QTS Project Wind

Waste Recovery Plan – Phase B & C

QTS

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1.0

Introduction

1.0 Introduction

1.1 The Site

QTS Data Centres (QTS, the Client) is proposing to construct a new data centre campus on the site of the former coal-stock yards which serviced Blyth Power Station until the early 1990's. The site consists of a parcel of land which is approximately 102 Ha in size and is located 3km north of Blyth town centre in Cambois, Northumberland. The approximate centre of the site is National Grid Reference (NGR) NZ 29820 84164.

This report will relate to the area of the site as shown in red in the Figure below – 'The Site'. The wider site boundary covered in outlined planning is presented in blue.

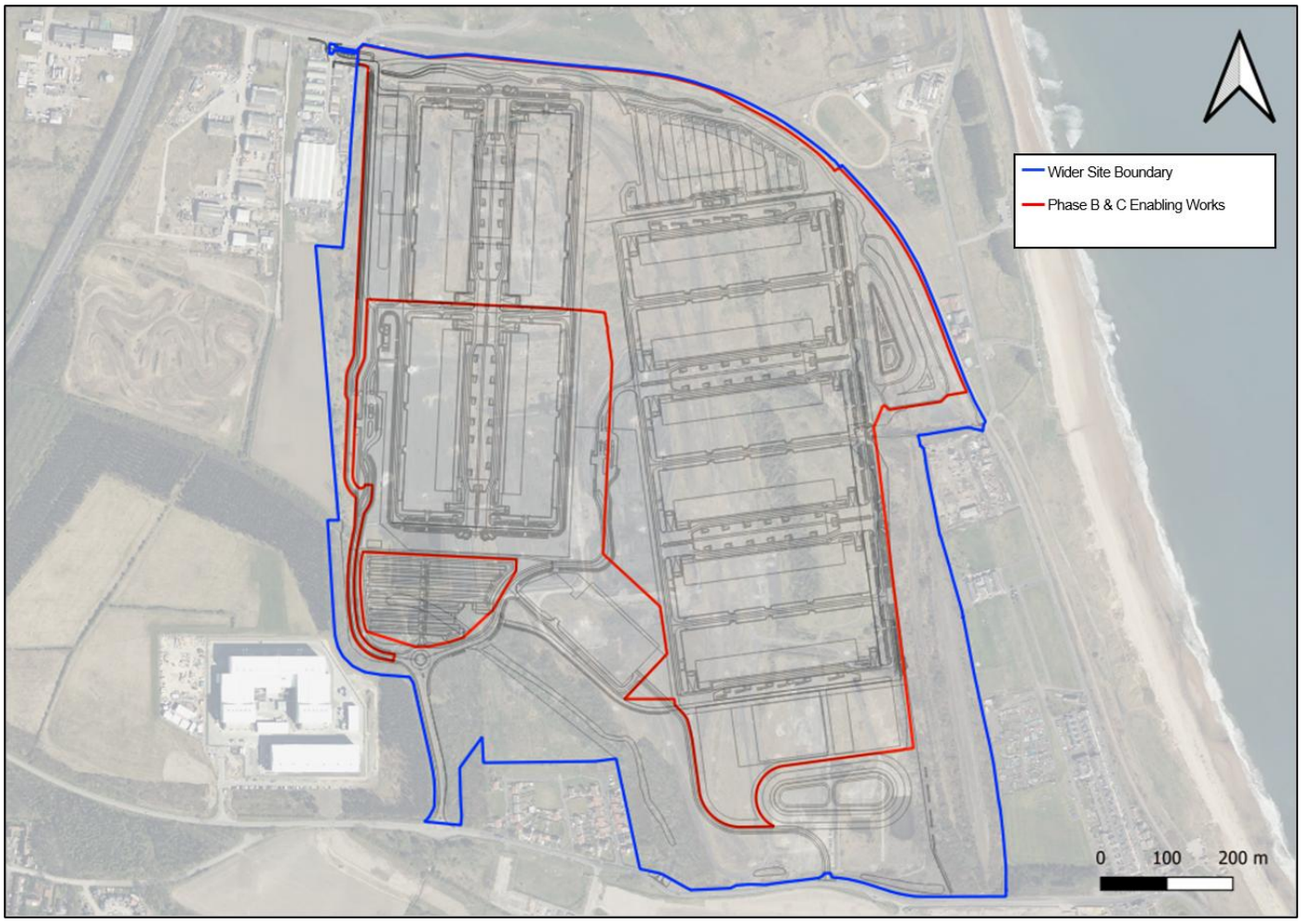


Figure 1-1: Site Layout (Red Line Boundary)

1.2 The Scheme

The proposed scheme within the Phase B & C Earthworks boundary (the Site) at the time of writing is to undertake earthworks and obstruction removal activities to establish finished enabling levels, which will eventually facilitate the construction of the proposed data centre campus. The permanent elements of the scheme within Phase B & C currently include eight data centres buildings (DC03 through to DC10), a substation, associated below-ground infrastructure, landscaping and external pavements and roads. The enabling works will also aim to provide a development platform for the construction of datacentre buildings DC03 and DC04, which will include for the excavation and breaking out of hard materials and obstructions, along with the processing and placement of engineered fill.

1.3 Objectives

Cundall was commissioned by the Client to prepare a Waste Recovery Plan for the proposed development to support a deposit for recovery permit for the Burnt Shale material (also known as Red Shale) present on the Site. “Recovery of waste” is defined as any operation the principal result of which, is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function. This report aims to demonstrate that the reuse of the Burnt Shale material is a recovery activity and will outline the controls that will be in place to minimise risk to the Environment and Human Health to levels that are acceptable and suitable for the site.

A previous Environmental Permit was granted on Phase A of the site (EPR/JP3321LF) for the recovery of Burnt Shale materials to be deposited in the Zone C Tunnel excavation. The granting of this permit demonstrates the recoverability of the material and its suitability for reuse on site. It is noted that the location of deposition was decided during the determination period of the application and no viable pollutant pathways were recorded based on the deposition location. There is currently no decided location for the reuse of Burnt Shale in Phase B&C but additional assessments are being undertaken to determine the potential for the Burnt Shale to act as a source of contamination and as such determine the appropriate suitability criteria with respect to controlled waters.

Other Made Ground materials on site are considered to be low risk and are intending to be reused either under the Definition of Waste Code of Practice (DoW COP) managed by CL:AIRE or, in the case of PFA, reused under the relevant WRAP Quality Protocol.

1.4 Sources of Information

The following sources of information have been used in the preparation of this report, including references therein:

1. Cundall (14 August 2025) Detailed Remediation Strategy Report reference GBR1-RMAP1-CDL-STE-XX-RP-0003.
2. Cundall (3 July 2026) Earthworks Specification. Report reference GBR1-ENA2-CDL-STE-XX-SP-B-0001
3. Cundall (3 July 2026) Earthworks Strategy - Enabling Works Phase B & C. Report reference GBR1-ENA2-CDL-STE-XX-RP-B-1005
4. Cundall (3 July 2026) Enabling Works Proposals, Enabling Works Phase B & C. Drawing reference GBR1-ENA2-CDL-STE-XX-DR-B-1008
5. Cundall (3 July 2026) Ground Conditions Summary Report. Report reference GBR1-ENA2-CDL-STE-XX-RP-B-1002
6. Cundall (3 July 2026) Enabling Works Phase B & C Surface Cover Materials. Drawing reference GBR1-ENA2-CDL-STE-XX-DR-B-1002
7. Cundall (8 May 2026) Enabling Works Phase B & C Finished Ground Level. Drawing reference GBR1-RMAPB-CDL-STE-XX-DR-C-1008 P02
8. Arcadis (January 2025). Cambois Data Centre Campus Ground Investigation Report. Report reference: 30226657-AUK-XX-XX-RP-ZZ-0017-01 Rev 01.
9. Arcadis (January 2025) Ground Investigation Factual Report – Stage 1 Project Wind, Blyth. Report reference: 30226657-AUK-XX-XX-RP-ZZ-0015-01 Rev 03.
10. Arcadis (January 2025) Ground Investigation Factual Report – Stage 2 Project Wind, Blyth. Report reference: 30226657-AUK-XX-XX-RP-ZZ-0015-01 Rev 03.
11. Arcadis (November 2024) Cambois Data Centre Campus - Phase 2 Geoenvironmental Assessment. Report reference: 30226657-AUK-XX-XX-RP-ZZ-00112-01 Rev 01
12. 1st Horizon (21 October 2024) Blyth Topographic and Utility Survey. DWG reference A-B11243
13. Arcadis (October 2024). Coal Mining Risk Assessment– Project Wind, Blyth. Report reference: 30226657-AUK-XX-XX-RP-ZZ-0010-01 Rev 01
14. Arcadis (October 2024). Phase 1B Geoenvironmental Desk Study – Project Wind, Blyth. Report reference: 30226657-AUK-XX-XX-RP-ZZ-0006-01 Rev 01.

15. Rolton Group Limited (4th April 2024). Gas and Groundwater Monitoring Summary Report – Project Wind. Report reference: 210114-RGL-XX-XX-RP-G-0002 Rev S2-P01.
16. Rolton Group Limited (11th August 2022). Burnt Shale Trial Pit Investigations for Former Coal Stocking Yards, Cambois. Report reference: PHX-RGL-XX-XX-RP-G-000014A Rev S2-P03.
17. Rolton Group Limited (1st April 2022). Phase 1 & Preliminary Geo-Environmental Summary for Rail Head Land, Cambois. Report reference: PHX-RGL-XX-XX-RP-G-000014 Rev S2-P02.
18. Rolton Group Limited (14th May 2021). Geotechnical and Geo-Environmental Report for Former Coal Stocking Yards, Cambois. Report reference: PHX-RGL-XX-XX-RP-G-000010 Rev S2-P01.
19. Rolton Group Limited (7th April 2021). Phase 1 Geo-environmental Desk Study for Former Coal Stocking Yards, Cambois. Report reference: PHX-RGL-XX-XX-RP-G-000005 Rev S2-P05.
20. Rolton Group Limited (18th February 2021). Coal Mining Risk Assessment for Former Coal Stocking Yards, Cambois. Report reference: PHX-RGL-XX-XX-RP-G-000008 Rev S2-P04.
21. British Geological Survey (1990). Sheet NZ 28 SE. 1:10,560 Scale Solid and Drift Geology Map.
22. British Geological Survey (1990). Sheet NZ 38 SW. 1:10,560 Scale Solid and Drift Geology Map.
23. British Geological Survey (1975). Sheet 15 – Tynemouth. 1:63,650/1:50,000 Scale Solid Geology Map.
24. British Geological Survey (1975). Sheet 15 – Tynemouth. 1:63,650/1:50,000 Scale Drift Geology Map.

1.5 Limitations

The findings and opinions conveyed in this report are based on development proposals obtained from the client and the sources detailed within Section 1.4, which Cundall believes are reliable. The information contained in this report is to the best of our knowledge accurate at the date of issue. If new information becomes known pertaining to the site, Cundall reserves the right to review the information and revise the report. Should the standards, legislation, guidance, and best practice used in the production of this report be amended, updated, or withdrawn then the findings and recommendations of this report may be affected.

Whilst every effort has been made to interpret the conditions between investigation locations, such information is only indicative, and liability cannot be accepted for its accuracy. There may be exceptional ground conditions elsewhere on the site which have not been recorded by previous ground investigation, and which have therefore not been considered.

2.0

Site Setting and History

2.0 Site Setting and History

2.1 Site Details

The geological and geoenvironmental setting of the Site extents have been determined based on the information contained within the references listed in Section 1.4 of this report. Where reference is made to other information sources, the source used is stated in the text.

Site Area and Shape	The Site is irregular in shape and occupies an area of 58 Ha.
Site Boundaries and Adjacent Land Use	▪ **North:** The northern boundary is formed by the historic Cambois Branch railway line which trends from west-east along the northern boundary. The River Wansbeck Estuary is situated around 1km north of the site with land in between mostly undeveloped. ▪ **South:** The southern boundary extends partially through the wider site (as shown on Figure 1-1), where Phase A enabling works are underway for the development of datacentre buildings DC01 & DC02, a substation and SuDS pond. The River Blyth estuary is situated approximately 400m south of the wider site boundary. The JDR cable manufacturing facility and the National Grid Blyth substation occupies the land separating the site from the River Blyth. ▪ **East:** The eastern boundary extends partially through the wider site (as shown on Figure 1-1). SSER is developing the area between Phase B & C and the wider south eastern boundary in the near future. Beyond the eastern site ownership boundary, land is occupied by developments associated with Cambois town including residential and commercial developments along with Cambois Primary School. Beyond this is the North Sea. ▪ **West:** The western boundary extends partially through the wider site (as shown on Figure 1-1), where Phase A enabling works are underway. Beyond the ownership boundary, land to the west is occupied by industrial development in the north, mature trees and undeveloped land in the south with the North Sea Link UK Converter Station beyond the southwest boundary. The A189 is situated approximately 500m west of the site.
Site Topography	Based on topographical data from October 2024 (Reference 12), existing site levels grade gently from approximately 10.5m AOD in the northwest to around 4m AOD in the southeast of the wider application site, not including stockpiles. Two large PFA stockpiles which occupy the east part of the site extend up to around 15m AOD (north) and 23.6m AOD (south). An additional PFA stockpile is located in the northwest and is only partially within the Phase B & C boundary, its highest point is within the Phase B & C boundary at around 15.3m AOD.
Existing Land Uses and Features	The area within the Phase B & C boundary is currently disused. The site features areas of asphalt and concrete hardstanding, informal roads (consisting of asphalt and gravel surfacing) associated with its former use as a coal stockyard or recent enabling works and rough grassland with areas of standing water. Around one third of the Phase B & C boundary area is occupied by two large stockpiles (both orientated north-south) comprising pulverised fuel ash, with anticipated thickness of 9m and 17m, respectively. Parts of the mounds are heavily vegetated with semi mature and mature trees. A network of concrete lined drainage channels (approximately 1m deep) are present around the hardstanding surfaces. Overhead power cables are present along the west edge of the north part of the Phase B & C boundary, trending roughly north to south. Historical below ground features associated with the former site use have been recorded within previous ground investigation reports, surveys, site walkovers and during the ongoing Phase A Enabling Works and are summarised below: ▪ Former PFA Lagoon with concrete lined basins and separator walls (predominately Phase A but included in southeast corner of Phase B & C). ▪ Foundations associated with historical buildings such as the former 1000T hoppers, conveyor supports and junction houses. ▪ Deep structures associated with the former travelling crane / conveyor and encountered as part of Phase A Enabling Works.

	▪ Deep structure associated with the former filler pits. ▪ Potential tunnels, suspected in the central southern part of the site. ▪ Relict test piles installed as part of the recent development works. ▪ Below ground structures associated with the former rail sidings. ▪ Below ground structures associated with the former rail depot (east). ▪ Culverted watercourses, such as the former route of the Maw Burn and Cow Gut. These obstructions are not considered exhaustive but summarise information that has been made available to Cundall.
Recent Site Developments	A previous developer (British Volt) responsible for enabling the site for a different proposed commercial end use entered administration in January 2023 and works ceased immediately. Based on the sudden demobilisation, any earthworks undertaken by them are unlikely to have been complete in accordance with the proposed development plans and material movement and handling around the site has not been fully captured within the information available. The QTS Phase A enabling works, which is currently ongoing, covers the west and southern sections of the wider application site which includes the proposed location of data centre buildings DC01 and DC02, generator yards, and the substation along with internal site roads.

Table 2-1: Site Details

2.2 Site History

Based on historical mapping and aerial imagery, key development dates and changes are recorded in Table 2-2.

Year	Site Activity
1865	The site is used as agricultural land.
1924	A football pitch, pavilion, and embankment have been constructed on the site.
1940	Railway line and sidings have been constructed in the north and east of the site. Other areas of the site are recorded to be used as allotments and welfare grounds.
1966	The site has been developed for use as a coal storage pad for the Blyth Power Station. A mineral railway with sidings has been developed through the centre of the site, and infrastructure including pylons, floodlighting, conveyors, reservoirs, and other ancillary buildings are recorded.
1992	Mapping from shows much of the site infrastructure to have been demolished. Two large mounds of PFA material have been deposited in the eastern site area.
2021	Aerial imagery shows evidence of surface scarring, likely associated with ground investigation and earthworks, as well as the construction of working platforms and haul roads. It is understood that this was in relation to works completed for a previously proposed development scheme.

Table 2-2: Key dates from historical mapping review

2.3 Mining Legacy

The entire site (as indicated by the blue boundary on Figure 1-1) is located within a coal mining reporting area with a portion of the site (north-west corner) falling in a high risk development zone, as defined by the Mining Remediation Authority (MRA - formerly the Coal Authority). Coal Mining Risk Assessment Reports have been produced by both Rolton (Reference 20) and Arcadis (Reference 13). The following key observations and conclusions have been noted.

- Six coal seams are recorded beneath the site between 104 and 218m in depth. These are considered too deep to impact the proposed development and have not been considered further.
- Potential shallow mine workings were identified by the MRA in the northwestern portion of the site associated with the outcropping Charlaw / Moorland seam, this has been designated by MRA as a High-Risk Development Zone.
- None of the intrusive investigations, including one undertaken specifically to identify mine workings within the High-Risk Development Zone, recorded evidence of shallow mine workings or mining related voids.
- Intact coal seams were recorded within 100m of the surface.
- There is no evidence of mine entries, opencast mines, coal authority managed tips or spine roads on or within 100m of the site boundary.
- There is no Coal Authority record of a damage notice, claim, court orders, active stop notice or request for preventative works on or within 50m of the site boundary that may indicate subsidence issues.
- There is no record of mine gas emissions or mine water treatment schemes within 500m of the site boundary.
- There is no record of future underground mining intents or coal mining licences within 200m of the site.

Notably the site was never recorded to be a colliery, it is anticipated that the Burnt Shale material was imported to site as a general fill material during the construction of the coal stocking yard.

2.4 Published Geological Information

The British Geological Survey (BGS) 1:10,000 scale and 1:50,000 scale geological maps of the area (References 21 to 24, Section 1.4) have been reviewed and indicates the wider site is underlain by the following sequence.

- **Superficial Geology:** The entire site is underlain by Till deposits to an anticipated depth of around 30mbgl (-25m AOD).

- **Solid Geology**: The West Sleekburn Dyke is recorded beneath the site, extending across the northern portion trending northwest to southeast. In addition:
  - The dyke is recorded as present within the Yard and Plessey seam as shown on the BGS 1:10,560 scale map (Reference 22).
- **Solid Geology:** Pennine Middle Coal Measures which are indicated as being interbedded sandstone, mudstone and siltstone in the northeast corner of the site and as sandstone across the rest of the site.
  - The Rolton report notes that the Moorland seam was encountered at 44.05mbgl, which (according to the stratigraphic column on the BGS map) is younger than the Yard and Plessey seam.
  - Based on the depth at which the Moorland seam was found, the Yard and Plessey is estimated to be around 150m beneath the site.

Although not shown on the BGS mapping, Made Ground covers the majority of the site and Alluvial deposits are anticipated to be present across the original channels of the Maw Burn and Cow Gut watercourses.

2.5 Ground Conditions

Numerous intrusive ground investigations have been carried out at the site. Rolton undertook a series of investigations between 2021 and 2024 to support an alternative development scheme being brought forward by British Volt. Selected enabling works including excavation and movement of material were undertaken by British Volt following the Rolton ground investigations, although the exact detail of these are not known as the scheme failed to complete and no verification records are available.

Arcadis then undertook a series of intrusive ground investigations in 2024 and 2025 for the current scheme proposals. Shallow ground conditions recorded by Arcadis therefore vary slightly to what was recorded by Rolton. All exploratory hole locations are shown on the 'Combined Exploratory Hole Location Plan' drawing (reference: GBR1-DCZZ-XXX-UG-DR-B-01-01).

The following ground conditions were recorded in the Cundall Ground Conditions report (Reference 5) and are summarised below.

2.5.1 Artificial Deposits

2.5.1.1 Made Ground

Made Ground was encountered across the entirety of the site and has been characterised into a variety of subcategories based on its visual appearance and BS 5930 description. These categories are outlined below.

- **Topsoil** - The thickness of topsoil was typically around 0.3m and was generally present across all areas except the former coal stores. Descriptions were given as dark brown slightly gravelly clayey sand or soft dark brown slightly sandy slightly gravelly silt with many fine rootlets. Occasional fragments of brick, concrete, clinker, tile, glass and ceramics were recorded.
- **Asphalt** - Recorded across former coal stocking areas (west and northwest), in the east along roads and adjacent to former building footprints. It is generally found from surface with a thickness of 0.1m.
- **Concrete** - Encountered generally near existing site roads, forming building footprints and around the former lagoons. The average thickness of concrete across the site was around 0.3m, where exploratory holes proved the base. Concrete drainage channels are also present throughout the site. There are likely more locations across the site where concrete is present, associated with former structures.
- **Railway Ballast -** Recorded in a reasonably well-defined area of the site which corresponds to where railways were formerly present in the northeast and central sections of the site, and also where the disused railway is present in the east of the site. The material is described as compact to moderately compact dark grey / black sandy gravel. Gravel is medium to coarse sub-angular basalt and granite. Thicknesses of railway ballast ranged from 0.05m to 0.80m with an average thickness of 0.3m.

- **Organic Made Ground -** Encountered across the site but is particularly concentrated where the historical railway lines once ran from the northwest through the central southern portion of the site. Thicknesses of Organic Made Ground are typically between 0.2m and 0.6m. However, it does extend to between 1m and 4.4m thick in discrete locations across the site. The material is generally described as soft to firm dark brown slightly sandy slightly gravelly organic clay or as firm to stiff mottled dark grey gravelly clay with organic pockets.
- **Surface Cover Granular** – Encountered across the central southern section of the site and sometimes in discrete location across the northern section of the site. This material has been characterised by its dark grey/black colouring and descriptions of sandy gravel and slightly gravelly sand. Gravel is of fine to medium subangular coal fines, basalt, furnace bottom ash and clinker.
- **Pulverised Fuel Ash (PFA)** – The Phase B & C boundary covers the two PFA stockpiles in the east of the site which occupy a combined area of over 100,000m^2. Across the site, PFA was also recorded beneath the northeast coal storing pad and across the central southern area below the hardstanding. Out with the stockpile areas, PFA was found to a maximum depth of 3.6mbgl (3m AOD), although nine positions terminated in PFA without proving the full depth (between 0.2m and 2.5mbgl. Descriptions of PFA across the Phase B & C enabling works boundary area are variable but are generally given as either a light grey sandy silt or grey slightly gravelly silty fine to medium sand. Occasional cobbles of sub-angular to angular cemented PFA, burnt shale, brick and sandstone was recorded in around half of the positions. Descriptions of PFA in the two eastern stockpiles indicate that the material is found to be relatively uniform across the entire depth described as 'moderately to very heavily compacted' light grey gravelly sandy gravels and cobbles of solidified PFA.
- **Granular Subgrade** - Granular subgrade material was found beneath the asphalt surfacing typically across the coal stocking yards, beneath former building footprints in the east and roads in the south to a maximum depth of 2.95mbgl. In general, granular subgrade has an average thickness of between 0.5m and 0.75m. Descriptions were generally given as brown or grey (occasionally yellow) angular to subrounded fine to coarse gravel. Gravel is predominantly of dolerite, sandstone, limestone and mudstone but occasionally of burnt shale, basalt and granite.
- **Reworked Clay** - Cohesive made ground, recorded by Rolton as 'Reworked clay' is widespread across the site having been encountered in just over half of all exploratory hole locations in Phase B & C. The base of reworked clay is reworked clay is recorded to depths greater than 2.5mbgl in around 50 positions throughout the site, but particularly through the central section of the site and northwest and southeast. This material was generally described as firm, locally soft to stiff brown mottled grey sandy gravelly clay with occasional cobbles and dark grey staining. Gravel is medium to coarse of subangular to subrounded sandstone, siltstone, burnt shale, coal fines and occasional clinker. Anthropogenic materials of brick, burnt shale, ceramic, wood and plastic were also encountered within around a third of the locations.
- **Granular General Made Ground** - Where Made Ground was recorded but could not be characterised as a unit above it has been described as granular general Made Ground. Granular general made ground was recorded to an average depth of between 1m and 1.5mbgl. Descriptions are variable but include compact to moderately compact grey sandy gravel with occasional cobbles, brick, ash and clinker. Slag was encountered in around 27 positions, nine of these in the extreme northeast area. In the east part of the site the material that has a slightly different description of very dark grey / black slightly clayey slightly gravelly medium to coarse sand with occasional fine to medium rootlets. Sand is described as being either predominately or partially comprised of ash and anthropogenic material such as wood is commonly recorded. In addition, a hydrocarbon odour was recorded in four positions within layers of granular made ground.

2.5.1.2 Burnt Shale

Burnt Shale was recorded in a number of positions across the vast majority of the site. Burnt Shale was recorded during all phases of investigations, but its extents were specifically investigated during the Rolton 'Burnt Shale' investigation. The approximate extents and thicknesses of Burnt Shale are shown on the 'Approximate Volume of Burnt Shale' drawing (Drawing number: GBR1-ENA2-CDL-STE-XX-DR-B-1004).

Descriptions of the material as provided by both Rolton and Arcadis are diverse. All investigations were carried out in accordance with BS5930 and as such the proportion of Burnt Shale in a given stratum was not required to be quantified in the material description.

Rolton note the material as red / orange in colour and primarily encountered as sandy gravel with frequent cobbles of burnt shale. It was occasionally locally interbedded with general made ground and has likely been present on site for some time and is significantly weathered.

Arcadis encountered the material in just over 20 positions and described it as a reddish brown gravel or sand where gravel is of burnt shale featuring other constituents (such as mudstone, concrete and sandstone). Notably Arcadis only classified the material as “Burnt Shale” where material was considered to comprise >50% visually Burnt Shale material.

Cundall’s assessment of Burnt Shale has assumed that the classification of strata provided by others (Arcadis and Rolton) are reasonable, however, where Cundall have noted strata to have descriptions consistent with ‘Burnt Shale’ materials, these have been included within Burnt Shale dataset. The material classified as Burnt Shale for the purposes of this report are therefore likely to represent the maximum volume of material to be classified as such. The classification of this material for the proposed works will be any strata where Burnt Shale is considered to comprise >50% on a visual basis.

Chemical testing was undertaken on samples of Burnt Shale from the Rolton investigation, the Arcadis investigation and the Phase A enabling works. A total of twenty-two Burnt Shale samples were tested for laboratory leachability on a 10:1 ratio. Concentrations above freshwater and saltwater EQS threshold criteria were recorded for determinants including Cadmium, Copper, Lead, Mercury, Nickel, Zinc and Fluoranthene.

2.5.2 Superficial Deposits

2.5.2.1 Alluvium

Alluvium was identified in small clusters of positions which partially aligned to the historical channels of the Maw Burn, Cow Gut and unnamed watercourse. However, Alluvial deposits did not follow the entire channel of the historical watercourses and is not considered to be present as a continuous layer across where the historical channels were located. Alluvium was also found in a concentrated area in the central southern section of the site. Where Alluvium is present on site it is typically described as a soft to firm greenish brown / dark grey slightly sandy slightly gravelly clay. Gravel is fine to coarse subangular to subrounded of coal, siltstone, mudstone, sandstone and coal fines. Occasional pockets of organic inclusions and an organic odour were also recorded.

2.5.2.2 Till

Till is typically present across the site from approximately 0.50mbgl and 2.5mbgl (depth to top). The corresponding elevations range from 10.4m to 2.9m AOD from north to south.

Around 20% of positions which extended into Till record the depth to the top of Till at more than 2.5mbgl, this does not include positions within the PFA stockpiles. Where the depth to Till was recorded more than 2.5mbgl, this is generally in the north and central sections of the site, corresponding to the location of the former railway, coal stocking yards, settling pond and culverted watercourses.

Till is logged as a clay in almost all exploratory holes. Descriptions are generally consistent across the site as firm to stiff, becoming very stiff with depth, dark greyish brown slightly sandy slightly gravelly clay. Gravel is angular to subrounded fine to coarse of various lithologies. Log descriptions for the upper 5m of Till are indicative of a slight weathered profile with the material being recorded as a firm mottled light grey / blue sandy slightly gravelly clay. A slight hydrocarbon odour was recorded in seven positions, six of which were recorded during the Burnt Shale investigation.

Granular layers were recorded in around fifteen positions across the site, generally found at depth (more than 7.0mbgl). Two positions recorded granular layers slightly shallower around 4.50mbgl however the thickness of each was limited (less than 1m). The greatest thickness was recorded within BH508 at 18.3mbgl where the granular layer was 6.2m. This is around 3m thicker than any other layer and so is not considered to be representative of the wider ground model. The typical thickness of granular layers was between 0.5m and 1m. It is therefore considered to be present as lenses only and is not considered to be a continuous layer. Descriptions were given as dense to medium dense sand and gravel. Gravel is of sandstone, siltstone and limestone.

The thickness of Till is generally between 20m and 30m where the full thickness is proven.

2.5.3 Bedrock

Solid geology at the site has been considered for the site as a whole and not just for the Phase B & C boundary.

2.5.3.1 Pennine Middle Coal Measures

Solid geology at the site is the Pennine Middle Coal Measures which features interlayered bands of extremely weak to moderately strong mudstone and siltstone and moderately strong sandstone. Rockhead was encountered from -13.6m to -27.6m AOD. Bands of coal were encountered at varying depths (from -18.91m and -85.65m AOD) and were typically described as extremely weak and weak coal with pyrite present.

2.5.3.2 West Sleekburn Dyke

The West Sleekburn Dyke was not encountered during the ground investigation but is shown on the 1:10,000 geological map to pass beneath the northern part of the site trending northwest - southeast. The West Sleekburn Dyke is a mafic igneous intrusion with a top surface at a similar level to the Pennine Middle Coal Measures. It is reported to be around 15m wide under Section 4.2.3 of the Arcadis Desk Study report (Ref 3, Section 1.4).

2.6 Waste Classification & EWC Code

Preliminary Waste Classification of all materials encountered was undertaken by Arcadis as part of the GQRA submitted for the scheme (Reference 7). Fifteen samples of materials described as Burnt Shale were analysed using HazWasteOnline™ software to provide a preliminary classification. The majority of samples returned a non-hazardous classification, with only one sample being classified as Hazardous. The sample returning a Hazardous classification was from TP107 at 1.3m bgl, in a known hydrocarbon hotspot that was removed as part of the Phase A Enabling Works. Hazardous classification therefore is not due to the inherent properties of the Burnt Shale material.

Waste Acceptance Criteria (WAC) testing was undertaken on four samples of Burnt Shale material. One sample did not exceed the limits for inert soils and therefore has a likely classification of inert. Two Burnt Shale samples were recorded to exceed the inert limits (total organic carbon, leachable sulphate and leachable fluoride) and therefore have a non-hazardous classification. One sample from TP107, within the known hydrocarbon hot spot, was classified as Hazardous based on the hydrocarbon content only, WAC did not record concentrations above the non-hazardous threshold.

Although it is recognised that the number of samples utilised in the preliminary waste assessment are low for the volume of Burnt Shale materials (equivalent to approximately 1 in 12,850m^3), additional testing to ensure chemical suitability of materials placed as part of the site works is mandated as part of the Remediation Strategy (Reference 2).

Based on the above the relevant waste code for the proposed waste to be recovered as part of the permit will be 17 05 04 (soils and stones not containing hazardous substances). Waste code 17 05 04 considered suitable for all potential forms of Burnt Shale proposed to be reused as defined in Section 2.5.1.2.

2.7 Hydrogeology

The superficial Glacial Till deposits are classified as a Secondary (undifferentiated) Aquifer and the Pennine Middle Coal Measures are classified as a Secondary A Aquifer by the Environment Agency. The site does not lie within 1km of a groundwater Source Protection Zone.

Groundwater monitoring was carried out during all phases of intrusive investigations with 85 installations in total with response zones present in Made Ground, Till, and Pennine Middle Coal Measures. Discontinuous water bodies were recorded in both the Made Ground and Till, and these are considered unlikely to plausibly support any potential abstraction. One laterally continuous groundwater body was found to be present in the Pennine Middle Coal Measures, confined by the overlying Till. The Pennine Middle Coal Measures (Secondary A Aquifer) is the only groundwater body identified that may be potentially sensitive to the placement of Burnt Shale materials.

2.8 Hydrology

Two named watercourses are present on site, Maw Burn in the north and Cow Gut in the south. Both of these watercourses have been culverted for most of their length across the site and flow from west to east, with Maw Burn entering in the north-western corner of the site, exiting along the eastern boundary and out falling into the North Sea. Cow Gut enters along the western site boundary, exits along the southern boundary and outfalls into the Blyth Estuary.

The routes of these watercourses were to be diverted as part of the previous British Volt scheme. The diversion of Maw Burn was completed with an open channel along the northern site boundary, connecting to an existing drainage channel around the eastern side of the northern PFA mound, before rejoining the original outfall from site. Where the surface water bodies are not culverted, there could be some contribution to baseflow from groundwater. Several open concrete lined drainage channels are present across the site and appear to drain into Maw Burn and Cow Gut.

Analysis of water samples from both the Maw Burn and Cow Gut were undertaken as part of the Arcadis ground investigation (Reference 11) and some marginal exceedances of the Environmental Quality Standards (EQS) were recorded; however, surface water samples recorded higher concentrations upstream of the site than downstream, indicating that site soils are not currently impacting the water quality. Three rounds of additional water samples were obtained to support the assessment for this permit, these can be found in the accompanying Hydrological Risk Assessment.

The Blyth Estuary is located approximately 300m south of the site and is part of the Northumberland Shore SSSI. Catchment area data does not exist under the Environment Agency as the estuary is classed as tidal. No Environment Agency water quality data has been made publicly available for review.

The North Sea is located approximately 300m east of the site boundary.

3.0

Development Proposals

3.0 Development Proposals

3.1 Planning Status

As discussed in Section 1.2, the scheme comprises multiple phases of development and the waste recovery plan has been prepared in relation to the Burnt Shale materials within the within Phase B & C of the development. The relevant planning permissions for the site with Northumberland County Council are outlined below.

- Outline planning application (24/04112/OUTES) relating to the entirety of the site, with all matters reserved, for the erection of up to ten data centre buildings of Class B8 use totalling up to 540,000m^2 gross internal area (GIA) in addition to ancillary structures, substation, emergency generators and other associated works. This planning application has a Permitted status, granted on 8 May 2025. R
- Reserved matters application (25/01760/REM) for Landscaping and Layout on approved planning application 24/04112/OUTES for Phase B enabling works including site preparation, earthworks, piling, other works required prior to the construction and operation of the data centre campus
- Reserved matters application (25/01894/REM) Reserved matters application for landscaping and layout on approved application 24/04112/OUTES for phase C enabling works including site preparation, earthworks, removal of PFA mounds and other works required prior to construction and operation of data centre campus.

3.2 Proposed Earthworks / Enabling Works

Based on the development proposals, the size of the site and the desire of the Client to develop the wider site in future phases, the principles of the earthworks vary over the Enabling Works. These are outlined below and are taken from the Earthworks Strategy (Reference 2).

The earthworks have been separated into eight key development areas (Area G to Area N) based on the anticipated works, rather than the spatial distribution of ground conditions. Earthwork Zones are shown on Drawing GBR1-ENA2-CDL-STE-XX-DR-B-1008 – Enabling Works Proposals, Enabling Works Phase B & C, reproduced in Figure 3-1. The earthworks proposals for areas in which Burnt Shale is present are outlined below (calculated to be approximately 51,000m^3), with an additional provisional sum of 9000m^3 to accommodate identified material in discrete locations and any additional Burnt Shale that may be encountered during enabling works.

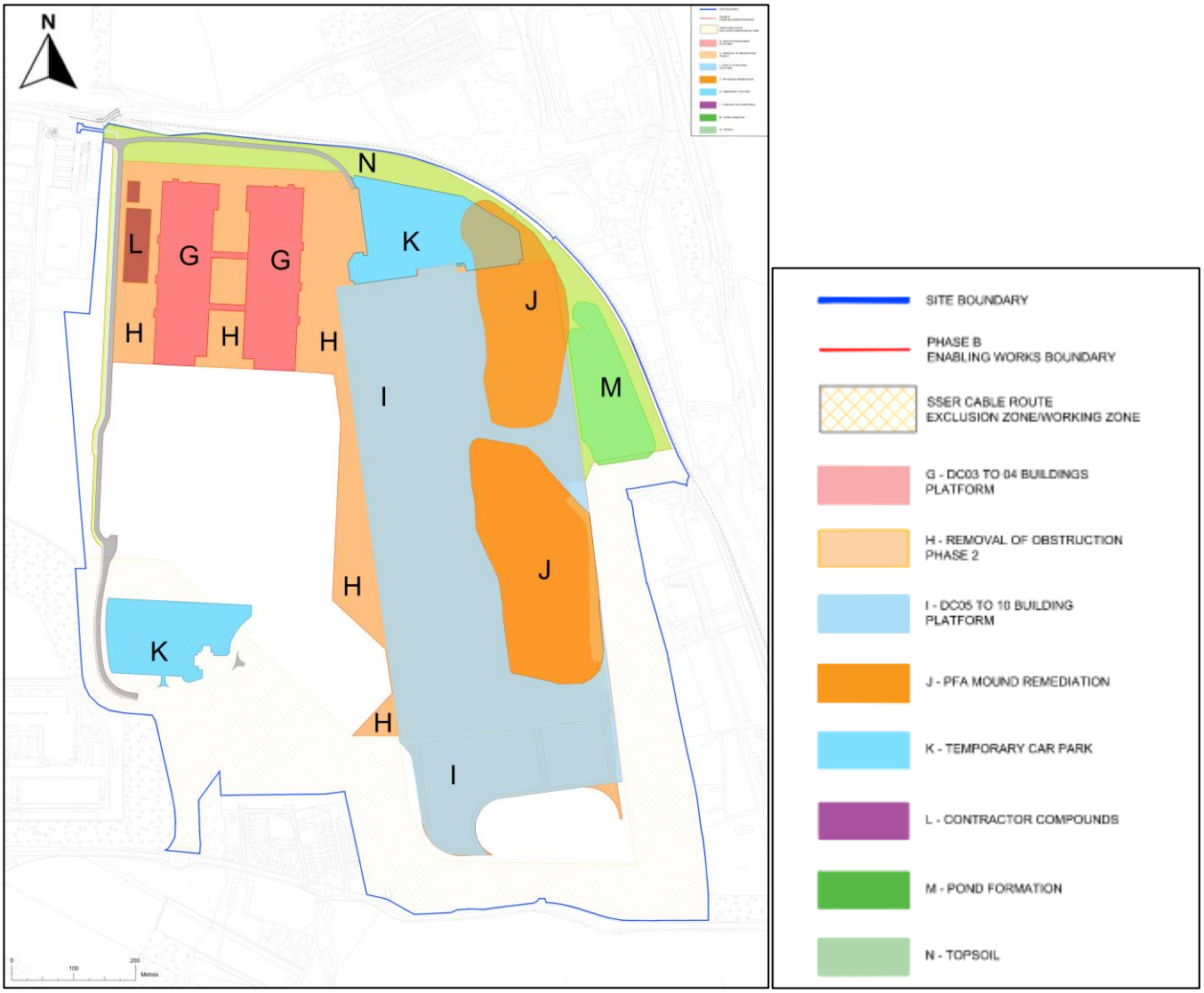


Figure 3-1: Phased Earthworks (GBR1-ENA2-CDL-STE-XX-DR-B-1008)

3.2.1 Zone G

The primary objective of earthworks in Zone G is to break out or excavate all surface material (hard and soft) and excavate to a depth to accommodate a granular working platform (base of platform proposed to be between 9.5m AOD and 10.0m AOD).

A preliminary working platform calculation has been undertaken using an assumed rig load and this indicates a platform thickness of 840mm of granular material will be required to be installed below the proposed enabling works level. The working platform across DC03 and DC04 buildings shall be a higher level than the platform across the proposed generator yards. Reference should be made to Drawing GBR1-ENA2-CDL-STE-XX-DR-C-1301.

Obstructions will be required to be removed in their entirety, including those identified on the Below Ground Features Plan and Existing Constraints Plan along with any identified during earthworks. Where the existing ground level is lower than the proposed base of the working platform, an extra over dig of 0.75m should be carried out to identify any potential below ground obstructions.

Backfilling will comprise the placement of engineered granular fill (Class 6) to achieve the enabling works finished ground level. Where existing levels are lower than the base of the working platform, the backfill shall comprise general fill.

Subsequent to the piling operation on DC03 and DC04, part of the upper working platform will be required to be excavated back to allow the piling rigs / ground improvement rigs to install the piles and the vibro stone columns on the

lower platform level (generator yard). Further detail on the excavation works required to form this part of the mat is included in Drawing GBR1-ENA2-CDL-STE-XX-DR-C-1301.

3.2.2 Zone H

Zone H includes external areas to the proposed data centre buildings. Service corridors are anticipated to be required across Zone H to facilitate the wider development.

Earthworks will comprise a minimum of 0.75m excavation below existing levels. Where obstructions are encountered within this excavation, these shall be excavated and fully removed or cropped to an elevation of 7.5m AOD where they extend below this level.

An existing area of standing water is present across part of Zone H, its location is shown on Cundall's 'Surface Cover Materials' drawing (GBR1-ENA2-CDL-STE-XX-DR-B-1002) This area will require dewatering with all soft material fully excavated and filled to the required level.

Backfilling will comprise suitable general fill to achieve proposed levels and will include an upper 150mm layer of engineered granular material (Class 6)as a protective surface, if required by the Client.

3.2.3 Zone I

Zone I includes the area currently proposed for the construction of DC05 to DC10 outside **of** the two large PFA stockpiles.

All known obstructions are required to be removed in their entirety beneath proposed building footprints (including the culvert identified during Phase A works). Possible mitigation options for the culvert have been summarised in a Cundall Design Note 'Culvert Mitigation Options' (GBR1-DCZZ-CDL-STE-XX-RP-B-0019).

Beyond the removal of known obstructions, earthworks comprise an excavation to the lower of 0.75m below existing ground level or proposed ground level.

Backfilling shall comprise suitable general fill to achieve proposed levels and will include an upper 150mm layer of granular general fill material (not Burnt Shale) as a protective surface, where available. If no granular material is available, other materialswill be used though it would then likely require removal from site in the permanent case due its lack of engineering suitability.

3.2.4 Zone J

Zone J includes the area currently proposed for the construction of DC05 to DC10 beneath the PFA stockpiles.

Earthworks proposals comprise the partial removal of the existing PFA stockpiles down to an elevation of approximately 10m AOD. Where obstructions are identified during the earthworks, these shall be excavated in full. Excavations shall refer to the Cundall Existing Mound Removal to Site Strip drawing (GBR1-ENA2-CDL-STE-XX-DR-C-1303). Material excavated should be used in the earthworks on the remainder of the site and in accordance with the Rolton Geotechnical Design Report and Outline Earthworks Specification document.

General backfilling is anticipated to only be required if obstructions are identified. Backfilling shall comprise suitable general fill to achieve proposed levels and will include an upper 150mm layer of granular general fill material (not Burnt Shale) as a protective surface where available. If no granular material is available other materials will be used though it would then likely require removal from site in the permanent case due its lack of engineering suitability.

3.2.5 Zone K

Zone K includes the temporary carpark which shall be used during the construction phase of the works.

Earthworks will comprise excavation to 0.60m below proposed pavement level. Where obstructions are encountered within this depth of excavation, these shall be excavated and fully removed or cropped to an elevation of 7.5m AOD whichever is the deeper. Former test piles are known to be present in Zone K and shall require cropping to 7.5m AOD (locations provided on the Below Ground Features plan).

The area of existing standing water as discussed as being present in Zone H also encroaches across Zone K. Similar to requirements for Zone H. This area will require dewatering with all soft material fully excavated and filled to the required level as shown on Cundall's 'Existing Ground Level to Enabling Finished Ground Level'.

3.2.6 Zone L

Zone L includes General Contractor (GC) laydown areas.

Earthworks will comprise excavation to the lower of 0.75m below existing ground level or proposed ground level followed by placement of general fill and then 0.3m of suitable Class 6 material underlain by a geotextile membrane to achieve finished levels.

3.2.7 Zone M

Two attenuation ponds will be constructed within Zone M and this is predominantly in an area of excavation. The proposed pond build up is shown on Cundall 'Enabling Works Phase C – Drainage Details Sheet 3' drawing (GBR1-ENA2-CDL-STE-XX-DR-C-5412).

Earthworks will comprise excavation to a minimum depth of 0.30m below finished levels to accommodate and suitable fill material, as detailed in Drawing GBR1-RMAPC-CDL-STE-XX-DR-C-1019 and within Arcadis Landscape Specification.

Obstructions will be required to be removed to a maximum depth of 0.50m below the invert level of any drainage pipework or 0.50m below the pond levels.

3.2.8 Zone N

Zone N runs around the north and north eastern boundary of the site and will be landscaped in accordance with the Arcadis Landscape Specification and associated drawings. The earthworks undertaken in this part of the site must also consider the adjacent Network Rail land.

The earthworks will comprise the breaking out and removal of obstructions and removal of surface material, followed by the placement of a clean cover system (comprising geotextile separation layer and a minimum 300mm of clean soils).

3.3 Suitability of Burnt Shale Materials

3.3.1 Introduction

As discussed in Section 2.6, chemical properties of the Burnt Shale mean it is a non-hazardous material (EWC 17 05 04) and were not identified by the Arcadis GQRA (Reference 7) to be of unsuitable chemical quality for reuse. This section aims to therefore outline the geotechnical suitability for reuse.

Cundall has prepared an earthworks specification for the enabling works area, which is intended to be covered by the Environmental Permit. The specification is based the Series 600 Specification for Highway Works (SHW), Standards for Highways and references the standards required for classification of material types on site. Appendix 6/1 outlines the requirements for acceptability and testing etc. of earthworks material and applies to all materials on site, including Burnt Shale materials. Appendix 6/1 from the earthworks specification (Reference 2) is reproduced as Appendix A and outlines acceptable material properties for each material class. Geotechnical properties of Burnt Shale material, as determined during the ground investigations, are presented in Sections 3.3.2 to 3.3.7.

3.3.2 Classification Testing (Natural Moisture Contents and Atterberg Limits)

Moisture content tests were carried out on 123 samples of Burnt Shale at depths of between 0.2m and 2.8mbgl. Although there is a general scatter of testing results, particularly in the upper 1.0m, the majority of the moisture contents range from between 12% and 20%. Below 1.0m bgl, the moisture contents are typically more consistent and appear to become drier with depth and range from 10% to 15%. It is reasonable to consider a characteristic natural moisture content range of between 12% and 18%.

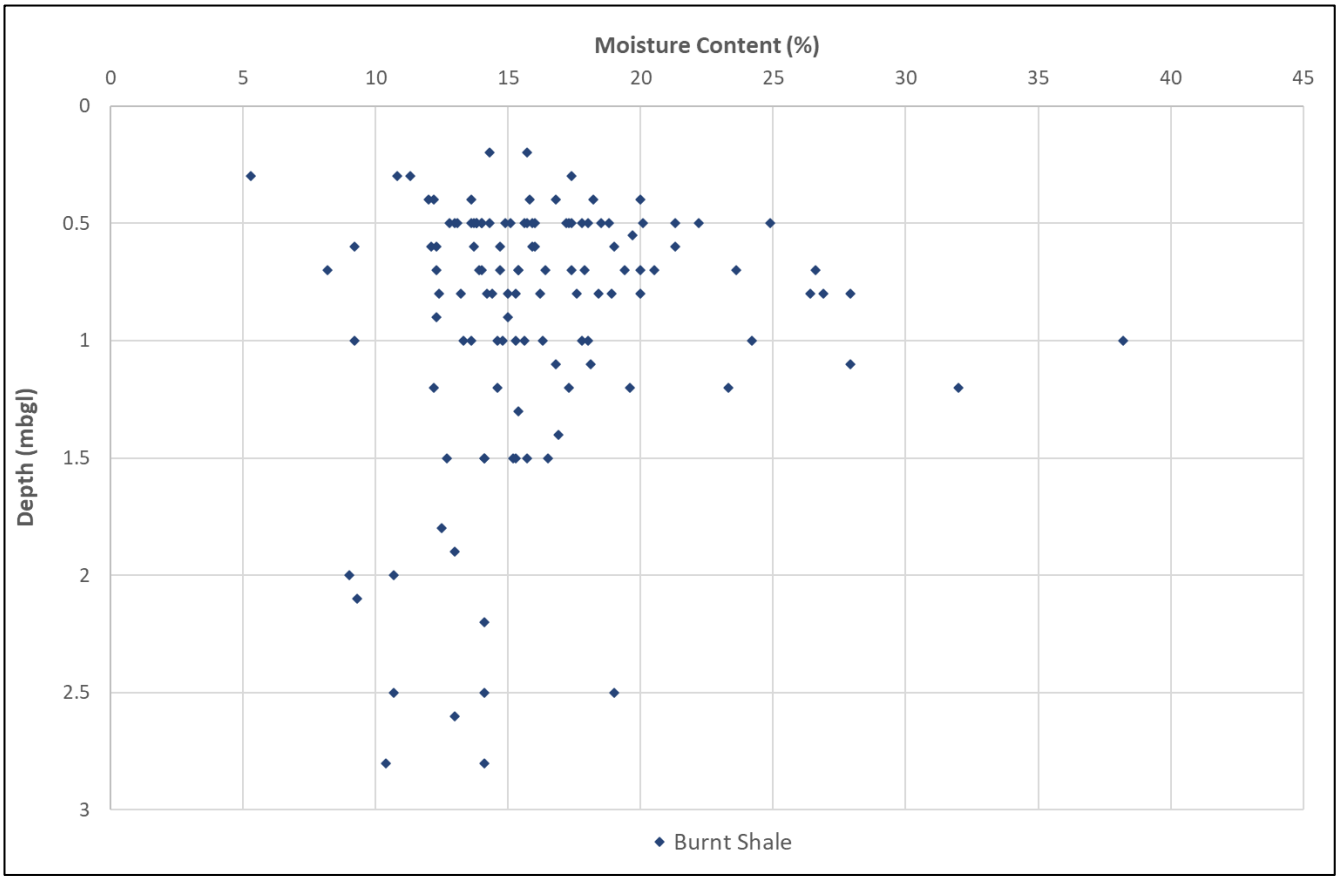


Figure 3-2 Moisture Content of Burnt Shale with Depth

Occasionally, the Burnt Shale was recovered during the ground investigation with a clay content (although predominantly a granular material), which is likely a result of how the individual granular particles have broken down over time when subject to weathering processes. The presence of clay content in some of the samples is confirmed in the Particle Size Distribution testing summarised in Section 3.3.3. Where material properties allowed, a total of eleven Atterberg Limit tests were undertaken on the Burnt Shale. Although this represents a relatively low number of tests compared to the volume of material present on site, it is considered appropriate given the predominantly granular nature of the material. Two of the samples recorded the material to be non-plastic. Although the Burnt Shale was predominantly described as granular, the results indicate a plastic limit of between 17% and 30%, liquid limits of between 38% and 59% and a plasticity index of between 18-35%. These are typically representative of an intermediate plasticity clay. Two results were recorded as high plasticity clay and two as an intermediate plasticity silt.

3.3.3 Particle Size Distribution

PSDs were carried out on 131 samples of burnt shale at depths of 0.20m and 2.80mbgl.

Although some of the results are variable, they typically indicate that the burnt shale is predominantly a gravel but given the percentage of fines that is recorded in around 20% of the samples, this indicates that the burnt shale may have been subject to weathering or has been heavily disturbed during handling and has degraded to become more representative of a cohesive or sandy material. In terms of its earthworks classification, almost 100 of the PSDs indicate that the material is representative of a Class 1A or 1B (granular fill), with the remaining samples indicating it to be representative of a Class 2 (cohesive material).

3.3.4 Compaction Tests

Nine compaction tests were carried out on samples of burnt shale at depths between ground level and 1.20mbgl. Six tests were carried out using a 2.5kg rammer and remaining three were carried out using a 4.5kg rammer.

Results of the 2.5kg tests indicate an optimum moisture content of between 14.8% and 24%. Maximum dry densities were recorded between 1.6 and 1.88mg/m^3.

Results of the 4.5kg tests indicate optimum moisture contents of 13% and 14%. Maximum dry densities were recorded between 1.86 and 1.94mg/m^3.

A further sixteen tests were undertaken on an unnamed material within the Rolton Burnt Shale Ground Investigation and although no clarity is provided regarding the material, the report text does conclude that '*the compaction test results for granular made ground, including burnt shale, recorded maximum dry densities between 1.81 and 1.95Mg/m^3 and optimum water contents of between 9 and 15% comparable to the as received water content of the samples between 5.3% and 17%.'*

Based on the characteristic moisture content range and the range of optimum moisture contents, the bulk of the material is close to or only marginally wet of optimum moisture content and it is not anticipated to require substantial conditioning or processing.

3.3.5 Organic Matter Tests

Organic matter content tests were carried out on 26 samples of burnt shale. Results ranged between 0.2% and 8.4% with an average of around 1.5%.

3.3.6 Swelling

A total of 22 swell tests were undertaken during the different phases of ground investigation. Eighteen tests were undertaken during the Rolton Burnt Shale Ground Investigation and four were undertaken during Arcadis Ground Investigation.

Testing undertaken as part of Rolton ground investigation was undertaken over a period of between 3 and 6 days and testing results indicated a maximum swell of 3.85mm and an average of less than 1mm.

3.3.7 California Bearing Ratio

Six CBR tests were undertaken during the Arcadis Ground Investigation and recorded CBR values ranging from 7.9% to 48%. The results appear to be higher than those anticipated from the material description, and it is reasonable to assume that a characteristic CBR value of 5% is achievable based on material descriptions.

Nine CBR values have been derived from plate load tests. All tests are carried out at a depth of 0.4mbgl. CBR values ranged from 3% to 59%, similar to the laboratory CBR tests carried out and discussed above.

3.3.8 Compliance with the Earthworks Specification

Based on the characteristics outlined in the preceding sections, the majority of samples of Burnt Shale obtained (a total of 132 samples) indicate gradings of material that is compliant with a Class 1A / Class 1B material as defined by Table 6/2 of the Specification for Highways Works (and referenced in Table 6/1 of the site's earthworks specification, Appendix A). 34 samples were representative of a Class 2 material (28 a Class 2C and six a Class 2A/2B) with a fines content between 15% and 80% (Class 2C) or 80% and 100% (Class 2A/2B). It should be noted that most of the Class 2 Burnt Shale material behaves as a granular material given the predominantly granular content of the material which, although compliant with the Class 2C (Stony Cohesive Material), it is likely to be unsuitable for undertaking remoulded undrained shear strength tests, therefore compliance with this aspect of the earthwork's specification will be determined in-situ following placement and compaction, if required, and following the companion trial.

No PSD results obtained from the Burnt Shale materials during the ground investigations indicate materials will be non-compliant with the grading requirements of these material classes.

Uniformity coefficients were not determined by the ground investigations; however, uniformity coefficients will only determine the materials use as a Class 1A or a Class 1B, both of which are required for the earthworks, to determine whether the fill is well graded, or uniformly graded. Uniformity coefficients are not applicable to Class 2C material. Based

on our knowledge of this type of material, its argillaceous nature and observed behaviour it is likely that the movement and tracking of material will inherently, without additional effort, increase the uniformity. Burnt Shale typically self-cements, which could give rise to oversize fragments being encountered in situ during exploratory investigations, and these are also anticipated to be easily broken down without the requirement for additional treatment.

In addition to the above evidence that material will be compliant with the earthworks specification, there is also a contractual obligation, as per the specification, for field compaction trials to be undertaken on all material types, inclusive of the Burnt Shale. During compaction trials and / or earthworks, if it is observed that oversize particles within the Burnt Shale do not break down as expected to become compliant with the relevant grading requirements, these will revert to a Class U1A (unsuitable material). This is not anticipated based on the data obtained during the previous ground investigations at the site but is a measure in place to ensure only suitable materials are recovered.

Moisture contents across the Phase B & C Enabling Works typically indicate that the material is between 12% and 18%. The results of the compaction tests indicate the optimum moisture content of the material ranges between 14.8% and 24% and these are typically wetter than the corresponding optimum moisture content (OMC) by between 2% and 9%. For Class 1A/B and 2C material the material should be ± 2% of OMC. It is likely that following excavation and tracking the material will be to be close to optimum moisture content and will not need significant conditioning. However, where localised wetter material is recorded, this will require conditioning via air drying, though given the granular nature of the material is anticipated that this would occur quickly following excavation.

Following the placement of Burnt Shale across the site and depending on its use (either below ground bearing / sensitive structures or in non sensitive / landscaped areas), the material will be subject to compliance testing to demonstrate its suitability. This will comprise either density testing (nuclear density and/or sand replacement tests) or settlement testing (plate load testing) and target limits of 97% density and less than 10mm settlement at a pressure of 250kN/m^2 will be required to be demonstrated to prove compliance.

Where Burnt Shale was excavated, tracked and compacted during the Phase A Enabling Works, its material properties were typically representative of a Class 2C (Stony cohesive fill). The material was placed and compacted in thin layers and achieved the relative density requirements that were included within the Specification. Given that there is very little variation in material consistency across the site, it is likely that any Burnt Shale that is placed and compacted in Phase B&C will perform similar.

On the basis of the above, Burnt Shale materials in their current condition are generally considered to be geotechnically suitable for reuse during earthworks. As described earlier in this Section, contingencies are in place for any unsuitable materials encountered.

4.0

Recovery of Waste Activities

4.0 Recovery of Waste Activities

4.1 Activities Proposed

This waste recovery permit is proposed to cover the excavation and reuse of Burnt Shale materials within the Phase B & C Site boundary. No treatment is considered likely to be required to the material in order to be suitable for reuse; however, detailed engineering plans will be later submitted in support of the permit. Other materials on site will be excavated and replaced under a Materials Management Plan in accordance with the Definition of Waste Code of Practice (DoWCoP) administered by CL:AIRE or under a WRAP Quality Protocol in the case of PFA. As there will be two reuse regimes in place on site, detailed and auditable records will be kept for all material movements providing an auditable trail.

A previous Environmental Permit was granted on Phase A of the site (EPR/JP3321LF) for the recovery of Burnt Shale materials to be deposited in the Zone C Tunnel excavation. The granting of this permit demonstrates the recoverability of the material and its suitability for reuse on site. For ease of regulation, it is also anticipated that Burnt Shale materials will be deposited in one continuous operation once the permit is granted, it is not suitable for Burnt Shale materials to be inter-layered with those placed under different regulatory regimes (i.e. materials placed under DoWCoP). Where Burnt Shale materials are placed above materials placed under DoWCoP it is not suitable to then additionally layer DoWCoP materials on top of Burnt Shale.

It is not acceptable for Burnt Shale materials to be used in any soil mixing operations and none of these are proposed as part the earthworks.

4.2 Substitution

As it is intended that these activities are carried out as deposit for recovery, it is a requirement to provide evidence that suitable funding is in place to carry out the scheme should a non-waste be required to be used. In line with Environment Agency guidance the following should be evidenced:

- the scheme falls within your area of responsibility or activity
- the scheme would result in a benefit that is proportionate to the scheme
- you have secured the funding you need to cover the cost of using non-waste, and any ongoing operating costs

4.2.1 Area of Responsibility or Activity

The site is owned, and the scheme is being developed, by Renaissance Land as a Special Project Vehicle on behalf of QTS. It is the responsibility of QTS, as site owners, to provide the relevant funding and ensure the correct activities are undertaken. Cundall and Arcadis have both been appointed by QTS to undertake design services relating to the site and an enabling works contractor will be additionally appointed by QTS.

4.2.2 Proportional Benefit

Reuse of Burnt Shale materials on site brings forward a number of sustainability and environmental benefits to the project. Minimisation of waste to landfill or appropriate treatment facility aligns with the UK governments overall Net Zero goals and the climate crisis declared by numerous local authorities and agencies (including Northumberland County Council and the Environment Agency). Reuse on site will prevent emissions associated with HGV movements, raw material extraction and import as well as conserving landfill capacity and reducing environmental impacts of waste disposal. On a scheme of this size and for the volume of Burnt Shale materials (approximately 60,000m^3) this aligns with a significant carbon reduction, in addition to local-scale air quality and transport infrastructure impacts.

4.2.3 Financial Gain from Using Non-wastes

There are no ongoing operating costs associated with the reuse of Burnt Shale material, contaminated land assessments to date have not recorded any exceptional risks from this material and overall controlled waters risks on site are considered to be Low (Reference 11).

The scheme has been priced on behalf of QTS by specialist cost consultants (Arcadis) and overall investment in the scheme across the Cambois Campus site is anticipated to close to £10 billion. The project budget includes a £24.5million allowance to complete all remediation and earthworks within the Enabling Works area, this is approximately 20% of the budget allocated to the remediation of the entire campus site. Currently there is a contingency in the budget for both the removal of Burnt Shale materials (as non-hazardous classification) of £4.5million, and a further £1.32 million allowance for the import of primary aggregate to replace all the Burnt Shale materials to ensure the site levels outlined in the planning application are achieved. These two items within the provisional contract sum for the appointed contractor are in addition to provisional sums for removal of unsuitable material that does not meet the requirements of the Detailed Remediation Strategy (Ref 1) and other materials that may be uncovered that are geotechnically unsuitable. These materials are likely to be disposed of as inert / non-hazardous based on the data available to date.

Based on the chemical properties and preliminary waste classification of Burnt Shale materials outlined in Section 2.6, if not re-used on site Burnt Shale materials will likely be removed as inert or non-hazardous. Hazardous Burnt Shale materials are not subject to the Burnt Shale provisional sum as part of the secured funding, as there is alternative contract sums allowed for unforeseen hazardous materials. Based on an assumed market rate of £37 per m^3 for inert removal materials and £75 per m^3 for removal of non-hazardous materials, the potential costs for the removal of all 60,000m^3 of Burnt Shale materials (in Zones G, H, I and M) are presented in Table 4-1. All scenarios comprise total potential costs in line or below the established budget providing evidence that this sum is sufficient.

Proportion Inert		Proportion Non-Hazardous		Replacement import cost (all material)	Total Potential Cost
%	Volume (m^3)	%	Volume (m^3)		
100	60,000	0	0	£1,320,000	£3,540,000
80	48,000	20	12,000	£1,320,000	£3,996,000
60	36,000	40	24,000	£1,320,000	£4,452,000
50	30,000	50	30,000	£1,320,000	£4,680,000
40	24,000	60	36,000	£1,320,000	£4,908,000
20	12,000	80	48,000	£1,320,000	£5,364,000
0	0	100	60,000	£1,320,000	£5,820,000

Table 4-1 - Potential costs for the removal of Burnt Shale Materials

QTS have publicly declared that the investment in this project is c.£10billion across the 10-data centre site. The use of waste materials present on site is driven by QTS's sustainability and environmental goals and will not impact the economic viability of the scheme. Additional confidential information has been provided to the Environment Agency directly by QTS to support the case presented above. Agreement has been confirmed under separate cover.

4.3 Waste Acceptance Procedures

As outlined in the Earthworks Specification and Detailed Remediation Strategy for the site (References1 and 2) all materials proposed to be reused on site will require testing and compliance with these documents. Non-compliant materials will most likely fall into a Class U1A material (geotechnically unsuitable), although some Burnt Shale materials that underly known contamination hot spots will more likely be Class U1B. As neither Class U1A or U1B materials are suitable for reuse on site these will not be recovered as part of the environmental permit and proof of their disposal and volume will be provided at permit surrender.

4.4 Suitably Qualified Persons undertaking assessments

As outlined in the EA guidance, demonstrable evidence of material suitability must be provided and independently verified by a suitably qualified person. The assessment should be undertaken by a Chartered specialist who is bound by a recognised professional code of conduct and subject to the quality and ethical standards of their professional institution. All deliverables go through a rigorous quality assurance process with multiple specialists to ensure their suitability and technical excellence.

4.5 Placement of Burnt Shale Materials

As Burnt Shale materials are geotechnically suitable for reuse as a Class 1A/B or Class 2C material and are chemically suitable for reuse on site they are suitable to be used anywhere required within the Red Line Boundary, this will be supported at application by the relevant Environmental Site Setting Design report and Hydrogeological Risk Assessments in line with Land Contamination Risk Management Guidance.

It is not acceptable for Burnt Shale materials to be used in any soil mixing operations and none of these are proposed as part the earthworks. For ease of regulation, it is also anticipated that Burnt Shale materials will be deposited in one continuous operation once the permit is granted, it is not suitable for Burnt Shale materials to be inter-layered with those placed under different regulatory regimes (i.e. materials placed under DoWCoP). Where Burnt Shale materials are placed above materials placed under DoWCoP it is not suitable to then additionally layer DoWCoP materials on top of Burnt Shale.

5.0

Conclusions

5.0 Conclusions

QTS Data Centres (QTS, the Client) is proposing to construct a new data centre campus on the site of the former coal-stock yards which serviced Blyth Power Station until the early 1990's. Cundall was commissioned by the QTS to prepare a Waste Recovery Plan for the proposed development to support a deposit for recovery permit for the Burnt Shale material (also known as Red Shale) present on the Site. "Recovery of waste" is defined as any operation the principal result of which, is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function.

Intrusive ground investigations have been carried out at the site by Rolton and Arcadis, both of whom have undertaken multiple phases of investigations. Made Ground was encountered across the entirety of the site and has been characterised into a variety of subcategories based on its visual appearance and BS 5930 description, notably the presence of Burnt Shale materials were recorded as part of this. Descriptions of the material as provided by both Rolton and Arcadis are diverse. All investigations were carried out in accordance with BS5930 and as such the proportion of Burnt Shale in a given stratum was not required to be quantified in the material description. Arcadis only classified the material as "Burnt Shale" where material was considered to comprise >50% visually Burnt Shale material. Made Ground is underlain locally by Alluvium overlying significant thicknesses of predominantly cohesive Glacial Till (20-30m thick). Bedrock at the site comprises Pennine Middle Coal Measures. Preliminary Waste Classification of Burnt Shale materials was undertaken by Arcadis. Burnt Shale materials recorded a mixture of inert and non-hazardous classification except in locations of known contamination hot spots.

The wider site has obtained outline planning for erection of up to ten data centre buildings of Class B8 use totalling up to 540,000m^2 gross internal area (GIA) in addition to ancillary structures, substation, emergency generators and other associated works. A further reserved matters application has been granted for the enabling works. Approximately 60,000m^3 of Burnt Shale materials are present within the enabling works boundary and the earthwork proposals comprise excavation and replacement of materials as engineering fill in these areas. No specific treatment is required for these materials to be reused.

The Deposit for Recovery permit is proposed to cover the excavation and replacement of Burnt Shale materials within the enabling works boundary. Other materials on site will be excavated and replaced under a Materials Management Plan in accordance with the Definition of Waste Code of Practice (DoWCoP) administered by CL:AIRE or a WRAP Quality Protocol. As there will be multiple reuse regimes in place on site, detailed and auditable records will be kept for all material movements providing an easily verifiable trail.

Reuse of Burnt Shale materials on site brings forward a number of sustainability and environmental benefits to the project. Minimisation of waste to landfill or appropriate treatment facility aligns with the UK governments overall Net Zero goals and the climate crisis declared by numerous local authorities and agencies (including Northumberland County Council and the Environment Agency). Reuse on site will prevent excessive emissions associated with HGV movements, raw material extraction and import as well as conserving landfill capacity and reducing environmental impacts of waste disposal. On a scheme of this size and for the volume of Burnt Shale materials (approximately 60,000m^3) this aligns with a significant carbon reduction, in addition to local-scale air quality and transport infrastructure impacts. Based on the anticipated materials balance there is a demonstratable need for the use of Burnt Shale materials as general fill based on their anticipated geotechnical properties. Additional assessments are being completed to determine chemical suitability criteria based on the controlled waters risk.

There are no ongoing operating costs associated with the reuse of Burnt Shale material, contaminated land assessments to date have not recorded any exceptional risks from this material and overall controlled waters risks on site are considered to be Low (Reference 11). Additional assessments will be provided to support this permit. It is not acceptable for Burnt Shale materials to be used in any soil mixing operations and none of these are proposed as part the earthworks. For ease of regulation, it is also anticipated that Burnt Shale materials will be deposited in one continuous operation once the permit is granted and will not be interlayered with other materials.

Funding has been secured should the Burnt Shale not be allowed to be reused, this includes the assumption that all the material must be removed as non-hazardous even where preliminary classification indicates that some may be removed

as inert. This evidences that the reuse of Burnt Shale materials constitutes a recovery rather than disposal activity and should be permitted as such.

Appendices

Appendices

Appendix A – Table 6/1 Reproduced from Cundall Earthworks Specification- Enabling Works (Reference GBR1-ENA2-CDL-STE-XX-SP-B-0001)

Table 6/1 Acceptable Earthworks Materials: Classification and Compaction Requirements

Class	General Material Description	Permitted Constituents (All subject to requirements of Table 6/1 SHW Series 600 and Appendix 6/1)	Typical Use	Material Properties				Compaction Requirements
				Property	Test	Lower Limit	Upper Limit	
1A	Well graded granular material	See Table 6/1 of SHW Series 600 but with no more than 1% Class B1 constituents (municipal incinerator bottom ash), Class D2 constituents (air cooled blast furnace slag), Class D4 constituents (electric arc furnace slag) or Class E constituents (nonferrous steel industry)	General Fill	Grading	BS1377: Part 2	Table 6/2	Table 6/2	Method compaction as per Table 6/4 Method 2 or End product specification to achieve 97% of maximum dry density of BS1377: Part 4 (4.5kg rammer), depending on end use.
				Uniformity Coefficient	see Note 5	10	-	
				Moisture Content (see Note 4)	BS 1377: Part 2	OMC-2%	OMC+2%	
				Flash Point	BS EN ISO 13736	>100ºC	-	
				Water soluble sulfate content	BS EN 1744-1 Clause 10	-	3000 mg/l as SO4	
1B	Uniformly graded granular material	See Table 6/1 of SHW Series 600 but with no more than 1% Class B1 constituents (municipal incinerator bottom ash), Class C1 constituents (coal fly ash), Class C4 constituents (coal bottom ash), Class D2 constituents (air cooled blast furnace slag), Class D3 constituents (basic oxygen furnace slag), Class D4 constituents (electric arc furnace slag) or Class E constituents	General Fill	Grading	BS1377: Part 2	Tab 6/2	Tab 6/2	Method compaction as per Table 6/4 Method 3 or End product specification to achieve 97% of maximum dry density of BS1377: Part 4 (4.5kg rammer) depending on end use.
				Uniformity Coefficient	see Note 5	-	10	
				Moisture Content (see Note 4)	BS 1377: Part 2	OMC-2%	OMC+2%	
				Flash Point	BS EN ISO 13736	>100ºC	-	

Class	General Material Description	Permitted Constituents (All subject to requirements of Table 6/1 SHW Series 600 and Appendix 6/1)	Typical Use	Material Properties				Compaction Requirements
				Property	Test	Lower Limit	Upper Limit	
		(nonferrous steel industry), Class F constituents (foundry industry)		Water soluble sulfate content	BS EN 1744-1 Clause 10	-	3000 mg/l as SO4	
2A	Wet cohesive material	Any material, or combination of materials, other than chalk	General Fill	Grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	Method compaction as per Table 6/4 Method 1 or end product compaction to achieve 97% target compaction, depending on end use.
				Plastic limit (PL)	BS 1377: Part 2	-	-	
				Moisture content (See note 4)	BS 1377: Part 2	PL - 4%	-	
				Moisture content	BS 1377: Part 2	OMC -2%	OMC -2%	
				Organic Matter	BS1377- Part 3	-	5%	
				Flash Point	BS13736	>100°C		
				Undrained shear strength of remoulded material	Clause 633	50kN/m^2	120kN/m^2	
				Water soluble sulfate content	BS EN 1744-1 Clause 10	-	3000 mg/l as SO4	
2B	Dry cohesive material	Any material, or combination of materials, other than chalk	Engineered General Fill	Grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	Method compaction as per Table 6/4 Method 2 or end product compaction to achieve
				Plastic limit (PL)	BS 1377: Part 2	-	-	

Class	General Material Description	Permitted Constituents (All subject to requirements of Table 6/1 SHW Series 600 and Appendix 6/1)	Typical Use	Material Properties				Compaction Requirements
				Property	Test	Lower Limit	Upper Limit	
				Moisture content (See note 4)	BS 1377: Part 2	-	PL - 4%	97% target compaction, depending on end use.
				Moisture content	BS 1377: Part 2	OMC -2%	OMC -2%	
				Organic Matter	BS1377- Part 3	-	5%	
				Flash Point	BS13736	>100ºC		
				Undrained shear strength of remoulded material	Clause 633	50kN/m^2	120kN/m^2	
				Water soluble sulfate content	BS EN 1744-1 Clause 10	-	3000 mg/l as SO4	
2C	Stony cohesive material	Any material, or combination of materials, other than chalk	General Fill	Grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	Method compaction as per Table 6/4 Method 2 or end product compaction to achieve 97% target compaction, depending on end use.
				Plastic limit (PL)	BS 1377: Part 2	-	-	
				Moisture content (See note 4)	BS 1377: Part 2	OMC-2%	OMC+2%	
				Undrained shear strength of remoulded material	Clause 633	50kN/m^2	120kN/m^2	
				Water soluble sulfate content	BS EN 1744-1 Clause 10	-	3000 mg/l as SO4	

Class	General Material Description	Permitted Constituents (All subject to requirements of Table 6/1 SHW Series 600 and Appendix 6/1)	Typical Use	Material Properties				Compaction Requirements
				Property	Test	Lower Limit	Upper Limit	
2E	Reclaimed pulverised fuel ash cohesive material	Reclaimed material from lagoon or stockpile containing not more than 20% furnace bottom ash	General Fill	Moisture content (See note 4)	BS 1377: Part 2	To enable end product compaction		End product compaction to achieve 97% target compaction of BS 1377 Part 4 (2.5kg rammer).
				Water soluble sulfate content	BS EN 1744-1 Clause 10	-	3000 mg/l as SO_4	
				Oxidisable sulphides content	BS EN 1744-1 Clause 13	-	0.3% as SO_4	
				pH value	BS 1377: Part 3	6	9	
				Remoulded CBR (Swelling)	BS 1377: Part 4	No result over 10mm and the average should be less than 5mm.		
4	Various	To Landscape Architect's requirements.	Fill to landscaped areas	To Landscape Architect's and soil specialist's requirements.				
5A	Site won topsoil	To Landscape Architect's requirements.	Topsoiling	To Landscape Architect's and soil specialist's requirements				
5B	Imported topsoil	To Landscape Architect's requirements.	Topsoiling	To Landscape Architect's and soil specialist's requirements				

Class	General Material Description	Permitted Constituents (All subject to requirements of Table 6/1 SHW Series 600 and Appendix 6/1)	Typical Use	Material Properties				Compaction Requirements
				Property	Test	Lower Limit	Upper Limit	
6C	Selected uniformly graded granular material	See Table 6/1 of SHW Series 600	Starter layer	Grading	BS 1377: Part 2 (on site) BS EN 933-2 (imported)	Table 6/2 (on site) or Table 6/5 (imported material)	Table 6/2 (on site) or Table 6/5 (imported material)	Method compaction as per Table 6/4 Method 3
				Uniformity Coefficient	See Note 5	-	10	
				Plasticity Index	BS 1377: Part 2	Non plastic- Plasticity Index		
				Los Angeles Coefficient	Clause 635	-	50	
				Moisture Content	BS 1377: Part 2	OMC-2%	OMC+2%	
6D	Selected uniformly graded granular material	See Table 6/1 of SHW Series 600	Starter layer below PFA	Grading	BS 1377: Part 2 (on site) BS EN 933-2 (imported)	Table 6/2 (on site) or Table 6/5 (imported material)	Table 6/2 (on site) or Table 6/5 (imported material)	Method compaction as per Table 6/4 Method 4
				Uniformity Coefficient	See Note 5	-	10	
				Plasticity Index	BS 1377: Part 2	Non plastic Plasticity Index		

Class	General Material Description	Permitted Constituents (All subject to requirements of Table 6/1 SHW Series 600 and Appendix 6/1)	Typical Use	Material Properties				Compaction Requirements
				Property	Test	Lower Limit	Upper Limit	
				Moisture Content	BS 1377: Part 2	OMC-2%	OMC+2%	
6F2 (site won)	Selected granular material (coarse grading)	Recycled aggregates including concrete, brick and masonry with not more 5% bituminous materials and asphalt	General Fill or Capping	Grading	BS 1377: Part 2	Table 6/2	Table 6/2	Method compaction as per Table 6/4 Method 6 or end product specification to achieve 97% of maximum dry density of BS1377: Part 4 (Vibrating hammer method).
				Moisture Content	BS 1377: Part 2	OMC-2%	OMC+2%	
				Los Angeles Coefficient	Clause 635 – SHW Series 600	-	50	
				Class Ra (asphalt) content	Clause 710	-	50	
				Bitumen content	BS EN 12697-1 or BS EN 12697-39	-	2.0	
				Constituents of Coarse Recycled Aggregate	BS EN 933-11	-	-	
				Water soluble sulfate content	BS EN 1744-1 Clause 10	-	3000 mg/l as SO4	
				Oxidisable sulphides content	BS EN 1744-1 Clause 13	-	0.3% as SO4	
				pH value	BS 1377: Part 3	6	9	
				Determinant (see Appendix 6/15)	As relevant to determinant	Limiting Value in	Limiting Value in	

Class	General Material Description	Permitted Constituents (All subject to requirements of Table 6/1 SHW Series 600 and Appendix 6/1)	Typical Use	Material Properties				Compaction Requirements
				Property	Test	Lower Limit	Upper Limit	
						Appendix 6/15	Appendix 6/15	
6F5 (imported)	Selected granular material (coarse grading) – imported on to site	Unbound mixture complying with BS EN 13285 containing aggregate confirming to BS EN 13242 form one or more of the following source codes: P (natural aggregates except chalk, siltstone or slate) A2 (crushed concrete) A3 (crushed bricks, masonry)	General Fill or Capping	Size designation and overall grading category	BS EN 13285 - 0/80 and G_E	Table 6/5	Table 6/5	Method compaction as per Table 6/4 Method 6 or, end product specification to achieve 97% of maximum dry density of BS1377: Part 4 (Vibrating hammer method).
				Maximum fines and oversize categories	BS EN13285 – UF_{12} and OC_{75}	Table 6/5	Table 6/5	
				Los Angeles Coefficient	BS EN 13242 – LA_{50}	-	50	
				Moisture Content	BS EN 1097-5	OMC-2%	OMC+2%	
				Water soluble sulfate content	BS EN 1744-1 Clause 10	-	3000 mg/l as SO_4	
				Oxidisable sulphides content	BS EN 1744-1 Clause 13	-	0.3% as SO_4	
				pH value	BS 1377: Part 3	6	9	
				Determinant (see Appendix 6/15)	As relevant to determinant	Limiting Value in	Limiting Value in	

Class	General Material Description	Permitted Constituents (All subject to requirements of Table 6/1 SHW Series 600 and Appendix 6/1)	Typical Use	Material Properties				Compaction Requirements
				Property	Test	Lower Limit	Upper Limit	
						Appendix 6/15	Appendix 6/15	
7G	Selected conditioned pulverised fuel ash cohesive material	Conditioned material direct from power station dust collection system and to which a controlled quantity of water has been supplied	For stabilisation with cement to form capping (Class 9C)	Water soluble sulphate	TRL 447 Suite	-	3000mg/l	NA
				Oxidisable sulfate	TRL 447 Suite	-	0.6%	
				Total potential sulfate	TRL 447 Suite	-	1% (unless contractor can demonstrate suitability at higher limits)	
				Organic Matter	BS1377-3	-	2% (unless contractor can demonstrate suitability at higher limits)	
				Flash Point	BS13736	>100ºC	-	
9C	Cement stabilised condition	7G with addition of cement according to Clause 614 in SHW Series 600	Capping / General fill	Pulverisation	BS EN 13286-48	60%	-	End product 97% of maximum dry density (2.5kg rammer method

Class	General Material Description	Permitted Constituents (All subject to requirements of Table 6/1 SHW Series 600 and Appendix 6/1)	Typical Use	Material Properties				Compaction Requirements
				Property	Test	Lower Limit	Upper Limit	
	pulverised fuel ash cohesive material.			Bearing ratio	BS EN 13286-47	15%	-	
				Soaked CBR Test (28 day minimum soak)	BS EN 13286-47	-	10mm max with an average of less than 5mm.	
				Water Content (immediately before compaction)	BS EN 14227-15:2015	OMC-2%	OMC+2%	

Footnotes to Table 6/1

App = Appendix

Tab = Table

Where in the Acceptable Limits column reference is made to Appendix 6/1, only those properties having limits ascribed to them in Appendix 6/1 shall apply. Where other appendices give limits for other properties not listed in this Table such limits shall also apply.

Where BS 1377: Part 2 is specified for mc, this shall mean BS 1377: Part 2 or BS 812: Part 3 as appropriate.

Uniformity coefficient is defined as the ratio of the particle diameters D60 to D10 on the particle-size distribution curve, where:

D60 = particle diameter at which 60% of the soil by weight is finer

D10 = particle diameter at which 10% of the soil by weight is finer

Materials shall comply with the current Environmental Regulations at the time of use. Reference shall be made to Annex ZA (informative) of BS EN 13242.

Acceptability limits are generic and shall be revised based on site specific source approval testing.

The limiting values of Class U1B are given in Cundall's Remediation and Earthworks Strategy.

Table 6/1 Acceptable Earthworks Materials: Classification and Compaction Requirements

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