mg/kg	1.400#3		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	1,1,2,2-tetrachloroethane	mg/kg	270#1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bromobenzene	mg/kg	97#3		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	1,2,3-trichloropropane	mg/kg	0.11#2		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	n-propylbenzene	mg/kg	4.100#3		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-

Chem_Group	ChemName	output unit	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Location_Code	MS\TP01	MS\TP01	MS\TP03	MS\TP04	MS\TP04	MS\TP05	MS\TP05	MS\TP05	MS\TP05	MS\TP06	MS\TP06	MS\TP06	MS\TP07	MS\TP07	MS\TP07	MS\TP09
				Sample_Depth_Range	3	4	2	0.5	4	0.5	1	2	3	0.5	1.2	3.8	0.5	2	4	1
				Sampled_Date_Time	17/06/2021	17/06/2021	14/06/2021	14/06/2021	15/06/2021	17/06/2021	17/06/2021	17/06/2021	17/06/2021	15/06/2021	15/06/2021	22/06/2021	17/06/2021	18/06/2021	18/06/2021	16/06/2021
				Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG
	2-chlorotoluene	mg/kg	23.000[#2]		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	1,3,5-trimethylbenzene	mg/kg	1.500[#2]		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	4-chlorotoluene	mg/kg	23.000[#2]		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	tert-butylbenzene	mg/kg	120.000[#2]		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	1,2,4-trimethylbenzene	mg/kg	42[#3]		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	sec-butylbenzene	mg/kg	120.000[#2]		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	p-isopropyltoluene	mg/kg			-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	1,3-dichlorobenzene	mg/kg	30[#1]		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	1,4-dichlorobenzene	mg/kg	4.400[#1]		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	n-butylbenzene	mg/kg	58.000[#2]		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	1,2-dichlorobenzene	mg/kg	2.000[#1]		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	1,2-dibromo-3-chloropropane	mg/kg	0.064[#2]		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	1,2,4-trichlorobenzene	mg/kg	220[#1]		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	Hexachlorobutadiene	mg/kg	31[#1]		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	1,2,3-trichlorobenzene	mg/kg	102[#1]		-	<0.01	-	-	<0.01	-	<0.01	<0.01	-	-	-	<0.01	-	<0.01	-	-
	1,2-Dichloroethene	mg/kg	14[#3]		-	<0.02	-	-	<0.02	-	<0.02	<0.02	-	-	-	<0.02	-	<0.02	-	-
	Trihalomethanes	mg/kg			-	<0.04	-	-	<0.04	-	<0.04	<0.04	-	-	-	<0.04	-	<0.04	-	-
	Hexachlorobenzene	mg/kg	110[#1]		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	Trichlorobenzene (total)	mg/kg			-	<0.02	-	-	<0.02	-	<0.02	<0.02	-	-	-	<0.02	-	<0.02	-	-
PAH	Naphthalene	mg/kg	190[#1]		<0.03	<0.01	<0.03	<0.03	<0.03	<0.03	<0.01	<0.01	<0.03	<0.03	0.04	<0.01	<0.03	<0.01	<0.03	<0.03
	Acenaphthylene	mg/kg	83.000[#1]		<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.1	<0.03	<0.03	<0.03	<0.03
	Acenaphthene	mg/kg	84.000[#1]		<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.1	<0.03	<0.03	<0.03	<0.03
	Fluorene	mg/kg	63.000[#1]		<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.1	<0.03	<0.03	<0.03	<0.03
	Phenanthrene	mg/kg	22.000[#1]		1.1	<0.03	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.03	0.12	0.25	<0.1 - 1.7	0.11	<0.03	<0.03	<0.03
	Anthracene	mg/kg	520.000[#1]		<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.04	<0.1 - 0.65	<0.03	<0.03	<0.03	<0.03
	Fluoranthene	mg/kg	23.000[#1]		1.6	<0.03	0.04	<0.03	<0.03	<0.03	<0.03	<0.03 - 0.2	0.05	0.35	0.95	4.1 - 7.4	0.44	<0.03	<0.03	0.04
	Pyrene	mg/kg	54.000[#1]		1.4	<0.03	0.03	<0.03	<0.03	<0.03	<0.03	<0.03 - 0.2	0.04	0.29	0.41	4.2 - 7.6	0.37	<0.03	<0.03	<0.03
	Benz(a)anthracene	mg/kg	170[#1]		<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03 - 0.1	0.03	0.26	0.25	0.56 - 0.6	<0.03	<0.03	<0.03	<0.03
	Chrysene	mg/kg	350[#1]		0.24	<0.03	0.03	<0.03	<0.03	<0.03	<0.03	<0.03 - 0.2	0.06	0.27	0.65	0.5 - 0.97	0.12	<0.03	<0.03	<0.03
	Benzo(a) pyrene	mg/kg	35[#1]	77[#4]	0.25	<0.03	<0.03	<0.03	<0.03	<0.03	<0.1 - 0.1	<0.03	<0.03	0.28	0.29	<0.3 - 0.4	0.39	<0.03	<0.03	<0.03
	Indeno(1,2,3-c,d)pyrene	mg/kg	500[#1]		0.16	<0.03	<0.03	<0.03	<0.03	<0.03	<0.1 - 0.06	<0.03	0.05	0.14	0.44	<0.3 - 0.2	0.21	<0.03	<0.03	<0.03
	Dibenz(a,h)anthracene	mg/kg	3.5[#1]		0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.04	0.1	<0.1	0.06	<0.03	<0.03	<0.03
	Benzo(g,h,i)perylene	mg/kg	3.900[#1]		0.17	<0.03	<0.03	<0.03	<0.03	<0.03	<0.1 - 0.09	<0.03	0.04	0.15	0.67	<0.3 - 0.2	0.23	<0.1 - 0.04	0.03	<0.03
	Benzo(b)fluoranthene	mg/kg	44[#1]		0.77	<0.1 - 0.44	<0.03	<0.03	<0.03	<0.03	<0.1 - 0.51	<0.03	0.05	0.46	0.91	0.45 - 0.6	0.78	<0.1 - 0.4	0.4	0.04
	Benzo(k)fluoranthene	mg/kg	1.200[#1]		0.2	<0.03	<0.03	<0.03	<0.03	<0.03	<0.1 - 0.05	<0.03	<0.03	0.19	0.52	<0.3 - 0.2	0.22	<0.03	<0.03	<0.03
	Benzo(b)&(k)fluoranthene	mg/kg			0.97	0.47	<0.06	<0.06	<0.06	<0.06	0.56	<0.06	0.08	0.65	1.43	0.8	1	0.43	0.43	0.07
	PAHs (sum of 4)	mg/kg			1.3	0.53	<0.12	<0.12	<0.12	<0.12	0.71	<0.12	0.17	0.94	2.54	1.2	1.44	0.5	0.49	0.13
	PAH 16 Total	mg/kg			5.9	0.44	0.14	<0.1	<0.1	<0.1	0.81	<0.1	0.32	2.5	5.5	<14.91	2.9	0.44	0.44	<0.1
	benzo(g,h,i)perylene + indeno(1,2,3-cd)pyrene	mg/kg			0.33	<0.06	<0.06	<0.06	<0.06	<0.06	0.15	<0.06	0.09	0.29	1.11	0.4	0.44	0.07	0.06	<0.06
	Benzo(a)pyrene (surrogate marker for PAH mixtu	mg/kg	15[#1]		0.25	<0.03	<0.03	<0.03	<0.03	<0.03	0.1	<0.03	<0.03	0.28	0.29	0.4	0.39	<0.03	<0.03	<0.03
SVOC	2,3,4,6-tetrachlorophenol	mg/kg	25.000[#2]		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	2,3,5,6-Tetrachlorophenol	mg/kg			-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	2,6-dichlorophenol	mg/kg			-	-	-	-	<0.01	-	-	-	-	-	-	<0.01	-	-	-	-
	Aniline	mg/kg	400[#2]		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	2-chlorophenol	mg/kg	5.800[#2]		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	2-methylphenol	mg/kg	160000[#3]		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	2-nitrophenol	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2,4-dichlorophenol	mg/kg	2.500[#2]		-	<0.1	-	-	<0.01	-	<0.1	<0.1	-	-	-	<0.01	-	<0.1	-	-
	2,4-dimethylphenol	mg/kg	16.000[#3]		-	<0.1	-	-	<0.01	-	<0.1	<0.1	-	-	-	<0.01	-	<0.1	-	-
	2,4,5-trichlorophenol	mg/kg	82.000[#2]		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	2,4,6-trichlorophenol	mg/kg	210[#2]		-	<0.1	-	-	<0.01	-	<0.1	<0.1	-	-	-	<0.01	-	<0.1	-	-
	4-chloro-3-methylphenol	mg/kg	82.000[#2]		-	<0.1	-	-	<0.01	-	<0.1	<0.1	-	-	-	<0.01	-	<0.1	-	-
	4-methylphenol	mg/kg	160000[#3]		-	-	-	-	<0.01	-	-	-	-	-	-	<0.01	-	-	-	-
	4-nitrophenol	mg/kg			-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	Pentachlorophenol	mg/kg	400[#1]		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	Phenol	mg/kg	440[#1]		-	<0.1	-	-	<0.01	-	<0.1	<0.1	-	-	-	<0.01	-	<0.1	-	-
	2-chloronaphthalene	mg/kg	390[#3]		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	2-methylnaphthalene	mg/kg	3.000[#2]		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	Bis(2-ethylhexyl) phthalate	mg/kg	85.000[#3]		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	Butyl benzyl phthalate	mg/kg	940.000[#3]		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	Di-n-butyl phthalate	mg/kg	15.000[#3]		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	Di-n-octyl phthalate	mg/kg	89.000[#3]		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	Diethylphthalate	mg/kg	150.000[#3]		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	Dimethyl phthalate	mg/kg			-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	2-nitroaniline	mg/kg	8.000[#2]		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-

Chem_Group	ChemName	output unit	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	MS\TP01	MS\TP01	MS\TP03	MS\TP04	MS\TP04	MS\TP05	MS\TP05	MS\TP05	MS\TP05	MS\TP06	MS\TP06	MS\TP06	MS\TP07	MS\TP07	MS\TP07	MS\TP09
				Sample_Depth_Range	3	4	2	0.5	4	0.5	1	2	3	0.5	1.2	3.8	0.5	2	4	1
				Sampled_Date_Time	17/06/2021	17/06/2021	14/06/2021	14/06/2021	15/06/2021	17/06/2021	17/06/2021	17/06/2021	17/06/2021	15/06/2021	15/06/2021	22/06/2021	17/06/2021	18/06/2021	18/06/2021	16/06/2021
					MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG
	3-nitroaniline	mg/kg			-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	4-bromophenyl phenyl ether	mg/kg			-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	4-chloroaniline	mg/kg	11[#2]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	4-chlorophenyl phenyl ether	mg/kg			-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	4-nitroaniline	mg/kg	110[#2]		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	Azobenzene	mg/kg	26[#2]		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	Bis(2-chloroethoxy) methane	mg/kg	2.500[#2]		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	Bis(2-chloroethyl)ether	mg/kg	1[#2]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Carbazole	mg/kg			-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	Dibenzofuran	mg/kg	1.200[#2]		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	Hexachlorocyclopentadiene	mg/kg	7.5[#2]		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	Hexachloroethane	mg/kg	22[#3]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Isophorone	mg/kg	2.400[#2]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	N-nitrosodi-n-propylamine	mg/kg	0.33[#2]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzyl alcohol	mg/kg	82.000[#2]		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	Bis(2-chloroisopropyl)ether	mg/kg			-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	2,6-Dimethylphenol	mg/kg	490[#2]		-	-	-	-	<0.01	-	-	-	-	-	-	<0.01	-	-	-	-
	4,6-Dinitro-2-methylphenol	mg/kg	66[#2]		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	Total Monohydric Phenols (S) Corrected	mg/kg			<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
	Diphenylamine	mg/kg	82.000[#2]		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
PCBs	PCB congener 28 + 31	mg/kg			-	<0.01	-	-	-	-	-	-	-	-	-	<0.01	-	<0.01	-	-
	Tetrachlorobiphenyl, 3,3,4,4- (PCB 77)	mg/kg	0.16[#2]		-	<0.01	-	-	-	-	-	-	-	-	-	<0.01	-	<0.01	-	-
	Tetrachlorobiphenyl, 3,4,4,5- (PCB 81)	mg/kg	0.048[#2]		-	<0.01	-	-	-	-	-	-	-	-	-	<0.01	-	<0.01	-	-
	Pentachlorobiphenyl, 2,3,3,4,4- (PCB 105)	mg/kg	0.49[#2]		-	<0.01	-	-	-	-	-	-	-	-	-	<0.01	-	<0.01	-	-
	Pentachlorobiphenyl, 2,3,4,4,5- (PCB 114)	mg/kg	0.5[#2]		-	<0.01	-	-	-	-	-	-	-	-	-	<0.01	-	<0.01	-	-
	PCB 118	mg/kg	0.49[#2]		-	<0.01	-	-	-	-	-	-	-	-	-	<0.01	-	<0.01	-	-
	Pentachlorobiphenyl, 2,3,4,4,5- (PCB 123)	mg/kg	0.49[#2]		-	<0.01	-	-	-	-	-	-	-	-	-	<0.01	-	<0.01	-	-
	Pentachlorobiphenyl, 3,3,4,4,5- (PCB 126)	mg/kg	0.00015[#2]		-	<0.01	-	-	-	-	-	-	-	-	-	<0.01	-	<0.01	-	-
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 156)	mg/kg	0.5[#2]		-	<0.01	-	-	-	-	-	-	-	-	-	<0.01	-	<0.01	-	-
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 157)	mg/kg	0.5[#2]		-	<0.01	-	-	-	-	-	-	-	-	-	<0.01	-	<0.01	-	-
	Hexachlorobiphenyl, 2,3,4,4,5,5- (PCB 167)	mg/kg	0.51[#2]		-	<0.01	-	-	-	-	-	-	-	-	-	<0.01	-	<0.01	-	-
	Hexachlorobiphenyl, 3,3,4,4,5,5- (PCB 169)	mg/kg	0.00051[#2]		-	<0.01	-	-	-	-	-	-	-	-	-	<0.01	-	<0.01	-	-
	Heptachlorobiphenyl, 2,3,3,4,4,5,5- (PCB 189)	mg/kg	0.52[#2]		-	<0.01	-	-	-	-	-	-	-	-	-	<0.01	-	<0.01	-	-
	PCB 52	mg/kg			-	<0.01	-	-	-	-	-	-	-	-	-	<0.01	-	<0.01	-	-
	PCB 101	mg/kg			-	<0.01	-	-	-	-	-	-	-	-	-	<0.01	-	<0.01	-	-
	PCB 138	mg/kg			-	<0.01	-	-	-	-	-	-	-	-	-	<0.01	-	<0.01	-	-
	PCB 153	mg/kg			-	<0.01	-	-	-	-	-	-	-	-	-	<0.01	-	<0.01	-	-
	PCB 180	mg/kg			-	<0.01	-	-	-	-	-	-	-	-	-	<0.01	-	<0.01	-	-
	Total PCB 7 Congeners	mg/kg			-	<0.01	-	-	-	-	-	-	-	-	-	<0.01	-	<0.01	-	-
Explosives	1,3-Dinitrobenzene	mg/kg	82[#2]		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	2,4-Dinitrotoluene	mg/kg	3.700[#3]		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	2,6-dinitrotoluene	mg/kg	1.900[#3]		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	Nitrobenzene	mg/kg	22[#2]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals	Arsenic	mg/kg	640[#1]	640 [#4]	9.6	5.5	6.4	6.1	5.5	32	42	180	28	7.4	28	18	24	7.6	13	5.3
	Beryllium	mg/kg	12[#1]		3.9	0.8	5.3	5.9	6.4	2.4	2.4	1.1	1.3	2.9	2.7	3.4	1.5	1	1.8	6.7
	Cadmium	mg/kg	190[#1]	410 [#4]	0.4	<0.1	0.1	0.1	0.1	4.4	3.5	1.2	1.1	1.2	0.8	22	4.6	0.2	1.1	<0.1
	Copper	mg/kg	68.000[#1]		31	8.1	9.7	8.1	6.2	2700	92	330	53	85	100	150	60	23	49	9.3
	Iron	mg/kg	820.000[#2]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lead	mg/kg	2.300[#4]	2.300 [#4]	46	22	12	15	1.4	630	270	200	80	21	120	1000	190	12	51	9.7
	Mercury	mg/kg	1100[#1]		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	0.06	<0.05	<0.05	0.11	0.33	<0.05	<0.05	<0.05	<0.05
	Nickel	mg/kg	980[#1]		11	3.8	2.5	3.6	2.1	68	30	27	23	86	66	57	21	5.2	15	3.3
	Selenium	mg/kg	12.000[#1]		4	0.5	1.6	1.3	0.6	<0.5	7.2	5.6	14	1.4	2	1	1	1.8	1.4	2
	Vanadium	mg/kg	9.000[#1]		280	23	45	51	17	110	1200	70	1900	620	100	160	390	2500	2100	170
	Zinc	mg/kg	730.000[#1]		170	37	27	76	5.5	1300	570	430	160	170	180	3700	170	70	450	13
	Boron (Water Soluble)	mg/kg			5.4	1.5	2.1	3.7	3.6	1	1.9	2.8	1.4	1.8	17	1.2	1.4	1.5	1.4	1.8
	Chromium (hexavalent)	mg/kg	33[#1]	49 [#4]	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Chromium (Trivalent)	mg/kg	8.600[#1]		130	8	8.1	16	3.8	32	210	29	260	260	49	54	110	380	350	51
Inorganics	Cyanide (Free)	mg/kg			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1
	Cyanide Total	mg/kg	150[#2]		0.3	16	<0.1	0.3	0.4	0.2	0.3	<0.1	<0.1	<0.1	<0.1	2.6	0.3	<0.1	0.3	<0.1
	Thiocyanate	mg/kg	230[#2]		<0.6	<0.6	<0.6	<0.6	0.9	<0.6	<0.6	<0.6	0.7	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
	Nitrate (as NO3-)	mg/kg	1.900.000[#2]		14	5.6	4.9	8.9	9.7	11	6.5	7.9	4.5	12	7.9	-	7.6	21	10	7.2
	Sulphide	mg/kg			1100	400	14,000	2600	7000	200	720	200	920	100	260	400	440	<10	280	1200
	Sulphur as S	mg/kg			5400	1000	6000	3900	12,000	2900	2600	9600	2200	800	3700	2600	1700	3700	2600	5800
	Soluble Sulphate 2:1 extract as SO4 BRE	g/l			1.3	0.44	0.97	0.58	1.9	1.5	0.71	1.8	0.32	0.46	0.33	0.31	0.18	0.25	0.36	0.52
	Elemental Sulphur	mg/kg			0.86	6.5	7.3	11	3.7	1.7	<0.75	<0.75	<0.75	<0.75	28	40	<0.75	<0.75	<0.75	1.8

Chem_Group	ChemName	output unit	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	MS\TP01	MS\TP01	MS\TP03	MS\TP04	MS\TP04	MS\TP05	MS\TP05	MS\TP05	MS\TP05	MS\TP06	MS\TP06	MS\TP06	MS\TP07	MS\TP07	MS\TP07	MS\TP09
				Sample_Depth_Range	3	4	2	0.5	4	0.5	1	2	3	0.5	1.2	3.8	0.5	2	4	1
				Sampled_Date_Time	17/06/2021	17/06/2021	14/06/2021	14/06/2021	15/06/2021	17/06/2021	17/06/2021	17/06/2021	17/06/2021	15/06/2021	15/06/2021	22/06/2021	17/06/2021	18/06/2021	18/06/2021	16/06/2021
					MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG
Other	Organic Matter	%			0.7	1.1	0.7	1.2	0.5	0.2	0.9	0.2	1.1	1.6	2.6	1.7	1.5	0.2	0.9	0.4
	Moisture	%			9.2	17	6.6	4.7	15	10	8.5	16	7	15	14	-	9.1	5.5	7.6	6.4
	TOC	%			-	-	-	-	-	-	-	-	-	-	-	0.00028	-	-	-	-
Asbestos	Asbestos Quantification - Total - %	%			-	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-
	Asbestos Identification	None			0	0	0	-	0	1	0	0	0	0	0	1	0	0	0	0
Field	pH	pH_Units	**11.5**		10.1	10.4	10.1	9.2	10.3	9.3	10	6.4	10.5	10.1	8.5	5.6	10.2	11.4	**11.9**	10.8
MISC	1,2-Dinitrobenzene	mg/kg	**82**#2		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	1,4-dinitrobenzene	mg/kg	**82**#2		-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-
	Decane	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Natural Moisture Content	%			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/4-Methylphenol (m/p-cresol)	mg/kg			-	<0.1	-	-	<0.1	-	<0.1	<0.1	-	-	-	<0.1	-	<0.1	-	-

Env Stds Comments
#1:LQM/CIEH S4ULs 2015
#2:USEPA RSL (May 2020)
#3:EIC/AGS/CL:AIRE
#4:Defra C4SL 12/2014

C4SL 2021 - Vinyl chloride, tetrachloroethene, trichloroethene
GAC: Generic Assessment Criteria
(blank): No assessment criteria available
 - : Not analysed
HH: Human Health

1,2-Dichloroethene - cis 1,2-dichloroethene used
2-methylphenol - cresol total used
4-methylphenol -cresol total used
pH - Hazardous Waste Value - corrosive

XXX	Exceedance of HH Soil. Commercial/Industrial. Sandy Loam. TOC>=0.58 to <1.45%
XXX	Exceedance of HH Soil. C4SL Commercial (England, Ireland, Northern Ireland, Wales. TOC>=0.58 to <3.48 &>0.58 to <1.45%

MG - Made Ground
TFD-S - Tidal Flat Deposits - Sand
TFD-C - Tidal F;at Deposits - Clay
GT - Glacial Till
RMU - Redcar Mudstone Formation

Chem_Group	ChemName	output unit	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	Location_Code: MS\TP09 Sample_Depth_Range: 3 Sampled_Date_Time: 16/06/2021 MG	MS\TP10 0.3 21/06/2021 MG	MS\TP10 0.5 21/06/2021 MG	Statistical Summary Number of Results	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	Median Concentration	Standard Deviation	Number of Guideline Exceedances	Number of Guideline Exceedances (Detects Only)
TPH	EPH >C10-C40	mg/kg			<10	<10	<10	93	17	<10	7400	204	5	1085	0	0
	>C5-C6 Aliphatics	mg/kg	3.200[#1]		<0.01	<0.01	-	48	0	<0.01	<0.01	0.005	0.005	0	0	0
	>C6-C8 Aliphatics	mg/kg	7.800[#1]		<0.01	<0.01	-	48	0	<0.01	<0.01	0.005	0.005	0	0	0
	>C8-C10 Aliphatics	mg/kg	2.000[#1]		<0.01	<0.01	-	48	1	<0.01	0.04	0.0057	0.005	0.0051	0	0
	>C10-C12 Aliphatics	mg/kg	9.700[#1]		<1.5	<1.5	-	48	2	<1.5	530	12	0.75	76	0	0
	>C12-C16 Aliphatics	mg/kg	59.000[#1]		<1.2	<1.2	-	48	5	<1.2	520	20	0.6	85	0	0
	>C16-C21 Aliphatics	mg/kg			<1.5	<1.5	-	48	7	<1.5	1000	43	0.75	169	0	0
	>C16-C35 Aliphatics	mg/kg	1.600.000[#1]		<4.9	<4.9	-	48	7	<4.9	1840	125	2.45	408	0	0
	>C21-C35 Aliphatics	mg/kg			<3.4	<3.4	-	48	6	<3.4	1300	81	1.7	294	0	0
	>C5-C35 Aliphatics	mg/kg			<10	<10	-	48	6	<10	2400	161	5	526	0	0
	>EC5-EC7 Aromatics	mg/kg	26.000[#1]		<0.01	<0.01	-	48	0	<0.01	<0.01	0.005	0.005	0	0	0
	>EC7-EC8 Aromatics	mg/kg	56.000[#1]		<0.01	<0.01	-	48	0	<0.01	<0.01	0.005	0.005	0	0	0
	>EC8-EC10 Aromatics	mg/kg	3.500[#1]		<0.01	<0.01	-	48	1	<0.01	0.28	0.011	0.005	0.04	0	0
	>EC10-EC12 Aromatics	mg/kg	16.000[#1]		<0.9	<0.9	-	48	5	<0.9	4.1	0.72	0.45	0.82	0	0
	>EC12-EC16 Aromatics	mg/kg	36.000[#1]		<0.5	<0.5	-	48	6	<0.5	200	7.8	0.25	36	0	0
	>EC16-EC21 Aromatics	mg/kg	28.000[#1]		<0.6	<0.6	-	48	7	<0.6	1100	43	0.3	198	0	0
	>EC21-EC35 Aromatics	mg/kg	28.000[#1]		<1.4	<1.4	-	48	7	<1.4	2500	80	0.7	380	0	0
	>EC5-EC35 Aromatics	mg/kg			<10	<10	-	48	7	<10	3500	134	5	556	0	0
	>C5-C35 Aliphatics & Aromatics	mg/kg			<10	<10	-	48	8	<10	5500	289	5	998	0	0
VOC	Dichlorodifluoromethane	mg/kg	370[#2]		-	-	-	12	0	<0.05	<0.05	0.025	0.025	0	0	0
	MTBE	mg/kg	7.900[#3]		<0.01	<0.01	-	67	0	<0.01	<0.05	0.008	0.005	0.0072	0	0
	Chloromethane	mg/kg	1[#3]		-	-	-	12	6	<0.05	0.856	0.15	0.072	0.24	0	0
	Vinyl chloride	mg/kg	0.059[#1]	*1.1*	<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	Bromomethane	mg/kg	30[#2]		-	-	-	12	0	<0.05	<0.05	0.025	0.025	0	0	0
	Chloroethane	mg/kg	960[#3]		-	-	-	12	0	<0.05	<0.05	0.025	0.025	0	0	0
	Trichlorofluoromethane	mg/kg	350.000[#2]		-	-	-	12	0	<0.05	<0.05	0.025	0.025	0	0	0
	1,1-dichloroethene	mg/kg	26[#3]		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	Dichloromethane	mg/kg	270[#3]		-	-	-	12	0	<0.05	<0.05	0.025	0.025	0	0	0
	trans-1,2-dichloroethene	mg/kg	22[#3]		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	1,1-dichloroethane	mg/kg	280[#3]		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	cis-1,2-dichloroethene	mg/kg	14[#3]		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	2,2-dichloropropane	mg/kg			<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	Bromochloromethane	mg/kg	630[#2]		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	Chloroform	mg/kg	99[#1]		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	1,1,1-trichloroethane	mg/kg	660[#1]		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	1,1-dichloropropene	mg/kg			<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	Carbon tetrachloride	mg/kg	2.9[#1]		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	1,2-dichloroethane	mg/kg	0.67[#1]		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	Benzene	mg/kg	27[#1]	*27*[#4]	<0.01	<0.01	-	67	0	<0.01	<0.05	0.008	0.005	0.0072	0	0
	Trichloroethene	mg/kg	1.2[#1]	*0.73*	<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	1,2-dichloropropane	mg/kg	3.3[#3]		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	Dibromomethane	mg/kg	99[#2]		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	Bromodichloromethane	mg/kg	1.3[#2]		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	cis-1,3-dichloropropene	mg/kg			<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	Toluene	mg/kg	56.000[#1]		<0.01	<0.01	-	67	0	<0.01	<0.05	0.008	0.005	0.0072	0	0
	trans-1,3-dichloropropene	mg/kg			<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	1,1,2-trichloroethane	mg/kg	94[#3]		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	Tetrachloroethene	mg/kg	19[#1]	*24*	<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	1,3-dichloropropane	mg/kg	23.000[#2]		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	Sum of PCE and TCE	mg/kg			<0.02	-	-	49	0	<0.02	<0.1	0.019	0.01	0.017	0	0
	Chlorodibromomethane	mg/kg	39[#2]		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	1,2-dibromoethane	mg/kg	0.16[#2]		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	Chlorobenzene	mg/kg	56[#1]		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	1,1,1,2-tetrachloroethane	mg/kg	110[#1]		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	Ethylbenzene	mg/kg	5.700[#1]		<0.01	<0.01	-	67	0	<0.01	<0.05	0.008	0.005	0.0072	0	0
	Xylene (m & p)	mg/kg			<0.01	-	-	49	0	<0.01	<0.1	0.015	0.005	0.019	0	0
	Xylene Total	mg/kg	5.900[#1]		<0.01	<0.01	-	67	0	<0.01	<0.15	0.016	0.005	0.025	0	0
	Xylene (o)	mg/kg	6.600[#1]		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	Styrene	mg/kg	3.300[#3]		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	Bromoform	mg/kg	760[#3]		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	Isopropylbenzene	mg/kg	1.400[#3]		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	1,1,2,2-tetrachloroethane	mg/kg	270[#1]		-	-	-	12	0	<0.05	<0.05	0.025	0.025	0	0	0
	Bromobenzene	mg/kg	97[#3]		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	1,2,3-trichloropropane	mg/kg	0.11[#2]		<0.01	-	-	49	3	<0.01	<0.05	0.011	0.005	0.01	0	0
	n-propylbenzene	mg/kg	4.100[#3]		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0

				Location_Code	MS\TP09	MS\TP10	MS\TP10									
				Sample_Depth_Range	3	0.3	0.5									
				Sampled_Date_Time	16/06/2021	21/06/2021	21/06/2021	Statistical Summary								
			Human Health GAC Commercial Industrial	Human Health GAC Commercial Industrial	MG	MG	MG									
Chem_Group	ChemName	output unit	SLOAM_0.58-1.45%TOC	C4SL 0.58-3.48% TOC				Number of Results	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	Median Concentration	Standard Deviation	Number of Guideline Exceedances	Number of Guideline Exceedances (Detects Only)
	2-chlorotoluene	mg/kg	23.000#2		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	1,3,5-trimethylbenzene	mg/kg	1.500#2		<0.01	-	-	49	1	<0.01	<0.05	0.0096	0.005	0.0084	0	0
	4-chlorotoluene	mg/kg	23.000#2		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	tert-butylbenzene	mg/kg	120.000#2		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	1,2,4-trimethylbenzene	mg/kg	42#3		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	sec-butylbenzene	mg/kg	120.000#2		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	p-isopropyltoluene	mg/kg			<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	1,3-dichlorobenzene	mg/kg	30#1		<0.01	-	-	49	0	<0.01	<0.01	0.005	0.005	0	0	0
	1,4-dichlorobenzene	mg/kg	4.400#1		<0.01	-	-	49	0	<0.01	<0.01	0.005	0.005	0	0	0
	n-butylbenzene	mg/kg	58.000#2		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	1,2-dichlorobenzene	mg/kg	2.000#1		<0.01	-	-	49	0	<0.01	<0.01	0.005	0.005	0	0	0
	1,2-dibromo-3-chloropropane	mg/kg	0.064#2		<0.01	-	-	49	1	<0.01	<0.05	0.0096	0.005	0.0084	0	0
	1,2,4-trichlorobenzene	mg/kg	220#1		<0.01	-	-	49	0	<0.01	<0.01	0.005	0.005	0	0	0
	Hexachlorobutadiene	mg/kg	31#1		<0.01	-	-	49	0	<0.01	<0.01	0.005	0.005	0	0	0
	1,2,3-trichlorobenzene	mg/kg	102#1		<0.01	-	-	49	0	<0.01	<0.05	0.0095	0.005	0.0084	0	0
	1,2-Dichloroethene	mg/kg	14#3		<0.02	-	-	49	0	<0.02	<0.1	0.019	0.01	0.017	0	0
	Trihalomethanes	mg/kg			<0.04	-	-	49	0	<0.04	<0.2	0.038	0.02	0.034	0	0
	Hexachlorobenzene	mg/kg	110#1		<0.1	-	-	49	0	<0.01	<1	0.048	0.05	0.069	0	0
	Trichlorobenzene (total)	mg/kg			<0.02	-	-	49	0	<0.02	<0.06	0.014	0.01	0.0084	0	0
PAH	Naphthalene	mg/kg	190#1		<0.03	<0.03	<0.03	111	21	<0.01	1.8	0.049	0.015	0.19	0	0
	Acenaphthylene	mg/kg	83.000#1		0.06	<0.03	<0.03	111	7	<0.01	0.14	0.022	0.015	0.023	0	0
	Acenaphthene	mg/kg	84.000#1		<0.03	<0.03	<0.03	111	8	<0.01	2.2	0.042	0.015	0.21	0	0
	Fluorene	mg/kg	63.000#1		0.1	<0.03	<0.03	111	12	<0.01	1.7	0.043	0.015	0.17	0	0
	Phenanthrene	mg/kg	22.000#1		0.49	<0.03	<0.03	111	45	<0.01	11	0.24	0.015	1.1	0	0
	Anthracene	mg/kg	520.000#1		0.14	<0.03	<0.03	111	19	<0.01	3.1	0.061	0.015	0.3	0	0
	Fluoranthene	mg/kg	23.000#1		0.62	<0.03	0.03	111	48	<0.01	14	0.33	0.015	1.5	0	0
	Pyrene	mg/kg	54.000#1		0.45	<0.03	<0.03	111	44	<0.01	12	0.29	0.015	1.3	0	0
	Benz(a)anthracene	mg/kg	170#1		0.14	<0.03	<0.03	111	40	<0.01	5.7	0.13	0.015	0.55	0	0
	Chrysene	mg/kg	350#1		0.13	<0.03	<0.03	111	43	<0.01	4.5	0.12	0.015	0.45	0	0
	Benzo(a) pyrene	mg/kg	35#1	77#4	0.07	<0.03	<0.03	111	27	<0.01	4.5	0.11	0.015	0.44	0	0
	Indeno(1,2,3-c,d)pyrene	mg/kg	500#1		0.03	<0.03	<0.03	111	26	<0.01	2.3	0.066	0.015	0.23	0	0
	Dibenz(a,h)anthracene	mg/kg	3.5#1		<0.03	<0.03	<0.03	111	12	<0.01	0.75	0.027	0.015	0.071	0	0
	Benzo(g,h,i)perylene	mg/kg	3.900#1		0.05	<0.03	<0.03	111	34	<0.01	2.7	0.079	0.015	0.27	0	0
	Benzo(b)fluoranthene	mg/kg	44#1		0.15	<0.03	<0.03	111	44	<0.01	6.2	0.18	0.015	0.61	0	0
	Benzo(k)fluoranthene	mg/kg	1.200#1		0.05	<0.03	<0.03	111	27	<0.01	2.2	0.07	0.015	0.22	0	0
	Benzo(b)&(k)fluoranthene	mg/kg			0.2	<0.06	<0.06	111	45	<0.01	8.4	0.26	0.03	0.84	0	0
	PAHs (sum of 4)	mg/kg			0.28	<0.12	<0.12	111	45	<0.04	13.4	0.41	0.06	1.3	0	0
	PAH 16 Total	mg/kg			2.5	<0.1	<0.1	93	44	<0.1	74	1.8	0.05	7.8	0	0
	benzo(g,h,i)perylene + indeno(1,2,3-cd)pyrene	mg/kg			0.08	<0.06	<0.06	111	35	<0.02	5	0.15	0.03	0.49	0	0
	Benzo(a)pyrene (surrogate marker for PAH mixtu	mg/kg	15#1		0.07	<0.03	<0.03	111	27	<0.01	4.5	0.11	0.015	0.44	0	0
SVOC	2,3,4,6-tetrachlorophenol	mg/kg	25.000#2		<0.1	-	-	38	0	<0.1	<1	0.062	0.05	0.073	0	0
	2,3,5,6-Tetrachlorophenol	mg/kg			<0.1	-	-	38	0	<0.1	<1	0.062	0.05	0.073	0	0
	2,6-dichlorophenol	mg/kg			<0.01	<0.01	-	25	0	<0.01	<0.01	0.005	0.005	0	0	0
	Aniline	mg/kg	400#2		<0.1	-	-	38	0	<0.1	<1	0.062	0.05	0.073	0	0
	2-chlorophenol	mg/kg	5.800#2		<0.1	-	-	49	0	<0.01	<1	0.048	0.05	0.069	0	0
	2-methylphenol	mg/kg	160000#3		<0.1	-	-	49	0	<0.01	<1	0.048	0.05	0.069	0	0
	2-nitrophenol	mg/kg			-	-	-	12	0	<0.01	<0.01	0.005	0.005	0	0	0
	2,4-dichlorophenol	mg/kg	2.500#2		<0.01	<0.01	-	55	0	<0.01	<1	0.029	0.005	0.068	0	0
	2,4-dimethylphenol	mg/kg	16.000#3		<0.01	<0.01	-	55	0	<0.01	<1	0.029	0.005	0.068	0	0
	2,4,5-trichlorophenol	mg/kg	82.000#2		<0.1	-	-	49	0	<0.01	<1	0.048	0.05	0.069	0	0
	2,4,6-trichlorophenol	mg/kg	210#2		<0.01	<0.01	-	55	0	<0.01	<1	0.029	0.005	0.068	0	0
	4-chloro-3-methylphenol	mg/kg	82.000#2		<0.01	<0.01	-	55	0	<0.01	<1	0.029	0.005	0.068	0	0
	4-methylphenol	mg/kg	160000#3		<0.01	<0.01	-	36	0	<0.01	<0.01	0.005	0.005	0	0	0
	4-nitrophenol	mg/kg			<0.1	-	-	49	2	<0.01	<1	0.054	0.05	0.075	0	0
	Pentachlorophenol	mg/kg	400#1		<0.1	-	-	49	0	<0.01	<1	0.048	0.05	0.069	0	0
	Phenol	mg/kg	440#1		<0.01	<0.01	-	55	0	<0.01	<1	0.029	0.005	0.068	0	0
	2-chloronaphthalene	mg/kg	390#3		<0.1	-	-	49	0	<0.01	<1	0.048	0.05	0.069	0	0
	2-methylnaphthalene	mg/kg	3.000#2		<0.1	-	-	49	3	<0.01	<1	0.055	0.05	0.075	0	0
	Bis(2-ethylhexyl) phthalate	mg/kg	85.000#3		<0.1	-	-	49	0	<0.1	<1	0.059	0.05	0.064	0	0
	Butyl benzyl phthalate	mg/kg	940.000#3		<0.1	-	-	49	0	<0.1	<1	0.059	0.05	0.064	0	0
	Di-n-butyl phthalate	mg/kg	15.000#3		<0.1	-	-	49	0	<0.1	<1	0.059	0.05	0.064	0	0
	Di-n-octyl phthalate	mg/kg	89.000#3		<0.1	-	-	49	0	<0.1	<1	0.059	0.05	0.064	0	0
	Diethylphthalate	mg/kg	150.000#3		<0.1	-	-	49	0	<0.1	<1	0.059	0.05	0.064	0	0
	Dimethyl phthalate	mg/kg			<0.1	-	-	49	0	<0.1	<1	0.059	0.05	0.064	0	0
	2-nitroaniline	mg/kg	8.000#2		<0.1	-	-	49	0	<0.01	<1	0.048	0.05	0.069	0	0

				Location_Code	MS\TP09	MS\TP10	MS\TP10									
				Sample_Depth_Range	3	0.3	0.5									
				Sampled_Date_Time	16/06/2021	21/06/2021	21/06/2021									
			Human Health GAC Commercial Industrial	Human Health GAC Commercial Industrial	MG	MG	MG	Statistical Summary								
Chem_Group	ChemName	output unit	SLOAM_0.58-1.45%TOC	C4SL 0.58-3.48% TOC				Number of Results	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	Median Concentration	Standard Deviation	Number of Guideline Exceedances	Number of Guideline Exceedances (Detects Only)
	3-nitroaniline	mg/kg			<0.1	-	-	49	0	<0.01	<1	0.048	0.05	0.069	0	0
	4-bromophenyl phenyl ether	mg/kg			<0.1	-	-	49	0	<0.01	<1	0.048	0.05	0.069	0	0
	4-chloroaniline	mg/kg	11[#2]		-	-	-	12	0	<0.01	<0.01	0.005	0.005	0	0	0
	4-chlorophenyl phenyl ether	mg/kg			<0.1	-	-	49	0	<0.01	<1	0.048	0.05	0.069	0	0
	4-nitroaniline	mg/kg	110[#2]		<0.1	-	-	49	0	<0.01	<1	0.048	0.05	0.069	0	0
	Azobenzene	mg/kg	26[#2]		<0.1	-	-	49	0	<0.01	<1	0.048	0.05	0.069	0	0
	Bis(2-chloroethoxy) methane	mg/kg	2.500[#2]		<0.1	-	-	49	0	<0.01	<1	0.048	0.05	0.069	0	0
	Bis(2-chloroethyl)ether	mg/kg	1[#2]		-	-	-	12	0	<0.01	<0.01	0.005	0.005	0	0	0
	Carbazole	mg/kg			<0.1	-	-	49	2	<0.01	<1	0.054	0.05	0.075	0	0
	Dibenzofuran	mg/kg	1.200[#2]		<0.1	-	-	49	2	<0.01	<1	0.056	0.05	0.08	0	0
	Hexachlorocyclopentadiene	mg/kg	7.5[#2]		<0.1	-	-	49	0	<0.01	<1	0.048	0.05	0.069	0	0
	Hexachloroethane	mg/kg	22[#3]		-	-	-	12	0	<0.01	<0.01	0.005	0.005	0	0	0
	Isophorone	mg/kg	2.400[#2]		-	-	-	12	0	<0.01	<0.01	0.005	0.005	0	0	0
	N-nitrosodi-n-propylamine	mg/kg	0.33[#2]		-	-	-	12	0	<0.01	<0.01	0.005	0.005	0	0	0
	Benzyl alcohol	mg/kg	82.000[#2]		<0.1	-	-	38	0	<0.1	<1	0.062	0.05	0.073	0	0
	Bis(2-chloroisopropyl)ether	mg/kg			<0.1	-	-	38	0	<0.1	<1	0.062	0.05	0.073	0	0
	2,6-Dimethylphenol	mg/kg	490[#2]		<0.01	<0.01	-	25	0	<0.01	<0.01	0.005	0.005	0	0	0
	4,6-Dinitro-2-methylphenol	mg/kg	66[#2]		<0.1	-	-	38	0	<0.1	<1	0.062	0.05	0.073	0	0
	Total Monohydric Phenols (S) Corrected	mg/kg			<0.3	<0.3	<0.3	93	1	<0.3	0.4	0.15	0.15	0.026	0	0
	Diphenylamine	mg/kg	82.000[#2]		<0.1	-	-	38	0	<0.1	<1	0.062	0.05	0.073	0	0
PCBs	PCB congener 28 + 31	mg/kg			-	<0.01	-	19	1	<0.01	0.1	0.01	0.005	0.022	0	0
	Tetrachlorobiphenyl, 3,3,4,4- (PCB 77)	mg/kg	0.16[#2]		-	<0.01	-	19	0	<0.01	<0.01	0.005	0.005	0	0	0
	Tetrachlorobiphenyl, 3,4,4,5- (PCB 81)	mg/kg	0.048[#2]		-	<0.01	-	19	0	<0.01	<0.01	0.005	0.005	0	0	0
	Pentachlorobiphenyl, 2,3,3,4,4- (PCB 105)	mg/kg	0.49[#2]		-	<0.01	-	19	0	<0.01	<0.01	0.005	0.005	0	0	0
	Pentachlorobiphenyl, 2,3,4,4,5- (PCB 114)	mg/kg	0.5[#2]		-	<0.01	-	19	0	<0.01	<0.01	0.005	0.005	0	0	0
	PCB 118	mg/kg	0.49[#2]		-	<0.01	-	19	0	<0.01	<0.01	0.005	0.005	0	0	0
	Pentachlorobiphenyl, 2,3,4,4,5- (PCB 123)	mg/kg	0.49[#2]		-	<0.01	-	19	0	<0.01	<0.01	0.005	0.005	0	0	0
	Pentachlorobiphenyl, 3,3,4,4,5- (PCB 126)	mg/kg	0.00015[#2]		-	<0.01	-	19	0	<0.01	<0.01	0.005	0.005	0	19	0
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 156)	mg/kg	0.5[#2]		-	<0.01	-	19	0	<0.01	<0.01	0.005	0.005	0	0	0
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 157)	mg/kg	0.5[#2]		-	<0.01	-	19	0	<0.01	<0.01	0.005	0.005	0	0	0
	Hexachlorobiphenyl, 2,3,4,4,5,5- (PCB 167)	mg/kg	0.51[#2]		-	<0.01	-	19	0	<0.01	<0.01	0.005	0.005	0	0	0
	Hexachlorobiphenyl, 3,3,4,4,5,5- (PCB 169)	mg/kg	0.00051[#2]		-	<0.01	-	19	0	<0.01	<0.01	0.005	0.005	0	19	0
	Heptachlorobiphenyl, 2,3,3,4,4,5,5- (PCB 189)	mg/kg	0.52[#2]		-	<0.01	-	19	0	<0.01	<0.01	0.005	0.005	0	0	0
	PCB 52	mg/kg			-	<0.01	-	19	1	<0.01	0.07	0.0084	0.005	0.015	0	0
	PCB 101	mg/kg			-	<0.01	-	19	1	<0.01	0.01	0.0053	0.005	0.0011	0	0
	PCB 138	mg/kg			-	<0.01	-	19	0	<0.01	<0.01	0.005	0.005	0	0	0
	PCB 153	mg/kg			-	<0.01	-	19	0	<0.01	<0.01	0.005	0.005	0	0	0
	PCB 180	mg/kg			-	<0.01	-	19	0	<0.01	<0.01	0.005	0.005	0	0	0
	Total PCB 7 Congeners	mg/kg			-	<0.01	-	19	1	<0.01	0.18	0.014	0.005	0.04	0	0
Explosives	1,3-Dinitrobenzene	mg/kg	82[#2]		<0.1	-	-	38	0	<0.1	<1	0.062	0.05	0.073	0	0
	2,4-Dinitrotoluene	mg/kg	3.700[#3]		<0.1	-	-	49	0	<0.01	<1	0.048	0.05	0.069	0	0
	2,6-dinitrotoluene	mg/kg	1.900[#3]		<0.1	-	-	49	0	<0.01	<1	0.048	0.05	0.069	0	0
	Nitrobenzene	mg/kg	22[#2]		-	-	-	12	0	<0.01	<0.01	0.005	0.005	0	0	0
Metals	Arsenic	mg/kg	640[#1]	640 [#4]	6.2	8.7	18	101	101	3.1	180	13	8.3	19	0	0
	Beryllium	mg/kg	12[#1]		6.3	1.4	1.3	101	87	<0.2	8.1	2.5	1.4	2.5	0	0
	Cadmium	mg/kg	190[#1]	410 [#4]	<0.1	0.2	0.4	101	57	<0.1	22	1	0.1	3.1	0	0
	Copper	mg/kg	68.000[#1]		9.4	23	35	101	101	3.5	2700	59	15	270	0	0
	Iron	mg/kg	820.000[#2]		-	-	-	8	8	6200	73000	37900	38000	23072	0	0
	Lead	mg/kg	2.300[#4]	2.300 [#4]	7.2	28	110	101	101	0.9	1000	75	19	165	0	0
	Mercury	mg/kg	1100[#1]		<0.05	<0.05	0.11	101	16	<0.05	8.4	0.15	0.025	0.85	0	0
	Nickel	mg/kg	980[#1]		2.2	32	25	101	94	<1	86	17	7.7	19	0	0
	Selenium	mg/kg	12.000[#1]		2.4	<0.5	<0.5	101	62	<0.5	14	1.9	1.1	2.4	0	0
	Vanadium	mg/kg	9.000[#1]		110	48	50	101	101	8.7	2500	304	50	569	0	0
	Zinc	mg/kg	730.000[#1]		19	80	220	101	101	3.5	4100	220	52	582	0	0
	Boron (Water Soluble)	mg/kg			3.3	1	1.3	101	99	<0.2	17	2.9	2.2	2.6	0	0
	Chromium (hexavalent)	mg/kg	33[#1]	49 [#4]	<1	<1	<1	101	0	<1	<1	0.5	0.5	0	0	0
	Chromium (Trivalent)	mg/kg	8.600[#1]		30	35	31	101	101	2.4	990	106	26	192	0	0
Inorganics	Cyanide (Free)	mg/kg			<0.1	0.2	0.2	93	6	<0.1	0.2	0.056	0.05	0.028	0	0
	Cyanide Total	mg/kg	150[#2]		<0.1	0.2	0.3	93	38	<0.1	16	0.35	0.05	1.7	0	0
	Thiocyanate	mg/kg	230[#2]		<0.6	0.8	1	93	21	<0.6	2.8	0.5	0.3	0.47	0	0
	Nitrate (as NO3-)	mg/kg	1.900.000[#2]		7.8	1.5	8.1	92	79	<1	54	6.4	4.9	6.8	0	0
	Sulphide	mg/kg			2200	52	20	93	88	<10	14000	1009	350	1875	0	0
	Sulphur as S	mg/kg			5700	400	300	93	93	200	17000	3473	2900	2905	0	0
	Soluble Sulphate 2:1 extract as SO4 BRE	g/l			0.67	0.059	0.048	93	93	0.019	2.9	0.63	0.43	0.59	0	0
	Elemental Sulphur	mg/kg			3.8	<0.75	<0.75	93	67	<0.75	690	29	4.3	80	0	0

Chem_Group	ChemName	output unit	Human Health GAC Commercial Industrial SLOAM_0.58-1.45%TOC	Human Health GAC Commercial Industrial C4SL 0.58-3.48% TOC	MS\TP09	MS\TP10	MS\TP10	Statistical Summary: Number of Results	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	Median Concentration	Standard Deviation	Number of Guideline Exceedances	Number of Guideline Exceedances (Detects Only)
				Sample_Depth_Range	3	0.3	0.5									
				Sampled_Date_Time	16/06/2021	21/06/2021	21/06/2021									
					MG	MG	MG									
Other	Organic Matter	%			0.3	1.9	2.7	93	92	<0.1	3.4	1.1	1	0.74	0	0
	Moisture	%			12	17	19	81	81	2.2	26	13	13	6.4	0	0
	TOC	%			-	-	-	1	1	0.00028	0.00028		0.00028		0	0
Asbestos	Asbestos Quantification - Total - %	%			-	-	-	7	1	<0.001	0.001	0.00057	0.0005	0.00019	0	0
	Asbestos Identification	None			0	0	0	50	50	0	1	0.16	0	0.37	0	0
Field	pH	pH_Units	**11.5**		10.6	8.1	8	93	93	5.6	12.2	9.9	10.1	1.3	7	7
MISC	1,2-Dinitrobenzene	mg/kg	**82**#2		<0.1	-	-	38	0	<0.1	<1	0.062	0.05	0.073	0	0
	1,4-dinitrobenzene	mg/kg	**82**#2		<0.1	-	-	38	0	<0.1	<1	0.062	0.05	0.073	0	0
	Decane	mg/kg			-	-	-	1	1	0.6845	0.6845		0.6845		0	0
	Natural Moisture Content	%			-	-	-	12	12	13.1	31.3	23	24.25	5.4	0	0
	3/4-Methylphenol (m/p-cresol)	mg/kg			<0.1	-	-	38	0	<0.1	<1	0.062	0.05	0.073	0	0

Env Stds Comments
#1:LQM/CIEH S4ULs 2015
#2:USEPA RSL (May 2020)
#3:EIC/AGS/CL:AIRE
#4:Defra C4SL 12/2014

C4SL 2021 - Vinyl chloride, tetrachloroethene, trichloroethene
GAC: Generic Assessment Criteria
(blank): No assessment criteria available
 - : Not analysed
HH: Human Health

1,2-Dichloroethene - cis 1,2-dichloroethene used
2-methylphenol - cresol total used
4-methylphenol -cresol total used
pH - Hazardous Waste Value - corrosive

XXX	Exceedance of HH Soil. Commercial/Industrial. Sandy Loam. TOC>=0.58 to <1.45%
XXX	Exceedance of HH Soil. C4SL Commercial (England, Ireland, Northern Ireland, Wales. TOC>=0.58 to <3.48 &>0.58 to <1.45%

MG - Made Ground
TFD-S - Tidal Flat Deposits - Sand
TFD-C - Tidal F;at Deposits - Clay
GT - Glacial Till
RMU - Redcar Mudstone Formation

TPH Analytical Fractions	Human Health Commercial Industrial GAC (mg/kg)	Location	LF\BH02	LF\TP01	LF\TP01	LF\TP02	LF\TP03	MS\BH02	MS\BH02	MS\BH02	MS\BH03
		Sample Top Depth (mg/kg)	8.7	0.3	1	1	4	2.25	10.2	11.2	1
>C5-C6 Aliphatics	3200		3.125E-06	3.125E-06	3.125E-06	3.125E-06	3.125E-06	3.125E-06	3.125E-06	3.125E-06	3.125E-06
>C6-C8 Aliphatics	7800		1.282E-06	1.282E-06	1.282E-06	1.282E-06	1.282E-06	1.282E-06	1.282E-06	1.282E-06	1.282E-06
>C8-C10 Aliphatics	2000		0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005
>C10-C12 Aliphatics	9700		0.0001546	0.0001546	0.0001546	0.0001546	0.0001546	0.0546392	0.0001546	0.0001546	0.0001546
>C12-C16 Aliphatics	59000		4.746E-05	2.034E-05	2.034E-05	2.034E-05	2.034E-05	0.0088136	2.034E-05	2.034E-05	2.034E-05
>C16-C35 Aliphatics	1600000		5.188E-06	3.063E-06	3.063E-06	3.063E-06	3.063E-06	0.000825	3.063E-06	3.063E-06	3.063E-06
>EC5-EC7 Aromatics	26000		3.846E-07	3.846E-07	3.846E-07	3.846E-07	3.846E-07	3.846E-07	3.846E-07	3.846E-07	3.846E-07
>EC7-EC8 Aromatics	56000		1.786E-07	1.786E-07	1.786E-07	1.786E-07	1.786E-07	1.786E-07	1.786E-07	1.786E-07	1.786E-07
>EC8-EC10 Aromatics	3500		2.857E-06	2.857E-06	2.857E-06	2.857E-06	2.857E-06	2.857E-06	2.857E-06	2.857E-06	2.857E-06
>EC10-EC12 Aromatics	16000		5.625E-05	5.625E-05	5.625E-05	5.625E-05	5.625E-05	5.625E-05	5.625E-05	5.625E-05	5.625E-05
>EC12-EC16 Aromatics	36000		1.389E-05	1.389E-05	1.389E-05	1.389E-05	1.389E-05	1.389E-05	1.389E-05	1.389E-05	1.389E-05
>EC16-EC21 Aromatics	28000		2.143E-05	2.143E-05	2.143E-05	2.143E-05	2.143E-05	2.143E-05	2.143E-05	6.071E-05	2.143E-05
>EC21-EC35 Aromatics	28000		0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.0005357	0.00005
Hazard Index			**0.0003617**	**0.0003324**	**0.0003324**	**0.0003324**	**0.0003324**	**0.0644321**	**0.0003324**	**0.0008574**	**0.0003324**

TPH Analytical Fractions	***Human Health Commercial Industrial GAC (mg/kg)***	***Location***	MS\BH03	MS\BH03	MS\BH03	MS\BH04	MS\BH04	MS\BH05	MS\BH06	MS\BH06	MS\BH07
		Sample Top Depth (mg/kg)	2	11	23.4	0.3	1	17.3	0.5	5.3	4.2
>C5-C6 Aliphatics	3200		3.125E-06	3.125E-06	3.125E-06	3.125E-06	3.125E-06	3.125E-06	3.125E-06	3.125E-06	3.125E-06
>C6-C8 Aliphatics	7800		1.282E-06	1.282E-06	1.282E-06	1.282E-06	1.282E-06	1.282E-06	1.282E-06	1.282E-06	1.282E-06
>C8-C10 Aliphatics	2000		0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005
>C10-C12 Aliphatics	9700		0.0001546	0.0001546	0.0001546	0.0001546	0.0001546	0.0001546	0.0001546	0.0001546	0.0012371
>C12-C16 Aliphatics	59000		2.034E-05	2.034E-05	2.034E-05	2.034E-05	2.034E-05	2.034E-05	0.0002034	2.034E-05	0.0028814
>C16-C35 Aliphatics	1600000		3.063E-06	3.063E-06	3.063E-06	3.063E-06	3.063E-06	3.063E-06	0.0009	3.063E-06	0.00115
>EC5-EC7 Aromatics	26000		3.846E-07	3.846E-07	3.846E-07	3.846E-07	3.846E-07	3.846E-07	3.846E-07	3.846E-07	3.846E-07
>EC7-EC8 Aromatics	56000		1.786E-07	1.786E-07	1.786E-07	1.786E-07	1.786E-07	1.786E-07	1.786E-07	1.786E-07	1.786E-07
>EC8-EC10 Aromatics	3500		2.857E-06	2.857E-06	2.857E-06	2.857E-06	2.857E-06	2.857E-06	2.857E-06	2.857E-06	2.857E-06
>EC10-EC12 Aromatics	16000		5.625E-05	5.625E-05	5.625E-05	5.625E-05	5.625E-05	5.625E-05	5.625E-05	5.625E-05	0.0002563
>EC12-EC16 Aromatics	36000		1.389E-05	1.389E-05	1.389E-05	1.389E-05	1.389E-05	1.389E-05	0.0001111	1.389E-05	0.0041667
>EC16-EC21 Aromatics	28000		2.143E-05	2.143E-05	2.143E-05	2.143E-05	2.143E-05	2.143E-05	0.0021429	2.143E-05	0.0303571
>EC21-EC35 Aromatics	28000		0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.0314286	0.00005	0.0892857
Hazard Index			**0.0003324**	**0.0003324**	**0.0003324**	**0.0003324**	**0.0003324**	**0.0003324**	**0.0350096**	**0.0003324**	**0.1293471**

TPH Analytical Fractions	Human Health Commercial Industrial GAC (mg/kg)	Location	MS\BH07	MS\BH07	MS\BH08	MS\BH09	MS\BH10	MS\BH10	MS\BH10	MS\BH10	MS\BH11
		Sample Top Depth (mg/kg)	4.65	15.7	0.36	0.5	1	4	11.3	19.1	4
>C5-C6 Aliphatics	3200		3.125E-06	3.125E-06	3.125E-06	3.125E-06	3.125E-06	3.125E-06	3.125E-06	3.125E-06	3.125E-06
>C6-C8 Aliphatics	7800		1.282E-06	1.282E-06	1.282E-06	1.282E-06	1.282E-06	1.282E-06	1.282E-06	1.282E-06	1.282E-06
>C8-C10 Aliphatics	2000		0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005
>C10-C12 Aliphatics	9700		0.0001546	0.0001546	0.0001546	0.0001546	0.0001546	0.0001546	0.0001546	0.0001546	0.0001546
>C12-C16 Aliphatics	59000		2.034E-05	2.034E-05	2.034E-05	2.034E-05	2.034E-05	2.034E-05	2.034E-05	2.034E-05	2.034E-05
>C16-C35 Aliphatics	1600000		3.063E-06	3.063E-06	3.063E-06	3.063E-06	3.063E-06	3.063E-06	3.063E-06	3.063E-06	3.063E-06
>EC5-EC7 Aromatics	26000		3.846E-07	3.846E-07	3.846E-07	3.846E-07	3.846E-07	3.846E-07	3.846E-07	3.846E-07	3.846E-07
>EC7-EC8 Aromatics	56000		1.786E-07	1.786E-07	1.786E-07	1.786E-07	1.786E-07	1.786E-07	1.786E-07	1.786E-07	1.786E-07
>EC8-EC10 Aromatics	3500		2.857E-06	2.857E-06	2.857E-06	2.857E-06	2.857E-06	2.857E-06	2.857E-06	2.857E-06	2.857E-06
>EC10-EC12 Aromatics	16000		0.0001688	5.625E-05	5.625E-05	5.625E-05	5.625E-05	5.625E-05	5.625E-05	5.625E-05	5.625E-05
>EC12-EC16 Aromatics	36000		6.389E-05	1.389E-05	1.389E-05	1.389E-05	1.389E-05	1.389E-05	1.389E-05	1.389E-05	1.389E-05
>EC16-EC21 Aromatics	28000		0.0004286	2.143E-05	2.143E-05	2.143E-05	2.143E-05	2.143E-05	2.143E-05	2.143E-05	2.143E-05
>EC21-EC35 Aromatics	28000		0.0021071	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005
Hazard Index			**0.0029592**	**0.0003324**	**0.0003324**	**0.0003324**	**0.0003324**	**0.0003324**	**0.0003324**	**0.0003324**	**0.0003324**

TPH Analytical Fractions	*Human Health Commercial Industrial GAC (mg/kg)*	*Location*	MS\BH11	MS\BH12	MS\BH14	MS\BH14	MS\BH14	MS\BH15	MS\BH15	MS\BH16	MS\BH16
		Sample Top Depth (mg/kg)	5	1	4.2	14.2	17.5	1	2.7	0.5	3.3
>C5-C6 Aliphatics	3200		3.125E-06	3.125E-06	3.125E-06	3.125E-06	3.125E-06	3.125E-06	3.125E-06	3.125E-06	3.125E-06
>C6-C8 Aliphatics	7800		1.282E-06	1.282E-06	1.282E-06	1.282E-06	1.282E-06	1.282E-06	1.282E-06	1.282E-06	1.282E-06
>C8-C10 Aliphatics	2000		0.000005	0.000005	0.00002	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005
>C10-C12 Aliphatics	9700		0.0001546	0.0001546	0.0001546	0.0001546	0.0001546	0.0001546	0.0001546	0.0001546	0.0001546
>C12-C16 Aliphatics	59000		2.034E-05	2.034E-05	2.034E-05	2.034E-05	2.034E-05	2.034E-05	2.034E-05	2.034E-05	2.034E-05
>C16-C35 Aliphatics	1600000		3.063E-06	3.063E-06	3.063E-06	3.063E-06	3.063E-06	3.063E-06	3.063E-06	2.738E-05	3.063E-06
>EC5-EC7 Aromatics	26000		3.846E-07	3.846E-07	3.846E-07	3.846E-07	3.846E-07	3.846E-07	3.846E-07	3.846E-07	3.846E-07
>EC7-EC8 Aromatics	56000		1.786E-07	1.786E-07	1.786E-07	1.786E-07	1.786E-07	1.786E-07	1.786E-07	1.786E-07	1.786E-07
>EC8-EC10 Aromatics	3500		2.857E-06	2.857E-06	0.00008	2.857E-06	2.857E-06	2.857E-06	2.857E-06	2.857E-06	2.857E-06
>EC10-EC12 Aromatics	16000		5.625E-05	5.625E-05	5.625E-05	5.625E-05	5.625E-05	5.625E-05	5.625E-05	0.00015	5.625E-05
>EC12-EC16 Aromatics	36000		1.389E-05	1.389E-05	1.389E-05	1.389E-05	1.389E-05	1.389E-05	1.389E-05	2.222E-05	1.389E-05
>EC16-EC21 Aromatics	28000		2.143E-05	2.143E-05	2.143E-05	2.143E-05	2.143E-05	2.143E-05	2.143E-05	0.000075	2.143E-05
>EC21-EC35 Aromatics	28000		0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.0011786	0.00005
Hazard Index			**0.0003324**	**0.0003324**	**0.0004246**	**0.0003324**	**0.0003324**	**0.0003324**	**0.0003324**	**0.0016410**	**0.0003324**

TPH Analytical Fractions	*Human Health Commercial Industrial GAC (mg/kg)*	*Location*	MS\BH16	MS\BH16	MS\TP01	MS\TP04	MS\TP05	MS\TP05	MS\TP06	MS\TP06	MS\TP07
		Sample Top Depth (mg/kg)	4.2	5	4	4	1	2	1.2	3.8	2
>C5-C6 Aliphatics	3200		3.125E-06	3.125E-06	3.125E-06	3.125E-06	3.125E-06	3.125E-06	3.125E-06	3.125E-06	3.125E-06
>C6-C8 Aliphatics	7800		1.282E-06	1.282E-06	1.282E-06	1.282E-06	1.282E-06	1.282E-06	1.282E-06	1.282E-06	1.282E-06
>C8-C10 Aliphatics	2000		0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005
>C10-C12 Aliphatics	9700		0.0001546	0.0001546	0.0001546	0.0001546	0.0001546	0.0001546	0.0001546	0.0001546	0.0001546
>C12-C16 Aliphatics	59000		2.034E-05	2.034E-05	2.034E-05	2.034E-05	2.034E-05	2.034E-05	2.034E-05	0.0042373	2.034E-05
>C16-C35 Aliphatics	1600000		3.063E-06	3.063E-06	3.063E-06	3.063E-06	3.063E-06	3.063E-06	4.438E-05	0.000725	3.063E-06
>EC5-EC7 Aromatics	26000		3.846E-07	3.846E-07	3.846E-07	3.846E-07	3.846E-07	3.846E-07	3.846E-07	3.846E-07	3.846E-07
>EC7-EC8 Aromatics	56000		1.786E-07	1.786E-07	1.786E-07	1.786E-07	1.786E-07	1.786E-07	1.786E-07	1.786E-07	1.786E-07
>EC8-EC10 Aromatics	3500		2.857E-06	2.857E-06	2.857E-06	2.857E-06	2.857E-06	2.857E-06	2.857E-06	2.857E-06	2.857E-06
>EC10-EC12 Aromatics	16000		5.625E-05	5.625E-05	5.625E-05	5.625E-05	5.625E-05	5.625E-05	0.0002	0.0001688	5.625E-05
>EC12-EC16 Aromatics	36000		1.389E-05	1.389E-05	1.389E-05	1.389E-05	1.389E-05	1.389E-05	0.0001472	0.0055556	1.389E-05
>EC16-EC21 Aromatics	28000		2.143E-05	2.143E-05	2.143E-05	2.143E-05	2.143E-05	2.143E-05	0.0012143	0.0392857	2.143E-05
>EC21-EC35 Aromatics	28000		0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.0035	0.0078571	0.00005
Hazard Index			**0.0003324**	**0.0003324**	**0.0003324**	**0.0003324**	**0.0003324**	**0.0003324**	**0.0052937**	**0.0579969**	**0.0003324**

TPH Analytical Fractions	Human Health Commercial Industrial GAC (mg/kg)	Location	MS\TP09	MS\TP09	MS\TP10
		Sample Top Depth (mg/kg)	1	3	0.3
>C5-C6 Aliphatics	3200		3.125E-06	3.125E-06	3.125E-06
>C6-C8 Aliphatics	7800		1.282E-06	1.282E-06	1.282E-06
>C8-C10 Aliphatics	2000		0.000005	0.000005	0.000005
>C10-C12 Aliphatics	9700		0.0001546	0.0001546	0.0001546
>C12-C16 Aliphatics	59000		2.034E-05	2.034E-05	2.034E-05
>C16-C35 Aliphatics	1600000		3.063E-06	3.063E-06	3.063E-06
>EC5-EC7 Aromatics	26000		3.846E-07	3.846E-07	3.846E-07
>EC7-EC8 Aromatics	56000		1.786E-07	1.786E-07	1.786E-07
>EC8-EC10 Aromatics	3500		2.857E-06	2.857E-06	2.857E-06
>EC10-EC12 Aromatics	16000		5.625E-05	5.625E-05	5.625E-05
>EC12-EC16 Aromatics	36000		1.389E-05	1.389E-05	1.389E-05
>EC16-EC21 Aromatics	28000		2.143E-05	2.143E-05	2.143E-05
>EC21-EC35 Aromatics	28000		0.00005	0.00005	0.00005
Hazard Index			**0.0003324**	**0.0003324**	**0.0003324**

			Field_ID	LF\BH01D	LF\BH01S	MS\BH03D	MS\BH03S	MS\BH04D	MS\BH04S	MS\BH05D	MS\BH05S	MS\BH07D	MS\BH07S	MS\BH08D
			Location_Code	LF\BH01	LF\BH01	MS\BH03	MS\BH03	MS\BH04	MS\BH04	MS\BH05	MS\BH05	MS\BH07	MS\BH07	MS\BH08
			Well	D	S	D	S	D	S	D	S	D	S	D
			Sampled_Date_Time	13/08/2021	13/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	11/08/2021
			Monitoring_Unit	RMF	TFD SAND	RMF	TFD SAND	GLACIAL	TFD SAND	RMF	TFD SAND	TFD SAND	MADE GROUND	TFD SAND
Chem_Group	**ChemName**	**output unit**	Controlled Waters GAC_DWS (Groundwater)											
TPH	EPH >C10-C40	µg/L		280	210	3500	170	<10	<10	1000	370	120	280	54
	>C5-C6 Aliphatics	µg/L	**15.000[#1]**	<0.1	<0.1	120	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	>C6-C8 Aliphatics	µg/L	**15.000[#1]**	<0.1	<0.1	210	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	>C8-C10 Aliphatics	µg/L	**300[#1]**	<0.1	<0.1	15	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	>C10-C12 Aliphatics	µg/L	**300[#1]**	6.4	<1	<1	<1	<1	14	6	<1	<1	<1	33
	>C12-C16 Aliphatics	µg/L	**300[#1]**	4.6	<1	<1	<1	<1	5.4	13	<1	<1	<1	8.6
	>C16-C21 Aliphatics	µg/L	**300[#1]**	20	<1	<1	<1	<1	8.2	13	<1	<1	<1	8.2
	>C16-C35 Aliphatics	µg/L		25.9	<2	<2	<2	<2	9.7	27	<2	<2	<2	9.2
	>C21-C35 Aliphatics	µg/L	**300[#1]**	5.9	<1	<1	<1	<1	1.5	14	<1	<1	<1	<1
	>C5-C35 Aliphatics	µg/L		37	<10	340	<10	<10	30	46	<10	<10	<10	51
	>EC5-EC7 Aromatics	µg/L	**1[#2]**	<0.1	<0.1	**58**	<0.1	<0.1	<0.1	<0.1	**5.2**	<0.1	<0.1	<0.1
	>EC7-EC8 Aromatics	µg/L	**700[#1]**	<0.1	<0.1	20	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	>EC8-EC10 Aromatics	µg/L	**300[#1]**	<0.1	<0.1	250	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	>EC10-EC12 Aromatics	µg/L	**90[#1]**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	>EC12-EC16 Aromatics	µg/L	**90[#1]**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	>EC16-EC21 Aromatics	µg/L	**90[#1]**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	>EC21-EC35 Aromatics	µg/L	**90[#1]**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	>EC5-EC35 Aromatics	µg/L		<10	<10	330	<10	<10	<10	<10	<10	<10	<10	<10
	>C5-C35 Aliphatics & Aromatics	µg/L		37	<10	670	<10	<10	30	47	<10	<10	<10	51
VOC	Dichlorodifluoromethane	µg/L	**200[#3]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	MTBE	µg/L	**1.800[#4]**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Chloromethane	µg/L	**190[#3]**	<1	<1	-	2	-	2	-	2	2	2	3
	Vinyl chloride	µg/L	**0.5[#2]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Bromomethane	µg/L	**7.5[#3]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Chloroethane	µg/L	**21.000[#3]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Trichlorofluoromethane	µg/L	**5.200[#3]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,1-dichloroethene	µg/L	**140[#5]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Dichloromethane	µg/L	**20[#5]**	<27	<27	-	<27	-	<27	-	<27	<27	<27	<27
	trans-1,2-dichloroethene	µg/L	**50[#5]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,1-dichloroethane	µg/L	**2.8[#3]**	<1	<1	-	<1	-	<1	-	1	<1	<1	<1
	cis-1,2-dichloroethene	µg/L	**50[#5]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	2,2-dichloropropane	µg/L		<2	<2	-	<2	-	<2	-	<2	<2	<2	<2
	Bromochloromethane	µg/L	**83[#3]**	<4	<4	-	<4	-	<4	-	<4	<4	<4	<4
	Chloroform	µg/L	**100[#2]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,1,1-trichloroethane	µg/L	**2.000[#5]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,1-dichloropropene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Carbon tetrachloride	µg/L	**3[#2]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,2-dichloroethane	µg/L	**3[#2]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Benzene	µg/L	**1[#2]**	<1	<1	**58**	<1	<1	<1	<1	**5 - 5.2**	<1	<1	<1
	Trichloroethene	µg/L	**Use PCE + TCE[#2]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,2-dichloropropane	µg/L	**40[#5]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Dibromomethane	µg/L	**8.3[#3]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Bromodichloromethane	µg/L	**100[#2]**	<4	<4	-	<4	-	<4	-	<4	<4	<4	<4
	cis-1,3-dichloropropene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Toluene	µg/L	**700[#5]**	<1	<1	20	<1	<1	<1	<1	<1	<1	<1	<1
	trans-1,3-dichloropropene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,1,2-trichloroethane	µg/L	**0.28[#3]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Tetrachloroethene	µg/L	**Use PCE + TCE[#2]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,3-dichloropropane	µg/L	**370[#3]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Sum of PCE and TCE	µg/L	**10[#2]**	<2	<2	-	<2	-	<2	-	<2	<2	<2	<2
	Chlorodibromomethane	µg/L	**100[#2]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,2-dibromoethane	µg/L	**0.4[#5]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Chlorobenzene	µg/L	**300[#5]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,1,1,2-tetrachloroethane	µg/L	**0.57[#3]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Ethylbenzene	µg/L	**300[#5]**	<1	<1	210	<1	<1	<1	<1	<1	<1	<1	<1

Chem_Group	ChemName	output unit	Controlled Waters GAC_DWS (Groundwater)	LF\BH01D	LF\BH01S	MS\BH03D	MS\BH03S	MS\BH04D	MS\BH04S	MS\BH05D	MS\BH05S	MS\BH07D	MS\BH07S	MS\BH08D
			Location_Code	LF\BH01	LF\BH01	MS\BH03	MS\BH03	MS\BH04	MS\BH04	MS\BH05	MS\BH05	MS\BH07	MS\BH07	MS\BH08
			Well	D	S	D	S	D	S	D	S	D	S	D
			Sampled_Date_Time	13/08/2021	13/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	11/08/2021
			Monitoring_Unit	RMF	TFD SAND	RMF	TFD SAND	GLACIAL	TFD SAND	RMF	TFD SAND	TFD SAND	MADE GROUND	TFD SAND
	Xylene (m & p)	µg/L		<2	<2	-	<2	-	<2	-	<2	<2	<2	<2
	Xylene Total	µg/L	**500[#5]**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Xylene (o)	µg/L	**190[#3]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Styrene	µg/L	**20[#5]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Bromoform	µg/L	**100[#2]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Isopropylbenzene	µg/L	**450[#3]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,1,2,2-tetrachloroethane	µg/L	**0.076[#3]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Bromobenzene	µg/L	**62[#3]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,2,3-trichloropropane	µg/L	**0.00075[#3]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	n-propylbenzene	µg/L	**660[#3]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	2-chlorotoluene	µg/L	**240[#3]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,3,5-trimethylbenzene	µg/L	**60[#3]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	4-chlorotoluene	µg/L	**250[#3]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	tert-butylbenzene	µg/L	**690[#3]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,2,4-trimethylbenzene	µg/L	**56[#3]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	sec-butylbenzene	µg/L	**2,000[#3]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	p-isopropyltoluene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,3-dichlorobenzene	µg/L		<2	<2	-	<2	-	<2	-	<2	<2	<2	<2
	1,4-dichlorobenzene	µg/L	**300[#5]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	n-butylbenzene	µg/L	**1,000[#3]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,2-dichlorobenzene	µg/L	**1,000[#5]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,2-dibromo-3-chloropropane	µg/L	**1[#5]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,2,4-trichlorobenzene	µg/L	**0.1[#2]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Hexachlorobutadiene	µg/L	**0.1[#2]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,2,3-trichlorobenzene	µg/L	**0.1[#2]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,2-Dichloroethene	µg/L	**50[#5]**	<2	<2	-	<2	-	<2	-	<2	<2	<2	<2
	Trihalomethanes	µg/L	**100[#2]**	<7	<7	-	<7	-	<7	-	<7	<7	<7	<7
	Hexachlorobenzene	µg/L	**0.1[#2]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Trichlorobenzene (total)	µg/L	**0.1[#2]**	<2	<2	-	<2	-	<2	-	<2	<2	<2	<2
PAH	Naphthalene	µg/L	**6[#4]**	0.12	0.16	0.31	0.09	0.46	0.22	0.28	0.12	0.15	0.12	0.42
	Acenaphthylene	µg/L	**18[#4]**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Acenaphthene	µg/L	**18[#4]**	0.05	0.06	<0.01	0.01	0.09	0.04	0.01	0.01	0.17	0.12	0.08
	Fluorene	µg/L	**12[#4]**	0.02	0.02	0.08	0.01	0.04	0.01	0.03	0.02	0.06	0.07	0.02
	Phenanthrene	µg/L	**4[#4]**	<0.01	<0.01	0.2	<0.01	0.01	<0.01	0.03	<0.01	<0.01	0.02	<0.01
	Anthracene	µg/L	**90[#4]**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01
	Fluoranthene	µg/L	**4[#5]**	<0.01	0.01	<0.01	<0.01	0.02	<0.01	0.02	<0.01	<0.01	0.01	<0.01
	Pyrene	µg/L	**9[#4]**	<0.01	0.01	0.02	<0.01	0.02	<0.01	0.02	<0.01	<0.01	0.02	<0.01
	Benz(a)anthracene	µg/L	**3.5[#4]**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Chrysene	µg/L	**7[#4]**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Benzo(a) pyrene	µg/L	**0.01[#2]**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Indeno(1,2,3-c,d)pyrene	µg/L	**Use PAHs (sum of 4)[#2]**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Dibenz(a,h)anthracene	µg/L	**0.07[#4]**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Benzo(g,h,i)perylene	µg/L	**Use PAHs (sum of 4)[#2]**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Benzo(b)fluoranthene	µg/L	**Use PAHs (sum of 4)[#2]**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Benzo(k)fluoranthene	µg/L	**Use PAHs (sum of 4)[#2]**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Benzo(b)&(k)fluoranthene	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	PAHs (sum of 4)	µg/L	**0.1[#2]**	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
	PAH 16 Total	µg/L		<0.2	0.26	0.61	<0.2	0.63	0.28	0.39	<0.2	0.38	0.36	0.52
	benzo(g,h,i)perylene + indeno(1,2,3-cd)pyrene	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Benzo(a)pyrene (surrogate marker for PAH mixture)	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
SVOC	2,3,5,6-Tetrachlorophenol	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	2-chlorophenol	µg/L	**91[#3]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	2-methylphenol	µg/L	**930[#3]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	2,4-dichlorophenol	µg/L	**46[#3]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	2,4-dimethylphenol	µg/L	**360[#3]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1

Chem_Group	ChemName	output unit	Field_ID	LF\BH01D	LF\BH01S	MS\BH03D	MS\BH03S	MS\BH04D	MS\BH04S	MS\BH05D	MS\BH05S	MS\BH07D	MS\BH07S	MS\BH08D
			Location_Code	LF\BH01	LF\BH01	MS\BH03	MS\BH03	MS\BH04	MS\BH04	MS\BH05	MS\BH05	MS\BH07	MS\BH07	MS\BH08
			Well	D	S	D	S	D	S	D	S	D	S	D
			Sampled_Date_Time	13/08/2021	13/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	11/08/2021
			Monitoring_Unit	RMF	TFD SAND	RMF	TFD SAND	GLACIAL	TFD SAND	RMF	TFD SAND	TFD SAND	MADE GROUND	TFD SAND
			Controlled Waters GAC_DWS (Groundwater)											
	2,4,5-trichlorophenol	µg/L	**1.200**[#3]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	2,4,6-trichlorophenol	µg/L	**200**[#5]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	4-chloro-3-methylphenol	µg/L	**1.400**[#3]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	4-nitrophenol	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Pentachlorophenol	µg/L	**9**[#5]	<1	1.4	-	<1	-	<1	-	<1	<1	<1	<1
	Phenol	µg/L	**5.800**[#3]	4.4	7.9	-	3	-	<1	-	3.7	2	5	<1
	2-chloronaphthalene	µg/L	**750**[#3]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	2-methylnaphthalene	µg/L	**36**[#3]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Bis(2-ethylhexyl) phthalate	µg/L	**8**[#5]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Butyl benzyl phthalate	µg/L	**16**[#3]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Di-n-butyl phthalate	µg/L	**900**[#3]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Di-n-octyl phthalate	µg/L	**200**[#3]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Diethylphthalate	µg/L	**15.000**[#3]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Dimethyl phthalate	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	2-nitroaniline	µg/L	**190**[#3]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	3-nitroaniline	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	4-bromophenyl phenyl ether	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	4-chlorophenyl phenyl ether	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	4-nitroaniline	µg/L	**3.8**[#3]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Azobenzene	µg/L	**0.12**[#3]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Bis(2-chloroethoxy) methane	µg/L	**59**[#3]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Carbazole	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Dibenzofuran	µg/L	**7.9**[#3]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Hexachlorocyclopentadiene	µg/L	**0.41**[#3]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1-Methylnaphthalene	µg/L	**1.1**[#3]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Benzyl alcohol	µg/L	**2.000**[#3]	1.7	2.2	-	<1	-	<1	-	1.6	<1	<1	<1
	Bis(2-chloroisopropyl)ether	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Total Monohydric Phenols (S) Corrected	µg/L		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	Diphenylamine	µg/L	**1.300**[#3]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
PCBs	PCB 118+123	µg/L		-	-	-	-	-	-	-	-	<0.6	<0.6	-
	PCB congener 28 + 31	µg/L		-	-	-	-	-	-	-	-	<0.3	<0.3	-
	Tetrachlorobiphenyl, 3,3,4,4- (PCB 77)	µg/L	**0.006**[#3]	-	-	-	-	-	-	-	-	<0.3	<0.3	-
	Tetrachlorobiphenyl, 3,4,4,5- (PCB 81)	µg/L	**0.0004**[#3]	-	-	-	-	-	-	-	-	<0.2	<0.2	-
	Pentachlorobiphenyl, 2,3,3,4,4- (PCB 105)	µg/L	**0.004**[#3]	-	-	-	-	-	-	-	-	<0.2	<0.2	-
	Pentachlorobiphenyl, 2,3,4,4,5- (PCB 114)	µg/L	**0.004**[#3]	-	-	-	-	-	-	-	-	<0.3	<0.3	-
	Pentachlorobiphenyl, 3,3,4,4,5- (PCB 126)	µg/L	**0.0000012**[#3]	-	-	-	-	-	-	-	-	<0.5	<0.5	-
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 156)	µg/L	**0.004**[#3]	-	-	-	-	-	-	-	-	<0.3	<0.3	-
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 157)	µg/L	**0.004**[#3]	-	-	-	-	-	-	-	-	<0.2	<0.2	-
	Hexachlorobiphenyl, 2,3,4,4,5,5- (PCB 167)	µg/L	**0.004**[#3]	-	-	-	-	-	-	-	-	<0.3	<0.3	-
	Hexachlorobiphenyl, 3,3,4,4,5,5- (PCB 169)	µg/L	**0.000004**[#3]	-	-	-	-	-	-	-	-	<0.2	<0.2	-
	Heptachlorobiphenyl, 2,3,3,4,4,5,5- (PCB 189)	µg/L	**0.004**[#3]	-	-	-	-	-	-	-	-	<0.3	<0.3	-
	Total PCB WHO 12	µg/L		-	-	-	-	-	-	-	-	<1	<1	-
	PCB 52	µg/L		-	-	-	-	-	-	-	-	<0.2	<0.2	-
	PCB 101	µg/L		-	-	-	-	-	-	-	-	<0.3	<0.3	-
	PCB 138	µg/L		-	-	-	-	-	-	-	-	<0.2	<0.2	-
	PCB 153	µg/L		-	-	-	-	-	-	-	-	<0.2	<0.2	-
	PCB 180	µg/L		-	-	-	-	-	-	-	-	<0.2	<0.2	-
	Total PCB 7 Congeners	µg/L		-	-	-	-	-	-	-	-	<1	<1	-
Explosives	1,3-Dinitrobenzene	µg/L	**2**[#3]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	2,4-Dinitrotoluene	µg/L	**0.24**[#3]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	2,6-dinitrotoluene	µg/L	**0.049**[#3]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
Metals	Arsenic (Filtered)	µg/L	**10**[#2]	8.3	7	2.8	4.1	1.9	2.6	2.6	4.4	6.4	**13**	**13**
	Beryllium (Filtered)	µg/L	**12**[#5]	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Boron (Filtered)	µg/L	**1.000**[#2]	260	220	73	390	570	590	280	280	380	380	460
	Cadmium (Filtered)	µg/L	**5**[#2]	0.05	0.05	0.08	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03

Chem_Group	ChemName	output unit	Field_ID	LF\BH01D	LF\BH01S	MS\BH03D	MS\BH03S	MS\BH04D	MS\BH04S	MS\BH05D	MS\BH05S	MS\BH07D	MS\BH07S	MS\BH08D
			Location_Code	LF\BH01	LF\BH01	MS\BH03	MS\BH03	MS\BH04	MS\BH04	MS\BH05	MS\BH05	MS\BH07	MS\BH07	MS\BH08
			Well	D	S	D	S	D	S	D	S	D	S	D
			Sampled_Date_Time	13/08/2021	13/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	11/08/2021
			Monitoring_Unit	RMF	TFD SAND	RMF	TFD SAND	GLACIAL	TFD SAND	RMF	TFD SAND	TFD SAND	MADE GROUND	TFD SAND
			Controlled Waters GAC_DWS (Groundwater)											
	Copper (Filtered)	µg/L	**2.000[#2]**	<0.4	0.5	2	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	Iron (Filtered)	µg/L	**200[#2]**	29	12	70	14	**510**	**870**	13	44	26	41	14
	Lead (Filtered)	µg/L	**10[#2]**	<0.09	0.14	0.13	<0.09	<0.09	<0.09	0.09	0.11	0.1	0.16	<0.09
	Mercury (Filtered)	µg/L	**1[#2]**	0.19	0.23	0.03	0.07	<0.01	<0.01	0.72	0.02	0.03	0.33	0.06
	Nickel (Filtered)	µg/L	**20[#2]**	6.5	4.4	**22**	1	0.9	0.6	1	2.9	0.7	2.7	1.5
	Selenium (Filtered)	µg/L	**10[#2]**	4.9	**15**	**27**	4.7	0.71	0.29	**24**	0.69	8.2	**27**	3.8
	Vanadium (Filtered)	µg/L	**86[#3]**	15	15	1.7	14	<0.6	<0.6	14	1.3	2.3	7.6	4.5
	Zinc (Filtered)	µg/L	**6.000[#3]**	2.8	1.6	6	1.7	1.9	2.8	6.2	4.8	5.1	3.7	1.8
	Chromium (hexavalent)	µg/L	**50[#2]**	**83**	**50**	**120**	<7	<7	<7	19	<7	<7	<7	<7
	Chromium (Trivalent) (Filtered)	µg/L	**50[#2]**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Inorganics	Sulphate, Total Potential as SO4	µg/l	**250,000**	**390000**	**690000**	**1100000**	**920000**	**2700000**	**1000000**	210,000	96,000	**840000**	**1100000**	**710000**
	Cyanide (Free)	mg/L	**0.05[#2]**	<0.0001	<0.02 - 0.0002	<0.02 - 0.0002	<0.02 - 0.0005	<0.02 - 0.001	<0.02 - 0.0005	<0.02 - 0.0013	<0.02 - 0.0006	<0.02 - 0.0043	<0.02 - 0.0012	<0.02 - 0.0007
	Cyanide Total	mg/L	**0.05[#2]**	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.042	<0.04	<0.04	<0.04
	Thiocyanate	mg/L	**0.004[#3]**	**0.025**	**0.1**	**0.026**	<0.02	<0.02	<0.02	**0.41**	**2.3**	<0.02	**0.052**	**0.044**
	Nitrate (as NO3-)	mg/L	**50[#2]**	-	-	-	-	-	-	1.5	0.4	-	-	-
	Nitrite (as NO2-)	mg/L	**0.5[#2]**	-	-	-	-	-	-	<0.1	0.45	-	-	-
	Nitrate (as N)	mg/L		0.19	0.37	0.24	0.2	0.31	0.27	-	-	0.28	0.22	0.17
	Nitrite (as N)	mg/L		0.052	<0.035	0.25	<0.035	<0.035	<0.035	-	-	<0.035	<0.035	<0.035
	Sulphur as S	mg/L		150	-	490	310	-	380	51	-	-	400	-
	Ammoniacal Nitrogen as N	mg/L	**0.5**	0.23	0.062	0.12	0.19	0.12	0.015	0.27	**10**	**1.2**	0.47	**1.2**
	Ammoniacal Nitrogen as NH3	mg/L		0.28	0.075	0.14	0.23	0.15	0.019	0.32	13	1.5	0.58	1.5
	Total Hardness as CaCO3	mg/L		518	772	2170	806	1160	1380	75.8	45.7	697	945	388
Other	TOC	mg/L		<1	68	<1	43	30	15	2.2	12	13	38	32
Field	pH	pH_Units		11.4	11	12.2	8.6	8.2	7.7	10.3	9.2	8.3	8	7.8
MISC	Bis(2-ethylhexyl)esther	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,4-dinitrobenzene	µg/L	**2[#3]**	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	3/4-Methylphenol (m/p-cresol)	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1

Env Stds Comments

#1:WHO Petroleum DWG 2008
#2:WS Regs 2016 (Eng/Wal)
#3:USEPA RSL (tapwater) [May 2020]
#4:AECOM DWG (WHO method)
#5:WHO DWG 2017

GAC: Generic Assessment Criteria
(blank): No assessment criteria available
 - : Not analysed

XXX — Exceedance of GAC - DWS - England/Wales

			Field_ID	MS\BH09D	MS\BH11D	MS\BH11S	MS\BH12D	MS\BH12S	MS\BH13D	MS\BH13S	MS\BH14	MS\BH15D	MS\BH15S	MS\BH17D
			Location_Code	MS\BH09	MS\BH11	MS\BH11	MS\BH12	MS\BH12	MS\BH13	MS\BH13	MS\BH14	MS\BH15	MS\BH15	MS\BH17
			Well	D	D	S	D	S	D	S	-	D	S	D
			Sampled_Date_Time	13/08/2021	11/08/2021	12/08/2021	13/08/2021	11/08/2021	12/08/2021	12/08/2021	10/08/2021	13/08/2021	13/08/2021	10/08/2021
			Monitoring_Unit	TFD SAND	TFD SAND	MADE GROUND	RMF	GLACIAL	RMF	TFD SAND	TFD SAND	TFD SAND	MADE GROUND	RMF
Chem_Group	**ChemName**	**output unit**	Controlled Waters GAC_DWS (Groundwater)											
TPH	EPH >C10-C40	µg/L		150	<10	780	200	33	<10	440	53	130	120	<10
	>C5-C6 Aliphatics	µg/L	**15.000[#1]**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	>C6-C8 Aliphatics	µg/L	**15.000[#1]**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	>C8-C10 Aliphatics	µg/L	**300[#1]**	<0.1	<0.1	<0.1	0.7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	>C10-C12 Aliphatics	µg/L	**300[#1]**	2.8	45	110	<1	34	<1	<1	<1	2.4	5	<1
	>C12-C16 Aliphatics	µg/L	**300[#1]**	1.5	18	10	1.3	12	<1	<1	<1	1.6	<1	<1
	>C16-C21 Aliphatics	µg/L	**300[#1]**	30	24	4.9	5.1	19	<1	<1	<1	27	12	<1
	>C16-C35 Aliphatics	µg/L		31	36	6	6.1	24.8	<2	<2	<2	28	13.8	<2
	>C21-C35 Aliphatics	µg/L	**300[#1]**	<1	12	1.1	<1	5.8	<1	<1	<1	<1	1.8	<1
	>C5-C35 Aliphatics	µg/L		35	99	120	<10	71	<10	<10	<10	32	20	<10
	>EC5-EC7 Aromatics	µg/L	**1[#2]**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	>EC7-EC8 Aromatics	µg/L	**700[#1]**	<0.1	<0.1	<0.1	22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	>EC8-EC10 Aromatics	µg/L	**300[#1]**	<0.1	<0.1	<0.1	14	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	>EC10-EC12 Aromatics	µg/L	**90[#1]**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	>EC12-EC16 Aromatics	µg/L	**90[#1]**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	>EC16-EC21 Aromatics	µg/L	**90[#1]**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	>EC21-EC35 Aromatics	µg/L	**90[#1]**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	>EC5-EC35 Aromatics	µg/L		<10	<10	<10	36	<10	<10	<10	<10	<10	<10	<10
	>C5-C35 Aliphatics & Aromatics	µg/L		36	99	120	44	71	<10	<10	<10	32	20	<10
VOC	Dichlorodifluoromethane	µg/L	**200[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	MTBE	µg/L	**1.800[#4]**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Chloromethane	µg/L	**190[#3]**	<1	-	2	<1	-	-	-	-	-	<1	-
	Vinyl chloride	µg/L	**0.5[#2]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	Bromomethane	µg/L	**7.5[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	Chloroethane	µg/L	**21.000[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	Trichlorofluoromethane	µg/L	**5.200[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	1,1-dichloroethene	µg/L	**140[#5]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	Dichloromethane	µg/L	**20[#5]**	<27	-	<27	<27	-	-	-	-	-	<27	-
	trans-1,2-dichloroethene	µg/L	**50[#5]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	1,1-dichloroethane	µg/L	**2.8[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	cis-1,2-dichloroethene	µg/L	**50[#5]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	2,2-dichloropropane	µg/L		<2	-	<2	<2	-	-	-	-	-	<2	-
	Bromochloromethane	µg/L	**83[#3]**	<4	-	<4	<4	-	-	-	-	-	<4	-
	Chloroform	µg/L	**100[#2]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	1,1,1-trichloroethane	µg/L	**2.000[#5]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	1,1-dichloropropene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	Carbon tetrachloride	µg/L	**3[#2]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	1,2-dichloroethane	µg/L	**3[#2]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	Benzene	µg/L	**1[#2]**	**<1 - 5**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Trichloroethene	µg/L	**Use PCE + TCE[#2]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	1,2-dichloropropane	µg/L	**40[#5]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	Dibromomethane	µg/L	**8.3[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	Bromodichloromethane	µg/L	**100[#2]**	<4	-	<4	<4	-	-	-	-	-	<4	-
	cis-1,3-dichloropropene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	Toluene	µg/L	**700[#5]**	<1	<1	<1	<1 - 22	<1	<1	<1	<1	<1	<1	<1
	trans-1,3-dichloropropene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	1,1,2-trichloroethane	µg/L	**0.28[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	Tetrachloroethene	µg/L	**Use PCE + TCE[#2]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	1,3-dichloropropane	µg/L	**370[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	Sum of PCE and TCE	µg/L	**10[#2]**	<2	-	<2	<2	-	-	-	-	-	<2	-
	Chlorodibromomethane	µg/L	**100[#2]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	1,2-dibromoethane	µg/L	**0.4[#5]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	Chlorobenzene	µg/L	**300[#5]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	1,1,1,2-tetrachloroethane	µg/L	**0.57[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	Ethylbenzene	µg/L	**300[#5]**	<1	<1	<1	<1 - 14	<1	<1	<1	<1	<1	<1	<1

			Field_ID	MS\BH09D	MS\BH11D	MS\BH11S	MS\BH12D	MS\BH12S	MS\BH13D	MS\BH13S	MS\BH14	MS\BH15D	MS\BH15S	MS\BH17D
			Location_Code	MS\BH09	MS\BH11	MS\BH11	MS\BH12	MS\BH12	MS\BH13	MS\BH13	MS\BH14	MS\BH15	MS\BH15	MS\BH17
			Well	D	D	S	D	S	D	S	-	D	S	D
			Sampled_Date_Time	13/08/2021	11/08/2021	12/08/2021	13/08/2021	11/08/2021	12/08/2021	12/08/2021	10/08/2021	13/08/2021	13/08/2021	10/08/2021
			Monitoring_Unit	TFD SAND	TFD SAND	MADE GROUND	RMF	GLACIAL	RMF	TFD SAND	TFD SAND	TFD SAND	MADE GROUND	RMF
Chem_Group	**ChemName**	**output unit**	Controlled Waters GAC_DWS (Groundwater)											
	Xylene (m & p)	µg/L		<2	-	<2	<2	-	-	-	-	-	<2	-
	Xylene Total	µg/L	500[#5]	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Xylene (o)	µg/L	190[#3]	<1	-	<1	<1	-	-	-	-	-	<1	-
	Styrene	µg/L	20[#5]	<1	-	<1	<1	-	-	-	-	-	<1	-
	Bromoform	µg/L	100[#2]	<1	-	<1	<1	-	-	-	-	-	<1	-
	Isopropylbenzene	µg/L	450[#3]	<1	-	<1	<1	-	-	-	-	-	<1	-
	1,1,2,2-tetrachloroethane	µg/L	0.076[#3]	<1	-	<1	<1	-	-	-	-	-	<1	-
	Bromobenzene	µg/L	62[#3]	<1	-	<1	<1	-	-	-	-	-	<1	-
	1,2,3-trichloropropane	µg/L	0.00075[#3]	<1	-	<1	<1	-	-	-	-	-	<1	-
	n-propylbenzene	µg/L	660[#3]	<1	-	<1	<1	-	-	-	-	-	<1	-
	2-chlorotoluene	µg/L	240[#3]	<1	-	<1	<1	-	-	-	-	-	<1	-
	1,3,5-trimethylbenzene	µg/L	60[#3]	<1	-	<1	<1	-	-	-	-	-	<1	-
	4-chlorotoluene	µg/L	250[#3]	<1	-	<1	<1	-	-	-	-	-	<1	-
	tert-butylbenzene	µg/L	690[#3]	<1	-	<1	<1	-	-	-	-	-	<1	-
	1,2,4-trimethylbenzene	µg/L	56[#3]	<1	-	<1	<1	-	-	-	-	-	<1	-
	sec-butylbenzene	µg/L	2,000[#3]	<1	-	<1	<1	-	-	-	-	-	<1	-
	p-isopropyltoluene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	1,3-dichlorobenzene	µg/L		<2	-	<2	<2	-	-	-	-	-	<2	-
	1,4-dichlorobenzene	µg/L	300[#5]	<1	-	<1	<1	-	-	-	-	-	<1	-
	n-butylbenzene	µg/L	1,000[#3]	<1	-	<1	<1	-	-	-	-	-	<1	-
	1,2-dichlorobenzene	µg/L	1,000[#5]	<1	-	<1	<1	-	-	-	-	-	<1	-
	1,2-dibromo-3-chloropropane	µg/L	1[#5]	<1	-	<1	<1	-	-	-	-	-	<1	-
	1,2,4-trichlorobenzene	µg/L	0.1[#2]	<1	-	<1	<1	-	-	-	-	-	<1	-
	Hexachlorobutadiene	µg/L	0.1[#2]	<1	-	<1	<1	-	-	-	-	-	<1	-
	1,2,3-trichlorobenzene	µg/L	0.1[#2]	<1	-	<1	<1	-	-	-	-	-	<1	-
	1,2-Dichloroethene	µg/L	50[#5]	<2	-	<2	<2	-	-	-	-	-	<2	-
	Trihalomethanes	µg/L	100[#2]	<7	-	<7	<7	-	-	-	-	-	<7	-
	Hexachlorobenzene	µg/L	0.1[#2]	<1	-	<1	<1	-	-	-	-	-	<1	-
	Trichlorobenzene (total)	µg/L	0.1[#2]	<2	-	<2	<2	-	-	-	-	-	<2	-
PAH	Naphthalene	µg/L	6[#4]	0.2	0.17	0.11	0.08	0.5	0.24	0.1	0.65	4.9	0.6	0.06
	Acenaphthylene	µg/L	18[#4]	<0.01	<0.01	<0.01	0.01	0.01	<0.01	<0.01	0.02	0.01	0.1	0.02
	Acenaphthene	µg/L	18[#4]	0.02	0.02	0.04	<0.01	0.08	0.08	0.06	2.3	0.51	0.42	0.12
	Fluorene	µg/L	12[#4]	0.01	0.01	0.01	0.06	0.04	0.02	0.02	0.52	0.07	0.2	0.04
	Phenanthrene	µg/L	4[#4]	<0.01	<0.01	0.08	0.03	0.05	0.01	<0.01	2.6	<0.01	0.1	0.08
	Anthracene	µg/L	90[#4]	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	0.19	<0.01	0.02	0.02
	Fluoranthene	µg/L	4[#5]	<0.01	0.01	0.09	0.01	0.04	0.02	<0.01	0.24	<0.01	0.03	0.04
	Pyrene	µg/L	9[#4]	<0.01	0.01	0.11	0.01	0.03	0.02	0.01	0.14	0.01	0.03	0.03
	Benz(a)anthracene	µg/L	3.5[#4]	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01
	Chrysene	µg/L	7[#4]	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01
	Benzo(a) pyrene	µg/L	0.01[#2]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Indeno(1,2,3-c,d)pyrene	µg/L	Use PAHs (sum of 4)[#2]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Dibenz(a,h)anthracene	µg/L	0.07[#4]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
	Benzo(g,h,i)perylene	µg/L	Use PAHs (sum of 4)[#2]	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
	Benzo(b)fluoranthene	µg/L	Use PAHs (sum of 4)[#2]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Benzo(k)fluoranthene	µg/L	Use PAHs (sum of 4)[#2]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Benzo(b)&(k)fluoranthene	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	PAHs (sum of 4)	µg/L	0.1[#2]	<0.04	<0.04	0.04	<0.04	<0.04	<0.04	<0.04	0.04	<0.04	<0.04	<0.04
	PAH 16 Total	µg/L		0.23	0.22	0.5	0.21	0.76	0.39	0.2	6.8	5.6	1.5	0.42
	benzo(g,h,i)perylene + indeno(1,2,3-cd)pyrene	µg/L		<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02
	Benzo(a)pyrene (surrogate marker for PAH mixture)	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
SVOC	2,3,5,6-Tetrachlorophenol	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	2-chlorophenol	µg/L	91[#3]	<1	-	<1	<1	-	-	-	-	-	<1	-
	2-methylphenol	µg/L	930[#3]	<1	-	<1	<1	-	-	-	-	-	<1	-
	2,4-dichlorophenol	µg/L	46[#3]	<1	-	<1	<1	-	-	-	-	-	<1	-
	2,4-dimethylphenol	µg/L	360[#3]	<1	-	<1	<1	-	-	-	-	-	<1	-

			Field_ID	MS\BH09D	MS\BH11D	MS\BH11S	MS\BH12D	MS\BH12S	MS\BH13D	MS\BH13S	MS\BH14	MS\BH15D	MS\BH15S	MS\BH17D
			Location_Code	MS\BH09	MS\BH11	MS\BH11	MS\BH12	MS\BH12	MS\BH13	MS\BH13	MS\BH14	MS\BH15	MS\BH15	MS\BH17
			Well	D	D	S	D	S	D	S	-	D	S	D
			Sampled_Date_Time	13/08/2021	11/08/2021	12/08/2021	13/08/2021	11/08/2021	12/08/2021	12/08/2021	10/08/2021	13/08/2021	13/08/2021	10/08/2021
			Monitoring_Unit	TFD SAND	TFD SAND	MADE GROUND	RMF	GLACIAL	RMF	TFD SAND	TFD SAND	TFD SAND	MADE GROUND	RMF
Chem_Group	**ChemName**	**output unit**	Controlled Waters GAC_DWS (Groundwater)											
	2,4,5-trichlorophenol	µg/L	**1.200[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	2,4,6-trichlorophenol	µg/L	**200[#5]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	4-chloro-3-methylphenol	µg/L	**1.400[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	4-nitrophenol	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	Pentachlorophenol	µg/L	**9[#5]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	Phenol	µg/L	**5.800[#3]**	<1	-	<1	<1	-	-	-	-	-	3.8	-
	2-chloronaphthalene	µg/L	**750[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	2-methylnaphthalene	µg/L	**36[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	Bis(2-ethylhexyl) phthalate	µg/L	**8[#5]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	Butyl benzyl phthalate	µg/L	**16[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	Di-n-butyl phthalate	µg/L	**900[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	Di-n-octyl phthalate	µg/L	**200[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	Diethylphthalate	µg/L	**15.000[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	Dimethyl phthalate	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	2-nitroaniline	µg/L	**190[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	3-nitroaniline	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	4-bromophenyl phenyl ether	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	4-chlorophenyl phenyl ether	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	4-nitroaniline	µg/L	**3.8[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	Azobenzene	µg/L	**0.12[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	Bis(2-chloroethoxy) methane	µg/L	**59[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	Carbazole	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	Dibenzofuran	µg/L	**7.9[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	Hexachlorocyclopentadiene	µg/L	**0.41[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	1-Methylnaphthalene	µg/L	**1.1[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	Benzyl alcohol	µg/L	**2.000[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	Bis(2-chloroisopropyl)ether	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	Total Monohydric Phenols (S) Corrected	µg/L		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	Diphenylamine	µg/L	**1.300[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
PCBs	PCB 118+123	µg/L		-	-	-	-	-	-	-	-	-	-	-
	PCB congener 28 + 31	µg/L		-	-	-	-	-	-	-	-	-	-	-
	Tetrachlorobiphenyl, 3,3,4,4- (PCB 77)	µg/L	**0.006[#3]**	-	-	-	-	-	-	-	-	-	-	-
	Tetrachlorobiphenyl, 3,4,4,5- (PCB 81)	µg/L	**0.0004[#3]**	-	-	-	-	-	-	-	-	-	-	-
	Pentachlorobiphenyl, 2,3,3,4,4- (PCB 105)	µg/L	**0.004[#3]**	-	-	-	-	-	-	-	-	-	-	-
	Pentachlorobiphenyl, 2,3,4,4,5- (PCB 114)	µg/L	**0.004[#3]**	-	-	-	-	-	-	-	-	-	-	-
	Pentachlorobiphenyl, 3,3,4,4,5- (PCB 126)	µg/L	**0.0000012[#3]**	-	-	-	-	-	-	-	-	-	-	-
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 156)	µg/L	**0.004[#3]**	-	-	-	-	-	-	-	-	-	-	-
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 157)	µg/L	**0.004[#3]**	-	-	-	-	-	-	-	-	-	-	-
	Hexachlorobiphenyl, 2,3,4,4,5,5- (PCB 167)	µg/L	**0.004[#3]**	-	-	-	-	-	-	-	-	-	-	-
	Hexachlorobiphenyl, 3,3,4,4,5,5- (PCB 169)	µg/L	**0.000004[#3]**	-	-	-	-	-	-	-	-	-	-	-
	Heptachlorobiphenyl, 2,3,3,4,4,5,5- (PCB 189)	µg/L	**0.004[#3]**	-	-	-	-	-	-	-	-	-	-	-
	Total PCB WHO 12	µg/L		-	-	-	-	-	-	-	-	-	-	-
	PCB 52	µg/L		-	-	-	-	-	-	-	-	-	-	-
	PCB 101	µg/L		-	-	-	-	-	-	-	-	-	-	-
	PCB 138	µg/L		-	-	-	-	-	-	-	-	-	-	-
	PCB 153	µg/L		-	-	-	-	-	-	-	-	-	-	-
	PCB 180	µg/L		-	-	-	-	-	-	-	-	-	-	-
	Total PCB 7 Congeners	µg/L		-	-	-	-	-	-	-	-	-	-	-
Explosives	1,3-Dinitrobenzene	µg/L	**2[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	2,4-Dinitrotoluene	µg/L	**0.24[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	2,6-dinitrotoluene	µg/L	**0.049[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
Metals	Arsenic (Filtered)	µg/L	**10[#2]**	8.4	2.6	1.1	0.58	7.7	1.9	**10**	**24**	**11**	8.9	5.2
	Beryllium (Filtered)	µg/L	**12[#5]**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Boron (Filtered)	µg/L	**1.000[#2]**	210	700	360	180	300	660	360	17	76	80	<12
	Cadmium (Filtered)	µg/L	**5[#2]**	<0.03	<0.03	0.13	<0.03	<0.03	<0.03	<0.03	0.08	<0.03	<0.03	<0.03

Chem_Group	ChemName	output unit	Controlled Waters GAC_DWS (Groundwater)	MS\BH09D	MS\BH11D	MS\BH11S	MS\BH12D	MS\BH12S	MS\BH13D	MS\BH13S	MS\BH14	MS\BH15D	MS\BH15S	MS\BH17D
			Location_Code	MS\BH09	MS\BH11	MS\BH11	MS\BH12	MS\BH12	MS\BH13	MS\BH13	MS\BH14	MS\BH15	MS\BH15	MS\BH17
			Well	D	D	S	D	S	D	S	-	D	S	D
			Sampled_Date_Time	13/08/2021	11/08/2021	12/08/2021	13/08/2021	11/08/2021	12/08/2021	12/08/2021	10/08/2021	13/08/2021	13/08/2021	10/08/2021
			Monitoring_Unit	TFD SAND	TFD SAND	MADE GROUND	RMF	GLACIAL	RMF	TFD SAND	TFD SAND	TFD SAND	MADE GROUND	RMF
	Copper (Filtered)	µg/L	**2,000[#2]**	<0.4	<0.4	<0.4	1.7	0.4	<0.4	<0.4	0.7	<0.4	0.8	0.8
	Iron (Filtered)	µg/L	**200[#2]**	16	20	12	11	16	**1200**	91	16	8.6	14	22
	Lead (Filtered)	µg/L	**10[#2]**	0.09	0.1	1.8	0.49	<0.09	<0.09	<0.09	0.19	<0.09	0.19	0.1
	Mercury (Filtered)	µg/L	**1[#2]**	0.05	0.07	0.05	<0.01	0.08	<0.01	0.03	0.41	0.1	0.14	0.19
	Nickel (Filtered)	µg/L	**20[#2]**	1.6	2.3	1.4	4.4	3.1	11	0.9	5.2	0.7	0.9	2.2
	Selenium (Filtered)	µg/L	**10[#2]**	7.1	1.6	0.96	2.5	**28**	2	0.6	3.2	9.2	6.5	4.7
	Vanadium (Filtered)	µg/L	**86[#3]**	8.1	16	-	0.9	54	-	-	63	1.1	**93**	59
	Zinc (Filtered)	µg/L	**6,000[#3]**	4.4	1.8	220	3	3.2	8.7	6.3	<1.3	4.4	9.2	<1.3
	Chromium (hexavalent)	µg/L	**50[#2]**	<7	<7	<7	11	<7	<7	<7	<7	<7	<7	<7
	Chromium (Trivalent) (Filtered)	µg/L	**50[#2]**	<1	<1	4.3	<1	<1	<1	<1	<1	<1	<1	<1
Inorganics	Sulphate, Total Potential as SO4	µg/l	**250,000**	160,000	67,000	**770000**	130,000	160,000	**1300000**	**280000**	**540000**	130,000	**1100000**	**890000**
	Cyanide (Free)	mg/L	**0.05[#2]**	<0.02 - 0.0004	<0.02 - 0.0005	0.0001	<0.02 - 0.0005	<0.0001	0.0008	0.0044	<0.02 - 0.0005	<0.02 - 0.0002	<0.02 - 0.0001	<0.02 - 0.0007
	Cyanide Total	mg/L	**0.05[#2]**	<0.04	<0.04	-	<0.04	<0.04	-	-	<0.04	<0.04	<0.04	<0.04
	Thiocyanate	mg/L	**0.004[#3]**	**0.15**	**0.17**	-	<0.02	<0.02	-	-	**0.17**	**0.17**	**0.23**	**0.11**
	Nitrate (as NO3-)	mg/L	**50[#2]**	<0.1	-	-	-	<0.1	-	-	0.28	-	-	0.98
	Nitrite (as NO2-)	mg/L	**0.5[#2]**	<0.1	-	-	-	**0.69**	-	-	<0.1	-	-	<0.1
	Nitrate (as N)	mg/L		-	0.15	0.28	0.83	-	0.21	0.15	-	0.39	0.35	-
	Nitrite (as N)	mg/L		-	<0.035	<0.035	<0.035	-	<0.035	<0.035	-	<0.035	0.27	-
	Sulphur as S	mg/L		50	-	290	37	-	570	-	180	-	380	300
	Ammoniacal Nitrogen as N	mg/L	**0.5**	**1.9**	**1.8**	0.16	0.13	**0.66**	**2.6**	**2**	**0.79**	**1.3**	**0.57**	0.28
	Ammoniacal Nitrogen as NH3	mg/L		2.3	2.2	0.19	0.16	0.8	3.2	2.4	0.96	1.6	0.69	0.35
	Total Hardness as CaCO3	mg/L		30.3	95.4	725	437	142	3390	370	593	1040	931	1020
Other	TOC	mg/L		36	39	31	<1	100	3.9	8.2	7.6	4.6	6.1	16
Field	pH	pH_Units		9.7	8.4	7.9	11.9	11.2	7.2	8.5	10.9	9.7	10.7	11.2
MISC	Bis(2-ethylhexyl)esther	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	1,4-dinitrobenzene	µg/L	**2[#3]**	<1	-	<1	<1	-	-	-	-	-	<1	-
	3/4-Methylphenol (m/p-cresol)	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-

Env Stds Comments
#1:WHO Petroleum DWG 2008
#2:WS Regs 2016 (Eng/Wal)
#3:USEPA RSL (tapwater) [May 2020]
#4:AECOM DWG (WHO method)
#5:WHO DWG 2017

GAC: Generic Assessment Criteria
(blank): No assessment criteria available
 - : Not analysed

XXX Exceedance of GAC - DWS - England/Wales

Chem_Group	ChemName	output unit	Field_ID / Location_Code / Well / Sampled_Date_Time / Monitoring_Unit / Controlled Waters GAC_DWS (Groundwater)	Statistical Summary Number of Results	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	Median Concentration	Standard Deviation	Number of Guideline Exceedances	Number of Guideline Exceedances (Detects Only)
TPH	EPH >C10-C40	µg/L		22	17	<10	3500	360	140	746	0	0
	>C5-C6 Aliphatics	µg/L	**15.000[#1]**	22	1	<0.1	120	5.5	0.05	26	0	0
	>C6-C8 Aliphatics	µg/L	**15.000[#1]**	22	1	<0.1	210	9.6	0.05	45	0	0
	>C8-C10 Aliphatics	µg/L	**300[#1]**	22	2	<0.1	15	0.76	0.05	3.2	0	0
	>C10-C12 Aliphatics	µg/L	**300[#1]**	22	10	<1	110	12	0.5	25	0	0
	>C12-C16 Aliphatics	µg/L	**300[#1]**	22	10	<1	18	3.7	0.5	5.2	0	0
	>C16-C21 Aliphatics	µg/L	**300[#1]**	22	11	<1	30	8	2.7	9.9	0	0
	>C16-C35 Aliphatics	µg/L		22	11	<2	36	10	3.5	12	0	0
	>C21-C35 Aliphatics	µg/L	**300[#1]**	22	7	<1	14	2.3	0.5	3.8	0	0
	>C5-C35 Aliphatics	µg/L		22	11	<10	340	43	12.5	74	0	0
	>EC5-EC7 Aromatics	µg/L	**1[#2]**	22	2	<0.1	58	2.9	0.05	12	2	2
	>EC7-EC8 Aromatics	µg/L	**700[#1]**	22	2	<0.1	22	2	0.05	6.2	0	0
	>EC8-EC10 Aromatics	µg/L	**300[#1]**	22	2	<0.1	250	12	0.05	53	0	0
	>EC10-EC12 Aromatics	µg/L	**90[#1]**	22	0	<1	<1	0.5	0.5	0	0	0
	>EC12-EC16 Aromatics	µg/L	**90[#1]**	22	0	<1	<1	0.5	0.5	0	0	0
	>EC16-EC21 Aromatics	µg/L	**90[#1]**	22	0	<1	<1	0.5	0.5	0	0	0
	>EC21-EC35 Aromatics	µg/L	**90[#1]**	22	0	<1	<1	0.5	0.5	0	0	0
	>EC5-EC35 Aromatics	µg/L		22	2	<10	330	21	5	69	0	0
	>C5-C35 Aliphatics & Aromatics	µg/L		22	12	<10	670	59	25	140	0	0
VOC	Dichlorodifluoromethane	µg/L	**200[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	MTBE	µg/L	**1.800[#4]**	22	0	<1	<1	0.5	0.5	0	0	0
	Chloromethane	µg/L	**190[#3]**	12	7	<1	3	1.5	2	0.89	0	0
	Vinyl chloride	µg/L	**0.5[#2]**	12	0	<1	<1	0.5	0.5	0	12	0
	Bromomethane	µg/L	**7.5[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	Chloroethane	µg/L	**21.000[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	Trichlorofluoromethane	µg/L	**5.200[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	1,1-dichloroethene	µg/L	**140[#5]**	12	0	<1	<1	0.5	0.5	0	0	0
	Dichloromethane	µg/L	**20[#5]**	12	0	<27	<27	14	13.5	0	12	0
	trans-1,2-dichloroethene	µg/L	**50[#5]**	12	0	<1	<1	0.5	0.5	0	0	0
	1,1-dichloroethane	µg/L	**2.8[#3]**	12	1	<1	1	0.54	0.5	0.14	0	0
	cis-1,2-dichloroethene	µg/L	**50[#5]**	12	0	<1	<1	0.5	0.5	0	0	0
	2,2-dichloropropane	µg/L		12	0	<2	<2	1	1	0	0	0
	Bromochloromethane	µg/L	**83[#3]**	12	0	<4	<4	2	2	0	0	0
	Chloroform	µg/L	**100[#2]**	12	0	<1	<1	0.5	0.5	0	0	0
	1,1,1-trichloroethane	µg/L	**2.000[#5]**	12	0	<1	<1	0.5	0.5	0	0	0
	1,1-dichloropropene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	Carbon tetrachloride	µg/L	**3[#2]**	12	0	<1	<1	0.5	0.5	0	0	0
	1,2-dichloroethane	µg/L	**3[#2]**	12	0	<1	<1	0.5	0.5	0	0	0
	Benzene	µg/L	**1[#2]**	22	3	<1	58	3.4	0.5	12	3	3
	Trichloroethene	µg/L	**Use PCE + TCE[#2]**	12	0	<1	<1	0.5	0.5	0	0	0
	1,2-dichloropropane	µg/L	**40[#5]**	12	0	<1	<1	0.5	0.5	0	0	0
	Dibromomethane	µg/L	**8.3[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	Bromodichloromethane	µg/L	**100[#2]**	12	0	<4	<4	2	2	0	0	0
	cis-1,3-dichloropropene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	Toluene	µg/L	**700[#5]**	22	2	<1	22	1.9	0.5	4.7	0	0
	trans-1,3-dichloropropene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	1,1,2-trichloroethane	µg/L	**0.28[#3]**	12	0	<1	<1	0.5	0.5	0	12	0
	Tetrachloroethene	µg/L	**Use PCE + TCE[#2]**	12	0	<1	<1	0.5	0.5	0	0	0
	1,3-dichloropropane	µg/L	**370[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	Sum of PCE and TCE	µg/L	**10[#2]**	12	0	<2	<2	1	1	0	0	0
	Chlorodibromomethane	µg/L	**100[#2]**	12	0	<1	<1	0.5	0.5	0	0	0
	1,2-dibromoethane	µg/L	**0.4[#5]**	12	0	<1	<1	0.5	0.5	0	12	0
	Chlorobenzene	µg/L	**300[#5]**	12	0	<1	<1	0.5	0.5	0	0	0
	1,1,1,2-tetrachloroethane	µg/L	**0.57[#3]**	12	0	<1	<1	0.5	0.5	0	12	0
	Ethylbenzene	µg/L	**300[#5]**	22	2	<1	210	10	0.5	45	0	0

Chem_Group	ChemName	output unit	Field_ID / Location_Code / Well / Sampled_Date_Time / Monitoring_Unit / Controlled Waters GAC_DWS (Groundwater)	Statistical Summary: Number of Results	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	Median Concentration	Standard Deviation	Number of Guideline Exceedances	Number of Guideline Exceedances (Detects Only)
	Xylene (m & p)	µg/L		12	0	<2	<2	1	1	0	0	0
	Xylene Total	µg/L	**500[#5]**	22	0	<1	<1	0.5	0.5	0	0	0
	Xylene (o)	µg/L	**190[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	Styrene	µg/L	**20[#5]**	12	0	<1	<1	0.5	0.5	0	0	0
	Bromoform	µg/L	**100[#2]**	12	0	<1	<1	0.5	0.5	0	0	0
	Isopropylbenzene	µg/L	**450[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	1,1,2,2-tetrachloroethane	µg/L	**0.076[#3]**	12	0	<1	<1	0.5	0.5	0	12	0
	Bromobenzene	µg/L	**62[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	1,2,3-trichloropropane	µg/L	**0.00075[#3]**	12	0	<1	<1	0.5	0.5	0	12	0
	n-propylbenzene	µg/L	**660[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	2-chlorotoluene	µg/L	**240[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	1,3,5-trimethylbenzene	µg/L	**60[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	4-chlorotoluene	µg/L	**250[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	tert-butylbenzene	µg/L	**690[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	1,2,4-trimethylbenzene	µg/L	**56[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	sec-butylbenzene	µg/L	**2,000[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	p-isopropyltoluene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	1,3-dichlorobenzene	µg/L		12	0	<2	<2	1	1	0	0	0
	1,4-dichlorobenzene	µg/L	**300[#5]**	12	0	<1	<1	0.5	0.5	0	0	0
	n-butylbenzene	µg/L	**1,000[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	1,2-dichlorobenzene	µg/L	**1,000[#5]**	12	0	<1	<1	0.5	0.5	0	0	0
	1,2-dibromo-3-chloropropane	µg/L	**1[#5]**	12	0	<1	<1	0.5	0.5	0	0	0
	1,2,4-trichlorobenzene	µg/L	**0.1[#2]**	12	0	<1	<1	0.5	0.5	0	12	0
	Hexachlorobutadiene	µg/L	**0.1[#2]**	12	0	<1	<1	0.5	0.5	0	12	0
	1,2,3-trichlorobenzene	µg/L	**0.1[#2]**	12	0	<1	<1	0.5	0.5	0	12	0
	1,2-Dichloroethene	µg/L	**50[#5]**	12	0	<2	<2	1	1	0	0	0
	Trihalomethanes	µg/L	**100[#2]**	12	0	<7	<7	3.5	3.5	0	0	0
	Hexachlorobenzene	µg/L	**0.1[#2]**	12	0	<1	<1	0.5	0.5	0	12	0
	Trichlorobenzene (total)	µg/L	**0.1[#2]**	12	0	<2	<2	1	1	0	12	0
PAH	Naphthalene	µg/L	**6[#4]**	22	22	0.06	4.9	0.46	0.185	1	0	0
	Acenaphthylene	µg/L	**18[#4]**	22	6	<0.01	0.1	0.011	0.005	0.02	0	0
	Acenaphthene	µg/L	**18[#4]**	22	20	<0.01	2.3	0.2	0.06	0.49	0	0
	Fluorene	µg/L	**12[#4]**	22	22	0.01	0.52	0.063	0.025	0.11	0	0
	Phenanthrene	µg/L	**4[#4]**	22	11	<0.01	2.6	0.15	0.0075	0.55	0	0
	Anthracene	µg/L	**90[#4]**	22	5	<0.01	0.19	0.016	0.005	0.039	0	0
	Fluoranthene	µg/L	**4[#5]**	22	12	<0.01	0.24	0.027	0.01	0.052	0	0
	Pyrene	µg/L	**9[#4]**	22	15	<0.01	0.14	0.024	0.01	0.034	0	0
	Benz(a)anthracene	µg/L	**3.5[#4]**	22	2	<0.01	0.02	0.0059	0.005	0.0033	0	0
	Chrysene	µg/L	**7[#4]**	22	2	<0.01	0.02	0.0059	0.005	0.0033	0	0
	Benzo(a) pyrene	µg/L	**0.01[#2]**	22	0	<0.01	<0.01	0.005	0.005	0	0	0
	Indeno(1,2,3-c,d)pyrene	µg/L	**Use PAHs (sum of 4)[#2]**	22	0	<0.01	<0.01	0.005	0.005	0	0	0
	Dibenz(a,h)anthracene	µg/L	**0.07[#4]**	22	1	<0.01	0.01	0.0052	0.005	0.0011	0	0
	Benzo(g,h,i)perylene	µg/L	**Use PAHs (sum of 4)[#2]**	22	2	<0.01	0.01	0.0055	0.005	0.0015	0	0
	Benzo(b)fluoranthene	µg/L	**Use PAHs (sum of 4)[#2]**	22	0	<0.01	<0.01	0.005	0.005	0	0	0
	Benzo(k)fluoranthene	µg/L	**Use PAHs (sum of 4)[#2]**	22	0	<0.01	<0.01	0.005	0.005	0	0	0
	Benzo(b)&(k)fluoranthene	µg/L		22	0	<0.02	<0.02	0.01	0.01	0	0	0
	PAHs (sum of 4)	µg/L	**0.1[#2]**	22	2	<0.04	0.04	0.022	0.02	0.0059	0	0
	PAH 16 Total	µg/L		22	19	<0.2	6.8	0.93	0.385	1.7	0	0
	benzo(g,h,i)perylene + indeno(1,2,3-cd)pyrene	µg/L		22	2	<0.02	0.02	0.011	0.01	0.0029	0	0
	Benzo(a)pyrene (surrogate marker for PAH mixture)	µg/L		22	0	<0.01	<0.01	0.005	0.005	0	0	0
SVOC	2,3,5,6-Tetrachlorophenol	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	2-chlorophenol	µg/L	**91[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	2-methylphenol	µg/L	**930[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	2,4-dichlorophenol	µg/L	**46[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	2,4-dimethylphenol	µg/L	**360[#3]**	12	0	<1	<1	0.5	0.5	0	0	0

			Field_ID Location_Code Well Sampled_Date_Time Monitoring_Unit	Statistical Summary								
Chem_Group	ChemName	output unit	Controlled Waters GAC_DWS (Groundwater)	Number of Results	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	Median Concentration	Standard Deviation	Number of Guideline Exceedances	Number of Guideline Exceedances (Detects Only)
	2,4,5-trichlorophenol	µg/L	**1.200[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	2,4,6-trichlorophenol	µg/L	**200[#5]**	12	0	<1	<1	0.5	0.5	0	0	0
	4-chloro-3-methylphenol	µg/L	**1.400[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	4-nitrophenol	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	Pentachlorophenol	µg/L	**9[#5]**	12	1	<1	1.4	0.58	0.5	0.26	0	0
	Phenol	µg/L	**5.800[#3]**	12	7	<1	7.9	2.7	2.5	2.4	0	0
	2-chloronaphthalene	µg/L	**750[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	2-methylnaphthalene	µg/L	**36[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	Bis(2-ethylhexyl) phthalate	µg/L	**8[#5]**	12	0	<1	<1	0.5	0.5	0	0	0
	Butyl benzyl phthalate	µg/L	**16[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	Di-n-butyl phthalate	µg/L	**900[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	Di-n-octyl phthalate	µg/L	**200[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	Diethylphthalate	µg/L	**15.000[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	Dimethyl phthalate	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	2-nitroaniline	µg/L	**190[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	3-nitroaniline	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	4-bromophenyl phenyl ether	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	4-chlorophenyl phenyl ether	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	4-nitroaniline	µg/L	**3.8[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	Azobenzene	µg/L	**0.12[#3]**	12	0	<1	<1	0.5	0.5	0	12	0
	Bis(2-chloroethoxy) methane	µg/L	**59[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	Carbazole	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	Dibenzofuran	µg/L	**7.9[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	Hexachlorocyclopentadiene	µg/L	**0.41[#3]**	12	0	<1	<1	0.5	0.5	0	12	0
	1-Methylnaphthalene	µg/L	**1.1[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	Benzyl alcohol	µg/L	**2.000[#3]**	12	3	<1	2.2	0.83	0.5	0.62	0	0
	Bis(2-chloroisopropyl)ether	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	Total Monohydric Phenols (S) Corrected	µg/L		22	0	<100	<100	50	50	0	0	0
	Diphenylamine	µg/L	**1.300[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
PCBs	PCB 118+123	µg/L		2	0	<0.6	<0.6		0.3		0	0
	PCB congener 28 + 31	µg/L		2	0	<0.3	<0.3		0.15		0	0
	Tetrachlorobiphenyl, 3,3,4,4- (PCB 77)	µg/L	**0.006[#3]**	2	0	<0.3	<0.3		0.15		2	0
	Tetrachlorobiphenyl, 3,4,4,5- (PCB 81)	µg/L	**0.0004[#3]**	2	0	<0.2	<0.2		0.1		2	0
	Pentachlorobiphenyl, 2,3,3,4,4- (PCB 105)	µg/L	**0.004[#3]**	2	0	<0.2	<0.2		0.1		2	0
	Pentachlorobiphenyl, 2,3,4,4,5- (PCB 114)	µg/L	**0.004[#3]**	2	0	<0.3	<0.3		0.15		2	0
	Pentachlorobiphenyl, 3,3,4,4,5- (PCB 126)	µg/L	**0.0000012[#3]**	2	0	<0.5	<0.5		0.25		2	0
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 156)	µg/L	**0.004[#3]**	2	0	<0.3	<0.3		0.15		2	0
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 157)	µg/L	**0.004[#3]**	2	0	<0.2	<0.2		0.1		2	0
	Hexachlorobiphenyl, 2,3,4,4,5,5- (PCB 167)	µg/L	**0.004[#3]**	2	0	<0.3	<0.3		0.15		2	0
	Hexachlorobiphenyl, 3,3,4,4,5,5- (PCB 169)	µg/L	**0.000004[#3]**	2	0	<0.2	<0.2		0.1		2	0
	Heptachlorobiphenyl, 2,3,3,4,4,5,5- (PCB 189)	µg/L	**0.004[#3]**	2	0	<0.3	<0.3		0.15		2	0
	Total PCB WHO 12	µg/L		2	0	<1	<1		0.5		0	0
	PCB 52	µg/L		2	0	<0.2	<0.2		0.1		0	0
	PCB 101	µg/L		2	0	<0.3	<0.3		0.15		0	0
	PCB 138	µg/L		2	0	<0.2	<0.2		0.1		0	0
	PCB 153	µg/L		2	0	<0.2	<0.2		0.1		0	0
	PCB 180	µg/L		2	0	<0.2	<0.2		0.1		0	0
	Total PCB 7 Congeners	µg/L		2	0	<1	<1		0.5		0	0
Explosives	1,3-Dinitrobenzene	µg/L	**2[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	2,4-Dinitrotoluene	µg/L	**0.24[#3]**	12	0	<1	<1	0.5	0.5	0	12	0
	2,6-dinitrotoluene	µg/L	**0.049[#3]**	12	0	<1	<1	0.5	0.5	0	12	0
Metals	Arsenic (Filtered)	µg/L	**10[#2]**	22	22	0.58	24	6.7	5.8	5.4	5	5
	Beryllium (Filtered)	µg/L	**12[#5]**	22	0	<0.1	<0.1	0.05	0.05	0	0	0
	Boron (Filtered)	µg/L	**1.000[#2]**	22	21	<12	700	311	290	201	0	0
	Cadmium (Filtered)	µg/L	**5[#2]**	22	5	<0.03	0.13	0.029	0.015	0.031	0	0

Chem_Group	ChemName	output unit	Field_ID / Location_Code / Well / Sampled_Date_Time / Monitoring_Unit / Controlled Waters GAC_DWS (Groundwater)	Statistical Summary: Number of Results	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	Median Concentration	Standard Deviation	Number of Guideline Exceedances	Number of Guideline Exceedances (Detects Only)
	Copper (Filtered)	µg/L	**2.000[#2]**	22	7	<0.4	2	0.45	0.2	0.5	0	0
	Iron (Filtered)	µg/L	**200[#2]**	22	22	8.6	1200	140	18	312	3	3
	Lead (Filtered)	µg/L	**10[#2]**	22	13	<0.09	1.8	0.19	0.095	0.37	0	0
	Mercury (Filtered)	µg/L	**1[#2]**	22	18	<0.01	0.72	0.13	0.065	0.17	0	0
	Nickel (Filtered)	µg/L	**20[#2]**	22	22	0.6	22	3.5	1.9	4.8	1	1
	Selenium (Filtered)	µg/L	**10[#2]**	22	22	0.29	28	8.3	4.7	9.5	5	5
	Vanadium (Filtered)	µg/L	**86[#3]**	19	17	<0.6	93	20	8.1	27	1	1
	Zinc (Filtered)	µg/L	**6.000[#3]**	22	20	<1.3	220	14	3.45	46	0	0
	Chromium (hexavalent)	µg/L	**50[#2]**	22	5	<7	120	16	3.5	30	3	3
	Chromium (Trivalent) (Filtered)	µg/L	**50[#2]**	22	1	<1	4.3	0.67	0.5	0.81	0	0
Inorganics	Sulphate, Total Potential as SO4	µg/l	**250,000**	22	22	67000	2700000	694682	700000	600606	15	15
	Cyanide (Free)	mg/L	**0.05[#2]**	22	20	<0.0001	0.0044	0.0044	0.00525	0.0021	0	0
	Cyanide Total	mg/L	**0.05[#2]**	19	1	<0.04	0.042	0.021	0.02	0.005	0	0
	Thiocyanate	mg/L	**0.004[#3]**	19	13	<0.02	2.3	0.21	0.052	0.52	19	13
	Nitrate (as NO3-)	mg/L	**50[#2]**	6	4	<0.1	1.5	0.54	0.34	0.58	0	0
	Nitrite (as NO2-)	mg/L	**0.5[#2]**	6	2	<0.1	0.69	0.22	0.05	0.28	1	1
	Nitrate (as N)	mg/L		16	16	0.15	0.83	0.29	0.255	0.16	0	0
	Nitrite (as N)	mg/L		16	3	<0.035	0.27	0.05	0.0175	0.083	0	0
	Sulphur as S	mg/L		13	13	37	570	276	300	172	0	0
	Ammoniacal Nitrogen as N	mg/L	**0.5**	22	22	0.015	10	1.2	0.52	2.1	11	11
	Ammoniacal Nitrogen as NH3	mg/L		22	22	0.019	13	1.5	0.635	2.7	0	0
	Total Hardness as CaCO3	mg/L		22	22	30.3	3390	806	711	770	0	0
Other	TOC	mg/L		22	19	<1	100	23	14	25	0	0
Field	pH	pH_Units		22	22	7.2	12.2	9.5	9.45	1.6	0	0
MISC	Bis(2-ethylhexyl)esther	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	1,4-dinitrobenzene	µg/L	**2[#3]**	12	0	<1	<1	0.5	0.5	0	0	0
	3/4-Methylphenol (m/p-cresol)	µg/L		12	0	<1	<1	0.5	0.5	0	0	0

Env Stds Comments
#1:WHO Petroleum DWG 2008
#2:WS Regs 2016 (Eng/Wal)
#3:USEPA RSL (tapwater) [May 2020]
#4:AECOM DWG (WHO method)
#5:WHO DWG 2017

GAC: Generic Assessment Criteria
(blank): No assessment criteria available
- : Not analysed

XXX	Exceedance of GAC - DWS - England/Wales

			Field_ID	LF\BH01D	LF\BH01S	MS\BH03D	MS\BH03S	MS\BH04D	MS\BH04S	MS\BH05D	MS\BH05S	MS\BH07D	MS\BH07S	MS\BH08D
			Location_Code	LF\BH01	LF\BH01	MS\BH03	MS\BH03	MS\BH04	MS\BH04	MS\BH05	MS\BH05	MS\BH07	MS\BH07	MS\BH08
			Well	D	S	D	S	D	S	D	S	D	S	D
			Sampled_Date_Time	13/08/2021	13/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	11/08/2021
			Monitoring_Unit	RMF	TFD SAND	RMF	TFD SAND	GLACIAL	TFD SAND	RMF	TFD SAND	TFD SAND	MADE GROUND	TFD SAND
Chem_Group	ChemName	output unit	Controlled Waters GAC_EQS-Coast (Surface Water)											
TPH	EPH >C10-C40	µg/L		280	210	3500	170	<10	<10	1000	370	120	280	54
	>C5-C6 Aliphatics	µg/L		<0.1	<0.1	120	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	>C6-C8 Aliphatics	µg/L		<0.1	<0.1	210	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	>C8-C10 Aliphatics	µg/L		<0.1	<0.1	15	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	>C10-C12 Aliphatics	µg/L		6.4	<1	<1	<1	<1	14	6	<1	<1	<1	33
	>C12-C16 Aliphatics	µg/L		4.6	<1	<1	<1	<1	5.4	13	<1	<1	<1	8.6
	>C16-C21 Aliphatics	µg/L		20	<1	<1	<1	<1	8.2	13	<1	<1	<1	8.2
	>C16-C35 Aliphatics	µg/L		25.9	<2	<2	<2	<2	9.7	27	<2	<2	<2	9.2
	>C21-C35 Aliphatics	µg/L		5.9	<1	<1	<1	<1	1.5	14	<1	<1	<1	<1
	>C5-C35 Aliphatics	µg/L		37	<10	340	<10	<10	30	46	<10	<10	<10	51
	>EC5-EC7 Aromatics	µg/L	8[#1]	<0.1	<0.1	58	<0.1	<0.1	<0.1	<0.1	5.2	<0.1	<0.1	<0.1
	>EC7-EC8 Aromatics	µg/L	74[#2]	<0.1	<0.1	20	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	>EC8-EC10 Aromatics	µg/L		<0.1	<0.1	250	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	>EC10-EC12 Aromatics	µg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	>EC12-EC16 Aromatics	µg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	>EC16-EC21 Aromatics	µg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	>EC21-EC35 Aromatics	µg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	>EC5-EC35 Aromatics	µg/L		<10	<10	330	<10	<10	<10	<10	<10	<10	<10	<10
	>C5-C35 Aliphatics & Aromatics	µg/L		37	<10	670	<10	<10	30	47	<10	<10	<10	51
VOC	Dichlorodifluoromethane	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	MTBE	µg/L	260[#3]	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Chloromethane	µg/L		<1	<1	-	2	-	2	-	2	2	2	3
	Vinyl chloride	µg/L	8[#3]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Bromomethane	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Chloroethane	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Trichlorofluoromethane	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,1-dichloroethene	µg/L	1[#3]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Dichloromethane	µg/L	20[#1]	<27	<27	-	<27	-	<27	-	<27	<27	<27	<27
	trans-1,2-dichloroethene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,1-dichloroethane	µg/L		<1	<1	-	<1	-	<1	-	1	<1	<1	<1
	cis-1,2-dichloroethene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	2,2-dichloropropane	µg/L		<2	<2	-	<2	-	<2	-	<2	<2	<2	<2
	Bromochloromethane	µg/L		<4	<4	-	<4	-	<4	-	<4	<4	<4	<4
	Chloroform	µg/L	2.5[#1]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,1,1-trichloroethane	µg/L	100[#4]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,1-dichloropropene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Carbon tetrachloride	µg/L	12[#1]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,2-dichloroethane	µg/L	10[#1]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Benzene	µg/L	8[#1]	<1	<1	58	<1	<1	<1	<1	5 - 5.2	<1	<1	<1
	Trichloroethene	µg/L	10[#1]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,2-dichloropropane	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Dibromomethane	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Bromodichloromethane	µg/L		<4	<4	-	<4	-	<4	-	<4	<4	<4	<4
	cis-1,3-dichloropropene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Toluene	µg/L	74[#2]	<1	<1	20	<1	<1	<1	<1	<1	<1	<1	<1
	trans-1,3-dichloropropene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,1,2-trichloroethane	µg/L	300[#4]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Tetrachloroethene	µg/L	10[#1]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,3-dichloropropane	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Sum of PCE and TCE	µg/L		<2	<2	-	<2	-	<2	-	<2	<2	<2	<2
	Chlorodibromomethane	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,2-dibromoethane	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Chlorobenzene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,1,1,2-tetrachloroethane	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Ethylbenzene	µg/L	20[#4]	<1	<1	210	<1	<1	<1	<1	<1	<1	<1	<1

Chem_Group	ChemName	output unit	Controlled Waters GAC_EQS-Coast (Surface Water)	LF\BH01D	LF\BH01S	MS\BH03D	MS\BH03S	MS\BH04D	MS\BH04S	MS\BH05D	MS\BH05S	MS\BH07D	MS\BH07S	MS\BH08D
			Location_Code	LF\BH01	LF\BH01	MS\BH03	MS\BH03	MS\BH04	MS\BH04	MS\BH05	MS\BH05	MS\BH07	MS\BH07	MS\BH08
			Well	D	S	D	S	D	S	D	S	D	S	D
			Sampled_Date_Time	13/08/2021	13/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	11/08/2021
			Monitoring_Unit	RMF	TFD SAND	RMF	TFD SAND	GLACIAL	TFD SAND	RMF	TFD SAND	TFD SAND	MADE GROUND	TFD SAND
	Xylene (m & p)	µg/L		<2	<2	-	<2	-	<2	-	<2	<2	<2	<2
	Xylene Total	µg/L	30[#4]	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Xylene (o)	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Styrene	µg/L	50[#4]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Bromoform	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Isopropylbenzene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,1,2,2-tetrachloroethane	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Bromobenzene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,2,3-trichloropropane	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	n-propylbenzene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	2-chlorotoluene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,3,5-trimethylbenzene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	4-chlorotoluene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	tert-butylbenzene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,2,4-trimethylbenzene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	sec-butylbenzene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	p-isopropyltoluene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,3-dichlorobenzene	µg/L		<2	<2	-	<2	-	<2	-	<2	<2	<2	<2
	1,4-dichlorobenzene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	n-butylbenzene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,2-dichlorobenzene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,2-dibromo-3-chloropropane	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,2,4-trichlorobenzene	µg/L	Refer to 'Trichlorobenzene (total)'[#5]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Hexachlorobutadiene	µg/L	0.6[#6]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,2,3-trichlorobenzene	µg/L	Refer to 'Trichlorobenzene (total)'[#5]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,2-Dichloroethene	µg/L		<2	<2	-	<2	-	<2	-	<2	<2	<2	<2
	Trihalomethanes	µg/L		<7	<7	-	<7	-	<7	-	<7	<7	<7	<7
	Hexachlorobenzene	µg/L	0.05[#6]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Trichlorobenzene (total)	µg/L	0.4[#1]	<2	<2	-	<2	-	<2	-	<2	<2	<2	<2
PAH	Naphthalene	µg/L	2[#1]	0.12	0.16	0.31	0.09	0.46	0.22	0.28	0.12	0.15	0.12	0.42
	Acenaphthylene	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Acenaphthene	µg/L		0.05	0.06	<0.01	0.01	0.09	0.04	0.01	0.01	0.17	0.12	0.08
	Fluorene	µg/L		0.02	0.02	0.08	0.01	0.04	0.01	0.03	0.02	0.06	0.07	0.02
	Phenanthrene	µg/L		<0.01	<0.01	0.2	<0.01	0.01	<0.01	0.03	<0.01	<0.01	0.02	<0.01
	Anthracene	µg/L	0.1[#1]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01
	Fluoranthene	µg/L	0.0063[#1]	<0.01	**0.01**	<0.01	<0.01	**0.02**	<0.01	**0.02**	<0.01	<0.01	**0.01**	<0.01
	Pyrene	µg/L		<0.01	0.01	0.02	<0.01	0.02	<0.01	0.02	<0.01	<0.01	0.02	<0.01
	Benz(a)anthracene	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Chrysene	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Benzo(a) pyrene	µg/L	0.00017[#1]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Indeno(1,2,3-c,d)pyrene	µg/L	see BaP and notes[#5]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Dibenz(a,h)anthracene	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Benzo(g,h,i)perylene	µg/L	0.00082[#6]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Benzo(b)fluoranthene	µg/L	0.017[#6]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Benzo(k)fluoranthene	µg/L	0.017[#6]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Benzo(b)&(k)fluoranthene	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	PAHs (sum of 4)	µg/L		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
	PAH 16 Total	µg/L		<0.2	0.26	0.61	<0.2	0.63	0.28	0.39	<0.2	0.38	0.36	0.52
	benzo(g,h,i)perylene + indeno(1,2,3-cd)pyrene	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Benzo(a)pyrene (surrogate marker for PAH mixture)	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
SVOC	2,3,5,6-Tetrachlorophenol	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	2-chlorophenol	µg/L	50[#4]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	2-methylphenol	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	2,4-dichlorophenol	µg/L	0.42[#2]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1

			Field_ID	LF\BH01D	LF\BH01S	MS\BH03D	MS\BH03S	MS\BH04D	MS\BH04S	MS\BH05D	MS\BH05S	MS\BH07D	MS\BH07S	MS\BH08D
			Location_Code	LF\BH01	LF\BH01	MS\BH03	MS\BH03	MS\BH04	MS\BH04	MS\BH05	MS\BH05	MS\BH07	MS\BH07	MS\BH08
			Well	D	S	D	S	D	S	D	S	D	S	D
			Sampled_Date_Time	13/08/2021	13/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	11/08/2021
			Monitoring_Unit	RMF	TFD SAND	RMF	TFD SAND	GLACIAL	TFD SAND	RMF	TFD SAND	TFD SAND	MADE GROUND	TFD SAND
Chem_Group	ChemName	output unit	Controlled Waters GAC_EQS-Coast (Surface Water)											
	2,4-dimethylphenol	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	2,4,5-trichlorophenol	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	2,4,6-trichlorophenol	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	4-chloro-3-methylphenol	µg/L	40[#4]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	4-nitrophenol	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Pentachlorophenol	µg/L	0.4[#1]	<1	**1.4**	-	<1	-	<1	-	<1	<1	<1	<1
	Phenol	µg/L	7.7[#2]	4.4	**7.9**	-	3	-	<1	-	3.7	2	5	<1
	2-chloronaphthalene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	2-methylnaphthalene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Bis(2-ethylhexyl) phthalate	µg/L	1.3[#1]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Butyl benzyl phthalate	µg/L	0.75[#2]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Di-n-butyl phthalate	µg/L	8[#4]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Di-n-octyl phthalate	µg/L	20[#4]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Diethylphthalate	µg/L	200[#4]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Dimethyl phthalate	µg/L	800[#4]	<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	2-nitroaniline	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	3-nitroaniline	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	4-bromophenyl phenyl ether	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	4-chlorophenyl phenyl ether	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	4-nitroaniline	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Azobenzene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Bis(2-chloroethoxy) methane	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Carbazole	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Dibenzofuran	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Hexachlorocyclopentadiene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1-Methylnaphthalene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Benzyl alcohol	µg/L		1.7	2.2	-	<1	-	<1	-	1.6	<1	<1	<1
	Bis(2-chloroisopropyl)ether	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	Total Monohydric Phenols (S) Corrected	µg/L		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	Diphenylamine	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
PCBs	PCB 118+123	µg/L		-	-	-	-	-	-	-	-	<0.6	<0.6	-
	PCB congener 28 + 31	µg/L		-	-	-	-	-	-	-	-	<0.3	<0.3	-
	Tetrachlorobiphenyl, 3,3,4,4- (PCB 77)	µg/L		-	-	-	-	-	-	-	-	<0.3	<0.3	-
	Tetrachlorobiphenyl, 3,4,4,5- (PCB 81)	µg/L		-	-	-	-	-	-	-	-	<0.2	<0.2	-
	Pentachlorobiphenyl, 2,3,3,4,4- (PCB 105)	µg/L		-	-	-	-	-	-	-	-	<0.2	<0.2	-
	Pentachlorobiphenyl, 2,3,4,4,5- (PCB 114)	µg/L		-	-	-	-	-	-	-	-	<0.3	<0.3	-
	Pentachlorobiphenyl, 3,3,4,4,5- (PCB 126)	µg/L		-	-	-	-	-	-	-	-	<0.5	<0.5	-
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 156)	µg/L		-	-	-	-	-	-	-	-	<0.3	<0.3	-
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 157)	µg/L		-	-	-	-	-	-	-	-	<0.2	<0.2	-
	Hexachlorobiphenyl, 2,3,4,4,5,5- (PCB 167)	µg/L		-	-	-	-	-	-	-	-	<0.3	<0.3	-
	Hexachlorobiphenyl, 3,3,4,4,5,5- (PCB 169)	µg/L		-	-	-	-	-	-	-	-	<0.2	<0.2	-
	Heptachlorobiphenyl, 2,3,3,4,4,5,5- (PCB 189)	µg/L		-	-	-	-	-	-	-	-	<0.3	<0.3	-
	Total PCB WHO 12	µg/L		-	-	-	-	-	-	-	-	<1	<1	-
	PCB 52	µg/L		-	-	-	-	-	-	-	-	<0.2	<0.2	-
	PCB 101	µg/L		-	-	-	-	-	-	-	-	<0.3	<0.3	-
	PCB 138	µg/L		-	-	-	-	-	-	-	-	<0.2	<0.2	-
	PCB 153	µg/L		-	-	-	-	-	-	-	-	<0.2	<0.2	-
	PCB 180	µg/L		-	-	-	-	-	-	-	-	<0.2	<0.2	-
	Total PCB 7 Congeners	µg/L		-	-	-	-	-	-	-	-	<1	<1	-
Explosives	1,3-Dinitrobenzene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	2,4-Dinitrotoluene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	2,6-dinitrotoluene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
Metals	Arsenic (Filtered)	µg/L	25[#2]	8.3	7	2.8	4.1	1.9	2.6	2.6	4.4	6.4	13	13
	Beryllium (Filtered)	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Chem_Group	ChemName	output unit	Field_ID	LF\BH01D	LF\BH01S	MS\BH03D	MS\BH03S	MS\BH04D	MS\BH04S	MS\BH05D	MS\BH05S	MS\BH07D	MS\BH07S	MS\BH08D
			Location_Code	LF\BH01	LF\BH01	MS\BH03	MS\BH03	MS\BH04	MS\BH04	MS\BH05	MS\BH05	MS\BH07	MS\BH07	MS\BH08
			Well	D	S	D	S	D	S	D	S	D	S	D
			Sampled_Date_Time	13/08/2021	13/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	12/08/2021	11/08/2021
			Monitoring_Unit	RMF	TFD SAND	RMF	TFD SAND	GLACIAL	TFD SAND	RMF	TFD SAND	TFD SAND	MADE GROUND	TFD SAND
			Controlled Waters GAC_EQS-Coast (Surface Water)											
	Boron (Filtered)	µg/L	7,000[#4]	260	220	73	390	570	590	280	280	380	380	460
	Cadmium (Filtered)	µg/L	0.2[#1]	0.05	0.05	0.08	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
	Copper (Filtered)	µg/L	3.76[#2]	<0.4	0.5	2	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	Iron (Filtered)	µg/L	1,000[#2]	29	12	70	14	510	870	13	44	26	41	14
	Lead (Filtered)	µg/L	1.3[#1]	<0.09	0.14	0.13	<0.09	<0.09	<0.09	0.09	0.11	0.1	0.16	<0.09
	Mercury (Filtered)	µg/L	0.07[#6]	**0.19**	**0.23**	0.03	0.07	<0.01	<0.01	**0.72**	0.02	0.03	**0.33**	0.06
	Nickel (Filtered)	µg/L	8.6[#1]	6.5	4.4	**22**	1	0.9	0.6	1	2.9	0.7	2.7	1.5
	Selenium (Filtered)	µg/L		4.9	15	27	4.7	0.71	0.29	24	0.69	8.2	27	3.8
	Vanadium (Filtered)	µg/L	100[#4]	15	15	1.7	14	<0.6	<0.6	14	1.3	2.3	7.6	4.5
	Zinc (Filtered)	µg/L	6.8[#2]	2.8	1.6	6	1.7	1.9	2.8	6.2	4.8	5.1	3.7	1.8
	Chromium (hexavalent)	µg/L	0.6[#2]	**83**	**50**	**120**	<7	<7	<7	**19**	<7	<7	<7	<7
	Chromium (Trivalent) (Filtered)	µg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Inorganics	Sulphate, Total Potential as SO4	µg/l		390,000	690,000	1,100,000	920,000	2,700,000	1,000,000	210,000	96,000	840,000	1,100,000	710,000
	Cyanide (Free)	mg/L	0.001[#4]	<0.0001	<0.02 - 0.0002	<0.02 - 0.0002	<0.02 - 0.0005	**<0.02 - 0.001**	<0.02 - 0.0005	**<0.02 - 0.0013**	<0.02 - 0.0006	**<0.02 - 0.0043**	**<0.02 - 0.0012**	<0.02 - 0.0007
	Cyanide Total	mg/L	0.001[#2]	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	**0.042**	<0.04	<0.04	<0.04
	Thiocyanate	mg/L		0.025	0.1	0.026	<0.02	<0.02	<0.02	0.41	2.3	<0.02	0.052	0.044
	Nitrate (as NO3-)	mg/L		-	-	-	-	-	-	1.5	0.4	-	-	-
	Nitrite (as NO2-)	mg/L		-	-	-	-	-	-	<0.1	0.45	-	-	-
	Nitrate (as N)	mg/L		0.19	0.37	0.24	0.2	0.31	0.27	-	-	0.28	0.22	0.17
	Nitrite (as N)	mg/L		0.052	<0.035	0.25	<0.035	<0.035	<0.035	-	-	<0.035	<0.035	<0.035
	Sulphur as S	mg/L		150	-	490	310	-	380	51	-	-	400	-
	Ammoniacal Nitrogen as N	mg/L	0.021 (unionised ammonia)[#2]	**0.23**	**0.062**	**0.12**	**0.19**	**0.12**	0.015	**0.27**	**10**	**1.2**	**0.47**	**1.2**
	Ammoniacal Nitrogen as NH3	mg/L		0.28	0.075	0.14	0.23	0.15	0.019	0.32	13	1.5	0.58	1.5
	Total Hardness as CaCO3	mg/L		518	772	2170	806	1160	1380	75.8	45.7	697	945	388
Other	TOC	mg/L		<1	68	<1	43	30	15	2.2	12	13	38	32
Field	pH	pH_Units		11.4	11	12.2	8.6	8.2	7.7	10.3	9.2	8.3	8	7.8
MISC	Bis(2-ethylhexyl)esther	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	1,4-dinitrobenzene	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1
	3/4-Methylphenol (m/p-cresol)	µg/L		<1	<1	-	<1	-	<1	-	<1	<1	<1	<1

Env Stds Comments

#1:WFD England/Wales. 2015 - AA-EQS Trans./Coastal
#2:WFD England/Wales. 2015 - Saltwater Standards
#3:PNEC (EU REACH) - Coastal
#4:SEPA WAT-SG-53 Marine EQS - AA - 2015
#5:Water Env't Regs (Scotland) 2015. AA-EQS Coast
#6:WFD England/Wales. 2015 - MAC-EQS Trans./Coastal

GAC: Generic Assessment Criteria
(blank): No assessment criteria available
 - : Not analysed

XXX Exceedance of GAC - Aquatic Toxicity - England/Wales - Transitional/Coastal

			Field_ID	MS\BH09D	MS\BH11D	MS\BH11S	MS\BH12D	MS\BH12S	MS\BH13D	MS\BH13S	MS\BH14	MS\BH15D	MS\BH15S	MS\BH17D
			Location_Code	MS\BH09	MS\BH11	MS\BH11	MS\BH12	MS\BH12	MS\BH13	MS\BH13	MS\BH14	MS\BH15	MS\BH15	MS\BH17
			Well	D	D	S	D	S	D	S	-	D	S	D
			Sampled_Date_Time	13/08/2021	11/08/2021	12/08/2021	13/08/2021	11/08/2021	12/08/2021	12/08/2021	10/08/2021	13/08/2021	13/08/2021	10/08/2021
			Monitoring_Unit	TFD SAND	TFD SAND	MADE GROUND	RMF	GLACIAL	RMF	TFD SAND	TFD SAND	TFD SAND	MADE GROUND	RMF
Chem_Group	**ChemName**	**output unit**	Controlled Waters GAC_EQS-Coast (Surface Water)											
TPH	EPH >C10-C40	µg/L		150	<10	780	200	33	<10	440	53	130	120	<10
	>C5-C6 Aliphatics	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	>C6-C8 Aliphatics	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	>C8-C10 Aliphatics	µg/L		<0.1	<0.1	<0.1	0.7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	>C10-C12 Aliphatics	µg/L		2.8	45	110	<1	34	<1	<1	<1	2.4	5	<1
	>C12-C16 Aliphatics	µg/L		1.5	18	10	1.3	12	<1	<1	<1	1.6	<1	<1
	>C16-C21 Aliphatics	µg/L		30	24	4.9	5.1	19	<1	<1	<1	27	12	<1
	>C16-C35 Aliphatics	µg/L		31	36	6	6.1	24.8	<2	<2	<2	28	13.8	<2
	>C21-C35 Aliphatics	µg/L		<1	12	1.1	<1	5.8	<1	<1	<1	<1	1.8	<1
	>C5-C35 Aliphatics	µg/L		35	99	120	<10	71	<10	<10	<10	32	20	<10
	>EC5-EC7 Aromatics	µg/L	8[#1]	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	>EC7-EC8 Aromatics	µg/L	74[#2]	<0.1	<0.1	<0.1	22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	>EC8-EC10 Aromatics	µg/L		<0.1	<0.1	<0.1	14	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	>EC10-EC12 Aromatics	µg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	>EC12-EC16 Aromatics	µg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	>EC16-EC21 Aromatics	µg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	>EC21-EC35 Aromatics	µg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	>EC5-EC35 Aromatics	µg/L		<10	<10	<10	36	<10	<10	<10	<10	<10	<10	<10
	>C5-C35 Aliphatics & Aromatics	µg/L		36	99	120	44	71	<10	<10	<10	32	20	<10
VOC	Dichlorodifluoromethane	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	MTBE	µg/L	260[#3]	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Chloromethane	µg/L		<1	-	2	<1	-	-	-	-	-	<1	-
	Vinyl chloride	µg/L	8[#3]	<1	-	<1	<1	-	-	-	-	-	<1	-
	Bromomethane	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	Chloroethane	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	Trichlorofluoromethane	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	1,1-dichloroethene	µg/L	1[#3]	<1	-	<1	<1	-	-	-	-	-	<1	-
	Dichloromethane	µg/L	20[#1]	<27	-	<27	<27	-	-	-	-	-	<27	-
	trans-1,2-dichloroethene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	1,1-dichloroethane	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	cis-1,2-dichloroethene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	2,2-dichloropropane	µg/L		<2	-	<2	<2	-	-	-	-	-	<2	-
	Bromochloromethane	µg/L		<4	-	<4	<4	-	-	-	-	-	<4	-
	Chloroform	µg/L	2.5[#1]	<1	-	<1	<1	-	-	-	-	-	<1	-
	1,1,1-trichloroethane	µg/L	100[#4]	<1	-	<1	<1	-	-	-	-	-	<1	-
	1,1-dichloropropene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	Carbon tetrachloride	µg/L	12[#1]	<1	-	<1	<1	-	-	-	-	-	<1	-
	1,2-dichloroethane	µg/L	10[#1]	<1	-	<1	<1	-	-	-	-	-	<1	-
	Benzene	µg/L	8[#1]	<1 - 5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Trichloroethene	µg/L	10[#1]	<1	-	<1	<1	-	-	-	-	-	<1	-
	1,2-dichloropropane	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	Dibromomethane	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	Bromodichloromethane	µg/L		<4	-	<4	<4	-	-	-	-	-	<4	-
	cis-1,3-dichloropropene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	Toluene	µg/L	74[#2]	<1	<1	<1	<1 - 22	<1	<1	<1	<1	<1	<1	<1
	trans-1,3-dichloropropene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	1,1,2-trichloroethane	µg/L	300[#4]	<1	-	<1	<1	-	-	-	-	-	<1	-
	Tetrachloroethene	µg/L	10[#1]	<1	-	<1	<1	-	-	-	-	-	<1	-
	1,3-dichloropropane	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	Sum of PCE and TCE	µg/L		<2	-	<2	<2	-	-	-	-	-	<2	-
	Chlorodibromomethane	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	1,2-dibromoethane	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	Chlorobenzene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	1,1,1,2-tetrachloroethane	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	Ethylbenzene	µg/L	20[#4]	<1	<1	<1	<1 - 14	<1	<1	<1	<1	<1	<1	<1

			Field_ID	MS\BH09D	MS\BH11D	MS\BH11S	MS\BH12D	MS\BH12S	MS\BH13D	MS\BH13S	MS\BH14	MS\BH15D	MS\BH15S	MS\BH17D
			Location_Code	MS\BH09	MS\BH11	MS\BH11	MS\BH12	MS\BH12	MS\BH13	MS\BH13	MS\BH14	MS\BH15	MS\BH15	MS\BH17
			Well	D	D	S	D	S	D	S	-	D	S	D
			Sampled_Date_Time	13/08/2021	11/08/2021	12/08/2021	13/08/2021	11/08/2021	12/08/2021	12/08/2021	10/08/2021	13/08/2021	13/08/2021	10/08/2021
			Monitoring_Unit	TFD SAND	TFD SAND	MADE GROUND	RMF	GLACIAL	RMF	TFD SAND	TFD SAND	TFD SAND	MADE GROUND	RMF
Chem_Group	ChemName	output unit	Controlled Waters GAC_EQS-Coast (Surface Water)											
	Xylene (m & p)	µg/L		<2	-	<2	<2	-	-	-	-	-	<2	-
	Xylene Total	µg/L	30#4	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Xylene (o)	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	Styrene	µg/L	50#4	<1	-	<1	<1	-	-	-	-	-	<1	-
	Bromoform	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	Isopropylbenzene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	1,1,2,2-tetrachloroethane	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	Bromobenzene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	1,2,3-trichloropropane	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	n-propylbenzene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	2-chlorotoluene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	1,3,5-trimethylbenzene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	4-chlorotoluene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	tert-butylbenzene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	1,2,4-trimethylbenzene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	sec-butylbenzene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	p-isopropyltoluene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	1,3-dichlorobenzene	µg/L		<2	-	<2	<2	-	-	-	-	-	<2	-
	1,4-dichlorobenzene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	n-butylbenzene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	1,2-dichlorobenzene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	1,2-dibromo-3-chloropropane	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	1,2,4-trichlorobenzene	µg/L	Refer to 'Trichlorobenzene (total)'#5	<1	-	<1	<1	-	-	-	-	-	<1	-
	Hexachlorobutadiene	µg/L	0.6#6	<1	-	<1	<1	-	-	-	-	-	<1	-
	1,2,3-trichlorobenzene	µg/L	Refer to 'Trichlorobenzene (total)'#5	<1	-	<1	<1	-	-	-	-	-	<1	-
	1,2-Dichloroethene	µg/L		<2	-	<2	<2	-	-	-	-	-	<2	-
	Trihalomethanes	µg/L		<7	-	<7	<7	-	-	-	-	-	<7	-
	Hexachlorobenzene	µg/L	0.05#6	<1	-	<1	<1	-	-	-	-	-	<1	-
	Trichlorobenzene (total)	µg/L	0.4#1	<2	-	<2	<2	-	-	-	-	-	<2	-
PAH	Naphthalene	µg/L	2#1	0.2	0.17	0.11	0.08	0.5	0.24	0.1	0.65	4.9	0.6	0.06
	Acenaphthylene	µg/L		<0.01	<0.01	<0.01	0.01	0.01	<0.01	<0.01	0.02	0.01	0.1	0.02
	Acenaphthene	µg/L		0.02	0.02	0.04	<0.01	0.08	0.08	0.06	2.3	0.51	0.42	0.12
	Fluorene	µg/L		0.01	0.01	0.01	0.06	0.04	0.02	0.02	0.52	0.07	0.2	0.04
	Phenanthrene	µg/L		<0.01	<0.01	0.08	0.03	0.05	0.01	<0.01	2.6	<0.01	0.1	0.08
	Anthracene	µg/L	0.1#1	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	0.19	<0.01	0.02	0.02
	Fluoranthene	µg/L	0.0063#1	<0.01	0.01	0.09	0.01	0.04	0.02	<0.01	0.24	<0.01	0.03	0.04
	Pyrene	µg/L		<0.01	0.01	0.11	0.01	0.03	0.02	0.01	0.14	0.01	0.03	0.03
	Benz(a)anthracene	µg/L		<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01
	Chrysene	µg/L		<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01
	Benzo(a) pyrene	µg/L	0.00017#1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Indeno(1,2,3-c,d)pyrene	µg/L	see BaP and notes#5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Dibenz(a,h)anthracene	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
	Benzo(g,h,i)perylene	µg/L	0.00082#6	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
	Benzo(b)fluoranthene	µg/L	0.017#6	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Benzo(k)fluoranthene	µg/L	0.017#6	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Benzo(b)&(k)fluoranthene	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	PAHs (sum of 4)	µg/L		<0.04	<0.04	0.04	<0.04	<0.04	<0.04	<0.04	0.04	<0.04	<0.04	<0.04
	PAH 16 Total	µg/L		0.23	0.22	0.5	0.21	0.76	0.39	0.2	6.8	5.6	1.5	0.42
	benzo(g,h,i)perylene + indeno(1,2,3-cd)pyrene	µg/L		<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02
	Benzo(a)pyrene (surrogate marker for PAH mixture)	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
SVOC	2,3,5,6-Tetrachlorophenol	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	2-chlorophenol	µg/L	50#4	<1	-	<1	<1	-	-	-	-	-	<1	-
	2-methylphenol	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	2,4-dichlorophenol	µg/L	0.42#2	<1	-	<1	<1	-	-	-	-	-	<1	-

Chem_Group	ChemName	output unit	Field_ID	MS\BH09D	MS\BH11D	MS\BH11S	MS\BH12D	MS\BH12S	MS\BH13D	MS\BH13S	MS\BH14	MS\BH15D	MS\BH15S	MS\BH17D
			Location_Code	MS\BH09	MS\BH11	MS\BH11	MS\BH12	MS\BH12	MS\BH13	MS\BH13	MS\BH14	MS\BH15	MS\BH15	MS\BH17
			Well	D	D	S	D	S	D	S	-	D	S	D
			Sampled_Date_Time	13/08/2021	11/08/2021	12/08/2021	13/08/2021	11/08/2021	12/08/2021	12/08/2021	10/08/2021	13/08/2021	13/08/2021	10/08/2021
			Monitoring_Unit	TFD SAND	TFD SAND	MADE GROUND	RMF	GLACIAL	RMF	TFD SAND	TFD SAND	TFD SAND	MADE GROUND	RMF
			Controlled Waters GAC_EQS-Coast (Surface Water)											
	2,4-dimethylphenol	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	2,4,5-trichlorophenol	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	2,4,6-trichlorophenol	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	4-chloro-3-methylphenol	µg/L	40[#4]	<1	-	<1	<1	-	-	-	-	-	<1	-
	4-nitrophenol	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	Pentachlorophenol	µg/L	0.4[#1]	<1	-	<1	<1	-	-	-	-	-	<1	-
	Phenol	µg/L	7.7[#2]	<1	-	<1	<1	-	-	-	-	-	3.8	-
	2-chloronaphthalene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	2-methylnaphthalene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	Bis(2-ethylhexyl) phthalate	µg/L	1.3[#1]	<1	-	<1	<1	-	-	-	-	-	<1	-
	Butyl benzyl phthalate	µg/L	0.75[#2]	<1	-	<1	<1	-	-	-	-	-	<1	-
	Di-n-butyl phthalate	µg/L	8[#4]	<1	-	<1	<1	-	-	-	-	-	<1	-
	Di-n-octyl phthalate	µg/L	20[#4]	<1	-	<1	<1	-	-	-	-	-	<1	-
	Diethylphthalate	µg/L	200[#4]	<1	-	<1	<1	-	-	-	-	-	<1	-
	Dimethyl phthalate	µg/L	800[#4]	<1	-	<1	<1	-	-	-	-	-	<1	-
	2-nitroaniline	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	3-nitroaniline	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	4-bromophenyl phenyl ether	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	4-chlorophenyl phenyl ether	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	4-nitroaniline	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	Azobenzene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	Bis(2-chloroethoxy) methane	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	Carbazole	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	Dibenzofuran	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	Hexachlorocyclopentadiene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	1-Methylnaphthalene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	Benzyl alcohol	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	Bis(2-chloroisopropyl)ether	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	Total Monohydric Phenols (S) Corrected	µg/L		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	Diphenylamine	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
PCBs	PCB 118+123	µg/L		-	-	-	-	-	-	-	-	-	-	-
	PCB congener 28 + 31	µg/L		-	-	-	-	-	-	-	-	-	-	-
	Tetrachlorobiphenyl, 3,3,4,4- (PCB 77)	µg/L		-	-	-	-	-	-	-	-	-	-	-
	Tetrachlorobiphenyl, 3,4,4,5- (PCB 81)	µg/L		-	-	-	-	-	-	-	-	-	-	-
	Pentachlorobiphenyl, 2,3,3,4,4- (PCB 105)	µg/L		-	-	-	-	-	-	-	-	-	-	-
	Pentachlorobiphenyl, 2,3,4,4,5- (PCB 114)	µg/L		-	-	-	-	-	-	-	-	-	-	-
	Pentachlorobiphenyl, 3,3,4,4,5- (PCB 126)	µg/L		-	-	-	-	-	-	-	-	-	-	-
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 156)	µg/L		-	-	-	-	-	-	-	-	-	-	-
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 157)	µg/L		-	-	-	-	-	-	-	-	-	-	-
	Hexachlorobiphenyl, 2,3,4,4,5,5- (PCB 167)	µg/L		-	-	-	-	-	-	-	-	-	-	-
	Hexachlorobiphenyl, 3,3,4,4,5,5- (PCB 169)	µg/L		-	-	-	-	-	-	-	-	-	-	-
	Heptachlorobiphenyl, 2,3,3,4,4,5,5- (PCB 189)	µg/L		-	-	-	-	-	-	-	-	-	-	-
	Total PCB WHO 12	µg/L		-	-	-	-	-	-	-	-	-	-	-
	PCB 52	µg/L		-	-	-	-	-	-	-	-	-	-	-
	PCB 101	µg/L		-	-	-	-	-	-	-	-	-	-	-
	PCB 138	µg/L		-	-	-	-	-	-	-	-	-	-	-
	PCB 153	µg/L		-	-	-	-	-	-	-	-	-	-	-
	PCB 180	µg/L		-	-	-	-	-	-	-	-	-	-	-
	Total PCB 7 Congeners	µg/L		-	-	-	-	-	-	-	-	-	-	-
Explosives	1,3-Dinitrobenzene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	2,4-Dinitrotoluene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	2,6-dinitrotoluene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
Metals	Arsenic (Filtered)	µg/L	25[#2]	8.4	2.6	1.1	0.58	7.7	1.9	10	24	11	8.9	5.2
	Beryllium (Filtered)	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Chem_Group	ChemName	output unit	Controlled Waters GAC_EQS-Coast (Surface Water)	MS\BH09D	MS\BH11D	MS\BH11S	MS\BH12D	MS\BH12S	MS\BH13D	MS\BH13S	MS\BH14	MS\BH15D	MS\BH15S	MS\BH17D
			Field_ID	MS\BH09D	MS\BH11D	MS\BH11S	MS\BH12D	MS\BH12S	MS\BH13D	MS\BH13S	MS\BH14	MS\BH15D	MS\BH15S	MS\BH17D
			Location_Code	MS\BH09	MS\BH11	MS\BH11	MS\BH12	MS\BH12	MS\BH13	MS\BH13	MS\BH14	MS\BH15	MS\BH15	MS\BH17
			Well	D	D	S	D	S	D	S	-	D	S	D
			Sampled_Date_Time	13/08/2021	11/08/2021	12/08/2021	13/08/2021	11/08/2021	12/08/2021	12/08/2021	10/08/2021	13/08/2021	13/08/2021	10/08/2021
			Monitoring_Unit	TFD SAND	TFD SAND	MADE GROUND	RMF	GLACIAL	RMF	TFD SAND	TFD SAND	TFD SAND	MADE GROUND	RMF
	Boron (Filtered)	µg/L	7.000[#4]	210	700	360	180	300	660	360	17	76	80	<12
	Cadmium (Filtered)	µg/L	0.2[#1]	<0.03	<0.03	0.13	<0.03	<0.03	<0.03	<0.03	0.08	<0.03	<0.03	<0.03
	Copper (Filtered)	µg/L	3.76[#2]	<0.4	<0.4	<0.4	1.7	0.4	<0.4	<0.4	0.7	<0.4	0.8	0.8
	Iron (Filtered)	µg/L	1.000[#2]	16	20	12	11	16	**1200**	91	16	8.6	14	22
	Lead (Filtered)	µg/L	1.3[#1]	0.09	0.1	**1.8**	0.49	<0.09	<0.09	<0.09	0.19	<0.09	0.19	0.1
	Mercury (Filtered)	µg/L	0.07[#6]	0.05	0.07	0.05	<0.01	**0.08**	<0.01	0.03	**0.41**	**0.1**	**0.14**	**0.19**
	Nickel (Filtered)	µg/L	8.6[#1]	1.6	2.3	1.4	4.4	3.1	**11**	0.9	5.2	0.7	0.9	2.2
	Selenium (Filtered)	µg/L		7.1	1.6	0.96	2.5	28	2	0.6	3.2	9.2	6.5	4.7
	Vanadium (Filtered)	µg/L	100[#4]	8.1	16	-	0.9	54	-	-	63	1.1	93	59
	Zinc (Filtered)	µg/L	6.8[#2]	4.4	1.8	**220**	3	3.2	**8.7**	6.3	<1.3	4.4	**9.2**	<1.3
	Chromium (hexavalent)	µg/L	0.6[#2]	<7	<7	<7	**11**	<7	<7	<7	<7	<7	<7	<7
	Chromium (Trivalent) (Filtered)	µg/L		<1	<1	4.3	<1	<1	<1	<1	<1	<1	<1	<1
Inorganics	Sulphate, Total Potential as SO4	µg/l		160,000	67,000	770,000	130,000	160,000	1,300,000	280,000	540,000	130,000	1,100,000	890,000
	Cyanide (Free)	mg/L	0.001[#4]	<0.02 - 0.0004	<0.02 - 0.0005	0.0001	<0.02 - 0.0005	<0.0001	0.0008	**0.0044**	<0.02 - 0.0005	<0.02 - 0.0002	<0.02 - 0.0001	<0.02 - 0.0007
	Cyanide Total	mg/L	0.001[#2]	<0.04	<0.04	-	<0.04	<0.04	-	-	<0.04	<0.04	<0.04	<0.04
	Thiocyanate	mg/L		0.15	0.17	-	<0.02	<0.02	-	-	0.17	0.17	0.23	0.11
	Nitrate (as NO3-)	mg/L		<0.1	-	-	-	<0.1	-	-	0.28	-	-	0.98
	Nitrite (as NO2-)	mg/L		<0.1	-	-	-	0.69	-	-	<0.1	-	-	<0.1
	Nitrate (as N)	mg/L		-	0.15	0.28	0.83	-	0.21	0.15	-	0.39	0.35	-
	Nitrite (as N)	mg/L		-	<0.035	<0.035	<0.035	-	<0.035	<0.035	-	<0.035	0.27	-
	Sulphur as S	mg/L		50	-	290	37	-	570	-	180	-	380	300
	Ammoniacal Nitrogen as N	mg/L	0.021 (unionised ammonia)[#2]	**1.9**	**1.8**	**0.16**	**0.13**	**0.66**	**2.6**	**2**	**0.79**	**1.3**	**0.57**	**0.28**
	Ammoniacal Nitrogen as NH3	mg/L		2.3	2.2	0.19	0.16	0.8	3.2	2.4	0.96	1.6	0.69	0.35
	Total Hardness as CaCO3	mg/L		30.3	95.4	725	437	142	3390	370	593	1040	931	1020
Other	TOC	mg/L		36	39	31	<1	100	3.9	8.2	7.6	4.6	6.1	16
Field	pH	pH_Units		9.7	8.4	7.9	11.9	11.2	7.2	8.5	10.9	9.7	10.7	11.2
MISC	Bis(2-ethylhexyl)esther	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	1,4-dinitrobenzene	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-
	3/4-Methylphenol (m/p-cresol)	µg/L		<1	-	<1	<1	-	-	-	-	-	<1	-

Env Stds Comments
#1:WFD England/Wales. 2015 - AA-EQS Trans./Coastal
#2:WFD England/Wales. 2015 - Saltwater Standards
#3:PNEC (EU REACH) - Coastal
#4:SEPA WAT-SG-53 Marine EQS - AA - 2015
#5:Water Env't Regs (Scotland) 2015. AA-EQS Coast
#6:WFD England/Wales. 2015 - MAC-EQS Trans./Coastal

GAC: Generic Assessment Criteria
(blank): No assessment criteria available
 - : Not analysed

XXX Exceedance of GAC - Aquatic Toxicity - England/Wales - Transitional/Coastal

			Field_ID									
			Location_Code									
			Well									
			Sampled_Date_Time									
			Monitoring_Unit									
			Controlled Waters GAC_EQS-Coast (Surface Water)	Statistical Summary								
Chem_Group	ChemName	output unit		Number of Results	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	Median Concentration	Standard Deviation	Number of Guideline Exceedances	Number of Guideline Exceedances (Detects Only)
TPH	EPH >C10-C40	µg/L		22	17	<10	3500	360	140	746	0	0
	>C5-C6 Aliphatics	µg/L		22	1	<0.1	120	5.5	0.05	26	0	0
	>C6-C8 Aliphatics	µg/L		22	1	<0.1	210	9.6	0.05	45	0	0
	>C8-C10 Aliphatics	µg/L		22	2	<0.1	15	0.76	0.05	3.2	0	0
	>C10-C12 Aliphatics	µg/L		22	10	<1	110	12	0.5	25	0	0
	>C12-C16 Aliphatics	µg/L		22	10	<1	18	3.7	0.5	5.2	0	0
	>C16-C21 Aliphatics	µg/L		22	11	<1	30	8	2.7	9.9	0	0
	>C16-C35 Aliphatics	µg/L		22	11	<2	36	10	3.5	12	0	0
	>C21-C35 Aliphatics	µg/L		22	7	<1	14	2.3	0.5	3.8	0	0
	>C5-C35 Aliphatics	µg/L		22	11	<10	340	43	12.5	74	0	0
	>EC5-EC7 Aromatics	µg/L	8[#1]	22	2	<0.1	58	2.9	0.05	12	1	1
	>EC7-EC8 Aromatics	µg/L	74[#2]	22	2	<0.1	22	2	0.05	6.2	0	0
	>EC8-EC10 Aromatics	µg/L		22	2	<0.1	250	12	0.05	53	0	0
	>EC10-EC12 Aromatics	µg/L		22	0	<1	<1	0.5	0.5	0	0	0
	>EC12-EC16 Aromatics	µg/L		22	0	<1	<1	0.5	0.5	0	0	0
	>EC16-EC21 Aromatics	µg/L		22	0	<1	<1	0.5	0.5	0	0	0
	>EC21-EC35 Aromatics	µg/L		22	0	<1	<1	0.5	0.5	0	0	0
	>EC5-EC35 Aromatics	µg/L		22	2	<10	330	21	5	69	0	0
	>C5-C35 Aliphatics & Aromatics	µg/L		22	12	<10	670	59	25	140	0	0
VOC	Dichlorodifluoromethane	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	MTBE	µg/L	260[#3]	22	0	<1	<1	0.5	0.5	0	0	0
	Chloromethane	µg/L		12	7	<1	3	1.5	2	0.89	0	0
	Vinyl chloride	µg/L	8[#3]	12	0	<1	<1	0.5	0.5	0	0	0
	Bromomethane	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	Chloroethane	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	Trichlorofluoromethane	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	1,1-dichloroethene	µg/L	1[#3]	12	0	<1	<1	0.5	0.5	0	0	0
	Dichloromethane	µg/L	20[#1]	12	0	<27	<27	14	13.5	0	12	0
	trans-1,2-dichloroethene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	1,1-dichloroethane	µg/L		12	1	<1	1	0.54	0.5	0.14	0	0
	cis-1,2-dichloroethene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	2,2-dichloropropane	µg/L		12	0	<2	<2	1	1	0	0	0
	Bromochloromethane	µg/L		12	0	<4	<4	2	2	0	0	0
	Chloroform	µg/L	2.5[#1]	12	0	<1	<1	0.5	0.5	0	0	0
	1,1,1-trichloroethane	µg/L	100[#4]	12	0	<1	<1	0.5	0.5	0	0	0
	1,1-dichloropropene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	Carbon tetrachloride	µg/L	12[#1]	12	0	<1	<1	0.5	0.5	0	0	0
	1,2-dichloroethane	µg/L	10[#1]	12	0	<1	<1	0.5	0.5	0	0	0
	Benzene	µg/L	8[#1]	22	3	<1	58	3.4	0.5	12	1	1
	Trichloroethene	µg/L	10[#1]	12	0	<1	<1	0.5	0.5	0	0	0
	1,2-dichloropropane	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	Dibromomethane	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	Bromodichloromethane	µg/L		12	0	<4	<4	2	2	0	0	0
	cis-1,3-dichloropropene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	Toluene	µg/L	74[#2]	22	2	<1	22	1.9	0.5	4.7	0	0
	trans-1,3-dichloropropene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	1,1,2-trichloroethane	µg/L	300[#4]	12	0	<1	<1	0.5	0.5	0	0	0
	Tetrachloroethene	µg/L	10[#1]	12	0	<1	<1	0.5	0.5	0	0	0
	1,3-dichloropropane	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	Sum of PCE and TCE	µg/L		12	0	<2	<2	1	1	0	0	0
	Chlorodibromomethane	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	1,2-dibromoethane	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	Chlorobenzene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	1,1,1,2-tetrachloroethane	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	Ethylbenzene	µg/L	20[#4]	22	2	<1	210	10	0.5	45	1	1

Chem_Group	ChemName	output unit	Controlled Waters GAC_EQS-Coast (Surface Water)	Number of Results	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	Median Concentration	Standard Deviation	Number of Guideline Exceedances	Number of Guideline Exceedances (Detects Only)
			Field_ID									
			Location_Code									
			Well									
			Sampled_Date_Time									
			Monitoring_Unit	Statistical Summary								
	Xylene (m & p)	µg/L		12	0	<2	<2	1	1	0	0	0
	Xylene Total	µg/L	30[#4]	22	0	<1	<1	0.5	0.5	0	0	0
	Xylene (o)	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	Styrene	µg/L	50[#4]	12	0	<1	<1	0.5	0.5	0	0	0
	Bromoform	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	Isopropylbenzene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	1,1,2,2-tetrachloroethane	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	Bromobenzene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	1,2,3-trichloropropane	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	n-propylbenzene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	2-chlorotoluene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	1,3,5-trimethylbenzene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	4-chlorotoluene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	tert-butylbenzene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	1,2,4-trimethylbenzene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	sec-butylbenzene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	p-isopropyltoluene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	1,3-dichlorobenzene	µg/L		12	0	<2	<2	1	1	0	0	0
	1,4-dichlorobenzene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	n-butylbenzene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	1,2-dichlorobenzene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	1,2-dibromo-3-chloropropane	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	1,2,4-trichlorobenzene	µg/L	Refer to 'Trichlorobenzene (total)'[#5]	12	0	<1	<1	0.5	0.5	0	0	0
	Hexachlorobutadiene	µg/L	0.6[#6]	12	0	<1	<1	0.5	0.5	0	12	0
	1,2,3-trichlorobenzene	µg/L	Refer to 'Trichlorobenzene (total)'[#5]	12	0	<1	<1	0.5	0.5	0	0	0
	1,2-Dichloroethene	µg/L		12	0	<2	<2	1	1	0	0	0
	Trihalomethanes	µg/L		12	0	<7	<7	3.5	3.5	0	0	0
	Hexachlorobenzene	µg/L	0.05[#6]	12	0	<1	<1	0.5	0.5	0	12	0
	Trichlorobenzene (total)	µg/L	0.4[#1]	12	0	<2	<2	1	1	0	12	0
PAH	Naphthalene	µg/L	2[#1]	22	22	0.06	4.9	0.46	0.185	1	1	1
	Acenaphthylene	µg/L		22	6	<0.01	0.1	0.011	0.005	0.02	0	0
	Acenaphthene	µg/L		22	20	<0.01	2.3	0.2	0.06	0.49	0	0
	Fluorene	µg/L		22	22	0.01	0.52	0.063	0.025	0.11	0	0
	Phenanthrene	µg/L		22	11	<0.01	2.6	0.15	0.0075	0.55	0	0
	Anthracene	µg/L	0.1[#1]	22	5	<0.01	0.19	0.016	0.005	0.039	1	1
	Fluoranthene	µg/L	0.0063[#1]	22	12	<0.01	0.24	0.027	0.01	0.052	22	12
	Pyrene	µg/L		22	15	<0.01	0.14	0.024	0.01	0.034	0	0
	Benz(a)anthracene	µg/L		22	2	<0.01	0.02	0.0059	0.005	0.0033	0	0
	Chrysene	µg/L		22	2	<0.01	0.02	0.0059	0.005	0.0033	0	0
	Benzo(a) pyrene	µg/L	0.00017[#1]	22	0	<0.01	<0.01	0.005	0.005	0	22	0
	Indeno(1,2,3-c,d)pyrene	µg/L	see BaP and notes[#5]	22	0	<0.01	<0.01	0.005	0.005	0	0	0
	Dibenz(a,h)anthracene	µg/L		22	1	<0.01	0.01	0.0052	0.005	0.0011	0	0
	Benzo(g,h,i)perylene	µg/L	0.00082[#6]	22	2	<0.01	0.01	0.0055	0.005	0.0015	22	2
	Benzo(b)fluoranthene	µg/L	0.017[#6]	22	0	<0.01	<0.01	0.005	0.005	0	0	0
	Benzo(k)fluoranthene	µg/L	0.017[#6]	22	0	<0.01	<0.01	0.005	0.005	0	0	0
	Benzo(b)&(k)fluoranthene	µg/L		22	0	<0.02	<0.02	0.01	0.01	0	0	0
	PAHs (sum of 4)	µg/L		22	2	<0.04	0.04	0.022	0.02	0.0059	0	0
	PAH 16 Total	µg/L		22	19	<0.2	6.8	0.93	0.385	1.7	0	0
	benzo(g,h,i)perylene + indeno(1,2,3-cd)pyrene	µg/L		22	2	<0.02	0.02	0.011	0.01	0.0029	0	0
	Benzo(a)pyrene (surrogate marker for PAH mixture)	µg/L		22	0	<0.01	<0.01	0.005	0.005	0	0	0
SVOC	2,3,5,6-Tetrachlorophenol	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	2-chlorophenol	µg/L	50[#4]	12	0	<1	<1	0.5	0.5	0	0	0
	2-methylphenol	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	2,4-dichlorophenol	µg/L	0.42[#2]	12	0	<1	<1	0.5	0.5	0	12	0

			Field_ID									
			Location_Code									
			Well									
			Sampled_Date_Time									
			Monitoring_Unit									
			Controlled Waters GAC_EQS-Coast	**Statistical Summary**								
Chem_Group	**ChemName**	**output unit**	(Surface Water)	Number of Results	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	Median Concentration	Standard Deviation	Number of Guideline Exceedances	Number of Guideline Exceedances (Detects Only)
	2,4-dimethylphenol	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	2,4,5-trichlorophenol	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	2,4,6-trichlorophenol	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	4-chloro-3-methylphenol	µg/L	40[#4]	12	0	<1	<1	0.5	0.5	0	0	0
	4-nitrophenol	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	Pentachlorophenol	µg/L	0.4[#1]	12	1	<1	1.4	0.58	0.5	0.26	12	1
	Phenol	µg/L	7.7[#2]	12	7	<1	7.9	2.7	2.5	2.4	1	1
	2-chloronaphthalene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	2-methylnaphthalene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	Bis(2-ethylhexyl) phthalate	µg/L	1.3[#1]	12	0	<1	<1	0.5	0.5	0	0	0
	Butyl benzyl phthalate	µg/L	0.75[#2]	12	0	<1	<1	0.5	0.5	0	12	0
	Di-n-butyl phthalate	µg/L	8[#4]	12	0	<1	<1	0.5	0.5	0	0	0
	Di-n-octyl phthalate	µg/L	20[#4]	12	0	<1	<1	0.5	0.5	0	0	0
	Diethylphthalate	µg/L	200[#4]	12	0	<1	<1	0.5	0.5	0	0	0
	Dimethyl phthalate	µg/L	800[#4]	12	0	<1	<1	0.5	0.5	0	0	0
	2-nitroaniline	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	3-nitroaniline	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	4-bromophenyl phenyl ether	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	4-chlorophenyl phenyl ether	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	4-nitroaniline	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	Azobenzene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	Bis(2-chloroethoxy) methane	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	Carbazole	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	Dibenzofuran	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	Hexachlorocyclopentadiene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	1-Methylnaphthalene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	Benzyl alcohol	µg/L		12	3	<1	2.2	0.83	0.5	0.62	0	0
	Bis(2-chloroisopropyl)ether	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	Total Monohydric Phenols (S) Corrected	µg/L		22	0	<100	<100	50	50	0	0	0
	Diphenylamine	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
PCBs	PCB 118+123	µg/L		2	0	<0.6	<0.6		0.3		0	0
	PCB congener 28 + 31	µg/L		2	0	<0.3	<0.3		0.15		0	0
	Tetrachlorobiphenyl, 3,3,4,4- (PCB 77)	µg/L		2	0	<0.3	<0.3		0.15		0	0
	Tetrachlorobiphenyl, 3,4,4,5- (PCB 81)	µg/L		2	0	<0.2	<0.2		0.1		0	0
	Pentachlorobiphenyl, 2,3,3,4,4- (PCB 105)	µg/L		2	0	<0.2	<0.2		0.1		0	0
	Pentachlorobiphenyl, 2,3,4,4,5- (PCB 114)	µg/L		2	0	<0.3	<0.3		0.15		0	0
	Pentachlorobiphenyl, 3,3,4,4,5- (PCB 126)	µg/L		2	0	<0.5	<0.5		0.25		0	0
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 156)	µg/L		2	0	<0.3	<0.3		0.15		0	0
	Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 157)	µg/L		2	0	<0.2	<0.2		0.1		0	0
	Hexachlorobiphenyl, 2,3,4,4,5,5- (PCB 167)	µg/L		2	0	<0.3	<0.3		0.15		0	0
	Hexachlorobiphenyl, 3,3,4,4,5,5- (PCB 169)	µg/L		2	0	<0.2	<0.2		0.1		0	0
	Heptachlorobiphenyl, 2,3,3,4,4,5,5- (PCB 189)	µg/L		2	0	<0.3	<0.3		0.15		0	0
	Total PCB WHO 12	µg/L		2	0	<1	<1		0.5		0	0
	PCB 52	µg/L		2	0	<0.2	<0.2		0.1		0	0
	PCB 101	µg/L		2	0	<0.3	<0.3		0.15		0	0
	PCB 138	µg/L		2	0	<0.2	<0.2		0.1		0	0
	PCB 153	µg/L		2	0	<0.2	<0.2		0.1		0	0
	PCB 180	µg/L		2	0	<0.2	<0.2		0.1		0	0
	Total PCB 7 Congeners	µg/L		2	0	<1	<1		0.5		0	0
Explosives	1,3-Dinitrobenzene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	2,4-Dinitrotoluene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	2,6-dinitrotoluene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
Metals	Arsenic (Filtered)	µg/L	25[#2]	22	22	0.58	24	6.7	5.8	5.4	0	0
	Beryllium (Filtered)	µg/L		22	0	<0.1	<0.1	0.05	0.05	0	0	0

			Field_ID Location_Code Well Sampled_Date_Time Monitoring_Unit	Statistical Summary								
Chem_Group	**ChemName**	**output unit**	Controlled Waters GAC_EQS-Coast (Surface Water)	Number of Results	Number of Detects	Minimum Concentration	Maximum Concentration	Average Concentration	Median Concentration	Standard Deviation	Number of Guideline Exceedances	Number of Guideline Exceedances (Detects Only)
	Boron (Filtered)	µg/L	7.000[#4]	22	21	<12	700	311	290	201	0	0
	Cadmium (Filtered)	µg/L	0.2[#1]	22	5	<0.03	0.13	0.029	0.015	0.031	0	0
	Copper (Filtered)	µg/L	3.76[#2]	22	7	<0.4	2	0.45	0.2	0.5	0	0
	Iron (Filtered)	µg/L	1.000[#2]	22	22	8.6	1200	140	18	312	1	1
	Lead (Filtered)	µg/L	1.3[#1]	22	13	<0.09	1.8	0.19	0.095	0.37	1	1
	Mercury (Filtered)	µg/L	0.07[#6]	22	18	<0.01	0.72	0.13	0.065	0.17	9	9
	Nickel (Filtered)	µg/L	8.6[#1]	22	22	0.6	22	3.5	1.9	4.8	2	2
	Selenium (Filtered)	µg/L		22	22	0.29	28	8.3	4.7	9.5	0	0
	Vanadium (Filtered)	µg/L	100[#4]	19	17	<0.6	93	20	8.1	27	0	0
	Zinc (Filtered)	µg/L	6.8[#2]	22	20	<1.3	220	14	3.45	46	3	3
	Chromium (hexavalent)	µg/L	0.6[#2]	22	5	<7	120	16	3.5	30	22	5
	Chromium (Trivalent) (Filtered)	µg/L		22	1	<1	4.3	0.67	0.5	0.81	0	0
Inorganics	Sulphate, Total Potential as SO4	µg/l		22	22	67000	2700000	694682	700000	600606	0	0
	Cyanide (Free)	mg/L	0.001[#4]	22	20	<0.0001	0.0044	0.0044	0.00525	0.0021	5	5
	Cyanide Total	mg/L	0.001[#2]	19	1	<0.04	0.042	0.021	0.02	0.005	19	1
	Thiocyanate	mg/L		19	13	<0.02	2.3	0.21	0.052	0.52	0	0
	Nitrate (as NO3-)	mg/L		6	4	<0.1	1.5	0.54	0.34	0.58	0	0
	Nitrite (as NO2-)	mg/L		6	2	<0.1	0.69	0.22	0.05	0.28	0	0
	Nitrate (as N)	mg/L		16	16	0.15	0.83	0.29	0.255	0.16	0	0
	Nitrite (as N)	mg/L		16	3	<0.035	0.27	0.05	0.0175	0.083	0	0
	Sulphur as S	mg/L		13	13	37	570	276	300	172	0	0
	Ammoniacal Nitrogen as N	mg/L	0.021 (unionised ammonia)[#2]	22	22	0.015	10	1.2	0.52	2.1	0	0
	Ammoniacal Nitrogen as NH3	mg/L		22	22	0.019	13	1.5	0.635	2.7	0	0
	Total Hardness as CaCO3	mg/L		22	22	30.3	3390	806	711	770	0	0
Other	TOC	mg/L		22	19	<1	100	23	14	25	0	0
Field	pH	pH_Units		22	22	7.2	12.2	9.5	9.45	1.6	0	0
MISC	Bis(2-ethylhexyl)esther	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	1,4-dinitrobenzene	µg/L		12	0	<1	<1	0.5	0.5	0	0	0
	3/4-Methylphenol (m/p-cresol)	µg/L		12	0	<1	<1	0.5	0.5	0	0	0

Env Stds Comments
#1:WFD England/Wales. 2015 - AA-EQS Trans./Coastal
#2:WFD England/Wales. 2015 - Saltwater Standards
#3:PNEC (EU REACH) - Coastal
#4:SEPA WAT-SG-53 Marine EQS - AA - 2015
#5:Water Env't Regs (Scotland) 2015. AA-EQS Coast
#6:WFD England/Wales. 2015 - MAC-EQS Trans./Coastal

GAC: Generic Assessment Criteria
(blank): No assessment criteria available
 - : Not analysed

XXX Exceedance of GAC - Aquatic Toxicity - England/Wales - Transitional/Coastal

Groundwater Chemical Screening Against EQS Protective of Surface Water
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	SCREENING VALUE EQS COASTAL	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R3	R2	R3	R2	R3	R2	R3
												Exploratory monitoring well	DUPLICATE A (MS\BH09)	DUPLICATE B (MS\BH14)	LF\BH01 (D)	LF\BH01 (D)	LF\BH01 (S)	LF\BH01 (S)	MS\BH03 (D)	MS\BH03 (S)
												Depth	4.34-8.70	3.60-8.00	4.61-38.00	4.56-38.00	4.64-8.10	4.58-8.10	1.87-28.50	1.91-2.70
												Sampling Date	15/11/2021	16/11/2021	18/10/2021	17/11/2021	18/10/2021	17/11/2021	13/10/2021	17/11/2021
												Monitoring Unit	TFD SAND	TFD SAND	RMF	RMF	TFD SAND	TFD SAND	RMF	MADE GROUND
Metals											-									
Arsenic, Dissolved	<0.16	ug/l	42	42	0.72	61	7.50	**25**	WFD England/Wales. 2015 - Saltwater Standards	YES	**1**		9.4	23	5.1	9.1	9.7	11	6.8	4.2
Beryllium, Dissolved	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	**NV**		NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron, Dissolved	<12	ug/l	42	38	<12	740	387.34	**7000**	SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		230	< 12	270	240	320	350	570	450
Cadmium, Dissolved	<0.03	ug/l	42	9	<0.03	0.2	0.08	**0.2**	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		< 0.03	0.07	0.04	0.04	0.03	< 0.03	< 0.03	< 0.03
Chromium III, Dissolved	<1	ug/l	42	7	<1	16	5.94	**NV**		NO	0		< 1.0	< 1.0	7.9	< 1.0	16	< 1.0	< 1.0	< 1.0
Chromium, Hexavalent	<7	ug/l	42	1	<7	9.2	9.20	**0.6**	WFD England/Wales. 2015 - Saltwater Standards	YES	**1**		< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0
Copper, Dissolved	<0.4	ug/l	42	16	<0.4	3.3	1.26	**3.76**	WFD England/Wales. 2015 - Saltwater Standards	NO	0		< 0.4	0.7	3.3	1.8	0.5	< 0.4	< 0.4	< 0.4
Iron, Dissolved	<5.5	ug/l	42	42	7.6	11000	637.09	**1000**	WFD England/Wales. 2015 - Saltwater Standards	YES	**5**		64	16	56	34	30	19	**11000**	86
Lead, Dissolved	<0.09	ug/l	42	23	<0.09	2.5	0.53	**1.3**	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	**3**		< 0.09	0.57	**1.4**	0.23	0.4	< 0.09	< 0.09	< 0.09
Mercury, Dissolved	<0.01	ug/l	42	33	<0.01	0.36	0.10	**0.07**	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	YES	**14**		0.06	**0.36**	**0.17**	**0.19**	**0.15**	**0.11**	0.06	0.07
Nickel, Dissolved	<0.5	ug/l	42	37	<0.5	15	2.64	**8.6**	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	**1**		0.9	5.5	6.2	4.4	1.5	0.9	0.6	< 0.5
Selenium, Dissolved	<0.25	ug/l	42	38	<0.25	7.8	1.86	**NV**		NO	0		1.8	2.5	3	2	1.4	1.3	0.8	1.1
Vanadium, Dissolved	<0.6	ug/l	42	33	<0.6	96	9.16	**100**	SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		2.2	6.6	8.1	7.1	3.8	0.7	0.9	2
Zinc, Dissolved	<1.3	ug/l	42	30	<1.3	51	6.97	**6.8**	WFD England/Wales. 2015 - Saltwater Standards	YES	**8**		3	3.1	**10**	6.2	4.9	2.5	1.7	3
pH	<	pH	42	42	7	12	9.31	**11**	Hazardous Waste Value	YES	**8**		9.2	**11.3**	**11.3**	10.6	10.2	9.2	7.7	8.2
Cyanide, Total Low Level	<0.0001	mg/l	42	41	<0.0001	0.076	0.01	**0.001**	WFD England/Wales. 2015 - Saltwater Standards	YES	**36**		**0.0053**	**0.0052**	**0.0048**	**0.0052**	**0.0063**	**0.0057**	0.0001	**0.0084**
Cyanide, Free Low Level	<0.0001	mg/l	42	36	<0.0001	0.0056	0.00	**0.001**	SEPA WAT-SG-53 Marine EQS - AA - 2015	YES	**6**		0.0003	0.0002	0.0008	0.0003	0.0002	0.0003	< 0.0001	0.0004
Thiocyanate	<20	ug/l	42	29	<20	9300	1207.34	**NV**		NO	0		110	230	46	< 20	< 20	37	< 20	< 20
Total Hardness as CaCO3	<0.1	mg/l	42	42	4.49	6550	1100.97	**N/A**		NO	0		128	437	723	837	1050	991	6410	945
Ammoniacal Nitrogen as NH3	<0.015	mg/l	42	41	<0.015	23	4.56	**NV**		NO	0		6.4	5.7	0.47	0.18	0.098	0.097	3	0.11
Ammoniacal Nitrogen as N	<0.015	mg/l	42	41	<0.015	19	3.78	**0.021**	WFD England/Wales. 2015 - Saltwater Standards (unionised ammonia)	YES	**41**		**5.2**	**4.7**	**0.39**	**0.15**	**0.08**	**0.08**	**2.5**	**0.09**
Nitrate as NO3	<0.1	mg/l	28	11	<0.1	140	14.52	**NV**		NO	0		< 0.10	< 0.10	17			0.31		0.34
Nitrate as N	<0.1	mg/l	14	5	<0.1	1.5	0.58	**NV**		NO	0					0.24	0.35		< 0.10	
Nitrite as NO2	<0.1	mg/l	30	19	<0.1	440	30.89	**NV**		NO	0		< 0.10	< 0.10				< 0.10		< 0.10
Nitrite as N	<0.035	mg/l	12	0	<0.035	<0.035	<0.035	**NV**		NO	0				< 0.035	< 0.035	< 0.035		< 0.035	
Sulphate as SO4	<0.1	mg/l	42	42	7.5	3000	801.11	**NV**		NO	0		160	420	820	7.5	900	840	2700	840
Total Organic Carbon	<1	mg/l	42	40	<1	190	24.01	**N/A**		NO	0		4.7	5.1	< 1.0	180	23	11	64	6
Aliphatic C5-C6	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	**NV**		NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	<0.1	ug/l	42	1	<0.1	14	14.00	**NV**		NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	<0.1	ug/l	42	2	<0.1	21	11.00	**NV**		NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	<1	ug/l	42	5	<1	30	11.46	**NV**		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	<1	ug/l	42	5	<1	15	7.10	**NV**		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	<1	ug/l	42	6	<1	160	79.00	**NV**		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	<1	ug/l	42	6	<1	220	61.72	**NV**		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	<10	ug/l	42	7	<10	390	138.00	**NV**		NO	0		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	**8**	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	<0.1	ug/l	42	2	<0.1	19	16.00	**74**	WFD England/Wales. 2015 - Saltwater Standards	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	<0.1	ug/l	42	2	<0.1	72	47.50	**NV**		NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	<1	ug/l	42	6	<1	3.9	2.75	**NV**		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	<1	ug/l	42	8	<1	11	7.28	**NV**		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	<1	ug/l	42	8	<1	110	48.58	**NV**		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	<1	ug/l	42	7	<1	110	26.89	**NV**		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	<10	ug/l	42	10	<10	240	78.80	**NV**		NO	0		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	<10	ug/l	42	12	<10	630	146.42	**NV**		NO	0		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
EPH (C10-C40)	<10	ug/l	42	35	<10	1100	146.69	**NV**		NO	0		72	120	87	130	190	150	130	140
Benzene	<1	ug/l	42	0	<1	<1	<1	**8**	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	<1	ug/l	42	2	<1	19	16.00	**74**	WFD England/Wales. 2015 - Saltwater Standards	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	<1	ug/l	42	2	<1	72	47.50	**20**	SEPA WAT-SG-53 Marine EQS - AA - 2015	YES	**2**		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	<1	ug/l	42	0	<1	<1	<1	**30**	SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE	<1	ug/l	42	0	<1	<1	<1	**260**	PNEC (EU REACH) - Coastal	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Phenol - Monohydric	<100	ug/l	42	10	<100	2000	735.00	**50**	SEPA WAT-SG-53 Marine EQS - AA - 2015	YES	**10**		< 100	< 100	< 100	< 100	< 100	< 100	**1100**	< 100
Dichlorodifluoromethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Chloromethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Vinyl Chloride	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Bromomethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Chloroethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Trichlorofluoromethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,1-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Methylene Chloride	<27	ug/l	30	0	<27	<27	<27	**NR**		NO	0		< 27		< 27	< 27		< 27	< 27	< 27
Trans-1,2-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,1-dichloroethane	<1	ug/l	30	3	<1	2	1.33	**NV**		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Cis-1,2-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1		< 1	< 1		< 1	< 1	< 1

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	SCREENING VALUE EQS COASTAL	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R3	R2	R3	R2	R3	R2	R3
												Exploratory monitoring well	DUPLICATE A (MS\BH09)	DUPLICATE B (MS\BH14)	LF\BH01 (D)	LF\BH01 (D)	LF\BH01 (S)	LF\BH01 (S)	MS\BH03 (D)	MS\BH03 (S)
												Depth	4.34-8.70	3.60-8.00	4.61-38.00	4.56-38.00	4.64-8.10	4.58-8.10	1.87-28.50	1.91-2.70
												Sampling Date	15/11/2021	16/11/2021	18/10/2021	17/11/2021	18/10/2021	17/11/2021	13/10/2021	17/11/2021
												Monitoring Unit	TFD SAND	TFD SAND	RMF	RMF	TFD SAND	TFD SAND	RMF	MADE GROUND
2,2-dichloropropane	<2	ug/l	30	0	<2	<2	<2	NR		NO	0		< 2		< 2	< 2		< 2	< 2	< 2
Bromochloromethane	<4	ug/l	30	0	<4	<4	<4	NR		NO	0		< 4		< 4	< 4		< 4	< 4	< 4
Chloroform	<1	ug/l	30	1	<1	5	5.00	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,1,1-trichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,1-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Carbon tetrachloride	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Benzene	<1	ug/l	30	5	<1	5	3.80	8	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		4		< 1	< 1		< 1	< 1	< 1
1,2-dichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Trichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,2-dichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Dibromomethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Bromodichloromethane	<4	ug/l	30	0	<4	<4	<4	NR		NO	0		< 4		< 4	< 4		< 4	< 4	< 4
cis-1,3-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Toluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
trans-1,3-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,1,2-trichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Tetrachloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,3-dichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Dibromochloromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,2-dibromoethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Chlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,1,1,2-tetrachloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Ethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
m+p-Xylene	<2	ug/l	30	0	<2	<2	<2	NR		NO	0		< 2		< 2	< 2		< 2	< 2	< 2
o-Xylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Styrene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Bromoform	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Isopropylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,1,2,2-tetrachloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Bromobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,2,3-trichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
n-propylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
2-chlorotoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,3,5-trimethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
4-chlorotoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Tert-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,2,4-trimethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
sec-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
p-isopropyltoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,3-dichlorobenzene	<2	ug/l	30	0	<2	<2	<2	NR		NO	0		< 2		< 2	< 2		< 2	< 2	< 2
1,4-dichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
n-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,2-dichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,2-dibromo-3-chloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,2,4-trichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Hexachlorobutadiene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Naphthalene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,2,3-trichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
MTBE	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Phenol	<1	ug/l	28	5	<1	3.5	2.06	7.7	WFD England/Wales. 2015 - Saltwater Standards	NO	0		< 1.0		1.9	1.3		< 1.0	< 1.0	< 1.0
Aniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
2-Chlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Benzyl Alcohol	<1	ug/l	28	2	<1	2.2	1.85	NV		NO	0		< 1.0		2.2	1.5		< 1.0	< 1.0	< 1.0
2-Methylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Bis(2-chloroisopropyl)ether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
3&4-Methylphenol	<1	ug/l	28	1	<1	13	13.00	100	Methylphenols-SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Bis(2-chloroethoxy)methane	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
2,4-Dimethylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
2,4-Dichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
4-Chloro-3-methylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
2-Methylnaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Hexachlorocyclopentadiene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
2,4,6-Trichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
2,4,5-Trichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
2-Chloronaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
2-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
2,4-Dinitrotoluene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	SCREENING VALUE EQS COASTAL	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R3	R2	R3	R2	R3	R2	R3
												Exploratory monitoring well	DUPLICATE A (MS\BH09)	DUPLICATE B (MS\BH14)	LF\BH01 (D)	LF\BH01 (D)	LF\BH01 (S)	LF\BH01 (S)	MS\BH03 (D)	MS\BH03 (S)
												Depth	4.34-8.70	3.60-8.00	4.61-38.00	4.56-38.00	4.64-8.10	4.58-8.10	1.87-28.50	1.91-2.70
												Sampling Date	15/11/2021	16/11/2021	18/10/2021	17/11/2021	18/10/2021	17/11/2021	13/10/2021	17/11/2021
												Monitoring Unit	TFD SAND	TFD SAND	RMF	RMF	TFD SAND	TFD SAND	RMF	MADE GROUND
Acenaphthylene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
3-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Acenaphthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
4-Nitrophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Dibenzofuran	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
2,6-Dinitrotoluene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
2,3,4,6-Tetrachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Diethylphthalate	<1	ug/l	28	1	<1	1.1	1.10	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
4-Chlorophenylphenylether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Fluorene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
4-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Diphenylamine	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
4-Bromophenylphenylether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Hexachlorobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)ester	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Pentachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Phenanthrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Anthracene	<1	ug/l	28	0	<1	<1	<1	0.1	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Di-n-butylphthalate	<1	ug/l	28	2	<1	2	1.60	8	SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Butylbenzylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Benzo(a)anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Chrysene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)phthalate	<1	ug/l	28	4	<1	13	5.50	1.3	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	3		< 1.0		5	< 1.0		< 1.0	< 1.0	< 1.0
Di-n-octylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Benzo(b)fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Benzo(k)fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Benzo(a)pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Indeno(123cd)pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Dibenzo(ah)anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Benzo(ghi)perylene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
1,4-Dinitrobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Dimethylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
1,3-Dinitrobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
2,3,5,6-Tetrachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Azobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Carbazole	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
1-Methylnaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Naphthalene	<0.1	ug/l	40	24	<0.1	5.1	0.58	2	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	1		0.2	<0.1	0.1	0.8	0.2	0.2	0.8	
Acenaphthylene	<0.013	ug/l	40	8	<0.013	0.202	0.06	NV		NO	0		<0.013	<0.013	<0.013	0.013	<0.013	<0.013	<0.013	
Acenaphthene	<0.013	ug/l	40	20	<0.013	0.986	0.20	NV		NO	0		<0.013	0.13	0.039	0.08	0.04	<0.013	<0.013	
Fluorene	<0.014	ug/l	40	15	<0.014	0.28	0.07	NV		NO	0		<0.014	0.025	<0.014	0.028	<0.014	<0.014	<0.014	
Phenanthrene	<0.011	ug/l	40	19	<0.011	0.361	0.05	NV		NO	0		<0.011	<0.011	0.011	0.026	<0.011	0.015	<0.011	
Anthracene	<0.013	ug/l	40	2	<0.013	0.026	0.02	0.1	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	
Fluoranthene	<0.012	ug/l	40	9	<0.012	0.266	0.07	0.0063	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	9		<0.012	0.225	<0.012	<0.012	<0.012	<0.012	<0.012	
Pyrene	<0.013	ug/l	40	9	<0.013	0.168	0.05	NV		NO	0		<0.013	0.143	<0.013	0.015	<0.013	<0.013	<0.013	
Benzo(a)anthracene	<0.015	ug/l	40	0	<0.015	<0.015	<0.015	NV		NO	0		<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	
Chrysene	<0.011	ug/l	40	1	<0.011	0.015	0.02	NV		NO	0		<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	
Benzo(bk)fluoranthene	<0.018	ug/l	40	0	<0.018	<0.018	<0.018	NV		NO	0		<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	
Benzo(a)pyrene	<0.016	ug/l	40	0	<0.016	<0.016	<0.016	0.00017	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	
Indeno(123cd)pyrene	<0.011	ug/l	40	0	<0.011	<0.011	<0.011	see BaP and notes	Water Env't Regs (Scotland) 2015. AA-EQS Coast	NO	0		<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	
Dibenzo(ah)anthracene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	NV		NO	0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Benzo(ghi)perylene	<0.011	ug/l	40	0	<0.011	<0.011	<0.011	0.00082	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	
PAH 16 Total	<0.195	ug/l	40	23	<0.195	6.231	0.90	NV		NO	0		0.2	0.523	<0.195	0.962	0.24	0.215	0.8	
Benzo(b)fluoranthene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	0.017	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Benzo(k)fluoranthene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	0.017	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Naphthalene	<0.001	ug/l	42	3	<0.001	0.11	0.09	2	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	0.052
Acenaphthylene	<0.001	ug/l	42	3	<0.001	0.007	0.00	NV		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	0.001
Acenaphthene	<0.001	ug/l	42	3	<0.001	0.044	0.02	NV		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	0.001
Fluorene	<0.001	ug/l	42	3	<0.001	0.012	0.01	NV		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	0.002

Groundwater Chemical Screening Against EQS Protective of Surface Water
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	SCREENING VALUE EQS COASTAL	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R3	R2	R3	R2	R3	R2	R3
												Exploratory monitoring well	DUPLICATE A (MS\BH09)	DUPLICATE B (MS\BH14)	LF\BH01 (D)	LF\BH01 (D)	LF\BH01 (S)	LF\BH01 (S)	MS\BH03 (D)	MS\BH03 (S)
												Depth	4.34-8.70	3.60-8.00	4.61-38.00	4.56-38.00	4.64-8.10	4.58-8.10	1.87-28.50	1.91-2.70
												Sampling Date	15/11/2021	16/11/2021	18/10/2021	17/11/2021	18/10/2021	17/11/2021	13/10/2021	17/11/2021
												Monitoring Unit	TFD SAND	TFD SAND	RMF	RMF	TFD SAND	TFD SAND	RMF	MADE GROUND
Phenanthrene	<0.001	ug/l	42	2	<0.001	0.005	0.00	**NV**		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	0.004
Anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**0.1**	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	<0.001
Fluoranthene	<0.001	ug/l	42	2	<0.001	0.002	0.00	**0.0063**	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	<0.001
Pyrene	<0.001	ug/l	42	2	<0.001	0.003	0.00	**NV**		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	<0.001
Benzo(a)anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**NV**		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	<0.001
Chrysene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**NV**		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	<0.001
Benzo(bk)fluoranthene	<0.002	ug/l	42	0	<0.002	<0.002	<0.002	**NV**		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	<0.002
Benzo(a)pyrene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**0.00017**	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	<0.001
Indeno(123cd)pyrene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**see BaP and notes**	Water Env't Regs (Scotland) 2015. AA-EQS Coast	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	<0.001
Dibenzo(ah)anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**NV**		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	<0.001
Benzo(ghi)perylene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**0.00082**	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	<0.001
PAH 16 Total	<0.016	ug/l	42	3	<0.016	0.178	0.13	**NV**		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	0.06
Benzo(b)fluoranthene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**0.017**	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	<0.001
Benzo(k)fluoranthene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**0.017**	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	<0.001
TAME	Non detect		22	0	Non detect	Non detect	Non detect	**NR**		NO	0		Not Detected	Not Detected		Not Detected		Not Detected		Not Detected
PCB 28 + PCB 31	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0									< 0.3
PCB 52	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0									< 0.2
PCB 77	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0									< 0.3
PCB 81	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0									< 0.2
PCB 101	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0									< 0.3
PCB 105	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0									< 0.2
PCB 114	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0									< 0.3
PCB 118 + PCB 123	< 0.6	ug/l	1	0	< 0.6	< 0.6	< 0.6	**NR**		NO	0									< 0.6
PCB 126	< 0.5	ug/l	1	0	< 0.5	< 0.5	< 0.5	**NR**		NO	0									< 0.5
PCB 138	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0									< 0.2
PCB 153	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0									< 0.2
PCB 156	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0									< 0.3
PCB 157	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0									< 0.2
PCB 167	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0									< 0.3
PCB 169	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0									< 0.2
PCB 180	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0									< 0.2
PCB 189	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0									< 0.3
PCB 12	< 1.0	ug/l	1	0	< 1.0	< 1.0	< 1.0	**NR**		NO	0									< 1.0
PCB 7 Total	< 1.0	ug/l	1	0	< 1.0	< 1.0	< 1.0	**NR**		NO	0									< 1.0

n/US Non suitable sample. PAH concentrations to high to undertake low level PAH analysis
NR All concentrations less than limit of detection. No screening value required.
NV No screening value available
1.1 Exceedance of EQS

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	SCREENING VALUE EQS COASTAL	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R2	R3	R2	R3	R2	R3	R2	R3
												Exploratory monitoring well	MS\BH03 (S)	MS\BH03 (D)	MS\BH04 (D)	MS\BH04 (D)	MS\BH04 (S)	MS\BH04 (S)	MS\BH05 (D)	MS\BH05 (D)
												Depth	1.87-2.70	1.98-28.50	2.51-28.50	2.40-28.50	2.32-5.00	2.35-5.00	5.64-29.90	5.69-29.90
												Sampling Date	13/10/2021	16/11/2021	13/10/2021	16/11/2021	13/10/2021	16/11/2021	12/10/2021	15/11/2021
												Monitoring Unit	MADE GROUND	RMF	TFD CLAY	TFD CLAY	TFD SAND	TFD SAND	RMF	RMF
Metals											-									
Arsenic, Dissolved	<0.16	ug/l	42	42	0.72	61	7.50	**25**	WFD England/Wales. 2015 - Saltwater Standards	YES	**1**		4	2	3.5	4.3	4.6	4	9.6	6.1
Beryllium, Dissolved	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	**NV**		NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron, Dissolved	<12	ug/l	42	38	<12	740	387.34	**7000**	SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		490	430	550	640	610	550	190	180
Cadmium, Dissolved	<0.03	ug/l	42	9	<0.03	0.2	0.08	**0.2**	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		< 0.03	< 0.03	< 0.03	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium III, Dissolved	<1	ug/l	42	7	<1	16	5.94	**NV**		NO	0		< 1.0	< 1.0	5.9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chromium, Hexavalent	<7	ug/l	42	1	<7	9.2	9.20	**0.6**	WFD England/Wales. 2015 - Saltwater Standards	YES	**1**		< 7.0	< 7.0	< 7.0	< 7.0	**9.2**	< 7.0	< 7.0	< 7.0
Copper, Dissolved	<0.4	ug/l	42	16	<0.4	3.3	1.26	**3.76**	WFD England/Wales. 2015 - Saltwater Standards	NO	0		< 0.4	< 0.4	1.2	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Iron, Dissolved	<5.5	ug/l	42	42	7.6	11000	637.09	**1000**	WFD England/Wales. 2015 - Saltwater Standards	YES	**5**		120	360	480	430	**2400**	**1600**	24	51
Lead, Dissolved	<0.09	ug/l	42	23	<0.09	2.5	0.53	**1.3**	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	**3**		< 0.09	< 0.09	0.57	< 0.09	0.15	< 0.09	< 0.09	0.15
Mercury, Dissolved	<0.01	ug/l	42	33	<0.01	0.36	0.10	**0.07**	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	YES	**14**		0.07	**0.09**	< 0.01	0.01	< 0.01	< 0.01	0.05	0.05
Nickel, Dissolved	<0.5	ug/l	42	37	<0.5	15	2.64	**8.6**	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	**1**		< 0.5	0.8	2.1	1.6	0.6	0.7	4.5	2.2
Selenium, Dissolved	<0.25	ug/l	42	38	<0.25	7.8	1.86	**NV**		NO	0		1.5	0.3	0.83	0.6	0.33	0.49	0.56	0.35
Vanadium, Dissolved	<0.6	ug/l	42	33	<0.6	96	9.16	**100**	SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		4	1.5	< 0.6	< 0.6	< 0.6	< 0.6	1.9	0.8
Zinc, Dissolved	<1.3	ug/l	42	30	<1.3	51	6.97	**6.8**	WFD England/Wales. 2015 - Saltwater Standards	YES	**8**		< 1.3	1.5	3.8	2.4	< 1.3	2.6	1.4	5.7
pH	<	pH	42	42	7	12	9.31	**11**	Hazardous Waste Value	YES	**8**		8.2	7.1	**12**	8.1	8.5	7.7	9.5	9.6
Cyanide, Total Low Level	<0.0001	mg/l	42	41	<0.0001	0.076	0.01	**0.001**	WFD England/Wales. 2015 - Saltwater Standards	YES	**36**		**0.0098**	0.0005	**0.0056**	**0.0086**	**0.0095**	**0.0078**	**0.019**	**0.006**
Cyanide, Free Low Level	<0.0001	mg/l	42	36	<0.0001	0.0056	0.00	**0.001**	SEPA WAT-SG-53 Marine EQS - AA - 2015	YES	**6**		0.0003	0.0001	0.0007	**0.0021**	0.001	**0.0025**	**0.0016**	0.0002
Thiocyanate	<20	ug/l	42	29	<20	9300	1207.34	**NV**		NO	0		23	< 20	< 20	< 20	< 20	< 20	3900	2700
Total Hardness as CaCO3	<0.1	mg/l	42	42	4.49	6550	1100.97	**N/A**		NO	0		876	1490	1090	576	1280	1160	19.2	34.9
Ammoniacal Nitrogen as NH3	<0.015	mg/l	42	41	<0.015	23	4.56	**NV**		NO	0		< 0.015	3.4	1.9	0.085	0.11	0.12	6.6	15
Ammoniacal Nitrogen as N	<0.015	mg/l	42	41	<0.015	19	3.78	**0.021**	WFD England/Wales. 2015 - Saltwater Standards (unionised ammonia)	YES	**41**		< 0.015	**2.8**	**1.6**	**0.07**	**0.091**	**0.1**	**5.5**	**13**
Nitrate as NO3	<0.1	mg/l	28	11	<0.1	140	14.52	**NV**		NO	0		< 0.10			0.17		< 0.10	< 0.10	< 0.10
Nitrate as N	<0.1	mg/l	14	5	<0.1	1.5	0.58	**NV**		NO	0			< 0.10	< 0.10		< 0.10			
Nitrite as NO2	<0.1	mg/l	30	19	<0.1	440	30.89	**NV**		NO	0		11			1.4		14	5.3	< 0.10
Nitrite as N	<0.035	mg/l	12	0	<0.035	<0.035	<0.035	**NV**		NO	0			< 0.035	< 0.035		< 0.035			
Sulphate as SO4	<0.1	mg/l	42	42	7.5	3000	801.11	**NV**		NO	0		860	2100	1400	1400	1400	1500	82	81
Total Organic Carbon	<1	mg/l	42	40	<1	190	24.01	**N/A**		NO	0		8.1	4.1	< 1.0	12	5.9	4.6	9.2	6
Aliphatic C5-C6	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	**NV**		NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	<0.1	ug/l	42	1	<0.1	14	14.00	**NV**		NO	0		< 0.1	< 0.1	14	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	<0.1	ug/l	42	2	<0.1	21	11.00	**NV**		NO	0		< 0.1	< 0.1	21	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	<1	ug/l	42	5	<1	30	11.46	**NV**		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	30	< 1.0
Aliphatic C12-C16	<1	ug/l	42	5	<1	15	7.10	**NV**		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	5.5	< 1.0
Aliphatic C16-C21	<1	ug/l	42	6	<1	160	79.00	**NV**		NO	0		< 1.0	< 1.0	< 1.0	14	< 1.0	< 1.0	21	< 1.0
Aliphatic C21-C35	<1	ug/l	42	6	<1	220	61.72	**NV**		NO	0		< 1.0	< 1.0	< 1.0	9.9	< 1.0	< 1.0	1.4	< 1.0
Aliphatic C5-C35	<10	ug/l	42	7	<10	390	138.00	**NV**		NO	0		< 10	< 10	35	23	< 10	< 10	58	< 10
Aromatic C5-C7	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	**8**	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	<0.1	ug/l	42	2	<0.1	19	16.00	**74**	WFD England/Wales. 2015 - Saltwater Standards	NO	0		< 0.1	< 0.1	19	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	<0.1	ug/l	42	2	<0.1	72	47.50	**NV**		NO	0		< 0.1	< 0.1	72	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	<1	ug/l	42	6	<1	3.9	2.75	**NV**		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	<1	ug/l	42	8	<1	11	7.28	**NV**		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	<1	ug/l	42	8	<1	110	48.58	**NV**		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	<1	ug/l	42	7	<1	110	26.89	**NV**		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	<10	ug/l	42	10	<10	240	78.80	**NV**		NO	0		< 10	< 10	91	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	<10	ug/l	42	12	<10	630	146.42	**NV**		NO	0		< 10	< 10	130	24	< 10	< 10	58	< 10
EPH (C10-C40)	<10	ug/l	42	35	<10	1100	146.69	**NV**		NO	0		130	1100	110	93	< 10	64	330	190
Benzene	<1	ug/l	42	0	<1	<1	<1	**8**	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	<1	ug/l	42	2	<1	19	16.00	**74**	WFD England/Wales. 2015 - Saltwater Standards	NO	0		< 1.0	< 1.0	19	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	<1	ug/l	42	2	<1	72	47.50	**20**	SEPA WAT-SG-53 Marine EQS - AA - 2015	YES	**2**		< 1.0	< 1.0	**72**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	<1	ug/l	42	0	<1	<1	<1	**30**	SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE	<1	ug/l	42	0	<1	<1	<1	**260**	PNEC (EU REACH) - Coastal	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Phenol - Monohydric	<100	ug/l	42	10	<100	2000	735.00	**50**	SEPA WAT-SG-53 Marine EQS - AA - 2015	YES	**10**		< 100	**330**	**360**	< 100	< 100	< 100	< 100	< 100
Dichlorodifluoromethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0				< 1	< 1		< 1		< 1
Chloromethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0				< 1	< 1		< 1		< 1
Vinyl Chloride	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0				< 1	< 1		< 1		< 1
Bromomethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0				< 1	< 1		< 1		< 1
Chloroethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0				< 1	< 1		< 1		< 1
Trichlorofluoromethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0				< 1	< 1		< 1		< 1
1,1-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0				< 1	< 1		< 1		< 1
Methylene Chloride	<27	ug/l	30	0	<27	<27	<27	**NR**		NO	0				< 27	< 27		< 27		< 27
Trans-1,2-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0				< 1	< 1		< 1		< 1
1,1-dichloroethane	<1	ug/l	30	3	<1	2	1.33	**NV**		NO	0				< 1	< 1		< 1		1
Cis-1,2-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0				< 1	< 1		< 1		< 1

Groundwater Chemical Screening Against EQS Protective of Surface Water
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	SCREENING VALUE EQS COASTAL	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R2	R3	R2	R3	R2	R3	R2	R3
												Exploratory monitoring well	MS\BH03 (S)	MS\BH03 (D)	MS\BH04 (D)	MS\BH04 (D)	MS\BH04 (S)	MS\BH04 (S)	MS\BH05 (D)	MS\BH05 (D)
												Depth	1.87-2.70	1.98-28.50	2.51-28.50	2.40-28.50	2.32-5.00	2.35-5.00	5.64-29.90	5.69-29.90
												Sampling Date	13/10/2021	16/11/2021	13/10/2021	16/11/2021	13/10/2021	16/11/2021	12/10/2021	15/11/2021
												Monitoring Unit	MADE GROUND	RMF	TFD CLAY	TFD CLAY	TFD SAND	TFD SAND	RMF	RMF
2,2-dichloropropane	<2	ug/l	30	0	<2	<2	<2	NR		NO	0				< 2	< 2		< 2		< 2
Bromochloromethane	<4	ug/l	30	0	<4	<4	<4	NR		NO	0				< 4	< 4		< 4		< 4
Chloroform	<1	ug/l	30	1	<1	5	5.00	NR		NO	0				< 1	< 1		< 1		5
1,1,1-trichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,1-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Carbon tetrachloride	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Benzene	<1	ug/l	30	5	<1	5	3.80	8	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0				< 1	< 1		< 1		5
1,2-dichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Trichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,2-dichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Dibromomethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Bromodichloromethane	<4	ug/l	30	0	<4	<4	<4	NR		NO	0				< 4	< 4		< 4		< 4
cis-1,3-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Toluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
trans-1,3-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,1,2-trichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Tetrachloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,3-dichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Dibromochloromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,2-dibromoethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Chlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,1,1,2-tetrachloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Ethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
m+p-Xylene	<2	ug/l	30	0	<2	<2	<2	NR		NO	0				< 2	< 2		< 2		< 2
o-Xylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Styrene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Bromoform	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Isopropylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,1,2,2-tetrachloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Bromobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,2,3-trichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
n-propylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
2-chlorotoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,3,5-trimethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
4-chlorotoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Tert-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,2,4-trimethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
sec-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
p-isopropyltoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,3-dichlorobenzene	<2	ug/l	30	0	<2	<2	<2	NR		NO	0				< 2	< 2		< 2		< 2
1,4-dichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
n-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,2-dichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,2-dibromo-3-chloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,2,4-trichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Hexachlorobutadiene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Naphthalene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,2,3-trichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
MTBE	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Phenol	<1	ug/l	28	5	<1	3.5	2.06	7.7	WFD England/Wales. 2015 - Saltwater Standards	NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Aniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
2-Chlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Benzyl Alcohol	<1	ug/l	28	2	<1	2.2	1.85	NV		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
2-Methylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Bis(2-chloroisopropyl)ether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
3&4-Methylphenol	<1	ug/l	28	1	<1	13	13.00	100	Methylphenols-SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Bis(2-chloroethoxy)methane	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
2,4-Dimethylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
2,4-Dichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
1,2,4-Trichlorobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
4-Chloro-3-methylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
2-Methylnaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Hexachlorocyclopentadiene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
2,4,6-Trichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
2,4,5-Trichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
2-Chloronaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
2-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
2,4-Dinitrotoluene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0

Groundwater Chemical Screening Against EQS Protective of Surface Water
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	SCREENING VALUE EQS COASTAL	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R2	R3	R2	R3	R2	R3	R2	R3
												Exploratory monitoring well	MS\BH03 (S)	MS\BH03 (D)	MS\BH04 (D)	MS\BH04 (D)	MS\BH04 (S)	MS\BH04 (S)	MS\BH05 (D)	MS\BH05 (D)
												Depth	1.87-2.70	1.98-28.50	2.51-28.50	2.40-28.50	2.32-5.00	2.35-5.00	5.64-29.90	5.69-29.90
												Sampling Date	13/10/2021	16/11/2021	13/10/2021	16/11/2021	13/10/2021	16/11/2021	12/10/2021	15/11/2021
												Monitoring Unit	MADE GROUND	RMF	TFD CLAY	TFD CLAY	TFD SAND	TFD SAND	RMF	RMF
Acenaphthylene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
3-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Acenaphthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
4-Nitrophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Dibenzofuran	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
2,6-Dinitrotoluene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
2,3,4,6-Tetrachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Diethylphthalate	<1	ug/l	28	1	<1	1.1	1.10	NR		NO	0				< 1.0	1.1		< 1.0		< 1.0
4-Chlorophenylphenylether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Fluorene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
4-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Diphenylamine	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
4-Bromophenylphenylether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Hexachlorobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Bis(2-ethylhexyl)ester	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Pentachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Phenanthrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Anthracene	<1	ug/l	28	0	<1	<1	<1	0.1	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Di-n-butylphthalate	<1	ug/l	28	2	<1	2	1.60	8	SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Butylbenzylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Benzo(a)anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Chrysene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Bis(2-ethylhexyl)phthalate	<1	ug/l	28	4	<1	13	5.50	1.3	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	3				< 1.0	< 1.0		< 1.0		< 1.0
Di-n-octylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Benzo(b)fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Benzo(k)fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Benzo(a)pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Indeno(123cd)pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Dibenzo(ah)anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Benzo(ghi)perylene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
1,4-Dinitrobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Dimethylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
1,3-Dinitrobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
2,3,5,6-Tetrachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Azobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Carbazole	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
1-Methylnaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Naphthalene	<0.1	ug/l	40	24	<0.1	5.1	0.58	2	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	1		0.1	0.3	1.3	<0.1	0.2	<0.1	0.4	0.7
Acenaphthylene	<0.013	ug/l	40	8	<0.013	0.202	0.06	NV		NO	0		<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013
Acenaphthene	<0.013	ug/l	40	20	<0.013	0.986	0.20	NV		NO	0		<0.013	<0.013	0.146	<0.013	0.053	<0.013	<0.013	<0.013
Fluorene	<0.014	ug/l	40	15	<0.014	0.28	0.07	NV		NO	0		<0.014	0.033	0.035	<0.014	0.015	<0.014	<0.014	<0.014
Phenanthrene	<0.011	ug/l	40	19	<0.011	0.361	0.05	NV		NO	0		<0.011	<0.011	0.017	<0.011	0.013	<0.011	0.016	<0.011
Anthracene	<0.013	ug/l	40	2	<0.013	0.026	0.02	0.1	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013
Fluoranthene	<0.012	ug/l	40	9	<0.012	0.266	0.07	0.0063	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	9		<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
Pyrene	<0.013	ug/l	40	9	<0.013	0.168	0.05	NV		NO	0		<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013
Benzo(a)anthracene	<0.015	ug/l	40	0	<0.015	<0.015	<0.015	NV		NO	0		<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Chrysene	<0.011	ug/l	40	1	<0.011	0.015	0.02	NV		NO	0		<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
Benzo(bk)fluoranthene	<0.018	ug/l	40	0	<0.018	<0.018	<0.018	NV		NO	0		<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	<0.016	ug/l	40	0	<0.016	<0.016	<0.016	0.00017	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016
Indeno(123cd)pyrene	<0.011	ug/l	40	0	<0.011	<0.011	<0.011	see BaP and notes	Water Env't Regs (Scotland) 2015. AA-EQS Coast	NO	0		<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
Dibenzo(ah)anthracene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	NV		NO	0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)perylene	<0.011	ug/l	40	0	<0.011	<0.011	<0.011	0.00082	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
PAH 16 Total	<0.195	ug/l	40	23	<0.195	6.231	0.90	NV		NO	0		<0.195	0.333	1.498	<0.195	0.281	<0.195	0.416	0.7
Benzo(b)fluoranthene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	0.017	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(k)fluoranthene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	0.017	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	<0.001	ug/l	42	3	<0.001	0.11	0.09	2	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	0.101	n/US	n/US	n/US
Acenaphthylene	<0.001	ug/l	42	3	<0.001	0.007	0.00	NV		NO	0		n/US	n/US	n/US	n/US	0.007	n/US	n/US	n/US
Acenaphthene	<0.001	ug/l	42	3	<0.001	0.044	0.02	NV		NO	0		n/US	n/US	n/US	n/US	0.027	n/US	n/US	n/US
Fluorene	<0.001	ug/l	42	3	<0.001	0.012	0.01	NV		NO	0		n/US	n/US	n/US	n/US	0.006	n/US	n/US	n/US

Groundwater Chemical Screening Against EQS Protective of Surface Water
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	SCREENING VALUE EQS COASTAL	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R2	R3	R2	R3	R2	R3	R2	R3
												Exploratory monitoring well	MS\BH03 (S)	MS\BH03 (D)	MS\BH04 (D)	MS\BH04 (D)	MS\BH04 (S)	MS\BH04 (S)	MS\BH05 (D)	MS\BH05 (D)
												Depth	1.87-2.70	1.98-28.50	2.51-28.50	2.40-28.50	2.32-5.00	2.35-5.00	5.64-29.90	5.69-29.90
												Sampling Date	13/10/2021	16/11/2021	13/10/2021	16/11/2021	13/10/2021	16/11/2021	12/10/2021	15/11/2021
												Monitoring Unit	MADE GROUND	RMF	TFD CLAY	TFD CLAY	TFD SAND	TFD SAND	RMF	RMF
Phenanthrene	<0.001	ug/l	42	2	<0.001	0.005	0.00	NV		NO	0		n/US	n/US	n/US	n/US	<0.001	n/US	n/US	n/US
Anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	0.1	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	<0.001	n/US	n/US	n/US
Fluoranthene	<0.001	ug/l	42	2	<0.001	0.002	0.00	0.0063	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	0.002	n/US	n/US	n/US
Pyrene	<0.001	ug/l	42	2	<0.001	0.003	0.00	NV		NO	0		n/US	n/US	n/US	n/US	0.003	n/US	n/US	n/US
Benzo(a)anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	NV		NO	0		n/US	n/US	n/US	n/US	<0.001	n/US	n/US	n/US
Chrysene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	NV		NO	0		n/US	n/US	n/US	n/US	<0.001	n/US	n/US	n/US
Benzo(bk)fluoranthene	<0.002	ug/l	42	0	<0.002	<0.002	<0.002	NV		NO	0		n/US	n/US	n/US	n/US	<0.002	n/US	n/US	n/US
Benzo(a)pyrene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	0.00017	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	<0.001	n/US	n/US	n/US
Indeno(123cd)pyrene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	see BaP and notes	Water Env't Regs (Scotland) 2015. AA-EQS Coast	NO	0		n/US	n/US	n/US	n/US	<0.001	n/US	n/US	n/US
Dibenzo(ah)anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	NV		NO	0		n/US	n/US	n/US	n/US	<0.001	n/US	n/US	n/US
Benzo(ghi)perylene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	0.00082	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	<0.001	n/US	n/US	n/US
PAH 16 Total	<0.016	ug/l	42	3	<0.016	0.178	0.13	NV		NO	0		n/US	n/US	n/US	n/US	0.146	n/US	n/US	n/US
Benzo(b)fluoranthene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	0.017	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	<0.001	n/US	n/US	n/US
Benzo(k)fluoranthene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	0.017	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	<0.001	n/US	n/US	n/US
TAME	Non detect		22	0	Non detect	Non detect	Non detect	NR		NO	0			Not Detected		Not Detected		Not Detected		Not Detected
PCB 28 + PCB 31	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 52	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 77	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 81	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 101	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 105	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 114	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 118 + PCB 123	< 0.6	ug/l	1	0	< 0.6	< 0.6	< 0.6	NR		NO	0									
PCB 126	< 0.5	ug/l	1	0	< 0.5	< 0.5	< 0.5	NR		NO	0									
PCB 138	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 153	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 156	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 157	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 167	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 169	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 180	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 189	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 12	< 1.0	ug/l	1	0	< 1.0	< 1.0	< 1.0	NR		NO	0									
PCB 7 Total	< 1.0	ug/l	1	0	< 1.0	< 1.0	< 1.0	NR		NO	0									

n/US Non suitable sample. PAH concentrations to high to undertake low level PAH analysis

NR All concentrations less than limit of detection. No screening value required.

NV No screening value available

1.1 Exceedance of EQS

Groundwater Chemical Screening Against EQS Protective of Surface Water
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	SCREENING VALUE EQS COASTAL	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R2	R3	R2	R3	R2	R3	R2	R3	R2
												Exploratory monitoring well	MS\BH05 (S)	MS\BH05 (S)	MS\BH07	MS\BH07	MS\BH08	MS\BH08	MS\BH09	MS\BH09	MS\BH11
												Depth	4.61-12.50	4.61-12.50	4.09-7.30	4.38-7.30	5.71-13.30	5.74-13.30	4.60-8.70	4.34-8.70	4.19-11.40
												Sampling Date	12/10/2021	15/11/2021	12/10/2021	15/11/2021	12/10/2021	15/11/2021	12/10/2021	15/11/2021	13/10/2021
												Monitoring Unit	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND
Metals											-										
Arsenic, Dissolved	<0.16	ug/l	42	42	0.72	61	7.50	25	WFD England/Wales. 2015 - Saltwater Standards	YES	1		7.4	6.8	8.7	5.8	3.9	3.2	7.4	7.9	3.5
Beryllium, Dissolved	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	NV		NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron, Dissolved	<12	ug/l	42	38	<12	740	387.34	7000	SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		200	140	370	410	650	660	230	230	740
Cadmium, Dissolved	<0.03	ug/l	42	9	<0.03	0.2	0.08	0.2	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium III, Dissolved	<1	ug/l	42	7	<1	16	5.94	NV		NO	0		< 1.0	< 1.0	2.4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.1
Chromium, Hexavalent	<7	ug/l	42	1	<7	9.2	9.20	0.6	WFD England/Wales. 2015 - Saltwater Standards	YES	1		< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0
Copper, Dissolved	<0.4	ug/l	42	16	<0.4	3.3	1.26	3.76	WFD England/Wales. 2015 - Saltwater Standards	NO	0		< 0.4	< 0.4	1	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	0.8
Iron, Dissolved	<5.5	ug/l	42	42	7.6	11000	637.09	1000	WFD England/Wales. 2015 - Saltwater Standards	YES	5		95	99	38	340	85	37	18	56	89
Lead, Dissolved	<0.09	ug/l	42	23	<0.09	2.5	0.53	1.3	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	3		0.1	0.12	0.56	< 0.09	< 0.09	< 0.09	< 0.09	0.11	0.26
Mercury, Dissolved	<0.01	ug/l	42	33	<0.01	0.36	0.10	0.07	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	YES	14		0.03	0.02	0.06	< 0.01	0.04	0.05	0.13	0.12	0.07
Nickel, Dissolved	<0.5	ug/l	42	37	<0.5	15	2.64	8.6	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	1		4.3	3.7	1.3	0.5	0.7	0.6	1.3	1.2	2.2
Selenium, Dissolved	<0.25	ug/l	42	38	<0.25	7.8	1.86	NV		NO	0		0.49	0.31	2.3	< 0.25	0.74	0.47	5.6	2.6	0.41
Vanadium, Dissolved	<0.6	ug/l	42	33	<0.6	96	9.16	100	SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		1	0.9	1.5	< 0.6	4.2	5.6	15	3.3	20
Zinc, Dissolved	<1.3	ug/l	42	30	<1.3	51	6.97	6.8	WFD England/Wales. 2015 - Saltwater Standards	YES	8		< 1.3	1.3	11	< 1.3	< 1.3	1.7	< 1.3	2.1	51
pH	<	pH	42	42	7	12	9.31	11	Hazardous Waste Value	YES	8		9.5	9.6	8	8.1	8.3	8.3	9.2	9.3	8.9
Cyanide, Total Low Level	<0.0001	mg/l	42	41	<0.0001	0.076	0.01	0.001	WFD England/Wales. 2015 - Saltwater Standards	YES	36		0.02	0.0089	0.013	0.0049	0.0085	0.0072	0.0051	0.012	0.014
Cyanide, Free Low Level	<0.0001	mg/l	42	36	<0.0001	0.0056	0.00	0.001	SEPA WAT-SG-53 Marine EQS - AA - 2015	YES	6		0.0017	0.0004	0.0007	0.0001	0.0003	0.0003	0.0003	0.0007	0.0004
Thiocyanate	<20	ug/l	42	29	<20	9300	1207.34	NV		NO	0		4400	4300	< 20	54	43	31	110	170	190
Total Hardness as CaCO3	<0.1	mg/l	42	42	4.49	6550	1100.97	N/A		NO	0		19.5	11.1	647	769	552	577	106	108	128
Ammoniacal Nitrogen as NH3	<0.015	mg/l	42	41	<0.015	23	4.56	NV		NO	0		12	23	1.1	1.8	2.3	3	6.6	6.3	4.1
Ammoniacal Nitrogen as N	<0.015	mg/l	42	41	<0.015	19	3.78	0.021	WFD England/Wales. 2015 - Saltwater Standards (unionised ammonia)	YES	41		10	19	0.91	1.5	1.9	2.5	5.4	5.2	3.3
Nitrate as NO3	<0.1	mg/l	28	11	<0.1	140	14.52	NV		NO	0		< 0.10	0.15		< 0.10	< 0.10	< 0.10	< 0.10	0.36	< 0.10
Nitrate as N	<0.1	mg/l	14	5	<0.1	1.5	0.58	NV		NO	0				1.5						
Nitrite as NO2	<0.1	mg/l	30	19	<0.1	440	30.89	NV		NO	0		5.6	3.1	15	< 0.10	< 0.10	< 0.10	1.8	< 0.10	2.2
Nitrite as N	<0.035	mg/l	12	0	<0.035	<0.035	<0.035	NV		NO	0										
Sulphate as SO4	<0.1	mg/l	42	42	7.5	3000	801.11	NV		NO	0		85	100	820	85	730	380	150	160	96
Total Organic Carbon	<1	mg/l	42	40	<1	190	24.01	N/A		NO	0		8.5	8	8.4	5.5	29	9.1	17	8.2	23
Aliphatic C5-C6	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	NV		NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	<0.1	ug/l	42	1	<0.1	14	14.00	NV		NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	<0.1	ug/l	42	2	<0.1	21	11.00	NV		NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	<1	ug/l	42	5	<1	30	11.46	NV		NO	0		4.8	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	6.4	< 1.0	< 1.0
Aliphatic C12-C16	<1	ug/l	42	5	<1	15	7.10	NV		NO	0		4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	6.7	< 1.0	< 1.0
Aliphatic C16-C21	<1	ug/l	42	6	<1	160	79.00	NV		NO	0		120	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	160	< 1.0	< 1.0
Aliphatic C21-C35	<1	ug/l	42	6	<1	220	61.72	NV		NO	0		70	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	220	< 1.0	< 1.0
Aliphatic C5-C35	<10	ug/l	42	7	<10	390	138.00	NV		NO	0		200	< 10	< 10	< 10	< 10	< 10	390	< 10	< 10
Aromatic C5-C7	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	8	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	<0.1	ug/l	42	2	<0.1	19	16.00	74	WFD England/Wales. 2015 - Saltwater Standards	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	<0.1	ug/l	42	2	<0.1	72	47.50	NV		NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	<1	ug/l	42	6	<1	3.9	2.75	NV		NO	0		< 1.0	< 1.0	3.9	< 1.0	2.1	< 1.0	2.2	< 1.0	< 1.0
Aromatic C12-C16	<1	ug/l	42	8	<1	11	7.28	NV		NO	0		7.6	< 1.0	11	< 1.0	4.1	< 1.0	8.4	< 1.0	< 1.0
Aromatic C16-C21	<1	ug/l	42	8	<1	110	48.58	NV		NO	0		59	< 1.0	74	< 1.0	43	< 1.0	110	< 1.0	< 1.0
Aromatic C21-C35	<1	ug/l	42	7	<1	110	26.89	NV		NO	0		25	< 1.0	23	< 1.0	15	< 1.0	110	< 1.0	< 1.0
Aromatic C5-C35	<10	ug/l	42	10	<10	240	78.80	NV		NO	0		92	< 10	110	< 10	64	< 10	240	< 10	< 10
TPH Ali/Aro Total C5-C35	<10	ug/l	42	12	<10	630	146.42	NV		NO	0		290	< 10	110	< 10	64	< 10	630	< 10	< 10
EPH (C10-C40)	<10	ug/l	42	35	<10	1100	146.69	NV		NO	0		170	70	15	140	110	29	300	56	< 10
Benzene	<1	ug/l	42	0	<1	<1	<1	8	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	<1	ug/l	42	2	<1	19	16.00	74	WFD England/Wales. 2015 - Saltwater Standards	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	<1	ug/l	42	2	<1	72	47.50	20	SEPA WAT-SG-53 Marine EQS - AA - 2015	YES	2		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	<1	ug/l	42	0	<1	<1	<1	30	SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE	<1	ug/l	42	0	<1	<1	<1	260	PNEC (EU REACH) - Coastal	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Phenol - Monohydric	<100	ug/l	42	10	<100	2000	735.00	50	SEPA WAT-SG-53 Marine EQS - AA - 2015	YES	10		< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
Dichlorodifluoromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Chloromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Vinyl Chloride	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Bromomethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Chloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Trichlorofluoromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,1-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Methylene Chloride	<27	ug/l	30	0	<27	<27	<27	NR		NO	0		< 27		< 27		< 27		< 27	< 27	< 27
Trans-1,2-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,1-dichloroethane	<1	ug/l	30	3	<1	2	1.33	NV		NO	0		2		< 1		< 1		1	< 1	< 1
Cis-1,2-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1

Groundwater Chemical Screening Against EQS Protective of Surface Water
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	SCREENING VALUE EQS COASTAL	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R2	R3	R2	R3	R2	R3	R2	R3	R2
												Exploratory monitoring well	MS\BH05 (S)	MS\BH05 (S)	MS\BH07	MS\BH07	MS\BH08	MS\BH08	MS\BH09	MS\BH09	MS\BH11
												Depth	4.61-12.50	4.61-12.50	4.09-7.30	4.38-7.30	5.71-13.30	5.74-13.30	4.60-8.70	4.34-8.70	4.19-11.40
												Sampling Date	12/10/2021	15/11/2021	12/10/2021	15/11/2021	12/10/2021	15/11/2021	12/10/2021	15/11/2021	13/10/2021
												Monitoring Unit	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND
2,2-dichloropropane	<2	ug/l	30	0	<2	<2	<2	NR		NO	0		< 2		< 2		< 2		< 2	< 2	< 2
Bromochloromethane	<4	ug/l	30	0	<4	<4	<4	NR		NO	0		< 4		< 4		< 4		< 4	< 4	< 4
Chloroform	<1	ug/l	30	1	<1	5	5.00	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,1,1-trichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,1-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Carbon tetrachloride	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Benzene	<1	ug/l	30	5	<1	5	3.80	8	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		2		< 1		< 1		4	4	< 1
1,2-dichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Trichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,2-dichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Dibromomethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Bromodichloromethane	<4	ug/l	30	0	<4	<4	<4	NR		NO	0		< 4		< 4		< 4		< 4	< 4	< 4
cis-1,3-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Toluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
trans-1,3-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,1,2-trichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Tetrachloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,3-dichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Dibromochloromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,2-dibromoethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Chlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,1,1,2-tetrachloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Ethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
m+p-Xylene	<2	ug/l	30	0	<2	<2	<2	NR		NO	0		< 2		< 2		< 2		< 2	< 2	< 2
o-Xylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Styrene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Bromoform	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Isopropylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,1,2,2-tetrachloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Bromobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,2,3-trichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
n-propylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
2-chlorotoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,3,5-trimethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
4-chlorotoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Tert-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,2,4-trimethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
sec-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
p-isopropyltoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,3-dichlorobenzene	<2	ug/l	30	0	<2	<2	<2	NR		NO	0		< 2		< 2		< 2		< 2	< 2	< 2
1,4-dichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
n-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,2-dichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,2-dibromo-3-chloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,2,4-trichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Hexachlorobutadiene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Naphthalene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,2,3-trichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
MTBE	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Phenol	<1	ug/l	28	5	<1	3.5	2.06	7.7	WFD England/Wales. 2015 - Saltwater Standards	NO	0		< 1.0		< 5.0		< 1.0		< 1.0	1.2	< 1.0
Aniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
2-Chlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Benzyl Alcohol	<1	ug/l	28	2	<1	2.2	1.85	NV		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
2-Methylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Bis(2-chloroisopropyl)ether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
3&4-Methylphenol	<1	ug/l	28	1	<1	13	13.00	100	Methylphenols-SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Bis(2-chloroethoxy)methane	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
2,4-Dimethylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
2,4-Dichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
4-Chloro-3-methylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
2-Methylnaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Hexachlorocyclopentadiene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
2,4,6-Trichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
2,4,5-Trichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
2-Chloronaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
2-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
2,4-Dinitrotoluene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0

Groundwater Chemical Screening Against EQS Protective of Surface Water
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	SCREENING VALUE EQS COASTAL	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R2	R3	R2	R3	R2	R3	R2	R3	R2
												Exploratory monitoring well	MS\BH05 (S)	MS\BH05 (S)	MS\BH07	MS\BH07	MS\BH08	MS\BH08	MS\BH09	MS\BH09	MS\BH11
												Depth	4.61-12.50	4.61-12.50	4.09-7.30	4.38-7.30	5.71-13.30	5.74-13.30	4.60-8.70	4.34-8.70	4.19-11.40
												Sampling Date	12/10/2021	15/11/2021	12/10/2021	15/11/2021	12/10/2021	15/11/2021	12/10/2021	15/11/2021	13/10/2021
												Monitoring Unit	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND
Acenaphthylene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
3-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Acenaphthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
4-Nitrophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Dibenzofuran	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
2,6-Dinitrotoluene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
2,3,4,6-Tetrachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Diethylphthalate	<1	ug/l	28	1	<1	1.1	1.10	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
4-Chlorophenylphenylether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Fluorene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
4-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Diphenylamine	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
4-Bromophenylphenylether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Hexachlorobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)ester	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Pentachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Phenanthrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Anthracene	<1	ug/l	28	0	<1	<1	<1	0.1	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Di-n-butylphthalate	<1	ug/l	28	2	<1	2	1.60	8	SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Butylbenzylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Benzo(a)anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Chrysene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)phthalate	<1	ug/l	28	4	<1	13	5.50	1.3	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	3		< 1.0		13		< 1.0		< 1.0	2.9	< 1.0
Di-n-octylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Benzo(b)fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Benzo(k)fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Benzo(a)pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Indeno(123cd)pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Dibenzo(ah)anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Benzo(ghi)perylene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
1,4-Dinitrobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Dimethylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
1,3-Dinitrobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
2,3,5,6-Tetrachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Azobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Carbazole	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
1-Methylnaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Naphthalene	<0.1	ug/l	40	24	<0.1	5.1	0.58	2	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	1		0.1	0.1	<0.1	0.1	<0.1	0.1	<0.1	0.3	0.1
Acenaphthylene	<0.013	ug/l	40	8	<0.013	0.202	0.06	NV		NO	0		<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013
Acenaphthene	<0.013	ug/l	40	20	<0.013	0.986	0.20	NV		NO	0		<0.013	<0.013	0.053	<0.013	0.014	0.015	<0.013	<0.013	0.078
Fluorene	<0.014	ug/l	40	15	<0.014	0.28	0.07	NV		NO	0		<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	0.022
Phenanthrene	<0.011	ug/l	40	19	<0.011	0.361	0.05	NV		NO	0		0.012	<0.011	<0.011	0.039	<0.011	<0.011	<0.011	<0.011	0.019
Anthracene	<0.013	ug/l	40	2	<0.013	0.026	0.02	0.1	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013
Fluoranthene	<0.012	ug/l	40	9	<0.012	0.266	0.07	0.0063	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	9		<0.012	<0.012	<0.012	0.019	<0.012	<0.012	<0.012	<0.012	<0.012
Pyrene	<0.013	ug/l	40	9	<0.013	0.168	0.05	NV		NO	0		<0.013	<0.013	<0.013	0.032	<0.013	<0.013	<0.013	<0.013	<0.013
Benzo(a)anthracene	<0.015	ug/l	40	0	<0.015	<0.015	<0.015	NV		NO	0		<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Chrysene	<0.011	ug/l	40	1	<0.011	0.015	0.02	NV		NO	0		<0.011	<0.011	<0.011	0.015	<0.011	<0.011	<0.011	<0.011	<0.011
Benzo(bk)fluoranthene	<0.018	ug/l	40	0	<0.018	<0.018	<0.018	NV		NO	0		<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	<0.016	ug/l	40	0	<0.016	<0.016	<0.016	0.00017	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016
Indeno(123cd)pyrene	<0.011	ug/l	40	0	<0.011	<0.011	<0.011	see BaP and notes	Water Env't Regs (Scotland) 2015. AA-EQS Coast	NO	0		<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
Dibenzo(ah)anthracene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	NV		NO	0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)perylene	<0.011	ug/l	40	0	<0.011	<0.011	<0.011	0.00082	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
PAH 16 Total	<0.195	ug/l	40	23	<0.195	6.231	0.90	NV		NO	0		<0.195	<0.195	<0.195	0.205	<0.195	<0.195	<0.195	0.3	0.219
Benzo(b)fluoranthene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	0.017	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(k)fluoranthene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	0.017	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	<0.001	ug/l	42	3	<0.001	0.11	0.09	2	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Acenaphthylene	<0.001	ug/l	42	3	<0.001	0.007	0.00	NV		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Acenaphthene	<0.001	ug/l	42	3	<0.001	0.044	0.02	NV		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Fluorene	<0.001	ug/l	42	3	<0.001	0.012	0.01	NV		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US

Groundwater Chemical Screening Against EQS Protective of Surface Water
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	SCREENING VALUE EQS COASTAL	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R2	R3	R2	R3	R2	R3	R2	R3	R2
												Exploratory monitoring well	MS\BH05 (S)	MS\BH05 (S)	MS\BH07	MS\BH07	MS\BH08	MS\BH08	MS\BH09	MS\BH09	MS\BH11
												Depth	4.61-12.50	4.61-12.50	4.09-7.30	4.38-7.30	5.71-13.30	5.74-13.30	4.60-8.70	4.34-8.70	4.19-11.40
												Sampling Date	12/10/2021	15/11/2021	12/10/2021	15/11/2021	12/10/2021	15/11/2021	12/10/2021	15/11/2021	13/10/2021
												Monitoring Unit	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND
Phenanthrene	<0.001	ug/l	42	2	<0.001	0.005	0.00	NV		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	0.1	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Fluoranthene	<0.001	ug/l	42	2	<0.001	0.002	0.00	0.0063	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Pyrene	<0.001	ug/l	42	2	<0.001	0.003	0.00	NV		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Benzo(a)anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	NV		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Chrysene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	NV		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Benzo(bk)fluoranthene	<0.002	ug/l	42	0	<0.002	<0.002	<0.002	NV		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Benzo(a)pyrene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	0.00017	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Indeno(123cd)pyrene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	see BaP and notes	Water Env't Regs (Scotland) 2015. AA-EQS Coast	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Dibenzo(ah)anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	NV		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Benzo(ghi)perylene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	0.00082	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
PAH 16 Total	<0.016	ug/l	42	3	<0.016	0.178	0.13	NV		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Benzo(b)fluoranthene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	0.017	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Benzo(k)fluoranthene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	0.017	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
TAME	Non detect		22	0	Non detect	Non detect	Non detect	NR		NO	0			Not Detected		Not Detected		Not Detected		Not Detected	
PCB 28 + PCB 31	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0										
PCB 52	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0										
PCB 77	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0										
PCB 81	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0										
PCB 101	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0										
PCB 105	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0										
PCB 114	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0										
PCB 118 + PCB 123	< 0.6	ug/l	1	0	< 0.6	< 0.6	< 0.6	NR		NO	0										
PCB 126	< 0.5	ug/l	1	0	< 0.5	< 0.5	< 0.5	NR		NO	0										
PCB 138	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0										
PCB 153	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0										
PCB 156	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0										
PCB 157	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0										
PCB 167	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0										
PCB 169	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0										
PCB 180	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0										
PCB 189	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0										
PCB 12	< 1.0	ug/l	1	0	< 1.0	< 1.0	< 1.0	NR		NO	0										
PCB 7 Total	< 1.0	ug/l	1	0	< 1.0	< 1.0	< 1.0	NR		NO	0										

n/US Non suitable sample. PAH concentrations to high to undertake low level PAH analysis
NR All concentrations less than limit of detection. No screening value required.
NV No screening value available
1.1 Exceedance of EQS

Groundwater Chemical Screening Against EQS Protective of Surface Water
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	SCREENING VALUE EQS COASTAL	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R2	R3	R2	R3	R2	R3	R2
												Exploratory monitoring well	MS\BH11	MS\BH12 (D)	MS\BH12 (D)	MS\BH12 (S)	MS\BH12 (S)	MS\BH13 (D)	MS\BH13 (D)	MS\BH13 (S)
												Depth	4.17-11.40	4.11-34.50	3.98-34.50	4.09-20.50	4.01-20.50	2.28-20.00	2.35-20.00	2.29-9.50
												Sampling Date	17/11/2021	18/10/2021	17/11/2021	12/10/2021	17/11/2021	12/10/2021	16/11/2021	12/10/2021
												Monitoring Unit	TFD SAND	RMF	RMF	GLACIAL TILL	GLACIAL TILL	RMF	RMF	TFD SAND
Metals											-									
Arsenic, Dissolved	<0.16	ug/l	42	42	0.72	61	7.50	25	WFD England/Wales. 2015 - Saltwater Standards	YES	1		2.5	0.73	0.72	0.95	1.3	0.95	1	16
Beryllium, Dissolved	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	NV		NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron, Dissolved	<12	ug/l	42	38	<12	740	387.34	7000	SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		690	700	550	180	36	590	650	630
Cadmium, Dissolved	<0.03	ug/l	42	9	<0.03	0.2	0.08	0.2	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		< 0.03	0.08	< 0.03	< 0.03	< 0.03	0.19	0.2	< 0.03
Chromium III, Dissolved	<1	ug/l	42	7	<1	16	5.94	NV		NO	0		< 1.0	2.2	< 1.0	6.1	< 1.0	< 1.0	< 1.0	< 1.0
Chromium, Hexavalent	<7	ug/l	42	1	<7	9.2	9.20	0.6	WFD England/Wales. 2015 - Saltwater Standards	YES	1		< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0
Copper, Dissolved	<0.4	ug/l	42	16	<0.4	3.3	1.26	3.76	WFD England/Wales. 2015 - Saltwater Standards	NO	0		< 0.4	1.5	< 0.4	0.9	< 0.4	1.7	1.5	< 0.4
Iron, Dissolved	<5.5	ug/l	42	42	7.6	11000	637.09	1000	WFD England/Wales. 2015 - Saltwater Standards	YES	5		130	**4500**	**2700**	23	15	7.6	83	350
Lead, Dissolved	<0.09	ug/l	42	23	<0.09	2.5	0.53	1.3	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	3		0.38	1.1	< 0.09	0.23	< 0.09	**2.5**	0.69	< 0.09
Mercury, Dissolved	<0.01	ug/l	42	33	<0.01	0.36	0.10	0.07	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	YES	14		0.04	0.03	0.04	0.02	0.03	< 0.01	< 0.01	0.01
Nickel, Dissolved	<0.5	ug/l	42	37	<0.5	15	2.64	8.6	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	1		1	2.4	0.7	2.7	5.8	7.6	**15**	1
Selenium, Dissolved	<0.25	ug/l	42	38	<0.25	7.8	1.86	NV		NO	0		0.29	0.63	< 0.25	3	7.8	0.7	0.61	0.27
Vanadium, Dissolved	<0.6	ug/l	42	33	<0.6	96	9.16	100	SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		13	2.2	0.6	4.8	3	< 0.6	< 0.6	1.3
Zinc, Dissolved	<1.3	ug/l	42	30	<1.3	51	6.97	6.8	WFD England/Wales. 2015 - Saltwater Standards	YES	8		3.4	**8.5**	1.6	1.9	< 1.3	**22**	**18**	3.8
pH	<	pH	42	42	7	12	9.31	11	Hazardous Waste Value	YES	8		8.7	7.2	7	**11.6**	**11.8**	7.2	7	8.2
Cyanide, Total Low Level	<0.0001	mg/l	42	41	<0.0001	0.076	0.01	0.001	WFD England/Wales. 2015 - Saltwater Standards	YES	36		**0.012**	0.0003	0.0006	**0.0099**	**0.0055**	**0.0022**	0.0009	**0.039**
Cyanide, Free Low Level	<0.0001	mg/l	42	36	<0.0001	0.0056	0.00	0.001	SEPA WAT-SG-53 Marine EQS - AA - 2015	YES	6		0.0005	< 0.0001	< 0.0001	**0.0018**	0.0005	0.0007	0.0009	**0.0056**
Thiocyanate	<20	ug/l	42	29	<20	9300	1207.34	NV		NO	0		240	32	< 20	25	< 20	42	< 20	9300
Total Hardness as CaCO3	<0.1	mg/l	42	42	4.49	6550	1100.97	N/A		NO	0		126	1780	1650	349	1740	6550	6140	416
Ammoniacal Nitrogen as NH3	<0.015	mg/l	42	41	<0.015	23	4.56	NV		NO	0		4.6	7.9	6.8	4.9	5	5.8	6.4	5.4
Ammoniacal Nitrogen as N	<0.015	mg/l	42	41	<0.015	19	3.78	0.021	WFD England/Wales. 2015 - Saltwater Standards (unionised ammonia)	YES	41		**3.8**	**6.5**	**5.6**	**4.1**	**4.1**	**4.8**	**5.3**	**4.5**
Nitrate as NO3	<0.1	mg/l	28	11	<0.1	140	14.52	NV		NO	0		0.25	140						
Nitrate as N	<0.1	mg/l	14	5	<0.1	1.5	0.58	NV		NO	0				0.44	< 0.10	0.39	< 0.10	< 0.10	< 0.10
Nitrite as NO2	<0.1	mg/l	30	19	<0.1	440	30.89	NV		NO	0		< 0.10			23		440		44
Nitrite as N	<0.035	mg/l	12	0	<0.035	<0.035	<0.035	NV		NO	0			< 0.035	< 0.035		< 0.035		< 0.035	
Sulphate as SO4	<0.1	mg/l	42	42	7.5	3000	801.11	NV		NO	0		110	210	170	380	1100	3000	2600	1100
Total Organic Carbon	<1	mg/l	42	40	<1	190	24.01	N/A		NO	0		11	41	37	62	190	2	1.8	6.8
Aliphatic C5-C6	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	NV		NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	<0.1	ug/l	42	1	<0.1	14	14.00	NV		NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	<0.1	ug/l	42	2	<0.1	21	11.00	NV		NO	0		< 0.1	< 0.1	< 0.1	< 0.1	1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	<1	ug/l	42	5	<1	30	11.46	NV		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	6.1	< 1.0	10
Aliphatic C12-C16	<1	ug/l	42	5	<1	15	7.10	NV		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	4.3	< 1.0	15
Aliphatic C16-C21	<1	ug/l	42	6	<1	160	79.00	NV		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	79	< 1.0	80
Aliphatic C21-C35	<1	ug/l	42	6	<1	220	61.72	NV		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	20	< 1.0	49
Aliphatic C5-C35	<10	ug/l	42	7	<10	390	138.00	NV		NO	0		< 10	< 10	< 10	< 10	< 10	110	< 10	150
Aromatic C5-C7	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	8	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	<0.1	ug/l	42	2	<0.1	19	16.00	74	WFD England/Wales. 2015 - Saltwater Standards	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	13	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	<0.1	ug/l	42	2	<0.1	72	47.50	NV		NO	0		< 0.1	< 0.1	< 0.1	< 0.1	23	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	<1	ug/l	42	6	<1	3.9	2.75	NV		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	3.1	< 1.0	2.7
Aromatic C12-C16	<1	ug/l	42	8	<1	11	7.28	NV		NO	0		2.5	< 1.0	< 1.0	< 1.0	< 1.0	9.2	< 1.0	7.1
Aromatic C16-C21	<1	ug/l	42	8	<1	110	48.58	NV		NO	0		24	< 1.0	< 1.0	< 1.0	< 1.0	42	< 1.0	33
Aromatic C21-C35	<1	ug/l	42	7	<1	110	26.89	NV		NO	0		1.5	< 1.0	< 1.0	< 1.0	< 1.0	6.2	< 1.0	7.5
Aromatic C5-C35	<10	ug/l	42	10	<10	240	78.80	NV		NO	0		29	< 10	< 10	< 10	36	61	< 10	50
TPH Ali/Aro Total C5-C35	<10	ug/l	42	12	<10	630	146.42	NV		NO	0		29	< 10	< 10	< 10	37	170	< 10	200
EPH (C10-C40)	<10	ug/l	42	35	<10	1100	146.69	NV		NO	0		59	180	76	73	110	86	58	100
Benzene	<1	ug/l	42	0	<1	<1	<1	8	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	<1	ug/l	42	2	<1	19	16.00	74	WFD England/Wales. 2015 - Saltwater Standards	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	13	< 1.0	< 1.0	< 1.0
Ethylbenzene	<1	ug/l	42	2	<1	72	47.50	20	SEPA WAT-SG-53 Marine EQS - AA - 2015	YES	2		< 1.0	< 1.0	< 1.0	< 1.0	**23**	< 1.0	< 1.0	< 1.0
Xylene	<1	ug/l	42	0	<1	<1	<1	30	SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE	<1	ug/l	42	0	<1	<1	<1	260	PNEC (EU REACH) - Coastal	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Phenol - Monohydric	<100	ug/l	42	10	<100	2000	735.00	50	SEPA WAT-SG-53 Marine EQS - AA - 2015	YES	10		**910**	**610**	**510**	< 100	< 100	**2000**	**1200**	**160**
Dichlorodifluoromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Chloromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Vinyl Chloride	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Bromomethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Chloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Trichlorofluoromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,1-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Methylene Chloride	<27	ug/l	30	0	<27	<27	<27	NR		NO	0		< 27	< 27	< 27		< 27			< 27
Trans-1,2-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,1-dichloroethane	<1	ug/l	30	3	<1	2	1.33	NV		NO	0		< 1	< 1	< 1		< 1			< 1
Cis-1,2-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1

Groundwater Chemical Screening Against EQS Protective of Surface Water
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	SCREENING VALUE EQS COASTAL	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R2	R3	R2	R3	R2	R3	R2
												Exploratory monitoring well	MS\BH11	MS\BH12 (D)	MS\BH12 (D)	MS\BH12 (S)	MS\BH12 (S)	MS\BH13 (D)	MS\BH13 (D)	MS\BH13 (S)
												Depth	4.17-11.40	4.11-34.50	3.98-34.50	4.09-20.50	4.01-20.50	2.28-20.00	2.35-20.00	2.29-9.50
												Sampling Date	17/11/2021	18/10/2021	17/11/2021	12/10/2021	17/11/2021	12/10/2021	16/11/2021	12/10/2021
												Monitoring Unit	TFD SAND	RMF	RMF	GLACIAL TILL	GLACIAL TILL	RMF	RMF	TFD SAND
2,2-dichloropropane	<2	ug/l	30	0	<2	<2	<2	NR		NO	0		< 2	< 2	< 2		< 2			< 2
Bromochloromethane	<4	ug/l	30	0	<4	<4	<4	NR		NO	0		< 4	< 4	< 4		< 4			< 4
Chloroform	<1	ug/l	30	1	<1	5	5.00	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,1,1-trichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,1-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Carbon tetrachloride	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Benzene	<1	ug/l	30	5	<1	5	3.80	8	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		< 1	< 1	< 1		< 1			< 1
1,2-dichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Trichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,2-dichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Dibromomethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Bromodichloromethane	<4	ug/l	30	0	<4	<4	<4	NR		NO	0		< 4	< 4	< 4		< 4			< 4
cis-1,3-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Toluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
trans-1,3-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,1,2-trichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Tetrachloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,3-dichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Dibromochloromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,2-dibromoethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Chlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,1,1,2-tetrachloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Ethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
m+p-Xylene	<2	ug/l	30	0	<2	<2	<2	NR		NO	0		< 2	< 2	< 2		< 2			< 2
o-Xylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Styrene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Bromoform	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Isopropylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,1,2,2-tetrachloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Bromobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,2,3-trichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
n-propylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
2-chlorotoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,3,5-trimethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
4-chlorotoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Tert-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,2,4-trimethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
sec-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
p-isopropyltoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,3-dichlorobenzene	<2	ug/l	30	0	<2	<2	<2	NR		NO	0		< 2	< 2	< 2		< 2			< 2
1,4-dichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
n-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,2-dichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,2-dibromo-3-chloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,2,4-trichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Hexachlorobutadiene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Naphthalene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,2,3-trichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
MTBE	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Phenol	<1	ug/l	28	5	<1	3.5	2.06	7.7	WFD England/Wales. 2015 - Saltwater Standards	NO	0		< 1.0	3.5	< 1.0		< 1.0			< 1.0
Aniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
2-Chlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Benzyl Alcohol	<1	ug/l	28	2	<1	2.2	1.85	NV		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
2-Methylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Bis(2-chloroisopropyl)ether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
3&4-Methylphenol	<1	ug/l	28	1	<1	13	13.00	100	Methylphenols-SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Bis(2-chloroethoxy)methane	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
2,4-Dimethylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
2,4-Dichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
1,2,4-Trichlorobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
4-Chloro-3-methylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
2-Methylnaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Hexachlorocyclopentadiene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
2,4,6-Trichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
2,4,5-Trichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
2-Chloronaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
2-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
2,4-Dinitrotoluene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0

Groundwater Chemical Screening Against EQS Protective of Surface Water
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	SCREENING VALUE EQS COASTAL	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R2	R3	R2	R3	R2	R3	R2
												Exploratory monitoring well	MS\BH11	MS\BH12 (D)	MS\BH12 (D)	MS\BH12 (S)	MS\BH12 (S)	MS\BH13 (D)	MS\BH13 (D)	MS\BH13 (S)
												Depth	4.17-11.40	4.11-34.50	3.98-34.50	4.09-20.50	4.01-20.50	2.28-20.00	2.35-20.00	2.29-9.50
												Sampling Date	17/11/2021	18/10/2021	17/11/2021	12/10/2021	17/11/2021	12/10/2021	16/11/2021	12/10/2021
												Monitoring Unit	TFD SAND	RMF	RMF	GLACIAL TILL	GLACIAL TILL	RMF	RMF	TFD SAND
Acenaphthylene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
3-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Acenaphthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
4-Nitrophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Dibenzofuran	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
2,6-Dinitrotoluene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
2,3,4,6-Tetrachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Diethylphthalate	<1	ug/l	28	1	<1	1.1	1.10	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
4-Chlorophenylphenylether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Fluorene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
4-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Diphenylamine	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
4-Bromophenylphenylether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Hexachlorobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Bis(2-ethylhexyl)ester	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Pentachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Phenanthrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Anthracene	<1	ug/l	28	0	<1	<1	<1	0.1	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Di-n-butylphthalate	<1	ug/l	28	2	<1	2	1.60	8	SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		< 1.0	< 1.0	< 1.0		< 1.0			2
Fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Butylbenzylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Benzo(a)anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Chrysene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Bis(2-ethylhexyl)phthalate	<1	ug/l	28	4	<1	13	5.50	1.3	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	3		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Di-n-octylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Benzo(b)fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Benzo(k)fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Benzo(a)pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Indeno(123cd)pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Dibenzo(ah)anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Benzo(ghi)perylene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
1,4-Dinitrobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Dimethylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
1,3-Dinitrobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
2,3,5,6-Tetrachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Azobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Carbazole	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
1-Methylnaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Naphthalene	<0.1	ug/l	40	24	<0.1	5.1	0.58	2	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	1			<0.1	<0.1	0.4	0.7	<0.1	<0.1	<0.1
Acenaphthylene	<0.013	ug/l	40	8	<0.013	0.202	0.06	NV		NO	0			<0.013	<0.013	0.015	<0.013	<0.013	<0.013	<0.013
Acenaphthene	<0.013	ug/l	40	20	<0.013	0.986	0.20	NV		NO	0			0.061	<0.013	0.271	<0.013	<0.013	<0.013	<0.013
Fluorene	<0.014	ug/l	40	15	<0.014	0.28	0.07	NV		NO	0			0.017	<0.014	0.065	<0.014	<0.014	<0.014	<0.014
Phenanthrene	<0.011	ug/l	40	19	<0.011	0.361	0.05	NV		NO	0			<0.011	0.011	0.015	0.011	<0.011	<0.011	<0.011
Anthracene	<0.013	ug/l	40	2	<0.013	0.026	0.02	0.1	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0			<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013
Fluoranthene	<0.012	ug/l	40	9	<0.012	0.266	0.07	0.0063	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	9			<0.012	**0.013**	<0.012	<0.012	<0.012	**0.012**	<0.012
Pyrene	<0.013	ug/l	40	9	<0.013	0.168	0.05	NV		NO	0			<0.013	<0.013	<0.013	<0.013	<0.013	0.013	<0.013
Benzo(a)anthracene	<0.015	ug/l	40	0	<0.015	<0.015	<0.015	NV		NO	0			<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Chrysene	<0.011	ug/l	40	1	<0.011	0.015	0.02	NV		NO	0			<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
Benzo(bk)fluoranthene	<0.018	ug/l	40	0	<0.018	<0.018	<0.018	NV		NO	0			<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	<0.016	ug/l	40	0	<0.016	<0.016	<0.016	0.00017	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0			<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016
Indeno(123cd)pyrene	<0.011	ug/l	40	0	<0.011	<0.011	<0.011	see BaP and notes	Water Env't Regs (Scotland) 2015. AA-EQS Coast	NO	0			<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
Dibenzo(ah)anthracene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	NV		NO	0			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)perylene	<0.011	ug/l	40	0	<0.011	<0.011	<0.011	0.00082	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0			<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
PAH 16 Total	<0.195	ug/l	40	23	<0.195	6.231	0.90	NV		NO	0			<0.195	<0.195	0.766	0.711	<0.195	<0.195	<0.195
Benzo(b)fluoranthene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	0.017	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(k)fluoranthene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	0.017	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	<0.001	ug/l	42	3	<0.001	0.11	0.09	2	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		0.11	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
Acenaphthylene	<0.001	ug/l	42	3	<0.001	0.007	0.00	NV		NO	0		0.003	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
Acenaphthene	<0.001	ug/l	42	3	<0.001	0.044	0.02	NV		NO	0		0.044	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
Fluorene	<0.001	ug/l	42	3	<0.001	0.012	0.01	NV		NO	0		0.012	n/US	n/US	n/US	n/US	<0.001	n/US	n/US

Groundwater Chemical Screening Against EQS Protective of Surface Water
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	SCREENING VALUE EQS COASTAL	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R2	R3	R2	R3	R2	R3	R2
												Exploratory monitoring well	MS\BH11	MS\BH12 (D)	MS\BH12 (D)	MS\BH12 (S)	MS\BH12 (S)	MS\BH13 (D)	MS\BH13 (D)	MS\BH13 (S)
												Depth	4.17-11.40	4.11-34.50	3.98-34.50	4.09-20.50	4.01-20.50	2.28-20.00	2.35-20.00	2.29-9.50
												Sampling Date	17/11/2021	18/10/2021	17/11/2021	12/10/2021	17/11/2021	12/10/2021	16/11/2021	12/10/2021
												Monitoring Unit	TFD SAND	RMF	RMF	GLACIAL TILL	GLACIAL TILL	RMF	RMF	TFD SAND
Phenanthrene	<0.001	ug/l	42	2	<0.001	0.005	0.00	NV		NO	0		0.005	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
Anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	0.1	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		<0.001	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
Fluoranthene	<0.001	ug/l	42	2	<0.001	0.002	0.00	0.0063	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		0.001	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
Pyrene	<0.001	ug/l	42	2	<0.001	0.003	0.00	NV		NO	0		0.003	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
Benzo(a)anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	NV		NO	0		<0.001	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
Chrysene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	NV		NO	0		<0.001	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
Benzo(bk)fluoranthene	<0.002	ug/l	42	0	<0.002	<0.002	<0.002	NV		NO	0		<0.002	n/US	n/US	n/US	n/US	<0.002	n/US	n/US
Benzo(a)pyrene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	0.00017	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		<0.001	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
Indeno(123cd)pyrene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	see BaP and notes	Water Env't Regs (Scotland) 2015. AA-EQS Coast	NO	0		<0.001	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
Dibenzo(ah)anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	NV		NO	0		<0.001	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
Benzo(ghi)perylene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	0.00082	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		<0.001	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
PAH 16 Total	<0.016	ug/l	42	3	<0.016	0.178	0.13	NV		NO	0		0.178	n/US	n/US	n/US	n/US	<0.016	n/US	n/US
Benzo(b)fluoranthene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	0.017	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		<0.001	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
Benzo(k)fluoranthene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	0.017	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		<0.001	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
TAME	Non detect		22	0	Non detect	Non detect	Non detect	NR		NO	0		Not Detected		Not Detected		Not Detected		Not Detected	
PCB 28 + PCB 31	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 52	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 77	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 81	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 101	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 105	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 114	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 118 + PCB 123	< 0.6	ug/l	1	0	< 0.6	< 0.6	< 0.6	NR		NO	0									
PCB 126	< 0.5	ug/l	1	0	< 0.5	< 0.5	< 0.5	NR		NO	0									
PCB 138	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 153	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 156	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 157	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 167	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 169	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 180	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 189	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 12	< 1.0	ug/l	1	0	< 1.0	< 1.0	< 1.0	NR		NO	0									
PCB 7 Total	< 1.0	ug/l	1	0	< 1.0	< 1.0	< 1.0	NR		NO	0									

n/US Non suitable sample. PAH concentrations to high to undertake low level PAH analysis
NR All concentrations less than limit of detection. No screening value required.
NV No screening value available
1.1 Exceedance of EQS

Groundwater Chemical Screening Against EQS Protective of Surface Water
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	SCREENING VALUE EQS COASTAL	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R2	R3	R2	R3	R2	R3	R2
												Exploratory monitoring well	MS\BH13 (S)	MS\BH14	MS\BH14	MS\BH15 (D)	MS\BH15 (D)	MS\BH15 (S)	MS\BH15 (S)	MS\BH17
												Depth	2.28-9.50	3.63-8.00	3.60-8.00	3.51-12.00	3.57-12.00	3.49-5.00	3.53-5.00	5.65-20.00
												Sampling Date	16/11/2021	13/10/2021	16/11/2021	13/10/2021	16/11/2021	13/10/2021	16/11/2021	13/10/2021
												Monitoring Unit	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	MADE GROUND	MADE GROUND	RMF
Metals											-									
Arsenic, Dissolved	<0.16	ug/l	42	42	0.72	61	7.50	**25**	WFD England/Wales. 2015 - Saltwater Standards	YES	**1**		10	**61**	2.5	10	8.2	12	7.9	6.5
Beryllium, Dissolved	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	**NV**		NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron, Dissolved	<12	ug/l	42	38	<12	740	387.34	**7000**	SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		620	59	< 12	100	64	92	58	< 12
Cadmium, Dissolved	<0.03	ug/l	42	9	<0.03	0.2	0.08	**0.2**	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		< 0.03	0.08	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium III, Dissolved	<1	ug/l	42	7	<1	16	5.94	**NV**		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chromium, Hexavalent	<7	ug/l	42	1	<7	9.2	9.20	**0.6**	WFD England/Wales. 2015 - Saltwater Standards	YES	**1**		< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0
Copper, Dissolved	<0.4	ug/l	42	16	<0.4	3.3	1.26	**3.76**	WFD England/Wales. 2015 - Saltwater Standards	NO	0		1.2	1	0.8	< 0.4	< 0.4	< 0.4	0.6	< 0.4
Iron, Dissolved	<5.5	ug/l	42	42	7.6	11000	637.09	**1000**	WFD England/Wales. 2015 - Saltwater Standards	YES	**5**		890	230	40	11	11	9.2	22	28
Lead, Dissolved	<0.09	ug/l	42	23	<0.09	2.5	0.53	**1.3**	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	**3**		0.1	**1.6**	0.26	< 0.09	< 0.09	0.11	< 0.09	0.11
Mercury, Dissolved	<0.01	ug/l	42	33	<0.01	0.36	0.10	**0.07**	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	YES	**14**		< 0.01	**0.19**	< 0.01	**0.16**	**0.17**	**0.25**	**0.19**	**0.28**
Nickel, Dissolved	<0.5	ug/l	42	37	<0.5	15	2.64	**8.6**	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	**1**		1.3	6.3	< 0.5	< 0.5	0.6	1	0.9	3.2
Selenium, Dissolved	<0.25	ug/l	42	38	<0.25	7.8	1.86	**NV**		NO	0		< 0.25	1.6	< 0.25	5.1	2	6.8	5.2	4.4
Vanadium, Dissolved	<0.6	ug/l	42	33	<0.6	96	9.16	**100**	SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		2	33	< 0.6	< 0.6	0.6	22	96	31
Zinc, Dissolved	<1.3	ug/l	42	30	<1.3	51	6.97	**6.8**	WFD England/Wales. 2015 - Saltwater Standards	YES	**8**		**8.8**	**17**	3	< 1.3	< 1.3	< 1.3	< 1.3	2.2
pH	<	pH	42	42	7	12	9.31	**11**	Hazardous Waste Value	YES	**8**		8	10.9	**11.3**	10	10.3	10.9	10.9	**11.1**
Cyanide, Total Low Level	<0.0001	mg/l	42	41	<0.0001	0.076	0.01	**0.001**	WFD England/Wales. 2015 - Saltwater Standards	YES	**36**		< 0.0001	**0.0051**	**0.0045**	**0.015**	**0.011**	**0.012**	**0.0082**	**0.037**
Cyanide, Free Low Level	<0.0001	mg/l	42	36	<0.0001	0.0056	0.00	**0.001**	SEPA WAT-SG-53 Marine EQS - AA - 2015	YES	**6**		< 0.0001	0.0002	< 0.0001	0.0005	0.0002	0.0003	0.0003	0.0004
Thiocyanate	<20	ug/l	42	29	<20	9300	1207.34	**NV**		NO	0		7400	200	210	270	280	220	220	110
Total Hardness as CaCO3	<0.1	mg/l	42	42	4.49	6550	1100.97	**N/A**		NO	0		433	104	4.49	1010	2230	873	1060	783
Ammoniacal Nitrogen as NH3	<0.015	mg/l	42	41	<0.015	23	4.56	**NV**		NO	0		6.4	8.5	5.8	2.6	2.2	2.3	1.8	3.9
Ammoniacal Nitrogen as N	<0.015	mg/l	42	41	<0.015	19	3.78	**0.021**	WFD England/Wales. 2015 - Saltwater Standards (unionised ammonia)	YES	**41**		**5.3**	**7**	**4.8**	**2.1**	**1.9**	**1.9**	**1.5**	**3.2**
Nitrate as NO3	<0.1	mg/l	28	11	<0.1	140	14.52	**NV**		NO	0			< 0.10	0.82	0.19	< 0.10	< 0.10	0.12	< 0.10
Nitrate as N	<0.1	mg/l	14	5	<0.1	1.5	0.58	**NV**		NO	0		< 0.10							
Nitrite as NO2	<0.1	mg/l	30	19	<0.1	440	30.89	**NV**		NO	0			2.7	1.8	3.7	0.42	2.9	1.7	7.3
Nitrite as N	<0.035	mg/l	12	0	<0.035	<0.035	<0.035	**NV**		NO	0		< 0.035							
Sulphate as SO4	<0.1	mg/l	42	42	7.5	3000	801.11	**NV**		NO	0		350	130	400	1100	1300	880	970	810
Total Organic Carbon	<1	mg/l	42	40	<1	190	24.01	**N/A**		NO	0		6.1	14	5.9	3	100	3.4	6.3	5.2
Aliphatic C5-C6	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	**NV**		NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	<0.1	ug/l	42	1	<0.1	14	14.00	**NV**		NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	<0.1	ug/l	42	2	<0.1	21	11.00	**NV**		NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	<1	ug/l	42	5	<1	30	11.46	**NV**		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	<1	ug/l	42	5	<1	15	7.10	**NV**		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	<1	ug/l	42	6	<1	160	79.00	**NV**		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	<1	ug/l	42	6	<1	220	61.72	**NV**		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	<10	ug/l	42	7	<10	390	138.00	**NV**		NO	0		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	**8**	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	<0.1	ug/l	42	2	<0.1	19	16.00	**74**	WFD England/Wales. 2015 - Saltwater Standards	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	<0.1	ug/l	42	2	<0.1	72	47.50	**NV**		NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	<1	ug/l	42	6	<1	3.9	2.75	**NV**		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	2.5	< 1.0	< 1.0
Aromatic C12-C16	<1	ug/l	42	8	<1	11	7.28	**NV**		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	8.3	< 1.0	< 1.0
Aromatic C16-C21	<1	ug/l	42	8	<1	110	48.58	**NV**		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	3.6	< 1.0	< 1.0
Aromatic C21-C35	<1	ug/l	42	7	<1	110	26.89	**NV**		NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	<10	ug/l	42	10	<10	240	78.80	**NV**		NO	0		< 10	< 10	< 10	< 10	< 10	15	< 10	< 10
TPH Ali/Aro Total C5-C35	<10	ug/l	42	12	<10	630	146.42	**NV**		NO	0		< 10	< 10	< 10	< 10	< 10	15	< 10	< 10
EPH (C10-C40)	<10	ug/l	42	35	<10	1100	146.69	**NV**		NO	0		< 10	< 10	120	< 10	130	< 10	96	< 10
Benzene	<1	ug/l	42	0	<1	<1	<1	**8**	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	<1	ug/l	42	2	<1	19	16.00	**74**	WFD England/Wales. 2015 - Saltwater Standards	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	<1	ug/l	42	2	<1	72	47.50	**20**	SEPA WAT-SG-53 Marine EQS - AA - 2015	YES	**2**		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	<1	ug/l	42	0	<1	<1	<1	**30**	SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE	<1	ug/l	42	0	<1	<1	<1	**260**	PNEC (EU REACH) - Coastal	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Phenol - Monohydric	<100	ug/l	42	10	<100	2000	735.00	**50**	SEPA WAT-SG-53 Marine EQS - AA - 2015	YES	**10**		**170**	< 100	< 100	< 100	< 100	< 100	< 100	< 100
Dichlorodifluoromethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Chloromethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Vinyl Chloride	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Bromomethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Chloroethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Trichlorofluoromethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,1-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Methylene Chloride	<27	ug/l	30	0	<27	<27	<27	**NR**		NO	0		< 27	< 27		< 27		< 27	< 27	< 27
Trans-1,2-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,1-dichloroethane	<1	ug/l	30	3	<1	2	1.33	**NV**		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Cis-1,2-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1		< 1		< 1	< 1	< 1

Groundwater Chemical Screening Against EQS Protective of Surface Water
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	SCREENING VALUE EQS COASTAL	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R2	R3	R2	R3	R2	R3	R2
												Exploratory monitoring well	MS\BH13 (S)	MS\BH14	MS\BH14	MS\BH15 (D)	MS\BH15 (D)	MS\BH15 (S)	MS\BH15 (S)	MS\BH17
												Depth	2.28-9.50	3.63-8.00	3.60-8.00	3.51-12.00	3.57-12.00	3.49-5.00	3.53-5.00	5.65-20.00
												Sampling Date	16/11/2021	13/10/2021	16/11/2021	13/10/2021	16/11/2021	13/10/2021	16/11/2021	13/10/2021
												Monitoring Unit	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	MADE GROUND	MADE GROUND	RMF
2,2-dichloropropane	<2	ug/l	30	0	<2	<2	<2	NR		NO	0		< 2	< 2		< 2		< 2	< 2	< 2
Bromochloromethane	<4	ug/l	30	0	<4	<4	<4	NR		NO	0		< 4	< 4		< 4		< 4	< 4	< 4
Chloroform	<1	ug/l	30	1	<1	5	5.00	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,1,1-trichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,1-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Carbon tetrachloride	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Benzene	<1	ug/l	30	5	<1	5	3.80	8	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,2-dichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Trichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,2-dichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Dibromomethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Bromodichloromethane	<4	ug/l	30	0	<4	<4	<4	NR		NO	0		< 4	< 4		< 4		< 4	< 4	< 4
cis-1,3-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Toluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
trans-1,3-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,1,2-trichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Tetrachloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,3-dichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Dibromochloromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,2-dibromoethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Chlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,1,1,2-tetrachloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Ethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
m+p-Xylene	<2	ug/l	30	0	<2	<2	<2	NR		NO	0		< 2	< 2		< 2		< 2	< 2	< 2
o-Xylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Styrene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Bromoform	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Isopropylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,1,2,2-tetrachloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Bromobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,2,3-trichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
n-propylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
2-chlorotoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,3,5-trimethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
4-chlorotoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Tert-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,2,4-trimethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
sec-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
p-isopropyltoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,3-dichlorobenzene	<2	ug/l	30	0	<2	<2	<2	NR		NO	0		< 2	< 2		< 2		< 2	< 2	< 2
1,4-dichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
n-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,2-dichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,2-dibromo-3-chloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,2,4-trichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Hexachlorobutadiene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Naphthalene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,2,3-trichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
MTBE	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Phenol	<1	ug/l	28	5	<1	3.5	2.06	7.7	WFD England/Wales. 2015 - Saltwater Standards	NO	0		< 1.0	2.4		< 1.0		< 1.0	< 1.0	< 1.0
Aniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
2-Chlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Benzyl Alcohol	<1	ug/l	28	2	<1	2.2	1.85	NV		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
2-Methylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Bis(2-chloroisopropyl)ether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
3&4-Methylphenol	<1	ug/l	28	1	<1	13	13.00	100	Methylphenols-SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		< 1.0	13		< 1.0		< 1.0	< 1.0	< 1.0
Bis(2-chloroethoxy)methane	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
2,4-Dimethylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
2,4-Dichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
4-Chloro-3-methylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
2-Methylnaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Hexachlorocyclopentadiene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
2,4,6-Trichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
2,4,5-Trichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
2-Chloronaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
2-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
2,4-Dinitrotoluene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0

Groundwater Chemical Screening Against EQS Protective of Surface Water
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	SCREENING VALUE EQS COASTAL	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R2	R3	R2	R3	R2	R3	R2
												Exploratory monitoring well	MS\BH13 (S)	MS\BH14	MS\BH14	MS\BH15 (D)	MS\BH15 (D)	MS\BH15 (S)	MS\BH15 (S)	MS\BH17
												Depth	2.28-9.50	3.63-8.00	3.60-8.00	3.51-12.00	3.57-12.00	3.49-5.00	3.53-5.00	5.65-20.00
												Sampling Date	16/11/2021	13/10/2021	16/11/2021	13/10/2021	16/11/2021	13/10/2021	16/11/2021	13/10/2021
												Monitoring Unit	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	MADE GROUND	MADE GROUND	RMF
Acenaphthylene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
3-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Acenaphthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
4-Nitrophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Dibenzofuran	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
2,6-Dinitrotoluene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
2,3,4,6-Tetrachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Diethylphthalate	<1	ug/l	28	1	<1	1.1	1.10	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
4-Chlorophenylphenylether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Fluorene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
4-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Diphenylamine	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
4-Bromophenylphenylether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Hexachlorobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)ester	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Pentachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Phenanthrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Anthracene	<1	ug/l	28	0	<1	<1	<1	0.1	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Di-n-butylphthalate	<1	ug/l	28	2	<1	2	1.60	8	SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		1.2	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Butylbenzylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Benzo(a)anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Chrysene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)phthalate	<1	ug/l	28	4	<1	13	5.50	1.3	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	3		< 1.0	1.1		< 1.0		< 1.0	< 1.0	< 1.0
Di-n-octylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Benzo(b)fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Benzo(k)fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Benzo(a)pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Indeno(123cd)pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Dibenzo(ah)anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Benzo(ghi)perylene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
1,4-Dinitrobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Dimethylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
1,3-Dinitrobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
2,3,5,6-Tetrachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Azobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Carbazole	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
1-Methylnaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Naphthalene	<0.1	ug/l	40	24	<0.1	5.1	0.58	2	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	1		<0.1	0.4	<0.1	**5.1**	<0.1	0.6	<0.1	0.6
Acenaphthylene	<0.013	ug/l	40	8	<0.013	0.202	0.06	NV		NO	0		<0.013	<0.013	0.013	0.02	<0.013	0.202	0.18	0.025
Acenaphthene	<0.013	ug/l	40	20	<0.013	0.986	0.20	NV		NO	0		<0.013	0.611	0.157	0.986	0.074	0.589	0.361	0.141
Fluorene	<0.014	ug/l	40	15	<0.014	0.28	0.07	NV		NO	0		<0.014	0.158	0.026	0.11	<0.014	0.28	0.185	0.03
Phenanthrene	<0.011	ug/l	40	19	<0.011	0.361	0.05	NV		NO	0		<0.011	0.361	<0.011	0.015	0.011	0.152	0.096	0.038
Anthracene	<0.013	ug/l	40	2	<0.013	0.026	0.02	0.1	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		<0.013	0.026	<0.013	<0.013	<0.013	<0.013	0.015	<0.013
Fluoranthene	<0.012	ug/l	40	9	<0.012	0.266	0.07	0.0063	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	9		<0.012	**0.053**	**0.266**	<0.012	<0.012	**0.018**	**0.031**	<0.012
Pyrene	<0.013	ug/l	40	9	<0.013	0.168	0.05	NV		NO	0		<0.013	0.036	0.168	<0.013	<0.013	0.015	0.02	<0.013
Benzo(a)anthracene	<0.015	ug/l	40	0	<0.015	<0.015	<0.015	NV		NO	0		<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Chrysene	<0.011	ug/l	40	1	<0.011	0.015	0.02	NV		NO	0		<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
Benzo(bk)fluoranthene	<0.018	ug/l	40	0	<0.018	<0.018	<0.018	NV		NO	0		<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	<0.016	ug/l	40	0	<0.016	<0.016	<0.016	0.00017	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016
Indeno(123cd)pyrene	<0.011	ug/l	40	0	<0.011	<0.011	<0.011	see BaP and notes	Water Env't Regs (Scotland) 2015. AA-EQS Coast	NO	0		<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
Dibenzo(ah)anthracene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	NV		NO	0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)perylene	<0.011	ug/l	40	0	<0.011	<0.011	<0.011	0.00082	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
PAH 16 Total	<0.195	ug/l	40	23	<0.195	6.231	0.90	NV		NO	0		<0.195	1.645	0.63	6.231	<0.195	1.856	0.888	0.834
Benzo(b)fluoranthene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	0.017	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(k)fluoranthene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	0.017	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	<0.001	ug/l	42	3	<0.001	0.11	0.09	2	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Acenaphthylene	<0.001	ug/l	42	3	<0.001	0.007	0.00	NV		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Acenaphthene	<0.001	ug/l	42	3	<0.001	0.044	0.02	NV		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Fluorene	<0.001	ug/l	42	3	<0.001	0.012	0.01	NV		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US

Groundwater Chemical Screening Against EQS Protective of Surface Water
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	SCREENING VALUE EQS COASTAL	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R2	R3	R2	R3	R2	R3	R2
												Exploratory monitoring well	MS\BH13 (S)	MS\BH14	MS\BH14	MS\BH15 (D)	MS\BH15 (D)	MS\BH15 (S)	MS\BH15 (S)	MS\BH17
												Depth	2.28-9.50	3.63-8.00	3.60-8.00	3.51-12.00	3.57-12.00	3.49-5.00	3.53-5.00	5.65-20.00
												Sampling Date	16/11/2021	13/10/2021	16/11/2021	13/10/2021	16/11/2021	13/10/2021	16/11/2021	13/10/2021
												Monitoring Unit	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	MADE GROUND	MADE GROUND	RMF
Phenanthrene	<0.001	ug/l	42	2	<0.001	0.005	0.00	**NV**		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**0.1**	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Fluoranthene	<0.001	ug/l	42	2	<0.001	0.002	0.00	**0.0063**	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Pyrene	<0.001	ug/l	42	2	<0.001	0.003	0.00	**NV**		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Benzo(a)anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**NV**		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Chrysene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**NV**		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Benzo(bk)fluoranthene	<0.002	ug/l	42	0	<0.002	<0.002	<0.002	**NV**		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Benzo(a)pyrene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**0.00017**	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Indeno(123cd)pyrene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**see BaP and notes**	Water Env't Regs (Scotland) 2015. AA-EQS Coast	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Dibenzo(ah)anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**NV**		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Benzo(ghi)perylene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**0.00082**	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
PAH 16 Total	<0.016	ug/l	42	3	<0.016	0.178	0.13	**NV**		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Benzo(b)fluoranthene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**0.017**	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Benzo(k)fluoranthene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**0.017**	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
TAME	Non detect		22	0	Non detect	Non detect	Non detect	**NR**		NO	0		Not Detected		Not Detected		Not Detected		Not Detected	
PCB 28 + PCB 31	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0									
PCB 52	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0									
PCB 77	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0									
PCB 81	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0									
PCB 101	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0									
PCB 105	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0									
PCB 114	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0									
PCB 118 + PCB 123	< 0.6	ug/l	1	0	< 0.6	< 0.6	< 0.6	**NR**		NO	0									
PCB 126	< 0.5	ug/l	1	0	< 0.5	< 0.5	< 0.5	**NR**		NO	0									
PCB 138	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0									
PCB 153	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0									
PCB 156	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0									
PCB 157	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0									
PCB 167	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0									
PCB 169	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0									
PCB 180	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0									
PCB 189	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0									
PCB 12	< 1.0	ug/l	1	0	< 1.0	< 1.0	< 1.0	**NR**		NO	0									
PCB 7 Total	< 1.0	ug/l	1	0	< 1.0	< 1.0	< 1.0	**NR**		NO	0									

n/US Non suitable sample. PAH concentrations to high to undertake low level PAH analysis
NR All concentrations less than limit of detection. No screening value required.
NV No screening value available
1.1 Exceedance of EQS

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	SCREENING VALUE EQS COASTAL	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R2	R3
												Exploratory monitoring well	MS\BH17	Trip Blank	TRIP BLANK
												Depth	5.64-20.00		
												Sampling Date	16/11/2021	13/10/2021	15/11/2021
												Monitoring Unit	RMF		
Metals											-				
Arsenic, Dissolved	<0.16	ug/l	42	42	0.72	61	7.50	25	WFD England/Wales. 2015 - Saltwater Standards	YES	1		1.6		
Beryllium, Dissolved	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	NV		NO	0		< 0.1		
Boron, Dissolved	<12	ug/l	42	38	<12	740	387.34	7000	SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		< 12		
Cadmium, Dissolved	<0.03	ug/l	42	9	<0.03	0.2	0.08	0.2	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		< 0.03		
Chromium III, Dissolved	<1	ug/l	42	7	<1	16	5.94	NV		NO	0		< 1.0		
Chromium, Hexavalent	<7	ug/l	42	1	<7	9.2	9.20	0.6	WFD England/Wales. 2015 - Saltwater Standards	YES	1		< 7.0		
Copper, Dissolved	<0.4	ug/l	42	16	<0.4	3.3	1.26	3.76	WFD England/Wales. 2015 - Saltwater Standards	NO	0		1.6		
Iron, Dissolved	<5.5	ug/l	42	42	7.6	11000	637.09	1000	WFD England/Wales. 2015 - Saltwater Standards	YES	5		81		
Lead, Dissolved	<0.09	ug/l	42	23	<0.09	2.5	0.53	1.3	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	3		0.49		
Mercury, Dissolved	<0.01	ug/l	42	33	<0.01	0.36	0.10	0.07	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	YES	14		< 0.01		
Nickel, Dissolved	<0.5	ug/l	42	37	<0.5	15	2.64	8.6	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	1		< 0.5		
Selenium, Dissolved	<0.25	ug/l	42	38	<0.25	7.8	1.86	NV		NO	0		0.43		
Vanadium, Dissolved	<0.6	ug/l	42	33	<0.6	96	9.16	100	SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		1.6		
Zinc, Dissolved	<1.3	ug/l	42	30	<1.3	51	6.97	6.8	WFD England/Wales. 2015 - Saltwater Standards	YES	8		< 1.3		
pH	<	pH	42	42	7	12	9.31	11	Hazardous Waste Value	YES	8		11.3		
Cyanide, Total Low Level	<0.0001	mg/l	42	41	<0.0001	0.076	0.01	0.001	WFD England/Wales. 2015 - Saltwater Standards	YES	36		0.076		
Cyanide, Free Low Level	<0.0001	mg/l	42	36	<0.0001	0.0056	0.00	0.001	SEPA WAT-SG-53 Marine EQS - AA - 2015	YES	6		< 0.0001		
Thiocyanate	<20	ug/l	42	29	<20	9300	1207.34	NV		NO	0		120		
Total Hardness as CaCO3	<0.1	mg/l	42	42	4.49	6550	1100.97	N/A		NO	0		27.5		
Ammoniacal Nitrogen as NH3	<0.015	mg/l	42	41	<0.015	23	4.56	NV		NO	0		3.3		
Ammoniacal Nitrogen as N	<0.015	mg/l	42	41	<0.015	19	3.78	0.021	WFD England/Wales. 2015 - Saltwater Standards (unionised ammonia)	YES	41		2.7		
Nitrate as NO3	<0.1	mg/l	28	11	<0.1	140	14.52	NV		NO	0		< 0.10		
Nitrate as N	<0.1	mg/l	14	5	<0.1	1.5	0.58	NV		NO	0				
Nitrite as NO2	<0.1	mg/l	30	19	<0.1	440	30.89	NV		NO	0		< 0.10		
Nitrite as N	<0.035	mg/l	12	0	<0.035	<0.035	<0.035	NV		NO	0				
Sulphate as SO4	<0.1	mg/l	42	42	7.5	3000	801.11	NV		NO	0		920		
Total Organic Carbon	<1	mg/l	42	40	<1	190	24.01	N/A		NO	0		4.3		
Aliphatic C5-C6	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	NV		NO	0		< 0.1		
Aliphatic C6-C8	<0.1	ug/l	42	1	<0.1	14	14.00	NV		NO	0		< 0.1		
Aliphatic C8-C10	<0.1	ug/l	42	2	<0.1	21	11.00	NV		NO	0		< 0.1		
Aliphatic C10-C12	<1	ug/l	42	5	<1	30	11.46	NV		NO	0		< 1.0		
Aliphatic C12-C16	<1	ug/l	42	5	<1	15	7.10	NV		NO	0		< 1.0		
Aliphatic C16-C21	<1	ug/l	42	6	<1	160	79.00	NV		NO	0		< 1.0		
Aliphatic C21-C35	<1	ug/l	42	6	<1	220	61.72	NV		NO	0		< 1.0		
Aliphatic C5-C35	<10	ug/l	42	7	<10	390	138.00	NV		NO	0		< 10		
Aromatic C5-C7	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	8	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		< 0.1		
Aromatic C7-C8	<0.1	ug/l	42	2	<0.1	19	16.00	74	WFD England/Wales. 2015 - Saltwater Standards	NO	0		< 0.1		
Aromatic C8-C10	<0.1	ug/l	42	2	<0.1	72	47.50	NV		NO	0		< 0.1		
Aromatic C10-C12	<1	ug/l	42	6	<1	3.9	2.75	NV		NO	0		< 1.0		
Aromatic C12-C16	<1	ug/l	42	8	<1	11	7.28	NV		NO	0		< 1.0		
Aromatic C16-C21	<1	ug/l	42	8	<1	110	48.58	NV		NO	0		< 1.0		
Aromatic C21-C35	<1	ug/l	42	7	<1	110	26.89	NV		NO	0		< 1.0		
Aromatic C5-C35	<10	ug/l	42	10	<10	240	78.80	NV		NO	0		< 10		
TPH Ali/Aro Total C5-C35	<10	ug/l	42	12	<10	630	146.42	NV		NO	0		< 10		
EPH (C10-C40)	<10	ug/l	42	35	<10	1100	146.69	NV		NO	0		120		
Benzene	<1	ug/l	42	0	<1	<1	<1	8	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		< 1.0		
Toluene	<1	ug/l	42	2	<1	19	16.00	74	WFD England/Wales. 2015 - Saltwater Standards	NO	0		< 1.0		
Ethylbenzene	<1	ug/l	42	2	<1	72	47.50	20	SEPA WAT-SG-53 Marine EQS - AA - 2015	YES	2		< 1.0		
Xylene	<1	ug/l	42	0	<1	<1	<1	30	SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		< 1.0		
MTBE	<1	ug/l	42	0	<1	<1	<1	260	PNEC (EU REACH) - Coastal	NO	0		< 1.0		
Phenol - Monohydric	<100	ug/l	42	10	<100	2000	735.00	50	SEPA WAT-SG-53 Marine EQS - AA - 2015	YES	10		< 100		
Dichlorodifluoromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Chloromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Vinyl Chloride	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Bromomethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Chloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Trichlorofluoromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
1,1-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Methylene Chloride	<27	ug/l	30	0	<27	<27	<27	NR		NO	0		< 27	< 27	< 27
Trans-1,2-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
1,1-dichloroethane	<1	ug/l	30	3	<1	2	1.33	NV		NO	0		< 1	< 1	< 1
Cis-1,2-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1

Groundwater Chemical Screening Against EQS Protective of Surface Water
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	SCREENING VALUE EQS COASTAL	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R2	R3
												Exploratory monitoring well	MS\BH17	Trip Blank	TRIP BLANK
												Depth	5.64-20.00		
												Sampling Date	16/11/2021	13/10/2021	15/11/2021
												Monitoring Unit	RMF		
2,2-dichloropropane	<2	ug/l	30	0	<2	<2	<2	**NR**		NO	0		< 2	< 2	< 2
Bromochloromethane	<4	ug/l	30	0	<4	<4	<4	**NR**		NO	0		< 4	< 4	< 4
Chloroform	<1	ug/l	30	1	<1	5	5.00	**NR**		NO	0		< 1	< 1	< 1
1,1,1-trichloroethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
1,1-dichloropropene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
Carbon tetrachloride	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
Benzene	<1	ug/l	30	5	<1	5	3.80	**8**	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		< 1	< 1	< 1
1,2-dichloroethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
Trichloroethylene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
1,2-dichloropropane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
Dibromomethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
Bromodichloromethane	<4	ug/l	30	0	<4	<4	<4	**NR**		NO	0		< 4	< 4	< 4
cis-1,3-dichloropropene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
Toluene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
trans-1,3-dichloropropene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
1,1,2-trichloroethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
Tetrachloroethylene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
1,3-dichloropropane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
Dibromochloromethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
1,2-dibromoethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
Chlorobenzene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
1,1,1,2-tetrachloroethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
Ethylbenzene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
m+p-Xylene	<2	ug/l	30	0	<2	<2	<2	**NR**		NO	0		< 2	< 2	< 2
o-Xylene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
Styrene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
Bromoform	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
Isopropylbenzene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
1,1,2,2-tetrachloroethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
Bromobenzene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
1,2,3-trichloropropane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
n-propylbenzene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
2-chlorotoluene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
1,3,5-trimethylbenzene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
4-chlorotoluene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
Tert-butylbenzene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
1,2,4-trimethylbenzene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
sec-butylbenzene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
p-isopropyltoluene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
1,3-dichlorobenzene	<2	ug/l	30	0	<2	<2	<2	**NR**		NO	0		< 2	< 2	< 2
1,4-dichlorobenzene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
n-butylbenzene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
1,2-dichlorobenzene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
1,2-dibromo-3-chloropropane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
1,2,4-trichlorobenzene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
Hexachlorobutadiene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
Naphthalene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
1,2,3-trichlorobenzene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
MTBE	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1
Phenol	<1	ug/l	28	5	<1	3.5	2.06	**7.7**	WFD England/Wales. 2015 - Saltwater Standards	NO	0		< 1.0		
Aniline	<1	ug/l	28	0	<1	<1	<1	**NR**		NO	0		< 1.0		
2-Chlorophenol	<1	ug/l	28	0	<1	<1	<1	**NR**		NO	0		< 1.0		
Benzyl Alcohol	<1	ug/l	28	2	<1	2.2	1.85	**NV**		NO	0		< 1.0		
2-Methylphenol	<1	ug/l	28	0	<1	<1	<1	**NR**		NO	0		< 1.0		
Bis(2-chloroisopropyl)ether	<1	ug/l	28	0	<1	<1	<1	**NR**		NO	0		< 1.0		
3&4-Methylphenol	<1	ug/l	28	1	<1	13	13.00	**100**	Methylphenols-SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		< 1.0		
Bis(2-chloroethoxy)methane	<1	ug/l	28	0	<1	<1	<1	**NR**		NO	0		< 1.0		
2,4-Dimethylphenol	<1	ug/l	28	0	<1	<1	<1	**NR**		NO	0		< 1.0		
2,4-Dichlorophenol	<1	ug/l	28	0	<1	<1	<1	**NR**		NO	0		< 1.0		
1,2,4-Trichlorobenzene	<1	ug/l	28	0	<1	<1	<1	**NR**		NO	0		< 1.0		
4-Chloro-3-methylphenol	<1	ug/l	28	0	<1	<1	<1	**NR**		NO	0		< 1.0		
2-Methylnaphthalene	<1	ug/l	28	0	<1	<1	<1	**NR**		NO	0		< 1.0		
Hexachlorocyclopentadiene	<1	ug/l	28	0	<1	<1	<1	**NR**		NO	0		< 1.0		
2,4,6-Trichlorophenol	<1	ug/l	28	0	<1	<1	<1	**NR**		NO	0		< 1.0		
2,4,5-Trichlorophenol	<1	ug/l	28	0	<1	<1	<1	**NR**		NO	0		< 1.0		
2-Chloronaphthalene	<1	ug/l	28	0	<1	<1	<1	**NR**		NO	0		< 1.0		
2-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	**NR**		NO	0		< 1.0		
2,4-Dinitrotoluene	<1	ug/l	28	0	<1	<1	<1	**NR**		NO	0		< 1.0		

Groundwater Chemical Screening Against EQS Protective of Surface Water
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	SCREENING VALUE EQS COASTAL	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R2	R3
												Exploratory monitoring well	MS\BH17	Trip Blank	TRIP BLANK
												Depth	5.64-20.00		
												Sampling Date	16/11/2021	13/10/2021	15/11/2021
												Monitoring Unit	RMF		
Acenaphthylene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
3-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Acenaphthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
4-Nitrophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Dibenzofuran	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
2,6-Dinitrotoluene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
2,3,4,6-Tetrachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Diethylphthalate	<1	ug/l	28	1	<1	1.1	1.10	NR		NO	0		< 1.0		
4-Chlorophenylphenylether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Fluorene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
4-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Diphenylamine	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
4-Bromophenylphenylether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Hexachlorobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Bis(2-ethylhexyl)ester	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Pentachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Phenanthrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Anthracene	<1	ug/l	28	0	<1	<1	<1	0.1	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		< 1.0		
Di-n-butylphthalate	<1	ug/l	28	2	<1	2	1.60	8	SEPA WAT-SG-53 Marine EQS - AA - 2015	NO	0		< 1.0		
Fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Butylbenzylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Benzo(a)anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Chrysene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Bis(2-ethylhexyl)phthalate	<1	ug/l	28	4	<1	13	5.50	1.3	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	3		< 1.0		
Di-n-octylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Benzo(b)fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Benzo(k)fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Benzo(a)pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Indeno(123cd)pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Dibenzo(ah)anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Benzo(ghi)perylene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
1,4-Dinitrobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Dimethylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
1,3-Dinitrobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
2,3,5,6-Tetrachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Azobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Carbazole	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
1-Methylnaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Naphthalene	<0.1	ug/l	40	24	<0.1	5.1	0.58	2	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	1		<0.1		
Acenaphthylene	<0.013	ug/l	40	8	<0.013	0.202	0.06	NV		NO	0		0.021		
Acenaphthene	<0.013	ug/l	40	20	<0.013	0.986	0.20	NV		NO	0		0.184		
Fluorene	<0.014	ug/l	40	15	<0.014	0.28	0.07	NV		NO	0		0.037		
Phenanthrene	<0.011	ug/l	40	19	<0.011	0.361	0.05	NV		NO	0		0.034		
Anthracene	<0.013	ug/l	40	2	<0.013	0.026	0.02	0.1	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		<0.013		
Fluoranthene	<0.012	ug/l	40	9	<0.012	0.266	0.07	0.0063	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	YES	9		0.032		
Pyrene	<0.013	ug/l	40	9	<0.013	0.168	0.05	NV		NO	0		0.025		
Benzo(a)anthracene	<0.015	ug/l	40	0	<0.015	<0.015	<0.015	NV		NO	0		<0.015		
Chrysene	<0.011	ug/l	40	1	<0.011	0.015	0.02	NV		NO	0		<0.011		
Benzo(bk)fluoranthene	<0.018	ug/l	40	0	<0.018	<0.018	<0.018	NV		NO	0		<0.018		
Benzo(a)pyrene	<0.016	ug/l	40	0	<0.016	<0.016	<0.016	0.00017	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		<0.016		
Indeno(123cd)pyrene	<0.011	ug/l	40	0	<0.011	<0.011	<0.011	see BaP and notes	Water Env't Regs (Scotland) 2015. AA-EQS Coast	NO	0		<0.011		
Dibenzo(ah)anthracene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	NV		NO	0		<0.01		
Benzo(ghi)perylene	<0.011	ug/l	40	0	<0.011	<0.011	<0.011	0.00082	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		<0.011		
PAH 16 Total	<0.195	ug/l	40	23	<0.195	6.231	0.90	NV		NO	0		0.333		
Benzo(b)fluoranthene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	0.017	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		<0.01		
Benzo(k)fluoranthene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	0.017	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		<0.01		
Naphthalene	<0.001	ug/l	42	3	<0.001	0.11	0.09	2	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		n/US		
Acenaphthylene	<0.001	ug/l	42	3	<0.001	0.007	0.00	NV		NO	0		n/US		
Acenaphthene	<0.001	ug/l	42	3	<0.001	0.044	0.02	NV		NO	0		n/US		
Fluorene	<0.001	ug/l	42	3	<0.001	0.012	0.01	NV		NO	0		n/US		

Groundwater Chemical Screening Against EQS Protective of Surface Water
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	SCREENING VALUE EQS COASTAL	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R2	R3
												Exploratory monitoring well	MS\BH17	Trip Blank	TRIP BLANK
												Depth	5.64-20.00		
												Sampling Date	16/11/2021	13/10/2021	15/11/2021
												Monitoring Unit	RMF		
Phenanthrene	<0.001	ug/l	42	2	<0.001	0.005	0.00	**NV**		NO	0		n/US		
Anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**0.1**	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		n/US		
Fluoranthene	<0.001	ug/l	42	2	<0.001	0.002	0.00	**0.0063**	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		n/US		
Pyrene	<0.001	ug/l	42	2	<0.001	0.003	0.00	**NV**		NO	0		n/US		
Benzo(a)anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**NV**		NO	0		n/US		
Chrysene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**NV**		NO	0		n/US		
Benzo(bk)fluoranthene	<0.002	ug/l	42	0	<0.002	<0.002	<0.002	**NV**		NO	0		n/US		
Benzo(a)pyrene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**0.00017**	WFD England/Wales. 2015 - AA-EQS Trans./Coastal	NO	0		n/US		
Indeno(123cd)pyrene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**see BaP and notes**	Water Env't Regs (Scotland) 2015. AA-EQS Coast	NO	0		n/US		
Dibenzo(ah)anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**NV**		NO	0		n/US		
Benzo(ghi)perylene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**0.00082**	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		n/US		
PAH 16 Total	<0.016	ug/l	42	3	<0.016	0.178	0.13	**NV**		NO	0		n/US		
Benzo(b)fluoranthene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**0.017**	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		n/US		
Benzo(k)fluoranthene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**0.017**	WFD England/Wales. 2015 - MAC-EQS Trans./Coastal	NO	0		n/US		
TAME	Non detect		22	0	Non detect	Non detect	Non detect	**NR**		NO	0		Not Detected		
PCB 28 + PCB 31	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0				
PCB 52	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0				
PCB 77	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0				
PCB 81	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0				
PCB 101	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0				
PCB 105	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0				
PCB 114	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0				
PCB 118 + PCB 123	< 0.6	ug/l	1	0	< 0.6	< 0.6	< 0.6	**NR**		NO	0				
PCB 126	< 0.5	ug/l	1	0	< 0.5	< 0.5	< 0.5	**NR**		NO	0				
PCB 138	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0				
PCB 153	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0				
PCB 156	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0				
PCB 157	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0				
PCB 167	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0				
PCB 169	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0				
PCB 180	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0				
PCB 189	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0				
PCB 12	< 1.0	ug/l	1	0	< 1.0	< 1.0	< 1.0	**NR**		NO	0				
PCB 7 Total	< 1.0	ug/l	1	0	< 1.0	< 1.0	< 1.0	**NR**		NO	0				

n/US	Non suitable sample. PAH concentrations to high to undertake low level PAH analysis
NR	All concentrations less than limit of detection. No screening value required.
NV	No screening value available
1.1	Exceedance of EQS

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	DWS SCREENING VALUE	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R3	R2	R3	R2	R3	R2	R3
												Exploratory monitoring well	DUPLICATE A (MS\BH09)	DUPLICATE B (MS\BH14)	LF\BH01 (D)	LF\BH01 (D)	LF\BH01 (S)	LF\BH01 (S)	MS\BH03 (D)	MS\BH03 (S)
												Depth	4.34-8.70	3.60-8.00	4.61-38.00	4.56-38.00	4.64-8.10	4.58-8.10	1.87-28.50	1.91-2.70
												Sampling Date	15/11/2021	16/11/2021	18/10/2021	17/11/2021	18/10/2021	17/11/2021	13/10/2021	17/11/2021
												Monitoring Unit	TFD SAND	TFD SAND	RMF	RMF	TFD SAND	TFD SAND	RMF	MADE GROUND
Arsenic, Dissolved	<0.16	ug/l	42	42	0.72	61	7.50	**10**	WS Regs 2016 (Eng/Wal)	YES	**5**		9.4	**23**	5.1	9.1	9.7	**11**	6.8	4.2
Beryllium, Dissolved	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	**12**	WHO DWG 2017	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron, Dissolved	<12	ug/l	42	38	<12	740	387.34	**1000**	WS Regs 2016 (Eng/Wal)	NO	0		230	< 12	270	240	320	350	570	450
Cadmium, Dissolved	<0.03	ug/l	42	9	<0.03	0.2	0.08	**5**	WS Regs 2016 (Eng/Wal)	NO	0		< 0.03	0.07	0.04	0.04	0.03	< 0.03	< 0.03	< 0.03
Chromium III, Dissolved	<1	ug/l	42	7	<1	16	5.94	**50**	WS Regs 2016 (Eng/Wal)	NO	0		< 1.0	< 1.0	7.9	< 1.0	16	< 1.0	< 1.0	< 1.0
Chromium, Hexavalent	<7	ug/l	42	1	<7	9.2	9.20	**50**	WS Regs 2016 (Eng/Wal)	NO	0		< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0
Copper, Dissolved	<0.4	ug/l	42	16	<0.4	3.3	1.26	**2000**	WS Regs 2016 (Eng/Wal)	NO	0		< 0.4	0.7	3.3	1.8	0.5	< 0.4	< 0.4	< 0.4
Iron, Dissolved	<5.5	ug/l	42	42	7.6	11000	637.09	**200**	WS Regs 2016 (Eng/Wal)	YES	**12**		64	16	56	34	30	19	**11000**	86
Lead, Dissolved	<0.09	ug/l	42	23	<0.09	2.5	0.53	**10**	WS Regs 2016 (Eng/Wal)	NO	0		< 0.09	0.57	1.4	0.23	0.4	< 0.09	< 0.09	< 0.09
Mercury, Dissolved	<0.01	ug/l	42	33	<0.01	0.36	0.10	**1**	WS Regs 2016 (Eng/Wal)	NO	0		0.06	0.36	0.17	0.19	0.15	0.11	0.06	0.07
Nickel, Dissolved	<0.5	ug/l	42	37	<0.5	15	2.64	**20**	WS Regs 2016 (Eng/Wal)	NO	0		0.9	5.5	6.2	4.4	1.5	0.9	0.6	< 0.5
Selenium, Dissolved	<0.25	ug/l	42	38	<0.25	7.8	1.86	**10**	WS Regs 2016 (Eng/Wal)	NO	0		1.8	2.5	3	2	1.4	1.3	0.8	1.1
Vanadium, Dissolved	<0.6	ug/l	42	33	<0.6	96	9.16	**86**	USEPA RSL (tapwater) [May 2020]	YES	**1**		2.2	6.6	8.1	7.1	3.8	0.7	0.9	2
Zinc, Dissolved	<1.3	ug/l	42	30	<1.3	51	6.97	**6000**	USEPA RSL (tapwater) [May 2020]	NO	0		3	3.1	10	6.2	4.9	2.5	1.7	3
pH	<	pH	42	42	7	12	9.31	**11**	Hazardous Waste Value	YES	**8**		9.2	**11.3**	**11.3**	10.6	10.2	9.2	7.7	8.2
Cyanide, Total Low Level	<0.0001	mg/l	42	41	<0.0001	0.076	0.01	**0.05**	WS Regs 2016 (Eng/Wal)	YES	**1**		0.0053	0.0052	0.0048	0.0052	0.0063	0.0057	0.0001	0.0084
Cyanide, Free Low Level	<0.0001	mg/l	42	36	<0.0001	0.0056	0.00	**0.05**	WS Regs 2016 (Eng/Wal)	NO	0		0.0003	0.0002	0.0008	0.0003	0.0002	0.0003	< 0.0001	0.0004
Thiocyanate	<20	ug/l	42	29	<20	9300	1207.34	**4**	USEPA RSL (tapwater) [May 2020]	YES	**29**		**110**	**230**	**46**	< 20	< 20	**37**	< 20	< 20
Total Hardness as CaCO3	<0.1	mg/l	42	42	4.49	6550	1100.97	**N/A**		NO	0		128	437	723	837	1050	991	6410	945
Ammoniacal Nitrogen as NH3	<0.015	mg/l	42	41	<0.015	23	4.56	**NV**		NO	0		6.4	5.7	0.47	0.18	0.098	0.097	3	0.11
Ammoniacal Nitrogen as N	<0.015	mg/l	42	41	<0.015	19	3.78	**0.5**	WS Regs 2016 (Eng/Wal) as NH4	YES	**33**		**5.2**	**4.7**	0.39	0.15	0.08	0.08	**2.5**	0.09
Nitrate as NO3	<0.1	mg/l	28	11	<0.1	140	14.52	**50**	WS Regs 2016 (Eng/Wal)	YES	**1**		< 0.10	< 0.10	17			0.31		0.34
Nitrate as N	<0.1	mg/l	14	5	<0.1	1.5	0.58	**NV**		NO	0					0.24	0.35		< 0.10	
Nitrite as NO2	<0.1	mg/l	30	19	<0.1	440	30.89	**0.5**	WS Regs 2016 (Eng/Wal)	YES	**18**		< 0.10	< 0.10				< 0.10		< 0.10
Nitrite as N	<0.035	mg/l	12	0	<0.035	<0.035	<0.035			NO	0				< 0.035	< 0.035	< 0.035		< 0.035	
Sulphate as SO4	<0.1	mg/l	42	42	7.5	3000	801.11	**250**	WS Regs 2016 (Eng/Wal)	YES	**28**		160	**420**	**820**	7.5	**900**	**840**	**2700**	**840**
Total Organic Carbon	<1	mg/l	42	40	<1	190	24.01	**N/A**		NO	0		4.7	5.1	< 1.0	180	23	11	64	6
Aliphatic C5-C6	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	**15000**	WHO Petroleum DWG 2008	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	<0.1	ug/l	42	1	<0.1	14	14.00	**15000**	WHO Petroleum DWG 2008	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	<0.1	ug/l	42	2	<0.1	21	11.00	**300**	WHO Petroleum DWG 2008	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	<1	ug/l	42	5	<1	30	11.46	**300**	WHO Petroleum DWG 2008	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	<1	ug/l	42	5	<1	15	7.10	**300**	WHO Petroleum DWG 2008	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	<1	ug/l	42	6	<1	160	79.00	**300**	WHO Petroleum DWG 2008	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	<1	ug/l	42	6	<1	220	61.72	**300**	WHO Petroleum DWG 2008	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	<10	ug/l	42	7	<10	390	138.00	**60000**	USEPA RSL (tapwater) [May 2020] (mineral oil)	NO	0		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	**1**	WS Regs 2016 (Eng/Wal)	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	<0.1	ug/l	42	2	<0.1	19	16.00	**700**	WHO Petroleum DWG 2008	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	<0.1	ug/l	42	2	<0.1	72	47.50	**300**	WHO Petroleum DWG 2008	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	<1	ug/l	42	6	<1	3.9	2.75	**90**	WHO Petroleum DWG 2008	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	<1	ug/l	42	8	<1	11	7.28	**90**	WHO Petroleum DWG 2008	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	<1	ug/l	42	8	<1	110	48.58	**90**	WHO Petroleum DWG 2008	YES	**1**		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	<1	ug/l	42	7	<1	110	26.89	**90**	WHO Petroleum DWG 2008	YES	**1**		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	<10	ug/l	42	10	<10	240	78.80	**60000**	USEPA RSL (tapwater) [May 2020] (mineral oil)	NO	0		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	<10	ug/l	42	12	<10	630	146.42	**60000**	USEPA RSL (tapwater) [May 2020] (mineral oil)	NO	0		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
EPH (C10-C40)	<10	ug/l	42	35	<10	1100	146.69	**60000**	USEPA RSL (tapwater) [May 2020] (mineral oil)	NO	0		72	120	87	130	190	150	130	140
Benzene	<1	ug/l	42	0	<1	<1	<1	**1**	WS Regs 2016 (Eng/Wal)	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	<1	ug/l	42	2	<1	19	16.00	**700**	WHO DWG 2017	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	<1	ug/l	42	2	<1	72	47.50	**300**	WHO DWG 2017	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	<1	ug/l	42	0	<1	<1	<1	**500**	WHO DWG 2017	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE	<1	ug/l	42	0	<1	<1	<1	**1800**	AECOM DWG (WHO method)	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Phenol - Monohydric	<100	ug/l	42	10	<100	2000	735.00	**5800**	USEPA RSL (tapwater) [May 2020] (phenol)	NO	0		< 100	< 100	< 100	< 100	< 100	< 100	1100	< 100
Dichlorodifluoromethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Chloromethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Vinyl Chloride	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Bromomethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Chloroethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Trichlorofluoromethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,1-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Methylene Chloride	<27	ug/l	30	0	<27	<27	<27	**NR**		NO	0		< 27		< 27	< 27		< 27	< 27	< 27
Trans-1,2-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,1-dichloroethane	<1	ug/l	30	3	<1	2	1.33	**NV**		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Cis-1,2-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
2,2-dichloropropane	<2	ug/l	30	0	<2	<2	<2	**NR**		NO	0		< 2		< 2	< 2		< 2	< 2	< 2
Bromochloromethane	<4	ug/l	30	0	<4	<4	<4	**NR**		NO	0		< 4		< 4	< 4		< 4	< 4	< 4

Groundwater Chemical Screening Against DWS Protective of Groundwater Quality
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	DWS SCREENING VALUE	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R3	R2	R3	R2	R3	R2	R3
												Exploratory monitoring well	DUPLICATE A (MS\BH09)	DUPLICATE B (MS\BH14)	LF\BH01 (D)	LF\BH01 (D)	LF\BH01 (S)	LF\BH01 (S)	MS\BH03 (D)	MS\BH03 (S)
												Depth	4.34-8.70	3.60-8.00	4.61-38.00	4.56-38.00	4.64-8.10	4.58-8.10	1.87-28.50	1.91-2.70
												Sampling Date	15/11/2021	16/11/2021	18/10/2021	17/11/2021	18/10/2021	17/11/2021	13/10/2021	17/11/2021
												Monitoring Unit	TFD SAND	TFD SAND	RMF	RMF	TFD SAND	TFD SAND	RMF	MADE GROUND
Chloroform	<1	ug/l	30	1	<1	5	5.00	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,1,1-trichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,1-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Carbon tetrachloride	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Benzene	<1	ug/l	30	5	<1	5	3.80	1	WS Regs 2016 (Eng/Wal)	YES	5		4		< 1	< 1		< 1	< 1	< 1
1,2-dichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Trichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,2-dichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Dibromomethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Bromodichloromethane	<4	ug/l	30	0	<4	<4	<4	NR		NO	0		< 4		< 4	< 4		< 4	< 4	< 4
cis-1,3-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Toluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
trans-1,3-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,1,2-trichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Tetrachloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,3-dichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Dibromochloromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,2-dibromoethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Chlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,1,1,2-tetrachloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Ethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
m+p-Xylene	<2	ug/l	30	0	<2	<2	<2	NR		NO	0		< 2		< 2	< 2		< 2	< 2	< 2
o-Xylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Styrene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Bromoform	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Isopropylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,1,2,2-tetrachloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Bromobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,2,3-trichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
n-propylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
2-chlorotoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,3,5-trimethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
4-chlorotoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Tert-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,2,4-trimethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
sec-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
p-isopropyltoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,3-dichlorobenzene	<2	ug/l	30	0	<2	<2	<2	NR		NO	0		< 2		< 2	< 2		< 2	< 2	< 2
1,4-dichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
n-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,2-dichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,2-dibromo-3-chloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,2,4-trichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Hexachlorobutadiene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Naphthalene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
1,2,3-trichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
MTBE	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1	< 1		< 1	< 1	< 1
Phenol	<1	ug/l	28	5	<1	3.5	2.06	5800	USEPA RSL (tapwater) [May 2020]	NO	0		< 1.0		1.9	1.3		< 1.0	< 1.0	< 1.0
Aniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
2-Chlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Benzyl Alcohol	<1	ug/l	28	2	<1	2.2	1.85	NV		NO	0		< 1.0		2.2	1.5		< 1.0	< 1.0	< 1.0
2-Methylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Bis(2-chloroisopropyl)ether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
3&4-Methylphenol	<1	ug/l	28	1	<1	13	13.00	930	USEPA RSL (tapwater) [May 2020]	NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Bis(2-chloroethoxy)methane	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
2,4-Dimethylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
2,4-Dichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
4-Chloro-3-methylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
2-Methylnaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Hexachlorocyclopentadiene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
2,4,6-Trichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
2,4,5-Trichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
2-Chloronaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
2-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
2,4-Dinitrotoluene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Acenaphthylene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
3-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Acenaphthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
4-Nitrophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Dibenzofuran	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0

Groundwater Chemical Screening Against DWS Protective of Groundwater Quality
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	DWS SCREENING VALUE	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R3	R2	R3	R2	R3	R2	R3
												Exploratory monitoring well	DUPLICATE A (MS\BH09)	DUPLICATE B (MS\BH14)	LF\BH01 (D)	LF\BH01 (D)	LF\BH01 (S)	LF\BH01 (S)	MS\BH03 (D)	MS\BH03 (S)
												Depth	4.34-8.70	3.60-8.00	4.61-38.00	4.56-38.00	4.64-8.10	4.58-8.10	1.87-28.50	1.91-2.70
												Sampling Date	15/11/2021	16/11/2021	18/10/2021	17/11/2021	18/10/2021	17/11/2021	13/10/2021	17/11/2021
												Monitoring Unit	TFD SAND	TFD SAND	RMF	RMF	TFD SAND	TFD SAND	RMF	MADE GROUND
2,6-Dinitrotoluene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
2,3,4,6-Tetrachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Diethylphthalate	<1	ug/l	28	1	<1	1.1	1.10	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
4-Chlorophenylphenylether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Fluorene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
4-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Diphenylamine	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
4-Bromophenylphenylether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Hexachlorobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)ester	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Pentachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Phenanthrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Di-n-butylphthalate	<1	ug/l	28	2	<1	2	1.60	900	USEPA RSL (tapwater) [May 2020]	NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Butylbenzylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Benzo(a)anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Chrysene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)phthalate	<1	ug/l	28	4	<1	13	5.50	8	WHO DWG 2017	YES	1		< 1.0		5	< 1.0		< 1.0	< 1.0	< 1.0
Di-n-octylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Benzo(b)fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Benzo(k)fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Benzo(a)pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Indeno(123cd)pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Dibenzo(ah)anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Benzo(ghi)perylene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
1,4-Dinitrobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Dimethylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
1,3-Dinitrobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
2,3,5,6-Tetrachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Azobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Carbazole	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
1-Methylnaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Naphthalene	<0.1	ug/l	40	24	<0.1	5.1	0.58	6	AECOM DWG (WHO method)	NO	0		0.2	<0.1	0.1	0.8	0.2	0.2	0.8	
Acenaphthylene	<0.013	ug/l	40	8	<0.013	0.202	0.06	18	AECOM DWG (WHO method)	NO	0		<0.013	<0.013	<0.013	0.013	<0.013	<0.013	<0.013	
Acenaphthene	<0.013	ug/l	40	20	<0.013	0.986	0.20	18	AECOM DWG (WHO method)	NO	0		<0.013	0.13	0.039	0.08	0.04	<0.013	<0.013	
Fluorene	<0.014	ug/l	40	15	<0.014	0.28	0.07	12	AECOM DWG (WHO method)	NO	0		<0.014	0.025	<0.014	0.028	<0.014	<0.014	<0.014	
Phenanthrene	<0.011	ug/l	40	19	<0.011	0.361	0.05	4	AECOM DWG (WHO method)	NO	0		<0.011	<0.011	0.011	0.026	<0.011	0.015	<0.011	
Anthracene	<0.013	ug/l	40	2	<0.013	0.026	0.02	90	AECOM DWG (WHO method)	NO	0		<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	
Fluoranthene	<0.012	ug/l	40	9	<0.012	0.266	0.07	4	WHO DWG 2017	NO	0		<0.012	0.225	<0.012	<0.012	<0.012	<0.012	<0.012	
Pyrene	<0.013	ug/l	40	9	<0.013	0.168	0.05	9	AECOM DWG (WHO method)	NO	0		<0.013	0.143	<0.013	0.015	<0.013	<0.013	<0.013	
Benzo(a)anthracene	<0.015	ug/l	40	0	<0.015	<0.015	<0.015	3.5	AECOM DWG (WHO method)	NO	0		<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	
Chrysene	<0.011	ug/l	40	1	<0.011	0.015	0.02	7	AECOM DWG (WHO method)	NO	0		<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	
Benzo(bk)fluoranthene	<0.018	ug/l	40	0	<0.018	<0.018	<0.018			NO	0		<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	
Benzo(a)pyrene	<0.016	ug/l	40	0	<0.016	<0.016	<0.016	0.01	WS Regs 2016 (Eng/Wal)	NO	0		<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	
Indeno(123cd)pyrene	<0.011	ug/l	40	0	<0.011	<0.011	<0.011	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	
Dibenzo(ah)anthracene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	0.07	AECOM DWG (WHO method)	NO	0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Benzo(ghi)perylene	<0.011	ug/l	40	0	<0.011	<0.011	<0.011	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	
PAH 16 Total	<0.195	ug/l	40	23	<0.195	6.231	0.90	NV		NO	0		0.2	0.523	<0.195	0.962	0.24	0.215	0.8	
Benzo(b)fluoranthene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Benzo(k)fluoranthene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Sum of 4 PAHs	<0.024	ug/l	40	0	<0.024	<0.024	<0.024	0.1	WS Regs 2016 (Eng/Wal)	NO	0		<0.024	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024	
Naphthalene	<0.001	ug/l	42	3	<0.001	0.11	0.09	6	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	0.052
Acenaphthylene	<0.001	ug/l	42	3	<0.001	0.007	0.00	18	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	0.001
Acenaphthene	<0.001	ug/l	42	3	<0.001	0.044	0.02	18	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	0.001
Fluorene	<0.001	ug/l	42	3	<0.001	0.012	0.01	12	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	0.002
Phenanthrene	<0.001	ug/l	42	2	<0.001	0.005	0.00	4	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	0.004
Anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	90	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	<0.001
Fluoranthene	<0.001	ug/l	42	2	<0.001	0.002	0.00	4	WHO DWG 2017	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	<0.001
Pyrene	<0.001	ug/l	42	2	<0.001	0.003	0.00	9	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	<0.001
Benzo(a)anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	3.5	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	<0.001
Chrysene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	7	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	<0.001
Benzo(bk)fluoranthene	<0.002	ug/l	42	0	<0.002	<0.002	<0.002	NV		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	<0.002
Benzo(a)pyrene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	0.01	WS Regs 2016 (Eng/Wal)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	<0.001
Indeno(123cd)pyrene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	<0.001

Groundwater Chemical Screening Against DWS Protective of Groundwater Quality
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	DWS SCREENING VALUE	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R3	R2	R3	R2	R3	R2	R3
												Exploratory monitoring well	DUPLICATE A (MS\BH09)	DUPLICATE B (MS\BH14)	LF\BH01 (D)	LF\BH01 (D)	LF\BH01 (S)	LF\BH01 (S)	MS\BH03 (D)	MS\BH03 (S)
												Depth	4.34-8.70	3.60-8.00	4.61-38.00	4.56-38.00	4.64-8.10	4.58-8.10	1.87-28.50	1.91-2.70
												Sampling Date	15/11/2021	16/11/2021	18/10/2021	17/11/2021	18/10/2021	17/11/2021	13/10/2021	17/11/2021
												Monitoring Unit	TFD SAND	TFD SAND	RMF	RMF	TFD SAND	TFD SAND	RMF	MADE GROUND
Dibenzo(ah)anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**0.07**	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	<0.001
Benzo(ghi)perylene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**Use PAHs (sum of 4)**	WS Regs 2016 (Eng/Wal)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	<0.001
PAH 16 Total	<0.016	ug/l	42	3	<0.016	0.178	0.13	**NV**		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	0.06
Benzo(b)fluoranthene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**Use PAHs (sum of 4)**	WS Regs 2016 (Eng/Wal)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	<0.001
Benzo(k)fluoranthene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	**Use PAHs (sum of 4)**	WS Regs 2016 (Eng/Wal)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	<0.001
TAME	Non Detect	ug/l	22	0	Non Detect	Non Detect	Non Detect	**NR**		NO	0		Not Detected	Not Detected		Not Detected		Not Detected		Not Detected
PCB 28 + PCB 31	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0									< 0.3
PCB 52	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0									< 0.2
PCB 77	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0									< 0.3
PCB 81	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0									< 0.2
PCB 101	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0									< 0.3
PCB 105	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0									< 0.2
PCB 114	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0									< 0.3
PCB 118 + PCB 123	< 0.6	ug/l	1	0	< 0.6	< 0.6	< 0.6	**NR**		NO	0									< 0.6
PCB 126	< 0.5	ug/l	1	0	< 0.5	< 0.5	< 0.5	**NR**		NO	0									< 0.5
PCB 138	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0									< 0.2
PCB 153	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0									< 0.2
PCB 156	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0									< 0.3
PCB 157	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0									< 0.2
PCB 167	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0									< 0.3
PCB 169	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0									< 0.2
PCB 180	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	**NR**		NO	0									< 0.2
PCB 189	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	**NR**		NO	0									< 0.3
PCB 12	< 1.0	ug/l	1	0	< 1.0	< 1.0	< 1.0	**NR**		NO	0									< 1.0
PCB 7 Total	< 1.0	ug/l	1	0	< 1.0	< 1.0	< 1.0	**NR**		NO	0									< 1.0

n/US	Non suitable sample. PAH concentrations to high to undertake low level PAH analysis
NR	All concentrations less than limit of detection. No screening value required.
NV	No screening value available
1.1	Exceedance of DWS

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	DWS SCREENING VALUE	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R2	R3	R2	R3	R2	R3	R2	R3
												Exploratory monitoring well	MS\BH03 (S)	MS\BH03 (D)	MS\BH04 (D)	MS\BH04 (D)	MS\BH04 (S)	MS\BH04 (S)	MS\BH05 (D)	MS\BH05 (D)
												Depth	1.87-2.70	1.98-28.50	2.51-28.50	2.40-28.50	2.32-5.00	2.35-5.00	5.64-29.90	5.69-29.90
												Sampling Date	13/10/2021	16/11/2021	13/10/2021	16/11/2021	13/10/2021	16/11/2021	12/10/2021	15/11/2021
												Monitoring Unit	MADE GROUND	RMF	TFD CLAY	TFD CLAY	TFD SAND	TFD SAND	RMF	RMF
Arsenic, Dissolved	<0.16	ug/l	42	42	0.72	61	7.50	10	WS Regs 2016 (Eng/Wal)	YES	5		4	2	3.5	4.3	4.6	4	9.6	6.1
Beryllium, Dissolved	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	12	WHO DWG 2017	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron, Dissolved	<12	ug/l	42	38	<12	740	387.34	1000	WS Regs 2016 (Eng/Wal)	NO	0		490	430	550	640	610	550	190	180
Cadmium, Dissolved	<0.03	ug/l	42	9	<0.03	0.2	0.08	5	WS Regs 2016 (Eng/Wal)	NO	0		< 0.03	< 0.03	< 0.03	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium III, Dissolved	<1	ug/l	42	7	<1	16	5.94	50	WS Regs 2016 (Eng/Wal)	NO	0		< 1.0	< 1.0	5.9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chromium, Hexavalent	<7	ug/l	42	1	<7	9.2	9.20	50	WS Regs 2016 (Eng/Wal)	NO	0		< 7.0	< 7.0	< 7.0	< 7.0	9.2	< 7.0	< 7.0	< 7.0
Copper, Dissolved	<0.4	ug/l	42	16	<0.4	3.3	1.26	2000	WS Regs 2016 (Eng/Wal)	NO	0		< 0.4	< 0.4	1.2	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Iron, Dissolved	<5.5	ug/l	42	42	7.6	11000	637.09	200	WS Regs 2016 (Eng/Wal)	YES	12		120	360	480	430	2400	1600	24	51
Lead, Dissolved	<0.09	ug/l	42	23	<0.09	2.5	0.53	10	WS Regs 2016 (Eng/Wal)	NO	0		< 0.09	< 0.09	0.57	< 0.09	0.15	< 0.09	< 0.09	0.15
Mercury, Dissolved	<0.01	ug/l	42	33	<0.01	0.36	0.10	1	WS Regs 2016 (Eng/Wal)	NO	0		0.07	0.09	< 0.01	0.01	< 0.01	< 0.01	0.05	0.05
Nickel, Dissolved	<0.5	ug/l	42	37	<0.5	15	2.64	20	WS Regs 2016 (Eng/Wal)	NO	0		< 0.5	0.8	2.1	1.6	0.6	0.7	4.5	2.2
Selenium, Dissolved	<0.25	ug/l	42	38	<0.25	7.8	1.86	10	WS Regs 2016 (Eng/Wal)	NO	0		1.5	0.3	0.83	0.6	0.33	0.49	0.56	0.35
Vanadium, Dissolved	<0.6	ug/l	42	33	<0.6	96	9.16	86	USEPA RSL (tapwater) [May 2020]	YES	1		4	1.5	< 0.6	< 0.6	< 0.6	< 0.6	1.9	0.8
Zinc, Dissolved	<1.3	ug/l	42	30	<1.3	51	6.97	6000	USEPA RSL (tapwater) [May 2020]	NO	0		< 1.3	1.5	3.8	2.4	< 1.3	2.6	1.4	5.7
pH	<	pH	42	42	7	12	9.31	11	Hazardous Waste Value	YES	8		8.2	7.1	12	8.1	8.5	7.7	9.5	9.6
Cyanide, Total Low Level	<0.0001	mg/l	42	41	<0.0001	0.076	0.01	0.05	WS Regs 2016 (Eng/Wal)	YES	1		0.0098	0.0005	0.0056	0.0086	0.0095	0.0078	0.019	0.006
Cyanide, Free Low Level	<0.0001	mg/l	42	36	<0.0001	0.0056	0.00	0.05	WS Regs 2016 (Eng/Wal)	NO	0		0.0003	0.0001	0.0007	0.0021	0.001	0.0025	0.0016	0.0002
Thiocyanate	<20	ug/l	42	29	<20	9300	1207.34	4	USEPA RSL (tapwater) [May 2020]	YES	29		23	< 20	< 20	< 20	< 20	< 20	3900	2700
Total Hardness as CaCO3	<0.1	mg/l	42	42	4.49	6550	1100.97	N/A		NO	0		876	1490	1090	576	1280	1160	19.2	34.9
Ammoniacal Nitrogen as NH3	<0.015	mg/l	42	41	<0.015	23	4.56	NV		NO	0		< 0.015	3.4	1.9	0.085	0.11	0.12	6.6	15
Ammoniacal Nitrogen as N	<0.015	mg/l	42	41	<0.015	19	3.78	0.5	WS Regs 2016 (Eng/Wal) as NH4	YES	33		< 0.015	2.8	1.6	0.07	0.091	0.1	5.5	13
Nitrate as NO3	<0.1	mg/l	28	11	<0.1	140	14.52	50	WS Regs 2016 (Eng/Wal)	YES	1		< 0.10			0.17		< 0.10	< 0.10	< 0.10
Nitrate as N	<0.1	mg/l	14	5	<0.1	1.5	0.58	NV		NO	0			< 0.10	< 0.10		< 0.10			
Nitrite as NO2	<0.1	mg/l	30	19	<0.1	440	30.89	0.5	WS Regs 2016 (Eng/Wal)	YES	18		11			1.4		14	5.3	< 0.10
Nitrite as N	<0.035	mg/l	12	0	<0.035	<0.035	<0.035			NO	0			< 0.035	< 0.035		< 0.035			
Sulphate as SO4	<0.1	mg/l	42	42	7.5	3000	801.11	250	WS Regs 2016 (Eng/Wal)	YES	28		860	2100	1400	1400	1400	1500	82	81
Total Organic Carbon	<1	mg/l	42	40	<1	190	24.01	N/A		NO	0		8.1	4.1	< 1.0	12	5.9	4.6	9.2	6
Aliphatic C5-C6	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	15000	WHO Petroleum DWG 2008	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	<0.1	ug/l	42	1	<0.1	14	14.00	15000	WHO Petroleum DWG 2008	NO	0		< 0.1	< 0.1	14	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	<0.1	ug/l	42	2	<0.1	21	11.00	300	WHO Petroleum DWG 2008	NO	0		< 0.1	< 0.1	21	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	<1	ug/l	42	5	<1	30	11.46	300	WHO Petroleum DWG 2008	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	30	< 1.0
Aliphatic C12-C16	<1	ug/l	42	5	<1	15	7.10	300	WHO Petroleum DWG 2008	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	5.5	< 1.0
Aliphatic C16-C21	<1	ug/l	42	6	<1	160	79.00	300	WHO Petroleum DWG 2008	NO	0		< 1.0	< 1.0	< 1.0	14	< 1.0	< 1.0	21	< 1.0
Aliphatic C21-C35	<1	ug/l	42	6	<1	220	61.72	300	WHO Petroleum DWG 2008	NO	0		< 1.0	< 1.0	< 1.0	9.9	< 1.0	< 1.0	1.4	< 1.0
Aliphatic C5-C35	<10	ug/l	42	7	<10	390	138.00	60000	USEPA RSL (tapwater) [May 2020] (mineral oil)	NO	0		< 10	< 10	35	23	< 10	< 10	58	< 10
Aromatic C5-C7	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	1	WS Regs 2016 (Eng/Wal)	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	<0.1	ug/l	42	2	<0.1	19	16.00	700	WHO Petroleum DWG 2008	NO	0		< 0.1	< 0.1	19	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	<0.1	ug/l	42	2	<0.1	72	47.50	300	WHO Petroleum DWG 2008	NO	0		< 0.1	< 0.1	72	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	<1	ug/l	42	6	<1	3.9	2.75	90	WHO Petroleum DWG 2008	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	<1	ug/l	42	8	<1	11	7.28	90	WHO Petroleum DWG 2008	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	<1	ug/l	42	8	<1	110	48.58	90	WHO Petroleum DWG 2008	YES	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	<1	ug/l	42	7	<1	110	26.89	90	WHO Petroleum DWG 2008	YES	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	<10	ug/l	42	10	<10	240	78.80	60000	USEPA RSL (tapwater) [May 2020] (mineral oil)	NO	0		< 10	< 10	91	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	<10	ug/l	42	12	<10	630	146.42	60000	USEPA RSL (tapwater) [May 2020] (mineral oil)	NO	0		< 10	< 10	130	24	< 10	< 10	58	< 10
EPH (C10-C40)	<10	ug/l	42	35	<10	1100	146.69	60000	USEPA RSL (tapwater) [May 2020] (mineral oil)	NO	0		130	1100	110	93	< 10	64	330	190
Benzene	<1	ug/l	42	0	<1	<1	<1	1	WS Regs 2016 (Eng/Wal)	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	<1	ug/l	42	2	<1	19	16.00	700	WHO DWG 2017	NO	0		< 1.0	< 1.0	19	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	<1	ug/l	42	2	<1	72	47.50	300	WHO DWG 2017	NO	0		< 1.0	< 1.0	72	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	<1	ug/l	42	0	<1	<1	<1	500	WHO DWG 2017	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE	<1	ug/l	42	0	<1	<1	<1	1800	AECOM DWG (WHO method)	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Phenol - Monohydric	<100	ug/l	42	10	<100	2000	735.00	5800	USEPA RSL (tapwater) [May 2020] (phenol)	NO	0		< 100	330	360	< 100	< 100	< 100	< 100	< 100
Dichlorodifluoromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Chloromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Vinyl Chloride	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Bromomethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Chloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Trichlorofluoromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,1-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Methylene Chloride	<27	ug/l	30	0	<27	<27	<27	NR		NO	0				< 27	< 27		< 27		< 27
Trans-1,2-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,1-dichloroethane	<1	ug/l	30	3	<1	2	1.33	NV		NO	0				< 1	< 1		< 1		1
Cis-1,2-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
2,2-dichloropropane	<2	ug/l	30	0	<2	<2	<2	NR		NO	0				< 2	< 2		< 2		< 2
Bromochloromethane	<4	ug/l	30	0	<4	<4	<4	NR		NO	0				< 4	< 4		< 4		< 4

Groundwater Chemical Screening Against DWS Protective of Groundwater Quality
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	DWS SCREENING VALUE	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R2	R3	R2	R3	R2	R3	R2	R3
												Exploratory monitoring well	MS\BH03 (S)	MS\BH03 (D)	MS\BH04 (D)	MS\BH04 (D)	MS\BH04 (S)	MS\BH04 (S)	MS\BH05 (D)	MS\BH05 (D)
												Depth	1.87-2.70	1.98-28.50	2.51-28.50	2.40-28.50	2.32-5.00	2.35-5.00	5.64-29.90	5.69-29.90
												Sampling Date	13/10/2021	16/11/2021	13/10/2021	16/11/2021	13/10/2021	16/11/2021	12/10/2021	15/11/2021
												Monitoring Unit	MADE GROUND	RMF	TFD CLAY	TFD CLAY	TFD SAND	TFD SAND	RMF	RMF
Chloroform	<1	ug/l	30	1	<1	5	5.00	NR		NO	0				< 1	< 1		< 1		5
1,1,1-trichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,1-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Carbon tetrachloride	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Benzene	<1	ug/l	30	5	<1	5	3.80	1	WS Regs 2016 (Eng/Wal)	YES	5				< 1	< 1		< 1		5
1,2-dichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Trichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,2-dichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Dibromomethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Bromodichloromethane	<4	ug/l	30	0	<4	<4	<4	NR		NO	0				< 4	< 4		< 4		< 4
cis-1,3-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Toluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
trans-1,3-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,1,2-trichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Tetrachloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,3-dichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Dibromochloromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,2-dibromoethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Chlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,1,1,2-tetrachloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Ethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
m+p-Xylene	<2	ug/l	30	0	<2	<2	<2	NR		NO	0				< 2	< 2		< 2		< 2
o-Xylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Styrene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Bromoform	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Isopropylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,1,2,2-tetrachloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Bromobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,2,3-trichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
n-propylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
2-chlorotoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,3,5-trimethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
4-chlorotoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Tert-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,2,4-trimethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
sec-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
p-isopropyltoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,3-dichlorobenzene	<2	ug/l	30	0	<2	<2	<2	NR		NO	0				< 2	< 2		< 2		< 2
1,4-dichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
n-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,2-dichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,2-dibromo-3-chloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,2,4-trichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Hexachlorobutadiene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Naphthalene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
1,2,3-trichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
MTBE	<1	ug/l	30	0	<1	<1	<1	NR		NO	0				< 1	< 1		< 1		< 1
Phenol	<1	ug/l	28	5	<1	3.5	2.06	5800	USEPA RSL (tapwater) [May 2020]	NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Aniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
2-Chlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Benzyl Alcohol	<1	ug/l	28	2	<1	2.2	1.85	NV		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
2-Methylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Bis(2-chloroisopropyl)ether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
3&4-Methylphenol	<1	ug/l	28	1	<1	13	13.00	930	USEPA RSL (tapwater) [May 2020]	NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Bis(2-chloroethoxy)methane	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
2,4-Dimethylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
2,4-Dichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
1,2,4-Trichlorobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
4-Chloro-3-methylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
2-Methylnaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Hexachlorocyclopentadiene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
2,4,6-Trichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
2,4,5-Trichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
2-Chloronaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
2-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
2,4-Dinitrotoluene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Acenaphthylene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
3-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Acenaphthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
4-Nitrophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Dibenzofuran	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0

Groundwater Chemical Screening Against DWS Protective of Groundwater Quality
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	DWS SCREENING VALUE	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R2	R3	R2	R3	R2	R3	R2	R3
												Exploratory monitoring well	MS\BH03 (S)	MS\BH03 (D)	MS\BH04 (D)	MS\BH04 (D)	MS\BH04 (S)	MS\BH04 (S)	MS\BH05 (D)	MS\BH05 (D)
												Depth	1.87-2.70	1.98-28.50	2.51-28.50	2.40-28.50	2.32-5.00	2.35-5.00	5.64-29.90	5.69-29.90
												Sampling Date	13/10/2021	16/11/2021	13/10/2021	16/11/2021	13/10/2021	16/11/2021	12/10/2021	15/11/2021
												Monitoring Unit	MADE GROUND	RMF	TFD CLAY	TFD CLAY	TFD SAND	TFD SAND	RMF	RMF
2,6-Dinitrotoluene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
2,3,4,6-Tetrachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Diethylphthalate	<1	ug/l	28	1	<1	1.1	1.10	NR		NO	0				< 1.0	1.1		< 1.0		< 1.0
4-Chlorophenylphenylether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Fluorene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
4-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Diphenylamine	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
4-Bromophenylphenylether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Hexachlorobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Bis(2-ethylhexyl)ester	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Pentachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Phenanthrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Di-n-butylphthalate	<1	ug/l	28	2	<1	2	1.60	900	USEPA RSL (tapwater) [May 2020]	NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Butylbenzylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Benzo(a)anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Chrysene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Bis(2-ethylhexyl)phthalate	<1	ug/l	28	4	<1	13	5.50	8	WHO DWG 2017	YES	1				< 1.0	< 1.0		< 1.0		< 1.0
Di-n-octylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Benzo(b)fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Benzo(k)fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Benzo(a)pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Indeno(123cd)pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Dibenzo(ah)anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Benzo(ghi)perylene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
1,4-Dinitrobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Dimethylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
1,3-Dinitrobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
2,3,5,6-Tetrachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Azobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Carbazole	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
1-Methylnaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0				< 1.0	< 1.0		< 1.0		< 1.0
Naphthalene	<0.1	ug/l	40	24	<0.1	5.1	0.58	6	AECOM DWG (WHO method)	NO	0		0.1	0.3	1.3	<0.1	0.2	<0.1	0.4	0.7
Acenaphthylene	<0.013	ug/l	40	8	<0.013	0.202	0.06	18	AECOM DWG (WHO method)	NO	0		<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013
Acenaphthene	<0.013	ug/l	40	20	<0.013	0.986	0.20	18	AECOM DWG (WHO method)	NO	0		<0.013	<0.013	0.146	<0.013	0.053	<0.013	<0.013	<0.013
Fluorene	<0.014	ug/l	40	15	<0.014	0.28	0.07	12	AECOM DWG (WHO method)	NO	0		<0.014	0.033	0.035	<0.014	0.015	<0.014	<0.014	<0.014
Phenanthrene	<0.011	ug/l	40	19	<0.011	0.361	0.05	4	AECOM DWG (WHO method)	NO	0		<0.011	<0.011	0.017	<0.011	0.013	<0.011	0.016	<0.011
Anthracene	<0.013	ug/l	40	2	<0.013	0.026	0.02	90	AECOM DWG (WHO method)	NO	0		<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013
Fluoranthene	<0.012	ug/l	40	9	<0.012	0.266	0.07	4	WHO DWG 2017	NO	0		<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
Pyrene	<0.013	ug/l	40	9	<0.013	0.168	0.05	9	AECOM DWG (WHO method)	NO	0		<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013
Benzo(a)anthracene	<0.015	ug/l	40	0	<0.015	<0.015	<0.015	3.5	AECOM DWG (WHO method)	NO	0		<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Chrysene	<0.011	ug/l	40	1	<0.011	0.015	0.02	7	AECOM DWG (WHO method)	NO	0		<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
Benzo(bk)fluoranthene	<0.018	ug/l	40	0	<0.018	<0.018	<0.018			NO	0		<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	<0.016	ug/l	40	0	<0.016	<0.016	<0.016	0.01	WS Regs 2016 (Eng/Wal)	NO	0		<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016
Indeno(123cd)pyrene	<0.011	ug/l	40	0	<0.011	<0.011	<0.011	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
Dibenzo(ah)anthracene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	0.07	AECOM DWG (WHO method)	NO	0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)perylene	<0.011	ug/l	40	0	<0.011	<0.011	<0.011	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
PAH 16 Total	<0.195	ug/l	40	23	<0.195	6.231	0.90	NV		NO	0		<0.195	0.333	1.498	<0.195	0.281	<0.195	0.416	0.7
Benzo(b)fluoranthene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(k)fluoranthene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sum of 4 PAHs	<0.024	ug/l	40	0	<0.024	<0.024	<0.024	0.1	WS Regs 2016 (Eng/Wal)	NO	0		<0.024	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024
Naphthalene	<0.001	ug/l	42	3	<0.001	0.11	0.09	6	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	0.101	n/US	n/US	n/US
Acenaphthylene	<0.001	ug/l	42	3	<0.001	0.007	0.00	18	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	0.007	n/US	n/US	n/US
Acenaphthene	<0.001	ug/l	42	3	<0.001	0.044	0.02	18	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	0.027	n/US	n/US	n/US
Fluorene	<0.001	ug/l	42	3	<0.001	0.012	0.01	12	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	0.006	n/US	n/US	n/US
Phenanthrene	<0.001	ug/l	42	2	<0.001	0.005	0.00	4	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	<0.001	n/US	n/US	n/US
Anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	90	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	<0.001	n/US	n/US	n/US
Fluoranthene	<0.001	ug/l	42	2	<0.001	0.002	0.00	4	WHO DWG 2017	NO	0		n/US	n/US	n/US	n/US	0.002	n/US	n/US	n/US
Pyrene	<0.001	ug/l	42	2	<0.001	0.003	0.00	9	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	0.003	n/US	n/US	n/US
Benzo(a)anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	3.5	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	<0.001	n/US	n/US	n/US
Chrysene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	7	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	<0.001	n/US	n/US	n/US
Benzo(bk)fluoranthene	<0.002	ug/l	42	0	<0.002	<0.002	<0.002	NV		NO	0		n/US	n/US	n/US	n/US	<0.002	n/US	n/US	n/US
Benzo(a)pyrene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	0.01	WS Regs 2016 (Eng/Wal)	NO	0		n/US	n/US	n/US	n/US	<0.001	n/US	n/US	n/US
Indeno(123cd)pyrene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		n/US	n/US	n/US	n/US	<0.001	n/US	n/US	n/US

Groundwater Chemical Screening Against DWS Protective of Groundwater Quality
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	DWS SCREENING VALUE	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R2	R3	R2	R3	R2	R3	R2	R3
												Exploratory monitoring well	MS\BH03 (S)	MS\BH03 (D)	MS\BH04 (D)	MS\BH04 (D)	MS\BH04 (S)	MS\BH04 (S)	MS\BH05 (D)	MS\BH05 (D)
												Depth	1.87-2.70	1.98-28.50	2.51-28.50	2.40-28.50	2.32-5.00	2.35-5.00	5.64-29.90	5.69-29.90
												Sampling Date	13/10/2021	16/11/2021	13/10/2021	16/11/2021	13/10/2021	16/11/2021	12/10/2021	15/11/2021
												Monitoring Unit	MADE GROUND	RMF	TFD CLAY	TFD CLAY	TFD SAND	TFD SAND	RMF	RMF
Dibenzo(ah)anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	0.07	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	<0.001	n/US	n/US	n/US
Benzo(ghi)perylene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		n/US	n/US	n/US	n/US	<0.001	n/US	n/US	n/US
PAH 16 Total	<0.016	ug/l	42	3	<0.016	0.178	0.13	NV		NO	0		n/US	n/US	n/US	n/US	0.146	n/US	n/US	n/US
Benzo(b)fluoranthene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		n/US	n/US	n/US	n/US	<0.001	n/US	n/US	n/US
Benzo(k)fluoranthene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		n/US	n/US	n/US	n/US	<0.001	n/US	n/US	n/US
TAME	Non Detect	ug/l	22	0	Non Detect	Non Detect	Non Detect	NR		NO	0			Not Detected		Not Detected		Not Detected		Not Detected
PCB 28 + PCB 31	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 52	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 77	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 81	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 101	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 105	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 114	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 118 + PCB 123	< 0.6	ug/l	1	0	< 0.6	< 0.6	< 0.6	NR		NO	0									
PCB 126	< 0.5	ug/l	1	0	< 0.5	< 0.5	< 0.5	NR		NO	0									
PCB 138	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 153	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 156	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 157	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 167	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 169	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 180	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 189	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 12	< 1.0	ug/l	1	0	< 1.0	< 1.0	< 1.0	NR		NO	0									
PCB 7 Total	< 1.0	ug/l	1	0	< 1.0	< 1.0	< 1.0	NR		NO	0									

n/US	Non suitable sample. PAH concentrations to high to undertake low level PAH analysis
NR	All concentrations less than limit of detection. No screening value required.
NV	No screening value available
1.1	Exceedance of DWS

Groundwater Chemical Screening Against DWS Protective of Groundwater Quality
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	DWS SCREENING VALUE	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R2	R3	R2	R3	R2	R3	R2	R3	R2
												Exploratory monitoring well	MS\BH05 (S)	MS\BH05 (S)	MS\BH07	MS\BH07	MS\BH08	MS\BH08	MS\BH09	MS\BH09	MS\BH11
												Depth	4.61-12.50	4.61-12.50	4.09-7.30	4.38-7.30	5.71-13.30	5.74-13.30	4.60-8.70	4.34-8.70	4.19-11.40
												Sampling Date	12/10/2021	15/11/2021	12/10/2021	15/11/2021	12/10/2021	15/11/2021	12/10/2021	15/11/2021	13/10/2021
												Monitoring Unit	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND
Arsenic, Dissolved	<0.16	ug/l	42	42	0.72	61	7.50	10	WS Regs 2016 (Eng/Wal)	YES	5		7.4	6.8	8.7	5.8	3.9	3.2	7.4	7.9	3.5
Beryllium, Dissolved	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	12	WHO DWG 2017	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron, Dissolved	<12	ug/l	42	38	<12	740	387.34	1000	WS Regs 2016 (Eng/Wal)	NO	0		200	140	370	410	650	660	230	230	740
Cadmium, Dissolved	<0.03	ug/l	42	9	<0.03	0.2	0.08	5	WS Regs 2016 (Eng/Wal)	NO	0		< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium III, Dissolved	<1	ug/l	42	7	<1	16	5.94	50	WS Regs 2016 (Eng/Wal)	NO	0		< 1.0	< 1.0	2.4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.1
Chromium, Hexavalent	<7	ug/l	42	1	<7	9.2	9.20	50	WS Regs 2016 (Eng/Wal)	NO	0		< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0
Copper, Dissolved	<0.4	ug/l	42	16	<0.4	3.3	1.26	2000	WS Regs 2016 (Eng/Wal)	NO	0		< 0.4	< 0.4	1	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	0.8
Iron, Dissolved	<5.5	ug/l	42	42	7.6	11000	637.09	200	WS Regs 2016 (Eng/Wal)	YES	12		95	99	38	340	85	37	18	56	89
Lead, Dissolved	<0.09	ug/l	42	23	<0.09	2.5	0.53	10	WS Regs 2016 (Eng/Wal)	NO	0		0.1	0.12	0.56	< 0.09	< 0.09	< 0.09	< 0.09	0.11	0.26
Mercury, Dissolved	<0.01	ug/l	42	33	<0.01	0.36	0.10	1	WS Regs 2016 (Eng/Wal)	NO	0		0.03	0.02	0.06	< 0.01	0.04	0.05	0.13	0.12	0.07
Nickel, Dissolved	<0.5	ug/l	42	37	<0.5	15	2.64	20	WS Regs 2016 (Eng/Wal)	NO	0		4.3	3.7	1.3	0.5	0.7	0.6	1.3	1.2	2.2
Selenium, Dissolved	<0.25	ug/l	42	38	<0.25	7.8	1.86	10	WS Regs 2016 (Eng/Wal)	NO	0		0.49	0.31	2.3	< 0.25	0.74	0.47	5.6	2.6	0.41
Vanadium, Dissolved	<0.6	ug/l	42	33	<0.6	96	9.16	86	USEPA RSL (tapwater) [May 2020]	YES	1		1	0.9	1.5	< 0.6	4.2	5.6	15	3.3	20
Zinc, Dissolved	<1.3	ug/l	42	30	<1.3	51	6.97	6000	USEPA RSL (tapwater) [May 2020]	NO	0		< 1.3	1.3	11	< 1.3	< 1.3	1.7	< 1.3	2.1	51
pH	<	pH	42	42	7	12	9.31	11	Hazardous Waste Value	YES	8		9.5	9.6	8	8.1	8.3	8.3	9.2	9.3	8.9
Cyanide, Total Low Level	<0.0001	mg/l	42	41	<0.0001	0.076	0.01	0.05	WS Regs 2016 (Eng/Wal)	YES	1		0.02	0.0089	0.013	0.0049	0.0085	0.0072	0.0051	0.012	0.014
Cyanide, Free Low Level	<0.0001	mg/l	42	36	<0.0001	0.0056	0.00	0.05	WS Regs 2016 (Eng/Wal)	NO	0		0.0017	0.0004	0.0007	0.0001	0.0003	0.0003	0.0003	0.0007	0.0004
Thiocyanate	<20	ug/l	42	29	<20	9300	1207.34	4	USEPA RSL (tapwater) [May 2020]	YES	29		4400	4300	< 20	54	43	31	110	170	190
Total Hardness as CaCO3	<0.1	mg/l	42	42	4.49	6550	1100.97	N/A		NO	0		19.5	11.1	647	769	552	577	106	108	128
Ammoniacal Nitrogen as NH3	<0.015	mg/l	42	41	<0.015	23	4.56	NV		NO	0		12	23	1.1	1.8	2.3	3	6.6	6.3	4.1
Ammoniacal Nitrogen as N	<0.015	mg/l	42	41	<0.015	19	3.78	0.5	WS Regs 2016 (Eng/Wal) as NH4	YES	33		10	19	0.91	1.5	1.9	2.5	5.4	5.2	3.3
Nitrate as NO3	<0.1	mg/l	28	11	<0.1	140	14.52	50	WS Regs 2016 (Eng/Wal)	YES	1		< 0.10	0.15		< 0.10	< 0.10	< 0.10	< 0.10	0.36	< 0.10
Nitrate as N	<0.1	mg/l	14	5	<0.1	1.5	0.58	NV		NO	0				1.5						
Nitrite as NO2	<0.1	mg/l	30	19	<0.1	440	30.89	0.5	WS Regs 2016 (Eng/Wal)	YES	18		5.6	3.1	15	< 0.10	< 0.10	< 0.10	1.8	< 0.10	2.2
Nitrite as N	<0.035	mg/l	12	0	<0.035	<0.035	<0.035			NO	0										
Sulphate as SO4	<0.1	mg/l	42	42	7.5	3000	801.11	250	WS Regs 2016 (Eng/Wal)	YES	28		85	100	820	85	730	380	150	160	96
Total Organic Carbon	<1	mg/l	42	40	<1	190	24.01	N/A		NO	0		8.5	8	8.4	5.5	29	9.1	17	8.2	23
Aliphatic C5-C6	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	15000	WHO Petroleum DWG 2008	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	<0.1	ug/l	42	1	<0.1	14	14.00	15000	WHO Petroleum DWG 2008	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	<0.1	ug/l	42	2	<0.1	21	11.00	300	WHO Petroleum DWG 2008	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	<1	ug/l	42	5	<1	30	11.46	300	WHO Petroleum DWG 2008	NO	0		4.8	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	6.4	< 1.0	< 1.0
Aliphatic C12-C16	<1	ug/l	42	5	<1	15	7.10	300	WHO Petroleum DWG 2008	NO	0		4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	6.7	< 1.0	< 1.0
Aliphatic C16-C21	<1	ug/l	42	6	<1	160	79.00	300	WHO Petroleum DWG 2008	NO	0		120	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	160	< 1.0	< 1.0
Aliphatic C21-C35	<1	ug/l	42	6	<1	220	61.72	300	WHO Petroleum DWG 2008	NO	0		70	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	220	< 1.0	< 1.0
Aliphatic C5-C35	<10	ug/l	42	7	<10	390	138.00	60000	USEPA RSL (tapwater) [May 2020] (mineral oil)	NO	0		200	< 10	< 10	< 10	< 10	< 10	390	< 10	< 10
Aromatic C5-C7	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	1	WS Regs 2016 (Eng/Wal)	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	<0.1	ug/l	42	2	<0.1	19	16.00	700	WHO Petroleum DWG 2008	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	<0.1	ug/l	42	2	<0.1	72	47.50	300	WHO Petroleum DWG 2008	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	<1	ug/l	42	6	<1	3.9	2.75	90	WHO Petroleum DWG 2008	NO	0		< 1.0	< 1.0	3.9	< 1.0	2.1	< 1.0	2.2	< 1.0	< 1.0
Aromatic C12-C16	<1	ug/l	42	8	<1	11	7.28	90	WHO Petroleum DWG 2008	NO	0		7.6	< 1.0	11	< 1.0	4.1	< 1.0	8.4	< 1.0	< 1.0
Aromatic C16-C21	<1	ug/l	42	8	<1	110	48.58	90	WHO Petroleum DWG 2008	YES	1		59	< 1.0	74	< 1.0	43	< 1.0	110	< 1.0	< 1.0
Aromatic C21-C35	<1	ug/l	42	7	<1	110	26.89	90	WHO Petroleum DWG 2008	YES	1		25	< 1.0	23	< 1.0	15	< 1.0	110	< 1.0	< 1.0
Aromatic C5-C35	<10	ug/l	42	10	<10	240	78.80	60000	USEPA RSL (tapwater) [May 2020] (mineral oil)	NO	0		92	< 10	110	< 10	64	< 10	240	< 10	< 10
TPH Ali/Aro Total C5-C35	<10	ug/l	42	12	<10	630	146.42	60000	USEPA RSL (tapwater) [May 2020] (mineral oil)	NO	0		290	< 10	110	< 10	64	< 10	630	< 10	< 10
EPH (C10-C40)	<10	ug/l	42	35	<10	1100	146.69	60000	USEPA RSL (tapwater) [May 2020] (mineral oil)	NO	0		170	70	15	140	110	29	300	56	< 10
Benzene	<1	ug/l	42	0	<1	<1	<1	1	WS Regs 2016 (Eng/Wal)	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	<1	ug/l	42	2	<1	19	16.00	700	WHO DWG 2017	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	<1	ug/l	42	2	<1	72	47.50	300	WHO DWG 2017	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	<1	ug/l	42	0	<1	<1	<1	500	WHO DWG 2017	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE	<1	ug/l	42	0	<1	<1	<1	1800	AECOM DWG (WHO method)	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Phenol - Monohydric	<100	ug/l	42	10	<100	2000	735.00	5800	USEPA RSL (tapwater) [May 2020] (phenol)	NO	0		< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
Dichlorodifluoromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Chloromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Vinyl Chloride	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Bromomethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Chloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Trichlorofluoromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,1-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Methylene Chloride	<27	ug/l	30	0	<27	<27	<27	NR		NO	0		< 27		< 27		< 27		< 27	< 27	< 27
Trans-1,2-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,1-dichloroethane	<1	ug/l	30	3	<1	2	1.33	NV		NO	0		2		< 1		< 1		1	< 1	< 1
Cis-1,2-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
2,2-dichloropropane	<2	ug/l	30	0	<2	<2	<2	NR		NO	0		< 2		< 2		< 2		< 2	< 2	< 2
Bromochloromethane	<4	ug/l	30	0	<4	<4	<4	NR		NO	0		< 4		< 4		< 4		< 4	< 4	< 4

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Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	DWS SCREENING VALUE	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R2	R3	R2	R3	R2	R3	R2	R3	R2
												Exploratory monitoring well	MS\BH05 (S)	MS\BH05 (S)	MS\BH07	MS\BH07	MS\BH08	MS\BH08	MS\BH09	MS\BH09	MS\BH11
												Depth	4.61-12.50	4.61-12.50	4.09-7.30	4.38-7.30	5.71-13.30	5.74-13.30	4.60-8.70	4.34-8.70	4.19-11.40
												Sampling Date	12/10/2021	15/11/2021	12/10/2021	15/11/2021	12/10/2021	15/11/2021	12/10/2021	15/11/2021	13/10/2021
												Monitoring Unit	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND
Chloroform	<1	ug/l	30	1	<1	5	5.00	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,1,1-trichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,1-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Carbon tetrachloride	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Benzene	<1	ug/l	30	5	<1	5	3.80	1	WS Regs 2016 (Eng/Wal)	YES	5		2		< 1		< 1		4	4	< 1
1,2-dichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Trichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,2-dichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Dibromomethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Bromodichloromethane	<4	ug/l	30	0	<4	<4	<4	NR		NO	0		< 4		< 4		< 4		< 4	< 4	< 4
cis-1,3-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Toluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
trans-1,3-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,1,2-trichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Tetrachloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,3-dichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Dibromochloromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,2-dibromoethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Chlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,1,1,2-tetrachloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Ethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
m+p-Xylene	<2	ug/l	30	0	<2	<2	<2	NR		NO	0		< 2		< 2		< 2		< 2	< 2	< 2
o-Xylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Styrene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Bromoform	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Isopropylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,1,2,2-tetrachloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Bromobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,2,3-trichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
n-propylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
2-chlorotoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,3,5-trimethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
4-chlorotoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Tert-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,2,4-trimethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
sec-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
p-isopropyltoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,3-dichlorobenzene	<2	ug/l	30	0	<2	<2	<2	NR		NO	0		< 2		< 2		< 2		< 2	< 2	< 2
1,4-dichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
n-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,2-dichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,2-dibromo-3-chloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,2,4-trichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Hexachlorobutadiene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Naphthalene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
1,2,3-trichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
MTBE	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1		< 1		< 1		< 1	< 1	< 1
Phenol	<1	ug/l	28	5	<1	3.5	2.06	5800	USEPA RSL (tapwater) [May 2020]	NO	0		< 1.0		< 5.0		< 1.0		< 1.0	1.2	< 1.0
Aniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
2-Chlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Benzyl Alcohol	<1	ug/l	28	2	<1	2.2	1.85	NV		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
2-Methylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Bis(2-chloroisopropyl)ether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
3&4-Methylphenol	<1	ug/l	28	1	<1	13	13.00	930	USEPA RSL (tapwater) [May 2020]	NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Bis(2-chloroethoxy)methane	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
2,4-Dimethylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
2,4-Dichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
4-Chloro-3-methylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
2-Methylnaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Hexachlorocyclopentadiene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
2,4,6-Trichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
2,4,5-Trichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
2-Chloronaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
2-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
2,4-Dinitrotoluene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Acenaphthylene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
3-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Acenaphthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
4-Nitrophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Dibenzofuran	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	DWS SCREENING VALUE	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R2	R3	R2	R3	R2	R3	R2	R3	R2
												Exploratory monitoring well	MS\BH05 (S)	MS\BH05 (S)	MS\BH07	MS\BH07	MS\BH08	MS\BH08	MS\BH09	MS\BH09	MS\BH11
												Depth	4.61-12.50	4.61-12.50	4.09-7.30	4.38-7.30	5.71-13.30	5.74-13.30	4.60-8.70	4.34-8.70	4.19-11.40
												Sampling Date	12/10/2021	15/11/2021	12/10/2021	15/11/2021	12/10/2021	15/11/2021	12/10/2021	15/11/2021	13/10/2021
												Monitoring Unit	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND
2,6-Dinitrotoluene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
2,3,4,6-Tetrachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Diethylphthalate	<1	ug/l	28	1	<1	1.1	1.10	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
4-Chlorophenylphenylether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Fluorene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
4-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Diphenylamine	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
4-Bromophenylphenylether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Hexachlorobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)ester	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Pentachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Phenanthrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Di-n-butylphthalate	<1	ug/l	28	2	<1	2	1.60	900	USEPA RSL (tapwater) [May 2020]	NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Butylbenzylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Benzo(a)anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Chrysene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)phthalate	<1	ug/l	28	4	<1	13	5.50	8	WHO DWG 2017	YES	1		< 1.0		13		< 1.0		< 1.0	2.9	< 1.0
Di-n-octylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Benzo(b)fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Benzo(k)fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Benzo(a)pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Indeno(123cd)pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Dibenzo(ah)anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Benzo(ghi)perylene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
1,4-Dinitrobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Dimethylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
1,3-Dinitrobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
2,3,5,6-Tetrachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Azobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Carbazole	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
1-Methylnaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		< 5.0		< 1.0		< 1.0	< 1.0	< 1.0
Naphthalene	<0.1	ug/l	40	24	<0.1	5.1	0.58	6	AECOM DWG (WHO method)	NO	0		0.1	0.1	<0.1	0.1	<0.1	0.1	<0.1	0.3	0.1
Acenaphthylene	<0.013	ug/l	40	8	<0.013	0.202	0.06	18	AECOM DWG (WHO method)	NO	0		<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013
Acenaphthene	<0.013	ug/l	40	20	<0.013	0.986	0.20	18	AECOM DWG (WHO method)	NO	0		<0.013	<0.013	0.053	<0.013	0.014	0.015	<0.013	<0.013	0.078
Fluorene	<0.014	ug/l	40	15	<0.014	0.28	0.07	12	AECOM DWG (WHO method)	NO	0		<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	0.022
Phenanthrene	<0.011	ug/l	40	19	<0.011	0.361	0.05	4	AECOM DWG (WHO method)	NO	0		0.012	<0.011	<0.011	0.039	<0.011	<0.011	<0.011	<0.011	0.019
Anthracene	<0.013	ug/l	40	2	<0.013	0.026	0.02	90	AECOM DWG (WHO method)	NO	0		<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013
Fluoranthene	<0.012	ug/l	40	9	<0.012	0.266	0.07	4	WHO DWG 2017	NO	0		<0.012	<0.012	<0.012	0.019	<0.012	<0.012	<0.012	<0.012	<0.012
Pyrene	<0.013	ug/l	40	9	<0.013	0.168	0.05	9	AECOM DWG (WHO method)	NO	0		<0.013	<0.013	<0.013	0.032	<0.013	<0.013	<0.013	<0.013	<0.013
Benzo(a)anthracene	<0.015	ug/l	40	0	<0.015	<0.015	<0.015	3.5	AECOM DWG (WHO method)	NO	0		<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Chrysene	<0.011	ug/l	40	1	<0.011	0.015	0.02	7	AECOM DWG (WHO method)	NO	0		<0.011	<0.011	<0.011	0.015	<0.011	<0.011	<0.011	<0.011	<0.011
Benzo(bk)fluoranthene	<0.018	ug/l	40	0	<0.018	<0.018	<0.018			NO	0		<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	<0.016	ug/l	40	0	<0.016	<0.016	<0.016	0.01	WS Regs 2016 (Eng/Wal)	NO	0		<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016
Indeno(123cd)pyrene	<0.011	ug/l	40	0	<0.011	<0.011	<0.011	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
Dibenzo(ah)anthracene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	0.07	AECOM DWG (WHO method)	NO	0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)perylene	<0.011	ug/l	40	0	<0.011	<0.011	<0.011	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
PAH 16 Total	<0.195	ug/l	40	23	<0.195	6.231	0.90	NV		NO	0		<0.195	<0.195	<0.195	0.205	<0.195	<0.195	<0.195	0.3	0.219
Benzo(b)fluoranthene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(k)fluoranthene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sum of 4 PAHs	<0.024	ug/l	40	0	<0.024	<0.024	<0.024	0.1	WS Regs 2016 (Eng/Wal)	NO	0		<0.024	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024
Naphthalene	<0.001	ug/l	42	3	<0.001	0.11	0.09	6	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Acenaphthylene	<0.001	ug/l	42	3	<0.001	0.007	0.00	18	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Acenaphthene	<0.001	ug/l	42	3	<0.001	0.044	0.02	18	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Fluorene	<0.001	ug/l	42	3	<0.001	0.012	0.01	12	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Phenanthrene	<0.001	ug/l	42	2	<0.001	0.005	0.00	4	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	90	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Fluoranthene	<0.001	ug/l	42	2	<0.001	0.002	0.00	4	WHO DWG 2017	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Pyrene	<0.001	ug/l	42	2	<0.001	0.003	0.00	9	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Benzo(a)anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	3.5	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Chrysene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	7	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Benzo(bk)fluoranthene	<0.002	ug/l	42	0	<0.002	<0.002	<0.002	NV		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Benzo(a)pyrene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	0.01	WS Regs 2016 (Eng/Wal)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Indeno(123cd)pyrene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US

Groundwater Chemical Screening Against DWS Protective of Groundwater Quality
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	DWS SCREENING VALUE	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R2	R3	R2	R3	R2	R3	R2	R3	R2
												Exploratory monitoring well	MS\BH05 (S)	MS\BH05 (S)	MS\BH07	MS\BH07	MS\BH08	MS\BH08	MS\BH09	MS\BH09	MS\BH11
												Depth	4.61-12.50	4.61-12.50	4.09-7.30	4.38-7.30	5.71-13.30	5.74-13.30	4.60-8.70	4.34-8.70	4.19-11.40
												Sampling Date	12/10/2021	15/11/2021	12/10/2021	15/11/2021	12/10/2021	15/11/2021	12/10/2021	15/11/2021	13/10/2021
												Monitoring Unit	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND
Dibenzo(ah)anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	0.07	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Benzo(ghi)perylene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
PAH 16 Total	<0.016	ug/l	42	3	<0.016	0.178	0.13	NV		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Benzo(b)fluoranthene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Benzo(k)fluoranthene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
TAME	Non Detect	ug/l	22	0	Non Detect	Non Detect	Non Detect	NR		NO	0			Not Detected		Not Detected		Not Detected		Not Detected	
PCB 28 + PCB 31	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0										
PCB 52	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0										
PCB 77	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0										
PCB 81	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0										
PCB 101	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0										
PCB 105	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0										
PCB 114	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0										
PCB 118 + PCB 123	< 0.6	ug/l	1	0	< 0.6	< 0.6	< 0.6	NR		NO	0										
PCB 126	< 0.5	ug/l	1	0	< 0.5	< 0.5	< 0.5	NR		NO	0										
PCB 138	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0										
PCB 153	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0										
PCB 156	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0										
PCB 157	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0										
PCB 167	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0										
PCB 169	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0										
PCB 180	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0										
PCB 189	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0										
PCB 12	< 1.0	ug/l	1	0	< 1.0	< 1.0	< 1.0	NR		NO	0										
PCB 7 Total	< 1.0	ug/l	1	0	< 1.0	< 1.0	< 1.0	NR		NO	0										

n/US Non suitable sample. PAH concentrations to high to undertake low level PAH analysis
NR All concentrations less than limit of detection. No screening value required.
NV No screening value available
1.1 Exceedance of DWS

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	DWS SCREENING VALUE	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R2	R3	R2	R3	R2	R3	R2
												Exploratory monitoring well	MS\BH11	MS\BH12 (D)	MS\BH12 (D)	MS\BH12 (S)	MS\BH12 (S)	MS\BH13 (D)	MS\BH13 (D)	MS\BH13 (S)
												Depth	4.17-11.40	4.11-34.50	3.98-34.50	4.09-20.50	4.01-20.50	2.28-20.00	2.35-20.00	2.29-9.50
												Sampling Date	17/11/2021	18/10/2021	17/11/2021	12/10/2021	17/11/2021	12/10/2021	16/11/2021	12/10/2021
												Monitoring Unit	TFD SAND	RMF	RMF	GLACIAL TILL	GLACIAL TILL	RMF	RMF	TFD SAND
Arsenic, Dissolved	<0.16	ug/l	42	42	0.72	61	7.50	**10**	WS Regs 2016 (Eng/Wal)	YES	**5**		2.5	0.73	0.72	0.95	1.3	0.95	1	**16**
Beryllium, Dissolved	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	**12**	WHO DWG 2017	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron, Dissolved	<12	ug/l	42	38	<12	740	387.34	**1000**	WS Regs 2016 (Eng/Wal)	NO	0		690	700	550	180	36	590	650	630
Cadmium, Dissolved	<0.03	ug/l	42	9	<0.03	0.2	0.08	**5**	WS Regs 2016 (Eng/Wal)	NO	0		< 0.03	0.08	< 0.03	< 0.03	< 0.03	0.19	0.2	< 0.03
Chromium III, Dissolved	<1	ug/l	42	7	<1	16	5.94	**50**	WS Regs 2016 (Eng/Wal)	NO	0		< 1.0	2.2	< 1.0	6.1	< 1.0	< 1.0	< 1.0	< 1.0
Chromium, Hexavalent	<7	ug/l	42	1	<7	9.2	9.20	**50**	WS Regs 2016 (Eng/Wal)	NO	0		< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0
Copper, Dissolved	<0.4	ug/l	42	16	<0.4	3.3	1.26	**2000**	WS Regs 2016 (Eng/Wal)	NO	0		< 0.4	1.5	< 0.4	0.9	< 0.4	1.7	1.5	< 0.4
Iron, Dissolved	<5.5	ug/l	42	42	7.6	11000	637.09	**200**	WS Regs 2016 (Eng/Wal)	YES	**12**		130	**4500**	**2700**	23	15	7.6	83	**350**
Lead, Dissolved	<0.09	ug/l	42	23	<0.09	2.5	0.53	**10**	WS Regs 2016 (Eng/Wal)	NO	0		0.38	1.1	< 0.09	0.23	< 0.09	2.5	0.69	< 0.09
Mercury, Dissolved	<0.01	ug/l	42	33	<0.01	0.36	0.10	**1**	WS Regs 2016 (Eng/Wal)	NO	0		0.04	0.03	0.04	0.02	0.03	< 0.01	< 0.01	0.01
Nickel, Dissolved	<0.5	ug/l	42	37	<0.5	15	2.64	**20**	WS Regs 2016 (Eng/Wal)	NO	0		1	2.4	0.7	2.7	5.8	7.6	15	1
Selenium, Dissolved	<0.25	ug/l	42	38	<0.25	7.8	1.86	**10**	WS Regs 2016 (Eng/Wal)	NO	0		0.29	0.63	< 0.25	3	7.8	0.7	0.61	0.27
Vanadium, Dissolved	<0.6	ug/l	42	33	<0.6	96	9.16	**86**	USEPA RSL (tapwater) [May 2020]	YES	**1**		13	2.2	0.6	4.8	3	< 0.6	< 0.6	1.3
Zinc, Dissolved	<1.3	ug/l	42	30	<1.3	51	6.97	**6000**	USEPA RSL (tapwater) [May 2020]	NO	0		3.4	8.5	1.6	1.9	< 1.3	22	18	3.8
pH	<	pH	42	42	7	12	9.31	**11**	Hazardous Waste Value	YES	**8**		8.7	7.2	7	**11.6**	**11.8**	7.2	7	8.2
Cyanide, Total Low Level	<0.0001	mg/l	42	41	<0.0001	0.076	0.01	**0.05**	WS Regs 2016 (Eng/Wal)	YES	**1**		0.012	0.0003	0.0006	0.0099	0.0055	0.0022	0.0009	0.039
Cyanide, Free Low Level	<0.0001	mg/l	42	36	<0.0001	0.0056	0.00	**0.05**	WS Regs 2016 (Eng/Wal)	NO	0		0.0005	< 0.0001	< 0.0001	0.0018	0.0005	0.0007	0.0009	0.0056
Thiocyanate	<20	ug/l	42	29	<20	9300	1207.34	**4**	USEPA RSL (tapwater) [May 2020]	YES	**29**		**240**	**32**	< 20	**25**	< 20	**42**	< 20	**9300**
Total Hardness as CaCO3	<0.1	mg/l	42	42	4.49	6550	1100.97	**N/A**		NO	0		126	1780	1650	349	1740	6550	6140	416
Ammoniacal Nitrogen as NH3	<0.015	mg/l	42	41	<0.015	23	4.56	**NV**		NO	0		4.6	7.9	6.8	4.9	5	5.8	6.4	5.4
Ammoniacal Nitrogen as N	<0.015	mg/l	42	41	<0.015	19	3.78	**0.5**	WS Regs 2016 (Eng/Wal) as NH4	YES	**33**		**3.8**	**6.5**	**5.6**	**4.1**	**4.1**	**4.8**	**5.3**	**4.5**
Nitrate as NO3	<0.1	mg/l	28	11	<0.1	140	14.52	**50**	WS Regs 2016 (Eng/Wal)	YES	**1**		0.25	**140**						
Nitrate as N	<0.1	mg/l	14	5	<0.1	1.5	0.58	**NV**		NO	0				0.44	< 0.10	0.39	< 0.10	< 0.10	< 0.10
Nitrite as NO2	<0.1	mg/l	30	19	<0.1	440	30.89	**0.5**	WS Regs 2016 (Eng/Wal)	YES	**18**		< 0.10			**23**		**440**		**44**
Nitrite as N	<0.035	mg/l	12	0	<0.035	<0.035	<0.035			NO	0			< 0.035	< 0.035		< 0.035		< 0.035	
Sulphate as SO4	<0.1	mg/l	42	42	7.5	3000	801.11	**250**	WS Regs 2016 (Eng/Wal)	YES	**28**		110	210	170	**380**	**1100**	**3000**	**2600**	**1100**
Total Organic Carbon	<1	mg/l	42	40	<1	190	24.01	**N/A**		NO	0		11	41	37	62	190	2	1.8	6.8
Aliphatic C5-C6	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	**15000**	WHO Petroleum DWG 2008	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	<0.1	ug/l	42	1	<0.1	14	14.00	**15000**	WHO Petroleum DWG 2008	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	<0.1	ug/l	42	2	<0.1	21	11.00	**300**	WHO Petroleum DWG 2008	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	<1	ug/l	42	5	<1	30	11.46	**300**	WHO Petroleum DWG 2008	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	6.1	< 1.0	10
Aliphatic C12-C16	<1	ug/l	42	5	<1	15	7.10	**300**	WHO Petroleum DWG 2008	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	4.3	< 1.0	15
Aliphatic C16-C21	<1	ug/l	42	6	<1	160	79.00	**300**	WHO Petroleum DWG 2008	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	79	< 1.0	80
Aliphatic C21-C35	<1	ug/l	42	6	<1	220	61.72	**300**	WHO Petroleum DWG 2008	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	20	< 1.0	49
Aliphatic C5-C35	<10	ug/l	42	7	<10	390	138.00	**60000**	USEPA RSL (tapwater) [May 2020] (mineral oil)	NO	0		< 10	< 10	< 10	< 10	< 10	110	< 10	150
Aromatic C5-C7	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	**1**	WS Regs 2016 (Eng/Wal)	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	<0.1	ug/l	42	2	<0.1	19	16.00	**700**	WHO Petroleum DWG 2008	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	13	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	<0.1	ug/l	42	2	<0.1	72	47.50	**300**	WHO Petroleum DWG 2008	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	23	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	<1	ug/l	42	6	<1	3.9	2.75	**90**	WHO Petroleum DWG 2008	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	3.1	< 1.0	2.7
Aromatic C12-C16	<1	ug/l	42	8	<1	11	7.28	**90**	WHO Petroleum DWG 2008	NO	0		2.5	< 1.0	< 1.0	< 1.0	< 1.0	9.2	< 1.0	7.1
Aromatic C16-C21	<1	ug/l	42	8	<1	110	48.58	**90**	WHO Petroleum DWG 2008	YES	**1**		24	< 1.0	< 1.0	< 1.0	< 1.0	42	< 1.0	33
Aromatic C21-C35	<1	ug/l	42	7	<1	110	26.89	**90**	WHO Petroleum DWG 2008	YES	**1**		1.5	< 1.0	< 1.0	< 1.0	< 1.0	6.2	< 1.0	7.5
Aromatic C5-C35	<10	ug/l	42	10	<10	240	78.80	**60000**	USEPA RSL (tapwater) [May 2020] (mineral oil)	NO	0		29	< 10	< 10	< 10	36	61	< 10	50
TPH Ali/Aro Total C5-C35	<10	ug/l	42	12	<10	630	146.42	**60000**	USEPA RSL (tapwater) [May 2020] (mineral oil)	NO	0		29	< 10	< 10	< 10	37	170	< 10	200
EPH (C10-C40)	<10	ug/l	42	35	<10	1100	146.69	**60000**	USEPA RSL (tapwater) [May 2020] (mineral oil)	NO	0		59	180	76	73	110	86	58	100
Benzene	<1	ug/l	42	0	<1	<1	<1	**1**	WS Regs 2016 (Eng/Wal)	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	<1	ug/l	42	2	<1	19	16.00	**700**	WHO DWG 2017	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	13	< 1.0	< 1.0	< 1.0
Ethylbenzene	<1	ug/l	42	2	<1	72	47.50	**300**	WHO DWG 2017	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	23	< 1.0	< 1.0	< 1.0
Xylene	<1	ug/l	42	0	<1	<1	<1	**500**	WHO DWG 2017	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE	<1	ug/l	42	0	<1	<1	<1	**1800**	AECOM DWG (WHO method)	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Phenol - Monohydric	<100	ug/l	42	10	<100	2000	735.00	**5800**	USEPA RSL (tapwater) [May 2020] (phenol)	NO	0		910	610	510	< 100	< 100	2000	1200	160
Dichlorodifluoromethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1		< 1			< 1
Chloromethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1		< 1			< 1
Vinyl Chloride	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1		< 1			< 1
Bromomethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1		< 1			< 1
Chloroethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1		< 1			< 1
Trichlorofluoromethane	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1		< 1			< 1
1,1-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1		< 1			< 1
Methylene Chloride	<27	ug/l	30	0	<27	<27	<27	**NR**		NO	0		< 27	< 27	< 27		< 27			< 27
Trans-1,2-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1		< 1			< 1
1,1-dichloroethane	<1	ug/l	30	3	<1	2	1.33	**NV**		NO	0		< 1	< 1	< 1		< 1			< 1
Cis-1,2-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	**NR**		NO	0		< 1	< 1	< 1		< 1			< 1
2,2-dichloropropane	<2	ug/l	30	0	<2	<2	<2	**NR**		NO	0		< 2	< 2	< 2		< 2			< 2
Bromochloromethane	<4	ug/l	30	0	<4	<4	<4	**NR**		NO	0		< 4	< 4	< 4		< 4			< 4

Groundwater Chemical Screening Against DWS Protective of Groundwater Quality
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	DWS SCREENING VALUE	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R2	R3	R2	R3	R2	R3	R2
												Exploratory monitoring well	MS\BH11	MS\BH12 (D)	MS\BH12 (D)	MS\BH12 (S)	MS\BH12 (S)	MS\BH13 (D)	MS\BH13 (D)	MS\BH13 (S)
												Depth	4.17-11.40	4.11-34.50	3.98-34.50	4.09-20.50	4.01-20.50	2.28-20.00	2.35-20.00	2.29-9.50
												Sampling Date	17/11/2021	18/10/2021	17/11/2021	12/10/2021	17/11/2021	12/10/2021	16/11/2021	12/10/2021
												Monitoring Unit	TFD SAND	RMF	RMF	GLACIAL TILL	GLACIAL TILL	RMF	RMF	TFD SAND
Chloroform	<1	ug/l	30	1	<1	5	5.00	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,1,1-trichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,1-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Carbon tetrachloride	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Benzene	<1	ug/l	30	5	<1	5	3.80	1	WS Regs 2016 (Eng/Wal)	YES	5		< 1	< 1	< 1		< 1			< 1
1,2-dichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Trichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,2-dichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Dibromomethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Bromodichloromethane	<4	ug/l	30	0	<4	<4	<4	NR		NO	0		< 4	< 4	< 4		< 4			< 4
cis-1,3-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Toluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
trans-1,3-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,1,2-trichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Tetrachloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,3-dichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Dibromochloromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,2-dibromoethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Chlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,1,1,2-tetrachloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Ethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
m+p-Xylene	<2	ug/l	30	0	<2	<2	<2	NR		NO	0		< 2	< 2	< 2		< 2			< 2
o-Xylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Styrene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Bromoform	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Isopropylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,1,2,2-tetrachloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Bromobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,2,3-trichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
n-propylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
2-chlorotoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,3,5-trimethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
4-chlorotoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Tert-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,2,4-trimethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
sec-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
p-isopropyltoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,3-dichlorobenzene	<2	ug/l	30	0	<2	<2	<2	NR		NO	0		< 2	< 2	< 2		< 2			< 2
1,4-dichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
n-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,2-dichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,2-dibromo-3-chloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,2,4-trichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Hexachlorobutadiene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Naphthalene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
1,2,3-trichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
MTBE	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1		< 1			< 1
Phenol	<1	ug/l	28	5	<1	3.5	2.06	5800	USEPA RSL (tapwater) [May 2020]	NO	0		< 1.0	3.5	< 1.0		< 1.0			< 1.0
Aniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
2-Chlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Benzyl Alcohol	<1	ug/l	28	2	<1	2.2	1.85	NV		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
2-Methylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Bis(2-chloroisopropyl)ether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
3&4-Methylphenol	<1	ug/l	28	1	<1	13	13.00	930	USEPA RSL (tapwater) [May 2020]	NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Bis(2-chloroethoxy)methane	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
2,4-Dimethylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
2,4-Dichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
1,2,4-Trichlorobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
4-Chloro-3-methylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
2-Methylnaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Hexachlorocyclopentadiene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
2,4,6-Trichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
2,4,5-Trichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
2-Chloronaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
2-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
2,4-Dinitrotoluene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Acenaphthylene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
3-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Acenaphthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
4-Nitrophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Dibenzofuran	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	DWS SCREENING VALUE	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R2	R3	R2	R3	R2	R3	R2
												Exploratory monitoring well	MS\BH11	MS\BH12 (D)	MS\BH12 (D)	MS\BH12 (S)	MS\BH12 (S)	MS\BH13 (D)	MS\BH13 (D)	MS\BH13 (S)
												Depth	4.17-11.40	4.11-34.50	3.98-34.50	4.09-20.50	4.01-20.50	2.28-20.00	2.35-20.00	2.29-9.50
												Sampling Date	17/11/2021	18/10/2021	17/11/2021	12/10/2021	17/11/2021	12/10/2021	16/11/2021	12/10/2021
												Monitoring Unit	TFD SAND	RMF	RMF	GLACIAL TILL	GLACIAL TILL	RMF	RMF	TFD SAND
2,6-Dinitrotoluene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
2,3,4,6-Tetrachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Diethylphthalate	<1	ug/l	28	1	<1	1.1	1.10	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
4-Chlorophenylphenylether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Fluorene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
4-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Diphenylamine	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
4-Bromophenylphenylether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Hexachlorobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Bis(2-ethylhexyl)ester	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Pentachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Phenanthrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Di-n-butylphthalate	<1	ug/l	28	2	<1	2	1.60	900	USEPA RSL (tapwater) [May 2020]	NO	0		< 1.0	< 1.0	< 1.0		< 1.0			2
Fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Butylbenzylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Benzo(a)anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Chrysene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Bis(2-ethylhexyl)phthalate	<1	ug/l	28	4	<1	13	5.50	8	WHO DWG 2017	YES	1		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Di-n-octylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Benzo(b)fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Benzo(k)fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Benzo(a)pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Indeno(123cd)pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Dibenzo(ah)anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Benzo(ghi)perylene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
1,4-Dinitrobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Dimethylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
1,3-Dinitrobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
2,3,5,6-Tetrachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Azobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Carbazole	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
1-Methylnaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0	< 1.0		< 1.0			< 1.0
Naphthalene	<0.1	ug/l	40	24	<0.1	5.1	0.58	6	AECOM DWG (WHO method)	NO	0			<0.1	<0.1	0.4	0.7	<0.1	<0.1	<0.1
Acenaphthylene	<0.013	ug/l	40	8	<0.013	0.202	0.06	18	AECOM DWG (WHO method)	NO	0			<0.013	<0.013	0.015	<0.013	<0.013	<0.013	<0.013
Acenaphthene	<0.013	ug/l	40	20	<0.013	0.986	0.20	18	AECOM DWG (WHO method)	NO	0			0.061	<0.013	0.271	<0.013	<0.013	<0.013	<0.013
Fluorene	<0.014	ug/l	40	15	<0.014	0.28	0.07	12	AECOM DWG (WHO method)	NO	0			0.017	<0.014	0.065	<0.014	<0.014	<0.014	<0.014
Phenanthrene	<0.011	ug/l	40	19	<0.011	0.361	0.05	4	AECOM DWG (WHO method)	NO	0			<0.011	0.011	0.015	0.011	<0.011	<0.011	<0.011
Anthracene	<0.013	ug/l	40	2	<0.013	0.026	0.02	90	AECOM DWG (WHO method)	NO	0			<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013
Fluoranthene	<0.012	ug/l	40	9	<0.012	0.266	0.07	4	WHO DWG 2017	NO	0			<0.012	0.013	<0.012	<0.012	<0.012	0.012	<0.012
Pyrene	<0.013	ug/l	40	9	<0.013	0.168	0.05	9	AECOM DWG (WHO method)	NO	0			<0.013	<0.013	<0.013	<0.013	<0.013	0.013	<0.013
Benzo(a)anthracene	<0.015	ug/l	40	0	<0.015	<0.015	<0.015	3.5	AECOM DWG (WHO method)	NO	0			<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Chrysene	<0.011	ug/l	40	1	<0.011	0.015	0.02	7	AECOM DWG (WHO method)	NO	0			<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
Benzo(bk)fluoranthene	<0.018	ug/l	40	0	<0.018	<0.018	<0.018			NO	0			<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	<0.016	ug/l	40	0	<0.016	<0.016	<0.016	0.01	WS Regs 2016 (Eng/Wal)	NO	0			<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016
Indeno(123cd)pyrene	<0.011	ug/l	40	0	<0.011	<0.011	<0.011	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0			<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
Dibenzo(ah)anthracene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	0.07	AECOM DWG (WHO method)	NO	0			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)perylene	<0.011	ug/l	40	0	<0.011	<0.011	<0.011	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0			<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
PAH 16 Total	<0.195	ug/l	40	23	<0.195	6.231	0.90	NV		NO	0			<0.195	<0.195	0.766	0.711	<0.195	<0.195	<0.195
Benzo(b)fluoranthene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(k)fluoranthene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sum of 4 PAHs	<0.024	ug/l	40	0	<0.024	<0.024	<0.024	0.1	WS Regs 2016 (Eng/Wal)	NO	0			<0.024	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024
Naphthalene	<0.001	ug/l	42	3	<0.001	0.11	0.09	6	AECOM DWG (WHO method)	NO	0		0.11	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
Acenaphthylene	<0.001	ug/l	42	3	<0.001	0.007	0.00	18	AECOM DWG (WHO method)	NO	0		0.003	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
Acenaphthene	<0.001	ug/l	42	3	<0.001	0.044	0.02	18	AECOM DWG (WHO method)	NO	0		0.044	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
Fluorene	<0.001	ug/l	42	3	<0.001	0.012	0.01	12	AECOM DWG (WHO method)	NO	0		0.012	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
Phenanthrene	<0.001	ug/l	42	2	<0.001	0.005	0.00	4	AECOM DWG (WHO method)	NO	0		0.005	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
Anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	90	AECOM DWG (WHO method)	NO	0		<0.001	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
Fluoranthene	<0.001	ug/l	42	2	<0.001	0.002	0.00	4	WHO DWG 2017	NO	0		0.001	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
Pyrene	<0.001	ug/l	42	2	<0.001	0.003	0.00	9	AECOM DWG (WHO method)	NO	0		0.003	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
Benzo(a)anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	3.5	AECOM DWG (WHO method)	NO	0		<0.001	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
Chrysene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	7	AECOM DWG (WHO method)	NO	0		<0.001	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
Benzo(bk)fluoranthene	<0.002	ug/l	42	0	<0.002	<0.002	<0.002	NV		NO	0		<0.002	n/US	n/US	n/US	n/US	<0.002	n/US	n/US
Benzo(a)pyrene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	0.01	WS Regs 2016 (Eng/Wal)	NO	0		<0.001	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
Indeno(123cd)pyrene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		<0.001	n/US	n/US	n/US	n/US	<0.001	n/US	n/US

Groundwater Chemical Screening Against DWS Protective of Groundwater Quality
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	DWS SCREENING VALUE	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R2	R3	R2	R3	R2	R3	R2
												Exploratory monitoring well	MS\BH11	MS\BH12 (D)	MS\BH12 (D)	MS\BH12 (S)	MS\BH12 (S)	MS\BH13 (D)	MS\BH13 (D)	MS\BH13 (S)
												Depth	4.17-11.40	4.11-34.50	3.98-34.50	4.09-20.50	4.01-20.50	2.28-20.00	2.35-20.00	2.29-9.50
												Sampling Date	17/11/2021	18/10/2021	17/11/2021	12/10/2021	17/11/2021	12/10/2021	16/11/2021	12/10/2021
												Monitoring Unit	TFD SAND	RMF	RMF	GLACIAL TILL	GLACIAL TILL	RMF	RMF	TFD SAND
Dibenzo(ah)anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	0.07	AECOM DWG (WHO method)	NO	0		<0.001	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
Benzo(ghi)perylene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		<0.001	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
PAH 16 Total	<0.016	ug/l	42	3	<0.016	0.178	0.13	NV		NO	0		0.178	n/US	n/US	n/US	n/US	<0.016	n/US	n/US
Benzo(b)fluoranthene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		<0.001	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
Benzo(k)fluoranthene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		<0.001	n/US	n/US	n/US	n/US	<0.001	n/US	n/US
TAME	Non Detect	ug/l	22	0	Non Detect	Non Detect	Non Detect	NR		NO	0		Not Detected		Not Detected		Not Detected		Not Detected	
PCB 28 + PCB 31	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 52	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 77	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 81	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 101	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 105	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 114	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 118 + PCB 123	< 0.6	ug/l	1	0	< 0.6	< 0.6	< 0.6	NR		NO	0									
PCB 126	< 0.5	ug/l	1	0	< 0.5	< 0.5	< 0.5	NR		NO	0									
PCB 138	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 153	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 156	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 157	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 167	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 169	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 180	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 189	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 12	< 1.0	ug/l	1	0	< 1.0	< 1.0	< 1.0	NR		NO	0									
PCB 7 Total	< 1.0	ug/l	1	0	< 1.0	< 1.0	< 1.0	NR		NO	0									

n/US	Non suitable sample. PAH concentrations to high to undertake low level PAH analysis
NR	All concentrations less than limit of detection. No screening value required.
NV	No screening value available
1.1	Exceedance of DWS

Groundwater Chemical Screening Against DWS Protective of Groundwater Quality
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	DWS SCREENING VALUE	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R2	R3	R2	R3	R2	R3	R2
												Exploratory monitoring well	MS\BH13 (S)	MS\BH14	MS\BH14	MS\BH15 (D)	MS\BH15 (D)	MS\BH15 (S)	MS\BH15 (S)	MS\BH17
												Depth	2.28-9.50	3.63-8.00	3.60-8.00	3.51-12.00	3.57-12.00	3.49-5.00	3.53-5.00	5.65-20.00
												Sampling Date	16/11/2021	13/10/2021	16/11/2021	13/10/2021	16/11/2021	13/10/2021	16/11/2021	13/10/2021
												Monitoring Unit	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	MADE GROUND	MADE GROUND	RMF
Arsenic, Dissolved	<0.16	ug/l	42	42	0.72	61	7.50	10	WS Regs 2016 (Eng/Wal)	YES	5		10	61	2.5	10	8.2	12	7.9	6.5
Beryllium, Dissolved	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	12	WHO DWG 2017	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron, Dissolved	<12	ug/l	42	38	<12	740	387.34	1000	WS Regs 2016 (Eng/Wal)	NO	0		620	59	< 12	100	64	92	58	< 12
Cadmium, Dissolved	<0.03	ug/l	42	9	<0.03	0.2	0.08	5	WS Regs 2016 (Eng/Wal)	NO	0		< 0.03	0.08	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium III, Dissolved	<1	ug/l	42	7	<1	16	5.94	50	WS Regs 2016 (Eng/Wal)	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chromium, Hexavalent	<7	ug/l	42	1	<7	9.2	9.20	50	WS Regs 2016 (Eng/Wal)	NO	0		< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0
Copper, Dissolved	<0.4	ug/l	42	16	<0.4	3.3	1.26	2000	WS Regs 2016 (Eng/Wal)	NO	0		1.2	1	0.8	< 0.4	< 0.4	< 0.4	0.6	< 0.4
Iron, Dissolved	<5.5	ug/l	42	42	7.6	11000	637.09	200	WS Regs 2016 (Eng/Wal)	YES	12		890	230	40	11	11	9.2	22	28
Lead, Dissolved	<0.09	ug/l	42	23	<0.09	2.5	0.53	10	WS Regs 2016 (Eng/Wal)	NO	0		0.1	1.6	0.26	< 0.09	< 0.09	0.11	< 0.09	0.11
Mercury, Dissolved	<0.01	ug/l	42	33	<0.01	0.36	0.10	1	WS Regs 2016 (Eng/Wal)	NO	0		< 0.01	0.19	< 0.01	0.16	0.17	0.25	0.19	0.28
Nickel, Dissolved	<0.5	ug/l	42	37	<0.5	15	2.64	20	WS Regs 2016 (Eng/Wal)	NO	0		1.3	6.3	< 0.5	< 0.5	0.6	1	0.9	3.2
Selenium, Dissolved	<0.25	ug/l	42	38	<0.25	7.8	1.86	10	WS Regs 2016 (Eng/Wal)	NO	0		< 0.25	1.6	< 0.25	5.1	2	6.8	5.2	4.4
Vanadium, Dissolved	<0.6	ug/l	42	33	<0.6	96	9.16	86	USEPA RSL (tapwater) [May 2020]	YES	1		2	33	< 0.6	< 0.6	0.6	22	96	31
Zinc, Dissolved	<1.3	ug/l	42	30	<1.3	51	6.97	6000	USEPA RSL (tapwater) [May 2020]	NO	0		8.8	17	3	< 1.3	< 1.3	< 1.3	< 1.3	2.2
pH	<	pH	42	42	7	12	9.31	11	Hazardous Waste Value	YES	8		8	10.9	11.3	10	10.3	10.9	10.9	11.1
Cyanide, Total Low Level	<0.0001	mg/l	42	41	<0.0001	0.076	0.01	0.05	WS Regs 2016 (Eng/Wal)	YES	1		< 0.0001	0.0051	0.0045	0.015	0.011	0.012	0.0082	0.037
Cyanide, Free Low Level	<0.0001	mg/l	42	36	<0.0001	0.0056	0.00	0.05	WS Regs 2016 (Eng/Wal)	NO	0		< 0.0001	0.0002	< 0.0001	0.0005	0.0002	0.0003	0.0003	0.0004
Thiocyanate	<20	ug/l	42	29	<20	9300	1207.34	4	USEPA RSL (tapwater) [May 2020]	YES	29		7400	200	210	270	280	220	220	110
Total Hardness as CaCO3	<0.1	mg/l	42	42	4.49	6550	1100.97	N/A		NO	0		433	104	4.49	1010	2230	873	1060	783
Ammoniacal Nitrogen as NH3	<0.015	mg/l	42	41	<0.015	23	4.56	NV		NO	0		6.4	8.5	5.8	2.6	2.2	2.3	1.8	3.9
Ammoniacal Nitrogen as N	<0.015	mg/l	42	41	<0.015	19	3.78	0.5	WS Regs 2016 (Eng/Wal) as NH4	YES	33		5.3	7	4.8	2.1	1.9	1.9	1.5	3.2
Nitrate as NO3	<0.1	mg/l	28	11	<0.1	140	14.52	50	WS Regs 2016 (Eng/Wal)	YES	1			< 0.10	0.82	0.19	< 0.10	< 0.10	0.12	< 0.10
Nitrate as N	<0.1	mg/l	14	5	<0.1	1.5	0.58	NV		NO	0		< 0.10							
Nitrite as NO2	<0.1	mg/l	30	19	<0.1	440	30.89	0.5	WS Regs 2016 (Eng/Wal)	YES	18			2.7	1.8	3.7	0.42	2.9	1.7	7.3
Nitrite as N	<0.035	mg/l	12	0	<0.035	<0.035	<0.035			NO	0		< 0.035							
Sulphate as SO4	<0.1	mg/l	42	42	7.5	3000	801.11	250	WS Regs 2016 (Eng/Wal)	YES	28		350	130	400	1100	1300	880	970	810
Total Organic Carbon	<1	mg/l	42	40	<1	190	24.01	N/A		NO	0		6.1	14	5.9	3	100	3.4	6.3	5.2
Aliphatic C5-C6	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	15000	WHO Petroleum DWG 2008	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	<0.1	ug/l	42	1	<0.1	14	14.00	15000	WHO Petroleum DWG 2008	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	<0.1	ug/l	42	2	<0.1	21	11.00	300	WHO Petroleum DWG 2008	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	<1	ug/l	42	5	<1	30	11.46	300	WHO Petroleum DWG 2008	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	<1	ug/l	42	5	<1	15	7.10	300	WHO Petroleum DWG 2008	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	<1	ug/l	42	6	<1	160	79.00	300	WHO Petroleum DWG 2008	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	<1	ug/l	42	6	<1	220	61.72	300	WHO Petroleum DWG 2008	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	<10	ug/l	42	7	<10	390	138.00	60000	USEPA RSL (tapwater) [May 2020] (mineral oil)	NO	0		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	1	WS Regs 2016 (Eng/Wal)	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	<0.1	ug/l	42	2	<0.1	19	16.00	700	WHO Petroleum DWG 2008	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	<0.1	ug/l	42	2	<0.1	72	47.50	300	WHO Petroleum DWG 2008	NO	0		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	<1	ug/l	42	6	<1	3.9	2.75	90	WHO Petroleum DWG 2008	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	2.5	< 1.0	< 1.0
Aromatic C12-C16	<1	ug/l	42	8	<1	11	7.28	90	WHO Petroleum DWG 2008	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	8.3	< 1.0	< 1.0
Aromatic C16-C21	<1	ug/l	42	8	<1	110	48.58	90	WHO Petroleum DWG 2008	YES	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	3.6	< 1.0	< 1.0
Aromatic C21-C35	<1	ug/l	42	7	<1	110	26.89	90	WHO Petroleum DWG 2008	YES	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	<10	ug/l	42	10	<10	240	78.80	60000	USEPA RSL (tapwater) [May 2020] (mineral oil)	NO	0		< 10	< 10	< 10	< 10	< 10	15	< 10	< 10
TPH Ali/Aro Total C5-C35	<10	ug/l	42	12	<10	630	146.42	60000	USEPA RSL (tapwater) [May 2020] (mineral oil)	NO	0		< 10	< 10	< 10	< 10	< 10	15	< 10	< 10
EPH (C10-C40)	<10	ug/l	42	35	<10	1100	146.69	60000	USEPA RSL (tapwater) [May 2020] (mineral oil)	NO	0		< 10	< 10	120	< 10	130	< 10	96	< 10
Benzene	<1	ug/l	42	0	<1	<1	<1	1	WS Regs 2016 (Eng/Wal)	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	<1	ug/l	42	2	<1	19	16.00	700	WHO DWG 2017	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	<1	ug/l	42	2	<1	72	47.50	300	WHO DWG 2017	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	<1	ug/l	42	0	<1	<1	<1	500	WHO DWG 2017	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE	<1	ug/l	42	0	<1	<1	<1	1800	AECOM DWG (WHO method)	NO	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Phenol - Monohydric	<100	ug/l	42	10	<100	2000	735.00	5800	USEPA RSL (tapwater) [May 2020] (phenol)	NO	0		170	< 100	< 100	< 100	< 100	< 100	< 100	< 100
Dichlorodifluoromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Chloromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Vinyl Chloride	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Bromomethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Chloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Trichlorofluoromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,1-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Methylene Chloride	<27	ug/l	30	0	<27	<27	<27	NR		NO	0		< 27	< 27		< 27		< 27	< 27	< 27
Trans-1,2-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,1-dichloroethane	<1	ug/l	30	3	<1	2	1.33	NV		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Cis-1,2-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
2,2-dichloropropane	<2	ug/l	30	0	<2	<2	<2	NR		NO	0		< 2	< 2		< 2		< 2	< 2	< 2
Bromochloromethane	<4	ug/l	30	0	<4	<4	<4	NR		NO	0		< 4	< 4		< 4		< 4	< 4	< 4

Groundwater Chemical Screening Against DWS Protective of Groundwater Quality
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	DWS SCREENING VALUE	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R2	R3	R2	R3	R2	R3	R2
												Exploratory monitoring well	MS\BH13 (S)	MS\BH14	MS\BH14	MS\BH15 (D)	MS\BH15 (D)	MS\BH15 (S)	MS\BH15 (S)	MS\BH17
												Depth	2.28-9.50	3.63-8.00	3.60-8.00	3.51-12.00	3.57-12.00	3.49-5.00	3.53-5.00	5.65-20.00
												Sampling Date	16/11/2021	13/10/2021	16/11/2021	13/10/2021	16/11/2021	13/10/2021	16/11/2021	13/10/2021
												Monitoring Unit	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	MADE GROUND	MADE GROUND	RMF
Chloroform	<1	ug/l	30	1	<1	5	5.00	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,1,1-trichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,1-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Carbon tetrachloride	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Benzene	<1	ug/l	30	5	<1	5	3.80	1	WS Regs 2016 (Eng/Wal)	YES	5		< 1	< 1		< 1		< 1	< 1	< 1
1,2-dichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Trichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,2-dichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Dibromomethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Bromodichloromethane	<4	ug/l	30	0	<4	<4	<4	NR		NO	0		< 4	< 4		< 4		< 4	< 4	< 4
cis-1,3-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Toluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
trans-1,3-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,1,2-trichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Tetrachloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,3-dichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Dibromochloromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,2-dibromoethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Chlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,1,1,2-tetrachloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Ethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
m+p-Xylene	<2	ug/l	30	0	<2	<2	<2	NR		NO	0		< 2	< 2		< 2		< 2	< 2	< 2
o-Xylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Styrene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Bromoform	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Isopropylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,1,2,2-tetrachloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Bromobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,2,3-trichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
n-propylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
2-chlorotoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,3,5-trimethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
4-chlorotoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Tert-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,2,4-trimethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
sec-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
p-isopropyltoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,3-dichlorobenzene	<2	ug/l	30	0	<2	<2	<2	NR		NO	0		< 2	< 2		< 2		< 2	< 2	< 2
1,4-dichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
n-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,2-dichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,2-dibromo-3-chloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,2,4-trichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Hexachlorobutadiene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Naphthalene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
1,2,3-trichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
MTBE	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1		< 1		< 1	< 1	< 1
Phenol	<1	ug/l	28	5	<1	3.5	2.06	5800	USEPA RSL (tapwater) [May 2020]	NO	0		< 1.0	2.4		< 1.0		< 1.0	< 1.0	< 1.0
Aniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
2-Chlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Benzyl Alcohol	<1	ug/l	28	2	<1	2.2	1.85	NV		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
2-Methylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Bis(2-chloroisopropyl)ether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
3&4-Methylphenol	<1	ug/l	28	1	<1	13	13.00	930	USEPA RSL (tapwater) [May 2020]	NO	0		< 1.0	13		< 1.0		< 1.0	< 1.0	< 1.0
Bis(2-chloroethoxy)methane	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
2,4-Dimethylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
2,4-Dichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
4-Chloro-3-methylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
2-Methylnaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Hexachlorocyclopentadiene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
2,4,6-Trichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
2,4,5-Trichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
2-Chloronaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
2-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
2,4-Dinitrotoluene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Acenaphthylene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
3-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Acenaphthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
4-Nitrophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Dibenzofuran	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	DWS SCREENING VALUE	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R2	R3	R2	R3	R2	R3	R2
												Exploratory monitoring well	MS\BH13 (S)	MS\BH14	MS\BH14	MS\BH15 (D)	MS\BH15 (D)	MS\BH15 (S)	MS\BH15 (S)	MS\BH17
												Depth	2.28-9.50	3.63-8.00	3.60-8.00	3.51-12.00	3.57-12.00	3.49-5.00	3.53-5.00	5.65-20.00
												Sampling Date	16/11/2021	13/10/2021	16/11/2021	13/10/2021	16/11/2021	13/10/2021	16/11/2021	13/10/2021
												Monitoring Unit	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	MADE GROUND	MADE GROUND	RMF
2,6-Dinitrotoluene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
2,3,4,6-Tetrachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Diethylphthalate	<1	ug/l	28	1	<1	1.1	1.10	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
4-Chlorophenylphenylether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Fluorene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
4-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Diphenylamine	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
4-Bromophenylphenylether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Hexachlorobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)ester	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Pentachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Phenanthrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Di-n-butylphthalate	<1	ug/l	28	2	<1	2	1.60	900	USEPA RSL (tapwater) [May 2020]	NO	0		1.2	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Butylbenzylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Benzo(a)anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Chrysene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)phthalate	<1	ug/l	28	4	<1	13	5.50	8	WHO DWG 2017	YES	1		< 1.0	1.1		< 1.0		< 1.0	< 1.0	< 1.0
Di-n-octylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Benzo(b)fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Benzo(k)fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Benzo(a)pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Indeno(123cd)pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Dibenzo(ah)anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Benzo(ghi)perylene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
1,4-Dinitrobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Dimethylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
1,3-Dinitrobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
2,3,5,6-Tetrachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Azobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Carbazole	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
1-Methylnaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0	< 1.0		< 1.0		< 1.0	< 1.0	< 1.0
Naphthalene	<0.1	ug/l	40	24	<0.1	5.1	0.58	6	AECOM DWG (WHO method)	NO	0		<0.1	0.4	<0.1	5.1	<0.1	0.6	<0.1	0.6
Acenaphthylene	<0.013	ug/l	40	8	<0.013	0.202	0.06	18	AECOM DWG (WHO method)	NO	0		<0.013	<0.013	0.013	0.02	<0.013	0.202	0.18	0.025
Acenaphthene	<0.013	ug/l	40	20	<0.013	0.986	0.20	18	AECOM DWG (WHO method)	NO	0		<0.013	0.611	0.157	0.986	0.074	0.589	0.361	0.141
Fluorene	<0.014	ug/l	40	15	<0.014	0.28	0.07	12	AECOM DWG (WHO method)	NO	0		<0.014	0.158	0.026	0.11	<0.014	0.28	0.185	0.03
Phenanthrene	<0.011	ug/l	40	19	<0.011	0.361	0.05	4	AECOM DWG (WHO method)	NO	0		<0.011	0.361	<0.011	0.015	0.011	0.152	0.096	0.038
Anthracene	<0.013	ug/l	40	2	<0.013	0.026	0.02	90	AECOM DWG (WHO method)	NO	0		<0.013	0.026	<0.013	<0.013	<0.013	<0.013	0.015	<0.013
Fluoranthene	<0.012	ug/l	40	9	<0.012	0.266	0.07	4	WHO DWG 2017	NO	0		<0.012	0.053	0.266	<0.012	<0.012	0.018	0.031	<0.012
Pyrene	<0.013	ug/l	40	9	<0.013	0.168	0.05	9	AECOM DWG (WHO method)	NO	0		<0.013	0.036	0.168	<0.013	<0.013	0.015	0.02	<0.013
Benzo(a)anthracene	<0.015	ug/l	40	0	<0.015	<0.015	<0.015	3.5	AECOM DWG (WHO method)	NO	0		<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Chrysene	<0.011	ug/l	40	1	<0.011	0.015	0.02	7	AECOM DWG (WHO method)	NO	0		<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
Benzo(bk)fluoranthene	<0.018	ug/l	40	0	<0.018	<0.018	<0.018			NO	0		<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	<0.016	ug/l	40	0	<0.016	<0.016	<0.016	0.01	WS Regs 2016 (Eng/Wal)	NO	0		<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016
Indeno(123cd)pyrene	<0.011	ug/l	40	0	<0.011	<0.011	<0.011	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
Dibenzo(ah)anthracene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	0.07	AECOM DWG (WHO method)	NO	0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)perylene	<0.011	ug/l	40	0	<0.011	<0.011	<0.011	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
PAH 16 Total	<0.195	ug/l	40	23	<0.195	6.231	0.90	NV		NO	0		<0.195	1.645	0.63	6.231	<0.195	1.856	0.888	0.834
Benzo(b)fluoranthene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(k)fluoranthene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sum of 4 PAHs	<0.024	ug/l	40	0	<0.024	<0.024	<0.024	0.1	WS Regs 2016 (Eng/Wal)	NO	0		<0.024	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024
Naphthalene	<0.001	ug/l	42	3	<0.001	0.11	0.09	6	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Acenaphthylene	<0.001	ug/l	42	3	<0.001	0.007	0.00	18	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Acenaphthene	<0.001	ug/l	42	3	<0.001	0.044	0.02	18	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Fluorene	<0.001	ug/l	42	3	<0.001	0.012	0.01	12	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Phenanthrene	<0.001	ug/l	42	2	<0.001	0.005	0.00	4	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	90	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Fluoranthene	<0.001	ug/l	42	2	<0.001	0.002	0.00	4	WHO DWG 2017	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Pyrene	<0.001	ug/l	42	2	<0.001	0.003	0.00	9	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Benzo(a)anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	3.5	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Chrysene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	7	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Benzo(bk)fluoranthene	<0.002	ug/l	42	0	<0.002	<0.002	<0.002	NV		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Benzo(a)pyrene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	0.01	WS Regs 2016 (Eng/Wal)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Indeno(123cd)pyrene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US

AECOM

Groundwater Chemical Screening Against DWS Protective of Groundwater Quality
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	DWS SCREENING VALUE	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R2	R3	R2	R3	R2	R3	R2
												Exploratory monitoring well	MS\BH13 (S)	MS\BH14	MS\BH14	MS\BH15 (D)	MS\BH15 (D)	MS\BH15 (S)	MS\BH15 (S)	MS\BH17
												Depth	2.28-9.50	3.63-8.00	3.60-8.00	3.51-12.00	3.57-12.00	3.49-5.00	3.53-5.00	5.65-20.00
												Sampling Date	16/11/2021	13/10/2021	16/11/2021	13/10/2021	16/11/2021	13/10/2021	16/11/2021	13/10/2021
												Monitoring Unit	TFD SAND	TFD SAND	TFD SAND	TFD SAND	TFD SAND	MADE GROUND	MADE GROUND	RMF
Dibenzo(ah)anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	0.07	AECOM DWG (WHO method)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Benzo(ghi)perylene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
PAH 16 Total	<0.016	ug/l	42	3	<0.016	0.178	0.13	NV		NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Benzo(b)fluoranthene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
Benzo(k)fluoranthene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		n/US	n/US	n/US	n/US	n/US	n/US	n/US	n/US
TAME	Non Detect	ug/l	22	0	Non Detect	Non Detect	Non Detect	NR		NO	0		Not Detected		Not Detected		Not Detected		Not Detected	
PCB 28 + PCB 31	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 52	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 77	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 81	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 101	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 105	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 114	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 118 + PCB 123	< 0.6	ug/l	1	0	< 0.6	< 0.6	< 0.6	NR		NO	0									
PCB 126	< 0.5	ug/l	1	0	< 0.5	< 0.5	< 0.5	NR		NO	0									
PCB 138	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 153	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 156	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 157	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 167	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 169	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 180	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0									
PCB 189	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0									
PCB 12	< 1.0	ug/l	1	0	< 1.0	< 1.0	< 1.0	NR		NO	0									
PCB 7 Total	< 1.0	ug/l	1	0	< 1.0	< 1.0	< 1.0	NR		NO	0									

n/US Non suitable sample. PAH concentrations to high to undertake low level PAH analysis
NR All concentrations less than limit of detection. No screening value required.
NV No screening value available
1.1 Exceedance of DWS

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	DWS SCREENING VALUE	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R2	R3
												Exploratory monitoring well	MS\BH17	Trip Blank	TRIP BLANK
												Depth	5.64-20.00		
												Sampling Date	16/11/2021	13/10/2021	15/11/2021
												Monitoring Unit	RMF		
Arsenic, Dissolved	<0.16	ug/l	42	42	0.72	61	7.50	10	WS Regs 2016 (Eng/Wal)	YES	5		1.6		
Beryllium, Dissolved	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	12	WHO DWG 2017	NO	0		< 0.1		
Boron, Dissolved	<12	ug/l	42	38	<12	740	387.34	1000	WS Regs 2016 (Eng/Wal)	NO	0		< 12		
Cadmium, Dissolved	<0.03	ug/l	42	9	<0.03	0.2	0.08	5	WS Regs 2016 (Eng/Wal)	NO	0		< 0.03		
Chromium III, Dissolved	<1	ug/l	42	7	<1	16	5.94	50	WS Regs 2016 (Eng/Wal)	NO	0		< 1.0		
Chromium, Hexavalent	<7	ug/l	42	1	<7	9.2	9.20	50	WS Regs 2016 (Eng/Wal)	NO	0		< 7.0		
Copper, Dissolved	<0.4	ug/l	42	16	<0.4	3.3	1.26	2000	WS Regs 2016 (Eng/Wal)	NO	0		1.6		
Iron, Dissolved	<5.5	ug/l	42	42	7.6	11000	637.09	200	WS Regs 2016 (Eng/Wal)	YES	12		81		
Lead, Dissolved	<0.09	ug/l	42	23	<0.09	2.5	0.53	10	WS Regs 2016 (Eng/Wal)	NO	0		0.49		
Mercury, Dissolved	<0.01	ug/l	42	33	<0.01	0.36	0.10	1	WS Regs 2016 (Eng/Wal)	NO	0		< 0.01		
Nickel, Dissolved	<0.5	ug/l	42	37	<0.5	15	2.64	20	WS Regs 2016 (Eng/Wal)	NO	0		< 0.5		
Selenium, Dissolved	<0.25	ug/l	42	38	<0.25	7.8	1.86	10	WS Regs 2016 (Eng/Wal)	NO	0		0.43		
Vanadium, Dissolved	<0.6	ug/l	42	33	<0.6	96	9.16	86	USEPA RSL (tapwater) [May 2020]	YES	1		1.6		
Zinc, Dissolved	<1.3	ug/l	42	30	<1.3	51	6.97	6000	USEPA RSL (tapwater) [May 2020]	NO	0		< 1.3		
pH	<	pH	42	42	7	12	9.31	11	Hazardous Waste Value	YES	8		11.3		
Cyanide, Total Low Level	<0.0001	mg/l	42	41	<0.0001	0.076	0.01	0.05	WS Regs 2016 (Eng/Wal)	YES	1		0.076		
Cyanide, Free Low Level	<0.0001	mg/l	42	36	<0.0001	0.0056	0.00	0.05	WS Regs 2016 (Eng/Wal)	NO	0		< 0.0001		
Thiocyanate	<20	ug/l	42	29	<20	9300	1207.34	4	USEPA RSL (tapwater) [May 2020]	YES	29		120		
Total Hardness as CaCO3	<0.1	mg/l	42	42	4.49	6550	1100.97	N/A		NO	0		27.5		
Ammoniacal Nitrogen as NH3	<0.015	mg/l	42	41	<0.015	23	4.56	NV		NO	0		3.3		
Ammoniacal Nitrogen as N	<0.015	mg/l	42	41	<0.015	19	3.78	0.5	WS Regs 2016 (Eng/Wal) as NH4	YES	33		2.7		
Nitrate as NO3	<0.1	mg/l	28	11	<0.1	140	14.52	50	WS Regs 2016 (Eng/Wal)	YES	1		< 0.10		
Nitrate as N	<0.1	mg/l	14	5	<0.1	1.5	0.58	NV		NO	0				
Nitrite as NO2	<0.1	mg/l	30	19	<0.1	440	30.89	0.5	WS Regs 2016 (Eng/Wal)	YES	18		< 0.10		
Nitrite as N	<0.035	mg/l	12	0	<0.035	<0.035	<0.035			NO	0				
Sulphate as SO4	<0.1	mg/l	42	42	7.5	3000	801.11	250	WS Regs 2016 (Eng/Wal)	YES	28		920		
Total Organic Carbon	<1	mg/l	42	40	<1	190	24.01	N/A		NO	0		4.3		
Aliphatic C5-C6	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	15000	WHO Petroleum DWG 2008	NO	0		< 0.1		
Aliphatic C6-C8	<0.1	ug/l	42	1	<0.1	14	14.00	15000	WHO Petroleum DWG 2008	NO	0		< 0.1		
Aliphatic C8-C10	<0.1	ug/l	42	2	<0.1	21	11.00	300	WHO Petroleum DWG 2008	NO	0		< 0.1		
Aliphatic C10-C12	<1	ug/l	42	5	<1	30	11.46	300	WHO Petroleum DWG 2008	NO	0		< 1.0		
Aliphatic C12-C16	<1	ug/l	42	5	<1	15	7.10	300	WHO Petroleum DWG 2008	NO	0		< 1.0		
Aliphatic C16-C21	<1	ug/l	42	6	<1	160	79.00	300	WHO Petroleum DWG 2008	NO	0		< 1.0		
Aliphatic C21-C35	<1	ug/l	42	6	<1	220	61.72	300	WHO Petroleum DWG 2008	NO	0		< 1.0		
Aliphatic C5-C35	<10	ug/l	42	7	<10	390	138.00	60000	USEPA RSL (tapwater) [May 2020] (mineral oil)	NO	0		< 10		
Aromatic C5-C7	<0.1	ug/l	42	0	<0.1	<0.1	<0.1	1	WS Regs 2016 (Eng/Wal)	NO	0		< 0.1		
Aromatic C7-C8	<0.1	ug/l	42	2	<0.1	19	16.00	700	WHO Petroleum DWG 2008	NO	0		< 0.1		
Aromatic C8-C10	<0.1	ug/l	42	2	<0.1	72	47.50	300	WHO Petroleum DWG 2008	NO	0		< 0.1		
Aromatic C10-C12	<1	ug/l	42	6	<1	3.9	2.75	90	WHO Petroleum DWG 2008	NO	0		< 1.0		
Aromatic C12-C16	<1	ug/l	42	8	<1	11	7.28	90	WHO Petroleum DWG 2008	NO	0		< 1.0		
Aromatic C16-C21	<1	ug/l	42	8	<1	110	48.58	90	WHO Petroleum DWG 2008	YES	1		< 1.0		
Aromatic C21-C35	<1	ug/l	42	7	<1	110	26.89	90	WHO Petroleum DWG 2008	YES	1		< 1.0		
Aromatic C5-C35	<10	ug/l	42	10	<10	240	78.80	60000	USEPA RSL (tapwater) [May 2020] (mineral oil)	NO	0		< 10		
TPH Ali/Aro Total C5-C35	<10	ug/l	42	12	<10	630	146.42	60000	USEPA RSL (tapwater) [May 2020] (mineral oil)	NO	0		< 10		
EPH (C10-C40)	<10	ug/l	42	35	<10	1100	146.69	60000	USEPA RSL (tapwater) [May 2020] (mineral oil)	NO	0		120		
Benzene	<1	ug/l	42	0	<1	<1	<1	1	WS Regs 2016 (Eng/Wal)	NO	0		< 1.0		
Toluene	<1	ug/l	42	2	<1	19	16.00	700	WHO DWG 2017	NO	0		< 1.0		
Ethylbenzene	<1	ug/l	42	2	<1	72	47.50	300	WHO DWG 2017	NO	0		< 1.0		
Xylene	<1	ug/l	42	0	<1	<1	<1	500	WHO DWG 2017	NO	0		< 1.0		
MTBE	<1	ug/l	42	0	<1	<1	<1	1800	AECOM DWG (WHO method)	NO	0		< 1.0		
Phenol - Monohydric	<100	ug/l	42	10	<100	2000	735.00	5800	USEPA RSL (tapwater) [May 2020] (phenol)	NO	0		< 100		
Dichlorodifluoromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Chloromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Vinyl Chloride	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Bromomethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Chloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Trichlorofluoromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
1,1-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Methylene Chloride	<27	ug/l	30	0	<27	<27	<27	NR		NO	0		< 27	< 27	< 27
Trans-1,2-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
1,1-dichloroethane	<1	ug/l	30	3	<1	2	1.33	NV		NO	0		< 1	< 1	< 1
Cis-1,2-dichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
2,2-dichloropropane	<2	ug/l	30	0	<2	<2	<2	NR		NO	0		< 2	< 2	< 2
Bromochloromethane	<4	ug/l	30	0	<4	<4	<4	NR		NO	0		< 4	< 4	< 4

Groundwater Chemical Screening Against DWS Protective of Groundwater Quality
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	DWS SCREENING VALUE	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R2	R3
												Exploratory monitoring well	MS\BH17	Trip Blank	TRIP BLANK
												Depth	5.64-20.00		
												Sampling Date	16/11/2021	13/10/2021	15/11/2021
												Monitoring Unit	RMF		
Chloroform	<1	ug/l	30	1	<1	5	5.00	NR		NO	0		< 1	< 1	< 1
1,1,1-trichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
1,1-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Carbon tetrachloride	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Benzene	<1	ug/l	30	5	<1	5	3.80	1	WS Regs 2016 (Eng/Wal)	YES	5		< 1	< 1	< 1
1,2-dichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Trichloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
1,2-dichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Dibromomethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Bromodichloromethane	<4	ug/l	30	0	<4	<4	<4	NR		NO	0		< 4	< 4	< 4
cis-1,3-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Toluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
trans-1,3-dichloropropene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
1,1,2-trichloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Tetrachloroethylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
1,3-dichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Dibromochloromethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
1,2-dibromoethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Chlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
1,1,1,2-tetrachloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Ethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
m+p-Xylene	<2	ug/l	30	0	<2	<2	<2	NR		NO	0		< 2	< 2	< 2
o-Xylene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Styrene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Bromoform	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Isopropylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
1,1,2,2-tetrachloroethane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Bromobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
1,2,3-trichloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
n-propylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
2-chlorotoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
1,3,5-trimethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
4-chlorotoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Tert-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
1,2,4-trimethylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
sec-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
p-isopropyltoluene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
1,3-dichlorobenzene	<2	ug/l	30	0	<2	<2	<2	NR		NO	0		< 2	< 2	< 2
1,4-dichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
n-butylbenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
1,2-dichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
1,2-dibromo-3-chloropropane	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
1,2,4-trichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Hexachlorobutadiene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Naphthalene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
1,2,3-trichlorobenzene	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
MTBE	<1	ug/l	30	0	<1	<1	<1	NR		NO	0		< 1	< 1	< 1
Phenol	<1	ug/l	28	5	<1	3.5	2.06	5800	USEPA RSL (tapwater) [May 2020]	NO	0		< 1.0		
Aniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
2-Chlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Benzyl Alcohol	<1	ug/l	28	2	<1	2.2	1.85	NV		NO	0		< 1.0		
2-Methylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Bis(2-chloroisopropyl)ether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
3&4-Methylphenol	<1	ug/l	28	1	<1	13	13.00	930	USEPA RSL (tapwater) [May 2020]	NO	0		< 1.0		
Bis(2-chloroethoxy)methane	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
2,4-Dimethylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
2,4-Dichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
1,2,4-Trichlorobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
4-Chloro-3-methylphenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
2-Methylnaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Hexachlorocyclopentadiene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
2,4,6-Trichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
2,4,5-Trichlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
2-Chloronaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
2-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
2,4-Dinitrotoluene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Acenaphthylene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
3-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Acenaphthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
4-Nitrophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Dibenzofuran	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		

Groundwater Chemical Screening Against DWS Protective of Groundwater Quality
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	DWS SCREENING VALUE	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R2	R3
												Exploratory monitoring well	MS\BH17	Trip Blank	TRIP BLANK
												Depth	5.64-20.00		
												Sampling Date	16/11/2021	13/10/2021	15/11/2021
												Monitoring Unit	RMF		
2,6-Dinitrotoluene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
2,3,4,6-Tetrachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Diethylphthalate	<1	ug/l	28	1	<1	1.1	1.10	NR		NO	0		< 1.0		
4-Chlorophenylphenylether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Fluorene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
4-Nitroaniline	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Diphenylamine	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
4-Bromophenylphenylether	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Hexachlorobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Bis(2-ethylhexyl)ester	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Pentachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Phenanthrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Di-n-butylphthalate	<1	ug/l	28	2	<1	2	1.60	900	USEPA RSL (tapwater) [May 2020]	NO	0		< 1.0		
Fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Butylbenzylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Benzo(a)anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Chrysene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Bis(2-ethylhexyl)phthalate	<1	ug/l	28	4	<1	13	5.50	8	WHO DWG 2017	YES	1		< 1.0		
Di-n-octylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Benzo(b)fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Benzo(k)fluoranthene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Benzo(a)pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Indeno(123cd)pyrene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Dibenzo(ah)anthracene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Benzo(ghi)perylene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
1,4-Dinitrobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Dimethylphthalate	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
1,3-Dinitrobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
2,3,5,6-Tetrachlorophenol	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Azobenzene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Carbazole	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
1-Methylnaphthalene	<1	ug/l	28	0	<1	<1	<1	NR		NO	0		< 1.0		
Naphthalene	<0.1	ug/l	40	24	<0.1	5.1	0.58	6	AECOM DWG (WHO method)	NO	0		<0.1		
Acenaphthylene	<0.013	ug/l	40	8	<0.013	0.202	0.06	18	AECOM DWG (WHO method)	NO	0		0.021		
Acenaphthene	<0.013	ug/l	40	20	<0.013	0.986	0.20	18	AECOM DWG (WHO method)	NO	0		0.184		
Fluorene	<0.014	ug/l	40	15	<0.014	0.28	0.07	12	AECOM DWG (WHO method)	NO	0		0.037		
Phenanthrene	<0.011	ug/l	40	19	<0.011	0.361	0.05	4	AECOM DWG (WHO method)	NO	0		0.034		
Anthracene	<0.013	ug/l	40	2	<0.013	0.026	0.02	90	AECOM DWG (WHO method)	NO	0		<0.013		
Fluoranthene	<0.012	ug/l	40	9	<0.012	0.266	0.07	4	WHO DWG 2017	NO	0		0.032		
Pyrene	<0.013	ug/l	40	9	<0.013	0.168	0.05	9	AECOM DWG (WHO method)	NO	0		0.025		
Benzo(a)anthracene	<0.015	ug/l	40	0	<0.015	<0.015	<0.015	3.5	AECOM DWG (WHO method)	NO	0		<0.015		
Chrysene	<0.011	ug/l	40	1	<0.011	0.015	0.02	7	AECOM DWG (WHO method)	NO	0		<0.011		
Benzo(bk)fluoranthene	<0.018	ug/l	40	0	<0.018	<0.018	<0.018			NO	0		<0.018		
Benzo(a)pyrene	<0.016	ug/l	40	0	<0.016	<0.016	<0.016	0.01	WS Regs 2016 (Eng/Wal)	NO	0		<0.016		
Indeno(123cd)pyrene	<0.011	ug/l	40	0	<0.011	<0.011	<0.011	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		<0.011		
Dibenzo(ah)anthracene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	0.07	AECOM DWG (WHO method)	NO	0		<0.01		
Benzo(ghi)perylene	<0.011	ug/l	40	0	<0.011	<0.011	<0.011	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		<0.011		
PAH 16 Total	<0.195	ug/l	40	23	<0.195	6.231	0.90	NV		NO	0		0.333		
Benzo(b)fluoranthene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		<0.01		
Benzo(k)fluoranthene	<0.01	ug/l	40	0	<0.01	<0.01	<0.01	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		<0.01		
Sum of 4 PAHs	<0.024	ug/l	40	0	<0.024	<0.024	<0.024	0.1	WS Regs 2016 (Eng/Wal)	NO	0		<0.024		
Naphthalene	<0.001	ug/l	42	3	<0.001	0.11	0.09	6	AECOM DWG (WHO method)	NO	0		n/US		
Acenaphthylene	<0.001	ug/l	42	3	<0.001	0.007	0.00	18	AECOM DWG (WHO method)	NO	0		n/US		
Acenaphthene	<0.001	ug/l	42	3	<0.001	0.044	0.02	18	AECOM DWG (WHO method)	NO	0		n/US		
Fluorene	<0.001	ug/l	42	3	<0.001	0.012	0.01	12	AECOM DWG (WHO method)	NO	0		n/US		
Phenanthrene	<0.001	ug/l	42	2	<0.001	0.005	0.00	4	AECOM DWG (WHO method)	NO	0		n/US		
Anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	90	AECOM DWG (WHO method)	NO	0		n/US		
Fluoranthene	<0.001	ug/l	42	2	<0.001	0.002	0.00	4	WHO DWG 2017	NO	0		n/US		
Pyrene	<0.001	ug/l	42	2	<0.001	0.003	0.00	9	AECOM DWG (WHO method)	NO	0		n/US		
Benzo(a)anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	3.5	AECOM DWG (WHO method)	NO	0		n/US		
Chrysene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	7	AECOM DWG (WHO method)	NO	0		n/US		
Benzo(bk)fluoranthene	<0.002	ug/l	42	0	<0.002	<0.002	<0.002	NV		NO	0		n/US		
Benzo(a)pyrene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	0.01	WS Regs 2016 (Eng/Wal)	NO	0		n/US		
Indeno(123cd)pyrene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		n/US		

Groundwater Chemical Screening Against DWS Protective of Groundwater Quality
Rounds 2 and 3

Determinand	Limit of Detection	UNITS	TOTAL NUMBER OF SAMPLES	TOTAL NUMBER OF SAMPLES > LOD	MINIMUM	MAXIMUM	AVERAGE	DWS SCREENING VALUE	SOURCE	Greater than Screening Value (YES/NO)	NUMBER EXCEEDING SCREENING VALUE	Monitoring Round	R3	R2	R3
												Exploratory monitoring well	MS\BH17	Trip Blank	TRIP BLANK
												Depth	5.64-20.00		
												Sampling Date	16/11/2021	13/10/2021	15/11/2021
												Monitoring Unit	RMF		
Dibenzo(ah)anthracene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	0.07	AECOM DWG (WHO method)	NO	0		n/US		
Benzo(ghi)perylene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		n/US		
PAH 16 Total	<0.016	ug/l	42	3	<0.016	0.178	0.13	NV		NO	0		n/US		
Benzo(b)fluoranthene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		n/US		
Benzo(k)fluoranthene	<0.001	ug/l	42	0	<0.001	<0.001	<0.001	Use PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)	NO	0		n/US		
TAME	Non Detect	ug/l	22	0	Non Detect	Non Detect	Non Detect	NR		NO	0		Not Detected		
PCB 28 + PCB 31	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0				
PCB 52	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0				
PCB 77	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0				
PCB 81	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0				
PCB 101	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0				
PCB 105	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0				
PCB 114	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0				
PCB 118 + PCB 123	< 0.6	ug/l	1	0	< 0.6	< 0.6	< 0.6	NR		NO	0				
PCB 126	< 0.5	ug/l	1	0	< 0.5	< 0.5	< 0.5	NR		NO	0				
PCB 138	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0				
PCB 153	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0				
PCB 156	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0				
PCB 157	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0				
PCB 167	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0				
PCB 169	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0				
PCB 180	< 0.2	ug/l	1	0	< 0.2	< 0.2	< 0.2	NR		NO	0				
PCB 189	< 0.3	ug/l	1	0	< 0.3	< 0.3	< 0.3	NR		NO	0				
PCB 12	< 1.0	ug/l	1	0	< 1.0	< 1.0	< 1.0	NR		NO	0				
PCB 7 Total	< 1.0	ug/l	1	0	< 1.0	< 1.0	< 1.0	NR		NO	0				

n/US Non suitable sample. PAH concentrations to high to undertake low level PAH analysis
NR All concentrations less than limit of detection. No screening value required.
NV No screening value available
1.1 Exceedance of DWS

Table I1
Made Ground
Groundwater Exceedances
Round 1 to Round 3

EQS Groundwater Exceedances in Made Ground - Protective of Surface Water

Determinand	Units	EQS Screening Value	MS\BH07 (S)			MS\BH11 (S)			MS\BH15 (S)		
			R1	R2	R3	R1	R2	R3	R1	R2	R3
Lead	ug/l	**1.3**		-	-	1.8	-	-			
Mercury	ug/l	**0.07**	0.33	-	-		-	-	0.14	0.25	0.19
Zinc	ug/l	**6.8**		-	-	220	-	-	9.2		
Cyanide, Total Low Level	mg/l	**0.001**		-	-		-	-		0.012	0.0082
Cyanide Free	mg/l	**0.001**	0.0012	-	-		-	-			
Ammoniacal Nitrogen as N	mg/l	**0.021**	0.47	-	-	0.16	-	-	0.57	1.9	1.5
Benzo(g,h,i)perylene	ug/l	**0.00082**		-	-	0.01	-	-			
Fluoranthene	ug/l	**0.0063**	0.01	-	-	0.09	-	-	0.03	0.018	0.031

DWS Groundwater Exceedances in Made Ground - Protective of Groundwater Quality

Determinand	Units	DWS Screening Value	MS\BH07 (S)			MS\BH11 (S)			MS\BH15 (S)		
			R1	R2	R3	R1	R2	R3	R1	R2	R3
Arsenic	ug/l	**10**	13	-	-		-	-			12
Selenium	ug/l	**10**	27	-	-		-	-			
Vanadium	ug/l	**86**		-	-		-	-	93	96	
Thiocyanate	ug/l	**4**	52	-	-		-	-	230	220	220
Ammoniacal Nitrogen as N	mg/l	**0.5**		-	-		-	-		1.5	1.9
Nitrite as NO2	mg/l	**0.5**		-	-		-	-	0.57	1.7	2.9
Sulphate as SO4	mg/l	**250**	1,100	-	-		-	-	1100	970	880

Key

1.1	Concentration greater than Screening Value
	Concentration less than Screening Value
-	Not sampled. Monitoring well dry/damp or insufficient water to obtain sample
R1	Ground Monitoring Round 1 (August 2021)
R2	Ground Monitoring Round 2 (October 2021)
R3	Ground Monitoring Round 3 (November 2021)

EQS Groundwater Exceedances in Tidal Flat Deposits - Protective of Surface Water

Determinand	Units	EQS (Coastal)	LF\BH01 (S)			MS\BH03 (S)			MS\BH04 (S)			MS\BH05 (S)			MS\BH07 (D)		
			R1	R2	R3	R1	R2	R3	R1	R2	R3	R1	R2	R3	R1	R2	R3
Arsenic	ug/l	25															
Chromium, Hexavalent	ug/l	0.6	50							9.2							
Iron	ug/l	1000								2400	1600						
Lead	ug/l	1.3															
Mercury	ug/l	0.07	0.23	0.15	0.11												
Zinc	ug/l	6.8														11	
Cyanide, Total Low Level	mg/l	0.001		0.0063	0.0057		0.0098	0.0084		0.0095	0.0078	0.042	0.02	0.0089		0.013	0.0049
Cyanide, Free Low Level	mg/l	0.001									0.0025		0.0017		0.0043		
Ammoniacal Nitrogen as N	mg/l	0.021	0.062	0.08	0.08	0.19		0.09		0.091	0.1	10	10	19	1.2	0.91	1.5
Bis(2-ethylhexyl)phthalate	ug/l	1.3														13	
Naphthalene	ug/l	2															
Fluoranthene	ug/l	0.0063	0.01														0.019
Pentachlorophenol	ug/l	0.4	1.4														
Phenol	ug/l	7.7	7.9														
Anthracene	ug/l	0.1															
Benzo(g,h,i)perylene	ug/l	0.00082															

Determinand	MS\BH08 (D)			MS\BH09 (D)			MS\BH11 (D)			MS\BH13 (S)			MS\BH14			MS\BH15 (D)		
	R1	R2	R3	R1	R2	R3	R1	R2	R3	R1	R2	R3	R1	R2	R3	R1	R2	R3
Arsenic														61				
Chromium, Hexavalent																		
Iron																		
Lead														1.6				
Mercury					0.13	0.12							0.41	0.19		0.1	0.16	0.17
Zinc								51				8.8		17				
Cyanide, Total Low Level		0.0085	0.0072		0.0051	0.012		0.014	0.012		0.039			0.0051	0.0045		0.015	0.011
Cyanide, Free Low Level										0.0044	0.0056							
Ammoniacal Nitrogen as N	1.2	1.9	2.5	1.9	5.4	5.2	1.8	3.3	3.8	2	4.5	5.3	0.79	7	4.8	1.3	2.1	1.9
Bis(2-ethylhexyl)phthalate						2.9												
Naphthalene																4.9	5.1	
Fluoranthene							0.01						0.24	0.053	0.266			
Pentachlorophenol																		
Phenol																		
Anthracene													0.19					
Benzo(g,h,i)perylene													0.01					

Key
- 1.1 — Concentration greater than Screening Value
- Concentration less than Screening Value
- R1 — Ground Monitoring Round 1 (August 2021)
- R2 — Ground Monitoring Round 2 (October 2021)
- R3 — Ground Monitoring Round 3 (November 2021)

DWS Groundwater Exceedances in Tidal Flat Deposits - Protective of Groundwater Quality

Determinand	Units	DWS	LF\BH01 (S)			MS\BH03 (S)			MS\BH04 (S)			MS\BH05 (S)			MS\BH07 (D)		
			R1	R2	R3	R1	R2	R3	R1	R2	R3	R1	R2	R3	R1	R2	R3
Arsenic	ug/l	10			11												
Chromium (hexavalent)	ug/l	50	50														
Iron	ug/l	200							870	2400	1600						340
Selenium	ug/l	10	15														
Thiocyanate	ug/l	4	100		37		23					2300	4400	4300			54
Ammoniacal Nitrogen as N	mg/l	0.5										10	10	19	1.2	0.91	1.5
Nitrite as NO2	mg/l	0.5					11				14		5.6	3.1		15	
Sulphate as SO4	mg/l	250	390	900	840	920	860	840	1000	1400	1500	960			840	820	
>EC5-EC7 Aromatics	ug/l	1										5.2					
Aromatic C16-C21	ug/l	90															
Aromatic C21-C35	ug/l	90															
Benzene	ug/l	1										5.2	2				
Bis(2-ethylhexyl)phthalate	ug/l	8														13	

Determinand	MS\BH08 (D)			MS\BH09 (D)			MS\BH11 (D)			MS\BH13 (S)			MS\BH14			MS\BH15 (D)		
	R1	R2	R3	R1	R2	R3	R1	R2	R3	R1	R2	R3	R1	R2	R3	R1	R2	R3
Arsenic	13										16		24	61		11		
Chromium (hexavalent)																		
Iron											350	890		230				
Selenium																		
Thiocyanate	44	43	31	150	110	170	170	190	240		9300	7400	170	200	210	170	270	280
Ammoniacal Nitrogen as N	1.2	1.9	2.5	1.9	5.4	5.2	1.8	3.3	3.8	2	4.5	5.3	0.79	7	4.8	1.3	2.1	1.9
Nitrite as NO2					1.8			2.2			44			2.7	1.8		3.7	
Sulphate as SO4	710	730	380							280	1100	350	540		400		1100	1300
>EC5-EC7 Aromatics																		
Aromatic C16-C21					110													
Aromatic C21-C35					110													
Benzene				5	4	4												
Bis(2-ethylhexyl)phthalate																		

Key
- 1.1 — Concentration greater than Screening Value
- Concentration less than Screening Value
- R1 — Ground Monitoring Round 1 (August 2021)
- R2 — Ground Monitoring Round 2 (October 2021)
- R3 — Ground Monitoring Round 3 (November 2021)

-

EQS Groundwater Exceedances in Glacial Till - Protective of Surface Water

Determinand	Units	EQS (Coastal)	MS\BH04(D)			MS\BH12 (S)		
			R1	R2	R3	R1	R2	R3
Fluoranthene	µg/l	**0.0063**	0.02			0.04		
Mercury (Filtered)	µg/l	**0.07**				0.08		
Cyanide, Total Low Level	µg/l	**0.001**		0.0056	0.0086		0.0099	0.0055
Cyanide, Free Low Level	µg/l	**0.001**			0.0021		0.0018	
Ammoniacal Nitrogen as N	mg/l	**0.021**	0.12	1.6	0.07	0.66	4.1	4.1
Ethylbenzene	µg/l	**20**		72				23

DWS Groundwater Exceedances in Glacial Till - Protective of Groundwater Quality

Determinand	Units	DWS	MS\BH04(D)			MS\BH12 (S)		
			R1	R2	R3	R1	R2	R3
Iron	µg/l	**200**	510	480	430			
Selenium	µg/l	**10**				28		
Thiocyanate	ug/l	**4**					25	
Ammoniacal Nitrogen as N	mg/l	**0.5**		1.6		0.66	4.1	4.1
Nitrite as NO2	mg/l	**0.5**			1.4	0.69	23	
Sulphate as SO4	mg/l	**250**	2700	1400	1400		380	1100

Key

1.1	Concentration greater than Screening Value
	Concentration less than Screening Value
R1	Ground Monitoring Round 1 (August 2021)
R2	Ground Monitoring Round 2 (October 2021)
R3	Ground Monitoring Round 3 (November 2021)

EQS Groundwater Exceedances in Redcar Mudstone Formation - Protective of Surface Water

Determinand	Units	EQS (Coastal)	LF\BH01D			MS\BH03D			MS\BH05D			MS\BH12D			MS\BH13D			MS\BH17D		
			R1	R2	R3	R1	R2	R3	R1	R2	R3	R1	R2	R3	R1	R2	R3	R1	R2	R3
Chromium (hexavalent)	ug/l	**0.6**	83			120			19			11								
Iron, Dissolved	ug/l	**1000**					11000						4500	2700	1200					
Lead, Dissolved	ug/l	**1.3**		1.4												2.5				
Mercury, Dissolved	ug/l	**0.07**	0.19	0.17	0.19			0.09	0.72									0.19	0.28	
Nickel, Dissolved	ug/l	**8.6**				22									11		15			
Zinc, Dissolved	ug/l	**6.8**		10									8.5		8.7	22	18			
Cyanide, Total Low Level	mg/l	**0.001**		0.0048	0.0052					0.019	0.006					0.0022			0.037	0.076
Cyanide, Free Low Level	mg/l	**0.001**							0.0013	0.0016										
Ammoniacal Nitrogen as N	mg/l	**0.021**	0.23	0.39	0.15	0.12	2.5	2.8	0.27	5.5	13	0.13	6.5	5.6	2.6	4.8	5.3	0.28	3.2	2.7
Bis(2-ethylhexyl)phthalate	ug/l	**1.3**		5																
Fluoranthene	ug/l	**0.0063**							0.02			0.01		0.013	0.02		0.012	0.04		0.032
>EC5-EC7 Aromatics	ug/l	**8**				58														
Benzene	ug/l	**8**				58														
Ethylbenzene	ug/l	**20**				210														

DWS Groundwater Exceedances in Redcar Mudstone Formation- Protective of Groundwater Quality

Determinand	Units	DWS	LF\BH01D			MS\BH03D			MS\BH05D			MS\BH12D			MS\BH13D			MS\BH17D		
			R1	R2	R3	R1	R2	R3	R1	R2	R3	R1	R2	R3	R1	R2	R3	R1	R2	R3
Chromium (hexavalent)	ug/l	**50**	83			120														
Iron, Dissolved	ug/l	**200**					11000	360					4500	2700	1200					
Nickel	ug/l	**20**				22														
Selenium	ug/l	**10**				27			24											
Cyanide, Total Low Level	mg/l	**0.05**																		0.076
Thiocyanate	ug/l	**4**	25	46		26			410	3900	2700		32			42		110	110	120
Ammoniacal Nitrogen as N	mg/l	**0.5**					2.5	2.8		5.5	13		6.5	5.6	2.6	4.8	5.3		3.2	2.7
Nitrate as NO3	mg/l	**50**											140							
Nitrite as NO2	mg/l	**0.5**								5.3						440			7.3	
Sulphate as SO4	mg/l	**250**	390	820		1100	2700	2100							1300	3000	2600	890	810	920
Benzene	ug/l	**1**				58					5									
>EC5-EC7 Aromatics	ug/l	**1**				58														

Key

1.1	Concentration greater than Screening Value
	Concentration less than Screening Value
R1	Ground Monitoring Round 1 (August 2021)
R2	Ground Monitoring Round 2 (October 2021)
R3	Ground Monitoring Round 3 (November 2021)

27. Appendix J 3D Model

28. Appendix K Foundations

Title	NZT Preliminary Onshore Ground Investigation		
Subtitle	CCR & Workshops		
Location	Teesworks		
Report No.	Report No: 6065746_ACM_RP_ENV	Press F9 to calculate profile	
Date	22/10/2021	CALCULATED SETTLEMENTS	
Engineer	NJ/CMC/SDM		
Status:	Version 1.061 28th January 2014	25.12	mm
Subtitle 2	Ground Profile - MS/BH13		
Subtitle 3	Groundwater at 3.6 m OD		
Subtitle 4			

Coordinates

Stress Point

Xp	27.50	(m)
Yp	64.00	(m)

Coordinates and Loads

Load Stage	1	2	3	4	5	6	7	8	
Applied Stress (kPa)	35.00								
Current Level (mOD)	5.70								
x1 (m)	0.00								
y1 (m)	0.00								
y dimension (m)	128.000								
x dimension (m)	55.000								
z depth below ground (m)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Set at zero!
Overburden (kPa)	10.00								
Increment for long profile (m)	1.00								

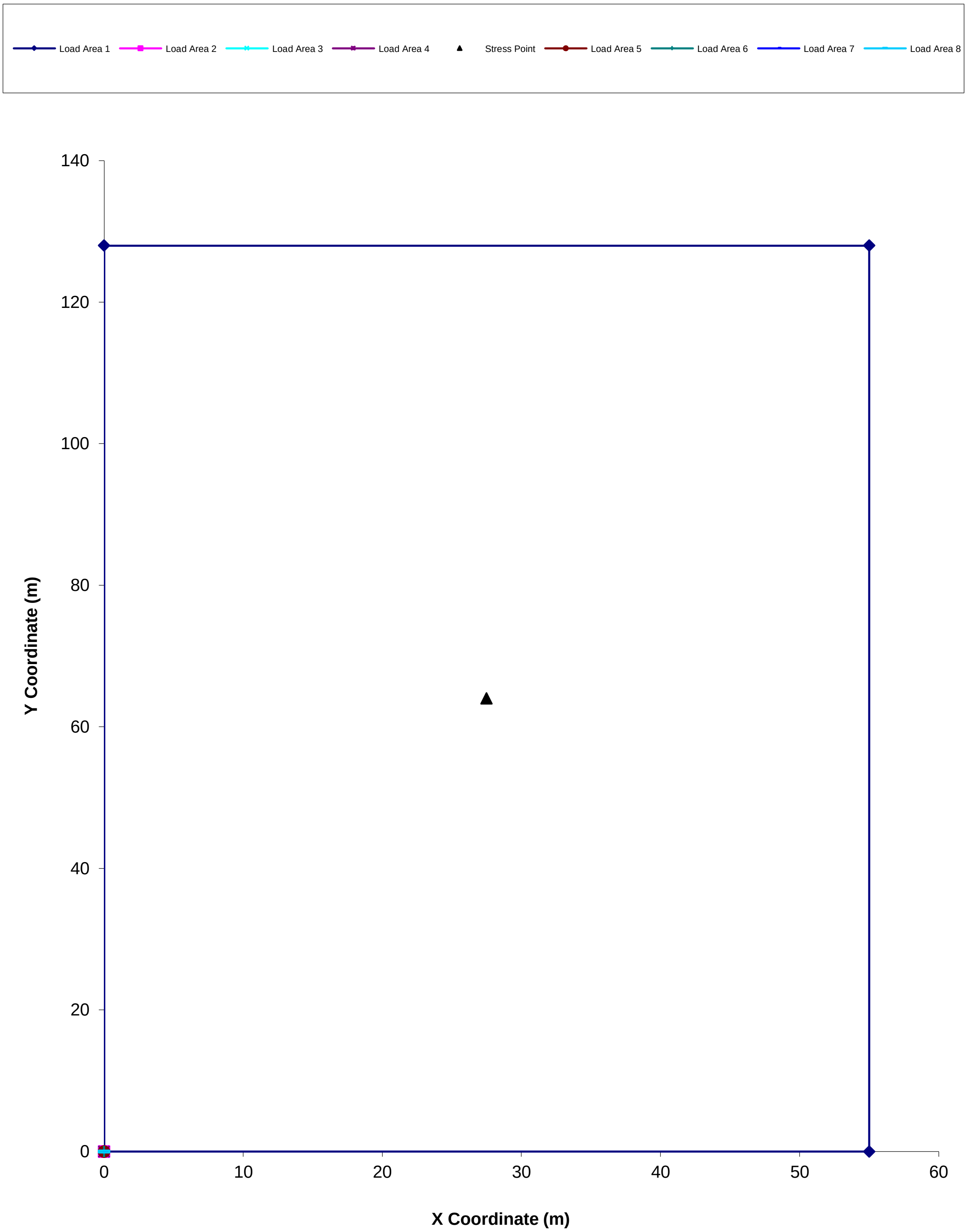
Water Level and Weight

Water Level (mOD)	3.60	
Unit Weight (kN/m^3)	9.81	

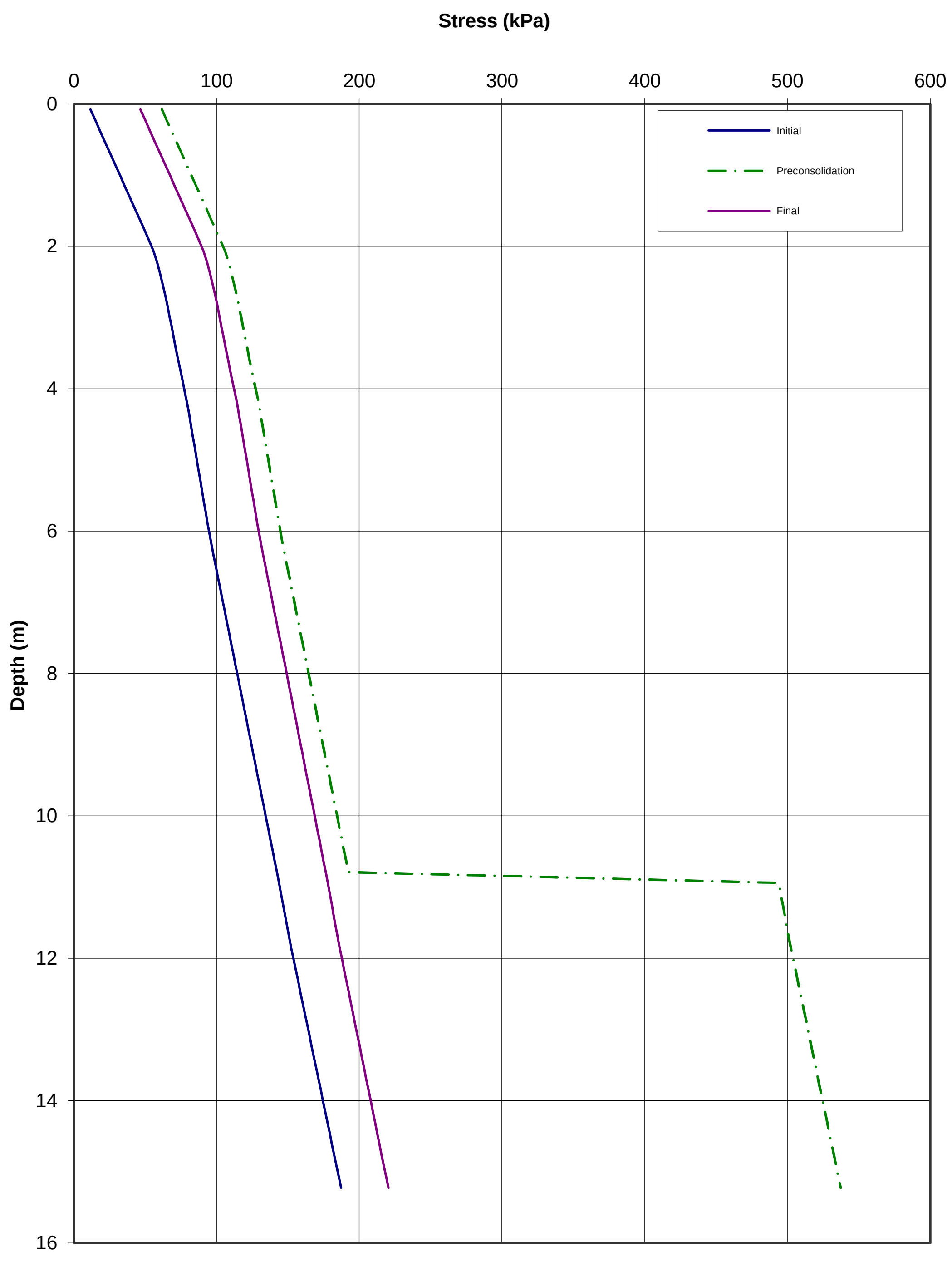
SOIL PROPERTIES

Initial Bed Level (mOD)	5.70	Fixed at current level
Total Thickness (m)	15.30	

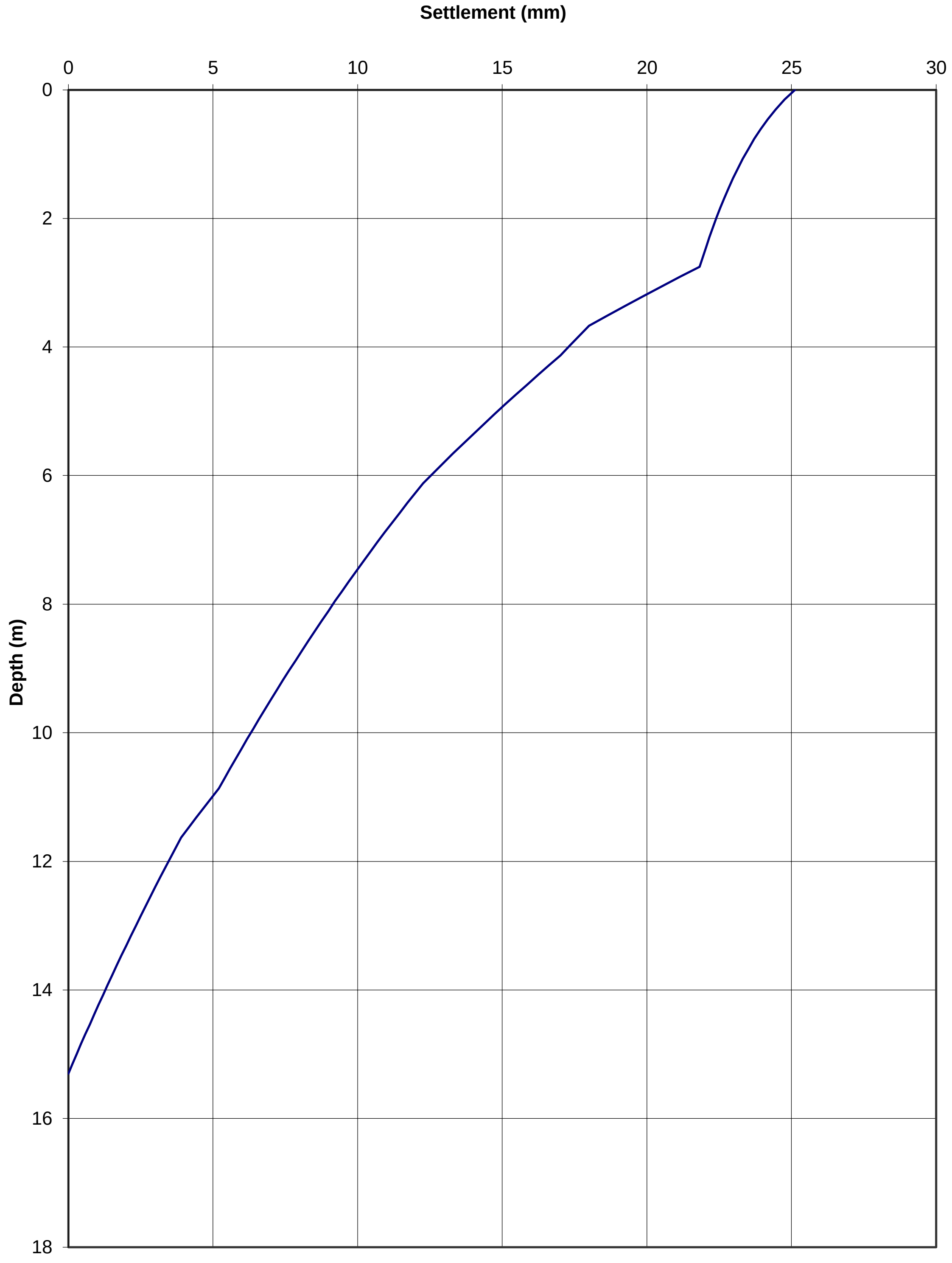
Depth Top (m)	Layer Number	Bulk Density (Mg/m^3)	Dry Density (Mg/m^3)	Saturated Density (Mg/m^3)	Particle Density (Mg/m^3)	mc above (%)	Saturated mc (%)	Void Ratio	Cs Index	Ratio Cc/Cs	Cc Index	Pc'-Po' (kPa)	Skempton Bjerrum Coefficient μ_g	Description
0.00	1	2.28	2.05	2.28	2.65	11.00	11.02	0.2920	0.0050	10.0	0.0500	50.00	1.00	Made Ground - Slag dominant (d1)
2.70	2	2.00	1.61	2.00	2.65	24.00	24.34	0.6450	0.0386	7.0	0.2700	50.00	1.00	Made Ground - Soft clay (d4)
3.65	3	2.08	1.73	2.08	2.65	20.00	20.00	0.5300	0.0200	10.0	0.2000	50.00	1.00	Made Ground - Sand (hydrocarbon odour) (d2)
4.20	4	1.86	1.43	1.86	2.50	30.00	30.00	0.7500	0.0286	7.0	0.2000	50.00	1.00	Tidal Flats - Clay (soft organic) (c1)
6.05	5	2.02	1.67	2.00	2.50	21.00	20.00	0.5000	0.0200	10.0	0.2000	50.00	1.00	Tidal Flats - Sand (c2)
10.90	6	1.93	1.50	1.93	2.65	29.00	29.06	0.7700	0.0333	7.0	0.2330	350.00	1.00	Lacustrine Deposits - Laminated Clay (b3)
11.70	7	2.06	1.70	2.06	2.65	21.00	21.13	0.5600	0.0210	10.0	0.2100	350.00	1.00	Glacial Till (b1)



PROJECT TITLE:- **NZT Preliminary Onshore Ground Investigation**	ORIGINATOR:- AECOM
SKETCH / FIG TITLE:- **CCR & Workshops** **Teesworks** **SETTLEMENT ANALYSIS** Ground Profile - MS/BH13 Geometry of Loaded Area and Location of Stress Profile	SKETCH / FIG NO.:- Figure 1 Report No: 6065746_ACM_RP_ENV DATE:- 22/10/2021



PROJECT TITLE:- **NZT Preliminary Onshore Ground Investigation**	ORIGINATOR:- AECOM
SKETCH / FIG TITLE:- **CCR & Workshops** **Teesworks** **SETTLEMENT ANALYSIS** Ground Profile - MS/BH13 Stress Profiles	SKETCH / FIG No.:- Figure 2 Report No: 6065746_ACM_RP_ENV DATE:- 22/10/2021



PROJECT TITLE:-

NZT Preliminary Onshore Ground Investigation

ORIGINATOR:-

AECOM

SKETCH / FIG TITLE:-

CCR & Workshops

Teesworks

SETTLEMENT ANALYSIS

Ground Profile - MS/BH13

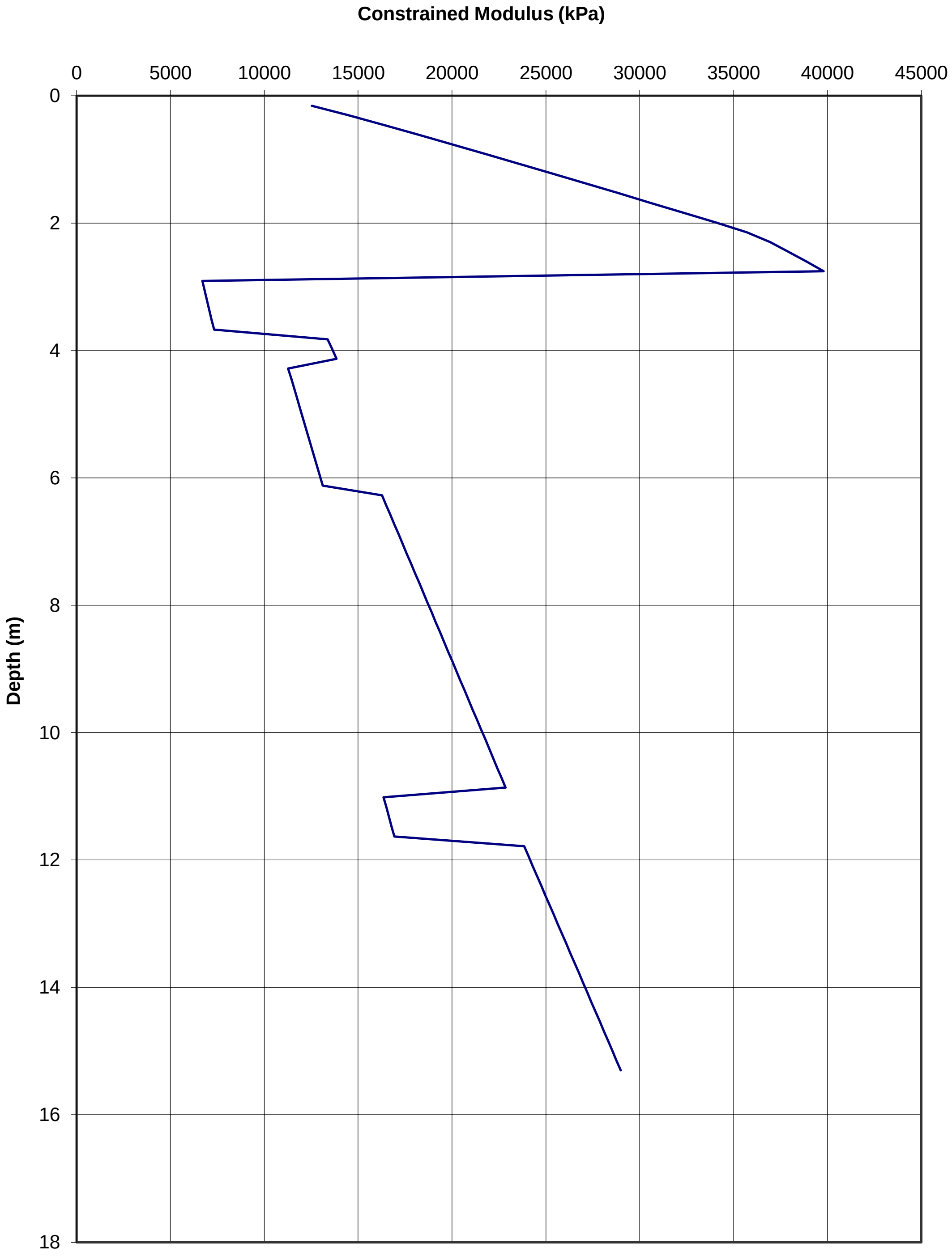
Displacement Profile

SKETCH / FIG No.:-
Figure 3

Report No:
6065746_ACM_RP_ENV

DATE:-

22/10/2021



PROJECT TITLE:-

NZT Preliminary Onshore Ground Investigation

ORIGINATOR:-

AECOM

SKETCH / FIG TITLE:-

CCR & Workshops

Teesworks

SETTLEMENT ANALYSIS

Ground Profile - MS/BH13

Drained Soil Stiffness Profile

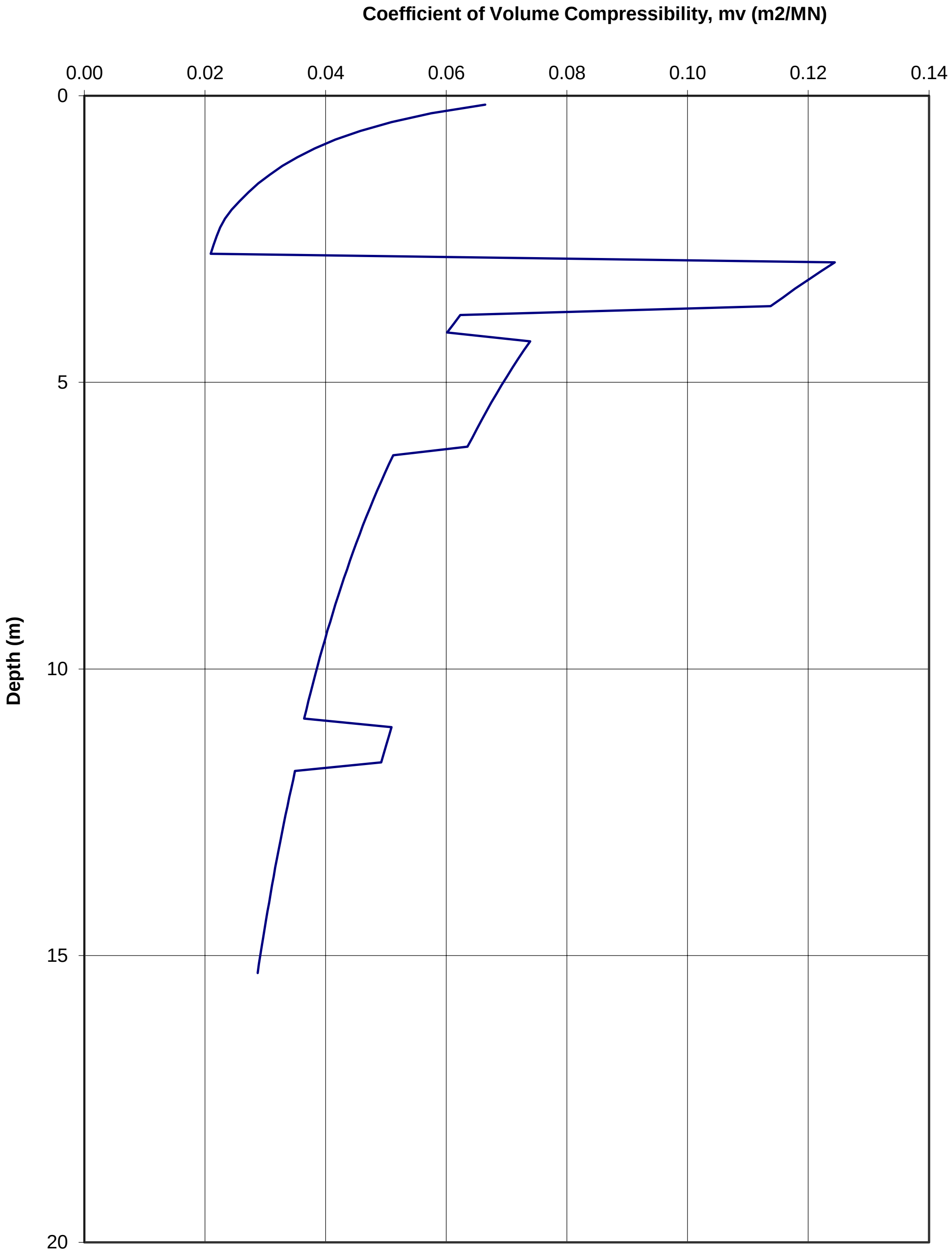
SKETCH / FIG No.:-
Figure 4

Report No:
6065746_ACM_RP_ENV

DATE:-

22/10/2021

bp



PROJECT TITLE:-

NZT Preliminary Onshore Ground Investigation

ORIGINATOR:-

AECOM

SKETCH / FIG TITLE:-

CCR & Workshops

Teesworks

SETTLEMENT ANALYSIS

Ground Profile - MS/BH13

mv profile

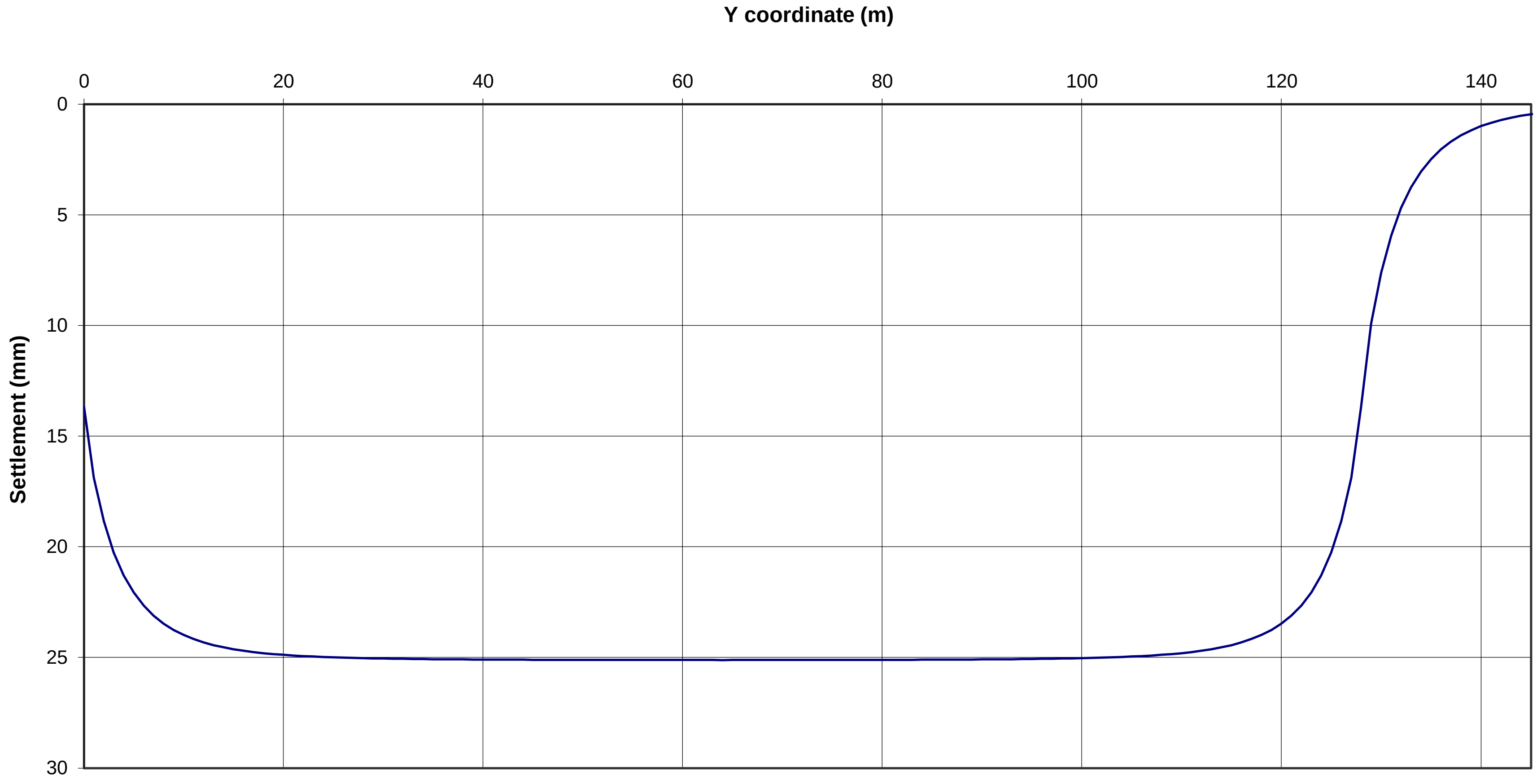
SKETCH / FIG No.:-
Figure 5

Report No:
6065746_ACM_RP_ENV

DATE:-

22/10/2021

bp



PROJECT TITLE:-

NZT Preliminary Onshore Ground Investigation

ORIGINATOR:-

AECOM

SKETCH / FIG TITLE:-

CCR & Workshops

Teesworks

SETTLEMENT ANALYSIS

Displacement along Centre Line

Ground Profile - MS/BH13

SKETCH / FIG No.:-
Figure 6

Report No:
6065746_ACM_RP_ENV

DATE:-
22/10/2021

CALCULATION OF AXIAL PILE CAPACITY USING THE BETA METHOD

FILE :	60657467	**Summary**	circular concrete 0.6 m pile					
CLIENT :	bp on behalf of OGCI				**FoS**	**Safe**	**Applied**	**kN**
JOB :	Net Zero Teesside	**Skin**	3535.17	kN	2.50	1414.07	**Dead Load**	1500.00
SITE :	Preliminary Onshore Ground Investigation	**Toe**	2544.69	kN	3.00	848.23	**Live Load**	500.00
LOCATION:	MS\BH08 - Cooling	**Total**	6079.86	kN		2262.30	**Total Load**	2000.00
SUBTITLE:	600mm dia. concrete Bored piles 2m rock socket	**Top Stress**	21.50	N/mm^2				
ENG'R :	CMC	**Stress Ratio**	0.61					
CHECK :	SDM /NJ	**Head settlement**	10.85	mm	Toe estimate	5.00	mm	
DATE :	02-Nov-21	**Spring stiffness**	184278	kN/m				
Version	1.125							
Date updated:	12/09/14							
Author :	sdm							

INPUT INFORMATION

Existing ground level	7.98	mOD
Finished formation level	6.98	mOD
Pile cut off level	6.98	mOD
Embedment below cut off	25.80	m
Pile Toe Level	-18.82	mOD
Depth below finished ground	25.80	m
Pile Type:	circular	
Installation Method:	bored	
Depth Water:	3.98	m
Unit Weight Water:	9.81	kN/m^3
Pile Diameter:	0.600	m
:	0.000	m
:	0.000	m
Pile Base Area:	0.2827	sq.m
Shaft perimeter area	1.88496	sq.m/m
Surcharge:	0.00	kPa
Volume pile material	7.2948	m^3
Compressive Strength:	35.00	N/mm^2
Pile Modulus	3.5000E+07	(kPa)
Material:	concrete	
Pile material section area	0.28274	sq.m

1.60

Soil Properties

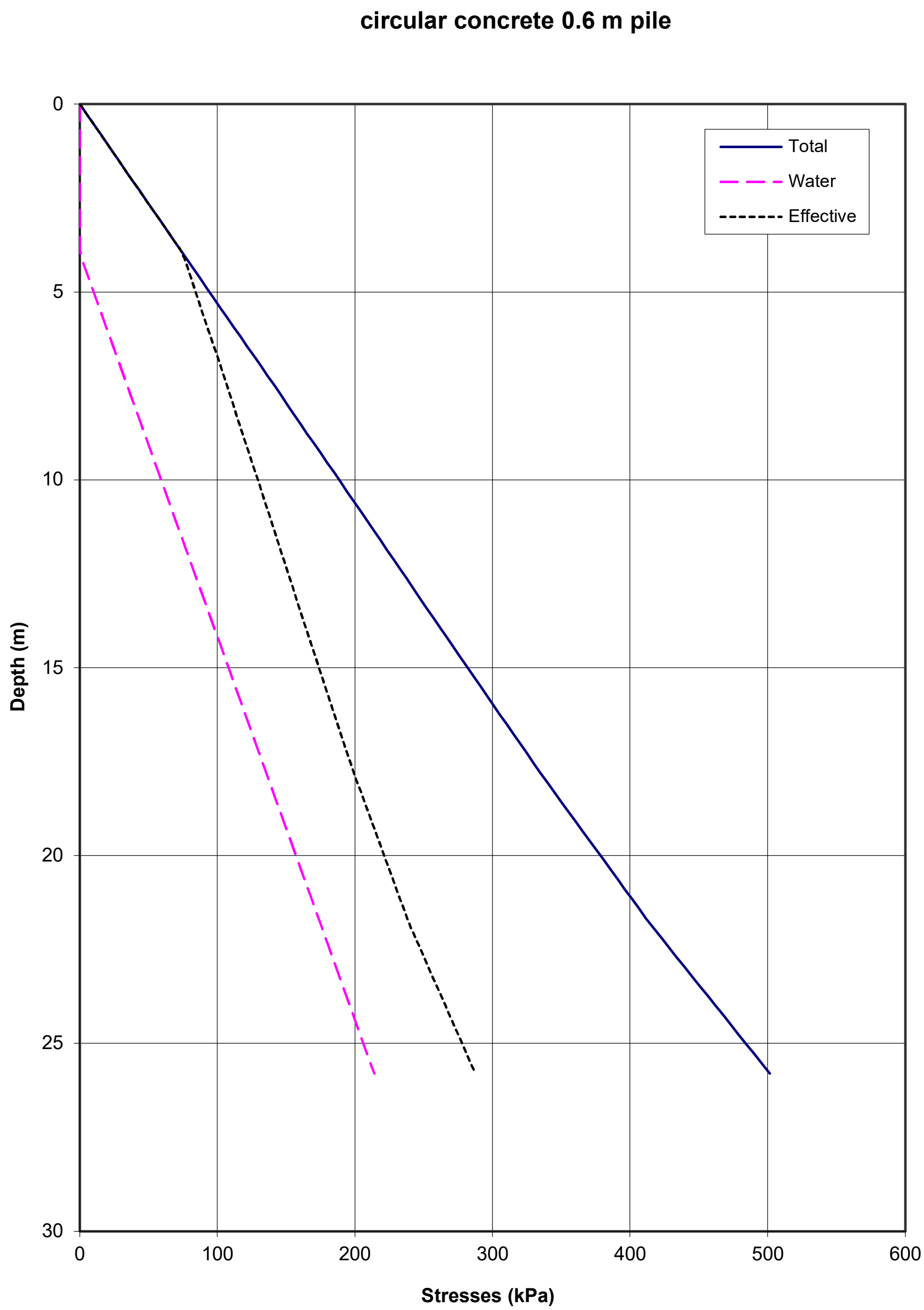
Layer Number	Pile Depth Top (m)	Bulk Density (Mg/m3)	Friction Angle (deg)	Cohesion (kPa)	Interface Factor	Preload Stress (kPa)	Artesian Gradient	Material Type		Description
1	0.00	1.920	0.01	0.00	1.00	50.00	1.00	soil	d1	Made Ground - Slag dominant
2	5.90	1.950	34.00	0.00	1.00	50.00	1.00	soil	d2	Made Ground - Silty Sand
3	7.20	1.900	34.00	0.00	1.00	50.00	1.00	soil	d3	Made Ground - Gravel
4	7.80	1.900	30.00	0.00	1.00	50.00	1.00	soil	c2	Tidal Flats - Sand
5	8.50	1.920	27.00	0.00	1.00	50.00	1.00	soil	c1	Tidal Flats - Clay (soft organic)
6	10.20	1.900	30.00	0.00	1.00	50.00	1.00	soil	c2	Tidal Flats - Sand
7	13.80	1.920	27.00	0.00	1.00	50.00	1.00	soil	c1	Tidal Flats - Clay
8	17.80	2.020	28.00	0.00	1.00	350.00	1.00	soil	b3	Lacustrine Deposits - Laminated Clay
9	21.80	2.230	29.00	0.00	1.00	350.00	1.00	soil	b1	Glacial Till
10	23.80	2.230	0.00	1500.00	1.00	600.00	1.00	rock	a3	Redcar Mudstone Formation

Limiting Ko OC Values

Soil Type	Pile Type	Calculation Reference	Maximum Value
soil	driven	soildriven	1.50
soil	bored	soilbored	1.00

Depth below 6.98 (m)	Soil/ Rock	Bulk Density (Mg/m^3)	Total Stress (kPa)	Artesian Gradient Factor	Water Stress (kPa)	Effective Stress (kPa)	Cohesion (kPa)	Friction Angle (degrees)	Interface Factor	Preload Stress (kPa)	OCR value	K nc	K p	Triaxial Compr Strength (MPa)	Uniaxial Compr Strength (MPa)
0.00	soil	1.92	0.00	1.00	0.00	0.00	0.00	0.01	1.00	50.00	0.00	1.00	1.00	0.00	0.00
0.26	soil	1.92	4.86	1.00	0.00	4.86	0.00	0.01	1.00	50.00	11.29	1.00	1.00	0.00	0.00
0.52	soil	1.92	9.72	1.00	0.00	9.72	0.00	0.01	1.00	50.00	6.14	1.00	1.00	0.01	0.00
0.77	soil	1.92	14.58	1.00	0.00	14.58	0.00	0.01	1.00	50.00	4.43	1.00	1.00	0.01	0.00
1.03	soil	1.92	19.44	1.00	0.00	19.44	0.00	0.01	1.00	50.00	3.57	1.00	1.00	0.02	0.00
1.29	soil	1.92	24.30	1.00	0.00	24.30	0.00	0.01	1.00	50.00	3.06	1.00	1.00	0.02	0.00
1.55	soil	1.92	29.16	1.00	0.00	29.16	0.00	0.01	1.00	50.00	2.71	1.00	1.00	0.03	0.00
1.81	soil	1.92	34.02	1.00	0.00	34.02	0.00	0.01	1.00	50.00	2.47	1.00	1.00	0.03	0.00
2.06	soil	1.92	38.88	1.00	0.00	38.88	0.00	0.01	1.00	50.00	2.29	1.00	1.00	0.04	0.00
2.32	soil	1.92	43.74	1.00	0.00	43.74	0.00	0.01	1.00	50.00	2.14	1.00	1.00	0.04	0.00
2.58	soil	1.92	48.59	1.00	0.00	48.59	0.00	0.01	1.00	50.00	2.03	1.00	1.00	0.05	0.00
2.84	soil	1.92	53.45	1.00	0.00	53.45	0.00	0.01	1.00	50.00	1.94	1.00	1.00	0.05	0.00
3.10	soil	1.92	58.31	1.00	0.00	58.31	0.00	0.01	1.00	50.00	1.86	1.00	1.00	0.06	0.00
3.35	soil	1.92	63.17	1.00	0.00	63.17	0.00	0.01	1.00	50.00	1.79	1.00	1.00	0.06	0.00
3.61	soil	1.92	68.03	1.00	0.00	68.03	0.00	0.01	1.00	50.00	1.73	1.00	1.00	0.07	0.00
3.87	soil	1.92	72.89	1.00	0.00	72.89	0.00	0.01	1.00	50.00	1.69	1.00	1.00	0.07	0.00
4.13	soil	1.92	77.75	1.00	1.45	76.30	0.00	0.01	1.00	50.00	1.66	1.00	1.00	0.08	0.00
4.39	soil	1.92	82.61	1.00	3.98	78.63	0.00	0.01	1.00	50.00	1.64	1.00	1.00	0.08	0.00
4.64	soil	1.92	87.47	1.00	6.51	80.96	0.00	0.01	1.00	50.00	1.62	1.00	1.00	0.08	0.00
4.90	soil	1.92	92.33	1.00	9.04	83.29	0.00	0.01	1.00	50.00	1.60	1.00	1.00	0.08	0.00
5.16	soil	1.92	97.19	1.00	11.58	85.61	0.00	0.01	1.00	50.00	1.58	1.00	1.00	0.09	0.00
5.42	soil	1.92	102.05	1.00	14.11	87.94	0.00	0.01	1.00	50.00	1.57	1.00	1.00	0.09	0.00
5.68	soil	1.92	106.91	1.00	16.64	90.27	0.00	0.01	1.00	50.00	1.55	1.00	1.00	0.09	0.00
5.93	soil	1.95	111.81	1.00	19.17	92.64	0.00	34.00	1.00	50.00	1.54	0.44	3.54	0.19	0.00
6.19	soil	1.95	116.74	1.00	21.70	95.04	0.00	34.00	1.00	50.00	1.53	0.44	3.54	0.19	0.00
6.45	soil	1.95	121.68	1.00	24.23	97.45	0.00	34.00	1.00	50.00	1.51	0.44	3.54	0.19	0.00
6.71	soil	1.95	126.61	1.00	26.76	99.85	0.00	34.00	1.00	50.00	1.50	0.44	3.54	0.20	0.00
6.97	soil	1.95	131.55	1.00	29.29	102.26	0.00	34.00	1.00	50.00	1.49	0.44	3.54	0.20	0.00
7.22	soil	1.90	136.42	1.00	31.82	104.60	0.00	34.00	1.00	50.00	1.48	0.44	3.54	0.21	0.00
7.48	soil	1.90	141.23	1.00	34.35	106.87	0.00	34.00	1.00	50.00	1.47	0.44	3.54	0.21	0.00
7.74	soil	1.90	146.04	1.00	36.89	109.15	0.00	34.00	1.00	50.00	1.46	0.44	3.54	0.21	0.00
8.00	soil	1.90	150.85	1.00	39.42	111.43	0.00	30.00	1.00	50.00	1.45	0.50	3.00	0.20	0.00
8.26	soil	1.90	155.66	1.00	41.95	113.71	0.00	30.00	1.00	50.00	1.44	0.50	3.00	0.21	0.00
8.51	soil	1.92	160.49	1.00	44.48	116.01	0.00	27.00	1.00	50.00	1.43	0.55	2.66	0.20	0.00
8.77	soil	1.92	165.35	1.00	47.01	118.34	0.00	27.00	1.00	50.00	1.42	0.55	2.66	0.20	0.00
9.03	soil	1.92	170.21	1.00	49.54	120.67	0.00	27.00	1.00	50.00	1.41	0.55	2.66	0.21	0.00
9.29	soil	1.92	175.07	1.00	52.07	123.00	0.00	27.00	1.00	50.00	1.41	0.55	2.66	0.21	0.00
9.55	soil	1.92	179.93	1.00	54.60	125.32	0.00	27.00	1.00	50.00	1.40	0.55	2.66	0.21	0.00
9.80	soil	1.92	184.79	1.00	57.13	127.65	0.00	27.00	1.00	50.00	1.39	0.55	2.66	0.22	0.00
10.06	soil	1.92	189.65	1.00	59.66	129.98	0.00	27.00	1.00	50.00	1.38	0.55	2.66	0.22	0.00
10.32	soil	1.90	194.48	1.00	62.20	132.29	0.00	30.00	1.00	50.00	1.38	0.50	3.00	0.23	0.00
10.58	soil	1.90	199.29	1.00	64.73	134.56	0.00	30.00	1.00	50.00	1.37	0.50	3.00	0.24	0.00
10.84	soil	1.90	204.10	1.00	67.26	136.84	0.00	30.00	1.00	50.00	1.37	0.50	3.00	0.24	0.00
11.09	soil	1.90	208.91	1.00	69.79	139.12	0.00	30.00	1.00	50.00	1.36	0.50	3.00	0.25	0.00
11.35	soil	1.90	213.72	1.00	72.32	141.40	0.00	30.00	1.00	50.00	1.35	0.50	3.00	0.25	0.00
11.61	soil	1.90	218.52	1.00	74.85	143.67	0.00	30.00	1.00	50.00	1.35	0.50	3.00	0.25	0.00
11.87	soil	1.90	223.33	1.00	77.38	145.95	0.00	30.00	1.00	50.00	1.34	0.50	3.00	0.26	0.00
12.13	soil	1.90	228.14	1.00	79.91	148.23	0.00	30.00	1.00	50.00	1.34	0.50	3.00	0.26	0.00
12.38	soil	1.90	232.95	1.00	82.44	150.51	0.00	30.00	1.00	50.00	1.33	0.50	3.00	0.26	0.00
12.64	soil	1.90	237.76	1.00	84.97	152.79	0.00	30.00	1.00	50.00	1.33	0.50	3.00	0.27	0.00
12.90	soil	1.90	242.57	1.00	87.51	155.06	0.00	30.00	1.00	50.00	1.32	0.50	3.00	0.27	0.00
13.16	soil	1.90	247.38	1.00	90.04	157.34	0.00	30.00	1.00	50.00	1.32	0.50	3.00	0.27	0.00
13.42	soil	1.90	252.19	1.00	92.57	159.62	0.00	30.00	1.00	50.00	1.31	0.50	3.00	0.28	0.00
13.67	soil	1.90	257.00	1.00	95.10	161.90	0.00	30.00	1.00	50.00	1.31	0.50	3.00	0.28	0.00
13.93	soil	1.92	261.83	1.00	97.63	164.20	0.00	27.00	1.00	50.00	1.30	0.55	2.66	0.27	0.00
14.19	soil	1.92	266.69	1.00	100.16	166.53	0.00	27.00	1.00	50.00	1.30	0.55	2.66	0.27	0.00
14.45	soil	1.92	271.55	1.00	102.69	168.86	0.00	27.00	1.00	50.00	1.30	0.55	2.66	0.28	0.00
14.71	soil	1.92	276.41	1.00	105.22	171.19	0.00	27.00	1.00	50.00	1.29	0.55	2.66	0.28	0.00
14.96	soil	1.92	281.27	1.00	107.75	173.51	0.00	27.00	1.00	50.00	1.29	0.55	2.66	0.28	0.00
15.22	soil	1.92	286.13	1.00	110.28	175.84	0.00	27.00	1.00	50.00	1.28	0.55	2.66	0.29	0.00
15.48	soil	1.92	290.99	1.00	112.82	178.17	0.00	27.00	1.00	50.00	1.28	0.55	2.66	0.29	0.00
15.74	soil	1.92	295.85	1.00	115.35	180.50	0.00	27.00	1.00	50.00	1.28	0.55	2.66	0.29	0.00
16.00	soil	1.92	300.71	1.00	117.88	182.83	0.00	27.00	1.00	50.00	1.27	0.55	2.66	0.30	0.00
16.25	soil	1.92	305.57	1.00	120.41	185.16	0.00	27.00	1.00	50.00	1.27	0.55	2.66	0.30	0.00
16.51	soil	1.92	310.42	1.00	122.94	187.49	0.00	27.00	1.00	50.00	1.27	0.55	2.66	0.30	0.00
16.77	soil	1.92	315.28	1.00	125.47	189.81	0.00	27.00	1.00	50.00	1.26	0.55	2.66	0.31	0.00
17.03	soil	1.92	320.14	1.00	128.00	192.14	0.00	27.00	1.00	50.00	1.26	0.55	2.66	0.31	0.00
17.29	soil	1.92	325.00	1.00	130.53	194.47	0.00	27.00	1.00	50.00	1.26	0.55	2.66	0.31	0.00
17.54	soil	1.92	329.86	1.00	133.06	196.80	0.00	27.00	1.00	50.00	1.25	0.55	2.66	0.32	0.00
17.80	soil	2.02	334.85	1.00	135.59	199.25	0.00	28.00	1.00	350.00	2.76	0.53	2.77	0.48	0.00
18.06	soil	2.02	339.96	1.00	138.12	201.84	0.00	28.00	1.00	350.00	2.73	0.53	2.77	0.48	0.00
18.32	soil	2.02	345.07	1.00	140.66	204.42	0.00	28.00	1.00	350.00	2.71	0.53	2.77	0.49	0.00
18.58	soil	2.02	350.19	1.00	143.19	207.00	0.00	28.00	1.00	350.00	2.69	0.53	2.77	0.49	0.00
18.83	soil	2.02	355.30	1.00	145.72	209.58	0.00	28.00	1.00	350.00	2.67	0.53	2.77	0.50	0.00
19.09	soil	2.02	360.41	1.00	148.25	212.16	0.00	28.00	1.00	350.00	2.65	0.53	2.77	0.50	0.00
19.35	soil	2.02	365.52	1.00	150.78	214.74	0.00	28.00	1.00	350.00	2.63	0.53	2.77	0.51	0.00
19.61	soil	2.02	370.64	1.00	153.31	217.33	0.00	28.00	1.00	350.00	2.61	0.53	2.77	0.51	0.00
19.87	soil	2.02	375.75	1.00	155.84	219.91	0.00	28.00	1.00	350.00	2.59	0.53	2.77	0.51	0.00
20.12	soil	2.02	380.86	1.00	158.37	222.49	0.00	28.00	1.00	350.00	2.57	0.53	2.77	0.52	0.00
20.38	soil	2.02	385.97	1.00	160.90	225.07	0.00	28.00	1.00	350.00	2.56	0.53	2.77	0.52	0.00
20.64	soil	2.02	391.09	1.00	163.43	227.65	0.00	28.00	1.00	350.00	2.54	0.53	2.77	0.53	0.00
20.90	soil	2.02	396.20	1.00	165.97	230.23	0.00	28.00	1.00	350.00	2.52	0.53	2.77	0.53	0.00
21.16	soil	2.02	401.31	1.00	168.50	232.82	0.00	28.00	1.00	350.00	2.50	0.53	2.77	0.54	0.00
21.41	soil	2.02	406.42	1.00	171.03	235.40	0.00	28.00	1.00	350.00	2.49	0.53	2.77	0.54	0.00
21.67	soil	2.02	411.54	1.00	173.56	237.98	0.00	28.00	1.00	350.00	2.47	0.53	2.77	0.54	0.00
21.93	soil	2.23	416.92	1.00	176.09	240.83	0.00	29.00	1.00	350.00	2.45	0.52	2.88	0.56	0.00
22.19	soil	2.23	422.56	1.00	178.62	243.94	0.00	29.00	1.00	350.00	2.43	0.52	2.88	0.57	0.00
22.45	soil	2.23	428.20	1.00	181.15	247.05	0.00	29.00	1.00	350.00	2.42	0.52	2.88	0.57	0.00
22.70	soil	2.23	433.85	1.00	183.68	250.17	0.00	29.00	1.00	350.00	2.40	0.52	2.88	0.58	0.00
22.96	soil	2.23	439.49	1.00	186.21	253.28	0.00	29.00	1.00	350.00	2.38	0.52	2.88	0.58	0.00
23.22	soil	2.23	445.14	1.00	188.74	256.39	0.00	29.00	1.00	350.00	2.37	0.52	2.88	0.59	0.00
23.48	soil	2.23	450.78	1.00	191.28	259.50	0.00	29.00	1.00	350.00	2.35	0.52	2.88	0.59	0.00
23.74	soil	2.23	456.42	1.00	193.81	262.62	0.00	29.00	1.00	350.00	2.33	0.52	2.88	0.60	0.00
23.99	rock	2.23	462.07	1.00	196.34	265.73	1500.00	0.00	1.00	600.00	3.26	1.00	1.00	1.77	3.00
24.25	rock	2.23	467.71	1.00	198.87	268.84	1500.00	0.00	1.00	600.00	3.23	1.00	1.00	1.77	3.00
24.51	rock	2.23	473.36	1.00	201.40	271.96	1500.00	0.00	1.00	600.00	3.21	1.00	1.00	1.77	3.00
24.77	rock	2.23	479.00	1.00	203.93	275.07	1500.00	0.00	1.00	600.00	3.18	1.00	1.00	1.78	3.00
25.03	rock	2.23	484.64	1.00	206.46	278.18	1500.00	0.00	1.00	600.00	3.16	1.00	1.00	1.78	3.00
25.28	rock	2.23	490.29	1.00	208.99	281.30	1500.00	0.00	1.00	600.00	3.13	1.00	1.00	1.78	3.00
25.54	rock	2.23	495.93	1.00	211.52	284.41	1500.00	0.00	1.00	600.00	3.11	1.00	1.00	1.78	3.00
25.80	rock	2.23	501.58	1.00	214.05	287.52	1500.00	0.00	1.00	600.00	3.09	1.00	1.00	1.79	3.00

Depth below 6.98 (m)	Ko OC	K	Beta Factor	0.2*sqrt(UCS)/ UCS alpha rock	Nq* Factor	Ultimate Skin Friction (kPa)	Ultimate Shaft Capacity (kN)	Ultimate Toe Bearing (kPa)	Ultimate Toe Capacity (kN)	Ultimate Axial Capacity (kN)	Dead Load plus Drag (kN)	Ultimate less Skin (kN)	Nett Force in Pile (kN)	Working Stress (N/mm^2)	Maximum Allowable Stress (N/mm^2)	Incr. Pile Compr. (mm)	Working Pile Compr (mm)
0.00	0.00	0.00	0.00	0.0000	1.00	0.00	0.00	0.00	0.00	0.00	1500.00	6079.86	1500.00	5.31	14.00		5.85
0.26	1.00	1.00	0.00	0.0000	1.00	0.00	0.00	4.86	1.38	1.38	1500.00	6079.86	1500.00	5.31	14.00	0.0391	5.81
0.52	1.00	1.00	0.00	0.0000	1.00	0.00	0.00	9.73	2.75	2.75	1500.00	6079.86	1500.00	5.31	14.00	0.0391	5.77
0.77	1.00	1.00	0.00	0.0000	1.00	0.00	0.00	14.59	4.13	4.13	1500.00	6079.86	1500.00	5.31	14.00	0.0391	5.74
1.03	1.00	1.00	0.00	0.0000	1.00	0.00	0.00	19.46	5.50	5.51	1500.00	6079.85	1500.00	5.31	14.00	0.0391	5.70
1.29	1.00	1.00	0.00	0.0000	1.00	0.00	0.01	24.32	6.88	6.88	1500.01	6079.85	1500.01	5.31	14.00	0.0391	5.66
1.55	1.00	1.00	0.00	0.0000	1.00	0.01	0.01	29.19	8.25	8.26	1500.01	6079.85	1500.01	5.31	14.00	0.0391	5.62
1.81	1.00	1.00	0.00	0.0000	1.00	0.01	0.01	34.05	9.63	9.64	1500.01	6079.85	1500.01	5.31	14.00	0.0391	5.58
2.06	1.00	1.00	0.00	0.0000	1.00	0.01	0.01	38.92	11.00	11.02	1500.01	6079.84	1500.01	5.31	14.00	0.0391	5.54
2.32	1.00	1.00	0.00	0.0000	1.00	0.01	0.02	43.78	12.38	12.40	1500.02	6079.84	1500.02	5.31	14.00	0.0391	5.50
2.58	1.00	1.00	0.00	0.0000	1.00	0.01	0.02	48.65	13.75	13.78	1500.02	6079.84	1500.02	5.31	14.00	0.0391	5.46
2.84	1.00	1.00	0.00	0.0000	1.00	0.01	0.02	53.51	15.13	15.16	1500.02	6079.83	1500.02	5.31	14.00	0.0391	5.42
3.10	1.00	1.00	0.00	0.0000	1.00	0.01	0.03	58.38	16.51	16.54	1500.03	6079.83	1500.03	5.31	14.00	0.0391	5.38
3.35	1.00	1.00	0.00	0.0000	1.00	0.01	0.03	63.24	17.88	17.92	1500.03	6079.82	1500.03	5.31	14.00	0.0391	5.34
3.61	1.00	1.00	0.00	0.0000	1.00	0.01	0.04	68.11	19.26	19.30	1500.04	6079.82	1500.04	5.31	14.00	0.0391	5.31
3.87	1.00	1.00	0.00	0.0000	1.00	0.01	0.05	72.97	20.63	20.68	1500.05	6079.81	1500.05	5.31	14.00	0.0391	5.27
4.13	1.00	1.00	0.00	0.0000	1.00	0.01	0.05	76.38	21.60	21.65	1500.05	6079.80	1500.05	5.31	14.00	0.0391	5.23
4.39	1.00	1.00	0.00	0.0000	1.00	0.01	0.06	78.71	22.26	22.31	1500.06	6079.80	1500.06	5.31	14.00	0.0391	5.19
4.64	1.00	1.00	0.00	0.0000	1.00	0.01	0.07	81.04	22.91	22.98	1500.07	6079.79	1500.07	5.31	14.00	0.0391	5.15
4.90	1.00	1.00	0.00	0.0000	1.00	0.01	0.07	83.37	23.57	23.65	1500.07	6079.78	1500.07	5.31	14.00	0.0391	5.11
5.16	1.00	1.00	0.00	0.0000	1.00	0.01	0.08	85.71	24.23	24.31	1500.08	6079.78	1500.08	5.31	14.00	0.0391	5.07
5.42	1.00	1.00	0.00	0.0000	1.00	0.02	0.09	88.04	24.89	24.98	1500.09	6079.77	1500.09	5.31	14.00	0.0391	5.03
5.68	1.00	1.00	0.00	0.0000	1.00	0.02	0.10	90.37	25.55	25.65	1500.10	6079.76	1500.10	5.31	14.00	0.0391	4.99
5.93	0.57	0.57	0.38	0.0000	49.30	35.58	8.75	4566.76	1291.22	1299.97	1508.75	6071.11	1508.75	5.34	14.00	0.0392	4.95
6.19	0.57	0.57	0.38	0.0000	49.30	36.32	26.23	4685.29	1324.73	1350.97	1526.23	6053.62	1526.23	5.40	14.00	0.0396	4.91
6.45	0.56	0.56	0.38	0.0000	49.30	37.05	44.07	4803.82	1358.25	1402.32	1544.07	6035.78	1544.07	5.46	14.00	0.0400	4.87
6.71	0.56	0.56	0.38	0.0000	49.30	37.78	62.27	4922.35	1391.76	1454.03	1562.27	6017.59	1562.27	5.53	14.00	0.0405	4.83
6.97	0.56	0.56	0.38	0.0000	49.30	38.50	80.81	5040.88	1425.28	1506.09	1580.81	5999.04	1580.81	5.59	14.00	0.0410	4.79
7.22	0.56	0.56	0.37	0.0000	49.30	39.21	99.71	5156.30	1457.91	1557.62	1599.71	5980.14	1599.71	5.66	14.00	0.0415	4.75
7.48	0.55	0.55	0.37	0.0000	49.30	39.90	118.95	5268.59	1489.66	1608.61	1618.95	5960.91	1618.95	5.73	14.00	0.0420	4.71
7.74	0.55	0.55	0.37	0.0000	49.30	40.59	138.52	5380.88	1521.41	1659.93	1638.52	5941.33	1638.52	5.80	14.00	0.0425	4.67
8.00	0.61	0.61	0.35	0.0000	29.03	39.06	157.89	3234.25	914.46	1072.36	1657.89	5921.96	1657.89	5.86	14.00	0.0430	4.62
8.26	0.61	0.61	0.35	0.0000	29.03	39.73	177.05	3300.37	933.16	1110.21	1677.05	5902.81	1677.05	5.93	14.00	0.0435	4.58
8.51	0.65	0.65	0.33	0.0000	19.92	38.21	196.00	2311.45	653.55	849.55	1696.00	5883.86	1696.00	6.00	14.00	0.0440	4.54
8.77	0.64	0.64	0.33	0.0000	19.92	38.87	214.74	2357.85	666.67	881.41	1714.74	5865.11	1714.74	6.06	14.00	0.0445	4.49
9.03	0.64	0.64	0.33	0.0000	19.92	39.53	233.81	2404.24	679.78	913.59	1733.81	5846.05	1733.81	6.13	14.00	0.0450	4.45
9.29	0.64	0.64	0.33	0.0000	19.92	40.19	253.19	2450.64	692.90	946.09	1753.19	5826.67	1753.19	6.20	14.00	0.0455	4.40
9.55	0.64	0.64	0.33	0.0000	19.92	40.84	272.89	2497.03	706.02	978.91	1772.89	5806.96	1772.89	6.27	14.00	0.0460	4.36
9.80	0.64	0.64	0.33	0.0000	19.92	41.50	292.92	2543.42	719.14	1012.05	1792.92	5786.94	1792.92	6.34	14.00	0.0465	4.31
10.06	0.64	0.64	0.32	0.0000	19.92	42.16	313.26	2589.82	732.25	1045.51	1813.26	5766.60	1813.26	6.41	14.00	0.0470	4.26
10.32	0.59	0.59	0.34	0.0000	29.03	45.17	334.49	3839.58	1085.61	1420.11	1834.49	5745.37	1834.49	6.49	14.00	0.0476	4.21
10.58	0.59	0.59	0.34	0.0000	29.03	45.83	356.62	3905.69	1104.31	1460.93	1856.62	5723.24	1856.62	6.57	14.00	0.0481	4.17
10.84	0.59	0.59	0.34	0.0000	29.03	46.50	379.07	3971.81	1123.00	1502.07	1879.07	5700.79	1879.07	6.65	14.00	0.0487	4.12
11.09	0.59	0.59	0.34	0.0000	29.03	47.16	401.85	4037.92	1141.70	1543.54	1901.85	5678.01	1901.85	6.73	14.00	0.0493	4.07
11.35	0.59	0.59	0.34	0.0000	29.03	47.83	424.94	4104.04	1160.39	1585.33	1924.94	5654.91	1924.94	6.81	14.00	0.0499	4.02
11.61	0.58	0.58	0.34	0.0000	29.03	48.49	448.37	4170.15	1179.08	1627.45	1948.37	5631.49	1948.37	6.89	14.00	0.0505	3.97
11.87	0.58	0.58	0.34	0.0000	29.03	49.16	472.11	4236.27	1197.78	1669.89	1972.11	5607.75	1972.11	6.97	14.00	0.0511	3.92
12.13	0.58	0.58	0.34	0.0000	29.03	49.82	496.18	4302.39	1216.47	1712.65	1996.18	5583.68	1996.18	7.06	14.00	0.0517	3.87
12.38	0.58	0.58	0.34	0.0000	29.03	50.49	520.57	4368.50	1235.16	1755.74	2020.57	5559.28	2020.57	7.15	14.00	0.0524	3.81
12.64	0.58	0.58	0.33	0.0000	29.03	51.15	545.29	4434.62	1253.86	1799.15	2045.29	5534.57	2045.29	7.23	14.00	0.0530	3.76
12.90	0.58	0.58	0.33	0.0000	29.03	51.82	570.33	4500.73	1272.55	1842.88	2070.33	5509.53	2070.33	7.32	14.00	0.0536	3.71
13.16	0.58	0.58	0.33	0.0000	29.03	52.48	595.69	4566.85	1291.25	1886.93	2095.69	5484.17	2095.69	7.41	14.00	0.0543	3.65
13.42	0.58	0.58	0.33	0.0000	29.03	53.14	621.37	4632.96	1309.94	1931.31	2121.37	5458.49	2121.37	7.50	14.00	0.0550	3.60
13.67	0.58	0.58	0.33	0.0000	29.03	53.81	647.38	4699.08	1328.63	1976.01	2147.38	5432.48	2147.38	7.59	14.00	0.0556	3.54
13.93	0.62	0.62	0.32	0.0000	19.92	51.78	673.05	3271.61	925.03	1598.08	2173.05	5406.81	2173.05	7.69	14.00	0.0563	3.48
14.19	0.62	0.62	0.31	0.0000	19.92	52.43	698.39	3318.00	938.14	1636.54	2198.39	5381.47	2198.39	7.78	14.00	0.0570	3.43
14.45	0.62	0.62	0.31	0.0000	19.92	53.08	724.05	3364.40	951.26	1675.31	2224.05	5355.81	2224.05	7.87	14.00	0.0576	3.37
14.71	0.62	0.62	0.31	0.0000	19.92	53.74	750.02	3410.79	964.38	1714.40	2250.02	5329.83	2250.02	7.96	14.00	0.0583	3.31
14.96	0.62	0.62	0.31	0.0000	19.92	54.39	776.32	3457.19	977.50	1753.81	2276.32	5303.54	2276.32	8.05	14.00	0.0590	3.25
15.22	0.61	0.61	0.31	0.0000	19.92	55.04	802.93	3503.58	990.61	1793.54	2302.93	5276.93	2302.93	8.14	14.00	0.0597	3.19
15.48	0.61	0.61	0.31	0.0000	19.92	55.70	829.85	3549.97	1003.73	1833.59	2329.85	5250.00	2329.85	8.24	14.00	0.0604	3.13
15.74	0.61	0.61	0.31	0.0000	19.92	56.35	857.10	3596.37	1016.85	1873.95	2357.10	5222.76	2357.10	8.34	14.00	0.0611	3.07
16.00	0.61	0.61	0.31	0.0000	19.92	57.00	884.66	3642.76	1029.97	1914.63	2384.66	5195.20	2384.66	8.43	14.00	0.0618	3.01
16.25	0.61	0.61	0.31	0.0000	19.92	57.65	912.54	3689.16	1043.08	1955.62	2412.54	5167.32	2412.54	8.53	14.00	0.0625	2.95
16.51	0.61	0.61	0.31	0.0000	19.92	58.31	940.74	3735.55	1056.20	1996.94	2440.74	5139.12	2440.74	8.63	14.00	0.0633	2.88
16.77	0.61	0.61	0.31	0.0000	19.92	58.96	969.25	3781.94	1069.32	2038.57	2469.25	5110.61	2469.25	8.73	14.00	0.0640	2.82
17.03	0.61	0.61	0.31	0.0000	19.92	59.61	998.08	3828.34	1082.44	2080.52	2498.08	5081.78	2498.08	8.84	14.00	0.0648	2.76
17.29	0.61	0.61	0.31	0.0000	19.92	60.26	1027.23	3874.73	1095.55	2122.79	2527.23	5052.63	2527.23	8.94	14.00	0.0655	2.69
17.54	0.61	0.61	0.31	0.0000	19.92	60.91	1056.70	3921.13	1108.67	2165.37	2556.70	5023.16	2556.70	9.04	14.00	0.0663	2.62
17.80	0.87	0.87	0.46	0.0000	22.55	92.26	1093.94	4492.52	1270.23	2364.17	2593.94	4985.92	2593.94	9.17	14.00	0.0671	2.56
18.06	0.87	0.87	0.46	0.0000	22.55	93.08	1139.01	4550.72	1286.69	2425.69	2639.01	4940.85	2639.01	9.33	14.00	0.0682	2.49
18.32	0.86	0.86	0.46	0.0000	22.55	93.90	1184.47	4608.93	1303.14	2487.62	2684.47	4895.39	2684.47	9.49	14.00	0.0694	2.42
18.58	0.86	0.86	0.46	0.0000	22.55	94.72	1230.34	4667.13	1319.60	2549.94	2730.34	4849.52	2730.34	9.66	14.00	0.0706	2.35
18.83	0.86	0.86	0.46	0.0000	22.55	95.54	1276.60	4725.34	1336.06	2612.66	2776.60	4803.26	2776.60	9.82	14.00	0.0718	2.28
19.09	0.85	0.85	0.45	0.0000	22.55	96.35	1323.26	4783.55	1352.52	2675.77	2823.26	4756.60	2823.26	9.99	14.00	0.0730	2.20
19.35	0.85	0.85	0.45	0.0000	22.55	97.17	1370.31	4841.75	1368.97	2739.29	2870.31	4709.54	2870.31	10.15	14.00	0.0742	2.13
19.61	0.85	0.85	0.45	0.0000	22.55	97.98	1417.77	4899.96	1385.43	2803.20	2917.77	4662.09	2917.77	10.32	14.00	0.0755	2.05
19.87	0.84	0.84	0.45	0.0000	22.55	98.79	1465.61	4958.17	1401.89	2867.50	2965.61	4614.24	2965.61	10.49	14.00	0.0767	1.98
20.12	0.84	0.84	0.45	0.0000	22.55	99.60	1513.86	5016.37	1418.35	2932.20	3013.86	4566.00	3013.86	10.66	14.00	0.0779	1.90
20.38	0.84	0.84	0.45	0.0000	22.55	100.41	1562.49	5074.58	1434.80	2997.30	3062.49	4517.36	3062.49	10.83	14.00	0.0792	1.82
20.64	0.84	0.84	0.44	0.0000	22.55	101.22	1611.52	5132.78	1451.26	3062.78	3111.52	4468.33	3111.52	11.00	14.00	0.0805	1.74
20.90	0.83	0.83	0.44	0.0000	22.55	102.03	1660.95	5190.99	1467.72	3128.66	3160.95	4418.91	3160.95	11.18	14.00	0.0818	1.66
21.16	0.83	0.83	0.44	0.0000	22.55	102.84	1710.76	5249.20	1484.18	3194.94	3210.76	4369.10	3210.76	11.36	14.00	0.0831	1.57
21.41	0.83	0.83	0.44	0.0000	22.55	103.64	1760.97	5307.40	1500.63	3261.60	3260.97	4318.89	3260.97	11.53	14.00	0.0844	1.49
21.67	0.83	0.83	0.44	0.0000	22.55	104.45	1811.57	5365.61	1517.09	3328.66	3311.57	4268.29	3311.57	11.71	14.00	0.0857	1.40
21.93	0.81	0.81	0.45	0.0000	25.56	108.32	1863.30	6155.03	1740.29	3603.60	3363.30	4216.56	3363.30	11.90	14.00	0.0870	1.32
22.19	0.81	0.81	0.45	0.0000	25.56	109.30	1916.22	6234.60	1762.79	3679.01	3416.22	4163.64	3416.22	12.08	14.00	0.0884	1.23
22.45	0.81	0.81	0.45	0.0000	25.56	110.27	1969.61	6314.16	1785.29	3754.89	3469.61	4110.25	3469.61	12.27	14.00	0.0898	1.14
22.70	0.80	0.80	0.44	0.0000	25.56	111.25	2023.47	6393.73	1807.78	3831.26	3523.47	4056.38	3523.47	12.46	14.00	0.0912	1.05
22.96	0.80	0.80	0.44	0.0000	25.56	112.23	2077.81	6473.29	1830.28	3908.09	3577.81	4002.04	3577.81	12.65	14.00	0.0926	0.96
23.22	0.80	0.80	0.44	0.0000	25.56	113.20	2132.63	6552.85	1852.78	3985.41	3632.63	3947.23	3632.63	12.85	14.00	0.0940	0.86
23.48	0.79	0.79	0.44	0.0000	25.56	114.17	2187.92	6632.42	1875.27	4063.19	3687.92	3891.94	3687.92	13.04	14.00	0.0954	0.77
23.74	0.79	0.79	0.44	0.0000	25.56	115.14	2243.68	6711.98	1897.77	4141.45	3743.68	3836.18	3743.68	13.24	14.00	0.0969	0.67
23.99	1.00	1.00	0.00	0.1155	9.00	346.41	2355.91	9000.00	2544.69	4900.60	3855.91	3723.95	3723.95	13.17	14.00	0.0973	0.57
24.25	1.00	1.00	0.00	0.1155	9.00	346.41	2524.37	9000.00	2544.69	5069.06	4024.37	3555.48	3555.48	12.57	14.00	0.0949	0.48
24.51	1.00	1.00	0.00	0.1155	9.00	346.41	2692.84	9000.00	2544.69	5237.53	4192.84	3387.02	3387.02	11.98	14.00	0.0905	0.39
24.77	1.00	1.00	0.00	0.1155	9.00	346.41	2861.30	9000.00	2544.69	5405.99	4361.30	3218.55	3218.55	11.38	14.00	0.0861	0.30
25.03	1.00	1.00	0.00	0.1155	9.00	346.41	3029.77	9000.00	2544.69	5574.46	4529.77	3050.09	3050.09	10.79	14.00	0.0817	0.22
25.28	1.00	1.00	0.00	0.1155	9.00	346.41	3198.24	9000.00	2544.69	5742.93	4698.24	2881.62	2881.62	10.19	14.00	0.0773	0.14
25.54	1.00	1.00	0.00	0.1155	9.00	346.41	3366.70	9000.00	2544.69	5911.39	4866.70	2713.16	2713.16	9.60	14.00	0.0729	0.07
25.80	1.00	1.00	0.00	0.1155	9.00	346.41	3535.17	9000.00	2544.69	6079.86	5035.17	2544.69	2544.69	9.00	14.00	0.0685	0.00



PROJECT TITLE:-

Net Zero Teesside

FIGURE TITLE:-

Preliminary Onshore Ground
MS\BH08 - Cooling

600mm dia. concrete Bored piles 2m rock

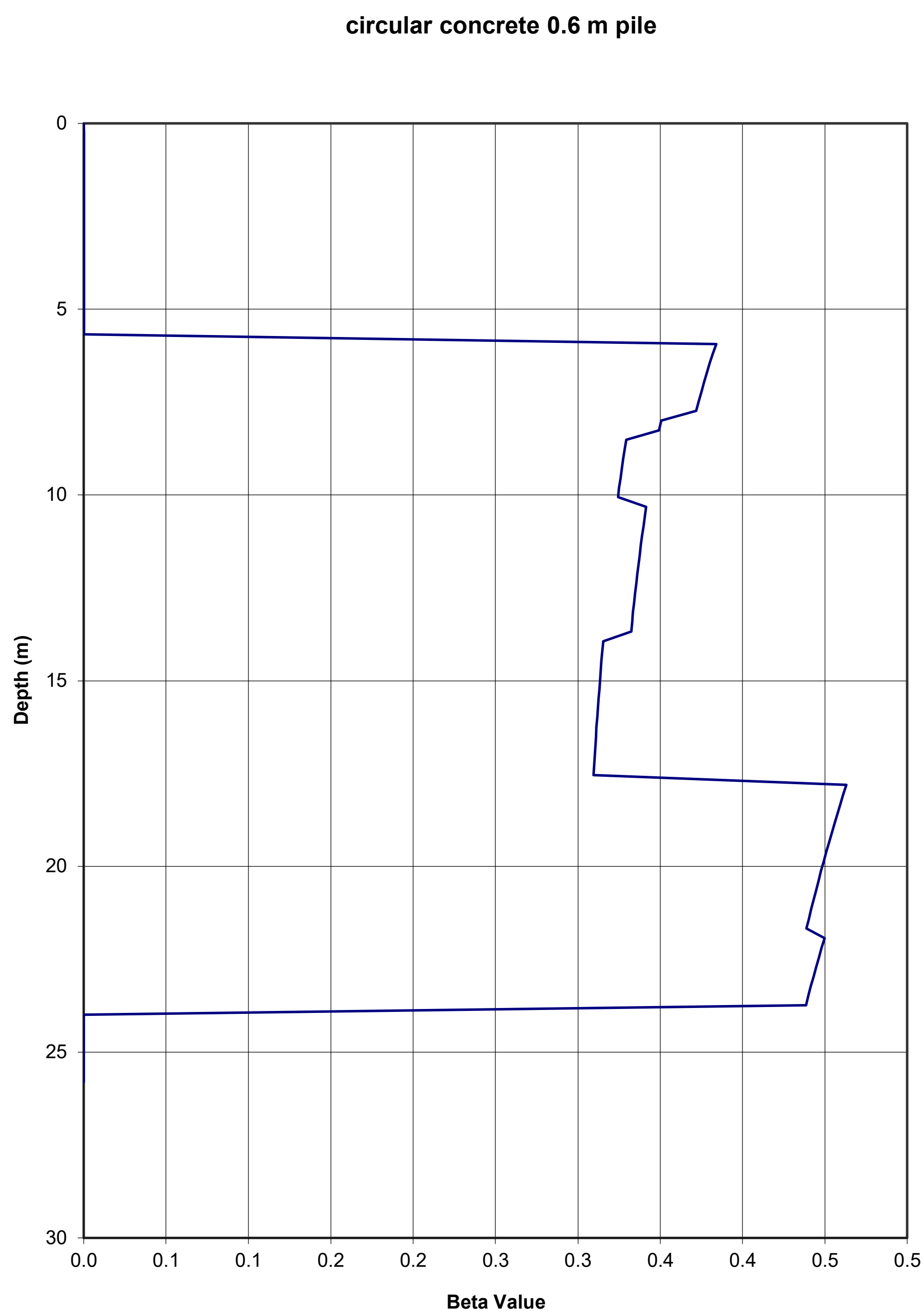
CALCULATION OF AXIAL PILE CAPACITY USING THE BETA METHOD

Vertical Stress Profiles

FIGURE No.
Figure 1

REPORT No.:
60657467

DATE:-
02-Nov-21



PROJECT TITLE:-

Net Zero Teesside

AECOM

FIGURE TITLE:-

Preliminary Onshore Ground Investigation
MS\BH08 - Cooling

600mm dia. concrete Bored piles 2m rock

CALCULATION OF AXIAL PILE CAPACITY USING THE BETA METHOD

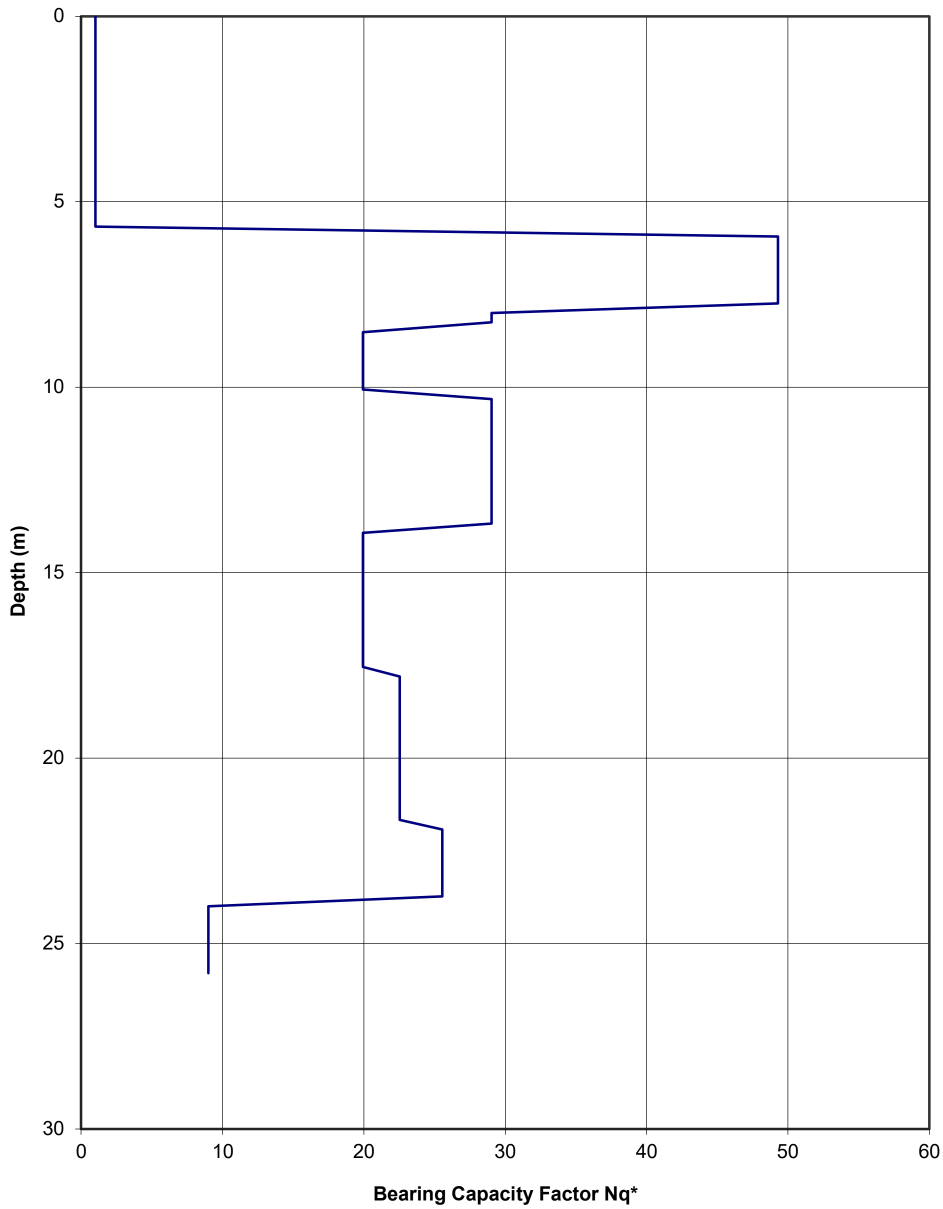
Beta Values

FIGURE No.:
Figure 2

REPORT No.:-
60657467

DATE:-
02-Nov-21

circular concrete 0.6 m pile



PROJECT TITLE:-

Net Zero Teesside

AECOM

FIGURE TITLE:-

Preliminary Onshore Ground Investigation

MS\BH08 - Cooling

600mm dia. concrete Bored piles 2m rock

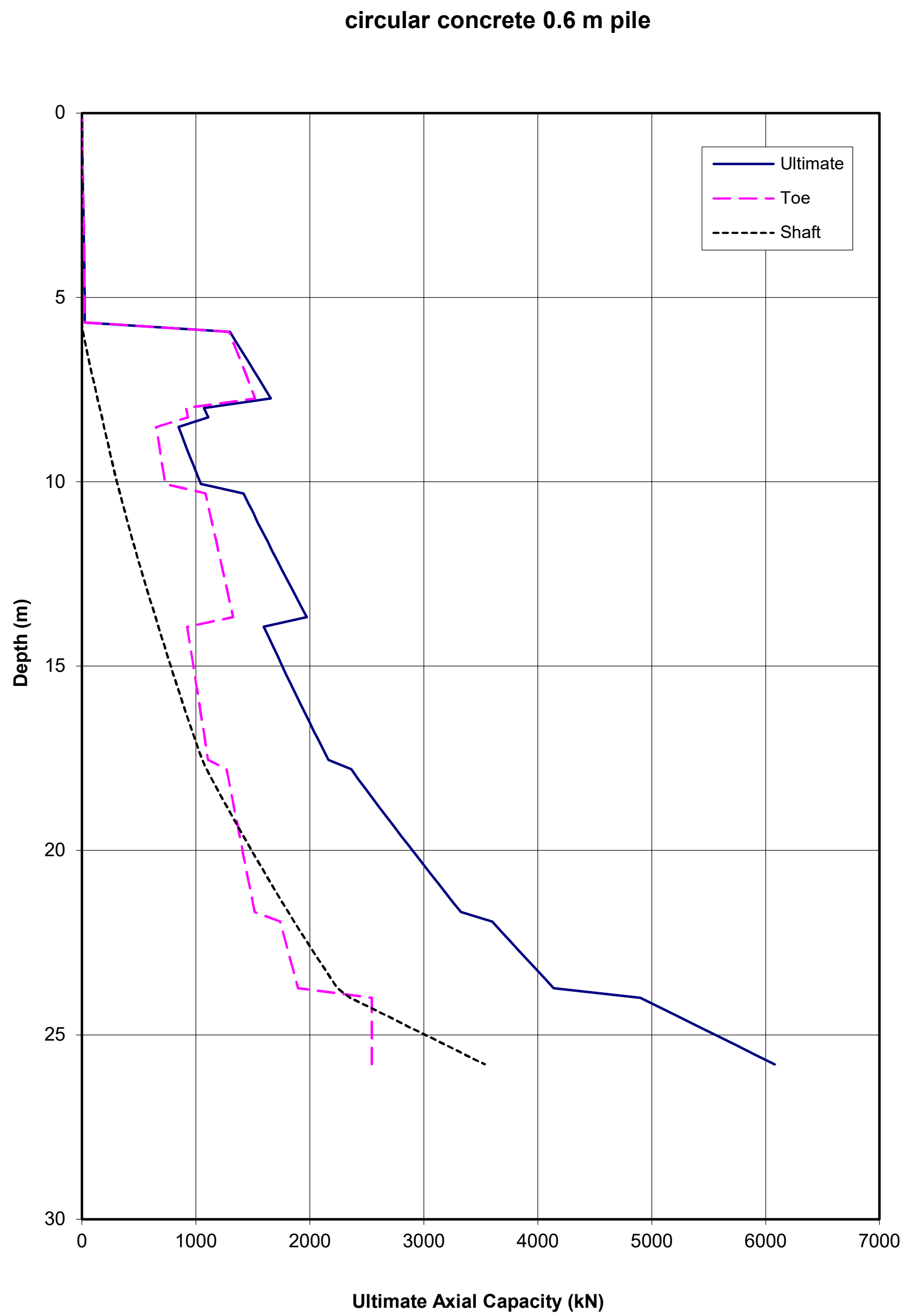
CALCULATION OF AXIAL PILE CAPACITY USING THE BETA METHOD

N_q* Values

FIGURE No.: Figure 4

REPORT No.:- 60657467

DATE:- 02-Nov-21



PROJECT TITLE:-

Net Zero Teesside

AECOM

FIGURE TITLE:-

Preliminary Onshore Ground
MS\BH08 - Cooling
600mm dia. concrete Bored piles 2m rock

CALCULATION OF AXIAL PILE CAPACITY USING THE BETA METHOD

Ultimate Axial Pile Capacity

FIGURE No.:
Figure 8

REPORT No:-
60657467

DATE:-
02-Nov-21

CALCULATION OF AXIAL PILE CAPACITY USING THE BETA METHOD

FILE :	60657467	**Summary**	**circular concrete 0.75 m pile**						
CLIENT :	bp on behalf of OGCI				**FoS**	**Safe**	**Applied**	**kN**	
JOB :	Net Zero Teesside	**Skin**	4418.96	kN	2.50	1767.58	**Dead Load**	2500.00	
SITE :	Preliminary Onshore Ground Investigation	**Toe**	3976.08	kN	3.00	1325.36	**Live Load**	500.00	
LOCATION:	MS\BH08 - Cooling	**Total**	8395.04	kN		3092.94	**Total Load**	3000.00	
SUBTITLE:	750mm dia. concrete Bored piles 2m rock socket	**Top Stress**	19.00	N/mm^2					
ENG'R :	CMC	**Stress Ratio**	0.54						
CHECK :	SDM /NJ	**Head settlement**	10.75	mm	Toe estimate	5.00	mm		
DATE :	02-Nov-21	**Spring stiffness**	279159	kN/m					
Version	1.125								
Date updated:	12/09/14								
Author :	sdm								

AECOM

INPUT INFORMATION

Existing ground level	7.98	mOD
Finished formation level	6.98	mOD
Pile cut off level	6.98	mOD
Embedment below cut off	25.80	m
Pile Toe Level	-18.82	mOD
Depth below finished ground	25.80	m
Pile Type:	circular	
Installation Method:	bored	
Depth Water:	3.98	m
Unit Weight Water:	9.81	kN/m^3
Pile Diameter:	0.750	m
:	0.000	m
:	0.000	m
Pile Base Area:	0.4418	sq.m
Shaft perimeter area	2.35619	sq.m/m
Surcharge:	0.00	kPa
Volume pile material	11.3981	m^3
Compressive Strength:	35.00	N/mm^2
Pile Modulus	3.5000E+07	(kPa)
Material:	concrete	
Pile material section area	0.44179	sq.m

1.60

Soil Properties

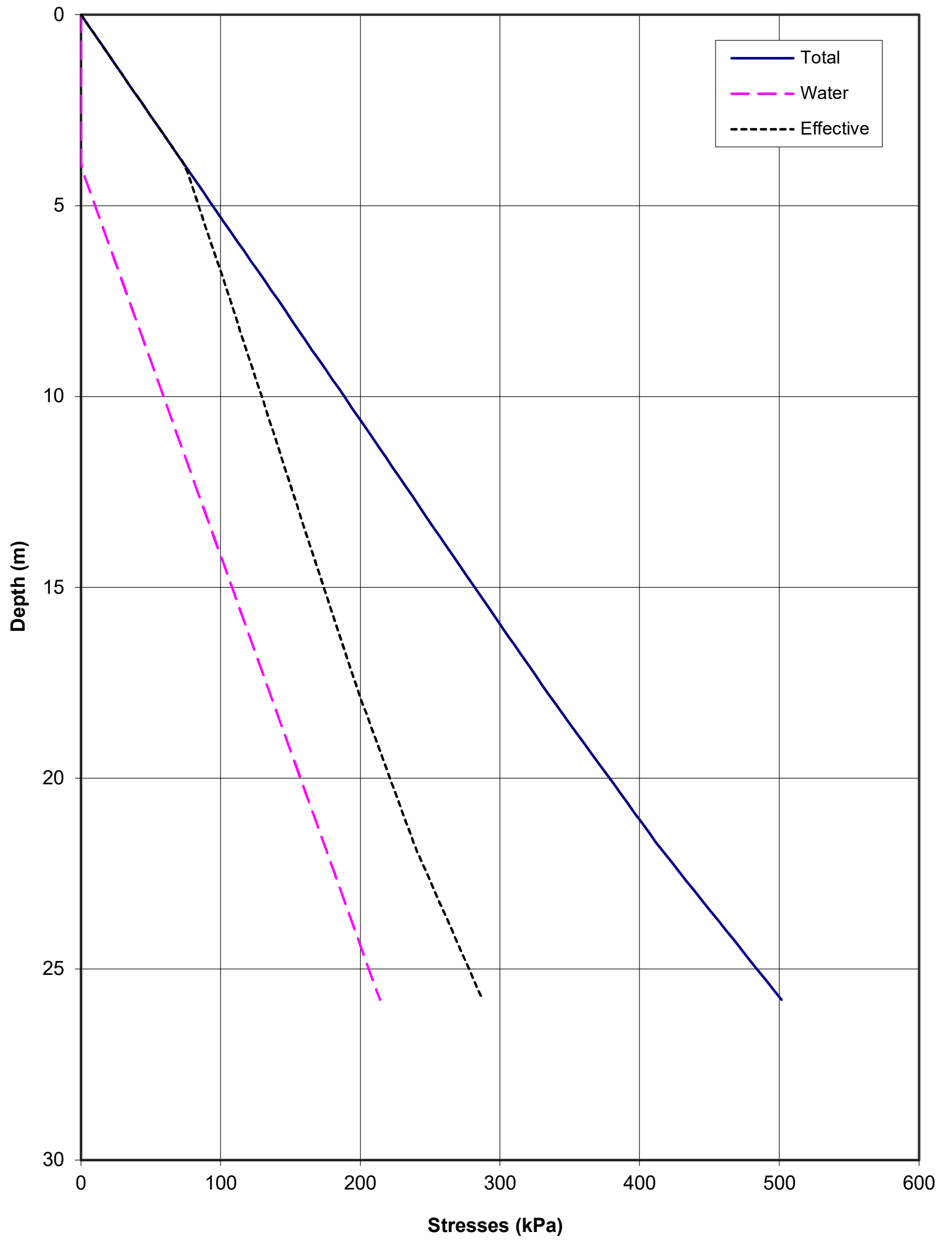
Layer Number	Pile Depth Top (m)	Bulk Density (Mg/m3)	Friction Angle (deg)	Cohesion (kPa)	Interface Factor	Preload Stress (kPa)	Artesian Gradient	Material Type		Description
1	0.00	1.920	0.01	0.00	1.00	50.00	1.00	soil	d1	Made Ground - Slag dominant
2	5.90	1.950	34.00	0.00	1.00	50.00	1.00	soil	d2	Made Ground - Silty Sand
3	7.20	1.900	34.00	0.00	1.00	50.00	1.00	soil	d3	Made Ground - Gravel
4	7.80	1.900	30.00	0.00	1.00	50.00	1.00	soil	c2	Tidal Flats - Sand
5	8.50	1.920	27.00	0.00	1.00	50.00	1.00	soil	c1	Tidal Flats - Clay (soft organic)
6	10.20	1.900	30.00	0.00	1.00	50.00	1.00	soil	c2	Tidal Flats - Sand
7	13.80	1.920	27.00	0.00	1.00	50.00	1.00	soil	c1	Tidal Flats - Clay
8	17.80	2.020	28.00	0.00	1.00	350.00	1.00	soil	b3	Lacustrine Deposits - Laminated Clay
9	21.80	2.230	29.00	0.00	1.00	350.00	1.00	soil	b1	Glacial Till
10	23.80	2.230	0.00	1500.00	1.00	600.00	1.00	rock	a3	Redcar Mudstone Formation

Limiting Ko OC Values

Soil Type	Pile Type	Calculation Reference	Maximum Value
soil	driven	soildriven	1.50
soil	bored	soilbored	1.00

Depth below 6.98 (m)	Soil/ Rock	Bulk Density (Mg/m^3)	Total Stress (kPa)	Artesian Gradient Factor	Water Stress (kPa)	Effective Stress (kPa)	Cohesion (kPa)	Friction Angle (degrees)	Interface Factor	Preload Stress (kPa)	OCR value	K nc	K p	Triaxial Compr Strength (MPa)	Uniaxial Compr Strength (MPa)	Ko OC	K	Beta Factor	0.2*sqrt(UCS)/ UCS alpha rock	Nq* Factor	Ultimate Skin Friction (kPa)	Ultimate Shaft Capacity (kN)	Ultimate Toe Bearing (kPa)	Ultimate Toe Capacity (kN)	Ultimate Axial Capacity (kN)	Dead Load plus Drag (kN)	Ultimate less Skin (kN)	Nett Force in Pile (kN)	Working Stress (N/mm^2)	Maximum Allowable Stress (N/mm^2)	Incr. Pile Compr. (mm)	Working Pile Compr (mm)
0.00	soil	1.92	0.00	1.00	0.00	0.00	0.00	0.01	1.00	50.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.0000	1.00	0.00	0.00	0.00	0.00	0.00	2500.00	8395.04	2500.00	5.66	14.00		5.75
0.26	soil	1.92	4.86	1.00	0.00	4.86	0.00	0.01	1.00	50.00	11.29	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.0000	1.00	0.00	0.00	4.86	2.15	2.15	2500.00	8395.04	2500.00	5.66	14.00	0.0417	5.70
0.52	soil	1.92	9.72	1.00	0.00	9.72	0.00	0.01	1.00	50.00	6.14	1.00	1.00	0.01	0.00	1.00	1.00	0.00	0.0000	1.00	0.00	0.00	9.73	4.30	4.30	2500.00	8395.04	2500.00	5.66	14.00	0.0417	5.66
0.77	soil	1.92	14.58	1.00	0.00	14.58	0.00	0.01	1.00	50.00	4.43	1.00	1.00	0.01	0.00	1.00	1.00	0.00	0.0000	1.00	0.00	0.00	14.59	6.45	6.45	2500.00	8395.04	2500.00	5.66	14.00	0.0417	5.62
1.03	soil	1.92	19.44	1.00	0.00	19.44	0.00	0.01	1.00	50.00	3.57	1.00	1.00	0.02	0.00	1.00	1.00	0.00	0.0000	1.00	0.00	0.00	19.46	8.60	8.60	2500.00	8395.03	2500.00	5.66	14.00	0.0417	5.58
1.29	soil	1.92	24.30	1.00	0.00	24.30	0.00	0.01	1.00	50.00	3.06	1.00	1.00	0.02	0.00	1.00	1.00	0.00	0.0000	1.00	0.00	0.01	24.32	10.75	10.75	2500.01	8395.03	2500.01	5.66	14.00	0.0417	5.54
1.55	soil	1.92	29.16	1.00	0.00	29.16	0.00	0.01	1.00	50.00	2.71	1.00	1.00	0.03	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.01	29.19	12.89	12.90	2500.01	8395.03	2500.01	5.66	14.00	0.0417	5.50
1.81	soil	1.92	34.02	1.00	0.00	34.02	0.00	0.01	1.00	50.00	2.47	1.00	1.00	0.03	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.01	34.05	15.04	15.06	2500.01	8395.02	2500.01	5.66	14.00	0.0417	5.45
2.06	soil	1.92	38.88	1.00	0.00	38.88	0.00	0.01	1.00	50.00	2.29	1.00	1.00	0.04	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.02	38.92	17.19	17.21	2500.02	8395.02	2500.02	5.66	14.00	0.0417	5.41
2.32	soil	1.92	43.74	1.00	0.00	43.74	0.00	0.01	1.00	50.00	2.14	1.00	1.00	0.04	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.02	43.78	19.34	19.36	2500.02	8395.02	2500.02	5.66	14.00	0.0417	5.37
2.58	soil	1.92	48.59	1.00	0.00	48.59	0.00	0.01	1.00	50.00	2.03	1.00	1.00	0.05	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.03	48.65	21.49	21.52	2500.03	8395.01	2500.03	5.66	14.00	0.0417	5.33
2.84	soil	1.92	53.45	1.00	0.00	53.45	0.00	0.01	1.00	50.00	1.94	1.00	1.00	0.05	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.03	53.51	23.64	23.67	2500.03	8395.01	2500.03	5.66	14.00	0.0417	5.29
3.10	soil	1.92	58.31	1.00	0.00	58.31	0.00	0.01	1.00	50.00	1.86	1.00	1.00	0.06	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.04	58.38	25.79	25.83	2500.04	8395.00	2500.04	5.66	14.00	0.0417	5.25
3.35	soil	1.92	63.17	1.00	0.00	63.17	0.00	0.01	1.00	50.00	1.79	1.00	1.00	0.06	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.04	63.24	27.94	27.98	2500.04	8394.99	2500.04	5.66	14.00	0.0417	5.20
3.61	soil	1.92	68.03	1.00	0.00	68.03	0.00	0.01	1.00	50.00	1.73	1.00	1.00	0.07	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.05	68.11	30.09	30.14	2500.05	8394.99	2500.05	5.66	14.00	0.0417	5.16
3.87	soil	1.92	72.89	1.00	0.00	72.89	0.00	0.01	1.00	50.00	1.69	1.00	1.00	0.07	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.06	72.97	32.24	32.30	2500.06	8394.98	2500.06	5.66	14.00	0.0417	5.12
4.13	soil	1.92	77.75	1.00	1.45	76.30	0.00	0.01	1.00	50.00	1.66	1.00	1.00	0.08	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.07	76.38	33.74	33.81	2500.07	8394.97	2500.07	5.66	14.00	0.0417	5.08
4.39	soil	1.92	82.61	1.00	3.98	78.63	0.00	0.01	1.00	50.00	1.64	1.00	1.00	0.08	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.07	78.71	34.77	34.85	2500.07	8394.96	2500.07	5.66	14.00	0.0417	5.04
4.64	soil	1.92	87.47	1.00	6.51	80.96	0.00	0.01	1.00	50.00	1.62	1.00	1.00	0.08	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.08	81.04	35.80	35.89	2500.08	8394.95	2500.08	5.66	14.00	0.0417	5.00
4.90	soil	1.92	92.33	1.00	9.04	83.29	0.00	0.01	1.00	50.00	1.60	1.00	1.00	0.08	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.09	83.37	36.83	36.93	2500.09	8394.95	2500.09	5.66	14.00	0.0417	4.95
5.16	soil	1.92	97.19	1.00	11.58	85.61	0.00	0.01	1.00	50.00	1.58	1.00	1.00	0.09	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.10	85.71	37.86	37.96	2500.10	8394.94	2500.10	5.66	14.00	0.0417	4.91
5.42	soil	1.92	102.05	1.00	14.11	87.94	0.00	0.01	1.00	50.00	1.57	1.00	1.00	0.09	0.00	1.00	1.00	0.00	0.0000	1.00	0.02	0.11	88.04	38.89	39.00	2500.11	8394.93	2500.11	5.66	14.00	0.0417	4.87
5.68	soil	1.92	106.91	1.00	16.64	90.27	0.00	0.01	1.00	50.00	1.55	1.00	1.00	0.09	0.00	1.00	1.00	0.00	0.0000	1.00	0.02	0.12	90.37	39.92	40.04	2500.12	8394.92	2500.12	5.66	14.00	0.0417	4.83
5.93	soil	1.95	111.81	1.00	19.17	92.64	0.00	34.00	1.00	50.00	1.54	0.44	3.54	0.19	0.00	0.57	0.57	0.38	0.0000	49.30	35.58	10.94	4566.76	2017.53	2028.47	2510.94	8384.10	2510.94	5.68	14.00	0.0418	4.79
6.19	soil	1.95	116.74	1.00	21.70	95.04	0.00	34.00	1.00	50.00	1.53	0.44	3.54	0.19	0.00	0.57	0.57	0.38	0.0000	49.30	36.32	32.79	4685.29	2069.90	2102.69	2532.79	8362.24	2532.79	5.73	14.00	0.0421	4.74
6.45	soil	1.95	121.68	1.00	24.23	97.45	0.00	34.00	1.00	50.00	1.51	0.44	3.54	0.19	0.00	0.56	0.56	0.38	0.0000	49.30	37.05	55.09	4803.82	2122.26	2177.35	2555.09	8339.95	2555.09	5.78	14.00	0.0424	4.70
6.71	soil	1.95	126.61	1.00	26.76	99.85	0.00	34.00	1.00	50.00	1.50	0.44	3.54	0.20	0.00	0.56	0.56	0.38	0.0000	49.30	37.78	77.83	4922.35	2174.63	2252.46	2577.83	8317.20	2577.83	5.84	14.00	0.0428	4.66
6.97	soil	1.95	131.55	1.00	29.29	102.26	0.00	34.00	1.00	50.00	1.49	0.44	3.54	0.20	0.00	0.56	0.56	0.38	0.0000	49.30	38.50	101.02	5040.88	2226.99	2328.01	2601.02	8294.02	2601.02	5.89	14.00	0.0432	4.62
7.22	soil	1.90	136.42	1.00	31.82	104.60	0.00	34.00	1.00	50.00	1.48	0.44	3.54	0.21	0.00	0.56	0.56	0.37	0.0000	49.30	39.21	124.64	5156.30	2277.98	2402.62	2624.64	8270.40	2624.64	5.94	14.00	0.0436	4.57
7.48	soil	1.90	141.23	1.00	34.35	106.87	0.00	34.00	1.00	50.00	1.47	0.44	3.54	0.21	0.00	0.55	0.55	0.37	0.0000	49.30	39.90	148.69	5268.59	2327.59	2476.28	2648.69	8246.35	2648.69	6.00	14.00	0.0440	4.53
7.74	soil	1.90	146.04	1.00	36.89	109.15	0.00	34.00	1.00	50.00	1.46	0.44	3.54	0.21	0.00	0.55	0.55	0.37	0.0000	49.30	40.59	173.16	5380.88	2377.20	2550.36	2673.16	8221.88	2673.16	6.05	14.00	0.0444	4.48
8.00	soil	1.90	150.85	1.00	39.42	111.43	0.00	30.00	1.00	50.00	1.45	0.50	3.00	0.20	0.00	0.61	0.61	0.35	0.0000	29.03	39.06	197.37	3234.25	1428.85	1626.21	2697.37	8197.67	2697.37	6.11	14.00	0.0448	4.44
8.26	soil	1.90	155.66	1.00	41.95	113.71	0.00	30.00	1.00	50.00	1.44	0.50	3.00	0.21	0.00	0.61	0.61	0.35	0.0000	29.03	39.73	221.31	3300.37	1458.06	1679.37	2721.31	8173.73	2721.31	6.16	14.00	0.0452	4.39
8.51	soil	1.92	160.49	1.00	44.48	116.01	0.00	27.00	1.00	50.00	1.43	0.55	2.66	0.20	0.00	0.65	0.65	0.33	0.0000	19.92	38.21	245.00	2311.45	1021.17	1266.17	2745.00	8150.04	2745.00	6.21	14.00	0.0456	4.35
8.77	soil	1.92	165.35	1.00	47.01	118.34	0.00	27.00	1.00	50.00	1.42	0.55	2.66	0.20	0.00	0.64	0.64	0.33	0.0000	19.92	38.87	268.43	2357.85	1041.66	1310.10	2768.43	8126.61	2768.43	6.27	14.00	0.0460	4.30
9.03	soil	1.92	170.21	1.00	49.54	120.67	0.00	27.00	1.00	50.00	1.41	0.55	2.66	0.21	0.00	0.64	0.64	0.33	0.0000	19.92	39.53	292.26	2404.24	1062.16	1354.42	2792.26	8102.78	2792.26	6.32	14.00	0.0464	4.26
9.29	soil	1.92	175.07	1.00	52.07	123.00	0.00	27.00	1.00	50.00	1.41	0.55	2.66	0.21	0.00	0.64	0.64	0.33	0.0000	19.92	40.19	316.49	2450.64	1082.66	1399.15	2816.49	8078.55	2816.49	6.38	14.00	0.0468	4.21
9.55	soil	1.92	179.93	1.00	54.60	125.32	0.00	27.00	1.00	50.00	1.40	0.55	2.66	0.21	0.00	0.64	0.64	0.33	0.0000	19.92	40.84	341.12	2497.03	1103.15	1444.27	2841.12	8053.92	2841.12	6.43	14.00	0.0472	4.16
9.80	soil	1.92	184.79	1.00	57.13	127.65	0.00	27.00	1.00	50.00	1.39	0.55	2.66	0.22	0.00	0.64	0.64	0.33	0.0000	19.92	41.50	366.14	2543.42	1123.65	1489.80	2866.14	8028.89	2866.14	6.49	14.00	0.0476	4.11
10.06	soil	1.92	189.65	1.00	59.66	129.98	0.00	27.00	1.00	50.00	1.38	0.55	2.66	0.22	0.00	0.64	0.64	0.32	0.0000	19.92	42.16	391.57	2589.82	1144.15	1535.72	2891.57	8003.47	2891.57	6.55	14.00	0.0480	4.07
10.32	soil	1.90	194.48	1.00	62.20	132.29	0.00	30.00	1.00	50.00	1.38	0.50	3.00	0.23	0.00	0.59	0.59	0.34	0.0000	29.03	45.17	418.11	3839.58	1696.27	2114.39	2918.11	7976.92	2918.11	6.61	14.00	0.0485	4.02
10.58	soil	1.90	199.29	1.00	64.73	134.56	0.00	30.00	1.00	50.00	1.37	0.50	3.00	0.24	0.00	0.59	0.59	0.34	0.0000	29.03	45.83	445.77	3905.69	1725.48	2171.26	2945.77	7949.26	2945.77	6.67	14.00	0.0489	3.97
10.84	soil	1.90	204.10	1.00	67.26	136.84	0.00	30.00	1.00	50.00	1.37	0.50	3.00	0.24	0.00	0.59	0.59	0.34	0.0000	29.03	46.50	473.84	3971.81	1754.69	2228.53	2973.84	7921.20	2973.84	6.73	14.00	0.0494	3.92
11.09	soil	1.90	208.91	1.00	69.79	139.12	0.00	30.00	1.00	50.00	1.36	0.50	3.00	0.25	0.00	0.59	0.59	0.34	0.0000	29.03	47.16	502.31	4037.92	1783.90	2286.21	3002.31	7892.73	3002.31	6.80	14.00	0.0499	3.87
11.35	soil	1.90	213.72	1.00	72.32	141.40	0.00	30.00	1.00	50.00	1.35	0.50	3.00	0.25	0.00	0.59	0.59	0.34	0.0000	29.03	47.83	531.18	4104.04	1813.11	2344.29	3031.18	7863.86	3031.18	6.86	14.00	0.0503	3.82
11.61	soil	1.90	218.52	1.00	74.85	143.67	0.00	30.00	1.00	50.00	1.35	0.50	3.00	0.25	0.00	0.58	0.58	0.34	0.0000	29.03	48.49	560.46	4170.15	1842.32	2402.78	3060.46	7834.58	3060.46	6.93	14.00	0.0508	3.77
11.87	soil	1.90	223.33	1.00	77.38	145.95	0.00	30.00	1.00	50.00	1.34	0.50	3.00	0.26	0.00	0.58	0.58	0.34	0.0000	29.03	49.16	590.14	4236.27	1871.53	2461.67	3090.14	7804.90	3090.14	6.99	14.00	0.0513	3.72
12.13	soil	1.90	228.14	1.00	79.91	148.23	0.00	30.00	1.00	50.00	1.34	0.50	3.00	0.26	0.00	0.58	0.58	0.34	0.0000	29.03	49.82	620.23	4302.39	1900.74	2520.96	3120.23	7774.81	3120.23	7.06	14.00	0.0518	3.67
12.38	soil	1.90	232.95	1.00	82.44	150.51	0.00	30.00	1.00	50.00	1.33	0.50	3.00	0.26	0.00	0.58	0.58	0.34	0.0000	29.03	50.49	650.72	4368.50	1929.94	2580.66	3150.72	7744.32	3150.72	7.13	14.00	0.0523	3.61
12.64	soil	1.90	237.76	1.00	84.97	152.79	0.00	30.00	1.00	50.00	1.33	0.50	3.00	0.27	0.00	0.58	0.58	0.33	0.0000	29.03	51.15	681.61	4434.62	1959.15	2640.76	3181.61	7713.43	3181.61	7.20	14.00	0.0528	3.56
12.90	soil	1.90	242.57	1.00	87.51	155.06	0.00	30.00	1.00	50.00	1.32	0.50	3.00	0.27	0.00	0.58	0.58	0.33	0.0000	29.03	51.82	712.91	4500.73	1988.36	2701.27	3212.91	7682.13	3212.91	7.27	14.00	0.0533	3.51
13.16	soil	1.90	247.38	1.00	90.04	157.34	0.00	30.00	1.00	50.00	1.32	0.50	3.00	0.27	0.00	0.58	0.58	0.33	0.0000	29.03	52.48	744.61	4566.85	2017.57	2762.18	3244.61	7650.43	3244.61	7.34	14.00	0.0539	3.45
13.42	soil	1.90	252.19	1.00	92.57	159.62	0.00	30.00	1.00	50.00	1.31	0.50	3.00	0.28	0.00	0.58	0.58	0.33	0.0000	29.03	53.14	776.71	4632.96	2046.78	2823.49	3276.71	7618.32	3276.71	7.42	14.00	0.0544	3.40
13.67	soil	1.90	257.00	1.00	95.10	161.90	0.00	30.00	1.00	50.00	1.31	0.50	3.00	0.28	0.00	0.58	0.58	0.33	0.0000	29.03	53.81	809.22	4699.08	2075.99	2885.21	3309.22	7585.81	3309.22	7.49	14.00	0.0549	3.34
13.93	soil	1.92	261.83	1.00	97.63	164.20	0.00	27.00	1.00	50.00	1.30	0.55	2.66	0.27	0.00	0.62	0.62	0.32	0.0000	19.92	51.78	841.32	3271.61	1445.35	2286.67	3341.32	7553.72	3341.32	7.56	14.00	0.0555	3.29
14.19	soil	1.92	266.69	1.00	100.16	166.53	0.00	27.00	1.00	50.00	1.30	0.55	2.66	0.27	0.00	0.62	0.62	0.31	0.0000	19.92	52.43	872.99	3318.00	1465.85	2338.84	3372.99	7522.05	3372.99	7.63	14.00	0.0560	3.23
14.45	soil	1.92	271.55	1.00	102.69	168.86	0.00	27.00	1.00	50.00	1.30	0.55	2.66	0.28	0.00	0.62	0.62	0.31	0.0000	19.92	53.08	905.06	3364.40	1486.35	2391.41	3405.06	7489.98	3405.06	7.71	14.00	0.0565	3.18
14.71	soil	1.92	276.41	1.00	105.22	171.19	0.00	27.00	1.00	50.00	1.29	0.55	2.66	0.28	0.00	0.62	0.62	0.31	0.0000	19.92	53.74	937.53	3410.79	1506.84	2444.37	3437.53	7457.51	3437.53	7.78	14.00	0.0571	3.12
14.96	soil	1.92	281.27	1.00	107.75	173.51	0.00	27.00	1.00	50.00	1.29	0.55	2.66	0.28	0.00	0.62	0.62	0.31	0.0000	19.92	54.39	970.40	3457.19	1527.34	2497.73	3470.40	7424.64	3470.40	7.86	14.00	0.0576	3.06
15.22	soil	1.92	286.13	1.00	110.28	175.84	0.00	27.00	1.00	50.00	1.28	0.55	2.66	0.29	0.00	0.61	0.61	0.31	0.0000	19.92	55.04	1003.66	3503.58	1547.83	2551.49	3503.66	7391.38	3503.66	7.93	14.00	0.0582	3.00
15.48	soil	1.92	290.99	1.00	112.82	178.17	0.00	27.00	1.00	50.00	1.28	0.55	2.66	0.29	0.00	0.61	0.61	0.31	0.0000	19.92	55.70	1037.32	3549.97	1568.33	2605.65	3537.32	7357.72	3537.32	8.01	14.00	0.0587	2.94
15.74	soil	1.92	295.85	1.00	115.35	180.50	0.00	27.00	1.00	50.00	1.28	0.55	2.66	0.29	0.00	0.61	0.61	0.31	0.0000	19.92	56.35	1071.37	3596.37	1588.83	2660.20	3571.37	7323.66	3571.37	8.08	14.00	0.0593	2.89
16.00	soil	1.92	300.71	1.00	117.88	182.83	0.00	27.00	1.00	50.00	1.27	0.55	2.66	0.30	0.00	0.61	0.61	0.31	0.0000	19.92	57.00	1105.83	3642.76	1609.32	2715.15	3605.83	7289.21	3605.83	8.16	14.00	0.0599	2.83
16.25	soil	1.92	305.57	1.00	120.41	185.16	0.00	27.00	1.00	50.00	1.27	0.55	2.66	0.30	0.00	0.61	0.61	0.31	0.0000	19.92	57.65	1140.68	3689.16	1629.82	2770.49	3640.68	7254.36	3640.68	8.24	14.00	0.0605	2.76
16.51	soil	1.92	310.42	1.00	122.94	187.49	0.00	27.00	1.00	50.00	1.27	0.55	2.66	0.30	0.00	0.61	0.61	0.31	0.0000	19.92	58.31	1175.92	3735.55	1650.32	2826.24	3675.92	7219.12	3675.92	8.32	14.00	0.0610	2.70
16.77	soil	1.92	315.28	1.00	125.47	189.81	0.00	27.00	1.00	50.00	1.26	0.55	2.66	0.31	0.00	0.61	0.61	0.31	0.0000	19.92	58.96	1211.56	3781.94	1670.81	2882.38	3711.56	7183.47	3711.56	8.40	14.00	0.0616	2.64
17.03	soil	1.92	320.14	1.00	128.00	192.14	0.00	27.00	1.00	50.00	1.26	0.55	2.66	0.31	0.00	0.61	0.61	0.31	0.0000	19.92	59.61	1247.60	3828.34	1691.31	2938.91	3747.60	7147.43	3747.60	8.48	14.00	0.0622	2.58
17.29	soil	1.92	325.00	1.00	130.53	194.47	0.00	27.00	1.00	50.00	1.26	0.55	2.66	0.31	0.00	0.61	0.61	0.31	0.0000	19.92	60.26	1284.04	3874.73	1711.80	2995.84	3784.04	7111.00	3784.04	8.57	14.00	0.0628	2.52
17.54	soil	1.92	329.86	1.00	133.06	196.80	0.00	27.00	1.00	50.00	1.25	0.55	2.66	0.32	0.00	0.61	0.61	0.31	0.0000	19.92	60.91	1320.87	3921.13	1732.30	3053.17	3820.87	7074.17	3820.87	8.65	14.00	0.0634	2.45
17.80	soil	2.02	334.85	1.00	135.59	199.25	0.00	28.00	1.00	350.00	2.76	0.53	2.77	0.48	0.00	0.87	0.87	0.46	0.0000	22.55	92.26	1367.43	4492.52	1984.73	3352.16	3867.43	7027.61	3867.43	8.75	14.00	0.0641	2.39
18.06	soil	2.02	339.96	1.00	138.12	201.84	0.00	28.00	1.00	350.00	2.73	0.53	2.77	0.48	0.00	0.87	0.87	0.46	0.0000	22.55	93.08	1423.76	4550.72	2010.45	3434.21	3923.76	6971.28	3923.76	8.88	14.00	0.0650	2.32
18.32	soil	2.02	345.07	1.00	140.66	204.42	0.00	28.00	1.00	350.00	2.71	0.53	2.77	0.49	0.00	0.86	0.86	0.46	0.0000	22.55	93.90	1480.59	4608.93	2036.16	3516.75	3980.59	6914.45	3980.59	9.01	14.00	0.0659	2.26
18.58	soil	2.02	350.19	1.00	143.19	207.00	0.00	28.00	1.00	350.00	2.69	0.53	2.77	0.49	0.00	0.86	0.86	0.46	0.0000	22.55	94.72	1537.92	4667.13	2061.88	3599.80	4037.92	6857.12	4037.92	9.14	14.00	0.0669	2.19
18.83	soil	2.02	355.30	1.00	145.72	209.58	0.00	28.00	1.00	350.00	2.67	0.53	2.77	0.50	0.00	0.86	0.86	0.46	0.0000	22.55	95.54	1595.75	4725.34	2087.59	3683.34	4095.75	6799.29	4095.75	9.27	14.00	0.0679	2.12
19.09	soil	2.02	360.41	1.00	148.25	212.16	0.00	28.00	1.00	350.00	2.65	0.53	2.77	0.50	0.00	0.85	0.85	0.45	0.0000	22.55	96.35	1654.07	4783.55	2113.31	3767.38	4154.07	6740.96	4154.07	9.40	14.00	0.0688	2.06
19.35	soil	2.02	365.52	1.00	150.78	214.74	0.00	28.00	1.00	350.00	2.63	0.53	2.77	0.51	0.00	0.85	0.85	0.45	0.0000	22.55	97.17	1712.89	4841.75	2139.02	3851.91	4212.89	6682.14	4212.89	9.54	14.00	0.0698	1.99
19.61	soil	2.02	370.64	1.00	153.31	217.33	0.00	28.00	1.00	350.00	2.61	0.53	2.77	0.51	0.00	0.85	0.85	0.45	0.0000	22.55	97.98	1772.21	4899.96	2164.74	3936.94	4272.21	6622.83	4272.21	9.67	14.00	0.0708	1.91
19.87	soil	2.02	375.75	1.00	155.84	219.91	0.00	28.00	1.00	350.00	2.59	0.53	2.77	0.51	0.00	0.84	0.84	0.45	0.0000	22.55	98.79	1832.02	4958.17	2190.45	4022.47	4332.02	6563.02	4332.02	9.81	14.00	0.0718	1.84
20.12	soil	2.02	380.86	1.00	158.37	222.49	0.00	28.00	1.00	350.00	2.57	0.53	2.77	0.52	0.00	0.84	0.84	0.45	0.0000	22.55	99.60	1892.32	5016.37	2216.16	4108.49	4392.32	6502.72	4392.32	9.94	14.00	0.0728	1.77
20.38	soil	2.02	385.97	1.00	160.90	225.07	0.00	28.00	1.00	350.00	2.56	0.53	2.77	0.52	0.00	0.84	0.84	0.45	0.0000	22.55	100.41	1953.12	5074.58	2241.88	4195.00	4453.12	6441.92	4453.12	10.08	14.00	0.0738	1.70
20.64	soil	2.02	391.09	1.00	163.43	227.65	0.00	28.00	1.00	350.00	2.54	0.53	2.77	0.53	0.00	0.84	0.84	0.44	0.0000	22.55	101.22	2014.40	5132.78	2267.59	4282.00	4514.40	6380.63	4514.40	10.22	14.00	0.0748	1.62
20.90	soil	2.02	396.20	1.00	165.97	230.23	0.00	28.00	1.00	350.00	2.52	0.53	2.77	0.53	0.00	0.83	0.83	0.44	0.0000	22.55	102.03	2076.18	5190.99	2293.31	4369.49	4576.18	6318.85	4576.18	10.36	14.00	0.0758	1.55
21.16	soil	2.02	401.31	1.00	168.50	232.82	0.00	28.00	1.00	350.00	2.50	0.53	2.77	0.54	0.00	0.83	0.83	0.44	0.0000	22.55	102.84	2138.45	5249.20	2319.02	4457.48	4638.45	6256.59	4638.45	10.50	14.00	0.0769	1.47
21.41	soil	2.02	406.42	1.00	171.03	235.40	0.00	28.00	1.00	350.00	2.49	0.53	2.77	0.54	0.00	0.83	0.83	0.44	0.0000	22.55	103.64	2201.21	5307.40	2344.74	4545.95	4701.21	6193.83	4701.21	10.64	14.00	0.0779	1.39
21.67	soil	2.02	411.54	1.00	173.56	237.98	0.00	28.00	1.00	350.00	2.47	0.53	2.77	0.54	0.00	0.83	0.83	0.44	0.0000	22.55	104.45	2264.46	5365.61	2370.45	4634.91	4764.46	6130.58	4764.46	10.78	14.00	0.0790	1.31
21.93	soil	2.23	416.92	1.00	176.09	240.83	0.00	29.00	1.00	350.00	2.45	0.52	2.88	0.56	0.00	0.81	0.81	0.45	0.0000	25.56	108.32	2329.13	6155.03	2719.21	5048.34	4829.13	6065.91	4829.13	10.93	14.00	0.0800	1.23
22.19	soil	2.23	422.56	1.00	178.62	243.94	0.00	29.00	1.00	350.00	2.43	0.52	2.88	0.57	0.00	0.81	0.81	0.45	0.0000	25.56	109.30	2395.27	6234.60	2754.36	5149.63	4895.27	5999.77	4895.27	11.08	14.00	0.0811	1.15
22.45	soil	2.23	428.20	1.00	181.15	247.05	0.00	29.00	1.00	350.00	2.42	0.52	2.88	0.57	0.00	0.81	0.81	0.45	0.0000	25.56	110.27	2462.01	6314.16	2789.51	5251.52	4962.01	5933.03	4962.01	11.23	14.00	0.0822	1.07
22.70	soil	2.23	433.85	1.00	183.68	250.17	0.00	29.00	1.00	350.00	2.40	0.52	2.88	0.58	0.00	0.80	0.80	0.44	0.0000	25.56	111.25	2529.34	6393.73	2824.66	5354.00	5029.34	5865.69	5029.34	11.38	14.00	0.0834	0.98
22.96	soil	2.23	439.49	1.00	186.21	253.28	0.00	29.00	1.00	350.00	2.38	0.52	2.88	0.58	0.00	0.80	0.80	0.44	0.0000	25.56	112.23	2597.27	6473.29	2859.81	5457.08	5097.27	5797.77	5097.27	11.54	14.00	0.0845	0.90
23.22	soil	2.23	445.14	1.00	188.74	256.39	0.00	29.00	1.00	350.00	2.37	0.52	2.88	0.59	0.00	0.80	0.80	0.44	0.0000	25.56	113.20	2665.79	6552.85	2894.96	5560.75	5165.79	5729.25	5165.79	11.69	14.00	0.0856	0.81
23.48	soil	2.23	450.78	1.00	191.28	259.50	0.00	29.00	1.00	350.00	2.35	0.52	2.88	0.59	0.00	0.79	0.79	0.44	0.0000	25.56	114.17	2734.90	6632.42	2930.11	5665.01	5234.90	5660.14	5234.90	11.85	14.00	0.0868	0.73
23.74	soil	2.23	456.42	1.00	193.81	262.62	0.00	29.00	1.00	350.00	2.33	0.52	2.88	0.60	0.00	0.79	0.79	0.44	0.0000	25.56	115.14	2804.60	6711.98	2965.26	5769.86	5304.60	5590.44	5304.60	12.01	14.00	0.0879	0.64
23.99	rock	2.23	462.07	1.00	196.34	265.73	1500.00	0.00	1.00	600.00	3.26	1.00	1.00	1.77	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	2944.88	9000.00	3976.08	6920.96	5444.88	5450.15	5444.88	12.32	14.00	0.0897	0.55
24.25	rock	2.23	467.71	1.00	198.87	268.84	1500.00	0.00	1.00	600.00	3.23	1.00	1.00	1.77	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	3155.47	9000.00	3976.08	7131.54	5655.47	5239.57	5239.57	11.86	14.00	0.0891	0.46
24.51	rock	2.23	473.36	1.00	201.40	271.96	1500.00	0.00	1.00	600.00	3.21	1.00	1.00	1.77	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	3366.05	9000.00	3976.08	7342.13	5866.05	5028.99	5028.99	11.38	14.00	0.0857	0.38
24.77	rock	2.23	479.00	1.00	203.93	275.07	1500.00	0.00	1.00	600.00	3.18	1.00	1.00	1.78	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	3576.63	9000.00	3976.08	7552.71	6076.63	4818.41	4818.41	10.91	14.00	0.0822	0.29
25.03	rock	2.23	484.64	1.00	206.46	278.18	1500.00	0.00	1.00	600.00	3.16	1.00	1.00	1.78	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	3787.21	9000.00	3976.08	7763.29	6287.21	4607.82	4607.82	10.43	14.00	0.0786	0.21
25.28	rock	2.23	490.29	1.00	208.99	281.30	1500.00	0.00	1.00	600.00	3.13	1.00	1.00	1.78	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	3997.80	9000.00	3976.08	7973.87	6497.80	4397.24	4397.24	9.95	14.00	0.0751	0.14
25.54	rock	2.23	495.93	1.00	211.52	284.41	1500.00	0.00	1.00	600.00	3.11	1.00	1.00	1.78	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	4208.38	9000.00	3976.08	8184.46	6708.38	4186.66	4186.66	9.48	14.00	0.0716	0.07
25.80	rock	2.23	501.58	1.00	214.05	287.52	1500.00	0.00	1.00	600.00	3.09	1.00	1.00	1.79	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	4418.96	9000.00	3976.08	8395.04	6918.96	3976.08	3976.08	9.00	14.00	0.0681	0.00

circular concrete 0.75 m pile



PROJECT TITLE:-

Net Zero Teesside

AECOM

FIGURE TITLE:-

Preliminary Onshore Ground
MS\BH08 - Cooling

750mm dia. concrete Bored piles 2m rock

CALCULATION OF AXIAL PILE CAPACITY USING THE BETA METHOD

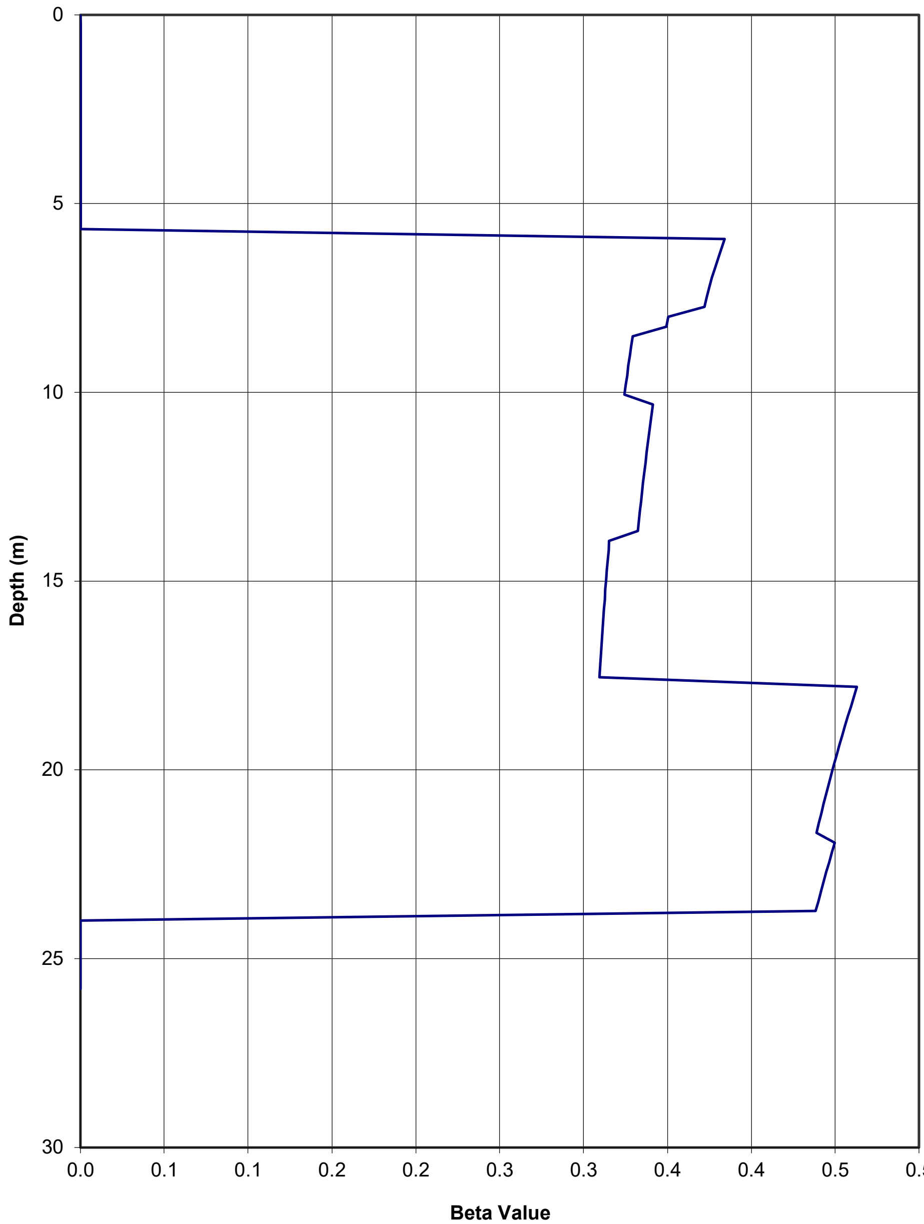
Vertical Stress Profiles

FIGURE No.
Figure 1

REPORT No.:
60657467

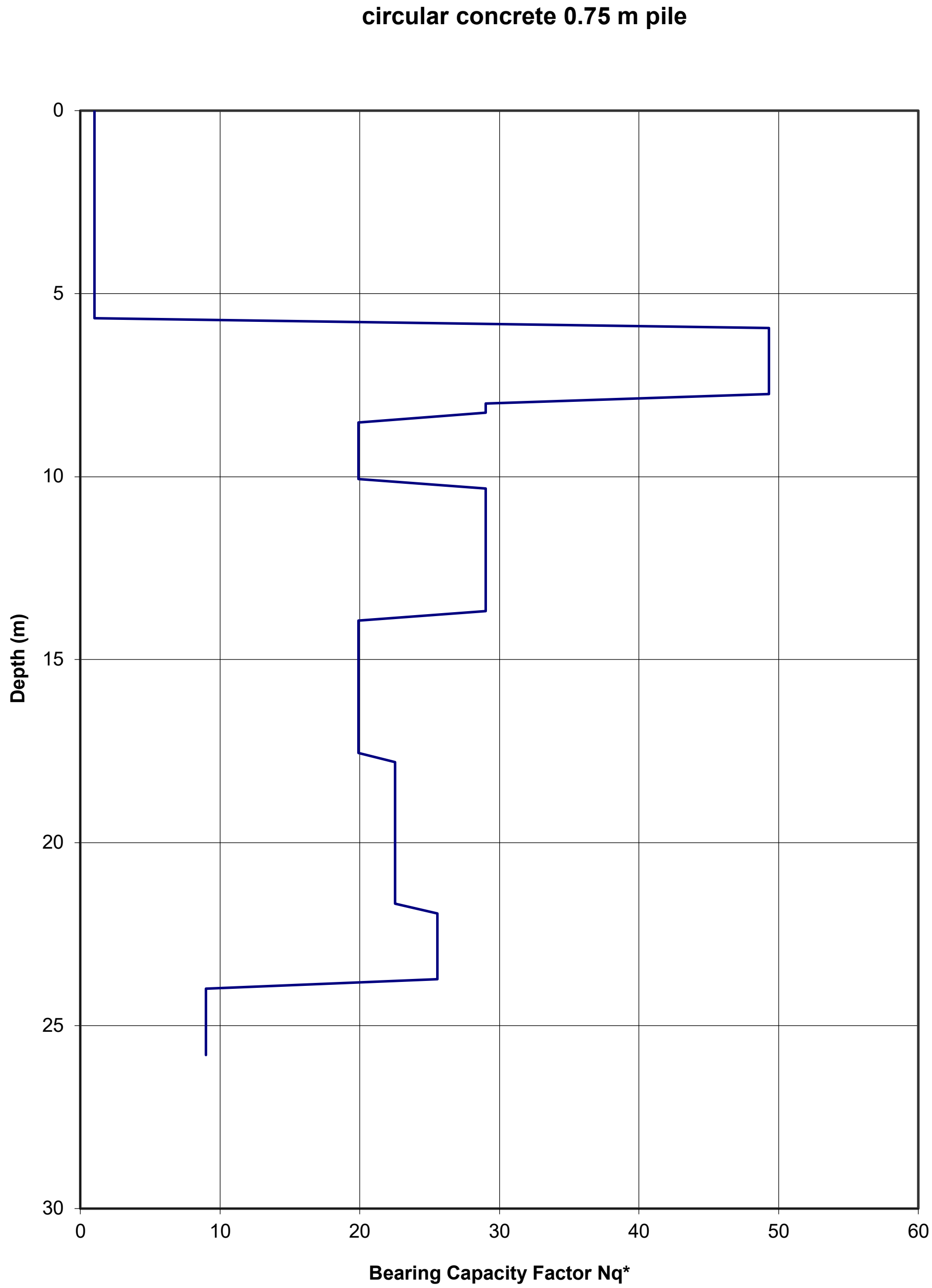
DATE:-
02-Nov-21

circular concrete 0.75 m pile



PROJECT TITLE:-	
Net Zero Teesside	AECOM

FIGURE TITLE:-	FIGURE No.: Figure 2
Preliminary Onshore Ground Investigation **MS\BH08 - Cooling** 750mm dia. concrete Bored piles 2m rock	REPORT No.:- 60657467
CALCULATION OF AXIAL PILE CAPACITY USING THE BETA METHOD Beta Values	DATE:- 02-Nov-21



PROJECT TITLE:-

Net Zero Teesside

FIGURE TITLE:-

Preliminary Onshore Ground Investigation

MS\BH08 - Cooling

750mm dia. concrete Bored piles 2m rock

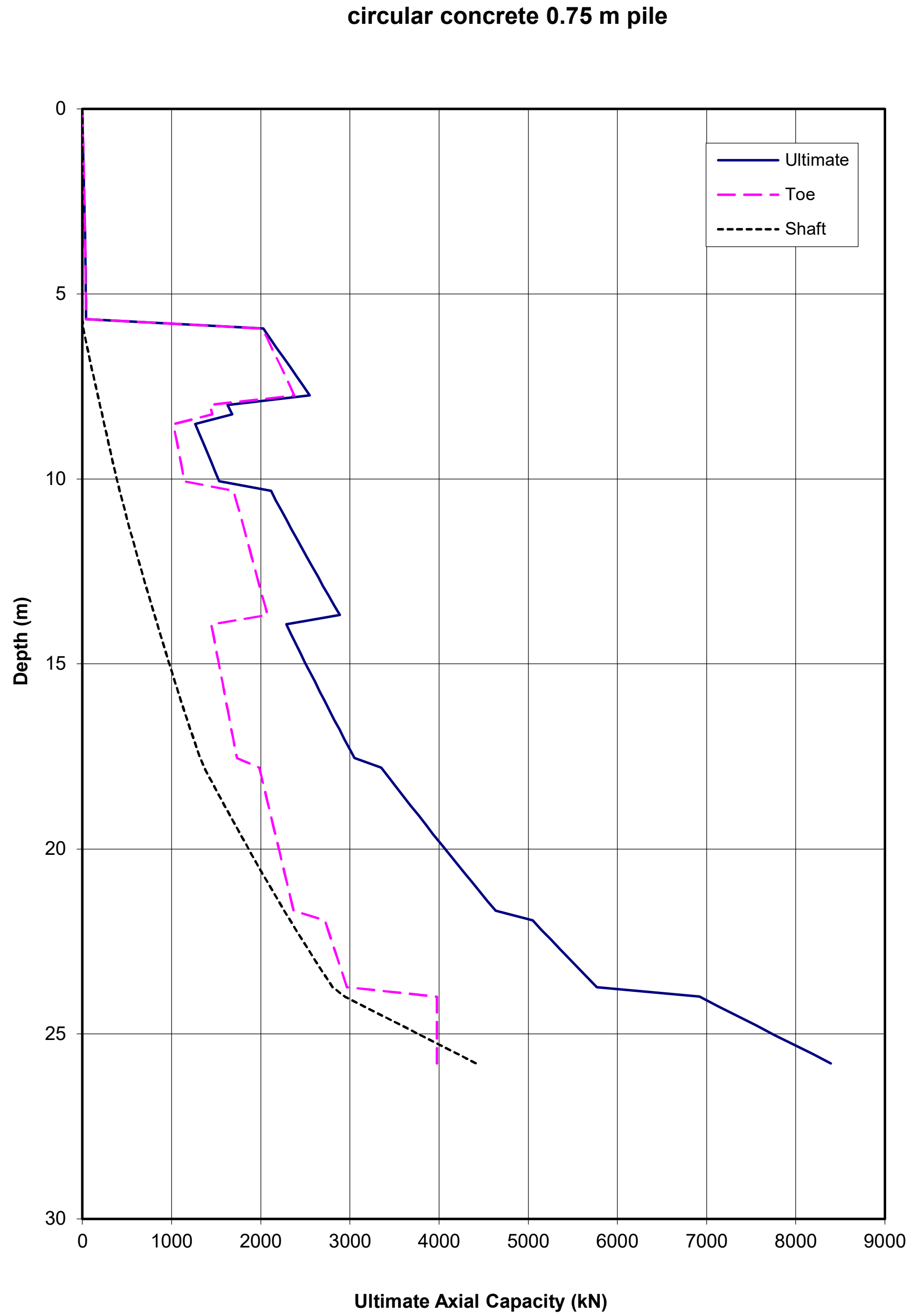
CALCULATION OF AXIAL PILE CAPACITY USING THE BETA METHOD

N_q* Values

FIGURE No.:
Figure 4

REPORT No.:-
60657467

DATE:-
02-Nov-21



PROJECT TITLE:-

Net Zero Teesside

AECOM

FIGURE TITLE:-

Preliminary Onshore Ground
MS\BH08 - Cooling

750mm dia. concrete Bored piles 2m rock

CALCULATION OF AXIAL PILE CAPACITY USING THE BETA METHOD

Ultimate Axial Pile Capacity

FIGURE No.:
Figure 8

REPORT No:-
60657467

DATE:-
02-Nov-21

CALCULATION OF AXIAL PILE CAPACITY USING THE BETA METHOD

FILE :	60657467	**Summary**	circular concrete 0.9 m pile						
CLIENT :	bp on behalf of OGCI				FoS	Safe	Applied	kN
JOB :	Net Zero Teesside	**Skin**	5302.75	kN	2.50	2121.10	**Dead Load**	3000.00
SITE :	Preliminary Onshore Ground Investigation	**Toe**	5725.55	kN	3.00	1908.52	**Live Load**	1000.00
LOCATION:	MS\BH08 - Cooling	**Total**	11028.30	kN		4029.62	**Total Load**	4000.00
SUBTITLE:	900mm dia. concrete Bored piles 2m rock socket	**Top Stress**	17.34	N/mm^2				
ENG'R :	CMC	**Stress Ratio**	0.50					
CHECK :	SDM /NJ	**Head settlement**	9.86	mm	Toe estimate	5.00	mm	
DATE :	02-Nov-21	**Spring stiffness**	405868	kN/m				
Version	1.125							
Date updated:	12/09/14							
Author :	sdm							

INPUT INFORMATION

Existing ground level	7.98	mOD
Finished formation level	6.98	mOD
Pile cut off level	6.98	mOD
Embedment below cut off	25.80	m
Pile Toe Level	-18.82	mOD
Depth below finished ground	25.80	m
Pile Type:	circular	
Installation Method:	bored	
Depth Water:	3.98	m
Unit Weight Water:	9.81	kN/m^3
Pile Diameter:	0.900	m
:	0.000	m
:	0.000	m
Pile Base Area:	0.6362	sq.m
Shaft perimeter area	2.82743	sq.m/m
Surcharge:	0.00	kPa
Volume pile material	16.4133	m^3
Compressive Strength:	35.00	N/mm^2
Pile Modulus	3.5000E+07	(kPa)
Material:	concrete	
Pile material section area	0.63617	sq.m

1.60

Soil Properties

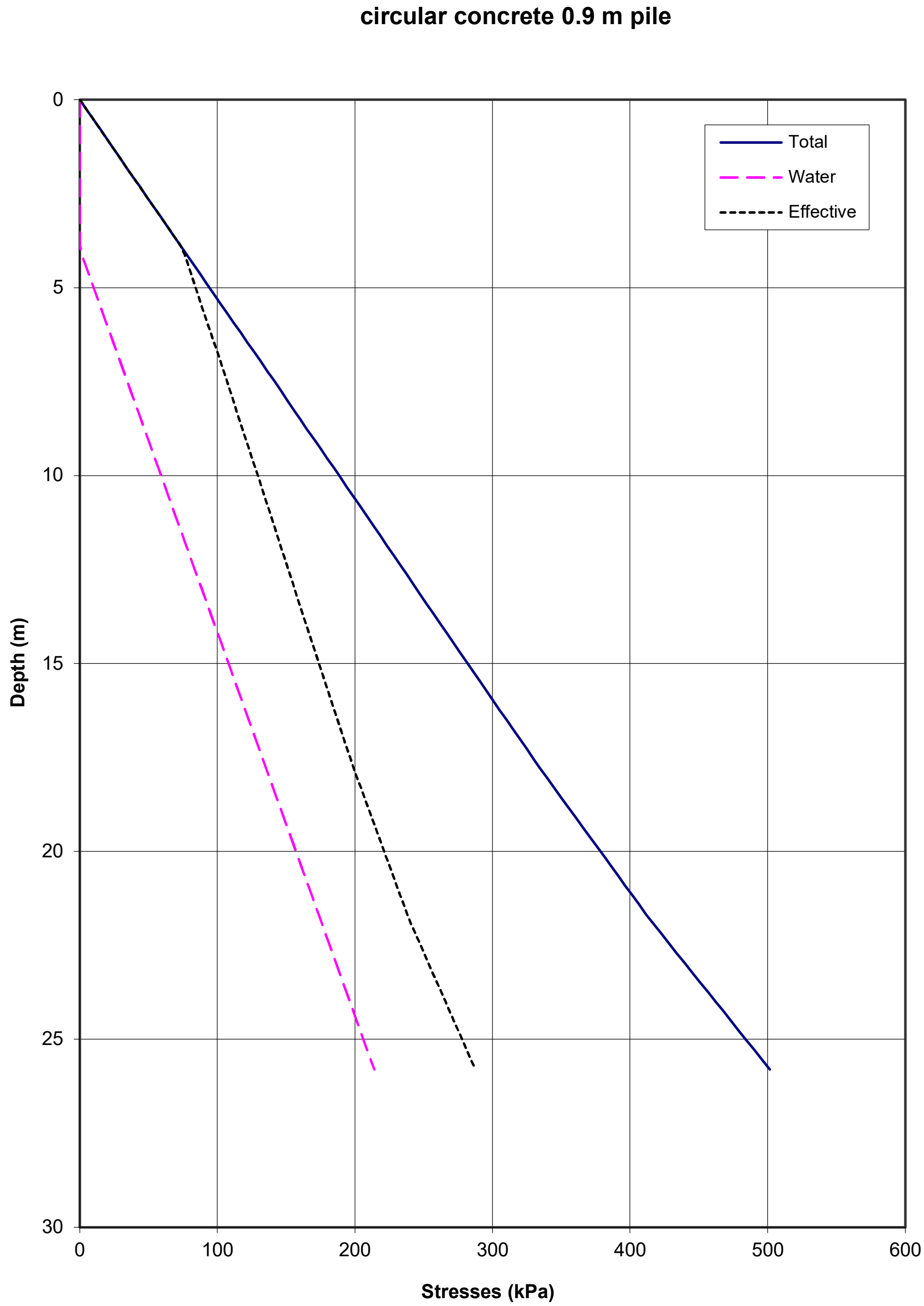
Layer Number	Pile Depth Top (m)	Bulk Density (Mg/m3)	Friction Angle (deg)	Cohesion (kPa)	Interface Factor	Preload Stress (kPa)	Artesian Gradient	Material Type		Description
1	0.00	1.920	0.01	0.00	1.00	50.00	1.00	soil	d1	Made Ground - Slag dominant
2	5.90	1.950	34.00	0.00	1.00	50.00	1.00	soil	d2	Made Ground - Silty Sand
3	7.20	1.900	34.00	0.00	1.00	50.00	1.00	soil	d3	Made Ground - Gravel
4	7.80	1.900	30.00	0.00	1.00	50.00	1.00	soil	c2	Tidal Flats - Sand
5	8.50	1.920	27.00	0.00	1.00	50.00	1.00	soil	c1	Tidal Flats - Clay (soft organic)
6	10.20	1.900	30.00	0.00	1.00	50.00	1.00	soil	c2	Tidal Flats - Sand
7	13.80	1.920	27.00	0.00	1.00	50.00	1.00	soil	c1	Tidal Flats - Clay
8	17.80	2.020	28.00	0.00	1.00	350.00	1.00	soil	b3	Lacustrine Deposits - Laminated Clay
9	21.80	2.230	29.00	0.00	1.00	350.00	1.00	soil	b1	Glacial Till
10	23.80	2.230	0.00	1500.00	1.00	600.00	1.00	rock	a3	Redcar Mudstone Formation

Limiting Ko OC Values

Soil Type	Pile Type	Calculation Reference	Maximum Value
soil	driven	soildriven	1.50
soil	bored	soilbored	1.00

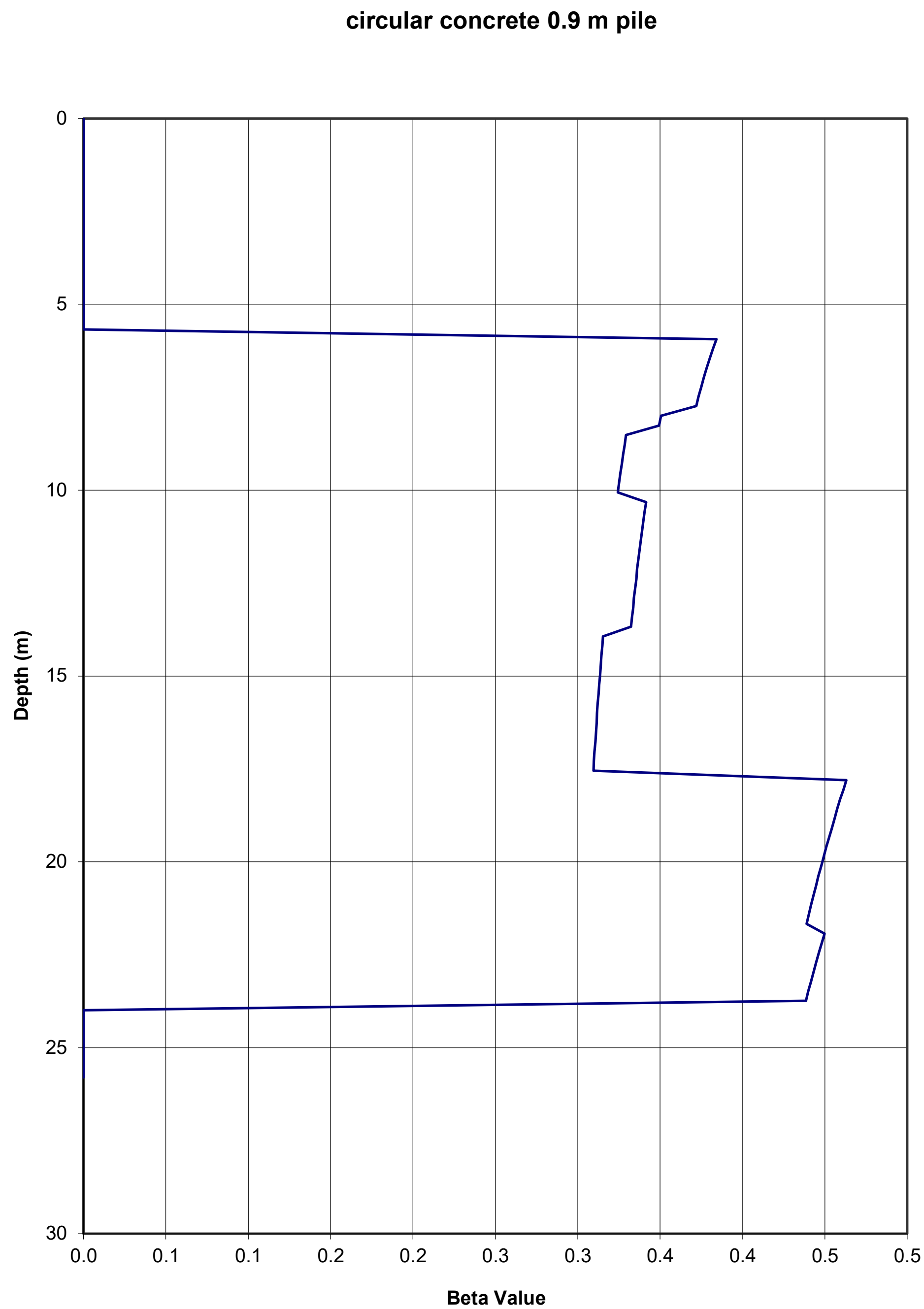
Depth below 6.98 (m)	Soil/ Rock	Bulk Density (Mg/m^3)	Total Stress (kPa)	Artesian Gradient Factor	Water Stress (kPa)	Effective Stress (kPa)	Cohesion (kPa)	Friction Angle (degrees)	Interface Factor	Preload Stress (kPa)	OCR value	K nc	K p
0.00	soil	1.92	0.00	1.00	0.00	0.00	0.00	0.01	1.00	50.00	0.00	1.00	1.00
0.26	soil	1.92	4.86	1.00	0.00	4.86	0.00	0.01	1.00	50.00	11.29	1.00	1.00
0.52	soil	1.92	9.72	1.00	0.00	9.72	0.00	0.01	1.00	50.00	6.14	1.00	1.00
0.77	soil	1.92	14.58	1.00	0.00	14.58	0.00	0.01	1.00	50.00	4.43	1.00	1.00
1.03	soil	1.92	19.44	1.00	0.00	19.44	0.00	0.01	1.00	50.00	3.57	1.00	1.00
1.29	soil	1.92	24.30	1.00	0.00	24.30	0.00	0.01	1.00	50.00	3.06	1.00	1.00
1.55	soil	1.92	29.16	1.00	0.00	29.16	0.00	0.01	1.00	50.00	2.71	1.00	1.00
1.81	soil	1.92	34.02	1.00	0.00	34.02	0.00	0.01	1.00	50.00	2.47	1.00	1.00
2.06	soil	1.92	38.88	1.00	0.00	38.88	0.00	0.01	1.00	50.00	2.29	1.00	1.00
2.32	soil	1.92	43.74	1.00	0.00	43.74	0.00	0.01	1.00	50.00	2.14	1.00	1.00
2.58	soil	1.92	48.59	1.00	0.00	48.59	0.00	0.01	1.00	50.00	2.03	1.00	1.00
2.84	soil	1.92	53.45	1.00	0.00	53.45	0.00	0.01	1.00	50.00	1.94	1.00	1.00
3.10	soil	1.92	58.31	1.00	0.00	58.31	0.00	0.01	1.00	50.00	1.86	1.00	1.00
3.35	soil	1.92	63.17	1.00	0.00	63.17	0.00	0.01	1.00	50.00	1.79	1.00	1.00
3.61	soil	1.92	68.03	1.00	0.00	68.03	0.00	0.01	1.00	50.00	1.73	1.00	1.00
3.87	soil	1.92	72.89	1.00	0.00	72.89	0.00	0.01	1.00	50.00	1.69	1.00	1.00
4.13	soil	1.92	77.75	1.00	1.45	76.30	0.00	0.01	1.00	50.00	1.66	1.00	1.00
4.39	soil	1.92	82.61	1.00	3.98	78.63	0.00	0.01	1.00	50.00	1.64	1.00	1.00
4.64	soil	1.92	87.47	1.00	6.51	80.96	0.00	0.01	1.00	50.00	1.62	1.00	1.00
4.90	soil	1.92	92.33	1.00	9.04	83.29	0.00	0.01	1.00	50.00	1.60	1.00	1.00
5.16	soil	1.92	97.19	1.00	11.58	85.61	0.00	0.01	1.00	50.00	1.58	1.00	1.00
5.42	soil	1.92	102.05	1.00	14.11	87.94	0.00	0.01	1.00	50.00	1.57	1.00	1.00
5.68	soil	1.92	106.91	1.00	16.64	90.27	0.00	0.01	1.00	50.00	1.55	1.00	1.00
5.93	soil	1.95	111.81	1.00	19.17	92.64	0.00	34.00	1.00	50.00	1.54	0.44	3.54
6.19	soil	1.95	116.74	1.00	21.70	95.04	0.00	34.00	1.00	50.00	1.53	0.44	3.54
6.45	soil	1.95	121.68	1.00	24.23	97.45	0.00	34.00	1.00	50.00	1.51	0.44	3.54
6.71	soil	1.95	126.61	1.00	26.76	99.85	0.00	34.00	1.00	50.00	1.50	0.44	3.54
6.97	soil	1.95	131.55	1.00	29.29	102.26	0.00	34.00	1.00	50.00	1.49	0.44	3.54
7.22	soil	1.90	136.42	1.00	31.82	104.60	0.00	34.00	1.00	50.00	1.48	0.44	3.54
7.48	soil	1.90	141.23	1.00	34.35	106.87	0.00	34.00	1.00	50.00	1.47	0.44	3.54
7.74	soil	1.90	146.04	1.00	36.89	109.15	0.00	34.00	1.00	50.00	1.46	0.44	3.54
8.00	soil	1.90	150.85	1.00	39.42	111.43	0.00	30.00	1.00	50.00	1.45	0.50	3.00
8.26	soil	1.90	155.66	1.00	41.95	113.71	0.00	30.00	1.00	50.00	1.44	0.50	3.00
8.51	soil	1.92	160.49	1.00	44.48	116.01	0.00	27.00	1.00	50.00	1.43	0.55	2.66
8.77	soil	1.92	165.35	1.00	47.01	118.34	0.00	27.00	1.00	50.00	1.42	0.55	2.66
9.03	soil	1.92	170.21	1.00	49.54	120.67	0.00	27.00	1.00	50.00	1.41	0.55	2.66
9.29	soil	1.92	175.07	1.00	52.07	123.00	0.00	27.00	1.00	50.00	1.41	0.55	2.66
9.55	soil	1.92	179.93	1.00	54.60	125.32	0.00	27.00	1.00	50.00	1.40	0.55	2.66
9.80	soil	1.92	184.79	1.00	57.13	127.65	0.00	27.00	1.00	50.00	1.39	0.55	2.66
10.06	soil	1.92	189.65	1.00	59.66	129.98	0.00	27.00	1.00	50.00	1.38	0.55	2.66
10.32	soil	1.90	194.48	1.00	62.20	132.29	0.00	30.00	1.00	50.00	1.38	0.50	3.00
10.58	soil	1.90	199.29	1.00	64.73	134.56	0.00	30.00	1.00	50.00	1.37	0.50	3.00
10.84	soil	1.90	204.10	1.00	67.26	136.84	0.00	30.00	1.00	50.00	1.37	0.50	3.00
11.09	soil	1.90	208.91	1.00	69.79	139.12	0.00	30.00	1.00	50.00	1.36	0.50	3.00
11.35	soil	1.90	213.72	1.00	72.32	141.40	0.00	30.00	1.00	50.00	1.35	0.50	3.00
11.61	soil	1.90	218.52	1.00	74.85	143.67	0.00	30.00	1.00	50.00	1.35	0.50	3.00
11.87	soil	1.90	223.33	1.00	77.38	145.95	0.00	30.00	1.00	50.00	1.34	0.50	3.00
12.13	soil	1.90	228.14	1.00	79.91	148.23	0.00	30.00	1.00	50.00	1.34	0.50	3.00
12.38	soil	1.90	232.95	1.00	82.44	150.51	0.00	30.00	1.00	50.00	1.33	0.50	3.00
12.64	soil	1.90	237.76	1.00	84.97	152.79	0.00	30.00	1.00	50.00	1.33	0.50	3.00
12.90	soil	1.90	242.57	1.00	87.51	155.06	0.00	30.00	1.00	50.00	1.32	0.50	3.00
13.16	soil	1.90	247.38	1.00	90.04	157.34	0.00	30.00	1.00	50.00	1.32	0.50	3.00
13.42	soil	1.90	252.19	1.00	92.57	159.62	0.00	30.00	1.00	50.00	1.31	0.50	3.00
13.67	soil	1.90	257.00	1.00	95.10	161.90	0.00	30.00	1.00	50.00	1.31	0.50	3.00
13.93	soil	1.92	261.83	1.00	97.63	164.20	0.00	27.00	1.00	50.00	1.30	0.55	2.66
14.19	soil	1.92	266.69	1.00	100.16	166.53	0.00	27.00	1.00	50.00	1.30	0.55	2.66
14.45	soil	1.92	271.55	1.00	102.69	168.86	0.00	27.00	1.00	50.00	1.30	0.55	2.66
14.71	soil	1.92	276.41	1.00	105.22	171.19	0.00	27.00	1.00	50.00	1.29	0.55	2.66
14.96	soil	1.92	281.27	1.00	107.75	173.51	0.00	27.00	1.00	50.00	1.29	0.55	2.66
15.22	soil	1.92	286.13	1.00	110.28	175.84	0.00	27.00	1.00	50.00	1.28	0.55	2.66
15.48	soil	1.92	290.99	1.00	112.82	178.17	0.00	27.00	1.00	50.00	1.28	0.55	2.66
15.74	soil	1.92	295.85	1.00	115.35	180.50	0.00	27.00	1.00	50.00	1.28	0.55	2.66
16.00	soil	1.92	300.71	1.00	117.88	182.83	0.00	27.00	1.00	50.00	1.27	0.55	2.66
16.25	soil	1.92	305.57	1.00	120.41	185.16	0.00	27.00	1.00	50.00	1.27	0.55	2.66
16.51	soil	1.92	310.42	1.00	122.94	187.49	0.00	27.00	1.00	50.00	1.27	0.55	2.66
16.77	soil	1.92	315.28	1.00	125.47	189.81	0.00	27.00	1.00	50.00	1.26	0.55	2.66
17.03	soil	1.92	320.14	1.00	128.00	192.14	0.00	27.00	1.00	50.00	1.26	0.55	2.66
17.29	soil	1.92	325.00	1.00	130.53	194.47	0.00	27.00	1.00	50.00	1.26	0.55	2.66
17.54	soil	1.92	329.86	1.00	133.06	196.80	0.00	27.00	1.00	50.00	1.25	0.55	2.66
17.80	soil	2.02	334.85	1.00	135.59	199.25	0.00	28.00	1.00	350.00	2.76	0.53	2.77
18.06	soil	2.02	339.96	1.00	138.12	201.84	0.00	28.00	1.00	350.00	2.73	0.53	2.77
18.32	soil	2.02	345.07	1.00	140.66	204.42	0.00	28.00	1.00	350.00	2.71	0.53	2.77
18.58	soil	2.02	350.19	1.00	143.19	207.00	0.00	28.00	1.00	350.00	2.69	0.53	2.77
18.83	soil	2.02	355.30	1.00	145.72	209.58	0.00	28.00	1.00	350.00	2.67	0.53	2.77
19.09	soil	2.02	360.41	1.00	148.25	212.16	0.00	28.00	1.00	350.00	2.65	0.53	2.77
19.35	soil	2.02	365.52	1.00	150.78	214.74	0.00	28.00	1.00	350.00	2.63	0.53	2.77
19.61	soil	2.02	370.64	1.00	153.31	217.33	0.00	28.00	1.00	350.00	2.61	0.53	2.77
19.87	soil	2.02	375.75	1.00	155.84	219.91	0.00	28.00	1.00	350.00	2.59	0.53	2.77
20.12	soil	2.02	380.86	1.00	158.37	222.49	0.00	28.00	1.00	350.00	2.57	0.53	2.77
20.38	soil	2.02	385.97	1.00	160.90	225.07	0.00	28.00	1.00	350.00	2.56	0.53	2.77
20.64	soil	2.02	391.09	1.00	163.43	227.65	0.00	28.00	1.00	350.00	2.54	0.53	2.77
20.90	soil	2.02	396.20	1.00	165.97	230.23	0.00	28.00	1.00	350.00	2.52	0.53	2.77
21.16	soil	2.02	401.31	1.00	168.50	232.82	0.00	28.00	1.00	350.00	2.50	0.53	2.77
21.41	soil	2.02	406.42	1.00	171.03	235.40	0.00	28.00	1.00	350.00	2.49	0.53	2.77
21.67	soil	2.02	411.54	1.00	173.56	237.98	0.00	28.00	1.00	350.00	2.47	0.53	2.77
21.93	soil	2.23	416.92	1.00	176.09	240.83	0.00	29.00	1.00	350.00	2.45	0.52	2.88
22.19	soil	2.23	422.56	1.00	178.62	243.94	0.00	29.00	1.00	350.00	2.43	0.52	2.88
22.45	soil	2.23	428.20	1.00	181.15	247.05	0.00	29.00	1.00	350.00	2.42	0.52	2.88
22.70	soil	2.23	433.85	1.00	183.68	250.17	0.00	29.00	1.00	350.00	2.40	0.52	2.88
22.96	soil	2.23	439.49	1.00	186.21	253.28	0.00	29.00	1.00	350.00	2.38	0.52	2.88
23.22	soil	2.23	445.14	1.00	188.74	256.39	0.00	29.00	1.00	350.00	2.37	0.52	2.88
23.48	soil	2.23	450.78	1.00	191.28	259.50	0.00	29.00	1.00	350.00	2.35	0.52	2.88
23.74	soil	2.23	456.42	1.00	193.81	262.62	0.00	29.00	1.00	350.00	2.33	0.52	2.88
23.99	rock	2.23	462.07	1.00	196.34	265.73	1500.00	0.00	1.00	600.00	3.26	1.00	1.00
24.25	rock	2.23	467.71	1.00	198.87	268.84	1500.00	0.00	1.00	600.00	3.23	1.00	1.00
24.51	rock	2.23	473.36	1.00	201.40	271.96	1500.00	0.00	1.00	600.00	3.21	1.00	1.00
24.77	rock	2.23	479.00	1.00	203.93	275.07	1500.00	0.00	1.00	600.00	3.18	1.00	1.00
25.03	rock	2.23	484.64	1.00	206.46	278.18	1500.00	0.00	1.00	600.00	3.16	1.00	1.00
25.28	rock	2.23	490.29	1.00	208.99	281.30	1500.00	0.00	1.00	600.00	3.13	1.00	1.00
25.54	rock	2.23	495.93	1.00	211.52	284.41	1500.00	0.00	1.00	600.00	3.11	1.00	1.00
25.80	rock	2.23	501.58	1.00	214.05	287.52	1500.00	0.00	1.00	600.00	3.09	1.00	1.00

Depth below 6.98 (m)	Triaxial Compr Strength (MPa)	Uniaxial Compr Strength (MPa)	Ko OC	K	Beta Factor	0.2*sqrt(UCS)/UCS alpha rock	Nq* Factor	Ultimate Skin Friction (kPa)	Ultimate Shaft Capacity (kN)	Ultimate Toe Bearing (kPa)	Ultimate Toe Capacity (kN)	Ultimate Axial Capacity (kN)	Dead Load plus Drag (kN)	Ultimate less Skin (kN)	Nett Force in Pile (kN)	Working Stress (N/mm^2)	Maximum Allowable Stress (N/mm^2)	Incr. Pile Compr. (mm)	Working Pile Compr (mm)
0.00	0.00	0.00	0.00	0.00	0.00	0.0000	1.00	0.00	0.00	0.00	0.00	0.00	3000.00	11028.30	3000.00	4.72	14.00		4.86
0.26	0.00	0.00	1.00	1.00	0.00	0.0000	1.00	0.00	0.00	4.86	3.09	3.10	3000.00	11028.30	3000.00	4.72	14.00	0.0348	4.82
0.52	0.01	0.00	1.00	1.00	0.00	0.0000	1.00	0.00	0.00	9.73	6.19	6.19	3000.00	11028.30	3000.00	4.72	14.00	0.0348	4.79
0.77	0.01	0.00	1.00	1.00	0.00	0.0000	1.00	0.00	0.00	14.59	9.28	9.29	3000.00	11028.30	3000.00	4.72	14.00	0.0348	4.75
1.03	0.02	0.00	1.00	1.00	0.00	0.0000	1.00	0.00	0.00	19.46	12.38	12.38	3000.00	11028.30	3000.00	4.72	14.00	0.0348	4.72
1.29	0.02	0.00	1.00	1.00	0.00	0.0000	1.00	0.00	0.01	24.32	15.47	15.48	3000.01	11028.30	3000.01	4.72	14.00	0.0348	4.68
1.55	0.03	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.01	29.19	18.57	18.58	3000.01	11028.29	3000.01	4.72	14.00	0.0348	4.65
1.81	0.03	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.02	34.05	21.66	21.68	3000.02	11028.29	3000.02	4.72	14.00	0.0348	4.61
2.06	0.04	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.02	38.92	24.76	24.78	3000.02	11028.28	3000.02	4.72	14.00	0.0348	4.58
2.32	0.04	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.03	43.78	27.85	27.88	3000.03	11028.28	3000.03	4.72	14.00	0.0348	4.54
2.58	0.05	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.03	48.65	30.95	30.98	3000.03	11028.27	3000.03	4.72	14.00	0.0348	4.51
2.84	0.05	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.04	53.51	34.04	34.08	3000.04	11028.27	3000.04	4.72	14.00	0.0348	4.47
3.10	0.06	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.04	58.38	37.14	37.18	3000.04	11028.26	3000.04	4.72	14.00	0.0348	4.44
3.35	0.06	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.05	63.24	40.23	40.28	3000.05	11028.25	3000.05	4.72	14.00	0.0348	4.40
3.61	0.07	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.06	68.11	43.33	43.39	3000.06	11028.24	3000.06	4.72	14.00	0.0348	4.37
3.87	0.07	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.07	72.97	46.42	46.49	3000.07	11028.23	3000.07	4.72	14.00	0.0348	4.33
4.13	0.08	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.08	76.38	48.59	48.67	3000.08	11028.22	3000.08	4.72	14.00	0.0348	4.30
4.39	0.08	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.09	78.71	50.07	50.16	3000.09	11028.21	3000.09	4.72	14.00	0.0348	4.26
4.64	0.08	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.10	81.04	51.56	51.66	3000.10	11028.20	3000.10	4.72	14.00	0.0348	4.23
4.90	0.08	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.11	83.37	53.04	53.15	3000.11	11028.19	3000.11	4.72	14.00	0.0348	4.19
5.16	0.09	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.12	85.71	54.52	54.64	3000.12	11028.18	3000.12	4.72	14.00	0.0348	4.16
5.42	0.09	0.00	1.00	1.00	0.00	0.0000	1.00	0.02	0.13	88.04	56.01	56.14	3000.13	11028.17	3000.13	4.72	14.00	0.0348	4.13
5.68	0.09	0.00	1.00	1.00	0.00	0.0000	1.00	0.02	0.14	90.37	57.49	57.63	3000.14	11028.16	3000.14	4.72	14.00	0.0348	4.09
5.93	0.19	0.00	0.57	0.57	0.38	0.0000	49.30	35.58	13.13	4566.76	2905.25	2918.37	3013.13	11015.18	3013.13	4.74	14.00	0.0348	4.06
6.19	0.19	0.00	0.57	0.57	0.38	0.0000	49.30	36.32	39.35	4685.29	2980.65	3020.00	3039.35	10988.95	3039.35	4.78	14.00	0.0351	4.02
6.45	0.19	0.00	0.56	0.56	0.38	0.0000	49.30	37.05	66.11	4803.82	3056.06	3122.17	3066.11	10962.19	3066.11	4.82	14.00	0.0354	3.99
6.71	0.20	0.00	0.56	0.56	0.38	0.0000	49.30	37.78	93.40	4922.35	3131.47	3224.87	3093.40	10934.90	3093.40	4.86	14.00	0.0357	3.95
6.97	0.20	0.00	0.56	0.56	0.38	0.0000	49.30	38.50	121.22	5040.88	3206.87	3328.09	3121.22	10907.08	3121.22	4.91	14.00	0.0360	3.91
7.22	0.21	0.00	0.56	0.56	0.37	0.0000	49.30	39.21	149.57	5156.30	3280.29	3429.86	3149.57	10878.73	3149.57	4.95	14.00	0.0363	3.88
7.48	0.21	0.00	0.55	0.55	0.37	0.0000	49.30	39.90	178.43	5268.59	3351.73	3530.16	3178.43	10849.88	3178.43	5.00	14.00	0.0367	3.84
7.74	0.21	0.00	0.55	0.55	0.37	0.0000	49.30	40.59	207.79	5380.88	3423.17	3630.96	3207.79	10820.52	3207.79	5.04	14.00	0.0370	3.80
8.00	0.20	0.00	0.61	0.61	0.35	0.0000	29.03	39.06	236.84	3234.25	2057.54	2294.38	3236.84	10791.46	3236.84	5.09	14.00	0.0373	3.77
8.26	0.21	0.00	0.61	0.61	0.35	0.0000	29.03	39.73	265.57	3300.37	2099.60	2365.18	3265.57	10762.73	3265.57	5.13	14.00	0.0377	3.73
8.51	0.20	0.00	0.65	0.65	0.33	0.0000	19.92	38.21	294.00	2311.45	1470.48	1764.48	3294.00	10734.30	3294.00	5.18	14.00	0.0380	3.69
8.77	0.20	0.00	0.64	0.64	0.33	0.0000	19.92	38.87	322.12	2357.85	1500.00	1822.11	3322.12	10706.19	3322.12	5.22	14.00	0.0383	3.65
9.03	0.21	0.00	0.64	0.64	0.33	0.0000	19.92	39.53	350.71	2404.24	1529.51	1880.22	3350.71	10677.59	3350.71	5.27	14.00	0.0387	3.61
9.29	0.21	0.00	0.64	0.64	0.33	0.0000	19.92	40.19	379.79	2450.64	1559.03	1938.81	3379.79	10648.52	3379.79	5.31	14.00	0.0390	3.57
9.55	0.21	0.00	0.64	0.64	0.33	0.0000	19.92	40.84	409.34	2497.03	1588.54	1997.88	3409.34	10618.96	3409.34	5.36	14.00	0.0393	3.54
9.80	0.22	0.00	0.64	0.64	0.33	0.0000	19.92	41.50	439.37	2543.42	1618.06	2057.43	3439.37	10588.93	3439.37	5.41	14.00	0.0397	3.50
10.06	0.22	0.00	0.64	0.64	0.32	0.0000	19.92	42.16	469.89	2589.82	1647.57	2117.46	3469.89	10558.42	3469.89	5.45	14.00	0.0400	3.46
10.32	0.23	0.00	0.59	0.59	0.34	0.0000	29.03	45.17	501.74	3839.58	2442.63	2944.37	3501.74	10526.57	3501.74	5.50	14.00	0.0404	3.42
10.58	0.24	0.00	0.59	0.59	0.34	0.0000	29.03	45.83	534.93	3905.69	2484.69	3019.62	3534.93	10493.38	3534.93	5.56	14.00	0.0408	3.37
10.84	0.24	0.00	0.59	0.59	0.34	0.0000	29.03	46.50	568.61	3971.81	2526.76	3095.36	3568.61	10459.70	3568.61	5.61	14.00	0.0412	3.33
11.09	0.25	0.00	0.59	0.59	0.34	0.0000	29.03	47.16	602.77	4037.92	2568.82	3171.58	3602.77	10425.54	3602.77	5.66	14.00	0.0415	3.29
11.35	0.25	0.00	0.59	0.59	0.34	0.0000	29.03	47.83	637.42	4104.04	2610.88	3248.29	3637.42	10390.89	3637.42	5.72	14.00	0.0419	3.25
11.61	0.25	0.00	0.58	0.58	0.34	0.0000	29.03	48.49	672.55	4170.15	2652.94	3325.49	3672.55	10355.75	3672.55	5.77	14.00	0.0424	3.21
11.87	0.26	0.00	0.58	0.58	0.34	0.0000	29.03	49.16	708.17	4236.27	2695.00	3403.17	3708.17	10320.14	3708.17	5.83	14.00	0.0428	3.16
12.13	0.26	0.00	0.58	0.58	0.34	0.0000	29.03	49.82	744.27	4302.39	2737.06	3481.33	3744.27	10284.03	3744.27	5.89	14.00	0.0432	3.12
12.38	0.26	0.00	0.58	0.58	0.34	0.0000	29.03	50.49	780.86	4368.50	2779.12	3559.98	3780.86	10247.44	3780.86	5.94	14.00	0.0436	3.08
12.64	0.27	0.00	0.58	0.58	0.33	0.0000	29.03	51.15	817.93	4434.62	2821.18	3639.11	3817.93	10210.37	3817.93	6.00	14.00	0.0440	3.03
12.90	0.27	0.00	0.58	0.58	0.33	0.0000	29.03	51.82	855.49	4500.73	2863.24	3718.73	3855.49	10172.81	3855.49	6.06	14.00	0.0445	2.99
13.16	0.27	0.00	0.58	0.58	0.33	0.0000	29.03	52.48	893.53	4566.85	2905.30	3798.83	3893.53	10134.77	3893.53	6.12	14.00	0.0449	2.94
13.42	0.28	0.00	0.58	0.58	0.33	0.0000	29.03	53.14	932.06	4632.96	2947.36	3879.42	3932.06	10096.25	3932.06	6.18	14.00	0.0453	2.90
13.67	0.28	0.00	0.58	0.58	0.33	0.0000	29.03	53.81	971.07	4699.08	2989.43	3960.49	3971.07	10057.24	3971.07	6.24	14.00	0.0458	2.85
13.93	0.27	0.00	0.62	0.62	0.32	0.0000	19.92	51.78	1009.58	3271.61	2081.31	3090.89	4009.58	10018.73	4009.58	6.30	14.00	0.0462	2.81
14.19	0.27	0.00	0.62	0.62	0.31	0.0000	19.92	52.43	1047.59	3318.00	2110.82	3158.41	4047.59	9980.72	4047.59	6.36	14.00	0.0467	2.76
14.45	0.28	0.00	0.62	0.62	0.31	0.0000	19.92	53.08	1086.07	3364.40	2140.34	3226.41	4086.07	9942.23	4086.07	6.42	14.00	0.0471	2.71
14.71	0.28	0.00	0.62	0.62	0.31	0.0000	19.92	53.74	1125.04	3410.79	2169.85	3294.89	4125.04	9903.27	4125.04	6.48	14.00	0.0476	2.67
14.96	0.28	0.00	0.62	0.62	0.31	0.0000	19.92	54.39	1164.47	3457.19	2199.37	3363.84	4164.47	9863.83	4164.47	6.55	14.00	0.0480	2.62
15.22	0.29	0.00	0.61	0.61	0.31	0.0000	19.92	55.04	1204.39	3503.58	2228.88	3433.27	4204.39	9823.91	4204.39	6.61	14.00	0.0485	2.57
15.48	0.29	0.00	0.61	0.61	0.31	0.0000	19.92	55.70	1244.78	3549.97	2258.40	3503.18	4244.78	9783.52	4244.78	6.67	14.00	0.0490	2.52
15.74	0.29	0.00	0.61	0.61	0.31	0.0000	19.92	56.35	1285.65	3596.37	2287.91	3573.56	4285.65	9742.66	4285.65	6.74	14.00	0.0494	2.47
16.00	0.30	0.00	0.61	0.61	0.31	0.0000	19.92	57.00	1326.99	3642.76	2317.43	3644.42	4326.99	9701.31	4326.99	6.80	14.00	0.0499	2.42
16.25	0.30	0.00	0.61	0.61	0.31	0.0000	19.92	57.65	1368.81	3689.16	2346.94	3715.75	4368.81	9659.49	4368.81	6.87	14.00	0.0504	2.37
16.51	0.30	0.00	0.61	0.61	0.31	0.0000	19.92	58.31	1411.11	3735.55	2376.45	3787.56	4411.11	9617.20	4411.11	6.93	14.00	0.0509	2.32
16.77	0.31	0.00	0.61	0.61	0.31	0.0000	19.92	58.96	1453.88	3781.94	2405.97	3859.85	4453.88	9574.43	4453.88	7.00	14.00	0.0514	2.27
17.03	0.31	0.00	0.61	0.61	0.31	0.0000	19.92	59.61	1497.12	3828.34	2435.48	3932.61	4497.12	9531.18	4497.12	7.07	14.00	0.0519	2.22
17.29	0.31	0.00	0.61	0.61	0.31	0.0000	19.92	60.26	1540.85	3874.73	2465.00	4005.84	4540.85	9487.46	4540.85	7.14	14.00	0.0524	2.16
17.54	0.32	0.00	0.61	0.61	0.31	0.0000	19.92	60.91	1585.04	3921.13	2494.51	4079.56	4585.04	9443.26	4585.04	7.21	14.00	0.0529	2.11
17.80	0.48	0.00	0.87	0.87	0.46	0.0000	22.55	92.26	1640.91	4492.52	2858.01	4498.93	4640.91	9387.39	4640.91	7.30	14.00	0.0535	2.06
18.06	0.48	0.00	0.87	0.87	0.46	0.0000	22.55	93.08	1708.51	4550.72	2895.04	4603.55	4708.51	9319.79	4708.51	7.40	14.00	0.0542	2.00
18.32	0.49	0.00	0.86	0.86	0.46	0.0000	22.55	93.90	1776.71	4608.93	2932.07	4708.78	4776.71	9251.60	4776.71	7.51	14.00	0.0550	1.95
18.58	0.49	0.00	0.86	0.86	0.46	0.0000	22.55	94.72	1845.50	4667.13	2969.10	4814.61	4845.50	9182.80	4845.50	7.62	14.00	0.0557	1.89
18.83	0.50	0.00	0.86	0.86	0.46	0.0000	22.55	95.54	1914.90	4725.34	3006.13	4921.03	4914.90	9113.41	4914.90	7.73	14.00	0.0565	1.84
19.09	0.50	0.00	0.85	0.85	0.45	0.0000	22.55	96.35	1984.89	4783.55	3043.16	5028.05	4984.89	9043.42	4984.89	7.84	14.00	0.0574	1.78
19.35	0.51	0.00	0.85	0.85	0.45	0.0000	22.55	97.17	2055.47	4841.75	3080.19	5135.66	5055.47	8972.83	5055.47	7.95	14.00	0.0582	1.72
19.61	0.51	0.00	0.85	0.85	0.45	0.0000	22.55	97.98	2126.65	4899.96	3117.22	5243.87	5126.65	8901.65	5126.65	8.06	14.00	0.0590	1.66
19.87	0.51	0.00	0.84	0.84	0.45	0.0000	22.55	98.79	2198.42	4958.17	3154.25	5352.67	5198.42	8829.88	5198.42	8.17	14.00	0.0598	1.60
20.12	0.52	0.00	0.84	0.84	0.45	0.0000	22.55	99.60	2270.78	5016.37	3191.28	5462.06	5270.78	8757.52	5270.78	8.29	14.00	0.0607	1.54
20.38	0.52	0.00	0.84	0.84	0.45	0.0000	22.55	100.41	2343.74	5074.58	3228.31	5572.05	5343.74	8684.56	5343.74	8.40	14.00	0.0615	1.48
20.64	0.53	0.00	0.84	0.84	0.44	0.0000	22.55	101.22	2417.28	5132.78	3265.34	5682.62	5417.28	8611.02	5417.28	8.52	14.00	0.0623	1.42
20.90	0.53	0.00	0.83	0.83	0.44	0.0000	22.55	102.03	2491.42	5190.99	3302.37	5793.78	5491.42	8536.88	5491.42	8.63	14.00	0.0632	1.35
21.16	0.54	0.00	0.83	0.83	0.44	0.0000	22.55	102.84	2566.14	5249.20	3339.39	5905.54	5566.14	8462.16	5566.14	8.75	14.00	0.0641	1.29
21.41	0.54	0.00	0.83	0.83	0.44	0.0000	22.55	103.64	2641.45	5307.40	3376.42	6017.88	5641.45	8386.85	5641.45	8.87	14.00	0.0649	1.23
21.67	0.54	0.00	0.83	0.83	0.44	0.0000	22.55	104.45	2717.35	5365.61	3413.45	6130.80	5717.35	8310.95	5717.35	8.99	14.00	0.0658	1.16
21.93	0.56	0.00	0.81	0.81	0.45	0.0000	25.56	108.32	2794.95	6155.03	3915.66	6710.62	5794.95	8233.35	5794.95	9.11	14.00	0.0667	1.09
22.19	0.57	0.00	0.81	0.81	0.45	0.0000	25.56	109.30	2874.33	6234.60	3966.28	6840.60	5874.33	8153.98	5874.33	9.23	14.00	0.0676	1.03
22.45	0.57	0.00	0.81	0.81	0.45	0.0000	25.56	110.27	2954.41	6314.16	4016.90	6971.31	5954.41	8073.89	5954.41	9.36	14.00	0.0685	0.96
22.70	0.58	0.00	0.80	0.80	0.44	0.0000	25.56	111.25	3035.21	6393.73	4067.51	7102.72	6035.21	7993.09	6035.21	9.49	14.00	0.0695	0.89
22.96	0.58	0.00	0.80	0.80	0.44	0.0000	25.56	112.23	3116.72	6473.29	4118.13	7234.85	6116.72	7911.58	6116.72	9.61	14.00	0.0704	0.82
23.22	0.59	0.00	0.80	0.80	0.44	0.0000	25.56	113.20	3198.94	6552.85	4168.75	7367.69	6198.94	7829.36	6198.94	9.74	14.00	0.0714	0.75
23.48	0.59	0.00	0.79	0.79	0.44	0.0000	25.56	114.17	3281.87	6632.42	4219.36	7501.24	6281.87	7746.43	6281.87	9.87	14.00	0.0723	0.67
23.74	0.60	0.00	0.79	0.79	0.44	0.0000	25.56	115.14	3365.52	6711.98	4269.98	7635.49	6365.52	7662.79	6365.52	10.01	14.00	0.0733	0.60
23.99	1.77	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	3533.86	9000.00	5725.55	9259.41	6533.86	7494.44	6533.86	10.27	14.00	0.0747	0.53
24.25	1.77	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	3786.56	9000.00	5725.55	9512.11	6786.56	7241.74	6786.56	10.67	14.00	0.0772	0.45
24.51	1.77	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	4039.26	9000.00	5725.55	9764.81	7039.26	6989.05	6989.05	10.99	14.00	0.0798	0.37
24.77	1.78	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	4291.96	9000.00	5725.55	10017.51	7291.96	6736.35	6736.35	10.59	14.00	0.0795	0.29
25.03	1.78	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	4544.66	9000.00	5725.55	10270.21	7544.66	6483.65	6483.65	10.19	14.00	0.0766	0.21
25.28	1.78	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	4797.35	9000.00	5725.55	10522.91	7797.35	6230.95	6230.95	9.79	14.00	0.0737	0.14
25.54	1.78	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	5050.05	9000.00	5725.55	10775.61	8050.05	5978.25	5978.25	9.40	14.00	0.0707	0.07
25.80	1.79	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	5302.75	9000.00	5725.55	11028.30	8302.75	5725.55	5725.55	9.00	14.00	0.0678	0.00



PROJECT TITLE:-	
Net Zero Teesside	AECOM

FIGURE TITLE:-	FIGURE No. Figure 1
Preliminary Onshore Ground **MS\BH08 - Cooling** 900mm dia. concrete Bored piles 2m rock CALCULATION OF AXIAL PILE CAPACITY USING THE BETA METHOD	REPORT No.: 60657467
Vertical Stress Profiles	DATE:- 02-Nov-21



PROJECT TITLE:-

Net Zero Teesside

AECOM

FIGURE TITLE:-

Preliminary Onshore Ground Investigation
MS\BH08 - Cooling

900mm dia. concrete Bored piles 2m rock

CALCULATION OF AXIAL PILE CAPACITY USING THE BETA METHOD

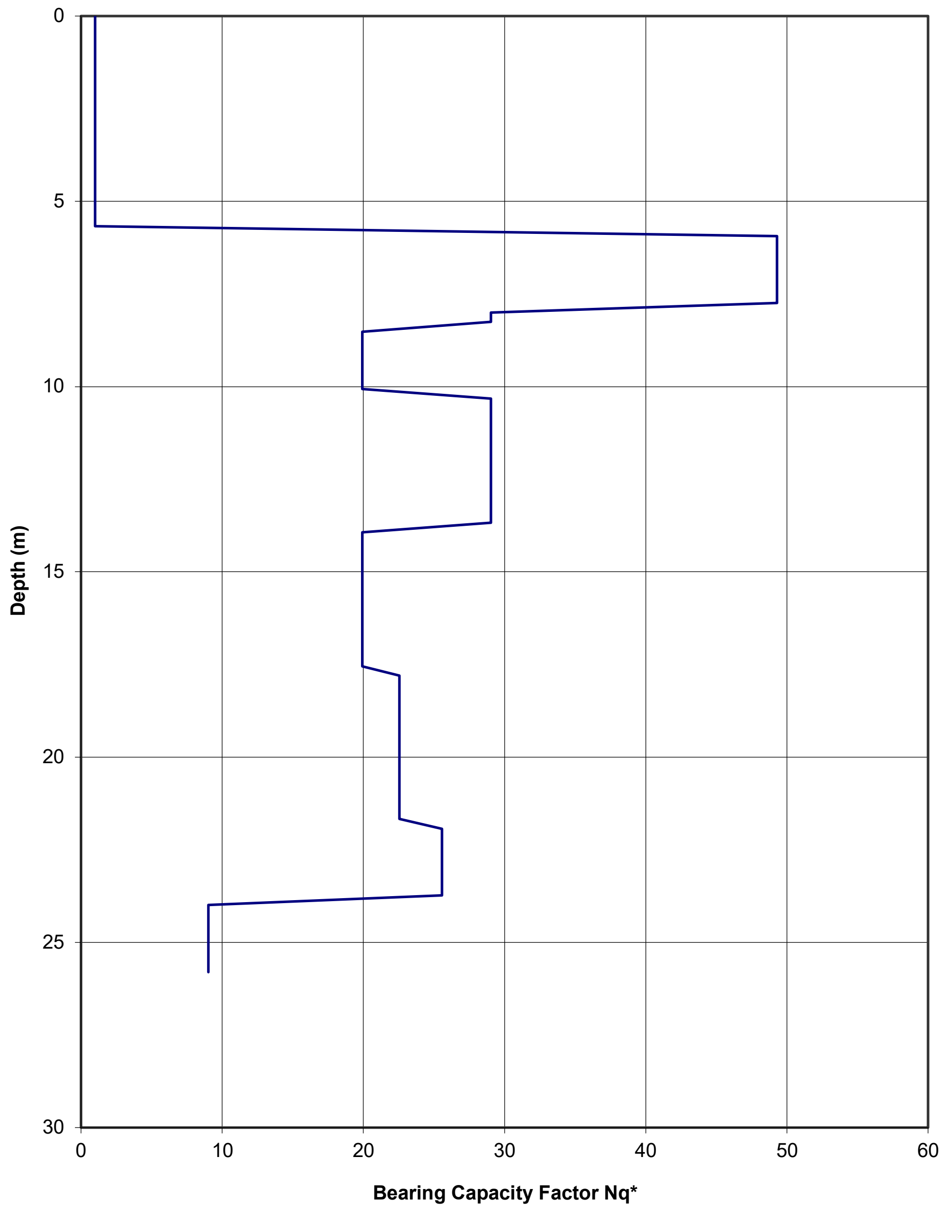
Beta Values

FIGURE No.:
Figure 2

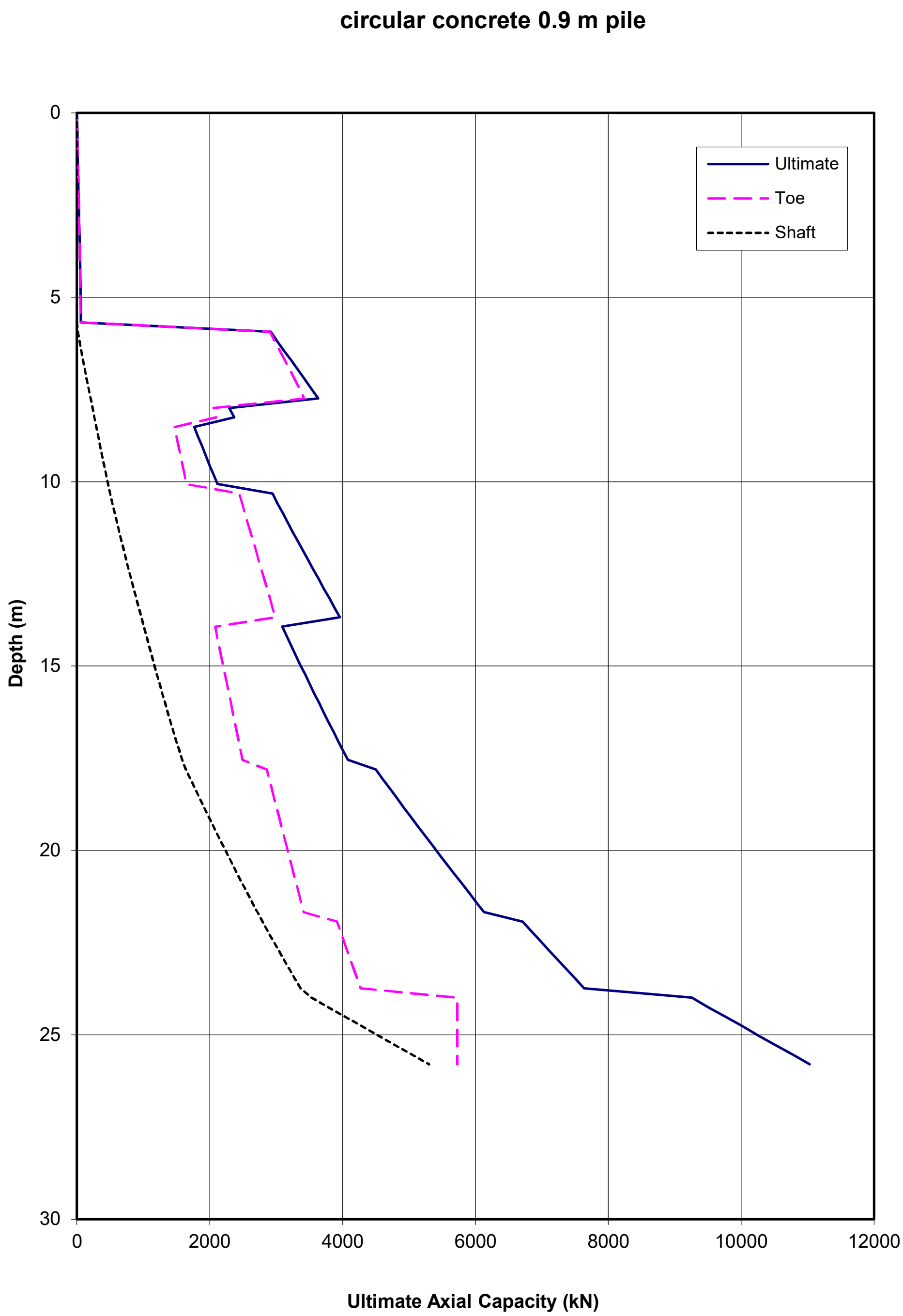
REPORT No.:-
60657467

DATE:-
02-Nov-21

circular concrete 0.9 m pile



PROJECT TITLE:- **Net Zero Teesside**	AECOM
FIGURE TITLE:- **Preliminary Onshore Ground Investigation** **MS\BH08 - Cooling** 900mm dia. concrete Bored piles 2m rock CALCULATION OF AXIAL PILE CAPACITY USING THE BETA METHOD N_q* Values	FIGURE No.: Figure 4 REPORT No.:- 60657467 DATE:- 02-Nov-21



PROJECT TITLE:- **Net Zero Teesside**	AECOM
FIGURE TITLE:- **Preliminary Onshore Ground** **MS\BH08 - Cooling** 900mm dia. concrete Bored piles 2m rock CALCULATION OF AXIAL PILE CAPACITY USING THE BETA METHOD Ultimate Axial Pile Capacity	FIGURE No.: Figure 8 REPORT No:- 60657467 DATE:- 02-Nov-21

CALCULATION OF AXIAL PILE CAPACITY USING THE BETA METHOD

FILE :	60657467
CLIENT :	bp on behalf of OGCI
JOB :	Net Zero Teesside
SITE :	Preliminary Onshore Ground Investigation
LOCATION:	MS\BH08 - Cooling
SUBTITLE:	1200mm dia. concrete Bored piles 2m rock socket
ENG'R :	CMC
CHECK :	SDM /NJ
DATE :	02-Nov-21
Version	1.125
Date updated:	12/09/14
Author :	sdm

Summary	circular concrete 1.2 m pile		FoS	Safe	Applied	kN
Skin	7070.33	kN	2.50	2828.13	Dead Load	14000.00
Toe	10178.76	kN	3.00	3392.92	Live Load	3000.00
Total	17249.10	kN		6221.05	Total Load	17000.00
Top Stress	15.25	N/mm^2				
Stress Ratio	0.44					
Head settlement	14.25	mm	Toe estimate	5.00	mm	
Spring stiffness	1192649	kN/m				

INPUT INFORMATION

Existing ground level	7.98	mOD
Finished formation level	6.98	mOD
Pile cut off level	6.98	mOD
Embedment below cut off	25.80	m
Pile Toe Level	-18.82	mOD
Depth below finished ground	25.80	m
Pile Type:	circular	
Installation Method:	bored	
Depth Water:	3.98	m
Unit Weight Water:	9.81	kN/m^3
Pile Diameter:	1.200	m
:	0.000	m
:	0.000	m
Pile Base Area:	1.1310	sq.m
Shaft perimeter area	3.76991	sq.m/m
Surcharge:	0.00	kPa
Volume pile material	29.1791	m^3
Compressive Strength:	35.00	N/mm^2
Pile Modulus	3.5000E+07	(kPa)
Material:	concrete	
Pile material section area	1.13097	sq.m

1.60

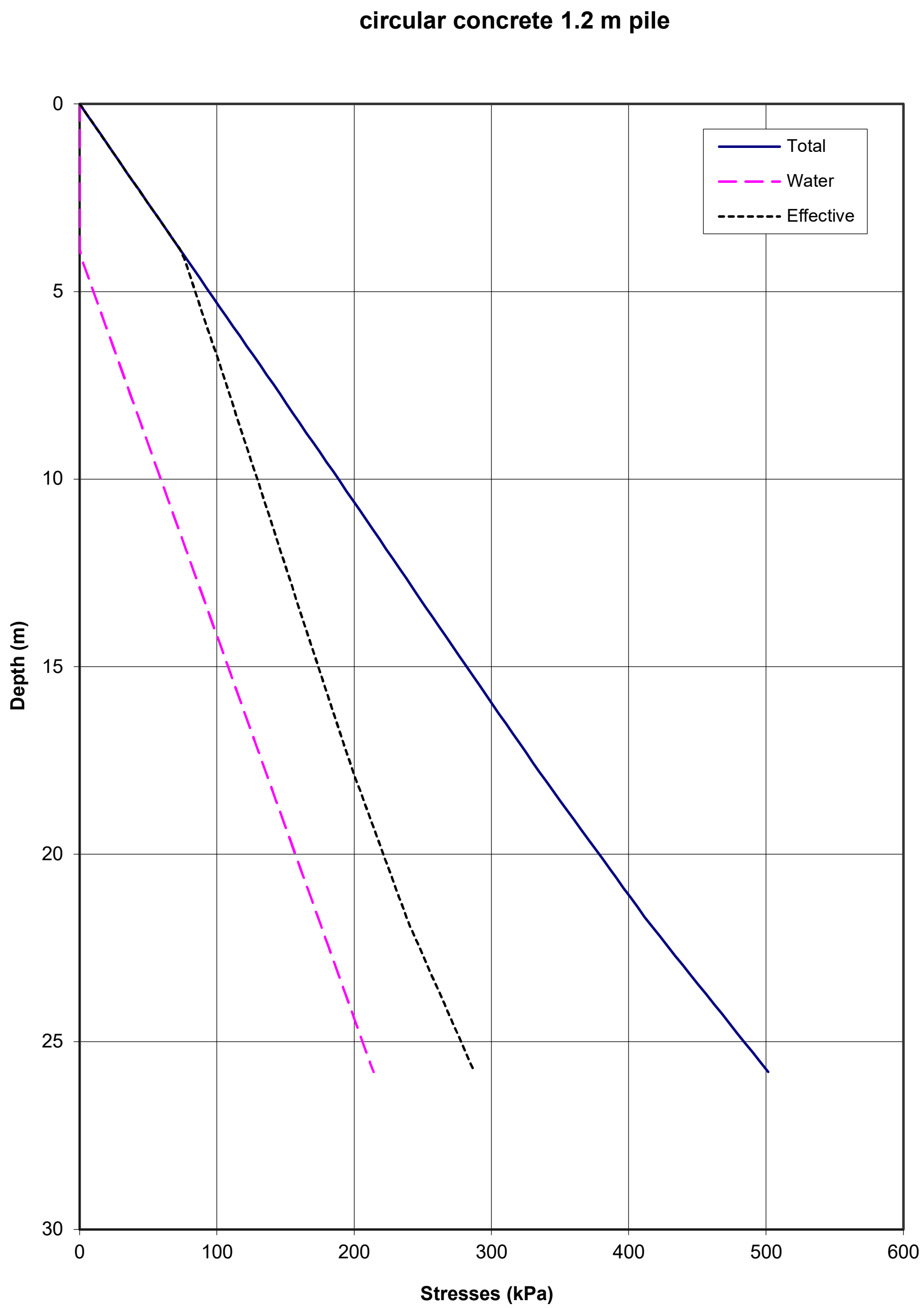
Soil Properties

Layer Number	Pile Depth Top (m)	Bulk Density (Mg/m3)	Friction Angle (deg)	Cohesion (kPa)	Interface Factor	Preload Stress (kPa)	Artesian Gradient	Material Type		Description
1	0.00	1.920	0.01	0.00	1.00	50.00	1.00	soil	d1	Made Ground - Slag dominant
2	5.90	1.950	34.00	0.00	1.00	50.00	1.00	soil	d2	Made Ground - Silty Sand
3	7.20	1.900	34.00	0.00	1.00	50.00	1.00	soil	d3	Made Ground - Gravel
4	7.80	1.900	30.00	0.00	1.00	50.00	1.00	soil	c2	Tidal Flats - Sand
5	8.50	1.920	27.00	0.00	1.00	50.00	1.00	soil	c1	Tidal Flats - Clay (soft organic)
6	10.20	1.900	30.00	0.00	1.00	50.00	1.00	soil	c2	Tidal Flats - Sand
7	13.80	1.920	27.00	0.00	1.00	50.00	1.00	soil	c1	Tidal Flats - Clay
8	17.80	2.020	28.00	0.00	1.00	350.00	1.00	soil	b3	Lacustrine Deposits - Laminated Clay
9	21.80	2.230	29.00	0.00	1.00	350.00	1.00	soil	b1	Glacial Till
10	23.80	2.230	0.00	1500.00	1.00	600.00	1.00	rock	a3	Redcar Mudstone Formation

Limiting Ko OC Values

Soil Type	Pile Type	Calculation Reference	Maximum Value
soil	driven	soildriven	1.50
soil	bored	soilbored	1.00

Depth below 6.98 (m)	Soil/ Rock	Bulk Density (Mg/m^3)	Total Stress (kPa)	Artesian Gradient Factor	Water Stress (kPa)	Effective Stress (kPa)	Cohesion (kPa)	Friction Angle (degrees)	Interface Factor	Preload Stress (kPa)	OCR value	K nc	K p	Triaxial Compr Strength (MPa)	Uniaxial Compr Strength (MPa)	Ko OC	K	Beta Factor	0.2*sqrt(UCS)/ UCS alpha rock	Nq* Factor	Ultimate Skin Friction (kPa)	Ultimate Shaft Capacity (kN)	Ultimate Toe Bearing (kPa)	Ultimate Toe Capacity (kN)	Ultimate Axial Capacity (kN)	Dead Load plus Drag (kN)	Ultimate less Skin (kN)	Nett Force in Pile (kN)	Working Stress (N/mm^2)	Maximum Allowable Stress (N/mm^2)	Incr. Pile Compr. (mm)	Working Pile Compr (mm)
0.00	soil	1.92	0.00	1.00	0.00	0.00	0.00	0.01	1.00	50.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.0000	1.00	0.00	0.00	0.00	0.00	0.00	14000.00	17249.10	14000.00	12.38	14.00		9.25
0.26	soil	1.92	4.86	1.00	0.00	4.86	0.00	0.01	1.00	50.00	11.29	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.0000	1.00	0.00	0.00	4.86	5.50	5.50	14000.00	17249.09	14000.00	12.38	14.00	0.0912	9.16
0.52	soil	1.92	9.72	1.00	0.00	9.72	0.00	0.01	1.00	50.00	6.14	1.00	1.00	0.01	0.00	1.00	1.00	0.00	0.0000	1.00	0.00	0.00	9.73	11.00	11.01	14000.00	17249.09	14000.00	12.38	14.00	0.0912	9.07
0.77	soil	1.92	14.58	1.00	0.00	14.58	0.00	0.01	1.00	50.00	4.43	1.00	1.00	0.01	0.00	1.00	1.00	0.00	0.0000	1.00	0.00	0.00	14.59	16.51	16.51	14000.00	17249.09	14000.00	12.38	14.00	0.0912	8.98
1.03	soil	1.92	19.44	1.00	0.00	19.44	0.00	0.01	1.00	50.00	3.57	1.00	1.00	0.02	0.00	1.00	1.00	0.00	0.0000	1.00	0.00	0.01	19.46	22.01	22.01	14000.01	17249.09	14000.01	12.38	14.00	0.0912	8.89
1.29	soil	1.92	24.30	1.00	0.00	24.30	0.00	0.01	1.00	50.00	3.06	1.00	1.00	0.02	0.00	1.00	1.00	0.00	0.0000	1.00	0.00	0.01	24.32	27.51	27.52	14000.01	17249.08	14000.01	12.38	14.00	0.0912	8.80
1.55	soil	1.92	29.16	1.00	0.00	29.16	0.00	0.01	1.00	50.00	2.71	1.00	1.00	0.03	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.01	29.19	33.01	33.03	14000.01	17249.08	14000.01	12.38	14.00	0.0912	8.71
1.81	soil	1.92	34.02	1.00	0.00	34.02	0.00	0.01	1.00	50.00	2.47	1.00	1.00	0.03	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.02	34.05	38.51	38.53	14000.02	17249.07	14000.02	12.38	14.00	0.0912	8.62
2.06	soil	1.92	38.88	1.00	0.00	38.88	0.00	0.01	1.00	50.00	2.29	1.00	1.00	0.04	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.03	38.92	44.01	44.04	14000.03	17249.07	14000.03	12.38	14.00	0.0912	8.52
2.32	soil	1.92	43.74	1.00	0.00	43.74	0.00	0.01	1.00	50.00	2.14	1.00	1.00	0.04	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.03	43.78	49.52	49.55	14000.03	17249.06	14000.03	12.38	14.00	0.0912	8.43
2.58	soil	1.92	48.59	1.00	0.00	48.59	0.00	0.01	1.00	50.00	2.03	1.00	1.00	0.05	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.04	48.65	55.02	55.06	14000.04	17249.05	14000.04	12.38	14.00	0.0912	8.34
2.84	soil	1.92	53.45	1.00	0.00	53.45	0.00	0.01	1.00	50.00	1.94	1.00	1.00	0.05	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.05	53.51	60.52	60.57	14000.05	17249.05	14000.05	12.38	14.00	0.0912	8.25
3.10	soil	1.92	58.31	1.00	0.00	58.31	0.00	0.01	1.00	50.00	1.86	1.00	1.00	0.06	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.06	58.38	66.02	66.08	14000.06	17249.04	14000.06	12.38	14.00	0.0912	8.16
3.35	soil	1.92	63.17	1.00	0.00	63.17	0.00	0.01	1.00	50.00	1.79	1.00	1.00	0.06	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.07	63.24	71.52	71.59	14000.07	17249.03	14000.07	12.38	14.00	0.0912	8.07
3.61	soil	1.92	68.03	1.00	0.00	68.03	0.00	0.01	1.00	50.00	1.73	1.00	1.00	0.07	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.08	68.11	77.03	77.11	14000.08	17249.01	14000.08	12.38	14.00	0.0912	7.98
3.87	soil	1.92	72.89	1.00	0.00	72.89	0.00	0.01	1.00	50.00	1.69	1.00	1.00	0.07	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.09	72.97	82.53	82.62	14000.09	17249.00	14000.09	12.38	14.00	0.0912	7.89
4.13	soil	1.92	77.75	1.00	1.45	76.30	0.00	0.01	1.00	50.00	1.66	1.00	1.00	0.08	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.11	76.38	86.39	86.49	14000.11	17248.99	14000.11	12.38	14.00	0.0912	7.79
4.39	soil	1.92	82.61	1.00	3.98	78.63	0.00	0.01	1.00	50.00	1.64	1.00	1.00	0.08	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.12	78.71	89.02	89.14	14000.12	17248.98	14000.12	12.38	14.00	0.0912	7.70
4.64	soil	1.92	87.47	1.00	6.51	80.96	0.00	0.01	1.00	50.00	1.62	1.00	1.00	0.08	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.13	81.04	91.66	91.79	14000.13	17248.96	14000.13	12.38	14.00	0.0912	7.61
4.90	soil	1.92	92.33	1.00	9.04	83.29	0.00	0.01	1.00	50.00	1.60	1.00	1.00	0.08	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.15	83.37	94.29	94.44	14000.15	17248.95	14000.15	12.38	14.00	0.0912	7.52
5.16	soil	1.92	97.19	1.00	11.58	85.61	0.00	0.01	1.00	50.00	1.58	1.00	1.00	0.09	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.16	85.71	96.93	97.09	14000.16	17248.93	14000.16	12.38	14.00	0.0912	7.43
5.42	soil	1.92	102.05	1.00	14.11	87.94	0.00	0.01	1.00	50.00	1.57	1.00	1.00	0.09	0.00	1.00	1.00	0.00	0.0000	1.00	0.02	0.18	88.04	99.57	99.74	14000.18	17248.92	14000.18	12.38	14.00	0.0912	7.34
5.68	soil	1.92	106.91	1.00	16.64	90.27	0.00	0.01	1.00	50.00	1.55	1.00	1.00	0.09	0.00	1.00	1.00	0.00	0.0000	1.00	0.02	0.19	90.37	102.20	102.39	14000.19	17248.90	14000.19	12.38	14.00	0.0913	7.25
5.93	soil	1.95	111.81	1.00	19.17	92.64	0.00	34.00	1.00	50.00	1.54	0.44	3.54	0.19	0.00	0.57	0.57	0.38	0.0000	49.30	35.58	17.50	4566.76	5164.88	5182.38	14017.50	17231.59	14017.50	12.39	14.00	0.0913	7.16
6.19	soil	1.95	116.74	1.00	21.70	95.04	0.00	34.00	1.00	50.00	1.53	0.44	3.54	0.19	0.00	0.57	0.57	0.38	0.0000	49.30	36.32	52.47	4685.29	5298.94	5351.41	14052.47	17196.63	14052.47	12.43	14.00	0.0915	7.06
6.45	soil	1.95	121.68	1.00	24.23	97.45	0.00	34.00	1.00	50.00	1.51	0.44	3.54	0.19	0.00	0.56	0.56	0.38	0.0000	49.30	37.05	88.15	4803.82	5432.99	5521.14	14088.15	17160.95	14088.15	12.46	14.00	0.0917	6.97
6.71	soil	1.95	126.61	1.00	26.76	99.85	0.00	34.00	1.00	50.00	1.50	0.44	3.54	0.20	0.00	0.56	0.56	0.38	0.0000	49.30	37.78	124.53	4922.35	5567.05	5691.58	14124.53	17124.56	14124.53	12.49	14.00	0.0919	6.88
6.97	soil	1.95	131.55	1.00	29.29	102.26	0.00	34.00	1.00	50.00	1.49	0.44	3.54	0.20	0.00	0.56	0.56	0.38	0.0000	49.30	38.50	161.63	5040.88	5701.11	5862.74	14161.63	17087.47	14161.63	12.52	14.00	0.0922	6.79
7.22	soil	1.90	136.42	1.00	31.82	104.60	0.00	34.00	1.00	50.00	1.48	0.44	3.54	0.21	0.00	0.56	0.56	0.37	0.0000	49.30	39.21	199.43	5156.30	5831.63	6031.06	14199.43	17049.67	14199.43	12.56	14.00	0.0924	6.70
7.48	soil	1.90	141.23	1.00	34.35	106.87	0.00	34.00	1.00	50.00	1.47	0.44	3.54	0.21	0.00	0.55	0.55	0.37	0.0000	49.30	39.90	237.90	5268.59	5958.64	6196.54	14237.90	17011.19	14237.90	12.59	14.00	0.0927	6.60
7.74	soil	1.90	146.04	1.00	36.89	109.15	0.00	34.00	1.00	50.00	1.46	0.44	3.54	0.21	0.00	0.55	0.55	0.37	0.0000	49.30	40.59	277.05	5380.88	6085.64	6362.69	14277.05	16972.05	14277.05	12.62	14.00	0.0929	6.51
8.00	soil	1.90	150.85	1.00	39.42	111.43	0.00	30.00	1.00	50.00	1.45	0.50	3.00	0.20	0.00	0.61	0.61	0.35	0.0000	29.03	39.06	315.79	3234.25	3657.85	3973.64	14315.79	16933.31	14315.79	12.66	14.00	0.0932	6.42
8.26	soil	1.90	155.66	1.00	41.95	113.71	0.00	30.00	1.00	50.00	1.44	0.50	3.00	0.21	0.00	0.61	0.61	0.35	0.0000	29.03	39.73	354.10	3300.37	3732.63	4086.73	14354.10	16895.00	14354.10	12.69	14.00	0.0934	6.32
8.51	soil	1.92	160.49	1.00	44.48	116.01	0.00	27.00	1.00	50.00	1.43	0.55	2.66	0.20	0.00	0.65	0.65	0.33	0.0000	19.92	38.21	392.00	2311.45	2614.19	3006.19	14392.00	16857.09	14392.00	12.73	14.00	0.0937	6.23
8.77	soil	1.92	165.35	1.00	47.01	118.34	0.00	27.00	1.00	50.00	1.42	0.55	2.66	0.20	0.00	0.64	0.64	0.33	0.0000	19.92	38.87	429.49	2357.85	2666.66	3096.15	14429.49	16819.61	14429.49	12.76	14.00	0.0939	6.14
9.03	soil	1.92	170.21	1.00	49.54	120.67	0.00	27.00	1.00	50.00	1.41	0.55	2.66	0.21	0.00	0.64	0.64	0.33	0.0000	19.92	39.53	467.62	2404.24	2719.13	3186.75	14467.62	16781.48	14467.62	12.79	14.00	0.0942	6.04
9.29	soil	1.92	175.07	1.00	52.07	123.00	0.00	27.00	1.00	50.00	1.41	0.55	2.66	0.21	0.00	0.64	0.64	0.33	0.0000	19.92	40.19	506.38	2450.64	2771.60	3277.99	14506.38	16742.71	14506.38	12.83	14.00	0.0944	5.95
9.55	soil	1.92	179.93	1.00	54.60	125.32	0.00	27.00	1.00	50.00	1.40	0.55	2.66	0.21	0.00	0.64	0.64	0.33	0.0000	19.92	40.84	545.79	2497.03	2824.07	3369.86	14545.79	16703.31	14545.79	12.86	14.00	0.0947	5.85
9.80	soil	1.92	184.79	1.00	57.13	127.65	0.00	27.00	1.00	50.00	1.39	0.55	2.66	0.22	0.00	0.64	0.64	0.33	0.0000	19.92	41.50	585.83	2543.42	2876.54	3462.38	14585.83	16663.26	14585.83	12.90	14.00	0.0949	5.76
10.06	soil	1.92	189.65	1.00	59.66	129.98	0.00	27.00	1.00	50.00	1.38	0.55	2.66	0.22	0.00	0.64	0.64	0.32	0.0000	19.92	42.16	626.51	2589.82	2929.01	3555.53	14626.51	16622.58	14626.51	12.93	14.00	0.0952	5.66
10.32	soil	1.90	194.48	1.00	62.20	132.29	0.00	30.00	1.00	50.00	1.38	0.50	3.00	0.23	0.00	0.59	0.59	0.34	0.0000	29.03	45.17	668.98	3839.58	4342.46	5011.44	14668.98	16580.11	14668.98	12.97	14.00	0.0955	5.57
10.58	soil	1.90	199.29	1.00	64.73	134.56	0.00	30.00	1.00	50.00	1.37	0.50	3.00	0.24	0.00	0.59	0.59	0.34	0.0000	29.03	45.83	713.24	3905.69	4417.23	5130.47	14713.24	16535.86	14713.24	13.01	14.00	0.0958	5.47
10.84	soil	1.90	204.10	1.00	67.26	136.84	0.00	30.00	1.00	50.00	1.37	0.50	3.00	0.24	0.00	0.59	0.59	0.34	0.0000	29.03	46.50	758.14	3971.81	4492.01	5250.15	14758.14	16490.95	14758.14	13.05	14.00	0.0960	5.37
11.09	soil	1.90	208.91	1.00	69.79	139.12	0.00	30.00	1.00	50.00	1.36	0.50	3.00	0.25	0.00	0.59	0.59	0.34	0.0000	29.03	47.16	803.69	4037.92	4566.78	5370.47	14803.69	16445.40	14803.69	13.09	14.00	0.0963	5.28
11.35	soil	1.90	213.72	1.00	72.32	141.40	0.00	30.00	1.00	50.00	1.35	0.50	3.00	0.25	0.00	0.59	0.59	0.34	0.0000	29.03	47.83	849.89	4104.04	4641.56	5491.45	14849.89	16399.21	14849.89	13.13	14.00	0.0966	5.18
11.61	soil	1.90	218.52	1.00	74.85	143.67	0.00	30.00	1.00	50.00	1.35	0.50	3.00	0.25	0.00	0.58	0.58	0.34	0.0000	29.03	48.49	896.73	4170.15	4716.33	5613.07	14896.73	16352.36	14896.73	13.17	14.00	0.0969	5.09
11.87	soil	1.90	223.33	1.00	77.38	145.95	0.00	30.00	1.00	50.00	1.34	0.50	3.00	0.26	0.00	0.58	0.58	0.34	0.0000	29.03	49.16	944.22	4236.27	4791.11	5735.33	14944.22	16304.87	14944.22	13.21	14.00	0.0972	4.99
12.13	soil	1.90	228.14	1.00	79.91	148.23	0.00	30.00	1.00	50.00	1.34	0.50	3.00	0.26	0.00	0.58	0.58	0.34	0.0000	29.03	49.82	992.36	4302.39	4865.88	5858.25	14992.36	16256.73	14992.36	13.26	14.00	0.0976	4.89
12.38	soil	1.90	232.95	1.00	82.44	150.51	0.00	30.00	1.00	50.00	1.33	0.50	3.00	0.26	0.00	0.58	0.58	0.34	0.0000	29.03	50.49	1041.15	4368.50	4940.66	5981.80	15041.15	16207.95	15041.15	13.30	14.00	0.0979	4.79
12.64	soil	1.90	237.76	1.00	84.97	152.79	0.00	30.00	1.00	50.00	1.33	0.50	3.00	0.27	0.00	0.58	0.58	0.33	0.0000	29.03	51.15	1090.58	4434.62	5015.43	6106.01	15090.58	16158.52	15090.58	13.34	14.00	0.0982	4.69
12.90	soil	1.90	242.57	1.00	87.51	155.06	0.00	30.00	1.00	50.00	1.32	0.50	3.00	0.27	0.00	0.58	0.58	0.33	0.0000	29.03	51.82	1140.65	4500.73	5090.21	6230.86	15140.65	16108.44	15140.65	13.39	14.00	0.0985	4.60
13.16	soil	1.90	247.38	1.00	90.04	157.34	0.00	30.00	1.00	50.00	1.32	0.50	3.00	0.27	0.00	0.58	0.58	0.33	0.0000	29.03	52.48	1191.37	4566.85	5164.98	6356.36	15191.37	16057.72	15191.37	13.43	14.00	0.0988	4.50
13.42	soil	1.90	252.19	1.00	92.57	159.62	0.00	30.00	1.00	50.00	1.31	0.50	3.00	0.28	0.00	0.58	0.58	0.33	0.0000	29.03	53.14	1242.74	4632.96	5239.76	6482.50	15242.74	16006.35	15242.74	13.48	14.00	0.0992	4.40
13.67	soil	1.90	257.00	1.00	95.10	161.90	0.00	30.00	1.00	50.00	1.31	0.50	3.00	0.28	0.00	0.58	0.58	0.33	0.0000	29.03	53.81	1294.76	4699.08	5314.53	6609.29	15294.76	15954.34	15294.76	13.52	14.00	0.0995	4.30
13.93	soil	1.92	261.83	1.00	97.63	164.20	0.00	27.00	1.00	50.00	1.30	0.55	2.66	0.27	0.00	0.62	0.62	0.32	0.0000	19.92	51.78	1346.10	3271.61	3700.10	5046.21	15346.10	15902.99	15346.10	13.57	14.00	0.0999	4.20
14.19	soil	1.92	266.69	1.00	100.16	166.53	0.00	27.00	1.00	50.00	1.30	0.55	2.66	0.27	0.00	0.62	0.62	0.31	0.0000	19.92	52.43	1396.78	3318.00	3752.57	5149.36	15396.78	15852.31	15396.78	13.61	14.00	0.1002	4.10
14.45	soil	1.92	271.55	1.00	102.69	168.86	0.00	27.00	1.00	50.00	1.30	0.55	2.66	0.28	0.00	0.62	0.62	0.31	0.0000	19.92	53.08	1448.10	3364.40	3805.04	5253.14	15448.10	15801.00	15448.10	13.66	14.00	0.1005	4.00
14.71	soil	1.92	276.41	1.00	105.22	171.19	0.00	27.00	1.00	50.00	1.29	0.55	2.66	0.28	0.00	0.62	0.62	0.31	0.0000	19.92	53.74	1500.05	3410.79	3857.51	5357.56	15500.05	15749.05	15500.05	13.71	14.00	0.1009	3.90
14.96	soil	1.92	281.27	1.00	107.75	173.51	0.00	27.00	1.00	50.00	1.29	0.55	2.66	0.28	0.00	0.62	0.62	0.31	0.0000	19.92	54.39	1552.63	3457.19	3909.99	5462.62	15552.63	15696.46	15552.63	13.75	14.00	0.1012	3.80
15.22	soil	1.92	286.13	1.00	110.28	175.84	0.00	27.00	1.00	50.00	1.28	0.55	2.66	0.29	0.00	0.61	0.61	0.31	0.0000	19.92	55.04	1605.85	3503.58	3962.46	5568.31	15605.85	15643.24	15605.85	13.80	14.00	0.1015	3.69
15.48	soil	1.92	290.99	1.00	112.82	178.17	0.00	27.00	1.00	50.00	1.28	0.55	2.66	0.29	0.00	0.61	0.61	0.31	0.0000	19.92	55.70	1659.71	3549.97	4014.93	5674.63	15659.71	15589.39	15589.39	13.78	14.00	0.1017	3.59
15.74	soil	1.92	295.85	1.00	115.35	180.50	0.00	27.00	1.00	50.00	1.28	0.55	2.66	0.29	0.00	0.61	0.61	0.31	0.0000	19.92	56.35	1714.20	3596.37	4067.40	5781.59	15714.20	15534.90	15534.90	13.74	14.00	0.1014	3.49
16.00	soil	1.92	300.71	1.00	117.88	182.83	0.00	27.00	1.00	50.00	1.27	0.55	2.66	0.30	0.00	0.61	0.61	0.31	0.0000	19.92	57.00	1769.32	3642.76	4119.87	5889.19	15769.32	15479.77	15479.77	13.69	14.00	0.1011	3.39
16.25	soil	1.92	305.57	1.00	120.41	185.16	0.00	27.00	1.00	50.00	1.27	0.55	2.66	0.30	0.00	0.61	0.61	0.31	0.0000	19.92	57.65	1825.08	3689.16	4172.34	5997.42	15825.08	15424.01	15424.01	13.64	14.00	0.1007	3.29
16.51	soil	1.92	310.42	1.00	122.94	187.49	0.00	27.00	1.00	50.00	1.27	0.55	2.66	0.30	0.00	0.61	0.61	0.31	0.0000	19.92	58.31	1881.47	3735.55	4224.81	6106.28	15881.47	15367.62	15367.62	13.59	14.00	0.1003	3.19
16.77	soil	1.92	315.28	1.00	125.47	189.81	0.00	27.00	1.00	50.00	1.26	0.55	2.66	0.31	0.00	0.61	0.61	0.31	0.0000	19.92	58.96	1938.50	3781.94	4277.28	6215.78	15938.50	15310.59	15310.59	13.54	14.00	0.1000	3.09
17.03	soil	1.92	320.14	1.00	128.00	192.14	0.00	27.00	1.00	50.00	1.26	0.55	2.66	0.31	0.00	0.61	0.61	0.31	0.0000	19.92	59.61	1996.16	3828.34	4329.75	6325.91	15996.16	15252.93	15252.93	13.49	14.00	0.0996	2.99
17.29	soil	1.92	325.00	1.00	130.53	194.47	0.00	27.00	1.00	50.00	1.26	0.55	2.66	0.31	0.00	0.61	0.61	0.31	0.0000	19.92	60.26	2054.46	3874.73	4382.22	6436.68	16054.46	15194.63	15194.63	13.44	14.00	0.0992	2.89
17.54	soil	1.92	329.86	1.00	133.06	196.80	0.00	27.00	1.00	50.00	1.25	0.55	2.66	0.32	0.00	0.61	0.61	0.31	0.0000	19.92	60.91	2113.39	3921.13	4434.69	6548.08	16113.39	15135.70	15135.70	13.38	14.00	0.0988	2.79
17.80	soil	2.02	334.85	1.00	135.59	199.25	0.00	28.00	1.00	350.00	2.76	0.53	2.77	0.48	0.00	0.87	0.87	0.46	0.0000	22.55	92.26	2187.88	4492.52	5080.91	7268.80	16187.88	15061.21	15061.21	13.32	14.00	0.0984	2.69
18.06	soil	2.02	339.96	1.00	138.12	201.84	0.00	28.00	1.00	350.00	2.73	0.53	2.77	0.48	0.00	0.87	0.87	0.46	0.0000	22.55	93.08	2278.01	4550.72	5146.74	7424.76	16278.01	14971.08	14971.08	13.24	14.00	0.0979	2.59
18.32	soil	2.02	345.07	1.00	140.66	204.42	0.00	28.00	1.00	350.00	2.71	0.53	2.77	0.49	0.00	0.86	0.86	0.46	0.0000	22.55	93.90	2368.94	4608.93	5212.57	7581.52	16368.94	14880.15	14880.15	13.16	14.00	0.0973	2.50
18.58	soil	2.02	350.19	1.00	143.19	207.00	0.00	28.00	1.00	350.00	2.69	0.53	2.77	0.49	0.00	0.86	0.86	0.46	0.0000	22.55	94.72	2460.67	4667.13	5278.40	7739.08	16460.67	14788.42	14788.42	13.08	14.00	0.0967	2.40
18.83	soil	2.02	355.30	1.00	145.72	209.58	0.00	28.00	1.00	350.00	2.67	0.53	2.77	0.50	0.00	0.86	0.86	0.46	0.0000	22.55	95.54	2553.20	4725.34	5344.23	7897.43	16553.20	14695.90	14695.90	12.99	14.00	0.0961	2.30
19.09	soil	2.02	360.41	1.00	148.25	212.16	0.00	28.00	1.00	350.00	2.65	0.53	2.77	0.50	0.00	0.85	0.85	0.45	0.0000	22.55	96.35	2646.52	4783.55	5410.06	8056.58	16646.52	14602.58	14602.58	12.91	14.00	0.0955	2.21
19.35	soil	2.02	365.52	1.00	150.78	214.74	0.00	28.00	1.00	350.00	2.63	0.53	2.77	0.51	0.00	0.85	0.85	0.45	0.0000	22.55	97.17	2740.63	4841.75	5475.89	8216.52	16740.63	14508.47	14508.47	12.83	14.00	0.0949	2.11
19.61	soil	2.02	370.64	1.00	153.31	217.33	0.00	28.00	1.00	350.00	2.61	0.53	2.77	0.51	0.00	0.85	0.85	0.45	0.0000	22.55	97.98	2835.53	4899.96	5541.72	8377.26	16835.53	14413.56	14413.56	12.74	14.00	0.0943	2.02
19.87	soil	2.02	375.75	1.00	155.84	219.91	0.00	28.00	1.00	350.00	2.59	0.53	2.77	0.51	0.00	0.84	0.84	0.45	0.0000	22.55	98.79	2931.23	4958.17	5607.55	8538.78	16931.23	14317.87	14317.87	12.66	14.00	0.0936	1.93
20.12	soil	2.02	380.86	1.00	158.37	222.49	0.00	28.00	1.00	350.00	2.57	0.53	2.77	0.52	0.00	0.84	0.84	0.45	0.0000	22.55	99.60	3027.71	5016.37	5673.38	8701.10	17027.71	14221.38	14221.38	12.57	14.00	0.0930	1.83
20.38	soil	2.02	385.97	1.00	160.90	225.07	0.00	28.00	1.00	350.00	2.56	0.53	2.77	0.52	0.00	0.84	0.84	0.45	0.0000	22.55	100.41	3124.99	5074.58	5739.21	8864.20	17124.99	14124.11	14124.11	12.49	14.00	0.0924	1.74
20.64	soil	2.02	391.09	1.00	163.43	227.65	0.00	28.00	1.00	350.00	2.54	0.53	2.77	0.53	0.00	0.84	0.84	0.44	0.0000	22.55	101.22	3223.05	5132.78	5805.04	9028.09	17223.05	14026.05	14026.05	12.40	14.00	0.0917	1.65
20.90	soil	2.02	396.20	1.00	165.97	230.23	0.00	28.00	1.00	350.00	2.52	0.53	2.77	0.53	0.00	0.83	0.83	0.44	0.0000	22.55	102.03	3321.89	5190.99	5870.87	9192.76	17321.89	13927.20	13927.20	12.31	14.00	0.0911	1.56
21.16	soil	2.02	401.31	1.00	168.50	232.82	0.00	28.00	1.00	350.00	2.50	0.53	2.77	0.54	0.00	0.83	0.83	0.44	0.0000	22.55	102.84	3421.52	5249.20	5936.70	9358.22	17421.52	13827.57	13827.57	12.23	14.00	0.0904	1.47
21.41	soil	2.02	406.42	1.00	171.03	235.40	0.00	28.00	1.00	350.00	2.49	0.53	2.77	0.54	0.00	0.83	0.83	0.44	0.0000	22.55	103.64	3521.94	5307.40	6002.53	9524.47	17521.94	13727.16	13727.16	12.14	14.00	0.0898	1.38
21.67	soil	2.02	411.54	1.00	173.56	237.98	0.00	28.00	1.00	350.00	2.47	0.53	2.77	0.54	0.00	0.83	0.83	0.44	0.0000	22.55	104.45	3623.13	5365.61	6068.36	9691.49	17623.13	13625.96	13625.96	12.05	14.00	0.0891	1.29
21.93	soil	2.23	416.92	1.00	176.09	240.83	0.00	29.00	1.00	350.00	2.45	0.52	2.88	0.56	0.00	0.81	0.81	0.45	0.0000	25.56	108.32	3726.60	6155.03	6961.18	10687.78	17726.60	13522.49	13522.49	11.96	14.00	0.0885	1.20
22.19	soil	2.23	422.56	1.00	178.62	243.94	0.00	29.00	1.00	350.00	2.43	0.52	2.88	0.57	0.00	0.81	0.81	0.45	0.0000	25.56	109.30	3832.43	6234.60	7051.16	10883.60	17832.43	13416.66	13416.66	11.86	14.00	0.0878	1.11
22.45	soil	2.23	428.20	1.00	181.15	247.05	0.00	29.00	1.00	350.00	2.42	0.52	2.88	0.57	0.00	0.81	0.81	0.45	0.0000	25.56	110.27	3939.22	6314.16	7141.15	11080.36	17939.22	13309.88	13309.88	11.77	14.00	0.0871	1.03
22.70	soil	2.23	433.85	1.00	183.68	250.17	0.00	29.00	1.00	350.00	2.40	0.52	2.88	0.58	0.00	0.80	0.80	0.44	0.0000	25.56	111.25	4046.95	6393.73	7231.13	11278.08	18046.95	13202.15	13202.15	11.67	14.00	0.0864	0.94
22.96	soil	2.23	439.49	1.00	186.21	253.28	0.00	29.00	1.00	350.00	2.38	0.52	2.88	0.58	0.00	0.80	0.80	0.44	0.0000	25.56	112.23	4155.63	6473.29	7321.12	11476.75	18155.63	13093.47	13093.47	11.58	14.00	0.0857	0.85
23.22	soil	2.23	445.14	1.00	188.74	256.39	0.00	29.00	1.00	350.00	2.37	0.52	2.88	0.59	0.00	0.80	0.80	0.44	0.0000	25.56	113.20	4265.26	6552.85	7411.10	11676.36	18265.26	12983.84	12983.84	11.48	14.00	0.0850	0.77
23.48	soil	2.23	450.78	1.00	191.28	259.50	0.00	29.00	1.00	350.00	2.35	0.52	2.88	0.59	0.00	0.79	0.79	0.44	0.0000	25.56	114.17	4375.83	6632.42	7501.09	11876.92	18375.83	12873.26	12873.26	11.38	14.00	0.0843	0.68
23.74	soil	2.23	456.42	1.00	193.81	262.62	0.00	29.00	1.00	350.00	2.33	0.52	2.88	0.60	0.00	0.79	0.79	0.44	0.0000	25.56	115.14	4487.35	6711.98	7591.08	12078.43	18487.35	12761.74	12761.74	11.28	14.00	0.0835	0.60
23.99	rock	2.23	462.07	1.00	196.34	265.73	1500.00	0.00	1.00	600.00	3.26	1.00	1.00	1.77	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	4711.82	9000.00	10178.76	14890.58	18711.82	12537.28	12537.28	11.09	14.00	0.0824	0.52
24.25	rock	2.23	467.71	1.00	198.87	268.84	1500.00	0.00	1.00	600.00	3.23	1.00	1.00	1.77	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	5048.75	9000.00	10178.76	15227.51	19048.75	12200.35	12200.35	10.79	14.00	0.0806	0.44
24.51	rock	2.23	473.36	1.00	201.40	271.96	1500.00	0.00	1.00	600.00	3.21	1.00	1.00	1.77	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	5385.68	9000.00	10178.76	15564.44	19385.68	11863.42	11863.42	10.49	14.00	0.0784	0.36
24.77	rock	2.23	479.00	1.00	203.93	275.07	1500.00	0.00	1.00	600.00	3.18	1.00	1.00	1.78	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	5722.61	9000.00	10178.76	15901.37	19722.61	11526.49	11526.49	10.19	14.00	0.0762	0.28
25.03	rock	2.23	484.64	1.00	206.46	278.18	1500.00	0.00	1.00	600.00	3.16	1.00	1.00	1.78	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	6059.54	9000.00	10178.76	16238.30	20059.54	11189.55	11189.55	9.89	14.00	0.0740	0.21
25.28	rock	2.23	490.29	1.00	208.99	281.30	1500.00	0.00	1.00	600.00	3.13	1.00	1.00	1.78	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	6396.47	9000.00	10178.76	16575.23	20396.47	10852.62	10852.62	9.60	14.00	0.0718	0.14
25.54	rock	2.23	495.93	1.00	211.52	284.41	1500.00	0.00	1.00	600.00	3.11	1.00	1.00	1.78	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	6733.40	9000.00	10178.76	16912.16	20733.40	10515.69	10515.69	9.30	14.00	0.0696	0.07
25.80	rock	2.23	501.58	1.00	214.05	287.52	1500.00	0.00	1.00	600.00	3.09	1.00	1.00	1.79	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	7070.33	9000.00	10178.76	17249.10	21070.33	10178.76	10178.76	9.00	14.00	0.0674	0.00



PROJECT TITLE:-

Net Zero Teesside

AECOM

FIGURE TITLE:-

Preliminary Onshore Ground
MS\BH08 - Cooling

1200mm dia. concrete Bored piles 2m rock

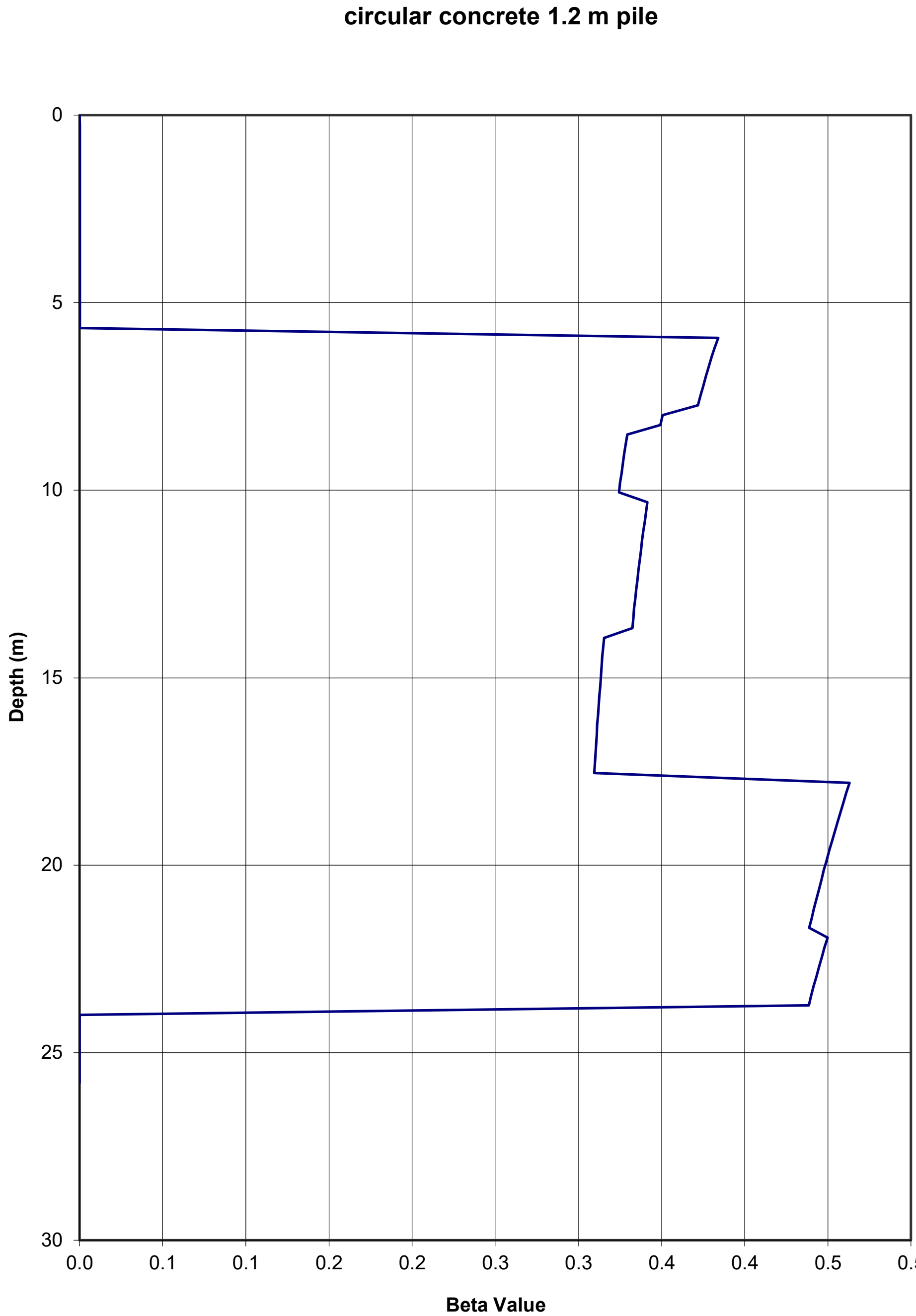
CALCULATION OF AXIAL PILE CAPACITY USING THE BETA METHOD

Vertical Stress Profiles

FIGURE No.
Figure 1

REPORT No.:
60657467

DATE:-
02-Nov-21



PROJECT TITLE:-

Net Zero Teesside

FIGURE TITLE:-

Preliminary Onshore Ground Investigation
MS\BH08 - Cooling

1200mm dia. concrete Bored piles 2m rock

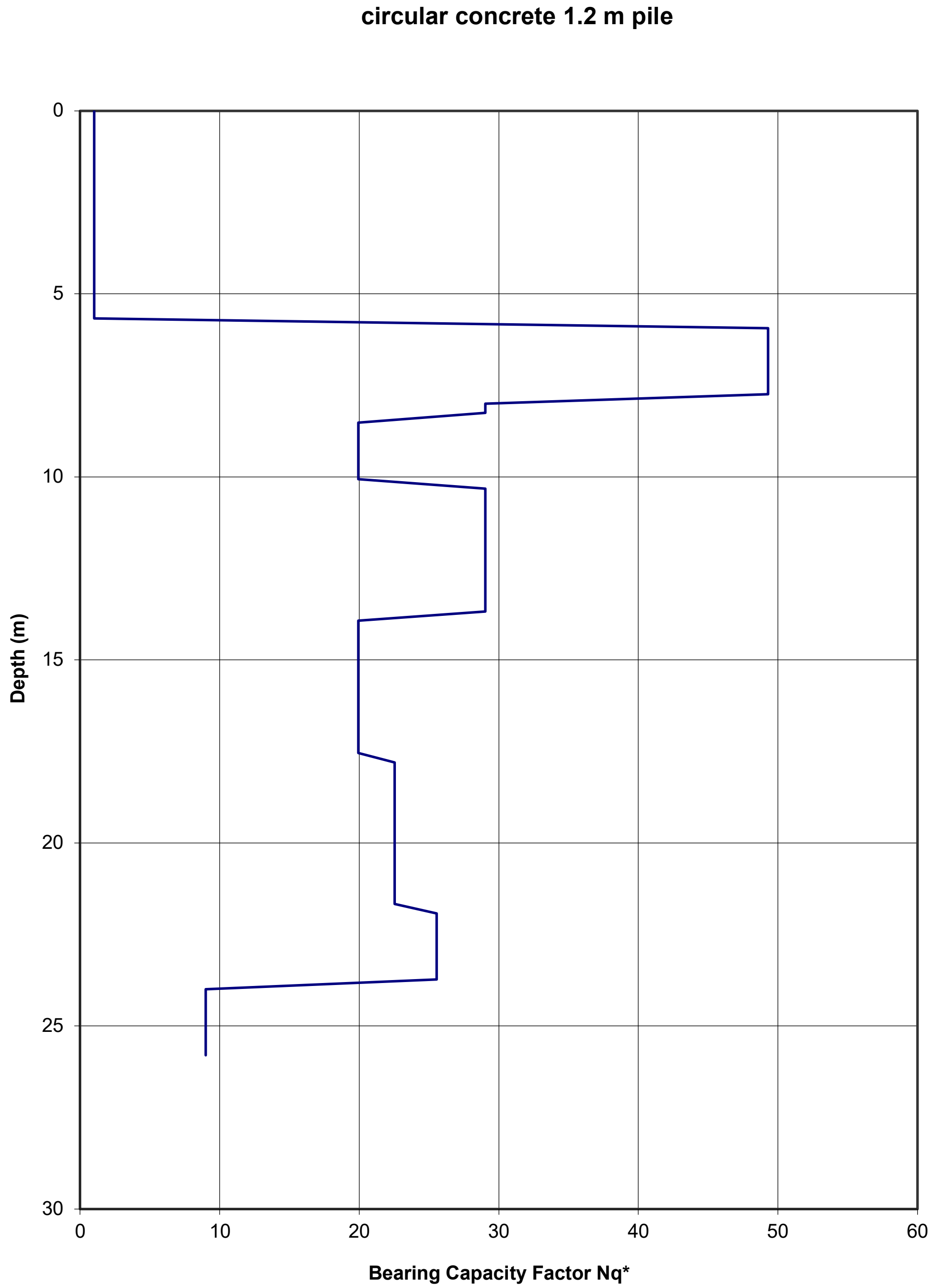
CALCULATION OF AXIAL PILE CAPACITY USING THE BETA METHOD

Beta Values

FIGURE No.:
Figure 2

REPORT No.:-
60657467

DATE:-
02-Nov-21



PROJECT TITLE:-

Net Zero Teesside

AECOM

FIGURE TITLE:-

Preliminary Onshore Ground Investigation

MS\BH08 - Cooling

1200mm dia. concrete Bored piles 2m rock

CALCULATION OF AXIAL PILE CAPACITY USING THE BETA METHOD

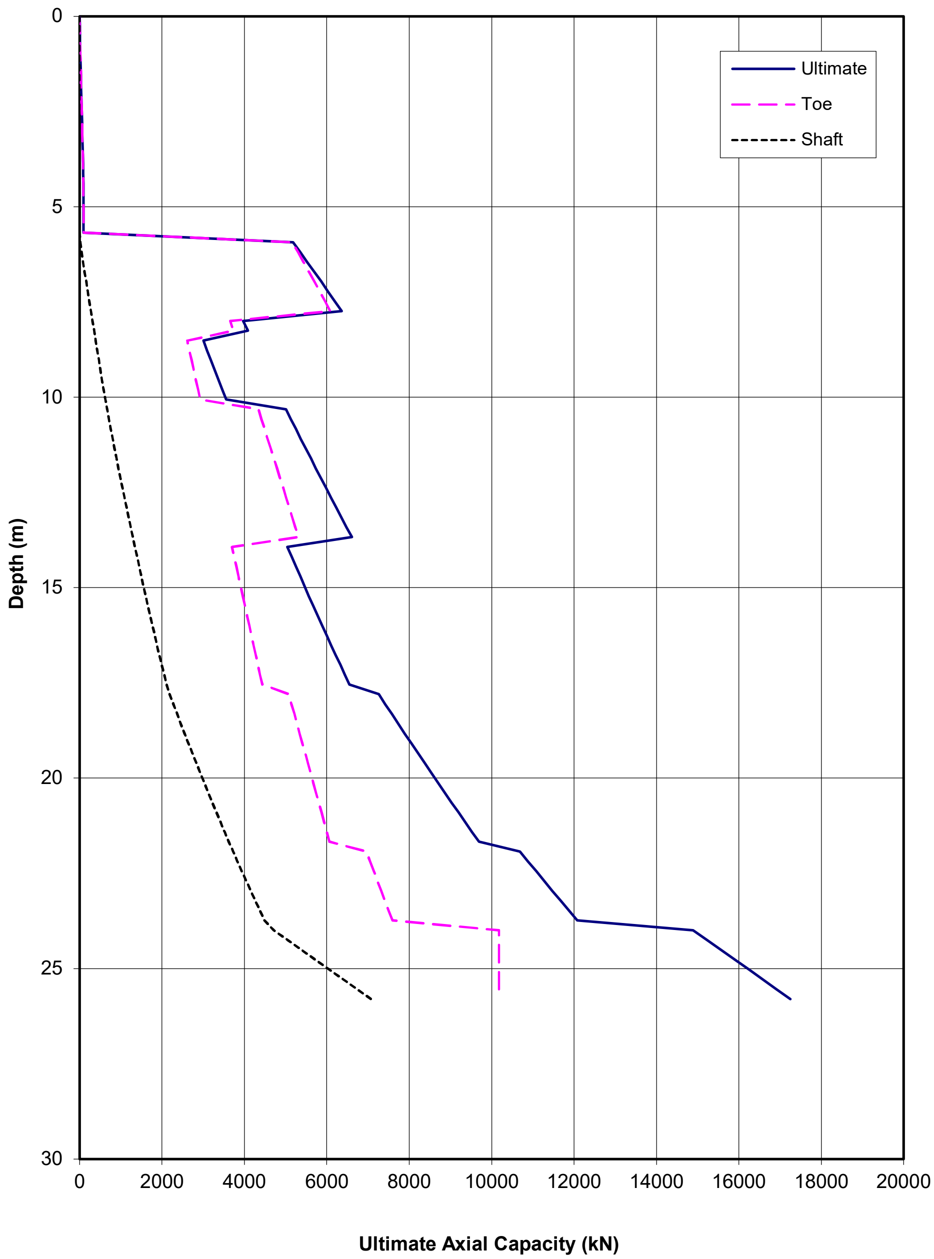
N_q* Values

FIGURE No.: Figure 4

REPORT No.:- 60657467

DATE:- 02-Nov-21

circular concrete 1.2 m pile



PROJECT TITLE:-

Net Zero Teesside

AECOM

FIGURE TITLE:-

Preliminary Onshore Ground
MS\BH08 - Cooling

1200mm dia. concrete Bored piles 2m rock

CALCULATION OF AXIAL PILE CAPACITY USING THE BETA METHOD

Ultimate Axial Pile Capacity

FIGURE No.:
Figure 8

REPORT No:-
60657467

DATE:-
02-Nov-21

CALCULATION OF AXIAL PILE CAPACITY USING THE BETA METHOD

FILE :	60657467
CLIENT :	bp on behalf of OGCI
JOB :	Net Zero Teesside
SITE :	Preliminary Onshore Ground Investigation
LOCATION:	MS\BH08 - Cooling
SUBTITLE:	340mm dia. Steel Tubular pile 2m rock socket
ENG'R :	CMC
CHECK :	SDM /NJ
DATE :	02-Nov-21
Version	1.125
Date updated:	12/09/14
Author :	sdm

Summary	circular steel 0.34 m pile		**FoS**	**Safe**	**Applied**	**kN**
Skin	2003.26	kN	2.50	801.30	**Dead Load**	800.00
Toe	817.13	kN	3.00	272.38	**Live Load**	200.00
Total	2820.39	kN		1073.68	**Total Load**	1000.00
Top Stress	31.06	N/mm^2				
Stress Ratio	0.07					
Head settlement	6.56	mm	Toe estimate	5.00	mm	
Spring stiffness	152391	kN/m				

INPUT INFORMATION

Existing ground level	7.98	mOD
Finished formation level	6.98	mOD
Pile cut off level	6.98	mOD
Embedment below cut off	25.80	m
Pile Toe Level	-18.82	mOD
Depth below finished ground	25.80	m
Pile Type:	circular	
Installation Method:	driven	
Depth Water:	3.98	m
Unit Weight Water:	9.81	kN/m^3
Pile Diameter:	0.340	m
:	0.000	m
:	0.002	m
Pile Base Area:	0.0908	sq.m
Shaft perimeter area	1.06814	sq.m/m
Surcharge:	0.00	kPa
Volume pile material	2.3424	m^3
Compressive Strength:	420.00	N/mm^2
Pile Modulus	2.1000E+08	(kPa)
Material:	steel	
Pile material section area	0.09079	sq.m

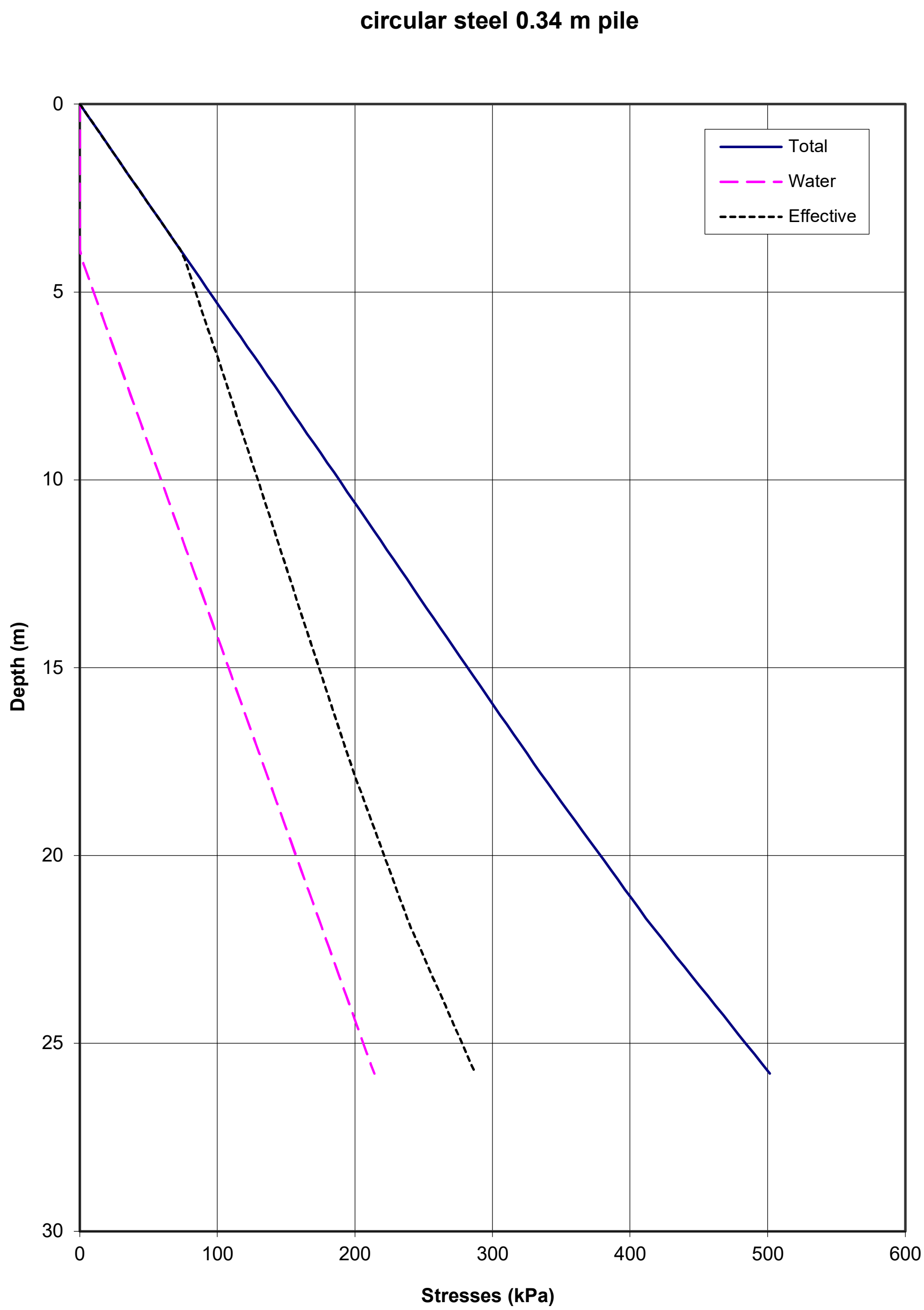
Soil Properties

Layer Number	Pile Depth Top (m)	Bulk Density (Mg/m3)	Friction Angle (deg)	Cohesion (kPa)	Interface Factor	Preload Stress (kPa)	Artesian Gradient	Material Type		Description
1	0.00	1.920	0.01	0.00	1.00	50.00	1.00	soil	d1	Made Ground - Slag dominant
2	5.90	1.950	34.00	0.00	1.00	50.00	1.00	soil	d2	Made Ground - Silty Sand
3	7.20	1.900	34.00	0.00	1.00	50.00	1.00	soil	d3	Made Ground - Gravel
4	7.80	1.900	30.00	0.00	1.00	50.00	1.00	soil	c2	Tidal Flats - Sand
5	8.50	1.920	27.00	0.00	1.00	50.00	1.00	soil	c1	Tidal Flats - Clay (soft organic)
6	10.20	1.900	30.00	0.00	1.00	50.00	1.00	soil	c2	Tidal Flats - Sand
7	13.80	1.920	27.00	0.00	1.00	50.00	1.00	soil	c1	Tidal Flats - Clay
8	17.80	2.020	28.00	0.00	1.00	350.00	1.00	soil	b3	Lacustrine Deposits - Laminated Clay
9	21.80	2.230	29.00	0.00	1.00	350.00	1.00	soil	b1	Glacial Till
10	23.80	2.230	0.00	1500.00	1.00	600.00	1.00	rock	a3	Redcar Mudstone Formation

Limiting Ko OC Values

Soil Type	Pile Type	Calculation Reference	Maximum Value
soil	driven	soildriven	1.50
soil	bored	soilbored	1.00

Depth below 6.98 (m)	Soil/ Rock	Bulk Density (Mg/m^3)	Total Stress (kPa)	Artesian Gradient Factor	Water Stress (kPa)	Effective Stress (kPa)	Cohesion (kPa)	Friction Angle (degrees)	Interface Factor	Preload Stress (kPa)	OCR value	K nc	K p	Triaxial Compr Strength (MPa)	Uniaxial Compr Strength (MPa)	Ko OC	K	Beta Factor	0.2*sqr t(UCS)/ UCS alpha rock	Nq* Factor	Ultimate Skin Friction (kPa)	Ultimate Shaft Capacity (kN)	Ultimate Toe Bearing (kPa)	Ultimate Toe Capacity (kN)	Ultimate Axial Capacity (kN)	Dead Load plus Drag (kN)	Ultimate less Skin (kN)	Nett Force in Pile (kN)	Working Stress (N/mm^2)	Maximum Allowable Stress (N/mm^2)	Incr. Pile Compr. (mm)	Working Pile Compr (mm)
0.00	soil	1.92	0.00	1.00	0.00	0.00	0.00	0.01	1.00	50.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.0000	1.00	0.00	0.00	0.00	0.00	0.00	800.00	2820.39	800.00	8.81	210.00		1.56
0.26	soil	1.92	4.86	1.00	0.00	4.86	0.00	0.01	1.00	50.00	11.29	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.0000	1.00	0.00	0.00	4.86	0.44	0.44	800.00	2820.39	800.00	8.81	210.00	0.0108	1.55
0.52	soil	1.92	9.72	1.00	0.00	9.72	0.00	0.01	1.00	50.00	6.14	1.00	1.00	0.01	0.00	1.00	1.00	0.00	0.0000	1.00	0.00	0.00	9.73	0.88	0.88	800.00	2820.39	800.00	8.81	210.00	0.0108	1.54
0.77	soil	1.92	14.58	1.00	0.00	14.58	0.00	0.01	1.00	50.00	4.43	1.00	1.00	0.01	0.00	1.00	1.00	0.00	0.0000	1.00	0.00	0.00	14.59	1.33	1.33	800.00	2820.39	800.00	8.81	210.00	0.0108	1.53
1.03	soil	1.92	19.44	1.00	0.00	19.44	0.00	0.01	1.00	50.00	3.57	1.00	1.00	0.02	0.00	1.00	1.00	0.00	0.0000	1.00	0.00	0.00	19.46	1.77	1.77	800.00	2820.39	800.00	8.81	210.00	0.0108	1.52
1.29	soil	1.92	24.30	1.00	0.00	24.30	0.00	0.01	1.00	50.00	3.06	1.00	1.00	0.02	0.00	1.00	1.00	0.00	0.0000	1.00	0.00	0.00	24.32	2.21	2.21	800.00	2820.39	800.00	8.81	210.00	0.0108	1.51
1.55	soil	1.92	29.16	1.00	0.00	29.16	0.00	0.01	1.00	50.00	2.71	1.00	1.00	0.03	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.00	29.19	2.65	2.65	800.00	2820.39	800.00	8.81	210.00	0.0108	1.50
1.81	soil	1.92	34.02	1.00	0.00	34.02	0.00	0.01	1.00	50.00	2.47	1.00	1.00	0.03	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.01	34.05	3.09	3.10	800.01	2820.38	800.01	8.81	210.00	0.0108	1.49
2.06	soil	1.92	38.88	1.00	0.00	38.88	0.00	0.01	1.00	50.00	2.29	1.00	1.00	0.04	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.01	38.92	3.53	3.54	800.01	2820.38	800.01	8.81	210.00	0.0108	1.48
2.32	soil	1.92	43.74	1.00	0.00	43.74	0.00	0.01	1.00	50.00	2.14	1.00	1.00	0.04	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.01	43.78	3.98	3.98	800.01	2820.38	800.01	8.81	210.00	0.0108	1.46
2.58	soil	1.92	48.59	1.00	0.00	48.59	0.00	0.01	1.00	50.00	2.03	1.00	1.00	0.05	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.01	48.65	4.42	4.43	800.01	2820.38	800.01	8.81	210.00	0.0108	1.45
2.84	soil	1.92	53.45	1.00	0.00	53.45	0.00	0.01	1.00	50.00	1.94	1.00	1.00	0.05	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.01	53.51	4.86	4.87	800.01	2820.38	800.01	8.81	210.00	0.0108	1.44
3.10	soil	1.92	58.31	1.00	0.00	58.31	0.00	0.01	1.00	50.00	1.86	1.00	1.00	0.06	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.02	58.38	5.30	5.32	800.02	2820.37	800.02	8.81	210.00	0.0108	1.43
3.35	soil	1.92	63.17	1.00	0.00	63.17	0.00	0.01	1.00	50.00	1.79	1.00	1.00	0.06	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.02	63.24	5.74	5.76	800.02	2820.37	800.02	8.81	210.00	0.0108	1.42
3.61	soil	1.92	68.03	1.00	0.00	68.03	0.00	0.01	1.00	50.00	1.73	1.00	1.00	0.07	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.02	68.11	6.18	6.21	800.02	2820.37	800.02	8.81	210.00	0.0108	1.41
3.87	soil	1.92	72.89	1.00	0.00	72.89	0.00	0.01	1.00	50.00	1.69	1.00	1.00	0.07	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.03	72.97	6.63	6.65	800.03	2820.36	800.03	8.81	210.00	0.0108	1.40
4.13	soil	1.92	77.75	1.00	1.45	76.30	0.00	0.01	1.00	50.00	1.66	1.00	1.00	0.08	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.03	76.38	6.93	6.96	800.03	2820.36	800.03	8.81	210.00	0.0108	1.39
4.39	soil	1.92	82.61	1.00	3.98	78.63	0.00	0.01	1.00	50.00	1.64	1.00	1.00	0.08	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.03	78.71	7.15	7.18	800.03	2820.36	800.03	8.81	210.00	0.0108	1.38
4.64	soil	1.92	87.47	1.00	6.51	80.96	0.00	0.01	1.00	50.00	1.62	1.00	1.00	0.08	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.04	81.04	7.36	7.40	800.04	2820.35	800.04	8.81	210.00	0.0108	1.37
4.90	soil	1.92	92.33	1.00	9.04	83.29	0.00	0.01	1.00	50.00	1.60	1.00	1.00	0.08	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.04	83.37	7.57	7.61	800.04	2820.35	800.04	8.81	210.00	0.0108	1.36
5.16	soil	1.92	97.19	1.00	11.58	85.61	0.00	0.01	1.00	50.00	1.58	1.00	1.00	0.09	0.00	1.00	1.00	0.00	0.0000	1.00	0.01	0.05	85.71	7.78	7.83	800.05	2820.34	800.05	8.81	210.00	0.0108	1.35
5.42	soil	1.92	102.05	1.00	14.11	87.94	0.00	0.01	1.00	50.00	1.57	1.00	1.00	0.09	0.00	1.00	1.00	0.00	0.0000	1.00	0.02	0.05	88.04	7.99	8.04	800.05	2820.34	800.05	8.81	210.00	0.0108	1.33
5.68	soil	1.92	106.91	1.00	16.64	90.27	0.00	0.01	1.00	50.00	1.55	1.00	1.00	0.09	0.00	1.00	1.00	0.00	0.0000	1.00	0.02	0.05	90.37	8.20	8.26	800.05	2820.34	800.05	8.81	210.00	0.0108	1.32
5.93	soil	1.95	111.81	1.00	19.17	92.64	0.00	34.00	1.00	50.00	1.54	0.44	3.54	0.19	0.00	0.57	0.57	0.38	0.0000	49.30	35.58	4.96	4566.76	414.63	419.58	804.96	2815.43	804.96	8.87	210.00	0.0109	1.31
6.19	soil	1.95	116.74	1.00	21.70	95.04	0.00	34.00	1.00	50.00	1.53	0.44	3.54	0.19	0.00	0.57	0.57	0.38	0.0000	49.30	36.32	14.87	4685.29	425.39	440.25	814.87	2805.52	814.87	8.98	210.00	0.0110	1.30
6.45	soil	1.95	121.68	1.00	24.23	97.45	0.00	34.00	1.00	50.00	1.51	0.44	3.54	0.19	0.00	0.56	0.56	0.38	0.0000	49.30	37.05	24.97	4803.82	436.15	461.12	824.97	2795.42	824.97	9.09	210.00	0.0111	1.29
6.71	soil	1.95	126.61	1.00	26.76	99.85	0.00	34.00	1.00	50.00	1.50	0.44	3.54	0.20	0.00	0.56	0.56	0.38	0.0000	49.30	37.78	35.28	4922.35	446.91	482.19	835.28	2785.11	835.28	9.20	210.00	0.0112	1.28
6.97	soil	1.95	131.55	1.00	29.29	102.26	0.00	34.00	1.00	50.00	1.49	0.44	3.54	0.20	0.00	0.56	0.56	0.38	0.0000	49.30	38.50	45.79	5040.88	457.67	503.47	845.79	2774.59	845.79	9.32	210.00	0.0114	1.27
7.22	soil	1.90	136.42	1.00	31.82	104.60	0.00	34.00	1.00	50.00	1.48	0.44	3.54	0.21	0.00	0.56	0.56	0.37	0.0000	49.30	39.21	56.50	5156.30	468.15	524.65	856.50	2763.89	856.50	9.43	210.00	0.0115	1.26
7.48	soil	1.90	141.23	1.00	34.35	106.87	0.00	34.00	1.00	50.00	1.47	0.44	3.54	0.21	0.00	0.55	0.55	0.37	0.0000	49.30	39.90	67.41	5268.59	478.35	545.75	867.41	2752.98	867.41	9.55	210.00	0.0117	1.25
7.74	soil	1.90	146.04	1.00	36.89	109.15	0.00	34.00	1.00	50.00	1.46	0.44	3.54	0.21	0.00	0.55	0.55	0.37	0.0000	49.30	40.59	78.50	5380.88	488.54	567.04	878.50	2741.89	878.50	9.68	210.00	0.0118	1.23
8.00	soil	1.90	150.85	1.00	39.42	111.43	0.00	30.00	1.00	50.00	1.45	0.50	3.00	0.20	0.00	0.61	0.61	0.35	0.0000	29.03	39.06	89.47	3234.25	293.64	383.12	889.47	2730.92	889.47	9.80	210.00	0.0120	1.22
8.26	soil	1.90	155.66	1.00	41.95	113.71	0.00	30.00	1.00	50.00	1.44	0.50	3.00	0.21	0.00	0.61	0.61	0.35	0.0000	29.03	39.73	100.33	3300.37	299.65	399.98	900.33	2720.06	900.33	9.92	210.00	0.0121	1.21
8.51	soil	1.92	160.49	1.00	44.48	116.01	0.00	27.00	1.00	50.00	1.43	0.55	2.66	0.20	0.00	0.65	0.65	0.33	0.0000	19.92	38.21	111.07	2311.45	209.86	320.93	911.07	2709.32	911.07	10.03	210.00	0.0123	1.20
8.77	soil	1.92	165.35	1.00	47.01	118.34	0.00	27.00	1.00	50.00	1.42	0.55	2.66	0.20	0.00	0.64	0.64	0.33	0.0000	19.92	38.87	121.69	2357.85	214.07	335.76	921.69	2698.70	921.69	10.15	210.00	0.0124	1.18
9.03	soil	1.92	170.21	1.00	49.54	120.67	0.00	27.00	1.00	50.00	1.41	0.55	2.66	0.21	0.00	0.64	0.64	0.33	0.0000	19.92	39.53	132.49	2404.24	218.29	350.78	932.49	2687.90	932.49	10.27	210.00	0.0125	1.17
9.29	soil	1.92	175.07	1.00	52.07	123.00	0.00	27.00	1.00	50.00	1.41	0.55	2.66	0.21	0.00	0.64	0.64	0.33	0.0000	19.92	40.19	143.47	2450.64	222.50	365.97	943.47	2676.91	943.47	10.39	210.00	0.0127	1.16
9.55	soil	1.92	179.93	1.00	54.60	125.32	0.00	27.00	1.00	50.00	1.40	0.55	2.66	0.21	0.00	0.64	0.64	0.33	0.0000	19.92	40.84	154.64	2497.03	226.71	381.35	954.64	2665.75	954.64	10.51	210.00	0.0128	1.15
9.80	soil	1.92	184.79	1.00	57.13	127.65	0.00	27.00	1.00	50.00	1.39	0.55	2.66	0.22	0.00	0.64	0.64	0.33	0.0000	19.92	41.50	165.99	2543.42	230.92	396.91	965.99	2654.40	965.99	10.64	210.00	0.0130	1.13
10.06	soil	1.92	189.65	1.00	59.66	129.98	0.00	27.00	1.00	50.00	1.38	0.55	2.66	0.22	0.00	0.64	0.64	0.32	0.0000	19.92	42.16	177.51	2589.82	235.13	412.65	977.51	2642.88	977.51	10.77	210.00	0.0131	1.12
10.32	soil	1.90	194.48	1.00	62.20	132.29	0.00	30.00	1.00	50.00	1.38	0.50	3.00	0.23	0.00	0.59	0.59	0.34	0.0000	29.03	45.17	189.54	3839.58	348.60	538.15	989.54	2630.84	989.54	10.90	210.00	0.0133	1.11
10.58	soil	1.90	199.29	1.00	64.73	134.56	0.00	30.00	1.00	50.00	1.37	0.50	3.00	0.24	0.00	0.59	0.59	0.34	0.0000	29.03	45.83	202.08	3905.69	354.61	556.69	1002.08	2618.31	1002.08	11.04	210.00	0.0135	1.09
10.84	soil	1.90	204.10	1.00	67.26	136.84	0.00	30.00	1.00	50.00	1.37	0.50	3.00	0.24	0.00	0.59	0.59	0.34	0.0000	29.03	46.50	214.81	3971.81	360.61	575.41	1014.81	2605.58	1014.81	11.18	210.00	0.0136	1.08
11.09	soil	1.90	208.91	1.00	69.79	139.12	0.00	30.00	1.00	50.00	1.36	0.50	3.00	0.25	0.00	0.59	0.59	0.34	0.0000	29.03	47.16	227.71	4037.92	366.61	594.32	1027.71	2592.68	1027.71	11.32	210.00	0.0138	1.07
11.35	soil	1.90	213.72	1.00	72.32	141.40	0.00	30.00	1.00	50.00	1.35	0.50	3.00	0.25	0.00	0.59	0.59	0.34	0.0000	29.03	47.83	240.80	4104.04	372.61	613.42	1040.80	2579.59	1040.80	11.46	210.00	0.0140	1.05
11.61	soil	1.90	218.52	1.00	74.85	143.67	0.00	30.00	1.00	50.00	1.35	0.50	3.00	0.25	0.00	0.58	0.58	0.34	0.0000	29.03	48.49	254.07	4170.15	378.62	632.69	1054.07	2566.32	1054.07	11.61	210.00	0.0142	1.04
11.87	soil	1.90	223.33	1.00	77.38	145.95	0.00	30.00	1.00	50.00	1.34	0.50	3.00	0.26	0.00	0.58	0.58	0.34	0.0000	29.03	49.16	267.53	4236.27	384.62	652.15	1067.53	2552.86	1067.53	11.76	210.00	0.0144	1.02
12.13	soil	1.90	228.14	1.00	79.91	148.23	0.00	30.00	1.00	50.00	1.34	0.50	3.00	0.26	0.00	0.58	0.58	0.34	0.0000	29.03	49.82	281.17	4302.39	390.62	671.79	1081.17	2539.22	1081.17	11.91	210.00	0.0145	1.01
12.38	soil	1.90	232.95	1.00	82.44	150.51	0.00	30.00	1.00	50.00	1.33	0.50	3.00	0.26	0.00	0.58	0.58	0.34	0.0000	29.03	50.49	294.99	4368.50	396.63	691.62	1094.99	2525.40	1094.99	12.06	210.00	0.0147	0.99
12.64	soil	1.90	237.76	1.00	84.97	152.79	0.00	30.00	1.00	50.00	1.33	0.50	3.00	0.27	0.00	0.58	0.58	0.33	0.0000	29.03	51.15	309.00	4434.62	402.63	711.62	1109.00	2511.39	1109.00	12.21	210.00	0.0149	0.98
12.90	soil	1.90	242.57	1.00	87.51	155.06	0.00	30.00	1.00	50.00	1.32	0.50	3.00	0.27	0.00	0.58	0.58	0.33	0.0000	29.03	51.82	323.18	4500.73	408.63	731.82	1123.18	2497.20	1123.18	12.37	210.00	0.0151	0.96
13.16	soil	1.90	247.38	1.00	90.04	157.34	0.00	30.00	1.00	50.00	1.32	0.50	3.00	0.27	0.00	0.58	0.58	0.33	0.0000	29.03	52.48	337.56	4566.85	414.63	752.19	1137.56	2482.83	1137.56	12.53	210.00	0.0153	0.95
13.42	soil	1.90	252.19	1.00	92.57	159.62	0.00	30.00	1.00	50.00	1.31	0.50	3.00	0.28	0.00	0.58	0.58	0.33	0.0000	29.03	53.14	352.11	4632.96	420.64	772.75	1152.11	2468.28	1152.11	12.69	210.00	0.0155	0.93
13.67	soil	1.90	257.00	1.00	95.10	161.90	0.00	30.00	1.00	50.00	1.31	0.50	3.00	0.28	0.00	0.58	0.58	0.33	0.0000	29.03	53.81	366.85	4699.08	426.64	793.49	1166.85	2453.54	1166.85	12.85	210.00	0.0157	0.92
13.93	soil	1.92	261.83	1.00	97.63	164.20	0.00	27.00	1.00	50.00	1.30	0.55	2.66	0.27	0.00	0.62	0.62	0.32	0.0000	19.92	51.78	381.40	3271.61	297.04	678.43	1181.40	2438.99	1181.40	13.01	210.00	0.0159	0.90
14.19	soil	1.92	266.69	1.00	100.16	166.53	0.00	27.00	1.00	50.00	1.30	0.55	2.66	0.27	0.00	0.62	0.62	0.31	0.0000	19.92	52.43	395.76	3318.00	301.25	697.00	1195.76	2424.63	1195.76	13.17	210.00	0.0161	0.89
14.45	soil	1.92	271.55	1.00	102.69	168.86	0.00	27.00	1.00	50.00	1.30	0.55	2.66	0.28	0.00	0.62	0.62	0.31	0.0000	19.92	53.08	410.29	3364.40	305.46	715.75	1210.29	2410.10	1210.29	13.33	210.00	0.0163	0.87
14.71	soil	1.92	276.41	1.00	105.22	171.19	0.00	27.00	1.00	50.00	1.29	0.55	2.66	0.28	0.00	0.62	0.62	0.31	0.0000	19.92	53.74	425.01	3410.79	309.67	734.69	1225.01	2395.38	1225.01	13.49	210.00	0.0165	0.85
14.96	soil	1.92	281.27	1.00	107.75	173.51	0.00	27.00	1.00	50.00	1.29	0.55	2.66	0.28	0.00	0.62	0.62	0.31	0.0000	19.92	54.39	439.91	3457.19	313.88	753.80	1239.91	2380.48	1239.91	13.66	210.00	0.0167	0.84
15.22	soil	1.92	286.13	1.00	110.28	175.84	0.00	27.00	1.00	50.00	1.28	0.55	2.66	0.29	0.00	0.61	0.61	0.31	0.0000	19.92	55.04	454.99	3503.58	318.10	773.09	1254.99	2365.40	1254.99	13.82	210.00	0.0169	0.82
15.48	soil	1.92	290.99	1.00	112.82	178.17	0.00	27.00	1.00	50.00	1.28	0.55	2.66	0.29	0.00	0.61	0.61	0.31	0.0000	19.92	55.70	470.25	3549.97	322.31	792.56	1270.25	2350.14	1270.25	13.99	210.00	0.0171	0.80
15.74	soil	1.92	295.85	1.00	115.35	180.50	0.00	27.00	1.00	50.00	1.28	0.55	2.66	0.29	0.00	0.61	0.61	0.31	0.0000	19.92	56.35	485.69	3596.37	326.52	812.21	1285.69	2334.70	1285.69	14.16	210.00	0.0173	0.79
16.00	soil	1.92	300.71	1.00	117.88	182.83	0.00	27.00	1.00	50.00	1.27	0.55	2.66	0.30	0.00	0.61	0.61	0.31	0.0000	19.92	57.00	501.31	3642.76	330.73	832.04	1301.31	2319.08	1301.31	14.33	210.00	0.0175	0.77
16.25	soil	1.92	305.57	1.00	120.41	185.16	0.00	27.00	1.00	50.00	1.27	0.55	2.66	0.30	0.00	0.61	0.61	0.31	0.0000	19.92	57.65	517.11	3689.16	334.95	852.05	1317.11	2303.28	1317.11	14.51	210.00	0.0177	0.75
16.51	soil	1.92	310.42	1.00	122.94	187.49	0.00	27.00	1.00	50.00	1.27	0.55	2.66	0.30	0.00	0.61	0.61	0.31	0.0000	19.92	58.31	533.08	3735.55	339.16	872.24	1333.08	2287.31	1333.08	14.68	210.00	0.0179	0.73
16.77	soil	1.92	315.28	1.00	125.47	189.81	0.00	27.00	1.00	50.00	1.26	0.55	2.66	0.31	0.00	0.61	0.61	0.31	0.0000	19.92	58.96	549.24	3781.94	343.37	892.61	1349.24	2271.15	1349.24	14.86	210.00	0.0181	0.71
17.03	soil	1.92	320.14	1.00	128.00	192.14	0.00	27.00	1.00	50.00	1.26	0.55	2.66	0.31	0.00	0.61	0.61	0.31	0.0000	19.92	59.61	565.58	3828.34	347.58	913.16	1365.58	2254.81	1365.58	15.04	210.00	0.0184	0.70
17.29	soil	1.92	325.00	1.00	130.53	194.47	0.00	27.00	1.00	50.00	1.26	0.55	2.66	0.31	0.00	0.61	0.61	0.31	0.0000	19.92	60.26	582.10	3874.73	351.79	933.89	1382.10	2238.29	1382.10	15.22	210.00	0.0186	0.68
17.54	soil	1.92	329.86	1.00	133.06	196.80	0.00	27.00	1.00	50.00	1.25	0.55	2.66	0.32	0.00	0.61	0.61	0.31	0.0000	19.92	60.91	598.79	3921.13	356.01	954.80	1398.79	2221.60	1398.79	15.41	210.00	0.0188	0.66
17.80	soil	2.02	334.85	1.00	135.59	199.25	0.00	28.00	1.00	350.00	2.76	0.53	2.77	0.48	0.00	0.87	0.87	0.46	0.0000	22.55	92.26	619.90	4492.52	407.88	1027.78	1419.90	2200.49	1419.90	15.64	210.00	0.0191	0.64
18.06	soil	2.02	339.96	1.00	138.12	201.84	0.00	28.00	1.00	350.00	2.73	0.53	2.77	0.48	0.00	0.87	0.87	0.46	0.0000	22.55	93.08	645.44	4550.72	413.17	1058.61	1445.44	2174.95	1445.44	15.92	210.00	0.0194	0.62
18.32	soil	2.02	345.07	1.00	140.66	204.42	0.00	28.00	1.00	350.00	2.71	0.53	2.77	0.49	0.00	0.86	0.86	0.46	0.0000	22.55	93.90	671.20	4608.93	418.45	1089.65	1471.20	2149.19	1471.20	16.20	210.00	0.0197	0.60
18.58	soil	2.02	350.19	1.00	143.19	207.00	0.00	28.00	1.00	350.00	2.69	0.53	2.77	0.49	0.00	0.86	0.86	0.46	0.0000	22.55	94.72	697.19	4667.13	423.74	1120.93	1497.19	2123.20	1497.19	16.49	210.00	0.0201	0.58
18.83	soil	2.02	355.30	1.00	145.72	209.58	0.00	28.00	1.00	350.00	2.67	0.53	2.77	0.50	0.00	0.86	0.86	0.46	0.0000	22.55	95.54	723.41	4725.34	429.02	1152.43	1523.41	2096.98	1523.41	16.78	210.00	0.0204	0.56
19.09	soil	2.02	360.41	1.00	148.25	212.16	0.00	28.00	1.00	350.00	2.65	0.53	2.77	0.50	0.00	0.85	0.85	0.45	0.0000	22.55	96.35	749.85	4783.55	434.31	1184.15	1549.85	2070.54	1549.85	17.07	210.00	0.0208	0.54
19.35	soil	2.02	365.52	1.00	150.78	214.74	0.00	28.00	1.00	350.00	2.63	0.53	2.77	0.51	0.00	0.85	0.85	0.45	0.0000	22.55	97.17	776.51	4841.75	439.59	1216.10	1576.51	2043.88	1576.51	17.36	210.00	0.0212	0.52
19.61	soil	2.02	370.64	1.00	153.31	217.33	0.00	28.00	1.00	350.00	2.61	0.53	2.77	0.51	0.00	0.85	0.85	0.45	0.0000	22.55	97.98	803.40	4899.96	444.88	1248.28	1603.40	2016.99	1603.40	17.66	210.00	0.0215	0.50
19.87	soil	2.02	375.75	1.00	155.84	219.91	0.00	28.00	1.00	350.00	2.59	0.53	2.77	0.51	0.00	0.84	0.84	0.45	0.0000	22.55	98.79	830.51	4958.17	450.16	1280.68	1630.51	1989.88	1630.51	17.96	210.00	0.0219	0.47
20.12	soil	2.02	380.86	1.00	158.37	222.49	0.00	28.00	1.00	350.00	2.57	0.53	2.77	0.52	0.00	0.84	0.84	0.45	0.0000	22.55	99.60	857.85	5016.37	455.45	1313.30	1657.85	1962.54	1657.85	18.26	210.00	0.0222	0.45
20.38	soil	2.02	385.97	1.00	160.90	225.07	0.00	28.00	1.00	350.00	2.56	0.53	2.77	0.52	0.00	0.84	0.84	0.45	0.0000	22.55	100.41	885.41	5074.58	460.73	1346.14	1685.41	1934.98	1685.41	18.56	210.00	0.0226	0.43
20.64	soil	2.02	391.09	1.00	163.43	227.65	0.00	28.00	1.00	350.00	2.54	0.53	2.77	0.53	0.00	0.84	0.84	0.44	0.0000	22.55	101.22	913.20	5132.78	466.02	1379.21	1713.20	1907.19	1713.20	18.87	210.00	0.0230	0.41
20.90	soil	2.02	396.20	1.00	165.97	230.23	0.00	28.00	1.00	350.00	2.52	0.53	2.77	0.53	0.00	0.83	0.83	0.44	0.0000	22.55	102.03	941.20	5190.99	471.30	1412.50	1741.20	1879.19	1741.20	19.18	210.00	0.0234	0.38
21.16	soil	2.02	401.31	1.00	168.50	232.82	0.00	28.00	1.00	350.00	2.50	0.53	2.77	0.54	0.00	0.83	0.83	0.44	0.0000	22.55	102.84	969.43	5249.20	476.59	1446.02	1769.43	1850.96	1769.43	19.49	210.00	0.0238	0.36
21.41	soil	2.02	406.42	1.00	171.03	235.40	0.00	28.00	1.00	350.00	2.49	0.53	2.77	0.54	0.00	0.83	0.83	0.44	0.0000	22.55	103.64	997.88	5307.40	481.87	1479.75	1797.88	1822.51	1797.88	19.80	210.00	0.0241	0.33
21.67	soil	2.02	411.54	1.00	173.56	237.98	0.00	28.00	1.00	350.00	2.47	0.53	2.77	0.54	0.00	0.83	0.83	0.44	0.0000	22.55	104.45	1026.55	5365.61	487.15	1513.71	1826.55	1793.84	1793.84	19.76	210.00	0.0243	0.31
21.93	soil	2.23	416.92	1.00	176.09	240.83	0.00	29.00	1.00	350.00	2.45	0.52	2.88	0.56	0.00	0.81	0.81	0.45	0.0000	25.56	108.32	1055.87	6155.03	558.83	1614.70	1855.87	1764.52	1764.52	19.43	210.00	0.0241	0.29
22.19	soil	2.23	422.56	1.00	178.62	243.94	0.00	29.00	1.00	350.00	2.43	0.52	2.88	0.57	0.00	0.81	0.81	0.45	0.0000	25.56	109.30	1085.86	6234.60	566.05	1651.91	1885.86	1734.53	1734.53	19.10	210.00	0.0237	0.26
22.45	soil	2.23	428.20	1.00	181.15	247.05	0.00	29.00	1.00	350.00	2.42	0.52	2.88	0.57	0.00	0.81	0.81	0.45	0.0000	25.56	110.27	1116.11	6314.16	573.28	1689.39	1916.11	1704.28	1704.28	18.77	210.00	0.0233	0.24
22.70	soil	2.23	433.85	1.00	183.68	250.17	0.00	29.00	1.00	350.00	2.40	0.52	2.88	0.58	0.00	0.80	0.80	0.44	0.0000	25.56	111.25	1146.64	6393.73	580.50	1727.13	1946.64	1673.75	1673.75	18.44	210.00	0.0229	0.22
22.96	soil	2.23	439.49	1.00	186.21	253.28	0.00	29.00	1.00	350.00	2.38	0.52	2.88	0.58	0.00	0.80	0.80	0.44	0.0000	25.56	112.23	1177.43	6473.29	587.72	1765.15	1977.43	1642.96	1642.96	18.10	210.00	0.0224	0.19
23.22	soil	2.23	445.14	1.00	188.74	256.39	0.00	29.00	1.00	350.00	2.37	0.52	2.88	0.59	0.00	0.80	0.80	0.44	0.0000	25.56	113.20	1208.49	6552.85	594.95	1803.44	2008.49	1611.90	1611.90	17.75	210.00	0.0220	0.17
23.48	soil	2.23	450.78	1.00	191.28	259.50	0.00	29.00	1.00	350.00	2.35	0.52	2.88	0.59	0.00	0.79	0.79	0.44	0.0000	25.56	114.17	1239.82	6632.42	602.17	1841.99	2039.82	1580.57	1580.57	17.41	210.00	0.0216	0.15
23.74	soil	2.23	456.42	1.00	193.81	262.62	0.00	29.00	1.00	350.00	2.33	0.52	2.88	0.60	0.00	0.79	0.79	0.44	0.0000	25.56	115.14	1271.42	6711.98	609.39	1880.81	2071.42	1548.97	1548.97	17.06	210.00	0.0212	0.13
23.99	rock	2.23	462.07	1.00	196.34	265.73	1500.00	0.00	1.00	600.00	3.26	1.00	1.00	1.77	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	1335.01	9000.00	817.13	2152.14	2135.01	1485.38	1485.38	16.36	210.00	0.0205	0.11
24.25	rock	2.23	467.71	1.00	198.87	268.84	1500.00	0.00	1.00	600.00	3.23	1.00	1.00	1.77	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	1430.48	9000.00	817.13	2247.61	2230.48	1389.91	1389.91	15.31	210.00	0.0195	0.09
24.51	rock	2.23	473.36	1.00	201.40	271.96	1500.00	0.00	1.00	600.00	3.21	1.00	1.00	1.77	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	1525.94	9000.00	817.13	2343.07	2325.94	1294.45	1294.45	14.26	210.00	0.0182	0.07
24.77	rock	2.23	479.00	1.00	203.93	275.07	1500.00	0.00	1.00	600.00	3.18	1.00	1.00	1.78	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	1621.41	9000.00	817.13	2438.53	2421.41	1198.98	1198.98	13.21	210.00	0.0169	0.05
25.03	rock	2.23	484.64	1.00	206.46	278.18	1500.00	0.00	1.00	600.00	3.16	1.00	1.00	1.78	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	1716.87	9000.00	817.13	2534.00	2516.87	1103.52	1103.52	12.15	210.00	0.0156	0.04
25.28	rock	2.23	490.29	1.00	208.99	281.30	1500.00	0.00	1.00	600.00	3.13	1.00	1.00	1.78	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	1812.33	9000.00	817.13	2629.46	2612.33	1008.06	1008.06	11.10	210.00	0.0143	0.02
25.54	rock	2.23	495.93	1.00	211.52	284.41	1500.00	0.00	1.00	600.00	3.11	1.00	1.00	1.78	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	1907.80	9000.00	817.13	2724.93	2707.80	912.59	912.59	10.05	210.00	0.0130	0.01
25.80	rock	2.23	501.58	1.00	214.05	287.52	1500.00	0.00	1.00	600.00	3.09	1.00	1.00	1.79	3.00	1.00	1.00	0.00	0.1155	9.00	346.41	2003.26	9000.00	817.13	2820.39	2803.26	817.13	817.13	9.00	210.00	0.0117	0.00



PROJECT TITLE:-

Net Zero Teesside

AECOM

FIGURE TITLE:-

Preliminary Onshore Ground
MS\BH08 - Cooling

340mm dia. Steel Tubular pile 2m rock

CALCULATION OF AXIAL PILE CAPACITY USING THE BETA METHOD

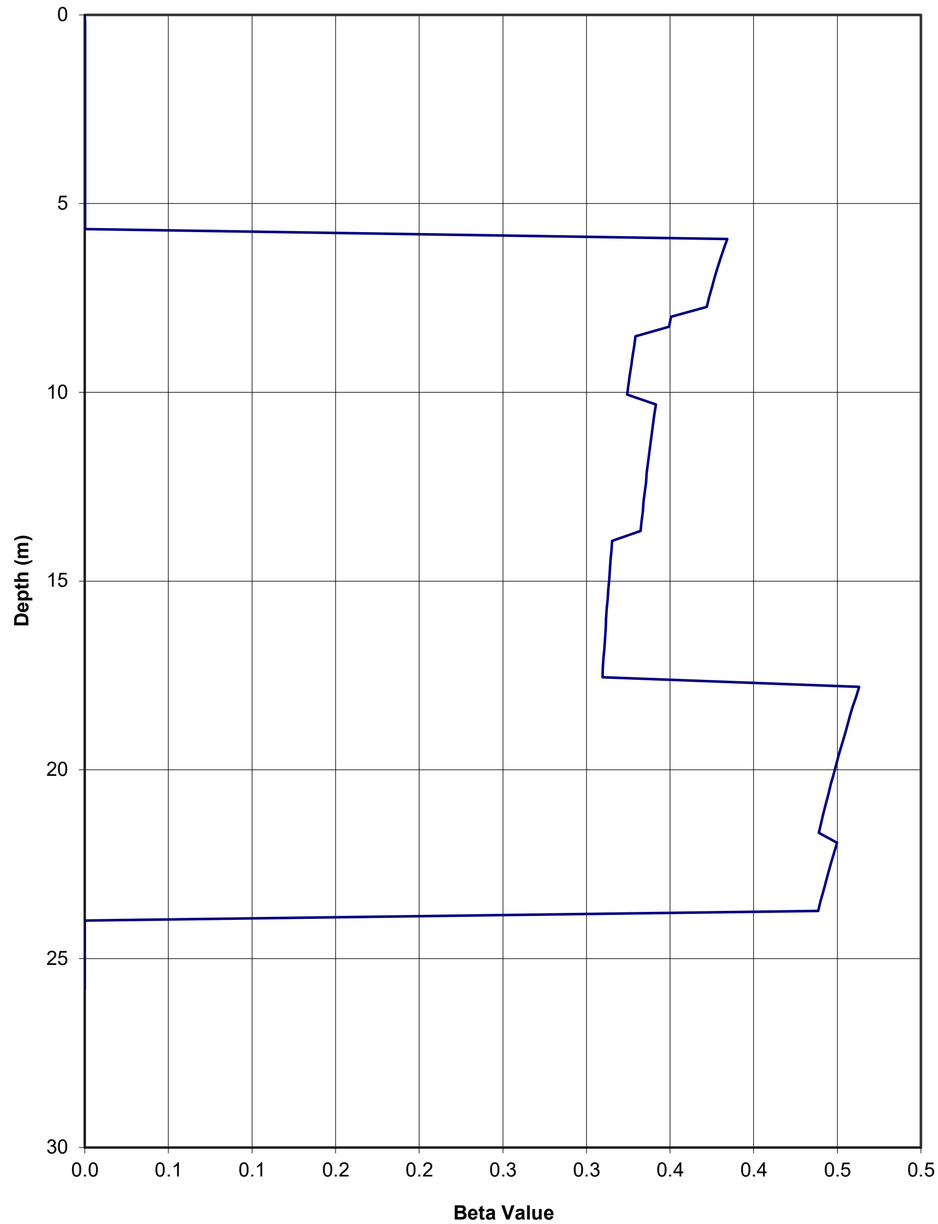
Vertical Stress Profiles

FIGURE No.
Figure 1

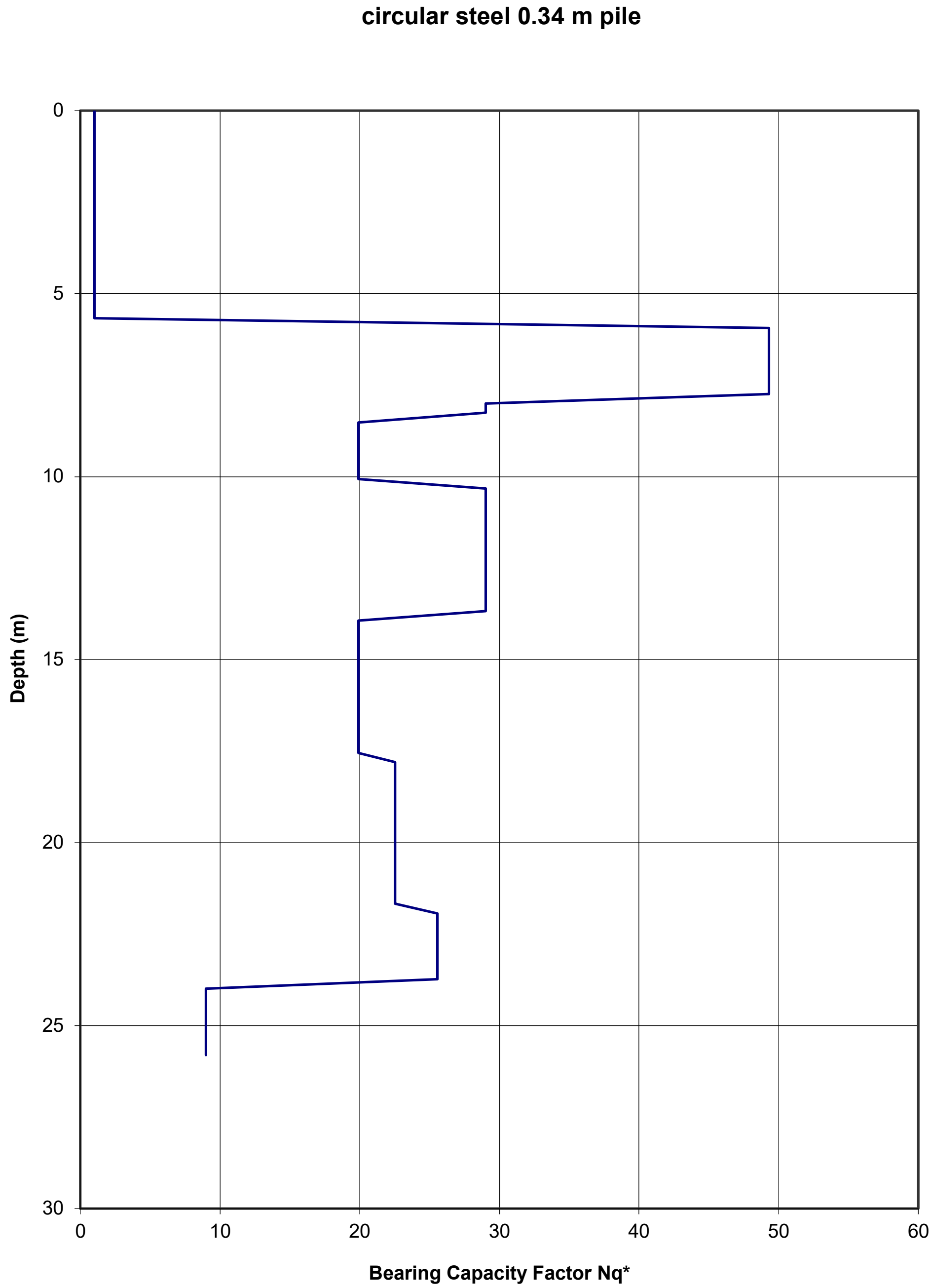
REPORT No.:
60657467

DATE:-
02-Nov-21

circular steel 0.34 m pile



PROJECT TITLE:- **Net Zero Teesside**	AECOM
FIGURE TITLE:- **Preliminary Onshore Ground Investigation** **MS\BH08 - Cooling** 340mm dia. Steel Tubular pile 2m rock CALCULATION OF AXIAL PILE CAPACITY USING THE BETA METHOD Beta Values	FIGURE No.: Figure 2 REPORT No.:- 60657467 DATE:- 02-Nov-21



PROJECT TITLE:-
Net Zero Teesside

AECOM

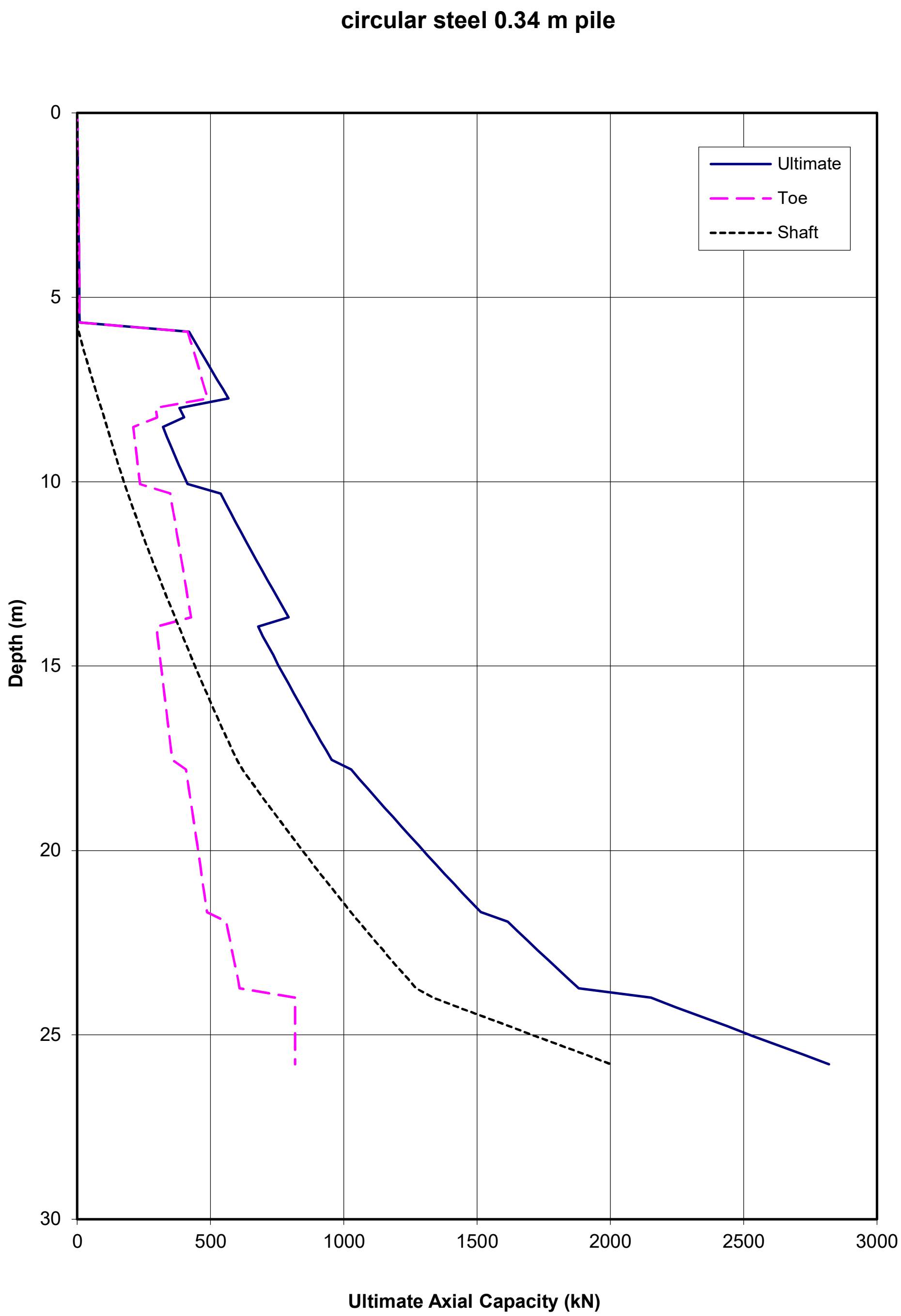
FIGURE TITLE:-
Preliminary Onshore Ground Investigation
MS\BH08 - Cooling
340mm dia. Steel Tubular pile 2m rock
CALCULATION OF AXIAL PILE CAPACITY USING THE BETA METHOD

N_q* Values

FIGURE No.:
Figure 4

REPORT No.:-
60657467

DATE:-
02-Nov-21



PROJECT TITLE:- **Net Zero Teesside**	AECOM
FIGURE TITLE:- **Preliminary Onshore Ground** **MS\BH08 - Cooling** 340mm dia. Steel Tubular pile 2m rock CALCULATION OF AXIAL PILE CAPACITY USING THE BETA METHOD Ultimate Axial Pile Capacity	FIGURE No.: Figure 8 REPORT No:- 60657467 DATE:- 02-Nov-21

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