

# **METALS PROCESSING AREA,** FORMER STEELWORKS, REDCAR

Phase II Environmental Site Assessment (Shallow Soils)

South Tees Development Corporation

REPORT NO. 10035117-AUK-XX-XX-RP-ZZ-0125-02-MRA Shallow Soils **NOVEMBER 2020** 







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This report dated August 2020 has been prepared for South Tees Site Company (the "Client") in accordance with the terms and conditions of appointment dated 14 September 2017(the "Appointment") between the Client and **Arcadis (UK) Limited** ("Arcadis") for the purposes specified in the Appointment. For avoidance of doubt, no other person(s) may use or rely upon this report or its contents, and Arcadis accepts no responsibility for any such use or reliance thereon by any other third party.

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### APPENDIX B

**Study Limitations** 

#### APPENDIX C

AEG Data

### APPENDIX D

Slag Analysis Report – Not Currently Available

#### APPENDIX E

GQRA – Summary of Soil Screen

#### APPENDIX F

**GQRA – Summary of Soil Leachate Screen** 

# **1** Introduction

## 1.1 **Project Background**

The Metals Processing Area (MPA) (the site) is a land parcel situated at the Former Redcar Steelworks located within the Redcar, Lackenby, Grangetown and South Bank conurbations of the Borough of Redcar & Cleveland, within the industrial area generally known as 'South Tees'. Figure 1 in Appendix A provides details of the site location.

The "South Tees Regeneration Master Plan" dated November 2019 has been developed detailing the industrial-led regeneration of the Former Redcar Steelworks into a world class employment-generating zone and economic growth enabler for the Tees Valley.

The Masterplan has identified the MPA as being located within the South Bank Zone. The site is a priority development area and Arcadis understands this report is to be used within a detailed planning application for *"Demolition of existing buildings/ structures and engineering operations associated with ground remediation and preparation of land for development"*.

#### **1.2 Contract Details**

Arcadis (UK) Limited (Arcadis) was appointed by South Tees Development Corporation (STDC) to oversee and manage a ground investigation undertaken by Allied Exploration and Geotechnics Limited (AEG) and to provide consultancy advice on the redevelopment of the site.

The work was carried out in accordance with the "*Prairie Site, Warrenby Site and the SLEMS Ground Investigations Provision of Consultancy Services* Agreement between Tees Valley Combined Authority and Arcadis.

The scope of works was defined by Arcadis, on behalf of STDC, as presented in "Metals Recovery Area – PM and Technical Support (updated)" dated 1<sup>st</sup> July 2020. At the request of STDC the investigation was split into two phases, an initial investigation of shallow soils (this phase) and a subsequent investigation of deeper soils and groundwater to be conducted when further certainty on redevelopment scenarios has been confirmed.

## **1.3 Projects Aims and Objectives**

As technical consultant, our specific objectives of this phase of works were to:

- Manage and technically supervise the site works, undertaken by AEG, on behalf of STDC;
- Direct the site works to ensure compliance by the ground investigation contractors with existing site management protocols and procedures;
- Specify the requirements for laboratory analysis;
- Analyse the results of ground investigations; and,
- Prepare interpretative technical reports, namely;
  - Prepare an interpretative technical report including an assessment of identified environmental risks associated with the site considering the findings of the initial shallow soils investigation (*this document*).
  - Prepare an interpretative technical report including an assessment of identified environmental risks associated with the site considering the findings of the subsequent deep soils and groundwater investigation (*to be reported under a separate cover*),

#### 1.4 Report Aims

The aim of this environmental site assessment report is to use the available information to develop a conceptual site model (CSM) for the site and identify the potential significance of any source-pathway-receptor (SPR) linkages identified by the CSM in relation to shallow soils at the site. Where significant, and potentially complete pollutant linkages are identified, suitable risk management/remediation recommendations are to be made.

# 1.5 Reliability / Limitations of Information

A complete list of Arcadis Study Limitations is presented in Appendix B.

It should be noted that ground conditions between exploratory holes may vary from those identified during this ground investigation; any design should take this into consideration.

# 2 Site Conceptualisation

No specific Phase I Environmental Site Assessment (ESA) exists for the site. However, the northern portion of the site is covered by the following document supplied by STDC:

• TS4 South Bank – Phase 1 Geo-Environmental Desk Study, prepared by CH2M Hill for the Homes and Communities Agency, report ref. 678079\_TS4\_002 dated August 2017 and marked Final.

The site is also considered in:

• South Industrial Zone ES - Vol 2 - Chapter H (Ground Conditions and Remediation), prepared by Arcadis for STDC and dated July 2020.

In addition, STDC also supplied the following documents:

 Former Steelworks Land, South Tees Outline Remedial Strategy, Prepared for South Tees Development Corporation by Wood, Ref 41825-wood-XX-XX-RP-OC-0001\_S0\_P01 dated 25th June 2019 [Wood 2019]

This section incorporates a review of the above reports, publicly available records, and data collected as part of the site investigation works by AEG4291 Metal Processing Area Shallow Soils Investigation (Final Report) presented as Appendix C.

The scope completed by AEG included:

- 31no. trial pits excavated by a 30 tonne tracked excavator, to a target depth of 4.5m, refusal, or until natural material is encountered; and,
- Soil sampling for in-field assessment and submission to Derwentside Environmental Testing Services (DETS), AEG in-house Geotechnical Laboratory and Thomas Research Services (TRS) laboratories for chemical and geotechnical testing;

#### 2.1 Site Location

The MPA is located in the south west of the Former Redcar Steelworks and is bound by land occupied by MGT Teesside to the north, PD Ports to the east, the SLEMs and Cleveland Channel to the South and the wider south bank site to the west. The site elevation generally ranges from approximately 7m to 12m above Ordnance Datum (AOD).

The centre of site is located at National Grid Reference: 454600, 522600; and an indicative post code for the site is TS10 5QW.

A Site Location Plan is presented on Figure 1 within Appendix A.

#### 2.2 Site Description

The site is approximately 21.5 hectares in size and approximately rectangular in shape tapering to the south. The southern boundary is marked by a rapid change in level to the Cleveland Channel (approx. 2 to 3m AOD) with the SLEMs facility beyond. The Cleveland Channel discharges into the Lackenby Channel which runs parallel to the eastern boundary of the site. Both the Cleveland and Lackenby channels are tidal and discharge into the River Tees a short distance north of the site.

PD Ports facilities are located to the east (beyond the Cleveland Channel) and include a utility corridor, port buildings and wharf facilities. The area north of the site is currently under development as a biomass power station operated by MGT Teesside. A third party landfill (land rise) Highfield Environmental is located to the east of the site, the landfill is understood to accept wastes types including domestic and special.

At the time of the siteworks the site is covered by stockpiles of aggregates from the steelmaking process, which are being processed by a contractor. There are infrequent concrete structures including a large viewing platform in the centre of the site, south of which are four buildings. With the exception of the viewing platform and the stockpiles the area is generally level and covered with aggregates of steel biproducts.

# 2.3 Site History

Based on a review of the documents in 2.1, the site was originally sand and mud associated with the Tees Estuary. The site was reclaimed from the Tees between 1896 and 1938 by the assumed deposition of waste products from the steelmaking process. A number of small structures and a gun emplacement are shown on mapping from 1952 along with railway lines from 1959. The site is shown in its approximate current layout from 1991.

The site is understood to have been leased from Tata Steel to Harsco who undertook "recycling materials from iron and steelmaking for recovery of metals" under permit PP3338MT.

## 2.4 Geology

Review of the British Geological Survey (BGS) data suggests that the majority of the site is underlain by Tidal Flat Deposits predominantly comprising sand and clay This is anticipated to be underlain by Glaciolacustrine Deposits and Glacial Till based on data from historic boreholes in the vicinity of the MPA.

Bedrock beneath the site is anticipated to comprise Mercia Mudstone. Excerpts from the BGS mapping data are presented as Figure 2 below and in Appendix A.



Figure 2: Excerpts from BGS Mapping

The following table provides an overview of the site-specific geology encountered during the investigation across the site. The full geology encountered is provided on the trial pit logs within Appendix C.

Interpreted Unit	Minimum Basal Depth (m bgl)	Maximum Basal Depth (m bgl)	Comment
Made Ground	>4.5	>4.5 (base not proved at majority of locations)	Site surfacing comprised a grey aggregate of slightly sandy gravel of slag. The Made Ground in all locations with the exception of MPA_AUK_TP102 comprised slag rich deposits which contained 75 – 100% recovered as gravel and cobbles and varying quantities of ash, and clinker. Slag was vesicular and noted to be predominantly grey but with green, brown, purple and white colouration and or precipitates on the surface. Occasional iron rich deposits were also noted on the slag. Fragments of concrete and metal were noted within the deposits. The slag deposits were well bound and potentially partially fused across the Made Ground which required significant effort to excavate. More humic material was noted at the surface in MPA_AUK_TP102, underlain by slag rich deposits and a concrete slab obstruction.
Tidal Flat Deposits (Secondary A Aquifer)	N/A	N/A	Not encountered
Glaciolacustrine Deposits	N/A	N/A	Not encountered
Glacial Till	N/A	N/A	Not encountered
Mercia Mudstone (Secondary (B) Aquifer)	N/A	N/A	Not encountered

Made Ground was encountered in all intrusive locations and proven to a thickness of up to 4.5m. The base of the Made Ground was not proven in any of the 31 trial pits, therefore, greater thickness of made ground material exists across the site.

Two types of Made Ground were noted:

- Slag-dominant material: Generally ranging from gravel to boulder size fragments of slag. The slag
  material generally ranged from light grey to dark grey/black in colour, but a wide range of other colours
  were also noted including blue, brown, green, and purple. Discolouration of the slag surface was also
  noted with white crystallisation/discolouration often noted on the outer surface along with occasional
  iron rich areas. Slag is estimated to comprise 75 100% of the soil matrix, weighted towards the latter.
- **Granular Made Ground:** Identified in 5 locations only (MPA\_AUK\_TP101, MPA\_AUK\_TP110, MPA\_AUK\_TP119, MPA\_AUK\_TP127, and MPA\_AUK\_TP128) and was described as a sandy fine to coarse gravel with many cobbles. Gravel and cobbles include brick, concrete, wood and other demolition materials, slag was not the dominant constituent although often still present within the soil matrix. Although present in the locations listed above the pits were dominated by slag rich materials.

## 2.5 Hydrogeology

Groundwater was not encountered during the investigation. The hydrogeological map for the area (Sheet 1: Hydrogeological Map of England and Wales, 1:625,000 scale) indicates that groundwater beneath the site within the Mercia Mudstone Formation is at an elevation of approximately 0m AOD with groundwater elevation contours indicating a flow to the north. The site is not located within a Groundwater Source Protection Zone

and given the proximity to the Tees Estuary groundwater is likely to be tidally influenced and potentially subject to saline intrusion.

## 2.6 Hydrology

The closest surface water features to the site are the Cleveland Channel which forms the southern boundary of the site and the Lackenby Channel which is located approximately 40m to the east of the site. The Cleveland Channel flows into the Tees via the Lackenby Channel. Both the Cleveland and Lackenby channels are tidally influenced.

## 2.7 Potential Areas of Concern

Based on a review of the documents listed in Section 2.1 above and the DEFRA Magic Website https://magic.defra.gov.uk/MagicMap.aspx accessed 3rd August 2020 the following potential areas of concern (Environmental PAOC) have been identified for the site and are summarised on Figure 3 below and in Appendix A.



The significance of these potential sources is considered further in Section 3.2.

# **3 Environmental Site Condition Assessment**

### 3.1 Introduction

This section summarises the findings of Section 2 in the form of an environmental (land contamination) CSM.

The CSM allows a qualitative evaluation of potentially active "pollutant linkages" at the site; these being plausible scenarios whereby a contamination source is connected to a possible receptor by one or more pathways:

- Potential sources of contamination: these include any actual or potentially contaminating materials and activities, located either on or in the vicinity of the site;
- Potential pathways for contamination migration: these comprise the routes or mechanisms by which contaminants may migrate from the source to the receptor including environmental migration pathways and human health exposure pathways; and
- Potential receptors of contamination: these include present and/or future land users, ecological systems, water resources and property.

The potential significance of these source-pathway-receptor linkages will be assessed in the Section 4.

#### 3.2 Contamination Sources

Based on the information reviewed in this report the following potential contamination sources have been identified:

#### 3.2.1 On-Site

On-site sources have been identified associated with Made Ground and potential contaminants of concern (CoC) associated with former site uses. The table below summarises the most significant potential on-site sources and the primary contaminants associated with these sources. The identified CoC are considered to represent those likely to be present from other less significant sources.

Potential On-Site sources	Primary Contaminants		
Made Ground including slag deposits	Metals (including heavy metals), polycyclic aromatic hydrocarbons (PAHs), cyanide, thiocyanate, sulphate, pH, ammonia, and asbestos.		
	Potential source of ground gas if found to be have a high organic content.		
Substation	Hydrocarbons, asbestos, and <b>polychlorinated biphenyls</b> (PCBs)		
Buildings of unknown use	Metals, and asbestos		
Gun emplacement	Unexploded ordnance		
Garage and maintenance workshop	Metals, asbestos, TPH, PAH, acids and bases, VOCs, SVOCs, pH		
Slag crushing and metal cleaning plant	Metals (including heavy metals), cyanide, thiocyanate, sulphate, pH, and ammonia.		
Railway lines and sidings	Metals, asbestos, TPH, PAH, VOC, SVOC, PCB, and pH.		

#### 3.2.2 Off-Site

Potentially contaminative land uses have been identified in the vicinity of the site, the most pertinent of which are presented in the table with potentially associated contaminants:

Potential On-Site sources	Primary Contaminants
Highfield Environmental	Metals (including heavy metals), PAH, cyanide, thiocyanate, sulphate, pH, ammonia, asbestos, total petroleum hydrocarbons (TPH), volatile organic compounds (VOC), semi volatile organic compounds (SVOC), and ground gas.
SLEMS / CLE9 – The SLEMS facility processes BOS Oxide. BOS material and other steelmaking biproducts are stockpiled on site. The SLEMS is understood to be located on top of the former CLE9 landfill.	Metals (including heavy metals), PAH, cyanide, thiocyanate, sulphate, pH, ammonia, asbestos, total petroleum hydrocarbons (TPH), volatile organic compounds (VOC), semi volatile organic compounds (SVOC), and ground gas if found to have a high organic content.
Former Oil Terminal and tanks	Metals, asbestos, TPH, PAH, acids and bases, VOCs, SVOCs, pH and PCBs
PD Ports and Tarmac leasehold	Metals, asbestos, TPH, PAH, acids and bases, VOCs, SVOCs, pH and PCBs

Contaminants of concern in green are of generally low environmental mobility and have therefore been discounted for the sources in question based on the distance from the site.

### 3.3 Contamination Sources Assessment

The contamination assessment will be undertaken in two ways – contaminants that are dependent upon the material composition (e.g. metals, inorganics, asbestos and PAHs) will be assessed separately for each material type and contaminants that are associated with a particular point source (e.g. hydrocarbons) will be assessed based on the likely source. This report is focused on shallow soils and does not fully assess the risks to Controlled Waters however, soil leachate testing was conducted to give an indication of risk.

The laboratory certificates are presented in Appendix C.

#### 3.3.1 Made Ground

#### Asbestos

Asbestos (identified as chrysotile) was identified in three samples of granular Made Ground, quantification was requested on these samples and reported as follows:

- MPA\_AUK\_TP101\_SO\_0350 0.003%
- MPA\_AUK\_TP102A\_SO\_0100 0.002%
- MPA\_AUK\_TP103\_SO\_0060 0.002%

A potential ACM (cement pipe) was noted in situ in MPA\_AUK\_TP117.

#### Metals and Inorganics

With the exception of hexavalent chromium and mercury the metals analysed for were detected in each of the soil samples tested. Mercury was identified in 4 of the 32 samples tested. Concentrations of metals were notably higher in the samples of slag dominant made ground compared to granular made ground.

Levels of cyanide and thiocyanate were low across the site, though more variation was noted in soluble sulphate concentrations. Soil samples were on average strongly alkaline ranging between pH 9.8 and 12.7.

Leachability testing showed the majority of metals were present in the leachate from made ground samples. Leached concentrations of metals were noted in all samples tested with arsenic, barium, copper, magnesium, manganese and vanadium leaching in all samples. The pH of leachate samples was noted to be slightly alkaline and lower than the corresponding soil samples.

#### Polyaromatic Hydrocarbons

Concentrations of PAH were measured in 29 of the 32 soil samples analysed, and in all eight samples of soil leachate; comprising a broad range of both light, mid and heavy end compounds.

#### Total Petroleum Hydrocarbons

Concentrations of TPH were measured in 14 of the 32 soil samples analysed at concentrations ranging between 1000mg/kg (MPA\_AUK\_TP113\_SO\_0090) and 33mg/kg (MPA\_AUK\_TP117\_SO\_0060), the former and a detection in MPA\_AUK\_TP101\_SO\_0350 (560mg/kg) are the only detections measured over 500mg/kg.

Total petroleum hydrocarbons were not measured above the method detection limit (MDL) in soil leachate.

#### Other Contaminants

No elevated concentrations of VOC, SVOC, or PCBs were measured in any of the soil samples with the exception of carbazole and dibenzofuran detected at the MDL in MPA\_AUK\_TP121\_SO\_0080.

#### 3.4 Pathways

Potential migration pathways based on a proposed commercial industrial end use are discussed below.

#### 3.4.1 Airborne Migration Pathways

- The majority of the site is currently not formally surfaced, as such, particulate inhalation due to dust generation is a potentially active pathway if hardstanding or buildings were not present across the site in a future development scenario.
- Vapour inhalation pathways in relation to contaminants in soil and groundwater are potentially active, both for an exposure scenario in outdoor or indoor air space.
- During potential re-development works, sub-surface soils could be exposed at the surface due to trenching and or re-profiling requirements and therefore dust has the potential to be generated. Notwithstanding this, typical dust suppression techniques should be employed so that exposures would be minimised.
- Migration and accumulation of permanent ground gases originating from the made ground on site in confined spaces leading to asphyxiation and/or explosion is considered potentially active.

#### 3.4.2 Direct Contact Exposure Pathways

- The proposed site surfacing under any potential re-development scenario is unknown; should a significant portion of the site area be covered in some form soft landscaping, dermal contact and ingestion pathways in relation to soil would be considered potentially active. Given the depth to groundwater (greater than 4.5m bgl, unless the final ground elevation is reduced significantly), direct contact pathways in relation to groundwater are not considered active.
- Direct contact pathways with soils could be active throughout a potential redevelopment; typical mitigation
  measures such as personal protective equipment (PPE; overalls, gloves etc.) could be used to mitigate this
  risk. If unexpected contamination (such as non-aqueous phase liquids (NAPL)) were identified during
  redevelopment works, additional PPE may be required as mitigation.

#### 3.4.3 Aqueous Migration Pathways

- Leaching of contaminants in the shallow soils to groundwater within the Tidal Flat Deposits is considered potentially active;
- The thickness of Glacial Till on-site between the Tidal Flat Deposits and the underlying Mercia Mudstone is not well delineated therefore the potential for vertical migration of contaminants to the underlying Secondary (B) Aquifer is considered potentially active.
- Given the granular nature of the identified and thickness of the Made Ground and the permeability of the Tidal Flat Deposits, lateral migration of off-site impacts onto the site from nearby PAOC is considered

potentially active. The most likely source would be the SLEMS and Highfield Environmental waste facilities located hydraulically down gradient of the site.

- Lateral migration of on-site impacts towards the Cleveland and Lackenby watercourses is considered potentially active given the identified thickness and nature of the Made Ground. The potential for infiltration of CoC into watercourses *via* surface runoff or migration of rainfall through the made ground is considered potentially active.
- Depending on pile design for future structures, vertical migration of impacts down foundation piles is considered potentially active unless appropriately designed.

### 3.5 Receptors

The potential receptors to be considered in any contaminated land scenario can be summarised as follows:

#### 3.5.1 Human Health

For the purposes of this assessment it is assumed that the proposed development will comprise a commercial or industrial end use, and as such commercial and industrial workers are the primary receptor of concern for any contamination risk. The risk would be influenced by the duration and location of the staff work regimes.

Users of the adjacent buildings (industrial workers and neighbouring residents) could also be at risk. However, for exposure to occur, active cross-boundary migration pathways would be required. It is noted that the neighbouring residents are situated over 1km from the site, and as such are not considered to be at significant risk from the site.

#### 3.5.2 Property (buildings, etc)

The proposed development will include new structures and associated infrastructure, which could be subject to potential sulphate attack in relation to buried concrete. Given the presence of slag deposits within the Made Ground the potential for expansive slag to impact structures is considered potentially active, the risks from ground gas are also considered potentially active. It is understood that mitigation of risks to property will be the responsibility of the developer.

#### 3.5.3 Controlled Water

Groundwater is a Controlled Water; therefore, the groundwater beneath the site requires consideration. At this site, the underlying geology comprises Tidal Flat Deposits which are classified as a Secondary (A) Aquifer and the Mercia Mudstone Formation classified as a Secondary (B) Aquifer both of which are considered groundwater receptors at the site. It is noted that the site is not located within a Source Protection Zone (SPZ) and no SPZ's have been identified within 1km of the site. Additionally, the site is not located in a drinking water protected area or a drinking water safeguard zone, and neither zone is present within 1km of the site. The site adjoins a tidal section of the River Tees and therefore there is the potential for saline intrusion into the underlying aquifers limiting their resource value.

Surface water courses are also considered Controlled Water receptors; given its presence at the site boundary the Cleveland is considered the primary surface water receptor for the site.

#### 3.5.4 Ecological

The Cleveland and Teesmouth Coast SSSI, SPA, and RAMSAR is located approximately 350m to the north of the site.

Based on the distance from the site the risk to ecological receptors is considered low. In addition, potential discharges from the site to the Teesmouth and Cleveland Coast SPA and RAMSAR via the River Tees are likely to be limited by tidal exchange and the large volume of the River Tees receiving water. This is in line with the findings of Wood 2019.

#### 3.6 **Obstructions**

Frequent hard deposits of slag presented issues with progression of a number of the exploratory holes during the course of the investigation completed by AEG (trial pit logs presented in Appendix C), concrete structures

were also noted in MPA\_AUK\_TP102 and MPA\_AUK\_TP129. It should be noted that further obstructions may be encountered in areas not investigated.

## 3.7 Slag Testing Data

A total of 5 samples of slag recovered from trial pits were submitted for examination the results are presented in Appendix C and summarised below.

Sample	Depth	AEG Estimated % Slag
MPA_AUK_TP101	1.9	75 - 100%
MPA_AUK_TP107	1.5	75 - 100%
MPA_AUK_TP119	2.0	75 - 100%
MPA_AUK_TP120	3.8	75 - 100%
MPA_AUK_TP122	3.8	75 - 100%

- Four samples contained mixed slag deposits with blast furnace slag predominating in 2 samples and basic steel slags dominating in the remainder. One sample comprised entirely blast furnace slag (MPA\_AUK\_TP107)
- Small amounts of basic refractory materials were noted in 1 slag sample (MPA\_AUK\_TP122), these materials are particularly susceptible to expansion.
- Samples containing medium or higher proportions of basic steel slag were tested for free calcium and magnesium oxides. Free calcium oxide compositions ranged from 0.8% to 1.4% and free magnesium oxides were measured at 0.9%. This indicates expansion potential within the slags.
- Samples containing medium or higher proportions of basic steel slag were subject to 28 day accelerated expansion tests. The results showed expansion ranging between 0.29% and 0.9%.
- The samples tested contained did not contain Ettringite indicating expansion has not occurred in the past, however this does not mean that expansion will not occur.

The analysis report is presented in Appendix D.

### 3.8 Conceptual Site Model

The above data has been used to produce an initial CSM for the site, this is presented below as Figure 4.

## Figure 4 **Outline Conceptual Site Model - Commercial Industrial End Use**



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# 4 Generic Quantitative Risk Assessment

## 4.1 Tiered Approach

The purpose of this assessment is to quantify potential risks to the human health, controlled waters, ecological and future built receptors identified in the CSM in relation to the redevelopment of the site for a generic commercial/industrial use.

The following scenarios are not considered in this section:

- Risks to Construction Workers any redevelopment and construction work should be conducted in full recognition of HS(G)66.
- Nuisance health effects the Statutory Nuisance Act considered olfactory impacts from odours and allows comparison of enclosed space air concentrations with odour threshold concentrations.
- An assessment of the geotechnical development constraints which is outside the scope of this document.

Quantitative assessment of risks arising from soil and groundwater contamination are assessed in accordance with the framework presented in Contaminated Land Report 11 (CLR 11) (EA, 2004) and Land Contamination: Risk Management (LC:RM) (EA, 2020). This sets out a tiered approach to quantitative risk assessment comprising:

- Generic Quantitative Risk Assessment (GQRA) Comparison of site contaminant levels against generic standards and compliance criteria including an assessment of risk using a source-pathwayreceptor model.
- Detailed Quantitative Risk Assessment (DQRA) Derivation of site-specific risk assessment criteria and calculation of site specific clean-up goals.

In this report, a GQRA has been carried out. The potential pollutant linkages identified in the preliminary CSM for human health and controlled water receptors have been assessed by comparison against relevant generic assessment criteria (GAC). These have been derived using conservative assumptions to enable potential pollutant pathways that do not pose unacceptable risks to receptors to be identified and discounted. Exceedance of a GAC does not imply that an unacceptable risk is necessarily present, rather that further assessment may be required to verify the potential risk.

It is assumed that the site will be redeveloped as a typical commercial industrial development comprising office buildings, hardstanding and some areas of soft landscaping. The site has not been zoned at this stage and all data has been considered on an individual sample basis.

### 4.2 Human Health Risks

#### 4.2.1 Selection of Soil GAC

Potentially active pollutant linkages and contaminants of concern (CoC) in relation to human health risks have been identified in the initial CSM as:

- A. Vapour inhalation of indoor and outdoor air from volatile contaminants in soils, (potential CoC include volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs))
- B. Vapour inhalation of indoor and outdoor air from volatile contaminants in shallow groundwater, (potential CoC include VOCs and SVOCs)
- C. Dermal contact/ingestion of soil (potential CoC include heavy metals, organic/inorganic compounds)
- D. Dust inhalation (potential CoC include asbestos, volatiles, and heavy metals)

For the purposes of this assessment it is assumed that future re-development will comprise a commercial or industrial end use and, as such, commercial and industrial workers are the primary receptor of concern for any contamination risk. The risk would be influenced by the duration and location of the staff work regimes. For the basis of this assessment, it is assumed that site workers will be on-site for a "standard" 8 hour working day.

Commercial end use assumes a pre-1970s commercial property is present at the site with some open areas uncovered by hardstanding and is therefore regarded as conservative for a redevelopment scenario as new structures are assumed to be constructed to current standards.

To assess potential linkages A, C and D above, GAC have been chosen, based on an assumed industrial/commercial end use. Criteria published by authoritative industry bodies and commonly accepted by regulators for use under the planning regime for development sites have been used first. For contaminants for which no published values are available, Arcadis derived criteria (developed following the CLEA framework (v1.07)) or foreign national criteria have been used.

The GAC comprise (in order of priority):

- LQM/CIEH Suitable for Use Levels (S4UL) (LQM / CIEH, 2015),
- Department of Environment Food and Rural Affairs (DEFRA) Category 4 Screening Levels (C4SL) (DEFRA, 2012),
- Arcadis derived generic assessment criteria based on CLEA v1.07,
- United States Environmental Protection Agency (U.S. EPA) Regional Screening Levels (RSLs) (USEPA, 2018)

Soil organic matter recorded in 32No. soil samples obtained from the site ranged from 0.2 to 4.2 % SOM. As such, the S4UL selected as GAC are those for a commercial end use assuming 1% SOM.

It is noted that the USEPA RSLs do not consider the risk to human health via the inhalation of vapour pathway. As such, should concentrations of volatile or semi-volatile CoC be measured above MDL for which only a USEPA RSL GAC is available, further consideration may need to be given to the risk to human health from inhalation of vapours.

The selected human health GAC for soil are presented in Appendix E:

#### 4.2.2 Soil Quality Screening

Contaminant concentrations in soil samples have been compared with the soil GAC in Appendix E. Contaminants which were measured in excess of the GAC are summarised below. Contaminants that have not been identified in excess of their respective GAC are not considered to represent a significant risk to identified human health receptors and as such do not require further assessment in relation to the redevelopment of the site unless the above assumptions are not valid.

The following samples were analysed:

- 27 No. samples of slag-dominated Made Ground
- 5 No. samples of granular Made Ground

None of concentrations of CoC measured in the 32 soils samples were in excess of the soil GAC for the contaminants for which screening criteria are available, therefore there is not considered to be a significant risk to human health from these CoC in shallow soils. The maximum recorded concentrations in soil for all contaminants are listed in Appendix E.

Contaminants for which no screening criteria were available have been reviewed. Most contaminants, including polychlorinated biphenyls (PCBs) and VOCs were recorded below the method detection limit (MDL) in all soil samples.

Contaminants measured in soil at concentrations above MDL, for which no screening criteria were available were aluminium, iron, magnesium, manganese, silicon, total cyanide, sulphate, and carbazole. Potential human health risks from these are qualitatively assessed in Section 4.2.4.

#### 4.2.3 Asbestos in Soil

A total of 32No. soils samples were screened by polarised light microscopy in accordance with HSG248 for the presence of asbestos (HSE, 2005). In 3No. sample asbestos was detected as bundles of fibres (chrysotile). The detections were recorded in MPA\_AUK\_TP101 (0.003%), MPA\_AUK\_TP102A (0.002%), and MPA\_AUK\_TP130 (0.0025) at depths of 3.5, 1.0 and 0.6 metres below ground level (m bgl) respectively. The samples from MPA\_AUK\_TP101 and MPA\_AUK\_TP130 are noted to be within deposits containing demolition material, whilst the sample from MPA\_AUK\_TP102A is very slag rich. In pit MPA\_AUK\_TP130 similar material is encountered to the surface and therefore dust generation is considered a valid pathway.

#### 4.2.4 Qualitative Risk Assessment for Substances in Soil without GACs

As shown in Appendix E, several contaminants including some PCBs, VOCs and SVOCs do not have a GAC available, but were recorded at less than the MDL in all soil samples. Based on a review of the MDLs, these are not considered to pose a significant risk to human health and are likely to indicate an absence of that contaminant group on the site, especially given the relatively low MDLs obtained.

The following were recorded at concentrations in excess of their MDL and with no readily available GAC identified for comparison: aluminium, iron, magnesium, manganese, silicon, total cyanide, sulphate, dibenzofuran and carbazole. With the exception of total cyanide, and carbazole, these are all elements present naturally in soil and some are biologically required nutrients. They may be elevated above natural levels where slag and other steelmaking wastes are incorporated into soil due to the site's former use, particularly manganese and iron. However, regardless of these elevations, their typically low toxicity is likely to mean these occurrences present a low risk of adverse harm to the development.

Total cyanide is known to be less toxic than free cyanide. When compared to the Arcadis site specific assessment criteria for free cyanide derived for the Prairie site (10035117-AUK-XX-XX-RP-ZZ-0088-01-Prairie\_Risk Assessment), the concentrations of total cyanide are not in excess. As such, concentrations of total cyanide are not considered to represent a significant risk to human health receptors.

The SVOCs, dibenzofuran, and carbazole were detected at the MDL. These are indicative of incomplete combustion products and therefore consistent with the presence of steelmaking wastes. Both compounds were at the MDL and when compared to the GAC, dibenzofuran concentrations were not in excess. Given that the single concentration of carbozole measured at the MDL, the risk to human health from concentrations of carbozole is also considered to be low.

Other effects, such as phytotoxicity, are not assessed as the Made Ground encountered at the site is likely to be unsuitable as a growing medium and some form of capping with "clean" soil is likely to be incorporated into any future development.

#### 4.2.5 Discussion

None of the potential contaminants of concern analysed in the soil samples were in excess of available GAC protective of human health via potential pollutant linkages A and C in Section 4.2.2 above. On this basis, these linkages are not considered active for shallow soils and are unlikely to pose a significant risk to human health. As the full depth of unsaturated Made Ground was not proven at the site the potential that contamination that could potentially pose a significant risk via pollutant linkage A exists at greater depth cannot be excluded at this point.

Groundwater was not encountered within the trial pits therefore the significance of pollutant linkage B cannot be assessed at this time and will require investigation during subsequent assessment works.

Asbestos fibres were identified in two samples, however only one of these contained obvious demolition materials, the other being primarily composed of slag deposit. Asbestos is potentially hazardous when inhaled and therefore pollutant linkage D (inhalation of dust) is considered potentially active as surface soils may become airborne during construction or if incorporated into soft landscaping without any cover. The highest risk is considered to be associated with the granular Made Ground, accepting however that the data does not suggest asbestos is prevalent at the site.

Acute risks to construction workers arising from short-term contact with contaminated soils during demolition and redevelopment of the site are not assessed by the chronic risk assessment methods in this report. During

construction works, site workers should remain vigilant to the possible risk of encountering isolated areas of contaminated material. Should potentially contaminated material be encountered, further testing may be required to assess the risk to health and safety of the site workers and the environment. All persons engaged in site construction works should be made aware of the findings of the intrusive investigation and the hazards associated with handling potentially contaminated materials. It is recommended that all works are conducted in accordance with the Health and Safety Executive publication entitled "Protection of Workers and the General Public during the Development of Contaminated Land" (HSE, 1991).

## 4.3 Risks to Controlled Waters

#### 4.3.1 Selection of GAC

Potentially active pollutant linkages in relation to Controlled Waters have been identified in the initial CSM as:

- 1) Leaching of CoC from Made Ground to groundwater in Tidal Flat Deposits
- 2) Vertical Migration of CoC to the Mercia Mudstone
- 3) Horizontal Migration of contaminated groundwater to the Cleveland Channel watercourse
- 4) Migration of CoC in groundwater onto site from off-site sources
- 5) Migration of CoC in groundwater off site.

An assessment of the potential for soluble contaminants in the Made Ground and slag on the site to impact the Controlled Waters receptors identified in the CSM (on-site surface water and underlying Secondary Aquifers (Tidal Flat Deposits and Mercia Mudstone)) has been undertaken.

At this point only a partial assessment of pollutant linkage 1 has been undertaken as the shallow soils investigation was not intended to assess groundwater or surface water quality at the site. The proposed deep soil and groundwater investigation will assess pollutant linkages 2 to 5.

Concentrations of leachable contaminants from soil leaching tests and groundwater samples have been compared to appropriate Water Quality Standards (WQS).

The WQS chosen are UK Drinking Water Standards (DWS) protective of aquifer water resources, and Environmental Quality Standards (EQS) considered protective of surface waterbody quality. The EQS are for saline waters protective of the Tees Estuary receptor. The WQS are listed in Appendix F.

#### 4.3.2 Soil Leachate

The results of 10No. soil leachate tests were compared to the WQS as shown in Appendix F. Contaminant concentrations that exceeded the WQS are shown in the table below. One of the samples was granular Made Ground and 9No. samples were slag-dominated Made Ground. Samples tested were taken across the site from depths ranging from 0.6 m to 1.2m bgl.

Contaminant	Unit	No. Samples Exceeding	WQS Exceeded		Sample	Concentration
Arsenic	µg/l	1/10	DWS 10		MPA_AUK_TP124_SO_0080	23
		8/10	EQS	3.76	MPA_AUK_TP103_SO_0080	12
					MPA_AUK_TP108_SO_0100	9
Copper	µg/l				MPA_AUK_TP115_SO_0060	4.1
					MPA_AUK_TP111_SO_0120	13
					MPA_AUK_TP117_SO_0060	7.4

Contaminant	Unit	No. Samples Exceeding	WQS Ex	WQS Exceeded Sample		Concentration
					MPA_AUK_TP119_SO_0100	9.9
					MPA_AUK_TP121_SO_0080	9.7
					MPA_AUK_TP123_SO_0100	6.6
					MPA_AUK_TP103_SO_0080	2.2
					MPA_AUK_TP111_SO_0120	11
	µg/l	5/10	EQS	1.3	MPA_AUK_TP121_SO_0080	61
Lead					MPA_AUK_TP123_SO_0100	2.2
					MPA_AUK_TP124_SO_0080	2.6
					MPA_AUK_TP111_SO_0120	11
	µg/l	2/10	DWS	10	MPA_AUK_TP121_SO_0080	61
Mercury	µg/l	1/10	EQS	0.07	MPA_AUK_TP117_SO_0060	0.07
Molybdenum	µg/l	1/10	DWS	70	MPA_AUK_TP121_SO_0080	95
			EQS		MPA_AUK_TP103_SO_0080	11.3
		8/10		6 – 8.5	MPA_AUK_TP108_SO_0100	11.8
					MPA_AUK_TP106_SO_0100	9.6
рН	pH units				MPA_AUK_TP111_SO_0120	12.3
k					MPA_AUK_TP115_SO_0060	11.9
					MPA_AUK_TP117_SO_0060	11.4
					MPA_AUK_TP121_SO_0080	12.2
					MPA_AUK_TP123_SO_0100	11.3
Naphthalene	µg/l	1/10	EQS DWS	2	MPA_AUK_TP123_SO_0100	85
					MPA_AUK_TP106_SO_0100	0.46
Anthracene	µg/l	2/10	EQS	0.1	MPA_AUK_TP123_SO_0100	0.46
					MPA_AUK_TP103_SO_0080	0.01
					MPA_AUK_TP106_SO_0100	2.5
					MPA_AUK_TP111_SO_0120	0.01
					MPA_AUK_TP115_SO_0060	0.09
Fluoranthene	µg/l	9/10	EQS	0.0063	MPA_AUK_TP117_SO_0060	0.02
					MPA_AUK_TP119_SO_0100	0.54
					MPA_AUK_TP121_SO_0080	0.01
					MPA_AUK_TP123_SO_0100	0.07
					MPA_AUK_TP124_SO_0080	0.04

Contaminant	Unit	No. Samples Exceeding	WQS Exceeded		Sample	Concentration
		5/10	EQS		MPA_AUK_TP106_SO_0100	3.3
				0.017	MPA_AUK_TP115_SO_0060	0.05
Benzo(b)fluoranthene	µg/l				MPA_AUK_TP119_SO_0100	0.02
			Dire	0.025	MPA_AUK_TP123_SO_0100	0.03
					MPA_AUK_TP124_SO_0080	0.01
					MPA_AUK_TP106_SO_0100	1.0
		5/10	EQS DWS	0.017 0.01	MPA_AUK_TP115_SO_0060	0.74
Benzo(a)pyrene	µg/l				MPA_AUK_TP119_SO_0100	0.24
					MPA_AUK_TP123_SO_0100	0.03
					MPA_AUK_TP124_SO_0080	0.01
	µg/l	3/10	DWS	0.025	MPA_AUK_TP106_SO_0100	2.1
Indeno(1,2,3-c,d)pyrene					MPA_AUK_TP115_SO_0060	0.03
					MPA_AUK_TP119_SO_0100	0.4
					MPA_AUK_TP106_SO_0100	2.2
					MPA_AUK_TP115_SO_0060	0.04
			EQS	0.00082	MPA_AUK_TP117_SO_0060	0.02
Benzo(g,h,i)perylene	µg/I	6/10	DWS	0.025	MPA_AUK_TP119_SO_0100	0.5
					MPA_AUK_TP123_SO_0100	0.01
					MPA_AUK_TP124_SO_0080	0.02

An exceedance of the EQS for five metals were recorded. Five PAH were measured in excess of DWS with seven measured in excess of EQS.

As the WQS are protective of water quality within the receptor (the water body for EQS or the customer's tap for DWS); direct comparison with soil leachate results is a conservative assessment as it does not take into account dilution and attenuation along the pathway.

The EQS for copper is based on the bioavailable fraction which is likely to be less than the total dissolved concentrations recorded in the results. As not all the copper is likely to be bioavailable the EQS can therefore be regarded as conservative.

Concentrations of CoC measured above MDL for which no GAC was readily available are qualitatively assessed in Section 4.3.3. Discussion of the concentrations of CoC measured in leachate which are in excess of WQS is included in Section 4.3.4.

#### 4.3.3 Qualitative Risk Assessment for Substances in Leachate without WQS

As shown in Appendix F, for several contaminants including some metals (beryllium and magnesium) and inorganics (chloride, and sulphate) WQS are not readily available for comparison. Concentrations of beryllium, were not measured above the laboratory MDL in any of the leachate samples tested. As such, these compounds are not considered to pose a significant risk to identified water resource receptors.

The following compounds did not have readily available GAC and were recorded at concentrations in excess of their MDL: magnesium, sulphate and chloride, these elements and compounds are present naturally in

groundwater. Considering the site setting (close to saline coastal environment) these compounds are not considered to pose a significant risk to water resources.

Given a number of PAHs do not have readily available WQS, assessment of the risk to water resources will be made using PAHs in groundwater that have available WQS. This is considered to be sufficiently protective of water resources.

None of the contaminants without WQS are expected to pose a significant risk to Controlled Waters under a commercial redevelopment scenario and therefore further assessment of the contaminants in shallow soils is not warranted.

#### 4.3.4 Discussion

#### PAH

Concentrations of PAH have been measured in excess of WQS in the majority of leachate samples. Of the measured concentrations of PAH in excess in leachate, the majority are considered to be marginally in excess of the WQS. Given this, and that PAH are generally of low mobility in the natural environment, the risk to water resources receptors from these contaminants is considered to be low however investigation of the underlying groundwater will need to be completed to confirm this.

#### Heavy Metals

Of the heavy metals, arsenic, copper, lead, mercury, and molybdenum were measured in excess of the WQS in leachate. Of the measured concentrations of metals in excess in leachate, the majority are considered to be marginally in excess of the WQS within the same order of magnitude. Therefore, the risk to water resources receptors from these contaminants is likely to be low however investigation of the underlying groundwater will need to be completed to confirm this.

### 4.4 Built Receptors

Significant contamination can pose a risk to subsurface structures and services, where these are in direct contact with soil and/or groundwater. Substances such as dissolved metals, sulphate, cations, phenols and hydrocarbons in high concentrations can adversely affect in-ground materials such as concrete, metal and plastics.

The most sensitive built receptor is generally plastic water supply pipes, which can be affected by permeation of hydrocarbons and organic solvents into the pipe. The available chemical data for soil samples has been reviewed against the UK Water Industry Research (UKWIR) criteria to provide an indication of the potential acceptability of polyethylene (PE) pipes in brownfield land (Water UK, 2014), although an exact comparison is not possible due to differences in the determinand suites tested. Concentrations of the chemicals measured in the soil samples collected from the site have not been identified in excess of the UKWIR criteria however it is noted the Made Ground at the site can be alkaline (up to a pH of 12). Additional analysis of soil along any proposed route of water supply pipes is likely to be required to validate the acceptability of PE water supply pipes, alternatively barrier pipe or similar could be used.

Potential pollutant linkage E (attack on subsurface structures) cannot be discounted at this stage and appropriate mitigation measures may be required, these will be dependent on the redevelopment scenario and may require further assessment to define.

# **5 Updated Conceptual Site Model**

An updated CSM has been developed, using the findings of the above assessments, and is presented below as Figure 5. Pollutant linkages that have been shown to be inactive or not a significant risk have been removed.



# 6 Conclusions

This report has used information obtained from the recent ground investigation to assess the potential contamination risks to human health, Controlled Waters, ecological receptors and built property. The assessment has been undertaken based on a future generic commercial end use. Based upon this assessment of data, the CSM has been updated to identify the potential pollutant linkages considered to be complete (previous page).

Heavy metals have been recorded in soil and dissolved in soil leachate samples across the site. These are likely associated with the slag within the Made Ground. The probable source is historical placement of material from the steelmaking process.

## 6.1 Human Health Risk

Potential risks to human health via intake of a range of contaminants from shallow soils (Made Ground including slag materials) were assessed using GAC. None of the contaminants for which GAC are available exceeded the criteria and therefore no unacceptable risks have been identified from contact with or ingestion of soils on the site. Soil pH was noted to be strongly basic / alkaline. Contaminants without GACs have been qualitatively reviewed and no potentially significant risks have been identified. However, risks to human health from vapour intrusion of contaminants in groundwater has not been assessed as groundwater quality has not been investigated at this point.

Quantifiable asbestos was recorded in 3 out of 32 samples of Made Ground across the site (0.002 - 0.003%). This was associated with obvious demolition material within Made Ground at the site in only one case. Asbestos fibres in shallow soils in areas without buildings or hardstanding has the potential to become airborne and available for inhalation, particularly during construction, posing chronic risks to human health.

Additional assessment may be required dependent on the redevelopment scenario to further delineate the presence of asbestos on the site and determine necessary mitigation measures. It is likely that a clean cover system in areas of soft landscaping can be utilised to mitigate the risk to site occupiers and neighbouring land users. During redevelopment, good construction practice such as minimising handling of asbestos-contaminated soils, damping down and appropriate Personal Protective Equipment (PPE) may be sufficient to mitigate the risk to construction workers, but the works should be carried out with due consideration to the Control of Asbestos Regulations (2012).

Soil containing more than 0.1% m/m asbestos, if disposed of off-site, may be classified as hazardous waste and attract significantly higher disposal costs. Additional testing would be required to confirm the quantity of asbestos and delineate any areas above the threshold.

### 6.2 Controlled Waters

Several exceedances of Water Quality Standards (WQS) were recorded in soil leachate samples from Made Ground. As assessment of groundwater and surface water quality has not been conducted at this stage the significance of the potential pollutant linkages identified for Controlled Waters cannot be assessed.

### 6.3 Flood Risk

The Wood "Flood Risk Assessment and Drainage Strategy Flood Risk Assessment and Drainage Strategy" (Ref. 41825-WOOD-XX-XX-RP-OW-0001\_A\_P01) concluded that the potential import of up to 500mm mudstone onto the site did not increase the surface water flood risk.

The proposed planning application "*Demolition of existing buildings/ structures and engineering operations associated with ground remediation and preparation of land for development*" is assumed to comprise the excavation and crushing of hardstanding and other impermeable obstructions within the Made Ground and their backfill within the excavation. As such, Arcadis considers that following removal of hardstanding this approach will not decrease surface water infiltration rates and therefore the risk or surface water flooding both on and off-site will likely be no higher than that identified by Wood.. The proposed works are also unlikely to significantly alter the surface run off and infiltration from the site into the adjoining surface water features.

## 6.4 Recommendations

- 1. The proposed planning permission is for "*Demolition of existing buildings/ structures and engineering operations associated with ground remediation and preparation of land for development*". It is recommended that a watching brief is in place for environmental; contamination.
- 2. Assessment of deep soils, ground and surface water should be undertaken prior to redevelopment to further assess the risks to Controlled Waters at the site, and the risks to human health from the vapour intrusion pathway.
- 3. Following the collection of additional data, further assessment of the risk to identified surface receptors from concentrations of CoC identified in groundwater should be undertaken.
- 4. Prior to redevelopment a remediation options appraisal should be carried out for the loose asbestos fibres identified in the Made Ground on the site. Additional data collection may be needed to support the associated risk assessment/remediation design.
- 5. Depending on the redevelopment scenario further ground investigation including ground gas monitoring of shallow soils should carried out prior to redevelopment to quantify the ground gas risk on the site in the context of the proposed layout and design.

# APPENDIX A

**Figures** 





Legend	Notes: REPRODUCED FROM OS MASTERMAP BY PERMISSION OF ORDNANCE SURVEY® ON BEHALF OF THE CONTROLLER	Title: MPA - Potential Area	as of Concern (PAOC)
STDC Shapefile Data	OF HER MADES ITY'S STATIONERY OFFICE. © CROWN COPYRIGHT. ALL RIGHTS RESERVED. LICENCE NUMBER GD 100024393. CONTACT ARCADIS IN CASE OF ANY QUERIES.	Site: Redcar Steelworks - MPA	
<ul> <li>Rail Track</li> <li>Tanks</li> </ul>	Not shown PAOC - Made Ground	Client: South Tees Developemen	t Corporation
		Project: 37774100	Figure 3
Metals Recovery Area		Date: 3/08/2020 Drawn By: JALM DRG No: 10035117-AUK-XX-X	X-DR-ZZ-0125-01-MPA_PAOC
	A <sub>N</sub>	<b>ARCA</b>	DIS tran



# Legend



Metals Recovery Area

#### Hatching Shows Artificial Ground

#### Notes:

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#### Title: MPA - Anticipated Geology

Site: Redcar Steelworks - MPA

Client: South Tees Developement Corporation

Project: 10035117

Figure 2

Date: 01/04/2020 Drawn By: JALM DRG No: 10035117-AUK-XX-XX-DR-ZZ-0126-01-MPA\_Geology



# Legend

# Site Boundary Metals Processing Area

#### Notes:

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#### Title: MPA - Site Location Plan

Site: Redcar Steelworks - MPA

Client: South Tees Developement Corporation

Project: 10035117

Figure 1

Date: 07/08/2020 Drawn By: JALM DRG No: 10035117-AUK-XX-XX-DR-ZZ-0127-01-MPA\_SLP



Figure 4 Outline Conceptual Site Model - Commercial Industrial End Use



Key:

Pollutant linkage not considered to present a significant level of risk



# APPENDIX B Study Limitations

**IMPORTANT**: This section should be read before reliance is placed on any of the information, opinions, advice, recommendations or conclusions contained in this report.

- This report has been prepared by Arcadis UK Ltd (Arcadis), with all reasonable skill, care and diligence within the terms of the Appointment and with the resources and manpower agreed with STDC (the 'Client'). Arcadis does not accept responsibility for any matters outside the agreed scope.
- 2. This report has been prepared for the sole benefit of the Client unless agreed otherwise in writing.
- 3. Unless stated otherwise, no consultations with authorities or funders or other interested third parties have been carried out. Arcadis are unable to give categorical assurance that the findings will be accepted by these third parties as such bodies may have unpublished, more stringent objectives. Further work may be required by these parties.
- 4. All work carried out in preparing this report has used, and is based on, Arcadis' professional knowledge and understanding of current relevant legislation. Changes in legislation or regulatory guidance may cause the opinion or advice contained in this report to become inappropriate or incorrect. In giving opinions and advice, pending changes in legislation, of which Arcadis is aware, have been considered. Following delivery of the report, Arcadis have no obligation to advise the Client or any other party of such changes or their repercussions.
- This report is only valid when used in its entirety. Any information or advice included in the report should not be relied upon until considered in the context of the whole report.
- Whilst this report and the opinions made are correct to the best of Arcadis' belief, Arcadis cannot guarantee the accuracy or completeness of any information provided by third parties.

- This report has been prepared based on the information reasonably available during the project programme. All information relevant to the scope may not have been received.
- This report refers, within the limitations stated, to the condition of the Site at the time of the inspections. No warranty is given as to the possibility of changes in the condition of the Site since the time of the investigation.
- The content of this report represents the professional opinion of experienced environmental consultants. Arcadis does not provide specialist legal or other professional advice. The advice of other professionals may be required.
- 10. Where intrusive investigation techniques have been employed they have been designed to provide a reasonable level of assurance on the conditions. Given the discrete nature of sampling, no investigation technique is capable of identifying all conditions present in all areas. In some cases the investigation is further limited by site operations, underground obstructions and above ground structures. Unless otherwise stated, areas beyond the boundary of the site have not been investigated.
- 11. If below ground intrusive investigations have been conducted as part of the scope, service tracing for safe location of exploratory holes has been carried out. The location of underground services shown on any drawing in this report has been determined by visual observations and electromagnetic techniques. No guarantee can be given that all services have been identified. Additional services, structures or other below ground obstructions, not indicated on the drawing, may be present on Site.
- 12. Unless otherwise stated the report provides no comment on the nature of building materials,

operational integrity of the facility or on any regulatory compliance issue

# APPENDIX C

AEG Data - 4291 Metal Processing Area Shallow Soils Investigation (Final Report)
Figure 5 Outline Conceptual Site Model - Commercial Industrial End Use





Pollutant linkage not considered to present a significant level of risk



# METAL PROCESSING AREA SHALLOW SOILS INVESTIGATION



Final Factual Report (Rev.00)



Contract Number: 4291 Client: South Tees Development Corporation Consulting Engineer: Arcadis

Date: November 2020

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### ALLIED EXPLORATION & GEOTECHNICS LIMITED

# REPORT CONTROL SHEET



# **Contract Details**

Contract Title	Metal Processing Area Shallow Soils Investigation	
Contract Number	4291	
Location	Former Redcar Steelworks, Redcar	
National Grid Reference	NZ 546 227	

# **Report Details**

Report Status	Final (Rev.00)		
Report Type	Factual		
Volume Number	1	Of	1
Copy Number	PDF	Of	PDF
Report Recipient	Jonathan Miles	Arcadis	

# **Client/Consultant Engineer Details**

Client	Consultant Engineer	
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# Signed & Approved On Behalf of Allied Exploration & Geotechnics Limited

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# METAL PROCESSING AREA SHALLOW SOILS INVESTIGATION

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## FIELD DATA ENCLOSURES:

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Exploratory Hole Location Plan	1
Trial Pit Records	2
Groundwater Observation Made at the Time of Site Works	3

# **IN-SITU TESTING ENCLOSURES:**

Test Report Certificate	0
Plate Loading Test Results	1

# LABORATORY ENCLOSURES:

Laboratory Report Certificate	0
Sample Description Sheets	1
Moisture Content/Plasticity Index and Moisture Content	2
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Determination of California Bearing Ratio	7
Determination of Permeability in a Triaxial Cell	8
Determination of In-Situ Density Core Cutter	9
Slag Analysis (Tested Externally)	10

# **APPENDICES:**

Specialist Chemical Testing (Tested Externally)	Appendix I
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# 1. INTRODUCTION

The site works were commissioned in order to determine the ground and groundwater conditions on site prior to the proposed works at the Metals Processing Area of Redcar Steelworks, Redcar.

Allied Exploration & Geotechnics Limited (AEG) were contracted by South Tees Development Corporation with Arcadis acting in the capacity of Consulting Engineer to perform a ground investigation at this site in order to provide information on the subsurface ground and groundwater conditions as well as to obtain samples for geotechnical and specialist chemical testing.

## 1.1 Scope of Works

The investigation works consisted of the following main elements:

- Thirty one machine excavated trial pits.
- Associated sampling.
- In-situ Plate Load Testing.

Site work was carried out between the 6<sup>th</sup> and 16<sup>th</sup> July 2020 with subsequent laboratory testing and reporting thereafter. A factual report only was requested.

The comments and opinions expressed in this report are based on the ground conditions encountered during the site work and on the results of tests carried out in the field and in the laboratory. There may, however, be special conditions prevailing on the site which have not been disclosed by this investigation and which have not been taken into account by this report.

# 2. THE SITE

## 2.1 Location

The National Grid Reference of the approximate centre of the site is NZ 546 227. This can be found on Ordnance Survey 1:50,000 Sheet Number 93 (Middlesbrough, Darlington & Hartlepool). Part of this sheet is reproduced as Figure 1, the Site Location Plan.

The site is located approximately 1.10km south of Teesport Container Terminal 1 and 1.90km north east of South Bank train station.







Figure 1: Site Location Plan

Reproduced from the Ordnance Survey 1:50,000 scale Landranger map by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office, Crown Copyright. All rights reserved. Licence number AL 100002282.





## 2.2 Site Description and Topography

The site is bound to the north and west by and access road that connects areas of the former Redcar Steelworks site. A dirt track runs along the southern site boundary, beyond which a water course runs parallel to this path, and is surrounded by some greenery. To the east, the site is bound by an infrastructure corridor comprising above ground pipework and Tees Dock Road, beyond which lies a Teesport Container Terminal. The surrounding land is principally industrial land related to port activities on the River Tees (which runs approximately 400m northwest of the site). A railway line runs northeast-southwest approximately 600m south of the site boundary.

# 3. SITE OPERATIONS

## 3.1 General

All exploratory hole work, associated sampling, *in-situ* testing and logging was carried out in accordance with techniques outlined in Table 1, as appropriate; at positions as near as practicable to those supplied by the Consulting Engineer. These are shown on the Exploratory Hole Location Plan, Field Data Enclosure 1.

Reference Code Number	Title
BS 1377:1990	Methods of Test for Soils for Civil Engineering Purposes (where not in contravention or superseded by Eurocode references)
BS 5930:2015	Code of Practice for Ground Investigation (where not in contravention or superseded by Eurocode references)
BS EN ISO 14688-1:2018 & 14688-2:2018	Identification and Classification of Soil
BS 10175:2011+A2:2017	Investigation of Potentially Contaminated Sites

Table 1: British Standard Reference Code Number

The depths of all trial pits, descriptions of the material encountered, details of any groundwater encountered, samples taken and *in-situ* testing carried out together with any other relevant information can be found on the Trial Pit Records, Field Data Enclosure 2. A key to all symbols and abbreviations used throughout the report is included in the Key Sheets.

In accordance with the Site Investigation Steering Group publication "Guidelines for the Safe Investigation by Drilling of Landfills and Contaminated Land" the site was classified YELLOW.

The primary purpose of ground investigation exploratory holes is to probe the stratified sequences of soil and/or rock. From the results of these probings no conclusion should be drawn concerning the presence of, size, lithological nature, and numbers per unit volume of ground cobbles and boulders in soil types such as glacial till (boulder clay). Refer to the Key Sheets for further information.





## 3.2 Health & Safety Considerations: Services

Before the commencement of any exploratory hole a search for underground services was conducted as prescribed in HSE publication '*Avoiding Underground Services (HSG47*)' and in accordance with in-house internal safety procedure AEG-14.

Service plans were provided by the Client and were consulted by Hall Construction representatives prior to using a service locating device (such as a Cable Avoidance Tool or C.A.T.) to scan a working area around the proposed exploratory hole location. Where no services were indicated they issued AEG with a '*Permit-to-Work*' form was issued by the investigation supervisor and, with the exception of trial pits, the position was commenced with a hand excavated inspection pit. The inspection pit was also scanned during the excavation procedure. It should be noted that the digging of an inspection pit only confirms or guards against the possible presence of underground public utility services within the excavated pit. Where no services were indicated by the scanning procedure or inspection pit the exploratory hole was commenced in accordance with the Contract Specification.

Where services were located or there was reasonable belief that they were present, the position was relocated in agreement with the Client. Details of any services uncovered/located during this investigation are given in Table 2.

Exploratory Hole Number	Type of Service	Orientation & Depth (size where indicated)	Status (Damaged/Undamaged)	Additional Remarks
MPA_AUK_TP103	Black cable	270° at 1.40m BGL (25mm diameter)	Redundant/damaged	None
MPA_AUK_TP105	Black cable	270° at 1.40m BGL (25mm diameter)	Redundant/damaged	None
MPA_AUK_TP113	Relic bedding for a cable	1.20m BGL	N/A	Engineer notes fine to medium sand.
MPA_AUK_TP117	2 No. pipe sections	270° at 1.00m BGL (Both 50mm diameter)	Redundant/damaged	Pipes have been previously backfilled/tipped.
MPA_AUK_TP127	Electric cable	270° at 1.60m BGL (75mm diameter)	Redundant/damaged	None
MPA_AUK_TP128	Electric cable	270° at 1.60m BGL (75mm diameter)	Redundant/damaged	None

**Table 2: Services Encountered** 

# 3.3 Exploratory Holes: Mechanically Excavated Trial Pits

Thirty one trial pits were mechanically excavated using a JCB 360 Tracked excavator to a maximum depth of 4.50m BGL. The Trial Pit Records are presented along with a Summary Table detailing any relevant remarks as Field Data Enclosure 2.

## 3.4 Samples

Representative samples of soil were obtained from the trial pits and were taken to the laboratory for selected geotechnical and specialist chemical testing.

Environmental samples were taken in accordance with the contract specification during the investigation using an approved selection of container types in order to suit the encountered material properties and

Contract Title: Metal Processing Area Shallow Soils Investigation 6 Contract Number: 4291 Client: South Tees Development Corporation Date: 06/11/2020 Status: Final



designated laboratory analytical parameters. Full chain of custody procedures were in place post sampling and during the transportation stage to the nominated specialist chemical laboratory. Environmental samples were administered appropriately following the best practice guidance provided in the contract specification.

## 3.5 Groundwater

The comments on groundwater conditions are based on the observations made at the time of investigation. It should be noted that groundwater levels may vary due to seasonal and other effects.

Groundwater was encountered in one trial pit (MPA\_AKU\_TP111) during the site works operation. Where groundwater observations were made details are given on the relevant Trial Pit Record and in greater detail (collectively in tabulated format) as Field Data Enclosure 3: Groundwater Observations Made at the Time of Site Works.

# 3.6 Operative Observations: Potential Contamination

For the purposes of determining the condition of the site, with regard to human health and environmental issues, reference should specifically be made to any specialist chemical testing undertaken as part of the investigation scheme, as well as any supporting desk study and risk assessment documentation. The information given herein collates the observations made by the operatives involved in the investigation only and comments that have been indicated on the engineering records.

Where there was potential evidence of contamination, principally as a consequence of olfactory and visual identification, information is provided in Table 3.

Exploratory Hole Number	Occurrence ( <i>in-situ</i> /surface/ laboratory sample)	Visual / Olfactory / Laboratory Testing	Depth (m BGL)	Occurrence Type	Additional Remarks
MPA_AUK_TP128	In-situ	Olfactory	0.00- 1.00	Slight hydrocarbon odour noted	None

Table 3: Potential Contamination Encountered

It should be stressed that the information provided herein is subjective, as it is based on the perceptions of individuals and not specialists routinely involved in the chemical determination of contaminated residues, liquors, vapours or solid contaminants.

# 3.7 Surveying

The investigation positions were surveyed after completion of site by Hall Construction and AEG representatives. These positions have been subsequently plotted in AutoCAD® software and are shown on the Exploratory Hole Location Plan, Field Data Enclosure 1.





# 4. IN-SITU TESTING

## 4.1 General

*In-situ* testing as specified by the Consulting Engineer was carried out in selected trial pits in accordance with techniques outlined in the relevant British Standard and/or AEG Quality Procedure. The results are presented in the *In-situ* Testing Enclosures with a number of the test results summarised at the relevant depth on the Trial Pit Records.

# 4.2 Plate Load Testing

Three plate load testing was carried out at nominated locations within the investigated area. The tests were undertaken on three mounds of material present on site, comprising BOS Oxide (PLT-01 (BO)), mixed BOS Oxide and mudstone (PLT-02 (BO&M)) and mudstone (PLT-03 (M)). Results from this work are presented in *In-situ* Testing Enclosure 1.

## 5. LABORATORY TESTING

## 5.1 General

Laboratory testing as scheduled by the Consulting Engineer was carried out on selected samples in accordance with techniques outlined in BS 1377:1990, AEG Laboratory Quality Procedures or other appropriate standard as quoted.

## 5.2 Geotechnical Testing

The results are presented in the Laboratory Enclosures with an outline list of the procedures undertaken given in Table 4.

Test	Procedure
Moisture Content	BS 1377 Part 2 1990 (BS EN ISO 17892-1:2014)
Plasticity Index and Moisture Content	BS 1377 Part 2 1990 (BS EN ISO 17892-1:2014)
Determination of Particle Density	BS 1377 Part 2 1990
Particle Size Distribution Sieving	BS 1377 Part 2 1990
Particle Size Distribution Sedimentation	BS 1377 Part 2 1990
Determination of Calorific Value, Total Sulphur, Sulphate and pH (Tested externally)	See External Laboratory Certificates
Determination of Dry Density/Moisture Content Relationship	BS 1377 Part 4 1990
Determination of California Bearing Ratio	BS 1377 Part 4 1990
Determination of Permeability in a Triaxial Cell	BS 1377 Part 6 1990
Determination of In-Situ Density Core Cutter	BS1377 Part 9 1990
Slag Analysis (Tested externally)	-

Table 4: Geotechnical Testing



## 5.3 Specialist Chemical Testing

Selected samples have been submitted for chemical analysis as specified by the Consulting Engineer, conducted under a subcontract arrangement with Derwentside Environmental Testing Services (DETS). The results of this testing are presented as Appendix I.

# 5.4 Laboratory Identified Asbestos

Selected samples were analysed for asbestos content as specified by the Consulting Engineer. Any identified asbestos is presented in Table 5 which has been summarised from specialist chemical testing results (see Appendix I for further details).

Exploratory Hole Number	Occurrence	Depth (m BGL)	Occurrence Type	Additional Remarks
MPA_AUK_TP101	Laboratory Sample	3.50	White asbestos	Small bundles of Chrysotile present
MPA_AUK_TP102A	Laboratory Sample	1.00	White asbestos	Large bundle of Chrysotile present
MPA_AUK_TP130	Laboratory Sample	0.60	White asbestos	Small Bundles of Chrysotile present

**Table 8: Laboratory Identified Asbestos** 



Key Sheets







#### INTRODUCTION

The following explanatory notes define the terminologies, abbreviations and symbols pertaining to each individual column or section of the Exploratory Hole records. 'Exploratory Hole' is used as a general term in this report to comprise borehole, drillhole, and trial pit. All exploratory hole records have been produced using 'gINT®', which is an integrated software environment for the storage and manipulation of subsurface data.

The primary purpose of ground investigation exploratory holes is to probe the stratified sequences of soil and/or rock. From the results of these probings no conclusion should be drawn concerning the presence of, size, lithological nature, and numbers per unit volume of ground cobbles and boulders in soil types such as glacial till (boulder clay). With respect to rotary coring, driller's records and observations of the recovered core are used to determine any zones of no recovery (core loss). These zones are based on the interpretation of the logging engineer and are therefore potentially subjective. In addition, where relevant, every effort is made to highlight material/zones that may relate to suspected old workings. However, it should be noted that this is not straightforward (especially without detailed information regarding anticipated subsurface conditions) and therefore no guarantee can be made with regards to the accuracy of the interpretation of the recovered core.

#### INFORMATION COMMON TO ALL EXPLORATORY HOLE RECORDS

#### Status Box

The status box in the top right hand corner of each exploratory hole record gives the status of each individual record i.e. PRELIM1, PRELIM2, PRELIM3 FINAL etc. The date shown relates to the last instance the data was revised. This information is for AEG Quality Assurance only.

#### Exploratory Hole No

The identity number used throughout the report.

#### Project

The ground investigation project name. Occasionally the project name may be shortened or abbreviated due to string length restraints imposed by the gINT® computer programme.

#### Client

Client's name responsible for funding the ground investigation project. The Client's name may be shortened or abbreviated due to string length restraints imposed by the gINT® computer programme.

#### Location

The exploratory hole position given as either national grid co-ordinates, local grid if specified, or a reference name normally pertaining to the area of investigation.

#### Method (Equipment)

Represents the drilling, excavation or boring method(s) or equipment used.

#### Ground Level (m(AOD))

The precise ground level in metres above Ordnance Datum at the exploratory hole location from which the reduced level for each stratigraphic boundary is calculated.

#### Date

The date relating to the start of the exploratory hole excavation.

#### Sheet

The sheet number and total number of sheets for the particular record.

#### Checked By

Printed signature of the person who has carried out the technical quality check on the log.

#### Logged By

The name of the engineer who has carried out the logging of the exploratory hole.

#### Contract No.

The Allied Exploration & Geotechnics Limited reference number for the project.





#### INFORMATION RELEVANT TO BOREHOLE AND WINDOW/WINDOWLESS SAMPLE HOLE RECORDS

Sample & Tests Columns			
Depth	The depth over which a sample or test is taken is shown in depth column of the exploratory hole record in a "fromto" format.		
Туре No	Indicates the type of sample/test and number given by the driller.		
Test Result	Result of the test given in the applicable units.		
Water Column	1		
Water Strike	Level of groundwater strike within an exploratory hole. The symbol 🗡 denotes a water strike and is suffixed with a		
	number, which indicates the strike order. The corresponding unfilled symbol is the depth the strike rose to.		
Seepage	Groundwater seepage within an exploratory hole is denoted by the 4 symbol.		
Strata Columns			
Reduced Level	The corresponding reduced level of each soil or rock boundary in metres Ordnance Datum.		
Legend	A graphical representation of the materials encountered using BS 5930:1999 Amendment No.2 (Aug 2010) recommended symbols for soil and rock.		
Depth (Thickness)	The depth below ground level of each soil or rock boundary in metres and the thickness of each individual stratigraphic unit (given in brackets).		
Description	Engineering description of each individual soil or rock type follows recommendations outlined in Section 6 of BS 5930:1999 Amendment No.2 (Aug 2010) with the following implementation:		
	1 The amendment of section 6 incorporates the guidance indicated in BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2004 and BS EN ISO 14689-1:2003 European Standard with particular emphasis on current UK practice.		
	Supplementary laboratory or in-situ assessed measurements of undrained strength are provided where applicable information is available in parenthesis in accordance with clause 41.3.2 BS 5930:1999 Amendment No.2 (Aug 2010) after the field strength determined consistency. The description based measurement table indicating the quantitative undrained strength classification divisions is provided in Key Sheets Table 1.		

Term based on measurement	Undrained strength classification definition cu, in kPa (from BS EN ISO 14688-2:2004, 5.3, Table 5)
Extremely low	<10
Very low	10-20
Low	20-40
Medium	40-75
High	75-150
Very High	150-300
Extremely High	300-600

#### **KEY SHEETS TABLE 1**

3 Cobble and boulder content is expressed in accordance with the terms provided in EN ISO 14688-2: 2004 where visually identified in trial pit excavations, or inferred/recovered during the drilling operations. The assessment of frequency and spatial occurrence of coarse and very coarse rock material should not be considered as precise, but only an indicator or estimate of the potential conditions. It should be noted that the recovery of coarse or very coarse particles in boreholes is dependent on the limitations imposed by the casing diameter. The terminology used is outlined in Key Sheets Table 2.





Fraction	Percent by Mass	Term	
	<5	Low boulder content	
Boulders	5 to 20	Medium boulder content	
	>20	High boulder content	
	<10	Low cobble content	
Cobbles	10 to 20	Medium cobble content	
	>20	High cobble content	

#### KEY SHEETS TABLE 2

4 Rock Strength based on assessed field or measured unconfined compressive strength follows the classification scheme given in clause 44.2.1 BS5930:1999 Amendment No.2 (Aug 2010) as outlined in Key Sheets Table 3.

Term for use in field or based on measurement	Definition for field use	Definition on basis of Unconfined Compressive Strength measurement (MPa)	Old Classification of rock strength: Terminology (Strength Range MPa)	Old Classification of rock strength: Determination Method
Extremely weak	Can be indented by thumbnail. Gravel sized lumps crush between finger and thumb.	0.6-1.0	Very Weak (<1.25)	Lumps can be crushed between fingers
Very weak	Crumbles under firm blows with point of geological hammer. Can be peeled by a pocket knife.	1-5	Weak (1.25 – 5)	Lumps can be broken with heavy hand pressure
Weak	Can be peeled by a pocket knife with difficulty. Shallow indentations made by firm blow with the point of geological hammer.	5-25	Moderately Weak (5-12.50)	This slab can be broken with heavy pressure
Medium Strong	Cannot be scraped with pocket knife. Can be fractured with a single firm blow of geological hammer.	25-50	Moderately Strong (12.50-50)	Rock can be broken in the hand with a hammer
Strong	Requires more than one blow of geological hammer to fracture.	50-100	Strong (50-100)	Rock can be broken on a flat surface using a hammer
Very Strong	Requires many blows of geological hammer to fracture.	100-250	Very Strong (100-200)	Rock chipped by blows with a hammer
Extremely strong	Can only be chipped with geological hammer.	>250	Extremely Strong (>200)	Rock rings when hit with a hammer
Based on BS EN ISO 14689-1:2003 4.2.7, Table 5			BS5930: 1999 (Superseded	– Section 6 I Version)

## KEY SHEETS TABLE 3

5 Where 'rock weathering classification' can be applied it is 'Approach 4' which will be used. If any other approach is used the factual text of the report will provide details of the applicable specific approach. (Ref.: Figure 19, p143, BS 5930:1999 Amendment No.2 (Aug 2010)). An outline of the 'Approach 4' rock weathering classification scheme is provided as Key Sheets Table 4.

APPROACH 4 CLASSIFICATION INCORPORATING MATERIAL AND MASS FEATURES		
Class	Classifier	Typical characteristics
А	Unweathered	Original strength, colour, fracture spacing
В	Partially weathered	Slightly reduced strength, slightly closer fracture spacing, weathering penetrating in from fractures, brown oxidation
С	Distinctly weathered	Further weathered, much closer fracture spacing grey reduction
D	Destructured	Greatly weakened, mottled, ordered lithorelics in matrix becoming weakened and disordered, bedding disturbed.
E	Residual or reworked	Matrix with occasional altered random or 'apparent' lithorelics, bedding destroyed. Classed as reworked when foreign inclusions are present as a result of transportation.
KEY SHEETS TABLE 4		





#### Instrument/Backfill Column

A graphical representation of backfill material or instrumentation detail using graphic legends. Its placement in the column is relative to depth in metres and corresponds to the exploratory hole in scale.

#### Boring Progress and Water Observations Columns

This section provides inform	ation on each day's production as a daily log.
Date	Date of shift.
Depth	Depth of hole at the start of the shift.
Casing	Casing's depth at the start of the shift.
Casing Dia	Casing's diameter at the start of the shift.
Water Depth	Water level within the borehole at the start and end of shift.

#### **Chiselling Columns**

Indicates where hard strata occurred in the borehole and breaking out was carried out to advance the borehole.

From	The depth commenced.
То	The depth finished.
Hours	The time spent for breaking out.

#### Water Added Columns

Indicates the depth range where water was added to the borehole to facilitate boring or to prevent stress relief disturbance "blowing/boiling" in granular soils.

From	Depth in metres from where water was added.
То	Depth in metres to where water was added.

#### General Remarks

Any remarks believed to be relevant to the exploratory hole.

#### INFORMATION RELEVANT TO PIT/TRENCH RECORDS

The pit/trench records follow the same format as the borehole and window/windowless sample hole records for the Samples & Tests, Water and Strata columns. However, in addition to these there are the following:

#### Plan

A schematic plan view of the pit showing its excavated dimensions together with its orientation, given as a compass bearing to magnetic north.

#### Groundwater

Notes on water bearing horizons.

#### Stability

The engineer's comments outlining the stability of the sides during pit excavation.

#### General Remarks

The engineer's comments of any other information relevant to construction of the pit.

#### Additional Information

An indication if a sketch and/or photographs accompany the record.





Underground Services	
Depth	Depth service was encountered.
Orientation	Orientation given as a compass bearing to magnetic north.
Туре	Type of service encountered.
Diameter	Diameter of service encountered.
Condition	Condition the service encountered was noticed in.

#### INFORMATION RELEVANT TO DRILLHOLE RECORDS AND ROTARY CONTINUATION

Run Details Columns	
Depth	Each drill run is highlighted by a horizontal line with the top and bottom depths shown in metres. Core diameter (C Dia) is
	presented also within each run.
TCR (SCR) RQD	Information provided on the total core recovery, solid core recovery and rock quality designation. Refer to Abbreviations for
	further details.
Fracture Index	Information given relating to the fracture index of the rock.
Strata Columns	
As the strata columns for	horehole and window/windowless sample hole records except for description which is as follows:

Discontinuities Detail	Information	on	core	discontinuities,	localised	variations	in	weathering,	lithology,	strength	and	structure	follows
	recommenda	tions	s outli	ned in Section 6	BS 5930:1	999 Amend	lme	ent No.2 (Aug	2010):Clau	se 44.			
Main	Engineering description of each individual soil or rock type follows recommendations outlined in Section 6 of BS 5930:199											30:1999	
	Amendment	No.2	(Aug	2010).									

#### Instrument/Backfill Column

A graphical representation of backfill material or instrumentation detail using graphic legends. Its placement in the column is relative to depth in metres and corresponds to the exploratory hole in scale.

#### **Drilling Progress and Water Observations Columns**

Date	Date of shift.
Depth	Depth of hole at the start of the shift.
Casing	Casing's depth at the start of the shift.
Water Strike	Depth at which water was encountered.
Water Standing	Depth at which water in the hole levelled off.
Water Remarks	Any remarks believed to be relevant to the water e.g. Artesian.

#### **Standard Penetration Test**

Depth	The depth commenced.
Туре	Type of standard penetration test (SPT).
Result	Result of SPT.
Flush	
From	The depth commenced.
То	The depth finished.
Туре	Details of the type of flush used. A = Air, F = Foam, W = Water and Pol = Polymer.
Returns	An indication of the percentage of the returned flush material.

#### General Remarks

Any remarks believed to be relevant to the exploratory hole.





SAMPLES	
В	Bulk disturbed sample.
ES	Environmental soil sample.
EW	Environmental water sample.
G	Gas sample.
J	Small disturbed sample.
LB	Large bulk disturbed sample.
Р	Piston sample.
P*	An attempted but failed undisturbed piston sample.
U	Undisturbed sample.
U*	An attempted but failed general purpose undisturbed sample.
U <sub>(ss)</sub>	Sample has been subsampled.
ES <sub>(U)</sub>	Brackets following a sample denotes a subsample. The sample information within the brackets is the origin of the
	subsample.
W	Water sample.

#### IN-SITU TESTS

CBR	California Bearing Ratio mould sample or test.
HSV	In-situ hand shear vane.
HSV*	An attempted but failed in-situ hand shear vane.
HSV result of e.g 80(20)kPa	Denotes average HSV peak result followed by average HSV residual result (in brackets).
HP	Hand penetrometer test.
K (F)	Falling head permeability test.
K (R)	Rising head permeability test.
K (C)	Constant head permeability test.
К (Р)	Packer permeability test.
PT	Pressuremeter test.
PID	Photo ionisation detector test.
FID	Flame ionisation detector test.
S	Standard Penetration Test (SPT) using the split barrel sampler (shoe). The corresponding uncorrected 'N' value is
	given in the test result column with more detailed information provided in the In-Situ Testing Enclosures where
	applicable. Testing has been conducted in accordance with BS EN ISO 22476-3: 2005.
С	Denotes SPT test using a solid cone in preference to the split barrel sampler (usually in coarse granular soil) with all
	other reporting requirements as outlined above for the split barrel sampler.
S/C result of e.g. 1/2.94	Denotes where full penetration has not been achieved during the SPT test. In such cases the penetration (mm) per
	blow is recorded in the test result column e.g. 1/2.94 is 2.94mm of penetration per single blow.
SV	In-situ down-the-hole shear vane test. The remoulded shear strength is given in brackets.

#### ROCK QUALITY AND CORE RECOVERY

TCR	Total Core Recovery - the length of the recovered core expressed as a percentage of the length of core run.
SCR	Solid Core Recovery - the sum length of all core pieces that are recovered with at least one full diameter, expressed
	as a percentage of the length of core run.
RQD	Rock Quality Designation - The sum length of all core pieces that are 100mm or longer (measured along the centre
	of the core), expressed as a percentage of the length of core run.
FI	Fracture Index - The number of fractures per 1000mm length of solid core.
NI	Non-intact - The material recovered in a non-intact state.
NR	No recovery from the core run. These zones are based on the interpretation of the logging engineer and are
	therefore potentially subjective.





Symbols and Abbreviations: Explanation of Instrumentation Legends Used







Symbols and Abbreviations: Explanation of Legends Used

<b>.</b>		Rocks										
Soi	ils	Sedim	entary	Metan	norphic	Igne	eous					
	Made Ground		Chalk	 	Coarse Grained	· · · · ·	Coarse Grained					
	Cobbles and Boulders		Limestone	: : 	Medium Grained		Medium Grained					
na na sa Rofin San Rofin San Rofin San Rofin San	Gravel	2002 2003 2003 2003 2003	Conglomerate		Fine Grained		Fine Grained					
	Sand	8008 8007 8008 8008 8008 8008 8008 8008	Breccia									
	Silt		Sandstone									
	Clay		Siltstone									
 	Peat	:	Mudstone									
	Topsoil		Shale									
Note: Composite signified by combined the second se	soil types will be ned symbols e.g.	8	Coal									
	Silty Sand		Pyroclastic (Volcanic Ash)									
			Gypsum									

# 

# Exploratory Hole Location Plan



							_	/		Ŧ	Voreht		Tees Do
Date:	Scale:	Contract No.:	Consultant: 1	client South Te	contract ⊺itle: Metal Processir	Drawing No.:	Drawing Title: ENC 01 : E	Base Plan Supplier	W			KEY:	
01/08/2020	NOT TO SCALE	4291	Arcadis Whitehall Riverside Leeds, LS1 4BN	es Development Corporation	ig Area Shallow Soils Investigation	AEG/4291/01	xploratory Hole Location Plan	d by Consulting Engineer	s		TRIAL PIT		d Exporation and Geotechnics Limited Unit 25 Stella Gill Industrial Estate Petron Fell Chester - Le - Street Co Durham DH2 2RG (Tel): 0191 387 4710 (Fax): 0191 387 4710 (Email): enquiries@aeg.uk.net



# **Trial Pit Records**

# **Trial Pit Summary Table**

Exploratory Hole Number	Excavation Method	Completion Depth (m BGL)	Remarks
MPA_AUK_TP101	Machine excavated	4.50	Advanced to required depth.
MPA_AUK_TP102	Machine excavated	0.80	Terminated due to encountering concrete slab.
MPA_AUK_TP102A	Machine excavated	4.50	Advanced to required depth.
MPA_AUK_TP103	Machine excavated	4.50	Advanced to required depth.
MPA_AUK_TP104	Machine excavated	4.50	Advanced to required depth.
MPA_AUK_TP105	Machine excavated	4.50	Advanced to required depth.
MPA_AUK_TP106	Machine excavated	4.50	Advanced to required depth.
MPA_AUK_TP107	Machine excavated	4.50	Advanced to required depth.
MPA_AUK_TP108	Machine excavated	4.50	Advanced to required depth.
MPA_AUK_TP109	Machine excavated	4.50	Advanced to required depth.
MPA_AUK_TP110	Machine excavated	4.50	Advanced to required depth.
MPA_AUK_TP111	Machine excavated	4.50	Advanced to required depth.
MPA_AUK_TP112	Machine excavated	4.50	Advanced to required depth.
MPA_AUK_TP113	Machine excavated	4.50	Advanced to required depth.
MPA_AUK_TP114	Machine excavated	4.50	Advanced to required depth.
MPA_AUK_TP115	Machine excavated	4.50	Advanced to required depth.
MPA_AUK_TP116	Machine excavated	3.20	Terminated due to an obstruction.
MPA_AUK_TP117	Machine excavated	4.50	Advanced to required depth.
MPA_AUK_TP118	Machine excavated	3.20	Terminated due to snapped ripper tooth on excavator.
MPA_AUK_TP119	Machine excavated	4.50	Advanced to required depth.
MPA_AUK_TP120	Machine excavated	4.50	Advanced to required depth.
MPA_AUK_TP121	Machine excavated	4.50	Advanced to required depth.
MPA_AUK_TP122	Machine excavated	4.50	Advanced to required depth.
MPA_AUK_TP123	Machine excavated	4.50	Advanced to required depth.
MPA_AUK_TP124	Machine excavated	4.50	Advanced to required depth.
MPA_AUK_TP125	Machine excavated	4.50	Advanced to required depth.
MPA_AUK_TP126	Machine excavated	4.00	Terminated due to possibly metallic obstruction.
MPA_AUK_TP127	Machine excavated	4.00	Terminated due to metallic obstruction.
MPA_AUK_TP128	Machine excavated	4.50	Advanced to required depth.
MPA_AUK_TP129	Machine excavated	1.30	Terminated due to concrete slab.
MPA_AUK_TP130	Machine excavated	4.50	Advanced to required depth.







Status:-

Ġ	TRIAL PIT RECORD											
Project:		Meta	Proce	essing A	rea Shall	ow Soils	Investigation			Expl	oratory Hole No.	
Client:	Ent:         Location:           South Tees Development Corporation         Former Redcar Steelworks, Redcar           E:454685.392 N:522293.388											
Method (Equip	Method (Equipment): Machine Excavated (JCB 360 Tracked) 9.969 9.969 9.969											
SA	MPLES &	TESTS					1	STRATA				
Depth	Type No	Test Result	Water	Reduced Level	Legend (	Depth (Thickness)		escription				
0.40 0.60 0.90	J1 B2 ES3			8.97		(1.00)	MADE GRO metal fragme ash. Gravel and ash. Sla	UND (Brown/black ents. Sand is fine to is fine to coarse sul g content is 75-100	grey sandy ( o coarse and bangular and 0%. Slag is v vellow blue a	gravel w include d include esicular	vith wood and spredominantly es slag, concrete r).	
1.70 1.90	J4 B5			7.47		(1.50)	cobble conte slag. Cobble Slag is vesic	ent. Gravel is fine to ent. Gravel is fine to sare angular and i ular).	o coarse sub include slag.	angular Slag co	and includes ontent is 75-100%.	
2.40	LB6			7.47		2.50	at c.2.40m B MADE GRO cobble conte	GL gravel and co UND (Brown very s ent. Sand is fine to c	obbles. andy gravel coarse. Grav	with low	v to medium	
3.20	B8					-  - -	subangular a content is 25 are angular	and includes concre 5-50%. Slag is grey and include concre	ete, slag and , green and v te, slag and	yellow white ve	brick. Slag esicular. Cobbles prick. Slag content	
3.50	ES9					(2.00)	is 25-50%. S	lag is grey vesicula	ar).	,	Ū	
3.80	J10											
4.20	B11			5.47		- - - 						
						· · · · · ·	Complete at	4.50m BGL.				
		PLAN				GROL						
-		6.00 Face A			1	No gro	undwater inflow	Observed.				
eD		Orientation										
Fac		<u>315°</u>		ά C		STABI Pit side	LITY es and base sta	ble throughout excav	vation.			
		Face C										
	ADDIT	IONAL INFORI	MATIC	N		GENE	RAL REMARK	(S				
Sketch Dia	agram:	No S	iketch T	aken								
Photogra	aphs:	Yes		See add shee	litional ets.							
All dim	ensions in Scale 1:50	metres		For exp abbrev	lanation o	a of symbols and Checked by: Logged by: Contract No. see Key Sheets <i>K.W.</i> D. Portsmouth <b>4291</b>						



# ALLIED EXPLORATION & GEOTECHNICS LIMITED Head Office: Regional Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durtham, DH2 2RG Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL





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		Status:-	FINAL									
Project:		Metal	Process	sina Are	a Shal	low Soils	Inves	tigation			Expl	oratory Hole No.
Client:	South Tee	Redcar	MP	A_AUK_TP102								
Method (Equi	pment): Mach	ine Excavated (	(JCB 360	) Tracke	ed)		E	:454663 Ground Le	3 <u>.223 N:522364.</u> evel (m): 10.667	102 Start Date: 09/07/2020	Sheet:	1 of 2
S,	AMPLES &	TESTS							STRATA			
Depth	Depth Type Test test Reduced Legend									Description		
0.30 0.50 0.60	J1 B2 ES3			9.87		Depth (Thickness)       Description         0.20       MADE GROUND (Brown clayey slightly grave rootlets and wood fragments. Sand is fine to medium subangular and includes concrete and MADE GROUND (Brown grey/blue sandy grave coarse and includes predominantly ash. Grave subangular and includes slag. Slag content is vesicular).         at c.0.80m BGL concrete slab.         Terminated at 0.80m BGL - due to encounterin Unable to extend pit due to near by services.						nd with many . Gravel is fine to k). and is fine to ne to coarse 00%. Slag is crete slab.
		PLAN 5.00 Face A			1	GROU No gro	INDW undwa	ATER ter inflov	v observed.			
Orientation B Orientation B OOO° C Face C						STABILITY Pit sides and base stable throughout excavation.						
	ADDIT		ATION			GENE	RAL F	REMAR	<s< td=""><td></td><td></td><td></td></s<>			
Sketch D	Diagram:	No SI	ketch Tak	en								
Photog	raphs:	Yes	S	ee additio sheets	onal							
All din	nensions in Scale 1:50	metres	Fo	or expla bbrevia	nation tions s	of symbo ee Key S	ls and heets	ł	Checked by: <i>K,W,</i>	Logged D. Portsi	l by: nouth	Contract No. 4291



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**ALLIED EXPLORATION & GEOTECHNICS LIMITED** 

e:	Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RC
ffice:	Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL

Tel: 0191 387 4700 Fax: 0191 387 4710 Tel: 01772 735 300 Fax: 01772 735 999

	TRIAL PIT RECORD								Status:-	FINAL				
Project:	x: Metal Processing Area Shallow Soils Investigation									Exp	loratory Hole No.			
Client:	Client: South Tees Development Corporation					Location	Location: Former Redcar Steelworks, Redcar					A_AUK_TP102A		
Method (Equipment): Machine Excavated (JCB 360 Tracked)						L	Ground Le	vel (m): 10.700	Start Date: 13/07/2020	Sheet:	1 of 3			
SAI	SAMPLES & TESTS				STRATA									
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	Depth Inickness) Description							
0.50 0.80 1.00 1.60 1.80 2.10 2.60 2.80 3.60 3.80 4.30	J1 B2 ES3 J4 B5 LB6 J7 B8 J9 B10 J11			6.20		(0.40) 0.40 (4.10)	(0.40)       MADE GROUND (Brown black grey sand coarse. Gravel is fine to coarse subangula concrete. Slag content is 75-100%. Slag i 'loose').         MADE GROUND (Grey green gravel with content. Gravel is fine to coarse subangula Cobbles and boulders are angular and ind 75-100%. Assessed as 'loose').         at c.2.10m BGL cobbles.         (4.10)         between c.3.50-4.50m BGL very sandy red bricks.         4.50         Complete at 4.50m BGL.				gravel. Sand is fine to and includes slag and vesicular. Assessed as igh cobble and boulder r and includes slag. ude slag. Slag content is with occasional yellow and			
PLAN + 4.00 Face A Orientation 000° * 000° * 120					GROU No gro	INDW undwa	ATER ter inflow	observed.						
ADDITIONAL INFORMATION				GENE (1) Coc	RAL I	REMARK es and le	Sable throughout	excavalion.						
Sketch Diagram:     No Sketch Taken       Photographs:     Yes       See additional sheets.       All dimensions in metres   For explanation					of symbo	ols and		Checked by	Logge	d by:	Contract No.			



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Ē	т	Status:- FINAL			
Project:	Metal Processing Area Sh	Exploratory Hole No.			
Client:	South Tees Development Corporation	MPA_AUK_TP102A			
Method (E	quipment): Machine Excavated (JCB 360 Tracked)		Ground Level (m): 10.700	Start Date: 13/07/2020	Sheet: 3 of 3
		Tgure MPA_AUK MPA_AUK_TP10	TP102A.3 12A Spoil		



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	TRIAL PIT RECORD									Status:- FINAL			
Project:	t: Metal Processing Area Shallow Soils Investigation									Exp	loratory Hole No.		
Client:	nt: South Tees Development Corporation						Form	er Redo 454579	ar Steelwork	s, Rec	dcar	MP	A_AUK_TP103
Method (Equipn	Method (Equipment): Machine Excavated (JCB 360 Tracked)							Ground Le	vel (m): 10.210		Start Date: 09/07/2020	Sheet:	1 of 3
SAN	MPLES & T	ESTS							STRAT	Ą		ł	
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	epth Description						
0.60 0.70 0.80 1.50 1.80 2.30 2.60 2.80 3.60 3.80	J1 B2 ES3 J4 B5 LB6 J7 B8 J9 B10			9.41 9.31 5.71		(0.80) - 0.80 - 0.80 - 0.90 	MADE GROUND (Brown/black grey sandy metal fragments. Sand is fine to coarse an ash. Gravel is fine to coarse subangular ar and ash. Slag content is 75-100%. Slag is 0.80 0.90 MADE GROUND (White yellow gravel. Gra subangular and includes slag. Slag conter vesicular). MADE GROUND (Grey green yellow blue cobble content. Gravel is fine to coarse su slag. Cobbles are angular and include slag Slag is vesicular. Assessed as 'loose'). at c.1.40m BGL 25mm diameter black c in centre of pit (redundant/broken). at c.2.30m BGL cobbles.				grey sandy o coarse and bangular an 0%. Slag is v gravel. Gra Slag content rellow blue a o coarse sub include slag 'loose'). eter black ca en).	gravel v d include d includ vesicula ivel is fir t is 75-1 and whit bangular . Slag ca able runn	vith wood and es predominantly les slag, concrete r). ne to coarse 00%. Slag is e gravel with high r and includes ontent is 75-100%. ning 270 degrees
		PLAN 6.00 Face A			1	GROU No gro	JNDW# undwat	ATER er inflow	observed.				
C Orientation T w Orientation S w Og0° 80 C U Face C					STAB Pit side	ILITY es and I	base mo	deratley stable	e throu	ighout excav	ation.		
			GENE	RAL R	EMARK	(S							
Sketch Diag	gram:	No S	ketch T	aken									
Photogra	phs:	Yes		See ado shee	litional ets.								
All dime	ensions in r Scale 1:50	netres		For exp abbrev	lanation	of symbo	ols and Sheets		Checked	by:	Logged D. Ports	d by: mouth	Contract No. <b>4291</b>





ÉE GS ™	Status:- FINAL							
Project: Metal Processing Area Sh	Metal Processing Area Shallow Soils Investigation							
Client: South Tees Development Corporation	South Tees Development Corporation							
Method (Equipment): Machine Excavated (JCB 360 Tracked)		Ground Level (m): 10.210	Start Date: 09/07/2020	Sheet: 2 of 3				
	Figure MPA_AU MPA_AUK_	trias	and reasons that and reasons					
	Figure MPA_AUK_		the remember of the second sec					



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Ġ	TR	IAL PIT R	ECORD		Status:- FINAL				
Project:	Metal Processing Area Shal	Exploratory Hole No.							
Client:	South Tees Development Corporation	MPA_AUK_TP103							
Method (Eq	uipment): Machine Excavated (JCB 360 Tracked)	Sheet: 3 of 3							
<image/>									


Q5					TR	IAL P	IT RECOP	RD			FINAL
Project:		Metal	Proce	essing A	rea Shal	low Soils	Investigation			Expl	oratory Hole No.
Client:	South Tee	s Development	Corpo	oration		Location	Former Red	car Steelworks, Re	edcar	MP	A_AUK_TP104
Method (Equip	oment): Mach	ine Excavated (	JCB 3	360 Trac	ked)		Ground Le	5.462 N.522445.7 evel (m): 10.600	9 Start Date: 09/07/2020	Sheet:	1 of 3
SA	MPLES &	TESTS						STRATA		1	
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)		C	Description		
0.50 0.80 1.00 1.60 1.80 2.40 2.70 2.90 3.70 3.90	J1 B2 ES3 J4 B5 LB6 J7 B8 J9 B10			6.10		(0.40) 0.40 	MADE GRO metal fragm ash. Gravel and ash. Sla MADE GRO cobble conte slag. Cobble Slag is vesio at c.2.40m E	gravel w d include d include vesicular and white bangular . Slag cc s 'loose;)	ith wood and es predominantly es slag, concrete ;). e gravel with high and includes ontent is 75-100%.		
		PLAN 6.00			-	GROL	INDWATER undwater inflov	v observed.			
		Face A		-							
Face		090° _		C C		STAB Pit side	ILITY es and base un	stable throughout e	xcavation.		
	ADDIT	IONAL INFORM	ΙΑΤΙΟ	N		GENE	RAL REMARK	<s< td=""><td></td><td></td><td></td></s<>			
Sketch Dia	agram:	No SI	ketch T	aken							
Photogra	aphs:	Yes		See add shee	litional ets.						
All dim	ensions in Scale 1:50	metres		For exp abbrev	lanation iations s	of symbo ee Key S	ols and Sheets	Checked by:	Logged D. Portsr	l by: nouth	Contract No. 4291







EE GS ™	Status:- FINAL								
Project: Metal Processing Area Sha	allow Soils Inves	stigation		Exploratory Hole No.					
Client: South Tees Development Corporation	Location: Forr F	ner Redcar Steelworks, R	edcar 19	MPA_AUK_TP104					
Method (Equipment): Machine Excavated (JCB 360 Tracked)		Ground Level (m): 10.600	Start Date: 09/07/2020	Sheet: 3 of 3					
Fi	igure MPA_AU	(_TP104.3	ł						
		Unit         Unit <td< td=""><td></td><td></td></td<>							



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E C	TRIAL PIT RECORD										
Project:		Metal	Proce	essing A	rea Shal	low Soils	Investigation			Exp	loratory Hole No.
Client:	outh Tees	Development	Corpo	oration		Location	Former Red	Redcar	МР	A_AUK_TP105	
Method (Equipme	ent): Machir	ne Excavated (	JCB 3	860 Trac	ked)	Ground Level (m):         Start Date:         Sheet:           10.360         09/07/2020         1 of 3					
SAM	PLES & T	ESTS			1		I	STRATA			
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)			Description		
0.40 0.70 1.00 1.40 1.70 2.60 2.70 2.80 3.60 3.70	J1 B2 ES3 J4 B5 J6 B7 LB8 J9 B10			<u>8.16</u>		(2.20) 	MADE GROUND (Brown/black grey slight with wood and metal fragments. Sand is fi predominantly ash. Gravel is fine to coarse slag, concrete and ash. Slag content is 75 between c.0.90-2.20m BGL assessed a at c.1.40m BGL 25mm diameter black c in centre of pit (redundant/broken). 2.20 MADE GROUND (Grey green yellow blue high cobble content. Gravel is fine to coarse slag. Cobbles are angular and include slag Slag is vesicular. Assessed as 'loose'). at c.2.80m BGL cobbles with some grav 2.30)				very sandy gravel arse and includes jular and includes Slag is vesicular). ning 270 degrees e gravel with with gular and includes ontent 75-100%.
Sketch Diagr	ADDITIC ram:	PLAN 6.00 Face A Orientation 090° Face C DNAL INFORM No Si Yes	MATIC ketch T	N aken See add shee	litional	GROU No gro	ILITY es and base mo	roughout excav	ation.	Contract No	







Status:-**TRIAL PIT RECORD** FINAL Project: Exploratory Hole No. Metal Processing Area Shallow Soils Investigation Client: Location: Former Redcar Steelworks, Redcar E:454523.260 N:522578.126 Ground Level (m): 10.360 MPA\_AUK\_TP105 South Tees Development Corporation Method (Equipment): Machine Excavated (JCB 360 Tracked) Start Date: 09/07/2020 Sheet: 3 of 3

#### Figure MPA\_AUK\_TP105.3 MPA\_AUK\_TP105 Spoil







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Ġ					TR	IAL P	IT RECOF	RD		Status:-	FINAL	
Project:		Metal	Proce	essing A	rea Shall	low Soils	Investigation			Expl	oratory Hole No.	
Client:	South Tees	Development	Corpo	oration		Location	Former Redo E:454634	car Steelworks, Re .271 N:522536.01	dcar 3	МРА	A_AUK_TP106	
Method (Equip	oment): Machir	ne Excavated (	JCB 3	60 Trac	cked)		Ground Le	Start Date: 08/07/2020	Sheet:	1 of 3		
SA	MPLES & T	ESTS			1 1		I	STRATA				
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)		D	escription			
0.50 0.80 1.00	J1 B2 ES3			5.91		(0.40) - 0.40     (1.10)          	MADE GROUND (Brown grey sandy gravel with wood and met fragments. Sand is fine to coarse and includes predominantly a Gravel is fine to coarse subangular and includes slag, concrete yellow and red brick. Slag content is 75-100%. Slag is vesicula MADE GROUND (Grey green yellow cobbles with much gravel is fine to coarse and includes sah. Gravel is fine to coarse subangular and includes slag and yellow brick, concrete and as Slag content is 50-75%. Slag is vesicular. Cobbles are angular include slag. Slag content is 75-100%. Slag is vesicular).					
1.60 1.80 2.20 2.60 2.80 3.60 3.80	J4 B5 J7 B8 J9 B10			2.91		(3.00)	1.50       MADE GROUND (Grey green white sandy gravel with high cobble content. Sand is fine to coarse and includes predominantly ash. Gravel is fine to coarse subangular and includes slag, ash, clinker and yellow crystalline textured brick. Cobbles are angular and inclu yellow brick and slag. Slag content is 75-100%. Slag is vesicular). between c.1.50-4.50m BGL lenses of orange brown slightly clave sandy gravel. Sand is fine to coarse and includes ash. Gravel is fin to coarse subangular and include clinker, ash and burnt mudstone.         4.50         Complete at 4.50m BGL.					
Sketch Dia	ADDITI( agram: aphs:	PLAN 5.20 Face A Orientation 090° Face C ONAL INFORM No St	MATIO	N aken See add shee	ditional ets.	GROU No gro	INDWATER undwater inflow	v observed. Betweer	n c.3.00-4.50n	n BGL - s	slag is damp.	
All dim	ensions in r Scale 1:50	netres		For exp abbrev	lanation viations se	of symbo ee Key S	ols and Sheets	Checked by:	Logged D. Portsr	l by: nouth	Contract No. 4291	



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TRIA	Status:- FINAL						
Project: Metal Processing Area Shallow	v Soils Inve	stigation		Exploratory Hole No.			
Client: South Tees Development Corporation	ocation: Forr	ner Redcar Steelworks, Re	dcar	MPA_AUK_TP106			
Method (Equipment): Machine Excavated (JCB 360 Tracked)	L	Ground Level (m): 7.405	Start Date: 08/07/2020	Sheet: 3 of 3			
	IPA_AUK_T						



G	TRIAL PIT RECORD											
Project:		Metal	Proce	essing A	rea Shal	low Soils	Investigation			Expl	oratory Hole No.	
Client:	South Tees	s Development	Corpo	oration		Location: Former Redcar Steelworks, Redcar					A_AUK_TP107	
Method (Equipn	nent): Machi	ne Excavated	JCB 3	360 Trac	ked)	Ground Level (m):         Start Date:         Sheet:           7.450         08/07/2020         1 of 3						
SAN	/IPLES & T	TESTS						STRATA				
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)		I	Description			
0.50 0.70 0.90	J1 B2 ES3			6.05			MADE GRO and metal fra predominani slag, concre include slag.	UND (Brown grey agments. Sand is tly ash. Gravel is te and yellow and . Slag content is 7	/ cobbles with fine to coarse fine to coarse I red brick. Cc 75-100%. Slaç	some gi e and inc subangi ibbles ar g is vesic	ravel and wood cludes ular and includes e angular and cular).	
1.70 1.90 2.20	J4 B5 LB6						MADE GROUND (Grey green yellow gravel with high cobble conten Gravel is fine to coarse subangular and includes slag. Cobbles are angular and include slag. Slag content is 75-100%. Slag is vesicular between c.1.50-2.50m BGL with occasional yellow brick (cobble sized).					
2.70 2.90	J7 B8					- - - - - - - - - - -						
3.70 3.90	J9 B10			2.95		- - - - - - - - - - - - - - - - - - -						
						- - - - - - - - - -	Complete at	4.50m BGL.				
		PLAN				GROL		, chaonied Botuce	on o 2 70 4 E0r		alag is domn	
		6.00 Face A Orientation						Observed. Detwee	511 0.0.70-4.001		siag is damp.	
Face						STABI Pit side	LITY es and base sta	ble throughout exc	avation.			
		Face C										
ADDITIONAL INFORMATION												
Sketch Diagram: No Sketch Taken												
Photographs: Yes See additional sheets.												
All dime	All dimensions in metres Scale 1:50 For explanati abbreviation						ols and heets	Checked by:	Logged D. Portsi	l by: mouth	Contract No. 4291	











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Ġ					TR	IAL P	IT RE	ECOF	RD			Status:-	FINAL
Project:		Metal	Proce	essing A	rea Shal	low Soils	s Invest	tigation				Expl	oratory Hole No.
Client:	South Tees	Development	Corpo	oration		Location: Former Redcar Steelworks, Redcar					dcar	MP	A_AUK_TP108
Method (Equip	ment): Machir	ne Excavated (	JCB 3	360 Trac	cked)		E:454686.549 N:522511.326           Ground Level (m):         Start Date:         Shee           7.400         09/07/2020         Shee						1 of 3
SAI	MPLES & T	ESTS							STRA	ATA		1	
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)				De	escription		
0.60 0.80 1.00 1.60 1.80 2.30 2.60 2.80 3.60 3.80	J1 B2 ES3 J4 B5 LB6 J7 B8 J9 B10			6.90		4.50 MADE GROUND (Brown gre fragments. Sand is fine to co Gravel is fine to coarse suba is 75-100%. Slag is vesicular MADE GROUND (Grey gree cobble content. Gravel is fine and yellow brick. Cobbles are 75-100%. Slag is vesicular).					sandy grave se and inclu ular slag an rellow blue a o coarse sub ingular and	I with wc des pred d concre and white angular include s	ood and metal dominantly ash. ete. Slag content e gravel with high and includes slag slag. Slag content
Face D		PLAN 6.00 Face A Orientation 090°			= 4.50 -	GROL No gro	JNDW/ undwat	ATER er inflow	observed.		vation		
		Face C				1 11 3100							
	ADDITIC	ONAL INFORM	IATIO	N		GENERAL REMARKS							
Sketch Diagram: No Sketch Taken													
Photogra	phs:	Yes		See ado shee	ditional ets.								
All dime	All dimensions in metres For explanati Scale 1:50 abbreviation								Checke <i>K.W</i>	d by:	Logged D. Portsi	d by: mouth	Contract No. 4291



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 Tel: 0191 387 4700 Fax: 0191 387 4710

 Regional Office:
 Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL
 Tel: 0197 2735 300 Fax: 01772 735 999

EE CS TR		Status:- FINAL					
Project: Metal Processing Area Shal	llow Soils Inves	tigation		Exploratory Hole No.			
Client: South Tees Development Corporation	Location: Forn E	ner Redcar Steelworks, I :454686.549 N:522511.	Redcar 326	MPA_AUK_TP108			
Method (Equipment): Machine Excavated (JCB 360 Tracked)		Ground Level (m): 7.400	Start Date: 09/07/2020	Sheet: 3 of 3			
	MPA_AUK_T						



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Ē	TRIAL PIT RECORD											Status:- FINAL		
Project:		Metal	Proce	essing A	rea Shal	low Soils	Inve	tigation				Exp	loratory Hole No.	
Client:	South Tees	s Development	Corpo	oration		Location: Former Redcar Steelworks, Redcar					lcar	MP	A_AUK_TP109	
Method (Equipr	ment): Machi	ne Excavated	(JCB 3	860 Trac	cked)		Ľ	Ground Le	vel (m): 8.643	4.408	Start Date: 06/07/2020	Sheet:	1 of 3	
SAI	MPLES &	TESTS							STRAT	4				
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)				De	escription			
0.40 0.80 0.90 1.60 1.80 2.00 2.60 3.00 3.60 4.00	J1 B2 ES3 J4 B5 LB6 J7 B8 J9 B10			4.14		<u>0.20</u>	0.20       MADE GROUND (Grey brown sandy grave Sand is fine to coarse. Gravel is fine to coarse includes red brick, concrete and slag. Slag vesicular).         MADE GROUND (Grey green blue gravel v Gravel is fine to coarse subangular and include slag. Slag content is 7: between c.0.20-4.50m BGL pocket of red fine subangular and includes iron/clinker.         (4.30)       at c.2.00m BGL cobbles. between c.2.00-4.50m BGL some recove precipitate deposits on surface.         (4.30)       Complete at 4.50m BGL.				I with loo rse suba content vith high ludes sl 5-100%. d brown	w cobble content. angular and is 50-75%. Slag is cobble content. ag. Cobbles are . Slag is vesicular). gravel. Gravel is g has white		
		PLAN 3.50 Face A Orientation	<u> </u>			GROUNDWATER No groundwater inflow observed.								
Face	U Orientation 14 000° 88 U Orientation 14 No B U Orientation 14 No B Orientation 14 No D Orientation 14 No D Orientation 14 No D Orientation 14 No D Orientation 14 No D Orientation 14 No D Orientation 14 No D Orientation 14 No D Orientation 14 No D Orientation 14 No D Orientationti No D Orientation 14 No D Orientation 14 No D Orientationtationtationtation 14 No D Orientation					STABILITY Pit sides and base stable throughout excavation.								
ADDITIONAL INFORMATION					GENERAL REMARKS									
Sketch Diagram: No Sketch Taken														
Photographs: Yes See additional sheets.														
All dime	All dimensions in metres Scale 1:50 For explanatic abbreviations						ols an Sheets	ł	Checked K.W.	oy:	Logged D. Portsi	d by: mouth	Contract No. 4291	







	TRI	AL PIT R	ECORD		Status:- FINAL
Project:	Metal Processing Area Shallo	ow Soils Inve	stigation		Exploratory Hole No.
Client:	South Tees Development Corporation	Location: Forr	ner Redcar Steelworks, E:454459.688 N:522714	Redcar 469	MPA_AUK_TP109
Method (Eq	uipment): Machine Excavated (JCB 360 Tracked)		Ground Level (m): 8.643	Start Date: 06/07/2020	Sheet: 3 of 3
		MPA_AŪK_			



Ğ					TR	IAL PI	T RECO	RD		Status:-	FINAL
Project:		Metal	Proce	ssing A	rea Shal	low Soils	Investigation			Explo	pratory Hole No.
Client:	South Tees	Development	Corpo	ration		Location	: Former Red	Redcar 800	MPA	_AUK_TP110	
Method (Equi	pment): Machir	ne Excavated (	JCB 3	60 Trac	ked)		Ground L	evel (m): 10.589	Start Date: 13/07/2020	Sheet:	1 of 3
SA	AMPLES & T	ESTS					I	STRATA	ł	1	
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)			Description		
0.60 0.80 1.00 1.60 1.80 2.20 2.70 2.90 3.40 3.60 4.40	J1 B2 ES3 J4 B5 LB6 J7 B8 J9 B10 J11			<u>10.09</u> 8.19 7.59 6.09		[0.50) 0.50 (1.90) (1.90) 2.40 (0.60) (0.60) (1.50) (1.50) 4.50	MADE GRC coarse. Gra concrete. SI MADE GRC metal and w includes sla vesicular. C content is 7 MADE GRC cobble cont ash. Gravel slag and co Cobbles are is 25-50%. S MADE GRC content. Gra Cobbles are is vesicular.	DUND (Brown blavel is fine to coal ag content is 75- DUND (Grey sand ood fragments, of g and concrete. obbles are angu 5-100%. Slag is DUND (Grey blue ent. Sand is fine is fine to coarse norete. Slag cont a angular and inc Slag is vesicular) DUND (Grey gree avel is fine to coa a angular and inc Assessed as 'lo	gravel. S and incluvesicular igh cobb o coarse s 25-50%. slag and ndy grave includes d includes Slag is v ck and sla avel with r and inclu	and is fine to udes slag and ). le content with subangular and Slag is concrete. Slag el with medium predominantly s yellow brick, esicular. ag. Slag content high cobble udes slag. is 75-100%. Slag	
Sketch D Photogr	ADDITI( iagram: raphs:	PLAN 4.00 Face A Orientation <u>090°</u> Face C <u>DNAL INFORM</u> No Sł Yes	IATIO xetch Ta	N aken See add	itional ts.	GROL No gro	INDWATER undwater inflox LITY es and base un	w observed.	excavation.		
All dim	nensions in n Scale 1:50	netres		For exp abbrev	lanation iations se	of symbo ee Kev S	ols and sheets	Checked by:	Logged D. Portsi	d by: mouth	Contract No. 4291



<u> </u>				000000000000000000000000000000000000000	
	TRI	Status:- FINAL			
Project:	Metal Processing Area Shallo	Exploratory Hole No.			
Client:	South Tees Development Corporation	Location: Forr E	ner Redcar Steelworks, Re E:454518.889 N:522657.80	edcar 10	MPA_AUK_TP110
Method (E	Equipment): Machine Excavated (JCB 360 Tracked)	-	Ground Level (m): 10.589	Start Date: 13/07/2020	Sheet: 2 of 3



Figure MPA\_AUK\_TP110.2 MPA\_AUK\_TP110





	AL PIT RECORD		Status:- FINAL							
Project: Metal Processing Area Shallov	Metal Processing Area Shallow Soils Investigation									
Client: South Tees Development Corporation	South Tees Development Corporation E:454518.889 N:522657.800									
Method (Equipment): Machine Excavated (JCB 360 Tracked)	Ground Level (m): 10.589	Start Date: 13/07/2020	Sheet: 3 of 3							
<caption></caption>										



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E C					TR	ial Pi	TR	ECOR	D		Status:-	FINAL
Project:		Metal	Proce	essing A	rea Shal	low Soils	Inves	tigation			Exp	loratory Hole No.
Client:	South Tee	s Development	Corpo	oration		Location	: Forn	ner Redo	ar Steelworks, I 911 N·522680	Redcar 264	MP	PA_AUK_TP111
Method (Equipn	nent): Mach	ine Excavated	JCB 3	360 Trac	ked)	_1		Ground Le	vel (m): 5.420	Start Date: 10/07/2020	Sheet:	1 of 3
SAN	/IPLES &	TESTS			1				STRATA		1	
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)				Description		
0.50 0.80 1.20 1.60 1.80 2.20 2.60 2.80 3.60 3.80 4.20	J1 B2 ES3 J4 B5 LB6 J7 B8 J9 B10 J11		₹.	0.92		MADE GROUND (Brown grey gravel with wood and metal fragm Gravel is fine to coarse subangular and includes slag, concrete a yellow and red brick. Slag content 75-100%. Slag is vesicular).         (1.30)       at c.1.10-1.40m BGL iron girder running 225 degrees.         MADE GROUND (Grey green yellow blue gravel with high cobbl content. Gravel is fine to coarse subangular and includes slag. Cobbles are angular and include slag. Slag content 75-100%. Sl vesicular).         -       between c.1.40-1.70m BGL concrete beneath iron girder.         (3.20)       4.50         Complete at 4.50m BGL.						d metal fragments. lag, concrete and s vesicular). grees. ith high cobble cludes slag. t 75-100%. Slag is on girder.
Sketch Diag	ADDIT gram: ohs:	PLAN 6.00 Face A Orientation 090° Face C IONAL INFORM No S Yes	MATIC ketch T	N See add shee	ditional	GROU Water	INDW strike	ATER at 3.90m base mo	BGL (Moderate I derately stable b	nflow). At c.3.3(	0m BGL	- slag is Damp.
All dime	nsions in	metres		For exp	lanation	of symbo	ols and	ł	Checked by:	Logge	d by: mouth	Contract No. 4291



Project:	Metal Processing Area Shall	ow Soils Inve	stigation		Exploratory Hole No.
Client:	South Tees Development Corporation	Location: Forr E	ner Redcar Steelworks, Re E:454573.911 N:522689.26	dcar 4	MPA_AUK_TP111
Method (Eq	uipment): Machine Excavated (JCB 360 Tracked)		Ground Level (m): 5.420	Start Date: 10/07/2020	Sheet: 2 of 3

#### Figure MPA\_AUK\_TP111.1 MPA\_AUK\_TP111



Figure MPA\_AUK\_TP111.2 MPA\_AUK\_TP111





Project:

Status:-

FINAL







					TR	ial pi	TR	ECOR	D		Status:-	FINAL
Project:		Meta	Proce	essing A	rea Shal	low Soils	Inve	stigation			Expl	loratory Hole No.
Client:	outh Tees	Development	Corpo	oration		Location	: Forr	ner Redo	ar Steelworks, Re	edcar	MP	A_AUK_TP112
Method (Equipm	ent): Machir	ne Excavated	(JCB 3	360 Trac	ked)		E	Ground Le	Start Date: 08/07/2020	Sheet:	1 of 3	
SAN	IPLES & T	ESTS										
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)			ſ	Description		
0.60 0.70 0.90	J1 B2 ES3			6.10		(1.40)	MAI with prec slag inclu	DE GROI wood ar dominant l, concret ude slag.	JND (Brown grey Id metal fragmen ly ash. Gravel is f e and yellow and Slag content is 7	sandy grave ts. Sand is fin ine to coarse red brick. Co 5-100%. Slag	l with hig e to coa subang bbles ar g is vesio	gh cobble content irse and includes ular and includes re angular and cular).
1.60 1.80 2.10 2.60 2.80	J4 B5 LB6 J7 B8					- - - - - - - - - - - - - - - - - - -	MAI with Gra con con betv at c	DE GROI high cob vel is fine crete and tent is 75 veen c.2. 2.10m B	JND (Grey green ble content. San to coarse suban l ash. Cobbles ar -100%. Slag is ve 00-4.50m BGL GL cobbles wit	yellow blue a d is fine to co gular and inc e angular anc esicular). slag is more h some grave	and white arse and ludes sla l include iron rich el.	e sandy gravel d includes ash. ag, yellow brick, a slag. Slag 1.
3.70 3.90 4.30	J9 B10 J11			3.00								
						- - - - - - - - - - - - - - - - - - -	Con	nplete at	4.50m BGL.			
		PLAN 5.50 Face A Orientation	·		1	GROL No gro	INDW	ATER ater inflow	observed. At c.3.7	70-4.50m BGL	- slag is	damp.
Face				G U		STABI Pit side	LITY es and	base sta	ble throughout exc	avation.		
	ADDITI	ONAL INFORM	ΛΑΤΙΟ	N		GENE	RAL I	REMARK	S			
Sketch Diag	gram:	No S	ketch T	Taken								
Photograp	ohs:	Yes		See additional sheets.								
All dime	nsions in n icale 1:50	netres		For exp abbrev	lanation iations s	of symbo ee Key S	ols and heets	b	Checked by:	Logged D. Portsr	l by: nouth	Contract No. 4291



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Status:-**TRIAL PIT RECORD** FINAL Project: Exploratory Hole No. Metal Processing Area Shallow Soils Investigation Client: Location: Former Redcar Steelworks, Redcar E:454678.306 N:522609.878 Ground Level (m): 7.496 MPA\_AUK\_TP112 South Tees Development Corporation Method (Equipment): Machine Excavated (JCB 360 Tracked) Start Date: 08/07/2020 Sheet: 2 of 3 Figure MPA\_AUK\_TP112.1 MPA\_AUK\_TP112 Figure MPA\_AUK\_TP112.2 MPA\_AUK\_TP112



TRIAL	PIT RECORD		Status:- FINAL							
roject: Metal Processing Area Shallow S	oils Investigation		Exploratory Hole No.							
ient: South Tees Development Corporation	South Tees Development Corporation E:454678.306 N:522609.878									
ethod (Equipment): Machine Excavated (JCB 360 Tracked)	Ground Level (m): 7.496	Start Date: 08/07/2020	Sheet: 3 of 3							



Status:-

Ġ					TR	ial Pi	IT RECOF	RD		Status:-	FINAL
Project:		Metal	Proce	essing A	rea Shal	low Soils	Investigation			Explo	pratory Hole No.
Client:	South Tees	Development	Corpo	oration		Location	Former Redo E:454705	car Steelworks, Red .251 N:522610.362	dcar 2	MPA	A_AUK_TP113
Method (Equipr	nent): Machir	ne Excavated (	JCB 3	360 Trac	ked)		Ground Le	evel (m): 7.446	Start Date: \$ 08/07/2020	Sheet:	1 of 3
SAI	MPLES & T	ESTS			1	1	1				
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)		De	escription		
0.60 0.80 0.90 1.60 1.80 2.30 2.60 2.80 3.60 3.80	J1 B2 ES3 J4 B5 LB6 J7 B8 J9 B10			2.95		(0.40) 0.40 (4.10) (4.10) (4.10) (4.50	MADE GRO fragments. S Gravel is fin. yellow and r MADE GRO cobble conte and yellow b is 75-100%. at c.1.20m E at c.2.30m E pockets and between c.2 gravel. Sanc fine to coars mudstone. at c.3.80m E	UND (Brown grey s Sand is fine to coarse e to coarse subang ed brick. Slag conte UND (Grey green ) ent. Gravel is fine to rick. Cobbles are a Slag is vesicular). GL fine to mediu GL fine to mediu 40-4.50m BGL I is fine to coarse a e subangular and i GL cobbles with 4.50m BGL.	sandy gravel v se and include ular and include ular and include reliow blue an o coarse suba ingular and in um sand (relic sandy gravel v ntent. enses of red I nd includes a ncludes ash, w some gravel.	with woo es prede ides sla %. Slag id white ingular a clude s beddin with occ brown c sh and clinker a	od and metal ominantly ash. g, concrete and is vesicular). gravel with high and includes slag lag. Slag content ig for a cable). casional clay clayey sandy clinker. Gravel is and burnt
		PLAN 5.00 Face A			1	GROL No gro	INDWATER undwater inflow	v observed. At c.3.50	)-4.50m BGL -	slag is c	lamp.
Face D		Orientation 000°				STABI Pit side	LITY es and base sta	ble throughout exca	vation.		
	ADDITI		IATIC	N		GENE	RAL REMARK	(S			
Sketch Dia	gram:	No Sł	ketch T	aken							
Photogra	phs:	Yes		See add shee	litional ts.						
All dime	ensions in n Scale 1:50	netres		For exp abbrev	lanation iations s	of symbo ee Key S	ols and Sheets	Checked by:	Logged I D. Portsm	by: outh	Contract No. 4291



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	TRI	AL PIT RI	ECORD		Status:- FINAL
Project:	Metal Processing Area Shallo	ow Soils Inves	tigation		Exploratory Hole No.
Client:	South Tees Development Corporation	Location: Form	er Redcar Steelworks, •454705 251 N·522610	Redcar	MPA_AUK_TP113
Method (E	<sup>quipment):</sup> Machine Excavated (JCB 360 Tracked)		Ground Level (m): 7.446	Start Date: 08/07/2020	Sheet: 3 of 3
	<caption></caption>	IIRE MPA_AUK MPA_AUK_T	P113.3 P113		



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Ġ					TR	IAL P	IT RECOR	D		FINAL
Project:		Metal	Proce	essing A	rea Shal	low Soils	Investigation			Exploratory Hole No.
Client:	South Tees	Development	Corpo	oration		Location	Former Redc	ar Steelworks, Red 840 N:522786 212	dcar 2	MPA_AUK_TP114
Method (Equip	oment): Machi	ne Excavated (	(JCB 3	360 Trac	ked)		Ground Le	Start Date: 06/07/2020	Sheet: 1 of 3	
SA	MPLES & 1	TESTS						STRATA		1
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)		De	escription	
0.60	.11			9.64		(0.40) - 0.40	MADE GROU subangular a vesicular). MADE GROU	JND (Brown grey g and includes slag. S JND (Brown grey g	gravel. Grave Slag content green beige	el is fine to coarse : is 75-100%. Slag is gravel. Gravel is medium
0.70 0.80	B2 ES2A			8.44		(1.20) - - - - - - - - - - - - - - - - - - -	Slag is vesic	pangular and inclu ular).	des slag. Sla	ag content is 75-100%.
1.70 1.80 2.30	J3 B4						MADE GROI cobble conte slag. Cobble Slag is vesic	JND (Compacted ent. Gravel is fine to sare angular and ular).	grey green b o coarse sub include slag	olue gravel with high bangular and includes . Slag content is 75-100%
2.50	LB6					- - - - - - (2.90)	at c.2.50m B at c.2.60m B	GL cobbles with GL slag is fused	n little gravel. I.	
3.30	J7					-				
3.80 4.30	B8 J9			5.54		-				
				0.04			Complete at	4.50m BGL.		
		PLAN				GROL	JNDWATER			
-		3.50 Face A			]	No gro	undwater inflow	observed.		
Face D		Orientation 000° ∎			1.20 H	STAB Pit side	ILITY es and base stal	ble throughout exca	vation.	
		Face C			_]]					
	ADDITI		/ATIC	N		GENE	RAL REMARK	<u></u>		
Sketch Di	agram:	No Si	ketch T	aken						
Photogra	aphs:	Yes		See add shee	litional ets.					
All dim	ensions in r Scale 1:50	metres		For exp abbrev	lanation iations s	of symbo ee Key S	ols and Sheets	Checked by:	Logged D. Portsr	l by: Contract No. mouth <b>4291</b>



Ğ	TRI	AL PIT R	ECORD		Status:- FINAL
Project:	Metal Processing Area Shallo	ow Soils Inve	stigation		Exploratory Hole No.
Client:	South Tees Development Corporation	Location: Forr E	ner Redcar Steelworks, Re :454345.840 N:522786.21	edcar 2	MPA_AUK_TP114
Method (E	quipment): Machine Excavated (JCB 360 Tracked)		Ground Level (m): 10.035	Start Date: 06/07/2020	Sheet: 2 of 3



Figure MPA\_AUK\_TP114.2 MPA\_AUK\_TP114





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- C-					
Project:	Metal Processing Area Shallo	ow Soils Inves	stigation		Exploratory Hole No.
Client:	South Tees Development Corporation	Location: Form	ner Redcar Steelworks, R ::454345.840 N:522786.2	edcar 12	MPA_AUK_TP114
Method (Ec	uipment): Machine Excavated (JCB 360 Tracked)		Ground Level (m): 10.035	Start Date: 06/07/2020	Sheet: 3 of 3

# <image>



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ŝ					TR	IAL PI	TR	ECOF	RD			Status:-	FINAL
Project:		Metal	Proce	ssing A	rea Shal	low Soils	Inves	tigation				Exp	loratory Hole No.
Client: S	outh Tee	s Development	Corpo	ration		Location	: Forn E	ner Redo :454484	car Steelworks .884 N:52279	dcar 7	MP	A_AUK_TP115	
Method (Equipm	ent): Mach	achine Excavated (JCB 360 Tracked) Ground Level (m): Start Date: 06/07/20									Start Date: 06/07/2020	Sheet:	1 of 3
SAM	IPLES &	TESTS							STRATA	۱			
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)				De	escription		
0.40 0.50 0.60 1.40 1.50 2.00 2.60 2.80 3.80 4.00	J1 B2 ES3 J4 B5 LB6 J7 B8 J7 B8 J9 B10			6.75		(1.00) 1.30 (3.20)	MAI San to cc Slac Coar coar vesi MAI cont Cob is ve at c.	DE GRO d is fine parse su conten DE GRO isse auba cular). DE GRO ent. Gra bles are iscicular) 2.00m E	UND (Grey broken to coarse and bangular and i UND (Grey/blit ncludes blue of ngular and inco UND (Grey groken vel is fine to co angular and in GL cobbles	own s inclu ag is ue claig grey a clude: een t oarse nclud	sandy grave ides predom des yellow b vesicular). ayey very sa ash like subs s slag. Slag olue beige gi e subangula e slag. Slag little gravel.	I with lo inantly a rick, con ndy gra stance. content ravel wit r and ind conten	w cobble content. ash. Gravel is fine herete and slag. vel. Sand is fine to Gravel is fine to is 50-75%. Slag is th high cobble cludes slag. t is 75-100%. Slag
					~~~~~		Con	nplete at	4.50m BGL.				
#		PLAN 3.50 Face A Orientation			"   	GROU No gro	INDW	ATER ter inflov	v observed. At c	:.3.80	ım BGL - slaç	g is dam	p.
Fac		Face C		0 		STABI Pit side	LITY es and	base sta	ble throughout	exca	vation.		
	ADDIT	IONAL INFORM	IATIOI	N		GENE	RAL F	REMAR	(S				
Sketch Diag	ram:	No Sł	ketch Ta	aken									
Photograp	hs:	Yes	Yes See additional sheets.										
All dimer S	nsions in cale 1:50	metres	I	For exp abbrev	lanation iations s	of symbo ee Key S	ls and heets	ł	Checked b	y:	Logged D. Portsr	d by: mouth	Contract No. 4291







	AL PIT R	ECORD		Status:- FINAL
Project: Metal Processing Area Shallo	ow Soils Inves	tigation		Exploratory Hole No.
Client: South Tees Development Corporation	Location: Forn	ner Redcar Steelworks, l :454484.884 N:522797.	Redcar 577	MPA_AUK_TP115
Method (Equipment): Machine Excavated (JCB 360 Tracked)		Ground Level (m): 8.046	Start Date: 06/07/2020	Sheet: 3 of 3
Fig	ure MPA_AUM MPA_AUK_1	C_TP115.3 P115		·


Status:-

Ġ					TR	IAL PI	IT RECOF	RD		Status:-	FINAL	
Project:		Metal	Proce	ssing A	rea Shall	ow Soils	Investigation			Explo	pratory Hole No.	
Client:	South Tees	s Development	Corpo	ration		Location	Former Redo E:454567	car Steelworks, Re .524 N:522775.26	dcar 8	MPA	A_AUK_TP116	
Method (Equipr	nent): Machi	ne Excavated (	(JCB 3	60 Trac	ked)	-	Ground Le	evel (m): 7.355	Start Date: 06/07/2020	Sheet:	1 of 3	
SA	MPLES &	TESTS					1					
Depth	Type No	Test Result	Water	Reduced Level	Legend	(Thickness) Description						
0.40 0.60 0.80 1.40 1.60 2.00 2.40 2.80	J1 B2 ES3 J4 B5 LB6 J7 B8			4.16		0.30       MADE GROUND (Grey brown sandy gravel with low cobble content Sand is fine to coarse. Gravel is fine to coarse subangular and includes yellow brick, concrete and slag. Slag content is 50-75%. Slag is vesicular).         MADE GROUND (Grey green blue gravel and cobbles. Gravel is fin to coarse subangular and includes slag. Cobbles are angular and include slag. Slag content is 75-100%. Slag is vesicular). between c.0.30-3.20m BGL pocket of red brown gravel. Gravel is fine subangular and include iron/clinker.         (2.90)       between c.1.80-3.20m BGL some recovered slag has white precipitate deposits on surface.         3.20       Terminated at 3.20m BGL - obstruction.						
		PLAN 3.50 Face A	<u> </u>		1	GROU No gro	I JNDWATER Jundwater inflow	v observed.				
Face D		Orientation 000°				STABI Pit side	ILITY es and base sta	ble throughout exca	vation.			
	ידוחח		ΛΔΤΙΟ	N				(5				
Sketch Dia	gram:	No S	ketch Ta	ken								
Photogra	phs:	Yes		See add shee	litional ets.							
All dime	ensions in i Scale 1:50	metres	 F	<sup>−</sup> or exp abbrev	lanation o	of symbo ee Key S	ols and Sheets	Checked by:	Logged D. Portsn	by: nouth	Contract No. 4291	



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Status:-**TRIAL PIT RECORD** FINAL Project: Exploratory Hole No. Metal Processing Area Shallow Soils Investigation Client: Location: Former Redcar Steelworks, Redcar MPA\_AUK\_TP116 South Tees Development Corporation E:454567.524 N:522775.268 Ground Level (m): 7.355 Method (Equipment): Machine Excavated (JCB 360 Tracked) Start Date: 06/07/2020 Sheet: 3 of 3

#### Figure MPA\_AUK\_TP116.3 MPA\_AUK\_TP116





Status:-

Ġ					TR	IAL P	IT RECOF	RD		Status:-	FINAL		
Project:		Meta	Proce	essing A	rea Shall	low Soils	Investigation			Expl	oratory Hole No.		
Client:	South Tees	Development	Corpo	oration		Location	Former Redo E:454708	car Steelworks, Red 3.734 N:522766.034	dcar 4	MP	A_AUK_TP117		
Method (Equip	oment): Machii	ne Excavated	(JCB 3	360 Trac	ked)		Ground Le	evel (m): 7.965	Start Date: 08/07/2020	Sheet:	1 of 3		
SA	MPLES & T	TESTS					1	STRATA					
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	epth Description						
0.30 0.50 0.60 1.30 1.50 2.00 2.30 2.50 3.30 3.50 4.30 4.50	J1 B2 ES3 J4 B5 LB6 J7 B8 J9 B10 J11 B12			7.77		(4.30)	MADE GRO Gravel is fin- yellow and r MADE GRO Gravel is fin- brick. Cobbl 75-100%. SI at c.1.00m E redundant p fibrous ceme at c.2.00m E between c.2 Sand is fine to medium s	UND (Brown grey g e to coarse subang ed brick. Slag conte UND (Grey green ) e to coarse subang es are angular and lag is vesicular). BGL previously be ipe sections runnin ent lagging. BGL cobbles with .80-4.50m BGL I to coarse and inclu- subangular and inclu-	gravel with w jular and inc ent is 75-100 /ellow grave jular and inc include slag ackfilled/tipp g 270 degre some grave	ludes sla <u>19%. Slag</u> <u>1 with hig</u> <u>1 with hig</u> <u>2 with high</u> <u>2 with high</u> <u></u>	d metal fragments. ag, concrete and j is vesicular). Jh cobble content. ag and yellow ontent is . 50mm diameter iddle of pit) with iddle of pit) with sandy gravel. ash. Gravel is fine d burnt mudstone.		
4.50						-	Complete at	4.00m BGL.					
		PLAN	<u> </u>	<u></u>	<u> </u>	GROL	INDWATER						
-		5.00 Face A			1		undwater innow	V ODSEIVED. ALC.3.30	-4.00m BGL	- Slag is	damp.		
Face D		Orientation 000°			- 1.20 -	STAB Pit side	ILITY es and base un	stable throughout ex	cavation.				
		Face C											
	ADDITI	ONAL INFORI	MATIO	N		GENE	RAL REMARK	<s< td=""><td></td><td></td><td></td></s<>					
Sketch Dia	agram:	No S	ketch T	aken									
Photogra	aphs:	Yes		See ado shee	litional its.								
All dim	ensions in r Scale 1:50	metres		For exp abbrev	lanation d	of symbo ee Key S	ols and Sheets	Checked by:	Logged D. Portsr	l by: nouth	Contract No. 4291		





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Ġ	Status:- FINAL				
Project:	Metal Processing Area Shall	ow Soils Inve	stigation		Exploratory Hole No.
Client:	South Tees Development Corporation	Location: Forr	mer Redcar Steelworks, E:454708.734 N:522766	Redcar 6.034	MPA_AUK_TP117
Method (Ed	<sup>quipment):</sup> Machine Excavated (JCB 360 Tracked)	·	Ground Level (m): 7.965	Start Date: 08/07/2020	Sheet: 2 of 3
	Fig	ure MPA_AUI MPA_AUK_	K_TP117.1 TP117		



Figure MPA\_AUK\_TP117.2 MPA\_AUK\_TP117





EE TRIAL F	PIT RECORD	Status:- FINAL
Project: Metal Processing Area Shallow Soi	Is Investigation	Exploratory Hole No.
Client: South Tees Development Corporation	Former Redcar Steelworks, Redcar E:454708.734 N:522766.034	MPA_AUK_TP117
Method (Equipment): Machine Excavated (JCB 360 Tracked)	Ground Level (m): Start Date: 7.965 08/07/2020	Sheet: 3 of 3
	<text></text>	



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Ġ					TR	IAL PI	IT RECOF	RD		Status:-	FINAL	
Project:		Metal	Proce	essing A	rea Shall	low Soils	Investigation			Explo	pratory Hole No.	
Client:	South Tees	Development	Corpo	oration		Location	: Former Redo E:454739	car Steelworks, Re 9.993 N:522662.82	dcar 8	MPA	A_AUK_TP118	
Method (Equi	pment): Machi	ne Excavated	(JCB 3	360 Trac	ked)		Ground Le	evel (m): 7.317	Start Date: 08/07/2020	Sheet:	1 of 3	
S	AMPLES & 1	TESTS						STRATA				
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	n Description					
0.50 0.60 0.80 1.80 1.90 2.00 2.80 2.90	J1 B2 ES3 J4 B5 LB6 J7 B8			4.12		0.30 	MADE GRO Gravel is fin yellow and r MADE GRO medium to h and includes content is 75 between c.1 at c.2.00m E at c.2.50m E	UND (Brown grey e to coarse suban- ed brick. Slag con UND (Grey green high cobble conten s slag. Cobbles are 5-100%. Slag is ve .80-3.20m BGL 3GL cobbles with 3GL large fused	gravel with w gular and incl tent is 75-100 yellow slight t. Gravel is fir e angular and sicular). slag is fused n some grave section of sla	vood and ludes sla <u>)%. Slag</u> y clayey ne to coa ł include el.	metal fragments. g, concrete and <u>is vesicular).</u> sandy gravel with rse subangular slag. Slag	
						-	excavator.					
		PLAN 5.20 Face A Orientation				GROL No gro	JNDWATER undwater inflov	v observed.				
Eac				ù C		STABI Pit side	ILITY es and base sta	able throughout exca	avation.			
	ADDITI	ONAL INFORM	ΛΑΤΙΟ	N		GENE	RAL REMARK	<s< td=""><td></td><td></td><td></td></s<>				
Sketch D	liagram:	No S	ketch T	aken								
Photog	raphs:	Yes		See ado shee	litional ets.							
All din	nensions in r Scale 1:50	metres		For exp abbrev	lanation iations se	of symbo ee Key S	bls and Sheets	Checked by:	Logged D. Portsr	l by: nouth	Contract No. 4291	







E Cs	RIAL PIT R	ECORD		Status:- FINAL
Project: Metal Processing Area S	hallow Soils Inve	stigation		Exploratory Hole No.
Client: South Tees Development Corporation	Location: Forr F	ner Redcar Steelworks, Re -454739 993 N·522662 82	dcar	MPA_AUK_TP118
Method (Equipment): Machine Excavated (JCB 360 Tracked)		Ground Level (m): 7.317	Start Date: 08/07/2020	Sheet: 3 of 3
	Figure MPA_AU	(_TP118.3 18 Spoil	1	
	「「「「「「「「」」」」			



Project:

Client:

Depth

0.30

0.80

1.00

1.40

1.70

2.00

2.70

3.00

3.70

4.00

Face D

Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL

Status:-**TRIAL PIT RECORD FINAL** Metal Processing Area Shallow Soils Investigation Exploratory Hole No. Location: Former Redcar Steelworks, Redcar MPA\_AUK\_TP119 South Tees Development Corporation E:454305.588 N:522861.286 Method (Equipment): Ground Level (m) Start Date: Sheet: Machine Excavated (JCB 360 Tracked) 9.069 06/07/2020 1 of 3 SAMPLES & TESTS STRATA Test Result Water Type No Reduced Depth Legend Description Level Thickn MADE GROUND (Brown clayey very sandy gravel with wood and metal fragments. Sand is fine to coarse. Gravel is fine to coarse .J1 subangular and includes red brick, concrete and slag. Slag content is 25-50%. Slag is grey vesicular). (1.20)B2 FS3 7.87 MADE GROUND (Grey black compacted ash. Recovered as gravel. Gravel is fine to coarse angular). 7.57 1.50 J4 MADE GROUND (Grey green blue gravel with high cobble content. J5 Gravel is fine to coarse subangular and includes slag. Cobbles are angular and include slag. Slag content is 75-100%. Slag is vesicular). B6 at c.2.60m BGL ... slag is mainly blue grey. J7 . (3.00) LB8 at c.3.00m BGL ... cobbles with some gravel. at c.3.60m BGL ... a pocket of yellow bricks noted. J9 B10 4.50 4.57 Complete at 4.50m BGL. PLAN GROUNDWATER No groundwater inflow observed. 3.50 Face A 1.20 Face / Orientation 000° STABILITY ω Pit sides and base stable throughout excavation. Face C

ADD	ITIONAL INFORM	IATION	GENERAL REMAR	۲S		
Sketch Diagram:	No Sk	etch Taken				
Photographs:	Yes	See additional sheets.				
All dimensions i Scale 1:	n metres 50	For explanation of abbreviations set	of symbols and ee Key Sheets	Checked by: <i>K,W,</i>	Logged by: D. Portsmouth	Contract No 4291
Print Date a	nd Time: 12/11/2020 10:1	12:38		-		



## ALLIED EXPLORATION & GEOTECHNICS LIMITED Head Office: Regional O





	TRIAL	L PIT REC	ORD		Status:- FINAL
Project:	Metal Processing Area Shallow	Soils Investiga	ion		Exploratory Hole No.
Client:	South Tees Development Corporation	cation: Former F E:454	Redcar Steelworks, R 305.588 N:522861.2	edcar 86	MPA_AUK_TP119
Method (E	quipment): Machine Excavated (JCB 360 Tracked)	Grou	nd Level (m): 9.069	Start Date: 06/07/2020	Sheet: 3 of 3
		PA_AŪK_TP11			



										[ <b></b>		
Ğ					TR	IAL PI	T RECO	RD		Status:-	FINAL	
Project:		Meta	l Proce	essing A	rea Shal	low Soils	Investigatior	1		Ехр	loratory Hole No.	
Client:	South Tee	s Developmen	t Corpo	oration		Location	Former Rec	Icar Steelworks, Re	dcar	MP	A_AUK_TP120	
Method (Equip	oment): Mach	ine Excavated	(JCB 3	360 Trac	ked)		Ground I	<u>3.192 N:522886.74</u> .evel (m): 6.977	8 Start Date: 07/07/2020	Sheet:	1 of 3	
SA	MPLES &	TESTS						STRATA				
Depth	Туре	Test	ater	Reduced	Legend	Depth		D	escription			
0.40	J1 B2		\$	6.68 6.48		- - - 0.30 - 0.50	MADE GROUND (Brown grey gravel with wood and metal fragmen 0.30 Gravel is fine to coarse subangular and includes slag and concrete 0.50 Slag content is 75-100%. Slag is vesicular). MADE GROUND (Compacted grey green blue gravel. Gravel is fine					
0.80	ES3					- - - - - - -	to coarse s 75-100%. S MADE GRO is fine to co and include	ubangular anf incluo Slag is vesicular). DUND (Grey green arse subangular an s slag. Slag conten	des slag and blue cobbles id includes s t is 75-100%	ash. Sl with so lag. Cob . Slag is	ag content is me gravel. Gravel obles are angular s vesicular).	
1.80 2.00	J4 B5 LB6					- 	at c.2.00m BGL cobbles.					
2.80	B8					- - - - - -	between c.2.90-4.50m BGL slag is fused with whites deposits on surface.					
3.80	ј9 В10			2.48		- - - - - - - - - - - - - - - - - - -	at c.3.80m	BGL cobbles.				
						-		4.30m BGL.				
		PLAN				GROU No gro	INDWATER undwater inflo	w observed.				
		6.00 Face A Orientation										
E		Face C		0		STABI Pit side	LITY es and base st	able throughout exca	ivation.			
	ADDIT	IONAL INFOR	MATIC	N	GENERAL REMARKS							
Sketch Dia	agram:	No S	Sketch T	aken								
Photogra	aphs:	Yes		See add shee	additional heets.							
All dim	ensions in Scale 1:50	metres		For exp abbrev	lanation iations se	of symbo	ols and iheets	Checked by: <i>K,W,</i>	Loggeo D. Portsr	l by: nouth	Contract No. 4291	



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	_ PIT R	ECORD		Status:- FINAL
Project: Metal Processing Area Shallow S	Soils Inves	tigation		Exploratory Hole No.
Client: South Tees Development Corporation	cation: Forn F	ner Redcar Steelworks, Re :454403 192 N:522886 74	dcar	MPA_AUK_TP120
Method (Equipment): Machine Excavated (JCB 360 Tracked)		Ground Level (m): 6.977	Start Date: 07/07/2020	Sheet: 3 of 3
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Ġ	TRIAL PIT RECORD											Status:-	FINAL
Project:		Meta	Proce	essing A	rea Sha	llow Soils	Inves	tigation				Exp	loratory Hole No.
Client:	outh Tee	s Development	Corpo	oration		Location	Form	ner Redc	ar Steelworks,	Redo	car	MP	A_AUK_TP121
Method (Equipm	ent): Mach	ine Excavated	(JCB 3	360 Trac	ked)		E	Ground Le	. <u>384 N:522877</u> vel (m): 8.400	.338 St	art Date: 07/07/2020	Sheet:	1 of 3
SAM	IPLES &	TESTS							STRATA				
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)				Des	scription		
0.50 0.60 0.80	J1 B2 ES3			6.50		MADE GROUND (Brown grey gravel with wood and metal fragme Gravel is fine to coarse subangular and includes slag, concrete an yellow and red brick. Slag content is 75-100%. Slag is vesicular). MADE GROUND (Grey green yellow sandy gravel with high cobb content and metal fragments. Sand is fine to coarse and includes predominantly ash. Gravel is fine to coarse subangular and include slag, yellow brick and concrete. Cobbles are angular and include slag. Slag content is 75-100%. Slag is vesicular).						d metal fragments. ag, concrete and g is vesicular). / with high cobble e and includes ular and includes ar and include	
2.00 2.20 2.50	J4 B5 LB6			5.50		1.90 MADE GROUND (Grey green blue gravel with high cobble content. Gravel is fine to coarse subangular and includes slag. Cobbles are angular and includes slag. Slag content is 75-100%. Slag is vesicular). at c.2.50m BGL cobbles.							cobble content. ag. Cobbles are 6. Slag is
3.00 3.20 4.00 4.20	J7 B8 J9 B10			3 90		<ul> <li>2.90</li> <li>MADE GROUND (Grey green yellow blue sandy gravel with high cobble content. Sand is fine to coarse and includes predominantly ash. Gravel is fine to coarse subangular and includes slag and yello brick. Cobbles are angular and include slag. Slag content is 75-100%. Slag is vesicular).</li> <li>between c.2.90-4.50m BGL lenses of orange brown clayey gravel Gravel is fine to coarse angular and includes burnt mudstone.</li> </ul>						avel with high predominantly es slag and yellow ontent is wyn clayey gravel. mudstone.	
						- - - - - - - - - - - - - - - -	Corr	plete at ·	4.50m BGL.				
	<u> </u>	PLAN 5.50 Face A Orientation	<u></u>		1	GROU No gro	INDW undwa	ATER ter inflow	observed.				
Eac		∎ Face C		ີດ ເ		STABI Pit side	LITY es and	base stal	ble throughout e	excava	ation.		
ADDITIONAL INFORMATION						GENE	RAL F	REMARK	S				
Sketch Diagram: No Sketch Taken													
Photograp	hs:	Yes		See ado shee	litional ets.								
All dimer S	nsions in cale 1:50	metres		For exp abbrev	lanation iations s	of symbo ee Key S	ls and heets	1	Checked by	y:	Logged D. Portsr	l by: nouth	Contract No. 4291



## ALLIED EXPLORATION & GEOTECHNICS LIMITED Head Office: Regional O





	PIT RECORD		Status:- FINAL
Project: Metal Processing Area Shallow So	ils Investigation		Exploratory Hole No.
Client: South Tees Development Corporation	ion: Former Redcar Steelw F·454522 384 N·52	orks, Redcar 2877 338	MPA_AUK_TP121
Method (Equipment): Machine Excavated (JCB 360 Tracked)	Ground Level (m): 8.400	Start Date: 07/07/2020	Sheet: 3 of 3



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EE CS	TRIAL PIT RECORD												
Project:		Metal	Proce	essing A	rea Shal	llow Soils	Inve	tigation			Exp	loratory Hole No.	
Client:	South Tees	Development	Corpo	oration		Location: Former Redcar Steelworks, Redcar						MPA_AUK_TP122	
Method (Equipr	nent): Machii	ne Excavated (	JCB 3	360 Trac	cked)		Ľ	Ground Le	vel (m): 7.922	Start Date: 07/07/2020	Sheet:	1 of 3	
SAI	MPLES & T	ESTS							STRATA				
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)				Description			
No         Result         S         Level         Egons           0.40 0.50         J1 B2 0.70         J1 ES3         7.62						(4.20)	MAI Gra yelld MAI con Cob is ve at c betv	DE GROU vel is fine w and ro DE GROU ent. Gra bles are ssicular). 1.70m B 2.80m B veen c.2.	JND (Brown gr to coarse sub ed brick. Slag c JND (Grey gre vel is fine to co angular and in GL cobbles 1 GL cobbles 1 60-4.50m BGL	ey gravel with v angular and inc ontent is 75-10 en yellow blue g arse subangula clude slag. Slag with some grave	vood and iludes sl. 0%. Slag gravel wi r and ind content el.	d metal fragments. ag, concrete and j is vesicular). ith high cobble cludes slag. t is 75-100%. Slag	
Sketch Dia	PLAN 4.50 Face A Orientation 090° Face C ONAL INFORM No S	MATIC ketch T	VN Taken See add	" " " " " " " " " " " " " " " " " " "	GROL No gro	INDW undwa	ATER ter inflow base sta	ble throughout e	xcavation.				
All dime	phs:	Yes		For exp	lanation	of symbo	ols and	ł	Checked by	/: Logger D. Ports	d by: mouth	Contract No. 4291	



TRI	AL PIT RECORD	Status:- FINAL
Project: Metal Processing Area Shall	ow Soils Investigation	Exploratory Hole No.
Client: South Tees Development Corporation	Location: Former Redcar Steelworks, Redcar E:454598.678 N:522875.032	MPA_AUK_TP122
lethod (Equipment): Machine Excavated (JCB 360 Tracked)	Ground Level (m): Start D 7.922 07/0	Date: Sheet: 7/2020 2 of 3
		HAA. ALE - TPI2
Fig	ure MPA_AUK_TP122.2 MPA_AUK_TP122	
		How we want



	RIAL PIT RE	CORD		Status:- FINAL
Project: Metal Processing Area Sha	allow Soils Investig	gation		Exploratory Hole No.
Client: South Tees Development Corporation	Location: Forme	r Redcar Steelworks, R 54598 678 N:522875 0	edcar	MPA_AUK_TP122
Method (Equipment): Machine Excavated (JCB 360 Tracked)	G	ound Level (m): 7.922	Start Date: 07/07/2020	Sheet: 3 of 3



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G					TR	ial P	IT RECOF	RD		Status:-	FINAL		
Project:		Metal	Proce	essing A	rea Shal	low Soils	s Investigation	Exploratory Hole No.					
Client:	South Tees	Development	Corpo	oration		Location: Former Redcar Steelworks, Redcar					MPA_AUK_TP123		
Method (Equipr	nent): Machir	ne Excavated (	JCB 3	360 Trac	ked)		Ground Le	9.723 N:522952.8 evel (m): 7.198	Start Date: 07/07/2020	Sheet:	1 of 3		
SAI	MPLES & T	ESTS						STRATA		1			
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	h ess) Description						
0.80       J1       6.80         0.90       B2       6.60         1.00       ES3       6.60         1.80       J4       6.80         1.90       B5       6.80         2.30       LB6       6.80         2.80       J7       B8         3.80       J9       B10         3.80       J9       B10					(0.40) 0.40 0.60 0.70 (3.80) (3.80) 	MADE GRO Gravel is fin purple brick. MADE GRO to coarse su 75-100%. Si MADE GRO Gravel is fin sandstone). MADE GRO content. Gra Cobbles are Slag is vesic at c.2.30m E	UND (Brown gre e to coarse suba Slag content is UND (Compacte bangular and inc ag is vesicular). UND (Yellow brc e to coarse suba UND (Grey gree vel is fine to coa angular and incl cular). 3GL cobbles w	y gravel with v ngular and inc 75-100%. Slag d grey green b cludes slag and wwn sandy grav ngular and inc n yellow blue g rse subangula udes slag. Sla ith some grave	vood and ludes sla j is vesic olue grav d ash. Sl vel. Sand ludes lin gravel wi r and inc g conter	d metal fragments. ag, concrete and ular). /el. Gravel is fine ag content is d is fine to coarse. nestone and th high cobble cludes slag. nt is 75-100%.			
*	ADDITI( gram:	PLAN 5.00 Face A Orientation 090° Face C DNAL INFORM No Si Yes	IATIO	N See add shee	litional	GROL No gro	JNDWATER JNDWATER JUITY es and base sta	v observed.	cavation.				
All dime	ensions in n Scale 1.50	netres		For exp	lanation	of symbo	ols and Sheets	Checked by:	Logged D. Ports	d by: mouth	Contract No. 4291		



#### ALLIED EXPLORATION & GEOTECHNICS LIMITED Head Office: Regional Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durtham, DH2 2RG Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL





	TRIAL	PIT RECORD		Status:- FINAL
Project:	Metal Processing Area Shallow So	oils Investigation		Exploratory Hole No.
Client:	South Tees Development Corporation	ion: Former Redcar Steelworks, E:454389.723 N:522952	Redcar .986	MPA_AUK_TP123
Method (E	equipment): Machine Excavated (JCB 360 Tracked)	Ground Level (m): 7.198	Start Date: 07/07/2020	Sheet: 3 of 3
	<caption></caption>			



Status:-

Ġ			Status	FINAL								
Project:		Meta	al Proce	essing A	rea Shall	ow Soils	Investigation			Expl	oratory Hole No.	
Client:	South Tee	s Developmen	t Corp	oration		Location: Former Redcar Steelworks, Redcar E:454459.744 N:522994.039					A_AUK_TP124	
Method (Equip	ment): Mach	ine Excavated	(JCB :	360 Trac	ked)		Ground Le	Sheet:	1 of 3			
SA	MPLES &	TESTS			1 1	STRATA						
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)		De	scription			
0.30 0.60 0.80 1.50 1.60 2.00 2.70 3.00 3.70 4.00	J1 B2 ES3 J4 B5 LB6 J7 B8 J9 B10			6.93		(4.20)	MADE GRO Gravel is fin- yellow and r MADE GRO content. Gra Cobbles are is vesicular) between c.1 burnt clayey at c.1.60m E between c.2 surface.	ravel with wo ular and inclu nt is 75-1009 ellow blue gr subangular e slag. Slag o andom lense s fine to coar little gravel.	with wh	I metal fragments. ag, concrete and is vesicular). th high cobble cludes slag. is 75-100%. Slag bands of orange ular gravel).		
Sketch Dia	ADDIT agram: aphs:	PLAN 5.00 Face A Orientation <u>090°</u> Face C IONAL INFOR No : Yes	MATIC Sketch 1	DN Faken See add shee	itional	GROU No gro	INDWATER undwater inflov	v observed. Ible throughout excav	ration.			
All dim	ensions in Scale 1:50	metres		For exp abbrev	lanation o	of symbols and Checked by: Logged by: Contract No. See Key Sheets K.W. D. Portsmouth 4291						



#### ALLIED EXPLORATION & GEOTECHNICS LIMITED Head Office: Regional Office: Duit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL Te: 0191 387 4700 Fax: 0191 387 4710 Te: 0197 2735 300 Fax: 01772 735 999







	TRI	AL PIT R	ECORD		Status:- FINAL
Project:	Metal Processing Area Shallo	w Soils Inves	stigation		Exploratory Hole No.
Client:	South Tees Development Corporation	Location: Forr	ner Redcar Steelworks, F	Redcar	MPA_AUK_TP124
Method (E	<sup>quipment):</sup> Machine Excavated (JCB 360 Tracked)		Ground Level (m): 7.230	Start Date: 07/07/2020	Sheet: 3 of 3
	<caption></caption>	IRE MPA_AUK MPA_AUK_1			





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ſ	IRIAL PIT R	ECORD		Status:- FINAL
Metal Processing Area S	hallow Soils Inves	stigation		Exploratory Hole No.
South Tees Development Corporation	Location: Forr F	ner Redcar Steelworks	, Redcar 5 533	MPA_AUK_TP125
<sup>quipment):</sup> Machine Excavated (JCB 360 Tracked)		Ground Level (m): 7.708	Start Date: 07/07/2020	Sheet: 3 of 3
	Figure MPA_AUK_T	CTP125.3 P125		
				



# ALLIED EXPLORATION & GEOTECHNICS LIMITED Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL Tel: 0191 387 4700 Fax: 0197 387 4710 Tel: 01772 735 390 Fax: 01772 735 999

88 89					TR	ial P	TR	ECOF	RD		Status:-	FINAL		
Project:		Metal	Proce	essing A	rea Shal	low Soils	Inves	tigation			Exp	loratory Hole No.		
Client:	South Tee	s Development	Corpo	oration		Location: Former Redcar Steelworks, Redcar					MP	A_AUK_TP126		
Method (Equipn	nent): Mach	ine Excavated	(JCB 3	360 Trac	ked)		E	Ground Le	vel (m): 7.523	Start Date: 13/07/2020	Sheet:	1 of 3		
SAN	MPLES &	TESTS							STRATA	- I	1			
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	Depth Thickness) Description							
0.40 0.60 0.80 1.60 1.80 2.30 2.60 2.80 3.60 3.80	J1 B2 ES3 J4 B5 LB6 J7 B8 J9 B10			6.42		(1.10) 1.10 (2.90) (2.90) 4.00	MAI coan at c. MAI is fir and at c. <i>Terr</i>	DE GRO se. Grav ent is 75 0.60m B DE GRO ne to coa include	ick grey sandy rse subangular vesicular). th some grave in gravel with h and includes s nt is 75-100%.	gravel. S r and inc l. ligh cobl lag. Cob Slag is	Sand is fine to Judes slag. Slag			
		PLAN 4.00 Face A	<u> </u>		1	GROL No gro	INDW undwa	ATER ter inflow	v observed.					
Face D		Orientation 000° Face C			Ecce B	STAB Pit side	LITY es and	base sta	ble throughout ex	cavation.				
	ADDIT	IONAL INFORM	MATIC	N		GENE	RAL F	REMARK	(S					
Sketch Dia	Sketch Diagram: No Sketch Taken													
Photogra	phs:	Yes		See ado shee	litional ets.									
All dime	ensions in Scale 1:50	metres		For exp abbrev	lanation iations s	of symbo ee Key S	ols and heets	ł	Checked by:	Logge D. Ports	d by: mouth	Contract No. 4291		





Figure MPA\_AUK\_TP126.2 MPA\_AUK\_TP126





-1	Regional Office:	Unit 20 Business Development Centre,	Eanam Wharf, Blackb	um, BB1 5BL Tel: 017	72 735 300 <b>Fax:</b> 01772 73	,						
		TRIAL PIT RECORD										
Proje	ect: Me	tal Processing Area Shallo	ow Soils Inve	stigation		Exploratory Hole No.						
Clien	t: South Tees Developme	nt Corporation	Location: Forr E	ner Redcar Steelworks, E:454677.394 N:522465	Redcar 464	MPA_AUK_TP126						
Meth	od (Equipment): Machine Excavate	d (JCB 360 Tracked)		Ground Level (m): 7.523	Start Date: 13/07/2020	Sheet: 3 of 3						

# Figure MPA\_AUK\_TP126.3 MPA\_AUK\_TP126



**ALLIED EXPLORATION & GEOTECHNICS LIMITED** 4700 Fax: 0191 387 4710 300 Fax: 01772 735 999

a Gill Industrial Estate, Pelton Fell, Chester-le-S	treet, Co. Durham, DH2 2RG	Tel: 0191 387 4
ness Development Centre, Eanam Wharf, Black	burn, BB1 5BL	Tel: 01772 735

					TR	IAL PI	TR	ECOF	RD		Status:-	FINAL	
Project:		Metal	Proce	essing A	rea Shal	llow Soils	Inves	tigation			Expl	oratory Hole No.	
Client:	South Tees	Development	Corpo	oration		Location: Former Redcar Steelworks, Redcar					MPA_AUK_TP127		
Method (Equip	oment): Machi	ne Excavated (	JCB :	360 Trac	ked)			Ground Le	vel (m): 7.405	Start Date: 10/07/2020	Sheet:	1 of 3	
SA	MPLES & T	ESTS				STRATA							
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness) Description							
0.40 0.60 0.90 1.60 1.80	J1 B2 ES3 J4 B5			6.41		(1.00) 	MAI meta ash. cond MAI and inclu Slag at c. degi	DE GRO al fragme Gravel crete. Sla DE GRO medium ides slag conteni 1.60m E rees in c	UND (Brown bla ents. Sand is fin is fine to coarse ag content is 25 UND (Grey gree boulder conten g. Cobbles and : is 75-100%. SI GL 75mm dia entre of pit (red	ack grey sandy e to medium and subangular and -50%. Slag is v en yellow white t. Gravel is fine boulders are and ag is vesicular) ameter electric undant).	gravel w nd includ d includ esicular) gravel w to coars ngular ar cable ru	vith wood and les predominantly es slag and ). vith high cobble se subangular and nd include slag. nning 270	
2.30 2.60 2.80 3.60 3.80	LB6 J7 B8 J9 B10			3.41		(3.00) (3.00)							
							∖at c. Terr	4.00m B	GL metalic o at 4.00m BGL - ι	bstruction - pos netallic obstruc	sible lac	lle bottom. /	
		PLAN 5.50 Face A			1	GROL No gro	INDW undwa	ATER ter inflow	v observed.				
Orientation							LITY es and	base sta	ble throughout e:	xcavation.			
[	ADDITI	ONAL INFORM	IATIC	N		GENE	RAL F	REMAR	(S				
Sketch Di	Sketch Diagram: No Sketch Taken												
Photogr	Photographs: Yes See additional sheets.												
All dim	ensions in r Scale 1:50	netres		For exp	lanation	of symbo	ols and	I	Checked by	: Logged D. Ports	d by: mouth	Contract No. 4291	



#### ALLIED EXPLORATION & GEOTECHNICS LIMITED Head Office: Regional Office: Duit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL Te: 0191 387 4700 Fax: 0191 387 4710 Te: 0197 2735 300 Fax: 01772 735 999





#### **ALLIED EXPLORATION & GEOTECHNICS LIMITED** Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG Tel: 0191 387 4700 Fax: 0191 387 4710 Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL Tel: 01772 735 300 Fax: 01772 735 999

TRIAL PIT RECORD				Status:- FINAL
Metal Processing Area Shallow Soils Investigation				Exploratory Hole No.
Client: South Tees Development Corporation	South Tees Development Corporation E:454693.944 N:522537.382			MPA_AUK_TP127
Method (Equipment): Machine Excavated (JCB 360 Tracked)		Ground Level (m): 7.405	Start Date: 10/07/2020	Sheet: 3 of 3
Fight ALIK TP127 Spoil				




8					TR	IAL PI	TR	ECOF	RD		Status:-	FINAL
Project:		Metal	Proce	essing A	rea Shal	llow Soils	Inve	tigation			Ехр	loratory Hole No.
Client:	South Tees	s Development	Corp	oration		Location	: Forr	ner Redo	car Steelworks,	Redcar	МР	A_AUK_TP128
Method (Equip	ment): Machi	ne Excavated (	JCB :	360 Trac	cked)		<u></u>	Ground Le	. <u>.391 N.322370</u> evel (m): 7.902	Start Date: 10/07/2020	Sheet:	1 of 3
SA	MPLES & 1	TESTS							STRATA		1	
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)				Description		
0.40 0.60 1.30 1.50 2.60 2.80 3.00 3.60 3.80	J1 B2 ES3 J4 B5 J6 B7 LB8 J9 B10			6.90		(1.00) (1.00) - - - - - - - - - - - - - - - - - -	MAI frag Gra Slig vesi MAI con Cob is ve at c cen betw san sub at c	DE GRO ments. \$ vel is fin thydroc cular). DE GRO ent. Gra ent is 50 bles are biles are sicular) 1.60m E re of pit veen c.2 dy grave angular 3.00m E	UND (Brown gr Sand is fine to n e to coarse sub carbon odour n UND (Grey gre vel is fine to co 0-75% becomin angular and in angular and in GGL 75mm el (redundant). .50-4.50m BGL I. Sand is fine t and includes bu GGL cobbles	ey clayey very g nedium and pre angular and inc oted. Slag conte en yellow white arse subangula g 75-100% with clude slag. Slag ectric cable run with lenses o o medium. Grav int mudstone, o with some grave	gravely dominar ludes sl ent is 25 gravel v r and in depth. depth. conten ning 270 of orang vel is find clinker a el.	sand with wood htly includes ash. ag and concrete. -50%. Slag is with high cobble cludes slag. Slag Slag is vesicular. t is 75-100%. Slag 0 degrees in e brown clayey e to medium nd ash.
C eograduational de la construcción de la construcc	ADDITI agram:	PLAN 6.00 Face A Orientation 045° ■ Face C ONAL INFORM	MATIC ketch 1		1.20 Face R	GROL No gro	Con INDW undwa	ATER ter inflov base sta	4.50m BGL.	4.20-4.50m - sla	g is dam	p.
Photogra	aphs:	Yes		See ado shee	ditional ets.							
All dime	ensions in i Scale 1:50	metres		For exp abbrev	lanation	of symbo	ols and	ł	Checked by	/: Logged D. Ports	d by: mouth	Contract No. 4291



# ALLIED EXPLORATION & GEOTECHNICS LIMITED Head Office: Regional Office: Regional Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL Tel: 0191 387 4700 Fax: 0191 387 4710 Tel: 01772 735 300 Fax: 01772 735 999

	T	RIAL PIT R	ECORD		Status:- FINAL
Project:	Metal Processing Area Sha	allow Soils Inve	stigation		Exploratory Hole No.
Client:	South Tees Development Corporation	Location: For	ner Redcar Steelworks, E:454711.391 N:522576	Redcar 5.301	MPA_AUK_TP128
Method (E	Equipment): Machine Excavated (JCB 360 Tracked)	·	Ground Level (m): 7.902	Start Date: 10/07/2020	Sheet: 2 of 3
	<image/>	igure MPA_AU MPA_AUK_		A SQUE	
		In the second seco	TP128.2 TP128	1624	







Ē					TR	IAL PI	TRI	ECOF	RD		Status:-	FINAL
Project:		Metal	Proce	essing A	rea Shal	low Soils	Inves	tigation			Exp	oratory Hole No.
Client:	South Tees	s Development	Corpo	oration		Location	: Form	er Redo	car Steelworks, Re	dcar	MP	A_AUK_TP129
Method (Equipn	nent): Machi	ne Excavated	(JCB 3	360 Trac	ked)			Ground Le	0.17210.522560.92 evel (m): 7.280	9 Start Date: 13/07/2020	Sheet:	1 of 3
SAN	/IPLES & 1	TESTS							STRATA			
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)			D	escription		
0.50 0.80 1.10	J1 B2 ES3			5.98		(1.30)	MAE fragr and vesic at c. betw at c. <i>Term</i>	DE GRO ments. S sular). 0.10m E een c.0 1.30m E <i>inated</i> a	UND (Brown black Sand is fine to coar s slag and concrete GL grey concre .40-1.30m BGL GL concrete sla at 1.30m BGL - cor	grey sandy rse. Gravel is e. Slag conte te angular bo concrete wal ab. horete slab.	gravel v fine to nt is 75- oulder. I at sout	/ith wood coarse subangular 100%. Slag is hern face of pit.
		PLAN 5.00 Face A			 ]1	GROU No gro	INDW/ undwa	ATER ter inflow	v observed.			
Face D		Orientation 000° Face C		race b	3.00	STABI Pit side	LITY es and	base sta	ble throughout exca	avation.		
		<u></u>					<u></u>		<i>(</i> 2			
Sketch Dia	ADDITI gram:	UNAL INFORM	ketch T	N aken			KAL F	EMAR	8			
Photogra	ohs:	Yes		See add shee	litional ts.							
All dime	nsions in i Scale 1:50	metres	I	For exp abbrev	lanation iations s	of symbo ee Key S	ols and heets		Checked by:	Logged D. Portsr	l by: nouth	Contract No. 4291



<u>n</u>	Regional Office: Unit 20 Business Development Centre, Eanam W	harf, Blackburn, BB1 5BL Tel: 01772 735 300 Fax: 017	72 735 999
	TRIALI	PIT RECORD	Status:- FINAL
Project:	Metal Processing Area Shallow So	ils Investigation	Exploratory Hole No.
Client:	South Tees Development Corporation	on: Former Redcar Steelworks, Redcar E:454766.172 N:522560.929	MPA_AUK_TP129
Method (Equ	<sup>lipment):</sup> Machine Excavated (JCB 360 Tracked)	Ground Level (m): Start Date: 7.280 13/07/20:	20 Sheet: 2 of 3
			



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	TF	RIAL PIT R	ECORD		Status:- FINAL
Project:	Metal Processing Area Sha	allow Soils Inve	tigation		Exploratory Hole No.
Client:	South Tees Development Corporation	Location: Forn E	ner Redcar Steelworks ::454766.172 N:522560	, Redcar ).929	MPA_AUK_TP129
Method (E	<sup>quipment):</sup> Machine Excavated (JCB 360 Tracked)		Ground Level (m): 7.280	Start Date: 13/07/2020	Sheet: 3 of 3
		igure MPA_AUK MPA_AUK_TP1	t TP129.3 29 Spoil		



					TR	ial pi	TR	ECORI	)		Status:-	FINAL
Project:		Metal	Proce	essing A	rea Shal	low Soils	Inve	stigation			Exp	loratory Hole No.
Client:	South Tees	Development	Corpo	oration		Location	: Forr	ner Redca	r Steelworks,	Redcar	MP	A_AUK_TP130
Method (Equipm	nent): Machir	ne Excavated	(JCB 3	60 Trac	ked)		L	Ground Leve	i (m): 7.682	Start Date: 10/07/2020	Sheet:	1 of 3
SAN	/IPLES & T	ESTS					1		STRATA	ł		
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)				Description		
0.20 0.30 0.60	J1 B2 ES3			6.68		(1.00)	MAI woo coa are is 50	DE GROU d, metal c rse subanç angular ar 0-75%. Sla	ND (Brown gr able and shee gular slag, co nd include sla ng is vesicular	ey slightly sance t metal (2.00x ncrete and yello g and yellow ar ).	dy gravel 2.00m). ow and ro nd red br	and cobbles with Gravel is fine to ed brick. Cobbles ick. Slag content
1.20 1.30	J4 B5			0.08			MAI with coa inclu	DE GROU high cobb rse subang ude slag. S	ND (Grey gre le content an gular and incl Slag content is 0-4.50m BGL	en yellow blue s d metal fragme udes slag. Cobl s 75-100%. Slag	slightly c nts. Gra bles are g is vesi of orang	layey sandy gravel vel is fine to angular and cular). e brown clayey
2.30 2.50	J6 LB7					- - - (3.50) - - -	san sub	dy gravel. angular an	Sand is fine t d includes bu	o medium. Grav irnt mudstone a	vel is find and clink	e to medium er.
3.30 3.50 4.30	J8 B9 J10			3.18		- - - - - - - - - - - - - - - - - - -						
4.40	БП					- - - - - - - - - - -	Con	nplete at 4.	50m BGL.			
		PLAN				GROL	INDW	ATER				
÷		6.00 Face A Orientation				No gro	undwa	ater inflow o	bserved. At c.	3.50m BGL - sla	ig is dam	p.
Face		090°			20 	STABI Pit side	LITY es and	base unsta	able between (	).00-2.00m BGL.	. Stable b	elow 2.00m BGL.
		Face C			1							
	ADDITIC	ONAL INFORM	ΛΑΤΙΟ	N		GENE	RAL I	REMARKS	;			
Sketch Diag	gram:	No S	ketch T	aken								
Photograp	ohs:	Yes		See ado shee	litional Its.							
All dime	nsions in n Scale 1:50	netres		For exp abbrev	lanation iations s	of symbo ee Key S	ols and heets	d	Checked by	/: Logge D. Ports	d by: mouth	Contract No. 4291





 Head Office:
 Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG
 Tel: 0191 387 4700 Fax: 0191 387 4710

 Regional Office:
 Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL
 Tel: 01772 735 300 Fax: 01772 735 999

EE GS	RIAL PIT R	ECORD		Status:- FINAL
Project: Metal Processing Area SI	hallow Soils Inves	stigation		Exploratory Hole No.
Client: South Tees Development Corporation	Location: Forr E	ner Redcar Steelworks, Re :454486.409 N:522919.93	dcar 8	MPA_AUK_TP130
Method (Equipment): Machine Excavated (JCB 360 Tracked)		Ground Level (m): 7.682	Start Date: 10/07/2020	Sheet: 3 of 3
	MPA_AUK_TP1			

### Groundwater Observations Made at the Time of Site Works

	Remarks		AEG Contract No. 4291	Certefficaries Pto
		Moderate Infloye	Development Corporation	- 10 PO
	Depth After 20 mins		South Tems	Approve
Durch	After 15 mins		lient >-	
-	After 10 mims		U.	1
Conth	After 5 mins			recked By >
Total	(mins)		apite	5
	Dopth (m)		Ditsavui mo	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Sealed (m)		a Shelow S	-50 -50
	Depth of Casing (m)		ary Buispace	Rage N
	Depth of Water (m)	80	Melan Pro	
	Date	10/0772020	×	ue - 06/11/2020
	Exploratory Hole No.	TPHIT TPHIT	Contract To	Darm of tea



### In-situ Test Report Certificate

ALLIED EXPLORATION & GEOTECHNICS LIMITED et Pencer Note (25 Stanting Gel Instanting Extrans. Pencer (Fairl Communication and Co. Diamann. Dec 2985). Ter UTP). 3074/00 Fairl Q101 and 4110 Response Oncer (End. 5) Business Development Centre II answer White Time Review. Terl 11 = 1 for 01254 503 ccto Fairl D1254 503 ccto Fairl D12555 503 ccto Fairl D12555 503 ccto F I think filled IN-SITU TESTING REPORT CERTIFICATE Metal Processing Area Shallow Soils Contract Title: **AEG Reference:** 4291 Investigation **Client Address:** South Tees Development Corporation I certify that In-situ testing was carried out on the above contract in accordance with techniques outlined in BS 1377' 1990' Part 9 or other appropriate standards as quoted, and the following results. given on the attached enclosures, were obtained The tests carried out are indicated in the attached table showing the enclosure number and the total number of pages. For and on behalf of Allied Exploration & Geotechnics Limited Nick Vater (Managing Director) Kerry Wade (Technical Manager) Date 06 November 2020 Signed Tests marked not UKAS accredited in this certificate are not included in the UKAS accreditation schedule for our laboratory. Any opinions and interpretations expressed herein are outside the scope of the laboratory's UKAS accreditation In-silu Testing Nopol1 Conficato Rage 1-612

### IN-SITU TESTING REPORT CERTIFICATE

#### ENCLOSURES

Enclosure Number	Description	UKAS Accredited	Reference	No. of Pages
0	Test Report Certificate	N/A		2
-	Standard Penetration Test Results (SPT)	Yes	BS 1377 Part 9 1990	1
~	Hand Shear Vane Test Results	No		3
2	Variable Head Permeability Test Results	No	BS 5930 1999 Section 4	
	In-situ Water Quality Parameter Test Results	No		
	Density by Sand Replacement Method	Yes	BS 1377 Part 9 1990	
-	Density by Core Cutter Method	Yes	BS 1377 Part 9 1990	
1.8	Determination of the Vane Shear Strength (Down the Hole)	Yes	BS 1377 Part 9 1990	
~	Shallow Pad (skip) Load Test Results	No	BS 1377 Part 9 1990	1.
~	Determination of the California Bearing Ratio	Yes	BS 1377 Part 9 1990	
1	Plate Loading Test Results	No	BS 1377 Part 9 1990	3
-	Apparent Resistivity of Soil	No	BS 1377 Part 9 1990	
-	Redox Potential of Soil	No	BS 1377 Part 9 1990	1
a.	Determination of the Soil Infiltration Rate for Soakaway Design	No	BRE Digest 365-1991	

In ally Josling report Certificate Page 2.01.2



### In-Situ Plate Load Test Results



#### ALLIED EXPLORATION & GEOTECHNICS LIMITED In-Situ Plate Load Test

BS 1377 : Part 9 : 1990

Unit 25 Stella Gill Industrial Estate Pelton Fell Chester-le-Street County Durham DH2 2RG. Tel: 01913874700 Fax: 01913874710 email: enquiries@aeq.uk.net

	roject Title:	Metal Processing A	rea Shallow Soils Investig	ation		
	Client:	South Tees Develop	ment Corporation		Project No.:	4291
Те	st Position:	PLT-01 (BO)	Depth (mBGL):	0.00	Operator:	JM
D	ate of Test	31/07/2020	Plate Diameter (mm):	453	Plate Area (m2)	0 16117
Rea	ction Load:	Tracked 360 (16T)		100	Sample:	No
nea	Weether:				Equipment Mass (Kg):	28.00
			ve /C attle ve a vt		Equipment Mass (Rg).	30.90
	Test Type:	Incremental - Pressu			Equipment Force (KN):	0.382
IVIa	iterial Type:	MADE GROUND (BI	ack gravelly sand.)			
	Remarks:	Self weight of the eq	upment calculated at 0.38 kl	N (I.e. plate, extension	rod, jack piston and load c	ell).
10	ad Stage	Time	Force	Pressure	Av. Penetration	Av. Pene
1	au olago	Minutes	kN	kPa	(mm)	mm/kPa
	0	0.0	0.00	2.37	0.00	0.0000
	1	6.0	4.00	27.19	0.11	0.0039
	2	12.0	8.00	52.00	0.23	0.0044
	3	18.0	16.00	101.64	0.54	0.0053
	4	24.0	32.00	200.91	0.94	0.0047
	5	30.0	64.00	399.46	1.66	0.0041
	6	36.0	0.00	2.37	1.16	0.4914
						<u> </u>
	Plate	Penetration (mm):	1.25	k762:	150402.5	kN/m2/m
	Plate Loa	ad @1.25mm (kPa):	300.00	Equivalent CBR:	57.22	%
		Plate Factor:	0.6267	Subgrade Mod (E):	234.60	MN/m2
	Pen	etration Comment:	1.25mm achieved at given pi	ressure		
	1.80					
Settlement (mm)	1.60 1.40 1.20 1.00 0.80 0.60 0.40 0.20 0.00 0.0	10.0 20.0 Time (Min	30.0 40.0 utes)	450.0 400.0 350.0 300.0 2250.0 150.0 100.0 50.0 0.0 0.00 0 0	50 1.00 1.50 Settlement (mm)	
Settlement (mm)	1.60 1.40 1.20 1.00 0.80 0.60 0.40 0.20 0.00 0.0 <b>Certificate:</b>	10.0 20.0 Time (Min 4291/PLT-01 (BO)	0.0 40.0 <b>utes</b> )	450.0 400.0 350.0 300.0 250.0 150.0 100.0 50.0 0.0 0.0 0.0 0.0 0.0 0.0	50 1.00 1.50 Settlement (mm)	2.00
Settlement (mm)	1.60 1.40 1.20 1.00 0.80 0.60 0.40 0.20 0.00 0.00 Certificate: Calculated:	10.0 20.0 Time (Min 4291/PLT-01 (BO) Nick Vater	30.0 40.0 utes)	450.0 400.0 350.0 300.0 250.0 150.0 150.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	50 1.00 1.50 Settlement (mm)	2.00
Settlement (mm)	1.60 1.40 1.20 1.00 0.80 0.60 0.40 0.20 0.00 0.0 Certificate: Calculated: Approved:	10.0 20.0 Time (Min 4291/PLT-01 (BO) Nick Vater Nick Vater	30.0 40.0 utes)	450.0 400.0 350.0 300.0 250.0 150.0 100.0 50.0 0.0 0.0 0.0 0.0 0.0 0.0	50 1.00 1.50 Settlement (mm) Tested in accordance with n/a 1 of 1	0 2.00

Contract: Metal Processing Area Shallow Soils Investigation Contract No: 4291 Date: 05/11/2020 Page: 1 of 3



#### ALLIED EXPLORATION & GEOTECHNICS LIMITED In-Situ Plate Load Test

BS 1377 : Part 9 : 1990

Unit 25 Stella Gill Industrial Estate Pelton Fell Chester-le-Street County Durham DH2 2RG. Tel: 01913874700 Fax: 01913874710 email: enguiries@aeg.uk.net

Project Title	: Metal Processing A	Area Shallow Soils Investig	ation	Ŭ	
Clien	: South Tees Develop	ment Corporation		Project No.:	4291
Test Positior	: PLT-02 (BO&M)	Depth (mBGL):	0.05	Operator:	JM
Date of Tes	: 31/07/2020	Plate Diameter (mm):	453	Plate Area (m2):	0 16117
Reaction Load	• Tracked 360 (16T)			Sample:	No
Weathe	Clear and sunny			Equipment Mass (Ka):	38.00
	Incremental Brace	uro/Sottlomont		Equipment Fores (kN).	0.202
Motorial Type		rev cendy grovel )		Equipment Force (kiv).	0.302
	: MADE GROUND (G	biey Salluy glavel.)	VI /i a plata avtancian	rad isal piston and load a	
Remarks			V (I.e. plate, extension	Tou, jack piston and load o	eii).
Load Stage	l ime Missutes	Force	Pressure	AV. Penetration	Av. Pene
0	Minutes	<u>KN</u>	<u>кра</u>	(mm)	<b>тт/кРа</b>
0	0.0	0.00	2.37	0.00	0.0000
2	0.0	4.00	<u> </u>	0.10	0.0059
3	12.0	16.00	101.6/	0.17	0.0033
<u> </u>	24.0	32.00	200.91	1 01	0.0040
5	30.0	64.00	399.46	2 19	0.0055
6	36.0	0.00	2.37	1.42	0.5999
Pla	e Penetration (mm):	1.25	k762:	122828.7	kN/m2/m
Plate L	oad @1.25mm (kPa):	245.00	Equivalent CBR:	40.28	%
	Ulata Laatari	() (5) (5)	Subarada Mad (L)		MN/m2
Do	Fidle Facior.	0.0207 1.25mm achieved at given n		187.40	
Pe	netration Comment:	1.25mm achieved at given p	essure	187.40	WIN/1112
2.50	netration Comment:	1.25mm achieved at given p	450.0 400.0		
2.50 2.00	netration Comment:	1.25mm achieved at given p	450.0 400.0 350.0 300.0		
2.50 2.00 (m) 1.50 1.00		1.25mm achieved at given p	450.0 400.0 350.0 300.0 250.0 200.0		
2.50 2.00 () () () () () () () () () () () () ()		1.25mm achieved at given p	450.0 400.0 350.0 300.0 250.0 150.0 100.0 50.0		
2.50 2.00 () () () () () () () () () () () () ()	10.0 20.0 Time (Min	1.25mm achieved at given p	450.0 400.0 350.0 300.0 250.0 150.0 100.0 50.0 0.0 0.0 0.0 0.00 0.50	1.00 1.50 Settlement (mm)	
2.50 2.00 (m) 1.50 1.00 0.50 0.00 0.0	10.0 20.0 Time (Min 24291/PLT-02 (BO&N	1.25mm achieved at given p	450.0 400.0 350.0 300.0 250.0 150.0 100.0 50.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	1.00 1.50 Settlement (mm)	2.00 2.50
2.50 2.00 () () () () () () () () () () () () ()	10.0 20.0 Time (Min 24291/PLT-02 (BO&N : Nick Vater	1.25mm achieved at given p	450.0 400.0 350.0 300.0 250.0 150.0 100.0 50.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	1.00 1.50 Settlement (mm) Tested in accordance with n/a	2.00 2.50
2.50 2.00 2.00 1.50 0.50 0.00 0.0 Certificate Calculated Approved	10.0 20.0 Time (Min 24291/PLT-02 (BO&N 20.1 Time (Min 20.1 Time (Min 20.1 Time (Min 20.1 Time (Min 20.1 Time (Min 20.1 Time (Min 20.1) Time (Min 20.1)	1.25mm achieved at given p	450.0 400.0 350.0 300.0 250.0 150.0 100.0 50.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	1.00 1.50 Settlement (mm) Tested in accordance with n/a 1 of 1	2.00 2.50

Contract: Metal Processing Area Shallow Soils Investigation Contract No: 4291 Date: 05/11/2020 Page: 2 of 3



#### ALLIED EXPLORATION & GEOTECHNICS LIMITED In-Situ Plate Load Test

BS 1377 : Part 9 : 1990

Unit 25 Stella Gill Industrial Estate Pelton Fell Chester-le-Street County Durham DH2 2RG. Tel: 01913874700 Fax: 01913874710 email: enquiries@aeq.uk.net

Project Title	: Metal Processing A	Area Shallow Soils Investig	ation	Ŭ	
Client	South Tees Develop	oment Corporation		Project No.:	4291
Test Position	: PLT-03 (M)	Depth (mBGL):	0.05	Operator:	JM
Date of Test	: 31/07/2020	Plate Diameter (mm):	453	Plate Area (m2):	0.16117
Reaction Load	: Tracked 360 (16T)			Sample:	No
Weather	Clear and sunny			Equipment Mass (Kg):	38.90
Test Type	Incremental - Press	ire/Settlement		Equipment Force (kN):	0 382
Material Type	MADE GROUND (G	Grev sandy gravel )			0.002
Remarks	Self weight of the ec	nuipment calculated at 0.38 kl	V (i e plate extension	rod jack niston and load c	ell)
	Time	Force	Pressure	Av Penetration	Av Pene
Load Stage	Minutes	kN	kPa	(mm)	mm/kPa
0	0.0	0.00	2 37	0.00	0.0000
1	6.0	4.00	27.19	0.08	0.0028
2	12.0	8.00	52.00	0.14	0.0026
3	18.0	16.00	101.64	0.43	0.0042
4	24.0	32.00	200.91	0.86	0.0043
5	30.0	64.00	399.46	2.08	0.0052
6	36.0	0.00	2.37	1.38	0.5844
Diat	Penetration (mm):	1 25	k762:	1/0375.6	kN/m2/m
Plate Lo	ad $@1.25$ mm (kPa)	280.00	Equivalent CBR:	<b>50 77</b>	0/2
	Dista Eastar:	0.0007	Cubarada Mad (E):	017.01	/0 MNI/m2
			Subdrade Mod (E)	1717 51	
Per	netration Comment:	1.25mm achieved at given p	Subgrade Mod (E): ressure	217.31	
2.50 2.00 () () () () () () () () () () () () ()	netration Comment:	1.25mm achieved at given p	Subgrade Mod (E): ressure 450.0 400.0 350.0 300.0 250.0 150.0 100.0 50.0 0.0 0.00 0.50	217.31	
2.50 2.00 2.00 1.50 1.00 0.50 0.00 0.0 Certificate	10.0 20.0 Time (Min	1.25mm achieved at given p	Subgrade Mod (E): ressure 450.0 400.0 350.0 300.0 250.0 150.0 100.0 50.0 0.0 0.0 0.0 0.0 0.0 0.0	1.00 1.50 Settlement (mm)	2.00 2.50
2.50 2.00 2.00 1.50 0.50 0.00 0.00 0.00 0.0	10.0 20.0 Time (Min 24291/PLT-03 (M)	1.25mm achieved at given p	Subgrade Mod (E): ressure 450.0 400.0 350.0 300.0 250.0 150.0 150.0 100.0 50.0 0.0 0.00 0.00 0.50 End Remark: Moisture Content:	1.00 1.50 Settlement (mm) Tested in accordance with n/a	2.00 2.50
2.50 2.00 2.00 0.50 0.50 0.00 0.0 Certificate Calculated Approved	10.0 20.0 Time (Min 24291/PLT-03 (M) Nick Vater	1.25mm achieved at given p	Subgrade Mod (E): ressure 450.0 400.0 350.0 300.0 250.0 150.0 100.0 50.0 0.0 0.0 0.0 0.0 0.0 0.0	1.00 1.50 Settlement (mm) Tested in accordance with n/a 1 of 1	2.00 2.50

Contract: Metal Processing Area Shallow Soils Investigation Contract No: 4291 Date: 05/11/2020 Page: 3 of 3



### Laboratory Report Certificate

8		
Ğ	LABORATORY REPOR	1367
Contract Title:	Metal Processing Area Shallow Solls Investigation	AEG Reference: 4291
Client:	South Tees Development Corporation	
We certify that La techniques outlin The samples we were obtained	aboratory testing was carried out on sample ed in BS 1377: 1990, BS EN ISO 17892.20 re received from July 2020 and the followi	is from the above contract in accordance with 14 or other appropriate standards as quoted, ng results, given on the attached enclosures,
The tests carried number of pages	d out are indicated in the attached table :	showing the enclosure number and the total
For and on behal	of Allied Exploration & Geotechnics Limited	
	Nick Valer (Managing Director)	
$\Box_{I}$	Kevin Warriner (HSE & Quality Director)	
Z	Michelle Selkirk (Laboratory Manager)	
. B	mono	
Signed	TISKU	Date: 11 November 2020
Tests marked no for our laborator laboratory's UKA:	t UKAS accredited in this certificate are not ry Any opinions and interpretations express Saccreditation	Included in the UKAS accreditation schedula essed herein are outside the scope of the
Please note the n	naterial was derived from samples taken out	side the control of the laboratory

### LABORATORY REPORT CERTIFICATE

#### ENCLOSURES

Enclosure Number	Description	UKAS Accredited	Reference	No. of Pages
0	Laboratory Report Certificate	N/A		3
1	Sample Description Sheets	N/A		5
2	Moisture Content	Yes	BS 1377 Part 2 1990 (BS EN ISO 17892-1 2014)	2
2	Plasticity Index and Moisture Content	Yes	BS 1377 Part 2 1990 (BS EN ISO 17892-1 2014)	1
3	Determination of Particle Density	Yes	BS 1377 Part 2 1990	1
4	Particle Size Distribution Sleving	Yes	BS 1377 Part 2 1990	48
4	Particle Size Distribution Sedimentation	Na	BS 1377 Part 2 1990	7
5	Determination of Galorific Value, Total Sulphur, Sulphate and pH (Tested externally)	No	See DETS certificates	6
6	Determination of Dry Density/Moisture Content Relationship	Yes	BS 1377 Part 4 1990	12
7	Determination of California Bearing Ratio	Yes	BS 1377 Part 4 1990	3
8	Determination of Permeability in a Triaxial Celi	Yes	BS 1377 Part 6 1990	5
9	Determination of In-Situ Density Core Gutter Method	Yes	BS1377 Part 9 1990	1
10	Stag Analysis (Tested externally)	No		- 14

### LABORATORY REPORT CERTIFICATE

### ABBREVIATIONS

All the abbreviations used on the laboratory certificates are given below:

Br	Brittle	PSD	Particle Size Distribution by sieve analysis
c	Compound	SB	Shear Box
CBR	California Bearing Ratio	SED	Sedimentation Analysis
CDT	Consolidated Drained Triaxial	SO4	Sulphate (total, water extract, groundwater)
CL	Chloride content (water or soil)	CP2	Dry Density/Moisture Content 2.5kg rammer
US	Unsuitable sample for test	CP4	As above using 4.5kg rammer
UUT	Undrained Unconsolidated Triaxial	CPV	As above using vibrating hammer
HSV	Vane Test	CUT	Consolidated Undrained Triaxial
IS	Insufficient sample for test	R	Remoulded
LOI	Loss On Ignition	U	Undisturbed
м	Multi-stage testing	MC	Moisture Content
MCV	Moisture Content Value	PL	Point Load
NAT	Natural preparation method	NMC	Natural (or as received) moisture content
P	Plastic	PFH	Permeability Falling Head Method
OED	Oedometer	PTXL	Permeability in Triaxial Cell
OMC	Optimum Moisture Content	ORG	Organic content
в	Large disturbed (bulk) sample	PD	Particle Density (SG)
L	Small disturbed (jar) sample	PI	Liquid limit, plastic limit and plasticity index

#### Typical Mode of Failure for Triaxial Testing

#### Brittle



Compound

Plastic

Expansiony report Certificane Page 3 of 3



### Sample Description Sheets

2 Office control being of the intervention of the intervention of the second cost of the Automatic Strategy and the intervention of the second office.

		-	ABORATORT SAMPLE DESCRIPTION SHEE	
xploratory Hole Nit.	Sample Depth (m)	in ID	Description	Laboratory Tests/Remarks
BOS1 0.00 B			MADE GROUND (Black very clayey very sandy gravel of mudstone (Clay of low to intermediate plasticity))	MC PI PSD SED CP2 PTX
MPA_AUK_TP101	1.70	J4	MADE GROUND (Grey slightly sandy gravel of slag).	MC
MPA_AUK_TP101	2.40	LB6	MADE GROUND (Grey cobbles with much gravel of stag)	PSD US for CP4 & CER
PA_AUK_TP102A	2.10	LB6	MADE GROUND (Grey cobbles of slag).	PSD
PA_AUK_TP100	0.60	31	MADE GROUND (Brown gravely sand Gravel includes slag).	MC Calonfic Value
APA_AUK_TP103	1.50	.54	MADE GROUND (Brown gravelly sand).	MC
MPA_AUK_TP103	2.30	LBG	MADE GROUND (Grey cobbles of slag)	PSD US for CP4
APA_AUK_TP104	2.40	LB5	MADE GROUND (Brown cobbles of slag).	PSD US for CP4
MPA_AUK_TP104	2.70	л	MADE GROUND (Brown sandy gravel of stag)	MC.
APA_AUK_TP105	0.40	31	MADE GROUND (Brown gravelly send. Gravel includes stag)	MC Calonfic Value
PA_AUK_TP105	0,70	82	MADE GROUND (Grey brown slightly clayey very sandy grave) including metal fragments)	PSD CP4
MPA_AUK_TP105	2 80	LB8	MADE GROUND (Grey cobbles with some gravel of slag)	PSD US for CP4 & CBR
MPA_AUK_TP105	3.60	19	MADE GROUND (Grey slightly sandy gravel of slag).	MC
MPA_AUK_TP100	0.50	.J1	MADE GROUND (Grey slightly sandy gravel of slag).	MC BRE Caloritic Value
PA_AUK_TP105	080	82	MADE GROUND (Grey cobbles with much grave) of sag).	PSD US for CP4 & CBR
PA_AUK_TP106	2.60	57	MADE GROUND (Brown slightly sandy gravel of slag).	BRE Caloritic Value
MPA_AUK_TP107	0.50	J1	MADE GROUND (Brown sandy gravel of slag)	MC Calorific Value
MPA_AUK_TP107	0.70	82	MADE GROUND (Grey cobbles with some gravel of stag)	PSD US for CBR
MPA_AUK_TP108	0.60	11	MADE GROUND (Brown sandy grave) of slag).	Dialorffic Value
MPA_AUK_TP108	1.60	14	MADE GROUND (Brown sandy gravel of slag).	Calorific Value
MPA_AUK_TP109	MADE GROUND (Grivy cobbies of stag)		PSD US for PD & CP4	
iontract Title - Metal	Processin	ng An	ea Shallow Solls Investigation South Teas	Development Corporation
Signeid :	m	30	No Name Contraction	Page Tots
Date of issue	e. 05/11/202	20	Certificate No . AEG Cont SD/4291/1	rest No - 4291

Head DNew care(2) their control more price. Another field Control and Section (2) (advanced (2)) and (2) (advanced

			ABORATORY SAMPLE DESCRIPTION SHEE	.1
Holy No.	Samp Depth (m	nê ID	Description	Laboratory Tests/Romarks
MPA_AUK_TP109	2.60	J7	MADE GROUND (Grey gravel of slag)	MC BRE
MPA_AUK_TP110	080	B2	MADE GROUND (Grey sandy gravel including slag and metal tragments)	PSO PD CP4
MPA_AUK_TP110	Z 90	BS	MADE GROUND (Dark brown sandy gravel with a medium cobble content. Gravel includes slag and metal fragments).	PSD US for CP4
MPA_AUK_TP112	0.60	JI	MADE GROUND (Brown gravely sand, Gravel includes plastic and stag)	MC
VPA_AUK_TP112	0.70	B2	MADE GROUND (Grey sandy gravel with a high cobble content of stag).	PSD US for CP4 & CBR
PA_AUK_TP112	2.10	LBG	MADE GROUND (Grey cobbles with some gravel of slag)	PSD US for PD & CP4
VPA_AUK_TP112	2.60	J7	MADE GROUND (Brown slightly sandy gravet of slag)	MC Galonfic Value
WPA_AUK_TP113	2.30	1.86	MADE GROUND (Brown clayey very sandy gravel with occasional clay pockets and a medium cobbile content. Gravel induites slag).	PSD US for CP4
WPA_AUK_TP113	2.60	57	MADE GROUND (Brawn slightly sandy grave) of slag)	NC
WPA_AUK_TP113	3.80	Bid	MADE GROUND (Grey cobbles with some gravel of slag)	PSD.
MPA_AUK_TP114	2.30	.15	MADE GROUND (Brown sightly sandy pravel of stag)	MC
MPA_AUK_TP114	2.50	LBS	MADE GROUND (Grey cobbles with occasional gravel of stag).	PSD US for PD & CP4
WPA_AUK_TP115	0.40		MADE GROUND (Grey sandy gravel of slag)	Calorific Value
WPA_AUK_TP115	0.50	B2	MADE GROUND (Grey clayey very sandy grove!)	PSD CP4 CBR
MPA_AUK_TP115	2.00	LB6	MADE GROUND (Grey cobbies with occasional gravel of slag)	PSD
MPA_AUK_TP116	1.40	.14	MADE GROUND (Brown slightly sandy gravel of slag)	MC BRE
MPA_AUK_TP116	1.60	85	MADE (GROUND (Grey grave) and cobbles of stag).	PSD US for PD
MPA_AUK_TP117	2.00	LB6	MADE GROUND (Grey cobbles with some gravel of slag).	PSD US for CP4 & CBR
MPA_AUK_TP117	2.30	37	MADE GROUND (Reddiati brown sandy gravel of slag).	MC.
MPA_AUK_TP117	ġ,ĝą	拍	MADE GROUND (Brown slightly sandy gravel of slag)	BRE Calonfic Value
MPA_AUK_TP118	0.60	82	MADE GROUND (Grey slightly clayey sandy gravel with a medium cobble conteni of slag)	PSD CER
Contract Title - Meta	I Processi	ing Ar	ea Shallow Soils Investigation South Tee	s Development Corporation
Signed :	m	n	D Name .	Page 2 of 5
Dete of issu	05/11/20	20	Certilicale No - AEG Cor SD/4291/2	4291

Many Mary Martin of Transmission Participal Communications and American Statistics, 2022 New York, New

		1	ABORATORY SAMPLE DESCR	RIPTION SHEET	1		
Exploratory Hole No.	Same Depth (n	nia ni ID	Description	Laboratory Tests/Remarks			
AUK_TP118	2 00	avel of slag).	PSD				
MPA_AUK_TP118	2 80	JŤ	MADE GROUND (Grey slightly sandy gravel of	MC			
MPA_AUK_TP119	0.80	82	MADE GROUND (Brown clayey very sandy gr occasional rootlets).	ravel of slag with	PSD CBR		
MPA_AUK_TP115	1.40	J4	MADE GROUND (Grey slightly sandy gravel of	of slag)	Caloritic Value		
IPA_AUK_TP119	2.70	J7	MADE GROUND (Grey slightly sandy gravel o	(slag)	MC.		
PA_AUK_TP119	3,00	LB8	MADE GROUND (Grey cobbles with some on	avel).	PSD US for CP4		
PA_AUK_TP120	0.60	82	MADE GROUND (Grey cobbles with some gra	avel of stag).	PSD US for CBR		
MPA_AUK_TP120	2.00	LBG	MADE GROUND (Grey cobbles of slag)		PSD		
MPA_AUK_TP120	3.60	eL.	MADE GROUND (Grey slightly sandy gravel o	of slag).	BRE		
PA_AUK_TP120	3.60	B10	MADE GROUND (Grey cobbles of stag)	PSD			
PALAUK_TP121	2.00	J4	MADE GROUND (Brown gravelly sand Grave	MC			
VPA_AUK_TP121	2,50	1.86	MADE GROUND (Grey cobbles of slag)	PSD US for PD CP4 & CBR			
MPA_AUK_TP122	1.40	.14	MADE GROUND (Brown sandy gravel of slag	MG			
MPA_AUK_TP122	1.70	85	MADE GROUND (Grey cobbles with some gr	MADE GROUND (Grey cobbles with some gravel of slag)			
MPA_AUK_TP122	2 80	LB7	MADE GROUND (Brown and grey cobbles we	MADE GROUND (Brown and grey cobbles with some gravel of slag)			
MPA_AUK_TP123	2.30	LB6	MADE GROUND (Gray cobbles with some gra	avel of slag)	PSD US for CBR		
MPA_AUK_TP124	1.60	85	MADE GROUND (Grey and brown cobbles wi stag)	th occasional gravel of	PSD		
MPA_AUK_TP124	3.70	94	MADE GROUND (Brown sandy gravel of slag	0	BRE		
MPA_AUK_TP125	1.90	J4	MADE GROUND (Brown gravely sand Grave	el includes stag).	MC.		
MPA_AUK_TP125	2.40	LB6	MADE GROUND (Grey cobbles with some gr	avel of slag)	PSD US for CP4 & CBR		
MPA_AUK_TP125	MADE GROUND (Brown sandy gravel of slag)				MC		
Contract Time . Meta	Processi	ing An	a Shallow Soils Investigation	Client South Tees D	evelopment Corporation		
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		ι	ABORATORY SAMPLE DESCI	RIPTION SHEET			
Exploratory Hole No.	Samp Depth (r	n in	Description	Laboratory Tests/Remarks			
MPA_AUK_TP125	4.20	B10	MADE GROUND (Grey cobbles with some g	ravel),	PSD		
MPA_AUK_TP126	0.40	л.	MADE GROUND (Brown sandy gravel of stat	MC BRE			
MPA_AUK_TP126	0.60	B2	MADE GROUND (Grey cobbles with some g	PSD US for CBR			
MPA_AUK_TP127	0.40	,n	MADE GROUND (Grey sandy gravel of slag)	). —	Calorific Value		
MPA_AUK_TP127	0.60	B2	MADE GROUND (Brown sandy gravel includ fragments).	ling slag and metal	PSD US for CP4 & CBR		
MPA_AUK_TP127	1.60	J4	MADE GROUND (Grey sandy gravel of stag)	).	Calorific Value		
MPA_AUK_TP128	0.40	н	MADE GROUND (Brown slightly gravely san fragments).	nd. Gravel includes metal	MC BRE		
MPA_AUK_TP128	0.60	82	MADE GROUND (Dark grey dayey very grav includes metal fragments)	MADE GROUND (Dark grey clayey very gravely sand Gravel includes metal fracments).			
MPA AUK TP128	3.00	LBS	MADE GROUND (Grey cobbles with some g	PSD			
MPA AUK TP128	3.60	J9	MADE GROUND (Grey slightly sandy grave)	MC Calorific Value: US for Pt			
MPA AUK TP130	ŭ 20	JI.	MADE GROUND (Brown sandy gravel of sta	MC US for PI			
MPA AUK TP130	0.30	R2	MADE GROUND (Brown slightly sandy grave and brick fragments).	PSD PO US for CP4			
MPA AUX TP130	1.20	14	MADE GROUND (Brown sandy gravel of sta	MC			
MPA AUX TE130	130	85	MADE GROUND (Brown and grey slightly dir high cobble content of stag and metal fragme	PSD PD			
Stownile	0.00	'R1	MADE GROUND (Grey slavey very sandy gr	avel of mudstone. (Clay	MC PI PSO SED BRE CP2		
-Sittorphe	0.00	DI.	MADE GROUND (Grey clayey very sandy gr	avel of mudstone).	MC. Density US for HSV & PTXI		
Stockpile	0.00	CI	UADE GROUND /Grou change stock of the	of mindelines. (Claused	W' DI DEGI DO DDE (-D3		
Stockpile	0.00	82	live plasticity))	or monorone (cony or	PTXL		
Stockpile	0.00	C2	MADE GROUND (Grey clayey very sendy gr	avel of mudstone)	MC Density PSD SED PD US for HSV & PTXL		
Stockpile	0.00	B3	MADE GROUND (Grey clayey very sandy gr of low plasticity).	ravé) ol mudstone. (Clay	MC PI PSD SED BRE CP2 PTXL		
Stockpie	0.00	C3	MADE GROUND (Grey dayey very sandy gr	ravel of muds(one)	MC US for Density, HSV & PTX		
Stockpile	0.00	84	MADE GROUND (Grey very clayey very san (Clay of low plasticity)).	dy gravel of mudstone	MC PI PSD SED CP2 PTXL		
Contract Title - Meta	I Process	iog Ar	ea Shallow Soils Investigation	Client - South Tees (	Development Corporation		
A Signed	m	N	NO Harma		Page 4 of 5		
CS Davie of taxe	05/11/20	720	Certilicale No - SDM291/4	AEG Contra	4291		

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Exploratory Hole No.	Sample Depth (m) (D)		Description	Laboratory Tests/Remarks MC Density US for PTXL	
Stockpile	0.00 C4		MADE GROUND (Grey very clayey very sandy gravel of mudstone):		
Stockpile	0 00	BŞ	MADE GROUND (Grey very clayey very sandy gravel of mudstone (Clay of low planticity))	MC PI PSD SED CP2 PTX	
Stockpille	0,00	C5	MADE GROUND (Grey very clayery very sandy gravel of mudstone).	MC Density US for PTXL	
Stockpile	0,00	B6	MADE GROUND (Grey clayey very sandy gravel of mudstone. (Clay of low plasticity)).	MC PI PSD SED CP2 PTXI	
Stockpile	0.00.	C6	MADE GROUND (Grey clayey very sandy gravel of mudstone).	MC Density US for PTXL	

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E	Dule of issue - 05/11/2020	Centrolate No - SD/4291/5	AEG Co	4291	UKAS UKAS



### Moisture Content/Plasticity Index and Moisture Content

		MC	BS 137	7 Part 2 Clause	3.2	6
Exploratory Hole No.	Sample Depth (m)	Sample ID	Specific Depth (m)	Moisture Content (%)	Date Tested	Remarks
MPA_AUK_TP101	170	J4	1.70	7.2	18/09/2020	2
REA, HUK, TE103	0.60	J1	0.60	8.8	22/09/2020	2
EGI-PT_NUA_ARK	1.50	J4	1.50	8,5	22/09/2020	3
APA_AUR_TP104	2.70	J7	2.70	7.7	22/09/2020	2
APA_AUK_TP105	0.40	JT.	0.40	17,8	22/09/2020	α
BPA_AUR_TP105	3.60	J9	3.60	10.2	18/09/2020	z .
APA_AUK_TP106	0.50	- 39	0.50	6.9	18/09/2020	2
WPA_AUK_TP107	0.50	JT	0.50	63	22/09/2020	a
WPA_AUK_TP100	2.60	SL.	2.60	7.4	22/09/2020	0
PA_AUK_TP112	0.60	th	0.60	8.6	18/09/2020	þ
WPA_AUK_TP112	2.60	J7	2.60	8	18/09/2020	0.
MPA_AUK_TP113	2.65	.57	2.60	15.3	22/09/2020	0
MPA_AUK_TPH14	2.30	J5	2:30	8	18/09/2020	D
MPA_AUK_IPIDE	1,40	.14	1,40	11.9	18/09/2020	p.
WPA_AUR_TP117	2.30	J7	2.30	10.4	18/09/2020	0
MPA_NUK_TP110	.2.80	,17	2.80	14.8	22/09/2020	٥
MPA_AUK_TPH(9	2.70	,17	2.70	31	22/09/202	d
MPA_AUK_TP121	2.00	J4	2.00	9.6	22/09/202	a
MPA_AUK_TP122	1.40	J4	1.40	93	18/09/202	o
MPA_AUK_TP325	1.90.	34	1.90	15.9	22/09/202	0
	For	description of	sample please	refer to the Labor	story Sample D	escription Sheet
Contract Title :- Me	tal Processing	Area Shallow	Soits Investigat	tion	Cherot :-	outh Tees Development Corporation
	0000	no	Name :-	TEL	THE P	Page tota
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Exploratory Hole No.	Sample Depth (m)	Sample ID	Specific Depth (m)	Moisture Content (%)	Date Tested	Remarks
MPA_HUR_TP125	3.90	.e.	3.90	12.1	22/09/2020	
MPA_AUK_TP128	0.40	JIT.	0.40	8.1	22/09/2020	
MPA_AUK_TP128	0.40	ιĻ	0.40	72	18/09/2020	
MPA_AUK_TP326	3.60	38	3,60	20.9	18/09/2020	
MPA_AUR_TP 190	0.20	J7	0.20	7	18/09/2020	
MPA_AUK_TP130	1.20	34	1.20	6.3	22/09/2020	
Stocksie	0.00	C3	0.00	5.9	10/07/2020	

For description of sample ploase refer to the Laboratory Sample Description Sheet

Contract Title -Metal Processing Area Shallow Solis Investigation Client South Tees Development Corporation

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 Name Page 2 of 2

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ATTERBERG LIMITS & NATURAL MOISTURE CONTENT Test Method - BS 1377 Part 2 Clause 3.2 4 1 to 44 8.5 1990 Plasticity Low Intermediate High Very High Extremely High 70 CE (CV 60 (CH 50 CI) PLASTICITY INDEX (%) 40 (CL A-Line 30 (ME 20 (MV)50 10 (MH ML M 0 20 40 120 60 80 100 10 LIQUID LIMIT (%) Specific Exploratory Depth Sample Preparation <0.425mm Date **FL** Depth u. PE ŧ, m/c.(%) Hole No. (m) Type/Ref. Method (11) Tested (mi) BOS1 B 0.00 35 -0.74 40.0 12.4 0.00 22 13 Air Dried 17/07/2020 5.8 0.00 30 16 -0.73 Air Dried 24.0 14/07/2020 # Stockpile D.00 B1 14 0.00 BŽ 30 17 13 -0.92 5.1 A Stock Dife 0.00 Air Dried 15.0 14/07/2020 # 0.00 **B**3 0.00 30 16 14 -0.69 Air Dried 27.0 6.4 14/07/2020 # \* Stock perm 0.00 Stock pile B4 0.00 32 17 15 -0.64 All Dried 38.0 7.4 17/07/2020 - # 31 18 13 -0.72 Air Dried 36 0 Stockyale 0.00 **B**5 0.00 8.6 17/07/2020

Diese control derivation interest future franke franke in the set of the set of the Distance o

For description of sample please refer to the Laboratory Sample Description Street, # = Insufficient for 4 point P1 If sample is prepared in the natural state we are unable to determine % retained on the 0.425min test sieve

-0.60

Air Dried

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B Date of issue -	102() Centrics	ete No Ply4291()	AEG Contract 4	No 1291	



### **Determination of Particle Density**

MPA_AUK_TP110         0.80         82         0.80         3.36           MPA_AUK_TP128         0.60         82         0.60         4.50           MPA_AUK_TP130         0.30         82         0.30         3.25           MPA_AUK_TP130         0.30         85         1.30         3.27           Stockpile         0.00         82         0.00         2.71	loratory de No.	Depth Sam (m) Type	ple Specific 8 No. (m)	Particle Der (Mg/m^3	nsity Date T 3)	ested
IPA_AUK_TP128         0.60         B2         0.60         4.50           IPA_AUK_TP130         0.30         B2         0.30         3.25           IPA_AUK_TP130         1.30         B5         1.30         3.27           IPA_AUK_TP130         0.00         B2         0.00         2.71           Itockpile         0.00         C2         0.00         2.76	K_TP110	0.80, B	2 0.80	3.36	24/09	2020
IPA_AUK_TP130         0.30         B2         0.30         3.25           IPA_AUK_TP130         1.30         B5         1.30         3.27           tockpile         0.00         B2         0.00         2.71           tockpile         0.00         C2         0.00         2.78	K_TP128	0.60. B	2 0.60	4.50	24/09	2020
IPA_AUK_TP130         1.30         B5         1.30         3.27           tockpile         0.00         B2         0.00         2.71           tockpile         0.00         C2         0.00         2.78	K_TP130	0.30 8	2 0.30	3.25	24/09	2020
tockpile         0.00         B2         0.00         2.71           tockpile         0.00         C2         0.00         2.78	K_TP130	1.30. 8	5 1.30	3.27	23/09	2020
stockple 0.00 C2 0.00 2.78		0.00 B	2 0.00	271	23/07/	2020
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For description of sample please refer to the Laboratory Sample Description Shint

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Metal Processing Area Sha	llow Soils Investigation	South Tees Development Corpor	ation
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### Particle Size Distribution Sieving and Sedimentation

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oratory Hole 1	Vo - MPA_AUK_TP10		Dept	h (m) > 2.40		Sample Type & No	- LB6	Specific De	spth (m) := 2.40	0	Date Teste	d 21/09/2020	
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Client	South Tees Develo	pment Corporal	non	C0011401 1110		Metal Processing A	rea Shallow S	oils Investigation			4	291	UKAS
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A_AUK_TP102A Depth (m) :- 210	Sample Type & No LB6 BS Seet Sums			and a second sec	
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SILT SAND		RAVEL CUBBI	EX BUULDERS		
For description of same	As pisase refer to the Laboratory Sample Dear	orption Sheet			
Certificate No PSD/4291/MPA_AUK_TP102ALB6/2,10 5	MOSUM, peuti	Name >	JARK I	Page 1 of 1	-8
Tees Development Corporation	Metal Processing Area Sha	flow Soils Investigation	AEC	Contract No :- 4291	DIXAS

Passing 1367 **F** UKA 9.0 22 0.6 0.6 9.0 9.0 0.5 0.5 0.5 0.5 00 2 2 0.6 20 0.2 20 0.4 0.2 0.1 Date Tested - 18/09/2020 Sievo Size (mm) 0.212 0.425 0.063 1.18 0.15 37.5 3.35 9.0 0.3 AEG Contract No :-2 3 3 28 30 2 6.9 7 5 Page t of 1 4291 50 2 \$ 2 2 8 8 3 8 2 a BOULDERS 200 COBBLES Specific Depth (m) - 2.30 100 t range b Metal Processing Area Shallow Solis Investigation Coante Name -1-BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990 (Test deviated from standard due to insufficient sample mass) For description of sample piease refer to the Laboratory Sample Description Sheet Medium GRAVEL PARTICLE SIZE DISTRIBUTION 2 invicu Sample Type & No - LB6 Fine IS See fast Coarse Signed :m000 Medium SAND Contract Title -PSD/4291MPA\_AUK\_TP103/LB6/2.30 united Deptin (m) - 2.30 Fine 5 å Coarse Certificate No --South Tees Development Corporation Medium SIL 10:0 Exploratory Hole No :- MPA\_AUK\_TP103 05/11/2020 Fine Date of issue -CLAV Clent 0.001 8 3 40 8 20 2 100 80 8 20 PERCENTAGE PASSING

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NOH KUO	NO - MPA_AUK_TP	104	0	hepth (m) :- 2.40			Sample Type 8	No > LB6		Specific De	p(h (m) - 2.40		Date Teste	d :- 22/09/2020	
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Client :-	South Tees Deve	opment Cor	poration	Cont	tract Title >		Metal Process	ing Area Sh	tallow Soils	Investigation			AEG Cont	act No :- 291	NKAS

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ory Hole No MPA_AUK_TP105	Depth (m) > 2.80		Sample Type & No	- LB8	Specific Dep	th (m) > 2.80	Da	e Tested ~ 3	22/09/2020	
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CLAY SILT		SAND		GRAVEL		COBBLES	BOULDERS	_		
	For descrip	tion of sample please n	ter to the Laboratory Su	ample Description 5	theat					
ate of issue - 05/11/2020	PSDI4291MPA_AUK_TP105/LB8/	2.80 Signed :-	Masm	0	Name :-	2	-	Page 1 o	5	-8(\$
lient - South Tees Development C	Contrac	1 TRIE Y	Metal Processing	Area Shallow So	in tenantication		AE	G Contract I	No :-	

ALLIED EXPLORATION & GEOTECHNICS LIMITED and other live of theme from the Common from the Common of the Common of the Common of the Common from the Common fr

	sploratory Hole No - MPA	AUK_TP106		Depth (m) ~ 0	180		Sample Type & 1	Vo - B2	Specific De	pth (m) > 0.80	0	late Tested	- 21/09/2020	
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10         0.212         0.4           0.001         0.01         0.15         0.15           0.01         0.01         0.01         0.15         0.3           0.01         0.01         0.01         0.01         0.15         0.3           0.01         0.01         0.1         0.01         0.01         0.15         0.3           0.01         0.01         0.01         0.1         0.01         0.01         0.15         0.3           0.01         0.01         0.01         0.1         0.10         0.01         0.15         0.3         0.2           0.01         0.01         0.01         0.01         0.01         0.01         0.01         0.15         0.2         0.3           0.01         0.01         0.01         0.01         0.01         0.01         0.01         0.01         0.15         0.2         0.3         0.2           0.01         0.01         0.01         0.01         0.01         0.01         0.01         0.01         0.01         0.01         0.01         0.01         0.01         0.01         0.01         0.01         0.01         0.01         0.01         0.01         0.01         <	20								1.10. 2			29	0.3	0.5
10     0.001     0.01     0.15     0.15     0.15     0.15     0.15     0.003     0.15     0.003     0.25       0.001     0.01     0.01     0.01     0.1     10     100     0.003     0.2       0.001     0.01     0.01     0.01     0.1     10     100     0.003     0.2       0.001     0.01     0.01     0.10     0.10     0.003     0.2       0.001     0.01     0.01     0.003     0.003     0.2       0.001     0.01     0.01     0.003     0.2       0.001     0.01     0.01     0.003     0.2       0.001     0.01     0.01     0.01     0.01       0.011     0.01     0.01     0.01     0.01       0.0111     0.01     0.01     0.001     0.01       0.0111     0.01     0.01     0.001     0.01       0.0111     0.01     0.01     0.001     0.01       0.0111     0.01     0.01     0.001     0.01       0.0111     0.01     0.01     0.001     0.01       0.0111     0.01     0.01     0.001     0.01       0.0111     0.01     0.01     0.001     0.01       0.		1 1000 A						and the second se	and the second	1			0.212	0.4
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0.001     0.01     0.1     1     10     100       0.01     Ene     Medium     Coarse     Fine     Medium     Coarse     Fine     Medium     Coarse     Fine     Medium     Coarse     10     100       CLAY     Fine     Medium     Coarse     Fine     Medium     Coarse     Fine     Medium     Coarse     Coarse     Fine     Medium     Coarse     Ene     Medium     Coarse     Ene     Medium     Coarse     Coarse     Ene     Medium     Coarse     Coarse     Ene     Medium     Coarse     COBBLES     BOULDERS       Date of issue : <t< td=""><td>-</td><td>14.1</td><td></td><td></td><td></td><td>101 10 10 10 10 10</td><td>1</td><td></td><td>1</td><td></td><td></td><td>-</td><td>0.063</td><td>0.2</td></t<>	-	14.1				101 10 10 10 10 10	1		1			-	0.063	0.2
CLAV       Fine       Medium       Coarse       Enc       Medium	0.001	0.01		0.1		-		10		100		1		
CLAY     SILT     SAND     GRAVEL     Currents     Poundation       Date of issue :     For description of sample prease refer to the Latoratory Sample Description Smeet     Currents     Page 1 of 1       Date of issue :     05/11/2020     PSDI4291/MPA_AUK_TP106/B2/0.80     Signed :     Mome :     Name :     Name :       Client :-     South Trees Development Corporation     Contract Title :     Metal Processing Area Strallow Soils Investigation     AEG Contract No :	Fane	Medium	Coarse	Fine	Mediu	m Coa	Irse Fin	Mediu	m Coarse	SOUDI LO	DOU!! PEDE	6		
Date of issue :     For description of sample pease refer to the Latoratory Sample Description Sheet       Date of issue :     Certificate No :-       DS/11/2020     PSD/4291/MPA_AUK_TP106/82/0.80       Signed :-     Contract       Distribution     South Tees Development Corporation       South Tees Development Corporation     Acid Constract Title -       Metal Processing Area Stration Soils Investigation	CLAY	SILT			SANC	0		GRAVI	E .	CONCESS	BUULUEN	0		
Date of issue :-     Certificate No :-     Page 1 of 1       05/11/2020     P5D/4291/MPA_AUK_TP106/82/0.80     Signed :-     Mame :-     Page 1 of 1       Client     South Tees Development Corporation     AEG Contract No :-     AEG Contract No :-				For	description of sa	unple piease ref	er to the Laboratory	r Sample Description	Sheet					
Client - Contract Title - Contract Title - Metal Processing Area Shallow Soils Investigation 4291 4291	Date of issue	20	Certificate No :- PSD/4291/MI	PA_AUK_TP10	06/82/0.80	Signed :-	0SUU	2	Name :- V	GEL	//SK	Page 1	t of 1	-9
	Clent >- South 1	Tees Developmen	nt Corporation	0	contract Title		Metal Processin	g Area Shallow S	Soils Investigation			AEG Contra 421	ct No >	UKAS

Passing (\*/\*) UKAS 1367 31.6 24.5 12.0 11.0 8 6.6 0.9 1.6 29 5.9 20 1.6 2.4 20 0.6 10.4 32 22 2 03 Date Tested - 24/09/2020 Sieve Sizo 0,425 0.212 (unu) 0.063 1.18 0.3 0.15 37.5 3.35 9:0 12 12 8 2 8 9 6.3 iri N 2 AEG Contract No :-Page 1 of 1 4291 8 8 2 ş 8 2 \$ 8 8 3 BOULDERS 2 COBBLES Specific Depth (m) :- 0.70 100 1 Metal Processing Area Shallow Soils Investigation Coarse - emen Some BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990 (Test deviated from standard due to insufficient sample mass) For description of sample please refer to the Laboratory Sample Description Sheet Medium GRAVEL PARTICLE SIZE DISTRIBUTION 2 mult B Sample Type & No - B2 Fine BS Seve Sizes Znm Coarse Signed :-1000ml Medium SAND Contract Tale PSD/4291MPA\_AUK\_TP107/B2/0.70 Depth (m) :- 0.70 Fine 5 10 Coarse Certificate No :-South Tees Development Corporation Medium SIL 0.01 Exploratory Hole No :- MPA\_AUK\_TP107 05/11/2020 File Date of issue :-CLAY Client 0.001 \$ 8 2 8 5 8 20 8 8 8 PERCENTAGE PASSING

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8	atory Hole No MPA_AUK_TP10	60	Det	pth (m) > 2.00			Sample Type	& No LB6		Specific De	$pth\left(m\right) > 2.00$		Date Test	ed > 21/09/202	
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	CLAY	SILT			SAND				GRAVEL		CODOLES	BUULUN	2		
				For des	scription of same	ple please re	fer to the Labora	ttory Sample De	esciption She	10					
41	Date of issue :- 05/11/2020	Certificati	e No :- 291MPA_A	UK_TP109AU	B6/2.00	-: poulis	SUL	2	Z	ame >	35	101	Sed	e 1 of 1	-8(\$
	Client :- South Tees Develo	pment Corpor	ation	Cont	rad Title -		Metal Proces	Ising Area St	hallow Solls	Investigation			AEG Con	tract No - 1291	UKAS
				-											1367

weat Differe Look 21 (Settli Gal Indone) future (Father Fat), Chemican Sheer, Carlowin, DHC 2000 - Kar CHM SAT 4000 Kar. 01111 241 APA Reprinted Chemical Distances Contra European Sheer, Blackhen, 1981 258, - Tel. 01172 218, 2000 Kar. 01172 758 400



Passing U KAS TELES 1367 100.0 8 88.9 86.98 29.3 71.2 31.9 57.3 48.6 40.7 28.3 23.5 10.2 18.1 1.41 6.9 6.9 10 0.4 1.8 Date Tested > 22/09/2020 Sieve Size (mm) 0.425 0.212 0.15 0.063 37.5 3.35 1.18 9.0 E.O 22 6.3 AEG Contract No >-8 3 28 20 0 N 2 in Page 1 of 1 4291 8 8 8 2 8 8 2 2 8 묶 BOULDERS COBBLES Specific Depth (m) - 2.90 100 ALLIED EXPLORATION & GEOTECHNICS LIMITED 0 Citra C Metal Processing Area Shallow Solls Investigation Coarse Name :miles For description of sample paase refer to the Laboratory Sample Description Sheet BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990 (Test deviated from standard due to insufficient sample mass) Medium GRAVEL PARTICLE SIZE DISTRIBUTION 2 No. Sample Type & No > B8 Fine ES Sava Stet Coarse Signed > Poolum 1 Medium SAND Contract Title -PSDM291/MPA\_AUK\_TP110/B8/2.90 ardine Depth (m) :- 2.90 Fine 0 ł Certificate No --Coarse South Tees Development Corporation Medium SILT 0.01 Exploratory Hole No - MPA\_AUK\_TP110 05/11/2020 Fine Date of issue --CLAY Chent. 0.001 30 2 1001 2 8 28 2 8 3 8 PERCENTAGE PASSING



ALLIED EXPLORATION & GEOTECHNICS LIMITED MALLIED EXPLORATION & GEOTECHNICS LIMITED

	alati mana	TOT ALL ADD. TOT	641		C Juni Hand	(Test devia	ted from sta	Sample Type 2	s No - LB6	nple mass)	ecific Death Ir	m) - 2.10		Date Tested	- 17/09/2020	
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Citièni - Courte Taue Punctement Committee - Metal Processing Area Shallow Solts Investigation	Date of its	ue 05/11/2020	Centr	ficate No	AUK_TP11	2/LB6/2.10	Signed :-	m80	2	Name		ELKI	24	Page	1 0/ 1	
	Client >-	South Tees Devel	opment Cor	rporation	0	ontract Tele		Metal Process	sing Area Shal	low Soils Inve	stigation			AEG Contri 42	act No	UKAS

Passing (%) 100.0 808 80.8 86.7 75.9 66.8 59.0 51.8 Date Tested - 22/09/2020 Sieve Size (mm) 37.5 党 8 3 2 8 2 2 5 8 8 2 8 Specific Depth (m) - 2.30 ALLIED EXPLORATION & GEOTECHNICS LIMITED 80 miloc BS1377 : Part 2 : Clause 9.2 & 9.4 : 1900 (Test devisted from standard due to insufficient sample mass) PARTICLE SIZE DISTRIBUTION THE R Sample Type & No - LB6 BS Serve Sates 2mm 10001 in the Depth (m) > 2.30 and a



ALLIED EXPLORATION & GEOTECHNICS LIMITED and other (set) from the present from the present the present provided in the present provided in the present from the present provided in the present present provi

oratory Hole No :-	MPA_AUK_TP113		Depth (m) :-	3.80		Sample Type	& No > 810	00	pecific Depth	1 (m) :- 3.80		Date Tester	5-17/09/202	0
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02			-									2	20	0.7
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E	Fine Medium	n Coarse	Fine	Media	E C	barse	Fine Me	ndium	Coarse	CODDI DO	BOULDED	0		
CLAY	SILT			SAN	0		GR	AVEL		CODDECO	BUULUE	2		
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Date of issue -	11/2020	Certificate No :- PSD/4291/MF	A_AUK_TP1	13/810/3.80	Signed -	R	Ou	Name	de l	1979	BX	Page	t of 1	-8(7
Cient :- S	uth Tees Developme	nt Corporation		Contract Title		Metal Proces	ising Area Shallo	w Soils Inve	estigation			AEG Contr 4	act No	DIXA NIXA
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ALLIED EXPLORATION & GEOTECHNICS LIMITED Management (Not 20 Notes (20 Notes

Explor	story Hole N	NUA AUK	TP114	0	apth (m) - 2	05		Sample Type &	No :- LB6		Specific Dep	th (m) - 2.50		Date Tested	1 - 21/09/202	0
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6	Date of issu	e :- 05/11/2020	Cen	SD/4291/MPA	AUK_TP11	41.B6/2.50	Signed :-	à	00	Nam			1 H	Page	1 1 0/ 1	-80
ш	Client >-	South Tees C	levelopment Co	orporation	0	ontract Title	x	Metal Process	ing Area Shal	tow Soils In	vestigation			AEG Contr 4	act No :- 291	DIKAS
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Passing 1367 100.0 100.0 100.0 UKA 95.5 8 2.08 78.8 69.5 26.0 62.5 51.6 47.0 32.8 18.9 13.2 10.6 40.7 16.2 1-10 2 4.5 Date Tested - 18/09/2020 Sieve Size (mm) 0.212 0.425 0.063 0.15 3.35 1.18 0.3 37.5 0.6 6.9 2 AEG Contract No -3 8 8 8 2 0 -.04 Page 1 of 1 4291 100 2 8 80 2 뎚 3 8 2 2 BOULDERS COBBLES Specific Depth (m) :- 0.50 100 100 Metal Processing Area Shallow Solls Investigation Coarse. Name :appen BS1377 : Part 2 : Clause 9.2 & 9.4 : 1900 (Test deviated from standard due to insufficient sample mass) For description of sample please refer to the Laboratory Sample Description Sheet Medium GRAVEL 2 PARTICLE SIZE DISTRIBUTION The second secon Sample Type & No - B2 Fine BS Serve Subst 2 Coarse Signed -POQue1 Medium SAND Contract Title -PSD/4291/MPA\_AUK\_TP115/82/0.50 2 Depth (m) - 0.50 Fine 50 200 Coarse Certificate No :-South Tees Development Corporation Medium SIL 0.01 Exploratory Hole No :- MPA\_AUK\_TP115 05/11/2020 Fina Date of issue :-CLAV Client -0.001 22 2 00 8 02 2 3 50 8 2 PERCENTAGE PASSING

ALLIED EXPLORATION & GEOTECHNICS LIMITED Indicate list 25 Name of the Advance of Advance

						(Test dev	viated from st	andard due to I	Insufficient	sample ma	(85)					
Expl	ratory Hole No	-MPA_AUK_1	P115	u	lepth (m) :- 1	2.00		Sample Type	& No LBC	in	Specific Dep	$\eta h \left( m \right) > 2.00$		Date Tested	- 18/09/2020	
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	00				-141-01			-						100	Sieve Size (mm)	Passing (%)
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6	Date of issue	5/11/2020	Cer	SD/4291/MPA	AUK_TP11	15/LB6/2,00	Signed :-	0000	04	2	lame -	1 tab	AR	Page	1 of 1	-8
ш	Client -				0	ontract Title	-	0	Y					AEG Contra	act No :-	**
14		South Tees De	velopment C	orporation				Metal Proces	Ising Area S	Shallow Sol	Is Investigation			42	161	UKAS

20     10     10       1     1     10       1     1     10       1     1     10       1     10     100       1     0     100       1     0     100       1     0     100	Depth (m) > 1.60 Sample Type & No > B5 Specific Depth (m) > 1.60 Date Tested >	eve Size (mm) 75 63 50 537,5 537,5 28 20 14 10 6,3 5 5 3,35 5 14 10 6,3 6,3 5 0,425 0,425 0,425 0,5 0,5 0,5 0,5 0,5 0,5 0,5 0,5 0,5 0,
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Passing UKAS 1367 A 12.9 26.1 17.71 5 2 0.6 0.6 0.5 0.5 0.5 0.4 03 0.0 20 2 0.9 0.8 0.4 0.1 Date Tested - 22/09/2020 Sieve Size 0.212 (mm) 0,425 0.15 0.063 3.35 1.18 9.6 0.3 37.5 2 N AEG Contract No :-3 3 22 20 껲 0 6.3 10 Page 1 of 1 4291 5 9 8 8 2 2 \$ 8 22 8 0 BOULDERS COBBLES Specific Depth (m) :- 2.00 9 8 Citero Participa Metal Processing Area Shallow Solis Investigation Coarse Name 豪 BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990 (Test deviated from standard due to insufficient sample mass) For description of sample please refer to the Laboratory Sample Description Sheet Medium GRAVEL 2 PARTICLE SIZE DISTRIBUTION TAKE B Sample Type & No -- LB6 Fine BIS Serve Elsen Coarse Signed module Medium SAND Contract Title :-PSD/4291/MPA\_AUK\_TP117/LB6/2.00 212um Depth (m) > 2.00 Elet. 5 100 Coarse Certificate No --South Tees Development Corporation Medium Silli 0.01 Exploratory Hole No - MPA\_AUK\_TP117 05/11/2020 Fine Date of issue ---CLAY. Client 0.001 0 8 8 8 2 3 8 40 2 22 PERCENTAGE PASSING

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e - 05/11/2020	fificate No :- PSDi4291/MPA_I	AUK_TP118/LB6/	2.00 Signed	NOSW!	-	lama :+	N. S	X	Page 1 of 1	
Parati Taxa Pavahamant C		Contract	t Tille :		Challon Cal	and a second		AEG	Contract No :-	

Passing 100.0 8 NKA. 1367 80.9 83.3 20.5 1.61 64.4 58.9 51.0 24.9 22.8 47.1 40.4 34.2 29.7 20.3 17.2 14.4 20 20 Date Tested :- 22/09/2020 Sieve Size 0.425 0.212 0,063 0.15 (mm) 37.5 3.35 1 18 0.6 0.3 AEG Contract No :--8 8 28 8 2 2 23 10 N Page 1 of 1 4291 100 2 8 8 22 \$ 2 2 20 22 BOULDERS 1 52 COBBLES Specific Depth (m) > 0.80 00 ALLIED EXPLORATION & GEOTECHNICS LIMITED ð Metal Processing Area Shallow Soils Investigation Coarse Name :and a BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990 (Test deviated from standard due to insufficient sample mass) For description of sample please when to the Laboratory Sample Description Sheet Medium GRAVEL PARTICLE SIZE DISTRIBUTION 2 maje il Sample Type & No :- B2 Fine BS Serve Subst Dryn Coarse Signed >/ undou Medium SAND Contract Tale -PSD/4291/MPA\_AUK\_TP119/82/0.80 - dela Depth (m) -- 0.80 Fine 5 200 Coarse Certificate No --South Tees Development Corporation Medium SIL 10.0 Exploratory Hole No - MPA\_AUK\_TP119 05/11/2020 Fine Date of issue -CLAY Chent -0.001 2 100 8 8 2 8 3 40 2 8 **DERCENTAGE PASSING** 

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						For description of su	ample pleater	refer to the Lab	oratory Sample	le Description (	Sheet					
	Date of iss	05/11/2020	- C	SD/4291/MP/	A_AUK_TP	119/LB8/3.00	Signed -	MB	2		Name :- NI	刻	AH I	Pag	e 1 of 1	-8(*
ua	Client -	South Tees Deve	lopment C	orporation		Contract Title		Metal Proc	pessing Area	a Shallow Sq	vits investigation			AEG Cont	ract No :- 291	SVAN
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Ш	Client >	South Tees Developn	nent Corporation	0	potract Title		Metal Processit	ng Area Shallow	Soils Investigat	uo	-	AEG Contr 4	act No.> 291	UKAS
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Client -	South Tees Develor	pment Corporate	u	Contract Title	3	Metal Process	sing Area Shallow	v Solis Investig	ation		AEG Cont	ract No :- 291	A A
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Instruction         Description         Standar					F (Test dev	BS1377 : P	E SIZE DIS art 2 : Clause 1 andard due to	STRIBUTION 9.2 & 9.4 : 1990 insufficient samp	(e mass)					
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CLAY         Fine         Medium         Coarse         Fine         Medium         Coarse         Fine         Medium         Coarse         Fine         Medium         Coarse         BOULDERS         BOULD	0	100	0.01		0.1	•		-		100		i		
CLAV     Sult     SAND     GRAVEL     Concercion     Concercion       Page 1 of 1     Far esscription of same refer to the Laboratory Sample Description Sinet     Far esscription of same refer to the Laboratory Sample Description Sinet     Page 1 of 1       PSD/4291/MPA_AUK_TP121/LB6/2 50     Signed Tale     Metal Processing Area Shallow Soils Investigation     AEG Contract No :-       Client :     South Tees Development Corporation     Contract Tale :-     Metal Processing Area Shallow Soils Investigation     AEG Contract No :-			Fine Media	um Coarse	Fine Med	dium C	oanse	Fine Me	dium Coarse	COODI EC	BOUR DEB	ų		
Date of issue :     For description of sample please refer to the Laboratory Sample Description Street       Date of issue :     Certificate No :-       05/11/2020     PSDI4291/MPA_AUK_TP121/LB6/2.50       Signed Tale :     Name :-       05/11/2020     PSDI4291/MPA_AUK_TP121/LB6/2.50       Signed Tale :     Name :-       05/11/2020     PSDI4291/MPA_AUK_TP121/LB6/2.50       Signed Tale :     Name :-       05/11/2020     PSDI4291/MPA_AUK_TP121/LB6/2.50       05/11/2020     Page 1 of 1       05/11/2020     Page 1 of 1       05/11/2020     Signed Tale :-       05/11/2020     Signed Tale :-		CLAV	Sil	T	SA	ON		GR	AVEL	000000	-	2		
Date of issue :-     Certificate No :-     Page 1 of 1       05/11/2020     PSDv4291/MPA_AUK_TP121/LB8/2.50     Signed 1       05/11/2020     PSDv4291/MPA_AUK_TP121/LB8/2.50     Signed 1       05/11/2020     AEG Contract No :-     AEG Contract No :-       05/11/2020     Client :-     AEG Contract No :-       05/11/2020     Contract Tale :-     Metal Processing Area Shallow Soils Investigation					For description of	f sample piease	refer to the Labor	ratory Sample Descrip	Kon Sheet					
Client - South Tets Development Corporation Contract Tale - Metal Processing Area Shallow Soils Investigation 4291	1	Date of Iss	9400 1	Certificate No :- PSD/4291/MPA	AUK_TP121/LB6/2 50	Signed I	San	2	Name -	B	2	Page	e 1 of 1	
	ua	Client :-	South Tees Developm	sent Corporation	Contract Tale	1	Metal Proce	issing Area Shallo	w Soils Investigatio	U		AEG Cont	ract No 291	UKAS

Norv Hole No - R	IPA AUK TP122		apth (m) - 1.3	0		Sample Type	& No 1- B5		Specific Dept	n (m)1.70	á	ate Tested	-17/09/2020	
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CLAY	SILT			SAN	0			GRAVEL		COBRES	DOULDER	0		
			Fors	tescription of su	umple please a	wher to the Labora	wory Sample De	recription Sheet						
hate of issue	1/2020	Certificate No :- PSD/4291/MP/	AUK_TP12	01,1285/1,70	Signed :-	MSC	2	Nar	-: 01	ALL.	17	Page	1 01 1	
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ALLIED EXPLORATION & GEOTECHNICS LIMITED Inscience to a present from the property of the present of the present

ratory Hole 1	No - MPA_AUK_TPI	22	D	pth (m) - 2.80	(Test devia	Non ITOTI Par	Sample Type	\$ 8 No > LBT		Specific De	100 (m) > 2.80		Date Tested	- 24/09/2020	
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CLAY		SILT			SANG				GRAVEL		CODDICES	DOULUE	2		
				For de	tracription of sa	mple please r	ofer to the Labor	atory Sample De	escription She	et.					
Date of iss	ue 05/11/2020	Centifi	cate No :- DI4291/MPA	AUK_TP1220	LB7/2.80	Signed >	SCA	20	Na	me -	1.	14	bage	1 01 1	-£(*
Client >				Can	Mach Tale >-								AEG Contr	act No :	

PARTICLE SIZE DISTRIBUTION         BS1377: Part 2: Clause 92.8.4.1.4900         Total clause 92.8.4.1.4900         Total clause 92.8.4.1.4900         Total clause 17pe & No : LB6       Specific Oppit (m) : 2.30         Total clause 17pe & No : LB6       Specific Oppit (m) : 2.30         Total clause 17pe & No : LB6       Specific Oppit (m) : 2.30         Total clause 17pe & No : LB6       Specific Oppit (m) : 2.30         Total clause 17pe & No : LB6       Specific Oppit (m) : 2.30         Total clause 17pe & No : LB6       Specific Oppit (m) : 2.30         Optimized 1         Total clause 1         Total clause 1         Optimized 1         Total clause 1         Optimized 1         Total clause 2         Total clause 2	PARTICLE SIZE DISTRIBUTION       Tata device Distribution Standard of the stand		Date Tested > 22/09/2020		100 Sieve Size Passi (mm) (%)	2 6 1 J	90 ra 11.2	an 50 15	37.5 15	70 28 1.5	20 15	an 14 1.4	to 14	en 63 13.	5 12	335 12	40 2 1.1	1.18 1.0	30 0.6 0.8	0.425 0.8	20 0.3 0.7	0.212 0.6	10 0.15 0.5	0.003 0.4		pore here	evolution a		Page 1 of 1	
PARTICLE SIZE DISTRIBUTION BS1377 : Part 2: Clause e.2.8.9.4.: 1990 Test deviated from standard due to insufficient sample manual standard due to fine       Data transmeter manual standard manual standard due to insufficient sample manual standard due to fine	PARTICLE SIZE DISTRIBUTION BARTICLE SIZE DISTRIBUTION BES1377 F avr. 2: Clause 0.2: 43: 41:00 BES1377 F avr. 2: Clause 0.2: 5: 43: 41:00 BES1421 Dispribution BES1421 Dispribution BES1421 Dispribution BES1421 Dispribution BES1421 Dispribution BES1421 Dispribution BES1422 DISprist	ass)	Specific Depth (m) - 2.30	20pm 63pm	in the substances									-			000					12			100	1 Coarse coorse	r	Shedt	Name >	
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	123 De 00 0.01 0.01 0.01 St.T Certificate No :- PSDie291MPA_	PARTICL BS1377 : F ITest deviated from s	ptn (m) 2.30	-ton sola																0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1				0.1	Fine Medium	SAND	For description of sample please	AUK_TP123/LB6/2 30 Signed :	

Passing 8 17.3 3.6 3.6 2 0.0 00 0.0 0.0 2 24 2 2 6.0 6.0 10 5 00 0.0 Date Tested > 24/09/2020 Sieve Size (mm) 1.18 0,425 0.212 0.15 0.063 37.5 3.35 9.0 0.3 12 88 38 8 1 0 6.3 AEG Contract No :-40. Page 1 of 1 30 2 8 8 3 \$ 8 R 2 8 0 BOULDERS COBBLES Specific Depth (m) - 1.60 100 0.000 Coarse Name -2001 For description of sample please refer to the Laboratory Sample Description Sheet BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990 (Test deviated from standard due to insufficient sample mass) Medium GRAVEL 0 PARTICLE SIZE DISTRIBUTION di Jenn Sample Type & No - B5 Fine BS Seve Sters Coarse Signed > 1 ados Medium SAND Contract Title :-PSD/4291/MPA\_AUK\_TP124/B5/1.60 Sector. Depth (m) - 1.60 Fine +.0 2 Certificate No :-Coarse Medium 0.0 15 Exploratory Hole No :- MPA\_AUK\_TP124 05/11/2020 Fire Date of issue >-CLAV 0.00 2 8 8 2 8 욹 9 8 20 8 PERCENTAGE PASSING Ð,

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Metal Processing Area Shallow Solls Investigation

South Tees Development Corporation

Client -

						(Test deviat	BS1377 : Pa	nrt 2 : Clause Indard due to	9.2 & 9.4 : 1 insufficient	t sample mi	(88)					
Exploi	Istory Hole !	No MPA_AUK_TP12	5	Dep	50 (m) - 2.4	0		Sample Typ	e & No :- LE	98	Specific Dep	th $(m) \simeq 2.40$	D	ate Tested	- 21/09/2020	l
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ЪE				Ē										-	3,35	1.3
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			Ĩ		Ford	escription of sa	imple please n	efer to the Labo	ratory Sample	Description St	teet			1		
4	Date of iss	ue > 05/11/2020	Certificat PSD/4	e No :- 291/MPA_A	UK_TP125	ALB6/2.40	Signed :-	SW	no	-	Vame -	17ER	MHIS	Page	1 of 1	-8
ш	Clent	South Tees Develop	ment Corpor	ation	ő	ntract Tide :-		Metal Proce	essing Area	Shallow So	Is Investigation		*	EG Contra 42	Hot No :	NKAS
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					E Test deviate	S1377 : Par	t 2 : Clause 9.2 Idard due to ins	& 9.4 : 1990 afficient sample	e mass)						
Diploratory F	tole No -+ MPA_AU	K_TP125	å	spth (m) :- 4.20			Sample Type &	No B10	Spe	cific Depth (m) - 4	20	Date	Tested -	22/09/2020	
					ardine	unios	BS Seve Szes 2mm	mich	undo:	ulco					
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0	AY Fint	Medium	Coarse	Fine	Medium	Co	arse Fa	ne Med	ium C	oarse COBE	BLES B	OULDERS			
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Date	of issue :- 05/11/2020	Cert	Ificate No :- SD/4291/MPA	AUK_TP1256	810/4.20	Signed -	NSO	2	Name -		8	1	Page 1 o	11	-8(*
The Clerk	South Tees	Development C	orporation	Con	fract Title >-		Metal Processi	ng Area Shallow	v Soils Invest	gation		AE	G Contract 4291	No :-	UKAS
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ALLIED EXPLORATION & GEOTECHNICS LIMITED MALLIED EXPLORATION & GEOTECHNICS LIMITED

xploratory	Hote No - MPA	AUK_TP126		Depth (m)	0.60		Sample Type 8	\$ No 82	0	pecific Dep	th (m) :- 0.60	a	Date Teste	d :- 21/09/202	0
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Cler	1:- South Te	es Developmen	nt Corporation		Contract Title		Metal Process	ing Area Shallow	v Solis Inve	retigation			AEG Cont	tract No :- 1291	UKAS UKAS
															1367

Passing UKAS 1367 100.0 93.2 87.7 27.2 22.8 17.5 13.6 68.7 55.7 38.4 30.3 10.01 45.4 4.0 6.7 5 3.00 91 Date Tested > 22/09/2020 Sieve Size (mm) 0.425 0.212 0.15 0.063 37.5 3.35 1.18 9.0 0.3 10 10 23 8 8 AEG Contract No :-33 wi. 14 字 Page 1 of 1 4291 30 8 2 8 2 윢 8 2 8 8 0 BOULDERS 1 COBBLES Specific Depth (m) - 0.60 100 ALLIED EXPLORATION & GEOTECHNICS LIMITED Đ 10 Metal Processing Area Shallow Solis Investigation Coarse 3 20pm Sinth N BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990 (Test deviated from standard due to insufficient sample mass) For description of sample please refer to the Laboratory Sample Description Sheet Medium GRAVEL PARTICLE SIZE DISTRIBUTION ç A New Sample Type & No - B2 Fine HS Save Stres Coarse Signed -Medium SAND Contract Title PSD/4291/MPA\_AUK\_TP127/B2/0.60 webs: Depth (m) - 0.60 Fine ť 5 Coarse Certificate No :-South Tees Development Corporation Medium SILT 0.0 Exploratory Hole No -- MPA\_AUK\_TP127 05/11/2020 Fine Date of issue -CLAY Clent -0.001 100 2 8 8 2 8 3 20 22 20 PERCENTAGE PASSING 5


ALLIED EXPLORATION & GEOTECHNICS LIMITED Majora per and the proceeding of the proce

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Contract Title - Metal Processing Area Shallow Solis Investigation A291 4291 4291	8 2	e No :- 291MPA_AUK_TP128	3/LB8/3.00 Signed	asw.	02	Name	H		Page 1 of 1	-8(*
	orati	č u	preract Title -	Metal Processin	ig Area Shallow St	oits Investigation		AEG	Contract No 4291	A Day

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UKAS 1267 Passing 512 51.2 31.2 31.2 23.8 10.9 19.3 4 5 13.1 9.8 40 35 2.9 23 24 0.8 83 10 30 Date Tested - 18/09/2020 Sieve Size 0.212 (mm) 0.425 3.35 1.18 0.3 0.15 0.063 0.6 37.5 6.3 10 63 3 38 20 2 2 AEG Contract No >> ŵ Page 1 of 1. 4291 50 8 2 22 2 8 8 8 \$ 8 č BOULDERS 3 CX COBBLES Specific Depth (m) > 0.30 5 100 angel I Metal Processing Area Shallow Solls Investigation C03750 Name milor. For description of sample please refer to the Laboratory Sample Description Screet BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990 (Test deviated from standard due to insufficient sample mass) Medium GRAVEL PARTICLE SIZE DISTRIBUTION 2 and g Sample Type & No - B2 Fine ISS Stave Sizes Coarse Signed > (undoop Medium SAND Contract Trile PSDI4291MIPA\_AUK\_TP130/82/0.30 inter Depth (m) - 0.30 Fine 5 å Coarse Certificate No :-South Tees Development Corporation Medium SIL 0.01 Exploratory Hole No .- MPA\_AUK\_TP130 05/11/2020 Fine Date of issue > CLAY Client > 0.001 2 1001 \$ \$ 8 2 8 8 2 8 《EEC **DERCENTAGE PASSING** 



U KAS Institud Passing 8 100.0 96.5 93.4 86.5 78.2 64.1 62.6 54.7 41.6 32.5 25.9 23.6 21.6 20.0 18.9 16.4 12.3 5.5 Date Tested :- 15/07/2020 Sieve Size (mm) 0.425 0.063 0.002 37.5 0.212 0.15 0.02 0.006 3.35 1.18 9.0 0.3 28 AEG Contract No :-29 0 6.3 è 2 10 Page 1 of 1 4291 100 2 22 10 8 8 8 \$ \$ 8 c BOULDERS COBBLES Specific Depth (m) - 0.00 10 100 1000 Metal Processing Area Shallow Solis Investigation Coarse Name :-200111 For description of sample please refer to the Laboratory Sample Description Sheet Medium GRAVEL PARTICLE SIZE DISTRIBUTION ₽ BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990 ŀ Sample Type & No .- B1 NOSUU- paulis Fine BG Seve Spes Coarse No. Medium SAND Contract Title > Haufty . PSD/4291/Stockpile/B1/0.00 Depth (m) :- 0.00 er. 5 Coarse Certificate No :-South Tees Development Corporation Medium SILT 0.01 Exploratory Hole No - Stockpile 05/11/2020 e. Date of issue > CLAY - tuent 000 2 100 2 8 8 8 2 8 8 40 PERCENTAGE PASSING

ALLIED EXPLORATION & GEOTECHNICS LIMITED

Passing (%) UKAS 1367 100.0 87.9 96.6 12.0 10.9 84.0 28.6 22.5 15.2 93.7 73.7 62.2 45.6 36.7 42.7 13.4 8.6 17.1 Date Tested > 16/07/2020 Sieve Size (mm) 0,425 0.212 0.063 37.5 3.35 1.18 9.0 0.3 0.15 8 6.9 AEG Contract No :-3 50 28 -2 2 40 Page 1 of 1 4291 8 2 8 8 8 2 8 33 ÷ 8 Ð BOULDERS COBBLES Specific Depth (m) > 0.00 100 ALLIED EXPLORATION & GEOTECHNICS LIMITED Shim Metal Processing Area Shallow Soils Investigation Coarte Name -N. For description of sample please wher to the Laboratory Sample Description Sheet Medium GRAVEL 2 PARTICLE SIZE DISTRIBUTION BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990 6.5pm Sample Type & No > B2 2 Fine ISS Same Scots Coarse Signed moon Medium SAND Contract Title -white PSD/4291/Stockpile/82/0.00 Depth (m) :- 0.00 Line 5 50 Certificate No :-Coarse South Tees Development Corporation Medium SILT 0.01 Exploratory Hole No - Stockpile 05/11/2020 Fine Date of issue :-CLAY Client -0.001 2 100 2 8 3 2 20 20 8 8 **DERCENTAGE PASSING** 

Passing UKAS INING 1367 100.0 93.4 84.8 78.5 61.0 53.8 44.8 34.2 27.0 21.6 19.9 12.0 17.4 16.5 18.4 14.1 (N) 80 5.8 2 Date Tested - 17/07/2020 Sieve Size (mm) 0.425 0.212 0.083 0.005 0.002 3.35 1.18 9.0 0.3 0.15 0.02 28 6.3 AEG Contract No :-8 갶 2 -Page 1 of 1 4291 100 \$ 8 8 3 \$ 2 2 2 3 0 BOULDERS COBBLES Specific Depth (m) - 0.00 100 ALLIED EXPLORATION & GEOTECHNICS LIMITED 1000 Metal Processing Area Shallow Sols Investigation Coarse Name N 20pm BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990 (Test deviated from standard due to insufficient sample mass) Fur description of sample please refer to the Laboratory Sample Description Sheet Medium GRAVEL PARTICLE SIZE DISTRIBUTION 2 ŀ Sample Type & No -- C2 202 Fine 05 Seve Sces Coarse Signed eo(ou Medium SAND Contract Title .-2194 PSD/4291/Stockpile/C2/0.00 Depth (m) :- 0.00 Fina 50 100 Coarse Certificate No --South Tees Development Corporation Medium Silt 0.01 Exploratory Hole No -- Stockpile 05/11/2020 Fine Date of issue -CLAY Client -0.001 1001 2 8 8 2 8 2 8 8 22 金屋 PERCENTAGE PASSING 2



UKAAS 1367 Passing 100.0 -98.6 98.6 95.4 93.0 65.8 63.9 60.6 48.5 41.2 38.2 34.6 31.4 28.6 20.0 16.91 87.7 80.4 0.99 9.9 14 Date Tested :- 17/07/2020 Sieve Size (mm) 0.212 1.18 0,425 0.15 0.063 0.02 0.006 0.002 37.5 3.35 9.0 203 50 23 28 20 2 6.3 -AEG Contract No :-1 ÷ Page 1 of 1 4291 100 2 8 8 \$ 3 \$ 3 8 2 0 BOULDERS COBBLES Specific Depth (m) > 0.00 5 ALLIED EXPLORATION & GEOTECHNICS LIMITED Profession of the second Coarse Metal Processing Area Shallow Solis Investigation Name --For description of sample please refer to the Laboratory Sample Description Sheet Medium GRAVEL PARTICLE SIZE DISTRIBUTION 2 BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990 miles. NSON Sample Type & No -- B4 Fine Same State Coarse Signed - V mooo Medium SAND Contract Title >-4007 PSD/4291/Stockpile/B4/0.00 Depth (m) :- 0.00 Fine 50 2 Coarse Certificate No :-South Tees Development Corporation Medium SILT 0.01 Exploratory Hole No - Stockpile 05/11/2020 Fine Date of issue -CLAY Client .-0.001 2 1001 20 8 8 2 09 3 8 9 金星 **DNISSA9 3DATAGE PASSING** 

Passing UKAS Interest 100.01 -97.2 6.46 0.06 85.2 7.87 65.5 63.6 56.9 54.2 47.5 32.6 39.3 28.1 29.7 27.3 20.4 17.0 11.4 19 Date Tested :- 17/07/2020 Sieve Size (mm) 0.212 0.425 0,15 0.063 0,005 0.002 37.5 3,35 1.18 0.02 99 90 0.3 AEG Contract No :-28 20 2 2 6.3 ¢4 10 Page 1 of 1 4291 50 3 8 2 3 3 믂 8 8 9 0 BOULDERS COBBLES Specific Depth (m) > 0.00 8 ALLIED EXPLORATION & GEOTECHNICS LIMITED 60 mm Metal Processing Area Shallow Soils Investigation Coarse Name > iller. For description of sample please refer to the Laboratory Sample Description Sheet Medium GRAVEL 2 PARTICLE SIZE DISTRIBUTION BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990 100 Sample Type & No -- B5 Fine BS Serve Sters Coarse Signed m000 Medium SAND Contract Title -21200 PSD/4291/Stockpile/B5/0.00 Depth (m) > 0.00 Fine 5 5 Coarse Certificate No :-South Tees Development Corporation Medium SIL 0.01 Exploratory Hole No - Stockpile 05/11/2020 Fine Date of Issue 1 CLAY Client > 0.001 23 22 8 3 8 0 80 8 8 8 PERCENTAGE PASSING

Passing UKAS 8 1367 100.01 98.7 97.4 93.7 88.9 82.2 74.2 56.6 49.9 19.9 18.3 14.9 10.9 24.4 60.1 40.3 31.4 22.1 17.5 24 0.9 Date Tested - 17/07/2020 Sieve Size (mm) 0.212 1.18 0.425 0.15 0.063 0.02 0,006 0.002 37.5 3.35 9.6 0.3 18 9 6.9 -AEG Contract No :-82 22 2 φ Page 1 of 1 4291 100 2 8 8 8 \$ 3 8 2 8 0 BOULDERS COBBLES Specific Depth (m) - 0.00 100 Page 1 Metal Processing Area Shallow Soils Investigation Coarse Name unio? For description of sample please refer to the Laboratory Sample Description Sheet Medium GRAVEL 2 PARTICLE SIZE DISTRIBUTION BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990 mire. Sample Type & No -- B6 Fine IS Save Sch Coarse Signed > moon Medium SAND Contract Title :-500 PSD/4291/Stockpile/B6/0.00 Depth (m) -- 0.00 Fine 5 2 Coarse Certificate No --South Tees Development Corporation Medium SILT SILT 0.01 Exploratory Hole No > Stockpile 05/11/2020 Fine Date of issue -CLAY Client. 0.001 1001 무 8 80 2 8 33 8 35 20 (20) PERCENTAGE PASSING

ALLIED EXPLORATION & GEOTECHNICS LIMITED



# Determination of Calorific Value, Total Sulphur, Sulphate and pH (Tested Externally)



Certificate Number 20-12670

Client Allied Exploration & Geotechnics Limited Unit 25 Stella Gill Industrial Estate Pelton Fell DH2 2RG 11-Nov-20

Our Reference 20-12670

Client Reference 4291

Order No LA2369

Contract Title Metal Processing Area Shallow Soils Investigation

Description 3 Soil samples.

Date Received 15-Jul-20

Date Started 15-Jul-20

Date Completed 11-Nov-20

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

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

Approved By

Adam Fenwick Contracts Manager



Derwentside Environmental Testing Services Limited Unit 2, Park Road Industrial Estate South, Consett, Co Durham, DH8 5PY Tel: 01207 582533 • email: info@dets.co.uk • www.dets.co.uk



# Summary of Chemical Analysis

### Soil Samples

Our Ref 20-12670 Client Ref 4291

Chent Ref 429

Contract Title Metal Processing Area Shallow Soils Investigation

		Lab No	1697822	16//7823	1697824
	Sa	mple ID	5tockpile	Stockpive	Stockpile
		Depth	0	0.	0
	0	ther ID	1	2	3
	Samp	le Type	B:	U.	
	Sampli	ng Date	08/07/2020	08/07/2010	08/07/2020
	Sampli	ng Time	n/s-	0,01	n/l
Method	LOD	Units			
DETSC 2008#		pH	9.3	9.5	9.3
DETSC 2076#	10	mg/i	190	96	190
DETSC 2320	0.01	56	0,93	0.57	0.68
	Method DETSC 2008# DETSC 2076# DETSC 2320	Sa Sampli Sambli Sama Sambli Sambli Sama Sambli Sambli	Lab No Sample ID Depth Other ID Sample Type Sampling Date Sampling Time Method LOD Units DETSC 2008# pH OETSC 2008# 10 mg/l DETSC 2320 0.01 %	Lab No         1697822           Sample ID         Stockpile           Depth         0           Other ID         1           Sample Type         III           Sampling Date         08/07/2020           Sampling Time         n/s           Method         LOD         Units           DETSC 2008#         pH         9.3           DETSC 2008#         10         mg/l         190           DETSC 2320         0.01         %         0.93	Lab No         1697822         1697822           Sample ID         Stockpile         Stockpile           Depth         0         0           Other ID         1         2           Sample Type         II         II           Sampling Date         08/07/2020         08/07/2020           Sampling Time         n/s         i/Ji           Method         LOD         Units           DETSC 2008#         IPH         9.3         9.5           OETSC 2076#         10         mg/i         190         96           DETSC 2320         0.01         %         0.93         0.57



### Information in Support of the Analytical Results

Our Ref 20-12670 Client Ref 4291

Contract Metal Processing Area Shallow Soils Investigation

### **Containers Received & Deviating Samples**

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1097822	Stockpile 0 \$0%	08/07/20	PT 5001==		1
1697823	Stockpile 0 50%	08/07/20	P7 500ml		
1697824	Stockpile 8 SOIL	08/07/30	PT 500ml		
Rep: P-Plant	ie Thub				

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

### Soil Analysis Notes

morganic tell shalps was carried out on a dried sample, crusted to pais a 425pm www, in accordance with 85E177

Organic soil analysis was carried out on an 'as received' sample. Organits result are carriested for monture and expension and new your basis.

Fire Low on Driving, send its inspress organics analysis on an air drived balls, is Larmell but AL # temperature of 28°C er/ 2°C.

### Disposal

Promitive usue date of this test certificate, samples will be hero for the following times prior to disposal Sure - 1 mente, Cinuidi - 2 weeks, Asonstan (test portion) >6 months.

Ind of Report

Certificate of Analysis

Certificate Number 20-18899

Client Allied Exploration & Geotechnics Limited Unit 25 Stella Gill Industrial Estate Pelton Fell DH2 2RG 11-Nov-20

Our Reference 20-18899

Client Reference 4291

Order No LA 2395

Contract Title Metal Processing Area Shallow Soils Investigation

Description 20 Soil samples

Date Received 28-Sep-20

Dute Started 28-Sep-20

Date Completed 11-Nov-20

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

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

Approved By

Adam Fenwick Contracts Manager



Derwentside Environmental Testing Services Limited Unit 2, Park Road Industrial Estate South, Consett, Co Durham, DHS 5PV Tel: 01207 582333 + email: info@dets.co.uk + www.dets.co.uk

Page 1 al 5



# Summary of Chemical Analysis

# Soil Samples

Our Ref 20-18899

Chent Ref 4291 Contract Title Metal Processing Area Shallow Soils Investigation

4065 1734066	TPT NUK AUK TPT	0.0 08	0.5 0.5	1 1	4 P	2020 09/07/2020	n/s. n/s			1.0 < 1.0	
173	MPA_AUK					120/80				v	
1734064	THA_AUK_TP1	8	2,6	4		0802/10/80	1/12		10.1	<1.0	1700
1714061	APA, AUK, TP1 N	98	50	I	4	08/07/2020	N <sup>1</sup>		11.5	×1.0	065
1734062	IPA_AUK_TPA[A	-50	1.4		Ŧ	0202/10/60	14/10			\$1.D	
1900121	IPA AUK TP1 N	0.5	0.6		-	0202/20/60	a/a			<1.0	
Lab No	2	mple (D	Depth	ther iD	le Type	1g Date	I Time	Units	Hd	Ba/IW	(/Bu
		Sat		0	Samp	Samplin	Sampliir	top		H	9
								Method	DETSC 2008#	DE75C 5008	DETSC 2076#
											Mract as 504

key, it should's factoriation with an any distant context the MCERTS logol, nutsing tunderly.

% DETS

# Summary of Chemical Analysis

# Soil Samples

Our Ref 20-18899 Client Ref 4291 Contract Title Metal Processing Area Shallow Soils Investigation

		Lab	INO NO	57 1734065	1734069	1/34070	1704671	C104E11	1754071	1734074	£704ET1
			NAPA AGK T	PL MPA AUK TP1	MPA_AUK_TP1	APA_AUK_TP1 A	APA_AUK_TP1 A	APA_AUK_TPT A	APA. NUK. TP1	NPA_AUK_TP	MPA_AUK_IP
		Sample	0	04 04	12	21	16	11	19	120	124
		Del	oth 1	.6 2.6	2.6	9.4	1.4	55	14	3.5	3.7
		other	0	4	12	-	a	6	4	-	51
		Sample Ty	pe	1 1	ł	4	-		4	1	~
		Sampling D.	ate 09/07/20	0702/20/90 02	08/02/2020	06/07/2020	06/07/2020	0202/20/80	06/07/2020	0202/20/10	02/22/2050
		Sampling Ti	me	151 eV4	e//\$	a/a	1/1-	n/s.	a/u	in/16	e/n
Test	Method	LOD Ur	its								
Inorganics											
PH	DET5C 2008#		Hd	11.2			12.3	12.3		11.9	11.2
Calarific Value	DETSC 5008	TWI T	/kg <1	0	< 1.0	×1.0		<1.0	c1.0		
Sulphale Aqueouv Extract as SO4	DETSC 2076#	10 11	g/1	740			23	400		570	1400

while decomposition (we when a first of the set of the



# Summary of Chemical Analysis

# Soil Samples

Our Ref 20-18899

Cilent Ref. 4291 Contract Title Metal Processing Area Shallow Solls Investigation

× 1.0 126 TITE COLOR TITE COLOR TO A COLOR 15 10/07/2020 Ş 128 10/02/2020 12.0 40 100 -90 1 in/s 122 10/07/2020 <1.0 10/07/2020 < 1.0 127 50 100 126 40 13/07/2020 ž 12.1 5 Lab No Depth H Sample ID Other ID Sample Type Sampling Date Sampling Time LOD Units MU/Kg me/l H Of DETSC 20764 DETSC 2008# DETSC 5008 Method Sulphate Aqueous Extract as 504 Calorific Value Inorganics Test H

Avey, II - MULTITY (Auxorditations only applies if report carries the MCCRTS lags), n/A-rest supplied.



mondat

### Information in Support of the Analytical Results

Our Ref 20-18899

Client Ref 4291

Contract Metal Processing Area Shallow Solly Investigation

### **Containers Received & Deviating Samples**

Sample ID	Date	Containers Received	Holding time exceeded for tests	container for
Link sine Thing as some	04/07/30	ST 10	Towning time exceeded for terrs	10000
	0000720	P1 10		
MPA_AUK_TP105.0.4 SOIL	09/07/20	*1 H.	the second se	
MPA_AUK_TP106.0.5 SOIL	08/07/20	#T 1L	Amons 2.1 (Hudays), pH + Conductivity (7 days)	
MPA_AUK_TP1062.6 SOIL	08/07/20	WT AL.	Anions 2.1 (30 days), pH + Conductivity (7 days)	
MPA_AUK_TP1070.5 SCHL	08/07/20	PT 11.		
MPA_ALIK_TP108.0.6 SOIL	09/07/20	PT IL		_
MPA_AUK_TP108 1.6 SOIL	09/07/20	PTTI		A
MPA_AUK_TP109 2.6 SOIL	05/07/20	FT IL	Arrions 2:1 (10 days), pH + Conductivity (7 days)	
MPA_AUK_TP112 2.6 SOIL	08/07/20	PT IL		
MPA_AUK_TP115.0.4 SOIL	06/07/20	#T 1L		
MPA_ALIK_TP11614 SOIL	06/07/26	PTAL	Anions 2 1 (30days), sH + Conductivity (7 days)	
MPA_AUK_TP117.3.3 SOIL	08/07/20	PT IL	Anions 2 1 (10 days), pH + Conductivity (7 days)	
MPA_AUK_TP11914SOL	06/07/20	PT D.		
MPA_AUK_TP1203.6 SOIL	07/07/20	PT 11.	Amons 2.1 (Blidge), pH + Conductivity (7 days)	1
MPA_AUK_TP124 3.7 SOIL	107/07/20	PT 11.	Anions 2:1 (30 days), pH + Conductivity (7 days)	
MPA_AUK_TP126.0.4 SOIL	13/07/20	#7 1L	Anions 2-1 (30 days), pH + Conductivity (7 days)	
MPA_AUK_TP127.0.4 SOIL	10/07/20	PT 11		
MPA_AUK_TP1271.650%	10/07/26	PTIL		
MPA_AUK_TP1280.4 SOIL	10/07/20	PT D.	Anions 2.3 (Bidden), pH v Conductivity (7 days)	
MPA_ACIN_TP1283-65OH	10/07/20	PT 11.		
	Sample ID MPA_AUK_TP108.0.6 SOIL MPA_AUK_TP105.0.4 SOIL MPA_AUK_TP105.0.4 SOIL MPA_AUK_TP106.2.6 SOIL MPA_AUK_TP107.0.5 SOIL MPA_AUK_TP110.1.4 SOIL MPA_AUK_TP110.1.4 SOIL MPA_AUK_TP120.3.6 SOIL MPA_AUK_TP120.3.6 SOIL MPA_AUK_TP120.3.6 SOIL MPA_AUK_TP127.0.4 SOIL MPA_AUK_TP127.0.4 SOIL MPA_AUK_TP127.0.4 SOIL MPA_AUK_TP127.0.4 SOIL MPA_AUK_TP128.0.4 SOIL	Date           Sample ID         Sampled           MPA_AUK_TP108.0.6 S011         09/07/20           MFA_AUK_TP105.0.4 S011         09/07/20           MFA_AUK_TP106.0.4 S011         09/07/20           MPA_AUK_TP106.0.5 S011         08/07/20           MPA_AUK_TP106.2.6 S011         08/07/20           MPA_AUK_TP106.2.6 S011         08/07/20           MPA_AUK_TP107.0.5 S011         08/07/20           MPA_AUK_TP112.2.6 S011         08/07/20           MPA_AUK_TP115.0.4 S011         08/07/20           MPA_AUK_TP110.1 4 S011         08/07/20           MPA_AUK_TP120.3.6 S011         08/07/20           MPA_AUK_TP120.4.6 S011         07/07/20           MPA_AUK_TP120.3.6 S011         07/07/20           MPA_AUK_TP120.4.6 S011         10/07/20           MPA_AUK_TP120.4.6 S011         10/07/20           MPA_AUK_TP122.0.4 S011         1	Date           Sample ID         Sample Containers Received           MPA_AUK_TP103.0.6 SOIL         0%07/20         PT 1//           MFA_AUK_TP105.0.4 SOIL         0%07/20         PT 1//           MFA_AUK_TP105.0.4 SOIL         0%07/20         PT 1//           MPA_AUK_TP106.0.5 SOIL         0%07/20         PT 1//           MPA_AUK_TP106.7.6 SOIL         0%07/20         PT 1//           MPA_AUK_TP106.7.6 SOIL         0%07/20         PT 1//           MPA_AUK_TP108.0.6 SOIL         0%07/20         PT 1//           MPA_AUK_TP108.0.6 SOIL         0%07/20         PT 1//           MPA_AUK_TP108.0.6 SOIL         0%07/20         PT 1//           MPA_AUK_TP109.2.6 SOIL         0%07/20         PT 1//           MPA_AUK_TP112.2.6 SOIL         0%07/20         PT 1//           MPA_AUK_TP115.0.4 SOIL         0%07/20         PT 1//           MPA_AUK_TP115.0.4 SOIL         0%07/20         PT 1//           MPA_AUK_TP110.1.4 SOIL         0%07/20         PT 1//           MPA_AUK_TP120.3.6 SOIL         0%07/20	Date         Sample ID         Sample (Containers Received)         Holding time exceeded for tests           MPA_AUK_TP108.06.8.001         09/07/20         PT 11           MPA_AUK_TP108.06.8.001         09/07/20         PT 11           MPA_AUK_TP108.06.5.001         09/07/20         PT 11           MPA_AUK_TP106.0.5.501         08/07/20         PT 11           MPA_AUK_TP108.06.5.001         08/07/20         PT 11           MPA_AUK_TP108.06.5.001         08/07/20         PT 11           MPA_AUK_TP108.06.5.001         08/07/20         PT 11           MPA_AUK_TP108.06.5.001         09/07/20         PT 11           MPA_AUK_TP108.06.5.001         08/07/20         PT 11           MPA_AUK_TP115.04.501         06/07/20         PT 11           MPA_AUK_TP115.04.501         06/07/20         PT 11           MPA_AUK_TP115.04.501         06/07/20         PT 11           MPA_AUK_TP115.04.501         06/07/20         PT 11           MPA_AUK_TP120.45.001

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DETS cerved by held rescension for two integrity of samples received whereby the laboratory and not undertake the sampling, in this restance samples received may be deviating. Deviating Sample orders are based on British and international standards and laboratory trias in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to held time, inappropriate contained and international standards and laboratory trias in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to held time, inappropriate contained etclare deviating due to the reasons stated. This means that the works is accredited where applicable, but results may be commined due to sample deviation. If no sampled date (so h) or gaterinine (waters) has been supplied then samples are deviating. However, if you are able to supplied date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not e specified and where the poststore supplied is suitable.

### Soil Analysis Notes

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### Disposal

From the goue date of this test certificant, somales will be held for the following times prior to disparal forts - 1 month, Equato - 2 weeks. Adventor (test portion) - 6 months

BYOM YOU REMARKED

# Determination of Dry Density/Moisture Content Relationship



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Hald Office UNUP Description Annual Dates Free Field Design in Report On Dataset (NE 2001 In Fig. 2010) In Fig. 1011 (a) 4111 (b) 4111 Report Office UNUP Description Description Tests Tester (Intel Report 10) Mill, Ser 2012 (2) 1014 (a) 1012 (2) 1014





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had Office (in) a new or exceeded from them of all Device backness (in Comparison (in 1971) in 1970) has shown in the second office in



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IPA_AUK_TPID1	2.40	the second se		(%)	(%)	
		LB6	4.5kg Compaction	99.0	99.0	Test Unsuitable due to excessive coarse material
PA_AUK_TPIOS	2 30	LB6	4 5kg Compaction	99.0	99.0	Test Unsuitable due to excessive coarse material
IPA_AUK_TP104	2,40	LB6	4.5kg Compaction	99.0	99,0	Test Unsuitable due to excessive coarse material
IPA_AUK_TP105	2.80	LB8	4.5kg Compaction	96.0	95.0	Test Unsuitable due to excessive coarse material
APA_AUK,TP100	0.80	B2	4.5kg Compaction	98.0	97.0	Test Unsuitable due to excessive coarse material
PA_AUK_TP100	2.00	LBS	4 5kg Compaction	99.0	99.0	Test Unsuitable due to excessive coarse material
APA_AUK_TP110	2.90	BS	4 5kg Compaction	43.0	21.0	Test Unsuitable due to excessive coarse material
APA_AUK_TP112	0.70	B2	4 5kg Compadion	51 0	37.0	Test Unsuitable due to excessive coarse material
MPA_AUK_TP112	2.10	LBG	4.5kg Compaction	R2 0	81.0	Test Unsuitable due to excessive coarse material
MPA_AUK_TP112	2.30	LB6	4.5kg Compaction	33 0	13.0	Test Unsuitable due to excessive coarse material
MPA_AUK_TPI 14	2.50	LBG	4 5kg Compaction	99.0	99.0	Test Unsuitable due to excessive coarse material
ADA AUK TPIT	2.00	LB6	4.5kg Compaction	99.0	98.0	Test Unsuitable due to excessive coarse material
RA_AUR_TPI 16	3,00	LB8	4 5kg Compaction	100.0	99,0	Test Unsuitable due to excessive coarse material
MPA_AUR_TP121	2.50	LB6	4 5kg Compaction	\$9,0	99.0	Test Unsuitable due to excessive coarse material
MPA_AUK_TP123	170	BS	4 5kg Compaction	99.0	99.0	Test Unsuitable due to excessive coarse material
MPA_AUK_TET25	2.40	LB6	4 5kg Compedition	95.0	98.0	Test Unsuitable due to excessive coarse materia
MPALAUK_TP127	0.60	82	4 5kg Compaction	44.0	12 0	Test Unsuitable due to excessive coarse materia
MILA AUK TRIS	0.30	B2:	4.5kg Compaction	81,0	69.0	Test Unsuitable due to excessive coarse materia

Asme -Page 1 of 1 AEG Contract No. -4291 Centricate No 5 Date of Insue -USCP/4291/1 05/11/2020 136



# Determination of California Bearing Ratio

DETERMINATION OF THE CALIFORNIA BEARING RATIO BS 1377 : Part 4 : 1990 and Part 2 : Clause 3.2 : 1990 Exploratory Hole No - MPA\_AUK\_TP115 Sample No.- B2 Depth (m)- 0.50 "As Received" Moisture Content (%) Surcharge (Kg) = 6 Retained on 20mm (%) 21.0 Seating Load (N) : Top 250 / Bottom 250 Correction Needed No Test Moisture Content (%) : Top 7.8 / Bottom 9.8 Soaking Time (Days) N/A Bulk Density (Mg/m<sup>3</sup>) : 2.80 Swelling (mm) : N/A 2.58 Dry Density (Mg/m3) : Date Tested : 18/09/2020 CBR Value (%) Top 97 / Bottom Preparation Method : 4.5kg Compaction Remarks : Test was stopped due to maximum load ring capacity being reached. 30 25 20 Force (kN) Top ٠ 15 Bottom

10 5 10 2.0 3.0 4.0 5.0 6.0 7.0 Perietration (mm) For description of sample please refer to the Laboratory Sample Description Sheet Client -Contract Title Metal Processing Area Shallow Solis Investigation South Tees Development Corporation Signed Name > Page 1 of 1 AEG Contract No. Date of issue Certificate No -05/11/2020 CBR/4291/MPA\_AUK\_TP115/82/0.50/1 4291

### ALLIED EXPLORATION & GEOTECHNICS LIMITED DETERMINATION OF THE CALIFORNIA BEARING RATIO Not to BS 1377 Part 4: 1990 and Part 2: Clause 3.2: 1990 Exploratory Hole No.- MPA\_AUK\_TP118 Sample No.- B2 Depth (m)- 0.60 "As Received" Moisture Content (%) Surcharge (Kg): 6 Retained on 20mm (%) : 35.0 Seating Load (N) Top 250 / Bottom 250 Correction Needed No Test Moisture Content (%). Top 9.1 / Bottom 9.2 Soaking Time (Days) N/A Bulk Density (Mg/m3) : 2.41 Swelling (mm) N/A Dry Density (Mg/m<sup>3</sup>) = 2.21 Date Tested : 23/09/2020 CBR Value (%): Top 130 / Bottom 200 Preparation Method : 4.5kg Compaction Remarks : Test was stopped due to maximum load ring capacity being reached. 30 25 20 Force (kN) Top 15 Bottom 10 5 2.0 10 3.0 40 5.0 6.0 7.0 Penetration (mm) For description of sample please refer to the Laboratory Sample Description Sheet Client > Contract Title : Metal Processing Area Shallow Soils Investigation South Tees Development Corporation

 Signed - MSOL
 Name Page 1 of 1

 Date of issue Certificate No AEG Contract No 

 05/11/2020
 CBR/4251/MPA\_AUK\_TP118/82/0 60/1
 AEG Contract No 

 1367
#### ALLIED EXPLORATION & GEOTECHNICS LIMITED DETERMINATION OF THE CALIFORNIA BEARING RATIO BS 1377 Part 4 : 1990 and Part 2 : Clause 3.2 : 1990 Exploratory Hole No.- MPA\_AUK\_TP119 Sample No.- B2 Depth (m)- 0.80 "As Received" Moisture Content (%) Surcharge (Kg) 6 Retained on 20mm (%) : 29.0 Seating Load (N) Top 250 / Bottom 250

Test Moisture Content (%)

Bulk Density (Mg/m<sup>3</sup>) :

Dry Density (Mg/m<sup>2</sup>) :

CBR Value (%)

Top 11 / Bottom 10

Top 110 / Bottom 150

2.34

2.12

No

N/A

N/A

22/09/2020

Correction Needed

Swelling (mm) :

Date Tested :

Soaking Time (Days)



4291



# Determination of Permeability in a Triaxial Cell

Certificate No: 4291 BOS1 B Sheet 1 of 1 ALLIED EXPLORATION & GEOTECHNICS LIMITED Unit 25 Stella Gill Industrial Estate Pelton Fell Chester-le-Street, Co Durham DH2 2RG a UKAS TESTING Laboratory No. 1367 DETERMINATION OF PERMEABILITY IN TRIAXIAL CELL SITE: Metal Processing Area Shallow Soils Investigation JOB No: 4291 CLIENT: South Tees Development Corporation Type of specimen: Remoulded @ NMC +4% (2.5kg rammer) Sample No: BOS1 B Depth: 0.00 Specific Depth: n/a For sample description please refer to sample description sheet. SPECIMEN DETAILS: INITIAL FINAL 147:5 Length 145.8 mm Diameter mm 104.6 105.0 Moisture Content % 15.3 17.4 Wet Density Mg/m<sup>A</sup>3 2.10 2.13 Dry Density Mg/mA3 1.82 1.81 DEGREE OF SATURATION: 99.9 34 PERMEABILITY : Cell Pressure kPa 350 Top Back Pressure kPa 300 Base Back Pressure kPa 330 Mean Effective Stress kPa 35 Mean Flow Rate mi/min 0.075750 Permeability m/sec 6.98xE-09 TIME (mins) 100 200 300 400 500 600 0 5 10 15 ð 20 ರ 25 30 35 40

DATE TESTED: 13/08/2020 DATE OF ISSUE: 10/09/2020 APPROVED BY: M WWW NAME: M Selkirk: Certificate No: 4291 Stockpile B2 Sheet 1 of 1 ALLIED EXPLORATION & GEOTECHNICS LIMITED Unit 25 Stella Gill Industrial Estate Pellon Fell Chester-le-Street . Co Durham DH2 2RG a UKAS TESTING Laboratory No. 1367 DETERMINATION OF PERMEABILITY IN TRIAXIAL CELL SITE Metal Processing Area Shallow Solis Investigation JOB No: 4291 CLIENT: South Tees Development Corporation Type of specimen: Remoulded @ NMC +3% (2.5kg rammer) Sample No: Stockpile B2 Depth: 0.00 Specific Depth: n/a For sample description please refer to sample description sheet. SPECIMEN DETAILS: FINAL INITIAL 137.5 138.1 Length mm Diameter 103.8 103.5 mm Moisture Content % 8.5 10.1 Wet Density Mg/m<sup>\*3</sup> 2.27 2.30 Dry Density Mg/m<sup>A</sup>3 2.10 2.09 DEGREE OF SATURATION: 100.0 % PERMEABILITY : Cell Pressure kPa 350 Top Back Pressure kPa 300 Base Back Pressure kPa 330 Mean Effective Stress kPa 35 Mean Flow Rate ml/min N/A Permeability m/sec. N/A Remarks: Unable to complete test. Water flow through sample was too rapid; probably due to air voids. TIME (mins) D. 400 800 1200 1600 2000 2400 đ 0.2 0.4 0.6 FLOW 0.8 1 12 14 16 DATE TESTED: 24/07/2020 DATE OF ISSUE: 29/07/2020 APPROVED BY: NAME: M Selkirk

ALL	IED EXPLOR Unit 25 5 Ghest a UK ETERMINATION	ATION & GI Stella Gill Industria er-le-Street , Co I AS TESTING Lab I OF PERMEA	EOTEC al Estate , F Durham DH oratory No BILITY II	HNICS LIM Pelton Fell 12 2RG 1367 N TRIAXIAL (				
SITE:	Metal Processing	Area Shallow Sol	is Investiga	ation	JOB No:	4291		
CLIENT:	South Tees Devel	opment Corporati	ion	Type of speci	men:	Remoulded @ NM		
Sample No:	Stockpile B3	Depth:	Depth: 0.00 Specific Depth:			n/a		
Fo	r sample description	n please refer to s	ample des	cription sheet		_		
SPECIMEN	DETAILS:			INITIAL		FINAL		
Length		mm		135.0		134.7		
Diameter		mm		104.8		104.1		
Moisture Co	ontent	%		12.9		13.9		
Wet Densit	Y	Mg/m^3		2.17		2.21		
Dry Density		Mg/m^3		1.92		1.94		
DEGREE O	F SATURATION	· %				99.9		
DEDMEAR	UTV -							
Coll Drogou		4Da		950				
Tap Back B	ine Receives	kPa		300				
Top Back P	Drassure	kPa		300				
Base Back	Pressure	KPa kDa		330				
Mean Effect	tive Stress	KPa m//min		30				
Permeabilit	V	m/sec		4.44xE-10				
		T	IME (mins)					
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DATE TEST	ED: 24/07/20	20	DATE OF	ISSUE:	29/07/202	a.		
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D	ETERMINATION	OF PERMEA	BILITY	N TRIAXIAL C	ELL		
SITE	Metal Processing	Area Shallow Soi	s Investig	abon J	OB No:	4291	
CLIENT:	South Tees Devel	opment Corporati	on	Type of specin	nen:	Remoulded @ NM	
Sample No:	Stockpile B4	Depth:	Depth: 0.00 Specific I			n/a	
Fo	or sample description	n please refer to s	ampla des	scription sheet.		-	
SPECIMEN	DETAILS:			INITIAL		FINAL	
Length		mm		149 0		147.6	
Diameter		mm		105.9		104.8	
Moisture C	ontent	%		12.7		12.2	
Wet Densit	ly	Mg/m^3		2.19		2.25	
Dry Density	y	Mg/m <sup>4</sup> 3		1.94		2.00	
DEGREE (	OF SATURATION	: %				100.0	
PERMEAB	BILITY :					·	
Cell Pressu	line	kPa		350			
Top Back F	Pressure	kPa		300			
Base Back	Pressure	kPa		330			
Mean Effec	ctive Stress	kPa		35			
Mean Flow	Rate	ml/min		0.001871			
Permeabili	ty	m/sec		1.72xE-10			
		т	IME (mins	a.			
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E. 2.5							
3							
3.5					-		
4					-		
45 -						-	

Gertificate No: 4291 Stockpile B6 Sheet 1 of ALLIED EXPLORATION & GEOTECHNICS LIMITED Unit 25 Stella Gill Industrial Estate Peton Fell Chester-le-Street, Co Durham DH2 2RG a UKAS TESTING Laboratory No 1367 DETERMINATION OF PERMEABILITY IN TRIAXIAL CELL SITE: Metal Processing Area Shallow Soils Investigation 4291 JOB No: CLIENT: South Tees Development Corporation Type of specimen: Remoulded @ NMC +6% (2.5kg rammer) Sample No: Stockpile B6. Depth: 0.00 Specific Depth: n/a For sample description please refer to sample description sheet. SPECIMEN DETAILS: INITIAL FINAL. Length 160.0 mm Diameter mm 105.0 Moisture Content % 14.5 Wet Density Mg/m^3 2.30 Dry Density Mg/m^3 2.01 DEGREE OF SATURATION: % N/A PERMEABILITY : Cell Pressure kPa 350 Top Back Pressure kPa 300 Base Back Pressure kPa 330 Mean Effective Stress kPa. 35 Mean Flow Rate ml/min N/A Permeability m/sec N/A Sample unable to hold itself up sufficiently for test to be completed - too Remarks: soft/wet. TIME (mins) 0 400 800 1200 1600 2000 2400 Ø 0.2 0.4 0.6 FLOW 0.8 1 12 14 1.6 DATE TESTED: 0708/2020 DATE OF ISSUE: 18/08/2020 sch APPROVED BY: (1) NAME: M.Selkirk



# Determination of In-situ Density Core Cutter

# ALLIED EXPLORATION & GEOTECHNICS LIMITED

a) Office and 24 second of second Facet Protoc Fail (Design Andreas) To Design (DOURD, The Prot Office Second Facet Protocol (Design And Protocol), 201 (Sec. Tag 2017) To 201 Facet (To 2017) To 201 (Sec. Tag 2017) To 2017) To 2017) To 2017 (Sec. Tag 2017) To 2017) To 2017 (Sec. Tag 2017) To 2017) To 2017 (Sec. Tag 2017) To 2017) To 2017) To 2017 (Sec. Tag 2017) To 2017) To 2017 (Sec. Tag 2017) To 2017) To 2017) To 2017 (Sec. Tag 2017) To 2017) To 2017) To 2017 (Sec. Tag 2017) To 2017) To 2017) To 2017 (Sec. Tag 2017) To 2017) To 2017) To 2017) To 2017) To 2017 (Sec. Tag 2017) To 2017 (Sec. Tag 2017) To 2017) To 2017) To 2017) To 2017) To 2017) To

IN-SITU DENSITY TEST CORE CUTTER METHOD BS 1377 Part 9 Clause 2.4 1990											
Exploratory Hole No.:-	Sample Type & No.:-	Sample Depth (m):-	Specific Depth (m):-	Bulk Density (Mg/m^3):-	Dry Density (Mg/m^3):-	Moisture Content (%):-	Date Tested	Test Method			
BOST	В	0.00	0.00	2.20	2.04	8.0	17/07/2020	Undisturbed			
Stockpile	C1	0.00	D.00	2.12	1.99	66	10/07/2020	Undisturbed			
Stockpille	C2	000	0.00	2.09	199	5.1	10/07/2020	Undisturbed			
Stockpile	04	0.00	0.00	2.17	1.98	9.5	17/07/2020	Undetablished			
Stockplie	05	0.00	0.00	2.20	2.02	8.5	17/07/2020	Undisturbed			
Stockpile	C6	0.00	0 00	2.20	2.06	59	17/07/2020	Undistinted			

For description of simple please refer to the Laboratory Sample Description Sweet

Metal Processing Area Shallow Solis Investigation

Client .

South Tees Development Corporation

Contract Title

 
 Application
 Name >
 Page 1.01 1

 Date of issue -05/11/2020
 Dertificate No -DENS/4291/1
 AEG Contract No -4291



Slag Analysis (Tested Externally)

# TRS REPORT

Report Ref: BG0G/AEG/MPR/TRS/10/20/RP2 Date Issued: 11 September 2020 TRS Sample Refs: BG0G05-09 Order No: Job 4291

## **EXAMINATION OF FIVE SAMPLES**

## FROM

## 4291 MPA SITE, REDCAR

## FOR

## **ALLIED EXPLORATION & GEOTECHNICS LTD**



# **Thomas Research Services Ltd.**

Tel: +44 (0) 1469 532 929 www.slagtest.co.uk Unit 7.Tattershall Castle Court, Morgan Way, New Holland, North LincoInshire, DN19 7PZ, United Kingdom A Limited Company registeried in England. Company Registration No: 2518421

# EXAMINATION OF FIVE SAMPLES FROM 4291 MPA SITE, REDCAR FOR

## ALLIED EXPLORATION & GEOTECHNICS LTD

## 1. BACKGROUND

Five bulk samples were received from the above site on 31<sup>rd</sup> July 2020. Each sample was weighed and allocated a unique TRS reference number, the details of which are recorded below:-

TRS Ref	Site Ref	Depth/m	Mass/kg
BG0G05	TP101 B5	1.9	19.5
BG0G06	TP107 B5	1.5	18.9
BG0G07	TP119 B6	2.0	17.9
BG0G08	TP120 B9	3.8	11.0
BG0G09	TP122 B9	3.8	12.0

There was a delay in processing these samples due to the Coronovirus lockdown.

The purpose of the exercise was to identify the range and relative concentrations of any iron and steelmaking slags present in the samples, and whether there was any potential for volumetric instability from the materials.

## 2. SAMPLE PREPARATION & PROGRAMME OF ANALYSIS

The samples were primary crushed to reduce particle size down to <50mm, portions then being selected and dried at low temperature to constant weight. The dried material was subjected to a regime of stage crushing and quartering to further reduce particle size down to <5mm. Portions of this <5mm material

were made up into resin bound blocks, one face of which was ground flat and polished using diamond pastes. Further portions of the <5mm material were milled to a fine powder. Fractions of material were extracted throughout the preparation procedure to provide the materials necessary for the further tests and analyses required in the programme.

A petrological examination was made of the polished blocks using reflected light microscopy, the complete findings of which are recorded in appendix A. The results of this examination were discussed in our report of 11<sup>th</sup> September 2020. On the basis of that report, and after discussions with the client, the following tests and analyses were carried out on the samples:-

Samples BG0G09 was subjected to the following tests & analyses to assess the potential for expansion of the blast furnace slag.

- Water soluble sulphate (table 1)
- Acid soluble sulphate (table 1)
- Total sulphur (table 1)
- Thermal analysis (table 3)
- TRS accelerated expansion test (table 4)

Samples BG0G05 & 07 were subjected to the following tests & analyses to assess the potential for expansion of the basic steel slag.

- Free CaO (table 2)
- Free MgO (table 2)
- Thermal analysis (table 3)
- TRS accelerated expansion test (table 4)

## 3. DISCUSSION OF RESULTS

## 3.1 Petrology

A petrological examination was made of the five samples using reflected light microscopy. The complete findings of this examination are recorded in appendix A.

Blast furnace slag was present in all five samples, with substantial quantities present in samples BGOG 06, 08 & 09 and small amounts in samples BGOG 05 & 07. The blast furnace slag was predominantly crystalline with only minor amounts of glassy material seen. Secondary alteration due to weathering was moderate, consisting mainly of pore infill and surface rinds. Products of alteration included calcite and gypsum, with other products being difficult to identify specifically under the microscope. Old weathered blast furnace slag may occasionally contain pockets of potentially expansive material (see appendix B). This potential can only be assessed by direct expansion testing (see sections 3.2-3.5). The unaltered slag consisted predominantly of mellilite, along with more minor amounts of spinel, metallic iron and sulphides.

Basic steel slag was present in four of the five samples. Samples BG0G 05 & 07 contained very large amounts, with samples BG0G 08 & 09 containing small amounts. The slag was extensively altered due to weathering, the secondary phases being difficult to identify specifically under the microscope. The unaltered basic steel slag consisted largely of dicalcium silicate, along with more minor amounts of RO & R<sub>3</sub>O<sub>4</sub> phase, CaF phase, line phase and periclase. The mineralogy of the basic steel slag would suggest that it may have significant potential for expansion (see appendix B). This potential can only be assessed by direct expansion testing (see sections 3.3 to 3.5).

Thomas Research Service: Ltd \_ 7 Tattershall Castle Crient, New Hulland, North Linconshire, DN19 7P2 101 - 44 (0) 1469 552929 www.slagtesLin.uk A small amount of basic refractory material was seen in sample BGOG 09. This material, even in minor amounts, can have significant potential for expansion (see appendix B).

Other constituents seen in the samples, generally in minor concentrations, included alumino-silicate brick, quartz, iron ore, metal, coal and coke. A cementitious material often bound the smaller particles together. This material appeared similar to the slag alteration products.

## 3.2 Sulphur Species

The following range of analyses were performed on samples BG0G09 (this sample contained significant amounts of blast furnace slag). The results are recorded in table 1:-

- Water soluble sulphate
- Acid soluble sulphate
- Total sulphur

Total sulphur recorded was 0.77 percent. Acid soluble sulphate was 0.85 percent, with a corresponding water soluble sulphate of 0.57 g/l. These sulphate and sulphur values were fairly typical for blast furnace slag. However, care should be taken when specifying concrete that may come into contact with the stag. Calculations show that 44 percent of the available sulphur is present as sulphate.

## 3.3 Thermal Analysis

Simultaneous differential thermal analysis (DTA) and thermo-gravimetric analysis (TGA) were performed on samples BG0G05, 07 & 09. The results are recorded in table three.

No ettringite or gypsum was seen in any of the samples.

Thirmail Research Services Ltd., 7 Tattershall Castle Court, Yerk Holland, North Lincolnshire, DN10 7P2 5 Tel: +44 (0) 1469 532929 www.ulagterE.co.uk Calcium hydroxide was recorded in samples BG0G05 & 07 at trace and 0.6 percent. Magnesium hydroxide was measured in the same samples both at trace level. These values were used to correct the free CaO and free MgO analyses recorded in table 2.

Calcite was present in all three samples examined at between 0.2 and 3.4 percent. This product is an indicator as to the weathered state of the slag.

## 3.4 Free CaO & Free MgO

Free CaO & free MgO analyses were carried out on samples BG0G05 & 07 (These samples contained significant mounts of basic steel slag). The results are recorded in table 2. Both original and corrected values are recorded. The original values include both the oxide (CaO and MgO) and the hydroxide ((Ca(OH)<sub>2</sub> and Mg(OH)<sub>2</sub>)) contents. The corrected values report only the oxide content (CaO and MgO) after correction using the hydroxide values from the thermal analyses. These corrected values are the more significant, as it is only the oxides that are still free to hydrate, i.e. expand.

Free lime was recorded in the samples at 1.4 and 0.8 percent. Free magnesia was recorded at 0.9 percent. These corrected free lime and free magnesia levels record oxides that are potentially still free to hydrate (i.e. expand).

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## 3.5 TRS Accelerated Expansion Test

The TRS accelerated expansion test was performed on samples BG0G05, 07 & 09. The results are recorded in table four. Note that the test measures potential for future expansion, and is not a measure of expansion that may have taken place in the past.

Sample BG0G09 (consisting predominantly of blast furnace slag, with minor amounts of basic steel slag and basic refractory material) recorded an expansion result of 0.29 percent. The samples containing significant basic steel slag recorded expansion results of 0.76 and 0.90 percent.

### 4. CONCLUSIONS

The following conclusions can be drawn:-

- Blast furnace slag was a dominant constituent in three of the samples (BG0G 06, 08 & 09) and a minor constituent in the remaining two. The slag was mainly crystalline although minor amounts of glassy material were seen. The slag showed some alteration due to weathering. Old weathered blast furnace slag may occasionally contain pockets of potentially expansive material.
- Further testing of sample BG0G09 consisting predominantly of blast furnace slag (with minor basic steel slag & basic refractory) recorded an expansion result of 0.29 percent. The sulphate values should be taken into consideration when specifying concrete that may come into contact with the slag.
- Basic steel slag was the dominant constituent in samples BG0G 05 and 07. It was also present in small amounts in samples 08 & 09. This material is likely to present a significant risk of expansion.

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- Expansion testing of samples (BG0G05 & 07) consisting mainly of basic steel slag recorded expansion results of 0.76 and 0.90 percent.
- Minor amounts of basic refractory material were seen in sample BG0G 09. This product can be a significant source of expansion, even when present in relatively small amounts.
- Other products were seen in the samples in minor amounts including alumino-silicate brick, guartz, iron ore, metal, coal and coke.

### Note

These conclusions apply only to the samples tested and may not represent the bulk of the material on the site from which they were taken.

lan D. Thomas

Ian D Thomas BSc(Hons)

21 October 2020

#### TABLE 1

SULPHUR SPECTES ANALYSES

TRS Ref	Site Ref	Water Sol. SO <sub>1</sub> (g/l)	Acid Sol. SO <sub>1</sub> (%)	Total 5 (%)
B60G05	TP101 85		2.0.00	
BG0G07	TP119 86		-	
B60609	TP122 B9	0.57	0,85	0.72

TABLE 2

ANALYSIS FOR FREE CaO AND FREE MgO

TRS Ref	Site Ref	Free CaO Original (%)	Free CaO Corrected (%)	Free MgO Original (%)	Free MgO Corrected (%)	
BG0G05	TP101 B5	1.4	1.4	0.9	0.9	
BGOG07	TP119 B6	13	0.9	20.9	0.9	
BG0609	TP122 89					

TABLE 3

#### **RESULTS FROM THERMAL** ANALYSIS

TRS Ref	Site Ref	Mass % by Thermal Analysis									
		L.O.I.	Ettringite	Gypsum	Calcite	Ca(OH):	Mg(OH);	Others			
BG0G05	TP101 B5	1.42	0.0	D.0	LA:	trane.	ELQ.	100			
BG0G07	TP119 B6	0,97	0.0	0.5	0.2	0.6	1000				
BG0G09	TP122 B9	6.44	0.0	0.0	3.4	7.0	b/ace-				

TABLE 4

TRS ACCELERATED EXPANSION TEST

TRS Ref	Site Ref	7 day (%)	14 day (%)	21 day (96)	28 day (%)
BG0G05	TP101 85	0.55	0.69	0,74	0.75
BG0G07	TP119 B6	0.42	0.22	0.83	0,90
BG0609	TP122 B9	0.12	0.28	0.79	0.29

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## APPENDIX A

#### PETROLOGICAL REPORT ON SAMPLES BGOG 05-09

A petrological examination has been carried out of five samples BG0G 05 to 09.

Polished blocks were prepared using particulate material crushed to a nominal size of – 5mm. Representative material was made up into resin-bonded blocks. One face of each of these was ground flat and polished using diamond pastes. In addition, the surfaces were selectively etched with water and 0.1%N HCl in order to help with the phase identification.

The detailed results are given in the accompanying Table.

Samples 06, 08 and 09 consist largely of blast furnace slag and its alteration products.

Samples 05 & 07 are mainly basic steel slag. Very little basic refractory material was seen.

#### Blast furnace slag

The unaltered blast furnace stag consists mainly of crystalline mellite (Ca,Mg,Al silicate). Also, some spinel (MgAl<sub>2</sub>O<sub>4</sub>) occurs as a primary phase. The matn×, the space between the mellite crystals, is partly occupied by silicate glass and partly with other silicates. The slag contains minor amounts of iron metal occurring as tiny globules and prills and, also, dendritic crystals of Ca,Mn sulphide. Secondary alteration is moderate. It is mainly restricted to pore infill and the formation of thin rinds, especially the larnite. The secondary products are mostly finely granular and are difficult to identify specifically under the microscope. Minor amounts of calcite (CaCO<sub>5</sub>) and well-crystallised gypsum (CaSO<sub>4</sub>/2H<sub>2</sub>O) are present.

#### Basic steel slag

The unaltered basic steel slag consists mainly of dicalcium silicate, RO and RiO<sub>4</sub> phases (FeO and Fe<sub>1</sub>O<sub>4</sub> with some AI, Mn, Mg and Ca in solid solution) and CaF phases (complex Ca alumino-ferrites). Individual particles vary considerably in composition. Line phase (CaO with some Fe, Mn and Mg in solid solution) is present in minor amounts. It occurs mainly as granular particles up to about 0.1 mm in size. Peridase (MgO with some Fe in solid solution) is more common. Some metal is present as prills. The slag is extensively altered to secondary products that are difficult to identify specifically and are, probably, mainly hydrated silicates.

#### Other constituents

These include quartz, iron one and coke. The particles are bonded together by cementitious material that is similar to the slag alteration products but probably also includes some clay. It consists mostly of complex hydrates difficult to identify under the optical microscope.

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	5	6	7	8	9
BLAST FURNACE SLAG					
Amount	s	L	s	L	1
Phases present:-					
Melilite	1	L	L	L	L
Matrix & other silicates	s	5	\$	\$	5
Ca sulphide		vs		VS	VS
Metallic iron	-	\$		\$	VS
Spinel	\$	\$	10	s	VS
Glassy slag	-	s		-	-
Alteration products	s	5	s	m	s
Calcite		-	5	-	-
Gypsum			-	s	5
BASIC STEEL SLAG					
Amount	L		L	s	s
Phases present:-					
Dicalcium silicate	1	22	1.5	1	m
Tricalcium silicate	s	-			-
Unetched silicate	0.50	10	\$	100	
RO phase	m		m	m	m
CaF phase	5	10	s	s	s
R3O4 phase	\$		\$	s	-
Metal & rust	s		VS	•	VS
Lime phase	VS		VS	-	-
Periclase	\$		s	s	s
Alteration products	m	-	s	1	1
BASIC REFRACTORIES					
Amount	•			•	\$
OTHER CONSTITUENTS					
Alumino-silicate brick		\$	-	*	-
Quartz, etc.	5	VS	VS	-	VS
Intermediate slag	5		-		+
Metal, rust, scale, etc.	s		VS	VS	s
Iron ore, ironstone, etc.			-	-	VS
Shale, etc.	m			-	-
Coke	s		-	-	VS
Coal & char Cementitious alteration	-	s			਼
products	s	vs	s	s	s

L = very large, I = large, m = medium, s = small and vs = very small amounts

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#### GENERAL EXPLANATION

#### L = very large, I = large, m = medium, s = small and vs = very small amounts.

Blast furnace slag. When present this consists mainly of mellite (Ca,Mg,AI silicate ranging m composition between Ca,AI,SiO<sub>2</sub> and Ca<sub>1</sub>MgSi<sub>2</sub>O<sub>2</sub>). Other common phases are merwinite (Ca<sub>2</sub>MgSi<sub>2</sub>O<sub>2</sub>), The matrix often consists of some of the above phases, especially mellite, but may also contain other phases such as wollastonite (CaSiO<sub>3</sub>), anorthite (CaAI<sub>2</sub>Si<sub>2</sub>O<sub>3</sub>) and pyrokene ((CaMg)SiO<sub>3</sub>). Spinel (MgAI<sub>2</sub>O<sub>4</sub>) may be present. Sulphides and metal usually occur and are mostly finely dispersed, but the metal sometimes occurs as prills and may contain some graphite and Ti carbo-nitride (TiCN). Material reported as ceramic in appearance is very finely crystalline. The alteration products often include calcite and gypsum but are mostly silicate and/or sulpho-aluminate hydrates that are difficult to identify specifically under the microscope.

**Basic steel slag.** When present this consists mainly of dicalcium alicate, mostly the 8-form (larnite) but sometimes the alpha form. Phosphoric slags may contain nagelschmidtite (Ca<sub>2</sub>SiO, with Ca<sub>2</sub>P<sub>i</sub>O<sub>4</sub> in solid solution). Other silicate often present in small amounts, unetched by dilute HCI, is probably mellite. RO, R<sub>2</sub>O<sub>4</sub> and RF phases are typically present and are manly FeO and Fe<sub>2</sub>O<sub>4</sub> with some Mg, Mn, Ca, etc. in solid solution and complex Ca alumino-territes. There may also be some Fe<sub>2</sub>O<sub>1</sub> and spinel ((Mg,Fe)Al<sub>2</sub>O<sub>4</sub>). The slag typically carries minor amounts of penclase (MgO with some Fe in solid solution) and lime phase (CaO with some Fe, Mn & Mg in solid solution). Other possible minor constituents include fluorite (CaF<sub>2</sub>) and apablite (Ca fluoro-phosphale), the last present in phosphoric slags. The alteration products are, again, difficult to identify specifically but are probably, mainly, hydrated silicates. Portlandite (Ca(OH))) may be present.

**Basic refractory material.** When present, this is mainly magnesian and consists of granular periclase (MgO) with interstitial silicates. Sometimes samples contain chrome magnesia material with chromite present in addition to the other phases. Hot face material (from close to the furnace) may also occur. The periclase and interstitial silicates show second/inv alteration similar to that of the basic steel stag. Brucite (MgOH), is likely.

Acid steel slag. When present this consists mainly of Rayalite ((Fe, Mn), SiQ<sub>4</sub>), Fe, Mn oxides and cristobalite (high temperature SiQ<sub>7</sub>).

Other slags. The 'intermediate slag' (probably primary flush slags from steel furnaces) has a variable phase assemblage, being mainly formed of silicates, particularly divaloum plicate, mellilite, merwinite and a complex olivine phase together with spinel and wustite (FeO). Sometimes it contains significant: amounts of pendase, well embedded in the slag. The 'ferrous slag' (probably from foundry operations) has similar slicates but much more substantial content of iron oxides, usually wustite. It is often ussociated with scale (iron oxides formed on the surface of steel during reheating/cooling). When present, the 'cindery slag' consists of various silicates and silicate date with Fe oxides, hercynite (FeAI<sub>2</sub>O<sub>4</sub>) and, sometimes, conundum (Al<sub>2</sub>O<sub>4</sub>). It is usually derived from heating furnaces and is often associated with burnt shale. When present, the 'siliceous clinker' is similar but devoid of iron oxides.

Other constituents The alumino-silicate brick includes a range of refractory firebrick, common brick and alumina-rich refractories. The 'quartz, sendstone, etc.' may include used silica refractory material consisting of quartz and its high temperature forms. Sometimes there is a distinct granular texture and it is derived from silcrete, a kind of chert. Conventitious material may bond the finer particles together. It is similar to the other alternation products consisting roostly of complex hydrates difficult to identify under the microscope Sometimes some is used Portland cement recognised by the relict textures of the clinker and the embedded quartz sand

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## APPENDIX B

## MECHANISMS OF VOLUMETRIC INSTABILITY IN IRON AND STEEL INDUSTRY SLAGS

Volumetric change with time can occur in some types of iron and steel industry slags. These mechanisms are briefly described in this section.

#### **Blast Furnace Slags**

Fresh-make air-cooled, i.e. crystalline, blast fumace slags are almost always volumetrically stable after cooling. The two mechanisms for volumetric instability listed in BS1047;1983 – "Air Cooled Blast furnace Slag for use in Construction" are:-

Beta to gamma inversion of dicalcium silicate.

b) Iron unsoundness.

a) Research by G H Thomas on this phase transformation has shown the transformation to be athermal rather than isothermal. In practical terms this means that inversion, and the expansion associated with it, can only occur during the cooling cycle. In fully cooled material there would appear to be no further risk of instability from this mechanism.

b) Iron unsoundness is a <u>very rare</u> form of instability frequently associated with operating problems in the blast furnace. TRS know of only <u>one instance</u> in over 40 years. The mechanism, which is a hydrolysis reaction, is immediately triggered off by the presence of water. Once water has initiated the reaction, the mechanism proceeds to completion. It is impossible to arrest the process once started; at least by methods operating in normal ambient conditions.

It follows that the risk of late expansion from either of these mechanisms in blast. furnace slag is remote.

#### Sulphoaluminate Type Activity

Some years ago, G. H. Thomas discovered a third mechanism that may give rise to volumetric instability. The process is possible only in some old blast furnace slag altered.

Thomas Research Services Ltd., 7 Tatrostoli Costlo Court, New Molland, North Encolnshim, DM19 702 11 Tel: +44 (0) 1469 532929 www.slagtest.co.uk by weathering. When the sulphide sulphur in the blast furnace slags is oxidised during weathering to sulphate, under some circumstances reactions can take place within the slag to produce an 'ettringite' type product. The process is somewhat analogous to sulphatic attack on concrete and has a similar result - expansion of the mass and associated disruption.

For the mechanism to have any significance, the slag needs to have residual potential for this reaction. Evidence of past activity does not necessarily indicate further reaction is possible.

The TRS accelerated expansion test is, we believe, uniquely capable of identifying such slags, as well as instability attributable to free CaO and free MgO in steel slag & etc.

#### **Basic Steel Slags**

Basic steel slags commonly contain significant quantities of free CaO and free MgO. These free oxides are well known for the massive expansion associated with their hydration. In practical terms, it is impossible to forecast when hydration will take place, but it can be up to decades after the material was cooled – or placed. The reasons are complex, but include the varying density of the oxides, due to the variation in temperatures at which the products have been held in the furnace. Other factors influencing rate of hydration include:-

- the protection of slags by a reaction product at the oxide interface with the slag.
- the presence of the oxides as lime or magnesia rich solid solutions instead of the pure oxide.

The result is potential future volumetric instability but at an unforeseeable date. Periclase, i.e. free MgO, is relatively much slower than free CaO to hydrate.

#### Scrap High Magnesia Refractories

These are particularly undesirable components in fill as they commonly result in high concentrations of free MgO. The problems associated with these concentrations are similar to those where periclase is found in basic steel slag. Specialist Chemical Testing (Tested Externally)





## Certificate Number 20-12202,20-12303,20-12415,20-13862,20-12854,20-19768

13-Nov-20

- Client Allied Exploration & Geotechnics Limited Unit 25 Stella Gill Industrial Estate Pelton Fell DH2 2RG
- Our Reference 20-12202,20-12303,20-12415,20-13862,20-12854,20-19768
- Client Reference 4291
  - Order No (not supplied)
  - Contract Title Metal Processing Area Shallow Soils Investigation
  - Description 37 Soil samples, 10 Leachate samples.
  - Date Received 08-Jul-20
  - Date Started 08-Jul-20
- Date Completed 13-Nov-20
- Test Procedures Identified by prefix DETSn (details on request).
  - *Notes* Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By



Adam Fenwick Contracts Manager





# **Summary of Chemical Analysis**

## **Matrix Descriptions**

 Our Ref
 20-12202,20-12303,20-12415,20-13862,20-12854,20-19768

 Client Ref
 4291

 Contract Title
 Metal Processing Area Shallow Soils Investigation

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
MPA_AUK_TP119	3	1	1694833	10/08/2020	Dark brown gravelly SAND
MPA_AUK_TP114	2A	0.8	1694834	10/08/2020	Dark brown sandy GRAVEL (sample matrix outside MCERTS scope of accreditation)
MPA_AUK_TP109	3	0.9	1694835	10/08/2020	Dark brown sandy GRAVEL (sample matrix outside MCERTS scope of accreditation)
MPA_AUK_TP116	3	0.8	1694836	10/08/2020	Dark brown sandy GRAVEL (sample matrix outside MCERTS scope of accreditation)
MPA_AUK_TP115	3	0.6	1694837	10/08/2020	Dark brown sandy GRAVEL (sample matrix outside MCERTS scope of accreditation)
MPA_AUK_TP123	3	1	1695460	10/08/2020	Dark brown gravelly SAND
MPA_AUK_TP120	3	0.8	1695461	10/08/2020	Dark brown gravelly SAND
MPA_AUK_TP121	3	0.8	1695462	10/08/2020	Dark brown gravelly SAND
MPA_AUK_TP122	3	0.7	1695463	10/08/2020	Dark brown sandy GRAVEL (sample matrix outside MCERTS scope of accreditation)
MPA_AUK_TP124	3	0.8	1695464	10/08/2020	Dark brown gravelly SAND
MPA_AUK_TP125	3	0.8	1695465	10/08/2020	Dark brown gravelly SAND
MPA_AUK_TP106	3	1	1696136	10/08/2020	Dark grey very gravelly SAND
MPA_AUK_TP107	3	0.9	1696137	10/08/2020	Dark grey very gravelly SAND
MPA_AUK_TP112	3	0.9	1696138	10/08/2020	Dark grey very gravelly SAND
MPA_AUK_TP113	3	0.9	1696139	10/08/2020	Dark grey very gravelly SAND
MPA_AUK_TP117	3	0.6	1696140	10/08/2020	Dark grey very gravelly SAND
MPA_AUK_TP118	3	0.8	1696141	10/08/2020	Dark grey very gravelly SAND
MPA_AUK_TP126	3	0.8	1699073	10/08/2020	Dark brown gravelly SAND
MPA_AUK_TP127	3	0.9	1699074	10/08/2020	Dark brown gravelly SAND
MPA_AUK_TP128	3	0.9	1699075	10/08/2020	Dark brown gravelly SAND
MPA_AUK_TP129	3	1.1	1699076	10/08/2020	Dark brown gravelly SAND
MPA_AUK_TP130	3	0.6	1699077	10/08/2020	Dark brown gravelly SAND
MPA_AUK_TP102A	3	1	1699078	10/08/2020	Dark brown gravelly SAND
MPA_AUK_TP110	3	1	1699079	10/08/2020	Dark brown gravelly SAND
MPA_AUK_TP111	3	1.2	1699080	10/08/2020	Dark brown gravelly SAND
MPA_AUK_TP101	3	0.9	1705062	10/08/2020	Dark brown gravelly SAND
MPA_AUK_TP101	9	3.5	1705063	10/08/2020	Dark brown gravelly SAND
MPA_AUK_TP102	3	0.6	1705064	10/08/2020	Dark brown gravelly SAND
MPA_AUK_TP103	3	0.8	1705065	10/08/2020	Dark brown gravelly SAND
MPA_AUK_TP104	3	1	1705066	10/08/2020	Dark brown gravelly SAND
MPA_AUK_TP105	3	1	1705067	10/08/2020	Dark brown gravelly SAND
MPA_AUK_TP108	3	1	1705068	10/08/2020	Dark brown gravelly SAND
SSA	А	0	1740101	10/08/2020	Dark grey very gravelly SAND
SSD	D	0	1740102	10/08/2020	Dark grey very gravelly SAND
SSC	С	0	1740103	10/08/2020	Dark grey very gravelly SAND
SSE	E	0	1740104	10/08/2020	Dark grey very gravelly SAND
SSB	В	0	1740105	10/08/2020	Dark grey very gravelly SAND



# Summary of Chemical Analysis Soil Samples

## Our Ref 20-12202,20-12303,20-12415,20-13862,20-12854,20-19768 Client Ref 4291

Contract Title Metal Processing Area Shallow Soils Investigation

	Lab No			1694833	1694834	1694835	1694836
				MPA_AUK_TP1	MPA_AUK_TP1	MPA_AUK_TP1	MPA_AUK_TP1
		Sa	ample ID	19	14	09	16
			Depth	1	0.8	0.9	0.8
		_	Other ID	3	2A	3	3
		Sam	ple Type	ES	ES	ES	ES
		Sampl	ing Date	06/07/2020	06/07/2020	06/07/2020	06/07/2020
		Sampl	ing Time	n/s	n/s	n/s	n/s
Test	Method	LOD	Units				
Asbestos Quantification	DETSC 1102	0.001	%				
Metals							
Aluminium	DETSC 2301*	1	mg/kg	19000	13000	29000	8000
Antimony	DETSC 2301*	1	mg/kg	5.6	11	2.5	7.1
Arsenic	DETSC 2301#	0.2	mg/kg	21	2.3	64	7.2
Barium	DETSC 2301#	1.5	mg/kg	450	91	190	120
Beryllium	DETSC 2301#	0.2	mg/kg	2.1	0.2	3.4	0.5
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	1.4	2.5	3.8	4.7
Cadmium	DETSC 2301#	0.1	mg/kg	0.5	0.3	1.6	0.5
Chromium	DETSC 2301#	0.15	mg/kg	290	550	48	340
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	36	41	35	52
Iron	DETSC 2301	25	mg/kg	91000	240000	22000	160000
Lead	DETSC 2301#	0.3	mg/kg	41	8.9	550	31
Magnesium	DETSC 2301*	1	mg/kg	18000	28000	17000	21000
Manganese	DETSC 2301#	20	mg/kg	9200	17000	1600	17000
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Molybdenum	DETSC 2301#	0.4	mg/kg	3.0	3.0	0.8	5.7
Nickel	DETSC 2301#	1	mg/kg	21	21	11	39
Silicon	DETSC 2301*	10	mg/kg	63000	53000	63000	13000
Vanadium	DETSC 2301#	0.8	mg/kg	700	390	82	1100
Zinc	DETSC 2301#	1	mg/kg	170	47	230	94
Inorganics							
рН	DETSC 2008#		pН	11.3	12.7	10.8	11.9
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.1	< 0.1	0.1	0.5
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6
Organic matter	DETSC 2002#	0.1	%	4.2	0.2	0.7	0.8
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	180	< 10	1000	34
Sulphur (free)	DETSC 3049#	0.75	mg/kg	< 0.75	< 0.75	2.4	2.2



# Summary of Chemical Analysis Soil Samples

## *Our Ref* 20-12202,20-12303,20-12415,20-13862,20-12854,20-19768 *Client Ref* 4291

Contract Title Metal Processing Area Shallow Soils Investigation

		Lab No		1694833	1694834	1694835	1694836
				MPA_AUK_TP1	MPA_AUK_TP1	MPA_AUK_TP1	MPA_AUK_TP1
		Sa	ample ID	19	14	09	16
			Depth	1	0.8	0.9	0.8
		_	Other ID	3	2A	3	3
		Sam	ple Type	ES	ES	ES	ES
		Sampl	ing Date	06/07/2020	06/07/2020	06/07/2020	06/07/2020
		Sampl	ing Time	n/s	n/s	n/s	n/s
Test	Method	LOD	Units				
Petroleum Hydrocarbons		0.04	//	.0.01	. 0. 01	. 0.01	. 0. 01
Aliphatic CS-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	3./
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	14
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	110
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	120
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	3.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	21
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	25
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	150
PAHs							
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.04
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.20	< 0.03	< 0.03	1.0
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.05
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.35	0.03	< 0.03	1.2
Pyrene	DETSC 3303#	0.03	mg/kg	0.29	< 0.03	< 0.03	0.78
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.15	< 0.03	< 0.03	0.23
Chrysene	DETSC 3303	0.03	mg/kg	0.19	< 0.03	< 0.03	0.35
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.22	< 0.03	< 0.03	0.34
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.08	< 0.03	< 0.03	0.13
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.12	< 0.03	< 0.03	0.12
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.10	< 0.03	< 0.03	0.09
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.11	< 0.03	< 0.03	0.10
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	1.8	< 0.10	< 0.10	4.4