Extra MSA Group

Warrington Motorway Service Area, J11 M62

Addendum to Environmental Statement

Part 2 – Geology and Ground Conditions

Technical Paper 7

Revision D~~C~~ Date ~~30 July 2019~~ December 2021

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Contents

Tables and Figures:

Appendices:

1. Introduction

1.1. This document now constitutes part of an Addendum to the Environmental Statement originally submitted to Warrington Council in August 2018 to accompany the outline planning application for a 'New Concept' Motorway Service Area (MSA) at Junction 11 of the M62 Motorway.

1.2. Following the submission of the outline planning application, Warrington Council have refused the Planning Application (Decision Notice dated 17 June 2021) and subsequently, the Applicant has submitted an appeal under Section 78 of the Town and Country Planning Act 1990 against the refusal by Warrington Borough Council for which an Inquiry will be held.

1.3. As part of the Cumulative Assessment, HS2 is included as one of the projects assessed, as there 'might' be cumulative environmental effects when considered with the Application Proposals. Since the submission of the planning application, additional information has been made available by the Secretary of State for Transport and HS2. The Applicant has also had ongoing discussions with HS2 due to the proximity of the Site to the HS2 proposals and HS2's requirement for land associated with the Application Proposals as shown through the Safeguarding Plans, most recently those plans relating to the Safeguarding Directions, dated 2020 (ES Part 1 Report, Appendix 14c), which are an update to the previous plans relating to the Safeguarding Directions, dated 2018 (ES Part 1 Report, Appendix 14b).

1.4. This Addendum to the ES is primarily to provide an update to the cumulative assessment in light of this additional information. However it also updates other matters such as policy and guidance references where relevant, most notably in relation to a newly published National Planning Policy Framework (2021). There are no resulting amendments to the assessment of the likely environmental effects as a result of the Application Proposals when considered individually, which remain as set out within the original ES (August 2018).

1.5. The cumulative assessment is a requirement of the Environmental Impact Assessment Regulations (2017) and is undertaken to identify whether there are likely to be any incremental effects from the combined influences of various projects coming forward, based on the information that is available at the time. Schedule 4 of the EIA Regulations states that an Environmental Statement must include a description of the likely significant effects of the development on the environment resulting from 'the cumulation of effects with other existing

and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources' (Schedule 4 (5)(e)).

1.6. It is to be noted that it is not the role of an Environmental Statement to assess every theoretical possibility that may come forward, but to look at the reasonable likelihood of a development occurring. Assessment should be of the likely significant effects and be proportionate. It is the assessment of the accumulation of, and interrelationship between, effects which might affect the environment, economy or community as a whole, even though they may be acceptable when considered on an individual basis with mitigation measures in place. Thereby, assessing the likely residual effects as a result of the interrelationship between the proposed and cumulative sites at that point in time.

1.7. The amendments to Section 9 of the ES Part 1 Addendum (Interaction of Effects and Cumulative Impact) provides a project description in respect of the HS2 proposals, supported by a series of plans, included at ES Part 1 Report, Appendix 14a-14f, as well as an update as a result of the cumulative assessment undertaken within this ES Part 2 Technical Paper Addendum.

1.8. In order to ensure the Addendum is understandable and to avoid extensive cross referencing, changes have been integrated within the original text of the ES and its technical papers to form a single Addendum to the ES. Wherever changes or additions have been made to the text of the original technical paper, the text has been underlined and anything that is no longer relevant or valid has been struck through (~~struck through~~) but retained within the text. A log is also included within the appendix of this Technical Paper (Appendix 1.3) so that the text removed (i.e. the text struck through within the paper) is identified and a reason for its removal provided. This Addendum should however be read in conjunction with the original ES (August 2018) as not all the technical papers have been subject to change.

1.9. The Application is now the subject of an Appeal, and as such all references to Application Proposals, Application Site, Applicant should be read as Appeal Proposals, Appeal Site and Appellant respectively. These references have not however been amended within the ES Part 1 or Part 2 Addendum documents.

1.10. ~~1.1~~ This technical paper has been prepared by Wardell Armstrong LLP (WA) under instruction from Extra MSA Group. The chapter considers the scope of the likely impacts upon geology and ground conditions resulting from the development of this Site.

1.11. ~~1.2~~ The Site has been subject to a Phase 1 Environmental Assessment, a preliminary Site investigation (included at Appendices 1.1 and 1.2), a soil/peat survey (included Paper 10: Agricultural Land and Soils and a Site walkover survey which have informed the baseline assessment.

1.12. ~~1.3~~ In order to assess the significance of potential impacts, the following key items of legislation have been considered:

- Part IIA of the Environmental Protection Act, 1990
- The Groundwater (England and Wales) Regulations, 2009
- National Planning Policy Framework published in ~~February 2019~~ July 2021
- National Planning Practice Guidance (Land affected by Contamination), published in March 2014

1.13. ~~1.4~~ The paper will address the suitability of the Site for the Proposed Development and any risk to human health receptors (construction workers and future occupiers).

2. Documents Consulted

Sources of Information

2.1. The environmental data is primarily based on a Landmark Envirocheck report dated 26th November 2018. The following reports have been completed for the Site and provide information for the baseline assessment:

- Phase I Environmental Assessment, Wardell Armstrong LLP, Report Reference SH11739-Rep-004 November 2018 (Appendix 7.1);
- Preliminary Site Investigation, Wardell Armstrong LLP. Report Reference SH11739-Rep-002 August 2018 (Appendix 7.2); and
- Soil and ALC Survey and Peat Depth Survey, Wardell Armstrong LLP, Report Reference AD/HS/ER/SH11739/006, March 2019 (Appendix 10.7).

National Policy

2.2. National Policy is set out within the National Planning Policy Framework (NPPF ~~2019~~2021). Relevant Paragraphs from the Ground Conditions and Pollution section are as follows:

> *~~178~~183. Planning policies and decisions should ensure that:*
>
> *a) a Site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation);*
>
> *b) after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and*
>
> *c) adequate Site investigation information, prepared by a competent person, is available to inform these assessments.*
>
> *~~179~~184. Where a Site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.*

2.3. Paragraph 183b within the NPPF 2018 makes reference to the Environmental Protection Act (EPA) 1990 Part IIA. Part IIA was introduced into the EPA by the Environment Act 1995 to help deal with the substantial legacy of contaminated land. Part IIA, its accompanying regulations and Statutory Guidance contained in DETR Circular 02/2000 Contaminated Land came into force in England on 1st April 2000. Part IIA included the first statutory definition of "contaminated land" and conferred new responsibilities and powers on local authorities and the Environment Agency to identify contaminated land and ensure that it is dealt with. Defra published updated guidance in April 2012 (EPA 1990: Part 2A Contaminated Land Statutory Guidance).

2.4. Within Part IIA, contaminated land is defined as "...any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on, or under the land that:

a) *significant harm is being caused or there is a significant possibility of such harm being caused; or*

b) *significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused."*

2.5. Part IIA addresses "unacceptable risk". The approach is based upon the principles of risk assessment, including the concept of a contaminant, a receptor and a pathway, which, if combined, form a pollutant linkage. These, and other key terms, are defined in Part IIA and in the statutory guidance (DETR Circular 02/2000). A significant pollutant linkage forms the basis of a formal determination that land is contaminated land.

2.6. For each receptor, a description of the harm that is to be regarded as significant harm for the purposes of the regime is contained in the statutory guidance. Receptors include human beings, ecological systems in certain protected locations (e.g. Sites of Special Scientific Interest), property such as crops, livestock, domesticated animals, animals maintained for sporting purposes and buildings and their services. Significant harm includes, in appropriate cases, death, disease, serious injury, specified ecological system effects, substantial diminution of crop yield and structural building failure.

2.7. National Planning Practice Guidance (NPPG) was published in March 2014 and includes guidance for land affected by contamination and land stability. The NPPG documents currently

refer to paragraphs within the previous version of the NPPF (2012) and will be updated to refer to the NPPF 20~~18~~21 in due course

Local Policy

2.8. Local Policy is set out within the *Local Plan Core Strategy* (Warrington Borough Council, Adopted July 2014). The following policies are appropriate to Ground Conditions:

Policy QE 5

Biodiversity and Geodiversity

The Council will work with partners to protect and where possible enhance Sites of recognised nature and geological value. These efforts will be guided by the principles set out in National Planning Policy and those which underpin the strategic approach to the care and management of the borough's Green Infrastructure in its widest sense.

Sites and areas recognised for their nature and geological value are shown on the Policies Map and include:

- European Sites of International Importance
- Sites of Special Scientific Interest
- Regionally Important Geological Sites
- Local Nature Reserves
- Local Wildlife Sites
- Wildlife Corridors

The specific Sites covered by the above designations at the time of publication are detailed in Appendix 3.

Proposals for development which may affect **European Sites of International Importance** will be subject to the most rigorous examination in accordance with the Habitats Directive. Development or land use change not directly connected with or necessary to the management of the Site and which is likely to have significant effects on the Site (either individually or in combination with other plans or projects) and which would affect the integrity of the Site, will not be permitted unless the Council is satisfied that;

- there is no alternative solution; and
- there are imperative reasons of over-riding public interest for the development or land use change.

Proposals for development in or likely to affect **Sites of Special Scientific Interest (SSSI)** will be subject to special scrutiny. Where such development may have an adverse effect, directly or indirectly, on the SSSI it will not be permitted unless the reasons for the development clearly outweigh the nature conservation value of the Site itself and the national policy to safeguard the national network of such Sites.

Proposals for development likely to have an adverse effect on **regionally and locally designated Sites** will not be permitted unless it can be clearly demonstrated that there are reasons for the development which outweigh the need to safeguard the substantive nature conservation value of the Site or feature.

Proposals for development which may adversely affect the integrity or continuity of **UK Key habitats or other habitats of local importance**, or adversely affect **EU Protected Species**, **UK Priority Species or other species of local importance**, or which are the subject of **Local Biodiversity Action Plans** will only be permitted if it can be shown that the reasons for the development clearly outweigh the need to retain the habitats or species affected and that mitigating measures can be provided which would reinstate the habitats or provide equally viable alternative refuge Sites for the species affected.

All development proposals affecting protected Sites, wildlife corridors, key habitats or priority species (as identified in Local Biodiversity Action Plans) should be accompanied by information proportionate to their nature conservation value including;

- a Site survey where necessary to identify features of nature and geological conservation importance; an assessment of the likely impacts of the Proposed Development proposals for the protection and management of features identified for retention;
- an assessment of whether the reasons for the development clearly outweigh the nature conservation value of the Site, area or species; and
- proposals for compensating for features damaged or destroyed during the development process

Where development is permitted, the Council will consider the use of conditions or planning obligations to ensure the protection and enhancement of the Site's nature conservation interest and/or to provide appropriate compensatory measures.

Policy QE 6

Environment and Amenity Protection

The Council, in consultation with other Agencies, will only support development which would not lead to an adverse impact on the environment or amenity of future occupiers or those currently occupying adjoining or nearby properties, or does not have an unacceptable impact on the surrounding area. The Council will take into consideration the following:

- The integrity and continuity of tidal and fluvial flood defences;
- The quality of water bodies, including canals, rivers, ponds and lakes;
- Groundwater resources in terms of their quantity, quality and the ecological features they support;
- Land quality;
- Air quality;
- Noise and vibration levels and times when such disturbances are likely to occur;
- Levels of light pollution and impacts on the night sky;
- Levels of odours, fumes, dust, litter accumulation and refuse collection / storage.
- The need to respect the living conditions of existing neighbouring residential occupiers and future occupiers of new housing schemes in relation to overlooking/loss of privacy, outlook, sunlight, daylight, overshadowing, noise and disturbance;
- The effect and timing of traffic movement to, from and within the Site and car parking including impacts on highway safety;
- The ability and the effect of using permitted development rights to change use within the same Use Class (as set out in the in the Town and Country Planning (General Permitted Development Order) without the need to obtain planning consent.

Proposals may be required to submit detailed assessments in relation to any of the above criteria to the Council for approval.

Where development is permitted which may have an impact on such considerations, the Council will consider the use of conditions or planning obligations to ensure any appropriate mitigation or compensatory measures are secured.

Development proposals on land that is (or is suspected to be) affected by contamination or ground instability or has a sensitive end use must include an assessment of the extent of the issues and any possible risks. Development will only be permitted where the land is, or is made, suitable for the proposed use.

Additional guidance to support the implementation of this policy is provided in the Design and Construction and Environmental Protection Supplementary Planning Documents.

2.9. Additionally, the *Environmental Protection: Supplementary Planning Document* (Warrington Borough Council, May 2013) has been reviewed and provides information to developers to assist with planning applications. The flowchart (fig 4.1) set out in Section 4.3 sets out the "idealised Planning and Contaminated Land Procedure" and identifies that a Preliminary Risk Assessment should be carried out and submitted where a Site is known or suspected to be affected by contamination. For this Site the Preliminary Risk Assessment is deemed to have been carried out within the Phase 1 Environmental Assessment and Preliminary Site Investigation Reports which will be included with the ES (also attached at Appendices 7.1 and 7.2).

3. Consultations

3.1. An ES scoping Request Report was submitted to Warrington Borough Council on 20th December 2018. A response was received from Environmental Protection on 1st February 2019. The full report and Scoping Opinion from Warrington Borough Council can be found in the ES Part 1 Appendix A and Appendix 18 respectively. The response is as follows:

> ***Contaminated Land***
> *A preliminary risk assessment has been carried out and supplied with the application. It has identified potential sources of contamination and identified potential pathways to the end use receptors. It has also identified potential gas and groundwater issues that are associated with the onSite conditions, the peat present on Site and the adjacent landfill Site.*
>
> *The recommendations are for further detailed on Site geotechnical investigation including an unexploded ordinance specialist desk study to be completed prior to redevelopment due to the proximity to the former ROF Risley Site. It is considered likely that mitigation measures to protect the underlying aquifer would be required for any development on Site.*
>
> *This information may be presented up front with any application or via a conditional route for subsequent discharge.*

3.2. The Scoping Request Report was discussed during a telephone conversation with the Environmental Health team on 31st January 2019. The response received above reflects the discussion held and confirmed that further Site investigation work and gas assessments could be completed via planning conditions.

Theme / Issue	Date	Consultee	Method	Summary of Discussion	Outcome / Output
Contamination	31-01-19	Warrington Environmental Health	Telephone conversation	Discussion on the scoping report submitted and their requirements for supporting technical data and reports for the planning application. They stated that they would have "no objection" to the scheme from a contaminated land point of view. They would expect that further SI and gas assessment would be necessary but that these could be subject to planning condition and therefore completed at detailed design stage.	The technical paper has included technical reports and data as set out in the scoping report. Mitigation has identified that further work will be required but that this will be carried out at detailed design stage.
Contaminated Land	01-02-19	Warrington Environmental Health	Scoping Response	A preliminary risk assessment has been carried out and supplied with the application. It has identified potential sources of contamination and identified potential pathways to the end use receptors. It has also identified potential gas and groundwater issues that are associated with the onSite conditions, the peat present on Site and the adjacent landfill Site. The recommendations are for further detailed on Site geotechnical investigation including an unexploded ordinance specialist desk study to be completed prior to redevelopment due to the proximity to the former ROF Risley Site. It is considered likely that mitigation measures to protect the underlying aquifer would be required for any development on Site. This information may be presented up front with any application or via a conditional route for subsequent discharge.	Further work identified will be carried out at detailed design stage.
Peat				Refer to Agricultural Land Soils Paper 10	

Table 3.1: Summary of Consultations and Discussions

4. Methodology and Approach

4.1. The Site has been subject to a series of assessments and reports in order to provide the baseline data for the impact assessment. These reports are included in the appendices and are as follows:

- Phase I Environmental Assessment (Appendix 7.1)
- Phase II Site investigation (Appendix7.2)
- Soil and ALC Survey and Peat Depth Survey, Wardell Armstrong LLP, Report Reference AD/HS/ER/SH11739/006, March 2019 (Appendix 10.7)

Receptors

4.2. The following receptors are identified from baseline assessments and are summarised on the Ground Conditions Receptor Plan at Appendix 6 of ES Part I:

- Human Health (construction workers and future occupiers)
- Peat and other Geological Strata
- HP Gas Main

4.3. Table 4.1 sets out the rationale for designation of receptors.

Designation	Receptors
International	An Internationally designated geological or geomorphological Site e.g SSSI or Geopark There are not considered to be any receptors that will be affected at this level of sensitivity. Holcroft Moss and Risley Moss are European Sites of International importance but are not designated for Geology.
National	A nationally designated geological or geomorphological Site e.g SSSI Presence of economically important mineral which is valuable as a national resource. There are not considered to be any geological receptors that will be affected at this level of sensitivity. Holcroft Moss and Risley Moss are SSSIs but are not designated for Geology. An HP gas main is present on the eastern Site boundary and is part of the national transmission network. Ground stability will be considered in respect of this receptor.

Designation	Receptors
Regional	Geological features of designated regional importance, e.g Regionally Important Geological Sites (RIGS) or Sites within Geological Conservation Review (GCR). Presence of economically important minerals of regional value. There are not considered to be any receptors that will be affected at this level of sensitivity. Three RIGS are identified within Warrington but none are located in proximity to the Site.
County	Geological receptors are not identified at this level.
Borough/District	Geological receptors are not identified at this level.
Local/Neighbourhood	Non-statutory Sites that have been identified by local geoconservation groups as being of importance. Geological strata and features that are not protected. There are no geological features in the vicinity of the Site that are protected or identified as locally important. The Peat and other geological strata present beneath the Site are considered to be at local/neighbourhood scale. The Peat is buried under agricultural use and not identified as a notable geological unit or Site in this location. Human Health Receptors comprise construction workers and future users of the Site.

Table 4.1: Receptors

Environmental Impacts

4.4. For each of the receptors identified, an assessment has been made to determine the likely environmental impact (positive or negative) as a result of the Proposed Development. The assessment is made based on the baseline assessments carried out and from professional judgement. The rationale used to assign the impacts as set out in Table 4.2.

Magnitude	Environmental Impact
Substantial	Total loss of, or alteration to, the baseline resource such that post development characteristics or quality would be fundamentally and irreversibly changed. Significant improvement to the baseline resource, regeneration, restoration and enhancement on an extensive scale.

Magnitude	Environmental Impact
High	Significant loss of, or alteration to, the baseline resource such that post development characteristics or quality would be significantly changed. Significant improvement to the baseline resource, regeneration, restoration and enhancement on a large scale.
Moderate	Loss of, or alteration to, the baseline resource such that post development characteristics or quality would be partially changed. Improvement to the baseline resource; regeneration, restoration and enhancement.
Minor	Small changes to the baseline resource, which are detectable but the underlying characteristics or quality of the baseline situation would be similar to pre-development conditions. Minor improvement to the baseline resource; regeneration, restoration and enhancement on a small scale
Negligible	A very slight negative change to the baseline conditions, which is barely distinguishable, and approximates to the 'no change' situation. A very slight positive change to the baseline conditions, which is barely distinguishable and approximates to the 'no change' situation.
Neutral	No change, either positive or negative, to baseline conditions.

Table 4.2: Environmental Impacts

Significance of Effects

4.5. The significance of effect is determined using the significance matrix in Section 6 of the Environmental Statement Part 1 Report. This identifies the receptor level across the top of the matrix and the magnitude of environmental impact down the side and where they meet within the matrix identifies the significance of the effect. Significant effects are those which are assessed as being Moderate Adverse, High Adverse or Substantial Adverse. Not significant effects are those which are assessed as being Minor Adverse, Negligible or Neutral, as well as beneficial effects.

Impact Prediction Confidence

4.6. It is also of value to attribute a level of confidence by which the predicted impact has been assessed. The criteria for these definitions are set out below:

Confidence Level	Description
High	The predicted impact is either certain i.e. a direct impact, or believed to be very likely to occur, based on reliable information or previous experience.
Low	The predicted impact and its levels are best estimates, generally derived from first principles of relevant theory and experience of the assessor. More information may be needed to improve confidence levels.

Table 4.3: Confidence Levels

5. Baseline Information

Site History

5.1. A review of Site history is carried out within the Phase I which is included at Appendix 1.1. A summary is presented below:

Summary of Land Use		
Date	**Site Land Use**	**Adjacent Land Use**
1849 -1870's	The Site is shown as part of Pestfurlong Moss and is undeveloped with a number of tracks crossing it.	The area is generally undeveloped with just a few farms shown in the vicinity.
1880 -1890's	Pestfurlong Moss Farm is shown in the central area and a track connects to Moss Side Farm to the west of the Site. A pond is shown in the north west corner of the Site.	Holcroft Firs (Woodland) and Holcroft Moss are shown bordering the Site to the east. A railway line (Wigan Junction Branch) is seen c. 400m north east of the Site.
1900 -1910's	No significant changes.	No significant changes.
1920-1930's	Some of the "tracks" previously noted are identified to have flow and are therefore likely to be drains/small watercourses. Some of the farm buildings also appear to have been demolished.	Holcroft Moss has a series of drains and tracks cut through and is likely to be subject to peat cutting.
1940-1950's	No significant changes.	Tramways are shown through Holcroft Moss and the woodland area of Holcroft Firs has reduced in size. The Royal Ordnance Factory (ROF) Risley is seen c. 300m south west of the Site.
1960-1970's	The farm buildings are no longer shown. Three new buildings are shown in the north of the Site – their use is not evident. The M62 Motorway and Junction 11 are constructed on plans dated 1975.	Holcroft Firs is no longer labelled. Drains are indicated across Holcroft Moss.
1980-1990's	The pond in the north west corner is no longer evident and is labelled as Scrub. Drains are indicated in the west of the Site and along the northern and eastern perimeters. Issues are labelled in the south. An access road is constructed from J11 onto the southwest of Site in late 1990's.	The railway line is shown as dismantled. ROF Risley is redeveloped as residential housing. Moss Side Farm to the west is expanded and a large spoil tip is seen to the west of this.
2000's	Only one building is now shown on Site in the north and a fenced area is shown adjacent to it.	No significant changes.
Present day	The Site comprises agricultural fields with some rough grass land. An agricultural building is present in the north of the Site.	The area around the Site is largely agricultural with the M62 motorway located to the south and a landfill Site to the west.

Table 5.1: Summary of Land Use

Mining History

5.2. Research of topographical, geological and other archive mining records has indicated evidence of surface workings in the vicinity of the Site. The Landmark Envirocheck report records six former opencast Sites within 1km of the Site. The commodities worked in these areas were Peat (two locations), Sand (two locations) and Common Clay and Shale (two locations). The closest of these was located c. 470m west of the Site at Silver Lane (Common Clay and Shale). All six opencast Sites have now ceased operation.

5.3. Published geological information indicates that this Site is not in an area of underground mining. Therefore, the Site is considered unlikely to be subject to any ground instability from this source and no mine entries should be present.

Geological setting

5.4. The assessment of the geology of the Site is based on the published geological mapping sheet (Sheet No 97, Runcorn, Solid and Drift Edition, 1:50,000 scale) supplemented by the Preliminary Site Investigation (SH11739-Rep 004, September 2018), topographical plans and Site visit. A summary of relevant geological information is provided below:

Summary of Relevant Geological Data	
Strata	**Description**
Made ground.	Made ground of an unknown nature, thickness and extent may be present on Site associated with the demolition of former buildings however none was observed during the preliminary Site investigation.
Natural superficials.	Peat was identified in varying thicknesses in the eastern part of the Site (0.30m to 1.40m) with increasing thickness toward the south east. The western part of the Site is shown to be underlain by Till deposits. These were observed in the north west of the Site to comprise cohesive deposits comprising sandy clay with a minor component of fine to coarse gravel with a generally rounded angularity. Lithologies were variable from igneous granite to sedimentary mudstone, shale and red sandstone
Solid strata.	Helsby Sandstone Formation. Not observed during preliminary SI.
Landslides.	Low risk
Ground stability.	British Geological Information Services indicate a high potential for compressible ground stability hazards on Site.

Table 5.2: Summary of Relevant Geological Data

Environmental Setting

5.5. No contaminated land entries or notices are identified within 1km of the Site.

5.6. The Landmark Envirocheck report identifies that the western part of the Site is within the boundary of Risley Landfill operated by Biffa Ltd. This landfill has been subject to a Partial Permit surrender by consolidated notice (ref: EPR/BV7877IR/S009) and the area within the boundary of the Site is now excluded. The surrender was effective from 7th August 2018 and the documents are included within the Phase I Environmental Assessment report at Appendix 7.1.

Phase I Environmental Assessment Conceptual Site Model (CSM)

5.7. The following Conceptual Site Model was developed within the Phase I Environmental Assessment (Appendix 1.1) and considers the potential sources and receptors at the Site as well as any pathway linkages. Please note that the Phase I report considers a number of receptors (i.e. controlled waters and flora and fauna) that will be considered in other technical papers within the ES (i.e. Water Resources and Ecology and Nature Conservation).

Conceptual Site Model		
Source (Contaminant)	**Pathway**	**Receptor**
No. 1 Made ground potentially present on Site (heavy and phytotoxic metals, PAH, asbestos).	1. Inhalation. 2. Dermal contact. 3. Ingestion. 4. Surface runoff. 5. Groundwater migration. 6. Direct contact (aggressive attack).	2. Future occupiers. 3. Construction workers. 4. Groundwater. 5. Surface water. 6. Subsurface building materials [sulphur] and plastic service pipes [phenol]. 7. Flora and Fauna.
No. 2 Historic building material and made ground (asbestos).	1. Disturbance and inhalation.	2. Future occupiers. 3. Construction workers.
No. 3 Ground gas – Peat (gas)	1. Inhalation 7. Gas migration	2. Future occupiers. 3. Construction workers. 7. Flora and Fauna.

Table 5.3: Conceptual Site Model

Site Investigation

5.8. A Site investigation (SI) was completed in December 2018 to identify, describe, and broadly delineate peat deposits present at the Site. In addition, the SI aimed to provide preliminary geotechnical information to inform design of the development. The SI comprised excavation and logging of 16 trial pits up to a depth of 3.3m below ground level (bgl) with in-situ and

laboratory geotechnical testing. The SI was supported by an Archaeological Watching Brief to ensure any finds within the Peat deposits were appropriately handled and recorded.

5.9. Topsoil was encountered across the Site to depths of c. 0.3m bgl and varied geographically becoming peat and clay based coincident with underlying strata. The natural materials encountered during the intrusive investigation showed a geographical variability across the Site. Typically, Peat deposits, of a dominantly pseudo-fibrous nature were encountered in the south east of the Site with a thickness varying from 0.3m to 1.4m with increasing distance toward the south east. Peat deposits were generally underlain by sand and firm sandy clay. The northern Site area was dominated by cohesive deposits comprising sandy clay with a minor component of fine to coarse gravel with a generally rounded angularity. Lithologies were variable from igneous granite to sedimentary mudstone, shale and red sandstone. Rockhead was not encountered in any of the trial pits.

5.10. From observations and geotechnical testing, the report concluded that the clay deposits on the Site are likely to be suitable as a founding medium, dependant on the required future loads. However, the peat deposits on the Site are not suitable as a founding stratum and will either require ground improvement or removal and replacement. Differential settlement is considered to be a significant risk at the Site due to the presence of peat. However, the limited area and depth of peat may allow either excavation of the peat and replacement with suitable fill or alternative engineering solutions such as surcharging to reduce the risk. Where large loads are required a piled foundation may be appropriate.

5.11. No artefacts were found to signify significant archaeological interest at the Site.

Soil and Peat Depth Survey

5.12. A soil and peat depth survey was completed in January 2019 using augered cores on an approximate 50 m grid. The depth to the underlying clay layer was confirmed in all cores. The data were recorded as depth from ground level and therefore also include the Peat topsoils across the Site, which have an average depth of 0.36m (see below).

5.13. Further detail on the soils and Peat is included within Technical Paper 10 Soils ~~the findings of the survey~~ but are summarised in this paper to provide further baseline information on the ground conditions at the Site.

5.14. The soil survey confirmed the existence of Peat over the majority of the Site. The Peat is deepest (1.75 m from ground level) towards the southeast of the Site, but thins out towards the north where, in the north-west corner, organo-mineral soils were identified; typically organic-rich clay loams over slowly permeable clays.

5.15. The peat topsoil is characterised by highly degraded, amorphous acidic black peat, with a low content of coarse fibres and wood remains and a low to moderate content of fine fibres. The topsoil depth averaged 0.36 m across the Site.

5.16. Where the Peat extends below the topsoil identified above, the Peat is characterised by an increasing water content with depth together with an increasing content of fibres (fine and coarse) and wood remains, highlighting the reduced degradation of the deeper Peat.

5.17. A peat depth drawing is included within the Agricultural Land and Soils paper at Appendix 10.5.

Evolution of the environment

5.18. Without the development in place the Site would likely continue in its current agricultural use. The Site does not currently impact on human health receptors and this would continue to be the case if the development were not to go ahead. Similarly, the peat deposits and other geology would remain as they are beneath the Site. It is possible that some stability impacts on the HP gas main would occur even without the development as the Peat is subject to seasonal change however, these impacts would be similar to what is already occurring on the Site.

6. Alternatives Considered

6.1. Following completion of the Phase I Environmental Assessment and Preliminary Site investigation, a constraints plan was produced to inform the layout.

6.2. The location and depth of the Peat deposits was considered during the layout options for the development and wherever possible the location of the buildings were kept outside of the areas of deeper Peat deposits. The Peat deposits were identified during the preliminary geotechnical work as being not suitable for supporting foundations and issues relating to differential settlement were also highlighted.

6.3. Throughout the design process a series of iterations and proposed levels and layouts were tested through modeling to determine the optimum layout resulting in minimal import/export of material.(See Agricultural Land and soils Paper 10) At scoping stage, it was expected that a cut/fill balance would be achieved but this has not been possible and there will be a deficit of material on Site to achieve the development platform. Some import of material will be necessary.

7. Potential Environmental Effects

7.1. This section assesses the potential environmental impacts on the identified receptors from the Proposed Development. It considers impacts both during construction and operational phases. The assessment does include measures already incorporated during design as outlined in Section 6 but does not consider further mitigation at this stage.

7.2. At scoping stage, it was intended that there would be a cut/fill balance across the Site in order to achieve a development platform. Further design has indicated that this is unlikely to be the case and the development will require some earthworks during construction phase and some import of material to form a development platform. At this stage to minimise the quantity of material needed, it is not intended to remove any of the geological strata (including Peat) from the Site, however, it is likely that there will be some redistribution of the Peat deposits around the Site to mitigate the geotechnical issues associated with this strata. Potential permanent loss of geological strata through construction/excavation was scoped out at scoping stage and it is considered that this can still be the case as all strata will remain on Site. However, there are potential impacts on the Peat deposits associated with the earthworks. These impacts are considered within the Paper 10 Agricultural Land and Soils.

Construction Phase

7.3. It is considered that the following potential impacts may arise during the construction phase of the development. These are assessed below and results are summarised in Table 7.1

1. Introduction of additional contamination into soil during construction phase as a result of accidental spillages i.e fuels.

   The Phase I and preliminary Phase II have identified that there is unlikely to be significant made ground and/or contamination on the Site and that it is suitable for a proposed commercial end use. Contamination may be introduced within the construction phase from accidental spillages or fuel/other substances. The receptor comprises Peat and Glacial Till at surface and Helsby Sandstone at depth. Strata are considered to be **Local** in value. The environmental impact is considered to be **Minor Negative**. Overall the significance of effect is assessed as **Minor Adverse.**

2. Impacts on Site and/or adjacent properties or infrastructure (including HP Gas Main) from unstable ground, and/or slopes or excavations during construction. The receptor is assessed as **National** in value. The excavation of Peat will take place outside the easement of the pipeline. However, some movement of the peat within the easement may occur. The pipeline is known to be situated beneath the level of the peat layer and movement of the Peat will only potentially affect the surface cover to the pipeline. The environmental impact is considered to be **Minor Negative**. Overall the significance of effect is assessed as **Moderate Adverse.**

3. Impacts on construction workers as a result of any ground gas on Site.

   There is potential for ground gas to be present both from the adjacent landfill and from the peat deposits. The risk from gas (asphyxiation, explosion) increases where it is allowed to accumulate in enclosed spaces such as basements or service corridors. At present there is limited potential for gas build up on the Site but during construction it is possible that voids within the ground and in new buildings could be created. The receptor is assessed as **Local** in value. The environmental impact is considered to be **Minor Negative**. Overall the significance of effect is assessed as **Minor Adverse.**

4. As described in the ES Part 1, Section 2 Project Description the management of peat in a construction Site is usually considered by means of a Peat Reuse hierarchy. The hierarchy prioritises the avoidance of peat resources where possible, and then ranks options for the re-use of disturbed peat in terms of most to least beneficial, Table 7-1. The hierarchy used for the Proposed Development is based upon that presented in Scottish Environmental Protection Agency (SEPA) guidance document 'Developments on Peat and Off-Site Uses of Waste Peat', with the addition of the Rank 5 option, stabilisation, as this technique of combining peat with 'concrete' to create a stable development platform has been successfully used on a range of developments.

	Rank	Description
Most Preferred	1	**Avoidance** of (disturbance to) the peat resource.
	2	**Re-use onSite** for beneficial / ecological uses (e.g. peatland type habitat creation, Site reinstatement).
	3	**Re-use off-Site** for beneficial / ecological uses (habitat creation, restoration of existing peatland, erosion control).
Least Preferred	4	**Recycling (also referred to as 'other reuse off Site')** includes mixing with other materials to form a soil substitute or use in other relevant works (e.g. use as a horticultural medium, agricultural land improvement, blending).
	5	**Stabilisation.** Mixing with 'concrete' to form a solid / stable development platform
	6	**Disposal** (only to be considered after all other options have been explored and discounted).

Table 7-1: Peat Reuse Hierarchy

As shown in Table 3-1, the consideration of alternative options for the reuse of peat has been undertaken in consultation with Natural England (NE), Greater Manchester Ecological Unit (GMEU) and the Environment Agency (EA).

5. The various alternatives considered for the reuse of peat within the Site are discussed by rank.

6. As explained in Table 7.1, the Rank 6 option (disposal) should only be considered once all other options have been explored and discounted; the disposal of the peat resources present within the Site has therefore never been considered as a viable option.

7. During the early stages of the iterative design process the use of stabilisation techniques (Rank 5 option) was considered for a portion of the peat resource. Preliminary geotechnical trials using peat samples from the Site in a range of mixes using a variety of cement binder percentages from 5% to 20% with other additives such as pulverized fuel ash or sand; showed that this technique could be successfully used to create a stable development platform within the Site. However, as the stabilisation (mixing of peat with other materials) could not be reversed, it was considered that this option was not suitable.

8. Early stages of the iterative design process also considered that the Rank 4 option, recycling would from part of the peat reuse strategy for the Site and would be fully investigated at reserved matters. To this end, initial discussions regarding the potential use of the peat as a soil improver on the adjacent former landfill Site were undertaken, however this as discounted as the current nutrient poor status of the soils within the landfill Site is resulting in the development of a desirable species rich flora, which would be hindered by the introduction of nutrient rich peats. The recycling option was also considered not desirable by NE.

9. The Rank 3 option, beneficial reuse off-Site, was discussed with GMEU in March 2019 GMEU and information regarding known peatland restoration Sites within the locale, in which peat could be beneficially re-used (i.e. potential receptor Sites) was exchanged. However, in June 2019 (See Agricultural Land and Soils Table 3-1) Natural England advised that relocating the peat would be undesirable and that in their opinion there were no local peatland Sites where it would feasible or desirable to re-locate peat. The option of working with local peatland Sites was therefore also discounted. But, as Natural England had stated that the most desirable mitigation (if the development was to go ahead) would be wetland creation on a neighbouring parcel of land, this option was investigated at some length. An options appraisal of six parcels of land close to the Site was undertaken; including land within the neighbouring former landfill Site; two similar areas of agricultural land over deep peat to the east and south east of the Site which could potentially be suitable for peat habitat restoration; and three areas to the north, north east and west of the Site which could potentially be underlain by clay deposits allowing for the creation / excavation of specially prepared peat receptor areas (water retentive peat basins within clays). The options appraisal and further work on the nature of the superficial geology of the potential Sites, showed that none of the six identified options was suitable. The landfill was discounted due to issues such as potential disturbance to the landfill cap, surcharging issues and the accentuation of landfill settlement. It was determined that the restoration of peat areas would be hindered by the presence of HS2 (if this comes forward), and that the impacts to local hydrology of blocking drainage could not be determined. Finally, from British Geological Survey (BGS) survey records the superficial geology is highly variable across short distances with significant deposits of sands and gravels interbedded with the clays, and from the desk

based data, the three identified 'peat basin' Sites appeared to be unsuitable for this purpose.

10. Therefore, through the iterative design and consultation process the Proposed Development was reviewed and redesigned such that all peat resources would be retained within the Site. An initial design to place a proportion of the excavated peat into the base of a SuDS pond (whilst allowing sufficient freeboard for SuDS capacity) was discussed with Natural England, but discounted due to NE's concern over the potential effects of runoff from the Proposed Development (potential contamination etc.).

11. Consequently, the layout was redesigned, shifting all built development further to the west and creating a Peat Habitat Zone (Appendix 10.5: Drawing SH11739/034: Peat Depth and Site Layout) This design change maximised the area of undisturbed (avoided) Peat, whist allowing for all disturbed Peat to be retained within the Site for beneficial reuse in the creation of peatland type habitat (ES Part 1, Section 2 Project Description). Therefore, all Peat resources within the Site will be addressed through the Rank 1 and Rank 2 options of the hierarchy.

7.4.

Nature of Impact	Receptor	Environmental Impact	Significance of Effect	Confidence Level
(1) Introduction of additional contamination into soil, during construction phase as a result of accidental spillages ie. fuels.	Local	Minor Negative	Minor Adverse	High

Nature of Impact	Receptor	Environmental Impact	Significance of Effect	Confidence Level
(2) Impacts on Site and/or adjacent properties and infrastructure (including HP gas main) from unstable ground, slopes and/or excavations during construction.	National	Minor Negative	Moderate Adverse	Low*
(3) Impacts on construction workers as a result of contamination and ground gas on Site.	Local	Minor Negative	Minor Adverse	High
(4) Impacts on the Site, surrounding area and/or construction workers as a result of the treatment of peat on Site. Impacts dependent on method selected	National	Substantial Negative	High Adverse	Low

Table 7.1: Significance of Effect - Construction Phase

* Detailed Design will be needed to increase confidence level

7.5. It can be concluded from the above assessment that in the absence of mitigation there are some minor and high adverse effects at Construction stage.

Operational Phase

7.6. The following potential impacts which may arise during the operational phase of the development are assessed.

1. Potential impact on soil/ground as a result of leakage from proposed fuel tanks and associated pipeworks or accidental spillage/leakage from vehicles (Site users and delivery vehicles) during the operational phase.

   Underground fuel tanks will be installed for the filling station. The void for the tanks will be excavated into the Glacial Till Deposits. The strata is considered to be a receptor of **Local** value. The environmental impact is assessed as **Minor Negative.** The overall significance of effect is **Minor Adverse.**

2. Impacts both on Site and on adjacent Sites (including HP gas main) as a result of unstable ground or instability created from Peat Treatment or potential changes to topography.

   Prior to construction, in line with good practice and the Applicant's own working procedures, soil and peat management within the Site would be defined through a detailed Site-specific Soil and Peat Management Plan (SPMP) which will be produced by a qualified soil scientist prior to construction. This will ensure that the quality of the peat is maintained and it remains in a condition suitable for reuse on Site to create peatland type habitat. A detailed description of the likely works is included in Paper 10 Agricultural Land and Soils. All engineering measures required to retain the peat in a stable condition will be identified and subject to detailed design to ensure their suitability. Likely works will include the installation of sheet piled walls to prevent peat movement of the retained peat during excavation and clay bunds to retain water during the creation of the peatland type habitat.

3. Impacts on future users of the Site as a result of ground gas.

   Gas monitoring has not yet been completed for the Site. Prior to detailed design, further Site investigation will be carried out and a gas assessment will be completed to determine the risk to future occupiers. The assessment should be based on gas monitoring results completed following the completion of the earthworks at the site. The receptors are assessed as **Local** and the environmental impact is considered to be **Minor Negative**. The overall significance of effect is assessed as **Minor Adverse.**

Nature of Impact	Receptor	Environmental Impact	Significance of Effect	Confidence Level
(1) Potential impact on soil/ground as a result of leakage from proposed fuel tanks and associated pipework or accidental spillage/leakage from vehicles (Site users and delivery vehicles) during the operational phase.	Local	Minor Negative	Minor Adverse	High
(2) Impacts both on Site and on adjacent Sites (including HP gas main) as a result of unstable ground or instability created from Peat Treatment or potential changes to topography	National	Minor Negative	Moderate Adverse	Low
(3) Impacts on future users of the Site as a result of ground gas.	Local	Minor Negative	Minor Adverse	High

Table 7.2: Significance of Effect - Operational Phase

7.7. It can be concluded from the above assessment that in the absence of mitigation there are some minor, moderate and high adverse effects at the Operational stage.

8. Proposed Mitigation

Construction Phase

8.1. Mitigation measures are considered for each of the impacts identified for the construction phase.

1. Introduction of additional contamination into soil during construction phase as a result of accidental spillages i.e Fuels.

   To mitigate the adverse effects of leaks and spillages to soil from construction plant and operations, all fuel, oils and chemicals should be contained within a bunded compound or in bunded, double skinned tanks. Spill control and clean up facilities will be provided. General good Site practices will also be implemented. In the event of a spillage, appropriate investigations will be carried out to determine the nature and extent of any contamination and if necessary remedial measures will be undertaken to remove contamination and/or protect identified receptors. The CEMP will outline detailed procedures where applicable.

2. Impacts on Site and/or adjacent properties or infrastructure (including HP Gas Main) from unstable ground, and/or slopes or excavations during construction. This mitigation has been addressed at construction phase paragraph 7.5 (2).

3. Impacts on construction workers as a result of any ground gas on Site.

   To assess and mitigate the risk from gas, a Site investigation and gas assessment will be completed at detailed design stage. The gas assessment will include the risk to construction workers. Mitigation is likely to include good practice methods and toolbox talks during the construction works. If a significant risk is shown, a construction method statement will set out the procedures for Site staff to follow to ensure that any risk is reduced.

4. Peat impacts are addressed in detail in Paper 10 Agricultural Land and Soils

Operational Phase

8.2. Mitigation measures are considered for each of the impacts identified for the operational phase.

1. Potential impact on soil/ground as a result of leakage from proposed fuel tanks and associated pipeworks or accidental spillage/leakage from vehicles (Site users and delivery vehicles) during the operational phase.

   In order to mitigate the risks from leakage of fuel tanks, the installation of the tanks will be in accordance with guidance provided by the Association for Petroleum & Explosives Administration (The Blue Book). In particular the following measures will be implemented:

   a. The new tanks will have secondary containment measures (i.e. double skin) and will be fitted with an interstitial monitoring device with automatic alarm;

   b. The new tanks will be fitted with overfill prevention; and

   c. Pipework will be installed with a minimum number of joints.

   In addition to good practice installation and operation, in the event that there is evidence of leakage/spillage from tanks, appropriate investigations will be carried out to determine the nature and extent of any contamination. Appropriate remediation will be carried out to treat contamination and protect the identified receptors.

   In respect of spillage/leakage from vehicles of Site users, infiltration into the ground will be limited by hardstanding cover across the majority of the Site. Infiltration is likely to be limited to the areas of landscaping and vehicular access is unlikely in these areas. Therefore, the probability of occurrence via infiltration can be considered to be unlikely.

   Rainwater run-off over the Site could potentially carry any substances which are leaked or spilt from vehicles on Site. As part of the drainage system, all surface water run-off will be intercepted via surface water drains and stored temporarily in order to release to the watercourse at a slower rate (agreed greenfield rate). To mitigate the risk of substances being carried within the run-off, fuel interceptors will be

incorporated within the drainage design to remove any hazardous substances which might be present. The interceptors will be subject to regular maintenance and inspections to ensure they are functioning correctly.

2. Impacts both on Site and on adjacent Sites (including HP gas main) as a result of unstable ground or instability created from Peat Treatment or potential changes to topography.

   All effects will be during construction and will be mitigated there.

3. Impacts on future users of the Site as a result of ground gas.

   Gas monitoring has not yet been completed for the Site. Prior to detailed design, further Site investigation will be carried out and a gas assessment will be completed to determine the risk to future occupiers. Gas protection measures will be incorporated into the detailed design to mitigate any risk to future occupiers.

9. Potential Residual Effects

9.1. Residual effects are considered following implementation of the mitigation measures outlined in Section 8.

Potential Residual Effects – Construction Phase

9.2. The overall impact of the proposal in terms of geology and ground conditions issues during the construction phase is highlighted in the table below:

Nature of Impact	Receptor	Environmental Impact	Significance of Effect	Confidence Level	Mitigation	Residual Significance of Effect
(1) Introduction of additional contamination into soil, during construction phase as a result of accidental spillages ie. fuels.	Local	Minor Negative	Minor Adverse	High	Good practice during construction, bunded storage and spill control.	Negligible
(2) Impacts on Site and/or adjacent properties and infrastructure (including HP gas main) from unstable ground, slopes and/or excavations during construction.	National	Minor Negative	Moderate Adverse	Low	Good practice and design during the construction works	Negligible
(3) Impacts on construction workers as a result of ground gas on Site.	Local	Minor Negative	Minor Adverse	High	Further SI and gas assessment. Good Site practice and toolbox talk if necessary.	Negligible

Nature of Impact	Receptor	Environmental Impact	Significance of Effect	Confidence Level	Mitigation	Residual Significance of Effect
(4) Impacts on the Site, surrounding area and/or construction workers as a result of the treatment of peat on Site.	National	Minor negative	Moderate Adverse	Low	Good practice and design during the construction works	Negligible

Table 9.1: Residual Significance of Effect - Construction Phase

9.3. It can be concluded from the above assessment that following mitigation there no significant effects at Construction stage.

Potential Residual Effects – Operational Phase

9.4. The overall impact of the proposal in terms of geology and ground conditions issues during the operational phase is highlighted in the table below:

Nature of Impact	Receptor	Environmental Impact	Significance of Effect	Confidence Level	Mitigation	Residual Significance of Effect
Potential impact on soil/ground as a result of leakage from proposed fuel tanks and associated pipework or accidental spillage/leakage from vehicles (Site users and delivery vehicles) during the operational phase.	Local	Minor Negative	Minor Adverse	High	Installation in accordance with guidance, on Site monitoring, investigation in the event of an issue. Hardstanding cover. Fuel interceptors.	Negligible

Nature of Impact	Receptor	Environmental Impact	Significance of Effect	Confidence Level	Mitigation	Residual Significance of Effect
Impacts both on Site and on adjacent Sites (including HP gas main) as a result of unstable ground or instability created from Peat Treatment or potential changes to topography	National	Minor negative	Moderate Adverse	Low	Good Construction practice and design	Negligible
Impacts on future users of the Site as a result of ground gas.	Local	Minor Negative	Minor Adverse	High	Protection measures will be incorporated where necessary	Negligible.

Table 9.2: Residual Significance of Effect - Operation Phase

9.5. It can be concluded from the above assessment that following mitigation there no significant effects at Operational stage.

10. Additive Impacts (Cumulative Impacts and their Effects)

10.1. For the purposes of this ES we define the additive cumulative effects as:

> ***'Those that result from additive impacts (cumulative) caused by other existing and/or approved projects together with the project itself***

10.2. The developments that are likely to have a cumulative impact when considered with the Proposed Development ~~have been~~ were scoped with the Local Authority and Key Consultees during the preparation of this ES (a full list is included within Section 9 of the ES Part One Report). Three developments ~~have been~~ were originally identified and are shown graphically on the plan included at **Appendix 14** of the ES Part One Report. None of these developments that are off-site are considered to have cumulative impacts in respect of geology and ground conditions as they are sufficiently remote that they will have no effect on the ground conditions on the site. Parts of the HS2 development such as construction and permanent maintenance accesses and utility works will fall within the site boundary. This could lead to cumulative impacts in respect of ground stability and ground contamination including within the conceptual site model in terms of ground gas migration linked to the adjacent former landfill.

10.3. This could affect future site visitors/ users including workers during the construction phase and thereafter employees, customers and maintenance workers once operational. HS2 construction is identified to be taking place following or close to completion of the MSA. Both developments individually will need to be suitably mitigated in terms of their potential respective impacts during construction and operational phases. It is therefore concluded that cumulatively any impacts are not considered to be significant and certainly no more significant than when considering the effect of the MSA individually.

11. Conclusion

11.1. This technical paper assessed the subsurface geology and ground conditions beneath the Site that may potentially impact upon and be impacted by, the Proposed Development. This included an assessment of general ground conditions, the potential presence of contamination and impacts on stability.

11.2. The assessment was carried out based on the findings of a desk based study with a Site walkover, a Site investigation, and a soils/peat survey.

11.3. Potential impacts were identified for construction and operational phases and were assessed in terms of the value of the receptor, the environmental impact and the overall significance of the effect. Moderate adverse were identified as a result of ground conditions.

11.4. Mitigation measures relating to the design of earthworks, slopes, minimise the risk to the HP Gas Main and measures to retain the Peat soils on site, are outlined to reduce the significance of the impacts identified. In all instances the significance of the impact can be reduced to **negligible** and **not significant**.

11.5. There are not considered to be any significant cumulative impacts associated with ground conditions for the developments identified including HS2.

11.6. Overall, the impact of the development on ground conditions is considered to be negligible following implementation of the mitigation measures outlined in this technical paper.

12. Reference List

British Geological Survey Map SJ69SE

HS2 (2018). High Speed Rail (Crewe to Manchester and West Midlands to Leeds). Volume 2:

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13. Appendices

Appendix 1.1 – Phase I Environmental Assessment

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ENERGY AND CLIMATE CHANGE
ENVIRONMENT AND SUSTAINABILITY
INFRASTRUCTURE AND UTILITIES
LAND AND PROPERTY
MINING AND MINERAL PROCESSING
MINERAL ESTATES
WASTE RESOURCE MANAGEMENT

EXTRA MSA GROUP

WARRINGTON MSA, J11 M62 MOTORWAY

PHASE I ENVIRONMENTAL ASSESSMENT

December 2018

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EXTRA MSA GROUP

WARRINGTON MSA, J11 M62 MOTORWAY
PHASE I ENVIRONMENTAL ASSESSMENT

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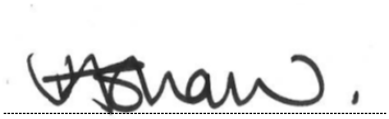

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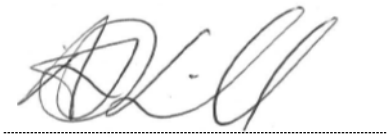


DOCUMENT RECORD

Issue No.	Date	Details
1	3rd December 2018	First issue - DRAFT
2	14th December 2018	Final

CONTENTS

APPENDICES

DRAWINGS

Drawing No.	Title	Scale
SH11739-007	Site Location Plan	1:50,000
SH11739-008	Site Plan	1:5,000
SH11739-010	Conceptual Site Model	NTS

1 EXECUTIVE SUMMARY

1.1 This report is prepared for a change of owner and use of the site and in accordance with instructions from Mr D Enuson of Extra MSA Group dated 26th November 2018. The site is the Proposed Warrington Motorway Services Area (MSA) and comprises approximately 15.33 Ha of agricultural land and grassland adjacent to J11 of the M62 Motorway. A summary of pertinent information relating to the site along with a qualitative assessment of the potential risk is provided in Table I.

TABLE I: Summary of Overall Risk

Issue	Summary	Risk Category	
		Humans	Property/ Environment
Present and past site use.	Agricultural fields and grassland.	Low	Low
Adjacent land uses.	Landfill. M62 Motorway. Agricultural use.	Moderate	Moderate
Environmental setting.	Pollution Incident on site but likely to be related to adjacent landfill. Several IPPCs in area which relate to adjacent landfill.	Low to Moderate	Low to Moderate
Asbestos	Asbestos is likely to be present in the farm buildings on site and may also be present in any made ground.	Low to Moderate	Low
Other issues.	Peat is present in the east of the site.	Moderate	Moderate
Geology and Mining	Potential Made ground overlying Peat/Till. Solid strata is Helsby Sandstone. Six opencast sites identified within 1km of site for Peat, Sand and Common Clay and Shale.	n/a	n/a
Geotechnical	Peat in the east of the site will need consideration in development proposals.	Moderate	Moderate
Groundwater and surface water	Principal Aquifer and Total catchment of SPZ. Nearest graded watercourse is 1.4km east but a number of ungraded watercourses/drains are present on site.	Low	Moderate to High
Flooding	Flood Zone 1.	Low	Low
Infrastructure Risk	An HP Gas main is identified in the East of the site.	Low	Low to Moderate

TABLE I: Summary of Overall Risk			
Issue	**Summary**	**Risk Category**	
		Humans	**Property/ Environment**
Recommended further work	Site investigation is recommended to inform detailed design for contamination and geotechnical purposes and to assess gas risk.	n/a	n/a
Overall Risk:	**Low to Moderate**		

1.2 The executive summary forms part of the overall report and should not be considered in isolation.

2 INTRODUCTION

Instructions

2.1 This report is prepared in accordance with instructions from Mr D Enuson of Extra dated 26th November 2018. This follows a proposal dated 22nd November 2018 by Wardell Armstrong.

Site Location

2.2 The site is the proposed Warrington MSA, and is located as shown on Drawing No. SH11739-007 (1:50,000 scale). A more detailed site plan is shown on Drawing No. SH11739-008 (1:5,000 scale). The site comprises approximately 15 hectares of agricultural land and grassland and is bounded by further agricultural fields to the north and east, by the M62 motorway to the south and by a landfill site to the west. The site is located approximately 6km north east of Warrington.

Scope and Objectives

2.3 The purpose of this report is to identify and examine in broad terms readily available information relating to the:

- past and current uses of the site and surrounding area;
- environmental setting including geology, mining, hydrogeology and hydrology;
- potential contamination sources, pathways and receptors as part of a preliminary conceptual model;
- potential stability and contamination constraints and liabilities that may arise in connection with the present use or proposed use of the site; and
- requirement or otherwise for future studies including potential intrusive site investigation prior to redevelopment.

2.4 The report has been produced in general accordance with the first incremental stage of a Land Quality Statement as set out by the Royal Institution of Chartered Surveyors (RICS) in their publication "Contamination, the Environment and Sustainability" dated April 2010. The report also draws on Environment Agency Report 11 entitled "Model Procedures for the Management of Land Contamination" dated September 2004. Further background to government guidance on contamination and the purpose and use of Land Quality Statements in assessing the risk of contamination at a site is described at Appendix II.

2.5 The report does not constitute or contain a valuation nor is it a full rigorous environmental audit. In this instance the report is prepared for a change of owner and use.

Proposed Site Use

2.6 It is proposed that the site is redeveloped for commercial use as a Motorway Services Area.

3 SITE HISTORY AND CURRENT LAND USE

Data Sources

3.1 The history of the site and the surrounding land has been investigated by consultation with a range of archive sources as summarised at Appendix III. The topographical and environmental data is based primarily on an Envirocheck report prepared by the Landmark Information Group and dated 26th November 2018 (LIG report, Appendix IV).

3.2 In addition, the following reports have been provided for information and review:

- *Preliminary Site Investigation, Wardell Armstrong LLP, Ref: SH11739-Rep-002, December 2018.*

Site History

3.3 Historic maps provided in the LIG report have been used to identify previous land uses, including any significant potentially contaminative uses. Where other features that may have an effect on development of the site have been identified, they are described.

3.4 Table II summarises the history of the site and its immediate vicinity from about 1849 to the present day.

TABLE II: Summary of Land Use

Date	Site Land Use	Adjacent Land Use
1849 -1870's	The site is shown as part of Pestfurlong Moss and is undeveloped with a number of tracks crossing it.	The area is generally undeveloped with just a few farms shown in the vicinity.
1880 -1890's	Pestfurlong Moss Farm is shown in the central area and a track connects to Moss Side Farm to the west of the site. A pond is shown in the north west corner of the site.	Holcroft Firs (Woodland) and Holcroft Moss are shown bordering the site to the east. A railway line (Wigan Junction Branch) is seen c. 400m north east of the site.
1900 -1910's	No significant changes.	No significant changes.
1920-1930's	Some of the "tracks" previously identified are identified to have flow and are therefore likely to be drains/small watercourses. Some of the farm buildings also appear to have been demolished.	Holcroft Moss has a series of drains and tracks cut through and is likely to be subject to peat cutting.
1940-1950's	No significant changes.	Tramways are shown through Holcroft Moss and the woodland area of Holcroft Firs has reduced in size. The Royal Ordnance Factory (ROF) Risley is seen c. 300m south west of the site.

TABLE II: Summary of Land Use		
Date	**Site Land Use**	**Adjacent Land Use**
1960-1970's	The farm buildings are no longer shown. Three new buildings are shown in the north of the site – their use is not evident. The M62 Motorway and Junction 11 are constructed on plans dated 1975.	Holcroft Firs is no longer labelled. Drains are indicated across Holcroft Moss.
1980-1990's	The pond in the north west corner is no longer evident and is labelled as Scrub. Drains are indicated in the west of the site and along the northern and eastern perimeters. Issues are labelled in the south. An access road is constructed from J11 onto the southwest of site in late 1990's.	The railway line is shown as dismantled. ROF Risley is redeveloped as residential housing. Moss Side Farm to the west is expanded and a large spoil tip is seen to the west of this.
2000's	Only one building is now shown on site in the north and a fenced area is shown adjacent to it.	No significant changes.
Present day	The site comprises agricultural fields with some rough grass land. An agricultural building is present in the north of the site	The area around the site is largely agricultural with the M62 motorway located to the south and a landfill site to the west.

Current Site Use

3.5 The site was visited on 30th November 2018. At the time of the visit the site comprised agricultural fields with some grassland. The following points are of note:

- the site was accessed from J11 of the M62 Motorway via a locked gate;
- the site comprised predominantly agricultural fields but some areas of rough grassland were noted in the west;
- the site was noted to slope down from the access road in the south west corner onto the main area of the site;
- soil was noted to be peaty in the south and east;
- agricultural buildings were noted in the north west of the site. Potential asbestos containing materials were noted in the roof;
- flytipping was noted in the vicinity of the agricultural buildings, including general household and construction waste;
- two 250L drums were also noted adjacent to the agricultural buildings; and
- a gas main was noted in the east of the site.

3.6 A site visit record is attached at Appendix V.

Asbestos

3.7 The Health and Safety at Work Act, the Control of Asbestos Regulations and the Construction (Design and Management) Regulations impose duties upon employers, site owners, their agents and contractors in respect of hazardous materials including asbestos. Other health and safety and welfare regulations place duties on Employers to undertake appropriate risk assessments. This could include the commissioning of surveys, identification and management of hazardous materials including any proposals for remedial work.

3.8 A site walkover survey has been completed. However, the walkover survey does not constitute an asbestos survey and not all areas of the site may have been visited or made available for inspection.

3.9 Asbestos has been identified during our site walkover within farm buildings and a full asbestos survey should be carried out prior to any redevelopment. Guidance on the need for asbestos surveys and the method of carrying them out are given in HSE Publication HSG264.

Ecology

3.10 There are a number of legal and planning policy considerations relating to certain important habitats and species where they are present on or in the vicinity of a site. Protected habitats and species can also be linked to development related activities via surface or groundwater and effects such as human/vehicular presence, noise, dust or pollution.

3.11 Reference to the LIG report indicates the presence of a Special Area of Conservation and a Site of Special Scientific Interest within 1km of the site.

TABLE III: Ecology	
Special Area of Conservation: Grid Ref: 368099 393393 Distance from Site: 887m East	Name: Manchester Mosses Source: Natural England Area: 1715154.68m^2 Reference: UK0030200 Status: Designated
Site of Special Scientific Interest: Grid Ref: 368099 393393 Distance from Site: 887m East	Name: Holcroft Moss Source: Natural England Area: 190417.08m^2 Reference: 1006461 Status: Notified

3.12 A Preliminary Ecological Assessment (PEA) has been carried out and is reported separately. No further consideration of ecology is made within this report.

Environmental Management

3.13 No issues relating to environmental management were identified during the site visit.

4 GEOLOGICAL AND HYDROGEOLOGICAL SETTING

Geology

4.1 The assessment of the geology of the site is based on the published geological mapping sheet (Sheet No 97, Runcorn, Solid and Drift Edition, 1:50,000 scale) supplemented by the Preliminary Site Investigation (SH11739-Rep 004, December 2018), topographical plans and site visit. A summary of relevant geological information is provided below in Table IV.

TABLE IV: Summary of Relevant Geological Data

Strata	Description
Made ground.	Made ground of an unknown nature, thickness and extent may be present on site associated with the demolition of former buildings however none was observed during the preliminary site investigation.
Natural superficials.	Peat was identified in varying thicknesses in the eastern part of the site (0.30m to 1.40m) with increasing thickness toward the south east. The western part of the site is shown to be underlain by Till deposits. These were observed in the north west of the site to comprise cohesive deposits comprising sandy clay with a minor component of fine to coarse gravel with a generally rounded angularity. Lithologies were variable from igneous granite to sedimentary mudstone, shale and red sandstone
Solid strata.	Helsby Sandstone Formation. Not observed during preliminary SI.
Landslides.	Low risk
Ground stability.	British Geological Information Services indicate a high potential for compressible ground stability hazards on site.

Hydrogeology

4.2 Hydrogeological information has been obtained from a review of:

- LIG Envirocheck report;
- Groundwater Protection Policy and Groundwater Vulnerability maps published by the Environment Agency;
- hydrogeological maps published by the British Geological Survey; and
- Groundwater Protection: Policy and Practice (Environment Agency, 2006).

4.3 This information indicates the site to be underlain by superficial deposits of Peat and Till which are classified as Unproductive Strata and Secondary Undifferentiated Aquifer respectively. The underlying solid strata are classified as a Principal Aquifer.

4.4 Principal aquifers are highly permeable formations usually with a known or probable presence of significant fracturing. They are usually highly productive, strategic reserves able to support large abstractions, public water supply and river base flow.

4.5 Secondary Undifferentiated aquifers typically have variable characteristics and may be identified as Secondary A or B aquifers (minor or non-aquifers).

4.6 Unproductive strata have low permeability and contribute negligible flow for water supply or river base flow.

4.7 There are nine active groundwater abstraction licences within influencing distance of the site (2km). The closest is c. 500m north east of the site (NGR: 367350 394350) and is operated by J & JR Allen Ltd which is licensed to abstract 2,000,000m^3 of groundwater per year for Agricultural irrigation purposes.

4.8 The site lies within Source Protection Zone III (Total Catchment) for a major public groundwater supply located 4km north west of the site.

Soil Vulnerability Classification – Leaching Potential

4.9 The soil vulnerability classification groups the many different soil types of England and Wales into three soil vulnerability classes and six sub-classes. Each is based on the physical and chemical properties of the soil, which affect the downward passage of water and contaminants. This classification is not applied to soil above non-aquifers. Soil information for urban areas is based on fewer observations than elsewhere. A worst case vulnerability is therefore assumed until proved otherwise.

4.10 The soil in the east of the site has an intermediate leaching potential (I2), which indicates that they can possibly transmit non- or weakly adsorbed pollutants and liquid discharges but are unlikely to transmit adsorbed pollutants.

4.11 The soil in the west of the site has a low leaching potential (L), which indicates that the pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal, or they have the ability to attenuate diffuse pollutants. Lateral flow from these soils may contribute to groundwater recharge elsewhere in the catchment.

Hydrology

4.12 The nearest graded surface watercourse is the Glaze Brook, which is approximately 1.4km east of the site. This watercourse was assessed to have an overall poor quality in 2006. A number of small drains are present across the site which are not graded.

4.13 The Environment Agency maintains national flood maps based on ground levels, predicted flood levels, information on flood defences and local knowledge. The flood maps show the predicted likelihood of flooding in an area in the context of current and also the proposed land use considered in development planning.

4.14 For existing land use purposes, the likelihood of flooding is classed as very low, low, medium or high based on the Environment Agency map entitled Risk of Flooding from Rivers and Sea. The site is within a Very Low risk area. The chance of flooding each year is between less than 1 in 1000 (0.1%). The surface water flooding map shows some flooding is possible in the western areas of the site in the vicinity of the drain and existing farm buildings.

4.15 For planning purposes, the likelihood of flooding is classed as low, medium or high based on flood zones identified in National Planning Policy Guidance (2014) attached to the National Planning Policy Framework (2012) and the EA map entitled Flood Map for Planning (Rivers and Sea). The Flood Map for Planning only applies if the site is intended for redevelopment. The site is within Zone 1 and has a low probability of flooding. The chance of flooding each year is less than 0.1% (1 in 1,000).

4.16 There are seven surface water abstraction licences within 2km of the site. The closest is c. 200m north of the site (NGR 366800 394100) from an un-named artificial watercourse and is operated by UK Waste limited, which is licensed to abstract an unspecified volumes of surface water per year for industrial purposes.

5 MINING AND QUARRYING

General

5.1 Research of the mining setting is based on examination of the published topographical and geological information as described in Section 4 of this report along with other mining archive information. Examination has also been made of the Mining Instability Study of Great Britain for any evidence of past mining relating to workings other than coal.

Surface Workings

5.2 Research of topographical, geological and other archive mining records has indicated evidence of surface workings in the vicinity of the site. The LIG report records six former opencast sites within 1km of the site. The commodities worked in these areas were Peat (two locations), Sand (two locations) and Common Clay and Shale (two locations). The closest of these was located c. 470m west of the site at Silver Lane (Common Clay and Shale). All six opencast sites have now ceased operation.

Underground Workings

5.3 Published geological information indicates that this site is not in an area of underground mining. Therefore, the site is considered unlikely to be subject to any ground instability from this source and no mine entries should be present.

6 ENVIRONMENTAL SETTING AND CONSULTATIONS

Statutory Sources

6.1 Information from various statutory sources has been summarised from the LIG report prepared specifically for this site and abridged at Appendix IV. A full copy of the LIG report is available on request. The results from a site visit have also been considered as part of this assessment.

Contaminated Land Register Entries and Notices

6.2 No contaminated land entries or notices are identified within 1km of the site.

Waste Management

6.3 The LIG report identifies that the western part of the site is within a landfill operated by Biffa Ltd. This landfill has been subject to a Partial Permit surrender by consolidated notice (ref: EPR/BV7877IR/S009) and the area within the boundary of the site is now excluded. The surrender was effective from 7th August 2018 and the documents are included at Appendix VI.

6.4 Information supplied has indicated the presence of one landfill (4 records within LIG but relate to the same site) within 1km of the site boundary. There are also four Environment Agency historic recorded landfill sites, and three records of other types of waste management located within 1km of the site. The closest recorded facility of each type is shown in Tables V, VI and VII.

6.5 In addition to the recorded/licensed landfilling activities in the vicinity of the site, the possibility, although remote of there being unrecorded landfilling activities within influencing distance of the site cannot be entirely discounted. If at some time in the future, the presence of such an unrecorded landfill is revealed then its potential influence on the site may need to be investigated and dealt with as necessary.

TABLE V: Recorded Landfill Sites

Location	Details
Licenced Waste Management Facility: Risley landfill Licence Holder: Biffa Waste Services Ltd Distance from Site: Adjacent to western boundary	Site Location: Silver Lane, Risley Licence Number: Not given Authority: Environment Agency Site Category: Waste landfilling; .10T/D with capacity >25,000T excluding inert waste Licence Status: Effective.

TABLE VI: Historic Landfill Sites	
Location	**Details**
Licenced Waste Management Facility: Historic Landfill Licence Holder: Wimpey Waste Management Grid Ref: 366069 393340 Distance from Site: 716m West	Site Location: Silver Lane, Risley (Old Abbey Farm) Licence Number: EAHLD16702 Input dates: Not clear (1980's) Waste Type: Special Waste.

TABLE VII: Registered Waste Transfer Sites	
Location	**Details**
Licence Holder: Christian Salveson Food Servs t/a Salveson rec Grid Ref: 366208 392888 Distance from Site: 736 south west	Site Location: 8 Leacroft Road, Risley Industrial Estate Licence Number: X61532 Authority: EA – NW Region Site Category: Transfer Waste Type: Commercial Waste – Specifically Plastic gown covers and film, PVC food trays, Rigid Flower Containers, Solid Finished Plastics Licence Status: Lapsed, cancelled, defunct, not applicable, surrendered, cancelled.

Radon

6.6 Radon can be a hazard within built developments and especially within enclosed or confined spaces. The Health Protection Agency and British Geological Survey document "Indicative Atlas of Radon in England and Wales" (2007) provides a summary of the number of homes in a given area above the "Action Level" for radon. Although the radon atlas relates directly to measurements taken from homes or dwellings, it is also relevant to employers assessing risks for enclosed underground and ground floor work places.

6.7 The BRE document "Radon: guidance on protective measures for new buildings" (2015) provides guidance for reducing the concentration of radon in new buildings and a two stage procedure using accompanying maps needed to determine the level of protection for a given site.

6.8 These documents have been consulted and the site is shown to lie in an area where no protection against radon is needed should development of residential dwellings or new structures of similar form of construction and compartmentation occur.

Environmental Issues

6.9 The Environment Agency data via the LIG report records the following environmental issues at or in the vicinity of the site (within 250m):

- 1 No. category two (significant) pollution incidents to controlled waters (Table VIII); and
- 9 No. Integrated Pollution Prevention and Controls (Table IX);

6.10 No discharge consents, local Authority Pollution Prevention Controls or Prosecutions or Enforcements were noted.

TABLE VIII: Pollution Incidents to Controlled Waters	
Incident	**Details**
Property Type: Tip Drainage Grid Ref: 367000 393700 Distance from Site: On site	Reference: 94652578 Pollutant: Tip Leachate Incident Date: 25/11/94 Note: Poor operational practice. Holcroft Brook Incident Severity: Category 2 – Significant incident.

TABLE IX: Integrated Pollution Prevention and Controls	
Operator	**Details**
Operator: Biffa Waste Services Ltd Grid Ref: 366720 393546 Distance from Site: 179m West	Permit Reference: BV7877 Effective Date: Not supplied Description: Waste Landfilling: Any other landfill to which the 2002 landfill regulations apply. Status: Valid.
NB. All nine IPPC entries relate to this operation. Five entries are permit variations with a total of 4 entries (including the one above) being currently valid.	

Archaeology

6.11 Preliminary examination of historical maps indicate no apparent features of significant archaeological interest in the general vicinity of the site.

6.1 An archaeological Watching Brief was present during the preliminary site investigation in order to assess any potential archaeological finds. This was carried out due to the likely presence of peat and previous knowledge of nearby sites.

6.2 Artefacts recovered from the surface of the harvested area of the site consisted mostly of 18th and 19th century pottery, including Buckley type coarse red earthenware, Victorian transfer print and some refined white earthenware. Glass, slag and copper alloy were also recovered.

6.3 No other significant archaeological features were encountered during the excavation work.

Unexploded Ordnance

6.4 A Zetica regional unexploded ordnance (UXO) risk map has been reviewed. The map shows the site to be in a Low risk area.

6.5 Examination of historic plans identified ROF Risley located c. 300m south west of the site. As a result of this land use, it is possible that a risk from unexploded ordnance may exist in the area and it may be prudent to carry out a UXO specialist desk study to identify any potential higher risk areas prior to redevelopment of the site.

7 CONCEPTUAL SITE MODEL

Environmental Issues

7.1 Conclusions are drawn from the preceding information in terms of potential sources of contamination, possible receptors that may be affected by any sources of contamination and the pathways that exist between source and receptor. This basic risk assessment allows identification of the suitability of the site for its current and future use and evaluation of any potential environmental liability that may attach to the site. A description of past or existing uses and any chemicals of potential concern is attached at Appendix VII. The issues can be broadly addressed as follows: land contamination, groundwater contamination, surface water contamination, ground gases and air pollution.

7.2 The land use history has identified the following potentially significant sources of contamination both on the site and adjacent to the site.

Potentially Significant Contamination Source On Site:

1. Potential made ground.
2. Potential asbestos containing material.
3. Ground gas – Peat.

Potentially Significant Contamination Source Off Site:

4. Adjacent landfill.

7.3 As a result of the land use history presented in previous sections of this report the site may have a number of sources of contamination. For land or groundwater to be designated as polluted a linkage must exist between:

- a source of contamination capable of causing significant harm;
- human or environmental receptors; and
- a pathway by which the contamination can reach the receptor.

7.4 A diagrammatic Conceptual Site Model is presented as Drawing No. SH11739-010.

TABLE X – Conceptual Site Model		
Source (Contaminant)	**Pathway**	**Receptor**
No. 1 Made ground potentially present on site (heavy and phytotoxic metals, PAH, asbestos).	1. Inhalation. 2. Dermal contact. 3. Ingestion. 4. Surface runoff. 5. Groundwater migration. 6. Direct contact (aggressive attack).	1. Future occupiers. 2. Construction workers. 3. Groundwater. 4. Surface water. 5. Subsurface building materials [sulphur] and plastic service pipes [phenol]. 6. Flora and Fauna.
No. 2 Historic building material and made ground (asbestos).	1. Disturbance and inhalation.	1. Future occupiers. 2. Construction workers.
No. 3 Ground gas – Peat (gas).	1. Inhalation. 7. Gas migration.	1. Future occupiers. 2. Construction workers. 6. Flora and Fauna.
No. 4 Adjacent Landfill (leachate, gas).	1. Inhalation. 2. Dermal contact. 3. Ingestion. 4. Surface runoff. 5. Groundwater migration. 6. Direct contact (aggressive attack). 7. Gas migration.	1. Future occupiers. 2. Construction workers. 3. Groundwater. 4. Surface water. 5. Subsurface building materials [sulphur]and plastic service pipes [phenol]. 6. Flora and Fauna.

8 ENVIRONMENTAL RISK ASSESSMENT

Introduction

8.1 The main issues considered in the risk assessment are:

- the environmental risks identified, if any, that may have implications for the current and the proposed use of the site.
- how likely it is that the environmental risks identified may affect the site. This is considered against a background of continuation of the current use and potential for the site to be redeveloped in accordance with the proposed use.
- other areas of primary concern from a ground engineering and environmental viewpoint that may have been revealed as a result of the research carried out. These features are limited to the scope of work/research carried out and may not cover such factors as the wider planning constraints, archaeology, ecology etc.

8.2 The Model Procedures for the Management of Land Contamination (CLR 11) states that, *"**Risk** is a combination of the probability or frequency of occurrence of a defined hazard and the magnitude of the consequences of the occurrence."*

8.3 For ease of reference and understanding the risks are assessed against 3 possible levels/categories:

- **Low risk** - site considered suitable for use and environmental setting. Contaminants may be present but unlikely to have an unacceptable impact on key targets. Action unlikely to be needed;
- **Moderate risk** - site may not be suitable for use and environmental setting. Contaminants probably or certainly present and likely to have an unacceptable impact on key targets. Action may be needed in the medium term; and
- **High risk** - site probably or certainly not suitable for use and environmental setting. Contaminants probably or certainly present and very likely to have an unacceptable impact on key targets. Urgent action needed in short term.

8.4 Under each of the categories the environmental issues which have been identified have been assessed with regard to a wide range of topics including (where appropriate):

- the 'source-pathway-receptor' concept;
- the behaviour of potential contaminants within the environment;
- environmental processes;
- industrial operations and best practice;

- current environmental legislation;
- the views and practices of the environmental regulators;
- the likelihood of environmental notices, orders or other enforcement action;
- any requirements to remove waste, contaminated or hazardous materials;
- the health and safety of occupiers or neighbours;
- any redevelopment plans for the site;
- effects on the fabric of buildings caused by contamination; and
- financial and cost implications.

Qualitative Risk Assessment

8.5 From the combination of the foregoing information a qualitative assessment of the potential geo-environmental risk is provided in Table XI. Where indicated, these risks may need to be considered for any future redevelopment of the land.

8.6 The effect of the present site use on the surrounding area is assessed with regard to the possible contaminant migration from the site off site and with regard to the general environmental setting and land quality of the surrounding area in order to put the on site assessment in context.

TABLE XI – Qualitative Risk Assessment

Issue	Summary	Risk Category	
		Humans	Property/ Environment
Contamination Potential:			
Present site use.	Agricultural fields and grassland.	Low	Low
Past site use.	Agricultural fields and grassland. Some previous farm buildings that are likely to have been demolished.	Low	Low
Impact to site from past and present adjacent land uses.	Adjacent Landfill site.	Moderate	Moderate
Mining history.	A number of opencast sites in the vicinity for Peat, Sand and Common Clay and Shale.	Low	Low
Emissions, pollution incidents, discharges etc.	A pollution incident is recorded on site, but this is likely to relate to the Landfill. There are a number of Local Authority Pollution Prevention Controls within influencing distance of the site which relate to the adjacent landfill.	Low to Moderate	Low to moderate
Asbestos.	Asbestos is likely be present in the farm buildings on site. It may also be present in any made ground as a result of demolition of former buildings.	Low to Moderate	Low

TABLE XI – Qualitative Risk Assessment			
Issue	**Summary**	**Risk Category**	
		Humans	**Property/ Environment**
Other issues.	Peat is present in the eastern part of the site.	Moderate	Moderate
Environmental Sensitivity:			
Geology.	Potential Made ground overlying Peat/Till. Solid strata is Helsby Sandstone.	n/a	n/a
Groundwater vulnerability.	This sandstone underlying the site is a Principal aquifer. The closest active groundwater abstraction licences is c. 500m north east. The site is within a Total Catchment Area for a Source protection Zone.	Low	Moderate to High
Surface water vulnerability.	The nearest graded surface watercourse is the River Glaze located 1.4km east of the site. A number of small watercourses/drains are present on the site. The closest surface water abstraction licence is c. 200m north.	Low	Low to Moderate
Geological constraints:			
Made ground / superficials / solid geology	Peat is present in the east of the site and will have implications for construction on the site.	Low	Moderate – to High
Mining setting	None on site but a number of opencast sites identified in the vicinity (Peat, Sand and Common Clay and Shale).	Low	Low
Risks relating to other constraints (miscellaneous):			
Services	A HP Gas main is identified in the east of the site.	Low	Low to Moderate
Flooding.	The site does not lie within a designated floodplain.	Low	Low
Ecology.	Addressed in separate report.	-	-
Liability Issues:			
Risk of liability with past use of site.	Agricultural fields and grassland.	Low	Low
Risk of liability with current use of site.	Agricultural fields and grassland.	Low	Low
Risk of liability for proposed use of site.	Motorway Services Area.	Low	Low to Moderate
Overall Risk for Site:	**Low to Moderate**		

9 CONCLUSIONS AND RECOMMENDATIONS

9.1 Based on the available information summarised in this report, the site is considered to present an overall Low to Moderate risk from past and present use and adjacent operations.

9.2 The potential for existing contamination at the site is considered to be limited however it is possible that some made ground may be present associated with previous demolition on site. There is a risk of ground gas from the Peat deposits in the east of the site and also a risk of leachate and gas migration onto site from the adjacent landfill.

9.3 The site is situated on a Principal Aquifer and within a Source Protection Zone (Total Catchment Area). The nearest watercourse is 1.4km from the site but there are a number of small watercourses/drains on site which will provide connectivity.

9.4 The presence of Peat in the east of the site will need to be considered within development proposals.

9.5 Some preliminary information on the Peat and general ground conditions at the site has been gained from the preliminary investigation. It is likely that a contamination investigation would be required prior to redevelopment of the site to confirm the presence and extent of any made ground and/or contamination on the site and also to assess the gas risk both from the Peat and the adjacent landfill. Some minor remedial measures may be necessary depending on the nature and extent of the made ground present.

9.6 We would recommend that a more detailed geotechnical investigation is carried out to assist with detailed design for the proposed development.

9.7 Due to the sensitivity of the site it is likely that mitigation measures to protect the underlying aquifer and Source Protection Zone would be required in any development on the site.

9.8 It is recommended that a UXO specialist desk study is completed prior to redevelopment due to the proximity of ROF Risley.

APPENDIX I

Standard Terms and Conditions and Limitations to Reports

STANDARD TERMS AND CONDITIONS AND LIMITATIONS TO REPORTS

This Report is provided for the stated purpose and for the sole use of the client in accordance with the Terms and Conditions of Appointment under which the services were performed. The Report is confidential to the client and no other warranty, expressed or implied, is made as to the professional advice included in the Report or any other services provided by Wardell Armstrong LLP. This Report may not be disclosed by the Client nor relied upon by any other party without the prior and express written agreement of Wardell Armstrong LLP.

The conclusions and recommendations contained in this Report are based upon information provided by others including details supplied by the client and/or professional advisors on the assumption that all relevant information from whom it has been requested and/or supplied is accurate. Information so provided and/or supplied has not been verified independently by Wardell Armstrong LLP, unless otherwise stated in the Report.

The methodology adopted and the sources of information used by Wardell Armstrong LLP in providing the services are outlined in this Report. The work described in this Report is based on the conditions and information as stated at the date the Report was completed. The scope of this Report and the services are accordingly limited by these circumstances. The findings outlined in the Report together with any opinions expressed and recommendations made are considered to be valid and appropriate at the time of preparation and for the specific purpose or purposes intended. Whilst a walk over site visit may have been carried out as part of the work this has been limited to observations only and no other physical investigations, sampling and testing work has been carried out as part of this work.

Wardell Armstrong LLP disclaim any undertaking or obligation to advise any person of any change in any matter affecting the Report which may come or be brought to Wardell Armstrong LLP's attention after the date of the Report. Unless otherwise stated in this Report, the assessments made assume that the sites and facilities will continue to be used for their current purpose without significant changes.

Where any site observations have been carried out, these have been restricted to a level of detail required to meet the stated objectives of the services. The results from any site observations made may vary and further confirmatory work should be made after the issuance of this Report. Wardell Armstrong LLP does not guarantee or warrant any estimates or projections contained in this Report.

APPENDIX II

Guidance on Contamination and Land Quality Statements

CONTAMINATION

Environmental Protection Act Part IIA

Contaminated land was defined for the first time under Part IIA of the Environmental Protection Act 1990. Part IIA was inserted into the 1990 Act by section 57 of the *Environment Act 1*995. The regime came into effect in England on 1 April 2000, Scotland on 12 July 2000 and Wales on 15 September 2001.

Contaminated land is defined as "any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that:
(a) significant harm is being caused or there is a significant possibility of such harm being caused; or
(b) significant pollution of the water environment is being caused or there is a significant possibility of such pollution being caused."

Harm is described in the EPA 1990 as being *"harm to the health of living organisms or other interference with ecological systems of which they form part and, in the case of man, includes harm to his property".*

There are a number of important government policies and priorities underlying the Act. The first priority is to prevent the creation of new contamination by use of this Act and other controls such as Environmental Permitting (formerly regulated by Integrated Pollution Prevention and Control and Waste Management licensing). The second is to identify and remove unacceptable risks to human health and the environment. In addition there is a desire to bring contaminated land back into beneficial use whilst seeking to ensure that the cost burdens faced by individuals, companies and society as a whole are proportionate, manageable and economically sustainable.

Under Part II(a), Local Authorities are responsible for the inspection of contaminated land and for ensuring that remediation is undertaken where necessary. Local Authorities also maintain a Public Register detailing the regulatory actions that they have implemented. The Environment Agency has a complementary role andact as the enforcing Authority for designated special sites.

The policy objectives are underlain by the "suitable for use" approach to the remediation of contaminated land, which the Government considers is the most appropriate approach to

achieving sustainable development. This approach recognises that the risks presented by any given level of contamination will vary greatly on a site by site basis.

In general the responsibility for paying for remediation will, where feasible, follow the "polluter pays" principle. In the first instance, any person who caused or knowingly permitted the contaminating substance to be in, or under the land will be the appropriate person(s) to undertake the remediation and meet its costs. If it is not possible to find such a person, responsibility will pass to the current owner or occupier of the land.

Planning Regime

Land contamination, or the possibility of it, is a material consideration for the purposes of town and country planning. This means that the planning authority has to consider the potential implications of contamination both when it is developing structure or local plans and when it is considering individual applications for planning permission. Under the suitable for use approach, risks should be assessed and remediation requirements set, on the basis of both the current use and its proposed new use.

Model Procedures for the Management of Contaminated Land - CLR 11

The Model Procedures for the Management of Contaminated Land (CLR11) was published by the Environment Agency and DEFRA in September 2004. It provides a technical framework for applying a risk management process when dealing with land affected by contamination in a way that is consistent with government policies and legislation within the UK.

The approach presented is designed to be applicable to a range of regulatory and non-regulatory contexts including:

i. Development or redevelopment of land under the planning regime;
ii. Regulatory intervention under Part IIA of the EPA 1990;
iii. Voluntary investigation and remediation; and
iv. Managing potential liabilities of those responsible for individual sites or a portfolio of sites.

The definition of contaminated land is based upon the principles of risk assessment. *"Risk is a combination of the probability, or frequency, of occurrence of a defined hazard and the magnitude of the consequences of the occurrence".*

CLR 11 uses the concept of "pollutant linkage" and identifies that there are three essential

elements for any risk:

- A **contaminant** – a substance that is in, on or under the land and has the potential to cause harm or cause pollution
- A **receptor** – something that could be adversely affected by a contaminant, such as people, an ecological system, property or a water body; and
- A **pathway** – a route or means by which a receptor can be exposed to, or affected by, a contaminant.

Each of these elements can exist independently, but they only create a risk when all three are present and linked together.

CLR 11 is structured as follows:

<table>
<tr><td colspan="3">Chapter 1
Overview of Model Procedures</td></tr>
<tr><td>Chapter 2
Risk Assessment</td><td>Chapter 3
Options Appraisal</td><td>Chapter 4
Implementation of the Remediation Strategy</td></tr>
<tr><td>Preliminary Risk Assessment</td><td>Identification of feasible remediation options</td><td>Preparation of the implementation plan</td></tr>
<tr><td>Generic quantitative risk assessment</td><td>Detailed evaluation of options</td><td>Design, implementation and verification</td></tr>
<tr><td>Detailed quantitative risk assessment</td><td>Developing the remediation strategy</td><td>Long term monitoring and maintenance</td></tr>
<tr><td colspan="3">Chapter 5
References and Glossary</td></tr>
</table>

A Phase I Environmental Assessment provides the first stage of the risk assessment (Preliminary Risk Assessment in the table above). Further risk assessment (described in Chapter 2) and the subsequent sections (Chapters 3 and 4) of CLR11 are dealt with through site investigation and any subsequent remediation reports.

CLR11 defines the purpose of the Preliminary Risk Assessment to "*develop an initial **conceptual model** of the site and establish whether or not there are potentially unacceptable risks".* It identifies that during a preliminary risk assessment *"the assessor collects and reviews largely desk-based information to prepare an initial conceptual model to identify possible*

pollutant linkages. The assessor then evaluates the possible linkages, using criteria appropriate to the risk assessment context".

CLR 11 states that "*Development of the conceptual model forms the main part of preliminary risk assessment, and the model is subsequently refined or revised as more information and understanding is obtained through the risk assessment process".* The Conceptual model presents the characteristics of the site in diagrammatic or written form and shows the possible relationships between potential contaminants, pathways and receptors. This then forms the basis of the further risk assessment and any site investigation or other works.

RICS Guidance Note: Contamination, the environment and sustainability (GN13/2010)

The document is intended to provide guidance to chartered surveyors (members of RICS). It supersedes an earlier document "Contamination and its implications for Chartered Surveyors" (September 1997) which promoted the concept of a Land Quality Statement (LQS) as the written output of an environmental risk assessment.

In addition to contamination, the document provides a summary and guidance on other factors which might affect land value and environmental duties and/or liabilities. These factors assist with the overall assessment of the site and often provide valuable information to consider within the conceptual model required in CLR11. These factors include, but are not limited to, flooding and flood risk management, invasive species, mineral workings, shallow mining subsidence, natural subsidence risk and radon.

Section 11.8 of the RICS guidance note which sets out what is usually incorporated within a Land Quality Statement as follows:

- *a detailed description of the site and its location, by reference to a plan;*
- *a description of the current uses of the land and of the adjacent land;*
- *a summary of the site history, produced by reference to historical maps, archive records, and statutory, local authority and water authority registers and records;*
- *identification of potential contaminants associated with existing and previous uses, or with geological and hydrogeological features, through site investigation reports and the specialists' own observations;*
- *identification of other relevant issues, including those pertaining to archaeology, ecology, sites of special scientific interest (SSSIs), human population exposure and characteristics*

of off-site locations that could have an environmental impact or be sensitive to effects from the subject site;

- *conclusions as to:*
  - *whether remedial treatment is necessary or prudent to enable the continued use of the property for its current use without undue risk to the health of persons using the property;*
  - *whether remedial treatment is necessary or prudent to reduce the risk of damage to a third party's health or property, or damage to the environment, which may give rise to a claim for damages, prosecution or action by the appropriate regulatory authorities;*
  - *if remedial treatment is not warranted, whether a residual risk of future claims from third parties and regulatory authorities remains;*
  - *whether concern regarding the risks associated with the known or suspected presence of contamination restricts the prudent use of the property compared with its likely range of possible uses if the site were uncontaminated;*
  - *if the property is to be redeveloped for a specified purpose, how much additional expense would be incurred in investigating contamination of the property further, and in carrying out any necessary remedial work, as compared with an uncontaminated property. Estimates produced prior to intensive investigations are often extremely broad; and*
  - *whether there is a likely implication from the foregoing for the value and/or the viability of development.*

Further information is available from a range of public and professional bodies including central government, local Council and the Environment Agency. Pertinent documents for additional information include Safe Development of Housing on Contaminated Land, 2014; , Managing and Reducing Land Contamination: Guiding Principles, 2010 and the Water Framework Directive (2000/60/EC, 23 October 2000).

APPENDIX III

Sources of Information

The following principal sources of information have been consulted in the preparation of this report:

- Landmark Envirocheck report dated 26th November 2018 (*a review of information provided by Landmark Information Group Ltd who were commissioned to provide an "Envirocheck" report consisting of published historical plans, environmental data sheets and environmental sensitivity plans;*
- Ordnance Survey County and National Grid Series Plans;
- British Geological Survey published maps and memoirs;
- Environment Agency;
- Other Mining Archives including the Mining Instability Study of GB prepared by Ove Arup;
- Inhouse Wardell Armstrong archives;
- Statutory Undertakers;

APPENDIX V

Data from Landmark Report

STATUTORY SOURCES OF INFORMATION

Information from the Landmark Information Group Ltd has been summarised in the Table below.

The site sensitivity map and full copy of the Envirocheck data is available on request.

Distance from an Approximate Central Point on Site*				
Agency & Hydrological	**On Site**	**0 to 250m**	**251 to 500m**	**501 to 1000m (*up to 2km)**
BGS Groundwater Flooding Susceptibility	Yes		Yes	
Contaminated Land Register Entries and Notices				
Discharge Consents			1	1
Prosecutions Relating to Controlled Waters				
Enforcement and Prohibition Notices				
Integrated Pollution Controls				
Integrated Pollution Prevention and Control		9		2
Local Authority Integrated Pollution Prevention and Control				
Local Authority Pollution Prevention and Controls				1
Local Authority Pollution Prevention and Control Enforcements				
Nearest Surface Water Feature	Yes			
Pollution Incidents to Controlled Waters	1	2	4	3
Prosecutions Relating to Authorised Processes				
Prosecutions Relating to Controlled Waters				
Registered Radioactive Substances				
River Quality				
River Quality Biology Sampling Points				
River Quality Chemistry Sampling Points				
Substantiated Pollution Incident Register				
Water Abstractions		1	2	1 (*12)
Water Industry Act Referrals		1		
Groundwater Vulnerability	Yes			
Drift Deposits	1			
Bedrock Aquifer Designations	Yes			
Superficial Aquifer Designations	Yes			
Source Protection Zones	1			
Extreme Flooding from Rivers or Sea without Defences				
Flooding from Rivers or Sea with Defences				
Areas Benefiting from Flood Defences				
Flood Water Storage Areas				
Flood Defences				
Detailed River Network Lines				
Detailed River Network Offline Drainage				
OS Water Network Lines	7	11	42	86
Waste	**On Site**	**0 to 250m**	**251 to 500m**	**501 to 1000m (*up to 2km)**
BGS Recorded Landfill Sites				
Historic Landfill Sites				4
Integrated Pollution Control Registered Waste Sites				
Licensed Waste Management Facilities (Landfills Boundaries)	1			
Licensed Waste Management Facilities (Locations)			2	1
Local Authority Landfill Coverage	1			
Local Authority Recorded Landfill Sites				
Potentially Infilled Land (Non-Water)				3
Potentially Infilled Land (Water)				
Registered Landfill Sites			3	3
Registered Waste Transfer Sites				2
Registered Waste Treatment or Disposal Sites				1

Hazardous Substances	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2km)
Control of Major Accident Hazards Sites (COMAH)				
Explosive Sites				
Notification of Installations Handling Hazardous Substances (NIHHS)				
Planning Hazardous Substance Consents				
Planning Hazardous Substance Enforcements				
Geological	**On Site**	**0 to 250m**	**251 to 500m**	**501 to 1000m (*up to 2km)**
BGS 1:625,000 Solid Geology	Yes			
BGS Estimated Soil Chemistry	Yes	Yes	Yes	Yes
BGS Recorded Mineral Sites			1	5
BGS Urban Soil Chemistry				
BGS Urban Soil Chemistry Averages				
CBSCB Compensation District				
Coal Mining Affected Areas				
Mining Instability				
Man-Made Mining Cavities				
Natural Cavities				
Non Coal Mining Areas of Great Britain				
Potential for Collapsible Ground Stability Hazards	Yes			
Potential for Compressible Ground Stability Hazards	Yes			
Potential for Ground Dissolution Stability Hazards				
Potential for Landslide Ground Stability Hazards	Yes			
Potential for Running Sand Ground Stability Hazards	Yes			
Potential for Shrinking or Swelling Clay Ground Stability Hazards	Yes			
Radon Potential - Radon Affected Areas				
Radon Potential - Radon Protection Measures				
Industrial Land Use	**On Site**	**0 to 250m**	**251 to 500m**	**501 to 1000m (*up to 2km)**
Contemporary Trade Directory Entries		3	12	22
Fuel Station Entries				
Points of Interest - Commercial Services		1	2	8
Points of Interest - Education and Health				
Points of Interest - Manufacturing and Production		1	7	18
Points of Interest - Public Infrastructure		2		1
Points of Interest - Recreational and Environmental				
Gas Pipelines	1			1
Underground Electrical Cables				
Sensitive Land Use	**On Site**	**0 to 250m**	**251 to 500m**	**501 to 1000m (*up to 2km)**
Ancient Woodland				
Areas of Adopted Green Belt	1			
Areas of Unadopted Green Belt				
Areas of Outstanding Natural Beauty				
Environmentally Sensitive Areas				
Forest Parks				
Local Nature Reserves				
Marine Nature Reserves				
National Nature Reserves				
National Parks				
National Sensitive Areas				
Nitrate Vulnerable Zones	1			
RAMSAR Sites				
Sites of Special Scientific Interest				1
Special Areas of Conservation				1
Special Protection Areas				
World Heritage Sites				

*The distances recorded are approximate and measured from the site boundary.

** Where ‘Yes’ and ‘No’ are referred to this indicates the presence or absence of data and does not imply a potential risk or hazard.

A P P E N D I X I V

Site Visit Record

Site Ownership:	MSA	Date:	30/11/18
Project:	Motorway Services, Warrington	Visited by:	Ryan O'Neill
Job Number:	SH11739	Site Area:	Approximately 25 Hectares

Assessment Topic	Summary Note
Boundary and Access	
Type of Boundary (N,S,E and W)	N.A
Extent of boundary	Eastern boundary follows the treeline / Southern Boundary adjacent to the motorway
Location of site entrances(s)	South West Corner / Road Access by Motorway Junction
Restrictions to access	Padlocked Steel Metal Gate
Access for plant?	Gate onto slip road south west corner
Traffic issues / restrictions?	Wide road access / busy surrounding roads
Current Land Use	
Land use type	Agricultural farmland
Buildings - No., size, construction	Two steel framed open sided portal structures
Defined areas / divisions	Separated by 10m of open space
Surface type and condition	Very poor / Holes in roof / Appear structurally unstable
Approx. % of surface coverings	< 1%
Adjacent land use(s)	Quarrying to the West / Farmland East and North / Industrial and residential to the South
Noise, dust, odours & emissions	Emissions from traffic on adjacent motorway
Env. Management	Good
Fly tipping	In a few places / west central parts of site near buildings and in the south adjacent to the motorway
Structures and Services	
Notable structures	Steel framed structures
Storage Facilities e.g. tanks, bunding etc.	None
Waste management	Fly tipping in a few places
Presence of ACM in structures	None
Structural condition	Buildings in very poor condition
Settlement / Subsidence	None
Below ground structures	Pipeline (Gas) sign noted in the south east of the site / Building foundations with concrete hardstanding
Electrical substations	None
Manhole covers – Culverts?	None
Pipeline markers	South east corner adjacent to motorway
Overhead Services	None
Topography	
Abrupt changes in slope	Along embankment south west corner, following western site boundary and along the drainage path.
Overburdened slopes	No
Excavations at base of slopes (Natural?)	No
Depressions	West of building 10m small depression linked with drainage path
Mounds	No
Evidence of landslip	No
Local subsidence / settlement	No
Imported soils	No
Evidence of mining	No
Soil and Geology	
Surface soil type	None visible
Soil / rock outcrops	None

Visible geological boundaries	None
Evidence of desiccation	None
Shrinkable soils (Peat / Silt)	None
Flora and Fauna	
Vegetation cover	Farmland i.e. crops 95% of site
Quality of vegetation	Good
Trees	Trees along the eastern site boundary
Habitat suitability	Good
Presence of ponds	No ponds noted / drainage path trending north to south on site
Invasive species incl. location	N. A
Ground and surface water	
Ground saturation / ponding	None
Evidence of flooding	None
Water loving plant species	N.A
Water bodies / sources	Drainage paths
Water quality – Flow, colour.	Good
Local Knowledge	
Place / street names	Site leading onto Birchwood Way.
Local industrial records	N.A
Site history	N.A
Health and Safety	
Hazards identified	N.A
Security?	N.A
Mitigation?	N.A

Additional Notes / Sketch Plans / Photographs

- Two buildings on site surrounded by trees, more metal structures than a typical building. Both steel famed portals separated by approximately 10m of open space, both are open at either side.
- Fly tipping within the area surrounding the buildings, two 250L drums noted in this vicinity.
- General household waste noted on the south west corner of the site, near the slip road adjacent to the motorway.

APPENDIX VI

Landfill Permit

Notice of surrender and consolidation with introductory note

The Environmental Permitting (England & Wales) Regulations 2016

Biffa Waste Services Limited

Risley Landfill Site
Silver Lane
Risley
Warrington
Cheshire
WA3 6BY

Variation application number

EPR/BV7877IR/S009

Permit number

EPR/BV7877IR

Risley Landfill Site
Permit number EPR/BV7877IR

Introductory note

This introductory note does not form a part of the notice

The following notice gives notice of the surrender in part and variation of an environmental permit.

Under the Environmental Permitting (England & Wales) Regulations 2016 (schedule 5, part 1, paragraph 19) a variation may comprise a consolidated permit reflecting the variations and a notice specifying the variations included in that consolidated permit.

Schedule 1 of the notice specifies the conditions that have been varied and schedule 2 comprises a consolidated permit which reflects the variations being made. Only the variations specified in schedule 1 are subject to a right of appeal.

The partial surrender is for a non-operational area of land which is outside the engineered landfill cells. The permit is varied to amend the site plan in schedule 7 of the permit to reflect the new installation boundary after the partial surrender.

The schedules specify the changes made to the permit.

The status log of a permit sets out the permitting history, including any changes to the permit reference number.

Status log of the permit		
Description	**Date**	**Comments**
Application received	03/12/2003	Application for a non-hazardous landfill
Request for information Schedule 4 notice	10/05/2004	Additional technical detail in support of the application
Additional information received	09/06/2004 & 21/06/2004	Technical information in support of the application
Request for information Schedule 4 notice	08/12/2004	Additional technical detail in support of the application
Additional information received	22/12/2004	Technical information in support of the application
Permit determined BV7877IR	21/04/2005	Issued to Biffa Waste Services Limited
Variation determined EPR/BV7877IR/V002 (Billing ref. TP3434LX)	26/06/2008	Permit Review - variation and consolidation
Application EPR/BV7877IR/V003 (variation)	01/07/2010	Variation to amend permitted waste types
Variation determined EPR/BV7877IR/V003 (Billing ref. UP3932KC)	15/07/2010	Permitted healthcare waste type 20 01 99 added
Agency variation determined EPR/BV7877IR/V004 (Billing ref. FP3235NV)	14/05/2013	Agency variation to implement the changes introduced by IED.

Status log of the permit		
Description	**Date**	**Comments**
Application EPR/BV7877IR/V005 (variation)	Duly made 15/07/2013	Relocation of the tanker offloading point of the leachate treatment plant
Variation determined EPR/BV7877IR/V005 (Billing ref. RP3538NV)	13/09/2013	Varied permit issued.
Application EPR/BV7877IR/V008 (variation)	Duly made 08/01/2016	An application was submitted on 03/12/2015 prior to this application dated 08/01/2016. As the earlier application was not determined at the time of this permit variation issue, we have logged correspondence for this application dated 08/01/2016 as V007 and correspondence for the earlier application dated 03/12/2015 as V006.
Variation determined EPR/BV7877IR/V006 (Billing ref. WP3936RU)	01/04/2016	Financial provision amendment. Varied permit issued.
Application EPR/BV7877IR/V007 (variation)	Duly made 26/02/2016	Application for the installation and operation of Siloxane gas treatment plant. Another variation application was submitted on 08/01/2016 after this application, which was submitted on 03/12/2015. As this application was submitted before the other permit variation application, we have logged correspondence for this application using the permit reference number suffix V006 and correspondence for the later application using suffix V007. The issued permit reference numbers, as shown in the status log, have been updated so that they are in numerical order.
Additional information	Received 23/03/2016 and 04/04/2016	Additional information regarding the operation and maintenance of the Siloxane gas treatment plant.
Variation determined EPR/BV7877IR/V007	18/04/2016	Varied permit issued.
Environment Agency Landfill Sector Review Permit reviewed Variation determined EPR/BV7877IR/V008 Permit EPR/BV7877IR	22/11/2017	Varied and consolidated permit issued in modern condition format
Partial surrender application EPR/BV7877IR/S009	Duly made 11/05/2018	Application to surrender a non-operational area of land as a low risk surrender
Partial surrender determined EPR/BV7877IR/S009 (PAS billing reference MP3330QA)	07/08/18	Partial surrender notice issued as a consolidated notice

End of introductory note

Notice of surrender and consolidation

The Environmental Permitting (England and Wales) Regulations 2016

The Environment Agency in exercise of its powers under regulation 20 and 25 of the Environmental Permitting (England and Wales) Regulations 2010 accepts the surrender in part and varies

Permit number

EPR/BV7877IR

Issued to

Biffa Waste Services Limited ("the operator")

whose registered office is

Coronation Road
Cressex Business Park
High Wycombe
Buckinghamshire
HP12 3TZ

company registration number 0946107

to operate a regulated facility at

Risley Landfill Site
Silver Lane
Risley
Warrington
Cheshire
WA3 6BY

to the extent set out in the schedules.

The notice shall take effect from 07/08/2018

Name	Date
Anne Nightingale	**07/08/2018**

Authorised on behalf of the Environment Agency

Schedule 1

The following conditions were varied as a result of the application made by the operator:

The site plan in schedule 7 of the permit.

Schedule 2 – consolidated permit

Consolidated permit issued as a separate document.

Permit

The Environmental Permitting (England and Wales) Regulations 2016

Permit number

EPR/BV7877IR

This is the consolidated permit referred to in the surrender and consolidation notice for application EPR/BV7877IR/S009 authorising,

Biffa Waste Services Limited ("the operator"),

whose registered office is

Coronation Road
Cressex Business Park
High Wycombe
Buckinghamshire
HP12 3TZ

company registration number 0946107

to operate a regulated facility at

Risley Landfill Site
Silver Lane
Risley
Warrington
Cheshire
WA3 6BY

to the extent authorised by and subject to the conditions of this permit.

Name	Date
Anne Nightingale	**07/08/2018**

Authorised on behalf of the Environment Agency

Conditions

1 Management

1.1 General management

1.1.1 The operator shall manage and operate the activities:

(a) in accordance with a written management system that identifies and minimises risks of pollution, including those arising from operations, maintenance, accidents, incidents, non-conformances, closure and those drawn to the attention of the operator as a result of complaints; and

(b) using sufficient competent persons and resources.

1.1.2 Records demonstrating compliance with condition 1.1.1 shall be maintained.

1.1.3 Any person having duties that are or may be affected by the matters set out in this permit shall have convenient access to a copy of it kept at or near the place where those duties are carried out.

1.1.4 The operator shall comply with the requirements of an approved competence scheme.

1.2 Finance

1.2.1 The financial provision for meeting the obligations under this permit set out in the agreement made between the operator and the Environment Agency dated 21 April 2005 shall be maintained by the operator throughout the subsistence of this permit and the operator shall produce evidence of such provision whenever required by the Environment Agency.

1.2.2 The operator shall ensure that the charges it makes for the disposal of waste in the landfill cover all of the following:

(a) the costs of setting up and operating the landfill;

(b) the costs of the financial provision required by condition 1.2.1; and

(c) the estimated costs for the closure and aftercare of the landfill.

1.3 Energy efficiency

1.3.1 The operator shall:

(a) take appropriate measures to ensure that energy is used efficiently in the activities;

(b) Review and record at least every four years whether there are suitable opportunities to improve the energy efficiency of the activities; and

(c) Implement any appropriate measures identified by a review.

1.4 Efficient use of raw materials

1.4.1 The operator shall:

(a) take appropriate measures to ensure that raw materials and water are used efficiently in the activities;

(b) maintain records of raw materials and water used in the activities;

(c) review and record at least every four years whether there are suitable alternative materials that could reduce environmental impact or opportunities to improve the efficiency of raw material and water use; and

(d) take any further appropriate measures identified by a review.

1.5 Avoidance, recovery and disposal of wastes produced by the activities

1.5.1 The operator shall:

(a) take appropriate measures to ensure that waste produced by the activities is avoided or reduced, or where waste is produced it is recovered wherever practicable or otherwise disposed of in a manner which minimises its impact on the environment;

(b) review and record at least every four years whether changes to those measures should be made; and

(c) take any further appropriate measures identified by a review.

2 Operations

2.1 Permitted activities

2.1.1 The operator is only authorised to carry out the activities specified in schedule 1, table S1.1 (the "activities").

2.2 The site

2.2.1 The activities shall not extend beyond the site, being the land shown edged in green on the site plan at schedule 7 to this permit.

2.3 Operating techniques

2.3.1 The activities shall, subject to the conditions of this permit, be operated using the techniques and in the manner described in the documentation specified in schedule 1, table S1.2, unless otherwise agreed in writing by the Environment Agency.

2.3.2 If notified by the Environment Agency that the activities are giving rise to pollution, the operator shall submit to the Environment Agency for approval within the period specified, a revision of any plan or other documentation ("plan") specified in schedule 1, table S1.2 or otherwise required under this permit which identifies and minimises the risks of pollution relevant to that plan , and shall implement the approved revised plan in place of the original from the date of approval, unless otherwise agreed in writing by the Environment Agency.

2.4 Improvement programme

2.4.1 The operator shall complete the improvements specified in schedule 1, table S1.3 by the date specified in that table unless otherwise agreed in writing by the Environment Agency.

2.5 Landfill Engineering

2.5.1 No construction of any new cell of the landfill shall commence until the operator has submitted construction proposals and the Environment Agency has confirmed that it is satisfied with the construction proposals.

2.5.2 Where the operator proposes to construct any new cell other than the first cell, but proposes no change from the design of the most recently approved cell which could have any impact on the performance of any element of the design, no construction of the new cell shall commence until the operator has submitted a cell layout drawing and the Environment Agency has confirmed that it is satisfied with the cell layout drawing.

2.5.3 The construction of a new cell shall take place only in accordance with the approved construction proposals unless:

(a) any change to the approved construction proposals would have no impact on the performance of any element of the design; or

(b) a change has otherwise been agreed in writing by the Environment Agency.

2.5.4 No disposal of waste shall take place in a new cell until the operator has submitted a CQA Validation Report and the Environment Agency has confirmed that it is satisfied with the CQA Validation Report.

2.5.5 No construction of landfill infrastructure shall commence until the operator has submitted relevant construction proposals or a written request to use previous construction proposals and the Environment Agency has confirmed that it is satisfied with the construction proposals.

2.5.6 The construction of the landfill infrastructure shall take place only in accordance with the approved construction proposals unless:

(a) any change to the approved construction proposals would have no impact on the performance of any element of the design; or

(b) a change has otherwise been agreed in writing by the Environment Agency.

2.5.7 The operator shall submit a CQA Validation Report within four weeks of the completion of the construction of the relevant landfill infrastructure, or other time period agreed in writing with the Environment Agency.

2.5.8 Where pollution controls are immediately necessary to prevent an incident or accident, then conditions 2.5.5 and 2.5.6 do not apply and the relevant landfill infrastructure may be constructed, provided that the construction proposals are submitted to the Environment Agency as soon as practicable.

2.5.9 For the purposes of conditions 2.5.1, 2.5.2, 2.5.4 and 2.5.5, the Environment Agency shall be deemed to be satisfied where it has not, within the period of four weeks from the date of receipt of the relevant construction proposals or CQA Validation Report, either:

(a) confirmed whether or not it is satisfied; or

(b) informed the operator that it requires further information.

2.5.10 Where the Environment Agency has required further information under condition 2.5.9(b), the Environment Agency shall be deemed to be satisfied where it has not, within the period of four weeks from the date of receipt of the further information, either:

(a) confirmed whether or not it is satisfied; or

(b) informed the operator that it requires further information.

2.6 Waste acceptance

2.6.1 For the following activities referenced in schedule 1, table S1.1(A1) Wastes shall only be accepted for disposal if:

(a) they are listed in schedule 2, table S2.1; and

(b) they are non- hazardous waste; and

(c) they are not whole used tyres (other than bicycle tyres and tyres with an outside diameter of more than 1400mm); and

(d) they are not shredded used tyres; and

(e) they are not liquid waste (including waste waters but excluding sludge[and excluding liquid waste accepted at a permitted leachate treatment activity); and

(f) they are not chemical substances from research and development or teaching activities, for example laboratory residues, which are unidentified and/or which are new and whose effects on man and/or the environment are unknown; and

(g) all the relevant waste acceptance procedures have been completed; and

(h) they fulfil the relevant waste acceptance criteria; and

(i) they have not been diluted or mixed solely to meet the relevant waste acceptance criteria; and

(j) they are wastes which have been treated, except for: inert wastes for which treatment is not technically feasible; or it is waste other than inert waste and treatment would not reduce its quantity or the hazards which it poses to human health or the environment, [or liquid waste accepted for treatment at a permitted leachate treatment activity]; and

(k) they are wastes with a code beginning with 07 05 and 16 03, they shall exclude waste medicinal products and pharmaceutically active waste materials arising from their manufacture.

2.6.2 For the following activities referenced in schedule 1, table S1.1(A2 and A4) waste shall only be accepted for treatment if:

(a) it is of a type and quantity listed in schedule 2, table S2.2; and

(b) it conforms to the description in the documentation supplied by the producer and holder.

2.6.3 For the following activities referenced in schedule 1, table S1.1(A3) waste shall only be accepted for treatment if:

(a) it is of a type and quantity listed in schedule 2, table S2.4; and

(b) it conforms to the description in the documentation supplied by the producer and holder.

2.6.4 Wastes shall only be accepted for restoration where:

(a) they are listed in schedule 2, table S2.3; and

(b) they are accepted in accordance with a restoration plan approved in writing by the Environment Agency.

2.6.5 The operator shall:

(a) visually inspect without unloading it, waste that is not in an enclosed container or enclosed vehicle on arrival at the landfill and waste at the point of deposit; and

(b) be satisfied that the waste conforms to the requirements of condition 2.6.1.

2.6.6 Where the operator has taken samples to establish that the waste is in conformity with the documentation submitted by the holder then the samples taken shall be retained for at least one month and results of any analysis for at least two years.

2.6.7 The operator on accepting each delivery of waste shall provide a receipt to the person delivering it.

2.6.8 The total quantity of waste that shall be deposited in the landfill shall be limited by the pre-settlement levels shown on drawing ESID6 (R3230700) dated 03.12.03.

2.6.9 The quantity of waste that is deposited in the landfill in any year shall not exceed the limits in schedule 1, table S1.4.

2.6.10 The operator shall maintain and implement a system which ensures that a record is made of the quantity, characteristics, date of delivery and, where practicable, origin of any waste that is received for disposal or recovery and of the identity of the producer, or in the case of municipal waste and multiple collection vehicles, of the collector of such waste. Any information regarded by the operator as commercially confidential shall be clearly identified in the record.

2.7 Leachate levels

2.7.1 The limits for the level of leachate listed in schedule 3, table S3.1 shall not be exceeded.

2.8 Closure and aftercare

2.8.1 The operator shall maintain a closure and aftercare management plan.

2.9 Landfill gas management

2.9.1 The operator shall take appropriate measures, including, but not limited to, those specified in any approved landfill gas management plan, to:

(a) collect landfill gas; and

(b) control the migration of landfill gas.

2.9.2 The operator shall use the collected landfill gas to produce energy. If the collected landfill gas cannot be used to produce energy, the operator shall use appropriate measures to flare or treat the gas in accordance with an approved landfill gas management plan.

2.9.3 The operator shall:

(a) if notified by the Environment Agency, submit to the Environment Agency for approval within the period specified, a revised landfill gas management plan;

(b) implement the revised landfill gas management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

3 Emissions and monitoring

3.1 Emissions to water, air or land

3.1.1 The limits in schedule 3 shall not be exceeded.

3.1.2 There shall be no point source emissions to water, air or land except from the sources and emission points listed in schedule 3, tables S3.2, S3.3 and S3.6.

3.1.3 The limits given in schedule 3, table S3.2 shall not be exceeded, save that compliance with an emission limit in that table shall include incorporation of the uncertainty allowance stated in Environment Agency guidance LFTGN 05 and LFTGN 08.

3.1.4 The operator shall prevent the input of any hazardous substances from the activities into groundwater.

3.1.5 The operator shall submit to the Environment Agency a review of the Hydrogeological Risk Assessment:

(a) between nine and six months prior to the fourth anniversary of the granting of the permit; and

(b) between nine and six months prior to every subsequent six years after the fourth anniversary of the granting of the permit.

3.1.6 For the following activities referenced in schedule 1, table S1.1 (A2, A3 and A4) Periodic monitoring shall be carried out at least once every 5 years for groundwater and 10 years for soil, unless such monitoring is based on systematic appraisal of the risk of contamination.

(a)

3.2 Emissions of substances not controlled by emission limits

3.2.1 Emissions of substances not controlled by emission limits (excluding odour) shall not cause pollution. The operator shall not be taken to have breached this condition if appropriate measures, including, but not limited to, those specified in any approved emissions management plan, have been taken to prevent or where that is not practicable, to minimise, those emissions.

3.2.2 The operator shall:

(a) if notified by the Environment Agency that the activities are giving rise to pollution, submit to the Environment Agency for approval within the period specified, an emissions management plan which identifies and minimises the risks of pollution from emissions of substances not controlled by emission limits;

(b) implement the approved emissions management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

3.2.3 All liquids in containers, whose emission to water or land could cause pollution, shall be provided with secondary containment, unless the operator has used other appropriate measures to prevent or where that is not practicable, to minimise, leakage and spillage from the primary container.

3.3 Odour

3.3.1 Emissions from the activities shall be free from odour at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Environment Agency, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved odour management plan, to prevent or where that is not practicable to minimise the odour.

3.3.2 The operator shall:

(a) if notified by the Environment Agency that the activities are giving rise to pollution outside the site due to odour, submit to the Environment Agency for approval within the period specified, an odour management plan which identifies and minimises the risks of pollution from odour;

(b) implement the approved odour management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

3.4 Noise and vibration

3.4.1 Emissions from the activities shall be free from noise and vibration at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Environment Agency, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved noise and vibration management plan to prevent or where that is not practicable to minimise the noise and vibration.

3.4.2 The operator shall:

(a) if notified by the Environment Agency that the activities are giving rise to pollution outside the site due to noise and vibration, submit to the Environment Agency for approval within the period specified, a noise and vibration management plan which identifies and minimises the risks of pollution from noise and vibration;

(b) implement the approved noise and vibration management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

3.5 Monitoring

3.5.1 The operator shall, unless otherwise agreed in writing by the Environment Agency, undertake the monitoring and any other actions specified in the following tables in schedule 3 to this permit:

(a) Leachate specified in tables S3.1 and S3.10;

(b) Point source emissions specified in tables S3.2, S3.3 and S3.6;

(c) Groundwater specified in tables S3.4 and S3.8;

(d) Landfill gas specified in tables S3.5, S3.7 and S3.9; and

(e) Surface water specified in table S3.11.

3.5.2 The operator shall maintain records of all monitoring required by this permit including records of the taking and analysis of samples, instrument measurements (periodic and continual), calibrations, examinations, tests and surveys and any assessment or evaluation made on the basis of such data.

3.5.3 A topographical survey of the site referenced to ordnance datum shall be carried out and shall be used to produce a plan of a scale adequate to show the surveyed features of the site:

(a) Annually; and

(b) prior to the disposal of waste in any new cell or new development area of the landfill; and

(c) following closure of the landfill or part of the landfill.

3.6 Pests

3.6.1 The activities shall not give rise to the presence of pests which are likely to cause pollution, hazard or annoyance outside the boundary of the site. The operator shall not be taken to have breached this condition if appropriate measures, including, but not limited to, those specified in any approved pests management plan, have been taken to prevent or where that is not practicable, to minimise the presence of pests on the site.

3.6.2 The operator shall:

(a) if notified by the Environment Agency, submit to the Environment Agency for approval within the period specified, a pests management plan which identifies and minimises risks of pollution hazard or annoyance from pests;

(b) implement the pests management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

4 Information

4.1 Records

4.1.1 All records required to be made by this permit shall:

(a) be legible;

(b) be made as soon as reasonably practicable;

(c) if amended, be amended in such a way that the original and any subsequent amendments remain legible, or are capable of retrieval; and

(d) be retained, unless otherwise agreed in writing by the Environment Agency, for at least 6 years from the date when the records were made, or in the case of the following records until permit surrender:

(i) the results of groundwater monitoring;

(ii) sub-surface landfill gas monitoring;

(iii) leachate levels, quality and quantities;

(iv) landfill gas generation and collection;

(v) waste types and quantities; and

(vi) the specification and as built drawings of the basal, sidewall and capping engineering systems.

4.1.2 The operator shall keep on site all records, plans and the management system required to be maintained by this permit, unless otherwise agreed in writing by the Environment Agency.

4.2 Reporting

4.2.1 The operator shall send reports and notifications required by the permit to the Environment Agency using the contact details supplied in writing by the Environment Agency.

4.2.2 A report or reports on the performance of the activities over the previous year ('the annual report') shall be submitted to the Environment Agency by 31st January each year or such other date as may be agreed in writing by the Agency, with the exception of 4.2.2(c) that must be provided by the end of February each year. The report(s) shall include as a minimum:

(a) a review of the results of the monitoring and assessment carried out in accordance with this permit against the relevant assumptions, parameters and results in the risk assessments submitted in relation to this installation and any agreed amendments thereto. The review will include written descriptions of the improvements made to operational performance during the year, action plans developed and planned improvements for the coming year;

(b) the energy consumed at the site, reported in the format set out in schedule 4 table S4.3

(c) the annual production/treatment set out in schedule 4, table S4.2;

(d) the topographical surveys required by condition 3.5.3 other than those submitted as part of a CQA validation report;

(e) the volumetric difference (reported in cubic metres) between the most recent topographical survey and the previous annual topographical survey i.e. the additional volume of the landfill void that is occupied by waste;

(f) an assessment of the settlement behaviour of the landfill body based on the difference between the most recent topographical survey and previous annual topographical survey for the areas of the landfill which did not receive waste between the surveys;

(g) a calculation of the remaining capacity (reported in cubic metres) derived from the pre-settlement contours and the most recent topographical survey;

(h) a plan(s) ('the monitoring and extraction point plan – MEPP') showing the locations of existing and any new leachate and landfill gas extraction and monitoring points.

4.2.3 Within 28 days of the end of the reporting period the operator shall, unless otherwise agreed in writing by the Environment Agency, submit reports of the monitoring and assessment carried out in accordance with the conditions of this permit, as follows:

(a) in respect of the parameters and emission points specified in schedule 4, table S4.1;

(b) using the forms specified in schedule 4, table S4.4 or other reporting format as agreed in writing with the Environment Agency; and

(c) giving the information from such results and assessments as may be required by the forms specified in those tables.

4.2.4 Within one month of the end of each quarter, the operator shall submit to the Environment Agency using the form made available for the purpose, the information specified on the form relating to the site and the waste accepted and removed from it during the previous quarter.

4.2.5 The operator shall, unless notice under this condition has been served within the preceding four years, submit to the Environment Agency, within six months of receipt of a written notice, a report assessing whether there are other appropriate measures that could be taken to prevent, or where that is not practicable, to minimise pollution.

4.3 Notifications

4.3.1 In the event:

(a) that the operation of the activities gives rise to an incident or accident which significantly affects or may significantly affect the environment, the operator must immediately—

(i) inform the Environment Agency;

(ii) take the measures necessary to limit the environmental consequences of such an incident or accident; and

(iii) take the measures necessary to prevent further possible incidents or accidents.

(b) of a breach of any permit condition the operator must immediately—

(i) inform the Environment Agency; and

(ii) take the measures necessary to ensure that compliance is restored within the shortest possible time.

(c) of a breach of permit condition which poses an immediate danger to human health or threatens to cause an immediate significant adverse effect on the environment, the operator must immediately suspend the operation of the activities or the relevant part of it until compliance with the permit conditions has been restored.

4.3.2 Any information provided under condition 4.3.1 (a)(i), or 4.3.1 (b)(i) where the information relates to the breach of a limit specified in the permit, shall be confirmed by sending the information listed in schedule 5 to this permit within the time period specified in that schedule.

4.3.3 The Environment Agency shall be notified within 14 days of the occurrence of the following matters, except where such disclosure is prohibited by Stock Exchange rules:

Where the operator is a registered company:

(a) any change in the operator's trading name, registered name or registered office address; and

(b) any steps taken with a view to the operator going into administration, entering into a company voluntary arrangement or being wound up.

Where the operator is a corporate body other than a registered company:

(a) any change in the operator's name or address; and

(b) any steps taken with a view to the dissolution of the operator.

In any other case:

(c) the death of any of the named operators (where the operator consists of more than one named individual);

(d) any change in the operator's name(s) or address(es); and

(e) any steps taken with a view to the operator, or any one of them, going into bankruptcy, entering into a composition or arrangement with creditors, or, in the case of them being in a partnership, dissolving the partnership.

4.3.4 Where the operator proposes to make a change in the nature or functioning, or an extension of the activities, which may have consequences for the environment and the change is not otherwise the subject of an application for approval under the Regulations or this permit:

(a) the Environment Agency shall be notified at least 14 days before making the change; and

(b) the notification shall contain a description of the proposed change in operation.

4.4 Interpretation

4.4.1 In this permit the expressions listed in schedule 6 shall have the meaning given in that schedule.

4.4.2 In this permit references to reports and notifications mean written reports and notifications, except where reference is made to notification being made "immediately", in which case it may be provided by telephone.

Schedule 1 – Operations

Table S1.1 activities				
Activity reference	**WFD Annex I and II operations (where applicable)**	**Activity listed in Schedule 1 of the EP Regulations**	**Description of specified activity**	**Limits of specified activity**
A1	D5 – Specially engineered landfill for non-hazardous waste and R10 – Land treatment resulting in benefit to agriculture or ecology.	Section 5.2 Part A(1)(a), The disposal of waste in a landfill.	Landfill for non-hazardous waste and landfill restoration	Receipt, handling, storage and disposal of wastes, consisting of the types and quantities specified in conditions 2.6, as an integral part of landfilling.
A2	D8 – Biological treatment of waste for the purpose of disposal.	Section 5.3A(1)(a)(i) Biological treatment of hazardous waste.	Treatment of hazardous leachate in a facility with a capacity of >10 tonnes/day	Biological treatment of hazardous leachate arising from the permitted landfill, Risley III and other hazardous liquid wastes in a sequence batch reactor. Receipt, storage, tankering and treatment of hazardous leachate, consisting of the types and quantities specified in Schedule 2 Table S2.2 to point of entry to sewer.
A3	D8 – Biological treatment of waste for the purpose of disposal and R10 – Land treatment resulting in benefit to agriculture or ecology.	Section 5.3A(1)(a)(i) Biological treatment of hazardous waste.	Treatment of hazardous soils in a facility with a capacity of >10 tonnes/day	Biological treatment of hazardous soils in a bio-pile treatment process for recovery and disposal. Handling, Storage and Treatment of hazardous waste soils, consisting of the types and quantities specified in Schedule 2 Table S2.4 to produce soils for restoration or as daily cover.
A4	D8 – Biological treatment of waste for the purpose of disposal.	Section 5.4 A(1)(a)(i) Biological treatment of non-hazardous waste.	Treatment of non-hazardous leachate in a facility with a capacity of >50 tonnes/day	Biological treatment of non-hazardous leachate arising from the permitted landfill, Risley III and other non-hazardous liquid wastes in a sequence batch reactor. Receipt, storage, tankering and treatment of non-hazardous leachate, consisting of the types and quantities specified in Schedule 2 Table S2.2 to point of entry to sewer.

Table S1.1 activities				
Activity reference	**WFD Annex I and II operations (where applicable)**	**Activity listed in Schedule 1 of the EP Regulations**	**Description of specified activity**	**Limits of specified activity**
Directly Associated Activities				
A5	R1 – use principally as a fuel to generate energy		Pre-treatment and utilisation of landfill gas for energy recovery in an appliance with a rated thermal input <50MW	Treatment and utilisation of landfill gas arising from the permitted landfill and Risley III
A6	N/A	-	Flaring of landfill gas for disposal in an appliance.	Flaring of landfill gas arising from the permitted landfill and Risley III.
A7	N/A	-	Secondary pre-treatment of landfill gas to remove Siloxanes and other trace impurities using filter medium.	Secondary treatment of landfill gas arising from the permitted landfill and Risley III using PpTek Siloxane removal system and vent air burner (enclosed flare).
A8	D6 – release to controlled waters	-	Discharges of site drainage from the landfill.	From surface water management system to point of entry to controlled waters.
A9	N/A	-	Storage of fuel for operation of plant and equipment.	Fuel storage tank.

Table S1.2 Operating Techniques		
Description	**Parts**	**Date Received**
Application	The response to questions 1.2, 2.1, 2.2, 2.3, 2.4 and 2.5 in part B of the Application Form excluding: Sections 1.1.17 Drawing ESID 7a; 1.1.20 and 1.1.25 Drawing ESID 8; 1.1.28 and 1.1.30 Drawing ESID 11; Sections 1.2.27; 2.3.9; 2.3.38; 2.3.42; 2.3.43; 2.3.78; 3.1.3 to 3.1.18 (inclusive).	03/12/2003
Meeting dated 14/04/2004	All parts	Response dated 20/04/2004
Request for information	All parts	Responses dated; 04/05/2004, 23/07/2004, 09/02/2005, 16/02/2005, 03/03/2005, 08/03/2005,

Table S1.2 Operating Techniques		
Description	**Parts**	**Date Received**
		14/03/2005, 19/04/2005.
Response to Schedule 4 Notice dated 10/05/2004	All parts	Responses dated 09/06/2004 and 21/06/2004
Response to Schedule 4 Notice dated 08/12/2004	All parts except air dispersion modelling	Response dated 22/12/2004
Request for information condition 1.4.1.13 of permit BV7877IR	All parts	Response date 10/02//2006
Request for information condition 1.4.1.14 of permit BV7877IR	None	Response dated 20/06/2005
Request for information condition 1.4.1.15 of permit BV7877IR	All parts	Response dated 18/05//2005
Request for information condition 2.2.4.8 of permit BV7877IR	None	Response dated 21/07/2005
Request for information condition 2.2.4.9 of permit BV7877IR	Landfill gas monitoring plan and location of new extraction system between BH33 and BH35.	Response dated 17/10/2005
Variation Application EPR/BV7877IR/V005	Responses to questions in parts C2 and C3 of the variation application including supporting documents.	Response dated 15/07/2013
Request for information (email dated 08/08/2013)	Responses to questions 1 and 2.	Response dated 08/08/2013
Variation Application EPR/BV7877IR/V006	Variation supporting statement, Air Dispersion Model document, Accident/Environmental Risk Assessment.	Response dated 26/02/2016
Request for information (emails dated 22/03/2016 and 24/03/2016)	Responses to questions 1) a), b) and c) of email dated 23/03/2016 and responses to questions 1 d) and 3 of email dated 04/04/2016, regarding operation and maintenance of the Siloxane treatment plant.	Responses dated 23/03/2016 and 04/04/2016

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
1	The operator shall submit a revised site plan which amends the installation boundary to include the private piped connection for leachate between the site boundary and the private sewer.	28/02/2018
2	The operator shall submit to the Environment Agency in writing for approval waste acceptance criteria for leachate accepted from offsite.	28/02/2018

Table S1.4 Annual waste input limits	
Category	**Limit Tonnes/ Year**
Non-hazardous waste	0
Waste for restoration	200,000
Leachate from offsite accepted at the onsite Leachate Treatment Plant	164,250

Schedule 2 – List of permitted wastes

Table S2.1 Permitted waste types for disposal at a landfill for non-hazardous waste	
Waste code	**Description**
01	**Wastes resulting from exploration, mining, quarrying, and physical and chemical treatment of minerals**
01 01	**wastes from mineral excavation**
01 01 01	wastes from mineral metalliferous excavation
01 01 02	wastes from mineral non-metalliferous excavation
01 03	**wastes from physical and chemical processing of metalliferous minerals**
01 03 06	tailings other than those mentioned in 01 03 04 and 01 03 05
01 03 08	dusty and powdery wastes other than those mentioned in 01 03 07
01 03 09	red mud from alumina production other than the wastes mentioned in 01 03 10
01 04	**wastes from physical and chemical processing of non-metalliferous minerals**
01 04 08	waste gravel and crushed rocks other than those mentioned in 01 04 07
01 04 09	waste sand and clays
01 04 10	dusty and powdery wastes other than those mentioned in 01 04 07
01 04 11	wastes from potash and rock salt processing other than those mentioned in 01 04 07
01 04 12	tailings and other wastes from washing and cleaning of minerals other than those mentioned in 01 04 07 and 01 04 11
01 04 13	wastes from stone cutting and sawing other than those mentioned in 01 04 07
01 05	**drilling muds and other drilling wastes**
01 05 04	freshwater drilling muds and wastes
01 05 07	barite-containing drilling muds and wastes other than those mentioned in 01 05 05 and 01 05 06
01 05 08	chloride-containing drilling muds and wastes other than those mentioned in 01 05 05 and 01 05 06
02	**Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing, food preparation and processing**
02 01	**wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing**
02 01 01	sludges from washing and cleaning
02 01 02	animal-tissue waste
02 01 03	plant-tissue waste
02 01 04	waste plastics (except packaging)
02 01 06	animal faeces, urine and manure (including spoiled straw), effluent, collected separately and treated off-site
02 01 07	wastes from forestry
02 01 09	agrochemical waste other than those mentioned in 02 01 08
02 01 10	waste metal
02 02	**wastes from the preparation and processing of meat, fish and other foods of animal origin**

Table S2.1 Permitted waste types for disposal at a landfill for non-hazardous waste	
Waste code	**Description**
02 02 01	sludges from washing and cleaning
02 02 03	materials unsuitable for consumption or processing
02 02 04	sludges from on-site effluent treatment
02 03	**wastes from fruit, vegetables, cereals, edible oils, cocoa, coffee, tea and tobacco preparation and processing; conserve production; yeast and yeast extract production, molasses preparation and fermentation**
02 03 01	sludges from washing, cleaning, peeling, centrifuging and separation
02 03 02	wastes from preserving agents
02 03 03	wastes from solvent extraction
02 03 04	materials unsuitable for consumption or processing
02 03 05	sludges from on-site effluent treatment
02 04	**wastes from sugar processing**
02 04 01	soil from cleaning and washing beet
02 04 02	off-specification calcium carbonate
02 04 03	sludges from on-site effluent treatment
02 05	**wastes from the dairy products industry**
02 05 01	materials unsuitable for consumption or processing
02 05 02	sludges from on-site effluent treatment
02 06	**wastes from the baking and confectionery industry**
02 06 01	materials unsuitable for consumption or processing
02 06 02	wastes from preserving agents
02 06 03	sludges from on-site effluent treatment
02 07	**wastes from the production of alcoholic and non-alcoholic beverages (except coffee, tea and cocoa)**
02 07 01	wastes from washing, cleaning and mechanical reduction of raw materials
02 07 02	wastes from spirits distillation
02 07 03	wastes from chemical treatment
02 07 04	materials unsuitable for consumption or processing
02 07 05	sludges from on-site effluent treatment
03	**Wastes from wood processing and the production of panels and furniture, pulp, paper and cardboard**
03 01	**wastes from wood processing and the production of panels and furniture**
03 01 01	waste bark and cork
03 01 05	sawdust, shavings, cuttings, wood, particle board and veneer other than those mentioned in 03 01 04
03 03	**wastes from pulp, paper and cardboard production and processing**
03 03 01	waste bark and wood
03 03 02	green liquor sludge (from recovery of cooking liquor)
03 03 05	de-inking sludges from paper recycling
03 03 07	mechanically separated rejects from pulping of waste paper and cardboard

Table S2.1 Permitted waste types for disposal at a landfill for non-hazardous waste	
Waste code	**Description**
03 03 08	wastes from sorting of paper and cardboard destined for recycling
03 03 09	lime mud waste
03 03 10	fibre rejects, fibre-, filler- and coating-sludges from mechanical separation
03 03 11	sludges from on-site effluent treatment other than those mentioned in 03 03 10
04	**Wastes from the leather, fur and textile industries**
04 01	**wastes from the leather and fur industry**
04 01 01	fleshings and lime split wastes
04 01 02	liming waste
04 01 06	sludges, in particular from on-site effluent treatment containing chromium
04 01 07	sludges, in particular from on-site effluent treatment free of chromium
04 01 08	waste tanned leather (blue sheetings, shavings, cuttings, buffing dust) containing chromium
04 01 09	wastes from dressing and finishing
04 02	**wastes from the textile industry**
04 02 09	wastes from composite materials (impregnated textile, elastomer, plastomer)
04 02 10	organic matter from natural products (for example grease, wax)
04 02 15	wastes from finishing other than those mentioned in 04 02 14
04 02 17	dyestuffs and pigments other than those mentioned in 04 02 16
04 02 20	sludges from on-site effluent treatment other than those mentioned in 04 02 19
04 02 21	wastes from unprocessed textile fibres
04 02 22	wastes from processed textile fibres
05	**Wastes from petroleum refining, natural gas purification and pyrolytic treatment of coal**
05 01	**wastes from petroleum refining**
05 01 10	sludges from on-site effluent treatment other than those mentioned in 05 01 09
05 01 13	boiler feedwater sludges
05 01 14	wastes from cooling columns
05 01 16	sulphur-containing wastes from petroleum desulphurisation
05 01 17	bitumen
05 06	**wastes from the pyrolytic treatment of coal**
05 06 04	waste from cooling columns
05 07	**wastes from natural gas purification and transportation**
05 07 02	wastes containing sulphur
06	**Wastes from inorganic chemical processes**
06 03	**wastes from the MFSU of salts and their solutions and metallic oxides**
06 03 14	solid salts and solutions other than those mentioned in 06 03 11 and 06 03 13
06 03 16	metallic oxides other than those mentioned in 06 03 15
06 09	**wastes from the MSFU of phosphorous chemicals and phosphorous chemical processes**

Table S2.1 Permitted waste types for disposal at a landfill for non-hazardous waste	
Waste code	**Description**
06 09 02	phosphorous slag
06 09 04	calcium-based reaction wastes other than those mentioned in 06 09 03
06 11	**wastes from the manufacture of inorganic pigments and opacificiers**
06 11 01	calcium-based reaction wastes from titanium dioxide production
06 13	**wastes from inorganic chemical processes not otherwise specified**
06 13 03	carbon black
07	**Wastes from organic chemical processes**
07 01	**wastes from the manufacture, formulation, supply and use (MFSU) of basic organic chemicals**
07 01 12	sludges from on-site effluent treatment other than those mentioned in 07 01 11
07 02	**wastes from the MFSU of plastics, synthetic rubber and man-made fibres**
07 02 12	sludges from on-site effluent treatment other than those mentioned in 07 02 11
07 02 13	waste plastic
07 02 15	wastes from additives other than those mentioned in 07 02 14
07 02 17	waste containing silicones other than those mentioned in 07 02 16
07 03	**wastes from the MFSU of organic dyes and pigments (except 06 11)**
07 03 12	sludges from on-site effluent treatment other than those mentioned in 07 03 11
07 04	**wastes from the MFSU of organic plant protection products (except 02 01 08 and 02 01 09), wood preserving agents (except 03 02) and other biocides**
07 04 12	sludges from on-site effluent treatment other than those mentioned in 07 04 11
07 06	**wastes from the MFSU of fats, grease, soaps, detergents, disinfectants and cosmetics**
07 06 12	sludges from on-site effluent treatment other than those mentioned in 07 06 11
07 07	**wastes from the MFSU of fine chemicals and chemical products not otherwise specified**
07 07 12	sludges from on-site effluent treatment other than those mentioned in 07 07 11
08	**Wastes from the manufacture, formulation, supply and use (MFSU) of coatings (paints, varnishes and vitreous enamels), adhesives, sealants and printing inks**
08 01	**wastes from MFSU and removal of paint and varnish**
08 01 12	waste paint and varnish other than those mentioned in 08 01 11
08 01 14	sludges from paint or varnish other than those mentioned in 08 01 13
08 01 16	aqueous sludges containing paint or varnish other than those mentioned in 08 01 15
08 01 18	wastes from paint or varnish removal other than those mentioned in 08 01 17
08 02	**wastes from MFSU of other coatings (including ceramic materials)**
08 02 01	waste coating powders
08 02 02	aqueous sludges containing ceramic materials
08 03	**wastes from MFSU of printing inks**
08 03 07	aqueous sludges containing ink
08 03 13	waste ink other than those mentioned in 08 03 12
08 03 15	ink sludges other than those mentioned in 08 03 14

Table S2.1 Permitted waste types for disposal at a landfill for non-hazardous waste	
Waste code	**Description**
08 03 18	waste printing toner other than those mentioned in 08 03 17
08 04	**wastes from MFSU of adhesives and sealants (including water proofing products)**
08 04 10	waste adhesives and sealants other than those mentioned in 08 04 09
08 04 12	adhesive and sealant sludges other than those mentioned in 08 04 11
08 04 14	aqueous sludges containing adhesives or sealants other than those mentioned in 08 04 13
09	**Wastes from the photographic industry**
09 01	**wastes from the photographic industry**
09 01 08	photographic film and paper free of silver or silver compounds
09 01 10	single-use cameras without batteries
09 01 12	single-use cameras containing batteries other than those mentioned in 09 01 11
10	**Wastes from thermal processes**
10 01	**wastes from power stations and other combustion plants (except 19)**
10 01 01	bottom ash, slag and boiler dust (excluding boiler dust mentioned in 10 01 04)
10 01 02	coal fly ash
10 01 03	fly ash from peat and untreated wood
10 01 05	calcium-based reaction wastes from flue-gas desulphurisation in solid form
10 01 15	bottom ash, slag and boiler dust from co-incineration other than those mentioned in 10 01 14
10 01 17	fly ash from co-incineration other than those mentioned in 10 01 16
10 01 19	wastes from gas cleaning other than those mentioned in 10 01 05, 10 01 07 and 10 01 18
10 01 21	sludges from on-site effluent treatment other than those mentioned in 10 01 20
10 01 23	aqueous sludges from boiler cleansing other than those mentioned in 10 01 22
10 01 24	sands from fluidised beds
10 01 26	wastes from cooling-water treatment
10 02	**wastes from the iron and steel industry**
10 02 01	wastes from the processing of slag
10 02 02	unprocessed slag
10 02 08	solid wastes from gas treatment other than those mentioned in 10 02 07
10 02 10	mill scales
10 02 14	sludges and filter cakes from gas treatment other than those mentioned in 10 02 13
10 02 15	other sludges and filter cakes
10 03	**wastes from aluminium thermal metallurgy**
10 03 02	anode scraps
10 03 05	waste alumina
10 03 16	skimmings other than those mentioned in 10 03 15
10 03 18	carbon-containing wastes from anode manufacture other than those mentioned in 10 03 17

Table S2.1 Permitted waste types for disposal at a landfill for non-hazardous waste	
Waste code	**Description**
10 03 20	flue-gas dust other than those mentioned in 10 03 19
10 03 22	other particulates and dust (including ball-mill dust) other than those mentioned in 10 03 21
10 03 24	solid wastes from gas treatment other than those mentioned in 10 03 23
10 03 26	sludges and filter cakes from gas treatment other than those mentioned in 10 03 25
10 03 28	wastes from cooling-water treatment other than those mentioned in 10 03 27
10 03 30	wastes from treatment of salt slags and black drosses other than those mentioned in 10 03 29
10 04	**wastes from lead thermal metallurgy**
10 04 10	wastes from cooling-water treatment other than those mentioned in 10 04 09
10 05	**wastes from zinc thermal metallurgy**
10 05 01	slags from primary and secondary production
10 05 04	other particulates and dust
10 05 11	dross and skimmings other than those mentioned in 10 05 10
10 06	**wastes from copper thermal metallurgy**
10 06 01	slags from primary and secondary production
10 06 02	dross and skimmings from primary and secondary production
10 06 04	other particulates and dust
10 06 10	wastes from cooling-water treatment other than those mentioned in 10 06 09
10 07	**wastes from silver, gold and platinum thermal metallurgy**
10 07 01	slags from primary and secondary production
10 07 02	dross and skimmings from primary and secondary production
10 07 03	solid wastes from gas treatment
10 07 04	other particulates and dust
10 07 05	sludges and filter cakes from gas treatment
10 07 08	wastes from cooling-water treatment other than those mentioned in 10 07 07
10 08	**wastes from other non-ferrous thermal metallurgy**
10 08 04	particulates and dust
10 08 09	other slags
10 08 11	dross and skimmings other than those mentioned in 10 08 10
10 08 13	carbon-containing wastes from anode manufacture other than those mentioned in 10 08 12
10 08 14	anode scrap
10 08 16	flue-gas dust other than those mentioned in 10 08 15
10 08 18	sludges and filter cakes from flue-gas treatment other than those mentioned in 10 08 17
10 08 20	wastes from cooling-water treatment other than those mentioned in 10 08 19
10 09	**wastes from casting of ferrous pieces**
10 09 03	furnace slag

Table S2.1 Permitted waste types for disposal at a landfill for non-hazardous waste	
Waste code	**Description**
10 09 06	casting cores and moulds which have not undergone pouring other than those mentioned in 10 09 05
10 09 08	casting cores and moulds which have undergone pouring other than those mentioned in 10 09 07
10 09 10	flue-gas dust other than those mentioned in 10 09 09
10 09 12	other particulates other than those mentioned in 10 09 11
10 09 14	waste binders other than those mentioned in 10 09 13
10 10	**wastes from casting of non-ferrous pieces**
10 10 03	furnace slag
10 10 06	casting cores and moulds which have not undergone pouring, other than those mentioned in 10 10 05
10 10 08	casting cores and moulds which have undergone pouring, other than those mentioned in 10 10 07
10 10 10	flue-gas dust other than those mentioned in 10 10 09
10 10 12	other particulates other than those mentioned in 10 10 11
10 10 14	waste binders other than those mentioned in 10 10 13
10 11	**wastes from manufacture of glass and glass products**
10 11 03	waste glass-based fibrous materials
10 11 05	particulates and dust
10 11 10	waste preparation mixture before thermal processing, other than those mentioned in 10 11 09
10 11 12	waste glass other than those mentioned in 10 11 11
10 11 14	glass-polishing and -grinding sludge other than those mentioned in 10 11 13
10 11 16	solid wastes from flue-gas treatment other than those mentioned in 10 11 15
10 11 18	sludges and filter cakes from flue-gas treatment other than those mentioned in 10 11 17
10 11 20	solid wastes from on-site effluent treatment other than those mentioned in 10 11 19
10 12	**wastes from manufacture of ceramic goods, bricks, tiles and construction products**
10 12 01	waste preparation mixture before thermal processing
10 12 03	particulates and dust
10 12 05	sludges and filter cakes from gas treatment
10 12 06	discarded moulds
10 12 08	waste ceramics, bricks, tiles and construction products (after thermal processing)
10 12 10	solid wastes from gas treatment other than those mentioned in 10 12 09
10 12 12	wastes from glazing other than those mentioned in 10 12 11
10 12 13	sludge from on-site effluent treatment
10 13	**wastes from manufacture of cement, lime and plaster and articles and products made from them**
10 13 01	waste preparation mixture before thermal processing
10 13 04	wastes from calcination and hydration of lime

Table S2.1 Permitted waste types for disposal at a landfill for non-hazardous waste	
Waste code	**Description**
10 13 06	particulates and dust (except 10 13 12 and 10 13 13)
10 13 07	sludges and filter cakes from gas treatment
10 13 10	wastes from asbestos-cement manufacture other than those mentioned in 10 13 09
10 13 11	wastes from cement-based composite materials other than those mentioned in 10 13 09 and 10 13 10
10 13 13	solid wastes from gas treatment other than those mentioned in 10 13 12
10 13 14	waste concrete and concrete sludge
11	**Wastes from chemical surface treatment and coating of metals and other materials; non-ferrous hydro-metallurgy**
11 01	**wastes from chemical surface treatment and coating of metals and other materials (for example galvanic processes, zinc coating processes, pickling processes, etching, phosphating, alkaline degreasing, anodising)**
11 01 10	sludges and filter cakes other than those mentioned in 11 01 09
11 01 14	degreasing wastes other than those mentioned in 11 01 13
11 02	**wastes from non-ferrous hydrometallurgical processes**
11 02 03	wastes from the production of anodes for aqueous electrolytical processes
11 02 06	wastes from copper hydrometallurgical processes other than those mentioned in 11 02 05
11 05	**wastes from hot galvanising processes**
11 05 02	zinc ash
12	**Wastes from shaping and physical and mechanical surface treatment of metals and plastics**
12 01	**wastes from shaping and physical and mechanical surface treatment of metals and plastics**
12 01 02	ferrous metal dust and particles
12 01 04	non-ferrous metal dust and particles
12 01 05	plastics shavings and turnings
12 01 13	welding wastes
12 01 15	machining sludges other than those mentioned in 12 01 14
15	**Waste packaging, absorbents, wiping cloths, filter materials and protective clothing not otherwise specified**
15 01	**packaging (including separately collected municipal packaging waste)**
15 01 02	plastic packaging
15 01 05	composite packaging
15 01 06	mixed packaging
15 01 09	textile packaging
15 02	**absorbents, filter materials, wiping cloths and protective clothing**
15 02 03	absorbents, filter materials, wiping cloths and protective clothing other than those mentioned in 15 02 02
16	**Wastes not otherwise specified in the list**

Table S2.1 Permitted waste types for disposal at a landfill for non-hazardous waste	
Waste code	**Description**
16 01	**end-of-life vehicles from different means of transport (including off-road machinery) and wastes from dismantling of end-of-life vehicles and vehicle maintenance (except 13, 14, 16 06 and 16 08)**
16 01 12	brake pads other than those mentioned in 16 01 11
16 01 19	Plastic
16 01 20	Glass
16 03	**off-specification batches and unused products**
16 03 04	inorganic wastes other than those mentioned in 16 03 03
16 03 06	organic wastes other than those mentioned in 16 03 05
16 08	**spent catalysts**
16 08 01	spent catalysts containing gold, silver, rhenium, rhodium, palladium, iridium or platinum (except 16 08 07)
16 08 03	spent catalysts containing transition metals or transition metal compounds not otherwise specified
16 11	**waste linings and refractories**
16 11 02	carbon-based linings and refractories from metallurgical processes others than those mentioned in 16 11 01
16 11 04	other linings and refractories from metallurgical processes other than those mentioned in 16 11 03
16 11 06	linings and refractories from non-metallurgical processes others than those mentioned in 16 11 05
17	**Construction and demolition wastes (including excavated soil from contaminated sites)**
17 01	**concrete, bricks, tiles and ceramics**
17 01 01	Concrete
17 01 02	Bricks
17 01 03	tiles and ceramics
17 01 07	mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06
17 02	**wood, glass and plastic**
17 02 02	Glass
17 02 03	Plastic
17 03	**bituminous mixtures, coal tar and tarred products**
17 03 02	bituminous mixtures other than those mentioned in 17 03 01
17 04	**metals (including their alloys)**
17 04 11	cables other than those mentioned in 17 04 10
17 05	**soil (including excavated soil from contaminated sites), stones and dredging spoil**
17 05 04	soil and stones other than those mentioned in 17 05 03
17 05 06	dredging spoil other than those mentioned in 17 05 05
17 05 08	track ballast other than those mentioned in 17 05 07
17 06	**insulation materials and asbestos-containing construction materials**

Table S2.1 Permitted waste types for disposal at a landfill for non-hazardous waste	
Waste code	**Description**
17 06 04	insulation materials other than those mentioned in 17 06 01 and 17 06 03
17 09	**other construction and demolition wastes**
17 09 04	mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03
18	**Wastes from human or animal health care and/or related research (except kitchen and restaurant wastes not arising from immediate health care)**
18 01	**wastes from natal care, diagnosis, treatment or prevention of disease in humans**
18 01 04	wastes whose collection and disposal is not subject to special requirements in order to prevent infection (for example dressings, plaster casts, linen, disposable clothing, diapers)
18 02	**wastes from research, diagnosis, treatment or prevention of disease involving animals**
18 02 03	wastes whose collection and disposal is not subject to special requirements in order to prevent infection
19	**Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use**
19 01	**wastes from incineration or pyrolysis of waste**
19 01 12	bottom ash and slag other than those mentioned in 19 01 11
19 01 14	fly ash other than those mentioned in 19 01 13
19 01 16	boiler dust other than those mentioned in 19 01 15
19 01 18	pyrolysis wastes other than those mentioned in 19 01 17
19 01 19	sands from fluidised beds
19 02	**wastes from physico/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)**
19 02 03	premixed wastes composed only of non-hazardous wastes
19 02 06	sludges from physico/chemical treatment other than those mentioned in 19 02 05
19 02 10	combustible wastes other than those mentioned in 19 02 08 and 19 02 09
19 04	**vitrified waste and wastes from vitrification**
19 04 01	vitrified waste
19 05	**wastes from aerobic treatment of solid wastes**
19 05 01	non-composted fraction of municipal and similar wastes
19 05 02	non-composted fraction of animal and vegetable waste
19 05 03	off-specification compost
19 06	**wastes from anaerobic treatment of waste**
19 06 04	digestate from anaerobic treatment of municipal waste
19 06 06	digestate from anaerobic treatment of animal and vegetable waste
19 08	**wastes from waste water treatment plants not otherwise specified**
19 08 01	Screenings
19 08 02	waste from desanding
19 08 05	sludges from treatment of urban waste water

Table S2.1 Permitted waste types for disposal at a landfill for non-hazardous waste	
Waste code	**Description**
19 08 09	grease and oil mixture from oil/water separation containing only edible oil and fats
19 08 12	sludges from biological treatment of industrial waste water other than those mentioned in 19 08 11
19 08 14	sludges from other treatment of industrial waste water other than those mentioned in 19 08 13
19 09	**wastes from the preparation of water intended for human consumption or water for industrial use**
19 09 01	solid waste from primary filtration and screenings
19 09 02	sludges from water clarification
19 09 03	sludges from decarbonation
19 09 04	spent activated carbon
19 09 05	saturated or spent ion exchange resins
19 09 06	solutions and sludges from regeneration of ion exchangers
19 10	**wastes from shredding of metal-containing wastes**
19 10 01	iron and steel waste
19 10 02	non-ferrous waste
19 10 04	fluff-light fraction and dust other than those mentioned in 19 10 03
19 10 06	other fractions other than those mentioned in 19 10 05
19 11	**wastes from oil regeneration**
19 11 06	sludges from on-site effluent treatment other than those mentioned in 19 11 05
19 12	**wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified**
19 12 04	plastic and rubber
19 12 05	Glass
19 12 08	Textiles
19 12 09	minerals (for example sand, stones)
19 12 10	combustible waste (refuse derived fuel)
19 12 12	other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11
20	**Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions**
20 01	**separately collected fractions (except 15 01)**
20 01 08	biodegradable kitchen and canteen waste
20 01 10	Clothes
20 01 11	Textiles
20 01 25	edible oil and fat
20 01 28	paint, inks, adhesives and resins other than those mentioned in 20 01 27
20 01 30	detergents other than those mentioned in 20 01 29
20 01 38	wood other than that mentioned in 20 01 37
20 01 39	Plastics

Table S2.1 Permitted waste types for disposal at a landfill for non-hazardous waste	
Waste code	**Description**
20 01 41	wastes from chimney sweeping
20 01 99	Other fractions not otherwise specified (comprising only of non-clinical human and animal offensive/hygiene waste (not arising from healthcare and/or related research i.e. not including waste from natal care, diagnosis, treatment or prevention of disease) which is not subject to special requirements in order to prevent infection
20 02	**garden and park wastes (including cemetery waste)**
20 02 01	biodegradable waste
20 02 02	soil and stones
20 02 03	other non-biodegradable wastes
20 03	**other municipal wastes**
20 03 01	mixed municipal waste
20 03 02	waste from markets
20 03 03	street-cleaning residues
20 03 04	septic tank sludge
20 03 06	waste from sewage cleaning
20 03 07	bulky waste

Table S2.1A Waste types previously permitted for disposal	
Waste code	**Description**
16	**Wastes not otherwise specified in the list**
16 05	**gases in pressure containers and discarded chemicals**
16 05 09	discarded chemicals other than those mentioned in 16 05 06, 16 05 07 or 16 05 08
16 06	**batteries and accumulators**
16 06 04	Alkaline batteries (except 16 06 03)
16 06 05	Other batteries and accumulators
20	**Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions**
20 01	**separately collected fractions (except 15 01)**
20 01 34	Batteries and accumulators other than those mentioned in 20 01 33

Table S2.2 Permitted waste types accepted for Leachate treatment	
Waste code	**Description**
19	**Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use**
19 07	**landfill leachate**
19 07 02*	landfill leachate containing dangerous substances
19 07 03	landfill leachate other than those mentioned in 19 07 02

Table S2.3 Permitted waste types for restoration	
Waste code	**Description**
01	**Wastes resulting from exploration, mining, quarrying, and physical and chemical treatment of minerals**
01 01	**wastes from mineral excavation**
01 01 01	wastes from mineral metalliferous excavation
01 01 02	wastes from mineral non-metalliferous excavation
01 04	**wastes from physical and chemical processing of non-metalliferous minerals**
01 04 08	waste gravel and crushed rocks other than those mentioned in 01 04 07
01 04 09	waste sand and clays
02	**Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing, food preparation and processing**
02 04	**wastes from sugar processing**
02 04 01	soil from cleaning and washing beet
03	**Wastes from wood processing and the production of panels and furniture, pulp, paper and cardboard**
03 03	**wastes from pulp, paper and cardboard production and processing**
03 03 05	de-inking sludges from paper recycling
03 03 09	lime mud waste
17	**Construction and demolition wastes (including excavated soil from contaminated sites)**
17 05	**soil (including excavated soil from contaminated sites), stones and dredging spoil**
17 05 04	soil and stones other than those mentioned in 17 05 03
17 05 06	dredging spoil other than those mentioned in 17 05 05
19	**Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use**
19 05	**wastes from aerobic treatment of solid wastes**
19 05 03	off-specification compost
19 08	**wastes from waste water treatment plants not otherwise specified**
19 08 05	sludges from treatment of urban waste water
19 09	**wastes from the preparation of water intended for human consumption or water for industrial use**
19 09 02	sludges from water clarification
19 12	**wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified**
19 12 09	minerals (for example sand, stones)
19 13	**wastes from soil and groundwater remediation**
19 13 02	solid wastes from soil remediation other than those mentioned in 19 13 01
19 13 04	sludges from soil remediation other than those mentioned in 19 13 03
20	**Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions**
20 02	**garden and park wastes (including cemetery waste)**

Table S2.3 Permitted waste types for restoration	
Waste code	**Description**
20 02 02	soil and stones

Table S2.4 Permitted waste types and quantities for Bio-pile Soil Treatment Process	
0 tonnes/year	
Waste code	**Description**
01	**Wastes resulting from exploration, mining, quarrying, and physical and chemical treatment of minerals**
01 05	**drilling muds and other drilling wastes**
01 05 05 *	oil-containing drilling muds and wastes
01 05 06 *	drilling muds and other drilling wastes containing hazardous substances
17	**CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)**
17 05	soil (including excavated soil from contaminated sites), stones and dredging spoil
17 05 03 *	soil and stones containing hazardous substances
17 05 04	soil and stones other than those mentioned in 17 05 03
17 05 05 *	dredging spoil containing hazardous substances
17 05 06	dredging spoil other than those mentioned in 17 05 05
17 05 07 *	track ballast containing hazardous substances
17 05 08	track ballast other than those mentioned in 17 05 07
19	**WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTE WATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND WATER FOR INDUSTRIAL USE.**
19 13	**wastes from soil and groundwater remediation**
19 13 01 *	solid wastes from soil remediation containing hazardous substances
19 13 02	solid wastes from soil remediation other than those mentioned in 19 13 01
19 13 03 *	sludges from soil remediation containing hazardous substances
19 13 04	sludges from soil remediation other than those mentioned in 19 13 03
* Wastes may not be mixed with non-hazardous wastes for the purpose of dilution.	

Schedule 3 – Emissions and monitoring

Table S3.1 Leachate level limits and monitoring requirements			
Monitoring point reference/ Description	**Limit**	**Monitoring frequency**	**Monitoring standard and method**
Operational Cells or Phases (Any cells or phases that do not have a final engineered cap agreed in accordance with the landfill engineering condition, 2.5)			
-	-	-	-
Non Operational Cells or Phases (Any cells or phases that have a final engineered cap agreed in accordance with the landfill engineering condition, 2.5)			
Leachate compliance and monitoring points on Plan R3180101 revision 1 dated 06/06/2006 Phases 3, 4, 5, 6, 7, 9 and 10 Phases 1 and 2 Phase 8	 1.2m above cell base 1.8m above cell base 2.6m above cell base	Quarterly	As specified in Environment Agency Guidance LFTGN02 (February 2003) or such other subsequent guidance as may be agreed in writing with the Environment Agency. Or as otherwise agreed with the Agency as part of a leachate monitoring plan.

Table S3.2 Point source emissions to air – emission limits and monitoring requirements						
Emission point Ref. & Location	**Parameter**	**Source**	**Limit (including unit)**	**Reference Period**	**Monitoring Frequency**	**Monitoring Standard or Method**
A1 - Flare stacks (permanent) located in engine and flare compound as shown on drawing ESID8	Oxides of Nitrogen	Landfill Gas Flares	150 mg/m^3	Hourly mean	Annually	As per M2 or such other subsequent guidance as may be agreed in writing with the Environment Agency. Monitoring is unnecessary where the flare is active for <10% of the year.
	CO		50 mg/m^3			
	Total VOCs		10 mg/m^3			
A2 - Existing engine exhausts located in engine and flare compound as shown on drawing ESID8	Oxides of Nitrogen	Gas utilisation plant	650 mg/m^3	Hourly mean	Annually	As per M2 or such other subsequent guidance as may be agreed in writing with the Environment Agency
	CO		1500 mg/m^3			
	Total VOCs		1750 mg/m^3			
A3 - Gas utilisation plant located in engine and flare compound as shown on drawing ESID8.	Oxides of Nitrogen	Gas utilisation plant	500 mg/m^3	Hourly mean	Annually	As per M2 or such other subsequent guidance as may be agreed in writing with the Environment Agency
	CO		1400 mg/m^3			
	Total VOCs		1000 mg/m^3			
A4 - Vent air burner (enclosed flare) of PpTek Siloxane removal system, as shown on drawing R303CB00 and labelled 'Vent Air Burner'.	Oxides of Nitrogen	PpTek siloxane removal system	150 mg/m^3	Hourly mean	Annually	As per M2 or such other subsequent guidance as may be agreed in writing with the Environment Agency. Monitoring is unnecessary where the flare is active for <10% of the year.
	CO		50 mg/m^3			
	Total VOCs		10 mg/m^3			

Table S3.3 Point source emissions to water (other than sewer) – emission limits and monitoring requirements						
Emission point Ref. & Location	**Parameter**	**Source**	**Limit (incl unit)**	**Reference Period**	**Monitoring Frequency**	**Monitoring Standard or Method**
SW 1 (95204010) S4 (95204040) as shown on drawing R3180101 revision 1 dated 06/06/2006	Suspended Solids	Surface Water Collection System	50 mg/l	Spot Sample	Monthly	Monitoring to be carried out in accordance with Environment Agency Guidance Document 'Guidance on Monitoring of Landfill Leachate, Groundwater and Surface Water (LFTGN02 February 2003), unless otherwise agreed in writing with the Agency.
	Visible oil and grease		No visible trace		Daily	
	pH		>5 and <9 pH units		Monthly	

Table S3.4 Groundwater – emission limits and monitoring requirements					
Monitoring point reference	**Parameter**	**Limit (including unit)**	**Reference Period**	**Monitoring frequency**	**Monitoring standard or method**
R418 (95202418) R422 (95202422) R423 (95202423) R424 (95202424) R425 (95202425) as shown on drawing R3180101 revision 1 dated 06/06/2006	Ammoniacal-N	1.70 mg/l	Spot Sample	Quarterly	As specified in Environment Agency Guidance LFTGN02 (February 2003), 'Monitoring of Landfill Leachate, Groundwater and Surface Water' risk assessments for your environmental permit (www.gov.uk) or such other subsequent guidance as may be agreed in writing with the Environment Agency
	Chloride	250 mg/l			
	Phenol	0.0005 mg/l			
	Methylphenol	0.0001 mg/l			
	Bis (2-ethylhexyl) phthalate	0.001 mg/l			
	Dichloromethane	0.001 mg/l			
	Toluene	0.004 mg/l			
	o-xylene	0.003 mg/l			
	m,p-xylene	0.003 mg/l			

Table S3.5 Landfill gas in external monitoring boreholes – limits and monitoring requirements				
Monitoring point Ref. /description	**Parameter**	**Limit (including units)**	**Monitoring frequency**	**Monitoring standard or method**
BH26 (95201042), BH27 (95201041), BH28 (95201040), BH29 (95201039), BH30 (95201038), BH31 (95201037), BH32 (95201036), BH33 (95201035), BH34 (95201034), BH35 (95201033), BH36 (95201032), BH37 (95201031), BH38(95201030), BH39 (95201029), BH40 (95201028), BH41 (95201027), BH42 (95201026), BH34A (95201134), as shown on drawing BF4945/05/03 Dated 17/01/2017.	Methane	1%v/v	Weekly	As per LFTGN03 (September 2004) or such other subsequent guidance as may be agreed in writing with the Environment Agency. Record whether the ground is: waterlogged frozen snow covered
	Carbon Dioxide	5 %v/v		
	Oxygen	no limit		
	Atmospheric pressure	no limit		
	Differential pressure	no limit		
BHN1 (95201052), BHN2 (95201053), BHN3 (95201054), BHN4 (95201055), BHN5 (95201056), BHN6 (95201057), BHN7 (95201058), BHN8 (95201059), BHN9 (95201060), BHN10 (95201061), BHN11 (95201062), BHN12 (95201063), BHN13 (95201064), BHN14 (95201065), BHN15 (95201066), BHN16 (95201067), BHN17 (95201068), BHN18 (95201069), BHN19 (95201070), BHN20 (95201071), BH6 (95201051), BH7 (95201050), BH8 (95201049), BH9 (95201048), BH10 (95201047), BH13 (95201018), BH14 (95201017), BH15 (95201016), BH16 (95201015), BH17 (95201014), BH18 (95201013), BH22 (95201048), BH23 (95201045), BH24 (95201044), BH25 (95201043), BH43 (95201025), BH44 (95201024), BH45 (95201023), BH46 (95201022), BH47 (95201021), BH48 (95201020), BH49 (95201019), as shown on drawing BF4945/05/03 Dated 17/01/2017.	Methane	1%v/v	Monthly	As per LFTGN03 (September 2004) or such other subsequent guidance as may be agreed in writing with the Environment Agency. Record whether the ground is: waterlogged frozen snow covered
	Carbon Dioxide	5 %v/v		
	Oxygen	no limit		
	Atmospheric pressure	no limit		
	Differential pressure	no limit		

Table S3.6 Point source emissions to sewer, effluent treatment plant or by tankering or other transfer off-site – emission limits and monitoring requirements						
Emission point Ref. & Location	**Parameter**	**Source**	**Limit (incl unit)**	**Reference Period**	**Monitoring Frequency**	**Monitoring Standard or Method**
S1 Disposal point to sewer located at National Grid Map Reference SJ 6520 9320	Volume	Leachate treatment plant	450 m^3/d	Spot sample	Daily	In accordance with the Application or as agreed otherwise with the Agency
	Flow		10 l/s			
	pH		>6 and <10 pH units			
	Ammonia		250 mg/l			
	Phenol		20 mg/l		Monthly	
	List 1 suite		-		Quarterly	
E1 to effluent treatment plant	pH and, NH_4-N	Risley III[1]	In accordance with limits set for emission point E2	Spot Sample	Daily	In accordance with the Application or as agreed otherwise with the Agency
	Temperature, COD and EC				Monthly	
	TON (oxidised-N), TOC, BOD, Ca, Mg, Na, K, Alk (CaCo3), SO_4, Cl, Fe, Mn, Cr, Cu, Ni, Pb and Zn				Quarterly	
	List I substances				Annually	
E2 to effluent treatment plant	BOD	Landfill leachate originating off site arriving by tanker[1]	100,000 mg/l	Spot sample	Prior to acceptance for treatment	In accordance with the Application or as agreed otherwise with the Agency
	Fe		100 mg/l			
	Toxic metals(total)		25 mg/l			
	Toxic metals (soluble)		10 mg/l			
	pH		>6 and <10 pH units			
	phenol		20 mg/l			
	SO_4		1000mg/l			
	Fats, oils and greases		250 mg/l			
	CN, Petroleum Spirit, Calcium Carbide, Carbon Disulphide		Nil			
	List I substances		Nil			
[1] Subject to Improvement Condition 2						

Table S3.7 Landfill gas emissions from capped surfaces for cells that have accepted non hazardous biodegradable waste – monitoring requirements			
Monitoring point Ref. /description	**Parameter**	**Monitoring frequency**	**Monitoring Standard or method**
Permanently capped zone	Methane concentration	Every 12 months	As per LFTGN 07 (v2 2010) or such other subsequent guidance as may be agreed in writing with the Environment Agency.
Temporarily capped zone	Methane concentration	Every 12 months	As per LFTGN 07 (v2 2010) or such other subsequent guidance as may be agreed in writing with the Environment Agency.
Whole site	Total Methane emission	As agreed with the Environment Agency	As per LFTGN 07 (v2 2010) or such other subsequent guidance as may be agreed in writing with the Environment Agency.
Uncapped areas	Methane concentration	Every 12 months	As agreed with the Environment Agency based on the wording of revised LFTGN 07 or landfill sector guidance or such other subsequent guidance as may be agreed in writing with the Environment Agency.

Table S3.8 Groundwater – other monitoring requirements			
Monitoring Point Ref. /Description	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**
Up gradient MEPP	Water level, Ammoniacal Nitrogen, Chloride, Electrical Conductivity, pH	Quarterly	As specified in Environment Agency Guidance LFTGN02 'Monitoring of Landfill Leachate, Groundwater and Surface Water' (February 2003), risk assessments for your environmental permit (www.gov.uk) or such other subsequent guidance as may be agreed in writing with the Environment Agency
	Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Sodium, Total Alkalinity, Total Sulphates, Zinc	Annually	
	Hazardous substances	Annually for first six years of operation	
Down or cross gradient MEPP	Water level, Ammoniacal Nitrogen, Chloride, Electrical Conductivity, pH	Quarterly	As specified in Environment Agency Guidance LFTGN02 'Monitoring of Landfill Leachate, Groundwater and Surface Water' (February 2003), risk assessments for your environmental permit (www.gov.uk) or such other subsequent guidance as may be agreed in writing with the Environment Agency After the initial 6 year monitoring period for hazardous substances, if the results of quarterly or annual monitoring suggest an increase in contamination, the operator shall also undertake a full leachate hazardous substances screen.
	Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Sodium, Total Alkalinity, Total Sulphates, Zinc	Annually	
	Hazardous substances	Annually for first six years of operation then every two years	
MEPP	Base of monitoring point (mAoD)	Annually	

Table S3.9 Landfill gas – other monitoring requirements				
Monitoring Point Ref. /Description	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
Gas collection system at well control valve, manifolds and strategic points on gas system	Methane Carbon Dioxide Oxygen Carbon Monoxide Atmospheric pressure Gas flow rate or suction % Balance Gas (calculated as the difference between the sum of measured gases and 100%)	Monthly or at such other frequency as may be agreed in writing with the Environment Agency.	Calibrated handheld monitoring instrument	Where the oxygen concentration exceeds 5% or the % balance gas is greater than 20% an assessment of air ingress into the system shall be undertaken. Where the concentration of carbon monoxide exceeds 100ppm then further investigation shall be undertaken. Record the ambient air temperature and whether the ground is: waterlogged frozen snow covered
Gas collection system at well control valve	Hydrogen Sulphide	Six monthly	Calibrated handheld monitoring instrument or Tedlar Bag sample in accordance with LFTGN04 (Version 3 March 2010) or other such subsequent guidance as may be agreed in writing with the Environment Agency or a method agreed with the Environment Agency.	Concentrations of hydrogen sulphide shall be assessed in accordance with the gas and odour management plans
Output to flare or LFG Utilisation Compound	Trace gas	Annually	Trace gas analysis in accordance with LFTGN04 (Version 3 March 2010) or such other subsequent guidance as may be agreed in writing with the Environment Agency [or a trace gas characterisation method agreed with the Environment Agency].	The concentration of trace gas components shall be assessed against the assumptions made in the Landfill gas risk assessment and dispersion modelling.

Table S3.9 Landfill gas – other monitoring requirements				
Monitoring Point Ref. /Description	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
Output to flare or LFG Utilisation Compound	Methane Carbon Dioxide Oxygen Gas flow rate Suction % Balance Gas (calculated as the difference between the sum of measured gases and 100%)	Weekly		Where the oxygen concentration exceeds 5% or the % balance gas is greater than 20% an assessment of air ingress into the system shall be undertaken.
Flare stacks (permanent) and A4 Vent air burner (enclosed flare) located in engine and flare compound as shown on drawing ESID8	Temperature	As per LFTGN05 (Version 2 March 2010) or such other subsequent guidance as may be agreed in writing with the Environment Agency.	As per M2 or such other subsequent guidance as may be agreed in writing with the Environment Agency.	
A2 - Existing engine exhausts and A3 - gas utilisation plant located in engine and flare compound as shown on drawing ESID8	NOx and CO	Quarterly	In accordance with Appendix C of LFTGN08, (Version 2 March 2010) or such other subsequent guidance as may be agreed in writing with the Environment Agency.	Where monitoring using hand-held, electrochemical equipment indicates an exceedance of the emissions standards specified in table S3.2, these shall be used as action levels and the operator shall investigate the cause and take appropriate measures to reduce emissions.

Table S3.10 Leachate – other monitoring requirements				
Monitoring point reference or description	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
Operational Cells or Phases **(Any cell or phases that do not have a final engineered cap agreed in accordance with condition 2.5)**				
MEPP	-	-	-	-
Non Operational Cells or Phases **(Any cell or phases that have a final engineered cap agreed in accordance with condition 2.5)**				
MEPP	Ammoniacal Nitrogen, Arsenic, BOD, Cadmium, Calcium, Chloride, Chromium, COD, Copper, Electrical Conductivity, Iron, Lead, Magnesium, Manganese, Nickel, pH, Potassium, Sodium, Total Alkalinity, Total Sulphates, Zinc	Annually	At leachate compliance points as listed in table S3.1. As specified in Environment Agency Guidance LFTGN02 'Monitoring of Landfill Leachate, Groundwater and Surface Water' (February 2003), risk assessments for your environmental permit (www.gov.uk), or such other subsequent guidance as may be agreed in writing with the Environment Agency	None
MEPP	Hazardous substances	Once every four years		
MEPP	Depth to base (mAOD)	Annually		

Table S3.11 Surface water – other monitoring requirements				
Monitoring Point Ref. /Description	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
MEPP	Ammoniacal Nitrogen Chloride Electrical conductivity pH Suspended solids Visual Oil and Grease	Monthly	Spot sample	As specified in Environment Agency Guidance LFTGN02 'Monitoring of Landfill Leachate, Groundwater and Surface Water' (February 2003), risk assessments for your environmental permit (www.gov.uk) or such other subsequent guidance as may be agreed in writing with the Environment Agency.

Schedule 4 – Reporting

Parameters, for which reports shall be made, in accordance with conditions of this permit, are listed below.

Table S4.1 Reporting of monitoring data		
Parameter	**Reporting period**	**Period ends**
Leachate level As specified by schedule 3, table S3.1	Every 3 months	31 March, 30 June, 30 September, 31 December
Point source emission to air As specified by schedule 3, table S3.2	Every 12 months	31 December
Point source emission to water (other than sewer) As specified by schedule 3, table S3.3	Every 3 months	31 March, 30 June, 30 September, 31 December
Emission to groundwater As specified by schedule 3, table S3.4	Every 3 months	31 March, 30 June, 30 September, 31 December
Landfill gas in external monitoring boreholes As specified by schedule 3, table S3.5	Every 3 months	31 March, 30 June, 30 September, 31 December
Point source emission to sewer, effluent treatment plant, tankering or other off site transfer As specified by schedule 3, table S3.6	Every 3 months	31 March, 30 June, 30 September, 31 December
Emission of landfill gas from capped surfaces As specified by schedule 3, table S3.7	Every 12 months	31 December
Other groundwater monitoring As specified by schedule 3, table S3.8	Every 3 months	31 March, 30 June, 30 September, 31 December
Other Landfill gas monitoring As specified by schedule 3, table S3.9 Trace gas monitoring	Every 3 months Every 12 months	31 March, 30 June, 30 September, 31 December 31 December
Other leachate monitoring As specified by schedule 3, table S3.10	Every 12 months	31 December
Other surface water monitoring As specified by schedule 3, table S3.11	Every 12 months	31 December
Meteorological data Landfill Directive, annex III, section 2	Every 12 months	31 December

* - where the reporting period is 12 months, you may submit this information as part of the ‘annual report’ required by condition 4.2.2.

Table S4.2: Annual production/treatment	
Leachate: Disposed of off site; Disposed of to any onsite effluent treatment plant; Accepted from offsite for treatment at any onsite effluent treatment plant.	Cubic metres/year
Landfill gas: combustion in flares; combustion in gas engines; Other methods of gas utilisation. Average methane content entering the landfill gas utilisation or treatment compound (based on the annual average of Table S3.9 monitoring) Methane generation rate (50%ile from a representative model)	Normalised cubic metres/year % methane v/v m^3 /hr

Table S4.3 Performance Parameters			
Parameter	**Frequency of assessment**	**Annual total**	**Unit**
Energy used (including for leachate treatment)	Annually		MWh of electricity or natural gas

Table S4.4 Reporting Forms		
Media/parameter	**Reporting Format**	**Date of Form**
Leachate	Form leachate 1 or other reporting format to be agreed in writing with the Environment Agency	10/11/2017
Air	Form Air 1 or other reporting format to be agreed in writing with the Environment Agency	10/11/2017
Controlled water	Form Water 1 or other reporting format to be agreed in writing with the Environment Agency	10/11/2017
Groundwater	Form Groundwater 1 or other reporting format to be agreed in writing with the Environment Agency	10/11/2017
Sewer	Form Sewer 1 or other reporting format to be agreed in writing with the Environment Agency	10/11/2017
Landfill gas	Form LFG 1 or other reporting format to be agreed in writing with the Environment Agency	10/11/2017
Particulate matter	Form Particulate 1 or other reporting format to be agreed in writing with the Environment Agency	10/11/2017
Waste Return	E-waste Return Form	-
Landfill topographical surveys and interpretation	Reporting format to be agreed in writing with the Environment Agency	10/11/2017

Schedule 5 – Notification

This page outlines the information that the operator must provide.

Units of measurement used in information supplied under Part A and B requirements shall be appropriate to the circumstances of the emission. Where appropriate, a comparison should be made of actual emissions and authorised emission limits.

If any information is considered commercially confidential, it should be separated from non-confidential information, supplied on a separate sheet and accompanied by an application for commercial confidentiality under the provisions of the EP Regulations.

Part A

Permit Number	
Name of operator	
Location of Facility	
Time and date of the detection	

(a) Notification requirements for any incident or accident which significantly affects or may significantly affect the environment	
To be notified within 24 hours of detection	
Date and Time of the event	
Reference or description of the location of the event	
Description of where any release into the environment took place	
Substances(s) potentially released	
Best estimate of the quantity or rate of release of substances	
Measures taken, or intended to be taken, to stop any emission	
Description of the failure or accident.	

(b) Notification requirements for the breach of a limit	
To be notified within 24 hours of detection unless otherwise specified below	
Emission point reference/ source	
Parameter(s)	
Limit	
Measured value and uncertainty	
Date and time of monitoring	

(b) Notification requirements for the breach of a limit	
To be notified within 24 hours of detection unless otherwise specified below	
Measures taken, or intended to be taken, to stop the emission	

Time periods for notification following detection of a breach of a limit	
Parameter	**Notification period**

(c) Notification requirements in the event of a breach of permit condition which poses an immediate danger to human health or threatens to cause an immediate significant adverse effect on the environment	
To be notified within 24 hours of detection	
Description of where the effect on the environment was detected	
Substances(s) detected	
Concentrations of substances detected	
Date of monitoring/sampling	

Part B to be supplied as soon as practicable

Any more accurate information on the matters for notification under Part A.	
Measures taken, or intended to be taken, to prevent a recurrence of the incident	
Measures taken, or intended to be taken, to rectify, limit or prevent any pollution of the environment which has been or may be caused by the emission	
The dates of any unauthorised emissions from the facility in the preceding 24 months.	

Name*	
Post	
Signature	
Date	

* authorised to sign on behalf of the operator

Schedule 6 – Interpretation

“accident” means an accident that may result in pollution.

“annually” means once every year.

“application” means the application for this permit, together with any additional information supplied by the operator as part of the application and any response to a notice served under Schedule 5 to the EP Regulations.

“authorised officer” means any person authorised by the Environment Agency under section 108(1) of The Environment Act 1995 to exercise, in accordance with the terms of any such authorisation, any power specified in section 108(4) of that Act.

“background concentration” means such concentration of that substance as is present in:

- For emissions to surface water, the surface water quality up-gradient of the site; or
- For emissions to sewer, the surface water quality up-gradient of the sewage treatment works discharge; or
- For emissions of landfill gas, the ground or air outside the site and not attributable to the site.

“cell layout drawing” means:

(a) A drawing or drawings of the proposed new cell that illustrate(s) in sufficient detail:

(i) the location of the new cell on the site;

(ii) the proposed level (Above Ordnance Datum) of the base of the excavation;

(iii) the proposed finished levels of all containment and leachate drainage layers;

(iv) the positions of leachate management infrastructure; and

(v) the positions of landfill gas infrastructure (if appropriate).

(b) A detailed written explanation of any minor design changes from the most recently approved cell that result from the new cell layout. This would include, for example:

(i) changes to slope length and gradient within the cell;

(ii) new leachate or landfill gas infrastructure construction design;

(iii) slope stability issues such as new basal excavation level; and/or

(iv) depth of waste.

“construction Proposals” means written information, at a level of detail appropriate to the complexity and pollution risk, on the design, specifications of materials selected, stability assessment (where relevant) and the construction quality assurance (CQA) programme in relation to the New Cell or Landfill Infrastructure.

“CQA Validation Report” means the final “as built” construction and engineering details of the New Cell or of the Landfill Infrastructure. It must provide a comprehensive record of the construction and must include, where relevant:

- The results of all testing required by the CQA programme - this must include the records of any failed tests with a written explanation, details of the remedial action taken, referenced to the appropriate secondary testing;
- Plans showing the location of all tests;
- “As-built” plans and sections of the works;
- Copies of the site engineer’s daily records;

- Records of any problems or non-compliances and the solution applied;
- Any other site specific information considered relevant to proving the integrity of the New Cell or Landfill Infrastructure;
- Validation by a qualified person that all of the construction has been carried out in accordance with the Construction Proposals.

“emissions to land” includes emissions to groundwater.

“EP Regulations” means The Environmental Permitting (England and Wales) Regulations 2016, SI 2016 No.1154 and words and expressions used in this permit which are also used in those Regulations have the same meanings as in those Regulations.

“emissions of substances not controlled by emission limits” means emissions of substances to air, water or land from the activities, either from the emission points specified in schedule 3 or from other localised or diffuse sources, which are not controlled by an emission or background concentration limit.

“exceeded” means that a value is above a permitted limit, or where a range of values or a minimum value is set as a permitted limit it means a value outside that range or below the minimum value, whichever is applicable.

“groundwater” means all water, which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil.

“hazardous substances” as defined by the Environmental Permitting (England and Wales) Regulations 2016, SI 2016 No.1154, schedule 22 and listed in our Hydrogeological risk assessment guidance.

"inert waste" means waste that does not undergo any significant physical, chemical or biological transformations. Inert waste will not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm human health. The total leachability and pollutant content of the waste and the ecotoxicity of the leachate must be insignificant, and in particular not endanger the quality of surface water and/or groundwater

“landfill Infrastructure” means any specified element of the:

- permanent capping;
- temporary capping (i.e. engineered temporary caps not cover materials);
- leachate abstraction systems;
- leachate transfer, treatment and storage systems;
- surface water drainage systems;
- leachate monitoring wells;
- groundwater monitoring boreholes;
- landfill gas monitoring boreholes;
- landfill gas management systems;
- lining within the installation.

within the site.

“LFTGN 02” means Environment Agency Guidance on monitoring of landfill leachate, groundwater and surface Water.

“LFTGN 03” means Environment Agency Guidance on the management of landfill gas.

“LFTGN 04 means Environment Agency Guidance for monitoring trace components in landfill gas

“LFTGN 05” means Environment Agency Guidance for monitoring enclosed landfill gas flares.

“LFTGN 07” means Environment Agency Guidance on monitoring landfill gas surface emissions.

“LFTGN 08” means Environment Agency Guidance for monitoring landfill gas engines.

“liquids” means any liquid other than leachate within the engineered landfill containment system.

“List of Wastes” means the list of wastes established by Commission Decision 2000/532/EC replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste, as amended from time to time.

“M2” means Environment Agency Guidance Monitoring of stack emissions to air.

“MCERTS” means the Environment Agency’s Monitoring Certification Scheme.

“medicinal product” means any medicine licensed by the Medicines and Healthcare products Regulatory Agency (MHRA) or their predecessors under the Medicines Act 1968, section 130.

“MEPP” Monitoring and extraction point plan, required by condition 4.2.2(h) to specify extraction points and routine monitoring locations.

“new cell” means any new cell, part of a cell or other similar new area of the site where waste deposit is to commence after issue of this permit and can comprise:

- groundwater under-drainage system;
- permanent geophysical leak location system;
- leak detection layer;
- sub-grade;
- barriers;
- liners;
- leachate collection system;
- leachate abstraction system;
- separation bund/layer;
- cell or area surface water drainage system;
- side wall subgrade and containment systems;

for the New Cell.

“no impact” means that the change made to the construction process will not affect the agreed design criteria, specification or performance in a way that has a negative effect.

“pests” means Birds, Vermin and Insects.

“previous year” means the 12 month period preceding the month the annual report is submitted in.

“quarter” means a calendar year quarter commencing on 1 January, 1 April, 1 July or 1 October.

“relevant waste acceptance procedures” means the procedure for the acceptance of waste at landfills and the associated sampling and test methods specified in the Council Decision Annex (2003/33/EC, European Council of 19 December 2002).

“relevant waste acceptance criteria” means the waste acceptance criteria and the associated sampling and test methods specified in the Council Decision Annex (2003/33/EC, European Council of 19 December 2002).

“review of the Hydrogeological Risk Assessment” means a written review of the hydrogeological risk assessment included in the Application, together with any other parts of the Application that addressed the requirements of the EP Regulations. The review shall assess whether the activities of disposal or tipping for the purpose of disposal of waste authorised by the permit continue to meet the requirements of the EP Regulations.

‘sustainably extracted’ means where suction can be applied to the extraction wells such that a flow rate of landfill gas, with a methane content capable of either being combusted, or treated by bio-oxidation, can be extracted without increasing the risk of air ingress to the waste or inducing aerobic degradation within the waste.

‘waste code’ - See ‘List of Wastes’.

“WFD” means Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste [and repealing certain Directives] – the Waste Framework Directive.

Unless otherwise stated, any references in this permit to concentrations of substances in emissions into air means the standards included in Environment Agency Guidance for Monitoring Enclosed Landfill Gas Flares LFTGN 05 or Guidance for Monitoring Landfill Gas Engine Emissions LFTGN 08.

Where the following terms appear in the waste code list in Tables S2.1, S2.3, S2.4, S2.5, S2.6 or S2.7 they have the meaning given below:

‘hazardous substance’ means a substance classified as hazardous as a consequence of fulfilling the criteria laid down in parts 2 to 5 of Annex I to Regulation (EC) No 1272/2008;

‘heavy metal’ means any compound of antimony, arsenic, cadmium, chromium (VI), copper, lead, mercury, nickel, selenium, tellurium, thallium and tin, as well as these materials in metallic form, as far as these are classified as hazardous substances;

‘polychlorinated biphenyls and polychlorinated terphenyls’ (‘PCBs’) means PCBs as defined in Article 2(a) of Council Directive 96/59/EC’.
Article 2(a) says that ‘PCBs’ means:

- polychlorinated biphenyls
- polychlorinated terphenyls
- monomethyl-tetrachlorodiphenyl methane, Monomethyl-dichloro-diphenyl methane, Monomethyldibromo-diphenyl methane
- any mixture containing any of the above mentioned substances in a total of more than 0,005 % by weight;

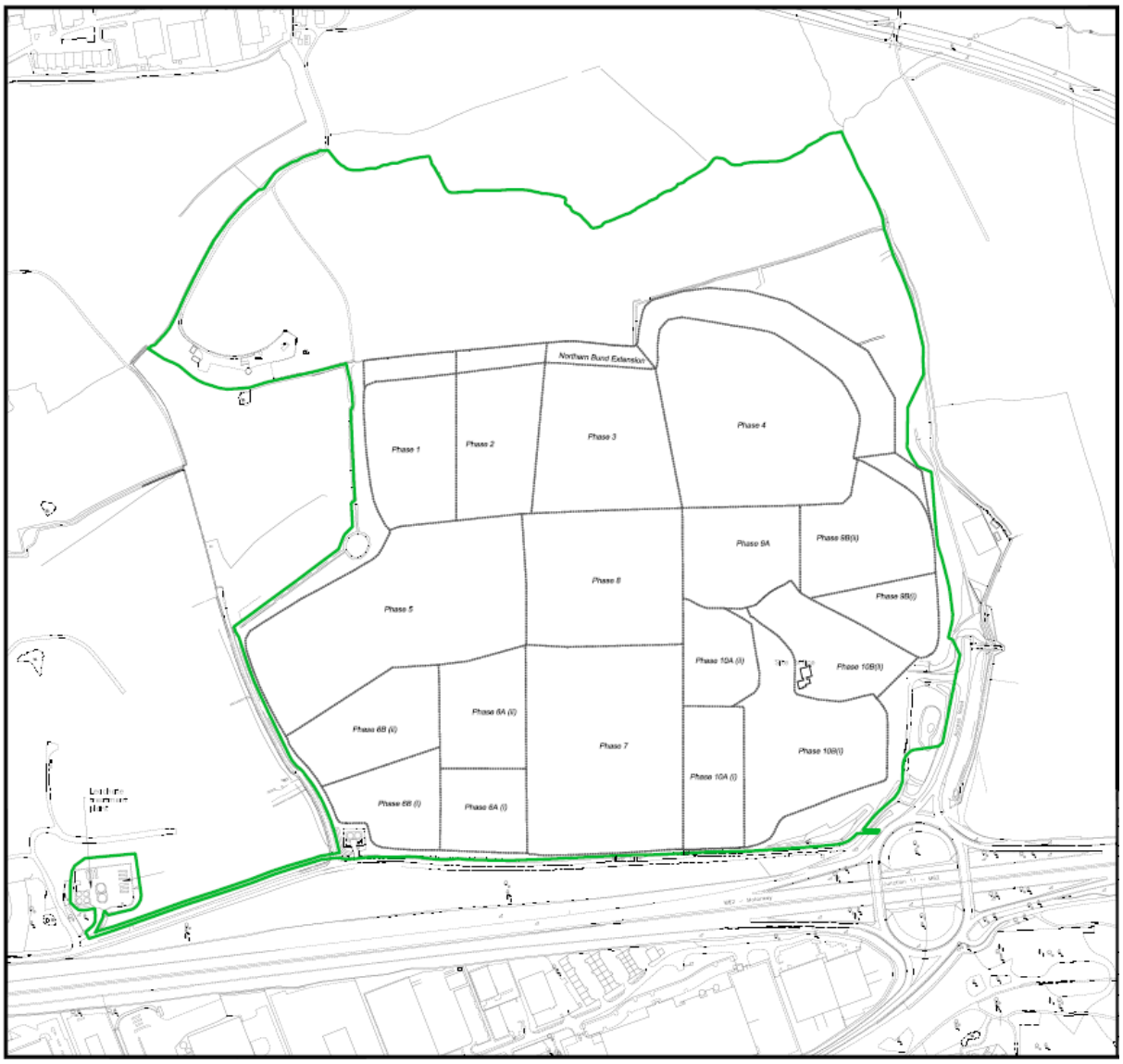
‘transition metals’ means any of the following metals: any compound of scandium, vanadium, manganese, cobalt, copper, yttrium, niobium, hafnium, tungsten, titanium, chromium, iron, nickel, zinc, zirconium, molybdenum and tantalum, as well as these materials in metallic form, as far as these are classified as hazardous substances;

‘stabilisation’ means processes which change the hazardousness of the constituents in the waste and transform hazardous waste into non-hazardous waste;

‘solidification’ means processes which only change the physical state of the waste by using additives without changing the chemical properties of the waste;

‘partly stabilised wastes’ means wastes containing, after the stabilisation process, hazardous constituents which have not been changed completely into non-hazardous constituents and could be released into the environment in the short, middle or long term.

Schedule 7 – Site plan



APPENDIX VII

List of Land Uses and Associated Chemicals of Potential Concern

Industry		Metals and non-metals					Inorganics					Organics						Other chemicals and compounds
		Common metal suite (Cd, Cr, Cu, Ni, Pb, Zn)	Hg	As	B	Se	CN	Nitrate	Sulphate	Asbestos	pH	Phenol	Acetone	Hydro-carbons	PAHs	Chlorinated hydro-carbons	PCBs	
Airports		✓					✓			✓	✓		✓	✓		✓	✓	
Animal and animal products processing works		✓		✓					✓			✓		✓	✓	✓		Dieldrin
Asbestos manufacturing works		✓							✓	✓				✓	✓	✓	✓	
Ceramics, cement and asphalt manufacturing works		✓	✓	✓					✓	✓	✓		✓	✓	✓		✓	
Charcoal works		✓	✓	✓		✓	✓	✓	✓	✓	✓		✓	✓		✓	✓	
Chemical works	coatings (paints and printing inks) manufacturing	✓							✓	✓	✓	✓		✓	✓	✓		Ba, S, organotin compounds
	cosmetics and toiletries manufacturing works	✓							✓	✓	✓		✓	✓	✓	✓		
	disinfectants manufacturing works	✓	✓						✓	✓	✓	✓		✓	✓	✓	✓	Ba, chloro-phenol, dioxins/furans
	explosives, propellants and pyrotechnics works	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓		✓	✓	Ba
	fertiliser manufacturing works	✓								✓	✓			✓	✓		✓	
	fine chemical manufacturing works	✓	✓	✓				✓	✓	✓		✓	✓	✓	✓		✓	V, dioxins/furans
	inorganic chemicals manufacturing works	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓			Ba
	linoleum, vinyl and bitumen-based floor coverings	✓		✓					✓	✓	✓	✓		✓	✓	✓	✓	organotin compounds
	mastics, sealants, adhesives, roofing felt works.	✓	✓	✓					✓	✓	✓	✓		✓	✓	✓		Ba
	organic chemicals manufacturing works	✓		✓			✓		✓	✓	✓	✓	✓	✓		✓		V
	pesticides manufacturing works	✓	✓	✓						✓	✓	✓		✓		✓	✓	chloro-phenol, hexachloro-cyclohexane, Dieldrin, dioxins/furans, organotin
	pharmaceuticals manufacturing works	✓	✓	✓						✓	✓			✓	✓	✓	✓	
	rubber processing works (including tyres)								✓			✓		✓		✓	✓	S, Zn,
	soap and detergent manufacturing works										✓		✓	✓	✓			
Dockyards and dockland		✓	✓	✓					✓	✓		✓		✓	✓	✓	✓	hexachloro-cyclohexane
Dry cleaners		✓	✓	✓		✓	✓	✓	✓	✓	✓			✓		✓	✓	
Engineering work	aircraft manufacturing works	✓					✓	✓	✓	✓	✓		✓	✓		✓	✓	
	electrical and electronic equipment works	✓	✓	✓	✓			✓	✓	✓	✓			✓		✓	✓	
	mechanical engineering and ordnance works	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	V, Be
	railway engineering works	✓		✓					✓	✓	✓			✓	✓	✓	✓	S
	shipbuilding repair and shipbreaking	✓		✓			✓			✓	✓		✓	✓		✓		organotin compounds
	vehicle manufacturing works	✓				✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	
Fibreglass and fibreglass resin manufacturing works		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	
Gasworks, coke works and coal carbonisation plants		✓	✓	✓			✓		✓	✓	✓	✓		✓	✓			V, S
Glass manufacturing works		✓	✓	✓	✓		✓	✓	✓	✓	✓		✓	✓		✓	✓	
Metal works	electroplating and other metal finishing works	✓			✓		✓	✓	✓	✓	✓	✓		✓		✓		
	iron and steelworks	✓		✓			✓		✓	✓	✓	✓		✓	✓		✓	V, S
	lead works	✓		✓					✓	✓	✓			✓	✓		✓	
	non-ferrous metals (excluding lead works)	✓	✓		✓				✓	✓				✓	✓		✓	V
	precious metal recovery works	✓	✓	✓				✓	✓	✓	✓			✓		✓	✓	
Oil refineries and bulk storage		✓					✓		✓	✓	✓	✓	✓	✓			✓	organolead compounds
Photographic processing industry		✓	✓	✓		✓	✓	✓	✓	✓	✓		✓	✓		✓	✓	
Power stations (excluding nuclear power stations)		✓	✓	✓		✓			✓	✓	✓			✓	✓	✓	✓	V, Ba, Be
Printing and bookbinding works		✓	✓	✓		✓	✓	✓	✓	✓	✓		✓	✓		✓	✓	
Pulp and paper manufacturing works		✓							✓	✓	✓			✓		✓	✓	hexachloro-cyclohexane, dioxins/furans
Railway land		✓							✓	✓					✓	✓	✓	V
Road vehicle: garages and filling stations		✓								✓	✓			✓	✓	✓		organolead compounds
Road vehicle: transport and haulage centres		✓								✓	✓		✓	✓	✓	✓		V, S, organolead compounds
Sewage works and sewage farm		✓	✓	✓			✓	✓	✓	✓	✓			✓		✓	✓	
Textile works and dye works		✓	✓		✓			✓	✓	✓	✓	✓	✓	✓		✓	✓	Dieldrin
Timber products and manufacturing works		✓		✓	✓				✓			✓	✓	✓	✓			
Timber treatment works		✓		✓	✓				✓	✓	✓	✓		✓	✓	✓		chloro-phenol, hexachloro-cyclohexane, Dieldrin, organotin
Waste management	drum and tank cleaning and recyling plants								✓	✓			✓	✓			✓	
	hazardous waste treatment plants	✓	✓	✓		✓		✓		✓	✓	✓				✓	✓	V, Ba, hexachloro-cyclohexane, Dieldrin
	landfills and other waste treatment/disposal sites	✓		✓					✓	✓	✓			✓	✓	✓	✓	dioxins/furans
	solvent recovery works	✓									✓					✓		
	metal recyling sites	✓	✓	✓			✓		✓	✓	✓			✓		✓	✓	Ba

* The information in this table is indicative only and does not present a comprehensive review. The data is summarised from R&D Publication CLR 8, Potential Contaminants for the Assessment of Land, DEFRA and EA, 2002. Assessment of individual sites requires knowledge of historic land use and specific site processes. Irrespective of the information present above there are several contaminants of concern such as hydrocarbons and PCBs, that can be found on any industrial site of significant size.

D R A W I N G S

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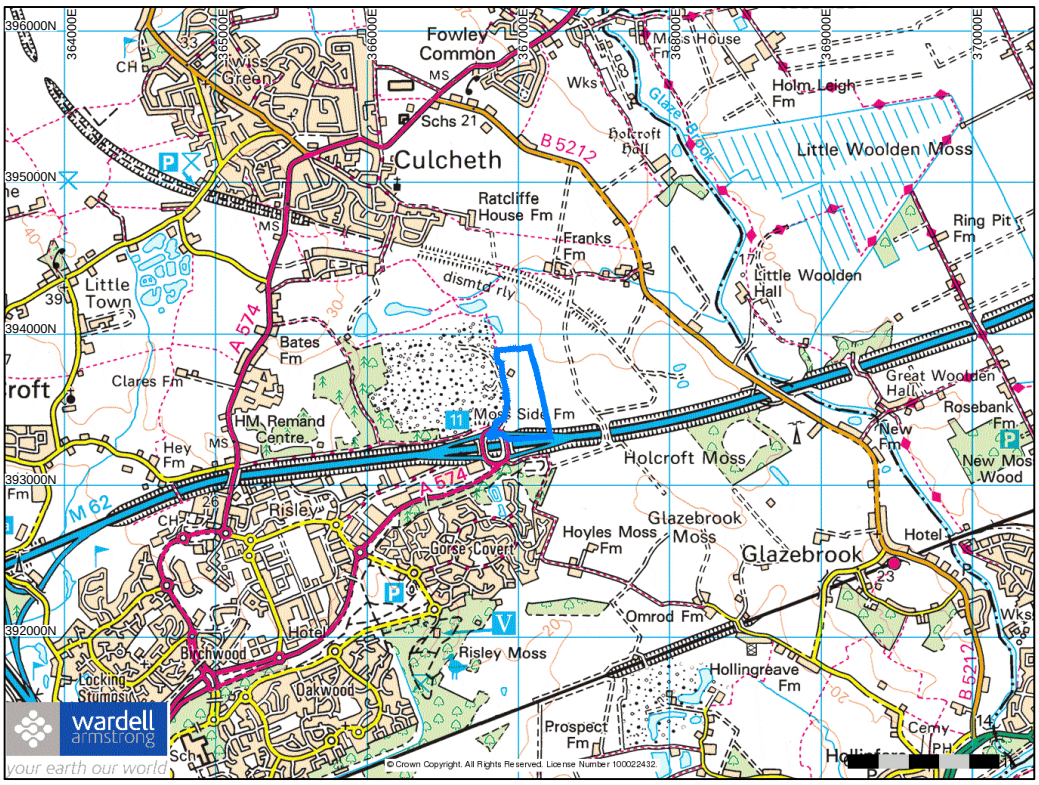

CLIENT: WARRINGTON MSA, J11 M62 MOTORWAY	DRG No.: SH11739-007		REV: A
PROJECT: POTENTIAL WARRINGTON MSA	SIZE: A4	SCALE: 1:50,000	DATE: 27/11/18
	DRAWN BY: DP	CHECKED BY: JAS	APPROVED BY: AJD
DRAWING TITLE: SITE LOCATION PLAN			

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Moss Side Farm
Pestfurlong Moss
Junction 11
A574
Pestfurlong Hill
LANE
dustrial
Track
Brook

A	FIRST ISSUE	13/12/18	SJB	JAS	AJD
REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT
WARRINGTON MSA,
J11 M62 MOTORWAY

PROJECT
POTENTIAL WARRINGTON MSA

DRAWING TITLE
SITE PLAN

DRG No. SH11739-008		REV A
DRG SIZE A3	SCALE 1:5000	DATE 27/11/18
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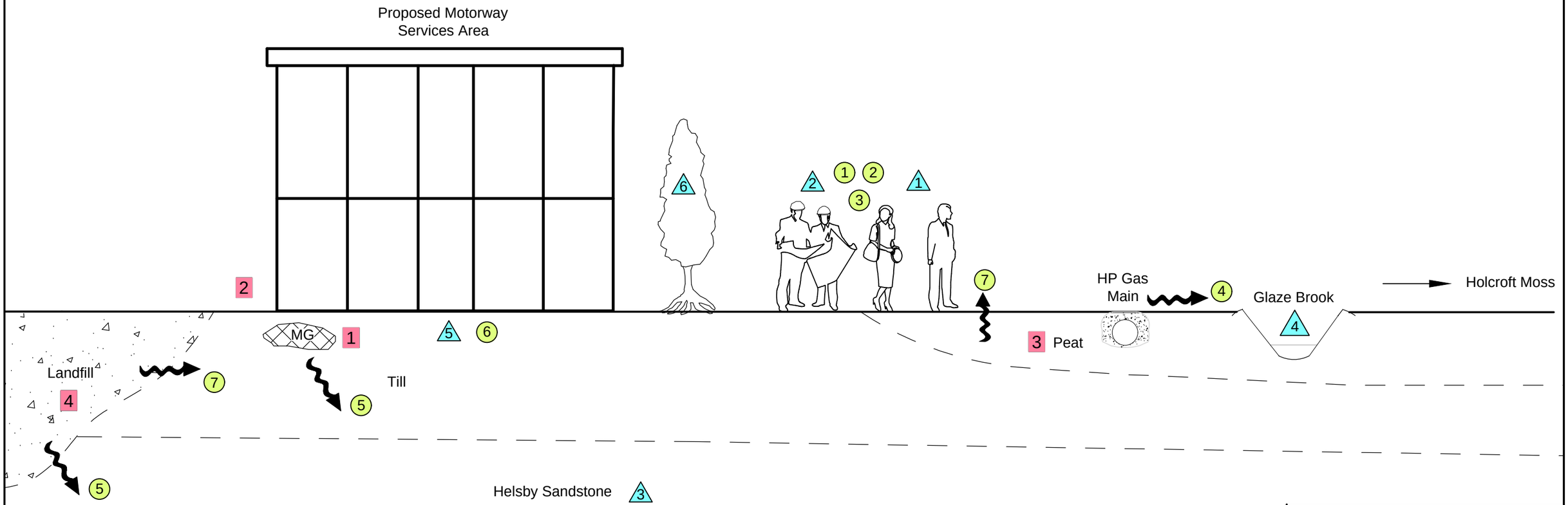

Source
- 1 Made Ground
- 2 Historic Building Material
- 3 Ground Gas (Peat)
- 4 Adjacent Landfill

Pathway
- (1) Inhalation
- (2) Dermal Contact with Soil and/or Dust
- (3) Ingestion of Soil and/or Dust
- (4) Surface Water Run Off
- (5) Groundwater Migration
- (6) Direct Contact
- (7) Gas Migration

Receptor
- 1 Future Occupiers
- 2 Construction Workers
- 3 Groundwater
- 4 Surface Water
- 5 Subsurface Building Materials
- 6 Flora & Fauna

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D
A	FIRST ISSUE	13/12/18	SJB	JAS	AJD

CLIENT
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J11 M62 MOTORWAY

PROJECT
POTENTIAL WARRINGTON MSA

DRAWING TITLE
SCHEMATIC CONCEPTUAL
SITE MODEL

DRG No.	REV
SH11739-010	A

DRG SIZE	SCALE	DATE
A3	NTS	04/12/18

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EXTRA MSA GROUP

WARRINGTON MSA, J11 M62 MOTORWAY

PRELIMINARY SITE INVESTIGATION

December 2018

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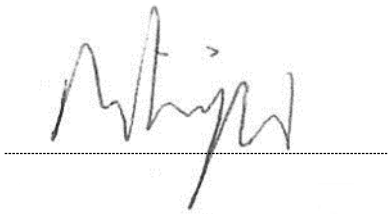
DATE ISSUED:	December 2018
JOB NUMBER:	SH11739
REPORT NUMBER:	RPT-002

EXTRA MSA GROUP

WARRINGTON MSA, J11 M62 MOTORWAY
PRELIMINARY SITE INVESTIGATION

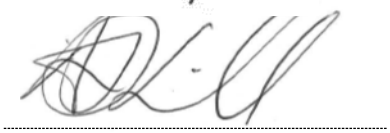
PREPARED BY:

M Biggins Environmental Geologist



REVIEWED AND APPROVED BY:

A J Dunhill Technical Director



DOCUMENT RECORD

Issue No.	Date	Details
1	24 September 2018	First issue
2	14th December 2018	Final

CONTENTS

FIGURES

APPENDICES

DRAWINGS

Drawing No	Title	Scale
SH11739-001	Site Location Plan	1:50,000
SH11739-004	Site Investigation Locations Plan	1:2,500
SH11739-005	Geological Sections Plan	1:2,500

1 EXECUTIVE SUMMARY

1.1 This report is prepared in accordance with instructions from Dennis Enuson of Extra MSA Group. The site is Warrington MSA, J11 M62 Motorway and comprises approximately 12.2 hectares of agricultural land. A summary of pertinent information relating to the site along with a qualitative assessment of the potential risk is provided in Table I.

TABLE I: SUMMARY

Issue	Description
Geological Conditions	The site is shown to be underlain by predominantly cohesive deposits of sandy slightly gravelly clay with a firm strength. The south east of the site is underlain initially by a thickness of peat, up to 1.4m prior to encountering cohesive deposits.
Archaeology	No significant archaeological evidence was encountered. Consideration should be given to the planning requirements for archaeology.
Geotechnical Assessment	The site is proven to have areas of peat, predominantly to the south east up to 1.4m thick. The remainder of the site, and areas underlying the peat deposits are proven to be dominated by cohesive sandy slightly gravelly clay with a firm to stiff strength. This material is likely to be suitable as a founding medium, dependant on the required future loads. Whilst the peat deposits are unlikely to be suitable as a founding medium in current form, the restricted area and depth of peat may allow either excavation of the peat and replacement with suitable fill or alternative engineering solutions such as surcharging to reduce the risk.
Recommended further work	Future site investigations to comply with planning requirements.

1.2 The executive summary forms part of the overall report and should not be considered in isolation.

2 INTRODUCTION

Instructions

2.1 This report is prepared in accordance with instructions from Dennis Enuson of Extra MSA Group dated. This follows a proposal dated 27 September 2017 by Wardell Armstrong.

Site Location

2.2 The site is Land off Junction 11 of them M62, and is located as shown on Drawing SH11739-001 (1:50,000 scale). A more detailed site plan is shown on Drawing SH11739-004 (1:2,500 scale). The site comprises approximately 12.2Ha of open agricultural land and is bounded by further fields to the north and east, the M62 motorway to the south and former Risley landfill to the west. The site is located c. 8.5km to the north east of Warrington city centre.

Figure 1: Aerial Image Showing the Approximate Site Area

Scope and Objectives

2.3 The purpose of this report is to present the findings of an intrusive investigation that was carried out to determine the geological conditions beneath the site. In particular to identify describe, and broadly delineate peat deposits present at the site. In addition, the report aims to provide preliminary geotechnical information of relevance to the proposed use of the site.

Proposed Site Use

2.4 It is proposed that the site is redeveloped for a commercial land use.

3 GEOLOGICAL SETTING

Geology

3.1 The assessment of the geology of the site is based on the published geological mapping sheet (Sheet SJ69SE 1:50,000 scale) supplemented by geological information and borehole logs held by the British Geological Survey.

3.2 Borehole logs available on the BGS website, drilled for the M62 construction and other water wells on site, suggest that up to 3.65m of peat directly underlie the surface, followed by variable depths of stiff glacial till (up to approximately 10m) followed by the Helsby Sandstone which is part of the Sherwood Sandstone group, a major aquifer.

4 SITE INVESTIGATION

Introduction

4.1 A physical site investigation has been carried out to assess the geotechnical nature of the ground. The site investigation comprised of a series of sixteen trial pits across the site area. Locations were positioned to provide a broad coverage of the site. Site investigation locations are shown on Drawing No. SH12191-004 (1:2,500 scale).

Scope

4.2 The investigation was designed as a series of tasks that are summarised below in Table II.

TABLE II: SUMMARY OF TASKS

Task	Summary	Date(s)
Preparatory Work	Setting up site investigation contract, including services enquiries, contractor health & safety document and site meeting with contractor/client.	August 2018
Intrusive site investigation	Excavation of 16 no. trial pits to c. 4.0m bgl	21st – 22nd August 2018
Laboratory analysis	Geotechnical testing in accredited laboratory – 17 bulk soil samples.	August - September 2018

4.3 The investigation was completed in accordance with Construction (Design and Management) (CDM) Regulations 2015 and a site-specific Health & Safety plan. Contractors used during this project include; H&C Plant Hire Ltd. (trial pits) and Socotec (geotechnical analysis).

Archaeological Watching Brief

4.4 Due to the likely presence of peat on the site and previous knowledge of nearby sites it was considered prudent to carry out an archaeological watching brief during the trial pit excavations in order to assess any potential archaeological finds.

Trial Pit Excavations

4.5 Trial pit excavations were completed under the full-time supervision of a Wardell Armstrong engineer. Sixteen trial pits (TP101 – TP116) were excavated to depths of

between 2.3m and 3.3m below ground level (bgl) using a JCB 3CX Sitemaster hydraulic excavator. Excavations beyond these depths were not possible due to reaching the required depth and or limitations of the plant. Locations (see Drawing No. SH11739-004) were positioned to provide widespread coverage of the site.

4.6 Trial pit logs are included at Appendix II.

4.7 During trial pit excavations hand shear vane tests were conducted where possible to determine the undrained (total stress) shear strength and the residual shear strength of the soil profile with depth.

4.8 Trial pits remained stable throughout excavation.

4.9 Trial pit logs are included at Appendix II.

Sampling and Testing

Geotechnical Sampling and Testing

4.10 Seventeen soil samples were taken for geotechnical testing and the testing schedule is summarised below in Table III. Geotechnical Results are attached at Appendix III.

TABLE III: SUMMARY OF GEOTECHNICAL ANALYSIS SCHEDULE	
Geotechnical Test	**Superficial Deposits**
Natural moisture content	12
Particle size distribution	6
Atterberg limit	7
2.5kg Compaction Testing	4*
* One compaction test could be completed only.	

Quality Assurance and Quality Control

4.11 The soil and groundwater samples were collected, transferred to the laboratory under chain of custody and analysed to ensure traceability and reliability of analytical results. Based on the laboratory QA data, the analytical results are considered acceptable for interpretative use.

Limitations of Site Investigation

4.12 It should be noted that the interpretation of the results of the physical site investigation is based on a limited number of investigation points. The locations and

numbers of the investigation locations were governed by the physical state of the site and the location of known services at the time of the investigation. Although reasonable inferences have been made during the interpretation, it is possible that variances in the thickness, distribution and physical/chemical characteristics of the strata present will exist.

5 RESULTS OF SITE INVESTIGATION

General Site Observations

5.1 The site was observed to be generally flat and slightly elevated above the M62 motorway. The area was divided into areas planted for arable crops and grassland and was noted by the landowner to be wet.

Archaeological Watching Brief

5.2 An archaeological watching brief was undertaken on the 21st and 22nd August 2018 alongside the geotechnical trial pitting.

5.3 A waterlogged deposit containing organic material was observed to be present in trial pits 102 – 108 and 110 – 112 which were all situated in the southeast quadrant of the site. Depths between 0.1m and 1.4m were recorded. The depths increased towards the southeast corner of the area. This is consistent with the area labelled as 'Pestfurlong Moss' on the current Ordnance Survey map. No anthropogenic material was noted within the deposit.

5.4 Artefacts recovered from the surface of the harvested area of the site consisted mostly of 18th and 19th century pottery, including Buckley type coarse red earthenware, Victorian transfer print and some refined white earthenware. Glass, slag and copper alloy were also recovered. Further finds analysis is warranted.

5.5 No other significant archaeological features were encountered during the excavation work.

Ground Conditions

Natural Strata

5.6 Topsoil was encountered across the site to depths of c. 0.3m bgl and varied geographically becoming peat and clay based coincident with underlying strata.

5.7 The natural materials encountered during the intrusive investigation showed a geographical variability across the site. Typically, Peat deposits, of a dominantly pseudo-fibrous nature were encountered in the south east of the site with a thickness varying from 0.3m to 1.4m with increasing distance toward the south east. Peat deposits were generally underlain by sand and firm sandy clay.

5.8 The northern site area was dominated by cohesive deposits comprising sandy clay with a minor component of fine to coarse gravel with a generally rounded angularity.

Lithologies were variable from igneous granite to sedimentary mudstone, shale and red sandstone.

5.9 A summary of the strata beneath the site is shown in Table IV.

TABLE IV: SUMMARY OF STRATA BENEATH THE SITE

Depth to base of strata (mbgl)			Mean Thickness (m)	Typical Description
Max.	Min.	Mean		
0.7	0.2	0.34	0.34	Topsoil
1.7	0.6	0.87	0.74	Peat
3.7*	2.3	2.13	2.10	Superficial Deposits
Not encountered				Rockhead/Bedrock

* Base of strata not always proven.

Observations of contamination

- No visual or olfactory evidence of contamination was identified within the trial pits

Groundwater

5.10 Groundwater was encountered within TP104 at 2.7m bgl with the strike depths recorded in the borehole logs.

6 GEOTECHNICAL RESULTS

Introduction

6.1 Site investigation works have identified up to 1.4m of peat in the south western site area. This is underlain by superficial deposits of sandy slightly gravelly clay, which is also present below topsoil across the remainder of the site.

6.2 In total, seventeen samples of made ground, natural superficial material and rock were collected from various depths and tested for range of geotechnical parameters including:

- Moisture content;
- Particle Size Distribution;
- Atterberg Limits;
- 2.5kg Rammer Compaction;

6.3 All tests were performed in an accredited geotechnical laboratory and in accordance with the appropriate British Standard.

6.4 Compaction tests could only be completed on one sample, the remaining samples comprising peat, could not be tested due to their geotechnical nature, high moisture and high organic content.

Natural Deposits

Particle Size Distribution Test

6.5 Particle Size Distribution tests were performed on nine samples from the natural deposits. The range in quantities of each soil fraction is shown in Table V.

TABLE V: PSD NATURAL DEPOSITS

Soil Fraction	Total Percentage
Cobbles	0
Gravel	2 - 77
Sand	8 - 70
Silt/Clay	3 - 96

Moisture Content

6.6 Seven samples of superficial deposits (excluding peat) were tested for natural moisture content, results varied between 11% and 27%. One sample was noted to have a higher moisture content of 42% and was described as organic, indicating a potential mix of peat into the sample resulting in a higher moisture content.

6.7 Five peat samples tested for moisture content reported moisture contents between 108 and 591%. One sample was described by the laboratory as brown sandy clay, however based on the moisture content of 591% it is interpreted the laboratory description is incorrect.

Atterberg Limits

6.8 Six samples from the superficial natural deposits (excluding peat) were tested for determination of liquid and plastic limits. The results determined low to intermediate plasticity material with a plasticity index (PI) ranging between 17% (TP113) and 20% (TP103). One sample (TP111) reported a non-plastic determination.

6.9 Two samples of peat were tested for determination of liquid and plastic limit with one sample reporting a plasticity index (PI) of 76% and the second sample determined as non-plastic result.

Compaction (2.5kg Rammer)

6.10 One sample of material representing natural clay deposits was subjected to the 2.5kg rammer compaction test. As a result of that testing, a maximum dry density of 1.63 and an optimum moisture content of 23.5% were reported. The 95% of maximum dry density value has been plotted on the compaction curve and resulted in two moisture content values that delimit moisture content range of 17.25% to 27.25% at which the material is likely to be suitable for compaction. Consideration should be given to the required air voids where re-compaction works are to take place.

6.11 Peat samples were unable to be adequately tested for compaction parameters.

Rockhead

6.12 Rockhead was not encountered in any of the trial pits.

7 CONCLUSIONS AND RECOMMNEDATIONS

General

7.1 A brief examination of freely available historic maps confirm that there has been no built development on the site other than Pestfurlong Moss Farm which was present to the west of the site in 1893 and was not present after 1963.

7.2 A total of 16 trial pits (to approximately 3.7m maximum depth) were completed as part of this preliminary investigation. Observations from the intrusive work have confirmed the presence of topsoil, peat, sands and clays over the majority of the site. The location of peat within the site is shown on geological sections in appendix IV and on drawing SH11739-004. Bedrock was not encountered during the investigation.

7.3 Seventeen soil samples from across the site were tested for geotechnical parameters.

7.4 At this stage no contamination testing has been carried out on soil samples and the extent of any contamination at the site is unknown. However, given the history of the site no significant contamination is expected. Contamination testing of soils is likely to be required as part of any future planning process. This should be taken into account in the Health and Safety plan under the CDM regulations. Where possible any groundworks on site should be designed and planned to minimise the exposure of workers to contaminated soil. Where risks cannot be removed entirely at this planning stage, mitigation measures should be employed and may include the use of personal protective clothing (PPE) including gloves and respiratory facemasks, dust suppression or other methods.

Surface Water and Groundwater

7.5 Groundwater levels encountered at the site show that the groundwater is generally more than 3m below ground level with the exception of trial pit 104 where an inflow was encountered at 2.7m.

7.6 The risk to surface and groundwater from any potential contamination is considered to be low due to the cohesive nature of the superficial deposits and the sites geographical location, the nearest rated surface watercourse, Glaze Brook, being 1500m to the East of the site.

Ground Gas

7.7 No ground gas monitoring has been carried out as part of this investigation. However, given the ground conditions it is likely that concentrations of ground gas may be

present on the site. The proximity of the landfill site may also increase the risk from ground gas. It is likely that monitoring of ground gas will be required as a part of any future planning application and may also result in gas protection measures for buildings a below ground structures.

Coal Mining

7.8 The site is not in an area affected by shallow mining.

Geotechnical and foundation design

7.9 Groundwater levels encountered at the site show that the groundwater is generally more than 3m below ground level with the exception of trial pit 104 where an inflow was encountered at 2.7m.

7.10 Excavations for trial pits largely remained stable for trial pitting purposes. However, it should be anticipated that excavations for the foundations might not remain stable for long periods of time in the areas where weak peat strata are present.

7.11 The clay deposits on the site are likely to be suitable as a founding medium, dependant on the required future loads. The peat deposits on the site are not suitable as a founding stratum and will either require ground improvement or removal and replacement.

7.12 Differential settlement is considered to be a significant risk at the site due to the presence of peat. However, the area and depth of peat may allow either excavation of the peat and replacement with suitable fill or alternative engineering solutions such as surcharging to reduce the risk.

7.13 In circumstances where abnormally heavy loading is to be catered for a piled solution may be appropriate.

Archaeology

7.14 A watching brief was carried out during the trial pit excavations. No artefacts were found to signify significant archaeological interest at the site. Future works should consider involvement of archaeological regulatory bodies during the planning process.

APPENDIX I

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Where any site observations have been carried out, these have been restricted to a level of detail required to meet the stated objectives of the services. The results from any site observations made may vary and further confirmatory work should be made after the issuance of this Report. Wardell Armstrong LLP does not guarantee or warrant any estimates or projections contained in this Report.

APPENDIX II

Trial Pit Logs

wardell armstrong Unit 5 Newton Business Centre Thorncliffe Park Estate Chapeltown Sheffield. S35 2PH	**Trial Pit Log**		TrialPit No **TP101** Sheet 1 of 1
Project Name: Warrington MSA	Project No. SH11739	Co-ords: 367022.04 - 393897.75 Level:	Date 21/08/2018
Location: Warrington		Dimensions (m): Depth 2.90	Scale 1:25
Client: Extra MSA Group			Logged MB

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.25			Soft brown organic sandy silty clay TOPSOIL.
				0.60			Medium dense white brown silty SAND.
				1.40			Firm grey brown mottled sandy CLAY.
	2.50 2.50	B					Soft red brown very sandy slighly gravelly CLAY. Gravel of rounded to subrounded fine to coarse sandstone and mudstone / shale.
				2.90			End of Pit at 2.90m
	3.30						

1
2
3
4
5

Remarks:

Stability:

AGS

wardell armstrong Unit 5 Newton Business Centre Thorncliffe Park Estate Chapeltown Sheffield. S35 2PH	**Trial Pit Log**		TrialPit No **TP102** Sheet 1 of 1
Project Name: Warrington MSA	Project No. SH11739	Co-ords: 367054.84 - 393797.98 Level:	Date 21/08/2018
Location: Warrington		Dimensions (m):	Scale 1:25
Client: Extra MSA Group		Depth 3.30	Logged MB

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
							Soft dark brown organic peat TOPSOIL.
				0.30			Soft dark brown organic fibrous PEAT. Wood fragments.
				0.60			Firm grey brown mottled silty CLAY. Rare rootlets and vegetation fragments.
	1.50						
				3.30			End of Pit at 3.30m

Remarks:

Stability:

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Trial Pit Log

TrialPit No
TP103
Sheet 1 of 1

Project Name: Warrington MSA	Project No. SH11739	Co-ords: 367088.19 - 393674.03 Level:	Date 21/08/2018
Location: Warrington		Dimensions (m):	Scale 1:25
Client: Extra MSA Group		Depth 3.00	Logged MB

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Soft dark brown organic peat TOPSOIL.
				0.30			
	0.50	B					Soft orange brown organic fibrous PEAT. Tree stump and numerous wood / vegetation fragments.
				0.65			
							Firm red brown very sandy CLAY.
	1.30						
				1.80			Firm grey brown mottled very sandy CLAY. Occasional pockets of sand and occasional gravel of angular to subrounded fine to coarse mudstone and sandstone.
	3.00	B		3.00			End of Pit at 3.00m

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Remarks:

Stability:

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Trial Pit Log

TrialPit No
TP104
Sheet 1 of 1

Project Name: Warrington MSA	Project No. SH11739	Co-ords: 367115.19 - 393559.36 Level:	Date 21/08/2018
Location: Warrington		Dimensions (m):	Scale 1:25
Client: Extra MSA Group		Depth 3.00	Logged MB

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Soft dark brown black organic peat TOPSOIL.
				0.40			Very soft dark brown clayey pseudo-fibrous PEAT. Numerous decomposing vegetation / woody fragments with intact pieces of wood and bark.
	1.60	B		1.70			Very soft grey very sandy gravelly CLAY. Gravel of subrounded to rounded fine mudstone, sandstone and red sandstone.
▽	3.00	B		3.00			End of Pit at 3.00m

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Remarks:

Stability:

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Trial Pit Log

TrialPit No
TP105
Sheet 1 of 1

Project Name: Warrington MSA	Project No. SH11739	Co-ords: 367133.86 - 393476.75 Level:	Date 22/08/2018
Location: Warrington		Dimensions (m):	Scale 1:25
Client: Extra MSA Group		Depth 3.10	Logged MB

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Soft dark brown sluightly sandy organic peat TOPSOIL.
				0.30			Soft dark brown pseudo-fibrous PEAT. Numerous wood and decomposing vegetation fragments.
				1.70			Soft light grey brown very sandy CLAY. Rare gravel of rounded medium quartzite.
				2.30			Soft red grey very sandy slightly gravelly CLAY. Gravel of subangular to subrounded fine shale, sandstone and quartz.
				2.80			Loose orange red slightly gravelly slightly clayey SAND. Gravel of rounded coarse mudstone and sandstone.
				2.90			Soft red brown slightly gravelly sandy CLAY. Gravel of rounded medium to coarse sandstone. Occasional vegetation fragments and rootlets.
				3.10			End of Pit at 3.10m

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Remarks:

Stability:

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Trial Pit Log

TrialPit No
TP106
Sheet 1 of 1

Project Name: Warrington MSA	Project No. SH11739	Co-ords: 367149.71 - 393399.13 Level:	Date 22/08/2018
Location: Warrington		Dimensions (m):	Scale 1:25
Client: Extra MSA Group		Depth 3.10	Logged MB

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
							Soft dark brown slightly sandy organic peat TOPSOIL.
				0.40			
							Soft dark brown pseudo-fibrous PEAT. Numerous fragments of vegetation and wood.
	1.00	B					
				1.40			
							Soft red grey mottled very sandy slightly gravelly CLAY. Gravel of subangular to rounded medium granite, mudstone and quartzite.
	2.30						
	2.50	B					
				2.80			
							Firm red grey sandy CLAY. Rare gravel of fine rounded quartz.
				3.10			
							End of Pit at 3.10m

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Remarks:

Stability:

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Trial Pit Log

TrialPit No
TP107
Sheet 1 of 1

Project Name: Warrington MSA	Project No. SH11739	Co-ords: 367165.67 - 393336.44 Level:	Date 22/08/2018
Location: Warrington		Dimensions (m):	Scale 1:25
Client: Extra MSA Group		Depth 2.90	Logged MB

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Soft dark brown slightly sandy organic peat TOPSOIL.
				0.70			Soft dark brown pseudo-fibrous PEAT. Numerous fragments of vegetation and wood.
				1.40			Soft to firm light grey sandy slightly gravelly CLAY. Gravel of subangular to angular fine mudstone, sandstone and quartzite.
				1.70			Soft to firm red grey sandy slightly gravelly CLAY. Gravel of subangular to rounded fine mudstone and quartzite.
	2.00						
				2.90			End of Pit at 2.90m

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Remarks:

Stability:

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Trial Pit Log

TrialPit No
TP108
Sheet 1 of 1

Project Name: Warrington MSA	Project No. SH11739	Co-ords: 367111.44 - 393328.29	Date 22/08/2018
Location: Warrington		Dimensions (m):	Scale 1:25
Client: Extra MSA Group		Depth 2.40	Logged MB

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
							Soft dark brown organic peat TOPSOIL.
				0.20			Soft dark brown pseudo-fibrous PEAT. Numerous fragments of vegetation and wood.
	0.50	B					
				1.00			Loose light brown grey SAND.
				1.50			Soft to firm red grey sandy CLAY.
	2.40	B		2.40			End of Pit at 2.40m

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Remarks:

Stability:

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Trial Pit Log

TrialPit No
TP109
Sheet 1 of 1

Project Name: Warrington MSA	Project No. SH11739	Co-ords: 366969.07 - 393355.59 Level:	Date 22/08/2018
Location: Warrington		Dimensions (m):	Scale 1:25
Client: Extra MSA Group		Depth 3.20	Logged MB

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
							Soft dark brown black slightly sandy organic TOPSOIL.
				0.30			Soft to firm grey brown sandy CLAY. Iron staining.
				1.10			Soft grey brown mottled sandy CLAY.
	1.70 1.70	B					
				2.10			Firm to stiff very sandy laminated grey brown CLAY.
				3.20			End of Pit at 3.20m

Remarks:

Stability:

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Trial Pit Log

TrialPit No
TP110
Sheet 1 of 1

Project Name: Warrington MSA	Project No. SH11739	Co-ords: 367047.30 - 393431.13 Level:	Date 22/08/2018
Location: Warrington		Dimensions (m):	Scale 1:25
Client: Extra MSA Group		Depth 2.70	Logged MB

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Soft dark brown black slightly sandy organic peat TOPSOIL.
	0.40 - 1.60	B		0.40			Soft orange brown pseudo-fibrous PEAT. Numerous fragments of vegetation and wood. Tree trunk.
				1.60			Firm grey sandy slightly gravelly CLAY. Gravel of rounded fine to medium shale and sandstone.
	2.00			2.10			Firm red grey laminated sandy CLAY.
	2.70			2.70			End of Pit at 2.70m

Remarks:

Stability:

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Trial Pit Log

TrialPit No **TP111**
Sheet 1 of 1

Project Name: Warrington MSA	Project No. SH11739	Co-ords: 366979.31 - 393494.89 Level:	Date 22/08/2018
Location: Warrington		Dimensions (m): Depth 3.00	Scale 1:25
Client: Extra MSA Group			Logged MB

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.30			Soft dark brown slightly clayey organic TOPSOIL.
				0.55			Soft dark brown pseudo-fibrous PEAT. Numerous fragments of vegetation and wood.
	1.80 1.90	B		2.60			Soft to firm red grey slightly sandy CLAY. Rootlets.
	2.90	B		3.00			Dense brown slightly silty SAND. End of Pit at 3.00m

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Remarks:

Stability:

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Project Name: Warrington MSA	Project No. SH11739	Co-ords: 367051.61 - 393539.18 Level:	Date 22/08/2018
Location: Warrington		Dimensions (m):	Scale 1:25
Client: Extra MSA Group		Depth 2.30	Logged MB

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.20			Soft dark brown slightly sandy organic TOPSOIL.
				0.70			Soft orange brown pseudo-fibrous PEAT. Numerous fragments of vegetation and wood. Tree trunk.
	2.00						Firm to stiff grey brown mottled sandy silty CLAY. Rare gravel of rounded fine quartz.
	2.30 2.30	B		2.30			End of Pit at 2.30m

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Remarks:

Stability:

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Trial Pit Log

TrialPit No **TP113**
Sheet 1 of 1

Project Name: Warrington MSA	Project No. SH11739	Co-ords: 366990.66 - 393587.78 Level:	Date 21/08/2018
Location: Warrington		Dimensions (m):	Scale 1:25
Client: Extra MSA Group		Depth 2.50	Logged MB

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Soft brown slightly sandy slightly gravelly clay TOPSOIL. Gravel of subrounded to rounded fine to medium sandstone.
				0.30			Loose grey white silty SAND.
				0.60			Firm red brown organic sandy CLAY. Interbeds of sand with rootlets and fragments of vegetation..
				1.10			Firm red brown sandy silty CLAY. Occasional red sandstone gravel.
	1.40			1.50			Firm to stiff friable grey brown mottled sandy slightly gravelly CLAY. Gravel of subrounded fine to medium dark mudstone . Shale and limestone. Rootlets.
	2.50	B		2.50			End of Pit at 2.50m

Remarks:

Stability:

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Project Name: Warrington MSA	Project No. SH11739	Co-ords: 366990.23 - 393679.33 Level:	Date 21/08/2018
Location: Warrington		Dimensions (m): Depth 3.70	Scale 1:25
Client: Extra MSA Group			Logged MB

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
							Soft dark brown organic slightly sandy silty clay TOPSOIL. Rare sandstone gravel.
				0.40			Medium dense yellow white silty SAND.
				0.60			Firm orange brown organic sandy CLAY. Occasional rootlets and pockets of sand.
				1.10			Firm to stiff grey brown mottled sandy silty CLAY. Occasional gravel of subrounded fine to coarse shale and rare granite. Becoming friable with depth.
	1.30						
				3.30			Soft red brown laminated silty CLAY.
				3.40			Loose orange fine to medium grained SAND.
				3.50			Firm red brown laminated silty CLAY.
	3.70 3.70	B		3.70			End of Pit at 3.70m

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Remarks:

Stability:

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Trial Pit Log

TrialPit No
TP115
Sheet 1 of 1

Project Name: Warrington MSA	Project No. SH11739	Co-ords: 366934.43 - 393803.09 Level:	Date 21/08/2018
Location: Warrington		Dimensions (m):	Scale 1:25
Client: Extra MSA Group		Depth 3.20	Logged MB

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.30			Soft dark brown organic slightly sandy silty clay TOPSOIL.
				0.60			Firm yellow brown sandy silty CLAY.
				2.60			Firm grey brown mottled silty CLAY. Occasional gravel of rounded fine to medium shale and weathered red sandstone.
	2.80			3.20			Firm red brown laminated slightly sandy silty CLAY. Rare gravel of rounded to subrounded shale and sandstone.
							End of Pit at 3.20m

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Remarks:

Stability:

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Trial Pit Log

TrialPit No
TP116
Sheet 1 of 1

Project Name: Warrington MSA	Project No. SH11739	Co-ords: 366910.81 - 393890.00 Level:	Date 21/08/2018
Location: Warrington		Dimensions (m):	Scale 1:25
Client: Extra MSA Group		Depth 3.00	Logged MB

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Soft brown organic sandy silty clay TOPSOIL.
				0.40			Firm orange brown sandy silty CLAY. Rootlets.
				0.60			Firm grey brown mottled sandy CLAY. Occasional gravel of rounded fine to medium dark mudstone / shale and rootlets.
				1.20			Firm red brown sandy laminated CLAY. Occasional pockets of sand.
	3.00 3.00	B		2.90 3.00			Soft red brown very sandy gravelly CLAY. Gravel of rounded to subrounded medium to coarse quartz, igneous lithology and sandstone. End of Pit at 3.00m

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Remarks:

Stability:

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APPENDIX III

Geotechnical Laboratory Results

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UKAS TESTING
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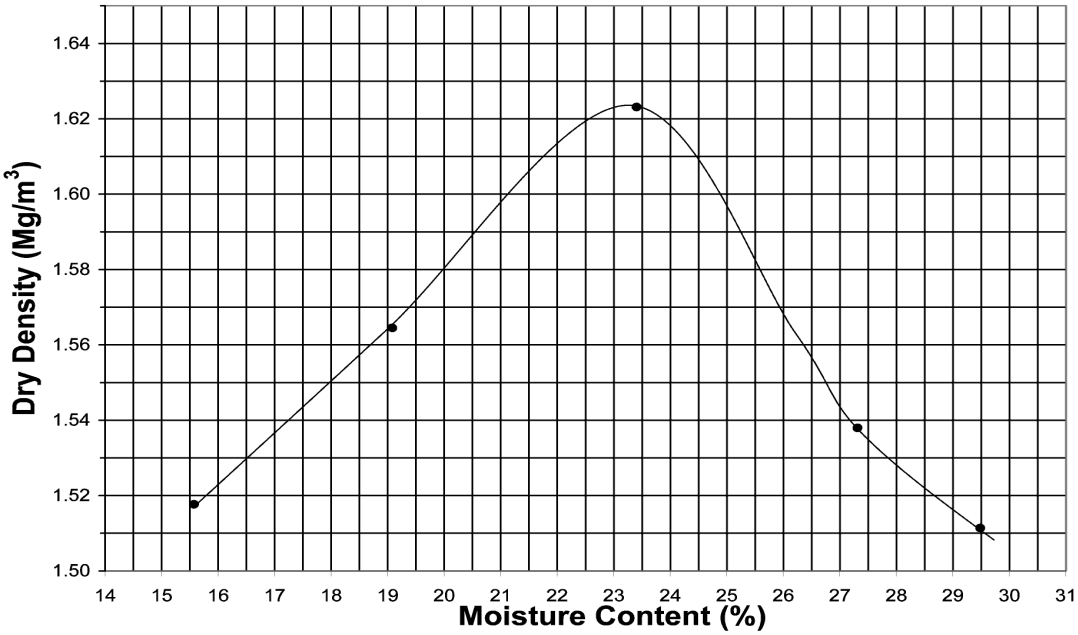
TEST REPORT

Maximum Dry Density and Optimum Moisture Content

Report No:	**WAM0011630/705/S0**	**Report Date:**	**21 September 2018**
		Our Contract Ref:	51044945
Client:	WARDELL ARMSTRONG LLP		
Address:	SIR HENRY DOULTON HOUSE FORGE LANE ETRURIA STOKE ON TRENT ST1 5BD	Sample No.	55040705
		Client Sample Ref:	TP111 - B1
		Date Sampled:	23 Aug 2018
		Date Received:	24 Aug 2018
Client Contact:	Matthew Bigging	Date Tested:	19 Sep 2018
Site:	**Warrington**		
Location:	B1		
Description:	Brown CLAY		
Material Specification:	Not given	Material Supplier:	Not given
Sample Type:	Bulk Bag	Material Source:	Not given
Depth:	1.80 - 1.80	Sampling Certificate:	Not Received
Preparation Method:	BS1377: Part 1:1990 7.6.2 (Natural) & BS 1377-4:1990 3.2.4.1/3.2.6.1	Samples Submitted by:	Client
		Sampled by:	Client

Results :

Number of Samples Used:	Multiple	Amount Retained on 37.5mm sieve (%):	0.0	Prepared to Pass:	20mm
Particle Density (Mg/m³):	Not Required	Amount Retained on 20.0mm sieve (%):	0.0	Method Used:	Neither
		As received Moisture Content (%):	11		



Optimum Moisture Content (%): 23.5 **Maximum Dry Density (Mg/m³):** 1.63

Comments: Air Voids lines not requested by Client

Certified that the test was determined in accordance with BS1377: Part 4 1990: Clause 3.3

Signed: P. Thomas

Paul Thomas - Field Section Manager
for and on behalf of SOCOTEC UK Limited

Form S5 v14 12/16

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TEST REPORT

Plastic Limits

Report No:	**WAM0011630/707/M13**	**Report Date:**	**21 September 2018**
		Our Contract Ref:	51044945
Client:	WARDELL ARMSTRONG LLP	Tested By:	SOCOTEC Warrington
Address:	SIR HENRY DOULTON HOUSE FORGE LANE ETRURIA STOKE ON TRENT ST1 5BD	Date Sampled:	23 Aug 18
		Date Received:	24 Aug 18
Client Contact:	Matthew Bigging	Date Tested:	13 Sep 18
Site:	Warrington		
		Sample Type:	BULK BAG
		Sampling Cert Received:	No
		Samples Submitted by:	Client
Method of preparation:	BS1377-2:1990 4.2.3	Sampled by:	Client

Results:

Sample Reference	Client's Ref	Location	Description	Moisture Content (%)	Plastic Limit	% Passing 425 µm
55040706	TP111 - B2	** Error **	Red/Brown Sandy CLAY, Occ Gravel	N/A	Non Plastic	81
55040707	TP110 -B1	** Error **	Black PEAT	524	Non Plastic	80

As Received, Coarse particles removed by hand prior to test
*** Washed over 425µm BS Test Sieve**

Certified that the Plastic Limits were determined in accordance with BS1377-2: 1990 Clause 5.0
Certified that the Moisture Content was determined in accordance with BS1377-2: 1990: 3.2
Method of Preparation: BS 1377-1:1990 7.4.3 & BS1377-2:1990 4.2.3/4.2.4

Signed: P. Thomas

Paul Thomas - Field Section Manager
for and on behalf of SOCOTEC UK Limited

Form S1 v9 7/06

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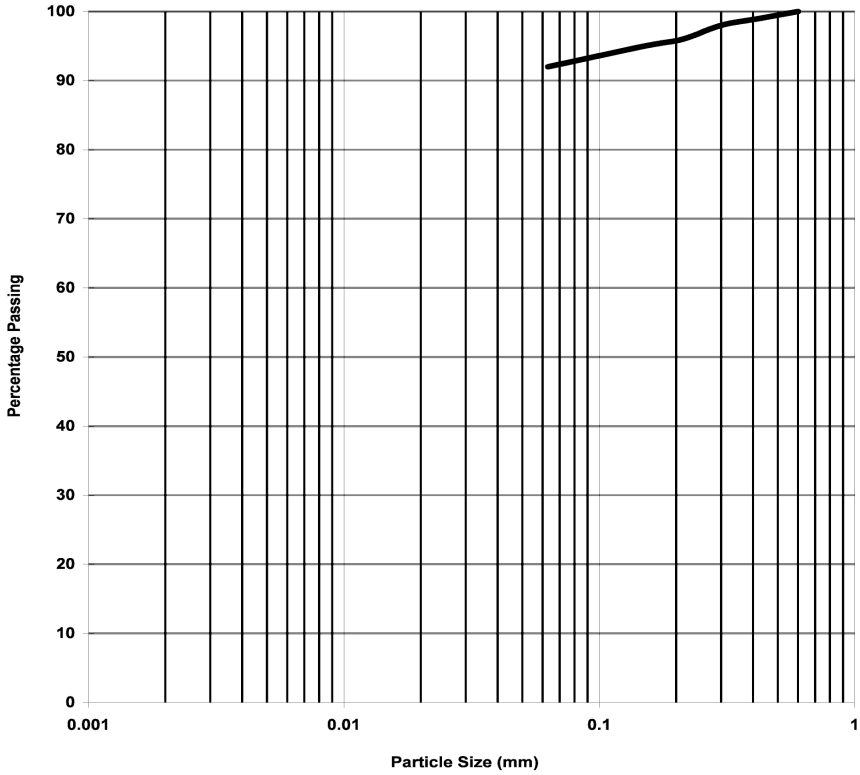
TEST REPORT

Particle Size Distribution

Report No:	**WAM0011630/693/M14**	**Report Date:**	**21 September 2018**
Client:	WARDELL ARMSTRONG LLP	Contract No:	51044945
Address:	SIR HENRY DOULTON HOUSE FORGE LANE ETRURIA STOKE ON TRENT ST1 5BD	Tested By:	SOCOTEC Warrington
		Sample No.	55040693
		Client Ref:	TP114 - B1
		Sampled by:	Client
Client Contact:	Matthew Bigging	Date Sampled:	23 Aug 2018
Site:	**Warrington**	Date Received:	24 Aug 2018
Samples Location:	B1	Date Tested:	11 Sep 2018
Material Description:	Brown CLAY		
Material Specification:	Not given	Material Supplier:	Not given
Type of Sample:	Bulk Bag	Material Source:	Not given
Preparation method:	BS1377: Part 1: 1990 7.4.5	Sampling Certificate:	Not Received
Moisture Content (%)	**27**		

Results :



Sieve	% Pass	Spec limits	
0.6	100		
0.425	99		
0.3	98		
0.212	96		
0.15	95		
0.063	92		

Remarks: **Uniformity Coefficient: N/A**

Certified that the Particle Size Distribution was determined in accordance with BS 1377-2 : 1990 : 9.2

Method of Preparation: BS 1377-1:1990 7.4.5
Certified that the Moisture Content was determined in accordance with BS1377-2: 1990: 3.2

Signed:

P. Thomas

Paul Thomas - Field Section Manager

for and on behalf of SOCOTEC UK Limited

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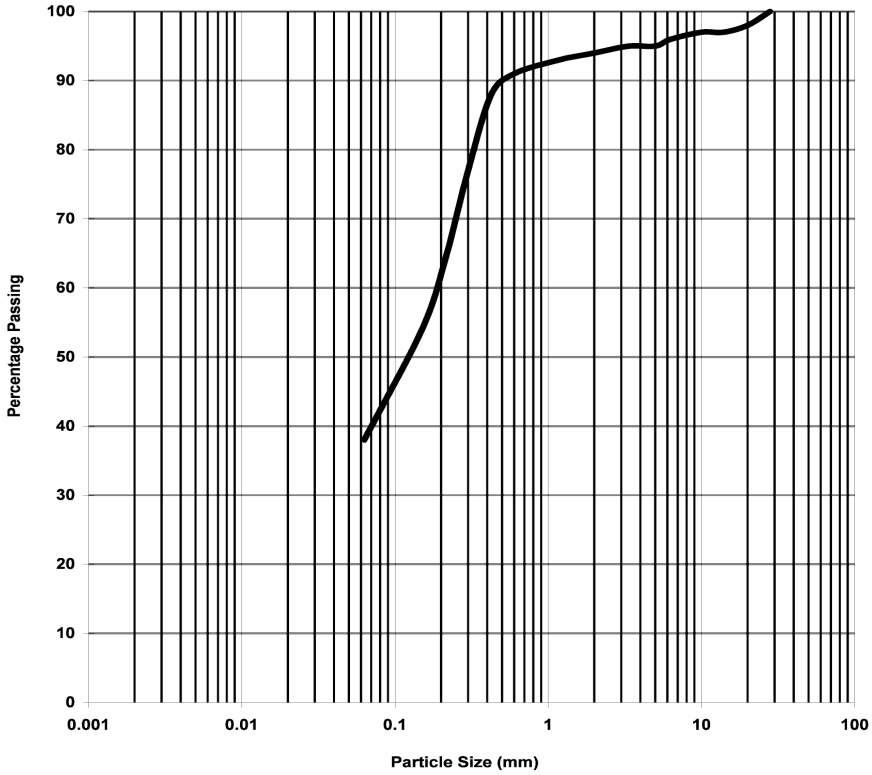
TEST REPORT

Particle Size Distribution

Report No:	**WAM0011630/695/M14**	**Report Date:**	**21 September 2018**
Client:	WARDELL ARMSTRONG LLP	Contract No:	51044945
Address:	SIR HENRY DOULTON HOUSE FORGE LANE ETRURIA STOKE ON TRENT ST1 5BD	Tested By:	SOCOTEC Warrington
		Sample No.	55040695
		Client Ref:	TP101 -B1
		Sampled by:	Client
Client Contact:	Matthew Bigging	Date Sampled:	23 Aug 2018
Site:	**Warrington**	Date Received:	24 Aug 2018
Samples Location:	B1	Date Tested:	11 Sep 2018
Material Description:	Brown Sandy CLAY & Gravel		
Material Specification:	Not given	Material Supplier:	Not given
Type of Sample:	Bulk Bag	Material Source:	Not given
Preparation method:	BS1377: Part 1: 1990 7.4.5	Sampling Certificate:	Not Received
Moisture Content (%)	**14**		

Results :



Sieve	% Pass	Spec limits	
28	100		
20	98		
14	97		
10	97		
6.3	96		
5	95		
3.35	95		
2	94		
1.18	93		
0.6	91		
0.425	88		
0.3	77		
0.212	64		
0.15	54		
0.063	38		

Remarks:

Uniformity Coefficient: N/A

Certified that the Particle Size Distribution was determined in accordance with BS 1377-2 : 1990 : 9.2

Method of Preparation: BS 1377-1:1990 7.4.5
Certified that the Moisture Content was determined in accordance with BS1377-2: 1990: 3.2

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Paul Thomas - Field Section Manager

for and on behalf of SOCOTEC UK Limited

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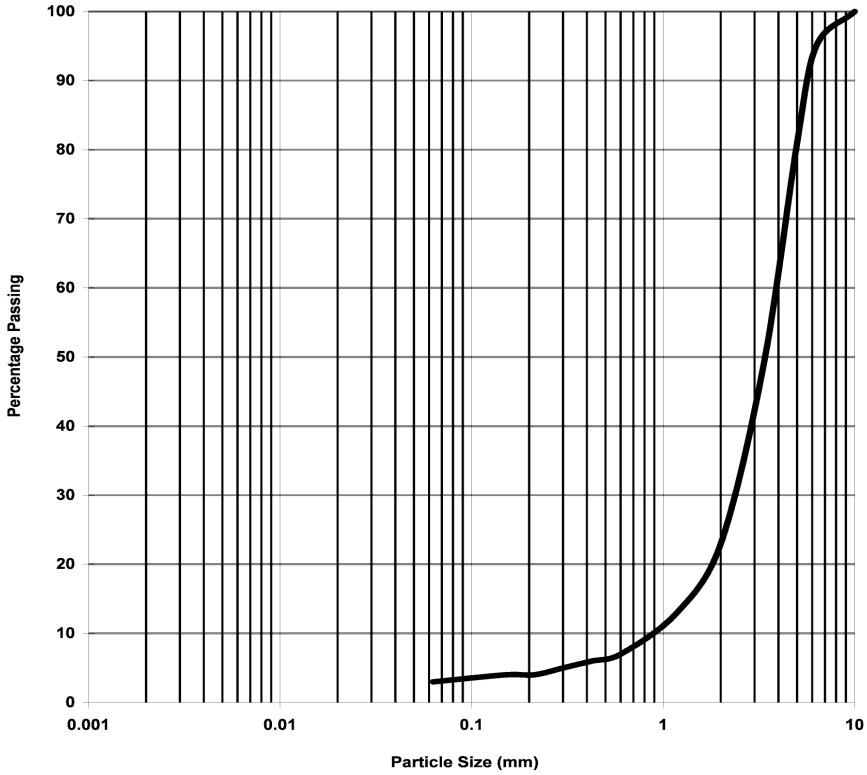
TEST REPORT

Particle Size Distribution

Report No:	**WAM0011630/698/M14**	**Report Date:**	**21 September 2018**
Client:	WARDELL ARMSTRONG LLP	Contract No:	51044945
Address:	SIR HENRY DOULTON HOUSE FORGE LANE ETRURIA STOKE ON TRENT ST1 5BD	Tested By:	SOCOTEC Warrington
		Sample No.	55040698
		Client Ref:	TP104 -B1
		Sampled by:	Client
Client Contact:	Matthew Bigging	Date Sampled:	23 Aug 2018
Site:	**Warrington**	Date Received:	24 Aug 2018
Samples Location:	B1	Date Tested:	11 Sep 2018
Material Description:	Brown Sandy GRAVEL		
Material Specification:	Not given	Material Supplier:	Not given
Type of Sample:	Bulk Bag	Material Source:	Not given
Preparation method:	BS1377: Part 1: 1990 7.4.5	Sampling Certificate:	Not Received
Moisture Content (%)	**591**		

Results :



Sieve	% Pass	Spec limits	
10	100		
6.3	95		
5	81		
3.35	49		
2	23		
1.18	13		
0.6	7		
0.425	6		
0.3	5		
0.212	4		
0.15	4		
0.063	3		

Remarks: **Uniformity Coefficient: 4.4**

Certified that the Particle Size Distribution was determined in accordance with BS 1377-2 : 1990 : 9.2
Uniformity Coefficient carried out in accordance to BS EN ISO 14688-2 2004
Method of Preparation: BS 1377-1:1990 7.4.5
Certified that the Moisture Content was determined in accordance with BS1377-2: 1990: 3.2

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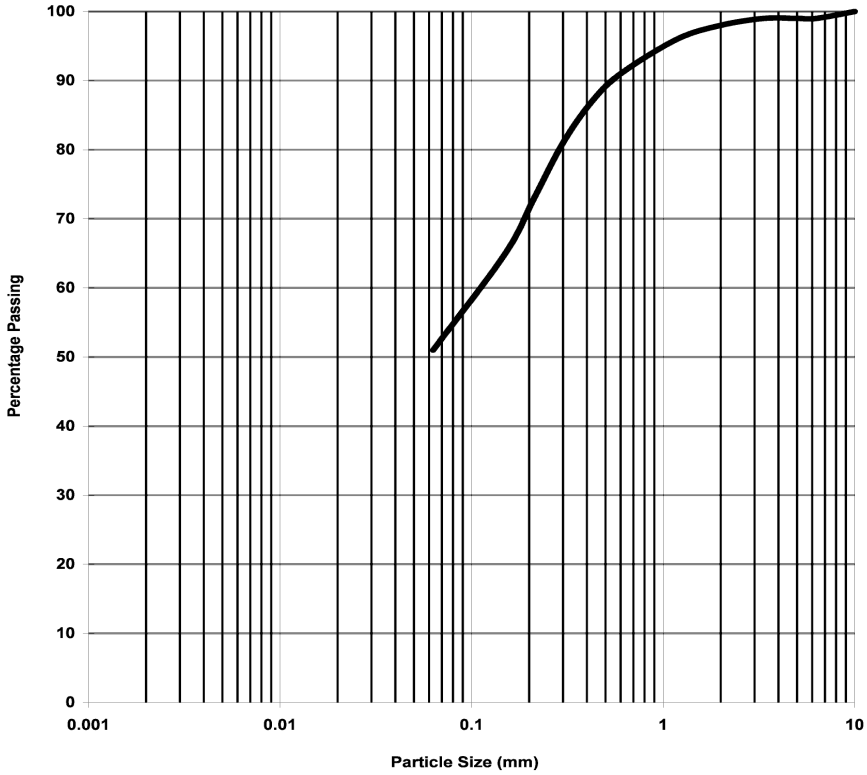
UKAS TESTING
0001

TEST REPORT

Particle Size Distribution

Report No:	**WAM0011630/701/M14**	**Report Date:**	**21 September 2018**
Client:	WARDELL ARMSTRONG LLP	Contract No:	51044945
Address:	SIR HENRY DOULTON HOUSE FORGE LANE ETRURIA STOKE ON TRENT ST1 5BD	Tested By:	SOCOTEC Warrington
		Sample No.	55040701
		Client Ref:	TP106 - B2
		Sampled by:	Client
Client Contact:	Matthew Bigging	Date Sampled:	23 Aug 2018
Site:	**Warrington**	Date Received:	24 Aug 2018
Samples Location:	B2	Date Tested:	11 Sep 2018
Material Description:	Brown Sandy CLAY		
Material Specification:	Not given	Material Supplier:	Not given
Type of Sample:	Bulk Bag	Material Source:	Not given
Preparation method:	BS1377: Part 1: 1990 7.4.5	Sampling Certificate:	Not Received
Moisture Content (%)	**27**		

Results :



Sieve	% Pass	Spec limits	
10	100		
6.3	99		
5	99		
3.35	99		
2	98		
1.18	96		
0.6	91		
0.425	87		
0.3	81		
0.212	73		
0.15	65		
0.063	51		

Remarks:

Uniformity Coefficient: N/A

Certified that the Particle Size Distribution was determined in accordance with BS 1377-2 : 1990 : 9.2

Method of Preparation: BS 1377-1:1990 7.4.5
Certified that the Moisture Content was determined in accordance with BS1377-2: 1990: 3.2

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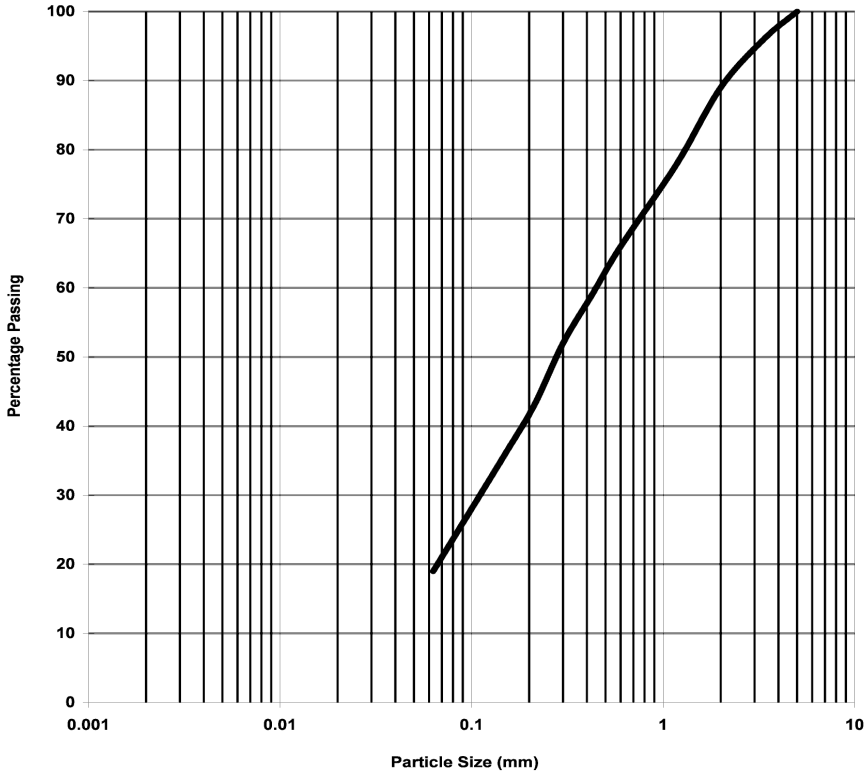
TEST REPORT

Particle Size Distribution

Report No:	**WAM0011630/702/M14**	**Report Date:**	**21 September 2018**
Client:	WARDELL ARMSTRONG LLP	Contract No:	51044945
Address:	SIR HENRY DOULTON HOUSE FORGE LANE ETRURIA STOKE ON TRENT ST1 5BD	Tested By:	SOCOTEC Warrington
		Sample No.	55040702
		Client Ref:	TP108 - B1
		Sampled by:	Client
Client Contact:	Matthew Bigging	Date Sampled:	23 Aug 2018
Site:	**Warrington**	Date Received:	24 Aug 2018
Samples Location:	B1	Date Tested:	11 Sep 2018
Material Description:	PEAT		
Material Specification:	Not given	Material Supplier:	Not given
Type of Sample:	Bulk Bag	Material Source:	Not given
Preparation method:	BS1377: Part 1: 1990 7.4.5	Sampling Certificate:	Not Received
Moisture Content (%)	**108**		

Results :



Sieve	% Pass	Spec limits	
5	100		
3.35	96		
2	89		
1.18	78		
0.6	66		
0.425	59		
0.3	52		
0.212	43		
0.15	36		
0.063	19		

Remarks:

Uniformity Coefficient: N/A

Certified that the Particle Size Distribution was determined in accordance with BS 1377-2 : 1990 : 9.2

Method of Preparation: BS 1377-1:1990 7.4.5
Certified that the Moisture Content was determined in accordance with BS1377-2: 1990: 3.2

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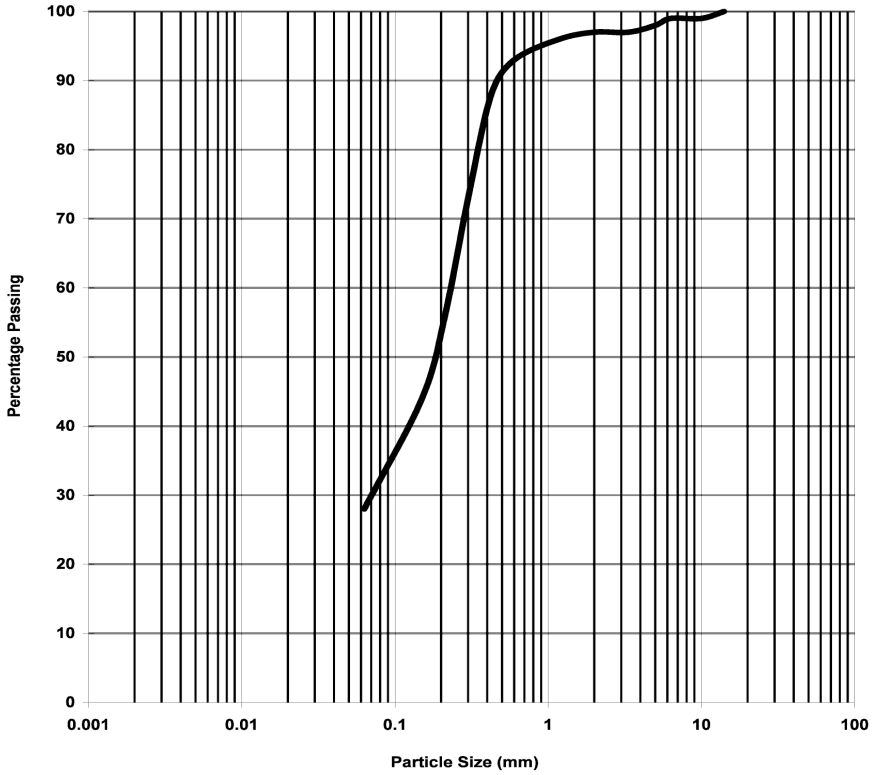
TEST REPORT

Particle Size Distribution

Report No:	**WAM0011630/706/M14**	**Report Date:**	**21 September 2018**
Client:	WARDELL ARMSTRONG LLP	Contract No:	51044945
Address:	SIR HENRY DOULTON HOUSE FORGE LANE ETRURIA STOKE ON TRENT ST1 5BD	Tested By:	SOCOTEC Warrington
		Sample No.	55040706
		Client Ref:	TP111 - B2
		Sampled by:	Client
Client Contact:	Matthew Bigging	Date Sampled:	23 Aug 2018
Site:	**Warrington**	Date Received:	24 Aug 2018
Samples Location:	B2	Date Tested:	11 Sep 2018
Material Description:	Red/Brown Sandy CLAY, Occ Gravel		
Material Specification:	Not given	Material Supplier:	Not given
Type of Sample:	Bulk Bag	Material Source:	Not given
Preparation method:	BS1377: Part 1: 1990 7.4.5	Sampling Certificate:	Not Received
Moisture Content (%)	**11**		

Results :



Sieve	% Pass	Spec limits	
14	100		
10	99		
6.3	99		
5	98		
3.35	97		
2	97		
1.18	96		
0.6	93		
0.425	88		
0.3	73		
0.212	56		
0.15	44		
0.063	28		

Remarks:

Uniformity Coefficient: N/A

Certified that the Particle Size Distribution was determined in accordance with BS 1377-2 : 1990 : 9.2

Method of Preparation: BS 1377-1:1990 7.4.5
Certified that the Moisture Content was determined in accordance with BS1377-2: 1990: 3.2

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TEST REPORT

Liquid and Plastic Limits and Plasticity Indices

Report No: **WAM0011630/703/M6**

Report Date: **21 September 2018**

Our Contract Ref: 51044945

Client: WARDELL ARMSTRONG LLP

Tested By: SOCOTEC Warrington

Address: SIR HENRY DOULTON HOUSE
FORGE LANE
ETRURIA
STOKE ON TRENT
ST1 5BD

Date Sampled: 23 Aug 2018

Date Received: 24 Aug 2018

Client Contact: Matthew Bigging

Date Tested: 13 Sep 2018

Site: Warrington

Sample Type: BULK BAG

Sampling Certificate: Not Received

Samples Submitted by: Client

Method of preparation: BS1377-1:1990 7.4.3 & BS 1377-2:1990 4.2

Sampled by: Client

Results:

Sample Reference	Client's Ref	Location	Description	Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	% Passing on 425 µm
55040692	TP113 -B1	B1 2.50 - 2.50	Dark Brown CLAY, Occ Sand & Gravel	N/A	32	17	15	**92
55040694	TP116 - B1	Soft red brown CLAY, occ sand and f-m gravel 3.00 -	Red/Brown CLAY, Occ Sand & Gravel	N/A	26	20	6	**93
55040697	TP103-B2	B2 3.00 - 3.00	Brown/Grey CLAY	N/A	39	19	20	**95
55040702	TP108 - B1	B1 0.50 - 0.50	PEAT	108	132	56	76	**83
55040703	TP108 - B2	B2 2.40 - 2.40	Brown/Grey CLAY, Occ Sand & Gravel	N/A	25	16	9	**94

*** Washed over 425µm BS Test Sieve**
**** As received, coarse particles removed by hand prior to test**

Comments:

Actual % passing 425µm BS Test Sieve from separate grading analysisEstimated % passing 425µm BS Test Sieve

Certified that the Liquid and Plastic Limits and Plasticity Indices were determined in accordance with BS1377-2: 1990 Clauses 4.4, 5.0 and 5.4 respectively
Certified that the Moisture Content was determined in accordance with BS1377-2: 1990: 3.2

Signed:

P. Thomas

Paul Thomas - Field Section Manager

for and on behalf of SOCOTEC UK Limited

Form S1 v9 7/06

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SOCOTEC

UKAS TESTING
0001

TEST REPORT

Moisture Content

Report No: **WAM0011630/708/M12**

Report Date: **21 September 2018**

Our Contract Ref: 51044945

Client: WARDELL ARMSTRONG LLP

Tested By: SOCOTEC Warrington

Address: Sir Henry Doulton House
Forge Lane
Etruria
Stoke On Trent
ST1 5BD

Date Sampled: 23 Aug 2018

Date Received: 24 Aug 2018

Client Contact: Matthew Bigging

Date Tested: 4 Sep 2018

Site: Warrington

Sampling Certificate: Not Received

Samples Submitted by: Client

Sampled by: Client

Method of preparation: BS1377-1:1990 7.4.2

Results:

Sample Reference	Clients Reference	Location	Moisture Content(%)	Sample Type	Description
55040693	TP114 - B1	B1 3.70 - 3.70m	27	Bulk Bag	Brown CLAY
55040695	TP101 -B1	B1 2.50 - 2.50m	14	Bulk Bag	Brown Sandy CLAY & Gravel
55040696	TP103 -B1	B1 0.50 - 0.50m	150	Bulk Bag	PEAT
55040698	TP104 -B1	B1 1.60 - 1.60m	591	Bulk Bag	Brown Sandy GRAVEL
55040699	TP104 - B2	B2 3.00 - 3.00m	42	Bulk Bag	Brown Organic CLAY
55040700	TP106 - B1	B1 1.00 - 1.00m	530	Bulk Bag	PEAT
55040701	TP106 - B2	B2 2.50 - 2.50m	27	Bulk Bag	Brown Sandy CLAY

Certified that the Moisture Content were determined in accordance with BS1377-2: 1990: 3.2

Signed: P. Thomas

Paul Thomas - Field Section Manager
for and on behalf of SOCOTEC UK Limited

Form S23 v8 08/16

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0001

TEST REPORT

Moisture Content

Report No:	**WAM0011630/708/M12**	**Report Date:**	**21 September 2018**
		Our Contract Ref:	51044945
Client:	WARDELL ARMSTRONG LLP	Tested By:	SOCOTEC Warrington
Address:	Sir Henry Doulton House Forge Lane Etruria Stoke On Trent ST1 5BD	Date Sampled:	23 Aug 2018
		Date Received:	24 Aug 2018
Client Contact:	Matthew Bigging	Date Tested:	4 Sep 2018
Site:	Warrington		
		Sampling Certificate:	Not Received
		Samples Submitted by:	Client
		Sampled by:	Client
Method of preparation:	BS1377-1:1990 7.4.2		

Results:

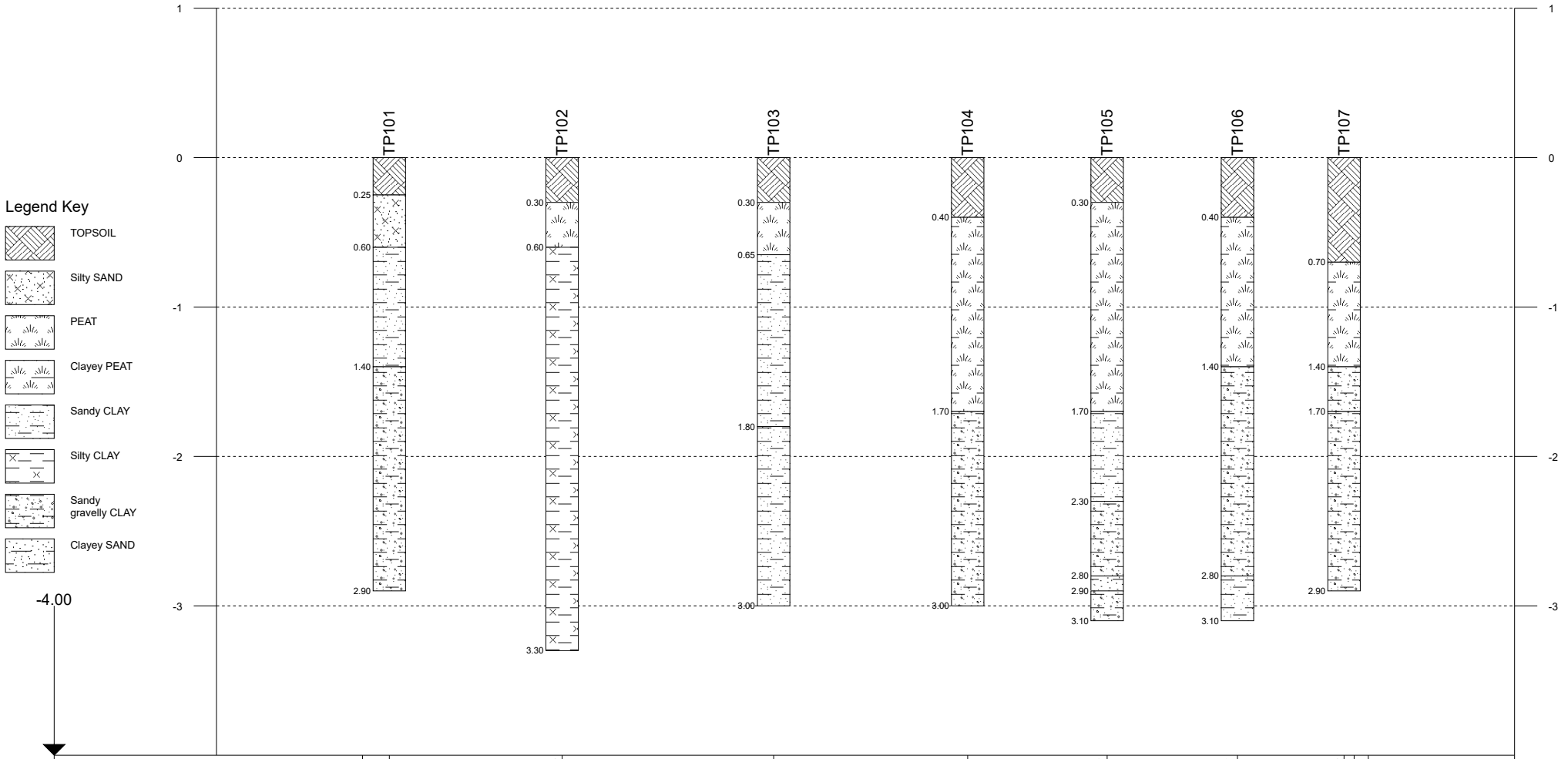
Sample Reference	Clients Reference	Location	Moisture Content(%)	Sample Type	Description
55040702	TP108 - B1	B1 0.50 - 0.50m	108	Bulk Bag	PEAT
55040704	TP109 - B1	B1 1.70 - 1.70m	15	Bulk Bag	Brown CLAY
55040705	TP111 - B1	B1 1.80 - 1.80m	11	Bulk Bag	Brown CLAY
55040707	TP110 -B1	B1 0.40 - 1.60m	524	Bulk Bag	Black PEAT
55040708	TP112 - B1	B1 2.30 - 2.30m	15	Bulk Bag	Brown SAND

Form S23 v8 08/16

APPENDIX IV

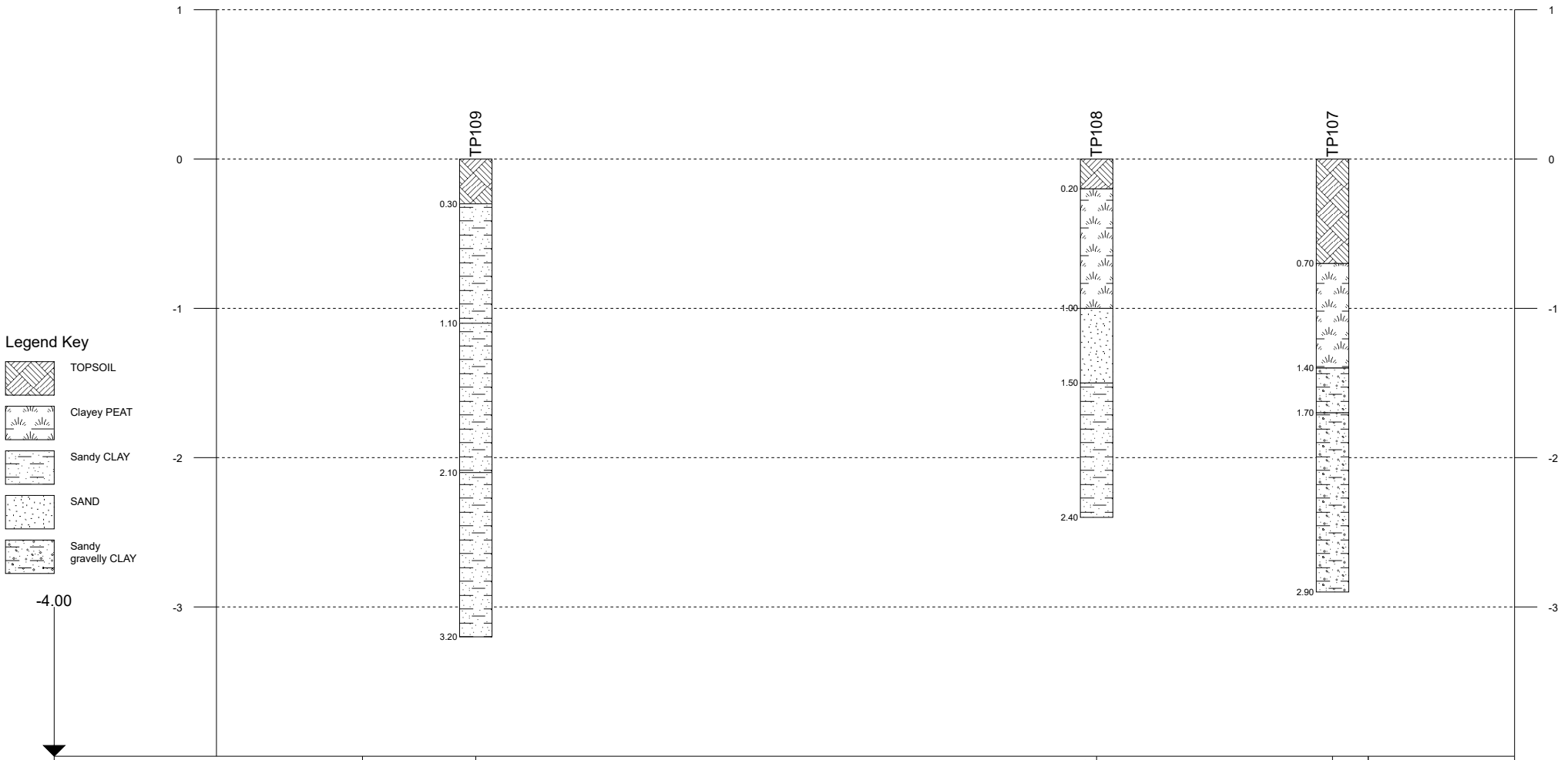
Geological Sections

Project Id: SH11739	Title: Section line 1
Project Title: Warrington MSA	Vertical Scale: 1:39
Location: Warrington	Horizontal Scale: 1:3536
Client: Extra MSA Group	Engineer: WA



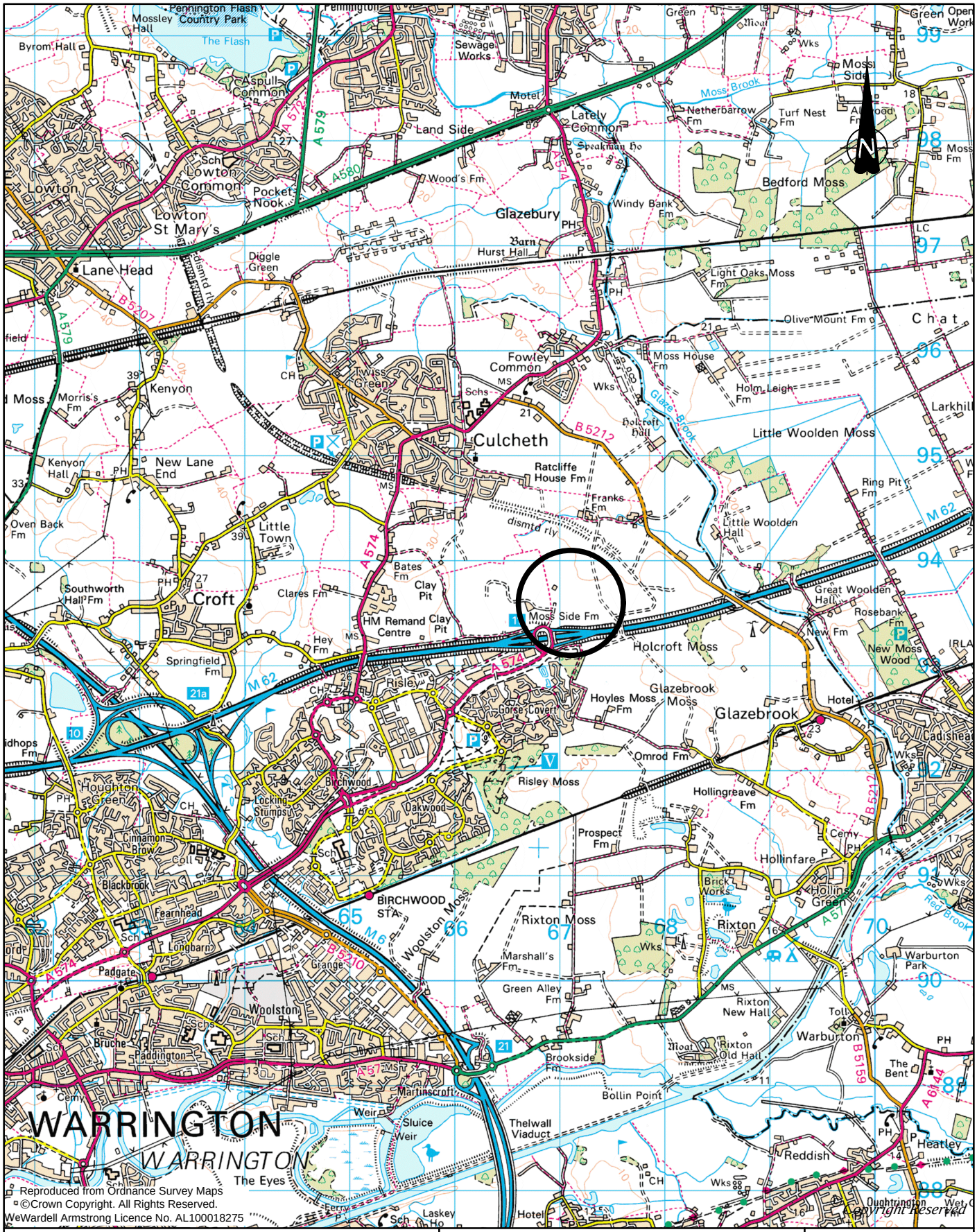
Chainage (m)	0.00	16.29	121.15	249.51	367.26	451.89	530.97	595.65	601.77	610.36
Offset (m)	3.28	9.16	9.32	5.75	2.43	2.33	3.12			
Elevation (mAOD)										

Project Id: SH11739	Title: Section line 2
Project Title: Warrington MSA	Vertical Scale: 1:39
Location: Warrington	Horizontal Scale: 1:1338
Client: Extra MSA Group	Engineer: WA



Chainage (m)	0.00	26.02	168.57	222.74	230.94
Offset (m)	18.58		7.73	0.80	
Elevation (mAOD)					

D R A W I N G S



CLIENT: WARRINGTON MSA, J11 M62 MOTORWAY	DRG No.: SH11739-001		REV: A
PROJECT: POTENTIAL WARRINGTON MSA	SIZE: A4	SCALE: 1:50000 @ A4	DATE: 27/01/16
	DRAWN BY: DP	CHECKED BY: AJD	APPROVED BY: AJD
DRAWING TITLE: SITE LOCATION PLAN			

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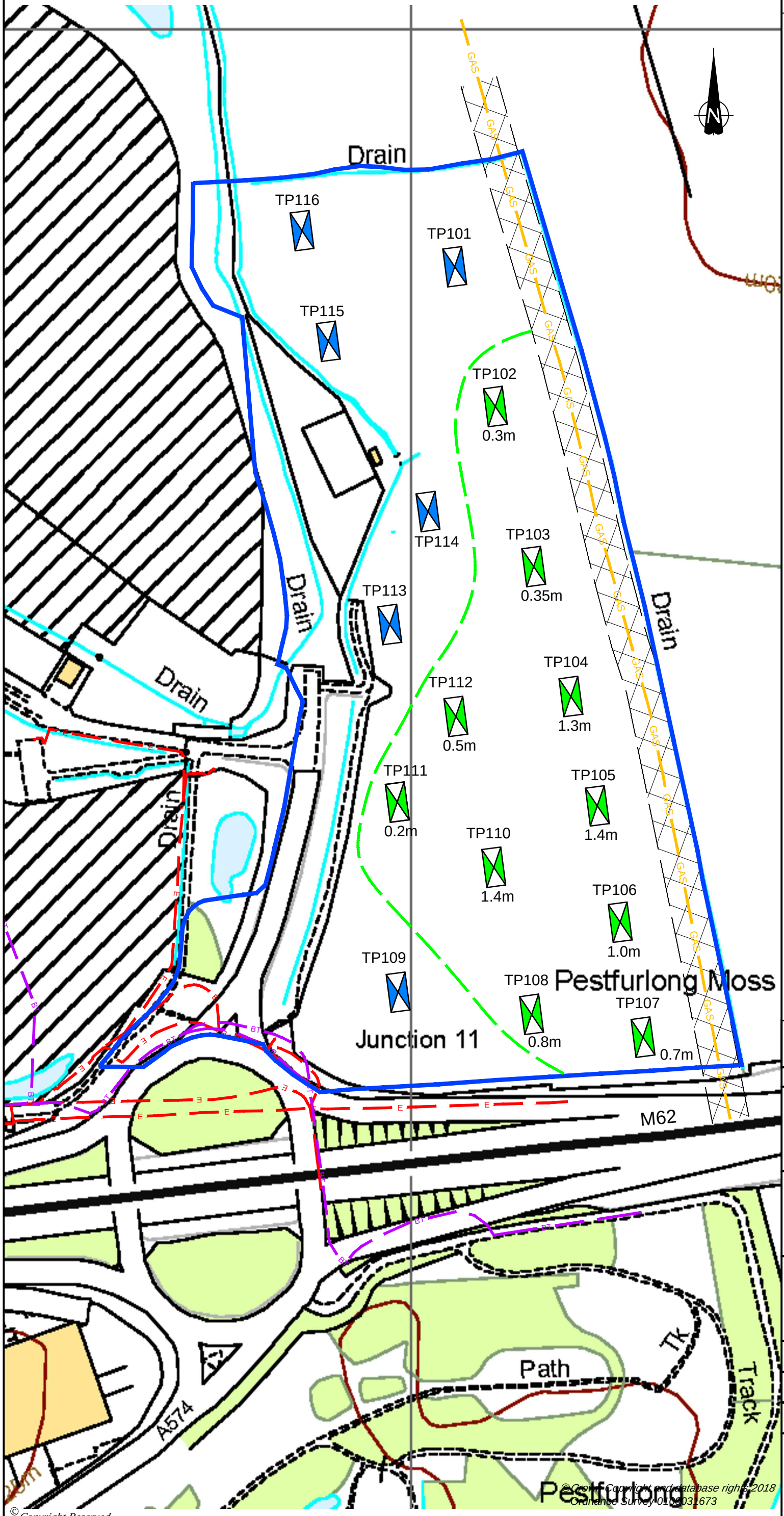
N:\SH\SH11739 - MOTORWAY SERVICES, WARRINGTON\03 - DESIGN\DRAWINGS\SH11739-001 SITE LOCATION PLAN.DWG

DO NOT SCALE FROM THIS DRAWING



REFERENCE

SITE BOUNDARY

APPROXIMATE LOCATION OF GAS PIPELINE WITH 24m WIDE EASEMENT

APPROXIMATE LOCATION OF ELECTRICITY

APPROXIMATE LOCATION OF BT

APPROXIMATE LOCATION OF PROPOSED TRIAL PIT — TP103

APPROXIMATE PEAT BOUNDARY

TRIAL PIT ENCOUNTERING PEAT — TP105, 1.4m

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D
A	FIRST ISSUE	13/12/18	SJB	JAS	AJD

CLIENT

WARRINGTON MSA,
J11 M62 MOTORWAY

PROJECT

POTENTIAL WARRINGTON MSA

DRAWING TITLE

SITE INVESTIGATION PLAN

DRG No.	REV
SH11739-004	A

DRG SIZE	SCALE	DATE
A3	1:2500	08/06/18

DRAWN BY	CHECKED BY	APPROVED BY
DP	JAS	AJD

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N:\SH\SH11739 - MOTORWAY SERVICES, WARRINGTON\03 - DESIGN\DRAWINGS\SH11739-004-A SITE INVESTIGATION PLAN.DWG

DO NOT SCALE FROM THIS DRAWING

REFERENCE

SITE BOUNDARY

APPROXIMATE LOCATION OF GAS PIPELINE WITH 24m WIDE EASEMENT

APPROXIMATE LOCATION OF ELECTRICITY

APPROXIMATE LOCATION OF BT

APPROXIMATE LOCATION OF PROPOSED TRIAL PIT

TP103

APPROXIMATE LOCATION OF SECTION LINE

A A'

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D
A	FIRST ISSUE	13/12/18	SJB	JAS	AJD

CLIENT

WARRINGTON MSA,
J11 M62 MOTORWAY

PROJECT

POTENTIAL WARRINGTON MSA

DRAWING TITLE

GEOLOGICAL SECTION PLAN

DRG No.	REV
SH11739-005	A

DRG SIZE	SCALE	DATE
A3	1:2500	06/09/18

DRAWN BY	CHECKED BY	APPROVED BY
DP	JAS	AJD

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N:\SH\SH11739 - MOTORWAY SERVICES, WARRINGTON\03 - DESIGN\DRAWINGS\SH11739-005-A GEOLOGICAL SECTION PLAN.DWG

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Appendix 1.2 – Preliminary Site Investigation

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ENERGY AND CLIMATE CHANGE
ENVIRONMENT AND SUSTAINABILITY
INFRASTRUCTURE AND UTILITIES
LAND AND PROPERTY
MINING AND MINERAL PROCESSING
MINERAL ESTATES
WASTE RESOURCE MANAGEMENT

EXTRA MSA GROUP

WARRINGTON MSA, J11 M62 MOTORWAY

PRELIMINARY SITE INVESTIGATION

December 2018

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Chapeltown, Sheffield, S35 2PH, United Kingdom
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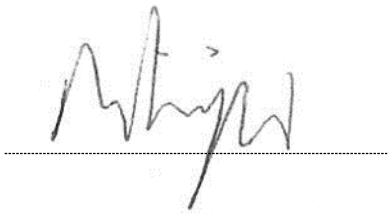
DATE ISSUED:	December 2018
JOB NUMBER:	SH11739
REPORT NUMBER:	RPT-002

EXTRA MSA GROUP

WARRINGTON MSA, J11 M62 MOTORWAY
PRELIMINARY SITE INVESTIGATION

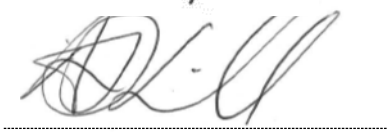
PREPARED BY:

M Biggins Environmental Geologist



REVIEWED AND APPROVED BY:

A J Dunhill Technical Director



DOCUMENT RECORD

Issue No.	Date	Details
1	24 September 2018	First issue
2	14th December 2018	Final

CONTENTS

FIGURES

APPENDICES

DRAWINGS

Drawing No	Title	Scale
SH11739-001	Site Location Plan	1:50,000
SH11739-004	Site Investigation Locations Plan	1:2,500
SH11739-005	Geological Sections Plan	1:2,500

1 EXECUTIVE SUMMARY

1.1 This report is prepared in accordance with instructions from Dennis Enuson of Extra MSA Group. The site is Warrington MSA, J11 M62 Motorway and comprises approximately 12.2 hectares of agricultural land. A summary of pertinent information relating to the site along with a qualitative assessment of the potential risk is provided in Table I.

TABLE I: SUMMARY

Issue	Description
Geological Conditions	The site is shown to be underlain by predominantly cohesive deposits of sandy slightly gravelly clay with a firm strength. The south east of the site is underlain initially by a thickness of peat, up to 1.4m prior to encountering cohesive deposits.
Archaeology	No significant archaeological evidence was encountered. Consideration should be given to the planning requirements for archaeology.
Geotechnical Assessment	The site is proven to have areas of peat, predominantly to the south east up to 1.4m thick. The remainder of the site, and areas underlying the peat deposits are proven to be dominated by cohesive sandy slightly gravelly clay with a firm to stiff strength. This material is likely to be suitable as a founding medium, dependant on the required future loads. Whilst the peat deposits are unlikely to be suitable as a founding medium in current form, the restricted area and depth of peat may allow either excavation of the peat and replacement with suitable fill or alternative engineering solutions such as surcharging to reduce the risk.
Recommended further work	Future site investigations to comply with planning requirements.

1.2 The executive summary forms part of the overall report and should not be considered in isolation.

2 INTRODUCTION

Instructions

2.1 This report is prepared in accordance with instructions from Dennis Enuson of Extra MSA Group dated. This follows a proposal dated 27 September 2017 by Wardell Armstrong.

Site Location

2.2 The site is Land off Junction 11 of them M62, and is located as shown on Drawing SH11739-001 (1:50,000 scale). A more detailed site plan is shown on Drawing SH11739-004 (1:2,500 scale). The site comprises approximately 12.2Ha of open agricultural land and is bounded by further fields to the north and east, the M62 motorway to the south and former Risley landfill to the west. The site is located c. 8.5km to the north east of Warrington city centre.

Figure 1: Aerial Image Showing the Approximate Site Area

Scope and Objectives

2.3 The purpose of this report is to present the findings of an intrusive investigation that was carried out to determine the geological conditions beneath the site. In particular to identify describe, and broadly delineate peat deposits present at the site. In addition, the report aims to provide preliminary geotechnical information of relevance to the proposed use of the site.

Proposed Site Use

2.4 It is proposed that the site is redeveloped for a commercial land use.

3 GEOLOGICAL SETTING

Geology

3.1 The assessment of the geology of the site is based on the published geological mapping sheet (Sheet SJ69SE 1:50,000 scale) supplemented by geological information and borehole logs held by the British Geological Survey.

3.2 Borehole logs available on the BGS website, drilled for the M62 construction and other water wells on site, suggest that up to 3.65m of peat directly underlie the surface, followed by variable depths of stiff glacial till (up to approximately 10m) followed by the Helsby Sandstone which is part of the Sherwood Sandstone group, a major aquifer.

4 SITE INVESTIGATION

Introduction

4.1 A physical site investigation has been carried out to assess the geotechnical nature of the ground. The site investigation comprised of a series of sixteen trial pits across the site area. Locations were positioned to provide a broad coverage of the site. Site investigation locations are shown on Drawing No. SH12191-004 (1:2,500 scale).

Scope

4.2 The investigation was designed as a series of tasks that are summarised below in Table II.

TABLE II: SUMMARY OF TASKS

Task	Summary	Date(s)
Preparatory Work	Setting up site investigation contract, including services enquiries, contractor health & safety document and site meeting with contractor/client.	August 2018
Intrusive site investigation	Excavation of 16 no. trial pits to c. 4.0m bgl	21st – 22nd August 2018
Laboratory analysis	Geotechnical testing in accredited laboratory – 17 bulk soil samples.	August - September 2018

4.3 The investigation was completed in accordance with Construction (Design and Management) (CDM) Regulations 2015 and a site-specific Health & Safety plan. Contractors used during this project include; H&C Plant Hire Ltd. (trial pits) and Socotec (geotechnical analysis).

Archaeological Watching Brief

4.4 Due to the likely presence of peat on the site and previous knowledge of nearby sites it was considered prudent to carry out an archaeological watching brief during the trial pit excavations in order to assess any potential archaeological finds.

Trial Pit Excavations

4.5 Trial pit excavations were completed under the full-time supervision of a Wardell Armstrong engineer. Sixteen trial pits (TP101 – TP116) were excavated to depths of

between 2.3m and 3.3m below ground level (bgl) using a JCB 3CX Sitemaster hydraulic excavator. Excavations beyond these depths were not possible due to reaching the required depth and or limitations of the plant. Locations (see Drawing No. SH11739-004) were positioned to provide widespread coverage of the site.

4.6 Trial pit logs are included at Appendix II.

4.7 During trial pit excavations hand shear vane tests were conducted where possible to determine the undrained (total stress) shear strength and the residual shear strength of the soil profile with depth.

4.8 Trial pits remained stable throughout excavation.

4.9 Trial pit logs are included at Appendix II.

Sampling and Testing

Geotechnical Sampling and Testing

4.10 Seventeen soil samples were taken for geotechnical testing and the testing schedule is summarised below in Table III. Geotechnical Results are attached at Appendix III.

TABLE III: SUMMARY OF GEOTECHNICAL ANALYSIS SCHEDULE	
Geotechnical Test	**Superficial Deposits**
Natural moisture content	12
Particle size distribution	6
Atterberg limit	7
2.5kg Compaction Testing	4*
* One compaction test could be completed only.	

Quality Assurance and Quality Control

4.11 The soil and groundwater samples were collected, transferred to the laboratory under chain of custody and analysed to ensure traceability and reliability of analytical results. Based on the laboratory QA data, the analytical results are considered acceptable for interpretative use.

Limitations of Site Investigation

4.12 It should be noted that the interpretation of the results of the physical site investigation is based on a limited number of investigation points. The locations and

numbers of the investigation locations were governed by the physical state of the site and the location of known services at the time of the investigation. Although reasonable inferences have been made during the interpretation, it is possible that variances in the thickness, distribution and physical/chemical characteristics of the strata present will exist.

5 RESULTS OF SITE INVESTIGATION

General Site Observations

5.1 The site was observed to be generally flat and slightly elevated above the M62 motorway. The area was divided into areas planted for arable crops and grassland and was noted by the landowner to be wet.

Archaeological Watching Brief

5.2 An archaeological watching brief was undertaken on the 21st and 22nd August 2018 alongside the geotechnical trial pitting.

5.3 A waterlogged deposit containing organic material was observed to be present in trial pits 102 – 108 and 110 – 112 which were all situated in the southeast quadrant of the site. Depths between 0.1m and 1.4m were recorded. The depths increased towards the southeast corner of the area. This is consistent with the area labelled as 'Pestfurlong Moss' on the current Ordnance Survey map. No anthropogenic material was noted within the deposit.

5.4 Artefacts recovered from the surface of the harvested area of the site consisted mostly of 18th and 19th century pottery, including Buckley type coarse red earthenware, Victorian transfer print and some refined white earthenware. Glass, slag and copper alloy were also recovered. Further finds analysis is warranted.

5.5 No other significant archaeological features were encountered during the excavation work.

Ground Conditions

Natural Strata

5.6 Topsoil was encountered across the site to depths of c. 0.3m bgl and varied geographically becoming peat and clay based coincident with underlying strata.

5.7 The natural materials encountered during the intrusive investigation showed a geographical variability across the site. Typically, Peat deposits, of a dominantly pseudo-fibrous nature were encountered in the south east of the site with a thickness varying from 0.3m to 1.4m with increasing distance toward the south east. Peat deposits were generally underlain by sand and firm sandy clay.

5.8 The northern site area was dominated by cohesive deposits comprising sandy clay with a minor component of fine to coarse gravel with a generally rounded angularity.

Lithologies were variable from igneous granite to sedimentary mudstone, shale and red sandstone.

5.9 A summary of the strata beneath the site is shown in Table IV.

TABLE IV: SUMMARY OF STRATA BENEATH THE SITE

Depth to base of strata (mbgl)			Mean Thickness (m)	Typical Description
Max.	Min.	Mean		
0.7	0.2	0.34	0.34	Topsoil
1.7	0.6	0.87	0.74	Peat
3.7*	2.3	2.13	2.10	Superficial Deposits
Not encountered				Rockhead/Bedrock

* Base of strata not always proven.

Observations of contamination

- No visual or olfactory evidence of contamination was identified within the trial pits

Groundwater

5.10 Groundwater was encountered within TP104 at 2.7m bgl with the strike depths recorded in the borehole logs.

6 GEOTECHNICAL RESULTS

Introduction

6.1 Site investigation works have identified up to 1.4m of peat in the south western site area. This is underlain by superficial deposits of sandy slightly gravelly clay, which is also present below topsoil across the remainder of the site.

6.2 In total, seventeen samples of made ground, natural superficial material and rock were collected from various depths and tested for range of geotechnical parameters including:

- Moisture content;
- Particle Size Distribution;
- Atterberg Limits;
- 2.5kg Rammer Compaction;

6.3 All tests were performed in an accredited geotechnical laboratory and in accordance with the appropriate British Standard.

6.4 Compaction tests could only be completed on one sample, the remaining samples comprising peat, could not be tested due to their geotechnical nature, high moisture and high organic content.

Natural Deposits

Particle Size Distribution Test

6.5 Particle Size Distribution tests were performed on nine samples from the natural deposits. The range in quantities of each soil fraction is shown in Table V.

TABLE V: PSD NATURAL DEPOSITS

Soil Fraction	Total Percentage
Cobbles	0
Gravel	2 - 77
Sand	8 - 70
Silt/Clay	3 - 96

Moisture Content

6.6 Seven samples of superficial deposits (excluding peat) were tested for natural moisture content, results varied between 11% and 27%. One sample was noted to have a higher moisture content of 42% and was described as organic, indicating a potential mix of peat into the sample resulting in a higher moisture content.

6.7 Five peat samples tested for moisture content reported moisture contents between 108 and 591%. One sample was described by the laboratory as brown sandy clay, however based on the moisture content of 591% it is interpreted the laboratory description is incorrect.

Atterberg Limits

6.8 Six samples from the superficial natural deposits (excluding peat) were tested for determination of liquid and plastic limits. The results determined low to intermediate plasticity material with a plasticity index (PI) ranging between 17% (TP113) and 20% (TP103). One sample (TP111) reported a non-plastic determination.

6.9 Two samples of peat were tested for determination of liquid and plastic limit with one sample reporting a plasticity index (PI) of 76% and the second sample determined as non-plastic result.

Compaction (2.5kg Rammer)

6.10 One sample of material representing natural clay deposits was subjected to the 2.5kg rammer compaction test. As a result of that testing, a maximum dry density of 1.63 and an optimum moisture content of 23.5% were reported. The 95% of maximum dry density value has been plotted on the compaction curve and resulted in two moisture content values that delimit moisture content range of 17.25% to 27.25% at which the material is likely to be suitable for compaction. Consideration should be given to the required air voids where re-compaction works are to take place.

6.11 Peat samples were unable to be adequately tested for compaction parameters.

Rockhead

6.12 Rockhead was not encountered in any of the trial pits.

7 CONCLUSIONS AND RECOMMNEDATIONS

General

7.1 A brief examination of freely available historic maps confirm that there has been no built development on the site other than Pestfurlong Moss Farm which was present to the west of the site in 1893 and was not present after 1963.

7.2 A total of 16 trial pits (to approximately 3.7m maximum depth) were completed as part of this preliminary investigation. Observations from the intrusive work have confirmed the presence of topsoil, peat, sands and clays over the majority of the site. The location of peat within the site is shown on geological sections in appendix IV and on drawing SH11739-004. Bedrock was not encountered during the investigation.

7.3 Seventeen soil samples from across the site were tested for geotechnical parameters.

7.4 At this stage no contamination testing has been carried out on soil samples and the extent of any contamination at the site is unknown. However, given the history of the site no significant contamination is expected. Contamination testing of soils is likely to be required as part of any future planning process. This should be taken into account in the Health and Safety plan under the CDM regulations. Where possible any groundworks on site should be designed and planned to minimise the exposure of workers to contaminated soil. Where risks cannot be removed entirely at this planning stage, mitigation measures should be employed and may include the use of personal protective clothing (PPE) including gloves and respiratory facemasks, dust suppression or other methods.

Surface Water and Groundwater

7.5 Groundwater levels encountered at the site show that the groundwater is generally more than 3m below ground level with the exception of trial pit 104 where an inflow was encountered at 2.7m.

7.6 The risk to surface and groundwater from any potential contamination is considered to be low due to the cohesive nature of the superficial deposits and the sites geographical location, the nearest rated surface watercourse, Glaze Brook, being 1500m to the East of the site.

Ground Gas

7.7 No ground gas monitoring has been carried out as part of this investigation. However, given the ground conditions it is likely that concentrations of ground gas may be

present on the site. The proximity of the landfill site may also increase the risk from ground gas. It is likely that monitoring of ground gas will be required as a part of any future planning application and may also result in gas protection measures for buildings a below ground structures.

Coal Mining

7.8 The site is not in an area affected by shallow mining.

Geotechnical and foundation design

7.9 Groundwater levels encountered at the site show that the groundwater is generally more than 3m below ground level with the exception of trial pit 104 where an inflow was encountered at 2.7m.

7.10 Excavations for trial pits largely remained stable for trial pitting purposes. However, it should be anticipated that excavations for the foundations might not remain stable for long periods of time in the areas where weak peat strata are present.

7.11 The clay deposits on the site are likely to be suitable as a founding medium, dependant on the required future loads. The peat deposits on the site are not suitable as a founding stratum and will either require ground improvement or removal and replacement.

7.12 Differential settlement is considered to be a significant risk at the site due to the presence of peat. However, the area and depth of peat may allow either excavation of the peat and replacement with suitable fill or alternative engineering solutions such as surcharging to reduce the risk.

7.13 In circumstances where abnormally heavy loading is to be catered for a piled solution may be appropriate.

Archaeology

7.14 A watching brief was carried out during the trial pit excavations. No artefacts were found to signify significant archaeological interest at the site. Future works should consider involvement of archaeological regulatory bodies during the planning process.

APPENDIX I

Standard Terms and Conditions and Limitations to Reports

STANDARD TERMS AND CONDITIONS AND LIMITATIONS TO REPORTS

This Report is provided for the stated purpose and for the sole use of the client in accordance with the Terms and Conditions of Appointment under which the services were performed. The Report is confidential to the client and no other warranty, expressed or implied, is made as to the professional advice included in the Report or any other services provided by Wardell Armstrong LLP. This Report may not be disclosed by the Client nor relied upon by any other party without the prior and express written agreement of Wardell Armstrong LLP.

The conclusions and recommendations contained in this Report are based upon information provided by others including details supplied by the client and/or professional advisors on the assumption that all relevant information from whom it has been requested and/or supplied is accurate. Information so provided and/or supplied has not been verified independently by Wardell Armstrong LLP, unless otherwise stated in the Report.

The methodology adopted and the sources of information used by Wardell Armstrong LLP in providing the services are outlined in this Report. The work described in this Report is based on the conditions and information as stated at the date the Report was completed. The scope of this Report and the services are accordingly limited by these circumstances. The findings outlined in the Report together with any opinions expressed and recommendations made are considered to be valid and appropriate at the time of preparation and for the specific purpose or purposes intended. .

Wardell Armstrong LLP disclaim any undertaking or obligation to advise any person of any change in any matter affecting the Report which may come or be brought to Wardell Armstrong LLP's attention after the date of the Report. Unless otherwise stated in this Report, the assessments made assume that the sites and facilities will continue to be used for their current purpose without significant changes.

Where any site observations have been carried out, these have been restricted to a level of detail required to meet the stated objectives of the services. The results from any site observations made may vary and further confirmatory work should be made after the issuance of this Report. Wardell Armstrong LLP does not guarantee or warrant any estimates or projections contained in this Report.

APPENDIX II

Trial Pit Logs

wardell armstrong Unit 5 Newton Business Centre Thorncliffe Park Estate Chapeltown Sheffield. S35 2PH	**Trial Pit Log**		TrialPit No **TP101** Sheet 1 of 1
Project Name: Warrington MSA	Project No. SH11739	Co-ords: 367022.04 - 393897.75 Level:	Date 21/08/2018
Location: Warrington		Dimensions (m): Depth 2.90	Scale 1:25
Client: Extra MSA Group			Logged MB

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.25			Soft brown organic sandy silty clay TOPSOIL.
				0.60			Medium dense white brown silty SAND.
				1.40			Firm grey brown mottled sandy CLAY.
	2.50 2.50	B					Soft red brown very sandy slighly gravelly CLAY. Gravel of rounded to subrounded fine to coarse sandstone and mudstone / shale.
				2.90			End of Pit at 2.90m
	3.30						

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Remarks:

Stability:

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Project Name: Warrington MSA	Project No. SH11739	Co-ords: 367054.84 - 393797.98 Level:	Date 21/08/2018
Location: Warrington		Dimensions (m):	Scale 1:25
Client: Extra MSA Group		Depth 3.30	Logged MB

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
							Soft dark brown organic peat TOPSOIL.
				0.30			Soft dark brown organic fibrous PEAT. Wood fragments.
				0.60			Firm grey brown mottled silty CLAY. Rare rootlets and vegetation fragments.
	1.50						
				3.30			End of Pit at 3.30m

Remarks:

Stability:

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Trial Pit Log

TrialPit No
TP103
Sheet 1 of 1

Project Name: Warrington MSA	Project No. SH11739	Co-ords: 367088.19 - 393674.03 Level:	Date 21/08/2018
Location: Warrington		Dimensions (m):	Scale 1:25
Client: Extra MSA Group		Depth 3.00	Logged MB

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Soft dark brown organic peat TOPSOIL.
				0.30			
	0.50	B					Soft orange brown organic fibrous PEAT. Tree stump and numerous wood / vegetation fragments.
				0.65			
							Firm red brown very sandy CLAY.
	1.30						
				1.80			Firm grey brown mottled very sandy CLAY. Occasional pockets of sand and occasional gravel of angular to subrounded fine to coarse mudstone and sandstone.
	3.00	B		3.00			End of Pit at 3.00m

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Remarks:

Stability:

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Trial Pit Log

TrialPit No
TP104
Sheet 1 of 1

Project Name: Warrington MSA	Project No. SH11739	Co-ords: 367115.19 - 393559.36 Level:	Date 21/08/2018
Location: Warrington		Dimensions (m):	Scale 1:25
Client: Extra MSA Group		Depth 3.00	Logged MB

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Soft dark brown black organic peat TOPSOIL.
				0.40			Very soft dark brown clayey pseudo-fibrous PEAT. Numerous decomposing vegetation / woody fragments with intact pieces of wood and bark.
	1.60	B		1.70			Very soft grey very sandy gravelly CLAY. Gravel of subrounded to rounded fine mudstone, sandstone and red sandstone.
▽	3.00	B		3.00			End of Pit at 3.00m

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Remarks:

Stability:

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Trial Pit Log

TrialPit No
TP105
Sheet 1 of 1

Project Name: Warrington MSA	Project No. SH11739	Co-ords: 367133.86 - 393476.75 Level:	Date 22/08/2018
Location: Warrington		Dimensions (m):	Scale 1:25
Client: Extra MSA Group		Depth 3.10	Logged MB

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Soft dark brown sluightly sandy organic peat TOPSOIL.
				0.30			Soft dark brown pseudo-fibrous PEAT. Numerous wood and decomposing vegetation fragments.
				1.70			Soft light grey brown very sandy CLAY. Rare gravel of rounded medium quartzite.
				2.30			Soft red grey very sandy slightly gravelly CLAY. Gravel of subangular to subrounded fine shale, sandstone and quartz.
				2.80			Loose orange red slightly gravelly slightly clayey SAND. Gravel of rounded coarse mudstone and sandstone.
				2.90			Soft red brown slightly gravelly sandy CLAY. Gravel of rounded medium to coarse sandstone. Occasional vegetation fragments and rootlets.
				3.10			End of Pit at 3.10m

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Remarks:

Stability:

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Trial Pit Log

TrialPit No
TP106
Sheet 1 of 1

Project Name: Warrington MSA	Project No. SH11739	Co-ords: 367149.71 - 393399.13 Level:	Date 22/08/2018
Location: Warrington		Dimensions (m):	Scale 1:25
Client: Extra MSA Group		Depth 3.10	Logged MB

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
							Soft dark brown slightly sandy organic peat TOPSOIL.
				0.40			
							Soft dark brown pseudo-fibrous PEAT. Numerous fragments of vegetation and wood.
	1.00	B					
				1.40			
							Soft red grey mottled very sandy slightly gravelly CLAY. Gravel of subangular to rounded medium granite, mudstone and quartzite.
	2.30						
	2.50	B					
				2.80			
							Firm red grey sandy CLAY. Rare gravel of fine rounded quartz.
				3.10			
							End of Pit at 3.10m

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Remarks:

Stability:

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Trial Pit Log

TrialPit No
TP107
Sheet 1 of 1

Project Name: Warrington MSA	Project No. SH11739	Co-ords: 367165.67 - 393336.44 Level:	Date 22/08/2018
Location: Warrington		Dimensions (m):	Scale 1:25
Client: Extra MSA Group		Depth 2.90	Logged MB

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Soft dark brown slightly sandy organic peat TOPSOIL.
				0.70			Soft dark brown pseudo-fibrous PEAT. Numerous fragments of vegetation and wood.
				1.40			Soft to firm light grey sandy slightly gravelly CLAY. Gravel of subangular to angular fine mudstone, sandstone and quartzite.
				1.70			Soft to firm red grey sandy slightly gravelly CLAY. Gravel of subangular to rounded fine mudstone and quartzite.
	2.00						
				2.90			End of Pit at 2.90m

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Remarks:

Stability:

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Trial Pit Log

TrialPit No
TP108
Sheet 1 of 1

Project Name: Warrington MSA	Project No. SH11739	Co-ords: 367111.44 - 393328.29	Date 22/08/2018
Location: Warrington		Dimensions (m):	Scale 1:25
Client: Extra MSA Group		Depth 2.40	Logged MB

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
							Soft dark brown organic peat TOPSOIL.
				0.20			Soft dark brown pseudo-fibrous PEAT. Numerous fragments of vegetation and wood.
	0.50	B					
				1.00			Loose light brown grey SAND.
				1.50			Soft to firm red grey sandy CLAY.
	2.40	B		2.40			End of Pit at 2.40m

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Remarks:

Stability:

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Trial Pit Log

TrialPit No
TP109
Sheet 1 of 1

Project Name: Warrington MSA	Project No. SH11739	Co-ords: 366969.07 - 393355.59 Level:	Date 22/08/2018
Location: Warrington		Dimensions (m):	Scale 1:25
Client: Extra MSA Group		Depth 3.20	Logged MB

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
							Soft dark brown black slightly sandy organic TOPSOIL.
				0.30			Soft to firm grey brown sandy CLAY. Iron staining.
				1.10			Soft grey brown mottled sandy CLAY.
	1.70 1.70	B					
				2.10			Firm to stiff very sandy laminated grey brown CLAY.
				3.20			End of Pit at 3.20m

Remarks:

Stability:

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Trial Pit Log

TrialPit No
TP110
Sheet 1 of 1

Project Name: Warrington MSA	Project No. SH11739	Co-ords: 367047.30 - 393431.13 Level:	Date 22/08/2018
Location: Warrington		Dimensions (m):	Scale 1:25
Client: Extra MSA Group		Depth 2.70	Logged MB

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Soft dark brown black slightly sandy organic peat TOPSOIL.
	0.40 - 1.60	B		0.40			Soft orange brown pseudo-fibrous PEAT. Numerous fragments of vegetation and wood. Tree trunk.
				1.60			Firm grey sandy slightly gravelly CLAY. Gravel of rounded fine to medium shale and sandstone.
	2.00			2.10			Firm red grey laminated sandy CLAY.
	2.70			2.70			End of Pit at 2.70m

Remarks:

Stability:

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Trial Pit Log

TrialPit No **TP111**
Sheet 1 of 1

Project Name: Warrington MSA	Project No. SH11739	Co-ords: 366979.31 - 393494.89 Level:	Date 22/08/2018
Location: Warrington		Dimensions (m): Depth 3.00	Scale 1:25
Client: Extra MSA Group			Logged MB

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.30			Soft dark brown slightly clayey organic TOPSOIL.
				0.55			Soft dark brown pseudo-fibrous PEAT. Numerous fragments of vegetation and wood.
	1.80 1.90	B		2.60			Soft to firm red grey slightly sandy CLAY. Rootlets.
	2.90	B		3.00			Dense brown slightly silty SAND. End of Pit at 3.00m

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Remarks:

Stability:

AGS

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Project Name: Warrington MSA	Project No. SH11739	Co-ords: 367051.61 - 393539.18 Level:	Date 22/08/2018
Location: Warrington		Dimensions (m):	Scale 1:25
Client: Extra MSA Group		Depth 2.30	Logged MB

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.20			Soft dark brown slightly sandy organic TOPSOIL.
				0.70			Soft orange brown pseudo-fibrous PEAT. Numerous fragments of vegetation and wood. Tree trunk.
	2.00						Firm to stiff grey brown mottled sandy silty CLAY. Rare gravel of rounded fine quartz.
	2.30 2.30	B		2.30			End of Pit at 2.30m

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Remarks:

Stability:

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Trial Pit Log

TrialPit No **TP113**
Sheet 1 of 1

Project Name: Warrington MSA	Project No. SH11739	Co-ords: 366990.66 - 393587.78 Level:	Date 21/08/2018
Location: Warrington		Dimensions (m):	Scale 1:25
Client: Extra MSA Group		Depth 2.50	Logged MB

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Soft brown slightly sandy slightly gravelly clay TOPSOIL. Gravel of subrounded to rounded fine to medium sandstone.
				0.30			Loose grey white silty SAND.
				0.60			Firm red brown organic sandy CLAY. Interbeds of sand with rootlets and fragments of vegetation..
				1.10			Firm red brown sandy silty CLAY. Occasional red sandstone gravel.
	1.40			1.50			Firm to stiff friable grey brown mottled sandy slightly gravelly CLAY. Gravel of subrounded fine to medium dark mudstone . Shale and limestone. Rootlets.
	2.50	B		2.50			End of Pit at 2.50m

Remarks:

Stability:

AGS

wardell armstrong Unit 5 Newton Business Centre Thorncliffe Park Estate Chapeltown Sheffield. S35 2PH	**Trial Pit Log**		TrialPit No **TP114** Sheet 1 of 1
Project Name: Warrington MSA	Project No. SH11739	Co-ords: 366990.23 - 393679.33 Level:	Date 21/08/2018
Location: Warrington		Dimensions (m): Depth 3.70	Scale 1:25
Client: Extra MSA Group			Logged MB

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
							Soft dark brown organic slightly sandy silty clay TOPSOIL. Rare sandstone gravel.
				0.40			Medium dense yellow white silty SAND.
				0.60			Firm orange brown organic sandy CLAY. Occasional rootlets and pockets of sand.
				1.10			Firm to stiff grey brown mottled sandy silty CLAY. Occasional gravel of subrounded fine to coarse shale and rare granite. Becoming friable with depth.
	1.30						
				3.30			Soft red brown laminated silty CLAY.
				3.40			Loose orange fine to medium grained SAND.
				3.50			Firm red brown laminated silty CLAY.
	3.70 3.70	B		3.70			End of Pit at 3.70m

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Remarks:

Stability:

AGS

wardell armstrong
Unit 5 Newton Business Centre
Thorncliffe Park Estate
Chapeltown
Sheffield. S35 2PH

Trial Pit Log

TrialPit No
TP115
Sheet 1 of 1

Project Name: Warrington MSA	Project No. SH11739	Co-ords: 366934.43 - 393803.09 Level:	Date 21/08/2018
Location: Warrington		Dimensions (m):	Scale 1:25
Client: Extra MSA Group		Depth 3.20	Logged MB

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.30			Soft dark brown organic slightly sandy silty clay TOPSOIL.
				0.60			Firm yellow brown sandy silty CLAY.
				2.60			Firm grey brown mottled silty CLAY. Occasional gravel of rounded fine to medium shale and weathered red sandstone.
	2.80			3.20			Firm red brown laminated slightly sandy silty CLAY. Rare gravel of rounded to subrounded shale and sandstone.
							End of Pit at 3.20m

1
2
3
4
5

Remarks:

Stability:

AGS

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Sheffield. S35 2PH

Trial Pit Log

TrialPit No
TP116
Sheet 1 of 1

Project Name: Warrington MSA	Project No. SH11739	Co-ords: 366910.81 - 393890.00 Level:	Date 21/08/2018
Location: Warrington		Dimensions (m):	Scale 1:25
Client: Extra MSA Group		Depth 3.00	Logged MB

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Soft brown organic sandy silty clay TOPSOIL.
				0.40			Firm orange brown sandy silty CLAY. Rootlets.
				0.60			Firm grey brown mottled sandy CLAY. Occasional gravel of rounded fine to medium dark mudstone / shale and rootlets.
				1.20			Firm red brown sandy laminated CLAY. Occasional pockets of sand.
	3.00 3.00	B		2.90 3.00			Soft red brown very sandy gravelly CLAY. Gravel of rounded to subrounded medium to coarse quartz, igneous lithology and sandstone. End of Pit at 3.00m

1
2
3
4
5

Remarks:

Stability:

AGS

APPENDIX III

Geotechnical Laboratory Results

SOCOTEC UK Limited
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paul.thomas@socotec.com

SOCOTEC

UKAS TESTING
0001

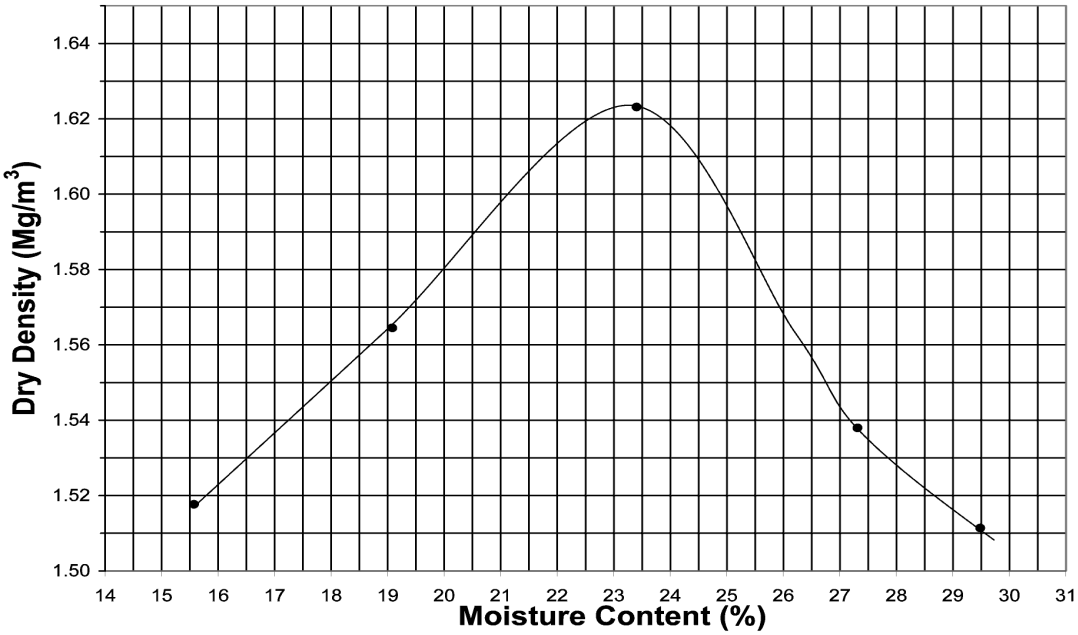
TEST REPORT

Maximum Dry Density and Optimum Moisture Content

Report No:	**WAM0011630/705/S0**	**Report Date:**	**21 September 2018**
		Our Contract Ref:	51044945
Client:	WARDELL ARMSTRONG LLP		
Address:	SIR HENRY DOULTON HOUSE FORGE LANE ETRURIA STOKE ON TRENT ST1 5BD	Sample No.	55040705
		Client Sample Ref:	TP111 - B1
		Date Sampled:	23 Aug 2018
		Date Received:	24 Aug 2018
Client Contact:	Matthew Bigging	Date Tested:	19 Sep 2018
Site:	**Warrington**		
Location:	B1		
Description:	Brown CLAY		
Material Specification:	Not given	Material Supplier:	Not given
Sample Type:	Bulk Bag	Material Source:	Not given
Depth:	1.80 - 1.80	Sampling Certificate:	Not Received
Preparation Method:	BS1377: Part 1:1990 7.6.2 (Natural) & BS 1377-4:1990 3.2.4.1/3.2.6.1	Samples Submitted by:	Client
		Sampled by:	Client

Results :

Number of Samples Used:	Multiple	Amount Retained on 37.5mm sieve (%):	0.0	Prepared to Pass:	20mm
Particle Density (Mg/m³):	Not Required	Amount Retained on 20.0mm sieve (%):	0.0	Method Used:	Neither
		As received Moisture Content (%):	11		



Optimum Moisture Content (%): 23.5 **Maximum Dry Density (Mg/m³):** 1.63

Comments: Air Voids lines not requested by Client

Certified that the test was determined in accordance with BS1377: Part 4 1990: Clause 3.3

Signed: P. Thomas

Paul Thomas - Field Section Manager
for and on behalf of SOCOTEC UK Limited

Form S5 v14 12/16

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SOCOTEC

UKAS TESTING
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TEST REPORT

Plastic Limits

Report No:	**WAM0011630/707/M13**	**Report Date:**	**21 September 2018**
		Our Contract Ref:	51044945
Client:	WARDELL ARMSTRONG LLP	Tested By:	SOCOTEC Warrington
Address:	SIR HENRY DOULTON HOUSE FORGE LANE ETRURIA STOKE ON TRENT ST1 5BD	Date Sampled:	23 Aug 18
		Date Received:	24 Aug 18
Client Contact:	Matthew Bigging	Date Tested:	13 Sep 18
Site:	Warrington		
		Sample Type:	BULK BAG
		Sampling Cert Received:	No
		Samples Submitted by:	Client
Method of preparation:	BS1377-2:1990 4.2.3	Sampled by:	Client

Results:

Sample Reference	Client's Ref	Location	Description	Moisture Content (%)	Plastic Limit	% Passing 425 µm
55040706	TP111 - B2	** Error **	Red/Brown Sandy CLAY, Occ Gravel	N/A	Non Plastic	81
55040707	TP110 -B1	** Error **	Black PEAT	524	Non Plastic	80

As Received, Coarse particles removed by hand prior to test
*** Washed over 425µm BS Test Sieve**

Certified that the Plastic Limits were determined in accordance with BS1377-2: 1990 Clause 5.0
Certified that the Moisture Content was determined in accordance with BS1377-2: 1990: 3.2
Method of Preparation: BS 1377-1:1990 7.4.3 & BS1377-2:1990 4.2.3/4.2.4

Signed: P. Thomas

Paul Thomas - Field Section Manager
for and on behalf of SOCOTEC UK Limited

Form S1 v9 7/06

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SOCOTEC

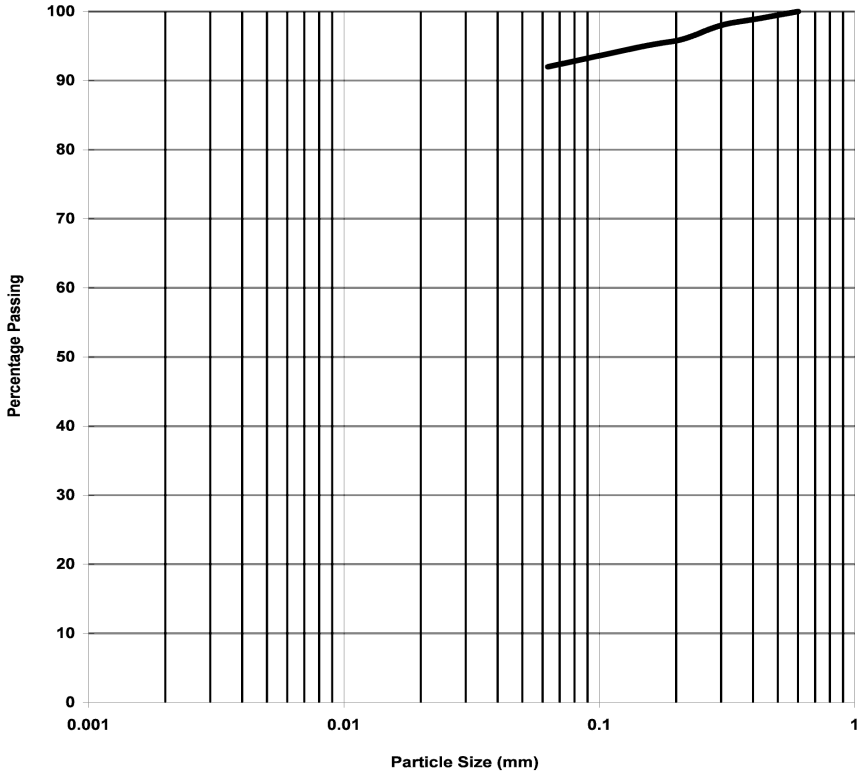
UKAS TESTING
0001

TEST REPORT

Particle Size Distribution

Report No:	**WAM0011630/693/M14**	**Report Date:**	**21 September 2018**
Client:	WARDELL ARMSTRONG LLP	Contract No:	51044945
Address:	SIR HENRY DOULTON HOUSE FORGE LANE ETRURIA STOKE ON TRENT ST1 5BD	Tested By:	SOCOTEC Warrington
		Sample No.	55040693
		Client Ref:	TP114 - B1
		Sampled by:	Client
Client Contact:	Matthew Bigging	Date Sampled:	23 Aug 2018
Site:	**Warrington**	Date Received:	24 Aug 2018
Samples Location:	B1	Date Tested:	11 Sep 2018
Material Description:	Brown CLAY		
Material Specification:	Not given	Material Supplier:	Not given
Type of Sample:	Bulk Bag	Material Source:	Not given
Preparation method:	BS1377: Part 1: 1990 7.4.5	Sampling Certificate:	Not Received
Moisture Content (%)	**27**		

Results :



Sieve	% Pass	Spec limits	
0.6	100		
0.425	99		
0.3	98		
0.212	96		
0.15	95		
0.063	92		

Remarks: **Uniformity Coefficient: N/A**

Certified that the Particle Size Distribution was determined in accordance with BS 1377-2 : 1990 : 9.2

Method of Preparation: BS 1377-1:1990 7.4.5
Certified that the Moisture Content was determined in accordance with BS1377-2: 1990: 3.2

Signed:

P. Thomas

Paul Thomas - Field Section Manager

for and on behalf of SOCOTEC UK Limited

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SOCOTEC

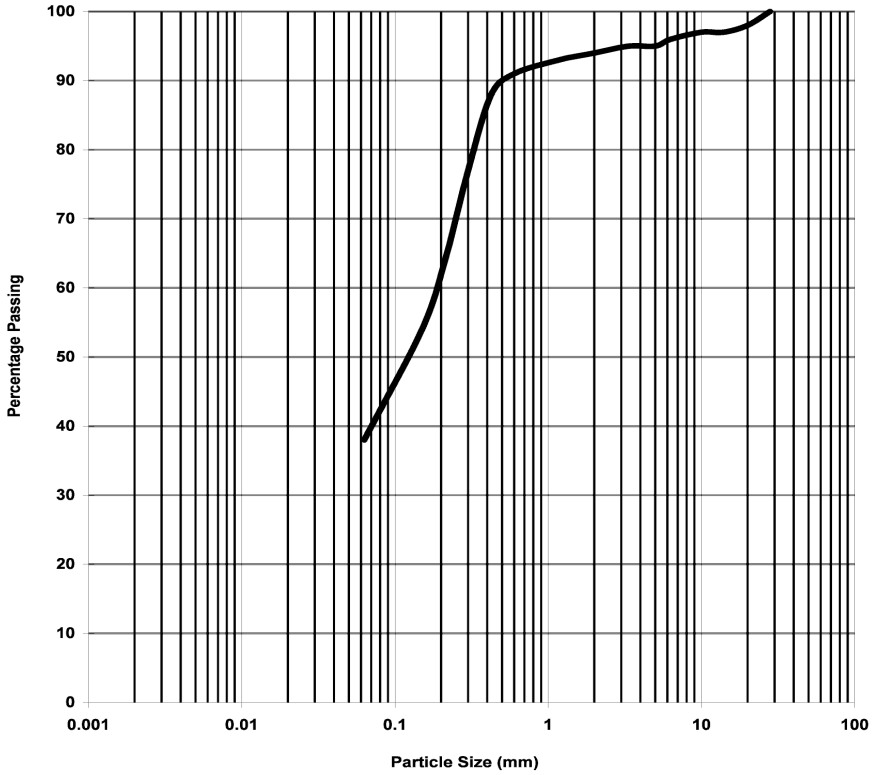
UKAS TESTING
0001

TEST REPORT

Particle Size Distribution

Report No:	**WAM0011630/695/M14**	**Report Date:**	**21 September 2018**
Client:	WARDELL ARMSTRONG LLP	Contract No:	51044945
Address:	SIR HENRY DOULTON HOUSE FORGE LANE ETRURIA STOKE ON TRENT ST1 5BD	Tested By:	SOCOTEC Warrington
		Sample No.	55040695
		Client Ref:	TP101 -B1
		Sampled by:	Client
Client Contact:	Matthew Bigging	Date Sampled:	23 Aug 2018
Site:	**Warrington**	Date Received:	24 Aug 2018
Samples Location:	B1	Date Tested:	11 Sep 2018
Material Description:	Brown Sandy CLAY & Gravel		
Material Specification:	Not given	Material Supplier:	Not given
Type of Sample:	Bulk Bag	Material Source:	Not given
Preparation method:	BS1377: Part 1: 1990 7.4.5	Sampling Certificate:	Not Received
Moisture Content (%)	**14**		

Results :



Sieve	% Pass	Spec limits	
28	100		
20	98		
14	97		
10	97		
6.3	96		
5	95		
3.35	95		
2	94		
1.18	93		
0.6	91		
0.425	88		
0.3	77		
0.212	64		
0.15	54		
0.063	38		

Remarks:

Uniformity Coefficient: N/A

Certified that the Particle Size Distribution was determined in accordance with BS 1377-2 : 1990 : 9.2

Method of Preparation: BS 1377-1:1990 7.4.5
Certified that the Moisture Content was determined in accordance with BS1377-2: 1990: 3.2

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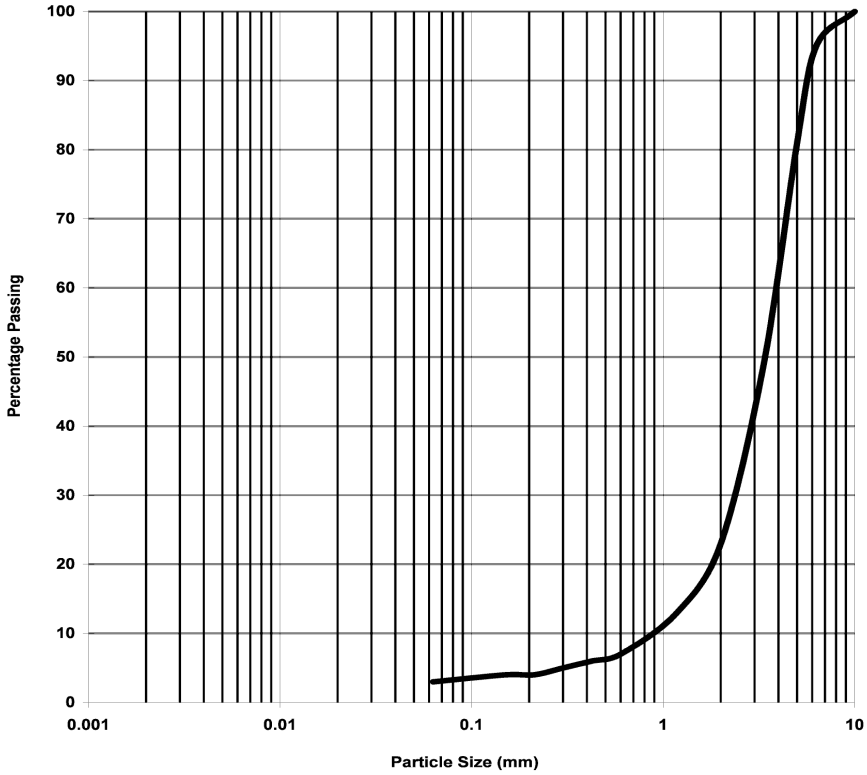
TEST REPORT

Particle Size Distribution

Report No:	**WAM0011630/698/M14**	**Report Date:**	**21 September 2018**
Client:	WARDELL ARMSTRONG LLP	Contract No:	51044945
Address:	SIR HENRY DOULTON HOUSE FORGE LANE ETRURIA STOKE ON TRENT ST1 5BD	Tested By:	SOCOTEC Warrington
		Sample No.	55040698
		Client Ref:	TP104 -B1
		Sampled by:	Client
Client Contact:	Matthew Bigging	Date Sampled:	23 Aug 2018
Site:	**Warrington**	Date Received:	24 Aug 2018
Samples Location:	B1	Date Tested:	11 Sep 2018
Material Description:	Brown Sandy GRAVEL		
Material Specification:	Not given	Material Supplier:	Not given
Type of Sample:	Bulk Bag	Material Source:	Not given
Preparation method:	BS1377: Part 1: 1990 7.4.5	Sampling Certificate:	Not Received
Moisture Content (%)	**591**		

Results :



Sieve	% Pass	Spec limits	
10	100		
6.3	95		
5	81		
3.35	49		
2	23		
1.18	13		
0.6	7		
0.425	6		
0.3	5		
0.212	4		
0.15	4		
0.063	3		

Remarks: **Uniformity Coefficient: 4.4**

Certified that the Particle Size Distribution was determined in accordance with BS 1377-2 : 1990 : 9.2
Uniformity Coefficient carried out in accordance to BS EN ISO 14688-2 2004
Method of Preparation: BS 1377-1:1990 7.4.5
Certified that the Moisture Content was determined in accordance with BS1377-2: 1990: 3.2

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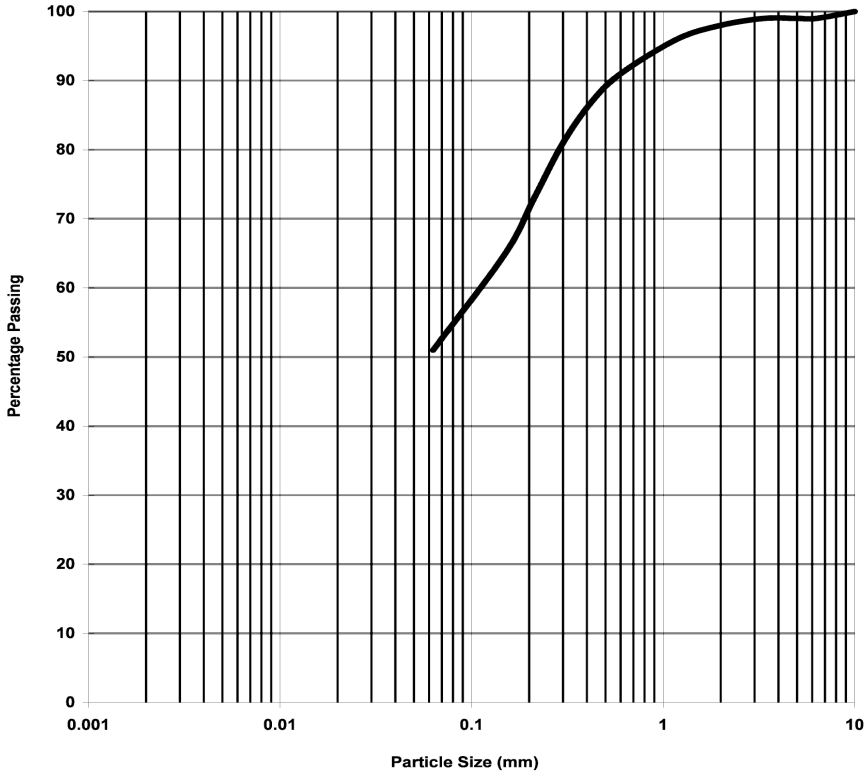
TEST REPORT

Particle Size Distribution

Report No:	**WAM0011630/701/M14**	**Report Date:**	**21 September 2018**
Client:	WARDELL ARMSTRONG LLP	Contract No:	51044945
Address:	SIR HENRY DOULTON HOUSE FORGE LANE ETRURIA STOKE ON TRENT ST1 5BD	Tested By:	SOCOTEC Warrington
		Sample No.	55040701
		Client Ref:	TP106 - B2
		Sampled by:	Client
Client Contact:	Matthew Bigging	Date Sampled:	23 Aug 2018
Site:	**Warrington**	Date Received:	24 Aug 2018
Samples Location:	B2	Date Tested:	11 Sep 2018
Material Description:	Brown Sandy CLAY		
Material Specification:	Not given	Material Supplier:	Not given
Type of Sample:	Bulk Bag	Material Source:	Not given
Preparation method:	BS1377: Part 1: 1990 7.4.5	Sampling Certificate:	Not Received
Moisture Content (%)	**27**		

Results :



Sieve	% Pass	Spec limits	
10	100		
6.3	99		
5	99		
3.35	99		
2	98		
1.18	96		
0.6	91		
0.425	87		
0.3	81		
0.212	73		
0.15	65		
0.063	51		

Remarks:

Uniformity Coefficient: N/A

Certified that the Particle Size Distribution was determined in accordance with BS 1377-2 : 1990 : 9.2

Method of Preparation: BS 1377-1:1990 7.4.5
Certified that the Moisture Content was determined in accordance with BS1377-2: 1990: 3.2

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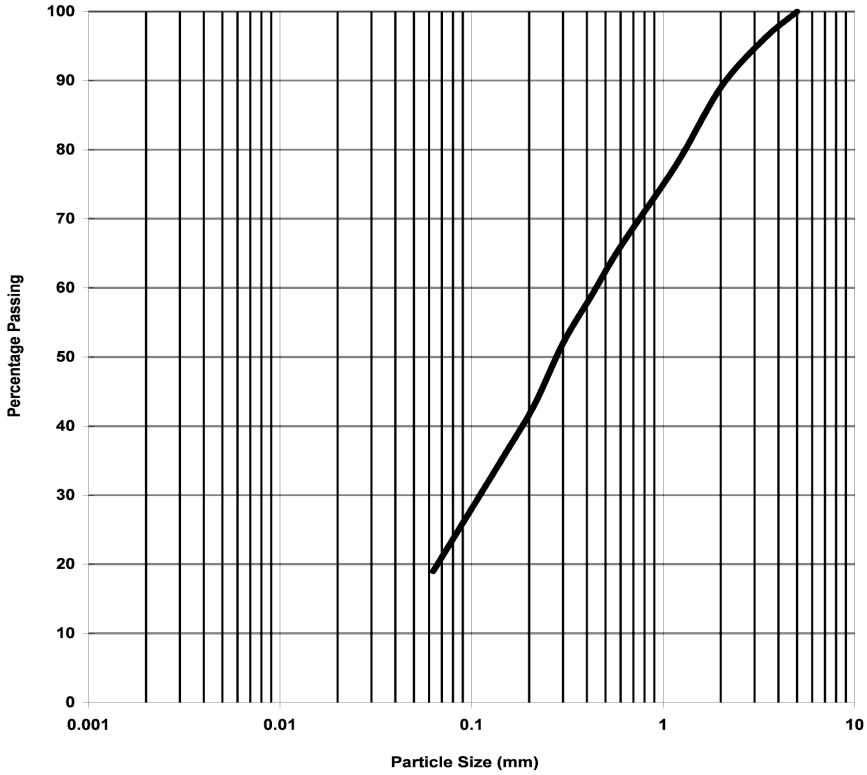
TEST REPORT

Particle Size Distribution

Report No:	**WAM0011630/702/M14**	**Report Date:**	**21 September 2018**
Client:	WARDELL ARMSTRONG LLP	Contract No:	51044945
Address:	SIR HENRY DOULTON HOUSE FORGE LANE ETRURIA STOKE ON TRENT ST1 5BD	Tested By:	SOCOTEC Warrington
		Sample No.	55040702
		Client Ref:	TP108 - B1
		Sampled by:	Client
Client Contact:	Matthew Bigging	Date Sampled:	23 Aug 2018
Site:	**Warrington**	Date Received:	24 Aug 2018
Samples Location:	B1	Date Tested:	11 Sep 2018
Material Description:	PEAT		
Material Specification:	Not given	Material Supplier:	Not given
Type of Sample:	Bulk Bag	Material Source:	Not given
Preparation method:	BS1377: Part 1: 1990 7.4.5	Sampling Certificate:	Not Received
Moisture Content (%)	**108**		

Results :



Sieve	% Pass	Spec limits	
5	100		
3.35	96		
2	89		
1.18	78		
0.6	66		
0.425	59		
0.3	52		
0.212	43		
0.15	36		
0.063	19		

Remarks:

Uniformity Coefficient: N/A

Certified that the Particle Size Distribution was determined in accordance with BS 1377-2 : 1990 : 9.2

Method of Preparation: BS 1377-1:1990 7.4.5
Certified that the Moisture Content was determined in accordance with BS1377-2: 1990: 3.2

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SOCOTEC

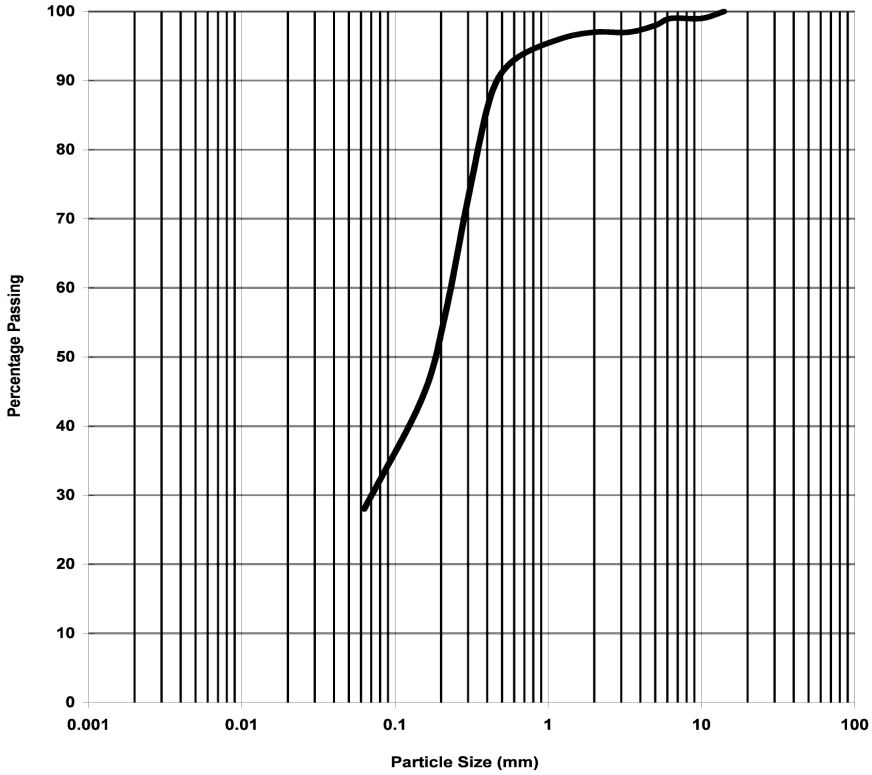
UKAS TESTING
0001

TEST REPORT

Particle Size Distribution

Report No:	**WAM0011630/706/M14**	**Report Date:**	**21 September 2018**
Client:	WARDELL ARMSTRONG LLP	Contract No:	51044945
Address:	SIR HENRY DOULTON HOUSE FORGE LANE ETRURIA STOKE ON TRENT ST1 5BD	Tested By:	SOCOTEC Warrington
		Sample No.	55040706
		Client Ref:	TP111 - B2
		Sampled by:	Client
Client Contact:	Matthew Bigging	Date Sampled:	23 Aug 2018
Site:	**Warrington**	Date Received:	24 Aug 2018
Samples Location:	B2	Date Tested:	11 Sep 2018
Material Description:	Red/Brown Sandy CLAY, Occ Gravel		
Material Specification:	Not given	Material Supplier:	Not given
Type of Sample:	Bulk Bag	Material Source:	Not given
Preparation method:	BS1377: Part 1: 1990 7.4.5	Sampling Certificate:	Not Received
Moisture Content (%)	**11**		

Results :



Sieve	% Pass	Spec limits	
14	100		
10	99		
6.3	99		
5	98		
3.35	97		
2	97		
1.18	96		
0.6	93		
0.425	88		
0.3	73		
0.212	56		
0.15	44		
0.063	28		

Remarks:

Uniformity Coefficient: N/A

Certified that the Particle Size Distribution was determined in accordance with BS 1377-2 : 1990 : 9.2

Method of Preparation: BS 1377-1:1990 7.4.5
Certified that the Moisture Content was determined in accordance with BS1377-2: 1990: 3.2

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for and on behalf of SOCOTEC UK Limited

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SOCOTEC

UKAS TESTING
0001

TEST REPORT

Liquid and Plastic Limits and Plasticity Indices

Report No: **WAM0011630/703/M6**

Report Date: **21 September 2018**

Our Contract Ref: 51044945

Client: WARDELL ARMSTRONG LLP

Tested By: SOCOTEC Warrington

Address: SIR HENRY DOULTON HOUSE
FORGE LANE
ETRURIA
STOKE ON TRENT
ST1 5BD

Date Sampled: 23 Aug 2018

Date Received: 24 Aug 2018

Client Contact: Matthew Bigging

Date Tested: 13 Sep 2018

Site: Warrington

Sample Type: BULK BAG

Sampling Certificate: Not Received

Samples Submitted by: Client

Method of preparation: BS1377-1:1990 7.4.3 & BS 1377-2:1990 4.2

Sampled by: Client

Results:

Sample Reference	Client's Ref	Location	Description	Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	% Passing on 425 µm
55040692	TP113 -B1	B1 2.50 - 2.50	Dark Brown CLAY, Occ Sand & Gravel	N/A	32	17	15	**92
55040694	TP116 - B1	Soft red brown CLAY, occ sand and f-m gravel 3.00 -	Red/Brown CLAY, Occ Sand & Gravel	N/A	26	20	6	**93
55040697	TP103-B2	B2 3.00 - 3.00	Brown/Grey CLAY	N/A	39	19	20	**95
55040702	TP108 - B1	B1 0.50 - 0.50	PEAT	108	132	56	76	**83
55040703	TP108 - B2	B2 2.40 - 2.40	Brown/Grey CLAY, Occ Sand & Gravel	N/A	25	16	9	**94

*** Washed over 425µm BS Test Sieve**
**** As received, coarse particles removed by hand prior to test**

Comments:

Actual % passing 425µm BS Test Sieve from separate grading analysisEstimated % passing 425µm BS Test Sieve

Certified that the Liquid and Plastic Limits and Plasticity Indices were determined in accordance with BS1377-2: 1990 Clauses 4.4, 5.0 and 5.4 respectively
Certified that the Moisture Content was determined in accordance with BS1377-2: 1990: 3.2

Signed:

P. Thomas

Paul Thomas - Field Section Manager

for and on behalf of SOCOTEC UK Limited

Form S1 v9 7/06

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SOCOTEC

UKAS TESTING
0001

TEST REPORT

Moisture Content

Report No: **WAM0011630/708/M12**

Report Date: **21 September 2018**

Our Contract Ref: 51044945

Client: WARDELL ARMSTRONG LLP

Tested By: SOCOTEC Warrington

Address: Sir Henry Doulton House
Forge Lane
Etruria
Stoke On Trent
ST1 5BD

Date Sampled: 23 Aug 2018

Date Received: 24 Aug 2018

Client Contact: Matthew Bigging

Date Tested: 4 Sep 2018

Site: Warrington

Sampling Certificate: Not Received

Samples Submitted by: Client

Sampled by: Client

Method of preparation: BS1377-1:1990 7.4.2

Results:

Sample Reference	Clients Reference	Location	Moisture Content(%)	Sample Type	Description
55040693	TP114 - B1	B1 3.70 - 3.70m	27	Bulk Bag	Brown CLAY
55040695	TP101 -B1	B1 2.50 - 2.50m	14	Bulk Bag	Brown Sandy CLAY & Gravel
55040696	TP103 -B1	B1 0.50 - 0.50m	150	Bulk Bag	PEAT
55040698	TP104 -B1	B1 1.60 - 1.60m	591	Bulk Bag	Brown Sandy GRAVEL
55040699	TP104 - B2	B2 3.00 - 3.00m	42	Bulk Bag	Brown Organic CLAY
55040700	TP106 - B1	B1 1.00 - 1.00m	530	Bulk Bag	PEAT
55040701	TP106 - B2	B2 2.50 - 2.50m	27	Bulk Bag	Brown Sandy CLAY

Certified that the Moisture Content were determined in accordance with BS1377-2: 1990: 3.2

Signed: P. Thomas

Paul Thomas - Field Section Manager
for and on behalf of SOCOTEC UK Limited

Form S23 v8 08/16

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0001

TEST REPORT

Moisture Content

Report No:	**WAM0011630/708/M12**	**Report Date:**	**21 September 2018**
		Our Contract Ref:	51044945
Client:	WARDELL ARMSTRONG LLP	Tested By:	SOCOTEC Warrington
Address:	Sir Henry Doulton House Forge Lane Etruria Stoke On Trent ST1 5BD	Date Sampled:	23 Aug 2018
		Date Received:	24 Aug 2018
Client Contact:	Matthew Bigging	Date Tested:	4 Sep 2018
Site:	Warrington		
		Sampling Certificate:	Not Received
		Samples Submitted by:	Client
		Sampled by:	Client
Method of preparation:	BS1377-1:1990 7.4.2		

Results:

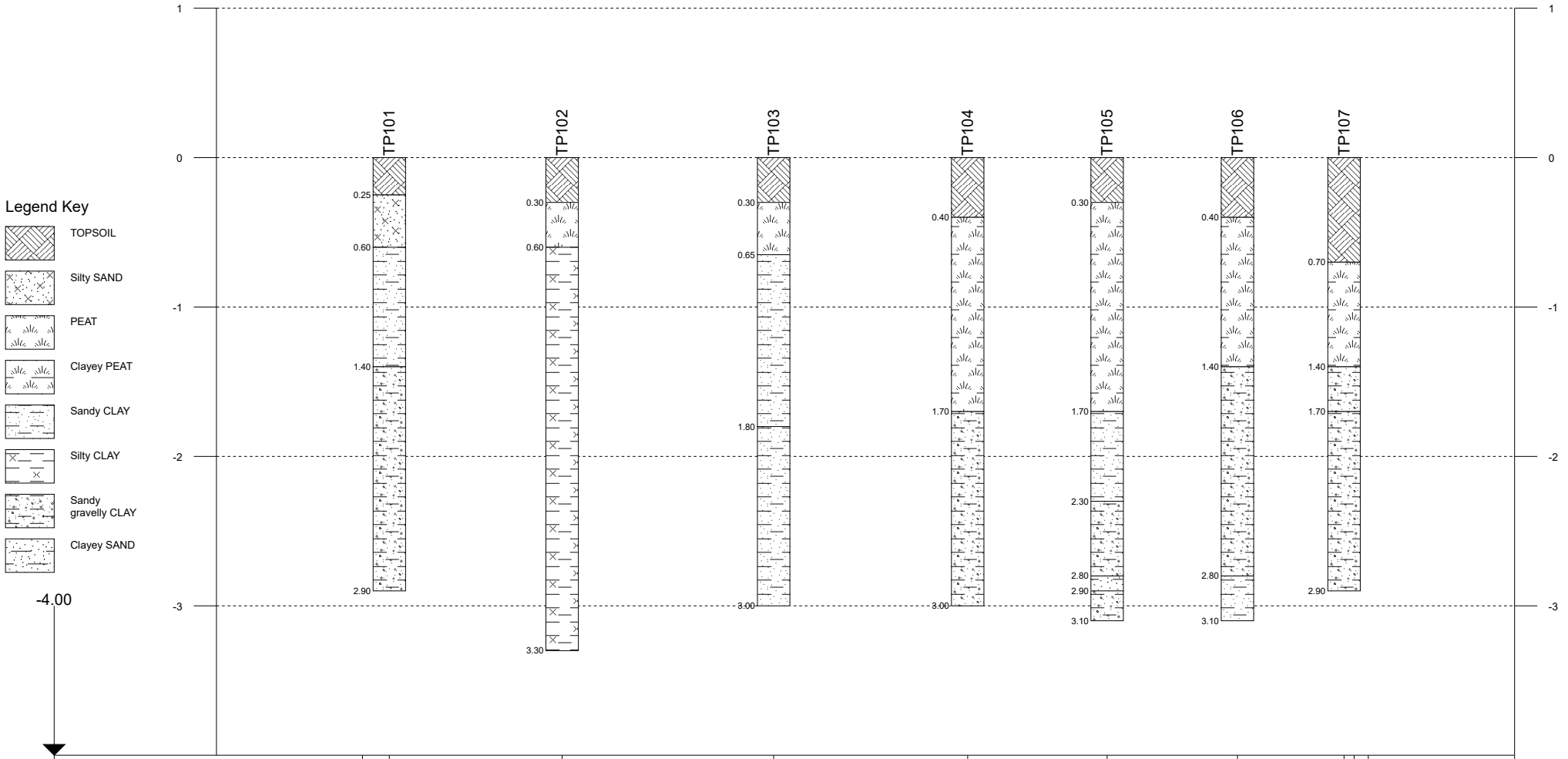
Sample Reference	Clients Reference	Location	Moisture Content(%)	Sample Type	Description
55040702	TP108 - B1	B1 0.50 - 0.50m	108	Bulk Bag	PEAT
55040704	TP109 - B1	B1 1.70 - 1.70m	15	Bulk Bag	Brown CLAY
55040705	TP111 - B1	B1 1.80 - 1.80m	11	Bulk Bag	Brown CLAY
55040707	TP110 -B1	B1 0.40 - 1.60m	524	Bulk Bag	Black PEAT
55040708	TP112 - B1	B1 2.30 - 2.30m	15	Bulk Bag	Brown SAND

Form S23 v8 08/16

APPENDIX IV

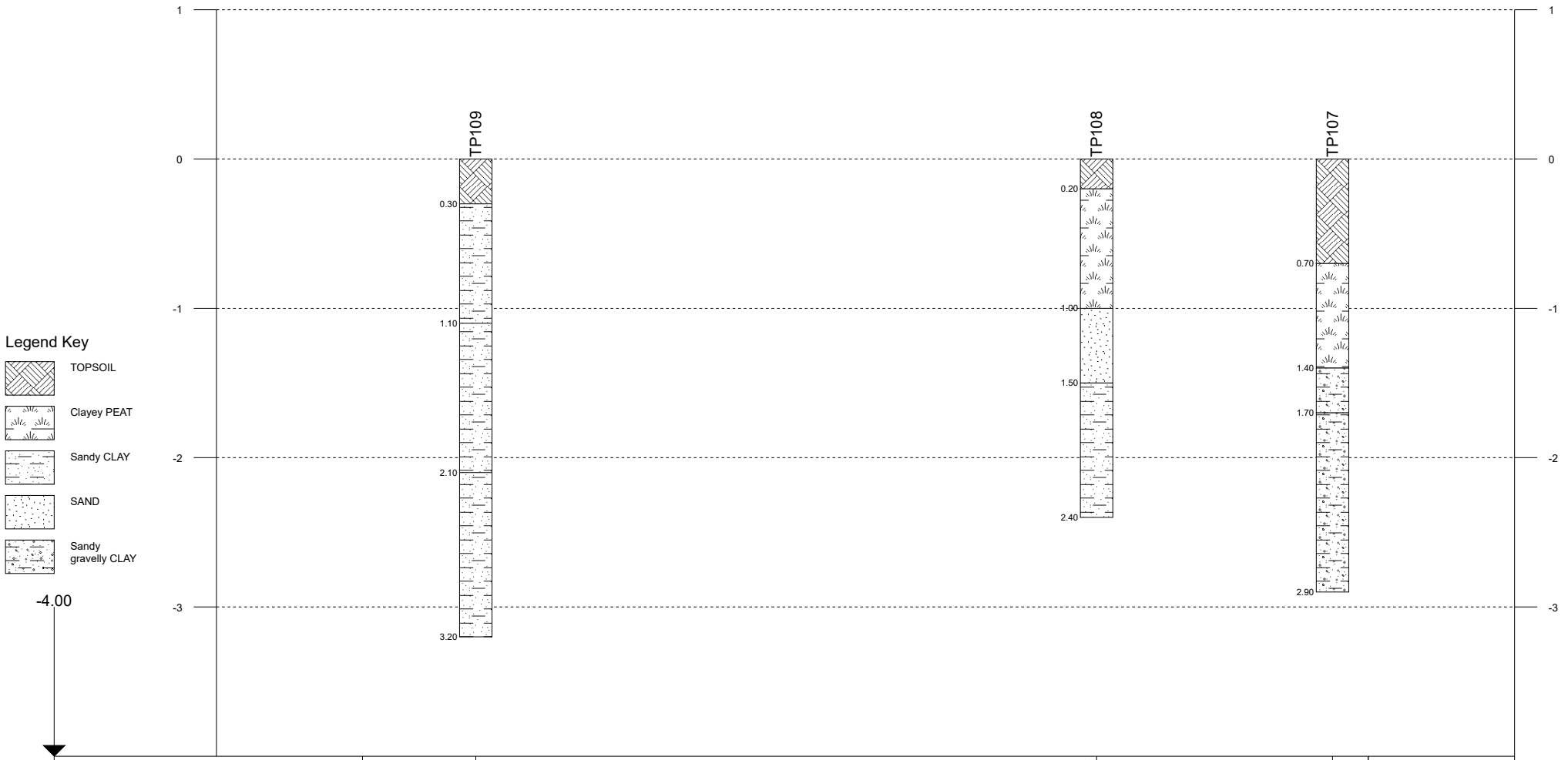
Geological Sections

Project Id: SH11739	Title: Section line 1
Project Title: Warrington MSA	Vertical Scale: 1:39
Location: Warrington	Horizontal Scale: 1:3536
Client: Extra MSA Group	Engineer: WA



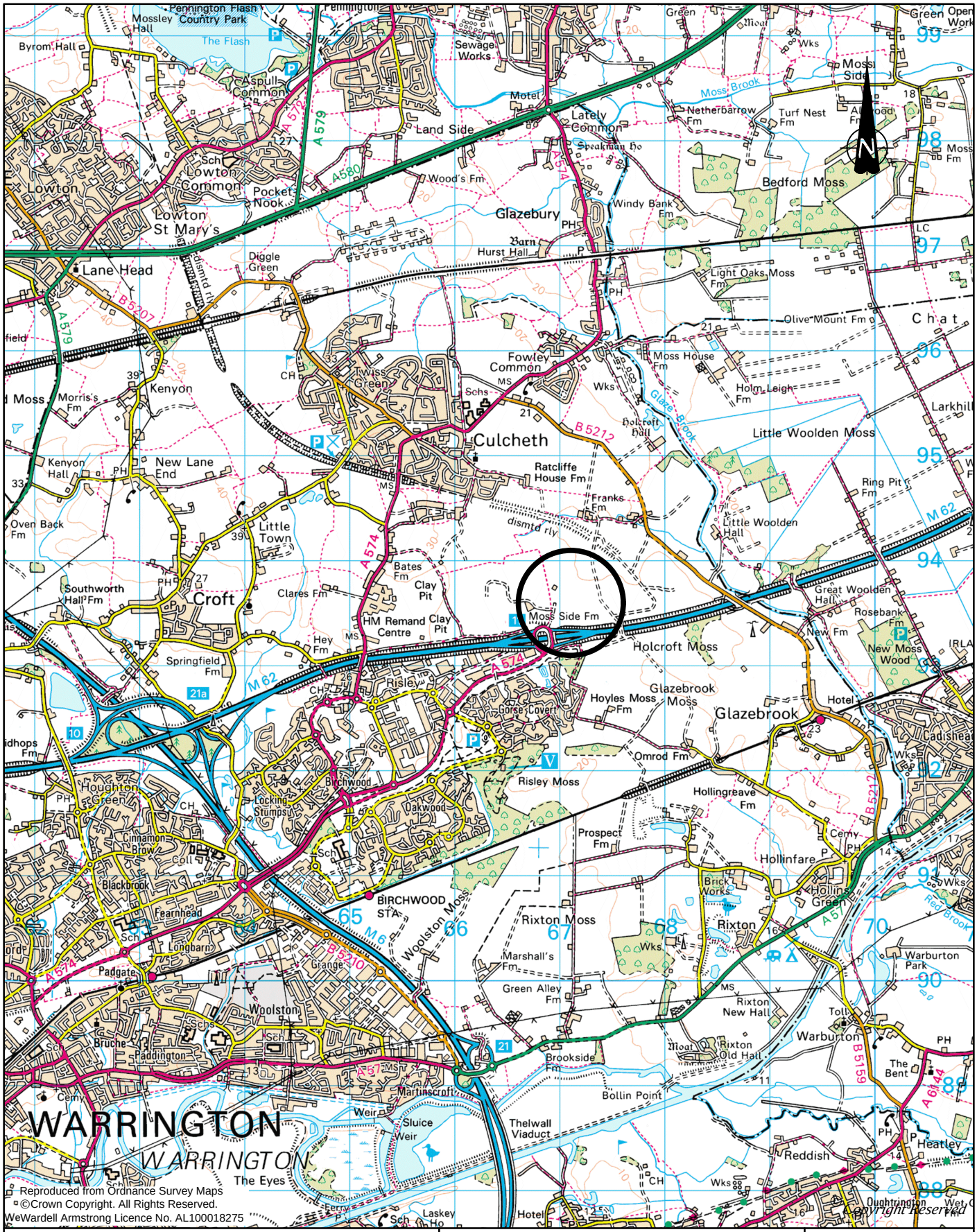
Chainage (m)	0.00	16.29	121.15	249.51	367.26	451.89	530.97	595.65	601.77	610.36
Offset (m)	3.28	9.16	9.32	5.75	2.43	2.33	3.12			
Elevation (mAOD)										

Project Id: SH11739	Title: Section line 2
Project Title: Warrington MSA	Vertical Scale: 1:39
Location: Warrington	Horizontal Scale: 1:1338
Client: Extra MSA Group	Engineer: WA



Chainage (m)	0.00	26.02	168.57	222.74	230.94
Offset (m)	18.58		7.73	0.80	
Elevation (mAOD)					

D R A W I N G S



CLIENT: WARRINGTON MSA, J11 M62 MOTORWAY	DRG No.: SH11739-001		REV: A
PROJECT: POTENTIAL WARRINGTON MSA	SIZE: A4	SCALE: 1:50000 @ A4	DATE: 27/01/16
	DRAWN BY: DP	CHECKED BY: AJD	APPROVED BY: AJD
DRAWING TITLE: SITE LOCATION PLAN			

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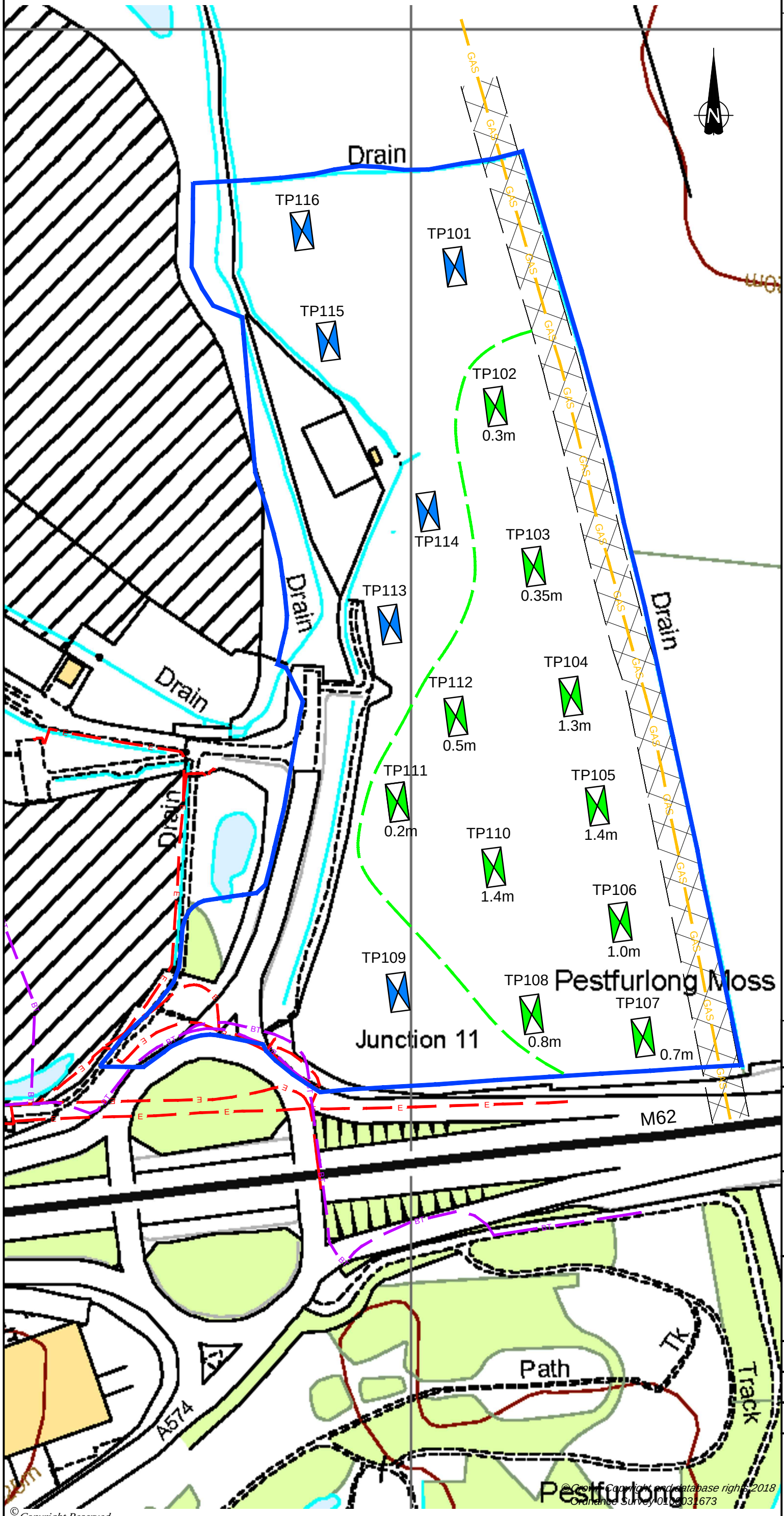
N:\SH\SH11739 - MOTORWAY SERVICES, WARRINGTON\03 - DESIGN\DRAWINGS\SH11739-001 SITE LOCATION PLAN.DWG

DO NOT SCALE FROM THIS DRAWING



REFERENCE

SITE BOUNDARY

APPROXIMATE LOCATION OF GAS PIPELINE WITH 24m WIDE EASEMENT

APPROXIMATE LOCATION OF ELECTRICITY

APPROXIMATE LOCATION OF BT

APPROXIMATE LOCATION OF PROPOSED TRIAL PIT — TP103

APPROXIMATE PEAT BOUNDARY

TRIAL PIT ENCOUNTERING PEAT — TP105, 1.4m

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D
A	FIRST ISSUE	13/12/18	SJB	JAS	AJD

CLIENT

WARRINGTON MSA,
J11 M62 MOTORWAY

PROJECT

POTENTIAL WARRINGTON MSA

DRAWING TITLE

SITE INVESTIGATION PLAN

DRG No.	REV
SH11739-004	A

DRG SIZE	SCALE	DATE
A3	1:2500	08/06/18

DRAWN BY	CHECKED BY	APPROVED BY
DP	JAS	AJD

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N:\SH\SH11739 - MOTORWAY SERVICES, WARRINGTON\03 - DESIGN\DRAWINGS\SH11739-004-A SITE INVESTIGATION PLAN.DWG

DO NOT SCALE FROM THIS DRAWING

REFERENCE

SITE BOUNDARY

APPROXIMATE LOCATION OF GAS PIPELINE WITH 24m WIDE EASEMENT

APPROXIMATE LOCATION OF ELECTRICITY

APPROXIMATE LOCATION OF BT

APPROXIMATE LOCATION OF PROPOSED TRIAL PIT

TP103

APPROXIMATE LOCATION OF SECTION LINE

A A'

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D
A	FIRST ISSUE	13/12/18	SJB	JAS	AJD

CLIENT

WARRINGTON MSA,
J11 M62 MOTORWAY

PROJECT

POTENTIAL WARRINGTON MSA

DRAWING TITLE

GEOLOGICAL SECTION PLAN

DRG No.	REV
SH11739-005	A

DRG SIZE	SCALE	DATE
A3	1:2500	06/09/18

DRAWN BY	CHECKED BY	APPROVED BY
DP	JAS	AJD

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Appendix 1.3 – Deleted Text Table

Warrington Motorway Service Area

J11, M62

ES Addendum

Text Deleted from Original ES Technical Paper - Part 2 – Geology and Ground Conditions

Section Number / Paragraph Number / Table number / Figure Number in Original Paper	Text Deleted from Original ES	Reason
Throughout document	National Planning Policy 2019	NPPF updated in 2021 with revised paragraph numbers
Section 5, paragraph 5.13	the findings of the survey	Grammatical
Section 10, paragraph 10.2	'have been' and 'have been'	Revised to indicate previously agreed position on cumulative developments